
Owner's Manual

Model V140

MONOBLOCK POWER AMPLIFIER

audio research
HIGH DEFINITION®

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Introduction

Please take time to carefully read and understand the following information and instructions before you install or attempt to operate your Audio Research V140 hybrid monoblock power amplifier. Becoming familiar with important facts about your amplifier and its correct operating procedures will help assure you of maximum musical satisfaction and reliable operation. The effort you invest now will be well rewarded as time goes by.

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The V140 hybrid monoblock power amplifiers represent an evolutionary improvement of the circuit topology first established in the popular "Classic" series amplifiers introduced by Audio Research a few years ago.

While continuing to use triode operation and Audio Research's patented, cross-coupled circuit, the V140 amplifier also incorporates a fully balanced input stage to minimize noise and distortion products that otherwise could degrade the musical performance of the output stage. The input stage uses select J-FET transistors with MOSFET followers to provide ultra quiet, low-impedance drive to the 6FQ7 dual triodes, which directly drive the output tubes. Partial cathode coupling and highly advanced output transformer design yield an effective power bandwidth of 10 Hz to 80 kHz. Audio Research's patented DEC (Decoupled Electrolytic Capacitor) circuit and the latest coaxial coupling capacitors are used to further enhance the performance of this remarkable amplifier.

The V140 also incorporates unique "soft" start-up and shut-off modes to help prevent life-shortening current "spikes" from reaching the output tubes. At turn-on, a 30-second delay allows the output tube heaters to rise to proper operating voltage and lets bias supply voltage stabilize; this sequence is then followed by a two-second ramp-up of B+ supply voltage to enable normal operation. Similarly, at turn-off the B+ supply voltage is ramped down to prevent abrupt loss of operating bias — again preventing undue stress to the output tubes.

In short, the V140 is an elegant, logical refinement of proven circuit design, with an astonishing ability to resolve meaningful musical detail. Providing sufficient power to drive a wide variety of today's highest quality loudspeakers, the V140 is both versatile and virtuoso; it will produce highly satisfying results from dynamic, electrostatic or planar loudspeaker types.

And, while shipped with KT90 type power output tubes, the V140 is compatible with several popular alternative tube types: 6550, 6550A, KT88 or KT100. (See instructions for output tube biasing elsewhere in this manual.)

You will find the performance of the V140 amplifiers a revelation in reproducing hitherto hidden musical intri-

cacies, as well as in lifelike dynamic expression; it is a revelation you will continue to enjoy for years to come.

Construction and Testing

Like every Audio Research product, your V140 power amplifier has been designed and carefully handcrafted in the U.S.A., using precision mechanical parts, electronic components and assembly procedures similar to those used in the manufacture of scientific equipment and musical instruments. To assure consistent performance standards, each V140 is visually inspected at several assembly points, test run, electronically tested and sonically evaluated prior to shipment.

This time-consuming, perfectionist approach to the design and manufacture of audio equipment is intended to provide you with the best in musical satisfaction and lasting value.

Packaging

Save all the packaging in a dry place. Your Audio Research amplifier is a precision electronic instrument and should be properly cartoned any time shipment is made. Because of its weight, it is highly probable that the unit will be damaged during shipment if repackaged in cartoning other than that designed for the unit.

You may not have occasion to return the unit to the factory for service, but if that should prove necessary, or other occasion to ship it occurs, the original packaging may save your investment from unnecessary damage, delay and expense.

Unpacking

The V140 is packed within two cartons (inner and outer) which have impact-absorbing panels in between. Because of the weight of the unit and because it is a precision electronic instrument it is necessary to take reasonable care of its unpacking and preparation for use.

It is best to have a large, open work area with two persons available to help. Set the carton upright in the center of the work area and with a small knife carefully slit the taped edges of the outer carton's top flaps. Fold the flaps to the sides and while holding the inner carton in place, roll the unit upside down. You can now lift the outer carton off and set it and the filler panels aside. Now slit the inner carton's taped seams on the bottom (now facing upward). Again, fold the flaps over and while holding the unit in, roll it over as before. You can now lift the inner carton off to find your V140 sitting upright, undamaged and uncartoned. Carefully remove the plastic wrap. Now, while you remember how, reassemble the carton system for future use.

