

MODEL SP-6A PREAMPLIFIER
INSTRUCTION MANUAL

Rev. D
3/28/79

audio research corporation

2843 TWENTY-SIXTH AVENUE SOUTH
MINNEAPOLIS, MINNESOTA 55406

SPECIAL NOTICES SECTION

Read Before Operating Unit

I. USE CAUTION

It is important to note, before placing this unit in operation, that the SP-6A is a vacuum tube device, with special circuitry for exceptional dynamic range and wide bandwidth.

The nature of this circuitry is such that a high amplitude sub-sonic surge is generated at it's output both at turn-on and at power off (also generated if the AC power line voltage is interrupted).

Two provisions have been made to protect the power amplifier and the speakers used with this preamplifier:

1. A separate on-off switch is provided for the "switched outlets" so that the preamplifier may be turned on and warmed up (5 minute wait recommended) before the power amplifier is turned on.

Conversely, the outlet switch should be turned off (again, a 5 minute wait is recommended) prior to turning off the preamplifier so that the amplifier can discharge it's energystorage (before the pre-amplifier is turned off).

2. A "mute" switch is also provided. This allows the output of the SP-6A to be opened internally during warm-up and turn-off to eliminate stress on your amplifier even when it is not on.

(Some manufacturers' solid state amplifiers use very low voltage components that could be damaged by these pulses.) The "mute" switch should also be used to protect speakers from low frequency signals when a tone arm is moved.

When pickup cartridges or head amplifiers are changed, the input selector should also be switched to an unused position, to minimize the need to wait for the SP-6A to internally restabilize (with the mute switch on also).

II. POWER LINE VOLTAGE INTERRUPTION HAZARD

The SP-6A has well regulated power supplies that are immune to normal line voltage fluctuations. However, if your power line voltage is interrupted (summer lightning storm, etc.) the same problem outlined above will occur.

To avoid possible speaker burnout, it is essential that your speakers be fused with appropriate size fuses. This is a highly desirable procedure in all audio systems, since this also provides protection to your speakers in the event of an amplifier, preamplifier or program source malfunction. If you do not know the proper size fuses for your speakers, we strongly urge you to obtain the speaker manufacturer's recommendation for the appropriate fuse.

Proper fusing can save you much inconvenience and costly speaker repairs.

III. WARRANTY REGISTRATION CAUTION

It is your responsibility to register your unit. While it is true that ARC will provide warranty service for 90 days even if you do not (proof of purchase required), you will lose the extended 3-year warranty unless you register the unit within 30 days of the date of your purchase. See our warranty statement for complete information about this.

It is also important to register your unit so that ARC can contact you, if the need arises, for any possible modification news, etc.

Finally, please read the rest of this manual to familiarize yourself with the unit.

SP-6A INSTRUCTIONS

The front panel has a total of 4 controls and 4 switches:

GAIN: This controls volume or loudness, and is a special segmented control with approximately 2 dB steps and accurate tracking. Although useable results can be obtained with settings anywhere in the operating range, more convenient control, best sound quality and signal-to-noise ratio will be obtained if the input signal levels and amplifier input sensitivity allow normal listening to occur in the 11 o'clock to 2 o'clock range of the volume control.

In the case of some high efficiency speakers (such as Klipschorn, etc.) and/or high output cartridges, it may be found with some high gain amplifiers (that do not have an input volume control) that normal listening will occur with the gain control just barely on, or up to the 9 o'clock position. If this proves to be the case, move the gain range switch on the rear chassis panel to the "low" or 50 dB gain setting. This will reduce the overall gain by 10 dB and allow better use of the front panel gain control. (Caution: Only operate this switch with the unit turned off, and be sure to lock it back in position, so that it cannot be accidentally moved while in use. Moving this switch with the unit on will almost certainly cause damage to your amplifier and/or speakers.

BALANCE: A conventional stereo control. Moves the sound from left to right or vice versa when rotated. Normally should be left centered.

MODE: Also a conventional stereo control. Allows operation as indicated.

