

Maxitronix™

ELECTRONIC LAB

OWNER'S MANUAL

ELECTRONIC
AM

RADIO
KIT

Safe, Solderless, Exciting, Educational and Fun!
Easy-To-Read Illustrated
Operating Manual Included!

- Learn and Build your own AM RADIO!
- Tune in your favorite AM RADIO stations!
- Receives 520-1650 KHz band!
- Learn how RADIOS work!
- With earphone included!
- Uses one 9V battery! (not included)

up

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This AM Radio is an excellent kit to help you begin your study of electronics. It's so simple you'll spend only a couple of hours putting it together. No soldering is required and you can make circuit changes very easily.

The MX-901A AM Radio Kit uses two transistors, 4 resistors and 5 capacitors including a variable capacitor. It has high sensitivity and covers a frequency range from 520KHz to 1625KHz.

This manual contains easy-to-follow, step-by-step instructions with drawings for clarity.

The broadcast signal coming to the antenna is tuned in or selected by the coil and variable capacitor circuit. The two transistor amplifier circuit then increases the signal strength.

The broadcast signal consists of high-frequency (radio frequency) wave modulated with a low frequency (audio frequency) wave.

The process of detection is used to select or separate the low-frequency (AF) wave from the broadcast (RF) wave. The weak current that flows in the antenna is increased many times through step by step amplification.

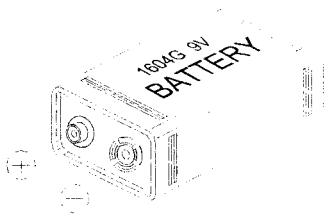
This detection circuit is in the lower left corner of front Panel. It receives the antenna signal across terminals 6 and 7. The audio amplifier circuit lies between terminals 12, 14 and 15. This circuit increases the audio frequency signal to levels capable of driving the earphone.

TOOLS REQUIRED

You will only need a few simple tools to build your kit.

- * Small screwdriver
- * A pair of long-nose pliers
- * Wire cutters

You will also need one 9V battery. TYPE 1604G or 6F22.



GETTING STARTED

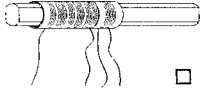
The first thing good kit builders do with a new project is to make sure all the necessary parts are in their kit.

To do this, check the contents of your kit against the parts list. The parts list is separated into two sections, electrical items (resistor, transistors and so forth) and mechanical parts (nuts, spring, screws, wires etc.). As you check off the parts, put them in a safe place so they will not get lost or damaged. Keeping them in the lid of the kit box is a good idea.

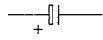
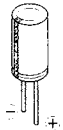
Next to each electronic part, you will see a picture of the part as well as its "schematic symbol". The schematic symbol will help you identify the part and locate the correct position for the part on the kit's cardboard panel. The quantity provided is in parenthesis.

PARTS LIST - Electrical Components

- Bar Antenna (1) – This is a ferrite rod with the antenna coil wound around it.



- Capacitor (4) – There are two kinds of capacitors in your kit: electrolytic and ceramic. The electrolytic capacitors look like tiny tin cans.



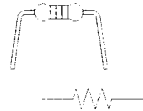
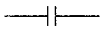
1 – marked 1uF, 25V or 50V

The ceramic capacitors are small, flat and circular. Each is marked with its value.

0.05uF (1) large, .05 or 503.

0.005uF(1) small, .005 or 502.

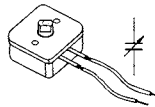
470pF (1) small, 471.



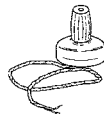
- Resistors (4) – these are the small, tan tubular objects with colored stripes. The stripes will help you identify them later.



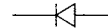
- Transistors (2) – Transistors have three leads (instead of two like the other parts). Possible Markings C3198, 3904, 9013, or 9014.



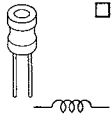
- Variable Capacitor (1) – This is a special capacitor that will be used to tune in the frequency of the desired radio station.



