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This FM 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.

You will find this simple to assemble FM radio performs amazingly well. FM radio circuits require many unique parts, such as limiting circuits and frequency to voltage converters, as well as very complex alignment procedures. This makes a simple basic kit difficult to manufacture. The MX-901F overcomes these problems by assembly and alignment of the FM Tuner in the factory, and easy to follow installation instructions.

Because the FM tuner is rather critical, please handle it with care. ***Do not move or touch any of the parts that are on the small Printed Circuit Board***.

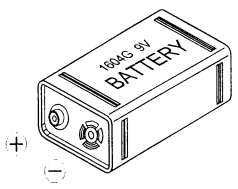
The MX-901F FM Radio covers the standard FM broadcast band of 88 to 108 MHz. First, the antenna picks up a very weak signal, the stations transmitted radio wave, which produces an equally weak current in the antenna wire. A tuning coil and a variable capacitor selects the desired station. Each station is then amplified by the 2-transistor amplifier circuit.

The weak current that flows in the antenna is increased, step by step, by the electronic process of amplification. Then the frequency to voltage converter changes the signal to an audio signal. The Audio Frequency (AF) signal is amplified by a 2-transistor amplifier and sent to the earphone. The earphone changes the AF signal to sound waves and you can hear the music or speech being transmitted by the radio station.

TOOLS REQUIRED

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

* A small Phillips screwdriver
* A pair of long-nose pliers
* Wire cutters (small diagonal type)
* One 9V battery



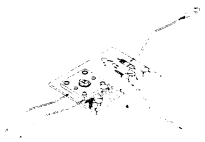
GETTING STARTED

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

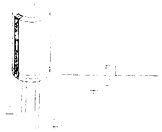
To do this, check the contents of your kit against the parts list. The parts list is separated into two sections, electrical contents (resistor, transistors and so forth) and mechanical parts (nuts, spring, screws, wires etc.). As you check off the parts, put them in a safe place so they will not get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



☐ FM Tuner Assembly (1) – Do not bend or move FM tuner circuits on the small Printed Circuit Board.

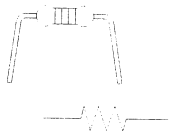


☐ Capacitor (3) – There are two kinds of capacitors in your kit: electrolytic and ceramic. The electrolytic capacitors look like tiny tin cans.

1 – marked 10uF/25V

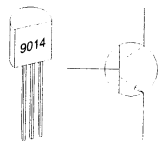
The ceramic capacitors are small, flat and circular. Each is marked with its value.

1 – marked 0.1uF or 104
1 – marked 470pF or 471



☐ Resistor (4) – These are the Small, tan tubular objects with colored stripes .The stripes will help you identify their electrical value later.

4.7k Ω (yellow, violet, red, gold)
10k Ω (brown, black, orange, gold)
390k Ω (orange ,white, yellow, gold)
470 Ω (yellow, violet, brown, gold)



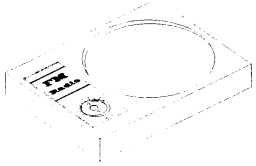
☐ Transistor (2) – Transistors have three leads instead of two like the other electronic parts.

9014 (2)

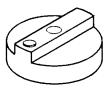
☐ Earphone, Ceramic (1) – changes electrical energy to sound waves.

Mechanical Parts

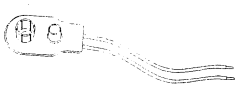
☐ Cardboard Panel with Plastic Frame. (1)



☐ Tuning Knob (1)



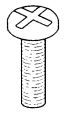
☐ Battery Snap for 9V Battery (1)



☐ Spring Terminals (16)

☐ FM Antenna Wire (1)

☐ Screws:



Long Type M3x12 (1)

Small Type M2.6x4 (3)

☐ Nut (1)

☐ Wire: (10)

White, (3") 75mm (8)
Blue, (5") 130mm (2)

