

KVH Industries, Inc.

TracPhone® V7IP

26" (66 cm) Configuration



Installation Guide

TracPhone V7-IP Installation Guide

mini-VSAT Broadbandsm System with CommBox-ACU

This guide explains how to install the TracPhone V7-IP mini-VSAT Broadband satellite communications system. Operation instructions are provided in the Quick Start Guide.

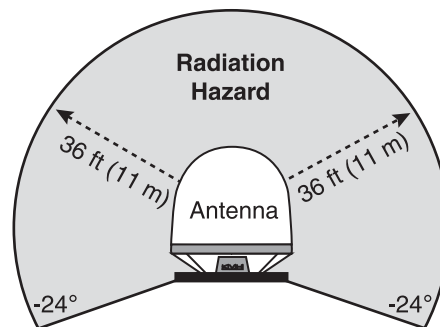
Installation Steps

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CAUTION - RF Radiation Hazard



The antenna transmits radio frequency (RF) energy that is potentially harmful. Whenever the system is powered on, make sure everyone stays more than 36 feet (11 m) away from the antenna. As shown in the illustration, no hazard exists directly below the antenna.



Who Should Install the System?

To ensure a safe and effective installation, only a KVH-certified technician should install the TracPhone system. To find a technician near you, visit www.kvh.com/wheretogetservice.

Technical Support

North/South America, Australia:

Phone: 1 866 701-7103 (*U.S. only*)

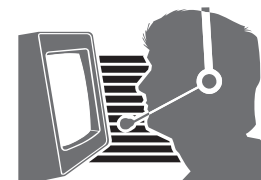
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CE Declaration of Conformity

The undersigned of this letter declares that the following equipment complies with the specifications of EC directive 1999/5/EC Radio & Telecommunications Terminal Equipment.

Equipment Included in this Declaration

TracPhone V7-IP system, consisting of:

- 02-1925-XX¹ or 02-1926 TracPhone V7-IP Antenna
- 02-1875-02 TracPhone CommBox-ACU
- 19-0487 TracPhone Modem

¹ The part number is followed by two alphanumeric characters which designate non-performance-affecting customer-specific branding.

Equipment Applicability

The TracPhone V7-IP system provides broadband Internet connectivity between a ship and any destination in the world. The equipment is not intended for SOLAS applications.

Declaration and Certification

The TracPhone V7-IP system complies with the following harmonized standards under the R&TTE Directive 1999/5/EC:

Essential Requirement		Applied Standard(s)
Article 3.1(a)	Health & Safety	EN60950-1:2006 + A1:2009
Article 3.1(b)	EMC	EN 301 843-1 v1.2.1:2004-06, EN 301 843-6 V1.1.1:2006-01, EN61000-3-2:2006, EN61000-3-3:1995, A1:2001 & A2:2005 EN60945:2002
Article 3.2	Spectrum Efficiency	EN302 340 V1.1.1:2006-04

Manufacturer

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50 Enterprise Center
Middletown, RI 02842-5279 USA



Rick Jones, Director of Corporate Quality

10 SEP 2012

Date

1

Inspect Parts and Get Tools

Before you begin, follow these steps to make sure you have everything you need to complete the installation.

- a. Unpack the box and ensure it contains everything shown in Figure 1 and on the *Kitpack Content Lists*. Save the packaging for future use.

IMPORTANT!

Always lift the antenna by the baseplate and never by the radome or any portion of the internal antenna assembly (see Figure 1).

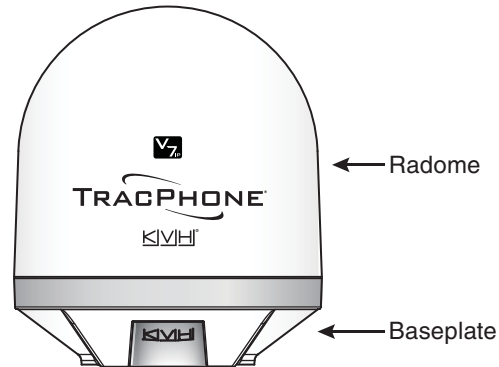
- b. Carefully examine all of the supplied parts to ensure nothing was damaged in shipment.
- c. Gather all of the following tools and materials that you will need:

- Flat-head and Phillips-head screwdrivers
- Electric drill and 5/8" (16 mm) bit
- 3.75" (95 mm) hole saw
- 5/16" hex driver
- 7/8" socket
- 7/16" open-end torque wrench set to 20 in.-lbs
- Light hammer and center punch
- Adhesive tape
- Silicone sealant, self-vulcanizing tape, or equivalent
- Heat gun (for heat shrink)
- Eye protection
- Shop towels
- Voltmeter
- Utility knife
- Cutting pliers

Figure 1: TracPhone V7-IP System Components

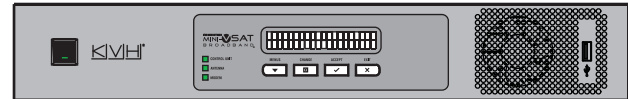
Antenna

(KVH part #02-1925-SL)



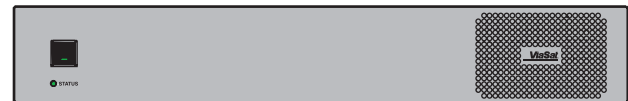
CommBox-ACU

(KVH part #02-1875-02)



Modem

(KVH part #19-0487)



- Wire stripper/terminal crimper
- File
- Two 75Ω RF coax cables, "F" connectors, and associated termination tools (see page 12)
- NMEA 0183 talker and interface cable (see page 18)
- Isolation transformer, if required (see page 20)
- Laptop PC with the latest TracPhone V7-IP CommBox-ACU/antenna software (.kvh) and modem configuration files (.sscf/.sed) downloaded from the KVH Partner Portal (www.kvh.com/partners)

2

Plan the Antenna Installation

Before you begin, consider the following antenna installation guidelines:

- Minimize blockage. The antenna requires a clear view of the sky to transmit and receive satellite signals (see Figure 2). The fewer obstructions, the better the system will perform.
- Make sure the mounting surface is wide enough to accommodate the antenna's base (see Figure 3). Also make sure it is flat, level (within $\pm 2^\circ$), strong enough to support the antenna's weight (57.6 lbs, 26.13 kg), and rigid enough to withstand heavy vibration.
- Select a location that is as close as possible to the intersection of the vessel's centerline and midships.
- Select a location that is well above any areas accessible to passengers and crew to reduce the risk of RF radiation exposure.
- Avoid placing the antenna near any magnetic compasses or other onboard antennas to prevent potential interference.

Radar/High-Power Radio Transmitters

Although many variables determine the exact distance required between the antenna and radar/high-power radio transmitters, including transmitter beam properties and the reflective properties of nearby surfaces, consider the following general guidelines when selecting a safe antenna location:

IMPORTANT!

RF emissions from radars and high-power radio transmitters may damage the antenna or impair its performance if it's improperly positioned within the beam path.

- Mount the antenna as far away as possible from the radar and high-power radio transmitters.

Figure 2: Blockage from Obstruction

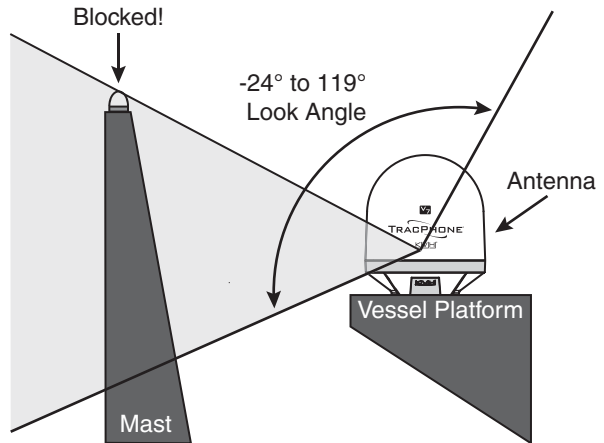
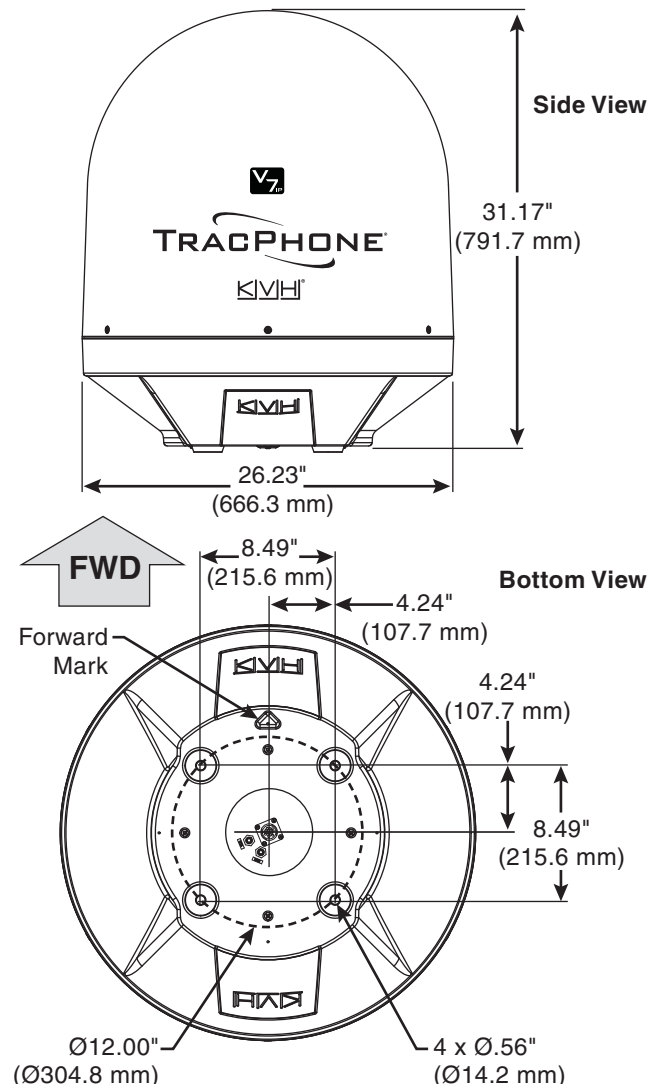


Figure 3: Antenna Dimensions

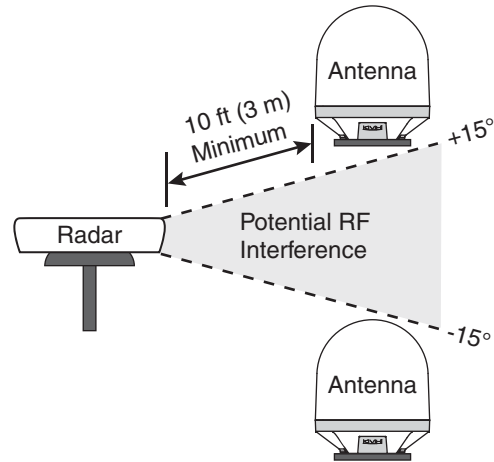


2

Continued Plan the Antenna Installation

- Do not mount the antenna at the same level as the radar. Most radar transmitters emit RF energy within an elevation range of -15° to $+15^{\circ}$ (see Figure 4). Therefore, mount the antenna outside this elevation range and at least 10 ft (3 m) away from the transmitter.

Figure 4: Avoiding RF Interference



3

Plan the Belowdecks Installation

Before you begin, consider the following installation guidelines for the belowdecks units.

- Select a mounting location in a dry, well-ventilated area belowdecks away from any heat sources or salt spray.
- Be sure the front panels will be easily accessible to the user.
- Leave enough room at the rear panels to accommodate the connecting cables.
- There are three options for mounting the belowdecks equipment:

Option 1 - In the optional case

Option 2 - In an onboard equipment rack

Option 3 - To a horizontal surface

NOTE: The CommBox-ACU and modem are sized to fit a standard 19" (482.6 mm) rack, occupying 3U of space.

- To use the supplied power/data cable, the CommBox-ACU must be located within 100 ft (30 m) of the antenna. However, you can order a 150 ft (45 m) cable if a longer cable run is necessary (KVH part no. 32-1031-0150).
- Be sure the location provides adequate Wi-Fi reception. Do not install it in an area surrounded by metal or near any electrical devices that emit RF noise.

Figure 5: CommBox-ACU or Modem Dimensions (Identical)

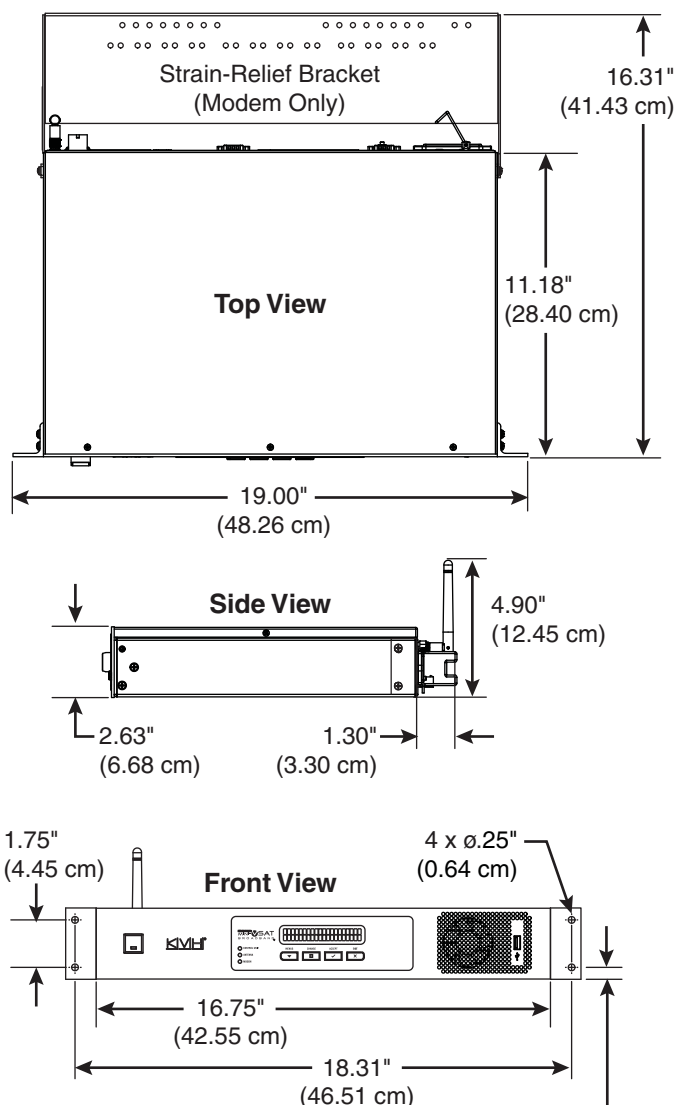
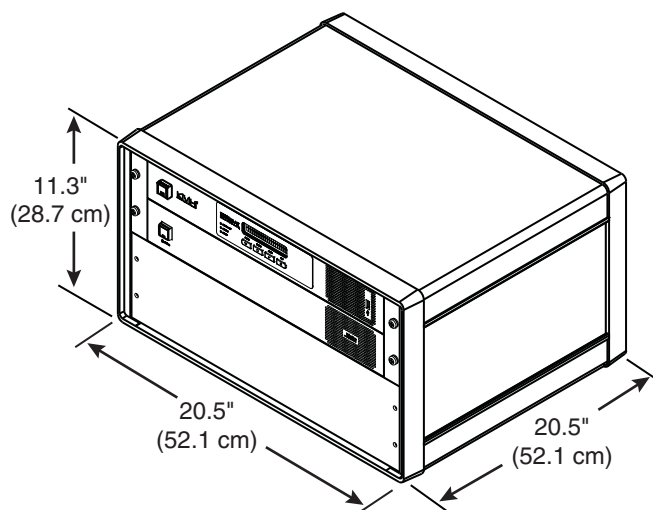


Figure 6: Case Dimensions



4

Prepare the Belowdecks Units

Case Mount

If you plan to use the optional case, follow these steps to assemble the case.

