# HF Portable Loop Antenna 3.0 (CHA F-LOOP 3.0 Basic, Total, and Plus) Operator's Manual

Nevada - USA
WWW.CHAMELEONANTENNA.COM

***VERSATILE – DEPENDABLE – STEALTH – BUILT TO LAST***

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WARNING! Never mount this, or any other antenna near power lines or utility wires! Any materials: ladders, ropes, or feedlines that contact power lines can conduct voltages that kill. Never trust insulation to protect you. Stay away from all power lines.

WARNING! Never operate this antenna where people could be subjected 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.

WARNING! A tuned loop can exhibit several hundred Volts and concentrated electromagnetic radiation when operating at QRP power levels (5-10 W). At higher RF levels, several thousand volts will be present at resonance! Exercise caution when using this antenna. Operate this antenna at your own risk.

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.

## Introduction

Thank you for purchasing and using the Chameleon Antenna™ High Frequency (HF) Portable Loop Antenna 3.0 (CHA F-LOOP 3.0). The unique craftsmanship of the CHA F-LOOP 3.0 distinguishes itself from the competition. The CHA F-LOOP 3.0 is available in three models:

1. CHA F-LOOP BASIC 3.0 – Standard and extended length flexible magnetic loop antenna covering 2.8 – 29.7 MHz (80 through 10 meter amateur bands);
2. CHA F-LOOP 3.0 PLUS – Same as BASIC model, but also includes a super high-efficiency two-piece rigid aluminum radiator loop;
3. CHA F-LOOP 3.0 TOTAL – Same as BASIC model, but also includes a larger 48 inch diameter booster flexible loop and coupling loop to improve performance from 4.0 - 23.1 MHz (40 through 15 meter amateur bands).

Easily deployable HF magnetic loop antennas, also called small transmitting loops, have been routinely used for many years in professional defense, military, diplomatic, and shipboard HF communication links, where robust and reliable general coverage radio communication is deemed mandatory. These antennas have only recently become commercially available for amateur radio.

You will be amazed by the performance of this antenna. The real practical advantage of the small loop, compared to a short vertical whip tuned against earth or a full-sized vertical antenna, is the loop's freedom from dependence on a ground plane and earth for achieving efficient operation; this unique characteristic has profound significance for small, restricted space antenna operation. In comparison, the bottom of a vertically oriented the loop does not need to be more than a loop diameter above ground making it very easy to install in a restricted location. There is no significant improvement in performance when a small loop is raised to great heights; all that matters is the loop is substantially clear of objects in the immediate area and oriented towards the desired direction of radiation.

Field trials of the CHA F-LOOP 3.0 (BASIC model shown in plate [1]), demonstrated that an inside magnetic loop antenna was only around one to two S-units lower, on both transmit and receive, than an outside full-size quarter wave vertical antenna. Remarkable for an antenna that is less than three foot in diameter and covers the 80 – 10 meter ham bands!

The magnetic loop is different than typical antennas because it emphasizes the magnetic part of the radio wave (H field) rather than the electric part (E field) of the radio wave. It also has a high Q (bandwidth of 17 KHz on 40 meters) providing immunity from interference outside the bandpass. The CHA F-LOOP 3.0 Antenna was designed with weight, portability, versatility and

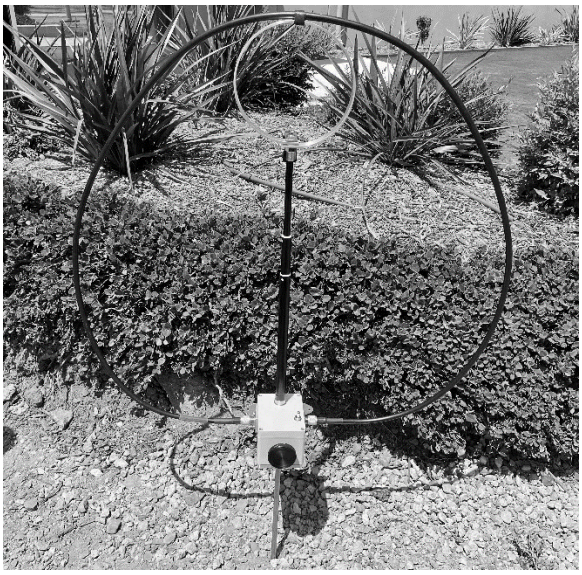


**Plate 1. CHA F-LOOP 3.0 BASIC.**

cost in mind, and is ideal for RVs, hotels, apartments, condominiums, townhouses, and places with restrictions where it is not feasible to erect a multi-band wire or vertical antenna.

The CHA F-LOOP BASIC 3.0, shown in plate (1), is comprised of a three-foot diameter flexible radiator loop, a coupling loop, a specially designed smaller tuning unit, new-style twist-lock telescoping mast, and coaxial feedline – all of which fit in the supplied military-style duffel bag.

The CHA F-LOOP 3.0 PLUS, shown in plate (2), has all the components and features of the BASIC model, plus a super high efficiency two-piece rigid aluminum radiator loop.

The CHA F-LOOP 3.0 TOTAL, has all the components and features of the BASIC model, plus a larger four-foot diameter booster flexible loop and coupling loop that improves performance in the 40 – 15 meter amateur service bands.