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

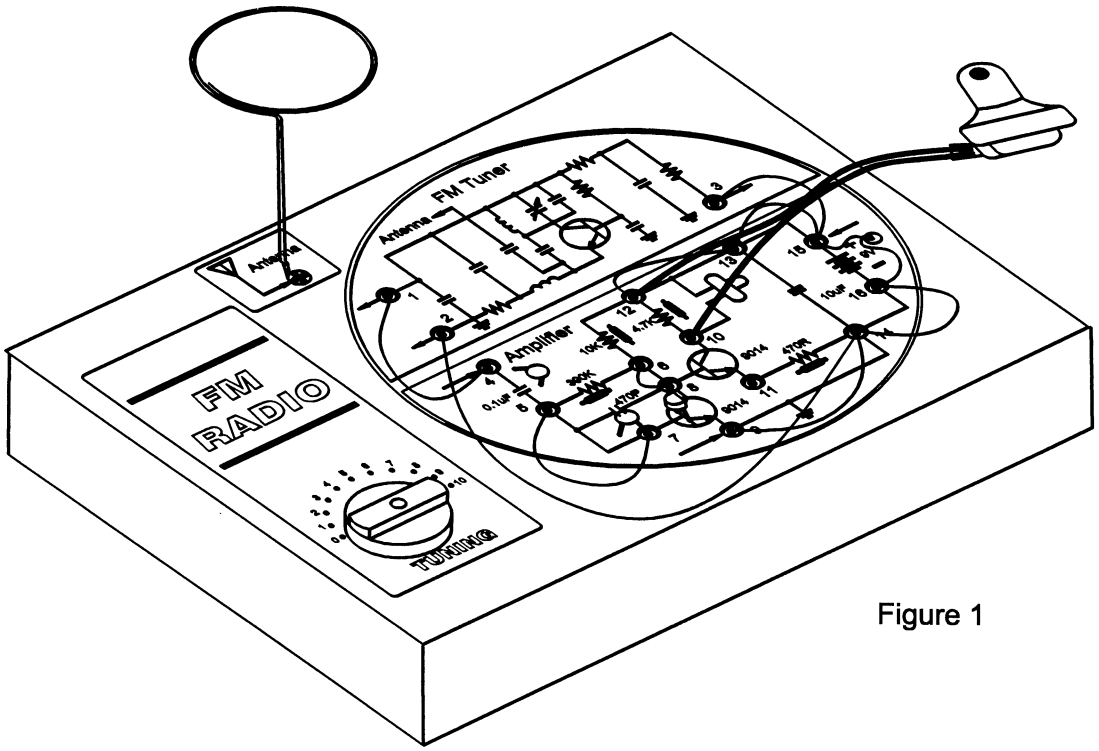


Figure 1

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

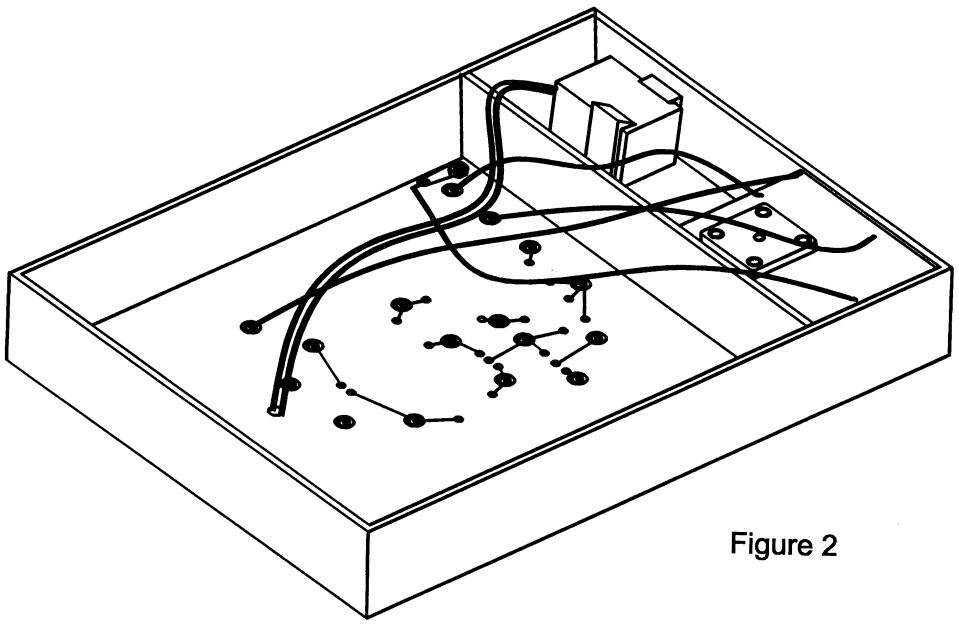


Figure 2

ASSEMBLY INSTRUCTIONS

Spring Terminals

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

- ☐ From the top side of the cardboard panel, install 16 spring terminals into the 16 large, numbered holes; To make installation easier, use the pointed end of a pencil or ballpoint pen to push the spring through the holes and twist 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 backside of the panel.

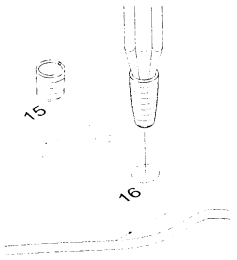


Figure 3

Resistors

You will mount the 390k ohm resistor first. (orange, white, yellow, 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 panel over and connect each lead to 5 and 6. 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 are always the hardest, but you will soon learn to do this easily.

