THE General Radio EXPERIMENTER

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ELECTRICAL MEASUREMENTS AND THEIR INDUSTRIAL APPLICATIONS

Also IN THIS ISSUE

A GENERAL PURPOSE WAVEMETER

● ONE OF THE INDISPENSABLE TOOLS OF THE RADIO ENGINEER is the ordinary wavemeter. While precise frequency measurements are often necessary, there are many uses in the laboratory for an instrument that gives an answer within a few per cent quickly and conveniently. Among these are checking the frequency ranges of oscillator coils, setting and determining oscillator frequencies, and finding the frequencies of parasitic oscillations in r-f amplifiers For experimental work the low accuracy of the wavemeter, as compared to precise crystal frequency standards, is more than offset by the speed and convenience of measurement.

The two inexpensive, general-purpose wavemeters formerly carried in our catalog (Type 574 and Type 358) have now been replaced by a single instrument, Type 566-A, which combines, in an improved design, wide range, small size, good accuracy, and low price.

Figure 1. View of the Type 566-A Wavemeter showing how coils are stored when not in use.

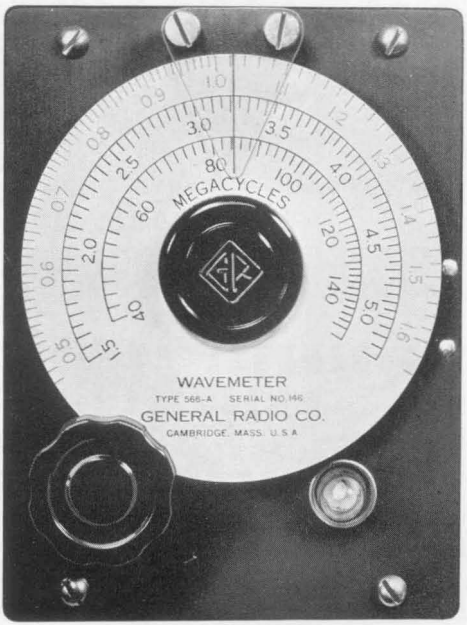


FIGURE 2. View of the wavemeter dial showing the frequency scales. The outer scale is engraved in red, the other two in black.

This new wavemeter is direct reading in frequency between 0.5 and 150 Mc. Only three frequency scales are used, as shown in Figure 2, although there are five plug-in coils. The outer scale is used with two coils, 0.5 to 1.6 Mc and 5 to 16 Mc. The middle scale covers the ranges 1.6 to 5 Mc and 16 to 50 Mc. The inside scale is used for the highest frequency coil, 50 to 150 Mc. These scales are accurate to ±2% up to 16 Mc, and to ±3% between 16 and 150 Mc.

The resonance indicator is an incandescent lamp. With low-power oscillators the reaction of the wavemeter on the oscillator tube currents can be observed.

Figure 3 gives an idea of the size of the wavemeter, and shows one of the features, that all coils except the highest frequency one can be rotated to secure the desired coupling. When not in use, coils are stored in the rack on the side of the instrument, as shown in Figure 1.

The slow-motion drive provided on the dial makes possible a fine adjustment of the condenser. The condenser itself is similar in construction to the TYPE 568, but has a longer stack. Figure 4 is an inside view of the instrument showing this condenser.

Four of the coils are wound on phenolic forms which enclose and protect the winding. The highest frequency coil, as shown at the left in Figure 3, is a straight bar.

The small size, accuracy, and low price of this wavemeter make it a particularly desirable instrument for the radio laboratory. Because all our facilities are devoted to war projects, this instrument is, at present, available only for war work. —E. KARPLUS

FIGURE 3. View of the TYPE 566-A Wavemeter in use. The coil can be rotated to secure optimum coupling to the source whose frequency is being measured.

SPECIFICATIONS

Frequency Range: 0.5 to 150 Mc (600 to 2 meters) using the five plug-in inductors furnished with the instrument. The condenser dial is direct reading in frequency. The precision with which the dial can be read is 2% or better.

Accuracy: The accuracy of dial indication is ±2%, 0.5 to 16 Mc; and ±3%, 16 to 150 Mc.

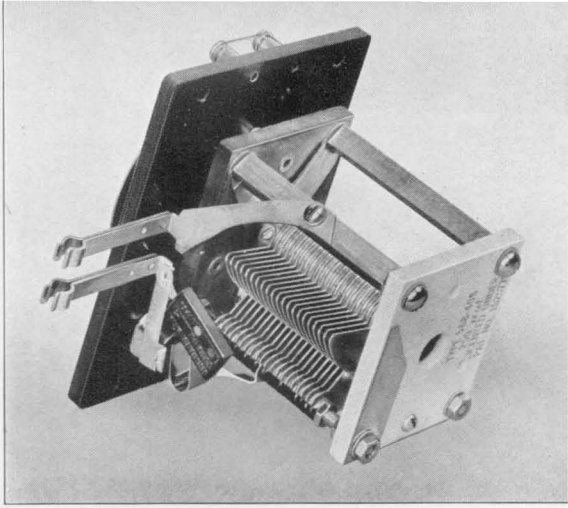


FIGURE 4. Interior view of the TYPE 566-A Wavemeter, showing the construction of the condenser.

Accessories Supplied: Two spare indicator lamps.

Dimensions: 4¾ x 5⅞ x 5¾ inches, over-all.

Net Weight: 3 pounds.

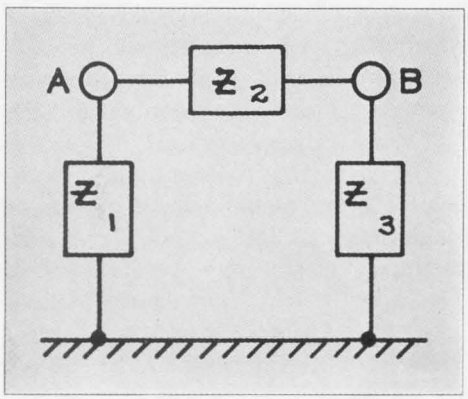
Type		*Code Word*	*Price*
566-A	Wavemeter	WAGON	$45.00

MEASURING BALANCED IMPEDANCES WITH THE R-F BRIDGE

INTRODUCTION

● **BECAUSE OF THE SPECIALIZED NATURE OF BALANCED IMPEDANCES,** equipment for their measurement has not received as much attention as has equipment for the measurement of impedances with one side grounded, and it is not as generally available. Consequently, the problem of measuring balanced impedances with equipment for measuring grounded impedances is often encountered. Measurements at radio frequencies of open-wire transmission lines and dipole antennas probably present the most common examples. Two methods by which these measurements can be accomplished are described here because of their particular usefulness with the TYPE 916-A and TYPE 516-C Radio-Frequency Bridges, and the TYPE 821-A Twin-T Impedance Measuring Circuit.

FIGURE 1. Equivalent circuit of a balanced line.



METHOD I

The first method[1] is similar to the well-known method of measuring the interelectrode capacitance of a triode by three capacitance measurements. The input impedance of the line is represented by the equivalent circuit of Figure 1. The measurement procedure is as follows:

(1) Short-circuit impedance Z_1 by grounding line *A* at point of measurement, and measure impedance from line *B* to ground. Call the measured value Z'.

[1]D. B. Sinclair, "Impedance Measurements on Broadcast Antennas," Part II, *Communications;* July, 1939.