ABOUT THIS DOCUMENT

This guide covers key aspects of the SurfBeam 2 Pro Portable’s hardware/software descriptions, installation, configuration, and troubleshooting. This guide is segmented into the following main sections:

Section 1 Introduction
Section 2 Setup and Teardown
Section 3 Satellite Alignment
Section 4 Operations
Section 5 Maintenance
Section 6 Troubleshooting
Section 7 Helpdesk Support
Section 8 Reshipment
Appendix A SurfBeam 2 Pro Portable Specifications
Appendix B SurfBeam 2 Pro Portable Quick Start Guide
Appendix C SurfBeam 2 Pro Portable Field Service Bulletin(s)

DOCUMENT CONVENTIONS

Terminology conventions used in this manual include:

Window Screens that can be minimized and recalled from the program control bar at the bottom of the monitor display
Tab screens Displays presented from clicking tabs on a main screen
Screens All other displays presented from clicking on continuation buttons
Pop-ups Displays presented automatically based on some action the user has taken, such as confirmation questions, information confirmations, or error messages
Tool-tips Descriptive messages displayed by placing the cursor on an editable field

SAFETY AND OPERATION PRECAUTIONS

The following icons identify important information, factors, and problems a user need to know to correctly install and configure the system.

TIP: The “Tip” icon identifies suggestions important for performing configuration procedures.

ATTENTION: The “Attention” icon identifies general knowledge information important for performing configuration procedures.

NOTE: The “Note” icon identifies information important for performing configuration procedures.

CAUTION: The “Caution” icon identifies procedures or factors that can affect the installation and configuration of the system (may damage or render equipment inoperable).

WARNING: The “Warning” icon identifies where and/or what potential problems might occur while performing configuration procedures.
# Acronyms

<table>
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<tr>
<td>WAN</td>
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1 INTRODUCTION

The ViaSat SurfBeam 2 (SB2) Pro Portable Terminal (Figure 1-1) provides portable and quickly deployable, high-speed internet and network connections in remote regions. The unit supports live video, file transfer, internet browsing and more. It functions across multiple operating systems and hardware platforms to support various applications (e.g., Skype, Google, Yahoo, etc.).

The SB2 Pro Portable Terminal is a true “Go Anywhere” device designed to meet the exacting needs of first responders, newsgathering, and other professional applications. With its compact size, easy setup, ruggedized hardware (built to MIL-STD-810 specifications), and support of both AC and DC power, the unit can be deployed in any location.

The Pro Portable Terminal’s design allows it to be setup, configured, and function in harsh environments (high winds, rain, snow, and dust). Items such as a weatherproof modem (with a built in four port Ethernet router) and GPS allow for easy satellite acquisition and quick service connection.

Figure 1-1: SurfBeam 2 Pro Portable
2 TERMINAL SETUP AND TEARDOWN

The SurfBeam 2 Pro Portable Terminal can be deployed in just about any desired location. To ensure optimal performance, all the installer must do is identify a stable deployment location with an unobstructed view of the sky and properly assemble the unit.

2.1 Site Survey

Conducting a site survey will ensure that the user maximize their opportunity for a successful connection to the Satellite Network. When determining a location, keep the following in mind:

- **Clear View of the Sky** – The unit needs a clear view of the sky. (Using a dish pointing application for your smartphone may assist in deploying the terminal; however, such a program is not required.)

- **Distance from Objects** (i.e., buildings, bushes, trees, hills/mountains, etc.) – The placement of the unit should have a minimum 2-to-1 distance-to-height ratio between it and nearby objects. For example, an object 20ft tall requires a distance of 40ft or greater, 30ft tall requires 60ft, etc.

- **Ground Cover** – The unit needs to be deployed on stable, flat ground; however, using the Tripods legs and level, a user can adapt the unit to slopes of varying degrees.

- **Securing the Unit** – The unit require the use of ballast (i.e., a 10 lbs. sandbag per Tripod leg) to secure it to the ground in case of high winds. In the event the 10 lbs. ballast is insufficient to maintain stability, discontinue use and secure the system by either disassembling and repacking the system or moving the assemble unit into a sheltered area.

- **Operating Precautions** – The unit needs a maintained 10ft safety perimeter to mitigate potential RF exposure on uncontrolled general populations.

2.2 Fastening System

The Pro Portable uses two types of devices to fasten adjustment points. It is critical that the user tighten these fasteners using the following methods.

- **Lever Fastener**
  - These levers are to be hand tightened, using the handle as a lever to tighten.
  - **NOTE:** Lifting up on the lever allows for repositioning the angle of the lever’s handle (left or right).

- **Knob Fastener / Fine Tuning Knob**
  - These knobs are to be hand tightened, using a twisting motion.

- **Lever Fastener (older models)**
  - These levers are to be hand tightened, using the handle as a lever to tighten.
  - **NOTE:** Even though these levers appear to be cam-locking levers, they are **NOT** to be used this way.
2.3 Receiving, Unpacking, and Assembly

2.3.1 Receiving

2.3.1.1 Unpacking and Inspection

**CAUTION:** Proper Electrostatic Discharge (ESD) precautions shall be maintained when handling equipment.

To unpack and inspect the equipment, perform the following procedures:

- Inspect the shipping container for damage before unpacking the equipment. Document any obvious dents, punctures, or other irregularities on the shipping form.
- Open the container and remove the packing material on top of the equipment.
- While performing the Assembly process, inspect the equipment for external damage including dents and scratches.
- Save the packing material and containers for reshipment and/or servicing.

**NOTE:** If the container is damaged, open the container in the presence of the shipping carrier agent if possible. If damage is found after the equipment is unpacked, retain the container and packing materials for inspection. This is important if a damage claim must be filed.

**CAUTION:** Do not attempt to operate the equipment if major damage is found. In the event questionable damage (major or otherwise) is identified, contact ViaSat, Inc. for support.

2.3.1.2 Handling and Precautions

**CAUTION:** Proper ESD precautions shall be maintained when handling equipment.

**CAUTION:** Care must be taken when handling the antenna to prevent damage to the unprotected Transmit Receive Integrated Assembly (TRIA), modem, semi-rigid cables, and wire bundle.

**CAUTION:** Keep all connector covers on the units until ready to install. This will keep units clean from foreign debris.

**CAUTION:** Care must be taken to prevent the cables from being crushed or bent when installing the Antenna onto its mounting position.

**CAUTION:** Care must be taken when handling the antenna to prevent damage to the parabolic reflector, feed, flexible cables, or any other antenna components.

**CAUTION:** The reflector should only be moved in azimuth and elevation by hand, using a slow deliberate motion. The reflector should never be moved quickly or jerked.

**CAUTION:** Before applying power, clear the area around the antenna.

**CAUTION:** Before connecting the interface cables to either the modem or the antenna, make sure the modem power is off. DC power is present on the Receive and Transmit Inter-Facility Link cables when power is on.

**CAUTION:** Always lift Antenna by its base to avoid bending brackets and causing misalignment of precision assemblies.
2.3.1.3 Antenna and Modem Handling Restrictions

**Antenna Restrictions**

Proper handling of the antenna is extremely important to prevent damage to it and its mechanical/electrical components. The antenna shall only be carried by the Tripod by two or more individuals without the modem (using the Azimuth/Elevation Assembly for stabilization) per the instructions provided in this manual. **NEVER** move or carry the antenna by any part of the rotating antenna reflector, TRIA, or modem. Observe restrictions shown in Figure 2-1 for proper handling and moving of the antenna.

![Antenna Handling Restrictions](image1)

**Figure 2-1: Antenna Transporting Restrictions**

**Modem Assembly Restrictions**

Proper handling of the modem assembly is extremely important to prevent damage to it and its electrical components. The assembly shall only be carried or moved by using two hands (one hand on each side) and never by any connected cable. Observe the handling restrictions shown in Figure 2-2 for proper handling and transportation.

![Modem Assembly Handling Restrictions](image2)

**Figure 2-2: Modem Assembly Transporting Restrictions**
2.3.2 Unpacking

The Pro Portable components come in a rugged, protective transit case with three layers and an attached accessory bag (Figure 2-3). Each layer and the bag provide a group of components (Table 2-1) that need to be assemble before moving on in the assembly process.

![Figure 2-3: Component Assembly Layers](image)

