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DEVELOPMENT OF THE SEMI-AUTOMATIC

TWO-WAY RADIO STATION AS-3

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Progress Report No. 6

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Progress Report #6

Radio Station AS-3

July 1, 1957

[redacted] 50X1

EA-122-1

GENERAL

REPORTING PERIOD

This report covers the work accomplished by [redacted] 50X1 on the development of the AS-3 Semi-automatic Two-way Radio Station during the period 1 May to 1 July, 1957. 50X1

PERSONNEL ASSIGNED 50X1

Personnel assigned to this project on a full-time basis are: 50X1

[redacted] Project Engineer 50X1
[redacted], Development Engineer

In addition, consultive and administrative assistance of [redacted] Vice President in Charge of Engineering, [redacted] 50X1
Assistant to the Vice President in Charge of Engineering, [redacted] 50X1
[redacted] Director, Development and Research Engineering, and [redacted] 50X1
Senior Project Engineer, were drawn upon as required.

CONFERENCES 50X1

Two conferences were held during this report period on 8 May and 18 June at [redacted] Conference reports for the subject meetings are attached to this report. 50X1

TECHNICAL DISCUSSION

TRANSMITTER AT-3

The resistive loads necessary for power measurements have arrived and are currently being evaluated. Several loads have been fabricated in the lower resistance ranges of 50 and 70 ohms and are currently in use.

A transmitter housing has been fabricated and will be used to obtain internal ambient temperatures under operating power conditions.

Oscillator. During circuit test and evaluation of the oscillator, it was noted that the oscillator had a tendency to drop out of oscillation when operating straight through. Work to eliminate this difficulty is in process.

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Keying Circuit. An alternate keying mechanism was proposed by our engineering group to provide a stand-by power saving of approximately 6 watts. This alternate keying scheme will make use of transistors of the silicon type and will also include a transistor multivibrator. The schematic of the transmitter, showing the bias arrangement to be used with this transistor keying method, is shown as Figure 6-1.

Unit Performance. One of the resistive loads mentioned previously is shown in Figure 6-2. The impedance plot of this load with its associated meter is shown in Figure 6-3.

Figure 6-4 is a plot of transmitter output power versus frequency.

KEYER AK-3

Further work on the magnetic pickup head alignment with respect to the tape has not resulted in the expected improvement in output pulse amplitude. The present available level of 20-30 millivolts peak to peak will therefore be used for the input signal to the Keyer-amplifier.

Figure 6-5 is a schematic of an all-transistor amplifier for use in this Keyer. It is designed to give a gain of approximately 50 db. This amplifier is currently in the process of construction.

CODER AC-3

Testing of the Coder mechanical mechanism has suggested several design improvements, which are presently being incorporated.

New record heads have been magnetized under controllable conditions. Figure 6-6 shows the type and amplitude of the resulting pulse. This pulse was recorded by using both the above-mentioned record heads and also the Keyer play-back head. A development model of the Coder will be produced during the next report period.

DC POWER SUPPLY AP/BA-3

The design of this Power Supply has been based upon the possibility of supplying either of the two receiver types under consideration. Parts for the Supply are on order and delivery is promised in July.

AC POWER SUPPLY AP/AC-3

This Power Supply has also been designed and parts ordered. Delivery of parts is expected in July, as for the DC Power Supply.

SYSTEMS

Preliminary systems packaging has been done and is illustrated in Figure 6-7. In this packaging scheme, major emphasis has been placed upon operational simplicity within the limits imposed by considerations of volume and weight. Control layouts are chosen and designed to give a minimum of individual controls, a maximum simplicity to routine right-handed operation of the controls, and a general good accessibility to all controls. The interconnection method has been designed to give maximum reliability of performance, a logical division permitting selection of units to do specific or general functions as required, maximum portability, and simplicity of the interconnection method itself.

In keeping with the reliability of performance and simplicity of interconnection, all connections will be made through plugs except for the line cord tying in the AC Power Supply to the power source itself, the antenna, and the headphones. In this way the number of small bits and pieces necessary to make this into an operational system is reduced to an absolute minimum.

A conference is requested at an early date to discuss packaging.

