SVP
Broadcast Microwave

HDR-100 Series
DIGITAL HD COFDM RECEIVER

Versions: Single
Diversity 2
Diversity 4
Diversity 6

USER'S GUIDE V1.0

Contents

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 to your existing installation will cause you nothing but satisfaction.

Please read these instructions carefully, and keep them at hand in case you have to refer to them.

Important Notes

1. The DR-100 COFDM digital receiver is completely compatible with the DVB-T standard included in European Standard ETSI EN300744.

2. There are two HDR-100 series receivers available: the HDR-102 and the HDR-106. The HDR-102 is a diversity 2 receiver so, 2 down-converters can be connected to it. On the other hand, the HDR-106 is a diversity 6 receiver so, it can receive signals from up to 6 down converters connected that are connected to it.

3. The complete receiver system consists of two parts: first, there is the one or more down-converters, which are installed outdoors next to the receiver antennas, and second there is the HDR-100 receiver which demodulates the IF (Intermediate frequency) delivered by the down converter.

4. The HDR-100 receivers are commonly used with SVP DC-COFDM down converters, which are available in the following frequency bands: from 2.0 to 2.5GHz, from 2.2 to 2.6GHz, from 3.4 to 3.7GHz and from 10.0 to 10.5GHz.

5. On the receiver site is important to determine if the channel in which the transmission will be down is interfered, if any other transmission is being done is that channel.

6. While installing the equipment, the power supply of the down-converters should be disabled in the Setup Configuration menu in order to avoid risk of short circuits.

7. The receiver must be well chilled. Some space must be left next to the sides of the HDR-100 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 specially when HD-SDI signals are transmitted.

9. The HDR-100's keypad is locked when it is not operated for 3 minutes. To unlock it right arrow button should be pressed for several seconds.

10. If you wish to install the rack mount demodulator unit horizontally, guides should be used, due to the weight of the equipment.

11. 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.

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

General Index

Chapter 1: Introduction

The HDR-100 series receiver can receive High Definition (HD) and Standard Definition (SD) signals. HD technology allows the reception of High Definition images with excellent resolution and detail, SDI signals of up to 1.5Gbps.

The receiver accepts COFDM signals coming from the down-converter connected to it in intermediate frequency, then demodulates and finally decodes the incoming signal. The signal introduced to the transmitter is obtained at the receiver outputs. Composite video, SD-SDI, and HD-SDI signals can be received.

All models of the HDR-100 series also have a DVB-ASI transport stream output that can be extremely useful if several decoders are to be chained or to implement an intermediate ASI feed without having to decode the received signal. They also have a Genlock reference input in order to lock composite video and SDI output signals.

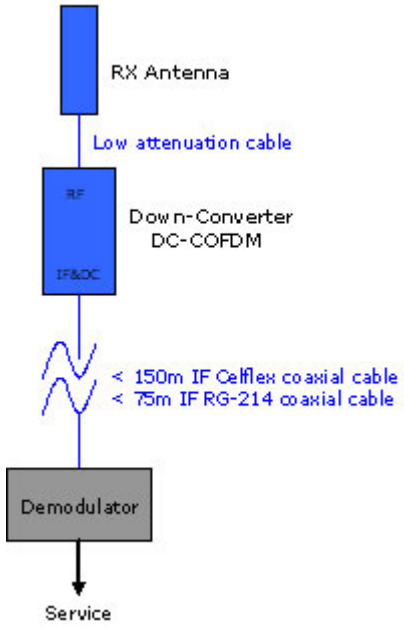

Figure 1.1 Connection diagram between the HDR-100 and the DC-COFDM

There are two HDR-100 series receivers available: the HDR-102 and the HDR-106. The HDR-102 is a diversity 2 receiver so, 2 down-converters can be connected to it. On the other hand, the HDR-106 is a diversity 6 receiver. It can receive signals from up to 6 down-converters that are connected to it.

The diversity technique used in the HDR-102 and HDR-106 models is known as "Maximum Ratio Combining" (MRC), in which the signal to be demodulated is the result of combining the best sub-carriers in each signal delivered by the down-converters; in other words, the unit does not simply

select the input signal from one of the down-converters, it combines these signals in such a way that the signal used by the demodulator is always the best signal available.