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Accessories

- 1 – Phillips-head screwdriver for cover removal
- 1 – Plastic screwdriver for bias adjustments

User-replaceable spare fuses include:

- 2 – 1/4 Amp AGC 250V normal-blow with 100V, 120V and 220V/240V units
- 2 – 6 1/4 Amp MDX 125V slo-blow with 120V units
- 2 – 7 Amp MDX 125V slo-blow with 100V units
- 2 – 3 Amp MDQ 250V slo-blow with 220V/240V units

Warnings

1. To prevent fire or shock hazard, do not expose your V140 to rain or moisture.
2. This unit contains voltages which can cause serious injury or death. Do not operate with covers removed. Refer servicing to your authorized Audio Research dealer or other qualified personnel.
3. The 16-gauge, 3-conductor power cord on your V140 is equipped with a standard 3-prong grounding plug. If used normally, it will provide a safe earth ground connection of the chassis. Refer to the section on "AC Power Connections" for detailed information.
4. For continued protection against fire hazard, replace fuses only with the same type and rating of fuses as specified.

Preparation for Use

Your V140 amplifier is shipped with the vacuum tubes packed in individual protective cartons. These must be unpacked and installed before you attempt to operate the amplifier. Proceed according to the following instructions.

1. Using the Phillips-head screwdriver provided, remove the top cover assembly, setting it and the retaining screws aside.

2. Carefully remove each vacuum tube from its carton and match its location number (written on the base of the tube and on its protective carton) to the number printed next to each socket on the circuit board. Firmly seat each tube in its matching socket, taking care to "key" the tube pins to the socket holds. Retain the tube cartons with other packing materials for possible future use.
3. Once all vacuum tubes have been installed, reposition the top cover assembly over the chassis and, reaching underneath the cover, connect the internal cooling fan power cord to the socket located to the rear of the circuit board; see "Connecting Cooling Fans" for further details.

Note: Contact Enhancers – such as the commercial preparation "Tweek" – are *not* recommended for use on vacuum tube contact pins. With continual exposure to heat and air, these substances can form gummy, dust-collecting residues which actually *reduce* contact and degrade sonic performance. Proper *external* use of these preparations – on interconnect plugs, speaker connections, etc. – is subject to the discretion of the owner.

Connecting Cooling Fans

Your V140 amplifier has two small cooling fans mounted to the inside rear of the top cover. These fans must be connected to an internal power socket before the amplifier is connected to an external AC power line. Once you have installed the vacuum tubes according to directions, set the top cover in position on the amplifier chassis. Lifting the back side of the cover, reach underneath, grasp the fan power plug suspended from the underside of the cover and plug into the power socket located just behind the main power supply capacitors on the circuit board. **Be sure the amplifier is not connected to external AC power when you connect fans to the internal power source.** Once fans have been plugged into the internal socket, reposition top cover and secure with retaining screws.

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Panel Controls

The front panel has:

- 1 – Switch 1 - Power Line On-Off
- 2 – Fuse holders: 1 - Power Line
 1 - High Voltage
- 2 – Indicators: 1 - Power "ON" (Green)
 1 - High Voltage (Green)

Use of Controls

POWER-ON SWITCH: Initiates/terminates AC line power to the amplifier. Function indicated by green LED at left of toggle switch.

Note: Audio Research does *not* recommend leaving your V140 "on" 24 hours a day as is the custom of some audiophiles to achieve maximum sonic performance on demand. While this is often recommended for solid-state equipment, Audio Research does not recommend this procedure for vacuum tube power amplifiers. (2,000 hours of tube life will pass by in 84 days!)

Installation

Two internal cooling fans located at the rear of your V140 help preserve component and tube life and also allow installation within a ventilated cabinet. However, the following guidelines should be observed in order to maximize the performance and service life of your amplifier.

To insure normal component life and safe operation this unit **must be operated only in a horizontal (upright) position**. Adequate air flow and proper cooling thereby can occur only if there is no restriction **below, behind and above** the unit.

The five (5) special non-marring elastomer feet provide adequate spacing only from a smooth, hard surface. **Never operate the unit while it is sitting on a surface such as a rug or carpet.**

If the unit is to be operated in an enclosure such as an equipment rack, make certain that adequate air flow above and below the unit is provided. The "ambient" operating temperature should never exceed 120°F or 49°C. Audio Research Corporation Rack Mount Ventilators (RMV-3) must be used above and below each unit. Improper installation will cause premature tube failure and will affect your warranty, as well as the service life of the unit.

It is normal for a vacuum tube power amplifier to run quite "warm," and if used for prolonged periods, "hot" to the touch. All components within are, however, operated at safe, conservative levels and will not be improperly affected thereby, providing the requirements outlined above are adhered to.