### Table 2-1: Component Assembly List

<table>
<thead>
<tr>
<th>Layer</th>
<th>Component</th>
<th>Description</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layer 1</td>
<td>Tripod</td>
<td>The Tripod has three adjustable legs (with pivot feet) that connected to center pole to which the Azimuth/Elevation Assembly head connects.</td>
<td>![image]</td>
</tr>
<tr>
<td></td>
<td>Azimuth (Az) / Elevation (El) Assembly</td>
<td>The head has four adjustment levers to point and lock the assembly head once the fully assemble unit has been pointed. This component mounts atop the tripods center pole and provides a platform base for the installation of the TRIA and center reflector</td>
<td>![image]</td>
</tr>
<tr>
<td></td>
<td>Center Reflector</td>
<td>The center reflector provides the middle piece of the antenna dish and mounts to the Azimuth/Elevation Assembly.</td>
<td>![image]</td>
</tr>
<tr>
<td>Layer 2</td>
<td>Edge Reflector (x2)</td>
<td>The edge reflector provides the edge piece of the antenna dish and mounts to either side of the center reflector. These two parts are interchangeable.</td>
<td>![image]</td>
</tr>
<tr>
<td>Layer</td>
<td>Component</td>
<td>Description</td>
<td>Image</td>
</tr>
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<td>------------</td>
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<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Layer 3</td>
<td>Modem Assembly</td>
<td>The modem assembly is a rectangular shaped box with a protective lid, an LCD screen, navigation buttons, 4 Ethernet ports, 4 round connector ports, and an ON/OFF switch. The component connects the host computer with the network, via the TRIA and antenna dish.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TRIA</td>
<td>The TRIA is the receiver/transmitter that converts signals between L-Band and Ka-Band.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Power Supply Brick</td>
<td>The power supply brick provides consistent power output at 24V, 9.2A, 221W max.</td>
<td></td>
</tr>
<tr>
<td>Accessory Bag</td>
<td>GPS</td>
<td>The GPS is a magnetic “computer-mouse” shaped device attached to a RG-174 15’ cable.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coax Cable</td>
<td>The Coax cable is a 3’ RG-6 F-Type (m) to F-Type (m), 75 Ohms, copper core cable that connects the modem and TRIA.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ethernet Cable</td>
<td>The Ethernet cable is a 5’ RJ-45 CAT-5 cable.</td>
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</tr>
<tr>
<td></td>
<td>TRIA Splash Plate</td>
<td>The Splash Plate is a replacement unit should the one installed on the TRIA be damaged or lost.</td>
<td></td>
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<tr>
<td></td>
<td>Power Cable</td>
<td>The Power cable for the Power Supply Brick is common three-wire cable.</td>
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<tr>
<td></td>
<td>90° Coax Connector</td>
<td>The 90° coax connector is designed to modify a straight RG6 F-type cable connection.</td>
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</table>
### 2.3.3 Assembling

After performing the site survey (review section 2.1 before starting the process below), the user can now unpack, assemble, and deploy the unit. Table 2-2 provides the instructions on this process.

**Table 2-2: Unpack and Assembly Process**

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Perform a site survey to locate your unit’s deployment location.</td>
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<tr>
<td>2.</td>
<td>Open the transit case on a flat surface to see the top layer of the case’s components.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Tripod</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Azimuth/Elevation Assembly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Center Reflector</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Remove the Tripod from the pocket on the right side of the case and loosen all knobs to arrange each leg in its out-most position.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Tighten each knob (x3) to lock the Tripod’s legs and position the Tripod with one leg pointing north.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Remove the Azimuth/Elevation Assembly from the pocket on the left side of the case.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Looking at the base of the Assembly, loosen the Azimuth lever and knob.</td>
<td></td>
</tr>
<tr>
<td>Step</td>
<td>Action</td>
<td>Image</td>
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<tr>
<td>------</td>
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</tr>
</tbody>
</table>
| 7.   | Verify that the Assembly base-plate and tower edges are approximately parallel.  
      • If they are not, rotate the Azimuth Fine Adjusting knob until the two edges become parallel. | ![Uneven assembly base-plate and tower edges](image1)  
      ![Parallel assembly base-plate and tower edges](image2)  
      ![Azimuth Fine Adjustment Knob](image3) |
| 8.   | Turn the Azimuth lever until tightened (leaving the Azimuth knob loose). | ![Azimuth Fine Adjustment Knob](image3) |
| 9.   | Looking at the back of the Assembly, loosen the Elevation lever (left highlight) and knob (right highlight). | ![Elevation lever and knob](image4) |
| 10.  | Verify that the Assembly top-plate has an Elevation angle of 0°.  
      • If it does not, rotate the top-plate to its bottom position and rotate the Elevation Fine Adjusting knob until the line on the top-plate lines up with the 0° marker on the tower. | ![Elevation angle](image5) |
<table>
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<tr>
<th>Step</th>
<th>Action</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.</td>
<td>Turn the Elevation lever until tightened (leaving the Elevation knob loose).</td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td>12.</td>
<td>Loosen Assembly Post knob.</td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>13.</td>
<td>Slide the Assembly onto the Tripod’s post and rotate it to ensure proper seating (revealing a 1/4-inch gap between the Assembly’s collar bottom and the top of the Tripod’s legs).</td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td>14.</td>
<td>Tighten the Assembly Post knob.</td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
<tr>
<td>15.</td>
<td>Loosening/tightening the knobs on the Tripod’s legs and using the leveling bubble on the Assembly base-plate, make the appropriate adjustments to get the leveling bubble to show inside the black circle. <strong>NOTE:</strong> It is not necessary to get the bubble to lineup exactly within the back circle. Approximately 90% or more of the bubble within the circle should be enough.</td>
<td><img src="image5.png" alt="Image" /></td>
</tr>
<tr>
<td>16.</td>
<td>Remove the Assembly, go to the transit case, and fold open the two pockets that held the Assembly and Tripod to gain access to the Center Reflector.</td>
<td><img src="image6.png" alt="Image" /></td>
</tr>
</tbody>
</table>
17. Mount the Assembly to the back of the Reflector using the four attached screws (hand-tighten these screws only), where the top of the Assembly points to the ViaSat logo.

18. Remove the Reflector and Assembly from the case, and slide the Assembly onto the Tripod’s post and rotate it to ensure proper seating (revealing a 1/4-inch gap between the Assembly’s collar bottom and the top of the Tripod’s legs).

19. At the transit case, fold back the layer two felt divider and remove one of the Edge Reflectors.

20. Attach the Edge reflectors to each side of the Center Reflector (one at a time) using the attached screws (hand-tighten these screws only).

   NOTE: For each Edge reflector, start by tightening the middle screw first and then tighten the two outer screws.

21. At the transit case, fold back the layer two and three dividers and CAREFULLY remove the TRIA (lifting the TRIA by the housing and NOT the Feedhorn).

22. Visually inspect the TRIA to ensure no damage has occurred and that the Splash Plate is properly seated on the Feedhorn.
<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>23.</td>
<td>With the TRIA placed on a stable surface, remove the 90° Coax Connector from the Accessory Bag and connect it to the TX/RX port on the TRIA.</td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> Ensure that the 90° connector is firmly attached (hand tightened only).</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> This connector can be installed later as shown in Step 31.</td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>Holding the sides of the TRIA housing and from behind the Center Reflector, <strong>CAREFULLY</strong> insert the Feedhorn through the reflector hole until the base of the Feedhorn and TRIA alignment slots contact the reflector hole and Assembly top-plate alignment posts.</td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>25.</td>
<td>Place one hand on the back of the TRIA housing and another on the Assembly tower. <strong>Gently</strong> push and wiggle the TRIA housing until it snaps into place.</td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td>26.</td>
<td>Hand tighten the large Collar Ring located between the TRIA housing and reflector to connect the two components. Visually inspect that the TRIA’s Feedhorn base is flush to the inside of the Center Reflector.</td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
<tr>
<td>27.</td>
<td>Visually inspect the TRIA to ensure no damage has occurred and that the Splash Plate is properly seated on the Feedhorn.</td>
<td><img src="image5.png" alt="Image" /> Correct Incorrect</td>
</tr>
<tr>
<td>28.</td>
<td>At the transit case, fold back the layer two and three dividers and <strong>CAREFULLY</strong> remove the modem assembly.</td>
<td><img src="image6.png" alt="Image" /></td>
</tr>
<tr>
<td>Step</td>
<td>Action</td>
<td>Image</td>
</tr>
<tr>
<td>------</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>29.</td>
<td>Attach the modem assembly to the Tripod leg pointing north and insert the quick-release pin (pressing the pin’s blue button) through the assembly mounting plate (locate at the back) and the hole that goes completely through the top and bottom of the leg.</td>
<td>![Image of modem assembly attached to Tripod leg]</td>
</tr>
<tr>
<td>30.</td>
<td>Verify that the modem’s power switch is turned OFF.</td>
<td>![Image of modem with power switch turned off]</td>
</tr>
</tbody>
</table>
| 31.  | At the transit case, locate the pouch attached to the inside of the case’s lid and remove the GPS (with cable), 3ft RG6 Coax cable, and power cable.  

**NOTE:** Ensure that the 90° connector is firmly attached to the 3ft RG-6 Coax cable if not already installed on the TRIA (hand tightened only) as shown in Step 21. | ![Images of GPS, Coax cable, and power cable] |
<p>| 32.  | Connect the end of the GPS cable to the “GPS” port on the back of the modem and place the other end (with the GPS) at least 5ft way. | ![Image of GPS cable connected to modem] |
| 33.  | Connect one end of the 3ft RG6 Coax cable to the “Antenna” port on the back of the modem assembly and connect the other end with the 90° connector fitting to the “TX” port on the TRIA. | ![Image of Coax cable connected to TRIA] |</p>
<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>34.</td>
<td>At the transit case, fold back the layer two and three dividers and remove the power supply brick.</td>
<td></td>
</tr>
<tr>
<td>35.</td>
<td>Connect the power cable to the power supply brick and twist the connector onto the “Power Input” port on the back of the modem assembly.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Twist the cap until it stops clicking and the blue ring on the cap covers the red ring on the modem port.</td>
<td></td>
</tr>
<tr>
<td>36.</td>
<td>Plug the end of the power cable into a <strong>grounded</strong> AC power outlet. <strong>DO NOT</strong> connect to <strong>ungrounded</strong> power sources, as this will severely damage the unit.</td>
<td></td>
</tr>
<tr>
<td>37.</td>
<td>Place any remaining storage bags and/or parts back into the transit case and close/latch the lid.</td>
<td></td>
</tr>
<tr>
<td>38.</td>
<td>Flip the power switch located on the back of the modem assembly from the OFF position (down) to the ON position (up).</td>
<td></td>
</tr>
<tr>
<td>39.</td>
<td>Open the lid of the modem assembly and use the tightening screws on either side to lock it in the desired position.</td>
<td></td>
</tr>
</tbody>
</table>


## 2.4 Disassemble and Repack

The SurfBeam 2 Pro Portable Terminal will need to be stowed after each use. Table 2-3 provides the instructions on this process.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Power down the modem assembly using the on/off switch.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Unplug the all the cables from the modem assembly, TRIA, and power brick, and place them back into the pouch located on the underside of the case lid.</td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td>3.</td>
<td>Hold down the Modem push-pin, remove it from Tripod leg, and place the modem and power brick in its place on the bottom layer of the case.</td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>4.</td>
<td>Re-attach plug dust covers on the modem assembly. Place the assembly and power brick in its place on the bottom layer tray of the case.</td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td>5.</td>
<td>Fold the tray’s cover down to cover the equipment and using the two straps located on the tray’s handle side: (1) loop the strap through the metal ring, (2) pull the strap tight, and (3) lay it back over itself so that the Velcro attaches. <strong>NOTE:</strong> Pervious versions of the Pro Portable case did not have restraining straps. If there are no straps, disregard this step.</td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
<tr>
<td>Step</td>
<td>Action</td>
<td>Image</td>
</tr>
<tr>
<td>------</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>6.</td>
<td>Loosen the Elevation lever and knob to lower the TRIA and Reflector to a level position, and then re-tighten them for stability.</td>
<td><img src="image1.jpg" alt="Image" /></td>
</tr>
</tbody>
</table>
| 7.   | Unscrew collar, remove the TRIA from the Reflector, and place it carefully in its designated location on the bottom layer of the case.  

