Φ 110i "Beta"

The VAC Phi Beta
Beam Power Integrated Amplifier

Operation & Maintenance Information

VAC

Valve Amplification Company

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CAUTION

THE AMPLIFIER 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.

PLEASE READ CAREFULLY

Your Phi Beta is fitted with a unique output tube monitoring circuit. Rather than directly contacting the audio path, and thus contaminating the pure sound, the temperature of a small cathode resistance is sensed. The four bi-color LED's on the front panel indicate the tubes' conditions.

If the idle current of a KT88 output tube drops below nominal limits, the LED corresponding to that tube will light green. This indicates that either the bias setting for that tube should be adjusted, or the tube should be replaced at your convenience, but it is safe to continue operating the amplifier.

The exact idle current of each tube may be tested by means of the meter and the test switches located on the front panel. The associated bias control should be adjusted so that the needle points directly at the dot in the center of the meter. When no test switch is selected, the meter indicates the incoming ac voltage (wall voltage).

Note: These LED's will also be green when the amplifier is first switched on, and will extinguish when the bias resistors have reached full operating temperature after approximately 30 minutes. The threshold between green and no illumination is not precise; do not be overly concerned if some positions take longer to extinguish. The condition of individual tubes may be checked with the built in meter.

Note: a strong air current could cause the lights to remain green even in normal operation.

In the event that any output tube draw excessive idle current (a "run away" tube or a tube not biased correctly), the high voltage supply in the amplifier will shut down automatically and the LED corresponding to the problematic KT88 tube will indicate red. The red light will stay on until the power switch is turned off. This tube must be replaced. (Note: The LED's for the other tubes will show green after a few minutes...this should be disregarded.)

To minimize difficulties, always use genuine VAC Tested audio tubes in your Phi.

INTRODUCTION

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

Essentially, the Beta is the combination of elements of the Phi 2.0 preamplifier with the Phi 110/110 stereo amplifier into a single, integrated, optimized system.

The 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 power amplifier section uses four KT88 tubes in Class AB1. Uniquely, each is provided with a separate DC heater supply to ensure that no undesirable couplings occur; only the intended ideal signal path exists. The input circuitry is derivative of the unique Williamson circuit, which provides pure, direct coupled, inherently balanced input amplification and phase splitting. Type 6SN7/5692 octal twin triodes do the honors.

Two superb VAC output transformers allow high power to be delivered with sonic purity, provide superb voltage/current translation, and will drive impedances from eight ohms to as low as one ohm.

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

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.

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

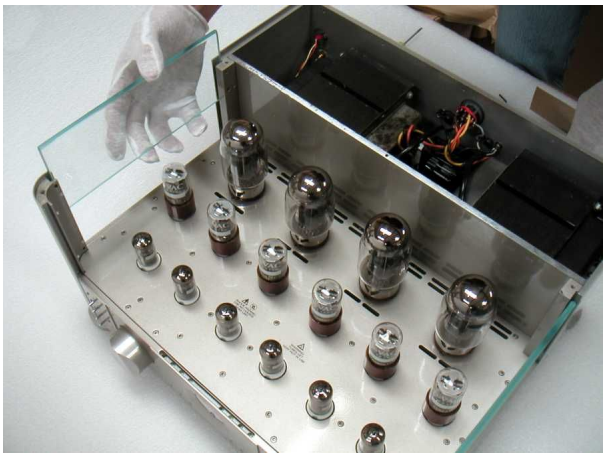
Take care to prevent the tool from scratching the chassis.

Note: tubes should not be installed yet.

Remove the top screws along the back edge.

Remove the top frame.

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

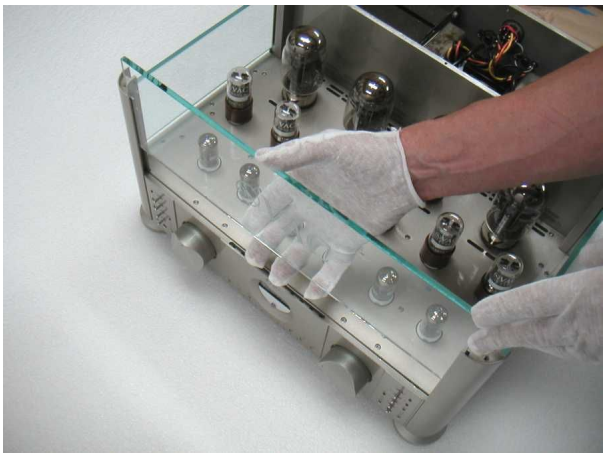


Slide the side glass plates into the pillars' channels.