Connection Instructions

The rear panel has:

- 1 – Input XLR connector
- 1 – Output Barrier Terminal Block
- 1 – Power Line Cord

IMPORTANT: Use the best available speaker wires and interconnects. Audio Research cannot emphasize this enough. As better components and systems are developed, it becomes increasingly important to avoid the limitations of inferior system interconnections. For best results we recommend Audio Research LITZLINK® interconnects and LITZLINE® speaker cables.

Audio Research uses circuitry called "partial cathode coupling" in all of its vacuum tube and hybrid power amplifier designs. This requires the 4 ohm taps of the V140's outputs to be grounded (internally). This is of no consequence when using most loudspeakers. Simply connect the "negative" speaker lead to "0" and the "positive" speaker lead to 4, 8 or 16 ohms, as required.

Some loudspeakers, however, including the Polk SDAs, Infinity RS-1 Series, and possibly some electrostatic designs have "common ground" systems, either by hookup between the speakers or in a special crossover device. Most headphone adaptor boxes also have a common ground. In these instances it is important to connect the "negative" speaker leads (or headphone common leads) to the "4" ohm taps rather than the "0" ohm taps to avoid shorting the amplifier or causing monaural performance to occur. Use either "0" ohms or "16" ohms for the "positive" speaker leads. (The "0" ohm tap will provide an inverted signal. Contact your authorized Audio Research dealer or Audio Research Customer Service Department for help with these special cases.)

It is important sonically that your entire system be connected so that the audio signal arriving at the speakers has correct, or "absolute" polarity (i.e., non-inverted). Connect the black or "-" speaker terminal to the wire that connects to the "0" terminal on the V140. Connect the red or "+" speaker terminal to the wire that connects to the "4", "8" or "16" terminal on the V140. Use the best available speaker cables and tighten the screw terminals securely with the phillips screwdriver supplied to ensure best sonic results.

MATCHING: It is important to use as close as possible an impedance match between the amplifier and speaker for optimum transfer of power to the speaker with minimum distortion. In the case of speaker systems with significant variations in impedance throughout the frequency spectrum, such as most electrostatic types, determine the best impedance match empirically for best overall sonic results.

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Connect the V140 input to the preamplifier or electronic crossover, using only the highest grade of audio interconnect cables. To avoid sonic degradation use the shortest practical length of cables.

AC POWER CONNECTIONS: It is essential that the V140 amplifier be connected to a wall AC power receptacle, or a similar heavy-duty source. If it is connected to convenience receptacles on preamplifiers, etc., the full sonic V140 capabilities of both the V140 and the preamplifier may be compromised. Furthermore, the proper control of start-up and shut-down surges may not occur unless the power switch on the front of the V140 is actually used for on/off control of the amplifier. The AC power source for the V140 amplifier should be capable of supplying 15 amperes for 100 or 120 volt units, or 8 amperes for 220 or 240 volt units.

For the very best performance on domestic 100 or 120 volt circuits, the V140 should be connected to its own AC power circuit branch, protected by a 15 amp breaker. The preamplifier and other audio equipment should be connected to a different power circuit and breaker. If the power receptacle of the V140 is more than 25 feet from the building power entrance and breaker box, it would be preferable to use installed wiring capable of 30 amperes to minimize voltage drop, using a 15 amp breaker. Avoid

the use of extension cords. If they must be used on a temporary basis, use 14-gauge or heavier cords.

The V140 utilizes a compatible grounding system that generally does not require a "ground lifter" adapter plug on the AC power cord to minimize hum. The power cord on your V140 has a standard three-prong grounding plug to provide maximum safety when it is connected to a ground wall receptacle. If there is any question regarding the safety of grounding procedures, be certain to seek competent help with the installation.

If electronic crossovers or other AC powered equipment is used with the V140 it may be necessary to use "ground lifter" adapters on the power plugs of that equipment to minimize system hum. Generally, the lowest hum is achieved when the only direct connection between audio common "ground" and true earth ground occurs in the preamplifier, through its grounded power cord. Other equipment in the system should have some form of isolation to prevent ground loops and associated hum.

Always place the power on-off switch on the front of the V140 in the OFF position before connecting the power line cord to AC power.

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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.

3-Year Limited Warranty

Terms and Conditions

1. LIMITED WARRANTY

Audio Research warrants the product designated herein to be free of manufacturing defects in material and workmanship, subject to the conditions hereinafter set forth, for a period of three (3) years from the date of purchase by the original purchaser or no later than five (5) years from the date of shipment to the authorized Audio Research dealer, whichever comes first, excepting vacuum tubes which are warranted for 90 days only (See 6).

