



HDR-108 RECEIVER
MANUAL V9.18
SW V9_1532162837571-20



Accessories included in this manual:



Down Converter &
Switchable Down-
Converter



QPT Pan & Tilt Positioner



Multisector Antennas



GPS-02
Receiver with
Antenna



NX-820 voice
and GPS
Transmitter

Contents

Chapter 1: Introduction

The first chapter provides a general description of the High Definition HDR-108 Receivers.

Chapter 2: Technical features

The second part offers the physical and environmental characteristics of the Receiver.

Chapter 3: How to order

The third part provides the user with information on ordering and different configurations available for these Receivers.

Chapter 4: Receiver Operation and Menus

The fourth part provides the user with all the necessary information to control and operate the equipment properly. The function of each button on the keyboard is detailed. It also outlines how the information is shown on the display, Receiver's menus, alarms, etc.

Chapter 5: Autotracking Antenna

In this chapter the Autotracking antenna control and how to configure this option is explained.

Chapter 6: GPS

This chapter indicates the operation of the Receiver GPS system and specifies the parameters that are shown in the GPS screen.

Chapter 7: Web Server

This chapter provides a detailed description of the Web Server tool. This feature allows the control of the Receiver through a website.

Chapter 8: Equipment Installation

This chapter indicates the available connections of the Receiver, the characteristics and the installation.

Chapter 9: Mechanical Dimensions

In this chapter, the mechanical drawing of the units described in this manual are included.

Chapter 10: Preventive maintenance

This chapter explain the procedure that should be followed during the Receiver's live.

Chapter 11: Warranty

This chapter contains warranty considerations and conditions.

Annex A. DC & DC-SW User Guide

The annex A includes the user guide for DC COFDM down converters and DC-SW switchable down converters.

Annex B. QPT User Guide

This annex indicates how to install and use the QPT-20 and QPT-90 with SVP Broadcast Microwave's tracking system.

Annex C. NX-820 User Guide

This annex provides a brief description of the technical features of the UHF GPS&Voice transceiver.

Annex D Multisector Antennas User Guide

This annex includes the user guide for the multisector antennas, both diversity and switching antennas developed by SVP.

Annex E. Video over IP Monitoring on a PC

Here how to use the video over IP output connection to a computer is explained.

Annex F. GPS-02 Receiver

This annex includes all the characteristics for the external GPS Receiver with antenna.

Dear Customer,

We would like to thank you for selecting this equipment and welcome you to the SVP's growing family of products.

We are sure that the addition of this equipment will give complete satisfaction to you with your existing installation.

Please read these instructions carefully and keep them to hand in case you need to refer to them.

About this manual

This user's guide provides indications and explanations about how to set up the Receiver easily in the most common cases.

This document is intended to help first time users:

- To find their way around the GUI.
- To understand the different possibilities of the Receiver.
- To configure the HDR series for their specific configurations.

Symbols

The symbols that appear in this manual are:



An information message which indicates explanations for the proper operation of the equipment.



It advises users that if they do not avoid, make or take specific actions, the device could be damaged.



In places where this symbol appears it means that by pressing the Down button the user can access the next screen.



In the options where this symbol appears, means that pressing the OK button, the user can access the submenu related to that option or can change the value of the parameter.



These symbols mean that the parameter can be modified on the same screen with the right and left keys.

Important Notes

- HDR series are MPEG2/H.264 4:2:2 – 10 bits – DVB-T2/T/ and ISDB-T with up to 8 diversities Receivers, these Receivers are fully compatible with the DVB-T2 standard included in ETSI EN30075, with DVB-T standard included in European Standard ETSI EN300744 and ISDB-T included in ARIB STD-B31 standard.
- The complete Receiver system consists of two parts: firstly, there are one or more down-converters, which are installed outdoors next to the Receiver antennas and secondly, the HDR series Receiver which demodulates the IF delivered by the down converter.
- These Receivers are commonly used with SVP DC down converters, which are available from 1.3 to 10.5 GHz in different frequency bands.
- On the Receiver site it is important to determine if the channel in which the transmission will be done has interference, if any other transmission is being done in that channel.
- While the equipment is being installed, the power supply of the down-converters should be disabled in the Setup Configuration menu in order to avoid the risk of short circuits.
- If Celflex 1/2 coaxial cables are used, the maximum length is 150 m. On the other hand, if RG-214 coaxial cables are used, the maximum length is limited to 100m.
- The Receiver must be well ventilated. Some space must be left next to the sides of the Receiver for ventilation purposes. This is especially important when it is installed in a rack case.
- Special care should be taken with SDI cables. Quality and length are very important especially with HD-SDI or 3G-SDI signals.
- If the user wants to install the rack mount demodulator unit horizontally, guides should be used, due to the weight of the equipment.
- It is not advisable to use a power supply lead with a cross-section less than that of the lead supplied, since this would cause a drop in the supply voltage and a deficiency in the operation of the equipment.
- Only authorized personnel should open the unit. Any repair or warranty will be invalidated if the seals are broken.

First Aid in Case of Electric Shock

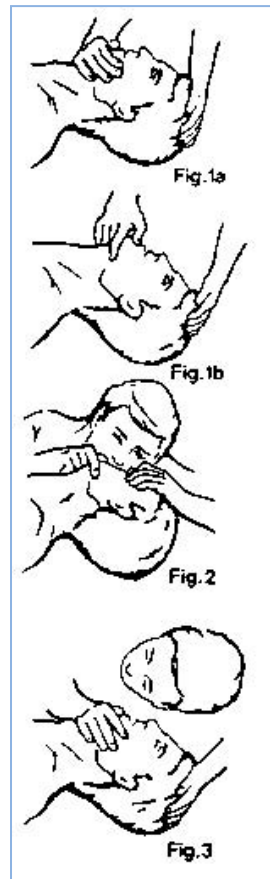
DO NOT TOUCH THE VICTIM WITH YOUR BARE HANDS until the circuit is broken. SWITCH OFF ELECTRIC CURRENT FOR MAINS. If this is not possible, PROTECT YOURSELF with DRY insulating material and pull the victim clear of the conductor.

If breathing has stopped, indicated by unconsciousness, lack of respiratory movements and a 'blue' look to cheeks, lips, ears and nails, START RESUSCITATION AT ONCE.

EMERGENCY RESUSCITATION – THE EXPIRED AIR METHOD

(Approved by the Royal Life Saving Society)

1. If possible, lie the victim on his back with his head slightly higher than his feet. Clear the mouth and throat of any obvious obstruction.
2. Kneel on one side of the victim, level with his head. LIFT THE JAW AND TILT THE HEAD BACK AS FAR AS POSSIBLE (Figs. 1a and 1b)
3. One of the following may happen:
4. Breathing may begin and consciousness returns.
5. Breathing may begin but consciousness NOT returns. Turn the victim on his side and ensure that the airway is kept clear.
6. Breathing may return but be NOISY which means that the airway is not fully clear. Try to clear the airway.
7. IF THERE NO SIGN OF BREATHING:
8. Check that the head is still tilted back.
9. Take a deep breath.
10. Pinch the victim's nose and blow firmly into his mouth (Fig. 2). As you do, the chest will RISE.
11. Turn your head away and take another breath, watching for the chest to FALL (Fig. 3).
12. Start with four quick breaths and then continue with one breath every five seconds (i.e. 12 times a minute). This should be continued until the victim revives or a doctor certifies death.
13. As consciousness returns the victim will start to breathe on his own, and a 'pink' color replaces the 'blue' look: this is the time to stop resuscitation. Continue to hold his chin up and so keep the airway clear.
14. In the case of injuries to the mouth, it may be necessary to use mouth-to-nose resuscitation. Seal the victim's mouth with your cheek and blow firmly into his nose, proceeding as above.



15. In the case of severe facial injuries, it may be necessary to do a manual method of artificial respiration (Silvester-Brosch or Holger Nielsen). Briefly, these methods apply compression to ribcage with the victim lying on his back (S-B) or face down (H.N.) with associated movement of his arms up and out. The cycle of movement should take about five seconds, i.e. the normal breathing phase.
16. Whatever the method, it is ESSENTIAL to commence resuscitation WITHOUT DELAY and to send for medical assistance immediately.

TREATMENT FOR BURNS

If the victim is also suffering from burns, then, without hindrance to resuscitation, observe the following:

1. DO NOT ATTEMPT TO REMOVE CLOTHING ADHERING TO THE BURN.
2. If possible, alleviate the pain from the burnt part by immersing in cold water.
3. If help as available or as soon as resuscitation is no longer required, the wound should be covered with a DRY clean dressing.
4. Oil or grease in any form should not be applied.
5. If severely burnt, get the victim to hospital immediately.

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Chapter 1: Introduction

The HDR-108 Receivers perform DVB-T2, DVB-T and ISDB-T demodulations. The later enables compatibility with nearly all types of COFDM Transmitters. The DVB-T2 modulation outperforms other modulations and offers much higher data rate and therefore, higher quality or much more robust signal than DVB-T and ISDB-T, making longer and more difficult links possible.

It integrates up to 8 diversities in DVB-T2, DVB-T and ISDB-T demodulations, using spatial diversity based on MRC (Maximum Ration Combining) technique, which reduces the effects of multipath and fading losses.

The down-converters are connected to an independent Receiver antenna in order to provide diversity. This allows the user to install different antennas to take advantage of their combined characteristics or employ antennas with similar characteristics orientated in different directions in order to offer wider coverage. The use of a diversity system makes the link more robust and offers better performance than a non-diversity system.

This Receiver features H.264 and MPEG-2 decoding for high definition (HD) and standard definition (SD) signals. H.264 compression makes possible HD signal transmission and reception using 40% lower bit-rate than conventional MPEG-2 systems. Moreover, it works in 4:2:2 with 10 bits.

Based on the ultimate and most advanced NTT H.264 compression technology, it offers the highest video quality with the minimum end to end latency available in the market, 33 ms. For added security, it is compatible with BISS-1, BISS-E and optionally AES-128 and AES-256 encryption technologies.

ASI input and Transport Stream over IP input make it possible to use this Receiver as a standalone decoder. Besides, the ASI output and the Transport Stream over IP output enable the user to handle the Receiver as a demodulator.

This new generation of Receivers has several outputs: 3G/HD/SD-SDI, HDMI, Transport Stream over IP and analogue video outputs. The received signal is simultaneously reproduced in all the outputs. SDI embedded, HDMI embedded, analogue and AES audio outputs are available as standard. User data or GPS data can be received over the data channel.

The easy control, operation and monitoring make these Receivers very manageable. All the parameters of the Receiver can be configured in the field. Four user-friendly interfaces are available: front panel and display, web-browser and serial commands connection.



From now on, the Receivers HDR 108, 104 and 102 will be referred as the *Receiver*, as the content of this manual is applicable to all three models, unless any configuration or feature is specific to a model.



Figure 1.1 AM Multisector Antenna connection figure

Chapter 2: Technical features

RF Stage DVB-T2, DVB-T and ISDB-T:

Frequency Range (RF):	1.3 to 13 GHz (Depending on the Down converter used)
Frequency Stability:	±2.5 ppm
Tuning Step:	10 kHz
Diversity:	8 in the HDR-108

IF Range:

Fixed:	70 MHz to 1000 MHz
Mobile:	150 MHz to 980 MHz

Typical Receiver Threshold:

	Frequency Band	
Bitrate	<i>5 GHz</i>	<i>2 GHz</i>
<i>4 Mbps</i>	-101 dBm	-102 dBm
<i>5 Mbps</i>	-100 dBm	-102 dBm
<i>6 Mbps</i>	-99 dBm	-100 dBm
<i>7 Mbps</i>	-98 dBm	-99 dBm
<i>8 Mbps</i>	-97 dBm	-98 dBm
<i>9 Mbps</i>	-96 dBm	-98 dBm
<i>10 Mbps</i>	-95 dBm	-97 dBm
<i>12 Mbps</i>	-94 dBm	-96 dBm
<i>14 Mbps</i>	-94 dBm	-95 dBm
<i>16 Mbps</i>	-92 dBm	-94 dBm
<i>18 Mbps</i>	-90 dBm	-93 dBm
<i>20 Mbps</i>	-90 dBm	-92 dBm
<i>30 Mbps</i>	-85 dBm	-86 dBm
<i>46 Mbps</i>	-76 dBm	-78 dBm

Table 2.1: Receiver Threshold

Demodulation:

DVB-T2:	COFDM 2K, 4K, 8K and 8K_ext QPSK, 16QAM, 64QAM, 256QAM LDPC FEC: 1/2, 3/5, 2/3, 3/4, 4/5, 5/6 IG: 1/4, 19/128, 1/8, 19/256, 1/16, 1/32 Bandwidth: 1.7, 5, 6, 7, 8 MHz Max. bitrate: 46.4 Mbps Min. bitrate: 1 Mbps
DVB-T:	COFDM 2K QPSK, 16QAM, 64QAM FEC: 1/2, 2/3, 3/4, 5/6, 7/8 IG: 1/4, 1/8, 1/16, 1/32 Bandwidth: 5, 6, 7, 8 MHz Max. bitrate: 31.67 Mbps
ISDB-T:	OFDM 2K, 4K and 8K QPSK, 16QAM, 64QAM FEC: 1/2, 2/3, 3/4, 5/6, 7/8 IG: 1/4, 1/8, 1/16, 1/32 Bandwidth: 6, 7, 8 MHz Max. bitrate: 31 Mbps

Decoder:

H.264:	Profiles: Baseline, Main, High High 422 Support 10 bits Level: 4.1 – 4.2 Latency: 33 ms
MPEG-2:	Profiles: 422P@HL, MP@HL, 422P@ML, MP@ML Latency: 33 ms
Audio Decoder:	MPEG-1 Layer I/II
Max. audio input bitrate:	384 kbps per channel
Genlock input:	Black burst or tri-level, Genlock loop active

Decryption:

BISS:	BISS-1 and BISS-E
AES:	AES-128 and AES-256

Video:

Outputs:	3G-SDI HD-SDI SD-SDI HDMI (1.4) CVBS Composite video (PAL/NTSC)
Formats:	1080p (1920x1080) – 23.98/ 24/ 25/ 29.97/ 30/ 50/ 59.94/ 60 Hz 1080i (1920x1080) – 50/ 59.94/ 60 Hz 720p (1280x720) – 23.98/ 24/ 25/ 29.97/ 30/ 50/ 59.94/ 60 Hz 576i (720x576) – 50 Hz 480i (720x480) – 59.94 Hz

Audio:

Output:	HDMI/ SDI embedded/ AES Digital/ Analogue
Analogue:	2 Stereo/ 4 Mono
SDI embedded:	1 Group (4 audio channels)
AES/EBU:	2 Stereo channels

Data Channels:

Data channel:	User data
Data rate:	19,200 to 115,200 bps

ASI and IP:

Outputs and Inputs:	ASI Transport Stream (EN50083-9) Transport Stream over IP (SMTP2022/CoP3) - FEC Max. TS packets / IP packet: 7
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Control and Monitorization of the device:

Control Interfaces:	Front panel & display Web Server interface Serial control via remote port
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Monitoring:	Decoder parameters
	Demodulation parameters
	Frequency and input level
	MER, BER, C/N
Video & Audio:	Alarms, warnings, logbook and clock
	TFT Video screen 2"
	2 x Stereo loud-speakers
	Earphone output

Antenna Control:

Parabolic:	Autotracking with positioner in 2 axis
	Remote polarization control
	Compass and tilt sensor input
Multisector:	Autotracking with panel switching

Power Supply:

AC input:	90 to 240 V
DC input:	11 to 36 V

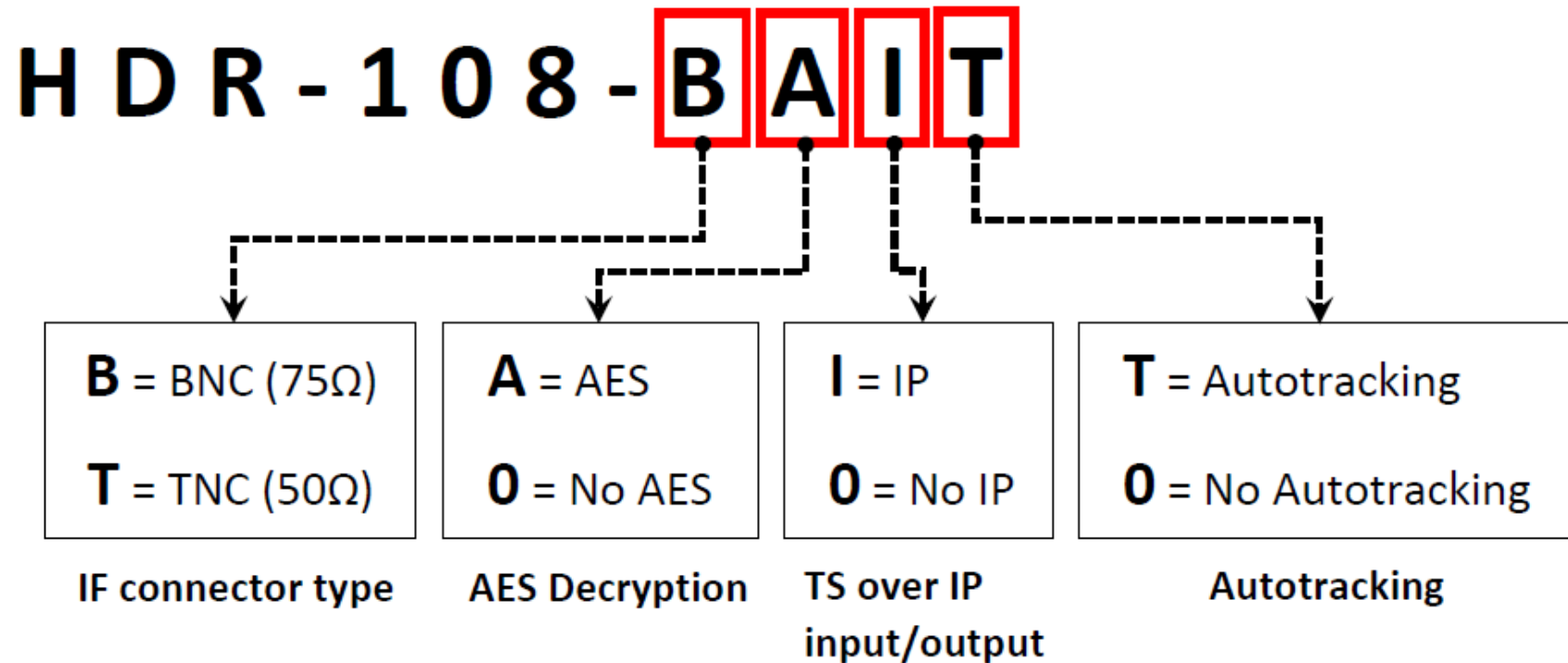
Mechanical:

Size:	1 RU rack size
Weight:	3.2 kg

Environmental:

Temperature range:	-20 to 55 °C
Humidity:	95%

Chapter 3: How to order



Chapter 4: Receiver Operation and Menus

This section contains all the necessary information to operate, control and configure the *Receiver*.

4.1 Display

To switch the equipment on and off, press ON/OFF button. When the equipment is turned on, the display will show a start-up, and then it will display the first main screen. To change from one main screen to another, the OK button must be pressed.

- 1st main screen: displays the most important parameters of the received signal.
- 2nd main screen: shows signal reception conditions, level and quality (for DVB-T2, DVB-T and ISDBT).
- 3rd main screen: displays the level of the eight received signals on the whole screen (for DVB-T2 and DVB-T).



It is important to consider that the 1st main screen is different depending on the standard of the received signal and the selected input.

Next, the main screen for each input type (DVB-T2, DVB-T, ISDBT, ASI and IP) is shown:

4.1.1 1st Main Screen for the DVB-T2

In the table below, the function of each parameter is explained.

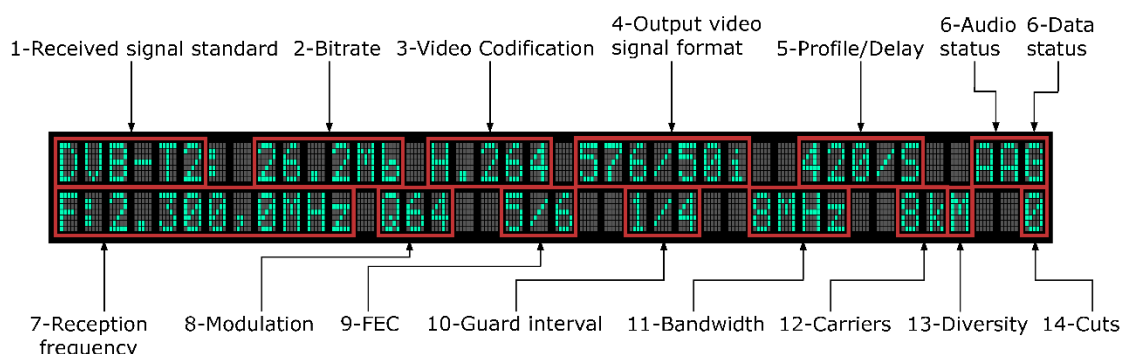


Figure 4.1: 1st Main screen DVB-T2

Parameter n°	Function
1	Received standard (DVB-T2)
2	Received bitrate (Mbps)
3	Video Codification (H.264 / MPEG-2)
4	Video Format (1080p, 1080i, 720p, 576i, 480i)
5	Video options: - Profile (4:2:0 or 4:2:2) - Delay (Standard (S), Super Low delay (SL)) or Ultra Low delay (UL).
6	Characters 1 (Audio 1) and 2 (Audio 2): - Audio status indication (Audio 1 and 2 not darkened -> audio received darkened -> audio not received) Character 3: - Data status indication (not darkened -> data received darkened -> data not received)
7	Reception frequency (MHz)
8	Modulation (QPSK, 16QAM, 64QAM, 256QAM)
9	LDPC FEC (1/2, 3/5, 2/3, 3/4, 4/5, 5/6)
10	Guard Interval (1/4, 19/128, 1/8, 19/256, 1/16, 1/32)
11	Bandwidth (1.7, 5, 6, 7, 8 MHz)
12	Number of carriers (2k, 4k, 8k and 8k_ext)
13	Diversity Technique: Mobile (M) or Fixed (F)
14	Number of cuts occurred to the input RF signal: In case there is a cut in the RF received signal, the number of cuts counter will increase its value in 1. To reset and set to 0 this value, press left button.

Table 4.1: Main screen for DVB-T2 standard



Before the audio status field, there could be a padlock depending on the encryption mode. If the input signal is encrypted, then a padlock will appear in this field.



If a flicking "s" is shown in diversity technique field, means that MRC technique has been selected by user but, due to MRC restrictions, the equipment has changed automatically to Switching mode.

4.1.2 1st Main Screen for the DVB-T

In the table below, the function of each parameter is explained. These values are numbered in the order they appear on the main screen.

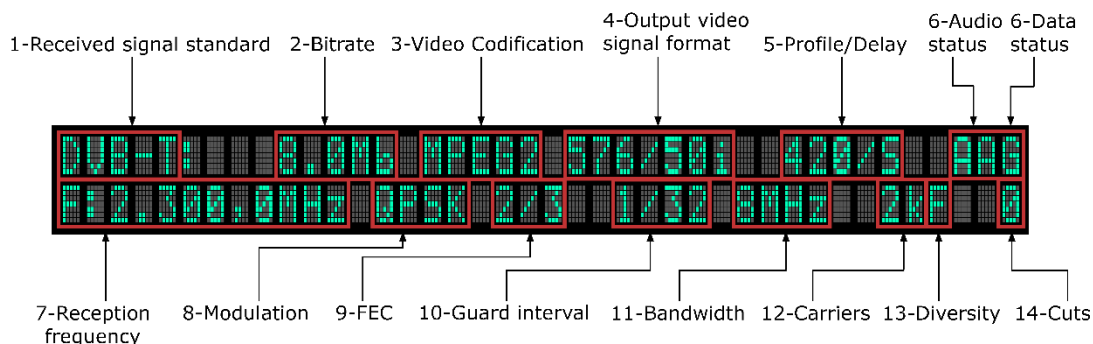


Figure 4.2: 1st Main screen DVB-T

Parameter n°	Function
1	Received standard (DVB-T)
2	Received bitrate (Mbps)
3	Video Codification (H.264 / MPEG-2)
4	Video Format (1080p, 1080i, 720p, 576i, 480i)
5	Video options: • Profile (4:2:0 or 4:2:2) • Delay (Standard (S), Super Low delay (SL)) or Ultra Low delay (UL).
6	Characters 1 (Audio 1) and 2 (Audio 2): • Audio status indication (Audio 1 and 2 not darkened -> audio received / darkened -> audio not received) Character 3: • Data status indication (not darkened -> data received / darkened -> data not received)
7	Reception frequency (MHz)
8	Modulation (QPSK, 16QAM, 64QAM)
9	FEC (1/2, 2/3, 3/4, 5/6, 7/8)
10	Guard Interval (1/4, 1/8, 1/16, 1/32)
11	Bandwidth (5, 6, 7, 8 MHz)
12	Number of carriers (2k)
13	Diversity Technique: Fixed (F)
14	Number of cuts occurred to the input RF signal: In case there is a cut in the RF received signal, the number of cuts counter will increase its value in 1. To reset and set to 0 this value, press left button.

Table 4.2: Main screen for DVB-T standard

4.1.3 1st Main Screen for the ISDB-T

In the table below, the function of each parameter is explained. These values are numbered in the order they appear on the main screen.

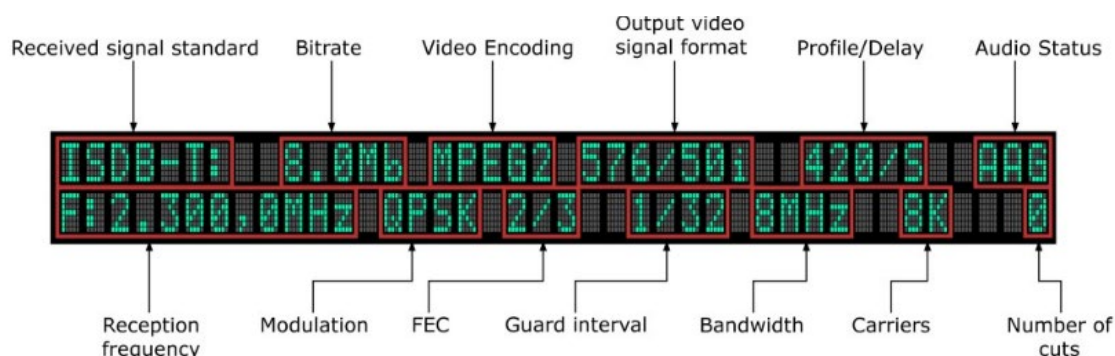


Figure 4.3: 1st Main screen ISDB-T

Parameter n°	Function
1	Received standard (ISDB-T)
2	Received bitrate (Mbps)
3	Video Codification (H.264 / MPEG-2)
4	Video Format (1080p, 1080i, 720p, 576i, 480i)
5	Video options: • Profile (4:2:0 or 4:2:2) • Delay (Standard (S), Super Low delay (UL) or Ultra Low delay (UL))
6	Characters 1 (Audio 1) and 2 (Audio 2): • Audio status indication (Audio 1 and 2 not darkened -> audio received / darkened -> audio not received) Character 3: • Data status indication (not darkened -> data received / darkened -> data not received)
7	Reception frequency (MHz)
8	Modulation (QPSK, 16QAM, 64QAM)
9	FEC (1/2, 2/3, 3/4, 5/6, 7/8)
10	Guard Interval (1/4, 1/8, 1/16, 1/32)
11	Bandwidth (6, 7, 8 MHz)
12	Carriers (2k, 4k and 8k)
13	Diversity Technique: Fixed (F) or Mobile (M)
14	Number of cuts occurred to the input RF signal: In case there is a cut in the RF received signal, the number of cuts counter will increase its value in 1. To reset and set to 0 this value, press left button.

Table 4.3: Main screen for ISDB-T standard

4.1.4 1st Main Screen for the ASI Input

In the table below, the function of each parameter is explained. These values are numbered in the order they appear on the main screen (the first one is the one allocated in the first line beginning from the left, the second one the next on the right ...).

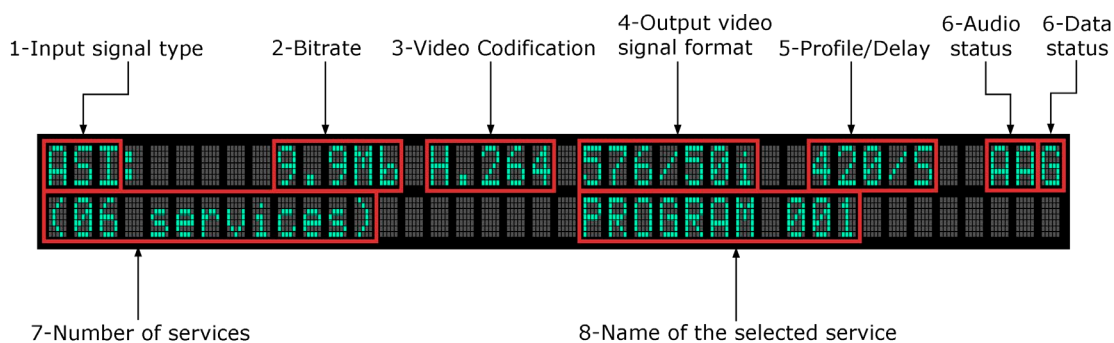


Figure 4.4: 1st Main screen ASI

Parameter n°	Function
1	Input signal type (ASI)
2	Received bitrate (Mbps)
3	Video Codification (H.264 / MPEG-2)
4	Video Format (1080p, 1080i, 720p, 576i, 480i)
5	Video options: • Profile (4:2:0 or 4:2:2) • Delay (Standard (S), Super Low delay (SL)) or Ultra Low delay (UL).
6	Characters 1 (Audio 1) and 2 (Audio 2): • Audio status indication (Audio 1 and 2 not darkened -> audio received / darkened -> audio not received) Character 3: • Data status indication (not darkened -> data received / darkened -> data not received)
7	Number of services available
8	Name of the selected service

Table 4.4: Main screen for ASI input

4.1.5 1st Main Screen for the IP Input

In the table below, the function of each parameter is explained. These values are numbered in the order they appear on the main screen (the first one is the one allocated in the first line beginning from the left, the second one the next at the right ...).

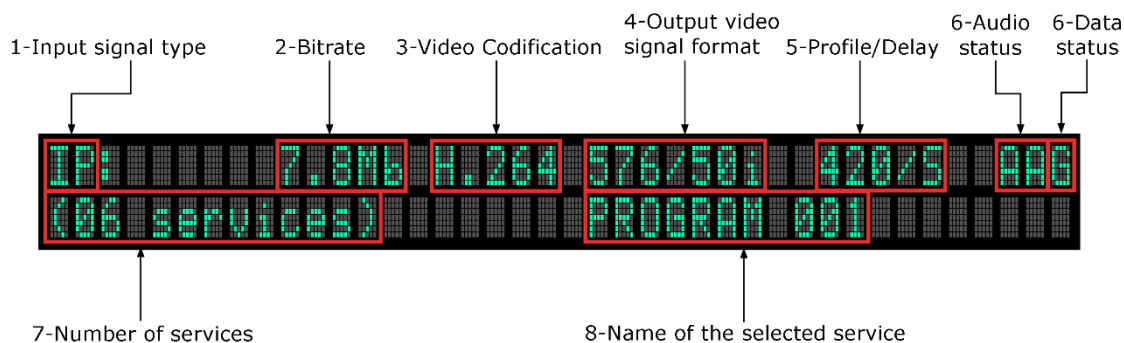


Figure 4.5: 1st Main screen IP

Parameter n°	Function
1	Input signal type (IP)
2	Received bitrate (Mbps)
3	Video Codification (H.264 / MPEG-2)
4	Video Format (1080p, 1080i, 720p, 576i, 480i)
	Video options:
5	• Profile (4:2:0 or 4:2:2) • Delay (Standard (S), Super Low delay (SL)) or Ultra Low delay (UL).
	Characters 1 (Audio 1) and 2 (Audio 2):
6	• Audio status indication (Audio 1 and 2 not darkened -> audio received / darkened -> audio not received) Character 3: • Data status indication (not darkened -> data received / darkened -> data not received)
7	Number of services available
8	Name of the selected service

Table 4.5: Main screen for IP input

4.1.6 2nd Main Screen (For the DVB-T2/T and ISDB-T)

On this second screen, the levels and the carrier to noise ratio values of eight IF inputs are shown. To see the parameters of the IF inputs, press the Up, Down arrow buttons.

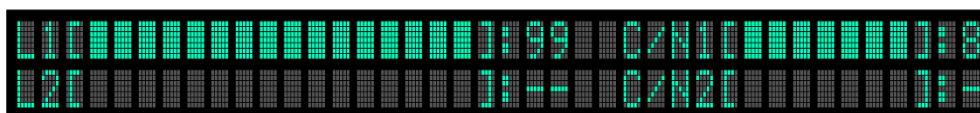


Figure 4.6: 2nd Main screen

The second main screen displays this information for each IF input:

- **Input signal level:** The possible values in this field are from 1 to 99 where a received signal of value 1 is a very weak signal and a signal of 99 means a very strong received signal.
- **C/N (Carrier to Noise Ratio):** The possible values in this field are from 1 to 9 where a received signal of value 1 is a very noisy signal whereas a received signal of value 9 means a very clean received signal.

4.1.7 3rd Main Screen (For the DVB-T2/T and ISDB-T)

On this third screen, the level of the eight possible DVB-T2 or DVB-T received signals is displayed:



Figure 4.7: 3rd Main screen

The third main screen displays this information for each IF input:

- **Input signal level:** It displays a number of bars. A high number of bars means a high level of the received signal.

4.2 Menus

Using the menu of this Receiver the user can change Receiver's parameters and configure them.

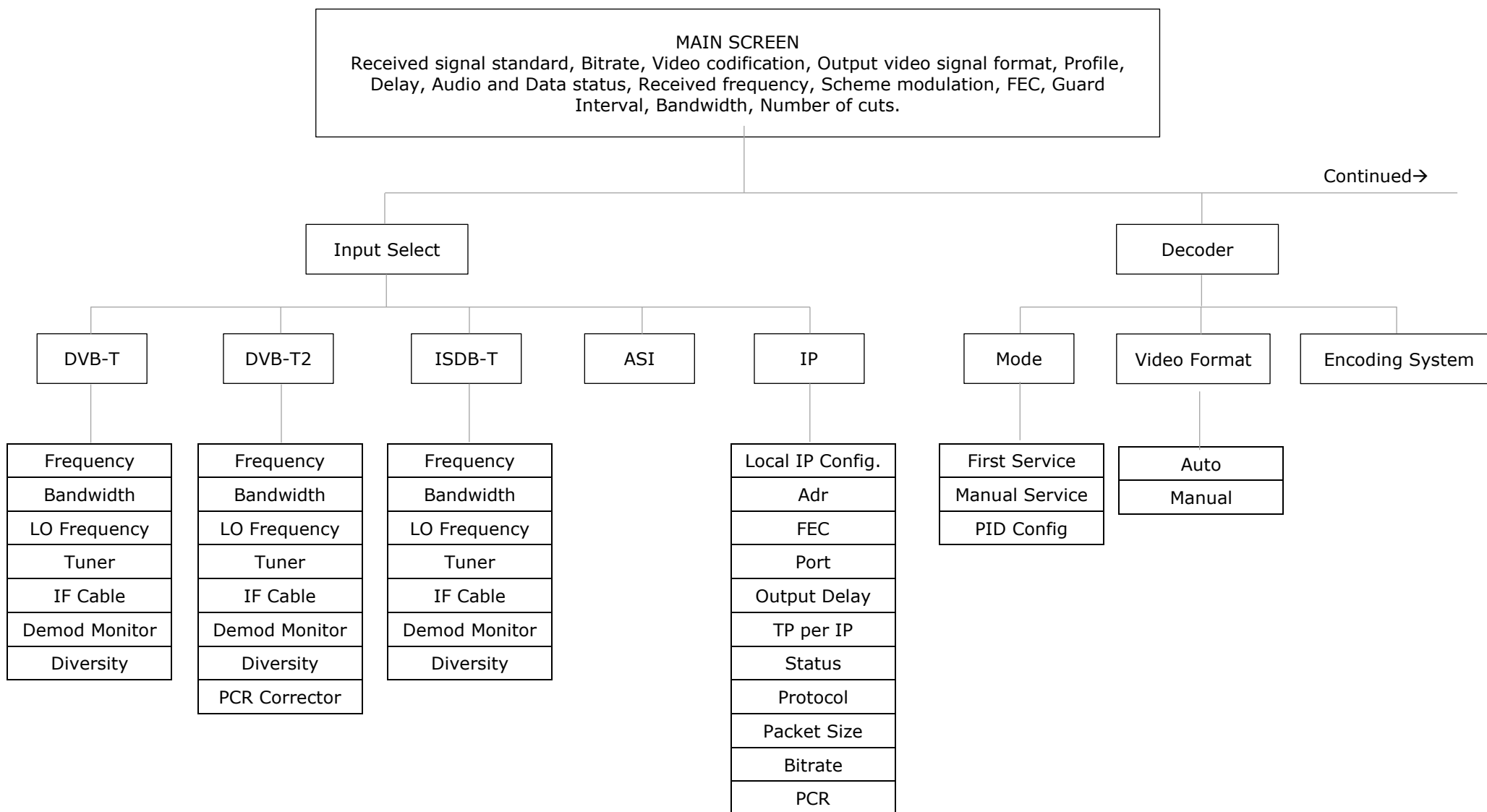
When the Receiver is switched on, the main screen appears. There are three main screens that show the parameters of the received signal/s and the quality of these signals (to change from one of these screens to another one, press the OK button):

- The first one shows the parameters of the received signal/s.
- The second one shows the level and quality of the received signal/s selected by user (for DVB-T2, DVB-T and ISDB-T).
- The third one shows the level of the eight possible DVB-T2/T or ISDB-T received signals.

To enter the menu of this unit the cross button must be pressed.

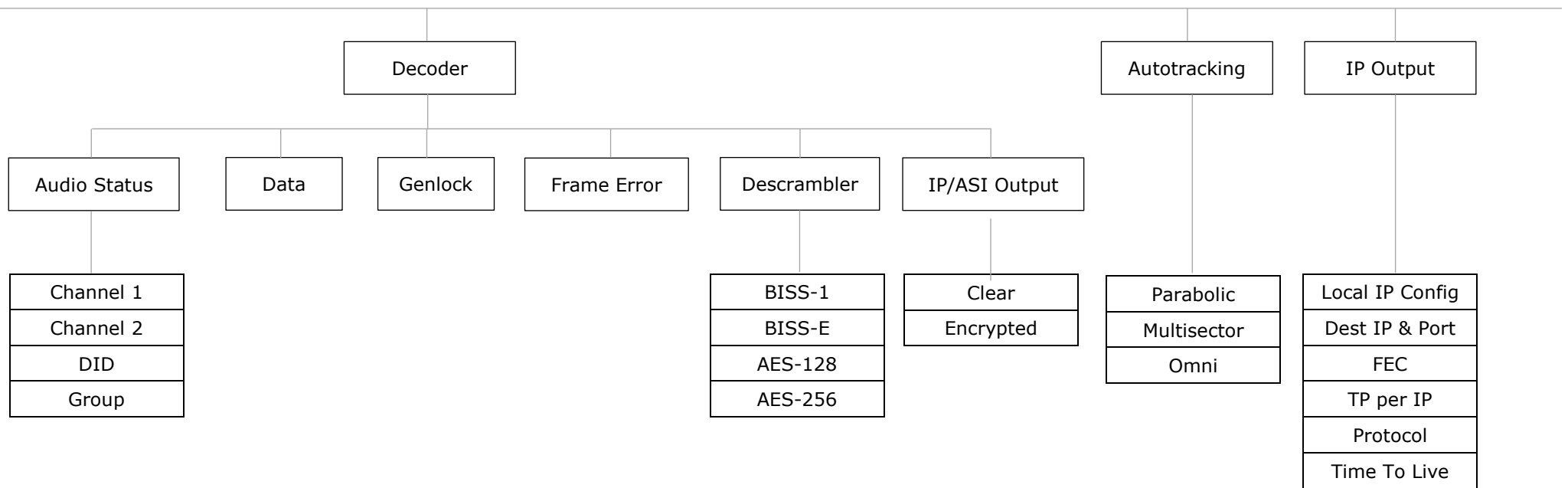
If you want to return to the main screen from the menu, the cross button must be pressed again. Furthermore, when in the submenus area, returning to the main screens is achieved by pressing the cross button as many times as it is needed.

