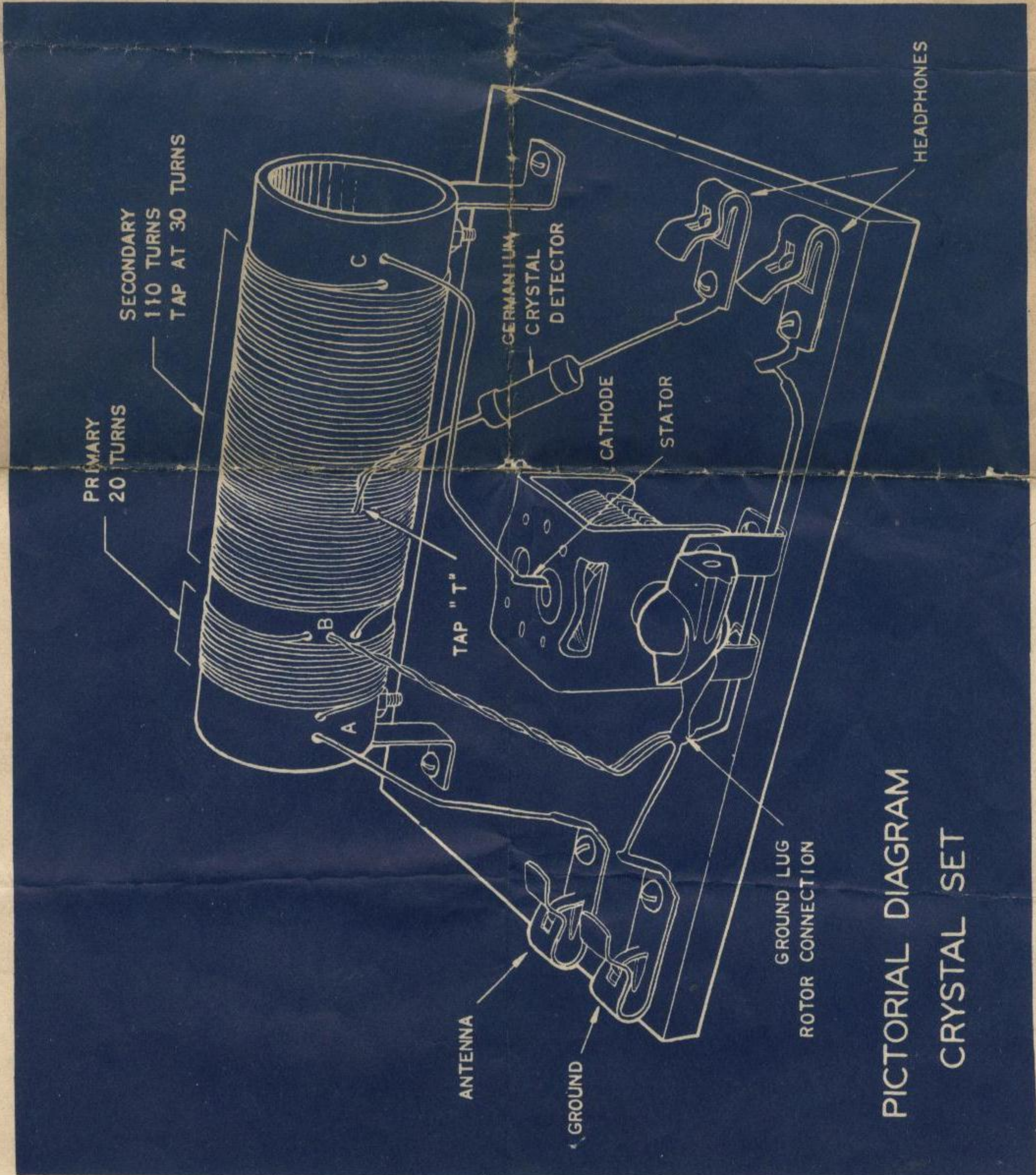




Allied Radio
CORPORATION



Knight Crystal Set



Building the KNIGHT Crystal Set

FEATURES

The Knight Crystal Set is easily constructed and operated. It provides a simple approach to set building and to the elements of radio communication. A fine operating radio set, it uses few parts, needs no power supply, has a minimum of adjustments and will give clear reception over a limited area.

