KVH Industries, Inc.

TracPhone® V3IP

V 3 IP

TRACPHONE®

KVH®

Installation Guide

TracPhone V3-IP Installation Guide

mini-VSAT Broadband℠ System with Integrated CommBox™ Modem

This guide explains how to install the TracPhone V3-IP mini-VSAT Broadband satellite communications system. Operation instructions are provided in the Quick Start Guide.
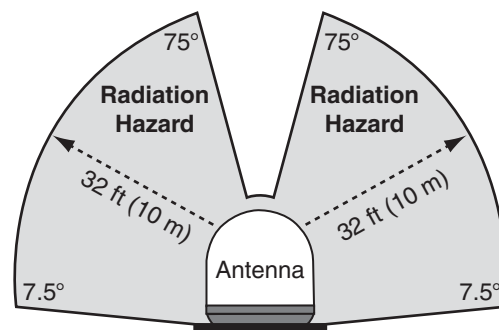
Installation Steps

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 32 ft (10 m) away from the antenna within its 7.5-75° elevation range. No hazard exists directly above the antenna and anywhere below the antenna's mounting plane.

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, Australasia:
Phone: 1 866 701-7103 *(U.S. only)*
Phone: +1 401 851-3806
Email: mvbsupport@kvh.com

Europe, Middle East, Africa, Asia-Pacific:
Phone: +45 45 160 180
Email: mvbsupport@kvh.com
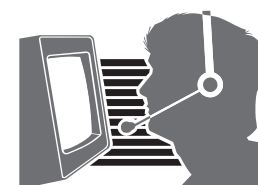
Important Safety Information

This icon indicates a danger, warning, or caution notice. Be sure to read these carefully to avoid injury.

WARNING

Risk of Electric Shock
Potentially lethal voltages are present within the ICM when it is connected to AC power. To avoid electric shock, do not open the chassis enclosure. There are no user-serviceable parts inside.

WARNING

Risk of Electric Shock
If any component of the TracPhone system becomes damaged and/or no longer functions normally, disconnect it from vessel power, secure it from unintended operation, and contact KVH Technical Support (see "Technical Support" on page 1). All repairs or modifications must be performed by a trained, KVH-certified technician. If you are a KVH-certified technician, you still must contact KVH Technical Support prior to conducting any repairs or modifications to the equipment.

WARNING

Risk of Explosion
Do not operate the ICM (or any other electrical device) in an environment where flammable gases, vapors, or dusts are present. In addition, do not operate the ICM in an environment with a temperature outside its 5° F to 131° F (-15° C to 55° C) temperature range.

WARNING

Risk of Electric Shock
Failure to ground the TracPhone system properly to ship's ground will cause an unsafe floating ground condition, risking potentially lethal electric shock. See "Connect Power" on page 19 for details on the proper grounding of the equipment.

CAUTION

RF Radiation Hazard
The antenna transmits up to 3 watts of radio frequency (RF) energy that is potentially harmful. Whenever the system is powered on, make sure everyone stays more than 32 feet (10 m) away from the antenna. No hazard exists directly below the antenna.

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 List*. 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).

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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 5/16" (8 mm) bit
- 3.5" (89 mm) hole saw
- 1/2" socket and 7/16" 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
- Eye protection
- Shop towels
- Voltmeter
- Utility knife
- Flush cutters
- Wire stripper/terminal crimper
- File
- Two 75Ω RF coax cables, "F" connectors, and associated termination tools (see page 12)

Figure 1: TracPhone V3-IP System Components
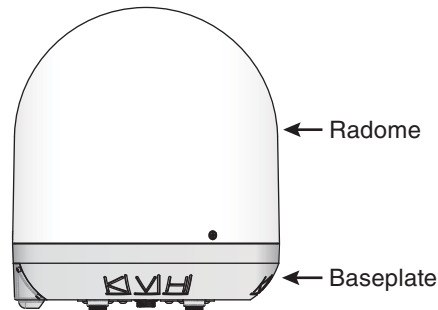
Antenna
(KVH part no. 02-1860-01)
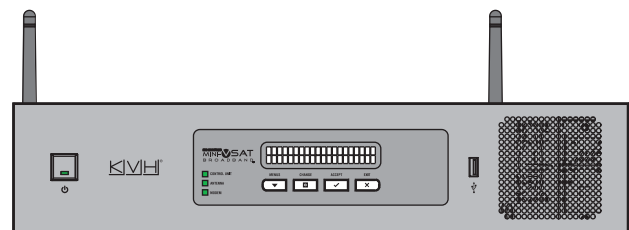
Integrated CommBox Modem (ICM)
(KVH part no. 02-2008-01)

- NMEA 0183 talker and interface cable, optional (see page 17)
- Isolation transformer, if required (see page 19)
- Laptop PC with the latest TracPhone V3-IP ICM/antenna software (.kvh) and modem configuration files (.sscf/.sed) downloaded from the KVH Partner Portal (**www.kvh.com/partners**)

❷ Plan the Antenna Installation

Before you begin, consider the following antenna installation guidelines.
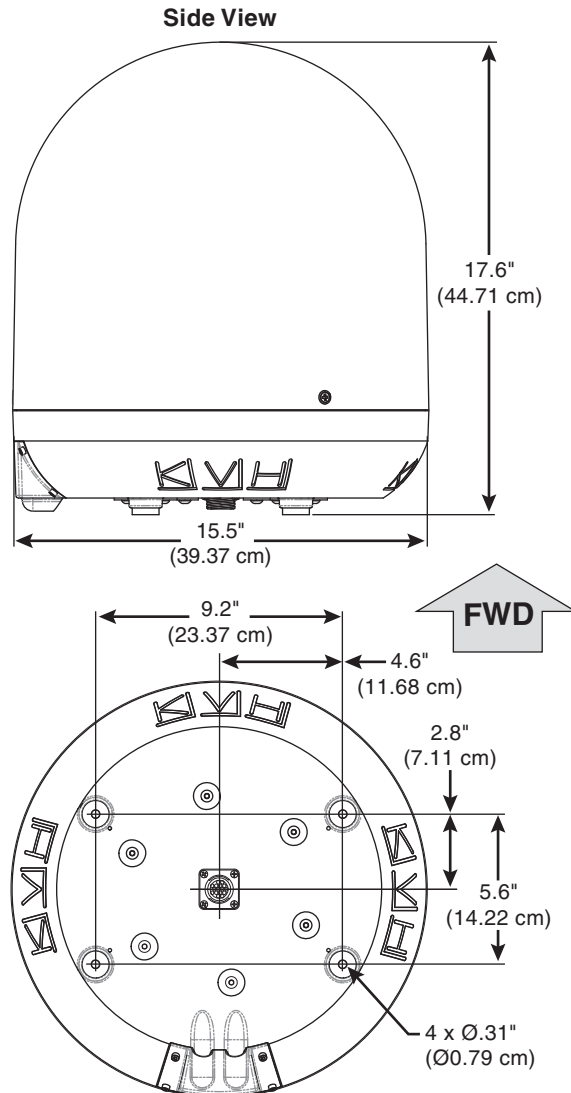
Choose a Suitable Location

- Select a location that is as close as possible to the intersection of the vessel's centerline and midships.

- Temperature must be within the operating range (-25ºC to 55ºC (-13ºF to 131ºF)).

- Avoid placing the antenna near any magnetic compasses or other onboard antennas to prevent potential interference.

Meet Mounting Structure Guidelines

Make sure the mounting surface is flat, level (within ±2º), and wide enough to accommodate the antenna's base (see Figure 2). Also make sure its mounting structure is strong enough to withstand the weight of the antenna (25 lbs, 11.3 kg) as well as other cumulative forces related to expected operating conditions, such as ice, snow, wash down, and maximum expected values of pitch, roll, and wind pressure (including gusts).
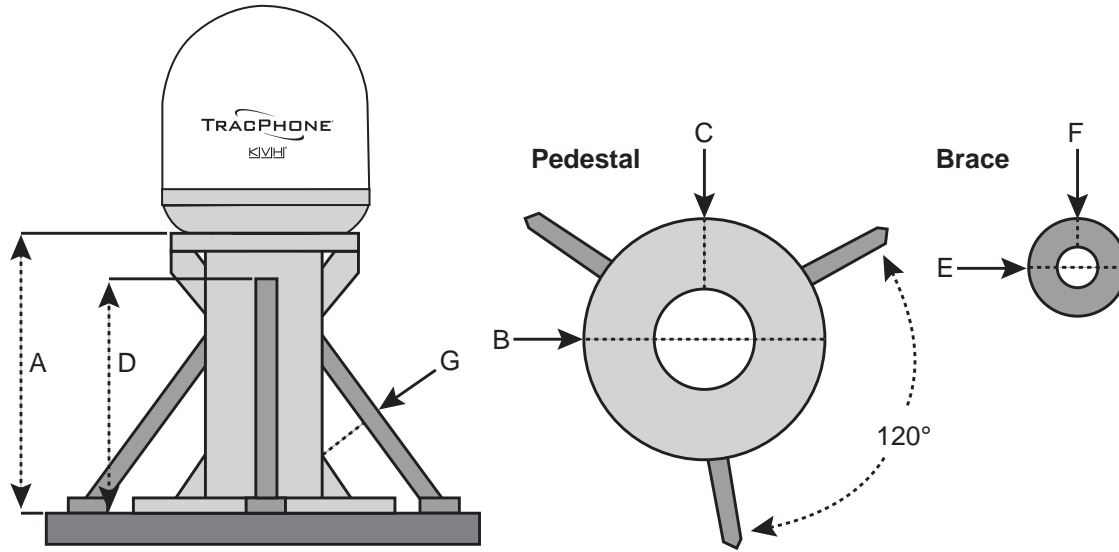
Figure 2: Antenna Dimensions

Side View

17.6"
(44.71 cm)

15.5"
(39.37 cm)

9.2"
(23.37 cm)

4.6"
(11.68 cm)

FWD

2.8"
(7.11 cm)

5.6"
(14.22 cm)

4 x Ø.31"
(Ø0.79 cm)

Meet Pedestal Structure Guidelines

If a pedestal is going to be used, it should meet the following minimum guidelines.

Figure 3: Pedestal and Brace Dimensions

Pedestal Height (A)	3.28 ft 1 m	6.56 ft 2 m	9.84 ft 3 m	13.12 ft 4 m
Tube OD (B)	5.0" 127 mm	3.0" 76.2 mm	5.0" 127 mm	8.0" 203.2 mm
Tube Wall Thickness (C)	0.25" 6.35 mm	0.25" 6.35 mm	0.25" 6.35 mm	0.5" 12.7 mm
Brace Height (D)	N/A	5.25 ft 1.60 m	7.35 ft 2.24 m	2.78 ft 9.12 m
Brace OD (E)	N/A	2.25" 57.15 mm	4.5" 114.3 mm	7.0" 177.8 mm
Brace Thickness (F)	N/A	0.25" 6.35 mm	0.25" 6.35 mm	0.25" 6.35 mm
Brace Angle (G)	N/A	25°	25°	25°

NOTE: If the pedestal exceeds 3.28 ft (1 m), braces must be placed at 120° intervals. Sizing is based on Structural Steel Tubing 60,000 psi (415 MPa) minimum yield.

Prevent RF Radiation Exposure

Select a location that is well above any areas accessible to passengers and crew to reduce the risk of RF radiation exposure. (See page 1 for an illustration of the hazard area.)

If mounting the antenna near an accessible area is unavoidable, you may configure one or two no-transmit zones to prevent transmissions in hazardous directions. (See "Set Up No-Transmit Zones" on page 24 for details.)

Minimize Satellite Blockage

The antenna requires a clear view of the sky to transmit and receive satellite signals (see Figure 4). The fewer obstructions, the better the system will perform.

Avoid RF Interference

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.

- 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° (see Figure 5). Therefore, mount the antenna outside this elevation range and at least 10 ft (3 m) away from the transmitter.

> **IMPORTANT!**
>
> Never place the antenna in the beam path of the radar regardless of distance. Radar energy may damage the antenna or impair its performance.
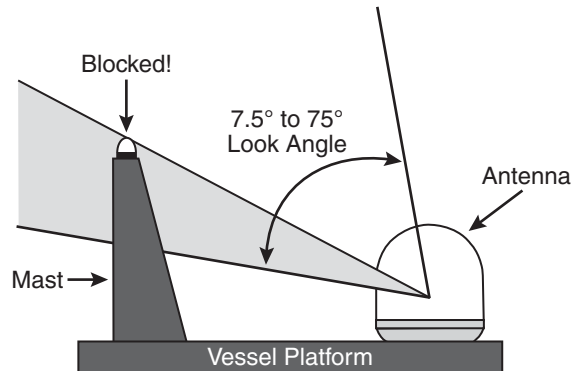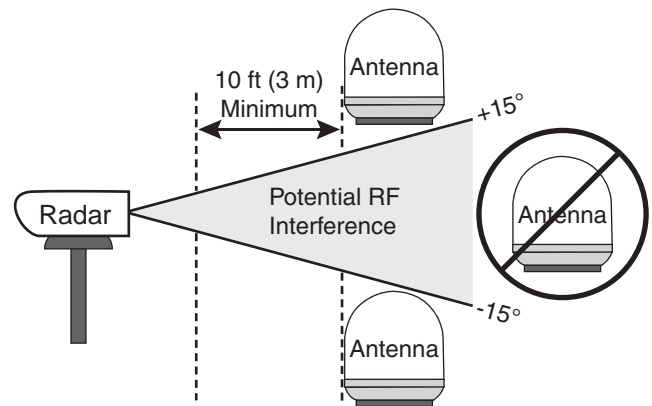
Figure 4: Blockage from Obstruction

