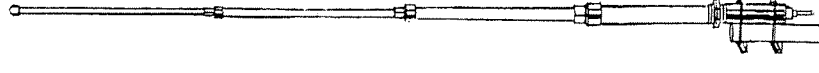


**Base Antenna
Notes, Tuning &
Installation Guidelines**

PROTON



PT99

PATRIOT



PAT-12

Optimum tuning
with 10'-12' of
mast and/or
support pipe
for mounting

Commercial Base Station Antennas

ProComm Products Incorporated
504 N. Oak St • Onarga, IL 60955

1) ALL installations benefit from fresh, low loss coax that is of known good quality. This does not mean that the cable is “good” just because it is reasonably “new”, doesn’t show a short circuit between center conductor & shield, has solid connections at both connectors and doesn’t have visibly corroded conductors inside the jacket. “Good” means that it maintains consistent impedance along the entire length of the cable. Unfortunately, we are finding that many coax cables that are currently produced are NOT “good” or operating within spec. Please take note that you can NOT see or check impedance with a multimeter. All of our antennas are designed for use with cables that meet industry spec.

2) If you have a high SWR reading across the entire band that changes minimally or not at all by moving the tuning rings, your coax may not be nearly as good as you think. This happens because you can only alter the tuning / resonant frequency of the antenna itself with the rings, not correct for impedance based issues elsewhere in the system. Once GOOD coax that meets spec is substituted, you should see a very noticeable change in SWR as the rings are adjusted. Most antennas will tune near optimum with the rings centered. Depending on the coax used & installation variables such as nearfield reflections, SWR should be less than 1.5 in the middle of the band. This equates to 95% efficiency or better. An SWR of 1.1 or 1.2 is more typical although only worth a few percentage points. While percentages can add up, don’t sweat the small stuff if you’ve got ALL of the other areas optimized!

3) When routing your coax and not using an RF choke, drop it down below the antenna as long & straight as possible & then lead it away at an angle if necessary. Anchoring the coax to the mast / support pole is fine so long as the cable itself isn’t pinched, dented or crushed. Try not to make sharp bends with ANY coax, especially those using foam dielectric. Poly dielectrics are a bit more rugged & forgiving in terms of bend radius & maintaining consistent impedance with improved power handling. They do this at the expense of being slightly higher loss than most foam cabling.

4) Extra coax cable should be spread out as best possible, not coiled up, wadded up or even wound in a figure 8. All of these can introduce stray electrical characteristics, poorer performance & less accurate SWR readings. Excessively long cables can introduce added line loss, reducing both incoming & outgoing signal. Sharp bends or heavy twisting can alter impedance & power handling characteristics, which is never good. This applies to both base & mobile installations.

5) Different types of coax can be the same physical length yet offer quite different lengths electrically. This has to do with the type of dielectric used & the associated changes in Velocity Factor. As such, it is not uncommon for different lengths or types of cable to produce varying SWR readings. Testing & verifying the quality & consistency of the cable should always be done PRIOR to using it in an installation. Connecting the intended coax for use directly to a dummy load & verifying a 1:1 SWR is a good & simple way to verify suitability. If the cable itself introduces a higher SWR into a non-reactive dummy load, things will only get worse once connected to a reactive antenna. Anything above a 1:1 SWR should have you questioning the quality of the coax and / or the dummy load, maybe even the SWR meter in use.

6) The Proton & Patriot are of a shunt fed capacitively coupled design. As such, they will show continuity (aka a “short”) between the hot & ground connections at the base of the antenna. A multimeter checks for continuity at DC (0 Hz) whereas the antennas are designed to operate using AC at 27 MHz. What looks like a short to a DC based multimeter in this regard is actually a tuned resonant trap. This design helps to shunt noise outside of the band, reduces in-band static & feeds excess voltage from a lightning strike directly to ground.

7) Using a tuned resonant trap as these antennas do, it is also normal for them to show an open circuit between the center pin of the SO-239 coax connector at the bottom of the antenna & the threaded metal ferrule up top. The tuning network utilizes capacitance, which blocks DC current flow. Multimeters work on DC, so the meter correctly shows an open circuit. Once fed with an AC signal in the RF range, the antenna conducts & radiates as designed.

8) Make sure that your mast / support pole has a 1” gap between the top of it & the bottom of the threaded tuning ring area. This also goes for the “hub” of any ground plane kit. This is CRITICAL & should NOT be overlooked. Mounting anything conductive in close proximity to the tuning ring section can severely detune the antenna and / or cause very unstable readings. Placing the support pipe too close to the threaded tuning ring section may even result in the tuning rings not making ANY adjustment at all. This and / or poor quality coax are the most common problems we encounter.

