TRACVISION®
BY KVH INDUSTRIES

TracVision® M1DX
with Multi-service Interface Box/Controller

TracVision® M1DX Installation Guide

TracVision M1DX Installation Guide

Multi-service Interface Box/Controller Configuration

These instructions explain how to install the TracVision M1DX satellite TV antenna system on a vessel. Complete instructions on how to use the system are provided in the *User's Guide*.

Installation Steps

Who Should Install the System?

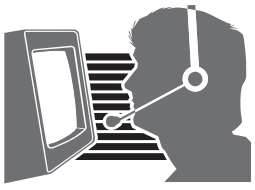
To ensure a safe and effective installation, KVH recommends that a KVH-authorized marine technician install the TracVision M1DX antenna. To find a technician near you, please visit ***www.kvh.com/wheretogetservice***.

Related Documentation

The following additional documents are provided with the TracVision M1DX system:

Document	**Description**
User's Guide	Operation, setup, and troubleshooting information
Product Registration Form	Details on registering the product with KVH
Warranty Statement	Warranty terms and conditions
Contents List	List of every part supplied in the kit

Technical Support



If you need technical assistance, please contact KVH Technical Support:

Phone: +1 401 847-3327
E-mail: techs@kvh.com
(Mon.-Fri., 9 am-6 pm ET; Sat. 9 am-2 pm ET)

1 Inspect Parts and Get Tools

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

IMPORTANT!

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

NOTE: *Henceforward, this manual uses the term "interface box" to refer to the multi-service interface box/controller.*

a. Unpack the box and ensure it contains everything shown on the *Kitpack Contents List*. Save the packaging for future use.

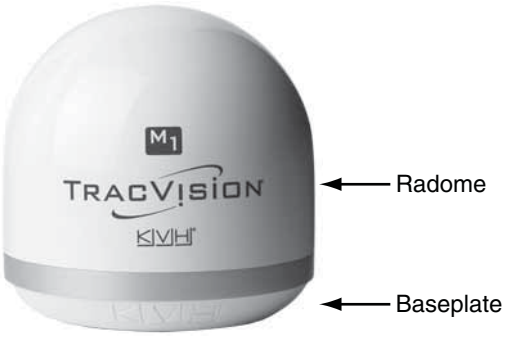
b. Carefully examine all of the supplied parts to ensure nothing was damaged in shipment.

c. Gather all of the tools and materials listed below. You will need these items to complete the installation.

- #2 Phillips screwdriver
- 7/16" open-end wrench
- 3/8" socket or open-end wrench
- Electric drill and 1/4" (6 mm) bit
- Hole saw of desired diameter (for cable access hole, see page 5)
- Silicone sealant or equivalent
- Adhesive tape
- Light hammer
- Center punch
- Eight 1/4" fasteners (see "Mount the Interface Box" on page 11)
- Satellite TV receiver(s) for your desired service *(see Figure 2 for a list of validated receivers; for information on connecting different receiver models, contact KVH Technical Support at 401-847-3327)*

Figure 1: TracVision M1DX System Components

Antenna



Multi-service Interface Box/Controller

Figure 2: KVH-Validated Receivers

Standard-Definition Models	
DIRECTV	DISH Network
D12 D11 D10	311 211k 211
High-Definition (HD) Models	
DIRECTV	DISH Network
HD not supported	211k 211

2 Plan the Installation

Before you begin, consider the following installation guidelines:

- Minimize blockage. The antenna requires a clear view of the sky to receive satellite TV (see Figure 3). 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 4). Also make sure it is flat, level (within ±2°), strong enough to support the antenna's weight (7.5 lbs), and rigid enough to withstand vibration.
- Custom mounting solutions, including struts and masts, are available from several third-party manufacturers. Contact your local KVH dealer or distributor for details.
- KVH recommends that you do not mount the antenna on the same level as the radar, because the radar's energy might overload the antenna.
- Be sure to mount the antenna near enough to the supplied interface box belowdecks to allow you to connect the 50-ft. (15 m) coaxial cable between the antenna and the interface box, while still maintaining sufficient slack in the cable.

IMPORTANT!

Do not shorten or extend the antenna cable. Since the cable carries data, power, and communications, the integrity of this cable and its connections is very important.

- When choosing a location for the interface box and receiver(s), find a dry, well-ventilated area belowdecks away from any heat sources or salt spray. Also be sure the interface box front panel will be easily accessible to the user.

IMPORTANT!

Be sure to follow the guidelines above. Damage caused by an improper installation is not covered under KVH warranty.

Figure 3: Blockage from Obstruction

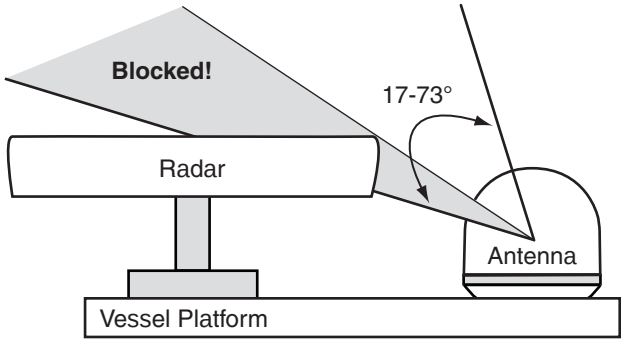
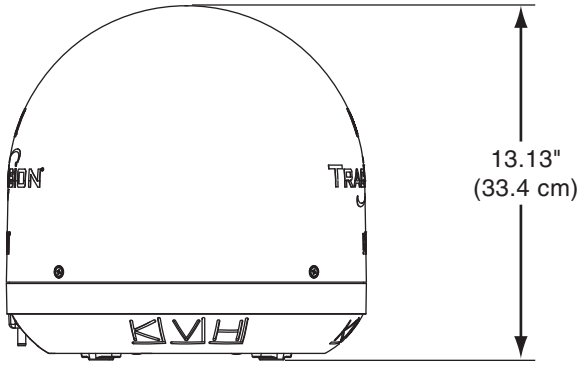
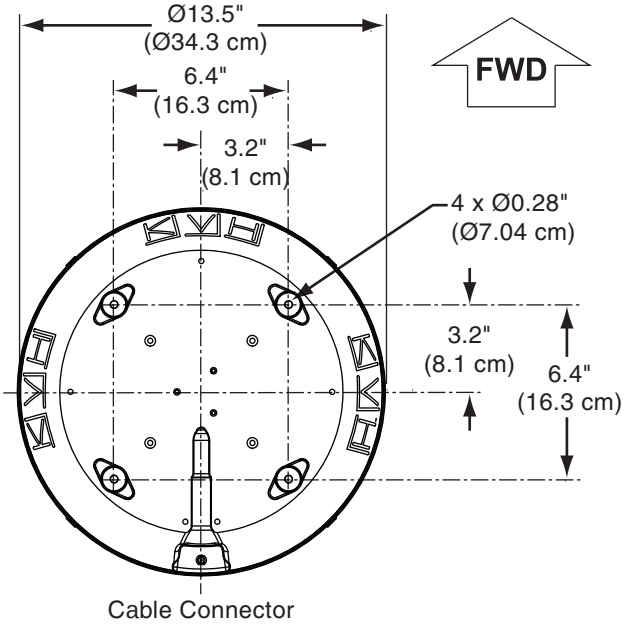


