



# Universal Remote Tuner 1 (CHA URT1) Operator's Manual

Nevada - USA

[WWW.CHAMELEONANTENNA.COM](http://WWW.CHAMELEONANTENNA.COM)



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# Table of Contents

Introduction .....	3
Components.....	4
Installation Options.....	7
Antenna Configurations .....	8
Random Wire Antenna .....	8
Vertical Antenna .....	9
Coaxial Fed Inverted “V” Antenna .....	10
Tuner Connections.....	11
Tuner Operation.....	13
Troubleshooting.....	13
Accessories.....	14
Specifications .....	14
Chameleon Antenna™ Products.....	15



Be aware of overhead power lines when you are installing the CHA URT1. You could be electrocuted if the antenna gets near or contacts overhead power lines.

Photographs and diagrams in this manual may vary slightly from current production units due to manufacturing changes that do not affect the form, fit, or function of the product.

All information on this product and the product itself is the property of and is proprietary to Chameleon Antenna™. Specifications are subject to change without prior notice.

## Introduction

Thank you for purchasing and using the Chameleon Antenna™ Universal Remote Tuner 1 (CHA URT1). The CHA URT1 is a remote outdoor tuner for almost any type of antenna and any brand or model transceiver. The CHA URT1 is unique in that it can be used for coaxial cable or wire fed antennas. This wide-range tuner will match wire antennas, such as a vertical, random wire antenna, or a long wire antenna. It can also be used with coaxial-fed antennas, like an Inverted “V” or dipole. Also, the CHA URT1 does not need a transceiver-specific control cable, so it works with any brand or model of transceiver. The rugged Tuner Unit is weatherproof and designed to be permanently installed outdoors at or near the antenna feedpoint, so loss due to high SWR on the feedline is avoided.

The CHA URT1 covers 1.8 – 54.0 MHz and has 16,000 memories for quick recall and tuning with previously used settings. It can match any antenna with an impedance of 5 to 1,500 Ohms within seconds and can handle up to 125 Watts on SSB/CW (*see specifications*).

The CHA URT1 consists of two units: a Coupler Unit and the Tuner Unit, see plate (1). The Tuner Unit is in a rugged weatherproof housing and contains the antenna matching network and controller. It is normally installed outside at or near the antenna feedpoint. The Coupler Unit contains the operator controls and status indicators. It uses a bias-T circuit to send power and control signals to the remote Tuner Unit over the connecting coaxial cable, so there is no need to order or install a separate transceiver-specific control cable. The Coupler Unit is not weatherproof and must be installed inside near the operator and transceiver.

Please read this User Guide, so you may obtain the greatest utility from your Cha URT1.



Plate 1. CHA URT1 Units.

## Components

The CHA URT1 consists of two units: a Tuner Unit and the Coupler Unit. The Coupler Unit is shown in figure (1). The Tuner Unit is shown in figure (2). The components of both units are described in the paragraphs below.

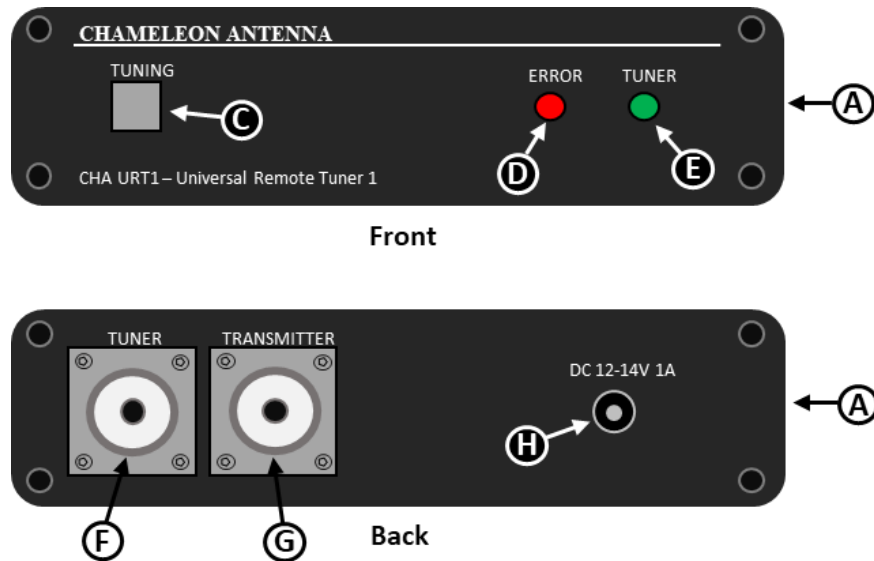


Figure 1. Coupler Unit.

