UDR-70 Portable Receiver
User Manual

V1.1

Accessories included in this manual:

QPT Pan & Tilt Positioner

SCDA

HAP-60

Cellular Datalink Antenna

Contents

Chapter 1: Introduction

This first chapter provides a general description of the Ultra High Definition UDR-70 receiver equipment.

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

This fourth part provides the user with all the necessary information to control and operate the equipment properly. It is detailed the function of each button on the keyboard. It is also explained how the information is shown on the display, receiver 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 UDR-70 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 controlling the UDR-70 receiver through a website.

Chapter 8: Equipment Installation

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

Chapter 9: Down Converter

This section provides the user all the necessary information to understand the general operation characteristics of the down-converter.

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: QPT User's Guide
Annex B: SCDA User's Guide
Annex C: HAP-60 User's Guide
Annex D: Modulation standards
Annex E: Cellular Datalink 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 in 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 UDR-70 receiver easily for the most common use cases.

This document is intended to help first time users:

- To find their way around the GUI.
- To understand the different possibilities of the UDR-70 receiver.
- To configure the UDR-70 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 the places where this symbol appears it means that by pressing the Down button of the equipment 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

1. The UDR-70 H.265 Portable receiver is fully compatible with the DVB-T standard included in European Standard ETSI EN300744, with DVB-T2 standard included in ETSI EN300755, with DVB-T standard included in European Standard ETSI EN300744, with DVB-S2 standard included in EN302307 and with DVB-S standard included in ETSI EN 300421. It also complies with the ISDB-T International technical standard (optional).
2. The control unit has a 70 MHz input connection available through which it is possible to receive the signal from the RF head via a triax cable or optical fiber in DVB-T2, DVB-T, DVB-S2 or DVB-S mode.
3. This device has the ASI and IP outputs available when the input is ASI. Besides, it has also the ASI output available when the input is IP.
4. The UDR-70 receiver can receive DVB-T2/T signals from the down converter that is connected to it.
5. The complete receiver system consists of two parts: firstly, there is a ODU unit, which is installed outdoors next to the receiver antenna, and secondly, the UDR-70 receiver which demodulates the 70MHz delivered by the down converter.
6. On the receiver site it is important to determine if the channel in which the transmission will be done is interfered, if any other transmission is being done in that channel.
7. The receiver must be well chilled. Some space must be left next to the sides of the UDR-70 receiver for ventilation purposes. This is especially important when it is installed in a rack case.
8. Special care should be taken with SDI cables. Quality and length are very important especially with 12G-SDI or 3G-SDI signals.
9. 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 deficient operation of the equipment.
10. 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. 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.

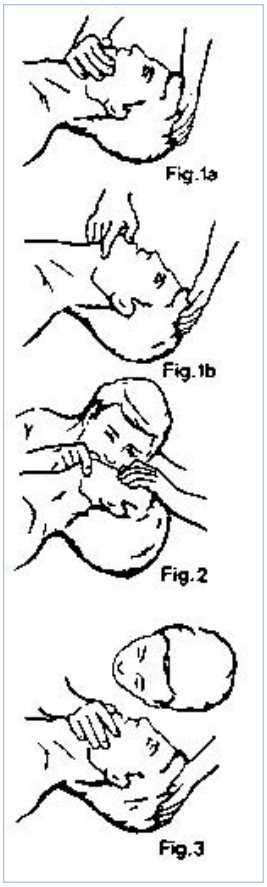
2. Kneel on one side of the victim, level with his head. LIFT THE JAW AND TILT THE HEAD BACK AS FAR AS POSSIBLE (Figs. 1a and 1b)

3. One of the following may happen:
   a) Breathing may begin and consciousness returns.
   b) Breathing may begin but consciousness NOT returns. Turn the victim on his side and ensure that the airway is kept clear.
   c) Breathing may return but be NOISY which means that the airway is not fully clear. Try to clear the airway.

4. IF THERE NO SIGN OF BREATHING:
   a) Check that the head is still tilted back.
   b) Take a deep breath.
   c) Pinch the victim's nose and blow firmly into his mouth (Fig. 2). As you do, the chest will RISE.
   d) Turn your head away and take another breath, watching for the chest to FALL (Fig. 3).

5. 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.

6. 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.



7. 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.
8. 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.

9. 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:

a) DO NOT ATTEMP TO REMOVE CLOTHING ADHERING TO THE BURN.

b) If possible, alleviate the pain from the burnt part by immersing in cold water.

c) If help as available or as soon as resuscitation is no longer required, the wound should be covered with a DRY clean dressing.

d) Oil or grease in any form should not be applied.

e) If severely burnt, get the victim to hospital immediately.

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Chapter 1: Introduction

The new UDR-70 is a digital UHD portable receiver designed by SVP Broadcast Microwave to perform DVB-T, DVB-T2 DVB-S2 (optional) and DVB-S (optional). The latest enables compatibility with neatly all types of COFDM transmitters. The former modulation outperforms DVB-T modulation and offers much higher data rate, and therefore, higher quality signal or much more robust signal than DVB-T, making possible longer and more difficult links. The DVB-S2 modulation outperforms DVB-S modulation due to DVB-S2 has four modulation modes available (QPSK, 8PSK, 16APSK and 32APSK) while the DVB-S only has one modulation available (QPSK). Besides, DVB-S2 uses LDPC code while DVB-S employs Viterbi code.

The UDR-70 is a 'two-box' system with 70 MHz intermediate frequency. It consists of a control unit and a RF head connected with triax cable or fiber optic. The distance between the control unit and the RF heads can be up to 600 m with triax.

It is an H.265, H.264 and MPEG-2 12G/3G/HD/SD professional broadcast quality decoder. Also, it works in 4:2:2 with 10 bits. Ultra low latency (end to end) of less than one frame is achieved as long as it is used together with SVP transmitters.

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.

Chapter 2: Technical features

RF Stage (ODU):

Frequency band:	2 GHz, 4 GHz, 6 GHz, 7 GHz, 10 GHz and 13 GHz
Frequency Stability:	±2.5 ppm
Tuning Step:	10 KHz
Input Level Range:	DVB-T2 @ 2 GHz: -20 to -102 dBm (4 Mbit/s) DVB-T2 @ 5 GHz: -20 to -101 dBm (4 Mbit/s)
Noise Figure:	2.5 dB
IF Frequency:	70 MHz over triax 70 MHz over fiber-Optic (Optional)

IF Stage DVB-T2, DVB-T, DVB-S2 and DVB-S (IDU):

Frequency:	70 MHz over triax 70 MHz over fiber-Optic (Optional)

Demodulation:

DVB-T2	COFDM 1K, 2K, 4K 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 1/128 Bandwidth: 1.7, 5, 6, 7, 8 MHz Max. bit rate: 46.4 Mbps Min. bit rate: 1 Mbps
DVB-T	COFDM 2K mode 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. bit rate: 31.67 Mbps
DVB-S2/S (optional):	DVB-S: QPSK DVB-S2: QPSK, 8PSK, 16 APSK, 32 APSK LDPC FEC (DVB-S2): 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 FEC (DVB-S): 1/2, 2/3, 3/4, 5/6, 7/8 Max. Symbol Rate 25 Msymb/s Max. Bandwidth: 30 MHz Max. Bitrate: 90.5 Mbps

Decoder:

Modes:	HEVC, H.264 and Mpeg-2
Latency Encoder + Decoder:	UHD 59p = 66ms UHD 50p = 75ms FHD 59p = 55ms FHD 50p = 70ms FHD 59i = 83ms FHD 50i = 98ms
Audio decoder:	MPEG-1 Layer 1, MPEG-1 Layer2 and AAC-LC

Video:

Outputs:	1 x 12G-SDI 4 x 3G-SDI, HD-SDI and SD-SDI 1 x SFP 12G Optical interface
Formats:	**2160p** 23.98/24/25/29.97/30/50/59.94/60 Hz **1080p** 23.98/24/25/29.97/30/50/59.94/60 Hz **1080i** 50/59.94/60 Hz **720p** 23.98/24/25/29.97/30/50/59.94/60 Hz **576i** 50 Hz **480i** 59.94 Hz
Profile:	4.2.2/4.2.0, 8/10-bit
Genlock:	Tri Level Composite

Audio:

Channel Quantity:	SDI Embedded 16 channels (8 pairs) Analogue 2 pair Line level
Output:	SDI Embedded Analogue

Data Channels:

Data channel:	User data/GPS
Data rate:	1,200 to 57,600 bps

ASI and IP:

Outputs and Inputs:	ASI Transport Stream Transport Stream over IP (Optional)

Decryption:

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

Control and Monitorization of the device:

Control Interfaces:	Front panel & display Web Browser interface
Monitoring:	Decoder parameters Demodulation parameters Frequency and input level MER, BER, C/N Alarms, warnings, logbook and clock
Video:	TFT Video screen 5”

Antenna Control (Optional):

Parabolic:	Autotracking with positioner in 2 axis Remote polarization control
Multisector:	Autotracking with panel switching

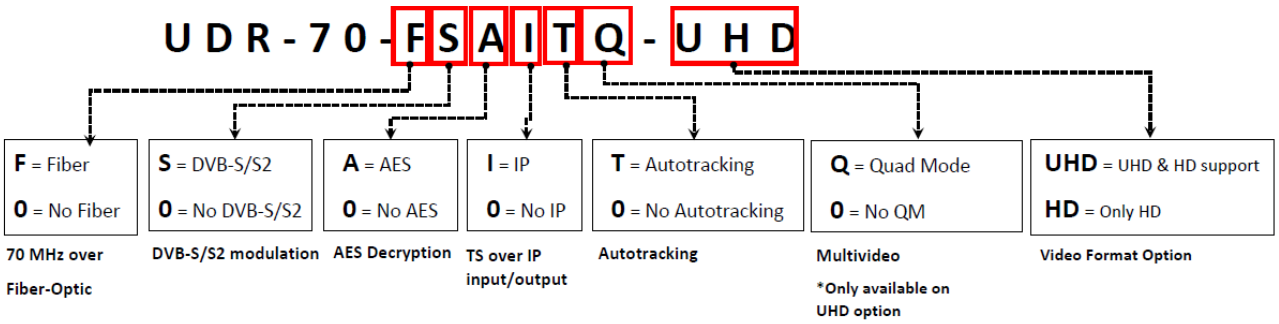
Power Supply:

AC input:	90 to 240 V
DC input:	9 to 36 V

Mechanical:

Control unit:	2 RU Half rack size Weight: 3.2 Kg
RF head:	2 RU Half rack size Weight: 3.2 Kg
Max. distance control unit- RF head	400 m (triax cable 11 mm) 2000 m with Fiber-Optic
Control unit-IF head connection	Triax Lemo 3 SMPTE Fiber-Optic Lemo (Optional)

Chapter 3: How to Order



Chapter 4: Receiver Operation and Menus

This section contains all the necessary information to operate, control and configure the UDR-70 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 of the received signal (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 on the selected input.

Next there are shown the linkages between the input and the character displayed in the principal screen:

Audio	A	
Data	DATA	D
	GPS	G

Table 1: Linkages between the input and the character displayed

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

4.1.1 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 in the main screen.

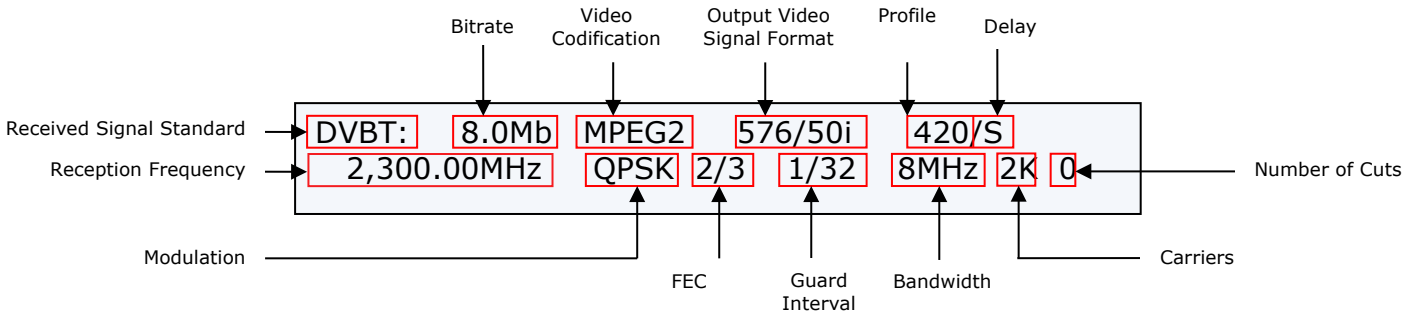


Figure 1: 1st Main screen DVB-T

Parameter nº	Function
1	Received standard (DVB-T)
2	Received bitrate (Mbps)
3	Video Codification (H.265 / MPEG-2)
4	Video Format (1080p, 1080i, 720p, 576i, 480i)
5	Video options: ▪ Profile (4:2:0 or 4:2:2) ▪ Delay (Standard (S), Low delay (L) or Super Low delay (SL))

6	Reception frequency (MHz)
7	Modulation (QPSK, 16QAM, 64QAM)
8	FEC (1/2, 2/3, 3/4, 5/6, 7/8)
9	Guard Interval (1/4, 1/8, 1/16, 1/32)
10	Bandwidth (5, 6, 7, 8 MHz)
11	Carriers (2K and 8K)
12	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 2:Main screen for DVB-T standard

4.1.2 1st Main Screen for the DVB-T2

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

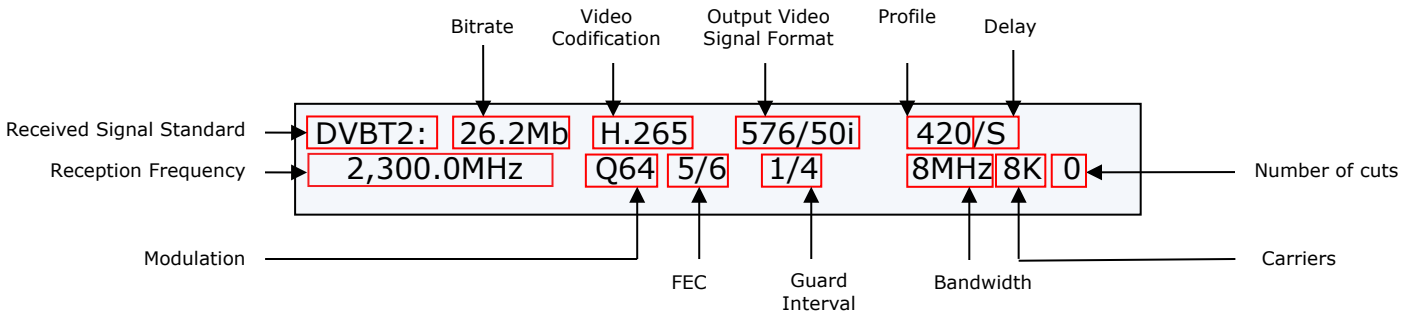


Figure 2: 1st Main screen DVB-T2

Parameter nº	Function
1	Received standard (DVB-T2)
2	Received bitrate (Mbps)
3	Video Codification (H.265 / MPEG-2)
4	Video Format (1080p, 1080i, 720p, 576i, 480i)
5	Video options ▪ Profile (4:2:0 or 4:2:2) ▪ Delay (Standard (S), Low delay (L) or Super Low delay (SL))
6	Reception frequency (MHz)
7	Modulation (QPSK, 16QAM, 64QAM, 256QAM)
8	LDPC FEC (1/2, 3/5, 2/3, 3/4, 4/5, 5/6)
9	Guard Interval (1/4, 19/128, 1/8, 19/256, 1/16, 1/32)
10	Bandwidth (1.7, 5, 6, 7, 8 MHz)
11	Carriers (1K, 2K, 4K, 8K, 8K_ext)
12	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 3: 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 BISS encrypted, then a padlock will appear in this field.

4.1.3 1st Main Screen for the DVB-S/S2 (optional)

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

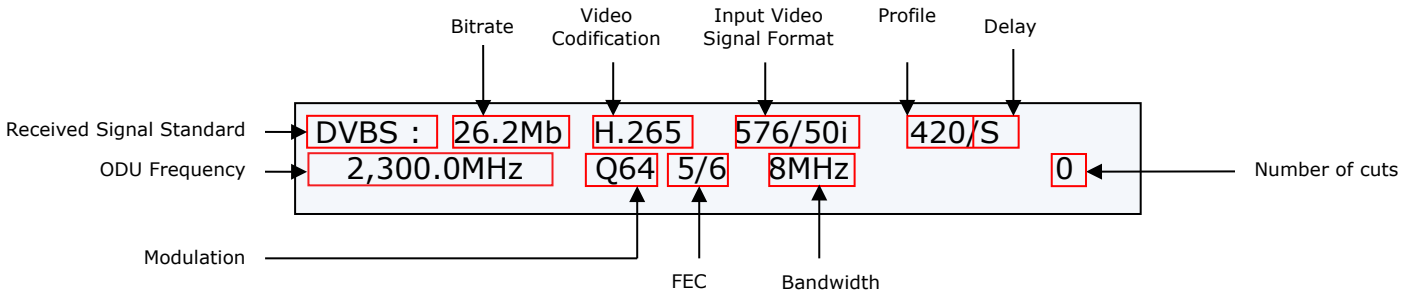


Figure 3: 1st Main screen DVB-S/S2

Parameter nº	Function
1	Received standard (DVB-S or DVB-S2)
2	Received bitrate (Mbps)
3	Video Codification (H.265 / MPEG-2)
4	Video Format (1080p, 1080i, 720p, 576i, 480i)

5	Video options ▪ Profile (4:2:0 or 4:2:2) ▪ Delay (Standard (S), Low delay (L) or Super Low delay (SL))
6	ODU frequency (MHz)
7	Modulation (QPSK, 8PSK, 16APSK, 32APSK)
8	FEC (1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10)
9	Bandwidth (1.7, 6, 7, 8 MHz)
10	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: 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 BISS encrypted, then a padlock will appear in this field.

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 in 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 …).

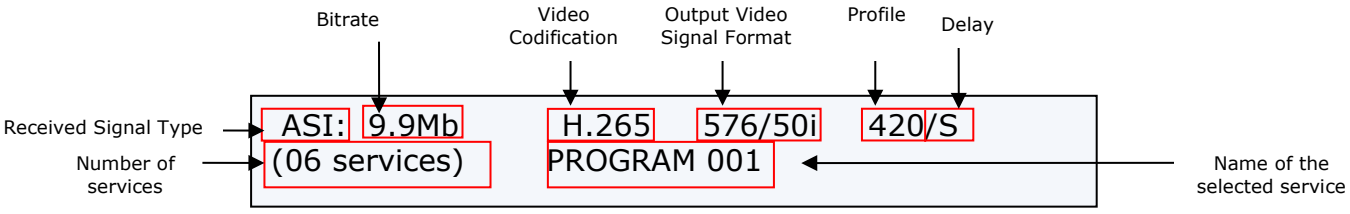


Figure 4: 1st Main screen ASI

Parameter nº	Function
1	Input signal type (ASI)
2	Received bitrate (Mbps)
3	Video Codification (H.265 / MPEG-2)
4	Video Format (1080p, 1080i, 720p, 576i, 480i)
5	Video options: ▪ Profile (4:2:0 or 4:2:2) ▪ Delay (Standard (S), Low delay (L) or Super low delay (SL))
6	Number of services available
7	Name of the selected service

Table 5: 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 in 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 …).

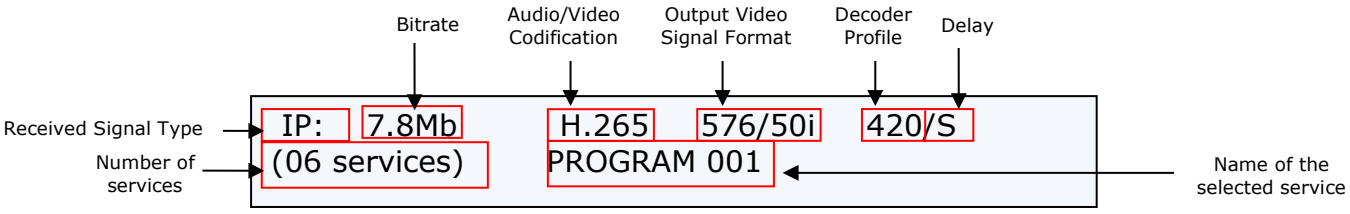


Figure 5: 1st Main screen IP

Parameter nº	Function
1	Input signal type (IP)
2	Received bitrate (Mbps)
3	Video Codification (H.265 / MPEG-2)
4	Video Format (1080p, 1080i, 720p, 576i, 480i)
5	Video options: ▪ Profile (4:2:0 or 4:2:2) ▪ Delay (Standard (S), Low delay (L) or Super Low delay (SL))
6	Number of services available
7	Name of the selected service

Table 6: Main screen for IP input

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

On this second screen, the level and the carrier to noise ratio value of the IF input are shown.

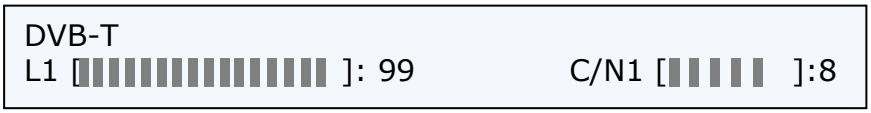


Figure 6: Main screen 2

The second main screen (figure 4.6) displays this information for the 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 whereas a received signal of value 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.

4.2 Menus

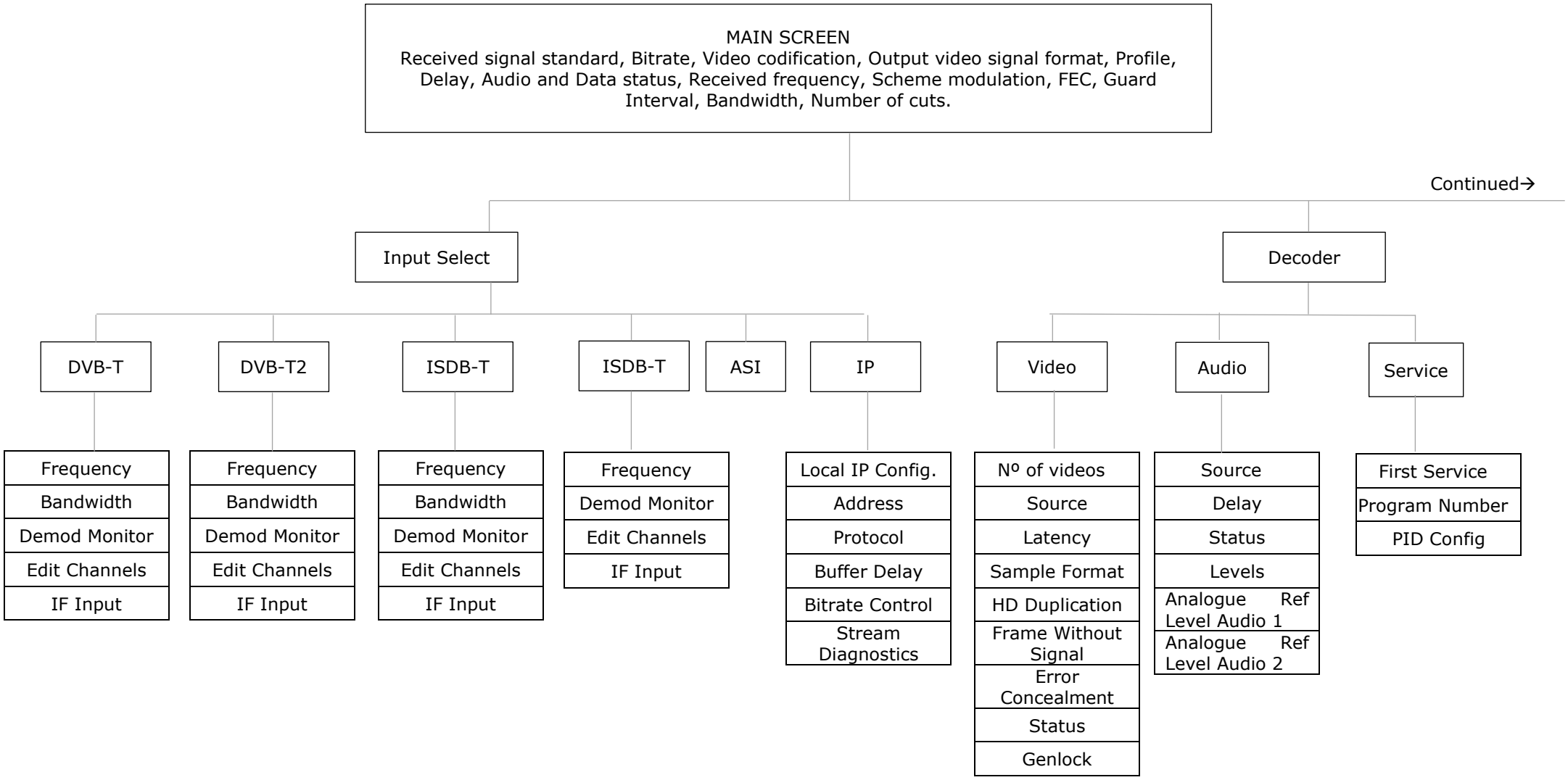
Using the menu of this receiver the user can change the receiver's parameters and configure them.

When the receiver is switched on, the main screen appears. There are two possible 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 (for DVB-T2/DVB-T or DVB-S/DVB-S2).

