

**OPERATING INSTRUCTION**

**24-WATT STEREO AMPLIFIER**

**S T A R   S A - 3 0**

## GENERAL DESCRIPTION

The Model SA-30 is a self-contained, AC operated amplifier designed for the control and faithful reproduction of either stereo or monophonic inputs from record players, changers, tuners, tape recorders, etc. It combines dual preamplifiers and dual power amplifiers on one compact chassis, with all the controls necessary for complete flexibility of operation. Each stereo channel provides a power output of 12 watts -- or a total of 24 watts if used monophonically. Terminations are provided for the connection of either 8 or 16 ohm speaker systems.

## INSTALLATION

The amplifier may be used in any convenient location such as a shelf, table or bookcase. Modern and attractive in appearance, the amplifier lends itself to this type of installation.

Since all electrical equipment generates heat, provision must be made for proper ventilation. The unit is well ventilated in itself, but sufficient space should be allowed around it to permit free air flow at all times. DO NOT place books or other objects on top of the amplifier, since covering the perforated cover will restrict ventilation. Failure to observe these precautions will result in sharply reduced component and tube life.

## CONNECTIONS TO ASSOCIATED EQUIPMENT

### LOUDSPEAKERS

Warning: Do not operate the amplifier without first connecting a speaker or equivalent load to each channel output.

Connect speakers as shown in Figure 1. If speakers are rated at 8 ohms, set the IMPEDANCE selector slide switch at the 8 ohm position. If the speakers are rated at 16 ohms, set the switch at the 16 ohm position.