2. CONDITIONS

This Warranty is subject to the following conditions and limitations. The Warranty is void and inapplicable if the product has been used or handled other than in accordance with the instructions in the owner's manual, abused, or misused, damaged by accident or neglect or in being transported, or the defect is due to the product being repaired or tampered with by anyone other than Audio Research or an authorized Audio Research repair center. The product must be packed and returned to Audio Research or an authorized Audio Research repair center by the customer at his or her sole expense. Audio Research will pay return freight of its choice. A RETURNED PRODUCT MUST BE ACCOMPANIED BY A WRITTEN DESCRIPTION OF THE DEFECT AND A PHOTOCOPY OF THE ORIGINAL PURCHASE RECEIPT. This receipt must clearly list model and serial number, the date of purchase, the name and address of the purchaser and authorized dealer and the price paid by the purchaser. Audio Research reserves the right to modify the design of any product without obligation to purchasers of previously manufactured products and to change the prices or specifications of any product without notice or obligation to any person.

3. REMEDY

In the event the above product fails to meet the above Warranty and the above conditions have been met, the purchaser's sole remedy under this Limited Warranty shall be to return the product to Audio Research or an authorized Audio Research repair center where the defect will be rectified without charge for parts or labor, except vacuum tubes (See 6). For a period of one year from date of purchase, Audio Research will pay round-trip freight of the company's choice for any product requiring return to the factory for authorized warranty service; such product(s) must originate from and will be returned to the retail store where purchased.

4. LIMITED TO ORIGINAL PURCHASER

This Warranty is for the sole benefit of the original purchaser of the covered product and shall not be transferred to a subsequent purchaser of the product.

5. DURATION OF WARRANTY

This Warranty expires on the third anniversary of the date of purchase or no later than the fifth anniversary of the date of shipment to the authorized Audio Research dealer, whichever comes first.

6. VACUUM TUBES

Vacuum tubes are warranted for the original 90-day period only.

7. DEMONSTRATION EQUIPMENT

Equipment used by an authorized dealer for demonstration purposes is warranted to be free of manufacturing defects in materials and workmanship for a period of three (3) years from the date of shipment to the dealer. Vacuum tubes are warranted for 90 days. After the first year, demo equipment needing warranty service must be packed and returned to Audio Research by the dealer at his sole expense. Audio Research will pay return freight of its choice. A returned product must be accompanied by a written description of the defect on an AUDIO RESEARCH RETURNED GOODS AUTHORIZATION form. Dealer-owned demonstration equipment sold at retail within three (3) years of date of shipment to the dealer is warranted to the first retail customer to be free of manufacturing defects in materials and workmanship for the duration of the 3-Year Limited Warranty remaining (as measured from the date of shipment of the equipment to the dealer). Vacuum tubes are not warranted for any period under these conditions of sale. In the event warranty service is needed under these conditions, the owner of the equipment must provide a copy of his purchase receipt, fulfilling the requirements described under "2. Conditions" above. The product must be packed and returned to Audio Research or an authorized Audio Research repair center by the customer at his or her sole expense. Audio Research will pay return freight of its choice.

8. MISCELLANEOUS

ANY IMPLIED WARRANTIES RELATING TO THE ABOVE PRODUCT SHALL BE LIMITED TO THE DURATION OF THIS WARRANTY. THE WARRANTY DOES NOT EXTEND TO ANY INCIDENTAL OR CONSEQUENTIAL COSTS OR DAMAGES TO THE PURCHASER. Some states do not allow limitations on how long an implied warranty lasts or an exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

9. WARRANTOR

Inquiries regarding the above Limited Warranty may be sent to the following address:

Audio Research
5740 Green Circle Drive, Minnetonka, Minnesota 55343-4424.
ATTN: Customer Services

Warranty Outside the U.S.A.

Audio Research has authorized distribution in many countries of the world. In each country, the authorized importing retailer or distributor has accepted the responsibility for warranty of our products. Warranty service should normally be obtained from the importing retailer or distributor from whom you purchased your product.

In the unlikely event of service required beyond the capability of the importer, Audio Research will fulfill the conditions of the warranty. Such product must be returned at the owner's expense to the Audio Research factory, together with a photocopy of the bill of sale for that product, a detailed description of the problem, and any information necessary for return shipment.

