

SteppIR™

CrankIR Portable Antenna System Assembly & Instruction Manual



This assembly manual is intended to be printed in full **COLOR**. If the manual is printed in **black and white**, many important details could be lost.

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WARNINGS

THIS ANTENNA IS AN ELECTRICAL CONDUCTOR. CONTACT WITH POWER LINES CAN RESULT IN DEATH, OR SERIOUS INJURY. DO NOT INSTALL THIS ANTENNA WHERE THERE IS ANY POSSIBILITY OF CONTACT WITH HIGH VOLTAGE OR ARC-OVER FROM POWER CABLES OR SERVICE DROPS TO BUILDINGS. THE ANTENNA SUPPORT MAST OR RADIAL(S) MUST NOT BE CLOSE TO ANY POWER LINES DURING INSTALLATION, REMOVAL, OR IN THE EVENT PART OF THE SYSTEM SHOULD ACCIDENTALLY FALL. EVEN BEING CLOSE TO POWER CABLES HIGH VOLTAGE AURALS CAN CAUSE LETHAL VOLTAGES IN THE ANTENNA.

FOLLOW THE GUIDELINES FOR ANTENNA INSTALLATIONS RECOMMENDED BY THE U.S. CONSUMER PRODUCT SAFETY COMMISSION.

EXTREME CARE MUST BE USED FOR YOUR SAFETY. YOU MUST INSURE THAT WHILE THE CRANKIR IS IN OPERATION NEITHER PEOPLE NOR PETS CAN COME IN CONTACT WITH ANY PORTION OF THE ANTENNA INCLUDING THE RADIALS.

DEADLY VOLTAGES AND CURRENTS MAY EXIST. ALSO, SINCE THE EFFECTS OF EXPOSURE TO RF ARE NOT FULLY UNDERSTOOD, LONG TERM EXPOSURE TO INTENSE RF FIELDS IS NOT RECOMMENDED.

RADIALS, BOTH ELEVATED AND GROUND MOUNTED SHOULD BE MARKED WITH WARNING TAPE AT APPROPRIATE INTERVALS TO VISUALLY ALERT PEOPLE TO THEIR PRESENCE.

ALL DEPLOYMENTS OF THE CRANKIR SHOULD BE GUYED TO AVOID THE RISK OF SERIOUS INJURY FROM THE ANTENNA FALLING.

STANDARD PIECES AND OPTIONS

STANDARD ITEMS

CrankIR 40m-2m Main Box:

Standard unit includes 55' of radiator wire and 55' of non-conductive leader.

16 foot Telescopic Pole:

10 section pole collapses to a mere 24" for easy transport and storage.

Pole Tip Tensioner:

2x 23" Fiberglass arms with pulleys, attached to pivot block. Provides constant tension to Vertical Radiator Wire/Cord.

Radial Lug:

For easy attachment to existing radial field or user-supplied cut-length radial.

OPTIONS

Tunable Radial Unit:

Provides simple "Turn the Crank Tuning" of the radial utilizing the same tuning system as the CrankIR Antenna. The antenna can be tuned to any band by simply setting the radial and vertical radiator to the matching color-coded band marks. No additional tuning is normally required.

40m-2m version includes 55' radiator wire and 80' non-conductive leader.

80m-2m version includes 100' radiator wire and 125' non-conductive leader.

80m Kit:

A must for serious 80m operations. Includes 80m-2m version Tunable Radial Unit (above) and Pole Extension Kit (below). Continuous coverage from 80m-2m.

OPTIONS (continued)

Pole Extension Kit:

Strongly recommended for 80m, improves 40m and 30m as well. Extends 16' pole to 22'. Couplers and 3 pole sections fit into 24" travel bag.

Dipole Kit:

Includes additional 16' Telescoping Pole, Pole Tip Tensioner, and Mounting Brackets. Allows conversion of CrankIR to a 20m-6m dipole.

Wire Radials:

40m—55' of 18 gauge insulated wire with terminal lug on one end. Includes line winder.

80m—100' of 18 gauge insulated wire with terminal lug on one end. Includes line winder.

1. CRANKIR INTRODUCTION

The CrankIR is a lightweight, high performance, extremely portable antenna that is suitable for use both in the field or at home when stealth operation is desired. The entire antenna collapses down to less than 24" and can be assembled and on the air in less than ten minutes.

The basic CrankIR model covers from 40m – 2m and has a power rating of 1500 watts. The vertical radiator is supported by the included 16' fiberglass pole consisting of ten 2' sections, which when collapsed is 24" long. For 80m capability we offer the 80m Option Kit (PN 06415) which includes a fiberglass pole and additional wire for the optional Radial Unit (PN 06401), see previous page. The antenna uses highly flexible 18 gauge copper wire for the radiating elements resulting in lightweight and high efficiency. This antenna is quickly and easily manually tuned by adjusting the hand cranked wire reels.

Tuning is easy with the built-in LED Impedance Meter; simply adjust the antenna until the LED is dimmest. An antenna tuner is not necessary to tune the CrankIR.

High efficiency is achieved by design; there are no coils, only capacity hat type resonating is used. There are no matching

networks; matching is accomplished by very low loss off-center feeding. When the vertical radiator is shorter than 1/4 wavelength (WL) the impedance drops significantly which then requires some way to match the lower antenna impedance to the 50 ohm transmitter. On the CrankIR, matching is done by off-center feeding the antenna. This is accomplished by extending the radial much longer than the normal 1/4 WL. By simply moving the feedpoint away from the center, a higher impedance is obtained with very little loss. The farther you move from the center the higher the impedance is. This method does result in increased imbalance so we provide a specially designed balun to insure the RF does not go down the feedline. Our patented loop element design resonates the antenna without the use of lossy coils. This results in a higher radiation resistance (by a factor of up to 2:1) than the same amount of coil loading; this, in turn, increases antenna efficiency.



Bob Fuller, W7KWS on the air with a CrankIR prototype. QTH Kauai, HI.

2. OPERATION CONTROLS



2. OPERATING CONTROLS

1 REEL CRANK HANDLE

Aluminum crank handle used to reel the wire in and out.

2 CORD REEL LOCK/DRAG

Drag adjustment that allows the cord reel to slip or lock together with the wire reel. The amount of drag is easily set by adjusting how tight the hand knob is set. The reels can be locked together without undue torque on this knob. This allows adjustment of the tension on the Wire/Cord . To remove the cord reel unscrew and remove this knob and pull the reel off, being careful not to lose the two plastic washers or cork clutch disc underneath.

3 RETURN SUPPORT ROD/CORD GUIDE BLOCK

The Return Support Rod mounts on this block by inserting and twisting the rod clockwise until the stop is reached. It also helps prevent the cord from coming off of the reel and tangling.

4 POLE CLAMPING WINGNUTS

Eight hand operated wingnuts that clamp the antenna unit to the tripod or other mounting pole, four knobs clamp the mount pole and four clamp the vertical fiberglass pole.