- Earphone, ceramic (1) This small earphone changes electrical energy to sound waves that you can hear.



- Diode (1) –Germanium type with black or red band.



- Coil (1) – This choke coil looks like small can with two leads.



- Screw - Long Type M3.0x8 (1)



- Screw - Short Type M2.6x4 (3)

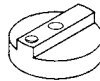
MECHANICAL PARTS

- Battery Snap for 9V Battery (1)



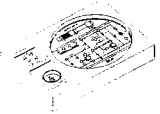
- Spring Terminal (15)

- Antenna Holder (polypropylene) for mounting Bar Antenna (1)



- Tuning Knob (1)

- Cardboard Panel with Plastic Side Frame (1)



- Wires:
White, (3') 75mm (8)



- Nuts (1)

Refer to the following illustration of complete unit when you building the kit:

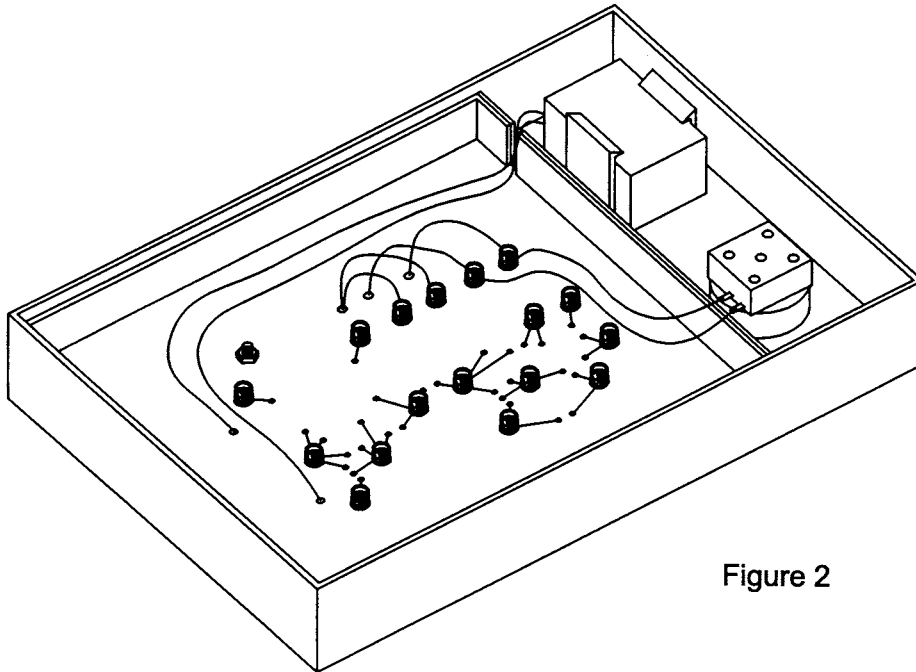


Figure 2

ASSEMBLY/INSTALLATION

Spring Terminals

The spring terminals provide an easy way to make electrical connections without the use of solder.

- From the topside of the cardboard panel, install 15 spring terminals into the 15 large, numbered holes. The smaller end of the spring should be at the bottom. To make installation easier, use the pointed end of pencil or ballpoint pen to push the spring through the holes then twist them slightly. (See Figure 3.)
- You will make many of your connections on the backside of the cardboard panel. As you install each spring, mark the number of each terminal on the back side of the panel.

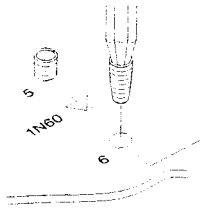


Figure 3

Resistors

You will mount the 2.2K ohm resistor first. It is marked with 4 colored bands (red, red, red, gold).

- Mount the resistor by bending its leads and inserting them, from the top of the cardboard panel, through the holes next to schematic symbol. (See Figure 4.)
- Now turn the over panel and connect leads to terminals 10 and 11.