Figure 4: Antenna Dimensions





3 Prepare the Mounting Site

Once you have identified a suitable antenna mounting site, according to the guidelines provided on page 4, follow these steps to prepare the mounting 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 5 and Figure 6). *You don't need to mount the antenna exactly on the centerline (the closer, the better), but the antenna's forward arrow must be parallel to it.*

b. Mark the locations for the four mounting holes on the mounting surface in the locations indicated on the template.

IMPORTANT!

The diameter of the cable access hole must not exceed 3.5" (89 mm) to maintain the integrity of the foam seal.

c. Mark a location for the cable access hole. KVH recommends a location 1.25" (32 mm) aft of the center of the mounting hole pattern, as shown on the template (see Figure 5). Size the hole appropriately to maintain a cable bend radius of at least 3" (75 mm).

d. Mark four seal guides in the locations indicated on the template. Later, these guides will help you position the foam seal correctly.

e. Drill a 1/4" (6 mm) hole at the four mounting hole locations you marked in Step b. Later, you will insert four #10-32 screws through these holes to secure the antenna to the mounting surface.

f. Using a hole saw, drill the cable access hole in the location you marked in Step c. Smooth the edges of the hole to protect the cable. Later, you will route the antenna cable through this hole and into the vessel.

g. Clean and dry the antenna mounting surface.

h. 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, surrounding the guides and centered between the mounting holes (see Figure 7).

Figure 5: Antenna Mounting Holes Layout

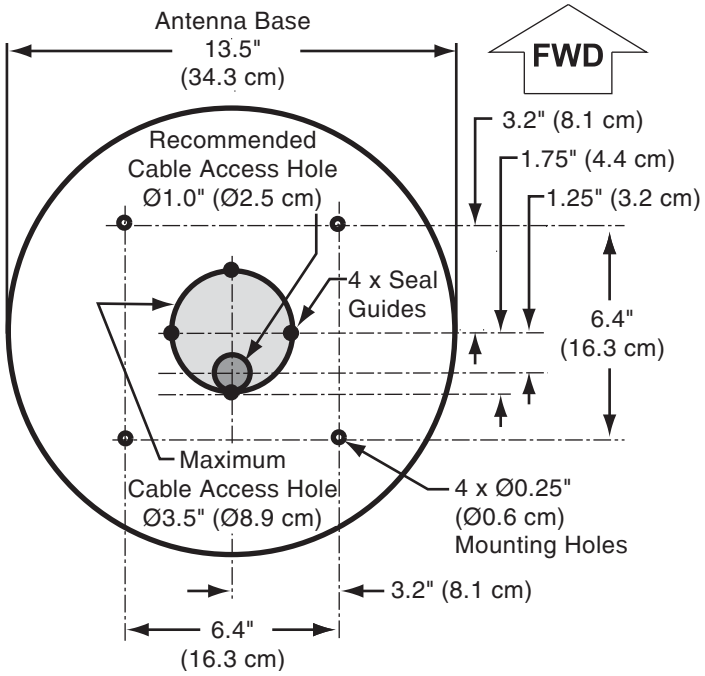
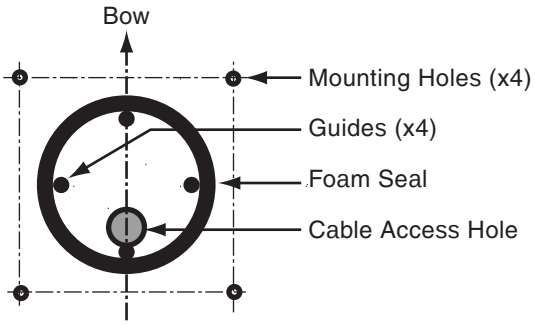


Figure 6: Using the Template to Mark Hole Locations

Figure 7: Foam Seal



4 Wire the Antenna

Follow these steps to connect the antenna cable to the antenna.

a. First attach the four rubber mounting feet (supplied in the kitpack) to the bottom of the antenna at the locations shown in Figure 8.

> ***IMPORTANT!***
>
> Be sure to install the rubber feet. They are required to isolate the antenna from vibration.

b. Route the antenna cable belowdecks through the cable access hole.

If you are routing the cable underneath the antenna (normal installation):
Keep the end of the cable with the right-angle connector and rubber sealing boot at the antenna site. You may remove the straight rubber boot at the opposite end of the cable for easier cable routing, if necessary.

If you are routing the cable straight down from the connector (alternate installation):
Keep the straight connector and rubber sealing boot at the antenna site.

c. Connect the cable to the antenna. Hand-tighten, then tighten with a 7/16" wrench for 1/4 turn to ensure an electrical and weather-proof connection (see Figure 9).

d. Position the rubber boot over the connector to help protect the connector from the elements (see Figure 10).

e. Leave an adequate service loop, approximately 8" (20 cm) of slack, in the antenna cable for easy serviceability.

f. Weatherproof and seal the cable access hole as required.

