

NB

## STV Gen2 Satellite Television Systems

Installation and operation

37, 45 and 60STV Gen2 models

# Raymarine®

SVB

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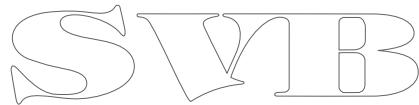
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**ENGLISH**

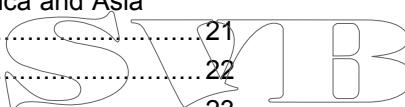
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# Chapter 1: Introduction

## Safety notices



### Warning: Product installation and operation

This product must be installed and operated in accordance with the instructions provided. Failure to do so could result in personal injury, damage to your boat and/or poor product performance.

### Caution: Power supply protection

When installing this product ensure the power source is adequately protected by means of a suitably-rated fuse or automatic circuit breaker.

### Caution: Use correct lifting point

When lifting the antenna unit, always lift from the base plate. Do NOT use the antenna cover or damage to the cover could occur.

### Caution: Do not damage connectors

Take care to avoid damage to the connectors underneath the antenna base plate when moving the unit. Do NOT use these connectors to lift the unit.

### Caution: Remove transit packing

Before installing or operating the product, open the antenna unit cover and remove the foam transit packing inserts from the unit base.

### Caution: Antenna coating

Do NOT paint or apply any other finish to the antenna unit. This could degrade performance beyond acceptable limits.

## Important information

### Handbook information

Your STV system provides television access to hundreds of TV channels. On the open sea or at the dock, the Raymarine Satellite TV system automatically identifies, acquires and tracks compatible signals from all digital video broadcast (DVB) satellites.



This handbook describes how to install, connect and maintain the Raymarine Satellite Television (STV) system . It is used with the following models:

- 37STV Gen2
- 45STV Gen2
- 60STV Gen2

These models are supplied in variants appropriate to your region.

Please carefully read and follow the installation, operating and maintenance procedures, to ensure optimum performance.

## Geographic location

Your STV system will operate in various geographic regions, dependant upon the type of satellite signal available.

Broadly speaking different regions around the globe use either circular or linear polarization for DVB satellite broadcasts. Each STV unit is configured to receive either Linear or Circular polarized signals.

Some examples of regions using circular and linear polarization are below.

### Circular polarization:

- North America

### Linear polarization:

- Europe
- Australia
- New Zealand
- China
- Middle East

For further assistance please refer to your regional satellite service providers or Raymarine technical support.

### Changing location

If you change your area of operation, you may need to arrange for modification to your STV system:

- Adjust the antenna low noise block (LNB) as appropriate for the area in which you are operating.
- Update the region information using your control unit (ACU) or a PC running the GUI software.
- Ensure that your satellite receivers (IRDs) will operate and receive DVB broadcasts at your new location.

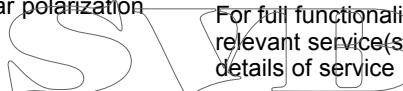
**Important:** Please refer all servicing / component replacement to authorized Raymarine agents.

### Satellite coverage

Up to date coverage maps and satellite information may be found on the appropriate website of your satellite service provider.

## Television reception

For full functionality of your STV System, you must subscribe to the relevant service(s) from the appropriate service provider(s). Full details of service providers are given.



## EMC installation guidelines

Raymarine equipment and accessories conform to the appropriate Electromagnetic Compatibility (EMC) regulations, to minimize electromagnetic interference between equipment and minimize the effect such interference could have on the performance of your system

Correct installation is required to ensure that EMC performance is not compromised.

For **optimum** EMC performance we recommend that wherever possible:

- Raymarine equipment and cables connected to it are:
  - At least 1 m (3 ft) from any equipment transmitting or cables carrying radio signals e.g. VHF radios, cables and antennas.

In the case of SSB radios, the distance should be increased to 7 ft (2 m).

- More than 2 m (7 ft) from the path of a radar beam. A radar beam can normally be assumed to spread 20 degrees above and below the radiating element.
- The product is supplied from a separate battery from that used for engine start. This is important to prevent erratic behavior and data loss which can occur if the engine start does not have a separate battery.
- Raymarine specified cables are used.
- Cables are not cut or extended, unless doing so is detailed in the installation manual.

**Note: Where constraints on the installation prevent any of the above recommendations**, always ensure the maximum possible separation between different items of electrical equipment, to provide the best conditions for EMC performance throughout the installation

### Suppression ferrites

Raymarine cables may be fitted with suppression ferrites. These are important for correct EMC performance. If a ferrite has to be removed for any purpose (e.g. installation or maintenance), it must be replaced in the original position before the product is used.

Use only ferrites of the correct type, supplied by Raymarine authorized dealers.

### Connections to other equipment

Requirement for ferrites on non-Raymarine cables

If your Raymarine equipment is to be connected to other equipment using a cable not supplied by Raymarine, a suppression ferrite MUST always be attached to the cable near the Raymarine unit.

## Declaration of conformity

This product conforms with EU Directive 2004/108/EC and is labelled with the CE conformity mark.

## Product disposal

Dispose of this product in accordance with the WEEE Directive.



The Waste Electrical and Electronic Equipment (WEEE) Directive requires the recycling of waste electrical and electronic equipment. Whilst the WEEE Directive does not apply to some Raymarine products, we support its policy and ask you to be aware of how to dispose of this product.

## Warranty registration

To register your STV Satellite television system ownership, please take a few minutes to fill out the warranty registration card found in the box, or visit [www.raymarine.com](http://www.raymarine.com) and register on-line.

It is important that you register your product to receive full warranty benefits. Your unit package includes a bar code label indicating the serial number of the unit. You should stick this label to the warranty registration card.

## Technical accuracy

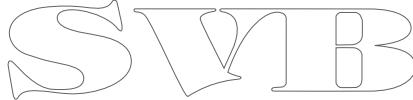
To the best of our knowledge, the information in this document was correct at the time it was produced. However, Raymarine cannot accept liability for any inaccuracies or omissions it may contain. In addition, our policy of continuous product improvement may change specifications without notice. As a result, Raymarine cannot accept liability for any differences between the product and this document.

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# Chapter 2: Installation

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## 2.1 Planning

### Parts supplied

Antenna Unit

Antenna Control Unit (ACU)

Installation Kit:

- Bolts
- Flat washers
- Spring washers
- Self tapping screws

Cables:

- 10 m Power cable - used for connecting the ACU to the DC power supply.
- 3 m RF cable - used for connecting the ACU and Integrated Receiver Decoder (IRD).
- 15 m RF cable - used for connecting the Antenna and ACU.
- 1.8 m PC cable - used for connecting the ACU to a personal computer for system set up and diagnostics.

Documentation

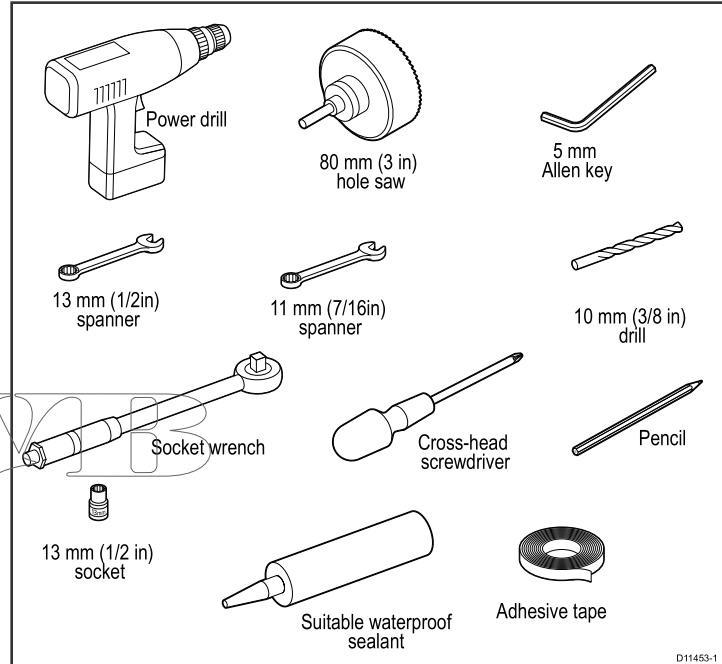
- Installation/operating instructions
- mounting template.

CD containing:

- Software for running the STV Graphical User Interface (GUI) on a personal computer (PC).
- User documentation in PDF format.

### Tools required

Tools necessary for installation.

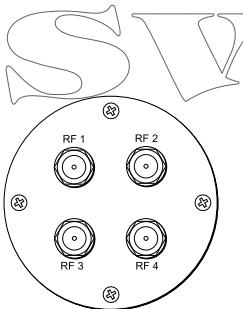


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## 2.2 Cables and connections

### Antenna connectors

RF connectors on the underside of the antenna connect the power, signal and control signals to the control unit (ACU).



STV model	RF connectors
37STV	2 RF connectors
45STV and 60STV	2 RF connectors Applicable to regions with single frequency band, DVB broadcast signals.
	4 RF connectors Applicable to regions with dual frequency band, linear polarized DVB broadcast signals.

### Extending cable runs

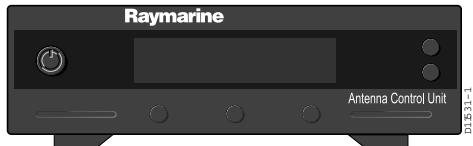
**Note:** System performance will be reduced if supplied cables are extended.

If the RF cable supplied as standard is not long enough, a 98 ft (30 m) cable, is available from your Raymarine dealer, (part number E96008). Connect the longer cable to the supplied 15 m (49 ft) RF cable to obtain a total cable length of 147 ft (45 m).

**Note:** Total cable lengths should not exceed 45 m (147 ft). System performance can not be guaranteed if cables are extended.

### Antenna Control Unit (ACU)

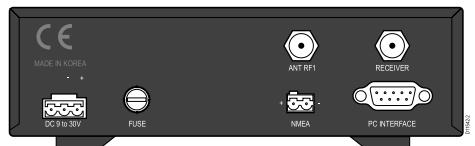
The Antenna Control Unit (ACU) provides all control and power-switching functions for the antenna. Three soft keys enable satellite programming and antenna diagnostics to be carried out.



Two buttons at the right-hand side of the front panel are used with some setup procedures to provide **BACK** and **ENTER** functions.

The ACU rear connectors are:

- **DC 9 to 30V** for power input.
- **ANT RF1** - connects power and signal to the antenna.
- **NMEA** - connects to GPS (optional).
- **PC INTERFACE** - connects to PC serial port for remote operation from a computer (optional).
- **RECEIVER** - connects to the satellite receiver (not supplied).