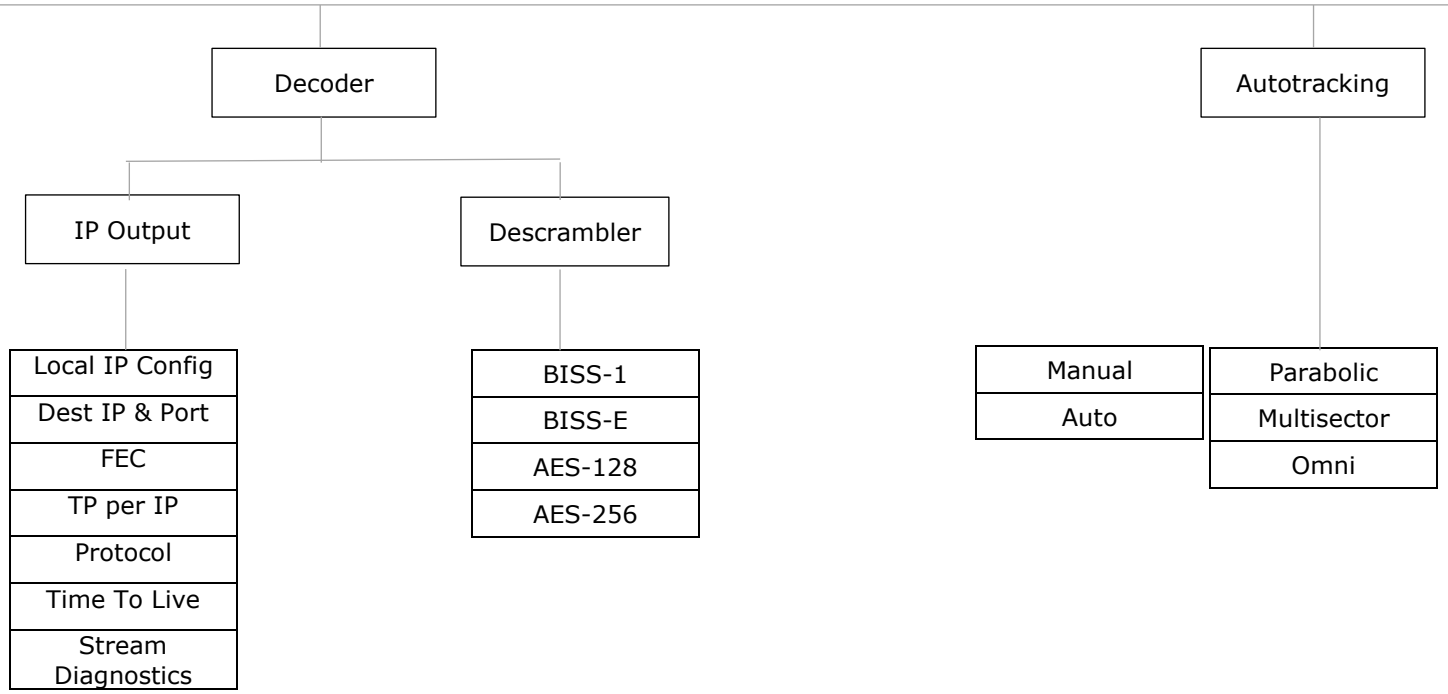
To enter the menu of this unit from the menu, the cross button must be pressed again.
If you want to return to the main screen from the menu, the cross button must be pressed again. Furthermore, when in the submenus area, returning to the main screens is achieved by pressing the cross button as many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

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

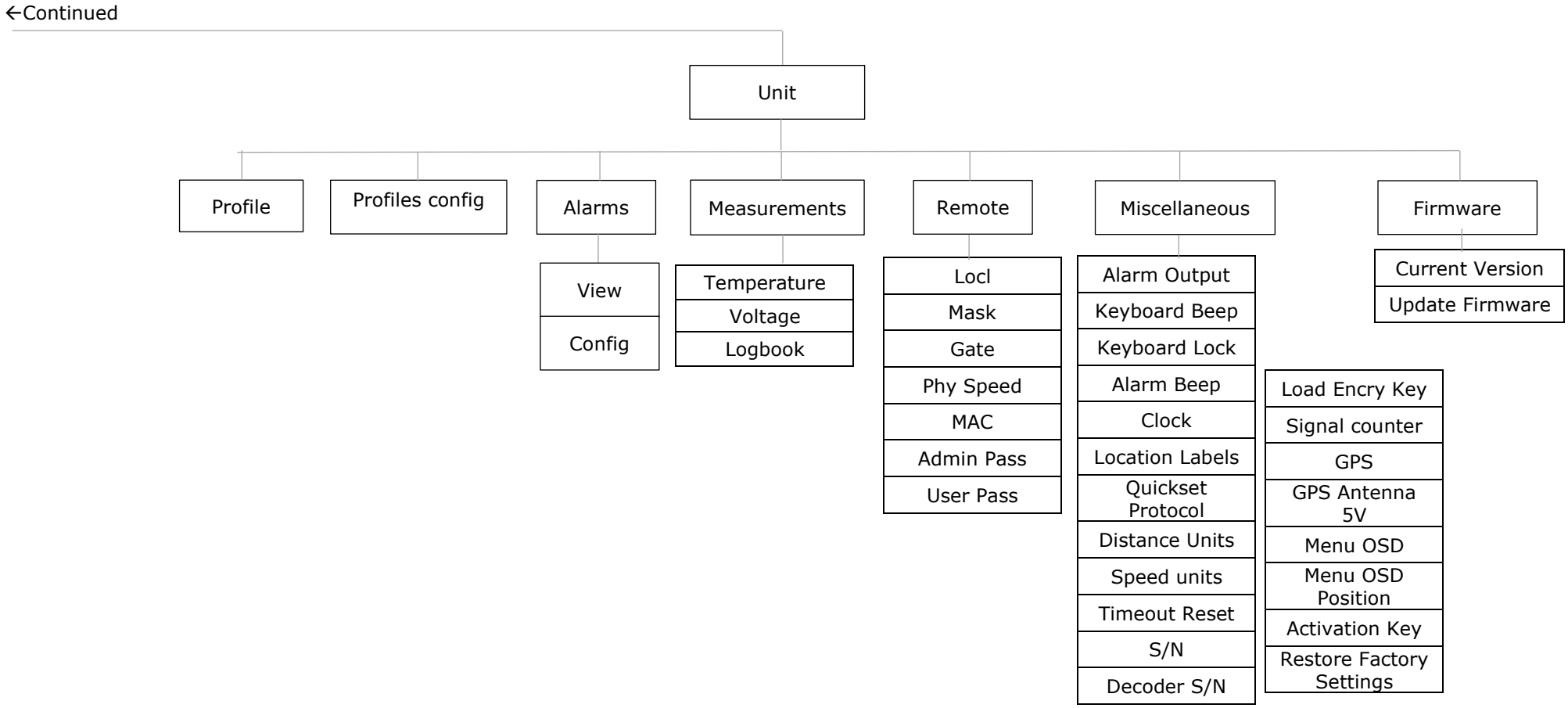

MAIN SCREEN
Received signal standard, Bitrate, Video codification, Output video signal format, Profile, Delay, Audio and Data status, Received frequency, Scheme modulation, FEC, Guard Interval, Bandwidth, Number of cuts.
Continued→
Input Select
Decoder
DVB-T
DVB-T2
ISDB-T
ISDB-T
ASI
IP
Video
Audio
Service
Frequency
Bandwidth
Demod Monitor
Edit Channels
IF Input
Frequency
Bandwidth
Demod Monitor
Edit Channels
IF Input
Frequency
Bandwidth
Demod Monitor
Edit Channels
IF Input
Frequency
Demod Monitor
Edit Channels
IF Input
Local IP Config.
Address
Protocol
Buffer Delay
Bitrate Control
Stream Diagnostics
Nº of videos
Source
Latency
Sample Format
HD Duplication
Frame Without Signal
Error Concealment
Status
Genlock
Source
Delay
Status
Levels
Analogue Ref Level Audio 1
Analogue Ref Level Audio 2
First Service
Program Number
PID Config

←Continued

Continued→



←Continued


Unit
Profile
Profiles config
Alarms
Measurements
Remote
Miscellaneous
Firmware
View
Config
Temperature
Voltage
Logbook
Locl
Mask
Gate
Phy Speed
MAC
Admin Pass
User Pass
Alarm Output
Keyboard Beep
Keyboard Lock
Alarm Beep
Clock
Location Labels
Quickset Protocol
Distance Units
Speed units
Timeout Reset
S/N
Decoder S/N
Load Encry Key
Signal counter
GPS
GPS Antenna 5V
Menu OSD
Menu OSD Position
Activation Key
Restore Factory Settings
Current Version
Update Firmware

4.2.1 Menu Navigation

This section contains a detailed description of each parameter that can be configured in the UDR-70 receiver via the menu.

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

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

Figure  means that to have access to the right image that button must be pushed.

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.

Different types of parameters are available:

- **Eligible:** When the user can choose between predetermined states. (They usually have the symbol <> near to them)

- **Editable:** When the user must 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 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 7: 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.

Unit: Parameters related to the Web Server, UART and other internal options of the receiver are configured here as well as other characteristics owned to the UDR-70 receiver.

4.2.2.1 Input Select Menu

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

- DVB-T
- DVB-T2
- ISDB-T
- DVB-S/S2 (Optional)
- ASI
- IP (Optional)

4.2.2.1.1 DVB-T

Figure 8: DVB-T Input Select Menu

Line nº	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). The frequency value can be edited if the ODU is set in Slave channel. If in the corresponding ODU a channel is selected, the number of the selected channel will appear next to the frequency value. If the ODU is not connected, some dashes will appear.

2	**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 Demod Monitor:** In this field, pressing the OK button, the different parameters of the received signal are displayed. (reading parameters) The available options are: ▪ Const (QPSK, 16QAM, 64QAM) ▪ FEC (1/2, 2/3, 3/4, 5/6, 7/8) ▪ GI (1/4, 1/8, 1/16, 1/32) ▪ Level (dBm) ▪ MER (dB) ▪ C/N (dB) ▪ ODU Temp (ºC) ▪ ODU Volt (V)
4	**DVB-T Edit List of ODU Frequency Channels:** In this field, pressing the OK button, the user can edit the frequency of the channel presets.
5	**DVB-T IF Input:** In this option, the IF input connector must be specified. To select the desired, Right, Left buttons must be pressed. (eligible parameter)

Table 7: DVB-T Input Select menu options

4.2.2.1.2 DVB-T2

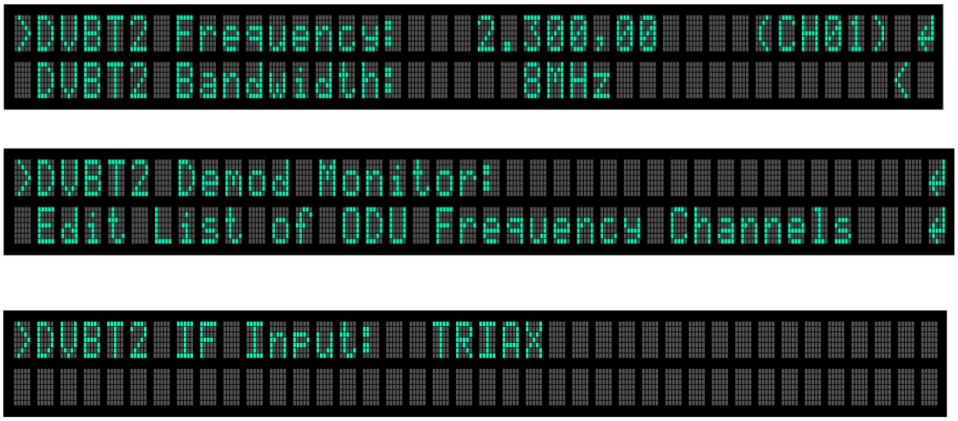


Figure 9: DVB-T2 Input Select Menu

Line nº	Function
1	**DVB-T2 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). The frequency value can be edited if the ODU is set in Slave channel. If in the corresponding ODU a channel is selected, the number of the selected channel will appear next to the frequency value. If the ODU is not connected, some dashes will appear.

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
3	**DVB-T2 Demod Monitor:** In this field, the number of the IF input which is wanted 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: ▪ Const (QPSK, 16QAM, 64QAM, 256QAM) ▪ FEC (1/2, 3/5, 2/3, 3/4, 4/5, 5/6) ▪ GI (1/4, 19/128, 1/8, 19/256, 1/16, 1/32) ▪ Level (dBm) ▪ MER (dB) ▪ C/N (dB) ▪ Mode (1K, 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) ▪ ODU Temp (ºC) ▪ ODU Volt (V)
4	**DVB-T2 Edit List of ODU Frequency Channels:** In this field, pressing the OK button, the user can edit the frequency of the channel presets.
5	**DVB-T2 IF Input:** In this option, the IF input connector must be specified. To select the desired, Right, Left buttons must be pressed. (eligible parameter)

Table 8: DVB-T2 Input Select menu options

4.2.2.1.3 ISDB-T

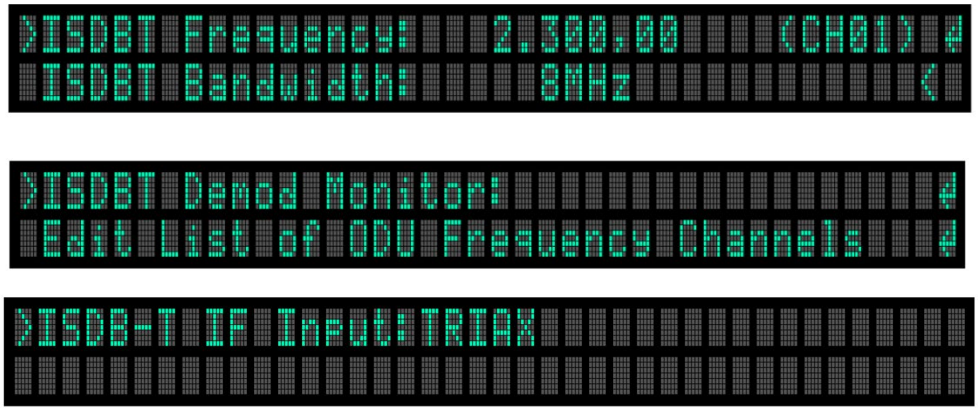


Figure 10: ISDB-T Input Select Menu

Line nº	Function
1	**ISDB-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). The frequency value can be edited if the ODU is set in Slave channel. If in the corresponding ODU a channel is selected, the number of the selected channel will appear next to the frequency value. If the ODU is not connected, some dashes will appear.

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 Demod Monitor:** In this field, the number of the IF input which is wanted 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: ▪ Const (QPSK, 16QAM, 64QAM) ▪ FEC (1/2, 2/3, 3/4, 5/6, 7/8) ▪ GI (1/4,1/8, 1/16, 1/32) ▪ Level (dBm) ▪ MER (dB) ▪ C/N (dB) ▪ Mode (2K, 4K, 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) ▪ ODU Temp (ºC) ▪ ODU Volt (V)
4	**ISDB-T Edit List of ODU Frequency Channels:** In this field, pressing the OK button, the user can edit the frequency of the channel presets.
5	**ISDB-T IF Input:** In this option, the IF input connector must be specified. To select the desired, Right, Left buttons must be pressed. (eligible parameter)

Table 9: ISDB-T Input Select menu options

4.2.2.1.4 DVB-S/S2 (optional)

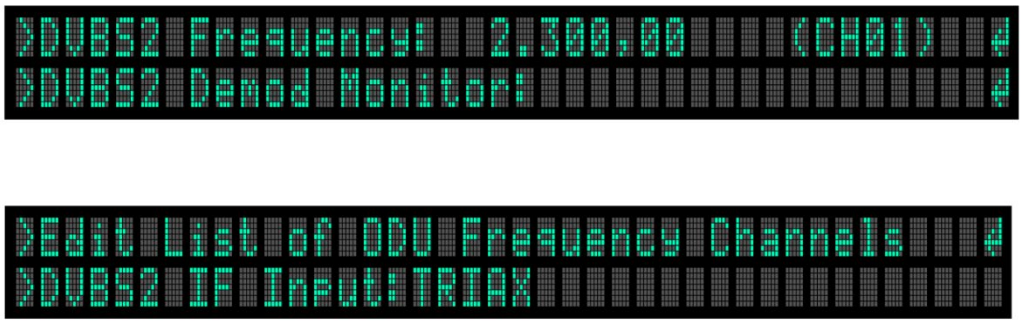


Figure 11: DVB-S/S2 Input Select Menu

Line nº	Function
1	**DVB-S/S2 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). The frequency value can be edited if the ODU is set in Slave channel. If in the corresponding ODU a channel is selected, the number of the selected channel will appear next to the frequency value. If the ODU is not connected, some dashes will appear.
3	**DVB-S/S2 Demod Monitor:** In this field, the number of the IF input which is wanted to be monitored must be selected. Once it has been selected, OK button must be pressed to access to the monitor screen where the parameters of the received signal shown below are displayed. (reading parameters) The available options are: ▪ Const (QPSK, 8PSK, 16APSK, 32APSK) ▪ LDPC FEC (1/4, 1/3, 2/5, 1/2, 3/5, 2/3, ¾, 4/5, 5/6, 8/9, 9/10) (DVB-S2) or FEC (1/2, 2/3, ¾, 4/5, 8/9, 9/10) (DVB-S) ▪ Level (dBm) ▪ MER (dB) ▪ C/N (dB) ▪ ODU Temp (ºC) ▪ ODU Volt (V)
4	**DVB-S/S2 Edit List of ODU Frequency Channels:** In this field, pressing the OK button, the user can edit the frequency of the channel presets.
5	**DVB-S/S2 IF Input:** In this option, the IF input connector must be specified. To select the desired, Right, Left buttons must be pressed. (eligible parameter)

Table 10: DVB-S/S2 Input Select menu options

4.2.2.1.5 ASI

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

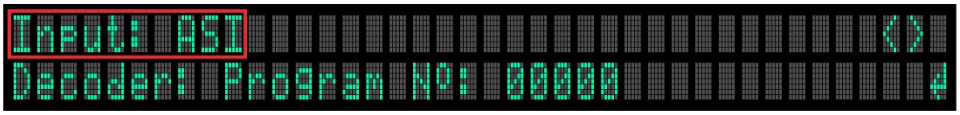


Figure 12: ASI Input Screen

4.2.2.1.6 IP (Optional)

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

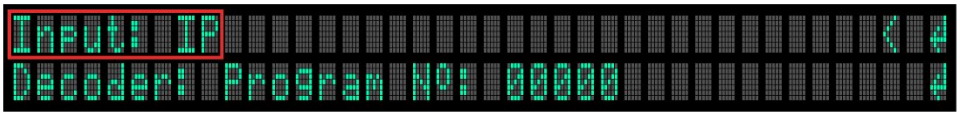


Figure 13: IP Input selected

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

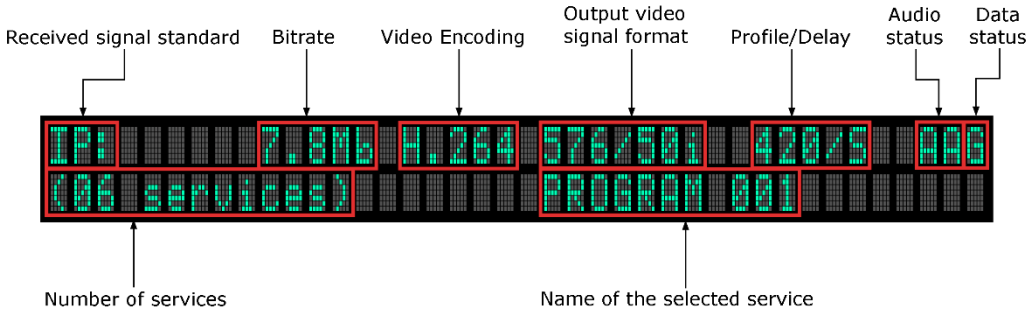


Figure 14: 1st Main screen IP

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

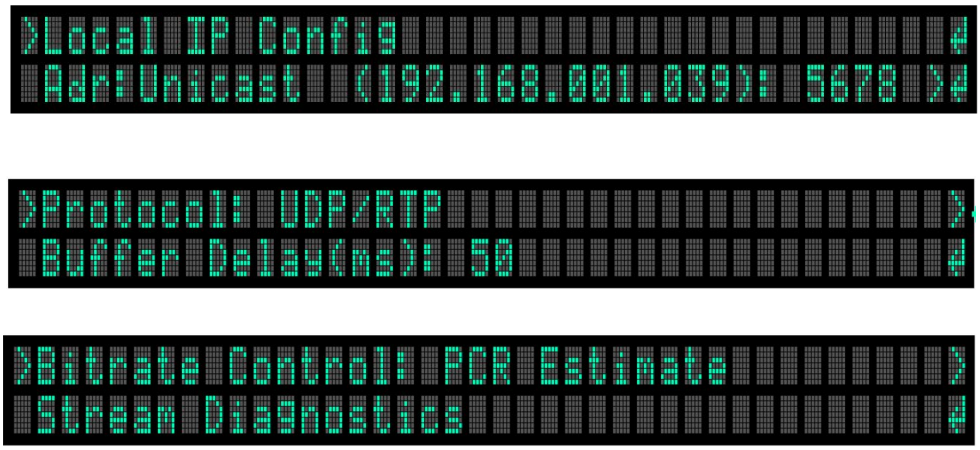


Figure 15:IP Input Select Menu

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

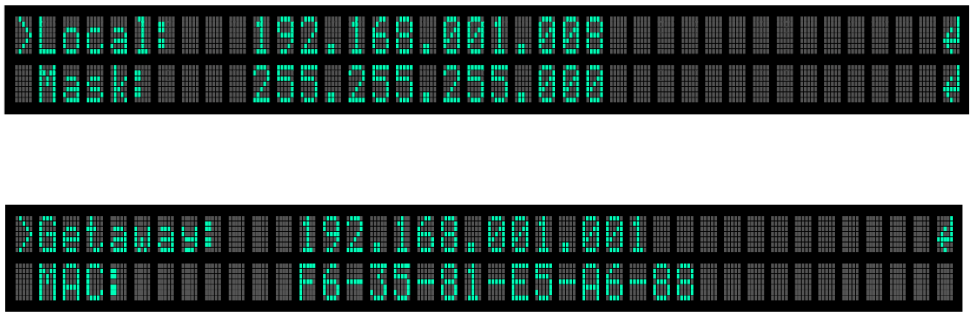


Figure 16:Local IP Configuration menu

Line nº	Function
1	**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)
2	**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)

3	**InpIP → Protocol:** This field displays the protocol used for the communication. (reading parameter The possible options are: • UDP/RTP • SRT
4	**InpIP → Buffer Delay [1..8000]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 value with the Up, Down and Right, Left buttons. To save the introduced value press the OK button. (editable parameter)
5	**InpIP → Bitrate Control:** This field you can choose which technique do you want to use for the bitrate control: • PCR Estimate • Fixed Buffer • Stream Estimate • Disable Buffer
6	**InpIP → Stream Diagnostics:** This field shows the stream diagnosis. (reading parameter) The available values are: • Estimated Bitrate • Jitter Tolerance • Jitter Errors • Lock Errors • Delay Factor

Table 11: 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.

Figure 17: Decoder Menu

4.2.2.2.1 Decoder Video Screen

In this field, the video mode for the decoding process is selected.
The available options are:

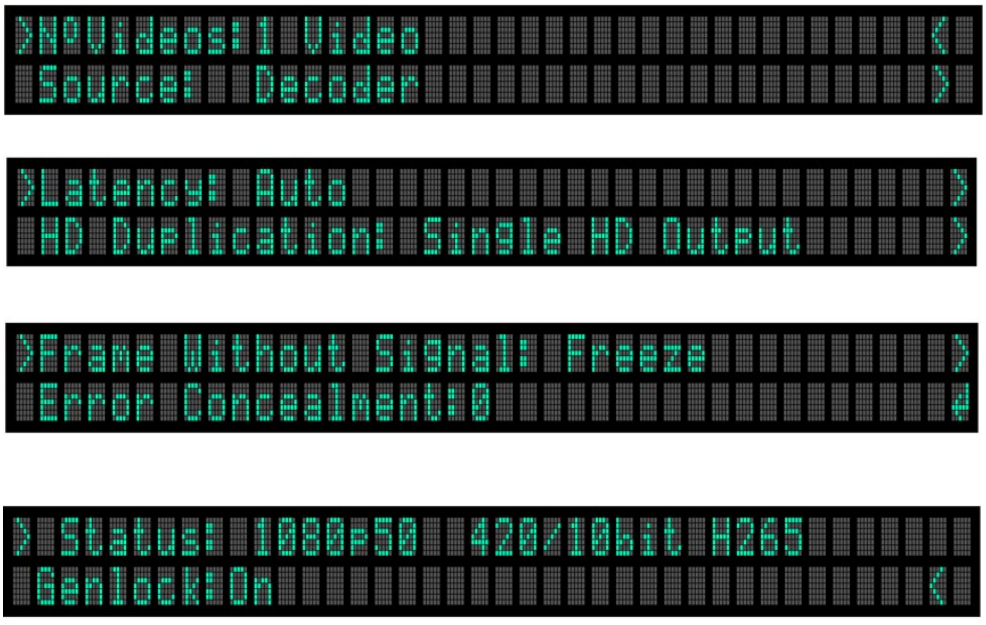


Figure 18: Video Menu

Line nº	Function
1	**Nº of Videos:** In this field, QuadSync conversion can be configured. The available options are: • 1 video. Standard mode for single HD/UHD operation. • 4 x HD-SDI 1080i • 4 x HD-SDI 1080psf • 4 x HD-SDI 1080p • 4 x 3G-SDI 1080p • 4 x HD-SDI 720p QuadSync option has to be installed to use this functionality.
2	**Source:** In this field, the video output source is configured. The available options are: • Decoder. Decoded video is output on SDI 1-4. • Pattern. Video pattern based on current configuration.
3	**Latency:** In this field, the delay of the coding process is configured. The available options are: • Auto • Normal • Low • Ultra Low Controls latency mode for decoding 3rd party streams only.
4	**HD Duplication:** In this field, SD/HD duplication can be configured. The available options are: • Four HD outputs. Decoded video in HD modes output on SDI 1-4. • Single HD Output. Decoded video in HD modes output on SDI 1 only.
5	**Frame Without Signal:** In this field, video fail mode can be configured. The available options are: • Freeze. On input stream interruption last decoded frame is held, most effective when Genlock is not disabled. • Blue. On input stream interruption output will go to blue screen. • Pattern. Video pattern is displayed
6	**Error Concealment:** In this field, the error concealment can be set between High and Low Level: • High. Freese frame is preferred over picture break-up. • Low. Picture break-up is preferred over freeze frame.

