



The 40m Isotron antenna.

# **INSTRUCTION MANUAL FOR THE ISOTRON 40**

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## ASSEMBLY FOR THE ISOTRON 40

Parts List: (Please locate all parts prior to assembly)

1. Top Plate
2. Bottom Plate with connector.
- 3 & 4. Acrylic Insulators 2" x 7".
- 5 & 6. Top and Bottom Non-Metallic Supports.
7. Coil Assembly.
- 7a. Two 1/4" Diameter Coil Support Rods. coil.
8. Lead wire, attached to the bottom of the coil.
9. 1/4" Diameter Tuning rod (90 deg. bend).
10. Capacitor Hat for the tuning bar.
11. Grounding wire.

## ASSEMBLY:

1. Bolt the Top Plate (1) to the Top Support (5). Use 1 1/2" x 1/4" machine bolt through the rear hole. Leave the front hole open (see figs. 1 & 2, Pg. 6)
2. Bolt the Bottom Plate (2) to the Bottom Support (6). Use a 1 1/2" x 1/4" machine bolt through the rear hole. Leave the front hole open.
3. Bolt both Acrylic Insulators . (3 & 4) to the Top Plate (1). Use three 3/4" x 1/4" machine bolts and nuts. Leave a hole open toward the front of the antenna opposite the side of the connector. The small threaded holes in the Acrylic Insulators should be placed away from the Top Plate. (see fig. 2, pg. 6)
4. Bolt the Bottom Plate (2) to the opposite ends of the Acrylic Insulators (3 & 4) using four 3/4" x 1/4" machine bolts.
5. Thread four stop nuts onto the ends of the Coil Support Rods (7a). There should be one stop nut on each end. (see fig. 1, pg. 6)
6. Thread one Coil Support Rod into the bottom of the Coil and tighten it. A minimum of 3/4" of thread needs to go into the coil.

### 3.

7. Slip one end of the second Coil Support Rod through the wire eye at the top of the Coil. Thread a second stop nut onto the end of this Coil Support Rod to secure the wire eye. Thread this Coil Support Rod into the top of the Coil and tighten (at least 3/4" in). Then tighten the second nut to secure the wire eye. (see fig. 1 pg. 6)
8. Mount the entire Coil Assembly (7,7a) to the Top and Bottom Plates (1 & 2) by putting the Coil Support Rods through the front holes in the Top and Bottom supports. Use one flat washer against the stop nut at the top. Tighten until snug with a 1/4" nut.
9. Slip the wire eye of the Grounding Wire (11) onto the rear bolt on the Bottom Support. Thread a second hex nut onto the rear bolt and tighten to hold the Ground wire in place. (see fig. 4, pg. 6)
10. Slip the small wire eye from both lead wires coming from the Coil and connector onto the 8/32 x 1/2" machine screw and thread the screw into the hole in the nearest Acrylic Insulator. (see fig. 1, pg. 5) Tighten securely.

### SETUP:

1. For best performance the antenna should be mounted as much in the clear as possible and as high as possible. Mount the antenna on a standard TV type **METAL** mast by sliding the U-Bolt assemblies over the end of the mast and tightening the hex nuts. Put the free end of the Ground Wire (11) over the nearest end of the If-Bolt before tightening the hex nut on that end. Align supports 5 & 6 so they are parallel. (see pg. 14) Square the antenna up and tighten the U-Bolts securely.
2. A coaxial feedline of 50-75 ohms should be connected to the coaxial connector. The coax should be taped to the metal mast or secured with standoffs. Make a neat coax run to your radio.  
PLEASE NOTE: Lengths of coax that are an exact 1/4 wavelength should be avoided. This length would have the velocity factor considered for your type of coax. This is only for the first 1/4 wavelength. Adding a few feet of coax to avoid this length is fine.
3. The Tuning Rod (9) should not be mounted at this time.

#### 4.

#### **TUNE UP:**

1. The antenna support (Metal Mast) should have a good earth ground (outdoor installation). Please refer to the section on **GROUNDING**.

2. The antenna is ready for testing. Using the least amount of power your SWR meter will operate at, check or graph the SWR across the band. **THE LOWEST SWR IS YOUR RESONANT POINT.**

3. In most cases this is all that is needed for the Tune Up. Please refer to pages 7, 8 and 9 on "**FINDING THE RESONANT POINT**" if further diagnosis is needed to find the minimum SWR.