The down-converters are connected to an independent receiver antenna in order to provide diversity. This allows different antennas to be installed, in order to take advantage of their combined characteristics, or antennas, with similar characteristics being installed oriented in different directions in order to offer wider coverage. Using a diversity system makes the link more robust and offers better performance than a non-diversity system.

Complete receiver system consist of two parts: one or more down-converters installed next to the receiver antennas and the HDR-100 series receiver installed indoors.

The display and the keypad on the front panel of the demodulator equipment can be used to monitor many parameters of interest, such as the modulation, the Viterbi coding or the FEC, and the guard interval used (obtained when the TPS, [Transmission Parameter Signalling] carriers are demodulated), signal levels, link quality parameters such as the SNR, the MER and the BER and the presence of alarms and/or warnings.

When orienting the antennas, the main screen showing the signal levels and the SNR of the IF inputs is very helpful. These measurements are displayed as a graph bar and as numerical values. The numerical values do not express signal levels or SNR in dB, they are merely indicative. The scale for the signal levels is from 1 to 100, and the SNR values range from 1 to 10.
The receiver also has a connection for the MD-70 meter. This equipment makes possible to monitor remotely signal level present in the antenna and signal quality. These measurements are really useful while orienting the antennas.

There is also a UDP/IP Ethernet link that allows these and many other parameters to be controlled and monitored from a remote station.

The equipment can be AC mains powered or run off DC batteries. The switchover from the mains to batteries is automatic. The down-converters are powered from the demodulator unit via the IF coaxial cable that connects them together.

An optional flight case is available for the HDR-10 receiver. Its size is 2 units rack; consequently, two equipments can be transported in it.

Figure 1.2 Flight case for the HDR-100 series receiver.

Chapter 2: Technical features

1 Main characteristics

I.F Section:

Intermediate frequency:	UHF
Frequency tuning step:	100KHz
Input level range:	0 to -95dBm
Diversity:	2 (HDR-102 model), 6 (HDR-106 model)
Diversity technique:	MRC (Maximum Ratio Combining)

Demodulador section:

Demodulation system:	COFDM DVB-T, modo 2K
Constellation types:	QPSK, 16QAM, 64QAM
FEC – Convolutional code:	1/2, 2/3, 3/4, 5/6,7/8
Guard Interval:	1/4, 1/8, 1/16, 1/32
Bitrate:	4.98 – 31.65Mbps
Bandwidth:	5, 6, 7, 8MHz
Detection threshold:	-95dBm @ QPSK FEC:½, IG: 1/32

Decoder section:

Decoder formats:	MP@ML (4:2:0): 1 to 15Mbps 422@ML (4:2:2) 3 to 31.65Mbps HL@ML
Audio decoder:	MPEG-1 layerII
End to end latency:	45-54ms with super low delay
Genlock input:	SD (NTSC/PAL) and HD Tri-level

Video section:

Video formats:	
PAL:	4:2:0 (720x576)/4:2:2(720x625)
NTSC:	4:2:0 (720x480)/4:2:2(720x525)
720P (1280x720):	4:2:0/4:2:2
Frame rate:	59.94/50/29.97/25/23.97Hz
1080i (1920x1080):	4:2:0/4:2:2
Frame rate:	29.97/25

Composite video outputs:	2 x PAL/NTSC seleccionable
SD-SDI/HD-SDI outputs:	2 x SMPTE 259M/292M(270Mbps – 1.5Gbps)
ASI Output:	EN50083-9

Audio section:

Number of audio channels:	2 pairs estéreo, 4 mono
Output type:	Analógico y embebido (simultáneamente)
Audio output level:	Línea (+12dBm)
Output impedance:	30Ω

Power supply section

AC power supply input range:	90 a 240V (50/60Hz)
DC power supply input range:	10 a 36V (Rango extendido)
Consumption:	20Watt

Connections:

IF1-IF6:	6 x N Female
Composite video:	2 x 75Ω BNC
SD-SDI/HD-SDI:	2 x 75Ω BNC
ASI:	1 x 75Ω BNC
Genlock:	1 x 75Ω BNC
MD-70:	4 pin Lemo 0B
Audios:	4 x XLR 3 Male
Ethernet:	8 pin RJ-45 10/100 Base-T
AC power supply:	MLC de Neutrik
DC power supply:	XLR 4 male