**NOTE:** If the splash plate falls off the TRIA, put it back on. | ![Image](image2.jpg) |
| 8.   | With the TRIA placed on a stable surface, remove the 90° Coax Connector from the Accessory Bag and connect it to the TX/RX port on the TRIA.  

**NOTE:** Ensure that the 90° connector is firmly attached (hand tightened only). | ![Image](image3.jpg) |
| 9.   | Unscrew and detach the Edge Reflectors (pulling/wiggling) and place them back into the case.  

**NOTE:** Ensure the protective felt divider covers the top of the edge reflectors after being placed in the case. | ![Image](image4.jpg) |
<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.</td>
<td>Remove the combination Center Reflector-AZ/EL unit from the Tripod and place it in the center of the case. &lt;br&gt;&lt;br&gt;<strong>NOTE:</strong> Keep the side pockets open outward before placing the Center Reflector in the case.</td>
<td><img src="image1.jpg" alt="Image" /></td>
</tr>
<tr>
<td>11.</td>
<td>Remove the AZ/EL assembly from the Center Reflector by loosening the four connecting screws.</td>
<td><img src="image2.jpg" alt="Image" /></td>
</tr>
<tr>
<td>12.</td>
<td>Using the four straps (two from the hinge side and two from the opposing side): (1) loop the strap through the metal ring, (2) pull the strap tight, and (3) lay it back over itself so that the Velcro attaches. &lt;br&gt;&lt;br&gt;<strong>NOTE:</strong> Previous versions of the Pro Portable case did not have restraining straps. If there are no straps, disregard this step.</td>
<td><img src="image3.jpg" alt="Image" /></td>
</tr>
<tr>
<td>13.</td>
<td>Then loosen the Elevation knob (beside the AZ/EL Assembly’s “Fine Adjust Preset” label) and move the elevation back to “0”, and re-tighten.</td>
<td><img src="image4.jpg" alt="Image" /></td>
</tr>
<tr>
<td>14.</td>
<td>Looking at the base of the Assembly, loosen the Azimuth lever and knob.</td>
<td><img src="image5.jpg" alt="Image" /></td>
</tr>
<tr>
<td>15.</td>
<td>Verify that the Assembly base-plate and tower edges are approximately parallel. &lt;br&gt;&lt;br&gt;• If they are not, rotate the Azimuth Fine Adjusting knob until the two edges become parallel.</td>
<td><img src="image6.jpg" alt="Image" /></td>
</tr>
<tr>
<td>Step</td>
<td>Action</td>
<td>Image</td>
</tr>
<tr>
<td>------</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>16.</td>
<td>Turn the Azimuth lever until tightened (leaving the Azimuth knob loose).</td>
<td><img src="image1.jpg" alt="Image" /></td>
</tr>
</tbody>
</table>
| 17.  | Place the AZ/EL Assembly in the left pocket and lock down with the inner most strap and then the outer most strap.  
**NOTE:** Previous versions of the Pro Portable case only had one restraining strap. If there is only one, disregard the second portion of this step and only attach the one strap. | ![Image](image2.jpg) |
| 18.  | Loosen Tripod knobs, fold feet inward (insure that its feet have the points pointing towards the inside), and tighten the levers. | ![Image](image3.jpg) |
| 19.  | Place the Tripod in the right pocket and lock down with the inner most strap and then the outer most strap.  
**NOTE:** Previous versions of the Pro Portable case only had one restraining strap. If there is only one, disregard the second portion of this step and only attach the one strap. | ![Image](image4.jpg) |
| 20.  | Confirm that all cables are in the case pouch and zip it closed, close the case top, and ensure the lid lock-down latches are secure. | ![Image](image5.jpg) |
3 TERMINAL SATellite Aligning

3.1 Pointing and Peaking Tones

The Pro Portable incorporates a Point-and-Peak process that uses digital tones for acquiring a satellite’s signal. These tones assist a user in identifying the peak azimuth and elevation angles to maximize connectivity (Table 3-1).

Table 3-1: Pointing and Peaking Tone List

<table>
<thead>
<tr>
<th>Tone Name</th>
<th>Description</th>
<th>Audio Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heartbeat</td>
<td>The Heartbeat tone indicates the TRIA is receiving power from the modem, but is not pointed at a satellite it recognizes. This tone is the initial tone at the beginning of the Point-and-Peak process. It is only heard when the TRIA pointed outside of the frequency range of a Beam.</td>
<td></td>
</tr>
<tr>
<td>Ring-Ring</td>
<td>The Ring-Ring tone defines the “edge” of the Satellite Beam and sounds like an old style telephone. The tone is only heard when entering the Beam. Therefore, to find both the right and left edges of the Beam, the Installer will sweep to the left, then sweep back to the right. This allows the modem to learn all the frequencies available in the beam.</td>
<td></td>
</tr>
<tr>
<td>Single Short Beep</td>
<td>The Single Short Beep tone is a ‘confirmation’ that the alignment process has found the correct satellite. This tone occurs just after Ring-Ring tone defines the edge of the Satellite Beam. The Single Short Beep is always heard in combination with the Ring-Ring.</td>
<td></td>
</tr>
<tr>
<td>Low/Slow and High/Fast</td>
<td>The Low/Slow and High/Fast tones are a set of tones that grade the frequencies being learned by the modem. This allows the Installer to hear/identify the center and the edges of the Beam.</td>
<td></td>
</tr>
<tr>
<td>High/Steady</td>
<td>The High/Steady tone indicates the center of the currently known frequency set. To find the correct center, the user must complete the entire Point-and-Peak process. When the final Center Point Frequency is found, the antenna will pass.</td>
<td></td>
</tr>
</tbody>
</table>
| Beep-Bop        | The Beep-Bop tone indicates two modem states:  
• When the TRIA locates a satellite with Ka-Band frequencies that the modem does not recognize  
• When the modem has reset during a re-Pointing process. |               |
3.2 Modem Setup

After performing the assembly of the Pro Portable Terminal (complete section 2.2 before starting the process below), the user can now setup the modem. Table 3-2 provides the instructions on this process, while section 4.1 provides additional details regarding the modem’s LCD screen, LEDs, and buttons.

**Table 3-2: Modem Setup Process**

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>After turning on the modem, the LED display shows the Start screen. The LED display is controlled by the Up/Down, Right/Left, ESC, and ENT buttons located to the right of the LED display. While the Start screen is displayed, press the ENT button to access the Main Menu screen.</td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td>2.</td>
<td>On the Main Menu screen, use arrow keys to scroll to “→ 1. Pointing” menu item and press ENT button to access the Location screen. <strong>NOTE:</strong> Pressing the ENT button will select whatever option that’s displayed on the middle line and identified by “→”. <strong>NOTE:</strong> If the display starts showing a checkerboard pattern, just press any of the four Arrow Keys to continue. The checkerboard is a screen saver.</td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>3.</td>
<td>When the Location screen opens, wait for values to display in the LAT and LON fields (the display will show a series of question marks “?” while waiting to get a GPS fix). This process may take several minutes to complete; however, if more than 5 minutes have elapsed without values appearing, try moving the GPS puck to another location. <strong>NOTE:</strong> If you are going to relocate the modem after Pointing, write down the GPS’s latitude and longitude location so you can manually input it later.</td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td>4.</td>
<td>Use arrow keys to scroll to “→ Press ENT to Cont.” menu item and press ENT button and continue with section 3.3, Baseline Elevation and Azimuth Setup.</td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
</tbody>
</table>
3.3 Baseline Elevation and Azimuth Setup

After performing the assembly of the Pro Portable Terminal (complete sections 2.2 and 3.2 before starting the process below), the user can now set the unit’s baseline elevation and azimuth. Table 3-3 provides the instructions on this process.