5 CLAMP SADDLES

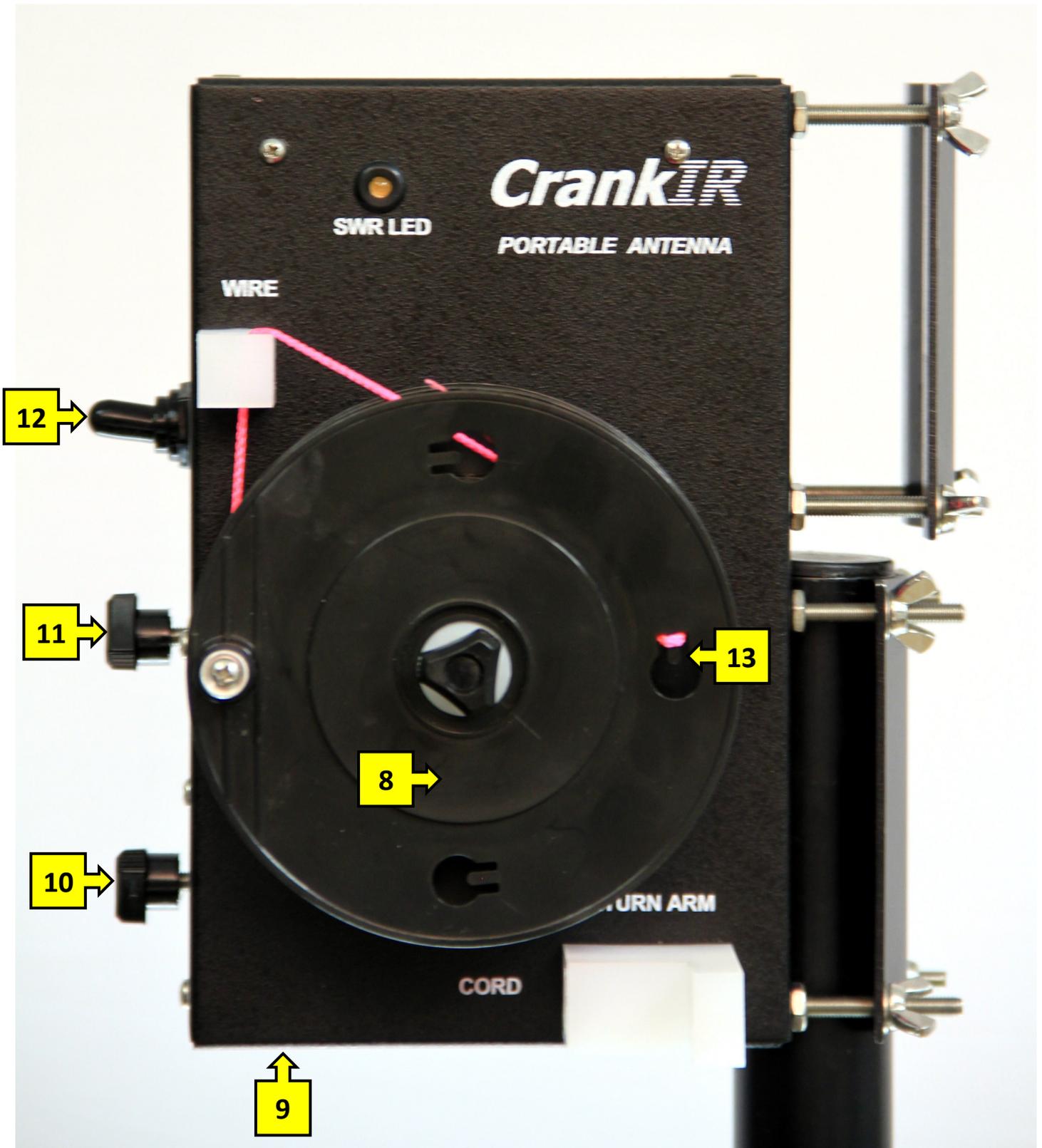
These two saddles form the outer half of the clamps that hold the vertical telescoping pole and the tripod to the antenna unit. The side of the antenna box is formed into a V to function as the mating saddle. The clamps can be flipped over to allow mounting to a small diameter pole

6 SWR INDICATOR LED

When the momentary SWR Bridge Switch **12** is actuated, adjust the antenna (both the vertical radiator and the radials) until this white LED is at minimum brightness. In many cases it will extinguish completely which indicates the lowest SWR point.

7 WIRE GUIDE BLOCK

Guides the wire as it is adjusted to prevent the wire from coming off the reel and tangling.



8 WIRE/CORD REEL ASSEMBLY

Two reels mounted on the same shaft to allow wire and cord to be reeled either in or out to facilitate tuning the antenna. The Wire/Cord is wound onto the reels so when one is winding out the other is winding in, allowing adjustment of the wire length over a wide range.

9 GROUND LUG/TUNABLE RADIAL UNIT MOUNTING HOLE

The .437 dia. (7/16") hole for either the included Ground Lug shaft with hand locking knob or optional Radial Reel Unit (PN 06401) mounts here. If the optional Tunable Radial Unit is not used, fixed length radials must be connected to the Ground Lug Shaft.

10 RADIAL RELEASE KNOB

This knob has two functions, it locks the Radial Reel shaft in any direction allowing you to "point" the radial in the desired direction and lock it. It also allows you to remove the Radial Reel or the Ground Lug by backing the knob out far enough to disengage from the groove in the shaft allowing the shaft to be pulled out. Make sure the Radial Release Knob is tight during operation to ensure radial electrical connection.

11 WIRE REEL LOCK/DRAW

Locks the vertical radiator reel shaft, this will keep the Wire/Cord from unwinding during transport and storage. The amount of drag is easily controlled by this knob as well.

12 TUNING MODE SWITCH

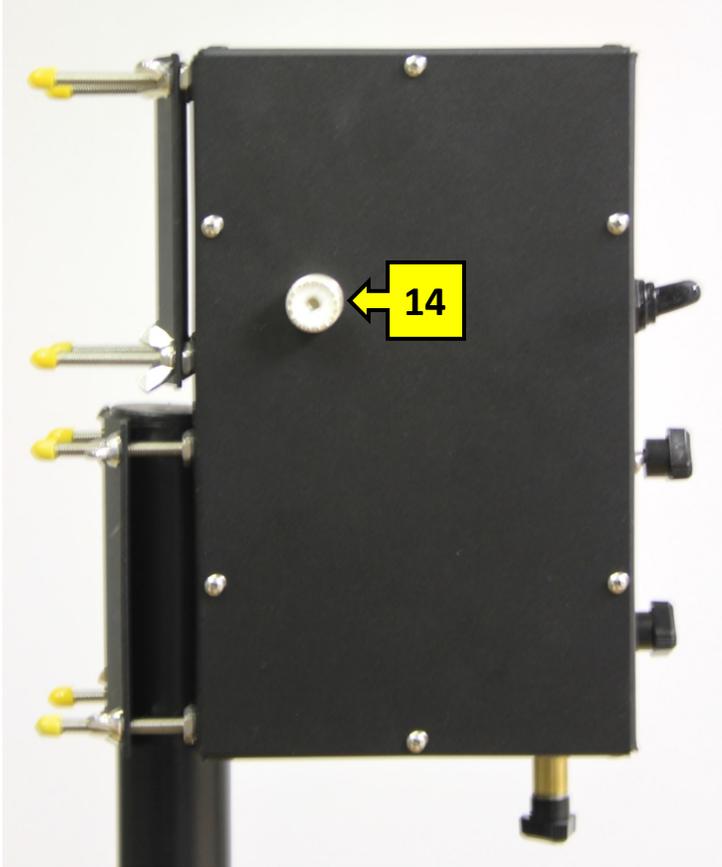
This momentary switch connects the coax directly to the antenna in the Normal position. When actuated to the Tune position the impedance bridge is switched into the circuit allowing you to tune the antenna to 50 ohms, as indicated by the LED going to the dimmest level. Do not use more than 15W in this mode.

13 CORD REEL HOOK

Allows easy attachment / detachment of the leader cord loop.

14 ANTENNA CONNECTOR

Connect 50-ohm coax terminated with a PL-259 connector to this SO-239 connector. (See picture on next page, located on back of main unit.)



Main box—back cover

Main box—side view



Pole Tip Tensioner Assembly



Standard Radiator / Radial Lengths:

The vertical radiator is marked at 1/4 WL intervals with color-coded indicators on the wire. Color-coded indicators are also included with the optional Radial Unit but are not permanently set to the wire to allow fine tuning or radial lengths by the customer.

BLACK	10m	99 inches	
RED	12m	112.75 inches	
ORANGE	15m	133 inches	Typical radial lengths will be the same as for the vertical radiator but will vary based upon location.
YELLOW	17m	155.75 inches	
GREEN	20m	199 inches	
BLUE	30m	279.25 inches	
VIOLET	40m	394.38 inches	

Before You Begin:

Carefully choose your setup location

When choosing a location to set up the CrankIR be sure to select a space with plenty of room to extend the vertical radiator and radial(s) to the appropriate length for the lowest desired band of operation. Make sure there is adequate overhead clearance and no obstructions where the radial(s) will be deployed.

Be aware of possible hazards

The exposed wire is highly conductive, ***if there is potential for lightning the antenna should not be deployed.***

Although the antenna has a small wind-load it can easily be blown-over by a moderate gust. Guying the antenna is the safest, most reliable way to ensure it does not fall over. Using weights or stakes can be a convenient strategy for short operations.

Always use common sense when setting up the antenna in a location with other people around. Don't risk injury to yourself or others — if the antenna can fall over and hurt someone — guy it!



Do You Have Everything?

Make sure you have everything you need before you begin to set up the antenna. Lay everything out at the setup location just to be sure.

3. GETTING STARTED

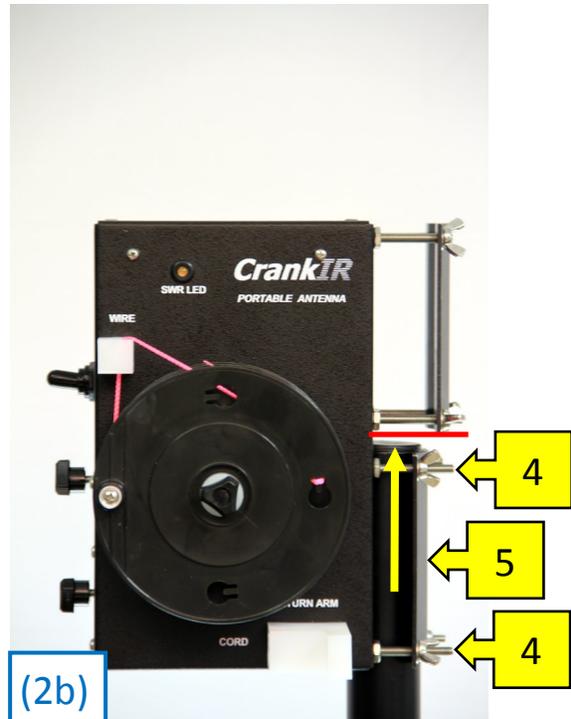
The following procedures are not the only way to deploy this antenna. It is in our experience an efficient way to set up the antenna. Over time you will likely find a method that better suits your use - we welcome your input.

