

1A FAULT LOCATOR TEST SET J94730A DESCRIPTION

1. GENERAL

1.01 This section describes the 1A fault locator test set, J94730A (oscillator SD-95616-01 and 147-type amplifier).

1.02 This section is reissued to include additional information on the batteries used in the 147-type amplifier.

1.03 This portable test set provides facilities for rapidly detecting and locating crosses and grounds in multiple wiring of switching equipment. It is arranged for checking the integrity of leads which have nominally the same capacity to ground and which have a relatively open dc circuit to ground. It also is arranged for checking the continuity of leads and for locating crosses between leads or to ground or battery.

2. EQUIPMENT FEATURES

2.01 The test set consists of a J94730B oscillator, a 147-type amplifier with belt clip and carrying strap, a 572A tool, a 723A receiver, test cords, a ladder strap, and a black fiber carrying case having inside dimensions of approximately 12-3/8 in. by 7-3/8 in. by 5-5/8 in. All of the component parts assembled in the carrying case weigh approximately 12 pounds. Fig. 1 shows the components of the test set outside of the carrying case.

Oscillator

2.02 The oscillator is mounted in an aluminum casing. The outside dimensions are 7-3/16 in. by 4-1/4 in. by 4-5/8 in. It weighs approximately 5 pounds. Fig. 2 shows the oscillator with the casing in place.

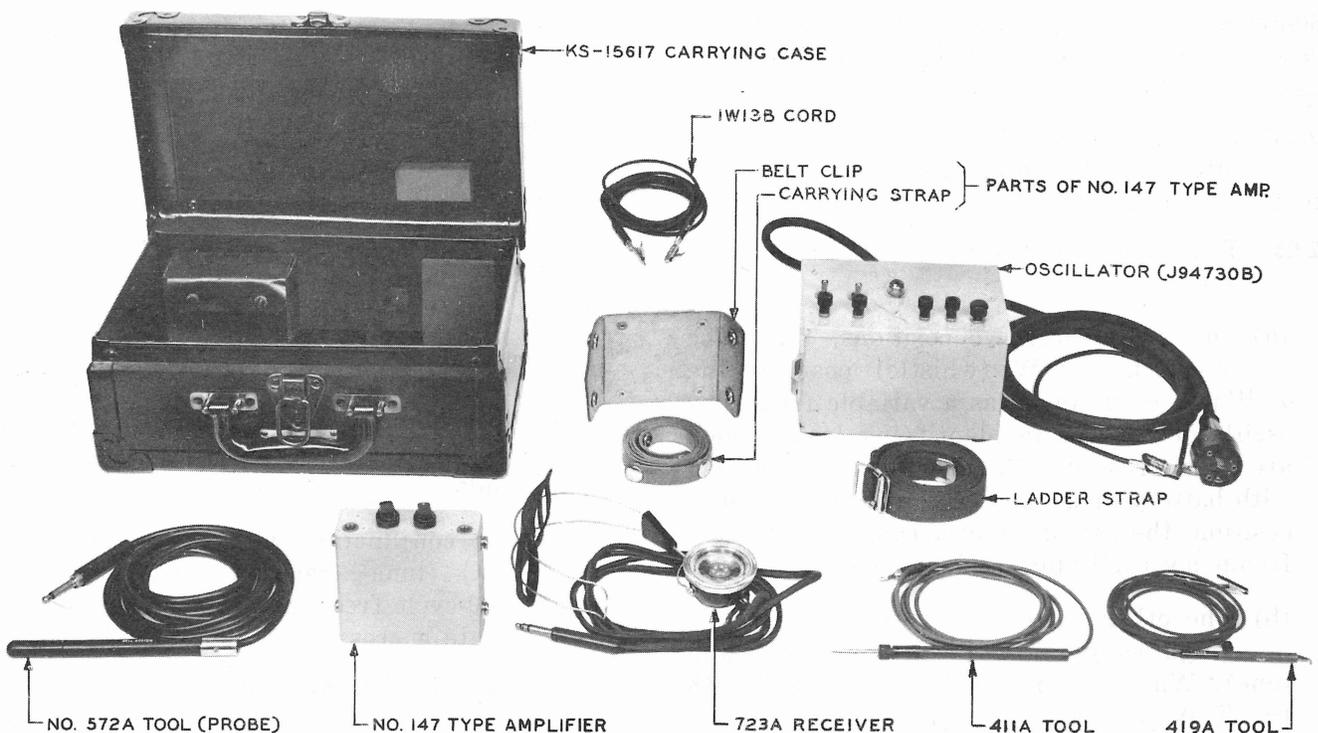


Fig. 1 - 1A Fault Locator Test Set (J94730A)

