Congratulations!

You have selected one of the most advanced land-mobile satellite tracking systems available today. KVH® Industries’ TracVision® SA is designed for use with DIRECTV® and the DISH™ Network. This manual provides detailed instructions on the proper installation, use, and maintenance of your TracVision SA system.

Throughout this manual, important information is marked for your attention by these icons:

- **A helpful tip that either directs you to a related area within the manual or offers suggestions on getting the highest quality out of your system.**
- **An alert to important information regarding procedures, product specifications, or product use.**
- **Information about installation, maintenance, troubleshooting, or other mechanical issues.**
- **An electrical safety warning to help identify electrical issues that can be a hazard to either this KVH product or a user.**

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TracVision SA Serial Number

This serial number will be required for all troubleshooting or service calls made regarding this product.
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DIRECTV® is an official trademark of DIRECTV, a unit of GM Hughes Electronics Corporation.

DISH™ Network is an official trademark of EchoStar Communications Corporation.
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1 Introduction

1.1 Digital Satellite Television

The DIRECTV® and DISH™ Network systems transmit digital audio and video data from land-based transmitters to a satellite “parked” above the equator. Each satellite relays the signals in spot beams covering the continental United States and contiguous waters. TracVision SA automatically identifies, locks on to and receives signals from the appropriate satellite when your vehicle is stationary.

1.2 TracVision SA System Overview

A complete satellite TV system includes the TracVision SA connected to an Integrated Receiver Decoder (IRD), aka a “satellite receiver,” and a television set. A desktop or laptop computer is used to conduct diagnostics. The interrelationship of units is illustrated in Figure 1-1. System specifications and a functional block diagram are provided in Appendices A and B, respectively.

![Figure 1-1]

TracVision SA is equipped with a single-port Low Noise Block (LNB) that can provide signals to a single IRD. Should you wish to equip your vehicle with multiple TVs and IRDs, a dual-port LNB is available as an option (KVH Part Number 19-0056).
1.2.1 TracVision SA Components

The Antenna Unit includes the antenna positioning mechanism, signal front end, power supply and control elements. These include antenna drive controls and mechanisms, the cable wrap subassembly, power conditioning and regulating circuits, and the RF detector. The antenna is a parabolic dish mounting a single-port low noise block (LNB) converter with built-in preamplifier. A molded ABS radome encloses the baseplate and is secured in place with standard fasteners. Liquid-tight (watertight) fittings located on the back of the baseplate join the power, signal, and control cabling from below-decks units.

**Figure 1-2**
Primary Components of the TracVision SA

![Diagram of TracVision SA components]

*Always lift the antenna unit by the gray baseplate and not the radome, antenna reflector, or internal mechanical assemblies. NEVER pick up the unit by the LNB!*

1.2.2 Integrated Receiver Decoder

The IRD receives satellite signals from the Antenna Unit for signal decoding, processing and channel selection, and sends the signals to the TV set for viewing. Messages are sent from the IRD to the Antenna Unit and messages are received from the Antenna Unit for display on the television screen. The IRD also provides the interface for the user to activate authorization for reception. Please refer to the User’s Manual provided with your selected IRD for complete operating instructions.
1.3 Materials Provided with TracVision SA

Table 1-1 lists the units, cables, and materials packed in the TracVision SA package by name and KVH part number.

<table>
<thead>
<tr>
<th>Component</th>
<th>KVH Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenna Unit (comprising):</td>
<td>01-0225-02</td>
</tr>
<tr>
<td>Baseplate Assembly</td>
<td>02-0952-02</td>
</tr>
<tr>
<td>Radome Assembly</td>
<td>02-0953-02</td>
</tr>
<tr>
<td>RF Cable (30’)</td>
<td>32-0589-30</td>
</tr>
<tr>
<td>Power Cable (30’)</td>
<td>32-0590-30</td>
</tr>
<tr>
<td>Data Cable (30’)</td>
<td>32-0591-30</td>
</tr>
<tr>
<td>Mounting Plate</td>
<td>20-0668</td>
</tr>
<tr>
<td>Kitpack*</td>
<td>72-0094</td>
</tr>
<tr>
<td>Installation and Operation Manual</td>
<td>54-0149</td>
</tr>
</tbody>
</table>

* A complete listing of kitpack contents is provided in Section 2.1.2, “Kitpack.”

1.3.1 Additional Materials Required for TracVision SA Use

To make full use of your new TracVision SA and receive satellite TV on the road, you will need to provide/purchase the following:

- Television
- Appropriate IRD for your selected satellite TV service (if using the DISH Network, a Model 4000 or 5000 IRD will be required)
- Sealing materials to weatherproof cable holes and seal mounting plate
- Optional KVH EchoStar Adapter (for use with the DISH Network service and IRD)

Operation of the DISH Network requires the purchase of an EchoStar IRD Adapter. To purchase an EchoStar Adapter, contact KVH or your local KVH dealer and ask for KVH Part Number 02-0899.
2 Installation

2.1 Overview of Installation

TracVision SA is designed for simple installation and setup. Just follow these easy steps:

1. Choose the antenna location.
2. Mount the antenna unit.
3. Connect the antenna unit cables.
4. Connect the antenna unit to the TV IRD.
5. Connect the TV IRD to the TV.

2.1.1 Installation Tools and Materials Required

- Electric drill
- \( \frac{1}{8} \)“-drill bit and \( \frac{1}{2} \)“ hole saw
- \( \frac{1}{2} \)“-socket wrench
- #2 Phillips and #0 flat tip screwdrivers
- Augat Snap ‘n Seal Crimp/Strip Tool (Part Number IT1000) if using the KVH-provided F-connector
- Silicone sealant or RTV
- Thread locker (as required)
- \( \frac{7}{16} \)“-open end wrench
- Wire strippers
- Adhesive suitable for specific roof construction and materials (e.g., butyl rubber adhesive tape or other liquid adhesive)
- Rivet Gun and \( \frac{7}{16} \)“-rivets (or other fastener suitable for specific roof construction)
- Terminal crimp tool
- Optional PC with terminal emulation software such as PROCOMM, Windows Terminal, or Windows 95 Hyperterminal

Plan the entire installation before proceeding! Take into account component placement, running cable distances between units, and accessibility to the equipment after installation.

The product serial number may be found in front of the antenna reflector on the rotating plate as well as on the inside front cover of this manual.

While some DIRECTV IRDs offer on-screen messages, it is recommended that a PC be available for all installations of both DIRECTV and EchoStar.
2.1.2 Kitpack

Table 2-1 lists the materials provided in the TracVision SA kitpack.