Antenna Set Up

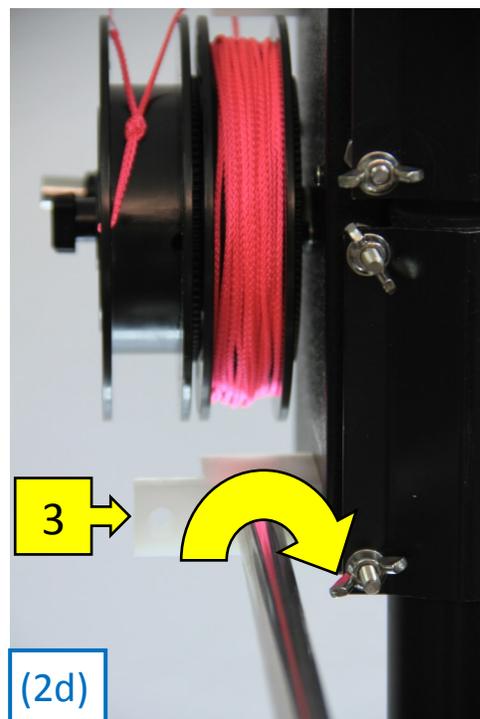
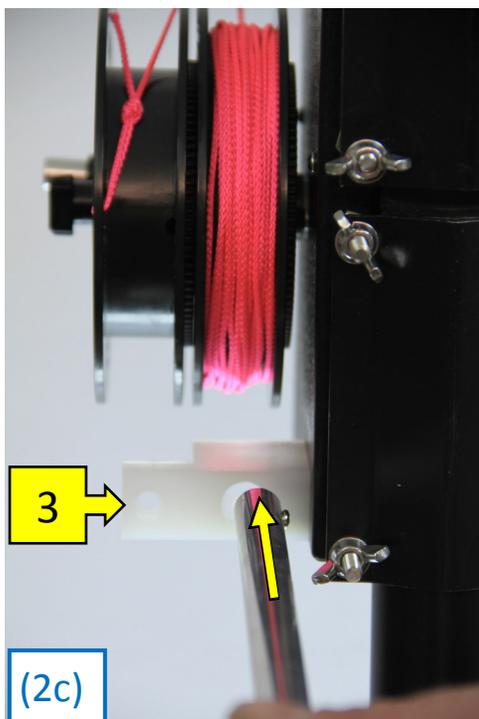
1. Set up the tripod or other mounting pole in an area that allows clearance for the vertical radiator and the radial(s). Always either guy the tripod or put weights on the support legs, it doesn't take much wind to blow over a 16' pole. (1)



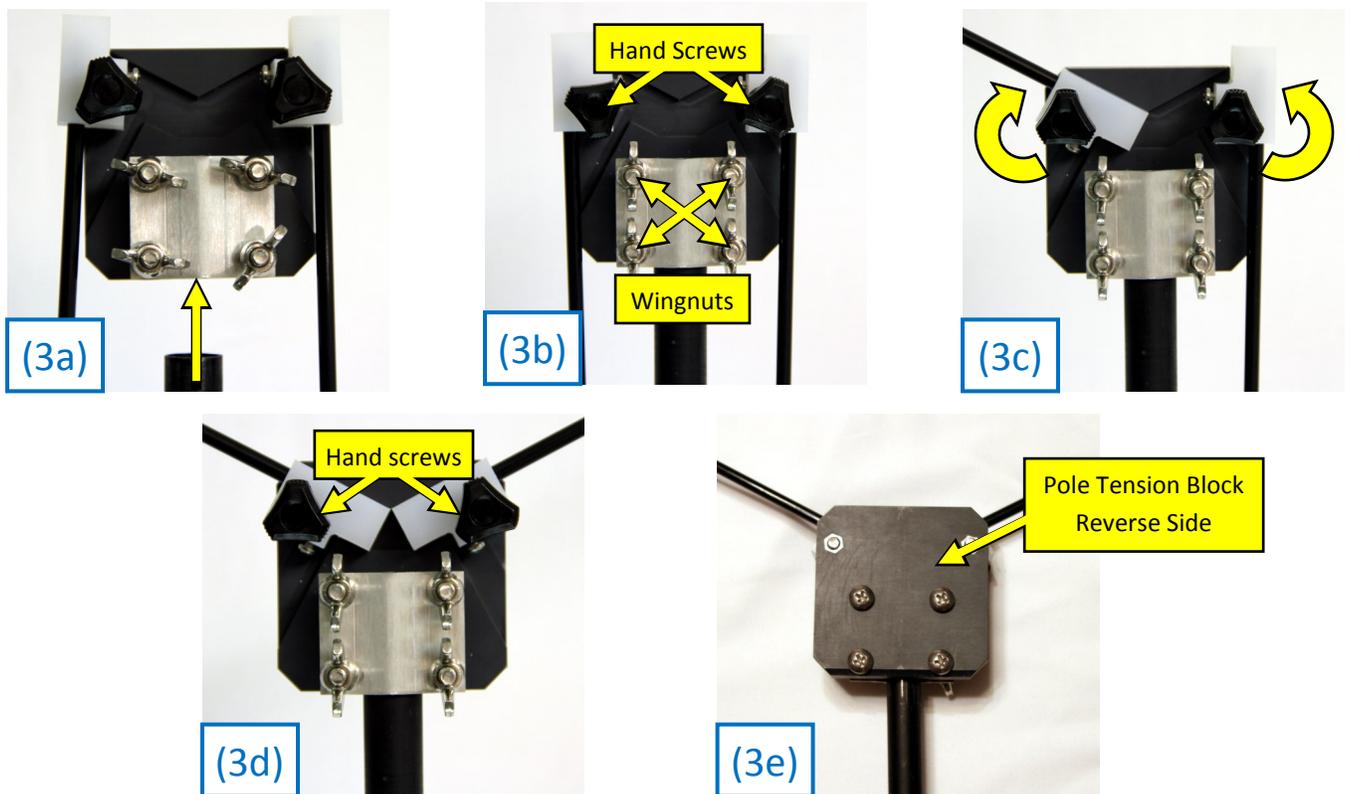
2. Attach the CrankIR to the tripod (2a) or other suitable mounting pole (1.825" max OD) and tighten the four wing nuts 4 on the saddle clamps 5 (2b). Make sure the tripod pole is only inserted to the top of the lower clamp so it doesn't block the telescoping pole from being inserted into the top clamp (2b).



Next Insert the Return Support Rod into the Return Support Rod Mounting Block **3** turn it clockwise until the stop is reached (2c, 2d).



3. Attach the Pole Tip Tensioner to the tip of the telescoping pole (3a) and tighten the four wingnuts on the saddle clamp (3b). Deploy the two fiberglass arms with pulleys by loosening the two hand screws (3b) enough to allow pulling the white plastic blocks out enough to clear the channel in the gray plastic block. Now rotate the rods so they are extended out roughly perpendicular to the telescoping pole (3c). Push both white plastic blocks down into the channel so they bottom out and tighten the hand screws (3d).

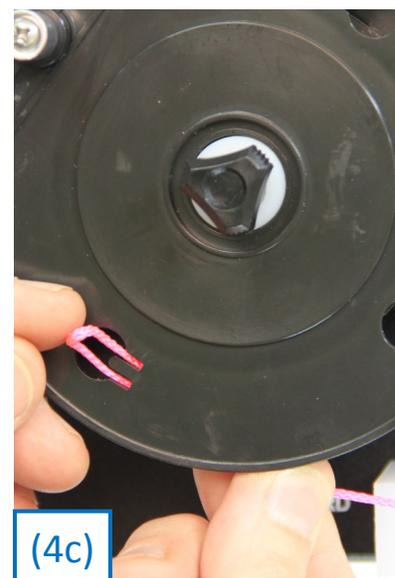
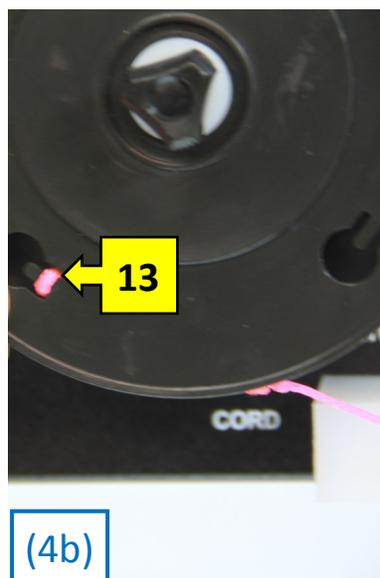
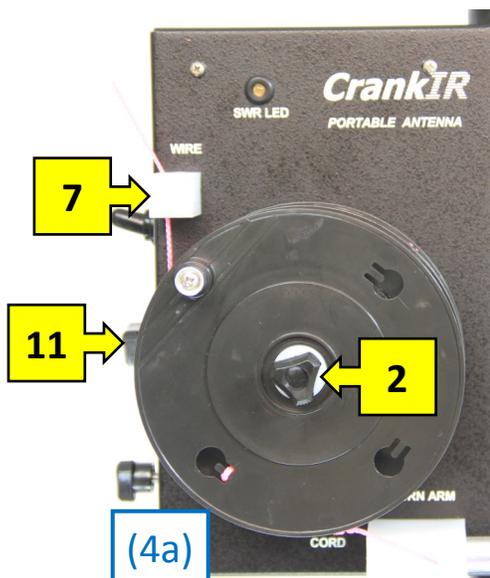


Rotate the Pole and Tensioner Block so the back of the block now faces “forward” (3e). Turning the block around greatly reduces the possibility of the cord/wire catching on the wingnuts or hand screw heads.

