

# SCOUT LINKED DIPOLE KIT - ASSEMBLY AND TUNING INSTRUCTIONS

REZ-LDK



Designed for use with the Scout base, this DIY kit enables you to create a 4-band, inverted V linked dipole. Ideal for portable operations like Parks on the Air (POTA), Summits on the Air (SOTA), and Field Day.

Whether you're a seasoned operator or a newcomer to DIY antennas, this kit provides everything you need to build and fine-tune your own reliable, high-performance antenna.

These instructions will guide you step by step through the building and tuning process. The total time to build and tune this antenna is approximately 2.5 hours.

## REQUIRED TOOLS AND MATERIALS

### ITEMS INCLUDED IN THIS KIT

ITEM	QTY
18 GA silicone wire	77 ft
3/8 Ring Terminals	2
Element Insulators	6
S-Clips	4
3/8" Marine Grade Shrink Tube	2
1/8" Shrink Tube	2
Wire Winder	2

### ITEMS REQUIRED (NOT INCLUDED)

ITEM	QTY
25' Antenna Support (mast, tree, etc.)	1
Tent Stakes	2
Paracord	Min. 25 ft
REZ Scout Antenna Base	1
REZ CM7 1:1 Current Choke	1

### REQUIRED TOOLS:

- Wire strippers
- Small flat head screwdriver
- Power Pole crimper (Powerwerx TR1crimp is recommended)
- Antenna analyzer
- Terminal crimper suitable for non-insulated terminals
- Heat gun
- A computer with an Internet connection

### KNOTS TO KNOW:

- Trucker's hitch
- Bowline
- Overhand

Take some time to practice these knots. There are many Internet resources which provide easy to follow instruction.

## SPECIFICATIONS

Wire	18 AWG, Stranded, Tinned Copper, Silicone Jacketed
Minimum Frequency	40 Meters
Power Limits	500 Watts SSB, 300 Watts CW, 200 Watts Digital (50% Duty Cycle)

# **IMPORTANT!**

READ ALL WARNINGS BEFORE USING THIS PRODUCT.

## **WARNING: ELECTRICAL SHOCK HAZARD**

DO NOT USE NEAR POWER LINES. CONTACT WITH POWER LINES CAN CAUSE AN ELECTRICAL SHOCK. SERIOUS INJURY OR DEATH MAY OCCUR.

## **WARNING: FIRE HAZARD**

DO NOT EXCEED THE POWER LIMITS LISTED IN THE SPECIFICATIONS TABLE ON PAGE 1 OF THIS MANUAL. EXCEEDING THE POWER LIMITS CAN RESULT IN A FIRE. EXCEEDING THE POWER LIMITS WILL VOID YOUR WARRANTY.

## **WARNING: RF EXPOSURE**

NEVER OPERATE THIS ANTENNA IN A WAY THAT COULD EXPOSE INDIVIDUALS TO HIGH LEVELS OF RF EXPOSURE, ESPECIALLY ABOVE 10 WATTS OR ABOVE 14 MHZ. NEVER USE THIS ANTENNA NEAR RF SENSITIVE MEDICAL DEVICES, SUCH AS PACEMAKERS.

## INTRODUCTION

An inverted V linked dipole consists of 2 wire “legs” with “linkable” radiating elements. Once linked, each element extends the previous element to create one longer element. This allows the antenna to radiate at a lower frequency each time a link is connected, allowing for multi-band use. Each leg of the antenna is connected to a feed point at the center of the antenna. The Scout base acts as the center feed point and may be supported by a mast or a rope suspended from a tree. The other end of each leg is attached to a rope extension which is in turn attached to a stake in the ground.