This crystal set is designed to give maximum selectivity in metropolitan areas where several high-powered radio stations may be found. However, in regions where this selectivity is not necessary, it may be easily adjusted to provide maximum sensitivity by means of extra taps placed on the secondary winding while constructing the coil. This adjustment will be explained later in the text.

USE OF DIAGRAMS

Carefully examine both diagrams before beginning construction. The pictorial diagram shows the parts as they actually appear. The schematic diagram indicates all parts by means of standard symbols. It is best for the beginner to use the pictorial diagram during actual construction since it clearly shows the position of each part, wire and connection, in addition to the identity of the part. The schematic diagram should be used to re-check the connections and for studying the operating principles.

ASSEMBLY

Assembly of the crystal set should begin with the winding of the coil. The coil is the most important part of this receiver and should be very carefully constructed. Do not try to rush the winding of the coil as it will only result in a poorly constructed one, which will not function properly in the completed receiver.

Two holes for mounting the coil should be drilled in the coil form first. These two holes may be made with a drill or a pocket-knife. They should be $3/8$ " from each end of the coil form and may be just large enough to pass the $5/16$ " machine screws, which are provided for mounting the coil. The two holes shown at "A" in the pictorial diagram are then drilled in the coil form. The first hole is located $3/8$ " from the end of the coil form as mentioned above and the second hole is $1/8$ " from the first one. Unwind 5 to 10 feet of the enameled coil wire furnished, being careful not to kink

the wire as a kink may cause it to break while the coil is being wound.

Pass approximately 5" of wire through the second of the two small holes in the coil form from the outside of the coil form towards the inside. Next pass the same wire through the first of the holes from the inside of the coil form, and pull taut the small loop on the inside of the form.

Fasten the coil of wire to a stationary object or have someone hold it, being careful not to cause any sharp bend in the wire. Pull the wire taut and slowly rotate the coil form, thus winding the wire on the form.

Wind twenty turns on the form for the primary winding. Stop every few turns and press the turns of wire together so that the coil form cannot be seen between the turns of wire. After twenty turns have been wound on the coil, leave approximately 5" of excess wire and cut off the remaining portion.

Drill the three small holes at point "B" and fasten the end of the primary winding through two of these holes in the same manner as the beginning of the coil winding, using two of the holes. Use the center and remaining hole at "B" to fasten the beginning of the secondary winding. Start the secondary in the same manner as the primary, with a 5" lead coming from the coil, and place thirty turns on the coil form.

The tap "T" is placed at 30 turns from point "B" on the coil and is made by forming a small loop in the wire. This loop is made by scraping the black enamel coating from the wire and twisting and soldering the wire together.

The remaining eighty turns of the 110 turn secondary may now be placed on the coil form and the end of the winding fastened through two small holes as shown in the pictorial diagram. If the builder wishes to be able to adjust the sensitivity and selectivity of this crystal set, taps should be placed every ten to fifteen turns while winding the secondary winding. No taps should be placed on the secondary before the first thirty turns.

There is more than enough wire furnished with the kit for winding the coils. However, any wasteful use of the wire furnished may result in the builder not having enough to complete the coil. The coil mounting feet should now be mounted on the coil form. Be careful not to cause any damage to the coil when mounting the feet on the coil form.

Mount the variable (tuning) condenser with angle brackets as shown. Be sure to place a solder lug under the condenser mounting screw, as shown in the pictorial diagram, when mounting the tuning condenser. Mount the coil in the position shown in the pictorial diagram. Fasten the clips to the baseboard with the screws provided.

WIRING

Solder all connections, using rosin core solder only. Avoid acid core solder or flux to prevent corrosion. Pre-heat parts for easier, better work. Do this by holding the soldering iron against the wire and terminal to be joined for a few seconds. Then apply just enough solder to cover the connection and fill crevices between the wires. Remove the iron but do not move wires until solder has set; this takes only a few seconds. Be sure to scrape the enamel coating from the wire furnished with this kit before endeavoring to solder any connections. When more than one wire is to be connected at a particular point, do not solder and re-solder. Install all wires at that point before soldering.

