

Equipment Report

LEAK TL-12 AMPLIFIER with VARI-SLOPE CONTROL

ONE OF THE FEW amplifiers to be equipped with any means for varying the slope of the treble roll-off obtained by the use of the high-frequency tone control is the Leak Vari-Slope preamplifier, which was studied with the Leak TL-12 triple-loop "Point One" power amplifier. Both sections incorporate some interesting features which differ in design principles from most American circuits. The Leak amplifier, as is well known, is British built.

The preamplifier employs only one tube—a dual triode. It is equipped with type ECC81, which is replaceable with the American 12AT7. All inputs are channeled through both stages of this tube, with differing amounts of feedback over the first stage being employed to adjust for the different input-signal levels. The input

selector switch provides one position for high-impedance microphone, three positions for phonograph with equalization for magnetic pickups, and one position for radio. Input voltages for one watt output, with the gain control at maximum, are .001, .003, and .010 volts, respectively. This is somewhat higher sensitivity than required on the radio channel where a voltage divider may be required to permit satisfactory operation of the volume control, or at least to balance the tuner and pickup levels approximately.

The phono positions of the preamplifier provide a bass turnover of approximately 400 cps (it differs only slightly between the three positions) and a choice between flat and roll-off response. The LP and 78A positions are uniform, with a 15-db drop

at 10,000 cps; 78B is essentially flat on the high end. The tone controls operate in steps, and serve to vary the inflection point on both bass and treble ends. The Vari-Slope feature provides a range between 5- and 50-db per octave roll-offs above the high-frequency inflection points, which are 9000, 7000, and 5000 respectively. The slope control has no effect on the boost positions, nor upon the bass control. Measured curves are shown in Fig. 3, page 54.

The control unit is easily mounted on panels not exceeding 3/4-in. thick in a cut-out 3 1/8 x 10 1/8 in. When it is desired to operate the preamplifier as an integral part of the power amplifier, it may be attached to predrilled holes on one end of the amplifier chassis, electrical connections being made with a short cable which is obtainable as an accessory.

The power amplifier is of a design which has not been publicized appreciably. It consists of a pentode first stage feeding a "long-tailed pair" of triodes (in a single envelop) which drive a pair of pentodes which are separately cathode biased. Tubes employed in the first two sockets are EF-36 and ECC-33, which may be replaced by 6J7 and 6SN7 respectively. The output tubes may be replaced by 5881's or 6L6's if the specified KT-66's are not at hand. The over-all feedback loop covers all three stages, and is fed from the secondary of the output transformer. The secondary may be connected so as to provide impedances ranging from 1.7 to 36 ohms.

The Leak amplifier has long claimed distortion figures below 0.1 per cent—hence the name "Point One"—which are borne out by measurement. Intermodulation distortion is less than 0.3 per cent at normal operating levels. Despite the unusual connection of the output stage whereby the two tubes derive their bias from independent resistors, no change in either output

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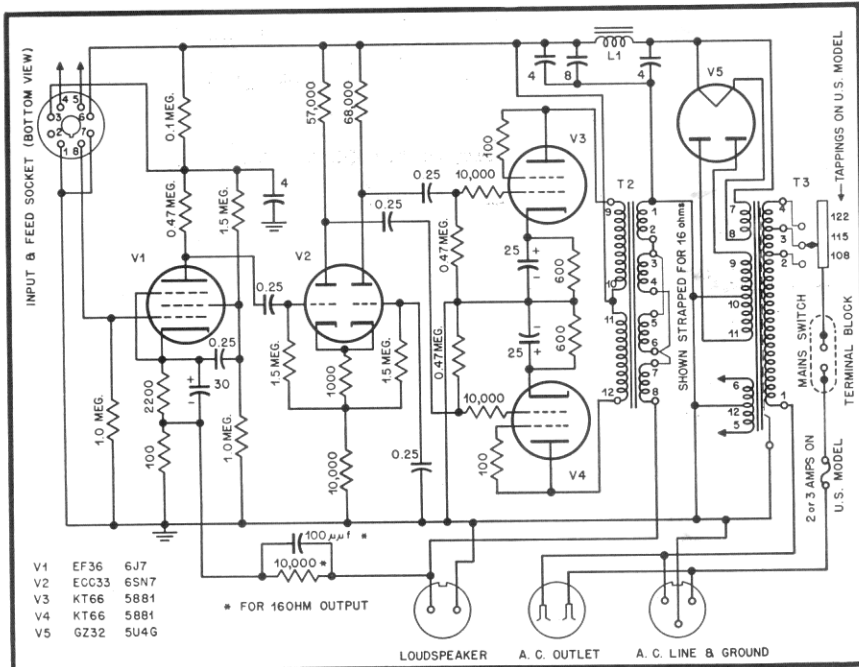
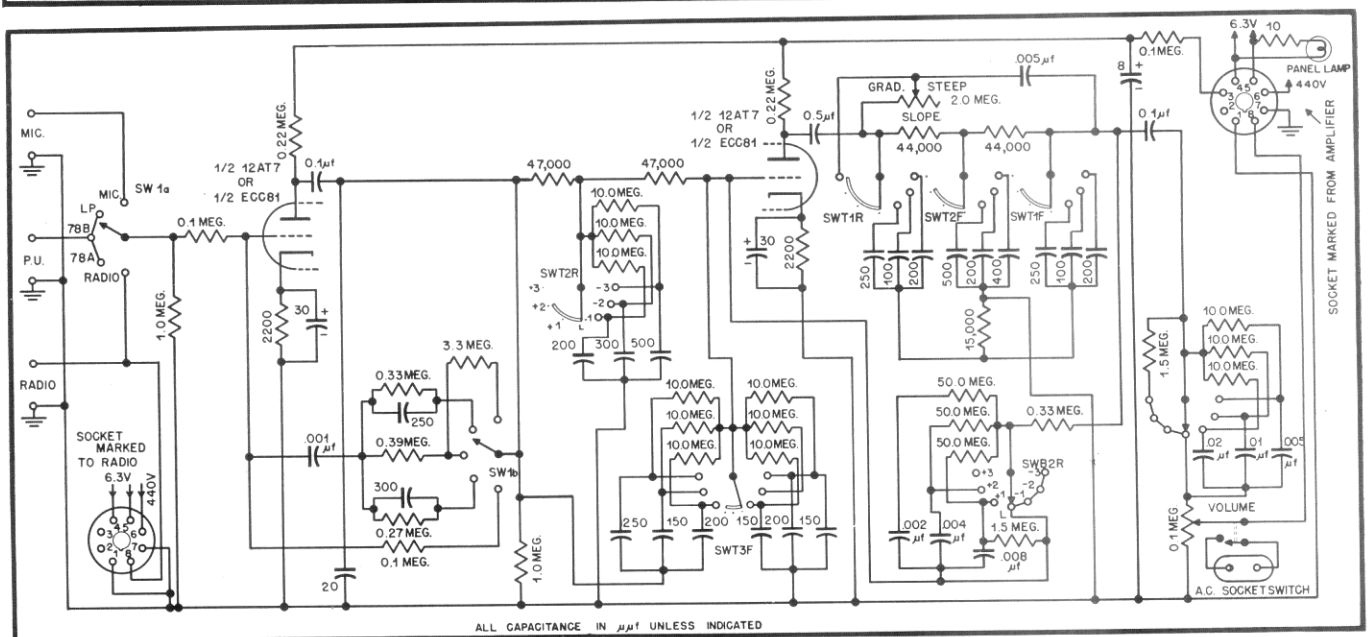