> ***IMPORTANT!***
>
> Be sure to seal the cable access hole to prevent water from leaking into the vessel.

Figure 8: Attaching the Rubber Feet

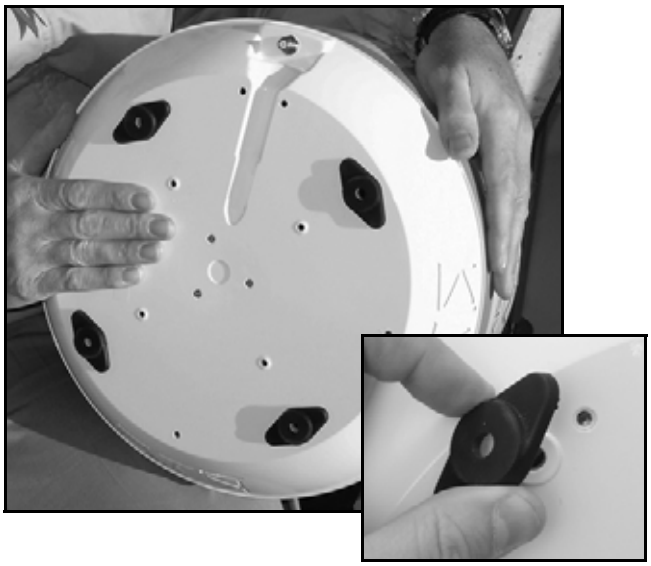
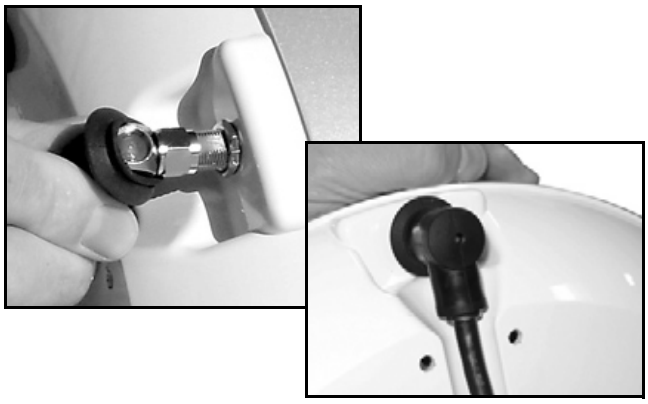


Figure 9: Connecting the Antenna Cable

Figure 10: Protecting the Connector with the Rubber Boot



5 Remove the Shipping Restraint

Follow these steps to remove the shipping restraint, which prevents the internal antenna assembly from moving during shipment.

a. Remove the four #8-32 screws securing the radome to the antenna (see Figure 11).

b. Carefully lift the radome straight up until clear of the antenna assembly and set it aside in a safe place (see Figure 12).

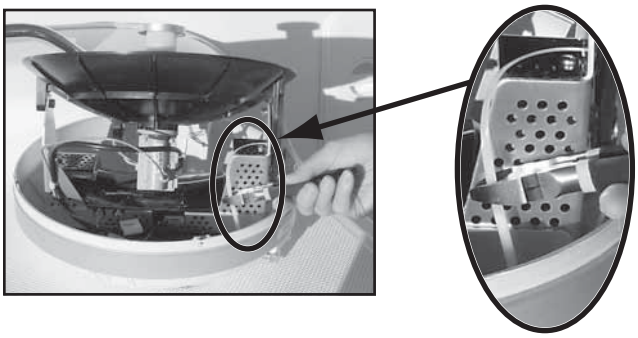
c. Using cutting pliers, cut and remove the tie-wrap securing the antenna assembly to the baseplate (see Figure 13).

d. Position the antenna onto the mounting surface. The antenna's base should rest squarely atop the foam seal.

Figure 11: Removing the Radome Screws

Figure 12: Removing the Radome

Figure 13: Removing the Shipping Restraint



6 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. Ensure the "Forward" arrows inside the baseplate point toward the bow and are parallel to the vessel's centerline (see Figure 14).

IMPORTANT!

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

b. Secure the antenna's baseplate to the mounting surface using four #10-32 Phillips screws, 0.43" flat washers, 0.75" flat washers, and lock nuts, as shown in Figure 15 and Figure 16.

IMPORTANT!

Use only manual hand tools to tighten the mounting screws. The torque from a power tool might distort the antenna baseplate.

c. Using hand tools, tighten the bolts until the foam seal is compressed and the antenna's four rubber feet are bottomed against the mounting surface.

d. Reinstall the radome onto the antenna. The radome's "TracVision" labels should face fore and aft. Secure the radome to the base using the four #8-32 screws you removed earlier.

Figure 14: Aligning the "Forward" Arrows

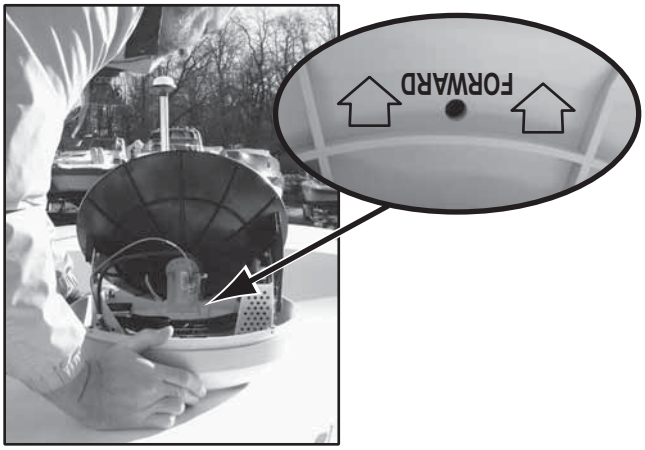
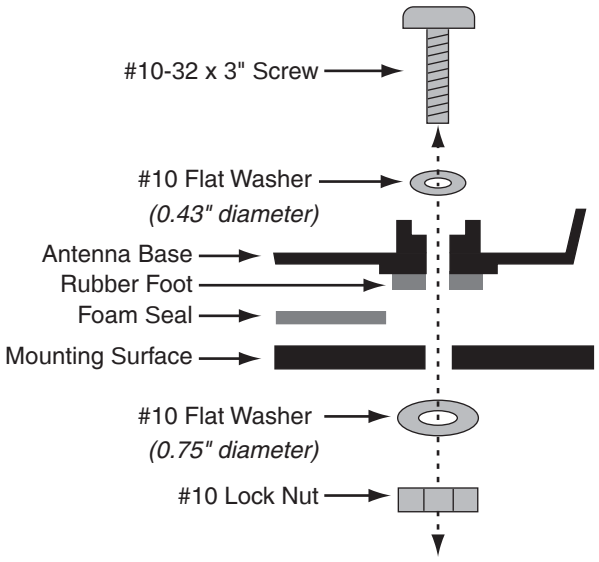