On the next page, a scheme that specifies the menu structure is shown.

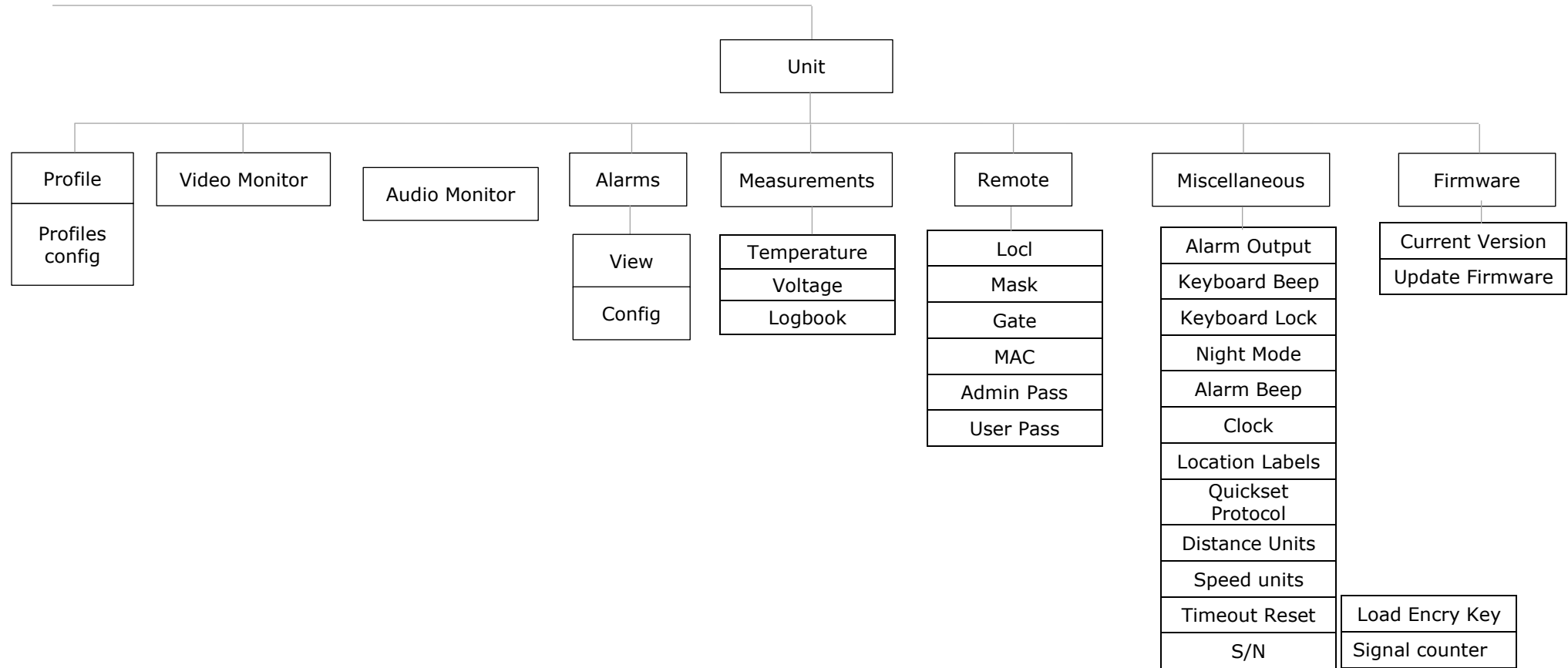


←Continued

Continued→



←Continued



4.2.1 Menu Navigation

This section contains a detailed description of each parameter that can be configured in the *Receiver* via the menu.

To enter the menu, press the Cross button if in the principal screen or in any submenu.

To select a parameter or a submenu use Up, Down arrows. Once selected press OK button to access to a submenu or to edit a parameter. To exit a submenu or a parameter press Cross button.



Symbols < > mean that the parameter can be modified in the same screen with the right and left keys.

Symbol ↵ means that pushing the OK button allows entering to the options of the submenu.

Several types of parameters are available:

- **Eligible:** When the user can choose between predetermined states. (They have the symbols < > near them)
- **Editable:** When the user can enter a value in that option. (The ↵ symbol is displayed on the right of the name). To save the introduced value, the OK button must be pressed.
- **Reading:** When the value of that parameter is a monitored parameter that can't be changed.

Next, the different menus and submenus with the options and the different parameters available are explained. Furthermore, in each figure, example parameters are shown.

4.2.2 Menu Structure

The following menu screen can be accessed by pressing the Cross key from the main screen.

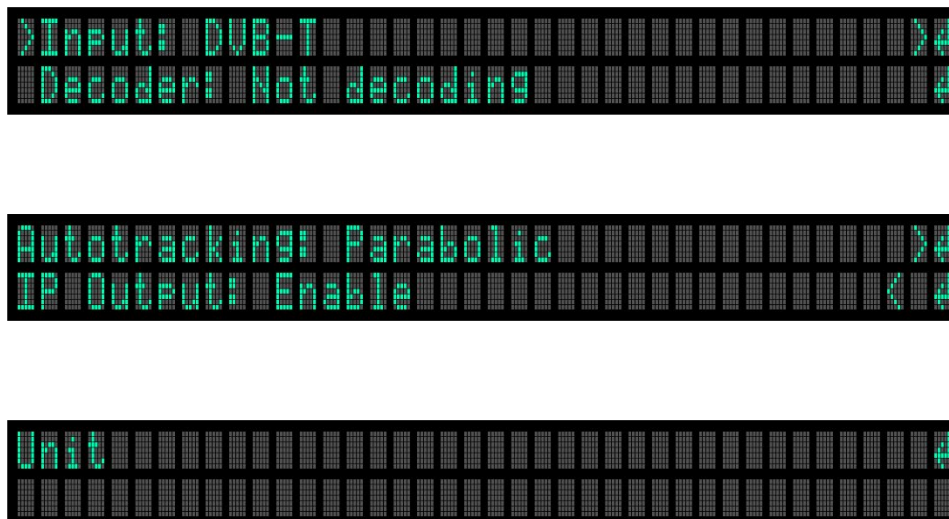


Figure 4.8: Setup Menu

- **Input:** All the parameters related to the received signal/s can be modified here as well as the selection of the input type.
- **Decoder:** All video, audio and data decoding parameters are accessible here.
- **Autotracking:** All the options and parameters related to the Autotracking configuration are shown in this option.
- **IP Output:** Configuration parameters of the output signals are set in this option.
- **Unit:** Parameters related to the Web Server, UART and other internal options of the *Receiver* are configured.

4.2.2.1 Input Select Menu

By using the Up, Down arrow keys, select the **Input** option. To change between inputs, press Left and Right keys. To enter the input submenu, press the OK key. Five inputs can be selected:

- DVB-T
- DVB-T2
- ISDB-T
- ASI
- IP (optional)

4.2.2.1.1 DVB-T

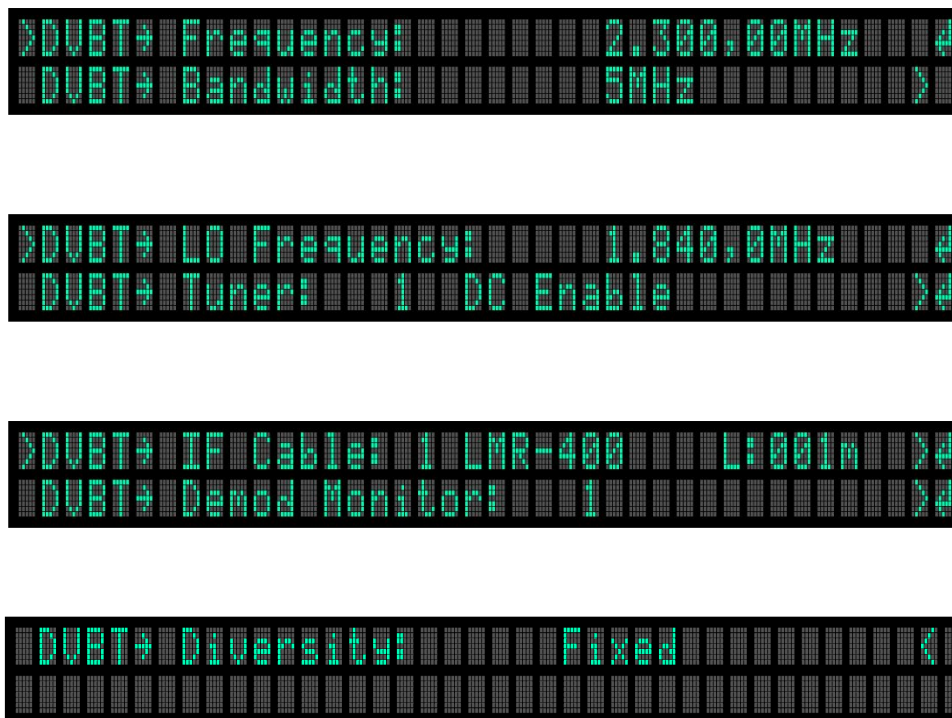


Figure 4.9: DVB-T Input Select Menu

Line n°	Function
1	DVB-T → Frequency: In this field, the frequency of the received signal must be set. To establish the frequency value, first press the OK button and then, with the Up, Down arrows buttons select the desired value. To save the introduced value, press the OK button. (editable parameter)
	DVB-T → Bandwidth: In this option, the bandwidth of the received signal must be specified. To select the bandwidth value, Right, Left buttons must be pressed. (eligible parameter) The available options are: • 5 MHz • 6 MHz • 7 MHz • 8 MHz
3	DVB-T → LO Frequency: In this field, the frequency of the local oscillator of the Down-Converter connected to the I.F. input must be specified. To establish the frequency value first, press the OK button and then, with the Up, Down arrows buttons select the desired value. To save the introduced value, press the OK button. (editable parameter)

DVB-T → Tuner:

This option allows enabling or disabling each of the IF inputs of the device. When the enable option is selected in an IF input, this input supplies power to the down converter connected to it. To choose the IF input, press the Right, Left buttons and to enable or disable the selected input, press the OK button. (eligible parameter)

The available options are:

4

- Tuner 1 (Enable, Disable)
- Tuner 2 (Enable, Disable)
- Tuner 3 (Enable, Disable)
- Tuner 4 (Enable, Disable)
- Tuner 5 (Enable, Disable)
- Tuner 6 (Enable, Disable)
- Tuner 7 (Enable, Disable)
- Tuner 8 (Enable, Disable)

DVB-T → IF Cable:

In this field, the type and length of the cable used between the input and the down-converter must be specified. To select the type of the cable, first press the OK button. Then, to choose the type of cable press the Up and Down arrow buttons. Once the type of cable has been selected, press the OK button again to move to the length option. Then, with the Up, Down, Right and Left buttons, the length can be selected. To save the introduced value, press the OK button. The maximum length available is 150 meters. (the type of the cable is an eligible parameter and the length of the cable is an editable parameter)

5

The available options are:

- BELD PRG11
 - BELD H125
 - LDF450A 1/2
 - CEFLEX 1/2
 - RG-223
 - RG-58
 - RG-214
 - LMR-400
-

6	DVB-T → Demod Monitor: In this field, the number of the IF input (from 1 to 8) which you want to be monitor must be selected. Once it has been selected, the OK button must be pressed to access the monitor screen where the parameters of the received signal shown below are displayed. (reading parameters) The available options are: • Const (QPSK, 16QAM, 64QAM) • FEC (1/2, 2/3, 3/4, 5/6, 7/8) • TG (1/4, 1/8, 1/16, 1/32) • Level (dBm) • MER (dB) • C/N (dB) • BER
7	DVB-T → Diversity: In this field, the diversity technique can be selected. The available options are: • Fixed (Switching technique) [1] MRC limitations to take into account: • MRC doesn't work when LO is superior to the RF • MRC doesn't work if the IF is lower than 150 MHz In both cases, the unit changes automatically to "Fixed" mode and a flicker "f" appears on DVB-T main screen of Receiver unit.

Table 4.6: DVB-T Input Select menu options

On Demodulation Monitor screen, the monitor parameters (Constellation, FEC, Time Guard, Level of the received signal, MER, C/N and BER) are shown.

Firstly, the user must introduce the I.F. input to be monitored (from 1 to 8).

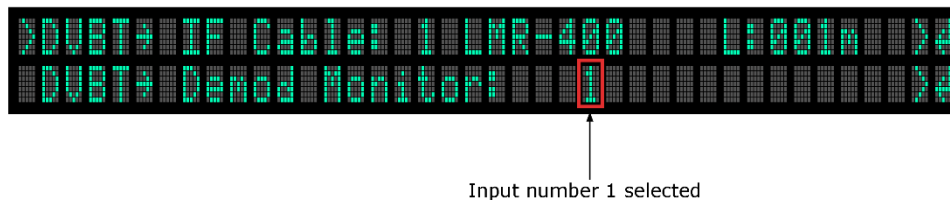


Figure 4.10: DVB-T Demodulation monitor selection

Secondly, the user must press the OK button to access the demodulation monitor screen.

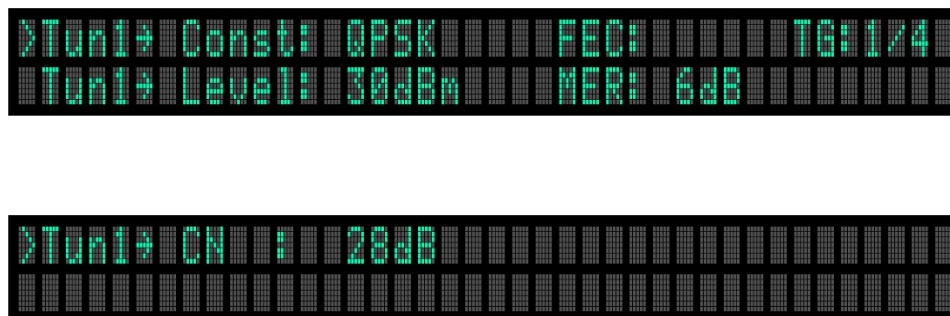


Figure 4.11: DVB-T Demodulation Monitor Screen

4.2.2.1.2 DVB-T2

```
>DVB-T2> Frequency: 2.300.00MHz <
DVB-T2> Bandwidth: 8MHz <
```

```
>DVB-T2> LD Frequency: 1.840.0MHz <
DVB-T2> Tuner: 1 DC Enable >
```

```
>DVB-T2> IF Cable: 1 LMR-400 L:001m >
DVB-T2> Demod Monitor: 1 >
```

```
>DVB-T2> Diversity: Auto <
DVB-T2> PCR Corrector: Off >
```

Figure 4.12: DVB-T2 Input Select Menu

Line nº	Function
1	DVB-T2 → Rx Frequency:
	In this field, the frequency of the received signal must be set. To establish the frequency value first, press the OK button and then, with the Up, Down arrows buttons select the desired value. To save the introduced value, press the OK button. (editable parameter)
2	DVB-T2 → Bandwidth:
	In this option, the bandwidth of the received signal must be specified. To select the bandwidth value, Right, Left buttons must be pressed. (eligible parameter) The available options are: • 1.7 MHz • 5 MHz • 6 MHz • 7 MHz • 8 MHz

DVB-T2 → LO Frequency:
3

In this field, the frequency of the local oscillator of the Down-Converter connected to the I.F. input must be specified. To establish the frequency value first, press the OK button and then, with the Up, Down arrows buttons select the desired value. To save the introduced value, press the OK button. (editable parameter)

DVB-T2 → Tuner:
4

This option allows enabling or disabling each of the IF inputs of the device. When the enable option is selected in an IF input, this input supplies power to the down converter connected to it. To choose the IF input, press the Right, Left buttons. To enable or disable the selected input, press the OK button. (eligible parameter)

The available options are:

- Tuner 1 (Enable, Disable)
- Tuner 2 (Enable, Disable)
- Tuner 3 (Enable, Disable)
- Tuner 4 (Enable, Disable)
- Tuner 5 (Enable, Disable)
- Tuner 6 (Enable, Disable)
- Tuner 7 (Enable, Disable)
- Tuner 8 (Enable, Disable)

DVB-T2 → IF Cable:
5

In this field, the type and the length of the cable used between the input and the down-converter must be specified. To select the type of the cable, first press the OK button. Then, choose the type of cable pressing the Up, Down arrow buttons. Once the type of cable has been selected, press the OK button again to move to the length option. Then, with the Up, Down, Right and Left buttons the length can be selected. The maximum length available is 150 meters. Press the OK button to save the introduced value. (The type of cable is an eligible parameter and the length of the cable is an editable parameter)

The available options are:

- BELD PRG11
 - BELD H125
 - LDF450A 1/2
 - CEFLEX 1/2
 - RG-223
 - RG-58
 - RG-214
 - LMR-400
-

6	DVB-T2 → Demod Monitor: In this field, the number of the IF input (from 1 to 8) which you want to be monitored must be selected. Once it has been selected, OK button must be pressed to access the monitor screen where the parameters of the received signal shown below are displayed. (reading parameters) The available options are: • Level (dBm) • SNR (dB) • MER (dB) • Const (QPSK, 16QAM, 64QAM, 256QAM) • FEC (1/2, 3/5, 2/3, 3/4, 4/5, 5/6) • TG (1/4, 19/128, 1/8, 19/256, 1/16, 1/32) • Mod (2K, 4K, 8K, 8K_ext) • Spec (spectrum normal or inverted) • Rot (constellation rotation enabled or disabled in the received signal) • Time IL Type (time interleaving mode) • Length (number of frames in one interleaving frame)
7	DVB-T2 → Diversity: In this field, the diversity technique can be selected. The available options are: • Mobile (MRC^[1] technique) • Fixed (Switching technique) [1] MRC limitations to take into account: • MRC doesn't work when LO is superior to the RF • MRC doesn't work if the IF is lower than 150 MHz In both cases, the unit changes automatically to "Fixed" mode and a flicker "f" appears on DVB-T2 main screen of Receiver unit.
8	DVB-T2 → PCR Corrector: The PCR corrector can be enabled to correct the PCR on the ASI output.

Table 4.7: DVB-T2 Input Select menu options

Next, it is shown the layout of the monitor parameters (Level of the received signal, Signal to Noise Ratio, Constellation, FEC, Time Guard, Mod, Spectrum and Rotation).

First, the user must introduce the I.F. input to be monitored (from 1 to 8).

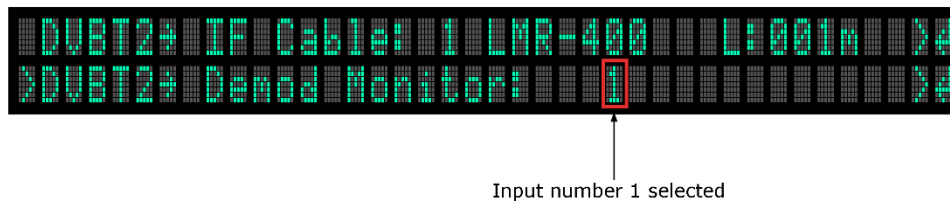


Figure 4.13: DVB-T2 Demodulation Monitor

Secondly, the user must press the OK button to access the demodulation monitor screen.



Figure 4.14: DVB-T2 Demodulation Monitor Screen

4.2.2.1.3 ISDB-T

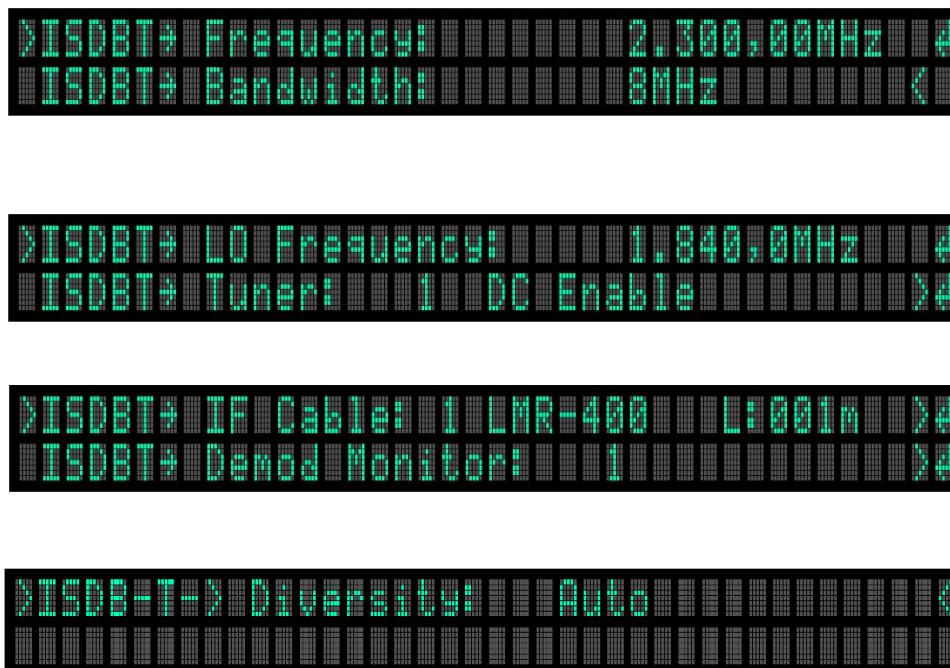


Figure 4.15: ISDB-T Input Select Menu

Line nº	Function
1	ISDB-T → Rx Frequency:
	In this field, the frequency of the received signal must be set. To establish the frequency value first, press the OK button and then, with the Up, Down arrow buttons select the desired value. To save the introduced value, press the OK button. (editable parameter)
2	ISDB-T → Bandwidth:
	In this option, the bandwidth of the received signal must be specified. To select the bandwidth value, Right, Left buttons must be pressed. (eligible parameter) The available options are: • 6 MHz • 7 MHz • 8 MHz
3	ISDB-T → LO Frequency:
	In this field, the frequency of the local oscillator of the Down-Converter connected to the I.F. input must be specified. To establish the frequency value first, press the OK button and then, with the Up, Down arrows buttons select the desired value. To save the introduced value, press the OK button. (editable parameter)

ISDB-T → Tuner:

This option allows enabling or disabling each of the IF inputs of the device. When the enable option is selected in an IF input, this input supplies power to the down converter connected to it. To choose the IF input, press the Right, Left buttons. To enable or disable the selected input, press the OK button. (eligible parameter)

The available options are:

- 4
- Tuner 1 (Enable, Disable)
 - Tuner 2 (Enable, Disable)
 - Tuner 3 (Enable, Disable)
 - Tuner 4 (Enable, Disable)
 - Tuner 5 (Enable, Disable)
 - Tuner 6 (Enable, Disable)
 - Tuner 7 (Enable, Disable)
 - Tuner 8 (Enable, Disable)

ISDB-T → IF Cable:

In this field, the type and the length of the cable used between the input and the down-converter must be specified. To select the type of the cable, first press the OK button. Then, to choose the type of cable press the Up, Down arrow buttons. Once the type of cable has been selected, press the OK button again to move to the length option. Then, with the Up, Down, Right and Left buttons the length can be selected. To save the introduced value, press the OK button, the maximum length available is 150 meters. (the type of cable is an eligible parameter and the length of the cable is an editable parameter)

5

The available options are:

- BELD PRG11
- BELD H125
- LDF450A 1/2
- CEFLEX 1/2
- RG-223
- RG-58
- RG-214
- LMR-400

ISDB-T → Demod Monitor:

6

In this field, the number of the IF input (from 1 to 8) which you want to be monitored must be selected. Once it has been selected, OK button must be pressed to access the monitor screen where the parameters of the received signal are displayed. (reading parameters)

ISDB-T → Diversity:

In this field, the diversity technique can be selected.

The available options are:

- 7**
- Mobile (MRC^[1] technique)
 - Fixed (Switching technique)

[1] MRC limitations to take into account:

- MRC doesn't work when LO is superior to the RF
 - MRC doesn't work if the IF is lower than 150 MHz
-

Table 4.8: ISDB-T Input Select menu options

Next, is shown the layout of the monitor parameters (Level of the received signal, Signal to Noise Ratio, Constellation, FEC, Time Guard, Mod, Spectrum and Rotation).

First, the user must introduce the I.F. input to be monitored (from 1 to 8).

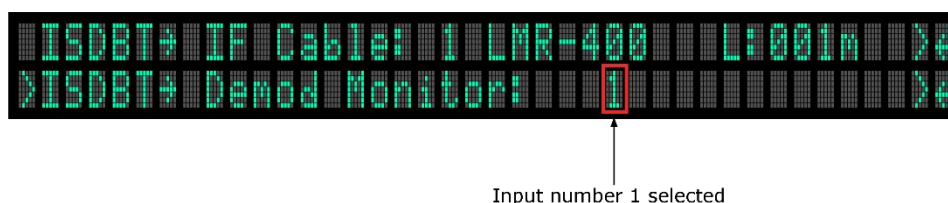


Figure 4.16: ISDB-T Demodulation Monitor

Secondly, the user must press the OK button to access the demodulation monitor screen.

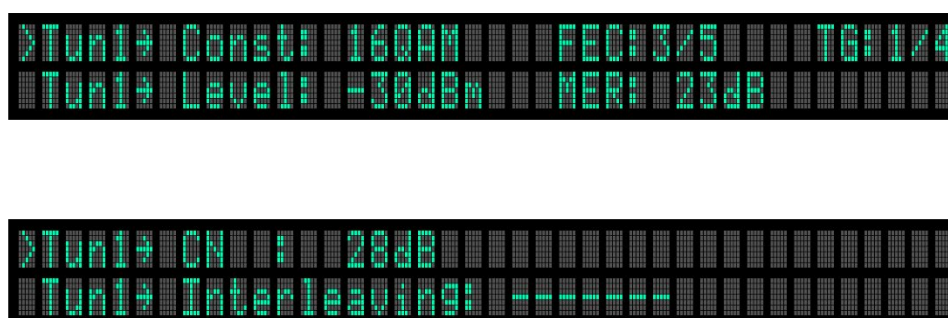


Figure 4.17: ISDB-T Demodulation Monitor Screen

4.2.2.1.4 ASI

By using the right and left arrow keys, select the **ASI Input** option.



Figure 4.18: ASI Input Screen

Then press the Cross button and these ASI options will appear on the main screen:

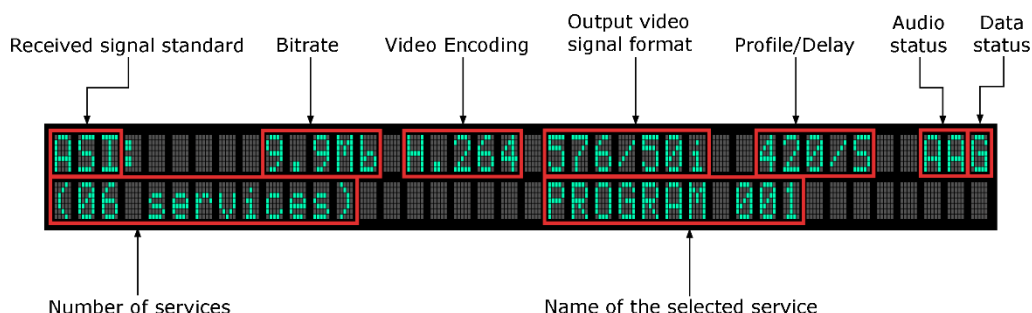


Figure 4.19: ASI Main Screen



Bitrate is only visible if you have video over IP option in your equipment.

Pressing the OK button on the main screen and having the Manual Service option selected in the Decoder menu, the user can access the different services available and see the number of each service.

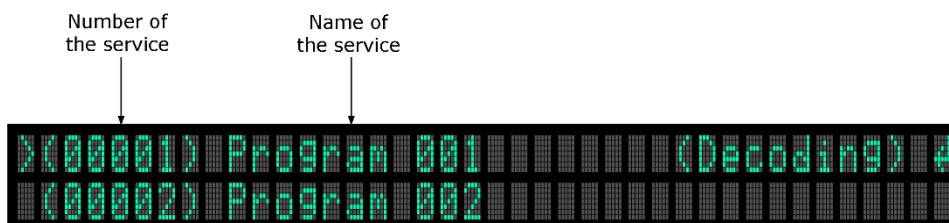


Figure 4.20: Number and name of the services

If the user wants to change the service, select the desired service on the list and press the OK button. This message will appear on the screen:



Figure 4.21: Change the service

Then, press the OK button again to change the service or the cross button not to change it.

4.2.2.1.5 IP

By using the right and left arrow keys, select the **IP Input** option.



Figure 4.22: IP Input selected

Then press the Cross button and these IP options will appear on the main screen:

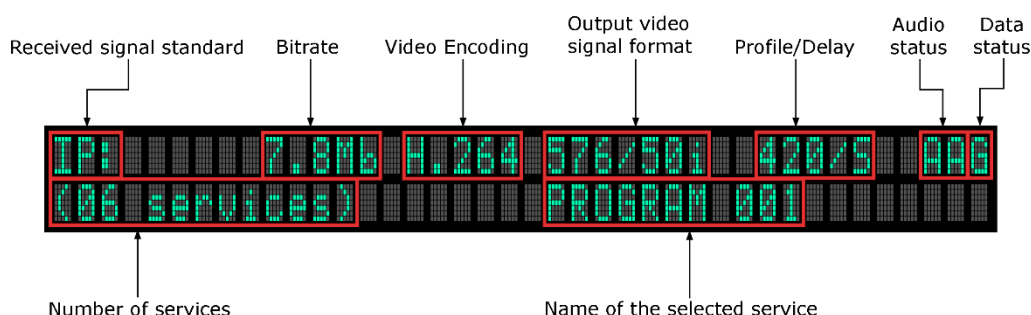


Figure 4.23: 1st Main screen IP

Pressing the OK button on the main screen and having the Manual Service option selected in the Decoder menu, the user can access the different services available and see the number of each service.

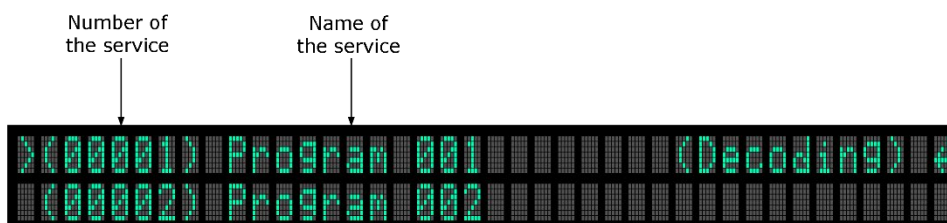


Figure 4.24: Number and name of the services

If the user wants to change the service, select the desired service on the list and press the OK button. This message will appear on the screen:



Figure 4.25: Change the service

Then, press the OK button again to change the service or the cross button not to change it.

To configure the different parameters related to the IP Input option, select IP Input option and press the OK button.

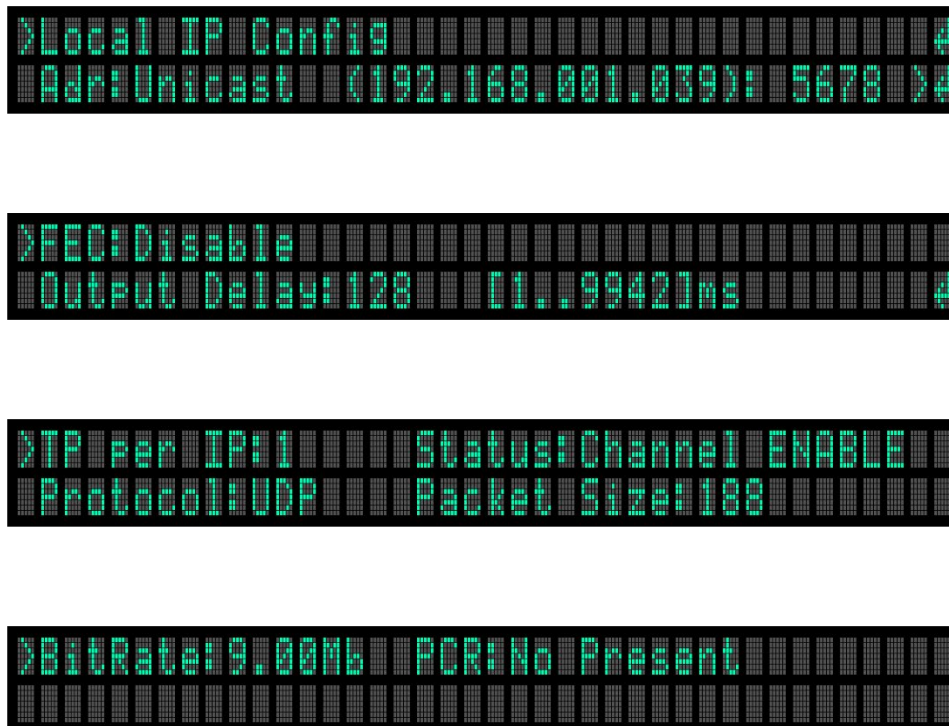


Figure 4.26: IP Input Select Menu

To setup the local IP address, network and gateway, select Local IP Config and press OK. The configuration menu is:

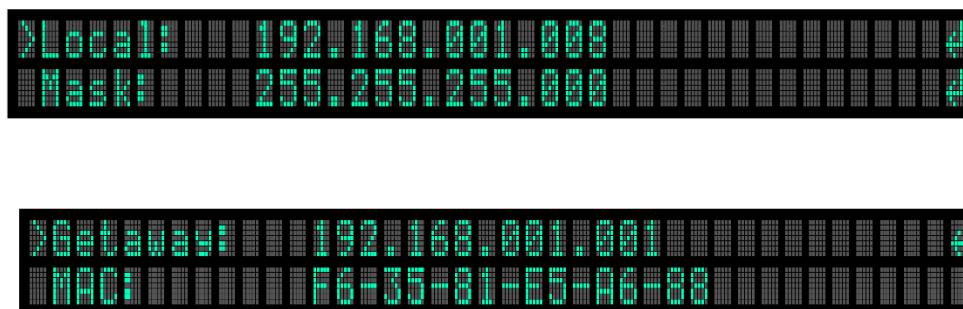


Figure 4.27 : Local IP Configuration menu

Line n°	Function
	InpIP → Local IP Config: To configure the network parameters, press the OK button. (editable parameters) The available options are: - Local: To establish the Local IP address, press the OK button and then, with the UP, Down buttons change the value. If the user wants to change from one character to another, press the Right, Left buttons. To save the introduced value, press the OK button. If this IP is the same as the IP for remote control (Webserver), the device will show a warning message. - Mask: In this field the Subnet Mask address must be specified. To establish the Subnet Mask address, press the OK button and then, with the UP, Down buttons change the number value. If the user wants to change from one character to another, press the Right, Left buttons. To save the introduced value, press the OK button. - Gateway: In this field the Gateway address must be specified. To establish the Gateway address, press the OK button and then, with the UP, Down buttons change the value. If the user wants to change from one character to another, press the Right, Left buttons. To save the introduced value, press the OK button. - VoIP MAC: In this field the MAC address of the Video over IP card is displayed (reading parameter)
1	
	InpIP → Adr: To select the short of address from which IP information is received, press Right, Left buttons. (eligible parameters) The available options are: - Unicast: In case you want to receive the signal from any single IP address to this device, unicast option must be chosen. - Multicast: In case the signal is received from a multicast address, that multicast address must be configured in this field. To enter the multicast address, press OK button to configure the multicast address. (editable parameter)
2	
	InpIP → Fec: Col: / Row: The IP Forward Error Correction is composed by a number of FEC columns and rows. In this field, it is shown the number of FEC columns and rows of the received signal. (reading parameter)
3	

4	InpIP → Output Delay [1..9942]ms: Delay from IP input to ASI output which is the delay between the obtaining of the IP input and the delivery to the decoder and to the ASI output. To edit this parameter, press the OK button and then, select the desired port with the Up, Down and Right, Left buttons. To save the introduced value press the OK button. (editable parameter)
5	InpIP → TP per IP: This field displays the number of TS packets per IP packet. (reading parameter)
6	InpIP → Status: This field displays the status of the IP input. (reading parameter)
7	InpIP → Protocol: This field displays the protocol used for the communication. (reading parameter) The possible options are: • UDP • RTP
8	InpIP → Packet Size: This field shows the size in bytes (188 or 204 bytes) of the IP received packets. (reading parameter) The available values are: • Channel is enabled • Channel is disabled • Channel is enabled but there is a problem with the processing of the received IP stream.
9	InpIP → BitRate: This field displays the bitrate of the received signal. (reading parameter)
10	InpIP → PCR: Program Clock Reference. To enable a decoder to present synchronized content, such as audio tracks matching the associated video, at least once each 100 ms. This parameter indicates if PCRs are found in incoming TS. (reading parameter)

Table 4.9: IP Input Select menu options

4.2.2.2 Decoder Menu

By using the Up and Down arrow keys, select the **Decoder** option and press the OK key.

```
>First Service: Program 001
Video Format: Auto (720/50p)
```

```
>Encoding System: 420/S [H.264]
Audio Status: CH1:256KB CH2:256KB
```

```
>Data: Data Channel 19200 None 1
>Genlock: Ref Lost Offset: 0fix
```

```
>Frame Without Signal: Freeze
>Descrambler: AES-256
```

```
>IP/ASI Output: Encrypted
```

Figure 4.28: Decoder Menu

4.2.2.2.1 Decoder Mode Screen

In this field, the mode for the decoding process is selected. Use Right, Left arrows buttons to select the appropriate option. (eligible parameters).

The available options are:

- **First Service Mode**

If the First Service option is selected, the first available service will be decoded.



Figure 4.29: Decoder First Service Mode Screen

- **Manual Mode**

If Manual mode is selected, then, the user can select a service from the list by clicking the OK button.



Figure 4.30: Decoder Manual Mode Screen

If the OK button is pressed, the user can access the different services available and see the name and number of each service. The selected service is the one which has the Decoding word on the right.



Figure 4.31: Number and name of the services

If you want to change the service, select the desired service on the list and press the OK button. This message will appear on the screen:



Figure 4.32: Change the service

Then, press the OK button again to change the service or the cross button not to change it.

- **PID Config Mode**

Selecting the PID Selection option and pressing the OK button, the user can configure the parameters shown below.

```
>Manual->Video PID: 134
Manual->Audio1 PID: 234
```

```
>Manual->Audio2 PID: 134
Manual->Data PID: 234
```

```
Manual->GPS PID: 336
Manual->Alarm PID: 337
```

```
>Manual->PMT PID: 678
Manual->PCR PID: 679
```

Figure 4.33: Decoder PID Config Mode Screen

Line n°	Function
	Video PID:
1	Here the video packet identifier must be entered. To change its value first, press the OK button and then, with the UP, Down arrows select the desired number. To save the introduced value the OK button must be pressed again. (editable parameter)
	Audio1 PID:
2	Here the audio1 packet identifier must be entered. To change its value first, press the OK button and then, with the UP, Down arrows select the desired number. To save the introduced value the OK button must be pressed again. (editable parameter)
	Audio2 PID:
3	Here the audio2 packet identifier must be entered. To change its value first, press the OK button and then, with the UP, Down arrows select the desired number. To save the introduced value the OK button must be pressed again. (editable parameter)
	Data PID:
4	Here the data packet identifier must be entered. To change its value first, press the OK button and then, with the UP, Down arrows select the desired number. To save the introduced value the OK button must be pressed again. (editable parameter)
	GPS PID:
5	Here the GPS data packet identifier must be entered. To change its value first, press the OK button and then, with the UP, Down arrows select the desired number. To save the introduced value the OK button must be pressed again. (editable parameter)
	ALARM PID:
6	Here the transmitter alarm identifier must be entered. To change its value first, press the OK button and then, with the UP, Down arrows select the desired number. To save the introduced value the OK button must be pressed again. (editable parameter)
	PMT PID:
7	Here the program map tables identifier must be entered. To change its value first, press the OK button and then, with the UP, Down arrows select the desired number. To save the introduced value the OK button must be pressed again. (editable parameter)
	PCR PID:
8	Here the program clock reference identifier must be entered. To change its value first, press the OK button and then, with the UP, Down arrows select the desired number. To save the introduced value the OK button must be pressed again. (editable parameter)

Table 4.10: PID Config menu

4.2.2.2.2 Decoder Video Format Screen

This file allows the user to select the format of the Receiver signal.