7	**Status:** In this field, the video format and other TS parameters are shown.
8	**Genlock:** In this field, genlock mode can be configured. The available options are: • Off. Genlock frame buffer disabled, video output at rate recovered by PCR. • External. Output synchronized to external reference, must have compatible frame rate. • Internal. Output synchronized to internal reference, use to prevent PCR jitter transfer to SDI output.

Table 12: Video menu options

4.2.2.2.2 Decoder Audio Screen

In this field, the audio mode for the decoding process is selected.
The available options are:

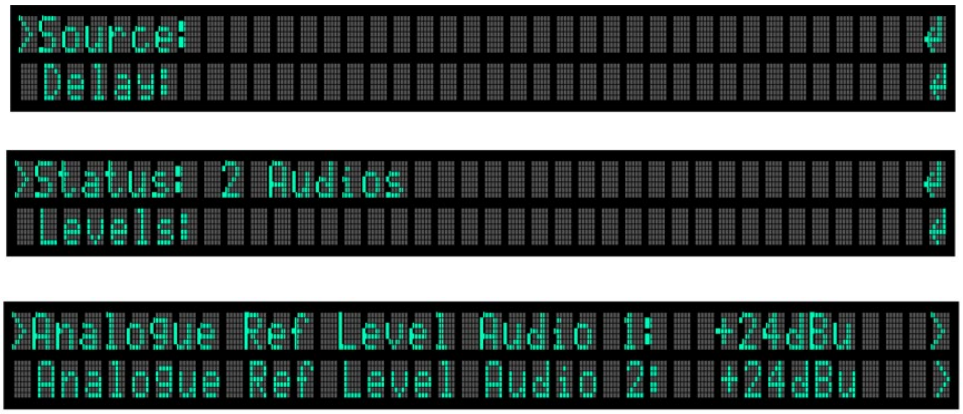


Figure 19: Decoder Audio Screen

Line nº	Function
1	**Source:** In this option, the audio source for 1 to 8 audios can be selected. The audio options are: • Decoder • Test Tone
2	**Analogue Audio Adjust Delay:** In this field, the audio delay is configured. -1000 to 1000 ms audio delay adjustment to approximately 4 ms accuracy. Negative numbers may result in loss of decoding if set earlier than actually possible.
3	**Status:** In this option, the audio channel status is shown per each channel (reading parameters)
4	**Levels:** In this option, the audio channel level is shown per each channel (reading parameters)
5	**Analogue Ref Level Audio 1:** In this field, the analogue audio reference level can be configured. The available options are: • +24 dBu • +18 dBu

6	**Analogue Ref Level Audio 2:** In this field, the analogue audio reference level can be configured. The available options are: • +24 dBu • +18 dBu

Table 13: Decoder Audio Status menu

4.2.2.2.3 Decoder Data

This receiver outputs one data channel. This channel doesn´t need configuration, the receiver outputs the same data rate configured in the transmitter.

4.2.2.2.4 Decoder Service Screen

In this field, the service selection performance is defined. Press Ok button to select it.

Figure 20: Service selection

The available options are:

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

• **PID Number.** Service decoding is based on provided PIDs.

• **Program number**. Service decoding is based on program number. Here the Program number must be entered. 1 to 65535 program number to be searched for in PAT.

4.2.2.2.5 Decoder IP Output

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

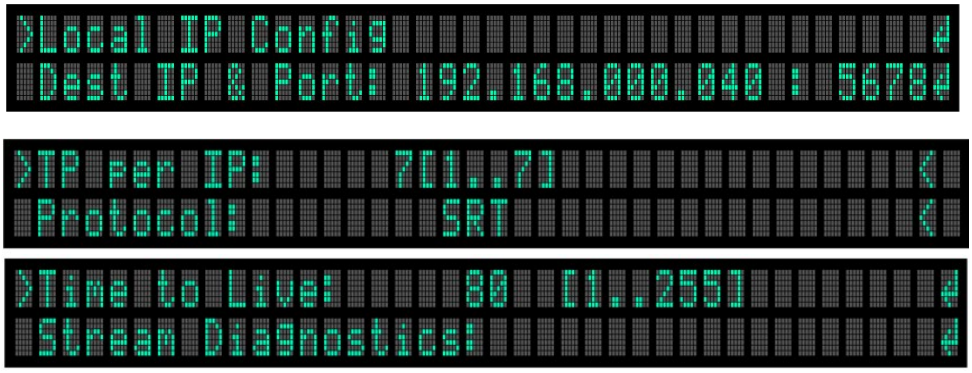


Figure 21: IP Output Options

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)

2	**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)
3	**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)
4	**Protocol:** The type of protocol used for the communication can be RTP, UDP or SRT. To select the desired protocol for the communication, use Right and Left buttons. (eligible parameter)
5	**Time To Live (TTL):** 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)
6	**Stream Diagnostics:** In this field the estimated bitrate and IP packet size is shown.

Table 14: 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.

4.2.2.2.6 Decoder Descrambler

In this option, you can choose the encryption mode.

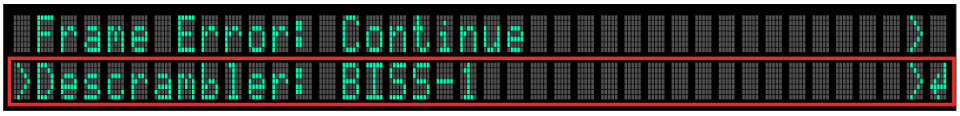


Figure 22: Decoder Descrambler screen

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

4.2.2.3 Autotracking Menu

In this section, it is explained how to configure the Autotracking with different types of antenna. The possible options are:

- Parabolic
- Multisector AMS
- Omni

Parabolic antenna

Next, how to configure the Autotracking with a **Parabolic Antenna** and the different parameters related to it is explained. Press the OK button to enter to the configuration menu.

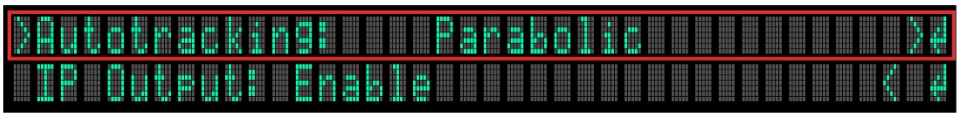


Figure 23: Parabolic Antenna option

Once the user is inside the parabolic section, there are three possible options (selected with the Right and Left button) which are detailed below:

- **Auto**

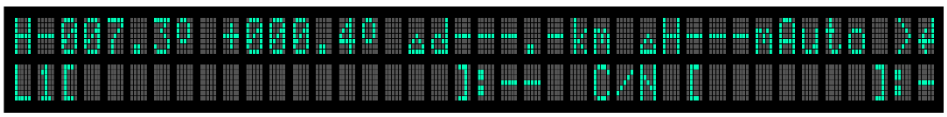


Figure 24: Parabolic Autotracking (Auto)

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

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

- Transmitter Position
- Receiver Position
- Receiver Configuration

First, press the OK button to access the Transmitter Position screen.

There are different options to select and configure:

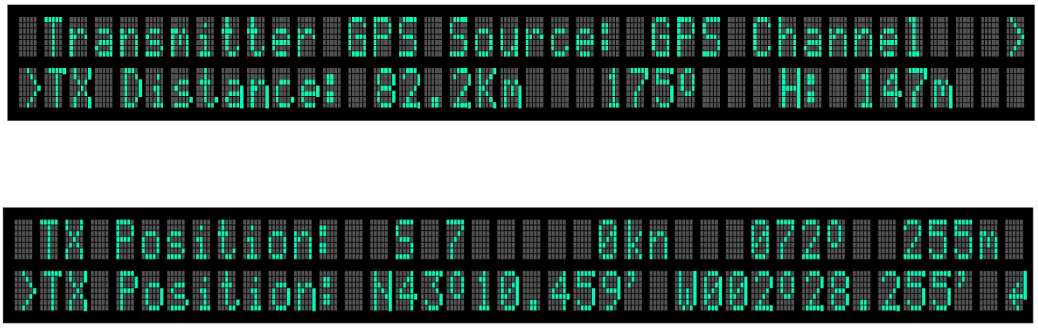


Figure 25:Transmitter Position screen

Line nº	Function
1	**Transmitter GPS Source:** The Transmitter's GPS information can be taken from four different sources: • 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.
2	**TX Distance:** In this option, different parameters are shown (reading parameters): • Distance between Transmitter & Receiver (km) • Direction from Transmitter to Receiver (degrees) • Height difference (m)
3	**TX Position:** In this option, different parameters are shown (reading parameters): • Number of satellites • Speed of the Transmitter (kn) • Direction of the Transmitter (degrees) • Height of the Transmitter (m)

4	**TX Position:** In this option, different parameters are shown (reading parameters): • Latitude of the Transmitter • Longitude of the Transmitter

Table 15: Transmitter Position menu

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

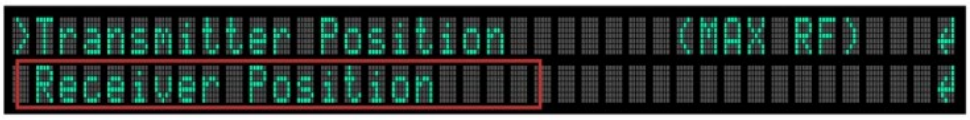


Figure 26:GPS Information options

There are different options to select and configure:

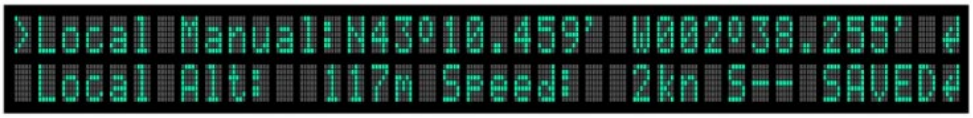


Figure 27: Receiver Position screen

Line nº	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 if 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 appears 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 editable parameter by the user.

3	**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 16: Receiver Position menu

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

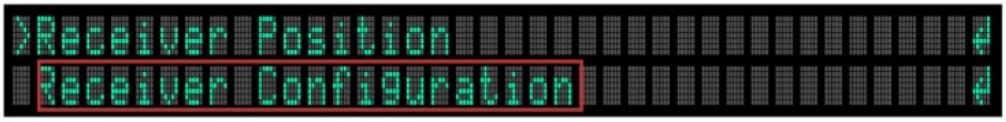


Figure 28: Receiver Configuration Option

There are different options to select and configure:

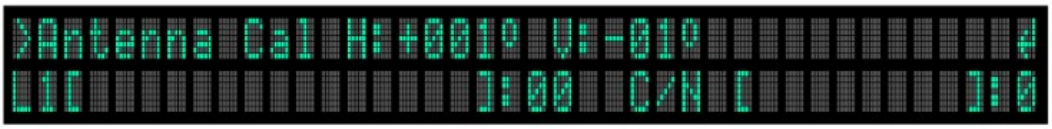


Figure 29:Receiver Configuration Screen

Line nº	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).

2	**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 10º 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 (0º, +VA and -VA) and will increase the horizontal sweep to 45º 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 (0º, +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.
3	**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.
4	**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 Inclinometer 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:
5	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.

Table 17: Receiver Configuration menu

- **Manual**

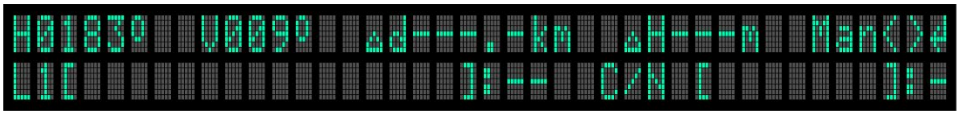


Figure 30: Parabolic Autotracking (Manual)

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**

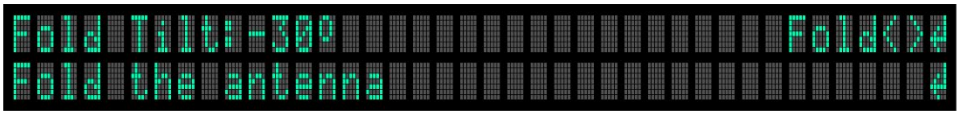


Figure 31: Parabolic Autotracking (Fold)

Line nº	Function
1	**Fold Tilt:** In this file, the number of degrees that are needed to fold the antenna is displayed. The limits for the fold angle are -30º and +90º. (editable parameter)
2	**Fold the antenna:** In this file, the user can fold the antenna.

Table 18: Fold menu

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

Sectorial Antenna

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

Figure 32: 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.

I. Auto

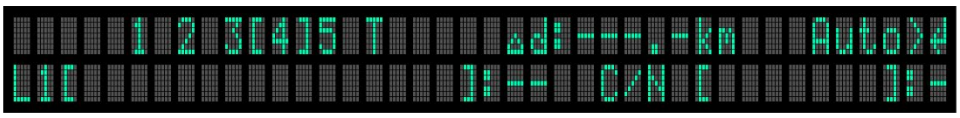


Figure 33: Sector Autotracking (Auto)

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.

II. Manual

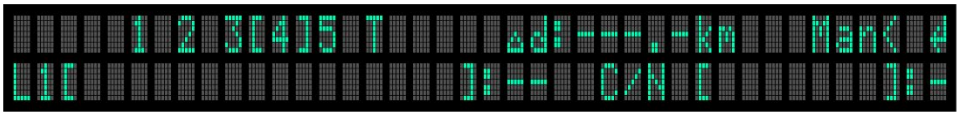


Figure 34: Sector Autotracking (Manual)

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.

Omni antenna

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

Figure 35: Omni Antenna option

4.2.2.4 Unit

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

Figure 36: Unit Menu

4.2.2.4.1 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.

4.2.2.4.2 Profiles Config

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

The configurable parameters are:

- Input type:
  - DVB-T
  - DVB-T2
  - ISDB-T
  - DVB-S/S2
  - ASI
  - IP
- Frequency
- Bandwidth

4.2.2.4.3 Unit Alarms Screen

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

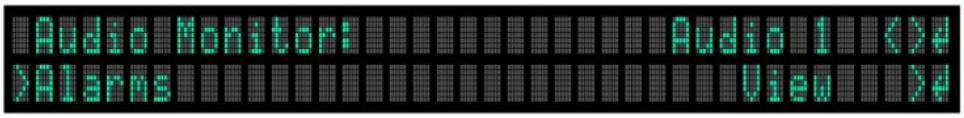


Figure 37: Unit Alarms menu

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

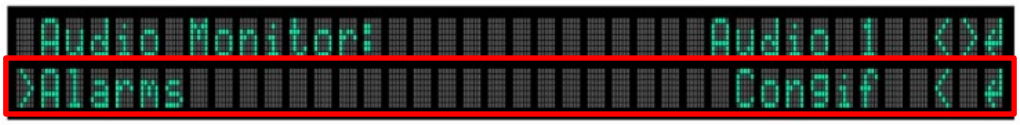


Figure 38: Alarms Configuration selection

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
- 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
- ODU:PLL NOT LOCKED
- ODU: FREQUENCY OUT OF RANGE
- ODU: RF LEVEL LOW
- ODU:VOLTAGE OUT OF RANGE
- ODU:TEMPERATUE HIGH
- ODU:NOT CONNECTED

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

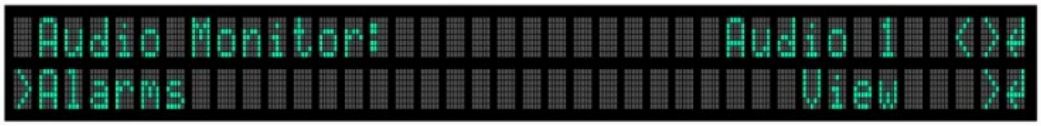


Figure 39: Alarms View selection

The alarms are shown as indicated below:

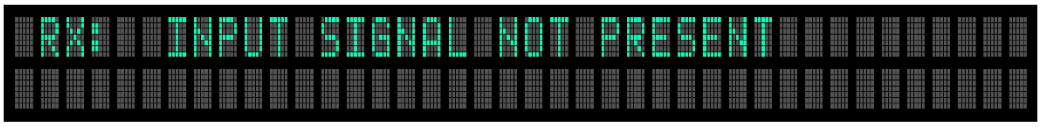


Figure 40: Present Alarms

4.2.2.4.4 Measurements Screen

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

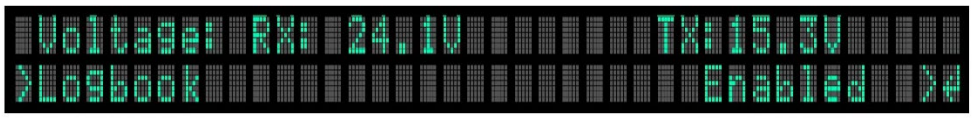


Figure 41:Monitor Menu

In this screen, several monitor parameters can be accessed:

Line nº	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 ºC or in ºF. 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 19: Unit Monitor menu options

4.2.2.4.4.1 LogBook

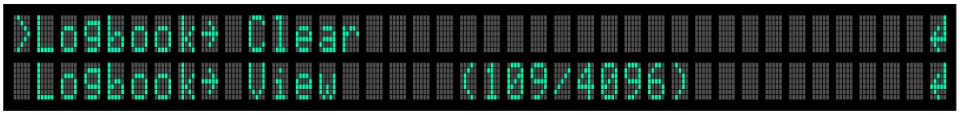


Figure 42: Monitor LogBook Menu

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.

4.2.2.4.5 Unit Remote (Webserver)

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

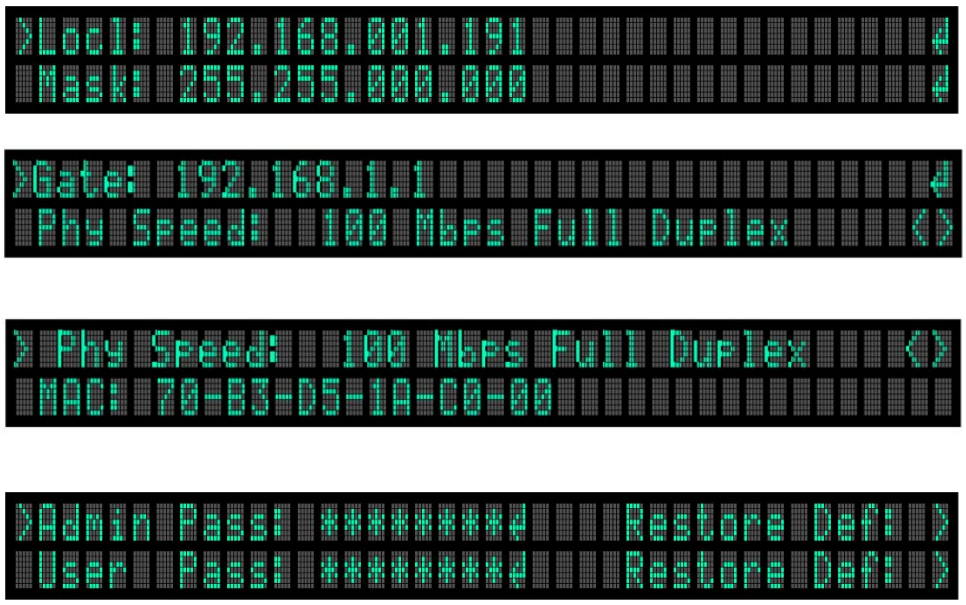


Figure 43: Webserver Menu

The available parameters are:

Line nº	Function
1	**Locl:** 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)
2	**Mask:** 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)
3	**Gate:** 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)

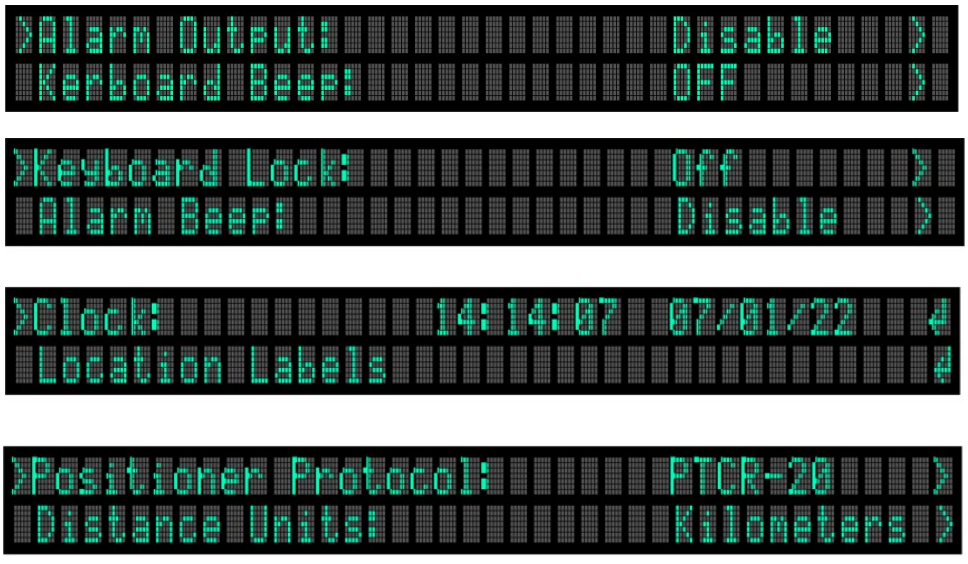
4	**Phy speed:** In this field, the negotiation speed can be configured. The options available: • 10Mbps Half Duplex • 10Mbps Full Duplex • 100Mbps Half Duplex • 100Mbps Full Duplex
5	**MAC** In this field, the MAC address of the device is shown. (Reading parameter)
6	**Admin Pass:** The administrator's password is introduced. It is a list of 8 digits. It can be set an own password or restore the default password (00000000).
7	**User Pass:** 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 20: Webserver menu options

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

4.2.2.4.6 Unit Miscellaneous Screen

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



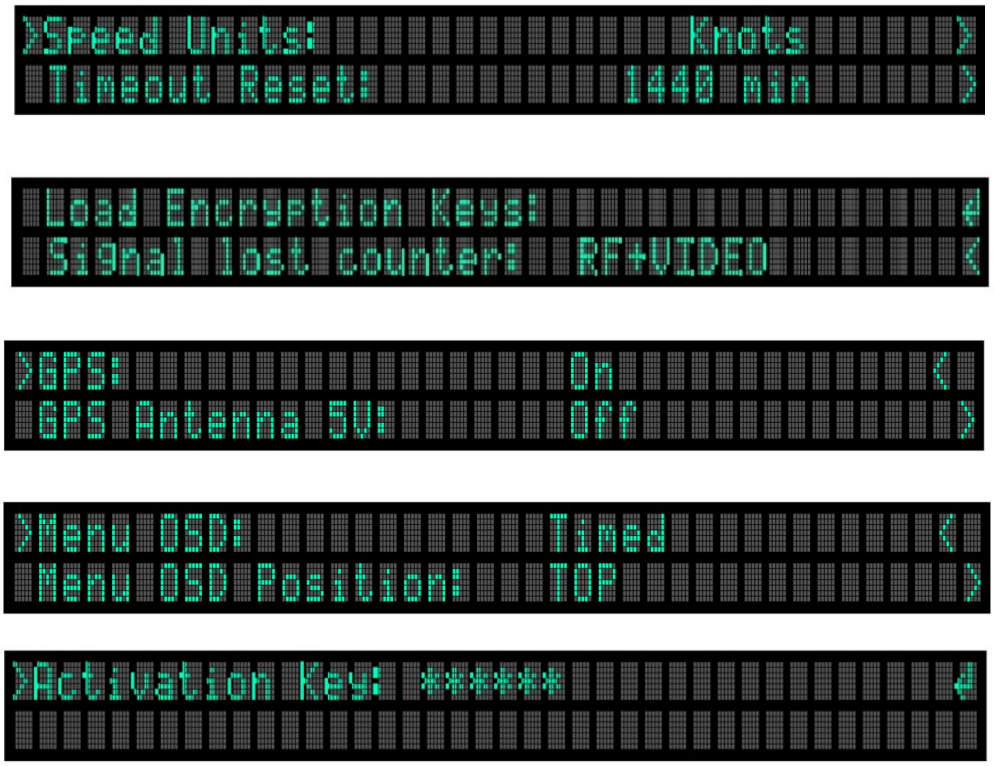


Figure 44: Miscellaneous Menu

The available options are:

Line nº	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
4	**Alarm Beep:** If this option is enabled, then a beep noise will sound each time that an alarm occurs. (eligible parameter) The available options are: • Enable • Disable
5	**Clock:** 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)
6	**Location Labels:** 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)
7	**Positioner Protocol:** In this field the type of Positioner Protocol employed is shown (eligible parameter). The available options are: PTCR-20 and PTCR-96.
8	**Distance Units:** If miles is selected, then, all the distances will be in miles and the same occurs if kilometres is selected. (eligible parameter) The available options are: • Kilometers • Miles
9	**Speed Units:** In this field, the desired parameter is selected to measure the speed (eligible parameter). There are three options available: • Knots • Km/h • Mph

10	**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.
11	**S/N:** In this field the serial number of the device is shown (reading parameter).
12	**Decoder S/N:** In this field the serial number of the decoder is shown (reading parameter).
13	**Load Encyption Keys:** 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 BISSESW:0123AC1238907098 BISSEU:413809ABA12393 Once the keys information has been loaded properly, "KEYS LOADED" message is shown in the screen.
14	**Signal Lost Counter:** 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
15	**GPS:** In this field, the GPS transmission can be enabled or disabled, the options available are: • On • Off
16	**GPS Antenna 5V:** In this field, the power supply to GPS antenna can be enabled or disabled, the options available are: • On • Off

17	**Menu OSD:** In this field, OSD menu timing can be configured, the options available are: • Always. It is always present. • Timed. It disappears from screen after 1 minute.
18	**Menu OSD Position:** In this field, the position of the OSD menu can be configured, the options available are: • Top • Bottom
19	**Activation Key:** License activation key is entered here.