<table>
<thead>
<tr>
<th>Part</th>
<th>Qty</th>
<th>KVH Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rocker Switch</td>
<td>1</td>
<td>12-0048</td>
</tr>
<tr>
<td>Switch Plate</td>
<td>1</td>
<td>19-0167</td>
</tr>
<tr>
<td>RF F-Connector</td>
<td>2</td>
<td>23-0170</td>
</tr>
<tr>
<td>Terminal Crimp (female)</td>
<td>5</td>
<td>23-0188-03</td>
</tr>
<tr>
<td>1/4-20 x 5/8 hex screws</td>
<td>4</td>
<td>14-0250-0010</td>
</tr>
<tr>
<td>1/4 flat washers</td>
<td>4</td>
<td>14-0251</td>
</tr>
<tr>
<td>Tie-wraps</td>
<td>5</td>
<td>22-0013</td>
</tr>
<tr>
<td>Flash kit cable and adapter</td>
<td>1</td>
<td>02-1029</td>
</tr>
</tbody>
</table>

2.2 Choosing the Best Location

- The ideal antenna site has a clear view of the horizon/satellite all around.
- Keep the antenna clear of any obstructions on the roof (e.g., air conditioners).
- Consider the location of the antenna relative to the location of any equipment or necessary wiring within the vehicle.
- For best operation, mount the antenna on a horizontal surface.

2.3 Mounting the Antenna Unit

1. Remove antenna unit from shipping container.
2. Remove and save the 8 pan head screws and sealing washers that hold radome to baseplate. Carefully lift radome straight up until clear of antenna assembly and set aside.
3. Position antenna unit in desired location on the centerline of the vehicle with baseplate and mounting plate arrows facing in the same direction (either forward or backward). The proper orientation is illustrated in Figure 2-1 on the following page.
4. While the baseplate is in place, mark location(s) on roof for cable access to permit convenient cable access to the liquid-tight fittings on the back of the baseplate.

5. Cut tie-wraps holding antenna unit to the forward shipping restraint.

6. Remove additional nuts and washers connecting baseplate and shipping restraints to the mounting plate. The positions of all three shipping restraints are pictured in Figure 2-3.

Do not discard the shipping restraints, washers, or the nuts. Save them for future use in case the antenna unit needs to be removed and shipped to another location. Four \( \frac{1}{4} \times \frac{5}{8} \) hex head screws have been provided in the kitpack for shipping as the bolts used to hold the shipping restraint during initial shipping are integral parts of the mounting plate.

Figure 2-1
Proper Orientation of the Antenna Unit

Figure 2-2
Forward Shipping Restraint (Arranged for Shipping)

Figure 2-3
TracVision SA Shipping Restraints (Top View)
7. Remove antenna unit from mounting plate.

8. The mounting plate allows the antenna unit to be mounted on a curved roof. While the perimeter of the mounting plate is secured to the vehicle with the appropriate fasteners, two flexible wings allow the rear mounting bolts to attach to the antenna baseplate. These may be angled upward to ensure a secure mounting, as shown in Figure 2-4.

![Figure 2-4](Mounting the Unit on a Curved Surface)

9. Using the mounting plate as a template, drill twenty-three \(\frac{3}{16}\)"-holes through roof of vehicle. Remove plate and clean roof surface. The dimensions of the baseplate are shown in Figure 2-5.

![Figure 2-5](Baseplate Dimensions)
10. Place a strip of black butyl rubber adhesive or an equivalent over all holes. If using a liquid construction adhesive, apply bead to mounting plate in a zig-zag pattern.

11. Reposition mounting plate over tape/adhesive and attach using 3/16"-diameter rivets (or appropriate fasteners). Seal all rivet heads and edges with silicone.

12. Drill cable access hole(s) in vehicle.

13. When unit is installed with connectors facing the rear of the vehicle, the factory-drilled drain holes are located as shown in Figure 2-6a.

13a. (Alternate Drain Hole Locations) If the antenna unit is installed with the connectors facing the front of the vehicle, drill out 3/16"-drain holes in rear-facing side of baseplate as illustrated in Figure 2-6b. The existing factory-drilled drain holes shown in Figure 2-6a must then be plugged with silicone rubber sealant.
14. Place antenna unit on mounting plate and secure using nuts and washers removed in Step 2.

15. For convenient storage, the forward shipping restraint may be rotated 180° and secured to its original mounting bolts as pictured in Figure 2-7.

16. Proceed to Section 2.4, “Connecting the Antenna Unit,” to wire the TracVision SA system. The radome will be placed back on the baseplate using the hardware removed in Step 2 after wiring and initializing the system.

2.4 Connecting the Antenna Unit

The following sections provide instructions for properly wiring the Antenna Unit to the IRD and to vehicle power.

Tips for Safe and Successful Wiring within the TracVision SA Baseplate

- When attaching cables to the TracVision SA terminal connector strips, make sure the insulation is stripped back approximately 1/4". Twist the wires gently to help achieve a good connection. Do not pinch insulation inside the connector.

- After attaching the power and data cables to the appropriate terminal connector strips, tug gently to ensure a firm connection.

- After attaching cables within the TracVision SA baseplate, eliminate any unnecessary slack in the cables before tightening the liquid-tight fittings.
- Run the RF signal cable into the baseplate last. It will help keep the power and data cables clear of the antenna and LNB.

- After hooking up all of the wiring and removing any slack, slowly rotate, raise, and lower the antenna reflector to make certain that the cables are all clear of any moving elements.

- Check to be certain that the elevation axis actuator motor shaft (pictured in Section 5, Maintenance, Figure 5-2) clears all cable connections.

- Completely seal all rooftop cable access holes.

**TracVision SA Cable Ports**

On one side of the baseplate are four liquid-tight fittings, which serve the dual purpose of relieving strain on the cables as well as providing a tight seal around the cable access ports.

When wiring is done properly, the sets of cables will overlap each other, as illustrated in Figure 2-11.
2.4.1 Connecting the Antenna Data Cable to the IRD

TracVision SA will not function properly unless you connect the data cable, the procedures for which vary based on your selected satellite TV service. The end of the data cable fitted with two DB9 connectors remains within the vehicle. This will be hooked up to the IRD as discussed later. For your reference, the pin assignments for the data cable DB9 connectors are detailed in Appendix C. The other end of the data cable will be attached to the TracVision SA as described in the following section.

TracVision SA Data Cable Wiring Process

1. Feed the cable up to the roof and through the third liquid-tight fitting (#3) from the left as pictured in Figure 2-10.

2. Refer to Figure 2-12 for the proper arrangement of data cable wires within the terminal strip.

3. After connecting the data cable to the TracVision SA, hook up the other end to the IRD as described in the next subsections.

DIRECTV

The data cable for TracVision SA is equipped with a male DB9 (low-speed data port) connector. Connect the DB9 connector on the data cable to the low-speed data port on the back of the IRD.

Wiring to an IRD with a DB15 Connector

Should the IRD only be equipped with a DB15 connector, contact KVH for an adapter or follow the alternate wiring directions provided in Appendix C.
DISH Network

Unlike the DIRECTV IRDs, the EchoStar IRD used with the DISH Network is not equipped with a DB9 connector. As a result, you will need to purchase an EchoStar Adapter (KVH Part Number 02-0899).

The rear of the DISH Network IRD has a port labeled “High Speed Data Port.”

1. Remove the protective metal plate to expose the High Speed Data Port. (Save the screws and plate in the IRD packing material in case the unit must be returned for repairs.)

