Free Way 1M

In Motion Satellite Antenna

User Manual

Ver. 1.0

Thanks to have bought our products.
We recommend to read all this instructions manual before installing and making use of the l'antenna.
Please, fill in the gap beneath with the antenna's serial number.
In case of problems, please transmit the following number:

Serial Nr. : _____

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Notes, Cautions, and Warnnings

Caution – Improper handling by unqualified personnel can cause serious damage to this equipment. Unqualified personnel who tamper with this equipment may be held liable for any resultant damage to the equipment.

Install under DRY condition ONLY! Do not install this system in the rain, or under any wet conditions. Moisture may affect electronics and void warrenty!

Warning – Need 2 people to install the antenna onto the roof. Do not try to install the antenna by yourself.

Note – Before you begin, carefully read each of the procedures in this manual. If you have not performed similar operations on comparable equipment, do not attempt to perform these procedures.

ntroduction

The Free Way 1M satellite antenna system is the innovative and a technologically advanced satellite In-Motion system. The Free Way 1M has a unique combination of state-of-the art components with the most sophisticated satellite acquisition and tracking programs to provide the following features:

- Fast satellite acquisition
- Compatible with any Satellite Receiver
- Compatible with all Direct Broadcast Satellites (DBS)
- Built-in Digital Broadcast Receiver(DVB)
- Capable of High Definition receiving

1.1 *Specifications*

Antenna Type	Parabola
Frequency Band	Banda Ku
Frequency Range	11,7 GHz – 12,75 GHz
Dish Dimension	390 x 700 mm
Antenna Weight	9 Kg
Antenna Gain	33 dBi
Minimum EIRP	49 dBW
Polarization	V/H o RHCP/LHCP
Type of Stabilization	2-axis Step Motor
Elevation Range	19° - 64°
Azimuth Range	Unlimited
Tracking Rate	50° /sec
Temperate Range	da -20° a 70°
Power	12-24 V DC

Table 1-1 Specifications

1.2 *Antenna system overview*

A complete satellite TV system, illustrated in Figure 1-1, includes the Free Way 1M antenna connected to a IDU, a satellite TV receiver, and a television set.

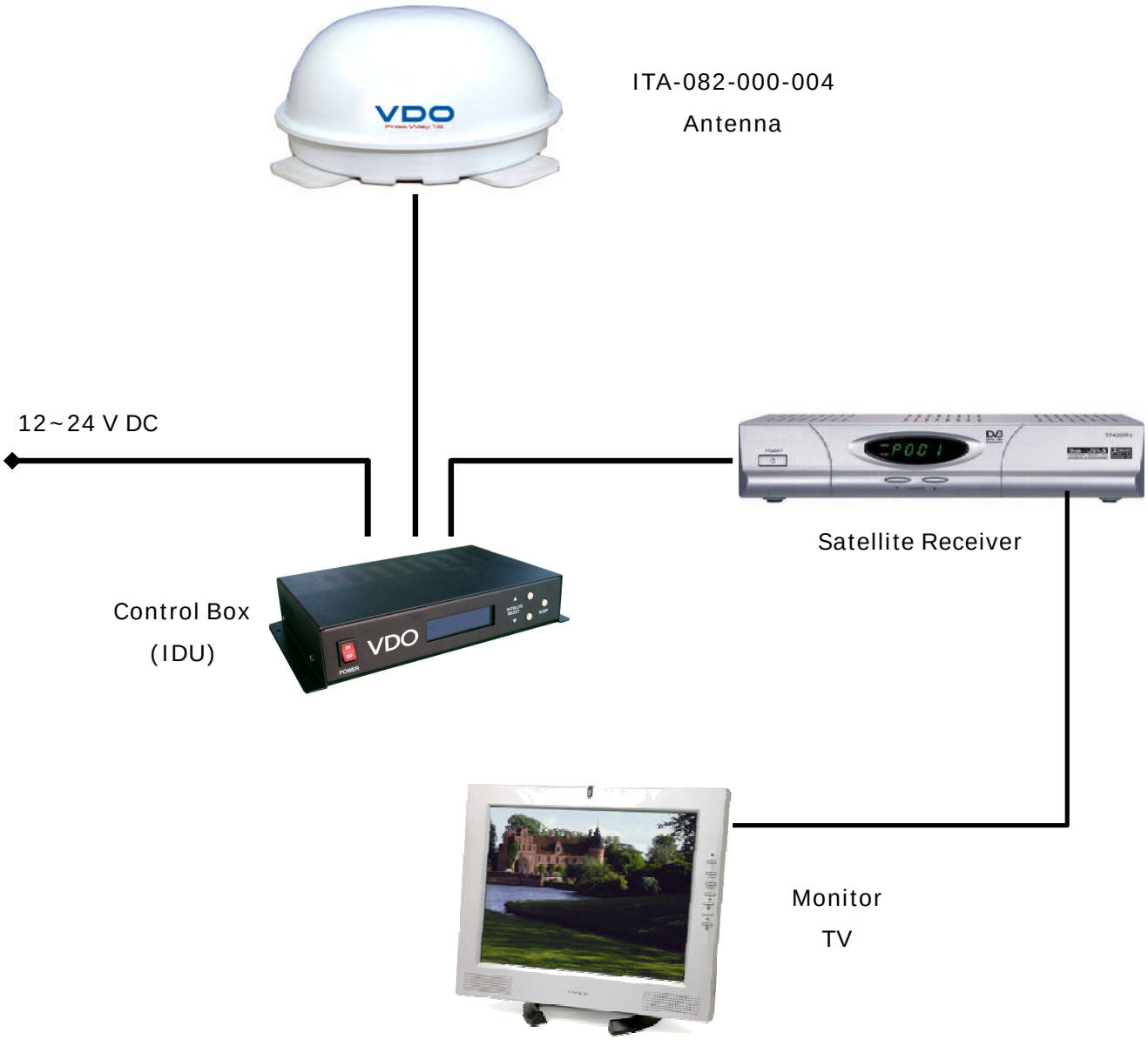


Figure 1-1 System diagram

1.3 Direct broadcast satellite overview

Direct Broadcast Service (DBS) satellites broadcast audio, video and data information from satellites located 22,000 miles in space. A receiving station, such as the Free Way 1M antenna, should include a dish and satellite receiver to receive the signals and process them for use by the consumer audio and video equipment. The system requires a clear view of the satellite to maximize the signal reception.