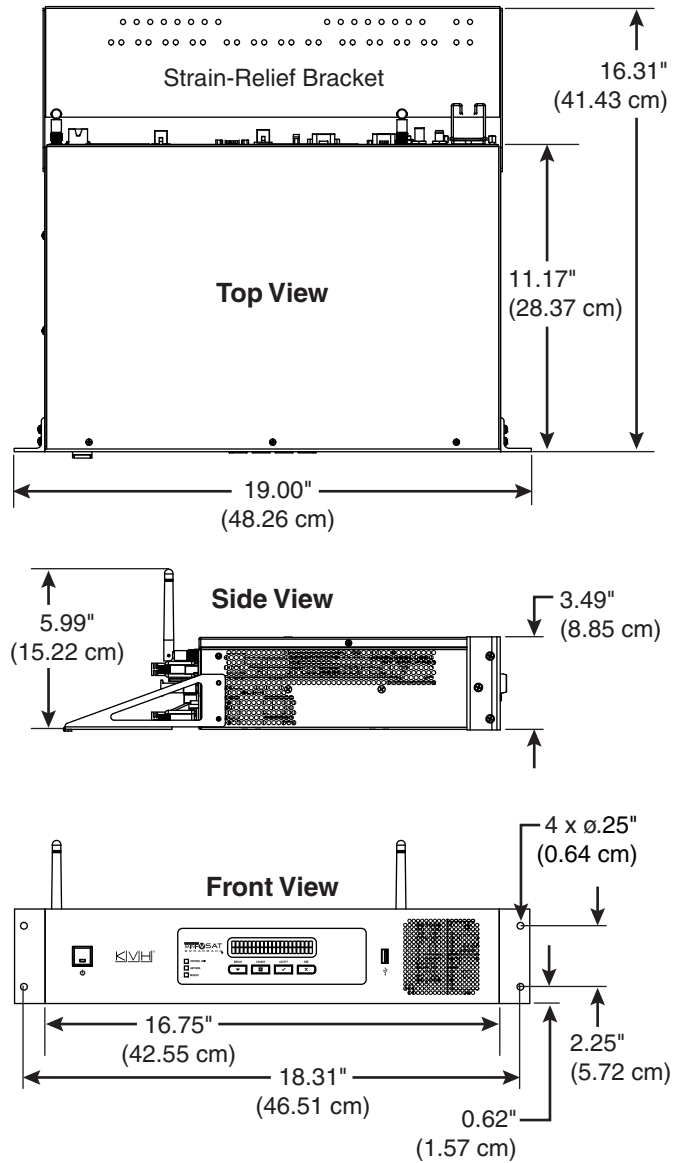Figure 5: Avoiding RF Interference

6

3 Plan the ICM Installation

Before you begin, consider the following installation guidelines for the ICM.

- Select a mounting location in a dry, well-ventilated area belowdecks away from any heat sources or salt spray.

- Be sure the front panel will be easily accessible to the user.

- Leave enough room at the rear panel to accommodate the connecting cables.

- To use the supplied power/data cable, the ICM 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 6: ICM Dimensions

Strain-Relief Bracket

Top View

16.31"
(41.43 cm)

11.17"
(28.37 cm)

19.00"
(48.26 cm)

Side View

5.99"
(15.22 cm)

3.49"
(8.85 cm)

Front View

4 x ø.25"
(0.64 cm)

16.75"
(42.55 cm)

18.31"
(46.51 cm)

2.25"
(5.72 cm)

0.62"
(1.57 cm)

④ Prepare the ICM

Follow these steps to prepare the ICM for installation.

Connect the ICM Jumper Cables

Connect the three supplied jumper cables to the rear panel of the ICM (see Figure 7).

a. Connect the serial data cable from the "A1" jack to the "A2" jack.

b. Connect the straight-through Ethernet cable from the "B1" jack to the "B2" jack.

c. Connect the BUC power cable from the "C1" jack to the "C2" jack.

Attach the Wi-Fi Antennas

Connect the two supplied Wi-Fi antennas to the rear panel of the ICM (see Figure 7).

Figure 7: Jumper Cables Wiring and Wi-Fi Antennas
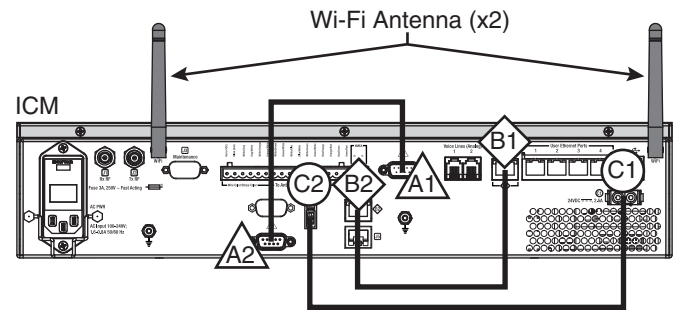
⑤ Mount the ICM

There are two options for mounting the ICM:

> **Option 1** -   Inside an equipment rack
>
> **Option 2** -   To a horizontal surface

NOTE: You may choose to wait to mount the ICM until after you have completed all system wiring.

Option 1 – Rack Mount

The ICM is sized to fit a standard 19" (48.26 cm) rack, occupying 2U of space. Follow these steps to secure the ICM in an equipment rack.

a. Attach the supplied strain-relief bracket to the back of the ICM using four supplied #6-32 screws and washers (see Figure 8).

b. Insert the ICM into the rack and secure its front mounting brackets to the rack using four M6 screws and washers (see Figure 9).

Option 2 – Horizontal Surface Mount

Follow these steps to mount the ICM to a horizontal surface.

a. Remove the six #6-32 screws and washers securing the two rack-mount brackets to the front of the ICM (see Figure 10). Remove the brackets.

b. Attach the supplied strain-relief bracket to the back of the ICM, and attach the supplied "L" mounting brackets to the sides of the ICM, using six supplied #6-32 screws and washers (see Figure 11).

c. Mount the ICM to the vessel using fasteners appropriate for the mounting surface.
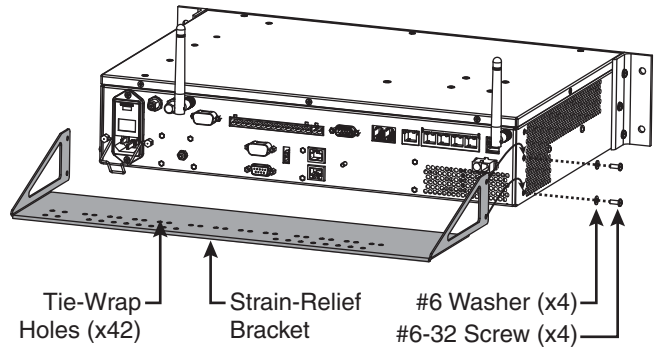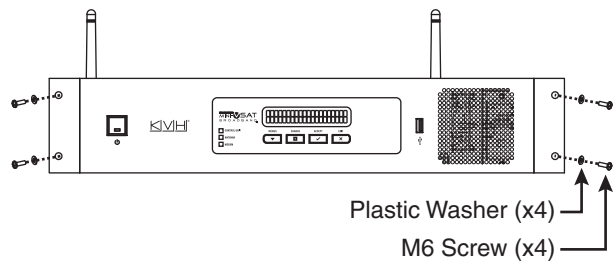
Figure 8: Attaching the Strain-Relief Bracket

Tie-Wrap Holes (x42)   Strain-Relief Bracket   #6 Washer (x4)   #6-32 Screw (x4)

Figure 9: Securing the ICM in the Rack

Plastic Washer (x4)   M6 Screw (x4)

Figure 10: Removing the Rack-Mount Brackets

Bracket (x2)   #6 Washer (x6)   #6-32 Screw (x6)
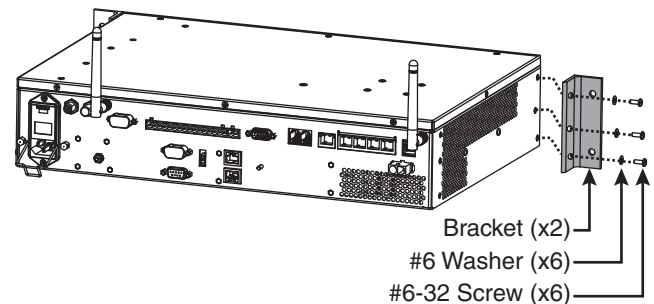
Figure 11: Attaching the Mounting and Strain-Relief Brackets

Strain-Relief Bracket   #6 Washer (x6)   #6-32 Screw (x6)   Mounting Bracket (x2)   Ø.156" (Ø3.96 mm) Mounting Hole (x4)
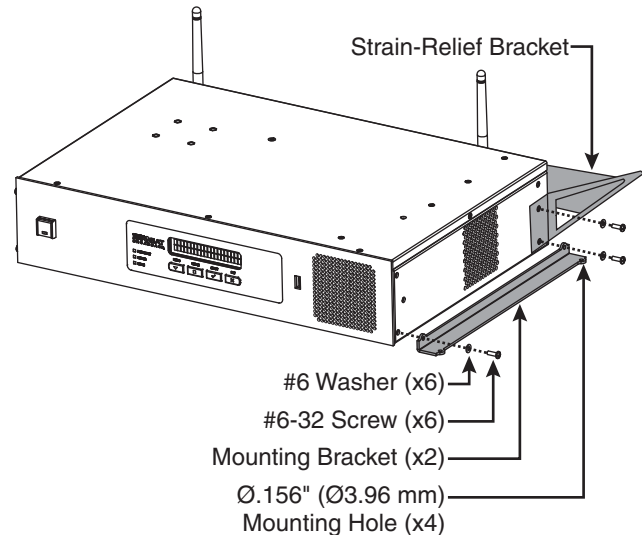
⑥ Prepare the Antenna Site

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

a. 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 12).

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.

b. 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.

c. Drill a 5/16" (8 mm) hole at the four mounting hole locations you marked in Step b. Later, you will insert four 1/4"-20 bolts through these holes to secure the antenna to the mounting surface.

d. Cut out the 3.5" (89 mm) cable access hole in the location you marked in Step b. Smooth the edges of the hole to protect the cables. (You may also apply anti-chafe material around the cables to prevent abrasion.) Later, you will route the power/data and RF cables through this hole and into the vessel.

e. Clean and dry the antenna mounting surface.

f. 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 12).

NOTE: Apply the foam seal to the vessel mounting surface, not to the antenna's baseplate.

g. Transport the antenna to the mounting site.

Figure 12: Antenna Mounting Holes Layout

Ø3.5" (Ø89 mm) Cable Access Hole

Foam Seal

5.6" (142.2 mm)

9.2" (233.7 mm)

Ø5/16" (Ø8 mm) Mounting Hole (x4)
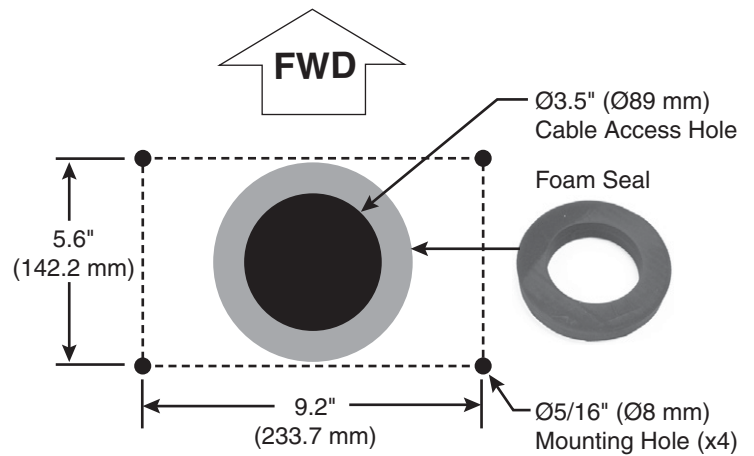
7 Remove the Shipping Restraints

Inside the antenna, two shipping restraints prevent the antenna assembly from moving during shipment. Follow these steps to remove these restraints.

a. Remove the three #10-32 Phillips screws securing the radome to the baseplate (see Figure 13). Carefully lift the radome straight up until clear of the antenna assembly and set it aside in a safe place.

NOTE: Due to the snug fit, some contact between the radome's sealing gasket and the antenna mechanism is normal.

b. Remove the two #10-32 shipping restraint screws (see Figure 14). Save the restraints for future use.

> **IMPORTANT!**
>
> Once you have removed the restraints, handle the antenna carefully. With the restraints removed, the internal antenna assembly rotates freely and, if not handled properly, can damage the limit switch.
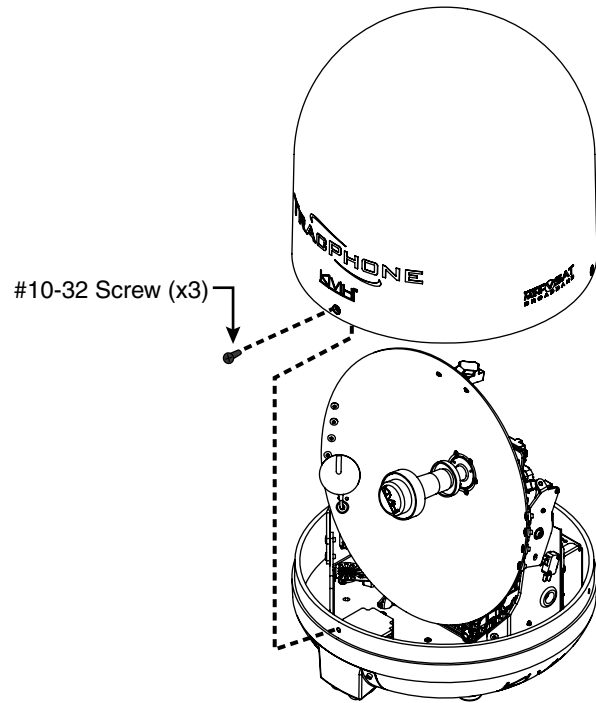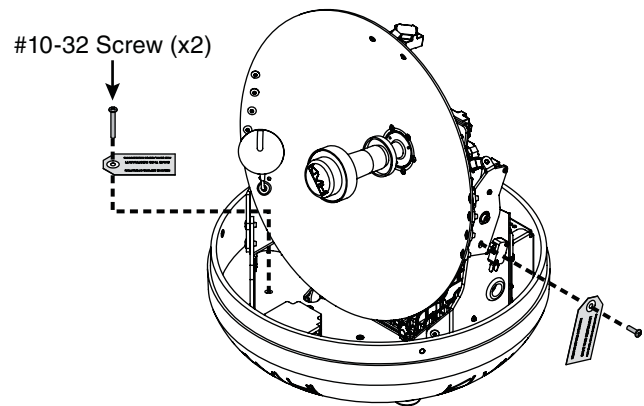
Figure 13: Removing the Radome

#10-32 Screw (x3)

Figure 14: Shipping Restraints

#10-32 Screw (x2)

8 Prepare the Antenna Cables

Follow these steps to prepare and route the RF and power/data cables.
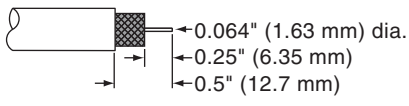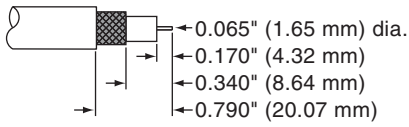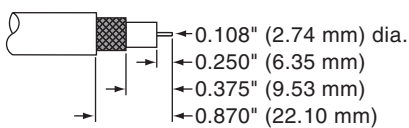
Prepare the Customer's RF Cables

You need to connect two 75Ω RF coax cables from the antenna to the belowdecks ICM. Refer to Figure 15 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.
>
> - Do not use RG-6 cable, as it will damage the system. Use of any cables not specified in Figure 15 will void the warranty.
>
> - 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. *See page 36 for instructions on terminating LMR cables.*
>
> - 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.
>
> - *(LMR cables only)* Make sure there is no gap between the end of the cable jacket and the start of the connector.
>
> - 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.
>
> - When determining cable lengths, don't forget to account for service loops, 14" (35 cm) in diameter, at each end.