Figure 4.34: Decoder Video Format screen

There are many options available. Press the Right and Left button to select the desired option:

Auto	1080/60i
525/59i	1080/59i
620/50i	1080/50i
720/60p	1080/30p
720/59p	1080/29p
720/50p	1080/25p
720/30p	1080/24p
720/29p	1080/23p
720/25p	1080/60p
720/24p	1080/59p
720/23p	1080/50p

For Auto detection mode, the video format is detected automatically. This option only works with SVP latest Transmitter versions (V7 and V9).

For MPEG-2 signals, the auto option is not available. It is necessary to select one of the other options for the received signal.

4.2.2.2.3 Decoder Encoding System Screen

In this field, the next parameters are displayed in the screen.



Figure 4.35: Decoder Encoding System screen

Line n°	Function
1	Profile:
	The profile of the received signal is displayed in this option. (reading parameter)
	The possible options are 4:2:0 and 4:2:2.
	Delay:
	The delay of the received signal is displayed in this option. (reading parameter)
	The possible options are:
	• Standard (S) • Low Delay (L) • Super Low Delay (SL)
	Video Codification:
	The video codification is shown in this option. (reading parameter)
	The available options are: H.264 and MPEG-2.

Table 4.11: Decoder Encoding System Menu



In case the Transmitter device is configured in Ultra Low Delay, the Receiver will indicate Super Low Delay. This means that the Receiver is not capable of distinguishing between Super Low Delay and Ultra Low Delay.

4.2.2.2.4 Decoder Audio Status Screen



Figure 4.36: Audio Data

To access the decoder audio screen, the OK button must be pressed. The parameters that appear are:

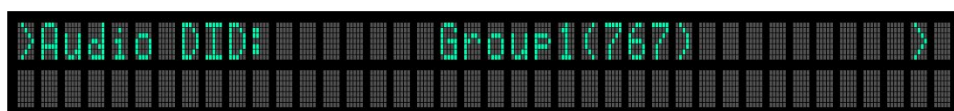


Figure 4.37: Decoder Audio Screen

Line nº	Function
	Channel 1:
1	In this option, the bitrate of the audio channel1 signal and the audio decoder standard are shown: MPEG1 Layer 1 or 2. (reading parameters)
	Channel 2:
2	In this option, the bitrate of the audio channel2 signal and the audio decoder standard are shown: MPEG1 Layer 1 or 2. (reading parameters)
	DID:
3	Selects the audio group or DID in which the 4 audio channels are going to be embedded in the SDI output signal. To select the desired group, press the Right, Left buttons. (eligible parameters)

Table 4.12: Decoder Audio Status menu

4.2.2.2.5 Data Screen

In this menu, it is possible to select which data want to be output on the DB-9 port of the receiver named as 'Aircraft GPS IN&OUT'. The options are: GPS received from Data Channel, GPS channel or ASI Embedded Data input.

```
>Data: Data Channel > 19200 None 1
>Genlock: Ref Lost Offset: 0Fix 4
```

Figure 4.38. User Data selection

If you enter the menu you can select the baud rate, parity and stop bits of Data output:

```
>Data-> Baud Rate: 19200
>Data-> Parity: NONE
>Data-> Stop Bits: 1
>Data-> ASI Emb. DATA PID: 8180
```

Figure 4.39: Decoder User Data Screen

Line nº	Function
Baud Rate:	
1	Select the baud rate at which the user data is going to be extracted. (Baud rate options are:19200, 38400, 57600, 78600, 115200) (eligible parameters)
Parity:	
2	The parity options are None, Even, Odd. (eligible parameters)
Stop Bits:	
3	The options are 1 or 2. (eligible parameter)
ASi Emb. Data PID:	
4	Here you should select the PID number of the data you want to output when ASI input data is selected. The option is limited to PID number from 8180 to 8188.

Table 4.13: Decoder User menu

4.2.2.2.6 Decoder GenLock Screen

This device has an external Genlock reference input to lock all the video outputs to it. (reading parameter)



Figure 4.40: Decoder GenLock screen

The available options are:

- **Reference lost:** The device does not detect the genlock signal.
- **Reference unlocked:** The device detects the genlock signal but it is not capable of synchronizing to that signal.
- **Reference locked:** The device detects the genlock signal and is capable of synchronizing to that signal

Offset makes a fine adjustment in pixels. To make this adjustment, you would need specific measuring equipment.

4.2.2.2.7 Decoder Frame Without Signal

In this file, the *Receiver's* behaviour can be configured if there is no signal. (eligible parameter).



Figure 4.41: Decoder Frame Without Signal Screen

- **Freeze:** The last image is frozen in the screen until the signal works again.
- **Colour (10 sec):** After 10 seconds, if the error is caused by the lack of RF signal, the screen becomes red. If the error is because there is no video, the screen becomes blue.
- **Black (0.5 sec):** The video becomes black after 0.5 seconds.
- **Black (5 sec):** The video becomes black after 5 seconds.

4.2.2.2.8 Descrambler

In this option, you can choose the encryption mode.



Figure 4.42: Decoder Descrambler screen

There are four options available. Press the Right and Left button to select the desired option:

- BISS-1 (Uses an unencrypted key for the BISS key)
- BISS-E (Uses an encrypted key)
- AES-128 (Optional)
- AES-256 (Optional)

The Keys can be saved via USB in unit->Miscellaneous menu.



When encryption is enabled, the bitrate is limited to under 105 Mbps

4.2.2.2.9 IP/ASI Output: Encrypted

In this option, you can choose the encryption mode.



Figure 4.43: Decoder IP/ASI Output screen

There are two options available. Press the Right and Left button to select the desired option:

- Encrypted (IP and ASI output signals are encrypted if the input signal is encrypted)
- Clear (IP and ASI output signals are not encrypted)

There are different options to select and configure:

```

Transmitter GPS Source: GPS Channel >
>TX Distance: 82.2Km 175° H: 147m
  
```

```

TX Position: 57° 0km 072° 255m
>TX Position: N43°10.459' 0002°28.255' 4
  
```

Figure 4.46: Transmitter Position screen

Line n°	Function
Transmitter GPS Source:	
The Transmitter's GPS information can be taken from four different sources:	
1	- Externally via UHF transmission. - Internally via Data Channel. - Internally via GPS Channel. - Embedded in ASI input. When ASI input is selected, please press OK key and configure the PID number of the data embedded in the ASI signal. The identifier must be configured between 8180 and 8188 numbers.
TX Distance:	
In this option, different parameters are shown (reading parameters):	
2	- Distance between Transmitter & Receiver (km) - Direction from Transmitter to Receiver (degrees) - Height difference (m)
TX Position:	
In this option, different parameters are shown (reading parameters):	
3	- Number of satellites - Speed of the Transmitter (kn) - Direction of the Transmitter (degrees) - Height of the Transmitter (m)
TX Position:	
In this option, different parameters are shown (reading parameters):	
4	- Latitude of the Transmitter - Longitude of the Transmitter

Table 4.14: Transmitter Position menu

Secondly, press the OK button to access the Receiver Position screen.



Figure 4.47:GPS Information options

There are different options to select and configure:



Figure 4.48: Receiver Position screen

Line n°	Function
1	Local Manual or Local GPS:
	In this line, the user can set the GPS coordinates of the Receiver. These coordinates are editable when no GPS information is received from an external GPS source. In that case, this option is named Local Manual.
	When GPS information is given by an external source, the GPS information is automatically updated and not editable. In that case, this option is named Local GPS. When we have been receiving GPS from an external GPS source, but we have lost it, the last GPS position received will be saved and the SAVED word will appear on the second line.
2	Local Altitude/ Speed/ Satellite number:
	In this line, the user can read the local altitude, speed and satellite number information provided by the external GPS source. When there is no GPS information, the local altitude is an editable parameter by the user.

	Heading and Inclinometer compensation: In this file are shown the measured values for the True North Heading, Pitch and Roll. The True North Heading can be introduced manually or automatically using an external Compass. When the Heading is being provided by an external Compass, immediately after the degree symbol, an alarm indicator is displayed indicating the following: • Static capital C will indicate that we are receiving the Compass information correctly. • An intermittent signal between lowercase c and uppercase C will indicate that we have the Compass connected but that the information we receive from the Compass is not correct. HDT information is received but the fields are empty. • A flashing capital C will indicate that we have lost the Compass. After 10 seconds, the capital C will become in a capital S which indicates that the Heading has been saved from the last information received by the Compass. And it will show which Heading is saved. The Heading can be manually edited in all the cases unless when there is a static capital C, that means that the external Compass has priority over the editable Heading. When the Heading is a manually edited value and we have saved it, the indicator will be a static capital M that indicates that this is the manually edited value. Pitch and Roll values are provided by the external Inclinometer. These are reading only parameters, at the end of the line, the compensation applied by the Pitch and Roll measurements is shown.
4	Go to True North: This option points the positioner to the True North. It is used to guarantee the correct configuration of the tracking system once all the configurable parameters have been set (GPS position, North Heading, Pan and Tilt measurements and Antenna Calibration). Once the positioner has been pointed to the North, please make sure that the calibration is correct by comparing it with an external Compass.

Table 4.15: Receiver Position menu

To finish, press the OK button to access the Receiver Configuration screen.



Figure 4.49: Receiver Configuration Option

There are different options to select and configure:



Figure 4.50: Receiver Configuration Screen

Line n°	Function
	Antenna Vertical Angle:
1	The Antenna Vertical Angle must be set as the vertical beam width of the antenna used (this angle will determine the vertical increase done while the unit is in Search Profile mode).

	Polarization and Search Profile: The Polarization can be controlled when an APO-75 with multiple Polarization antenna is being used, the polarization of the antenna can be remotely controlled from this menu. For more information, please go to section 9.2.9.2 APO-75 Antenna Polarity control. Another parameter to be configured in this line is the Search Profile: • Profile 1: When only a Parabolic Antenna is used for reception. It makes sweeps in all vertical and horizontal angles. In increments of 10° for the horizontal and in predefined vertical angle for the vertical. • Profile 2: When we use the tracking system in combination with other antennas. The positioner will look for the helicopter on the horizon (0°, +VA and -VA) and will increase the horizontal sweep to 45° in each sweep. This profile makes the H and V sweeps at the same time. • Profile 3: When we use the tracking system in combination with other antennas. The positioner will look for the helicopter in the horizon (0°, +VA and -VA) and will increase the horizontal sweep in 45 each sweep. This profile makes the H sweep first and then the V, forming a square. • NONE: None Search Profile is applicable.
2	
	Maximum RF: If Maximum RF is enabled, when the receiver receives RF signal but this signal does not include GPS information, the receiver will start tracking the Transmitter by following the maximum RF signal level. If RF signal is not received, the receiver will look for signal following the Search Profile selected. This option is used when no GPS signal is available. On the other hand, if Maximum RF is disabled, the receivers only track the transmitter based on the GPS signal received.
3	
	Antenna Calibration: It is recommended to calibrate the antenna to receive the maximum signal level by compensating any vertical or horizontal deviation introduced during the installation or by any other external causes. Before starting the Antenna Calibration, please make sure that the GPS position of the Receiver, GPS position of the Transmitter, North Heading and Inclinator compensation are correctly set, these parameters are set in Transmitter Position and Receiver Position menus. For a correct calibration of the antenna, please point the Receiver Positioner to the Transmitter's position and calibrate the antenna until you receive the highest signal level possible.
4	
	Level and C/N Indicator: In this line the level of the signal received is shown, this measurement is used to guarantee the maximum signal received while Antenna Calibration is made.
5	

Table 4.16: Receiver Configuration menu

- **Manual**



Figure 4.51: Parabolic Autotracking (Manual)

If the Manual option is selected by pressing the OK button the user can select manually the position of the Parabolic Antenna. To change the azimuth (H) position of the antenna, press the Right, Left buttons. To change the elevation (V) position of the antenna, press the Up, Down buttons.

The Level and C/N information of the signal are shown to be used for pointing the antenna to the maximum level received.

- **Fold**



Figure 4.52: Parabolic Autotracking (Fold)

Line n°	Function
	Fold Tilt:
1	In this file, the number of degrees that are needed to fold the antenna is displayed. The limits for the fold angle are -30° and +90°. (editable parameter)
	Fold the antenna:
2	In this file, the user can fold the antenna.

Table 4.17: Fold menu



Make sure that when you fold the antenna, the dish does not make contact with anything.

4.2.2.3.2 Sectorial Antenna

Next, how to configure the Autotracking with a **sectorial antenna** is explained.

```
>Autotracking: Multisector AMS
IP Output: Enable
```

Figure 4.53: Sectorial Antenna option

Once the user is inside the sectorial option, there are two possible options (eligible with the Right, Left keys) which are detailed below:



Value T means the top antenna.

- **Auto**

```
1 2 3 4 5 T Δd: ---. -km Auto>
L1C 0:-- C/N C 0:-
```

Figure 4.54: Sector Autotracking (Auto)

When the Auto option is selected, it means that the sector antenna is automatically selected. The selected sector is marked with the square brackets.

If the OK button is selected in this option, the parameters related to the Transmitter GPS information (TX Distance and TX Position) and the local GPS information (Local Manual and Local Altitude) are shown.

- **Manual**

```
1 2 3 4 5 T Δd: ---. -km Man<
L1C 0:-- C/N C 0:-
```

Figure 4.55: Sector Autotracking (Manual)

If the Manual option is selected then, by pressing the OK button the user can select manually the sector antenna from which you want to receive the signal.

4.2.2.3.3 Omni antenna

In this option, the Autotracking is configured with an **omnidirectional antenna**.



Figure 4.56: Omni Antenna option

4.2.2.4 IP Output Menu

By using the Up, Down arrow keys, select the **IP Output** option. This output can be enabled or disabled pressing the right and left buttons



Figure 4.57: IP Output

To configure the different parameters related to this option, select the enable option and press the OK button.



Figure 4.58: IP Output Options

The √ symbol appears when the device is connected to the destination device.

Line nº	Function
1	Local IP Config: In this field, different parameters related to the configuration of the local network can be set. The available parameters are: - Local: IP address of the device which is going to send the information. To change the IP address first press the OK button and then, with the Up, Down keys select the desired number. To change from one character to another, press Right, Left keys. To save the value, press the OK button. (editable parameters) - Mask: Subnet address of the device which is going to send the information. To change the Subnet Mask address first press the OK button and then, with the Up, Down keys select the desired number. To change from one character to another, press Right, Left keys. To save the value, press the OK button. (editable parameters) - Gateway: Gateway address of the device which is going to send the information. To change the Gateway address first press the OK button and then, with the Up, Down keys select the desired number. To change from one character to another, press Right, Left keys. To save the value, press the OK button. (editable parameters) - Video over IP MAC: In this field the MAC address of the Video over IP card is displayed (reading parameter)
	Dest IP & Port: In this option, the IP address and the number of the port of the device to which data is sent must be configured. In case you want to send data to a multicast address just enter the desired multicast address. To change the IP address and the number of the port, first press the OK button and then, with the Up, Down keys select the desired number. To change from one character to another, press Right, Left keys. To save the value, press the OK button. (editable parameter)
	FEC: In this field the Forward Error Correction can be enabled or disabled. When it is enabled, the number of columns and rows can be configured by pushing firstly the OK button and then, with the Up, Down arrows, the number of columns and rows wanted can be selected. If FEC option is enabled then, the only protocol which can be used is RTP. (eligible parameter and editable if enable option is chosen)
	TP per IP: In this field the number of Transport Stream packets per IP (from 1 to 7) can be configured. To select the desired value, press the Right and Left buttons. (eligible parameter)

Protocol:	
5	The type of protocol used for the communication can be RTP or UDP. To select the desired protocol for the communication, use Right and Left buttons. (eligible parameter)
Time To Live (TTL):	
6	This field limits the lifetime of the data. The Time To Live value (from 1 to 255) means the number of routers that a packet can reach until it is discarded. To configure this value, first press the OK button and then, with the Up, Down, Right and Left buttons select the desired value. To save the value, press OK button. (editable parameter)

Table 4.18: IP Output menu options



The Local IP address and the destination IP address MUST be different.



When a parameter of the TS over IP menu options is changed, it takes 30 seconds for the device to be configured and work again.

4.2.2.5 Unit

By using the Up, Down arrow keys, select the **Unit** option and press the OK key.

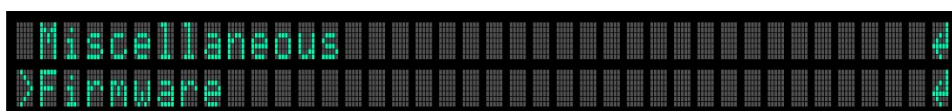
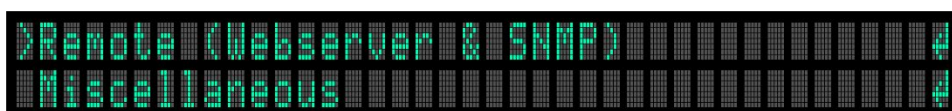


Figure 4.59: Unit Menu

4.2.2.5.1 Profile

In this field, you can enable profiles mode in the receiver. In order to access the profiles mode, please select enable and reboot the receiver unit.

4.2.2.5.2 Profiles Config

In this field, you can configure up to 16 profiles.

The configurable parameters are:

- Input type:
 - DVB-T
 - DVB-T2
 - ISDB-T
 - ASI
 - IP
- Frequency
- Bandwidth

4.2.2.5.3 Unit Video Monitor Screen

In this option, the video monitor can be configured.



Figure 4.60: Video Monitor Menu

In this field, the TFT video screen can be enabled or disabled. To switch off the TFT video screen, select the Disable option with Right or Left buttons. If you want to switch on the TFT video screen, the enable option must be selected. (eligible parameter)

4.2.2.5.4 Unit Audio Monitor Screen

In this field, the speakers and headphone audio outputs can be enabled, disabled or configured.

The available options are Audio 1 and Audio 2. Each option has eligible parameters to configure the audio monitor. To configure them, the OK button must be pressed, and these options will appear:

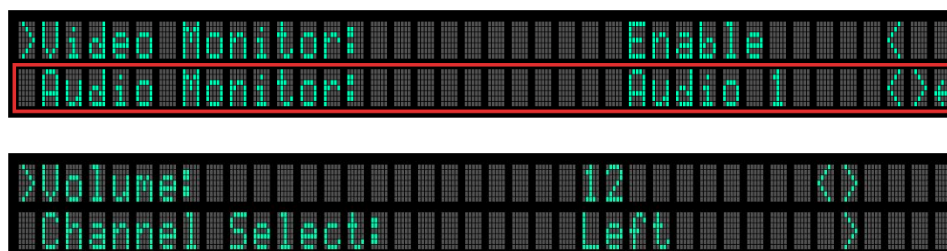


Figure 4.61: Audio Monitor Menu

Line n°	Function
Volume:	
1	Select the level of the audio output signal. The level range is from 0 to 15 where the higher one is the number 15 and the lower one is 0. (eligible parameter)
Channel select:	
In this field, the mode of the audio output can be selected with the Right, Left buttons. (eligible parameter)	
The available options are:	
2	- Left: Select this option to have the left channel of the audio output enabled and the right one disabled. - Right: Select this option to have the right channel of the audio output enabled and the left one disabled. - Right & Left: Select this option if you want to have both audio channels (right and left) enabled.

Table 4.19: Audio Monitor menu options

4.2.2.5.5 Unit Alarms Screen

In this section, you can View and Configure the Alarms shown by the Receiver and the Transmitter.



Figure 4.62: Unit Alarms menu

To Configure the Alarms shown by the Receiver, press OK button while Config option is selected:

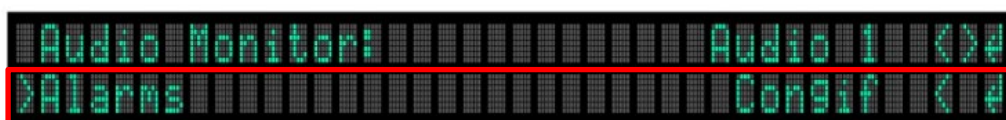


Figure 4.63: Alarms Configuration selection

Once inside Configuration menu, the Alarms which are wanted to be monitored can be enabled. Alarms which are disabled will not being monitored by the Receiver.

The available alarms are:

- Input Signal Not Present
- Decoder Is Not Decoding
- No Video Present
- DC Voltage Low
- DC Voltage High
- High Temperature
- Remote GPS Not Present
- Local GPS Not Present
- Compass GPS Not Present
- Inclinator Not Present
- QPT Not Present

By pressing OK button while View Alarms is selected, the different alarms which are present at this moment are shown:

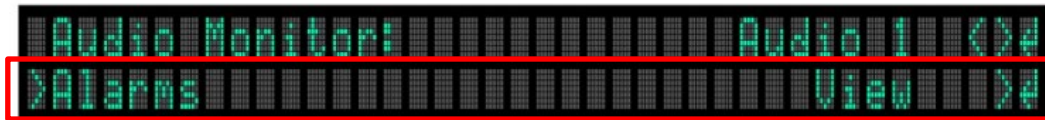


Figure 4.64: Alarms View selection

The alarms are shown as indicated below:

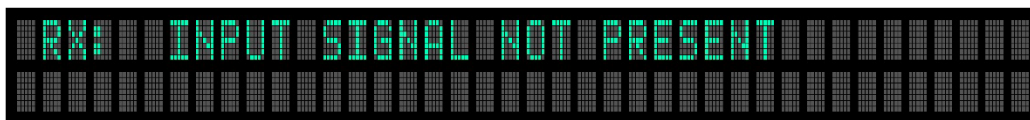


Figure 4.65: Present Alarms

4.2.2.5.6 Measurements Screen

In this field, several monitor parameters of the device are displayed.

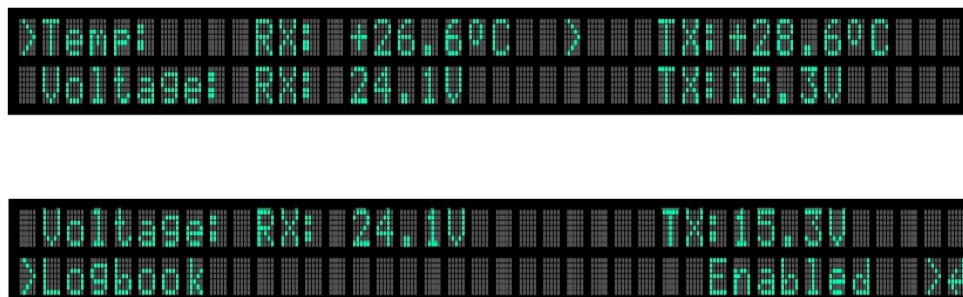


Figure 4.66: Monitor Menu

In this screen, several monitor parameters can be accessed:

Line n°	Function
1	Temperature:
	In this option, the internal temperature of the Receiver and Transmitter is shown. With the Right, Left keys, the user can select if the temperature is shown in °C or in °F. Also, the value which is between square brackets means the speed of the fans (values from 0 to 3) where 0 means that the fans are stopped and value 3 is the maximum speed. (reading parameter)
2	Voltage:
	In this option, the voltage of the Receiver and Transmitter is shown. (reading parameter)
3	Logbook:
	In this option, you can enable or disable the Logbook. Pressing the OK button allows the user to access the Logbook menu where the different events are shown. (reading parameter)

Table 4.20: Unit Monitor menu options

4.2.2.5.6.1 Monitor LogBook

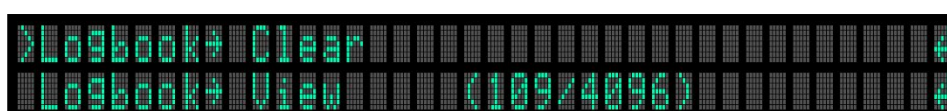


Figure 4.67: Monitor LogBook Menu

In this option, the different actions that occurred in the device since the last time the logbook was cleared are saved. The total number of logs that can be saved are 4096. If the user wants to clear the LogBook, go to the LogBook → Clear option and press the OK button. If the user wants to see all the events that have occurred, go to the option LogBook → View and press the OK button.

4.2.2.5.6.2 LogBook View

	Time of the event	Date of the event	Description of the event
>01	11:28:44	09/02/17	Decoding Sta
11	11:28:44	09/02/17	Video OK

Figure 4.68: LogBook View Menu

On this screen, the different logs that have occurred during the operation of the device are shown. The time at which the event occurred is displayed, the date of the event and a brief description of that event.

4.2.2.5.7 Unit Remote (Webserver Screen)

In this field, different parameters related to the configuration of the Webserver are shown.



Figure 4.69: Webserver Menu

The available parameters are:

Line n°	Function
	Local:
1	In this option, the IP address of the device can be set in case you want to control the device remotely. This is the IP that must be set in the web browser to access the Webserver. To change the IP address first press OK button and then, with the Up and Down keys select the desired number. To change from one character to another, press Right and Left keys. (editable parameter)
	Mask:
2	Here it can be written the Subnet Mask address of the device. To change the Subnet Mask address first press OK button and then, with the Up and Down keys select the desired number. To change from one character to another, press Right and Left keys. (editable parameter)
	Gate:
3	In this option, the address of the Gateway must be written. To change the Gateway address first press OK button and then, with the Up and Down keys select the desired number. To change from one character to another, press Right and Left keys. (editable parameter)
	MAC
4	In this field, the MAC address of the device is shown. (Reading parameter)

Admin Pass:	
5	The administrator's password is introduced. It is a list of 8 digits. It can be set an own password or restore the default password (00000000).
User Pass:	
6	In this option user's password is introduced. It is a list of 8 digits. It can be set an own password or restore the default password (00000000).

Table 4.21: Webserver menu options



The IP address of the Webserver, the Local IP address and the destination IP address must be different.

4.2.2.5.8 Unit Miscellaneous Screen

In this field, several parameters related to the mode of operation of the device can be configured.

```
>Alarm Output: [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] Disable [ ] [ ]>
|Keyboard Beep: [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] OFF [ ] [ ]>
```

```
>Keyboard Lock: [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] OFF [ ] [ ]>
|Night Mode: [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] 0 [ ] [ ]>
```

```
>Alarm Beep: [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] Disable [ ] [ ]>
|Clock: [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] 18:16:56 09/02/17 [ ] [ ]>
```

```
>Location Labels [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]>
|QuickSet Protocol: [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] PTCR-20 [ ] [ ]>
```

```
>Distance Units: [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] Miles [ ] [ ]<
|Speed Units: [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] Knots [ ] [ ]>
```

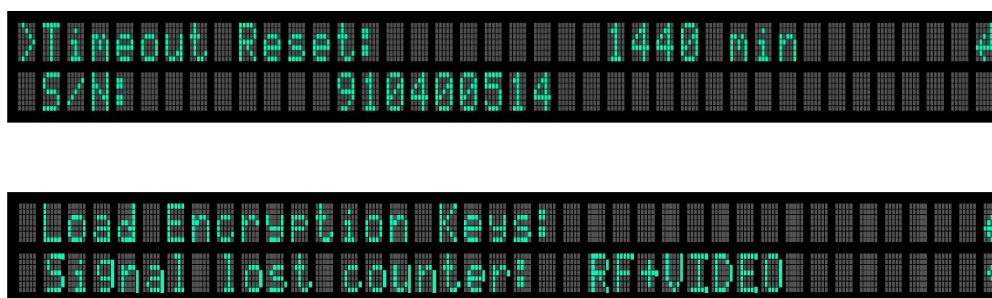


Figure 4.70: Miscellaneous Menu

The available options are:

Line n°	Function
1	Alarm Output:
	In this option, the alarm output of the Aircraft connector can be enabled or disabled The available options are: • Enable • Disable
2	Keyboard Beep:
	If this option is OFF, then, when the user presses any key of the keyboard, there will be no sound. If the ON option is selected then, a beep sound appears each time a key is pressed. To select between ON and OFF options, press the Right, Left keys. (eligible parameter)
3	Keyboard Lock:
	If the On option is selected and then, the buttons of the equipment remain for 5 minutes without being pressed, a message will appear on the screen saying that the keyboard is locked. Pressing the cross button, the keyboard can be unlocked. If the Off option is selected there will be no messages in the screen. The available options are: • On • Off

Night Mode:	
	There are four possible states for the night mode. To lower the screen brightness, increase the value of this option. The maximum value of this option is 3, setting the brightness to the minimum. (eligible parameter)
4	The available options are: • 0 • 1 • 2 • 3
Alarm Beep:	
	If this option is enabled, then a beep noise will sound each time that an alarm occurs. (eligible parameter)
5	The available options are: • Enable • Disable
Clock:	
6	In this field the date and the current hour are displayed, and they can also be configured pressing the OK button and changing the values with Up, Down and Right, Left buttons. (reading and editable parameter)
Location Labels:	
7	In this field there can be configured several parameters such as the place in which the device is located as well as the position of the Transmitter and the Receiver device. (editable parameter)
QuickSet Protocol:	
8	In this field the type of QuickSet Protocol employed is shown (eligible parameter). The available options are: PTCR-20 and PTCR-96.
Distance Units:	
	If miles is selected, then, all the distances will be in miles and the same occurs if kilometres is selected. (eligible parameter)
9	The available options are: • Kilometers • Miles
Speed Units:	
	In this field, the desired parameter is selected to measure the speed (eligible parameter). There are three options available:
10	• Knots • Km/h • Mph

Timeout Reset:	
11	In this field the time that the Receiver could be without receiving any signal is selected. After passing this time, the equipment is reset. To disable this option, 0 value must be written.
S/N:	
12	In this field the serial number of the device is shown (reading parameter).
Load Encryption Keys:	
13	In this field you can load the encryption keys for BISS and AES modes by USB. The file must have ".svp" extension and the content must be as it is indicated in the following example: AES128:1202A3412348C9127348FE2348971234 AES256:123AB89070F8097D897EE8970DE879879801098 9182918239182399AFFC123AE BISS1:89701234ABE1 BISSSW:0123AC1238907098 BISSU:413809ABA12393
	Once the keys information has been loaded properly, "KEYS LOADED" message is shown in the screen.
Signal Lost Counter:	
14	In this field, the counter shown in the main page can be configure to count cuts in three different ways:
	• RF cuts • Video • Cuts Video + RF cuts

Table 4.22: Miscellaneous menu options

4.2.2.5.9 Unit Firmware Screen

In this section, it is shown the firmware and changes can be made to the firmware. The steps to update the device are explained below.

The options are:



Figure 4.71:Firmware Menu

Line n°	Function
1	Current Version:
	In this field, the number of the firmware version installed in the device is shown. The characters which describe the number of the version are the one inside the red box shown in the figure above. The rest of the characters are important for the manufacturer but are not important for the user.
2	Update Firmware:
	This field is the one for updating the version of the device. To update the equipment properly, follow the instructions below.

Table 4.23: Unit Firmware menu options

In this section, the firmware of the device can be updated. Next, they are explained the necessary steps to make a successful update.

1. The latest firmware is allocated in the webpage of SVP Broadcast Microwave. To access the firmware file, first enter www.svpaerospace.com in your web browser.
2. Click on the Support tabs

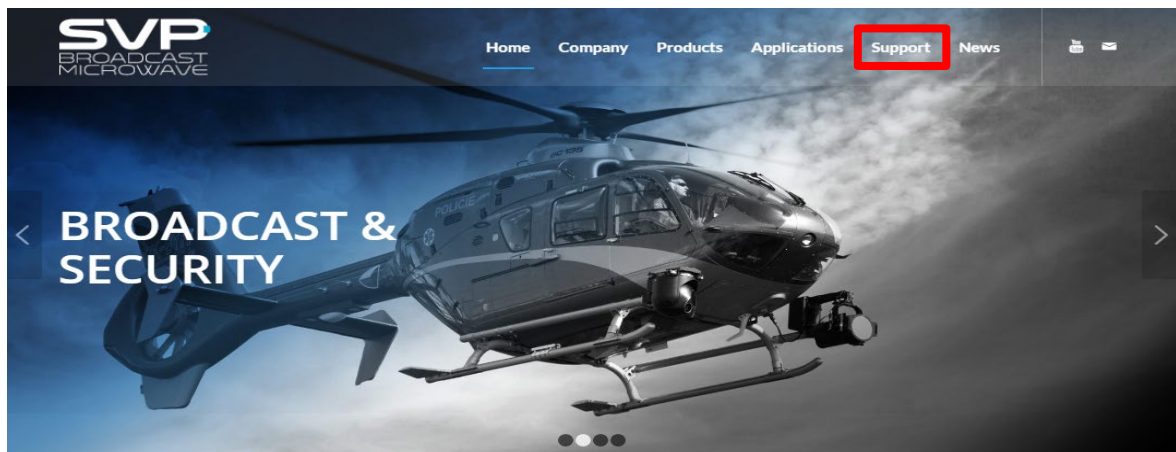


Figure 4.72: Updating firmware step 2

3. Click on Firmware.



Figure 4.73: Updating firmware step 3

4. Go to RX_Firmware.

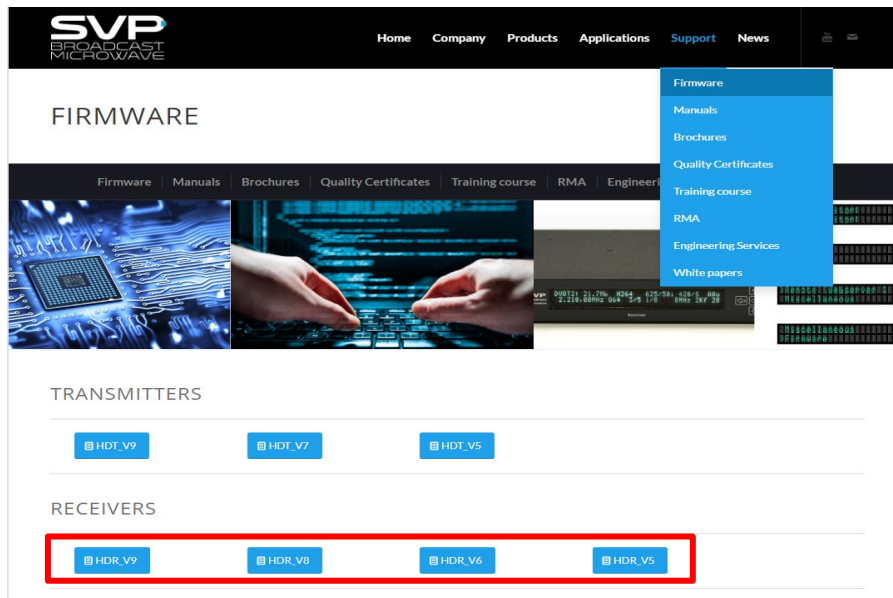


Figure 4.74: Updating firmware step 4

5. Press the version of the Receiver model needed (version of the equipment) to download the file.
6. Go to Firmware field and then press the current version option to check the number of the version installed in the device (the first two digits).

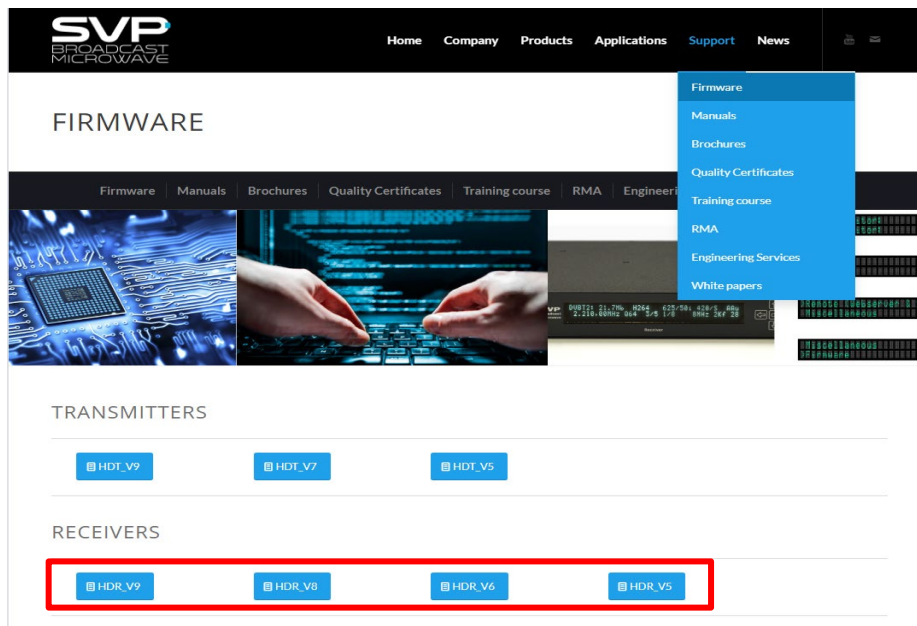


Figure 4.75: Updating firmware step 5

7. Once the firmware file has been downloaded, save it in a USB device.



In the USB device, the only file that can be allocated inside it is the firmware file of the device to be updated.

8. With the equipment completely powered off (**with no power supply**), insert the USB device in the USB connector, situated in the rear panel.



Before introducing the USB device, remove the power supply of the equipment.



If there is no signal introduced in the device (RF, ASI or SDI), the updating stage will be quicker.

9. Now, switch on the device.
10. Go to Unit menu. In case of being on the main screen, press the cross button to access the menu. There, with the Up, Down buttons, select the Unit option.
11. Select Firmware by pressing the OK button.
12. Select Check USB Memory with the OK button.
13. Now, automatically the device updates the firmware. The screens which are shown below display the different steps that the device makes while the updating process is taking place.



Don't power off the device during the updating process.



Figure 4.76: Updating process 1



Figure 4.77: Updating process 2



Figure 4.78: Updating process 3



Figure 4.79: Updating process 4

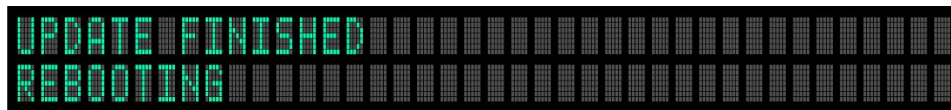


Figure 4.80: Updating process 5

Chapter 5: Autotracking Antenna (optional)

In this section, what the Autotracking antenna control consists of and the detailed steps to follow to configure this option properly is explained.

The *Receiver* can control a Sectorial and a Parabolic Antenna. This new feature constantly provides the highest signal level. The antenna points toward the Transmitter all the time.

This feature is achieved with the GPS coordinates sent by the Transmitter to the Receiver and the GPS coordinates of the Receiver. In the Receiver, the GPS coordinates can be introduced manually or through the GPS Data input. Furthermore, an UHF radio can be used in Autotracking systems when required to transmit the position of the plane's GPS at long distances for automatic pointing (NX-820).

In the next points, the two possible Autotracking systems are described.

5.1 Autotracking Multisector AMS Antenna

5.1.1 How it Works

The **Autotracking with Multisectorial Switchable Antenna AMS** consist of a tracking system (with up to 5 possible panels and one possible up-down antenna), which has inside a relay controlled by the *Receiver*. This solution provides the *Receiver* with the best signal quality using the GPS coordinates of the Transmitter and the Receiver. With these GPS coordinates, the *Receiver* device sends a control signal to the relay which is inside the AMS antenna to switch on the most suitable antenna panel in which the level of the received signal is the highest.

With this control signal, the relay (through a circuit based on PIN diodes) allows the RF signal of the most suitable panel antenna passing through it. Then, this signal is sent to the *Receiver*. It is important to orientate the AMS antenna correctly, so please make sure that the blue line on the antenna is faced to the North.