2. Install the KVH EchoStar Adapter as shown in Figure 2-14. Secure the Adapter to the IRD using the captive screws in the Adapter.

3. Connect the DB9 connector on the data cable to the EchoStar Adapter DB9.

Commissioning the IRD

Please refer to the user manual that accompanied your IRD for instructions on properly commissioning the system.

EchoStar Commissioning Issues

EchoStar IRDs that have not been commissioned within several months of manufacture require additional steps to complete the process. Refer to Appendix D for complete details.
2.4.2 Connecting the Antenna to Vehicle Power

Tips for Safe and Successful Wiring within the TracVision SA Baseplate

- When attaching cables to the TracVision SA terminal connector strips, make sure the insulation is stripped back approximately ¼˝. Twist the wires gently to help achieve a good connection. Do not pinch insulation inside the connector.

- After attaching the power and data cables to the appropriate terminal connector strips, tug gently to ensure a firm connection.

- After attaching cables within the TracVision SA baseplate, eliminate any unnecessary slack in the cables before tightening the liquid-tight fittings.

Connecting to Vehicle Power

TracVision SA must be connected to a +12 volt DC, 2.5-3.5 amp power supply to operate. The supplied power cable should be run up to the antenna unit, through the far right liquid-tight fitting (#4 – refer to Figure 2-10), and wired to the terminal connector strip as illustrated in Figure 2-16.

TracVision SA comes equipped with a KVH standard 30-foot power cable, a rocker switch, and a switch panel. Power cables of other lengths are also available through KVH distributors.

Figure 2-17 on the following page illustrates the internal wiring arrangement for TracVision SA within the vehicle, including the supplied rocker switch. When wiring the rocker switch, it is recommended that the shield wire from the TracVision SA be connected to the shield from vehicle power.
2.4.3 Connecting the Antenna RF Signal Cable to the IRD

The RF signal cable is fitted with an F-type connector at only one end and should be attached to TracVision SA and the IRD as follows:

1. Feed the bare end of the RF signal cable through the #2 liquid-tight fitting at the back of the TracVision SA baseplate and away from the dome. Leave the F-connector inside the TracVision SA baseplate (as pictured in Figure 2-18).

When shipped from the factory, the #1 liquid-tight fitting is sealed with a rubber stopper. Leave the stopper in the fitting unless you are going to install a dual output LNB and be connect a second RF cable to the TracVision SA.
2. Connect the RF signal cable’s F-connector to the plug labeled RF1.

3. Feed the bare end of the RF signal cable and pass through the cable hole drilled earlier and into the vehicle.

4. Attach the provided F-connector to the end of the RF signal cable inside the vessel as illustrated in Figure 2-19a-d, using an Augat Snap ‘n Seal Crimp/Strip tool to lock the connector on the cable.
   a. Slide compression fitting onto raw cable before beginning connector termination.
   b. Twist and break off connector body.
   c. Use Augat tool to strip center conductor and trim back overall jacket. Do not cut through braid.
   d. Slide connector body onto the prepared cable. Slide the compression fitting up into the connector body. Use Augat tool to snap on the connector.

5. Attach the cable to the IRD connector labeled SATELLITE IN.
2.5 Checking Out the System

Power up the TracVision SA system and IRD and observe messages on your TV screen to verify proper operation. Some messages originate in the IRD, others are generated in the TracVision SA circuits.

Depending on your choice of satellite TV service and IRD, the system may display several text messages on the television screen to aid in monitoring TracVision SA performance. These messages are not displayed when the IRD is displaying the Signal Strength Meter on the TV screen. The messages and their meanings are described in Table 2-2.

<table>
<thead>
<tr>
<th>Message</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>KVH TracVision SA</td>
<td>Displays for 5 seconds at startup</td>
</tr>
<tr>
<td>Software Version</td>
<td>Current software version</td>
</tr>
<tr>
<td></td>
<td>Alternates with “KVH TracVision SA”</td>
</tr>
<tr>
<td>Initializing</td>
<td>System initializing</td>
</tr>
<tr>
<td>Search Mode 1</td>
<td>Antenna Unit in Search Mode 1</td>
</tr>
<tr>
<td>Search Mode 2</td>
<td>Antenna Unit in Search Mode 2</td>
</tr>
<tr>
<td>Search Mode 3</td>
<td>Antenna Unit in Search Mode 3</td>
</tr>
<tr>
<td>Reacquisition</td>
<td>System is reacquiring the satellite</td>
</tr>
<tr>
<td>RF Signal Error</td>
<td>RF signal detector has no signal at input</td>
</tr>
<tr>
<td>AZ Motor Error</td>
<td>Fault detected in azimuth drive subassembly</td>
</tr>
<tr>
<td>EL Motor Error</td>
<td>Fault detected in elevation drive subassembly</td>
</tr>
</tbody>
</table>

Differences among IRD data ports may result in different message formats, and some messages may not be displayed on the television screen. DSS messages you may see are listed in Table 2-3.

<table>
<thead>
<tr>
<th>Message</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Searching for satellite – please stand by</td>
<td>The IRD is powered up and doesn’t detect the satellite signal.</td>
</tr>
<tr>
<td>Searching for program guide – please stand by</td>
<td>The system has found the satellite, but has been turned off for more than approximately four hours. This message appears for about 10 seconds.</td>
</tr>
</tbody>
</table>

Refer to your DSS User’s Manual for specific messages displayed by your system.

Table 2-2
TracVision SA Operational Messages

Table 2-3
DSS On-screen Messages

The DISH Network and some newer IRDs (e.g., the Sony A50) give priority to internal IRD messages rather than on-screen messages. KVH recommends that the maintenance port must be used to read installation-related messages on a PC.
2.6 Completing the Installation Process

If the system has initialized properly and is functioning, replace the radome on the baseplate (labels on the sides), securing it with the eight pan head screws and flat washers removed at the start of the installation process.

As noted previously, while some DIRECTV IRDs offer on-screen messages, it is recommended that a PC be available for all installations of both DIRECTV and EchoStar. This will permit the installer to record the TracVision SA startup sequence to verify that the unit is functioning within specified parameters. Baseline startup parameters (with optimal ranges) have been provided in Appendix E.

2.7 Configuring TracVision SA for Remote Satellite Dish Operation

In some campground locations, dense foliage will block the satellite signal. In these situations, a remote portable antenna may be the only solution to satellite signal reception.

The wiring option for the remote dish is very simple and should be installed when the TracVision is installed. A high-quality “A/B switch” should be used to change from TracVision to remote antenna operation. The recommended wiring arrangement for remote dish operation is illustrated in Figure 2-20.
3 Operation

The TracVision SA system is easy to use. Antenna unit initialization and satellite acquisition is automatic and does not require any operator intervention.

To use the TracVision SA system, the vehicle must be stationary. Once the vehicle is parked:

1. Turn on the IRD and the television.
2. Apply operating power to the antenna unit.

Refer to your IRD user manual for complete operating instructions for the IRD.

A clear line of sight to the satellite helps ensure that the antenna can acquire and track the satellite.