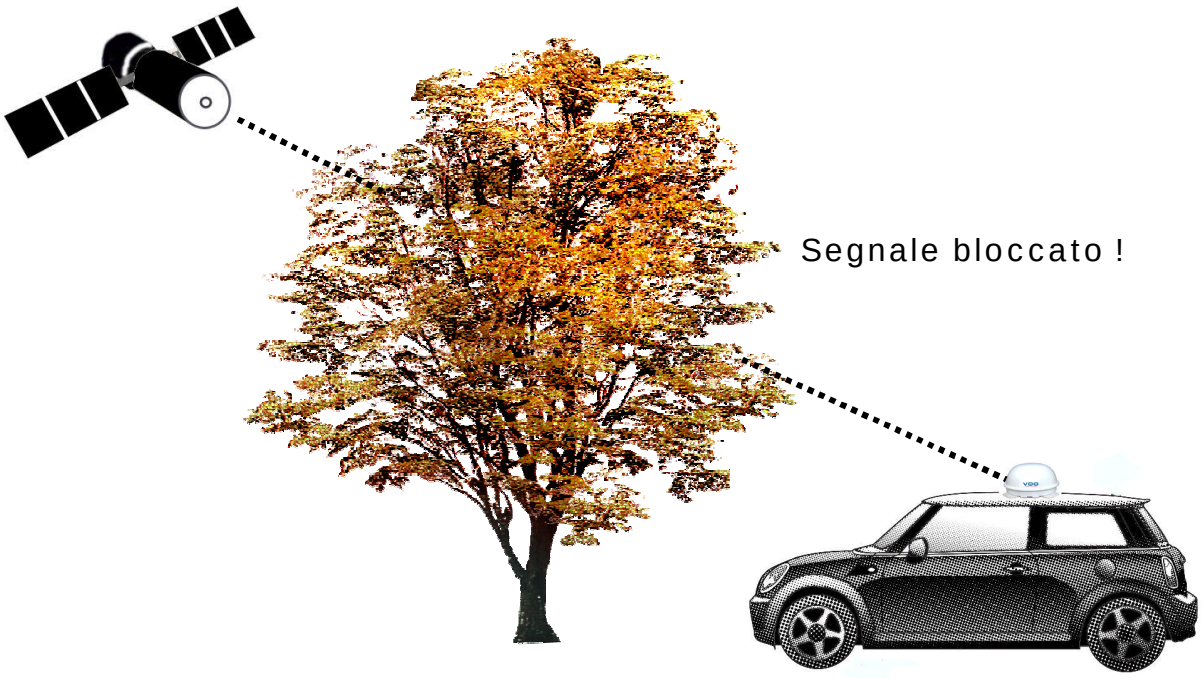


Figure 1-2 Satellite blockage

Objects such as tall houses, bridges and big trees that block this view will cause a loss of signal. The signal will be quickly restored once the antenna has a clear line of sight again. Heavy rain, cloud, snow or ice may also interfere with the signal reception quality. If the satellite signal is lost due to blockage or severe weather condition, services from the receiver will be lost (picture will freeze frame and may disappear). When the satellite signal strength is again high enough, then the receiver will resume providing desired programming services.

1.4 System components

Antenna

The antenna unit houses the antenna positioning mechanism, LNB (low noise block), and control elements within a radome. Weathertight connectors join the power, signal, and control cabling from the belowdecks units.

Control Box

The Control Box (IDU – Indoor Unit) is the system's user interface, providing access to the system and its functions. The Control Box also serves as the vehichle's junction box, allowing the system to use vehicle power, and supply and receive data to/from the antenna unit.

Figure 1-3 System components

Installation

This section offers a general explanation of how properly to install the Free Way 1M antenna. Installation of the Free Way 1M antenna must be accomplished by or under the supervision of an authorized dealer for the Limited Warranty to be valid and in force. The steps in the installation and setup process are as follows:

2.1 Unpacking the unit

1. Open the box and removing the packing material

   The following items are included in the packaging of the Free Way 1M antenna.

Item	Description	Quantity
1	Free Way 1M Antenna Unit	1 pc
2	IDU(In Door Unit)	1 pc
3	Power Cable	1 pc
4	Coaxial Cable (10 cm)	1 pc
5	Coaxial Cable (1 m)	1 pc
6	User Manual	1 set

Table 2-1 Parts included

2. Lift dome out of box vertically. Do not turn box and “roll” out, or turn upside down to remove.

Figure 2-1 Unpacking the unit

2.2 Preparing for the installation

1. Install Tools and Materials

The Free Way 1M antenna system is designed for simple installation and setup. However, the following list of equipment or items should be available during installation of the Free Way 1M antenna.

- § Electric drill and drill bits
- § Socket wrench
- § Silicon sealant
- § Fastener suitable for specific application

2. Verification of the vehicle's power supply

- § Confirm that the vehicle's power supply is 12VDC~24VDC.

3. Verification of the satellite receiver and Control Box's attachment and the electricity supply

- § Attach satellite receiver and Control Box in the interior of the vehicle of the trunk
- § Connect the power of satellite receiver and Control Box
- § Once the power of Satellite Receiver and Control Box is verified, it confirms that both Satellite Receiver and Control Box are working normally.

4. Procedure of the satellite's attachment and installation

- § Attach the satellite on the flat surface area of the vehicle's roof.
- § Connect each end of the Coaxial antenna cable to the satellite's terminal and the Control Box.
- § Connect the Control Box and the Satellite Receiver box together through the coaxial cable.
- § Make sure that the satellite is working normally, once the power is supplied.

Warning: things to consider when installing the antenna:

- § Turn off the power when attaching or detaching the antenna.
- § Make sure that the attached satellite is fixed on the flat surface.
- § Ensure that all the cables are connected properly.

2.3 Selecting the location

Determine the optimum mounting location for the antenna radome assembly. It should be installed where :

1. The antenna has a clear line-of-sight view to as much of the sky as is practical. Choose a location where masts or other structures do not block the satellite signal from the dish as the vehichle turns.

2. The antenna is at least 5 feet away from other transmitting antennas (HF, VHF and radar) that may generate signals that may interfere with the Free Way 1M antenna. The further away the Free Way 1M antenna is from these other antennas, the less impact their operation will have on it.

3. Direct radiation into the antenna from vehicle radar, especially high power surveillance radar arrays, is minimized. The radome should be as far away from the vehicle Radar as possible and should NOT be mounted on the same plane as the vehicle Radar.

4. The antenna radome assembly should be rigidly mounted to the vehichle. If necessary, reinforce the mounting area to assure that it does not flex due to the vehichle motion or vibration.

If these conditions cannot be entirely satisfied, the site selection will inevitably be a “best” compromise between the various considerations.

Figure 2-2 Selecting the location

2.4 Equipment and cable installation

This offers a general explanation of how to install the Control Box and satellite receiver properly to the inside of vehichle connecting with coaxial cable.

1. The coaxial cable is routed from the antenna to the Control Box inside the vehicle.

2. After once deciding where to place the Control Box and satellite receiver, make sure that both units are placed in a dry and protected area.

3. The Control Box and satellite receiver should be placed away from any heat source and in an area with proper ventilation.

4. Ensure that there are at least 3cm of space around both units for ventilation and connection of cables. Do not stack the units on top of each other.

5. Connect the coaxial cable to the Free Way 1M antenna port on the back of the Control Box

6. Connect the secondo coaxial cable between the Control Box and the satellite receiver

2.5 Setting the LNB skew angle automatically (only models with Auto-Skew function)

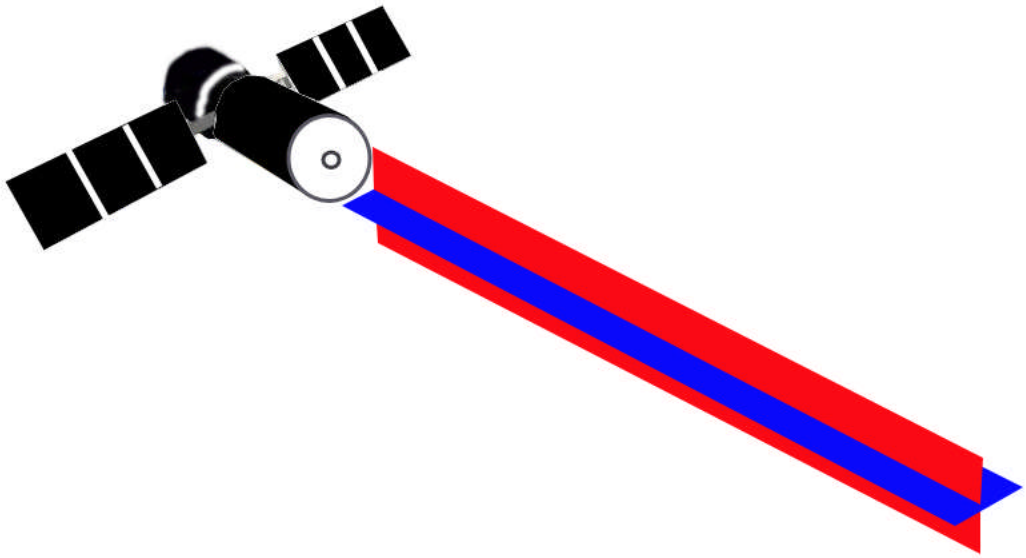


Figure 2-3 Satellite signals

Signals transmitted in vertical(red) and horizontal(blue) wave offset exactly 90º from each other. Since linear satellite signals are oriented in a precise cross pattern, the Free Way 1M antenna's receiving element, called an LNB (low-noise block) must be oriented in the same way to optimize reception. This orientation adjustment is referred to as the LNB's "skew angle." Figure 2-4 illustrates how skew determines the amount of signal the LNB collects. The more signal, the better reception.