Specifications

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POWER OUTPUT: 120 watts minimum continuous at 16 ohms from 20Hz to 20kHz with less than 1.0% total harmonic distortion (typically below .005% at 1 watt)

Approximate actual power available at "clipping": 125 watts (1kHz) (Note that actual power output is dependent upon both line voltage and "condition" ie: if power line has high distortion, maximum power will be affected adversely, although from a listening standpoint this is not very critical.)

POWER BANDWIDTH: (-3dB Points) 10Hz to 80kHz

INPUT SENSITIVITY: 1.3V RMS balanced for rated output

INPUT IMPEDANCE: 400K ohms balanced

OUTPUT REGULATION: Approximately 0.2dB 16 ohm load to open circuit (Damping factor approximately 45)

OVERALL NEGATIVE FEEDBACK: 21dB

SLEW RATE: 17 volts/microsecond

RISE TIME: 2.0 microseconds

HUM & NOISE: Less than 1.0mV RMS — 92dB below rated output (20kHz bandwidth unweighted, input shorted)

POWER SUPPLY ENERGY STORAGE: Approximately 415 joules

POWER REQUIREMENTS: 105-125VAC 60Hz (210-250VAC 50Hz) 450 watts at rated output, 700 watts maximum, 330 watts at "idle"

TUBES REQUIRED: 4 — Matched pair KT90 — Power Output; 2 — 6FQ7/6CG7 — Drivers

DIMENSIONS: 19" (48 cm) W (standard panel rack) x 8³/₄" (22 cm) H x 15³/₄" (40 cm) D (front panel back). Handles extend 1⁵/₈" (4.1 cm) forward of the front panel. Output connectors extend 1" behind rear panel.

WEIGHT: 61 lbs. (27.7 kg) Net; 75 lbs. (34.1 kg) Shipping

Specifications subject to change without notice.

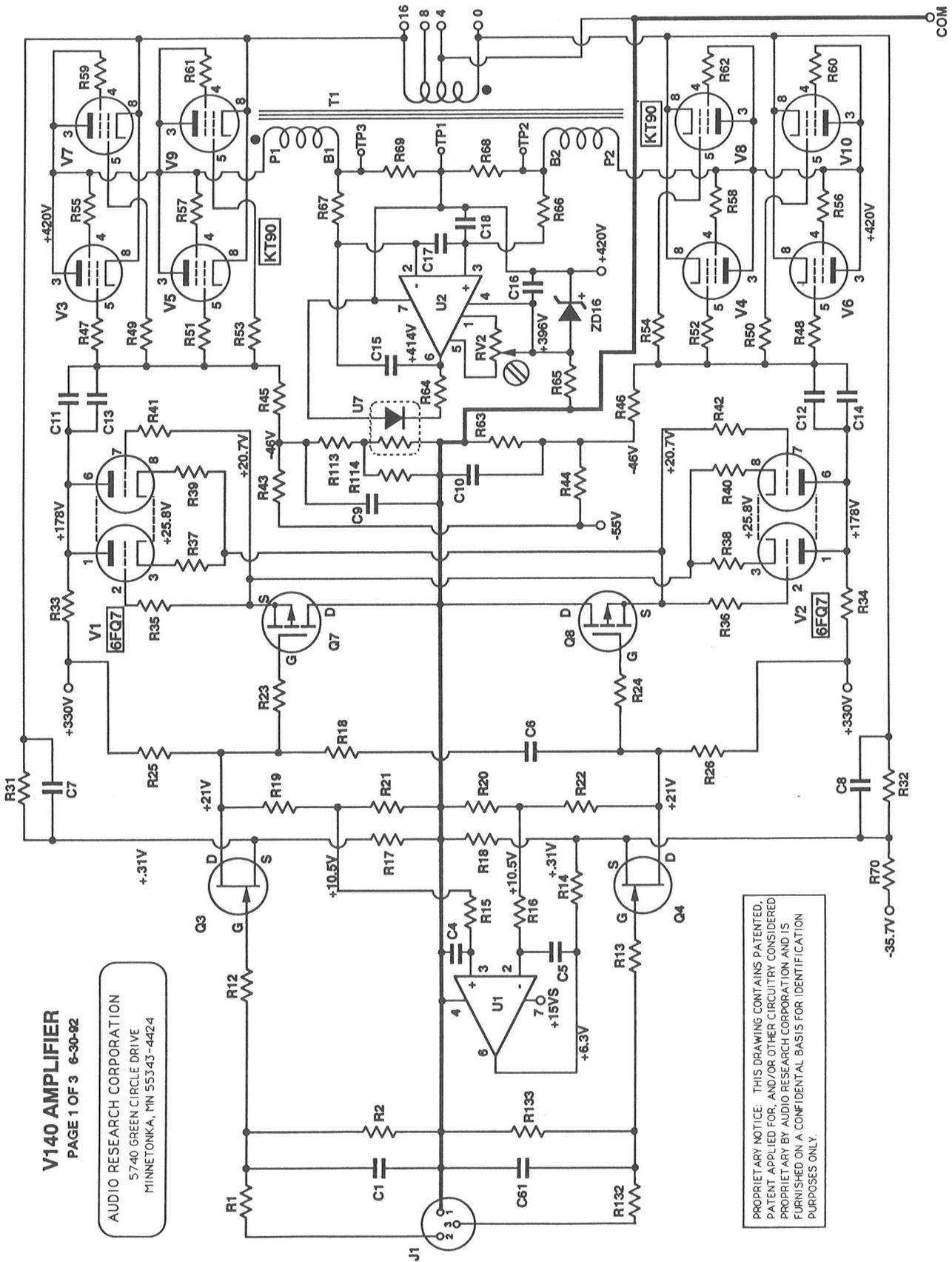
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Model V140 Schematics