The system carries out a number of automated steps at startup. For reference, these steps are outlined in Table 3-1.

### Table 3-1
**TracVision SA Automated Procedures**

<table>
<thead>
<tr>
<th>Step</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenna Unit Initialization</td>
<td>The microprocessor circuitry does a basic self-test of the hardware and software associated with the antenna unit.</td>
</tr>
<tr>
<td>IRD Identification</td>
<td>The microprocessor next queries the IRD to determine whether it is a DIRECTV or DISH Network IRD. Based on the IRD type, the system will then set various system variables to ensure that the correct satellite is found during Search Mode.</td>
</tr>
<tr>
<td>Satellite RF Threshold</td>
<td>The antenna is pointed at the north, south, east and west horizons to determine the background noise level and to calculate the minimum signal level required for satellite acquisition.</td>
</tr>
<tr>
<td>Satellite Search Modes</td>
<td>The system design includes three search modes to acquire the satellite.</td>
</tr>
<tr>
<td>Search Mode 1</td>
<td>The antenna makes three complete revolutions at the saved elevation.</td>
</tr>
<tr>
<td>Step</td>
<td>Actions</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Reacquisition Search (Search Mode 2)</td>
<td>The antenna will search in a “window” of 6˚ around the satellite’s last known elevation.</td>
</tr>
<tr>
<td>Search Mode 3</td>
<td>The antenna conducts a complete sky search, making continuous revolutions at steadily increasing elevations (from 20˚ to 70˚).</td>
</tr>
<tr>
<td>Fine-tuning/Satellite Verification</td>
<td>When a signal is detected, the antenna interrupts the search mode and begins a procedure to fine-tune the position for maximum signal strength. When the signal peak is found, the IRD is queried to determine if it can decode the peaked signal. If it is able to decode and lock onto the signal, then the system enters park mode.</td>
</tr>
</tbody>
</table>

### Using Your TracVision SA When Parked

When your vehicle is stopped, it is not necessary for the TracVision SA to be turned on. After parking your vehicle and confirming that the antenna is receiving the satellite signal, you may turn off the TracVision SA unit to avoid unnecessary use of power. The antenna will continue to receive the satellite TV signals and relay them to the IRD.

**“Instant On” Operation**

As part of its operation, TracVision SA routinely saves the satellite position to memory and retains it when the system is turned off. When TracVision SA is powered up, the system looks at the satellite’s last saved position. If the vehicle has not changed its location, the antenna will immediately acquire the satellite and receive the signal without initializing the antenna.

If the vehicle moves after TracVision SA is turned off, the Antenna Unit will quickly carry out its normal initialization routine to reacquire the satellite.
4 Troubleshooting

The troubleshooting matrix shown in Table 4-1 identifies some trouble symptoms, their possible causes, and references to troubleshooting solutions.

### Table 4-1
Troubleshooting Matrix

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>POSSIBLE CAUSE (AND SOLUTION)</th>
<th>X</th>
<th>X</th>
<th>X</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenna non-functional</td>
<td>Blown fuse or lack of power</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No IRD status message</td>
<td>Outside satellite blocked</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>No picture on TV set</td>
<td>IRD data port or cable/wiring</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Intermittent picture for short intervals</td>
<td>EchoStar IRD commissioning (Section 4.2.3)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>System will not find satellite</td>
<td>Failed IRD status check (Section 4.2.5)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Snowy television picture</td>
<td>LNB assembly faulty (Section 4.3)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IRD locks up</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.1 Causes and Remedies for Common Operational Issues

There are a number of common issues that can affect the signal reception quality or the operation of the TracVision SA. The following sections address these issues and potential solutions.
4.1.1 Blown Fuse or No Power

If the Antenna Unit is installed but entirely non-responsive, there are two key factors to check as part of the troubleshooting process:

1. Blown Fuse – The Antenna Unit is equipped with a fuse mounted on its CPU Board. If this fuse has blown or been broken, the Antenna Unit will not operate. Refer to Section 5.4.1, “PCB Removal and Replacement,” for details on the fuse location and how to access the CPU Board.

2. Wiring – If the system has been improperly wired, it will prevent the Antenna Unit from operating correctly. Refer to Section 2.4.2, “Connecting the Antenna to Vehicle Power,” for complete system wiring information.

4.1.2 Satellite Signal Blocked

Satellite signals can be blocked or degraded by trees and branches, buildings, mountains, overpasses, or equipment on the vehicle itself. Refer to Section 2.2, “Choosing the Best Location,” to make certain that the TracVision SA unit is in the optimal location. Simply moving the vehicle to clear an external obstruction will also restore signal quality.

4.1.3 Outside Satellite Coverage Zone

TracVision SA will provide outstanding reception throughout the entire coverage area for your satellite television service of choice. However, signal quality can be degraded as you approach the fringe coverage areas (e.g., Northern Maine). Refer to your satellite television service manual to check the viable coverage area.

4.1.4 Incorrect or Loose RF Connectors

As part of preventive maintenance (described in Section 5, “Maintenance,”) KVH recommends checking the Antenna Unit cable connections. A loose RF connector can reduce the signal quality. Refer to Section 2.4.3, “Connecting the Antenna RF Signal Cable to the IRD” for directions on proper Antenna Unit to RF cabling.
4.2 IRD Troubleshooting

The IRD that was provided with your satellite television service may also be the cause of less-than-ideal operation.

4.2.1 IRD Data Port or Cable/Wiring

Refer to Section 2.4.1, “Connecting the Antenna Unit Data Cable to the IRD” and your IRD user manual to confirm that the IRD is properly connected to the Antenna Unit and the television.

4.2.2 AC Power Fluctuating

If the system periodically displays a picture for less than one minute, then enters Search Mode 1, the IRD data port may be locked up as the result of power fluctuations and will require a reset. This can be verified by hooking up a PC to the data port and checking for error messages. Reset must be done by:

1. Completely shutting down DC power to the antenna.
2. Remove the AC source, either at the breaker or by unplugging the IRD.
3. Wait at least 10 seconds before restoring power first to the IRD and then to the antenna.

4.2.3 EchoStar IRD Commissioning Check

If you have purchased a DISH Network system, there is a chance that your EchoStar IRD will fail to acquire the satellite when you first activate it. This has been known to happen in IRDs that have not been commissioned within several months of their manufacture. Appendix D provides the manual satellite acquisition and commissioning procedure.

4.2.4 Failed IRD Status Check

As detailed in Appendix E, TracVision SA completes a detailed startup routine whenever it is turned on. One of the first checks is the IRD status test. As noted in the typical startup cycles, the expectation is that the IRD and its communications link to TracVision SA will pass this test. There are, however, two alternate results, each indicating a slightly different problem.

The long-term fix, typically done at original system installation, is to install an Uninterruptible Power Supply (like those available for use with computer systems) on the IRD. Be sure to specify a UPS with adequate available current for all devices attached to it. (An IRD draws approximately 200 watts.)
Test Result: NONE

If the system tests achieves a result of **NONE**, there is no communication at all between the antenna unit and the IRD.

