
Model V140

Operating Procedure

1. Make sure you have read and complied with the INSTALLATION and CONNECTION instructions prior to attempting operation.
2. Make sure your V140 is properly connected to a high-current power receptacle via the attached power cord (see CONNECTIONS).
3. Your preamplifier should be "On" and muted and/or set at minimum gain.
4. Turn the POWER switch from "Off" to "Power." The green "Power" LED indicator should glow immediately, and the high voltage LED is dim. Approximately 30 seconds later the green "High Voltage" LED should also light fully, indicating the proper operation of the high-voltage circuits. Three distinct relay clicks may be heard during the start-up. NOTE: If the "Power" or "High Voltage" indicator lamps fail to light, turn the "Power" switch to "Off" and check the appropriate fuses for possible failure. Extra fuses for both powerline and high-voltage circuits are packed with your V140.
5. Your V140 should now operate satisfactorily. However, a full stabilization or warm-up time of approximately one hour is recommended for best sonic performance.

Adjustment Procedure

NOTE: When removing top cover in preparation for any service adjustments, take care to unplug the fan cord from internal socket before lifting off cover completely. DO NOT ATTEMPT TO UNPLUG FANS UNLESS AMPLIFIER HAS FIRST BEEN DISCONNECTED FROM EXTERNAL AC POWER LINE.

The V140 utilizes very high quality, commercial and computer grade components which, together with conservative operation of all components and tubes, will provide long service life, if installed and operated within the parameters outlined in this Manual.

The output tubes, for example, are operated with electronically regulated "bias" voltage, that includes compensation for varying plate voltage as the line voltage changes. The resulting output tube current is essentially immune to line voltage variation within the normal range of 105-125 VAC, or equivalent export line voltages.

After vacuum tube replacement, it is desirable to make a single internal "bias" adjustment to optimize performance and tube life.

CAUTION: The following internal procedure should not be attempted by the owner unless he is *technically qualified*. There are high voltages within this unit which can be *lethal* under certain conditions. The internal "bias" adjustment should be accomplished by a qualified individual. It is necessary to remove the top and bottom covers from the V140 for this adjustment. The unit should be off before removal of the covers.

Normally, only the output tube idle current (bias voltage) requires adjustment in the V140. Use the plastic alignment tool provided for this adjustment.

The triode output stages of the V140 are partially cathode-coupled "push-pull Class AB₁," utilizing our tightly coupled output transformers which provide low distortion and sonic accuracy.

Output Tube Bias Adjustment

As shipped from the factory, the output "bias" adjustments are set for a nominal 75mA per KT90 tube. Under these idle conditions the tubes are each dissipating approximately 32 watts of their 50 watt rating (42 watt plate, 8 watt screen). This point of operation provides "enriched" Class AB₁, and will satisfy the most critical listener.

For best results, operate and adjust the V140 at 120VAC. Adjustment must be made under zero-signal conditions after at least 15-20 minutes of uninterrupted stabilization time.

A digital voltmeter capable of accurate measurements with 0.1mVDC resolution is preferred for accurate adjustment (must have 3½ digit display). Use the plastic alignment tool provided to make the adjustment. The "bias" adjustment trimpot is accessible from the top of the circuit board, along the rear edge.

WARNING. This adjustment involves measurements of circuits that are 420 volts DC above chassis potential, with large energy storage. Use extreme care to avoid shock hazard and to avoid damage to the V140 or to your meter due to careless use of test leads. All meter test leads connections must be isolated from chassis or earth ground. Start with the meter on its highest range before making connections, and then select the 200mVDC range. Do not attempt current measurements.

Connect the voltmeter across R68, TP1 to TP2. Adjust the "bias" for an average reading of 75mVDC (.075 Volt DC) across R68.

Servo Balance Calibration

Verify the bias adjustment before setting the servo. The servo adjustments are factory set and should not require readjustment except in the event of a circuit malfunction or component replacement (R68, R69, or U2). They are not user adjustments and are not usually required when changing tubes.

Allow 2-3 hours undisturbed warmup with top and bottom covers in place, to fully stabilize tube currents and servo circuit temperatures. The unit should be in a normal horizontal position, with its rubber feet resting on a hard surface for normal ventilation.

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Tip the unit vertically on its handles, and remove the bottom cover. Connect a 3½ digit DVM between TP2 and TP3. **WARNING:** high voltage.

