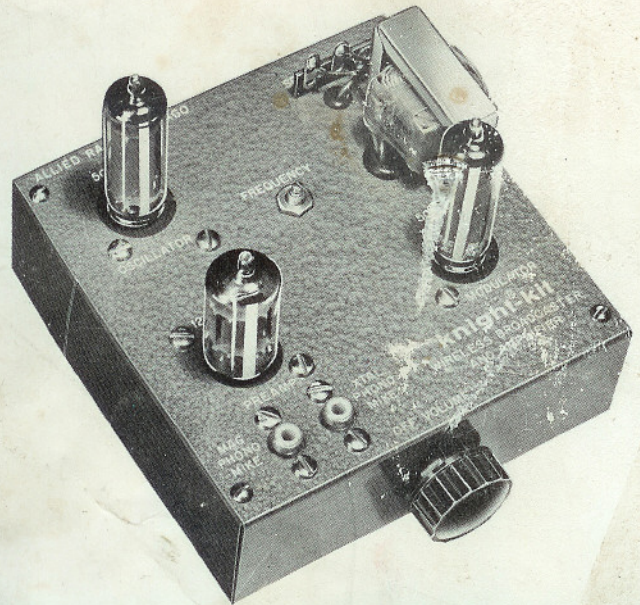


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RADIO
BROADCASTER-AMPLIFIER

ASSEMBLY MANUAL



knight-kit



Thank You . . .

for your interest in Knight-Kit

This Assembly Manual represents our many decades of experience in developing electronic kits which bring you outstanding performance at dollar-saving prices . . . and with maximum ease of construction.

As you go through the pages of this brochure, note how carefully each stage of construction is explained—how each diagram is magnified so that you almost have the feeling a good instructor is working at your side!

Knight-Kit's "do and check" method of kit-building insures accurate and simple assembly. Although your final product may represent a very complicated piece of electronic equipment, you will proceed with ease and assurance, step-by-step . . . and enjoy enormous satisfaction in your completed working unit.

Every Knight-Kit of your choice is available to you on the Allied Credit Fund Plan—

- No Money Down
- 24 Months To Pay
- Up To 50% Increased Buying Power

Your Knight-Kit purchase is backed with our exclusive and iron-clad guarantee—you must be *completely* satisfied or your purchase price is refunded!

It is always a pleasure to serve you.

A. D. Davis
A. D. Davis, President

RADIO BROADCASTER-AMPLIFIER

The Radio Broadcaster-Amplifier takes only a few hours to build, but has many uses in home entertainment. It can be connected to a record player or microphone, to send programs out to any number of standard radios in the house. Or it can be used as a complete preamplifier and amplifier with any record-player cartridge. One input takes ceramic or crystal cartridges and microphones; the other takes magnetic cartridges and microphones. The high-gain circuit provides plenty of amplification, even for low-level magnetic cartridges.

As a Broadcaster, this kit has many practical applications, since it will broadcast music from a single record player to as many radios as you like, located any place in the home. For party fun it's hard to beat — imagine the effect of a radio-broadcast made in your own voice — with your own words! The broadcaster can be tuned to come in at any desired point on your radio dial, from 600 kc to 1500 kc.

Terminals are provided for connecting a speaker directly to the Amplifier, so the record or microphone can be heard at the unit itself.

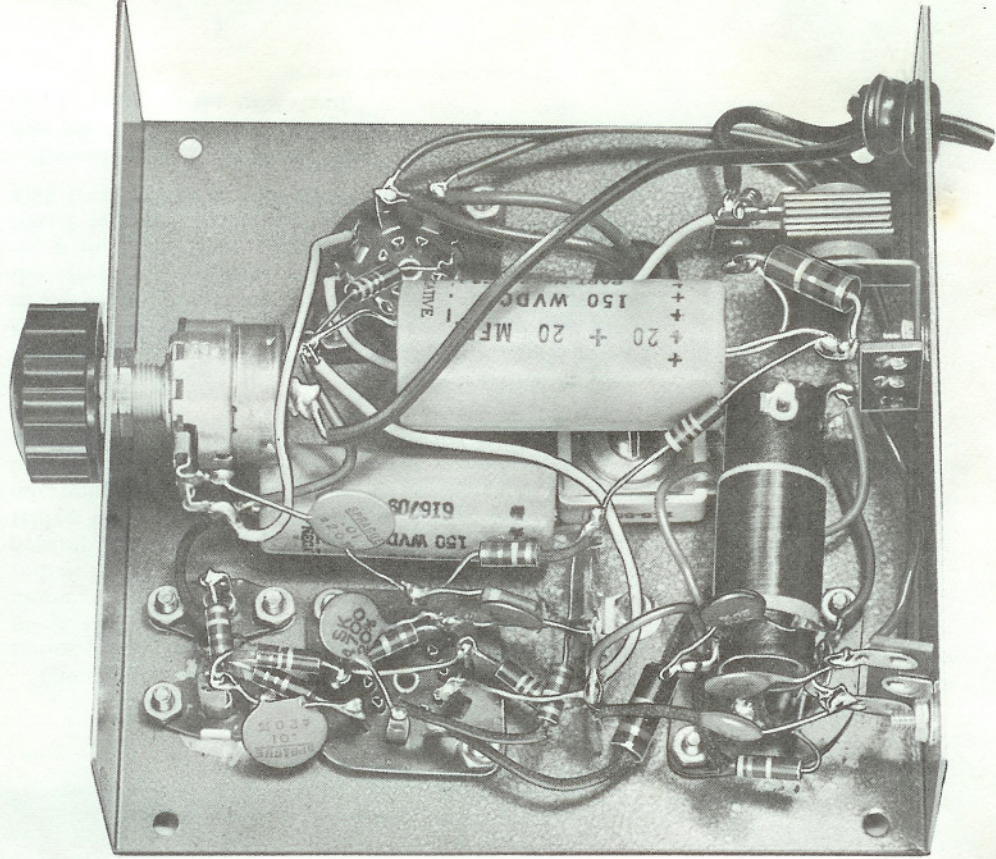


FIGURE 1.

Before starting to build, check each part against the parts list on page 20. This will help you become acquainted with each part. If you are unable to identify some parts by sight, locate their pictures on the wiring diagrams.

Symbols are used to describe parts. The Greek letter " μ " means micro, " Ω " means ohm, "K" means one-thousand, and M (or meg) means one million. Ten-percent tolerance resistors are used throughout, as shown by the fourth color band (silver) on each resistor.

The screws used are all 6-32 x 5/16" except four #4 self-tapping screws which will be specified.

The insulated wire furnished with this kit is cut to length, and the ends are stripped. Each different colored wire is a definite length, so be sure to use the color specified in each of the wiring steps. A piece of bare wire is included. Whenever it is necessary to use some of it, the exact length is specified.

