A Guide to TracVision G6

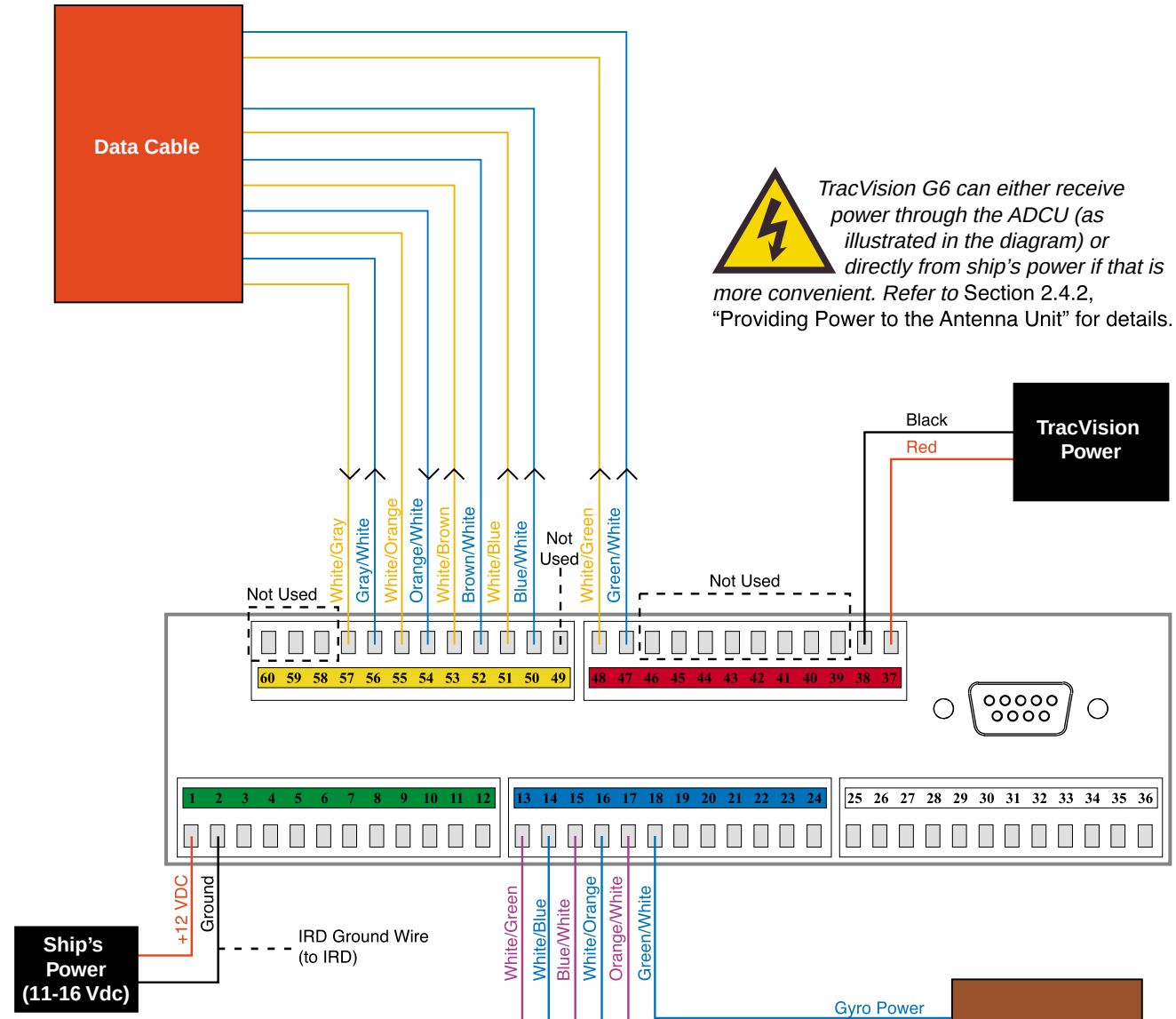
technical manual

- Installation
- Configuration
- Maintenance

KVH TracVision® G6

Satellite Television

TracVision® G6 Wiring Quick Reference Guide



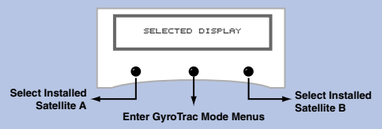
Wiring Color Code Definitions
First Color: Wire
Second Color: Tracer
Example: Red/Orange = Red Wire with Orange Tracer

TVG6 T/M Front Cover Rev. C

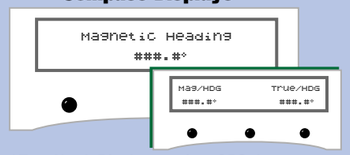
GyroTrac™ Advanced Digital Control Unit (ADCU) Menu Quick Reference Guide

ADCU Primary Display Options

See Section 3.2 for details

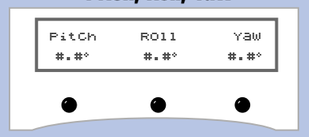


Compass Displays*

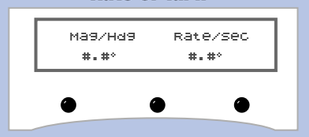


*True North Display requires GPS data

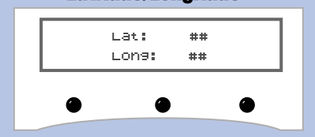
Pitch, Roll, Yaw



Rate of Turn

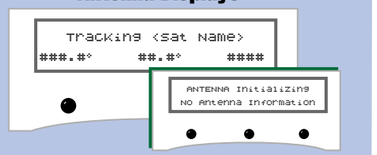


Latitude/Longitude†



† Lat/Long Display requires GPS data

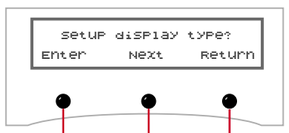
Antenna Displays

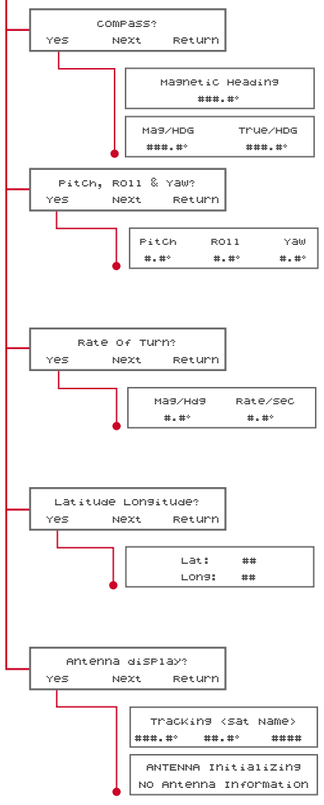


GyroTrac Mode Menus

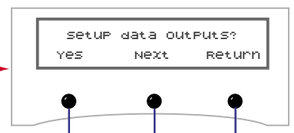
Return to Selected Primary Display

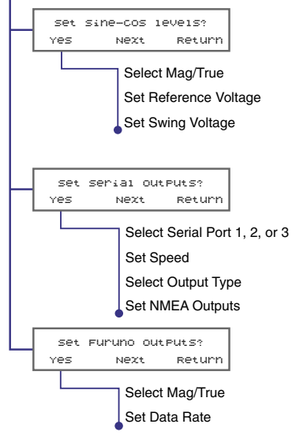
See Section 3.3 for details





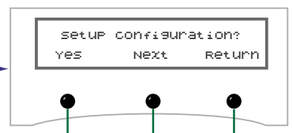
See Section 3.4 for details

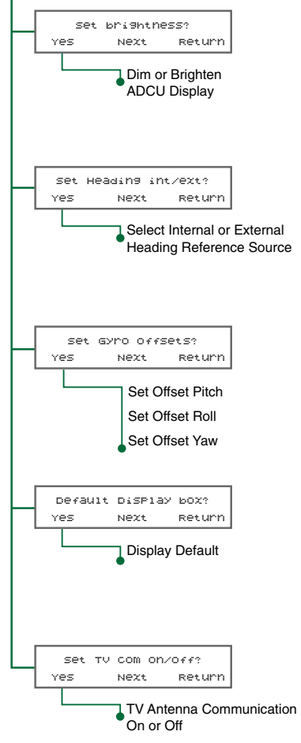




- Select Mag/True
- Set Reference Voltage
- Set Swing Voltage
- Select Serial Port 1, 2, or 3
- Set Speed
- Select Output Type
- Set NMEA Outputs
- Select Mag/True
- Set Data Rate

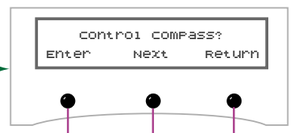
See Section 3.5 for details

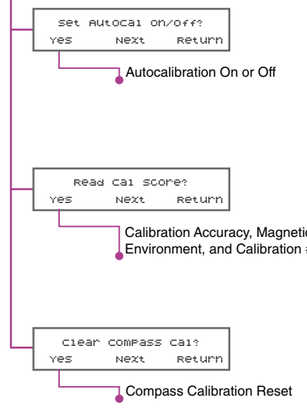




- Dim or Brighten ADCU Display
- Select Internal or External Heading Reference Source
- Set Offset Pitch
- Set Offset Roll
- Set Offset Yaw
- Display Default
- TV Antenna Communication On or Off

See Section 3.6 for details

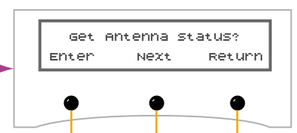


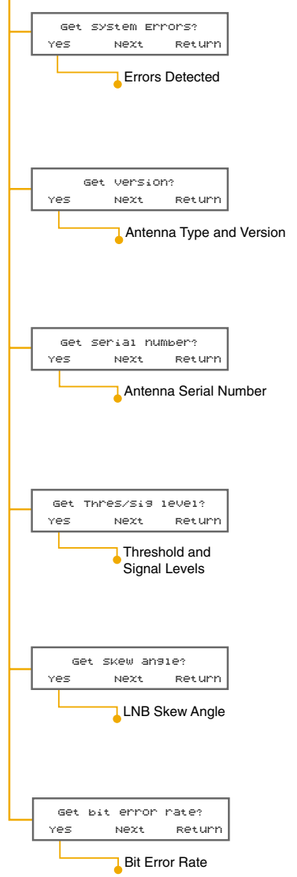


- Autocalibration On or Off
- Calibration Accuracy, Magnetic Environment, and Calibration #
- Compass Calibration Reset

The Control Compass Menus are only availailable if the selected heading reference source is INTERNAL.

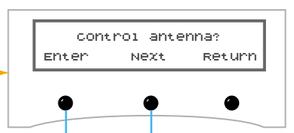
See Section 3.7 for details

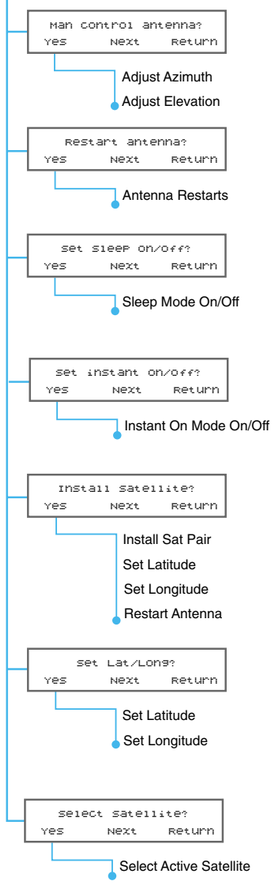




- Errors Detected
- Antenna Type and Version
- Antenna Serial Number
- Threshold and Signal Levels
- LNB Skew Angle
- Bit Error Rate

See Section 3.8 for details

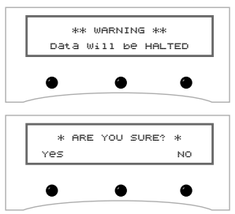




- Adjust Azimuth
- Adjust Elevation
- Antenna Restarts
- Sleep Mode On/Off
- Instant On Mode On/Off
- Install Sat Pair
- Set Latitude
- Set Longitude
- Restart Antenna
- Set Latitude
- Set Longitude
- Select Active Satellite

Alert Screens

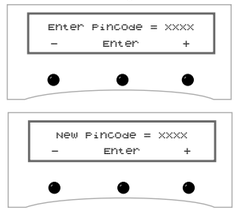
Certain operations temporarily halt data output. In this event, the ADCU will display a set of alert screens. Select Yes to proceed, No to return to the Main Data Display.



See Section 3.2.2 for more details

PIN Code Screens

Certain functions require the entry of a Personal Identification Number (PIN). PIN entry and selection are done on the screens below. The default setting is 0000.



See Section 3.2.3 for more details

TracVision G6 Technical Manual Addendum

(ECO #s 5959, 5503, 5315, 6138, 6166)

The following changes have been made to Revision C of the TracVision G6 Installation and Technical Manual (KVH Part Number 54-0161).

2.4.8.3 Connecting the Antenna RF Signal Cables in Quad-output LNB Systems

If your system comes with a quad-output LNB, four complete RF signal outputs are provided, rather than four divisions of the same signal. This allows you to connect up to four IRDs to the TracVision antenna without requiring a multiswitch.

In European systems that come with a quad-output LNB, all four RF outputs from the TracVision antenna can be connected to individual IRDs.

Connecting Three or Four IRDs

To connect a third IRD, a third RF cable should be connected to the plug labeled “RF3” on the base of the TracVision antenna. Connect the other end of the RF3 cable to the plug labeled “LNB,” “ANT/SAT,” or “SATELLITE IN” on the third IRD. To connect a fourth IRD, use the fourth RF cable, which should be connected to the plug labeled “RF4” on the base of the antenna.

Connecting More than Four IRDs

To connect more than four IRDs, you will need to install an active multiswitch between the antenna and the IRDs. Connect the multiswitch unit in accordance with the manufacturer's instructions. Figure 2-23 shows an example of a European multiswitch configuration.

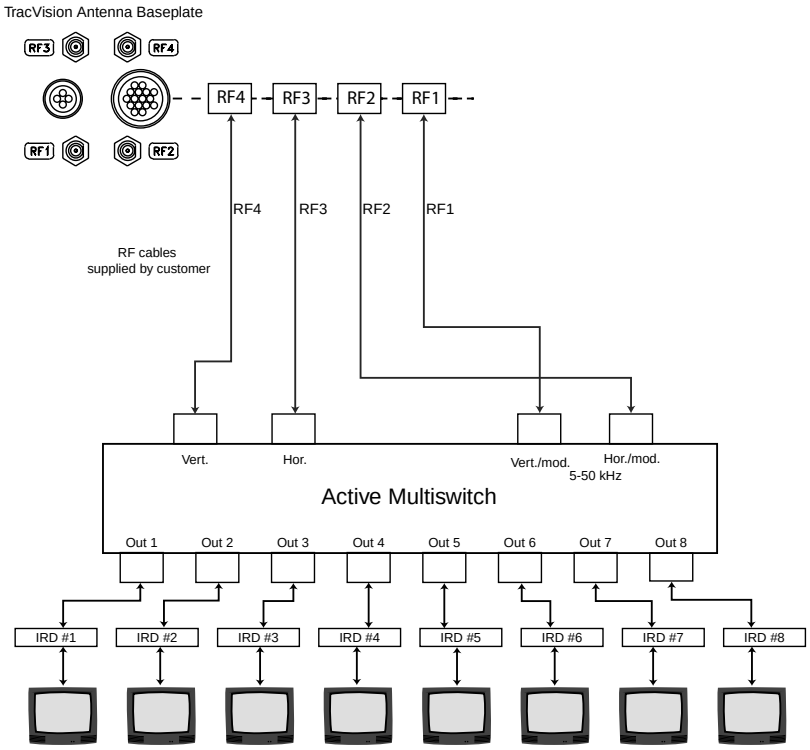


Figure 2-23
Single Multiswitch Installation (European Systems with Quad-output LNB)

4.1.1 Blown Fuse, Low Power, or Wiring

The 4-amp fuse on the CPU Printed Circuit Board (PCB) has been replaced with two 3.15-amp fuses to better protect the Antenna Unit's electronics.

1. Blown Fuse – The Antenna Unit is equipped with **two fuses** mounted on its CPU Board. If **either of these fuses** has blown or been broken, the Antenna Unit will not operate. Refer to *Section 5.4, "PCB Removal and Replacement,"* for details on the fuse locations and how to access the CPU Board.

5.3 TracVision G6 Field Replaceable Units

Table 5-1 has been updated to show the new part number for the 3.15-amp fuses and the new part numbers for the RF Detector PCB, European LNB, and Quad-output LNB. The azimuth limit switch has also been added to the list.

Table 5-1
TracVision G6 Field Replaceable Units

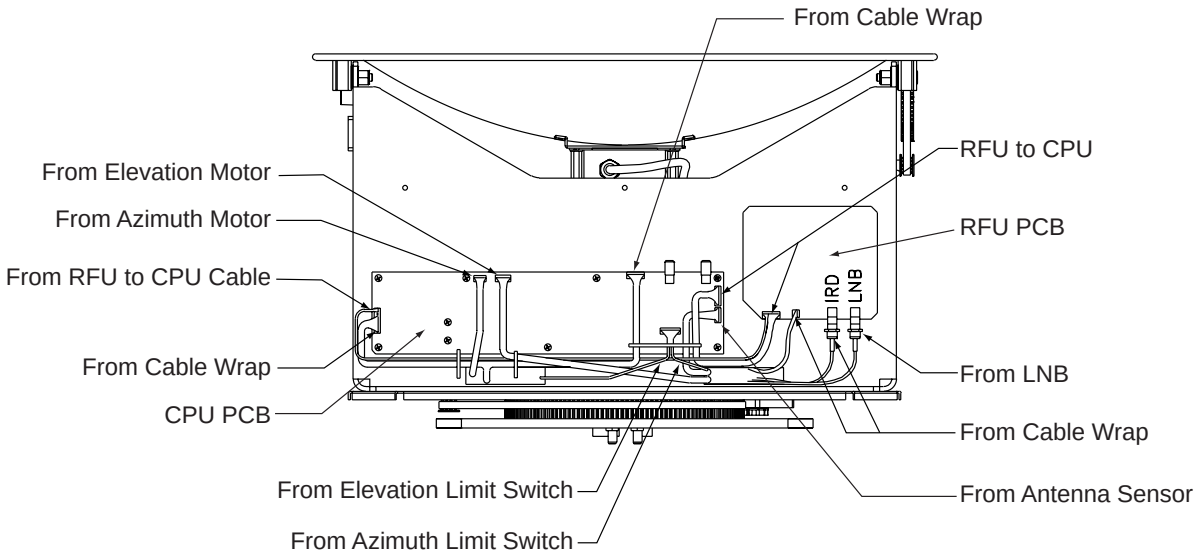
FRU	Part Number
Radome	02-1047-01
CPU	02-0992
RF Detector PCB	**02-1237**
Antenna Gyro Sensor	02-1035
Antenna Gyro Gasket	24-0139
Elevation Drive Belt	24-0105-83
Elevation Motor	02-1050
Azimuth Limit Switch Assembly	**02-0957-01**
European LNB Assembly	**02-1278**
U.S.-style LNB Assembly	02-0870
Latin American LNB Assembly	02-0870-01
Quad-output LNB Assembly	**02-1263**
ADCU	02-0961
Sensor Module	02-0991
Data Cable	32-0619-100
RF Cable	32-0566-0100
PC Cable	32-0628-06
Sensor Cable	32-0586-30
Power Cable	32-0510-100
CPU Fuses	**16-0017-3150**

5.4 PCB Removal and Replacement

The printed circuit boards (PCBs) are protected by a cover fastened to the antenna support frame. The cover must be removed to gain access to the main power **fuses** and the PCB assemblies discussed below. Refer to Figure 5-2; remove 3 nuts and washers from the bottom flange and 3 screws and washers from the upper flange. Remove the cover and set aside with the fasteners.

The CPU PCB has been changed from an "L"-shaped design to a simpler straight design. Figure 5-3 has been updated to show the new CPU PCB.

Figure 5-3
PCB Connector Locations (Rear View)



5.4.1 CPU Board

The new CPU Board is secured to the antenna frame using nine screws rather than eleven.

2. Remove **nine** #6-32 machine screws from the PCB.

The following procedure has been inserted for replacing the azimuth limit switch. As a result, Sections 5.6 through 5.9 of the Installation and Technical Manual have been renumbered Sections 5.7 through 5.10.

5.6 Azimuth Limit Switch Assembly Replacement

1. Rotate the antenna assembly, by hand, clockwise until it stops.
2. Remove the printed circuit board (PCB) cover, illustrated in Figure 5-2, using a #2 Phillips screwdriver and a ⅜" nut driver/socket.
3. At the CPU's Molex connector, cut the black and white wires from the azimuth limit switch (see Figure 5-3). Leave about one inch (25 mm) of the wires still connected for later reference.
4. At the azimuth limit switch cover, remove the hot melt keeping the black and white wires in place (see Figure 5-7).

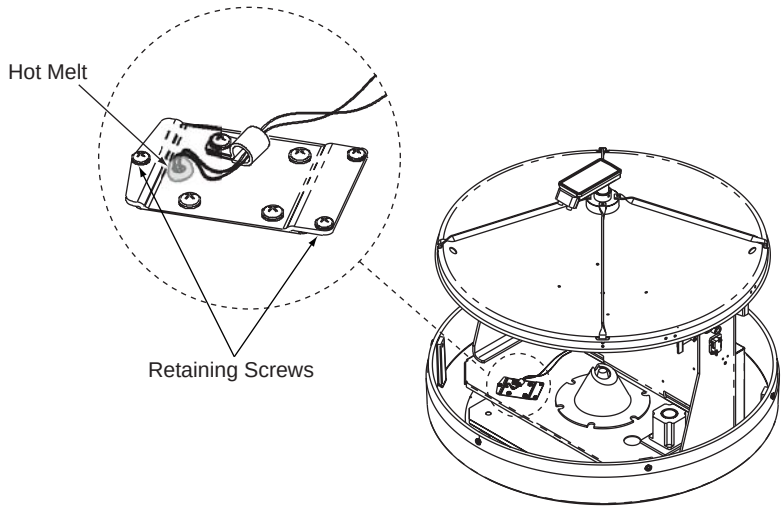


Figure 5-7
Azimuth Limit Switch Cover

5. Remove the three #6-32 x ⅜" retaining screws from the limit switch cover and set aside (see Figure 5-7). Lift the cover to access the limit switch underneath.
6. Remove the four #8-32 x ½" screws securing the limit switch to the cover and set aside.

7. Replace the azimuth limit switch. Attach the new switch to the cover using the #8 screws, flat washers, and cable clamp.

8. Route the new limit switch wires through the cover and cable clamp to the CPU's Molex connector. After noting the position of the old black and white wires, remove the old wires from the Molex connector. Attach the new wires in their place.

9. Before re-installing the azimuth limit switch to the antenna assembly, orient the switch's plastic cam as shown in Figure 5-8. With the cam in the proper position, reinstall the switch to the antenna assembly using the three #6 retaining screws and flat washers. ***Ensure the cam finger engages the stop pin in the mounting cavity.***

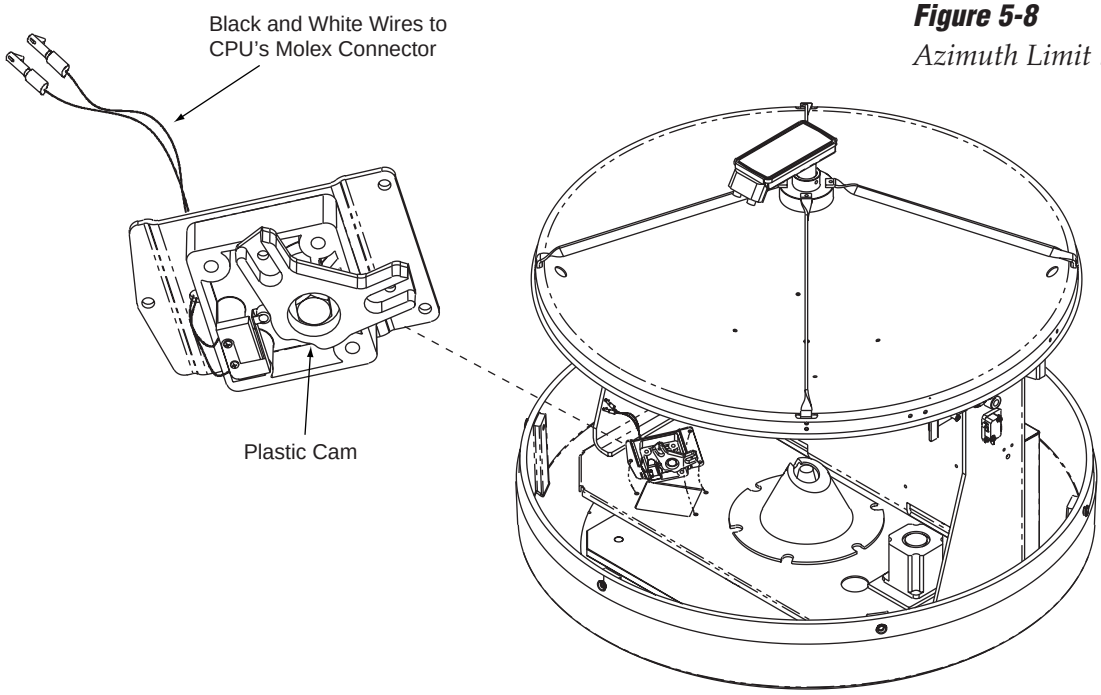


Figure 5-8
Azimuth Limit Switch Orientation

10. Apply hot melt or RTV at the limit switch cover's wire access hole to protect the wires from chafing.

TracVision G6 Technical Manual Addendum

(ECO #5903)

The following changes have been made to Revision C of the TracVision G6 Installation and Technical Manual (KVH Part Number 54-0161).

The 1-amp fuse in the GyroTrac ADCU has been replaced by two 1-amp resettable polyswitch fuses.

4.2 GyroTrac-specific Issues

The GyroTrac is designed for reliable, easy use. This section provides a brief overview of some potential operational issues that may arise.

Issue 1:

System is installed correctly and power is available, but the system is non-functional.

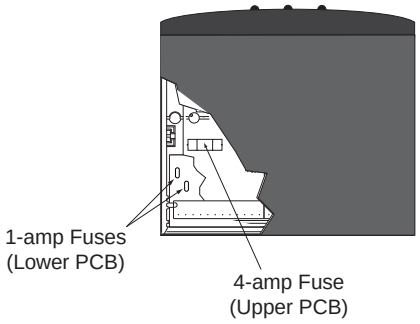
Solution:

Check the 4-amp fuse within the ADCU. Remove the two screws securing the top and the base of the ADCU. Remove the top of the ADCU. The 4-amp fuse is secured in brackets on the upper printed circuit board (PCB) within the unit. Remove the damaged fuse and replace with a new, functional fuse.

Two 1-amp fuses are mounted on the lower PCB. If these fuses trip, they will automatically reset once the offending device is removed from the circuit and the internal device temperature returns to normal.

Note: The fuses on the lower (main) PCB are 1-amp resettable polyswitch fuses. The fuse on the upper (interface) PCB is a 4-amp fast blow fuse.

Figure 4-2
ADCU Fuse Locations (Top Cutaway)



5.8 GyroTrac Replaceable Parts

The 1-amp fuse has been removed from the table of GyroTrac Field Replaceable Units. The new 1-amp resettable polyswitch fuses are mounted directly to the PCB and cannot be replaced in the field.

FRU	KVH Part No.
Sensor Module	02-0991
ADCU	02-0961
Flush Mount ADCU Panel	20-0667
Horizontal Sensor Bracket	20-0658
Vertical Sensor Bracket	20-0666
Connector Wire Terminal Strip	23-0223-12
Sensor to ADCU Data Cable	32-0623-30
ADCU Interface PCB Fuse, 4-amp	16-0017-4000

Table 5-2
GyroTrac Field Replaceable Units

TracVision G6 Technical Manual Addendum

(ECO #s 5959, 5503, 5315, 6138)

The following changes have been made to Revision C of the TracVision G6 Installation and Technical Manual (KVH Part Number 54-0161).

4.1.1 Blown Fuse, Low Power, or Wiring

The 4-amp fuse on the CPU Printed Circuit Board (PCB) has been replaced with two 3.15-amp fuses to better protect the Antenna Unit's electronics.

1. Blown Fuse – The Antenna Unit is equipped with **two fuses** mounted on its CPU Board. If **either of these fuses** has blown or been broken, the Antenna Unit will not operate. Refer to *Section 5.4, "PCB Removal and Replacement,"* for details on the fuse locations and how to access the CPU Board.

5.3 TracVision G6 Field Replaceable Units

Table 5-1 has been updated to show the new part number for the 3.15-amp fuses and the new part number for the RF Detector PCB. The azimuth limit switch has also been added to the list.

Table 5-1
TracVision G6 Field Replaceable Units

FRU	Part Number
Radome	02-1047-01
CPU	02-0992
RF Detector PCB	**02-1237**
Antenna Gyro Sensor	02-1035
Antenna Gyro Gasket	24-0139
Elevation Drive Belt	24-0105-83
Elevation Motor	02-1050
Azimuth Limit Switch Assembly	**02-0957-01**
European LNB Assembly	02-0932

FRU	Part Number
U.S.-style LNB Assembly	02-0870
Latin American LNB Assembly	02-0870-01
Quad-output LNB Assembly	02-1052
ADCU	02-0961
Sensor Module	02-0991
Data Cable	32-0619-100
RF Cable	32-0566-0100
PC Cable	32-0628-06
Sensor Cable	32-0586-30
Power Cable	32-0510-100
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5.4 PCB Removal and Replacement

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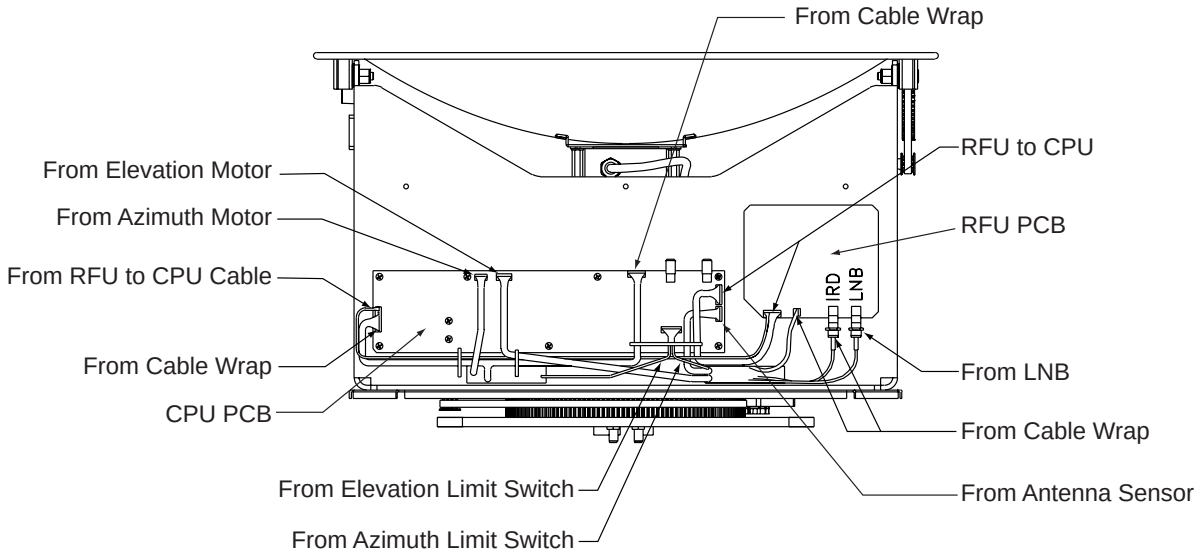
The CPU PCB has been changed from an "L"-shaped design to a simpler straight design. Figure 5-3 has been updated to show the new CPU PCB.

Figure 5-3
PCB Connector Locations (Rear View)



5.4.1 CPU Board

The new CPU Board is secured to the antenna frame using nine screws rather than eleven.

2. Remove **nine** #6-32 machine screws from the PCB.

The following procedure has been inserted for replacing the azimuth limit switch. As a result, Sections 5.6 through 5.9 of the Installation and Technical Manual have been renumbered Sections 5.7 through 5.10.

5.6 Azimuth Limit Switch Assembly Replacement

1. Rotate the antenna assembly, by hand, clockwise until it stops.
2. Remove the printed circuit board (PCB) cover, illustrated in Figure 5-2, using a #2 Phillips screwdriver and a ⅜" nut driver/socket.
3. At the CPU's Molex connector, cut the black and white wires from the azimuth limit switch (see Figure 5-3). Leave about one inch (25 mm) of the wires still connected for later reference.

4. At the azimuth limit switch cover, remove the hot melt keeping the black and white wires in place (see Figure 5-7).

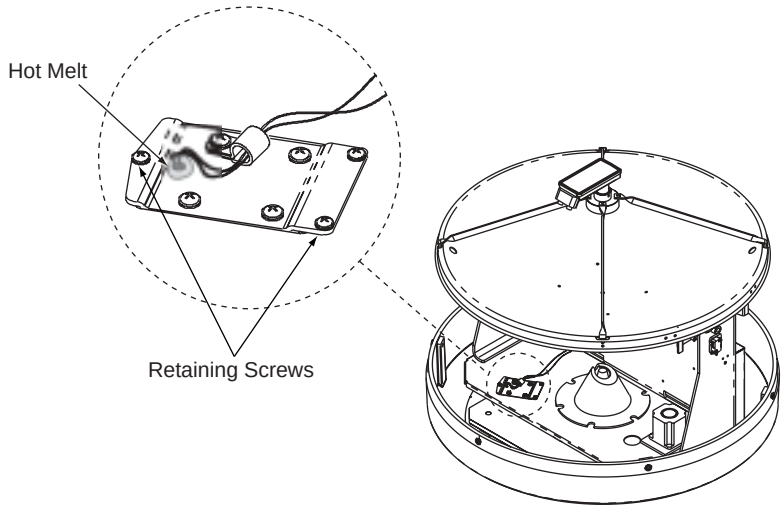


Figure 5-7
Azimuth Limit Switch Cover

5. Remove the three #6-32 x ⅜" retaining screws from the limit switch cover and set aside (see Figure 5-7). Lift the cover to access the limit switch underneath.

6. Remove the four #8-32 x ½" screws securing the limit switch to the cover and set aside.

7. Replace the azimuth limit switch. Attach the new switch to the cover using the #8 screws, flat washers, and cable clamp.

8. Route the new limit switch wires through the cover and cable clamp to the CPU's Molex connector. After noting the position of the old black and white wires, remove the old wires from the Molex connector. Attach the new wires in their place.

9. Before re-installing the azimuth limit switch to the antenna assembly, orient the switch's plastic cam as shown in Figure 5-8 on the following page. With the cam in the proper position, reinstall the switch to the antenna assembly using the three #6 retaining screws and flat washers. ***Ensure the cam finger engages the stop pin in the mounting cavity.***

10. Apply hot melt or RTV at the limit switch cover's wire access hole to protect the wires from chafing.

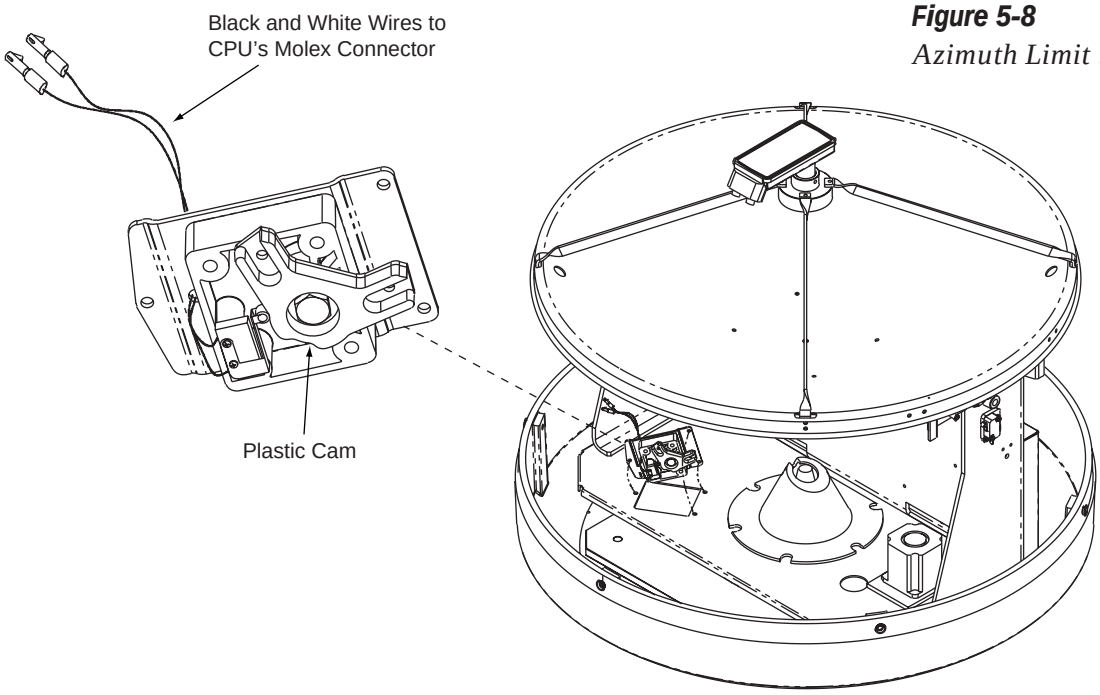


Figure 5-8
Azimuth Limit Switch Orientation

TracVision G6 Technical Manual Addendum

(ECO #s 5965, 5959, 5503, 5315)

The following changes have been made to Revision C of the TracVision G6 Installation and Technical Manual (KVH Part Number 54-0161).

4.1.1 Blown Fuse, Low Power, or Wiring

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5.3 TracVision G6 Field Replaceable Units

Table 5-1 has been updated to show the new part number for the 3.15-amp fuses and the new part number for the RF Detector PCB. The azimuth limit switch has also been added to the list.

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Elevation Motor	02-1050
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European LNB Assembly	02-0932

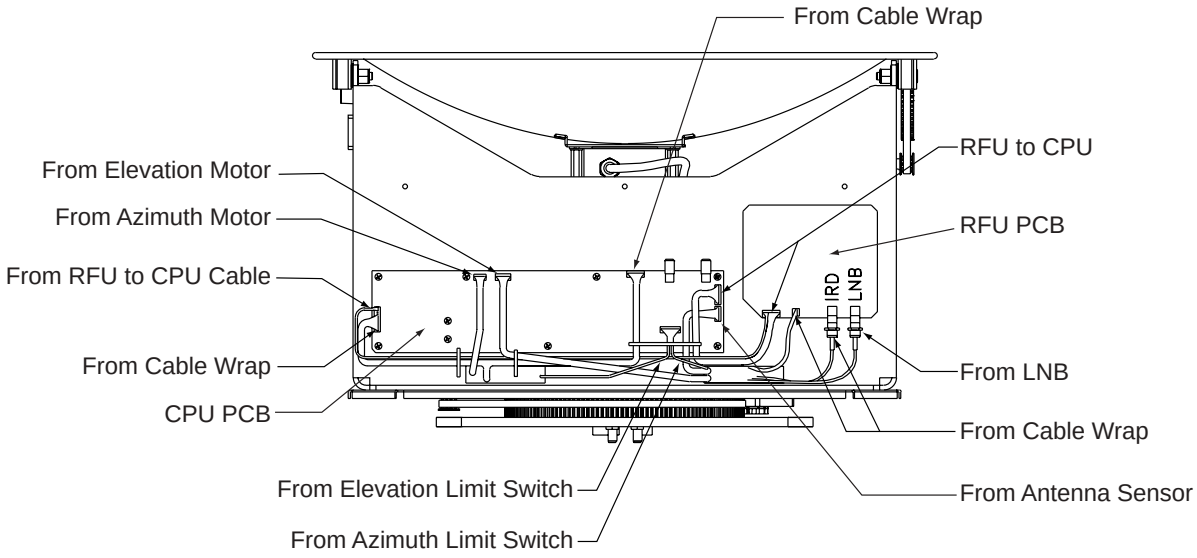
FRU	Part Number
U.S.-style LNB Assembly	02-0870
Latin American LNB Assembly	02-0870-01
Quad-output LNB Assembly	02-1052
ADCU	02-0961
Sensor Module	02-0991
Data Cable	32-0619-100
RF Cable	32-0566-0100
PC Cable	32-0628-06
Sensor Cable	32-0586-30
Power Cable	32-0510-100
CPU Fuses	**16-0017-3150**

5.4 PCB Removal and Replacement

The printed circuit boards (PCBs) are protected by a cover fastened to the antenna support frame. The cover must be removed to gain access to the main power **fuses** and the PCB assemblies discussed below. Refer to Figure 5-2; remove 3 nuts and washers from the bottom flange and 3 screws and washers from the upper flange. Remove the cover and set aside with the fasteners.

The CPU PCB has been changed from an "L"-shaped design to a simpler straight design. Figure 5-3 has been updated to show the new CPU PCB.

Figure 5-3
PCB Connector Locations (Rear View)



5.4.1 CPU Board

The new CPU Board is secured to the antenna frame using nine screws rather than eleven.

2. Remove **nine** #6-32 machine screws from the PCB.

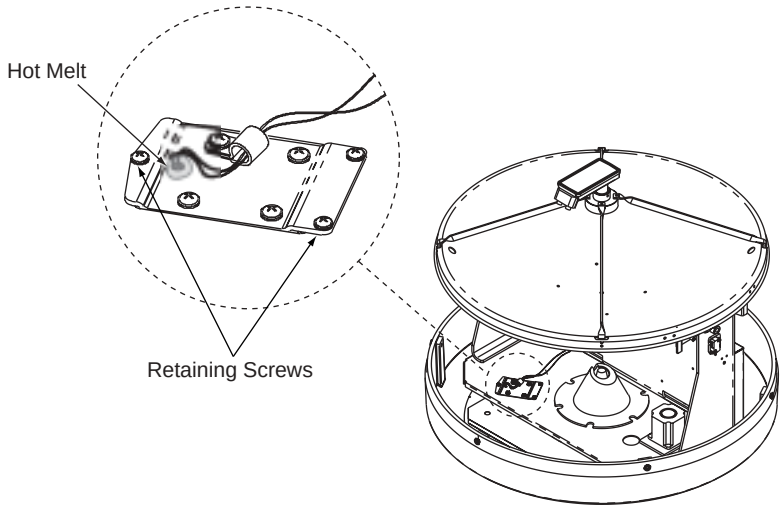
The following procedure has been inserted for replacing the azimuth limit switch. As a result, Sections 5.6 through 5.9 of the Installation and Technical Manual have been renumbered Sections 5.7 through 5.10.

