

# Φ2.0



## The VAC Phi 2.0 Master Control Triode Preamplifier

### Operation & Maintenance Information



Valve Amplification Company

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## CAUTION

THE PREAMPLIFIER AND POWER SUPPLY CONTAIN NO USER SERVICEABLE PARTS. DO NOT REMOVE THE BOTTOM PLATES OR CHASSIS COVERS. LETHAL VOLTAGES ARE PRESENT WITHIN THE CHASSIS. DO NOT OPERATE THE UNITS IF THEY ARE WET.

VACUUM TUBES BECOME **HOT** ENOUGH TO CAUSE SERIOUS BURNS. NEVER TOUCH A TUBE WHEN THE UNIT IS ON. IT MAY TAKE SEVERAL MINUTES FOR THE TUBES TO COOL DOWN AFTER THE UNIT IS SWITCHED OFF. IT IS STRONGLY RECOMMENDED THAT THE TUBE COVERS BE LEFT IN PLACE AT ALL TIMES.

THE GLASS COVERS WILL BECOME HOT IN NORMAL OPERATION. DO NOT SET OR SPRAY ANYTHING ON THEM.

THE AMPLIFIER AND POWER SUPPLY ARE **HEAVY**. IT IS ADVISABLE TO HAVE ASSISTANCE IN UNPACKING, MOVING, AND SETTING UP. BE SURE TO USE PROPER LIFTING TECHNIQUES TO AVOID BACK STRAIN AND INJURY. BE CERTAIN TO INSTALL IT IN A SECURE LOCATION FROM WHICH IT CAN NOT FALL OR TIP OVER.

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## INTRODUCTION

The Phi Preamplifier is the world's finest audio preamplifier and an absolutely unique component. Its unusual topology, premium parts, and flexibility make it a pleasure to hear and operate.

The line stage is, in effect, a small Class A1 power amplifier, capable of driving loads as low as a few hundred ohms. This is a stark contrast to normal preamplifiers, which claim a low output impedance but completely collapse when asked to deliver current. The Phi circuit is loafing with a normal load in the 10,000 to 200,000 ohm range, delivering an effortless, musical performance.

There is no loop feedback and no coupling capacitors in the line section. All active elements are triode tubes, the purest, most linear amplifying devices yet invented. Output matching is accomplished by way of superb output transformers. As a side benefit, different output grounding configurations are possible, optimizing performance into either balanced or single-ended loads, and allowing ground loops to be broken.

The optional phono stage uses triode tubes operating without loop feedback. Gain is moderately high, with a very low noise floor. Low output MC cartridges are accommodated by means of high quality matching transformers, which contribute voltage gain without noise, resulting in detail that emerges from a remarkably dark and neutral background.

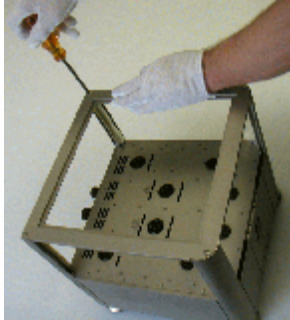
Remote volume control is implemented via a motorized mechanical device. This provides two major advantages. First, the control is completely intuitive to use. Second, we avoid the sound degradation attendant with VCAs, transistor switches, and switched resistor arrays.

The main chassis is machined from thick aluminum. The separate power supply allows e.m.f. fields, switching transients, and mechanical vibration to be isolated from the audio circuits. The high voltage supply dual choke pi filtering for extremely low noise.

The Phi 2.0 is designed not to the latest fad but to substance, for the highest possible sound quality. Time spent familiarizing yourself with this manual will be well rewarded.

## UNPACKING & ASSEMBLY

The Phi 2.0 is shipped with the vacuum tubes and glass covers installed. Should the need ever arise, the following directions illustrate how to install the glass; follow these steps in reverse order to remove the glass.