Adjust the 15-turn trimmer through the guide on the right side of the chassis. Use the *plastic alignment tool* supplied with the unit (not a metal screwdriver). Adjust for a null of less than 0.2mVDC indication. Response is very slow and it may take 20-30 seconds for the reading to stabilize after adjustment. Some fluctuation is normal, so use the average reading. For best results, the line voltage should be stable at about 120VAC, although the actual line voltage is not critical.

Servicing

Because of its careful design and exacting standards of manufacture, your V140 amplifier should normally require only minimal service to maintain its high level of performance.

CAUTION: The V140 amplifier contains sufficient levels of voltage and current to be *lethal*. Do not tamper with a component or part inside the unit. Even with the power turned off, a charge remains in the energy storage capacitors for some time. Refer any needed service to your authorized Audio Research dealer or other qualified technician.

The ten (10) vacuum tubes inside the V140 are high-quality KT90 and 6FQ7 tubes. Replacement output tubes should be matched for best sonic performance. (Your V140 comes from the factory with a matched set installed.) Reliable, matched, low gas KT90 tubes — such as those available from Audio Research — are strongly recommended for maximum performance and longevity. Check bias adjustment after replacing tubes.

Additional questions regarding the operation, maintenance or servicing of your amplifier may be referred to the Customer Service Department of Audio Research Corporation: (612) 939-0600.

Cleaning

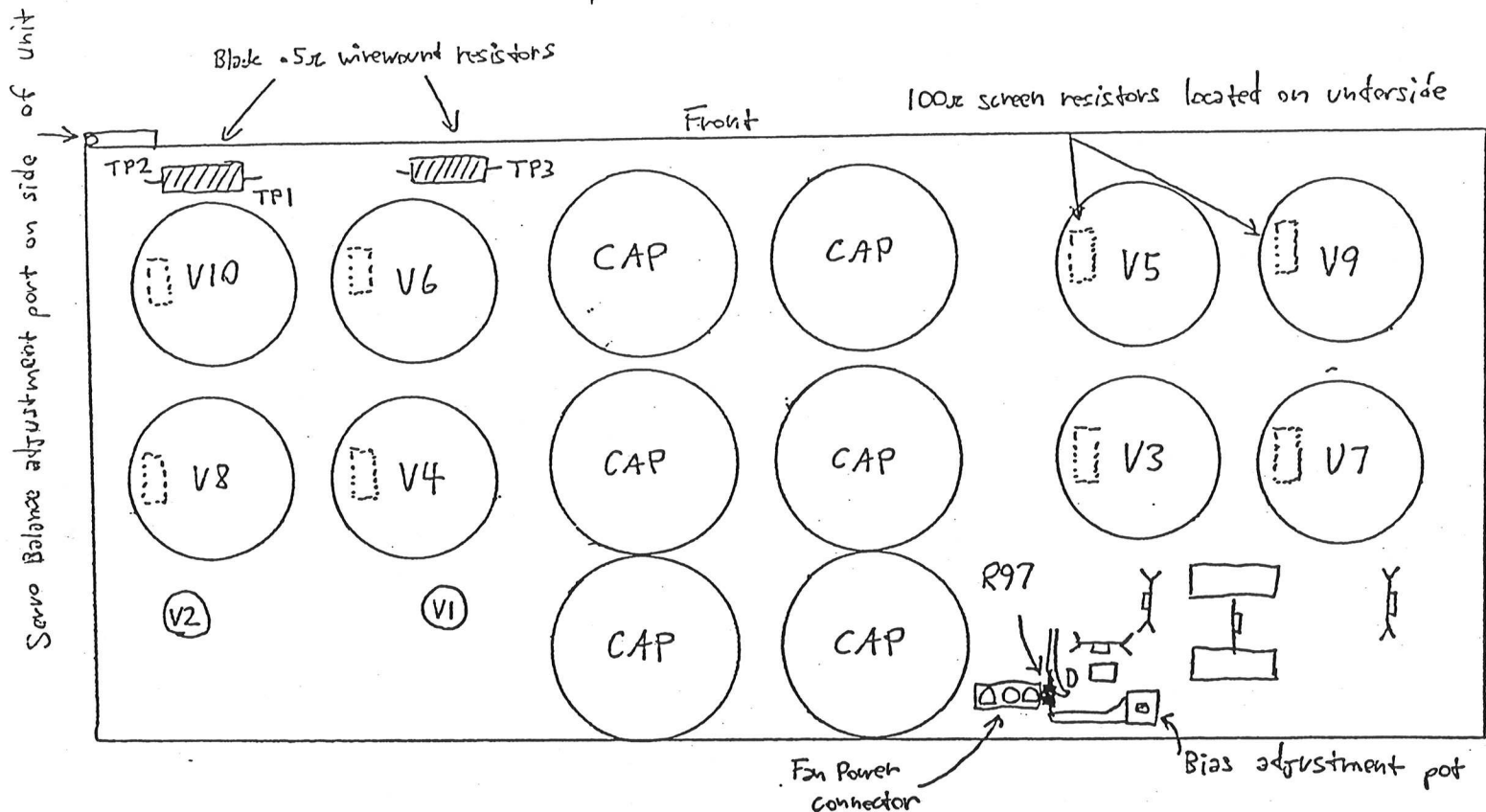
To maintain the visual appearance of your amplifier, occasionally wipe the front panel and top cover surfaces with a soft, damp (not wet) cloth to remove dust. A mild, non-alkaline soap solution may be used to remove fingerprints or similar smudges. Cleaners containing abrasives should *not* be used as they will damage the “brushed” grain of the front panel finish.