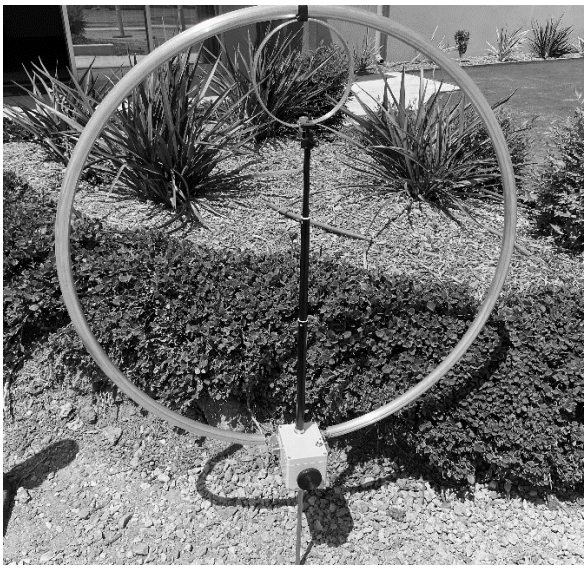


**Plate (2). CHA F-LOOP 3.0 PLUS.**

The CHA F-LOOP 3.0 doesn't require a ground-plane and doesn't need to be mounted up high. Do not use an antenna tuner or coupler, as it may cause you to mistune the antenna.

Antennas built by Chameleon Antenna™ are versatile, dependable, stealthy, and built to last. Please read this operator's manual so that you may maximize the utility you obtain from your CHA F-LOOP 3.0 antenna.

## HF Propagation

HF radio provides relatively inexpensive and reliable local, regional, national, and international voice and data communication capability. It is especially suitable for undeveloped areas where normal telecommunications are not available, too costly or scarce, or where the commercial telecommunications infrastructure has been damaged by a natural disaster or military conflict.

Although HF radio is a reasonably reliable method of communication, HF radio waves propagate through a complex and constantly changing environment and are affected by weather, terrain, latitude, time of day, season, and the 11-year solar cycle. A detailed explanation of the theory of HF radio wave propagation is beyond the scope of this operator's manual, but an understanding of the basic principles will help the operator decide what frequency will support their communication requirements.

HF radio waves propagate from the transmitting antenna to the receiving antenna using two methods: ground waves and sky waves.

Ground waves are composed of direct waves and surface waves. Direct waves travel directly from the transmitting
antenna to the receiving antenna when they are within the radio line-of-sight. Typically, this distance is 8 to 14 miles for field stations. Surface waves follow the curvature of the Earth beyond the radio horizon. They are usable, during the day and under optimal conditions, up to around 90 miles, see table (1). Low power, horizontal antenna polarization, rugged or urban terrain, dense foliage, or dry soil conditions can reduce the range very significantly. The U.S. Army found that in the dense jungles of Vietnam, the range for ground waves was sometimes less than one mile.

| Frequency | Distance | Frequency | Distance |
|---|---|---|---|
| **2 MHz** | 88 miles | **14 MHz** | 33 miles |
| **4 MHz** | 62 miles | **18MHz** | 29 miles |
| **7 MHz** | 47 miles | **24 MHz** | 25 miles |
| **10 MHz** | 39 miles | **30 MHz** | 23 miles |

**Table 1. Maximum Surface Wave Range by Frequency.**

Sky waves are the primary method of HF radio wave propagation. HF radio waves on a frequency below the critical frequency (found by an ionosonde) are reflected off one of the layers of the ionosphere and back to Earth between 300 and 2,500 miles, depending upon the frequency and ionospheric conditions. HF radio waves can then be reflected from the Earth to the ionosphere again during multi-hop propagation for longer range communication. The most important thing for the operator to understand about HF radio wave propagation is the concept of Maximum Usable Frequency (MUF), Lowest Usable Frequency (LUF), and Optimal Working Frequency (OWF). The MUF is the frequency for which successful communications between two points is predicted on 50% of the days of in a month. The LUF is the frequency below which successful communications are lost due to ionospheric loses. The OWF, which is somewhere between the LUF and around 80% of the MUF, is the range of frequencies which can be used for reliable communication. If the LUF is above the MUF, HF sky wave propagation is unlikely to occur.

The HF part of the Radio Frequency (RF) spectrum is usually filled with communications activity and an experienced operator can often determine where the MUF is, and with less certainty, the LUF by listening to where activity ends. The operator can then pick a frequency in the OWF and attempt to establish contact. Another method is using HF propagation prediction software, such as the *Voice of America Coverage Analysis Program (VOACAP)*, which is available at no cost to download or use online at www.voacap.com. The operator enters the location of the two stations and the program show a wheel with the predicted percentage of success based on frequency and time. ALE, which is the standard for interoperable HF communications, is an automated method of finding a frequency in the OWF and establishing and maintaining a communications link.

Even under optimal conditions, there is a gap between where ground waves end (around 40 to 90 miles) and the sky wave returns to Earth on the first hop (around 300 miles). NVIS propagation can be used to fill this gap. The frequency selected must be below the critical frequency, so NVIS is can normally only be

used on frequencies from around 2 to 10 MHz. Frequencies of 2 – 4 MHz are typical at night and 4 – 8 MHz during the day.

A magnetic loop antenna radiates at all angles from horizon to zenith, making it an equally effective antenna for both local and long-distance (DX) communication. While not specifically designed for NVIS, during field testing of the CHA F-LOOP 3.0, both DX and NVIS contacts were made on the 30 meter ham band within minutes of each other.

## Parts of the Antenna

The CHA F-LOOP 3.0 is comprised of the following components, see plates (3) and (4):


**Plate 3. CHA F-LOOP 3.0 Antenna Components.**

**a. Tuning Unit** – The Tuning Unit adjusts the resonant frequency of the CHA F-LOOP 3.0 antenna.

**b. Flexible Radiator Loop -** The Flexible Radiator Loop consists of a 34 inch diameter / 102 inch length of shorted coaxial cable with UHF Plugs (PL-259) at both ends.