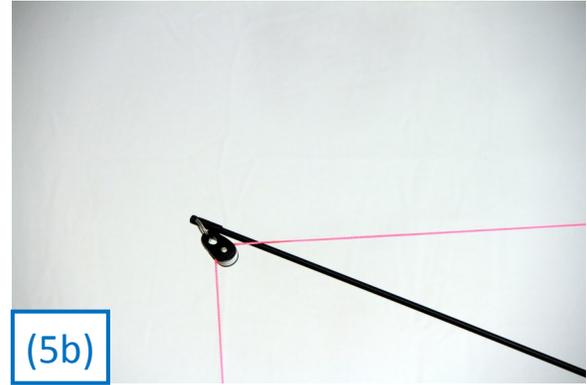
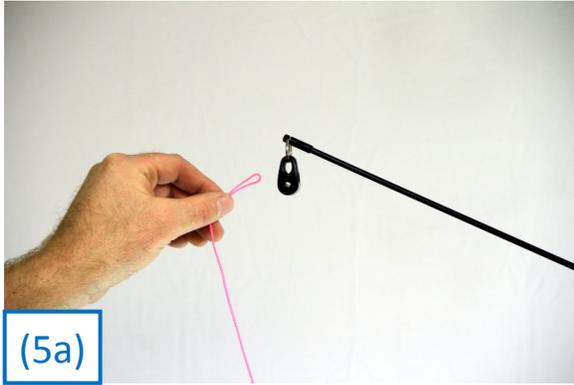
Next, extend the first two or three tip sections of the pole and pull them tight enough to lock them in place during use (3f). We recommend securing the pole joints with electrical tape to prevent inadvertent collapsing of the pole. Taping must be done if guy ropes are attached to the pole.



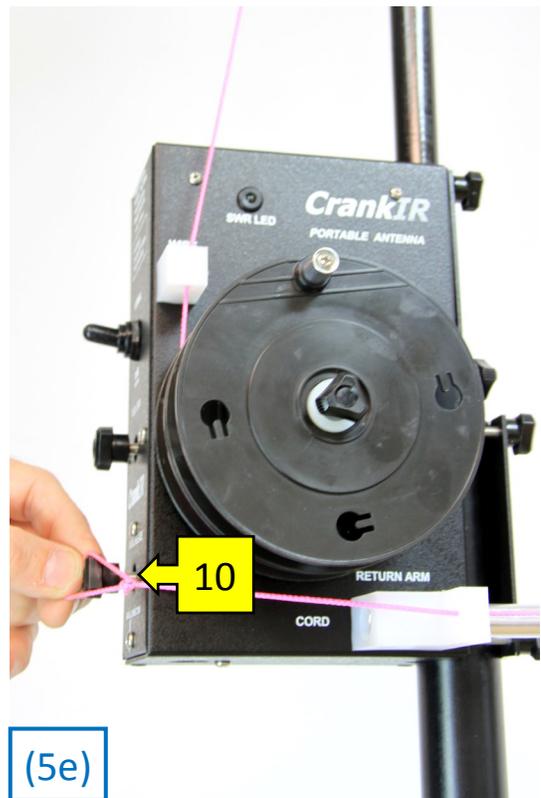
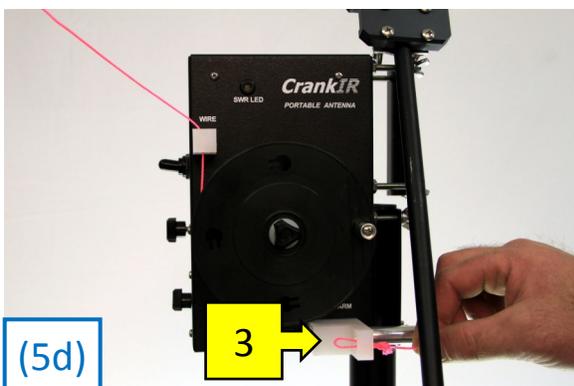
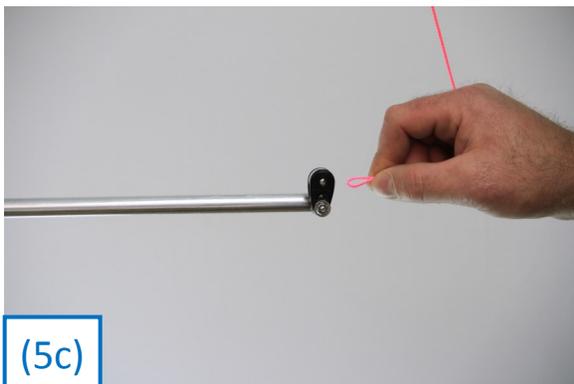
4. Release the Wire Reel Lock **11** by turning the hand screw, this knob also adjusts the spring-loaded drag on the wire reel **(4a)**. Adjust the knob so the wire reel has a suitable amount of drag to prevent freewheeling as the Wire/Cord is deployed by extending each pole section. If the wire reel is allowed to freewheel the wire will come off the reel and tangle. Now unlock the cord reel by turning the Cord Reel Lock/Drag Knob **2** and turn the Cord Reel to take tension off the cord and unhook the cord from the Cord Reel Hook **13** **(4b, 4c)**. The cord should already be routed through the Wire Guide Block **7** **(4a)**.



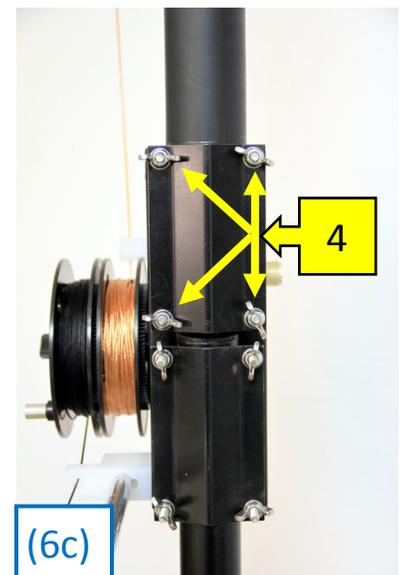
5. Next, thread the cord through the two pulleys (5a, 5b) on the Pole Tip Tensioner while holding the telescoping pole tip with the butt end resting on the ground.



Now thread the cord through the Return Support Rod and Return Support Rod/Cord Guide Block **3** (5d). Temporarily hook the cord loop around the Radial Release Knob **10** (5e). While holding the pole upright, extend each section and lock it in place; as you do this, the cord will be fed off the Wire Reel. Do this smoothly to prevent the cord coming off the reel and tangling.