NOTE: If you only need to run RG-11 RF cables, you may terminate one end of each with a right-angle connector, or use pre-terminated 50 ft (15 m) RG-11 cables from KVH (KVH part no. 32-1087-50), and omit the pigtail cables described in the next section.

Figure 15: RF Cable Requirements

15-50 ft (5-15 m) Cable Run	
Cable	RG-11 (KVH part no. 32-1087-50) *Loss: 0.084 dB/ft (0.276 dB/m)*
Connector	**Right-angle:** ICM FS11RA* **Straight:** Belden SNS11AS*
Tools	**Right-angle:** Cable Pro PS11 and CPLCCT-SS59/11 **Straight:** Belden CST596711 and L3011B (KVH part no. 72-0493)
Strip Lengths	0.064" (1.63 mm) dia. 0.25" (6.35 mm) 0.5" (12.7 mm)
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	0.065" (1.65 mm) dia. 0.170" (4.32 mm) 0.340" (8.64 mm) 0.790" (20.07 mm)
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	0.108" (2.74 mm) dia. 0.250" (6.35 mm) 0.375" (9.53 mm) 0.870" (22.10 mm)

* Cables from KVH include the proper connectors.
** LMR tool kits from KVH include a torque wrench.

8 Continued Prepare the Antenna Cables

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

---
IMPORTANT!

Use of the supplied RG-11 pigtail cables is **mandatory** if you are using LMR cables. Do not connect LMR-400-75 or LMR-600-75 cables directly to the antenna.

---

a. Clean and dry the RF cables' connectors.

b. **Label both ends** of the customer's RF cables. Label one cable "TX;" label the other "RX."

c. 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.

d. Connect and **SLOWLY** hand-tighten the "TX" RF cable to the feed-thru adapter of one of the supplied 3 ft (90 cm) RG-11 pigtail cables, allowing the grease to diffuse and settle into the entire space within the connector (see Figure 16).

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. Repeat steps c-e to connect the "RX" RF cable to the other pigtail cable.

Route the Cables Belowdecks

a. Keep the connector end of the power/data cable and the right-angle connector ends of the RF cables at the antenna location.

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

b. Route the opposite ends of the power/data and RF cables belowdecks through the 3.5" (89 mm) cable access hole. Leave an adequate service loop, at least 14" (35 cm) of slack, in the cables at the antenna location.

c. Route the cables to the ICM. Be sure to always maintain the minimum bend radius in the RF cables (see Figure 17).

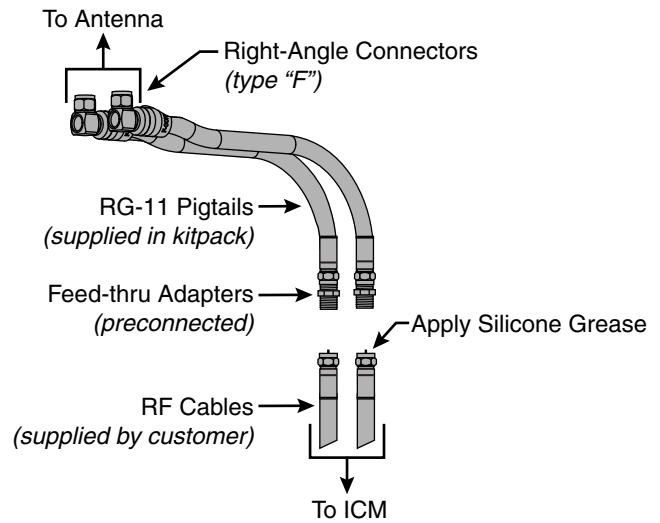Figure 16: Connecting the Pigtail Cables to the RF Cables

Figure 17: 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)

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9 Wire the Antenna

Follow these steps to connect the antenna cables.

a. Connect the power/data cable to the "Power/Data" jack on the bottom of the antenna (see Figure 18). Hand-tighten until the connector locks in place.

b. Using the supplied 3 mm Allen hex key, remove the connector cover from the antenna's baseplate. Save the cover and the four M4 cap screws for later use.

c. Clean and dry the antenna's RF connectors.

d. Place one of the supplied rubber washers over the "MRx" jack on the bottom of the antenna, as shown in Figure 19.

e. Fill half of the inner body of the "RX" pigtail cable's connector with silicone grease.

f. Connect and **SLOWLY** hand-tighten the "RX" pigtail cable to the "MRx" jack on the antenna, allowing the grease to diffuse and settle into the entire space within the connector.

g. Make sure the "RX" pigtail cable's connector is tightened all the way into the antenna's connector. Then tighten it with a 7/16" torque wrench set to 20 in.-lbs. Make sure the rubber washer compresses against the baseplate.

h. Repeat steps d-g to connect the "TX" pigtail cable to the antenna's "MTx" jack.

i. Wipe off any excess grease from the cables.

j. Seal all above deck RF cable connections with silicone sealant or equivalent.

k. Reattach the connector cover and secure in place with the M4 cap screws.

l. Secure the cables near the antenna connectors to relieve stress.

m. Seal the cable access hole, as required.

IMPORTANT!

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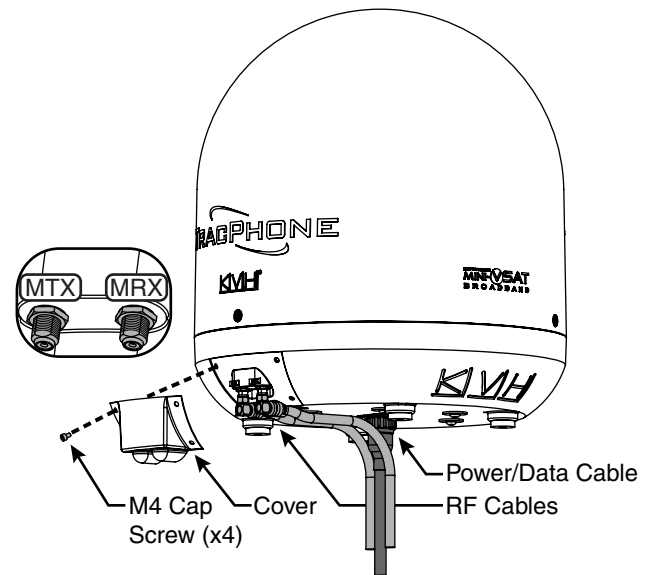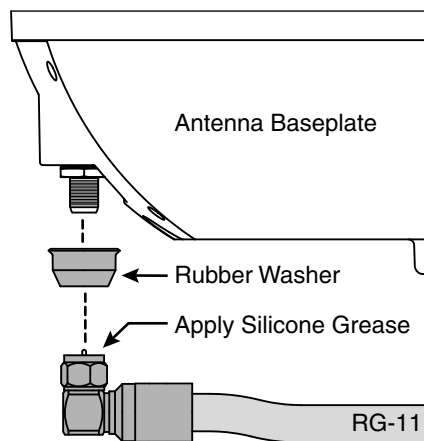

Figure 18: Antenna Cable Connections

Figure 19: Connecting RF Cables to the Antenna

10 Mount the Antenna

Follow these steps to mount the antenna.

a. Place the antenna 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 20). The antenna's baseplate should rest squarely atop the foam seal.

⚠	CAUTION

Be sure to observe the safe handling instructions in the Material Safety Data Sheet (MSDS) provided with the anti-seize lubricant.

b. Apply a thin layer of the supplied anti-seize lubricant to the threads of the four 1/4"-20 bolts to prevent galling.

IMPORTANT!

Be sure to insert the mounting bolts from above and use the supplied hardware for a secure connection.

c. At each of the four baseplate mounting holes, place a 5/8" diameter flat washer on a 1/4"-20 bolt and insert the bolt into the hole from above (see Figure 21).

IMPORTANT!

Use caution if you're using power tools. High installation speeds can damage the threads.

d. Secure each mounting bolt to the mounting surface using a 1" diameter flat washer and a 1/4"-20 lock nut from below. 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.

e. Reinstall the radome onto the antenna. Secure in place with the three #10-32 screws you removed earlier (see Figure 13 on page 11). Then install a protective plastic cap (supplied in the kitpack) over each radome screw.
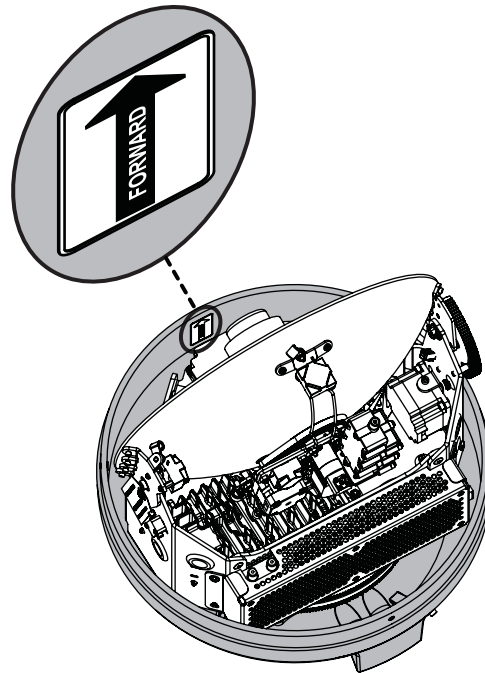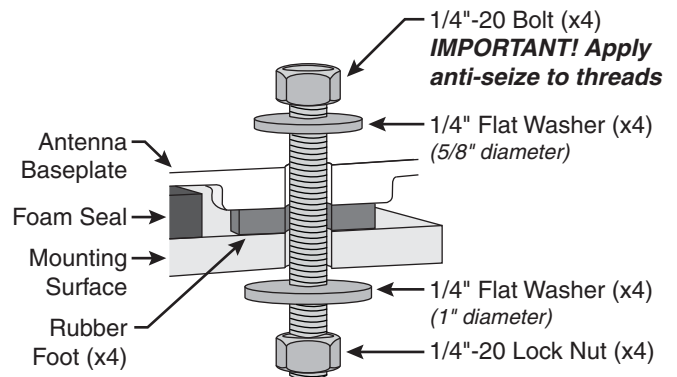
Figure 20: Forward Arrow in Antenna Baseplate

Figure 21: Mounting the Antenna (Side View)

1/4"-20 Bolt (x4)
IMPORTANT! Apply anti-seize to threads

1/4" Flat Washer (x4)
(5/8" diameter)

Antenna Baseplate

Foam Seal

Mounting Surface

Rubber Foot (x4)

1/4" Flat Washer (x4)
(1" diameter)

1/4"-20 Lock Nut (x4)

⑪ Wire the ICM

Follow these steps to wire the ICM (see page 45 for a complete wiring diagram).

Connect the Antenna Power/Data Cable

a. 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.

b. Connect the antenna power/data cable to the supplied 16-position terminal strip connector as shown in Figure 22.

IMPORTANT!

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

---

c. Place the terminal strip connector into the base of the supplied cable shroud as shown in Figure 23.

d. Secure the end of the power/data cable to the base of the shroud using the supplied clamp. This clamp will help relieve stress on the cable. Secure the clamp in place with the two screws.

e. Carefully fit all of the power/data cable's wires within the base of the shroud.

f. Snap the shroud's cover onto the base. Be sure not to pinch any wires between the cover and the base.

g. Plug the terminal strip connector into the rear panel of the ICM.