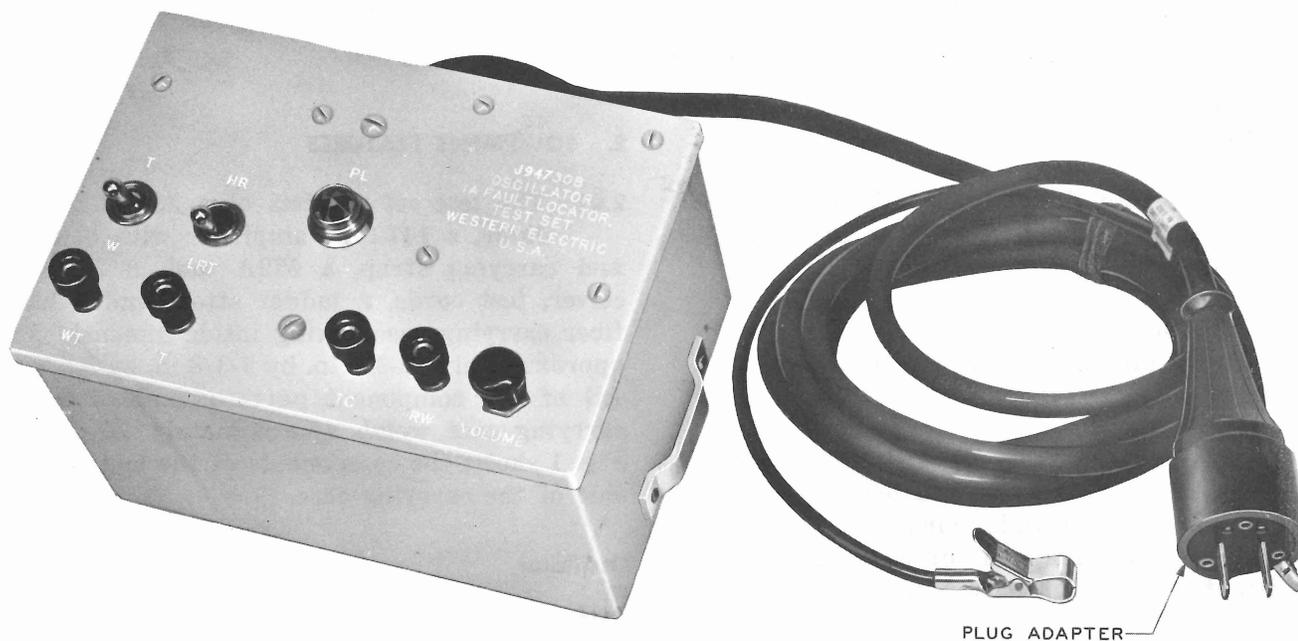


Fig. 2 – Oscillator (J94730B)

2.03 A 3-wire plug-ended cord is attached to the oscillator to supply 110- to 120-volt, 60-cycle power supply and for grounding the case and cover. A plug adapter is furnished for use where 2-wire outlets are provided.

2.04 A pilot lamp (PL) is provided to indicate that the power has been connected to the oscillator.

2.05 Two toggle switches are provided as follows:

(a) One switch has two positions, T and W.

When in the W (whistle) position, the oscillator is arranged as a variable frequency oscillator for use in identifying leads which are open, crossed with other leads, or crossed with battery or ground. When in the T (tone) position, the oscillator is arranged as a fixed frequency oscillator used to locate the cross.

(b) The other switch has two positions, HR (high range) and LRT (low range and tone). When in the LRT position and with the T/W switch in the W position, the oscillator is arranged to produce an audible whistle on leads up to approximately 1000

feet in length. When in the HR position and with the T/W switch in the W position, the oscillator is arranged to produce an audible whistle on leads from 1000 feet to 10,000 feet in length. This switch must be in the LRT position when the T/W switch is in the T position.

2.06 A potentiometer designated VOL is provided for adjusting the volume of the oscillator tone.

2.07 Four jacks are provided as follows:

(a) The WT (whistle or tone) jack is used:

(1) To connect the oscillator to the lead to be tested, when testing the integrity of leads.