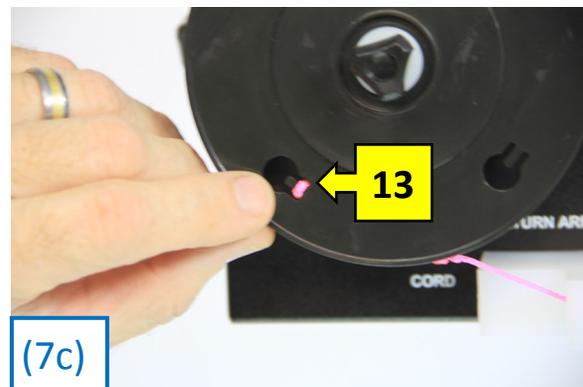
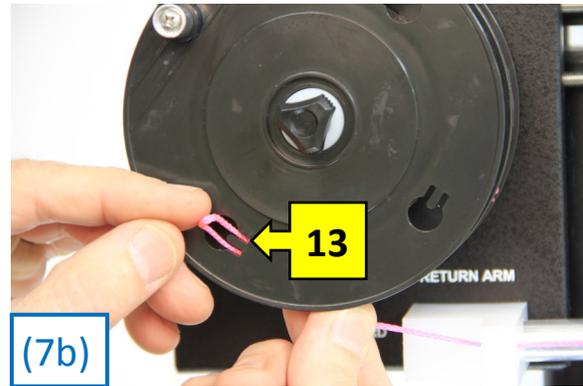
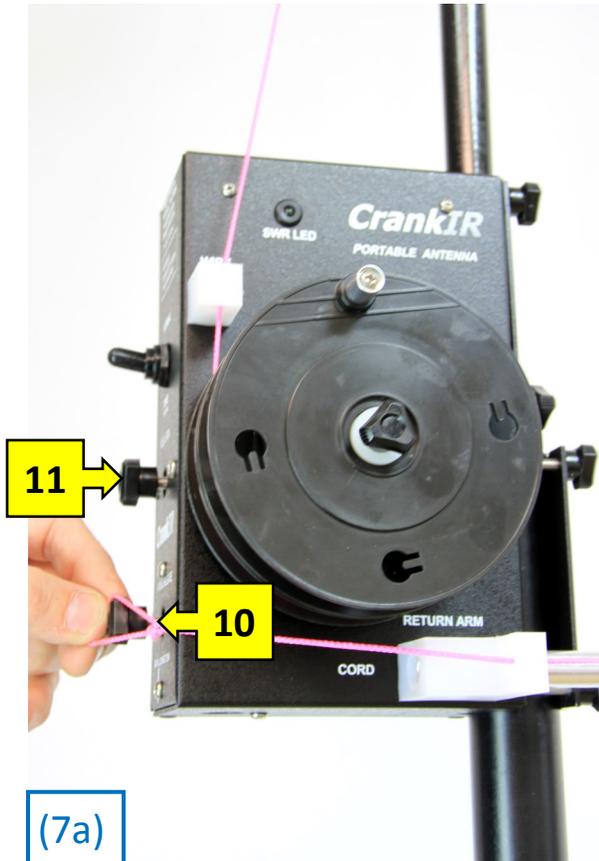
6. After all sections of the pole have been extended, (we recommend taping the pole joints, a must if the pole is wet) place the butt of the pole into the top saddle clamp of the CrankIR unit (6a). Rotate the pole so the Pole Tip Tensioner is in the same orientation as the Return Support Rod (6b) and then tighten all four hand screws **4** equally. It is okay if the telescoping pole rests on the tripod pole (6c).



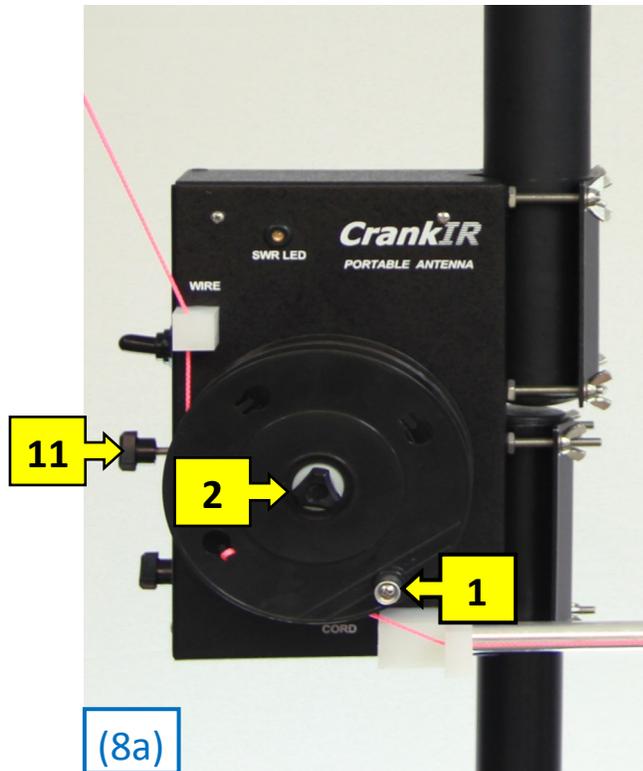
Mike—K7IR deploying the fully extended pole.



7. Remove the cord loop from the Radial Release Knob **10** (7a) and attach the loop to the Cord Hook **13** on the Cord Reel (7b, 7c).



8. Turn the Reel Crank Handle **1** (8a) clockwise (make sure the Cord Reel Lock/Drag Knob **11** is still untightened), this will pull the Wire/Cord off the Wire Reel. Continue cranking until the Wire/Cord junction is all the way to the top of the pole, halfway between the two pulleys.



Now turn the Reel Crank Handle **1** (8a) to adjust the tension on the Wire/Cord such that it pulls each end of the tensioner tips down about 6 inches (8b); you want to have it set so the wire always has tension as you change frequency, however ensure it does not exceed the maximum 18 inch travel of the Tip Tensioner (8c). The Pole Tip Tensioner is necessary because there is only a short period when the reels have equal amounts of Wire/Cord. At any other time, one reel is taking up less Wire/Cord than the other. This creates slack or tension on the Wire/Cord. The tension isn't critical; all you need is enough tension on the Wire/Cord to make sure it stays on the reel. After setting the tension, use the Cord Reel Lock/Drag **2** to lock the reels together. You can now tune the entire range of the vertical element by simply adjusting the vertical radiator wire length with the Reel Crank Handle **1** (8a) to the appropriate mark on the wire for the desired band. (see section 4)

9. Set the tripod height to about 4 feet, this is not critical and will work fine for 80m and up. This height is high enough off the ground to keep losses very low. Putting the mounting point higher doesn't hurt and can actually help on 80m-40m if you are having trouble getting a good match. Raising the antenna higher allows you more room to lower the ends of the radial(s) to assist in obtaining a low SWR in difficult situations.



4. RADIAL SET UP



Standard Radial Lug
(shipped in spare parts bag)



Optional Radial Unit

The CrankIR antenna ships with a Radial Lug as part of the standard kit. This allows for easy connection of one or more cut-length radials or to an existing radial field. An optional Tunable Radial Unit (PN 06401) is available for easy deployment of a variable length (tunable) elevated radial. This provides all the radial lengths from 40m—6m (80m-2m with 80m version) on one reel, eliminating the need to carry multiple individual radials. A single 1/4 WL radial (a longer radial is required if the vertical radiator ***pole height*** is less than 1/4 WL) for each band is all you will need to get on the air.

The Standard Radial Lug

If the vertical radiator is 1/4 WL long (20m and higher with 16' pole) attach a single radial (two or more will give omni-directional coverage and slightly higher efficiency) cut 1/4 WL long for the desired band to the ground lug and tighten the hand screw (10a, 10b). Route the radial in the most desired direction and attach it to a support at least 3' (if possible) off the ground. The signal strength will be 4dB stronger in the direction of the single radial. Radials for each band can be attached to the ground lug but they must be separated by about 6" or more to avoid destructive interactions. Some adjusting of the radial separation and/or length may be required.



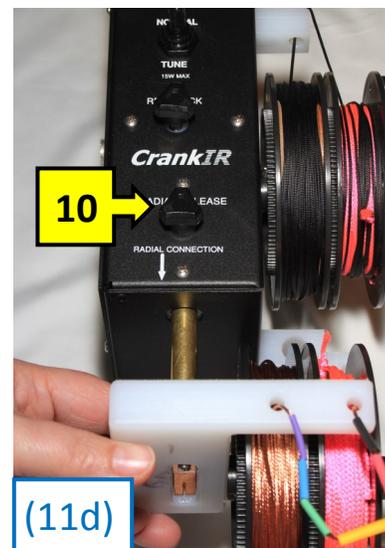
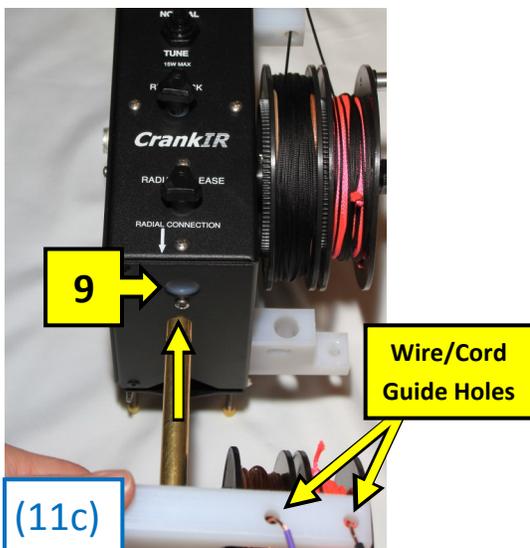
(10a)



(10b)