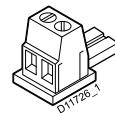


For connection details, refer to the installation procedures.

## Using GPS with STV

Your STV system can make use of GPS to improve the DVB signal tracking accuracy.

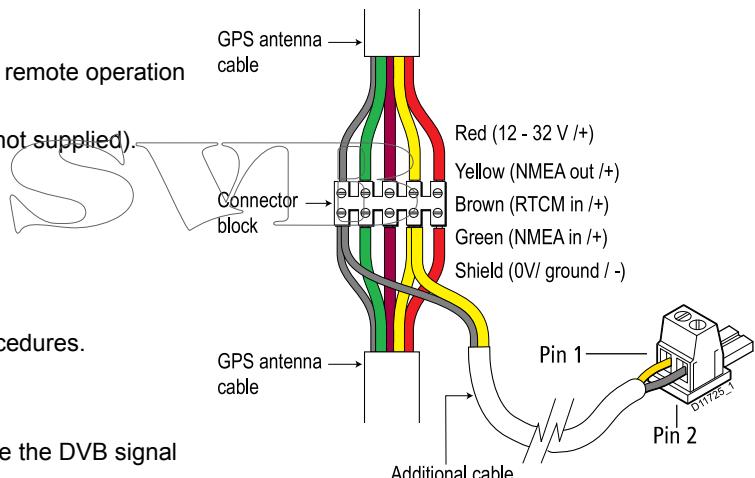
- **37 and 60 STV Gen2 models** – These have a built in GPS receiver for improved tracking accuracy.
- **45 STV** – This can be connected to an NMEA 0183 compatible GPS receiver using the connector provided.



NMEA  
connector

### Connecting STV to NMEA 0183 GPS

With the system powered OFF, connect an NMEA feed to the ACU for GPS positioning information, refer to the following illustration for reference:



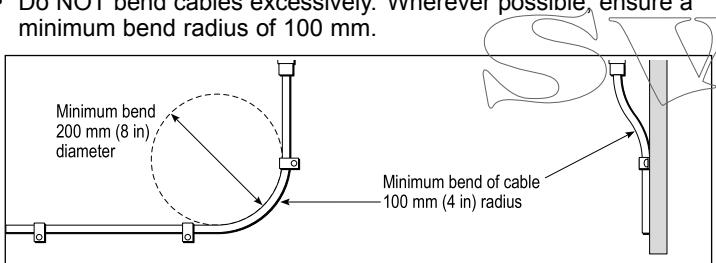
1. At a suitable point, cut your GPS antenna cable.
2. Strip each wire in the GPS and additional cable ready for the connector block.
3. Connect stripped GPS wires to the connector block, matching the wires on either side.

4. Put the NMEA OUT wire (yellow in the illustration) and ground wire into the connector block with the corresponding GPS antenna wires, as in the illustration.
  5. Secure all connections in the connector block.
  6. Connect and secure the free end of the additional cable in the 2 pin plug, so that:
    - i. NMEA OUT (+) connects to pin 1.
    - ii. Ground (-) connects to pin 2.
  7. Connect the 2 pin plug to **NMEA** on the rear of the ACU.
  8. Switch on the STV system.

## Routing cables

Cables must be routed correctly, to maximize performance and prolong cable life.

- Do NOT bend cables excessively. Wherever possible, ensure a minimum bend radius of 100 mm.



- Protect all cables from physical damage and exposure to heat. Use trunking or conduit where possible. Do NOT run cables through bilges or doorways, or close to moving or hot objects.
  - Secure cables in place using tie-wraps or lacing twine. Coil any extra cable and tie it out of the way.
  - Where a cable passes through an exposed bulkhead or deckhead, use a suitable watertight feed-through.
  - Do NOT run cables near to engines or fluorescent lights.

Always route data cables as far away as possible from:

- other equipment and cables,
  - high current carrying ac and dc power lines,
  - antennae.

## **Power requirements**

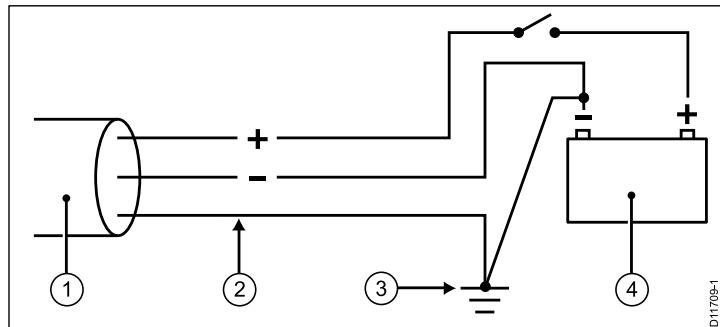
A Raymarine STV system needs either a 12 V dc or 24 V dc power supply. This is connected into the ACU.

## **Grounding requirements**

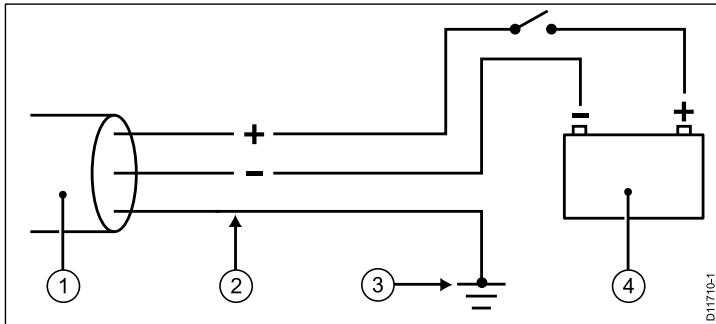
These grounding requirements are applicable for Raymarine equipment supplied with a separate drain wire or screen.

- The product power cable drain conductor (screen) must be connected to a common ground point.
  - It is recommended that the common ground point is a bonded ground, i.e. with the ground point connected to battery negative, and situated as close as possible to the battery negative terminal. If a bonded ground system is not possible, a non-bonded RF ground may be used.

## Bonded ground system (preferred)



## RF ground system (alternative)



## References

- ISO10133/13297
- BMEA code of practice
- NMEA 0400

1. Power cable to product.
2. Drain (screen).
3. Bonded (preferred) or non-bonded RF ground.
4. Power supply or battery.



## Implementation

If several items require grounding, they may first be connected to a single local point (e.g. within a switch panel), with this point connected via a single, appropriately-rated conductor, to the boat's common ground. The preferred minimum requirement for the path to ground (bonded or non-bonded) is via a flat tinned copper braid, with a 30 A rating (1/4 inch) or greater. If this is not possible, an equivalent stranded wire conductor maybe used, rated as follows:

- for runs of <1 m (3 ft), use 6 mm<sup>2</sup> (#10 AWG) or greater.
- for runs of >1 m (3 ft), use 8 mm<sup>2</sup> (#8 AWG) or greater.

In any grounding system, always keep the length of connecting braid or wires as short as possible.

**Important:** Do NOT connect this product to a positively-grounded power system.

## 2.3 System options

Your Raymarine Satellite TV system can be connected to one or multiple IRDs, to offer the maximum choice of channels to different cabins. This section describes the different combinations available and the method of connecting each variant.

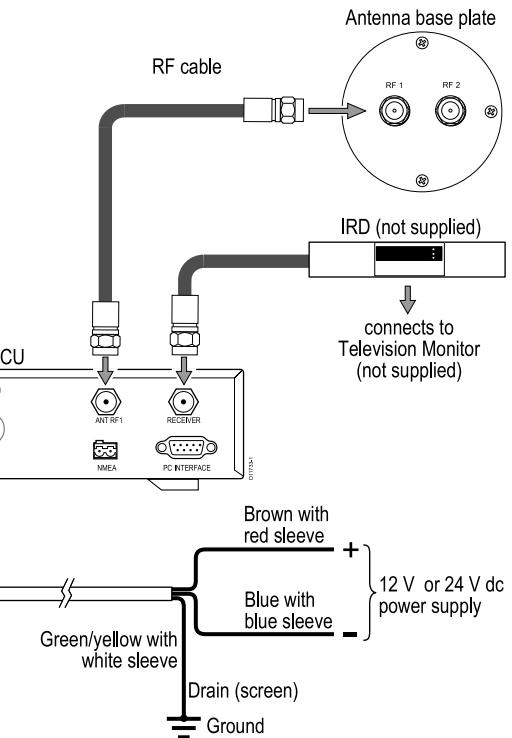
Ensure the power supply for the ACU is protected by either a 5 A quick-blow fuse or an equivalent automatic circuit breaker, connected in-line on the positive (white with red tag) wire of the power cable.

Note that for all variants, the **RF1** connector on the ACU must be connected to the **RF1** connector on the antenna base plate.

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## 2.4 Dual RF STV systems

### Connecting a basic system



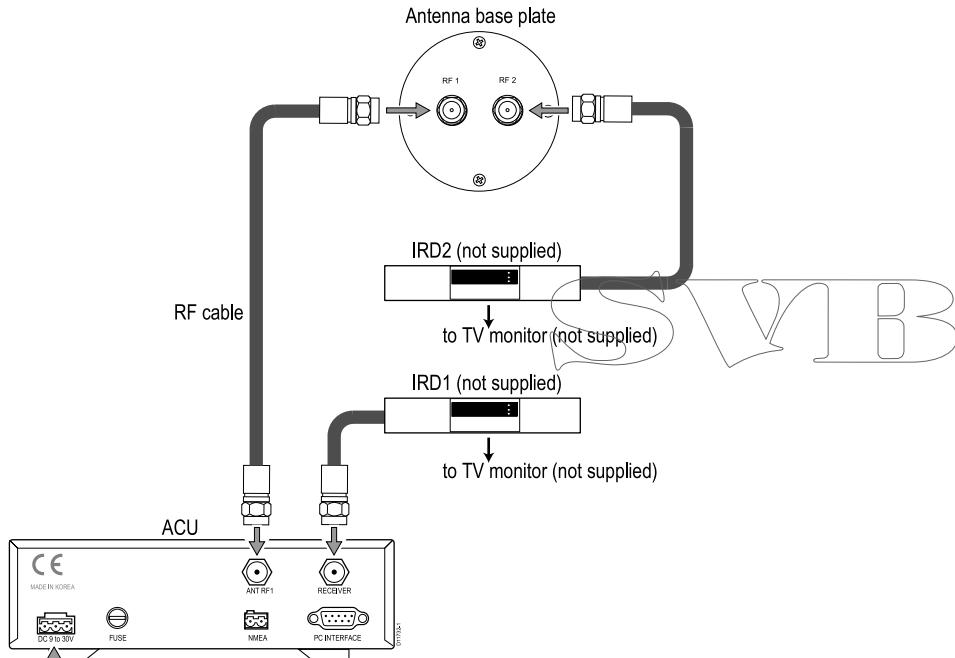
1. Connect an RF cable from the **ANT RF1** connector on the ACU to the **RF1** connector on the antenna base plate.
2. Connect an RF cable from the **RECEIVER** connector on the ACU to either the **LNB**, **ANT**, or **Satellite In** connector on the rear of the IRD.

