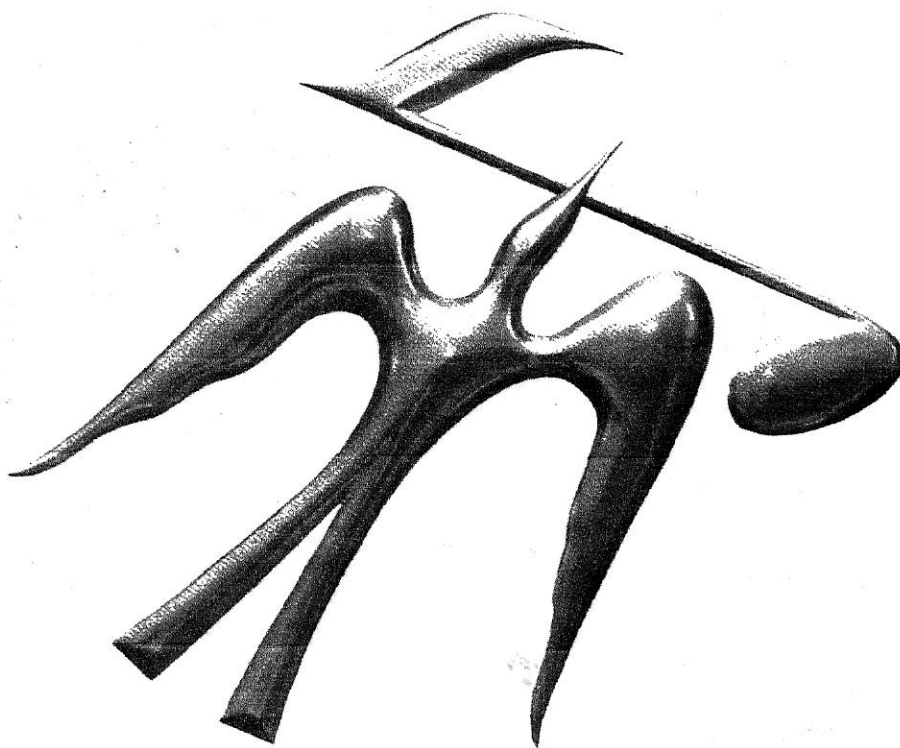


OPERATING INSTRUCTIONS AND WARRANTY



THE FISHER

SA-100

STEREOPHONIC 50-WATT POWER AMPLIFIER

WORLD LEADER IN HIGH FIDELITY

PRICE \$1.00

Congratulations!

WITH your purchase of a FISHER instrument you have completed a chain of events that began many months ago, in our research laboratories. For it is there that the basic concept of the equipment you have acquired came into being—its appearance, its functions, its quality of performance.

But the end step—your purchase—is merely a beginning. For you and your family, it will provide years of musical pleasure. The FISHER is from its inception designed to give long and trouble-free service. Some of the instruments we made twenty-three years ago are still in use today!

It is our continuing desire that your FISHER give you always the best performance of which it is capable. If you need our assistance at any time toward that objective, please keep in mind that we are always at your service.

IN CLOSING —

Many hours have been spent by our engineers and technical writers to create this instruction book for your guidance and enjoyment. If you want the most out of your FISHER, there is only *one* way to obtain it. With the equipment before you, *please read this booklet carefully*. It will be time well-spent.

Avery Fisher

Fisher Firsts Milestones In Audio History

- 1937 America's first high fidelity sound systems. Featured a beam-power amplifier, inverse feedback, acoustic speaker compartments (infinite baffle and bass reflex) and magnetic cartridges.
- 1937 First exclusively high fidelity TRF tuner, featuring broad-tuning 20,000 cycle fidelity.
- 1937 First two-unit high fidelity system with separate speaker enclosure.
- 1938 First coaxial speaker system.
- 1938 First high fidelity tuner with amplified AVC.
- 1939 First Dynamic Range Expander.
- 1939 First 3-Way Speaker in a high fidelity system.
- 1939 First Center-of-Channel Tuning Indicator.
- 1945 First Preamplifier-Equalizer with selective phonograph equalization.
- 1945 First logging scale for simple and accurate location of station frequencies.
- 1948 First Dynamic Range Expander with feedback.
- 1949 First FM-AM Tuner with variable AFC.
- 1952 First 50-Watt, all-triode amplifier.
- 1952 First self-powered Master Audio Control.
- 1953 First self-powered, electronic sharp-cut-off filter system for high fidelity use.
- 1953 First Universal Horn-Type Speaker Enclosure for any room location and any speaker.
- 1953 First FM-AM Receiver with a Cascode Front End.
- 1954 First low-cost electronic Mixer-Fader.
- 1954 First moderately-priced, professional FM Tuner with TWO meters.
- 1955 First Master Audio Control Chassis with five-position mixing facilities.
- 1955 First Peak Power Indicator in high fidelity.
- 1955 First correctly equalized, direct tape-head master audio controls and self-powered preamplifier.
- 1956 First to incorporate Power Monitor in a home amplifier.
- 1956 First All-Transistorized Preamplifier-Equalizer.
- 1956 First dual dynamic limiters in an FM tuner for home use.
- 1956 First Performance Monitor in a high quality amplifier for home use.
- 1956 First FM-AM tuner with TWO meters.
- 1956 First complete graphic response curve indicator for bass and treble.
- 1957 First Golden Cascode FM Tuner.
- 1957 First MicroRay Tuning Indicator.
- 1958 First Stereophonic Radio-Phonograph with Magnetic Stereo Cartridge.
- 1959 First high-quality Stereophonic Remote Control System.
- 1959 First complete Stereophonic FM-AM Receiver (FM-AM tuner, audio control, 40-watt amplifier.)
- 1960 First complete stereophonic FM-AM receiver with 60-watt power amplifier.
- 1960 First stereophonic receiver to use the new, revolutionary Type-7591 power output tube. (Featured in the FISHER 800.)
- 1960 Smithsonian Institution, Washington, D.C., accepts for its collection America's first commercially manufactured high fidelity radio-phonograph, made by Avery Fisher in 1937.