Figure 22: Antenna Power/Data Wiring
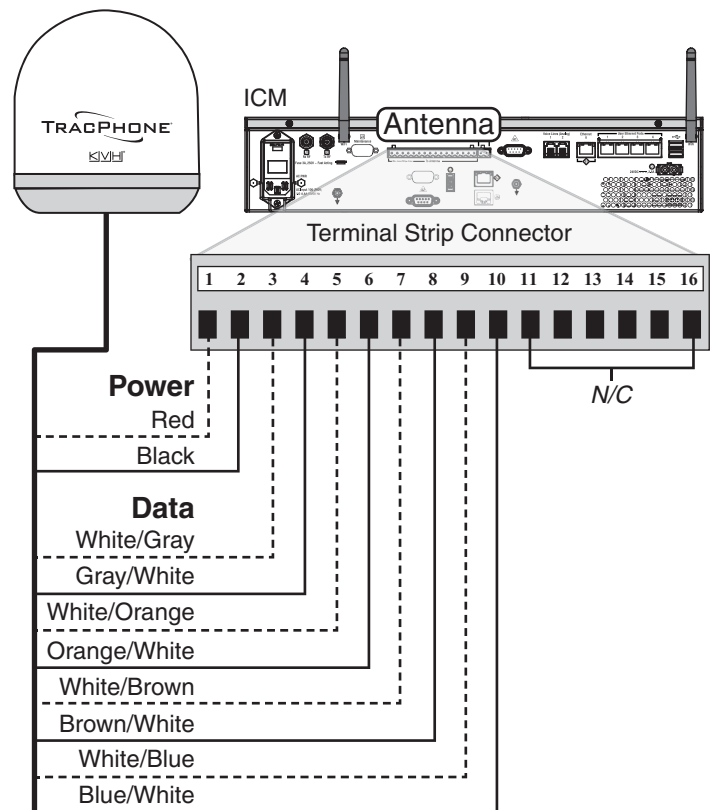
*Six unused wires are reserved for future use;
N/C = Not Connected*

Figure 23: Power/Data Cable Shroud
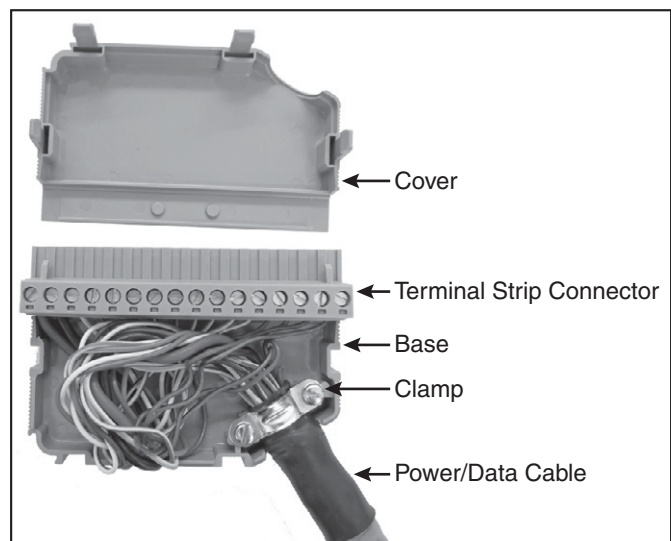
Connect a NMEA 0183 Talker (Optional)

A vessel heading input will enhance the system's performance. A vessel position input will serve as a backup to prevent a loss of service if the antenna's internal GPS fails.

If you want to supply both heading and position to the ICM, you can either connect a NMEA 0183 talker that transmits both messages, or connect two devices using a NMEA data multiplexer, such as Actisense® model NDC-4.

a. Configure the customer's NMEA 0183 talker(s) to transmit a compatible message or messages at 4800 baud (see Figure 24).

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

b. Make sure the data message(s) includes the checksum, identifiable by a ***xx** field at the end of the data sentence (e.g., $HEHDT,123.4, T***1F**). Do not exceed a 10 Hz input rate.

c. Connect the NMEA 0183 talker or NMEA data multiplexer to the supplied 2-position terminal strip connector as shown in Figure 25.

d. Plug the terminal strip connector into the rear panel of the ICM.

Figure 24: Compatible NMEA 0183 Inputs

Data Type	Compatible Messages
True or Magnetic Heading	$--HDG $--HDM $--HDT $--OSD $--THS $--VHW
Position	$--RMC

Figure 25: NMEA Wiring (Optional)

Connect the RF Cables

Figure 26: Antenna RF Transmit and Receive Wiring
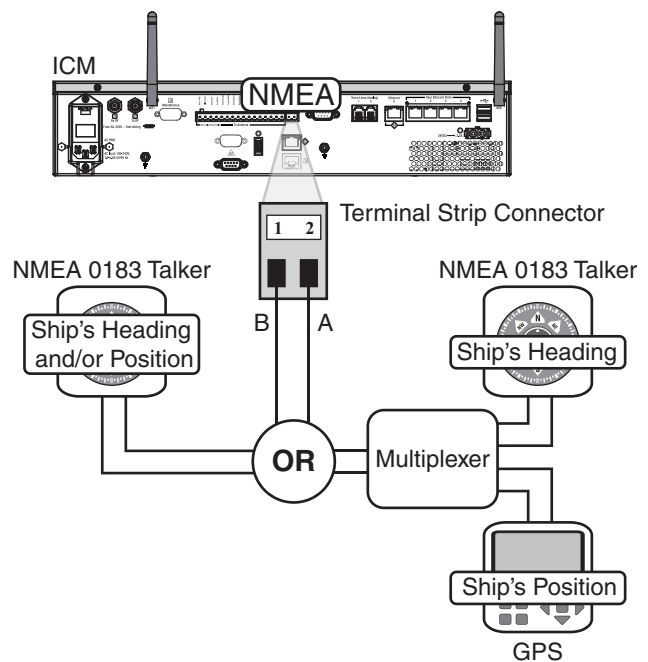
IMPORTANT!

If you are using LMR-600-75 cables, do not connect them directly to the ICM. Connect the supplied 1 ft (30 cm) pigtail cables between the RF cables and the ICM. Be sure to use the white pigtail cable (labeled "TX ONLY") at the ICM's "TxRF" jack.

---

a. Connect the RF coax cable labeled "RX" to the "Rx RF" jack on the back of the ICM (see Figure 26). Hand-tighten, then tighten with a 7/16" torque wrench set to 20 in.-lbs.

b. Connect the RF coax cable labeled "TX" to the "Tx RF" jack on the back of the ICM. 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.

---

12 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 ICM risks damage to the antenna and electric shock.

Figure 27: AC Power Options
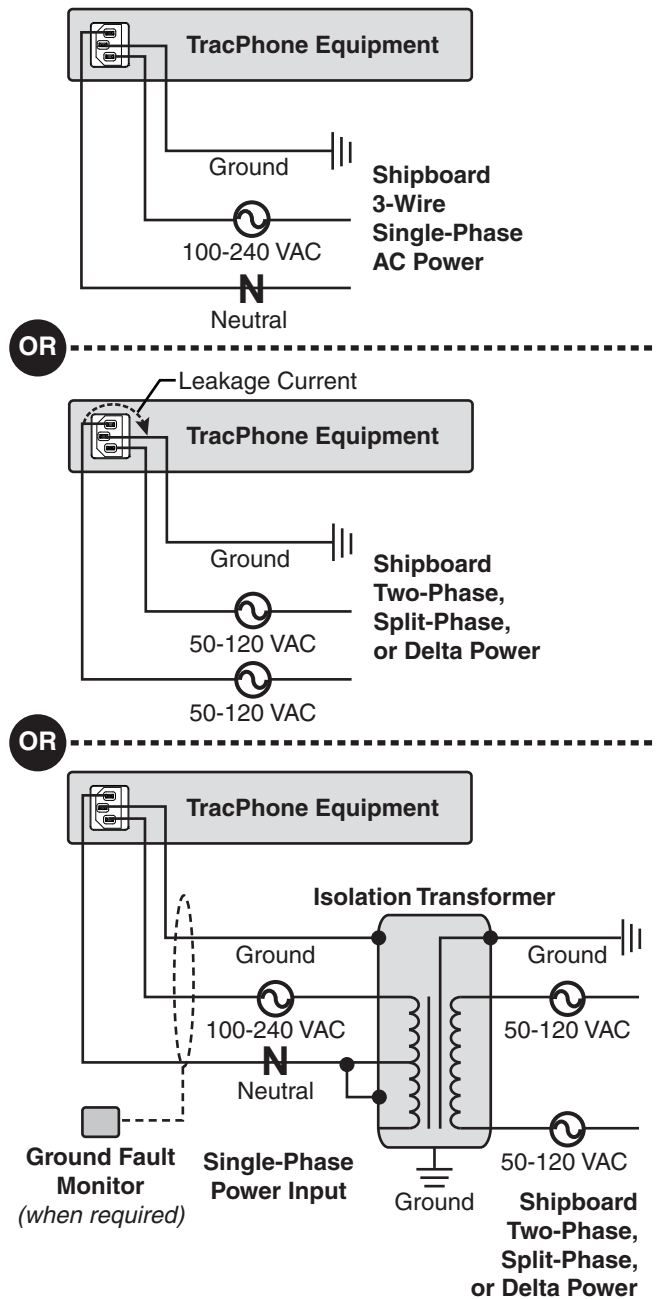
12 Continued Connect Power

Once you have read and understand the requirements described on page 19, follow these steps to connect power to the TracPhone system.

a. Before you begin, disconnect vessel power and be sure the vessel is properly grounded in accordance with marine standards.

b. Connect the supplied ground wire from the ground point on the ICM rear panel to ship's ground (see Figure 28).

c. Connect the supplied AC power cord to the ICM.

⚠ 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 2 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.

---

d. Using tie-wraps, secure all wires to the strain-relief bracket at the back of the ICM (see Figure 29). Leave enough slack for easy serviceability.

e. Double-check all of your wiring.

f. Plug the ICM power cord into the vessel's 100-240 VAC supply.

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

Figure 28: Power Wiring
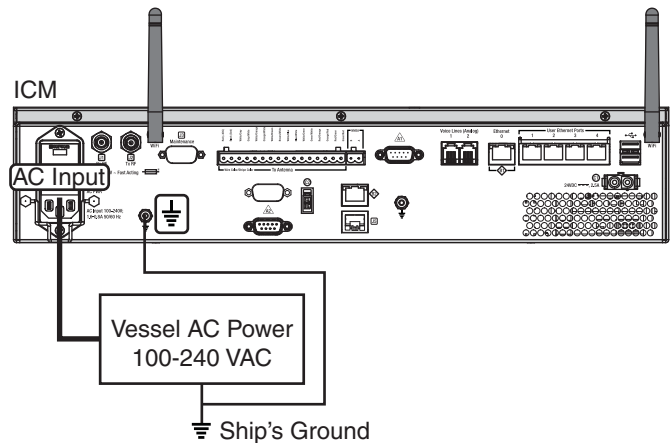
Figure 29: Strain-Relief Bracket
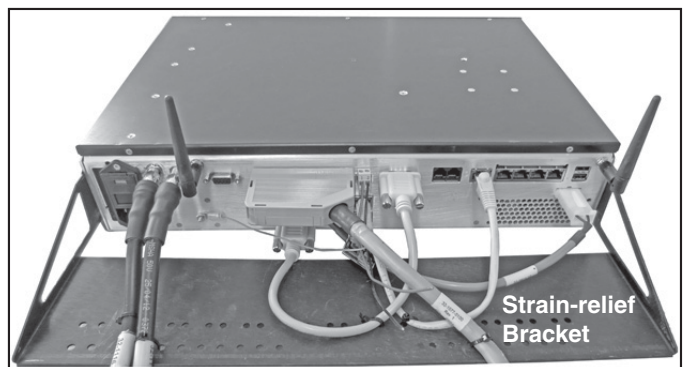
⓭ Turn On the System

Follow these steps to turn on the system.

a. Ensure the antenna has a clear, unobstructed view of the sky.

b. Apply vessel power to the TracPhone system.

c. Press the power button on the front of the ICM (see Figure 30). The button's light should illuminate green.

d. Measure the AC and DC voltages between the ground point on the ICM's rear panel (chassis ground) and ship's ground. Make sure you measure less than 2 VAC/2 VDC.

e. Wait at least 5 minutes for system startup.

IMPORTANT!

Powering down (rebooting) in reaction to a perceived delay can corrupt the ICM's CompactFlash (CF) card.

IMPORTANT!

Once the system is online, do not turn it off for 30 minutes to allow the ICM's 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. Details are available to technicians on the KVH Partner Portal and in the Help.

---

f. After the startup sequence is complete, verify that the ICM's Control Unit status light is lit solid green and the Antenna and Modem lights are lit solid or flashing green (see Figure 31).

g. Connect your PC to the "User Ethernet 1" port on the rear panel of the ICM (see Figure 32).

h. Open a web browser on your PC and enter the following address: **http://minivsat.kvh**.

i. Verify that the web interface appears in your browser. If it doesn't, enter the ICM'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 40).

Figure 30: Power Button
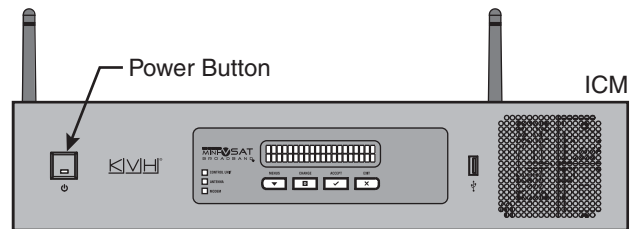
Figure 31: Status Lights
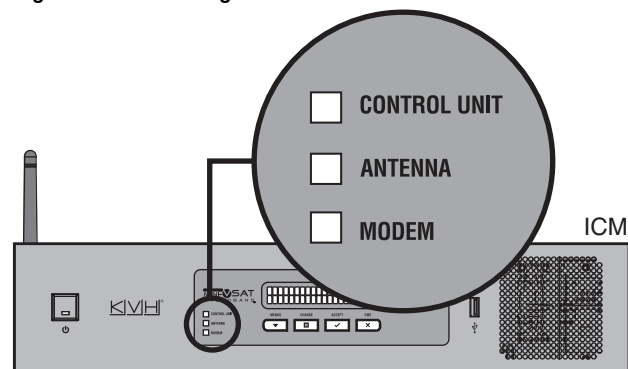
Figure 32: Connecting Your Laptop to the ICM
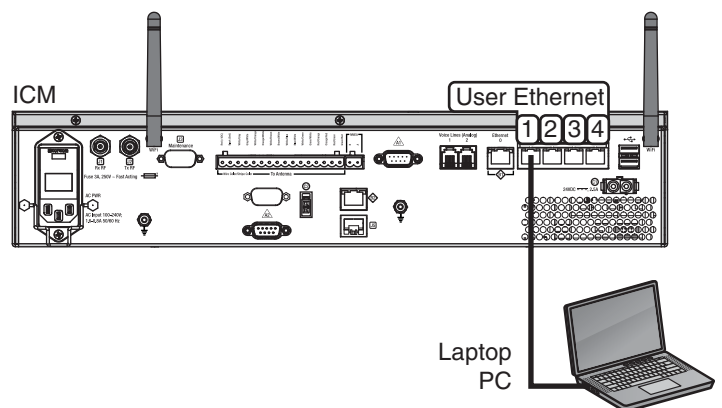
⑭ Update the System Software

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

Check the Current Software Version

a. Go to the TracPhone V3-IP web interface and click the **Updates** tab. Note the displayed ICM/Antenna software version (see Figure 33).

b. 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 V3-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.

a. Click **Choose File**.

b. At the Login window, enter the default password: "**password**".

c. Click **Browse** and navigate to the file you saved on your laptop (see Figure 34).

d. Click **Check File**.

e. At the confirmation message, click **Update**.

f. Wait for the software update to complete. It might take up to 40 minutes.