5.6 Azimuth Limit Switch Assembly Replacement

1. Rotate the antenna assembly, by hand, clockwise until it stops.
2. Remove the printed circuit board (PCB) cover, illustrated in Figure 5-2, using a #2 Phillips screwdriver and a ⅜" nut driver/socket.
3. At the CPU's Molex connector, cut the black and white wires from the azimuth limit switch (see Figure 5-3). Leave about one inch (25 mm) of the wires still connected for later reference.

4. At the azimuth limit switch cover, remove the hot melt keeping the black and white wires in place (see Figure 5-7).

Figure 5-7
Azimuth Limit Switch Cover



5. Remove the three #6-32 x ⅜" retaining screws from the limit switch cover and set aside (see Figure 5-7). Lift the cover to access the limit switch underneath.

6. Remove the four #8-32 x ½" screws securing the limit switch to the cover and set aside.

7. Replace the azimuth limit switch. Attach the new switch to the cover using the #8 screws, flat washers, and cable clamp.

8. Route the new limit switch wires through the cover and cable clamp to the CPU's Molex connector. After noting the position of the old black and white wires, remove the old wires from the Molex connector. Attach the new wires in their place.

9. Before re-installing the azimuth limit switch to the antenna assembly, orient the switch's plastic cam as shown in Figure 5-8 on the following page. With the cam in the proper position, reinstall the switch to the antenna assembly using the three #6 retaining screws and flat washers. ***Ensure the cam finger engages the stop pin in the mounting cavity.***

10. Apply hot melt or RTV at the limit switch cover's wire access hole to protect the wires from chafing.

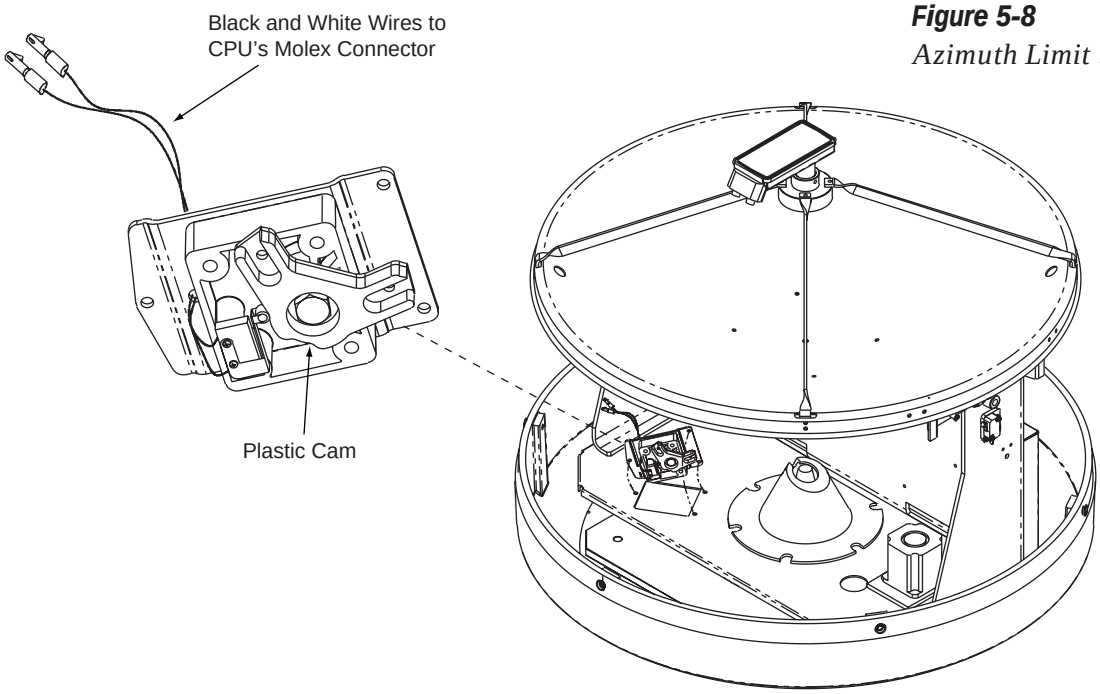


Figure 5-8
Azimuth Limit Switch Orientation

TracVision G6 Technical Manual Addendum

(ECO #5797)

The following changes have been made to Revision C of the TracVision G6 Installation and Technical Manual (KVH Part Number 54-0161).

Four fiber shoulder washers have been preinstalled on the inside of the antenna unit's base. Four additional fiber shoulder washers have been provided in the kitpack for use when mounting the antenna unit. These washers insulate the antenna unit from ground.

2.2 Installing the Antenna Unit

Table 2-4
Antenna Unit Kitpack Contents

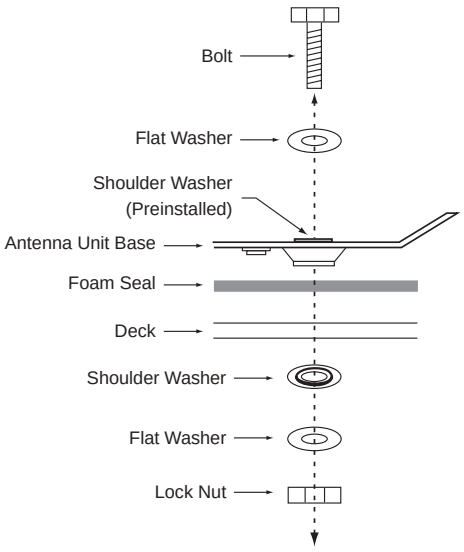
Part	Qty.
⅜-16 x 3" hex screws	4
⅜ flat washers	8
⅜-16 hex nuts	4
⅜ lock washers	4
⅜ fiber shoulder washers	**4**
#10-32 x ⅝" flat head screws	6
RG-11 type F connector	1
Plastic screw covers	6
Antenna base seal gasket	1
Tie-wraps	2
Core clamp	1

Antenna Unit Mounting Procedure

9. Place a flat washer from the kitpack on a bolt and insert the bolt into its hole ***from above*** as shown in Figure 2-5.

10. Apply a fiber shoulder washer, flat washer, and lock nut from underneath as shown in Figure 2-5.

Figure 2-5
Bolting the Antenna Unit to the Deck (Side View)



TracVision G6 Technical Manual Addendum

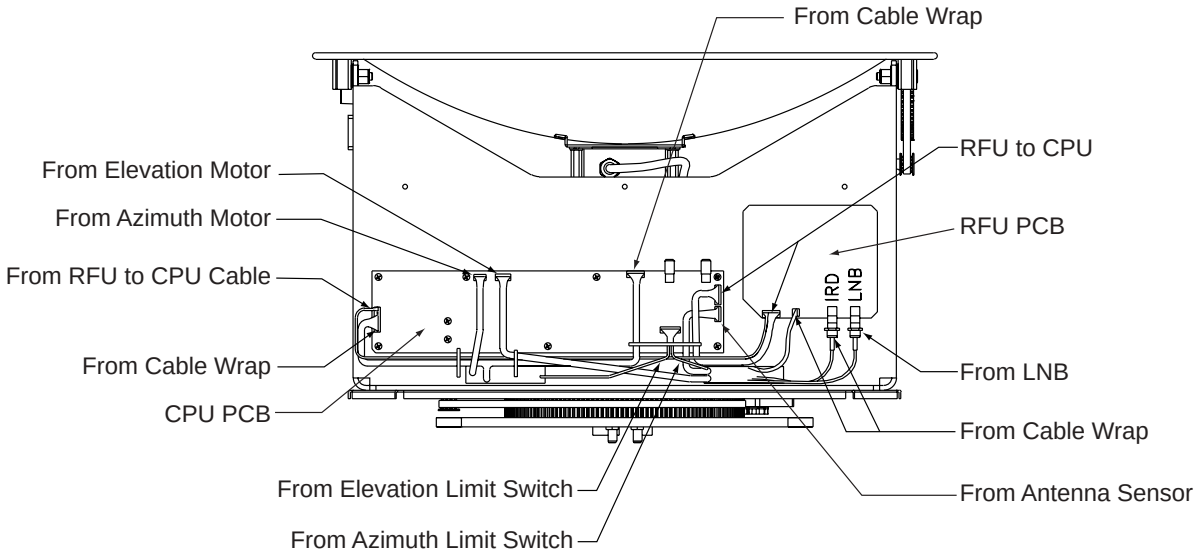
(ECO #5503)

The following changes have been made to Revision C of the TracVision G6 Installation and Technical Manual (KVH Part Number 54-0161).

5.4 PCB Removal and Replacement

The CPU Printed Circuit Board (PCB) has been changed from an "L"-shaped design to a simpler straight design. Figure 5-3 has been updated to show the new CPU PCB.

Figure 5-3
PCB Connector Locations (Rear View)



5.4.1 CPU Board

The new CPU Board is secured to the antenna frame using nine screws rather than eleven.

2. Remove **nine** #6-32 machine screws from the PCB.

TracVision G6 Technical Manual Addendum

(ECO #5619)

The following changes have been made to Revision C of the TracVision G6 Installation and Technical Manual (KVH Part Number 54-0161).

Inside Front Cover

The quick reference guide on the inside front cover has been changed as follows:

1. The PIN Code Screens box has been deleted.
2. A menu item has been added to the column headed by "Control antenna?" (see Figure A below).

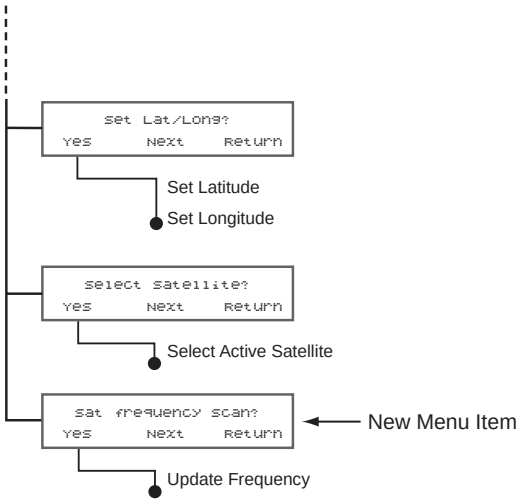


Figure A
New Menu Item on Quick Reference Guide

3.2.3 System Security

This section of the manual has been deleted. The little-used security option is no longer available.

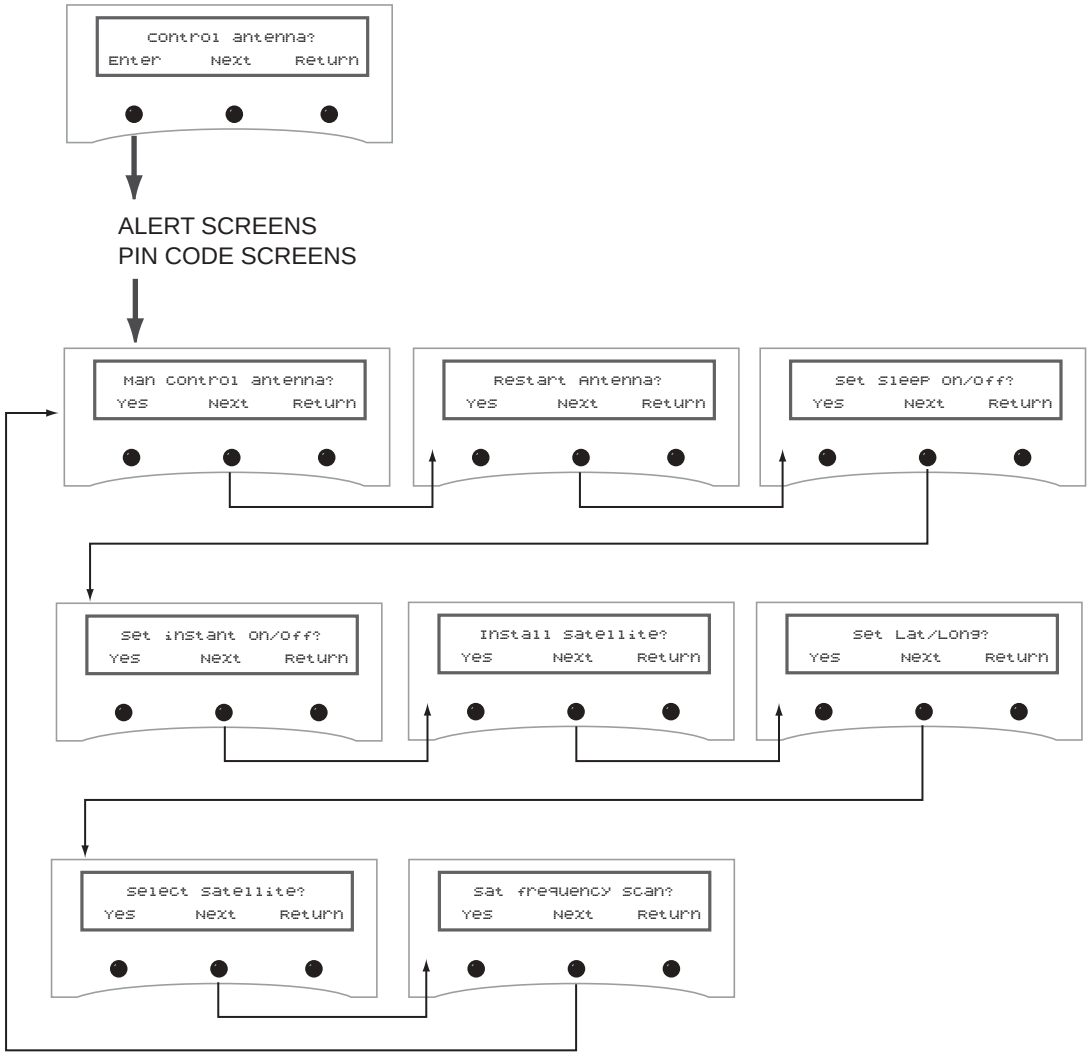
3.8 Control Antenna Mode

A new software feature has been added to the TracVision system – Satellite Frequency Scan. This option allows you to update the frequency data of any satellite stored in the system's library.

These screens are only seen if *Antenna Comm* is turned ON.

This sequence of steps allows a user to adjust the antenna's azimuth and elevation manually, restart the antenna, set Sleep Mode on or off, set Instant On Mode on or off, install a new pair of active satellites, set the latitude and longitude, select the active satellite system, and **update satellite frequency data**.

Figure 3-29
Control Antenna Mode Menu Sequence



3.8.7 Selecting Active Satellite

Figure 3-36 has been updated to include "Updating Satellite Frequency Data."

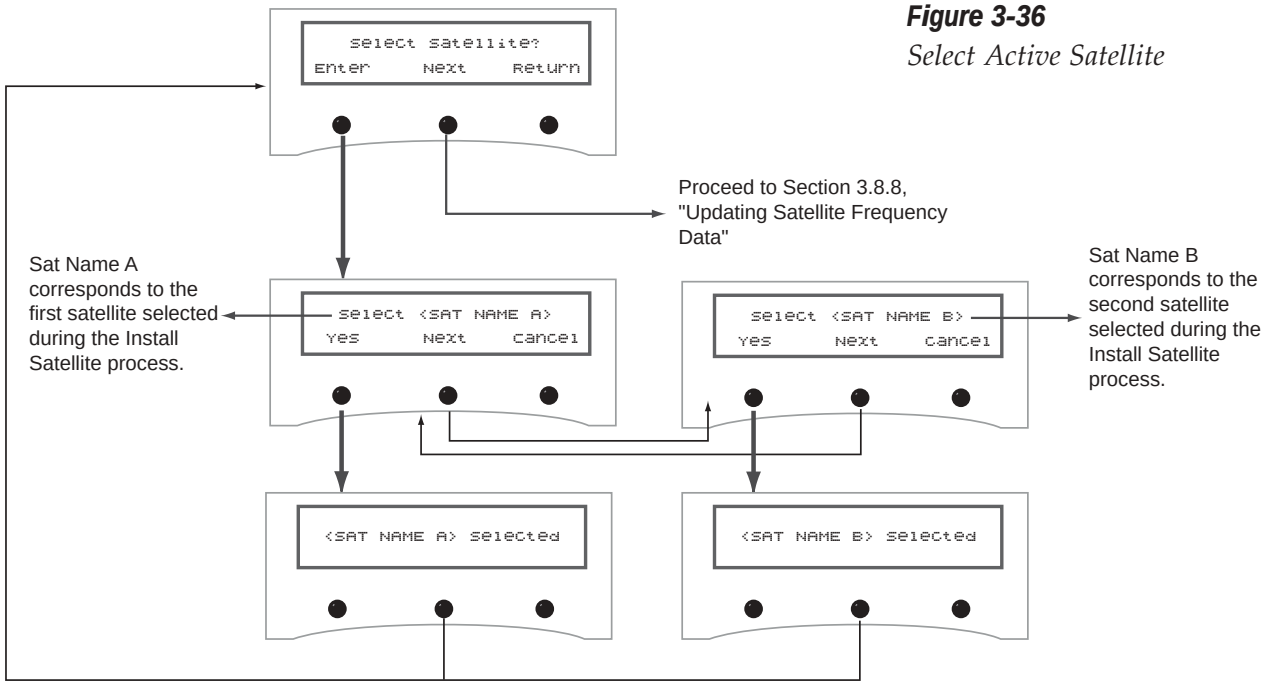


Figure 3-36
Select Active Satellite

3.8.8 Updating Satellite Frequency Data

If you select a channel but it doesn't appear on the TV, the satellite's frequency data may have changed. The Satellite Frequency Scan feature allows you to update the frequency data of any satellite stored in the system's library.

With the desired satellite, band, and polarization selected, the system will automatically search for the frequency with the strongest signal. The system will then update that satellite's programmed data with the new frequency (and associated network ID) and store it in the satellite library.

To update the satellite frequency data, perform the following:

1. Place your IRD in the satellite signal meter mode.
2. Select the desired satellite on the ADCU. ***Ensure the TV signal meter indicates that you have a strong signal.***

If the antenna is unable to find the selected satellite automatically, you can manually point the antenna using the Manual mode (see Section 3.8.1, "Manually Controlling the Antenna"*).*

3. Select the desired polarization and band on the IRD.
4. ***Do not move the vessel.*** Your boat must remain motionless during the entire Satellite Frequency Scan process.
5. Follow the ADCU menus on the next page. The scan itself will take a couple of minutes. Once complete, restart the antenna and ensure the antenna will track the new frequency.

If you are unsure about when and how to use the Satellite Frequency Scan feature, please contact your dealer/installer or distributor for assistance.

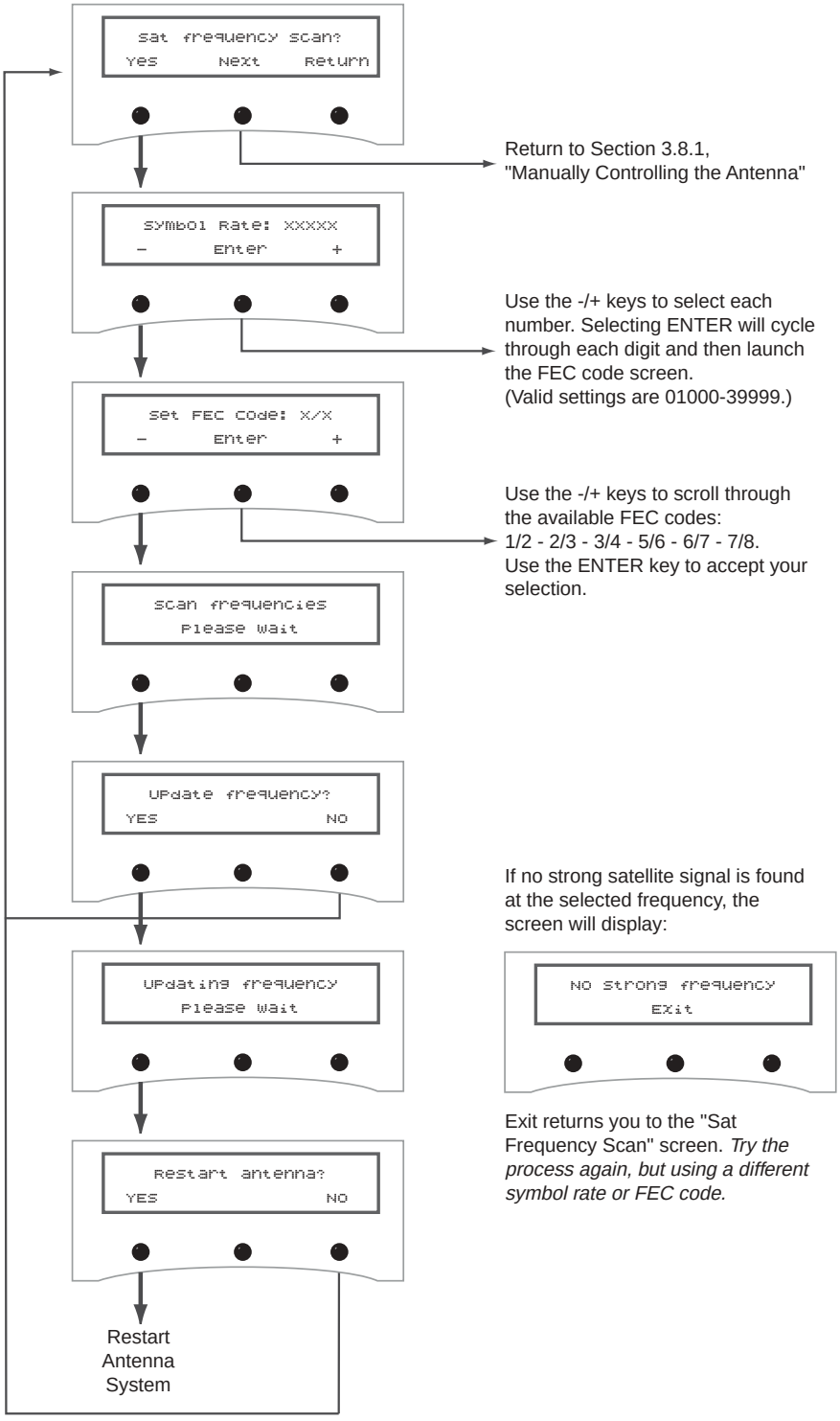


Figure 3-37
Satellite Frequency Scan

To find a valid symbol rate and FEC code, refer to an up-to-date satellite table either in a magazine or on the Internet. For your convenience, this data is available (for the system's predefined satellites) on our web site at www.kvh.com/footprint/index.html.

4 Troubleshooting

The Troubleshooting matrix has been updated to include the symptom "Certain channels do not work." Section 4.1.7, "Satellite Frequency Data Changed" *has been added.*

Figure 4-1
Troubleshooting Matrix

SYMPTOM	POSSIBLE CAUSE (AND SOLUTION)	Blown fuse, low power, or wiring (Section 4.1.1)	Vessel turning during startup (Section 4.1.2)	Incorrect satellite configuration (Section 4.1.3)	Satellite signal blocked (Section 4.1.4)	Outside satellite coverage zone (Section 4.1.5)	Radar interference (Section 4.1.6)	Satellite frequency data changed (Section 4.1.7)	Incorrect or loose RF connectors (Section 4.1.8)	Multiswitch interference (Section 4.1.9)	Passive multiswitch used (Section 4.1.10)	GyroTrac-specific issues (Section 4.2)	IRD faulty or improperly configured (Section 4.3)	Antenna gyro faulty (Section 4.4)	LNB assembly faulty (Section 4.4)
Antenna non-functional		X													
Antenna not switching channels/satellites				X						X			X		
No picture on TV set					X	X	X		X		X		X		X
Certain channels do not work								X							
Intermittent picture for short intervals			X		X	X	X		X		X			X	X
System works at dock but not on the move					X									X	
System will not find satellite			X	X	X	X	X		X		X	X			X
Snowy or pixelating television picture					X		X		X				X		
No antenna-specific menus on GyroTrac												X			
Antenna and GyroTrac not communicating												X			
No data output through Serial Port 3												X			

4.1.7 Satellite Frequency Data Changed

If some channels work, while one or more other channels do not, the satellite's frequency data may have changed. To update this frequency data, refer to *Section 3.8.8, "Updating Satellite Frequency Data."*

TracVision G6 Installation and Technical Manual Addendum

(ECO #5315)

The following changes have been made to Revision C of the TracVision G6 Installation and Technical Manual (KVH Part Number 54-0161).

5.3 TracVision G6 Field Replaceable Units

The azimuth limit switch has been added to the list of field replaceable units.

Table 5-1
TracVision G6 Field Replaceable Units

FRU	Part Number
Radome	02-1047-01
CPU	02-0992
RF Detector PCB	02-1017-02
Antenna Gyro Sensor	02-1035
Antenna Gyro Gasket	24-0139
Elevation Drive Belt	24-0105-83
Elevation Motor	02-1050
Azimuth Limit Switch Assembly	**02-0957-01**
European LNB Assembly	02-0932
U.S.-style LNB Assembly	02-0870
Latin American LNB Assembly	02-0870-01
Quad-output LNB Assembly	02-1052
ADCU	02-0961
Sensor Module	02-0991
Data Cable	32-0619-100
RF Cable	32-0566-0100
PC Cable	32-0628-06

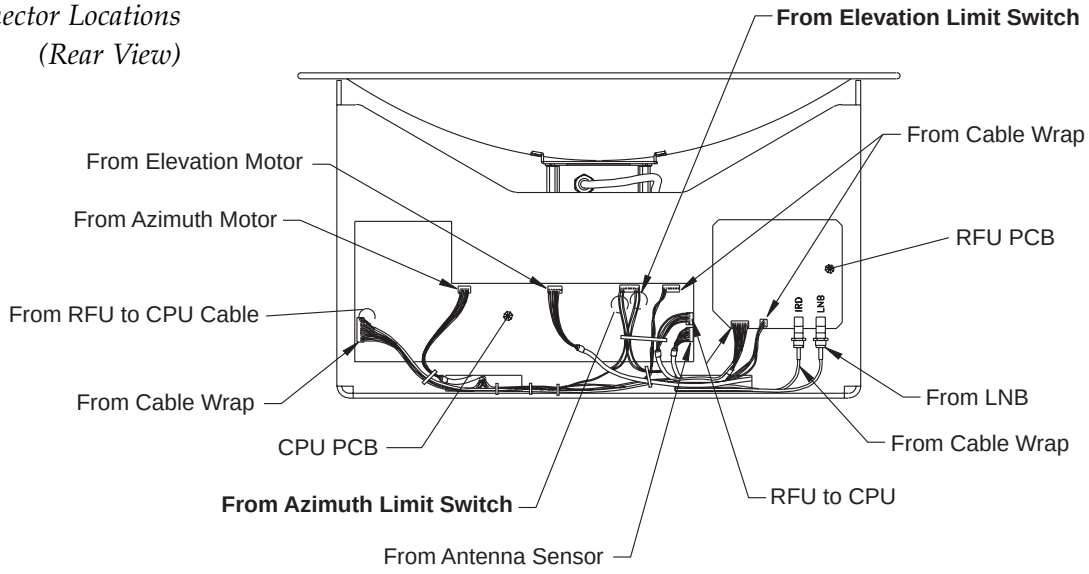
FRU	Part Number
Sensor Cable	32-0586-30
Power Cable	32-0510-100
CPU Fuse	16-0017-4000

* European TracVision G6 systems only
† North American TracVision G6 systems only

5.4 PCB Removal and Replacement

Figure 5-3 has been changed to indicate the correct Molex pin locations for the azimuth limit switch and the elevation limit switch.

Figure 5-3
PCB Connector Locations (Rear View)



The following procedure has been inserted for replacing the azimuth limit switch. As a result, Sections 5.6 through 5.9 of the Installation and Technical Manual have been renumbered Sections 5.7 through 5.10.

5.6 Azimuth Limit Switch Assembly Replacement

1. Rotate the antenna assembly, by hand, clockwise until it stops.
2. Remove the printed circuit board (PCB) cover, illustrated in Figure 5-2, using a #2 Phillips screwdriver and a ⅜" nut driver/socket.

3. At the CPU's Molex connector, cut the black and white wires from the azimuth limit switch (see Figure 5-3). Leave about an inch of the wires still connected for later reference.

4. At the azimuth limit switch cover, remove the hot melt keeping the black and white wires in place (see Figure 5-7).

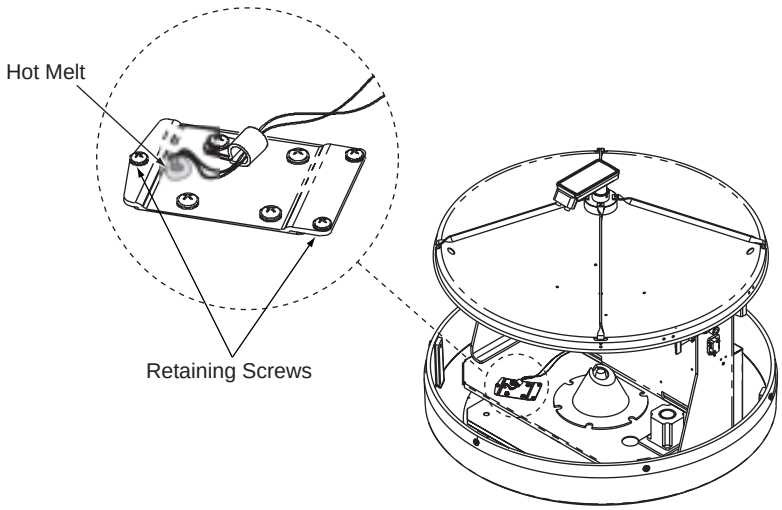


Figure 5-7
Azimuth Limit Switch Cover

5. Remove the three #6-32 x ⅜" retaining screws from the limit switch cover and set aside (see Figure 5-7). Lift the cover to access the limit switch underneath.

6. Remove the four #8-32 x ½" screws securing the limit switch to the cover and set aside.

7. Replace the azimuth limit switch. Attach the new switch to the cover using the #8 screws, flat washers, and cable clamp.

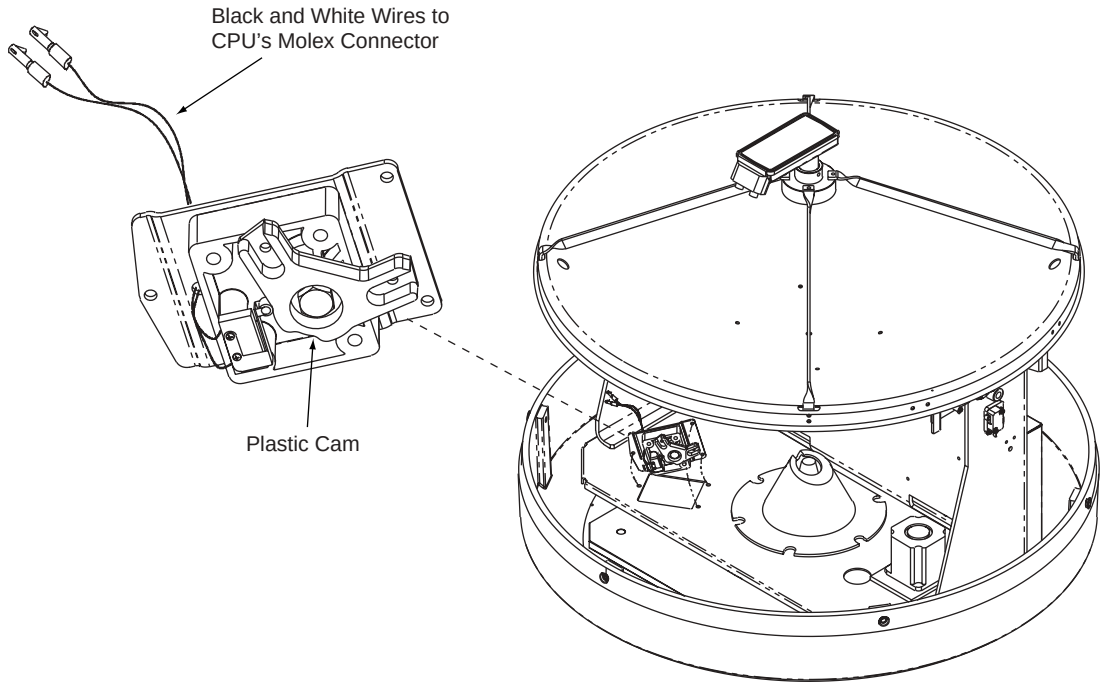
8. Route the new limit switch wires through the cover and cable clamp to the CPU's Molex connector. After noting the position of the old black and white wires, remove the old wires from the Molex connector. Attach the new wires in their place.

9. Before re-installing the azimuth limit switch to the antenna assembly, orient the switch's plastic cam as shown in Figure 5-8 on the following page. With the cam in the proper position, reinstall the switch to the antenna assembly using the three #6 retaining screws and flat washers. ***Ensure the cam finger engages the stop pin in the mounting cavity.***

10. Apply hot melt or RTV at the limit switch cover's wire access hole to protect the wires from chafing.

Figure 5-8

Azimuth Limit Switch Orientation



TracVision G6 Installation and Technical Manual

This manual provides detailed instructions on the proper installation, use, and maintenance of the KVH TracVision G6 automatic satellite tracking 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.

TracVision G6 Serial Number

This serial number will be required for all troubleshooting or service calls made regarding this product.

Direct questions, comments, or suggestions to:

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KVH Part # 54-0161 Rev. C

Table of Contents

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List of Tables

1 TracVision G6 System Overview

A complete satellite TV system, illustrated in Figure 1-1, includes the TracVision G6 connected to an IRD, the GyroTrac digital gyro-stabilized sensor, Advanced Digital Control Unit (ADCU), and a television set. A desktop or laptop computer is used to configure the system for satellite selection and conduct diagnostics. System specifications are provided in *Appendix A*.

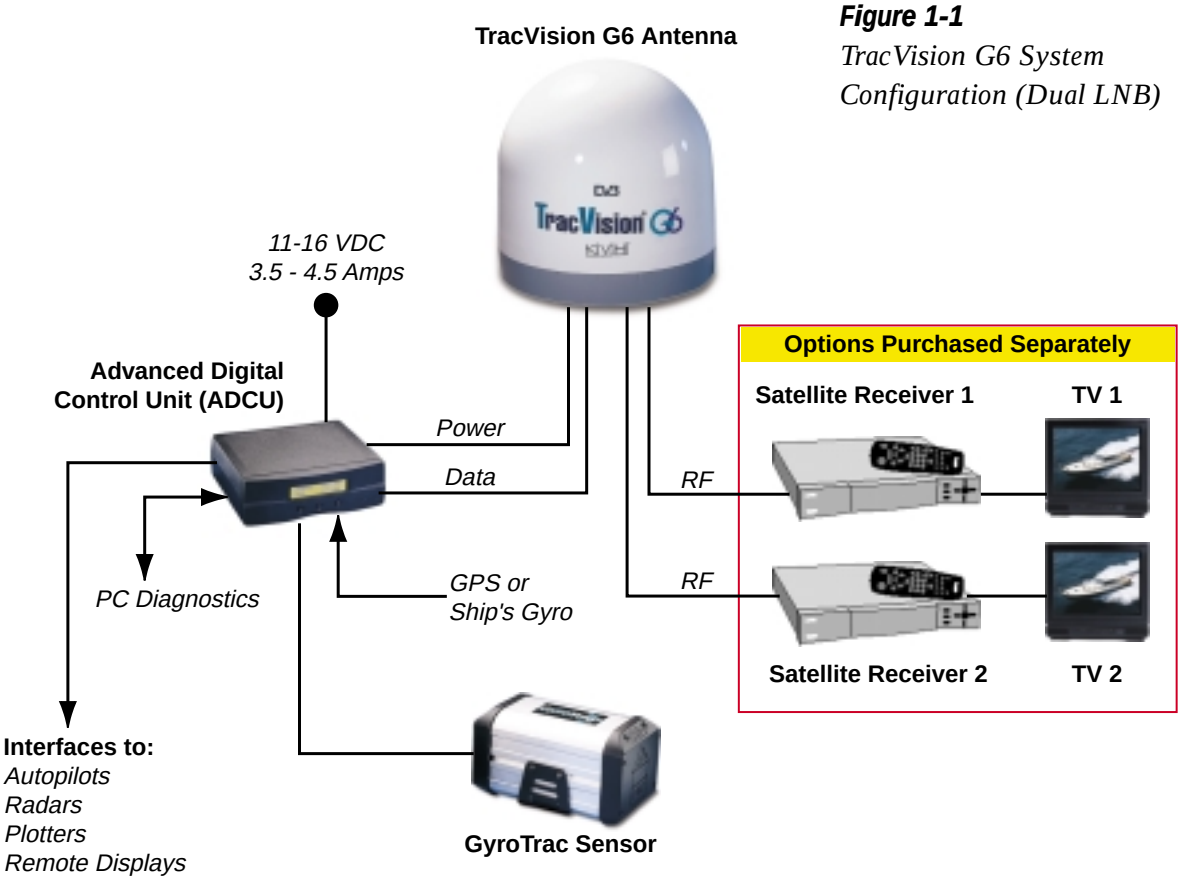


Figure 1-1
TracVision G6 System Configuration (Dual LNB)

1.1 Materials Provided With TracVision G6 System

Table 1-1 lists the components and materials in the TracVision G6 shipping carton.

Table 1-1
TracVision G6 Packing List

Component	KVH Part No.
Antenna Unit	02-1045-01† 02-1045-02* 02-1045-03†† 02-1045-04**
Installation Kitpack	72-0103
Data Cable	32-0619-100
PC Cable	32-0628-06
RF Cable†††	32-0566-100
Power Cable	32-0510-100
Ground Cable	32-0583-50
TracVision G6 Technical Manual	54-0161
TracVision G6 User's Guide	54-0161-01
GyroTrac, which includes:	01-0226
Sensor Module	*02-0991*
ADCU	*02-0961*
Flush Mount ADCU Panel	*20-0667*
Horizontal Sensor Bracket	*20-0658*
Vertical Sensor Bracket	*20-0666*
Sensor to ADCU Cable (30 ft.)	*32-0623-30*
Kitpack	*72-0095*

† North American TracVision G6 system
* European TracVision G6 system
†† DIRECTV Latin America TracVision G6 system (formerly "Galaxy Latin America")
** European TracVision G6 system with quad-output LNB
††† Not supplied with quad-output LNB systems

2 Installation

TracVision G6 is designed for simple installation and setup. Just follow these easy steps:

Step	Refer to Section...
1. Choose the hardware locations	2.1
2. Mount the Antenna Unit	2.2
3. Mount the GyroTrac	2.3
4. Install the IRD	Refer to IRD User Manual
5. Wire system components	2.4
6. Connect ADCU to vessel power	2.4.9
7. Calibrate the Sensor Module	2.5
8. Program the IRD (Europe only)	2.6
9. Install selected satellite pair	2.7.1
10. Load any user-selected satellites	2.7.2
11. Set the skew angle (Europe only)	2.8
12. Check out system	2.9

Table 2-1
Installation Process

Plan the entire installation before proceeding! Take into account antenna unit placement, running cable distances between units, and accessibility to the equipment after installation. Cable lengths are detailed in Tables 2-2 and 2-3 on the following page.

Materials and Equipment Required for Installation

- Electric drill
- ½" (13 mm) drill bit and 3" (80 mm) hole saw
- Socket wrenches
- Flat tip and Phillips screwdrivers
- RG-11 (75 ohms) cable for extra RF signal cables as needed. *If your system includes a quad-output LNB, you will need four RG-11 cables.*
- Crimp tool (LRC #L3011B or equivalent)
- Power cable to connect the ADCU to ship's power (Table 2-2 provides proper gauge and length specifications)
- Light hammer; center punch; tape; scriber/pencil
- Terminal lug crimping tool; wire strippers
- A PC with terminal emulation software such as PROCOMM, Windows Terminal, or Windows 95/98 Hyperterminal

KVH recommends the use of RG-11 (75 ohms) cable for RF wiring. Use of non-RG-11 (75 ohms) cables will result in degraded performance. The KVH warranty does not cover degraded performance due to improper wiring.

Recommended ADCU to Ship's Power Cabling

The following cable sizes are recommended for the specified running lengths and are based on Lloyd's and ABYC specifications. Cable jacketing should meet marine insulation standards while the cable should be tinned, stranded marine stock.

Table 2-2
Recommended ADCU-to-Ship's Power Cable Specifications

Cable Length	Cable Gauge
to 50 ft (15 m)	14 AWG (1.5 mm^2)
+50 ft (+15 m)	12 AWG (2.5 mm^2)

Below-decks Cable Lengths

The major considerations in locating the below-decks equipment are accessibility and cable lengths between units. Lengths of these cables are as follows:

Table 2-3
Lengths of Provided Below-decks Cables

Cable (Function)	Length
Data Cable (ADCU to Antenna Unit)	100 ft (30 m)
PC Cable (ADCU to PC)	6 ft (1.5 m)
RF Cable (Antenna to IRD)	100 ft (30 m)
Power Cable (Power to Antenna Unit)	100 ft (30 m)
Sensor to ADCU Cable (GyroTrac)	30 ft (10 m)
IRD Ground to ADCU Ground Cable	50 ft (15 m)

The power cable connector on the base of the Antenna Unit cannot accept cables thicker than 14 AWG (1.5 mm^2). Refer to Section 2.4.2, "Providing Power to the Antenna Unit," *for more details.*

2.1 Choosing the Best Location and Getting the Best Reception

There are several factors to consider when choosing the respective locations of the TracVision G6 antenna unit and GyroTrac sensor components.

The radome exterior is treated with a special finish selected for compatibility with the dome material and transparency to the satellite signals. Application of additional paints or finishes WILL degrade performance, potentially beyond acceptable limits.

2.1.1 Selecting the Best Location for the TracVision G6 Antenna Unit

- The ideal antenna site has a clear view of the horizon/satellite all around.
- Tracking errors will be reduced if the antenna forward arrow is aligned as closely as possible with the vessel's centerline.

