



$\Sigma 160 i$

The VAC Sigma 160i
Integrated Amplifier

Operation & Maintenance Information



Valve Amplification Company

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CAUTIONS

THE AMPLIFIER CONTAINS 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.

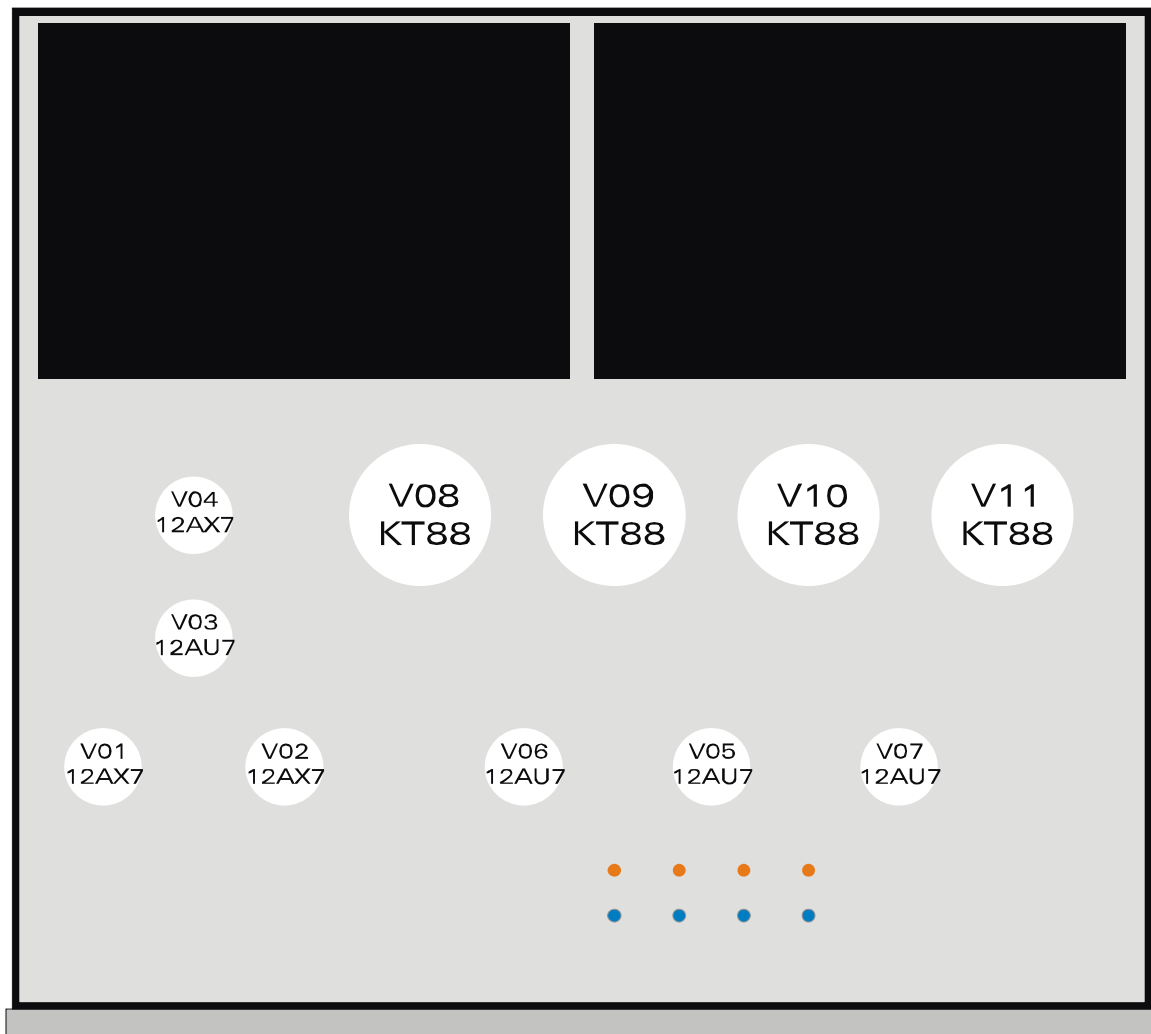
VACUUM TUBES BECOME HOT ENOUGH TO CAUSE SERIOUS BURNS. NEVER TOUCH A TUBE WHEN THE UNIT IS ON. IT MAY TAKE SEVERAL MINUTES FOR THE TUBES TO COOL DOWN AFTER THE UNIT IS SWITCHED OFF.