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

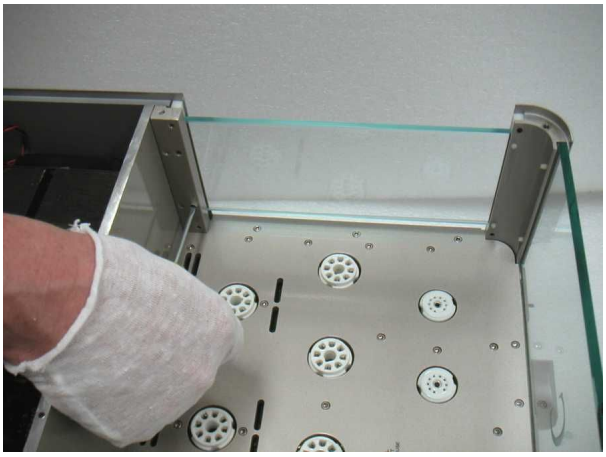
Take care not to scratch or break the glass

Note: tubes should not be installed yet.



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 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 nylon 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 rear screws.

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

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.

The large and medium size tubes have a plastic center pin ("keyway") that can only be inserted one way. Do not to break this pin.

The small tubes have a gap in the pins that matches the sockets, and can only be inserted one way.

Set the beveled glass top into the aluminum top frame. Take care not to chip the edges.

Note: The top glass will become hot in normal operation.

The glass may be removed from the Phi Beta (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 cables from the power supply.

Turn the locking collars fully tight (many turns required!).

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.

NOTE: Do not remove and connect input cables or speaker cables while is amplifier is running. Doing so risks damage to your loudspeakers or the amplifier.

Do not operate the amplifier without a loudspeaker or load resistor attached.

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 (balanced only) jacks. 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"

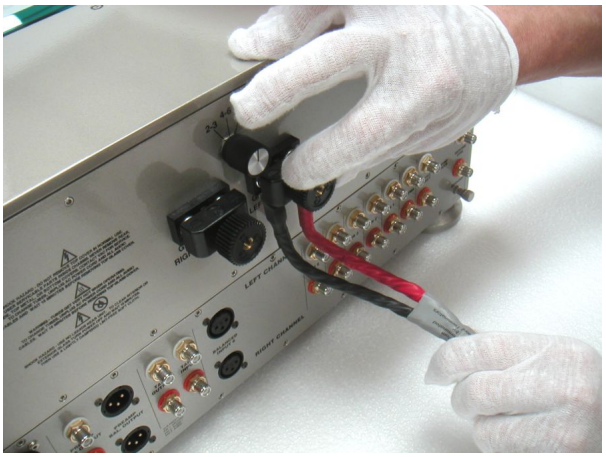
6) Connect phono cables to the rear panel MM and/or MC inputs labeled "Phono" (both may be used in the same system, as they are switched by a control on the front panel). Connect the ground wire(s) from the turntable(s) or phono cable(s) to the "Ground" terminal provided on the rear panel.

7) Set the Power Amplifier input switch (rear panel) to "Preamp" for normal operation.

If you are biamplifying with an active crossove, see the "Power Amp Direct Input" section later in the manual.

8) Connect the power cables from the power supply to the audio chassis. Be sure to insert the connector properly, and fully tighten the locking screws.

9) Connect the speaker cables and set the impedance selector switch to match the nominal or minimum impedance of your loudspeakers (you may try both).



10) 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.

11) 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.

12) Check the bias settings for the KT88 output tubes upon initial turn on, and whenever a KT88 is replaced. Please read the section on Output Tube Bias Adjustment for more details.

INPUTS (back panel)

Pairs of RCA jacks accommodate unbalanced line level sources. These are labeled "IN1", "IN2", etc.