- Place the Antenna Unit as close to the intersection of the vessel's fore-and-aft centerline and midships.
- Keep the antenna out of line with nearby radars, as their energy levels may overload the antenna's front-end circuits. If necessary, position the Antenna Unit so it is at least four feet (1.3 meters) above or below the level of the radar.
- Make sure that the mounting surface is rigid so that it cannot flex when the vessel vibrates. If necessary, add a strength member to the mounting site to stiffen it.

The Antenna Unit should not be too high off the water (a height above the waterline no more than half the vessel length).

2.1.2 Selecting the Best Location for the GyroTrac Sensor Components

Ideally, the GyroTrac sensor module should be mounted as low as possible in the center of the vessel – but *NOT* in the bilges.

- Place the Sensor Module as far as practical (minimum 3 ft./0.9 m) from magnetized or magnetizable materials.
- Maintain at least 4 feet (1.3 m) separation between the Sensor Module and any large ferrous masses, cables carrying high amperage direct current, or battery banks.
- Be alert for devices that change their magnetic characteristics when in use, such as CRTs, computer and TV screens, radar magnetrons, electric winches, loudspeakers, windshield wipers, and other devices with DC motors. GyroTrac cannot compensate for changing magnetic fields created by these devices.
- If it is necessary to fabricate custom mounting brackets for the Sensor Module, they should be made from non-ferrous materials such as wood, brass, aluminum, fiberglass, or plastic.

If uncertain of the best location for the sensor module, make a temporary installation and conduct a compass calibration (as described in Section 2.5, "Calibrating the Sensor Module*"). Any necessary adjustments to the sensor location can be made based on the calibration scores.*

Be certain to isolate the Sensor Module from ground (i.e., the ship's hull) by always using the fiber washers when attaching the Horizontal Sensor Bracket to either a mounting surface or the Vertical Sensor Bracket.

Mounting on Steel Vessels

The GyroTrac sensor module is a digital magnetic compass and great care is required when positioning the unit on steel-hulled craft. The ideal location is in the wheelhouse or above decks. Mount on an aluminum pole or bracket, well away from

magnetic fields such as cranes, derricks, motors, radomes, antennas, etc. ***DO NOT*** mount the sensor module on a steel or iron platform. Use aluminum, brass, plastic, or wood.

2.2 Installing the Antenna Unit

Specifics of installation will vary with vessel design but the following procedures are applicable in most situations and will result in a secure and effective installation.

Table 2-4 lists the components provided in the Antenna Unit Installation kitpack.

Table 2-4
Antenna Unit Kitpack Contents

Part	Qty.
⅜-16 x 3" hex screws	4
⅜ flat washers	8
⅜-16 hex nuts	4
⅜ lock washers	4
#10-32 x ⅝" flat head screws	6
RG-11 type F connector	1
Plastic screw covers	6
Antenna base seal gasket	1
Tie-wraps	2
Core clamp	1

Always lift the antenna unit by the gray baseplate structure, not the radome. Also be careful not to strike the exposed connectors extending from the bottom of the baseplate or allow them to carry the weight of the antenna unit.

Tips for Successful Antenna Unit Placement and Mounting

- The mounting surface should be essentially flat, free of vibration and flexing, and strong enough to carry the complete assembly (55 lbs/25 kg).
- The antenna unit need not be located exactly on the vessel's fore-and-aft axis, but its centerline reference MUST be parallel to it.
- Be sure to account for the radome height and the base dimensions, illustrated in Figure 2-1 on the following page.

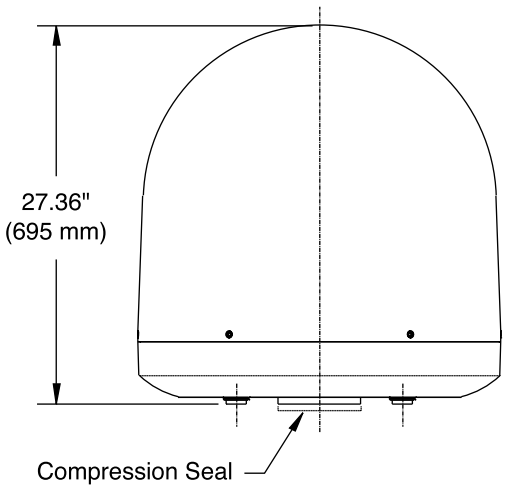


Figure 2-1
Antenna Unit Elevation

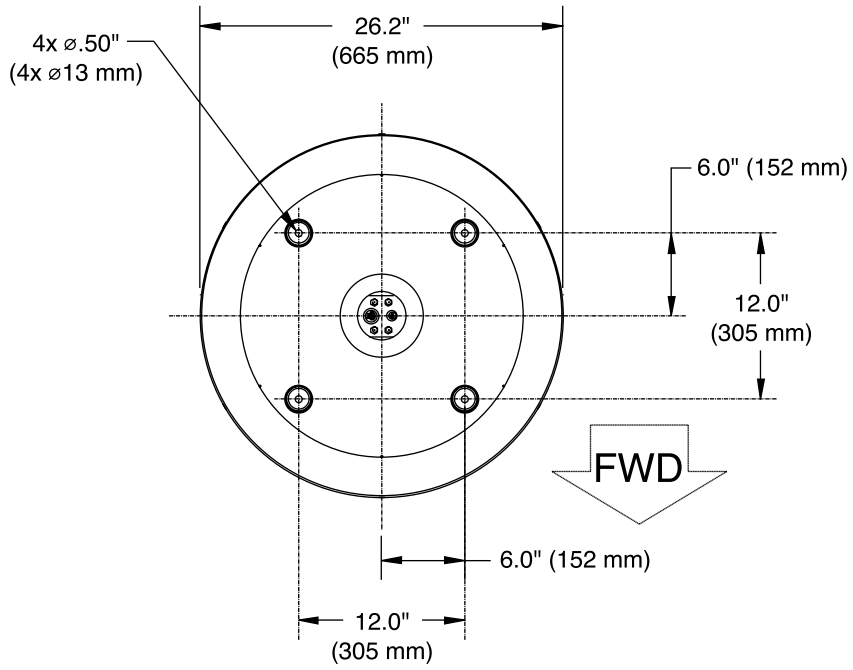


Figure 2-2
Antenna Unit Base Dimensions

Antenna Unit Mounting Procedure

1. Using the base dimensions presented in Figure 2-2 or the baseplate as a template, lay out the four mounting bolt holes. Check the layout to make certain the baseplate will be parallel with the vessel's fore/aft axis.
2. Drill four ½" (13 mm) bolt holes. Mark a 3" (80 mm) diameter circle in the center of the pattern and cut out to make a passage for the cables to connect to the baseplate. Smooth the edges of the hole to protect the cables.

Figure 2-3
Baseplate/Foam Seal Orientation (Bottom View)

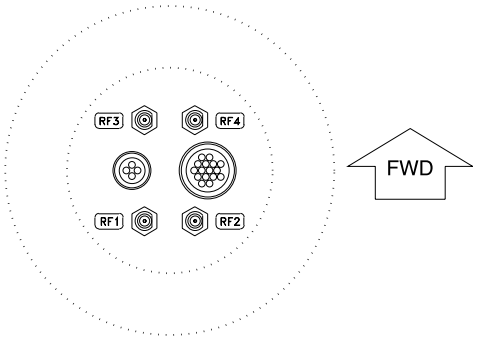
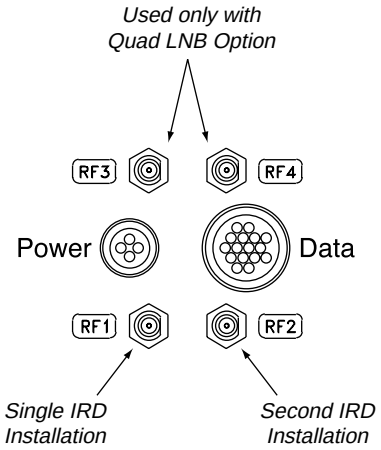


Figure 2-4
Baseplate Connector Assignments



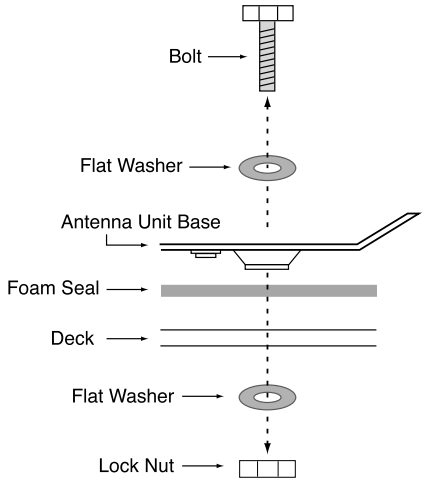
The foam shipping restraints must be removed before power is applied. Save the foam pieces for reuse and be sure to install it whenever the Antenna Unit is moved from place to place. See Section 5.9, "Preparation for Shipment," *for instructions on preparing for shipment.*

3. Place the foam seal in position on the mounting surface with the hole centered over the cable access cutout and the paper backing on the bottom as shown in Figure 2-3. Do not remove the paper backing at this time. Scribe a line all around the seal.
4. Position the baseplate assembly in place over the mounting holes and cable access. Ensure that all holes line up and that the connectors are centered over the cable access. Make any necessary adjustments before seating the foam seal in place permanently.
5. Clean the surface where the foam seal will be placed. Remove the paper backing from the foam seal to expose the contact cement. Lay the foam seal in place, adhesive side down, and press down firmly to bring the adhesive into full contact along the bottom.
6. Bring the Data Cable, RF Cable(s), and Power Cable up through the access hole and connect them to the baseplate. Turn the connectors down securely, but don't use excessive force; finger-tight is sufficient. Figure 2-4 illustrates the connector assignments. *Note that all four RF connectors need to be connected to four RF cables if using a quad-output LNB.*

   Do not use teflon gel on the cable fittings as it reduces signal strength at higher frequencies.
7. Remove the foam shipping restraints from the Antenna Unit.
8. Place the baseplate over the holes drilled in the foundation. Rotate the azimuth mechanism plate to expose all four mounting holes. *When rotating the azimuth mechanism by hand, go slowly. Hitting the stops with excessive force will damage the azimuth limit switch.*
9. Place a flat washer from the kitpack on a bolt and insert the bolt into its hole ***from above*** as shown in Figure 2-5 on the following page.
10. Apply a flat washer and lock nut from underneath as shown in Figure 2-5 on the following page.

11. Tighten securely until the foam seal is compressed as far as it will go and all four feet are bottomed against the mounting surface.
12. For European systems, please refer to Section 2.8, "Setting the Skew Angle." North American systems may proceed to step 13.
13. Place the radome over the baseplate. Align the radome screw holes with the inserts in the baseplate, insert the screws and tighten. Install a protective plastic screw cap from the kitpack over each screw. Several spare protective caps are provided.

Figure 2-5
Bolting the Antenna Unit to the Deck (Side View)



2.3 Installing the GyroTrac

The following sections provide detailed instructions for installing TracVision G6's GyroTrac Sensor Module and ADCU.

2.3.1 GyroTrac Installation Kitpack

Table 2-5 lists the materials provided in the GyroTrac kitpack.

Table 2-5
GyroTrac Kitpack Contents

Part	Qty.
#8 Fiber Washer	10
#8 Flat Washer	10
#8 Self-locking Nut	5
#10 Flat Washer	5
#10 Lock Washer	5
#10 Pan (Phillips head) Screw	5
#8 Pan (Phillips head) Screw	5
#8 Lock Washer	5
#8 Pan (Phillips head) Screw BP	5
Velcro Self-Adhesive Backing	8
Velcro Washer	4
4" Tie-wrap Clamp	5
Tie-wrap Screw Mount	6
Connector Wire Terminal Strip	5
Sensor Module to ADCU Power Wire Ferrite	1

2.3.2 Mounting the Sensor Module

Figure 2-6
Horizontal Sensor Bracket

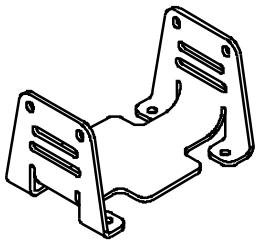


Figure 2-7
Vertical Sensor Bracket

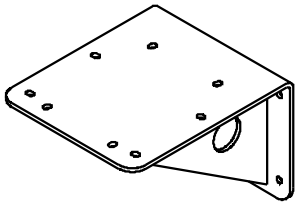
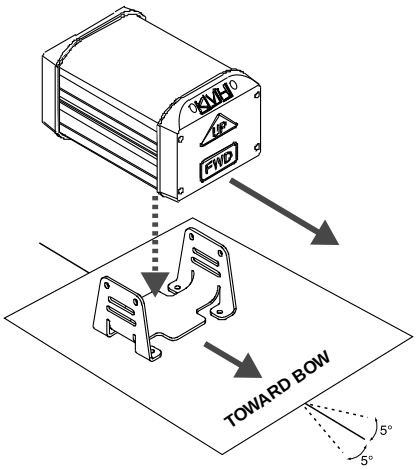


Figure 2-8
Proper Orientation of the Sensor Module



The GyroTrac Sensor Module comes equipped with two mounting brackets. The first is the Horizontal Sensor Bracket, which attaches directly to the Sensor Module housing, *and must be used in all mounting arrangements.*

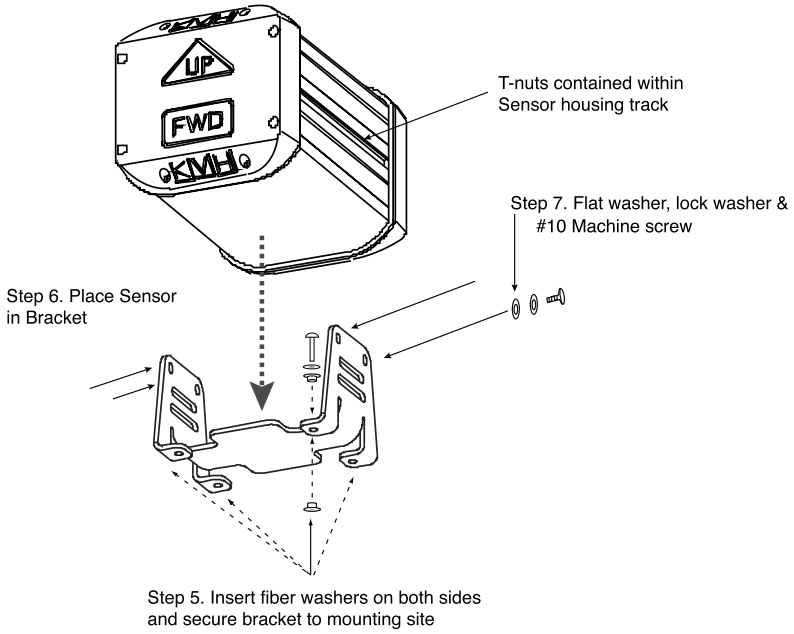
The Vertical Sensor Bracket allows the Sensor Module to be mounted on a vertical surface. The following steps detail the correct use of each bracket.

These brackets should enable the Sensor Module to be placed as level in pitch and roll as possible. If you are unable to place the Sensor Module in a level arrangement, refer to *Section 3.5.3, "Entering Gyro Offset Values"* to compensate.

Horizontal Bracket Only

1. Choose a mounting location free of excessive vibration and flexing.
2. The module must be oriented so that the forward reference on the end cap is pointed forward and parallel to the vessel's fore-and-aft axis (to ±5°). The proper orientation is illustrated in Figure 2-8.
3. Position the Horizontal Sensor Bracket so that the Sensor Module will be properly oriented when placed in the bracket.
4. Use the holes in the bracket feet to spot for mounting screws. Center punch and drill 4 holes with a ⅛" (0.125" or 3.5 mm) bit.
5. As illustrated in Figure 2-9, position the bracket over the mounting holes.
   - Insert fiber washers into both sides of mounting bracket.
   - Insert #8 flat washers and #8 Type BP pan head screws into the holes.

6. Place the Sensor Module in the bracket with the proper orientation (up/forward).
7. Thread #10 machine screws through lock washers, flat washers, and bracket, and then into the captive extrusion T-nuts within the Sensor Module housing as illustrated in Figure 2-9.



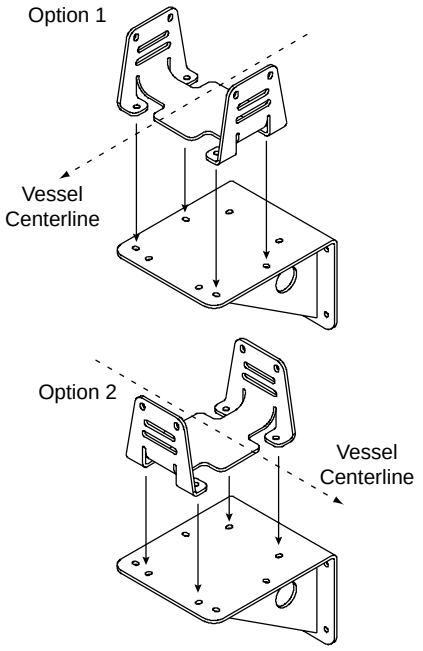
Should you ever need to replace the #10 machine screws used to secure the housing and bracket, the screws must be no longer than ⅜" (10 mm) to avoid damaging the housing.

Figure 2-9
Securing the Sensor Module and the Horizontal Sensor Bracket

Horizontal and Vertical Bracket

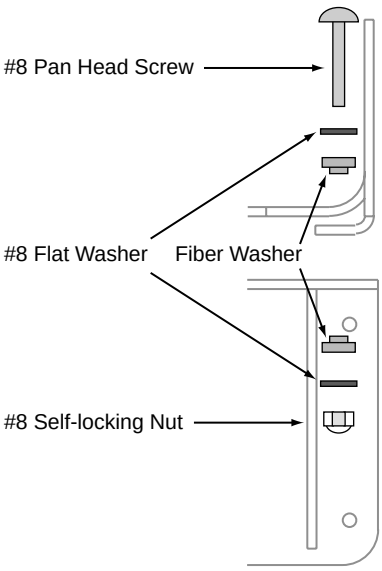
1. Choose a mounting location free of excessive vibration and flexing.
2. The module must be oriented so that the forward reference on the end cap is pointed forward and parallel to the vessel's fore-and-aft axis. See Figure 2-8 for reference. The brackets are designed so that the Sensor Module may be mounted perpendicular (option 1) or parallel (option 2) to the mounting surface as pictured in Figure 2-10.
3. The module must be level with the vessel's deck. This placement can be fine tuned by using the ADCU pitch and roll data. Adjust the brackets so that the pitch and roll are 0 (zero) when the vessel is docked and under normal load.

Figure 2-10
Optional Bracket Orientations



4. When choosing a location for the unit, make certain that there is sufficient overhead clearance for both brackets *and* the Sensor Module.
5. Use the holes in the Vertical Sensor Bracket to spot for mounting screws. Center punch and drill 4 holes with a ⅛" (0.125" or 3.5 mm) bit.
6. Secure the Vertical Sensor Bracket to the vertical surface with #8 flat washers and #8 screws.
7. Attach the Horizontal Sensor Bracket to the Vertical Sensor Bracket as shown in Figure 2-11.
   - Position the Horizontal Sensor Bracket over the mounting holes in the Vertical Sensor Bracket.
   - Insert fiber washers into both sides of mounting bracket.
   - Insert #8 flat washers and #8 Type BP pan head screws into the holes.
8. Place the Sensor Module in the bracket with the proper orientation (up/forward).
9. Thread #10 machine screws through lock washers, flat washers, and bracket, and then into the captive extrusion T-nuts within the Sensor Module housing.

Figure 2-11
Attaching the Horizontal and Vertical Brackets



2.3.3 Mounting the ADCU

The ADCU may be mounted in one of two ways: either directly to a horizontal surface using Velcro fasteners or flush to a control panel. Both the fasteners and the Flush Mount Bracket are included as part of the GyroTrac package.

Some tips for installing the ADCU:

- The ADCU should be placed in a dry location that is convenient for the user.
- It is not susceptible to magnetic interference nor must it be situated on a level surface.
- It should be placed so the LCD display is visible and buttons are accessible.
- Allow room at the back to connect cables to the rear panel.

Velcro Fastening

1. Choose a flat, stable location.
2. Remove the two strips of velcro fabric from the kitpack. Clean the bottom of the housing with a mild detergent and water to remove oils, etc. Peel the protective backing from the strips and apply them to the bottom of the housing at each of the four corners.
3. Position the four hook disks where the ADCU will be mounted. Drill screw holes for the disks and attach. Press the ADCU firmly into place so the loop material engages the hook disks.

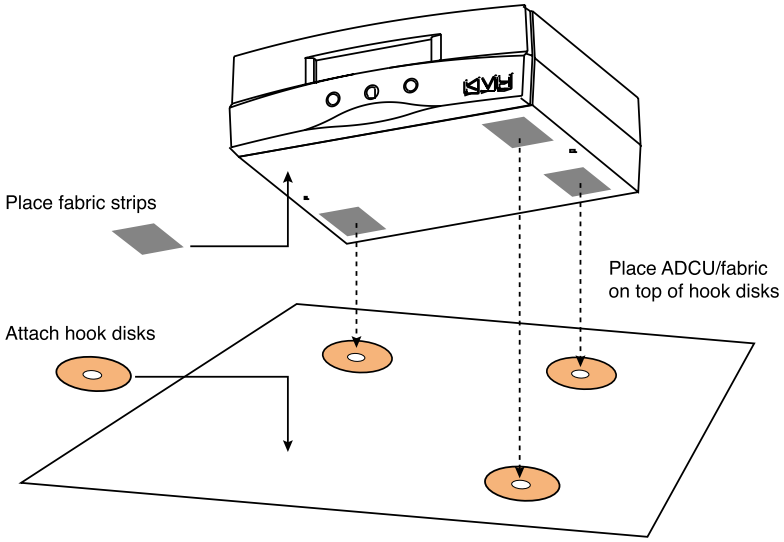
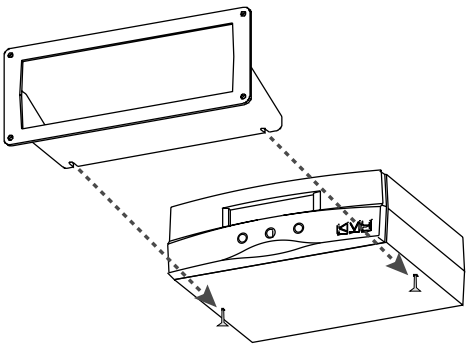


Figure 2-12
Mounting the ADCU with Velcro Attachments

Flush-mounting the ADCU

1. A template has been provided in *Appendix B* as a guide to mark and cut the proper hole for the Flush Mount Bracket. Cut the hole and make certain the bracket and ADCU will fit easily.
2. Attach the Flush Mount Bracket to the ADCU by loosening the two screws on the underside of the ADCU. Slide the Flush Mount Bracket backward over the ADCU until the two notches meet the screws as shown in Figure 2-13.
3. Tighten the screws to secure the ADCU to the bracket.

Figure 2-13
Securing the ADCU to the Flush Mount Bracket

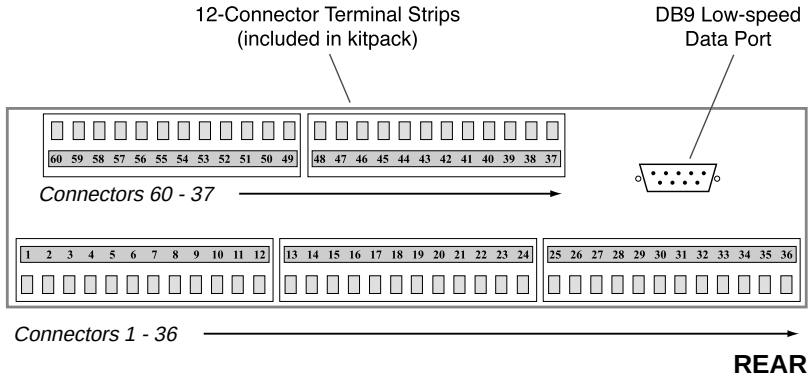


4. After completing the wiring described in *Section 2.4, "Wiring the TracVision G6 System Components,"* insert the ADCU and bracket into the hole and secure the unit.

2.4 Wiring the TracVision G6 System Components

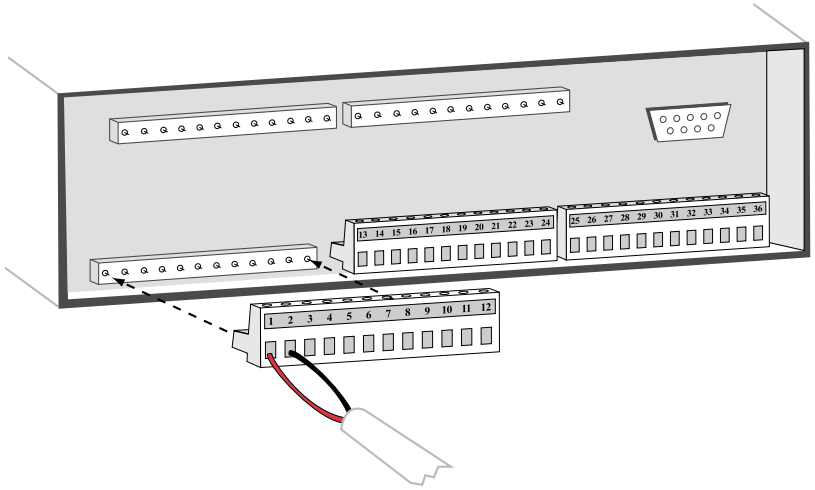
Virtually all wiring for the TracVision G6 connects at the rear panel of the GyroTrac ADCU. Included in the GyroTrac kitpack are five terminal strips with terminal connectors numbered 1 through 60.

Figure 2-14
Terminal Strip Order



After wires are secured within the terminal connectors, the strips will be slotted into the rear panel of the ADCU as illustrated in Figure 2-15.

Figure 2-15
Attaching the Terminal Strips to the ADCU



Tips for Successful and Safe Wiring

- When inserting a wire into the terminal connector, make certain wire insulation is not pinched in the connector.
- After inserting and securing wire, tug gently to ensure that the connection is solid.
- Position cables behind the ADCU so that they connect neatly to the terminal strips.
- Do not tin (solder) the wire ends.

Double-check all wiring. Be certain to plug terminal strips into the correct positions. If wiring is incomplete or incorrect or the terminal strips exchange positions, serious electrical damage can occur to the TracVision G6 Antenna Unit, the GyroTrac, and interfacing electronics.

Effective Strain Relief for ADCU Terminal Connections

Due to both the potential number of wires that will be connecting to the rear of the ADCU and the dynamic environment aboard ship, it is critical that the terminal connections are properly strain relieved using tie-wraps (a number of which are included with the GyroTrac kitpack).

Some things to consider when strain relieving cables:

- There should be no tension on the wires connecting to the terminal strip. Removing slack is important but the wires should not be taut.
- If the cable is equipped with a ferrite, the ferrite should be as close as possible to the terminal connections.
- Strain relieve wires and cables as close to the ferrite as possible. A good arrangement includes a tie-wrap behind the ferrite (on the side furthest from the ADCU); an ideal design includes a tie-wrap on either side of the ferrite.

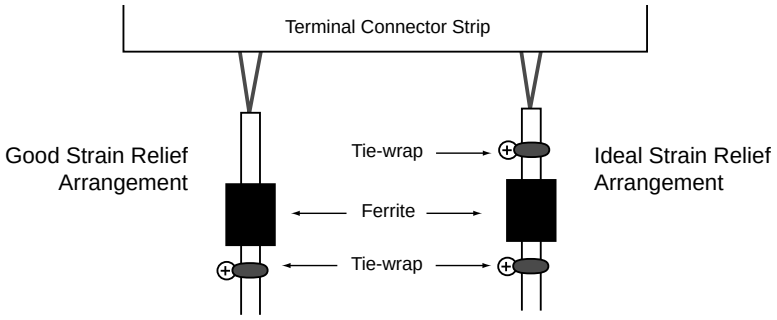


Figure 2-16
Examples of Effective Strain Relief

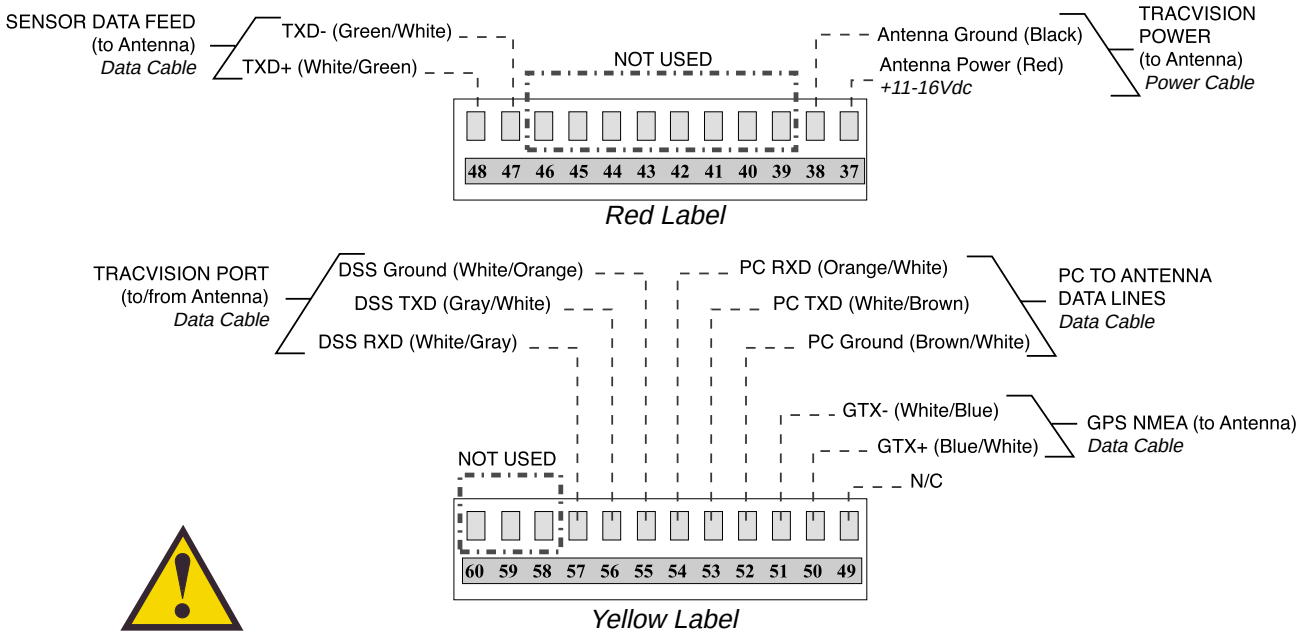
2.4.1 Wiring the Antenna Unit to the GyroTrac ADCU

Color wiring quick reference guides have been provided on the front and back covers of this manual.

Each cable provided with TracVision G6 should be routed and dressed before terminating at the ADCU. Note that the Data and Power cables have individual wires on one end. These can be trimmed to a shorter length if desired.

Figure 2-17
TracVision G6 Wiring Arrangement

The TracVision G6 satellite TV system connects directly to the ADCU via the top two terminal connector strips as follows:



Remove any unused wires from the Data Cable.

A comprehensive wiring diagram of the entire TracVision G6 system has been provided for technical reference in *Appendix C*. **A color quick reference guide to wiring your TracVision G6 has also been printed on the front cover of this manual.**

2.4.2 Providing Power to the Antenna Unit

Instructions for wiring the ADCU to ship's power are provided in Figure 2-18 and in Section 2.4.9, "Connecting the ADCU to Vessel Power."

For single-switch convenience, the ADCU has been designed to serve as a junction box between ship's power and the Antenna Unit as illustrated in Figure 2-17. However, the Antenna Unit can

be connected to a separate switch and breaker if it is more convenient or if the ADCU is placed more than 15 m (50 ft) from the Antenna Unit.

If there is a need to extend the Antenna Unit-to-ship's power cable, refer to the following tips:

- The Antenna Unit power cable connector cannot accept cables larger than 14 AWG (1.5 mm^2).
- If the cable is longer than 15 m (50 ft), be sure to verify the voltage at the antenna to ensure that there is sufficient power to drive the antenna under load (11-16 Vdc). If not, carefully increase the voltage to the Antenna Unit to compensate for any drop in power over the length of the cable and ensure that the voltage reaching the Antenna Unit is between 11 and 16 Vdc.

Power supplied to the TracVision G6 MUST NOT exceed 16 Vdc or the TracVision power supply will suffer serious damage!

2.4.3 Connecting External Devices to the GyroTrac ADCU

All connections between the ADCU and external devices are made at the connector strips located on the rear of the ADCU. Follow these guidelines when wiring additional equipment to the ADCU:

- Make certain any additional equipment complies with NMEA Standard 2.2.
- Data conductor wire should be minimum 18 AWG (0.75 mm^2), twisted pair, stranded, tinned marine cable.
- Do not use cables with wire diameter larger than 12 AWG (2.5 mm^2), as the connector plugs on the rear of the ADCU accept wire no larger than 12 AWG (2.5 mm^2) size.
- Cables provided with optional KVH displays and interface units are fully compatible with GyroTrac requirements. Note that cables to other external devices should follow the manufacturer's recommendations.
- For power cable specifications, refer to Table 2-2 at the beginning of this section.

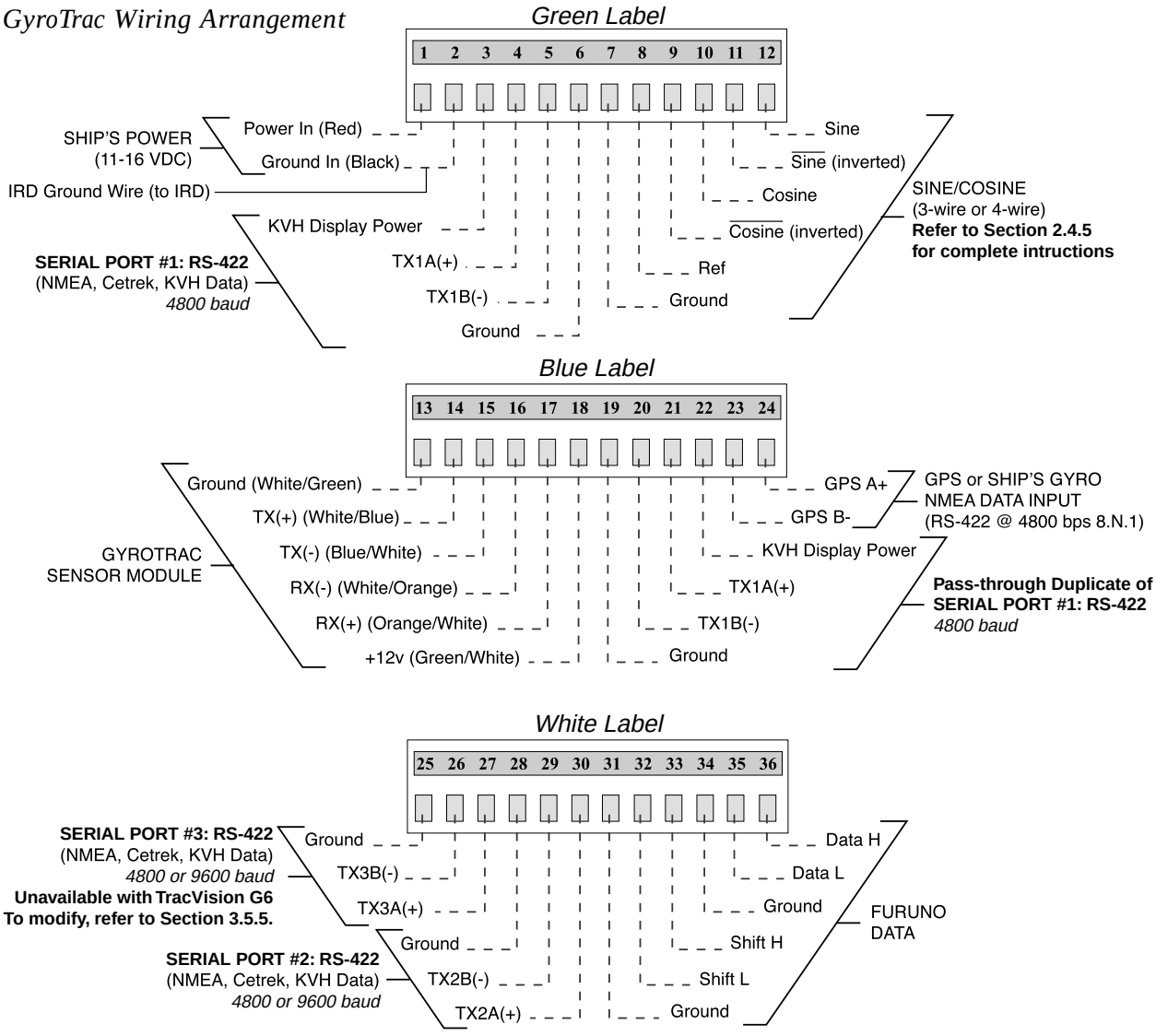
If the ADCU is receiving data from a ship's gyro, all compass outputs are automatically configured as True North and cannot be set as Magnetic.

Appendix D provides instructions on properly wiring optional KVH equipment to the GyroTrac system.

2.4.4 GyroTrac Wiring Diagram

Figure 2-18 presents a complete wiring diagram for each GyroTrac terminal connector strip.

Figure 2-18
GyroTrac Wiring Arrangement



As noted in Figure 2-18, the output for Serial Ports 2 and 3 can vary from 4800 baud to 9600 baud. This is determined automatically based upon the selected output. Serial Port 1 provides 4800 baud output only.

When the TracVision G6 antenna is connected to the GyroTrac system, GyroTrac Serial Port 3 will not provide output to other equipment. Serial Port 3 will only provide outputs if the antenna unit is disconnected from the ADCU and GyroTrac is configured to operate as a standalone system as described in *Section 3.5.5, "Selecting TracVision or GyroTrac-only Operations."*

2.4.5 Wiring the GyroTrac Sine/Cosine Interface

The sine/cosine reference voltage is an OUTPUT, not an INPUT. Connecting this output to the reference output for an autopilot or other system can result in problems. Section 2.4.5 provides instructions on how to solve this problem.

The GyroTrac ADCU sine/cosine interface provides the following outputs:

- sine
- cosine
- inverse sine
- inverse cosine
- reference voltage

Because the reference voltage is a reference output, not an input, connecting this output to another reference output from an autopilot or other system will cause problems.

The maximum current that can be drawn from the sine/cosine output is 10 mA.

In this case, connect the following wires from the autopilot (or other system) to the ADCU:

Table 2-6
GyroTrac/Autopilot Sine/Cosine Wiring Arrangement

Autopilot/Other System Wire	ADCU Terminal
Sine	12
Cosine	10
Internal Power Ground *(not chassis ground!)*	7
Reference (INPUT)	*8 (KVH Output)*

DO NOT connect the autopilot or other system to the ADCU reference output (ADCU terminal 8) if the autopilot has its own internal reference. Review the user's manual for the selected equipment.

Before connecting the Autopilot internal ground to ADCU terminal 7, use a low impedance voltmeter to make certain that there is no DC voltage between the two terminals. A DC surge could damage one or both systems.

To adjust the GyroTrac reference to match the reference of the autopilot (or other system), connect a voltmeter to GyroTrac ADCU terminal (#8) and the reference terminal of the autopilot (or other system). Adjust the GyroTrac reference voltage as described in *Section 3.4.1, "Setting the Sine/Cosine Data Output,"* until the voltmeter indicates 0 VDC.

The sine/cosine interface should now operate with optimal precision.

When the vessel is stationary, certain GPS models may not output the data required for GyroTrac to determine true north.

2.4.6 True North Capability

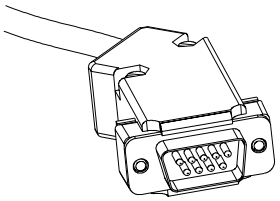
GyroTrac is capable of determining true north that is accurate, under most conditions, to within ±1.0˚. This information is obtained by providing GPS data input and reading the magnetic variance tables.

NMEA sentences from the GPS must contain one or all of the following sentences: VTG, VHW, or BWC. The sentence structure must comply with the NMEA 0183 V2.20 standard and run at 4800 bps 8.N.1.

As illustrated in Figure 2-18 and the GyroTrac quick reference wiring guide on the back cover of this manual, GPS interface cables connect to the ADCU at terminals 23 and 24. Refer to your GPS user manual for the correct NMEA data out configuration.

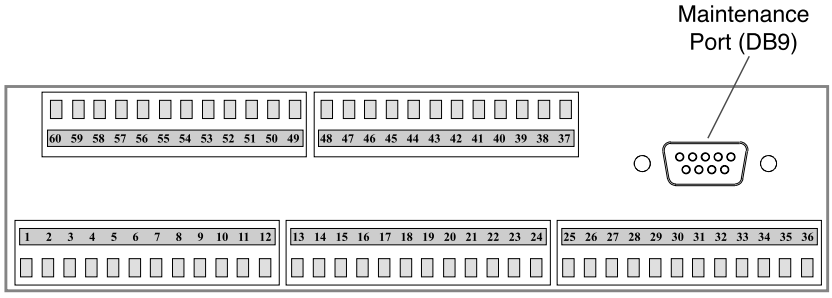
2.4.7 Connecting a PC to the ADCU

Figure 2-19
DB9 Plug



Locate cable 32-0628-06. For purposes of diagnostics and maintenance, it is occasionally necessary to hook up a PC to the system. This may be done using the DB9 maintenance port on the back of the ADCU. To do so, connect the DB9 (female) to the PC and the DB9 (male) to the ADCU.

Figure 2-20
ADCU DB9 Maintenance Port



RG-11 (75 ohms) cable is required for RF wiring. Use of non-RG-11 (75 ohms) cable will result in degraded performance.

2.4.8 Connecting an Antenna RF Signal Cable to the IRD

The RF signal cable is fitted with F-type connectors. One end should be connected to the plug labeled “RF1” on the base of the TracVision G6 system. The other connector should be connected to the IRD plug labeled “LNB” or “ANT/SAT.” If a second IRD is to be hooked up to the TracVision G6 antenna unit, the RF cable

for the second IRD should be connected to the plug labeled "RF2" while the other end is connected to the IRD plug labeled "LNB" or "ANT/SAT" on the second IRD. For details on connecting the RF cables in quad-output LNB configurations, see *Section 2.4.8.3, "Connecting the Antenna RF Signal Cables in Quad-output LNB Systems."*

The IRD that is connected to the RF1 cable controls which satellite the antenna is tracking. The IRD connected to RF2 can select different channels on that satellite but not change the satellite selection itself.