**Table 3-3: Baseline Elevation and Azimuth Setup Process**

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Once the GPS is fixed, press the ENT button to display the Elevation/Azimuth status screen. The Rx LED light</td>
<td>![Image] will be flashing and the heartbeat tone can be heard from the TRIA. This indicates that the TRIA is in Install Mode and ready to begin vertically sweeping the antenna to locate the satellite.</td>
</tr>
</tbody>
</table>
| 2.   | While supporting the back of the TRIA:                                                                        | ![Image]  
  - Loosen the “Lock EL Angle” lever (left side of the AZ/EL Assembly)  
  - Loosen the “Internal Elevation” knob (beside the AZ/EL Assembly’s “Fine Adjust Preset” label). |
| 3.   | Using the Inclinometer on the side of the TRIA manually set the reflector elevation to the “EL” value shown on  | ![Image]  
  “Status” screen (see Step 1) and tighten the internal elevation knob.  
  **NOTE:** If done correctly, the Inclinometer and “Fine Adjust Preset” values should approximately match (i.e., 40° on the Inclinometer and 40° on the “Fine Adjust Preset”). |
| 4.   | Using the “EL Fine Adjust” knob, raise or lower the TRIA angle to dial-in the elevation reading on the Inclinometer to equal the “EL” value shown on the “Status” screen.  
  **NOTE:** This may take many turns to make a fine movement. | ![Image] |
<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.</td>
<td>Loosen the “AZ Course Adjustment” knob and <strong>SLOWLY</strong> swing the Azimuth/Elevation Assembly to the left and right to identify the full range where the modem emits a “Ring-Ring” tone. <strong>NOTE</strong>: If you don’t hear a “Ring-Ring” tone, use the “EL Fine Adjust” knob to raise or lower the TRIA angle (a degree at a time) until you hear the tone.</td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td>6.</td>
<td>After Identifying the horizontal range where the modem emits a “Ring-Ring” tone, rotate the Assembly back across that range until you hear a “Short Beep” tone and tighten the “AZ Course Adjustment” lever. The “Short Beep” tone will change to either a “Low/Slow” tone or a “High/Fast” tone, indicating the unit is ready for fine-tuning. <strong>NOTE</strong>: If you continue to hear “Short Beep” tone and NOT a “Low/Slow” or a “High/Fast” tone, use the “EL Fine Adjust” knob to raise or lower the TRIA angle (a degree at a time) until you hear one of the two tones.</td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
</tbody>
</table>
3.4 Fine-tuning Azimuth and Elevation Setup

After performing the assembly of the Pro Portable Terminal (complete sections 2.2, 3.2, and 3.3 before starting the process below), the user can now fine-tune the unit’s azimuth and elevation. Table 3-4 provides the instructions on this process.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Image</th>
</tr>
</thead>
</table>
| 1.   | Loosen the “Lock AZ Angle” knob (left highlight) and the “Lock AZ Angle” knob (right highlight) on the bottom of the base plate.  
**NOTE:** Leave the “Lock AZ Angle” knob just tight enough to allow the azimuth to move. | ![Image 1](image1.jpg) |
| 2.   | Using the “AZ Fine Adjust” knob, horizontally adjust the azimuth:  
  a. Left until the tone changes from a “Low/Slow” tone to NO tone.  
  b. Maintaining a consistent speed, start turning the adjustment knob right while counting until you hear the tone go from:  
    - No Tone → Low/Slow → High/Fast → Low/Slow → No Tone  
  c. Divide the ending count number by 2 and using the same speed, turn the knob right until you reach the halfway mark.  
    - No Tone → Low/Slow → High/Fast  
  **NOTE:** The modem screen’s “SNR” and “Peak” dB numbers will change during this process, and the screen will report a “Status” as “Complete” even though the fine-tuning process is not complete. | ![Image 2](image2.jpg) |
| 3.   | Tighten the two “Lock AZ Angle” knobs on the base plate so the antenna has no movement left or right.  
**NOTE:** If you lose the tone while tightening; loosen them and repeat the above steps. | ![Image 3](image3.jpg) |
### Step 4
Using the “EL Fine Adjust” knob, vertically adjust the elevation:

- a. Up until the tone changes from a “Low/Slow” tone to **NO** tone.
- b. Maintaining a consistent speed, start turning the adjustment knob down while counting until you hear the tone go from:
  
  No Tone → Low/Slow → High/Fast → Low/Slow → No Tone
  
- c. Divide the ending count number by 2 and using the same speed, turn the knob up until you reach the halfway mark.
  
  No Tone → Low/Slow → High/Fast

**NOTE:** The modem screen’s “SNR” and “Peak” dB numbers will change during this process, and the screen will report a “Status” as “Complete” even though the fine-tuning process is not complete.

### Step 5
Tighten the “Lock EL Angle” lever so the antenna has no movement up or down and verify that all other levers and knobs are tight.

**NOTE:** If you lose the tone while tightening, loosen them and repeat the above steps.

### Step 6
Press the **ENT** button to begin the modem lock process. The LEDs on the Modem will be flashing.

- **Rx LED** will begin flashing and then go solid.
- **Tx LED** will begin flashing and then go solid once it has achieved modem lock.
- **ENET LED** will begin flashing and then go solid.

**NOTE:** Normal operations will show the **Rx**, **Tx**, and **ENET** LEDs flashing rapidly and may take several minutes to accomplish.

### Step 7
On the front of the modem, connect the CAT5 cable to the ENT1 port and the other end to a computer.

### Step 8
Open a web browser window and type 192.168.100.1 into the address bar and verify you can access the modem’s web interface.
3.5 Modem Relocation

After performing the assembly of the Pro Portable Terminal (complete sections 2.2, 3.2 through 3.4 before starting the process below), the user can now relocate the modem. Table 3-5 provides the instructions on this process.

**Table 3-5: Modem Relocation Process**

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Record the GPS Latitude and Longitude while the modem is on and connected to the antenna with the 3’ Coax cable.</td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td>2.</td>
<td>Power OFF the modem assembly.</td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>3.</td>
<td>Disconnect the power supply cable from the “Power Input” port on the back of the modem and the grounded AC power outlet.</td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td>4.</td>
<td>Place the modem assembly and GPS in the desired location, and connect the Coax cable of the required length.</td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
</tbody>
</table>
| 5.   | Connect the power cable to the power supply brick and twist the connector onto the “Power Input” port on the back of the modem assembly.  
   a. Twist the cap until it stops clicking and the blue ring on the cap covers the red ring on the modem port.  
   b. Plug the end of the power cable into a grounded AC power outlet. **(DO NOT connect to ungrounded power sources, as this will severely damage the unit.)** | ![Image](image5.png) |
| 6.   | Power ON the modem assembly. | ![Image](image6.png) |
| 7.   | After turning on the modem, the LED display shows the Start screen. The LED display is controlled by the Up/Down, Right/Left, ESC, and ENT buttons located to the right of the LED display. While the Start screen is displayed, press the ENT button to access the Main Menu screen. | ![Image](image7.png) |
| 8.   | On the Main Menu screen, use arrow keys to scroll to “→ 2. GPS” menu item and press ENT button.  
   **NOTE:** Pressing the ENT button will select whatever option’s displayed on the middle line and identified by “→”.  
   **NOTE:** If the display shows a checkerboard pattern (a screen saver), press any of the four Arrow Keys to continue. | ![Image](image8.png) |
<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.</td>
<td>On the Manual GPS screen, use arrow keys to scroll to “→ Manual Mode” menu item and press right arrow button once to turn ON (pressing the arrow twice will turn it OFF).</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>On the Manual GPS screen, use arrow keys to scroll to “→ LAT” menu item. Press right arrow button once to access the first “0” field and use the up/down arrows to set the first number. <strong>NOTE:</strong> After entering the first number, continue the same process to set the remaining fields.</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>After entering all required fields, press ENT to return to the “→ LAT” menu item and then use arrow keys to scroll to “→ LON” menu item. Press right arrow button once to access the first “0” field and use the up/down arrows to set the first number. <strong>NOTE:</strong> After entering the first number, continue the same process to set the remaining fields.</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>After entering all required fields, press the ESC button twice. <strong>NOTE:</strong> Pressing the ESC button will save the change.</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>On the Main Menu screen, use arrow keys to scroll to “→ 1. Pointing” menu item and press ENT button to access the Location screen.</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>When the Location screen opens, the values entered in the previous steps will display in the LAT and LON fields.</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>After verifying the LAT and LON fields, press the ENT button twice. <strong>NOTE:</strong> There is no reason to continue in the Pointing/Peaking process, since those required steps were previously performed.</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>On the front of the modem assembly, connect the CATS cable to the ENT1 port and the other end to a computer.</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>Open a web browser window and type 192.168.100.1 into the address bar and verify you can access the modem’s web interface by selecting “Modem” in the menu tree on the left.</td>
<td></td>
</tr>
</tbody>
</table>
4 TERMINAL OPERATIONS

The SurfBeam 2 Pro Portable modem uses an LCD screen and a web interface to provide valuable operational and status information regarding the modem, antenna, and installation configuration. The following sections provide details regarding accessing and navigating the modem’s LCD screen and web interface.

4.1 Modem Assembly LCD

The LCD screen on the modem assembly displays Pointing, GPS, Modem Status, DC Output, Help, Setting, and Volt Status information, which the user navigates using the ESC, ENT, Left/Right Arrow, and Up/Down Arrow buttons on the modems face plate (Figure 4-1).

Figure 4-1: Modem Assembly LCD Screen and User Interface

Figure 4-2 displays the modem assembly’s LCD menu navigation tree.

Figure 4-2: Modem Assembly LCD Menu Navigation Tree
4.2 Modem Web Interface

4.2.1 Accessing

To access the modem’s web interface, perform the following steps:

1. Configure a laptop for use on this same LAN as the modem by setting the laptop’s network settings for DHCP. In addition, the laptop can be connected directly to the modem ETH1 through ETH4 ports.

2. Launch a web browser on the Support PC.

3. At the web browser’s address field, enter the modem’s IP address (i.e., http://192.168.100.1) and press <Enter>.

4.2.2 Navigation and Information

Once accessed, the web browser will open the modem’s “Home” page (Figure 4-3). From this page, the user can access general information for the modem and TRIA configuration/status.