V140 AMPLIFIER

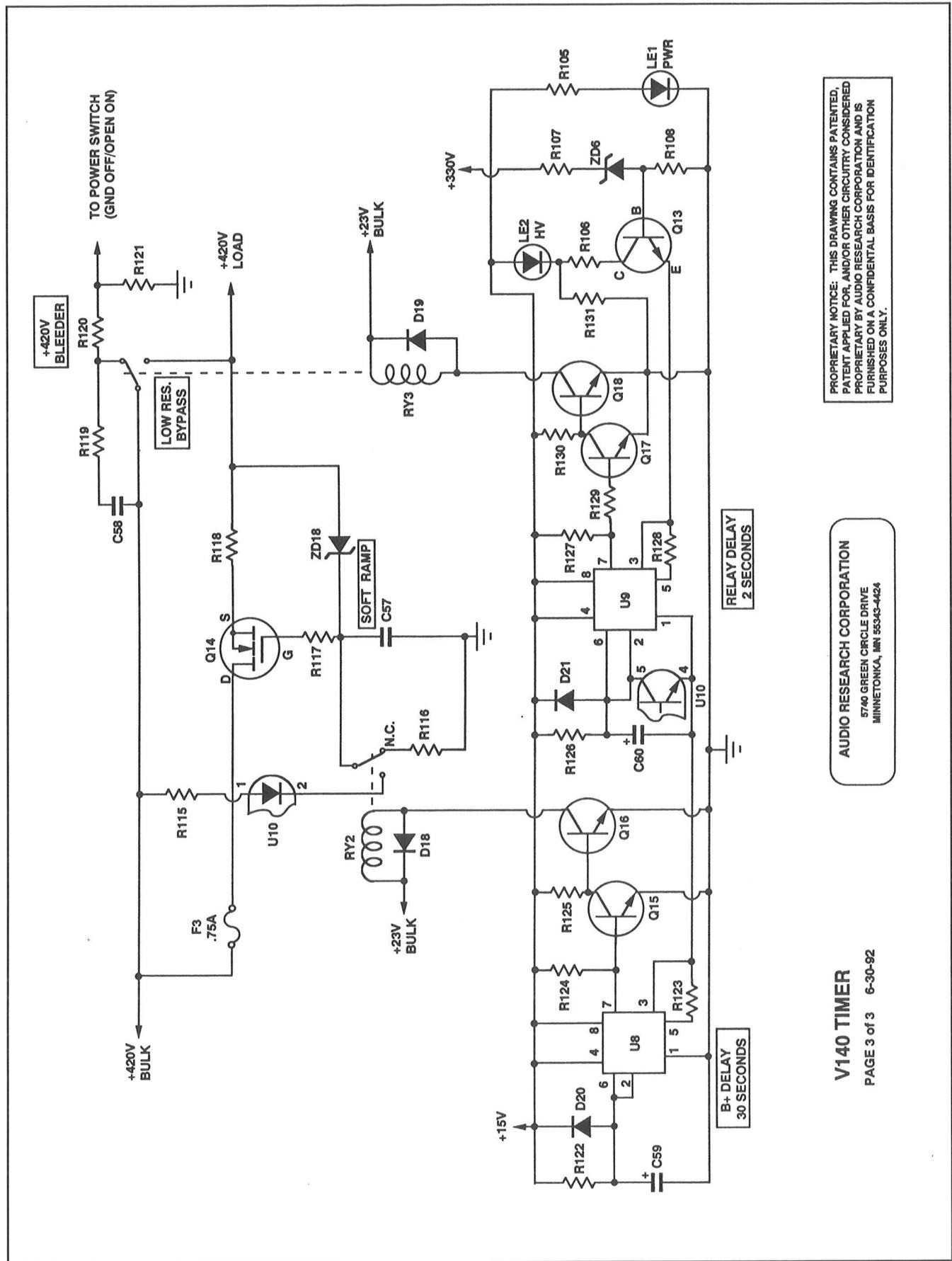
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Model V140 Schematics