(2) In conjunction with the T (tone) or TC (tone-capacitor) jack to connect the 500-cycle frequency, when using a probe to locate a cross.

(b) The RW (remote whistle) jack is used in conjunction with the T jack to connect the oscillator to the distant end when making a 2-man continuity test.

2.08 The oscillator may be located on a step of a rolling ladder, if desired, and fastened to the step of the ladder by means of the brackets at each end of the case and the ladder strap shown in Fig. 1.

2.09 147-Type Amplifier:

(a) The 147A amplifier is mounted in an aluminum casing. The outside dimensions are 4-7/16 in. by 4-7/16 in. by 1-7/16 in. It weighs approximately 1-1/2 pounds. Fig. 3 shows the amplifier with the cover in place and Fig. 4 shows it with the cover removed.

(b) The 147B amplifier supersedes the 147A amplifier and it is similar in size and outside appearance. The network in the amplifier formerly coded 703B network is now designated KS-14541 network.



Fig. 3 – 147-Type Amplifier

2.10 One switch is provided having two positions, COIL and PROBE. This switch should always be in the COIL position.

2.11 A potentiometer designated VOL is provided for adjusting the output of tone to the receiver.

2.12 Two jacks are provided as follows:

- (a) The INPUT jack is used to connect the 572A tool (probe) to the amplifier.
- (b) The REC (receiver) jack is used to connect the receiver and the battery supply to the amplifier.

2.13 Batteries are provided as follows:

- (a) 147A Amplifier: One 1-1/2 volt 1016 Eveready battery is used in the filament supply and a 22-1/2 volt KS-14773 battery for the plate supply.
- (b) 147B Amplifier: Two 1-1/2 volt KS-14368 batteries are used in parallel for the filament supply and a 22-1/2 volt KS-14773 battery for the plate supply.
- (c) The batteries are held in place in both amplifiers by means of spring clips on the amplifier chassis (see Fig. 4).

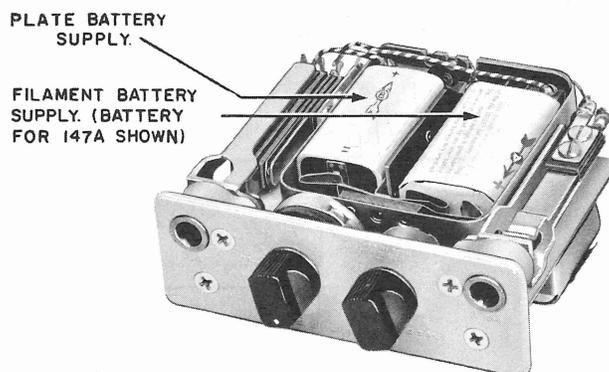


Fig. 4 – 147-Type Amplifier-Cover Removed

2.14 The other principal elements of the amplifier, the electron tubes, resistors, and capacitors are wired together and cast in a block of wax. This unit is coded the 703B network. If a defect develops, the network must be replaced.

2.15 The amplifier may be carried by means of the carrier strap or belt clip shown in Fig. 1. The strap and belt clip are readily attached to the amplifier by means of snap fasteners.

572A Tool

2.16 The 572A tool, shown in Fig. 1, is a magnetic-type probe, 1/2 in. in diameter and 6-5/8 in. long, intended for wire identification and location of crosses by picking up the 500-cycle frequency supplied by the oscillator to the leads under test.

3. CIRCUIT AND OPERATION FEATURES

3.01 Fig. 5 is a schematic of the oscillator circuit, showing the features presented in simplified form in Figs. 6 and 7.

Integrity Check of Leads

3.02 Fig. 6 shows in simplified form the arrangement of the oscillator for checking the integrity of leads having nominally the same capacity to ground and which are, therefore, normally free from battery or ground.

3.03 By means of the oscillator, it is possible to determine whether the same conditions prevail on a group of wires. When the test pick is applied to a wire a frequency is set up in the

oscillator which produces a tone, depending upon the condition of the wire. Where the conditions are similar, similar tones will be heard.

3.04 With the power supply connected, the T/W switch in the W position and the HR/LRT switch in the LRT position, the oscillator is arranged for checking the integrity of leads up to 1000 feet in length. When checking leads more than approximately 1000 feet long, the HR/LRT switch should be set in the HR position.