Table 21: Miscellaneous menu options

4.2.2.4.7 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:

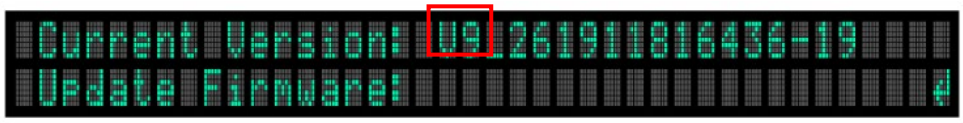


Figure 45:Firmware Menu

Line nº	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 22: 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. So as to access to the firmware file, first enter www.svpbm.com in your web browser.

2) Click on the Support tab.

Figure 46: Updating firmware step 2

3) Click on Firmware.

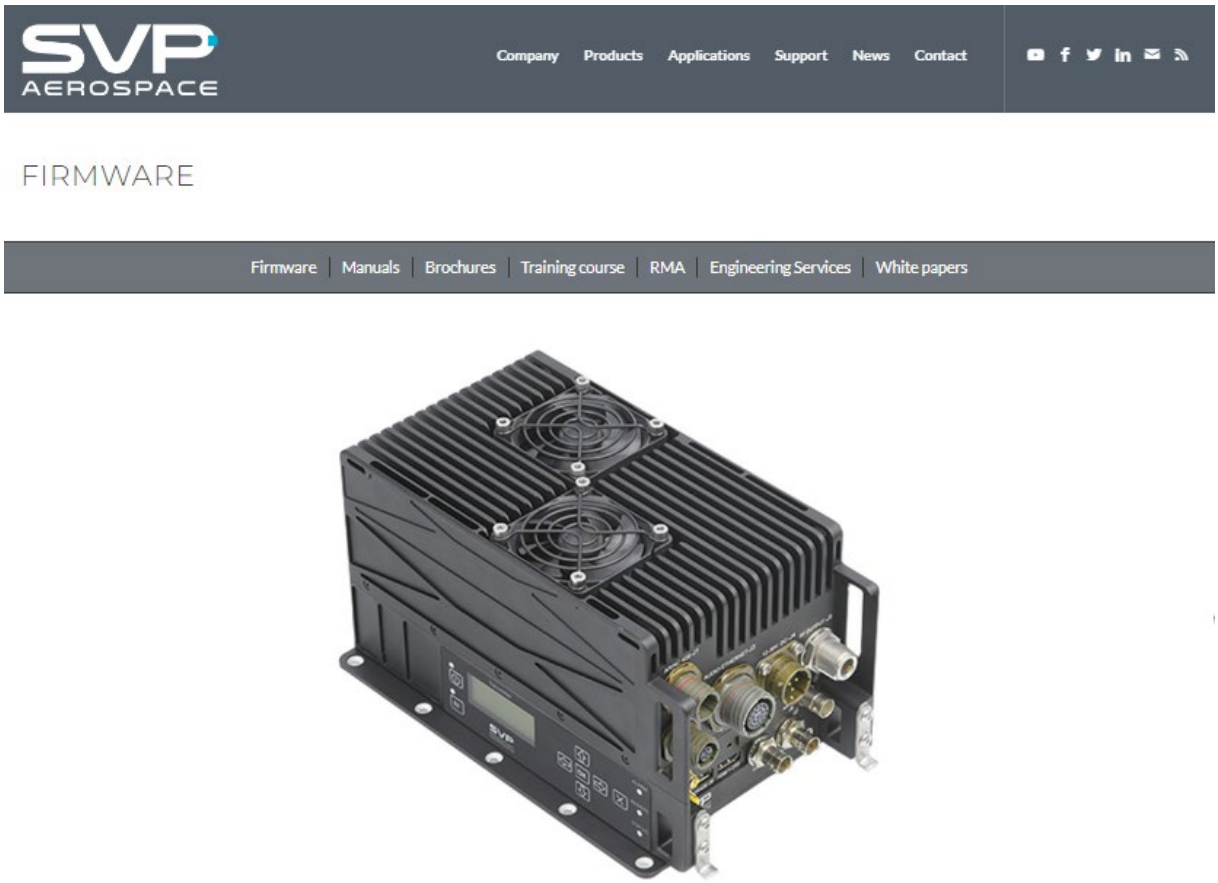


Figure 47: Updating firmware step 3

4) Go to RX_Firmware.

5) Press the version of the receiver model needed (version of the equipment) to download the file.

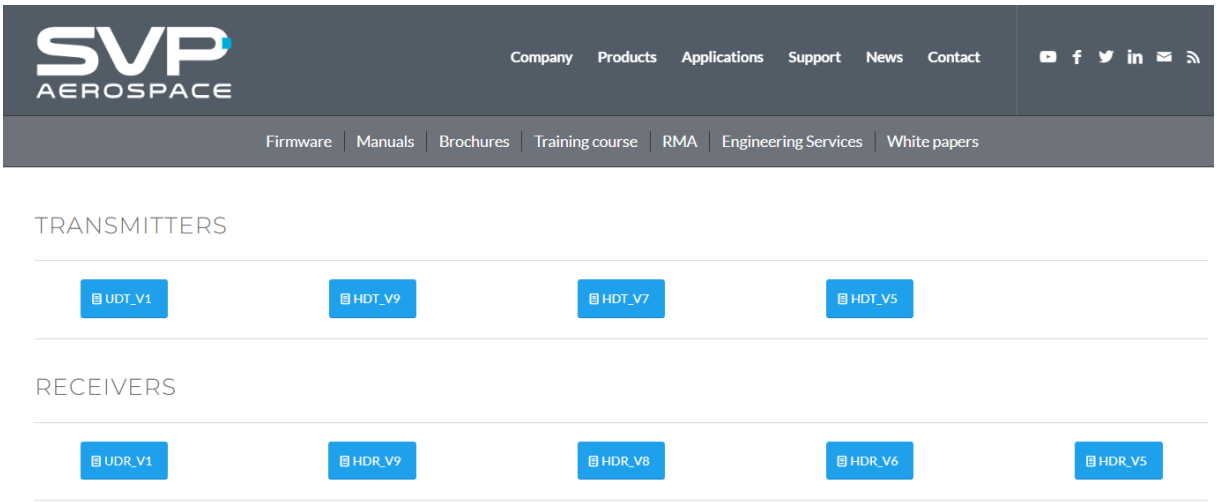


Figure 48:Updating firmware step 5

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).

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 to 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 49: Updating process 1

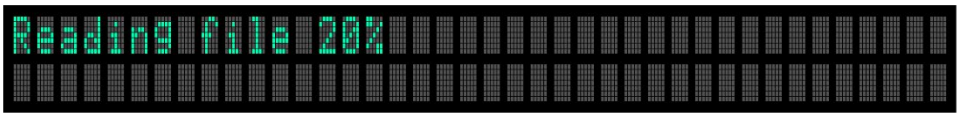


Figure 50: Updating process 2

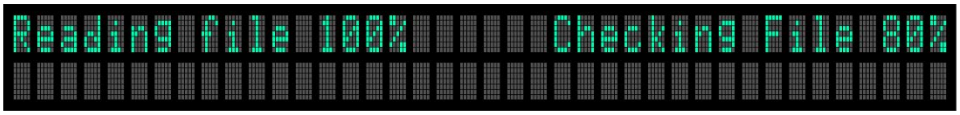


Figure 51: Updating process 3

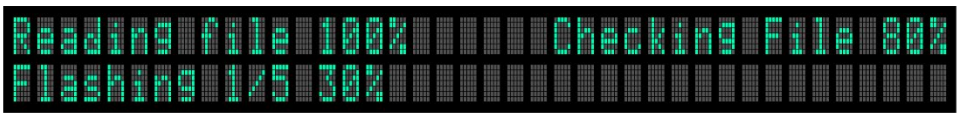


Figure 52: Updating process 4

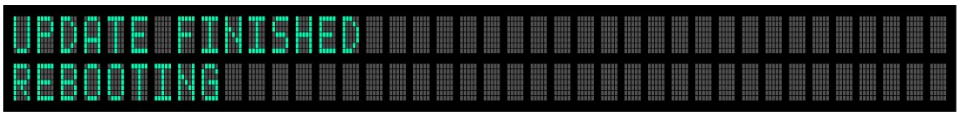


Figure 53: Updating process 5

You must remove the USB before start working with the new firmware.

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 UDR-70 receiver can control a sectorial, parabolic antenna or omnidirectional 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.

In the next points, the possible autotracking systems are described.

5.1 Autotracking Multisector AMS Antenna

5.1.1 How Does It Work

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 54: 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.

Figure 55: 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

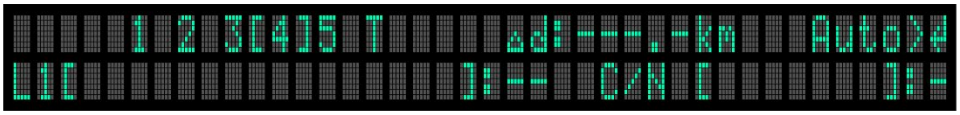


Figure 56: Multisector AMS Autotracking (Auto)

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

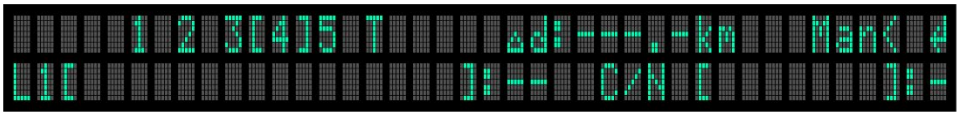


Figure 57:: Sector Autotracking (Manual)

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 Does It Work

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 Inclinometer. 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 Inclinometer 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 Inclinometer. 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:

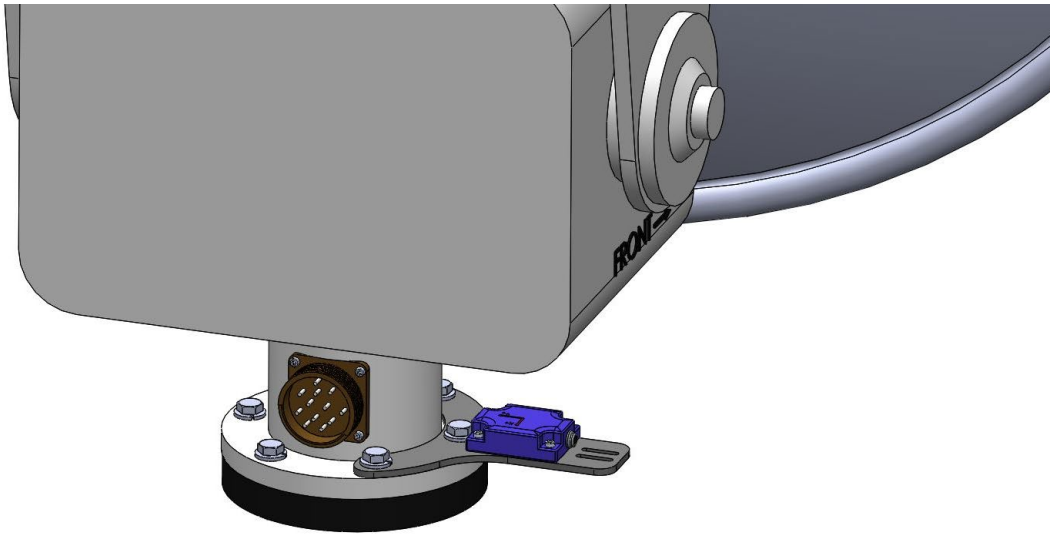


Figure 58:Inclinometer installation Diagram

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.

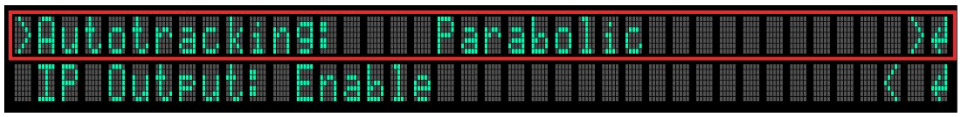


Figure 59: Parabolic Antenna Autotracking menu

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**

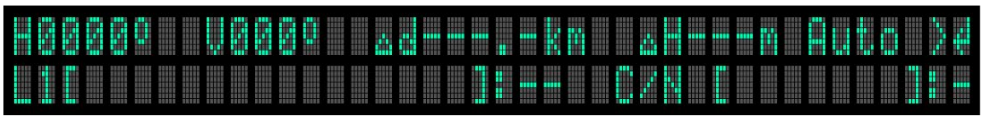


Figure 60: Auto Menu

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.

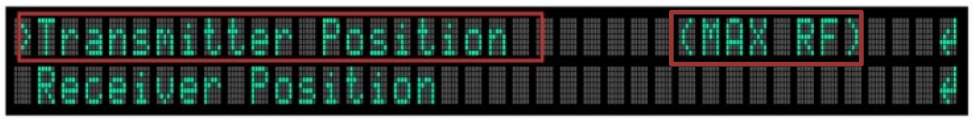


Figure 61:Transmitter Position source

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

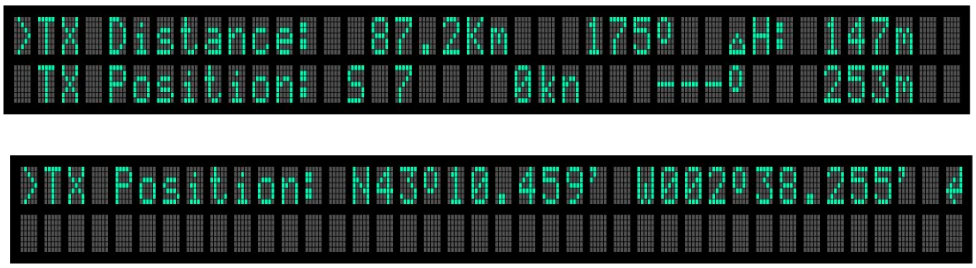


Figure 62: Transmitter GPS Information screen

- **Receiver Position**

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

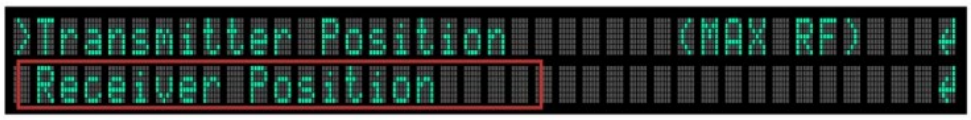


Figure 63: GPS Information options

The following parameters are shown on the Receiver Position menu.

Figure 64: 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 if 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 Inclinometer. 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 Inclinometer 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.

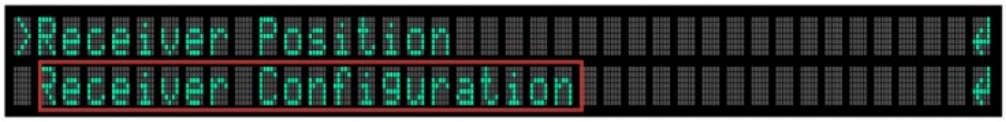


Figure 65: Receiver Configuration Option

There are different options to select and configure:

Figure 66: 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 10º 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 (0º, +VA and -VA) and will increase the horizontal sweep to 45º 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 (0º, +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 Inclinometer 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**

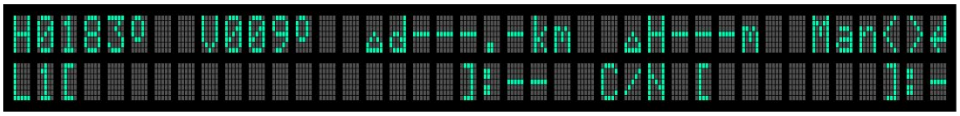


Figure 67: Manual Menu

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**

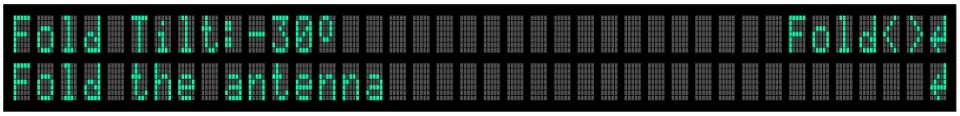


Figure 68: Fold Menu

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 -30º and +90º.
In the second line, by pressing the OK button, the antenna folds.

Chapter 6: GPS

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 **¡Error! No se encuentra el origen de la referencia.** 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:

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

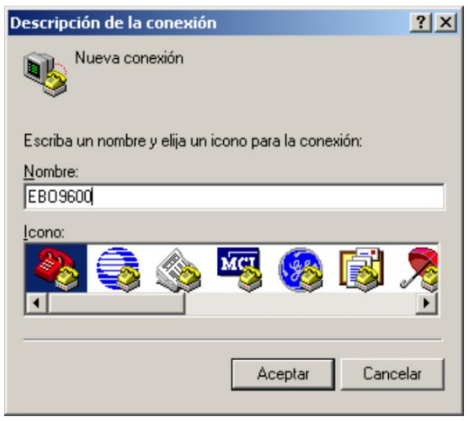


Figure 69: HyperTerminal new connection

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

Figure 70: COM port configuration

7. 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

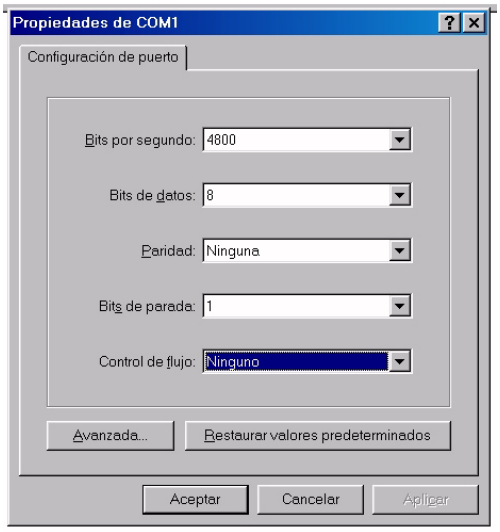


Figure 71:COM1 properties

8. 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.
9. 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.
10. When GPS data is obtained, go for example to the Google Earth application and type the received coordinates.
11. The Transmitter's position will be drawn on the map.

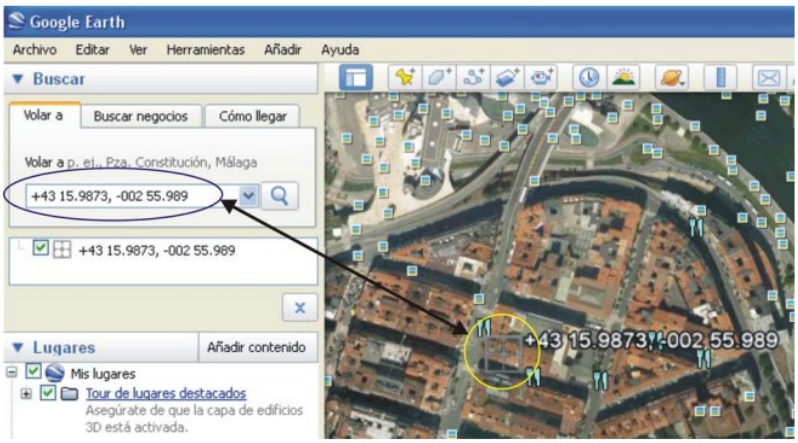


Figure 72: Google Earth example

Chapter 7: Web Server

7.1 Introduction

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:

12. Go to Unit → Webserver P

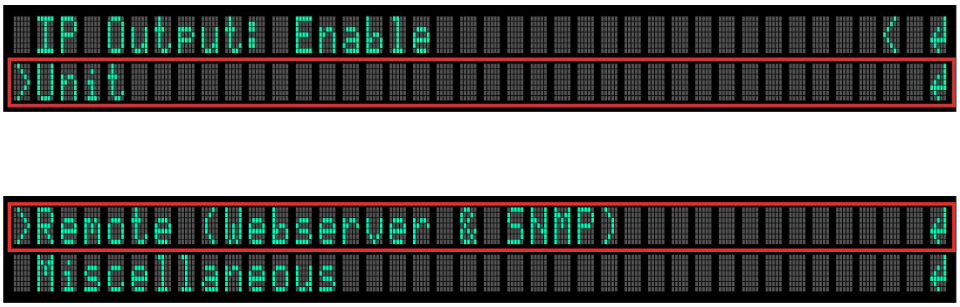


Figure 73: Web Server screen

13. Select Locl 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.

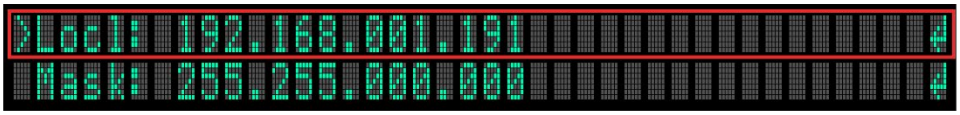


Figure 74: Local IP

14. 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.

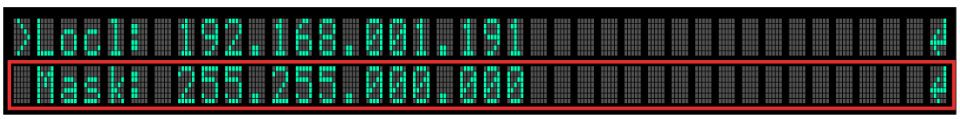


Figure 75: Subnet Mask

15. 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.

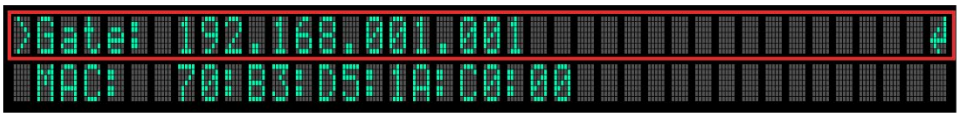


Figure 76: Gateway

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

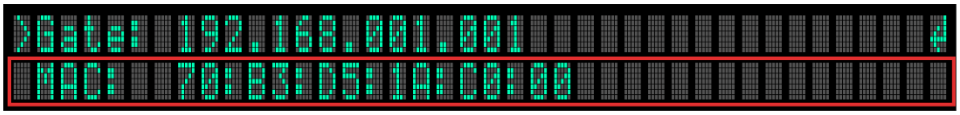


Figure 77: MAC address

17. 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.

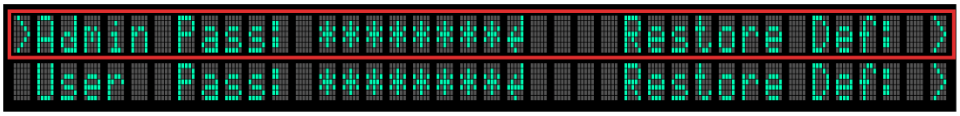


Figure 78: Admin Pass

18. 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.

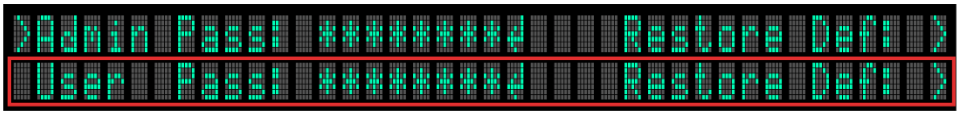


Figure 79: User Pass

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.

7.2 Web Page Overview

To access the Webserver, it is necessary to set the Webserver IP in the web browser and press Enter button. Then, the main menu will appear on the upper position of the screen. Once an option is chosen, it is possible to change any parameter allowed, or see the values of some options.

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

Next, several screens of the web server and their features are shown.