THE FISHER MODEL SA-100

Stereophonic

POWER AMPLIFIER

The FISHER SA-100 is a stereophonic power amplifier of unusual versatility designed to provide flawless music reproduction of stereophonic as well as monophonic program material. Advanced electronic circuitry has reduced distortion, hum and noise to complete inaudibility. In addition, this unit may be used with any loudspeaker system, from the low to the most highly-efficient types.

Two separate amplifier channels deliver up to 25 watts of music power for each section for a total of 50 watts, as measured by the new IHFM Standard. Terminal connections are provided to permit the use of different damping factors recommended by speaker manufacturers. A Center Channel output is also provided to which a third amplifier and speaker system can be connected to broaden the stereophonic sound pattern, or for installation at a remote location. Eight controls, four for each channel, facilitate the adjustment of all critical voltages and currents to maintain optimum dual-channel performance.

The SA-100 will reproduce the full orchestral range with ease and provide you with years of trouble-free operation. Here is another example of FISHER leadership in the development of Laboratory Standard high fidelity components.

A NOTE ON STEREOPHONIC SOUND

Stereophonic sound is a giant step forward in the history of high fidelity music reproduction. This unique dual-channel system offers a distinct advantage over monophonic (single-channel) systems by virtue of two important characteristics: the dimensions of *direction* and *depth*. These live sound qualities are for the most part missing in monophonic systems because recordings are made and reproduced over a single channel. This is somewhat analogous to listening to music with one ear. Stereophonic recording techniques, however, utilize two separate banks of microphones which are positioned in the left and right sections of an orchestra. In this arrangement, the microphones "hear" the music as we do — with two ears. The sound picked up by each bank of microphones is then fed to independent channels and recorded on disks or tape, or transmitted over separate channels of a stereophonic broadcast.

To reproduce stereophonic realism in the home, two separate sound channels are required to achieve the stereophonic effect. The stereo sound output of a record player, tape recorder or tuner is fed to two separate amplifier channels, which in turn drive two separate speaker systems. Thus, instruments located on the left side of the orchestra are heard predominantly in the speakers to your left; instruments

on the right side of the orchestra are heard predominantly in the speakers to your right; while instruments located in the center appear to be heard midway between the two speaker systems. The result is a startling sense of *presence* realized only at a live orchestral performance.

INSTALLING THE SA-100

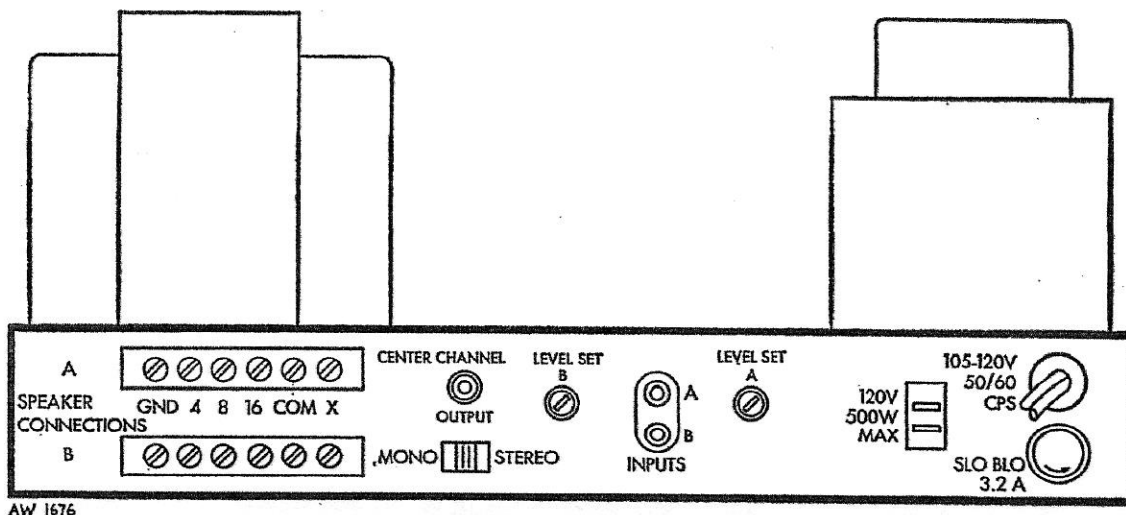
WARNING: The FISHER SA-100 must not be operated without first connecting speakers, or equivalent load resistors, to the Speaker Terminals in *each channel*. If you have not yet completed your stereophonic system, and are temporarily using only one channel of the SA-100, use Channel A. Be sure to connect a speaker or an equivalent load resistor to the Speaker Terminals of Channel B in this case.