**c. Coupling Loop -** The Coupling Loop is a 6 1/2 inch diameter rigid aluminum loop, which is attached to the end of the Telescoping Mast (g) and used in the CHA F-LOOP BASIC 3.0 antenna configuration. A slightly larger 7 inch diameter rigid aluminum loop is used in the CHA F-LOOP 3.0 PLUS antenna configuration. An even larger, 8 inch diameter rigid aluminum loop, is used in conjunction with the Booster Flexible Loop (e) in the CHA F-LOOP 3.0 TOTAL antenna configuration.

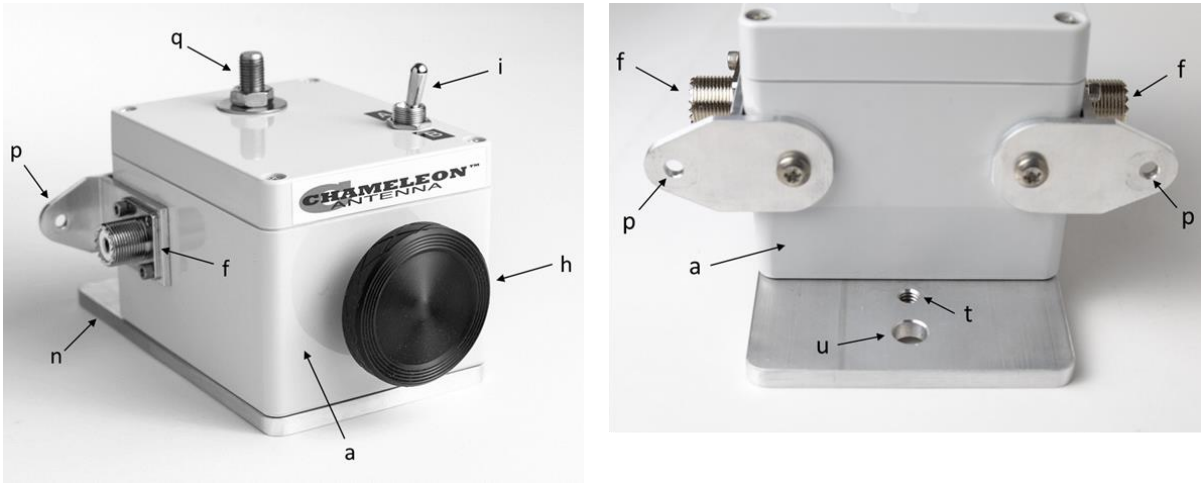



**Plate 4. CHA F-LOOP 3.0 Tuning Unit Details.**

**d. Flexible Radiator Loop Extension -** The Flexible Radiator Loop Extension consists of a 102 inch length of shorted coaxial cable with UHF Plugs at both ends. The Flexible Radiator Loop Extension enables the CHA F-LOOP 3.0 BASIC to operate the 80 meter ham band.

**e. Flexible Booster Loop *(included with TOTAL model)* -** The Flexible Booster Loop consists of a 48 inch diameter / 146 inch length of shorted coaxial cable with UHF Plugs at both ends and is designed to increase CHA F-LOOP 3.0 TOTAL performance in the 60 through 15 meter ham bands.

**f. Flexible Radiator Loop Connections -** The Flexible Radiator Loop Connections are UHF sockets (SO-239) located on the right and left sides of the Tuning Unit (a).

**g. Telescoping Mast -** The Telescoping Mast attaches the Tuning Unit (a) to the Coupling Loop (c).

**h. Tuning Knob -** The Tuning Knob is located on the front of the Tuning Unit (a) and is used to adjust the resonant frequency of the loop. The tuning capacitor rotates a total of around 2 ¾ revolutions. Left, or counter-clockwise, increases the resonant frequency of the antenna. Right, or clockwise, decreases the resonant frequency of the antenna.

i. **Band Switch -** The Band Switch is located on the top of the Tuning Unit (a). It has two positions, marked "A" and "B". "A" is the Low Range and "B" is the High Range. See the section "Loop Operation" for more details on operation of the Band Switch.

j. **Coupling Loop Attachment Bar -** The Coupling Loop Attachment Bar is used to attach the Coupling Loop (c) to the top of the Telescoping Mast (g).

k. **Coupling Loop Adjustment -** The Coupling Loop Adjustment is used to tighten the Coupling Loop Attachment Bar (j).

l. **Loop Connection -** The Loop Connection is a UHF socket located on the bottom of the Coupling Loop (c) used to attach the Coaxial Cable (m).

m. **Coaxial Cable -** The Coaxial Cable *(not shown)* is a 12 foot length of RG-58 coaxial cable, with an RF isolator at the antenna end, used to connect the CHA F-LOOP 3.0 Antenna to your radio set.

n. **Aluminum Base Plate -** The Aluminum Base Plate is on the bottom of the Tuning Unit (a). It is used to provide a stable base for placing the CHA F-LOOP 3.0 on a flat surface, such as a table, or to mount the CHA F-LOOP 3.0 to a heavy-duty camera tripod or an 3/8" antenna mount.

o. **Rigid Radiator Loop *(included with PLUS model)* -** The Rigid Radiator Loop *(not pictured)* is a super high efficiency two-piece aluminum radiator loop included with the PLUS model.

p. **Rigid Radiator Loop Mounts -** The Rigid Radiator Loop Mounts are used to attach the Rigid Radiator Loop (o) to the Tuning Unit (a).

q. **Telescoping Mast Stud -** The Telescoping Mast Stud is located on top of the Tuning Unit (a) and is used to attach the Telescoping Mast (g) to the Tuning Unit.