Figure 4-3: Modem Web Interface
4.2.2.1 Web Page Common Features

There are common icons used throughout the web interface. These items help users quickly identify the current modem, antenna, satellite, and communication statuses. Table 4-1 shows the color-coordinated operational beam being used by the modem (displayed in the upper-right corner of all pages); while Table 4-2 lists the icons used to show the system’s operating state (used on the Home, Modem, and Antenna pages).

**Table 4-1: Operational Beam**

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="gray" alt="Beam Not Active" /></td>
<td>Not Active (gray)</td>
<td>Beam is currently not being used. If all of the icons in the upper right corner of the web page are gray, then the system has not locked onto a satellite and the user must revisit section 3 to repoint and peak the system.</td>
</tr>
<tr>
<td>![Beam Active](purple, blue, green, orange)</td>
<td>Active (purple, blue, green, orange)</td>
<td>Beam is currently being accessed. The color is used to identify which beam is being accessed.</td>
</tr>
</tbody>
</table>

**Table 4-2: System Operating State**

<table>
<thead>
<tr>
<th>Function</th>
<th>Icon Set</th>
<th>Description</th>
</tr>
</thead>
</table>
| Forward Link     | ![Scanning](yellow) ![Syncing](green) | Yellow = Indicates the modem is initiating a Forward Link connection.  
* “Scanning” means that the process has just initiated  
* “Syncing” means that the process is nearing completion  
Green = Indicates the modem has established a Forward Link connection. |
| Return Link      | ![Ranging](gray) ![Ranged](yellow) ![Ranged](green) | Gray = Indicates that there is no Forward Link or that the Return Link is disabled (several minute may pass before the icon changes color).  
Yellow = Indicates the modem is initiating a Return Link connection (several minute may pass before the icon changes color).  
Green = Indicates the modem has established a Return Link connection. |
| Network Entry    | ![Network Entry](gray) ![Ranged](yellow) ![Ranged](green) | Gray = Indicates that there is no Link connection or the Network Entry is disabled (several minute may pass before the icon changes color).  
Yellow = Indicates the modem is initiating a network connection (several minute may pass before the icon changes color).  
Green = Indicates the modem has established a network connection. |
| DHCP             | ![DHCP](gray) ![DHCP](yellow) ![DHCP](green) | Gray = Indicates that there is no Link connection or the DHCP acquisition is disabled (several minute may pass before the icon changes color).  
Yellow = Indicates the modem is requesting an IP address from a Gateway DHCP (several minute may pass before the icon changes color). |
| Online           | ![Online](gray) ![Online](yellow) ![Online](green) | Green = Indicates the modem is online and should connect to the internet; however, if the system cannot connect to the internet:  
* Reboot the modem (may take multiple attempts)  
* Contact the NOC if the first several attempts did not correct the issue |
| Fault            | ![Fault](red) | Red = Indicates a fault has been detected or there is no communication’s link. |
4.2.2.2 Home Page (Basic Status)

The Home page (Figure 4-4) provides general information on the status of the modem, Inter-Facility Link (IFL), and antenna.

![Modem Web Interface – Home Page](image)

**General**

- **Modem**: Displays the modem’s current operating state. Clicking on the “MODEM” label below the box displaying the modem and the state icon, will navigate to the Modem page.

- **IFL**: Displays the IFL’s current operating state. Clicking on the “IFL” label below the box displaying the IFL connection and the state icon, will navigate to the IFL page.

- **TRIA**: Displays the antenna’s current operating state. Clicking on the “TRIA” label below the box displaying the antenna and the state icon, will navigate to the TRIA page.
4.2.2.3 Modem Page (Modem/IFL Cable Status)

The Modem page (Figure 4-5) provides general information on the status of the modem, Inter-Facility Link (IFL), and antenna.

![Modem Web Interface – Modem Page](image-url)
**Modem State**

**Modem**: Displays the status of the modem (see section Table 4-2 regarding icon details).
- **Scanning**: The modem is scanning or attempting to connect
- **Syncing**: The modem is syncing with the network and antenna
- **Synced**: The modem synced correctly
- **Ranging / Ranged**: The modem is configuring operating ranges.
- **Network Entry**: The modem is gaining access to the network
- **DHCP**: The modem is configuring itself to connect with the network
- **Online**: The modem is connected to the network and online

**Online Time**: Displays the duration of time the modem has been online.

**General**

- **Rx Power (dBm)**: Displays the modem’s power level.
- **Rx SNR (dB)**: Displays the Signal to Noise Ratio.
- **ODU Telemetry Status**: Displays if the modem is collecting and transmitting data.
- **Cable Resistance (Ohms)**: Displays the amount of resistance the cable is producing (lower is better).
- **Cable Attenuation (dB)**: Displays the level of attenuation occurring between the modem and antenna.

**Identification**

- **IP Address**: Displays the modem’s IP address.
- **Software Version**: Displays the modem’s software version.
- **Serial Number**: Displays the modem’s serial number.
- **IFL Type**: Displays the IFL’s current operating state.
- **MAC Address**: Displays the modem’s MAC address.
- **Hardware Version**: Displays the modem’s hardware version.
- **Part Number**: Displays the modem’s part number.

**Ethernet Interface Statistics**

- **Transmitted Packets**: Displays the number of received IP packets.
- **Received Packets**: Displays the number of received IP packets.
- **Loss of Sync Count**: Counts the number of sync losses for the current connection.
- **Transmitted Bytes**: Displays the number of bytes transmitted to the modem.
- **Received Bytes**: Displays the number of bytes received by the modem.
4.2.2.4 TRIA Page (TRIA Status)

The TRIA page (Figure 4-6) provides general information on the status of the TRIA.

Figure 4-6: Modem Web Interface – TRIA Page

**General**
- **Tx IF Power (dBm)**: Displays the IF power for the TRIA.
- **Tx RF Power (dBm)**: Displays the RF power for the TRIA.
- **Temperature (°C)**: Displays the ATRIA’s operation temperature.

**Diagnostics**
- **Brownout and Blueout Mode Enabled**: Displays “Yes” or “No” depending on system configuration.
- **TRIA Serial Number**: Displays the TRIA’s serial number.
- **TRIA Firmware Version**: Displays the TRIA’s firmware version.

**Module Status**
- **Bullfrog VG, Watchdog Timer, Tx/Rx PLL, Microprocessor, Cable Resistance, and Temperature**: Displays ✓ or ❌ depending on if the system has detected an issue.
4.3 Router Web Interface

4.3.1 Accessing

To access the router’s web interface, perform the following steps:

1. Configure a laptop for use on this same LAN as the modem by setting the laptop’s network settings for DHCP. In addition, the laptop can be connected directly to the modem ETH1 through ETH4 ports.

2. Launch a web browser on the Support PC.

3. At the web browser’s address field, enter the router’s IP address (i.e., http://192.168.100.1) and press Enter.

4. The web browser will request a user authentication and password (Figure 4-7) (User Name: admin, Password: admin).

![Figure 4-7: Router Web Interface Login Window](image)

4.3.2 Navigation and Information

Once accessed, the web browser will open the router’s “Home” page (Figure 4-8). From this page, the user can access general information for the router configuration/status.

![Figure 4-8: Router Web Interface](image)
4.3.2.1 Status Tab

This tab provides information regarding the system, router, terminal, and modem. This section covers the “Home” and “Router” pages, as selecting the “Terminal” or “Modem” will take the user to the appropriate “Modem Web Interface” page.

4.3.2.1.1 System Status Page

The System Status page (Figure 4-9) provides general information on the status of the modem/router, Firmware version, and connection activity.

![System Status Page](image)

*Figure 4-9: Router Web Interface – System Status Page*
4.3.2.1.2 Router Status Page

The Router Status page (Figure 4-10) provides general information on the status of the router’s WAN, DNS, LAN, DHCP, and the router’s serial/part numbers.

![Router Web Interface – Router Status Page](image-url)
4.3.2.2 Setup Tab

This tab provides information regarding the WAN, LAN, and DHCP Clients. LAN and DHCP Clients, shown in the sidebar, are the two most common and useful configuration pages that a user will access.

4.3.2.2.1 LAN Setup Page

The LAN Setup page (Figure 4-11) provides general information on the LAN configuration and the ability to configure modem’s IP address and DHCP settings.

![Figure 4-11: Router Web Interface – LAN Setup Page](image)

4.3.2.2.2 DHCP Setup Page

The DHCP Setup page (Figure 4-12) provides the ability to add static IP addresses and view general information on any current configured static IP address.

![Figure 4-12: Router Web Interface – DHCP Setup Page](image)
4.3.2.3 Network Tab

This tab provides information regarding the Port Forward, Range Forward, DMZ, Routes, and QoS.

4.3.2.3.1 Port Forwarding Page

The Port Forwarding page (Figure 4-13) provides general information and the ability to add/configure/remove ports for Port Forwarding.

![Figure 4-13: Router Web Interface – Port Forwarding Page](image)

4.3.2.3.2 Range Forwarding Page

The Range Forwarding page (Figure 4-14) provides general information and the ability to add/configure/remove ports for Range Forwarding.

![Figure 4-14: Router Web Interface – Range Forwarding Page](image)
4.3.2.3.3 DMZ Page

The DMZ page (Figure 4-15) provides the ability to configure the router and modem for operations in a Demilitarized Zone.

![Figure 4-15: Router Web Interface – DMZ Page]

4.3.2.3.4 Routes Page

The Routes page (Figure 4-16) provides information on the current routing table.

![Figure 4-16: Router Web Interface – Routes Page]
4.3.2.4 Administration Tab

This tab provides information regarding changing the user password, performing a backup/load/restore router configuration, upgrading the firmware, rebooting the system, and ping/trace route utilities.

