

**TW2010L**<sup>TM</sup>

*The Adventurer Lite*<sup>TM</sup>

*TransWorld Antennas*

INSTRUCTION MANUAL

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Due to continual product improvements, the information in this manual is subject to change any time without notice. TransWorld Antennas will be held free from liability, any problems arising from the use of this manual or the products described herein.

# 1 Limited Warranty

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TransWorld Antennas warrants to the original owner of this product if purchased from an authorized dealer or directly from TransWorld Antennas to be free from defects in material and workmanship for a period of 12 months from date of purchase, provided dated proof of purchase.

TransWorld Antennas agrees to repair or replace, at TransWorld Antennas' option, any defective product still under warranty. TransWorld Antennas will cover return shipping only. The warranty becomes null and void if it is determined that the product was subject to conditions beyond what the product is rated for, including, but not limited to, over power limits, extreme environmental conditions such as flood or fire, or general misuse.

TransWorld Antennas will repair or replace, at TransWorld Antennas' discretion, any out-of-warranty TransWorld Antennas product provided all part, labor, or other repair costs are provided by the customer, the amount of which is determined by TransWorld Antennas.

All repairs, in warranty and out-of-warranty should be sent to TransWorld Antennas along with a brief description of the problem and the circumstances, environmental conditions, and equipment used at the time the problem occurred. For warranty product repairs, a dated proof of purchase must also be supplied.

TransWorld Antennas will not be held liable, under any circumstances, for damages resulting from the use of any TransWorld Antennas product.

TransWorld Antennas reserves the right to make changes to this product, in part or in whole, at any time, in form, function, or manufacture, without obligation to install or incur any costs relating to the installation of modified parts onto existing product.

This warranty gives you specific rights. Other rights may apply, which vary from state to state.

An optional extended limited warranty purchased from TransWorld Antennas extends the period of this warranty to 24 months or 36 months, depending on warranty product purchased.

## 2 Important Safety Information

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THE INSTALLATION OF THIS PRODUCT NEAR POWER LINES IS DANGEROUS. FOLLOW THE ENCLOSED DIRECTIONS.

1. If you are installing an antenna for the first time, for your own safety, seek PROFESSIONAL ASSISTANCE. Your dealer can explain which mounting method to use for the size and type antenna you are about to install.
2. Select your installation site with safety; the distance from power lines should be at least twice the height of the antenna and mast combined. REMEMBER: ELECTRIC POWER LINES AND PHONE LINES LOOK ALIKE. FOR YOUR SAFETY, ASSUME THAT ANY OVERHEAD LINES CAN KILL YOU. When installing your antenna, REMEMBER:
  - a. DO NOT use a metal ladder.
  - b. DO NOT work on a wet or windy day.
  - c. DO dress properly (shoes with rubber soles and heels, rubber gloves, long sleeve shirt or jacket).
3. If the assembly starts to drop, get away and let it fall. Remember, the antenna, the mast, the cable and the metal wires are all excellent conductors of electrical current. Even the slightest touch of any of these parts to a power line completes an electrical path through the antenna and the installer.
4. If any part of the antenna system should come in contact with a power line, DON'T TOUCH IT OR TRY TO REMOVE IT YOURSELF. CALL YOUR LOCAL POWER COMPANY. They will remove it safely.

### GENERAL INSTALLATION INSTRUCTIONS FOR MAST MOUNTED ANTENNAS

1. Carefully follow the mounting instructions of the product.
2. Connect your mast at Ground by using a copper wire of minimum section 6 mm<sup>2</sup>.
3. Pay attention to the correct locking of nuts and screws.
4. If necessary (windy areas or very long masts) the use of special anti-wind rods is recommended.
5. While your antenna is on Tx mode (transmitting) DO NOT stand nearby.
6. It is recommended to strictly respect the maximum power settled by law and follow the instructions manual of the product.
7. Stick self-adhering "DANGER" label at eye level on your mast.

## 3 Specifications

Congratulations on the purchase of your TW2010L antenna! The TW2010L represents a revolutionary jump in HF antenna performance, convenience, and reliability. The ruggedly built TW2010L was designed with ease of use in mind. Therefore, all TW2010L antennas are pre-assembled and tuned at the time of manufacture. With its compact three-part fold-up design, the TW2010L is ready to go right out of the box<sup>1</sup> for permanent or temporary installation using the supplied quick break-down stand.

The TW2010L is a center fed vertical dipole antenna with a very low radiation take-off angle (around 27 degrees above horizontal), allowing for very long skips using low power on 10, 12, 15 17, and 20 meters<sup>2</sup>. The TW2010L is a ground-mounted omni directional antenna, requiring no ground radials, tower, or rotor.

### 3.1 Mechanical

**Dimensions (folded):**

Three pieces, each less than 34" long

**Antenna Dimensions (after setup):**

Width: 5' 3-1/2"  
 Height: 6' 10-1/2"  
 8' 3" on permanent mounting tube  
 Weight: Approx. 10 lbs

### 3.2 Electrical

Mode	Maximum Power
SSB	1,200W PEP
CW	800W
RTTY	500W
AM	375W, 100% mod (full legal)

<sup>1</sup> Tuning may be required

<sup>2</sup> Though some have reported some results on 2m, 6m, and 70cm, only 10-, 12-, 15-, 17-, and 20- meters are officially supported by TransWorld Antennas.