The flexible tubing supplied is called "spaghetti". Spaghetti is used to cover the bare end leads of some of the parts where there is a chance they will touch other bare wires or the chassis.

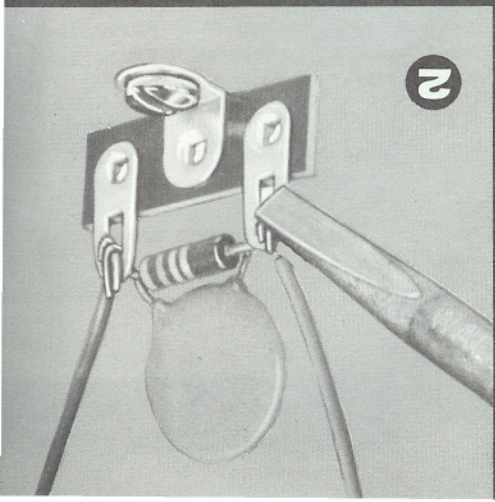
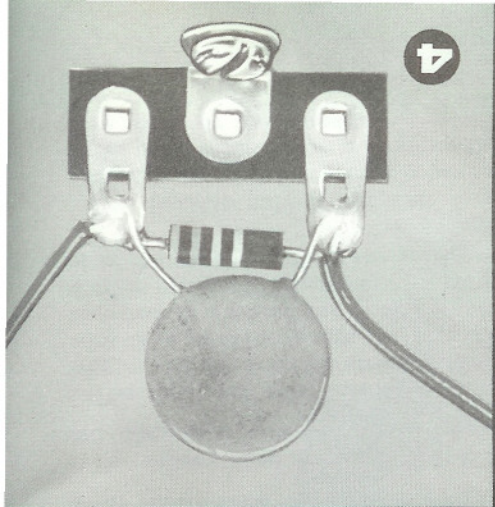
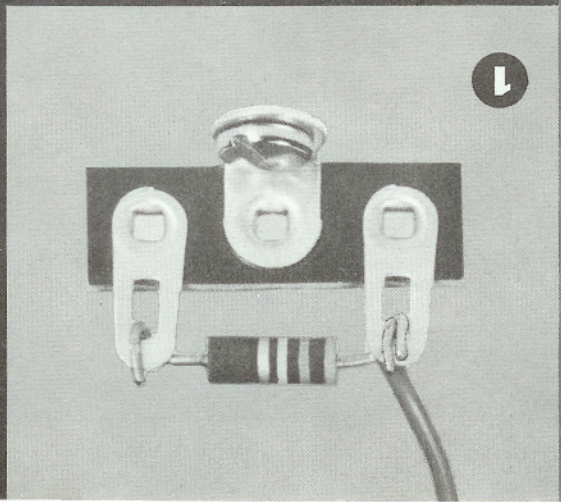
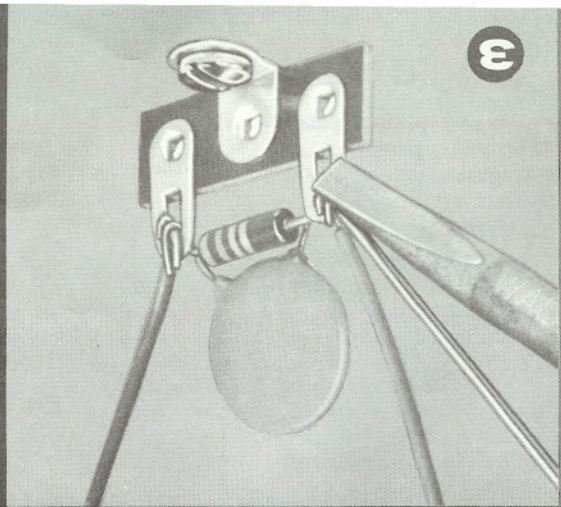
CONSTRUCTION AND WIRING HINTS

The only tools necessary for building your Radio Broadcaster-Amplifier are: A pair of long-nose side-cutting pliers, a screwdriver, and a soldering iron. Additional tools that simplify construction are a pair of diagonal cutters and a small screwdriver.

Be sure to follow the step-by-step instructions exactly. **DO NOT** wire this kit from the pictorials or schematic diagram alone, as it must be assembled and wired in a definite sequence. Occasionally, several parts are mounted with the same hardware, so be sure that you read each step all the way through. For your convenience, space is provided to check off each step after you have completed it.

Unless otherwise stated, all the leads on the resistors, capacitors, and transformers should be as short as possible. Figure 2 illustrates the best way to connect a component. As shown, the end leads should be pulled through the terminals so that the part is tightly mounted. After a lead is pulled through a terminal, bend it around the terminal and cut off the excess wire.

**THIS
KIT
MUST BE
PROPERLY
SOLDERED!**



USE ENOUGH HEAT

This is the main idea of good soldering. Apply enough heat to the metal surfaces you are joining to make the solder spread freely, until the contour (shape) of the connection shows under the solder.

AN ELECTRONIC UNIT WILL NOT WORK . . .

unless it is properly soldered. Read these instructions carefully to understand the basic ideas of good soldering.

Enough heat must be used so the solder can actually penetrate the metal surfaces, making an unbroken path over which electricity can travel. You are not using enough heat if the solder barely melts and forms a rounded ball of rough, flaky solder.

Use the Right Soldering Tool

A soldering iron in the 40-100 watt range is recommended. Any

iron in this range with a clean, chisel-shaped tip will supply the correct amount of heat to make a good solder connection. You may also use a solder gun but make sure the tip reaches full heat before you solder.

Keep the iron or gun tip brightly coated with solder. When necessary, wipe the hot tip clean with a cloth. If you are using an old tip, clean it before you start soldering. Use a fine file or steel wool to expose the bright metal. Heat the iron and immediately coat the tip with solder.

Use Only Rosin Core Solder

We supply the right kind of solder (*rosin core solder*). Do not use any other kind of solder! **Use of Acid Core Solder, Paste, or Irons Cleaned on a Sal Ammoniac Block will ruin any Electronic Unit and will Void the Guarantee.**

HERE'S HOW TO DO IT...

1 Join bare metal to bare metal; insulation must be removed. Make good mechanical connections and keep resistor and capacitor leads as short as possible, unless otherwise specified.

2 Coat the tip of a hot iron with solder. Then **Firmly Press the Flat Side of the Tip** against the parts to be soldered together. Keep the iron there while you . . .

3 Apply the solder between the metal to be soldered and the iron tip. Use only enough solder to flow over all surfaces of the connection, and all wires in the connection. Remove the iron.

Do Not Move Parts Until the Solder Hardens. If you accidentally move the wires as the solder is hardening, apply your iron and reheat.

4 Compare your soldering with the pictures on this page. You have a good connection if your solder has flowed over all surfaces to be connected, following the shape of the surfaces. It should appear smooth and bright and all wires in the connection should be well-soldered.