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Prepared by: Approved by:

Attach: Conference Reports for 5/8/57 & 6/18/57.

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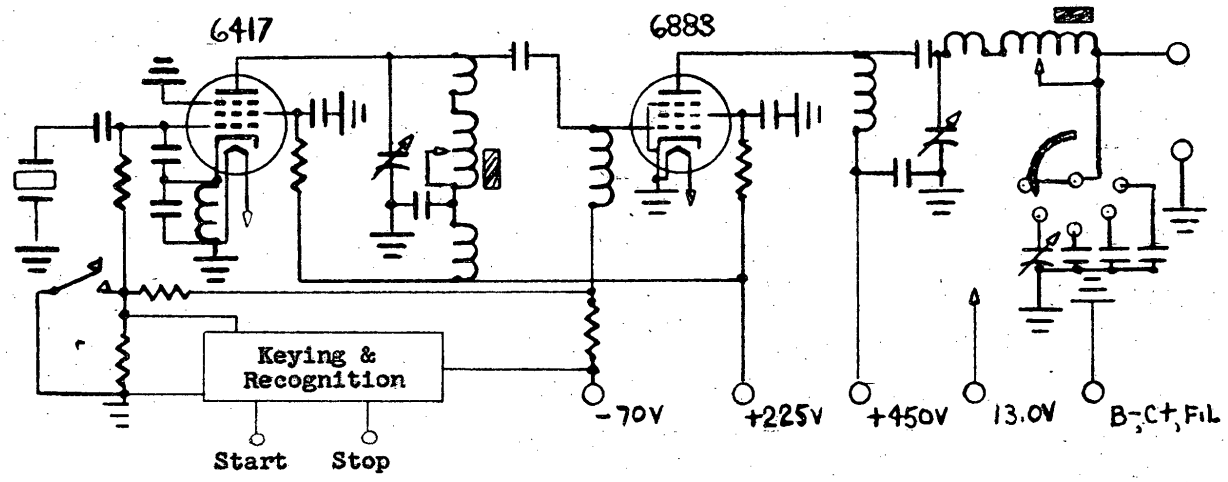