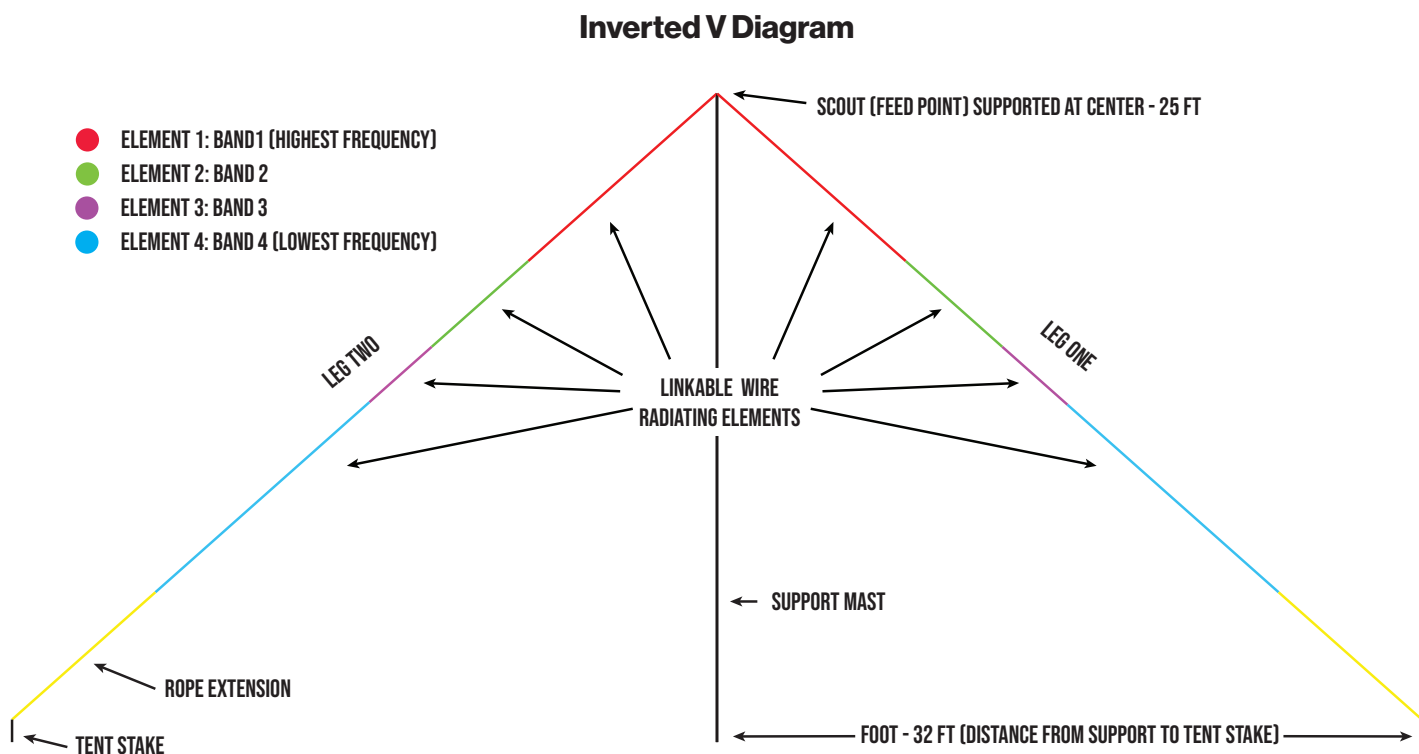
An inverted V dipole is a good choice for portable operations because it requires only one support making it easy to deploy. Compared with a flat top dipole, an inverted V antenna has a more omni-directional radiation pattern and has a higher take-off angle. This makes the inverted V a great all-around performer at the sacrifice of some DX performance.

## BUILDING THE INVERTED V LINKED DIPOLE

This section will cover the physical construction of the linked dipole. Please verify that you have all the tools and items listed on page one before you begin. Should you find you are missing included parts, please contact [support@rezantenna.com](mailto:support@rezantenna.com).

This kit is designed to build a 4-band inverted V linked dipole with an apex (center) height of 25 feet. The lowest frequency this kit is designed for is 40 meters (7.175 MHz center frequency).