3. Connect a 12 V or a 24 V dc supply to the **DC 9 to 30V** connector on the rear of the ACU.
4. Refer to the relevant Manufacturer's handbook for details on configuring your IRD.

The RF connection into the IRD is usually made into the connector labelled **LNB**, **ANT**, or **Satellite In**.

Refer to the relevant Manufacturer's handbook for details on configuring your IRD.

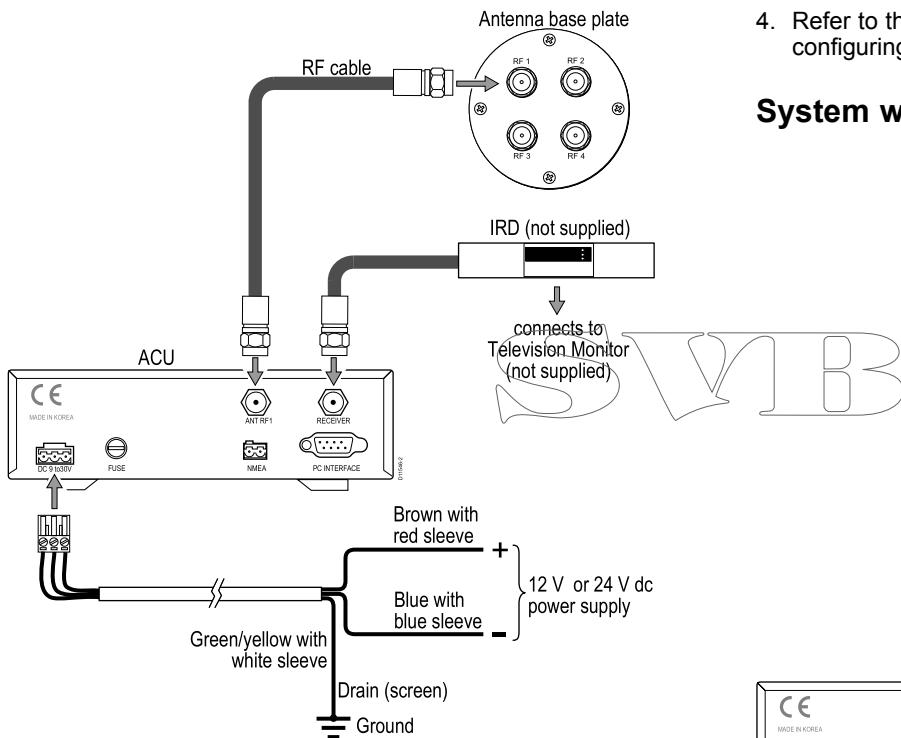
## System with 2 IRDs



You can connect two IRDs to your antenna as shown in the diagram. In this system, one IRD can be set as a two satellite receiver. The other IRD must be set as a one satellite receiver.

## 2.5 Quad RF STV systems

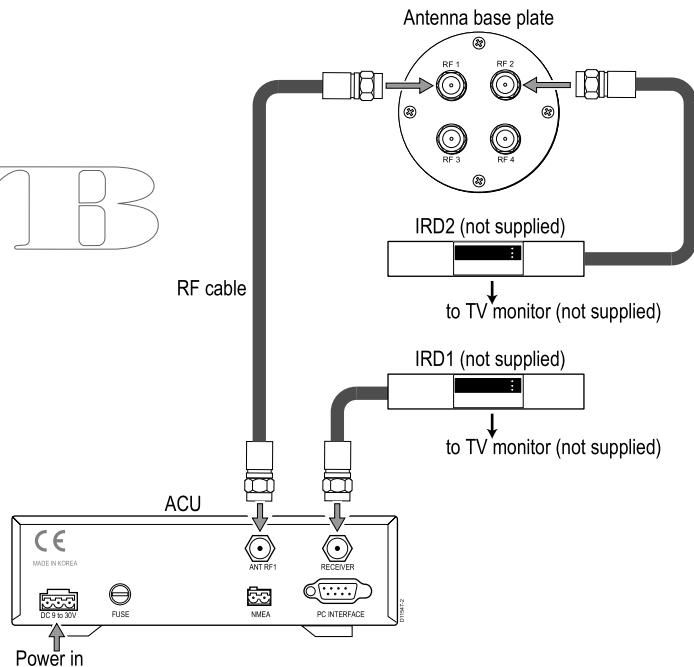
### Connecting a basic system



1. Connect an RF cable from the **ANT RF1** connector on the ACU to the **RF1** connector on the antenna base plate.

2. Connect an RF cable from the **RECEIVER** connector on the ACU to either the **LNB**, **ANT**, or **Satellite In** connector on the rear of the IRD.
3. Connect a 12 V or a 24 V dc supply to the **DC 9 to 30V** connector on the rear of the ACU.
4. Refer to the relevant Manufacturer's handbook for details on configuring your IRD.

### System with 2 IRDs



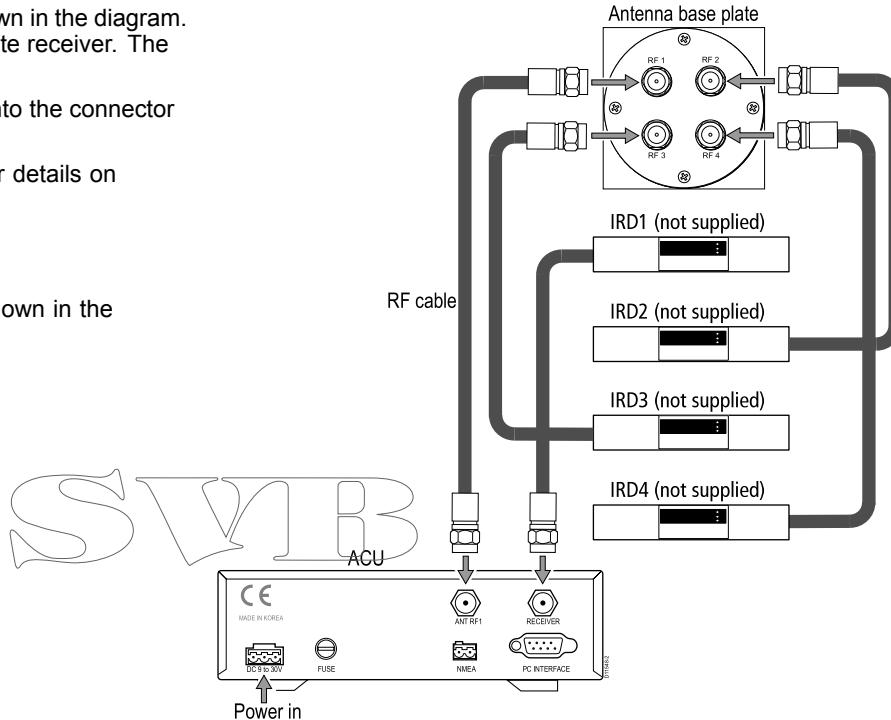
You can connect two IRDs to your antenna as shown in the diagram. In this system, one IRD can be set as a two satellite receiver. The other IRD must be set as a one satellite receiver.

The RF connection into the IRD is usually made into the connector labelled **LNB**, **ANT**, or **Satellite In**.

Refer to the relevant Manufacturer's handbook for details on configuring your IRD.

## System with 4 IRDs

You can connect four IRDs to your antenna as shown in the following diagram.



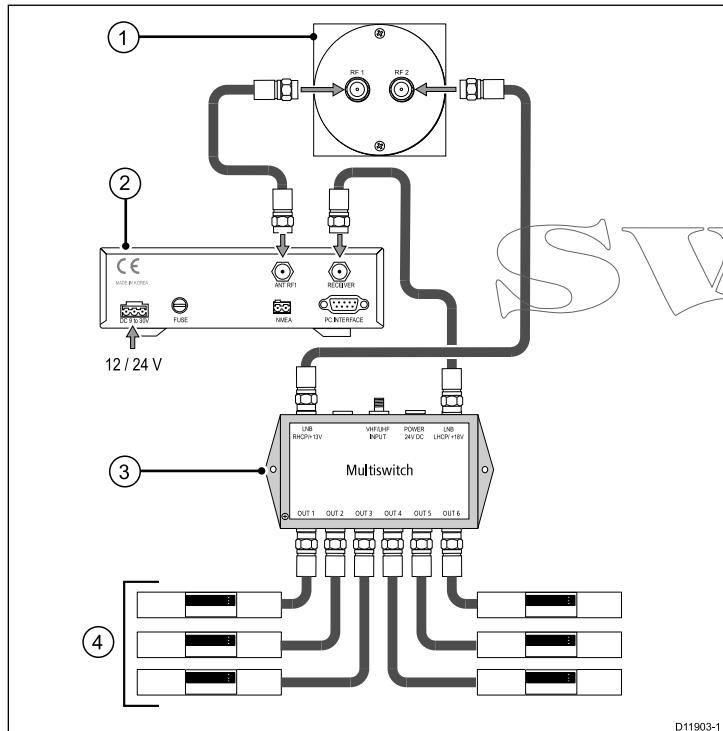
The RF cables from the antenna base plate connect to either the **LNB**, **ANT**, or **Satellite In** connector on the rear of the IRD.

Refer to the relevant Manufacturer's handbook for details on configuring your IRDs.

## 2.6 37STV multiswitch connection (America and Asia only)

### System with more than 2 IRDs

A dual RF STV system operating in a region with circular polarized DVB signals may include a multiswitch as shown. This allows connection of up to 6 IRDs (satellite receiver / decoders).



1. Antenna base plate
2. ACU
3. Multiswitch
4. IRDs – (not supplied)

The RF cables from the multiswitch connect to either the **LNB**, **ANT**, or **Satellite In** connectors on the rear of the IRDs.