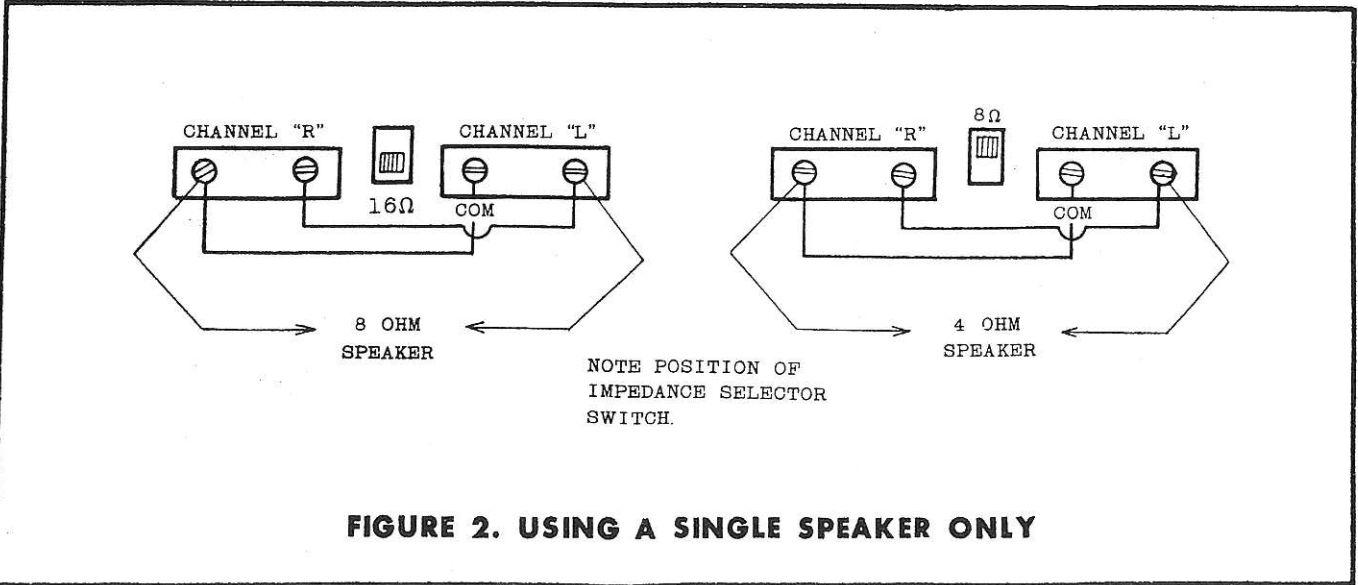
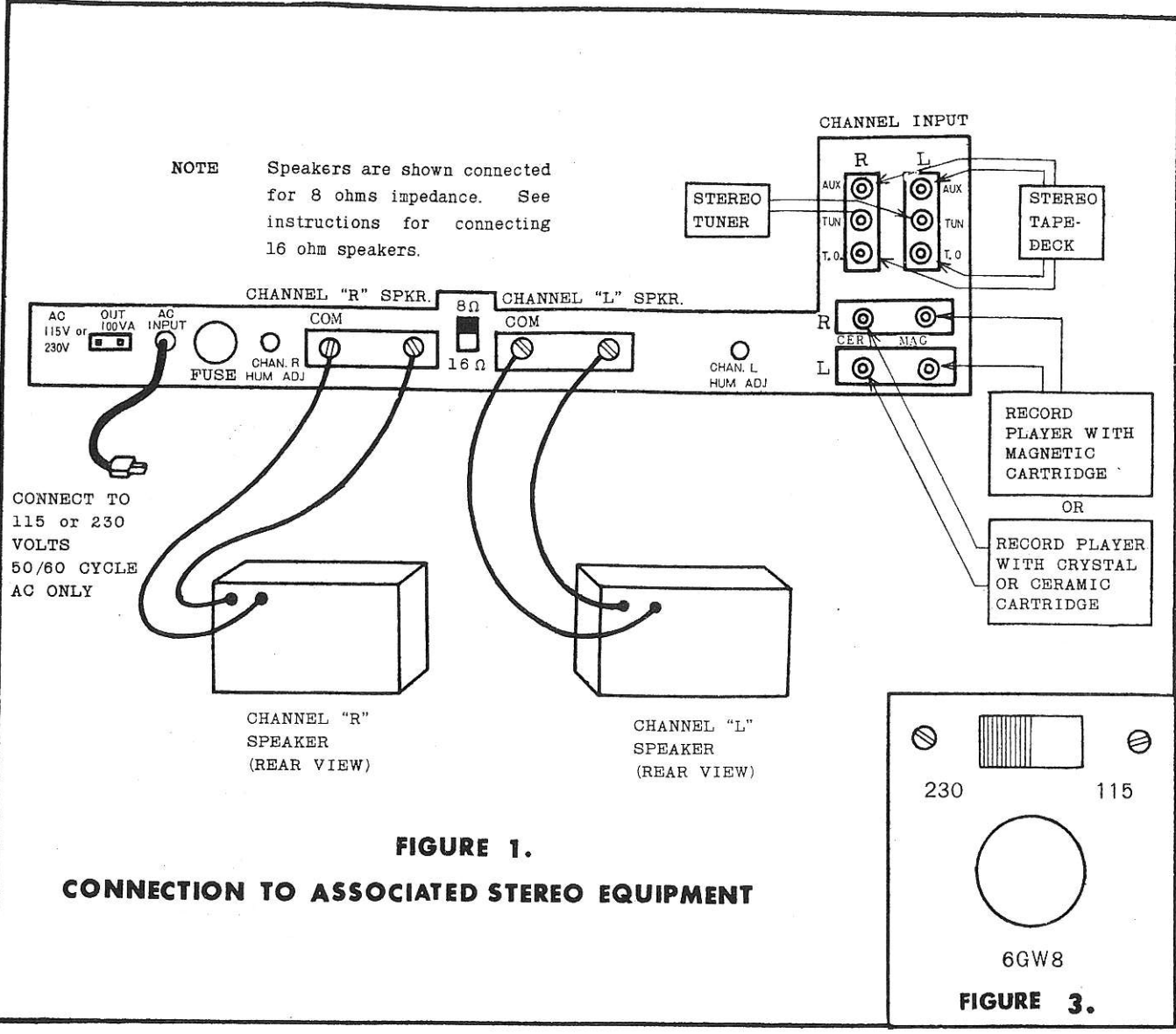
Using one speaker only: The dual outputs may be paralleled for connection to a single speaker system of 4 or 8 ohms. The required wiring connections and IMPEDANCE switch settings are shown in Figure 2.