The apex (center) height of the antenna (25') and the foot measurement (32') must be followed in order to successfully build this kit. Refer to the diagram below:



*This diagram depicts an inverted V dipole supported by an antenna mast; however, the support can also be a rope over a tree branch, etc. Familiarize yourself with this diagram as it will be referenced throughout these instructions.*

## Step 1: Calculate Element Lengths

In order to begin the assembly process, you need to choose the frequencies (bands) that you want to include in your antenna. We recommend you pick a frequency in the middle of each band of interest and use that frequency to calculate the element length.

To aid in this design, we have developed a web-based element calculator.

### The calculator automatically accounts for:

- Feed point height: 25 ft
- "Foot" measurement: 32 ft
- Leg angle: 52°
- Velocity factor of 18 AWG silicone-jacketed wire
- End effect compensation
- The column labeled "2x Link Length" accounts for the extra wire (6") needed to make the links. For element one it accounts for a 10" strain relief and a 6" link. More on this in the construction section.

### 1. Using the calculator

### Linked Dipole Element Calculator

Input frequency (MHz) for each element:

Element	Frequency (MHz)	2x Link Length (inches)	Calculated Length (inches)	5% Length Adjustment (inches)	Total Length (inches)
Element 1	<input type="text" value="28.9"/>	16	91 1/8"	4 9/16"	111 5/8"
Element 2	<input type="text" value="18.12"/>	12	54 3/16"	7 1/4"	73 7/16"
Element 3	<input type="text" value="14.175"/>	12	40 7/16"	9 5/16"	61 3/4"
Element 4	<input type="text" value="7.175"/>	12	181 3/16"	18 3/8"	211 9/16"

**Rope Extension: 15' 0"**

- i. To load the calculator open your web browser and go to [RezAntenna.com/LDK](http://RezAntenna.com/LDK)
- ii. Enter your desired frequencies in the calculator.
- iii. You will notice that the MHz value for element 4 cannot be set below 7.175 MHz. Remember, this is the center frequency and you will be cutting the element slightly long. This will allow you to tune the element to the lower portion of the 40 meter band.
- iv. Record the total length value of each element and the rope extension length.

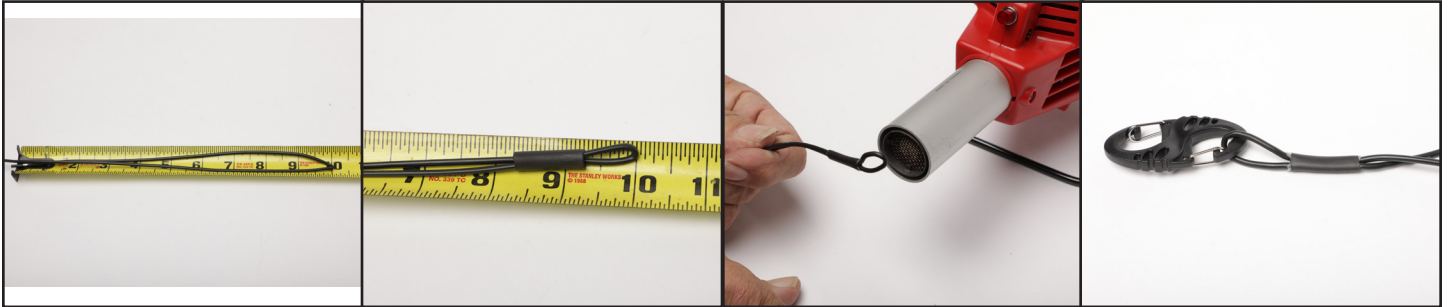
## Step 2: Assembly

Now that the element lengths have been calculated, it's time to begin assembling the wire elements and extension ropes for the antenna.