r. **Loop Extension Barrel Connector -** The Loop Extension Barrel Connector is a double-female UHF connector (SO-239) used to join the Flexible Radiator Loop (b) to the Flexible Radiator Loop Extension (d), which enables the CHA F-LOOP 3.0 to operate the 80 meter ham band.

s. **Power Compensator *(optional)* -** The optional Power Compensator attaches to Flexible Radiator Loop Connection (f) on the left side of the Tuning Unit (a). It is used to increase the power handling capability of the CHA F-LOOP 3.0.

t. **Camera Tripod Mount -** The Camera Tripod Mount is used to mount the CHA F-LOOP 3.0 to a heavy-duty camera tripod using a ¼" x 20 standard camera tripod stud. There are two threaded Camera Tripod Mounts in the Aluminum Base Plate (n), one in the center and one near the back edge. Either may be used.
A ¼" x 20 to 3/8" x 24 adapter (CHA SS ADAPTER) is available for purchase to enable use of the CHA SPIKE MOUNT, CHA JAWMOUNT, or CHA UCM optional high-quality antenna mounts.

u. **3/8" Antenna Mount -** The 3/8" Antenna Mount is an unthreaded hole at the rear of the Aluminum Base Plate (n) that enables attachment of the CHA F-LOOP 3.0 to any 3/8" antenna mount using a 3/8" x 24 hex bolt.

v. **Duffel Bag –** The military-style Duffel Bag *(not shown)*, is included with all models and is used to store the components of the CHA F-LOOP 3.0 when not deployed. It is incredibly versatile and can also be used as a backpack.

## Standard Single Flexible Loop Assembly (CHA F-LOOP 3.0 BASIC)

The Standard Single Flexible Loop configuration uses the standard (102 inch) Flexible Radiator Loop (b) and small (6 ½ inch) Coupling Loop (c) included with the CHA F-LOOP 3.0 BASIC, CHA FLOOP 3.0 PLUS, and CHA F-FLOOP 3.0 TOTAL antennas.

The CHA F-LOOP 3.0 BASIC antenna should be installed near the radio set; either indoors or in a sheltered outside area, such as a balcony or porch. Because the magnetic component of an electromagnetic wave is maximum at the boundary between the ground and the space above, loop performance is usually best when the loop is located near the ground at a distance outside of the loop's close-in induction field (just a loop diameter or two). The CHA F-LOOP 3.0 BASIC is not waterproof and must be installed in an area protected from the weather. Do not use an antenna tuner or coupler with this antenna, as it may cause you to mistune the antenna.

Perform the following steps to assemble the Standard Single Flexible Loop configuration.

1. Select a location to setup the CHA F-LOOP 3.0 BASIC antenna. The location can be indoors or in an outdoors area protected from the weather. The location must facilitate accessibility by the operator to the Tuning Knob (h). The operator needs to be able to adjust the Tuning Knob while listening to the receiver, activating the transmitter, and observing the SWR meter. If used indoors, the location should also be reasonably away from switching power supplies, Internet routers, and other sources of electrical and electronic interference.
2. Remove the CHA F-LOOP 3.0 BASIC components from the Duffel Bag (v).
3. Attach the Telescoping Mast (g) to the Tuning Unit (a) by screwing the bottom of the Telescoping Mast onto the Telescoping Mast Stud (q), located on the top of the Tuning Unit. Tighten snuggly, by gripping the base of the Telescoping Mast and turning clockwise. Do not grip the mast tubing or use tools when tightening.
4. Attach the small (6 ½ inch) Coupling Loop (c) to the Coupling Loop Attachment Bar (j), located at the top of the Telescoping Mast, by placing the threaded hole in the Coupling Loop bracket over the Coupling Loop Attachment stud and turning the Coupling Loop Adjustment (k) knob until snug. The UHF connector should be in front of the Telescoping Mast and point down, as shown in the upper-left inset of Plate (3).
5. Extend the Telescoping Mast sections so that the Telescoping Mast is 24 inches in length.

6. Connect one end of the Flexible Radiator Loop (b) to the left Radiator Loop Connection (f).
7. Connect the other end of the Flexible Radiator Loop to the right Radiator Loop Connection.
8. Secure the top middle of the Flexible Radiator Loop to the top middle of the Coupling Loop with one of the attached Sticky Straps.
9. Shape the Flexible Radiator Loop into a circular shape. The Coupling Loop and Flexible Radiator Loop should be in the same plane.
10. Place the CHA F-LOOP 3.0 BASIC on a flat surface, such as a tabletop, or attach the Aluminum Base Plate (n) to a heavy-duty camera tripod or other compatible antenna mount *(see the Accessories section for a list of compatible 3/8" antenna mounts available from Chameleon Antenna™).*
11. Connect the Coaxial Cable (m) to the Loop Connection (l).
12. Secure the Coaxial Cable Feedline along the Telescoping Mast to ensure easy tuning and consistent low SWR.
13. Perform an operational test *(see section on Loop Operation).*

## Double Flexible Loop Assembly (CHA F-LOOP 3.0 BASIC)

The Double Single Flexible Loop configuration uses the standard Flexible Radiator Loop, Flexible Radiator Loop Extension (d) and small Coupling Loop included with the CHA F-LOOP 3.0 BASIC, CHA FLOOP 3.0 PLUS, and CHA F-FLOOP 3.0 TOTAL.

The CHA F-LOOP 3.0 Double Flexible Loop configuration allows you to use the CHA F-LOOP 3.0 on the 80 meter ham band by extending the lower frequency of the CHA F-LOOP 3.0 down to 2.8 MHz. See Plate (5) and perform the following steps.