4.3.2.4.1 Password Page

The Password page (Figure 4-17) provides the ability to change the router’s required password.

![Figure 4-17: Router Web Interface – Password Page](image)

4.3.2.4.2 Backup/Restore Page

The Backup/Restore page (Figure 4-18) provides the ability backup, load new, or restore the modem’s configuration.

![Figure 4-18: Router Web Interface – Backup/Restore Page](image)
4.3.2.4.3 Firmware Upgrade Page

The Firmware Upgrade page (Figure 4-19) provides information on the current firmware and the ability upgrade the modem’s firmware. Section 4.4 provides the details on performing a firmware upgrade.

![Figure 4-19: Router Web Interface – Firmware Upgrade Page](image)

4.3.2.4.4 Reboot Page

The Reboot page (Figure 4-20) provides the ability to perform a router reboot from the web interface.

![Figure 4-20: Router Web Interface – Reboot Page](image)
4.3.2.4.5 Utilities Page

The Utilities page (Figure 4-21) provides the ability to test network connectivity by Pinging specific devices or web sites and performing a Trace Route.

![Figure 4-21: Router Web Interface – Utilities Page](image-url)
### 4.4 Firmware Update

Table 4-3 provides the instructions on updating the router’s firmware.

#### Table 4-3: Router Firmware Update Process

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Contact ViaSat for the latest firmware images and source code at: <a href="mailto:exedeenterprisesupport@viasat.com">exedeenterprisesupport@viasat.com</a></td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td>2.</td>
<td>After receiving the firmware release, save it to an easily accessible location on a user provide computer.</td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>3.</td>
<td>Power ON the modem assembly.</td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td>4.</td>
<td>On the front of the modem assembly, connect the CAT5 cable to the ENT1 port and the other end to the computer.</td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
<tr>
<td>5.</td>
<td>Open a web browser window, type 192.168.100.1 into the address bar, and press Enter.</td>
<td><img src="image5.png" alt="Image" /></td>
</tr>
<tr>
<td>6.</td>
<td>The web browser will request a user authentication and password (User Name: admin, Password: admin). <strong>NOTE:</strong> User Name and Password may have been changed from the above configuration per customer/service provider defined requirements (refer to section 7 for additional assistance).</td>
<td><img src="image6.png" alt="Image" /></td>
</tr>
<tr>
<td>7.</td>
<td>Click on Administration tab at the top of the page.</td>
<td><img src="image7.png" alt="Image" /></td>
</tr>
<tr>
<td>8.</td>
<td>Click on Firmware Upgrade on the side menu bar.</td>
<td><img src="image8.png" alt="Image" /></td>
</tr>
<tr>
<td>9.</td>
<td>Click on Choose File, navigate to the location where the image file is located, and click Open. <strong>NOTE:</strong> The image file name should be SB2PP_X.X.X.img, where X.X.X represents the firmware version number.</td>
<td><img src="image9.png" alt="Image" /></td>
</tr>
<tr>
<td>10.</td>
<td>Click Submit when you see the image file name appear to the left of the button.</td>
<td><img src="image10.png" alt="Image" /></td>
</tr>
</tbody>
</table>
11. The web page will refresh, displaying a notification that the image has loaded and the router is rebooting.

   **NOTE:** DO NOT exit the web browser.

12. The system is now updated with the new firmware.
   - The reloaded web page will display the updated Version number
   - The modem’s front panel will display the updated Version number

### 4.5 Network Connectivity

After achieving modem lock, the user will need to connect to the internet. Simply try going to any known website like Yahoo.com, MSN.com, and Google.com to verify that a connection has been established.

![Network Connectivity](image)

**NOTE:** If no connection is established, clear the cache and cookies from the browser Internet options and attempt to reconnect.
5 TERMINAL MAINTENANCE

The SurfBeam 2 Pro Portable unit requires preventative maintenance consisting of cleaning and routine inspections at regular intervals. The following sub-sections provide the Check-Out/Check-In, Weekly, Monthly, and Quarterly (or as necessary) maintenance checks that need to be performed.

Routine inspections and maintenance of the equipment are critical to the operation and long life of the equipment. Perform the following inspections and document any findings (photos are preferred). Submit any findings and photos to ViaSat customer service with serial number for engineering review. The modem assembly is an LRU and is typically not field repairable.

CAUTION: DO NOT USE power tools (e.g., drill, impact wrenches, etc.) while performing any maintenance unless instructed by a ViaSat representative.

NOTE: Use a 1" wide soft-bristle paintbrush or vacuum cleaner with soft-bristle brush nozzle to remove dirt and dust from accessible areas.

CAUTION: When first deployed, operators need to perform periodic checks (throughout the day) of the unit’s connection points, antenna, and wiring to ensure wind, heat, or other factors have not caused issues that may result in damages to persons, antenna, or modem.

CAUTION: If performing one of the following checks requires the operator to make physical contact with the Reflector or TRIA, the unit MUST be powered-down to ensure no damage occurs.

CAUTION: Physical contact with the antenna unit may cause connectivity issues resulting the user having to re-perform the alignment process.

5.1 Check-Out/Check-In Maintenance and Inspection

The SurfBeam 2 Pro Portable requires maintenance and inspection when being checked out and checked in. Table 5-1 provides the instructions on this process.

Table 5-1: Check-Out/Check-In Process

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Check the transit case for damage; checking the sides, hinges, latches, and verifying the case opens and closes securely.</td>
</tr>
</tbody>
</table>
| 2.   | Remove and inspect the Tripod for:  
|      | a. Bent, damaged, or loose parts/bolts  
|      | b. Excessive buildup of dirt/debris  
|      | c. Levers that function appropriately and have clear threads  
|      | d. Legs that can fully extend and be locked in place  
|      | e. Footpads that rotate smoothly |
| 3.   | Remove and inspect the Azimuth/Elevation Assembly for:  
|      | a. Bent, damaged, or loose parts/bolts  
|      | b. Excessive buildup of dirt/debris  
|      | c. Levers and knobs that function appropriately and have clear threads  
|      | d. Sufficiently tightened “hing” nuts and bolts to hold parts together without lateral motion while allowing the rotating parts to operate  
|      | e. Intact decals (i.e., “STEP” and “Fine Tune Adjustment” stickers are full attached)  
|      | f. Functioning level with unbroken protective glass |
4. Remove and inspect the Edge and Center Reflectors for:
   a. Bent or damaged parts/bolts
   b. Excessive buildup of dirt/debris
   c. Physical damage to the reflectors (e.g., scratches, cracks, dents, etc.)
   d. That all knobs are functioning appropriately and have clear threads

5. Remove and inspect the TRIA for:
   a. Bent, damaged, or loose parts/bolts
   b. Excessive buildup of dirt/debris
   c. Clean and corrosion free cable connections and threads
   d. Attached splash plate
   e. Functioning Inclinometer on the side of the TRIA

6. Remove and inspect the modem assembly’s Power Brick for:
   a. Bent, damaged, or loose parts/bolts
   b. Excessive buildup of dirt/debris
   c. Clean and corrosion free cable connections and threads

7. Remove and inspect the modem assembly for:
   a. Bent, damaged, or loose parts/bolts
   b. Excessive buildup of dirt/debris
   c. Clean and corrosion free cable connections and threads
   d. Connected latch-pin
   e. Covers to the Power Input, Power Output, and ENET ports
   f. Functioning ESC, ENT, Left/Right Arrow, and Up/Down Arrow buttons that make a popping sound when pushed

8. Remove and inspect the contents of the Accessory Bag for:

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUANTITY</th>
<th>ViaSat PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. GPS with attached 15” cable</td>
<td>x1</td>
<td>1133456</td>
</tr>
<tr>
<td>b. 3’ Coax Cable</td>
<td>x1</td>
<td>1148010</td>
</tr>
<tr>
<td>c. 5’ Ethernet Cable</td>
<td>x1</td>
<td>1025095</td>
</tr>
<tr>
<td>d. TRIA Splash Plate Replacement</td>
<td>x1</td>
<td>1143124</td>
</tr>
<tr>
<td>e. Power Cable</td>
<td>x1</td>
<td>1112863</td>
</tr>
<tr>
<td>f. 90° Coax Adapter</td>
<td>x2</td>
<td>1156729</td>
</tr>
</tbody>
</table>

   **NOTE:** The SurfBeam 2 Pro Portable Terminal does not have any field replaceable parts. If any part is missing from the case, refer to section 7 for additional assistance.

9. Remove and inspect the laminated “Quick Setup Guide”

10. Using instructions on the “Quick Setup Guide” and a laptop, setup the terminal and verify operations

11. Repack all contents according to section 2.4
5.2 Fielded Daily Maintenance and Inspection

The following checks need to be performed on a daily basis while the system is deployed:

- Check the antenna exterior for dirt/debris buildup and clean as necessary
- Ensure all levers and knobs are secure
- Ensure cables are hand tightened by turning each connection clockwise until the cable connection point appears fully seated

![Figure 5-1: Cable Connections](image)

- Inspect all electrical connectors for broken, loose, or corroded parts, and missing and/or loose hardware
- Check all wiring and coaxial cables for cuts, nicks, burns, or abraded insulation; bare or damaged wires; sharp V bends; pinched wires; broken or loose lacing, tie wraps, and clamps
- Perform a Site Survey (refer to section 2.1) to verify that nothing has changed in regards the surrounding environment (e.g., a vehicle has not parked in front of the unit, etc.)