### 3 Specifications *(cont.)*

**Antenna *(cont.)***

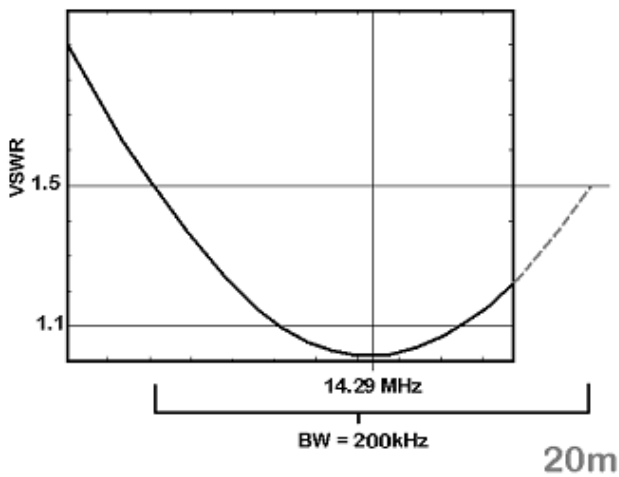
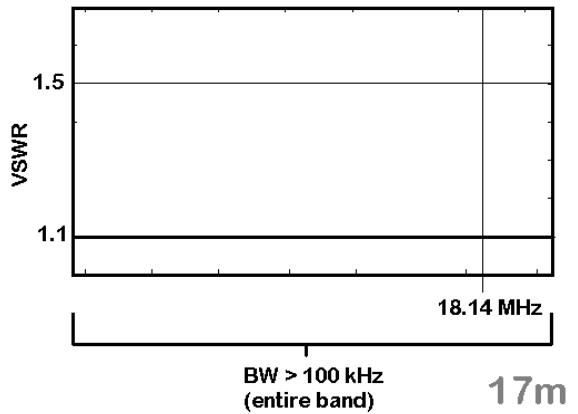
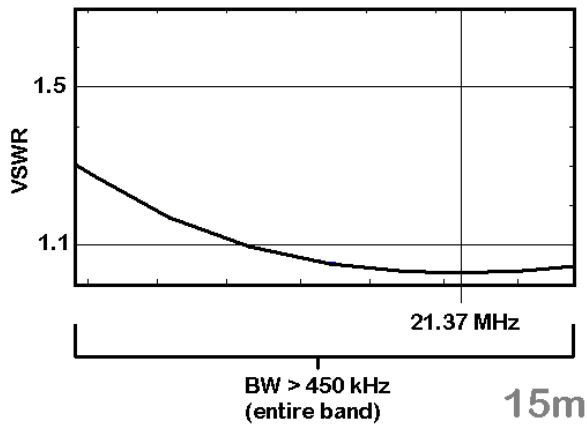
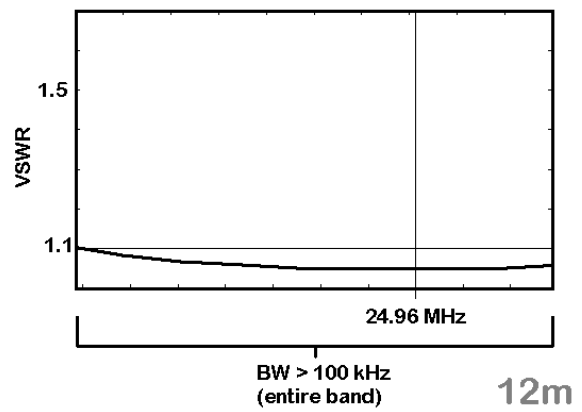
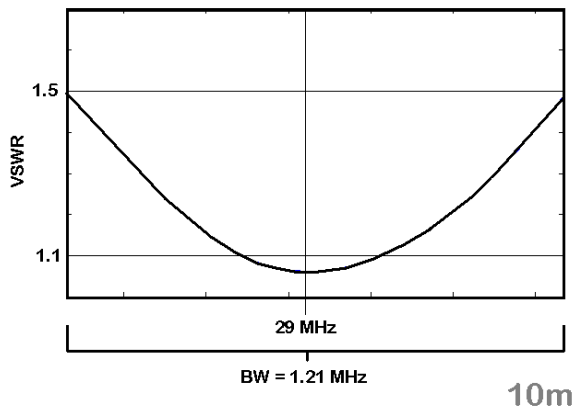
Band	1.5 : 1 Band Width <sup>3</sup>	Typical minimum VSWR
10m	1,210 kHz	1.1 : 1
12m	<Entire Band>	1.1 : 1
15m	<Entire Band>	1.1 : 1
17m	<Entire Band>	1.1 : 1
20m	200 kHz	1.1 : 1

Directionality: Omni directional  
 Vertical radiation angle: 27°  
 Band selection: 5-band manually switched at antenna structure

<sup>3</sup> Test conditions: 100 feet of quality RG8/U coax, 100W output power, antenna mounted approx. 24" above ground with no external objects, metallic or otherwise, within 20ft radius of the antenna.