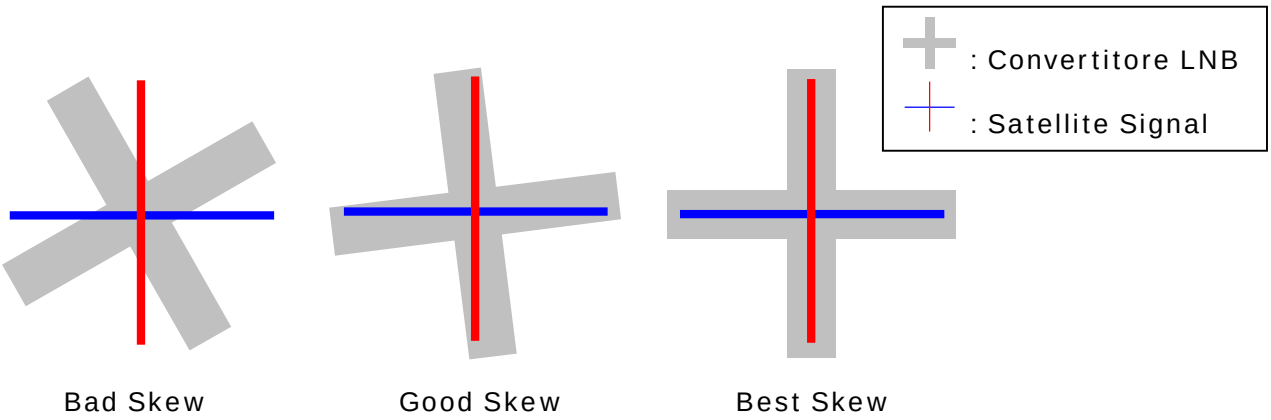


Figure 2-4 Best Skew Angle

The correct skew setting varies depend on your geographic location, since the orientation of your antenna to the satellite changes as you move. Free Way 1M is automatically set by GPS and skew motor. GPS gives skew controller location information. Then, skew controller command to skew motor. The skew motor changes the LNB angle and hold on the LNB. If you move to other area, the skew angle may be changed.

Operation

The Free Way 1M antenna system is easy to use. Under normal conditions, operation of the Free Way 1M antenna requires no intervention from the user. Antenna unit initialization and satellite acquisition is completely automatic.

3.1 Receiving Satellite TV signals

Television satellites are located in fixed positions above the Earth's equator and beam TV signals down to certain regions of the planet. To receive TV signals from a satellite, you must be located within that satellite's unique coverage area. To check it, see "Appendix B – Satellite Coverage Map" In addition, since TV satellites are located above the equator, the Free Way 1M antenna must have a clear view of the sky to receive satellite TV signals. Anything that stands between the antenna and the satellite can block the signal, resulting in lost reception. Common causes of blockage include tall houses, bridges, builidings and big trees. Heavy rain, ice, or snow might also temporarily interrupt satellite signals.

3.2 Turning the system On/Off

Since power to the Free Way 1M system is controlled by the Control Box, you can turn the antenna on or off by applying/removing operating power to the Control Box.

Turning on the system

Follow the steps below to turn on your Free Way 1M System.

1. Make sure the antenna has a clear view of the sky.
2. Turn on your satellite TV receiver and TV.
3. Apply operating power to the Control Box.
4. Wait one minute for system startup. The Control Box will display the Tracking Satellite screen after system testing is complete.

Turning off the System

Follow the steps below to turn off your Free Way 1M System.

1. Remove operating power from the Control Box.
2. Turn off your satellite TV receiver and TV.

3.3 Changing channels

If you have followed the installation instructions, your system should be set to the satellite of your choice and the system should have downloaded the appropriate channel guides. When the Free Way 1M antenna system and satellite receiver is properly configured, it is easy to change the channel using the remote control that normally comes with the receiver unit.

3.4 Watching TV

The Free Way 1M antenna is designed to operate as efficiently and as reliably as possible when the vehichle is moved and anchored. It is also the quickest satellite acquisition system available among the Free Way 1M antennas. If you have anchored the vehichle and the antenna has completed to searching selected satellite, turn off Control Box Power to avoid unnecessary use of power. Because the LNB receives its power from the Satellite Receiver through the Control Box, the antenna will continue to receive the satellite TV signals.

3.5 Switching between Satellites

You can switch between satellites using the IDU by pressing Satellite select buttons. Follow the steps below to switch to another satellite.

1. Ensure that the Control Box's leds are on.

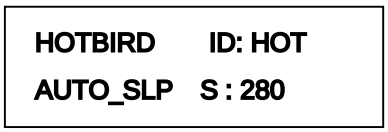


Figure 3-1 Control Box Leds

2. Press the Satellite select buttons to switch to another satellite.
3. The antenna shifts to track selected satellite. Wait for the ending of Tracking Satellite operation.