- A. Coupler Unit.** The Coupler Unit serves as the bridge between the transceiver and Tuner Unit. The Coupler Unit contains the operator controls and status indicators. It uses a bias-T circuit to send power and control signals to the remote Tuner Unit over the connecting coaxial cable. The Coupler Unit must be installed indoors near the transceiver.
- B. Tuner Unit.** The Tuner Unit contains the antenna matching network and controller. The Tuner Unit is in a rugged weatherproof housing and is normally installed outside at or near the antenna feedpoint.
- C. Tuning Button.** The Tuning Button is used to initiate an automatic tuning cycle.
- D. ERROR Indicator.** When the ERROR Indicator is illuminated red, it means the Coupler Unit TUNER connector is shorted. If this condition occurs, immediately remove power from the Coupler Unit and check the coaxial cable between the Coupler Unit and Tuner Unit for a short.

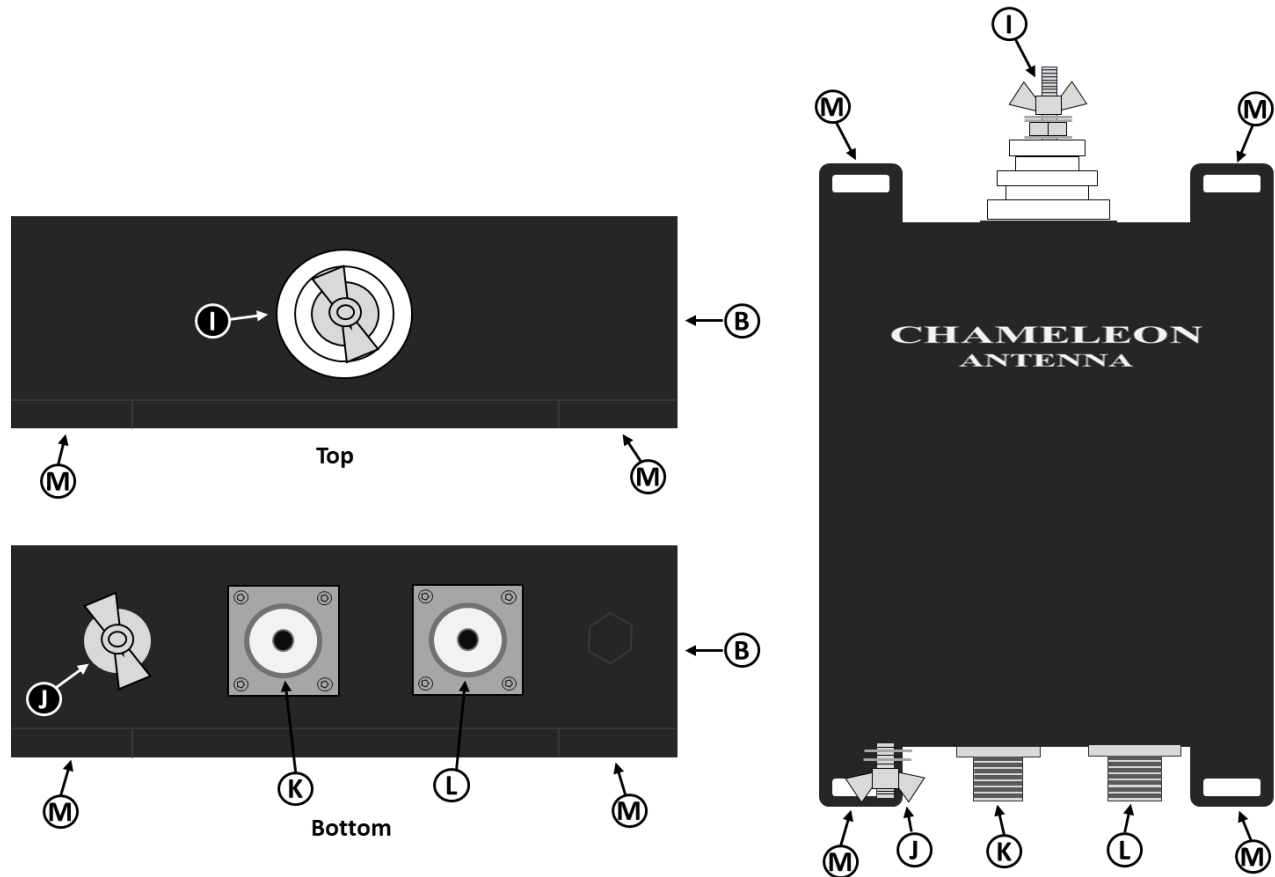


Figure 2. Tuner Unit.

- E. **TUNER Indicator.** The TUNER Indicator will be illuminated green when power has been applied to the Coupler Unit.
- F. **TUNER Connector.** The TUNER Connector is used to connect a coaxial cable from the Coupler Unit to the Tuner Unit. In addition to RF output, the Coupler Unit uses a bias-T circuit to send power and control signals to the remote Tuner Unit over the coaxial cable. Note: Do not connect any other devices between the Coupler Unit and Tuner Unit.
- G. **TRANSMITTER Connector.** The TRANSMITTER Connector is to connect a coaxial patch cable from the Coupler Unit to the transceiver.
- H. **DC 12-14V 1A Power Connector.** The DC 12-14V 1A Power Connector is used supply power to the Coupler Unit. The connector is a 5.5mm x 2.1mm coaxial connector, center pin positive (+).
- I. **Beehive Connector.** The Beehive Connector is an insulated standoff connection on the top of the Tuner Unit for connecting a single wire fed antenna. The Beehive Connector and Antenna Connector cannot be used at the same time. Do not use the Beehive Connector if using the Antenna Connector.