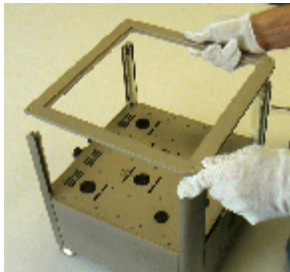


Remove the four screws that secure the aluminum top frame to the chassis pillars using the tool provided. Turn counterclockwise to remove.

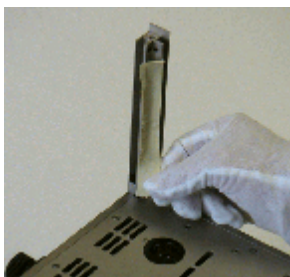


Wear the supplied cotton gloves to minimize the chance of fingerprinting the nickel plated chassis. Wipe any oils off immediately.

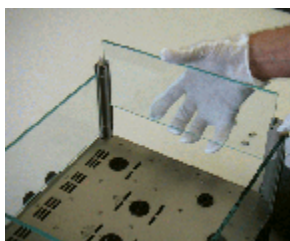
Take care to prevent the tool from scratching the chassis.



Remove the top frame.



From each of the columns remove the tape, which prevented the nylon setscrews from coming loose during shipment.



Slide the side glass plates into the pillars' channels.

The glass will not go all the way to the chassis top, but has a gap at the bottom for air flow.

Take care not to scratch or break the glass.

The front glass has the etched VAC logo. Install this between the front pillars.

Take great care not to scratch this glass.

The front glass fits into a small channel in the front plate.



Tighten the white nylon setscrews that secure the rear glass and side glasses. Turn clockwise to tighten.

There are four setscrews for each glass plate.

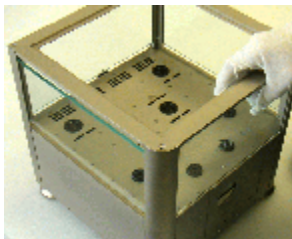
Do not tighten the setscrews for the front glass yet.



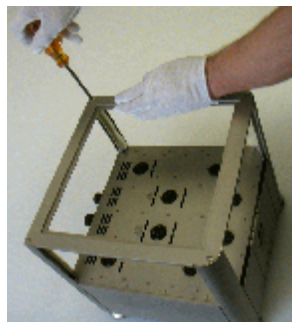
Install the aluminum blocks at the top of the side glasses. If there is a 'dimple' in the block, it should face the outside of the amplifier.



Tighten the metal setscrews that secure each block using the allen key supplied. Turn clockwise to tighten.



Replace the aluminum top frame. Ensure that the front glass fits into the groove in the top frame. Ensure that the top frame sits flush in the pillars.



Replace the four screws that secure the top frame. Turn clockwise to tighten.

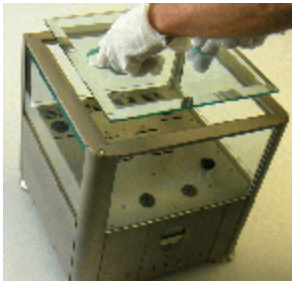
(Note: photo does not show the tubes or glass.)



Tighten the four white nylon setscrews that secure the front glass using the tool provided. Turn clockwise to tighten.

Do not over tighten.

Install the vacuum tubes.



Set the beveled glass top into the aluminum top frame, oriented so that the two holes are on the left and right side.

The glass may be removed from the Phi 2.0 (such as for replacement or for shipment) by following these steps in reverse order.

When loosening the metal and nylon setscrews, be careful not to back them all of the way out of the holes! If a metal screw falls into the amplifier, contact VAC for service directions.



Connect the DC cable from the power supply.

Tighten the two retaining screws.

NOTE: Do not plug the power supply into the wall outlet unless it is connected to the audio chassis.



Connect the iVAC data communications cable to an associated Phi Power Amplifier if appropriate. This allows the preamplifier to control power on, power off, and logo illumination intensity.

Alternatively, the 12 volt trigger outputs may be used to switch on/off some brands of power amplifiers.