3.6 Operating the Control Box

Appearance

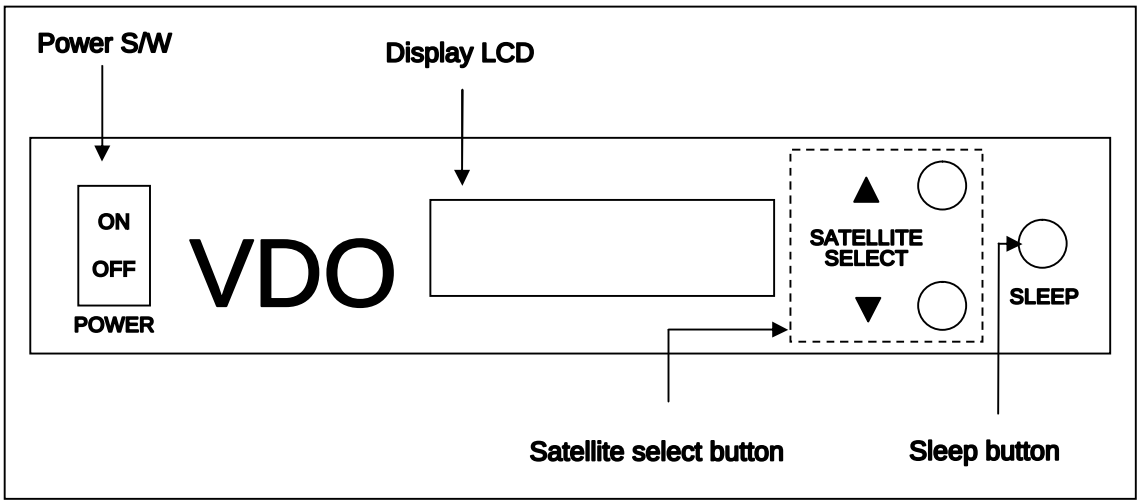


Figure 3-2 Appearance of Control Box

Functions of LCD Display

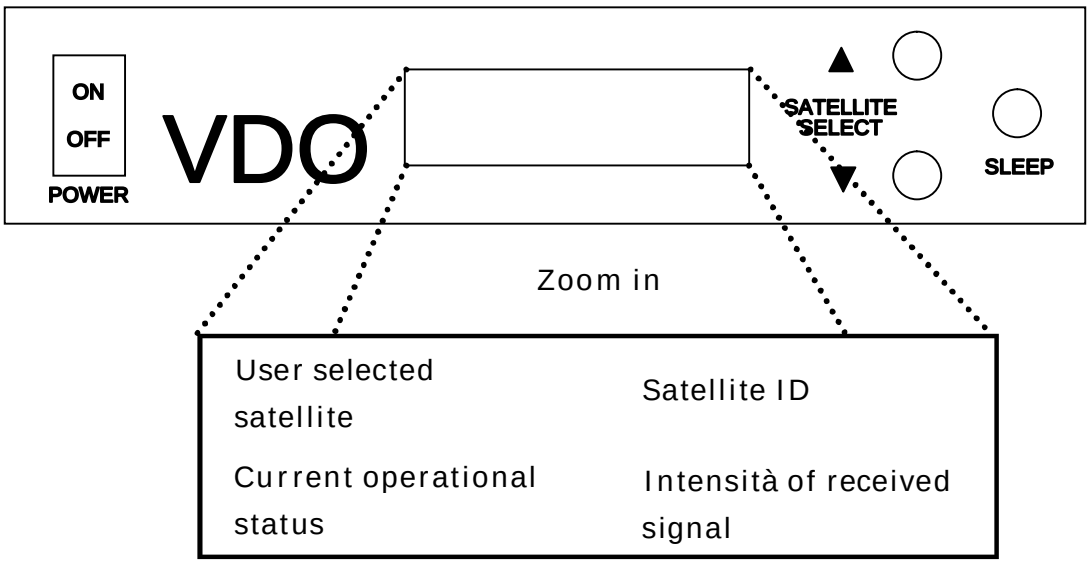
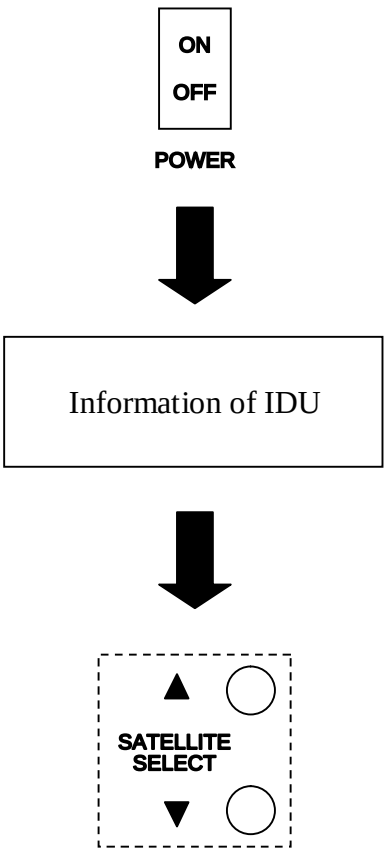


Figure 3-3 Functions of LCD Display

Explanation of words in LCD

- INIT : It shows condition of initializing the antenna.
- INIT-SCH : It shows condition of initial search mode.
- SAT-MOVE: It shows condition of moving to another satellite.
- S:xxx : It shows intensity of signal.
- ID:xxx : It shows ID of acquired satellite.
- GYRO-CAL : It shows condition of calibrating the Gyro Sensor.
- SEARCH : It shows condition of searching.
- TRACKING : It shows condition of tracking the satellite.
- RE_SEARCH : It shows condition of researching the satellite.
- AUTO_SLP : It show condition of auto-sleep mode

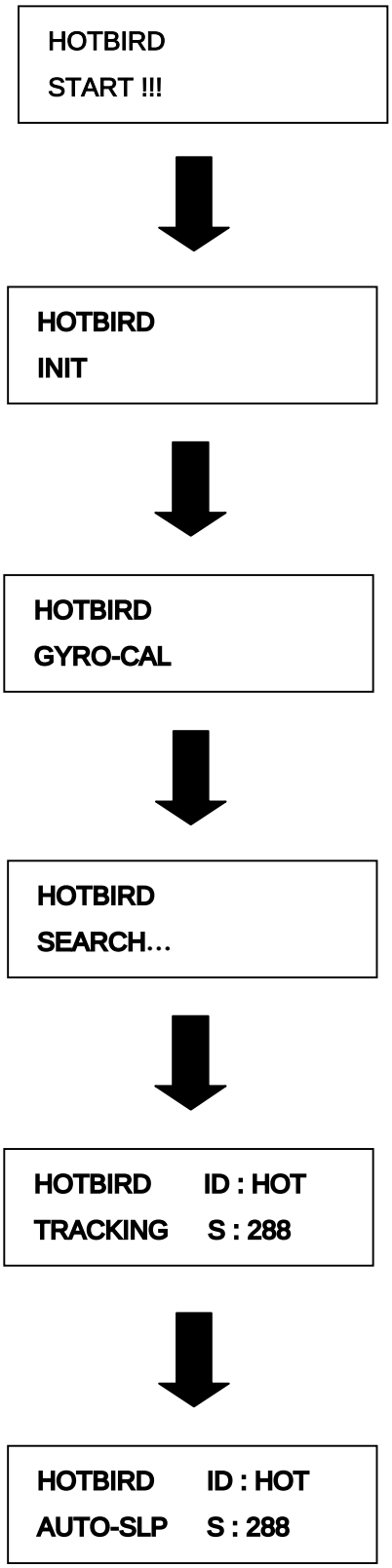
General Operation Order



Turn the power switch on

LCD shows information of Control Box

Push the satellite select button to choose satellite



It notices the start

The antenna is being initialized

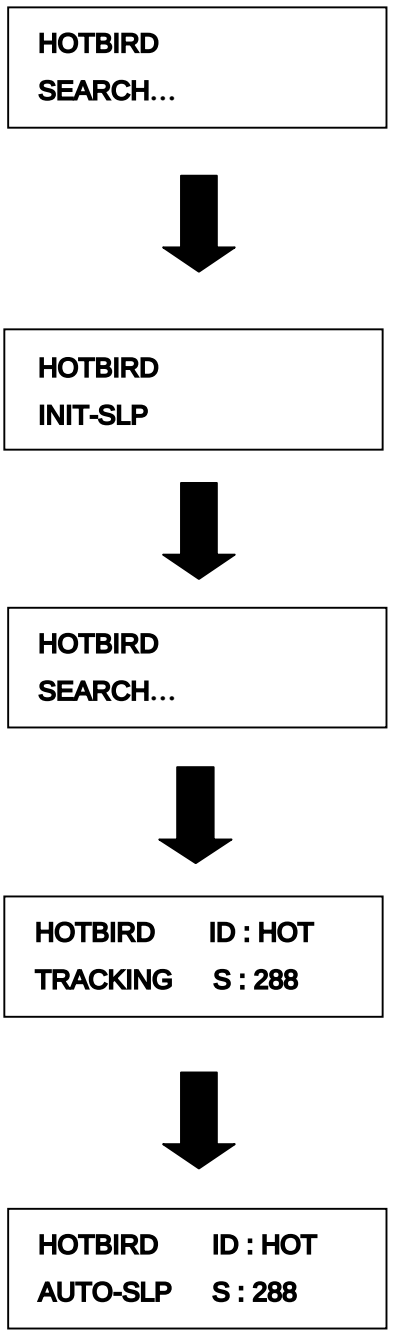
Gyro sensor is being calibrated

The antenna is searching the selected satellite

It shows ID and intensity of signal. The antenna is tracking the satellite

The Antenna stops to track the satellite

In case of search failure



The antenna is searching the selected satellite

If the antenna cannot search the signal, it stops to search during 2 minutes and repeat searching the satellite

The antenna is searching the selected satellite

It shows ID and intensity of signal. The antenna is tracking the satellite

The Antenna stops to track the satellite.