**Solution**

Check to be certain the IRD and TracVision SA are connected properly at the low-speed data port. Refer to *[Section 2.4, “Connecting the Antenna Unit,”]* for correct Antenna Unit to IRD wiring procedures and diagrams. After verifying the connection, cycle the power on and off and review the startup test results.

Test Result: UNKNOWN

In the instance of a result of **UNKNOWN**, a communications link exists, but the data received by the antenna unit is garbled and unrecognizable.

**Solution**

As with a result of **NONE**, first check to be certain the IRD and TracVision SA are connected properly at the low-speed data port. Refer to *[Section 2.4, “Connecting the Antenna Unit,”]* for correct Antenna Unit to IRD wiring procedures and diagrams. After verifying the connection, cycle the power on and off and review the startup test results. If this does not initially succeed, refer to *[Section 4.2.2, “AC Power Fluctuating,”]* and follow the IRD reset procedure.

4.2.5 IRD Faulty

In the case of a faulty IRD, refer to your IRD user manual for service, replacement, and warranty information.

4.3 LNB Faults

*[Section 5, “Maintenance,”]* provides detailed instructions for authorized service personnel who may be required to replace the TracVision SA LNB.
4.4 Computer Diagnostics

TracVision SA has been designed to provide diagnostic readouts viewed on the TV screen (DSS only) or on a personal computer having an RS-232 serial communication port. If you are unable to isolate a system problem with the foregoing troubleshooting tools, set up for computer diagnostics as described below. System problems will most likely be found somewhere through the diagnostic readouts.

The diagnostics procedure requires terminal emulation software such as PROCOMM, Windows Terminal, or Windows 95 Hyperterminal. Use the settings appropriate to your application.

1. Connect one end of the PC cable to the DB9 connector on the switchplate. Connect the other end to the serial port on the PC (a 9-pin/25-pin connector adapter may be needed for some PCs).

2. Open the terminal emulation software and establish the following settings:
   - 9600 baud
   - no parity
   - 8 data bits
   - 1 start bit
   - 1 stop bit
   - no flow control

3. Apply power to the TracVision SA system and allow the system to complete full initialization. Data should be scrolling on the PC display to identify any system problems detected. If no data is seen, recheck your connections and the terminal software setup.

4.5 Maintenance Port Parser Commands

TracVision SA system parser commands are detailed in Appendix F.
5 Maintenance

5.1 Warranty/Service Information

KVH Industries, Inc. warrants the KVH product purchased against defects in materials for a period of TWO (2) years and against labor costs for a period of ONE (1) year from the date of original retail purchase by the original purchaser. It is the customer’s responsibility to verify the date of purchase by returning the warranty card included with the product to KVH within 30 days of purchase, or by providing a copy of a dated sales receipt for the KVH product under warranty with the warranty claim. If this date cannot be verified, the warranty period will begin 30 days after the date of manufacture of the original product purchased.

For additional information on KVH warranty, repair, and liability policies, please refer to the complete warranty statement provided at the conclusion of this manual.

5.2 Preventive Maintenance

TracVision SA requires minimal preventive maintenance. The following tasks are sufficient to maintain peak performance.

Monthly

- Wash the exterior of the radome and baseplate assembly with fresh water; a mild detergent may be added to remove grime. Do not spray the radome directly with high-pressure water.

- Do not apply abrasive cleaners or volatile solvents such as acetone to the ABS radome.

Annually

- Remove the radome and examine the interior of the Antenna Unit for signs of corrosion, loose connections, or frayed or broken wires.

- Clean and wax the radome.

- Visually inspect the elevation drive shaft to be certain that it moves easily and is clear of grit and debris. Clean and lubricate with silicone or white lithium grease as required.

The serial number of your TracVision SA will be required during any troubleshooting or service calls. You will find the serial number on the inside front cover of this manual as well as in front of the antenna reflector on the rotating plate.
5.3 Replaceable Parts

TracVision SA has been designed with durability and low maintenance in mind. If you experience an operating problem or otherwise require technical assistance, contact your local authorized TracVision SA dealer/installer first. Have the Antenna Unit serial number ready with a list of the trouble symptoms. If an authorized dealer/installer is not located nearby, contact the factory directly at the telephone, facsimile, or e-mail listings inside the front cover.

Replacement part numbers for units that can be serviced in the field are listed in Table 5-1. These parts may be obtained from any KVH authorized dealer/installer.

<table>
<thead>
<tr>
<th>Part Name</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radome Assembly</td>
<td>02-0953-02</td>
</tr>
<tr>
<td>Power Cable</td>
<td>32-0590-30</td>
</tr>
<tr>
<td>Data Cable</td>
<td>32-0591-30</td>
</tr>
<tr>
<td>EchoStar Adapter Unit *</td>
<td>02-0899</td>
</tr>
<tr>
<td>CPU PCB</td>
<td>02-0954</td>
</tr>
<tr>
<td>RF PCB</td>
<td>02-0826</td>
</tr>
<tr>
<td>System Fuse</td>
<td>16-0017-4000</td>
</tr>
<tr>
<td>LNB</td>
<td>19-0194</td>
</tr>
</tbody>
</table>

* Optional, purchased separately

Should the fuse ever need to be replaced, TracVision SA uses a 5x20mm, 4-amp, 250-volt fast-blow fuse.

It is recommended that all other technical difficulties be resolved by returning the TracVision SA unit to an authorized service provider.
5.4 Field Replaceable Unit Procedures

The following subsections provide detailed procedures for repairing or swapping out field replaceable units. The procedures refer to labeled items presented on the following isometric diagrams, which are based on KVH assembly drawings.

Always lift the antenna unit by the gray baseplate, never by the radome or any portion of the antenna assembly!

Figure 5-1
Antenna, PCB, and Rotating Plate

Figure 5-2
Close-up of Linear Actuator, Pivot Bracket, and Pin
Figure 5-3
Antenna Assembly

Figure 5-4
Close-up of RF Detector, PCB, and Cover

Apply clamp directly behind ferrite as shown
5.4.1 PCB Removal and Replacement

**Estimated Time to Repair: ½ hour**

The microprocessor PCB assembly (Item 1) is protected by a cover (Item 21) fastened to the rotating plate (Item 11) – Fig. 5-1. The cover must be removed to gain access to the main power fuse and the PCB assembly.

1. Remove quick release pin (Item 14) from actuator pivot bracket (Item 8) – Fig. 5-2.
2. Remove shaft from linear actuator (Item 7) – Fig. 5-2.
3. Remove 16 pan head screws (Item 60) from the cover flanges. Remove PCB cover – Fig. 5-1.
4. Remove cable connectors from PCB.
5. The PCB is mounted to the rotating plate with 10 pan head screws. Figure 5-5 illustrates the PCB arrangement and connector locations.

6. Reverse this process to install the replacement PCB. Reinstall all cable connectors removed in Step 4.
7. Carry out the LNB calibration procedure (Section 5.4.3).