## INSTALLATION

- 1) Provide adequate ventilation.
- 2) Do not operate on carpet or any other surface that might block air flow.
- 3) The chassis will become warm in normal use.
- 4) Do not allow the chassis to touch any metal parts, such as the frame of an equipment rack. This might create a parallel ground path that could degrade the sound of your system.
- 5) Input connection is via single ended RCA jacks or XLR jacks (which can be from balanced or unbalanced sources). Output can be on RCA or XLR jacks, and can be set for balanced or unbalanced loads, with or without ground connection at the preamplifier. IMPORTANT: READ THE SECTION ON "OUTPUTS & GROUNDING SWITCH". Connect line level inputs (CD, Tuner, Tape, etc.) to the appropriate RCA input jacks on the rear panel. Note: with the exception of Phono (when fitted), all inputs are "line level"
- 6) Connect phono cables to the rear panel MM and/or MC inputs labeled "Phono" (both may be used in the same system, as they are switched by a control on the front panel). Connect the ground wire(s) from the turntable(s) or phono cable(s) to the "Ground" terminal provided on the rear panel.
- 7) Connect the power cables from the power supply to the preamplifier. Be sure to insert the connector properly, and fully tighten the locking screws.
- 8) Connect the input and output cables.
- 9) Connect the power supply to the power source indicated on the rear panel, either 100, 120, 220, or 240 volts AC. The voltage may be select by means of the removable selector card located underneath the fuse in the power connector; to change, remove the card and reinstall so that the desired voltage may be read. Avoid power conditioners that float the ground pin. ALWAYS connect power cord to component before plugging it into an AC outlet, and make sure that unit's power switch is set to the "off" position before making the final connection. For best performance, try to route the power cord away from signal cables.
- 10) Pay close attention to power quality, and be aware that different power cords can alter the sound. The backlit meter shows variation in power line voltage as reflected to the audio circuitry.

## INPUTS (back panel)

Five pairs of RCA jacks accommodate unbalanced line level sources. These are labeled "IN1" through "IN5".

"IN6" can accept a balanced signal on XLR connectors or an unbalanced line level source via RCA jacks. Set the "IN 6 MODE" switch accordingly.

Note: not all sources with XLR connectors are balanced. Many are unbalanced, with pin 2 or pin 3 tied to ground. The Phi Preamplifier accepts such sources.

The "CINEMA" inputs accept an unbalanced line level source via RCA jacks.

One pair of RCA jacks accommodate the monitor return from a tape deck. If you do not have a tape deck, these jacks can be used as an additional line level input.

Two phono inputs are provided for "MC" and "MM" cartridges. The ground lead from the turntable should be connected to the binding post located by these jacks.

## OUTPUTS & GROUNDING SWITCH (back panel)

One pair of RCA jacks provide line level output to a tape recorder. The level of signal is not adjusted by the volume control.

Two sets of RCA output jacks are provided as main outputs to power amplifiers. In addition, two pair of XLR jacks can be used to drive a power amplifier. The "OUTPUT MODE" switch must be set accordingly.

Do not connect an unbalanced load with "pin 3 hot" to the XLR connectors.



## OPERATION

Turn the "Volume" control fully counterclockwise.

Mute is automatically engaged when switching on the unit.

Allow the preamplifier to warm up for a minute before you un-mute the unit; failure to wait can cause a transient to be sent through your power amplifier that might cause damage to your loudspeakers.

As with all high fidelity products, the sound characteristic of the VAC changes somewhat as it warms up. Best sound will be achieved after about 15 minutes of operation.

Any time that the Phi Preamplifier has not been used for a few weeks the sound may be different. This is also normal for high resolution audio equipment. Optimum sound should return after a few hours of operation, preferably with an audio signal.

Note that although your VAC System has been run for 48 hours at the factory, it will continue to "break in" for approximately 150 hours. Also be aware that many components display the need for a new break in period after being transported in unheated cargo aircraft.