Troubleshooting

There are a number of common issues that can affect the signal quality or the operation of the Free Way 1M antenna system. The following sections address these issues and potential solutions.

4.1 Simple check

Can the antenna see the satellite?

The antenna requires an unobstructed view of the sky to receive satellite TV signals. Common causes of blockage include trees, buildings, bridges, and mountains.

Is there excessive dirt or moisture on the antenna dome?

Dirt buildup or moisture on the dome can reduce satellite reception. Clean the exterior of the dome periodically.

Is it raining heavily?

Heavy rain or snow can weaken satellite TV signals. Reception should improve once the inclement weather subsides.

Is everything turned on and connected properly?

Make sure your TV and receiver are both turned on and set up for the satellite input. Finally, check any connecting cables to ensure none have come loose.

4.2 Causes and Remedies

Receiver Fault

Your satellite TV receiver might be set up incorrectly or defective. First check the receiver's configuration to ensure it is set up for the desired programming. In the case of a faulty receiver, refer to your selected receiver's user manual for service and warranty information.

Satellite Coverage Issue

Television satellites are located in fixed positions above the Earth's equator and beam TV signals down to certain regions of the planet (not worldwide). To receive TV signals from a satellite, you must be located within that satellite's unique coverage area. See "Appendix-B Satellite Coverage Map"

Satellite Signal Blocked

The Free Way 1M Antenna needs a clear line of sight (LOS), view to the satellite for uninterrupted reception. Objects such as tall houses, bridges and big trees that block this view will cause a loss of signal. The signal will be quickly restored once the antenna has a clear line of sight again. Heavy rain, cloud, snow or ice may also interfere with the signal reception quality. If the satellite signal is lost due to blockage or severe weather condition, services from the receiver will be lost (picture will freeze frame and may disappear). When the satellite signal strength is again high enough, then the receiver will resume providing desired programming services.

Satellite Frequency Data Changed

If some channels work, while one or more other channels do not, or if the antenna cannot find the selected satellite, the satellite's frequency data might have changed. Please, in this case refer to your VDO-authorized dealer or distributor for assistance.

Improper Wiring

If the system has been improperly wired, the antenna will not operate correctly. Refer to the User Manual for complete system wiring information.

Loose Cable Connectors

We recommends periodically checking the antenna unit's cable connections. A loose cable connector can reduce signal quality or prevent automatic satellite switching using the receiver's remote control. Fasten the cable connector.

Appendix A

How to Set up the Skew Angle

Signals transmitted in vertical and horizontal wave offset exactly 90º from each other. Since linear satellite signals are oriented in a precise cross pattern, the Free Way 1M antenna's receiving element, called an LNB (low-noise block) must be oriented in the same way to optimize reception. This orientation adjustment is referred to as the LNB's "skew angle." The correct skew setting varies depending on your geographic location, since the orientation of your antenna to the satellite changes as you move. This appendix provides how to set up the skew angle.

European Position Grid

If you wish to determine the Skew Angle(LNB), use the position grid(Figure A-1 European Positon Grid) and table (Table A-1 Regional Skew angle) on page 30.

Figure A-1 Europe Position Grid

The correct skew setting varies depending on your geographic location, since the orientation of your antenna to the satellite changes as you move.

Grid Num.	ASTRA2N 28.2°E	ASTRA2S 28.2°E	ASTRA1 19.2°E	HOTBIRD 13.0°E	SIRIUS 4.8°E	THOR 0.8°W	AB3 5.0°W	HISPASAT 30°W
1	13°	13°	10°	7°	3°	1°	-1°	-11°
2	10°	10°	6°	4°	0°	-3°	-4°	-14°
3	6°	6°	2°	-1°	-4°	-7°	-9°	-18°
4	1°	1°	-3°	-5°	-9°	-11°	-12°	-20°
5	-2°	-2°	-6°	-9°	-12°	-14°	-15°	-22°
6	17°	17°	12°	9°	4°	1°	-1°	-15°
7	13°	13°	8°	5°	0°	-3°	-6°	-18°
8	8°	8°	2°	-1°	-6°	-9°	-11°	-22°
9	2°	2°	-3°	-7°	-11°	-14°	-16°	-25°
10	-3°	-3°	-8°	-11°	-15°	-18°	-20°	-27°
11	21°	21°	16°	12°	6°	2°	-2°	-19°
12	17°	17°	10°	6°	0°	-4°	-8°	-23°
13	10°	10°	3°	-2°	-7°	-11°	-14°	-28°
14	2°	2°	-4°	-9°	-15°	-18°	-21°	-32°
15	-4°	-4°	-10°	-14°	-20°	-23°	-25°	-34°
16	27°	27°	20°	15°	8°	2°	-2°	-23°
17	21°	21°	14°	8°	0°	-6°	-10°	-29°
18	12°	12°	4°	-2°	-10°	-15°	-18°	-34°
19	3°	3°	-6°	-11°	-18°	-23°	-26°	-38°
20	-5°	-5°	-13°	-18°	-25°	-28°	-31°	-41°
21	33°	33°	25°	19°	9°	3°	-2°	-29°
22	26°	26°	17°	10°	0°	-7°	-12°	-35°
23	16°	16°	5°	-2°	-12°	-18°	-23°	-41°
24	4°	4°	-7°	-14°	-23°	-28°	-32°	-45°
25	-6°	-6°	-16°	-23°	-30°	-34°	-37°	-48°

Table A-1 Regional Skew Angle

Setting the Skew Angle

If you have determine the correct skew angle, follow the steps below to adjust the antenna's LNB skew angle.

Caution – To avoid bodily injury, be sure tu turn off the antenna and disconnect the power to all wored components.

1. Turn off the antenna and disconnect power to all wired components

2. Using the screwdriver, remove the screws securing the radome. Then remove and set it aside in a safe place

3. Localite the LNB assembly on the back of the antenna reflector

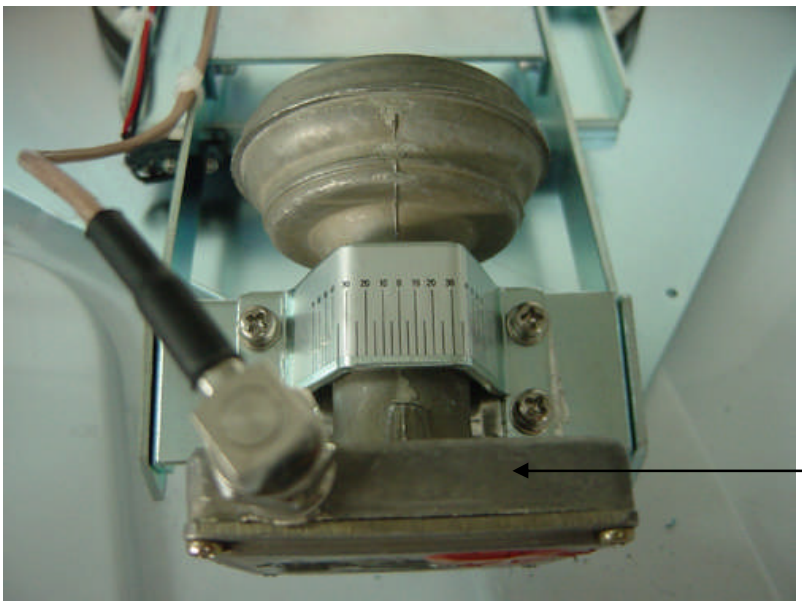


Figure A-2 The back of the reflector

4. Loosen the four screws fastening the LNB

5. Adjust the LNB clockwise or counter-clockwise, until the skew arrow on the LNB points to the skew angle that you determined earlier