7.2.1 DVB-T INPUT

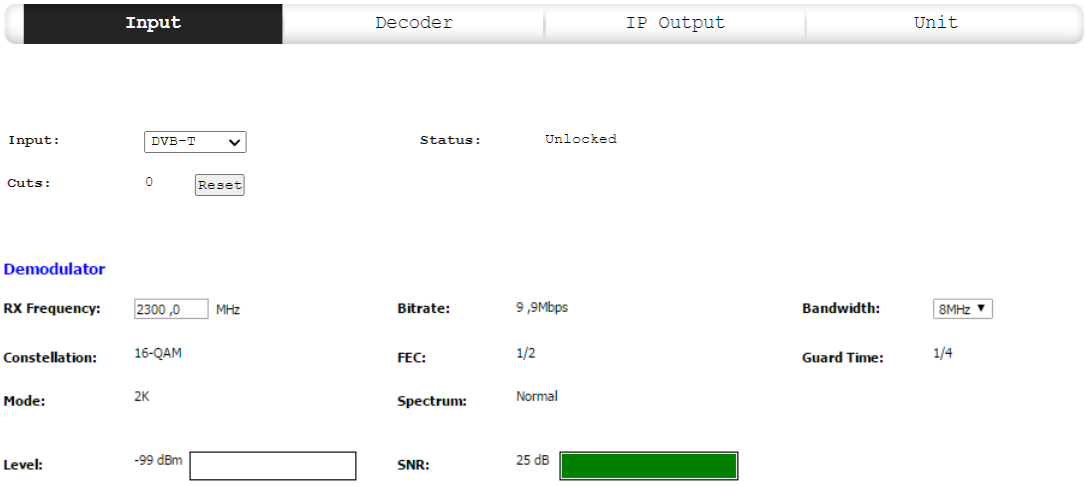


Figure 80:Web Server DVB-T Input screen

- **Input:**

  Select the type of the signal that is received. The available options are DVB-T, DVB-T2, DVB-S2/S, ASI and IP. (eligible parameter)

- **Status:**

  If this field shows the locked word then, it means that 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)

- **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 it is displayed the value of the guard time of the received signal. 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)

- **Level:**

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

- **SNR:**

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

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

7.2.2 DVB-T2 INPUT

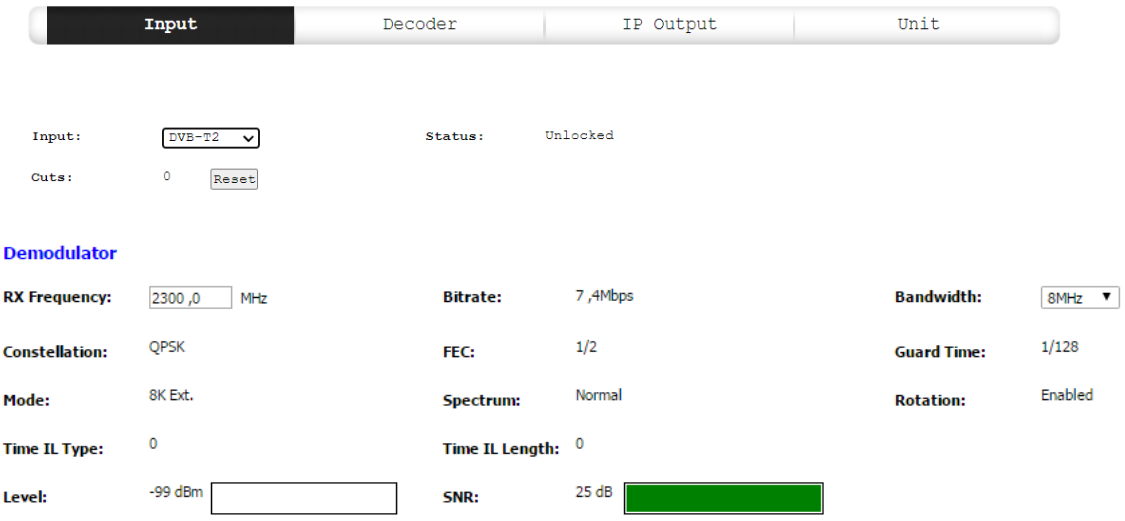


Figure 81: Web Server DVB-T2 Input screen

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 8 MHz for DVB-T2. (eligible parameter)

- **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, 5/6 for DVB-T2. (reading parameter)

- **Guard Time:**

  In this field it is displayed the value of the guard time of the received signal. The available options are 1/4, 19/128, 1/8, 19/256, 1/16, 1/32, 1/128 for DVB-T2. (reading parameter)

- **Mode:**

  In this field, the number of carriers of the received signal is displayed. The available options are 1K, 2K, 4K, 8K, and 8K_ext for DVB-T2. (reading parameter)

- **Spectrum:**

  Here the type of the spectrum of the received signal is shown. Inverted spectrum is just another method to help preventing signal theft. 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)

- **Level:**

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

- **SNR:**

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

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

7.2.3 DVB-S2/S INPUT

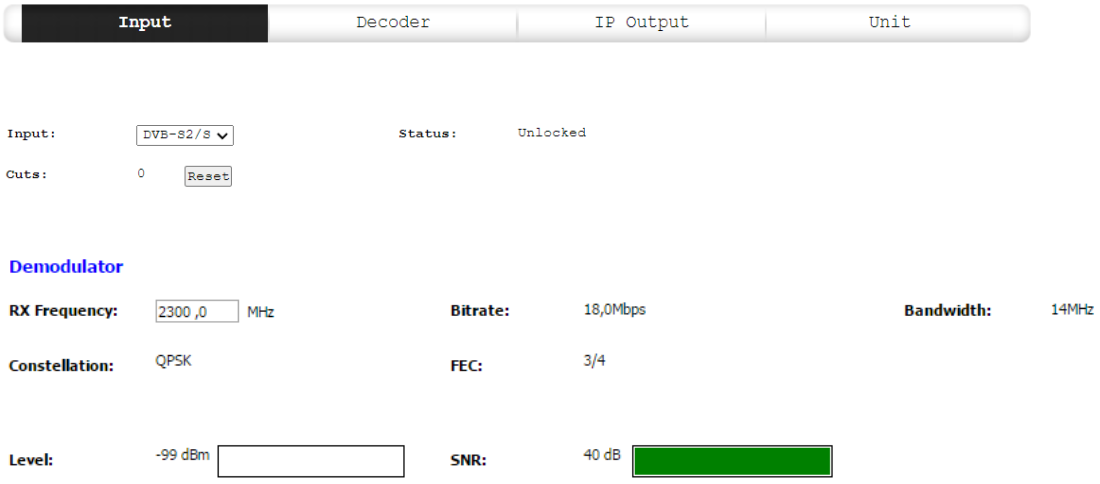


Figure 82: Web Server DVB-S2/S Input screen

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 is shown. (reading parameter)

- **Constellation:**

  In this field the type of modulation of the received signal is displayed. The available options are QPSK, 8PSK, 16APSK and 32APSK for DVB-S2. (reading parameter)

- **FEC:**

  In this field the value of the FEC of the received signal is displayed. The available options are 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 for DVB-S2. (reading parameter)

- **Level:**

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

- **SNR:**

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

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

7.2.4 ASI INPUT

Figure 83: Web Server ASI Input screen

In this screen it is shown if ASI signal is being received through the status field.

If this field shows the locked word, it means that 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)

7.2.5 IP INPUT

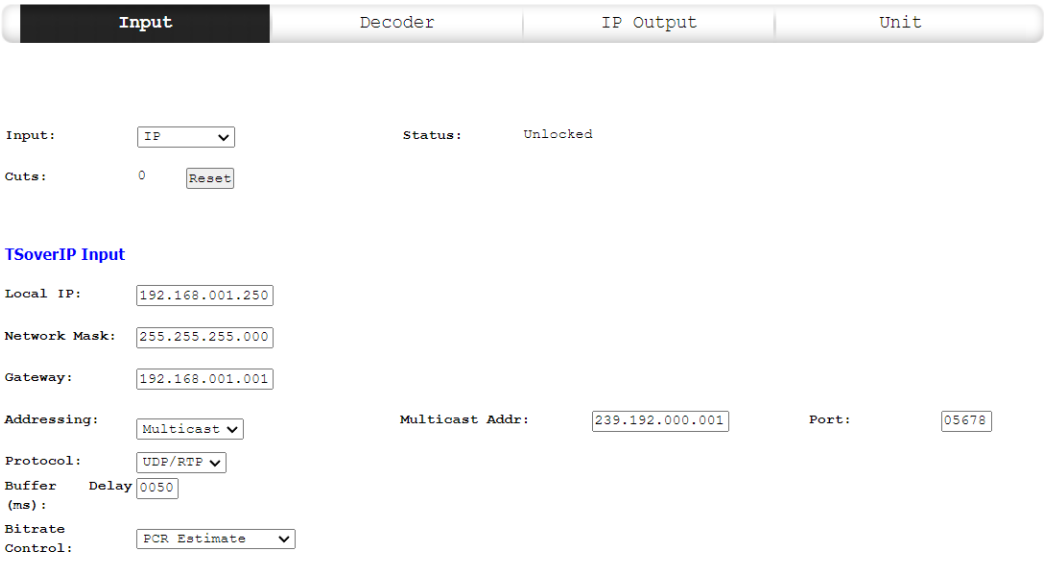


Figure 84: Web Server IP Input screen

- **Addressing:**

  In 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)

- **UDP Port:**

  In this field, the port number of the device through which is going to receive the signal must be set. (editable parameter)

- **Protocol:**
-

  This field displays the protocol used for the communication. (reading parameter
  The possible options are:
  - UDP/RTP
  - SRT

- **Buffer Delay:**

  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 value with the Up, Down and Right, Left buttons. To save the introduced value press the OK button. (editable parameter)

- **Bitrate Control:**
-

  This field you can choose which technique do you want to use for the bitrate control:

  - PCR Estimate
  - Fixed Buffer
  - Stream Estimate
  - Disable Buffer

7.2.6 DECODER

In this field, the status of the IP input is displayed. (reading parameter)

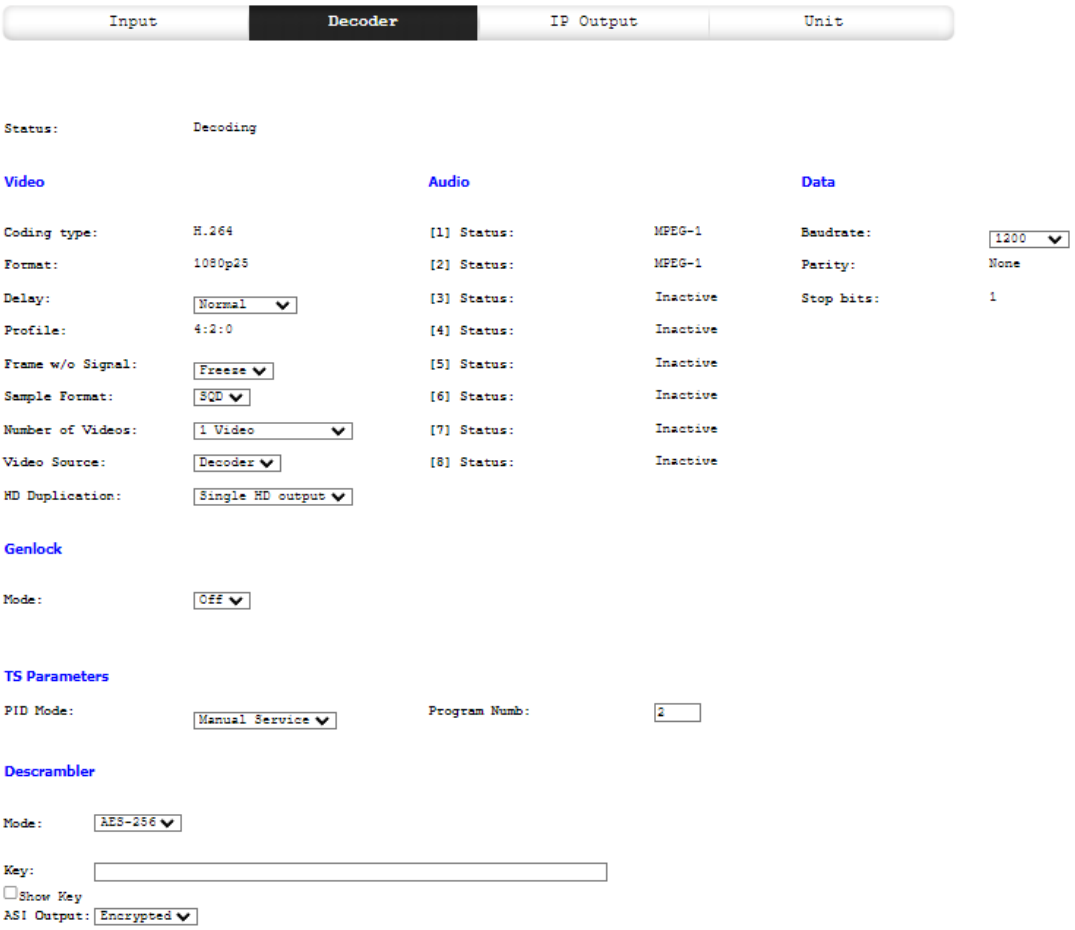


Figure 85: Web Server Decoder screen

- 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. On input stream interruption last decoded frame is held, most effective when Genlock is not disabled.

  - Blue. On input stream interruption output will go to blue screen.

- Number of Videos:

  In this field, QuadSync conversion can be configured.

  The available options are:

  - 1 video. Standard mode for single HD/UHD operation.
  - 4 x HD-SDI 1080i
  - 4 x HD-SDI 1080psf
  - 4 x HD-SDI 1080p
  - 4 x 3G-SDI 1080p
  - 4 x HD-SDI 720p

  QuadSync option has to be installed to use this functionality.

- Video Source:

  In this field, the video output source is configured.

  The available options are:

- Decoder. Decoded video is output on SDI 1-4.
- Pattern. Video pattern based on current configuration.

- HD Duplication

  In this field, SD/HD duplication can be configured.

  The available options are:

  - Four HD outputs. Decoded video in HD modes output on SDI 1-4.
  - Single HD Output. Decoded video in HD modes output on SDI 1 only.

Audio:

- [1] Status:

  This field shows the status of the Audio . If there is no audio, this field displays the message "Inactive". If there is audio is shows the encoding type.

Data:

- 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)

Genlock:

- Mode:

  In this field, genlock mode can be configured.

  The available options are:

  - Off. Genlock frame buffer disabled, video output at rate recovered by PCR.
  - External. Output synchronized to external reference, must have compatible frame rate.
  - Internal. Output synchronized to internal reference, use to prevent PCR jitter transfer to SDI output.

TS Parameters:

- First Service: First service received is automatically decoded.
- PID Mode:

  In this field the mode for the decoding proccess is selected.
  The user can select one of the received services by program number or 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)
- Audio3 PID:

  In this field, the audio 1 packet identifier must be introduced. (editable parameter)
- Audio4 PID:

  In this field, the audio 2 packet identifier must be introduced. (editable parameter)
- Audio5 PID:

  In this field, the audio 1 packet identifier must be introduced. (editable parameter)
- Audio6 PID:

  In this field, the audio 2 packet identifier must be introduced. (editable parameter)
- Audio7 PID:

  In this field, the audio 1 packet identifier must be introduced. (editable parameter)
- Audio8 PID:

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

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 characer introduced can be from 0 to 9 and from A to F. (editable parameter)

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.

7.2.7 IP Output

Figure 86: Web Server IP Output screen

Configuration:

This option is available if the IP Input is not selected

- Local IP:

  In this option, the IP address of the device is shown.

- Network Mask:

  Subnet address of the device which is going to send the information.

- Gateway:

  Gateway address of the device which is going to send the information.

- 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)

- 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, UDP or SRT. (eligible parameter)

- Time to live:

  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.

Diagnostics:

In this field, the estimated output bitrate and IP packet size is shown.

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.

7.2.8 UNIT

Figure 87: 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)
- Phy speed:

  Communication speed can be configured here.
- Detected speed:

  Communication detected speed Is shown here.
- 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)

- 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 ºC is selected then, the temperature value of the RX and TX will be shown in ºC and the same occurs when Fº 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
- Inclinometer not present
- QPT not present
- ODU: PLL not locked
- ODU: Frequency Out of Range
- ODU: Temperature High
- ODU: ODUNot Connected

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 88: 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 89: 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:

Figure 90: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:

Figure 91: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 UDR V10 receiver and click on submit, it will take 20-30 minutes to finish, the receiver will be automatically rebooted once the upgrade has finished.

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

Figure 92: 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.

Chapter 8: Equipment Installation

8.1 Introduction

This chapter provides important information for receiver system installation such as connections available in the rear panel of the UDR-70 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 UDR-70 receiver are shown in the figure below:

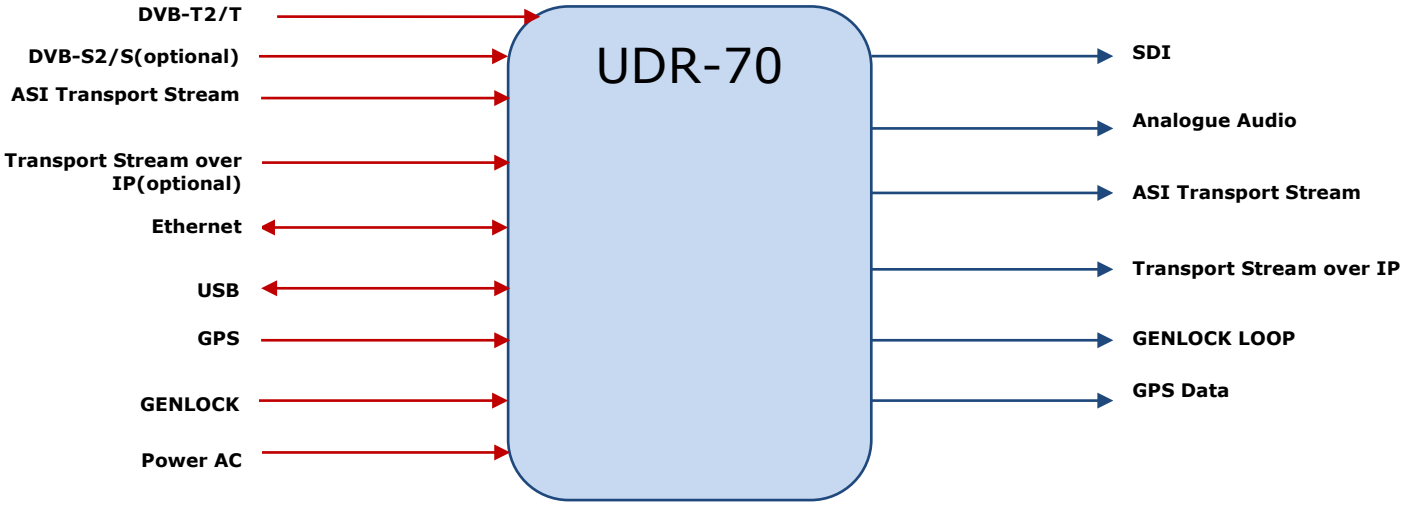


Figure 93: UDR-70 receiver connections

8.2.1 Power supply

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

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.

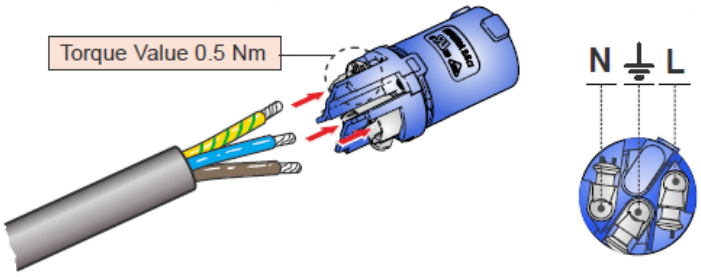
The AC mains input uses a Neutrik MLC connector. A cable with the required connectors is supplied with the receiver. The AC power connector used in this equipment is designed to prevent accidental disconnection. To extract the connector, pull back the locking clip and rotate the connector, as indicated 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 23: AC Power supply features

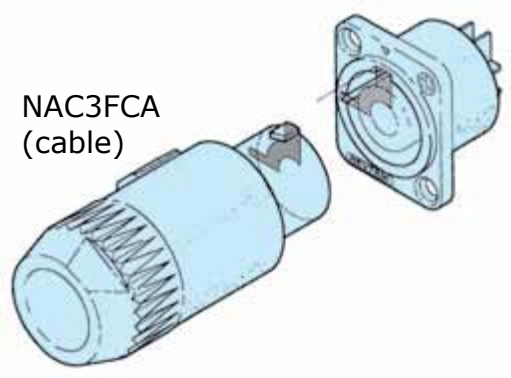
Pinout



Pin	Description
1	L
2	GND
3	N

Table 24: Power supply connector pinout

Connector needed



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

DC Power supply

The receiver equipment can be powered by a DC source from 20 to 36 V.

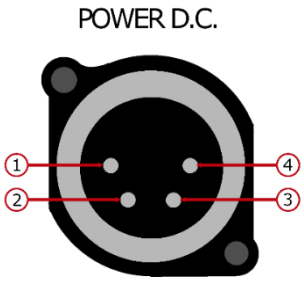
The DC power supply is connected via a Neutrik 4-pin male XLR connector with a safety clip to prevent accidental disconnection.

Power supply DC connection technical features

Item	Features
Connector label	POWER D.C.
Conector type	XLR-4 male
Supply voltage	20-36 V.

Table 25: DC Power supply features

Pinout



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

Table 26: DC Power supply connector pinout

Connector needed

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

8.2.2 Intermediate frequency

Intermediate frequency input I.F.

The connection between the receiver unit and the down-converter uses triax cable, whose maximum length depends on the type of triaxial cable used.

Intermediate frequency connection technical features

Item	Features
Connector label	I.F. INPUT
Connector type (equipment)	Lemo 3 triax
Part Number (equipment)	EHP.3T
Part Number (cable)	FFA.3T
Manufacturer	Lemo
Required cable	Draka-Triflex 8 – Y HDTV

Table 27: IF input features

Never connect receiver control unit directly to the transmitter control unit.

8.2.3 DVB-ASI Transport Stream

DVB-ASI Transport Stream Input

The UDR-70 receiver has a DVB-ASI Transport Stream input, compatible with the EN50083-9 standard, available on an insulated 75Ω BNC connector on the rear panel of the rack-mount demodulator unit.

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

ASI connection technical features

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

Table 28: DVB-ASI Transport Stream input connection features

DVB-ASI Transport Stream Output

The UDR-70 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 rack-mount demodulator unit.

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
Connector type	BNC female
Impedance	75Ω
Standard	EN50083-9
Packet length	188/204Bytes
Maximum Bitrate	216 Mbit/s

Table 29: DVB-ASI Transport Stream output connection features

8.2.4 Video Outputs

The *Receiver* includes one digital 3G-SDI/HD-SDI/SD-SDI video outputs. It also includes one 12Gb SDI output and 3 additional SDI outputs for multivideo.

SDI connection technical features

Item	Features
Connector label	SDI 12Gb/SDI2/SDI3/SDI4
Connector Type	BNC female
Impedance	75Ω
Standard	SMPTE-424 SMPTE-259 SMPTE-292

Table 30: SDI output connections features

4K 12 Gb Optical connection technical features

Item	Features
Connector label	4K 12 Gb Optical
Connector Type	SFP

Table 31: SDI output

8.2.5 Genlock

Genlock Input

The UDR-70 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 of the rack-mount demodulator unit.

Genlock connection technical features

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

Table 32: Genlock input connection features

8.2.6 Transport Stream over IP(optional)

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

TS over IP connection technical features

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

Table 33: 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.

4K Transport Stream over IP Output

TS over IP connection technical features

Item	Features
Connector Label	4K TS OUT
Connector Type	RJ-45

Table 34: Transport stream over IP connection technical features

8.2.7 Audio output

The *Receiver* has different possible audio outputs:

- 2 audio outputs to extract 2 stereo or 4 mono analogue (line) signals where connections are made using two DB-9 connectors on the equipment's rear panel.
- 4 SDI outputs with 8 audio channels embedded where connections are made with a mini BNC connector on equipment's rear panel.

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
Cable Connector type	DB-9 female

Table 35: Analogue audio outputs connections features

Pinout of the cable connector

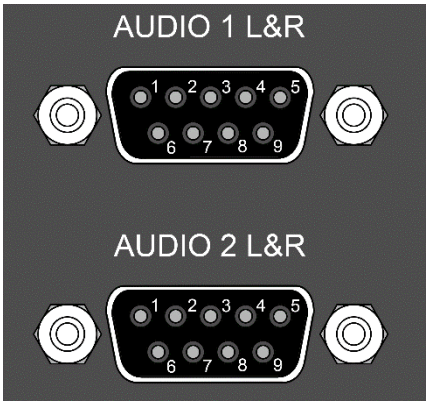


Figure 94:Analogue connectors

8.2.8 GPS / Data

GPS Data Input and Output

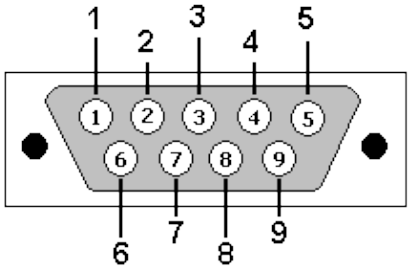
In order to provide GPS information about the receiver, the UDR-70 receiver incorporates a GPS RS232 connector. The data to be obtained is the positioning of the receiver.

GPS / DATA connection technical features

Item	Features
Connector Label	GPS-DATA
Connector type	DB-9 male

Table 36: GPS / DATA connection features

Pinout of the cable connector (Watched from the soldering side)



Pin	Description
1	+ 5V. GPS
2	Received Data to the PC
3	NOT USED
4	NOT USED
5	GND
6	NOT USED
7	GPS Data to the Receiver
8	NOT USED
9	NOT USED

Table 37: GPS data cable connector pinout

8.2.9 Remote control

The UDR-70 receiver can be controlled and monitored remotely over an Ethernet link throughout a Web Server and SNMP.

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 38: Remote connection technical features

8.2.10 USB

Through the USB connection, it is possible to update the firmware of the UDR-70 receiver directly from an exernal USB device receiver. Also, it can be used to supply up to 2.5A @ +5V to a device.

The connector is type A and its pinout is:

USB connection technical features

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

Table 39: USB input connection technical features

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.