USEFUL HINTS

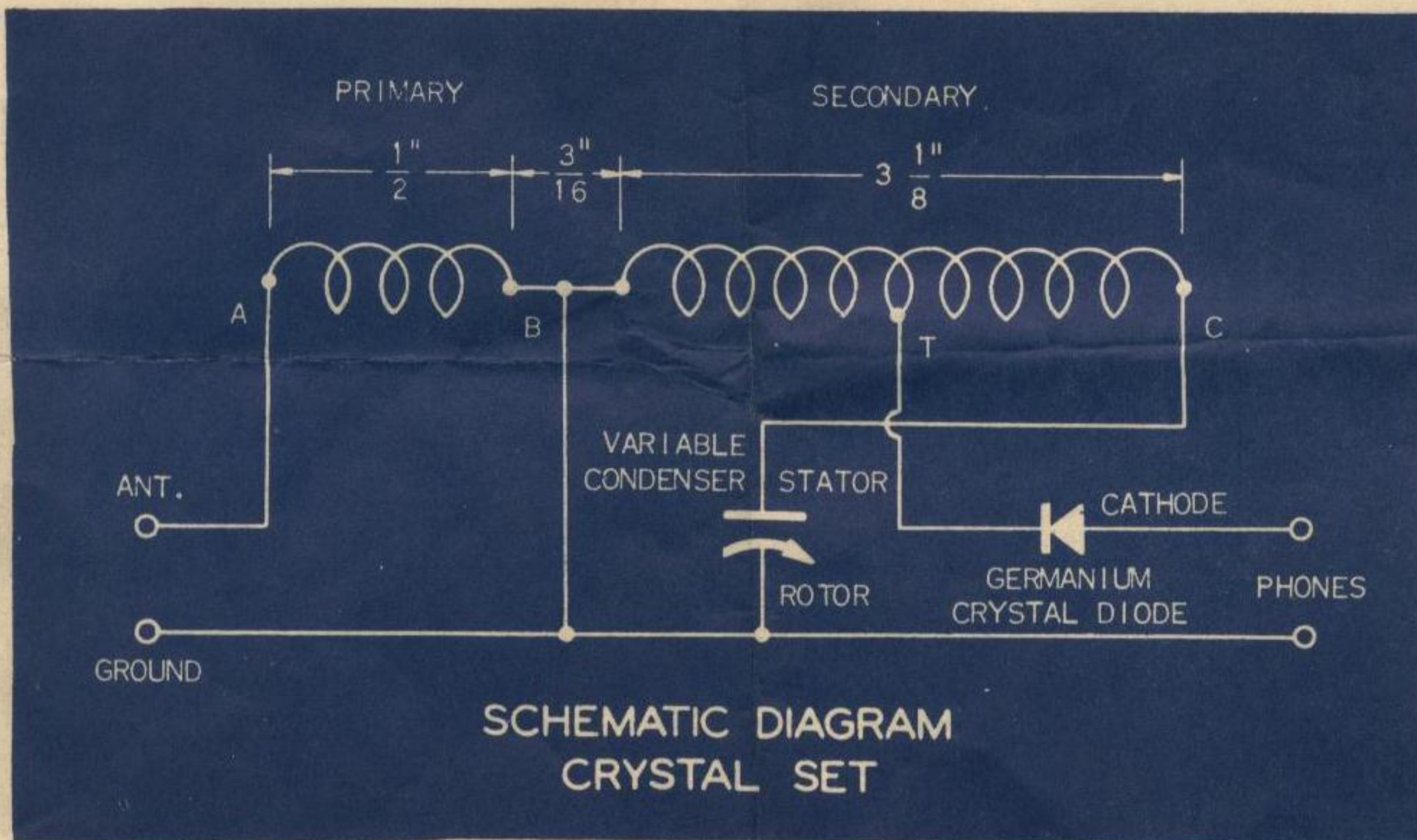
To get the best results, use a good antenna, good ground, and a pair of high-resistance headphones (1000 ohms or higher). In most cases a long antenna is unnecessary. However, if stations are weak, or if the nearest one is a great distance from you, you may need a long, high antenna and may need to adjust the set for maximum sensitivity by moving the connection at point "T" over to point "C". The antenna should be at least 50' long and as high as possible. Use glass or porcelain insulators at the ends and rubber-covered wire for a lead-in to prevent contact with grounded objects.