You Have Not Used Enough Heat: If your connection is rough and flaky-looking, or if the solder has formed a round ball instead of spreading.

The difference between good soldering (enough heat) and poor soldering (not enough heat) is just a few extra seconds with a hot iron firmly applied.

Remember, larger metal surfaces take a longer time to heat.

SEE FIGURE 4.

- From inside the chassis, scrape the paint from around the large hole that is used to mount the J-2 jack.

Mount the following parts **from inside** the chassis.

- Mount J-1 and J-2, the two phono jacks. Position them so the short terminal (ground) of one jack is touching the short terminal of the other jack. Use four screws and nuts.
- Mount R-9 and S-1, the 500K Ω VOLUME control with the OFF switch, on the front of the chassis. Use a large nut on the threaded bushing before inserting it through the chassis, and another large nut to securely fasten the control to the front of the chassis. The threaded bushing should not protrude past the outer nut on the front of the chassis
- Mount C-9, the mica FREQUENCY-CONTROL capacitor, using the nut supplied with the capacitor.
- Insert the three rubber grommets — one small grommet and two large grommets.

- Mount TS-1, a two-terminal strip, on the rear of the chassis. Use one screw. On the same screw, mount SR-1, the selenium rectifier, and secure with a nut.
- Mount TS-3, a three-terminal strip, using one screw and nut.
- Mount the 9-pin socket for the V-1 tube. The keyway must be positioned as shown. This is the open space between two of the socket pins. Use two screws and nuts.
- Mount a 7-pin socket for V-3, positioning the keyway as shown. Use two screws and nuts.
- Mount TS-2, a two-terminal strip, on the rear of the chassis, using one screw and nut.
- Mount the remaining 7-pin socket for V-2, positioning the keyway as shown. Use only one screw and nut, leaving the end nearest the keyway free, in position for later mounting.

The audio output transformer, T-1, mounts from the top of the chassis, as shown in Figure 10. The screws used to mount T-1 also mount other parts, so be sure to read the next 3 steps through to the end of each step.

- Clip the blue and red leads of T-1 to 3". Remove 1/4" of the insulation from the end of each lead. Twist the stranded ends tightly, and coat each end lightly with solder.
- From the top of the chassis, push the blue and red leads of T-1, the audio output transformer, through the large grommet.
- Mount one end of the transformer frame and the loose end of the V-2 socket with a screw and a nut. Do not tighten the nut.
- Slip the foot of TS-5, a three-terminal strip, under the loose end of the transformer frame. Insert a screw through the frame, through TS-5, and through the matching hole in the chassis. On this screw, from inside the chassis, mount TS-4, the one-terminal strip. Secure in place with a nut. Now tighten both nuts used for mounting T-1.
- Connect, but do not solder, the red lead to pin 7 of V-2.
- Connect, but do not solder, the blue lead to pin 6 of V-2.

FIRST WIRING

SEE FIGURE 5.

Wire all parts from inside the chassis.

- Connect, but do not solder, one lead of R-5, a 2.7 meg Ω resistor (marked with the color bands red, violet, and green) to pin 2 of V-1. Connect, but do not solder, the other lead to pin 8 of V-1.
- Connect, but do not solder, one end of a 2" bare wire to pin 3 of V-1. Pass the other end of the wire through pin 8 of V-1, and then connect, but do not solder, it to the short terminals of jacks J-1 and J-2.
- Connect, but do not solder, one lead of R-3, a 2.7 meg Ω resistor (red, violet, green) to pin 7 of V-1. Connect, but do not solder, the other lead to the short terminals of jacks J-1 and J-2.
- STUDY THE SOLDERING INSTRUCTIONS**

Note there are two tubular capacitors supplied. The one of larger diameter is a dual capacitor, marked 20-20 μ fd. The other is a single 20 μ fd capacitor. Each has a plus end that may be marked plus(+) or POSitive and a minus end that may be marked minus(-) or NEGative.

- Position C-2, the single 20 μ fd tubular capacitor, as shown, with the plus (+) end close to TS-3. Connect, but do not solder, the plus lead to terminal 3 of TS-3.
- Slip a 1¼" piece of spaghetti on the other lead of C-2. Solder it to the short terminals of J-1 and J-2.
- Position C-1, a .01 μ fd disc capacitor (may be marked as 10K or 10,000), as shown. Stand the round edge on the bottom of the chassis to keep the leads as short as possible. Solder one lead to pin 7 of V-1. Connect, but do not solder, the other lead to the tall terminal of J-2.
- Connect, but do not solder, one lead of R-8, a 47K resistor (yellow, violet, orange) to terminal 1 of TS-3. Push the resistor to the bottom of the chassis. Solder the other lead to pin 3 of V-1.
- Cut two 1¼" pieces of spaghetti and slip one on each lead of R-14, a 27 Ω 1-watt resistor (red, violet, black). Solder one lead of R-14 to pin 3 of V-3. Solder the other lead to pin 5 of V-1. Be sure the bare lead does not touch the mounting nut on V-1.
- Connect, but do not solder, one end of a yellow wire to terminal 1 of TS-3. Connect, but do not solder, the other end to terminal 2 of S-1.
- Solder one end of a green wire to pin 4 of V-3. Route the wire as shown. Solder the other end to pin 3 of V-2.
- Solder one end of a yellow wire to terminal 4 of V-2. Connect, but do not solder, the other end to the terminal of TS-4.
- Connect, but do not solder, one end of an orange wire to the bottom hole in pin 7 of V-3. Solder the other end to terminal 2 of C-9.
- Solder a violet wire to the back of terminal 1 of TS-2. Route the wire as shown. Solder the other end to pin 7 of V-2.
- Connect, but do not solder, one end of a blue wire to terminal 2 of TS-2. Route the wire along the bottom of the chassis as shown, and push the other end through the small grommet.
- Connect, but do not solder, a red wire to pin 1 of V-3. Connect, but do not solder the other end to terminal 1 of C-9.