INPUT SELECTOR: Chooses between various possible source material for listening choice.

The "phono" input is an RIAA compensated high gain input for use with most magnetic cartridges. The input is 50K ohms, with very low input capacity. If your cartridge needs more capacitance, there is built-in provision to add whatever is required. Contact your dealer or our service department if you need help with this.

PRE-AMP ON SWITCH AND INDICATOR: Turns the unit on in the up position, and the associated green LED will light up indicating that power is reaching the unit.

OUTLETS ON: Turns the power receptacles on the rear chassis panel on in the up position, and the associated LED will light up indicating that they are on. This switch is specifically provided to allow the amplifier to be turned on after the preamplifier is "warmed up." A vacuum tube device requires up to several minutes to fully stabilize its operating parameters. Solid-state amplifiers should not be on during this warmup period. Make certain that you have read and understand the SPECIAL NOTICES SECTION at the beginning of this manual before placing this unit into service.

MUTE OPERATE SWITCH: Opens the output of the preamplifier for the warmup (and cooldown) period; also to allow changing records (and maintaining a previous gain setting), answering the telephone, and the like.

INPUT MONITOR: Primarily aimed for use with tape recorders, but may be used with any signal source where bypassing the input selector is desirable.

The rear panel has 2 switches, 4 power receptacles, a fuse holder, a ground terminal, 4 output jacks, 12 input jacks, and a pair of banana jacks.

RECEPTACLES: There is one unswitched outlet which may be used for a turntable, or the like, where switching is not needed or wanted. There are 3 outlets, relay controlled, capable of providing power to large amplifiers and the like. Incidentally, the "click" you hear internally when activating the receptacle switch is the relay operating. (The line cord is a 3 conductor, #14 gauge, providing ample safe grounded power to these 3 outlets.)

It should be noted that the SP-6A line cord grounds the convenience outlet grounds only. The preamplifier chassis is not connected to the line cord ground in order to minimize system ground loops.

FUSE: Always use the same size and type as indicated on the rear of the chassis for safety.

VOLTAGE SWITCH: This switch is provided with a locking plate. Allows 105-120 or 210-240 VAC operation.

GAIN SWITCH: See discussion under "GAIN:" on page 1. Note that this switch must be locked in place when unit is operating.

OUTPUT CONNECTORS:

Main outputs should be connected to your power amplifier.

Tape outputs should be connected to your tape recorder.

INPUT CONNECTORS: These are all clearly marked and are all 50K ohms.

GROUND TERMINAL: To be used for "grounding" associated equipment, such as tone-arms, turntables, and the like. Should not be connected to tape recorders and/or amplifiers (or waterpipes and the like).

"CHASSIS" AND "B-" BANANA JACKS: Special emphasis has been placed in the design of this product to reduce and/or eliminate "hum," "TVI," "RFI," and "CB" type interferences.

For normal use, a jumper MUST be placed between these connectors. Otherwise, severe hum and/or oscillation will occur.

(Special off-chassis construction is employed to accomplish these interference reduction methods, and this connection is the only one from the "common" or "B-" circuit to the chassis so that it can act as a shield to outside interferences.)

For rack cabinet mounting, in common with, and only when connected to, (via inputs/outputs) this jumper may be removed to allow only one shield ground path, thereby eliminating what is known as "ground-loop" induced hum. Note that this may or may not necessarily be helpful in a given system.

If your SP-6A is ever removed from the rack, be sure to remember that a jumper must be re-installed.

Discussion, feature and specification sheets are also included herewith to provide you with additional information you may want or need.

A schematic diagram, complete with voltages, references, values, etc., is also included. These three items should provide all the basic information you will need.

Congratulations on your purchase. You have what is probably the finest stereo preamplifier ever offered for the reproduction of music.

PS: A few paragraphs about servicing this unit. First of all, a very serious caution: This unit contains over 500 volts of DC, together with an 80 joule energy storage power supply. Said another way, there is sufficient voltage and current available inside the unit to be lethal. So, please, don't poke around inside the unit. Refer any needed service to a qualified technician. (Even with the unit turned off, a charge remains in the energy storage filter for some time.)