Physical features:

Dimensions:	1U Rack. Depth 330mm
Weight:	5.1Kg
Operation temperature:	-10 to 45ºC

2 Connections

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

Figure 2.1 Back view of the HDR-100 series receiver

All input and output connections of the HDR-100 series receiver are shown in the figure below:

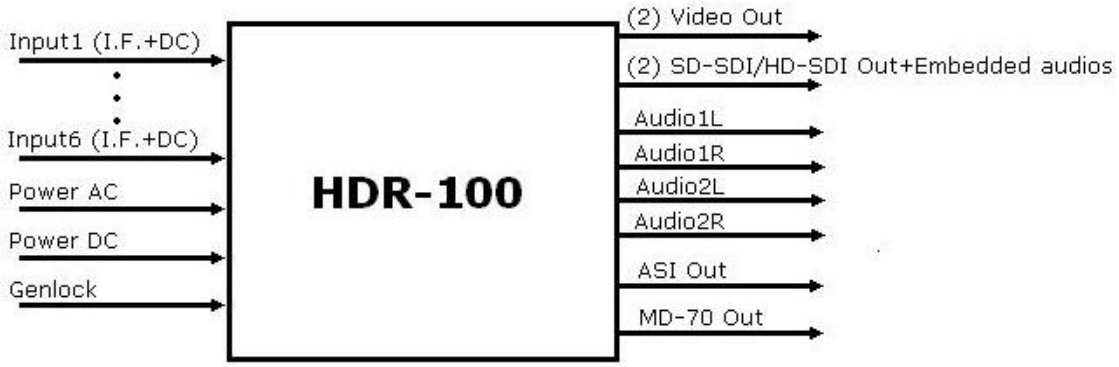

Figure 2.2 HDR-100 series receiver connections

2.1 Power supply

The receiver equipment can be powered by an AC source between 90 and 240V, or a DC source of 11 to 36 V.

The mains 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 equipment. 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

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

The IF inputs of the demodulator supply +12V to power the down-converters.

Table 2.1 AC Power supply features

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

Table 2.2 DC Power supply features

Item	Features
Connector label	POWER D.C.
Conector type	XLR-4 male
Supply voltage	11-36 V.

The pinout is:
- Pins1 and 2 => ground
- Pins 3 and 4 => +11V to +36V

Table 2.3 Down converter power supply features

Item	Features
Connector label	IF1…IF6
Conector type	N female
Supply voltaje	12V.
Consumption	Down-Converter:450mA@12V

2.2 Video Input

The HDR-100 series receivers include two analogue composite video outputs and two digital SD-SDI/HD-SDI video outputs. Depending on the input signal type on the transmitter, the output video signal on the receiver on SDI output will be SD-SDI or HD-SDI.

Each of these signals is available on 75Ω insulated BNC connector located on the rear panel of the receiver unit.

SDI output signal is compliant with SMPTE-259M and SMPTE-292M standards.

Table 2.4 Composite video and SDI ouput connections features

Item	Features	
Connector labels	VIDEO	SDI
Conector type	Insulated BNC female	
Impedance	75Ω	
Standard	PAL/NTSC	SMPTE-259 SMPTE-292

2.3 DVB-ASI Transport Stream

The HDR-100 series receivers have 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 may be extremely useful if an intermediate ASI feed is required without needing to decode the audio and video signals and then recode them into MPEG-2 in the transmitter equipment; therefore there is not quality loss due to a new coding process.

Table 2.5 Transport Stream output connection features

Item	Features
Connector label	ASI
Connector type	Insulated BNC female
Impedance	75Ω
Standard	EN50083-9
Packet length	188 bytes/204Bytes
Maximum Bitrate	31.65 Mbit/s

2.4 Audio

The HDR-100 series receivers deliver analogue audio signals and digital audio signals embedded in the SDI signal.

The equipments have four analogue audio outputs, available on 3-pin male XLR connectors on the rear panel of the rack-mount demodulator unit.

The pinout of the XLR-3 connectors is the following one:
- PIN-1: Ground
- PIN-2: Hot (+)
- PIN-3: Cold (-)

The output connection for the 4 audio channels embedded on SD-SDI/HD-SDI signal are available on the same 75Ω insulated BNC connectors used for the SD-SDI/HD-SDI signals.