SECOND WIRING

SEE FIGURE 6

- Connect, but do not solder, one lead of R-10, a 330 Ω resistor (orange, orange, brown) to terminal 2 of S-1. Solder the other lead to pin 1 of V-2.
- Connect, but do not solder, one lead of R-15, a 33 Ω resistor (orange, orange, black) to the terminal of TS-4. Solder the other lead to terminal 2 of SR-1 the selenium rectifier.
- Solder one lead of R-1, an 820K Ω resistor (gray, red, yellow) to the tall terminal of J-1. Connect, but do not solder, the other lead to the tall terminal of J-2.
- Solder one lead of R-2, a 22K resistor (red, red, orange) to the tall terminal of J-2. Solder the other lead to pin 8 of V-1.
- Connect, but do not solder, one lead of C-3, a .0047 μ fd disc capacitor (4700 or 4.7K) to pin 2 of V-1. Connect, but do not solder, the other lead to terminal 6 of V-1.
- Slip 1" of spaghetti on one lead of R-4, a 220K Ω resistor (red, red, yellow). Solder this lead to pin 6 of V-1. Connect, but do not solder, the other lead to terminal 3 of TS-3.
- Slip $\frac{3}{8}$ " of spaghetti on one lead of R-6, a 1.5 meg Ω resistor (brown, green, green). Connect, but do not solder, this lead to terminal 2 of TS-3. Connect, but do not solder, the other lead to pin 1 of V-1.
- Slip $\frac{3}{8}$ " of spaghetti on one lead of R-7, a 220K Ω resistor (red, red, yellow). Connect, but do not solder, this lead to terminal 3 of TS-3. Connect, but do not solder, the other lead to pin 1 of V-1.
- Solder one end of a 1 $\frac{1}{4}$ " bare wire to pin 4 of V-1. Connect, but do not solder, the other end to terminal 1 of TS-3.
- Connect, but do not solder, one end of a red wire to terminal 1 of TS-3. Connect, but do not solder the other end to terminal 1 of V-3.
- Clip to 1 $\frac{1}{4}$ " both leads of C-7, a 470 μ fd disc capacitor (.00047). Connect, but do not solder, one lead to pin 5 of V-3. Leave the other lead free for later wiring.

THIRD WIRING

- Thread one lead of R-12, a 4.7K Ω resistor (yellow, violet, red), through pin 6 of V-3 and connect it to pin 5 of V-3. Solder pins 5 and 6 of V-3. Slip $\frac{3}{4}$ " of spaghetti on the other lead. Solder this lead to pin 1 of V-3. R-12 should be positioned above the edge of the tube socket, so it will not interfere with later mounting.
- Slip $\frac{3}{4}$ " of spaghetti on one lead of C-8, a 100 $\mu\mu\text{fd}$ disc capacitor (.0001). Solder this lead to the **bottom** hole in pin 7 of V-3. Solder the other lead to terminal 2 of TS-2.
- Solder one end of a red wire to terminal 3 of R-9, the 500K Ω VOLUME control. Connect, but do not solder the other end to terminal 2 of the S-1 switch.
- Solder one end of a yellow wire to terminal 2 of R-9. Solder the other end to pin 5 of V-2.
- Solder one end of a blue wire to pin 6 of V-2. Route the wire around TS-4 and SR-1, as shown. Connect, but do not solder, the other end to terminal 2 of TS-1.
- Solder one end of a red wire to terminal 1 of C-9. The other end will be connected later.
- Bend down pins 2 and 3 of V-3, as shown. Be sure pin 3 does not touch the nut.

SEE FIGURE 9.

Notice that one end of the L-1 oscillator coil has three terminals. The other end has one terminal with a wire connected to it, plus a blank terminal (without a wire) which is not used. Handle the coil carefully, to protect the windings.

- With your pliers, bend the coil terminals as shown in Figure 7.
- Melt some excess solder on pin 7 of V-3. Melt a little solder on coil terminal D.
- Hold the coil in position for mounting, with coil terminal D placed against pin 7 of V-3. While holding the coil in position, place your iron against pin 7 of V-3, until the solder flows evenly around terminal and pin.
- Connect the red wire, previously soldered to terminal 1 of C-9, to coil terminal A and terminal 1 of TS-1. Solder the wire to both terminals.

- Slip $\frac{3}{4}$ " of spaghetti on one lead of C-6, a .0047 μfd disc capacitor (4700 or 4.7K). Solder the lead to terminal 1 of TS-3. (Be sure to solder **all** the wires in the terminal.) Solder the other lead to terminal 1 of TS-2 and coil terminal C.

- Solder the loose lead of C-7 to coil terminal B. (The other lead was previously soldered to pin 5 of V-3.)

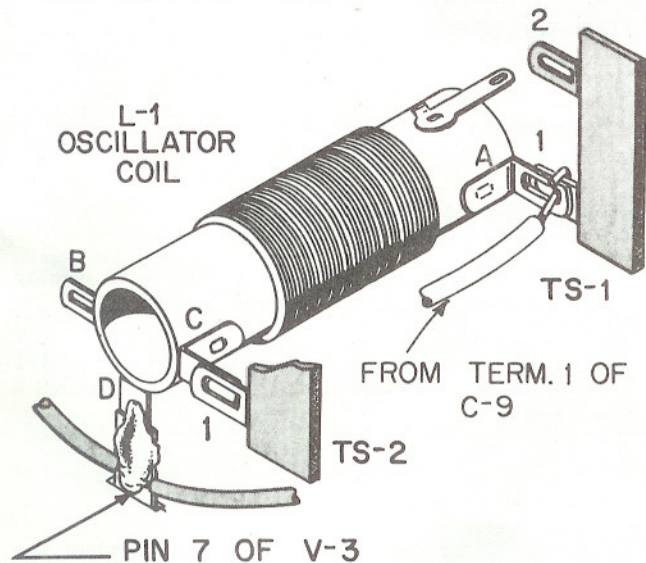


FIGURE 7. MOUNTING THE OSCILLATOR COIL

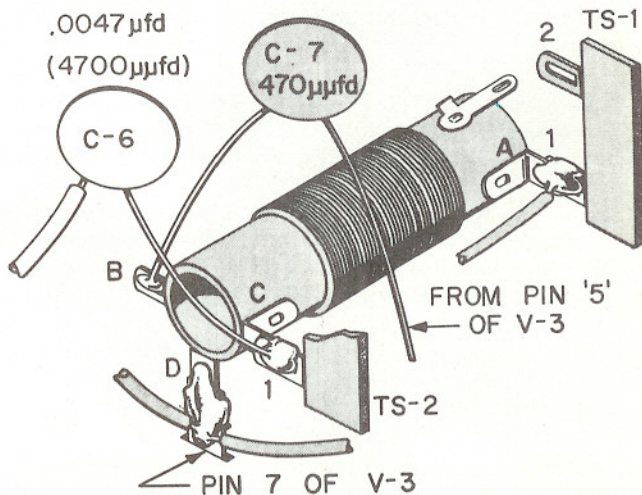


FIGURE 8. WIRING THE OSCILLATOR COIL

- Position C-10, the dual 20-20 μ fd tubular capacitor, as shown. Be sure the plus (+) end (the end with two leads) is closest to SR-1, the selenium rectifier. Solder the lead from the minus (-) end of C-10 to terminal 2 of S-1. Connect, but do not solder, either one of these plus leads to terminal 1 of SR-1. Connect, but do not solder, the other plus lead to terminal 2 of TS-1.
- Solder one lead of R-13, a 1K Ω 1-watt resistor (brown, black, red) to terminal 1 of SR-1. Connect, but do not solder, the other lead to terminal 2 of TS-1.
- Solder one lead of R-11, a 47K Ω resistor (yellow, violet, orange) to terminal 2 of TS-1. Solder the other lead to terminal 3 of TS-3. Be sure to solder **all** the wires in these terminals.
- Solder one lead of C-5, a .01 μ fd disc capacitor (10,000 or 10K) to terminal 1 of R-9. Solder the other lead to pin 1 of V-1.
- Solder one lead of C-4, an 82 μ fd disc capacitor, to pin 2 of V-1. Solder the other lead to terminal 2 of TS-3.
- Insert the bare ends of the line cord through the grommet on the rear of the chassis. Knot the cord so the knot is 5 inches from the bare ends. Split the two sections of the cord back to 1" from the knot. Solder either of the two wires to terminal 1 of S-1.