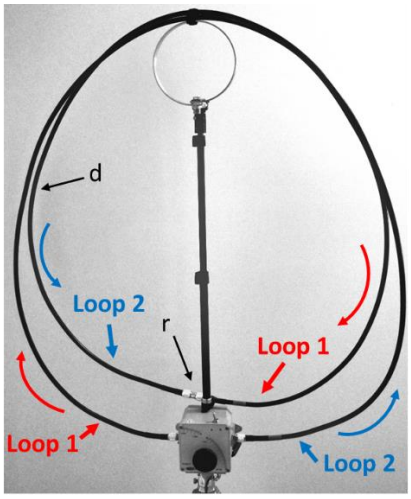



**Plate 5. Double Flexible Loop Antenna.**
***(CHA F-LOOP 2.0 shown)***

1. Perform assembly of the Standard Single Flexible Loop configuration.
2. Disconnect one end of the Flexible Radiator Loop (b) **"Loop 1"** from one of the Flexible Radiator Loop Connections (f).
3. Connect the free end of the Flexible Radiator Loop **"Loop 1"** to the Loop Extension Barrel Connector (r).
4. Connect one end of the Flexible Radiator Loop Extension (d) **"Loop 2"** to the open Flexible Radiator Loop Connection from step 2.
5. Form the Flexible Radiator Loop Extension **"Loop 2"** into a loop, like the Flexible Radiator Loop **"Loop 1"**.
6. Attach the top of the Flexible Radiator Loop Extension **"Loop 2"** to the top of the Coupling Loop (c) using the attached sticky strap.

7. Connect the free end of the Flexible Radiator Loop Extension **"Loop 2"** to the open end of the Loop Extension Barrel Connector.
8. Set Band Switch (i) to the "A" position.
9. Perform an operational test *(see section on Loop Operation).*

## Flexible Booster Loop Assembly (CHA F-LOOP 3.0 TOTAL)

The CHA F-LOOP 3.0 TOTAL uses the Flexible Booster Loop (e) and a large (8 inch) Coupling Loop to increase performance in the 60 to 15 meter ham bands. The CHA F-LOOP 3.0 TOTAL antenna should be installed near the radio set; either indoors or in a sheltered outside area, such as a balcony or porch. Because the magnetic component of an electromagnetic wave is maximum at the boundary between the ground and the space above, loop performance is usually best when the loop is located near the ground at a distance outside of the loop's close-in induction field (just a loop diameter or two). The CHA F-LOOP 3.0 TOTAL is not waterproof and must be installed in an area protected from the weather. Do not use an antenna tuner with this antenna, as it may cause you to mistune the antenna.

Perform the following steps to assemble the Flexible Booster Loop Antenna, see plates (2) and (3).

1. Select a location to setup the CHA F-LOOP 3.0 TOTAL antenna. The location can be indoors or in an outdoors area protected from the weather. The location must facilitate accessibility by the operator to the Tuning Knob (h). The operator needs to be able to adjust the Tuning Knob while listening to the receiver, activating the transmitter, and observing the SWR meter. If used indoors, the location should also be reasonably away from switching power supplies, Internet routers, and other sources of electrical and electronic interference.
2. Remove the CHA F-LOOP 3.0 TOTAL components from the Duffel Bag (v).
3. Attach the Telescoping Mast (g) to the Tuning Unit (a) by screwing the bottom of the Telescoping Mast onto the Telescoping Mast Stud (q), located on the top of the Tuning Unit. Tighten snuggly, by gripping the base of the Telescoping Mast and turning clockwise. Do not grip the mast tubing or use tools when tightening.
4. Attach the large (8 inch) Coupling Loop (c) to the Coupling Loop Attachment Bar (j), located at the top of the Telescoping Mast, by placing the threaded hole in the Coupling Loop bracket over the Coupling Loop Attachment stud and turning the Coupling Loop Adjustment (k) knob until snug. The UHF connector should be in front of the Telescoping Mast and point down, as shown in the upper-left inset of Plate (3).
5. Fully extend the Telescoping Mast sections.
6. Connect one end of the Flexible Booster Loop (e) to the left Radiator Loop Connection (f).
7. Connect the other end of the Flexible Booster Loop to the right Radiator Loop Connection.
8. Secure the top middle of the Flexible Booster Loop to the top middle of the Coupling Loop with one of the attached Sticky Straps.
9. Shape the Flexible Booster Loop into a circular shape. The Coupling Loop and Flexible Booster Loop should be in the same plane.
14. Place the CHA F-LOOP 3.0 TOTAL on a flat surface, such as a tabletop, or attach the Aluminum Base Plate (n) to a heavy-duty camera tripod or other compatible antenna mount *(see the Accessories section for a list*

*of compatible 3/8" antenna mounts available from Chameleon Antenna™).*

10. Connect the Coaxial Cable Feedline (m) to the Loop Connection (l).
11. Secure the Coaxial Cable Feedline along the Telescoping Mast to ensure easy tuning and consistent low SWR.
15. Perform an operational test *(see section on Loop Operation).*

## Rigid Radiator Loop Assembly (CHA F-LOOP 3.0 PLUS)

The CHA F-LOOP 3.0 PLUS uses the Rigid Radiator Loop (o) and the small (7 inch) Coupling Loop to improve efficiency in the 40 to 10 meter ham bands. The CHA F-LOOP 3.0 PLUS antenna should be installed near the radio set; either indoors or in a sheltered outside area, such as a balcony or porch. Because the magnetic component of an electromagnetic wave is maximum at the boundary between the ground and the space above, loop performance is usually best when the loop is located near the ground at a distance outside of the loop's close-in induction field (just a loop diameter or two). The CHA F-LOOP 3.0 PLUS is not waterproof and must be installed in an area protected from the weather. Do not use an antenna tuner with this antenna, as it may cause you to mistune the antenna.