The audio signals are compliant with SMPTE-272M when embedded on SD-SDI video signal and with SMPTE-299M when embedded on HD-SDI video signal.

Table 2.6 Analogue audio outputs connections features

Item	Features
Number of audio channels	4
Connector labels	AUDIO 1 LEFT AUDIO 1 RIGHT AUDIO 2 LEFT AUDIO 2 RIGHT
Connector type	XLR-3 male
Audio level output	Line +13dBm máximum
Impedance	30Ω

2.5 Genlock

The HDR-100 series receivers have a Genlock external reference input in order to lock composite video and SDI digital outputs to it. The connection is available on a 75Ω insulated BNC connector located on the rear panel of the rack-mount demodulator unit.

Table 2.7 Genlock input connection features

Item	Features
Connector label	F/LOCK
Connector type	Insulated BNC female
Impedance	75Ω
Reference signal type	PAL/NTSC Tri-level

2.6 MD-70 Connection

The Lemo 0B connector placed on the rear panel of the receiver equipment makes possible to connect the MD-70 meter. The data displayed in this external meter makes easier to install and point the antennas. This meter displays exact measurements of signal level, reception frequency and signal quality

Table 2.8 MD-70 connection features

Item	Features
Designación del conector	MD-70
Tipo de conector	Lemo 0B

2.7 Remote control/Ethernet

The HDR-100 series receivers can be controlled and monitored remotely over an Ethernet link.

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.

Table 2.9 Remote control

Item	Features
Connector label	ETHERNET
Connector type	8-pin RJ-45 10/100 Base-T

The pinout is:
- Pin 1 => TxD+ (out)
- Pin 2 => TxD- (out)
- Pin 3 => RxD+ (in)
- Pin 6 => RxD- (in)

2.8 Intermediate frequency inputs IF1…IF6

The connection between the receiver unit and the down-converter uses coaxial cable, whose maximum length depends on the type of coaxial cable used. If the Celflex ½" coaxial cable is used, the maximum length is 150m but if the RG-214 coaxial cable is used, the maximum length is reduced to 75m.

Table 2.10 IF input features

Item	Features
Connector label	IF1…IF6
Connector type	N female
Impedance	50Ω
Input frequency range	UHF
Input range: Threshold:	0 a -95 dBm QPSK: -95dBm 16QAM: -85 dBm 64QAM: -75 dBm

Chapter3: Receiver operation and menus

This section contains all the necessary information to operate, control and configure a HDR-100 series receiver.

1 Display and LEDs

To turn the equipment on and off, keep On/Off button pressed for serveral seconds. When the equipment is turned on, the display will show the estar-up message (model and version of the equipment) for two seconds, and then it will display one of the two main screens.

El HDT-100 two main screens:

- 1st main screen: displays most important parameters of the received signal.
- 2nd main screen: shows signal reception conditions, level and quality

Figure 1.1 Main screen 1

Figure 1.2 Main screen 2

To change from one main screen to the other, press the ENT button.

As shown in figure 1.1, main screen displays:

- Reception frequency (MHz)
- Audios status (On/Off)
- MPEG-2 profile (4:2:0 or 4:2:2)
- Delay (Standard/Super low delay)
- Output signal type (SD/HD)
- Modulation Scheme
- FEC
- Guard Interval
- Input Bitrate
- Received signal cuts

Second main screen displays for each IF input:

- Input signal level. 1 to 100 scale
- C/N. scale, from 1 to 10

The HDR-100 series receiver has 4 Leds on its front panel that show the information detailed below.

The Led next to the On/Off button provides the following information:
- If the Led is off the equipment is not being fed
- The Led flashes red when there is being fed but it is turned off
- The Led lights up in green when the equipment is turned on
- The led light up in red when the HDR-100 is alarmed.

The Led next to Remote button:
- If the led is off the receiver cannot be controlled remotely.
- When the Led lights in green the HDR-100 is ready to be controlled remotely.
- The led flashes in green when the receiver communicates with the remote system.

The Led next to Alarm button
- Lights red when one or more alarms are triggered.
- Lights orange if one or more warnings are detected
- Is off if there is not any alarm nor warning.

To check the alarms and warnings type Alarm button should be pressed.