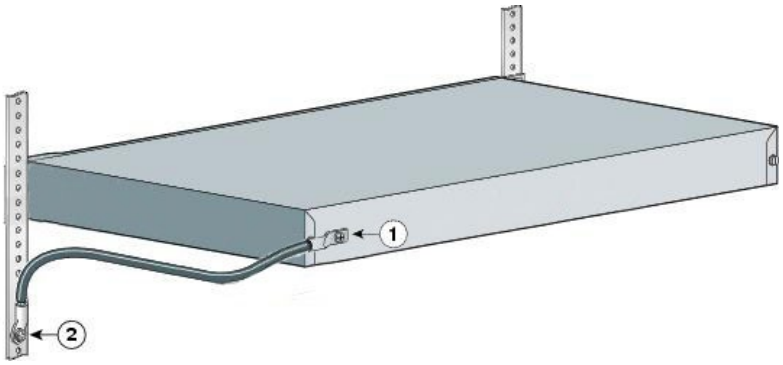


Figure 95: Receiver grounding example

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

There are 3 fans on the Receiver, 2 air outputs and 1 air input.

8.4 Installation diagrams

The down-converter should be installed next to the receiver antenna. The form that the antenna is connected to the down-converter input is through mechanical hook. The down-converter is connected to the UDR-70 receiver though a triax cable. For better performance high quality cables and connectors should be used.

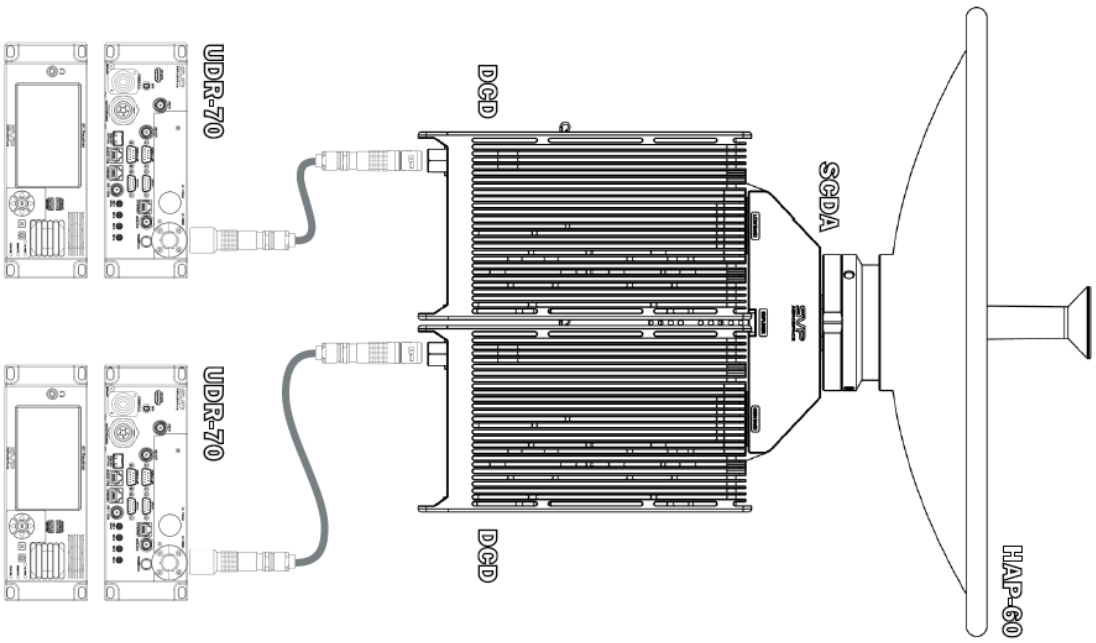
Do not connect wrongly up-converter to the receiver. In this case, the up converter doesn't switch on.

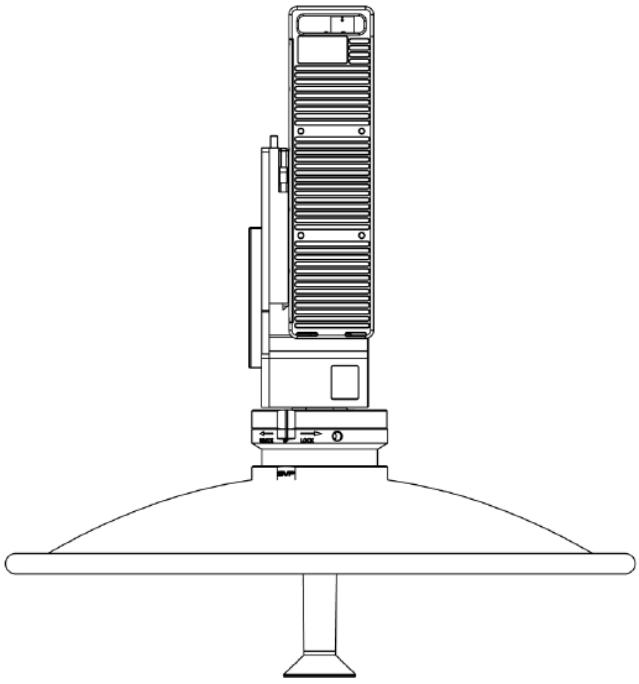
The down-converter is powered by the receiver by the IF output. So, the IF output should be connected to one IF input of the HD receiver.

Figure 96: Down-Converter

The power supply to the down-converter in the receiver should be disabled when the down-converter is being installed.

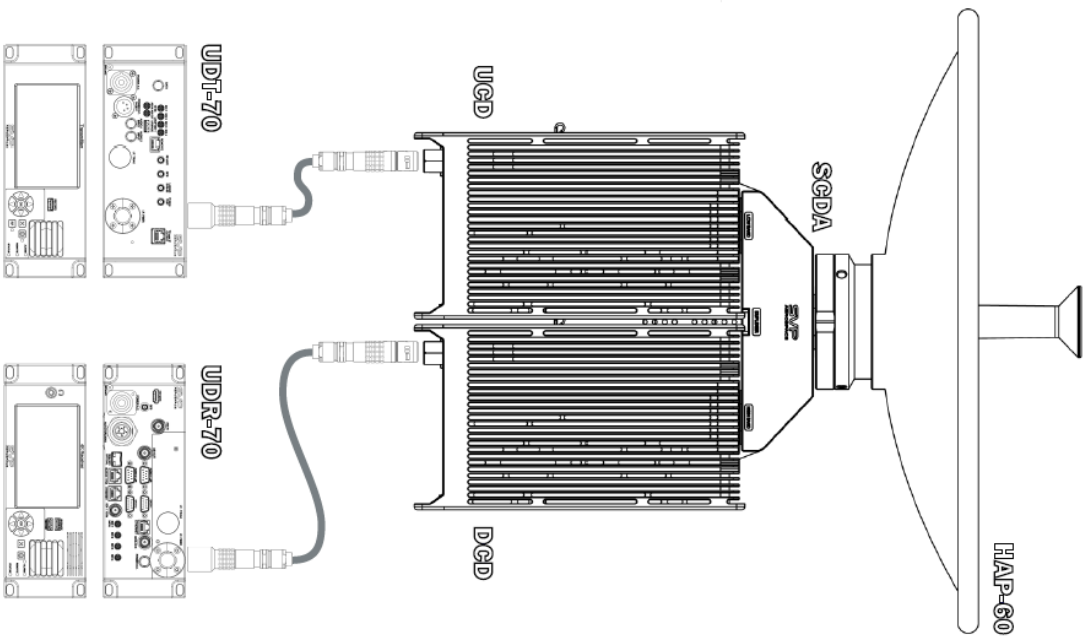
8.4.1 1+1 Configuration diagram

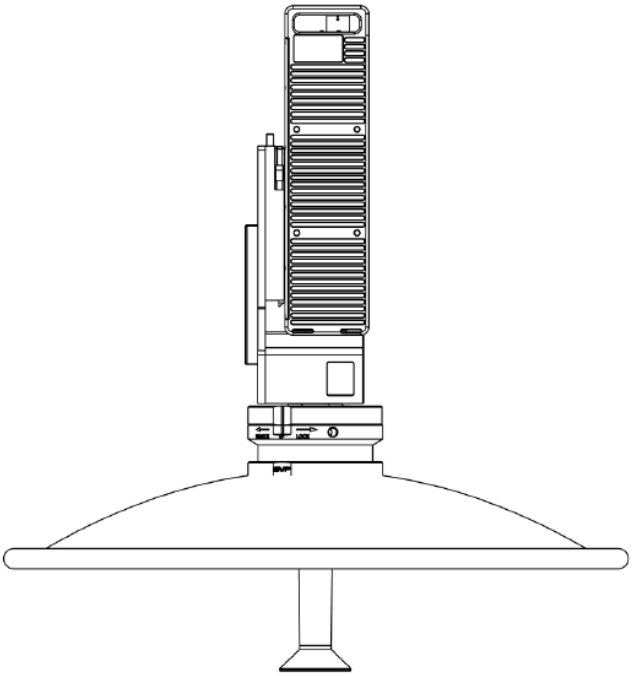




1+1 RX INSTALLATION

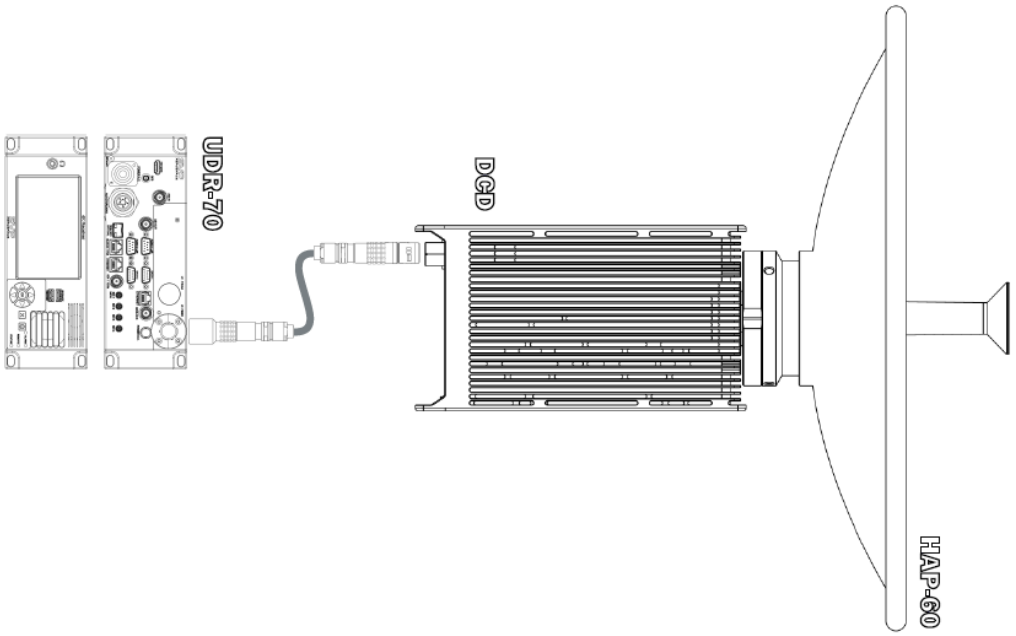
8.4.2 Duplex Configuration diagram

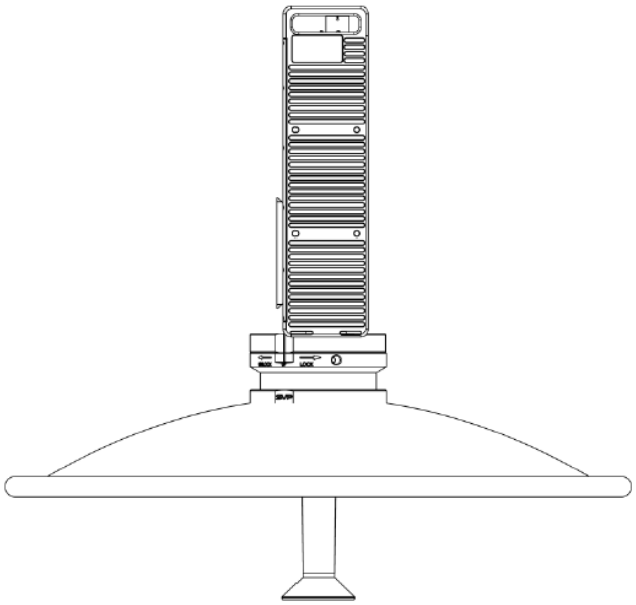




DUPLEX INSTALLATION

8.4.3 Single Configuration diagram





Chapter 9: Down Converter

This chapter provides all the information needed about the UDR-70 receiver down-converters.

9.1 Front Panel

The figure below shows the front panel of the down-converter.

- Lemo connector for IF
- Autotracking Antenna connector
- Channel selector: with 15 preset channels
- Status indicator LED
- Display

Figure 97: Front panel of the Down-Converter

The down-converter is a multi-frequency equipment. The reception frequency can be configured manually using the channel selector in the down-converter (one among 15 previously programmed frequencies).

To configure the reception frequency remotely, the channel selector must be set in 0 position, slave mode.

The down-converter has a Status Indicator LED.

- If the down-converter is working properly the LED lights in green.

- If the LED is Off:

    - The control unit has the down-converter power supply disabled
    - There is a short circuit in the triax cable

- When the PLL is unlocked the LED flashes green and red alternatively

- If the down-converter has any other alarm the LED lights in red.

9.2 Display

Next, it is shown the main screen of the Down - Converter.

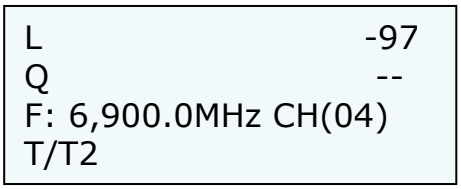


Figure 98: Down Converter front panel/ Main screen explanation

Parameters displayed in the panel are:

- Level of the received signal
- Quality of the received signal
- Frequency: received frequency in MHz
- Transmission standard
- Chanel (MHz)
- Bit Rate (Mbps)

9.2.1 Receiver threshold

The values listed below are threshold levels of receiver sensitivity. These values were measured with different modulations, constellations and FECs.

9.2.1.1 DVB-T2

QPSK

- **FEC: 1/2**

1,7 MHz	5 MHz	6 MHz	7 MHz	8 MHz
-107 dBm	-101 dBm	-100 dBm	-100 dBm	-99 dBm

- **FEC: 2/3**

1,7 MHz	5 MHz	6 MHz	7 MHz	8 MHz
-104 dBm	-99 dBm	-99 dBm	-99 dBm	- 98 dBm

- **FEC: 5/6**

1,7 MHz	5 MHz	6 MHz	7 MHz	8 MHz
-102 dBm	-98 dBm	-96 dBm	-96 dBm	-96 dBm

16 QAM

- **FEC: 1/2**

1,7 MHz	5 MHz	6 MHz	7 MHz	8 MHz
-101 dBm	-97 dBm	-96 dBm	-96 dBm	-95 dBm

- **FEC: 2/3**

1,7 MHz	5 MHz	6 MHz	7 MHz	8 MHz
-99 dBm	-94 dBm	-94 dBm	-93 dBm	-92 dBm

- **FEC: 5/6**

1,7 MHz	5 MHz	6 MHz	7 MHz	8 MHz
-96 dBm	-92 dBm	-91 dBm	-90 dBm	-90 dBm

64 QAM

- **FEC: 1/2**

1,7 MHz	5 MHz	6 MHz	7 MHz	8 MHz
-97 dBm	-93 dBm	-92 dBm	-91 dBm	-90 dBm

- **FEC: 2/3**

1,7 MHz	5 MHz	6 MHz	7 MHz	8 MHz
-95 dBm	-89 dBm	-89 dBm	-88 dBm	-87 dBm

- **FEC: 5/6**

1,7 MHz	5 MHz	6 MHz	7 MHz	8 MHz
-91 dBm	-86 dBm	-85 dBm	-85 dBm	-84 dBm

256 QAM

- **FEC: 1/2**

1,7 MHz	5 MHz	6 MHz	7 MHz	8 MHz
-93 dBm	-89 dBm	-87 dBm	-86 dBm	-86 dBm

- **FEC: 2/3**

1,7 MHz	**5 MHz**	**6 MHz**	**7 MHz**	**8 MHz**
-89 dBm	-85 dBm	-84 dBm	-83 dBm	-83 dBm

- **FEC: 5/6**

1,7 MHz	**5 MHz**	**6 MHz**	**7 MHz**	**8 MHz**
-85 dBm	-80 dBm	-79 dBm	-78 dBm	-77 dBm

9.2.1.2 DVB-T

QPSK

- **FEC: 1/2**

5 MHz	6 MHz	7 MHz	8 MHz
-101 dBm	-100 dBm	-99 dBm	-99 dBm

- **FEC: 3/4**

5 MHz	6 MHz	7 MHz	8 MHz
-99 dBm	-98 dBm	-97 dBm	-97 dBm

- **FEC: 7/8**

5 MHz	6 MHz	7 MHz	8 MHz
-97 dBm	-96 dBm	-96 dBm	-95 dBm

16 QAM

- **FEC: 1/2**

5 MHz	6 MHz	7 MHz	8 MHz
-96 dBm	-96 dBm	-95 dBm	-94 dBm

- **FEC: 3/4**

5 MHz	6 MHz	7 MHz	8 MHz
-93 dBm	-92 dBm	-91 dBm	-90 dBm

- **FEC: 7/8**

5 MHz	6 MHz	7 MHz	8 MHz
-91 dBm	-90 dBm	-89 dBm	-89 dBm

64 QAM

- **FEC: 1/2**

5 MHz	6 MHz	7 MHz	8 MHz
-92 dBm	-91 dBm	-90 dBm	-89 dBm

- **FEC: 3/4**

5 MHz	6 MHz	7 MHz	8 MHz
-87 dBm	-85 dBm	-85 dBm	-85 dBm

- **FEC: 7/8**

5 MHz	6 MHz	7 MHz	8 MHz
-85 dBm	-83 dBm	-83 dBm	-82 dBm

9.3 Alarms

Alarms and warnings detailed below can appear on the down-converter:

- Input RF signal low:
  When the received signal level is below -85dBm the equipment shows an alarm, inform the user that the received signal level is low. The LED in the down-converter lights red. In the control unit the LED next to ALARM button lights red and "Input RF signal low" alarm is displayed on the alarms list.

- Frequency out of range:
  When set in slave mode, the frequency configured remotely is out of the frequency range of the receiver, the equipment shows an alarm. In the down-converter the LED lights red. In the control unit the LED next to alarm button lights red and Frequency out of range alarm is displayed on the alarms list.

- Lock status of the down-converter:
  If the PLL of the down-converter is not locked in frequency, the equipment shows an alarm. In the down-converter the LED blinks red and green. In the control unit the LED next to alarm button lights red and PLL no lock alarm is displayed on the alarms list.

- Down-converter temperature high:
  If the temperature inside the down-converter reaches or exceeds 85ºC, an alarm is triggered. In the down-converter the LED lights in red. In the control unit the red LED next to the ALARM button lights in red and "Down-converter temperature High" alarm is displayed in the alarms list.

- Down-converter power supply low/high:
  If the power supply voltage to the down-converter is below 18V or above 36V, an alarm is triggered. In the down-converter the LED lights in red. In the control unit LED next to the ALARM button lights in red and "Down-converter power supply low/High" alarm is displayed on the alarms list. The unit stops displaying the alarm when the power supply voltage is 18V or greater, but below 36V.

9.4 Connections

This section provides important information about the connectors of the Down Converter.

9.4.1 IF connector

The connection between the transmitter unit and the down-converter uses triax cable, whose maximum length depends on the type of triax cable used.

Item	Features
Connector label	IF
Connector type (equipment)	Lemo 3 triax
Part Number (equipment)	EHP.3T
Part Number (cable)	FFA.3T
Manufacturer	Lemo
Required cable	Draka – Triflex 8 – Y HDTV

Table 40: Intermediate frequency connector technical features

Chapter 10: Preventive Maintenance

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

10.1 Maintenance Schedule

Procedure	Yearly	Quarterly	Monthly	Prior each use
Inspect wiring	✓			
Inspect the cables connection		✓		
Check point-to-point continuity of Triax cable			✓	✓(*)
Inspect the antenna bracket on RF head unit			✓	✓(*)
Inspect the antenna connection			✓	✓(*)

Table 41:. 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 with a multimeter the point-to-point continuity of the Triax cable that connect the Control unit and RF head unit.

10.3 Spare parts

The transmitter system has no user replaceable parts. Contact SVP Broadcast Microwave for all service and repair inquiries.

Contact email: info@svpbm.com

Note: Any attempts to service individual components may make the warranty void.

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 consent in writing has first been obtained from SVP Broadcast Microwave. SVP Broadcast Microwave shall not be under any liability for warranty in respect to 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
Zubiaurre 7
48215 Iurreta
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 hitherto 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: QPT User's 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 99: QPT Pan & Tilt Positioner

A.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 rugged 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 defence 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.

Digital Serial Integrated Control (IC) units communicate with SVP receiver models HDR-10X and UDR-70.

A.2 Technical Specifications

A.2.2 QPT-90

The QPT-90 positioner, if the temperature drops below -15ºC, 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).

Performance

Item	Specifications
Load Capacity	90 Ib-ft (10.8 Nm) maximum
Operating Voltage Range	24 VDC (±4 VDC)
Pan-Axis Range	435º (±217.5º) (non-slip ring)
Pan-Axis Speed	Max. 25º/sec
Tilt-Axis Range	180º (±90º)
Tilt-Axis Speed	Max.-8º/sec
Internal Heater	Included standard, thermostatically controlled
Consumption	4.4A at 24 VDC
Operating Temperature	Without Heater: -15ºC to 55ºC With Heater: -30ºC to 55ºC
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 42: QPT-90 Standard Performance

Serial features

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

Table 43: QPT-90 Serial features

Mil-Spec Shock Vibration

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

Table 44: QPT-90 Mil-Spec Shock Vibration

Figure 100:QPT-90 Pan & Tilt Positioner

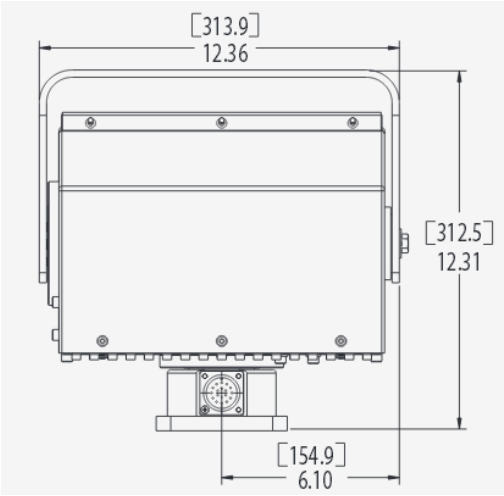


Figure 101: QPT-90 Dimensions

Annex B: SCDA User's Guide

Important Notes

1. The **SCDA duplexor** has been designed to allow an easy and quick installation of two RF Head units.

2. The duplexor is rugged and durable enough for virtually any environment.

3. The high performance of this equipment is only guaranteed when using high quality cables and connectors.

4. Only authorized personnel should open the product and any repair or warranty will be invalidated if the seals are broken.

Figure 102: SCDA Duplexor

B.1 Description

The **SCDA Duplexor** with double head bracket has been designed to allow an easy and quick installation of two equipments. Both units are installed near the antenna using just one tripod.

With this duplexor it is possible to connect two transmitters, two receivers or one receiver and one transmitter. This device is available for the frequency range which is needed.

The equipments can be up-converters or down-converters. This configuration makes possible for both equipments to share the same tripod and the same antenna.

The bracket has two clasps, one for each equipment, to prevent an unwanted manipulation.