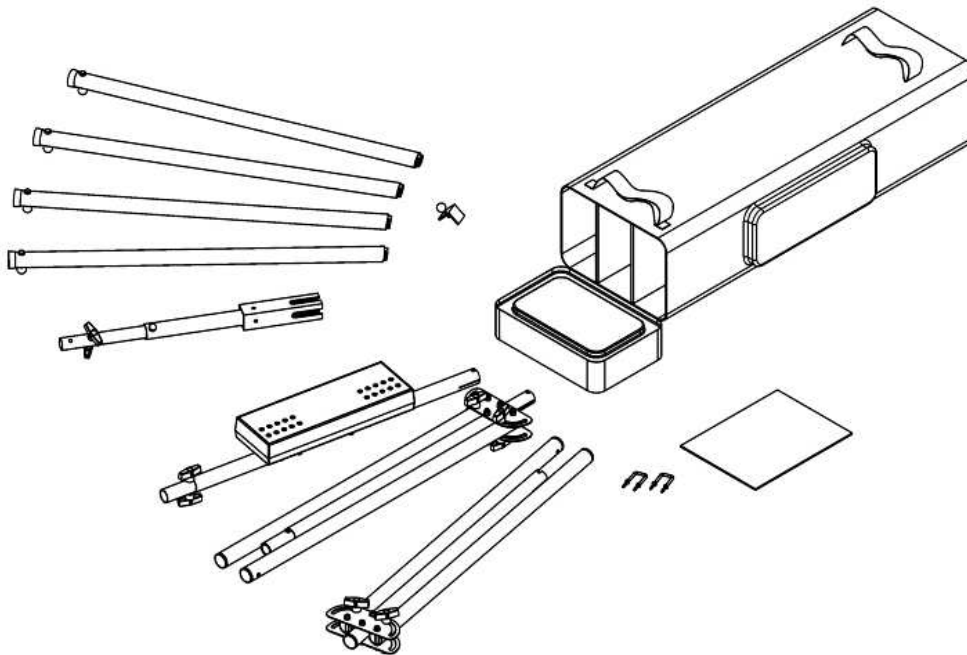
**3.3 VSWR Performance**

The five plots below represent the VSWR performance of the antenna under the test circumstances noted on page 6. The term “bandwidth” here refers to the range of frequencies over which the antenna exhibits a VSWR of 1.5:1 or less.



## 4 Unpacking

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Here's what you should find in your shipping box:

- Travel Bag containing the four main pieces of the antenna structure:
  - Top section
  - Middle section
  - Bottom section
  - Stand
    - Four leg assemblies
    - Stand body
    - Leg stop bracket
- Also included are:
  - This manual
  - Two shorting jumpers for band selection

**Save all packaging materials!** The original shipping materials may serve as a very handy travel box for portable applications. Also, if the antenna is returned for warranty or money-back guarantee claims, all original packaging materials will be required for approved shipping.



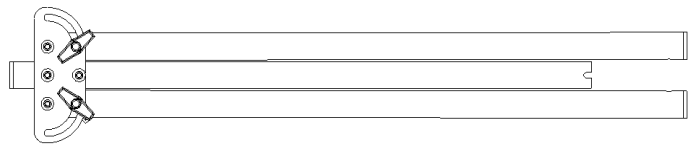
## 5 The Components of your Antenna

There are two basic components to your new TW2010L: The antenna structure and the stand.

### 5.1 The Structure

The structure of your antenna has been built in three pieces, top, middle, bottom. The top and bottom pieces fold up for quick and easy travel. Fold-up and assembly of the three main structure pieces is achieved using pre-installed clamp knobs. See below for a summary of these four components.