Basically, this unit is constructed to the highest commercial standards, and should require a very minimum amount of service over the years.

The vacuum tubes, however, are another matter. Some of them (all are premium grade ECC83/12AX7) will have to be changed every few thousand hours of use.

If excessive noise should develop in the phono section only, it is most likely V1.

If degraded sound should occur in the phono section only, it is most likely V2.

V3 is not normally critical, although occasionally excessive hum can be caused by failure of this tube.

If excessive noise develops in the high level section (ie, inputs other than phono), it is most likely V4.

If degraded sound develops in the high level section, it is most likely V5.

V6 is also not normally critical, although it also can introduce hum.

If tube changing is to be done, the unit should be disconnected from the amplifier and turned off while the change is made.

This unit is offered with a limited warranty as follows:

1. 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. To obtain this Warranty, THE ORIGINAL PURCHASER MUST MAIL TO AUDIO RESEARCH WITHIN THIRTY (30) DAYS OF THE DATE OF PURCHASE THIS WARRANTY REGISTRATION FORM COMPLETED, DATED, AND SIGNED BY BOTH THE PURCHASER AND THE SELLING DEALER TOGETHER WITH A COPY OF THE BILL OF SALE OR OTHER PROOF OF PURCHASE OF THE PRODUCT. Audio Research will then validate the Warranty and return the validated Warranty to the purchaser.

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. A RETURNED PRODUCT MUST BE ACCOMPANIED BY A WRITTEN DESCRIPTION OF THE DEFECT AND A PHOTOCOPY OF THIS VALIDATED WARRANTY. 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 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 7 below).

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. During the first ninety (90) day period following the date of purchase by the original purchaser, the Audio Research Limited 90-Day Warranty supersedes this Warranty.

6. Vacuum Tubes. Vacuum tubes and replacement thereof are warranted for the original 90-day period only.

7. 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.

SP-6A DISCUSSION

With the introduction of power amplifiers such as the D-52, D-110, and D-350, and the availability of a number of brands of high performance speaker systems, the need for a new and higher level of preamplifier for the best systems has occurred.

After a significant amount of research and study, we have determined that from a cost-effectiveness standpoint, once again, the vacuum tube must be used.

We then felt that if such a project were to be undertaken, it would be desirable to execute it to the highest standards reasonable, recognizing that in all probability it would be the last significant vacuum tube product offered to the music world.

One of the expensive (and little recognized) requirements for such a concept would be a power supply capable of providing isolated and regulated voltages to each circuit section. This has been accomplished in the SP-6A by utilizing an all solid state triple section regulator with massive "filtering" at the output of each section.

With such a power supply available, it now becomes possible to increase the bandwidth of an AC coupled vacuum tube design without compromising the all-important circuit stability. We have done this, drawing upon the SP-3 basic circuit design. Increased interstage time constants, larger output coupling capacitors, and "DC concept" feedback circuit innovations, all combine with the new power supply to provide a new standard of sound reproduction.

Only high quality turntables with stable pickup arms and cartridges should be used with this preamplifier.

We suggest that this preamplifier will provide the state-of-the-art reference well into the '80s. We further suggest that inclusion of this unit in any otherwise good music reproducing system will effect more improvement than any other single component change.

For further discussion of performance and use requirements, we encourage you to see your Audio Research dealer.

SP-6A FEATURES

Close tolerance segmented gain control, approximately 2 dB detent steps (guaranteed 1 1/2 dB tracking, 1/2 dB typical).

Front panel "Mute" switch for on-off warmup time, repeat settings, interruptions, etc.

Rear panel gain "Range" switch (-10 dB) for high efficiency speakers, high output cartridges, etc.

Special "Off-Chassis" construction, with all inputs/outputs isolated from chassis, plus circuit filters to eliminate or minimize "RFI," "TVI," and "CB" interference.

Rear panel provision to disconnect "common" from chassis so that rack mount installations with power amplifiers, etc., may be accomplished without ground-loop induced hum.