Simply bend the spring to one side with the long nose pliers or your finger and insert the wire between the coils of the spring. The first connections might seem difficult, but you will soon learn to do this easily.

Remember that you will identify the resistors by their colored bands.

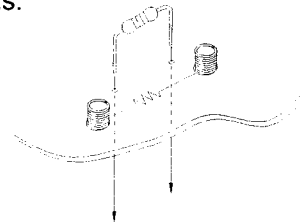


Figure 4

- Connect the 1.8K ohm resistor (brown, gray, red, gold) between terminals 15 and 13.
- Connect the 1M ohm resistor (brown, black, green, gold) to terminals 12 and 13.
- Connect the other 1M ohm resistor (brown, black, green, gold) to terminals 7 and 8.

Capacitors

From the top of the cardboard panel, insert the two leads of each capacitor through the holes next to its schematic symbol. (See Figure 5.)

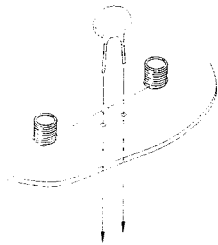


Figure 5

Then, on the backside of the panel, connect the leads to the designated spring terminals.

- Place the 0.05uF capacitor (large, marked .05uF or 503) into the holes

between terminals 6 and 9 and connect its leads to 6 and 9.

- Mount the 0.005uF capacitor (small, marked .005 or 502) and connect its leads to 5 and 8.
- Mount the 470pF capacitor (small, marked 471) and connect its leads to 12 and 13.

The remaining capacitor is an electrolytic. This means it must be connected observing the proper polarity (+ and -). The side of the capacitor with the minus (-) lead is marked with a vertical stripe and minus (-) signs. Of course, the other side is (+). (See Figure 6.)

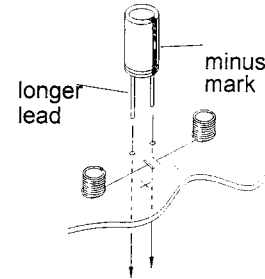


Figure 6

- Mount the 1uF capacitor and connect its to terminals 11 (+) and 12 (-).

- Now go back and carefully check your work. Be sure you have positioned each part in the right place. Be sure the minus (-) side of the electrolytic capacitors is toward the proper terminal. Double-check these parts. On the bottom side, cut off any excess wire ends.

Transistors

Transistors each have 3 leads. Each lead must go into the correct hole in the Panel Board. Pick up the Transistors and look at the bottom where the leads come out.

Now, look at the Transistor, with the flat side toward you as shown in Figure 7.

Make a mental note of the position of each lead, E, B, and C.

OK, got that? Now let's proceed.

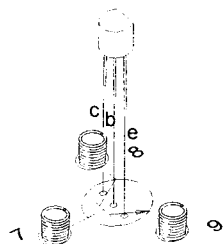


Figure 7

- Mount a Transistor marked C1815 or 9013 or 9014 between 12, 13 and 14. Position it so the flat side is away from spring 12. Insert the leads through the holes provided. On the bottom, connect the upper lead to 13, the center lead to 12 and the lower lead to 14. (See Figure 7 and 8.)
- Mount the other Transistor marked 3904 or 9018 to terminals 7, 8 and 9. Position it so the flat side is away from terminal 7. Insert the leads through the holes provided. On the bottom, connect the upper lead to 8, the center lead to 7 and the lower lead to 9. (See Figures 7 and 8.)

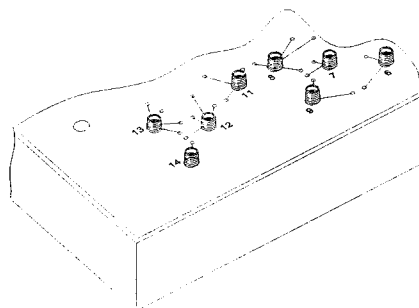


Figure 8

Since Transistors are very important, you must be sure you get them wired correctly. Be sure each lead goes into the correct hole and that you didn't cross over the leads on bottom side.