**Top Section**  
32.2" x 6.25" x 3.8"



**Middle Section**  
30.13" x 7.41" x 4.88"

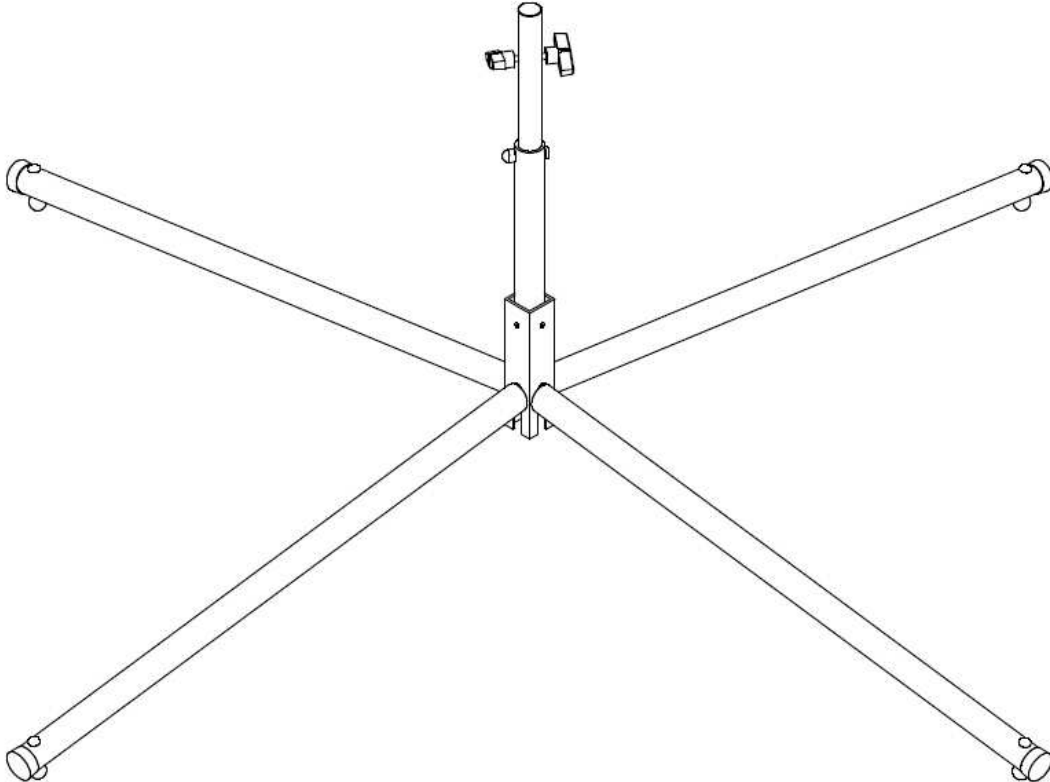


**Bottom Section**  
33.75" x 6.25" x 3.8"



## 5.2 The Stand

Your TW2010L is supplied with a four-leg stand intended for both permanent and temporary installations. The stand breaks down quickly and easily into five pieces.



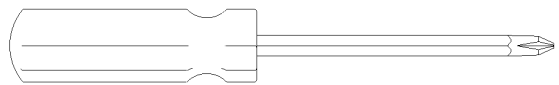
## 6 Getting Started

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Getting started with your new TW2010L is quick and easy. Follow these steps to get started using your new antenna right away.

### 6.1 Tools Needed

A small Phillips screwdriver should be the only tool ever needed for use with your TW2010L, required to open the switching array box for adjusting tuning (page 16).



Under normal circumstances, after optional initial tuning, no tools should ever be required for break down, transport, and setup of the TW2010L.

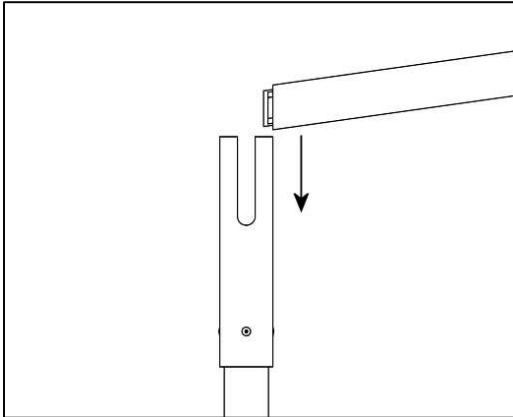
### 6.2 Antenna Setup

**1) Choose a location for your antenna.** The area you choose for your antenna should be at least 10 meters (about 33 feet) from any metal structure or other objects that could detune the antenna.

**⚠ Danger:** *The antenna should not be placed anywhere near power lines, as serious injury or death could occur. And as always, CALL BEFORE YOU DIG to ensure you know where buried gas, water, sewer, power, and other service lines are located.*

**⚠ Danger:** As with any antenna installation, exposure limits should be calculated to ensure safe operation. Vertical dipoles, such as the TW2010L, should not be operated at more than about 200W on 20m. Visit the ARRL website (<http://www.arrl.org/news/rfsafety/>) for more information on exposure limits and calculations.

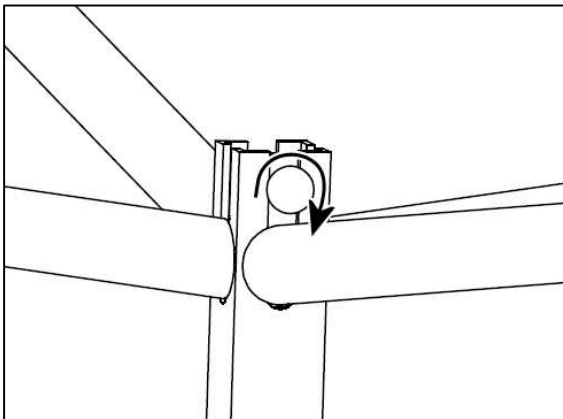
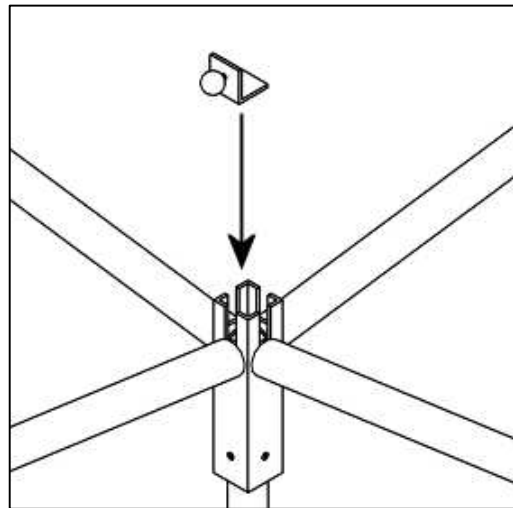
The antenna's coax feed line should be run at a 45-degree angle down from the structure to the ground to minimize parasitic coupling (see figure on page 15). Failure to do so will result in higher than expected VSWR readings. Plan for this extra footprint when choosing a location for your antenna.