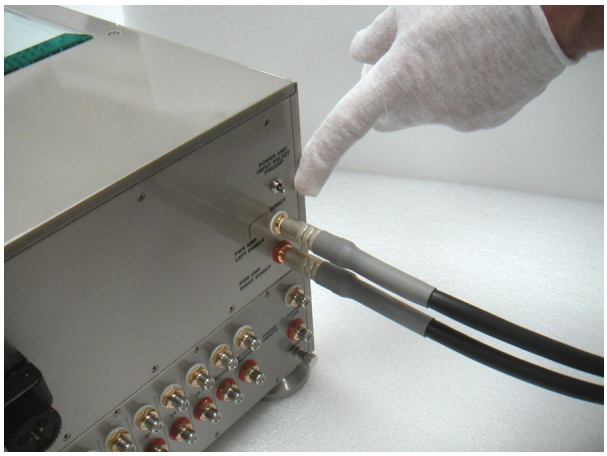
The XLR input can accept a balanced or unbalanced line level source.

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.



POWER AMP DIRECT INPUT

This switch allows direct access to the power amplifier section, useful for inserting an active crossover for biamplified systems.

PREAMPLIFIER OUTPUTS

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

RCA and XLR output jacks are provided as main preamplifier outputs; these may be used, for example, to drive an additional power amplifier, or to insert an external crossover (in conjunction with the Power Amp Direct Input).

Do not connect an unbalanced load to the XLR connectors.

OPERATION

Turn the "Volume" control fully counterclockwise.

Mute is automatically engaged when switching on the unit. High voltage power is not applied for 60 seconds, thus allowing time for the tubes to 'warm up.' Do not unmute before 60 seconds; failure to wait can cause a transient to be sent 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 Beta 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 eight 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 2.5 ampere fuse. For 100 or 120 volt operation, the fuse should be 5.0 amperes. These are 'slow blow' types.

The others are in a conventional fuse holders; the appropriate values are labeled by each fuse holder.

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.

Test: There are two "Test" switches, used to check the adjustment (the 'bias setting') of the KT88 output tubes. The switch on the left side tests tubes V13 and V14; the one on the right side tests tubes V15 and V16.

To test a KT88, push the toggle switch to the direction of the desired tube. Observe the meter. When properly adjusted, the needle will point straight up. It must never be set for a higher reading.

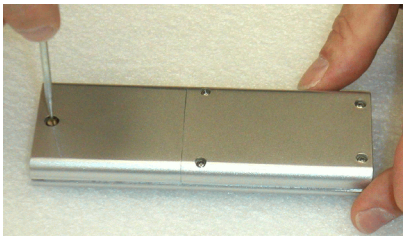
Adjacent to the tube legends ("V13", etc.) are small screwdriver adjustments for each KT88. Turning a control clockwise will result in a higher reading on the meter; turning counter-clockwise will result in a lower reading.

Also associated with the tube legends are four bicolor LED's. These will be green until the amplifier warms up. If one remains green, it indicates that the tube's adjustment needs to be turned up, or that the tube is no longer working. If one turns red, it means that tube conducted excessive current, and the amplifier automatically shuts down.

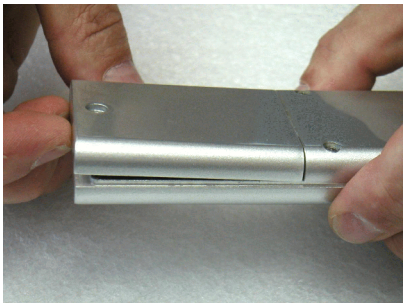
Excessive current may be the result of misadjustment or tube failure. You may attempt to reuse the tube by turning the bias adjustment fully counter-clockwise, restarting the amplifier, and attempting to make a normal adjustment. Replace the tube if the protection circuit continues to trigger.

REMOTE CONTROL

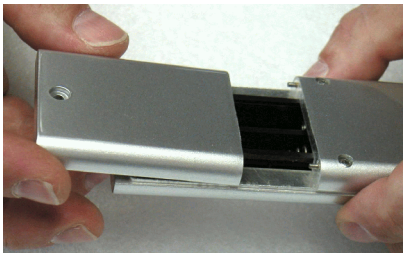
The remote control allows for wireless adjustment of POWER, SELECTOR, TAPE MONITOR, CINEMA, MUTE, and VOLUME.