- J. Ground Connector.** The Ground Connector is used to connect a ground or counterpoise wire.
- K. ANTENNA Connector.** The Antenna Connector is used to connect a coaxial cable fed antenna. The Antenna Connector and the Beehive Connector cannot be used at the same time. Do not use the Antenna Connector if using the Beehive Connector.
- L. COUPLER Connector.** The COUPLER Connector is used to connect a coaxial cable from the Tuner Unit to the Coupler Unit. Note: Do not connect any other devices between the Coupler Unit and Tuner Unit.
- M. Mounting Tabs.** The Mounting Tabs are used to mechanically attach the Tuner Unit to the Mounting Brackets or directly to an outside surface or object.
- N. Mounting Brackets.** The Mounting Brackets (*not shown*) attach to the Tuner Unit Mounting Tabs to enable mounting of the Tuner Unit on an outside surface or object.
- O. Power Cord.** The Power Cord (*not shown*) supplies power to the Coupler Unit from your 12V power supply. An AC Adapter is available as an option.

## Installation Options

The CHA URT1 is designed to be used as a remote tuner. A remote tuner is where the Tuner Unit is installed outside near the antenna feedpoint, so loss due to high SWR on the feedline is avoided. Stainless steel brackets are included to facilitate installation of the remote Tuner Unit outside. Figure (3) shows a block diagram of a remote tuner installation. **Do not connect any device (switch, diplexer, meter, etc.) between the Coupler Unit and Tuner Unit.**

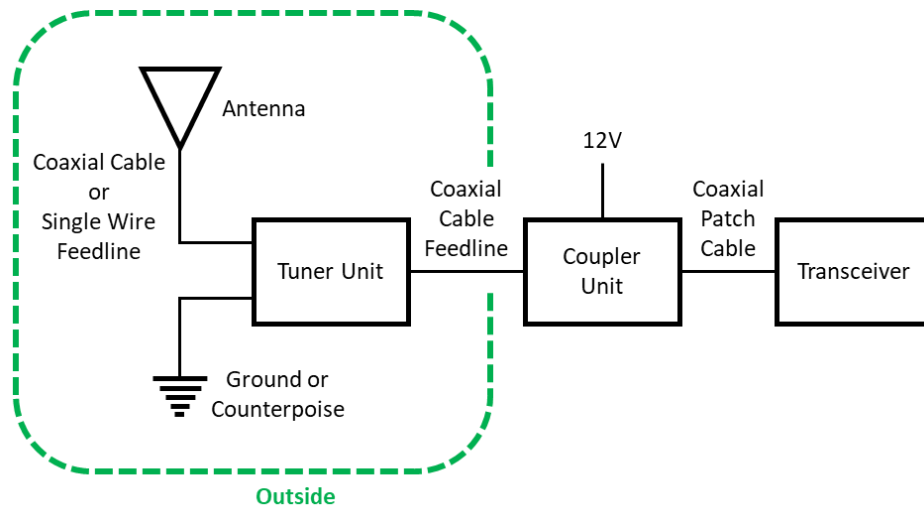


Figure 3. Remote Tuner Block Diagram.

If the CHA URT1 is replacing an existing local tuner or is going to be used with already installed coaxial cabling, the CHA URT1 can be used as a local tuner. A local tuner is where the Tuner Unit is installed inside, near the Coupler Unit, as shown in figure (4). Only coaxial cable fed antennas can be used in a local tuner configuration. **Do not connect any device (switch, diplexer, meter, etc.) between the Coupler Unit and Tuner Unit.**