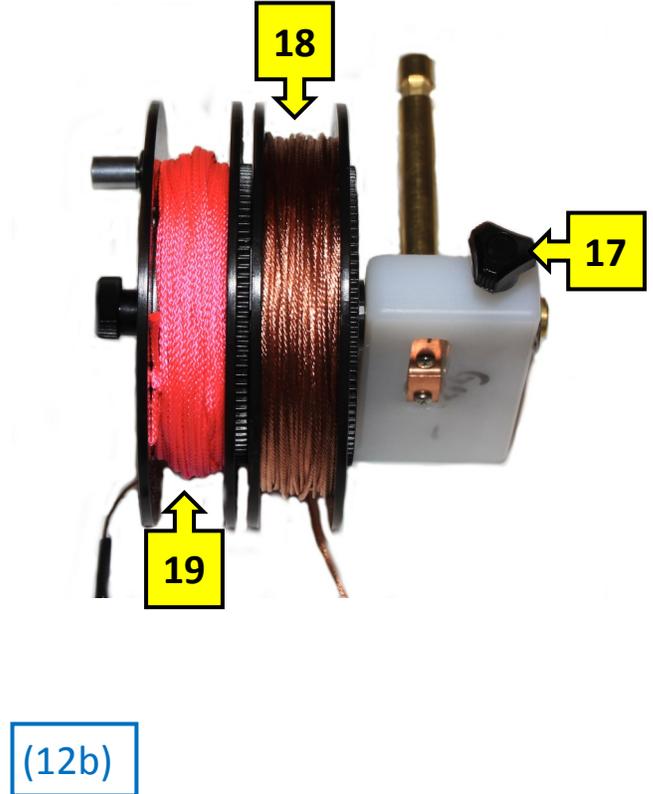
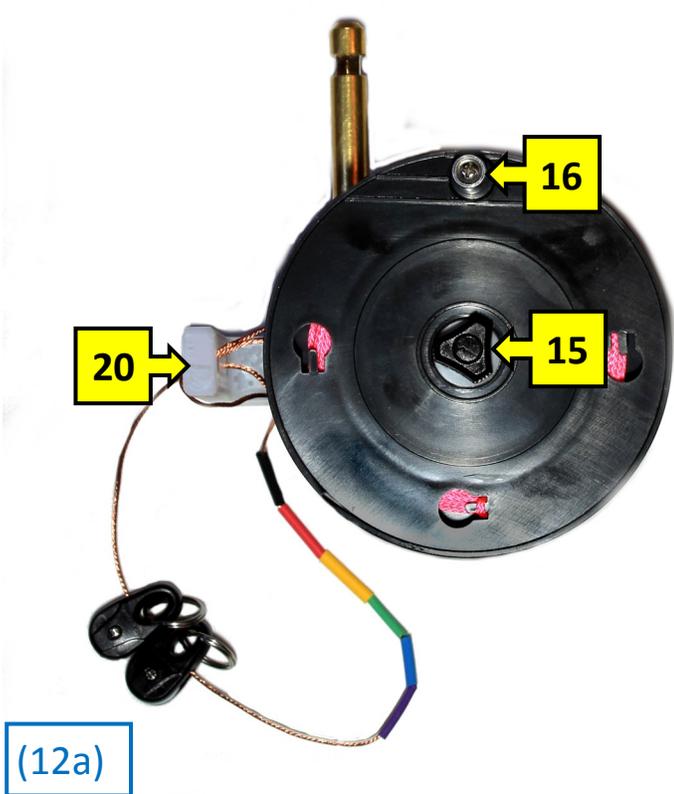
The optional Tunable Radial Unit

Begin by loosening the Radial Release Knob **10** (11a) and (if previously installed) remove the standard Radial Lug (11b). Once the Radial Lug has been removed simply insert the Tunable Radial Unit shaft into the Radial Reel/Ground Lug Mounting Hole **9** (11b, 11c) and push it in until it bottoms out. Now tighten the Radial Release Knob **10** (11d) to hold the assembly in place. By loosening the knob slightly you can rotate the Radial Unit to align the radials for the best performance in the desired direction of operation. Re-tighten the Radial Release Knob to lock the radial in the desired orientation.



Bear in mind you must be able to freely access the Radial Unit Crank Handle so be sure to align the Radial Unit accordingly. If your chosen alignment does not allow turning the Radial Unit Crank Handle , simply turn the tripod to allow access to the Radial Unit Crank Handle while keeping the radial pointed in the desired direction.

12. Lock the Radial Wire Reel **18** (12b) by turning the Wire Reel Lock Knob **17** and then loosen the Cord Reel Drag/Lock Knob **15** (12a). Now grab the pulley(s) and bungee and pull the cord out to the support(s) for the radials, the cord will reel off the Cord Reel **19** (12b) . The Wire Reel remains stationary, thus keeping the wire off the ground where it might coil up and kink. After the radials have been attached to the supports using the bungee cord(s), adjust the tension of the Wire/Cord by turning the Cord Reel Crank Handle **16** until the Wire/Cord is suspended off the ground. Tighten the Cord Reel Drag/Lock **15** and turn the crank such that the radial wire is fed out to the desired length. Loosen the Cord Reel Drag knob and adjust the tension until the Wire/Cord is well off the ground but not so tight that it puts undue force on the tripod and pulls it over. If you plan to use the antenna on only a couple bands, the tension on the bungee is not critical. If you want to cover 40m-6m, crank the radial out to the 20m point (about 16') and adjust for the minimum acceptable tension; you can now go from 40m to 6m without adjusting the tension.



13. When using the optional Radial Reel you only need one support for the end of the radial because the radial is now tunable to any frequency. Two pulleys and bungee cords are provided to allow either a straight 1/4 WL radial (13a) or allow the radial path to bend back on itself when space is tight (13b). When folded, the radial can be shortened by up to 40% with very little loss, so don't hesitate to use the fold back technique. If you have room for a straight run of 1/4 WL you only need one support and one pulley.



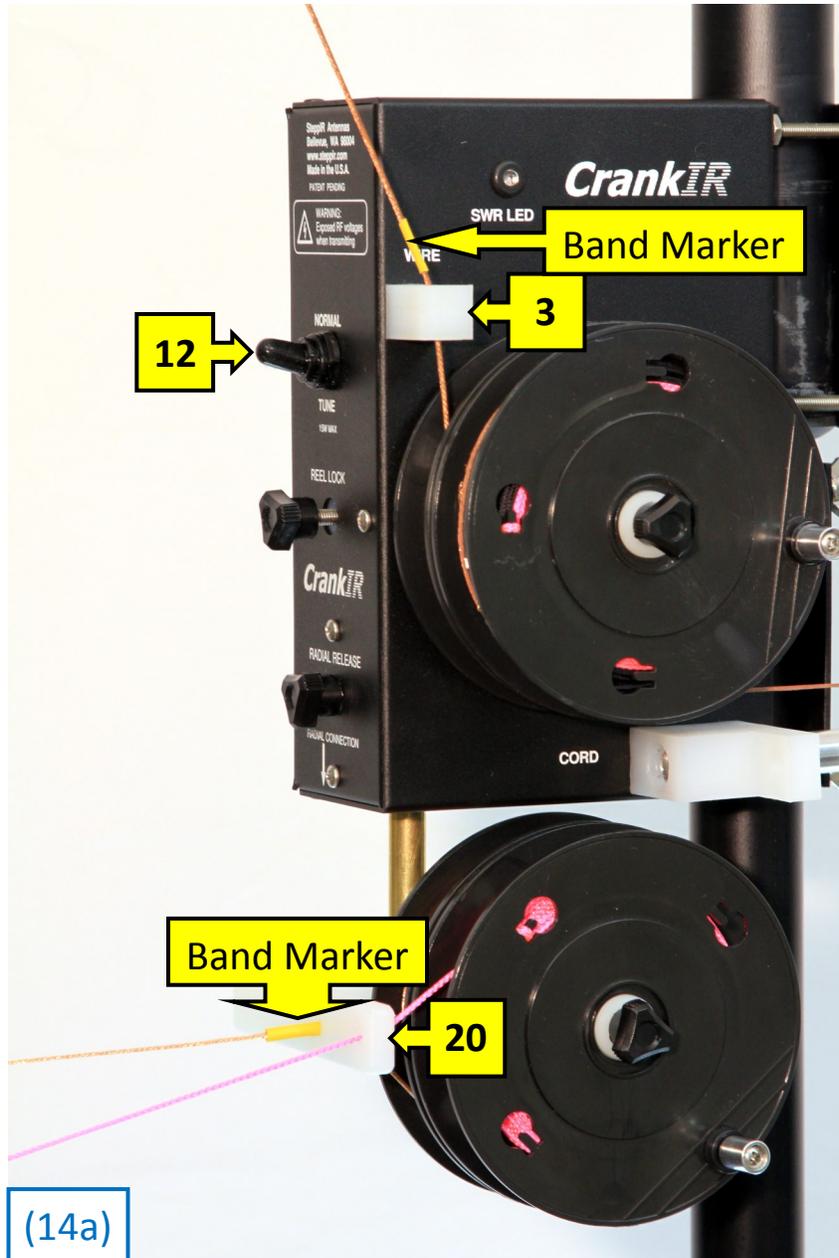
Color-coded heat shrink markers similar to those on the radiator are included on the radial wire. These markers have not been set (shrunk) to the radial so as to allow the user to fine-tune the radial lengths and then heat the heat shrink tubes to anchor them to the wire. When the vertical radiator and the radial wire are set to the desired band, usually, no additional tuning is necessary to get a very low SWR. If the SWR is high (greater than 1.5:1) adjust the radial length to see if it improves. If it doesn't, try adjusting the vertical radiator. Low SWR can be obtained with many different combinations of vertical radiator and radial length. Always keep the vertical radiator at least 1/4 WL long, if possible, and adjust SWR with the radial length. This gives the highest efficiency. The bungee cords keep tension on the wire and cord fairly constant even though the wire and cord come off the reels at different rates.