- a. Remove the four M4 screws securing the rear cover to the case. Discard the rear cover.
- b. Attach the top cover to the case using four M4 x 12 mm screws (see Figure 7). Attach the bottom cover and the two mounting brackets using four M4 x 16 mm screws.
- c. Attach the four plastic feet to the bottom cover (see Figure 7).
- d. At the front of the case, insert eight cage nuts into the following locations on the frame (four on each side) (see Figure 7): no. 2, no. 5, no. 9, and no. 12.
- e. At the back of the case, insert four cage nuts into the following locations on the frame (two on each side): no. 1 and no. 3.
- f. Remove the four #6-32 screws and washers securing the two retaining straps to the sides of the modem. *Do not remove the top screws securing the straps to the CommBox-ACU.*
- g. Attach the supplied strain-relief bracket to the retaining straps and modem using the screws and washers you removed in Step f (see Figure 8).
- h. At the top 3U section of the case, insert the CommBox-ACU/modem assembly and secure the front mounting brackets to the case using four M6 screws and washers (see Figure 9).
- i. Secure the back of the CommBox-ACU to the back of the case using the two supplied "Z" brackets. Attach the brackets to the case frame using four M6 screws and washers. Attach the brackets to the rear panel of the CommBox-ACU using four #6-32 screws and washers (see Figure 9).
- j. At the bottom 3U section of the case, attach the supplied blank panel using four M6 screws and washers (see Figure 9).
- k. Once you have completed all system wiring, mount the case to the vessel using fasteners appropriate for the mounting surface.

Figure 7: Assembling the Case

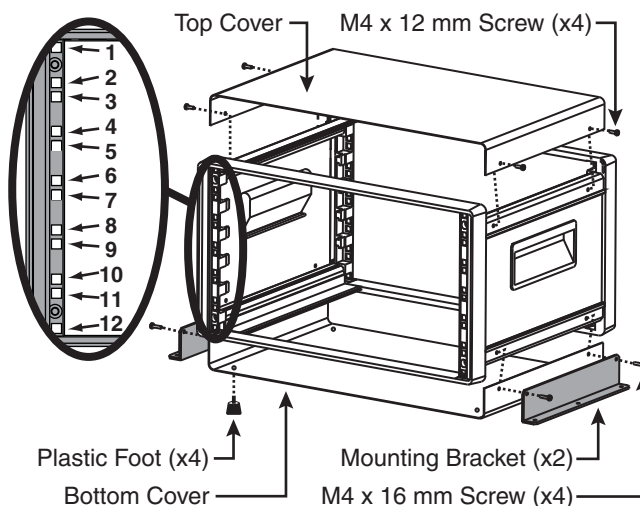


Figure 8: Attaching the Strain-Relief Bracket

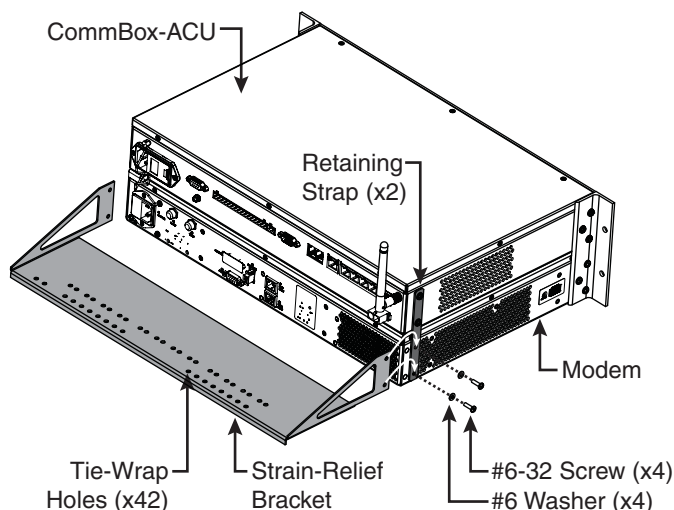
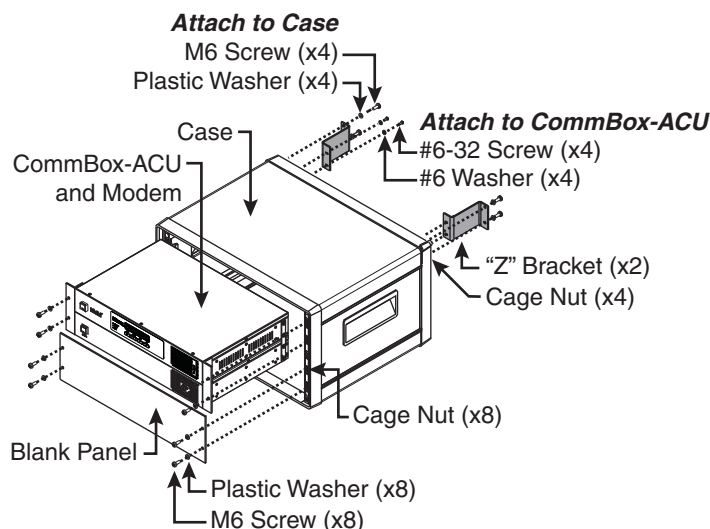


Figure 9: Securing the CommBox-ACU/Modem in the Case



4

Prepare the Belowdecks Units

Rack Mount

If you plan to use an existing equipment rack, follow these steps to secure the equipment in the rack.

- Remove the four #6-32 screws and washers securing the two retaining straps to the sides of the modem. *Do not remove the top screws securing the straps to the CommBox-ACU.*
- Attach the supplied strain-relief bracket to the retaining straps and modem using the screws and washers you removed in Step a (see Figure 10).
- Insert the CommBox-ACU/modem assembly into the rack and secure the front mounting brackets to the rack using four M6 screws and washers (see Figure 11).

Figure 10: Attaching the Strain-Relief Bracket

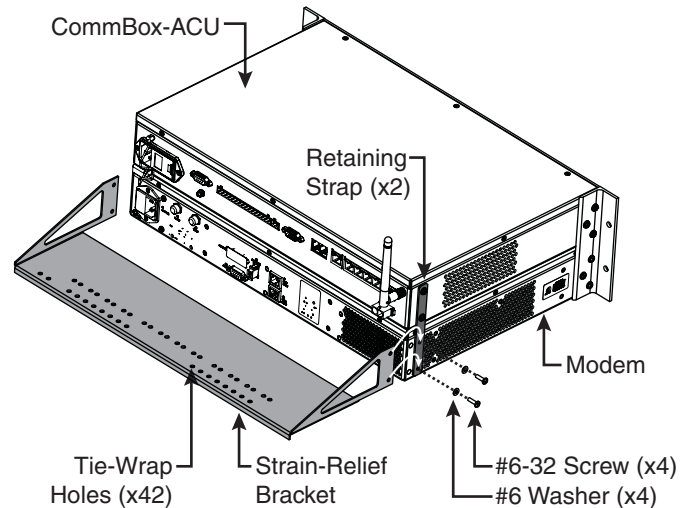
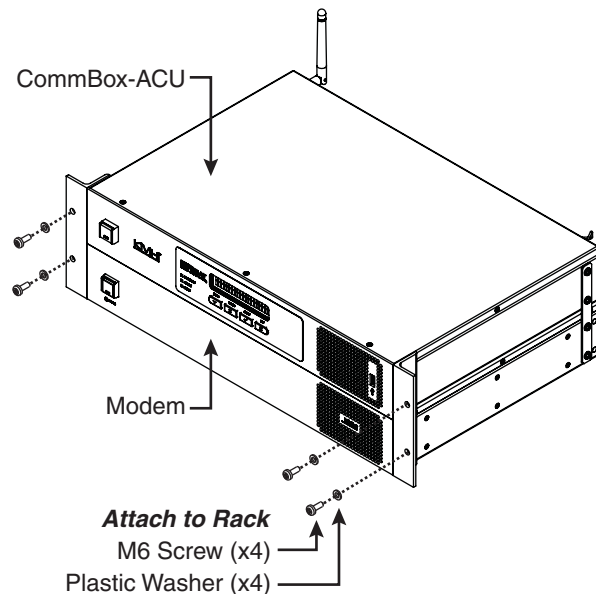


Figure 11: Securing the CommBox-ACU/Modem in the Rack



4

Prepare the Belowdecks Units

If you plan to mount the CommBox-ACU and modem to a horizontal surface, without using the optional case or an equipment rack, follow these steps to attach the strain-relief bracket and “L” mounting brackets.

- Remove the four #6-32 screws and washers securing the two retaining straps to the sides of the modem. *Do not remove the top screws securing the straps to the CommBox-ACU.*
- Attach the strain-relief bracket to the retaining straps and the modem using the screws and washers you removed in Step a (see Figure 12).
- Attach the supplied “L” mounting brackets to the sides of the modem using four #6-32 screws and washers (see Figure 13).
- Once you have completed all system wiring, mount the modem/CommBox-ACU assembly to the vessel using fasteners appropriate for the mounting surface.

Horizontal Surface Mount

Figure 12: Attaching the Strain-Relief Bracket

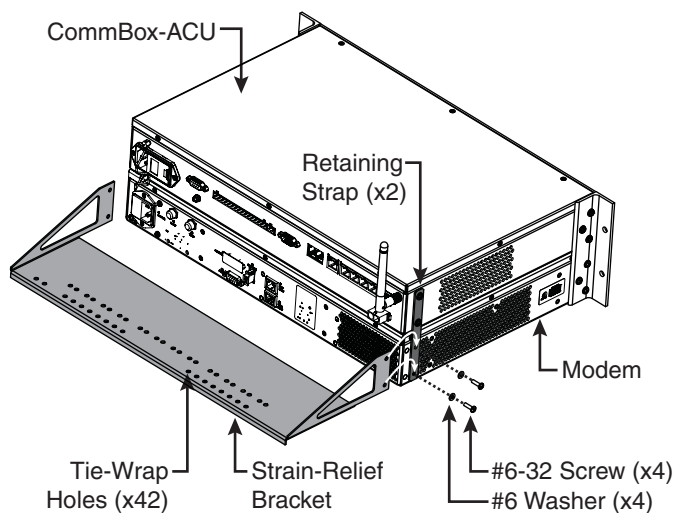
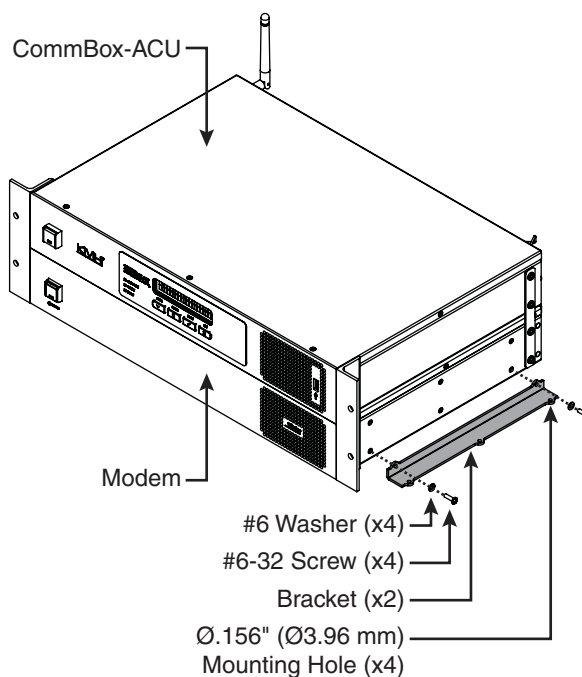


Figure 13: Attaching the Mounting Brackets



5

Prepare the Antenna Site

Once you have identified a suitable antenna mounting site, according to the guidelines provided in Step 2, follow these steps to drill the mounting holes and cable access hole to prepare the site for installation.

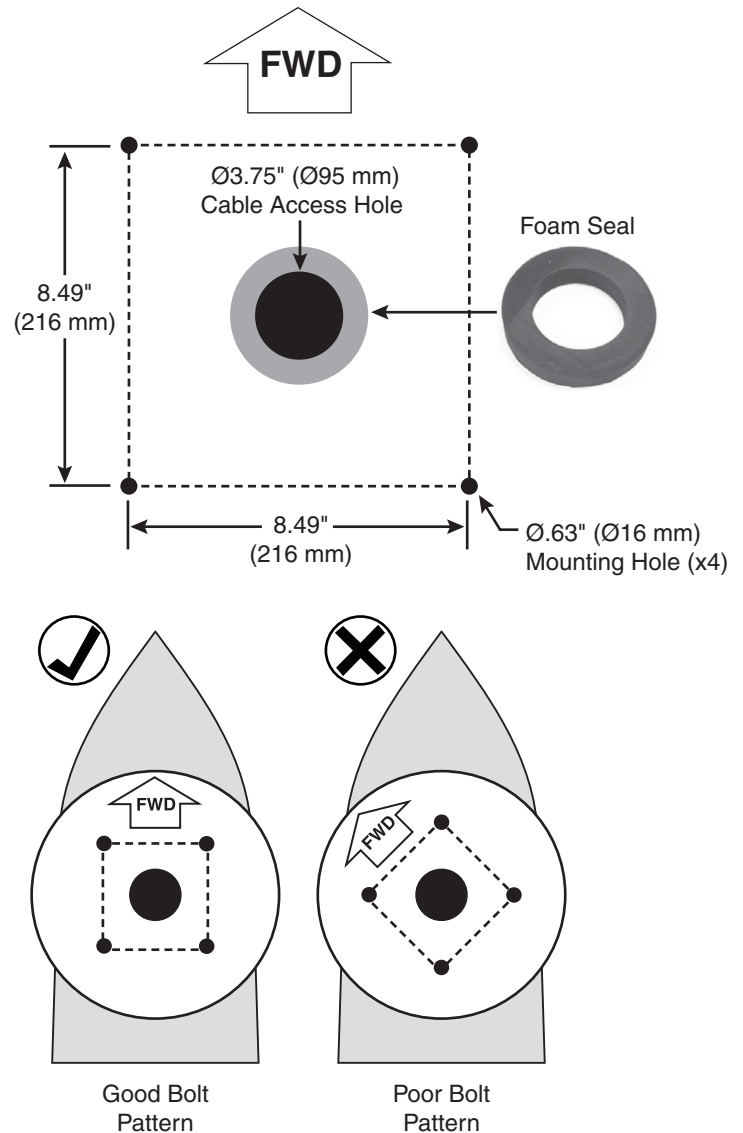
- Unfold the antenna mounting template (supplied in the Customer Welcome Kit) and place it onto the mounting surface. Make sure the "FWD" (forward) arrow points toward the bow and is parallel to the vessel's centerline (see Figure 14).