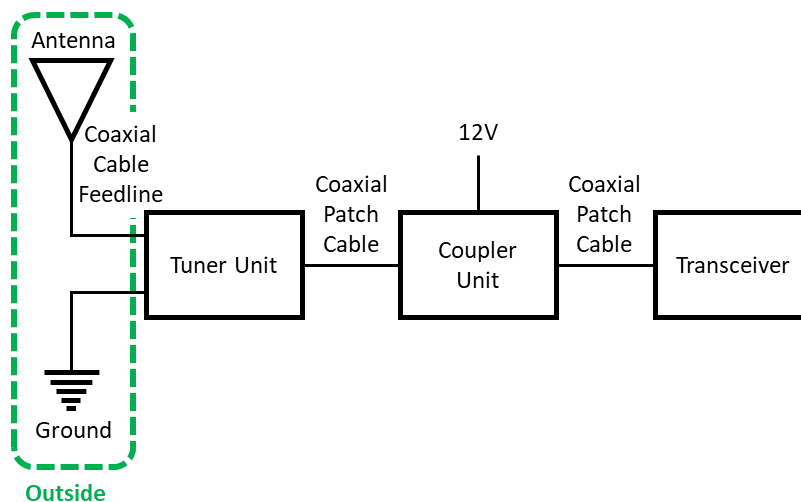


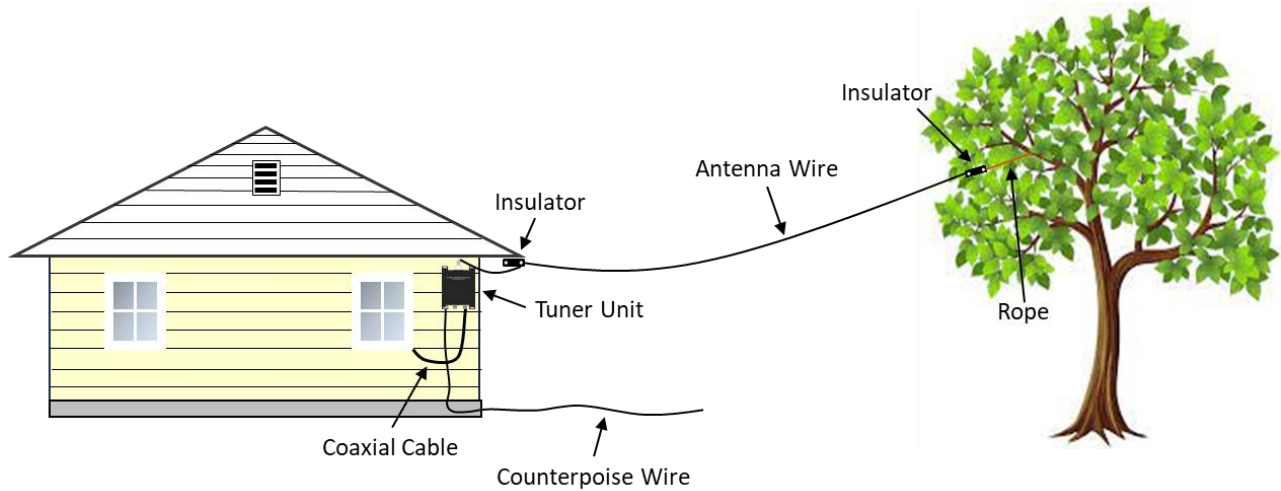
Figure 4. Local Tuner Block Diagram.

## Antenna Configurations

The CHA URT1 can tune almost any single wire or coaxial fed antenna. Three typical configurations are shown below.

### Random Wire Antenna

The most popular antenna configuration used with remote tuners is a Random Wire Antenna, see figure (5). The key to installing a “random” length wire antenna is that it cannot be a half-wavelength on any band you want to operate.



**Figure 5. Random Wire Antenna.**

According to one reference, the lengths under 150 feet that shouldn't be used are: 16, 19, 22, 26, 32, 33, 38, 44, 46, 48, 52, 64, 65, 66, 76, 78, 80, 88, 92, 95, 96, 99, 104, 110, 112, 114, 123, 128, 130, 132, 133, 138, and 144 feet. Search the Internet for “random wire antenna lengths” or see the ARRL Handbook for more information.

Install the Tuner Unit outside near the feedpoint of the antenna. Connect the Antenna Wire to the Beehive Connector on top of the Tuner Unit. Do not use the ANTENNA Connector on the bottom of the Tuner Unit. Connect one or more Counterpoise Wires to the Ground Connector on the bottom of the Tuner Unit. The minimum length in feet of the Counterpoise Wire is shown in table (1). For example, if the lowest band you intend to operate on is 80 meters, the minimum length of the Counterpoise Wire(s) would be 27 feet. It is not necessary to have specific length (“tuned”) Counterpoise Wires.