3.05 To make this check, the test pick connected to the WT jack must be free of any contact while the VOL potentiometer is ad-

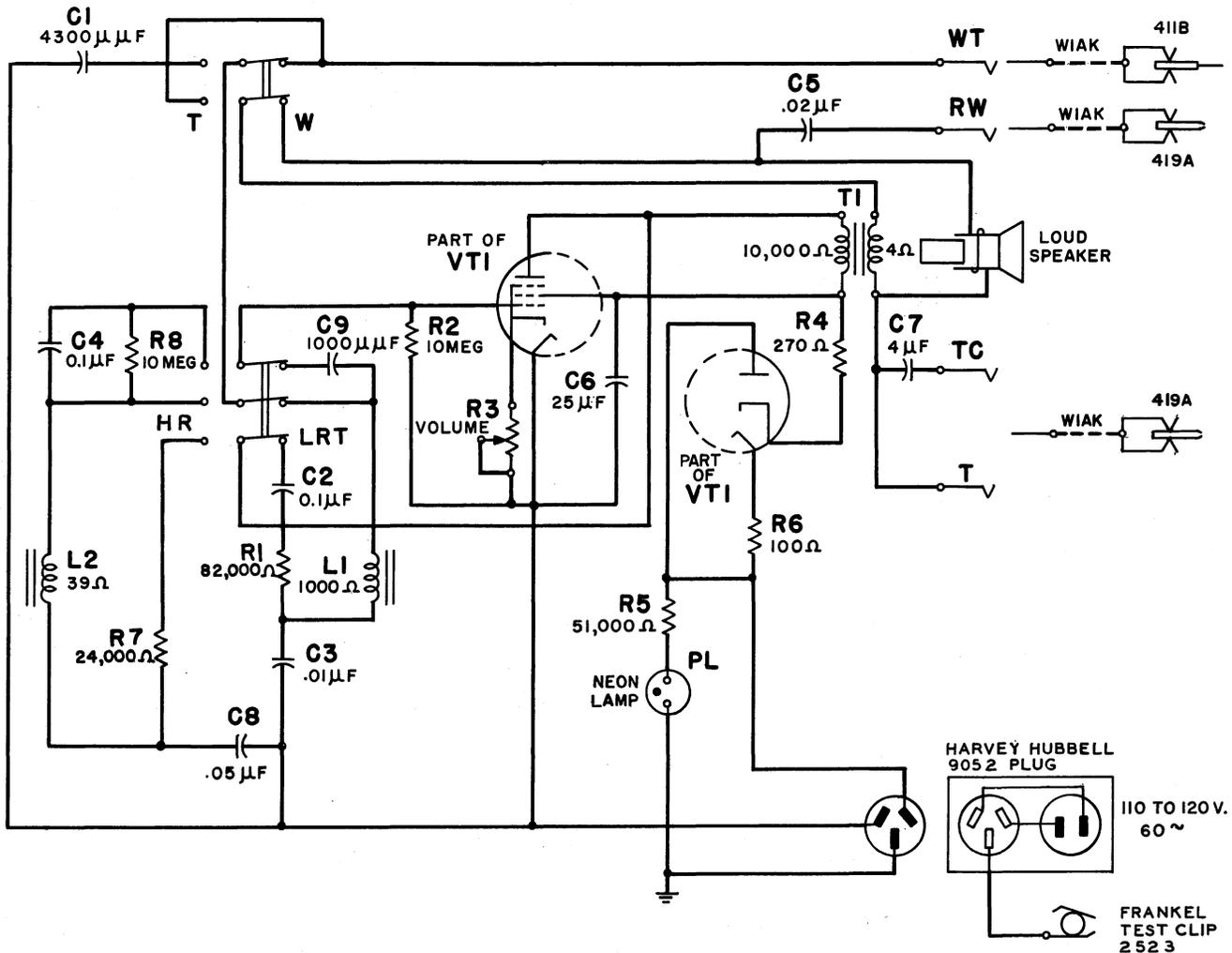


Fig. 5 — Oscillator Circuit

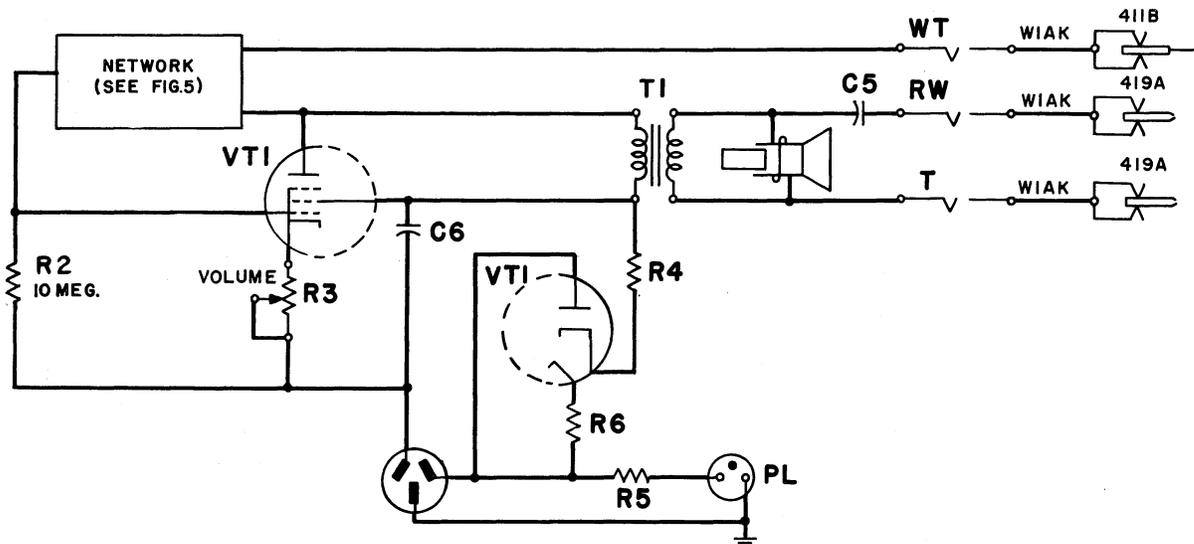


Fig. 6 - Oscillator Circuit Arranged for Integrity Check

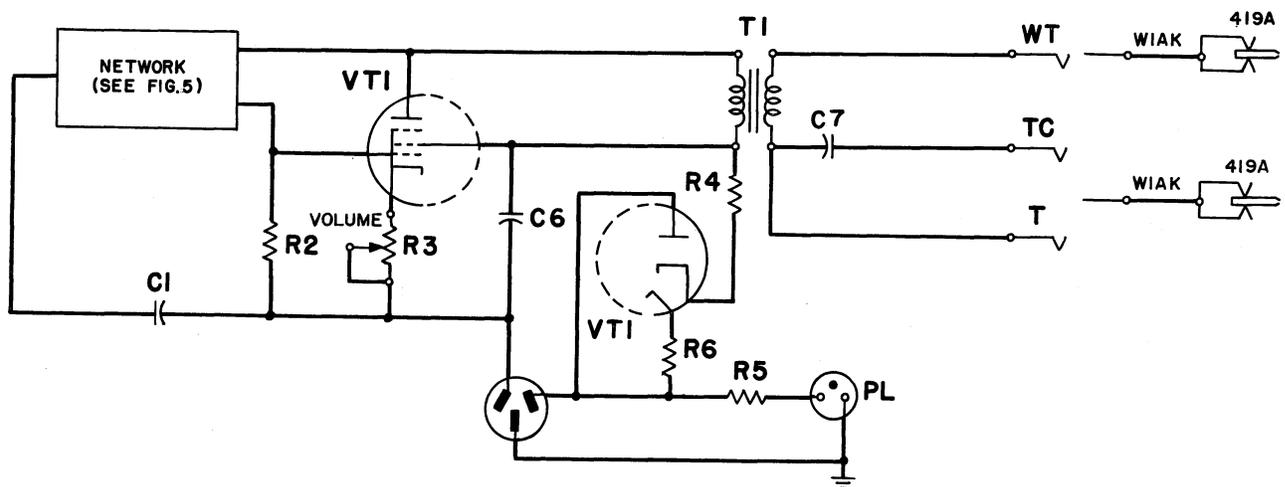


Fig. 7 - Oscillator Circuit Arranged for Locating Crosses

justed to a point just below the state where tone is heard.

3.06 With the test pick associated with the WT jack touching a wire, the circuit will oscillate at a particular frequency. Faultless wires of a group will have approximately the same capacity to ground and, when the test pick is connected to each in turn, a uniform whistle (frequency or pitch) in the loudspeaker indicates uniformity of leads. If a wire is crossed with another, the capacity to ground will be

greater and the whistle will be of a lower pitch. Open wires will cause a whistle of higher pitch, unless the open is at the distant end of the wire. Leads crossed with battery or ground will produce no whistle. Therefore, variations in the pitch of the whistle may indicate:

- (a) Variation in the length of leads.
- (b) Crosses to other leads or to battery or ground.