The SA-100 may be installed in any convenient location that is adequately ventilated. Because it has no operating controls that require frequent resetting, this unit may be installed out of sight at the rear of your component cabinet, or in a remote location if you wish. Directions for mounting the SA-100 in a custom cabinet are provided in the last section of this booklet. Temporarily, place the chassis at the approximate location where it will be installed, allowing enough room for input and output cable connections to the rear panel. This will enable you to determine the necessary cable lengths for permanent connection to your speakers and preamplifier. Do not remove the four rubber feet since these raise the chassis sufficiently to insure ventilation of the underside.

connecting the speakers . . .

Speaker Terminal strips are provided for each channel to accommodate speakers, or speaker systems, having an approximate impedance of 4, 8, or 16 ohms. In addition, each strip contains terminals for connecting a resistor to achieve different damping factors that may be specified by speaker manufacturers. (See Rear Panel, Figure 1.)

Most speakers are designed to operate with amplifiers having a high damping factor. Because the FISHER SA-100 has an inherent damping factor of 10, it will accommodate all these speakers without the addition of a resistor. However, should the speakers you are using require a lower damping factor than 10, a table has been prepared which will enable you to select the proper resistor value, (See Table 1.)



AW 1676

FIGURE 1. Rear panel of SA-100

NOTE: Connect the speakers that will be on your left to Channel A, and those on your right to Channel B, to coincide with the normal stereo sound arrangement. Remember to connect an equivalent load resistor to the Channel B Speaker Terminals if no speaker is connected to them.

CONNECTIONS WITHOUT RESISTOR: Depending upon the impedance ratings of the speakers or speaker systems, make connections to Speaker Terminals 4, 8 or 16 and to *GND*. Do this for each channel.

CONNECTIONS WITH RESISTOR: Select the required damping resistor as indicated in Table 1. For example: If your speakers, or speaker systems, each have an impedance of 4 ohms, and the damping factor specified by the manufacturer is 0.5, you will need a 150 ohm, $\frac{1}{2}$ watt resistor for each channel.

Connect the resistor across Speaker Terminals COM and X. Then, depending upon the impedance of the speaker or speaker system, connect leads to terminal 4, 8 or 16 and to *COM*. (not to *GND*), for each channel.

Note: The resistor values listed in Table 1 are nominal and are based on the use of standard resistors having a tolerance of 10 or 20 per cent.

TABLE 1 — RESISTOR VALUES FOR CHANGING DAMPING FACTORS

Nominal Speaker Impedance in Ohms	Manufacturer's Recommended Damping Factor	Value of Resistor To Be Connected Between COM and X (In Ohms, $\frac{1}{2}$ Watt)
16	0.5	68
16	1	180
16	2	390
8	0.5	100
8	1	270
8	2	680
4	0.5	150
4	1	390
4	2	1000

input connections . . .

Separate input jacks are provided for Channel A and Channel B. (See Figure 1.) To these may be connected any stereophonic or monophonic component, such as a preamplifier or audio control center, or a tuner with a pre-amplifier section.

If the component you are using is *stereophonic*, connect the A and B output cables to the *SA-100* input jacks A and B, respectively. Set the Mono-Stereo switch to *STEREO*.

If the component you are using is *monophonic*, connect the output cable to Channel A input jack. Set the Mono-Stereo switch to *MONO*. The signal will be amplified by both channels and the sound will be heard on both loudspeakers for a stereo effect. (If you leave the switch in *STEREO* position, only Channel A will receive the signal.)

connecting a center channel . . .

In large rooms, where it may be necessary to space loudspeakers farther apart to increase the spread of stereophonic sound, a "hole" may develop in the center. This apparent absence of sound in the center will become more noticeable as the distance between the two speaker systems is increased. It is possible to fill in this gap with the addition of a center channel amplifier and speaker system.