B.2 Technical Specifications

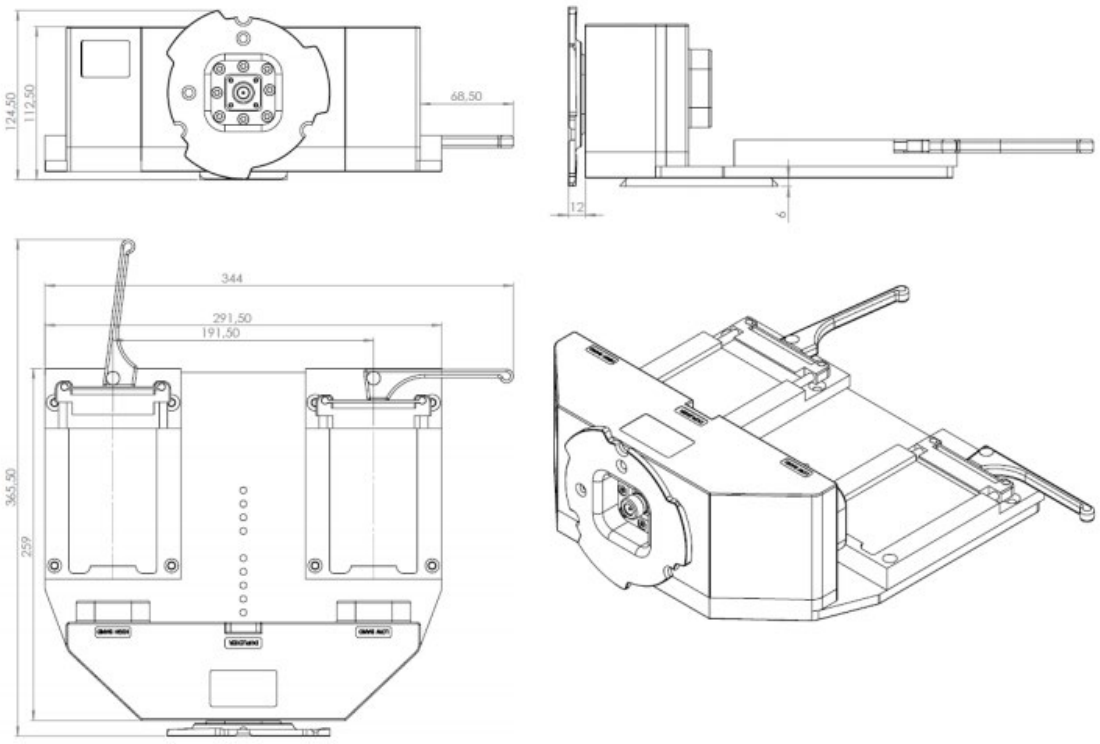
Main Characteristics

Item	Specifications
Frequency bands	2 GHz Band: 2.0 – 2.1 GHz / 2.21 – 2.38 GHz 6 GHz Band: 6.3 – 6.5 GHz / 6.6 GHz – 6.8 GHz 7 GHz Band: 6.80 – 6.95 GHz / 7.15 – 7.30 GHz 10 GHz Band: 10.20 – 10.35 GHz / 10.50 – 10.65 GHz
Material	Aluminium, powder coated
Weight	4.5 kg
Size	Width: 259 mm (without bracket) Height: 112.5 mm (without bracket) Depth: 291.5 mm

Table 45: SCDA Main Characteristics

Figure 103: SCDA Duplexor

B.3 Mechanical Drawings



B.4 Configurations

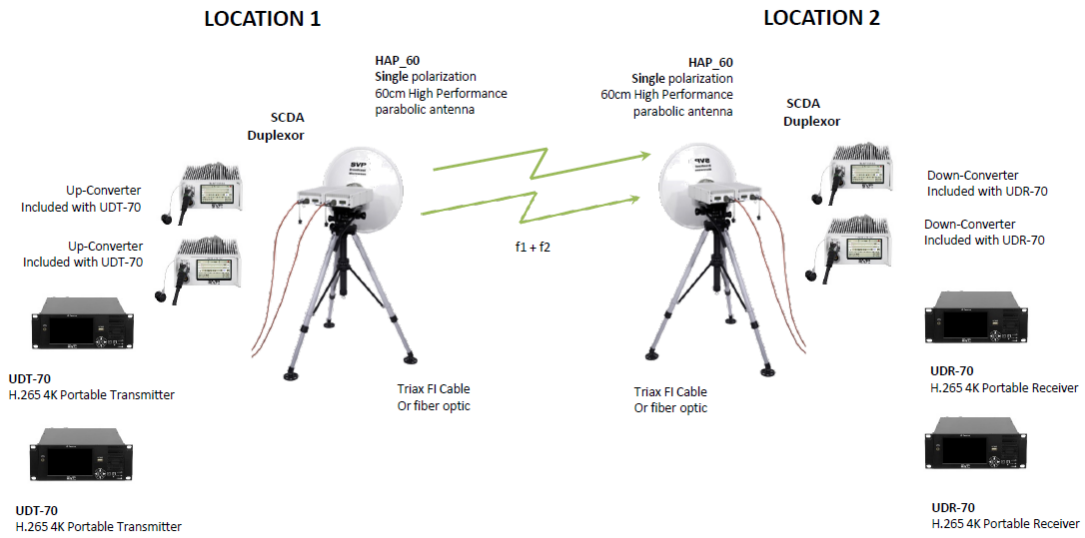


Figure 104: 1+1 Configuration

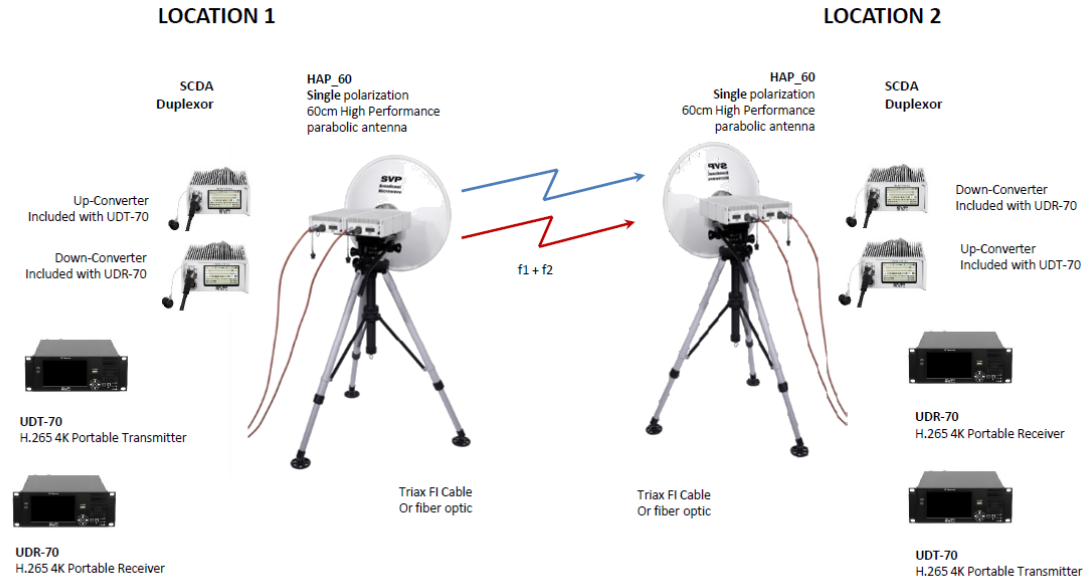


Figure 105: Bidirectional Configuration

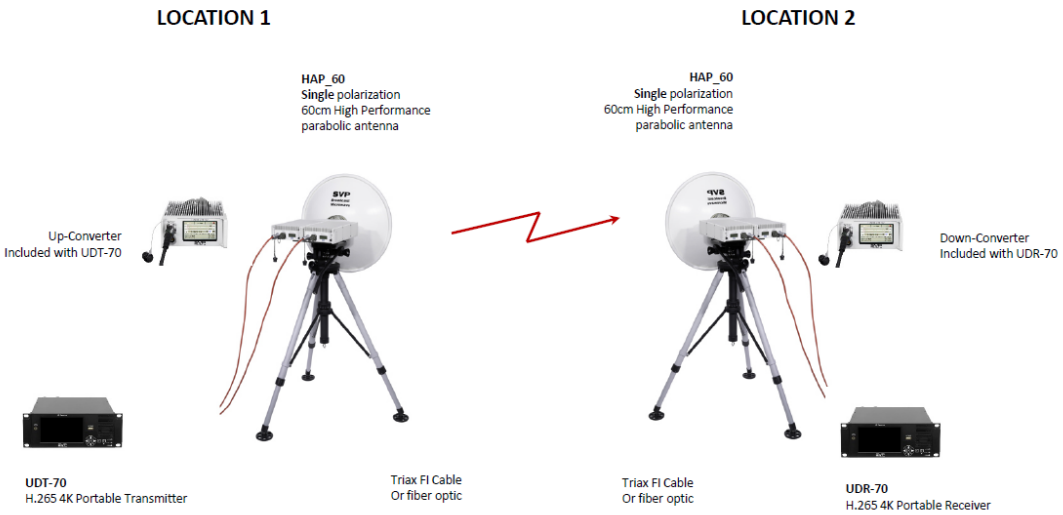


Figure 106: Single link Configuration

Annex C: HAP-60 User's Guide

Important Notes

1. The **HAP-60 parabolic antenna** has been designed to be used in portable SVP links.

2. The antenna is rugged and durable enough for virtually any environment.

3. The high performance of this equipment is only guaranteed when using high quality cables and connectors.

4. Only authorized personnel should open the product and any repair or warranty will be invalidated if the seals are broken.

Figure 107:HAP-60 Parabolic Antenna

C.1 Description

The **HAP-60** parabolic antenna from SVP Broadcast Microwave is a single polarization antenna with a 60 cm diameter. This antenna works in the 2 GHZ, 6 GHz, 7 GHz and 10 GHz frequency bands.

It has been especially designed to be used in portable SVP links. So, it can be clamped to the RF head of SVP equipment.

The reflector is made of aluminium and it has an external ring, which increases the robustness of the structure. The feeder has a quickset system and can be clamped to the antenna without screws.

The HAP antenna offers the best performance and a long useful life is guaranteed. It can be used in the most adverse weather conditions.

C.2 Technical Specifications

Main Characteristics

Item	Specifications
Frequency bands	2 GHz, 6 GHz, 7 GHz and 10 GHz
Bandwidth	500 MHz
Gain	Depends on the frequency
Polarization	Linear
VSWR	Typ: < 1.8
Connector	N female
Diameter	60 cm
Weight	5 kg

Table 46: HAP-60 Main Characteristics

Annex D: Modulation Standards

This chapter describes the DVB-T/T2 and DVB-S/S2 standards, as well as their features and the differences between them.

D.1. DVB-T

DVB-T is a technical standard that specifies the framing structure, channel coding and modulation for digital terrestrial television (DTT) broadcasting. It is a flexible system that allows networks to be designed for the delivery of a wide range of services, from HDTV to multichannel SDTV, fixed, portable, mobile, and even handheld reception.

D.1.1. How Does It Work

DVB-T, in common with almost all modern terrestrial transmission systems, uses OFDM (orthogonal frequency division multiplex) modulation. This type of modulation, which uses a large number of sub-carriers, delivers a robust signal that has the ability to deal with very severe channel conditions.
DVB-T has technical characteristics that make it a very flexible system:

- 3 modulation options (QPSK, 16QAM, 64QAM).
- 5 different FEC (forward error correction) rates.
- 4 Guard Intervals.
- Choice of 2k or 8k carriers.
- Can operate in 6, 7 or 8MHz channel bandwidths.

Using different combinations of the above parameters a DVB-T network can be designed to match the requirements of the network operator, finding the right balance between robustness and capacity.

D.2. DVB-T2

DVB-T2 is the world's most advanced digital terrestrial television (DTT) system, offering more robustness, flexibility and at least 50% more efficiency than any other DTT system. It supports SD, HD, UHD, mobile TV, or any combination thereof.

D.2.1. How Does It Work

Like its predecessor, DVB-T2 uses OFDM (orthogonal frequency division multiplex) modulation with a large number of subcarriers delivering a robust signal, and offers a range of different modes, making it a very flexible standard. DVB-T2 uses the same error correction coding as used in DVB-S2 and DVB-C2: LDPC (Low Density Parity Check) coding combined with BCH (Bose-Chaudhuri-Hocquengham) coding, offering a very robust signal. The number of carriers, guard interval sizes and pilot signals can be adjusted, so that the overheads can be optimised for any target transmission channel.

D.2.2. DVB-T2 New Features

The DVB-T2 standard has several improvements in comparison with the DVB-T standard.

FEC coding

In the error correction stage, the DVB-T2 standard implements a combination of LDPC codes with BCH codes. LDPC codes allow a close performance to Shannon limit and the BCH codes are used to eliminate the floor error of the LDPC codes.

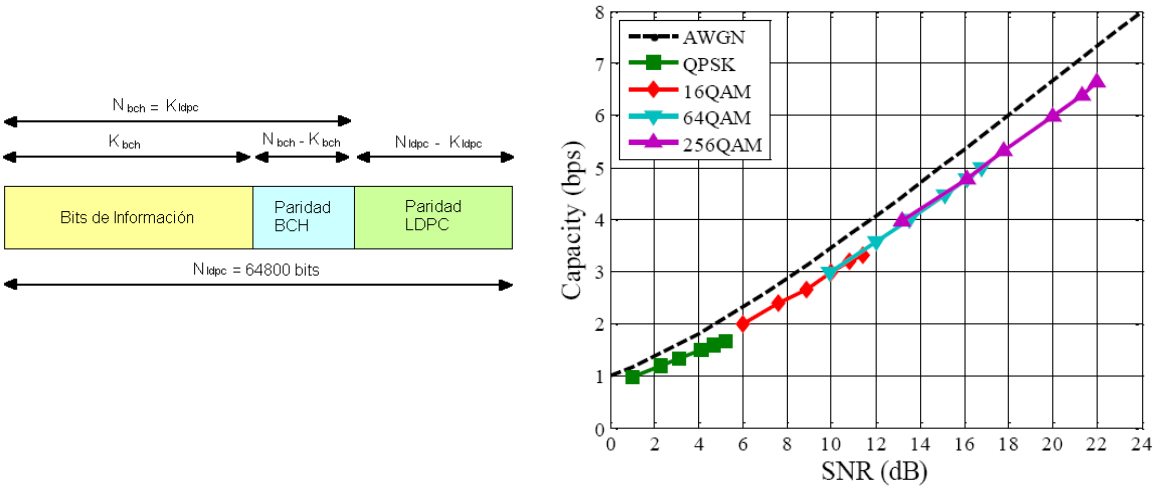


Figure 108: LDPC and BCH codes

Constellation Rotation

This new feature consists of a rotation of some degrees of the constellation. With this rotation, dependence between the I and Q components of the signal is achieved. This means that with only one component (the I or the Q) it is possible to know exactly the symbol to which it belongs.

This new feature provides additional robustness for low order constellations.

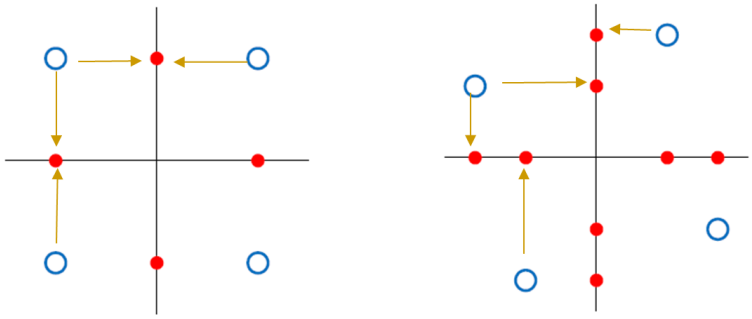


Figure 109: Constellation Rotation

D.3.3. DVB-T vs DVB-T2

Next, it is shown a comparison table between the two existing DVB terrestrial standards. The new features of the DVB-T2 standards respect to the DVB-T are in bold.

	DVB-T	**DVB-T2** (new/improved options in **bold**)
FEC	Convolutional Coding + Reed Solomon 1/2, 2/3, 3/4, 5/6, 7/8	LDPC + BCH 1/2, **3/5**, 2/3, 3/4, **4/5**, 5/6
Modes	QPSK, 16QAM, 64QAM	QPSK, 16QAM, 64 QAM, **256 QAM**
Guard Interval	1/4, 1/8, 1/16, 1/32	1/4, **19/128**, 1/8, **19/256**, 1/16, 1/32, **1/128**
FFT Size	2k, 8k	**1k**, 2k, **4k**, 8k, **16k**, **32k**
Scattered Pilots	8% of total	**1%, 2%, 4%,** 8% of total
Continual Pilots	2.0% of total	**0.4% - 2.4%** (0.4% - 0.8% in 8k–32k)
Bandwidth	6, 7, 8 MHz	**1.7, 5**, 6, 7, 8, **10** MHz
Typical data rate (UK)	24 Mbit/s	**40 Mbit/s**
Max. Data rate (@20 dB C/N)	31.7 Mbit/s (using 8 MHz)	**45.5 Mbit/s** (using 8 MHz)
Required C/N ratio (@24 Mbit/s)	16.7 dB	**10.8 dB**

Table 47:: DVB-T vs DVB-T2

D.3. DVB-S

DVB-S is the first generation of a standard for digital broadcasting via satellite.

D.3.1. How Does It Work

DVB-S was designed to carry MPEG-2 transport streams over satellite. MPEG-2 transport streams typically carry one or several television or radio services multiplexed into a synchronous bit stream. All service components are divided in short packets of 188 bytes, each identified by a Program Identifier in the header of the packet.
Generic data can also be carried in MPEG transport streams, provided that it is first encapsulated in the transport stream packets. The most common way to encapsulate IP data into MPEG streams is called Multi Protocol Encapsulation (MPE) and is also specified by a DVB standard. The total bit rate of the transport stream is constant but can typically be adjusted to match the needs of the satellite link. If the desired transport stream rate is greater than the sum of the carried components, empty packets are added to the stream by the multiplexer or the modulator. This operation is called rate adaptation. DVB-S uses QPSK modulation and concatenated error protection based on a convolutional Viterbi code and a shortened Reed Solomon code.

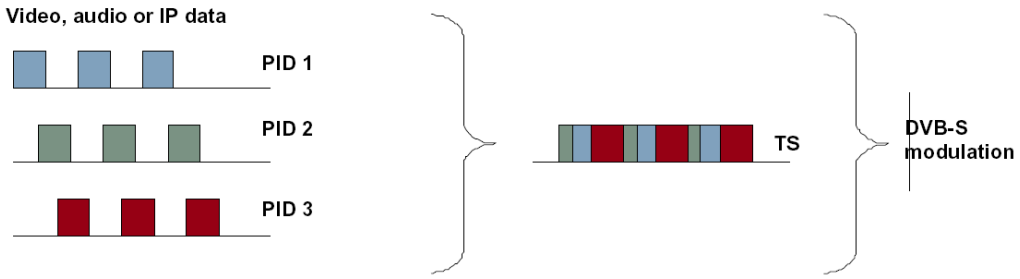


Figure 110: Future Extension Frames

D.4. DVB-S2

DVB-S2 is a digital satellite system developed by the DVB Project. It makes use of the latest modulation and coding techniques to deliver performance that approaches the theoretical limit for such systems.

D.4.1. How Does It Work

The original DVB-S system, on which DVB-S2 is based, specifies the use of QPSK modulation along with various tools for channel coding and error correction. Further additions were made with the emergence of DVB-DNSG (Digital Satellite News Gathering), for example allowing the use of 8PSK and 16QAM modulation. DVB-S2 delivers excellent performance, coming close to Shannon limit, the theoretical maximum information transfer rate in a channel for a given noise level. It can operate at carrier-to-noise ratios from -2dB (i.e., below the noise floor) with QPSK, through to +16dB using 32APSK. DVB-S2 benefits from more recent developments and has the following key technical characteristics:

New modulation schemes

There are four modulation modes available, with QPSK and 8PSK intended for broadcast applications in non-linear satellite transponders driven close to saturation. 16APSK and 32APSK, requiring a higher level of C/N, are mainly targeted at professional applications such as news gathering and interactive services.

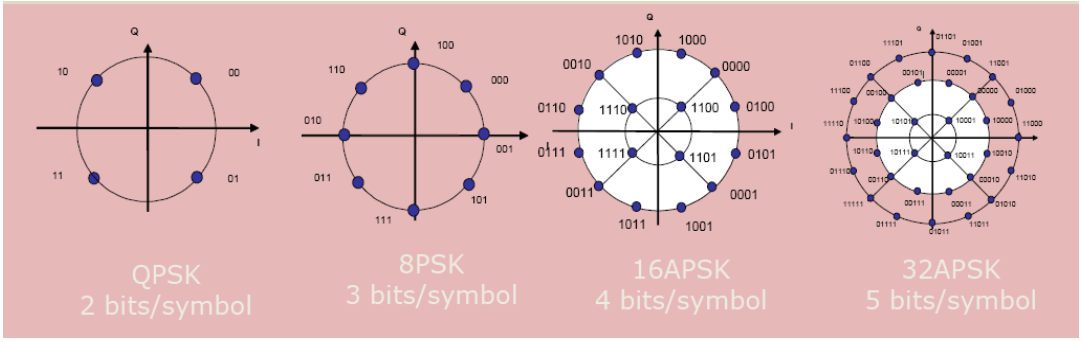


Figure 111: New DVB-S2 modulation schemes

Forward Error Correction

DVB-S2 uses a very powerful Forward error Correction scheme (FEC), a key factor in allowing achievement of excellent performance in the presence of high levels of noise and interference. The FEC system is based on concatenation of BCH (Bose, Chaudhuri – Hocquengham) with LDPC (Low density Parity Check) inner coding.

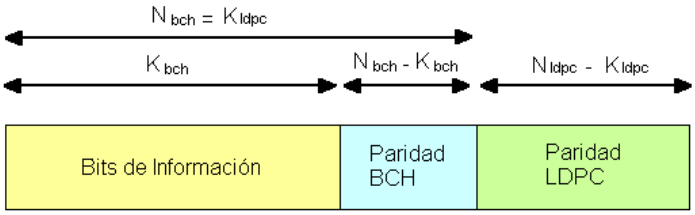


Figure 112: DVB-S2 FEC

Variable Coding and Modulation (VCM) (Used in the HRD-106 and IRD-70)

Variable Coding and Modulation is a mode of operation that allows different modulation parameters to be applied to the different DVB-S2 streams of a multistream signal. If each of the streams are intended for a different receiving site, VCM allows optimizing the parameters of each stream to get the best performance for each receive station, instead of dimensioning the whole link according to the smallest station.

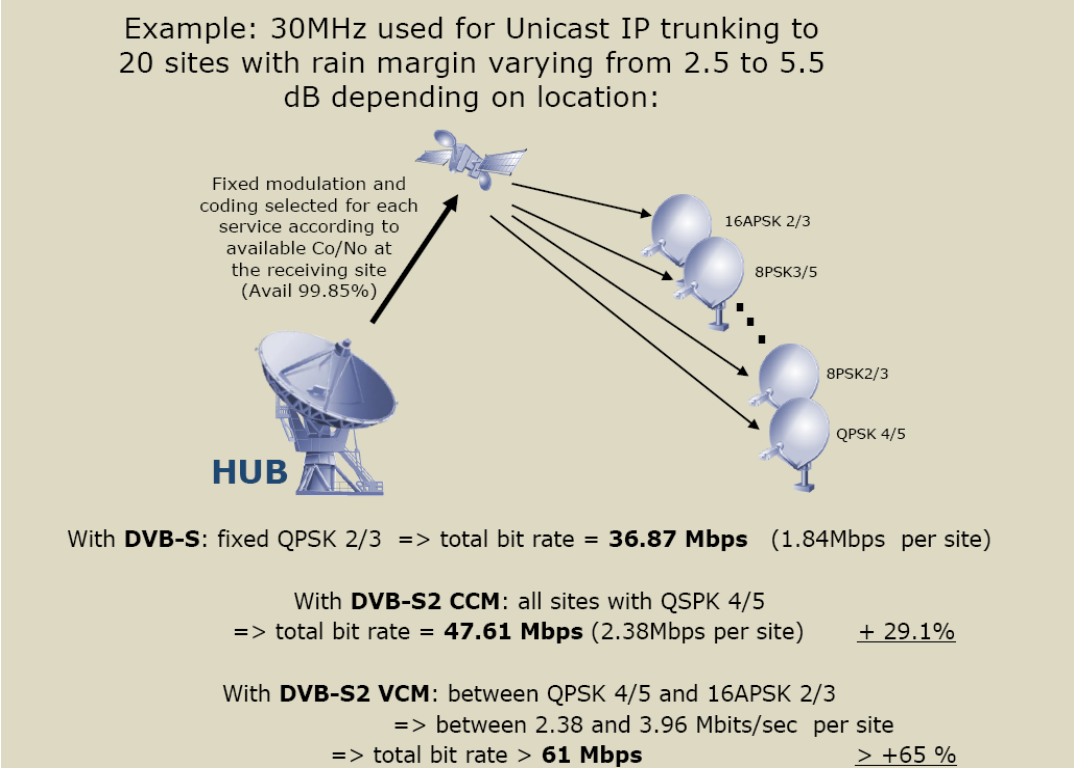


Figure 113: VCM mode

Adaptive Coding and Modulation (ACM) (Used in the HRD-106 and IRD-70)

In Adaptive Coding and Modulation mode, the modulation parameters of the Baseband frames can vary over time, according to the instantaneous receiving conditions of the site where the frame will be received. In ACM there is a feedback mechanism between the demodulator and the modulator. This feedback mechanism dynamically tells the modulator which modulation parameters to use for each baseband frame. ACM allows operating satellite links with almost no margin, since the system adapts automatically to fading or interference conditions.

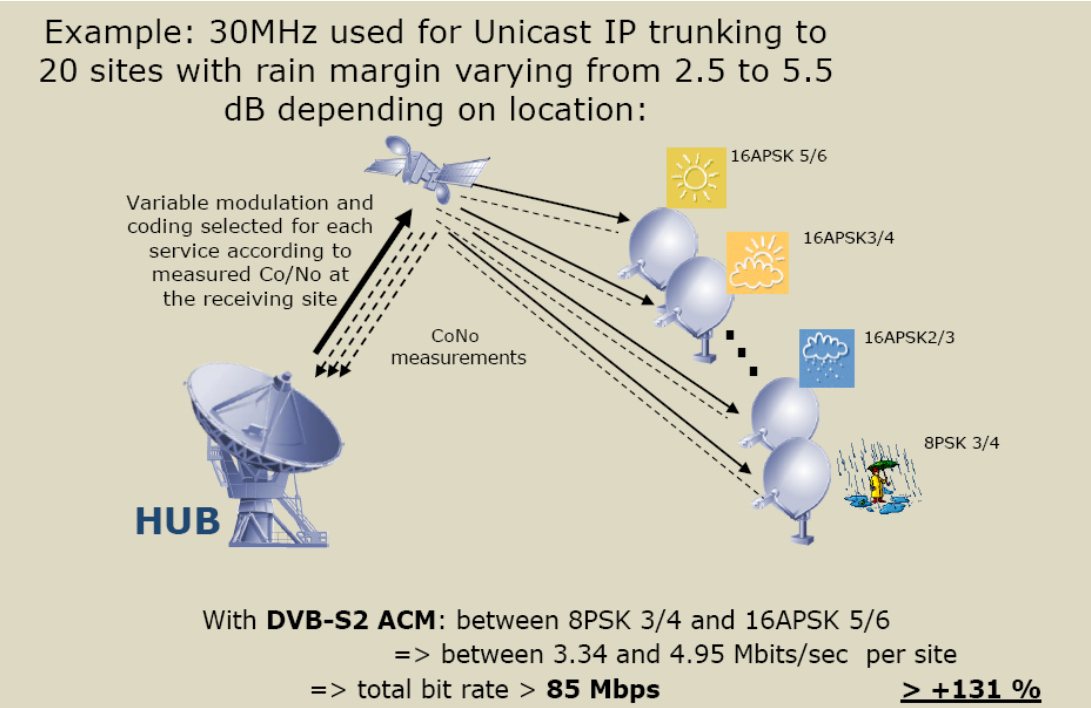


Figure 114: ACM mode

Other features implemented in the DVB-S2 standard are:

- Sharper roll-off factors which results in a direct gain of bandwidth.
- The ability to carry several signals on a single satellite carrier, without multiplexing in front of the modulator. This is called Multi-Stream.
- The ability to carry signals other than MPEG transport stream. This is called Generic Stream.