Figure 33: Updates Page on Web Interface
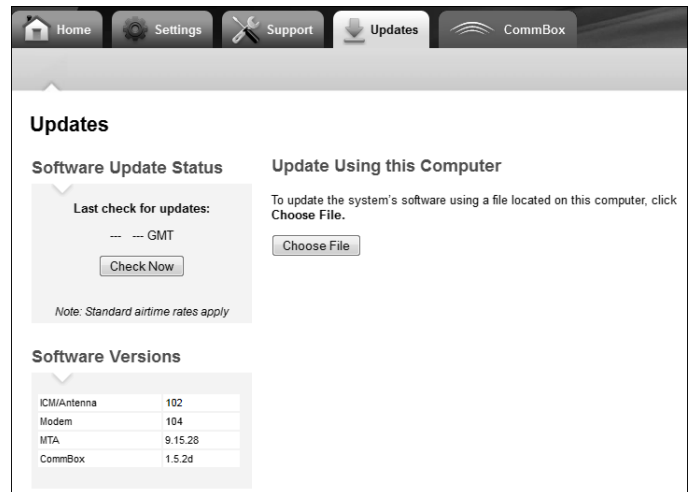
Figure 34: Update File Selected for Upload
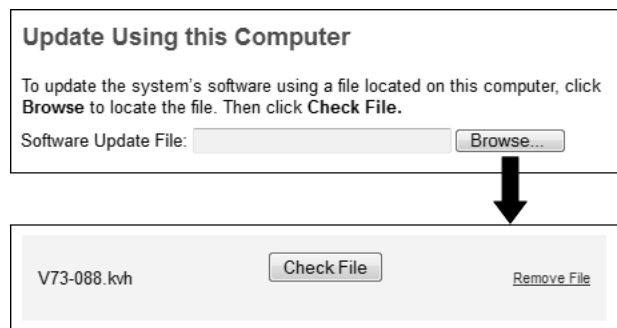
15 Customize the Web Interface

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.

a. At the TracPhone V3-IP web interface, click the **Settings** tab. Then click **Account**.

b. In Security, click **Edit**.

c. For the current password, enter the default password: "**password**" (see Figure 35).

d. 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.

a. At the TracPhone V3-IP web interface, click the **Settings** tab. Then click **Account**.

b. In Vessel Name, click **Edit**.

c. Enter the vessel name (see Figure 36). Then click **Save Settings**.

Assign the Phone Line Name

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

a. At the TracPhone V3-IP web interface, click the **Settings** tab. Then click **Other**.

b. In Phone Line Name, click **Edit**.

c. Enter a name for Line 1 (see Figure 37). Then click **Save**.

Figure 35: Setting the Administrator Password

Figure 36: Entering the Vessel Name

Figure 37: Assigning the Phone Line Name

16 Set Up No-Transmit Zones

To prevent exposure to RF energy (see the hazard area illustration on page 1), you can configure up to two no-transmit zones for areas where crew and/or passengers frequent (see Figure 38). 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.

a. 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 39).

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

b. At the TracPhone V3-IP web interface, click the **Settings** tab. Then click **No-Transmit Zones**.

c. Click **Edit**.

d. Click **Enforce Zones** (see Figure 40).

e. Enter the azimuth range for Zone 1.

f. Enter the azimuth range for Zone 2, if required.

g. Click **Save All Settings**.

h. At the confirmation message, click **Save**.
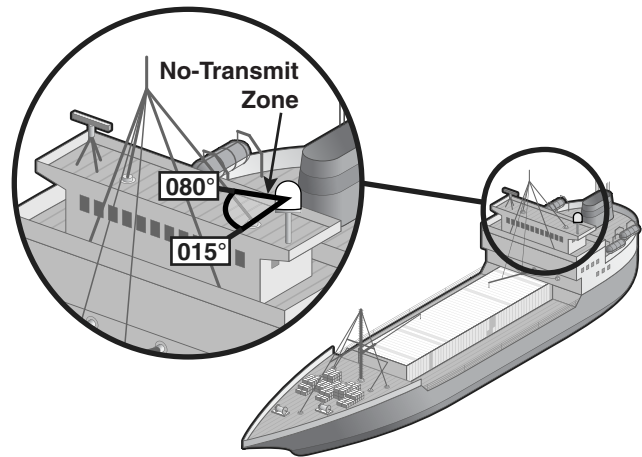
Figure 38: Example of a No-Transmit Zone
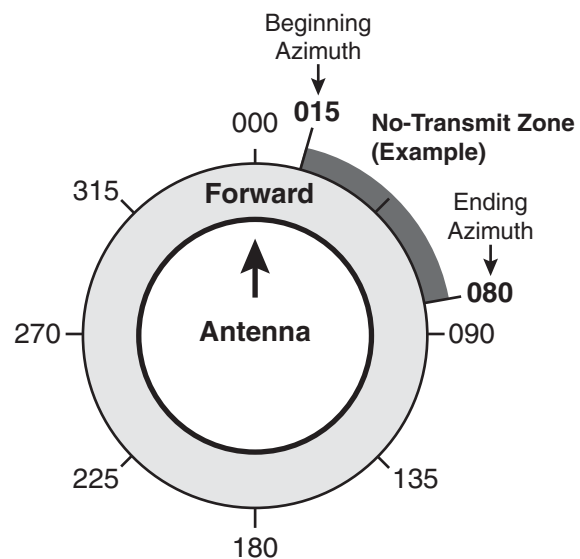

Figure 39: Azimuths Relative to Antenna's Forward Arrow

Figure 40: No-Transmit Zones Page of Web Interface

17 Set Up Tracking Avoidance Zones

You can configure up to five tracking avoidance zones for areas where there may be partial blockage or RF interference. Whenever the antenna is tracking a satellite in the direction of a tracking avoidance zone, it will switch to a different satellite if one is available.

Follow these steps to set up a tracking avoidance zone.

a. Determine the necessary azimuth range for the 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 point toward the bow.

b. Determine the necessary elevation range for each zone.

NOTE: Each no-transmit zone must span at least 5° in both azimuth and elevation.

c. At the TracPhone V3-IP web interface, click the **Settings** tab. Then click **Tracking Avoidance Zones**.

d. Click **Edit**.

e. Enter the azimuth and elevation ranges for Zone 1. Then select the **Enabled** check box (see Figure 41).

NOTE: Although you may enter an elevation as low as -25° and as high as 90°, the antenna can only receive signals within its 7.5° to 75° operating range.

f. Set up any additional zones by selecting a zone number from the drop-down menu and repeating step e for the selected zone.

g. In the Time in Zone box, enter the maximum number of minutes (between 1 and 60) during which the antenna will be allowed to track within a tracking avoidance zone. This precludes switching satellites in cases when the antenna is simply passing through a zone while the vessel is turning.

h. Click **Save Settings**.

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

Figure 41: Tracking Avoidance Zones Page of Web Interface

18 Test the System

Follow these steps to test the system for proper operation.

a. Ensure the antenna has a clear, unobstructed view of the sky.

b. Verify that the antenna is tracking the service satellite and the system is online, as indicated by the Home page of the TracPhone V3-IP web interface (see Figure 42).

c. Enter the following address in your web browser: **http://test.minivsat.net**.

    Verify that the Welcome page appears, indicating good communications between the TracPhone system and the land-based hub (see Figure 43).

d. Turn on all other electronic equipment above deck within the proximity of the antenna. Verify that the system continues to operate without any degradation in performance.

e. 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.

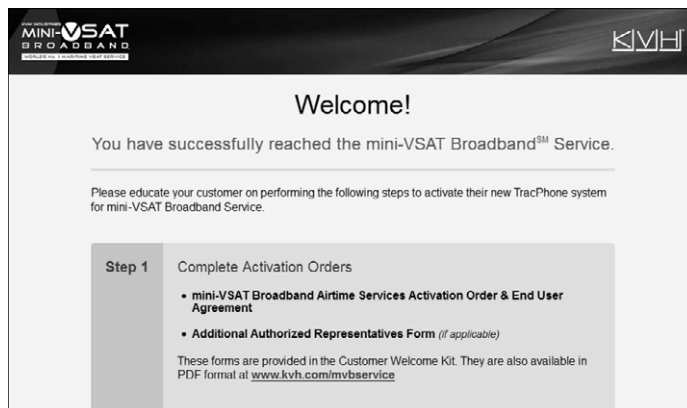Figure 42: Good Service Connection Indicated on Home Page

Figure 43: Welcome Page for Testing

⑲ Configure the Network

The ICM includes four Ethernet ports and a built-in wireless access point (WAP) that can be configured in a variety of ways to meet the customer's needs (see Figure 44). Some of the most common ICM network configurations can be selected directly from the TracPhone V3-IP web interface. Follow these steps to select one of these configurations. If the customer requires a custom configuration, please contact KVH Network Services at networkservices@kvh.com. If you need to connect a Media Server for IP-MobileCast™ service, see "Optional Media Server for IP-MobileCast" on page 33.

NOTE: The customer may also change the ICM's network configuration at the myKVH web portal (www.mykvh.com). To access myKVH, the customer will need to log in with the username and password provided by KVH at the time of activation.

a. At the TracPhone V3-IP web interface, click the **Settings** tab. Then click **Network Settings**.

b. In Network Configuration, click **Edit**.

c. Select an option from the **Configuration** drop-down menu. Then click **Save** (see Figure 45 and Figure 46).

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

e. Follow the additional instructions on the following pages for your chosen configuration.

Figure 44: ICM Ethernet Ports and Wireless Access Point
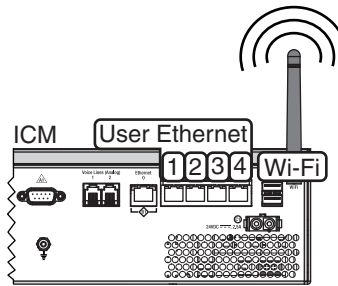

Figure 45: Selecting a Network Configuration
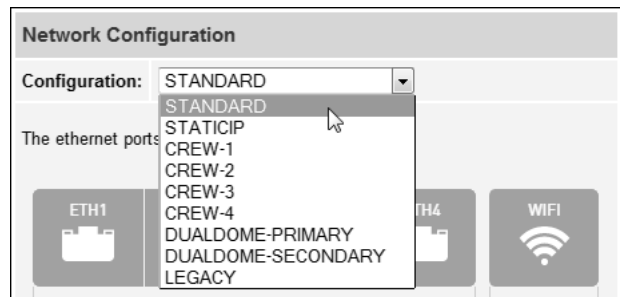
Figure 46: User Selectable Network Configurations

Option	Description
Crew-1	Ports 1-3: Unrestricted access Port 4, Wi-Fi: User login required
Crew-2	Ports 1-2: Unrestricted access Ports 3-4, Wi-Fi: User login required
Crew-3	User login required
Crew-4	Ports 1-2: Unrestricted access Port 3, Wi-Fi: User login required Port 4: Static IP service
Dual Dome - Primary	For dual antenna installation only; Ports 1-3, Wi-Fi: Unrestricted access Port 4: Connect to secondary system
Dual Dome - Secondary	For dual antenna installation only; No user access; connect to primary
Legacy	Not used with TracPhone V3-IP
Standard (default)	Unrestricted access to Internet
Static IP	Ports 1-3, Wi-Fi: Unrestricted access Port 4: Static IP service

Standard Configuration

In a standard configuration, all four User Ethernet ports and the built-in WAP provide direct Internet access without a user login. This is the default configuration. Follow these additional steps to configure the network.

a. To enable the ICM's WAP for wireless access, follow the steps in "ICM Wireless Settings" on page 32.

b. Connect the customer's computers and/or other network devices to the ICM (see Figure 48). For example, you might wish to add an external WAP (or Wi-Fi router configured for bridge mode) to supplement Wi-Fi access.

c. Make sure all computers are configured for DHCP addressing (see page 40). Devices connected to the ICM (via Ethernet cables or Wi-Fi) will receive IP addresses from the ICM via DHCP (see Figure 48). The ICM serves as a router.

NOTE: By default, the ICM 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 V3-IP web interface (go to Settings > Network Settings).

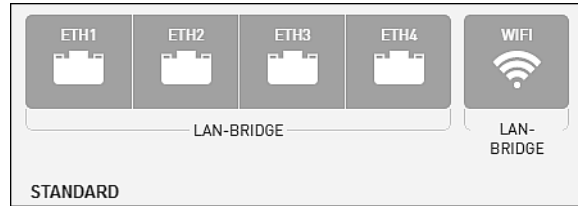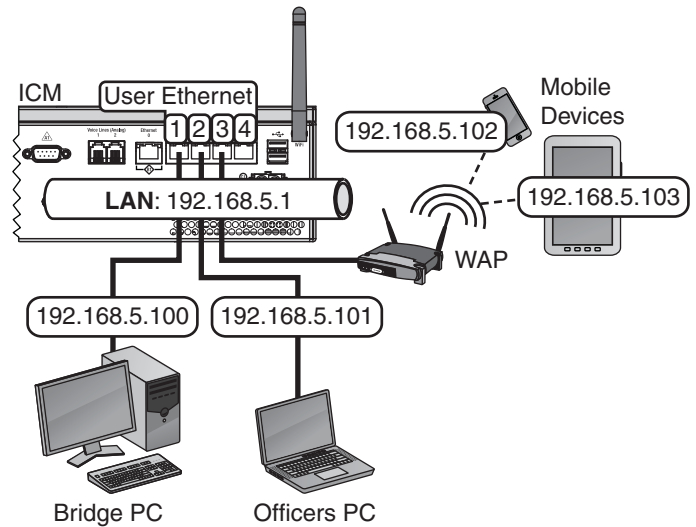Figure 47: Standard Configuration

Figure 48: Standard Configuration Wiring Example

Static IP Configuration

In a static IP configuration, a network device is assigned an IP address that can be accessed directly from the Internet. It does not receive an IP address from the ICM. Follow these additional steps to configure the network.