Figure 6-1 Transmitter Schematic

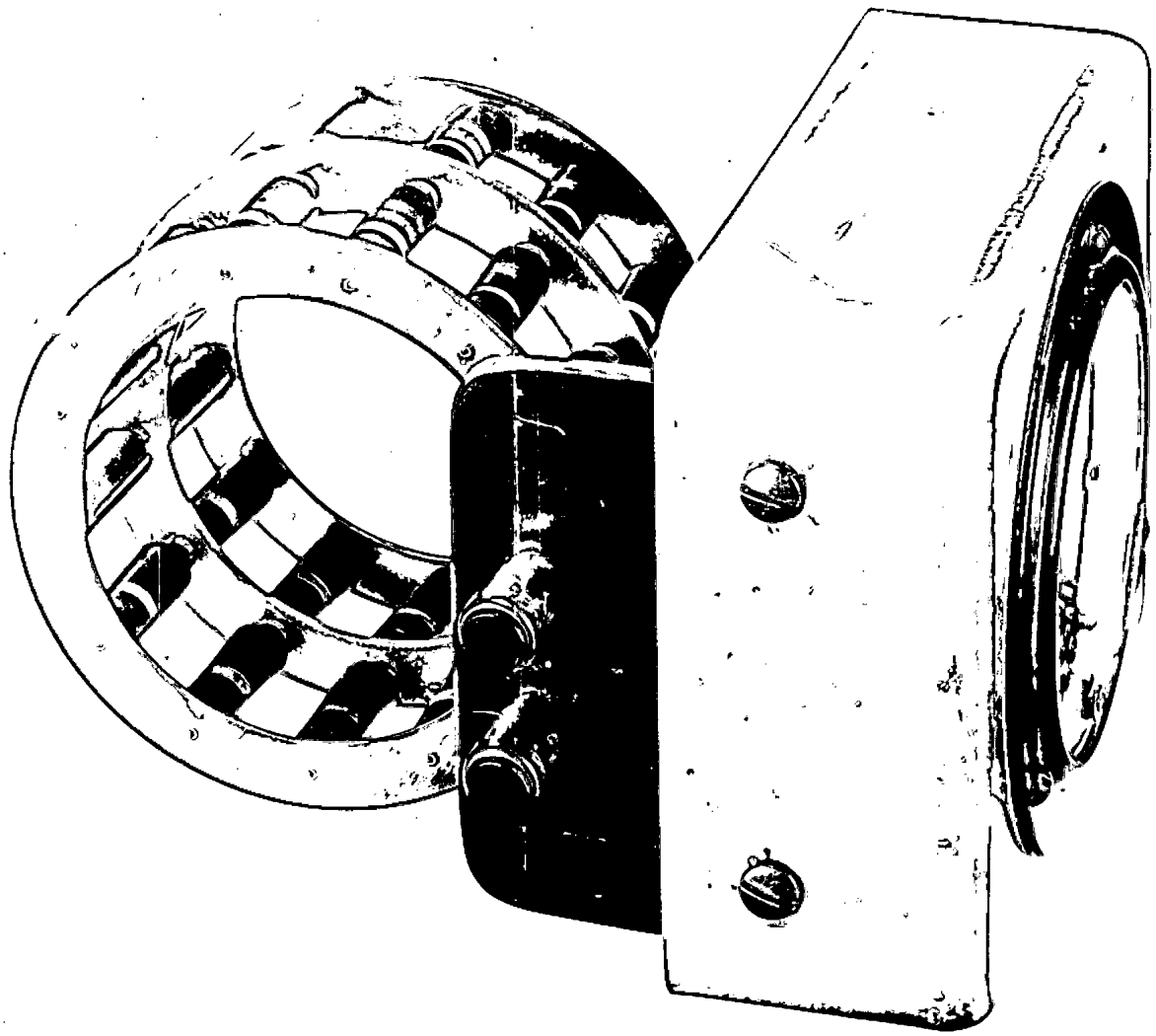

Figure 6-2 Photo 75 Ohm Resistive Load

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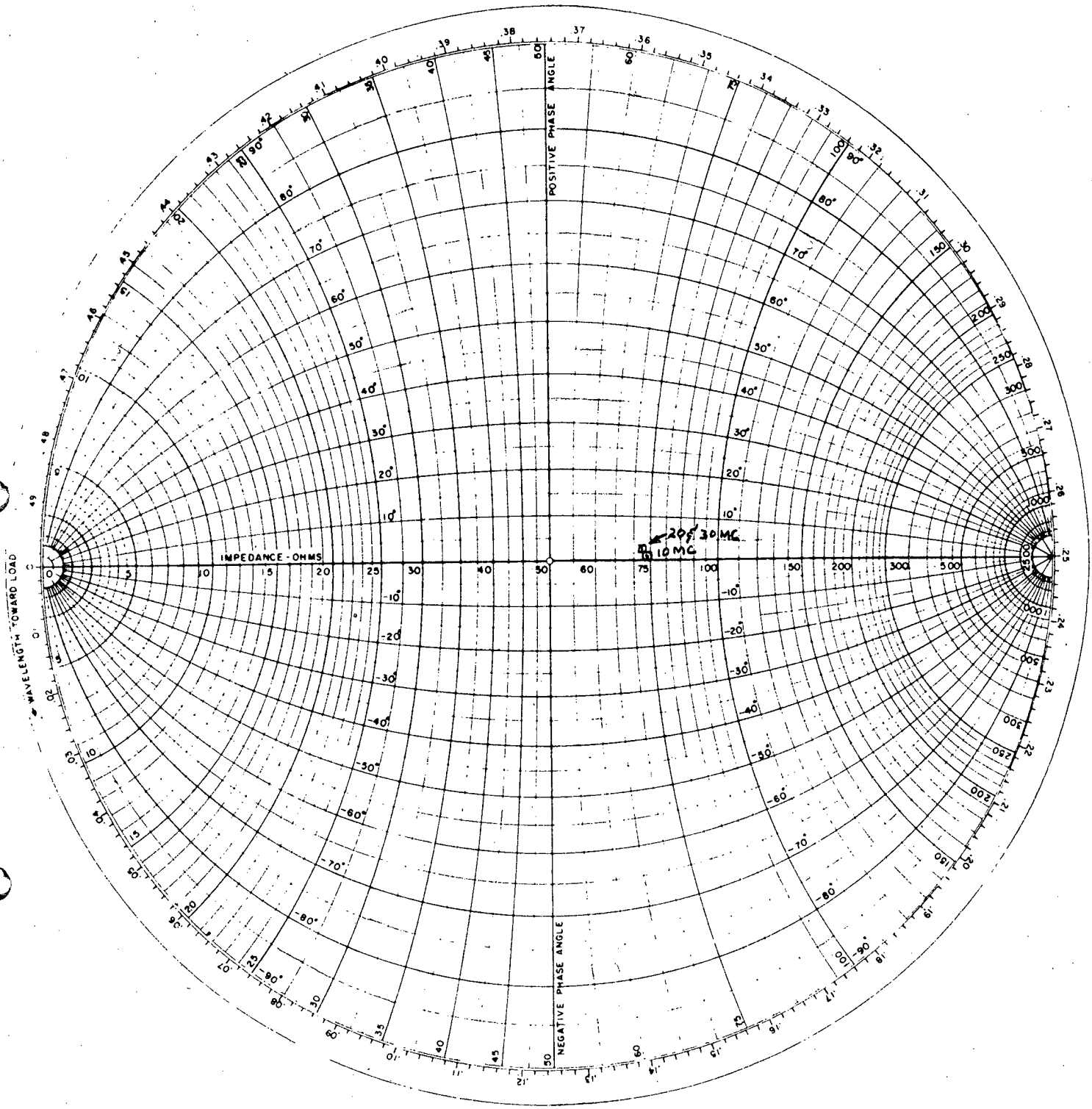