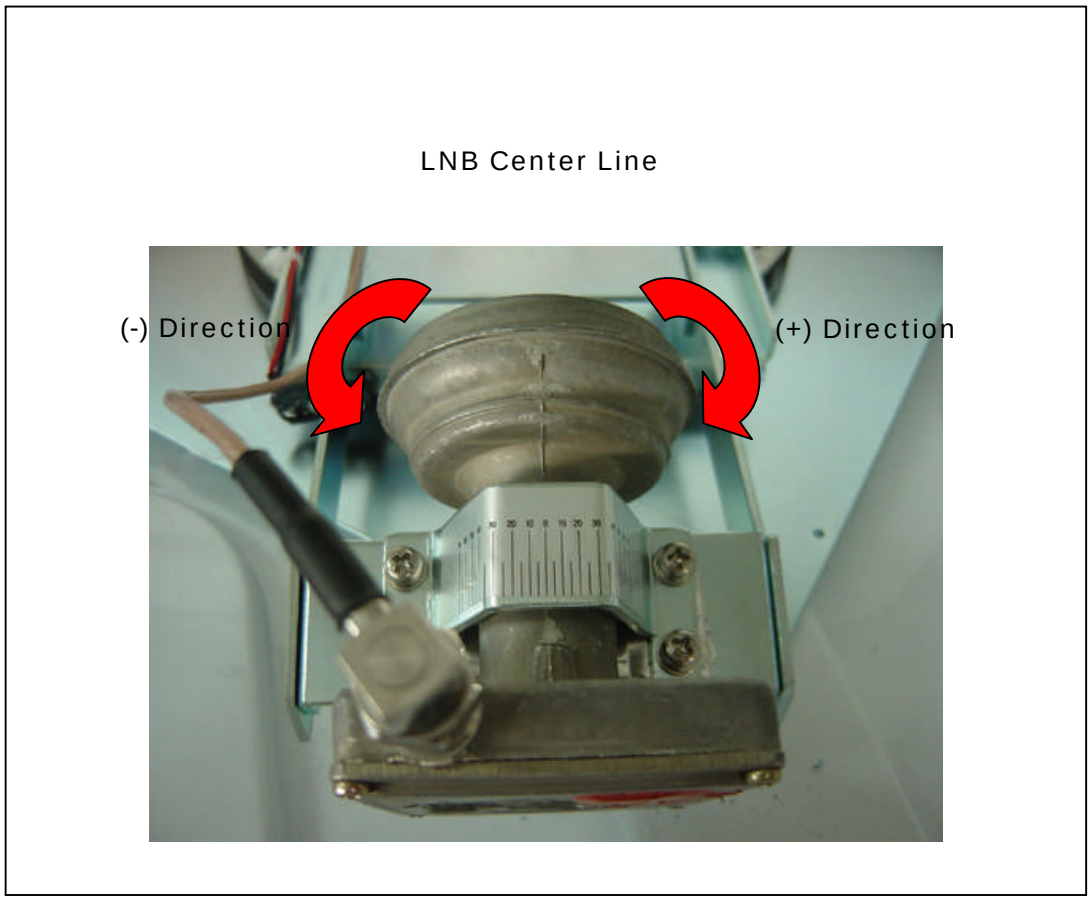


Figure A-3 LNB Skew Angle Adjustment

Caution – Be sure to keep the LNB fully inserted into the hall to ensure the optimum performance

6. Tighten the four screws

7. Reinstall the radome.

Appendix B

Satellite Coverage Map

Television satellites are located in fixed positions above the Earth's equator and beam TV signals down to certain regions of the planet (not worldwide). To receive TV signals from a satellite, you must be located within that satellite's unique coverage area.

Satellite TV broadcast spot beams are aimed at land masses where the bulk of subscribers can be found. Thus, the signal strength decreases as you travel away from the land masses. The further you travel offshore you will require a larger size antenna. Signal strength and reception can be affected by the weather conditions.

Here in succession are reported the coverage map of the main satellites used for TV broadcasting.
Although this information is believed to be correct, Continental Automotive Trading Italia has no control over the variations on the actual satellite footprint coverage