2.4.8.1 Connecting the IRD Ground Cable

A grounding wire has been provided to connect your IRD to a suitable ground. Attach the grounding wire to any suitable screw on the rear panel of the IRD with a good contact with the IRD chassis. The other end should be connected to a suitable ground, ideally to connector 2 of the ADCU terminal (see Figure 2-18).

2.4.8.2 Connecting the Antenna RF Signal Cables to a Multiswitch *(Latin and North American Systems Only)*

Some multiswitches (either active or passive), such as the Channel Master model 6214IFD, may interfere with the 22 KHz tone sent by DSS Plus™ IRDs to the antenna. As a result, the antenna may not receive the signal to change satellites when you change channels using your DSS Plus remote. In this case, you will need to use the maintenance port satellite switch procedure explained in Section 3.2, "Data Display and Accessing the Main Menu."

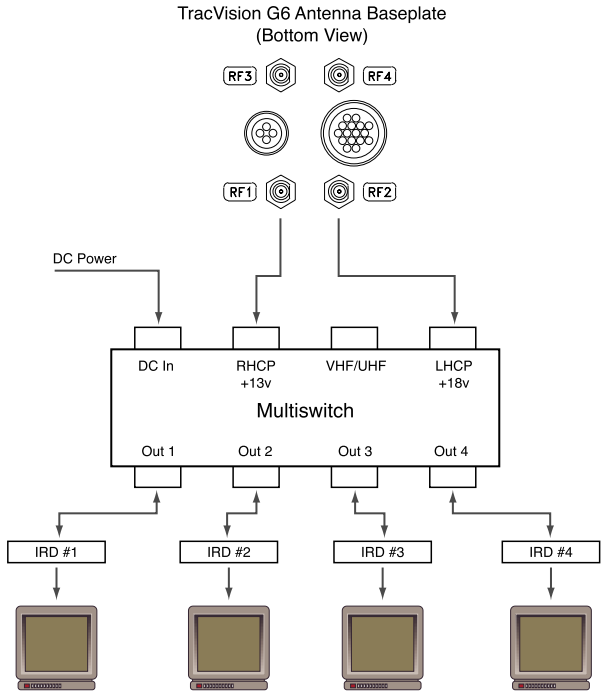
Due to the signal polarization of North American and Latin American satellites, it is possible for TracVision G6 to support more than two IRDs aboard a vessel. To install more than two IRD/TV pairs, an active multiswitch (Channel Master model 6214IFD or equivalent) is placed between the Antenna Unit and the IRDs. The following sections provide details for both a single multiswitch and a multiple multiswitch installation.

Multiswitch Installation for 3-4 IRD/TV Pairs

Figure 2-21 on the following page illustrates typical wiring arrangements for three or four IRDs. Mount the multiswitch unit in accordance with the manufacturer's instruction sheet.

1. Connect the RF cable tagged "RF1" to the multiswitch input labeled "LNB RHCP +13V".
2. Connect a second RF cable to the antenna unit's RF2 plug and to the multiswitch input labeled "LNB LHCP +18V".
3. Connect the multiswitch outputs to individual IRD inputs. Use RG-6 cable terminated with F-type connectors for all RF connections. Terminate all unused output connectors with 75 ohm DC blocks (Channel Master #7184, Radio Shack #15-1259 or equivalent).

Figure 2-21
Single Multiswitch Installation (Latin and North American systems only)

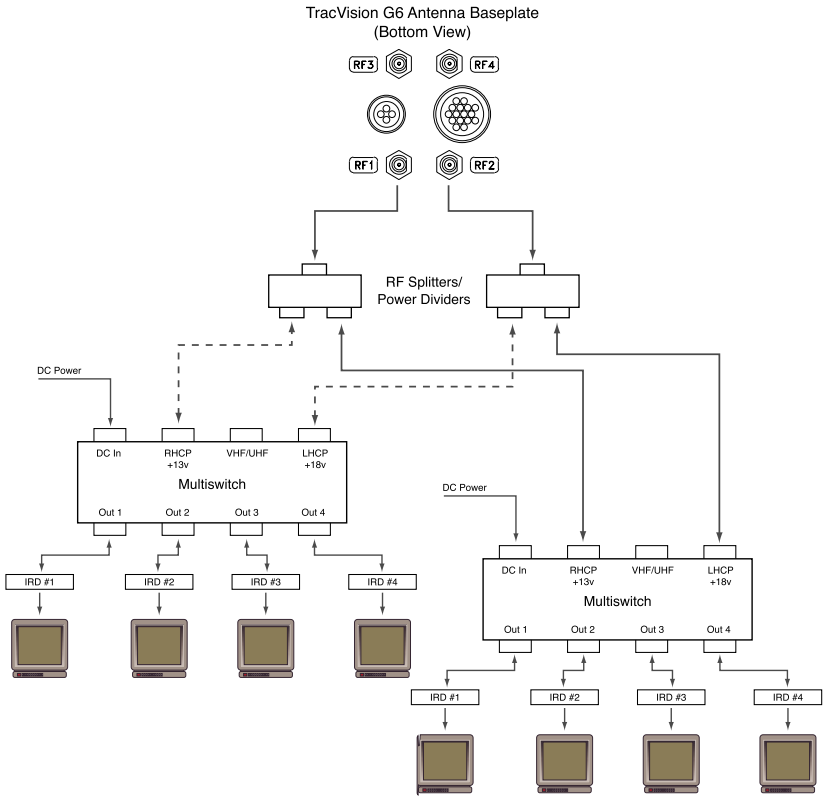


Due to the signal polarization in European satellites, the use of a multiswitch (active or otherwise), with a dual-output LNB will result in a loss of signal and less than optimal operation with TracVision G6 systems used in Europe.

Multiple Multiswitch Installation

If there is a need for more than four IRDs, it is possible to carry out a multiple multiswitch installation, as illustrated in Figure 2-22.

Figure 2-22
Multiple Multiswitch Installation (Latin and North American systems only)



2.4.8.3 Connecting the Antenna RF Signal Cables in Quad-output LNB Systems

The quad-output LNB accesses all four band/polarization combinations of European satellites, allowing you to connect multiple TVs to the same antenna.

Since each tap of the quad-output LNB passes only part of the total RF signal, an IRD cannot be connected directly to the antenna. Instead you will need to install a good quality, low-loss active multiswitch between the antenna unit and the IRDs.

To connect the four RF cables to the multiswitch, follow the procedure below.

1. Label both ends of the four RF cables to match their antenna baseplate connectors (RF1, RF2, RF3, and RF4).
2. Connect the free ends of the four RF cables to the active multiswitch as shown in Figure 2-23.

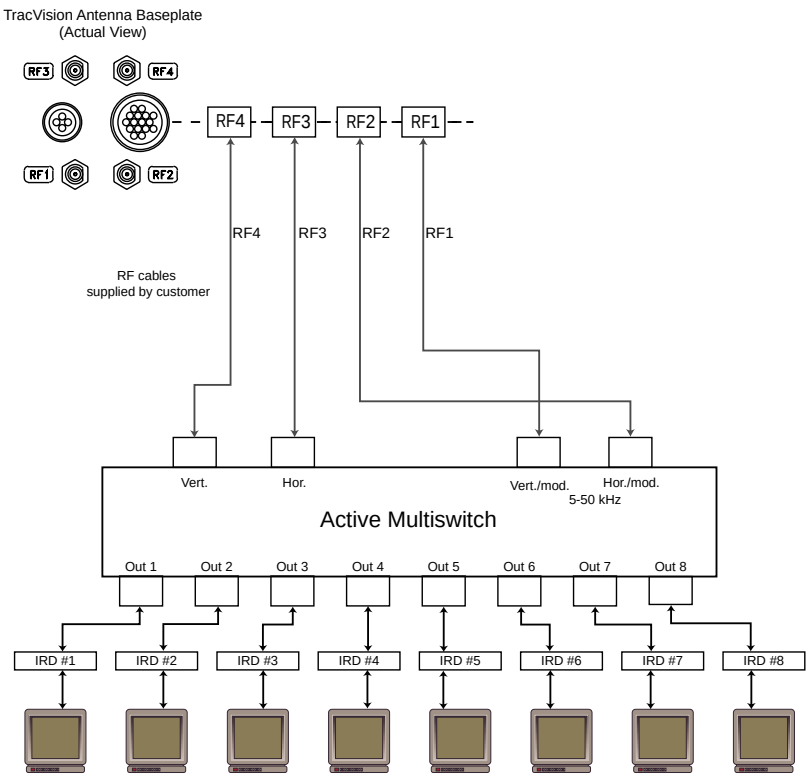


Figure 2-23
Single Multiswitch Installation (European Systems with Quad-output LNB)

In this wiring configuration, the antenna tracks on the vertically polarized high band, regardless of which satellite and channel is selected.

Power supplied to the TracVision G6 MUST NOT exceed 16V or the TracVision power supply will suffer serious damage!

The ADCU is equipped with fuses to protect against high-voltage spikes. If the system is installed correctly and power is available, but the system is non-functional, refer to Section 4, "Troubleshooting," *for instructions on checking and replacing the fuses.*

You must compensate the GyroTrac Sensor Module after installation so that any errors due to metal and magnetism in your vessel are removed!

2.4.9 Connecting the ADCU to Vessel Power

Short circuits may result in severe electrical shock or burns. Turn off vessel power and test the circuit to ensure that no power is present before connecting any power cables.

The TracVision G6 system does not have a dedicated power control (ON/OFF switch). A quick-tripping circuit breaker or fuse should be installed between vessel power and the ADCU. Circuit overload protection should be rated for 5 amperes. For recommended power cable specifications, refer to Table 2-2 at the beginning of this section.

If vessel power fluctuates widely or is noisy, a wide-range DC/DC converter power supply should be installed. *Test the voltage and polarity before making connections to vessel power.*

If the user-supplied power cable has a drain or shielded wire, ***DO NOT*** connect the drain or shield to either the ADCU or to ground.

2.5 Calibrating the Sensor Module

Although every Sensor Module is calibrated at the factory, hard and soft iron effects on the host platform can distort the local magnetic field, causing errors in the reported heading. These errors are minimized by proper location of the Sensor Module and are further removed by GyroTrac's autocompensation feature, which measures the surrounding magnetic field distortions and compensates for them, thereby removing the resulting heading errors and giving you a system with better than ±1˚ accuracy in most cases.

It is critical that the compensation procedure be performed and a good calibration score be achieved following GyroTrac's installation. This will ensure the accuracy of GyroTrac's measurements and the data it provides to your other onboard systems. Failure to properly calibrate the system may result in an autocalibration conducted under less-than-ideal circumstances. To ensure that some form of calibration occurs after installation, GyroTrac leaves the factory with its autocompensation feature turned on because any compensation is better than none. Autocompensation will automatically shut off if a Calibration Accuracy of <8˚ or better is recorded. However, <8˚

accuracy is insufficient for precision heading measurements. *KVH recommends that you follow the procedure outlined in the following sections to ensure that your system is calibrated properly.*

2.5.1 Compensating the GyroTrac

Select a calm day and a clear area. Avoid excessive pitching and rolling, as this can distort the compensation data.

1. Apply power to the GyroTrac and note your approximate heading so that you will know when you have completed a full circle.
2. Steer your boat at a slow, steady speed through a full circle that takes at least 2 minutes to complete. (Try to time your turn so that it takes 30 seconds or more to turn 90º.) After completing a full circle, continue the process with a second circle. The circles do not need to be perfectly round as long as you make a complete 360º turn.
3. Once you have completed two full circles, your compass should be compensated. Check the calibration score as described in the next section.

A complete explanation of the GyroTrac menus is provided in Section 3, "Interface Configuration and Operation." *Specifics regarding calibration are in* Section 3.6, "Control Compass Mode."

2.5.2 The Calibration Score

Each compensation results in a calibration score, pictured in Figure 2-24, that is stored in the system's memory.

Figure 2-24
Sample Calibration Score Screen

ACC (Calibration Accuracy)

The ACC data indicates the degree of accuracy the GyroTrac will provide based on the quality of the last calibration. Table 2-7 lists the five possible accuracy levels.

MAGENV (Magnetic Environment)

The MAGENV score (GOOD, OK, POOR, BAD) indicates the quality of the installation location. If the quality is POOR or BAD, the Sensor Module probably should be moved to a more favorable magnetic environment.

CAL # (Calibration Update Number)

The CAL # indicates the number of times the deviation table has been updated. It is used primarily to verify whether a new calibration has been accepted by the system.

Table 2-7
Possible Compass Accuracy Levels

ACC Score	Accuracy
<1°	Better than 1°
<2°	Better than 2°
<4°	Better than 4°
<8°	Better than 8°
BAD CAL	Recalibrate

2.6 Commissioning the IRD

Before it can be used, your IRD must be commissioned and/or programmed. Please refer to the user manual that accompanied your IRD for instructions on properly commissioning the system.

Programming European IRDs

Before the TracVision G6 system can be used in Europe, the IRD must be programmed to receive signals from the selected DVB satellite services. Programming is conducted using menu selections displayed on the TV screen. Please refer to the owner's manual of your IRD for specific instructions.

Table 2-8 provides some key data for use when programming the IRD.

Table 2-8
Key IRD Settings

Configuration Item	Setting
Antenna Alternative 1	DiSEqC 1
Antenna Alternative 2	DiSEqC 2
LNB Frequency	Universal

When programming the IRD with the antenna configuration data, make certain that your choices for Antenna Alternatives 1 and 2 match those installed as Satellites A and B during the Install Satellite procedure detailed in Section 2.7, "Installing Satellites on the ADCU."

It is also important that the IRD's settings for Antenna Alternatives 1 and 2 match the ADCU's installed satellite settings as follows:

- Antenna Alternative 1 = Satellite A
- Antenna Alternative 2 = Satellite B

Section 2.7, "Installing Satellites on the ADCU," provides details on the satellite installation process.

Programming DSS Plus IRDs

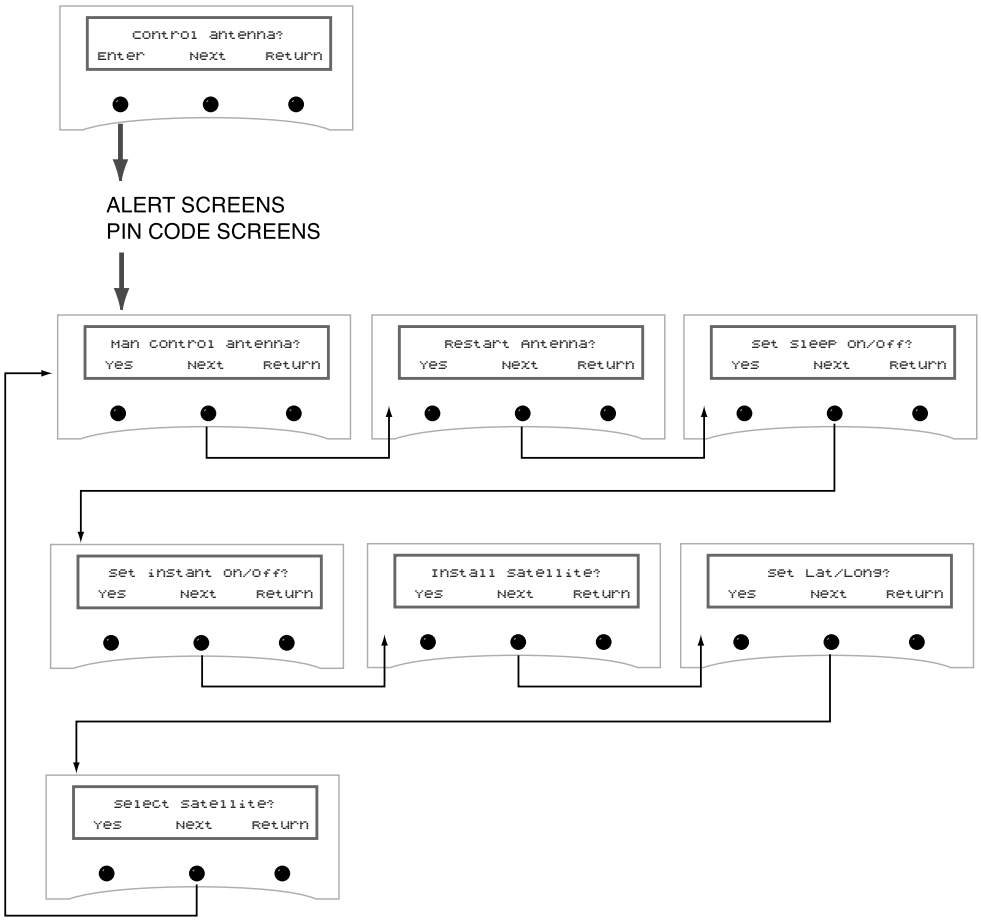
If you are using multiple DSS Plus IRDs and intend to shift from one satellite to another, **only one** of the IRDs can be configured as a two-satellite receiver. All other IRDs must be configured as one-satellite receivers. The two-satellite IRD will determine which satellite the antenna is tracking while the other receivers can watch any channels available via that satellite. Refer to your IRD user manual for complete details on this process.

2.7 Installing Satellites on the ADCU

To use TracVision G6, it is first necessary to install the selected satellite pair so that the antenna will acquire, track, and receive the proper signals.

To install the satellite pair, apply power to the ADCU. Following the startup sequence, press the center button six times until the "Control Antenna?" display appears. Press **ENTER** and access the Control Antenna Mode, which offers the following options:

Figure 2-25
Control Antenna Mode Menu Sequence



Press the center button until offered the "Install Satellite?" option (see Figure 2-26 on the following page). TracVision G6 allows two satellites to be installed in the system from its library of pre-loaded and user-defined satellites. Tables 2-9 and 2-10 on the following pages provide grids of possible satellite pairs that may be selected in either Europe or North America. In addition, the system will clearly indicate which satellites may be in a pair to make the installation process easier.

Section 3, "Interface Configuration and Operation" *provides complete details on the use of the ADCU menus, including complete antenna control details in* Section 3.8, "Control Antenna Mode."

Figure 2-26
Install Satellite Process

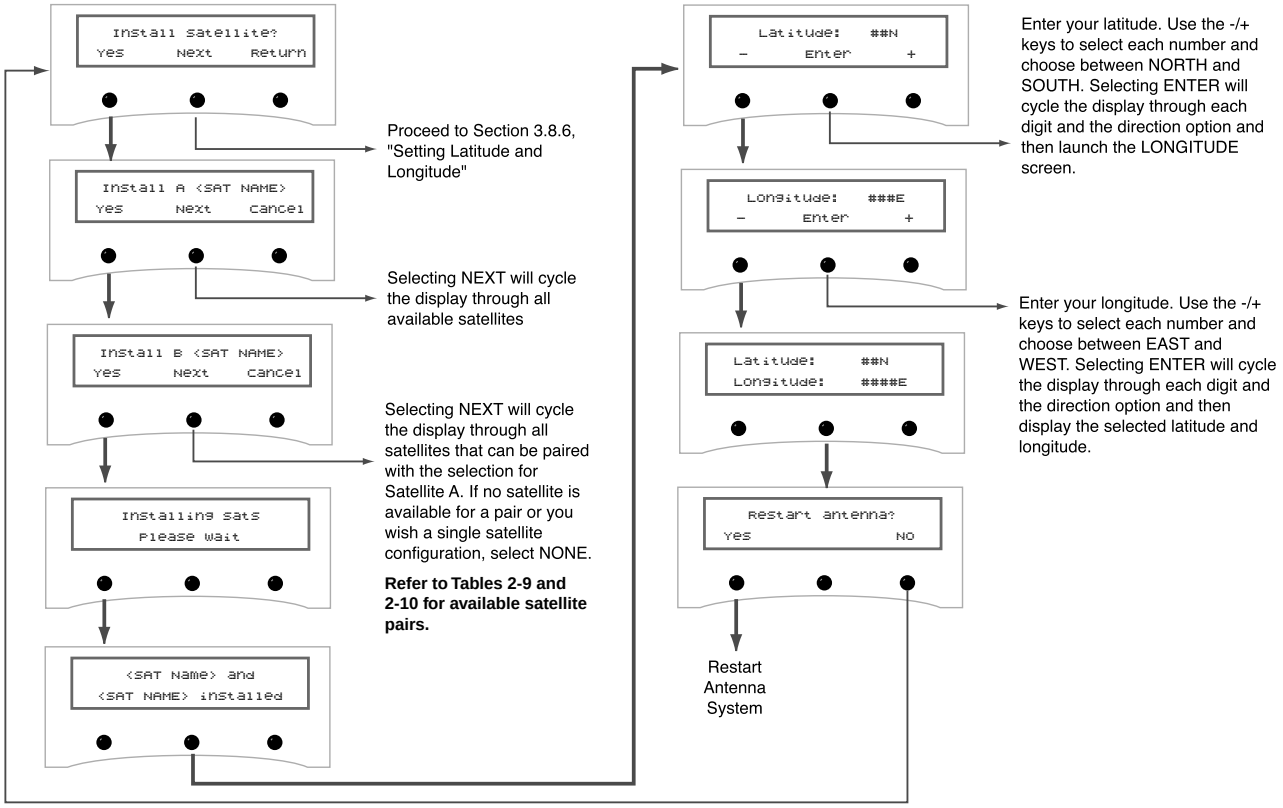


Table 2-9
Available Satellite Pairs – Europe (European LNB required)

	Astra 1	Astra 2N	Astra 2S	Hispasat	Hotbird WB	Sirius	Thor
Astra 1		✓	✓		✓	✓	
Astra 2N	✓				✓		
Astra 2S	✓				✓		
Hispasat							
Hotbird WB	✓	✓	✓			✓	
Sirius	✓				✓		✓
Thor						✓	

Table 2-10
Available Satellite Pairs – North America (U.S.-style LNB required)

	DSS_101	DSS_119	Echo_61	Echo_110	Echo_119	Echo_148	Expressvu
DSS_101		✓					
DSS_119	✓						
Echo_61				✓	✓		✓
Echo_110			✓		✓	✓	✓
Echo_119			✓	✓		✓	✓
Echo_148				✓	✓		✓
Expressvu			✓	✓	✓	✓	

DIRECTV Latin America Subscribers

If you have a TracVision G6 equipped for use with the DIRECTV Latin America service, your antenna will search for and receive signals from only one satellite (Galaxy 8).

After completing the process, restart the system unless you are going to install user-defined satellites, in which case refer to *Section 2.7.1, "Programming User-defined Satellites."*

2.7.1 Programming User-defined Satellites

The TracVision G6 satellite library has the capacity for two user-defined satellites in case you want to install/watch a satellite that is not in the KVH predefined list. User-defined satellites can only be configured via the antenna maintenance port. To configure a user satellite, information about the satellite must be provided, including:

- Satellite name
- Satellite position (longitude)
- Transponder information for each of the following polarizations/frequencies:
  - vertical high
  - vertical low
  - horizontal high
  - horizontal low

If a GPS is providing latitude and longitude to TracVision G6, this data will automatically be used in the satellite installation procedure. In this event, the menus will skip directly to "Restart Antenna."

How to tell the difference between High and Low bands:

High: 11.700 - 12.750 GHz

Low: 10.700 - 11.700 GHz

- Transponder information includes:
  - frequency
  - symbol rate
  - FEC code, and
  - network ID (in hexidecimal format)

This information can be obtained for your satellite service provider or on a number of sites on the Internet, such as www.satcodx.com.

Accessing the TracVision G6 RF Board

To program the user-defined satellites into the TracVision G6 satellite library, it is necessary to connect a PC to the terminal maintenance port. This procedure requires terminal emulation software such as PROCOMM, Windows Terminal, or Windows 95/98 Hyperterminal. Use the settings appropriate to your application and follow this procedure.

1. Connect one end of the PC/ADCU cable to the DB9 connector on the rear of the ADCU. 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 G6 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.

Entering User-defined Satellite Data

Once the link between the PC and the TracVision G6 is established, it is necessary to provide initial longitude data regarding the user-defined satellite. To do so, enter the SATCONFIG parser command via PC as follows:

Table 2-11
SATCONFIG Parser Command

Command:	**SATCONFIG,USERX,YYY,Z,D,L<cr>**
Where:	X = 1 or 2 (satellite alternative) YYY = longitude (0-180) Z = E (East) or W (West) D = decoding type (0=test, 1=DSS-A, 2=DSS-B, 3=DVB) L = LNB polarization (C=circular, L=linear)
Function:	configures one of the user-configurable satellites with the longitude provided
Response:	if valid entry, echoes the input data if invalid entry, returns error message

After entering the SATCONFIG command, you must turn on the DEBUG mode by typing **@DEBUGON**.

After entering the SATCONFIG and DEBUGON commands, enter the satellite transponder information via PC as follows:

Table 2-12
Satellite Transponder Data Sequence

Command:	**@SATCONFIG,X,N,F,S,C,ID,P,B,D<cr>**
Where:	@SATCONFIG = directs data to the RF Board X = satellite location A or B N = satellite table # (98 & 99 are slots for user-configured satellites) F = frequency in MHz (either 00000 or a range from 10700 - 12700) S = the satellite transponder symbol rate in Mbit/second (01000 - 29999) C = the FEC code (e.g., 12, 23, 34, 56, 67, 78) ID = the satellite network ID in hexidecimal format (0x####) P = the LNB polarization (v=vertical, h=horizontal) B = the LNB down conversion frequency (l=low, h=high, G=Latin America, U=USA) D = decoding type (0=test, 1=DSS-A, 2=DSS-B, 3=DVB)

This information has to be entered for each of the four transponder categories:

- vertical high
- vertical low
- horizontal high
- horizontal low

TracVision G6 requires that the data fields for all four transponder categories be provided. If the selected satellite does not have information for one or more of the transponder categories, default information should be entered in the fields as follows:

Table 2-13 *Satellite Transponder Default Data*

Transponder Data	Default Value
Frequency	00000
Symbol Rate	27500
FEC Code	the same value as provided for those transponders with data
Network ID	0x0000
Polarity and Band	whichever combinations are not already provided

After entering this information, it is necessary to save these settings. To do so, type:

@SAVE,A (or B if this data is for Satellite 2)

@DEBUGOFF

After completing this process, restart the system by either cycling power or typing **ZAP** in the maintenance screen.

One of your user-defined satellite options has now been added to the TracVision G6 satellite library. This option will now be available as USER1 the next time the Install Satellite menu is accessed. If a second satellite is added, it will appear as USER2 in the Install Satellite Menu.

An Example of Configuring a User-defined Satellite

The following is an example of configuring the fictional YOURSAT 101 as the USER1 configured satellite. Prior to configuring this satellite or any others, be certain to get the most up-to-date information from one of the sources previously discussed.

Yoursat 101 at 7 West, DVB decoder, Linear Polarization LNB

Table 2-14
Sample Satellite Configuration Data

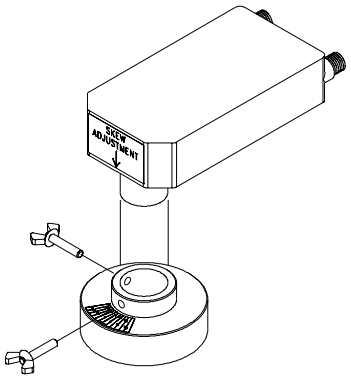
Horizontal High	
Frequency	11.966 GHz
Symbol Rate	27500
FEC Code	3/4
Network ID	2048 (dec) = 0x0800
Vertical High	
Frequency	11.823 GHz
Symbol Rate	27500
FEC Code	3/4
Network ID	2048(dec) = 0x0800
Vertical Low	
No Data Listed	
Horizontal Low	
No Data Listed	

Based on this information, the data entered via the PC would look like this, assuming that YOURSAT 101 would be Satellite 1:

```
SATCONFIG,USER1,7,W,3,L
@DEBUGON
@SATCONFIG,A,98,11966,27500,34,0x0800,H,H,3
@SATCONFIG,A,98,11823,27500,34,0x0800,V,H,3
@SATCONFIG,A,98,00000,27500,34,0x0000,V,L,3
@SATCONFIG,A,98,00000,27500,34,0x0000,H,L,3
@SAVE,A
@DEBUGOFF
ZAP
```

2.8 Setting the Skew Angle *(European Systems Only)*

Figure 2-27
Adjusting the European LNB Skew Angle

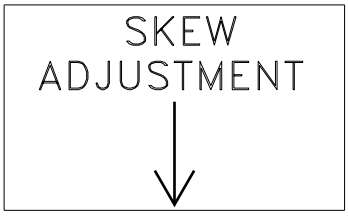


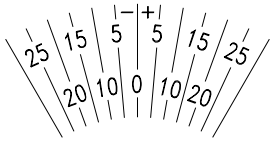
In both dual-output and quad-output LNB configurations, the Antenna LNB skew angle must be adjusted to optimize channel reception. Refer to your satellite service provider for the proper skew angle for the selected satellite service and geographical location. The ADCU will also provide the skew angle for the installed satellites, as long as a GPS is providing data input to the ADCU or the vessel's correct latitude and longitude were entered during the satellite installation process. Refer to *Section 3.7.1, "Antenna Status Data Screens,"* for details on viewing the ADCU-calculated skew value.

Adjusting the LNB Skew Angle

1. Turn off the power to the Antenna Unit.
2. Remove the radome and set it aside.
3. Loosen the two wing screws securing the LNB within the choke feed as illustrated in Figure 2-27.
4. Refer to the LNB skew angle labels on the end of the LNB and on the LNB choke feed (pictured in Figure 2-28) and adjust the LNB as necessary to match as closely as possible the skew angle provided by your service provider or the ADCU.
5. Retighten the wing screws.

Figure 2-28
Skew Angle Labels





2.9 Checking Out the System

To complete the TracVision G6 installation, it will be necessary to verify that the system functions properly. Critical to ensuring that the system is configured and operating properly is to check the system startup routine to ensure that the system is operating within normal parameters.

To do so, it is necessary to connect a PC to the terminal maintenance port. The diagnostics procedure requires terminal emulation software such as PROCOMM, Windows Terminal, or Windows 95/98 Hyperterminal. Use the settings appropriate to your application.

1. Connect one end of the PC/ADCU cable to the DB9 connector on the rear of the ADCU. 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 G6 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. After completing the review of the startup and operational routines, turn on the IRD and television and check the channels on the selected satellites. For European systems, view both horizontally and vertically polarized channels, if possible.
5. When all checks are completed, shut down the system.

A sample startup sequence has been provided in Appendix E *with the typical ranges and responses for the TracVision G6 during startup and operation.*

Be certain to fill out and submit the warranty card to KVH to ensure that your TracVision G6 is fully covered under the 2-year parts and 1-year labor warranty.

3 Interface Configuration and Operation

All operations related to the TracVision G6 and GyroTrac are controlled and monitored using the ADCU. An LCD screen displays navigation and configuration data and three soft keys enable a user to perform a multitude of menu-driven tasks.

3.1 Startup and Self-test

1. Turn on the IRD and the television receiver.
2. If a GPS receiver is connected, ensure that it has obtained an accurate position.
3. Apply operating power to the ADCU.
4. Wait while system conducts brief self-test sequence. Test status messages are displayed on the ADCU for approximately two seconds each.

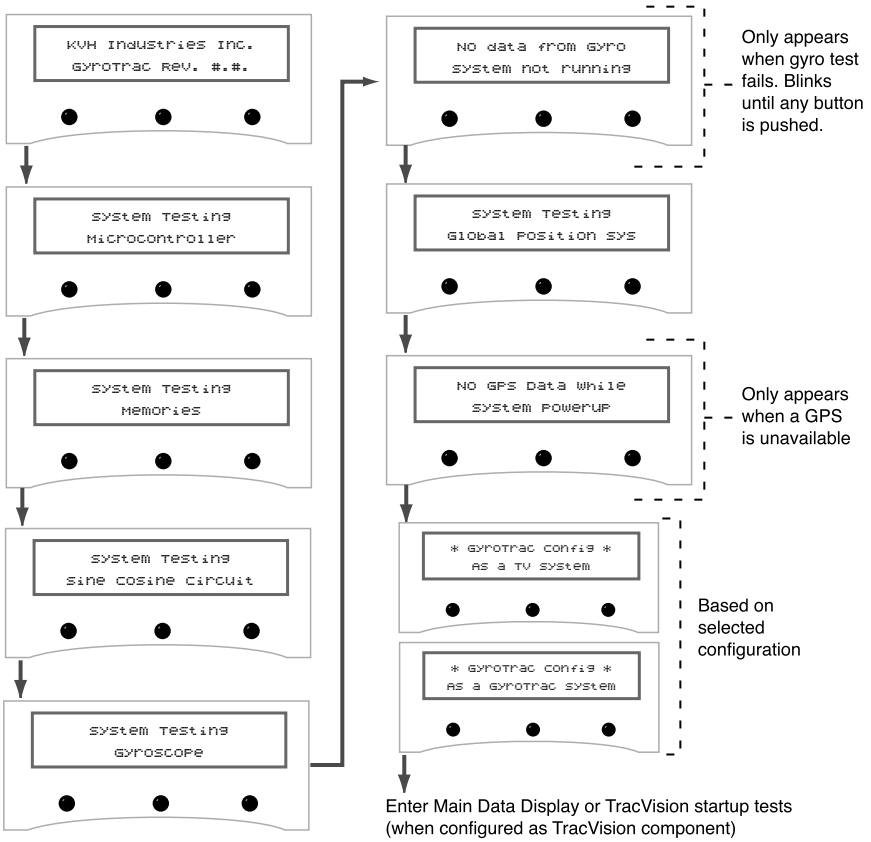


Figure 3-1
Startup and Self-test Sequence

The absence of valid GPS data is not a fault; the status message merely indicates that valid GPS data is not present, and that those navigation functions that use GPS inputs are not available.

The GPS must be turned on first for TracVision G6 to use the GPS position data during initialization.

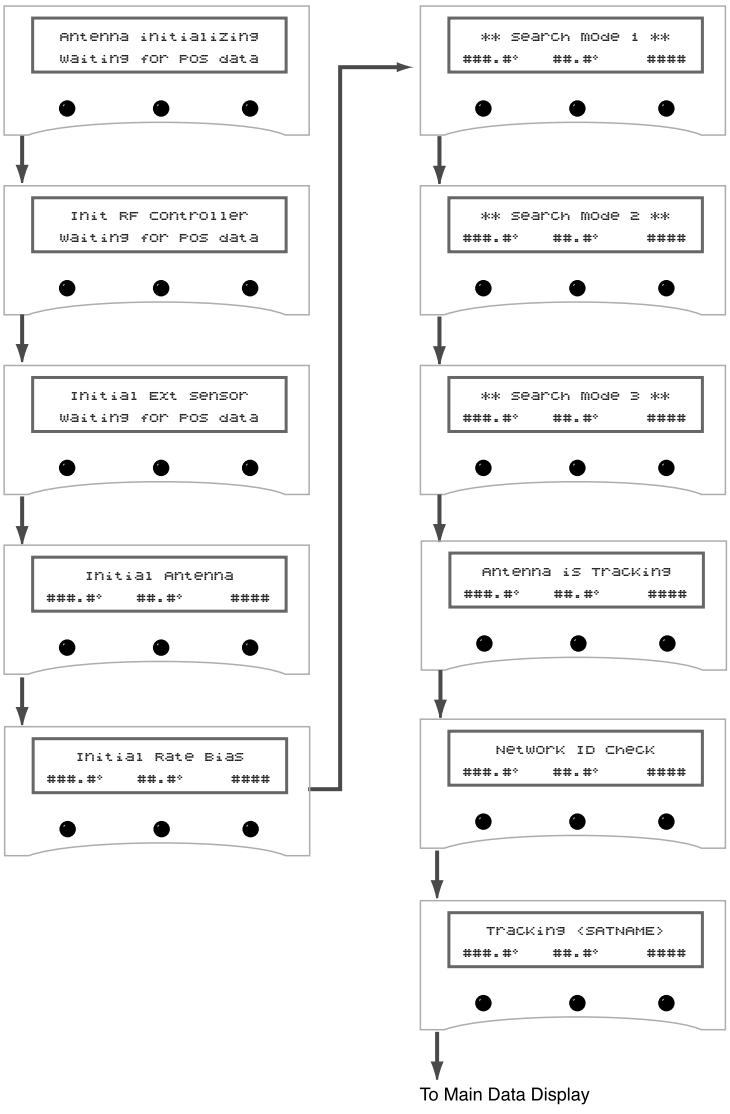
Figure 3-2
Startup Error Screen

If the self-testing routine detects faults in any of the first four self-tests, the screen pictured in Figure 3-2 is displayed. Operation halts at this point and the GyroTrac cannot operate. The unit should be returned to your local authorized KVH dealer, distributor, or service center.

3.1.1 TracVision Startup and Self-test Screens

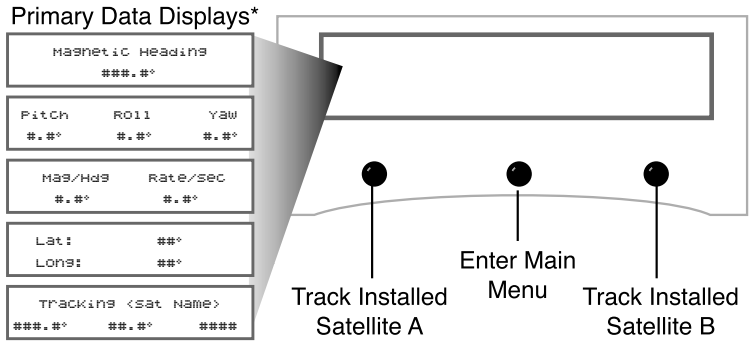
When configured as a component of a TracVision system, GyroTrac conducts a series of startup routines and self-tests to verify antenna operation. The TracVision self-test status screens are *only* displayed when the main data display is set to show the antenna status information (as described in *Section 3.3, "Setup Display Mode"*).

Figure 3-3
TracVision G6 Startup Screens



3.2 Data Display and Accessing the Main Menu

As soon as the self-test routine is completed, the LCD panel shows one of five data displays selected in the Display Setup Mode (described in *Section 3.3, "Setup Display Mode"*). When any of the primary data displays are on screen, the soft keys allow you to switch between the two installed satellites as well as enter the Main Menu mode. The key functions and display options are as follows:



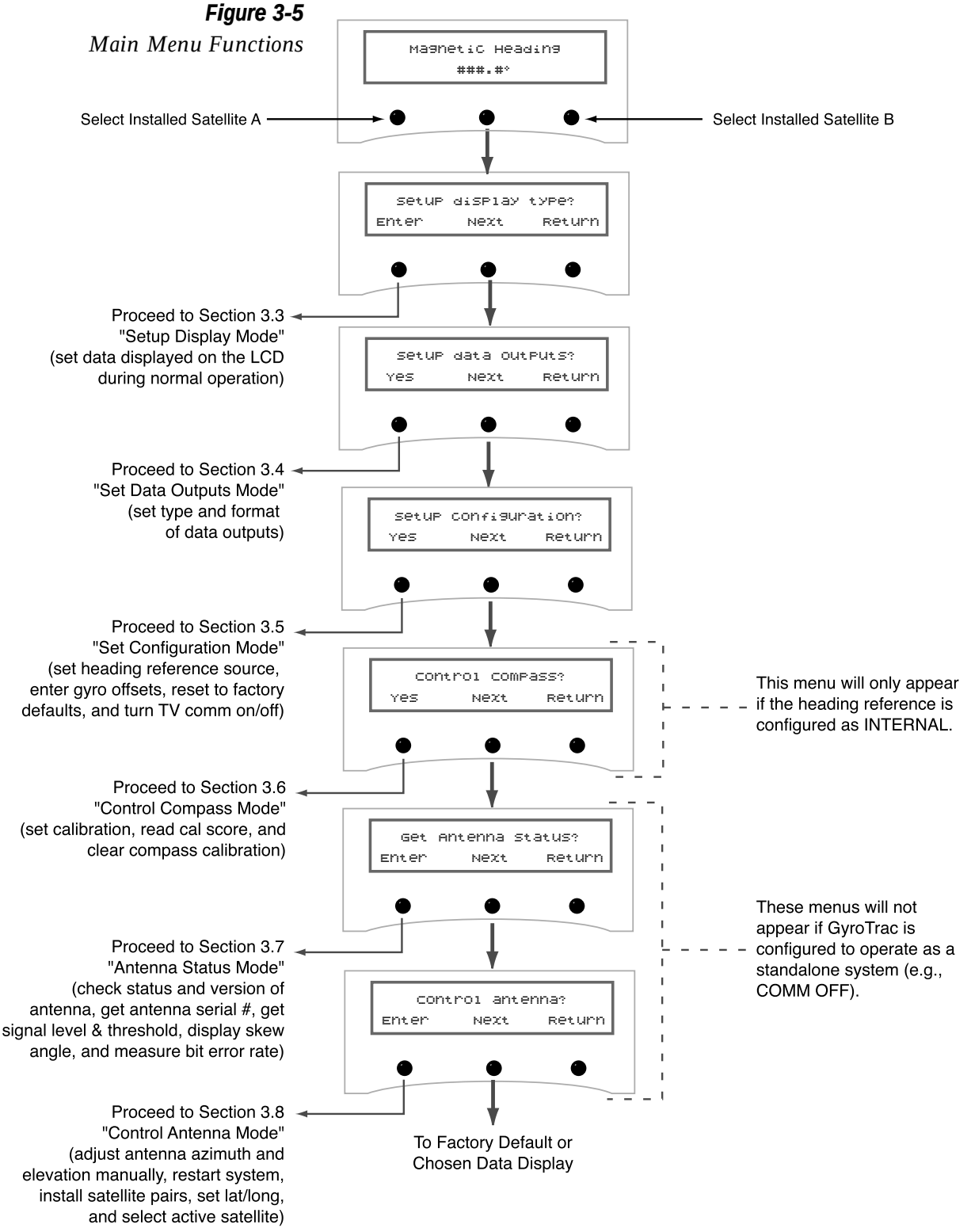
* Variations on these displays are also presented in Figure 3-11.

Figure 3-4
Soft Key Functions and Primary Data Displays

3.2.1 Main Menu

Pressing the center key will cycle the Main Menu through the available functions as follows:

Figure 3-5
Main Menu Functions



3.2.2 Alert Screens

Certain operations require GyroTrac to temporarily cease its data output or alter its configuration so that new parameters or configurations may be entered. When you enter one of these functions, a pair of alert screens will appear, informing you of what will happen. Selecting "Yes" will allow you to continue into the function. Selecting "No" will return you to the Main Menu.