IMPORTANT!

A static IP address should only be assigned to a secure device, such as a firewall router.

a. Ask the customer to fill out the request form at **www.kvh.com/staticip**. 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.

b. Connect the static IP device to "User Ethernet" port 4 on the ICM.

c. The customer will need to configure the device's TCP/IP properties according to the instructions KVH will provide in an email upon fulfilling the static IP request.

d. Connect all other (non-static IP) computers and/or network devices to "User Ethernet" ports 1-3 and Wi-Fi, as required. These ports and the built-in WAP provide direct Internet access without a user login. Follow the steps in "Standard Configuration" on page 28.
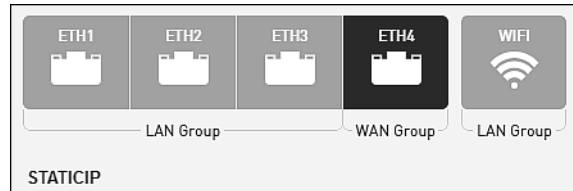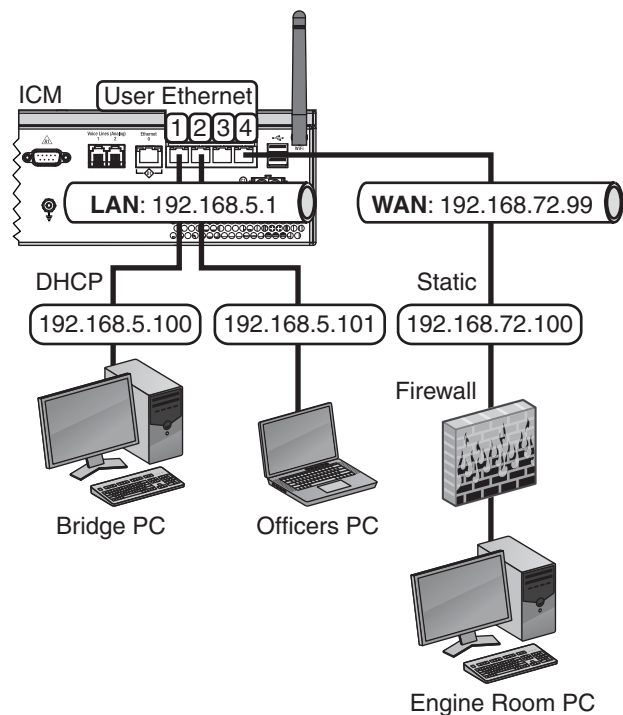
Figure 49: Static IP Configuration

Figure 50: Static IP Configuration Wiring Example

Crew Configurations

The crew configurations allow the customer to control user access to the system's Internet connection. Each crew configuration has certain ports (and Wi-Fi) designated as "Crew LAN." Users who connect to the system via one of these ports (or Wi-Fi) will be required to enter their user name and password to access the Internet. Once a user has consumed his/her data allotment for the current time period (e.g., day, week, or month), access to the system is denied until the next time period begins and the user's full allotment is restored. The "Ops LAN" ports, if any, provide direct Internet access without a user login. Follow these additional steps to configure the network.

a. Connect the Crew computers and/or network devices to the "User Ethernet "ports on the ICM that are designated "Crew LAN." (These ports require a user login.) Follow the steps in "Standard Configuration" on page 28.

b. Connect the Operations computers and/or network devices to the "User Ethernet" ports on the ICM that are designated "Ops LAN," if any. (These ports provide unrestricted access.) Follow the steps in "Standard Configuration" on page 28.

c. Inform the customer that they need to set up all of the user names/passwords and allocate data to each user at the myKVH web portal (**www.mykvh.com**).
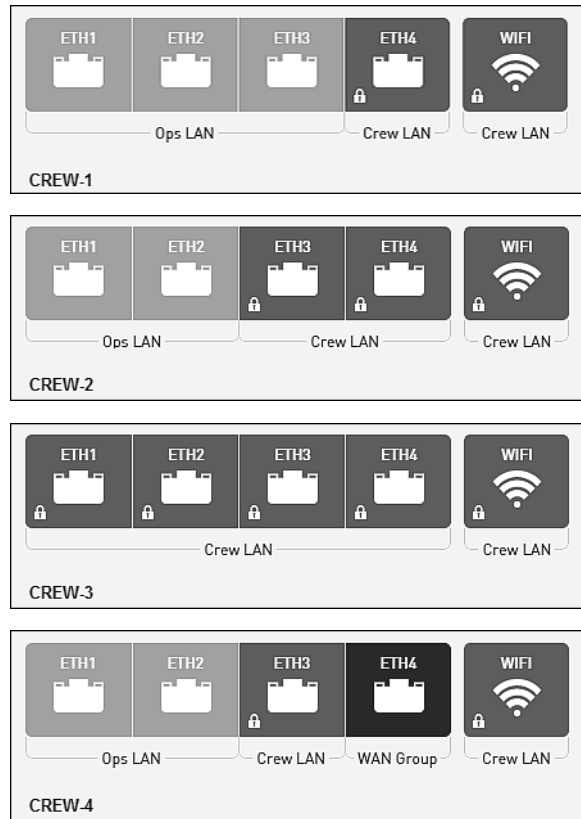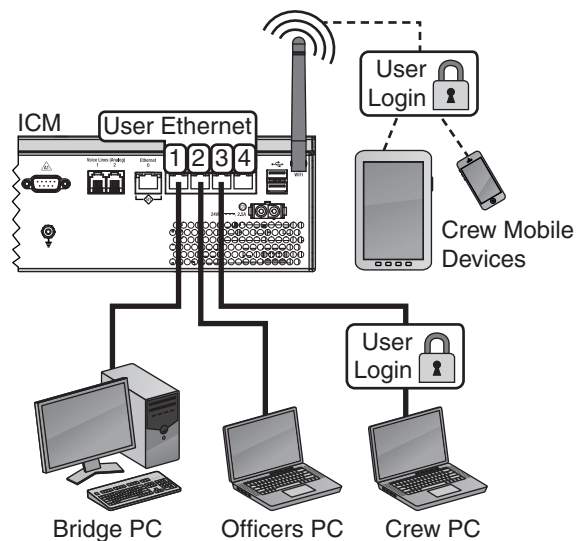
Figure 51: Crew Configurations

Figure 52: Crew-2 Configuration Wiring Example

Dual Dome Configuration

The dual dome configuration allows you to connect a second TracPhone V-IP Series antenna as a backup system. Whenever the primary system loses its connection to the mini-VSAT Broadband service, all voice and data traffic will automatically get routed to the secondary system.

IMPORTANT!

The dual dome configuration only supports a second TracPhone V-IP Series antenna. To use another type of antenna, contact Network Services at networkservices@kvh.com.

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a. Install the secondary TracPhone system according to the instructions in the Installation Guide.

b. Once the secondary TracPhone system is online, contact KVH Technical Support to request a dual dome configuration on the secondary system's ICM. KVH will need to modify a setting over the air.

c. Connect your laptop to the secondary system. At the web interface, select the **Dual Dome-Secondary** network configuration.

NOTE: Once the secondary system is configured for Dual Dome-Secondary, you will need to enter 192.168.0.10 (and not minivsat.kvh) to access the secondary system's web interface.

d. Connect your laptop to the primary system. At the web interface, select the **Dual Dome-Primary** network configuration.

e. Connect an Ethernet cable from any "User Ethernet" port on the secondary system's ICM to "User Ethernet" port 4 on the primary system's ICM (see Figure 54).

f. Connect the customer's computers and/or network devices to "User Ethernet" ports 1-3 and Wi-Fi on the primary system's ICM. These ports and the built-in WAP provide direct Internet access without a user login. Follow the steps in "Standard Configuration" on page 28.
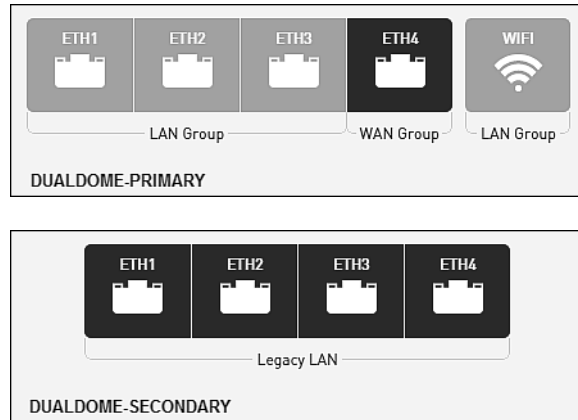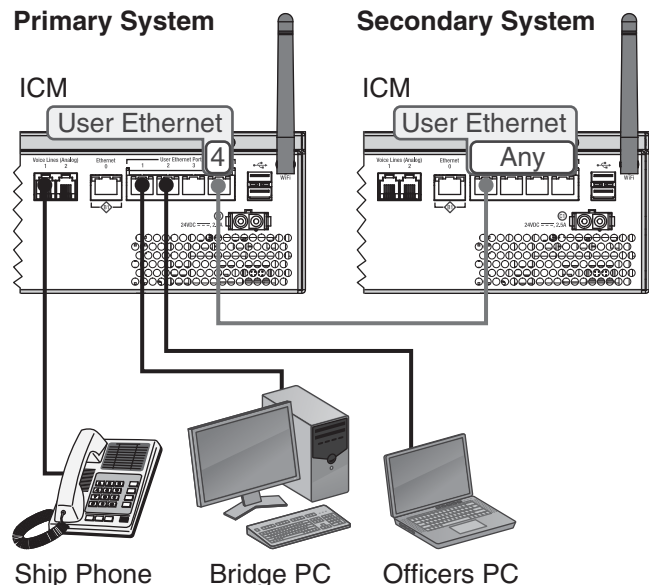
Figure 53: Dual Dome Configurations

Figure 54: Dual Dome Wiring Example

ICM Wireless Settings

With Wi-Fi enabled, vessel devices can connect to the ICM via its built-in wireless access point (WAP) and receive IP addresses from the ICM via DHCP (see Figure 55). Follow these steps to enable and configure the WAP, if desired by the customer.

IMPORTANT!

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

NOTE: The customer may also change the ICM's wireless settings at any time at the myKVH web portal (www.mykvh.com).

a. At the TracPhone V3-IP web interface, click the **Settings** tab. Then click **Network Settings**.

b. In Wi-Fi Settings, click **Edit**.

c. Set the following wireless options, then click **Save** (see Figure 56):

 • **State:** Select On.

 • **SSID**: Enter a unique name for the vessel network.

 • **Protocol**: Select either 802.11b or 802.11g.

 • **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 any channel for wireless communications.

IMPORTANT!

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

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d. At the confirmation message, click **Save**.
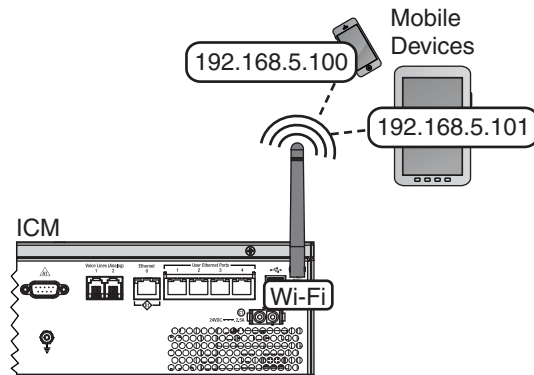
Figure 55: Wireless DHCP (Example)

Figure 56: Wi-Fi Settings on the ICM

Optional Media Server for IP-MobileCast

The IP-MobileCast service delivers licensed entertainment to commercial vessels and superyachts at sea without consuming the vessel's data plan or affecting data speeds. It also offers large file delivery services for critical ship operations, including chart updates, weather data, and crew training.

The optional Media Server (see Figure 58) stores all IP-MobileCast content downloaded from the mini-VSAT Broadband network (via the TracPhone antenna) and streams it locally to connected shipboard devices. If you need to connect a Media Server, the ICM must be set to one of the following network configurations:

- Static IP
- Crew-4
- Dual Dome-Primary/Dual Dome-Secondary

The Media Server requires a connection to the ICM's WAN Group, in addition to a LAN. Refer to the Media Server Installation Guide for complete details about installing and configuring the Media Server.

Optional CommBox Software

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

- **Standard Bundle**: Provides least cost routing, onboard firewall, web caching, web image compression, ad removal, and URL and content filtering
- **Enterprise Bundle**: Adds automated file transfers, differential synchronization, mail relay server, web mail client, anti-spam and anti-virus filters, roaming crew accounts, and prepaid Internet and email 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 57: Available Network Options

Option	KVH Part No.
Media Server, Commercial	02-2103
Media Server, Superyachts	02-2104
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.*

Figure 58: Media Server

20 Connect Voice Line Equipment

Follow these steps to connect the vessel's phone and any purchased voice line accessories to the system.

Connect the Vessel Phone

Using the supplied RJ-11 cable, connect the customer's analog (not digital) phone or PABX to the "Voice Line 1" jack on the ICM (see Figure 59).

NOTE: Do not use the "Voice Line 2" jack. Only the "Voice Line 1" jack is enabled for use.

Connecting Optional Accessories

KVH offers optional accessories that extend the capabilities of the TracPhone system. For example, the UCH-250 Fax Server (KVH part no. 19-0520) is an enterprise-grade fax solution that provides a dedicated fax line using a fully managed, store-and-forward fax service.