NEVER TOUCH A BROKEN VACUUM TUBE UNTIL THE UNIT HAS BEEN UNPLUGGED AND ALLOWED TO SIT FOR 15 MINUTES. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN A SEVERE ELECTRICAL SHOCK.

IT IS STRONGLY SUGGESTED THAT THE AMPLIFIER BE INSTALLED SO THAT NO ONE WILL COME IN ACCIDENTAL CONTACT WITH THE VACUUM TUBES.

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.

INSTALLING THE TUBES



The Sigma 160i is shipped with the vacuum tubes removed.

The large tubes (type KT88) have a plastic center pin, called a “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 they can only be inserted one way.

INSTALLATION

- 1) Provide adequate ventilation. 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.
- 5) Input connection is via single ended RCA jacks.
- 6) The optional balanced input via XLR jacks connects to the Line 3 input.
- 7) Preamplifier output is on RCA.
- 8) Connect line level inputs (CD, Tuner, Tape, etc.) to the appropriate RCA or XLR input jacks on the rear panel. Note: with the exception of Phono all inputs are "line level"
- 9) Connect phono cables to the rear panel MM inputs labeled "Phono". Connect the ground wire(s) from the turntable(s) or phono cable(s) to the "Ground" terminal provided on the rear panel. Optionally, this may be an MC input; this option must be fitted at the factory.
- 10) Connect the speaker cables to the terminals that match the nominal or minimum impedance of your loudspeakers (you may try both). Do not operate the amplifier without loads. Please note that because the line stage inverts absolute phase, you should connect the RED terminal of your loudspeakers to the COMMON terminal of the Sigma.
- 11) 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.
- 12) Connect the power supply to the power source indicated on the rear panel, either 100, 120, 220, or 240 volts AC. Avoid power conditioners that float the ground pin. For best performance, try to route the power cord away from signal cables.
- 13) 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.
- 14) Check the bias settings for the KT88 output tubes upon initial turn on, and whenever

a KT88 is replaced. See INSTALLING NEW OUTPUT TUBES.

INPUTS (back panel)

Pairs of RCA jacks accommodate unbalanced line level sources. These are labeled "L1", "L2", etc.

When fitted, the XLR input can accept a balanced or unbalanced line level source and is routed to the Line 4 position of the SELECTOR switch.

Note: not all sources with XLR connectors are balanced. Many are unbalanced, with pin 2 or pin 3 tied to ground. The Sigma 160i will accept such sources.

The "CINEMA" inputs accept an unbalanced line level source via RCA jacks. The VOLUME control does not effect the level of the CINEMA input

A phono input is provided for high output cartridges. The ground lead from the turntable should be connected to the binding post located by these jacks.

PREAMPLIFIER OUTPUTS

RCA output jacks are provided as main preamplifier outputs; these may be used, for example, to drive an additional power amplifier, subwoofer, or to insert an external crossover (in conjunction with the Cinema input).

OPERATION

Turn the "Volume" control fully counterclockwise.

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 Sigma 160i 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 200 hours. Also be aware that many components display the need for a new break in period after being transported in unheated cargo aircraft.

FUSES

There is a main fuse located in the IEC AC power inlet; there is also a spare fuse included.

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.

REMOTE CONTROL

The remote control allows for wireless adjustment of VOLUME.

Note: the wand may have buttons labeled "mute", but the Sigma does not have a mute function.

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.

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:

Power: Turns the unit off and on.

Selector: This switch selects between PHONO and LINE 1 through LINE 5 inputs. Rotate counterclockwise to move down through the inputs, clockwise to move up through the inputs.

Volume: Controls the output level all inputs except CINEMA.

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

The CINEMA input bypasses the VOLUME control and allows the control of volume to be determined entirely by the source component. This is useful when the Sigma 160i 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.

This input may also be used with, for example, a CD player that has its own volume control. In this way, the Sigma 160i's volume control is bypassed. Some audiophiles would consider this to be a "hot rod" mode.

CINEMA also functions as a power amplifier direct input. If, for example, an external crossover is to be used, the preamplifier outputs would go to the crossover, and the CINEMA inputs would be the return for either the low or high frequency range.