Note: The PHASE switch must be placed in the NORM position when using the amplifier in this manner.

For indoor installations, ordinary plastic-covered lamp cord can be used to connect speakers to the amplifier, and may be extended as far as 50 ft. without any significant power loss. TV antenna lead may be used for shorter distances, and is especially convenient for installation under a rug.

### STEREO HEADPHONES

The SA-30 is also equipped for stereophonic headphone listening. Simply connect the headphones to the jack provided in the front of the amplifier, and place the SPEAKER-PHONES switch at the "PHONES" position.



## PHONOGRAPH

The shielded leads from your phono arm should be provided with phono-type plugs for connection to the amplifier. To avoid loss in high frequency, these leads should not exceed 10 feet in length.

**LOW LEVEL PHONO INPUTS:** Inputs from a magnetic or variable reluctance (constant-velocity type) cartridge should be connected to the jacks designated "MAG". The termination at these jacks is 50,000 ohms. This value correctly loads most cartridges for flat frequency response.

**HIGH LEVEL PHONO INPUTS:** Inputs from "constant-amplitude" phono cartridges such as crystal, ceramic and FM-capacitance types, should be connected to the jacks designated "CER". In addition, crystal and ceramic cartridges may also be plugged into the "AUX" jacks.

## TUNER

The input jacks designated "TUNER" are for use with FM or AM tuners, FM Multiplex adapters, TV receivers and other equipment with at least 0.5 volt output. Shielded leads complete with phono-type plugs should be used to connect any of these sources to the amplifier.

**STEREO SOURCES:** The output of a stereo FM-AM tuner should be connected as follows: FM output into the "R" tuner input jack, AM output into the "L" tuner input jack of the same pair. When using a multiplex adapter, connect the two output leads of the adapter to the "R" and "L" tuner input jacks.

**MONOPHONIC SOURCES:** Monophonic outputs from Radios, Tuners or TV receivers may also be connected to the "TUNER" jacks. For example, an AM tuner could be connected to the "R" input jack and the sound output of a TV receiver connected to the "L" input jack. Selection of either of these inputs would be carried out by means of the "Selector" switch on the front panel of the amplifier. (All controls and their use are fully explained in the section headed "Description of Controls".) The jacks labeled "AUX" may also be used for inputs from Radios, Tuners and TV receivers, etc., either singly from monophonic sources, or as a pair for stereo inputs.

**NOTE:** In all cases, careful adjustment of levels must be made at the Tuners, TV receivers, etc., in order not to overload the amplifier.

## TAPE RECORDER

The output of a tape preamplifier should be connected to the high level input jacks labeled "AUX". To avoid overloading the amplifier, make use of the level controls available at the tape pre-amp. For recording purposes, use the output at the "T.O." jacks, which should be connected to the recorder input by means of shielded cables. All sources connected to the amplifier and selected by the SELECTOR switch, are available at these jacks. Listening to the original program material is possible, adjustment of the amplifier tone or volume controls having no effect on the signals at the "T.O." jacks.

## AC POWER

The amplifier is to be used on 115 or 230V, volts, 50/60 cycles AC only. Connecting it to any other power source will cause damage to the amplifier. The 3 amp fuse protecting the unit is located at the rear. To remove, simply unscrew the knurled cap. Use only a 3 amp. fuse as a replacement.

This Stereo Amplifier is available at both areas of 115V and 230V. When you use this set at 115V area, turn the slide switch to the position of 115V and when you use it at 230V area change it into the position of 230V.

Do not change the voltage when it is working, for the set will be broken. This set is adjusted at 230V now. (see figure 3.)

## DESCRIPTION OF CONTROLS

We suggest you take the time to read this section carefully. There are a number of controls and switches on the amplifier, each carefully designed for ease of operation. A full understanding of each control and its functions will enable you to obtain maximum enjoyment from the amplifier.

### SELECTOR

This switch selects signals connected to the input jacks. The "Phono" setting selects signals connected to either the "MAG" or "CER" inputs, and it is therefore not desirable to have operating equipment connected to both of these pairs of input jacks at the same time. The remaining positions of the switch ("Aux" and "Tuner"), select signals connected to the corresponding input jacks on the amplifier.