NOTE: You don't need to mount the antenna exactly on the vessel's centerline, but the antenna's forward arrow must be parallel to it.

- Using a light hammer and center punch, mark the locations for the four mounting holes and cable access hole on the mounting surface in the locations indicated on the template.
- Drill a 5/8" (16 mm) hole at the four mounting hole locations you marked in Step b. Later, you will insert four 1/2"-13 bolts through these holes to secure the antenna to the mounting surface.
- Cut out the 3.75" (95 mm) cable access hole in the location you marked in Step b. Smooth the edges of the hole to protect the cables. Later, you will route the power/data and RF cables through this hole and into the vessel. (You may also apply anti-chafe material around the cables to protect them from abrasion.)
- Clean and dry the antenna mounting surface.
- Peel off the paper backing from the supplied foam seal to expose the adhesive. Then press the foam seal down firmly onto the mounting surface, ensuring the hole in the foam seal aligns with the cable access hole in the mounting surface (see Figure 14).

NOTE: Apply the foam seal to the vessel mounting surface, not to the antenna's baseplate. You will have difficulty connecting the cables to the antenna if the foam seal is attached to the baseplate.

Figure 14: Antenna Mounting Holes Layout



6

Remove the Shipping Restraints

Inside the antenna, a foam shipping restraint prevents the antenna assembly from moving during shipment. In addition, four bolts secure the antenna to the shipping pallet. Follow these steps to remove these restraints.

- a. Remove the six #10-32 screws securing the radome to the baseplate (see Figure 15). Carefully lift the radome straight up until clear of the antenna assembly and set it aside in a safe place. If you keep the radome topside, secure it with a lanyard to prevent it from falling overboard.
- b. Carefully remove the foam shipping restraint that is wedged underneath the reflector (see Figure 16). Save this restraint for future use.

IMPORTANT!

Once you have removed the foam restraint, handle the antenna carefully, as its internal assembly will rotate freely. You will need to rotate the antenna assembly slowly by hand to remove the second pair of shipping bolts, but only **after** you have removed the first pair of bolts that are initially visible. If the antenna assembly hits a mechanical stop with excessive force, or it hits the head of a shipping bolt that wasn't removed, the limit switch might become damaged.

- c. Four 1/2" bolts secure the antenna to the shipping pallet (see Figure 16). Completely remove the two 1/2" shipping bolts that you can see without rotating the antenna assembly.
- d. Rotate the antenna assembly slowly by hand to reveal the other two 1/2" shipping bolts. Remove these bolts.
- e. Transport the antenna to the mounting location.

NOTE: The two hoisting eyelets on the antenna frame may be used to lift the antenna, if necessary (see Figure 17). After they have been used once, make sure they are undamaged and free of cracks before using them again.

Figure 15: Removing the Radome

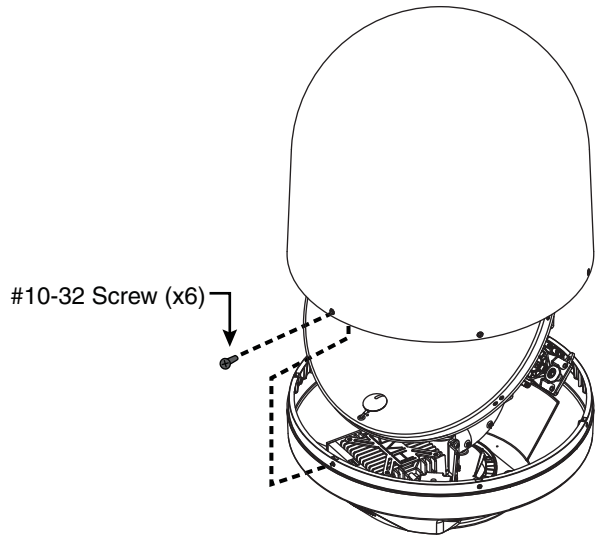


Figure 16: Foam Shipping Restraint and Bolts

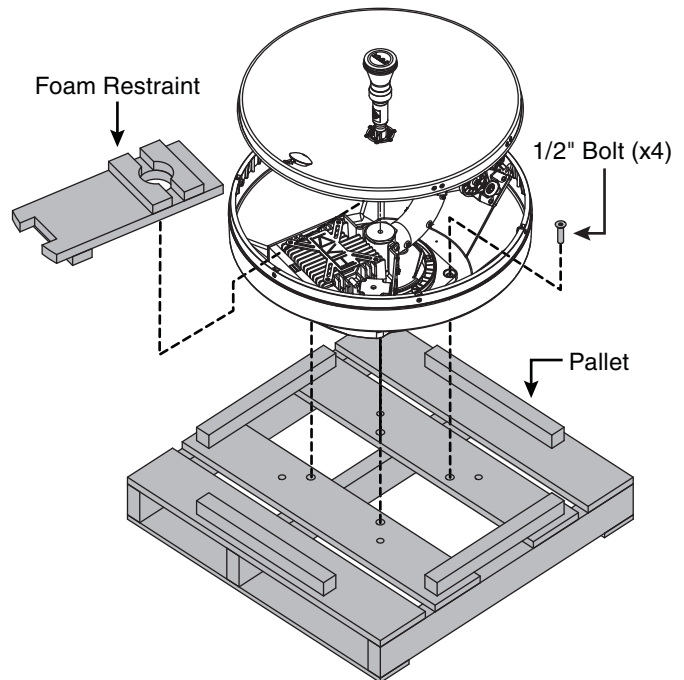
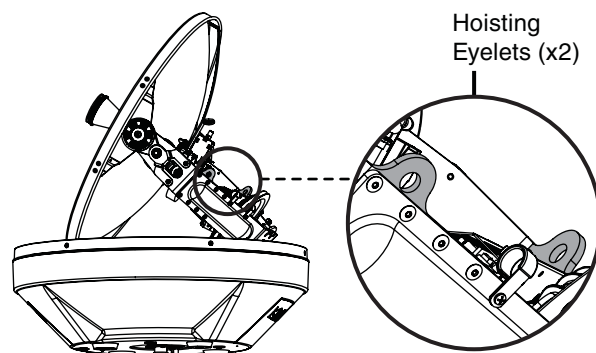


Figure 17: Antenna Hoisting Eyelets



7

Prepare the RF Cables

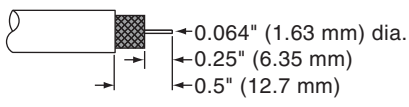
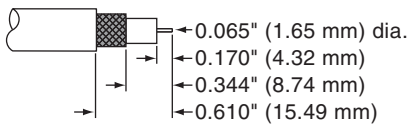
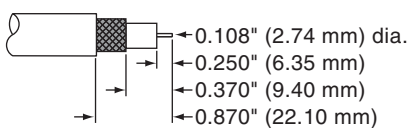
You need to connect two 75Ω RF coax cables from the antenna location to the belowdecks equipment. Refer to Figure 18 to determine the type of cables and connectors required for your cable run. Then prepare both of them as described below.

IMPORTANT!

- RF cables must be rated for 75Ω, not 50Ω.
- Low-quality, poorly terminated, or improperly installed RF cables are the most common cause of system problems. Terminate all RF cables with high-quality “F” connectors using the proper stripping/crimping tools, exactly to the manufacturer’s specifications.
- Make sure the center conductor pin at each end of the finished cables is 1/4" (0.20"-0.28") (5-7 mm) in length, measured from inside the nut to the tip, to ensure proper engagement. *Instructions for terminating LMR-400-75 cable are provided on page 31.*
- Each RF cable run must not exceed 6.5 dB of insertion loss. Keep in mind that an in-line connector adds at least 0.2 dB of loss.

- Terminate both ends of the cables with the proper “F” connectors (see Figure 18 for connector and tool part numbers).
- Label both ends** of the two RF cables. Label one cable “TX,” and label the other “RX.”

Figure 18: RF Cable Requirements

15-50 ft (5-15 m) Cable Run	
Cable	RG-11 (KVH part no. 32-0566-50) Loss: 0.084 dB/ft (0.276 dB/m)
Connector	Thomas & Betts SNS11AS*
Tools	Thomas & Betts CST596711, L3011B (KVH part no. 72-0493)
Strip Lengths	
51-100 ft (16-30 m) Cable Run	
Cable	LMR-400-75 (KVH part no. 32-0944-0100) Loss: 0.06 dB/ft (0.195 dB/m)
Connector	Times Microwave EZ-400-FMH-75*
Tools	Times Microwave TK-400EZ-75 (KVH part no. 72-0374-75**)
Strip Lengths	
101-150 ft (31-45 m) Cable Run	
Cable	LMR-600-75 (KVH part no. 32-0945-0150) Loss: 0.04 dB/ft (0.13 dB/m)
Connector	Times Microwave EZ-600-FMH-75*
Tools	Times Microwave TK-600EZ (KVH part no. 72-0375-75**)
Strip Lengths	

* Cables from KVH include the proper connectors.

** LMR tool kits from KVH include a torque wrench.

8

Wire the Antenna

Follow these steps to connect the RF and power/data cables to the antenna.

NOTE: An optional 150 ft (45 m) power/data cable is available from KVH (KVH part no. 32-1031-0150).

Route the Cables Belowdecks

- Route the power/data and RF cables belowdecks through the 3.75" (95 mm) cable access hole. Leave an adequate service loop, approximately 8" (20 cm) of slack, at the antenna location for easy serviceability.
- Route the other end of the cables to the belowdecks equipment. Be sure to always maintain the minimum bend radius in the RF cables (see Figure 19). Later, you will connect the power/data cable to the CommBox-ACU and the RF cables to the modem.

Connect the Customer's RF Cables to the Supplied Pigtail Cables

IMPORTANT!

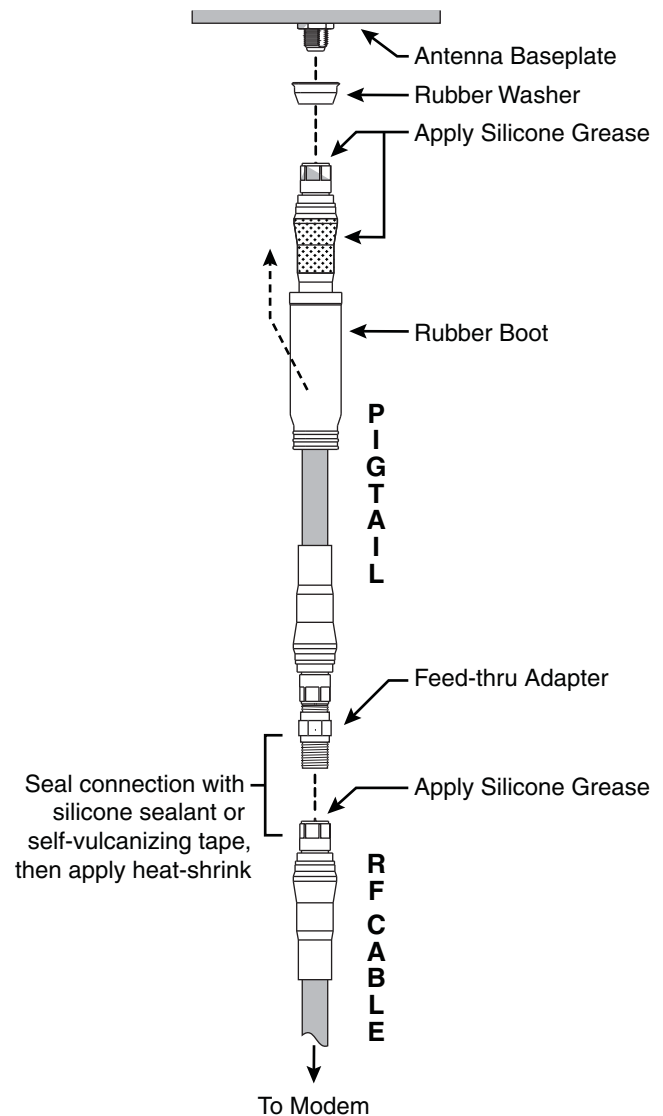
Use of the supplied pigtail cables is **mandatory**. Do not connect the customer's RF cables directly to the antenna.

- Clean and dry the RF cables' connectors.
- Heat shrink is supplied with each 3 ft (90 cm) pigtail cable to protect the connection between the customer's RF cables and the pigtail cables. Slide a heat shrink sleeve onto the end of each 3 ft (90 cm) pigtail cable (opposite the boot end) for later use.
- Fill half of the inner body of the customer's "TX" RF cable's connector with the supplied silicone grease to prevent moisture and corrosion.
- Connect and **SLOWLY** hand-tighten the "TX" RF cable to the feed-thru adapter of one of the supplied LMR-400-75 pigtail cables, allowing the grease to diffuse and settle into the entire space within the connector (see Figure 20).

Figure 19: Minimum Bend Radius of RF Cables

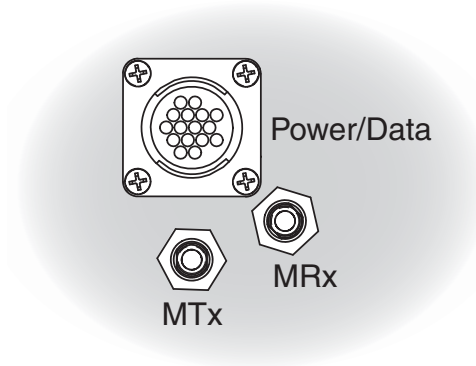
Cable Type	Minimum Bend Radius
RG-11	4.5" (11.5 cm)
LMR-400-75	4.5" (11.5 cm)
LMR-600-75	6" (15.3 cm)

Figure 20: Pigtail Cable Connections



- e. Make sure the RF cable's connector is tightened all the way into the pigtail cable's feed-thru adapter. Then tighten it with a 7/16" torque wrench set to 20 in.-lbs.
- f. Seal the RF cable-to-pigtail connection using silicone sealant, self-vulcanizing tape, or equivalent. Then protect the connection with the heat shrink (see step b).
- g. Repeat steps c-f to connect the "RX" RF cable to the other pigtail cable.