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V140 TIMER
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Model V140 Parts List

Schematic Symbol	Quantity	ARC Part	Description	Schematic Symbol	Quantity	ARC Part	Description
C CAPACITORS				R RESISTORS			
C 1,1A,61,61A	4	53150202	CAP. 150 PF 2 1/2% 630V PPN	R 68,68A,69,69A	4	43050004	RES. 0.5 OHM +/-2% 3W W.W.
C 4,5,15,18,33,34,35,41,42,44,62	11	53220507	CAP. .22 UF 10% 160V	R 70,107	2	42121503	RES. 121K 1% MK-350PPM
C 6	1	53330200	CAP. 330 PF 2.5% 160V	R 71	1	43100202	RES. 100 OHM 2W 5%
C 7,8	2	53560103	CAP. 56 PF +/-2% 630V DPN	R 73	1	46100201	RES. POWER OX.100 OHM 5% 3W
C 9,10,16,46	4	53100408	CAP. .01 UF 10% 63V PPN	R 74,92	2	42301503	RES. 301K 1% MK-3 50PPM
C 11,14	2	53100412	CAP. .01UF 600V	R 75	1	42392403	RES. 39.2K 1% MK-3 50PPM
C 12,13	2	53100610	CAP. 1UF 400V MIT	R 78,131	2	42499303	RES. 4.99K 1% MK-3 50PPM
C 17	1	53220306	CAP. 2200 PF 10% 100VDC	R 79A,87	2	42178403	RES. 17.8K 1% MK-3 50PPM
C 19-24	6	50800801	CAP. 800 UF 450V GRAY	R 80A	1	42562513	RES. 562K 1% MK-4 50PPM
C 25,26,27,36	4	53200602	CAP. 2 UF +/-10% 450V	R 81	1	42332203	RES. 332 OHM 1% MK-3 50PPM
C 28,29,30	3	53200612	CAP. 2 UF 450V REL. SEL.	R 82,100	2	43100002	RES. 1 OHM 2W 5% W.W.
C 31,31A,32,32A,37,40,52,58	8	53100406	CAP. .01 UF +/-10% 630V	R 83-86,101-103,117	3	42100203	RES. 100 OHM 1% MK-3 50PPM
C 38	1	50100909	CAP. 1000 UF 100V,NICHICON	R 87,115	2	42100103	RES. 10 OHM 1% MK-3 50PPM
C 39,45	2	53200603	CAP. 2 UF +/-10% 250V	R 88,108,124,125,127,129,130	7	42100403	RES. 10K +/-1% MK-3 50PPM
C 43	1	53100505	CAP. .1 UF 10% 63V	R 89	1	42133503	RES. 133K 1% MK-3 50PPM
C 47	1	50680800	CAP. 1000UF 35V	R 94	1	42432103	RES. 43.2 OHM 1% MK-3 50PPM
C 48,60	2	51220601	CAP. 2.2 UF +/-10% 25V	R 96	1	42121303	RES. 1.21K 1% MK-3 50PPM
C 53,54,55,56	4	53100407	CAP. .01 UF 250V 20% MPE MALL.	R 97	1	42127503	RES. 127K 1% MK-3 50PPM
C 57	1	53100504	CAP. .1 UF 600V	R 99	1	42274403	RES. 27.4K 1% MK-3 50PPM
C 59	1	51330702	CAP. 33 UF +/-10% 16V	R 114,123,128	3	42768403	RES. 76.8K 1% MK-3 50PPM
D DIODES				RV CONTROLS			
D 1,6-13,18,19	11	30500400	IN4005 GENERAL INSTRUMENT	RV 1	1	45100527	POT. 100 K 10%
D 2,3,4,5	4	30503310	EDAL #M4G5	RV 2	1	45500301	TRIM POT, 5K 10% 15 TURN
D 14,15,20,21	4	30500910	1N916B	RY RELAYS			
F FUSES				SW SWITCHES			
F 1	1	34501000	FUSE, 6-1/4 MDX	RY 1	1	64101200	RELAY, 24V POWER ON