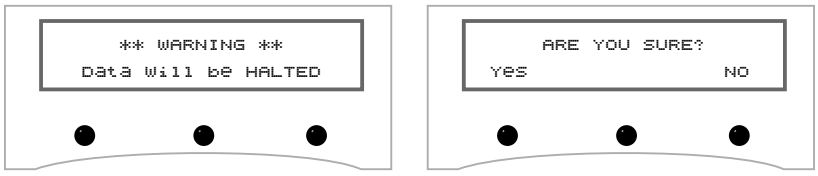


Figure 3-6
Sample Alert Screens

3.2.3 System Security

To prevent unauthorized adjustments to certain GyroTrac settings, certain functions require the entry of a customizable 4-digit Personal Identification Number (PIN). PIN entry and selection procedures are illustrated below. The default setting for the PIN is four zeros (0000). If an incorrect PIN is entered, the system automatically returns to the selected main data display.

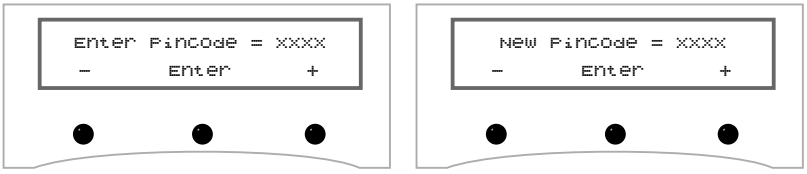
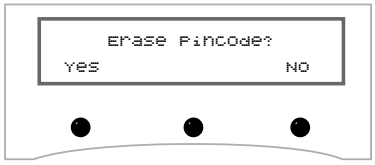


Figure 3-7
PIN Code Screens

To reset the PIN to four zeros (0000), turn on the TracVision G6 system and press and hold the middle key while the system self-test messages are being displayed until the Erase Pin Code screen pictured in Figure 3-8 appears.

Figure 3-8
Erase PIN Code Screen



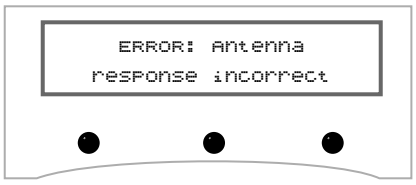
3.2.4 The RETURN and CANCEL Keys

Throughout the GyroTrac menus, the right-hand key will often be designated as either RETURN or CANCEL. These options have the following functions:

- **RETURN** – Returns to the main data display. If no keys are pressed within 10 seconds, the menu will automatically default to the main data display.
- **CANCEL** – Cancels current action and returns to the start of the action without making any changes.

3.2.5 Antenna Error Messages

Figure 3-9
Incorrect Response Error Message



At times, the ADCU will display error messages alerting you to a specific problem (e.g., you have selected an invalid satellite pair). There are also two general antenna error messages that are not related to a specific action.

"Antenna response incorrect" (pictured in Figure 3-9) indicates that the ADCU received an incorrect answer from the antenna in response to a request. The solution to this error is simply to carry out your requested operation again.

Figure 3-10
Non-responsive Antenna Error Message

"Antenna not responding" (pictured in Figure 3-10) indicates that no messages are being received from the antenna. This is usually the result of the antenna not being powered up or the antenna being unplugged from the ADCU.

3.3 Setup Display Mode

The Setup Display mode selects the data that will be displayed on the ADCU LCD after startup and self-test; it does not control the data sent to remote heading display units, north-up radars, autopilots, etc.

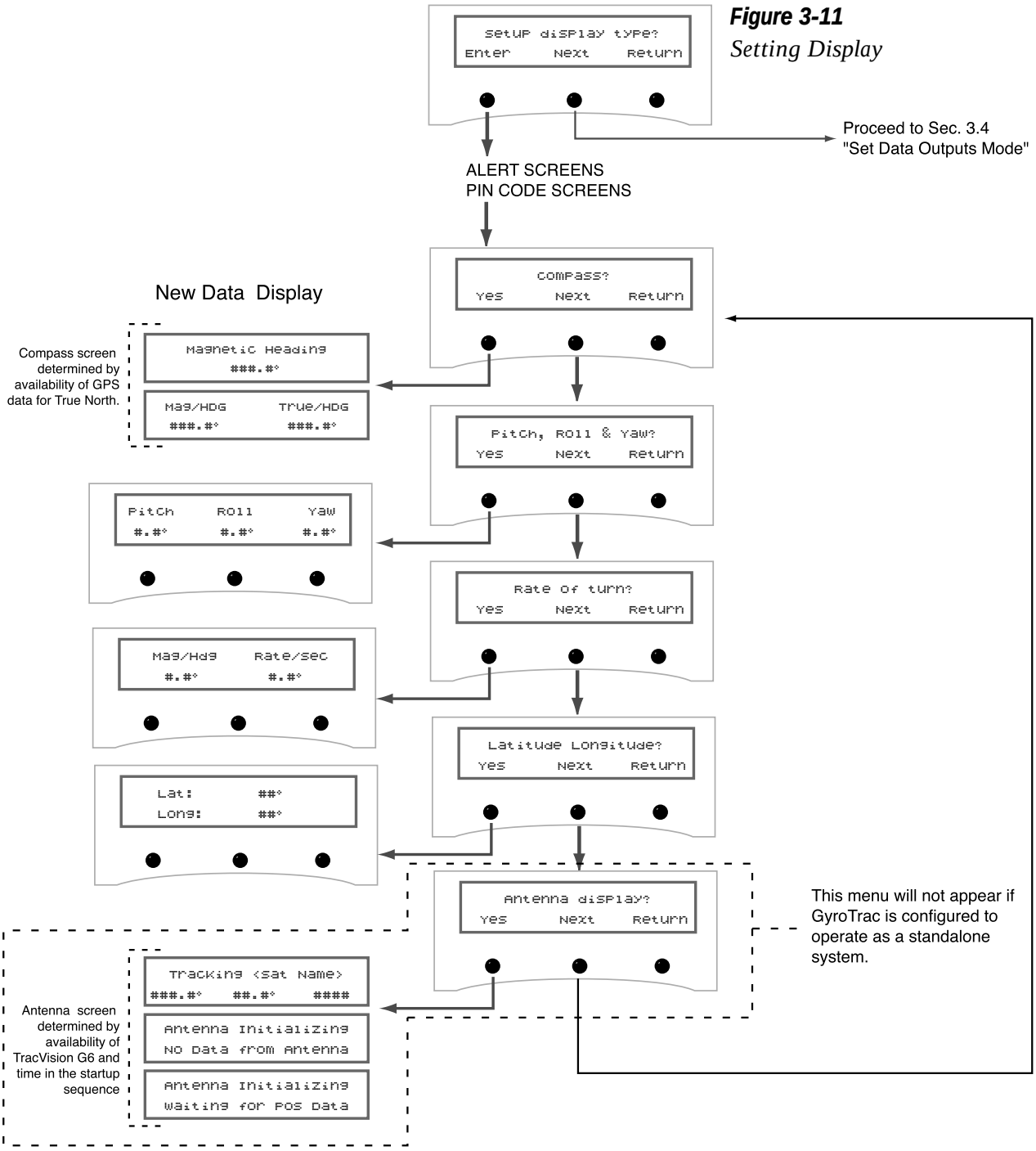


Figure 3-11
Setting Display

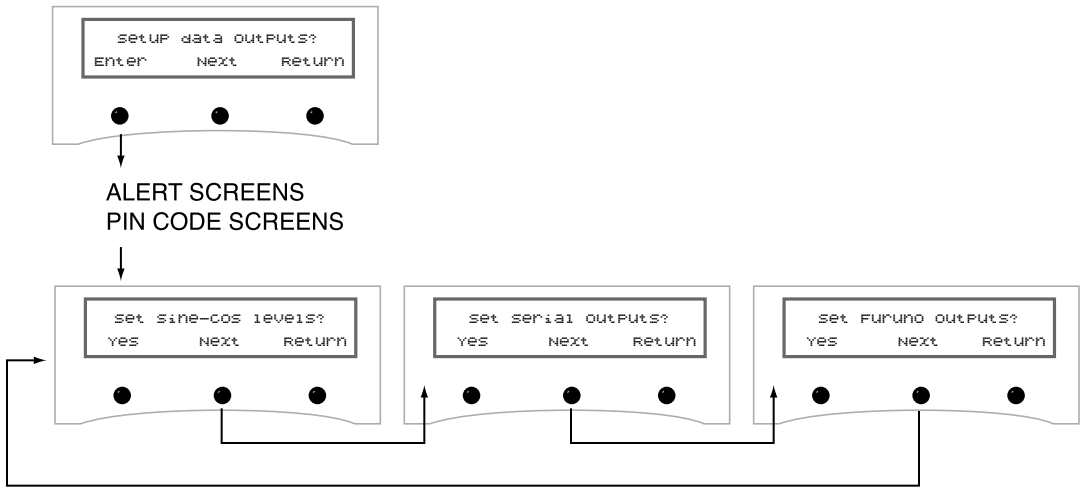
3.4 Set Data Outputs Mode

The Set Data Outputs function is used to select several types of data formats available in the GyroTrac. The message formats are:

- 1 sine/cosine (either 4-wire or B&G 3-wire)
- 3 serial message formats:
  - NMEA 0183
  - KVH pitch, roll, and yaw, and
  - Cetrek
- 1 Furuno AD10S

These messages are output to displays and external navigation systems only if selected via the ADCU. Selection procedures are presented in the following sections.

Figure 3-12
Data Outputs Mode Menu Sequence



3.4.1 Setting the Sine/Cosine Data Output

The sine/cosine setup is done in three stages: first the magnetic or true heading option is selected, then the reference voltage is set, and finally the swing voltage is set. The valid range for reference and swing voltages is between 0 and 6.5 volts. The default value for reference voltage is 2.5 volts. The default value for swing voltage is +/- 1.67 volts. Refer to your autopilot manual for correct voltage requirements.

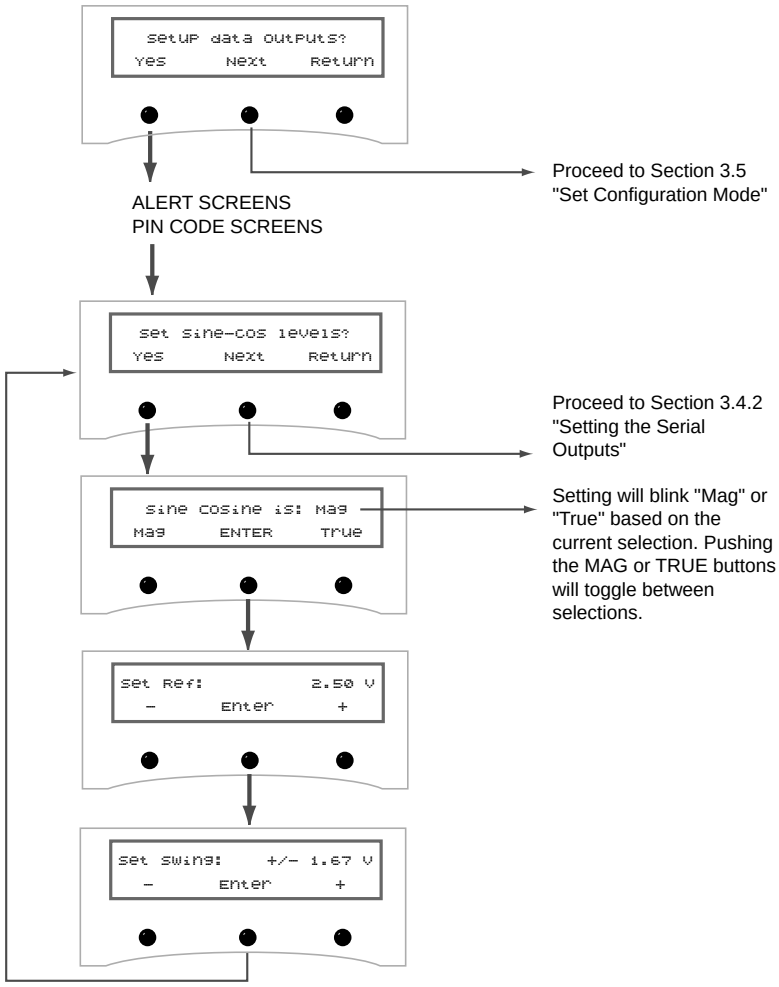
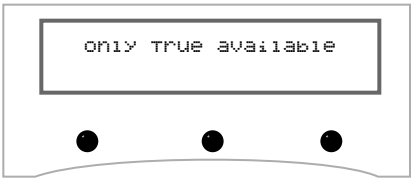
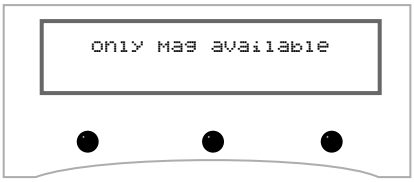


Figure 3-13
Setting Sine/Cosine Data Output

If the GyroTrac is receiving data from a ship's gyro, all compass outputs are automatically configured as True North and cannot be set as Magnetic. If this is the case, the following variation on the magnetic/true selection screen will be displayed:



If the system is NOT connected to a GPS or a ship's gyro, only magnetic heading data will be available and the following variation on the magnetic/true selection screen will be displayed:

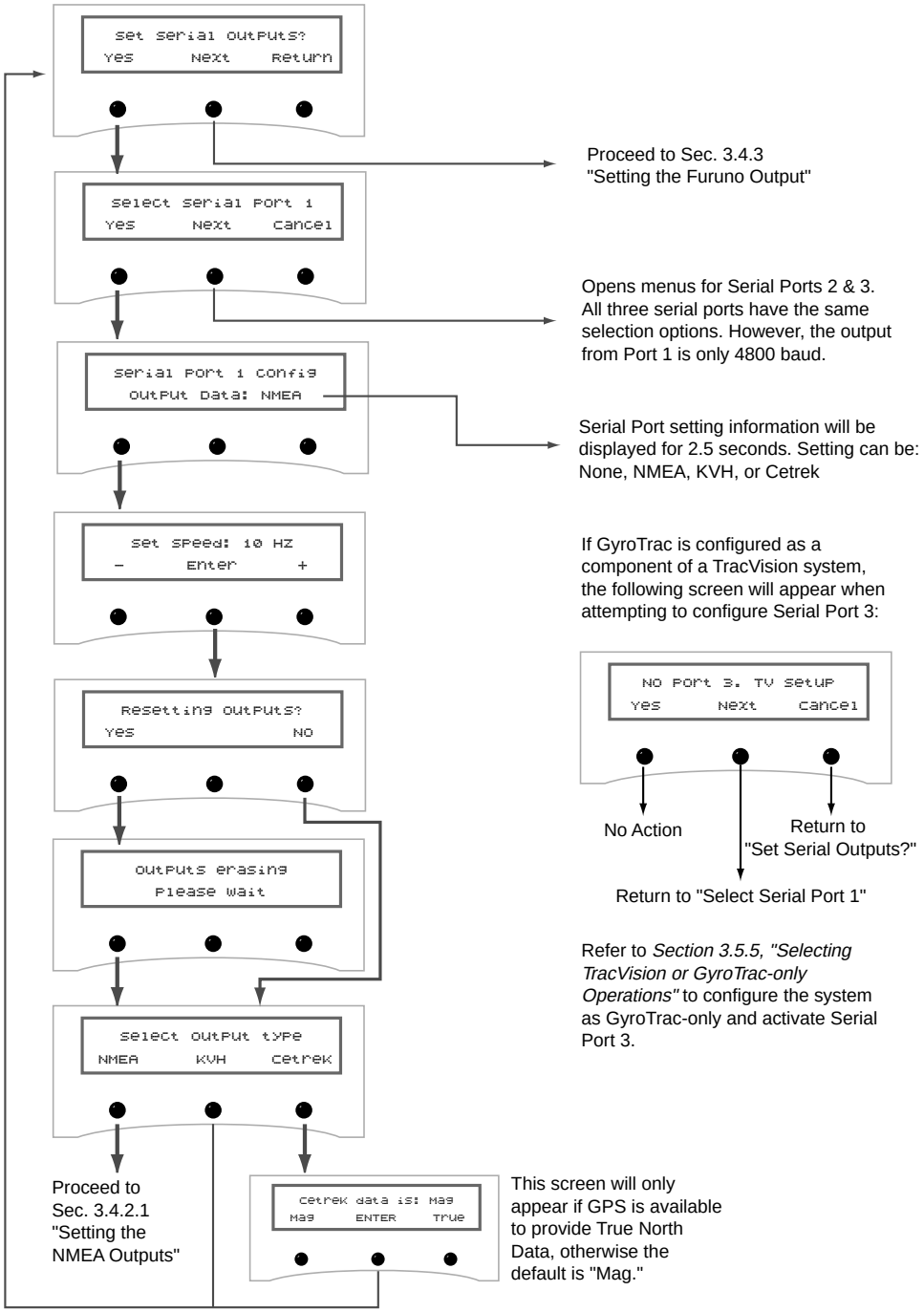


The system will then proceed to the "Set Ref" screens.

3.4.2 Setting the Serial Outputs

The GyroTrac can output up to three serial messages simultaneously in any combination of NMEA version 2.2, KVH RS-422, or Cetrek proprietary format. NMEA message options and the KVH and Cetrek formats are described briefly in *Appendix F.* Follow the procedures illustrated below to set the serial outputs. The factory default speed setting is 10 Hz.

Figure 3-14
Setting Serial Outputs

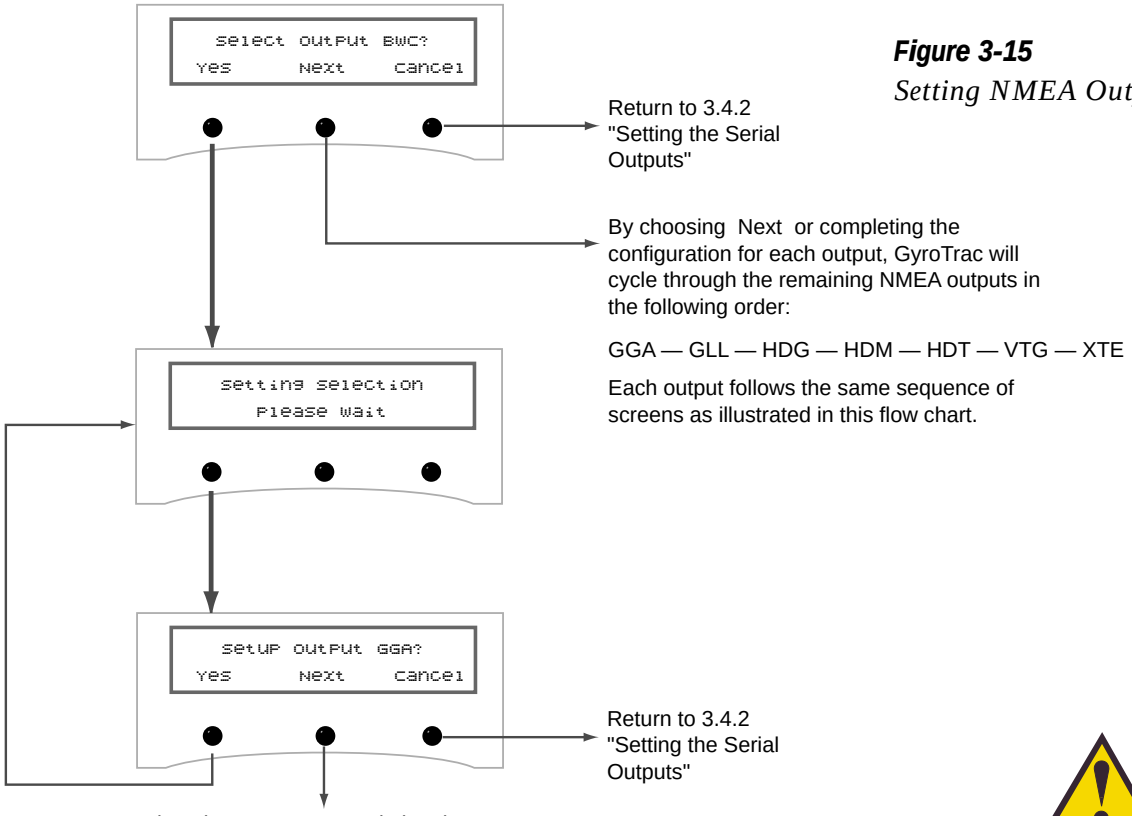


3.4.2.1 Setting the NMEA Outputs

GyroTrac is fully compatible with NMEA *input* versions 1.5 and 2.2. However, the individual serial ports can only be programmed to use NMEA version 2.2 as an *output*.

Custom configurations are not available on GyroTrac at this time.

Figure 3-15
Setting NMEA Outputs

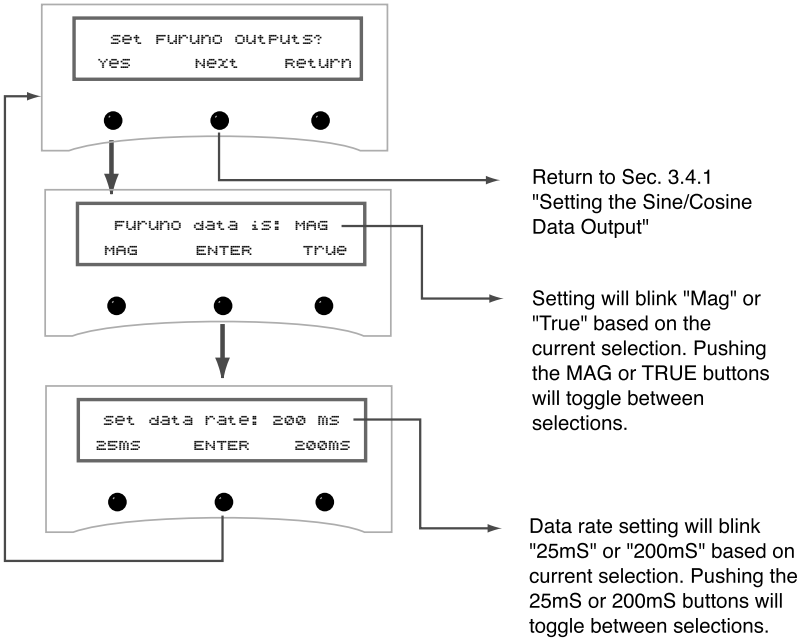


When Serial Ports 2 or 3 are selected to provide NMEA output, the baud rate is automatically changed to 4800 baud from the default of 9600 baud. Serial Port 1 and its pass-through duplicate only provide 4800 baud output.

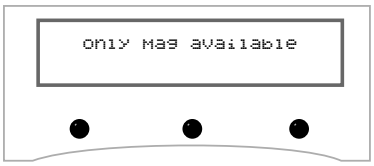
3.4.3 Setting the Furuno Output

This option selects two available options for the Furuno output: magnetic or true heading reference and 25 millisecond or 200 millisecond data output rate.

Figure 3-16
Setting Furuno Output



If the system is NOT connected to a GPS or a ship's gyro, only magnetic heading data will be available and the following variation on the magnetic/true selection screen will be displayed:



The system will then proceed to the "Set Data Rate" screen.

3.5 Set Configuration Mode

The Set Configuration function is used to set the display brightness, select an internal or external source for heading data, enter offset values that correct for mechanical mounting alignment errors, reset the system to its factory defaults, and turn TV communications on/off.

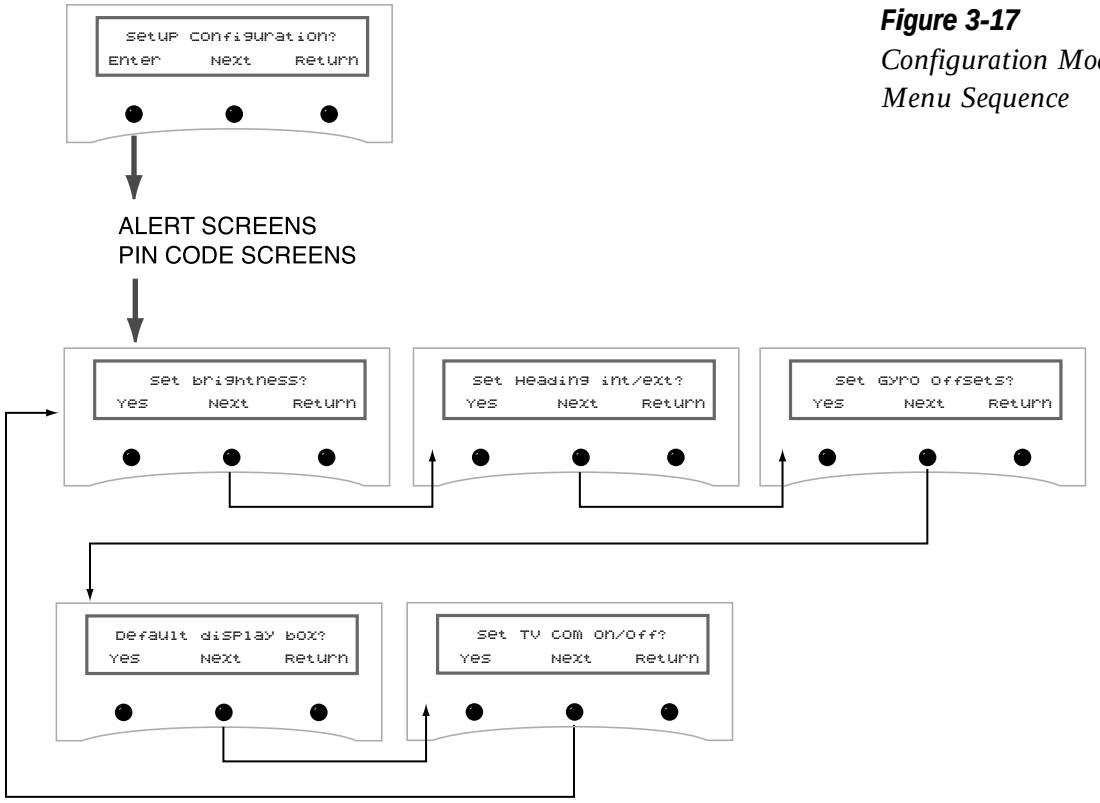
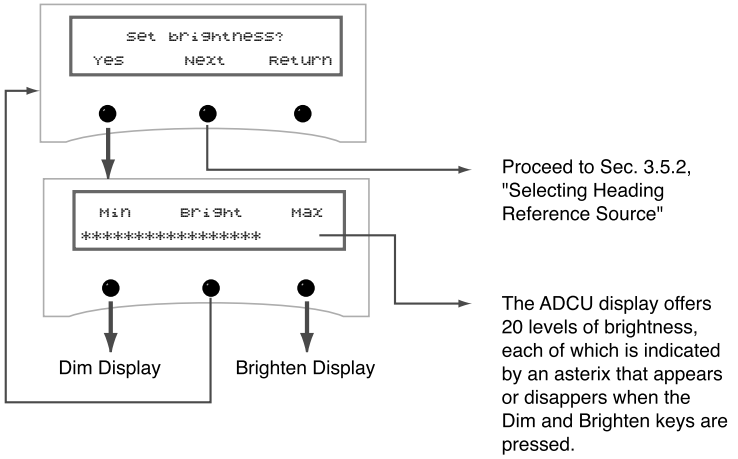


Figure 3-17
Configuration Mode Menu Sequence

3.5.1 Setting Display Brightness

The ADCU display's brightness may be adjusted to suit your preferences. Press the right key to make the display brighter, the left key to make it dimmer. When you are satisfied with the setting, press the center key to accept the setting.

Figure 3-18
Display Brightness Controls

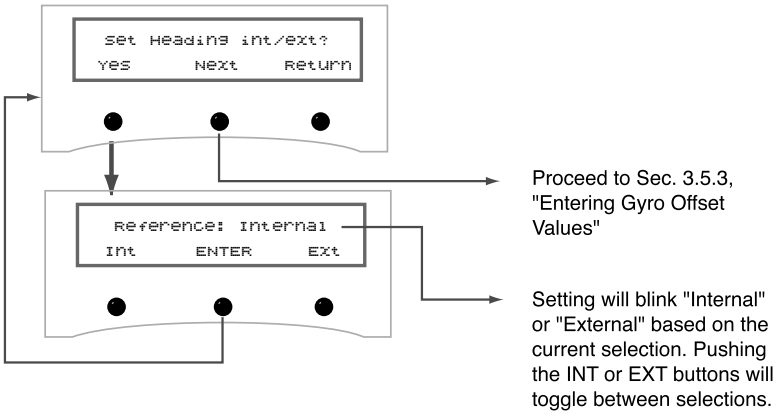


3.5.2 Selecting Heading Reference Source

The Heading Reference Source menu provides the option to override the GyroTrac's external sensor module in favor of another source, such as a ship's gyro, as follows:

- **INTERNAL** – GyroTrac will receive and use heading data from its sensor module. In addition, the Control Compass menus will be available.
- **EXTERNAL** – GyroTrac will receive and use heading data from an external heading source. As a result, the Control Compass menus will be inactive and hidden. Refer to Figure 2-18 for details on connecting a ship's gyro to the ADCU.

Figure 3-19
Internal/External Reference Menus



3.5.3 Entering Gyro Offset Values

The sensor module housing must be mounted as close to level in pitch and roll as possible, with its long axis parallel to the vessel's centerline. Sometimes allowances must be made for the particular installation where pitch, roll and azimuth references cannot be met. The offset values adjust for this. The allowable offset values for pitch and roll are ±45˚; the offset for azimuth can be up to ±180˚. Once entered, offset values will not need to be changed unless the Sensor Module is relocated.

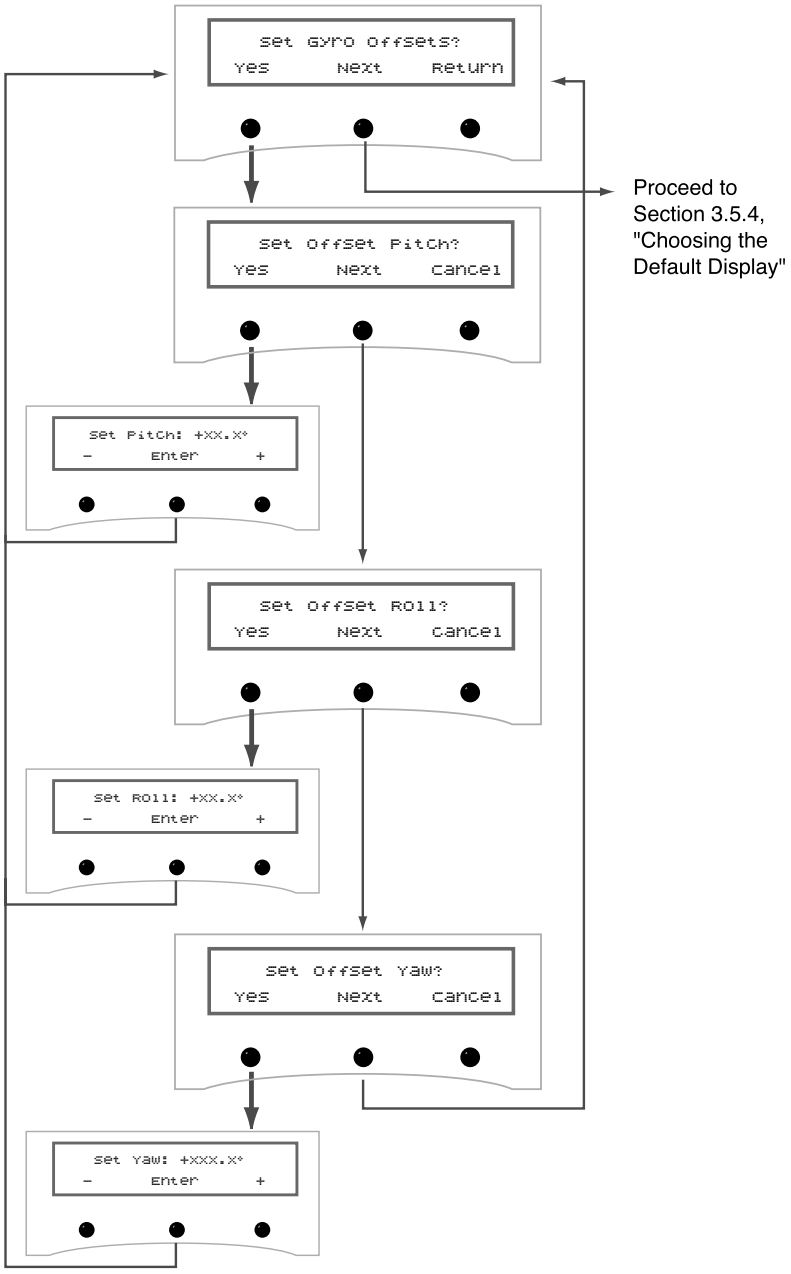


Figure 3-20
Entering Gyro Offset Values

Pitch, roll, and yaw settings are determined by the Sensor Module's internal inclinometer, not external measurements.

To set pitch, roll, and yaw properly, initially enter zeros for all measurements. Choose the Pitch, Roll, and Yaw display from the Main Menu and record those numbers.

Reverse the value of the Pitch and Roll (positive becomes negative, negative becomes positive).

Return to the Gyro Offset menu and enter the recorded numbers.

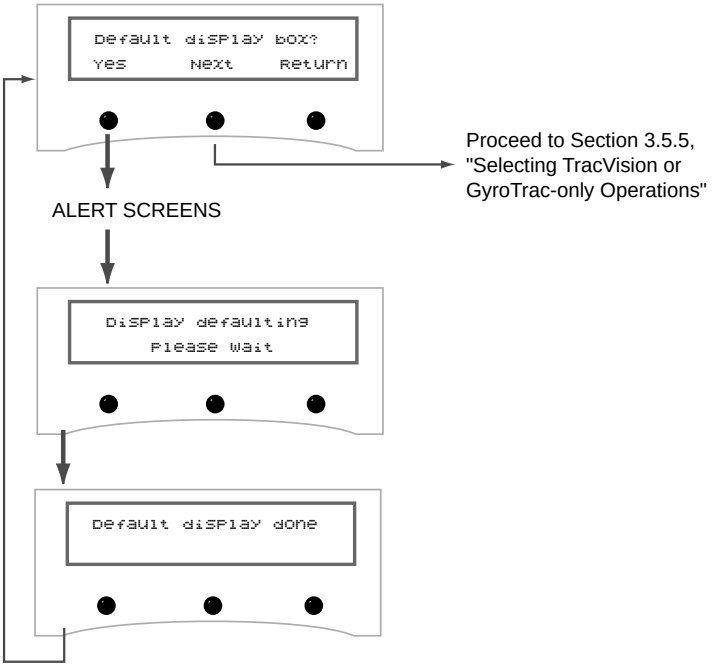
This process should be carried out in still water or at the dock.

As noted in Section 2.3.2, "Mounting the Sensor Module," *the sensor must be aligned to within ±5˚ of the vessel's fore-and-aft centerline. Deviation beyond ±5˚ will degrade pitch, roll, and yaw accuracy.*

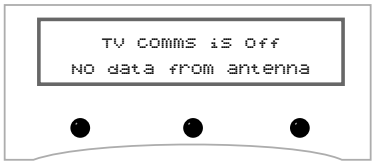
3.5.4 Choosing the Default Display

This option resets the ADCU display settings to their factory defaults (i.e., compass, 50 percent brightness).

Figure 3-21
Selecting the Default Display



If the main display is set to show antenna tracking information but the antenna communications are OFF, the following display will be shown:

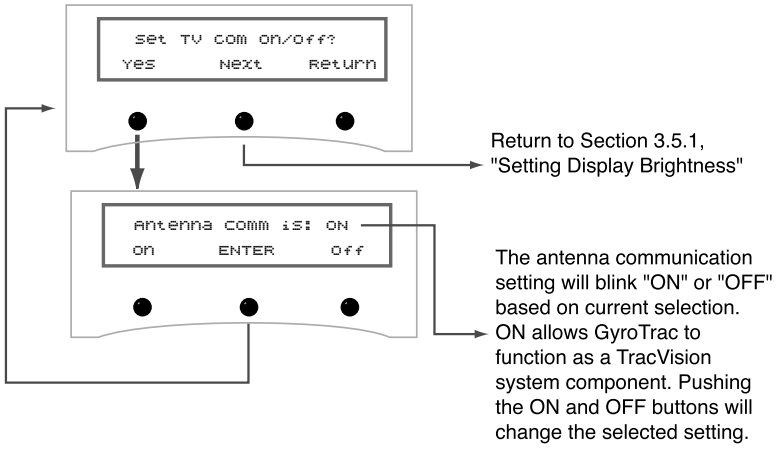


To correct the error, turn antenna communications ON or change the main display setting.

3.5.5 Selecting TracVision or GyroTrac-only Operations

GyroTrac's factory default configuration is to operate as a standalone system **(Antenna Comm is: OFF).** Connecting a TracVision antenna will reconfigure GyroTrac to function as a component of a TracVision system **(Antenna Comm is: ON)**.

Figure 3-22
Selecting TracVision or GyroTrac-only Operations



3.6 Control Compass Mode

These screens are only seen if heading reference is INTERNAL.

The Compass Control function provides control over the GyroTrac sensor module, including turning autocalibration on and off, reading the calibration score, and manually clearing the compass calibration.

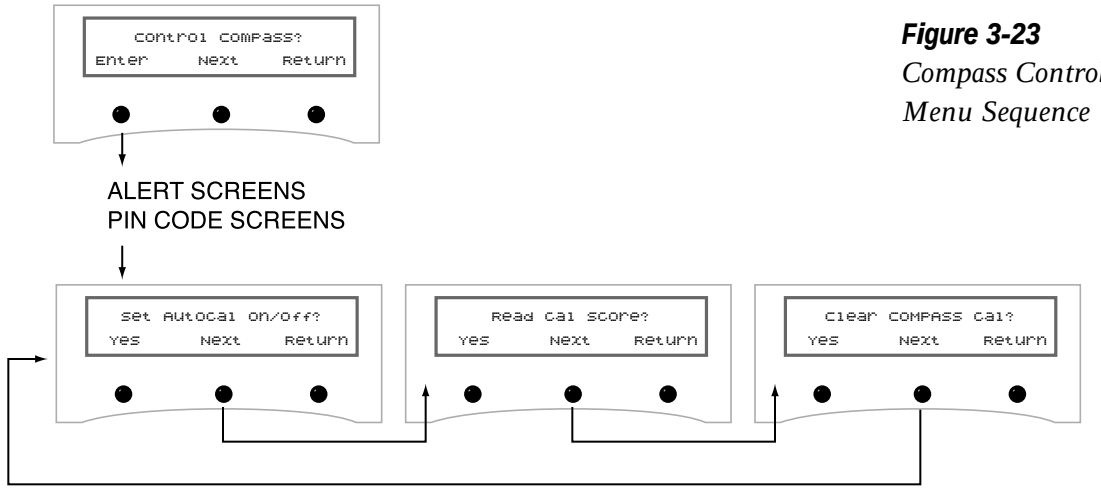


Figure 3-23
Compass Control Mode Menu Sequence

3.6.1 Selecting Autocompensation

These screens are only seen if heading reference is INTERNAL.

GyroTrac is fully capable of autocompensation to ensure that the navigation data is as accurate as possible.

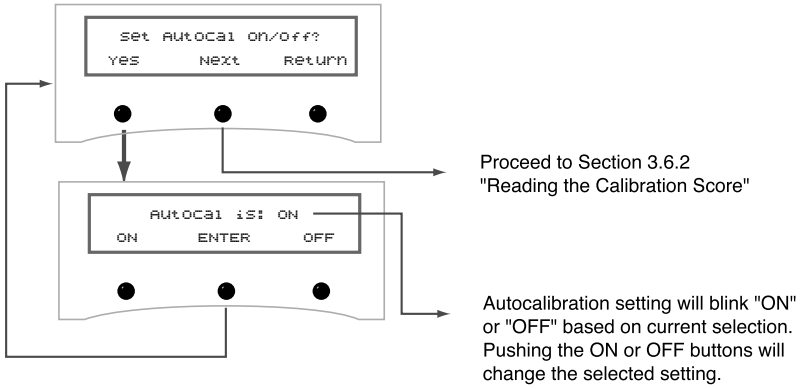


Figure 3-24
Setting Autocompensation

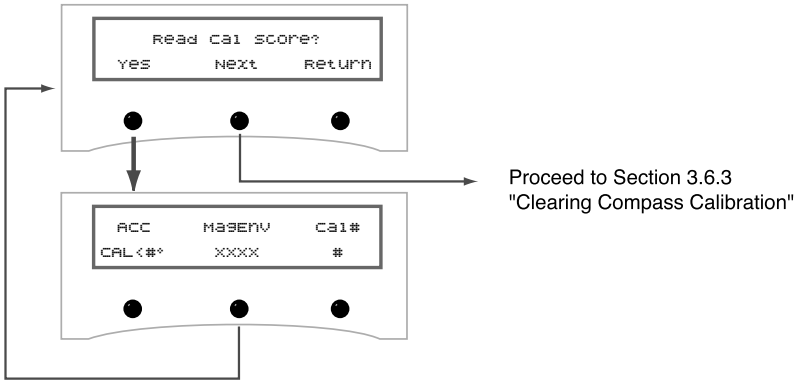
As noted in Section 2.5, "Calibrating the Sensor Module," a well-calibrated sensor is crucial to GyroTrac's accuracy. If you shift, remove, or add equipment near the sensor, KVH suggests turning autocompensation on so that the sensor will automatically recalibrate itself within the surrounding magnetic field.

3.6.2 Reading the Calibration Score

These screens are only seen if heading reference is INTERNAL.

The calibration score should be checked during the installation process and whenever adjustments are made to vessel equipment that can affect the compass' accuracy. A complete explanation of the compass calibration score has been provided in *Section 2.5.2, "The Calibration Score."*

Figure 3-25
Reading Calibration Score



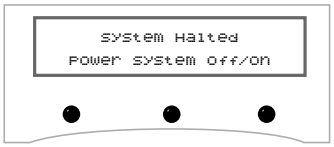
3.6.3 Clearing Compass Calibration

These screens are only seen if heading reference is INTERNAL.

