

# Guitar Amplifier - With Tremolo

By Harvey Pollack

**Make a small instrument sound like a big one. This amplifier will impart a pleasing variation in tone.**

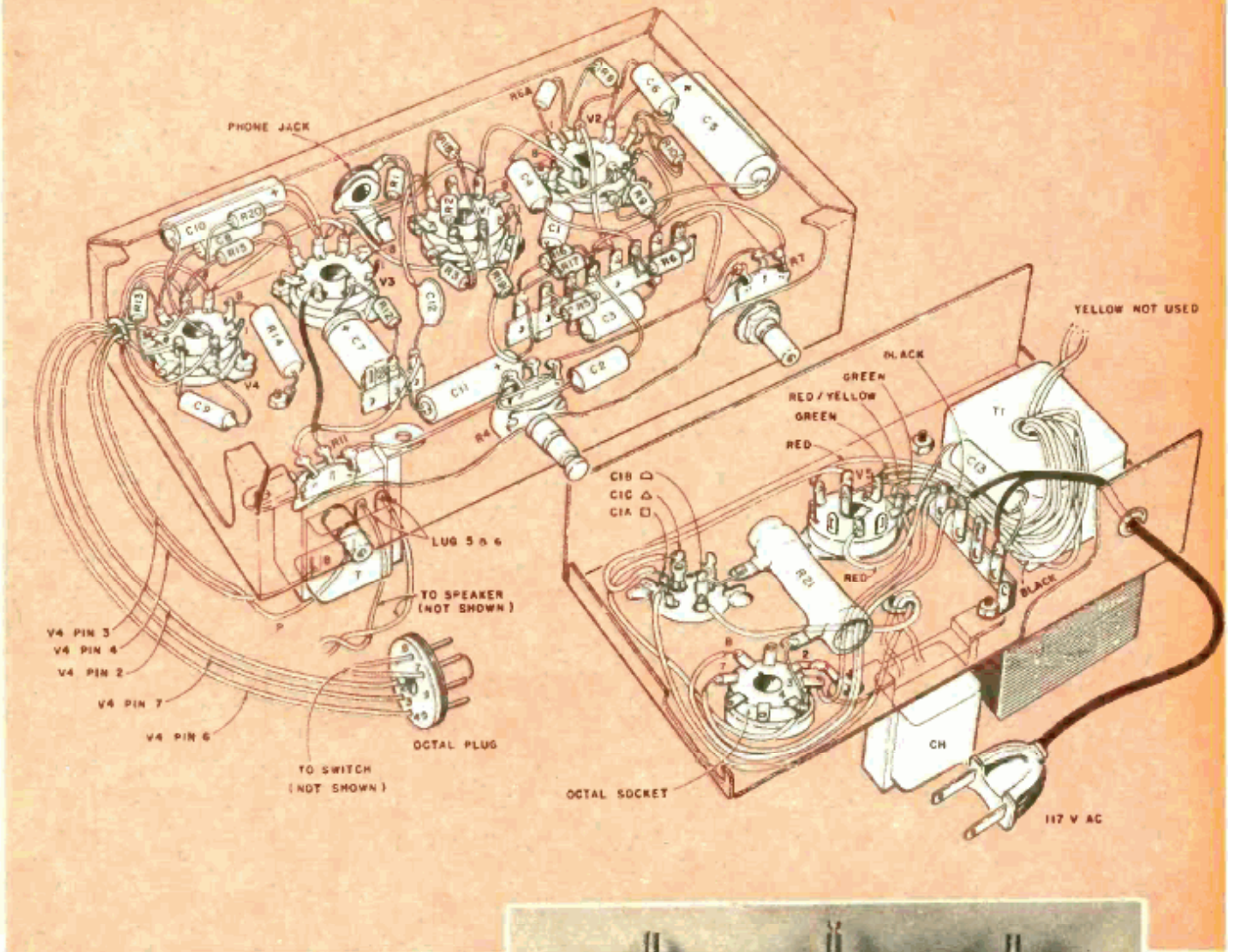
**A** LITTLE bit of talent goes a long way with a guitar amplifier that not only provides a wide tonal range at full volume, but permits the player to add exactly the right amount of tremolo by a touch of his fingers. The cost of the parts is only a small fraction of what you would pay for a similar unit—if you could buy it at all.