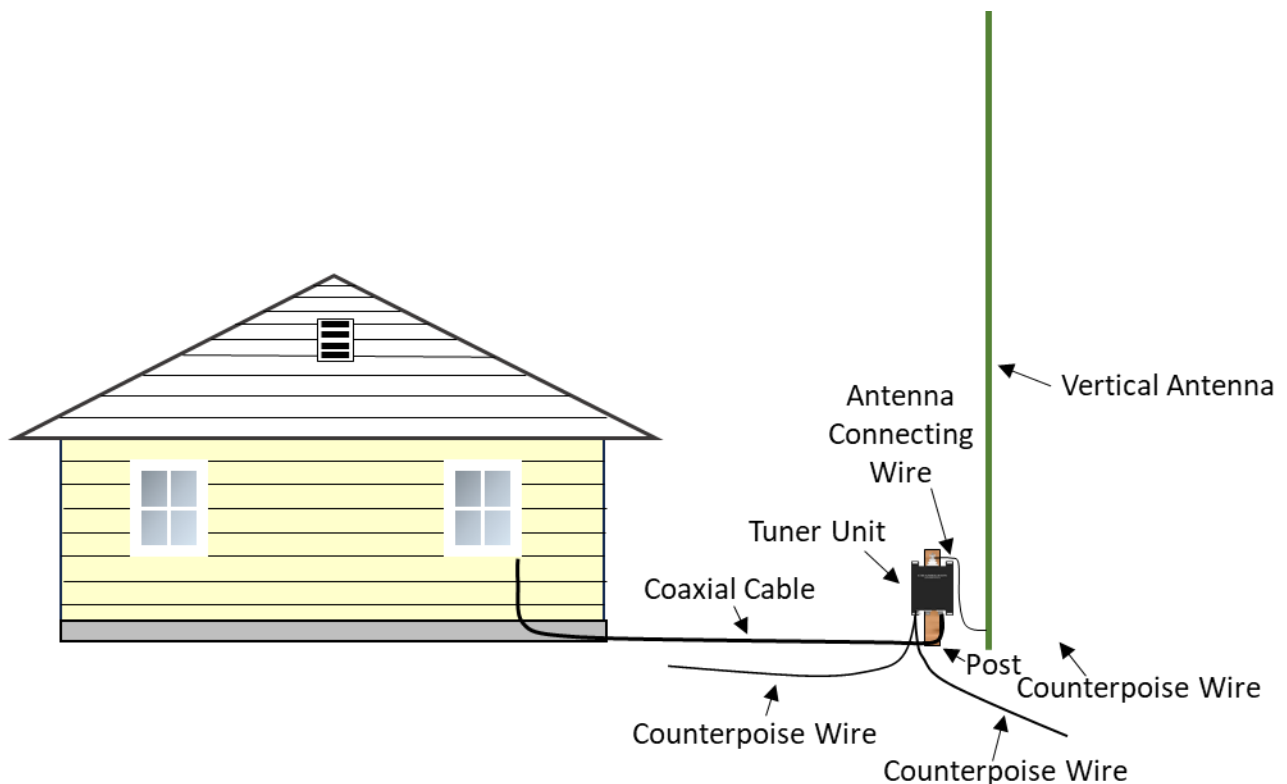


Band	Length	Band	Length
160	52	17	5
80	27	15	4
60	18	12	4
40	13	10	3
30	9	6	2
20	7		

**Table 1. Minimum Counterpoise Wire Length.**

## Vertical Antenna

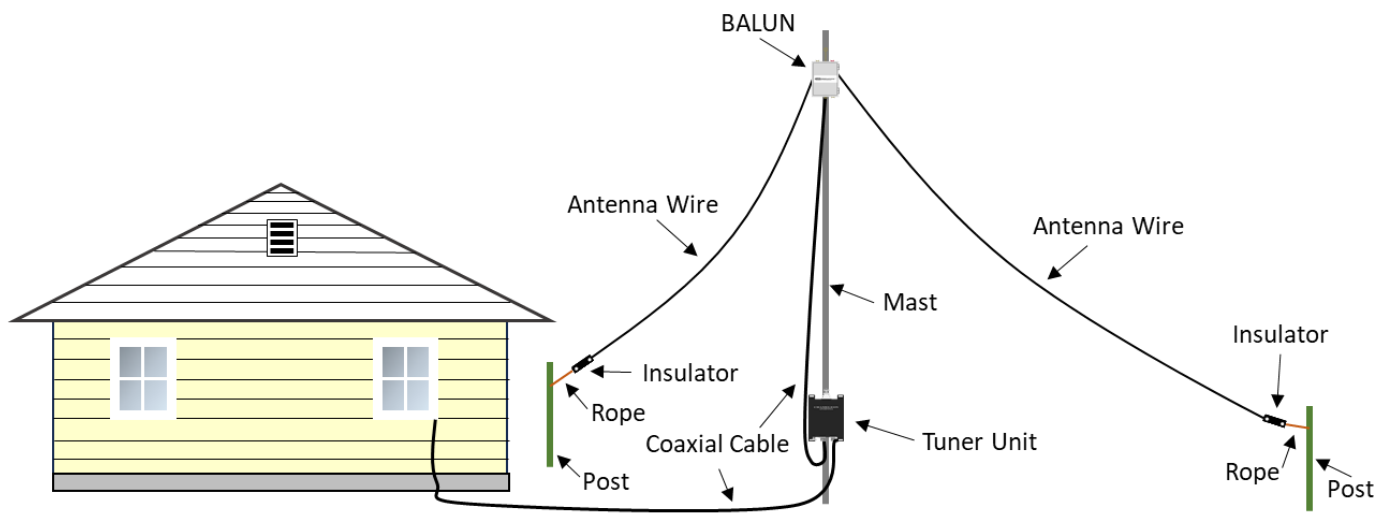
The CHA URT1 is ideal for an all-band ground-mounted Vertical Antenna, as shown in figure (6). For example, the classic 43 foot Vertical Antenna will have excellent performance on 160-6 meters, when used with the CHA URT1. Mount the Tuner Unit on a post near the base of the Vertical Antenna. Connect a wire from the Beehive Connector on top of the Tuner Unit to the base of the Vertical Antenna. Use at least two Counterpoise Wires, opposite each other for 360° coverage. See table (1) for the minimum length of the Counterpoise Wires. It is not necessary to have specific length (“tuned”) Counterpoise Wires. Elevated Radials can also be used. Connect the Counterpoise Wires to the Ground Connector on the bottom of the Tuner Unit. Do not connect anything to the Tuner Unit ANTENNA Connector.