Figure 15: Tightening the Mounting Bolts from Above

Figure 16: Mounting Hardware



7 Wire the Interface Box

Follow these steps to connect the antenna cable and receiver(s) to the interface box.

IMPORTANT!

Do not shorten or extend the antenna cable. Since the cable carries data, power, and communications, the integrity of this cable and its connections is very important.

IMPORTANT!

Be sure to route cables within the vessel appropriately to avoid damage. For example, do not route any cables through wet areas (bilges) or near hot exhaust pipes. Also be sure you do not kink the cable; maintain a bend radius of at least 3" (75 mm).

a. Connect the antenna cable (A) to the "To KVH Antenna" jack on the interface box (see Figure 17).

b. Connect an RF coaxial cable (B) from the "Unstacked Output" jack on the interface box to the "Satellite In" jack on the receiver. This receiver will control satellite selection.

c. Connect the receiver to the customer's television. Follow the instructions in the receiver's manual.

d. If you need to connect an additional receiver, connect the receiver to the "Stacked Output" jack on the interface box through an in-line destacker (see Figure 18 and Figure 19).

The destacker converts the stacked signal from the interface box into an unstacked signal, which receivers are configured to decode.

Figure 17: Wiring the Interface Box

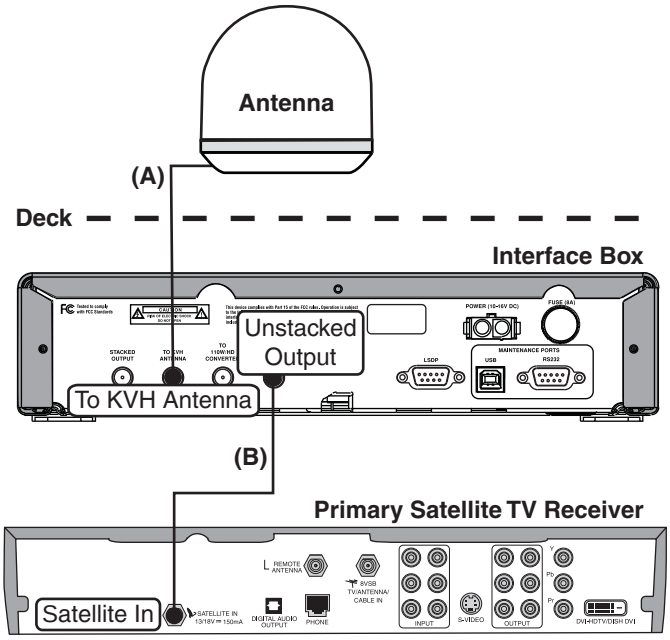
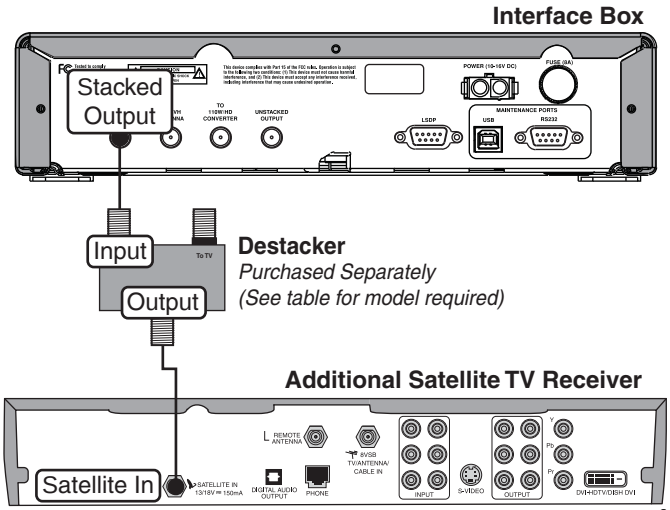


Figure 18: Destacker Models to Connect Additional Receiver(s)

# of Addl. Receivers	Destacker Model
1	Single-output (KVH part #19-0347)
2	Dual-output (KVH part #19-0410)

Figure 19: Connecting an Additional Receiver



8 Connect Power

The interface box requires 10-16 VDC power input supporting 50 watts *(4.2 amps @ 12 VDC).* Follow these steps to connect power to the interface box.

> **CAUTION**
>
> For your own safety, disconnect vessel power and make sure the circuit is dead before you connect any power wires.

a. Before you connect the power wires, turn off vessel power and test the circuit to ensure no power is present.

b. Connect the individual power wires to a dedicated 10-amp or 15-amp circuit breaker. Connect the negative (black) wire to ground (power return), and connect the positive (red) wire to +12 VDC vessel power.

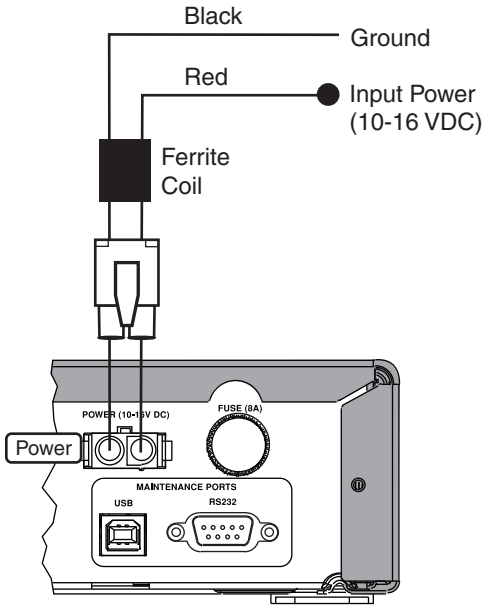
NOTE: *As an alternative, you may use an AC/DC power supply (KVH part #72-0206-01) to supply power to the interface box.*

c. Plug the other end of the wires into the "Power" jack on the rear panel of the interface box (see Figure 20).

