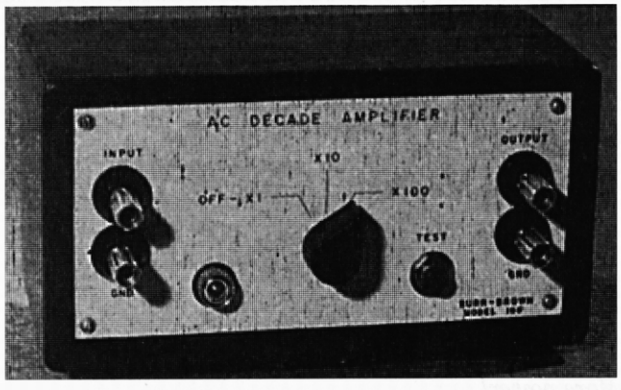
AC Decade Amplifier

No power cord but long battery life, small size, transistor reliability, and broad band pass add up to make this AC Decade Amplifier a neat laboratory tool. No polarity need be observed in connecting it to measuring equipment. Designed and manufactured by Burr-Brown Research Corp., Route 4, Box 139, Tucson, Arizona, the amplifier is powered by nine type-"C" flashlight cells with an approximate life of 1000 hours. Battery replacement is no problem since fresh standard type-C flashlight cells are easily obtained. The instrument is decaded in gains of X10 and X100 and is accurate to plus or minus 0.2 db at 1 kc. Gain change on both ranges is less than 0.3 db throughout battery life. It has a frequency response of from 1 cps to 800 kc. The low B voltages needed for transistors make possible dc coupling which results in good low frequency response.



The equivalent short-circuit noise resistance on both ranges is approximately 1500 ohms. The equivalent rms input short circuit noise voltage in various bandwidths is therefore approximately as follows: 20-kc bandwidth, 0.7 μv noise; 200-kc bandwidth, 2.2 μv noise; and 800-kc bandwidth, 4.5 μv noise.

For input signal generator impedances in excess of 1000 ohms the noise figure may be taken as 6 db or less. Input impedance for the amplifier is approximately 100,000 ohms shunted by 35 μμf for both gain ranges. The maximum dc voltage which may be impressed across the input terminals is 150 v. The maximum open-circuit output voltage is 1.2 v rms. Weight of the amplifier is 2-1/2 lbs including batteries. Its dimensions are 7-9/16 in. x 3-7/8in. x 3-9/16 in. This is the first of a series of transistorized lab instruments. Also available now is a square wave generator.*(Electronic Design, November 15, 1956, p. 48)*

Burr-Brown co-founder Tom Brown looks back at the significance of this amplifier, one of the most important devices in the company's history: "This was a case of serendipity finding us. When we were designing this amplifier, without realizing it, we actually were designing the first commercial solid-state op amp. We originally went to dc coupling to get rid of the large capacitors, and it was our customers who recognized this amplfifier as an excellent op amp. From then on, we were in the op amp business."—SS

Electronic Control For Typewriters

In an effort to further simplify the typist's job, International Business Machines Corporation has introduced electronic sensing and control equipment in their standard electric typewriterer. Incorporating an electronic-tube switching circuit which operates a relay hooked up to the tabulator, the unit makes tabulation entirely automatic. Conductive ink is used on the billing or accounting forms which, according to IBM spokesmen, costs only a little more than ordinary ink. Contact for "tab sensing" is made by a conducting brush as it passes over the ink line, thus operating the relay and stopping the carriage in a prescribed number of spaces beyond the line. The electronic unit , although employing a tube, measures only approximately 3 by 6 inches in size. It is mounted beneath the keyboard. One of the problems in "electronifying" the typewriter is the small space available for the electronic unit. Transistors can be expected to play an important part in this development.*(Electronic Design, November 1, 1956, p. 5)*

It's interesting that this scheme is based on special treatment of the paper—the addition of conductive ink—rather than any intelligence built into the electronics, which essentially operates as a relay.—SS