## FUSES

Please note that there are two fuses on the power supply.

One is located behind the clear plastic window of the power connector. For 220 or 240 volt operation, please use a 2.0 ampere fuse. For 100 or 120 volt operation, the fuse should be 4.0 amperes.

The other is in a conventional fuse holder. It should be a 0.3 ampere fuse.

If the unit is converted for operation at a voltage other than 220 volt, the fuse values must be changed. Please consult the factory for more information.

See the INSTALLATION section for information on changing the operating voltage.

## FRONT PANEL CONTROLS

Although most of the front panel controls (Volume, Power, Mute) are self explanatory, VAC has outfitted this unit with several advanced features which bear further description:

**Mute:** Toggles between the "Mute" and "Operate" condition. When muted, the indicator light is illuminated.

**Power:** Turns the unit off and on.

**Phono:** Selects between the MM and MC inputs. Overall phono function is selected with the main Selector switch (phono is one click counterclockwise from "1" or one click clockwise from "6").

The MM input provides 44 dB of gain, suitable for use with MM (moving magnet) and many high-output MC (moving coil) cartridges. The MC input has 64 dB of gain, making it suitable for most low output cartridges. Both MM and MC may be connected in the same system, so that in essence there are two phono inputs.

**Selector:** This switch selects between IN1 through IN6 and the PHONO inputs. Rotate counterclockwise to move down through the inputs, clockwise to move up through the inputs.

**Volume:** Controls the output level for the PHONO input, and any line input set to the "VAR" LEVEL mode.

**Tape:** This switch selects between the signal coming from the main selector (light out) or the signal connected to the "TAPE IN" jacks (light on).

**Cinema:** This switch selects the source connected to the "CINEMA" input jacks.

**Level:** This switch allows any input (except Phono) to be level controlled by the VOLUME control, or to be produced at a SET (fixed) level. To set this function, hold the toggle switch in the direction of the desired setting for five seconds, until the indicator light changes from blinking to solid illumination.

In the VARIABLE mode, the Phi functions like a conventional preamplifier.

The SET mode allows the control of volume to be determined entirely by the source component. This is useful when the Phi 2.0 is being used as an element of a multichannel or home theater system, with the level of all 5.1 channels

being set by the player or the decoder.

Note: The Tape Monitor takes the same setting as the source input. For example, if the SELECTOR is on input #1 and #1 is set up in a SET mode, when you engage the TAPE monitor it will also be in the SET mode, and the VOLUME control will not change the sound level. Conversely, if input #2 is in the VAR mode, then the TAPE monitor will also be in the VAR mode, and the volume control will function. [Therefore, it is suggested that the input be configured to VAR before recording and monitoring is started.](#)

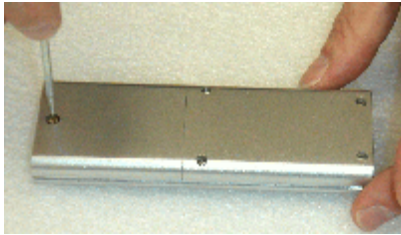
The SET mode may also be used with, for example, a CD player that has its own volume control. In this way, the Phi's volume control is bypassed. Some audiophiles would consider this to be a "hot rod" mode.

Meter: Indicates the operating voltage within the unit. This will vary somewhat due to fluctuations in power line voltage.

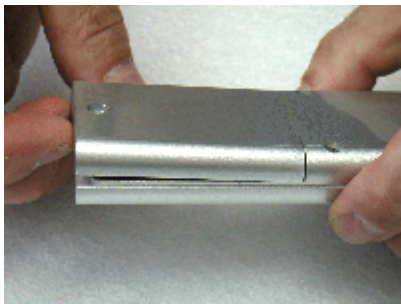
## REMOTE CONTROL

The remote control allows for wireless adjustment of POWER, SELECTOR, TAPE MONITOR, CINEMA, MUTE, and VOLUME.