The *SA-100* is equipped with a Center Channel Output jack which is connected to a divider network across the output stages of Channels A and B. The network combines equal portions of the audio output of each channel to provide a signal for a third "phantom" channel. By connecting an additional amplifier to the Center Channel Output jack, and positioning its speaker between the A and B speakers, the stereophonic curtain of sound will be augmented. Note: The output signal from the center speaker, though monophonic, will contain both stereo components.

The additional amplifier should be equipped with a Volume Control or Input Level Set in order that the relative output of the center speaker may be adjusted as necessary. Depending upon room acoustics, speaker efficiency, and speaker arrangement, the center speaker may have to be operated at a lower, higher or the same output level as the A and B systems.

Connect a cable from the center channel amplifier to the output jack on the rear panel marked *CENTER CHANNEL*. The cable should be of the low-capacitance type and no longer than 30 feet.

OPERATING THE SA-100

Connect the power cable extending from the rear panel to an outlet on your *preamplifier* or *tuner* supplying 105 to 120 volts AC, at 50 to 60 cycles, with a power capacity of at least 160 watts. The *SA-100* is not equipped with an On-Off power switch and should be operated from the control panel of your associated component. If you plug the *SA-100* into a wall outlet, it will be necessary to add a switch to the power cable.

using the controls . . .

The AC and DC Balance controls on the front panel (see Figure 2) and the Bias Adjust controls on top of the chassis (see Figure 3) have been set at the factory for optimum dual-channel performance, and should not be touched. There is little likelihood that these controls will have to be reset. Should this become necessary, however, the purpose of these controls, together with their adjustment procedure, is explained under Service Notes.

The Input Level Sets on the rear panel are provided to prevent overloading of the *SA-100* by the input signals. These controls are lo-

cated on either side of the Channel A and B input jacks. They should be set during installation for proper output at the speakers, and to compensate for speakers with different efficiencies.

After you have made all necessary connections, turn the A and B Level Sets to minimum by turning them fully *counterclockwise*. Turn on the power to the associated components, turn the volume controls on these components to maximum, and play a musical selection. Turn the Level Sets clockwise until the volume at the loudspeakers are at the maximum level you wish to hear.

SERVICE NOTES

The adjustment of the controls should be made in the order outlined below. Turn the Input Level Sets to *minimum*, completely counterclockwise, during adjustments. Set the Mono-Stereo switch to STEREO position. (Final adjustment of the Input Level Sets are described in the previous section entitled "Using The Controls."

IMPORTANT: Before turning on power to the *SA-100*, make certain that speakers, or equivalent load resistors, are connected to the Speaker Connections strip for *each* channel.

bias adjust . . .

These controls establish the correct bias voltages for maintaining proper operating conditions and are located on top of the chassis. Remove the link from the Test Point terminals on the front panel. Connect the leads of a volt meter (or VTVM) across the Channel A and Common terminals. Turn the Channel A Bias Adjust until the meter reads 0.6 volts.

Repeat the procedure for Channel B, and recheck Channel A.

dc balance . . .

These controls equalize the current through each output stage, provide balanced operation of the output transformers, and cancel out any DC ripple from the power supply, thus eliminating all hum components.

Connect the leads of a sensitive VTVM across the 16-ohm and Ground terminals of the Channel A Speaker Connections strip. Adjust the Channel A DC Balance for a *minimum* reading. This should be 0.4 millivolts or less. Repeat this procedure for Channel B.

ac balance . . .

The purpose of these controls is to provide balanced signals from the phase inverters to the grids of the output stages, and are adjusted for minimum distortion. Precise laboratory adjustments can be made only with an Intermodulation or Harmonic Distortion Analyzer. In this case, service men can follow the normal adjustment procedure. In lieu of adjustment with this instrument, however, a mechanical adjustment can be made. Simply set the controls at a point mid-way between the two extreme positions.

WARNING

Extremely high voltages capable of causing serious injury exist inside the chassis both during operation and for some time after the power to the amplifier is cut off. Disconnect the AC power cord before removing the bottom cover, and discharge all electrolytic capacitors to chassis ground before working inside. Do not remove the bottom cover unless you are qualified to perform servicing operations.