NOTE: *Do not remove the small ferrite coil that is clamped onto the power wires. This coil suppresses EMI (electromagnetic interference) from the interface box.*

d. Connect power to the receiver(s). Follow the instructions in the receiver's manual.

Figure 20: Interface Box Power Wiring



9 Mount the Interface Box

Once all cables are connected, follow these steps to install the interface box inside the vessel.

a. Attach the two mounting brackets to the sides of the unit using three #2-56 screws. Simply screw these fasteners into the vent slots (see Figure 21).

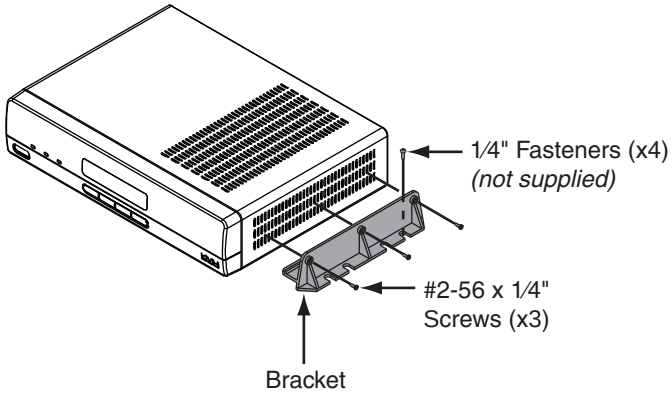
IMPORTANT!

To avoid overheating, do not block the upper vents of the interface box.

b. Secure the brackets to the mounting surface using appropriate 1/4" fasteners (not supplied).

NOTE: *Be sure to leave enough slack in the connecting cables (service loop) for easy serviceability.*

Figure 21: Interface Box Mounting



10 Turn On the System

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

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

b. Apply power to the TV and receiver.

c. Press the power switch on the front of the interface box to apply power to the TracVision system (see Figure 22).

d. Wait while the antenna searches the sky for the satellite. Within a few minutes, all three status lights on the front of the interface box should be lit green (see Figure 22).

NOTE: *If all three status lights are not lit green, refer to the User's Guide for troubleshooting information.*

e. Verify that the "System Needs Setup" screen is displayed on the interface box (see Figure 23).

f. Using the buttons on the interface box front panel (see Figure 24), follow the steps in the next section to set up the TracVision system for the customer's service provider:

Option 1 - DISH Network *(see page 13)*

Option 2 - DIRECTV *(see page 14)*

NOTE: *If you do not see an operating mode on the following pages that tracks your desired set of satellites, you can select up to five satellites in Manual mode instead. Refer to the User's Guide for details.*

Figure 22: Interface Box Power Switch and Status Lights

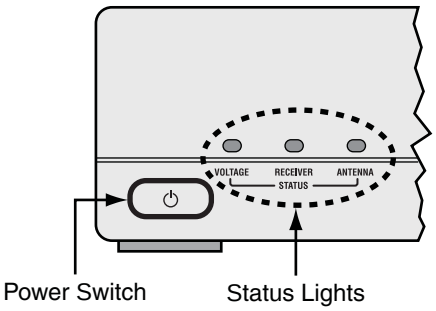


Figure 23: "System Needs Setup" Screen

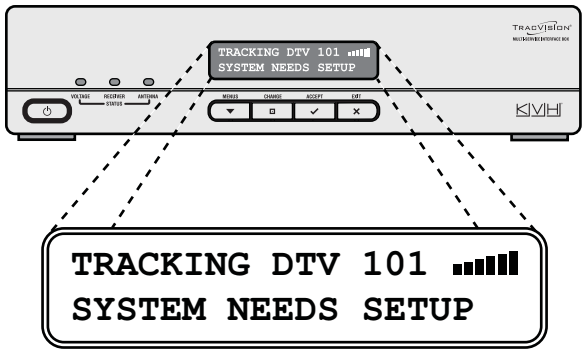
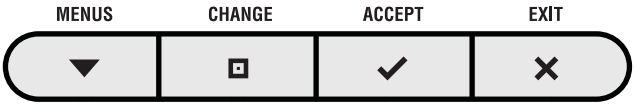


Figure 24: Interface Box Buttons



11 Set Up the System

Option 1 - DISH Network

Follow these steps and refer to the flowchart in Figure 25 to set up the system for DISH Network.

a. Press any button on the interface box front panel.

b. At "Service= DIRECTV?," press CHANGE until the display shows "Service= DISH." Then press ACCEPT.

c. At "Mode= DISH 1000/129," press CHANGE until the display shows the desired mode. Then press ACCEPT.

You may select any one of the following DISH Network modes:

Mode	Satellites Tracked
DISH 1000/129	119, 110, and 129
DISH 1000/61	119, 110, and 61
DISH 500	119 and 110

DISH 1000/129 or DISH 1000/61

Select one of these modes for DISH Network's three-satellite service (DISH 1000). Use the map in Figure 26 to help determine the appropriate DISH 1000 mode for your geographic area. Check with DISH Network for local channels availability.

DISH 500

Select this mode if you wish to receive programming from the 119 and 110 satellites for DISH 500 service.

d. Be sure to follow the instructions in Step 12 (page 15) to enter your position and Step 13 (page 16) to set up your receiver(s).