**2) Assemble Stand.** First, locate the slits in the exposed metal stud in the end of a leg assembly. Align these slits with the slot in the base of the stand body. Slide the leg down into the stand body completely.

Complete this step for all four legs, keeping the stand upside down while you work on it.

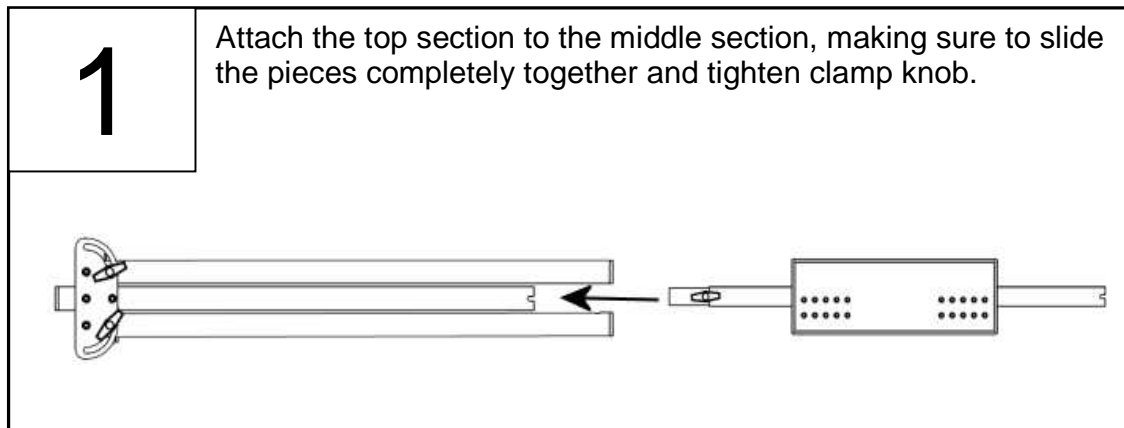
Next, slide the supplied leg stop bracket down into the base of the stand body, as shown at right, making sure it slides all the way down until the L-bracket presses against the leg studs inside the stand body.



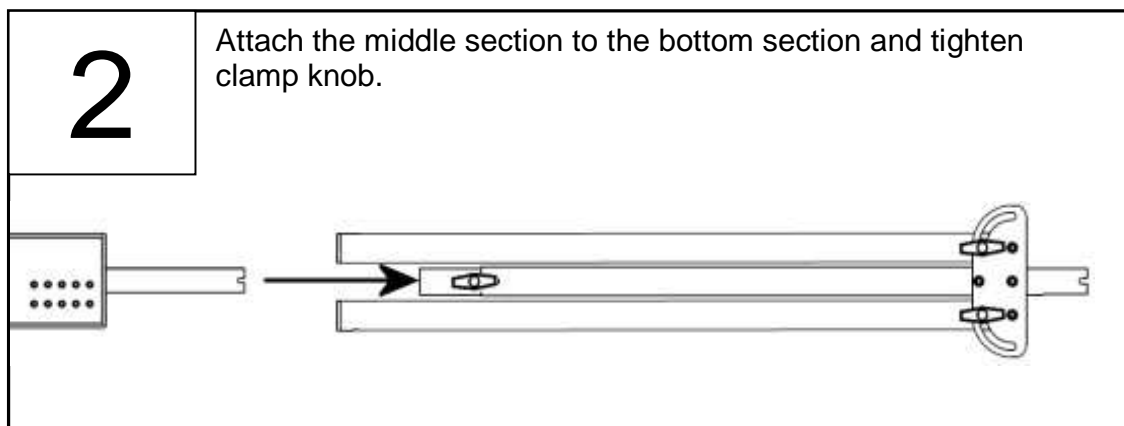
Finally, rotate the clamp ball clockwise until the leg stop bracket is firmly pinching the stand body wall, as shown at left.

Now your stand is ready to use. To disassemble, reverse the steps above.