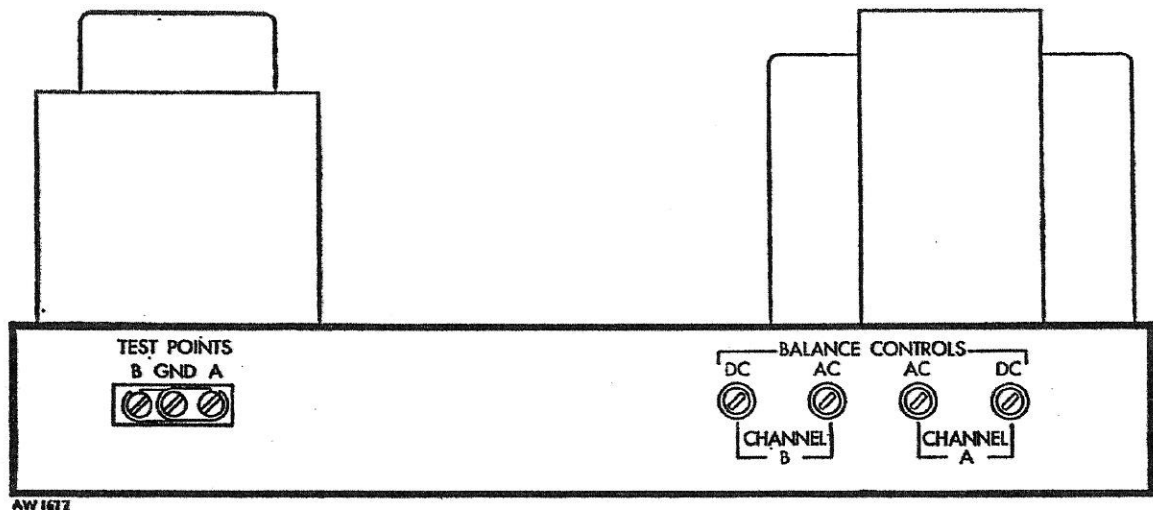


FIGURE 2. Front panel of SA-100

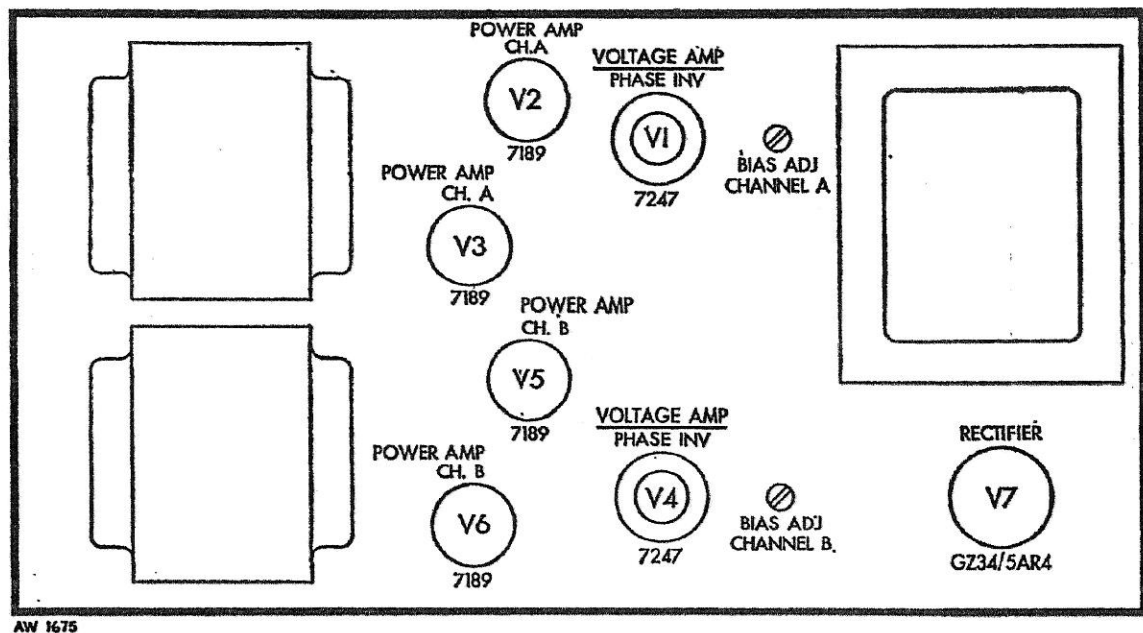


FIGURE 3. Tube layout for SA-100

CUSTOM INSTALLATION

The following are directions for mounting the *SA-100* in your own custom cabinet. Adequate ventilation is an absolute essential to insure trouble-free operation. The chassis must never be installed in a totally enclosed space nor located too close to other heat-producing equipment.

1 — Drill four mounting holes in the shelf on which your *SA-100* will be placed, as indicated in Figure 4. (If possible, cut out a small section within this area to provide greater ventilation.)

2 — Place the amplifier on the shelf so that the four mounting holes located at the extreme ends of the chassis bottom coincide with the four drilled holes on the shelf.

NOTE: Do not remove the four rubber mounting feet from the chassis. These raise the unit sufficiently from the shelf to provide ventilation to the underside of the chassis.

3 — Insert the four mounting screws through the flat washers (provided in the accessories bag) and through the underside of the mounting shelf into the chassis.

complete music system . . .

When THE FISHER *SA-100* is used with carefully selected associated equipment, the result is a perfectly matched high fidelity music system. Those seeking the ultimate in audio reproduction will find it in FISHER stereophonic tuners, master audio controls, and other quality equipment. Complete specifications will be sent to you promptly on request.

at your service . . .