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CL120 / V140 BIAS INSTRUCTIONS
AND 6550 UPDATE



1. Referring to diagram above, check all screen resistors for damage due to previous tube arc if you are retubing unit. These are located below each tube socket underneath the board. They are brown colored with brown/black/brown/gold stripes. You may skip this step if you are just checking bias.
2. If you are replacing the factory-supplied KT-90 or KT-91 tubes with same, skip to step 3. For replacement with 6550's, proceed as follows. Locate R97 per above diagram. This will typically be 49.9K ohm (yellow/white/white/red) or 76.8k ohm (violet/blue/grey/red) and was selected to provide the 75mV bias required by the KT-90 or KT-91's at mid rotation of the bias control. Since the 6550's require 65mV bias, R97 must be changed to re-orient the bias control to approximately mid-rotation to allow for adjustment to compensate for tube aging. R97 should be changed to either 76.8k ohm or 100k ohm (whichever value allows proper 65mV bias, with some range of adjustment left on control).

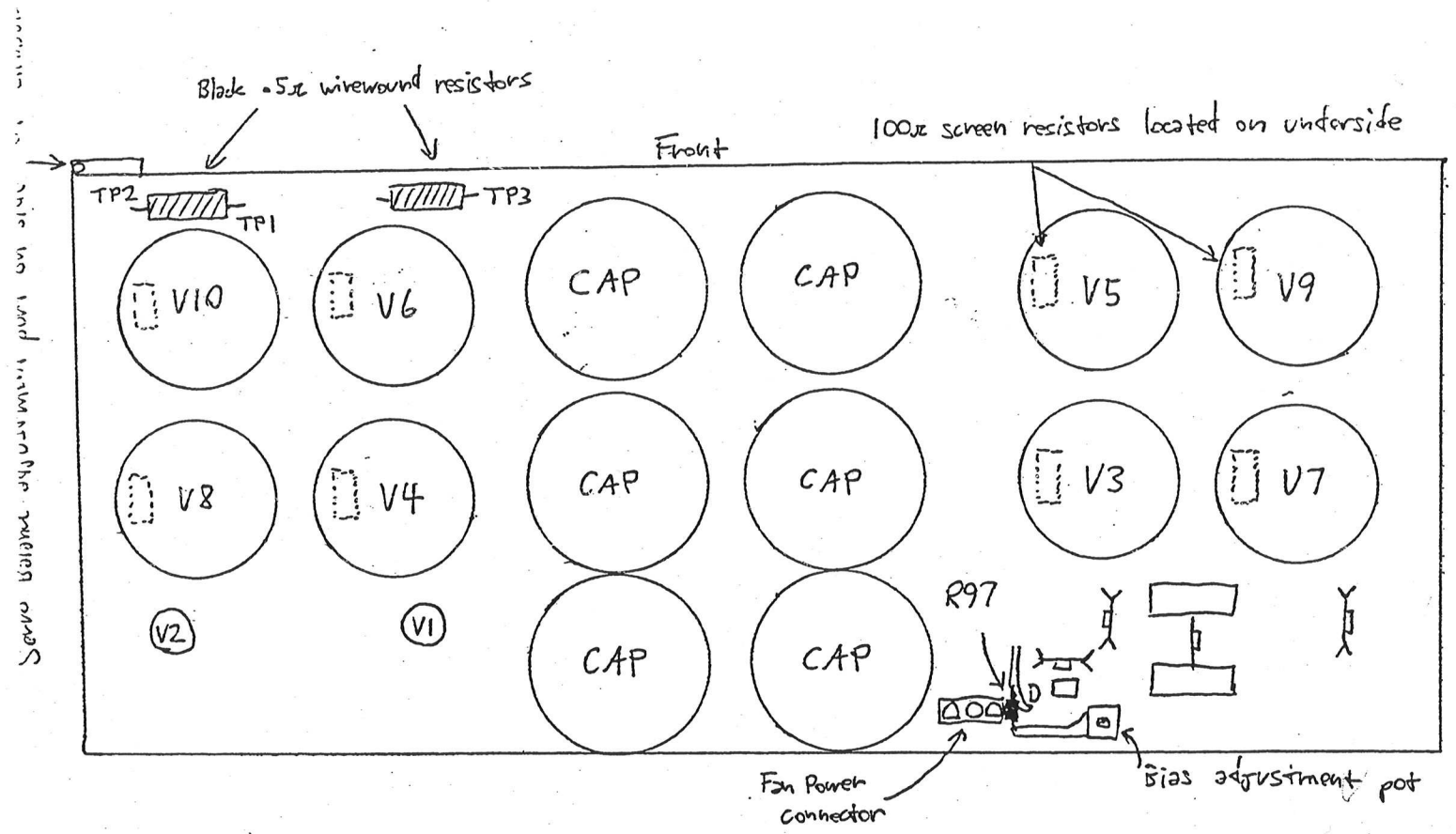
3. Locate TP-1, TP-2 per diagram. Attach 3½ digit DVM across test points. Set meter to 100mV range if applicable. Note that unless you have long probes it may be easier to set unit on its handles, remove bottom cover and access test points from below.
4. Turn on amp. Does not need to be connected to a load or speaker. Observe bias come up. Ignore + or - on DVM, you just want number. Set bias to 65mV for KT-88 or 6550 tubes; 75mV for KT-90/91/99A. Initially set bias about 10 to 15 mV low, it will rise as tubes heat up. Set final bias adjustment after 1 hr. warmup.
5. SERVO ADJUSTMENT ONLY
With amp fully warmed up and bias set, move probe from TP-1 to TP-3. Do not disturb probe at TP-2. Reading should be +/- .2mV or less. Normally this is a factory-set adjustment and does not need resetting. Resist the urge to "fiddle" with adjustment unless you are sure it is out of range. Normally after amp heats up, it will settle in.