5. If a lower Resonant Point is desired, then you can add the Tuning Rod (9). Put a stop nut on the short threaded end. Then insert in the remaining hole of the Top Plate. (Fig. 3 pg. 6)

6. The frequency adjustment is simply a rotation of the Tuning Rod (9) from straight up (highest resonant point in frequency) to straight down (lowest resonant point), rotating toward the front of the antenna.

7. If a lower range of Resonant Frequencies are needed, then you can add the hat (10). Put a stop nut first, the hat, then a second nut to the tuning bar (9). See figure 3, page 6.

8. There should be no matching devices in the line for the initial tune up. However a Matching device is highly recommended for the solid state radios once the Tune Up is complete.

9. Use the least amount of power your SWR meter will operate at for a more precise reading.

10. If tuning becomes complicated due to your environment, then refer to the pages titled, **FINDING THE RESONANT POINT** and **COMPENSATION FOR VARIATION IN LOCATION**.

11. If your installation is restricted to balcony, indoor or attic locations, then it is best not to attempt grounding the Metal Mast. The Isotrons were designed to be used with a metal mast. Even an indoor installation should have a Metal Mast even if it is a short one and the coax taped to it.

5.

12. If the Isotron 80 is used, it can be mounted on the same mast at the same height and one feedline is needed. The two antennas are connected in parallel using a coaxial "T".

### **WARRANTY**

**Bilal Company warrants this equipment against defects in material and workmanship for a period of one year from date of original purchase.**

**This warranty is limited to replacing or repairing the defective parts and is not valid if the equipment has been tampered with, misused or damaged.**

### **NOTE:**

Do not ship to the factory without prior authorization.

First write and describe the difficulty . Many time we can diagnose and correct problems by mail.