It is our desire that your FISHER performs to your complete satisfaction. We solicit your correspondence on any problem that may arise. After you have had the opportunity to familiarize yourself with THE FISHER, we would appreciate hearing from you concerning how it is meeting with your requirements.

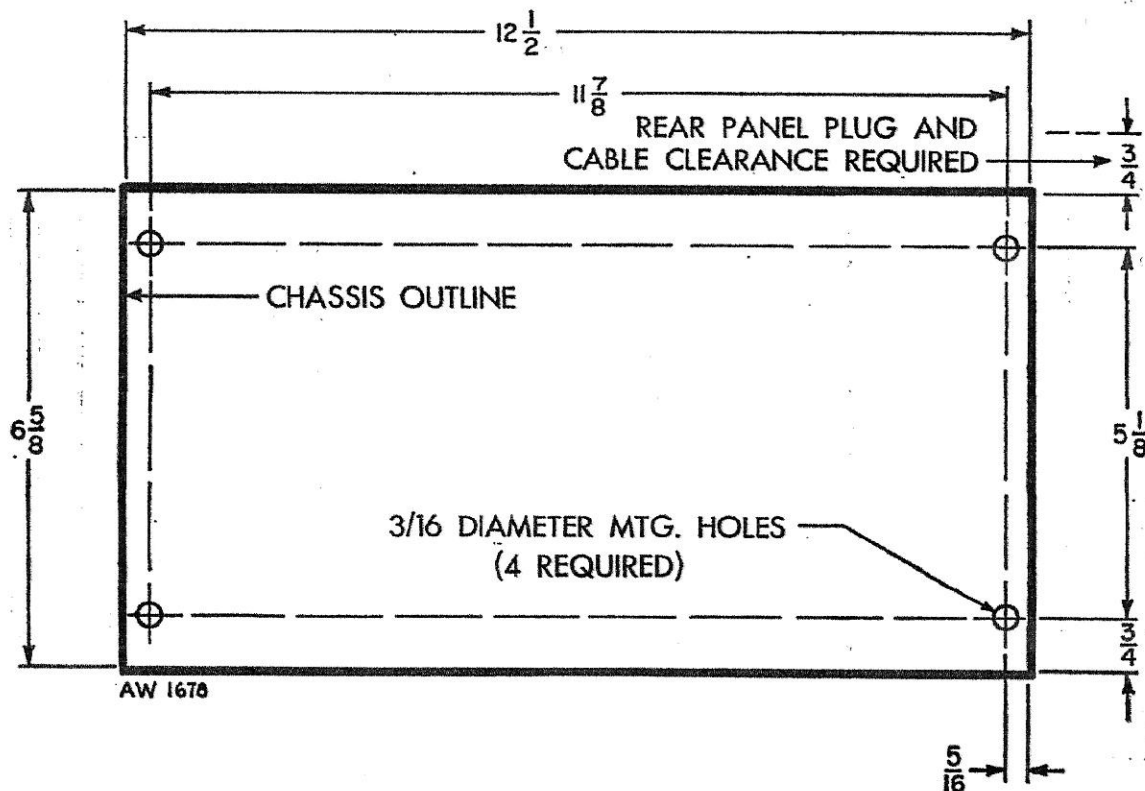


FIGURE 4. Shelf mounting diagram

PARTS DESCRIPTION LIST • MODEL "SA 100" **SERIAL NUMBERS 10001-19999**

CAPACITORS

10% Tolerance for all fixed capacitors, unless otherwise noted or marked GMB (guaranteed minimum value.)

Symbol	Description	Part Number
C1, 2	Mylar .022uf; 250V	C50197-49
C3, 4	Ceramic, 15uf, N75; 1000 V	C50070-18
C5, 6	Electrolytic, 50uf; 50V	C782-119
C7, 8	Electrolytic, 25uf; 6V	C639-114
C9	Electrolytic, 4 section	C50180-10
	A. 40uf; 450V	
	B. 40uf; 450V	
	C. 10uf; 450V	
	D. 10uf; 450V	
C10, 11	Ceramic, 2uf, NPO; 1000V	C50070-23
C12, 13, 14, 15	Mylar, .047uf; 400V	C50197-30
C16	Ceramic, 12uf, NPO; 1000V	C50070-2
C17	Ceramic, 5uf, NPO; 1000V	C50070-24
C18	Electrolytic, 50uf, 50V	C782-119
C19, 20	Ceramic, 270uf, 1000V	C50072-16
C21, 22	Ceramic, 330uf, 1000V	C50072-1

RESISTORS AND POTENTIOMETERS

In ohms, 10% tolerance, 1/2 Watt, unless otherwise noted. K=kilohm, M=megohm.

