

**MODULATED
OSCILLATOR**

C1070



A.W.A. Modulated Oscillator Type C1070

THE PURPOSE OF THE INSTRUMENT.

This instrument has been designed for use in servicing all kinds of radio receivers. Modulated or unmodulated signals of any frequency between 100 Kilocycles and 20 Megacycles are available.

THE FOLLOWING TESTS MAY BE CARRIED OUT RAPIDLY AND WITH AMPLE SERVICE ACCURACY:

1. Alignment of I.F. and R.F. circuits at any desired frequency.
2. Adjustment of receivers provided with wavelength or kilo-cycle scales to correct dial calibration by setting trimmers and padding condenser.
3. Examination of ganged T.R.F. circuits for errors in tracking
4. Measurement of overall sensitivity of all types of receivers at any frequency, and gain of I.F. amplifiers.
5. Estimation of noise level at higher sensitivities by comparison of audio outputs between modulated and unmodulated carrier of equal strength.
6. Determination of stage gain in I.F. or R.F. amplifiers.
7. Testing of valves for performance under working conditions by insertion of several in succession in a given socket in a receiver and noting the change in stage gain or overall sensitivity.
8. Checking the performance of A.V.C. in receivers.
9. Measurement of selectivity of I.F. or R.F. amplifiers in terms of band width in kilocycles, for input signals one hundred or one thousand times larger than the signal on tune required to give some chosen value of audio output.
10. Determination of image ratio, or the ratio of the micro-volts input at the image or second spot frequency at the micro-volts at the wanted signal frequency, both giving equal audio output.

This compressive list of tests covers more than is usually required in receiver servicing. None of these tests requires an instrument with capabilities of accuracy available in a signal

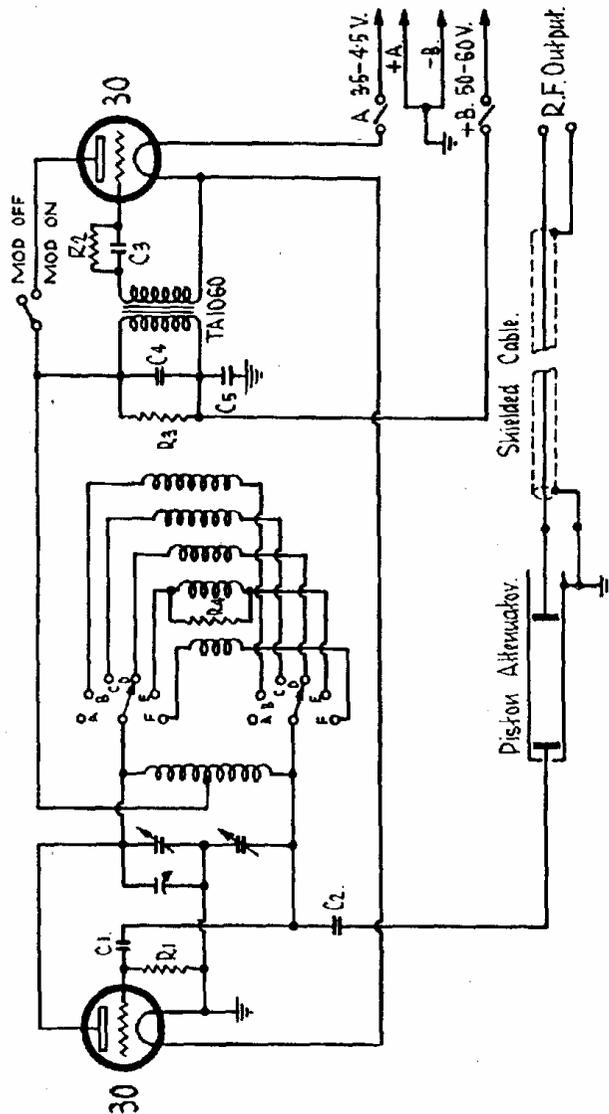


Fig. 3.—Circuit Diagram.

generator. Consequently the controls and methods of calibration can be modified in the direction of speeding up and generally simplifying operation. This object has been the aim in the design of the Type C1070 modulated oscillator, and has been achieved with but small reduction in accuracy below average signal generator performance.

Design and Performance

FREQUENCY RANGE.

100 K.C. to 20,000 K.C. in six ranges, selected by a switch.

Range A, 96 K.C. to 250 K.C.

Range B, 240 K.C. to 600 K.C.

Range C, 560 K.C. to 1420 K.C.

Range D, 90 metres to 220 metres (1,360 K.C. to 3,330 K.C.).

Range E, 37 metres to 96 metres (3,120 K.C. to 8,100 K.C.)

Range F, 15 metres to 38 metres (7,900 K.C. to 20,000 K.C.)

All ranges are directly calibrated on a rotovisor type dial: A, B and C are marked in kilocycles and D, E and F in metres.

Calibration accuracy is better than 1 per cent on range C. and within 2 per cent on the other ranges.

OUTPUT.

The attenuator calibration indicates directly the approximate microvolts output on Ranges B and C. It is calibrated 1, 3, 10, 30, etc., up to 100 M (100,000) with two extra markings not carrying accompanying figures. The one adjacent to the 100,000 Mark is 300,000 and the last one is the extreme position for the pointer when turned clockwise.

The approximate output signal on the other ranges may be estimated from the following table
Range Multiplying factor for Attenuator Calibration

Range	Multiplying factor for Attenuator Calibration
A	1.4
B	1
C	1
D	0.5
E	0.2
F	0.08

CONTROLS

The oscillator has four controls (from left to right):

No. 1. Range Switch. This control selects the coil for use on any desired range.