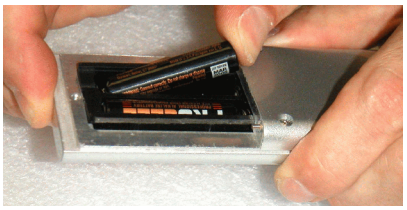
The remote wand is powered by two "AAA" batteries. These should be of the alkaline type. You will need to install them in the wand before using the remote. Since batteries can leak, they should be removed from the wand if it is not going to be used for an extended period of time.



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



Loosen the battery cover.

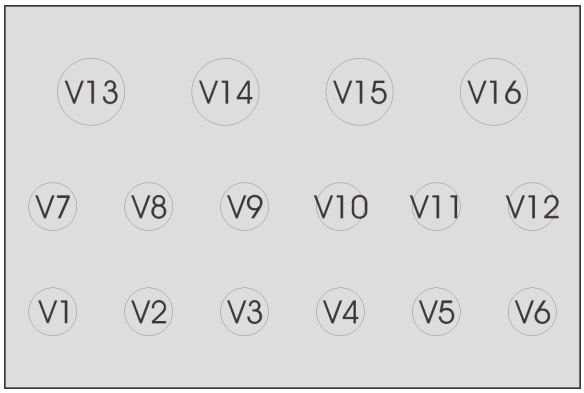


Remove the battery cover.

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

Reassemble the remote control by following these steps in reverse.

REPLACEMENT OF TUBES



Tubes V1 - V6 are type 12AX7/ECC83; you may wish to use low noise tested tubes for V3 and V4.

Tubes V7 - V12 are type 6SN7.

Tubes V13 - V16 are type KT88.

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 (12AX7) or the center key (6SN7 and KT88). Replace the glass cover before operating the amplifier.

Readjust bias settings whenever a KT88 is moved or replaced. See Installing New Output Tubes.

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.

INSTALLING NEW OUTPUT TUBES

Output tubes are type KT88. Replacement output tubes should be purchased from VAC. It is important that the tubes be checked for any tendency to mechanical or electrical shorts (see Safety Notice at the front of this manual). It is desirable that tubes be in matched quartets for each channel, and be close to the "bogey" values for the major parameters. Make certain that each tube fits firmly in its socket.

ALL POWER MUST BE OFF. Remove the top glass and the old tubes after they have cooled down (THE COVER BECOMES QUITE HOT IN NORMAL USE; TUBES BECOME HOT ENOUGH TO CAUSE SERIOUS BURNS WHEN IN OPERATION AND MAY TAKE SEVERAL MINUTES TO COOL DOWN). Install the new tubes firmly and fully in the sockets, observing that the tube will only fit into the socket in one orientation, determined by the plastic "keyway" in the center of the base. Do not use excessive force. Replace the top glass cover before operating the amplifier.

Whenever a tube is changed, the bias settings must be checked and adjusted.

A slight violet glow in the tube is not cause for concern. If at any time the plate (the outermost metal structure) of the output tubes begins to glow bright orange or red SWITCH OFF IMMEDIATELY. The red glow indicates that the tube is "running away", being destroyed by conducting excessive current. Tubes may run away for several reasons:

1) The tube is not fully inserted in the socket.
2) The tube fits loosely in the socket and thus can not make correct contact. Such a tube is unusable.
3) The tube is defective.

In the event that trouble is encountered check connections and/or try another tube. Stop if the problem persists and consult with your dealer or VAC.

For further information, refer to Tips & Advice: Tubes in General and Tips & Advice: Output Tubes.

CHECKING OUTPUT TUBE CONDITION

As described at the beginning of this manual, the Phi is equipped with the KT88 Sentry circuit, which continuously monitors each output tube to ensure that it is operating within normal limits. Each tube has a corresponding indicator light on the front panel.

A green indicator light will be seen as the amplifier warms up, or when a tube's idle current is less than normal. It is safe to use your amplifier under these conditions, but the tube should be replaced at your convenience. The threshold between green and no illumination is not precise; do not be overly concerned if some positions take longer to extinguish. The condition of individual tubes may be checked with the built in meter.

By operating the test switches below the light, the meter will display the exact idle current in the tube - this is used in setting the bias. Be certain to stop the music before making the reading. Typically, the meter will indicate near the dot at the center of the scale. A lower indication will also be observed if your power voltage is low.

If a strong air current is blowing on the amplifier, it is possible that a tube within the normal current range will still display the green indicator light.