$Z_0 = 50\ \Omega$

Z-θ CHART

MODEL 803 A VHF BRIDGE

HEWLETT - PACKARD COMPANY
PALO ALTO, CALIFORNIA

Figure 6-3 Impedance Characteristic of 75 Ohm Load (10-30 mc)

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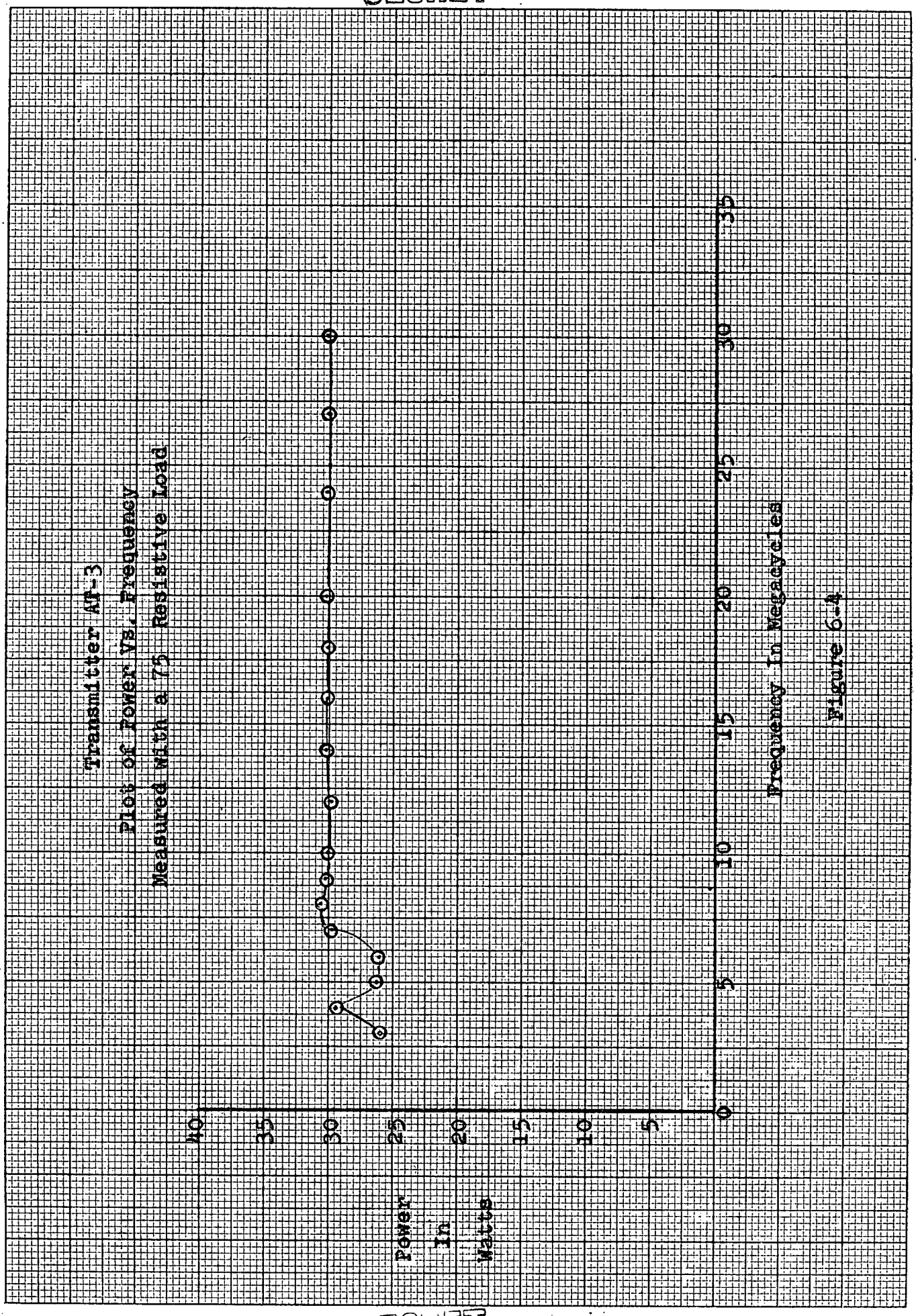