6. If servo out of range, insert plastic probe that came with amp into port on right side near front. Line up with trim pot. Ensure that DVM positive probe connected to TP-3, negative to TP-2. Turn pot clockwise to make reading more positive, CCW to make negative. Turn pot in 1/4 turn increments to avoid over-adjusting. Allow 5 minutes before observing final reading. It is normal for reading to "float" as servo works.

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V140 / CL-120 BIAS INSTRUCTIONS AND KT-90/91/99A UPDATE



1. Referring to diagram above, check all screen resistors for damage due to previous tube arc if you are retubing unit. These are located below each tube socket underneath the board. They are brown colored with brown/black/brown/gold stripes. You may skip this step if you are just checking bias.

* 2. If you are installing KT-90s/91/99A you must change R97, located just to the right of fan power connector as viewed from rear. R97 is either a 127K ohm (brown/red/violet/orange) or 100K ohm (brown/black/black/orange). Note also, another resistor may be connected in parallel with R97 to the same traces on the bottom of the board. Remove both if paralleled. Install provided resistor at R97 location. If you are field-installing this update, you will need to select an R97 value that permits proper 75mV idle bias across TP-1, TP-2 after full warmup (1 hour), with bias adjustment pot at mid-rotation. This will allow enough range of adjustment to compensate for tube aging. Typical R97 values are from 49.9K ohm to 76.8K ohm. Skip this step if you are just checking bias.

* THE V140'S TUBED WITH RUSSIAN 6SS0'S HAVE 100K RESISTORS AT R97. THIS PERMITS A BIAS OF 65 MILS FOR MOST 6SS0 TUBES.

3. Locate TP-1, TP-2 per diagram. Attach 3½ digit DVM across test points. Set meter to 100mV range if applicable. Note that unless you have long probes it may be easier to set unit on its handles, remove bottom cover and access test points from below.
4. Turn on amp. Does not need to be connected to a load or speaker. Observe bias come up. Ignore + or - on DVM, you just want number. Set bias to 65mV for KT-88 or 6550 tubes; 75mV for KT-90/91/99A. Initially set bias about 10 to 15 mV low, it will rise as tubes heat up. Set final bias adjustment after 1 hr. warmup.
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