---

**Figure 5-5**

PCB Connector Locations – Rear View (not to scale)

---

When carrying out maintenance on the PCB, be sure to not drop any of the small screws inside the mechanism. If a screw is lost within the baseplate, it must be retrieved to avoid causing any damage when the unit rotates.

TracVision SA is equipped with a 5x220 mm, 4-amp, 250 volt fast-blow fuse, which is mounted on the PCB. To access and replace the fuse, remove the PCB cover.
5.4.2 RF Detector

Estimated Time to Repair: ½ hour

The RF Detector PCB (Item 2) receives operating voltages from both the CPU board and the IRD (via the RF cable) – Fig. 5-1. Ensure that all power is turned off before proceeding.

1. Remove 2 RF connectors from the coaxial fittings on the PCB. Tag the cables to ensure that they are returned to the same connectors.

2. Remove the Molex connector from J3 – Fig. 5-5.

3. Remove 3 pan head screws (Item 33) – Fig. 5-4. Remove the RF Detector PCB from the rotating plate.

4. Installation of the replacement RF Detector is the reverse of this procedure. Be sure that the RF cables are restored to their original positions. Be sure that the center conductor pin is centered in the connector before tightening the collar.

5.4.3 Antenna LNB Replacement

Estimated Time to Repair: ½ hour

The LNB (Item 19) receives preamplifier operating power from the IRD via the RF Detector PCB – Fig. 5-3. Be certain that the IRD is disconnected from its power source before removing or reconnecting the LNB.

1. Disconnect both RF coaxial connectors at the LNB. Remove 4 pan head screws and washers (Items 57 and 58) – Fig. 5-3.

2. Remove LNB clamp (Item 23) – Fig. 5-3.

3. Remove LNB.

4. Replacement is the reverse of this procedure. Check the rotation to ensure that the LNB is not striking any wires or the baseplate.

Antenna LNB Normalization and Stability Test

1. Type `HALT<cr>` to put the system into Idle Mode.

2. Type `DEBUGON<cr>` to put the system into Debug Mode.
3. Use the PC 2, 4, 6, and 8 keys along with the Signal Strength Display Meter on the TV screen to peak the RF Signal.

4. Type **=CALLNB<cr>** to start the LNB Normalization Function.
   
   Note: The CALLNB Function requires the antenna to be pointed directly at the satellite peak before performing this routine.

5. The system must respond with the following message: **CALLNB: PASS**. If the system displays **CALLNB: FAIL**, return to step 1 and retry the procedure, making sure to achieve the highest possible RF signal peak.

6. Record the Cold Sky Average and the RFGAIN value reported in step 5.

7. Type **ZAP<cr>**. The system will re-initialize using the new RFGAIN and RFOFFSET scale factors displayed following step 5.

8. Wait for the system to perform the background noise calculation. Read the Average Noise Level value from the messages transmitted out the maintenance port. This value must be greater than 300 and less than 1300. An example of the message sequence and format is as follows:
   
   *** Averaging Background Noise ***
   
   Average Noise Level = 750
   
   Noise Threshold = 1450

9. Wait for the system to search for, find the satellite, enter Tracking Mode and track the satellite for a minimum of 30 seconds. Record the average RF signal value reported from the **+POS: AZ, EL, RF** messages. An example of the message sequence and format is as follows:
   
   +POS: 154.5 33.2 2521

10. The RF signal values while tracking shall be greater than 2000 and less than 3000.
5.4.4 **EchoStar Adapter Replacement**

**Estimated Time to Repair: ½ hour**

Use the following procedure to replace the EchoStar Adapter:

1. Remove power from Antenna and unplug IRD from AC power.
2. Observe static precautions.
3. Unscrew and remove DB9 cable connector from the Adapter.
4. Unscrew thumbscrews securing Adapter to IRD.
5. Carefully remove Adapter from IRD card edge.
6. Install new Adapter on the IRD card edge. Secure the Adapter and reinstall cable.

5.5 **Preparation for Shipment**

**Estimated Time: 1 hour**

If it is necessary to repack the Antenna Unit for shipment, the shipping restraints removed during installation must be replaced. Follow these steps to reinstall the restraints.

1. Rotate the antenna unit so that the LNB is facing forward (away from the liquid-tight fittings).
2. Attach the three restraints to the baseplate using the ¼”-20 x ½” long hex screws (provided as part of the kitpack), washers, and nuts (removed from shipping restraint during installation) as pictured in Figure 5-6 on the following page.
3. Place the antenna bracket on the forward shipping restraint.
4. Secure the forward restraint and bracket by wrapping three tie-wraps around the bend in the forward restraint and the antenna bracket (at the end of the LNB bracket).
Figure 5-6
Attaching the Shipping Restraints to the Antenna Baseplate

Figure 5-7
Securing the Forward Shipping Restraint

2 tie-wraps used to secure LNB arm
Forward Shipping Restraint
Nuts and Washers
Hex Screws and Washers
Appendix A
System Specifications

### Physical Characteristics

<table>
<thead>
<tr>
<th>Power</th>
<th>11-16 volts DC @ 2.5 amps nominal, 3.5 amps peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions/Weight</td>
<td>31” wide x 14.5” high/ 33 lbs</td>
</tr>
<tr>
<td>LNB</td>
<td>Single Output</td>
</tr>
<tr>
<td>Maintenance Port</td>
<td>9600 bps, 8,N,1,EIA, RS232</td>
</tr>
</tbody>
</table>

### Pointing System

<table>
<thead>
<tr>
<th>Elevation Range</th>
<th>15˚ to 75˚</th>
</tr>
</thead>
<tbody>
<tr>
<td>Azimuth Range</td>
<td>360˚</td>
</tr>
<tr>
<td>Position Repeatability</td>
<td>0.1˚</td>
</tr>
</tbody>
</table>

### Environmental

<table>
<thead>
<tr>
<th>Operating Temperature</th>
<th>-25˚C to +55˚C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Temperature</td>
<td>-40˚C to +85˚C</td>
</tr>
<tr>
<td>Humidity</td>
<td>to 100 percent</td>
</tr>
</tbody>
</table>
Appendix B
Functional Block Diagram

In-vehicle Components

TV

DSS or EchoStar IRD

PC

Power +12v DC

Terminal Connectors

RF1

IRD

Maint.

Power

Power Switch

TracVision SA Antenna Unit Components/Wiring

LNB

RF Detector

CPU/Motor Driver/Power Supply

Elevation Motor

Azimuth Motor

Elevation Limit Switch

Azimuth Motor Switch

Cable Assignments
RF1..............................RF Cable (32-0589-30)
IRD/Maint......................Data Cable (32-0591-30)
Power.........................Power Cable (32-0590-30)
Appendix C
Data Cable Wiring

C.1  Wiring TracVision SA to a 15-pin Data Connector

In some instances, the IRD provided with a satellite TV service may be equipped with a 15-pin connector (DB15 wide-band data port), rather than a 9-pin connector (DB9 low-speed data port). There are two methods that will allow a TracVision SA system to function through a DB15 port.