Two-man Continuity Check of Leads

3.07 The whistle function of the oscillator can be used to check wires in a cable for continuity, to check that wires are terminated properly, and to identify wires before they are connected to terminals.

3.08 In order to check the continuity of leads, the oscillator is arranged as described in 3.04 and 3.05, with the addition that the RW and T jacks are connected to the ring and tip, respectively, of the local talking circuit used in telephone communication between the testmen at each end of the lead. With the test pick associated with the WT jack touching the wire, the whistle can be heard by each man. If the testman at the distant end grounds the lead to which the whistle is applied, the whistle is stopped, indicating continuity of the lead.

Locating a Cross Between Two Leads or to Ground or Battery

3.09 Fig. 7 shows in simplified form the arrangement of the oscillator for locating a cross between leads or to ground or battery.

3.10 With the power supply connected, the T/W switch in the T position, and the HR/LRT switch in the LRT position, the oscillator is arranged to supply a tone of approximately 500 cycles. In order to check two crossed leads, this tone is connected to one of the crossed leads under test by means of the tool connected

to the WT jack and to the other crossed lead by means of the tool connected to the T jack. In order to check a lead crossed to battery or ground, the tone is connected to the lead by means of the tool connected to the WT jack and the tool connected to the TC jack is connected to battery or ground respectively.

3.11 Fig. 8 shows in simplified form the arrangement of the 147-type amplifier with the receiver connected to the REC jack and the 572A tool connected to the INPUT jack. With the 572A tool held near one of the crossed wires, the 500-cycle tone can be heard in the receiver and may be adjusted by means of the VOL potentiometer. The tone can be followed along the lead and should disappear when the tool passes beyond the cross. By inspecting the wiring and apparatus near the point where the tone disappears, the tester should be able to locate the trouble.

One-man Continuity Check of Leads (Buzzer Arrangement)

3.12 The oscillator circuit arranged as shown in Fig. 7 and the amplifier arranged as shown in Fig. 8 can be used in the same manner as a buzzer by wrapping approximately three turns of either test lead (connected to the WT jack and the T or TC jack) around the 572A tool. The test leads can then be applied to a circuit under test the same as for a buzzer. If tone is heard in the headset connected to the amplifier, the circuit is continuous.

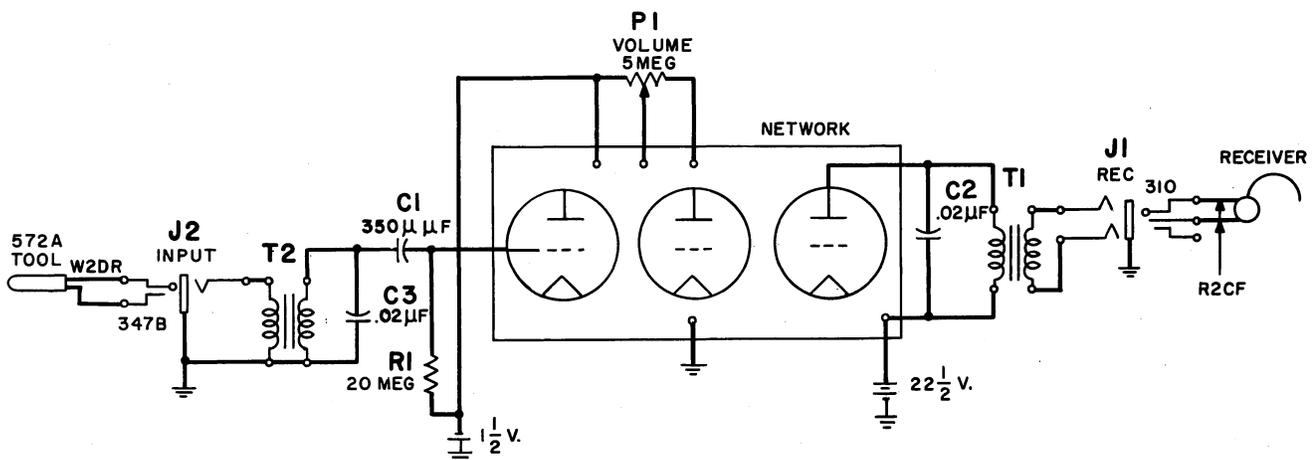


Fig. 8 – 147-Type Amplifier Circuit