The design is based on the use of two separate chassis, one for the power supply and the other for the tremolo and amplifier sections. To cut down on the amount of work required, a commercial power supply was utilized at a cost only slightly greater than the total price of the individual components (see Parts List). For those who insist upon building up everything from scratch, a list of components required for the construction of the power supply is provided.

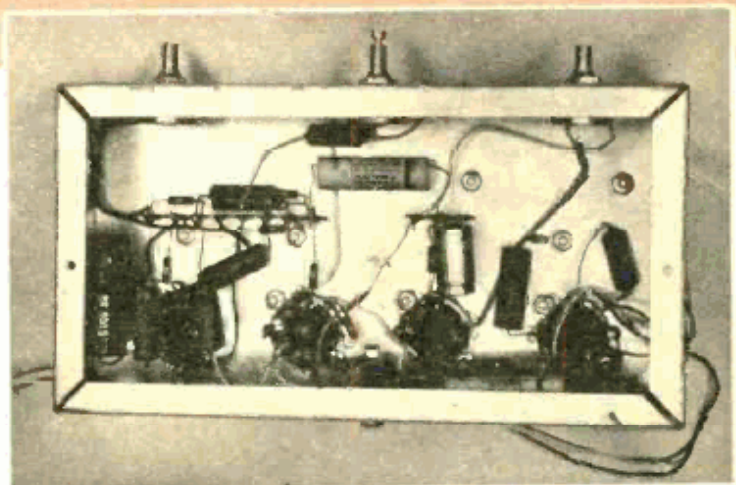
We strongly recommend that the tremolo oscillator (V2) be wired first because the placement of the small parts (capacitors

A "contact" type microphone is clipped on to the instrument and plugged into the amplifier. The amplifier power is sufficient to fill a small auditorium.





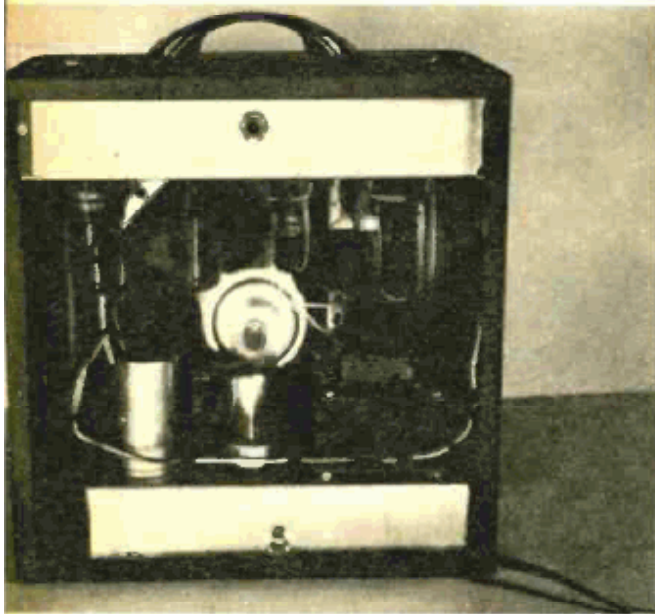
Wiring guide above shows 2-chassis construction. Upper unit is amplifier, lower is power supply.



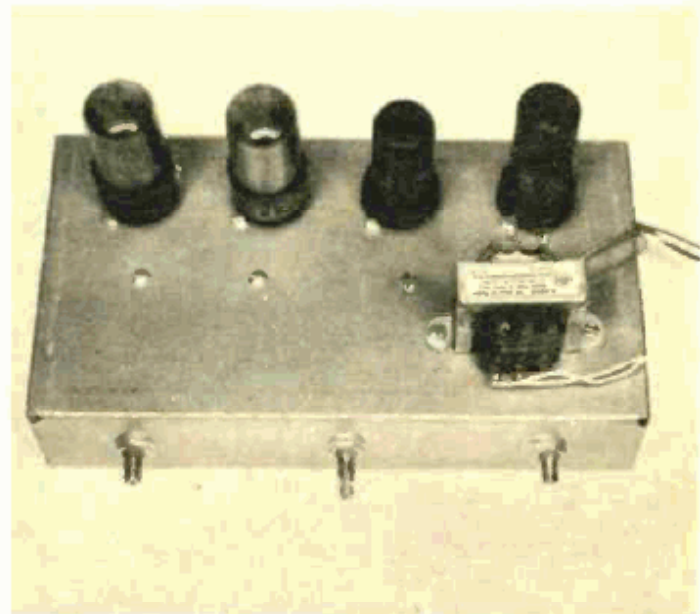
Underside of amplifier. Shafts at the top control tremolo rate (R7), tremolo depth (R4), volume (R11).