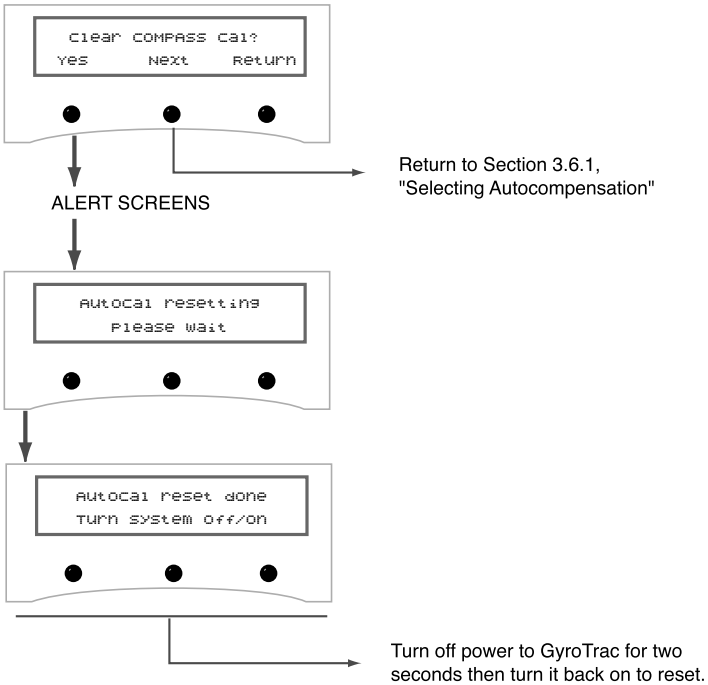
Clearing the compass calibration will reset the system to the factory defaults.

Figure 3-26
Clearing Compass Calibration

After resetting this autocalibration, the following screen may appear:



This may result from a temporary lack of communication with the compass. Restart the system to restore compass data.



3.7 Antenna Status Mode

These screens are only seen if *Antenna Comm* is turned ON.

This sequence of steps allows a user to scan for system errors, access antenna type, version, and serial number information, check the signal and noise levels, indicate the skew angle, and display the bit error rate.

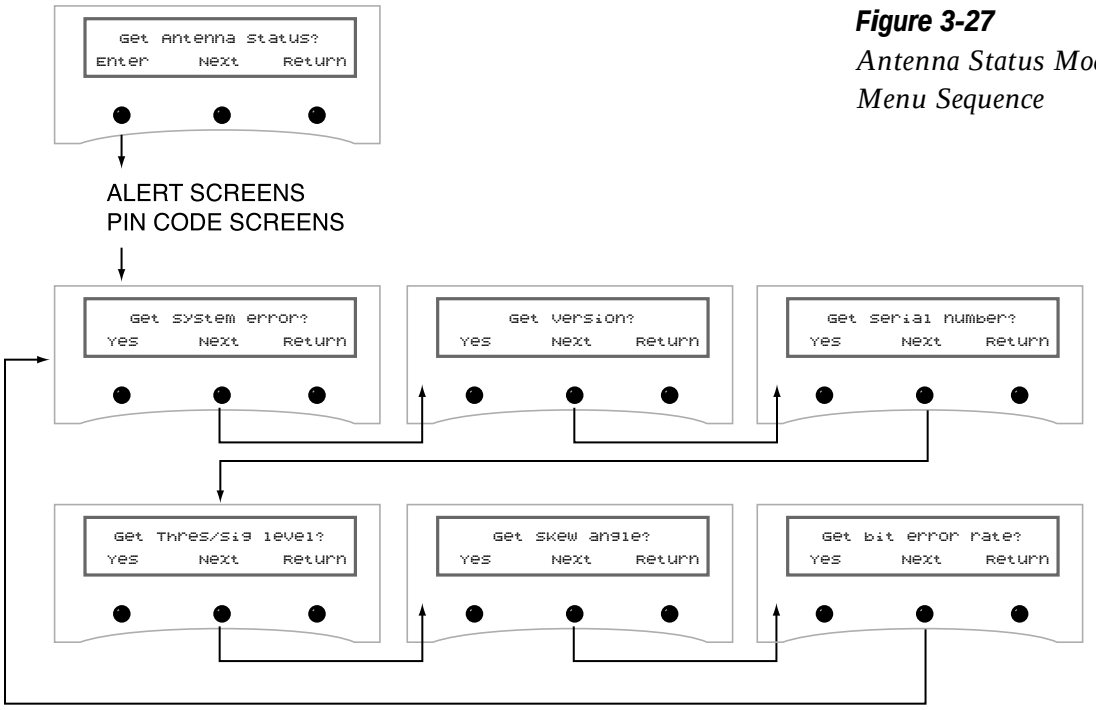


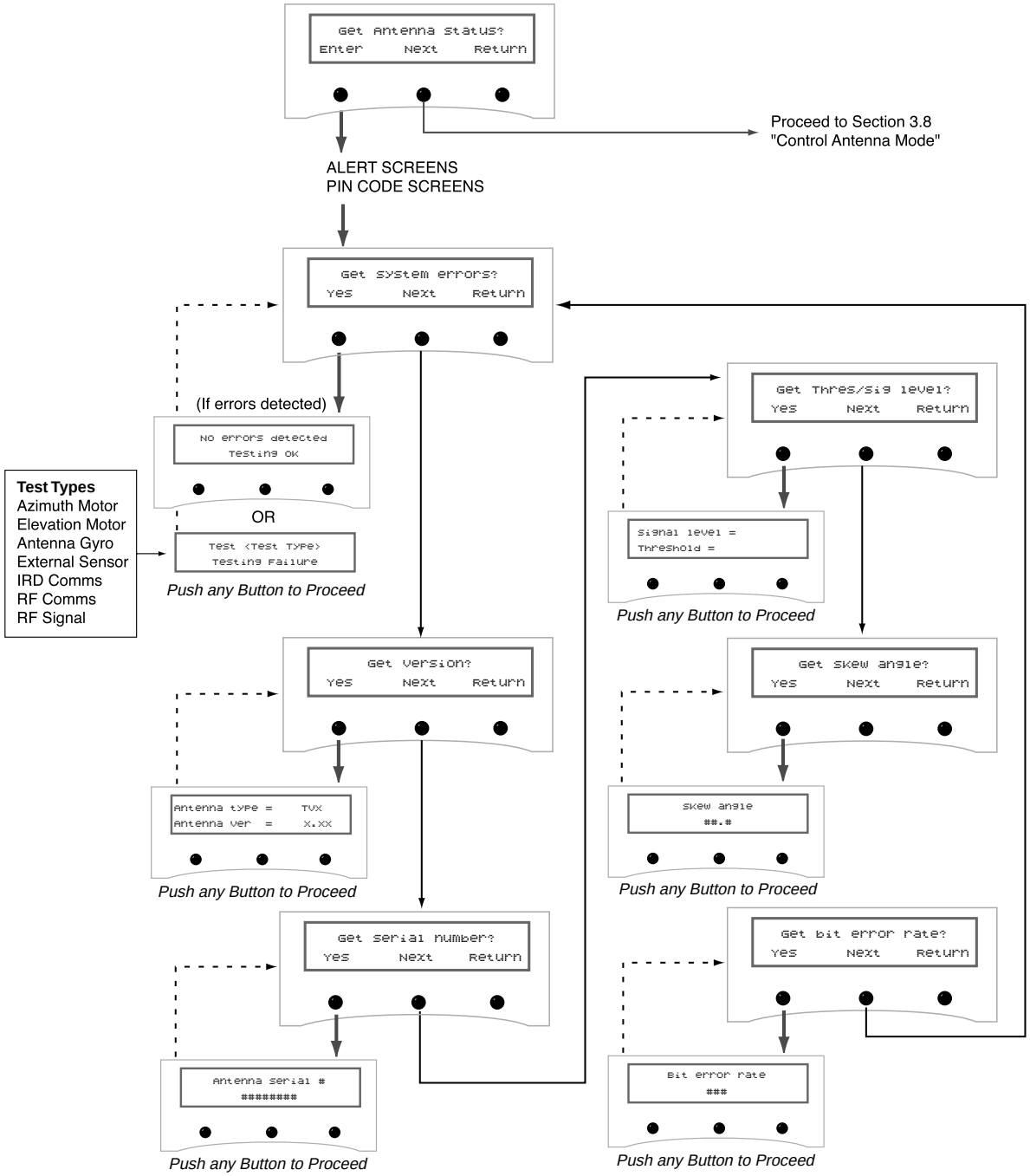
Figure 3-27
Antenna Status Mode Menu Sequence

3.7.1 Antenna Status Data Screens

These screens are only seen if *Antenna Comm* is turned ON.

Figure 3-28 illustrates the information available through the Get Antenna Status mode. The Skew Angle and Bit Error rates are only available when the GyroTrac ADCU is connected to a TracVision G6.

Figure 3-28
Antenna Status Data Screens



3.8 Control Antenna Mode

These screens are only seen if *Antenna Comm* is turned ON.

This sequence of steps allows a user to adjust the antenna's azimuth and elevation manually, restart the antenna, turn sleep mode on/off, turn instant on mode on/off, install a new pair of active satellites, set the latitude and longitude, and select the active satellite system.

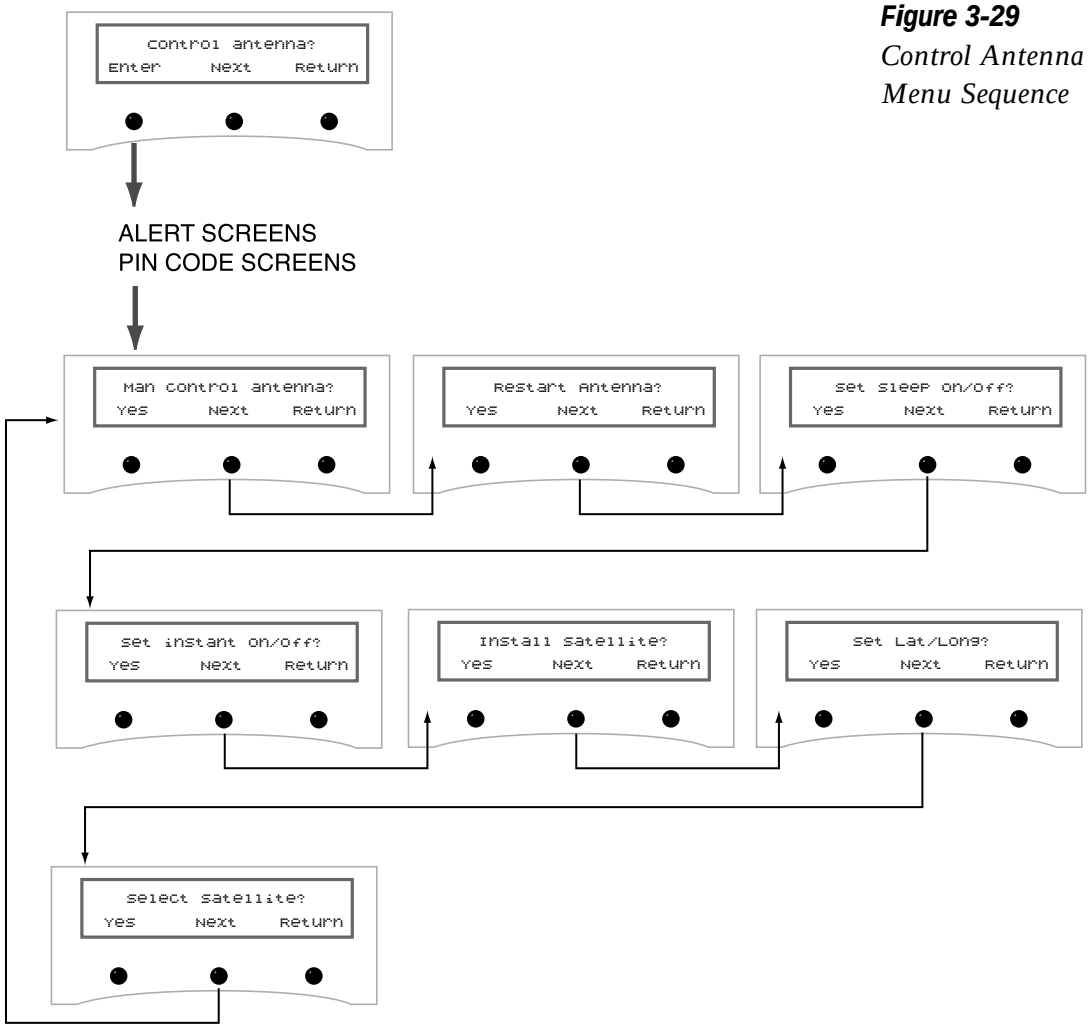
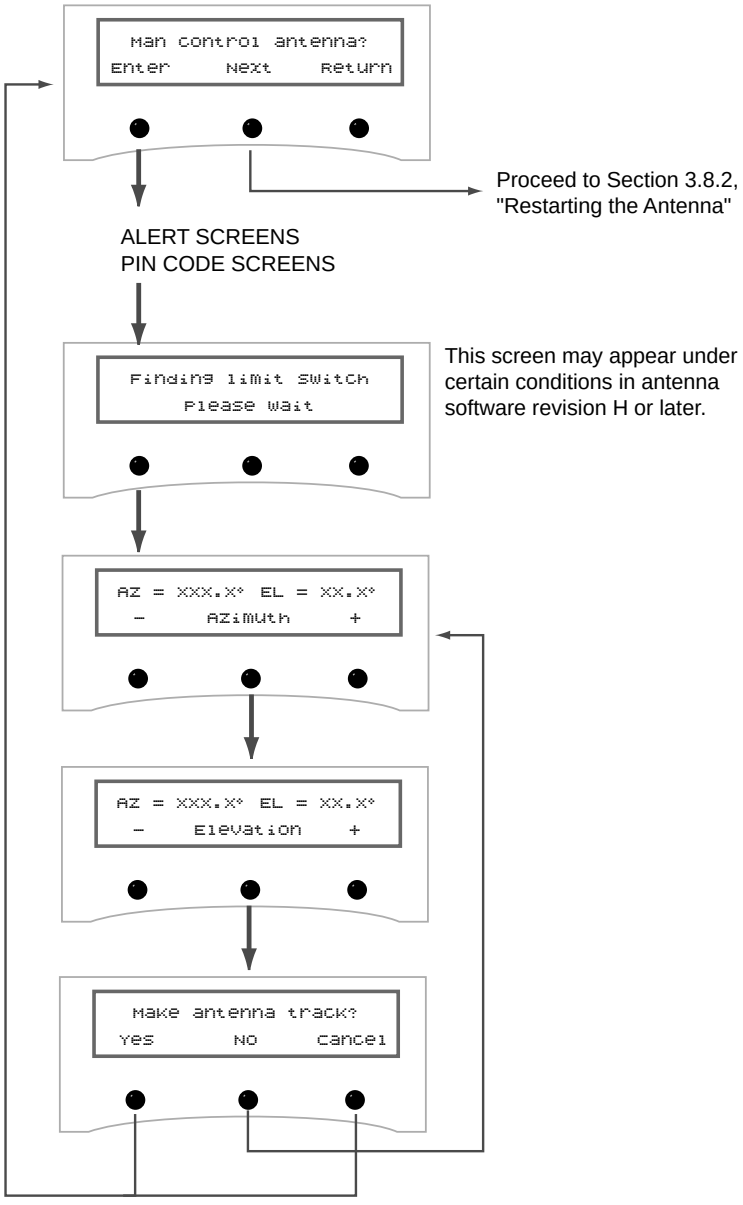


Figure 3-29
Control Antenna Mode Menu Sequence

3.8.1 Manually Controlling the Antenna

In certain circumstances, it may be necessary to control the azimuth, elevation, and tracking of the TracVision G6 antenna manually, using the process illustrated in Figure 3-30. Use +/- to manually move the dish. Azimuth measurements are reported as relative to the bearing of the vessel's bow.

Figure 3-30
Manual Antenna Control Procedure



If the manual adjustment of the antenna reached the maximum rotation (720°), the antenna will rotate 360° and return to the Manual Antenna Control screens.

If the system started up in Instant On mode, the following message may be displayed:

YES tells the antenna to begin actively tracking the set azimuth and elevation. NO leaves the antenna halted in its current position.

3.8.2 Restarting the Antenna

After resetting satellite parameters, it is necessary to restart the antenna before the new settings take effect.

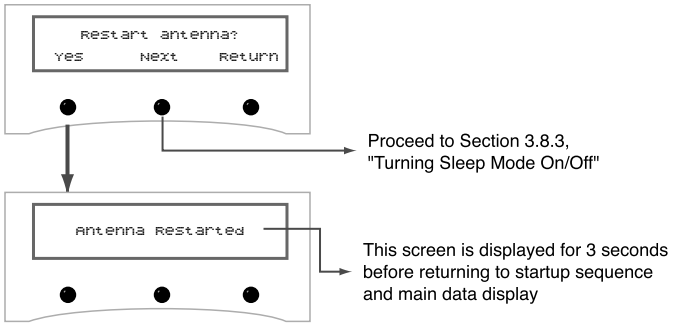


Figure 3-31
Restart Antenna Menu

3.8.3 Turning Sleep Mode On/Off

Sleep Mode turns off conical scan tracking if the antenna holds the same position for 1 minute. As soon as the vessel moves, the system will automatically begin tracking the satellite again.

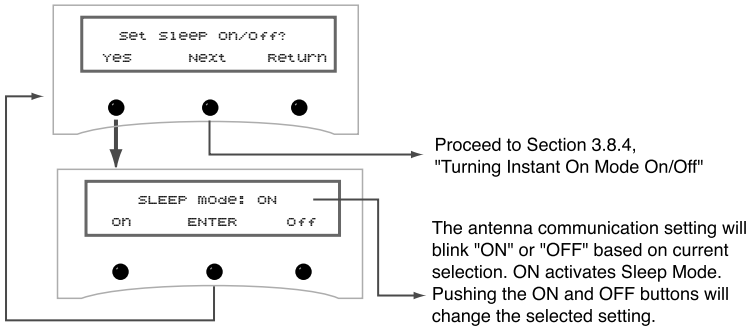


Figure 3-32
Sleep Mode Menu

As its factory default setting, Sleep Mode is turned ON.

3.8.4 Turning Instant On Mode On/Off

Instant On allows the antenna to immediately receive a TV signal if the vessel has not moved since the antenna was last shut off. If the vessel moves after acquiring the satellite via Instant On, the antenna will undergo its standard initialization process, resulting in a brief interruption of the TV signal.

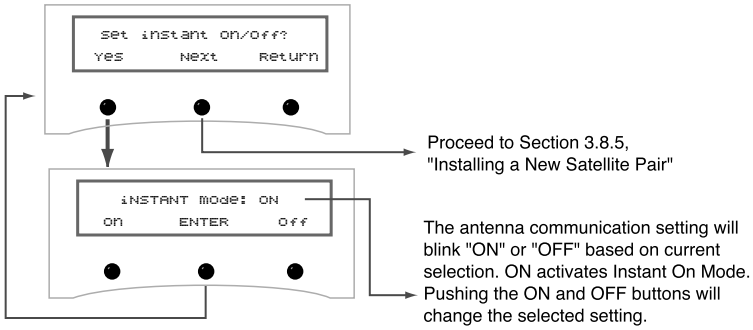


Figure 3-33
Instant On Mode Menu

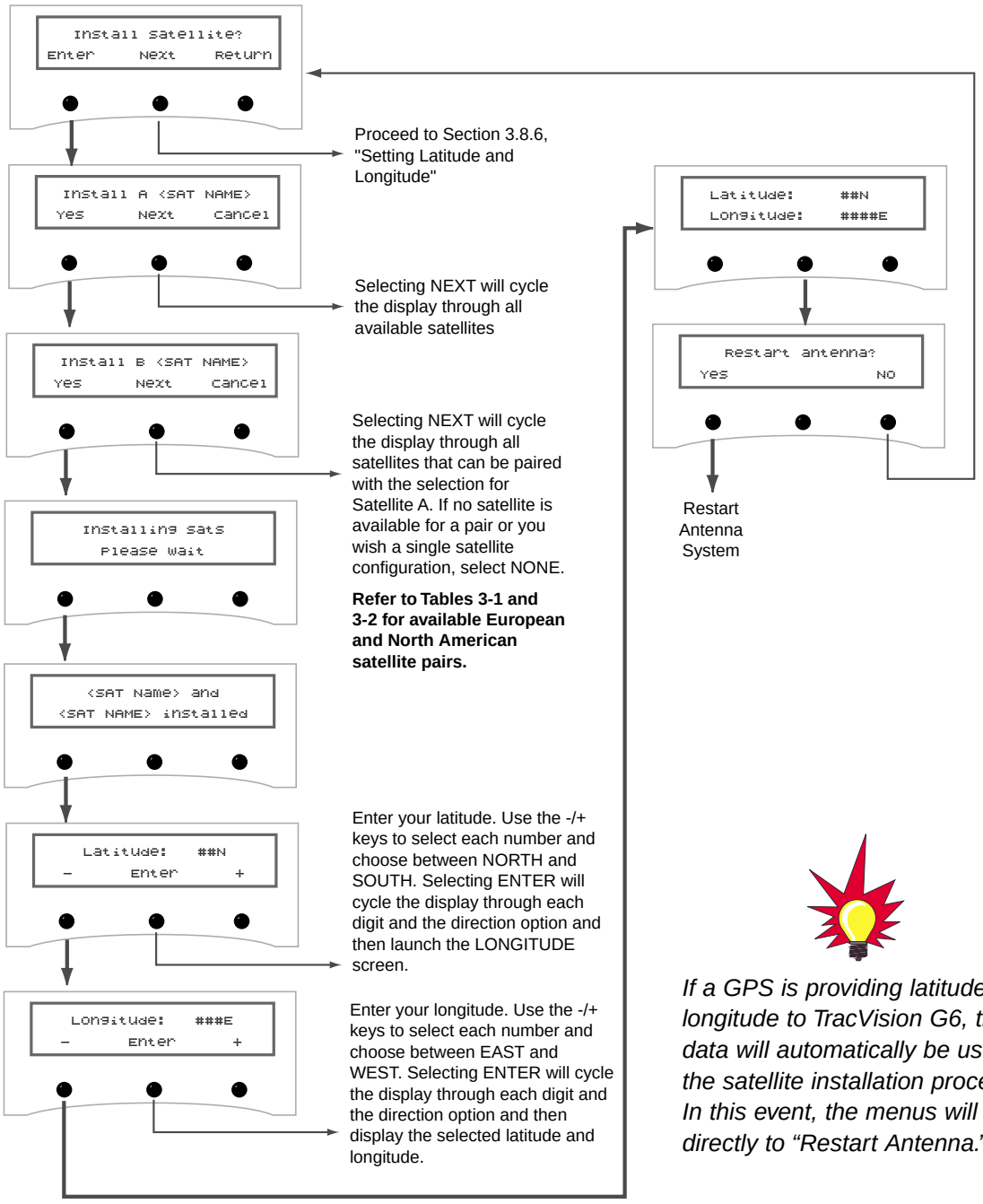
As its factory default setting, Instant On Mode is turned ON.

3.8.5 Installing a New Satellite Pair

These screens are only seen if the GyroTrac ADCU is connected to a TracVision G6.

TracVision G6 permits two satellite services (Satellites A and B) to be installed simultaneously. There is also an option for **NONE** on satellite B, permitting single satellite operation.

Figure 3-34
Install Satellite Pair Process



If a GPS is providing latitude and longitude to TracVision G6, this data will automatically be used in the satellite installation procedure. In this event, the menus will skip directly to "Restart Antenna."

Table 3-1
Available Satellite Pairs - Europe (European LNB required)

	Astra 1	Astra 2N	Astra 2S	Hispasat	Hotbird WB	Sirius	Thor
Astra 1		✓	✓		✓	✓	
Astra 2N	✓				✓		
Astra 2S	✓				✓		
Hispasat							
Hotbird WB	✓	✓	✓			✓	
Sirius	✓				✓		✓
Thor						✓	

Table 3-2
Available Satellite Pairs - North America (U.S.-style LNB required)

	DSS_101	DSS_119	Echo_61	Echo_110	Echo_119	Echo_148	Expressvu
DSS_101		✓					
DSS_119	✓						
Echo_61				✓	✓		✓
Echo_110			✓		✓	✓	✓
Echo_119			✓	✓		✓	✓
Echo_148				✓	✓		✓
Expressvu			✓	✓	✓	✓	

DIRECTV Latin America Subscribers

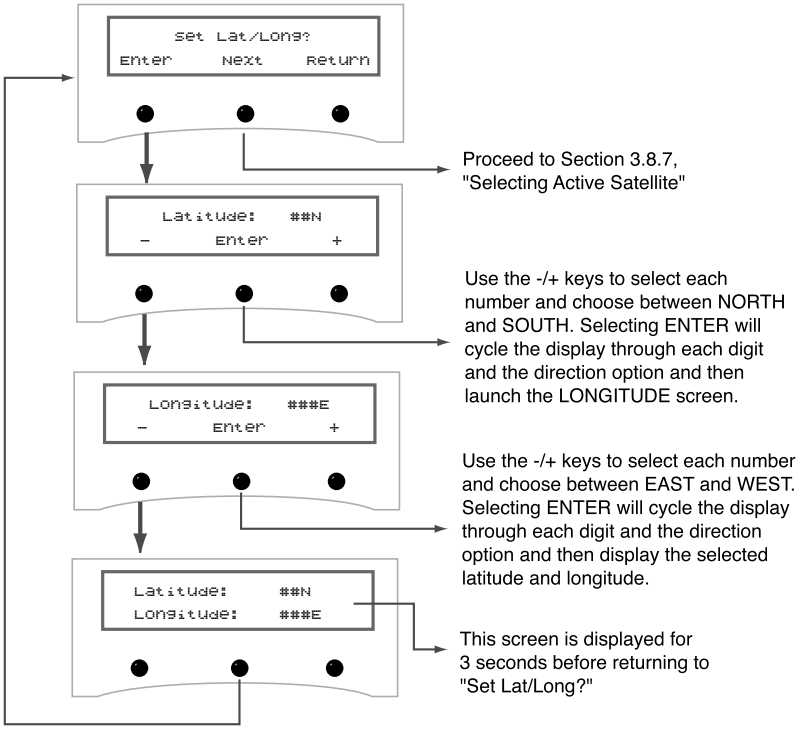
If you have a TracVision G6 equipped for use with the DIRECTV Latin America service, your antenna will search for and receive signals from only one satellite (Galaxy 8).

3.8.6 Setting Latitude and Longitude

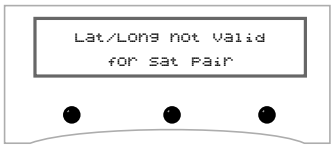
These screens are only seen if the GyroTrac ADCU is connected to a TracVision G6.

When installing a satellite pair, it is also necessary to enter the vessel's latitude and longitude to ensure that the installed satellites are viewable as well as to permit the system to set several internal parameters.

Figure 3-35
Set Latitude/Longitude Procedure



If the latitude and/or longitude entered is not valid for the installed satellite pair, the following screen will appear:



Recheck and re-enter your latitude and longitude and verify your installed satellite pair to resolve this issue.

3.8.7 Selecting Active Satellite

These screens are only seen if the GyroTrac ADCU is connected to a TracVision G6.

After installing the active pair of satellites, use the Select Satellite menu to choose which of the installed satellites will be active.

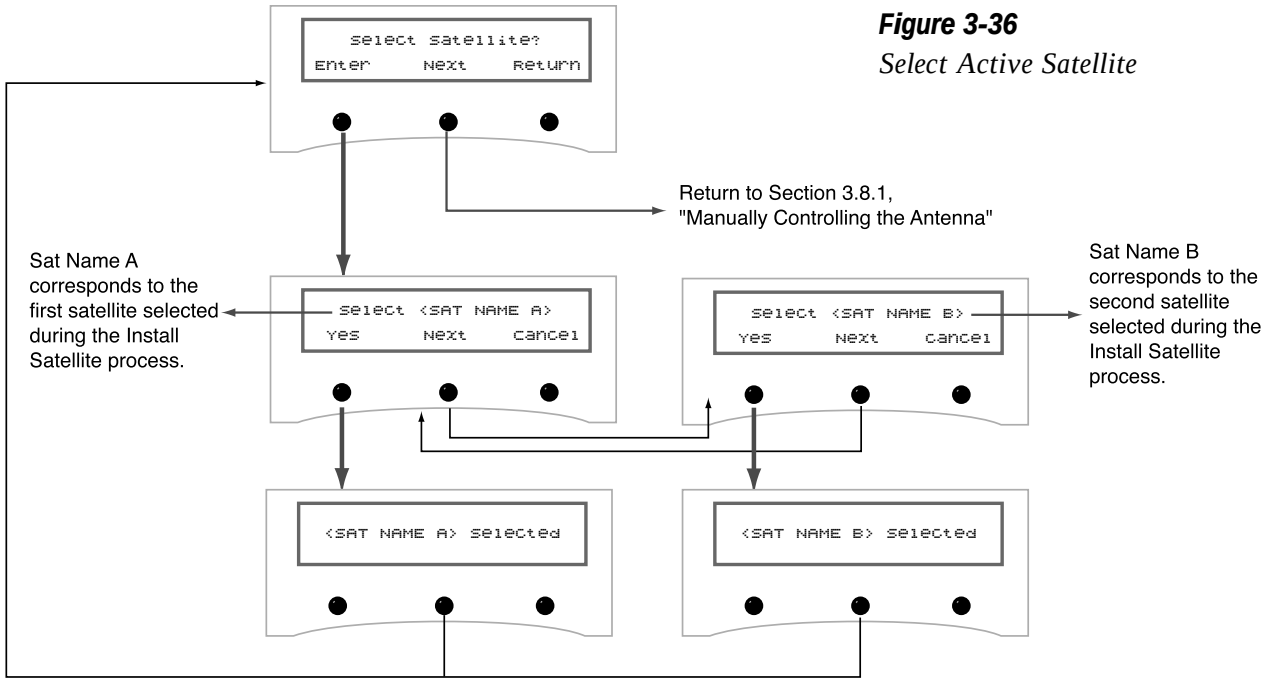


Figure 3-36
Select Active Satellite

4 Troubleshooting

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

Figure 4-1
Troubleshooting Matrix

SYMPTOM / POSSIBLE CAUSE (AND SOLUTION)	Blown fuse, low power, or wiring (Section 4.1.1)	Vessel turning during startup (Section 4.1.2)	Incorrect satellite configuration (Section 4.1.3)	Satellite signal blocked (Section 4.1.4)	Outside satellite coverage zone (Section 4.1.5)	Radar interference (Section 4.1.6)	Incorrect or loose RF connectors (Section 4.1.7)	Multiswitch interference (Section 4.1.8)	Passive multiswitch used (Section 4.1.9)	GyroTrac-specific issues (Section 4.2)	IRD faulty or improperly configured (Section 4.3)	Antenna gyro faulty (Section 4.4)	LNB assembly faulty (Section 4.4)
Antenna non-functional	X												
Antenna not switching channels/satellites			X					X			X		
No picture on TV set				X	X	X	X		X		X		X
Intermittent picture for short intervals		X		X	X	X	X		X			X	X
System works at dock but not on the move				X								X	
System will not find satellite		X	X	X	X	X	X		X	X			X
Snowy or pixelating television picture				X		X	X				X		
No antenna-specific menus on GyroTrac										X			
Antenna and GyroTrac not communicating										X			
No data output through Serial Port 3										X			

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 G6. The following sections address these issues and potential solutions.

4.1.1 Blown Fuse, Low Power, or Wiring

If the Antenna Unit is installed but entirely non-responsive, there are three 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, "PCB Removal and Replacement,"* for details on the fuse location and how to access the CPU Board.
2. Low Power – If the power cable from the Antenna Unit to the power source or ADCU is more than 15 m (50 ft), the power levels can decrease over the course of the cable, resulting in a voltage level at the Antenna Unit that is too low to power the system. Refer to *Section 2.4.2, "Providing Power to the Antenna Unit,"* for details on supplying adequate power to the Antenna Unit.
3. Wiring – If the system has been improperly wired, it will prevent the Antenna Unit from operating correctly. Refer to *Section 2.4.1, "Wiring the Antenna Unit to the GyroTrac ADCU,"* for complete system wiring information.

4.1.2 Vessel Turning During Startup

If the vessel turns during the 60-second startup and initialization sequence that occurs immediately after turning on the power to the TracVision G6 unit, the antenna gyro will record that variable motion as "standing still." This may cause the antenna to track improperly. To solve this problem, turn TracVision G6 off for at least 10 seconds. Turn the system back on, making certain that the vessel is either motionless or travelling in a straight line for the 60 seconds immediately following power-up.

4.1.3 Incorrect Satellite Configuration *(European Systems Only)*

The satellite configuration on European IRDs must match the satellite settings on the TracVision G6 system.

- Satellite A on the TracVision G6 must be the same satellite as IRD Alternative 1 (or A, based on your IRD) and must be assigned the IRD DiSEqC 1 setting.
- Satellite B on the TracVision G6 must be the same satellite as IRD Alternative 2 (or B, based on your IRD) and must be assigned the IRD DiSEqC 2 setting.

Refer to your IRD user manual for complete instructions on configuring your IRD.

4.1.4 Satellite Signal Blocked

Satellite signals can be blocked or degraded by buildings, other vessels, or equipment on the vessel itself. Refer to *Section 2.1, "Choosing the Best Location and Getting the Best Reception,"* to make certain that the TracVision G6 unit is in the optimal location.

4.1.5 Outside Satellite Coverage Zone

TracVision G6 will provide outstanding reception within the 24" (60 cm) antenna coverage area for your satellite television service of choice. However, signal quality can be degraded as you approach the fringe coverage areas. Refer to your satellite television service manual or an Internet resource, such as *www.satcodx.com*, to check the viable coverage area for a 24" (60 cm) antenna.

4.1.6 Radar Interference

The energy levels radiated by radar units can overload the antenna front-end circuits. Refer to *Section 2.1, "Choosing the Best Location and Getting the Best Reception,"* to make certain that the TracVision G6 unit is in the optimal location with regard to your radar unit.

4.1.7 Incorrect or Loose RF Connectors

As part of preventive maintenance (described in *Section 6, "Maintenance,"*) KVH recommends checking the Antenna Unit cable connections. A loose RF connector can reduce the signal quality. Refer to *Section 2.4.8, "Connecting the Antenna RF Signal Cable to the IRD"* for directions on proper Antenna Unit to RF cabling.

4.1.8 Multiswitch Interference *(DSS Plus™ IRD Users Only)*

Due to the signal polarization in European satellites, the use of a multiswitch (active or otherwise), will result in a loss of signal and less than optimal operation with TracVision G6 systems used in Europe, unless the system is equipped with the optional quad-output LNB.

TracVision G6 has the capability to switch from one satellite to another when you choose TV channels that are carried by your two selected satellites. However, some multiswitches (either active or passive), such as the Channel Master model 6214IFD, may interfere with the 22 KHz tone sent by DSS Plus IRDs to the antenna. As a result, the antenna may not receive the signal to change satellites when you change channels using your DSS Plus remote.

In this case, you will need to use the maintenance port satellite switch procedure explained in *Section 3.2, "Data Displays and Accessing the Main Menu."*

4.1.9 Passive Multiswitch Used *(Latin and North American Systems Only)*

As noted in *Section 2.4.8.2, "Connecting the Antenna RF Signal Cable to a Multiswitch (Latin and North American Systems Only),"* using a passive multiswitch may cause some signal loss and possibly reduce the maximum reception range in fringe areas. An active multiswitch can be used to connect more than two IRDs to the TracVision G6 system. However, please refer to *Section 4.1.7," Multiswitch Interference,"* for an explanation of a potential issue with the use of any type of multiswitch.

4.2 GyroTrac-specific Issues

The GyroTrac is designed for reliable, easy use. This section provides a brief overview of some potential operational issues that may arise.

Issue 1:

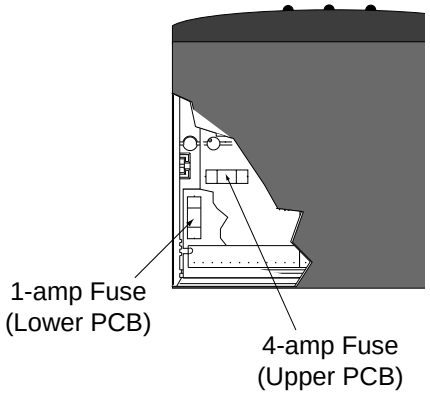
System is installed correctly and power is available, but the system is non-functional.

Solution:

Check the fuses within the ADCU. Remove the two screws securing the top and the base of the ADCU. Remove the top of the ADCU. The fuses are secured in brackets on the upper and lower printed circuit boards (PCBs) within the unit. Remove the damaged fuse and replace with a new, functional fuse.

Note: The fuse on the lower (main) PCB is a 1-amp fast blow fuse. The fuse on the upper (interface) PCB is a 4-amp fast blow fuse.

Figure 4-2
ADCU Fuse Locations (Top Cutaway)



Issue 2:

System fails startup routine and ADCU displays “Errors Detected.”

Solution:

GyroTrac will not operate unless the system passes the startup self-tests. The following actions may be taken in this instance.

- Shut down the system and restore power.
- Shut down the system and verify proper wiring as detailed in *Section 2.4, “Wiring the TracVision G6 System Components.”*
- Contact a KVH dealer or distributor for further assistance.

Issue 3:

GyroTrac is connected to a TracVision G6 system but there is no communication between GyroTrac and the antenna, and you are unable to access antenna-specific menus on the ADCU.

Solution:

Verify that GyroTrac is configured as a TracVision component, as detailed in *Section 3.5.5, "Selecting TracVision or GyroTrac-only Operations."*

Issue 4:

There is no data output through Serial Port #3.

Solution:

Serial Port #3 provides no output when GyroTrac is configured as a component within a GyroTrac-compatible TracVision system.

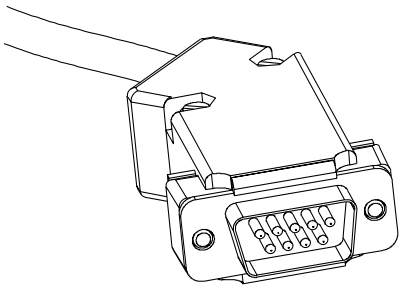
4.3 IRD Troubleshooting

The IRD that was provided with your satellite television service may also be the cause of less-than-ideal operation. First check the IRD's configuration to ensure it is set up for the desired programming. In the case of a faulty IRD, refer to your IRD user manual for service and warranty information. If the IRD is both configured properly and fully functional, contact your local KVH dealer or service center for assistance.

4.4 Antenna Gyro and LNB Faults

Section 5, "Maintenance," provides detailed instructions for authorized service personnel who may be required to replace the TracVision G6 antenna gyro or the LNB.

Figure 4-3
DB9 Connector



4.5 Computer Diagnostics

TracVision G6 has been designed to provide diagnostic readouts viewed on a personal computer having an RS-232 serial communication port. If you are unable to isolate a system problem, 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 95/98 Hyperterminal. Use the settings appropriate to your application.

1. Connect one end of the PC/ADCU cable to the DB9 connector on the rear of the ADCU. 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 G6 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. After completing the diagnostic, shut down the system.

4.6 Maintenance Port Parser Commands

TracVision G6 system parser commands are detailed in *Appendix G*.

5 Maintenance

The following sections provide details on preventive maintenance and field replaceable units and parts for the TracVision G6 antenna unit.

The serial number for your TracVision G6 will be required during any service or calls. You will find the serial number on the inside front cover of this manual.

5.1 Warranty/Service Information

KVH Industries, Inc. warrants TracVision G6 against defects in materials and workmanship for a period of two years and labor for a period of one year from the date of original retail purchase by the original purchaser. Labor is only warrantied if the TracVision G6 was installed by an authorized KVH dealer. 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 G6 requires minimal preventive maintenance. The following routine housekeeping chores are sufficient to maintain peak performance.

Monthly

Wash the exterior of the radome and baseplate assembly with fresh water to remove salt deposits; a mild detergent may be added to remove grime.

- Use caution when spraying the radome directly with high-pressure water from a hose.
- Do not apply abrasive cleaners or volatile solvents such as acetone to the ABS radome.

- Check all connectors at the Sensor Module, ADCU, Antenna Baseplate, and IRD. Remove connectors and examine for signs of corrosion; clean as needed.

Semi-Annually

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

5.3 TracVision G6 Field Replaceable Units

TracVision G6 components receive power from multiple sources. Do not open any electrical assemblies or attempt servicing until IRD power and vessel input power are disconnected.

The TracVision G6 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 G6 dealer/installer or distributor first. If an authorized dealer/installer or distributor is not located nearby, contact KVH or KVH Europe directly at the telephone, facsimile, or e-mail listings inside the front cover.

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

Table 5-1 *TracVision G6 Field Replaceable Units*

FRU	Part Number
Radome	02-1047-01
CPU	02-0992
RF Detector PCB	02-1017-02
Antenna Gyro Sensor	02-1035
Antenna Gyro Gasket	24-0139
Elevation Drive Belt	24-0105-83
Elevation Motor	02-1050
European LNB Assembly	02-0932
U.S.-style LNB Assembly	02-0870
Latin American LNB Assembly	02-0870-01
Quad-output LNB Assembly	02-1052
ADCU	02-0961
Sensor Module	02-0991

FRU	Part Number
Data Cable	32-0619-100
RF Cable	32-0566-0100
PC Cable	32-0628-06
Sensor Cable	32-0586-30
Power Cable	32-0510-100
CPU Fuse	16-0017-4000

* European TracVision G6 systems only
† North American TracVision G6 systems only

Table 5-1 (continued)
TracVision G6 Field Replaceable Units

To help us continually improve the quality and reliability of our systems, please return any failed component to KVH or KVH Europe after you receive your replacement part.

The Antenna Unit printed circuit boards, Antenna LNB, elevation stepping motor, and elevation drive belt may be removed and replaced on site using common hand tools. Other TracVision G6 service must be done by your authorized dealer/installer, distributor or by KVH. Evidence of tampering or unauthorized repairs will void the warranty. The following are step-by-step procedures for removing and replacing those components that may be serviced.

Figure 5-1 depicts the location of a number of components within the TracVision G6 Antenna Unit.