- Trim the other line-cord wire to 2" from the knot. Remove $\frac{1}{4}$ " of the insulation from the end; twist the bare stranded wires together and coat lightly with solder. Solder this end to the terminal of TS-4.

FINAL WIRING

SEE FIGURE 10.

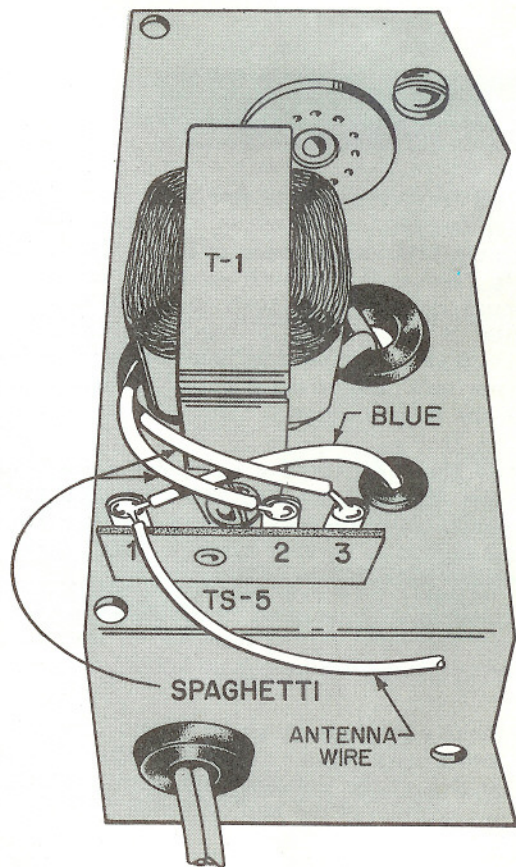
FROM THE TOP OF THE CHASSIS.

- Connect, but do not solder, the blue wire coming through the grommet to terminal 1 of TS-5.
- Slip a 1 $\frac{1}{4}$ " piece of spaghetti on the thin lead of T-1 that's closest to TS-5. Solder this lead to terminal 2 of TS-5.
- Slip a 2 $\frac{1}{2}$ " piece of spaghetti on the other thin lead of T-1. Solder this lead to terminal 3 of TS-5.
- Remove $\frac{1}{4}$ " of the insulation from one end of the 10-ft. coil of antenna wire supplied. Solder this end to terminal 1 of TS-5.

The wiring of your kit is completed.

- Check the work. Every connection must be mechanically strong, and all should now be well soldered. A single loose or unsoldered connection will make the unit intermittent in operation or completely inoperative.
- Mount the four rubber feet on the bottom cover, using four screws and nuts.
- Mount the bottom cover under the chassis. Fasten the cover from top of the chassis with four #4 self-tapping screws.
- Place the knob on the shaft of the VOLUME control, R-9, and position so the white dot points to the left-hand corner of the front panel. Tighten the setscrew.
- Insert the tubes in the proper sockets. The top of the chassis is marked with the tube number at each socket.

FIGURE 10.



- Use a screwdriver to adjust C-9, the FREQUENCY CONTROL capacitor, until the Broadcaster is heard at the radio. Now, turn down the VOLUME control at the Broadcaster, for comfortable listening.

If there is a howl or whistle in the radio, the frequency of the Radio Broadcaster may be too close to that of a radio station. Set the receiver dial to another quiet setting, and retune C-9 for this new setting.

USE AS AN AMPLIFIER

Your Broadcaster can simultaneously be used as a complete phono amplifier and broadcaster, creating a pleasing dimensional effect. If you wish to use the unit as a phono amplifier only, just curl up the antenna, out of the way. To use as a phono amplifier:

- Connect any 3.2Ω to 16Ω speaker to the terminals marked SPEAKER on top of the chassis.
- Plug the phono cable from your record player into the appropriate jack on the amplifier.

- Turn on your amplifier and allow one minute warm-up.
- Place the pickup arm on a record. Adjust the amplifier VOLUME control for the desired listening level.

If you wish to connect a phono plug to your record player or microphone, see Figure 11.

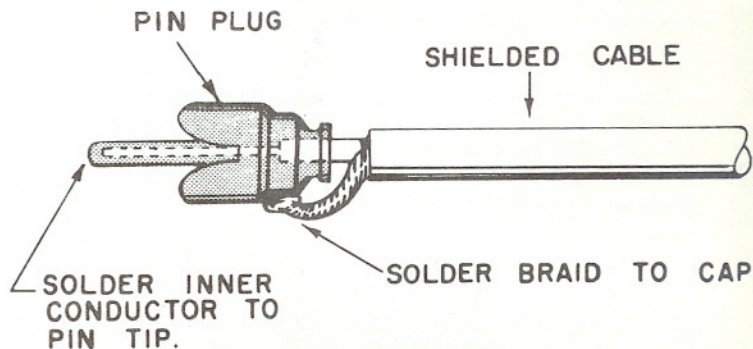


FIGURE 11. HOW TO CONNECT A PHONO PLUG

HOW IT WORKS

The Radio Broadcaster-Amplifier doubles as a phono amplifier and a miniature broadcasting station.

The phono amplifier section consists of V-1, the 12AX7, and V-2, the 50C5 tube. It amplifies the very small electrical signals coming off the record player cartridge or microphone, making the signals strong enough to drive a speaker and produce audible sound.

Ceramic, crystal or magnetic cartridges are correctly loaded by input resistors R-1 and R-2. The preamplifier tube, 12AX7, supplies the high gain needed for magnetic cartridges, with equalization supplied by a feedback loop made up of R-6 and C-4.

Output from the preamplifier stage is fed into the V-2 50C5 audio output tube which supplies ample power to drive a speaker and produce room-filling sound. The audio output transformer, T-1, matches a 3.2Ω to 16Ω speaker. The output level is adjusted by the R-9 VOLUME control which varies the signal voltage applied to the grid of the output tube.