Figure 6-4

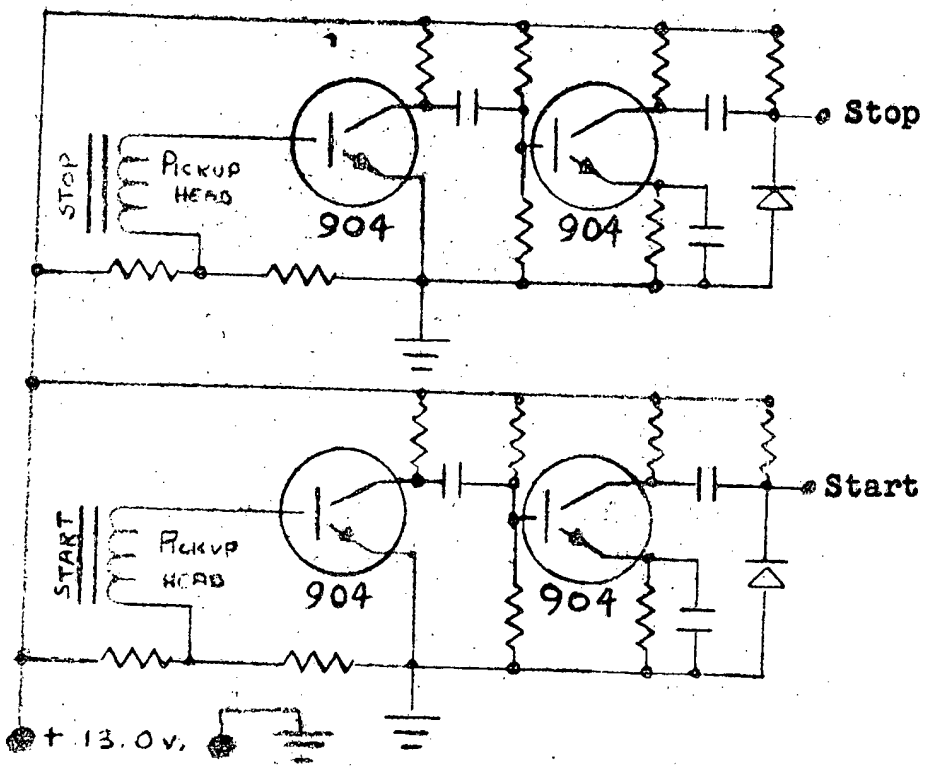

Figure 6-5 Keyer Amplifier Schematic