



The VAC Master 300 iQ Musicbloc™ Mono/Dual Stereo Beam Power Amplifier

Operation & Maintenance Information



Valve Amplification Company

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CAUTION - SAFETY NOTICE

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

Never touch a tube if the glass is broken. The internal structures carry high voltage and could present a serious, possibly lethal shock. If a tube breaks, unplug the amplifier and wait 30 minutes, then remove the tube.

Keep flammable objects away from the amplifier.

DO NOT LEAVE THE AMPLIFIER UNATTENDED IN OPERATION.

THE AMPLIFIER IS **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. IF NECESSARY, SECURE THE AMPLIFIER TO THE WALL TO PREVENT TIP OVER.

INDEX

- Introduction
- Installation
- Connection diagrams
- Operation
- Illuminated Logo
- Installing New Tubes
- Operation of the VAC iQ Circuit
- Care Of Chassis
- Tips and Advice
 - Fuses
 - A Word About Tubes in General
 - Output Tubes
 - Low Level Tubes
 - Grounding
 - Tuning Your System
- Specifications
- Footnotes
- Warranty & Registration Form

INTRODUCTION

The VAC Master 300 is a unique power amplifier, and one of the most powerful and detailed in VAC's history. Featuring a new fully balanced direct-coupled input & driver circuits, extremely fast and vivid sound is achieved.

This amplifier features VAC's patented* iQ Continuous Automatic Stable Bias System. This revolutionary invention is the only approach capable of keeping the true underlying idle point of each output tube unvarying and steady at all times. This leads to a uniquely stable operating point and an unvarying relationship between the output tubes and the speakers. The result is more detail, control, and nuance, from the tiniest whisper to the loudest crescendo.

The Musicbloc™ design is capable of being operated as a mono amplifier or as a dual-mono (stereo) amplifier.

The chassis is machined from thick aluminum, finished in a combination of hand polished metallic base coat/clear coat and high temperature powder coat paint.

The Master 300 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.

* The VAC iQ Continuous Automatic Bias technology is protected by U.S. Patent 8, 749,310; worldwide patents pending.

INSTALLATION

- 01) The amplifier is quite heavy. Consider the location carefully, and **use appropriate help in lifting, etc., so as to avoid injury**. Ensure that it will not tip over in your use; if there is a risk of this, especially due to children, take all necessary steps to secure the amplifier to a wall.
- 002) Install the vacuum tubes. Each tube or its box has a “V” number, which corresponds to the labels on the top plate of the amplifier; these indicate where each tube should be installed.

Fit each tube into the matching socket.

When inserting and removing tubes, handle them by their bases, not by their glass bulbs.

Note that there is a locator ridge on the tubes’ center posts that indicates proper alignment.
- 03) Place the top ventilation grill in place. It rests on the four button magnets attached to the side rails.
- 04) Set the back panel switch to Balanced (for use with balanced sources on XLR connector) or Single-ended (via RCA connector) as desired. Balanced input is preferred. Note: if operating in the mono mode with RCA inputs, use the upper (“left”) RCA input.
- 05) Set the three Mono/Stereo switches to the desired mode of operation.
- 06) Install the input cables in the back panel jacks that corresponds to the switch settings selected above.
- 07) Connect the speaker cables; the black lead goes to “-“ or “Ground”. The red lead goes to “+” or “Positive”. There are binding post pairs for left and right in stereo operation, and another for mono.
- 08) Connect 12 volt trigger input cables into the appropriate sockets on the back panel if desired; either will slave the off/on function to the external connection.
- 09) Provide adequate ventilation - allow at least six inches above and three inches to each side, and front and back.
- 10) Do not place in a completely enclosed cabinet.
- 11) Do not operate on any surface that might block air flow.
- 12) The chassis and glass will become hot in normal use.
- 13) The power supply may produce a small mechanical hum; therefore avoid placing the system on any surface that could act as a sounding board, or at any location in the room that corresponds to a resonance at your local power frequency (50 Hz or 60 Hz).
- 14) 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. Note that external grounding systems might degrade performance.