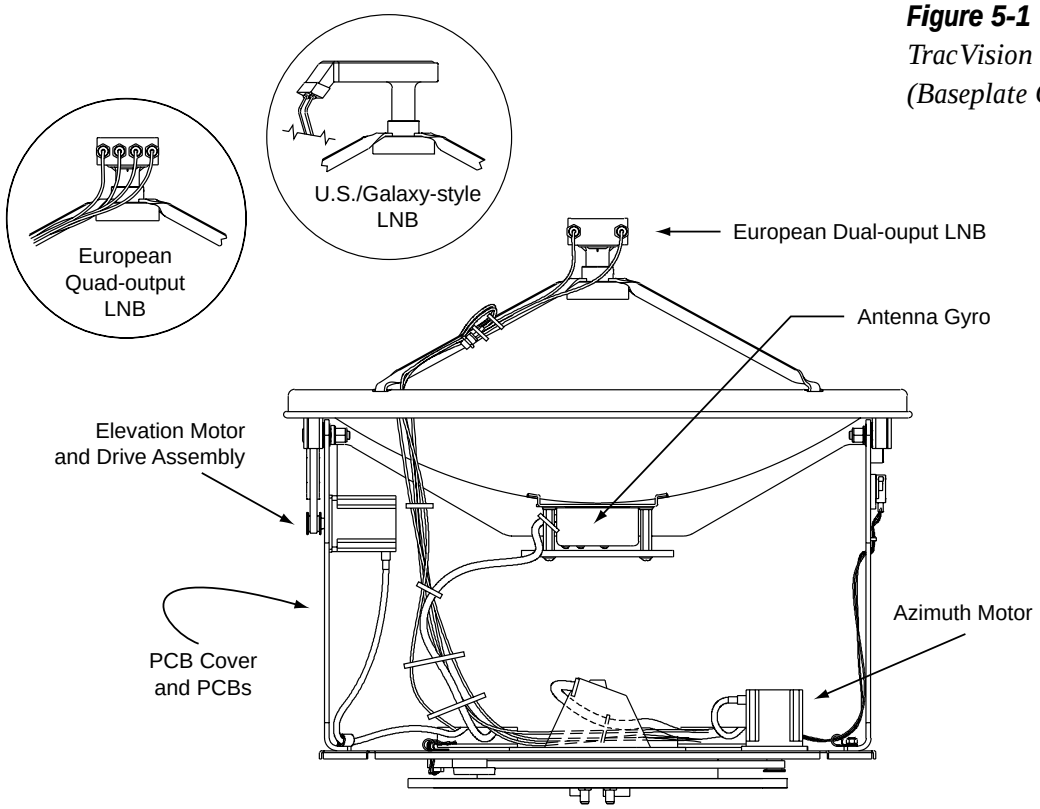
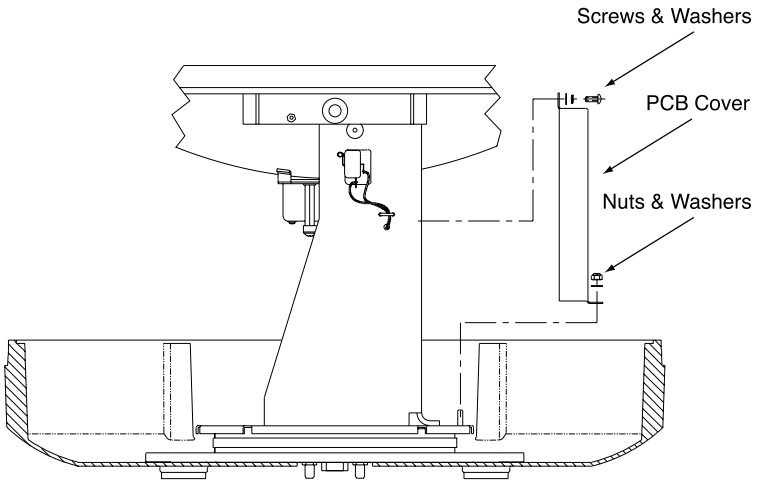


Figure 5-1
TracVision G6 Antenna Unit (Baseplate Cut Away)

5.4 PCB Removal and Replacement

The printed circuit boards (PCBs) are protected by a cover fastened to the antenna support frame. The cover must be removed to gain access to the main power fuse and the PCB assemblies discussed below. Refer to Figure 5-2; remove 3 nuts and washers from the bottom flange and 3 screws and washers from the upper flange. Remove the cover and set aside with the fasteners.

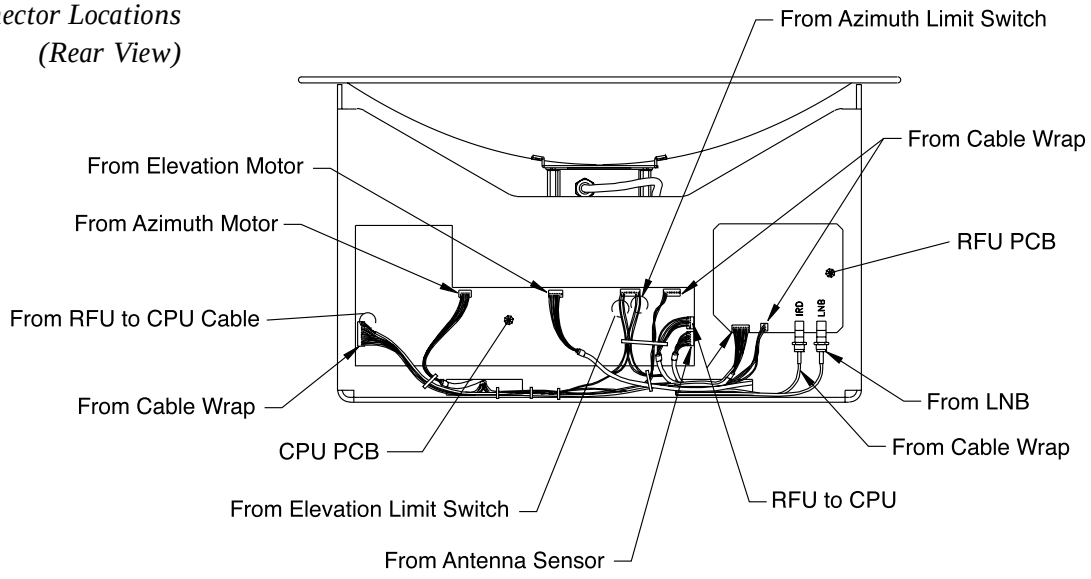
Figure 5-2
PCB Cover Plate Removal



The PCB cover fits snugly over the PCB. When removing or replacing the cover, take care to ensure that the cover does not dislodge any of the Molex connectors as this will cause system errors and improper operation.

The PCBs are mounted to the antenna elevation mechanism support frame with machine screws and are interconnected by means of keyed Molex connectors. Figure 5-3 shows the PCB arrangement, connector locations, and functions while Figure 5-4 on the next page shows how the printed circuit boards are mounted to the support frame.

Figure 5-3
PCB Connector Locations (Rear View)



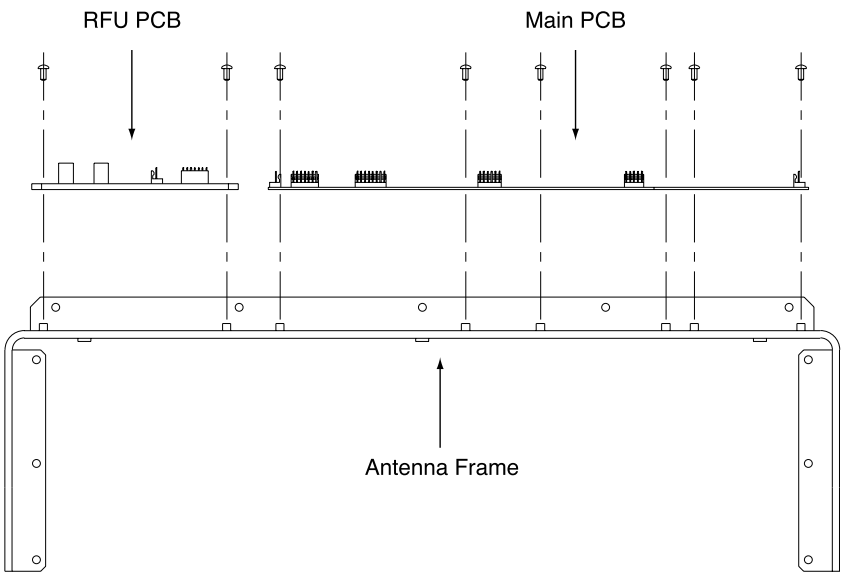


Figure 5-4
PCB Mounting (Top View)

5.4.1 CPU Board

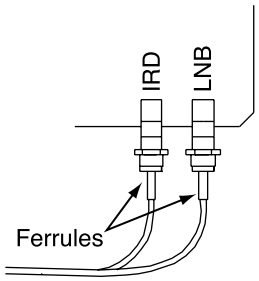
1. Remove the seven Molex connectors from the CPU.
2. Remove eleven #6-32 x 3/8" machine screws from the PCB.
3. Remove the assembly from the main support.
4. Installation of the replacement assembly is the reverse of this. Reinstall all Molex connectors removed in Step 1.
5. Calibrate the Gyro and LNB as described in Section 5.5.
6. Reinstall your preferred satellites as instructed in *Section 2.7, "Installing Satellites on the ADCU."*

5.4.2 RF Detector Board

The RF Detector receives operating voltages from both the CPU board and the IRD (via the RF cable). Ensure that ***all*** power (including the IRD) is turned off before proceeding.

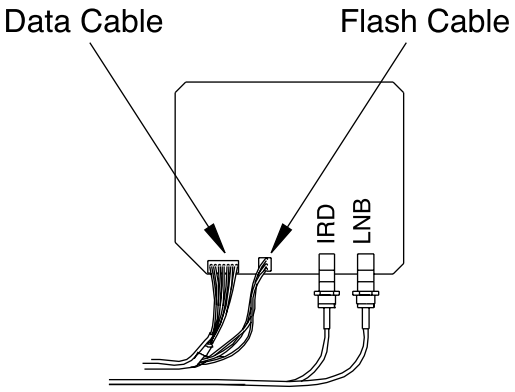
1. Unplug the Data and RF Flash cables from the RF Board.
2. Observe which RF cable is attached to the top RF connector. Add a piece of tape or some identifying mark so that the RF cables can be plugged into the proper RF connectors on the new RF Board.

Figure 5-5
RF Cable Ferrules



3. Remove the two RF cables from the RF connectors with a 7/16" wrench. Hold the RF connector ferrule while loosening the connectors to avoid excess stress on or twisting of the cables. Refer to Figure 5-5.
4. Remove the four 6-32 x 3/8" screws and set aside.
5. Remove the RF Board and discard.
6. Install the new RF Board, making certain to align the Board so that the RF Connectors are facing the bottom. Figure 5-6 illustrates the alignment of the new RF Board and cables.

Figure 5-6
New RF Board Installation



Failure to hold the ferrules tightly while loosening the RF connectors can result in damage to the cables and reduce the signal quality.

7. Secure the RF board using the screws removed in Step 4.
8. Reattach the RF cables, making certain that the RF cable originally attached to the top RF connector on the old RF Board is connected to the top RF connector on the new RF Board.
9. Attach the Data and RF Flash cables to the RF Board.

5.5 Antenna Gyro Assembly

1. Remove the printed circuit board (PCB) cover, illustrated in Figure 5-2, using a #2 Phillips screwdriver and a 3/8" nut driver/socket.
2. Use the screwdriver to remove the four screws and the counterweight.

3. Use the ⅜" nut driver/socket to remove the four standoffs securing the Antenna Gyro to the bracket. The standoff on the bottom right also secures a tie-wrap.
4. Remove 3 tie-wraps holding gyro and RF cables.
5. Disconnect the 7-pin Molex connector from the PCB. Place the old Antenna Gyro assembly aside.
6. Attach the 7-pin Molex to the new Antenna Gyro assembly.
7. Replace the Antenna Gyro gasket.
8. Use the standoffs removed in Step 3 to attach the new Antenna Gyro to the bracket. The bottom right standoff should be used to secure the tie-wrap on the Antenna Gyro Cable. The Antenna Gyro should be oriented so that the cable extends from the top of the gyro.
9. Reattach the counterweight and screws removed in Step 2.
10. Redress gyro and RF cables using 3 tie-wraps.
11. Carefully move the reflector through its range of motion to ensure that the cable moves freely between the elevation mechanism and the lower assembly. Adjust the Antenna Gyro cable as necessary to ensure proper motion.

Make sure the cable jacket passes through the PCB access slot to protect the wires from the edge of the PCB frame.

Antenna Gyro Calibration

1. With the PC connected to the maintenance port, apply power to the antenna unit.
2. Type **HALT<cr>** while the system is performing the limit switch initialization routine. The system will complete the initialization function by finding the azimuth and elevation switch limits and then go to the home position. Record the 8-digital serial number that was displayed in the startup message.
3. Type **DEBUGON<cr>** to enter Debug Mode.
4. Type **ZAP<cr>**.
5. Type **HALT<cr>** while the system is performing the limit switch initialization routine. The system will complete the initialization function by finding the azimuth and elevation switch limits and then go to the home position.

6. Type **DEBUGON<cr>** to enter Debug Mode.
7. Type **=CALGYRO<cr>**
8. Type **ZAP<cr>**.
9. Type **HALT<cr>** while the system is performing the limit switch initialization routine. The system will complete the initialization function by finding the azimuth and elevation switch limits and then go to the home position.

Refer to Section 2.9, "Checking Out the System" *for complete details in connecting a PC to the system via the maintenance port.*

Steps 10 through 12 will speed the antenna's acquisition of the satellite when GPS input to the antenna is not present. It is not required to complete the Antenna Gyro replacement process but doing so will speed acquisition and improve system performance. If you are not entering the latitude and longitude as described in Steps 10 through 12, continue to Step 13 to complete the process.

10. Determine the latitude and longitude of the vessel location to the nearest degree.
11. Type **GPS,AA,B,CCC,D<cr>** where
    - AA = Latitude in degrees
    - B = N or S
    - CCC = Longitude in degrees
    - D = E or W
12. Verify that the response has the correct parameters.
13. Type **ZAP** to restart/reinitialize the system.

5.6 Elevation Motor and Belt Replacement

The elevation motor is mounted to the inside of the elevation drive assembly support frame. Machine screw/washer and stop nut sets hold the drive motor in proper position to maintain proper tension on the toothed drive belt. When adjusting belt tension or changing the belt, do not remove the screws from the motor side, only loosen the external nuts on the belt side. Figure 5-7 shows the arrangement of motor, drive belt, and antenna pulley.

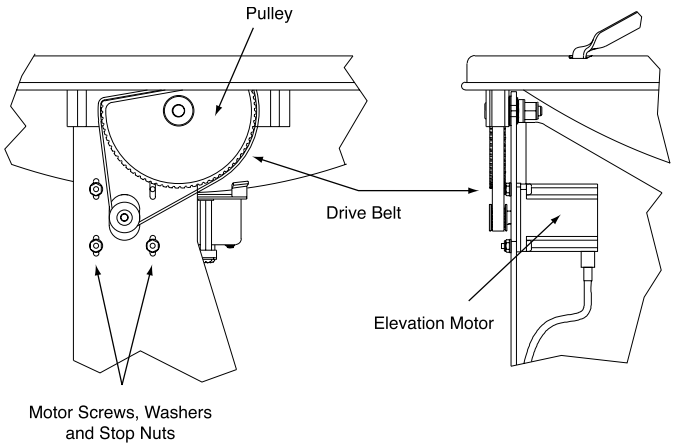


Figure 5-7
Elevation Drive Mechanism

5.6.1 Drive Belt Removal and Replacement

1. Use an 11⁄32" nut driver to loosen (3) #8-32 nuts until the motor is free to move upward. Raise the motor to the top of the slots and retighten the screws to hold it there.
2. Roll the belt over the motor hub while slowly moving the antenna reflector along its elevation axis. Work the belt out from between the antenna pulley and reflector.
3. Carefully work the new belt in between the antenna pulley and the reflector. Ensure that the teeth are on the inside of the belt. Feed the belt over the motor hub. Once the belt is in place, work it back and forth to ensure that the belt is aligned and the teeth are engaged with the motor pulley.
4. Loosen the nuts and gently press downward on the motor hub until the drive belt is at proper tension. Adjust the belt tension for a maximum of 1⁄8" (3 mm) deflection with moderate finger pressure between the motor and antenna pulley. Some readjustment may be necessary if the belt tension results in excessive antenna reflector vibration.
5. Tighten the holding screws.

5.6.2 Elevation Drive Motor Removal and Replacement

1. Remove the Elevation Motor Molex connector from the PCB (illustrated in Figure 5-3). Feed the drive motor cable through the cutout to the front of the elevation drive assembly support frame.
2. Remove the three stop nuts and washers that are holding the motor in position (pictured in Figure 5-7). Withdraw the motor assembly from the elongated slots.
3. Install the new assembly with the motor connector facing down, as shown in Figure 5-7. Reinstall the stop nuts and washers but do not tighten.
4. Raise the motor and work the toothed drive belt over the outer lip of the hub. Press down gently on the motor body while rotating the antenna reflector up and down to ensure free movement.

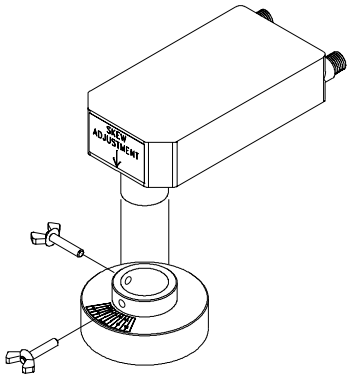
Excessive belt tension may result in antenna reflector vibration.

5. Adjust the belt tension for a maximum of ⅛" (3 mm) deflection with moderate finger pressure between the hub and gear. Some readjustment may be necessary if the belt tension results in excessive antenna reflector vibration.
6. Reconnect the Elevation Motor Molex connector to the PCB.

5.7 Antenna LNB Replacement

The LNB assembly receives preamplifier operating power from the IRD via the RF Detector PCB. Be certain that the IRD is turned off or disconnected from its power source before removing or reconnecting the LNB. The following sections provide replacement instructions for European and U.S.-style LNBs.

Figure 5-8
European Dual-output LNB Removal



5.7.1 European Dual-output LNB Replacement

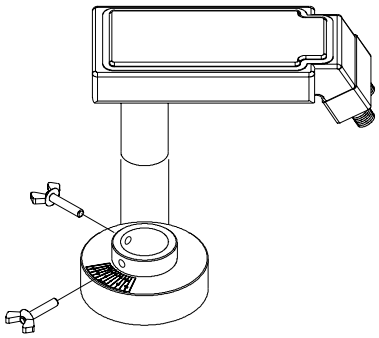
1. Disconnect both RF coaxial connectors at the LNB.
2. Observe the currently set skew value, as marked by the stickers on the LNB and choke assembly.
3. Loosen the wing screws and remove the LNB from the choke assembly (as pictured in Figure 5-8).

4. Place the new LNB into the choke assembly. Adjust the LNB's position so that it has the same skew value observed in Step 2.
5. Apply a small amount of thread-locking compound (e.g., Loctite 425 or equivalent non-permanent threadlocker) to the screw threads and tighten the wing screws to secure the LNB in position.
6. Reconnect the RF connectors.

5.7.2 U.S. and Latin American-style LNB Replacement

1. Disconnect both RF coaxial connectors at the LNB. Loosen (2) wing screws on the throat of the choke feed until the LNB is free to slide out. Withdraw the LNB as pictured in Figure 5-9.
2. Insert the replacement LNB as far as it will go. Be sure that it bottoms in the feedhorn. Be careful not to puncture or dislodge the plastic seal covering the LNB throat. Orient the LNB to align with the strut holding the pair of RF cables.
3. Apply a small amount of thread-locking compound (Loctite 425 or equivalent) to the wing screw threads and tighten the screws to secure the LNB in position.
4. Reconnect the RF connectors.

Figure 5-9
U.S.-style LNB Removal



5.7.3 European Quad-ouput LNB Replacement

1. Disconnect all four RF coxial connectors at the LNB.
2. Observe the currently set skew value, as marked by the stickers on the LNB and choke assembly.
3. Loosen the wing screws and remove the LNB from the choke assembly (as pictured in Figure 5-10).
4. Place the new LNB into the choke assembly. Adjust the LNB's position so that it has the same skew value observed in Step 2.

Figure 5-10
European Quad-output LNB Removal

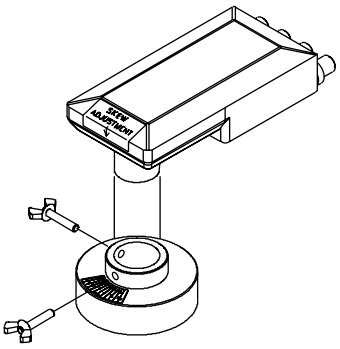
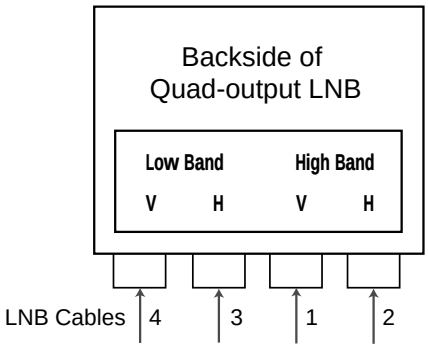


Figure 5-11
Quad-output LNB RF Cable Connections



5. Apply a small amount of thread-locking compound (e.g., Loctite 425 or equivalent non-permanent threadlocker) to the screw threads and tighten the wing screws to secure the LNB in position.
6. Reconnect the RF connectors as shown in Figure 5-11. For your convenience, all four LNB cables come pre-labeled (1, 2, 3, and 4).

5.8 GyroTrac Replaceable Parts

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

Replacement parts for components that can be serviced in the field are listed in Table 5-2. These parts may be obtained from any KVH-authorized dealer/installer.

Table 5-2
GyroTrac Field Replaceable Units

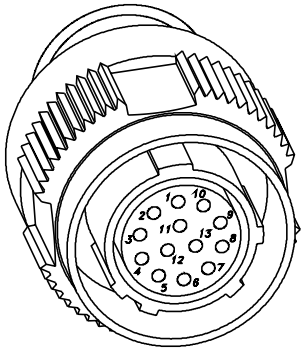
FRU	KVH Part No.
Sensor Module	02-0991
ADCU	02-0961
Flush Mount ADCU Panel	20-0667
Horizontal Sensor Bracket	20-0658
Vertical Sensor Bracket	20-0666
Connector Wire Terminal Strip	23-0223-12
Sensor to ADCU Data Cable	32-0623-30
ADCU Main PCB Fuse, 1-amp	16-0009-1000
ADCU Interface PCB Fuse, 4-amp	16-0017-4000

Table 5-3 and Figure 5-12 provide the pin assignments for the Sensor to ADCU Data Cable (Part Number 32-623-30).

Table 5-3
Data Cable Wiring/Terminal Assignments

Connector Terminal	Wire Color	Function
1	Wht/Blu Stripe	FE_TXD+
2	Blu/Wht Stripe	FE_TXD-
3	Wht/Org Stripe	FE_RXD-
4	Org/Wht Stripe	FE_RXD+
10	Wht/Grn Stripe	GND
11	Grn/Wht Stripe	+12V
Shell	Shield	---

Figure 5-12
Data Cable Terminal Arrangement



5.9 Preparation for Shipment

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

1. Rotate the azimuth mechanism slowly to find the limit switch stop. The front of the antenna should be facing the forward arrow.
2. Rotate the azimuth mechanism 180˚ in the opposite direction to ensure that the mechanism is not resting on the limit switch stop.
3. With the antenna reflector slightly elevated, slip the narrow end of the elevation shipping restraint beneath the lip of the antenna reflector. Gently wedge the restraint inside the baseplate as shown in Figure 5-13.

When rotating the azimuth mechanism by hand, go slowly! Hitting the mechanical stops with excessive force will damage the azimuth limit switch.

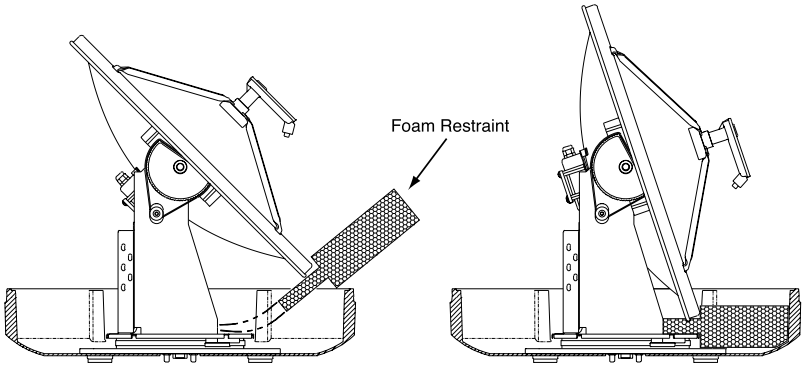
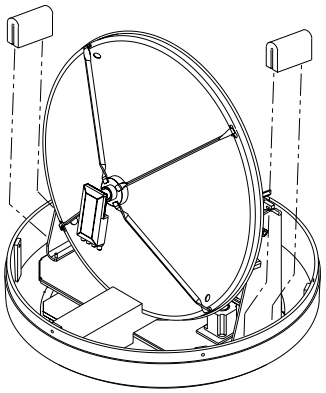


Figure 5-13
Elevation Shipping Restraint Placement

Figure 5-14
Azimuth Shipping Restraints Placement



4. Insert the two azimuth shipping restraints between the edge of the baseplate and the rotating plate along the side of the antenna frame, as pictured in Figure 5-14.
5. Pack the TracVision G6 unit in its original package.
6. As detailed in the warranty accompanying this product and printed on the last page of this manual, a Return Material Authorization (RMA) number is required prior to the return of the TracVision G6 system to KVH. Contact the KVH Technical Support Department at +1 401 847-3327 or via email at techs@kvh.com to obtain the RMA number. Please review your warranty to familiarize yourself with all requirements, liabilities, and policies.

Appendix A
System Specifications

A.1 Antenna Specifications

Physical Characteristics

Table A-1
TracVision G6 Antenna Physical Specifications

Antenna Unit	27.4" (70 cm) h x 26.2" (67 cm) d; 55 lbs (25 kg)
External Sensor	7.8" (19.8 cm) l x 5" (12.7 cm) w x 5" (12.9 cm) h
ADCU	7.3" (18.5 cm) d x 8.2" (20.8 cm) w x 2.6" (6.6 cm) h
Operating temperature	-13° to +130° F (-25° to +55° C)
Storage temperature	-40° to +185° F (-40° to +85° C)

Input Power

Table A-2
TracVision G6 Power Specifications

Input	11–16v DC @ 3.5 amps nominal (4.5 amps peak)

Antenna System Performance

Table A-3
TracVision G6 Performance Specifications

Minimum EIRP	47 dBW
Elevation range	10° - 80°
Azimuth range	720°
Pitch/roll range	±15°
Pitch/roll rate	30°/second
Turn rate	45°/second
Yaw	±90° in 10 seconds
Tracking rate	30° per second
Position repeatability	0.1°
Surge/sway/heave	±0.2 G
Shock	20 G, 11 msec
Vibration	0.9 G rms over 5-33 Hz

A.2 GyroTrac Compass Specifications

Table A-4
TracVision G6 GyroTrac Performance Specifications

Performance Data

Accuracy	±3.0˚ peak; ±1.0˚ typical[1]
Repeatability	±0.25˚
Resolution	±0.1˚ (gyro ±0.01)
Tilt Angle/Pitch & Roll Range	±45˚
Rate Gyro Drift	0˚/minute (auto-corrected)
Maximum Angular Velocity	45˚/second
Bandwidth	10 Hz
Power/Consumption	12-32 Vdc/330 mA (stand-alone) *TracVision component: 11-16 Vdc 3.5 amps nominal, 4.5 amps peak*
Data I/O Format	RS-422 (NMEA 0183 Version 2.2)
Zero Point Stability	±0.8˚

1. After calibration, free magnetic field to tilt angles of ±20˚; accuracy ±5.0 RMS to ±45˚ tilt or roll.

Table A-5
TracVision G6 GyroTrac Environmental Specifications

Environmental Data

Operating Temperature	-25˚C to +55˚C (-13˚F to +130˚F)
Storage Temperature	-40˚C to +85˚C (-40˚F to +185˚F)
Maximum Shock (Performance)	20G, 11 msec
EMI/RFI	IEC 945; FCC Part 15J, Class B

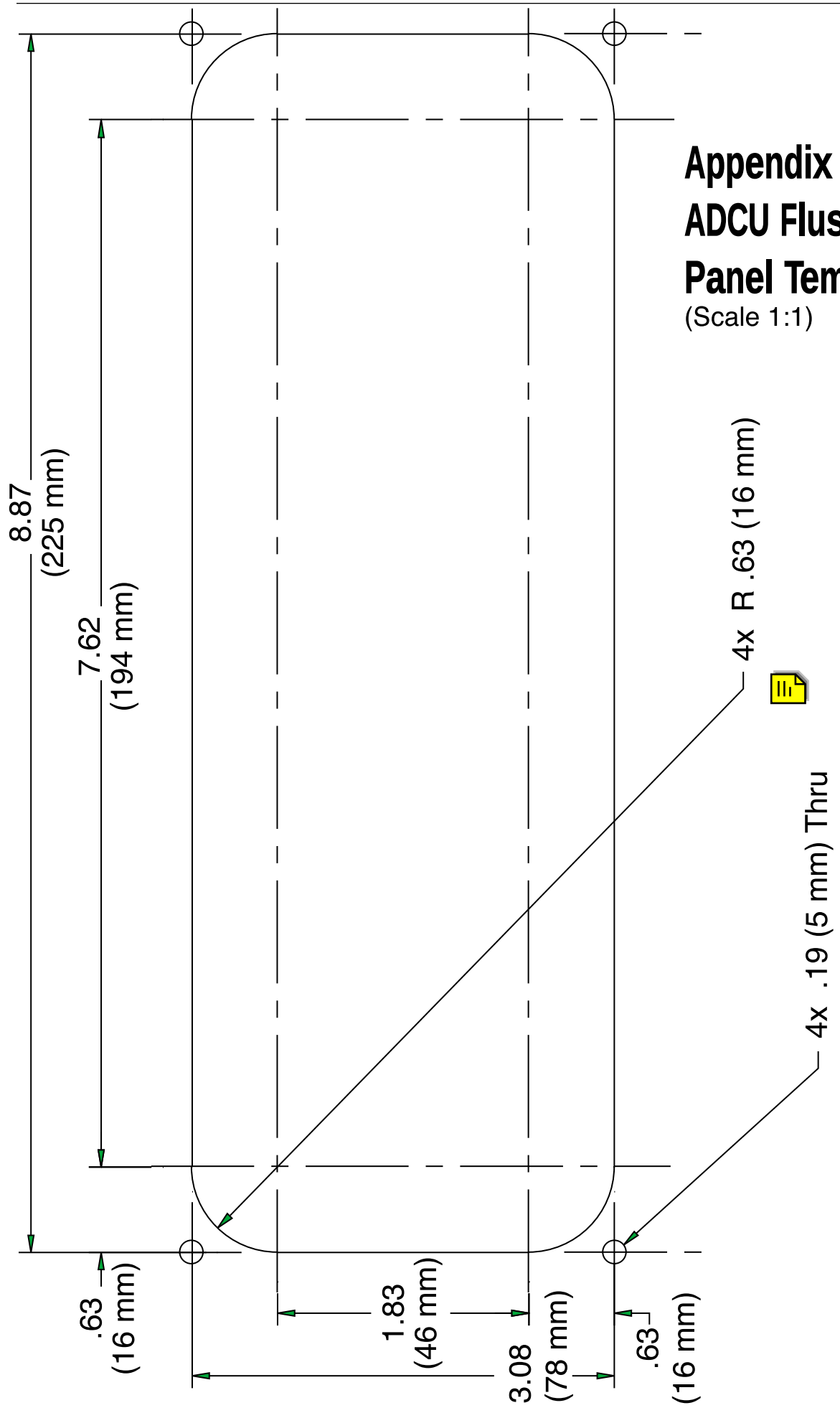
Interface Data (Choice of 4 Simultaneous Outputs)

NMEA 0183 ver. 2.2:	
BWC	Bearing, distance to waypoint
GGA	GPS fix data
GLL	GPS latitude, longitude
HDG	Stabilized magnetic heading
HDM	Magnetic heading
HDT	True heading
VTG	Course over ground, speed over ground
XTE	Cross-track error (measured)
Cetrek	Proprietary digital output
Sine/Cosine	
3-wire	User-selectable reference/swing voltage
4-wire (B&G)	Set reference voltage to 3.5v
Furuno	AD10S standard output

Table A-6
TracVision G6 GyroTrac Interface Specifications

Appendix B
ADCU Flush Mount Panel Template

(Scale 1:1)



Appendix C
Comprehensive TracVision G6 Wiring Diagram

The comprehensive TracVision G6 wiring diagram is unavailable in PDF format. If you require a copy of this wiring diagram, please contact KVH Technical Support at +1 401 847-3327 or via email at techs@kvh.com. A copy of the diagram can be mailed or faxed to you upon request.

Appendix D
Optional KVH Displays

Three optional displays are available for the GyroTrac; each presents true or magnetic heading in a different way (see Figure D-1). The pointer analog display has a pointer rotating against a fixed 360˚ dial. The digital display presents heading numerically; it also displays the compass calibration score when this option is selected with the Setup Configuration function. The rotating card display has a compass card rotating under a fixed lubber line. The pointer analog and digital displays have five levels of user-selectable backlighting; the rotating card display has continuously variable red or green backlighting (the color is user-selectable).

Figure D-1
Display Options

D.1 Optional Display Specifications

Pointer Analog Display

Dimensions	4.3" (110 mm) x 4.3" (110 mm) x 0.8" (20 mm)
Weight	7.5 oz (210 gm)

Digital Display

Dimensions	6.5" (165 mm) x 4.3" (110 mm) x 0.8" (20 mm)
Weight	13.4 oz (380 gm)

Card Analog Display

Dimensions	5.6" (142 mm) x 5.6" (142 mm) x 3" (76 mm)
Weight	39 oz (1110 gm)

Table D-1
Display Specifications

D.2 Mounting the Pointer Analog and Digital Displays

The pointer analog and digital displays both include a pigtail cable coming from inside the display housing. The following mounting instructions are applicable to both display types. Ensure the mounting surface is flat and free of excessive vibration. Do not mount the display housing on a rigid curved surface, as tightening down the nuts on the threaded studs may bend the housing and damage the unit. Refer to Figure D-2.

1. Using the template packed with the unit, mark the centers of the threaded studs.
2. Center-punch and drill 2 holes using a ¾-inch or 20 mm bit.
3. Feed the pigtail cable through the right hole, then insert the threaded studs.
4. Attach the lockwashers and nuts provided and tighten securely.

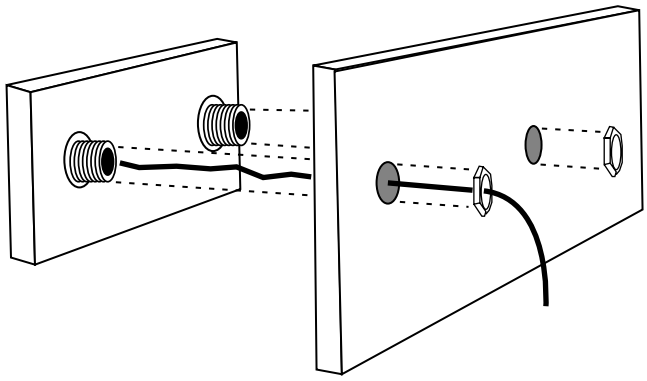


Figure D-2
Mounting the Analog/Digital Displays

D.2.1 Mounting the Display Backlighting Control

A backlighting control button is included with the pointer analog and digital display units. Figure D-3 illustrates the mounting procedure.

1. Select a location convenient to the display and drill a mounting hole using a ⅝-inch (16 mm) bit. The mounting area should be no thicker than ⅜-inch (10 mm).
2. Insert the button and secure it from the rear with the lockwasher and nut provided.

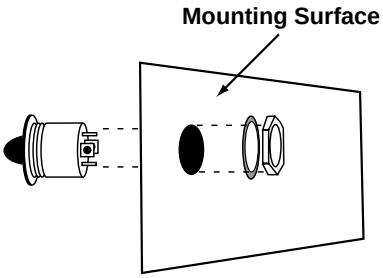


Figure D-3
Mounting the Display Backlighting Control Switch

D.2.2 Wiring the Pointer Analog and Digital Displays

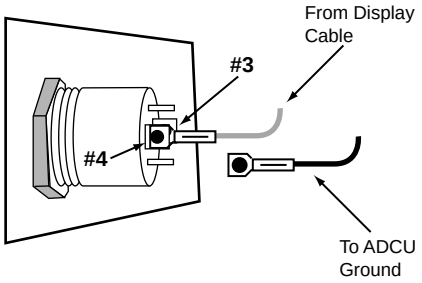
Table D-2 details the wiring designations for the pointer analog and digital displays, including the recommended ADCU terminal strip connectors.

Table D-2
Display Cable Connections

Wire Color	Signal Function	Recommended Terminal Connector
White	Lighting level	Backlight Control Button
Blue	RS-422 NMEA Data	TX1A(+) – #4
Green	RS-422 NMEA Ref	TXB(-) – #5
Red	12 Vdc positive	KVH Display Power – #3
Black	12 Vdc negative	Ground – #6
Shield/Drain	Ground	Ground – #6
Brown	Not Used	Not Connected

D.2.3 Wiring the Backlight Control Switch

Figure D-4
Wiring the Backlight Control Switch



1. Run a separate 2-conductor wire between the ADCU and the backlight control button.
2. Crimp terminal lugs to the two wires that will connect to the backlight control button.
3. Fasten the lugs to button terminals 3 and 4 (polarity does not matter) with nuts and lockwashers provided.
4. The other end of the 2-conductor wire will connect to the display cable and the ADCU as follows:
   - Splice one strand of the 2-conductor wire to the display cable's white wire.
   - Wire the other strand of the 2-conductor wire directly to the ADCU ground terminal.

D.3 Mounting the Rotating Card Display

The Rotating Card Display may be mounted either free standing on its bracket or flush with the panel. Templates for either method are found the end of this appendix. The unit should be no closer than 36" (1 m) to any magnetic compass. Before installing, remove the display unit from its stand by removing the latch knobs on either side.

D.3.1 Bracket Mounting

1. Select a site with room for the unit to rotate in its bracket. Cut out or copy Template D-1 and tape in place. Mark and drill two 1/4" (6 mm) holes as indicated. Fasten the bracket in place with the screws provided.
2. Reattach the display unit to the bracket temporarily until ready to make the power and data connections described in *Section D.3.3, "Wiring the Rotating Card Display."*

D.3.2 Panel Mounting

1. Cut out or copy Template D-2 and mark lines for the cutout area. Cut away the material inside the lines and clean up to the lines with a file. Test-fit the display unit in the cutout opening.
2. Remove the two 6 mm machine screws from the back of the display unit. Insert the display unit into the cutout; place the panel mounting bracket clamp in position behind the display unit. Reverse the 6 mm screws and reinsert into the case through the bracket clamp. Tighten the screws securely.

D.3.3 Wiring the Rotating Card Display

1. Refer to Figure D-5. To remove the backplate, undo 8 screws (a) and withdraw the backplate assembly. Separate the two pigtail plug connectors from the card assembly.

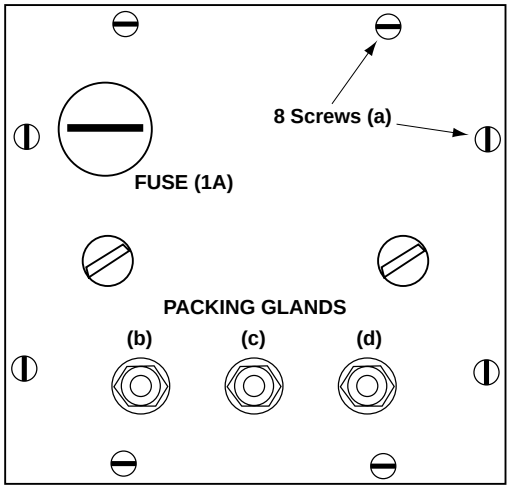


Figure D-5
Rotating Card Display – Removing the Backplate

2. Pass the power supply and data cables through their packing glands (b,c,d) from the outside and tighten the gland nuts before connecting wires.