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

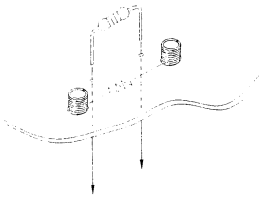


Figure 4

- ☐ Connect the 10K-ohm resistor (brown, black orange, gold) to terminals 6 and 12.
- ☐ Connect the 4.7K ohm resistor (yellow, violet, red, and gold) to terminals 10 and 12.
- ☐ Connect 470-ohm resistor (yellow, violet, brown, and gold) to terminals 11 and 14.

Capacitor

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.)

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

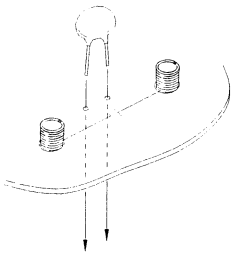


Figure 5

- ☐ Mount one of the 0.1uF capacitors (large, marked 104) to the holes above terminals 4 and 5 and connect its leads to 4 and 5.

- ☐ Mount the other 470 PF capacitor (small, marked 471) and connect its leads to 5 and 8.

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 strip and minus (-) signs. Of course, the other side is (+). (See Figure 6.)

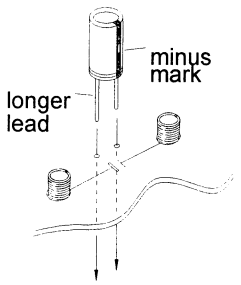


Figure 6

Connect the 10uF capacitors to terminals13 (+) and 14 (-).

- ☐ 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 capacitor is toward the proper terminal.
  Double-check these parts. On the bottom side, cut off any excess wire ends.

Transistors

Each transistor has three 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 and look at Figure 7.

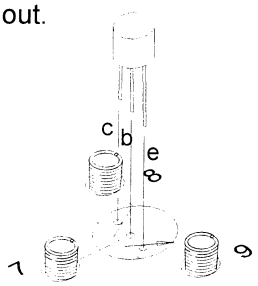


Figure 7

Make a mental note of the position of each lead, E, C and B. (See Figure 7.)

OK, got that? Now let's proceed.

- ☐ Mount a Transistor marked 9014 between 7, 8 and 9. **Position it so the flat side is toward spring 11.** 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 Figure 7 and 8.)

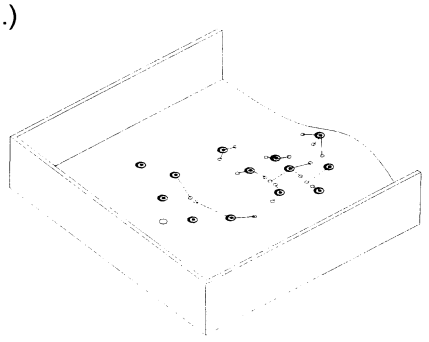


Figure 8

- ☐ Mount another transistor between 8, 10 and 11. **Position it so the flat side is toward 16**. Insert the leads through the holes provided. On the bottom, connect the C lead to 10, the center lead to 8 and the E lead to 11. (See Figure 7 and 8.)

- ☐ Since the transistors are so important **and you must be sure you installed them correctly.** Double-check them to be certain that each lead goes into the correct hole and that you do not have the leads overlapping on bottom side.

FM Tuner Assembly Board

You must use extreme care when you handle and mount the tuner assembly! Try not to touch any parts on the Board. Hold it only by the edges.

- ☐ Look at figure 9 and mount the FM Tuner Assembly to the bottom of the Panel Board.

- ☐ On the top, fasten it with two small screws.

- ☐ Mount the Tuning Knob on the Tuning Capacitor.

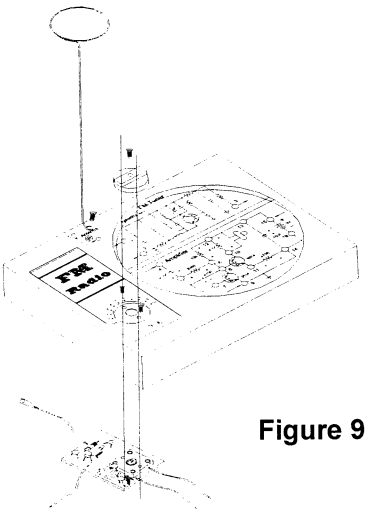


Figure 9

- ☐ Make sure the mark is on the left side of the shaft when you rotate the knob counter-clockwise.
- ☐ Fasten the knob with a small screw.

There are four wires coming out of the Tuner assembly.

- ☐ On the bottom, connect the white wire from the FM Tuner Assembly, under the antenna nut.(See Figures 9 & 10)
- ☐ Connect the Blue wire to spring terminal 1.
- ☐ Connect the Black wire to spring terminal 2.
- ☐ Connect the Red wire to spring terminal 3.