Perform the following steps to assemble the Rigid Radiator Loop Antenna, see plate (6).

1. Select a location to setup the CHA F-LOOP 3.0 PLUS antenna. The location can be indoors or in an outdoors area protected from the weather. The location must facilitate accessibility by the operator to the Tuning Knob (h). The operator needs to be able to adjust the Tuning Knob while listening to the receiver, activating the transmitter, and observing the SWR meter. If used indoors, the location should also be reasonably away from switching power supplies, Internet routers, and other sources of electrical and electronic interference.
2. Remove the CHA F-LOOP 3.0 PLUS components from the Duffel Bag (v).
3. Attach the Telescoping Mast (g) to the Tuning Unit (a) by screwing the bottom of the Telescoping Mast onto the Telescoping Mast Stud (q), located on the top of the Tuning Unit. Tighten snuggly, by gripping the base of the Telescoping Mast and turning clockwise. Do not grip the mast tubing or use tools when tightening.
4. Attach the small Coupling Loop (c) to the Coupling Loop Attachment Bar (j), located at the top of the Telescoping Mast, by placing the threaded hole in the Coupling Loop bracket over the Coupling Loop Attachment stud and turning the Coupling Loop Adjustment (k) knob until snug. The UHF connector should be in front of the Telescoping Mast and point down, as shown in the inset of Plate (3).

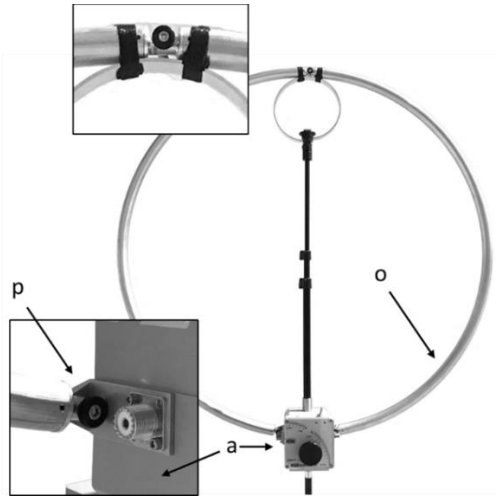



**Plate 6. Rigid Radiator Loop Assembly.**
**(F-LOOP 2.0 shown)**

5. Extend the Telescoping Mast sections so that the Telescoping Mast is 24 inches in length.
6. Attach the flange at the bottom of one end of the Rigid Radiator Loop (o) to the left Rigid Radiator Loop Mount (p) using the hardware provided. Do not tighten.
7. Attach the flange and the bottom of the other end of the Rigid Radiator Loop to the right Rigid Radiator Loop Mount using the hardware provided. Tighten the wing nuts on both sides of the loop finger tight.
8. Secure the top middle of the Rigid Radiator Loop to the top middle of the Coupling Loop with one of the attached Sticky Straps. The Coupling Loop and Rigid Radiator Loop should be in the same plane. *Note: a ¼ inch gap between the Coupling Loop and Rigid Radiator Loop usually provides best results. Some adjustment may be required.*
16. Place the CHA F-LOOP 3.0 PLUS on a flat surface, such as a tabletop, or attach the Aluminum Base Plate (n) to a heavy-duty camera tripod or other compatible antenna mount *(see the Accessories section for a list of compatible antenna mounts available from Chameleon Antenna™).*
9. Connect the Coaxial Cable Feedline (m) to the Loop Connection (l).
10. Secure the Coaxial Cable Feedline along the Telescoping Mast to ensure easy tuning and consistent low SWR.
17. Perform an operational test *(see section on Loop Operation).*

## Power Compensator Installation

The optional Power Compensator will increase the power handling capability of the CHA F-LOOP 3.0 BASIC or TOTAL to 60W intermittent duty cycle (SSB telephony) and 25W continuous duty cycle (CW, AM, FM, RTTY, and SSB-based digital). To install the Power Compensator, install the spacer nut and Power Compensator (s) bracket onto the left Flexible Radiator Loop Connection (f) and position the canister as shown in Plate (7). If used, attach one end of the Flexible Radiator Loop (b) to the Flexible Radiator Loop Connection. Tighten the spacer nut as necessary for a snug connection.

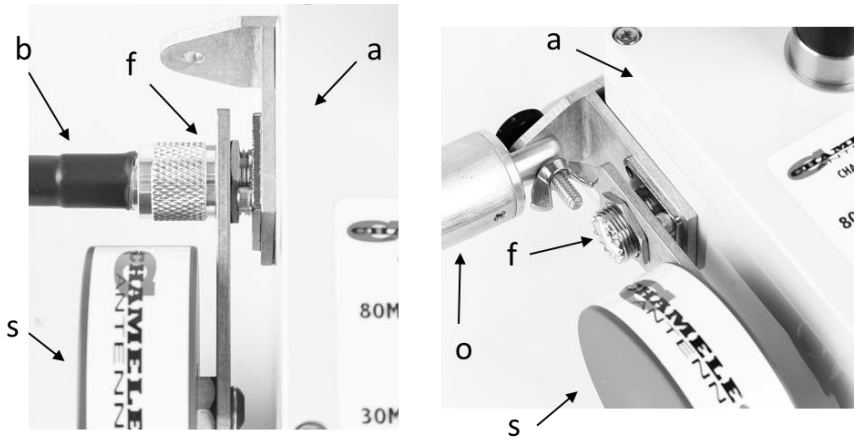



**Plate 7. Power Compensator Installation, Basic and Total (left) Plus (right).**

CAUTION: When using the Power Compensator, exceeding the specified power limits or prolonged transmission with an SWR above 3.0:1 will permanently damage the internal components of the Power Compensator. Also, dropping or rough handling the Power Compensator will permanently damage the internal components. *Damage caused by these conditions is not covered by the warranty.*

## Loop Operation

The CHA F-LOOP 3.0 is very easy to use. Perform the following steps whenever you change frequency.