If a tube draws excessive current, the indicator light will turn red and the high voltage supply will shut down. This tube should be replaced before using the amplifier.

Please note that operating the amplifier without adequate ventilation will cause the red indicator lights to come on and the amplifier to shut off. Operating the amplifier on a thick carpet will cause this, and is not safe.

Output Tube Bias Adjustment:

Bias settings it should be checked when you install your amplifier and approximately once every month thereafter. It must also be adjusted each time a tube is replaced.

When first installed or a KT88 tube is changed: Approximately 45 seconds after switching power on, the high voltage supply will engage and the front panel meter will start to show a reading. At this time, quickly check the bias reading of all four outputs tubes. Immediately adjust any which read above the central dot on the meter. Periodically check during the first five minutes to ensure that no tube reads above this point, adjusting as necessary.

Before making a final setting, allow the amplifier to reach normal operating temperature (about ten minutes of warmup should be sufficient). Mute the preamplifier and utilize the two toggle test switches on the front panel. Push the first toggle switch left and observe the bias meter. Using a small flat bladed screwdriver, rotate the control directly to the left of the switch until the needle is centered on the small black dot near the top of the meter. Then push that toggle switch right, and adjust the control to the right of the toggle. Repeat for the second toggle, and then, because the adjustments can interact slightly, recheck all four tubes, starting once again with first toggle.

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.

TIPS & ADVICE SECTION

A Word About Tubes in General

Each brand of tube can sound different in a particular high resolution circuit, because no two manufacturers make a tube type in quite the same way, and the central tendencies of the performance parameters will differ. To emphasize the point, examine the plate structure of 6SN7's from different manufacturers and you may find that they are 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. 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 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.

For phono only noise, Start by exchanging V3 with V4; if the problem changes channels then you have found the bad tube. If not, switch V2 with V5; lastly try swaping V1 with V6.

For line stage & phono trouble, swap V1 with V6, and V7 with V12.

For power amplifier trouble, swap V9 with V10, and V8 with V11.

VAC can test tubes for concerned customers.

Tips: Output Tubes

Your VAC Amplifier uses the KT88 kinkless tetrode. It is strongly recommended that replacement tubes be purchased only from VAC. If, however, you want to customize the sound to your tastes, be aware that as with interconnects and speaker cables, each tube manufacturer's KT88 tends to have a distinct sound, as well as its own reliability profile.

Tips: Low Level Tubes

The Voltage Amplifier/Phase Splitter, driver, and line stage gain tube type used in the Phi is the 6SN7 medium mu octal twin triode. Your amplifier is fitted with the current production VAC Tested 6SN7 from China, which we find superior to the NOS types we have tried. There are dozens of versions of this tube available in new old stock (NOS) from a variety of sources. It would be impossible to characterize them all.

Other equivalent type numbers are 5692, 13D2, B65, ECC32, QA2408, QB65, and CV1988.

The phono tubes and line stage output tubes are type 12AX7, also known as 12AX7A, 12AX7WA, ECC83, E83CC, 7025, and CV4004.

We strongly recommend obtaining tubes as sets from VAC.

Tips: Impedance Matching

We strongly suggest that you experiment with the three available impedance connections for the best sonic match with your system. Since no loudspeaker represents an unchanging impedance at all frequencies, it is impossible to assert with certainty which output tap is appropriate to use. In many systems an amazing difference in sound will exist between the various impedance taps.

The available connections on your Phi are:

Labeled	Use with speakers of
8 ohms	4 to 8 ohms
4 ohms	2 to 4 ohms
2 ohms	1 to 2 ohms

Since the impedance of most loudspeakers vary over a wide range experimentation is essential. Most speakers have a rated impedance of 4 or 8 ohms. We recommend starting with the 8 ohm connection; after you know the sound if that connection, try the 4 ohm connection. Choose the connection that sounds best to your ears.

If you bi-wire your system (run separate speaker leads from the amplifier to the high and low frequency transducers) you may discover that two different impedance taps work best.

Contrary to popular misconception, no power is lost due to unused output taps.
For more information consult VAC Technical Monograph 90-9.

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 two (2) years (tubes excepted). This warranty applies only to units sold in the United States of America through authorized VAC dealers and operated in the USA by the original owner. It covers factory service and, within the continental U.S., 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

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

Phi Beta 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.) _____