### 1. Cut the wire elements to length

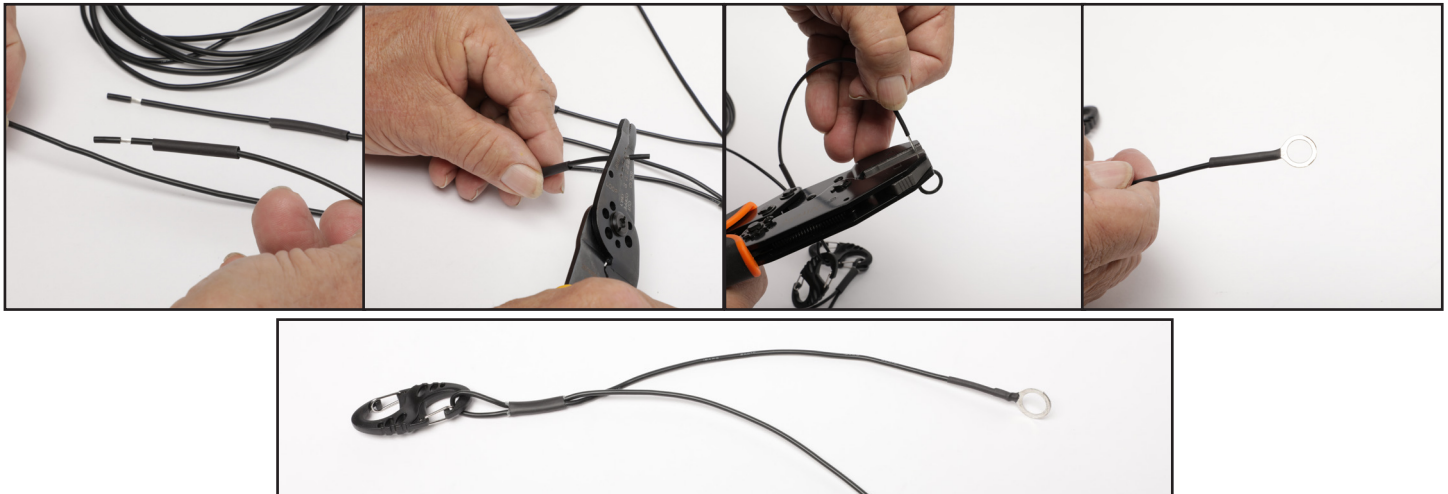
- i. Locate the spool of 18 GA silicone antenna wire.
- ii. Using wire cutters and a tape measure, cut the wire to the proper length. This length will be determined by the element calculator used in step 1.
- iii. Make sure to keep track of each element so it can be identified later on.

### 2. Create the center attachment point



- i. Take one end of the highest frequency element (element 1) and double it back 10" creating a loop.
- ii. Slip the 3/8" marine grade shrink tubing over the doubled-up wire.
- iii. Place the shrink tube 3/4" from the doubled over end to create a closed loop.
- iv. Shrink the tubing with a heat gun. Apply adequate heat so the glue inside the shrink tube melts. Let cool.
- v. Attach one S-Clip to the loop.
- vi. Repeat for the other leg of the dipole.

### 3. Terminate the inner-most element



- i. Slide the 1/8" shrink tube over the wire.
- ii. Strip 1/4" off the looped back end of the inner-most element.
- iii. Twist the strands of the wire together. This will make it easy to insert into the terminal.
- iv. Slide the terminal onto the wire and crimp the terminal.
- v. Slide the shrink tube over the terminal and use a heat gun to shrink the tube.
- vi. Repeat for the other leg of the dipole.

#### 4. Attach element insulators



- i. Thread the other end of the inner-most element through one hole of the element insulator leaving 6" of wire for a tag end.
- ii. Tie a single overhand knot in the wire by passing the tag end UNDER and over the wire. It's important to tie your knots consistently. These tag ends will later be terminated to become your element links. Tying them consistently will ensure all the linked ends hang downward once the antenna is deployed.
- iii. Tie the beginning of the next element on the opposite side of the element insulator.
- iv. Repeat this process for each element and leg of the dipole.