As a Radio broadcaster, this unit operates much like a regular broadcasting station. It sends out a signal between 600 kc and 1500 kc which can be received by any standard radio.

The signal is made up of two parts. The first part is the desired sound signal, which is too low in frequency to be broadcast by itself. The second part is the carrier wave, on which the sound signal "rides". The carrier wave is the right frequency to be broadcast to your radio.

The carrier wave is produced by V-3, the 50C5 oscillator tube, and is sent out into the air at the antenna. V-3 oscillates because some of the tube output across L-1 and C-9 is fed back into the tube, in the correct phase to be amplified and fed back again. The needed phase shift is provided by L-1. These oscillations or waves, can be varied between 600 kc to 1500 kc by adjusting C-9.

The sound (audio) signal is impressed on the carrier wave at the plate of V-3. The plate voltage of V-3 varies at an audio rate because it is tied to the plate of V-2. V-2 doubles as an audio output and modulator tube, and amplifies the audio voltage to effect 75% modulation of the carrier wave.

Clean modulation is assured by the use of degenerative feedback across R-10. The amount of modulation can be varied by adjusting R-9, the VOLUME control.

Free Information Service

First, write a letter to us if your wired kit does not operate properly. Address KNIGHT-KIT Dept. at Allied Radio. Give the stock number of the kit, date of purchase and describe the problem. In a great many cases our technicians can determine corrective steps from the information in your letter. This free information service may save you the expense and inconvenience of returning the kit for repairs.

Should it appear that work in our shop is necessary, we will send you a pre-addressed label and specific packing instructions for your kit.

Special Inspection Service

You may return this wired KNIGHT-KIT for inspection and repair within one year after purchase for a special service charge of \$2.50. An additional charge will be made for any parts damaged in construction or for parts beyond the one year warranty period. Service charges for kits returned after the one year period will be based on the length of time needed to repair the unit plus the cost of any parts required.

PLEASE NOTE: KITS SOLDERED WITH ACID CORE SOLDER, PASTE FLUX, OR WITH IRONS CLEANED ON A SAL AMMONIAC BLOCK ARE NOT ELIGIBLE FOR REPAIR OR SERVICE BECAUSE THEY HAVE BEEN PERMANENTLY DAMAGED BY THE ACID FLUX.

Packing Instructions

If you return this kit, pack it well. Do NOT use the original carton—it is too small for the assembled kit. To prevent damage in shipment, use a carton large enough so that cushioning material can be placed around the instrument. Cushion it well and tightly. Mark it: **FRAGILE — DELICATE ELECTRONIC EQUIPMENT.**

We recommend that this equipment be shipped ONLY by Railway Express, if at all possible, to forestall damage in shipment. Send the kit prepaid and insured. We will return the repaired kit to you C.O.D. as soon as repairs are completed. If you wish to save C.O.D. fees, your advance remittance may be enclosed for standard repair charges plus transportation costs. Any excess remittance will be refunded.

If Your Kit Arrived Damaged

If your kit was damaged in a parcel post shipment, please write us at once, describing the condition in which the shipment was received. If your kit was part of a Railway Express shipment that was damaged in transit, please notify the local Railway Express agent at once and then write us.

KNIGHT-KIT GUARANTEE

Allied fully protects your Knight-Kit purchase with this exclusive money-back guarantee. Your Knight-Kit must meet with your complete satisfaction or your purchase price is refunded.

In addition, we guarantee that only premium-quality components are selected for use in Knight-Kits. Every Knight-Kit component is fully warranted against defects in material and workmanship for a period of one year from date of original purchase. Should replacement parts be required under this warranty, notify us promptly, including sufficient details to identify the required parts. Parts will be shipped without charge. We reserve the right to request the return of defective parts.

SERVICE HINTS

If your Radio Broadcaster-Amplifier does not perform satisfactorily the first thing to do is to recheck all the wiring. (Be sure to remove the line cord plug from the power outlet before you remove the bottom plate to inspect the wiring.) Most cases of poor performance are caused by a wiring error, or the failure to use enough heat when soldering. If you have a friend who is familiar with electronics, he may find a mistake in the wiring that you have overlooked.

Occasionally the tubes fail to light because one has an open filament. Many radio or TV service shops will test your tubes free. The tubes are fully covered by Allied's guarantee, as listed in the next section.

Excessive hum can often be corrected by reversing the position of the line cord plug in the outlet.

FCC CERTIFICATION

CUT OUT AND PASTE ON THE BOTTOM PLATE

Allied Radio Corp. certifies that the KNIGHT-KIT Radio Broadcaster-Amplifier, 83Y706, meets FCC restricted radiation requirement for a low-power communication device under rule 15.204 when built according to the instruction manual and not more than 10 feet of wire is used as an antenna.

RESISTANCE CHART

All resistance measurements with respect to point B (terminal 1 of TS-3). Readings may vary $\pm 20\%$, depending on the meter used. Remove line cord plug from power outlet before taking readings.

TUBE	PIN								
	1	2	3	4	5	6	7	8	9
V-1 12AX7	1M	2.7M	47K	0	1.5	1M	2.7M	47K	.9
V-2 50C5	330	0	100	160	0	2M	2M		
V-3 50C5	0	4.7K	44	100	4.7K	4.7K	2M		

PARTS LIST

Symbol Number	Description	Part Number
CAPACITORS		
C-1	.01 μ fd disc ceramic	276015
C-2	20 μ fd tubular electrolytic	203200
C-3	.0047 μ fd disc ceramic	276477
C-4	82 μ fd disc ceramic	296016
C-5	.01 μ fd disc ceramic	276015
C-6	.0047 μ fd disc ceramic	276477
C-7	470 μ fd disc ceramic	276478
C-8	100 μ fd disc ceramic	276017
C-9	FREQUENCY CONTROL, variable mica	283001
C-10	20-20 μ fd 150 v. tubular electrolytic	213201

CONNECTORS

J-1	Phono jack	502220
J-2	Phono jack	502220
	Phono plugs (2)	502123

Symbol Number	Description	Part Number
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RESISTORS

All carbon, 1/2 watt, 10%, unless specified otherwise.