Figure 25: DISH Network Setup

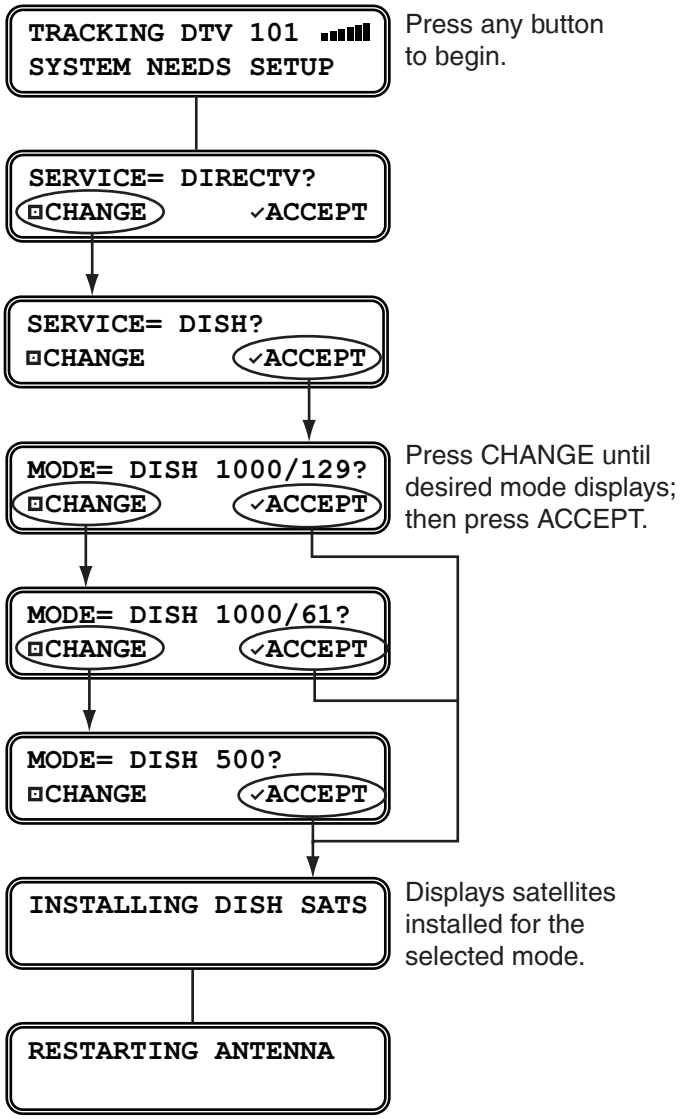
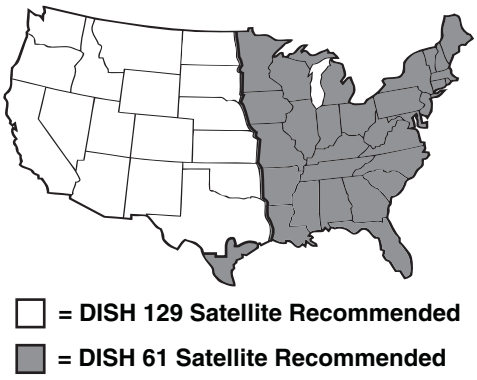


Figure 26: Recommended Areas for DISH 1000 Satellites



11 Set Up the System

Option 2 - DIRECTV

Follow these steps and refer to the flowchart in Figure 27 to set up the system for DIRECTV.

a. Press any button on the interface box front panel.

b. At "Service= DIRECTV?," press ACCEPT.

c. At "Mode= Tri-Sat Auto," press CHANGE until the display shows the desired mode. Then press ACCEPT.

You may select any one of the following DIRECTV modes:

Mode	Satellites Tracked
Tri-Sat Auto	Not used
Tri-Sat Pairs	Not used
Dual-Sat	101 and 119

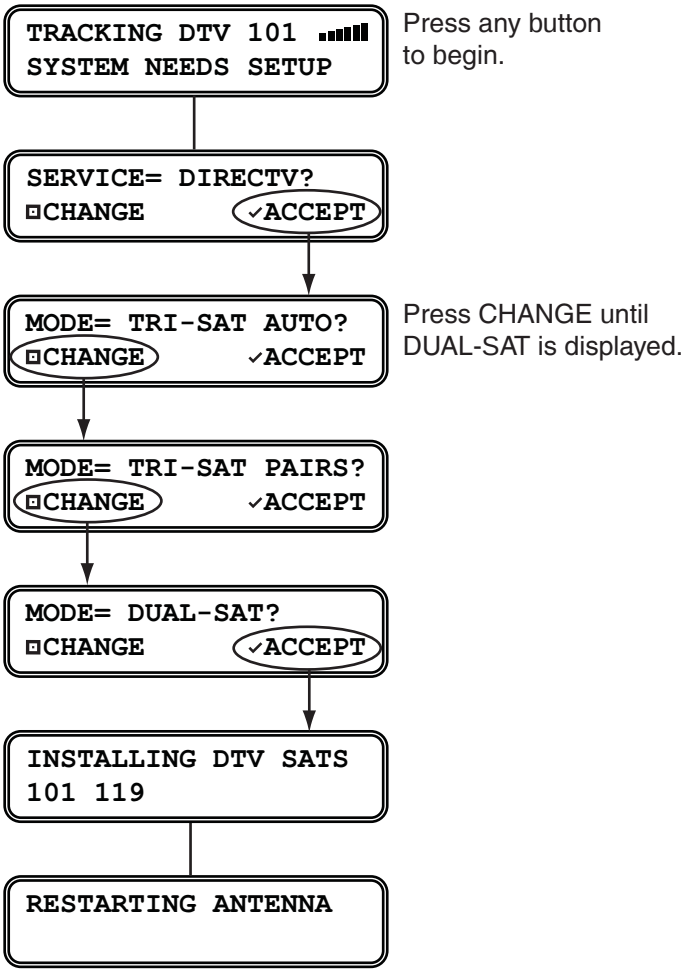
Tri-Sat Auto or Tri-Sat Pairs – Not Used

Do not use either of these modes for a new installation. The Tri-Sat Auto mode supports the Tri-Sat AutoSwitch; the Tri-Sat Pairs mode supports the HDTV Converter. These HDTV devices are no longer available.

Dual-Sat

Select this mode to receive programming from the 101 and 119 satellites for DIRECTV service.