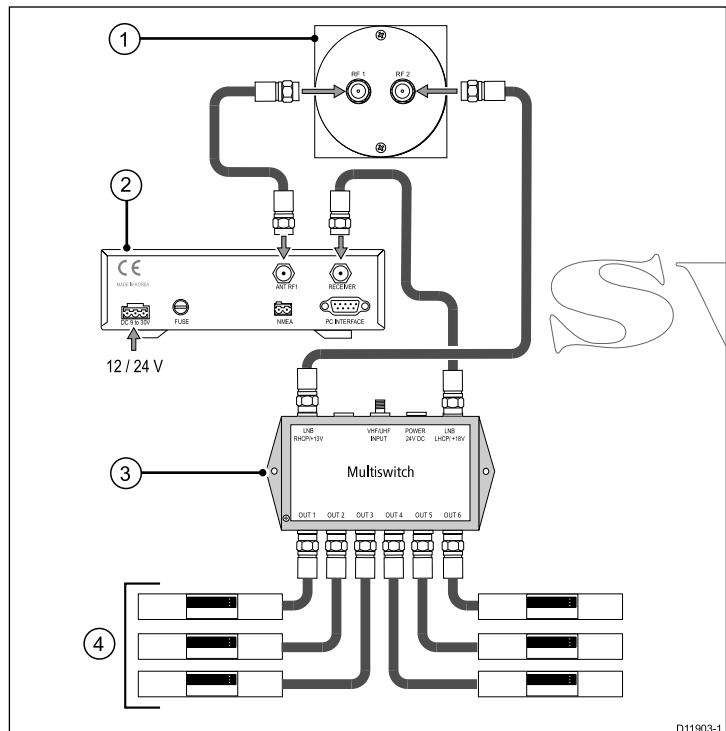
Refer to the relevant Manufacturer's handbook for details on configuring your IRDs.

## 2.7 45 / 60 STV Multiswitch connections

### System with more than 4 IRDs

You may use a multiswitch connected as shown. This allows connection of up to 6 IRDs (satellite receiver / decoders).

#### North America and Asia



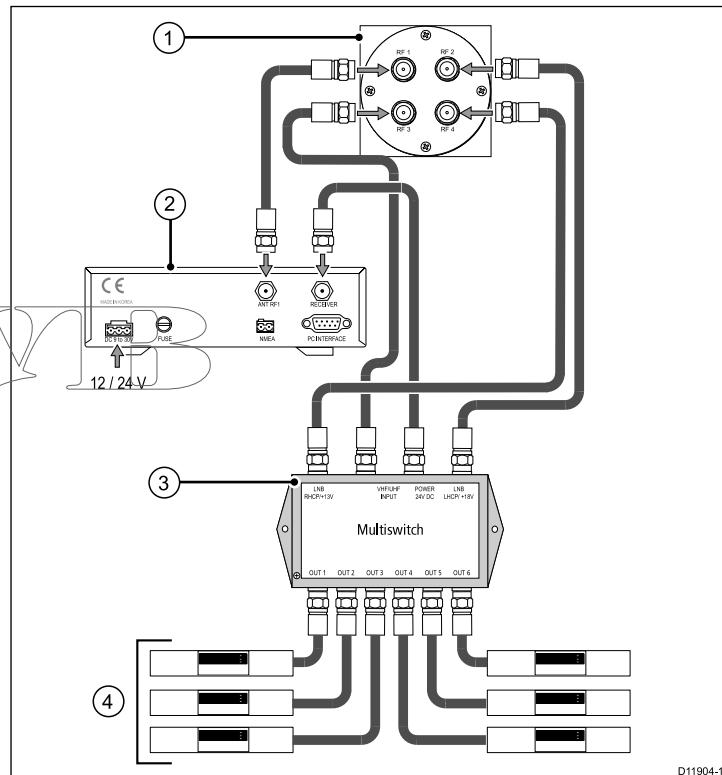
1. Antenna base plate

2. ACU

3. Multiswitch

4. IRDs – (not supplied)

#### Regions outside of North America and Asia



1. Antenna base plate

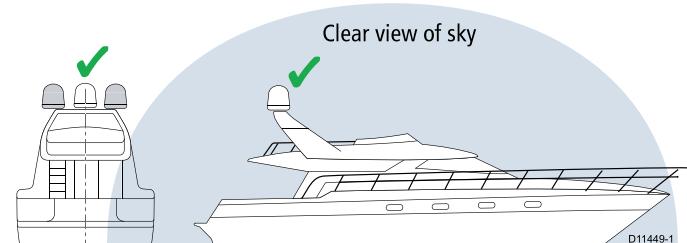
2. ACU
3. Multiswitch
4. IRDs – (not supplied)

The RF cables from the multiswitch connect to either the **LNB**, **ANT**, or **Satellite In** connectors on the rear of the IRDs.

Refer to the relevant Manufacturer's handbook for details on configuring your IRDs.

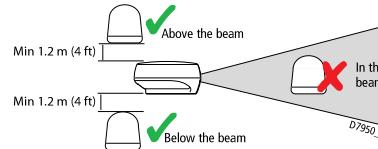
## 2.8 Installation / Mounting

### Antenna position

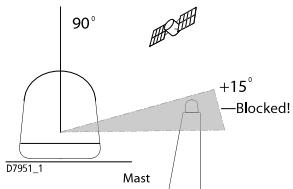


The antenna, must be installed where:

- There is an all round clear view of the horizon.
- It is not too high above the water - the maximum recommended height is one not exceeding half the length of the boat.
- It is as near as possible to the centerline of the boat.
- On a rigid mounting platform that is not subject to excessive vibration.
- Away from the edge of the boat. This will minimize excessive motion, which can adversely affect reception.
- Clear of any radar beam. This could adversely affect antenna operation.



- Clear of any object which could block the satellite signal. Ensure there is a +15° to +90° look angle at the intended installation position.

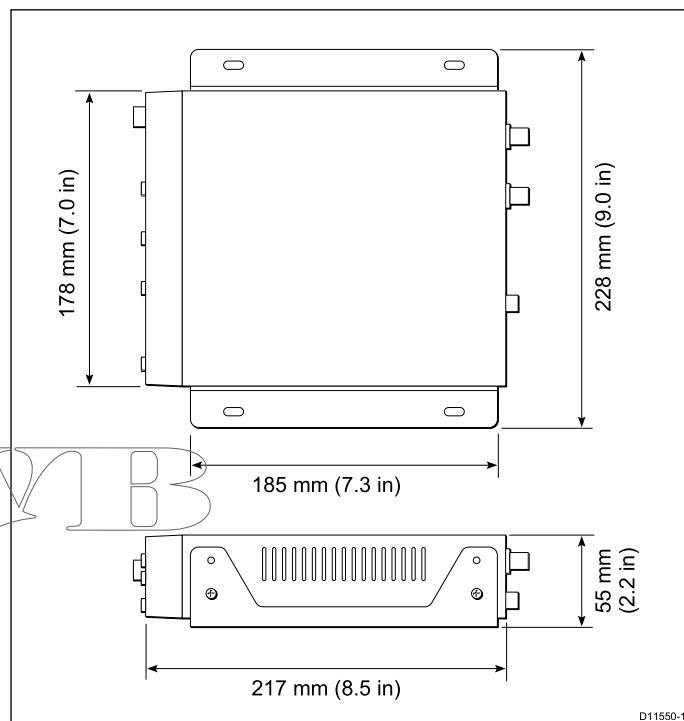


## ACU installation

The ACU must be fitted below decks in a position that is:

- Dry.
- Well ventilated.
- Easily accessible.
- Near to the main TV viewing area.

ACU dimensions



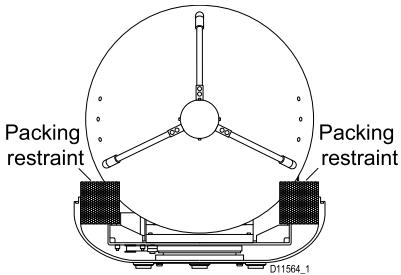
## Antenna installation

The procedures for installing the antenna assembly comprise:

- Preparation - remove transit packing.
- Procedure - prepare mount and fit antenna.

## Antenna preparation

1. Remove and retain the bolts and washers securing the antenna dome.
2. Remove the antenna dome and retain in a safe place.

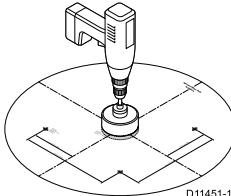


3. Locate and remove the packing restraints from the antenna assembly.
4. Replace the antenna dome and secure with the bolts retained at step 1.

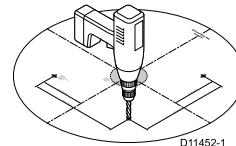
## Antenna installation procedure

Prepare the mounting surface then fit the antenna.

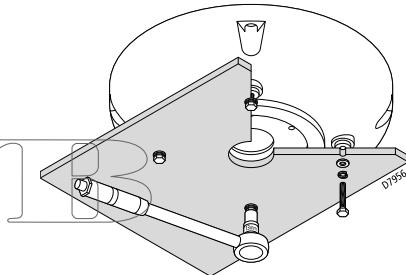
1. Using adhesive tape, attach the template to the mounting surface, ensuring that it is parallel to your boat's center line as marked on the template.
2. Using a suitable hole saw, remove the shaded center portion.



3. Drill four 10 mm holes in the positions indicated.



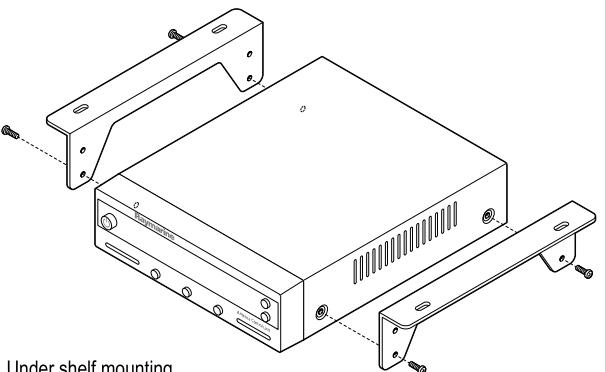
4. Countersink the mounting holes, then smooth the edges of the center hole with a suitable file, to avoid damage to the mounting surface.
5. Secure the antenna to the base using bolts, spring washers and flat washers.



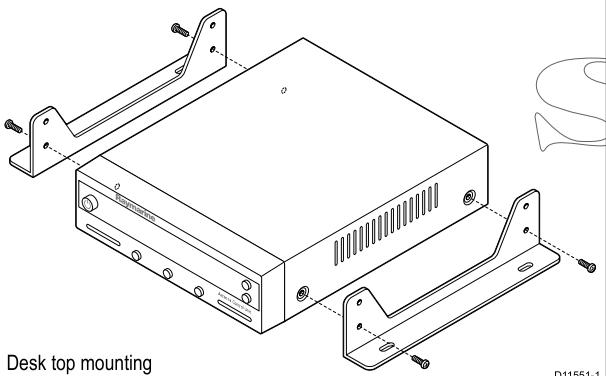
6. Tighten the bolts to a torque of 22.1 ft.lb (30 Nm) to ensure that the foam sealing ring is compressed to prevent water ingress.

## Installing the ACU

Use the two fixing brackets supplied to install the ACU. These brackets can be fitted to the sides of the unit to provide a top or bottom fix.