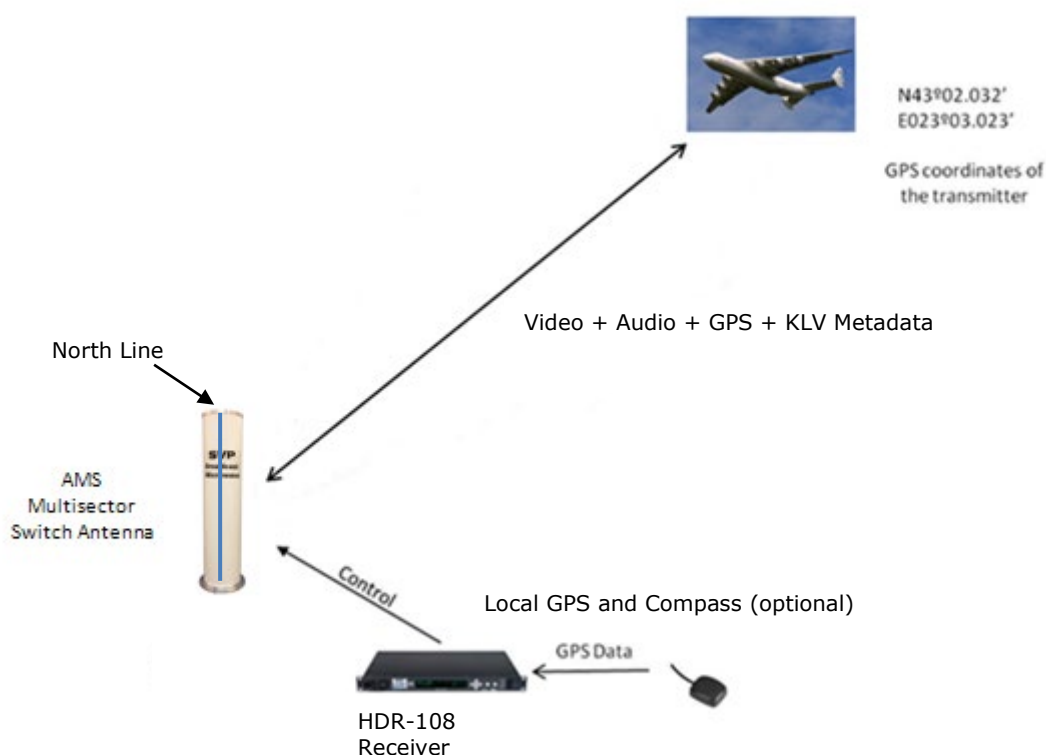


Figure 5.1: Autotracking with panel switching

5.1.2 Installation and Configuration

There are some notes that must be taken into account before starting with the operation of the Autotracking System.

The centre of the first sector must be orientated to the North. This centre of the first sector is marked with a blue line from the up to the down side of the antenna.

Next, how to configure the Autotracking with a **Multisector AMS** is explained.

1. Go to the Autotracking option.

```
>Autotracking: Multisector AMS <>#
IP Output: Enable <1>#
```

Figure 5.2: Antenna Control menu

In this option, there are three possible types of Autotracking (Multisector AMS, Parabolic and Omnidirectional). In this case, select the **Multisector AMS** option (the parabolic one is explained below) with the Right, Left keys. Once the option is selected, press the OK button to enter to the configuration menu.

2. Once the user is inside the **Multisector AMS** option, there are two possible options (eligible with the Right, Left keys) which are detailed below:
3. Auto

```
1 2 3 4 5 T Δ! --- -km Auto>#
L1C 0! --- C/N 0! -
```

Figure 5.3: Multisector AMS Autotracking (Auto)

When the Auto option is selected, it means that the sector antenna is automatically selected. The selected sector is the one which is marked with the square brackets.



Value T means the antenna on the Top.

4. Manual



Figure 5.4: Sector Autotracking (Manual)

If the Manual option is selected then, by pressing the OK button the user can select manually the sector antenna from which you want to receive the signal.



Manual option can only be selected in case there is no GPS signal. If the option is configured in manual and the Receiver recovers the GPS coordinates, then, the option will turn to Auto again.



If the option selected is Auto and the device is receiving a signal, but the GPS data disappears, the device will automatically stay two seconds in each sector until GPS data is received.



In case there is no GPS data, but the device is receiving the RF signal, the device will be kept in the same sector, it will not be tracking.

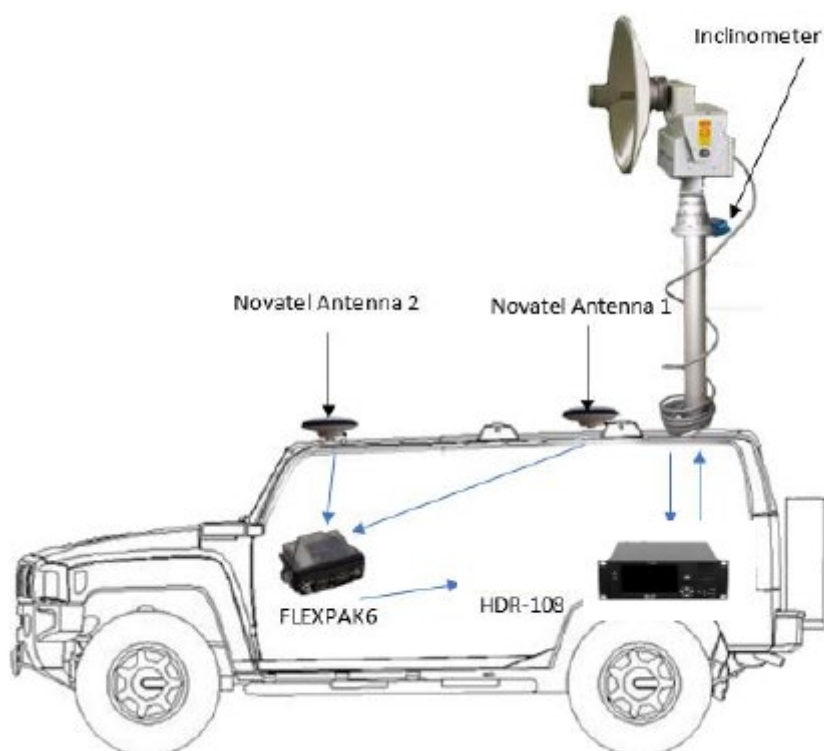
5.2 Autotracking Parabolic Antenna

5.2.1 How it works

The **Autotracking with Parabolic Antenna** consist of a directional antenna which is constantly aiming of the Transmitter using a QPT Positioner. In this way, we obtain the highest level of the received signal. This is achievable with the GPS coordinates of the Transmitter and the Receiver device as well as with a communication between the QuickSet Positioner and the *Receiver*.

In addition, for more accuracy, a Compass should be used for the automatic North Heading, and an Inclinometer should be used for the Pitch and Roll compensation, which is very useful when the positioner is installed in a mobile van or boat.

The following diagram shows a typical configuration of Autotracking with MOOG QPT positioner, Compass and Inclinometer:



5.2.2 Installation and Configuration

There are some notes that must be taken into account before starting with the operation of the Autotracking system.

To warranty that the Autotracking system installation has been correctly done and calibrated, the next steps must be followed:

First, make sure that the Parabolic Antenna is connected to the IF Input 1, it cannot be connected to the IF Input from 2 to 8.

QPT Positioner must be calibrated. This means that it must be straightened and oriented 0 degrees to the North. The North orientation can be done via an external Compass and the unit can automatically be straightened by the use of an external Inclinator. In addition, for a correct operation, the QPT Positioner must be configured as RS-422 communication. Please note that Autotracking connector's RS-422 port communication speed is of 57600 baud rate.

QPT Positioner and Inclinator are connected to the AUTOTRACKING Bayonet 19 pins connector and can be powered directly by the Receiver or by an external power supply. The power output provided is 24V when the Receiver is powered by AC power. When the Receiver is powered in DC, the same input voltage will be provided to the Positioner and Inclinator. Please make sure that the input DC voltage do not exceed the voltage range supported by the QPT Positioner (max.28 VDC).

Local GPS Receiver and Compass can be connected to the Receiver's LOCAL GPS & COMPASS DB-9 connector or to the AUTOTRACKING Bayonet 19 pins connector, but not to both at the same time.

When the Compass is connected to the AUTOTRACKING connector, it can be powered directly by this connector.



The GPS antennas of the Compass must be installed at a minimum 2 meters of distance between them.

Next it is explained how must be configured the Inclinometer:

- The QPT Positioner is connected via a RS-422 port and the Inclinometer is connected via a second RS-422 port to the Autotracking connector.
- The Inclinometer must be configured as a RS-422 port. The speed of the Inclinometer must be configured at 4800 baud rate with 2 Hz data rate.
- The Inclinometer and QPT Positioner can be powered by the Autotracking connector at 24 V.
- The Inclinometer must be installed on the base of the QPT Positioner for an accuracy measurement of PITCH and ROLL parameters as it is shown in the following diagram:

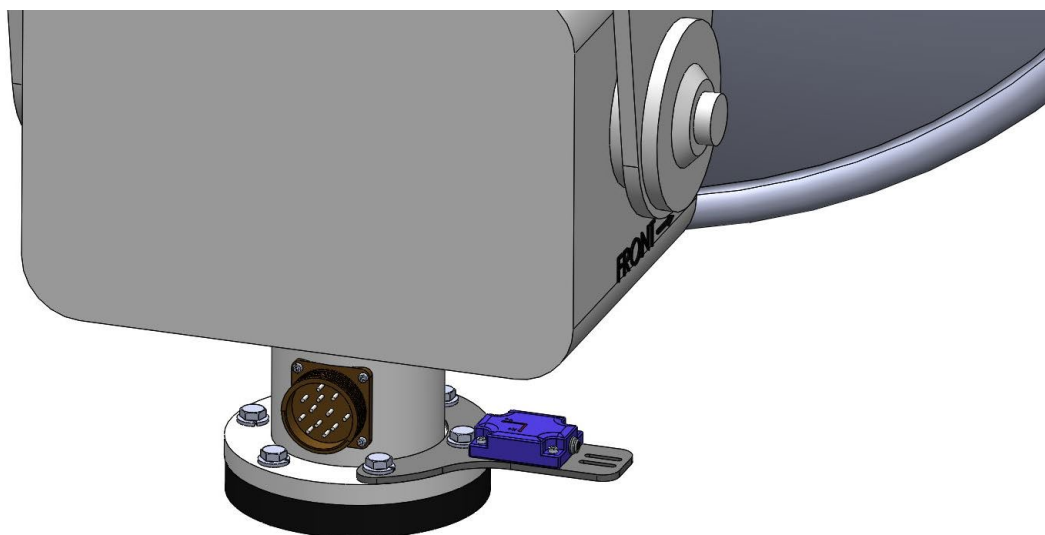


Figure 5.5: Inclinometer installation Diagram

Next it is explained how must be configured the GPS Receiver and Compass:

- The standard supported NMEA commands for the GPS Receiver and Compass are:
 - GGA (GPS). Provides the GPS position.
 - RMC (GPS Speed).
 - HDT (Compass). Provides heading relative to True North.
- For the GPS Receiver and Compass, the serial port must be set as indicated below:
 - 4800 baud rate.
 - Maximum 2 Hz data rate.
 - N-8-1 setting.

- The Local GPS Receiver and Compass can be connected to the LOCAL GPS & COMPASS DB-9 connector or to the AUTOTRACKING Bayonet 19 pins connector on the Receiver's rear panel. But not to both at the same time.
- The GPS Receiver and Compass must be installed in the base of the Van or Boat in line with the QPT Positioner Cable connector.

Once we have made sure that the installation is correct, we can start with the configuration of the Parabolic Antenna Autotracking system.

Next, how to configure the Autotracking with a **Parabolic Antenna** is explained.

First, go to Autotracking option.

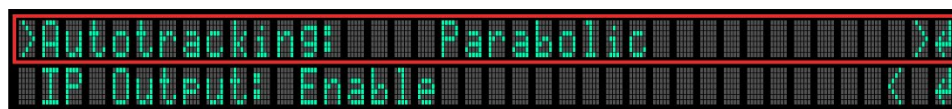


Figure 5.6: Parabolic Antenna Autotracking menu

In this option, there are three possible types of Autotracking (Parabolic, Multisector AMS and Omnidirectional). In this case, select the Parabolic option with the Right and Left keys. Once the option is selected, press the OK button to enter the configuration menu.

Once the user is inside the Parabolic Antenna option, there are three possible options (Auto, Manual and Fold) which are detailed below:

▪ **AUTO MODE**



Figure 5.7: Auto Menu

When the Auto option is selected, it means that the Parabolic Antenna is aimed automatically at the Transmitter device through the GPS coordinates of the Transmitter and the Receiver device.

Please note that, if for 30 seconds there is no GPS signal, the device will start looking for GPS signal. If there is no GPS signal but there is RF signal, then, the tracking will start looking for maximum RF signal received.

For a correct operation of the Auto mode, the Receiver Position must be set, and Receiver Configuration menu must be configured.

To start configuration please press OK on Auto mode.

Once user has accessed to the Auto mode screen, three options to choose will appear:

- Transmitter Position
- Receiver Position
- Receiver Configuration

▪ **Transmitter Position**

The Transmitter position can be located from 5 different sources. The source selected is indicated in line with Transmitter Position option:

- **BY GPS Channel:** Transmitter's GPS signal is being received from the GPS embedded in the Transport Stream.
- **BY Data Channel:** Transmitter's GPS signal is being received from the data embedded in the Transport Stream.
- **BY UHF:** Transmitter's GPS signal is being received from an external UHF Radio.
- **BY ASI Embedded Data:** Transmitter's GPS signal is being received from an external ASI input.
- **MAX RF:** There is not GPS signal and Transmitter position is being located by RF signal level. The receiver looks for RF signal following the Search Profile selected. Once that RF signal has been received, the receiver will look for the Maximum of the RF signal level and the tracking will be done by maximum of RF signal until it gets GPS signal. GPS signal always has preference, if the Receiver receives GPS signal, the status changes to BY HDT.
- **NONE:** There is not GPS signal. The receiver looks for RF signal following the Search Profile selected. Once that RF signal has been received, the receiver waits for GPS signal. Once that GPS signal has been received. The status changes to BY HDT.



Figure 5.8: Transmitter Position source

Inside Transmitter Position the parameters related to the Transmitter's GPS position are shown if any.

```
>TX Distance: 87.2Km 1750 ΔH: 147m
TX Position: S 7 0km ---0 253m
>TX Position: N43°10.459' W002°38.255' 4
```

Figure 5.9: Transmitter GPS Information screen

▪ **Receiver Position**

To start Receiver Autotracking configuration press the OK button to access the Receiver Position screen.

```
>Transmitter Position (MAX RF) 4
Receiver Position 4
```

Figure 5.10: GPS Information options

The following parameters are shown on the Receiver Position menu.

```
>Local Manual: N43°10.459' W002°38.255' 4
Local Alt: 117m Speed: 2km S-- SAVED4

>Heading: 106.7°S P: +00.2 R: -34.7° -00.1°
Go to True North
```

Figure 5.11: Receiver Position screen

▪ **Local Manual or Local GPS:**

In the first line, the user can set the GPS coordinates of the Receiver. These coordinates are editable when no GPS information is received from an external GPS source. In that case, this option is named Local Manual.

When GPS information is given by an external source, the GPS information is automatically updated and not editable. In that case, this option is named Local GPS.

When we have been receiving GPS from an external GPS source, but we have lost it, the last GPS position received will be saved and the SAVED word will appear on the second line.

- Local Altitude and Speed:

In this line, the user can read the local altitude and speed information provided by the external GPS source.

When there is no GPS information, the local altitude is editable by the user.

- Satellite Number:

In this field, the number of satellites from which we are receiving signal are shown. For a correct operation of the Autotracking system, it is recommended to receive signal from at least 6 satellites.

- True North Heading:

In this file are shown the measured values for the True North Heading.

The True North Heading can be introduced manually or automatically using an external Compass. When the Heading is being provided by an external Compass, immediately after the degree symbol, an alarm indicator is displayed indicating the following:

- Static capital C will indicate that we are receiving the Compass information correctly.
- An intermittent signal between lowercase c and uppercase C will indicate that we have the Compass connected but that the information we receive from the Compass is not correct. HDT information is received but the fields are empty.
- A flashing capital C will indicate that we have lost the Compass. After 10 seconds, the capital C will become in a capital S which indicates that the Heading has been saved from the last information received by the Compass. And it will show which Heading is saved.

The Heading can be manually edited in all the cases unless when there is a static capital C, that means that the external Compass has priority over the editable Heading.

When the Heading is a manually edited value and we have saved it, the indicator will be a static capital M that indicates that this is the manually edited value.

- Pitch and Roll Compensation

Pitch and Roll values are provided by the external Inclinator. These are reading only parameters, at the end of the line, the compensation applied by the Pitch and Roll measurements is shown.

It is necessary the use of an Inclinator sensor when the QPT Positioner is installed on an irregular surface or in a mobile Car or Boat.

- Go to True North:

This option points the positioner to the True North. It is used to guarantee the correct configuration of the tracking system once all the configurable parameters have been set (GPS position, North Heading, Pan and Tilt measurements and Antenna Calibration).

Once the positioner has been pointed to the North, please make sure that the calibration is correct by comparing it with an external Compass.

- **Receiver Configuration**

To finish, press the OK button to access the Receiver Configuration screen.



Figure 5.12: Receiver Configuration Option

There are different options to select and configure:

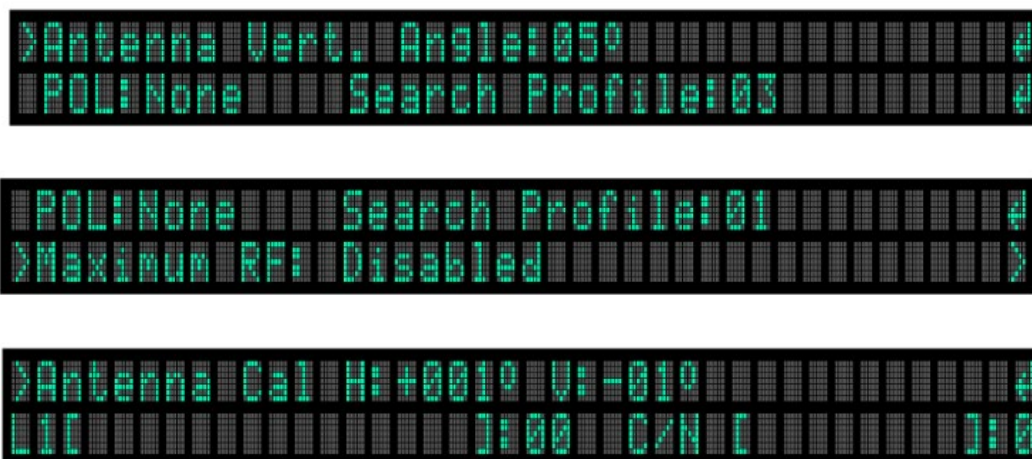


Figure 5.13: Receiver Configuration Screen

- **Antenna Vertical Angle:**

The Antenna Vertical Angle must be set as the vertical beam width of the antenna used (this angle will determine the vertical increase done while the unit is in Search Profile mode).

- **Polarization:**

The Polarization can be controlled when an APO-75 with multiple Polarization antenna is being used, the polarization of the antenna can be remotely controlled from this menu. For more information, please go to section 9.2.9.2 APO-75 Antenna Polarity control.

- **Search Profile:**

Another parameter to be configured in this line is the Search Profile:

- Profile 1: When only a Parabolic Antenna is used for reception. It makes sweeps in all vertical and horizontal angles. In

increments of 10° for the horizontal and in predefined vertical angle for the vertical.

- Profile 2: When we use the tracking system in combination with other antennas. The positioner will look for the helicopter on the horizon (0° , +VA and -VA) and will increase the horizontal sweep to 45° in each sweep. This profile makes the H and V sweeps at the same time.
- Profile 3: When we use the tracking system in combination with other antennas. The positioner will look for the helicopter in the horizon (0° , +VA and -VA) and will increase the horizontal sweep in 45° each sweep. This profile makes the H sweep first and then the V, forming a square.
- NONE: Search of the signal is disabled when there is no GPS information. The positioner remains static in the last position where it received GPS.

- Maximum RF:

If Maximum RF is enabled, when the receiver receives RF signal, but this signal does not include GPS information, the receiver will start tracking the Transmitter by following the maximum RF signal level. If RF signal is not received, the receiver will look for signal following the Search Profile selected. This option is used when no GPS signal is available.

On the other hand, if Maximum RF is disabled, the receivers only track the transmitter based on the GPS signal received.

- Antenna Calibration:

It is recommended to calibrate the antenna to receive the maximum signal level by compensating any vertical or horizontal deviation introduced during the installation or by any other external causes.

Before starting the Antenna Calibration, please make sure that the GPS position of the Receiver, GPS position of the Transmitter, North Heading and Inclinator compensation are correctly set, these parameters are set in Transmitter Position and Receiver Position menus.

For a correct calibration of the antenna, please point the Receiver Positioner to the Transmitter's position and calibrate the antenna until you receive the highest signal level possible.

- Level and C/N Indicator:

In this line the level of the signal received is shown, this measurement is used to guarantee the maximum signal received while Antenna Calibration is made.

▪ **MANUAL MODE**



Figure 5.14: Manual Menu

If the Manual option is selected, then, by pressing the OK button the user can select manually the position of the Parabolic Antenna. To change the azimuth (H) position of the antenna, press the Right, Left buttons. To change the elevation (V) position of the antenna, press the Up and Down buttons.

▪ **FOLD MODE**



Figure 5.15: Fold Menu

When this option is selected, it means that the Autotracking system is not being used and the antenna is going to be fold.

The number of degrees that are needed to fold the antenna is configured here. The fold limits are -30° and +90°.

In the second line, by pressing the OK button, the antenna folds.

Chapter 6: GPS Output Interfaces

6.1 Transmitter's GPS Data Output

As already explained, the *Receiver* outputs the Transmitter's GPS data through the AIRCRAFT GPS IN & OUT / SERIAL REMOTE connector (see section 8.2.8.2 for connector information). The protocol output is the same configured in the Aircraft GPS, typically NMEA0183. To establish a communication between the *Receiver* and the computer through the serial port, please follow these instructions:

1. Type a name for the connection and an icon from the list.



Figure 6.1: HyperTerminal new connection

2. Configure a COM port for the communication and select the COM port configured.



Figure 6.2: COM port configuration

3. In the COM properties, select the same parameters as the one selected in the *Receiver*:
 - Bits per second:
 - RS-232 data output: Editable from 9600, 19200, 38400, 57600, 78600 to 115200.
 - Data bits: 8
 - Parity: None
 - Stop bit: 1
 - Flow control: None

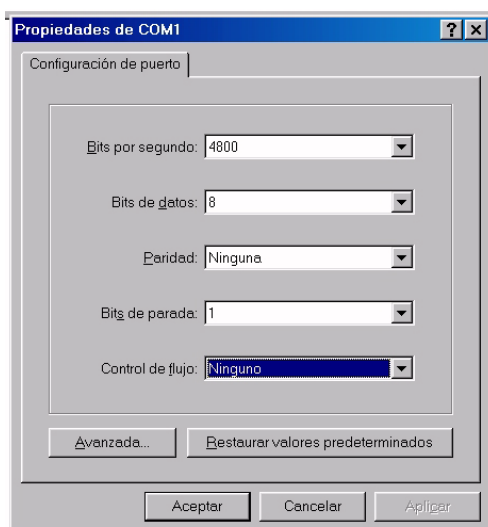


Figure 6.3: COM1 properties

4. Once the connection is established, the user can receive data from the *Receiver*. This data can be shown on the HyperTerminal screen or can be saved in a text document.
5. The sentences output are GGA and RMC as shown in the image below:


```
$GPGGA,162725.00,4310.45511,N,00238.25415,W,1,07,1.18,160.1,M,49.8,M,,*4B
$GPRMC,162726.00,A,4310.45521,N,00238.25402,W,0.045,,220319,,A*67
```

The frequency between sentences depends on Aircraft GPS configuration, it is typically of 1 sentence per second.
6. When GPS data is obtained, go for example to the Google Earth application and type the received coordinates.
7. The Transmitter's position will be drawn on the map.

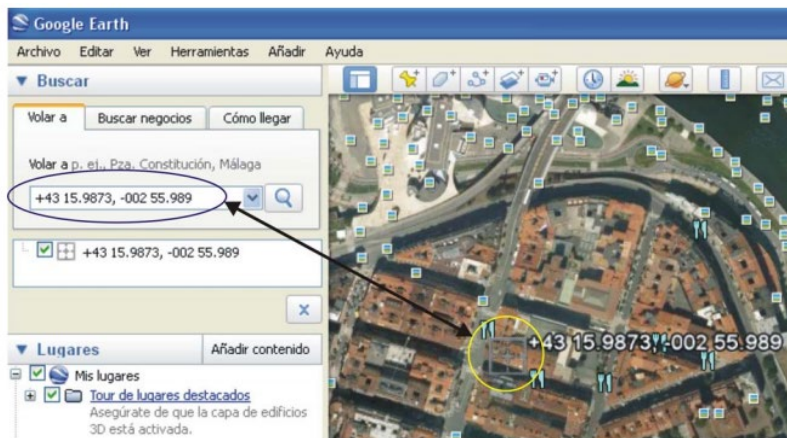


Figure 6.4: Google Earth example

Chapter 7: Web Server / Serial Control

7.1 Web server

7.1.1 Receiver menu

This equipment can be controlled using a PC connected to the rear panel Ethernet connector, through the Internet or a local network. The Remote connector of the Receiver is used for this purpose.

To configure the browser interface correctly, the IP address, Subnet Mask and Gateway need to be set correctly on this unit. Next, the steps to setup network parameters are shown:

1. Go to Unit → Webserver

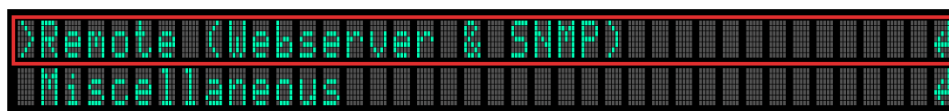


Figure 7.1: Web Server screen

2. Select Loc1 option and set an IP address. To change the IP address first press the OK button and then, with the Up, Down keys select the desired number. To change from one character to another, press Right, Left keys. Press the OK button to save the introduced value.



Figure 7.2: Local IP

3. Select Mask option and set the Subnet Mask. To change the Subnet Mask address first press OK button and then, with the Up, Down keys select the desired number. To change from one character to another, press Right, Left keys. Press the OK button to save the introduced value.


```
>Loc1: 192.168.001.191
Mask: 255.255.000.000
```

Figure 7.3: Subnet Mask

4. Select Gate option and set the Gateway. To change the Gateway address first press OK button and then, with the Up, Down keys select the desired number. To change from one character to another, press Right, Left keys. Press the OK button to save the introduced value.

```
>Gate: 192.168.001.001
MAC: 70:B3:D5:1A:C0:00
```

Figure 7.4: Gateway

5. In this field, the MAC address of the device is shown (Reading parameter).

```
>Gate: 192.168.001.001
MAC: 70:B3:D5:1A:C0:00
```

Figure 7.5: MAC address

6. Select Admin Pass option and set the administrator's password. If you want to access the Webserver directly without setting any password, the Admin Pass must be set to 0 (00000000). However, if you want to set an administrator's password, it is necessary to introduce 8 digits. In this way, with this password, the administrator can access the Webserver and make any configuration, modification or monitoring.

```
>Admin Pass: ***** Restore Def: >
User Pass: ***** Restore Def: >
```

Figure 7.6: Admin Pass

7. Select User Pass option and set the user's password. If you want to access the Webserver directly without setting any password, the User Pass must be set to 0 (00000000). However, if you want to set a user's password, it is necessary to introduce 8 digits. In this way, with this password, the user can access the Webserver and make any monitoring.



Figure 7.7: User Pass

Once the IP, Subnet Mask, Gateway, Admin Pass and User Pass are set and the laptop or PC is connected to the *Receiver*, open the web browser and enter the given IP to the Receiver in the address bar of the browser.

7.1.2 Web Page Overview

To access the Webserver, it is necessary to set the Webserver IP in the web browser and press Enter button.

To modify any parameter, introduce or select the new one and press enter button. Then the change will be set in the Receiver device.

7.1.2.1 DVB-T INPUT

Input	Decoder	IP Output	Unit
Input: DVB-T	Status: Unlocked		
Cuts: 0 Reset			
Demodulator			
RX Frequency: 2 . 300 , 00 MHz Set	Bitrate: 0 , 0Mbps	Bandwidth: 8MHz	
LO Frequency: 1840 , 0 MHz			
Diversity: Mobile			
Constellation: ----	FEC: ----	GI: ----	
Mode: ----	Spectrum: ----		
[T1] Level: -70 dBm 	[T1] SNR: 23 dB 	[T1] MER: 27 dB 	
[T2] Level: --- dBm 	[T2] SNR: --- dB 	[T2] MER: --- dB 	
[T3] Level: --- dBm 	[T3] SNR: --- dB 	[T3] MER: --- dB 	
[T4] Level: --- dBm 	[T4] SNR: --- dB 	[T4] MER: --- dB 	
[T5] Level: --- dBm 	[T5] SNR: --- dB 	[T5] MER: --- dB 	
[T6] Level: --- dBm 	[T6] SNR: --- dB 	[T6] MER: --- dB 	
[T7] Level: --- dBm 	[T7] SNR: --- dB 	[T7] MER: --- dB 	
[T8] Level: --- dBm 	[T8] SNR: --- dB 	[T8] MER: --- dB 	
[T1] State: Enable	[T1] Cable Type: LMR-400	[T1] Cable Length: 1 m	
[T2] State: Enable	[T2] Cable Type: LMR-400	[T2] Cable Length: 1 m	
[T3] State: Enable	[T3] Cable Type: LMR-400	[T3] Cable Length: 1 m	
[T4] State: Enable	[T4] Cable Type: LMR-400	[T4] Cable Length: 1 m	
[T5] State: Enable	[T5] Cable Type: LMR-400	[T5] Cable Length: 1 m	
[T6] State: Enable	[T6] Cable Type: LMR-400	[T6] Cable Length: 1 m	
[T7] State: Enable	[T7] Cable Type: LMR-400	[T7] Cable Length: 1 m	
[T8] State: Enable	[T8] Cable Type: LMR-400	[T8] Cable Length: 1 m	

Figure 7.8: Web Server DVB-T Input screen

- **Input:**

Select the type of the signal that is received. The available options are DVB-T2, DVB-T, ASI, IP and ISDB-T. (eligible parameter)

- **Status:**

If this field shows the locked word then, it means that the signal is present in the input of the device. If this field displays the word unlocked then, it means that there is no signal in the input of the device. (reading parameter)

- **Demodulator**

- RX Frequency:

In this field, the frequency of the received signal must be set. (editable parameter)

- Bitrate:

In this field the bitrate of the received signal is displayed. (reading parameter)

- Bandwidth:

In this option, the bandwidth of the received signal must be specified. The available options are 5, 6, 7 and 8MHz for DVB-T. (eligible parameter)

- LO Frequency:

In this field, the local oscillator frequency of down converters connected to the I.F. inputs must be specified. (editable parameter). The frequency must be the same in all the down converters.

- Diversity:

The available options are:

- Mobile (MRC[1] technique)
- Fixed (Switching technique)

[1] MRC limitations to take into account:

- MRC doesn't work when LO is superior to the RF
- MRC doesn't work if the IF is lower than 150 MHz

In both cases, the unit changes automatically to "Fixed" mode and a flicker "f" appears on DVB-T main screen of Receiver unit.

ISDB-T modulation always works in fixed mode.

- Constellation:

In this field the type of modulation of the received signal is displayed. The available options are QPSK, 16QAM and 64QAM for DVB-T. (reading parameter)

- FEC:

In this field the value of the FEC of the received signal is displayed. The available options are 1/2, 2/3, 3/4, 5/6, 7/8 for DVB-T. (reading parameter)

- Guard Time:

In this field, the value of the guard time of the received signal is displayed. The available options are 1/4, 1/8, 1/16, 1/32 for DVB-T. (reading parameter)

- Mode:

In this field, the number of carriers of the received signal is displayed. The available options are 2K, 8K for DVB-T. (reading parameter)

- Spectrum:

Here the type of the spectrum of the received signal is shown. The available options are inverted or normal spectrum. (reading parameter)

- [Tw] Level:

In this field, the level of the received signal, where w is the number of the demodulator (from 1 to 8 for diversity mode), is shown in dBm. (reading parameter)

- [Tw] SNR:

In this field, the Signal to Noise Ratio value of the received signal, where w is the number of the demodulator (from 1 to 8 for diversity mode), is displayed in dB. (reading parameter)

- [Tw] MER:

In this field, the Modulation Error value of the received signal, where w is the number of the demodulator (from 1 to 8 for diversity mode), is displayed in dB. (reading parameter)

- State:

This option allows enabling or disabling each of the IF inputs of the device. When the enable option is selected in an IF input, this input supplies power to the down converter connected to it. (eligible parameter)

The available options are:

- Enable
- Disable

- IF Cable Type:

In this field, if a cable is used from the Receiver device to the down converter device (8 available) the type of the cable must be specified. The possible types of cables are RG-142, RG-58, RG-214, LMR-400, CEFLEX 1/2, LDF450A 1/2, BELDEN H125, BELDEN PRG11, LMR200 and Andrew FSJ2. (eligible parameter)

- IF Cable Length:

In this field, the length of the cable used from the Receiver device to the down converter device must be specified. The maximum distance allowed is 150 meters. (editable parameter)



When editable parameters are being set in the Web Server and new values are being introduced, the text remains in RED until the enter button is pressed. When the enter button is pressed, the new values are saved, and the text will appear in BLACK. It is necessary to press the enter button to keep and save the new values on the screen.

7.1.2.2 DVB-T2 INPUT

Input	Decoder	IP Output	Unit
Input: DVB-T2 Status: Unlocked Cuts: 0 Reset 			
Demodulator			
RX Frequency: 2 . 300 , 00 MHz Set LO Frequency: 1840 , 0 MHz		Bitrate: 0 , 0Mbps Bandwidth: 6MHz ⬇	
Diversity: Mobile ⬇			
Constellation: ----		FEC: ---	
Mode: ----		Spectrum: ----	
Time IL Type: -		Rotation: ----	
Time IL Length: ---			
[T1] Level: -70 dBm [T1] SNR: 25 dB [T1] MER: 28 dB 			
[T2] Level: --- dBm	[T2] SNR: --- dB	[T2] MER: --- dB	
[T3] Level: --- dBm	[T3] SNR: --- dB	[T3] MER: --- dB	
[T4] Level: --- dBm	[T4] SNR: --- dB	[T4] MER: --- dB	
[T5] Level: --- dBm	[T5] SNR: --- dB	[T5] MER: --- dB	
[T6] Level: --- dBm	[T6] SNR: --- dB	[T6] MER: --- dB	
[T7] Level: --- dBm	[T7] SNR: --- dB	[T7] MER: --- dB	
[T8] Level: --- dBm	[T8] SNR: --- dB	[T8] MER: --- dB	
[T1] State: Enable ⬇	[T1] Cable Type: LMR-400 ⬇	[T1] Cable Length: 1 m	
[T2] State: Enable ⬇	[T2] Cable Type: LMR-400 ⬇	[T2] Cable Length: 1 m	
[T3] State: Enable ⬇	[T3] Cable Type: LMR-400 ⬇	[T3] Cable Length: 1 m	
[T4] State: Enable ⬇	[T4] Cable Type: LMR-400 ⬇	[T4] Cable Length: 1 m	
[T5] State: Enable ⬇	[T5] Cable Type: LMR-400 ⬇	[T5] Cable Length: 1 m	
[T6] State: Enable ⬇	[T6] Cable Type: LMR-400 ⬇	[T6] Cable Length: 1 m	
[T7] State: Enable ⬇	[T7] Cable Type: LMR-400 ⬇	[T7] Cable Length: 1 m	
[T8] State: Enable ⬇	[T8] Cable Type: LMR-400 ⬇	[T8] Cable Length: 1 m	

Figure 6.9 Web Server DVB-T2 Input screen

Demodulator

- **RX Frequency:**
In this field, the frequency of the received signal must be set. (editable parameter)
- **Bitrate:**
In this field, the bitrate of the received signal is displayed. (reading parameter)
- **Bandwidth:**
In this option, the bandwidth of the received signal must be specified. The available options are 1.7, 5, 6, 7 and 8MHz for DVB-T2. (eligible parameter)
- **LO Frequency:**
In this field, the frequency of the local oscillator connected to the I.F. input must be specified. (editable parameter)
- **Diversity:**
The available options are:
 - Mobile (MRC[1] technique)
 - Fixed (Switching technique)

[1] MRC limitations to take into account:

 - MRC doesn't work when LO is superior to the RF
 - MRC doesn't work if the IF is lower than 150 MHz

In both cases, the unit changes automatically to "Fixed" mode and a flicker "f" appears on DVB-T main screen of Receiver unit.

ISDB-T modulation always works in fixed mode.
- **Constellation:**
In this field, the type of modulation of the received signal is displayed. The available options are QPSK, 16QAM, 64QAM and 256QAM for DVB-T2. (reading parameter)
- **FEC:**
In this field, the value of the FEC of the received signal is displayed. The available options are 1/2, 3/5, 2/3, 3/4, 4/5 and 5/6 for DVB-T2. (reading parameter)
- **Guard Time:**
In this field, the value of the guard time of the received signal is displayed. The available options are 1/4, 1/8, 1/16 and 1/32 for DVB-T2. (reading parameter)

- **Mode:**
In this field, the number of carriers of the received signal are displayed. The available options are 1K, 2K, 4K and 8K for DVB-T2. (reading parameter)
- **Spectrum:**
Here the type of the spectrum of the received signal is shown. The available options are inverted or normal spectrum. (reading parameter)
- **Rotation:**
This field indicates if, in the received signal, the constellation is rotated or not. (reading parameter)
- **Time IL Type:**
In this field, the time interleaving mode is shown on the screen. (reading parameter)
- **Time IL Length:**
In this field, the number of frames in one interleaving frame is displayed. (reading parameter)
- **[Tw] Level:**
In this field, the level of the received signal, where w is the number of the demodulator (from 1 to 8 for diversity mode), is shown in dBm. (reading parameter)
- **[Tw] SNR:**
In this field, the Signal of Noise Ratio value of the received signal, where w is the number of the demodulator (from 1 to 8 for diversity mode), is displayed in dB. (reading parameter)
- **[Tw] MER:**
In this field, the Modulation Error value of the received signal, where w is the number of the demodulator (from 1 to 8 for diversity mode), is displayed in dB. (reading parameter)
- **[Tw] State:**
This option allows enabling or disabling each of the IF inputs of the device. When the Enable option is selected in an IF input, this input supplies power to the down converter connected to it. (eligible parameter)

The available options are:
 - Enable
 - Disable
- **[Tw] IF Cable Type:**
In this field, if a cable is used from the Receiver device to the down converter device (8 available) the type of the cable must be specified.

The possible types of cables are RG-142, RG-58, RG-214, LMR-400, CEFLEX 1/2, LDF450A 1/2, BELDEN H125, BELDEN PRG11, LMR200 and Andrew FSJ2. (eligible parameter)

- [Tw] IF Cable Length:

In this field, if a cable is used from the Receiver device to the down converter device, the length of the cable must be specified. The maximum length available is 150 meters (editable parameter)



When editable parameters are being set in the Web Server and new values are being introduced, the text remains in RED until the enter button is pressed. When the enter button is pressed, the new values are saved, and the text will appear in BLACK. It is necessary to press the enter button to keep and save the new values on the screen.

7.1.2.3 ISDB-T INPUT

Input	Decoder	IP Output	Unit
Input: ISDB-T	Status: Unlocked		
Cuts: 5 Reset			
Demodulator			
RX Frequency: 2 . 300 , 00 MHz Set	Bitrate: 0 , 0Mbps	Bandwidth: 8MHz	
LO Frequency: 1840 , 0 MHz			
Diversity: Mobile			
Constellation: ----	FEC: ---	GI: ----	
Interleaving: ----			
[T1] Level: -70 dBm 	[T1] SNR: 23 dB 	[T1] MER: 27 dB 	
[T2] Level: --- dBm 	[T2] SNR: --- dB 	[T2] MER: --- dB 	
[T3] Level: --- dBm 	[T3] SNR: --- dB 	[T3] MER: --- dB 	
[T4] Level: --- dBm 	[T4] SNR: --- dB 	[T4] MER: --- dB 	
[T5] Level: --- dBm 	[T5] SNR: --- dB 	[T5] MER: --- dB 	
[T6] Level: --- dBm 	[T6] SNR: --- dB 	[T6] MER: --- dB 	
[T7] Level: --- dBm 	[T7] SNR: --- dB 	[T7] MER: --- dB 	
[T8] Level: --- dBm 	[T8] SNR: --- dB 	[T8] MER: --- dB 	
[T1] State: Enable	[T1] Cable Type: LMR-400	[T1] Cable Length: 1 m	
[T2] State: Enable	[T2] Cable Type: LMR-400	[T2] Cable Length: 1 m	
[T3] State: Enable	[T3] Cable Type: LMR-400	[T3] Cable Length: 1 m	
[T4] State: Enable	[T4] Cable Type: LMR-400	[T4] Cable Length: 1 m	
[T5] State: Enable	[T5] Cable Type: LMR-400	[T5] Cable Length: 1 m	
[T6] State: Enable	[T6] Cable Type: LMR-400	[T6] Cable Length: 1 m	
[T7] State: Enable	[T7] Cable Type: LMR-400	[T7] Cable Length: 1 m	
[T8] State: Enable	[T8] Cable Type: LMR-400	[T8] Cable Length: 1 m	

Figure 7.9: Web Server ISDB-T Input screen

- **Input:**

Select the type of the signal that is received. The available options are DVB-T2, DVB-T, ASI, IP and ISDB-T. (eligible parameter)

- **Status:**

If this field shows the locked word then, it means that the signal is present in the input of the device. If this field displays the word unlocked then, it means that there is no signal in the input of the device. (reading parameter)

- **Demodulator**

- **RX Frequency:**

In this field, the frequency of the received signal must be set. (editable parameter)

- **Bitrate:**

In this field the bitrate of the received signal is displayed. (reading parameter)

- **Bandwidth:**

In this option, the bandwidth of the received signal must be specified. The available options are 6, 7 and 8MHz for ISDB-T. (eligible parameter)

- **LO Frequency:**

In this field, the frequency of the local oscillator connected to the I.F. input must be specified. (editable parameter)

- **Diversity:**

The available options are:

- Mobile (MRC[1] technique)
- Fixed (Switching technique)

[1] MRC limitations to take into account:

- MRC doesn't work when LO is superior to the RF
- MRC doesn't work if the IF is lower than 150 MHz

In both cases, the unit changes automatically to "Fixed" mode and a flicker "f" appears on DVB-T main screen of Receiver unit.