Figure 21: Connectors on Bottom of Antenna



Connect the Pigtail Cables to the Antenna

- a. Clean and dry the antenna's two RF connectors (see Figure 21).
- b. Place one of the supplied rubber connector washers over the "MTx" jack on the bottom of the antenna, as shown in Figure 20 on page 13.
- c. Fill half of the inner body of the "TX" pigtail cable's male connector with silicone grease.
- d. Connect and **SLOWLY** hand-tighten the "TX" pigtail cable to the antenna's "MTx" jack, allowing the grease to diffuse and settle into the entire space within the connector.
- e. Make sure the "TX" pigtail cable's connector is tightened all the way into the antenna's connector and the rubber washer is compressed against the antenna's base. Then tighten the connector with a 7/16" torque wrench set to 20 in.-lbs.
- f. Apply a thin layer of silicone grease to the jacket of the "TX" pigtail cable, along the wider segment at the base of the connector.
- g. Slide the rubber boot up the cable until it covers the entire connector and mates with the rubber washer. This will protect the connection from the elements.
- h. Wipe off any excess grease from the cable.
- i. Repeat steps b-h to connect the "RX" pigtail cable to the antenna.

8

Continued Wire the Antenna

Connect the Power/Data Cable

Connect the power/data cable to the “Power/Data” jack on the bottom of the antenna (see Figure 21 on page 14). Hand-tighten until the connector locks in place; do not use excessive force.

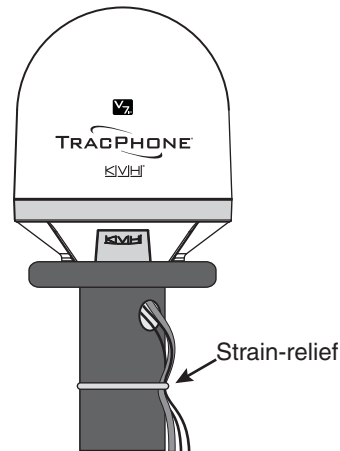
Protect the Cables

- Secure the cables near the antenna connectors to relieve stress (see Figure 22).
- Weatherproof and seal the cable access hole, as required.

IMPORTANT!

The integrity and reliability of the RF cables and their connections are critically important. Make certain that these cables are properly terminated, sealed against seawater and corrosion, strain-relieved, protected from abrasion, and free of stress.

Figure 22: Strain-relief Example



9

Mount the Antenna

Follow these steps to mount the antenna to the mounting surface.

- a. Place the antenna baseplate over the holes drilled in the mounting surface and make sure the forward arrow inside the baseplate points toward the bow and is parallel to the vessel's centerline (see Figure 23). The antenna's baseplate should rest squarely atop the foam seal.



CAUTION

Observe the safety warnings printed on the tube of Loctite® anti-seize lubricant: "Contains mineral oil, calcium hydroxide, and copper. May cause skin, eye, and respiratory irritation. Wear eye protection and gloves. **First aid:** In case of eye or skin contact, flush with water. Obtain medical attention for any eye or internal contact."

- b. Apply a thin layer of the supplied anti-seize lubricant to the threads of the four 1/2"-13 bolts to prevent galling.

IMPORTANT!

You will need to rotate the antenna assembly slowly by hand to see all four mounting holes. You will also need to fully install the first pair of mounting bolts prior to rotating the antenna assembly to install the second pair of bolts. If the antenna assembly hits a mechanical stop with excessive force, or it hits the head of a mounting bolt that wasn't secured in place, the limit switch might become damaged.

- c. At each of the two baseplate mounting holes that you can see without rotating the antenna assembly, insert a 1/2"-13 bolt from above and secure it to the mounting surface using a 1/2" flat washer and a 1/2"-13 lock nut from below (see Figure 24). Make sure both bolt heads are flush with the antenna's mounting plate before proceeding.

Figure 23: Forward Arrow in Antenna Baseplate

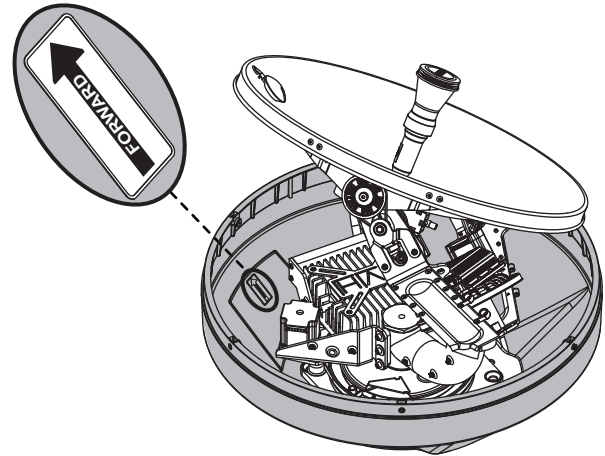
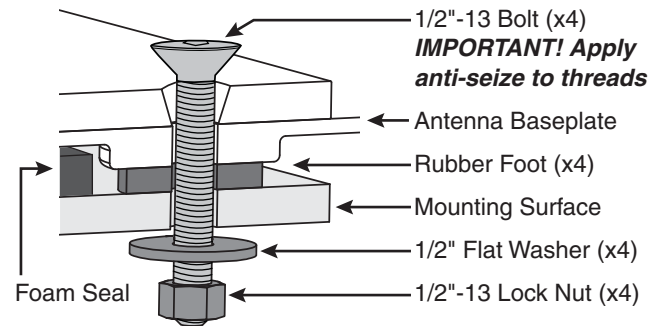


Figure 24: Mounting the Antenna (Side View)



9

Continued Mount the Antenna

- d. Rotate the antenna assembly slowly by hand to reveal the other two mounting holes then repeat step c at these two holes.
- e. Tighten all four bolts until the four rubber feet on the baseplate are bottomed against the mounting surface and the foam seal is fully compressed. KVH recommends that you tighten the nuts to between 35 and 40 ft-lbs (47 and 54 N-m) of torque.
- f. Reinstall the radome onto the antenna. Secure in place with the six #10-32 screws you removed earlier (see Figure 15 on page 11).
- g. Install a protective plastic cap (supplied in the kitpack) over each radome screw.

10 Wire the Belowdecks Equipment

Follow these steps to wire the belowdecks equipment (see page 38 for a complete wiring diagram).

Connect the Antenna Power/Data Cable

- First dress the power/data cable from the antenna. Strip back the insulation of each wire approximately 1/4" (6 mm) and gently twist each wire to ensure a good electrical connection.
- Connect the antenna power/data cable to the supplied 16-position terminal strip connector as shown in Figure 25.

IMPORTANT!

The diagram refers to wires by **body color/stripe color**. For example, "Brown/White" means the brown wire with white stripe.

- Plug the terminal strip connector into the rear panel of the CommBox-ACU.

Connect a NMEA 0183 Talker

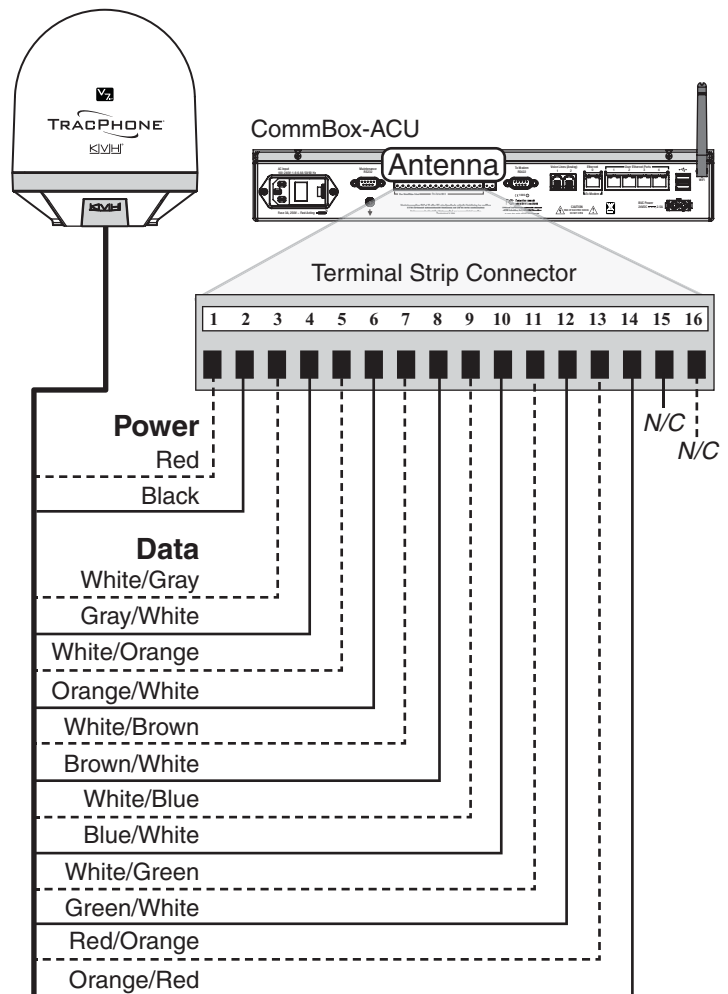
- Connect a NMEA 0183 talker (customer-supplied) to the supplied 2-position terminal strip connector as shown in Figure 26. Make sure the device is configured to transmit one of the following messages at 4800 baud to provide true or magnetic heading:

- \$--HDG
- \$--HDM
- \$--HDT
- \$--OSD
- \$--THS
- \$--VHW

NOTE: The system does not accept heading messages that conform to the NMEA 2000 standard.

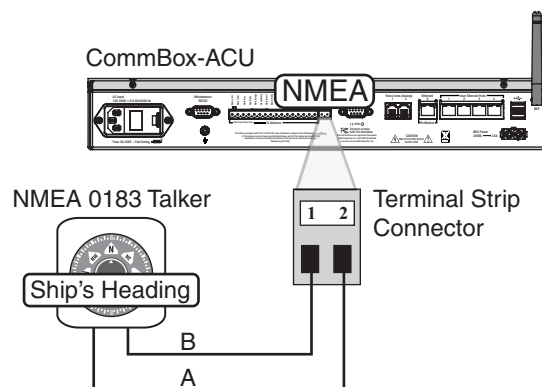
- Plug the terminal strip connector into the rear panel of the CommBox-ACU.

Figure 25: Antenna Power/Data Wiring



Two unused wires are reserved for future use; N/C = Not Connected

Figure 26: NMEA Wiring



10 Continued Wire the Belowdecks Equipment

Connect the RF Cables

IMPORTANT!

If you are using LMR-600-75 RF cables, do not connect them directly to the modem. Connect the supplied 1 ft (30 cm) LMR-400-75 pigtail cables in-line between the RF cables and the modem.

- Connect the RF coax cable labeled “RX” to the “Rx RF” jack on the back of the modem (see Figure 27). Hand-tighten, then tighten with a 7/16" torque wrench set to 20 in.-lbs.
- Connect the RF coax cable labeled “TX” to the “Tx RF” jack on the back of the modem. Hand-tighten, then tighten with a 7/16" torque wrench set to 20 in.-lbs.

IMPORTANT!

Be sure the RF cables are terminated properly with type “F” connectors.

Connect the CommBox-ACU to the Modem

- Connect a serial data cable from the “To Modem” jack on the CommBox-ACU to the “ACU” jack on the modem (see Figure 28).
- Connect a straight-through Ethernet cable from the “Ethernet 0” jack on the CommBox-ACU to the “User ENet” jack on the modem.
- Connect the BUC power cable from the “BUC Power” jack on the CommBox-ACU to the “BUC Pwr” jack on the modem.

Figure 27: Antenna RF Transmit and Receive Wiring

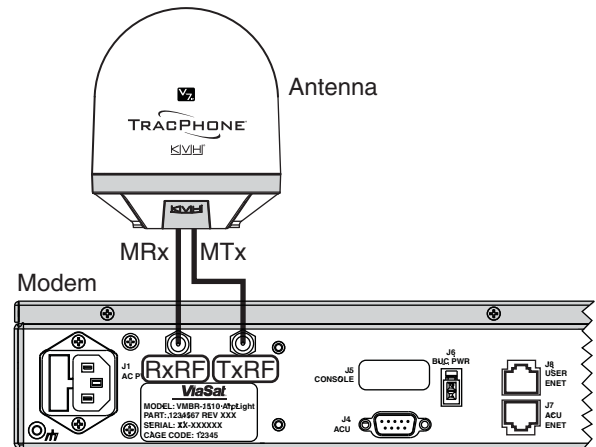
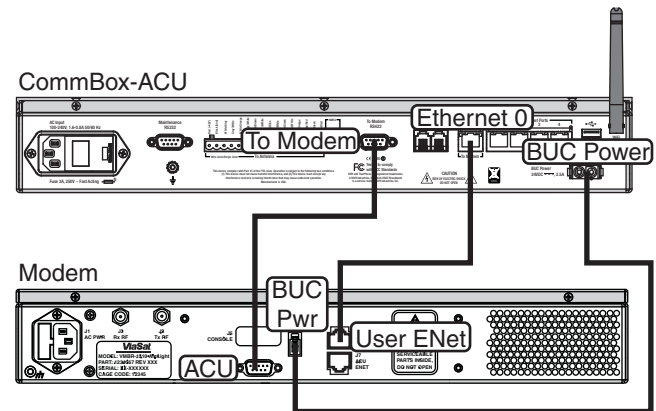


Figure 28: CommBox-ACU-to-Modem Wiring



11 Connect Power

Before you begin, be sure that you understand the following important requirements:

AC Power Requirements

The TracPhone system is designed to run on 3-wire single-phase AC power (hot, neutral, and ground). Voltage between hot-neutral and hot-ground should each measure between 100-240 VAC.

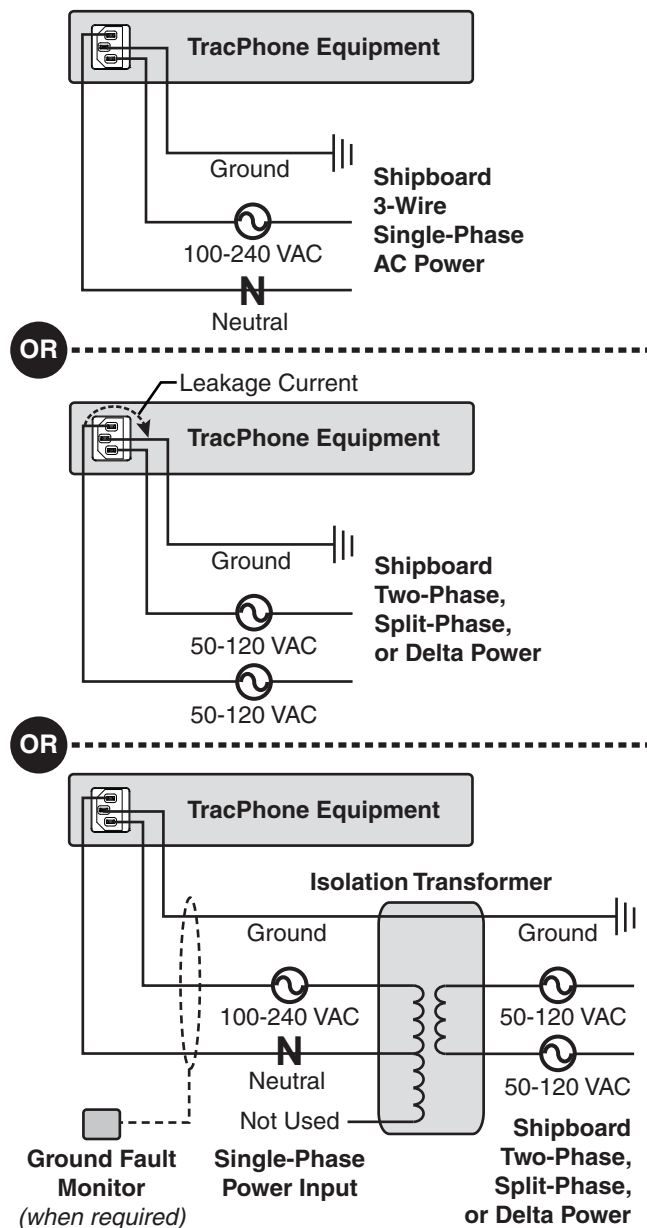
Many large ships use two-phase, split-phase, or delta power instead (3 wires: hot, hot, and ground; no neutral). In this case, voltage between hot-hot measures the proper voltage (100-240 VAC); while hot-ground measures only half the voltage (50-120 VAC). Although the TracPhone system can operate on this type of power, the excess voltage present on the second phase will cause a small amount of current to leak onto ship's ground. This leakage current might be unacceptable on some vessels. So check with the customer or ship's electrician and get permission before you run the system on two-phase power. Also be sure to ground the system, as explained below.