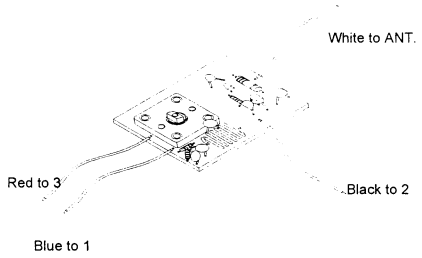


Figure 10

Battery Snap

- ☐ Connect the Red wire Of the Battery snap to terminal 15 and the Black wire to terminal 16.

This completes most of the wiring on the Panel Board. But, before you turn the radio on, check your work once more:

1. Be sure the transistor leads are connected properly. Study Figure 7 and make sure each lead is properly 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.

Wiring

Refer Back to Figure 1 and install the final wires on the top, as illustrated and noted below:

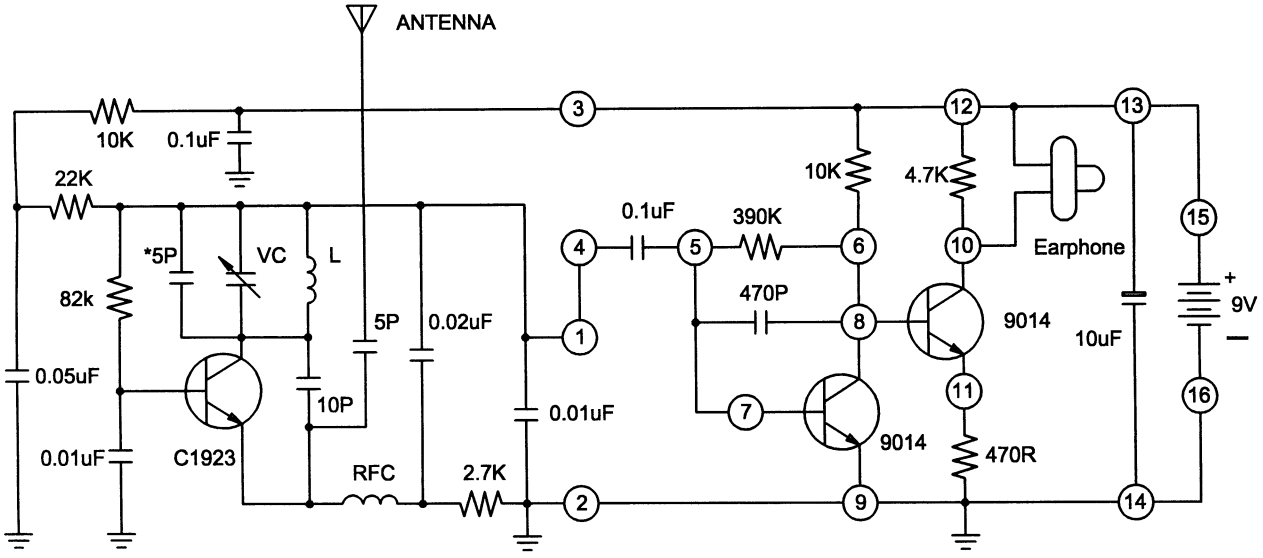
Connect a white wire between 1 and 4,
Connect a blue wire between 2 and 16.
Connect a white wire between 3 and 15,
Connect a white wire between 5 and 7,
Connect a white wire between 6 and 8,
Connect a white wire between 9 and 14,
Connect a white wire between 12 and 13,
Connect a white wire between 13 and 15,
Connect a white wire between 14 and 16.

- ☐ Connect the Earphone wires to 10 and 12.
- ☐ To turn the radio on connects a good 9V battery to the battery snap.

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

Check if Radio Does Not Work:

1. Make sure the "9V" batteries have 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 a colored pencil. Mark the illustrations of the wiring that you have done on your unit. Then check to see if anything is wired incorrectly.



FM RADIO SCHEMATIC DIAGRAM

MASTER PARTS LIST

Description	Description
Capacitors: 470pF ceramic disc (1) 0.1uF ceramic disc (1) 10uF/25V Electrolytic (1) Resistors: (4) 470 ohm (yellow, violet, brown, gold) 4.7k ohm (yellow, violet, red, gold) 10k ohm (brown, black, orange, gold) 390k ohm (orange, white, yellow, gold) Transistors 9014 (2) Earphone (1) Turner Assembly for FM (1)	FM antenna wire (1) Knob for tuning (1) Cardboard Panel with plastic Frame (1) Screws: Long Type M3x12 (1) Short Type M2.6x4 (3) Nut (1) Snap For 9V Battery (1) Spring, Terminals (16) Wires, for Hook up White, (3") 75mm (8) Blue (5") 130mm (2)