The speaker cabinet and 2 chassis. Amplifier is at left, power supply which plugs into it is to the right.



The amplifier is mounted upside down (at the top of the cabinet) with power supply below.



On amplifier chassis from left to right are V2, V1, V3, V4. Audio transformer is below V4.

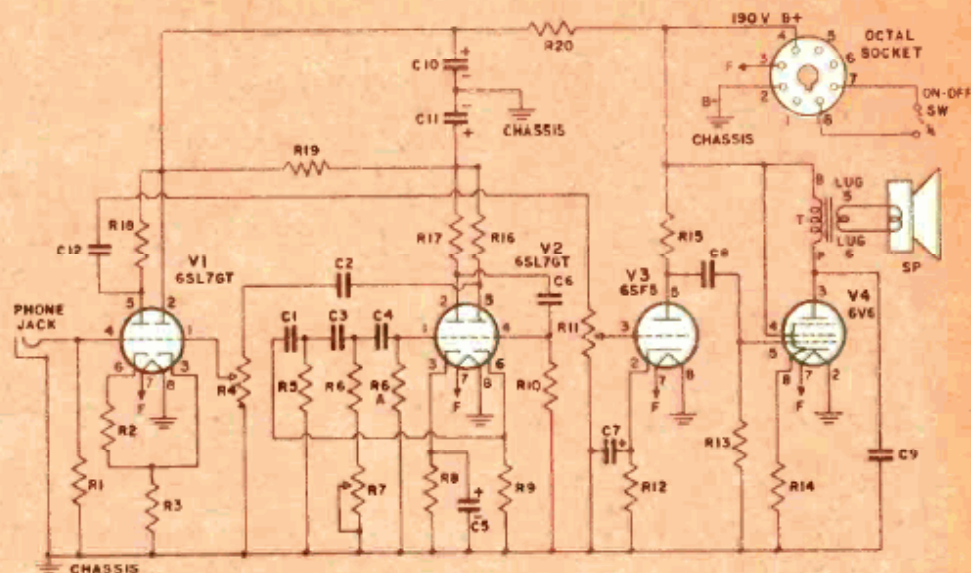
#### PARTS LIST

All resistors  $\frac{1}{2}$  watt unless otherwise noted  
 R1, R15—470,000 ohm  
 R2—1000 ohm  
 R3—33,000 ohm  
 R4, R11—500,000 ohm audio taper potentiometer  
 R5, R6A, R16, R19—270,000 ohm  
 R6—100,000 ohm  
 R7—1 megohm linear taper potentiometer  
 R8—4700 ohm  
 R9, R17—150,000 ohm  
 R10—1 megohm  
 R12—6800 ohm  
 R13—330,000 ohm  
 R14—250 ohm, 5 watt  
 R18—56,000 ohm  
 R20—27,000 ohm  
 C1, C3, C4, C6—.05 mfd., 400 volt  
 C2, C8—.01 mfd., 400 volt  
 C5—40 mfd., 50 volt electrolytic  
 C7—16 mfd., 50 volt electrolytic  
 C9—.001 mfd., 400 volt  
 C10, C11—8 mfd., 450 volt electrolytic  
 C12—.005 mfd., 450 volt  
 V1, V2—6SL7GT  
 V3—6SF5  
 V4—6V6  
 4—octal sockets (with ground lugs)  
 T—Audio output transformer (Stancor A-3B49)  
 SP—8" speaker, 3.2 ohm  
 SW—SPST switch  
 Phone jack, headphone type  
 Chassis—5"x9 $\frac{1}{2}$ "x2" aluminum (Bud AC-403)  
 Cabinet—Metal speaker type 10"x10"x6"  
 Microphones—Guitar or harmonica contact type  
 Power supply may be purchased completely wired (Lafayette A-620). If built from schematic, the following parts are required  
 VS—7Y2  
 CH—Choke, 8 henries, 50 ma. (Stancor C-1707)  
 TI—Power transformer 250-0-250 volts, 55 ma. (Stancor PM-8402)  
 R21—1300 ohm, 20 watts  
 C1A, C1B, C1C—3-section electrolytic 10-10-20 mfd., 350 volt  
 C13—.05 mfd., 600 volt  
 Chassis—5"x7"x2" (Bud CB-629)  
 1 Lokfal socket for 7Y2  
 1 octal socket for power plug