Astra 2N

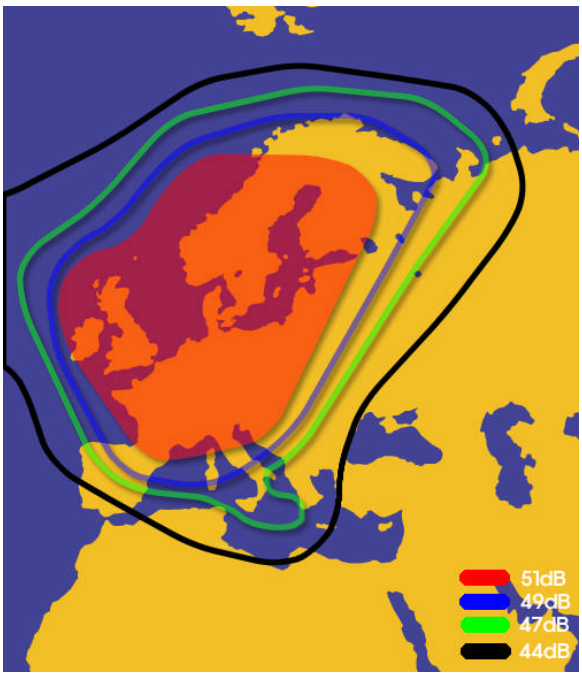


Figure B-1 Astra 2N coverage map

Astra 2S

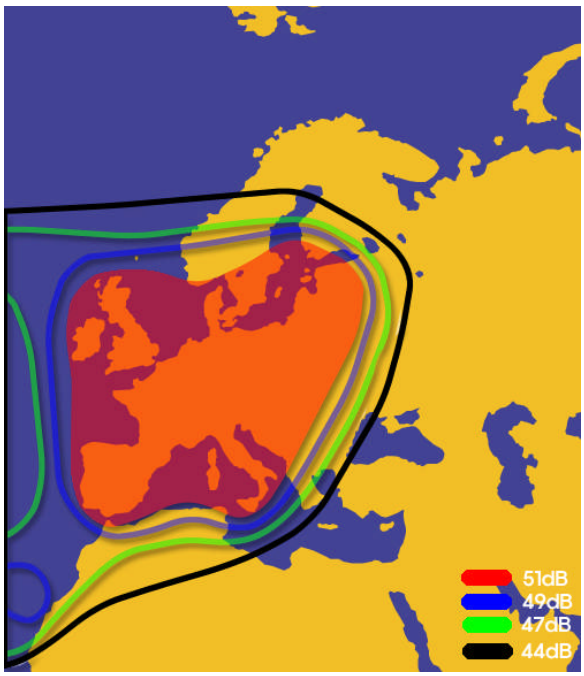


Figure B-2 Astra 2S coverage map

Astra 1

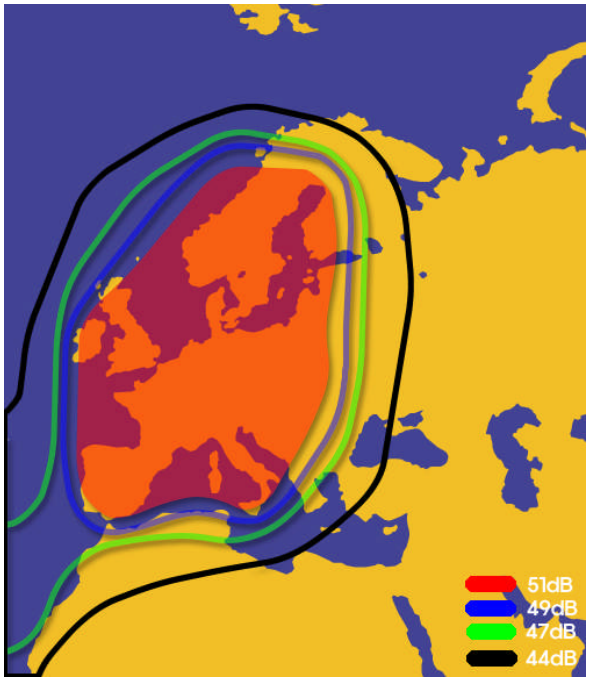


Figure B-3 Astra 1 coverage map

Hotbird

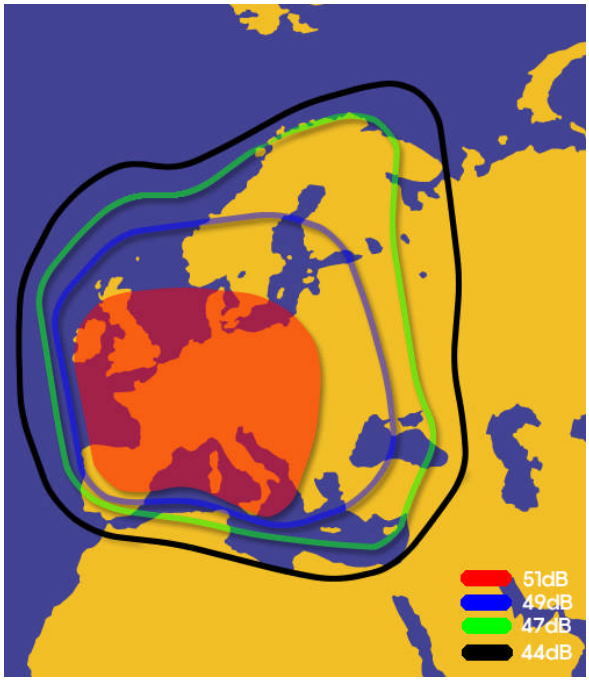


Figura B-4 Hotbird coverage map

Sirius

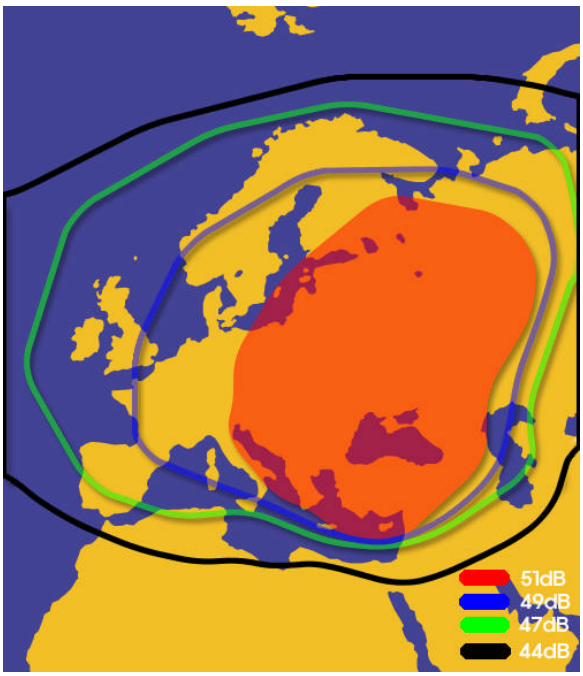


Figure B-5 Sirius coverage map

Thor 2/3

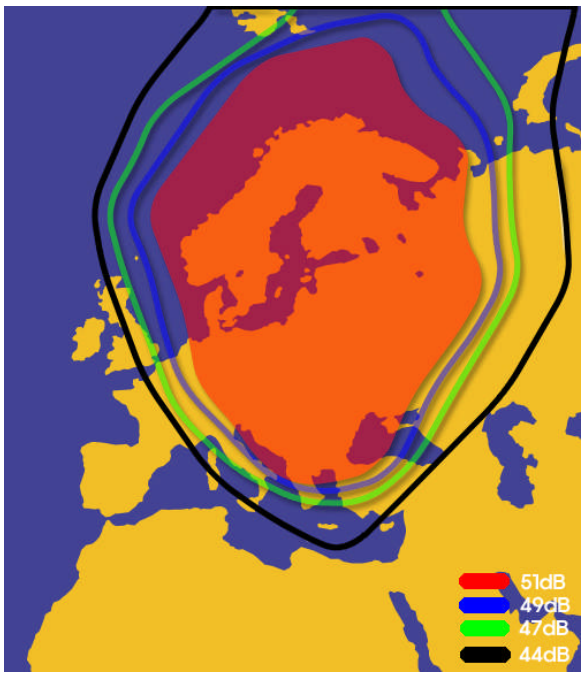


Figure B-6 Thor 2/3 coverage map

Atlantic Bird 3

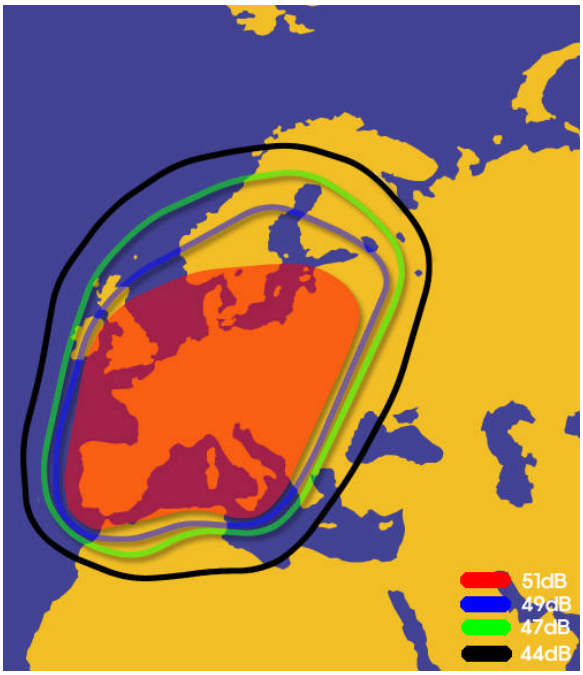


Figure B-7 Atlantic Bird 3 coverage map

Hispasat

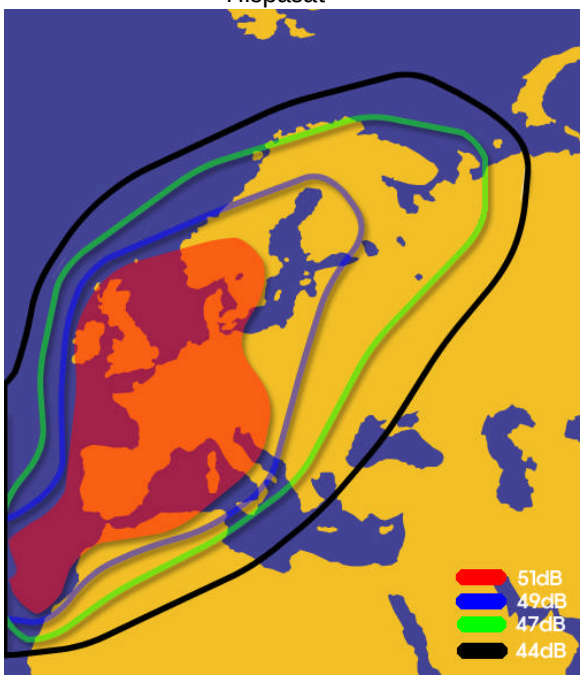


Figura B-8 Hispasat coverage map

Appendix C

Firmware Upgrade

If satellite beam is changed or eliminated, you have to upgrade firmware of Control Box. The update will be free supplied from Continental Automotive Trading Italia.