**Figure 6. Vertical Antenna.**

### **Coaxial Fed Inverted “V” Antenna**

The CHA URT1 can also be used for tuning coaxial fed antenna, such as an Inverted “V” dipole antenna that has a BALUN in the center, like that shown in figure (7). The Tuner Unit should be located as close to the BALUN of the dipole as practicable, such as at the base of the mast. Connect the coaxial cable from the antenna BALUN to the ANTENNA Connector on the bottom of the Tuner Unit. Do not connect anything to the Beehive Connector on top of the Tuner Unit. A ground rod should be connected to the Ground Connector on the bottom of the Tuner Unit.



**Figure 7. Inverted “V” Dipole Antenna.**

## Tuner Connections

Connecting the CHA URT1 is easy since transceiver-specific control cables are not required. Connect the Transceiver to the Coupler Unit, the Coupler Unit to the Tuner Unit, the Tuner Unit to the Antenna, and apply 12V using the supplied power cable. Refer to figures (1) and (2) for connector details. The CHA URT1 can be used to tune single wire fed or coaxial cable fed antennas. Figure (8) shows the connections necessary for a single wire antenna. Figure (9) shows the connections necessary for coaxial cable fed antennas. When installing Coaxial Connectors outside, be sure to use a good quality weatherproof sealing tape, such as *Coax-Seal*<sup>(R)</sup>.

- The coaxial cable between the Coupler Unit and the Tuner Unit has 12V DC power applied to it by the Coupler Unit bias-T circuit, be sure the coaxial cable is connected to the correct connectors on both units.
- For the same reason, do not connect any device (antenna switch, diplexer, meter, etc.) between the Coupler Unit and Tuner Unit. Any such device could short out the 12V DC power on the coaxial cable, damage the tuner, and void the warranty. Electrical or electronic devices should be connected between the Transceiver and the Coupler Unit.