ISDB-T modulation always works in fixed mode.

- **Constellation:**

In this field the type of modulation of the received signal is displayed. The available options are QPSK, 16QAM and 64QAM for ISDB-T. (reading parameter)

- FEC:

In this field the value of the FEC of the received signal is displayed. The available options are 1/2, 2/3, 3/4, 5/6, 7/8 for ISDB-T. (reading parameter)

- Guard Time:

In this field, the value of the guard time of the received signal is displayed. The available options are 1/4, 1/8, 1/16, 1/32 for ISDB-T. (reading parameter)

- Mode:

In this field, the number of carriers of the received signal is displayed. The available options are 2K, 4K and 8K for ISDB-T. (reading parameter)

- Spectrum:

Here the type of the spectrum of the received signal is shown. The available options are inverted or normal spectrum. (reading parameter)

- [Tw] Level:

In this field, the level of the received signal, where w is the number of the demodulator, is shown in dBm. (reading parameter)

- [Tw] SNR:

In this field, the Signal to Noise Ratio value of the received signal, where w is the number of the demodulator is displayed in dB. (reading parameter)

- [Tw] MER:

In this field, the Modulation Error value of the received signal, where w is the number of the demodulator is displayed in dB. (reading parameter)

- [Tw] State:

This option allows enabling or disabling each of the IF inputs of the device. When the Enable option is selected in an IF input, this input supplies power to the down converter connected to it. (eligible parameter)

The available options are:

- Enable
- Disable

- [Tw] IF Cable Type:

In this field, if a cable is used from the Receiver device to the down converter device (8 available) the type of the cable must be specified. The possible types of cables are RG-142, RG-58, RG-214, LMR-400, CEFLEX 1/2, LDF450A 1/2, BELDEN H125, BELDEN PRG11, LMR200 and Andrew FSJ2. (eligible parameter)

- [Tw] IF Cable Length:

In this field, if a cable is used from the Receiver device to the down converter device, the length of the cable must be specified. The maximum length available is 150 meters (editable parameter)

7.1.2.4 ASI INPUT

The screenshot shows the 'ASI INPUT' configuration screen. At the top, there is a navigation bar with four tabs: 'Input', 'Decoder', 'IP Output', and 'Unit'. The 'Input' tab is currently selected. Below the navigation bar, the screen is divided into two main sections. The first section contains the 'Input:' label, a dropdown menu showing 'ASI', and the 'Status:' label followed by the text 'Unlocked'. The second section contains the 'Cuts:' label, the number '0', and a 'Reset' button.

Figure 7.10: Web Server ASI Input screen

This screen is showing if the ASI signal is being received through the status field.

If this field shows the locked word, it means that a signal is present in the input of the device. If this field displays the word unlocked, it means that there is no signal in the input of the device. (reading parameter)

7.1.2.5 TS over IP INPUT

The screenshot shows a web interface for configuring 'TS over IP INPUT'. At the top, there are four tabs: 'Input' (selected), 'Decoder', 'TSoverIP Output', and 'Unit'. Below the tabs, the 'Input' section shows 'Input:' set to 'TSoverIP' and 'Status:' as 'Locked'. A sub-section titled 'TSoverIP Input' contains the following parameters:

Addressing:	Multicast	Multicast Addr:	239.192.000.001
FEC:	Enable	FEC Cols:	0
		FEC Rows:	0
UDP Port:	5678	Output Delay:	128 ms
Status:	Channel Enable	Bitrate:	18 ,5 Mbps
TP per IP:	7	Protocol:	RTP
		Packet Size:	188 bytes
		PCR Present:	PCR Present

Figure 7.11: Web Server IP Input screen

- **Addressing:**
This field is configured if the IP packets received come from a unicast address or from a multicast address. (eligible parameter)
- **Multicast Address:**
In this field, the multicast address must be specified to receive the information properly. (editable parameter)
- **FEC:**
In this field, the FEC option can be enabled or disabled. In case the enable option is selected, as the IP Forward Error Correction is composed by several FEC columns and rows, it is shown the number of FEC columns and rows of the received signal. (eligible parameter)
- **FEC Cols:**
In this field, the number of FEC columns of the received IP signal is displayed. (reading parameter)
- **FEC Rows:**
In this field, the number of FEC rows of the received IP signal is displayed. (reading parameter)
- **UDP Port:**
In this field, the port number of the device through which is going to receive the signal must be set. (editable parameter)
- **Output Delay:**
This delay means the time passed between the Transport Stream is obtained in the decoder and the signal is taken out from the decoder. (editable parameter)

- **Status:**
In this field, the status of the IP input is displayed. (reading parameter)
- **Bitrate:**
In this field, the bitrate of the received signal is shown. (reading parameter)
- **Packet Size:**
In this field, the size in bytes of the Transport Stream packets in the IP input is displayed. (reading parameter)
- **TP per IP:**
In this field, the number of Transport Stream packets per IP packet is displayed. (reading parameter)
- **Protocol:**
In this field, the protocol used for the communication is displayed. Two protocols are possible: UDP or RTP. (reading parameter)
- **PCR Present:**
Program Clock Reference. It indicates if PCR packets are found in incoming TS. (reading parameter)



When editable parameters are being set in the Web Server and new values are being introduced, the text remains in RED until the enter button is pressed. When the enter button is pressed, the new values are saved, and the text will appear in BLACK. It is necessary to press the enter button to keep and save the new values on the screen.

7.1.2.6 DECODER

Input	Decoder	IP Output	Unit
-------	---------	-----------	------

Status: Decoding

Video

Coding type: H.264

Format: 525i59

Delay: Super Low Delay

Profile: 4:2:0

Frame w/o Signal: Freeze

Audio

[1] Present
Status:
[1] Coding MPEG-1 Layer II
type:
[1] 256 Kbps
Bitrate:

[2] Present
Status:
[2] Coding MPEG-1 Layer II
type:
[2] 256 Kbps
Bitrate:

Data

Source: DATA Channel

Baudrate: 19200

Parity: None

Stop bits: 1

ASI Emb. DATA PID: 8187

Genlock

Status: Reference Lost

TS Parameters

PID Mode: First Service	Program Numb: [00002] (2) PROGRAM 001
Video PID: 200	Audio1 PID: 201
Data PID: 203	Audio2 PID: 202
GPS PID: 206	PMT PID: 204
	PCR PID: 205
	Alarm PID: 207

Descrambler

Status: Not Scrambled

Mode: AES-256

Key:

☐ Show Key

ASI Output: Encrypted

Figure 7.12: Web Server Decoder screen

- **Status:**

In this field, the status of the decoder is displayed. If the decoder is not decoding, then the message "Not Decoding" appears. If the decoder is decoding, then the word "Decoding" appears in this field. (reading parameter)

Video:

- Coding type:
This field shows the video coding type of the received video signal. The available options are H.264 and MPEG-2. (reading parameter)
- Format:
This field shows the video format of the received signal. The available options are Auto, 1080p, 1080i, 720p, 576i and 480i. (reading parameter)
- Delay:
This field shows the video delay of the received signal. The available options are Standard, Low Delay and Super Low delay. In case the input video signal is coded in Ultra Low Delay mode, the device decodes it but in the screen appears as Super Low Delay. (reading parameter)
- Profile:
This field shows the video profile of the received signal. The available options are 4:2:0 and 4:2:2. (reading parameter)
- Frame w/o Signal
If there is an error, the last image is frozen in the screen until the signal works again. (eligible parameter)
The available options are:
 - **Freeze:** The last image is frozen on the screen until the signal works again.
 - **Color (10 sec):** After 10 seconds, if the error is caused by the lack of RF signal, the screen becomes RED. If the error is because there is no video, the screen becomes BLUE.
 - **Black (0.5 sec):** The video becomes BLACK after 0.5 seconds.
 - **Black (5 sec):** The video becomes BLACK after 5 seconds.

Audio:

- [1] Status:
This field shows the status of the Audio 1. If there is no audio in the Audio 1 input, this field displays the message "Not Present". If there is audio in the Audio 1 input, this field displays the word "Present". (reading parameter)
- [1] Coding type:
This field displays the type of coding of the received Audio 1 signal. (reading parameter)
The possible options are:
 - MPEG-1 Layer I
 - MPEG-1 Layer II

- [1] Bitrate:
This field displays the bitrate of the received Audio 1 signal in Kbps. (reading parameter)
- [2] Status:
This field shows the status of the Audio 2. If there is no audio in the Audio 2 input, this field displays the message "Not Present". If there is audio in the Audio 2 input, this field displays the word "Present". (reading parameter)
- [2] Coding type:
This field displays the type of coding of the received Audio 2 signal. (reading parameter)
The possible options are:
 - MPEG-1 Layer I
 - MPEG-1 Layer II
- [2] Bitrate:
This field displays the bitrate of the received Audio 2 signal in Kbps. (reading parameter)
- DID:
Indicates in which audio group the coded audios are going to be embedded. This DID is eligible from group 1 to group 4. (eligible parameter)

Data:

- Source:
This field you should select the source of the data you want to output:
There are 3 types of received data available:GPS Channel, Data Channel or ASI embedded Data. (eligible parameter)
- Baudrate:
In this field the baudrate of the output serial port is configured. The available baudrates are 9600, 19200, 38400, 57600, 78600, 115200. (eligible parameter)
- Parity:
In this field the parity of the data signal is configured. The available options are None, Even and Odd. (eligible parameter)
- Stop bits:
In this field the number of stop bits of the data signal is configured. The available options are 1 and 2. (eligible parameter)
- ASI Embedded data PID:
On this field you should select the PID of the data embedded in the ASI input, it is limited to values between 8180 and 8188.

Genlock:

- Status:

This device has an external Genlock reference input in order to lock all video outputs to it. In this field, the status of the genlock is displayed. The available options are reference lost, reference unlocked or reference locked. (reading parameter)

TS Parameters:

- PID Mode:

In this field the mode for the decoding process is selected. If First Service mode is selected, then, the device selects automatically the PID values to decode.

If the manual option is selected, then, the user can select one of the received services. (eligible parameter).

In addition, if you select PID Config mode, you can set your services PID manually there.

- Program Number:

The available programs are shown in this field. (eligible parameter)

- Video PID:

In this field, the video packet identifier must be introduced. (editable parameter)

- Audio1 PID:

In this field, the audio 1 packet identifier must be introduced. (editable parameter)

- Audio2 PID:

In this field, the audio 2 packet identifier must be introduced. (editable parameter)

- Data PID:

In this field, the data packet identifier must be introduced. (editable parameter)

- PMT PID:

In this field, the programme map table packet identifier must be introduced. (editable parameter)

- PCR PID:

In this field, the clock reference packet identifier must be introduced. (editable parameter)

- GPS PID:

In this field, the GPS packet identifier must be introduced. (editable parameter)

- Alarm PID:

In this field, the TX alarm identifier must be introduced. (editable parameter)

Descrambler:

- Status:

In this field, the status of the descrambling process is displayed. If the input signal is not encrypted, then the message Not Scrambled appears. If the device is descrambling, then the word Scrambled appears in this field. (reading parameter)

- Mode:

Select the encryption mode: BISS, BISS-E, AES-128 and AES-256. (eligible parameter)

- Key:

Key for encryption mode selected. The values of each character introduced can be from 0 to 9 and from A to F. (editable parameter)

- ASI Output:

In this field you can select if the ASI output is clear or encrypted.



When encryption is enabled, the bitrate is limited to under 105 Mbps.



When editable parameters are being set in the Web Server and new values are being introduced, the text remains in RED until the enter button is pressed. When the enter button is pressed, the new values are saved, and the text will appear in BLACK. It is necessary to press the enter button to keep and save the new values on the screen.

7.1.2.7 TSoVerIP Output

Input	Decoder	IP Output	Unit
IP Output: Enable Dest IP: 239.192.000.001 Port: 5678 FEC: Disable TP per IP: 7 Protocol: UDP IP Output: Encrypted			

Figure 7.13: Web Server TSoVerIP Output screen

IP Output:



This option is available if the IP Input is not selected

- **Destination IP:**
In this option, the IP address of the device to which data is sent must be configured. In case you want to send data to a multicast address just enter the desired multicast address. (editable parameter)
- **Port:**
In this option, the port number of the device to which data is sent must be configured. (editable parameter)
- **FEC:**
In this field the Forward Error Correction can be enabled or disabled. In case it is enabled, the number of columns and rows can be configured. If FEC option is enabled then, the only protocol which can be used is RTP. (eligible parameter)
- **TP per IP:**
In this field the number of Transport Stream packets per IP (from 1 to 7) can be configured. (editable parameter)
- **Protocol:**
In this field the type of protocol used for the communication is selected. The type of protocol used for the communication can be RTP or UDP. (eligible parameter)
- **IP Output:** the IP output can be encrypted or clear if the input signal is encrypted.



The destination IP address, the Webserver IP address and the TSoIP Local IP address must be different.



When editable parameters are being set in the Web Server and new values are being introduced, the text remains in RED until the enter button is pressed. When the enter button is pressed, the new values are saved, and the text will appear in BLACK. It is necessary to press the enter button to keep and save the new values on the screen.

7.1.2.8 UNIT

Input	Decoder	IP Output	Unit
ON/OFF: ☒ RX ALARM: ☒ TX ALARM: ☐ REMOTE: ☒ STATUS: ☐ Restart			
Standby Mode: On		Timeout Reset: 1440 min	
Webserver IP: 192.168.001.191		Webserver Subnet: 255.255.000.000	
Webserver Gateway: 192.168.001.001		Webserver MAC: 70-B3-D5-1A-C3-10	
TSoIP Local IP: 192.168.001.008		TSoIP Subnet: 255.255.255.000	
TSoIP Gateway: 192.168.001.001		TSoIP MAC: 00-14-F4-05-85-A4	
Night Mode: 0		Distance Units: Kilometers	
Speed Units: Knots			
Voltage RX: 24.1 V		Voltage TX: --.- V	
Temperature RX: +46.7 °C		Temperature TX: --.- °C	
Voltage RX: 24.1 V		Voltage TX: --.- V	
Temperature RX: +46.5 °C		Temperature TX: --.- °C	
Admin Password: Default		(Mandatory: 8 characters)	
User Password: Default		(Mandatory: 8 characters)	
S/N: 910011019		Firmware: V9_1242142547468-	
Alarms RX: Input signal not present		Alarms configuration ☒ Input signal not present ☒ Decoder is not decoding ☒ No video present ☒ DC voltage low ☒ DC voltage high ☒ High temperature ☐ Remote GPS not present ☐ Local GPS not present ☐ Compass GPS not present ☐ Inclinometer not present ☐ QPT not present	
Logbook ☒ Enabled Save Logbook to File Clear Logbook			
Monitor File Auto Start Clear Save to File		Time Interval: 5 sec (1-99)	
Firmware Update Seleccionar archivo nada seleccionado Submit Activate Restart Select a file to upload			

Figure 7.14: Web Server Unit screen

First, the status of the different LEDs available is presented. These LEDs provide specific information about the status of the Receiver:

- **ON/OFF:**
The Led lights up GREEN when the equipment is turned on and it turns up in red if the equipment is turned off.
- **ALARM:**
The Led lights up RED when any alarm occurs.
- **REMOTE:**
The Led lights up RED when the user is connected remotely to the device.
- **STATUS:**
The Led lights up GREEN when a change in the configuration of the device is being processed.

Configuration:

- **Standby Mode:**
In this option, *Receiver* can be configured to be in Standby or in ON mode.
- **Timeout Reset:**
In this field, the time that the Receiver could be without receiving any signal is selected. After passing this time, the equipment is reset. To disable this option, 0 value must be written. (editable parameter)
- **Webserver IP:**
In this field, the IP address for the Webserver connection can be configured (editable parameter). This IP is the IP that has to be set in the web browser to access the Webserver and it must be different from the TSoIP Local IP and the Destin IP.
- **Webserver Subnet:**
In this field, the Subnet address for the Webserver connection can be configured. (editable parameter)
- **Webserver Gateway:**
In this field, the Gateway address for the Webserver connection can be configured. (editable parameter)
- **Webserver MAC:**
In this field, the MAC address of the device is shown. (reading parameter)
- **TSoIP Local IP:**
In this field, the IP address of this device for the Video over IP connection can be configured. This is the IP that you assign in your local LAN for the device (editable parameter).

- **TSoIP Subnet:**

In this field, the Subnet address of for the Video over IP connection device can be configured. (editable parameter)
- **TSoIP Gateway:**

In this field, the Gateway address of this device for the Video over IP connection can be configured. (editable parameter)
- **TSoIP MAC:**

In this field, the MAC address of this device for the Video over IP connection is shown. (reading parameter)
- **Night Mode:**

There are four possible states for the night mode. If night mode is in state 0 then the light in the screen will shine more than if it is in state 1. If the state is three then, the light in the screen will be the lowest of the four possible states. (eligible parameter)
- **Distance Units:**

If miles are selected then, all the distances will be in miles and the same occurs if kilometres are selected. (eligible parameter)
- **Speed Units:**

The speed can be measured in knots, km/h or Mph. (eligible parameter.)
- **Voltage:**

In this field, the power supply voltage of the RX and TX is shown. (reading parameter)
- **Temperature:**

If °C is selected then, the temperature value of the RX and TX will be shown in °C and the same occurs when F° is selected. (eligible parameter)
- **Admin Password:**

In this field, user can enter the administrator password. (eligible parameter)
- **User Password:**

In this field, user can enter the user password. (eligible parameter)
- **S/N:**

In this field, the serial number of the device is shown. (reading parameter)
- **Firmware:**

In this field, the firmware version of the equipment is shown. (reading parameter)

Alarms:

In this option, different alarms which are present in the Transmitter and Receiver are shown.

Alarms configuration:

In this field, the different alarms available in the Receiver are configured. The alarms are:

- Input signal not present
- Decoder is not decoding
- No video Present
- DC voltaje low
- DC voltaje high
- High Temperature
- Remote GPS not present
- Local GPS not present
- Compass GPS not present
- Inclinator not present
- QPT not present



The destination IP address, the Webserver IP address and the TSoIP Local IP address must be different.



When editable parameters are being set in the Web Server and new values are being introduced, the text remains in RED until the enter button is pressed. When the enter button is pressed, the new values are saved, and the text will appear in BLACK. It is necessary to press the enter button to keep and save the new values on the screen.

Logbook:

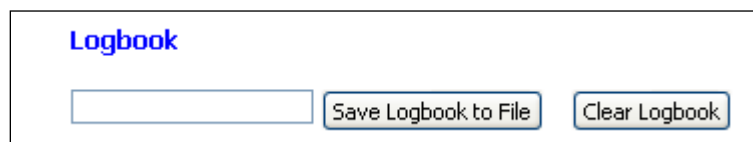


Figure 7.15: Logbook

This field allows the user to access the Logbook menu where the different events that have taken place are shown and send them to a text file.



This feature is supported using Firefox and Chrome navigators. Internet Explorer is not supported.



While the data is being saved, it is necessary to remain in the Unit section of the Webserver.

If it you want to send the different events to a file, type the name of the file and the extension and press Save Logbook to File. Then, open the file which has been downloaded on the computer and the information about the different events will be shown (time of the event, date of the event and description of the event).

Last 10	Events
00:00:04	11/12/14 ASI Locked
00:00:05	11/12/14
00:01:00	11/12/14 Decoding Stop
00:01:00	11/12/14 Decoding Start
00:01:03	11/12/14 Decoding Stop
00:01:00	11/12/14
00:01:00	11/12/14
00:01:00	11/12/14 Decoding Start
00:01:08	11/12/14 Decoding Stop
00:01:09	11/12/14

Figure 7.16: Logbook information

If you want to clear de Logbook, press Clear Logbook button.

Monitor File:

In this file, the information related to the latitude, longitude and altitude of the Transmitter and Receiver, the decoding status and the LEVEL, MER and C/N of each signal is displayed.

To export this information in a text file, it is important to consider the following items:



This feature is supported using Firefox and Chrome navigators. Internet Explorer is not supported.



While the data is being captured, it is necessary to remain in the Unit section of the Webserver. If you change to another section, the captured data will be lost.

There are two modes to send the data to the text file: manual and automatic. Using the Auto/Manual button this mode can be changed.

In the text area related to the name of the file you must include the name plus the extension as it is indicated in the figure below.

The process to follow in **Auto Mode** is:

Monitor File

Auto Start Clear monitor.csv Save to File

Time Interval: 5 sec (1-99)

Figure 7.17: Auto mode

- **First step:** Configure the time interval.
- **Second step:** Press the Start Button.
- **Third step:** Press the Stop Button when you want to stop capturing data.
- **Fourth step:** Write the name and the extension of the file to send the data.
- **Fifth step:** Press the "Save to file" button.

The process to follow in **Manual Mode** is:

Monitor File

Manual Dump Clear monitor.csv Save to File

Figure 7.18: Manual Mode

- **First step:** Press the Dump Button whenever you want to capture the data.
- **Second step:** Write the name and the extension of the file to dump the data.
- **Third step:** Press the "Save to file" button.

If you want to clear the captured data in one session, it is necessary to use the "Clear" button or change to another tab of the Webserver.

Once the data is captured, open the text file to access the information.

Firmware Update:

In this section, you can update the firmware of the receiver remotely.

Please select the latest SVP file available in the website for HDR V9 receiver and click on submit, it will take 20-30 minutes to finish, the receiver will be automatically rebooted once the upgrade has finished.

7.1.3 Web Page Setup Notes

For the data to be refreshed correctly, you may need to change some settings on your browser.

Please follow these instructions carefully.

For Google Chrome:

1. Click on the Chrome menu  situated in the toolbar of the browser.
2. Select tools.
3. Choose the option Delete navigation data.
4. Choose the option empty cache.
5. Click on Delete navigation data.

For Internet Explorer:

1. From the Tools menu, select Internet Options.
2. In the General tab, click the Settings button in the Browsing History section.
3. Select 'Every time I visit the webpage' then click the OK button.
4. Click the OK button.

For Mozilla Firefox:

1. Open a new tab, in the address bar enter about:config.
2. In the Filter box, enter disk.
3. Set the value for 'browser.cache.disk.enable' to false (double click to change the setting).
4. Close the about:config tab.

7.2 GPS Data over Ethernet

The user can get Transmitter and Receiver GPS position through the Ethernet port. Data transmission is made in JSON format through the Webserver Ethernet connector.

The command receiver has this format:

```
sprintf(response_buf,
"{\"MissionSoftware\":{\"TXGGA\": \"%s\", \"TXRMC\": \"%s\", \"RXGGA\": \"%s\", \"RXRMC\": \"%s\"}, \"VAR\": \"%08d\", \"NSS\": \"%u\"}"
```

In which the information is giving as follow:

- Latest GGA command received from Transmitter position.
- Latest RMC command received from Transmitter position.
- Latest GGA command received from Receiver position.
- Latest RMC command received from Receiver position.

7.3 Serial control via Remote Port

The Receiver can be controlled by a serial port through the AIRCRAFT GPS IN & OUT / SERIAL REMOTE connector (see section 8.2.8.2 for connector information). To establish a communication between the Receiver and the computer through the serial port, please follow these instructions:

1. Special transition connection (DB-9 male to DB-9 female) is needed between the computer and the Receiver. Please connect only the pins 4, 5 and 5 of the DB-9 connector. Connect the DB-9 output to the computer serial port.

DB-9 Male	DB-9 Female
4	2
5	5
7	3

Table 7.1: Remote control pinout

The no use of this transaction may cause a malfunction of the Receiver.

2. Open the HyperTerminal and type a name for the connection.

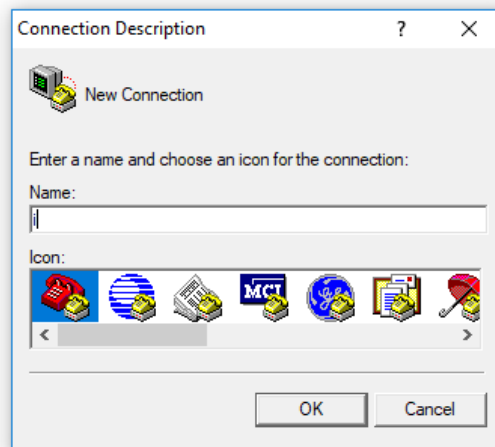


Figure 7.19: HyperTerminal new connection

3. Configure a COM port for the communication and select the COM port configured.

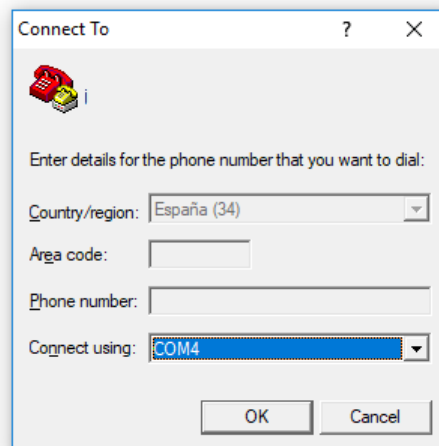


Figure 7.20: COM port configuration

4. In the COM properties are:

- Baud Rate: 9600
- Data bits: 8
- Parity: None
- Stop bit: 1
- Flow control: None

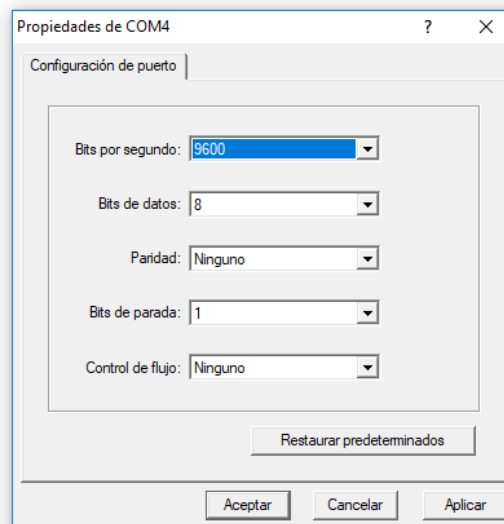


Figure 7.21: COM4 properties

5. Once the connection is established, the user can control the Receiver remotely. The following control interface will appear:

```

-----
| Serial Control Menu:                |
-----
| Switch ON                          ('U') |
| Switch OFF                         ('D') |
| Show RF Levels                     ('L') |
| Change BW                          ('B') |
| Change Frequency                   ('F') |
| Change Modulation                  ('M') |
| Show Info                          ('I') |
| Show Alarms                        ('A') |
-----

```

> Enter command: _

Figure 7.22: Serial control Menu

The available commands are:

- U : Switch ON the equipment.
- D : Switch OFF the equipment.
- L : Show RF Levels
- B : Change BW
- F : Change frequency
- M : Change Modulation
- I : Show Info
- A : Show Alarms

Chapter 8: Equipment Installation

8.1 Introduction

This chapter provides important information for the Receiver system installation such as connections available in the rear panel of the *Receiver* and their pinout, connectors needed and the accessories which are available with the Receiver device.

8.2 Connections



All the DB-9 pinouts refer to the connector that is fixed to the cable. The pinout of the cable connector is shown as if it is watched from the soldering side.

All input and output connections of the *Receiver* are shown in the figure below:

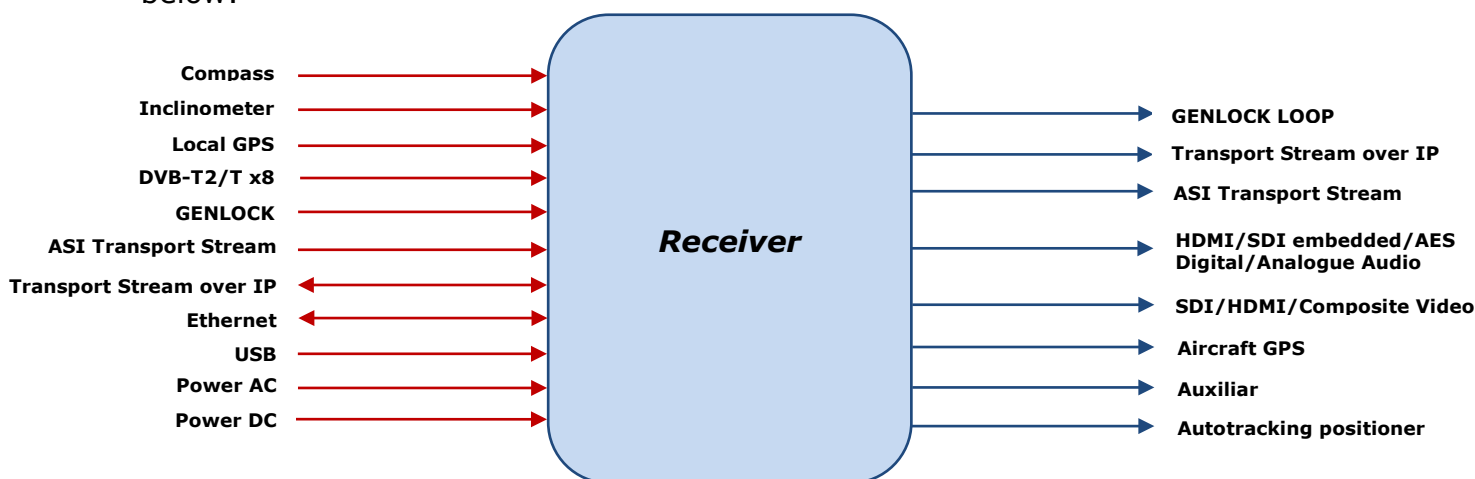


Figure 8.1: Receiver connections

All connectors of the rack-mount demodulator unit are on the rear panel, as shown in the figure below:



Figure 8.2: Receiver Rear View

8.2.1 Power supply

In this section, technical features about the power supply connections available and the connectors needed are described.

8.2.1.1 AC Power supply

The Receiver equipment can be powered by an AC source between 90 and 240 V.

The frequency should be between 50 and 60 Hz.

The AC main input uses a Neutrik MLC connector. A cable with the required connectors is supplied with the *Receiver*. The AC power connector used in this equipment is designed to prevent accidental disconnection. To extract the connector, pull back the locking clip and rotate the connector, as indicated on the connector itself.

Power supply AC connection technical features

Item	Features
Connector Label	POWER A.C.
Connector Type	MLC Neutrik
Supply voltage	90-240 V. (50/60Hz)

Table 8.1: AC Power supply features

Pinout

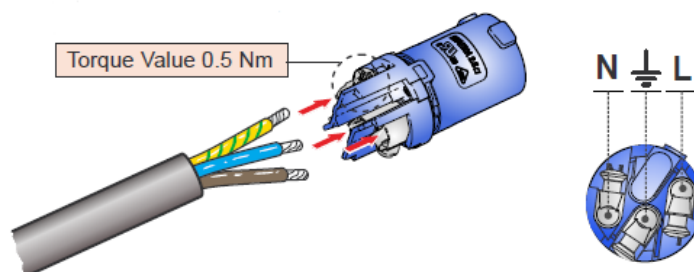


Figure 8.3: AC Power wiring

Connector needed

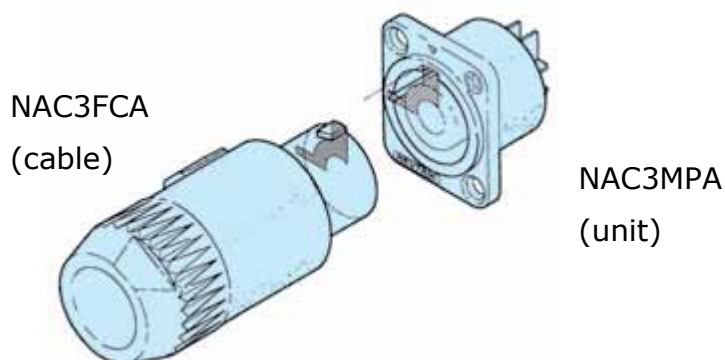


Figure 8.4: AC Power connectors

8.2.1.2 DC Power supply

The DC power supply is connected via a Neutrik 4-pin male XLR connector with a safety clip to prevent accidental disconnection.

Power supply DC connection technical features

Item	Features
Connector Label	POWER D.C.
Connector Type	XLR-4 male
Supply voltage	11-36 V.

Table 8.2: DC Power supply features

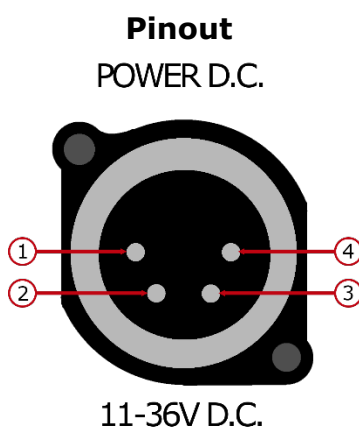


Figure 8.5: Connector pinout

Pin	Description
1	GND
2	GND
3	+ VCC
4	+ VCC

Table 8.3: DC Power supply connector pinout

Connector needed



Figure 8.6: Connector needed



The DC input is protected by a fuse (ATO model)

8.2.2 Intermediate Frequency

8.2.2.1 Intermediate Frequency inputs I.F.1 ... I.F.8

The connection between the Receiver unit and the down-converter uses a coaxial cable, whose maximum length depends on the type of coaxial cable used. If the "Celflex ½" coaxial cable is used, the maximum length is 130m but if the RG-214 coaxial cable is used, the maximum length is reduced to 80m.

The IF inputs of the *Receiver* supply DC power to the down-converters.



These connectors should not be manipulated with the equipment on, and if it is done, it should be done with great caution.

Intermediate frequency connection technical features

Item	Features
Connector Label	I.F.1...I.F.8
Connector Type	TNC female
Impedance	50Ω

Table 8.4: IF input features – TNC connector (DVB-T2/T)

Item	Features
Connector Label	I.F.1...I.F.8
Connector Type	BNC female
Impedance	75Ω

Table 8.5: IF input features – BNC connector (DVB-T2/T)

8.2.2.2 Lightning Protection

It is recommended to use a lightning protection in the RF and IF segment. The protection can be installed in the IF input of the Receiver or in the RF input of the DC. It is suggested to use the *Times-Protect® LP-GTV-N series* and *LP-GTV-T series*.

The *LP-GTV-TFM* model is used for the IF inputs (TNC connectors).

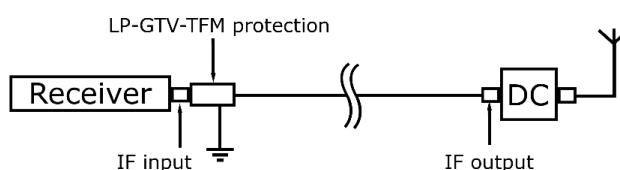


Figure 8.7: Installation schematic

*Not applicable in case of receiver's IF inputs with BNC connectors.

In the RF input of the DC, use the *LP-GTV-NFM* (N connectors).

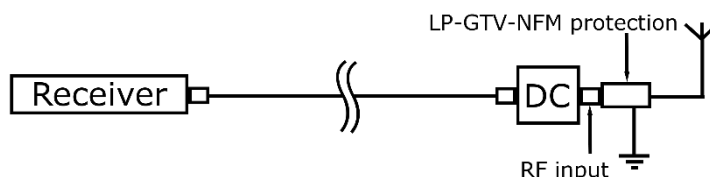


Figure 8.8: Installation schematic



The lighting protection must be earthed

8.2.3 DVB-ASI Transport Stream

8.2.3.1 DVB-ASI Transport Stream Input

The *Receiver* has a DVB-ASI Transport Stream input, compatible with the EN50083-9 standard, available on 75Ω BNC connector on the rear panel of the *Receiver*.

The ASI input is used when the equipment is used as a decoder.

ASI connection technical features

Item	Features
Connector label	ASI IN
Connector Type	BNC female
Impedance	75Ω
Standard	EN50083-9s
Packet length	188/204Bytes
Maximum Bitrate	216 Mbit/s

Table 8.5: DVB-ASI Transport Stream input connection features

8.2.3.2 DVB-ASI Transport Stream Output

The *Receiver* has a DVB-ASI Transport Stream output, compatible with the EN50083-9 standard, available on an insulated 75Ω BNC connector on the rear panel of the *Receiver*.

This output might be useful if an intermediate ASI feed is required without needing to decode the audio and video signals and then modulate it in the Transmitter equipment; therefore, there is no quality loss due to a new coding process.

ASI connection technical features

Item	Features
Connector label	ASI OUT
Connector Type	BNC female
Impedance	75Ω
Standard	EN50083-9
Packet length	188/204Bytes
Maximum Bitrate	216 Mbit/s

Table 8.6: DVB-ASI Transport Stream output connection features

8.2.4 Video Outputs

The *Receiver* includes one analogue composite video output, one HDMI output and two digital 3G-SDI/HD-SDI/SD-SDI video outputs.

The output video signal on the Receiver will be automatically configured to the same format as the received video signal, when the Auto option is selected in the Decoder menu

Each of these signals are available on 75Ω BNC connector located on the rear panel of the Receiver unit except the HDMI which has a HDMI connector.

Composite video (CVBS) output has video down-conversion available for HD signals.

SDI output signals are compliant with SMPTE 424M, SMPTE-292M and SMPTE-259M standards.

Composite video connection technical features

Item	Features
Connector label	CVBS
Connector Type	Mini BNC female
Impedance	75Ω
Standard	PAL/NTSC

Table 8.7: Composite video output connections features

SDI connection technical features

Item	Features
Connector label	SDI
Connector Type	BNC female
Impedance	75Ω
Standard	SMPTE-424
	SMPTE-259
	SMPTE-292

Table 8.8: SDI output connections features

HDMI connection technical features

Item	Features
Connector label	HDMI
Connector Type	Type A

Table 8.9: HDMI output signal connection features

8.2.5 Genlock

8.2.5.1 Genlock Input

The *Receiver* has an external Genlock reference input to lock all video outputs to it. The connection is available on a 75Ω insulated BNC connector located on the rear panel.

Genlock connection technical features

Item	Features
Connector label	GENLOCK IN
Connector Type	BNC female
Impedance	75Ω
Reference signal type	Black burst
	Tri-level

Table 8.10: Genlock input connection features

8.2.5.2 Genlock Output

The *Receiver* has available a Genlock loop-through output used to synchronize other video sources together. The connection is available on a 75Ω insulated BNC connector located on the rear panel.

Genlock connection technical features

Item	Features
Connector label	GENLOCK OUT
Connector Type	BNC female
Impedance	75Ω
Reference signal type	Black burst Tri-level

Table 8.11: Genlock output connection features

8.2.6 Transport Stream over IP (optional)

Transport Stream over IP Input and Output

The *Receiver* has an input that allows receiving and transporting video over IP.

TS over IP connection technical features

Item	Features
Connector Label	VIDEO over IP
Connector Type	RJ-45

Table 8.12: Transport stream over IP connection technical features



There is no recompression when the equipment sends the information through IP. At the level of ASI and IP, the device keeps the original coding generated in the Transmitter.

Transport Stream over IP gives some benefits like:

- Ensured Quality of Service with highly reliable Video Gateways.
- Built-in intelligent monitoring and redundancy solutions.
- Create revenue-generating professional Wide Area Networks for video transport.

Technical features are described below:

- IP encapsulation and 2D FEC encoding and decoding as defined in SMPTE 2022.
- Persistent storage of configuration parameters.
- Unicast and multicast IP addressing.