R-1	820K Ω	301824
R-2	22K Ω	301223
R-3	2.7 meg Ω	301275
R-4	220K Ω	301224
R-5	2.7 meg Ω	301275
R-6	1.5 meg Ω	301155
R-7	220K Ω	301224
R-8	47K Ω	301473
R-9	VOLUME control, 500K Ω , 20%, with switch S-1	390008
R-10	330 Ω	301331
R-11	47K Ω	301473
R-12	4.7K Ω	301472
R-13	1K Ω , 1 watt	304102
R-14	27 Ω , 1 watt	304270
R-15	33 Ω	301330

SELENIUM RECTIFIER

SR-1	50 ma. selenium rectifier	62000
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Symbol Number	Description	Part Number
SWITCH		
S-1	ON-OFF switch	See R-9
TERMINAL STRIPS		
TS-1	2-terminal strip	440201
TS-2	2-terminal strip	440201
TS-3	3-terminal strip	440303
TS-4	1-terminal strip	440101
TS-5	3-terminal strip	440303

TRANSFORMER AND COIL		
T-1	Audio output transformer	102200
L-1	Oscillator coil	112200

TUBES		
V-1	ECC83/12AX7 tube	611012
V-2	50C5 tube	610026
V-3	50C5 tube	610026

Description	Quantity	Part Number
WIRE, SOLDER, AND SPAGHETTI		
Antenna wire, 10 ft.	1	805002
Bare wire, 4"	1	806004
Insulated solid wire:		
red	4	801002
orange	1	801003
yellow	3	801004
green	1	801005
blue	2	801006
violet	1	801007
Line cord	1	802001
Solder, 3 ft.	1	930002
Spaghetti, 12"	1	812009

Description	Quantity	Part Number
HARDWARE		
#4 self-tapping screws	4	562292
6-32 x 5/16" screws	18	560343
6-32 nuts	18	570340
3/8-32 nuts	2	570840
MISCELLANEOUS		
Chassis	1	461207
Cover, bottom	1	463106
Feet, rubber	4	831001
Grommets, large	2	830200
Grommet, small	1	830001
Instruction Manual	1	750115
Knob	1	764202
Socket, 7-pin tube	2	501070
Socket, 9-pin tube	1	501090

TOOLS NEEDED FOR CONSTRUCTION

Stock Number	Description	Price*
46N852	Soldering pencil	\$4.73
46N449	Long nose, side-cutting pliers	1.76
45N796	Screwdriver	.72

TOOLS THAT MAKE CONSTRUCTION EASIER

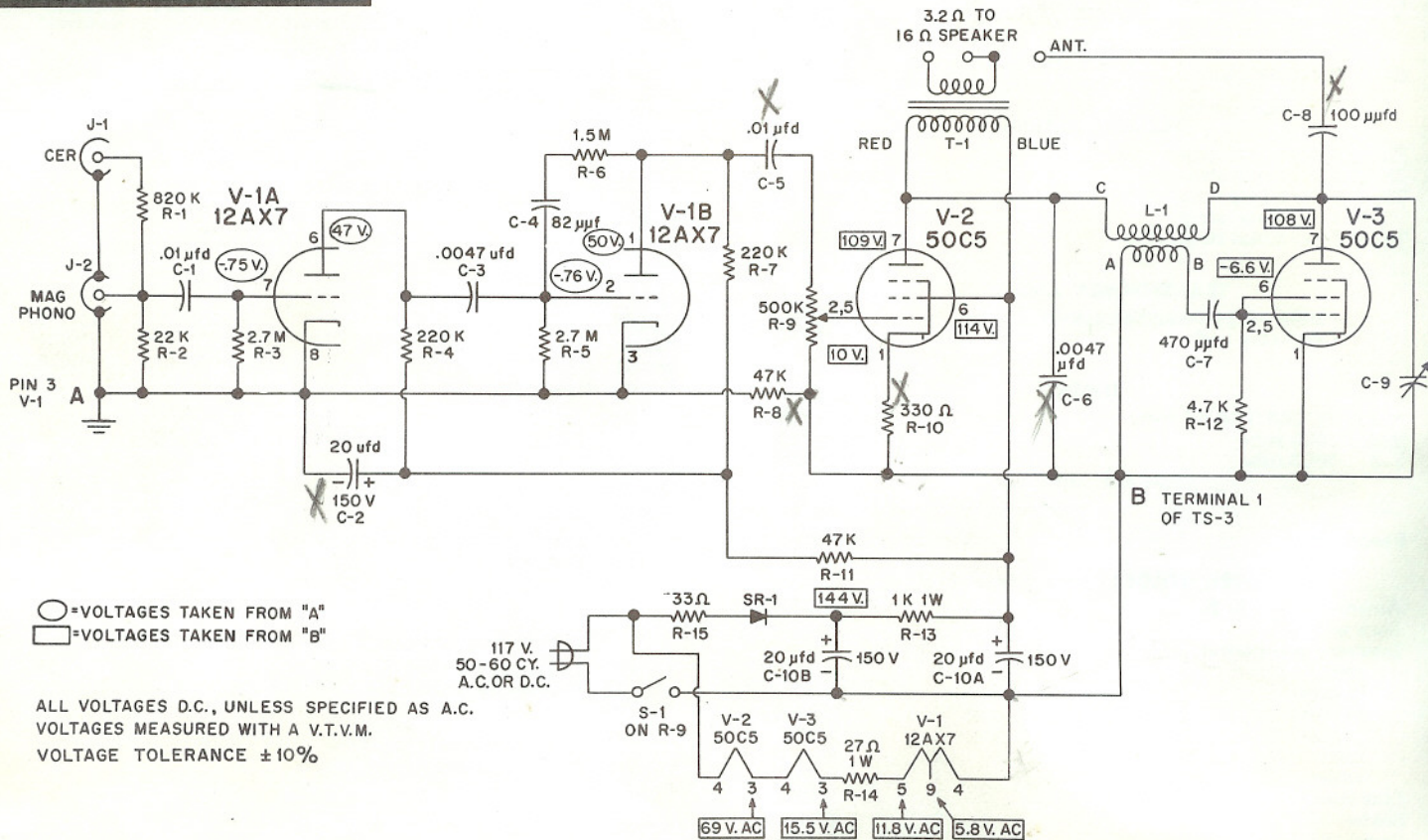
46N431	Diagonal cutting pliers	1.55
43N831	Set-screw screwdriver	.27

ACCESSORIES YOU MAY WANT

99S519	Crystal microphone	2.95
81D616	Speaker	1.40

*Price subject to change.

SCHEMATIC DIAGRAM





- **Built-in PM Speaker**
- **Sensitive Regenerative Circuit**
- **Standard and Short Wave Bands**
- **Convenient Bandswitching**

Sensitive 2-band receiver in easy-to-build kit form. Short wave band covers 6 to 18 megacycles — pulls in exciting foreign broadcasts from many parts of the world, plus Amateur, aircraft, police and marine radio. Specially designed regenerative circuit also provides highly sensitive reception on broadcast band. Broadcast band or short wave is selected simply by turning the bandswitch knob.