If two-phase power is the only available power source onboard, and if leakage current is unacceptable, KVH recommends that you install a suitable isolation transformer to supply single-phase power to the antenna system and run a ground wire from the transformer to ship's ground. In addition, since ground fault protection devices cannot detect faults behind a transformer, you will also need to install a ground fault monitoring device between the isolation transformer and the antenna system if ground fault protection is required on the vessel.

Grounding Requirements

Proper grounding of the TracPhone system to ship's ground is critically important, as it protects the equipment from lightning and electrostatic discharges (ESD). Failure to ground the chassis of the CommBox-ACU risks damage to the antenna and electric shock.

Figure 29: AC Power Options



11 Continued Connect Power

Once you have read and understand the requirements described on page 20, follow these steps to connect power to the TracPhone system.

- Before you begin, disconnect vessel power and be sure the vessel is properly grounded in accordance with marine standards.
- Connect the supplied AC power cords to the CommBox-ACU and modem (see Figure 30).
- Connect the supplied ground wire from the ground point on the CommBox-ACU rear panel to ship's ground.



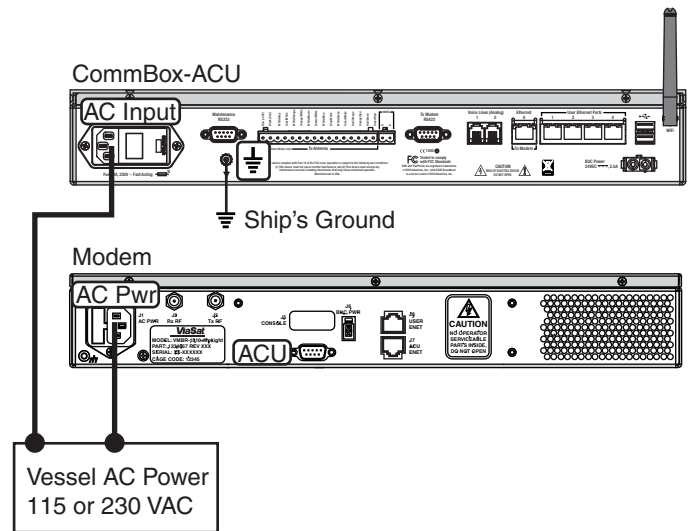
WARNING

Failure to ground the TracPhone system properly to ship's ground will cause an unsafe floating ground condition, risking damage to the antenna and electric shock, potentially resulting in DEATH. In a floating ground condition, the difference between the equipment's chassis ground and the ship's ground can measure well over 100 volts, when it normally should not exceed 25 volts. Therefore, always measure the difference in potential between chassis ground and ship's ground to make certain that there is no dangerous floating ground condition, even if the ground pin of the vessel's AC power plug appears to be intact.

- Using tie-wraps, secure all wires to the strain-relief bracket at the back of the CommBox-ACU and modem. Leave enough slack for easy serviceability.
- Plug the CommBox-ACU and modem power cords into the vessel's 115 or 230 VAC supply.

NOTE: Consider installing an uninterruptible power supply (UPS) to avoid service interruptions during power outages and transitions to/from shore power.

Figure 30: Power Wiring



12 Turn On the System

Follow these steps to turn on the TracPhone system for the first time.

- Double-check all of your wiring.
- Ensure the antenna has a clear, unobstructed view of the sky.
- Apply vessel power to the TracPhone system.
- Press the power buttons on the front of the modem and CommBox-ACU (see Figure 31). The buttons' lights should illuminate green.
- Wait 5 minutes for system startup.

IMPORTANT!

Once the system is online, do not turn it off for 30 minutes to allow the modem to download the latest SSCF/SED configuration files via the satellite. If the modem is unable to connect, you may upload these files manually via the modem's web interface. Details are available to technicians on the KVH Partner Portal and in the Help.

- Verify that the status lights on the CommBox-ACU and modem (see Figure 32) exhibit the following conditions:
 - Control Unit:** Lit green
 - Antenna:** Lit or flashing green
 - Modem:** Lit or flashing green
 - Status:** Any condition except off
- Connect your PC to the "User Ethernet 1" port on the rear panel of the CommBox-ACU (see Figure 33).
- Open a web browser on your PC and enter the following address:

<http://minivsat.kvh>
- Verify that the TracPhone V7-IP web interface appears in your browser. If the web interface is not displayed, enter the CommBox-ACU's IP address (*you can find this address on the LCD: go to Settings > Network Settings > IP Assignments*) and make sure your PC is configured for DHCP addressing (see page 35).

Figure 31: Power Buttons

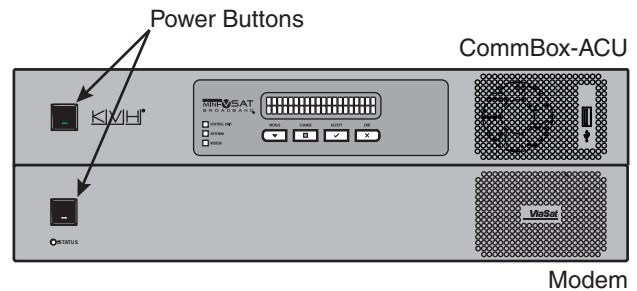


Figure 32: Status Lights

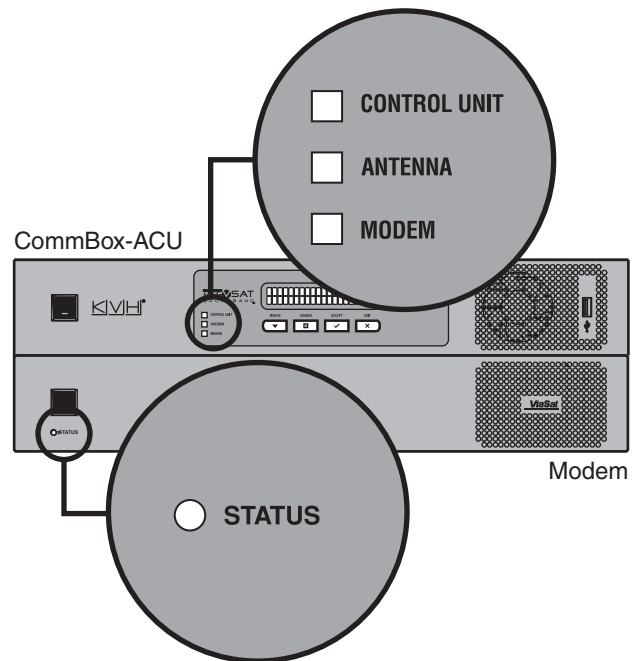
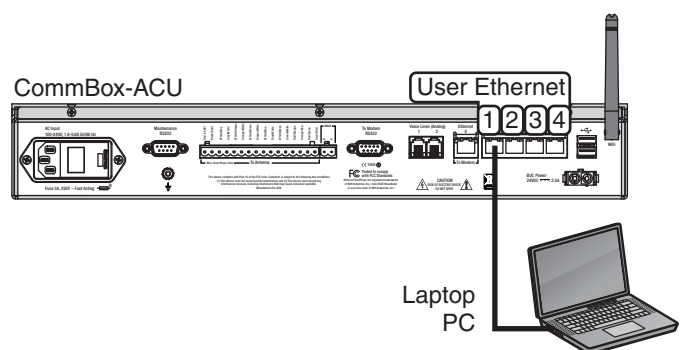


Figure 33: Connecting Your Laptop to the CommBox-ACU



13 Update the System Software

If Necessary

Follow these steps to ensure the latest software is installed in the TracPhone system.

Check the Current Software Version

- Go to the TracPhone V7-IP web interface and click the **Updates** tab. Note the displayed CommBox-ACU/Antenna software version (see Figure 34).
- If the reported software version is earlier than the latest version you downloaded from the KVH Partner Portal, update the system following the steps below.

Update the Software, If Necessary

NOTE: This procedure explains how to update the software using the TracPhone V7-IP web interface. However, you can also update the software using the mini-VSAT iPhone®/iPod Touch® app, a USB drive, or, if the system is activated, via the antenna's Internet connection (airtime charges may apply). Details are available in the Help.

- Click **Choose File**.
- At the Login window, enter the default password: "password".
- Click **Browse** and navigate to the file you saved on your laptop (see Figure 35).
- Click **Check File**.
- At the confirmation message, click **Update**.
- Wait for the software update to complete. It might take up to 20 minutes.

Figure 34: Updates Page on Web Interface

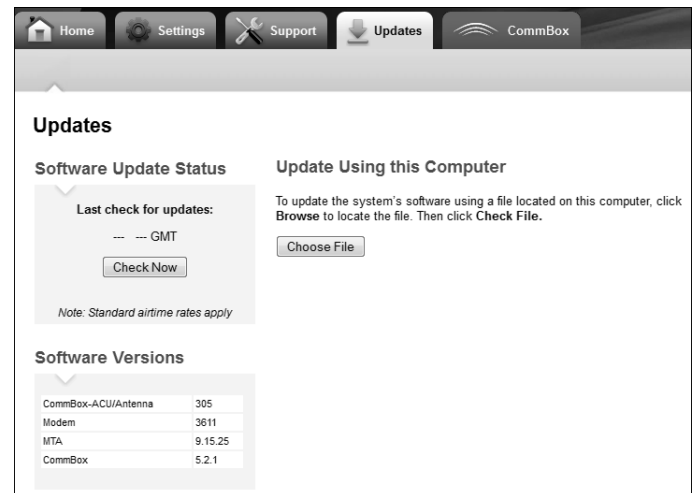
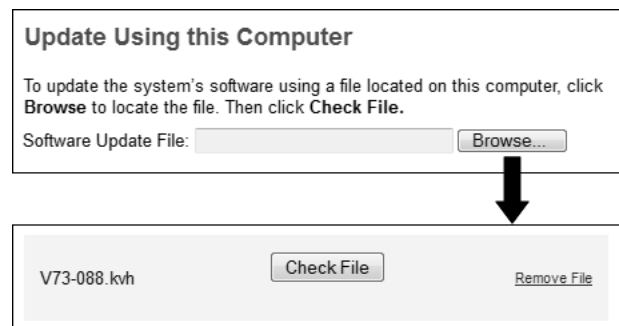


Figure 35: Update File Selected for Upload



14 Customize the Web Interface

Follow these steps to customize the web interface for the customer's use.

Set the Administrator Password

The user must be logged in as an administrator to make changes to the system's configuration. Follow these steps to change the administrator password to something unique.

- At the TracPhone V7-IP web interface, click the **Settings** tab. Then click **Account**.
- In Security, click **Edit**.
- For the current password, enter the default password: "**password**" (see Figure 36).
- Enter and then re-enter the new password. Then click **Save Settings**.

Enter the Vessel Name

The vessel name is displayed on the home page and in all support communications. Follow these steps to enter the correct vessel name.

- At the TracPhone V7-IP web interface, click the **Settings** tab. Then click **Account**.
- In Vessel Name, click **Edit**.
- Enter the vessel name (see Figure 37). Then click **Save Settings**.

Assign Phone Line Names

The phone line names are displayed on the home page and in all support communications. Follow these steps to assign a name (i.e., location) to each phone line.

- At the TracPhone V7-IP web interface, click the **Settings** tab. Then click **Other**.
- In Phone Line Names, click **Edit**.
- Enter names for Lines 1 and 2 (see Figure 38). Then click **Save**.

Figure 36: Setting the Administrator Password

The screenshot shows a web form titled "Security". Below the title is the instruction "Change the administrator's login password." There are three password input fields: "Enter the current password:" with a masked field containing seven dots; "Enter the new password:" with a masked field containing ten dots, a strength indicator showing a checkmark and the word "Strong", and a note "(between 4 and 20 characters long, with at least one letter and one number, case sensitive)"; and "Re-enter the new password:" with a masked field containing ten dots. At the bottom right are "Cancel" and "Save Settings" buttons.

Figure 37: Entering the Vessel Name

The screenshot shows a web form titled "Vessel Name". Below the title is the instruction "Change the name displayed on the Home page and in support communications." There is a "Vessel Name:" label followed by a text input field containing the word "Britanic". At the bottom right are "Cancel" and "Save Settings" buttons.

Figure 38: Assigning Phone Line Names

The screenshot shows a web form titled "Phone Line Names". Below the title is the instruction "The names displayed on the home page and in support communications (see example)". There are two rows: "Line 1:" with a text input field containing "Bridge" and a note "(up to 25 characters)"; and "Line 2:" with a text input field containing "Crew Quarters" and a note "(up to 25 characters)". At the bottom right are "Cancel" and "Save" buttons.

15 Set Up No-Transmit Zones

Optional

To prevent exposure to RF energy, which may be harmful to people who stand within 36 feet (11 meters) of the antenna, you can configure up to two no-transmit zones for areas where crew and/or passengers frequent (see Figure 39). The system will disable the transmitter whenever the antenna is pointing within one of these zones.

Follow these steps to set up a no-transmit zone.

- Determine the necessary azimuth range for the no-transmit zone(s). You will need to enter, in clockwise order, beginning and ending azimuths that define the outer boundaries of the zone(s) **relative to the antenna's forward arrow**, which should be pointing toward the bow (see Figure 40).

NOTE: Each no-transmit zone must span at least 5°. Therefore, be sure to set the beginning and ending azimuths at least 5° apart.

- At the TracPhone V7-IP web interface, click the **Settings** tab. Then click **No-Transmit Zones**.
- Click **Edit**.
- Click **Enforce Zones** (see Figure 41).
- Enter the azimuth range for Zone 1.
- Enter the azimuth range for Zone 2, if required.
- Click **Save All Settings**.
- At the confirmation message, click **Save**.