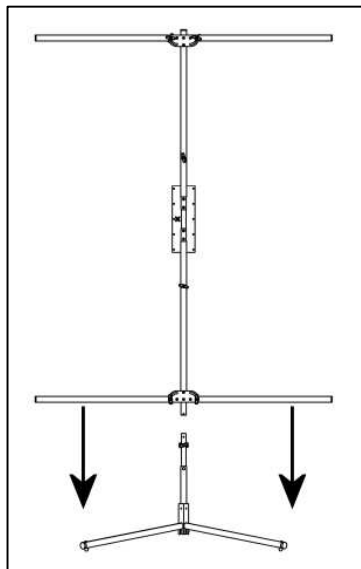
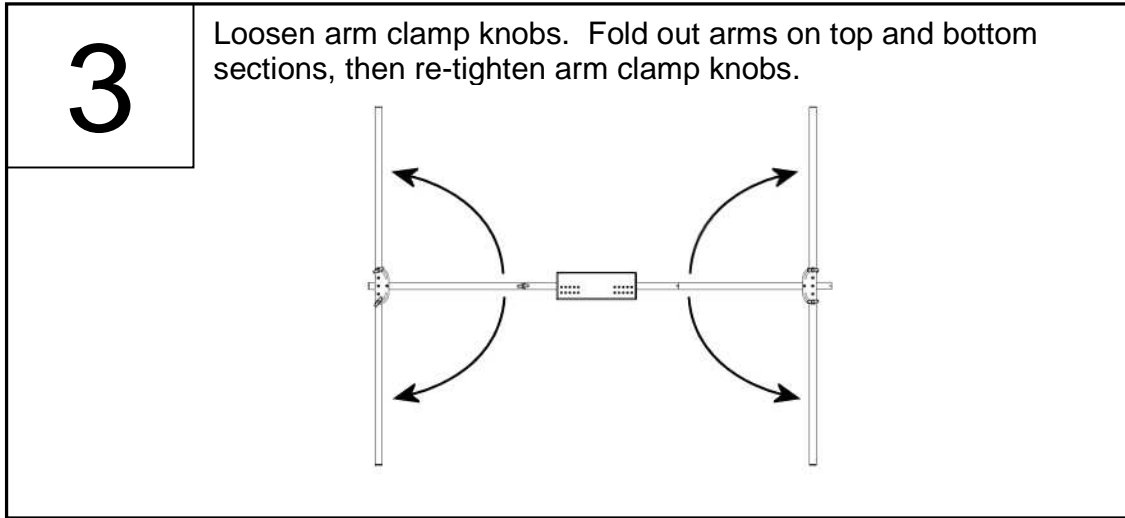
**3) Assemble antenna.** First, attach the bottom section to the middle section, making sure to slide the pieces completely together. The ¼” slots on the end of the middle section should engage completely with the stud of the clamp knob on the end of the bottom section, as shown in step 1 below. Tighten the clamp knob snugly.



Second, attach the middle section to the top section as shown in step 2 below. Again, the clamp knob stud should fully engage with the slots on the end of the top section. Tighten the clamp knob snugly.

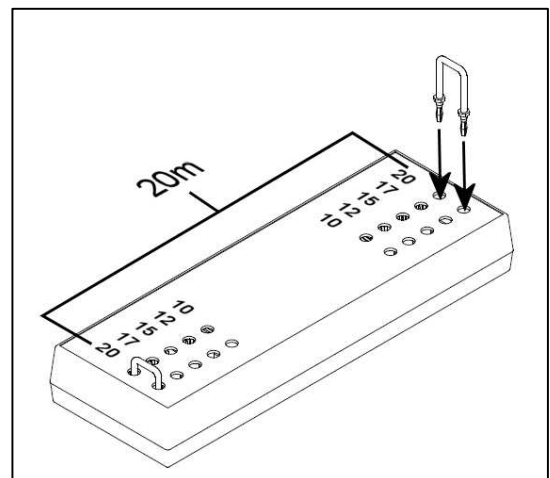


Finally, fold the arms of the top and bottom sections out as shown in step 3. The arms should be folded out completely horizontal. Firmly tighten all four clamp knobs to ensure that the top arms do not rotate downward over time.



**4) Install antenna onto the stand.** As shown at left, slide the bottom of the bottom section onto the stand's insulator rod. As with assembly above, the slots on the end of the bottom section should fully engage with the stand's clamp knob stud. Firmly tighten the clamp knob.

**5) Install shorting jumpers.** Band selection on your TW2010L is performed by moving a pair of shorting jumpers to the appropriate locations in the front of the antenna's loading box. To change bands, simply pullout the jumpers and re-insert into the holes that correspond to the new desired band, ensuring that the jumpers are inserted fully until they stop. In the example on the right, the 20m band is being selected. Both jumpers must be inserted into the correct holes for correct operation.