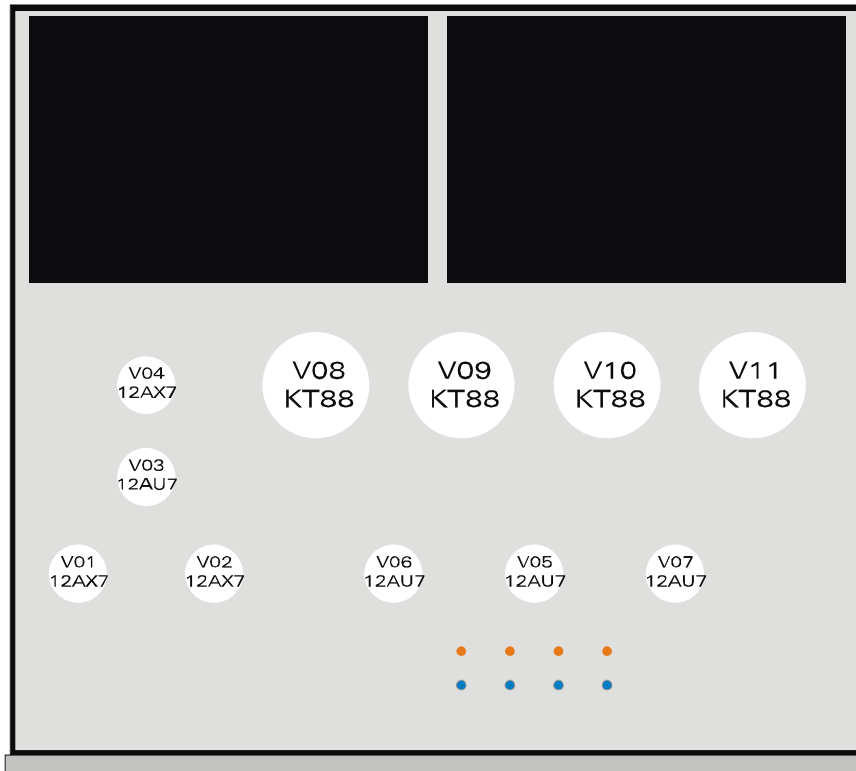
TOP CONTROLS

Bias: The condition of each KT88 tube is indicated by the lights on the top of the amplifier, and adjusted by the four adjacent controls. See SETTING BIAS FOR THE OUTPUT TUBES for directions.

The leftmost light and control effect the leftmost KT88, and so forth, from left to right.

REPLACEMENT OF TUBES

V01, V02	12AX7/ECC83 (low noise tested)
V03, V05, V06, V07	12AU7/6189
V04	12AX7/ECC83
V08 - V11	KT88 (KT88-SC preferred)



We 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 touching them - 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 and 12AU7) or the center key (KT88).

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. It is desirable that tubes be in matched quartets, 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. Wait 15 minutes for the old tubes to cool down (THE 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.

Whenever a tube is changed, the bias settings must be checked and adjusted (see the next page). Start with the associated bias control turned fully down (fully counterclockwise).

A slight blue 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.

SETTING BIAS FOR THE OUTPUT TUBES / CHECKING OUTPUT TUBE CONDITION

The Sigma 160i is equipped with the KT88 monitoring 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 top panel.

To check bias, mute the Sigma 160i; music should not be playing.

There are four amber LEDs on top of the amplifier, each corresponding to a KT88 tube; each also has an associated bias adjustment control.

If a light is off, it indicates that the associated KT88 is at or below the target setting. Turn the bias control clockwise until the LED lights amber, and then slightly back the control off until the light just goes out. Do this for each KT88, and then recheck all of the settings.

When the controls are set correctly, the amber LEDs will be seen to 'flicker' with the beat of the music, but go out when the volume level is very low.

Output Tube Bias Adjustment:

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

When a KT88 is first installed or changed:

Approximately 45 seconds after switching power on the tubes will begin to conduct electricity. Watch the LEDs carefully. Immediately adjust any which shows a red LED. After a minute or two, start to adjust the bias control up until the amber LED lights, and then back the control off slightly until the light goes out. If the light later comes on, adjust the control downwards. Continue to watch and adjust during the first 20 minutes of operation to ensure that no tube draws excessive current.

CARE OF CHASSIS

VAC chassis are aluminum for superior electromagnetic performance. The main chassis is finished in a durable powder coat 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.

The fascia is a multistage gloss lacquer, which may be treated as you would a fine automotive finish.

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, some steps may help you locate a bad tube.

For phono only noise, start by exchanging V1 with V2; if the problem changes channels then you have found the bad tube.

For power amplifier trouble, you may swap V06 with V07, V08 with V10, V09 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: 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 Sigma 160i are:	<u>Labeled</u>	<u>Use with speakers of</u>
	8 ohms	4 to 16 ohms
	4 ohms	2 to 8 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 4 ohm connection; after you know the sound of that connection, try the 8 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.

Sigma 160i Integrated Amplifier 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.) _____