R1, 2	Potentiometer, 250K, Level sets	R50103-1
R3	Wirewound, 2.2K, 2 W.	R782-121

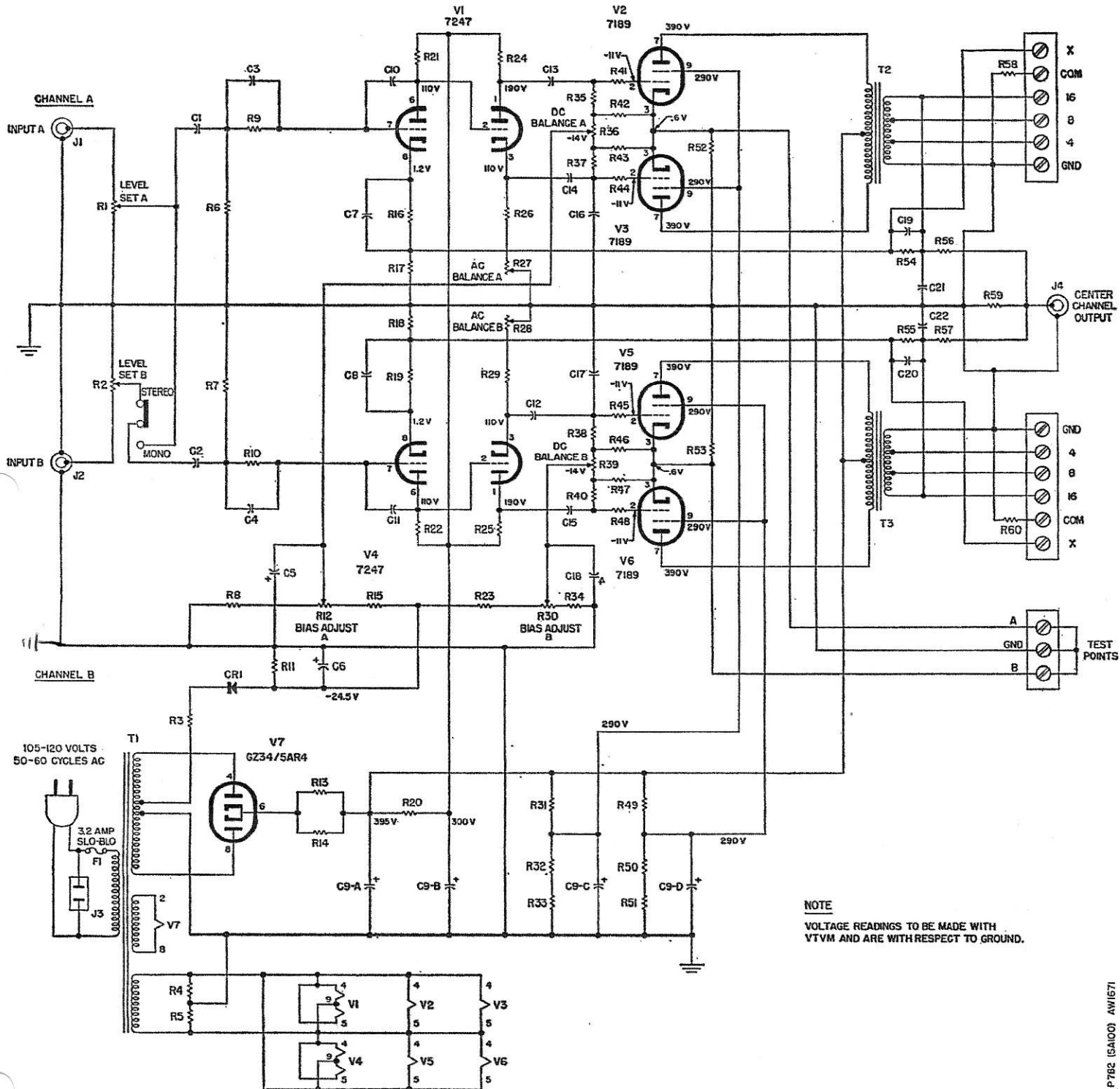
Symbol	Description	Part Number	Symbol	Description	Part Number
R4, 5	Composition, 220	RC20BF221K	R36	Potentiometer, 25K, DC balance ch. A	R50103-2
R6, 7	Composition, 1M	RC20BF105K	R37, 38	Composition, 220K	RC20BF224K
R8	Composition, 10K	RC20BF103K	R39	Potentiometer, 25K, DC balance ch. B	R50103-2
R9, 10	Composition, 47K	RC20BF473K	R40	Composition, 220K	RC20BF224K
R11	Composition, 4.7K	RC20BF472K	R41	Composition, 2.2K	RC20BF222K
R12	Potentiometer, 5K, bias adjust Ch. A.	R50103-4	R42, 43	Composition, 47K	RC20BF473K
R13, 14	Wirewound, 250, 7W	R539-121	R44, 45	Composition, 2.2K	RC20BF222K
R15	Composition, 4.7K	RC20BF472K	R46, 47	Composition, 47K	RC20BF473K
R16	Composition, 3.9K	RC20BF392K	R48	Composition, 2.2K	RC20BF222K
R17, 18	Composition, 220	RC20BF221K	R49	Wirewound, 4K, 5W.	R692-130
R19	Composition, 3.9K	RC20BF392K	R50, 51	Wirewound, 7.5K, 7W.	R740-138
R20	Composition, 22K, 2W	RC40BF223K	R52, 53	Wirewound, 10, 5%, 2W.	R782-120
R21, 22	Composition, 680K	RC20BF684K	R54, 55	Composition, 3.9K	RC20BF392K
R23	Composition, 4.7K	RC20BF472K	R56, 57	Composition, 12K	RC20BF123K
R24, 25	Composition, 68K, 1W	RC30BF683K	R58	Wirewound, .47, 5W.	R729-146
R26	Composition, 39K	RC20BF393K	R59	Composition, 1K	RC20BF102K
R27, 28	Potentiometer, 50K, AC balance	R50103-3	R60	Wirewound, .47, 5W.	R729-146
R29	Composition, 39K	RC20BF393K			
R30	Potentiometer, 5K, bias adjust ch. B	R50103-4			
R31	Wirewound, 4K, 5W.	R692-130			
R32, 33	Wirewound, 7.5K, 7W.	R740-138			
R34	Composition, 10K	RC20BF103K			
R35	Composition, 220K	RC20BF224K			