Separate on-off switch and indicator for amplifier (etc.), power receptacles (3), relay controlled, 1600 watt capacity.

Front and rear panels are of two-color anodized aluminum construction for permanent finish and lettering.

Industrial grade components and construction for long service life. Rated for continuous commercial service.

SP-6A SPECIFICATIONS

Frequency Response:

High level section, $\pm .25\text{dB}$, 5Hz to 30Hz.
- 3dB points below 1Hz and above 100kHz.
Magnetic phono, $\pm .25\text{dB}$ of RIAA, 30Hz to 40kHz.

Harmonic Distortion:

Less than .01% at 2V RMS output, 60K ohm load, 20Hz to 20kHz.
(Typically about .001% in the midband)

Intermodulation Distortion:

Less than .002% at 2V RMS output, 60K ohm load, SMPTE method.

Gain:

Magnetic phono input to tape output, 34dB
Magnetic phono input to main output, 60dB
High level inputs to tape output, 0dB
High level inputs to main output, 26dB

Input Impedance:

50K ohms, all inputs (magnetic phono may have any value from 10 ohms to 100K ohms substituted. Also has provision to add input capacitance for matching certain magnetic cartridges.)

Output Impedance:

500 ohms main output, 1000 ohms tape output.
Recommended minimum load for maximum audio quality 50K ohms and 500 pF maximum capacitance.

Maximum Inputs:

Magnetic phono, 500 mV at 1kHz. (1.5V RMS, 10kHz). High level inputs essentially overload proof.

Rated outputs:

2V RMS 5Hz to 30kHz, all outputs, 60K ohm load (main output capability is 60V RMS output at 1/2% THD at 1kHz into a 500K ohm load with 3V RMS high level input.)

Noise:

High Level

- (1) 250uV RMS maximum residual unweighted wide band noise at main output with gain control minimum (86dB below 5V RMS output)
- (2) More than 90dB below 1V RMS input (less than 20uV equivalent input noise).

Magnetic Phono

5uV equivalent input noise, wideband RMS (-66dB reference 10mV input).

Tube Compliment:

6 - premium grade ECC83/12AX7

Power Requirements:

105-120/210-240V AC, 50/60Hz, 35 watts

SP-6A SPECIFICATIONS (continued)

Dimensions:

19" (48 cm) W X 5 1/4" (13.4 cm) H (standard rack panel X 10 1/4" (26 cm) D

Handles extend 1 5/8" (4.1 cm) forward of front panel

Rear chassis fittings extend 7/8" (2.3 cm)

Weight:

22 lbs (10 kg) net, 30 lbs (13.75 kg) shipping

MODEL SP-6A PREAMPLIFIER

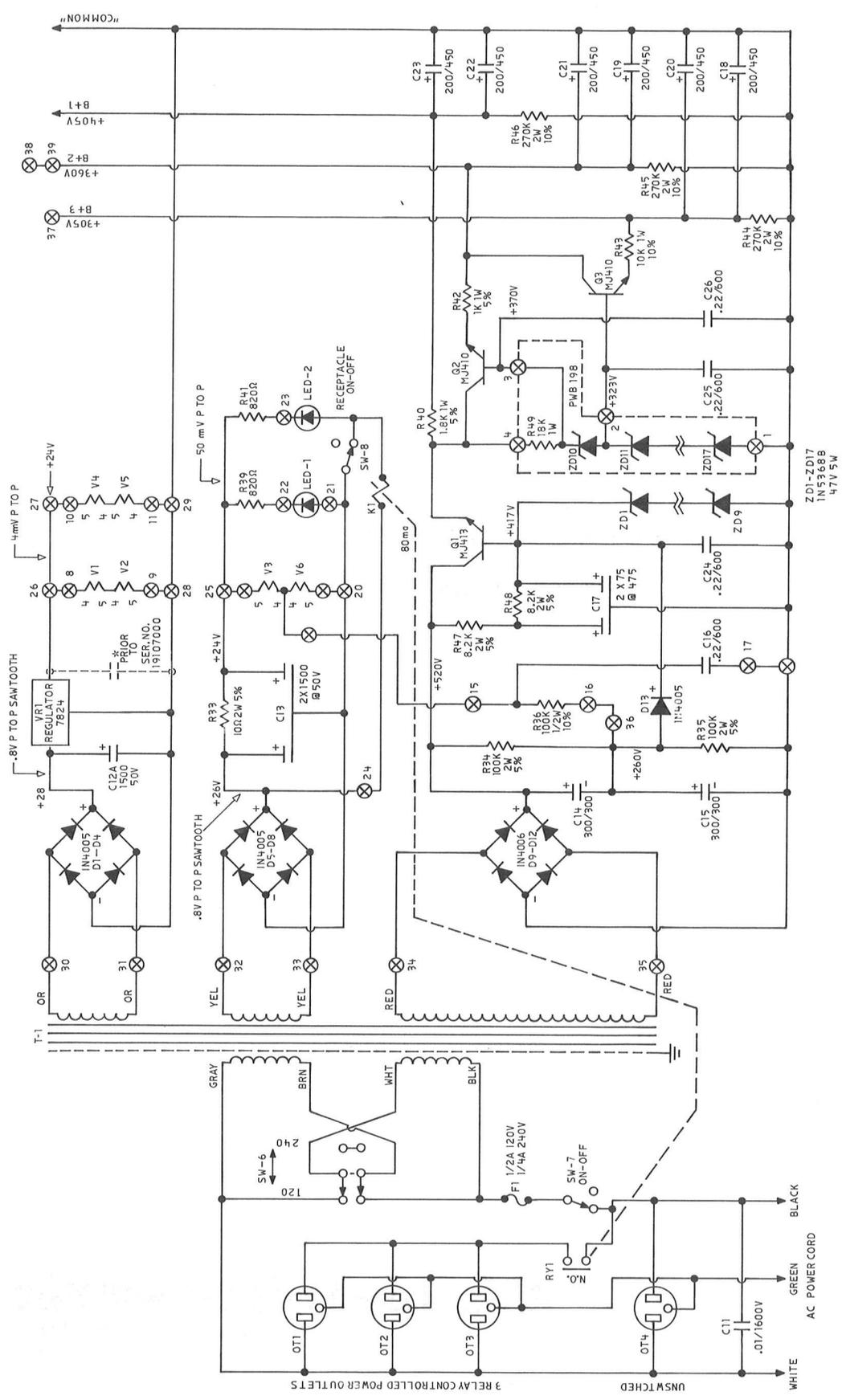
SCHEMATIC & PARTS LIST

REV. D
3/28/79

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MINNEAPOLIS, MINNESOTA 55406