- 15) Connect the power cord to the power source indicated on the rear panel (will be either 100, 120, 220, or 240 volts AC). Voltage conversions must be done at the factory or by an authorized VAC importer.
- 16) Avoid power conditioners or power cables that float the ground pin. This is an unsafe practice, and could result in damage to your system and lethal shock.
- 17) Maximum power requirement is approximately 1000 watts. Pay close attention to power quality, and be aware that different power cords can alter the sound.

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.

NOTE: Do not operate the amplifier without loudspeakers or load resistors attached.

NOTE: Do not operate without the ventilation grill in place.

NOTE: Take care to keep everyone, especially children and pets, from being able to reach and touch the tubes, which become extremely hot and could cause serious injury.

NOTE: Never touch a tube if the glass is broken. The internal structures carry high voltage and could present a serious, possibly lethal shock. If a tube breaks, unplug the amplifier and wait 30 minutes, then remove the tube.

NOTE: Keep flammable objects away from the amplifier.

REMINDER: 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.

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

REMINDER: Provide adequate ventilation Failure to do so may shorten the amplifier's life, and may result in tube failures.

OPERATION

The power switch is on the front panel.

Sound will begin approximately 60 seconds after turn on.

As with all high fidelity products, the sound characteristic of the VAC changes somewhat as it warms up. We advise against leaving the equipment on at all times for safety reasons, and because of the attendant acceleration of output tube wear and power consumption. Life of the output tubes averages 3,000 to 8,000 hours. For best tube life, turn the amplifier off when you are not listening.

Any time that the VAC Power Amplifier 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.

Please note that although your VAC System has been run for 48 hours at the factory, the break-in time of high resolution audio equipment is infuriatingly long. The Master 300's sound will continue to season for approximately 200 hours. The early sound of the amplifier will be less extended, dynamic, and coherent. Then the sound will improve noticeably, followed by a period of darker sound, finally giving way to the desired musicality. Patience is a virtue.

Also be aware that many components display the need for a new break in period after being transported in unheated cargo aircraft.

ILLUMINATED LOGO

The illumination of the front VAC logo may be turned on or off via the switch on the front panel.

INSTALLING NEW TUBES

First, see the SAFETY NOTICE earlier in the manual.

Output tubes are type KT88. Replacement output tubes should be purchased from VAC. It is desirable that tubes be in matched octets, 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 grill and the old tubes after they have cooled down (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 rods before operating the amplifier.

The patented VAC iQ system will adjust the bias settings for the tubes automatically. The front panel indicators will let you know if there is a problem with any of the KT88 tubes.

A slight violet glow in the tube is not cause for concern.

The small tubes are type 6SN7GTB. They should be matched section-to-section and to each other, and be close to "bogey" values - this is particularly important for the VAC direct-coupled circuits.

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.

VAC iQ Continuous Automatic Bias System

In engineering, the abbreviation “Iq” denotes the quiescent current of a vacuum tube, also known as the idle current or bias point. For best performance, the Iq must be set and maintained precisely, even as the amplifier warms up, the power line varies, the tubes drift, and regardless of whether you're playing the music softly or loudly.

No system has been able to do this. Until now.

The result of 17 years of research, the VAC iQ Bias Control System is the first and only system able to monitor continuously the true bias point of each output tube and hold it precisely at the desired value, thus ensuring optimal performance at all times. It actually outperforms manual systems because it can correct for the heating effects that occur when reproducing loud passages of music. The VAC circuit both MONITORS and CONTROLS, continuously, in real time.

The resulting performance difference is one that you can easily hear. And not only does it sound better, it radically reduces the rate of tube failures, and is self-diagnosing.

Operation

In operation, the iQ circuit monitors and maintains the correct bias adjustment for the KT88 output tubes at all times, regardless of the music playing.