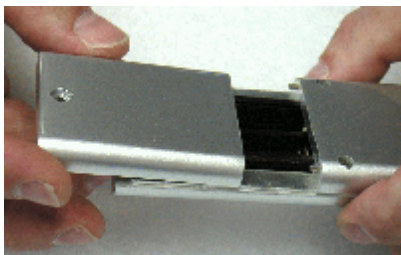
The remote wand is powered by two "AAA" batteries. These should be of the alkaline type. You will need to install them in the wand before using the remote. Since batteries can leak, they should be removed from the wand if it is not going to be used for an extended period of time.



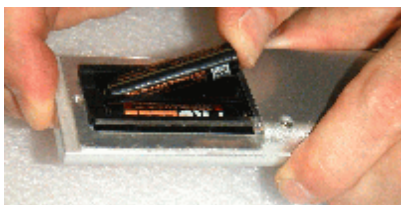
To install or change batteries, first loosen the screw on the back of the remote.



Loosen the battery cover.



Remove the battery cover.



Insert two AAA batteries, observing the polarity diagram inside the battery compartment.

Reassemble the remote control by following these steps in reverse.

## REPLACEMENT OF LOW LEVEL TUBES

Tubes V1L and V1R are 12AX7/ECC83; you may wish to use low noise tested tubes.

Tubes V2L, V2R, V3L, and V3R are 12AX7/ECC83.

Tubes V4L and V4R are type 8416, no substitute types are acceptable.

We strongly recommend that you use only tubes specifically selected and tested by VAC for this application.

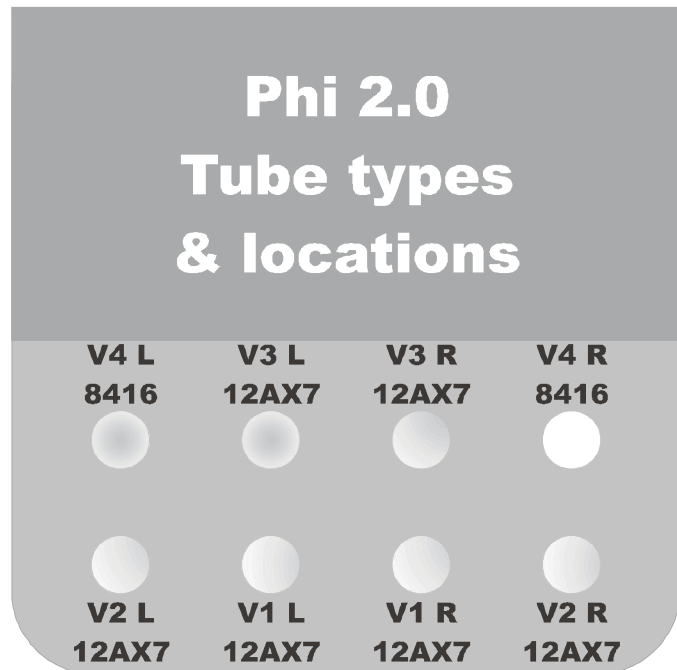
Before replacing tubes, all power must be turned off. Allow 15 minutes for the tubes to cool down before removing the top glass cover - in use they become hot enough to cause burns.

Install new tubes of the appropriate types firmly in their sockets, noting the location of holes in the socket and pins of the tubes, taking care to make sure that pin pattern corresponds to holes in tube socket. Replace the glass cover before operating the preamplifier.

In the event that trouble is encountered, check all signal, speaker and power connections. If the problem persists, follow all safety precautions stated earlier in this section, and check that all tubes are correctly seated in their sockets. If possible, try another tube. If the problem persists, please consult your VAC dealer or contact the factory directly.

Tubes are like the tires on a car; they will eventually need replacement. Murphy's Law states that a tube will probably fail right at the start of a long holiday weekend. Therefore, many audiophiles keep a spare tube of each type on hand, just in case!

VAC can test tubes for concerned customers.