At every position of the switch, all unused inputs are shorted for zero crosstalk -- except for the "Aux" input. A special purpose is served by omitting this input from the automatic shorting process. During a tape recording operation, the output of the tape recorder would normally be connected to the "Aux" input. The selector switch would, of course, be in either the "Phono", or "Tuner" positions to select the recording source. Shorting the "Aux" input would, in effect, place a short across the tape recorder output, which, although not being used, might nevertheless have a detrimental effect on the recording operation.

### MODE SWITCH

Normal Stereo: Setting the MODE switch at the STEREO position provides normal stereo operation. In this manner, channel "L" input signals are controlled and amplified through the channel "L" amplifier, and channel "R" input signals through the channel "R" amplifier.

Reverse Stereo: Setting the MODE switch at the "REV" position reverses the operation described for normal stereo. Effectively reversing the positions of the two speakers in the room, it is intended to provide a means of suiting individual tastes in listening as regards the relative positions of instrumental groupings.

Monophonic "L": Setting the MODE switch at the Mono "L" position allows signals connected to channel "L" input jacks to be controlled and amplified through both amplifiers and speakers.

Monophonic "R": Setting the MODE switch at the Mono "R" position performs the same function as above for channel "R" signals ("R" signals through both amplifiers and speakers).

### BASS AND TREBLE

These two dual concentric controls provide separate and independent tone control for each channel, either increasing or decreasing the relative strength of the bass and treble range. When the indicators on the knobs are set to be vertical (12 o'clock), response of the amplifier is flat. Clockwise rotation increases bass or treble response, and counter-clockwise rotation provides a reduction.

### VOLUME

This is a dual concentric control which acts as an independent level control for each channel. Each knob may be operated individually, without affecting the setting of the other. Balancing of channels can be carried out by ear, or, if greater accuracy is desired, by the use of VU balance meters connected to the speaker output terminals.

## PHASE

In the "REV" (Reverse) position of this switch, the phase of channel "R" is reversed electrically. This action effectively reverses the leads to the channel "R" speaker in the event that, during connection, the two speakers were connected out of phase. Additionally, the program material itself may have a phase reversal due to incorrect recording or duplicating (See "Phasing of Loudspeakers").

## HUM BALANCE

The HUM BAL controls at the rear of the amplifier will enable you to minimize any hum that may originate from the amplifier during normal operation. The procedure outlined below should be carried out with a turntable or record changer connected to the amplifier.

- a) With the pick-up arm at rest, set SELECTOR to "Phono", VOLUME controls to maximum, BASS and TREBLE to their midway or "flat" position, and all other switches for normal stereo operation.
- b) Using a screwdriver, adjust channel "R" HUM BAL control for minimum hum from channel "R" speaker; adjust the channel "L" control for minimum hum from channel "L" speaker.

## RUMBLE FILTER

This switch, when "on", inserts a low frequency filter into the circuit that effectively reduces the rumble from a noisy turntable or changer with a minimum effect on program material.

## OPERATING PROCEDURE

Before attempting to operate the amplifier, make sure that you have connected your program sources (phonograph, tuner, tape player, etc.) and loudspeakers correctly. Before plugging in the amplifier, be sure that the power source to be used is 105-125 volts, 50/60 cycle AC, and that the power switch located on the VOLUME control is "off".

Set the SELECTOR to the input you wish to use, and set both VOLUME controls to minimum. BASS and TREBLE controls should be set to the "flat" position (indicator mark opposite dot), RUMBLE switch "off", PHASE to "normal".

Turn the amplifier on; after a short warm-up period, the unit will be ready for operation. Operate your associated equipment (phonograph, tuner, tape player, etc.) and adjust the amplifier volume controls for desired level of sound.

## PHASING OF THE LOUDSPEAKERS

Correct phasing is important in a stereophonic system. If the speakers are out of phase, they will work in opposition to each other and there will be a noticeable loss in the low frequencies. Use the following procedure to make this adjustment:

- a) Set the SELECTOR switch to the "PHONO" position, and the MODE switch at "STEREO".
- b) Play a monophonic record containing heavy bass passages and adjust each of the concentric volume controls for approximately equal output from both speakers.