3. Refer to Figure D-6 below; connect the power and data wires to the terminal block as listed in Table D-3.

Figure D-6
Rotating Card Display – Terminal Strip Wiring

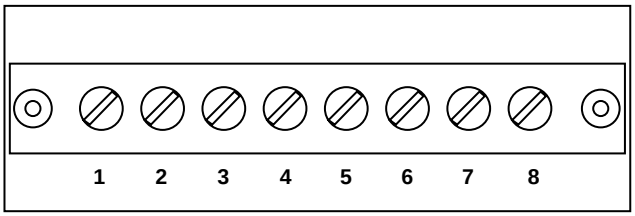
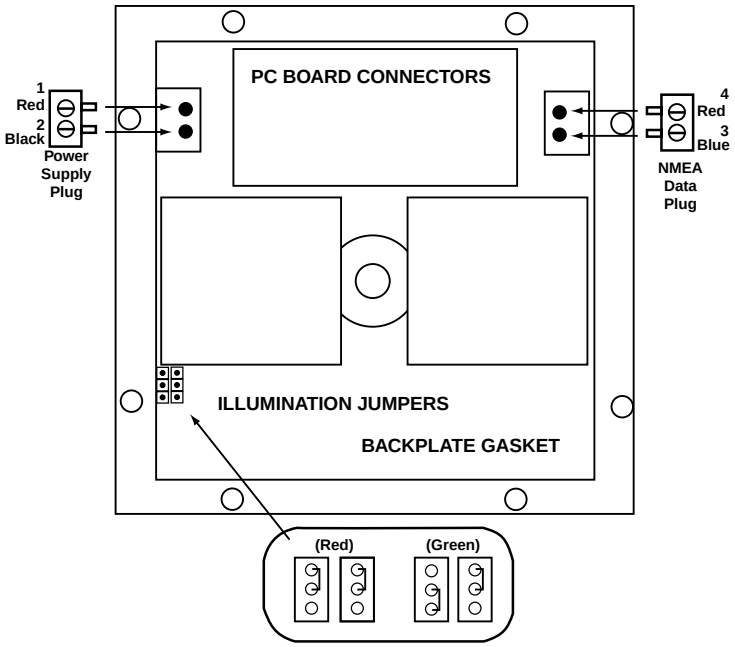


Table D-3
Rotating Card Display – Terminal Strip Wiring Details

Term. #	Function
1	Output B (linked to term. 5)
2	Output A (linked to term. 6)
3	Shield for output cable
4	Shield for input cable
5	Input B (NMEA 0183 data)
6	Input A (NMEA 0183 data)
7	11-40 Vdc NEG (-)
8	11-40 Vdc POS (+)

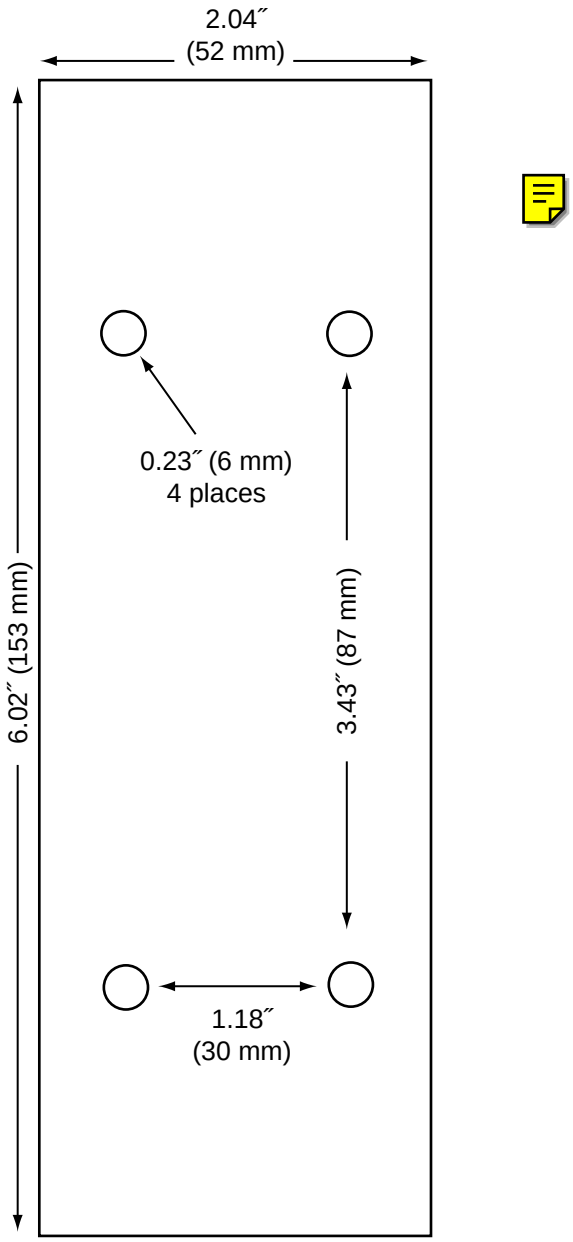
4. Set the jumpers as shown in Figure D-7 to select red or green night illumination.

Figure D-7
Rotating Card Display – PC Board Jumpers and Connectors

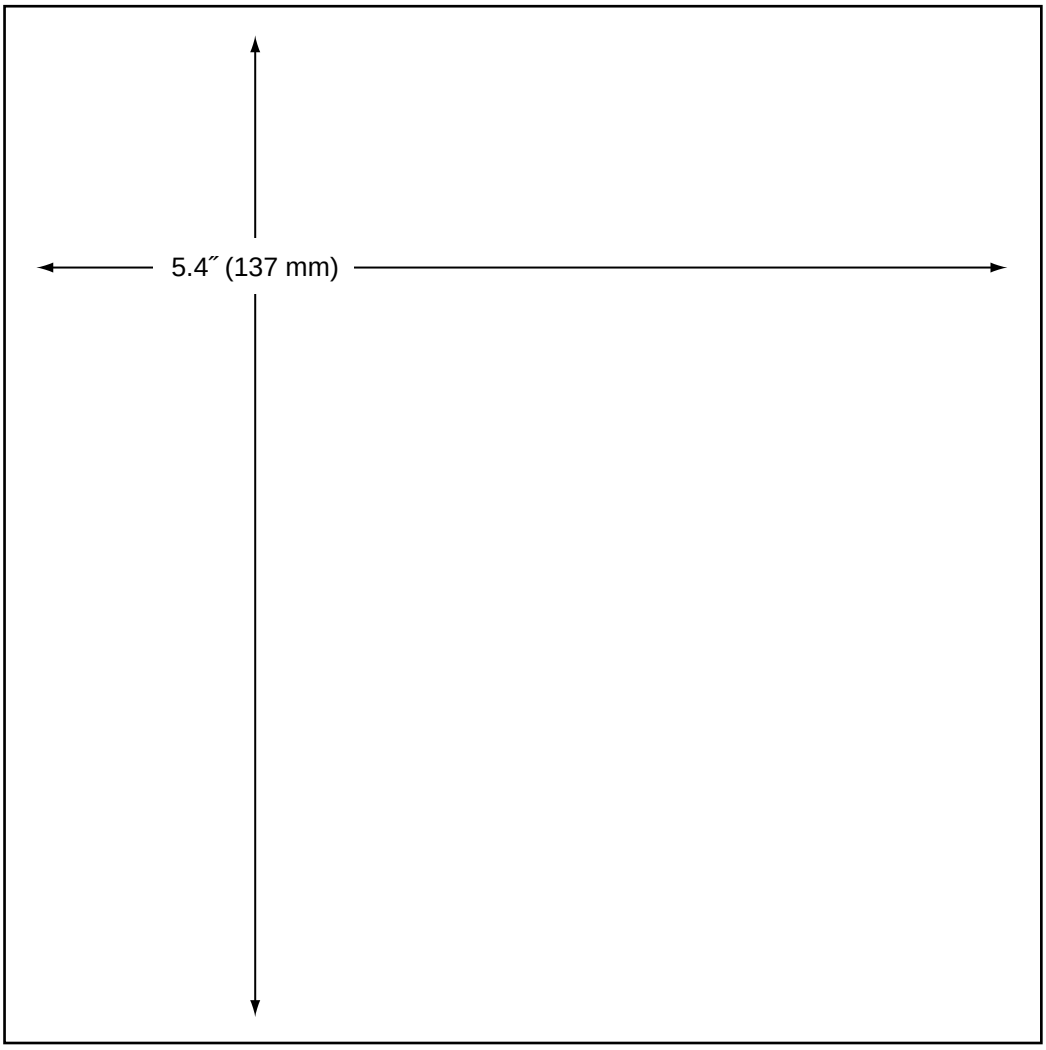


5. Check that the backplate gasket is in place; return the power and data pigtail plugs to their respective PC board connectors.
6. Arrange the internal wiring before replacing and tightening the backplate screws.

Template D-1 Rotating Card Display Bracket Mounting



Template D-2 Rotating Card Display Panel Mounting



Appendix E
Startup Data Sequences

The data on the following pages presents a sample startup data sequence registered by the TracVision G6. These sequences may vary based on the software version loaded onto the TracVision G6 system. This data can be recorded using the data port and a PC.

```
?PGM
TracVision G6 Controller Rev X - Version X.XX - Serial number XXXXXXXX
NMB Motors
RF: ZAP
*** Initializing RF Controller ***
RF: S,A,V,U,V
RF: SATINSTALL,55,C,57,C
RF: L,A-----------------------------------------Identifies Satellite A or B as currently
RF: SATCONFIG                                                loaded for acquisition
RF: F,A,12368,20000,67,0X0000,V,U,2--------------Satellite Configuration Data, Satellite A
RF: F,A,12368,20000,67,0X0000,V,U,2
RF: F,A,12238,20000,67,0X0000,H,U,2
RF: F,A,12238,20000,67,0X0000,H,U,2
RF: F,B,12374,20000,34,0X1004,V,U,3--------------Satellite Configuration Data, Satellite B
RF: F,B,12374,20000,34,0X1004,V,U,3
RF: F,B,12381,20000,34,0X1004,H,U,3
RF: F,B,12381,20000,34,0X1004,H,U,3
RF: RF PCB Version X.X ---------------------------Current RF software revision
RF: I,0,50524,00000,00196,0
RF COMM: PASS-------------------------------------PASS is expected
Limit Switch Test
Limit Switch Status: PASS------------------------PASS is expected
*** Initializing Ext Sensor ***
RF: S,A,V,U,V
ˌ=h,0ˌSˌ=h,1RF: S,A,H,U,V
RF: S,A,V,U,V
ES Status = @@
ˌ=h,0ˌ5ˌ=h,1ES Cal Score = 981--------------------Confirmed data from external sensor
RF: S,A,H,U,V
EXT SENSOR: PASS
*** Initializing Antenna ***
*** NO GPS-Default Used ***
GPS: UTC: 083000.00, Lat: 4131.00N, Long:  7115.00W----GPS data from NMEA port
GPS: DSS_119 AZ = 238.9, EL = 22.1----------------Calculated satellite position based on GPS
GPS: DSS_101 AZ = 220.9, EL = 33.4
*** Initializing Rate Bias ***
RF: S,A,V,U,V
```

```
A/D: 1563 1986 378
RF: Freeze DAC = +00840
RF: S,A,H,U,V
A/D: 1974 1996 1288
A/D: 2030 1997 437
RF: S,A,V,U,V
A/D: 2055 1959 434
Gyro Bias: Az = 2037.91, El = 2003.05---------Expected range is 1700-2300
Gyro Uncertainty: Az =    3.00, El =    3.00
*** Entering Search Mode 1 ***
RATE BIAS: PASS--------------------------------PASS is expected
Searching for DSS_101, Threshold = 1000
RF: S,A,H,U,V
+POS: 153.5  33.8  587
RF: S,A,V,U,V
+POS:  53.1  33.8  430
RF: S,A,H,U,V
+POS:  45.4  33.6  252
RF: S,A,H,U,V
Satellite Found: AZ = 201.2, EL =  33.4, RF = 1336
Antenna Pos: AZ = 146.66, EL =  33.28, RF = 1336
RF: Freeze DAC = +00613
*** Entering Tracking ***
RF: S,A,V,U,V
+POS: 152.8  33.3 1345
+POS: 146.7  32.2 2163
+POS: 146.3  31.3 3370
RF: S,A,V,U,V
RF: Freeze DAC = -00541
+POS: 145.3  30.5 2581
RF: S,A,V,U,V
+POS: 144.8  30.1 2057
*** Network ID Check *** ----------------------Comparing the tracked satellite's network ID to
+POS: 144.3  30.6 2180                           the selected satellite's network ID
+POS: 144.9  30.0 2117
RF: Y,0X0000-----------------------------------Indicates positive satellite identification
*** Tracking DSS_101 *** ----------------------Identifies satellite currently tracked
Saved Sat Pos: AZ =  203.2, EL =  30.8            (TV broadcast image should be available)
˛=h,0˛5˛=h,1ES Cal Score = 981
+POS: 144.5  30.9 2243
+POS: 144.8  30.0 2200
+POS: 144.7  30.9 2280
RF: S,A,V,U,V
+POS: 144.4  30.0 2264
+POS: 144.8  30.9 2343
Saved Sat Pos: AZ =  204.1, EL =  30.3
+POS: 144.3  30.2 2342
```

Appendix F
Data Outputs

The GyroTrac transmits up to five selectable message types simultaneously to external navigation devices connected to the User Interface. One output port is dedicated to the sine/cosine signal format, one is dedicated to the Furuno AD10S signal format, and three separate serial ports allow outputs of NMEA 0183, KVH RS-422, and Cetrek proprietary signal formats. Each of these message formats is described below. Step-by-step instructions for selecting desired message outputs is given in *Section 3, "Interface Configuration and Operation."*

F.1 Sine/Cosine Output

Refer to Section 2.4.5, "Wiring the GyroTrac Sine/Cosine Interface," *for complete instructions on properly configuring GyroTrac and other navigational systems to use the sine/cosine output.*

GyroTrac may be configured to provide either 3-wire or 4-wire sine/cosine output, but not both. Sine/cosine output message options are magnetic or true heading and a combination of reference and swing voltages used to denote the heading value. The reference and swing voltages are set through the ADCU to suit the requirements of the device using the data. Default reference and swing voltages (as shipped) are 5.0 volts. The allowable range for reference and swing voltages is 0 to 6.5 volts in 0.01 volt increments. The sine/cosine output is commonly used in ComNav, Robertson, and other autopilots.

The maximum current that can be drawn from the sine/cosine output is 10 mA.

B&G 4-wire Sine/Cosine

The B&G 4-wire sine/cosine output (also known as "differential sine/cosine") is a substitution of the Halcyon® compass. The reference voltage should be set at 3.5V.

F.2 Serial Port Outputs

Serial ports #1 and #2 may be individually programmed to output any of the message formats described below. Up to eight NMEA 0183 listening devices can be connected to each of the serial ports. Serial Port #1 also has a pass-through duplicate port. The NMEA message format conforms to NMEA 0183 version 2.20 standard for message structure. The KVH message format is an RS-422 message format giving stabilized pitch, roll and yaw data. Data output from Port 1 will be at 4800 baud while

data from Ports 2 and 3 will be at 9600 baud; this message may be used in any device capable of receiving this data rate. The Cetrek proprietary message format is a stabilized heading output for use with Cetrek autopilots. Each serial port can be independently programmed to output data at a rate of 1 Hz to 20 Hz, selectable in 1 Hz increments. The default data rate is 10 Hz.

Table F-1 *NMEA1 Magnetic Heading Output*

NMEA1 Magnetic Heading (HDM)

Communication:	4800 baud, 1 start bit, 8 data bits, 1 stop bit, no parity	
Update rate:	Selectable at 1 to 20 Hz (10 Hz default)	
Sentence type:	$HCHDM,XXX.X,M,* hh <CR> <LF>	
Sentence breakdown:	HCHDM	NMEA talker and sentence ID
	XXX.X	Stabilized magnetic heading in degrees and tenths
	M	Magnetic heading, ASCII hex 0x4D
	*	ASCII hex 0x2A
	hh	Checksum
	CR	Carriage return, ASCII hex 0x0D
	LF	Line feed, ASCII hex 0x0A

Table F-2 *NMEA2 Magnetic Heading Output*

NMEA2 Magnetic Heading (HDG)

Communication:	4800 baud, 1 start bit, 8 data bits, 1 stop bit, no parity	
Update rate:	Selectable at 1 to 20 Hz (10 Hz default)	
Sentence type:	$HCHDG,XXX.X, *hh <CR> <LF>	
Sentence breakdown:	HCHDG	NMEA talker and sentence ID
	XXX.X	Stabilized magnetic heading in degrees and tenths
	*	ASCII hex 0x2A
	hh	Checksum
	CR	Carriage return, ASCII hex 0x0D
	LF	Line feed, ASCII hex 0x0A

NMEA3 True Heading (HDT)

Communication:	4800 baud, 1 start bit, 8 data bits, 1 stop bit, no parity	
Update rate:	Selectable at 1 to 20 Hz (10 Hz default)	
Sentence type:	$HCHDT,XXX.X,T *hh <CR> <LF>	
Sentence breakdown:	HCHDT	NMEA talker and sentence ID
	XXX.X	Stabilized true heading in degrees and tenths
	T	True heading, ASCII hex 0x54
	*	ASCII hex 0x2A
	hh	Checksum
	CR	Carriage return, ASCII hex 0x0D
	LF	Line feed, ASCII hex 0x0A

Table F-3
NMEA3 True Heading Output

True Heading is only available when GPS data input is received by the ADCU. Section 2.4.6, “True North Capability,” *provides complete details.*

KVH Format Special Output Sentence (Set at Factory Only)

Communication:	9600 baud, 1 start bit, 8 data bits, 1 stop bit, no parity	
Update rate:	Selectable at 1 to 20 Hz (10 Hz default)	
Sentence type:	%AAAA,BBBB,CCCC <CR> <LF>	
Sentence breakdown:	%	Sentence identifier
	AAAA	Stabilized pitch attitude in tenths of degrees
	BBBB	Stabilized roll attitude in tenths of degrees
	CCCC	Stabilized magnetic azimuth in tenths of degrees
	CR	Carriage return, ASCII hex 0x0D
	LF	Line feed, ASCII hex 0x0A

Table F-4
KVH Output

Table F-5
Cetrek Output

Cetrek Output Sentence

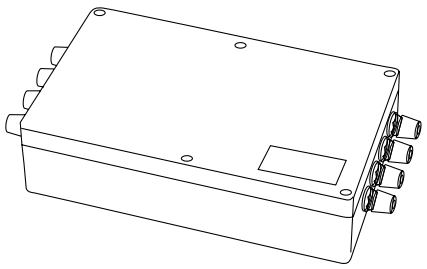
Communication:	4800 baud, 1 start bit, 8 data bits, 1 stop bit, no parity	
Update rate:	Selectable at 1 to 20 Hz (10 Hz default)	
Sentence type:	$$MSB LSB B C Status D <CR> <LF>	
Sentence breakdown:	MSB LSB	Binary value 0 to 1023, equal to 0.0 to 359.6 degrees stabilized magnetic heading
	B	ASCII hex 0x00
	C	ASCII hex 0x00
	Status	ASCII hex 0x43
	D	ASCII hex 0xAA
	CR	Carriage return, ASCII hex 0x0D
	LF	Line feed, ASCII hex 0x0A

F.3 Furuno Output

The Furuno output is a proprietary message format typically used with Furuno and other brands of radars and autopilots. Two user-configurable options are available: true or magnetic heading and 25 millisecond (40 Hz) or 200 millisecond (5 Hz) data rate. The default rate is 200 millisecond/5 Hz.

F.3.1 Optional Stepper Components

Figure F-1
Stepper Interface



An optional interface unit is available to generate a stepper output. The stepper interface uses an NMEA HDM or HDT serial message input to generate the stepper signal format.
The stepper signal replaces traditional gyro outputs used with satellite communication systems, autopilots, and steering displays. The Stepper Interface unit is shown in Figure F-1 while the specifications are presented in Table F-6.

Please refer to the Stepper Interface User Manual for specific wiring instructions.

Stepper Interface

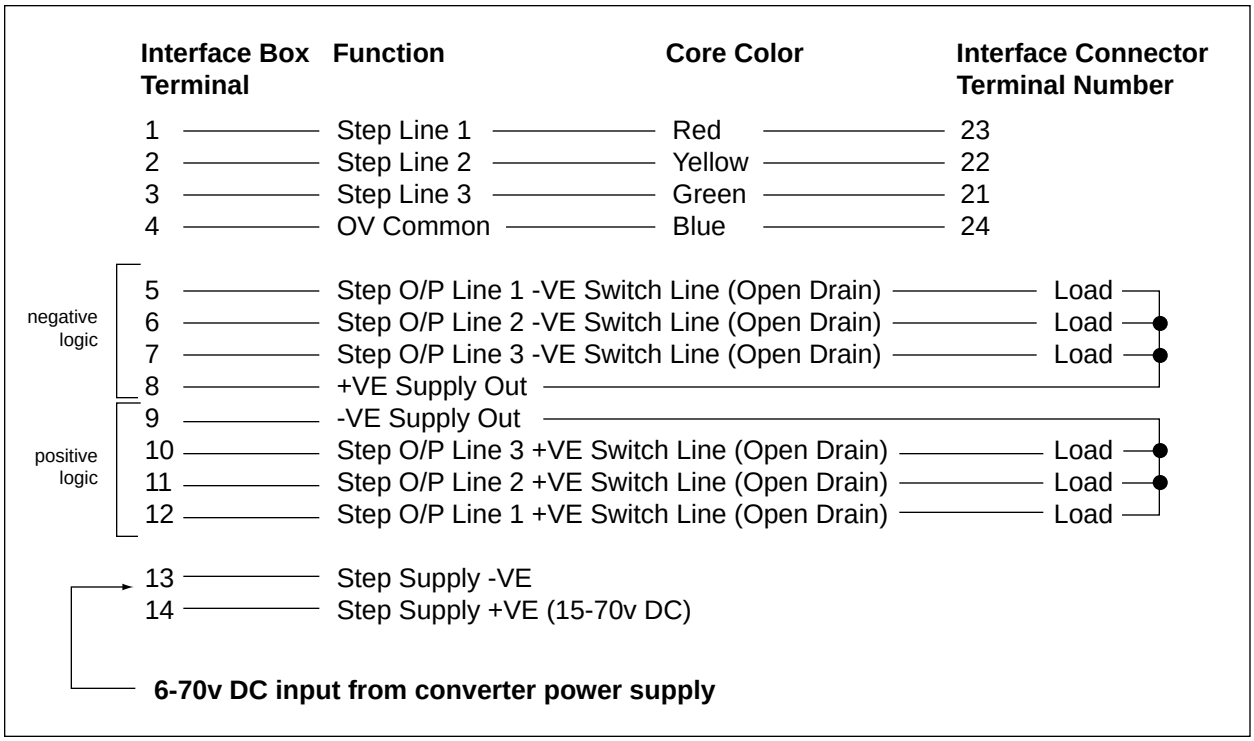
Dimensions	10.5" (267 mm) x 5.8" (147 mm) x 2.3" (58 mm)
Weight	13 oz (370 gm)
Input	NMEA 0183
Stepper Output	3, 6, 12, 24 steps/degree
Output Voltage	5v standard (30-70v option also available: Part Number 19-0089)

Table F-6
Stepper Interface Specifications

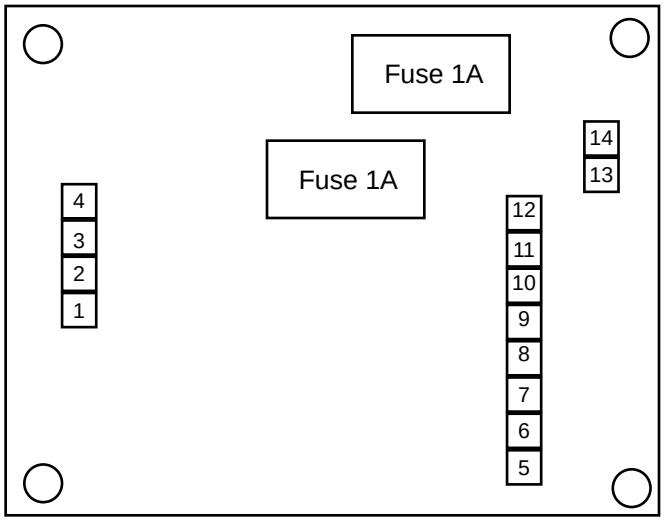
Stepper Voltage Converter

A Stepper Voltage Converter (KVH Part Number 19-0089) is needed when the receiving stepper device employs a reference voltage greater than the 5 volt maximum available from the Stepper Interface. The converter is wired directly between the Stepper Interface output and the receiving equipment to provide the necessary reference voltage. An external 6-70v DC power supply is required to provide the necessary voltage to this device. Figure F-2 on the following page shows the Stepper Voltage wiring connections and wiring diagram.

Figure F-2
Optional 6-70v Stepper Voltage Converter Wiring Diagram



The step supply is internally fused at 1 amp. Step output lines are opto-isolated from step input lines.



Appendix G
Maintenance Port Parser Commands

TracVision G6 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. For other commands the response is specific for each command, such as **VERSION**, **STATUS** or **HELP**.

G.1 System Commands

Table G-1
System Commands

Software Version

Function:	reports software version and system type
Command:	**VERSION**
Argument:	none
Response:	KVH TVG6 Rev X - Version X.XX - XXX Motors

System Status Report

Function:	reports general system status
Command:	**STATUS**
Argument:	none
Response:	system status string

Initialize/Restart the System

Function:	initializes the system (perform a soft reset)
Command:	**ZAP**
Argument:	none
Response:	echoes the command, then reinitializes the system

Help on Parser Commands

Function:	lists parser commands
Command:	**HELP**
Argument:	none
Response:	print a list of all parser commands

Calculate Skew Angle

Function:	report skew angle of the current satellite
Command:	**SKEWANGLE**
Argument:	none
Response:	SKEW ANGLE = XXXX.X

G.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 G-2
Manual Positioning Commands

Azimuth Angle

Function:	commands a manual azimuth angle that the mechanism moves to
Command:	**AZ,xxxx** (range is 0000-3599)
Argument:	desired azimuth angle of the mechanism relative to external magnetic reference, or baseplate fwd, 000°-359.9°
Response:	echoes the command; mechanism moves at a fixed velocity

Elevation Angle

Function:	commands a manual elevation angle that the mechanism moves to
Command:	**EL,xxx** (range is 100-850)
Argument:	desired elevation angle of the mechanism relative to up, or external sensor attitude reference, 10.0°-85.0°
Response:	echoes the command; mechanism moves at a fixed velocity

Azimuth CW Step

Function:	commands a 0.1 deg CW manual step in azimuth angle
Command:	**6**
Argument:	none
Response:	echoes the command

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

G.3 Operational Commands

Tracking Mode

Function:	starts active tracking of the satellite
Command:	**TRACK**
Argument:	none
Response:	echoes the command

Table G-3
Operational Commands

Idle Mode

Function:	halts active tracking and conical scan, then enters idle mode
Command:	**HALT**
Argument:	none
Response:	echoes the command

Current Cable Wrap Angle

Function:	sets or reports current cable wrap angle, defined as 0° (CCW limit) to 700° (CW limit); the value is expressed as 0000-7000 with an implied decimal
Command:	**WRAPANGLE,xxxx**
Argument:	the desired cable wrap angle setting
Response:	Wrap Angle = xxxx

G.4 Tracking and Conical Scan Commands

Table G-4
Tracking and Conical Scan Commands

Target Location

Function:	reports the target location in antenna frame. Data format is E### for elevation in degrees 000-900 and A#### for azimuth in degrees 0000-3599 with implied decimals
Command:	**TGTLOCATION**
Argument:	none
Response:	Target Location= A = E###, A#### B = E###, A####

Analog Signal Strength Report

Function:	reports signal strength from RF detector circuit in A/D counts (000-FFF Hex)
Command:	**SIGLEVEL**
Argument:	none
Response:	Signal Strength = xxxx

G.5 Sensor Module Commands

Table G-5
Sensor Module Commands

Report Platform Attitude

Function:	reports vessel attitude indicated by sensor module
Command:	**ATTITUDE**
Argument:	none
Response:	Pitch +/-pp.p, Roll +/-rr.r, Yaw yyy.y

Compass Calibration Score

Function:	reports compass calibration score
Command:	**CALSCORE**
Argument:	none
Response:	Cal Score = xxx

Compass Calibration Enable

Function:	enables the sensor module compass calibration
Command:	**CALON**
Argument:	none
Response:	echoes the command

Compass Calibration Disable

Function:	disables the sensor module compass calibration
Command:	**CALOFF**
Argument:	none
Response:	echoes the command

G.6 RF Board Commands

Table G-6
RF Board Commands

Serial Communications, Status/Polarization Report, Tone Changes

Function:	start serial communications, reports status & polarization/tone changes
Command:	**@S**
Response:	S,s,p,b,m <cr> every 5 seconds until ><cr>is returned from system software
Where:	s = Satellite (a = Primary, b = Secondary) p = Polarization (v = Vertical, h = Horizontal, x = No LNB Power) b = Band (h = High Band, l = Low band, g = Latin America, u = USA) m = Mode (v = Valid, i = Invalid)*

* The Mode bit is used to evaluate the Satellite, Polarization & Band combination vs. the Frequency/Symbol Rate/FEC currently in RAM. This bit will be set to invalid if the Frequency for the selected combination is set to 0x0000; otherwise it will be set to valid. For example the Mode bit will be set to invalid when the frequency is set to 00000 to indicate that there is not a frequency to track for the LNB tone and voltage setting.

Report RF Tracking Parameters

Function:	reports all RF tracking parameters for primary & secondary satellites*
Command:	**@SATCONFIG**
Response:	F,x,fffff,S,C,ID,P,B,D <cr>
Where:	x = Satellite (a = Primary, b = Secondary) fffff = Frequency in MHz (00000 and 10700 to 12700) S = Symbol rate in Mbit/Sec (1000 to 29999) C = FEC code rate (valid rates = 12, 23, 34, 56, 67, 78) ID = Satellite Network ID in hexidecimal format (valid range = 0x0000 to 0xffff hex) P = LNB Polarization (v = Vertical, h = Horizontal) B = the LNB down conversion frequency (l=low, h=high, G=Latin America, U=USA) D = decoding type (0=test, 1=DSS-A, 2=DSS-B, 3=DVB)

* This command dumps all eight combinations of the Satellite/Freq/Sym/FEC/ID/POL/Band/Decode currently stored in RAM.

Set RF Tracking Parameters

Function:	sets RF tracking parameter
Command:	**@SATCONFIG,X,N,F,S,C,ID,P,B,D<cr>**
Response:	Echoes the input data
Where:	@SATCONFIG = directs data to the RF Board X = satellite location A or B N = satellite table # (98 & 99 are slots for user-configured satellites) F = frequency in MHz (either 00000 or a range from 10700 - 12700) S = the satellite transponder symbol rate in Mbit/second (01000 - 29999) C = the FEC code (e.g., 12, 23, 34, 56, 67, 78) ID = the satellite network ID in hexidecimal format (0x####) P = the LNB polarization (v=vertical, h=horizontal) B = the LNB down conversion frequency (l=low, h=high, G=Latin America, U=USA) D = decoding type (0=test, 1=DSS-A, 2=DSS-B, 3=DVB)

ID Match/Decoded Network ID

Function:	report ID match and decoded network ID
Command:	**@CHECKID**
Response:	Y,0X#### N,0X#### Y,NoID N,NoID
Where:	Y = yes N = no 0X#### = network ID NoID = satellite unidentified

G.7 Installation Commands

Table G-7
Installation Commands

Set/Report GPS Position

Function:	reports or sets default GPS position
Command:	**GPS<cr>** **GPS,XX,D,YYY,E**
Response:	GPS = XXD YYYE<cr> GPS: XXD YYYE
Where:	XX = latitude (0-90) D = S (South) or N (North) YYY = longitude (0-180) E = E (East) or W (West)

Report Satellite Names

Function:	report names for satellites A and B
Command:	**SATINSTALL**
Response:	SATINSTALL,<sat_a_name>,<sat_b_name>

Report Configured Satellite Names

Function:	report names for all configured satellites
Command:	**SATLISTA**
Response:	SATLISTA,<sat_name1>,...,<sat_nameX>

Report Valid Satellite B Selections

Function:	report names for all valid satellite B selections for a given satellite A selection
Command:	**SATLISTB,<sat_a_name>**
Response:	SATLISTB,<sat_a_name>,<sat_b_name1> ...,<sat_b_nameX>

Install Satellite Pair

Function:	installs satellites A and B as the satellite pair
Command:	**SATINSTALL,<sat_a_name>,<sat_b_name>**
Response:	If valid pair, echoes the input data If invalid pair, returns error message

Configure Longitude of a User-configurable Satellite

Function:	configures one of the user-configurable satellites with the longitude provided
Command:	**SATCONFIG,USERX,YYY,Z,D,L**
Response:	If valid pair, echoes the input data If invalid pair, returns error message
Where:	X = 1 or 2 YYY = longitude (0-180) Z = E (East) or W (West) D = decoding type (0=test, 1=DSS-A, 2=DSS-B, 3=DVB) L = LNB polarization (C=circular, L=linear)

G.8 Debug Commands

Report Offset Angles

Function:	reports system offset angles
Command:	**OFFSETS** **OFFSETS,XXXXX,YYYY**
Response:	Offsets= XXXXX.X XXXXX.X
Where:	X = new azimuth offset (-1800 - 1800) Y = new elevation angle (-450 - 450)

Table G-8
Debug Commands

Apply Default Values to Default Satellites

Function:	updates the default satellites to the default values
Command:	**SATPAIR,X**
Response:	displays numerous frequency commands and reports “Satellite Installation Complete”
Where:	X = 0 (satellites default to Astra & Hotbird) or X = 1 (satellites default to Expressvu and EchoStar 119) or X = 2 (satellites default to DSS_101 and DSS_119) or X = 3 (satellites default to Galaxy West and None)

Report Last Satellite Tracked/Update Value

Function:	reports the last satellite tracked or updates the last tracked satellite to the value input if it is different from the current value
Command:	**LASTSAT** **LASTSAT,X**
Response:	Last = <sat_name>
Where:	X = A (updates to satellite A) or X = B (updates to satellite B)

Appendix H
Predefined Satellite Configurations

As noted previously, your TracVision G6 comes programmed with the satellite configurations for seven European, seven North American, and one Latin American satellite services. For your reference, those configurations are listed below. These configurations are current as of February 14,2001, and are subject to change by the satellite service providers.

Satellite	F,S,C,ID,P,B,D
Astra 1	11778,27500,34,0x0020,V,H,3 11742,27500,34,0x0020,V,L,3 12344,27500,34,0x0035,H,H,3 11876,27500,34,0x0020,H,L,3
Astra 2N	11778,27500,23,0x0020,V,H,3 00000,27500,34,0x0000,V,L,3 11914,27500,23,0x0020,H,H,3 00000,27500,34,0x0000,H,L,3
Astra 2S	11817,27500,23,0x0020,V,H,3 00000,27500,34,0x0000,V,L,3 11798,27500,23,0x0020,H,H,3 00000,27500,34,0x0000,H,L,3
Hispasat	12152,27500,34,0x0031,V,H,3 11660,27500,34,0x0031,V,L,3 12154,27500,34,0x0031,H,H,3 11522,27500,34,0x0031,H,L,3
Hotbird WB	12673,27500,34,0x013E,V,H,3 11464,27500,34,0x013E,V,L,3 12654,27500,34,0x013E,H,H,3 11642,27500,34,0x013E,H,L,3
Sirius	12130,27500,34,0x03E8,V,H,3 00000,27500,34,0x0000,V,L,3 12108,27500,34,0x0001,H,H,3 00000,27500,34,0x0000,H,L,3
Thor	12226,28000,78,0x0046,V,H,3 11309,24500,78,0x0046,V,L,3 12322,27800,34,0x0046,H,H,3 11229,24500,78,0x0046,H,L,3

Configuration Definitions

F = Frequency

S = Transponder symbol rate

C = FEC code

ID = Satellite network ID

P = LNB polarization (vertical or horizontal)

B = LNB band (high or low band)

D = Decoding type (3 = DVB)

North American Satellites

Satellite	F,S,C,ID,P,B,D
ExpressVu	12603,20000,56,0X0100,V,U,3 12603,20000,56,0X0100,V,U,3 12384,20000,56,0X0100,H,U,3 12384,20000,56,0X0100,H,U,3
Echostar 61	12577,20000,34,0X1002,V,U,3 12577,20000,34,0X1002,V,U,3 12358,20000,34,0X1002,H,U,3 12358,20000,34,0X1002,H,U,3
Echostar 110	12456,20000,34,0X1006,V,U,3 12456,20000,34,0X1006,V,U,3 12383,20000,34,0X1006,H,U,3 12383,20000,34,0X1006,H,U,3
Echostar 119	12374,20000,34,0X1004,V,U,3 12374,20000,34,0X1004,V,U,3 12381,20000,34,0X1004,H,U,3 12381,20000,34,0X1004,H,U,3
Echostar 148	00000,20000,34,0X1004,V,H,3 00000,20000,34,0X1004,V,U,3 00000,20000,34,0X1004,H,H,3 00000,20000,34,0X1004,H,U,3
DIRECTV 101	12368,20000,67,0X0000,V,U,2 12368,20000,67,0X0000,V,U,2 12238,20000,67,0X0000,H,U,2 12238,20000,67,0X0000,H,U,2
DIRECTV 119	12374,20000,34,0X1004,V,U,3 12374,20000,34,0X1004,V,U,3 12381,20000,34,0X1004,H,U,3 12381,20000,34,0X1004,H,U,3

Latin American Satellites

Satellite	F,S,C,ID,P,B,D
Galaxy 8I West	11685,20000,23,0X0001,V,G,1 11685,20000,23,0X0001,V,G,1 11685,20000,23,0X0001,H,G,1 11685,20000,23,0X0001,H,G,1
Galaxy 8I East	11924,20000,23,0X0001,V,G,1 11924,20000,23,0X0001,V,G,1 11924,20000,23,0X0001,H,G,1 11924,20000,23,0X0001,H,G,1

KVH Industries Limited Warranty
TracVision G6

Limited Warranty on Hardware

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.

If you discover a defect, KVH will, at its option, repair, replace or refund the purchase price of the product at no charge to you, provided you return it during the warranty period, transportation charges prepaid, to the factory direct. Please attach your name, address, telephone number, a description of the problem and a copy of the bill of sale or sales receipt as proof of date of original retail purchase, to each product returned to warranty service. Alternatively, you may bring the product to an Authorized KVH dealer/distributor for repair. If the product was installed by an Authorized KVH dealer/distributor (identified with the KVH Authorized dealer/distributor list), KVH will cover the dealer's/distributor's labor charges for warranty repairs, provided the dealer/distributor contacts KVH for pre-approval of the charges.

This Limited Warranty does not apply if the product has been damaged by accident, abuse, misuse or misapplication or has been modified without the written permission of KVH; if any KVH serial number has been removed or defaced; or if any factory-sealed part of the system has been opened without authorization.

Return Authorization

A Return Material Authorization is required prior to returning the product to KVH Industries. Please call our Technical Support Department at +1 401 847-3327 or send an e-mail to techs@kvh.com to obtain the RMA number. Write the number in large, clear characters on the outside of the box. To avoid confusion and misunderstandings, shipments without an RMA number clearly visible on the outside box will be refused and returned to you at your expense. If possible, use the original box and packing material to protect the equipment from damage in shipment. KVH assumes no responsibility for warranty shipments from the customer to the factory if not shipped in the manner prescribed above.

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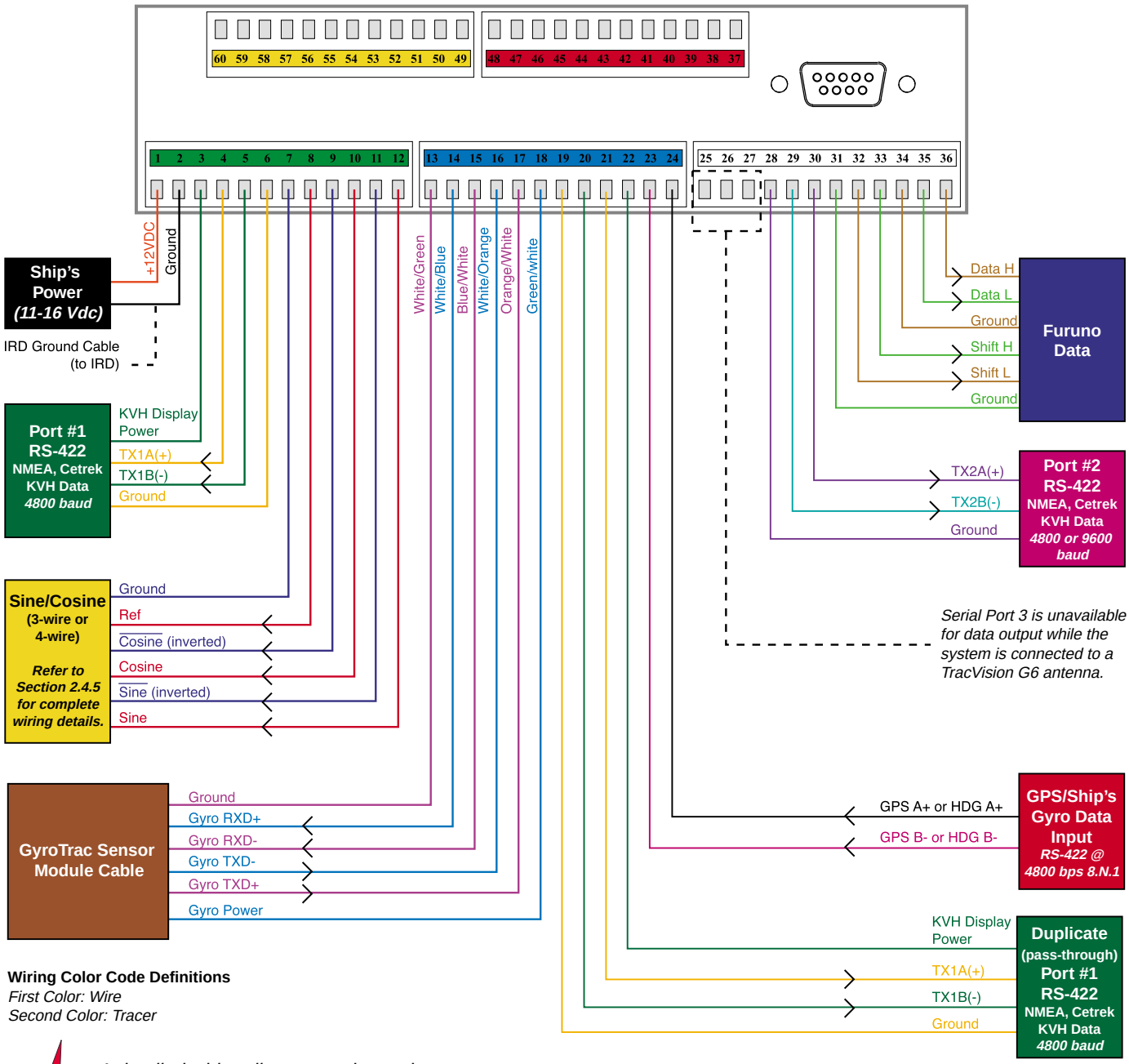
If any implied warranty, including implied warranties of merchantability and fitness for a particular purpose, cannot be excluded under applicable law, then such implied warranty shall be limited in duration to ONE (1) YEAR from the date of the original retail purchase of this product by the original purchaser.

Some states/countries do not allow the exclusion or limitation of implied warranties or liability for incidental or consequential damages, so the above limitations may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state/country to state/country.

GyroTrac Wiring Quick Reference Guide



Wiring Color Code Definitions
First Color: Wire
Second Color: Tracer

A detailed wiring diagram and complete instructions have been provided in Section 2.4, "Wiring the TracVision G6 System Components."

TVG6 T/M Back Cover Rev. C

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