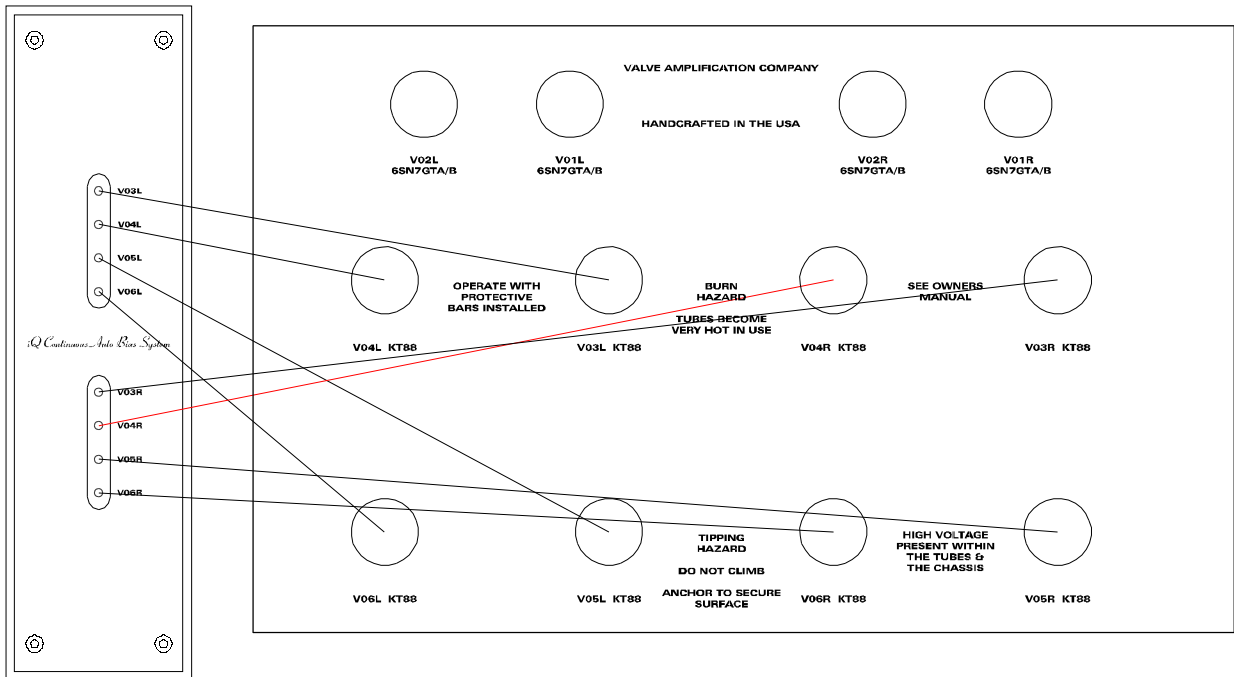
The iQ system contains two other components that inform you of tube condition and protect the amplifier; the operation of these two circuits is indicated by the bicolor LEDs.

If an LED illuminates GREEN, this is an indication that the associated tube is becoming weak. In a conventional amplifier, you would have advanced the bias control well clockwise for this tube. No immediate action is required; simply replace this KT88 with a fresh one when time permits, and the amplifier will make the best of the weak tube until then.

An LED will illuminate RED if an output tube draws excessive current, i.e., if a ‘run away’ occurs. Because of the stabilizing action of the auto bias circuit, this is most likely to occur if something inside the tube has physically broken. The iQ system detects the fault within a fraction of a second and shuts down the main power supply, thus preventing any damage; all of this happens long before the fuse can react. Switch power off, and replace and discard the indicated tube after it cools down.

See the chart on the next page.

IQ System Indicators



GREEN = WEAK TUBE, REPLACE AT YOUR CONVENIENCE
RED = DEFECTIVE TUBE, REPLACE, DO NOT USE AGAIN!

CARE OF CHASSIS

VAC chassis are machined aluminum for superior electromagnetic performance. The main chassis and the fascia are finished in an acrylic lacquer, similar to fine automobile; similar care must be taken in wiping or cleaning. THE AMP MUST BE SWITCHED OFF AND UNPLUGGED, and at no time may any cleaning material be allowed to get into the tube sockets or jacks.

TIPS & ADVICE SECTION

Tips: Fuses

Your amplifier is designed to use “slow blow” type fuses. These are contained in the fuse drawer built into the power receptacle.