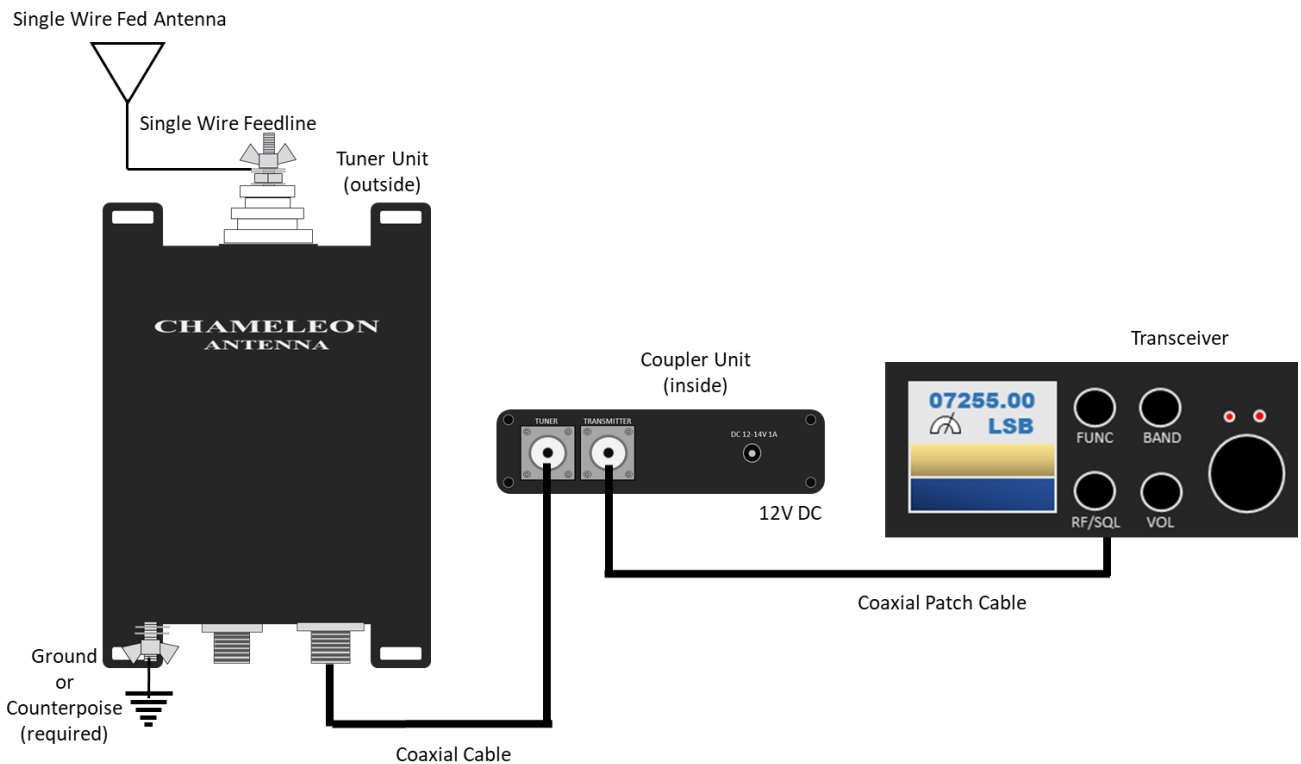
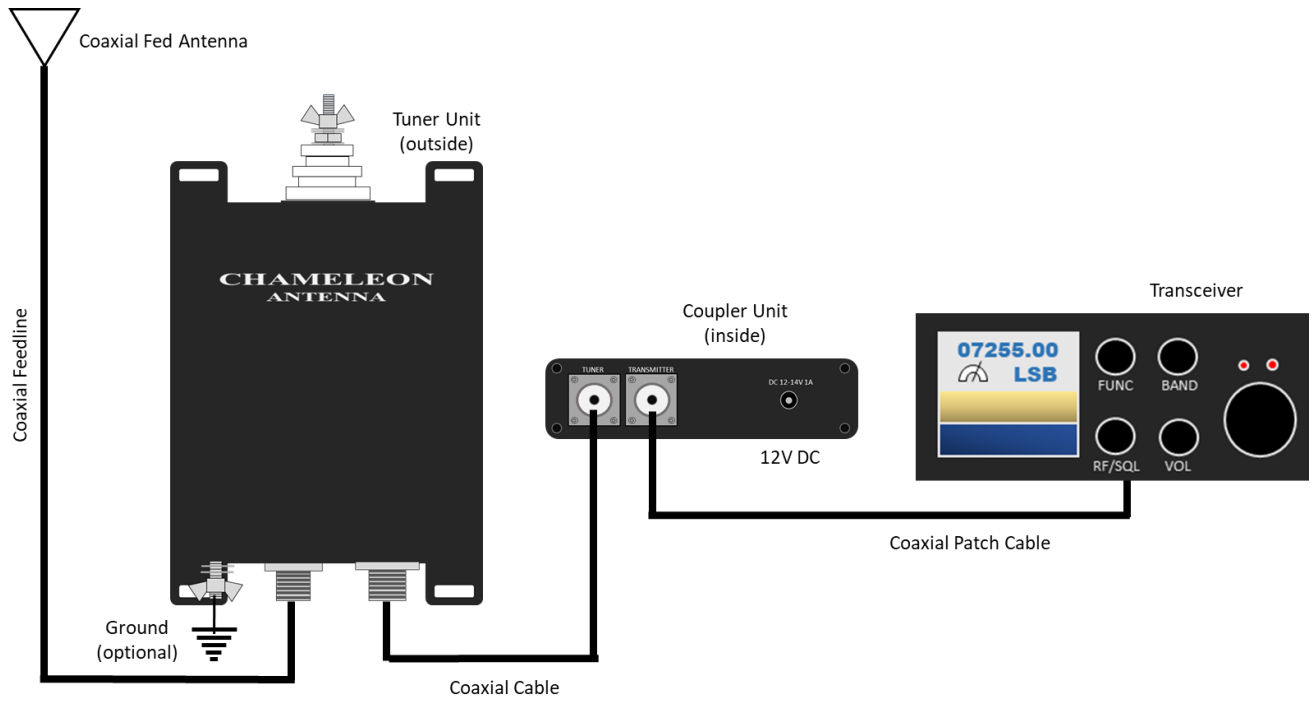


Figure 8. Single Wire Antenna Tuner Connections.



**Figure 9. Coaxial Fed Antenna Tuner Connections.**

## Tuner Operation

Operation of the CHA URT1 is one-button easy. To tune the antenna, perform the following steps:

1. Ensure the Tuner is connected. The TUNER indicator light will illuminate green when power is applied to the Coupler Unit.
2. Set the transceiver to the frequency on which you want to operate.
3. If your transceiver has an internal antenna tuner, ensure it is turned off or bypassed.
4. Set the mode to FM or RTTY (if your transceiver does not have FM or RTTY modes, use CW or AM).
5. Set power level to any value from 0.5 to 15 Watts.
6. Briefly press or tap the "TUNING" button.
7. Immediately key the transmitter so it produces a constant power output. Watch the Transceiver SWR meter and it will show the resulting SWR when the tuning cycle has completed. Unkey the transmitter when the tuning cycle completes (five seconds or less).