MISCELLANEOUS

CR1	Silicon Rectifier	SR782-117
F1	Fuse, 3.2A, slo-blo	F3319
T1	Transformer power	T782-115
T2	Transformer output	T782-116-1
T3	Transformer output	T782-116-2

SCHEMATIC DIAGRAM • MODEL SA-100

SERIAL NUMBERS 10001-19999



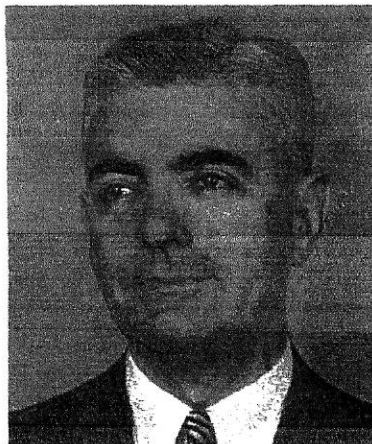
NOTE

VOLTAGE READINGS TO BE MADE WITH VTVM AND ARE WITH RESPECT TO GROUND.

RESISTORS	R1 R2	R3 R4 R5	R6 R7 R8 R9	R9 R10	R11 R12 R13 R14	R15 R16 R17 R18 R19 R20 R21	R22 R23	R24 R25 R26 R27 R28 R29	R30 R31 R32 R33 R34 R35 R36 R37 R38 R39 R40 R41 R42 R43 R44 R45 R46 R47 R48 R49 R50 R51	R52 R53	R54 R55 R56 R57	R58 R59 R60
CAPACITORS		C1 C2	C3 C4	C5 C6		C7 C8 C9-A C9-B C9-C C9-D			C12 C13 C14 C15 C16 C17 C18	C9-C		C19 C20 C21 C22

The Man Behind the Product

AVERY FISHER
*Founder and President,
Fisher Radio Corporation*



TWENTY-THREE YEARS AGO, Avery Fisher introduced America's first high fidelity radio-phonograph. That instrument attained instant recognition, for it opened a new era in the faithful reproduction of records and broadcasts. Some of its features were so basic that they are used in all high fidelity equipment to this day. One of these models is now in the permanent collection of the Smithsonian Institution as an example of the earliest high fidelity instruments commercially available in this country.

The engineering achievements of Avery Fisher and the world-wide reputation of his products have been the subject of descriptive and biographical articles in *Fortune*, *Time*, *Pageant*, *The New York Times*, *Life*, *Coronet*, *High Fidelity*, *Esquire*, *The Atlantic*, and other publications. Benefit concerts for the National Symphony Orchestra in Washington and the Philadelphia Orchestra, demonstrating recording techniques, and the great advances in the art of music reproduction, used FISHER high fidelity instruments both for recording and playback, to the enthralled audiences. FISHER equipment formed the key part of the high fidelity demonstration at the American National Exposition in Moscow, July 1959. FISHER FM and FM-AM tuners are the most widely used by broadcast stations for monitoring and relay work, and by research organizations—under conditions where absolute reliability and maximum sensitivity are a 'must.'

The FISHER instrument you have just purchased was designed to give you many years of pride and enjoyment. If you should desire information or assistance on the performance of your FISHER, please do not hesitate to write directly to Avery Fisher, President, Fisher Radio Corporation, Long Island City 1, New York.

Postage
Will be Paid
by
Addressee

No
Postage Stamp
Necessary
If Mailed in the
United States

BUSINESS REPLY CARD

FIRST CLASS PERMIT No. 45377, NEW YORK, N. Y.

FISHER RADIO CORPORATION

21-21 44th Drive

Long Island City 1, N. Y.