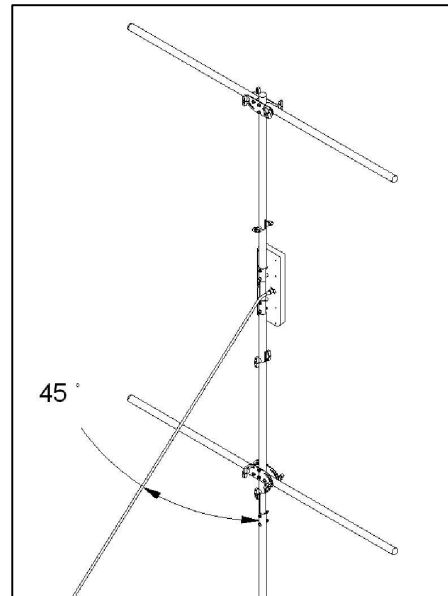
**⚠ Warning:** Remove jumpers from the antenna's loading box prior to transporting your antenna! The banana plugs on the ends of the jumpers can be easily damaged if the shorting jumpers are subject to hard lateral forces while plugged into the loading box. This type of damage can occur when transporting the middle section in the travel bag or similar carrier without first removing the shorting jumpers.

### 6.3 Connections

**⚠ Warning:** Turn off equipment before making or removing any connections. Failure to do so could result in equipment damage.

**Coax cable.** Connect your coax cable to your radio and to the SO-239 on the TW2010L's loading array box. It is highly recommended to use *at least* 65 feet of coax on your TW2010L. For best performance, use a high quality RG-8 or RG-8X coax cable.

Final connection notes: The coax cable should feed the antenna at a 45-degree angle as shown in the figure at right. Failure to do so will result in parasitic coupling and cause higher than normal VSWR readings.

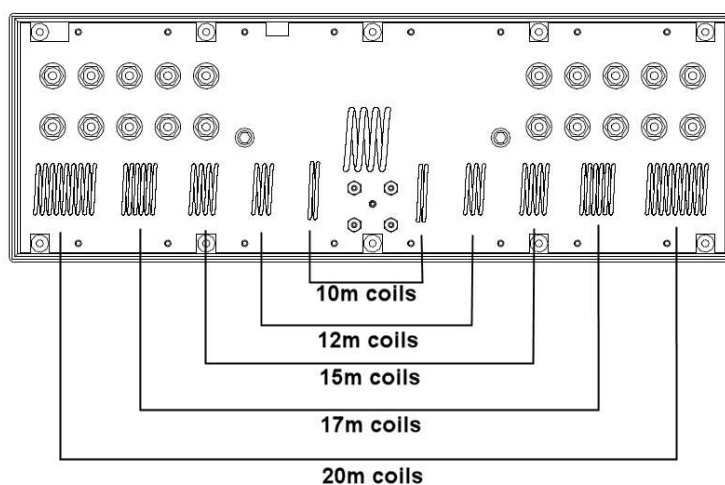


## 6.4 Tuning

Although your TW2010L was factory pre-tuned<sup>4</sup>, the environment in which your antenna is placed has an effect on tuning. Some minor adjustments may be necessary to tune the antenna to the desired center frequency for each band. Check the tuning of the antenna using an analyzer or the SWR meter on your transceiver before performing the tuning process. Post-factory tuning might not be required.

**⚠ Danger:** Do not apply RF power to the antenna while anyone is standing near the antenna. RF burns or electrical shock may occur, causing severe injury or death.

**Loading Array Operation.** All of the coils on the top half of the loading array are series connected. The shorting jumper shorts the signal to the metal structure, bypassing all of the coils above a given band (the bottom half of the loading array is effectively a mirror image of the top half). The tuning for each band depends on the tuning for the previous band. Therefore, tuning must start at the 10m coil pair and progress in order up to the 20m band.



**Equipment.** The tuning process requires Voltage Standing Wave Ratio (VSWR) measurement. These measurements can be accomplished using most any antenna analyzer. However, these devices typically generate a very small signal (less than 0.2W), and may show higher than expected VSWR readings. A

<sup>4</sup> The antenna is pre-tuned to the center of the general portion of the phone band under circumstance that may differ from the environment of your specific installation.



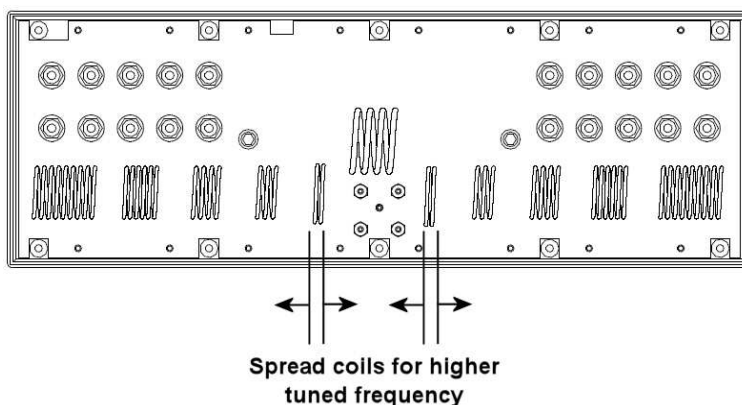
reading of 1.3:1 at the tuned frequency is typical at this low power. The VSWR readings should decrease once the antenna is used with 5W of power or more. The VSWR reading on your transceiver will likely show a lower VSWR than a low-power antenna analyzer.