***knight-kit*® Space Spanner®**

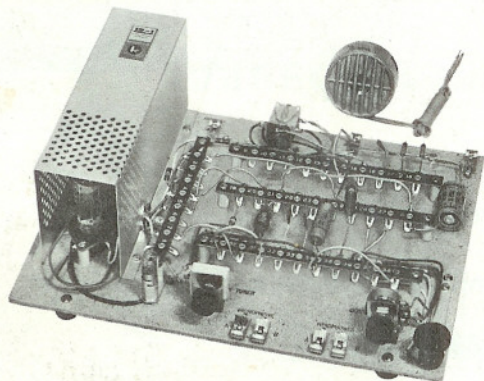
Thrilling Shortwave

And Broadcast Reception

83 Y 259

Built-in 4" PM speaker and beam-power output tube for plenty of volume. Headphone connectors on rear panel allow private, quiet listening; slide switch cuts out speaker. Sensitive circuit employs 12AT7 regenerative detector and audio amplifier; 50C5 power output; 35W4 rectifier. 6 controls allow precise, accurate tuning; Bandspread, Main Tuning, Antenna Trimmer, Bandswitch, Regeneration, and Volume. Panel is finished in attractive gray; has black knobs. Detailed, step-by-step instructions include pictorial and schematic diagrams. With all parts, punched chassis and tubes. Smart pyroxylin-covered, wood cabinet. Size, 7 x 10½ x 6". For 110-220 v., 50-60 cycle AC or DC. Shpg wt., 6½ lbs.

See your latest catalog for current prices.



knight-kit 12-IN-1 ELECTRONIC LAB KIT

83 Y 272

BUILD ANY ONE OF THESE FASCINATING PROJECTS

go from project to project by simply shifting wires!

The construction of these 12 practical circuits is the most enjoyable method of learning the basic fundamentals of electronics. Each of the projects performs a practical function and demonstrates the basic electronic principles of the circuit under construction. As an added feature, the kit is designed with a special transformer which reduces all voltages to less than 25 volts. Completely safe, the kit is ideal for both young and old. No previous electronic experience is necessary.

All 12 circuits are easy to assemble without the use of special tools. Numbered terminal strips allow you to quickly go from one project to another simply by changing the connections of a few wires.

In addition to schematic diagrams and circuit descriptions for each project, the manual has informative sections on commonly used schematic symbols, the International Morse Code, and capacitor and resistor color code markings.

• **ELECTRONIC TIMER**

For timing up to 30 minutes.

• **BODY-CAPACITY RELAY**

Turns light on or off when you step on metal plate.

• **RADIO "BROADCASTER"**

Be your own radio announcer — transmit through your radio.

• **PHOTOELECTRIC RELAY**

Turns on appliances, etc., when actuated by light.

• **ELECTRONIC SWITCH**

Use it to sound an alarm when it rains—amaze your friends.

• **MAGIC MUSIC OSCILLATOR**

Have fun "making music" by using hands to control light.

• **CODE PRACTICE OSCILLATOR**

Helps you learn the code.

• **ELECTRONIC FLASHER**

Turns indicator light on and off pre-set intervals.

• **VOICE-CONTROLLED RELAY**

Lets you turn device on and off speaking through mike.

• **CODE PRACTICE TRANSMITTER**

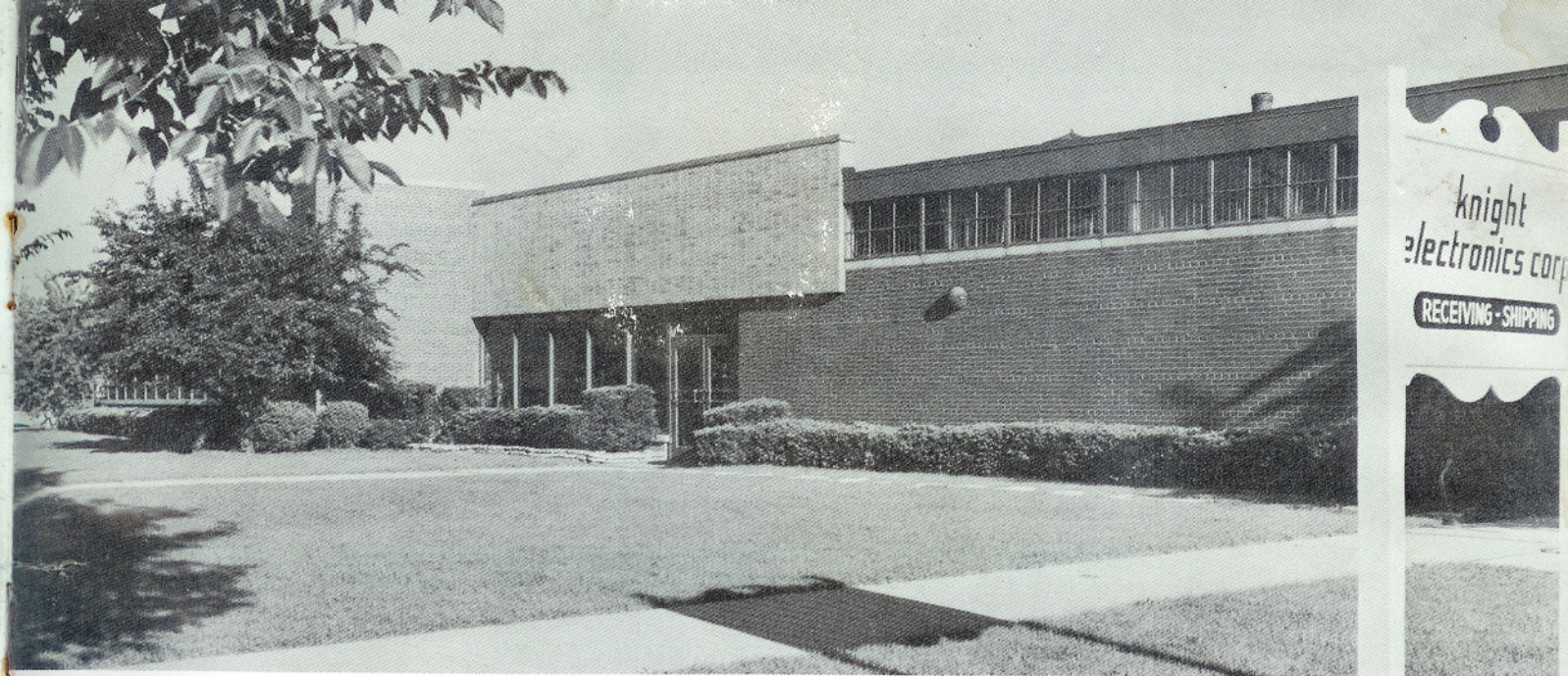
Lets you send code signals through your radio.

• **AUDIO AMPLIFIER**

Sends voice or music to remote located headphones.

• **RADIO**

Great for private radio listening from 550-1300 kc.



This is the new Knight Electronics Corporation Plant in Maywood, Illinois—a facility completely devoted to research, engineering, and manufacturing of electronic equipment in kit form. Here Knight pioneers in better electronic units at lower cost for electronic hobbyists, experimenters, laboratories, schools, and for industry.

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