#### 5. Finish the ends of the outer most elements (element 4)



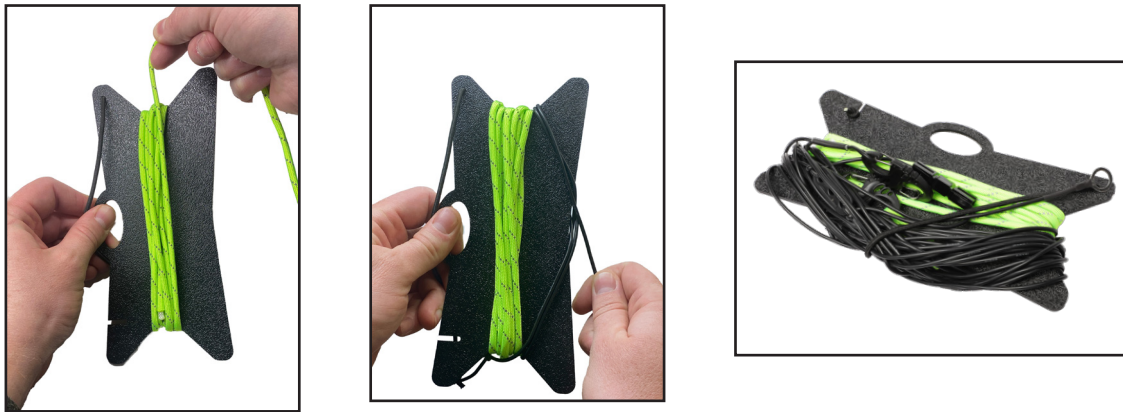
- i. Tie the end of the wire in an overhand knot around one side of the S clip.
- ii. Repeat for the remaining leg.

#### 6. Create the rope extensions



- i. Cut the paracord to the "Rope Extension" length indicated on the calculator.
- ii. Tie a bowline knot on one end of each rope extension.
- iii. Clip the bowline knot into the s-clip on the end of each dipole leg.

## 6. Winding the legs onto the line winders



- i. Starting with the rope end, wind the rope onto the winder in a circular motion.
- ii. Once you get to the antenna wire, begin winding in a “figure 8” motion.
- iii. Winding in a figure 8 motion will allow the antenna wire to easily slip off the winder when being deployed.
- iv. Secure the wire to the winder using the bungee cord.

## TUNING THE ANTENNA

Now that the build is complete it's time to tune each element. By design, each element will be 5% longer than the target frequency you entered in the calculator. This allows extra wire so that each element can be trimmed to length.

The goal is to get the SWR under 2:1 across the portion of the band you want to operate in. The 2:1 SWR bandwidth of the dipole may not cover all the frequencies you may want to use. Therefore, you need to decide which frequencies are most important. You can always use a tuner to access frequencies outside this bandwidth.

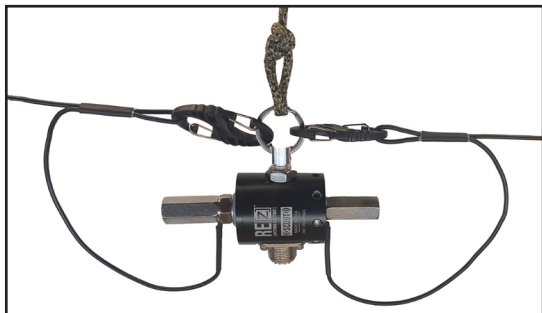
This kit is designed to be deployed as an inverted V at 25 feet. If you deploy it higher or as a flat top dipole you may find that you don't have enough wire to get a tune on 40 meters. You will also find that the measurement generated by the calculator will not be accurate.

Remember to deploy your antenna as you tuned it. Keep the height and configuration the same each time. The angle of each leg will also affect the tune of the antenna. The height of your support and the foot measurement will dictate the angle of each leg. Keeping the foot measurement and the support height consistent is critical to maintain a consistent tune.

Once the antenna is tuned you will trim the excess from the extension ropes and tie a bowline knot in the end. This way, the length is fixed, and you will not have to re-measure the stakes when deploying in the field.

## Step 1: Erecting the Antenna

### 1. Attach dipole legs and coax to the Scout Base



- i. Clip both S-clips to ring (s) on the Scout base. This provides strain relief on the ring terminal connections. The way this is done will depend on if the Scout is mast mounted using the Universal Mast Mount, or suspended by a rope.
- ii. Attach the 3/8" ring terminals to each stud on the Scout base.
- iii. Attach a 1:1 choke such as the REZ-CM7 to the feed point of the Scout.
- iv. Attach coaxial cable to the choke.
- v. Unwind the legs of the dipole off of the wire winder and raise the Scout base to 25'.