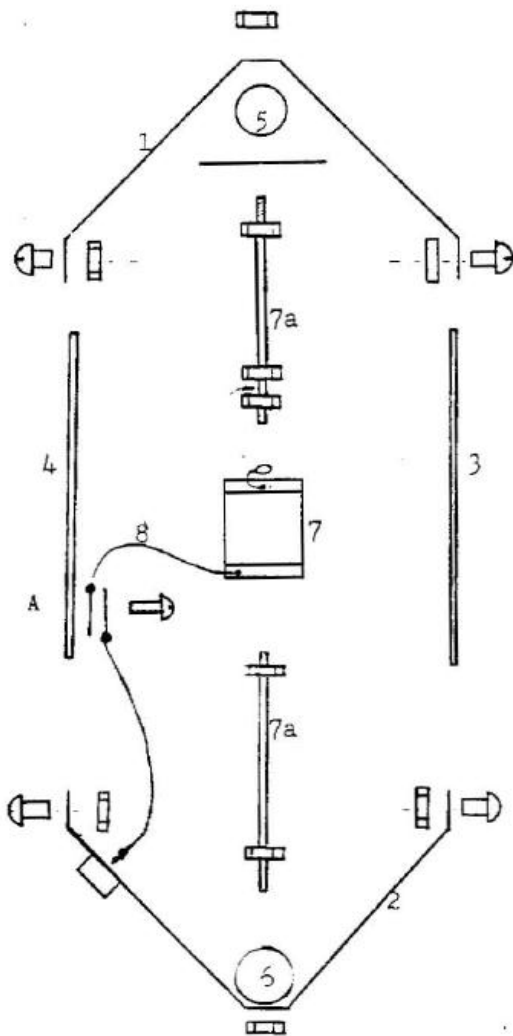


Figure 1

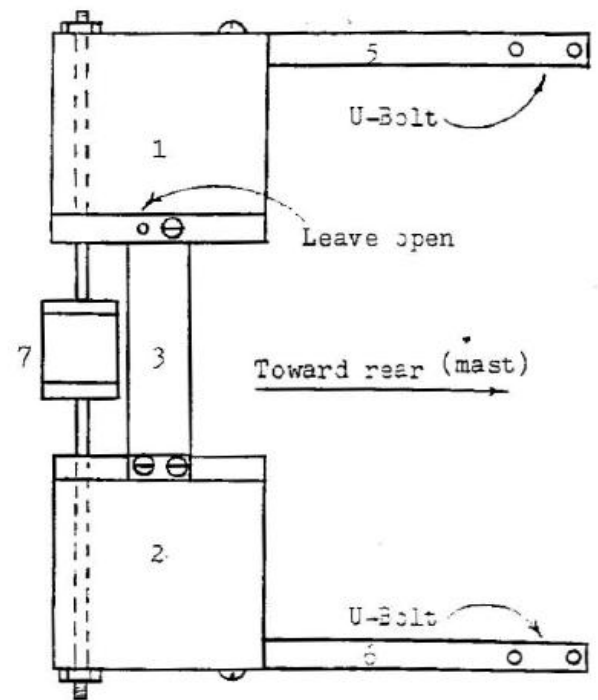


Figure 2

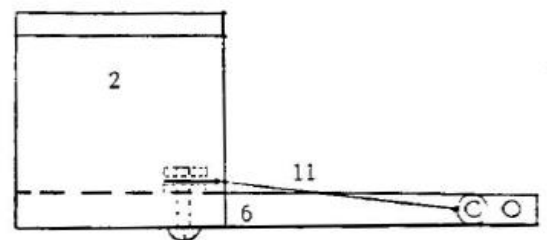


Figure 4

Not to scale.

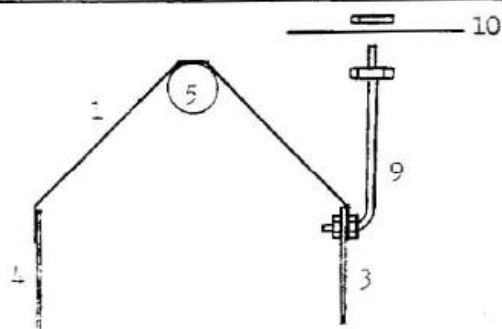


Figure 3



7.

## **FINDING THE RESONANT POINT**

1. Locating the resonant point is the major part of the tune up. The following steps is a reliable technique for locating the resonant point.

**2. IF YOUR SWR IS OVER 3:1, IT IS A RESONANT POINT ADJUSTMENT THAT NEEDS TO BE MADE.**

3. You will need a SWR meter. You will also need to hear the receiver from the antenna location.

4. Connect the antenna to your transceiver by means of a suitable length of coax. NEAT RUNS AND INSTALLATIONS ARE VERY IMPORTANT.

5. Tune your receiver to the frequency desired.

6. Listen to the Noise/Signal at this frequency.

7. Bring your hand toward the top plate of the antenna.

8. Carefully listen. If the Noise increases at some point while your hand is approaching the Top Plate, then the resonant point is higher than the frequency you are set at.

9. You will need to make the necessary adjustments to lower the resonant point of the antenna. (Rotating or adding hardware.)

10. If the Noise decreases Plate, then the antenna receiver is tuned. only)... while bringing your hand toward the Top is resonant at a lower frequency than the

11. If the antenna resonant point is low, it is best to start at the lowest frequency available to you. Check it again with your hand. This technique for determining the resonance is very reliable. It is not necessary to spend a lot of time guessing where the antenna is resonant.

Continue this procedure through the following steps as a reliable resonant point check.

## 8.

12. If the resonant point is low, it will be necessary to remove all tuning hardware to bring the resonant point to maximum. It is possible for your environment to make the antenna resonate below the designed band,
13. If the test shows the antenna is resonant lower than you desire or below the band, then tune your receiver to the lowest frequency available to you. Check the SWR as in the next step.
14. SWR should be checked at the lowest power that the meter will read. The sensitivity control should be all the way up and the meter calibrated by the gain on the exciter.
15. Note the SWR at the lowest frequency. Then move up 25 kHz and check the SWR again. Continue to do this until you can see a pattern.
16. If the SWR increases as you move up frequency, then the resonant point is below the band or minimum frequency. Trimming the coil may be necessary. (See page 10.)
17. The object is to locate a minimum SWR by graphing as described in step 15.
18. If you have a general coverage receiver you can listen at a lower frequency and check the antenna with your hand as described.
19. Once your resonant point is located in your operating area, your SWR will make a noticeable dip (below 3:1). Unless your environment interaction is very strong, this normally produces a low and acceptable SWR.
20. If you are using a Noise Bridge, it should be located near the antenna for tune up.
21. Impedance may be adjusted if necessary after completion with the resonant point. This is described on pages 11 and 12.