**Cables.** Make sure that the coax used for the tuning process is at least 65 feet long, and that the coax is installed at a 45 degree angle as described on page 16.

**Tuning.** To tune each band, each of two coils in the coil pair for that band must be spread or compressed (see figures below). By spreading each coil in the coil pair, the tuned frequency for that band will increase. Likewise, compressing the coils in a coil pair will decrease the band's tuned frequency. You should try to spread or compress each of the two coils in a coil pair by the same amount.

**1) Preparation.** To begin the tuning process, remove the loading array cover using a small Phillips screwdriver and connect the coax cable to the loading array box, as described on page 15. The coax you use for the tuning process should ideally be the coax you plan to use for the antenna during normal use. Connect the coax cable to the device you wish to use to measure VSWR.

**2) Start at 10m.** Set the shorting jumpers to the 10m band (see page 14, step 5 for details) and determine to what frequency the antenna is best tuned. If you wish to increase the tuned frequency, spread open each of the two coils labeled "10m" on the switching array circuit board, as shown in the figure below.



**3) Tune next band.** Once the 10m band is tuned, set the shorting jumpers to the 12m band and tune the 12m band in a similar fashion as you tuned the 10m band in step 2.

**4) Repeat for remaining bands.** Repeat the tuning process for the 15m, 17m, and 20m bands, in that order.

## **Final tuning notes**

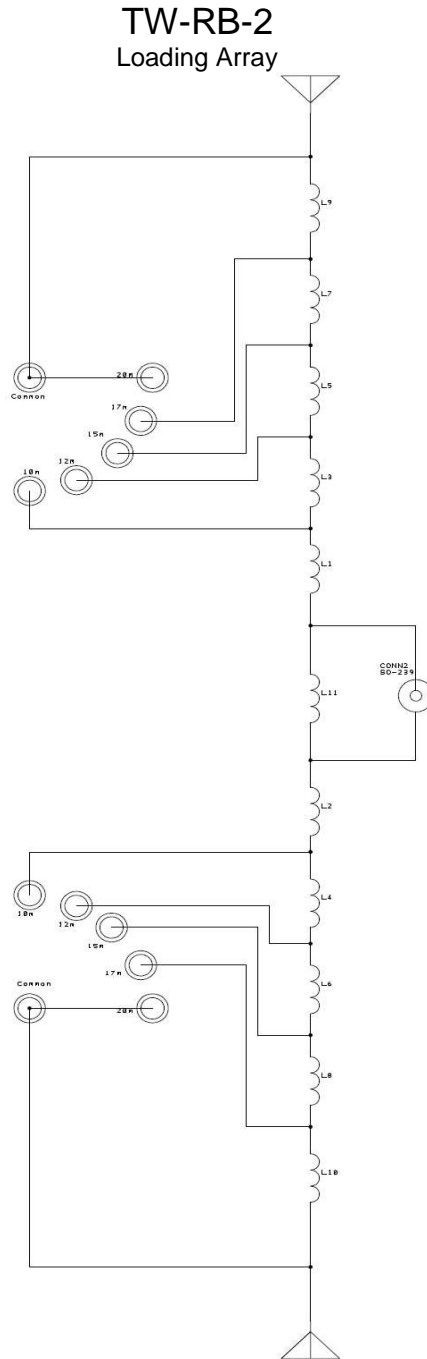
If lower bands exhibit very low VSWR, but higher bands suffer VSWR problems (or vice-versa), the spread of the center coil can be adjusted to effect which bands tune best. By spreading the center coil slightly, the low-frequency bands will tune better, and by compressing the center coil, the higher-frequency bands will tune better. But note that if the center coil is changed, the tuned center frequencies may change and the tuning process above will have to be repeated.

If tuning proves difficult, follow this checklist to eliminate common tuning problems:

- Is your antenna placed at least 30 feet away from other objects (buildings, people, trees, etc.)? The ends of the antenna's arms are very sensitive to coupling with external objects.
- Is your antenna installed such that the arms are at least 24" off the ground? The spacing between the antenna's arms and the ground should be between 24" and 36".
- Is your coax cable a high-quality RG-8 or RG-8X cable?
- Is your coax cable long enough? At least 65 feet of coax should be used for best results.
- Is your coax installed at a 45-degree angle with respect to the antenna as in the figure on page 15?
- Are you checking the VSWR using less than five watts? Once at least five watts is applied to the antenna, VSWR readings may improve significantly.

# 7 Schematics

This page contains the schematics for the TW2010L's TW-RB-2 loading array.



## 8 Contact Information

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If you need to contact TransWorld Antennas, just drop us an email at:

[support@transworldantennas.com](mailto:support@transworldantennas.com)

Use this email address for help with installation, setup, tuning, or operation, for product or company information, or warranty/money back guarantee claims.

Check back at our website frequently for product updates at:

[www.transworldantennas.com](http://www.transworldantennas.com)

We can also be reached through our web-based contact system on the website.