Diode and Choke Coil

The diode must be mounted correctly and cannot be reversed.

- From the top of the Cardboard panel, insert the two leads of the diode through the holes next to the schematic symbol. The Banded end must connect to terminal 6. (See Figure 9.)

- Connect the leads to Terminal 6 (banded end) and 5.

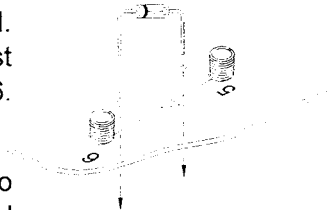


Figure 9

- Mount the choke coil and connect its leads to 8 and 11.

Bar Antenna

Examine the antenna Coils. They have some very thin wires. Handle them with care.

- Slip the white plastic Bracket over one end of the ferrite rod. (See Figure 10.)
- Position the Coil and Bracket as shown inserting the leads down through the holes provided and mount with a medium screw and nut.
- Turn the Panel over and very carefully connect the wires from the Antenna Coils as shown:
 - White wire to terminal 1.
 - Black wire to terminal 2.
 - Red wire to terminal 3,
 - Green wire to terminal 4.

Note: be sure that you connect the tinned end to each spring. Do not let any wires cross or short to each other.

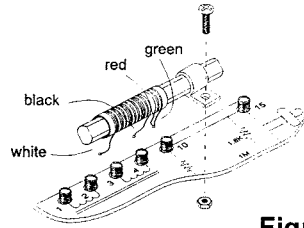


Figure 10

Tuning Capacitor

- Mount the tuning Capacitor from the bottom of the panel and position it as shown in Figure 11.
- On the top, fasten it with two small screws.
- Place the Tuning Knob on the Tuning Capacitor.
- Make sure the mark is at the left side of the shaft when you rotate the knob counter-clockwise.

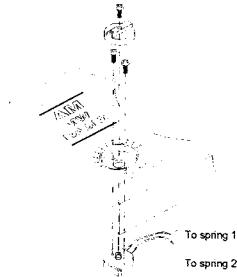


Figure 11

- Fasten the knob with a small screw.
- Turn the Panel over and on the bottom connect the Tuning Capacitor leads to terminals 1 and 2. (See Figure 11.)

Battery and Battery Snap

Mount a 9V battery into the battery slot. (See Figure 12.) Connect the Red wire of the Battery snap to terminal 15 and the Black wire to terminal 14. (See Figure 12.)

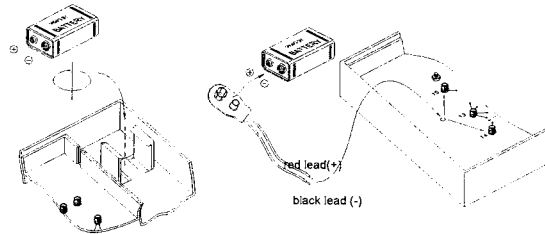


Figure 12

This completes most of the wiring on the Panel Board but before you finish up check your work once more:

1. Be sure the transistor leads are connected properly. Study Figure 7 and 8 once more and be sure each lead has been correctly connected.
2. Place your Board next to Figure 1 and compare each part and its leads to the illustration.
3. Turn the Board upside down and compare your wire connections to Figure 2.
4. Cut off any remaining excess wire ends.

Final Wiring

REFER BACK TO FIGURE 1 and connect wires on the top, panel as follows:

- Connect White wire between 10 and 15.
- Connect White wire between 9 and 14.
- Connect White wire between 3 and 6.
- Connect White wire between 4 and 7.

Connect the Earphone leads to terminals 15 and 13.

Snap the 9V battery into the Battery Snap

Be sure to install the battery with the correct polarity.

Your AM Radio is now ready to use.