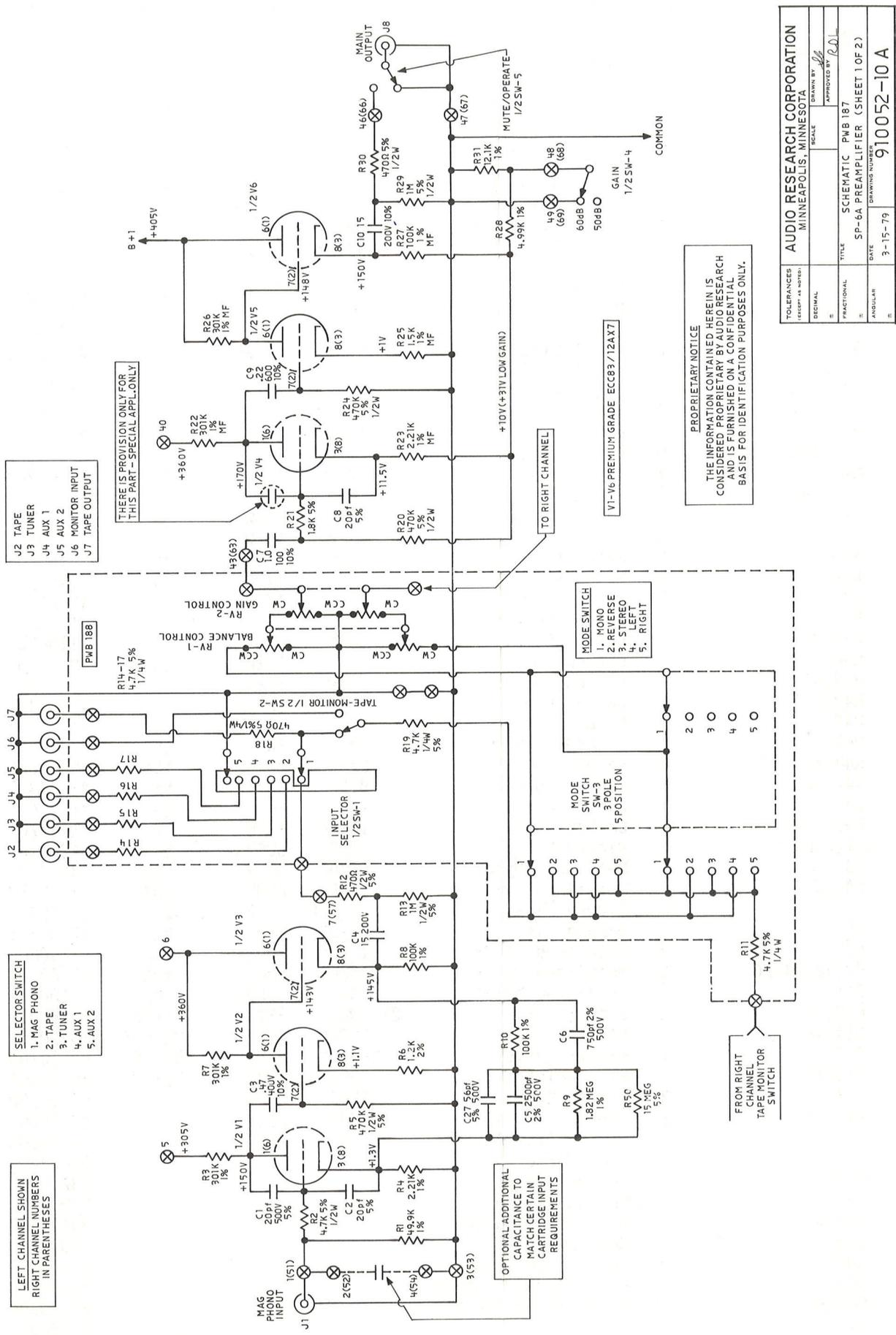
ALL VOLTAGE READINGS TAKEN WITH 120VAC 60Hz LINE



TOLERANCES (UNLESS OTHERWISE SPECIFIED)	AUDIO RESEARCH CORPORATION MINNEAPOLIS, MINNESOTA
DECIMAL	SCALE
FRACTIONAL	TITLE
ANGULAR	DATE
	DRAWING NUMBER

APPROVED BY	SCALE
DRAWN BY	TITLE
	DATE
	DRAWING NUMBER

910052-10 A



TOLERANCES (EXCEPT AS NOTED)	SCALE	DRAWN BY	APPROVED BY
DECIMAL			
FRACTIONAL			
ANGULAR			
TITLE		SCHEMATIC PWB 187	
DATE		SP-6A PREAMPLIFIER (SHEET 1 OF 2)	
DRAWING NUMBER		910052-10A	
AUDIO RESEARCH CORPORATION MINNEAPOLIS, MINNESOTA			