Under shelf mounting



Desk top mounting

4. Mark the 2 fixing hole positions for each mounting bracket, on the mounting surface.
5. Using a suitable drill bit, drill the 4 holes in the marked positions.
6. Where necessary (for example, on gel-coated surfaces), countersink the mounting holes to avoid damage to the mounting surface.
7. Using suitable screws, secure the ACU into position.

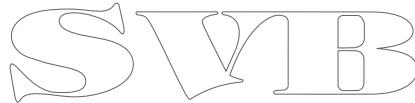
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1. Select the installation site, ensuring that the proposed site meets the criteria described under Planning the ACU installation.
2. Use the screws from the ACU to fix the mounting brackets to the ACU.
3. Place the ACU in the position where it is going to be installed.

# Chapter 3: System operation and setup

## Chapter contents

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## 3.1 Introduction

This section of the handbook describes how to set up your Raymarine Satellite TV system after installation using the ACU or the Graphical User Interface (GUI), and includes the following functions:

- System start up
- Change the default satellite
- Monitor the antenna status
- Enter set up mode
- Setting your operating region
- Setting the default satellites
- Setting up Remote Control
- Setting the GPS
- Editing satellite information
- Setting antenna parameters
- Setting the local frequency
- Setting the DiSEqC method
- Display versions
- Setting antenna go position
- Setting antenna move step

Many of the above functions will only be required at initial installation of your system.

**Important:** Raymarine does not recommend changing the satellite information unless advised to do so by the satellite provider.

**Note:** The satellite names shown on the ACU screen are dependent on geographic location and therefore may be different to the names in this manual.

**Note:** Vertical and horizontal polarization applies to regions with linear polarization only

## 3.2 Getting started

### Switching on

Ensure your IRDs and television monitors are switched on.

Press the power switch on the ACU to switch on the system. Check on the ACU that the start-up screens are displayed in the correct sequence.

### Startup sequence

Start of communication between antenna and the ACU.



Antenna initialized.



Antenna is searching for Satellite A.



Operating mode - antenna tracking satellite



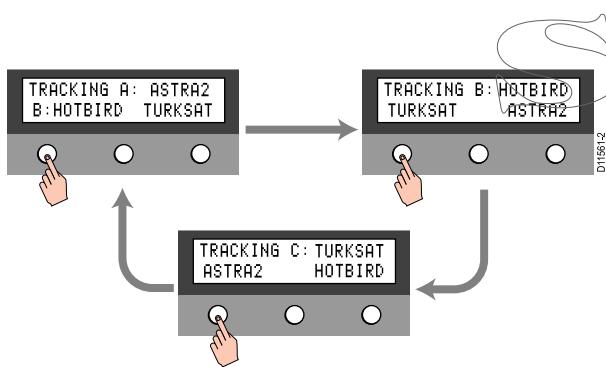
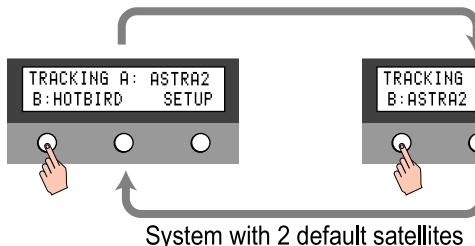
System set with two default satellites



System set with three default satellites

## Changing the target satellite

Your satellite system can be set up to track either two or three default satellites, depending on your geographical location. The name of the satellite the system is currently tracking is shown in the top line of the ACU display.



To change the default satellite, press the left hand soft key. The default satellite changes and is automatically tracked by the antenna.

## Monitoring antenna operation

With the system switched on and running, the ACU display shows the current status of the antenna. This can be either:

- **TRACKING** - the antenna is tracking the satellite
- **SEARCH** - the antenna is looking for the satellite
- **UNWRAPPING** - the antenna is unwrapping cable

You can check the details of the satellite position by pressing the center soft key:

- Once to see the elevation
- Twice to see latitude, longitude and signal strength
- Three times to return to the normal operating display

## Setting sleep mode

If the antenna loses the tracking satellite whilst in sleep mode, sleep mode is cancelled. To register a key on your remote control to access sleep mode see 'Setting the remote control'.

1. Press **Back** to access sleep mode.
2. Press **Back** again to exit sleep mode.



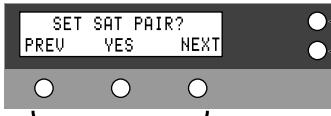
## 3.3 Setup using the ACU

### Setup principles

#### Using the ACU

The ACU setup mode gives access to a series of setup pages, to enable you to adjust the system parameters.

When setting up the system from the ACU, three context-dependent soft keys below the display are used to select and adjust the required parameters.



Context-dependent soft keys

Single function soft keys are used only during setup routines:

- The **BACK** soft key enables you go to the previous screen.
- The **ENTER** soft key is used to confirm settings.

You can:

- Define a pair or trio of satellites you want to use.
- Set the system to work with GPS.
- Edit a range of satellite information.
- Set various antenna parameters.
- Set the LNB local frequency.
- Set the DiSEqC method.
- Reset the system to factory default values.

You can also use setup mode to manually control the direction that the antenna points.

#### Setup routines

In setup mode, use the **PREV** or **NEXT** soft key to select the required setup screen.

For some setup functions, you also use the **PREV** and **NEXT** soft key to select a particular value. For example, when setting default satellites, you use **PREV** or **NEXT** cycle through the names of available satellites.

#### Editing screens

Some setup screens enable you to edit individual characters and are typically presented in this manner:



On the screen, the editable character is indicated by an underscore cursor (under A in this illustration).

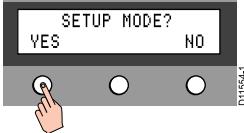
To edit the characters:

1. With the cursor under the first character, use the - and/or + soft keys to move through the available characters until the required character is displayed above the cursor.
2. Press the **INPUT** soft key to accept the edited character. The cursor then moves to the next character.
3. Repeat steps 1 and 2 until you have edited all necessary characters. If you want to change any character, use the **BACK** soft key to move the cursor to the relevant character.
4. When you have completed the edit for a screen, press the **ENTER** soft key to accept the values and move to the next setup screen.

#### Entering setup mode

Enter setup mode as follows:

1. Press the **ENTER** soft key to display the setup entry page.



2. Press the **YES** soft key to display the **SET SAT PAIR?** screen. This is the first screen in setup mode.



## Setting the operating region

Use this procedure to set the appropriate geographic region.

With the ACU in setup mode:

1. Use the **PREV** softkey to display **LOAD REGION INFO?**
2. Press the **YES** to display **CONTINENT**.
3. Use the **PREV** or **NEXT** softkey to cycle through the continent names in the top line of the display, until the required continent name is displayed.
4. Press the **SELECT** softkey to confirm the continent and display **REGION**.
5. Use the **PREV** or **NEXT** softkey to cycle through the region names in the top line of the display, until the required region name is displayed.
6. Press the **SELECT** softkey to confirm the region and display the **LOAD?** screen.
7. Press either:
  - **YES** to load the new settings. When the new settings have been loaded, the system re-initializes automatically.
  - **NO** to return to **SETUP MODE?** without making any changes.

8. If **SETUP MODE?** is displayed, press:

- **YES** if you want to remain in setup mode, or
- **NO** to re-initialize the system and return to operational mode.

## Setting the default satellites

Use this procedure to set either two or three default satellites.

1. Carry out the Enter setup mode procedure to display the **SET SAT PAIR?** screen.
2. Press the **YES** soft key to display the **SET TRIPLE SAT** screen.
3. If you are in an area where three satellites are available press **YES**. Otherwise, press **NO**.
4. Use the **PREV** or **NEXT** soft key to cycle through the satellite names, in the top line of the display.
5. When the required satellite name is displayed, press the **SELECT** soft key to select this satellite as satellite A.
6. Repeat steps 4 and 5 to select satellite B.
7. If you are setting up triple satellites, repeat steps 4 and 5 to select satellite C.
8. When the **SAVE?** screen is displayed, press the **YES** soft key.
9. When the **SETUP?** screen is displayed, press either soft key:
  - **YES** if you want to remain in setup mode, or
  - **NO** to re-initialize the system and return to operational mode.

## Setting the remote control

Use this procedure to set up your remote control with the ACU.

With the ACU in setup mode:

1. Press **NEXT** to cycle through the options and display **SET REMOCON?**.
2. Press **YES** to display the **CHANGE SAT** set screen.
3. Press **SELECT** to display the **PRESS A REMOTE KEY** screen.

4. Point your remote control towards the ACU, then press the remote control button that you want to allocate to the selected function.
5. Press the same remote control button again to confirm the selection.
6. If you want to set up another remote function:
  - i. At the ACU, press the **BACK** softkey.
  - ii. Press **NEXT** to select the next function to set up.
  - iii. Repeat the steps 3 to 6 above, for each remote control function to be set up.
7. When all required functions have been set for remote control, press the **EXIT** softkey to return to the top level of the setup menu.

## Setting the GPS

With the ACU in setup mode:

1. Press the **NEXT** softkey until **SET GPS?** is displayed.
2. Press **YES** to enter GPS setup mode and display the **LONGITUDE** screen.
3. Set the current longitude as follows:
  - i. Use the + and - softkeys to enter the required value for the character above the cursor (underscore).
  - ii. Press the **INPUT** softkey to accept each correct character and move the cursor to the next character.
  - iii. Repeat these steps until the correct longitude numeric value has been entered and the cursor is under the longitude direction indicator, **E** (east) or **W** (west).
  - iv. Use the **E** or **W** softkey to set the appropriate direction.
4. Press the **INPUT** softkey to proceed to the **LATITUDE** screen.
5. Set the current latitude as follows:
  - i. Use the + and - softkeys to enter the required value for the character above the cursor.



- ii. Press the **INPUT** soft key to accept each correct character and move the cursor to the next character.
  - iii. Repeat these steps until all correct latitude values have been entered and the cursor is under the latitude direction indicator, **N** (north) or **S** (south).
  - iv. Use the **N** or **S** softkey to set the appropriate direction
6. Press the **INPUT** softkey to proceed to the **SAVE?** screen.
  7. Press either:
    - **YES** to save your settings, or
    - **NO** to cancel the operation and return to the **SETUP MODE?** screen.

**Note:** If your system is connected to a GPS antenna, the position will be updated in real time.

## Satellite information

**Important:** We recommend that you do NOT attempt to edit satellite information. However, if you have to do so, contact the Raymarine Customer Support Department for advice before making any changes.