1. The CHA F-LOOP 3.0 is bidirectional favoring the sides, see plate (8). If possible, point one side toward the target signal and rotate the antenna for maximum signal strength.

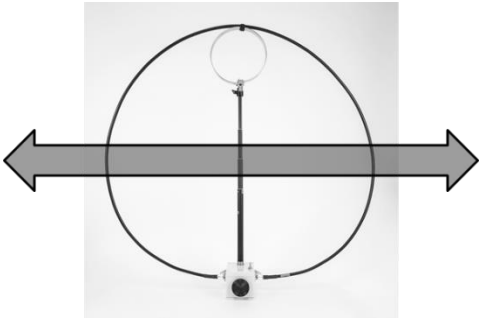


**Plate 8. CHA F-LOOP Antenna Directivity.**

2. Set the Band Switch (i) to the desired frequency range. Table (2) shows the more precise frequency range for each antenna configuration and switch setting. If the desired operating frequency is in both positions, "A" is preferrable.

| Antenna Configuration | Frequency Range (MHz) in A Position* | Frequency Range (MHz) in B Position* |
|---|---|---|
| Standard | 4.7 – 22.4 | 6.7 – 29.7 |
| Double | 2.8 – 10.2 | 5.0 – 11.9 |
| Booster | 4.0 – 17.9 | 5.4 - 23.1 |

*frequency range may vary slightly

**Table 2. "A/B" Frequency Ranges.**

3. Adjust the Tuning Knob (h) for maximum receive signal strength. Turn the Tuning Knob counterclockwise to decrease the resonant frequency, see Plate (9).


**Plate 9. CHA F-LOOP Antenna Tuning.**

You will know when you are close to resonant frequency because you will start hearing signals and a marked increase in receiver background noise. The Tuning Knob uses a 6:1 reduction drive which allows for fine adjustment and will rotate approximately 2¾ revolutions from lowest to highest frequency. Although the mechanism includes a clutch to prevent damage, you should not force the knob past the stops.

4. Ensure your transmitter is set for no more than 5 Watts during tuning.
5. Transmit a carrier and gradually turn the Tuning Knob counterclockwise and then

clockwise, around the highest receive signal point found in step 3, to obtain the lowest SWR. An SWR of 3.0:1 or less is satisfactory. Your hand may slightly influence the resonance of the loop while turning the Tuning Knob. This is completely normal, and you may have to "touch up" the adjustment slightly. The bandwidth of the loop at 60 meters is only 8 KHz, so once you are close to resonance, make only the slightest of Tuning Knob adjustments.

6. Increase transmitter power to no more than 25 Watts, see specifications.

## Disassembly

1. Disconnect Coaxial Cable and neatly coil cable.
2. If used, disconnect Flexible Radiator Loop, carefully coil loop, and secure with attached sticky strap.
3. If used, disconnect Flexible Radiator Loop Extension, carefully coil loop, and secure with attached sticky strap.
4. If used, detach the Flexible Booster Loop and secure pieces with attached sticky straps.
5. If used, un-attach the Rigid Radiator Loop. Re-install the hardware in the Rigid Radiator Loop flanges, so they do not get lost.
6. Fully collapse Telescoping Mast.
7. Remove Coupling Loop from the Telescoping Mast.
8. Remove the Telescoping Mast from the Tuning Unit.
9. Clean and inspect antenna components and then place them into the Duffel Bag.
10. The antenna is now ready for transport and storage.

## Troubleshooting

1. Ensure the loop is away from metal surfaces. Sometimes simply reorienting, relocating, or elevating the loop around two to four feet higher will reduce the SWR.
2. Ensure Radiator Loop Connections are securely tightened.
3. Inspect Flexible Radiator Loop for damage. Replace if damaged.
4. Ensure the Coaxial Cable Connection is securely tightened to the Loop Connection.
5. Inspect the Coaxial Cable Feedline for cuts in insulation or exposed shielding. Replace if damaged.
6. Ensure Band Switch is set for your frequency range.
7. Turn Tuning Knob fully counterclockwise.
8. Slowly adjust the Tuning Knob over entire range listening for a marked increase in received signal strength and receiver background noise.
9. If still not operational, replace the Coaxial Cable Feedline. *Most problems with antenna systems are caused by the coaxial cables and connectors.*
10. If still not operational, contact us for technical support.

## Preventive Maintenance

Like all our products, the CHA P-LOOP 3.0 is built to be rugged, long lasting and with details in mind. The craftsmanship of the system is unique to Chameleon Antenna™. The materials used in this antenna are water and rust resistant and do not require preventive maintenance, but they should be inspected for damage and cleaned with mild household cleaners after field use.