Figure 10. Coupler Unit Operation.

## Troubleshooting

1. Ensure the "TUNER" light is illuminated green. If not, check the 12V DC power supply and power connection to the Coupler Unit.
2. If the "ERROR" indicator is illuminated a steady red color, it indicates the coaxial cable between the Coupler Unit and the Tuner Unit has a short. Immediately remove power from the Coupler Unit. Replace or repair the coaxial cable between the Coupler Unit and the Tuner Unit. Make sure there are no devices (switch, diplexer, meter, etc.) connected between the Tuner Unit and Coupler Unit.
3. Ensure all connections are correct per figures (8) or (9).

4. Inspect antenna components, especially the coaxial cables, for indications of damage. Replaced damaged components. Most problems with antennas are caused by coaxial cables and connectors.
5. Be sure to check any patch cables or adapters used.
6. If your transceiver has an internal antenna tuner, ensure it is turned off or bypassed.
7. If still not operational, contact Chameleon Antenna™ for technical support.

## Accessories

The following accessories are available for purchase from Chameleon Antenna™. Go to [www.chameleonantenna.com](http://www.chameleonantenna.com) for current prices and availability.

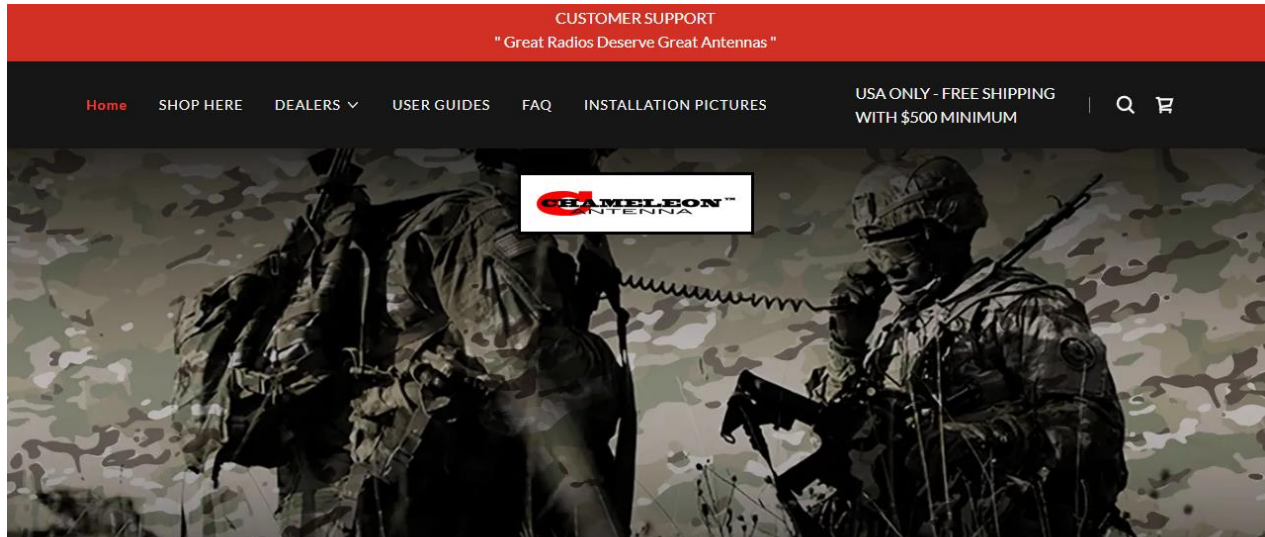
- **AC Adapter** – A “wall wart” style AC Adapter that plugs directly into the Coupler Unit and supplies 12V DC.
- **3 Ft. Coax Jumper Cable** - Connects your Tranceiver to the Coupler Unit.

## Specifications

- **Frequency Range:** 1.8 to 54.0 MHz.
- **Power Handling:** 125W SSB phone/CW, 100W SSB phone/CW 50 MHz, 60W all other modes.
- **Tuning Power Range:** 0.5 – 15 Watts.
- **Tuning Time:** 5 Seconds for full tune, 0.1 Seconds for memory tune.
- **Memory:** 16,000 frequencies.
- **Power Supply:** 12-14V DC, 1A
- **Temperature Range:** Approximately 14°F (10C) to 140°F (60C).
- **Tuner Unit Dimensions:** 8.8 x 5.1 x 1.8 inches (223 x 130 x 45 mm)
- **Tuner Unit Weight:** 38.8 oz (1100g)
- **Coupler Unit Dimensions:** 5.0 x 4.1 x 7 inches (128 x 105 x 43mm)
- **Coupler Unit Weight:** 14.1 oz (400g)

## Chameleon Antenna™ Products

Go to <http://chameleonantenna.com> for information about quality antenna products available for purchase from Chameleon Antenna™ – The Portable Antenna Pioneer.



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