Splicing a DB15 Connector to the Data Cable

It is possible to splice a DB15 connector to the TracVision SA data cable after removing the male DB9 connector. The alternate wiring arrangement is as follows:

<table>
<thead>
<tr>
<th>DB9 Pin</th>
<th>Wire Color</th>
<th>Function</th>
<th>DB15 Pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Blue/White</td>
<td>TXD</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>White/Blue</td>
<td>RXD</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>Green/White</td>
<td>GND</td>
<td>7</td>
</tr>
</tbody>
</table>

Creating a DB9-to-DB15 Adapter

It is also possible to construct a DB9-to-DB15 adapter that will remove the need to cut and splice the data cable. When constructing such an adapter, follow the DB9-to-DB15 pin arrangement detailed in Table C-1.

Table C-1
Alternate Wiring Arrangement for TracVision SA Data Cable to DB15 (15-wire) Connector
C.2 DB9 Data Connector Pin Assignments

During the troubleshooting or maintenance process, it may be necessary to check the DB9 data connectors to ensure that it is operating properly. With that in mind, Figure C-1 and Table C-2 detail the pin assignments for both the male and female DB9 connectors.

<table>
<thead>
<tr>
<th>From Connector</th>
<th>Wire Color</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male Connector Pin 2</td>
<td>Blu/Wht</td>
<td>DSSTXD</td>
</tr>
<tr>
<td>Male Connector Pin 3</td>
<td>Wht/Blu</td>
<td>DSSRXD</td>
</tr>
<tr>
<td>Male Connector Pin 5</td>
<td>Grn/Wht</td>
<td>DSSGND</td>
</tr>
<tr>
<td>Female Connector Socket 2</td>
<td>Org/Wht</td>
<td>PCRXD</td>
</tr>
<tr>
<td>Female Connector Socket 3</td>
<td>Wht/Org</td>
<td>PCTXD</td>
</tr>
<tr>
<td>Female Connector Socket 5</td>
<td>Brn/Wht</td>
<td>PCGND</td>
</tr>
</tbody>
</table>

**Table C-2**

db9 Pin Functions and Color Code

**Figure C-1**

DB9 Male and Female Connector Arrangement
Appendix D

EchoStar IRD Commissioning Procedure

If you have purchased a DISH Network system, there is a chance that your EchoStar IRD will fail to acquire the satellite when you first activate it. This has been known to happen in IRDs that have not been commissioned within several months of their manufacture. The following process is a manual method of acquiring the satellite for the first time so that the IRD can download the most up-to-date satellite and programming data, allowing it to automatically acquire the satellite from then on.

Please refer to your EchoStar IRD user manual for complete instructions on the IRD, the remote control, and the command screens.

Manual Satellite Acquisition and IRD Commissioning

1. Turn on TV and EchoStar IRD.
2. Using EchoStar remote, press MENU.
   - The Main Menu will come up on the Screen.
3. Select #6, System Setup.
4. Select #1, Installation.
5. Select #1, Point Dish/Signal.
   - The Signal Strength Screen will appear.
6. Using remote, select the zip code box on the screen, and input the local zip code.
   - The screen will show you the Azimuth and Elevation to the satellite. Write this down.
7. Connect a PC to the data port.
8. Turn on the TracVision SA.
9. Type **HALT <CR>** after receiving the message
   *** Entering Search Mode 1 ***.
10. Type in the elevation that you obtained in step 6.

It will be necessary to have a PC available to complete the manual acquisition and commissioning procedure.
11. Using a compass, take a bearing on an object that is approximately on the azimuth obtained in step 6.

12. Type in an azimuth that points the antenna in the direction of the object selected in step 11.

- Type **EL,xxx<CR>**
  (e.g., Elevation of 30.2° = **EL,302<CR>**)

- Valid azimuth range is 0-360° (0000-3600)

13. Check to see if there is signal strength on the Signal Meter Screen.

14. Move antenna counter-clockwise in 5° increments until signal strength is acquired. If you do not find satellite, point the antenna at the object selected in step 11 and move antenna clockwise in 5° increments until signal strength is acquired.

15. Once satellite is found, fine tune azimuth in 1° increments for maximum signal strength.

16. Fine tune in elevation in 1° increments for maximum signal strength.

17. Once the satellite is found, turn the EchoStar IRD off, using the power button on the infrared remote. Do not turn off the IRD using the front panel. Leave IRD in standby mode for approximately 5 minutes. The IRD will now download new software from the satellite.

- To verify that the IRD has been updated, put the IRD into the Signal Strength Screen mode, and three satellite options will appear on the left side of the screen: 61.5° West, 119° West, 148° West. Your EchoStar IRD is now updated.

18. Turn the TracVision SA off and then on. The EchoStar IRD will now communicate with the TracVision SA system. To verify this, monitor data port information. The following message will appear.

*** Initializing IRD ***

IRD STATUS: PASS ECHO
Appendix E
Startup Data Sequence

The data on the following pages presents two startup data sequences registered by the TracVision SA. The first is the standard, full initialization routine. The second routine is that registered by TracVision SA if it is turned on and acquires the satellite via the “Instant On” operation (described in Section 3, “Operation.”) These sequences can be recorded using the data port and a PC.

Standard Startup Sequence

?PGM

KVH TracVision SA Rev X - Version X.XX - Serial Number XXXXXXXX

Limit Switch Test
Limit Switch Status: PASS-----------------PASS is expected
*** Initializing IRD ***
..  
IRD STATUS: PASS  DSS ------------------PASS is expected with successful IRD identification
Saved Sat Pos: EL = 33.4
*** Averaging Background Noise ***
+POS: 45.0 26.6 735
+POS: 57.9 20.0 1004
+POS: 232.0 20.0 812
+POS: 25.6 20.0 898
Average Noise Level = 957
Noise Threshold = 1781
Saved Sat Pos: EL = 33.4
*** Entering Search Mode 1 ***
+POS: 80.9 32.1 1217
+POS: 44.6 33.4 853
Satellite Found: AZ = 327.7, EL = 33.4, RF = 2476
+POS: 306.4 33.4 1020
*** Initializing Finetune ----------------Peaking the satellite signal
+POS: 327.7 33.4 2827
+POS: 327.7 33.9 2717
Signal Peaked: AZ = 327.69, EL = 33.40, RF = 2822
+POS: 327.7 33.9 2756
+POS: 327.7 33.3 2727

Signal Detected = 82
+POS: 327.7  33.3 2734
+POS: 327.7  33.3 2748
Signal Detected = 81
+POS: 327.7  33.3 2731
+POS: 327.7  33.3 2712
+POS: 327.7  33.3 2674
+POS: 327.7  33.3 2713
Tracking DSS satellite at 101.5W
+POS: 327.7  33.3 2665
IRD Signal Quality = 79
+POS: 327.7  33.3 2681
+POS: 327.7  33.3 2708
Saved Sat Pos: AZ = 327.70, EL = 33.34