It is not possible to configure the equipment as IP input and IP output at the same time.

For correct operation, it is recommended to use a Cat 5 or higher UTP cable.

8.2.7 Audio Output

The *Receiver* has different possible audio outputs:

- 2 audio outputs to extract 2 stereo channels AES/EBU and 2 stereo or 4 mono analogue (line) signals where connections are made using two DB-9 connectors on the equipment's rear panel.
- 2 SDI outputs with 4 audio channels embedded where connections are made with a BNC connector on equipment's rear panel. The audio signals are compliant with SMPTE-272M when embedded on SD-SDI video signal and SMPTE-299M when embedded on HD-SDI or 3G-SDI video signal.
- 1 HDMI output with embedded audio signals where connections are made with a HDMI connector on equipment's rear panel.
- 1 3.5mm headphone output on the front panel for monitoring.

AES/EBU and Analogue Audio connection technical features

Item	Features
Number of audio channels	4
Connector label 1	AUDIO 1 L&R
Connector label 2	AUDIO 2 L&R
	ANALOG & AES-EBU
Cable Connector type	DB-9 female

Table 8.13: Analogue and AES/EBU audio outputs connections features

Pinout of the cable connector



Figure 8.9: Analogue and AES/EBU connectors



Figure 8.10: XLR-3 male connector



Figure 8.11: Audio cable with XLR-3 connector

Adapter cable connections

XLR-3 (male) Left pin	DB-9 pin
1	7
2	3
3	8

Table 8.14: XLR-3 Left to DB-9 pinout

XLR-3 (male) Right pin	DB-9 pin
1	5
2	4
3	9

Table 8.15: XLR-3 Right to DB-9 pinout

XLR-3 (male) AES/EBU pin	DB-9 pin
1	2
2	1
3	6

Table 8.16: XLR-3 AES/EBU to DB-9 pinout

8.2.8 GPS/Compass and Aircraft GPS IN/OUT

8.2.8.1 Local GPS and Compass input

The LOCAL GPS IN & COMPASS connector is used when the Receiver is configured with Autotracking system. There are three different types of Autotracking (Parabolic Antenna, AMS Multisector Antenna and Omnidirectional Antenna), this connector is used with Parabolic Antenna Autotracking and AMS Multisector Antenna.

Through this connector, the Receiver receives the Local GPS position and North orientation, which is needed for a correct operation of the Autotracking system with Parabolic Antenna.

The *Receiver* incorporates a RS232 communication for GPS Receiver and Compass data input to obtain its own position and North orientation.

All the information about the configuration and installation of the GPS Receiver and Compass is explained on section 5.2 Autotracking Parabolic Antenna.

Local GPS and Compass input connection technical features

Item	Features
Connector Label	LOCAL GPS IN & COMPASS
Cable Connector Type	DB-9 male

Table 8.17: Local GPS and Compass input connection features

Pinout of the connector

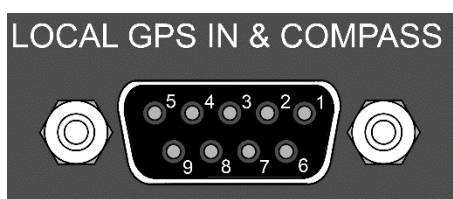


Figure 8.12: LOCAL GPS IN & COMPASS connector

Pin	Description
1	+5V GPS (with current limitation)
5	GND
8	Local GPS and Compass input (RS-232)

Table 8.18: LOCAL GPS IN & COMPASS connector pinout

8.2.8.1.1 Local GPS IN & COMPASS connector to Compass cable pinout

For the cable which connect Compass to the Receiver's LOCAL GPS IN & COMPASS connector, the following pins relationship must be followed:

Receiver's LOCAL GPS IN & COMPASS connector to Compass cable pinout

Receiver's LOCAL GPS IN & COMPASS (DB-9 Female)	Compass (DB-9 Male)
Pin 5	Pin 5
Pin 8	Pin 3

Table 8.19: Receiver's LOCAL GPS IN & COMPASS connector to Compass cable pinout

8.2.8.2 Aircraft GPS input and Aircraft GPS output

This connector can be used for two different proposes:

- When the Transmitter's GPS information is provided by an external UHF GPS Receiver.
- When the tracking and monitoring of the Transmitter is needed.

This connector would be used as input when the Transmitter's position is given by an external UHF GPS Receiver, this allow longer distances of GPS transmission. For more information of the UHF GPS Receiver, go to ANNEX C.

This connector would be used as output because it outputs the Transmitter's position on this connector, this position can be used for displaying the Transmitter's position for example on Google Maps.

The data which is obtained is:

- Transmitter positioning
- Transmitter direction with respect to the Receiver
- Distance from Receiver to Transmitter

Aircraft GPS input connection technical features

Item	Features
Connector Label	AIRCRAFT GPS IN & OUT
Cable Connector Type	DB-9 male

Table 8.20: Aircraft GPS Input connection features



Figure 8.13: AIRCRAFT GPS IN & OUT connector

Pin	Description
2	Aircraft GPS output (RS-232)
3	Aircraft GPS input (from UHF external Receiver)
5	GND

Table 8.21: AIRCRAFT GPS IN & OUT connector pinout



It is possible to use a RS232 to USB converter to retrieve the GPS data. In that case, **don't connect the converter directly to the *Receiver* as it could malfunction or even destruction of the *Receiver*.** Wire only the pins 2, 3 and 5 of the Receiver connector.

8.2.9 Autotracking connector (Optional)

The Autotracking connector can be used either with a Parabolic Antenna, Antenna with Selectable Polarity or with a Multisector Antenna. This can be configured in the Autotracking menu.

For different applications different devices are connected to this connector:

- **Parabolic Antenna Autotracking:** MOOG QPT positioner + Inclinator when the tracking is made with a Parabolic Antenna based on GPS position. This connector provides 24 V for the supply of the QPT Positioner and Inclinator.
- **AMS Multisector Antenna Autotracking:** AMS Multisector Antenna is connected to this connector when Antenna Switching Tracking based on GPS information is made.
- **Multi Polarity Parabolic Antenna Control:** APO Parabolic Antenna with configurable polarity is connected to this connector and the control of the polarity is made through it.

The connector used for Autotracking is located on the rear panel of the *Receiver*.

Receiver Autotracking connector

Item	Features
Connector Label on <i>Receiver</i>	AUTOTRACKING & SENSORS
Connector type	Bayonet 19 pin female
Part number (cable connector)	ITT Canon: JMS3116F14-19P

Table 8.22: Autotracking connector

8.2.9.1 Parabolic Antenna Autotracking

8.2.9.1.1 Autotracking connector pinout

This section explains the pinout that must be made on the Autotracking Bayonet 19 pins connector cable when the Parabolic Antenna Autotracking is configured. This configuration is formed by one Parabolic Antenna, one QPT Positioner and one Inclinator. The Local GPS Receiver and Compass can be connected to the Autotracking connector in case of being needed.

The QPT Positioner is connected via a RS422 port and the Inclinator is connected via a second RS-422 port. The Local GPS Receiver and Compass are connected via a RS232 port.

For more information of installation and configuration of the QPT Positioner Inclinator, Compass and Local GPS Receiver, please go to section 5.2. Autotracking Parabolic Antenna.

The following table describes the pinout of the Receiver's Autotracking connector to a QPT Positioner, Local GPS Receiver, Compass and Inclinator sensor:

Connector pinout

Bayonet 19 pin (Receiver)	Description
A	+ VCC (24 V when AC input)
B	Local GPS and Compass Input
C	+ 5V DC (Max. 700mA)
K	Inclinator Sensor TX (+)
L	Inclinator Sensor TX (-)
M	MOOG Positioner TX (+)
N	MOOG Positioner TX (-)
P	MOOG Positioner RX (+)
R	Inclinator Sensor RX (+)
S	Power Return GND
T	Digital Signal GND
U	MOOG Positioner RX (-)
V	Inclinator Sensor RX (-)

Table 8.23: Autotracking connector pinout

8.2.9.1.2 Autotracking connector to MOOG QPT-90 Positioner cable pinout

For the cable which connect the MOOG QPT-90 Positioner to the Receiver's Autotracking connector, the following pins relationship must be followed:

Receiver's Autotracking connector to MOOG QPT-90 Positioner cable pinout

Receiver's Autotracking (Bayonet 19 pin)		MOOG Positioner (D38999/20WJ43PN)	
Pin M	TX (+)	Pin X	RX (+)
Pin N	TX (-)	Pin Y	RX (-)
Pin P	RX (+)	Pin V	TX (+)
Pin U	RX (-)	Pin W	TX (-)
Pin A	+VCC (+24 VDC)	Pin b	Power Supply (+24 VDC)
Pin S	Power Supply GND	Pin m+p	Chassis GND and Power Return
Pin T	Signal GND	Pin Z	Signal GND

Table 8.24: Receiver's Autotracking connector to MOOG QPT-90 Positioner cable pinout

8.2.9.1.3 Autotracking connector to Inclinator cable pinout

For the cable which connect inclinometer to the Receiver's Autotracking connector, the following pins relationship must be followed:

Receiver's Autotracking (Bayonet 19 pin)		Inclinometer
Pin K	TX(+)	RX+
Pin L	TX (-)	RX-
Pin R	RX (+)	TX+
Pin V	RX (-)	TX-
Pin S	Power supply GND	GND
Pin A	+VCC (24V)	+Vin

Table 8.25: Receiver's Autotracking connector to Inclinator cable pinout



To connect any peripheral device to the Receiver's Autotracking connector via RS-422 port. Please note that the RX signals must be connected to TX signals and vice versa. While the polarity (+ or -) of the signal must be kept the same. For example, RX (+) signal must be connected to TX (+) signal and RX (-) signal must be connected to the TX (-) signal.

8.2.9.1.4 Autotracking connector to Compass cables pinout

For the communication cable which connect Compass to the Receiver's Autotracking connector, the following pins relationship must be followed:

Receiver's Autotracking connector to Compass communication cable pinout

Receiver's Autotracking (Bayonet 19 pin)		Compass (DB-9 Male)
Pin B	Local GPS and Compass Input	RS-232 TX signal
Pin T	Digital Signal GND	GND

Table 8.26: Receiver's Autotracking connector to Compass communication cable pinout

To power Compass from the Receiver's Autotracking connector, the following pins relationship must be followed:

Receiver's Autotracking connector to Compass power supply cable pinout

Receiver's Autotracking (Bayonet 19 pin)		Compass (Lemo 4 FGG 0B)
Pin A	+VCC (24V DC)	+VCC
Pin S	Power Return GND	GND

Table 8.27: Receiver's Autotracking connector to Compass power supply cable pinout

8.2.9.1.5 Autotracking connector to Local GPS Receiver cable pinout

To connect the Local GPS Receiver to the Receiver's Autotracking connector, the following pins relationship must be followed:

Receiver's Autotracking connector to Local GPS Receiver cable pinout

Receiver's Autotracking (Bayonet 19 pin)		GPS-02 (DB-9 Male)	
Pin B	Local GPS and Compass Input	Pin 3	RS-232 TX signal
Pin C	+ 5V DC (Max. 700mA)	Pin 1	DC Power Input (5V DC)
Pin S	Power Return GND	Pin 5	GND

Table 8.28: Receiver's Autotracking connector to Local GPS Receiver cable pinout

8.2.9.2 APO-75 Antenna Polarity control

The following table describes technical features and model of the connector used for the control of APO Parabolic Antenna different polarities:

Item	Features
Connector type	Bayonet 6 pin female
Part number	KPT00E10-6P

Table 8.29: APO-75 Autotracking connection features

Cable pinout

Bayonet 19 pin (Receiver)	Bayonet 6 pin(APO-75)	Description
E	B	LHCP
F	E	RHCP
C	A	Vertical
G	F	Horizontal
T	C	GND
D	-	OMNI Selection
B	-	External fan

Table 8.30: Autotracking cable pin relationship for an antenna with polarity

8.2.9.3 AMS Multisector Switch Antennas

The following table describes technical features and model of the connector used in the AMS Multisectorial Antenna Autotracking. For more information about the installation and configuration of the AMS Multisector Switch Antennas, please go to section 5.1 Autotracking Multisector AMS Antenna.

Item	Features
Connector Type	Bayonet 8 pin male
Part number for the antenna	ITT KPT: 02E12-8P (female base and male pins)

Table 8.31: AMS Autotracking connection features

Cable pinout

Bayonet 19 pin (Receiver)	Bayonet 8 pin (AMS)	Description
D	A	Sector 1
E	B	Sector 2
F	C	Sector 3
G	D	Sector 4
H	E	Sector 5
J	F	Uplook
T	G	GND

Table 8.32: Autotracking cable pin relationship for an AMS Multisector Switch Antenna

8.2.10 Remote control

8.2.10.1 Ethernet

The *Receiver* can be controlled and monitored remotely over an Ethernet link through a Web Server.

The link is connected via an 8-pin RJ-45 connector with a 10/100 Base-T network interface. This connector is located on the rear panel of the rack-mount demodulator.

Remote connection technical features

Item	Features
Connector Label	REMOTE
Connector Type	RJ-45

Table 8.33: Ethernet remote connection technical features

8.2.10.2 Serial

A serial interface is available on the Serial Remote connector to control the *Receiver* through a terminal such as Hyperterminal.



It is possible to use a RS232 to USB converter to retrieve the GPS data. In that case, **don't connect the converter directly to the *Receiver* as it could end in malfunction or even destruction of the *Receiver*.** Wire only the pins 4, 5 and 7 of the Receiver connector.

Serial remote connection technical features

Item	Features
Connector Label	AIRCRAFT GPS IN & OUT / SERIAL REMOTE
Connector Type	DB-9

Table 8.34: Serial remote connection features

Pin	Description
4	Serial remote TX (RS-232)
5	GND
7	Serial remote RX (RS-232)

Table 8.35: AIRCRAFT GPS IN & OUT / SERIAL REMOTE connector pinout

8.2.11 USB

Through the USB connection, it is possible to update the firmware of the *Receiver* directly from an external USB device Receiver. Also, it can be used to supply up to 2.5A @ +5V to a device.

USB connection technical features

Item	Features
Connector Label	USB
Connector type	Type A
Maximum output current	2.5 A

Table 8.36: USB input connection technical features

8.2.12 Miscellaneous

8.2.12.1 Alarm output

If the *Receiver* shows any alarm, the state of this signal changes to high. The alarm signal is available on AIRCRAFT GPS IN & OUT / SERIAL REMOTE connector.

Alarm output connection technical features

Item	Features
Connector Label	AIRCRAFT GPS IN & OUT / SERIAL REMOTE
Connector type	DB-9
High level voltage	5V

Table 8.37: Alarm output connection features

Pin	Description
1	Alarm out
5	GND

Table 8.38: AIRCRAFT GPS IN & OUT / SERIAL REMOTE connector pinout

8.2.12.2 RF Signal level

The RF signal power can be monitored with a PWM signal output proportional to the signal power. It is available on the AIRCRAFT GPS IN & OUT / SERIAL REMOTE connector.

Alarm output connection technical features

Item	Features
Connector Label	AIRCRAFT GPS IN & OUT / SERIAL REMOTE
Connector type	DB-9
High state voltage	5V

Table 8.39: Alarm output connection features

Pin	Description
5	GND
8	Level PWM

Table 8.40: AIRCRAFT GPS IN & OUT / SERIAL REMOTE connector pinout

8.3 Rack Unit Installation

The *Receiver* must be well cooled and therefore, some space must be left at the sides of the *Receiver* for ventilation purposes. This is especially important when the unit is installed in a rack.

Before operation, the Receiver must be earthed to the rack chassis. The Receiver incorporates a grounding point (M4 screw) on the left side of the rear panel.

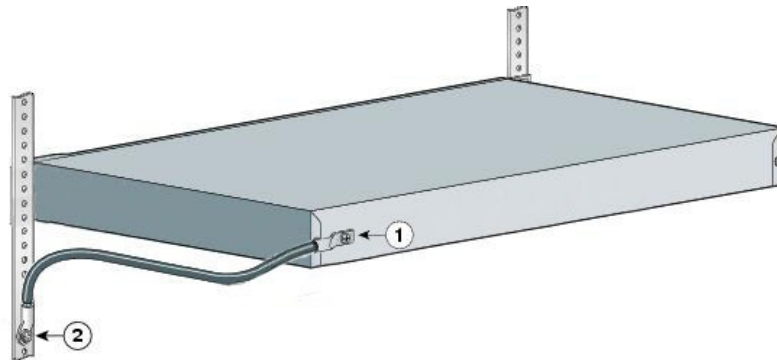


Figure 8.14: Receiver grounding example

There are 3 fans on the Receiver, 2 air outputs and 1 air input as shown in the following diagram:

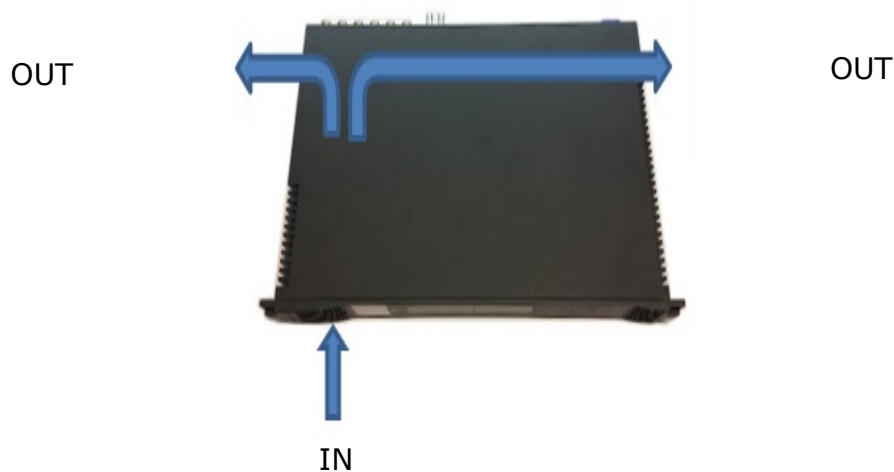
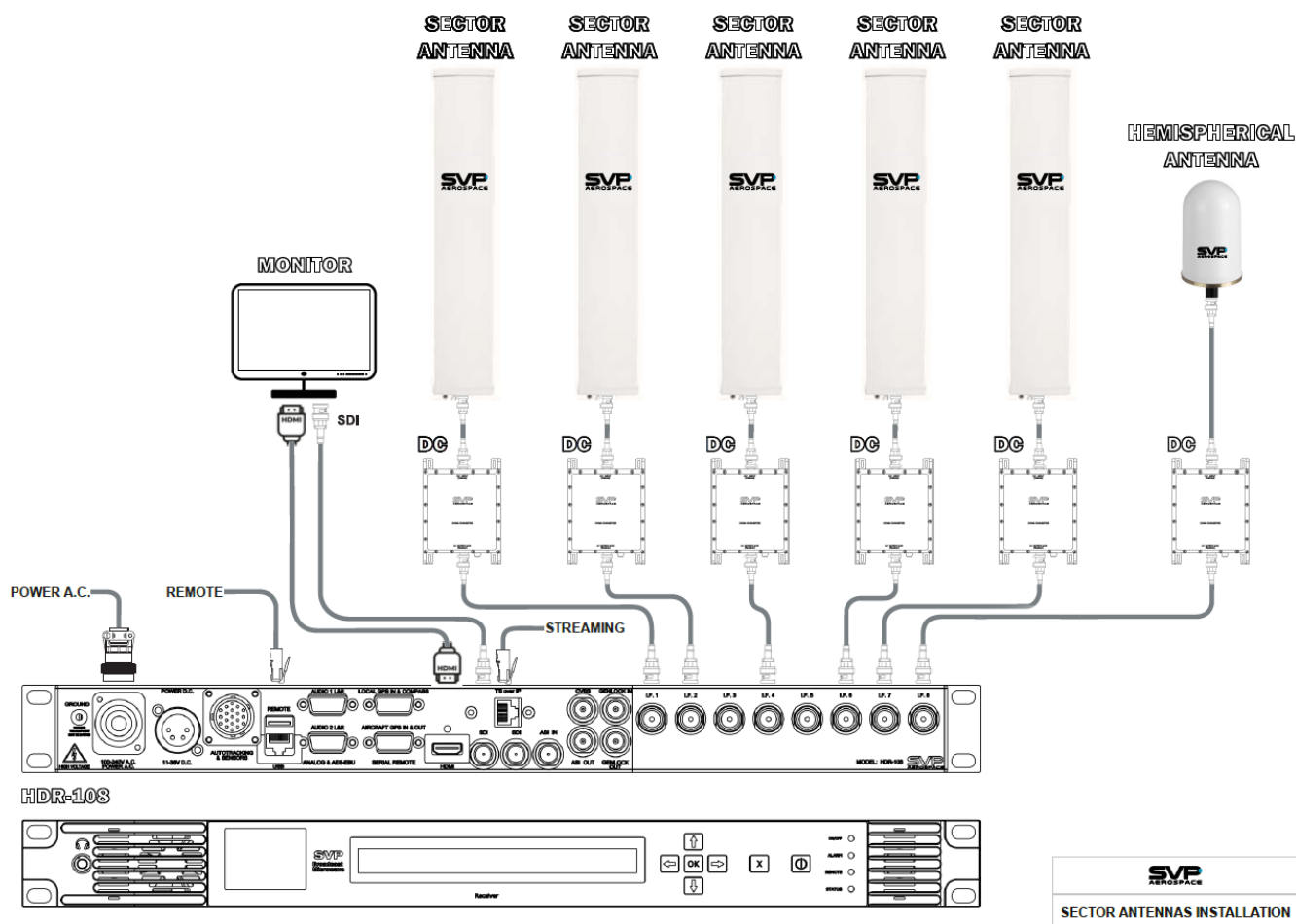


Figure 9.15 : Refrigeration system

8.4 Sector Antennas & Down-Converter Installation

The down-converter should be installed next to the Receiver antenna. The cable that connects the antenna output to the down-converter input should be as short as possible if the losses in the cable at high RF frequencies are high. For better performance, high quality cables and connectors should be used.

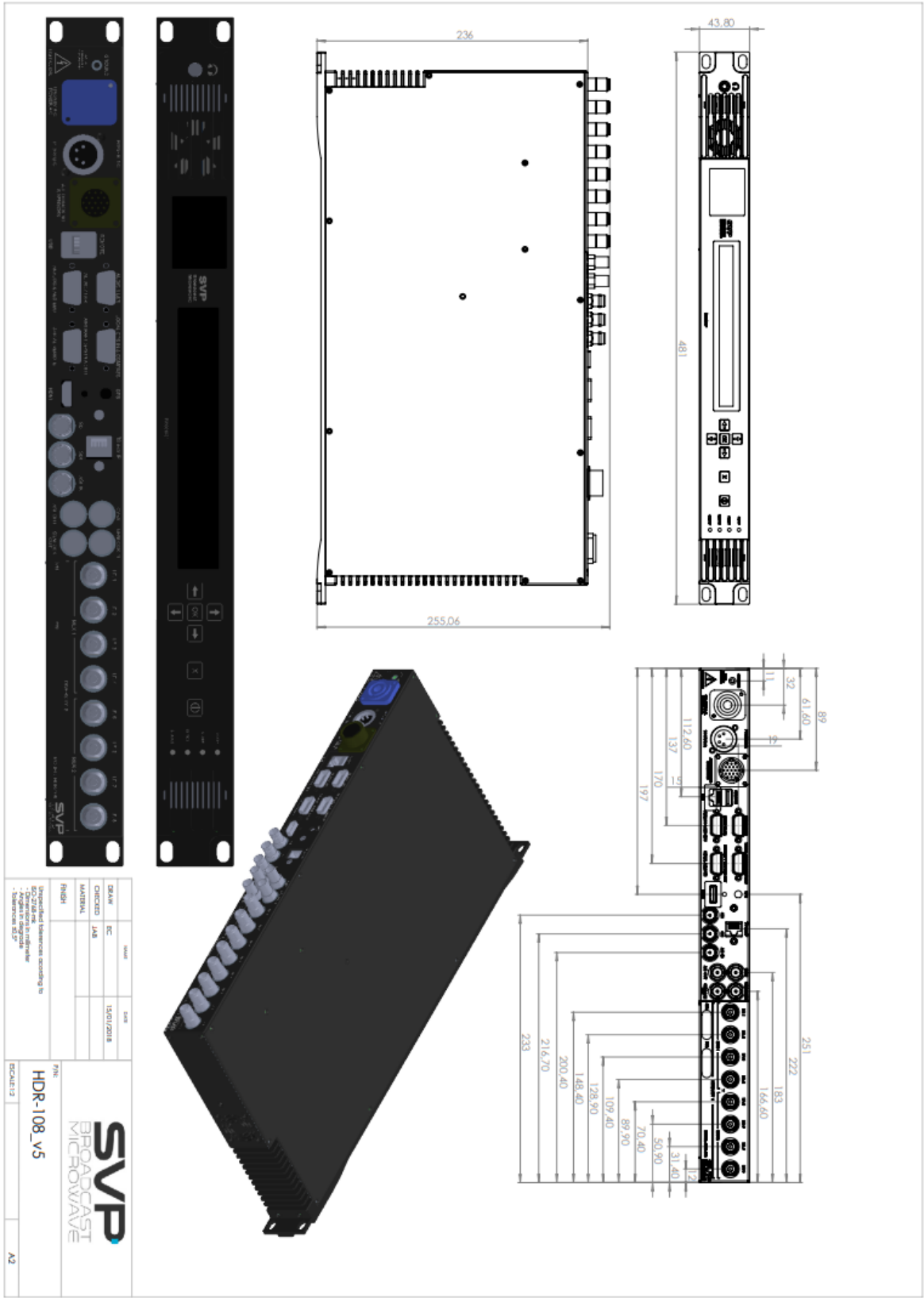
The down-converter is powered by the *Receiver* through the IF output. So, the IF output of the down-converter should be connected to one IF input of the *Receiver*. Depending on the model, up to 2, 4 or 8 down-converters can be connected to the Receiver.



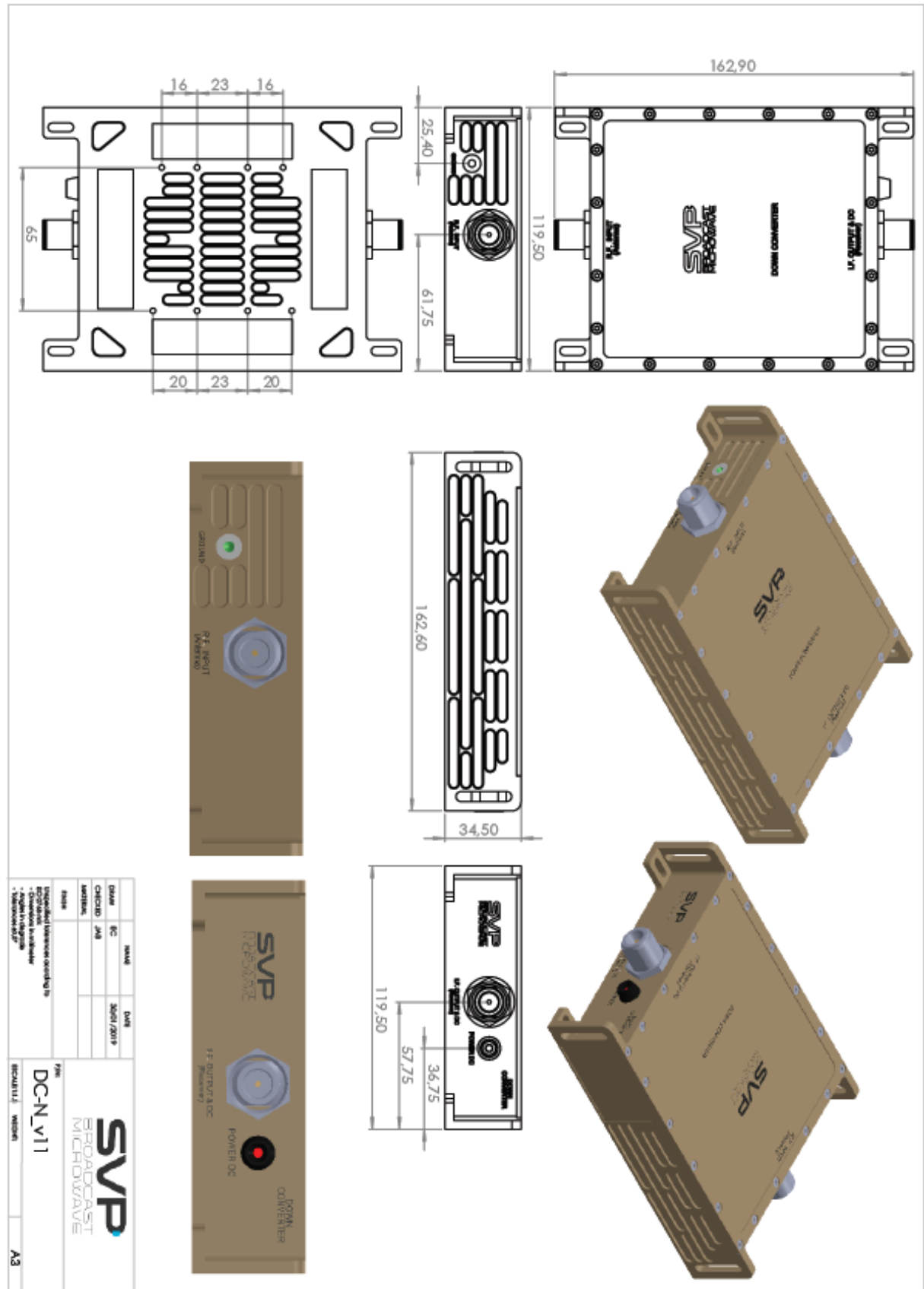
Chapter 9: Mechanical Dimensions

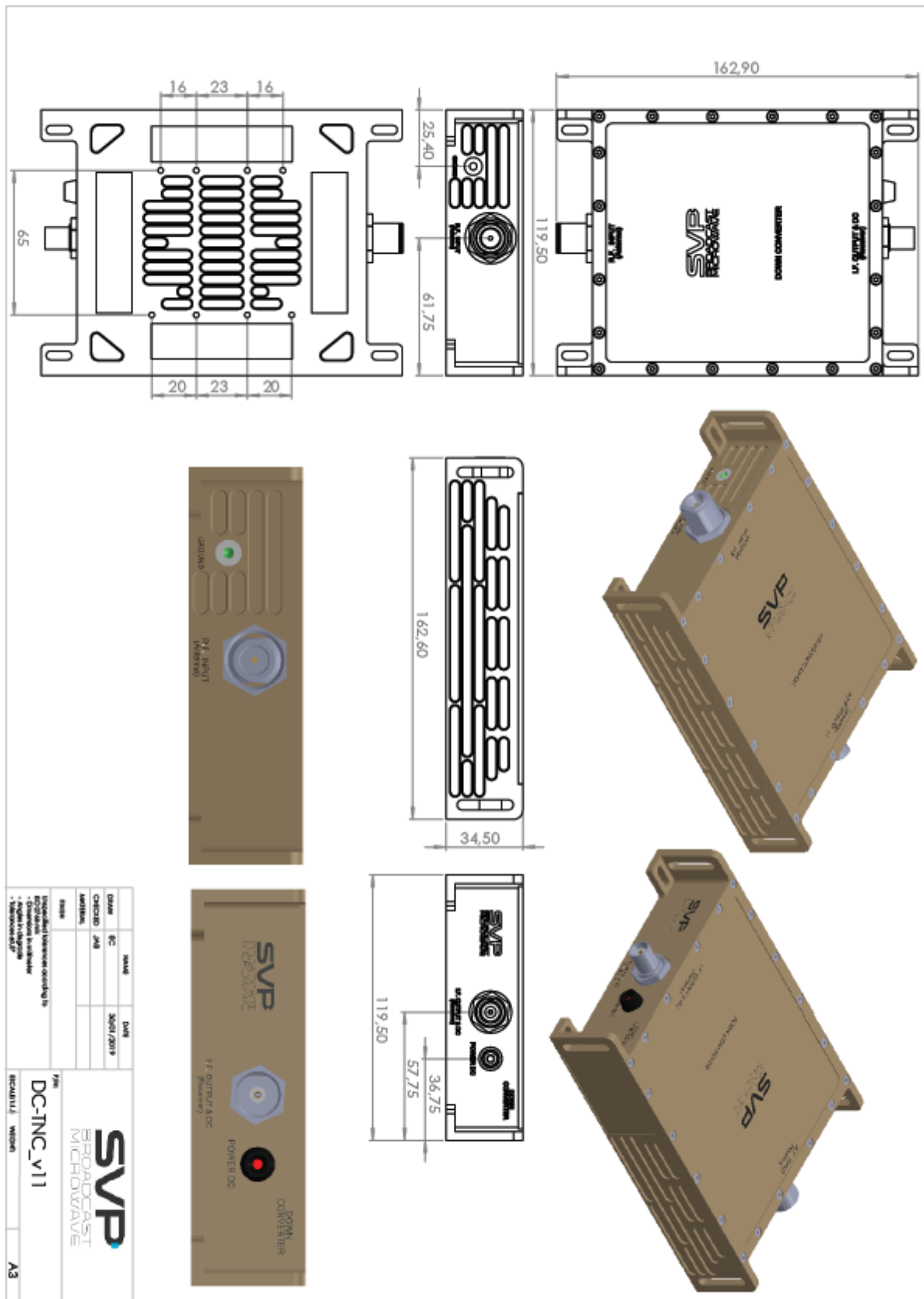
In this chapter, the mechanical drawing of the units described in this manual are included.

9.1 HDR-108 Mechanical Drawing

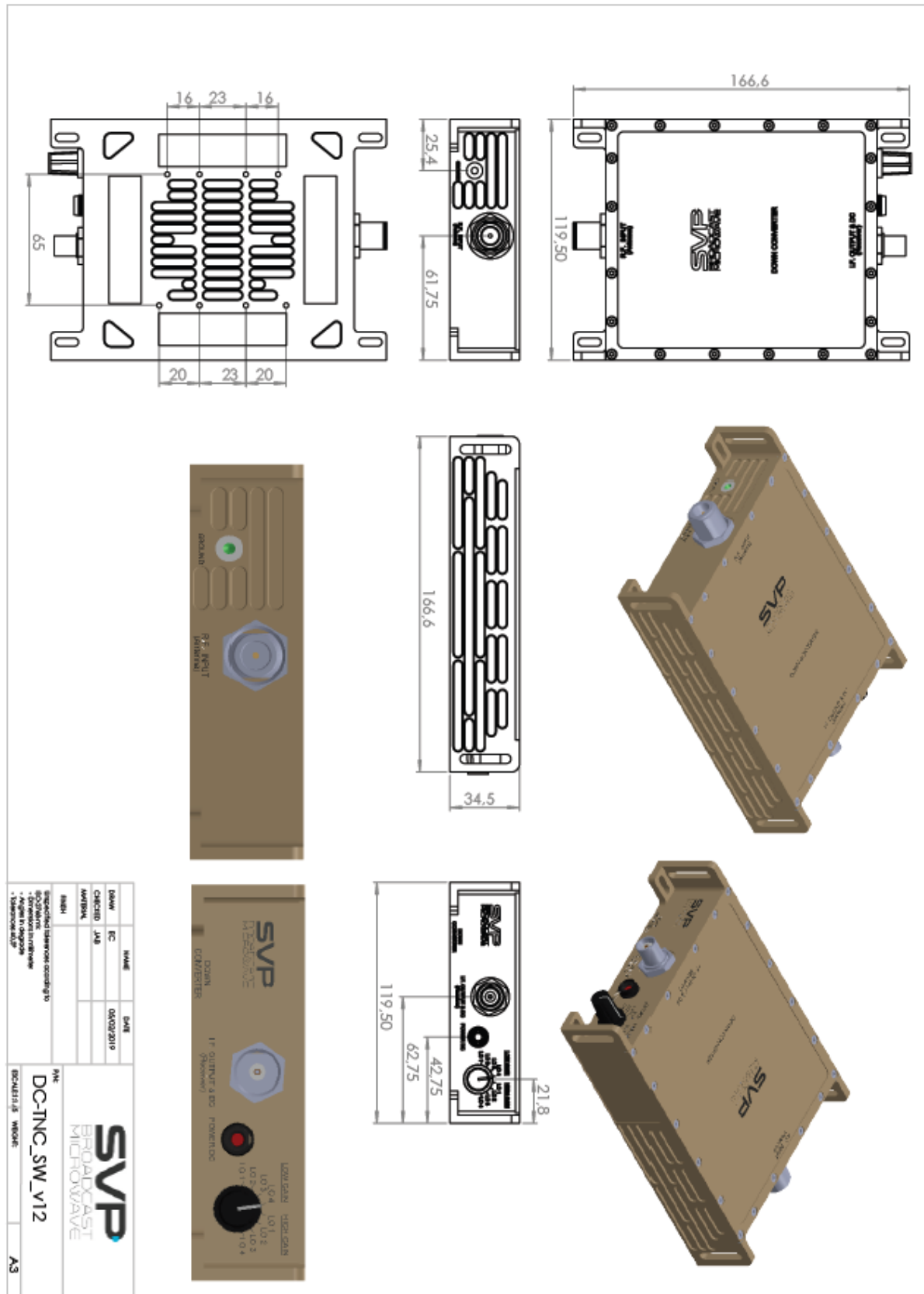


9.2 DC Down Converter Mechanical Drawing

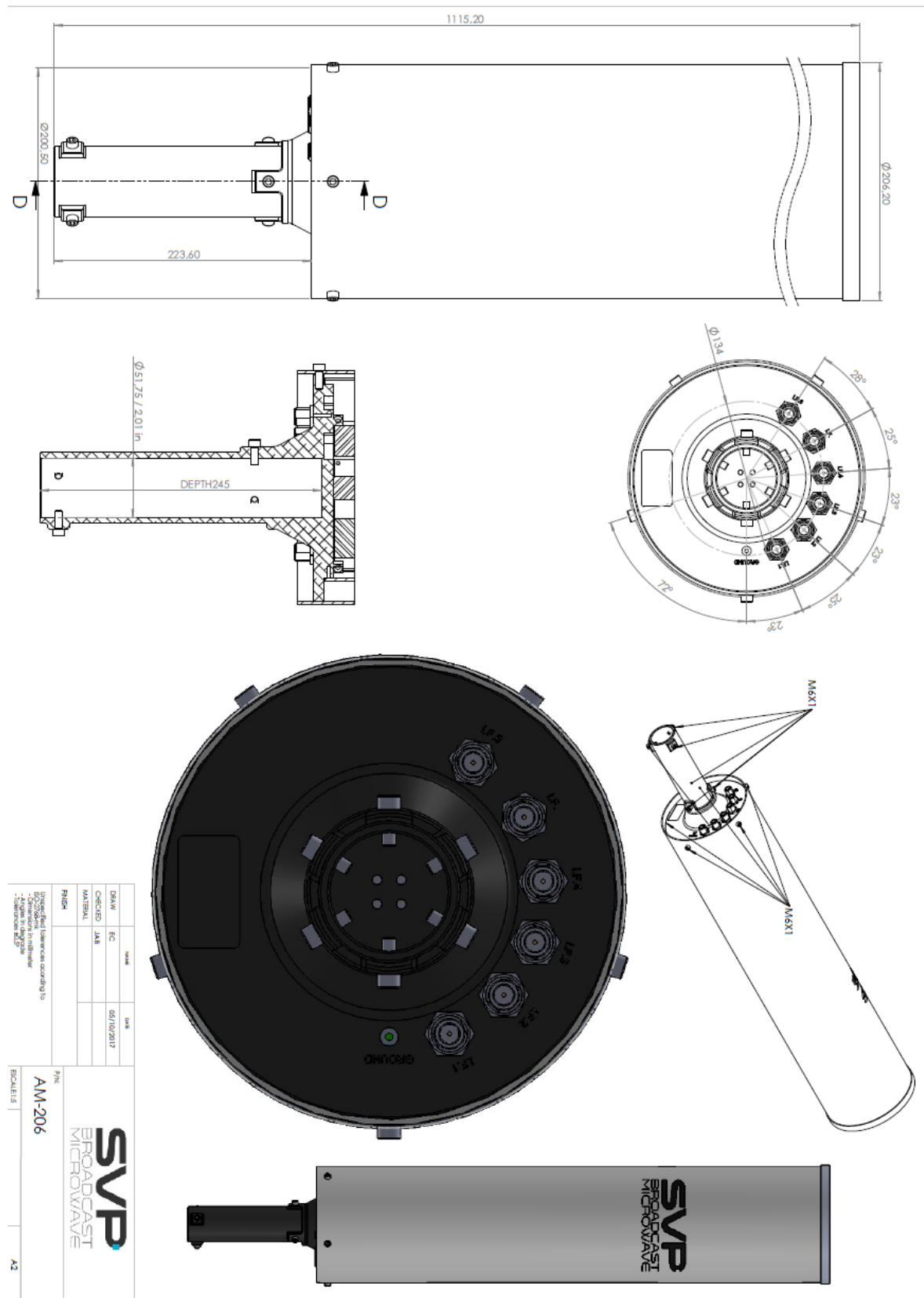




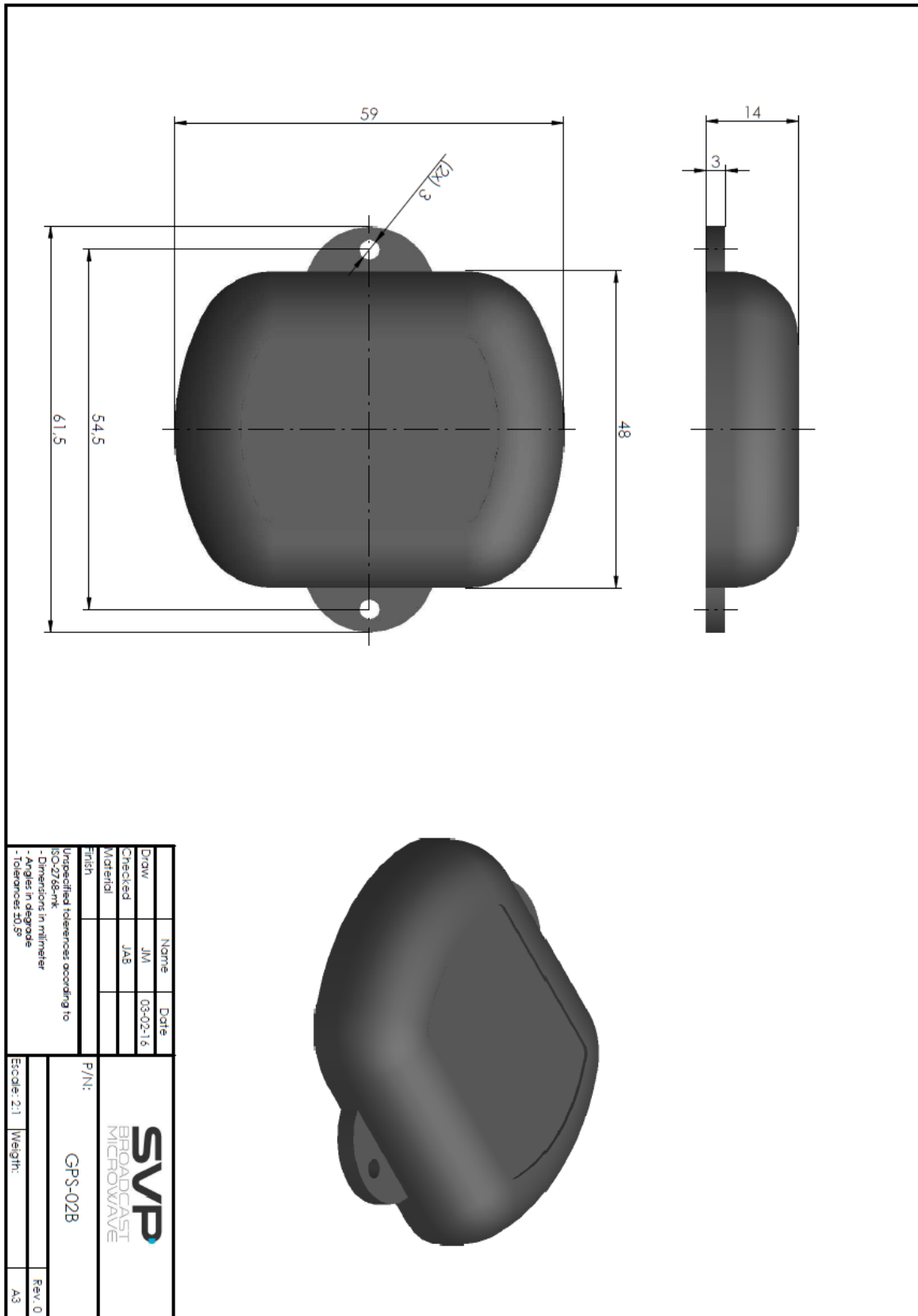
9.3 DC-SW Switchable Down Converter Mechanical Drawing



9.4 AM-206 Antenna Mechanical Drawing



9.5 GPS-02 GPS Receiver Mechanical Drawing



Chapter 10: Preventive Maintenance

In order to ensure system longevity, it is highly recommended that the following preventive maintenance procedures are carried out at the appropriate time.