Figure 39: Example of a No-Transmit Zone

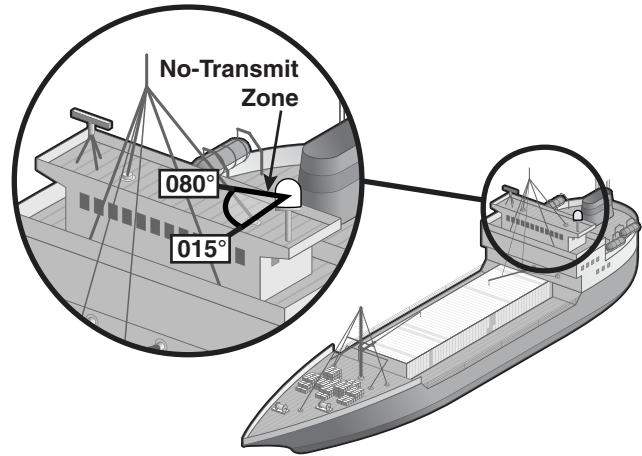


Figure 40: Azimuths Relative to Antenna's Forward Arrow

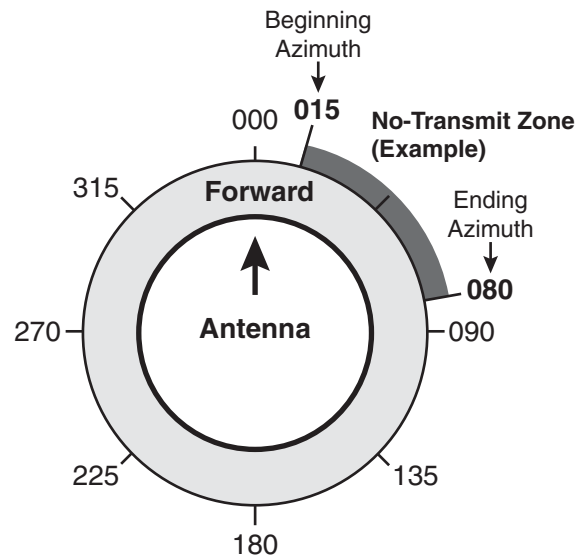


Figure 41: No-Transmit Zones Page of Web Interface

No-Transmit Zone Ranges:	
<input checked="" type="radio"/> Enforce Zones The antenna will not transmit within the zone(s) specified below.	
<input type="radio"/> Ignore Zones The antenna will be able to transmit in any direction without restriction. Be sure everyone stays at least 36 feet (11 meters) away from the antenna.	
Zone #1	Zone #2
Azimuth Range From: 15 ° To: 80 °	Azimuth Range From: --- ° To: --- °
Select Enforce Zones first. Zone must span more than 5°.	
<div> Cancel Clear All Zones Save All Settings </div>	

16 Test the System

Follow these steps to test the system for proper operation.

- Ensure the antenna has a clear, unobstructed view of the sky.
- Verify that the antenna is tracking the service satellite and the modem is online, as indicated by the Home page of the TracPhone V7-IP web interface (see Figure 42).
- On the Home page, make sure the vessel's heading is displayed in the Real-time Vessel & VSAT Satellite Display (see Figure 43). If it is not shown, check your wiring to the NMEA 0183 talker.

- Enter the following address in your web browser:

<http://208.83.165.11/mbbtest>

Verify that the Welcome page appears, indicating good communications between the modem and the land-based hub (see Figure 44).

- If the customer has activated the system for mini-VSAT Broadband service, verify that you can place a voice call. Connect the supplied diagnostics telephone to the "Voice Line 1" jack on the rear panel of the CommBox-ACU (see Figure 45). Then place a call to someone on a terrestrial or cellular network and ask them to call you back at the customer's number.
- If the customer has activated the system, also verify that the system can access the Internet by entering any common website address (URL) into your web browser.
- Fill out the installation checklist (provided in the Customer Welcome Kit) and return it to KVH. Refer to the instructions on the form.

IMPORTANT!

Submission of the Installation Checklist is **required** to certify the quality of your installation.

Figure 42: Good Service Connection Indicated on Home Page


My VSAT Status	
Connection Status	Antenna State
 ONLINE Eb/No: 3.9dB	TRACKING

Figure 43: Heading Displayed on Home Page

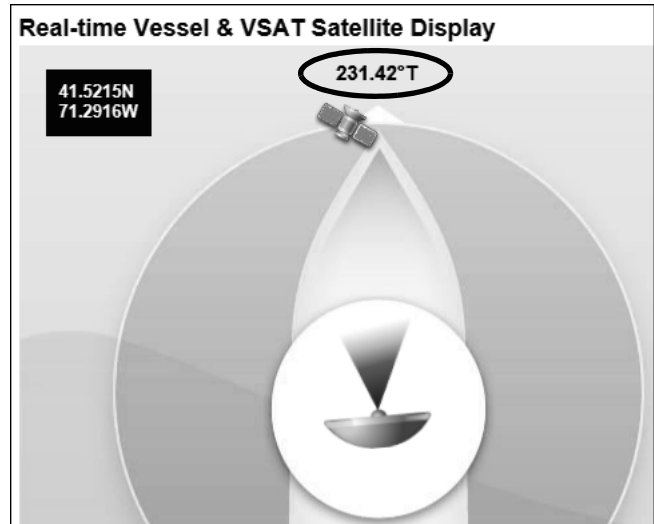
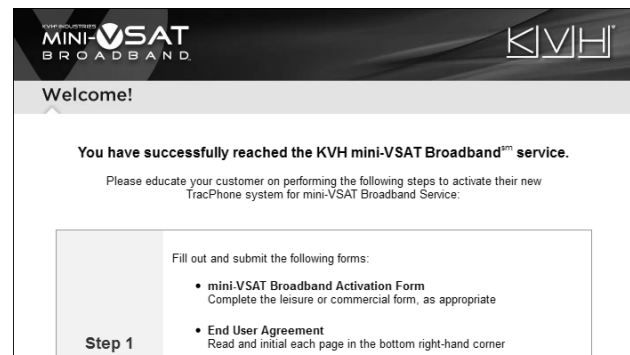


Figure 44: Welcome Page for Testing



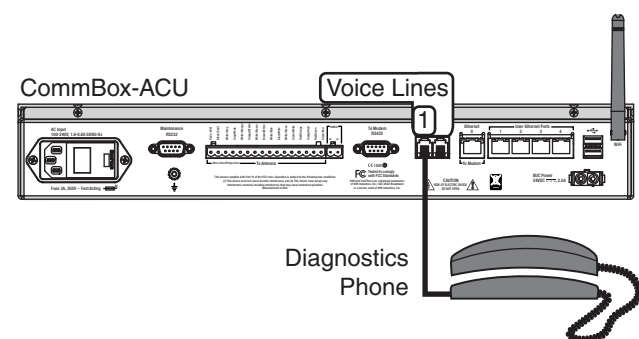
The figure shows a web page titled "Welcome!" with the KVH logo. It states: "You have successfully reached the KVH mini-VSAT Broadband™ service." Below this, it says: "Please educate your customer on performing the following steps to activate their new TracPhone system for mini-VSAT Broadband Service:"

Step 1

Fill out and submit the following forms:

- mini-VSAT Broadband Activation Form
Complete the leisure or commercial form, as appropriate
- End User Agreement
Read and initial each page in the bottom right-hand corner

Figure 45: Connecting the Diagnostics Phone to the CommBox-ACU



17 Connect Vessel Computers

Follow these steps to connect the vessel's computers (or other network devices) to the CommBox-ACU. There are three options:

Option 1 - Wired DHCP (*default*)

Option 2 - Wireless DHCP

Option 3 - Static IP

Option 1 – Wired DHCP

In a wired DHCP configuration, vessel computers connect via Ethernet cables and receive IP addresses from the CommBox-ACU (see Figure 46).

- Connect the vessel computers to any of the four “User Ethernet” ports on the CommBox-ACU.
- Make sure the computers are configured for DHCP addressing (see page 35).

NOTE: By default, the CommBox-ACU has a gateway of 192.168.5.1 and assigns IP addresses in the 192.168.5.100-200 range. If this configuration conflicts with an existing onboard network, you may change the settings at the TracPhone V7-IP web interface (go to Settings > Network Settings).

Option 2 – Wireless DHCP

In a wireless DHCP configuration, vessel computers connect to the CommBox-ACU via its built-in wireless access point (WAP) and receive IP addresses from the CommBox-ACU (see Figure 47).

IMPORTANT!

Establishing a wireless connection onboard a steel vessel might require a special external WAP and advanced networking expertise.

- Make sure the computers are configured for DHCP addressing (see page 35).
- At the TracPhone V7-IP web interface, click the **Settings** tab. Then click **Network Settings**.
- In Wireless Settings, click **Edit**.
- Select **Enabled**.

Figure 46: Wired DHCP Configuration (Example)

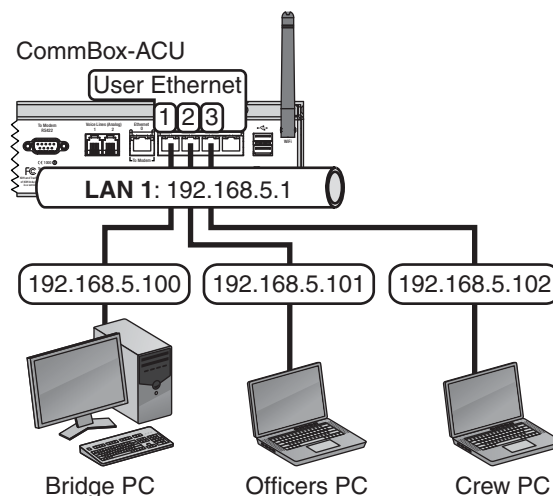
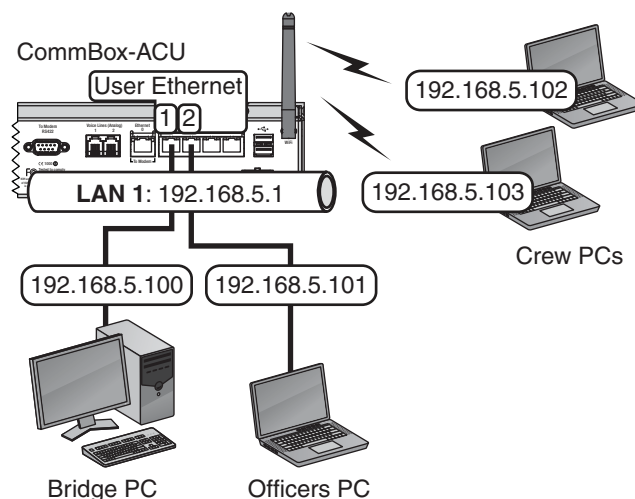


Figure 47: Wireless DHCP Configuration (Example)



17 Continued Connect Vessel Computers

e. Set the following wireless options, then click **Save** (see Figure 48):

- **SSID:** Keep the default name, or enter a unique name for the vessel network.
- **Security:** Select either security type - WPA2 or WEP (128-bit).
- **Password/Passphrase:** If you selected WPA2, enter a password (between 8-20 characters). If you selected WEP, enter a passphrase (must be 13 characters).
- **Channel:** Keep the default, or select a channel for wireless communications.

IMPORTANT!

Failure to apply security settings will make the vessel's wireless network vulnerable to outside intrusion.

f. At the confirmation message, click **Save**.

Option 3 – Static IP

In a static IP configuration, a network device is assigned a public IP address that can be accessed directly from the Internet. It does not receive an IP address from the CommBox-ACU.

IMPORTANT!

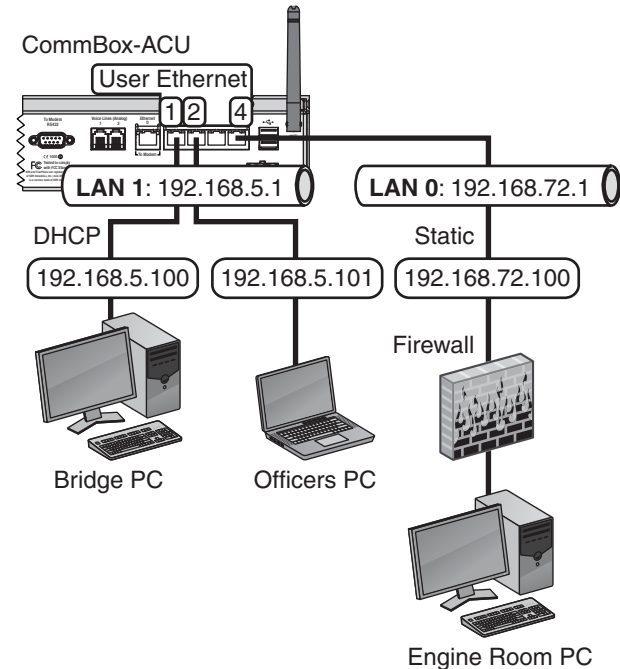
A static IP address provides an open, unprotected connection to the Internet. Therefore, it should only be assigned to a secure device, such as a firewall router.

- Ask the customer to fill out the request form at www.kvh.com/mvbcustomercenter (click the link in the sidebar). In addition, the system must be activated for mini-VSAT Broadband service, and it must remain online until KVH configures the system over the air.
- Connect the static IP device to the "User Ethernet 4" port on the CommBox-ACU.
- The customer will need to configure the device's TCP/IP properties according to the instructions KVH will provide in an e-mail upon fulfilling the static IP request.

Figure 48: Wireless Settings on the CommBox-ACU

Wireless Settings	
State:	<input checked="" type="radio"/> Enabled <input type="radio"/> Disabled (default)
SSID:	KVH-ACUBTP113 (Up to 32 characters)
IP Address:	192 . 168 . 5 . 1
Security:	WPA2
Password:	•••••••• (between 8 to 20 characters)
Channel:	7
<input type="button" value="Cancel"/> <input type="button" value="Save"/>	

Figure 49: Static IP Configuration (Example)



18 Connect Vessel Phones & Options

Follow these steps to connect the vessel's phones and any purchased accessories to the system.

Connect Vessel Phones

Using the supplied RJ-11 cables, connect the customer's analog (not digital) phone(s), fax machine, and/or PABX to the desired "Voice Line" jack(s) on the CommBox-ACU (see Figure 50). Each jack is linked to a phone line.

Connect Optional Accessories

KVH offers the following accessories that extend the system's voice/fax service capabilities:

- **UCH-250 Fax Server:** Enterprise-grade fax solution; provides a dedicated fax line using a fully managed, store-and-forward fax service
- **Crew Calling Gateway:** Provides a dedicated phone line for crew members and charter passengers to place ship-to-shore voice calls using prepaid calling cards

Refer to the instructions provided with the accessory to connect it to the TracPhone system.