5. USING THE SWR INDICATOR



To use the SWR indicator adjust the vertical radiator and the radial wire (if you have the optional Tunable Radial Unit) lengths until the marks on the wire corresponding to the desired band are just exiting the Wire Guide Block **3** (14a) and (if applicable) the Radial Wire Guide **20** (14a). Excite the antenna with 1W – 15W of RF on the desired frequency. **Caution, the SWR could be very high when the antenna is out of resonance so if your radio does not have a high SWR protection circuit your radio could be damaged.** When the Tune switch is actuated the radio sees a perfect match provided by the bridge, so if the switch is actuated before keying the transmitter the radio won't be damaged no matter how high the antenna SWR is.

Actuate the momentary Tuning Mode Switch **12** and tune the radial first until the LED is at its dimmest; this indicates the lowest SWR. It may be necessary to also tune the vertical radiator. The LED will extinguish completely when both the RF Power and SWR are low. To find the minimum, turn the crank to the middle of the range where the LED goes out and then lights again. This will be close to the minimum SWR. Release the Tune switch and you are ready to transmit. Sometimes the radio SWR indicator and the CrankIR won't agree. If this happens check the SWR indicator on the radio, if it has one, and adjust the for low SWR to prevent the radio from limiting RF output.



(14a)



The SWR LED shown “Glowing” (14b), and “Dimmed” (14c).

6. POLE EXTENSION KIT



The Pole Extension Kit consists of the following items:

3ea — 2' sections 1.75" OD Fiberglass Tubes

3ea — Aluminum Couplers (2 with single slit, 1 with extra half-slit)

4ea — Turn Key Clamps

Assembly/Set Up:

Begin by gathering the contents of the Pole Extension Kit. Locate one of the two aluminum couplers with the single cut along the full length of the coupler and place one of the Turn Key Clamps at its middle. Attach the coupler to the end of one of the fiberglass tubes being sure to only put the tube halfway into the coupler (15a). Repeat with a second fiberglass tube and coupler and join the two assembled pieces together (1b). Tighten the Turn Key Clamp.



Using the third tube and coupler (this coupler has a slit running the full length on one side and a half-slit on the other) assemble the pieces together being sure to orient the coupler so the half-slit is away from the tube. Attach this assembled unit to the coupler on the previously assembled two poles and tighten the band clamp (15c).



The fully pre-extended and assembled 16ft pole and tensioner (standard vertical pole) should now be inserted butt-end first into the last coupler (with the extra half-slit) Tighten the Turn Key Clamps (15d).



*Above photo not to scale.

Prior to raising the support mast ensure the Wire/Cord is already properly routed through the Pole Tip Tensioner Pulleys and Return Arm Pulley . Refer to section 5 of Antenna Set up. Carefully lift the entire 22' assembled pole and insert the butt-section into the pole Saddle Clamp **5** of the CrankIR main unit. Tighten the Saddle Clamp wing nuts.

7. TAKING THE ANTENNA DOWN

To disassemble the Vertical Radiator, turn the Reel Crank counter-clockwise to wind the Wire/Cord back onto the Wire Reel. Keep an eye on the Pole Tip Tensioner and do not let the tension become too great. If it does, loosen the Cord Lock/Drag Knob and adjust the tension. As you continue cranking the cord will eventually exit the Pole Tip Tension Pulleys and free fall to the ground. Ensure it does not become tangled or caught on anything as you wind all of the Wire/Cord onto the Wire Reel for storage. Leave about 6" of cord loose with it still through the wire guide and lock the wire reel using the Wire Reel Lock/Drag Knob **11** (4a). Hook the loose cord end to the Cord Hook **13** (4b) and loosen the Cord Lock/Drag Knob **2** (4a). Turn the Reel Crank Handle **1** clockwise until the cord is taut and lock the Cord Lock/Drag Knob **12** (***Stowing the Wire/Cord on both the CrankIR Unit and Tunable Radial Unit so it will not come off the reels will save you a lot of grief from tangles.***) Remove the vertical telescoping pole, take the Tip Tensioner off and place them in the bag. If you aren't putting it in the bag you can just leave the Tip Tensioner attached to the telescoping pole to make setting up even more convenient next time.

Remove and store the radial(s).

If you have the optional Radial Reel, turn the crank until all the wire is on the Wire Reel **18** and lock the Wire Reel Lock Knob **15**. This keeps the wire off the ground when putting it away and prevents tangles and kinks. Next, release the bungee cord(s) supporting the radial wire and then release the Cord Reel **19** by loosening the Cord Lock/Drag Knob **15** to allow you to reel the cord onto the cord reel until the pulleys are

held up against the Wire/Cord Guide Block **12** Next, lock the Cord Lock/
Drag Knob **15** to hold the Wire/Cord in place.

8. TROUBLESHOOTING

SWR LED WON'T GO DIM:

If possible, lower the power from the transmitter; especially if you are driving the antenna with more than 5W to tune it. When the vertical radiator is very short (pole height less than $1/8$ WL) the dip in LED brightness is not as pronounced, so at higher power levels it can be hard to see a dip. Alternately, try using your transmitter SWR meter to verify the functionality of the LED Bridge. **See next section also.**

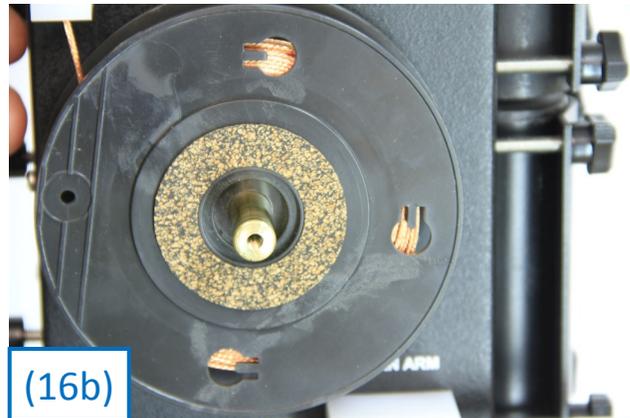
CAN'T GET A LOW SWR:

Make sure the transmitter is not in split mode.

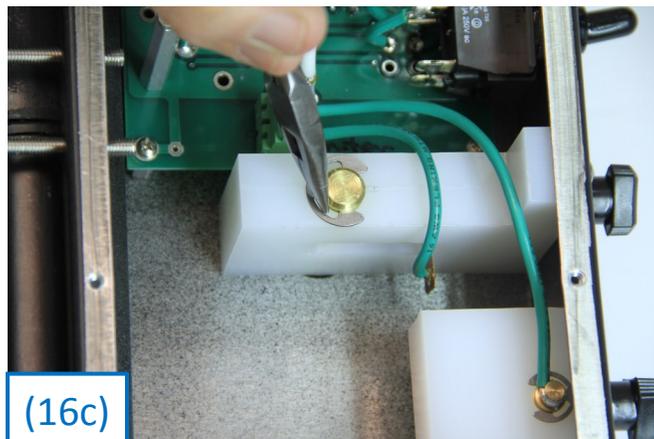
The length of the vertical radiator is too short or too long to allow matching to 50 ohms by tuning the radial length. Set the vertical radiator to $1/4$ WL (if possible at the desired frequency) and tune the radial. If you can't get a reasonable SWR, shorten the vertical radiator a little and try again. Repeat this until a match is obtained. When the vertical radiator is less than $1/4$ WL, shortening the radiator a bit can make a big difference. Shorten the radiator the least amount required for a reasonable match, it is more efficient when it is longer. If this doesn't work the location may be the problem. Look for things that could be de-tuning the antenna and move the antenna or the radial away from it. When the antenna is very shortened, lowering the ends of the radial(s) can help in getting the SWR low. Make sure all of your connections are tight, especially the Radial Release knob. If you have the Tunable Radial Unit, check the brush cavity for dirt or mud and clean it out if necessary. Holding the brush down with your finger while you turn the crank a few turns can wipe the shaft clean if it dirty.