“Instant On” Startup Sequence

?PGM

KVH TracVision SA Rev K - Version 5.05 - Serial Number 12345678

Instant On----------------------------System skips limit switch test

Limit Switch Status: PASS-----------PASS is expected
*** Initializing IRD ***
...
IRD STATUS: PASS  DSS ----------------PASS is expected with successful IRD identification
Saved Sat Pos: EL = 33.3
*** Initializing Finetune *************Peaking the satellite signal
+POS: 360.0  33.9 2622
Signal Peaked: AZ = 0.00, EL = 33.30, RF = 2674
+POS: 0.0  33.3 2646
+POS: 0.0  33.3 2638
IRD Signal Quality = 79
+POS: 0.0  33.3 2640
+POS: 0.0  33.3 2616
+POS: 0.0  33.3 2614
IRD Signal Quality = 77
CH = 200 XP = 7 HI = 0 LO = 10
+POS: 0.0  33.3 2652
Saved Sat Pos: AZ = 0.00, EL = 33.30
+POS: 0.0  33.3 2617
+POS: 0.0  33.3 2616
IRD Signal Quality = 78
+POS: 0.0  33.3 2610
Appendix F
Maintenance Port Parser
Commands

TracVision SA system parser commands are parsed when the system receives an ASCII carriage return (Hex 0D). An ASCII line feed (Hex 0A) is permitted but is ignored in any transmitted command. All system responses are terminated with an ASCII carriage return followed by a line feed and ending with either an acknowledge character (ASCII > (Hex 3E)) or a not-acknowledge character (ASCII ? (Hex 3F)). The parser commands are shown below in boldface capital letters but they are not case-sensitive. In most cases the command is responded to with an echo; that is, if you type **ZAP**, for example, and press “ENTER,” the response will be the command you have entered (i.e., **ZAP**). For other commands the response is specific for each command, such as **VERSION**, **STATUS**, or **HELP**.

### F.1 System Commands

<table>
<thead>
<tr>
<th>Software Version</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td>reports software version</td>
</tr>
<tr>
<td>Command</td>
<td>VERSION</td>
</tr>
<tr>
<td>Argument</td>
<td>none</td>
</tr>
<tr>
<td>Response</td>
<td>KVH TVSA Version XX.XX</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System Status Report</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Function:</td>
<td>reports general system status</td>
</tr>
<tr>
<td>Command:</td>
<td>STATUS</td>
</tr>
<tr>
<td>Argument:</td>
<td>none</td>
</tr>
<tr>
<td>Response:</td>
<td>system status string, (TBD)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Initialize the System</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Function:</td>
<td>initializes the system (perform a soft reset)</td>
</tr>
<tr>
<td>Command:</td>
<td>ZAP</td>
</tr>
<tr>
<td>Argument:</td>
<td>none</td>
</tr>
<tr>
<td>Response:</td>
<td>echoes the command, then reinitializes the system</td>
</tr>
</tbody>
</table>
F.2 Manual Positioning Commands

To execute the following commands, first put the Antenna Unit in idle mode by typing `HALT` and pressing “ENTER.” Positioning commands may be entered after the antenna comes to rest.

<table>
<thead>
<tr>
<th><strong>Help on Parser Commands</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Function:</strong></td>
</tr>
<tr>
<td><strong>Command:</strong></td>
</tr>
<tr>
<td><strong>Argument:</strong></td>
</tr>
<tr>
<td><strong>Response:</strong></td>
</tr>
</tbody>
</table>

**Azimuth Angle**

<table>
<thead>
<tr>
<th><strong>Function:</strong></th>
<th>commands a manual azimuth angle that the mechanism moves to</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Command:</strong></td>
<td><strong>AZ,xxxx</strong> (range is 0000-3599)</td>
</tr>
<tr>
<td><strong>Argument:</strong></td>
<td>desired azimuth angle of the mechanism relative to vehicle reference, or baseplate fwd, 000˚-359.9˚ (vehicle-referenced)</td>
</tr>
<tr>
<td><strong>Response:</strong></td>
<td>echoes the command; mechanism moves at a fixed velocity</td>
</tr>
</tbody>
</table>

**Elevation Angle**

<table>
<thead>
<tr>
<th><strong>Function:</strong></th>
<th>commands a manual elevation angle that the mechanism moves to</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Command:</strong></td>
<td><strong>EL,xxx</strong> (range is 100-700)</td>
</tr>
<tr>
<td><strong>Argument:</strong></td>
<td>desired elevation angle of the mechanism relative to up, or external sensor attitude reference, 10.0˚-70.0˚</td>
</tr>
<tr>
<td><strong>Response:</strong></td>
<td>echoes the command; mechanism moves at a fixed velocity</td>
</tr>
</tbody>
</table>

**Azimuth CW Step**

<table>
<thead>
<tr>
<th><strong>Function:</strong></th>
<th>commands a 0.1 deg CW manual step in azimuth angle</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Command:</strong></td>
<td>6</td>
</tr>
<tr>
<td><strong>Argument:</strong></td>
<td>none</td>
</tr>
<tr>
<td><strong>Response:</strong></td>
<td>echoes the command</td>
</tr>
</tbody>
</table>
Azimuth CCW Step

Function: commands a 0.1 deg CCW manual step in azimuth angle

Command: 4

Argument: none

Response: echoes the command

Elevation UP Step

Function: commands a 0.1 deg UP manual step in elevation angle

Command: 8

Argument: none

Response: echoes the command

Elevation DOWN Step

Function: commands a 0.1 deg DOWN manual step in elevation angle

Command: 2

Argument: none

Response: echoes the command

F.3 Operational Commands

Idle Mode

Function: halts active tracking and conical scan, then enters idle mode

Command: HALT

Argument: none

Response: echoes the command
## F.4 Target and Signal Commands

### Table F-4
Target and Signal Commands

<table>
<thead>
<tr>
<th>Function</th>
<th>Command</th>
<th>Argument</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Location</td>
<td>TGTLOCATION</td>
<td>none</td>
<td>Target Location = E XXX, A XXXX</td>
</tr>
<tr>
<td>Report RF Signal Strength</td>
<td>SIGLEVEL</td>
<td>none</td>
<td>Signal Strength = XXXX</td>
</tr>
<tr>
<td>Report IRD Signal Quality</td>
<td>SIGQUALITY</td>
<td>none</td>
<td>Stale Signal Quality = XX</td>
</tr>
<tr>
<td>Report IRD Type</td>
<td>IRDTYPE</td>
<td>none</td>
<td>IRD type has not been tested yet. IRD type is Echostar. IRD type is DSS. IRD type cannot be determined.</td>
</tr>
</tbody>
</table>
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TracVision SA

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KVH Industries, Inc. warrants the KVH product purchased against defects in materials for a period of TWO (2) years and against labor costs for a period of ONE (1) year from the date of original retail purchase by the original purchaser. It is the customer’s responsibility to verify the date of purchase by returning the warranty card included with the product to KVH within 30 days of purchase, or by providing a copy of a dated sales receipt for the KVH product under warranty with the warranty claim. If this date cannot be verified, the warranty period will begin 30 days after the date of manufacture of the original product purchased.

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