Installing Optional CommBox™ Software

CommBox software extends the system's network capabilities. Two options are available:

- **CommBox Standard Bundle:** Provides least cost routing, onboard firewall, bandwidth management, web caching, web image compression, ad removal, and URL and content filtering
- **CommBox Enterprise Bundle:** Provides everything in the Standard bundle, plus automated file transfers, differential synchronization, mail relay server, web mail client, anti-spam and anti-virus filters, roaming crew accounts, and prepaid Internet and e-mail services; integration with a CommBox hub is required

KVH will coordinate directly with the customer to select, install, and configure the appropriate bundle to meet their needs.

Figure 50: Connecting Vessel Phones (Example)

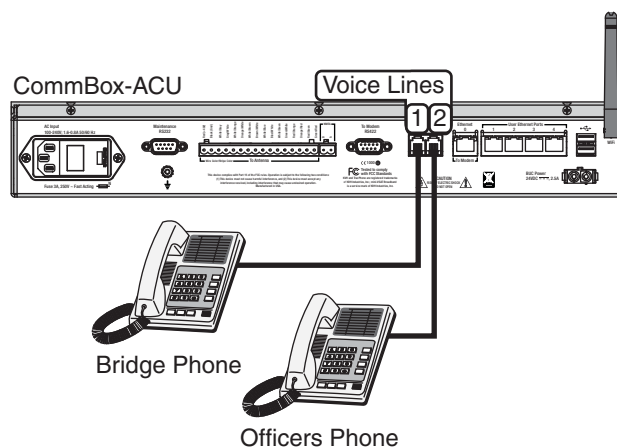


Figure 51: Available Options

Option	KVH Part No.
UCH-250 Fax Server	19-0520
Crew Calling Gateway	72-0349
CommBox Standard Bundle*	35-0010
CommBox Enterprise Bundle*	35-0011

* If the customer is interested in a CommBox solution, ask them to contact KVH Network Services at networkservices@kvh.com for a consultation.

19 Educate the Customer

The installation is complete! Before you leave the vessel, give the Welcome Kit to the customer, make sure he/she knows the administrator password, and explain how to use the system. Be sure the customer understands the following:

- **The antenna transmits RF energy that is potentially harmful.** Whenever the system is powered on, make sure everyone stays more than 36 feet (11 meters) away from the antenna (see illustration on page 1). If no-transmit zones were set up, make sure the customer understands where they are.
- Keep the radome installed on the antenna at all times. The radome protects the antenna's moving parts from wind, rain, and debris.
- The antenna must have a clear view of the sky to communicate via satellite. Common causes of blockage include masts, trees, buildings, and bridges (see Figure 53).
- Clean the antenna regularly. Dirt buildup on the radome can affect communications. Heavy rain or snow may also temporarily interrupt communications.
- The vessel must be located within the coverage area of the satellite. To view a coverage map, visit www.kvh.com/minivsatmap.
- The system must be activated for mini-VSAT Broadband service. For activation details, visit www.kvh.com/mvbservice.

For More Information

Refer to the Help provided on the web interface's Support page and on the documentation CD. Two versions are available (see Figure 54):

- **Condensed:** Resides on the CommBox-ACU locally; text-only format
- **Extended:** Resides on the KVH website (airtime charges may apply); complete with images and tutorials

NOTE: The Help is compatible with the following web browsers: Internet Explorer, Mozilla Firefox, Google Chrome, and Apple Safari.

Figure 52: Customer Welcome Kit



Figure 53: Example of Satellite Blockage

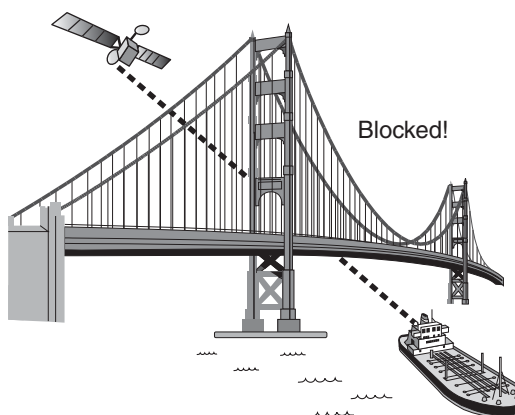
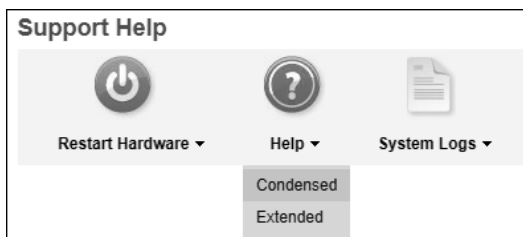


Figure 54: Help Options on Support Page



A Terminating LMR-400-75 Cable

Appendix

These instructions explain how to terminate an LMR-400-75 RF cable with an EZ-400-FMH-75 “F” connector using the tools from the TK-400EZ-75 tool kit. For more detailed instructions, refer to the Times Microwave website (www.timesmicrowave.com).

1. Using the CCT-01 cutting tool, cut the cable evenly (see Figure 55).
2. Since cutting the cable can deform the end, gently round the end of the cable using a pair of needle-nose pliers (see Figure 56). Also make sure the center conductor is centered within the cable.
3. Place the heat shrink sleeve and metal ferrule onto the cable (see Figure 57).
4. Insert the end of the cable into the #1 end of the ST-400EZ stripping tool (see Figure 58). Then rotate the tool clockwise around the cable until the tool turns easily. The end of the cable should now be stripped to expose the center conductor.

Figure 55: Cutting the Cable



Figure 56: Reshaping the Cable

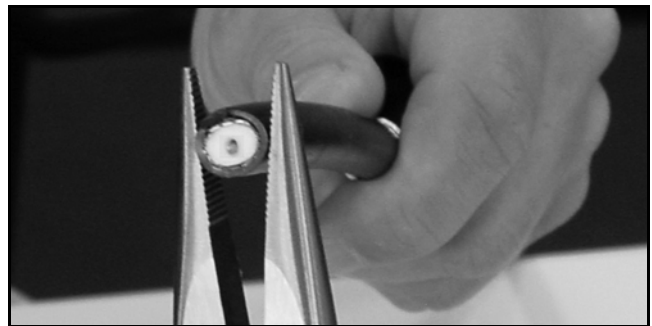


Figure 57: Placing the Heat Shrink Tubing and Ferrule

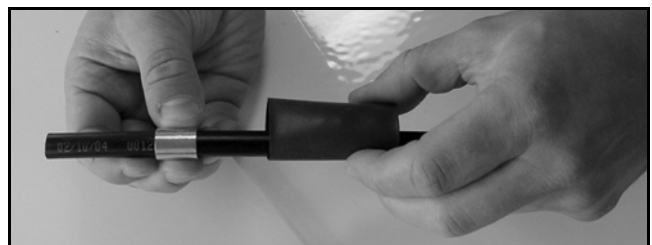
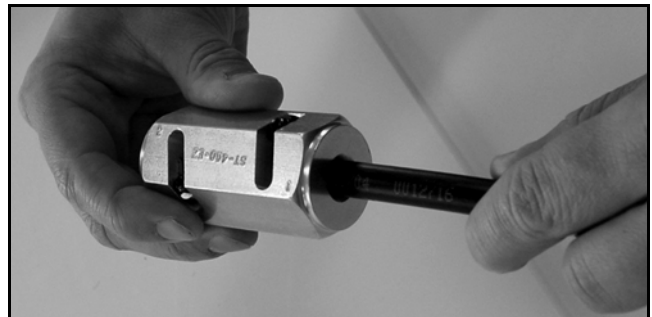


Figure 58: Stripping the End to Expose the Center Conductor



A

Continued Terminating LMR-400-75 Cable

5. Using a utility knife, carefully remove any residual plastic from the center conductor, if necessary (see Figure 59).
6. Insert the end of the cable into the #2 end of the ST-400EZ stripping tool (see Figure 60). Then rotate the tool clockwise around the cable until the tool turns easily. This removes the cable jacket from the end of the cable, exposing the braid and dielectric (see Figure 61).
7. Using the DBT-02 tool, deburr and chamfer the center conductor (see Figure 62). Avoid nicking the aluminum tape covering the dielectric.

Figure 59: Removing Plastic Residue

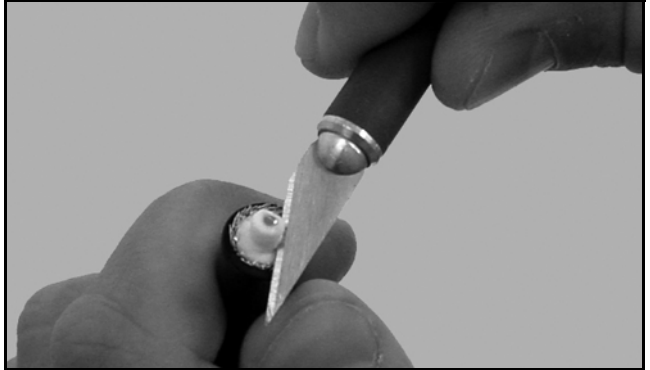


Figure 60: Stripping the Cable Jacket

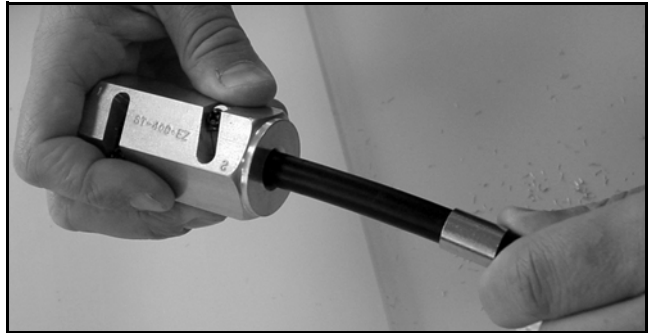
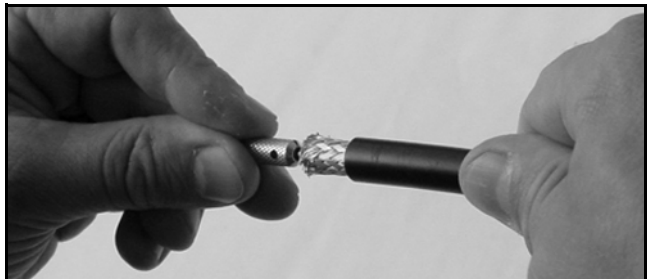


Figure 61: Cable Stripped, Exposing Dielectric



Figure 62: Deburring the Center Conductor



A

Continued Terminating LMR-400-75 Cable

8. Gently flare the braid with your fingers (see Figure 63).
9. Insert the end of the cable into the connector body until the dielectric is firmly seated inside the connector (see Figure 64). Be sure all braid wires remain on the outside of the connector.
10. Trim any excess braid (see Figure 65), if necessary. The braid should assemble flush to within 1/16" (1.6 mm) of the connector shoulder.
11. Slide the ferrule over the braid until it is flush against the connector shoulder (see Figure 66).

Figure 63: Flaring the Braid



Figure 64: Pushing On the Connector

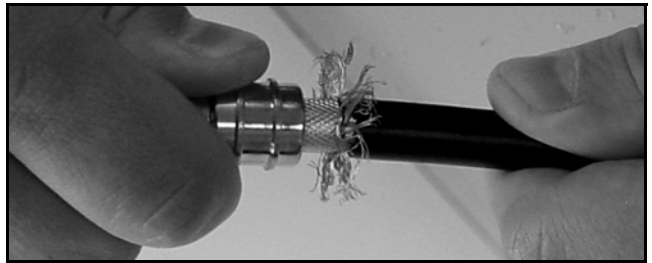


Figure 65: Trimming the Braid

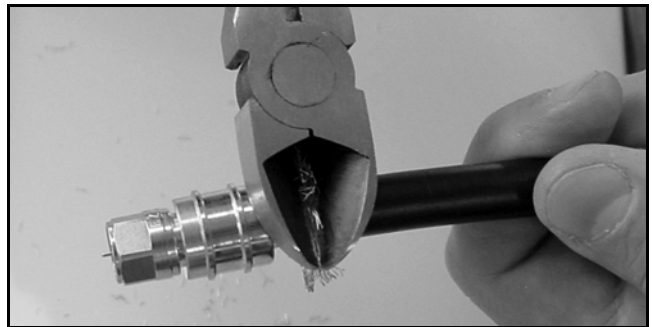
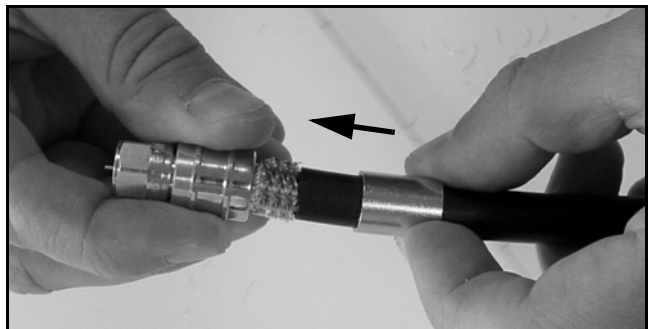


Figure 66: Sliding the Ferrule Over the Braid



A

Continued Terminating LMR-400-75 Cable

12. Using an appropriate crimp tool (either the CT-400/300 or the HX-4 with Y1719 dies), crimp the ferrule in place (see Figure 67). Crimp as close to the connector body as possible.
13. Crimp the ferrule again, but further back from the connector. However, be careful not to crimp the cable jacket.
14. Slide the heat shrink sleeve over the connector body and heat it to compress it into place (see Figure 68). When you are done, the heat shrink should extend from the rear of the connector to the cable jacket. This forms a weather-tight seal.
15. Using a multimeter or similar device, check the continuity of the cable.
16. Ensure the center conductor pin measures between 0.20" and 0.28" (5-7 mm) in length, to ensure proper engagement with the mating connector (see Figure 69).

Figure 67: Crimping the Ferrule onto the Cable

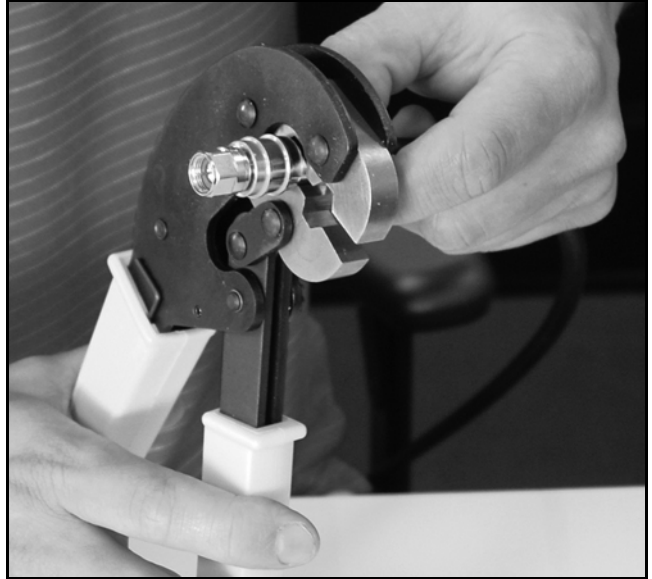


Figure 68: Applying the Heat Shrink Tubing

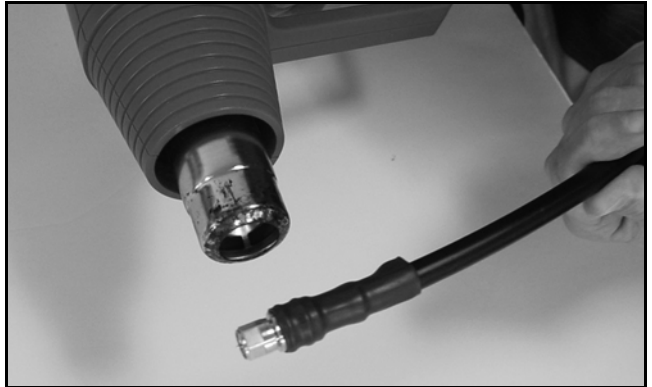
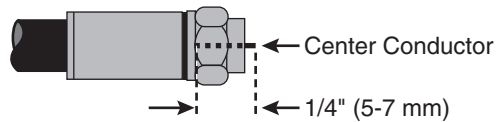


Figure 69: Proper Center Conductor Pin Length



Follow these steps to configure your computer for DHCP to allow it to receive an IP address from the CommBox-ACU. The location of this configuration setting varies slightly by operating system.