If taps are made on the secondary winding when the coil is constructed, the connection to the crystal diode should be moved up and down the coil until a tap is found which will give the best performance for the station being received.

The best ground is a few feet of metal rod or pipe, driven into moist earth. A good connection to a cold water pipe or to a radiator will also make an efficient ground.

SCHEMATIC SYMBOLS USED IN RADIO

ANTENNA (AERIAL)	RESISTOR	AIR-CORE CHOKE COIL	SWITCH (ROTARY OR SELECTOR)
GROUND (FOR CHASSIS CONNECTION)	POTENTIOMETER	IRON-CORE CHOKE COIL	POWER SWITCH (S.P.S.T.)
LOOP AERIAL (USUALLY BUILT INTO CABINET OF RECEIVER)	TAPPED RESISTOR OR VOLTAGE DIVIDER	R F TRANSFORMER (AIR CORE)	SWITCH (S.P.D.T.)
CONNECTION	RHEOSTAT	A F TRANSFORMER (IRON CORE)	SWITCH (D.P.S.T.)
NO CONNECTION	LIGHTNING ARRESTER	POWER TRANSFORMER P - 115-VOLT PRIMARY S ₁ - CENTER-TAPPED SECONDARY FOR FILAMENTS OF SIGNAL CIRCUIT TUBES S ₂ - SECONDARY WINDING FOR RECTIFIER TUBE FILAMENT S ₃ - CENTER-TAPPED HIGH-VOLTAGE SECONDARY WINDING	SWITCH (D.P.D.T.)
NO CONNECTION (WHEN CONNECTIONS ARE INDICATED BY DOTS)	FIXED CONDENSER (MICA OR PAPER)		FILAMENT
CONNECTION (WHEN NO-CONNECTION CROSS-OVERS ARE INDICATED BY HALF-CIRCLES)	FIXED CONDENSER (ELECTROLYTIC)	HEADPHONES	CATHODE
TERMINAL	VARIABLE CONDENSER	LOUDSPEAKER, MAGNETIC	GRID
ONE CELL OR "A" BATTERY	GANG TUNING CONDENSER	LOUDSPEAKER, P.M. DYNAMIC	PLATE
MULTI-CELL OR "B" BATTERY	TRIMMER AND FADDER CONDENSER	LOUDSPEAKER, ELECTRODYNAMIC	3-ELEMENT VACUUM TUBE
FUSE	I.F. TRANSFORMER (DOUBLE-TUNED)	PHONO PICK-UP	ALIGNING KEY OF OCTAL BASE
PILOT LAMP			CRYSTAL DETECTOR



COMPLETE PARTS LIST

- 1 1 1/2" x 5" coil form
- 1 55' coil of No. 22 enamel wire
- 1 381.4 mmfd midget single gang condenser
- 1 1N34 germanium crystal diode
- 1 1 1/4" pointer knob
- 4 Fahnestock clips
- 1 4 1/2" x 6" x 3/8" plywood base
- 1 Package of hardware consisting of:
8 - No. 6 x 1/4" wood screws; 2 - 6-32 x 1/8" machine screws; 2 - 6-32 hex nuts; 2 - coil mounting brackets; 1 - solder lug; 2 - condenser mounting brackets; 2 - 6-32 x 5/16" machine screws
- 1 Instruction sheet

83-261 COMPLETE KIT. Shipping weight, 2 lbs.

ACCESSORIES

- 1 2000 ohm headset. Shipping wt., 8 oz.
- 1 Antenna kit. Shipping wt., 4 lbs.

ALLIED RADIO CORP.

833 W. JACKSON BLVD.

CHICAGO 7, ILL.