In the fuse drawer are two fuses. The one furthers in is the active fuse. The one nearer to the outside is a spare.

The fuse ratings are labeled on the back of the power supply. Be certain to use only the fuse rating applicable to your local ac supply voltage.

With a high power amplifier, there can be an appreciable surge of current for a few milliseconds when power is switched on. Over time, this can fatigue a fuse and cause it to fail at the instant that power is applied. This may be considered normal.

Tips: 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.

It is normal to see a slight violet glow in a power tube such as a KT88. However, a vivid violet indicates excess current flow through the tube and should be investigated.

VAC can test tubes for concerned customers.

Tips: Output Tubes

Your VAC Amplifier uses the KT88 kinkless tetrode, with the Gold Lion (Russia) version provided. 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 and driver tubes in the Master are the 6SN7GTB medium mu octal twin triode. Your amplifier is fitted with the current production VAC Tested 6SN7 from Tung Sol (Russia). 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.

The matches among the four 6SN7GTB are critical to the Master 300's performance. Therefore we recommend that replacement tubes be obtained in sets from VAC.

Tips: Audio Grounding

Systems incorporating single-ended interconnect cables (“RCA cables”) are prone to a problem known as “ground looping”, which can result in extraneous hums and buzzes audible through the loudspeaker. If this occurs in your system, you have to attempt to minimize the ground loop.

To minimize the buzz using the normal RCA input jack, there are several steps you can take:

- 1) Use the shortest interconnects possible.
- 2) Use interconnects with good shielding properties.
- 3) Keep the audio cables as close together as possible.
- 4) Keep the AC cords away from the audio cables.
- 5) Try different ground settings on your preamplifier, if it has them.
- 6) The use of cheater plugs is not recommended and poses a safety hazard.
- 7) External grounding systems may degrade the sound or cause malfunctions.

SPECIFICATIONS

The VAC Master 300 has been developed with the critical ear as the major arbiter of quality, with both conventional and unique measurements providing insight and guidance as necessary. The lack of emphasis on measurements is due to the fact that engineering's arsenal of equipment and techniques do not operate on the pattern recognition principals that control human perception of sound.

In the immortal words of Daniel von Recklinghausen, if it measures good and sounds bad, it is bad. If it measures bad and sounds good, you've measured the wrong things.

For those concerned with test bench performance, the following describes typical measured performance when operated at 120 VAC, 60 Hz.

- 160 watt/channel dual mono into 4 ohms*; 320 watt mono into 4 ohms*
- Frequency response 4 Hz to 75 kHz
- Power bandwidth 20 Hz to 70 kHz
- Single-ended input via RCA jack, non-inverting
- Balanced input via XLR jack, non-inverting relative to pin 2 ("pin 2 hot", traditional EIA/RCA broadcast/recording standard); amp is fully balanced in this mode
- 12 volt trigger
- Illuminated logo; may be switched off
- 8 x KT88, 4 x 6SN7GTB
- Detachable power cord, standard 15A IEC power receptacle
- May be factory configured for operation at 100, 120, 220, or 230/240 volt operation

* An extremely stiff power line is required to achieve these output powers. Exact output power will depend upon the characteristics of the individual tubes fitted and their condition**. A variation of 1 dB in maximum output power may occur under normal circumstances with fresh tubes.

** Traditionally, tubes are considered to be at end of useful life when power capability is reduced by 3 dBW, but this may not necessarily correlate with subjective sound quality. The green iQ status LEDs will alert you prior to this point.

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, the warranty will be extended to two (2) years (tubes excepted). This warranty applies only to units sold in the United States of America through authorized VAC dealers and operated within the United States by the original purchaser. 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 the responsibility of the customer and/or dealer to ensure suitability of this equipment for any particular application.

Your questions and comments are always welcome. Contact:

Valve Amplification Company
2172 10th Street
Sarasota, FL 34237
Telephone (941) 952 9695 Fax (941) 952 9691
info@vac-amps.com

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

Master 300 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.) _____