NOTE: The computer must have a network interface card installed and all cabling must be 100 Mbps fast Ethernet UTP CAT-5 with RJ45 connectors.

Windows 7 or Windows Vista

1. Turn on the computer.
2. From the Windows Control Panel, navigate to the **Network and Sharing Center**. (You might need to click **Network and Internet** first.) You can find the control panel either through the Start menu or "My Computer."
3. At the Network and Sharing Center window, double-click the **Local Area Connection** link (Windows 7) or **View Status** link (Windows Vista) for the Ethernet connection you are using.
4. At the Local Area Connection Status window, click **Properties**. This screen only displays if the computer is currently connected to a network.
5. At the Local Area Connection Properties window, click the **Networking** tab. Then select **Internet Protocol Version 4** and click **Properties** (see Figure 70).
6. At the Internet Protocol Properties window, select **Obtain an IP address automatically** and **Obtain DNS server address automatically** (see Figure 71). Then click **OK**.
7. At the Local Area Connection Properties window, click **OK**.

Figure 70: Windows 7 - Local Area Connection Properties

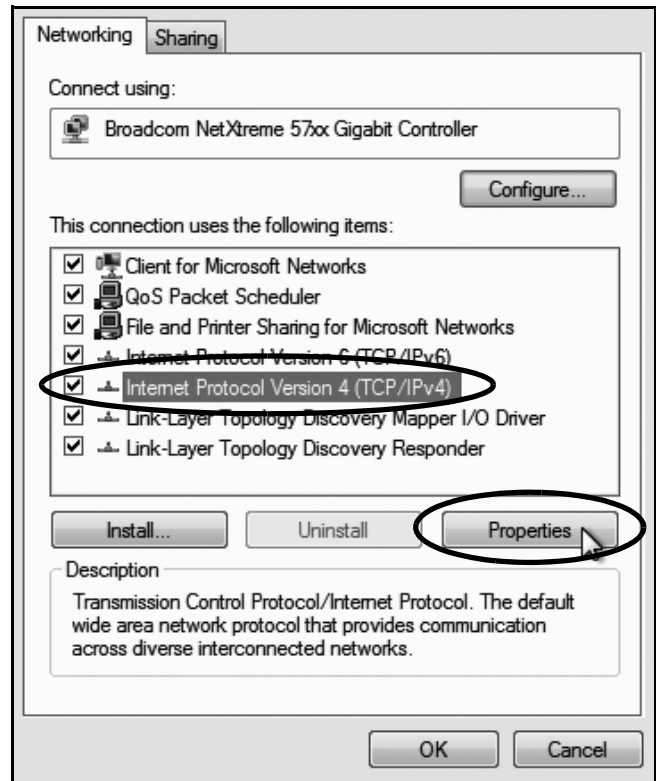
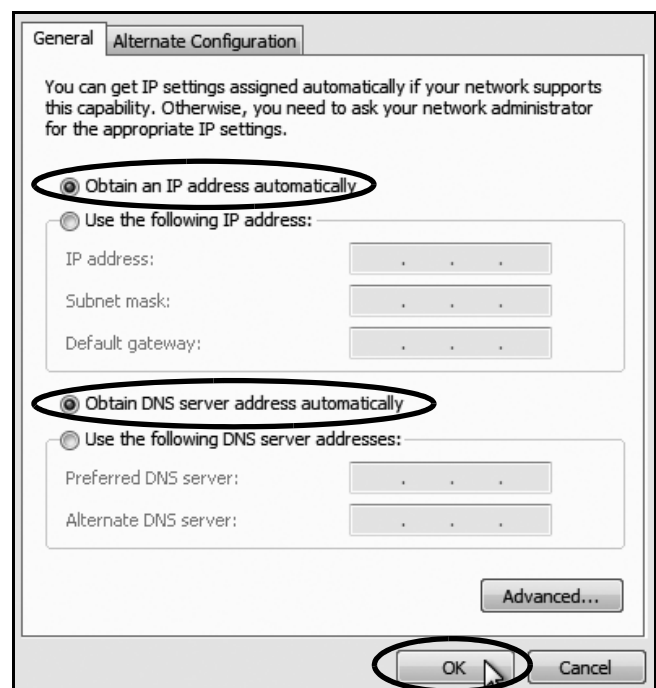


Figure 71: Windows 7 - Internet Protocol Properties



Windows XP

1. Turn on the computer.
2. At the Windows Control Panel, double-click **Network Connections**. *You can find the control panel either through the Start menu or "My Computer."*
3. At the Network Connections window, double-click the **Local Area Connection** icon for the Ethernet connection you are using.
4. At the Local Area Connection Status window, click the **General** tab. Then click **Properties**. *This screen only displays if the computer is currently connected to a network.*
5. At the Local Area Connection Properties window, click the **General** tab. Then select **Internet Protocol (TCP/IP)** and click **Properties** (see Figure 72).
6. At the Internet Protocol (TCP/IP) Properties window, click the **General** tab. Then select **Obtain an IP address automatically** and **Obtain DNS server address automatically** (see Figure 73). Then click **OK**.
7. At the Local Area Connection Properties window, click **OK**.
8. Restart the computer.

Figure 72: Windows XP - Local Area Connection Properties

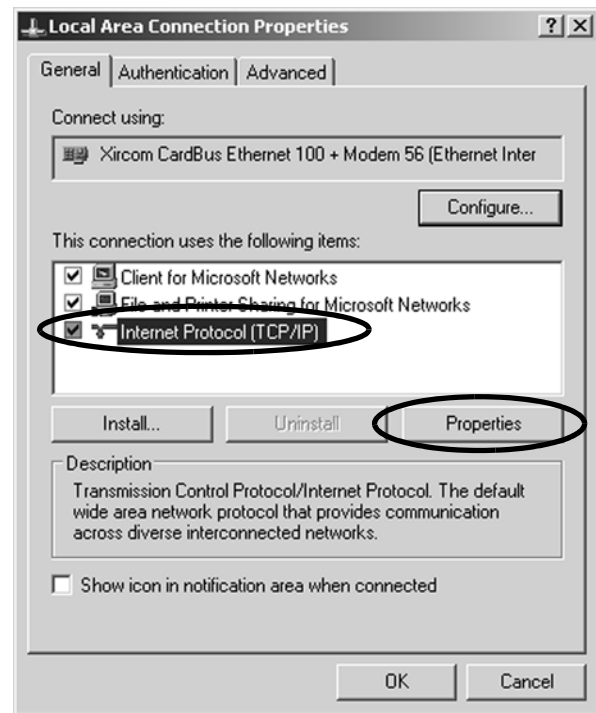
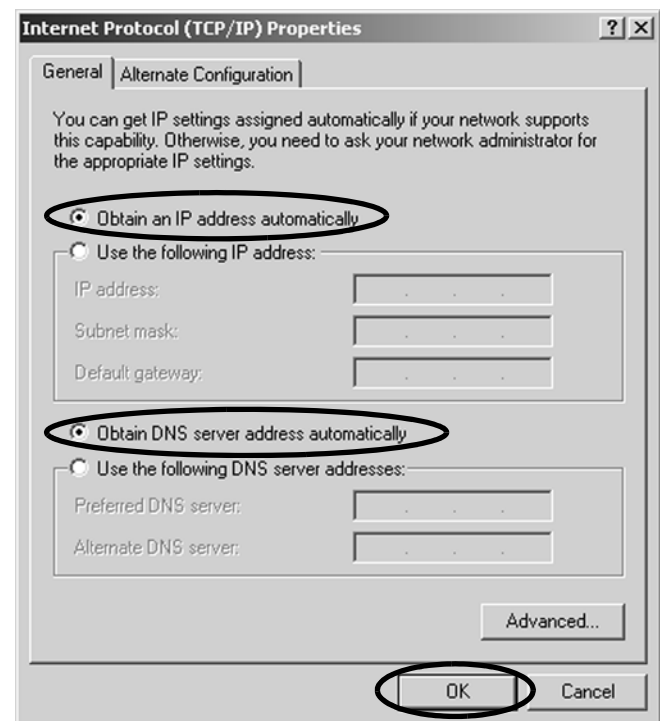


Figure 73: Windows XP - Internet Protocol (TCP/IP) Properties



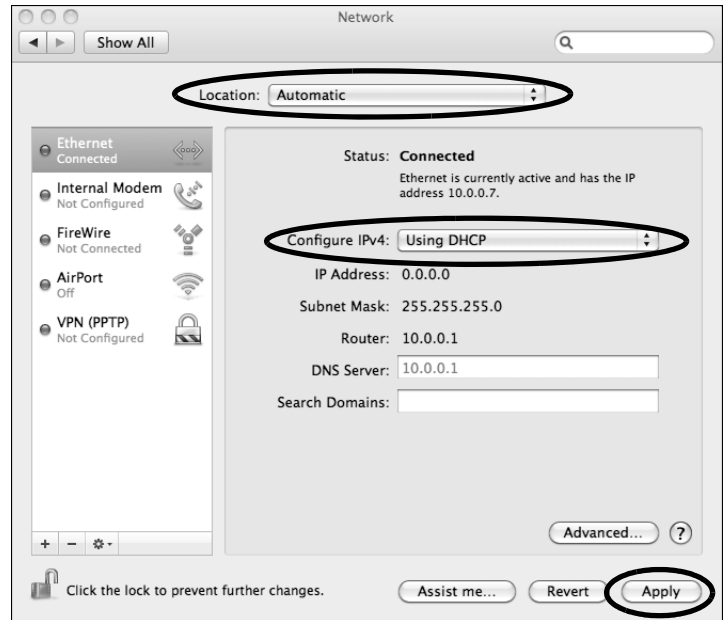
B

Continued Configuring Computers for DHCP

Macintosh OS X

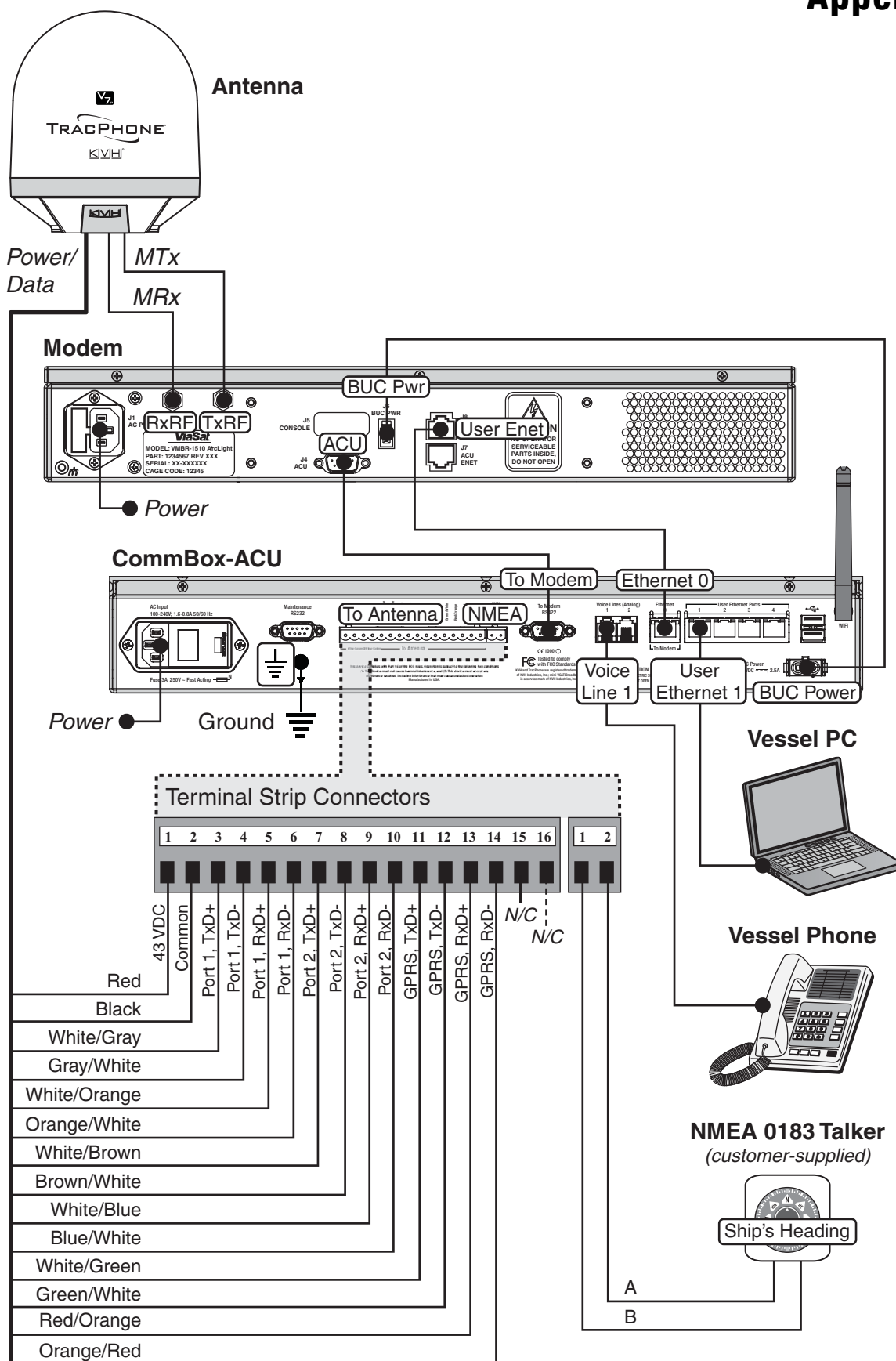
1. Turn on the computer.
2. In System Preferences, click **Network**.
3. In the Network dialog box, select **Ethernet** then set the following:
 - Location: **Automatic**
 - Configure IPv4: **Using DHCP**
4. Click **Apply**.
5. Restart the computer.

Figure 74: Macintosh OS X - Network Preferences



C Wiring Diagram

Appendix





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