## TIPS & ADVICE SECTION

### A Word About Tubes in General

It is true that each brand of tube sounds different in a particular high resolution circuit. This is because no two manufacturers make a tube type in quite the same way, and the central tendencies of the performance parameters will differ slightly with each maker. To emphasize the point, examine the plate structure of any two 6SN7 from different manufacturers will probably find that they may not even the same shape and size. (Be careful here, as often a tube is made by a firm other than indicated on its label. In the heyday of tubes it was common to crossbrand between major labels, such as GE and RCA. Today many labels do not manufacture their tubes at all, including Gold Aero and RAM.)

This sonic variability may at first seem a liability, but further thought will reveal that it is an advantage, just like the ability to adjust VTA on a tone arm. The owner of a tube amplifier can select those tubes which sound like the real thing in his/her specific system. Of course, if the manufacturer you prefer is rare you may want to purchase a few spare tubes for the future.

How long should tubes last? It has long been known in professional circles (and probably now forgotten) that a tube such as the 12AX7 will display better performance characteristics after two years of continual operation than when it was new. In normal use it is not unusual for a low level tube to last 5 years or longer. Output tubes are another story, as they are continually providing significant amounts of current. Here the sound is your best guide. Certainly a tube should be replaced when its emission is significantly down or its transconductance is substantially out of specification. In normal use, output tubes will last at least 2 years and perhaps more than 5 years.

**In the event of unusual noise in one channel, or a loss of sound in one channel, a bad tube may be located easily. Start by exchanging V4L with V4R; if the problem changes channels then you have found the bad tube. If not, switch V3L with V3R, and so on, until the symptom changes channels.**

VAC can test tubes for concerned customers.

### CARE OF CHASSIS

VAC chassis are machined aluminum for superior electromagnetic performance. The main chassis is finished in a durable clear coat over color powder coat paint. The power supply chassis is finished in durable textured gloss paint. Cleaning the units with a damp cloth **WHILE THE AMP IS SWITCHED OFF AND UNPLUGGED** should suffice. Do not get cleaning solutions onto or into the tube sockets.

## WARRANTY

Your equipment is warranted for a period of thirty (30) days from the date of purchase. In addition, if the registration form is received by VAC along with a copy of your sales receipt from an authorized VAC dealer within this thirty days, a service contract will be extended to cover your equipment for three (3) years (tubes excepted). This warranty applies only to units sold in the United States of America through authorized VAC dealers. It covers factory service and standard return shipping. For warranty information outside of the U.S. contact the importer of VAC equipment for your country. Units sold outside of the U.S. should still be registered with VAC. It is responsibility of the dealer and customer to determine suitability of this unit for a given application.

Your questions and comments are always welcome. Contact:

Valve Amplification Company  
1911 East Avenue North  
Sarasota, FL 34234  
Telephone (941) 952-9695 Fax (941) 952-9691  
[info@vac-amps.com](mailto:info@vac-amps.com)

*Detach and mail to the address above as soon as possible.*

### Phi 2.0 Registration Form

Name \_\_\_\_\_

Address \_\_\_\_\_

Telephone \_\_\_\_\_ / \_\_\_\_\_ - \_\_\_\_\_ e-mail \_\_\_\_\_

Dealer name \_\_\_\_\_ City \_\_\_\_\_

Salesperson \_\_\_\_\_ Purchase date \_\_\_\_\_ Serial Number \_\_\_\_\_

How did you first learn of VAC products? \_\_\_\_\_

What other brands/models did you consider? \_\_\_\_\_

What made you decide on the VAC? \_\_\_\_\_

What else would you like us to know? \_\_\_\_\_

Optional:

What magazines do you read regularly? \_\_\_\_\_

What are your hobbies (besides filling in warranty cards)? \_\_\_\_\_

What are your favorite types of music? \_\_\_\_\_

On what format? (CD, LP, DVD, SACD, MP3, etc.) \_\_\_\_\_