To perform the updating, follow the steps below.

1. Prepare the SD memory card

Figure C-1 SD memory card

2. Before you use the SD memory card, you should format it to "FAT16 (default)"

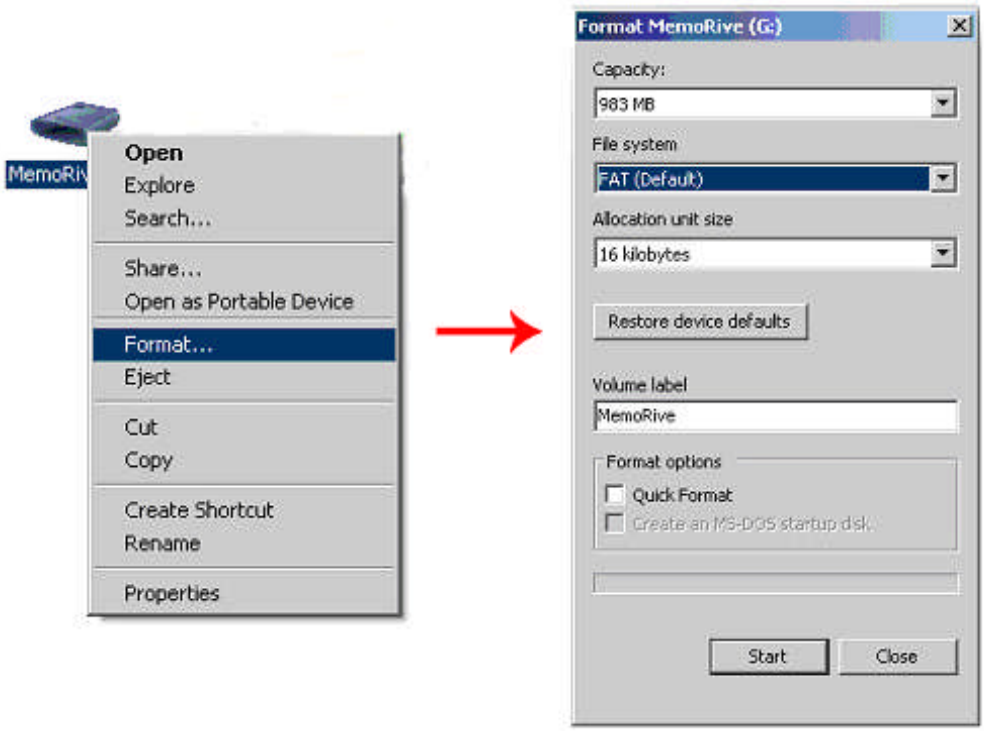


Figure C-2 Formatting SD memory card

3. After formatting your SD card, copy the new software file received from Continental Automotive Trading Italia

4. Turn off the Control Box

5. Put your SD memory card into the SD slot of back side of the Control Box

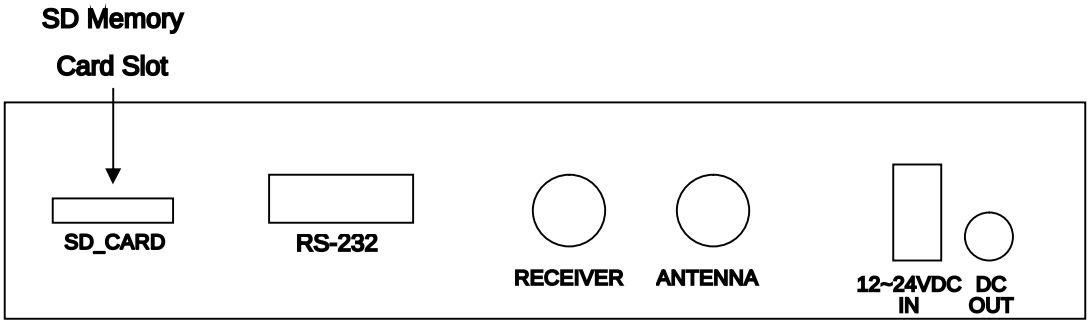


Figure C-3 The back of the IDU

6. Turn on the Control Box. You can see the message “WRITING SOFTWARE” in LCD Display.

7. If you see the message “FINISH TO WRITE”, the Control Box is finishing the software upgrade. You have to wait until the Control Box is restarted

8. Turn off the Control Box. Take your SD memory card away from the slot.

9. Turn on the Control Box

Appendix D

Antenna Drawing

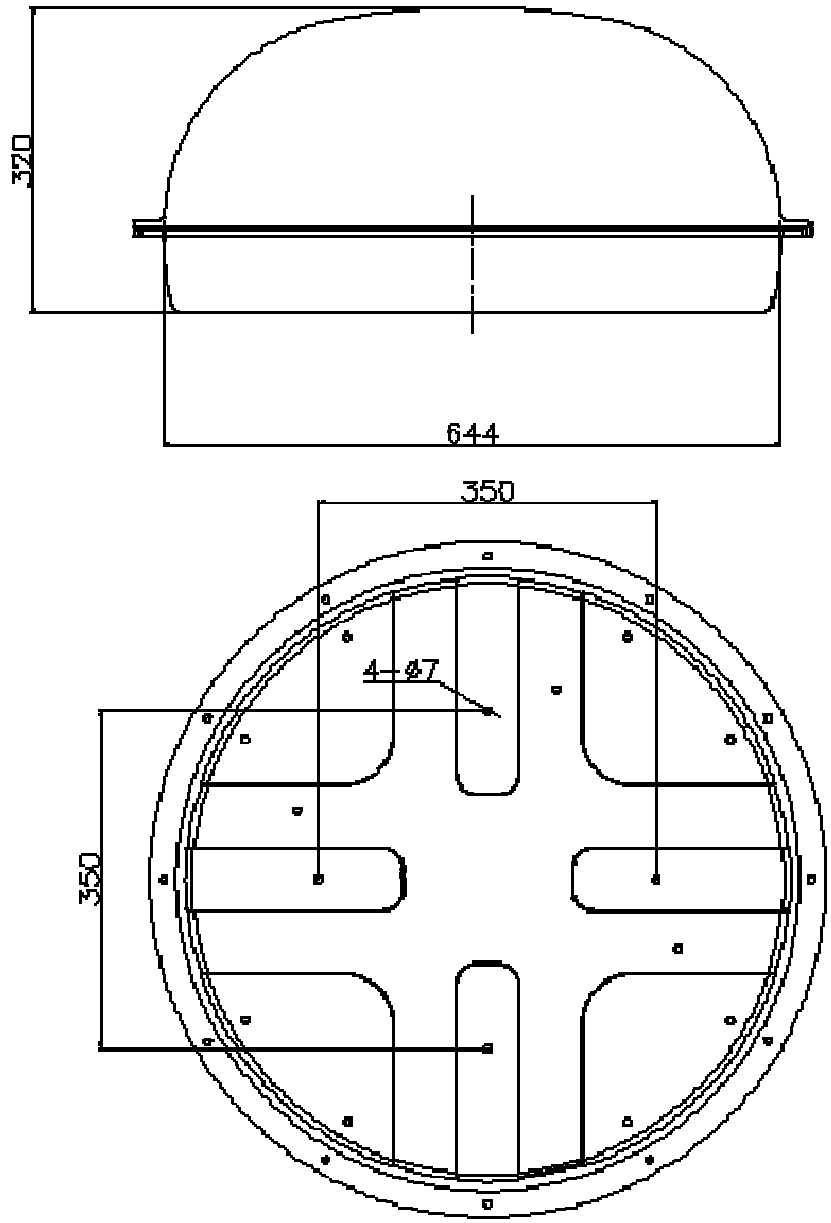


Figure D-1 Antenna Drawing