Figure 27: DIRECTV Setup



12 Enter Your Latitude & Longitude

Follow these steps and refer to the flowchart in Figure 28 to enter your vessel's latitude and longitude into the system. The antenna will use your position information to speed up satellite acquisition, which is critical for DISH Network configurations. If the antenna knows where you are, it knows where it should start looking for the satellite.

If you don't know your latitude/longitude, simply use the latitude and longitude for your region shown in Figure 29. For example, if you are located in San Francisco, CA (region #11), you would enter 40° N latitude and 125° W longitude.

a. Press MENUS on the interface box front panel until the display shows "Lat/Long."

b. At "Lat/Long= 41N, 071W," press CHANGE.

c. Press CHANGE again. A cursor appears under the first number in the displayed latitude.

d. Press CHANGE until the number is set to the first digit of your vessel's current latitude. Then press ACCEPT. The cursor moves to the next number.

e. Repeat Step d to set the remaining digits (plus North/South and East/West directions) of your latitude and longitude. Once you have set the entire position, the cursor disappears from the display.

f. Press ACCEPT. The antenna restarts. Wait one minute for system startup.

Figure 28: Latitude/Longitude Setting

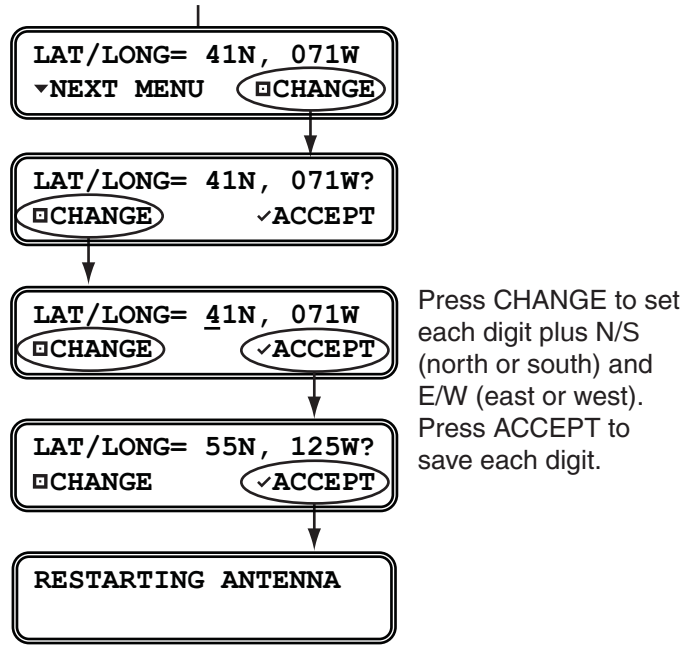
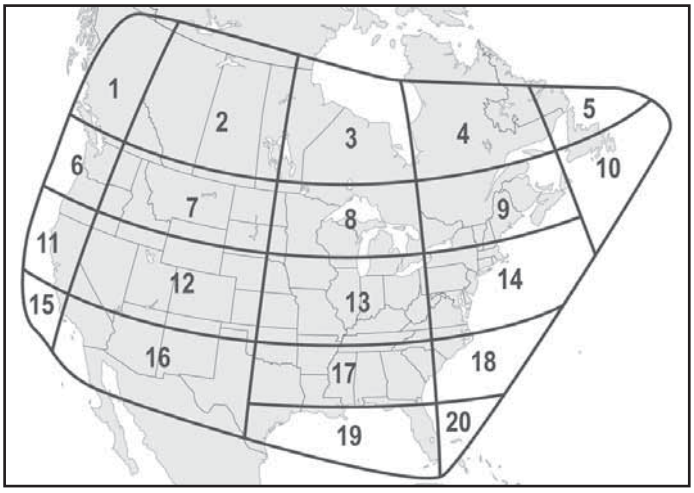


Figure 29: Latitude/Longitude Data for North America



#	LAT	LONG
1	55° N	125° W
2	55° N	110° W
3	55° N	90° W
4	55° N	70° W
5	55° N	55° W
6	45° N	125° W
7	45° N	110° W
8	45° N	90° W
9	45° N	70° W
10	45° N	50° W

#	LAT	LONG
11	40° N	125° W
12	40° N	110° W
13	40° N	90° W
14	40° N	70° W
15	32° N	125° W
16	32° N	110° W
17	32° N	90° W
18	32° N	75° W
19	27° N	83° W
20	27° N	78° W

13 Run Check Switch Tests

DISH Network Only

If you set up the system for DISH Network, follow these steps to run the receiver's Check Switch test as required.

Primary Receiver - 2 Check Switch Tests

Follow these steps to run two Check Switch tests on the primary receiver, which is connected to the "Unstacked Output" jack on the interface box. This receiver will control satellite selection.

IMPORTANT!

If you purchased a **preconfigured** DISH receiver from KVH, you only need to run **one** Check Switch test to set up the system.

a. Make sure the vessel is docked in calm water in a blockage-free area. Ensure the antenna has an unobstructed view of the sky.

b. Apply power to the TV and receiver. (If the antenna is turned off, turn it back on and wait a few minutes for startup.)

c. Using the receiver's remote, go to the "Point Dish / Signal Strength" screen (press MENU, 6, 1, 1 on most models).

d. Choose **Check Switch**, then press SELECT.

e. Choose **Test**, then press SELECT.

f. Wait at least 15 minutes, or until the interface box shows "Please run another Check Switch," before proceeding to allow the antenna to find all of the satellites. Disregard any messages on the TV; they do not correctly indicate when the antenna is ready for the next Check Switch test.

g. Once you have waited the proper amount of time, choose **Test**, then press SELECT to run a second Check Switch test.

h. Refer to the tables in Figure 30 and verify the values displayed on your TV match those required for your selected mode.

If your values match, exit the menu. The receiver will download the program guide.

If your values do not match, follow the steps on the next page to reset the system before retrying this procedure.