- c) Set the PHASE switch first to "Normal", and then to "Reverse", listening carefully to the bass tones in each position. If the greatest amount of bass is heard in the Reverse position, reverse the leads to one (only) speaker. Thereafter, the switch should be left in the Normal position unless it is discovered that the phase of one of your program sources has been reversed.

### **BALANCING CHANNELS**

For best stereophonic performance, both channels of sound should be equal in output, or "balanced". Balancing may be carried out by ear, or if a more precise adjustment is required, by means of a stereo balance meter. The procedure outlined below describes the method used to balance a Phono system. The same general procedure may be followed for any stereo program source connected to the amplifier.

- a) Set the SELECTOR switch at the PHONO position, and the MODE switch at STEREO.
- b) Playing a monophonic record, adjust each of the volume controls for equal sound output from the speakers. When the outputs are equal and in phase, sound will appear to come from an area centered between the two speakers (if they are spaced 6 to 8 feet apart).

### **USING A STEREO BALANCE METER**

Connect to the amplifier as instructed in the literature accompanying the meter. Follow the same procedure outlined previously for balancing without a meter, but use the meter to determine the correct point of balance.

This method balances the channels only as far as the amplifier outputs. If there are any inequalities in the speakers, balancing should be carried out by ear as described previously.

It should be remembered that setting both volume controls to identical positions merely provides equal gain from each channel within the amplifier and does not compensate for unequal inputs to the amplifier or dissimilar speaker systems.

### **USING THE SA-30 AS TWO MONOPHONIC AMPLIFIERS**

If desired, the SA-30 may be used as two separate monophonic amplifiers, with each speaker system placed in a separate room. An AM radio could be connected to the "R" input jack of the "tuner" or "Aux" pair, and an FM tuner connected to the "L" input jack of the same pair.

Placing the MODE switch at the STEREO position would reproduce the output of each piece of equipment separately through each amplifier and speaker, thus providing dual monophonic operation. One of the speakers would be placed in a room other than the one in which the equipment is located. The dual concentric controls on the amplifier will also enable you to set volume and tone controls individually to suit the acoustic requirements for each listening room.

### **EXCESSIVE HUM**

Excessive hum encountered during phono operation may be isolated in the following manner:

Disconnect the phono input cable from the amplifier and short the phono input jack to chassis. If the hum disappears, the trouble is not in the amplifier but in the phonograph or in the connection to the amplifier. Excessive hum encountered during any other operation of the amplifier may be isolated in a similar manner. Disconnect the input cable in question and short the particular input jack to chassis. As before, if hum disappears, the trouble is external to the amplifier.

**EXTERNAL HUM:** While it is not feasible to list all the possible causes of hum in a system, the following notes on the more common sources may enable you to locate and remedy the trouble. If the hum occurs on Phono, it may be due to lack of grounding of a metal pickup arm, in which case a good single ground connection to the cable shield from turntable frame, pickup arm, and cartridge case should be made. Hum which is present only when the phono motor is operating, and which varies as the pickup arm is moved across the turntable, is usually direct pickup by a magnetic cartridge from the phono motor. Using a rubber mat on the turntable will increase the separation of the cartridge from the motor. Hum can be induced in a magnetic cartridge from a power transformer or other magnetic field in the vicinity. Moving the phonograph away from the suspected source will normally cure the trouble. Always make sure that the phono input cable shielding is grounded to the amplifier chassis at one point only, through the skirt of the input plug where it connects to the amplifier.

**AC LINE CORDS:** As a general means of reducing hum, the following procedure should be carried out;

1. Turn on all equipment connected to the amplifier.
2. Reverse the AC wall plug from the amplifier to determine which position provides the least hum. Leave it in this position.
3. Repeat this procedure with the AC plugs of the other components, using the amplifier selection switch to select the component being tested.

Making a single ground connection between the amplifier and a ground point (such as the AC socket wall plate) may further reduce hum. The ground wire should be taken to a point as close to the input jacks of the amplifier as possible.