The editable parameters are typically, in sequence:

- **LONGITUDE** in degrees and minutes, plus E/W selector.
- **VER LOW/RHCP**. Vertical low band tracking frequency (in MHz) and symbol rate (in kHz).
- **VER LOW NID**. Vertical low band network identity (NID).
- **HOR LOW/LHCP**. Horizontal low band tracking frequency (in MHz) and symbol rate (in kHz).
- **HOR LOW NID**. Horizontal low band network identity (NID).
- **VER HIGH**. Vertical high band tracking frequency (in MHz) and symbol rate (in kHz).

- **VER HIGH NID.** Vertical high band network identity (NID).
- **HOR HIGH.** Horizontal high band tracking frequency (in MHz) and symbol rate (in kHz).
- **HOR HIGH NID.** Horizontal high band network identity (NID).
- The method of verifying satellite tracking. The options are:
  - **SIGNAL** - use only the signal level for tracking.
  - **DVB LOCK** - use only DVB Lock signal for tracking.
  - **DVB DECODE** - verify signal using DVB decoding method for tracking.
  - **DSS DECODE** - decode only DSS Lock signal for tracking.
- The method of supplying power to the LNB. The options are:
  - **AUTO** - change voltage to LNB by the IRD voltage. This is the RECOMMENDED SETTING.
  - **ONLY 13 V** - always supply 13 V to LNB.
  - **ONLY 18 V** - always supply 18 V to LNB.
- The required method of Digital Satellite Equipment Control (DiSEqC). The options are:
  - **AUTO** - change signal to LNB by the IRD DiSEqC. This is the RECOMMENDED SETTING.
  - **ONLY 0 KHZ** - always supply 0 kHz to LNB.
  - **ONLY 22KHZ** - always supply 22 kHz to LNB.



### Editing satellite information

With the ACU in setup mode:

1. Press the **NEXT** softkey to cycle through to the **EDIT SAT INFO?** screen.
2. Press **YES** to enter the edit mode.  
A satellite name edit screen is displayed.
3. Use **PREV** or **NEXT** to cycle through the available satellites.

4. To edit the displayed satellite name, press **SELECT**.  
An edit screen is displayed.
5. Change the displayed name as follows:
  - i. Use the + and - softkeys to change the value of the character above the cursor (underscore).
  - ii. Press the **INPUT** softkey to accept each correct character and move the cursor to the next character.
6. Press the **ENTER** soft key to confirm the edited data and display the edit screen for the next parameter.
7. Proceed and edit other satellite information as required. Typical parameters available to edit are:
  - **LONGITUDE**
  - **VER LOW/RHCP**
  - **VER LOW NID.**
  - **HOR LOW/LHCP**
  - **HOR LOW NID**
  - **VER HIGH**
  - **VER HIGH NID**
  - **HOR HIGH**
  - **HOR HIGH NID**
8. Press the **ENTER** button to accept the **HOR HIGH NID** value, and display the **VERIFY** screen.
9. Use the **PREV**, **NEXT** and **ENTER** softkeys to edit the following parameters.
  - **VERIFY** – method for verifying satellite tracking.
  - **VOLTAGE** – method of supplying power to the LNB.
  - **DISEQC** – digital Satellite Equipment Control. Choose between Auto, 0KHz and 22KHz.

10. Press **ENTER** to accept the **DISEQC** method and display the **SAVE?** screen.

11. Press, either:

- **YES** to save the changes you have made, or
- **NO** to discard any changes.

The **SETUP MODE?** entry screen is then displayed.

12. Press either:

- **YES** if you want to use another setup function, or
- **NO** to re-initialize the system using the new settings.

## Antenna parameters

**Important:** We recommend that you do NOT attempt to change the antenna parameters. However, if you have to do so, contact the Raymarine Customer Support Department for advice before making any changes.

The antenna parameters you can change are typically, in sequence:

- **SCAN OFFSET.** The angle between the marked point on the sub-reflector and the datum.
- **TRACK SCALE.** To determine the speed at which the antenna tracks a satellite. A high Track Scale value gives a high tracking speed.
- **DETECT LEVEL.** The basic signal detection level.
- **WRS LEVEL.** The basic WRS detection level.
- **TRACK OFFSET.**
- **POWER LEVEL.**
- **DISEQC LEVEL.** The value that identifies a 22 kHz tone.
- **OFFSET RH - LH.** The difference value between RHCP/LHCP and SCAN OFFSET.

### • **EL OFFSET.**

- **USE WRS.** Applies WRS while antenna is searching for satellite.
- **OFFSET DIFF.** Applies Offset Difference.

### Editing antenna parameters

1. Carry out the Enter setup mode procedure to display the **SET SAT PAIR?** screen.
2. Press the **NEXT** soft key three times to display the **SET ANT PARAMETER?** screen.
3. Press **YES** to enter parameter edit. The **PARAM: SCAN OFFSET:** screen is displayed.
4. Use the **PREV** and **NEXT** soft keys as necessary, to display the parameter you want to change.
5. To change the displayed parameter, press the **YES** soft key. An edit screen is displayed.
6. Change the displayed parameter as follows:
  - i. Use the + and - soft keys to change the value of the character above the cursor (underscore).
  - ii. Press the **INPUT** soft key to accept each correct character and move the cursor to the next character.
  - iii. Repeat sub-steps a, b and c until the correct name has been entered.
7. Press the **ENTER** soft key, to display the **ANOTHER PARAMETER?** screen.
8. To:
  - Exit the setup procedure, press the **NO** soft key to display the **SAVE?** screen.
  - Set up another antenna parameter, press the **YES** soft key to return to the parameter change routine, then repeat steps 4 to 8 as necessary.
9. When the **SAVE?** screen is displayed, press, either:
  - The **YES** soft key to save the changes you have made, or

- The **NO** soft key to discard any changes.

The **SETUP MODE?** entry screen is then displayed.

10. Press either:

- the **YES** soft key, if you want to use another setup function, or
- the **NO** soft key, to re-initialize the system using the new settings.

## Setting LNB local frequency

We recommend that you do NOT attempt to change the LNB local frequency.

However, if you have to do so, contact the Raymarine Customer Support Department for advice before making any changes.

1. Carry out the Enter setup mode procedure to display the **SET SAT PAIR?** screen.
2. Press the **NEXT** soft key four times to display the **SET LOCAL FREQ?** screen.
3. Press **YES** to display the **LNB TYPE:** screen.
4. Carry out the setting up procedure for single band or universal band, as necessary.

- Single band frequencies are:

- Asia, 11300 MHz
- Japan, 10678 MHz
- Korea, 10750 MHz
- America, 11250 MHz

- Universal frequencies are:
- Low band, 9750 MHz
  - High band, 10600 MHz

## Setting single band LNB frequency

With the **LNB TYPE:** screen displayed:

1. Use the **PREV** or **NEXT** soft key to scroll to **SINGLE**
  2. Press **SELECT** to display the **LOCAL FREQ** edit screen
  3. Set the required frequency as follows:
    - i. Use the + and - soft keys to change the value of the character above the cursor (underscore), as necessary.
    - ii. Press the **INPUT** soft key to accept each correct character and move the cursor to the next character.
    - iii. Repeat sub-steps a, b and c until the correct frequency has been entered.
  4. Press the **ENTER** button to accept the frequency value and display the **SAVE?** screen.
  5. Press, either:
    - The **YES** soft key to save the changes you have made, or
    - The **NO** soft key to discard any changes.
- The **SETUP MODE?** entry screen is then displayed.
6. Press either:
    - **YES** if you want to use another setup function, or
    - **NO** to re-initialize the system using the new settings.

## Setting universal LNB frequency

With the **LNB TYPE:** screen displayed:

1. Use the **PREV** or **NEXT** soft key to scroll to **UNIVERSAL**
  2. Press, either:
    - The **YES** soft key to save the changes you have made, or
    - The **NO** soft key to discard any changes.
- The **SETUP MODE?** entry screen is then displayed.
3. Press either:
    - **YES** if you want to use another setup function, or
    - **NO** to re-initialize the system using the new settings.

## Setting the DiSEqC method

We recommend that you do NOT attempt to change the DiSEqC.

However, if you have to do so, contact the Raymarine Customer Support Department for advice before making any changes.

1. Carry out the Enter setup mode procedure to display the **SET SAT PAIR?** screen.
2. Press the **NEXT** soft key five times to display the **USE DISEQC?** screen.
3. Press **YES** to display the DiSEqC edit screen.
4. Use the **PREV** or **NEXT** soft keys to select the required DiSEqC method. The options are:
  - **USE TO CHANGE BAND** - DiSEqC used to change high and low bands.
  - **USE TO CHANGE SAT** - DiSEqC used to change the satellite being tracked.
  - **DO NOT USE DISEQC** - DiSEqC not used.

5. Press the **ENTER** soft key to accept the frequency value and display the **SAVE?** screen.

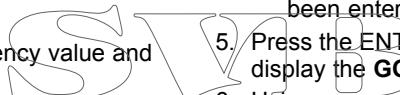
6. Press, either:

- The **YES** soft key to save the changes you have made, or
- The **NO** soft key to discard any changes.

The **SETUP MODE?** entry screen is then displayed.

7. Press either:

- **YES** if you want to use another setup function, or
- **NO** to re-initialize the system using the new settings.



## Manually directing the antenna

You can use the ACU to manually control the antenna. The options are:

- Setting the antenna go position - you set horizontal and vertical angles to which you want the antenna to point.

- Antenna move step - enables you to manually step the antenna, to the required horizontal and vertical directions.

### Setting antenna go position

1. Carry out the Enter setup mode procedure to display the **SET SAT PAIR?** screen.
2. Press the **PREV** soft key four times to display the **ANT GO POSITION?** screen.
3. Press **YES** to display the **GO TO AZ** edit screen.
4. Define the horizontal position to which you want the antenna to move, as follows:
  - i. Use the + and - soft keys to change the value of the character above the cursor (underscore).
  - ii. Press the **INPUT** soft key to accept each correct character and move the cursor to the next character.
  - iii. Repeat sub-steps a, b and c until the required value has been entered.
5. Press the **ENTER** soft key to confirm the horizontal position and display the **GO TO EL** edit screen.
6. Using a procedure similar to that in steps 4 and 5, define the vertical position to which you want the antenna to move.
7. Press the **ENTER** soft key to confirm the vertical position and display the **GOTO POSITION?** screen.
8. Press:
  - **YES** to drive the antenna to the position you have set. When you no longer need the antenna to point in this direction, press the **EXIT** soft key to return to the **SETUP MODE?** screen.
  - **NO** to return to the **ANT GO POSITION?** screen.

### Setting antenna move step

1. Carry out the Enter setup mode procedure to display the **SET SAT PAIR?** screen.
2. Press the **PREV** soft key four times to display the **ANT MOVE STEP?** screen.

