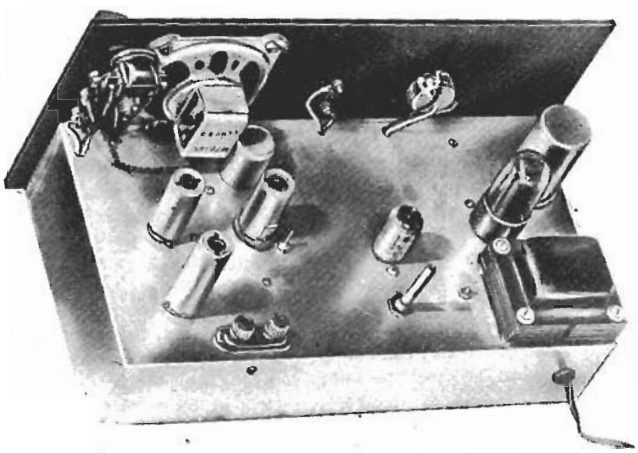
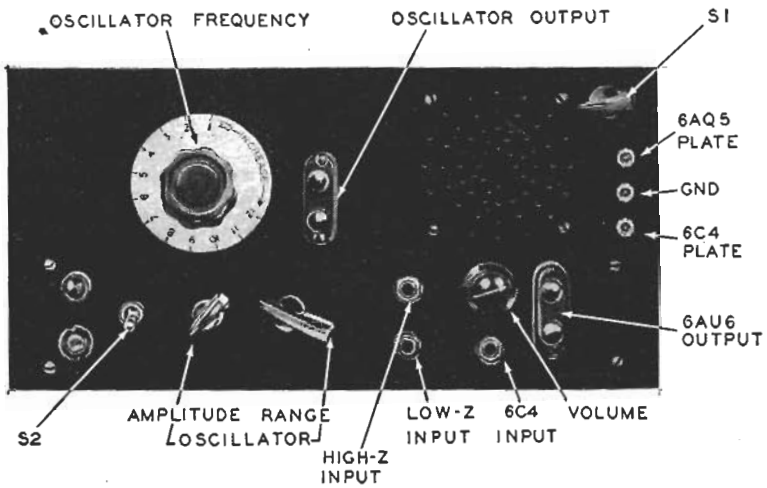
# SIGNAL TRACING AMPLIFIER

By PAUL S. LEDERER



Layout of the signal tracer isolates power supply and high-gain amplifier.




**Panel arrangement with controls and terminals. The oscillator circuit is not shown in the schematic at the right, but the source is given in the text.**

THIS is a description of a useful and versatile amplifier which will appeal to most audio enthusiasts and experimenters.

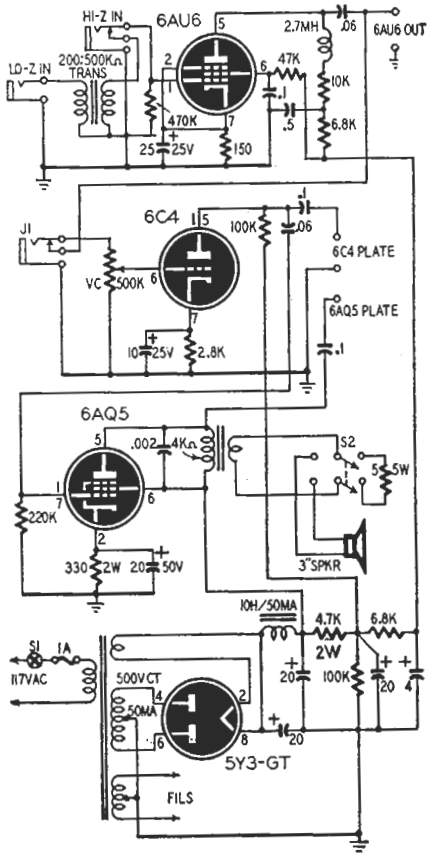
My original idea was to construct a small audio amplifier for signal tracing and other general uses. Then I decided to incorporate a wide-band amplifier for driving a v.t.v.m. whose lowest full-scale range is 3 volts.

The completed amplifier incorporates these two ideas. It consists of a 6AU6 broad-band amplifier, a 6C4 voltage amplifier, a 6AQ5 power amplifier, and a 5Y3-GT rectifier. The input to the 6AU6 stage has a 200-500,000-ohm audio input transformer with two input jacks so arranged for high- and low-impedance inputs. Two output terminals complete this stage which uses shunt peaking to achieve a gain of about 45 (within 3 db) from about 50 cycles to 400 kc.

If more gain is desired in the first stage, a larger plate-load resistor can be used (in such a case the bandwidth will decrease unless it is properly compensated with a larger shunt coil).

The volume control is at the input to the 6C4. A closed-circuit jack (J1) disconnects the first stage if necessary. The 6C4 stage has a gain of about 16. Its response is adequate for non-high-fidelity requirements. From the 6AQ5 stage, the output is single-ended, with a switch which disconnects the speaker and throws in either an external speaker or a dummy load (the latter is necessary when it is desired to get large output voltages, otherwise with the normal speaker in the volume would be unbearable). Two extra terminals make it possible to feed out voltages from the plate of the 6C4 and the plate of the 6AQ5 (through blocking capacitors).

Miniature tubes make it possible to build the amplifier very compactly, although I did not do so as I planned to add an audio oscillator to the same chassis at a later date. Just prior to taking the photographs, I added the oscillator described on page 28 of the August 1948 issue.




**Materials for versatile amplifier**

**Resistors:** 1—470,000, 1—220,000, 2—100,000, 1—47,000, 1—10,000, 2—6,800, 1—2,800, 1—150 ohms, ½ watt; 1—500,000-ohm audio taper potentiometer; 1—5 ohms, 5-watts, 1—4,700, 1—330 ohms, 2 watts.
**Capacitors:** (Paper) 1—0.5, 3—0.1, 2—.06, 1—.002 µf, 400 volts. (Electrolytic) 1—25, 1—10 µf, 25 volts; 1—20 µf, 50 volts; 3—20, 1—4 µf, 450 volts.
**Inductors:** 1—filter choke, 10 henrys 50 ma or more; 1—power transformer, 500 volts c.t., 50 ma or more, 6.3 volts at 1.5 amp, 5 volts at 2 amp; 1—output transformer, 4,000-ohm primary 3.5-ohm secondary; 1—200–500,000-ohm input transformer; 1—2.7-mh r.f. choke.
**Miscellaneous:** 1—6AU6, 1—6C4, 1—6AQ5, 1—5Y3-GT; 1—s.p.s.t. switch, 1—d.p.d.t. switch, 1—small PM speaker, 1—fuse, 1—fuse post, 1—open-circuit jack, 2—closed-circuit transfer-type jacks; binding posts, terminal strips, chassis, panel, assorted hardware, hookup wire.

Substituting a small voice coil-to-grid transformer at the input makes it possible to use the amplifier as an intercom by adding an external speaker and a talk-listen switch. END