F 2	3	34500102	FUSE, 1/4 250V	RY 2,3	2	64101300	RELAY, 24V 10A PC MNT.
F 3	1	34500280	FUSE, 3/4AMP FAST	T TRANSFORMERS			
J CONNECTORS				TH THERMISTORS			
J 1	1	23201970	XLR CONNECTOR (Female)	TH 1,2	1	47000300	THERMISTOR 30 OHM +/-20% CL60
L INDUCTORS				U INTEGRATED CIRCUITS			
L 1	1	61000170	CHOKO, 5.5 UH	U 1	1	31001901	TLO71CP TESTED(RED LINE)
LE PANEL INDICATOR				U 2	1	31002401	LF 441 CN TESTED-ACCEPT
LE 1,2	2	34300102	L.E.D.COLLAR & RETAINING RING	U 3,4	2	31002200	MC34071P
Q TRANSISTORS				U 6	1	31002000	MC7815CT
Q 3,4	2	30006525	FET, WHITE RED GREEN	U 7	1	34400122	PHOTO COUPLER TESTED
Q 7,8	2	30008106	FET, GRAY RED BLUE	U 8,9	2	31000801	TIMER
Q 9	1	30006761	FET, ORANGE YELLOW BROWN	U 10	1	34400402	PHOTO COUPLER 4N35 TESTED
Q 10	1	30006200	MTP 2P45	V VACUUM TUBES			
Q 11	1	30007029	FET, GRAY WHITE	V 1,2	2	32000201	VAC.TUBE, 6CG7/6FQ7
Q 13,15,16,17,18	5	30002800	TRANSISTOR,2N4401	V 3-10	8	32001700	VAC.TUBE, KT90
Q 14	1	30006910	FET, BROWN	ZD ZENER DIODES			
R RESISTORS				ZD ZENER DIODES			
R 1,132	2	42100314	RES. 1K 1% MK-5 50PPM	ZD 1,11	2	30500300	IN4740A
R 2,133	2	42205503	RES. 205K 1% MK-3 50PPM	ZD 2,3,13,14	4	31000705	LM329DZ GREEN
R 12,13,17,18	4	42150203	RES. 150 OHM 1% MK-3 50PPM	ZD 4,19	2	30504210	IN5355A (KNOX ONLY)
R 14	1	42215403	RES. 21.5K 1% MK-3 50PPM	ZD 5	1	30503500	IN5359 B
R 15,16,66,67	4	42464603	RES. 4.64 MEG. 1% MK-3 50PPM	ZD 6	1	30503600	TRANSIENT SUPPRESSOR
R 18,63,63A,64,79,93,95,113	8	42150403	RES. 15K 1% MK-3 50PPM	ZD 10	1	30504700	DIODE,1N5262B
R 19,20,21,22,98	5	42750303	RES. 7.5K 1% MK-3 50PPM	ZD 12	1	30501800	IN5245B
R 23,24,29,30,90	5	42549103	RES. 54.9 OHM 1% MK-3 50PPM	ZD 15,17	2	31002600	ZENER DIODE, TL431CLP ADJ
R 25,26	2	42825405	RES. 82.5K 1% MK-8 50PPM	ZD 16,18	2	30502500	IN4749
R 27,27A,28,28A,80	5	42280513	RES. 280K1% MK-4 50PPM				
R 31,32	2	42511313	RES. 5.11K 1% MK-4 50PPM				
R 33,33A,33B,33C,34,34A,34B	12	42100505	RES. 100K 1% MK-8 50PPM				
R 34C,76, 134,135							
R 35,36,41,42	4	42499203	RES. 499 OHM 1% MK-3 50PPM				
R 37,38,39,40,43,44,44A	8	42392303	RES. 3.92K 1% MK-3 50PPM				
R 37A,38A,39A,40A	4	42301303	RES. 3.01K 1% MK-3 50PPM				
R 45,45A,46,46A,91	5	42357403	RES. 35.7K 1% MK-3 50PPM				
R 47-54,105	10	42100303	RES. 1K 1% MK-3 50PPM				
R 55-62,119	9	43100200	RES. 100 OHM 5% 2W				
R 65,72,116,121	4	42300514	RES. 300K 1% MK-5 50PPM				