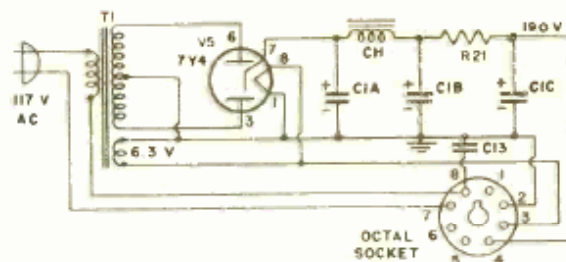
and resistors associated with this stage) may present a problem if left until later. Keep all the leads as short as possible, grouping C1 through C6 and R5 through R10 closely around the tube socket. The use of a terminal strip to support some of these components will make the wiring easier and the finished job neater. The circuit of the signal mixer (V1) should be wired next. Here again it is wise to keep the leads short and dressed close to the chassis. Although no shielded wire for the grid leads was found to be necessary in the author's model, you may find it necessary if you permit the leads to be longer than an inch or two.

The remainder of the amplifier may now be completed. The grid circuit of V3 is still a sensitive point and connections here should also be short, but from the 6SF5 to the 6V6 the wiring is not at all critical. The output transformer is a universal type, but you may use any output transformer that matches a 6V6 plate to the voice coil of your speaker. Another mechanical precaution to be noted at this point is this: the speaker is a rather flat PM type designed to occupy little space inside the cabinet. If you use the same case and general layout, don't yield to the temptation to buy a hi-fi type of speaker because the voice

Amplifier schematic. Keep the leads to V1 and V3 very short to avoid picking up hum.



Power supply schematic is at right. It may be bought already wired, as noted in parts list.



coil covers of such units are large and bulky—so much so that you may not be able to fit both chassis into the cabinet.

After completing construction, insert V3, V4, and V5 in their sockets and apply power. After a 15 second warmup period, you should be able to hear a loud hum or buzz from the speaker when you touch the grid of V3 (pin No. 3) with your finger. This is a rough test for the amplifier. If the hum is not heard, do not proceed with the remaining test until the trouble has been corrected. Since the amplifier circuit is relatively simple, an inoperative condition here is usually caused by poor solder connections or incorrect wiring, seldom by obscure defects you encounter in complex equipment.

Now plug in V1 and V2, and rotate all the potentiometers to maximum clockwise position. When the tubes have warmed up sufficiently, you should hear a soft rushing sound from the speaker fluctuating at the rate of about 10 vibrations per second. This sound is due to the gain variation produced by the tremolo oscillator and indicates that everything is working properly. Test the action of the controls as follows: rotation of R4 to its full off position should stop the tremolo effect in the tube rush without affecting the tremolo

rate at any setting; R7 should change the tremolo rate down from 10 cycles per second to about 3 cycles per second when rotated to full off; R11 should control the overall gain so that you hear the rush diminish smoothly.

Any one of the microphones for guitar, harmonica or other instruments may now be plugged into the phone jack. The individual settings of the three controls are made to suit your particular taste.

The most probable cause of lack of tremolo is an inoperative oscillator V2. This may be due to a bad tube or by defective capacitors or resistors in this circuit. The parts to check are C1 through C6, R5 through R10, R16 and R17. As always, the tube should be the primary suspect.

Excessive thumping at the tremolo frequency may be due to capacitive feedthrough from the plate circuit of the oscillator to the grid of V3 without going through the mixer tube. To cure this, oscillator plate leads must be shifted until the thump is minimized.