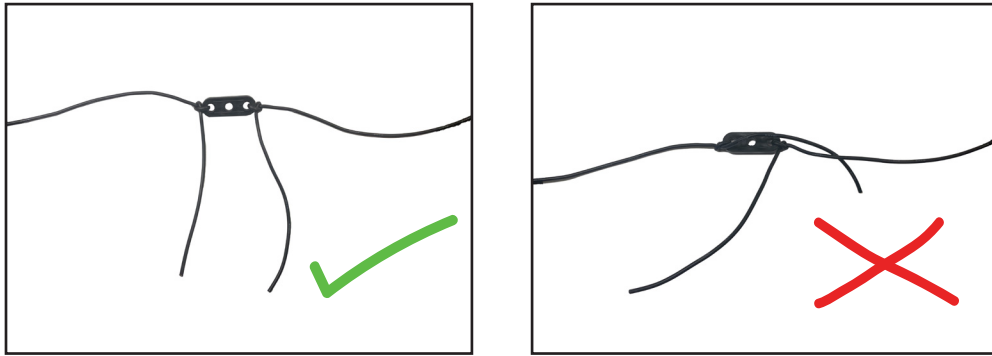
### 2. Set the rope stakes and rope extensions



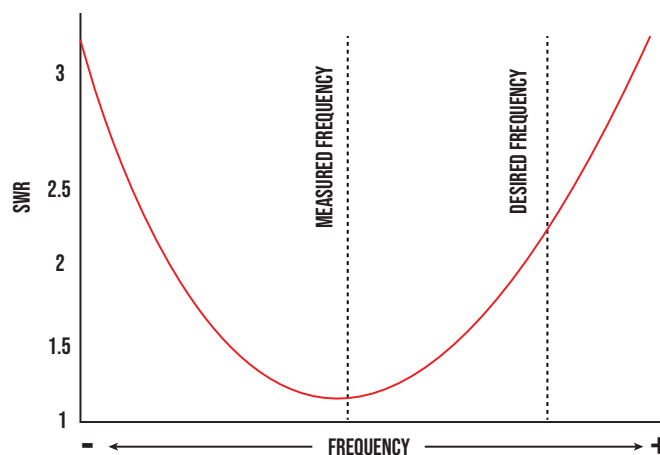
- i. On the ground, measure 32 feet from the center of the antenna. This is the "foot" measurement as shown in the diagram on pg. 2.
- ii. Insert the stake into the ground.
- iii. Loop the extension rope around the stake and tie a trucker's hitch knot. Tension the rope until there is only a slight sag in the antenna wire. Take care not to over-tension the antenna.
- iv. Repeat for the other leg ensuring the stakes are in line with each other.
- v. Your antenna should now look like the illustration on pg. 2.



## Step 2: Tuning and Terminating the Elements



**IMPORTANT:** While tuning the antenna make certain the link wires are hanging straight down and not touching the other element. If the link is touching another element, they will couple and throw off your tuning.

