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A Better Heathkit "Cantenna"

—improved metering circuit for an old standby

Update your dummy load.

The Heathkit® "Cantenna" dummy load, Model HN-31, consists of a fifty-Ohm dummy load resistor, R1, immersed in oil, and an indicating circuit consisting of resistors R2 and R3, capacitor C1, and diode D1. Fig. 1 shows the schematic diagram.

The indicating circuit provides for connection of a direct current meter to the jack marked DC OUT. This arrangement provides a means of indicating relative power.

With the circuit shown in Fig. 1, an amount of power at 3.5 MHz applied to the dummy load will produce a certain meter deflection. If the same amount of power is applied to the dummy load at 29.7 MHz, the meter deflection will be considerably greater.

By modifying the indicator circuit to that shown in Fig. 2, the indicating meter can be made to read the same value for a given amount of power whether it be at 3.5 MHz, 29.7 MHz, or at any frequency between these values.

When this has been accomplished, the indicating meter may be calibrated in Watts and will provide satisfactory indication of transmitter output power at any frequency between 3.5 MHz and 29.7 MHz.

The basic difference between the indicator circuits shown in Fig. 1 and Fig. 2 is that the circuit shown in Fig. 2 incorporates a frequency-compensating network.

In my case, an indicating meter that would read 200 Watts full scale was desired.

The first operation was to modify the circuit shown in Fig. 1 to that shown in Fig. 2. Note that in Fig. 2 the value of resistor R3 has been changed from 1000 Ohms to 2500 Ohms. It will be noted that Fig. 2 includes the additional components noted in Table 1.

All of these additional components are installed within the small metal box which is attached to the pail lid of the Heathkit® "Cantenna."

The indicating meter employed had a 200-microampere full-scale movement with an internal resistance of twelve hundred Ohms. This meter was di-

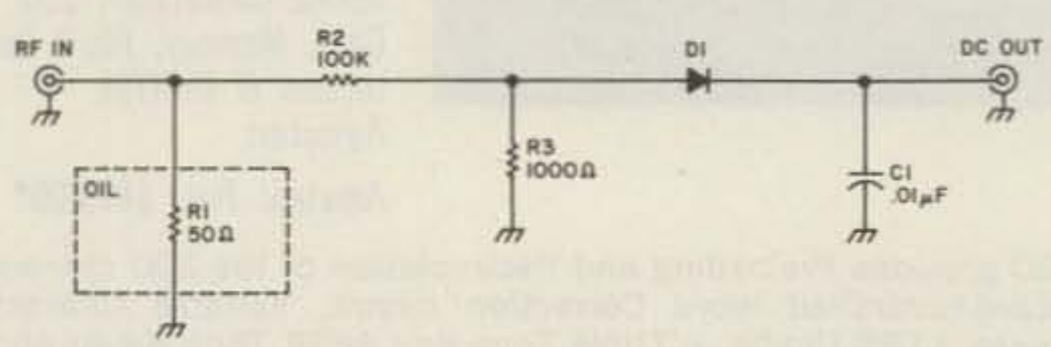

Fig. 1. Schematic of the Heathkit® "Cantenna."

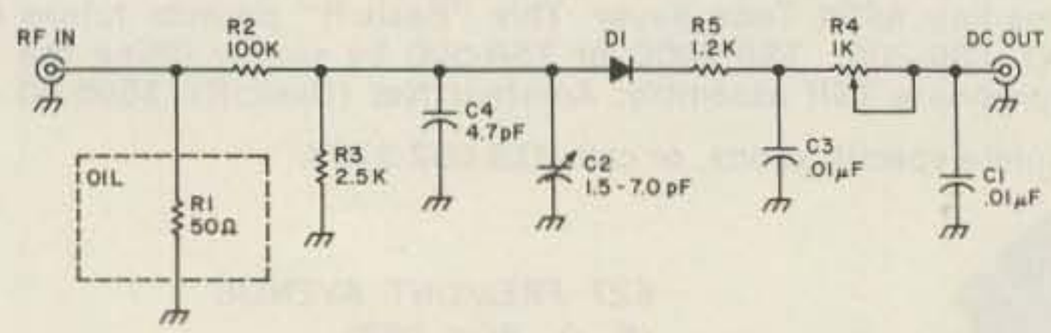

Fig. 2. Modified schematic of the Heathkit® "Cantenna."