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

Figure 59: Connecting the Vessel Phone

ICM

Voice Lines

Vessel Phone
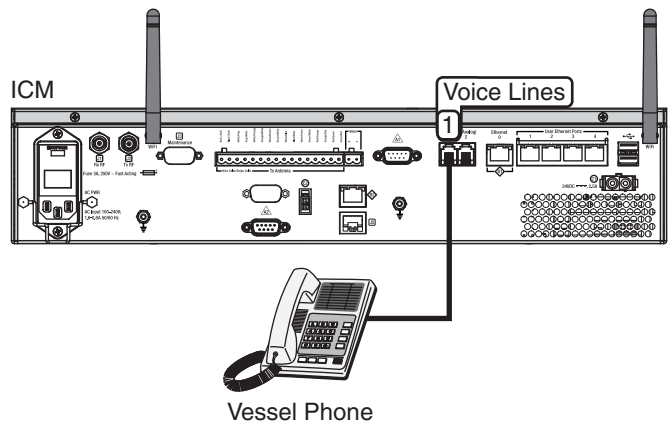
21 Educate the Customer

Give the Welcome Kit to the customer, make sure they know the administrator and Wi-Fi passwords, and show them how to use the system. Be sure they understand the following:

- **The antenna transmits RF energy that is potentially harmful.** Whenever the system is powered on, make sure everyone stays the minimum safe distance away from the antenna (see illustration on page 1). If no-transmit zones were set up, make sure the customer understands where they are.

- Read the End User Agreement carefully (available at **www.kvh.com/ mvbcustomercenter**).

- 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 61). Dirt buildup on the radome can also affect communications.

- The vessel must be located within the coverage area of the satellite (see **www.kvh.com/minivsatmap**).

- The system must be activated for mini-VSAT Broadband service (see **www.kvh.com/ mvbservice**).

- Data usage and overage alerts via email and text message, as well as user logins and their associated data allocations, can be configured easily over the Internet at the myKVH web portal (see **www.mykvh.com**).

For More Information

Refer to the Help provided on the web interface's Support page (see Figure 62). The Condensed version is text only and resides on the ICM. The Extended version includes images and resides on the KVH website (airtime charges may apply).

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

Figure 60: Customer Welcome Kit
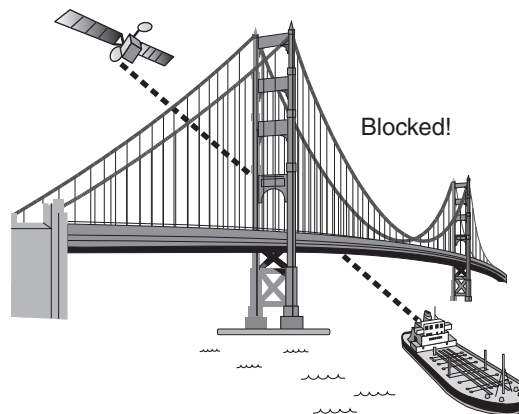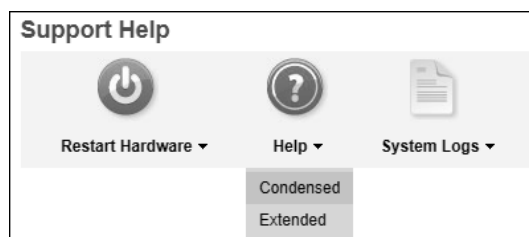

Figure 61: Example of Satellite Blockage

Blocked!

Figure 62: Help Options on Support Page

A Terminating LMR RF Cables

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. The same steps also apply to an LMR-600-75 cable, with the exception of the tools used.

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 63).

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 64). 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 65).

4. Insert the end of the cable into the #1 end of the ST-400EZ stripping tool (see Figure 66). 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.

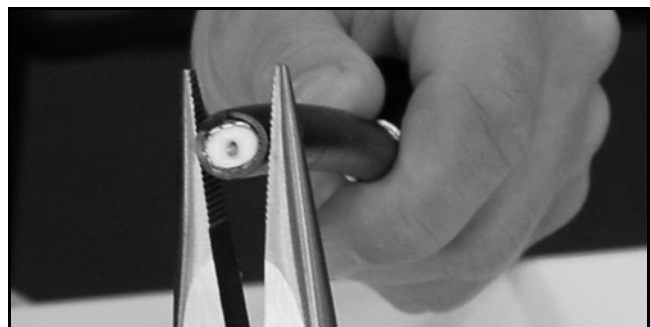Figure 63: Cutting the Cable

Figure 64: Reshaping the Cable

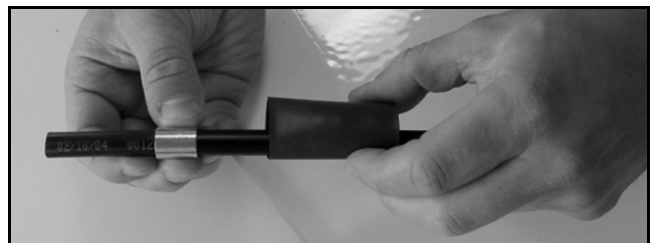Figure 65: Placing the Heat Shrink Tubing and Ferrule

Figure 66: Stripping the End to Expose the Center Conductor

5. Using a utility knife, carefully remove any residual plastic from the center conductor, if necessary (see Figure 67).

6. Insert the end of the cable into the #2 end of the ST-400EZ stripping tool (see Figure 68). 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 69).

7. Using the DBT-02 tool, deburr and chamfer the center conductor (see Figure 70). Avoid nicking the aluminum tape covering the dielectric.
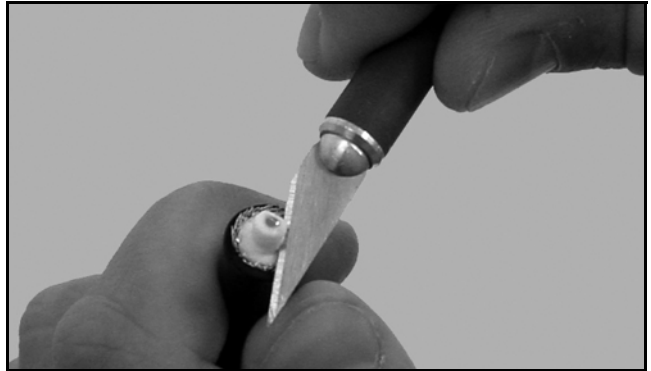
Figure 67: Removing Plastic Residue

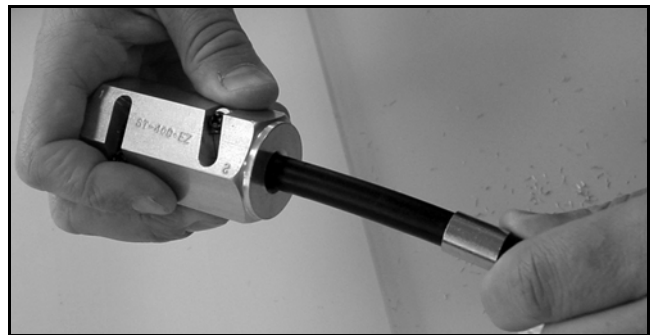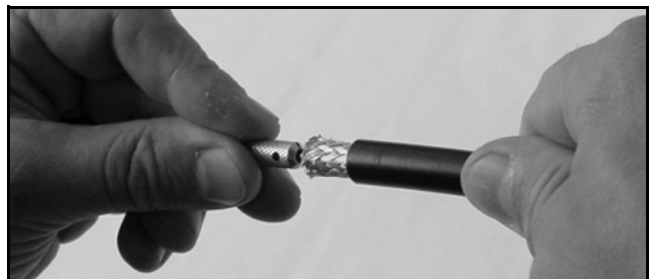Figure 68: Stripping the Cable Jacket

Figure 69: Cable Stripped, Exposing Dielectric

Figure 70: Deburring the Center Conductor

8. Gently flare the braid with your fingers (see Figure 71).

9. Insert the end of the cable into the connector body until the dielectric is firmly seated inside the connector (see Figure 72). Make sure there is no gap between the knurled end of the connector and the cable jacket. Also be sure all braid wires remain on the outside of the connector.

IMPORTANT!

A common installation failure occurs when the connector is not seated properly onto the cable. In these cases, the cable's center conductor does not fully engage the electrical contacts inside the connector. To ensure full engagement, make certain that there is no gap between the cable jacket and the knurled end of the connector before you crimp on the ferrule. You may need to deburr and center the end of the conductor to achieve a good fit.

---

10. Trim any excess braid (see Figure 73), 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 74).

Figure 71: Flaring the Braid
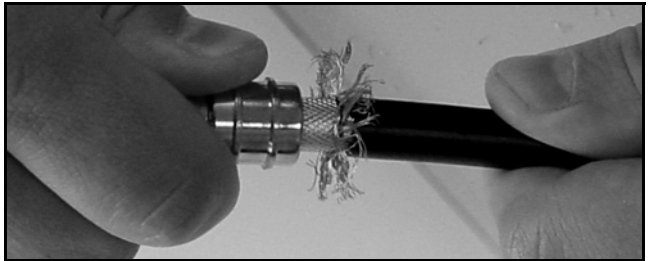

Figure 72: Pushing On the Connector
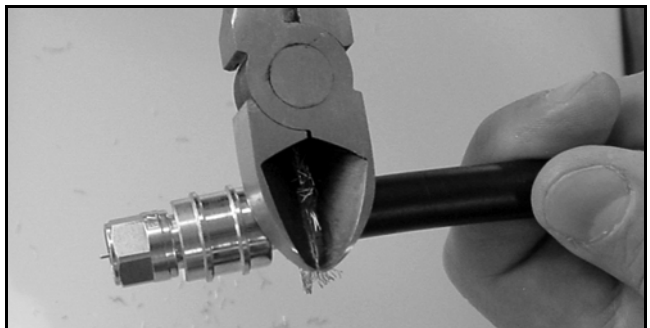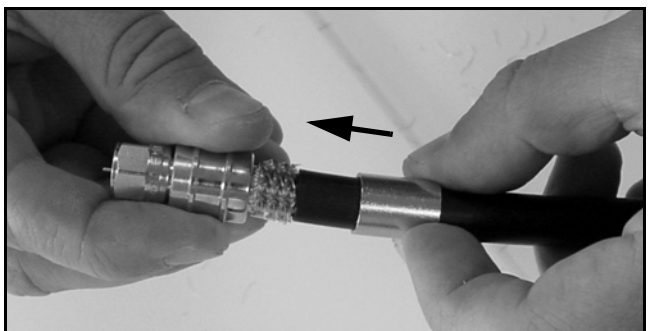

Figure 73: Trimming the Braid

Figure 74: Sliding the Ferrule Over the Braid

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 75). 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 76). 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 77).
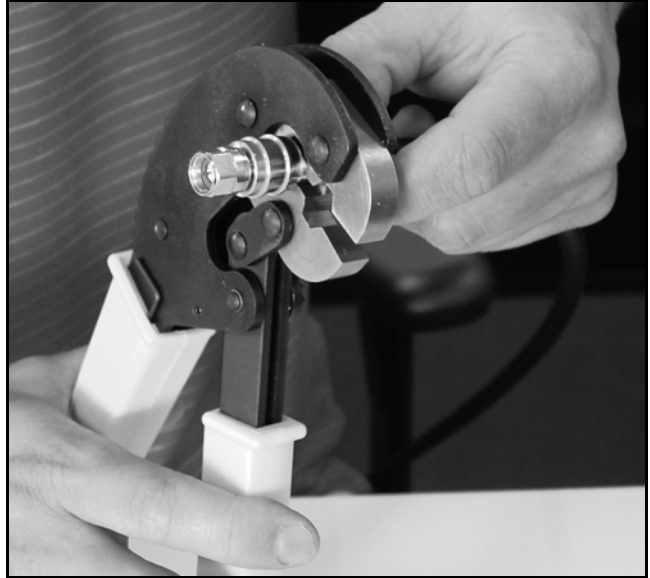
Figure 75: Crimping the Ferrule onto the Cable

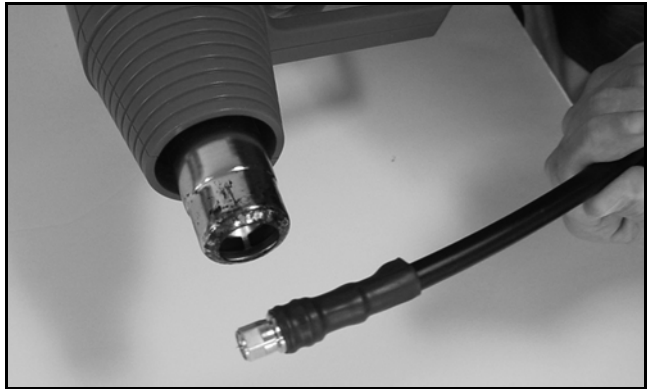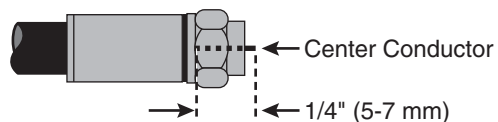
Figure 76: Applying the Heat Shrink Tubing

Figure 77: Proper Center Conductor Pin Length

Center Conductor

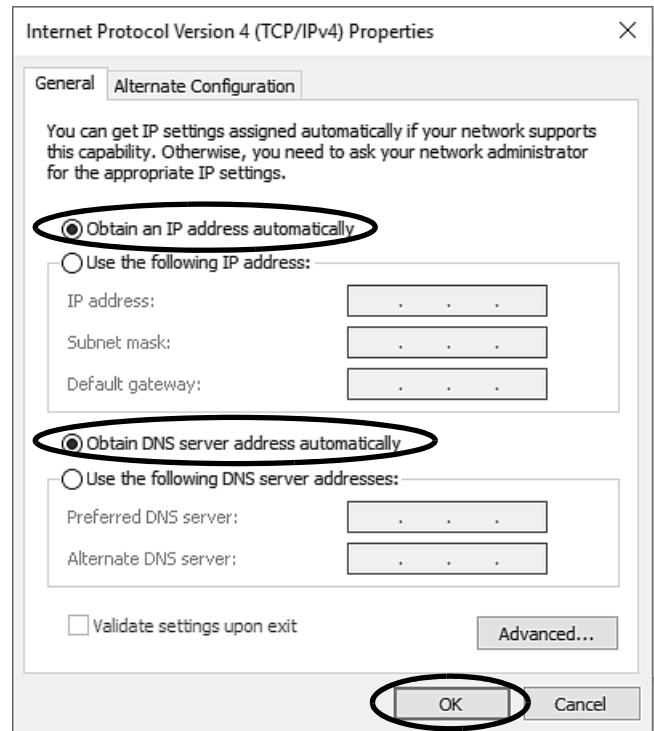1/4" (5-7 mm)

B Configuring Computers for DHCP

Follow these steps to configure your computer for DHCP to allow it to receive an IP address from the ICM. 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 10

1. Turn on the computer.

2. Open the **Network and Sharing Center**. The easiest way to get there is to simply enter the name in the search box on the taskbar. *You can also navigate to it from the Start menu: Settings > Network & Internet > Ethernet > Network and Sharing Center.*

3. In Network and Sharing Center, click the **Ethernet** link for the Ethernet connection you are using.

4. In the Ethernet Status dialog box, click **Properties**. *If this screen doesn't appear, just skip to Step 5.*

5. In the Ethernet Properties dialog box, on the **Networking** tab, select **Internet Protocol Version 4**, and then click **Properties**.