## Specifications

- Frequency:
  CHA F-LOOP 3.0 BASIC: Standard Flexible Loop: approximately 4.7 – 29.7 MHz (60 through 10 meter ham bands), Double Flexible Loop: approximately 2.8 – 11.9 MH (80 through 30 meter ham bands),
  CHA F-LOOP 3.0 PLUS: Rigid Radiator Loop: not measured, but guaranteed 5.4 to 29.7 MHz (60 through 10 meter ham bands).
  CHA F-LOOP 3.0 TOTAL: Flexible Booster Loop: approximately 4.0 - 23.1 MHz (60 through 15 meter ham bands).
- Power: 25W intermittent duty cycle (SSB telephony), 10W continuous duty cycle (CW, AM, FM, RTTY, and other digital modes).
- Diameter: 34 inches (Standard Loop), 48 inches (Booster Loop), 36 inches (Rigid Loop)
- Ingress Protection: Not water resistant. Equivalent to IP30 *(not tested).*
- RF Connection: UHF Plug (PL-259)
- Color: Black and Gray
- SWR: Operator tunable, typically not greater than 3.0:1 at resonance.
- Table (3) shows typical 2:1 bandwidth for the three antenna configurations. Note: The bandwidth of the Rigid Loop was not measured but should be comparable to the Standard configuration.

| 2:1 SWR BANDWIDTH (KHZ)* | | | |
|---|---|---|---|
| BAND | STANDARD | DOUBLE | BOOSTER |
| 80 | - | 6 | - |
| 60 | 8 | 12 | - |
| 40 | 17 | 14 | 16 |
| 30 | 27 | 28 | 30 |
| 20 | 40 | - | 60 |
| 17 | 60 | - | 90 |
| 15 | 100 | - | 140 |
| 12 | 160 | - | - |
| 10 | 210 | - | - |

*Bandwidth may vary

**Table 3. 2:1 SWR Bandwidth.**

- Weight: 4 lbs.
- Personnel Requirements and Setup Time: one operator, around 2 minutes.
- **IMPORTANT: Do not use an antenna tuner or coupler with this antenna!**

## Accessories

The following accessories are available for purchase from Chameleon Antenna™. Please contact us at support@chameleonantenna.com for current prices and availability.

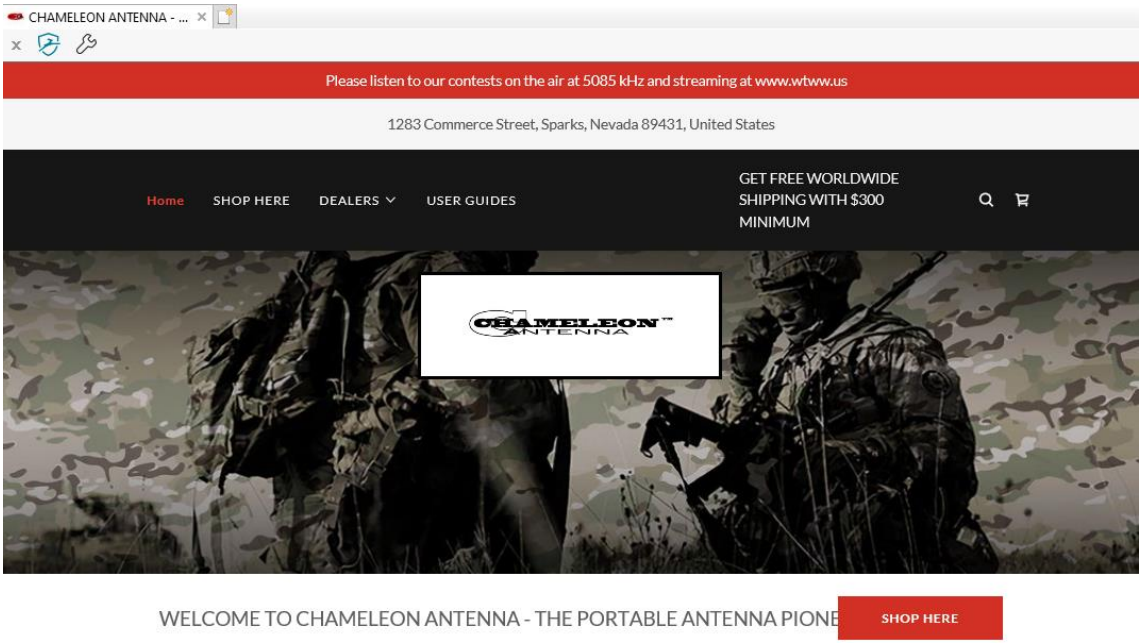
- **CHA SS ADAPTER –** Stainless steel adapter that converts ¼" x 20 camera tripod to 3/8" x 24 antenna mount.
- **CHA JAWMOUNT -** The Chameleon Jaw Mount has been assembled to offer portable antenna versatility for Chameleon Antenna owners. The mount orientation can easily be changed with a simple 3/16 Allen Key.
- **CHA UCM -** The CHA UCM is by far the ultimate mounting system on the market. Durable, and perfect for use in semi-permanent or portable installations. Quick, easy installation, and removal. The Easy up UCM lets you easily mount your antenna, to virtually any flat surface.
- **CHA SPIKE MOUNT -** The CHA SPIKE MOUNT is an innovative product built exclusively by the skilled machinists at Chameleon Antenna™. It is a precision fabricated heavy-duty stainless-steel stake with a fitting for attaching a counterpoise. It is rugged and highly portable and enables easy ground mounting of Chameleon antenna systems.
- **CHA POWER COMPENSATOR -** The CHA PC is built exclusively by Chameleon Antenna and increases the power handling capability of all Chameleon Antenna magnetic loop antennas by about 2 1⁄2 times.
- **Booster Kit.** Includes a 48 inch diameter / 146 inch long shorted coaxial cable loop and a 8 inch rigid coupling loop, which increases CHA F-LOOP 3.0 efficiency from 60 to 15 meters. *(This kit is included with the CHA F-LOOP 3.0 TOTAL)*

Recommended non-supplied accessories:

- SWR Power Meter.
- Heavy-Duty Tripod.

## Chameleon Antenna™ Products

Please go to http://chameleonantenna.com for information about additional quality antenna products available for purchase from Chameleon Antenna™ – The Portable Antenna Pioneer.

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3. Turkes, Gurkan, 1990, *Tactical HF Field Expedient Antenna Performance Volume I Thesis*, U.S. Naval Post Graduate School, Monterey, CA.