10.1 Maintenance Schedule

Procedure	Yearly	Quarterly	Monthly	Prior each use
Inspect Wiring		✓		
Inspect the cables connection		✓		
Inspect the screws of reception antenna/s and clean the connectors	✓			
Inspect the ground connection (M4 screw and lightning protection if used)		✓		

Table 11.1. Maintenance Schedule table

10.2 Maintenance Procedures

Quarterly, the following inspections should be done:

- Inspect antenna installation to ensure all components are secure and in good conditions.
- Inspect cables and connections.
- Check that the fans work.
- Check ambient temperature.

10.3 Spare Parts

After the warranty expiration or having SVP Broadcast Microwave's signed authorization, parts that can be replaced are:

- 100W @ 24V Lambda Power Supply. P/N: HWS100A-24/A /TDK)
- Ventilation fan. P/N: 1404KL-04W-B50 (NMB Technologies)

Fans should be replaced after completing its expected operational life, 30000 hours.

Chapter 11: Warranty

11.1 Warranty information

Under recommended use and service, all SVP Broadcast Microwave products are warranted against defects in material and workmanship to twenty-four (24) months from the date of original shipment.

SVP Broadcast Microwave's obligation is limited to repairing or replacing, at our plant, products, which prove to be defective during the warranty period.

Under no circumstances shall the warranty be transferred or assigned to any third party unless the consent in writing has first been obtained from SVP Broadcast Microwave. SVP Broadcast Microwave shall not be under any liability for warranty in respect of any equipment, which shall be sold by the Customer to any third party unless otherwise agreed in writing.

SVP Broadcast Microwave is not liable for consequential damage resulting from the use of SVP Broadcast Microwave equipment.

11.2 Claim for damage in shipment

Your unit should be inspected and tested as soon as it is received. Claims for damage should be filed with carrier.

11.3 Return procedures

All claims under warranty must be made promptly after occurrence of circumstances giving rise to the claim and must be received within the applicable warranty period by SVP Broadcast Microwave or its authorized representative. SVP Broadcast Microwave reserves the right to reject any warranty claim not promptly reported. After expiration of the applicable warranty period, products are not subject to adjustment.

Before any Product is returned for repair and / or adjustment, authorization from SVP Broadcast Microwave for the return and instructions as to how and where the Product should be shipped must be obtained. The Product type, serial numbers, and a full description of the circumstances giving rise to the warranty claim should be included. Such information will help establish the cause of failure and expedite adjustment or repair.

Important

Any Product returned without complete information will be considered not to have met all contractual requirements. Information required includes (as a minimum): Model Number, Serial Number, Description, Hours of Use, Type of Failure, and Operating Conditions during failure.

11.4 Transportation and packaging

Any Product returned for examination must be sent prepaid via the means of transportation indicated as acceptable by SVP Broadcast Microwave. SVP Broadcast Microwave reserves the right to reject any warranty claim on any item that has been altered or has been shipped by non-acceptable means of transportation. Returned Products should be carefully packed and unless otherwise indicated, shipped to:

SVP Broadcast Microwave
Arriluzea 3
48200 Durango
Vizcaya
Spain

11.5 Authorization for evaluation

When any Product is returned for examination and inspection, or for any other reason, Customer and its shipping agency shall be responsible for all damage resulting from improper packing or handling, and for loss in transit, notwithstanding any defect or nonconformity in the Product. By returning a Product, the owner grants SVP Broadcast Microwave permission to open and inspect the returned Product to determine the cause of failure, and SVP Broadcast Microwave's determination with regard thereto shall be final.

If it is found that the Product has been returned without cause and is still serviceable, the Customer will be notified and the Product returned with appropriate inspection charges billed, at SVP Broadcast Microwave's discretion, to the Customer.

Annex A: DC User Guide

Important Notes

1. The **DC** down-converters have been designed to work with COFDM signals. It converts the received RF signal to UHF band. Excellent results in the signal quality are obtained and measured in the Receiver.
2. Different DC models are available, which cover from 1.3 to 10.5 GHz in bands in case of DC and from 1.2 to 6.0 GHz in case of DC-SW.
3. The equipment is powered by the Receiver. It can also be powered using a Bias-Tee.
4. The high performance of this equipment is only guaranteed when using high quality cables and connectors.
5. SVP Broadcast Microwave recommends the use of high-quality connectors.
6. It is advisable to use lightning protection both in the RF section and in the IF.

A.1 DC COFDM Down-Converter

A.1.1 Description

The **DC** COFDM down-converter is suitable to work with COFDM digital links. It translates RF band signals to UHF band. Different down-converter models are available which can work from 1.3 to 10.5 GHz in bands.

Depending on the DC-COFDM model, the down-converter will be suitable to convert signals from a concrete frequency range.

The down-converter is designed to work in environments with high radiofrequency levels. Two band filters prevent the equipment from receiving and being saturated by strong nearby signals from other services. An input filter covers the working frequency range.

PHEMT technology and push-pull first stage are used to ensure excellent linearity. Moreover, the down-converter's excellent noise figure (less than 1.5 dB) makes reception of weak signals very clear.

The local oscillator has an extremely low noise phase and very high frequency stability. Excellent MER results are obtained in the Receiver. This MER increase due to the local oscillator's spectral purity enables increased link coverage, particularly when there is no direct vision, and modulation is between 16, 64 and 256 QAM.

The LED at the bottom shows the DC presence.

The equipment is powered by the Receiver. It can also be powered using a Bias-Tee.

The equipment is waterproof. It can work permanently under extreme weather conditions.

The down-converter is a very important element in COFDM links, which require maximum signal quality when using 64QAM or 256 QAM modulations.

The maximum fix mast diameter is 100 mm. In the following figure, the Down-Converter is shown:



Figure A.1: Down-Converter

A.1.2 Technical Specifications

This section shows the RF characteristics of the most used DC-COFDM models. For other frequency ranges, please contact SVP.

RF Section

Item	Specifications
Frequency range	DC_1300-1500 (1,300 to 1,550 MHz) DC_1700-1900 (1,700 a 1,900 MHz) DC_2000-2700 (2,000 a 2,700 MHz) DC_2200-2900 (2,200 a 2,900 MHz) DC_3200-3900 (3,200 a 3,900 MHz) DC_4400-5000 (4,400 a 5,000 MHz) DC_5000-5500 (5,000 a 5,500 MHz) DC_5500-6000 (5,500 a 6,000 MHz) DC_6430-7130 (6,430 a 7,130 MHz) DC_6800-7500 (6,800 a 7,500 MHz) DC_8000-8500 (8,000 a 8,500 MHz) DC_10000-10500 (10,000 a 10,500 MHz) DC_12750-13250 (12,750 a 13,250 MHz) Other frequency ranges on request.
Noise figure	<1.5 dB
Conversion gain	25 dB / 30dB / 35 dB (under request)
Local oscillator frequency	Depends on the frequency band 2 GHz (1600 MHz or 1840 MHz)) 3.3 to 3.8 GHz (2900 MHz) 4.5 to 4.98 GHz (4100 MHz) 4.9 to 5.38 GHz (4500 MHz) 5.3 to 5.78 GHz (4900 MHz) *Other frequencies under request
Phase noise	Typ -98 dBc/Hz @ 10KHz
Output frequency	UHF band
Input connectors	N female
Output connectors	TNC female (50Ω) or BNC female (75Ω) or N female (50Ω)
Number of poles of the input filter	≥5
Static protection	Yes
Absolute max rf level	0 dBm
Maximum operation level	-20 dBm

Table A.1 DC - RF section specifications

Power supply

Item	Specifications
Power range	9 to 24 V. DC
DC Connector	IF output connector

Table A.2: Power supply specifications

Consumption

Item	Specifications
DC consumption at 12 V	Typ. 400 mA

Table A.3: Consumption

Physical Characteristics

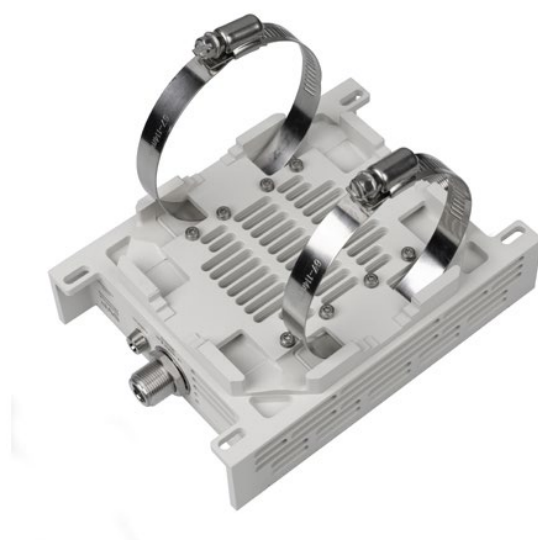
Item	Specifications
Size	119.5 x 162.2 x 34.5 mm (WxHxD) (w/o brackets)
Weight	0.855 Kg
Max. fix tube diameter	100 mm

Table A.4: Physical characteristics

Environmental conditions

Item	Specifications
Temperature range	-40 to 60°C

Table A.5: Environmental condition



A.2 Block Diagram

In this chapter, the block diagram of the DC down-converter is explained.

This diagram has several parts related to the DC internal performance which are shown in blocks with different inputs and outputs.

DC DOWN-CONVERTER

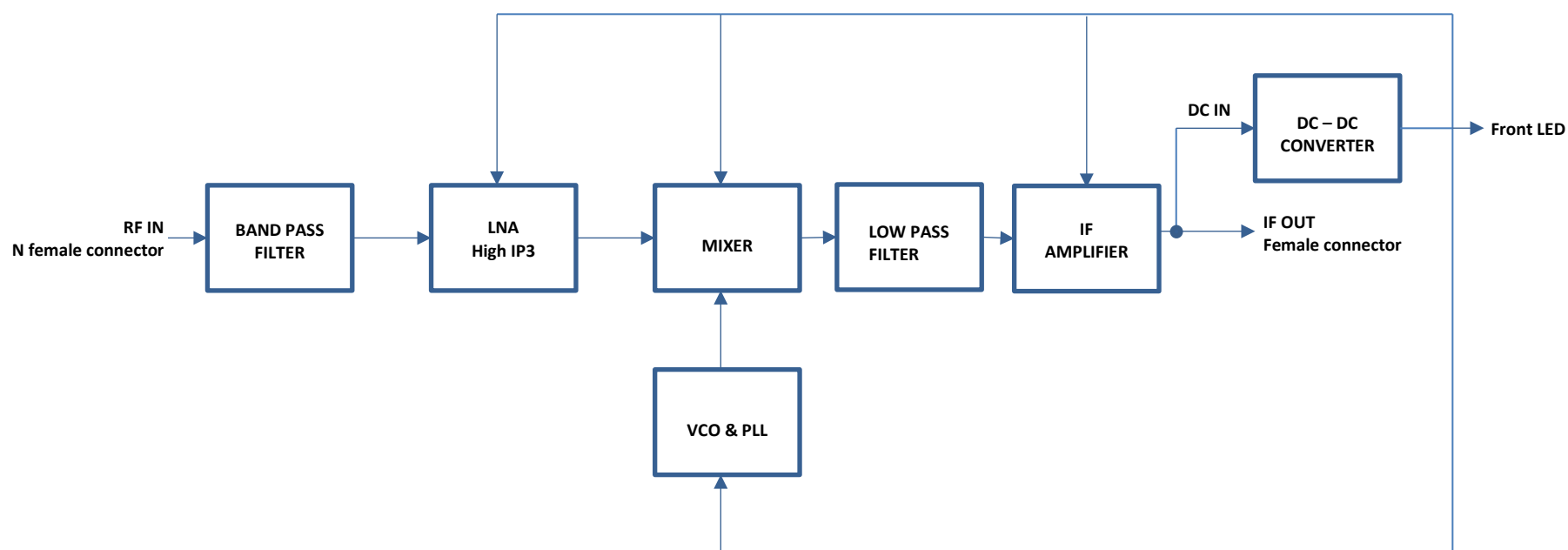


Figure A.2: Block Diagram

Annex B: QPT User Guide

Important Notes

1. The **QPT** Pan & Tilt positioners have been designed to move Parabolic Antennas in Autotracking systems.
2. The positioners are rugged and durable enough for virtually any environment. There are models specially designed for marine environments.
3. The high performance of this equipment is only guaranteed when using high quality cables and connectors.
4. Only authorized personnel should open the unit and any repair or warranty will be invalidated if the seals are broken.



Figure B.1 QPT Pan & Tilt Positioner

B.1 Description

The **QPT Pan & Tilt positioners** have been designed to move Parabolic Antennas in Autotracking systems.

The QPT positioners have been developed by Moog which is a designer, manufacturer and integrator of precision control components and systems.

These pan and tilt positioners have application in security, safety, surveillance, communications and electronic news gathering. There is a wide range of pan & tilt positioners for varying load capacities, mobile or fixed applications, and the durability to withstand even the harshest environments. Multiple models are available to fit user's needs and specific requirements. The QPT-20 and QPT-90 positioners are explained below.

As mentioned, QPT positioners are robust and durable enough for virtually any environment. They employ tough metal housing and gearing for durability in harsh environment. They are made with corrosion resistant material that provides a water tight seal to protect against moisture and outside contaminants.

Mil-Spec connectors are used to offer superior performance and reliability characteristics. Designed to work in extreme environmental conditions, these connectors are also used throughout the defense and aerospace industry and in a variety of commercial tasks.

QuickSet positioner can be powered by the Receiver or externally. When it is powered by the Receiver, it provides 24V when the Receiver is powered by AC power. When the Receiver is powered in DC, the same voltage will be provided to the positioner.

B.2 Technical Specifications

B.2.1 QPT-20

The QPT-20 positioner, if the temperature drops below -15°C , activates its inner heater. Note that if it is intended to use the positioner in an environment in which the temperature can drop below that temperature, the current can rise up to 4.5 Amp, so use an appropriate cable able to handle this current.

It is recommended to use AWG28 for the wires of the data cable, and twisted pair for both TX and RX signals.

To attach the antenna to the positioner, it is necessary a CLAM-1 bracket (Not included with the positioner).



The pinout of the QPT connector varies with the model.

Standard Performance

Item	Specifications
Load Capacity	8 Ib-ft (10.8 Nm) maximum
Operating Voltage Range	24 VDC (± 4 VDC) provided by the Receiver
Pan-Axis Range	435° ($\pm 217.5^{\circ}$) (non-slip ring)
Pan-Axis Speed	2° - 35° /sec
Tilt-Axis Range	180° ($\pm 90^{\circ}$)
Tilt-Axis Speed	1.0° - 12° /sec
Internal Heater	Included standard, thermostatically controlled
Consumption with heater	Max. 2.7A
Operating Temperature	Without Heater: -15°C to 55°C With Heater: -30°C to 55°C
Repeatability	0.25°
Motor Type / Drive	Stepper and DC Brush
Connector Specifications	Mil-Spec grade
Materials	Housing 6061-T6 Aluminium, stainless steel hardware, permanently sealed radial ball bearings
Finish/Colour	White powder coat paint over alodined chromate for corrosion resistance standard
Weight	14.3 Ibs. (6.48 kg) depending on model

Table B.1 QPT-20 Standard Performance

Serial IP features

Item	Specifications
Serial Communication	RS 422. Controllable by <i>Receiver</i>
Control Protocols	PTCR-20

Table B.2: QPT-20 Serial IP features

Mil-Spec Shock Vibration

Item	Specifications
Passed Shock	MIL-STD-810F Meth. 516.5
Passed Vibration	MIL-PRF-49256A

Table B.3: QPT-20 Mil-Spec Shock Vibration



Figure B.2: QPT-20 Pan & Tilt Positioner

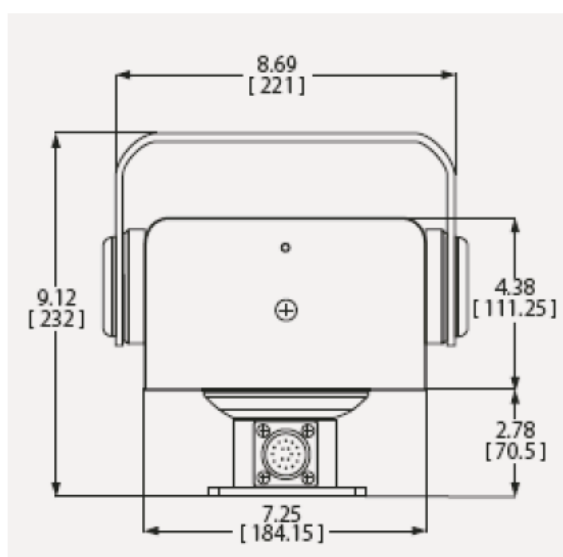


Figure B.3: QPT-20 Dimensions

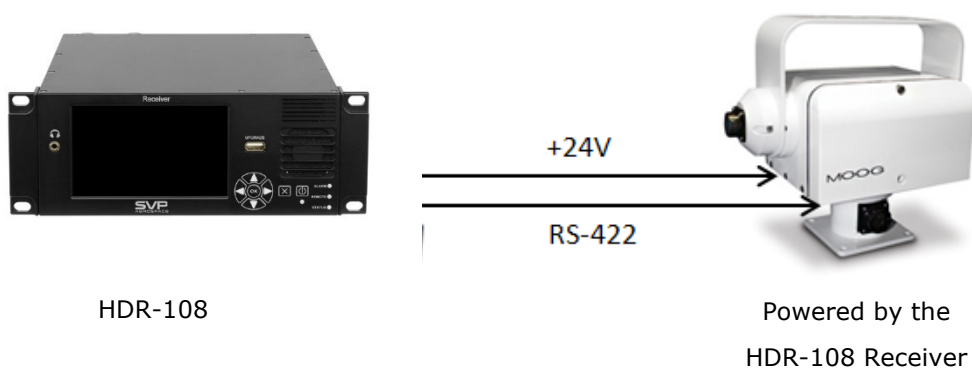


Figure B.4: QPT-20 connection scheme

B.2.2 QPT-90

The QPT-90 positioner, if the temperature drops below -15°C , the inner heater is activated. Note that if it is intended to use the positioner in an environment in which the temperature can drop below that temperature, the current can rise up to 4.5 Amp, so use a power supply and an appropriate cable which can handle this current.

It is recommended to use AWG28 for the wires of the data cable, and twisted pair for both TX and RX signals.

To attach the antenna to the positioner, it is necessary a CLAM-1 bracket (Not included with the positioner).



The pinout of the QPT connector varies with the model.

Standard Performance

Item	Specifications
Load Capacity	90 Ib-ft (10.8 Nm) maximum
Operating Voltage Range	24 VDC (± 4 VDC)
Pan-Axis Range	435° ($\pm 217.5^{\circ}$) (non-slip ring)
Pan-Axis Speed	Max. $25^{\circ}/\text{sec}$
Tilt-Axis Range	180° ($\pm 90^{\circ}$)
Tilt-Axis Speed	Max. $-8^{\circ}/\text{sec}$
Internal Heater	Included standard, thermostatically controlled
Consumption	4.4A at 24 VDC
Operating Temperature	Without Heater: -15°C to 55°C With Heater: -30°C to 55°C
Motor Type / Drive	Stepper and DC Brush
Connector Specifications	Mil-Spec grade
Materials	Housing 6061-T6 Aluminium, stainless steel hardware, permanently sealed radial ball bearings
Finish/Colour	White powder coat paint over alodined chromate for corrosion resistance standard
Weight	16.8 kg

Table B.4: QPT-90 Standard Performance

Serial Port features

Item	Specifications
Serial Communication	RS 422. Powered by external power supply.
Control Protocols	PTCR-20

Table B.5: QPT-90 Serial features

Mil-Spec Shock Vibration

Item	Specifications
Passed Shock	MIL-STD-810F Meth. 516.5
Passed Vibration	MIL-PRF-49256A

Table B.6: QPT-90 Mil-Spec Shock Vibration



Figure B.5: QPT-90 Pan & Tilt Positioner

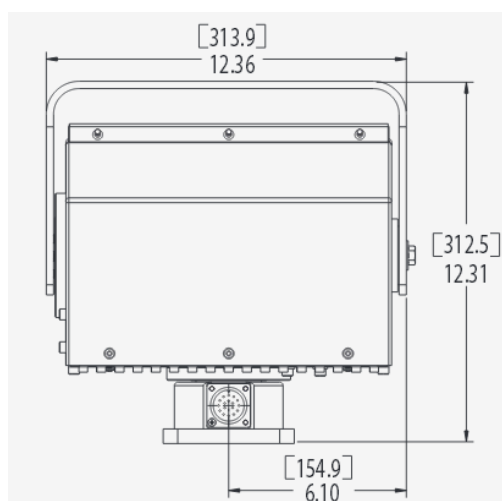


Figure B.6: QPT-90 Dimensions

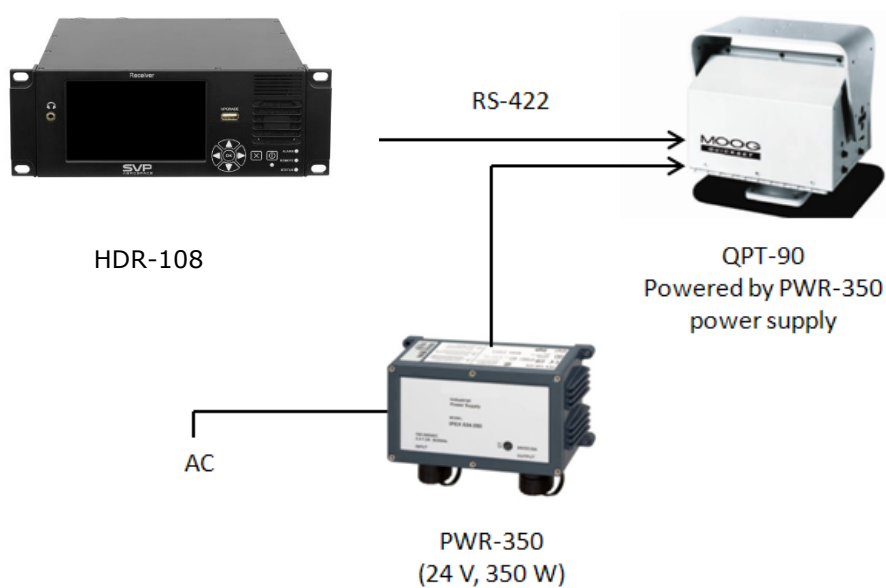


Figure B.7: QPT-90 connection scheme

Annex C: NX-820 User Guide

Important Notes

1. The **NX-820** equipment has been designed to be used in Autotracking systems when is required to transmit the position of the Aircraft GPS at long distances.
2. They are rugged and durable enough for virtually any environment.
3. Only authorized personnel should open the product and any repair or warranty will be invalidated if the seals are broken.



Figure C.1 NX-820

C.1 Description

The **NX-820** equipment is a GPS and bidirectional voice transmission system, with digital modulation and encrypted transmission. This system features a maximum capacity of forty presets permitting various configurations.

This product is used in Autotracking systems, when it is required to transmit the position of the plane's GPS at long distances for the automatic pointing.

It allows transmission at distances higher than 200 kilometres with an appropriate antenna.

C.2 Technical Specifications

General Information

Item	Specifications
Frequency Range Type	400 – 470 MHz
Number of Channels	260
Channel Spacing	6.25 / 12.5 KHz
Operating Voltage	12 – 14 VDC
Operating Temperature Range	-30°C to 60°C
Frequency Stability	±1.0 ppm
Antenna Impedance	50 Ohms
Dimensions (W x H x D)	160 x 43 x 136 mm
Weight	1.4 kg

Table C.1: NX-820 General Information

Receiver

Item	Specifications
Sensitivity (Digital)	3% BER 0.28 mV (0.20 mV)
	1% BER -2 dB (mV) -5 dB (mV)
Audio Distorsion	Less than 3%
Audio Output	4 W/ 4 W

Table C.2: NX-820 Receiver

Transmitter

Item	Specifications
RF Power Output	25 W Max.
Spurious Emission	-36 dBm < 1 GHz, -30 dBm > 1GHz
Modulation Distorsion	Less than 3%

Table C.3: NX-820 Transmitter

GPS

Item	Specifications
TIFF (Time to First Fix) – Cold Start	< 60 seconds
TIFF (Time to First Fix) – Hot Start	< 10 seconds
Horizontal Accuracy	< 10 meters
Position Transmission	Every 3 seconds

Table C.4: NX-820 GPS

Annex D: Multisector Antennas User Guide

Important Notes

1. The **AM** and **AMS** multisector antennas have been designed to be used as a reception antenna in links with Transmitter mobility, with up to diversity 6 mode.
2. These antennas are rugged and durable enough for virtually any environment.
3. For outdoor use, the connectors must be vulcanized.
4. The high performance of these antennas is only guaranteed when using high quality cables and connectors.
5. Only authorized personnel should open the product and any repair or warranty will be invalidated if the seals are broken.

D.1 AM-x06 Multisector Diversity Antenna

D.1.1 Introduction

The AM-x06 is a multisector diversity antenna, which has been developed by SVP Broadcast Microwave. This is a very compact, robust and easy to install solution for applications where hemispherical coverage with high gain is needed.

The AM-x06 antenna is formed of 5 vertical linear polarization sector panel antennas to offer an omnidirectional coverage. It also has an up antenna which allows hemispherical coverage.

This antenna integrates the Bandpass Filters and the Down-Converters. At the N connector outputs, it offers the received signal filtered, amplified and converted to the UHF band.

The AM-x06 antenna has been designed to be used in the Receiver site in scenarios with Transmitter mobility, such as airborne links, in diversity 6 mode; the up-down antenna allows the reception of the signal coming from the aircraft even if it is above the antenna.



Figure: AM-406 antenna
(4 GHz frequency band)

D.1.2 Technical Specifications

Item	Specifications
Available Frequency Bands	AM-206: 2.0 - 2.1 GHz (P/N:AM-206-2021) 2.2 - 2.38 GHz (P/N:AM-206-2224) AM-406: 4.5 – 5.0 GHz (P/N:AM-406-4550) AM-506: 5.0 – 5.4 GHz (P/N:AM-506-5054) AM-606: 6.28 –6.9 GHz (P/N: AM-606-6369)
Gain	5 Sector panel antennas: 16.5 dBi 1 Up-down antenna: 5 dBi
Elevation B/W	90°
Azimuth B/W	75° (x5)
Polarization	5 Panel antennas: Vertical 1 Up antenna: RHCP
Diameter	AM-206: 223 mm AM-406: 223 mm (Bottom) 130 (Top) AM-506: 223 mm (Bottom) 130 (Top) AM-606: 223 mm (Bottom) 130 (Top)
Length	AM-206: 800 mm AM-406: 700 mm AM-506: 700 mm AM-606: 700 mm
Weight (Without Bracket):	AM-206: approx. 8.5 kg AM-406: approx. 6.5 kg AM-506: approx. 6.4 kg AM-606: approx. 6.2 kg
Colour	White
Down-Converters	Included 6 units
Conversion Gain	30 dB
Noise Figure	< 1.5 dB
Local Oscillator	AM-206: 1,600 MHz AM-406: 4,100 MHz AM-506: 4,600 MHz AM-606: 5,800 MHz (Other frequencies under request)
Phase Noise	Better than -98 dBc/Hz @ 10 KHz

Power Supply	9 to 36 V by coaxial cable
Filter	AM-206: 6 poles Cavity AM-406: 10 poles Cavity AM-506: 10 poles Cavity AM-606: 10 poles Cavity
Filter Insertion Loss	< 0.5 dB
Connectors	6 x TNC female
Mount (Optional)	Stainless steel bracket and U bolts (P/N: CLAM-206 for AM-206) (P/N: CLAM-406 for AM-406/AM-506/AM-606)

Table D.1: AM-206, AM-406, AM-506 and AM-606 Technical characteristics

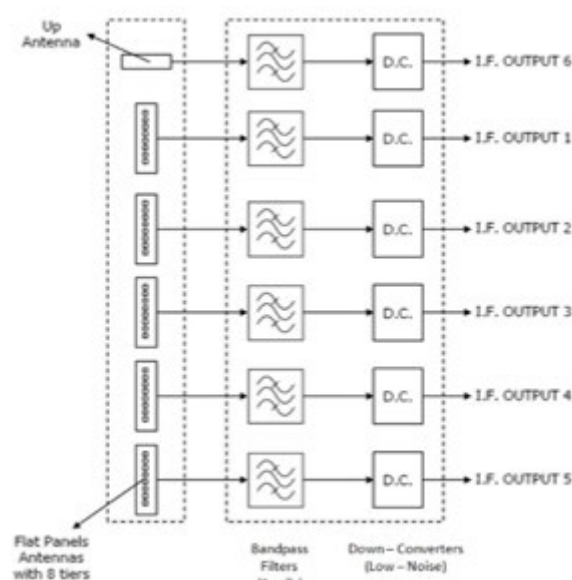


Figure D.1: AM-206, AM-406, AM-506 and AM-606 antenna schematic

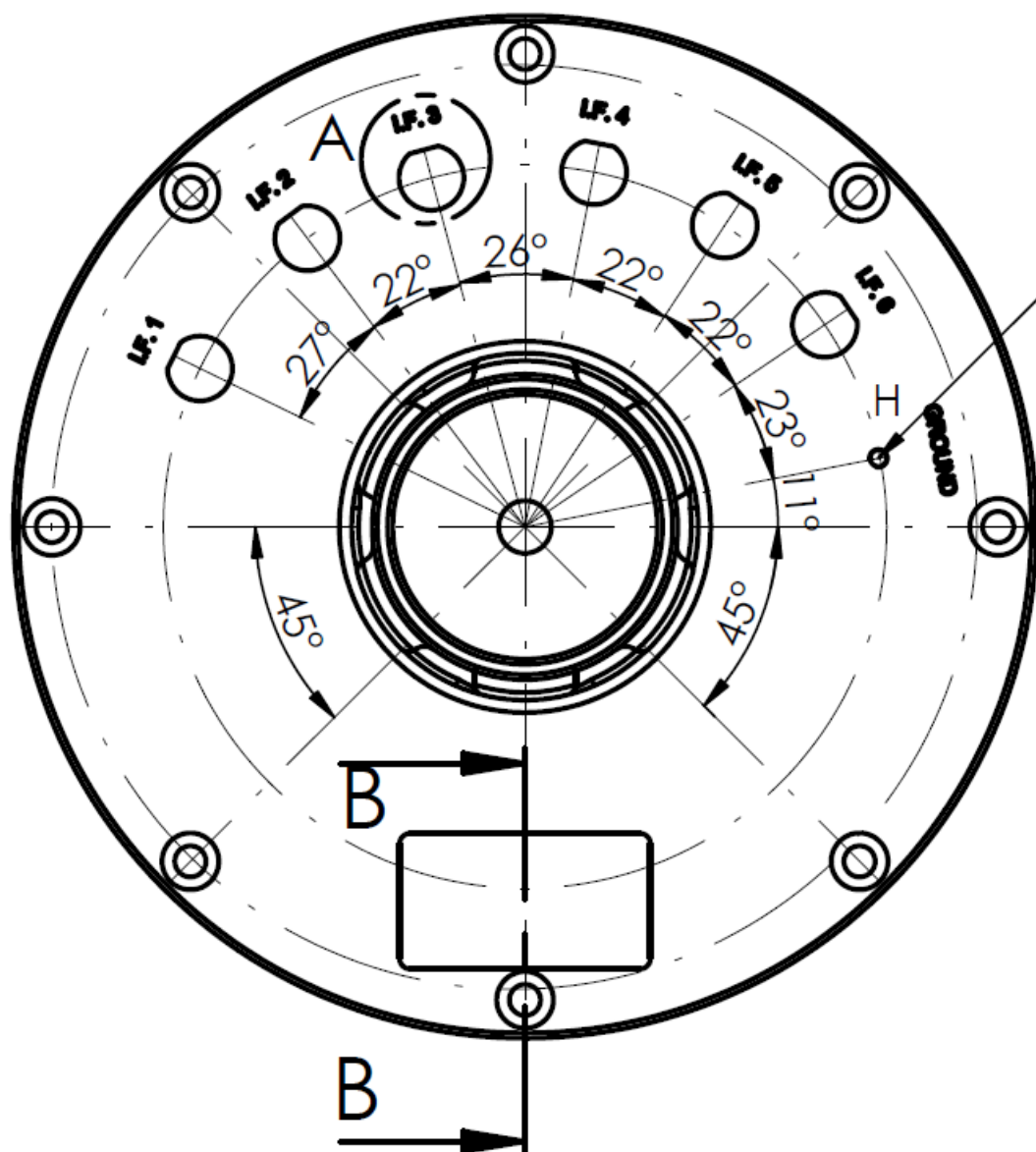


Figure D.2: AM-206, AM-406, AM-506 and AM-606 antenna plane

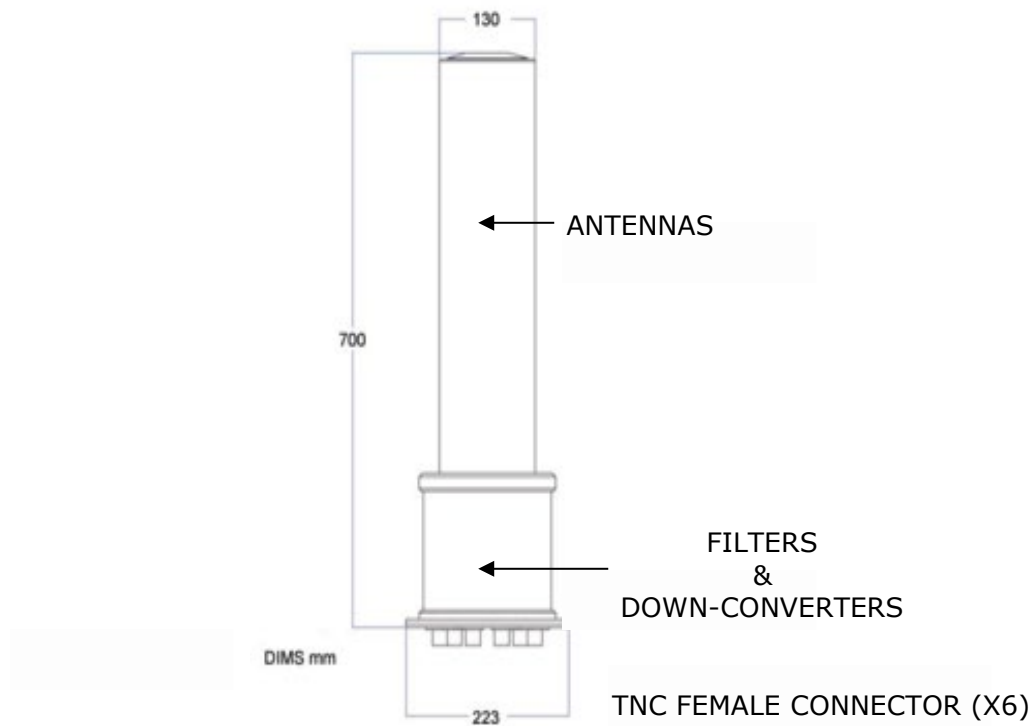


Figure D.3: AM-406 and AM-506 antenna

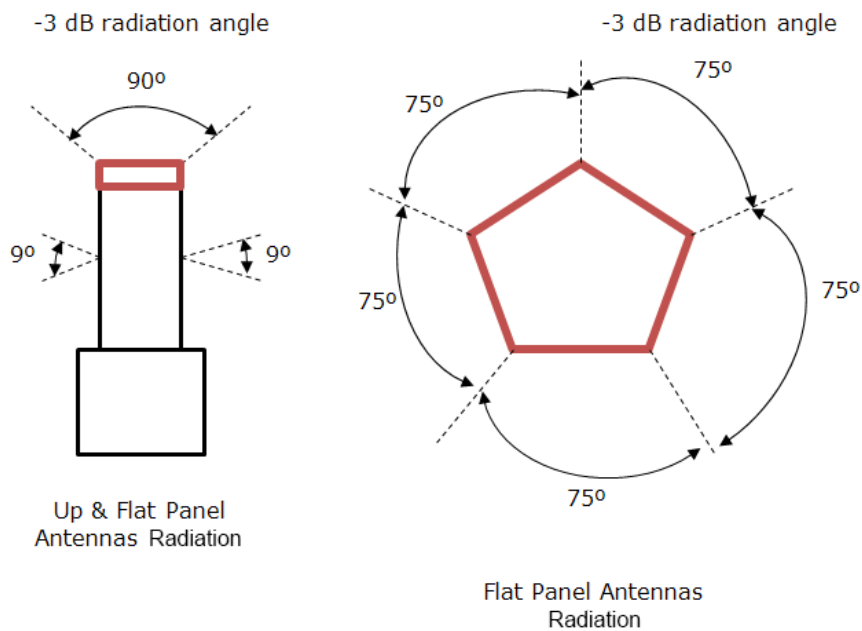


Figure D.4: AM-206, AM-406, AM-506 and AM-606 antenna radiation

D.2 AM-x04 Multisector Antenna

D.2.1 Introduction

The AM-x04 is a multisector antenna, which has been developed by SVP Broadcast Microwave. This is a very compact, robust and easy to install solution for applications where omnidirectional coverage with high gain is needed.