3. Press **YES** to display the **STEP AZ** control screen.
4. Use the **CCW** or **CW** soft keys to step the antenna counter-clockwise or clockwise, to the required horizontal direction. The horizontal angle is displayed on the top line.
5. When you have set the required horizontal direction, press the **EL** soft key to display the **STEP EL** control screen.
6. Use the **DOWN** or **UP** soft keys to step the antenna, to the required horizontal direction. The vertical angle is displayed on the top line.
7. To leave the antenna move step mode, press the **EXIT** soft key to return to the **ANT MOVE STEP?** screen.

## 3.4 Applying factory default values

Use this procedure to return all settings to the factory default values.

With the ACU in setup mode:

1. Press the **PREV** softkey until **SET DEFAULT?** is displayed.

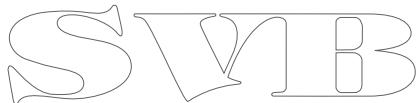
2. Press **YES**.

The message **DEFAULT SETTING** is displayed and the parameter values are reset. When the procedure is complete, the **SETUP MODE?** entry screen is displayed.

3. Press either:

- **YES** if you want to change the setup values, or

- **NO** to re-initialize the system using the default settings.



## 3.5 System information

You can use the ACU to display system product serial numbers and software versions.

The procedure for doing this is described as part of the maintenance procedures.

## 3.6 Checking system power

With the ACU in setup mode:

1. Press the **NEXT** softkey to cycle through the options until the **VIEW POWER?** screen is displayed.

The following information is displayed sequentially:

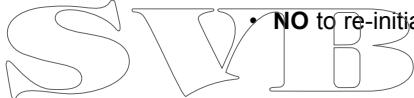
- **ACU POWER**
- **ANT POWER** (antenna power)
- **IRD power.**

2. To leave the power display, press **EXIT**.

The **SETUP MODE?** entry screen is then displayed.

3. Press either:

- **YES** if you want to use another setup function, or
- **NO** to re-initialize the system.



## 3.7 Skew angle

The skew angle can affect reception only for regions / satellites using Linear Polarized signals. When selecting between different satellites, or when moving from one geographic region to another, the angle of incidence between the antenna and the satellite signal will vary. The skew angle of the LNB (Low Noise Block) may be adjusted to compensate for this in order to maintain an optimal signal.

- **Auto-skew (Premium STV models)** – Auto-skew requires no manual adjustment. The skew angle is automatically adjusted to suit your location.
- **Manual skew adjustment** – For systems without the Auto-skew feature, you can manually adjust the skew angle.

Before attempting to do adjust the skew angle, seek advice from your service provider.

**Note:** DO NOT attempt to set the skew angle with power applied.

### Setting the skew angle

Contact your service provider to obtain the optimum skew angle for your geographical area.

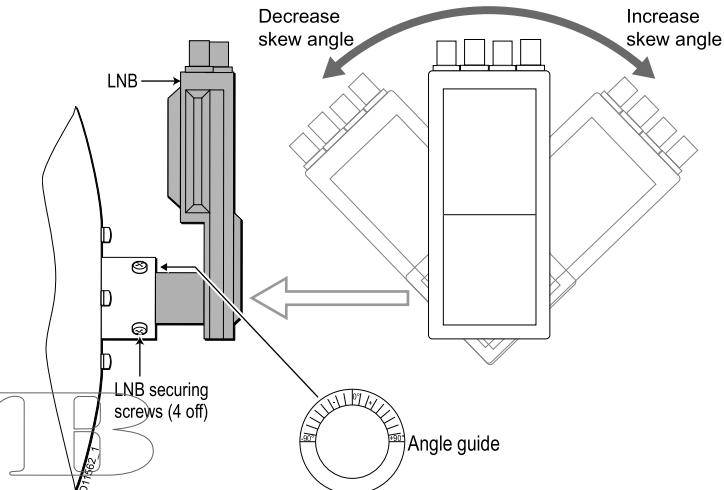
**Note:** Factory default skew angle settings are:

- For the USA: 0°
- For the EU: -8°

To set the skew angle:

1. Ensure that all power to the system is switched off.
2. Remove and retain the bolts and washers securing the antenna dome.
3. Remove the antenna dome and store in a safe place.

4. At the rear of the reflector, identify the four screws that secure the LNB, to the reflector, then loosen the screws just sufficiently to enable the LNB to be rotated, as shown in the illustration.



5. Rotate the LNB as necessary to set it to the skew angle recommended by your service provider.
6. Secure the LNB by tightening the four screws released at step 4.
7. Replace the antenna dome and secure it with the screws and washers retained at step 2.

### Auto-skew – manual skew setting

For STV systems with the auto-skew facility, you can select between auto-skew and manual adjustment.

With the ACU in setup mode:

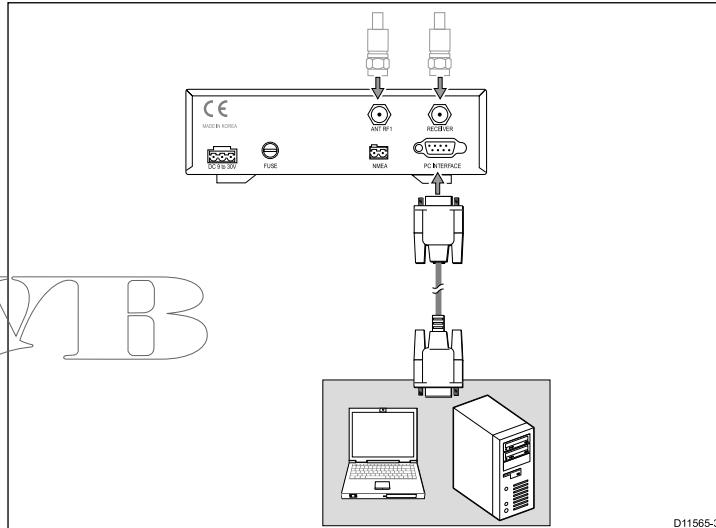
1. Use the softkeys to navigate down to the LNB skew calibration menu. **LNB SKEW? > CALIBRATION?**
2. Select from the following options using the **PREV**, **NEXT** and **YES** softkeys.

- **AUTO** – Auto-skew is enabled, you cannot manually adjust the skew position.
  - **MANUAL** – Auto-skew is disabled, you can proceed and set a skew position.
3. For manual mode adjustment, use the **+1** and **-1** softkeys to select the required value, then press **SET** when complete.

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## 3.8 Graphical User Interface

Graphical User Interface (GUI) software is provided on the CDROM supplied with your system components. When installed on a Personal Computer (PC) it enables you to operate your antenna system from the computer. To do this, the ACU must be connected to the serial port of the computer, using the 1.8 m PC cable supplied.

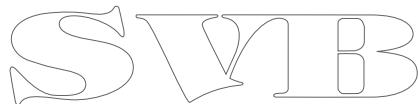


You can use the GUI for the majority of operating and setup functions.

# Chapter 4: Maintenance and troubleshooting

## Chapter contents

- 4.1 Maintenance on page 42
- 4.2 Troubleshooting on page 42
- 4.3 Raymarine customer support on page 44



## 4.1 Maintenance



### Warning: Switch off power

Before commencing any maintenance task, switch off all power to the product.

## Maintenance procedures

Although your Raymarine Satellite TV system require minimal maintenance, ensure that your system maintains peak performance by carrying out the following maintenance tasks on a routine basis:

- Examine cables for signs of damage such as chafing or cuts.
- Check that all cables are securely connected.
- Wash the exterior of the antenna cover with fresh water to remove salt deposits; a mild detergent may be added to remove grime.
  - DO NOT use abrasive cleaners or solvents such as acetone as this may result in irreparable damage to the unit.
  - The antenna is not a sealed unit, so DO NOT use a power spray to wash the exterior as this may result in water ingress and damage to the unit.
- Twice a year remove the antenna dome and examine the antenna assembly for signs of corrosion.

## 4.2 Troubleshooting

Your Raymarine product has been subjected to comprehensive test and quality assurance programs prior to packing and shipping. However, should the product develop a fault, refer to the following table and list (below) to identify a possible cause and corrective action to help restore normal operation.

If you still have a problem after referring to the table, contact your local Raymarine dealer, national distributor or Raymarine Product Support for further advice.

Symptom	Possible cause							
	1	2	3	4	5	6	7	8
Antenna not functioning	X				X			
Display shows 'ANT OUT OF CONTROL' message	X				X			
No picture on TV			X		X	X		X
Intermittent picture for short intervals		X	X	X	X	X		X
System works at the dock but not under way		X						
System will not find satellite		X	X	X	X	X	X	X
'Snowy' television picture				X				

1. Blown fuse, low power or wiring. Check that:
  - The in-line quick blow fuse (if fitted) has not blown, or the circuit breaker has not tripped. If the fuse has blown, replace it with one of the same type and rating.
  - There are no damaged wires and/or insecure connections.

- There is no power loss through the cable from the **RF1** connector on the antenna unit, particularly if this cable has been extended.

## 2. Satellite signal blocked.

Check that the antenna has a clear view of the sky. Satellite signals can be blocked or degraded by buildings, other boats, or equipment on your boat.

## 3. Outside satellite coverage zone.

Your system will provide excellent reception within the antenna coverage area for your satellite television service. However, signal quality may degrade as you approach the edges of this zone. Refer to the information on "Satellite coverage areas" to check the viable coverage area for your antenna.

## 4. Radar interference.

The energy levels radiated by radar units can overload the antenna circuits. Ensure that your antenna is installed correctly with respect to your radar unit, as described in the planning information for STV.

## 5. Incorrect or loose RF connectors.

All connections should be checked as part of the regular maintenance recommended by Raymarine, to ensure that they have not become loose. A loose RF connector can reduce signal quality or cause the antenna not to work.

## 6. Multi-switch interference.

If you have multiple IRD's connected to your system, make sure that you are using an ACTIVE not PASSIVE multi-switch.

## 7. IRD troubleshooting.

Your IRD may be the cause of unsatisfactory operation. Check the IRDs configuration to ensure it is programmed for the area in which you are operating. Unplug the IRD from the power supply for 15 seconds, then reconnect and allow the system to initialize.

## 8. LNB fault.

If you have an LNB fault, contact your local dealer, national distributor or Raymarine Product Support for further assistance. The LNB may require replacing.

## Antenna diagnosis procedure

With the ACU in setup mode:

1. Press the **PREV** softkey to cycle through the options until **ANT DIAGNOSIS?** is displayed.
2. Press **YES** to start the diagnosis routine.

The diagnosis routine runs automatically, carrying out a series of tests designated **CODE 101** to **CODE 110**. As each test completes, check the result indication:

?	Test running
—	Test skipped
●	Test passed
A number	Test failed

3. When the **DIAGNOSIS COMPLETE** screen is displayed, press **EXIT** to return to the **SETUP MODE?** entry screen.

For further assistance contact your local dealer or Raymarine technical support.