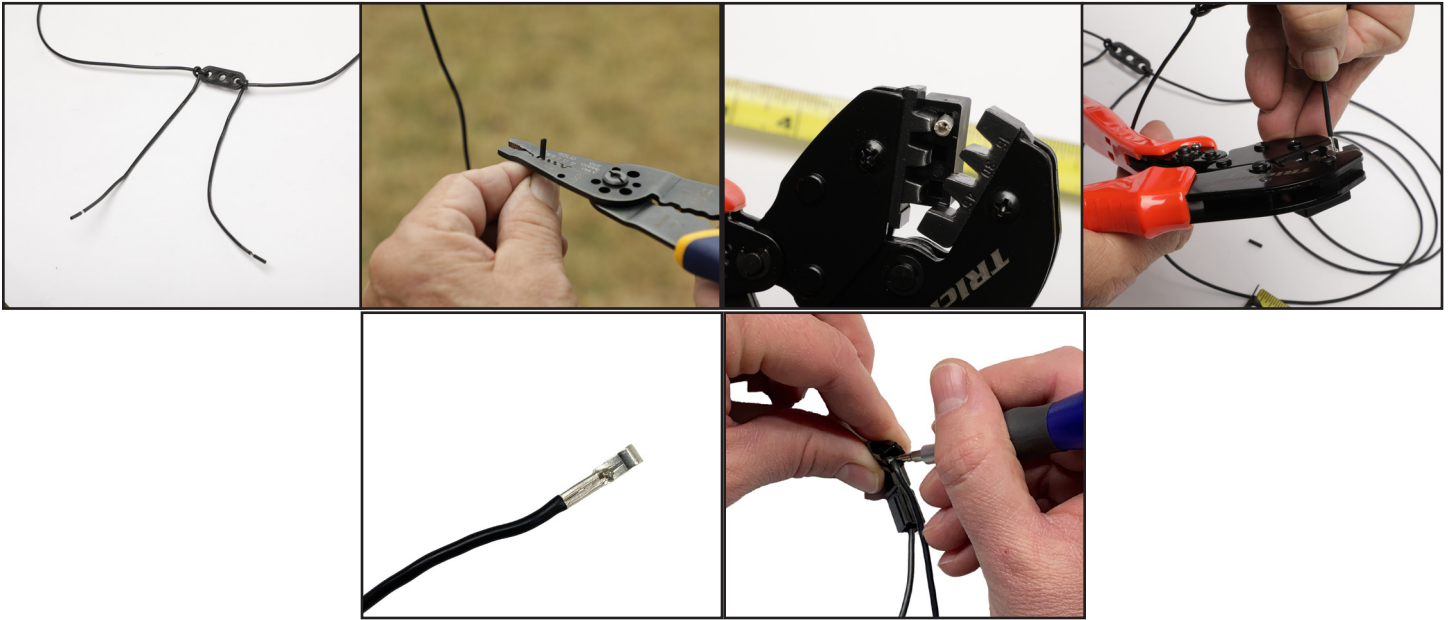


**When you run an initial SWR sweep of your antenna, the SWR dip as measured should be lower than the desired frequency. This is a result of adding 5% to the calculated length. As you begin to trim the antenna, the dip will move up in frequency towards your desired frequency.**

### 1. Sweep and trim the antenna elements

- i. Ensure all of the links are hanging downwards and not touching the other elements.
- ii. At this point element 1 (highest frequency) is the only active element in the antenna.
- iii. Attach your antenna analyzer to the coax, set the analyzer to the highest band you designed the antenna for.
- iv. The SWR dip should be either below or low in the band of interest as pictured in the above figure.
- v. Lower the antenna to access the first element.
- vi. Untie the element from the insulator and trim 1-2" off the wire. It's better to trim too little than too much.
- vii. Re-tie the element to the insulator leaving a 6" tag end.
- viii. Repeat for the other leg. Ensure you trim the same amount.
- ix. Loosen the extension ropes. It's important to remember this step. Since the antenna wire has been shortened due to the tuning process, more rope is now required. If the ropes are not loosened, the antenna wire will be placed under severe tension once the mast is returned to 25'.
- x. Raise the antenna back to 25'.
- xi. Re-tie the extension ropes.
- xii. Re-sweep the antenna and note the SWR dip. If it is lower than desired, you need to trim more wire.
- xiii. Repeat this process until the SWR is satisfactory.

## 2. Terminate the links with Powerpoles



- i. Now that the element has been tuned to the desired frequency, you will now terminate the wire to create the link.
- ii. Lower the antenna to gain access to the elements.
- iii. Ensure there is a 6" tag end of wire after your knot on both sides of the element insulator.
- iv. Strip each wire 1/4" and twist the strands together.
- v. Insert the Power Pole into the crimper according to the crimper's instructions.
- vi. Insert the wire into the Power Pole.
- vii. Crimp the Power Pole onto the wire.
- viii. Insert the Power Pole contact into the Power Pole body until it is fully seated. It's helpful to have a small screwdriver to push the contact down into the body.
- ix. Repeat for both wires.
- x. Once complete repeat this entire process for the other leg of the dipole.