Figure 30: Expected Check Switch Results

DISH 1000/129 Results

Port	**1**	**2**	**3**
Satellite	119	110	129
Trans	OK	OK	OK
Status	Reception Verified		
Switch	SW64		

DISH 1000/61 Results

Port	**1**	**2**	**3**
Satellite	119	110	61.5
Trans	OK	OK	OK
Status	Reception Verified		
Switch	SW64		

DISH 500 Results

Input	**1**	**1**	**2**	**2**
Satellite	119	119	110	110
Polarity	Odd	Even	Odd	Even
Status	Reception Verified			
Switch	SW42			

13 Continued Run Check Switch Tests

DISH Network Only

Resetting the System Before Retrying

If the receiver Check Switch results displayed on the TV do not match the expected values shown in Figure 30 on page 16, follow these steps and refer to the flowchart in Figure 31 to reset and reconfigure the system.

a. On the interface box, press MENUS until the display shows "Diagnostics= No."

b. Press CHANGE until the display shows "Diagnostics = Yes." Then press ACCEPT.

c. At "System Reset= No," press CHANGE until the display shows "System Reset = Yes." Then press ACCEPT.

d. At "Reset to Factory?," press ACCEPT.

e. Wait a few minutes for the system to reset to its factory conditions.

f. When the display shows "System Needs Setup," repeat the setup procedure on page 13 for the desired mode.

g. Be sure the vessel is docked in calm water, and make certain the antenna has a clear, unobstructed view of the sky.

h. Repeat the Check Switch steps on page 16.

Additional Receiver(s) - 1 Check Switch Test

If you connected multiple receivers, follow these steps to run a Check Switch test on each additional receiver (one at a time), **unless it is a preconfigured DISH receiver**. *When you are done, reconnect the receivers as before.*

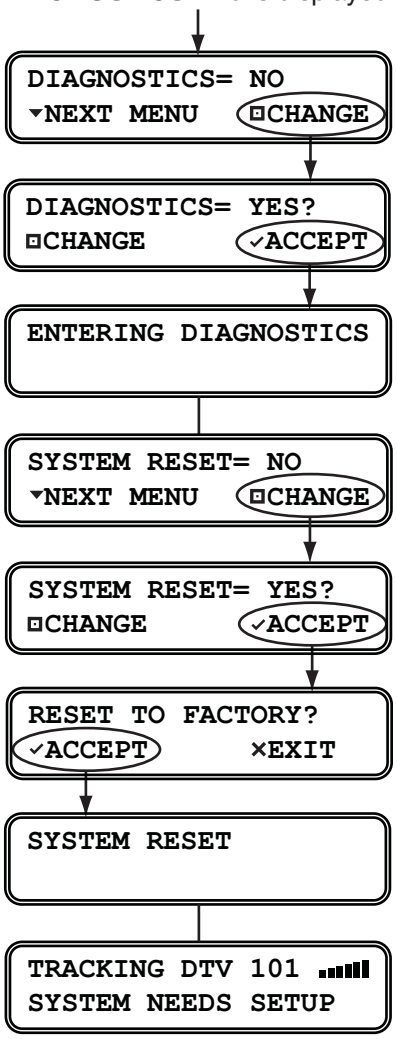
a. Temporarily disconnect the primary receiver from the "Unstacked Output" jack.

b. Connect the additional receiver to the "Unstacked Output" jack.

c. Perform Steps a-e on page 16 to run a single Check Switch test on the receiver.

d. Wait 15 minutes, then verify the values on the TV match the values shown in Figure 30 on page 16. If your values do not match, try running another Check Switch test.

Figure 31: Factory Reset



14 Educate the Customer

The installation process is complete! Before you leave the vessel, test the system to verify the antenna works properly. Then give the Customer Welcome Kit and all manuals to the customer and explain how to use the system. Also be sure the customer understands the following:

- Keep the radome installed on the antenna at all times. The radome protects the antenna's moving parts from wind, rain, and debris.

CAUTION

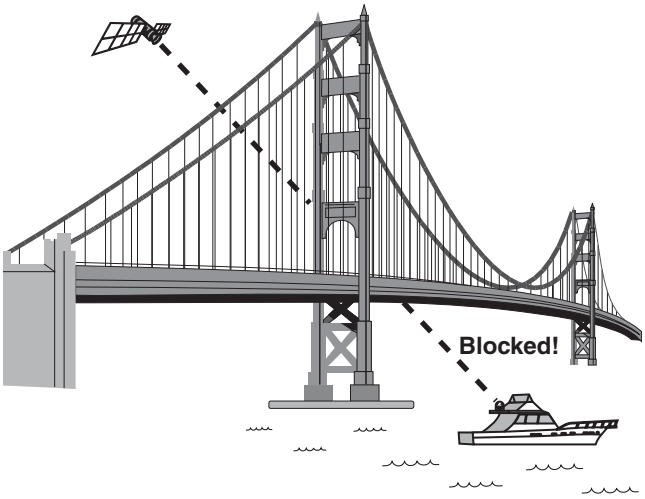
In the unlikely event that you need to remove the radome, remove power from the antenna first because the antenna's moving parts can cause injury.

- The receiver must be activated before it can decode satellite TV signals. Refer to Figure 32 for activation details.
- The antenna must have a clear view of the sky to receive satellite TV. Common causes of blockage include trees, buildings, bridges, and onboard equipment (see Figure 33). Heavy rain or snow might also temporarily interrupt reception.
- Clean the antenna regularly. Dirt buildup on the radome can affect satellite TV reception.
- **(DISH 1000 only)** You may need to change the operating mode when traveling between regions (see page 13 for details).
- Please register the system with KVH. The registration process is quick, easy, online, and ensures the best possible service from KVH. Visit ***www.kvh.com/register*** or refer to the Product Registration Form for details.
- The vessel must be located within the selected satellite's coverage area. To view satellite coverage maps, visit: ***www.kvh.com/footprint***.
- Refer to the *User's Guide* for complete operation and troubleshooting information.

Figure 32: Receiver Activation

Service:	**Call to Activate:**
DISH	1-866-399-8509 *(Mon.-Fri., 8:30 am - 5 pm ET)*
DIRECTV	1-866-551-8004 *(24 hours, 7 days a week)*

Figure 33: Blockage Example



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