9) The **PATRIOT** tunes best when using 10’ – 12’ of metal support pipe / mast. If you are using a shorter section of mast, you will probably have to lower the rings. If you are using a slightly longer section of mast, you

may have to raise the rings. If you are using a LOT more mast, you may have to trim the top whip section. BEFORE trimming the top whip, contact ProComm product support. The **PROTON** is more versatile in tuning & not fussy about mast length.

10) Depending on the conductivity of the soil in your area, what constitutes a GOOD Earth grounding system can vary drastically. In most cases, 8' down should be considered a minimum. Greater depths can be achieved by installing an 8' ground rod into a pre-dug hole. Just make sure you leave enough contact area exposed when driving it into the ground to make the necessary solid connections. Depending on the length of the run, 8 gauge copper wire should be considered minimum. If using copper clad aluminum or just plain aluminum, you will have to use a much heavier gauge conductor in order to maintain low series resistance. Cold water pipe connections may be less effective due to thread sealants used between adjoining pieces and / or the use of PVC pipe, minimizing length & Earth contact area.

11) Remember, all electrical connections start off good & deteriorate with age. Basic maintenance is required in order to maintain proper operation. The use of appropriate protective sealants such as Coax Seal, electrical putty or even long life Silicone based outdoor sealant around any / all points of connection exposed to weather can only help maintain good connections & reduce maintenance. All connections at or below ground level become quite critical as moisture from rain or dew tends to corrode bare metals quite quickly. When weatherproofing connections, be sure not to block any drain holes or insulate any mating electrical points of contact.

12) Antenna height & location can make a HUGE difference in performance. The lower the antenna is & the closer it is to nearby metallic objects, the poorer the performance & tuning capabilities. The higher that you can mount the antenna up in the air & out in the open, the better it will perform on both receive & transmit. We recommend mounting the antenna at least 10' above the roofline of the nearest building at a distance of 24' or greater from any large metal objects. The old radio analogy of "Height equals Might!" still holds true. Just remember to be safe, taking into consideration other nearby structures & especially overhead power lines.

13) Every antenna is checked & pre-tuned before leaving the factory. However, there are a multitude of variables that can occur with any given installation. In order to minimize variables, remove any accesso-

ries (Amplifier, TVI Filter, Antenna Switchbox) between the SWR meter & antenna within the line. If after doing so you find that the SWR needs some fine tuning, proceed as follows. Make sure to keep both rings together & move them at the same time.

**IF YOUR SWR IS HIGHER ON CH 1 THAN IT IS ON CH 40,
LOWER THE TUNING RINGS.**

**IF YOUR SWR IS HIGHER ON CH 40 THAN IT IS ON CH 1,
RAISE THE TUNING RINGS.**

Once the readings on CH 1 & CH 40 are reasonably balanced, the antenna will be tuned optimally in the middle of the operating band. Depending on the frequency coverage desired, one can tune the antenna for narrow or wide band results. Narrower bandwidth will result in sharper tuning whereas wider bandwidth offers more channel coverage.

14) Optimal system installation can take a good system & make it even better. Paying attention to wire & cable routing, AC polarity, proper antenna & equipment grounding, minimizing AC ground loops & the use of proper filtration (both AC & RF) can benefit not only the end user, but also family & neighbors. By cutting down incoming noise & reducing the potential for stray radiation, interference is reduced & range is increased.

15) No matter how hard we try, variables that are beyond our control exist in any given installation. If following these directions does not resolve a problem, contact us at (877) 331-5161 9AM – 3:30 CST. You can also contact us via email at ProductSupport@ProCommproducts.com or via our website at <http://www.procommproducts.com> for technical support. Specific info will be required about your installation & the materials used, so please be prepared to answer a series of questions.

Antenna Assembly & Installation

Lay the antenna components out on a flat surface. Using one lock washer between each mating section, carefully thread the adjoining sections together & snug tightly. The hardware kit supplied works for both the 2 section Patriot & the 4 section Proton, so you may end up with extra lock washers if assembling the Patriot. Do NOT double stack lock washers. When mounting the antenna to the support pole, arrange the clamps so that the rounded side wraps around the hub of the antenna & the serrated teeth of the outer clamp dig into the support pole. Make sure to leave at least 1" of clearance between the top of the support pole & the bottom of the threaded tuning ring section. This is CRITICAL. Try to align the antenna with the support pole as best possible.

Should you choose to do so, now is a good time to weatherproof the exterior mating surfaces of the antenna. The use of Coax Seal, electrical putty or long life Silicone based outdoor sealant is recommended. Do NOT apply sealant between any mating electrical contact points or block any drain holes in the antenna.