5.3 Fielded Monthly Maintenance and Inspection

The following checks need to be performed on a monthly basis while the system is deployed:

- Check the hardware securing the antenna to the ground
- Check the hardware securing the modem assembly
- Check all Coarse Adjustment levers and knobs for tightness
- Check for dirt penetration and signs of moisture
  - If sand, dirt or other debris is found, use a brush or vacuum to remove the foreign matter
  - If moisture exists, allow the unit to dry
- Check that the antenna heat-sinks are clear of debris
- Inspect all electrical connectors for broken, loose, or corroded parts, and missing and/or loose hardware
- Check all wiring and coaxial cables for cuts, nicks, burns, or abraded insulation; bare or damaged wires; sharp V bends; pinched wires; broken or loose lacing, tie wraps, and clamps
- Perform a Site Survey (refer to section 2.1)
- Fine-tune the Azimuth and Elevation (refer to section 3.4)

5.4 Inactive Monthly/Quarterly Maintenance and Inspection

The following checks need to be performed on a monthly basis while the system is placed in storage:

- Perform a complete assembly using the instructions provided in sections 2.3 and 3 (this process includes assembly, point and peaking, achieving modem lock, and allowing the unit to stay connected to the network for 20-30 minutes)
- Check all Coarse Adjustment levers and knobs for tightness
- Check for dirt penetration and signs of moisture
  - If sand, dirt or other debris is found, use a brush or vacuum to remove the foreign matter
  - If moisture exists, allow the unit to dry
- Check that the antenna heat-sinks are clear of debris
- Inspect all electrical connectors for broken, loose, or corroded parts, and missing and/or loose hardware
- Check all wiring and coaxial cables for cuts, nicks, burns, or abraded insulation; bare or damaged wires; sharp V bends; pinched wires; broken or loose lacing, tie wraps, and clamps
6 TROUBLESHOOTING

The following outlines potential issue a user might come across while setting up, configuring, and operating the SurfBeam 2 Pro Portable system. Table 6-1 provides a list of potential hardware issues and the possible solutions. If the provided solution does not resolve the issue, contact ViaSat’s NOC.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Solution</th>
</tr>
</thead>
</table>
| Modem assembly does not power on.                                       | 1. Ensure power switch is in the “ON” position  
2. Ensure power supply is connected to the modem  
3. Check to see if the LED on the power brick is functioning; if not:  
   a. Ensure the power plug is fully seated  
   b. Ensure power outlet/source is powered  
4. If using vehicle AC power, ensure AC adapter is configured for 120-150V and rated for 80W |
| Modem assembly does not allow the user to enter into the Pointing and Peaking process. | 1. Cycle the modem assembly’s power “ON/OFF” switch  
2. Ensure all cables are fully seated (i.e., Coax, GPS, etc.)  
3. Listen for a clicking noise coming from the TRIA after the modem assembly’s power is cycled |
| Modem does not populate latitude and longitude information.             | 1. Ensure the GPS cable connection with the modem assembly is fully seated  
2. Relocate the GPS unit to another location near the terminal  
3. Cycle the modems power “ON/OFF” switch |
| Terminal will not Peak.                                                 | 1. Ensure the Elevation is correctly set  
   a. Increase the elevation angle by 1° above the degree amount shown on the modem’s “Status” screen  
   b. Use an iPhone® or Android® smartphone app like DishPointer® Pro to dial in the elevation degree  
2. Sweep the Azimuth slower  
3. Sweep the Azimuth for 180° and come back to the compass bearing |
| Terminal experiences a low SNR during peaking process.                  | 1. Ensure the Splash Plate is correct seated on the antenna feedhorn  
2. Ensure the terminal has a clear view of the sky on the Azimuth compass bearing |
| Connection speeds have slowed or stopped.                               | 1. Ensure the modem is online by entering 192.168.100.1 into a Web browser window on a connected computer  
2. Ensure the Splash Plate is correct seated on the antenna feedhorn  
3. Ensure the Edge Reflectors are securely fastened  
4. Ensure the terminal is peaked (may require the operator to re-perform the process identified in section 3.4) |
7 HELPDESK SUPPORT

In the event of an Exede™ service or hardware issue resulting in a service problem, please contact your service provider.

- The customer is responsible for selecting the appropriate first point of contact that is the service provider from which the service was purchased. This may be either ViaSat directly or a Service Reseller (customer is responsible for obtaining the reseller contact information).

- Before contacting customer support, obtain as much information and relevant detail as possible to provide an accurate description of the suspected issue. Minimum information required includes:
  - Modem MAC Address
  - Antenna terminal equipment: manufacturer, model, or description
  - Detailed description of problem
  - Terminal Location

ViaSat NOC Technical Support:
Toll Free: 1-855-656-6623
Email: ExedeEnterpriseSupport@viasat.com

The ViaSat NOC is a 7 day x 24 hour operation

ViaSat’s Exede™ Enterprise Helpdesk for support (installation or field).
Phone: Domestic: 855-656-6623
       International: +1 720-493-7300
E-mail: ExedeEnterpriseSupport@viasat.com
8 RESHIPMENT

To ship the unit to another location, or return the unit to ViaSat for service/repair, use the carton(s) saved during the unpacking procedure. Place your contact information inside the container in case the package is lost or misdirected during shipping.

8.1 Return to the Factory

To prepare the unit for return to ViaSat, perform the following:

1. Contact ViaSat’s Network Operations Center (NOC) and request a Return Material Authorization (RMA) form and number to return the equipment. Below is ViaSat’s NOC contact information:
   - Phone: Domestic: 866-659-9702
     International: +1 760-602-5656
   - Fax: +1 760-929-3931
   - E-mail: ExedeEnterpriseSupport@viasat.com or noc-carlsbad@viasat.com
2. After receiving the RMA form and number from ViaSat, complete the form, email it back to the email address noted on the form and enclose it with the equipment. Ensure that all parts of the RMA form are complete.
3. Do not remove any modules or attaching cables from the unit. The unit should be configured as originally received from the manufacturer. Use the carton saved during the unpacking procedure in the applicable installation guide if possible.
4. If shipping from outside the USA, include a commercial invoice with the following statement: “American goods being returned for repair”

   NOTE: Before returning the unit, it is important that a RMA form and number is obtained from the NOC at ViaSat.

8.2 Packaging

To package the unit for shipment perform the following steps:

1. Ensure that there is sufficient foam packing material in the shipping container to protect the unit from any hard impact.
2. Cover the unit with foam or bubble-type packing material.
3. Place the unit in the center of the shipping container.
4. If using a cardboard packing carton, securely tape the seams of the carton’s top cover, bottom cover, and side flaps with reinforced packing tape.
5. Attach labels or stamp in indelible ink with the words FRAGILE DELICATE ELECTRONIC EQUIPMENT on the top, bottom, and all sides of the container.

   ATTENTION: The unit contains parts and assemblies sensitive to damage by ESD. Ensure that the unit is placed in an anti-static bag.

8.3 Shipping

To ship the unit, perform the following steps:

1. Ensure an ESD label similar to the ESD caution, see Attention note below, is attached to the container.
2. Ensure standard precautions for the shipment of delicate electronic equipment and ESD sensitivity are observed.
3. There are no other special shipping requirements for the unit. Any reputable surface or air-shipping carrier may be used.

   ATTENTION: The unit contains parts and assemblies sensitive to damage by ESD. Do not ship or store near strong electrostatic, electromagnetic, magnetic, or radioactive fields.
Appendix A  SURFBEAM 2 PRO PORTABLE SPECIFICATIONS

Antenna Characteristics
Antenna: 75 cm
Ruggedized: IP 66/MIL-STD-810
Weight: 35 lbs.
Operating Temperature: -20°C to +50°C

Component Characteristics
Coax IF Cable: • Transmit – 1800-2300 MHz IF frequency with less than 15 dB attenuation
• Receive – 300-800 MHz IF frequency with less than 10 dB attenuation
• DC resistance of less than 3 Ohm (sum of cable and shield)
• 75 Ohm impedance
• Minimum of 100% braid over foil coverage
Connector Requirements: • RG6 linear compression connector type (No crimp connectors)
• Fully weather sealed
CAT5 Ethernet Cable: The SurfBeam 2 Pro Portable Terminal will come with a 5-foot CAT5 Ethernet cable
GPS: Single port 15 foot GPS cable

Power Requirements
Connection Type: 6 pin port connection with screw on feature for a secure connection
Input: • 96 -240 VAC
• 50/60Hz
• 4.0A
Output: • 12 - 32VDC
• 9.2A
• 24W Max.
Power: • 1x input, 1x 12V or 24V output
• AC Power – 96 – 240VAC
• DC Power – 12 – 32 VDC
Battery: BA – 5590 (2.5hr Typical)

Tripod Characteristics
Tripod: • Adjustable legs
• Durable aluminum cast
• Multiple Modem placement points
• Pivoting feet and anchor points
Weight: 4 lbs.
TRIA Characteristics

Transmit Parameters: 5 Mbps TCP / 15 Mbps UDP
Receive Parameters: 20 Mbps TCP / 30 Mbps UDP
Weight: 6.5 lbs.
Operating Temperature: -20°C to +50°C
Polarization: Dual Polarization

Reflector Characteristics

Reflector: 75 cm
- 3 piece composite ruggedized (connected using 6 integrated knob screws)
  - Center reflector (x1)
  - Universal edge reflectors (x2)
Weight: 6.2 lbs.