No. 2. Battery Switch. The battery switch has three positions.

- (i) The first position, "OFF"; both the A Battery and B Battery circuits are open.
- (ii) In the second position, "MOD. OFF," the A Battery is connected to both valves but the B Battery is connected to the R.F. oscillator only.
- (iii) In the third position, "MOD. ON," the B Battery is connected to the Modulator valve also; thus modulated and on modulated carrier are available.

No. 3. Frequency Selector. By turning this knob any desired frequency throughout the range corresponding to the setting of the range switch may be obtained. Use the scale corresponding to the setting of the Range Switch.

No. 4. Attenuator. By turning this knob the amount of the output signal may be adjusted to any desired level. The approximate value of this signal may be estimated from the data given on page 3.

OPERATION.

1. Set the modulated oscillator about one foot to the left of the receiver under test.
2. Connect the output cable to the terminals of the oscillator. Connect the braided lead with coloured tracer in the braiding to the insulated terminal of the oscillator by means of the spade terminal. Connect the plain lead to the earthed terminal.
3. Connect the other end of the cable to the receiver under test. The plain lead is to be connected to the earth terminal and the other lead (tracer) to the aerial terminal or grid cap of a valve as required. When connected to the grid cap it is necessary to connect a resistor between the grid cap and earth to complete the bias circuit (about 250,000 ohms or larger is suitable).
4. Connect an Output meter in the plate circuit of the last valve. See Fig. 2.
5. Turn the battery switch to the "MOD. ON" position and select the desired test frequency by means of the range switch and the frequency control.
6. Tune the receiver to the frequency of the oscillator and adjust the attenuator to give a convenient deflection on the meter. Any tests listed on page I may now be carried out.

CAUTION.-Be sure that the Battery Switch is turned "OFF" when the oscillator is not in use.

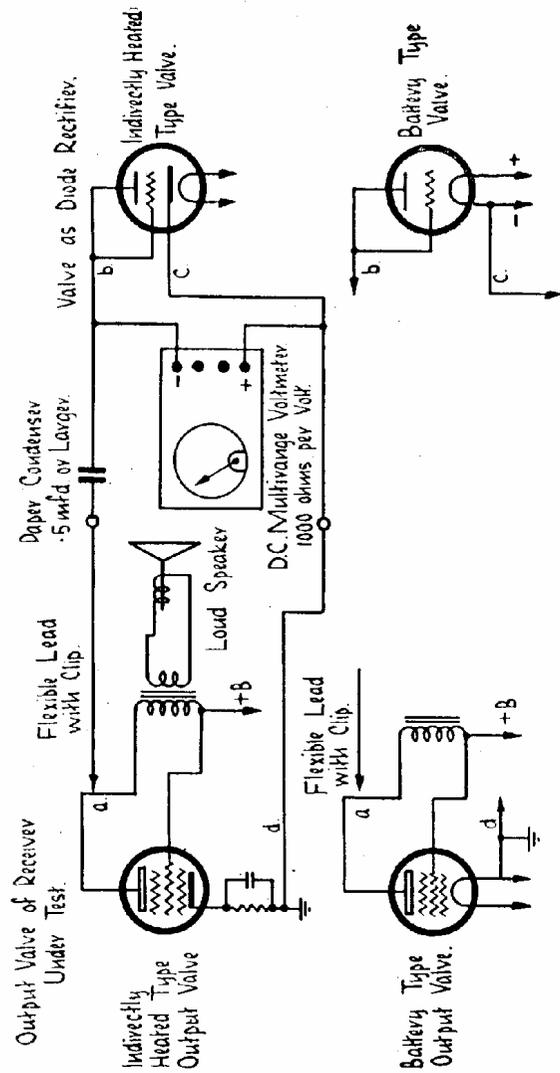


Fig. 2.--Output Meter.

the average maximum R.F. output on each hand is therefore:

A	400 Millivolts
B	300 "
C	300 "
P	150 "
E	60 "
F	25 "

The attenuator reacts noticeably upon the carrier only at the higher outputs. The frequency change caused through advancing the attenuator control from low outputs up to the position marked 100M is approximately as follows:

- High frequency end of hand 0.3 per cent.
- Middle of band 0.1 per cent.
- Low frequency end of band 0.05 per cent.

On position 300 M the shift of carrier frequency will be three times greater, as the change of frequency is directly proportional to the indication of the attenuator control.

It is important that the special shielded cable supplied should be used with the oscillator always, otherwise the above figures for R.F. output on each hand will not hold. This cable has the correct characteristics to suit the attenuator, and to behave as a dummy aerial on the broadcast ranges (for alignment purposes only).

Leakage signal through the attenuator cannot be detected except at about 20 M.C. where it is of the order of less than one microvolt. The relative ratios of attenuation as marked on the attenuator scale are almost unaffected by the value of the operating radio frequency.

MODULATION.

The modulator oscillator is adjusted to approximately 400 C.P.S. by adjusting the air gap of the TA1060 Transformer. The modulation depth is set at about 30 per cent. on the low frequency bands by means of a resistance in parallel with the "tank" circuit of the audio oscillator. The only serious departure from the figure of 30 per cent. for the modulation depth occurs on band F where it rises to about 45 per cent. The battery switch has 3 positions, "OFF," "MOD. OFF," and "MOD. ON," allowing the radio frequency output to be obtained free from modulation in the middle position.

CONSTRUCTION.

The coils and wave change switch together with the wiring and the oscillator valve socket are individually screened, and form together a complete assembly. This assembly, the variable condenser and modulator oscillator system are mounted to a rear panel. In this way radio

frequency currents in this panel cannot give rise to external stray fields due to the shielding effect of the front panel and outside metal case.

