

are about as far as it is advisable to go in an instrument of this type. Anything further would bring it into a class with kit and commercial type scopes. The 3-inch Simplescope with vertical amplifier does a very adequate job of monitoring at a very reasonable price, without complicated circuitry, requires no special parts, and should not prove to be a

difficult building job.

I want to thank Dick St. Amant WøGZQ, for his thorough testing of the model shown at his station under typical conditions. I almost didn't get it back, he liked it so well! And again my thanks go to my friend Bob Rode WøBRE, for the excellent photographs. . . . WøOPA



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The Heath IM-30 Transistor Checker

Here is a piece of test equipment that has been misnamed. Instead of a transistor tester it should have been named the transistor analyzer. This is exactly what it does. It measures $5\frac{1}{2} \times 10\frac{1}{4} \times 10\frac{1}{4}$. The tester tests transistors and diodes under conditions that correspond to actual dc operating conditions. Since the author has specialized in transistors for the past 7 years this equipment is right up his alley.

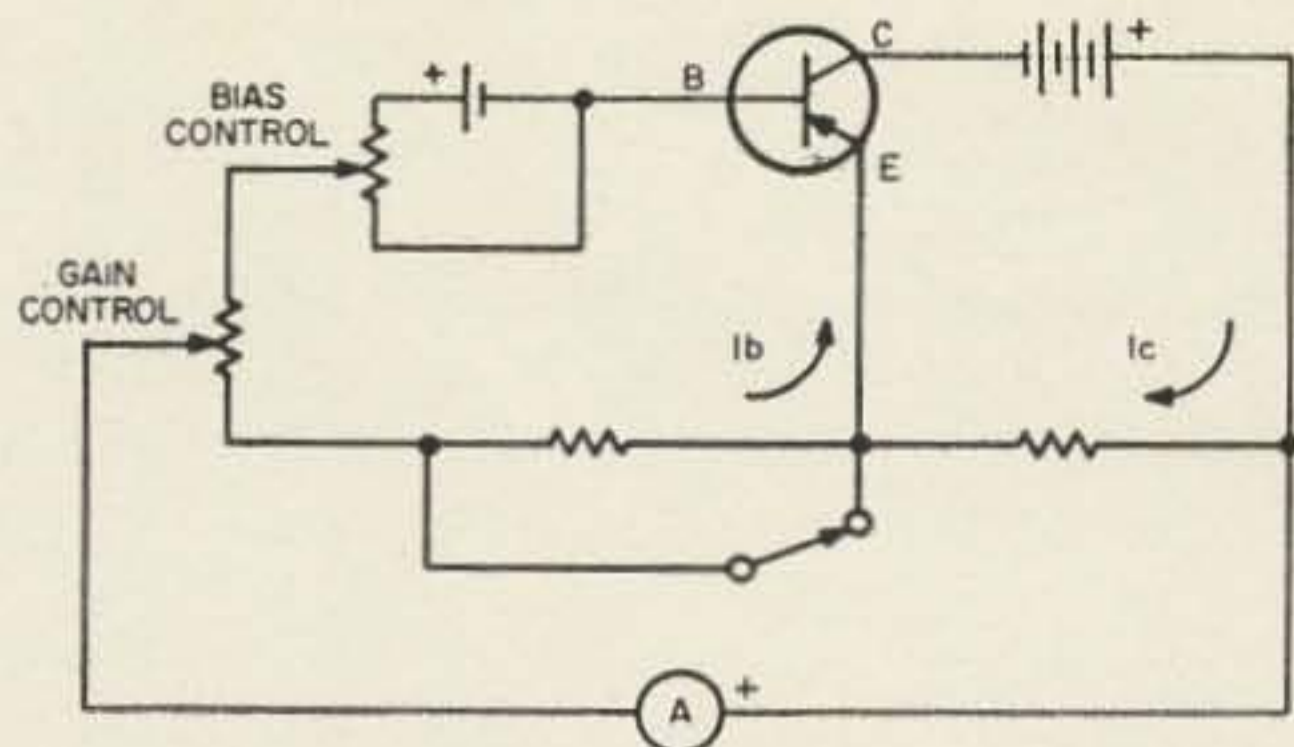
The kit is complete and the instructions are thorough. Only precision components were used in this kit. It was constructed and tested by the author in approximately 20 working hours.

With transistors coming into the amateur

field more each day this piece of test equipment fills the bill. It would almost be impossible to cover all the parameters this tester covers in this article.

Just about everyone who even has a slight interest in transistors wonders what the gain is of a particular transistor. This is a good way to find similar transistors when using 2 PNP in conventional push pull amplifiers or PNP and NPN in complementary symmetry amplifier for receivers or modulators.

Let's cover the gain test (dc beta-dc alpha). Readings are taken off of a calibrated direct gain dial after the 10-0-10 micro-amp 100K/volt meter has been nulled. The following is the gain circuit:



GAIN TEST (DC ALPHA) (DC BETA)

The following additional information may be obtained direct:

Base current (I_b) Collector to base leakage (I_{cbo})

Collector voltage (E_c) Leak voltage

Collector current (I_c) Short test

Collector to emitter leakage (I_{ceo}) Diode Test

With some of the above information and an external voltmeter used in several instances the following information may be obtained:

AC current gain DC Transconductance

$$\frac{I_{c1}-I_{c2}}{I_b}$$

$$\frac{I_{b1}-I_{b2}}{E_b}$$

AC Transconductance DC Base resistance

$$\frac{I_{c1}-I_{c2}}{E_b}$$

$$\frac{E_{b1}-E_{b2}}{I_b}$$

AC Base resistance DC Collector resist.

$$\frac{E_{b1}-E_{b2}}{I_c}$$

$$\frac{I_{b1}-I_{b2}}{I_c}$$

AC Collector resistance

$$\frac{E_{c1}-E_{c2}}{I_c}$$

$$\frac{I_{c1}-I_{c2}}{I_c}$$

What difference is used in the formulas two different bias or voltage points have to be taken.

The author selected a bargain basement transistor audio *if* type which costs less than a dollar and made several checks with some surprising results. It was a PNP with a gain of 90 which is excellent. A transistor has good gain if it has a gain of 70. The base *ac* resistance was 750 ohms and the collector *ac* resistance was 1500 ohms.

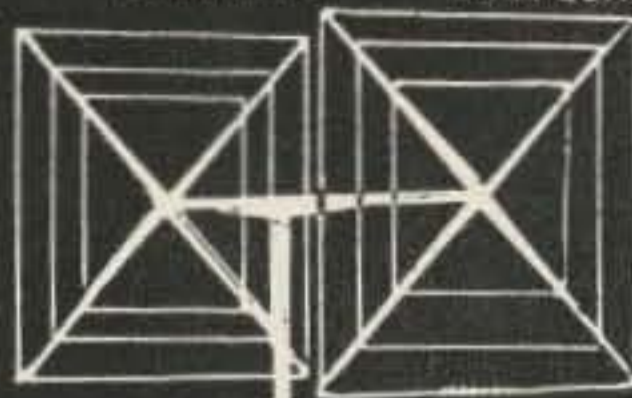
The base and collector resistances become important when a transistor is to be used in a circuit. This allows the builder to properly match the input and output. The checker in itself is an education in transistors. It takes a little practice and usage to master it. Remember it is a piece of laboratory test equipment. Instructions with the tester are very clear to follow. . . . W5JSN

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