6. In the Internet Protocol Properties dialog box, select **Obtain an IP address automatically** and **Obtain DNS server address automatically** (see Figure 78). Then click **OK**.

7. In the Ethernet Properties dialog box, click **Close**. Then click **Close** in the Ethernet Status dialog box.

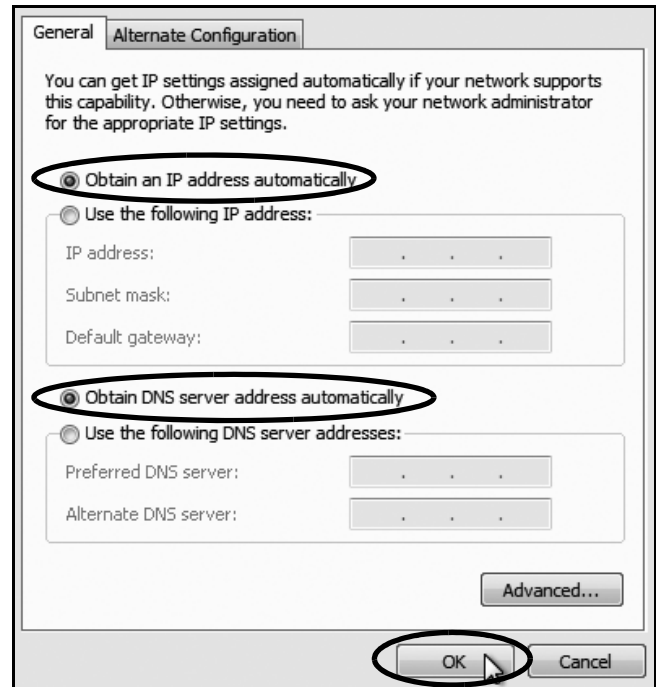Figure 78: Windows 10 - Internet Protocol Properties

Windows 8

1. Turn on the computer.

2. In Control Panel, double-click **Network and Sharing Center**. *To open the Control Panel, go to the desktop, select Settings from the Charms bar, then select Control Panel.*

3. In Network and Sharing Center, double-click the **Ethernet** link for the Ethernet connection you are using.

4. In the Ethernet Status dialog box, click **Properties**. *If this screen doesn't appear, just skip to Step 5.*

5. In the Ethernet Properties dialog box, on the **Networking** tab, select **Internet Protocol Version 4**, and then click **Properties**.

6. In the Internet Protocol Properties dialog box, select **Obtain an IP address automatically** and **Obtain DNS server address automatically** (see Figure 79). Then click **OK**.

7. In the Ethernet Properties dialog box, click **Close**.

Figure 79: Windows 8 - Internet Protocol Properties

Windows 7 or Windows Vista

1. Turn on the computer.

2. In Control Panel, double-click **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. In Network and Sharing Center, double-click the **Local Area Connection** link (Windows 7) or **View Status** link (Windows Vista) for the Ethernet connection you are using.

4. In the Local Area Connection Status dialog box, click **Properties**. *If this screen doesn't appear, just skip to Step 5.*

5. In the Local Area Connection Properties dialog box, click the **Networking** tab, select **Internet Protocol Version 4**, and then click **Properties**.

6. In the Internet Protocol Properties dialog box, select **Obtain an IP address automatically** and **Obtain DNS server address automatically** (see Figure 80). Then click **OK**.

7. In the Local Area Connection Properties dialog box, click **OK**.

Figure 80: Windows 7/Windows Vista- Internet Protocol Properties
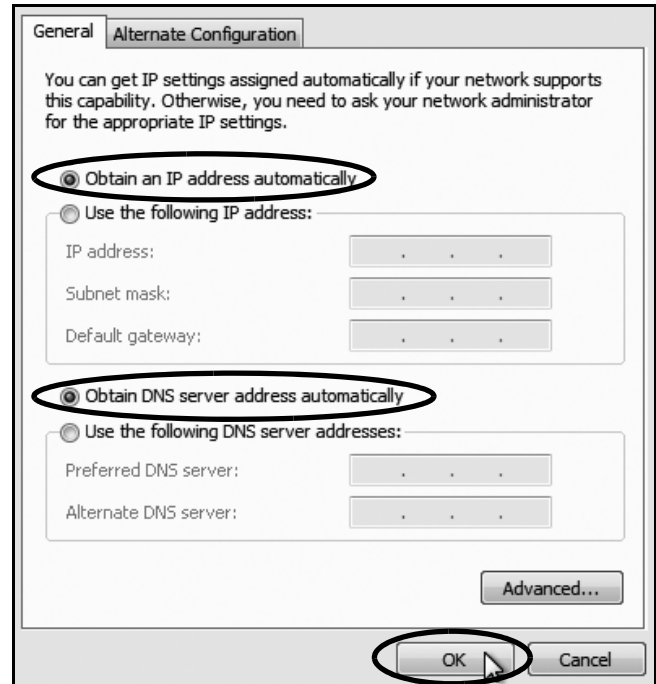
Windows XP

1. Turn on the computer.

2. In Control Panel, double-click **Network Connections**. *You can find the control panel either through the Start menu or "My Computer."*

3. In Network Connections, double-click the **Local Area Connection** for the Ethernet connection you are using.

4. In the Local Area Connection Status dialog box, click the **General** tab. Then click **Properties**. *If this screen doesn't appear, just skip to Step 5.*

5. In the Local Area Connection Properties dialog box, click the **General** tab, select **Internet Protocol (TCP/IP)**, and then click **Properties**.

6. In the Internet Protocol (TCP/IP) Properties dialog box, click the **General** tab. Then select **Obtain an IP address automatically** and **Obtain DNS server address automatically** (see Figure 81). Then click **OK**.

7. In the Local Area Connection Properties dialog box, click **OK**.

8. Restart the computer.

Figure 81: Windows XP - Internet Protocol (TCP/IP) Properties
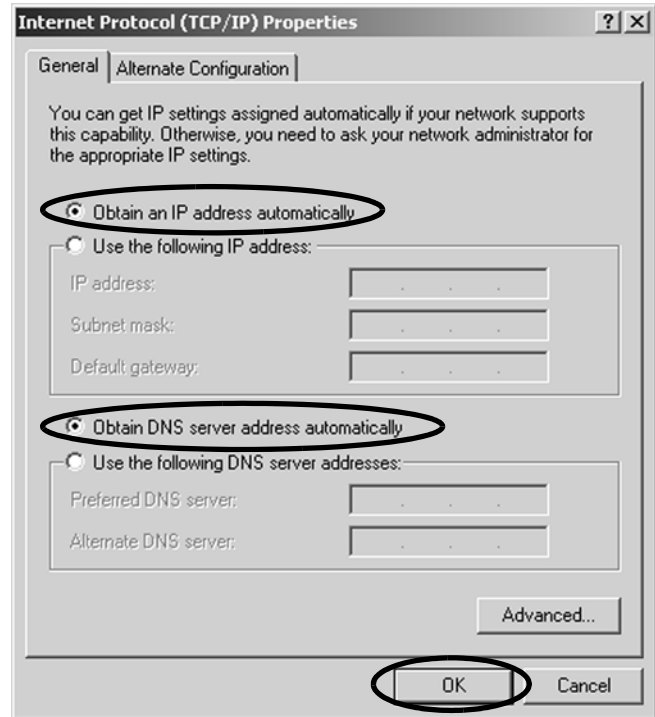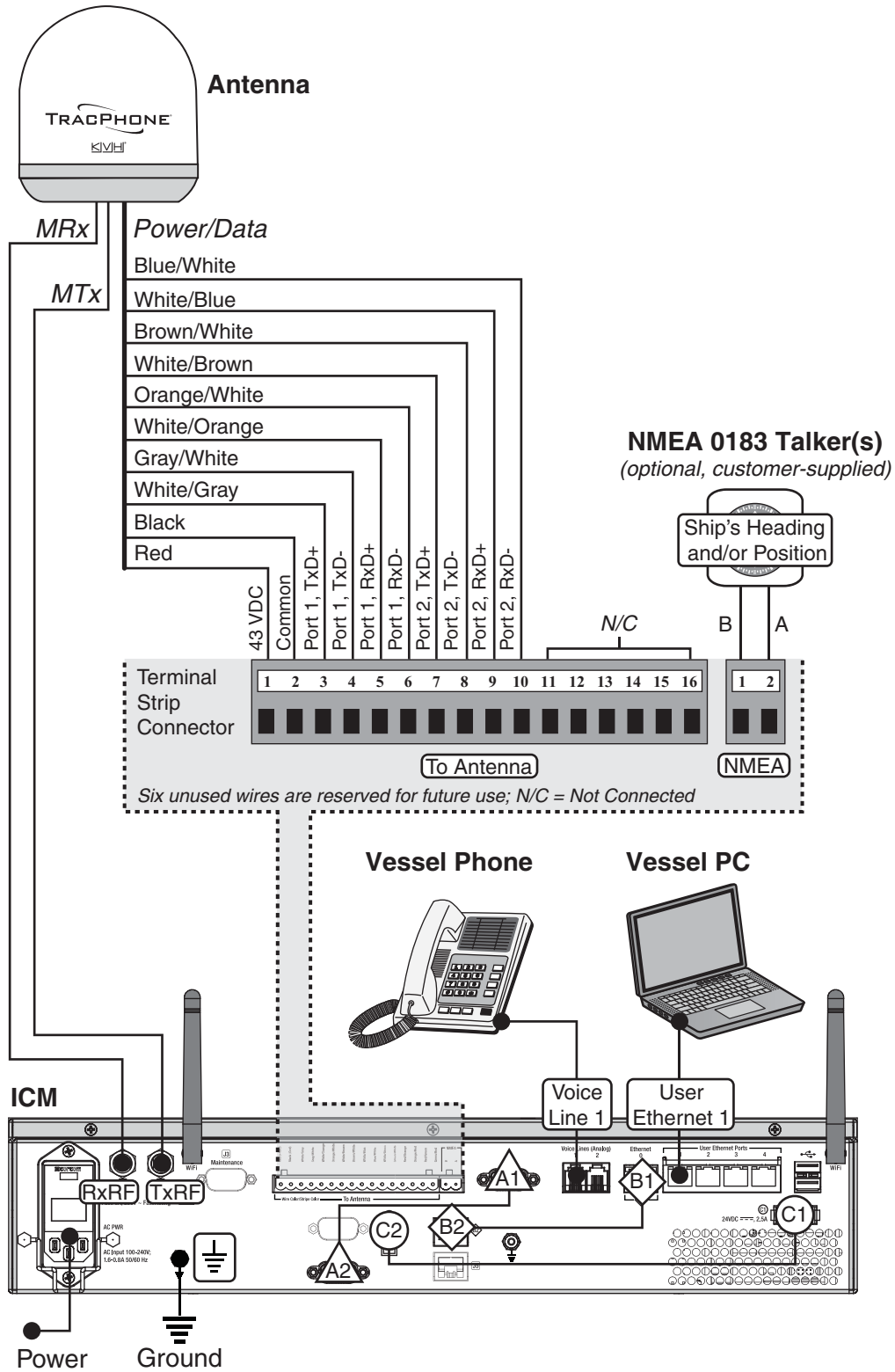
Macintosh OS X

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 82: Macintosh OS X - Network Preferences

Antenna

TracPhone
KVH

MRx

MTx

Power/Data

Blue/White
White/Blue
Brown/White
White/Brown
Orange/White
White/Orange
Gray/White
White/Gray
Black
Red

43 VDC
Common
Port 1, TxD+
Port 1, TxD-
Port 1, RxD+
Port 1, RxD-
Port 2, TxD+
Port 2, TxD-
Port 2, RxD+
Port 2, RxD-

N/C

NMEA 0183 Talker(s)
(optional, customer-supplied)

Ship's Heading and/or Position

B   A

Terminal Strip Connector

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |

| 1 | 2 |

To Antenna

NMEA

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

Vessel Phone

Vessel PC

Voice Line 1

User Ethernet 1

ICM

WIFI
Maintenance

RxRF   TxRF

AC PWR

AC Input 100-240V;
1.6-0.8A 50/60 Hz

Wire Color/Stripe Color — To Antenna

A1

Voice Lines (Analog)
2

Ethernet

User Ethernet Ports
2   3   4

WIFI

C2   B2

A2

24VDC ⎓ 2.5A

C1

B1

Power   Ground

KVH

Regulatory Compliance

European Union Compliance

Hereby, KVH Industries, Inc. declares that the radio equipment type TracPhone V3-IP is in compliance with Directive 2014/53/EU. For the full text of the EU Declaration of Conformity, go to www.kvh.com/euconformity on the KVH website.

Federal Communications Commission Compliance

The TracPhone system complies with Class B of Part 15 of the FCC (Federal Communications Commission) rules for radiated and conducted emissions.

FCC Identifiers: PPD-AR5B97 (ICM WiFi)

Use Conditions:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Note:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. To determine if the equipment is interfering with radio or television reception, remove or apply power to the equipment and observe if the interference goes away, or returns, when the unit is off or on. The user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult KVH for assistance.

IMPORTANT:

- To meet FCC requirements, shielded Ethernet cables are required to connect the ICM to the ship's network.
- This equipment contains no user serviceable parts. Opening this unit will violate the warranty and may result in this equipment no longer complying with FCC requirements for Class B digital devices.

QUALITY CERTIFIED SYSTEM
ISO 9001

KVH®

www.kvh.com

KVHI
NASDAQ
LISTED