C2	1.5-7.0-pF glass, piston-type variable capacitor
C3	.01-uF disk ceramic capacitor
R4	1000-Ohm miniature micro-potentiometer, Bourns trimpot 120-14-E1000
R5	1200-Ohm, ¼-Watt resistor, 10% tolerance
C4	4.7-pF disk ceramic capacitor

Table 1. The additional components included in Fig. 2.

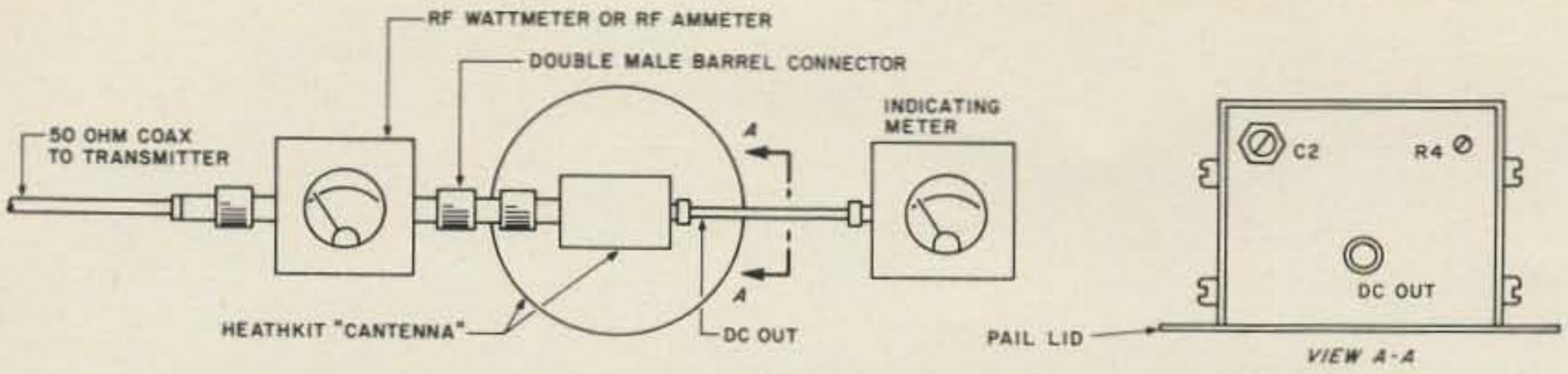

Fig. 3. Setup for frequency-compensation adjustment.

rectly connected to the DC OUT jack of the Heathkit® dummy load.

An indicator that will show the amount of power applied to the dummy load is necessary for proper adjustment of the frequency-compensating network. Either an ammeter or a wattmeter of known accuracy may be employed. The setup for frequency adjustment for proper compensation is shown in Fig. 3.

The adjustment procedure is as follows:

1. Set C2 at minimum capacity and set R4 at maximum resistance.

2. Set the transmitter on 3.5 MHz. Gradually increase the power level until the ammeter reads two Amperes or the wattmeter reads 200 Watts. Decrease the resistance of R4 until the indicating meter reads full scale.

3. Set the transmitter on 29.7 MHz. Gradually increase the power level until the ammeter reads two Amperes or the wattmeter reads 200 Watts. Note that the indicating meter will read full scale before the ammeter reads two Amperes or the wattmeter reads 200 Watts. Reduce the reading of the indicating meter by increasing the capacity of C2 until the indicating meter reads full scale when either the ammeter reads two Amperes or the wattmeter reads 200 Watts.

4. Repeat steps 2 and 3 in sequence until the indicating meter reads full scale when the ammeter reads two Amperes or the wattmeter reads 200 Watts, whether the applied frequency is 3.5 MHz or 29.7 MHz.

If a wattmeter was employed in the adjustment setup, the indicating meter may be directly calibrated from the wattmeter readings.

Ammeter Reading, Amperes	Indicating Meter, Watts
.4472	10
.6325	20
.7746	30
.8944	40
1.0000	50
1.0955	60
1.1832	70
1.2649	80
1.3416	90
1.4142	100
1.4832	110
1.5492	120
1.6125	130
1.6733	140
1.7320	150
1.7889	160
1.8439	170
1.8974	180
1.9494	190
2.0000	200

Table 2.

If an ammeter was employed in the adjustment setup, the Watts corresponding to the ammeter reading are shown in Table 2, and the indicating meter may be calibrated from this data.■

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