Fig. 1 (left). Schematic of Leak TL-12 amplifier and power supply. Fig. 2 (below) Schematic of Vari-Slope preamplifier.



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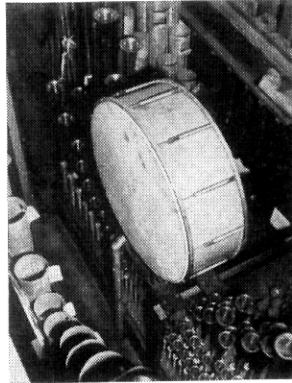
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effective lateral mechanical impedance at the stylus of a phonograph pickup and over a relatively wide range of frequencies. The impedance measurements made by this means are generally accurate within ± 15 per cent. The measured impedance and response characteristics of the crystal pickup chosen for purposes of illustration are seen to be qualitatively consistent with the mechanical circuit of the pickup. The mechanical circuit of this twister type of crystal pickup is more complicated than almost any other type in current use. Many modern pickups are, in fact, little more than a cantilever beam in simple flexure, and the analogous circuit in such cases is extremely simple for most of the audio range.

In Part II of this presentation we shall show the measured lateral impedances for a number of typical phonograph pickups.

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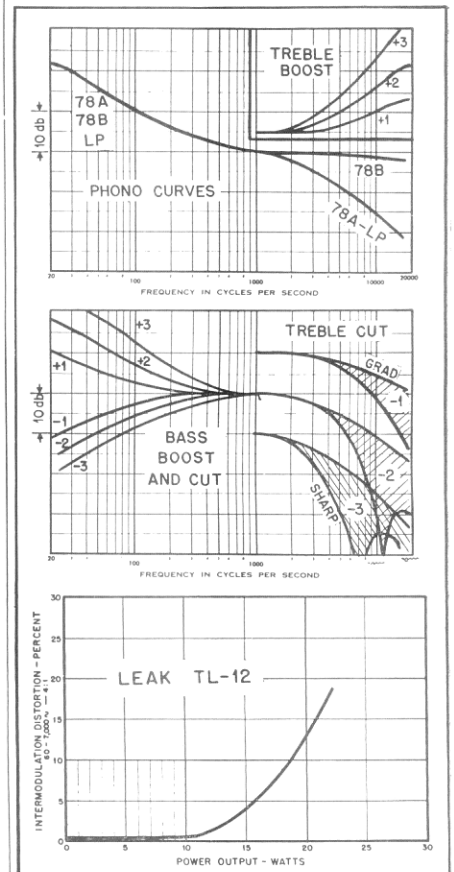


Fig. 3. Measured response and performance curves for the Leak amplifier.

or distortion was observed when the two cathodes were connected together by a clip lead, which may appear strange to students of typical push-pull amplifier stages.

The power amplifier is well built, employing paper capacitors for plate-supply filtering and assembled in a manner which provides easy access to all capacitors and resistors for replacement. Wiring is cabled wherever possible, the entire construction is a model of neat construction. The over-all quality of the amplifier is attested by its use in many professional applications in its native country.