Connect your coax into the antenna, paying close attention to seat the prongs on the PL-259 into the dimpled recesses of the SO-239. If you do not do this, you will end up with a gap that can collect moisture & corrode quite quickly. Route the coax along the support pipe & secure it in a place several inches below the antenna using a high quality zip tie. This reduces stress on the connectors & minimizes twisting of the cable as you move the antenna around during installation. You can add more zip ties below this point as necessary once the entire installation is secured. When raising or lowering the antenna system, PLEASE pay close attention to nearby structures & overhead power lines. Proceed with caution. We want you to enjoy your efforts & our products for a long time to come!

Now would be a good time to inspect all aspects of the installation & do a baseline check of SWR prior to permanent mounting. Remember, cable routing can & does affect SWR readings, so make sure that it is spread out. Due to differences caused by ground absorption & nearfield reflections, the tuning & SWR can vary once the antenna is raised to actual operating height. This is just a check to make sure that everything is operating within reason. If major difficulties are encountered, review the above steps one by one until the problem is located & corrected.

If everything is working as intended, permanently install the antenna & re-check SWR. Some fine tuning may be required, which was previously covered. If you followed all of the above tips & trips, chances are that you will now be fully operational as quickly & easily as possible, making you ready to hit the airwaves. Enjoy!

Mechanical & Electrical Specifications

PATRIOT (PAT-12)

Total Height: 12' Diameter: 1.125" Weight: 3.5 lbs

Input Connector: SO-239

Max Recommended Power: 2000 W peak

SWR at Resonance: Below 1.5 Typically 1.2

Recommended Mast Length: 10' – 12'

PROTON (PT-99)

Total Height: 18' 6" Diameter: 1.25" Weight: 5 lbs

Input Connector: SO-239

Max Recommended Power: 2000 W peak

SWR at Resonance: Below 1.5 Typically 1.2 or better

90 Day Limited Warranty

This product is warranted for 90 days from the date of purchase. ProComm Inc. warrants that this antenna has been manufactured free from defects in design & workmanship. During this period, ProComm Inc. will repair or replace any defective part free of charge. This warranty does not cover misuse, modifications or damage caused by acts of God.

ProComm Inc. is not responsible for damage to equipment or property or any consequential or accidental damages of any kind. Maximum liability shall not exceed the purchase price of this unit. Some States do not allow limitations on the length of the implied warranty, or exclusion or limitations of incidental or consequential damages. The above limitations and exclusions may not apply to you. This warranty gives you specific legal rights. You may also have other rights which may vary from State to State.

If after contacting ProComm Product Support it is necessary to return your antenna, please fill out & return this form to assure prompt service.

Name _____

Phone: _____

Email: _____

Address: _____

Description of problem or complaint: _____

Purchase Date: _____ Dealer: _____

Name: _____

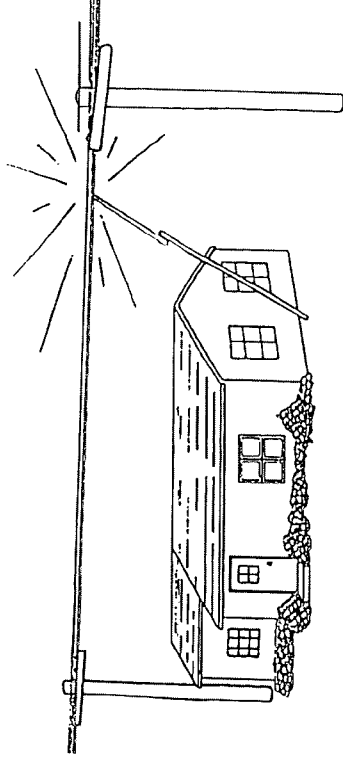
Phone: _____

Website: _____

CAUTION!

DANGER!

YOU CAN BE KILLED! AVOID CONTACT WITH POWER LINES!
PLEASE TAKE CARE WHEN INSTALLING OR MAINTAINING YOUR ANTENNA SYSTEM.



Do not erect a mast or tower in high winds, slippery weather conditions, during electrical storms or when lightning is possible. Special warning precautions are given when power lines are present. Special skill & tools are required to install towers or tall antenna arrays. Refer to qualified personnel and / or consult your dealer for special installation assistance & advice.

ProComm assumes no liability if dangerous installation practices are used.

Antenna Installation Date _____

Type & Length of Coax _____

Height to Base of Antenna _____

Length of Support Pipe _____

SWR Meter Make/Model _____

Length of Coax Jumper _____

SWR CH 1 _____ CH 20 _____ CH 40 _____

Max Power Applied (RMS) _____