D.4.2. Pilots in DVB-S2

Pilots are unmodulated symbols grouped in blocks that can be added on the physical layer framing level.
Pilots are used to:

- Reduce the phase noise influence. Phase noise is created by the frequency components around the main carrier frequency. This noise contains components at many frequencies with randomly changing phase.
- Pilots are used to increase the reliability and the continuous receiver synchronization.

It is advisable to use pilots in the following cases:

- In ACM mode (always on).

- When a noticeable amount of phase noise is present.

- At low data rates.

- When distortion is present on the signal for example due to non-linearity.

- When using one of the following ModCods:

    - 8PSK 3/5 and 2/3

    - 16APSK 3/4

    - 32APSK 3/5

D.4.3. DVB-S vs DVB-S2

Next there are shown a series of comparisons between DVB-S and DVB-S2 standards.

DVB-S vs DVB-S2 Performance

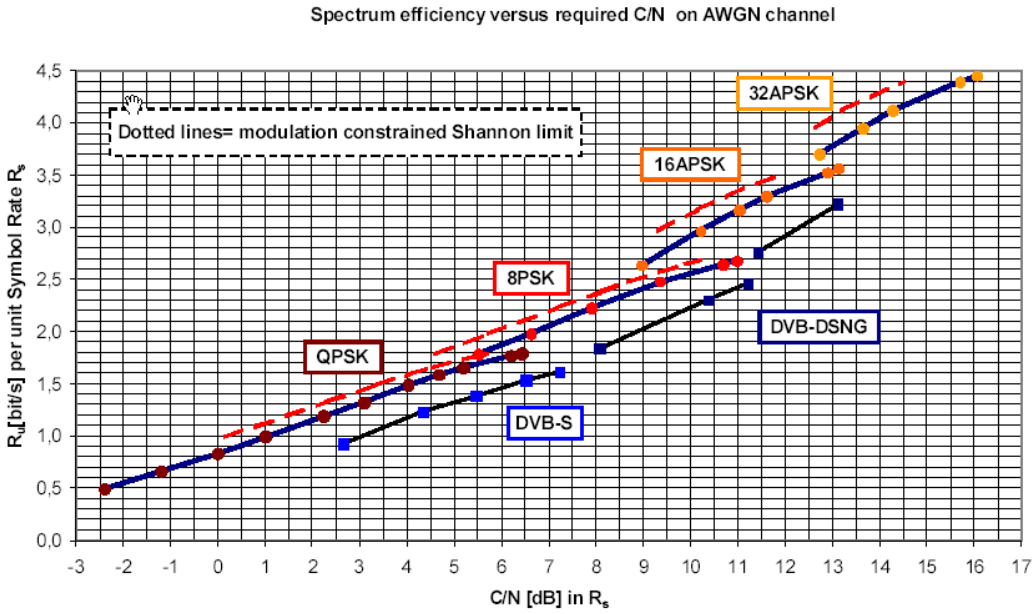


Figure 115: DVB-S vs DVB-S2 Performance

The figure above shows how the DVB-S2 standard is really close to the Shannon limit.

Main differences between DVB-S and DVB-S2

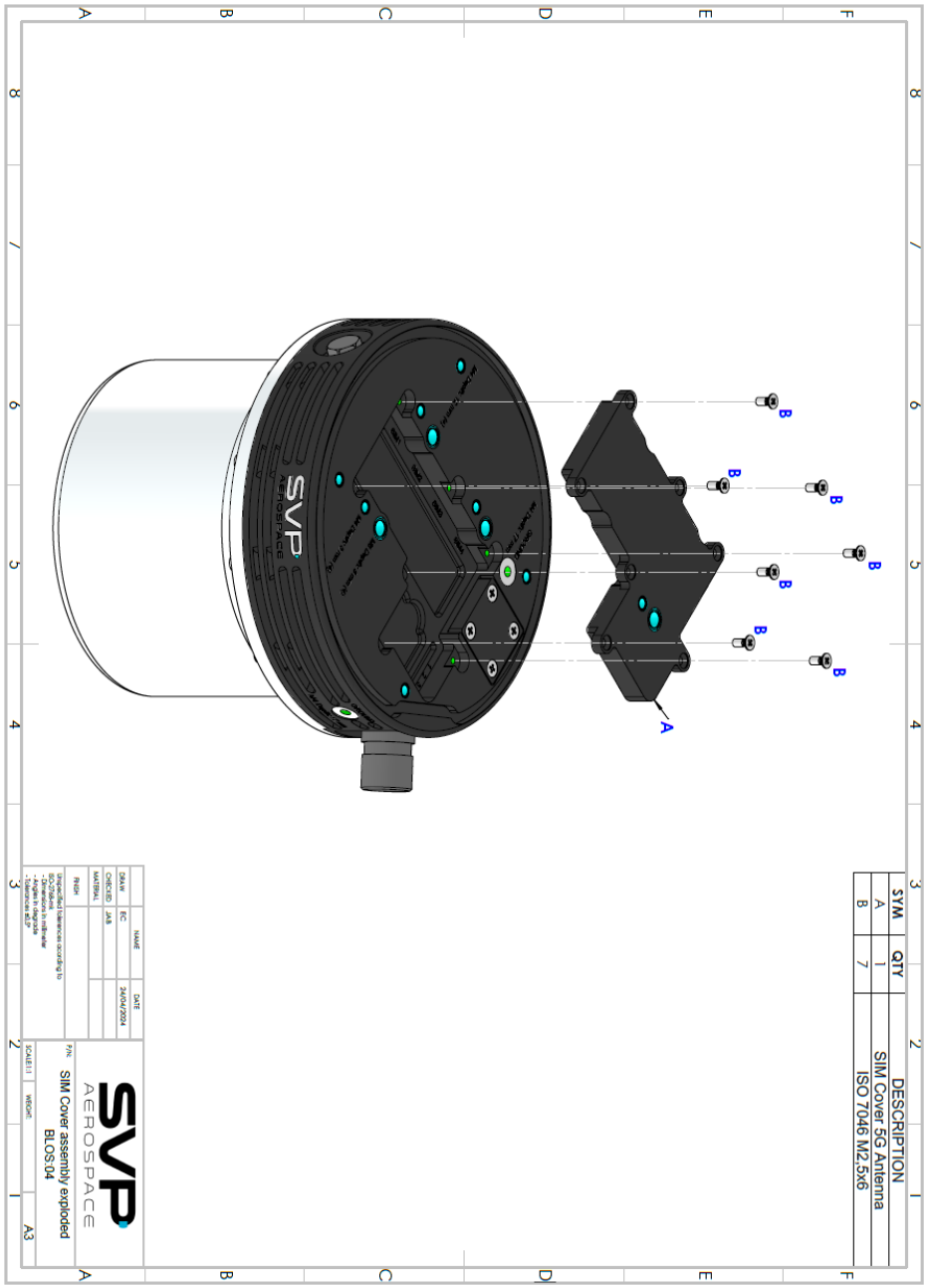
DVB-S	DVB-S2
Meant for broadcast only	Fully transparent to all data
Fixed 188 byte/packets	Baseband in 16 or 64 kbps
One TS/carrier	CCM/MultiStream – VCM – ACM
RS and Viterbi coding	LDPC and BCH coding
Need of high RX margin	Can work within noise floor
QPSK / QPSK-8PSK-16QAM	QPSK – 8PSK – 16APSK – 32APSK
35% and 25% Roll-off carrier	20% Roll off carrier
Consumer LNB's work in QPSK only	Pilot tones for extra synch in 8PSK

Table 48: Main differences between DVB-S and DVB-S2

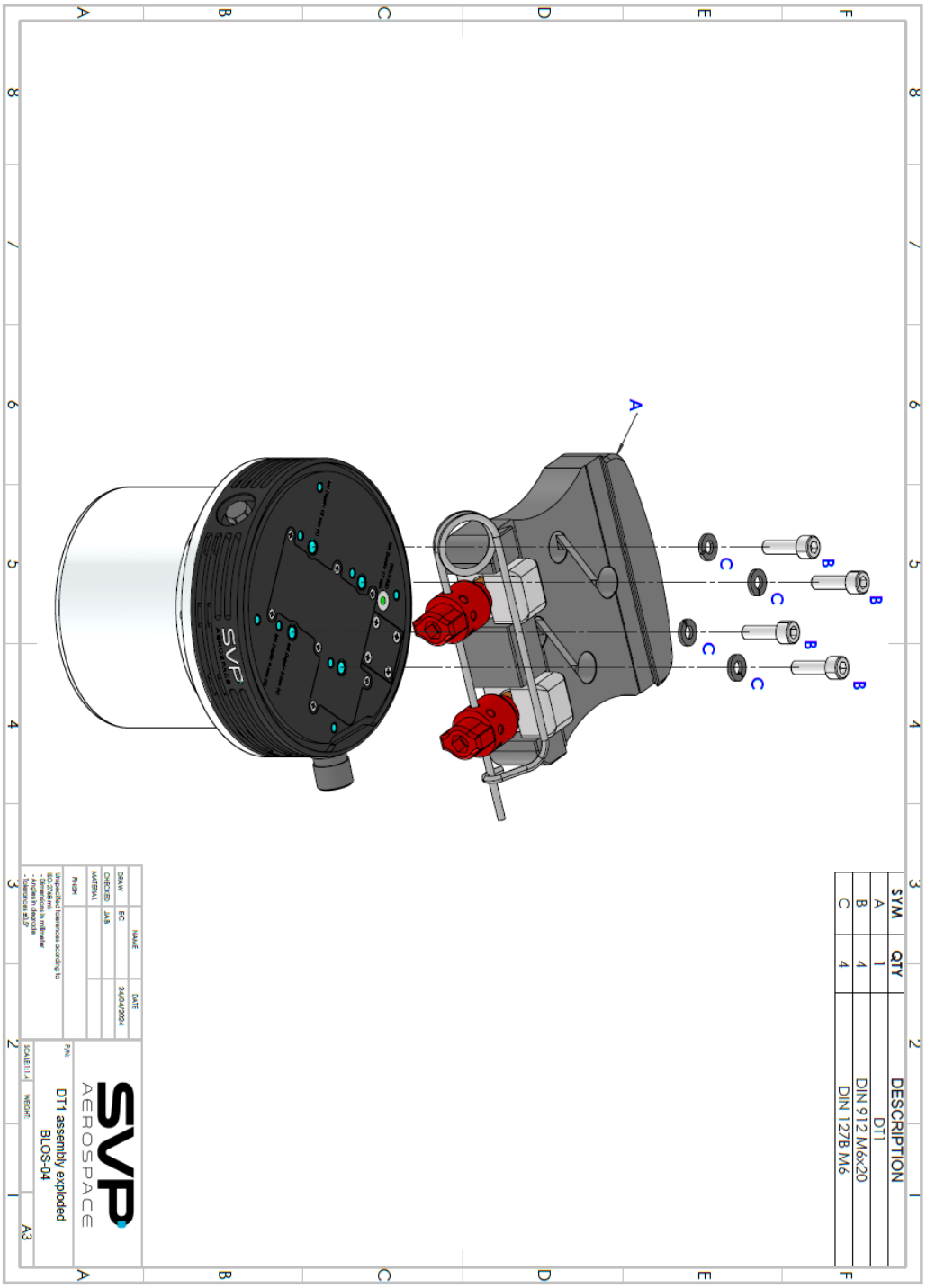
Annex E: Cellular Datalink Antenna

E.1 Cellular Datalink Antenna Installation diagrams

E.1.1 Cellular Datalink Antenna SIM Cover

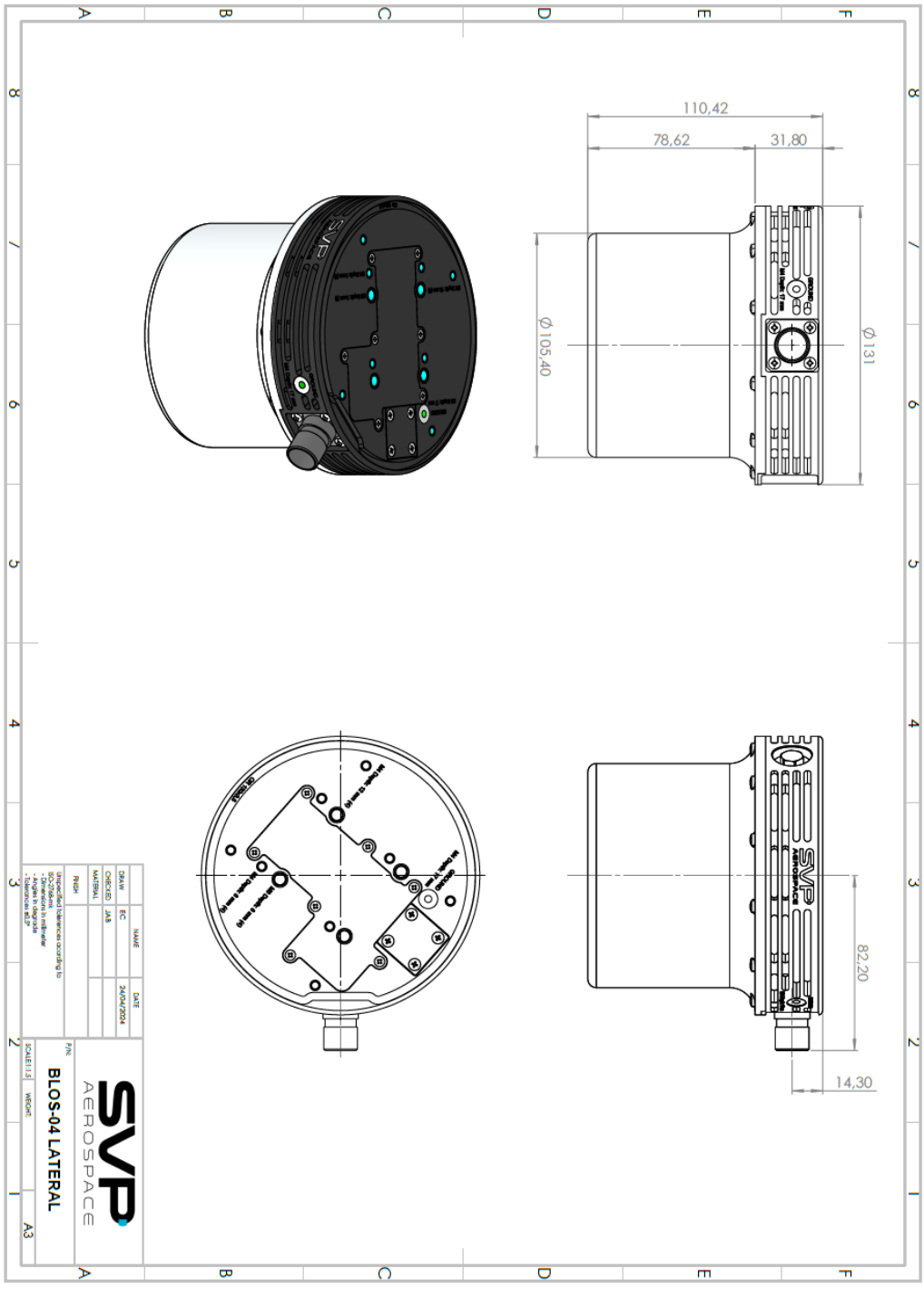


E.1.2 Cellular Datalink Antenna AIRFILM CAMERA SYSTEMS DT-1-1 Assembly

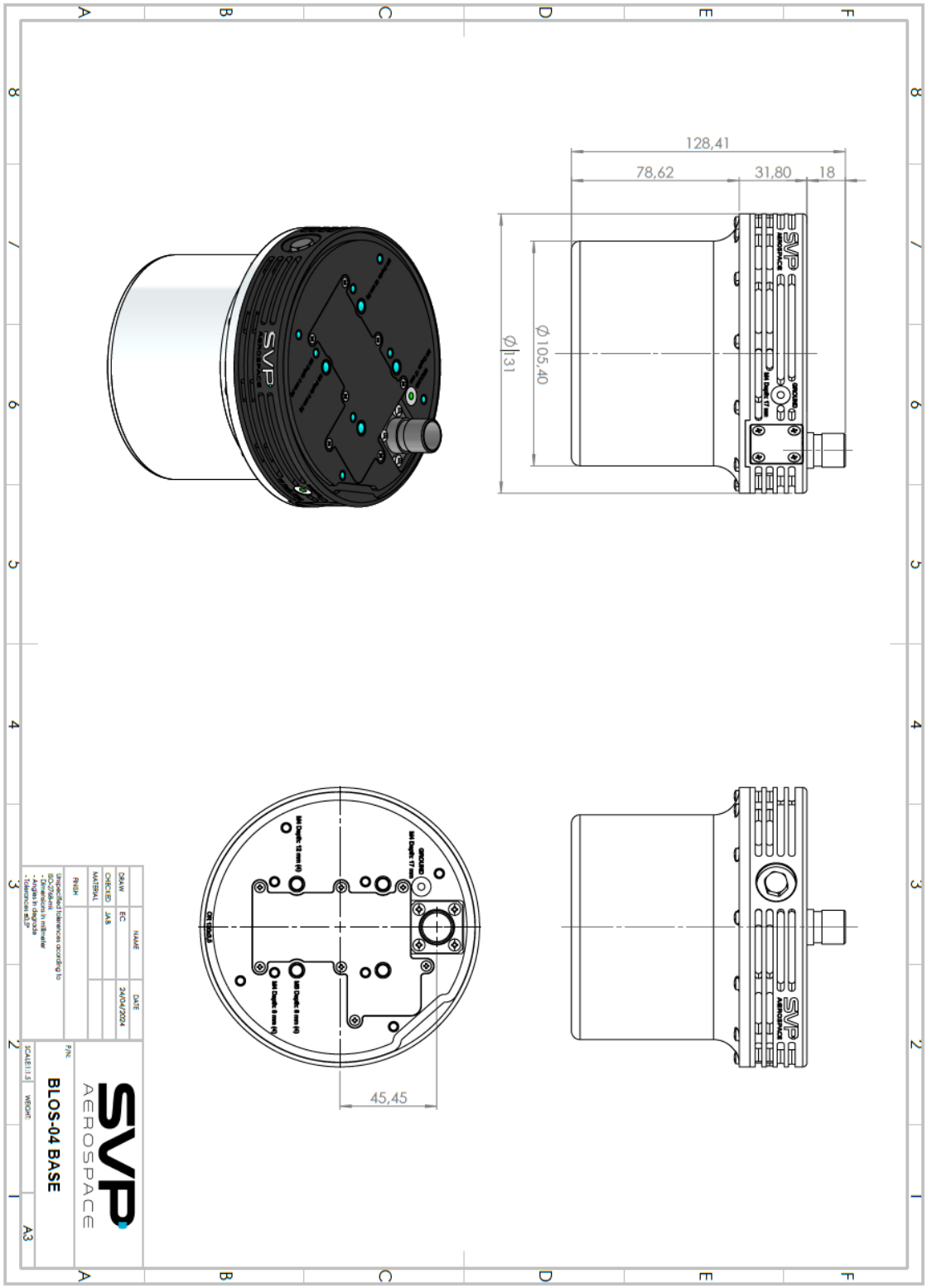


E.2 Cellular Datalink Antenna Mechanical Dimensions

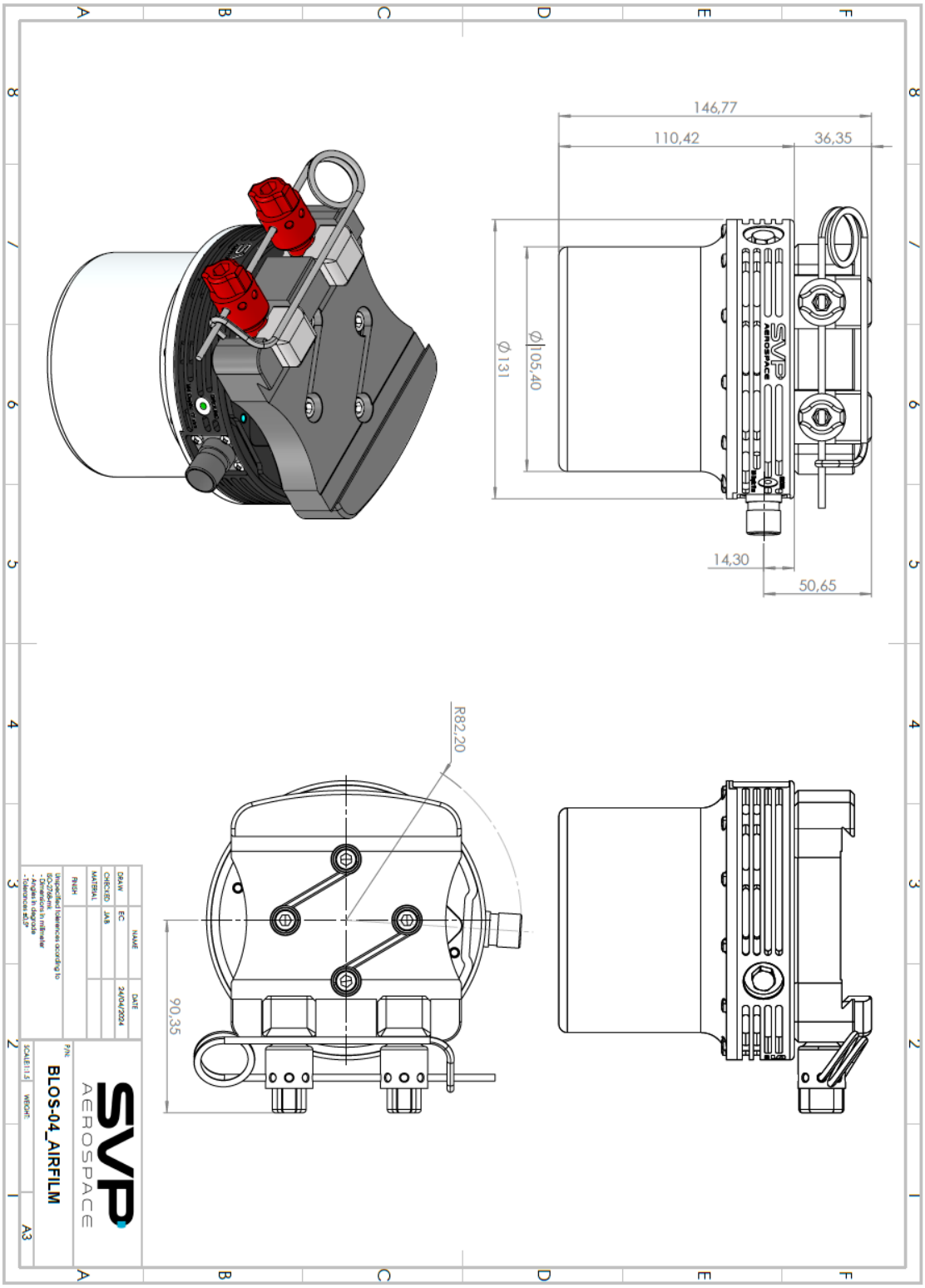
E.2.1 Cellular Datalink Antenna General Dimensions



E.2.2 Cellular Datalink Antenna Base



E.2.3 Cellular Datalink Antenna with AIRFILM



Glossary

AM	Multisectorial Antenna
APSK	Amplitude and phase-shift keying or asymmetric phase-shift keying (APSK)
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
HDR	High Definition Receiver

HDT	High Definition Transmitter
IF	Intermediate Frequency
IG	Interval Guard
IP	Internet Protocol
IP3	3rd order Intermodulation Product
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	RadioFrequency
RTC	Remote Control
SD	Standard Delay
SDI	Serial Digital Interface
SNMP	Simple Network Management Protocol

TFT	Thin-Film Transistor

TS	Transport Stream
UDP	User Datagram Protocol
UHF	Ultra High Frequency
VSWR	Voltage Standing Wave Ratio

Notes

Certificate of Conformance

Certificate No.: S 2012009
Description: UDR-70 H.265 portable Receiver
Model: UDR-70

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 and electrical 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; Harmonised Standard for 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

30610871X JUAN ANTONIO BURGOS (R: B95136719) Firmado digitalmente por 30610871X JUAN ANTONIO BURGOS (R:B95136719) Fecha: 2025.08.13 11:30:16 +02'00'

Durango, August 13th, 2025

Final note

SVP Broadcast Microwave S.L. is constantly striving to improve all 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.

The texts, illustrations and instructions in the manual are based on the existing situation when the manual is published.

SVP Broadcast Microwave reserves the right to make changes to this manual and to the equipment without prior notice.

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