Modem Assembly Characteristics

Router: 4 port ruggedized Ethernet router
- Rack mountable (removable brackets)
Keyboard/Display: LCD screen
- 6 input keys
- Sun shade
Input Power: 21-38 DC
- 220 Watts
- On/Off switch
- Auxiliary power output port
- Power input port
Connector: RF connector
- Standard GPS connector
Appendix B  SURFBEAM 2 PRO PORTABLE QUICK START GUIDE

Step 1: Assembly and Connections

1. Wait for the display shown below to appear and press “Enter” to get to main menu.

2. Use arrow keys to select “Pointing” and press “Enter.”

3. Wait for “Long” and “Lat” screen to appear, scroll down the list, and press “Enter.”

4. Set coarse elevation to the value listed on the LCD display, and then lock the antenna dish down.

CAUTION: When connecting to the power source, the integrity of the protective earth ground must be ensured, so that the equipment is connected to a socket-outlet with a protective earth ground connection.

NOTE: Use the following information to connect to the Terminal’s router and modem:

Router IP Address: 192.168.1.1 (Password: admin)

Modem IP Address: 192.168.100.1

Step 2: Pointing

1. Wait for the display shown below to appear and press “Enter” to get to main menu.

2. Use arrow keys to select “Pointing” and press “Enter.”

3. Wait for “Long” and “Lat” screen to appear, scroll down the list, and press “Enter.”

4. Set coarse elevation to the value listed on the LCD display, and then lock the antenna dish down.

CAUTION: When connecting to the power source, the integrity of the protective earth ground must be ensured, so that the equipment is connected to a socket-outlet with a protective earth ground connection.

NOTE: Use the following information to connect to the Terminal’s router and modem:

Router IP Address: 192.168.1.1 (Password: admin)

Modem IP Address: 192.168.100.1
5. Loosen azimuth lock nuts and set the course azimuth.

6. Fine tune azimuth using knob shown below until “Locked” appears in the Status display and the peak SNR equals the SNR value (target SNR > 12dB). Lock down azimuth and repeat procedure for fine tune elevation using the knobs shown below and press “Enter” to continue.

7. Once the satellite has been acquired, the terminal is ready for use. The internet, or streaming video, can be accessed using the laptop.
Appendix C  SURFBEAM 2 PRO PORTABLE FIELD SERVICE BULLETIN(S)

Pro Portable Single and Dual Co-Pol TRIA

Date: 04 June 2013  
Product(s) Affected: Pro Portable Terminal  
Hardware Release Affected: Co-Pol Transmit Receive Integrated Assembly (TRIA)  
Summary: A version of the Pro Portable is needed to allow the system to function while operating in a region that is covered by both Left Hand and Right Hand Circular Polarization.

Issue(s)

The country of Saudi Arabia has regions where a deployed Pro Portable requires the unit to be capable of either Left Hand or Right Hand Circular Polarization. To address the need for dual polarization capabilities, the Pro Portable comes in two configurations: (1) with one Co-Pol TRIA and the ability to rotate the Feedhorn assembly or (2) with two Co-Pol TRIAs.

**Configuration 1** – Requires that end user have access to a clean, low humidity, dust free environment to disassemble, rotate, and reassemble the unit’s Co-Pol TRIA.

**Configuration 2** – Requires the shipment of two Co-Pol TRIAs (one for each polarization) and allows the end user to assemble the unit with the correct Co-Pol TRIA.

Current documentation for the Pro Portable does not provide instructions on the following:

- Beam identification and Co-Pol TRIA modification/selection
- Configuration 1 installation instructions
- Configuration 2 installation instructions
Beam Identification and Co-Pol TRIA Modification/Selection

Resolution

The KACST program has designed the following map to identify the beam coverage areas and the polarization of those beams (refer to Figure C-1).

![Figure C-1: KACST Pro Portable Polarization Identification Map](image-url)
Implementation

To access the KACST network using a Pro Portable (using either of the configurations identified in the “Issue(s)” section) the operator must perform the following:

1. Using the provided map, locate the unit’s approximate location (refer to Figure C-2 for example)

   ![Figure C-2: Beam Selection for Identifying the Correct Co-Pol TRIA](image)

In the example image shown above, the deployment location appears to be near the edge of “Beam A”, but close to the center of “Beam B”. In this instance, choose “Beam B” due to the unit’s location being closer to the center of the beam’s footprint.

- **NOTE:** Always select the beam circle where the deployment location is closest to the beam’s general center. If the location is about equal distance away from both beam centers, either Polarization configuration will work.

- **NOTE:** If the system cannot connect to the internet, but does not produce an error message; change the configuration to the other polarity.

- **NOTE:** If experiencing issues that the above notes have not corrected, contact the KACST Network Operations Center (NOC).

2. Identify the circle type (blue with diagonal lines or red without lines) where the location falls within the circle’s perimeter

3. Use the identified circle type and the “Map Key” to identify the associated polarization
Configuration 1 Installation Process

Resolution

Configuration 1 requires that end user have access to a clean, low humidity, dust free environment to disassemble, rotate, and reassemble the unit’s Co-Pol TRIA (based on the KACST Pro Portable Polarization Identification Map shown in Figure C-1).

Implementation

End users should perform the following to complete the Pro Portable installation process:

**Process 1:** Identifying the point where the installer will deviate from the instructions provided with the unit.

1. Begin with the “Unpack and Assembly” section of the instructions provided with the unit
2. Read though the steps and identify the step that specifies the identification of the Co-Pol TRIA and modem
3. Identify and/or mark the step number, as it will only refer to the unit having a single Co-Pol TRIA

   **NOTE:** See step 7 of the “Unpack and Assembly” section of the SurfBeam 2 Pro Portable Terminal manual released in September 2012.

**Process 2:** Disassembling, rotating, and reassembling the Co-Pol TRIA.

1. Perform the steps outlined in the terminal manual until reaching the deviation point identified in the process described above
2. Verify the unit has one Co-Pol TRIA with an unmarked Feedhorn (if the unit has two, refer to the Configuration 2 Installation Process section)
3. Using the provided map, locate the unit’s approximate deployment location (refer to Beam Identification and Co-Pol TRIA Modification/Selection section)
4. Identify the circle where the deployment location falls within the circle’s perimeter
5. Refer to Table C-1 for identifying the correct Polarization and orientation details

   **Table C-1: Configuration 1 – Polarization Identification**

<table>
<thead>
<tr>
<th>Beam Circle</th>
<th>Polarization</th>
<th>Orientation Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Left Hand Circular Polarization</td>
<td>“L” on Feedhorn base faces arrow on Co-Pol TRIA’s main housing</td>
</tr>
<tr>
<td></td>
<td>Right Hand Circular Polarization</td>
<td>“R” on Feedhorn base faces arrow on Co-Pol TRIA’s main housing</td>
</tr>
</tbody>
</table>

6. Remove the Co-Pol TRIA from the shipping container and inspect its configuration (refer to Figure C-3)
7. Uninstall the four hex screws from the base of the Feedhorn (refer to Figure C-4)

**WARNING:** Proceed carefully with removing the Feedhorn, as protective Kapton tape is installed between the horn base and Ortho Mode Transducer (OMT) housing. This tape needs to stay intact to protect the unit from humidity, corrosion, and debris.

**NOTE:** In the event the protective Kapton tape is damaged or lost, contact the KACST NOC for instructions on moving forward with the installation.

8. Rotate the Feedhorn 90 degrees so the markings on the unit match those identified in step 5 (refer to Figure C-5)

**Figure C-4: Uninstalling Feedhorn**

**Figure C-5: Rotating Feedhorn**
9. Install the four hex screws on the base of the Feedhorn (torque screws to 35.6 kgf-cm (30.0 in-lbs)) (refer to Figure C-6)

![Figure C-6: Reinstalling Feedhorn](image)

10. Continue with the “Unpack and Assembly” instructions provided with the unit
Configuration 2 Installation Process

Resolution

Configuration 2 requires two Co-Pol TRIAs (one for each polarization) and allows the end user to assemble the unit with the correct Co-Pol TRIA (based on the KACST Pro Portable Polarization Identification Map shown in Figure C-1).

Implementation

End users should perform the following to complete the Pro Portable installation process:

**Process 1:** Identifying the point where the installer will deviate from the instructions provided with the unit.
1. Begin with the “Unpack and Assembly” section of the instructions provided with the unit
2. Read through the steps and identify the step that specifies the identification of the Co-Pol TRIA and modem
3. Identify and/or mark the step number, as it will only refer to the unit having a single Co-Pol TRIA

   **NOTE:** See step 7 of the “Unpack and Assembly” section of the SurfBeam 2 Pro Portable Terminal manual released in September 2012.

**Process 2:** Identifying the correct Co-Pol TRIA.
1. Perform the steps outlined in the terminal manual until reaching the deviation point identified in the process described above
2. Verify the unit has two Co-Pol TRIAs: one unmarked and one marked with a striped label located on the Feedhorn just above the Feedhorn’s base and on the rear of the TRIA housing (refer to Figure C-7) (if the unit has one TRIA, refer to Configuration 1 Installation Process section)

   **Figure C-7: TRIA Labeling**

3. Using the provided map, locate the unit’s approximate deployment location (refer to Beam Identification and Co-Pol TRIA Modification/Selection section)
4. Identify the circle where the deployment location falls within the circle’s perimeter
5. Refer to Table C-2 for identifying the correct Polarization and designated Co-Pol TRIA

   **Table C-2: Configuration 2 – Polarization Identification**

<table>
<thead>
<tr>
<th>Beam Circle</th>
<th>Polarization</th>
<th>Designated Co-Pol TRIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>🟢</td>
<td>Left Hand Circular Polarization</td>
<td>Striped Labeled Co-Pol TRIA</td>
</tr>
<tr>
<td>🟥</td>
<td>Right Hand Circular Polarization</td>
<td>Unmarked Co-Pol TRIA</td>
</tr>
</tbody>
</table>

6. Remove the matching Co-Pol TRIA from the shipping container
7. Continue with the “Unpack and Assembly” instructions provided with the unit