## 4.3 Raymarine customer support

Raymarine provides a comprehensive customer support service. You can contact customer support through the Raymarine website, telephone and email. If you are unable to resolve a problem, please use any of these facilities to obtain additional help.

### Web support

Please visit the customer support area of our website at:

[www.raymarine.com](http://www.raymarine.com)

This contains Frequently Asked Questions, servicing information, e-mail access to the Raymarine Technical Support Department and details of worldwide Raymarine agents.

### Telephone and email support

#### In the USA:

- Tel: +1 603 881 5200 extension 2444
- Email: [Raymarine@custhelp.com](mailto:Raymarine@custhelp.com)

#### In the UK, Europe, the Middle East, or Far East:

- Tel: +44 (0)23 9271 4713
- Email: [ukproduct.support@raymarine.com](mailto:ukproduct.support@raymarine.com)

### Product information

If you need to request service, please have the following information to hand:

- Product name.
- Product identity.
- Serial number.
- Software application version.

You can obtain this product information using the menus within your product.

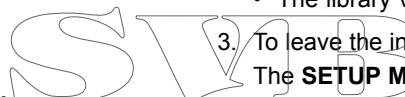
## Checking serial numbers & software versions

Use this procedure to see product serial numbers and software versions.

1. Press **ENTER** then **YES** to access setup mode.  
The **SET SAT PAIR?** screen is then displayed.
2. Press the **NEXT** softkey to cycle through the options and then select **VIEW VERSION?**.

The following information is displayed sequentially:

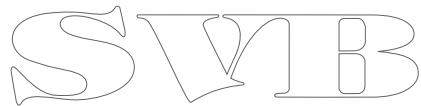
- The antenna product name.
  - The antenna serial number.
  - The antenna software version.
  - The ACU software version.
  - The library version.
3. To leave the information display, press the **EXIT** softkey.  
The **SETUP MODE?** entry screen is then displayed.
  4. Press either:
    - **YES** if you want to use another setup function, or
    - **NO** to re-initialize the system.



# Chapter 5: Satellite information

## Chapter contents

- 5.1 Satellite providers on page 46

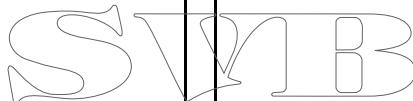


## 5.1 Satellite providers

To receive a satellite television service you need to subscribe to the service from the relevant service provider.

### Satellite providers - Europe

Country	Satellites	Service provider
England	Astra - AST 02AS0 Astra - AST02AN0	Astra <a href="http://www.ses-astra.com">www.ses-astra.com</a>
Germany	Primary: <ul style="list-style-type: none"><li>Astra - AST01GKU</li></ul> Secondary (limited channels) <ul style="list-style-type: none"><li>Hotbird - HOT234KW</li><li>Astra - AST01EH1</li><li>Astra - AST01FH1</li><li>Astra - AST01EV1</li></ul>	Astra <a href="http://www.ses-astra.com">www.ses-astra.com</a> Hotbird <a href="http://www.eutelsat.com">www.eutelsat.com</a>
France	Hotbird - HOT234KS Hotbird - HOT234KW Astra - AST101GKU	Hotbird <a href="http://www.eutelsat.com">www.eutelsat.com</a> Astra <a href="http://www.ses-astra.com">www.ses-astra.com</a>

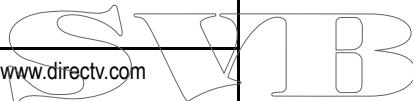


Spain	Primary: <ul style="list-style-type: none"><li>Astra - AST01GKU</li><li>Hispasat - HIS01AKS</li><li>Hispasat - HI01CKS</li><li>Hotbird - HOT234KW</li><li>Astra - AST01EV1</li></ul> Secondary (limited channels)	Astra <a href="http://www.ses-astra.com">www.ses-astra.com</a> Hispasat <a href="http://www.hispasat.com">www.hispasat.com</a> Hotbird <a href="http://www.eutelsat.com">www.eutelsat.com</a>
Italy	Hotbird - HOT234KS Hotbird - HOT234KW	Hotbird <a href="http://www.eutelsat.com">www.eutelsat.com</a>
Scandinavia	Primary: <ul style="list-style-type: none"><li>Sirius - SIR002KN</li><li>Thor - THO002KU</li></ul> Secondary (limited channels) <ul style="list-style-type: none"><li>Sirius - SIR003KN</li><li>Thor - THO001KU</li><li>Thor - THO003KU</li></ul>	Sirius <a href="http://www.nsab.se">www.nsab.se</a> Thor <a href="http://www.telenor.com">www.telenor.com</a>
Turkey	Hotbird - HOT234KW Turksat - TUR01BKT Turksat - TUR01CEB	Hotbird <a href="http://www.eutelsat.com">www.eutelsat.com</a> Turksat <a href="http://www.satcom.gov.tr">www.satcom.gov.tr</a>

Russia	Thor - TH0003KU Hotbird - HOT234KW	Thor <a href="http://www.telenor.com">www.telenor.com</a> Hotbird <a href="http://www.eutelsat.com">www.eutelsat.com</a>
Greece	Hotbird - HOT234KW	Hotbird <a href="http://www.eutelsat.com">www.eutelsat.com</a>

## Satellite providers - United States of America

Satellites	Service provider
NIMIQ1 - NIM001KB NIMIQ2 - NIM002KB	Bell TV <a href="http://www.bell.ca">www.bell.ca</a>
EchoStar 3 - ECH003KB EchoStar 6.8 - ECH008KB EchoStar 7 - ECH007KB EchoStar 1.2 - ECH001KB	EchoStar Communications Corp. <a href="http://www.dishnetwork.com">www.dishnetwork.com</a>
DIRECTV - DTV101 DIRECTV - DTV119	DirecTV Inc. <a href="http://www.directv.com">www.directv.com</a>



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# Appendix A Technical specification

## 37STV

Nominal supply voltage	12 or 24 V dc
Operating voltage range	9 to 30 V dc
Power consumption	30 W typical, 50 W max
Dimensions	<ul style="list-style-type: none"> <li>Satellite antenna unit: 43 cm x 44 cm (17 in x 17.3 in)</li> <li>Antenna dish diameter: 37 cm (14.6 in)</li> <li>Antenna control unit: 17.8 cm x 21.7 cm x 5.4 cm (7 x 8.6 x 2.2 in)</li> </ul>
Weight	<ul style="list-style-type: none"> <li>Satellite antenna unit: 9 kg (19.8 lbs.)</li> <li>Antenna control unit: 1.20 kg (2.6 lbs.)</li> </ul>
Environmental	<p><b>Installation environment</b></p> <ul style="list-style-type: none"> <li>Operating temperature: -15 °C to +55 °C (5 °F to 131 °F)</li> <li>Storage temperature: -25 °C to +70 °C (-13 °F to 158 °F)</li> <li>Relative humidity: max 95%</li> </ul>
Conformance	CE - Conforms to EU Directive 2004/108/EC

## System performance

Frequency	Ku-band 10.7 to 12.75 GHz
Minimum EIRP	50 dBW

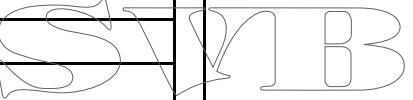
Azimuth range	680°
Elevation range	+10 to +80°
Vessel motion	<ul style="list-style-type: none"> <li>Roll ±25°</li> <li>Pitch ±15°</li> </ul>
Roll and pitch response rate	60° per second
Turn rate	60° per second

## 45STV

Nominal supply voltage	12 or 24 V dc
Operating voltage range	9 to 30 V dc
Power consumption	30 W typical, 50 W max
Dimensions	<ul style="list-style-type: none"> <li>Satellite antenna unit: 50 cm x 54 cm (19.7 in x 21.2 in)</li> <li>Antenna dish diameter: 45 cm (17.7 in)</li> <li>Antenna control unit: 17.8 cm x 21.7 cm x 5.4 cm (7 x 8.6 x 2.2 in)</li> </ul>
Weight	<ul style="list-style-type: none"> <li>Satellite antenna unit: 11.6 kg (25.6 lbs.)</li> <li>Antenna control unit: 1.20 kg (2.6 lbs.)</li> </ul>

Environmental	<b>Installation environment</b> <ul style="list-style-type: none"> <li>Operating temperature: -15 °C to +55 °C (5 °F to 131 °F)</li> <li>Storage temperature: -25 °C to +70 °C (-13 °F to 158 °F)</li> <li>Relative humidity: max 95%</li> </ul>
Conformance	CE - Conforms to EU Directive 2004/108/EC

### System performance

Frequency	Ku-band 10.7 to 12.75 GHz
Minimum EIRP	49 dBW
Azimuth range	680°
Elevation range	+0 to +90°
Vessel motion	<ul style="list-style-type: none"> <li>Roll ±25°</li> <li>Pitch ±15°</li> </ul> 
Roll and pitch response rate	50° per second
Turn rate	50° per second

### 60STV

Nominal supply voltage	12 or 24 V dc
Operating voltage range	9 to 30 V dc
Power consumption	30 W typical, 50 W max

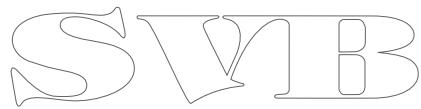
Dimensions	<ul style="list-style-type: none"> <li>Satellite antenna unit: 70 cm x 72 cm (27.5 in x 28.3 in)</li> <li>Antenna dish diameter: 60 cm (23.6 in)</li> <li>Antenna control unit: 17.8 cm x 21.7 cm x 5.4 cm (7 x 8.6 x 2.2 in)</li> </ul>
Weight	<ul style="list-style-type: none"> <li>Satellite antenna unit: 20 kg (44 lbs.)</li> <li>Antenna control unit: 1.20 kg (2.6 lbs)</li> </ul>

Environmental	<b>Installation environment</b> <ul style="list-style-type: none"> <li>Operating temperature: -15 °C to +55 °C (5 °F to 131 °F)</li> <li>Storage temperature: -25 °C to +70 °C (-13 °F to 158 °F)</li> <li>Relative humidity: max 95%</li> </ul>
Conformance	CE - Conforms to EU Directive 2004/108/EC

### System performance

Frequency	Ku-band 10.7 to 12.75 GHz
Minimum EIRP	47 dBW
Azimuth range	680°
Elevation range	+5 to +90°
Vessel motion	<ul style="list-style-type: none"> <li>Roll ±25°</li> <li>Pitch ±15°</li> </ul>

Roll and pitch response rate	45° per second
Turn rate	45° per second



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[www.raymarine.com](http://www.raymarine.com)

CE