The AM-x04 antenna consists of 4 flat panel antennas to offer an omnidirectional coverage.

This antenna integrates the bandpass filters and the down-converters. At the N connector outputs, it offers the received signal filtered, amplified and converted to the UHF band.

The AM-x04 antenna has been designed to be used in the Receiver site in airborne links in diversity 4 mode and like point of reception of high gain in autonomous cameras of the mobile unit.



Figure D.5: AM-204 antenna

D.3.2 Technical Specifications

Item	Specifications
Frequency	AM-204: 2.0 - 2.1 GHz (P/N:AM-204-2021) 2.2 - 2.38 GHz (P/N:AM-204-2224) AM-404: 4.5 – 5.0 GHz (P/N: AM-404-4550) AM-604: 6.4 – 7.0 GHz (P/N: AM-604-6470)
Gain	4 Panel antennas: 12 dBi
Elevation B/W	18°
Azimuth B/W	110° (x4)
Diameter	221 mm (Bottom) 120 (Top)
Length	AM-204: 671 mm AM-404:455 mm AM-604: 400 mm
Weight (Without Bracket)	AM-204: approx. 7.5 Kg AM-404: approx. 5.5 Kg AM-604: approx. 5.5 Kg
Colour	White
Down-Converters	Included 4 units
Conversion Gain	30 dB
Noise Figure	< 1.5 dB
Local Oscillator	AM-204: 1,600 MHz AM-404: 4,100 MHz AM-606: 6,000 MHz
Phase Noise	-98 dBc/Hz @ 10 KHz
Power Supply	9 to 36 V by coaxial cable
Filter	6 poles Cavity
Filter Insertion Loss	< 0.5 dB
Connector	4 x TNC female
Mount	Not included

Table D.2: AM-X04 Technical characteristics

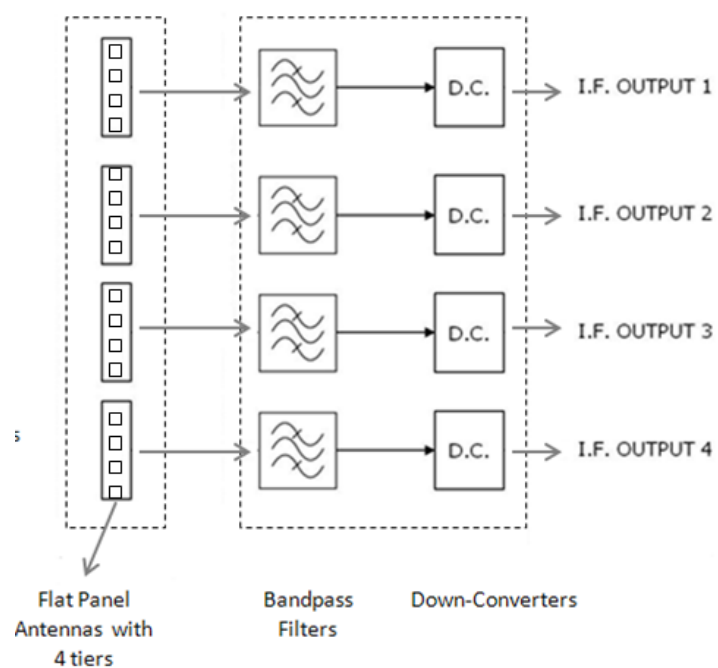


Figure D.6: AM-204, AM-404 and AM-604 antenna schematic

D.3 AMS-x06 Multisector Switch Antennas

D.3.1 Introduction

The AMS-x06 is a multisector antenna, which has been developed by SVP Broadcast Microwave. This is a very compact, robust and easy-to-install solution for applications where hemispherical coverage with high gain is needed.

The AMS-x06 antenna consists of 5 sector panel antennas to offer an omnidirectional coverage. And an up antenna which allows hemispherical coverage.

This antenna integrates the PIN diode switch. It has an N-female connector and control connector which is controlled by the *Receiver* with the Autotracking option based on GPS position. At the N connector output it offers the RF signal that has been selected.

The antenna has a Blue line which should be pointed to the geographic North.

This antenna has been designed to be used as Transmitter and as Receiver in a wide variety of applications, such as bidirectional datalinks or helicopter downlink systems.

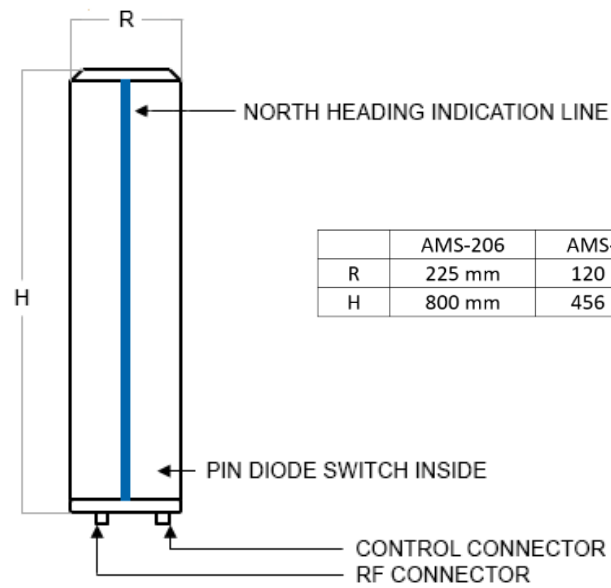


Figure D.7: AMS-206 and AMS-406 Antennas

D.3.2 Technical Specifications

Item	Specifications
Frequency	AMS-206: 2.0-2.38 GHz (P/N: AMS-206-2024) AMS-406: 4.5 - 5.1 GHz (P/N: AMS-406-4551) AMS-506: 5.0 - 5.4 GHz (P/N: AMS-506-5054) AMS-606: 6.28 - 6.9 GHz (P/N: AMS-606-6369)
Gain	5 Sector panel antennas: 16.5 dBi 1 Up-down antenna: 5 dBi
Elevation B/W	9°
Azimuth B/W	75° (x5)
Diameter	AMS-206: 225 mm AMS-406: 120 mm AMS-506: 120 mm AMS-606: 120 mm
Length	AMS-206: 800 mm AMS-406: 456 mm AMS-506: 456 mm AMS-606: 456 mm
Weight (Without Bracket)	AMS-206: approx. 7.2 Kg AMS-406: approx. 5.8 Kg AMS-506: approx. 5.6 Kg AMS-606: approx. 5.6 Kg
Polarization	5 Panel antennas: Vertical 1 Up-down antenna: RHCP
RF Connector	N female
Control connector	Bayonet 8 pin male ITT KPT: 02E12-8P

Table D.3: AMS-206, AMS-406, AMS-506 and AMS-606 Technical characteristics



	AMS-206	AMS-406	AMS-506	AMS-606
R	225 mm	120 mm	120 mm	120 mm
H	800 mm	456 mm	456 mm	456 mm

Figure D.8: AMS-206, AMS-406 and AMS-606 antennas



NORTH HEADING INDICATION LINE must be heading True North

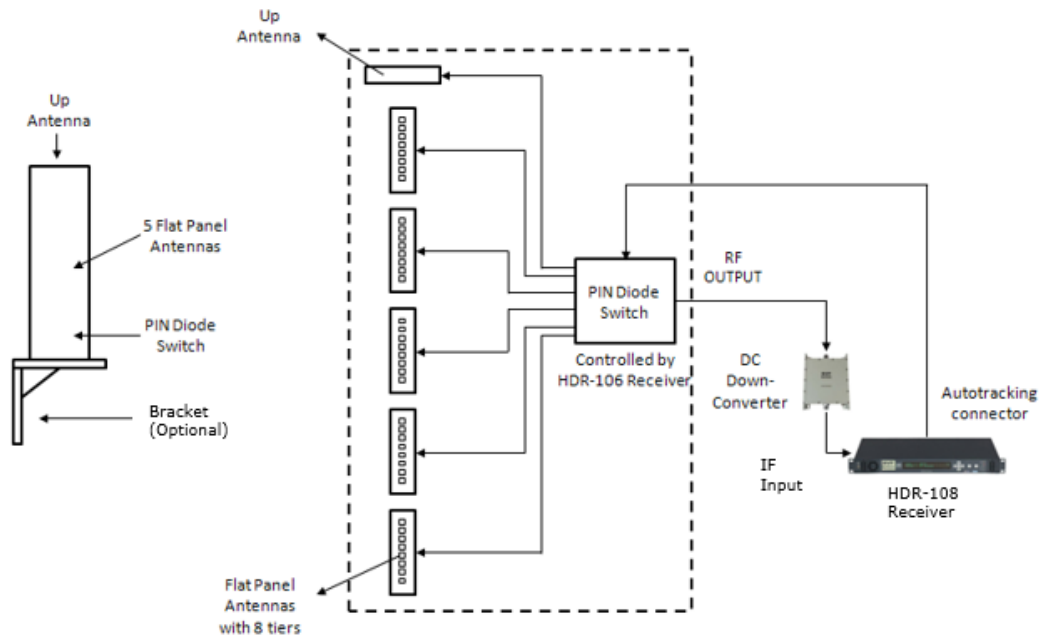


Figure D.9: AMS-206, AMS-406, AMS-506 and AMS-606 antennas schematic



The cable of the RF segment (between the antenna and the DC) must be shorter than 1 meter. On the IF segment (between the antenna and the DC), the length of the cable must be less than 100 meters.

• Receiver connections

This is the connector used for Autotracking located on the rear panel of the Receiver.

Item	Features
Connector Label on <i>Receiver</i>	AUTOTRACKING AND SENSORS
Connector type	Bayonet 19 pin female
Part number	ITT Canon: JMS3116F14-19P

Table D.5 Autotracking connector

These are the pins used for the control of the AMS multisector switch antenna on the Receiver side.

Connector pinout on the Receiver side

Pin	Description
D	Sector 1
E	Sector 2
F	Sector 3
G	Sector 4
H	Sector 5
J	Uplook
S	GND

Table D.6: Autotracking connector pinout on the *Receiver* side (for an AMS multisector switch antenna)

• Antenna connections

This is the connector used to control the antenna (for an AMS multisectorial switch antennas).

Item	Features
Connector type	Bayonet 8 pin male
Part number	ITT KPT: 02E12-8P

Table D.7: Autotracking connector on the AMS antenna

These are the pins used for the control of the AMS multisector switch antenna on the antenna side.

Connector pinout on the antenna side

Pin	Description
A	Sector 1
B	Sector 2
C	Sector 3
D	Sector 4
E	Sector 5
F	Uplink
G	GND

Table D.8: Autotracking connector pinout on the antenna side (for an AMS multisector switch antenna)

For a correct orientation, the sector 1 must be heading north, the middle of that sector is indicated with a blue line. Then, the rest of the sectors are rotating in a clockwise direction from sector 2 to sector 5 and finishing with the uplook on the top.

The minimum recommended cable diameter for each signal is AWG26 or greater. Ground can be AWG20 or greater.

The maximum allowed cable length for correct operation is 200 metres.



Cable must be designed for outdoor environment.

It is advised to use shielded cables, with 6 conductors for the sectors and shield connected to ground.

Annex E: Video over IP Monitoring on a PC

E.1 Introduction

This section provides information about how to display the IP video of the *Receiver* on the computer's or laptop's screen and how to record a video and display it on the PC. In this way, the user can analyse the desired video on the screen which could be more convenient and comfortable for testing. For this purpose, the VLC media player program is used. It can be used as a player and as a recorder.

E.2 VLC media player

VLC is a multimedia player that is capable of sending video data to a network connection, accepting video data from a network connection, and displaying the video. It can be used as a player and as a recorder.

There are several steps that must be carried out in order to have a successful process. Firstly, they are explained for the use of VLC as a player and secondly, for the use of VLC as a recorder.

It is important to verify that the IP address that has been set in the *Receiver* is the same as the IP of the PC. Moreover, the type of input that has to be set in the device is DVB-T2 and the PC and the Receiver have to be connected via an Ethernet cable.

E.2.1 VLC as a player

Step 1

Download the VLC, version 2.2.4 from <http://www.videolan.org>, then, install it on the host computer.



Figure E.1: VLC Media Player

Step 2

Once the VLC has been downloaded, the *Receiver* must be configured as it is shown below:

- **Select the ASI input:**



Figure E.2: Type of input selection

- **Go to the IP Output option of the main menu to configure the destination IP and port and the desired protocol.**



Figure E.3: Configuration of the Dest IP & Port

In this case, the selected IP belongs to the unicast IP range.

Press the OK button again to configure these parameters. The destination IP must be the IP of the computer where you want to display the video and the port is the number of the port that you choose for it (eligible parameter).

Then, go to Protocol option and select the desired type of protocol. It can be RTP or UDP.



Figure E.4: Configuration of the type of protocol

- **Once these parameters have been configured, it is necessary to verify the connection between the *Receiver* and the computer.**

An Ethernet cable must be used to connect the Receiver with the computer. The output of the Receiver that has to be used for this purpose is the Video over IP output, so the Ethernet cable must be connected to it.



It is very important to verify that the selected destination IP address is different from the IP address of the Webserver and the Local IP address. They cannot be the same.

Step 3

Once the configuration of the parameters has been done, start the VLC Media Player on the PC. This picture will appear on the screen.

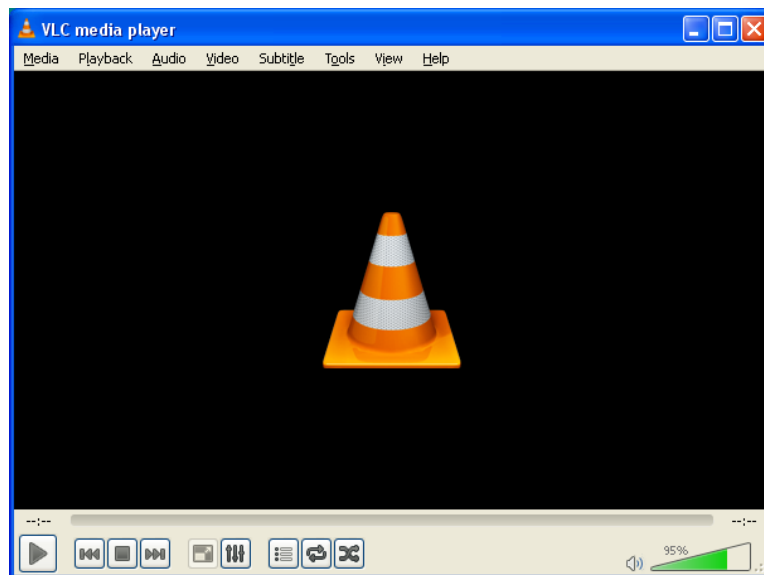


Figure E.5: VLC Media Player main screen

Step 4

From the VLC media player window, go to Media -> Open Network Stream.

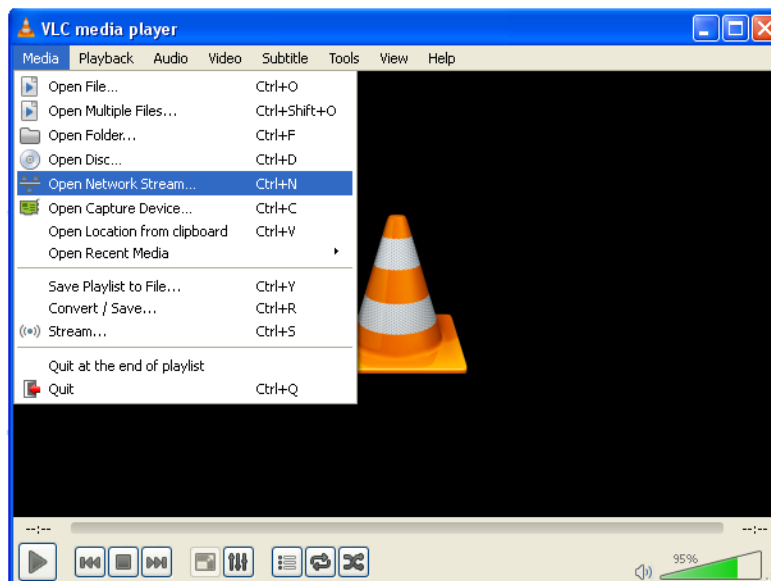


Figure E.6: Open Network Stream

Step 5

Then, go to Network section and enter the network URL as it is shown in the figure below.

The network URL has different parts:

Protocol → **udp**://@:**5678** ← Port

- **Protocol:** The type of protocol selected for the communication. It can be RTP or UDP.
- **Port:** Number of port of the device. (Port set on the *Receiver*)

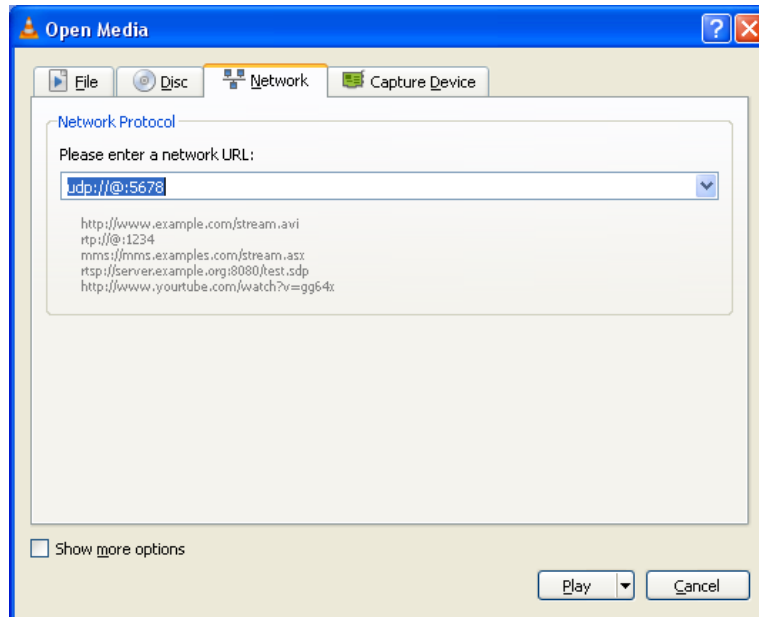


Figure E.7: Network URL

Step 6

Finally, press Play and the desired IP video will appear on the screen.

In the figure below, a connection diagram is shown. The aim of this diagram is to explain to users how to connect the *Receiver* and configure its parameters if you want to use the VLC media player and the Webserver at the same time. The meaning of the parameters is:

- **Local IP:** IP address of the device for the Video over IP connection.
- **Webserver IP:** IP address of the device for the Webserver connection.
- **Destination IP:** IP address of the device to which data is sent.
- **Destination Port:** Port Number of the device to which data is sent.
- **Protocol:** Type of protocol selected for the communication.



The Transmitter must be configured in Standard delay and 4.2.0 profile.



Encryption is not supported by the VLC

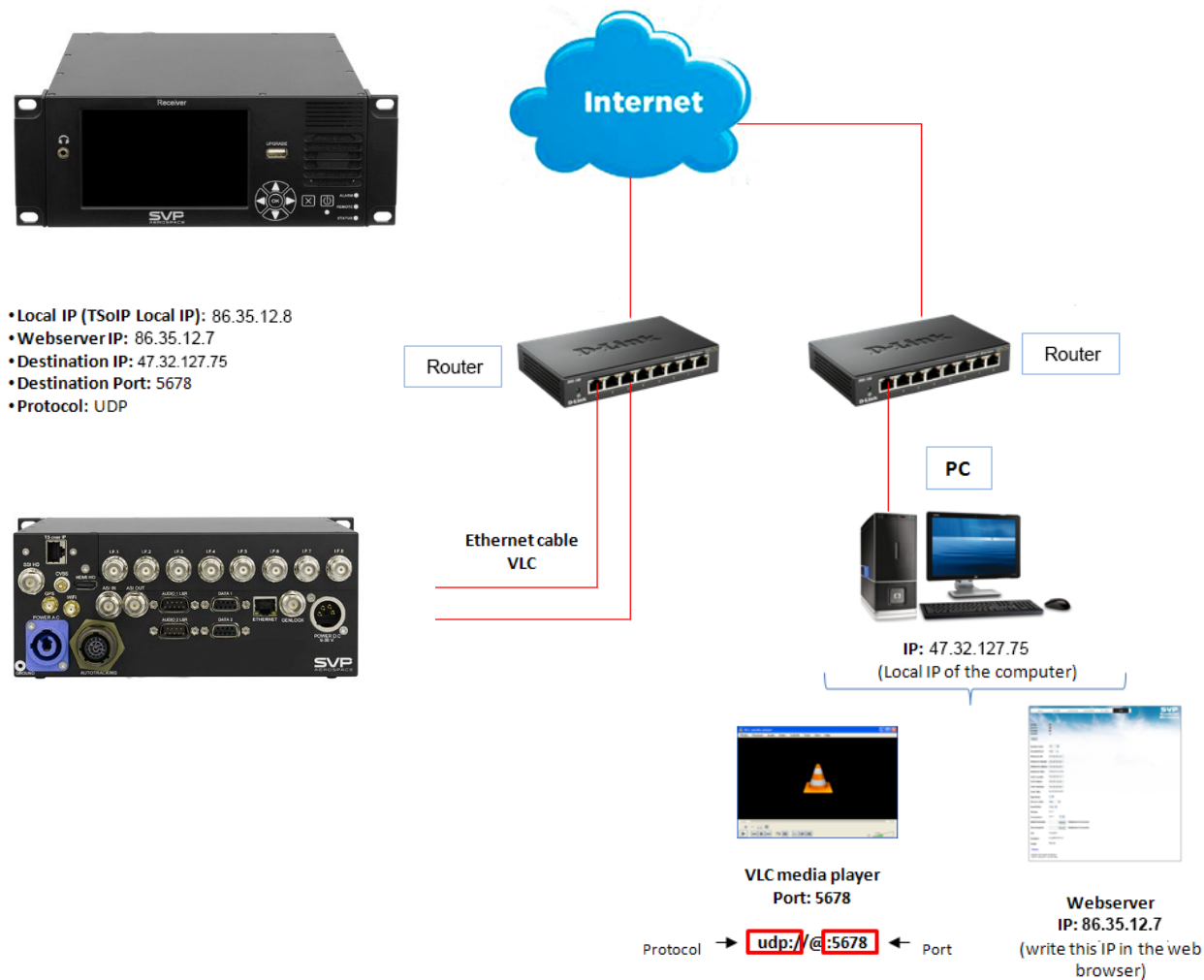


Figure E.8: Connection diagram example



Note that with private networks, the routers must be configured with port forwarding to be able to receive traffic from the Internet. Refer to the manual of the router or the administration in charge of the organization gateways.

E.2.2 VLC as a recorder

There are several steps that have to be carried out in order to record a TS video using VLC media player.

Step 1

Start VLC Media Player on the PC. This picture will appear on the screen.

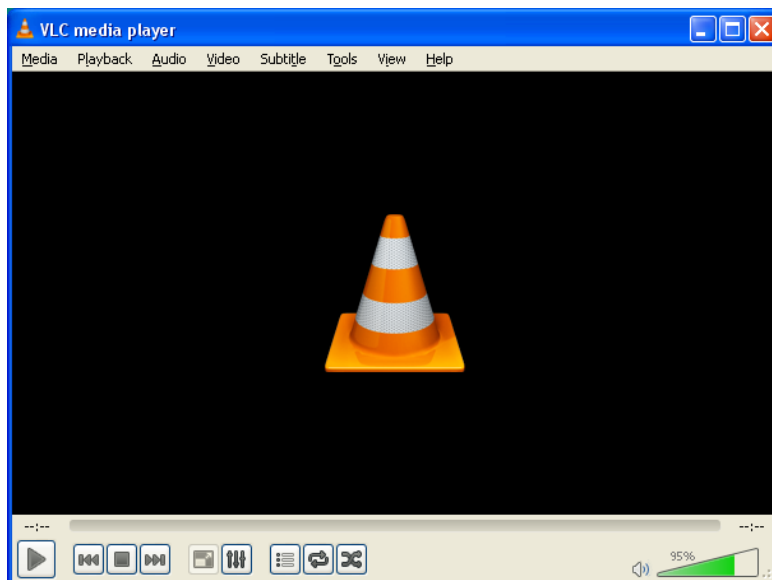


Figure E.9: VLC Media Player main screen

Step 2

From the VLC media player window, go to View -> Advanced Controls.

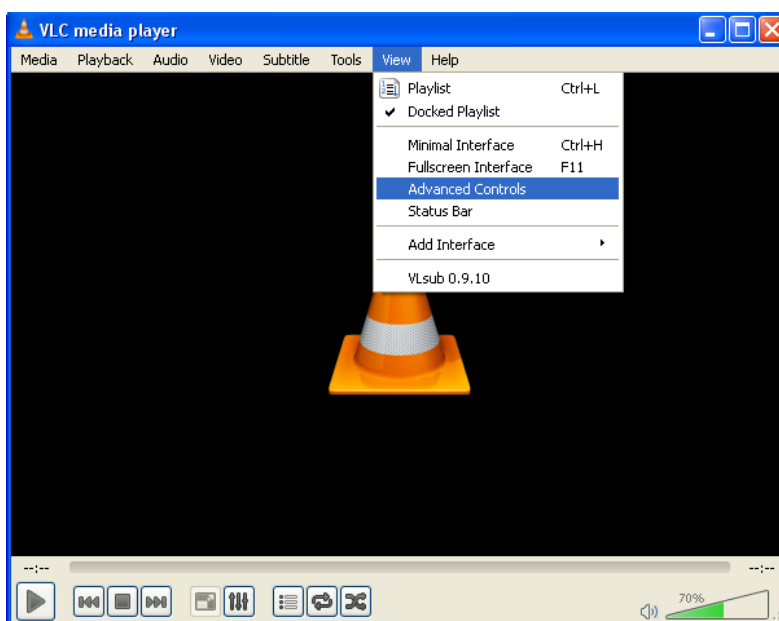


Figure E.10: VLC Media Player Advanced Controls

The buttons in red will be added to the main screen:

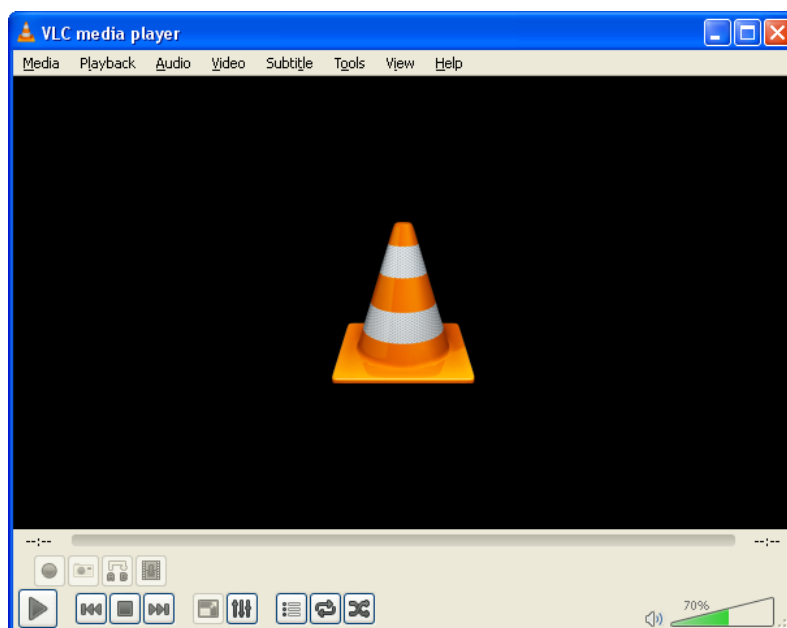


Figure E.11: VLC Media Player Advanced Controls buttons

Step 3

Press play button to play the desired video and select a file from your computer pressing Add button.

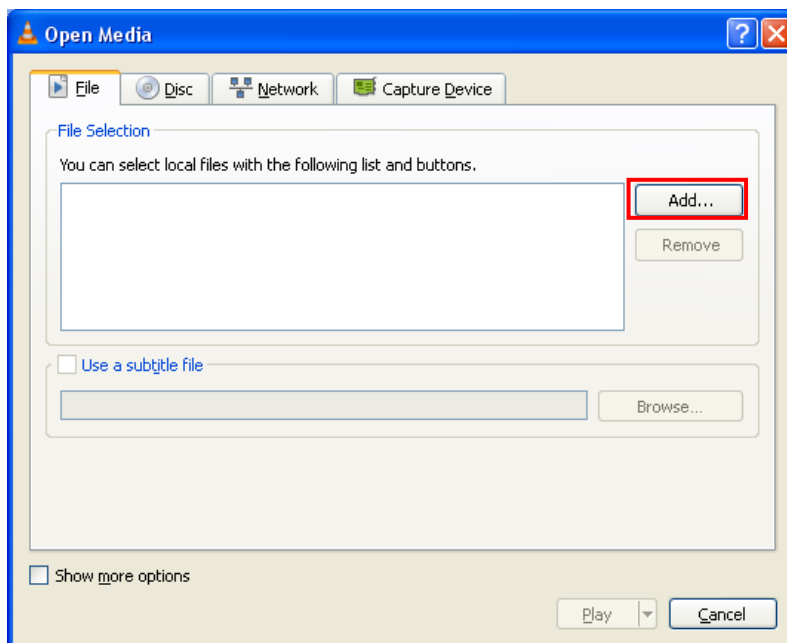


Figure E.12: Open Media

Step 4

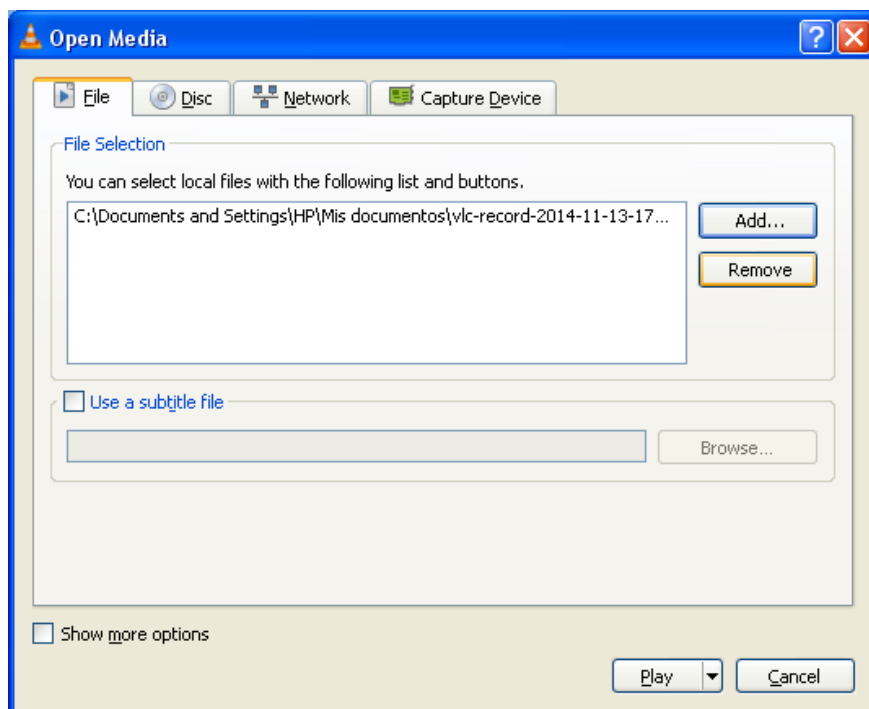


Figure E.13: Open Media

Once a file has been selected, press Play option and the video will be displayed in the VLC media player.

Step 5

Press Record button to start recording and then press Record button again to stop it. A .ts file will be saved automatically in the user's file "Documents" with "VLC record" name, the date and the hour.

 vlc-record-2014-11-13-17h48m44s-udp____5678-.ts

Annex F: GPS-02 Receiver

F.1 Description

Our satellite Receiver is a compact and easy solution to know the position where our Receiver is located. It's very useful if you combine it with an antenna positioner in mobile applications and to calculate the distance between the TX and RX units.

It has a direct connection to the *Receiver* which uses this GPS information to track the Transmitter automatically.

The *Receiver* is responsible for the power supply of the GPS. Also, it's the *Receiver* in charge of receiving the data information from the GPS. The connection is via a serial DB-9 connector. This allows a direct connection to the PC and display the position using software like Google Earth or similar.

The speed of the output data in the *Receiver* is configurable . When the Local GPS Receiver is connected, the *Receiver* automatically detects the GPS position if the GPS-02 receives a signal from enough satellites. Until we receive a GPS signal from more than 6 satellites, the position will be taken from the manual position.



Figure F.1: GPS antenna

F.2 Technical Specifications

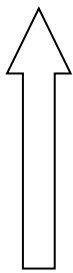
Item	Feature
Power Supply	+5V (provided by the Receiver) limited at 100 mA
Dimension	L: 59mm, W: 62mm, H: 15mm
Receiving frequency	1,575.42 MHz
Mounting	Magnetic base
Sensibility	-158 dBm
Start-up time	41 sec. Typical (cold start)
Baud rate	4,800 bps
Signal Interface	RS-232
Position accuracy	3.3 m
Connector	DB-9 Male
Weight without cable	70 gr
Enclosure	Highly impact; corrosion-proof
Construction	Ultrasonic welded, fully waterproof
Built in antenna	Highly-reliable ceramic path
SBAS	1 channel (Waas, Egnos, Msas)
Update rate	1 Hz
Protocol	NMEA V3.01
Power consumption	50-90 mA
Cable diameter	3.5 millimetres
Cable length	5 metres
Weight	200 g

Table F.1 GPS Receiver technical features

Antenna Tx



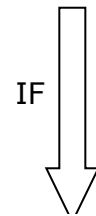
Parabolic
Antenna with
positioner



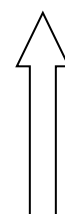
HDT-04



GPS-01
TX Antenna



HDR-108
Receiver

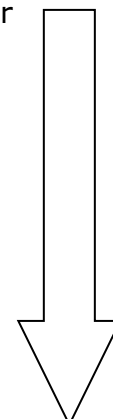


Position
Control



GPS-02
RX Antenna

RS-232



PC with
Google Maps via
serial port

Figure F.2 Link with GPS scheme

Glossary

AES/EBU	Audio Engineering Society/European Broadcasting Union
AES-128/ AES-256	Advanced Encryption Standard of 128 or 256 bits key
AM	Multisectorial Antenna
APSK	Amplitude and phase-shift keying or asymmetric phase-shift keying
ASI	Asynchronous Serial Interface
BNC	Bayonet Neill-Concelman
BR	BitRate
CA-BISS	Conditional Access-BISS
COFDM	Coded Orthogonal Frequency Division Multiplexing
DC	Direct current or Down Converter
DVB-T	Digital Video Broadcasting – Terrestrial
DVB-T2	Digital Video Broadcasting – Terrestrial Second Generation
ETSI	European Telecommunications Standards Institute
FEC	Forward Error Correction
FFT	Fast Fourier transform
GPS	Global Positioning System
HD	High Definition
HDMI	High-Definition Multimedia Interface
HDR	High Definition Receiver
HDT	High Definition Transmitter
IF	Intermediate Frequency
IG	Interval Guard
IP	Internet Protocol

IP3	3 rd order Intermodulation Product
ISDB-T	Integrated Services Digital Broadcasting
LCD	Liquid Crystal Display
LD	Low Delay
LED	Light-Emitting Diode
LNA	Low Noise Amplifier
MPEG	Moving Picture Experts Group
NLOS	Non-Line of Sight
PAL	Phase Alternating Line
PLL	Phase Locked Loop
PID	Packet Identification
QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase-Shift Keying
RF	Radio Frequency
RTC	Remote Control
SD	Standard Delay
SDI	Serial Digital Interface
TFT	Thin-Film Transistor
TS	Transport Stream
UDP	User Datagram Protocol
UHF	Ultra-High Frequency
USB	Universal Serial Bus
VSWR	Voltage Standing Wave Ratio

Certificate of Conformance

Certificate No.: S 2012011
Description: HDR-108 H.264 Diversity Receiver
Model: HDR-108

This declaration of conformity is issued under the exclusive responsibility of the manufacturer.
The equipment has been designed and tested to meet the following standards applicable to the 2014/53/UE directive:

EN 62368-1	Audio/video, information and communication technology equipment (Safety requirements)
EN 50566	Product standard to demonstrate the compliance of wireless communication devices with the basic restrictions and exposure limit values related to human exposure to electromagnetic fields in the frequency range from 30 MHz to 6 GHz.
EN 62368-1:2024	Audio/video, information and communication technology equipment (Safety requirements).
EN 62479:2010	Assessment of the compliance of low-power electronic equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)
UNE-EN 303340	Digital Terrestrial TV Broadcast Receivers; Harmonic emissions; Access to radio spectrum
EN 50663: 2017	Generic standard for assessment of low power electronic and electrical equipment related to human exposure restrictions for electromagnetic fields
EN 301 489-1:2020	Electromagnetic Compatibility (EMC) standard for radio equipment and services; clause 8.2: Radiated emission clause 8.3&8.4: Conducted emission clause 8.5: Harmonic current emissions clause 8.6: Voltage fluctuations and flicker clause 8.7: Conducted emission

RoHS Directive 2011/65/EU Restriction of the use of certain hazardous substances

Manufacturer / Fabricante
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Certified by / Certificado por

Juan Antonio Burgos

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11:47:38 +02'00'

Durango, August 13th, 2025

Certificate of Conformance Declaración de Conformidad

Name of Manufacturer/*Nombre del fabricante*: SVP Broadcast Microwave S.L.

Address/*Dirección*: Zubiaurre 7, Iurreta 48215 Vizcaya SPAIN

We declare under our responsibility the conformance of the product:

Declaramos bajo nuestra exclusiva responsabilidad la conformidad del producto:

Product name/*nombre del producto*: Down Converter

Brand/*Marca*: SVP Broadcast Microwave

Model/*Modelo*: DC

Made in /*País de Fabricación*: Spain/ España

Version/*Versión*: V9



The product referred in this declaration, conforms to the norms and regulations of the documents detailed below:

Al que se refiere esta declaración, con las normas u otros documentos normativos detallados a continuación:

Safety / *Seguridad*

EN 60950

Safety and Information Technology Equipment

Electromagnetic Compatibility / *Compatibilidad Electromagnética*

EN 301 489 Part 1

Common technical requirements

EN 301 489 Part 28

Specific conditions for wireless digital video links

RF:

EN 302 064

Wireless Video Links operating in the 1,3 GHz to 50 GHz frequency band

In accordance to the indications of Directive 2014/53/UE, of the European Parliament and council of April, 16th 2014.

De acuerdo con las disposiciones de la Directiva 2014/53/UE del Parlamento Europeo y del Consejo de 16 de abril de 2014.

Certified by / *Certificado por*

Date / *Fecha*

Juan Antonio Burgos

Technical Manager

17/05/2017

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Notes

*** Compatibility with other manufacturer's codecs is not guaranteed.**

Final note

SVP Broadcast Microwave S.L. is constantly striving to improve all of its products.

Therefore, we ask you to understand that modifications may occur in designs, equipment and technology. Consequently, no responsibility can be derived from the information, illustrations or descriptions contained in this manual.

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