## 3. Link the next element



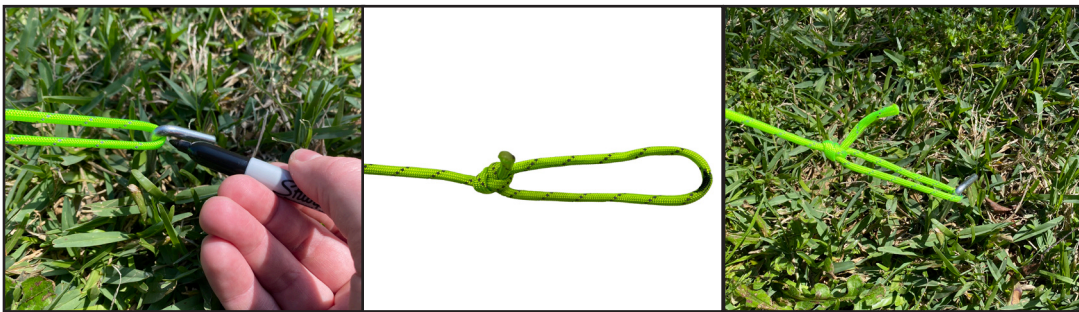
- i. Once you have terminated both legs of the antenna, connect the Power Poles together.
- ii. The next element is now linked.
- iii. Remember to un-tie the extension ropes before raising the antenna.
- iv. Repeat the tuning and termination procedure for the remaining elements.

## 4. Tuning the final element

- i. Once you reach the lowest frequency (element 4) element, you will follow the same tuning procedure as the previous elements.
- ii. Leaving the S-clip attached to the rope extension, untie the overhand knot from the S-clip and trim the antenna 1-2" at a time. Go slow, it's better to cut too little than too much.
- iii. Re-tie the knot and attach it to the S clip on the rope.
- iv. Remember to untie the extension ropes from the stakes before raising the antenna.
- v. Hoist the antenna to 25'.
- vi. Once you achieve the desired tune on the final element your antenna is now tuned.

## FINISHING TOUCHES

### 1. Finishing the extension ropes



- i. With the antenna still in the hoisted position, mark where the extension rope wraps around the stake. Remove the rope from the stake and tie a bowline knot, ensuring the mark you made ends up in the center of the loop. Trim off the excess rope. Doing this eliminates the need to measure the foot distance each time the antenna is deployed. This way the antenna legs stay at the same angle the next time you deploy it.

### 2. Finishing the overhand knots (optional)



- i. Remove both legs of the antenna and place a small zip tie on the tag end side of each overhand knot. This ensures the knots will not slip.

## WARRANTY INFORMATION

Each product is covered by a 1 year limited warranty.

**REZ ANTENNA SYSTEMS LLC**, warrants this product to be free from defects in material or workmanship for a period of one (1) year following the date of purchase, provided that the product is used for amateur radio purposes. This limited warranty does not cover failures due to abuse, accidental damage or when repairs have been made or attempted by anyone other than **REZ ANTENNA SYSTEMS LLC**. A defective product meeting the warranty conditions set forth herein will be replaced or repaired at no charge in the following manner:  
Send the product (prepaid) to the **REZ ANTENNA SYSTEMS LLC** Service Center for repair or replacement at **REZ ANTENNA SYSTEMS LLC's** option. Proof of purchase may be required. Information about **REZ ANTENNA SYSTEMS LLC's** service center and warranty instructions can be found at [www.rezantenna.com/warranty](http://www.rezantenna.com/warranty).

This warranty gives you specific legal rights and you may have other rights which vary from state to state. Should you have any questions, contact the **REZ ANTENNA SYSTEMS LLC** Service Center. This product is not intended for commercial use, and accordingly, such commercial use of this product will void this warranty. All other guarantees, express or implied, are hereby disclaimed.