SP-6A PARTS LIST

COMPONENT	QUAN.	DESCRIPTION	VALUE	RATING	TOL.	ARC PART NO.
V1-6	6	ECC83/12AX7A				32000100
D1-8,13	9	1N4005				30500400
D9-12	4	1N4006				30502200
ZD1-17	17	1N5368B	47V	5W	5%	30500100
LED1,2	2	LED				34300100
Q1	1	MJ413 Transistor				30003600
Q2,3	2	MJ410 Transistor				30000400
RV1	1	Balance Control	100K	LinTaper	10%	45100525
RV2	1	Gain Control	100K	LogTaper	10%	45100523
VR1	1	7824 Voltage Regulator	24V	1A	+1V	31000500
R1	2	Metal Film	49.9K	1/2W	1%	42499403
R2	2	Carbon Comp.	4.7K	1/2W	5%	41470303
R3	2	Wirewound	300K	2/10W	1%	43300501
R4,23	4	Metal Film	2.21K	1/2W	1%	42221303
R5,20,24	6	Carbon Comp.	470K	1/2W	5%	41470503
R6	2	Metal Film	1.2K	1/2W	2%	46120301
R7,22,26	6	Metal Film	301K	3/4W	1%	42301504
R8,27	4	Metal Film	100K	3/4W	1%	42100504
R9	2	Metal Film	1.82Meg	1/2W	1%	42182603
R10	2	Metal Film	100K	1/2W	1%	42100503
R11,19,14-17	10	Carbon Comp.	4.7K	1/4W	5%	41470302
R12,30	4	Carbon Comp.	470Ω	1/2W	5%	41470203
R13,29	4	Carbon Comp.	1Meg	1/2W	5%	41100603
R18	2	Carbon Comp.	470Ω	1/4W	5%	41470202
R21	2	Carbon Comp.	1.8K	1/2W	5%	41180303
R25	2	Metal Film	1.5K	1/2W	1%	42150303
R28	2	Metal Film	4.99K	1/2W	1%	42499303
R31	2	Metal Film	12.1K	1/2W	1%	42121403
R33	1	Carbon Comp.	10Ω	2W	5%	41190105
R34,35	2	Carbon Comp.	100K	2W	5%	41100505
R36	1	Carbon Comp.	100K	1/2W	10%	40100503
R39,41	2	Carbon Comp.	820Ω	1/2W	5%	41820203
R40	1	Carbon Comp.	1.8K	1W	5%	41180308
R42	1	Carbon Comp.	1K	1W	5%	41100304
R43	1	Carbon Comp.	10K	1W	10%	40100404
R44-46	3	Carbon Comp.	270K	2W	10%	40270505
R47,48	2	Carbon Comp.	8.2K	2W	5%	41820305
R49	1	Carbon Comp.	18K	1W	5%	41180404
R50	2	Carbon Comp.	15Meg	1/2W	5%	41150703
C1,2,8	6	Dipped Mica	20pF	500V	5%	57200100
C3	2	Metalized Mylar	.47μF	400V	10%	53470502
C4,10	4	Metalized Mylar	15μF	200V	10%	53150700
C5	2	Dipped Mica	2500pF	500V	2%	57250301
C6	2	Dipped Mica	750pF	500V	2%	57750201
C7	2	Metalized Mylar	1.0pF	100V	10%	53100600
C9,16,24-26	6	Metalized Mylar	.22uF	600V	10%	53220503
C11	1	Metalized Mylar	.01μF	1600V	10%	53100403
C12,13	2	Electrolytic	2X1500μF	50V	-10/+75%	50150900
C14,15	2	Electrolytic	300μF	300V	-10/+75%	50300800
C17	1	Electrolytic	2X75μF	475V	-10/+75%	50750700
C18-23	6	Electrolytic	200μF	450V	-10/+75%	50200801
C27	2	Dipped Mica	56pF	500V	5%	57560100
F1	1	SloBlo 120VAC (240VAC	1/2A 1/4A	250V 250V)		34500200 34500100
T1	1	Transformer				60003400
OT1-4	4	AC Receptacle				23200500
SW1	1	Source Switch				24001000
SW2,5	2	DPDT Gold Contact				24100400
SW3	1	Mode Switch				24000700
SW4	1	DPDT Silver Contact				24100100
SW6	1	DPDT Silver Contact				24100600
SW7,8	2	DPDT Silver Contact				24100700
K1	1	Relay				64100300
J1-16	16	Phono Jack				23201000