WIRE/CORD IS HOPELESSLY WRAPPED AROUND THE REEL SHAFT:

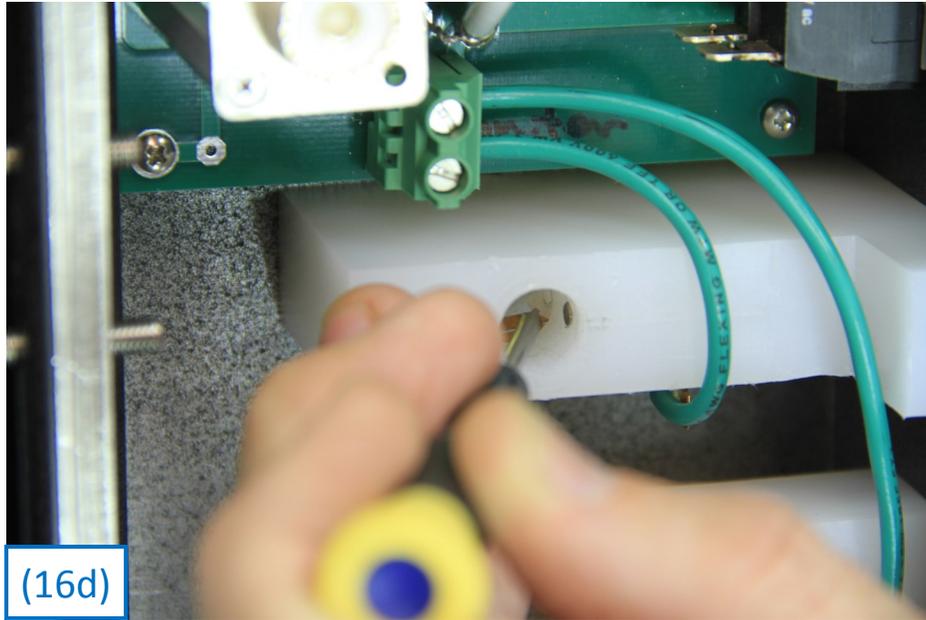
If this happens it may be easier to remove one or both reels to get access to the shaft and unwind the Wire/Cord. If the Wire/Cord is between the two reels, you only need to remove the outer reel (Cord Reel) by removing the Drag/Lock knob and pulling the Cord Reel off (16a, 16b).



Don't lose the two plastic spacer washers or cork clutch disk that goes between the two reels. Removing the inner reel (Wire Reel) is easy on the Tunable radial because the "C" clip is exposed and easy to access. A small screwdriver or suitable tool can be used. **The clip will tend to fly off so be careful to contain it as it is removed.** Do not lose the white spacer washer between the Wire Reel and the chassis on both the CrankIR Unit and the Tunable Radial Unit. Removing the Wire Reel necessitates removal of the back cover to access the "C" clip on that shaft.



Once the tangle is fixed, simply reverse the procedure, making sure all of the spacers are in place. **THE BRUSH SPRINGS UP WHEN THE SHAFT IS REMOVED. WHEN YOU RE-INSERT THE SHAFT YOU MUST PUSH THE BRUSH DOWN WITH A SMALL SCREWDRIVER OR OTHER TOOL SO THE BRUSH WILL NOT BECOME DAMAGED AS THE SHAFT IS INSERTED.**



WIRE/CORD CAN'T BE MOVED WITH CRANK

Wire/Cord has gotten wrapped around the pulleys at the Pole Tip Tensioner. Lay antenna down and untangle the Wire/Cord. Make sure you threaded it through as shown in the manual. The same applies to the Tunable Radial Unit pulley(s).

Check for kinks in the wire that can't get through the pulleys.

9. OPERATION TIPS

In most cases using the CrankIR as a vertical will result in better performance than the dipole configuration because it is generally difficult when operating portable to mount the antenna high enough to equal the performance of the vertical configuration. The dipole would need to be at least .3 WL high over average soil to equal the vertical performance. The exception to this is when the antenna can be placed at the edge of a cliff or sharp drop off; in this case, a low dipole might be a good choice. The CrankIR can be configured as a dipole on 20m and higher if you add the dipole kit (06410). A vertical will have a takeoff angle of about 25 degrees. A dipole must be mounted about 0.3 (WL) above ground to achieve the same 25 degree angle. On 20m that equates to about 20 feet and on 40m about 40 feet. Even 20ft can be a challenge when operating portable.

Low mounted dipoles work well for short-range communications - out to a few hundred miles. Ground reflections attenuate low angle radiation and accentuate the high-angle waves. Raising the antenna results in increased low angle radiation and thus much longer communication range.

So, if DX is your goal, the vertical mode is most often the best choice.

The following table lists the approximate bandwidth for the CankIR in the “normal” vertical configuration with a single, elevated radial.

BAND	SWR	BANDWIDTH (Approximate)
80m	2.0:1	120kHz
40m	2.0:1	300kHz
30m	1.0:1	Entire Band
20m	1.5:1	400kHz
18m	1.0:1	Entire Band
15m	1.5:1	550 kHz
12m	1.0:1	Entire Band
10m	1.5:1	900 kHz
6m	1.0:1	Entire Band

CrankIR Specifications

ELECTRICAL

Frequency	Standard Antenna: 6.8 to 150 MHz With 80m Option: 3.4 to 150 MHz
Power Limit	1500W PEP
Radiator	18 gauge; construction—63 wires, 36 gauge 0.049" (1.24 mm) OD, pure copper. Vertical wire marked at 1/4 WL for each amateur band.
Brushes	Copper-beryllium, 0.008" (.203 mm) thick
Reel Shafts	Brass, 0.437" (11.01mm) diameter (conducts the RF via brush contact)
SWR Indicator	Resistive Bridge, momentary switch activated Sensitivity 1W-15W (15W Max) Indicator, white LED (minimum brightness equals minimum SWR)
Balun	Current choke type Standard: 1.4" (35.56 mm) OD toroid NiZn (nickel-zinc) ferrite, RG-58U coax. High Power Opt: 2.4" (60.96 mm) OD toroid NiZn ferrite, RG-303 Teflon coax

CrankIR Specifications

DIMENSIONS AND WEIGHTS

Base Unit	6.0 x 6.0 x 8.1 inches, weight 3.0 lb. (152 x 152 x 206 mm, weight 1.36 kg) Construction - powder coated aluminum chassis Pole clamp range - 0.825-1.825 inches (21 mm-46.3 mm)
Base Unit with Optional Radial Unit	6.0 x 7.0 x 12.8 inches, weight 4.45 lb. (152 x 178 x 325 mm, weight 2.02 kg)
Pole Tip Tensioner	Collapsed: 22 inches (55.9 cm) Extended: 45 inches (114.3 cm) Pole clam range: 0.375-0.780 inches (9.5 mm-19.8 mm)
Return Support Rod	22.5 inches, 3.0 oz (57.2 cm, weight 86g)
Wire/Cord Reels	Capacity: 150 ft (45.7m) +/- of Wire/Cord Material: polycarbonate/ABS blend 4.5 inches (11.4 cm) diameter
Telescoping Pole	Extended: 16 feet (4.88 mm) +/- Collapsed: 23.5 inches (59.7 mm) Wall Thickness: 0.060 in. (1.5 mm) Tip diameter: 0.5 in. (12.7 mm) Weight: 2.0 lb (0.91 kg)

CrankIR Specifications

DIMENSIONS AND WEIGHTS

(CONTINUED)

80M Pole Extension	<p><u>Assembled:</u></p> <p>length - 64.5 in. (1.64m) Weight - 2.8 lb. (1.27 kg)</p> <p><u>Dismantled:</u></p> <p>Length - 23.5 in. (59.7 cm) each of three sections; 2ea 2.0 in (51 mm) OD, 1ea 1.75 in (44.45 mm) OD</p>
Total Weight	<p>Basic Antenna: 5.5 lb. (2.50 kg)</p> <p>Basic Antenna with Optional Radial</p>

ENVIRONMENTAL

Water Resistance	<p>Designed to operate in wet environments including rain, dew, etc. Brief water immersion will not cause damage. If immersed in salt water please rinse in fresh water to prevent corrosion.</p>
Operating Temperature Range	<p>-50 to +120 degrees Fahrenheit (-45 to +49c)</p>



STEPPIR ANTENNAS LIMITED PRODUCT WARRANTY

Our products have a limited warranty against manufacturers defects in materials or construction for two (2) years from date of shipment. Do not modify this product or change physical construction without the written consent of Fluidmotion Inc, dba SteppIR Antennas.

This limited warranty is automatically void if the following occurs: improper installation, unauthorized modification and physical abuse, or damage from severe weather that is beyond the product design specifications.

SteppIR Antenna's responsibility is strictly limited to repair or replacement of defective components, at SteppIR Antennas discretion. SteppIR Antennas will not be held responsible for any installation or removal costs, costs of any ancillary equipment damage or any other costs incurred as a result of the failure of our products.



Contact Information

Email :

New orders or questions about your current order: sales@steppir.com

Existing customers requiring technical or product support services: support@steppir.com

Information and questions about our products: sales@steppir.com

Phone / Fax:

Phone: 425-453-1910—9:30am to 4:30pm Pacific Standard Time

Fax : 425-462-4415

Tech Support: 425-891-6134—10:00am to 5:00pm Eastern Standard Time

Address:

**Fluidmotion Inc.
SteppIR Antennas
2112 116th Ave NE
Suite 1-5
Bellevue, WA 98004**

SteppIR