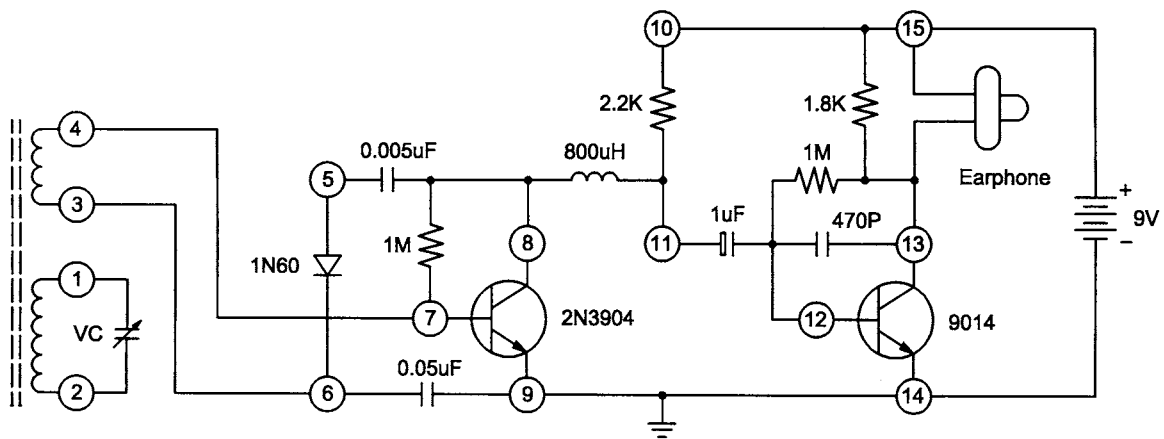
Place the Earphone in your ear. Adjust the tuning knob to listen to the different AM Broadcast stations.

For best Radio reception, you can bring the radio near the window, and adjust the position of the antenna bar.

Note: To turn the Radio off, merely remove the battery from the snap.

TROUBLE SHOOTING GUIDE

1. Make sure the 9V battery has been installed correctly.
2. Try new batteries. If the Batteries are weak or dead, your Radio won't work.
3. Go back through this manual and check each step again. A good way to do this is with colored pencil. Place a mark on the illustrations for the wiring that you have done. Then check for any incorrect wiring.
4. Check your wiring against Figure 1 and Figure 2.
5. Be especially careful as you check the wiring for the Transistors and the electrolytic Capacitors. Check all the illustrations carefully.
6. It's always a good idea to have a friend double check your work. You might be overlooking the same mistake time and again. Have a friend compare your Panel (with all parts mounted on it) with Figures 1 and 2.



AM MW RADIO SCHEMATIC DIAGRAM

MASTER PARTS LIST

Description	Description
<p>Antenna Coils</p> <p>Capacitors:</p> <p>1uF 25V or 50V electrolytic (1)</p> <p>0.05uF ceramic disc (1)</p> <p>0.005uF ceramic disc (1)</p> <p>470pF ceramic disc (1)</p> <p>Resistor:</p> <p>2.2K ohm (red, red, red, gold) (1)</p> <p>1.8K ohm (brown, gray, red, gold) (1)</p> <p>1M ohm (brown, black, green, gold) (2)</p> <p>Possible Transistor markings 2SC1815, 9013, 9014, 2N3904 or C3198 (2)</p> <p>Tuning Capacitor (1)</p> <p>Choke Coil 800uH (1)</p> <p>Diode IN60 (1)</p> <p>Earphone, ceramic (1)</p>	<p>Bar Antenna (1)</p> <p>Holder for Bar Antenna (1)</p> <p>Knob for tuning (1)</p> <p>Cardboard Panel with plastic Frame (1)</p> <p>Nuts (1)</p> <p>Screws:</p> <p style="padding-left: 40px;">Long Type M3.0x8 (1)</p> <p style="padding-left: 40px;">Short Type M2.6x4 (3)</p> <p>Snap for 9V Battery (1)</p> <p>Spring, Terminals (15)</p> <p>Wires, for Hook up</p> <p style="padding-left: 40px;">White (3") 75mm (8)</p>