The Led next to Lock button:
- The led lights in green when the receiver is locked
- The led is off when the HDR-100 receiver is not locked.

To unlock the receiver Lock button should be pressed for several seconds.

2 Front panel

The HDR-100 series receiver is configured following a menus structure on the display. The front panel has 9 buttons to enter and exit the equipment's control menus and submenus and to navigate through them.
Functions of each buttons are detailed in the following sections.

2.1 ON/OFF button

To turn the equipment on and off, keep this button pressed for several seconds.

When the receiver is turned on, the display will show the start-up message (model and version of the equipment) for two seconds, and the it will display the main screen.

If the power fails while the equipment is operating, it will restart automatically when the power returns, not being necessary to press the on/off button again.

Figure 2.1On/Off button

2.2 Remote control button (Remote)

This button is used to activate the remote control mode. When the Led next to this buttons is lit green, the equipment is ready for being controlled remotely via the Ethernet link.

To activate or defuse the remote control, simply press this button. When the equipment establishes communication with the remote equipment, the led flashes in green. In this state, the different parameters of the HDR-100 series receiver can be configured and monitored remotely.

To monitor and configure the equipment by remote control a program must be installed in the remote station. This program will be supplied together with the receiver on a CD-ROM.

Figure 2.2 Remote control button

2.3 Locking the keypad (LOCK)

This button is used to lock and unlock the keypad. When the keypad is locked, the LED next to this button lights up in green, and stays lit until this button is pressed again to unlock the keypad.

This button must be pressed during approximately 3 seconds to lock or unlock the keypad.

The purpose of this button is to prevent unwanted manipulation of the equipment (unwanted changes to the configuration, etc).

Figure 2.3 Keypad lock button

2.4 Alarms (Alarm)

When the equipment detects the existence of one or more alarms, the corresponding LED lights in red, and when one or more warnings are detected, the LED lights in orange.

When the ALARM button is pressed, the equipment displays the alarms and/or warnings it has detected. To exit the alarm menu and return to the main menu, simply press the ALARM button again.

Figure 2.4Alarm button

2.5 Menu

This button is used to enter and exit the equipment control menu and the submenus, plus other specific functions within each submenu

Figure 2.5 Menu button

2.6 Up, down, left, right, enter

The arrow buttons and the ENT (Enter) button are used to navigate through the menus.

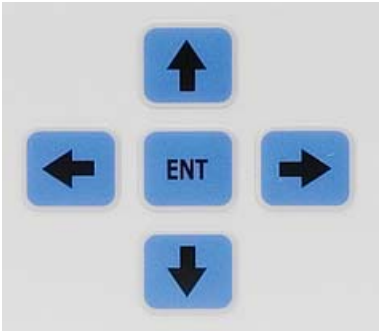

Figura 2.1 Controles para la navegación dentro de los menús

For more details regarding local control of the equipment, see section chapter 4 of this chapter, Receiver operation.

3 Menus

To enter the main menu of this equipment Menu button should be pressed. Two options are displayed: Monitor Status and Setup Configuration. To choose one or the other up and down arrows are used. Once one is selected right Ent button should be pressed.

Monitor Status menu allows the operator to check transmitter's configuration, it does not allow the change of any parameter. Setup Configuration menu allows the operator to change transmitter's parameters and to configure them.

Greyed out parameters are not selectable with current software version.

Table 3.1 Setup Configuration menu options

Función	Opciones	Comentarios
Rx.Frequency	2.0 to 2.7GHz 3.4 to 3.7GHz 10.0 to 10.5GHz	Reception frequency configuration in MHz. Frequency range depends on the down converter used.
DW. Converter Local Osc	(in MHz) Editable Valores SVP: 1840MHz: banda de 2GHz 2900MHz: Banda de 3GHz 9800MHz: Banda de 10GHz	Down-converter's local oscilator's frequency
DW. Converter	Enable/Disable	Enables or disables power supply to the down converter.
Bandwidth	5/6/7/8MHz	Received signal bandwidth condiguration
PID Mode	Manual Auto Prog Number	Manual: The user has to introduce PIDs numbers for the program to be decoded. (PMT, PCR, Video, Audio) Auto: The receiver automatically decodes the service with lowest PID number Prog Number: The receiver automatically decodes the service with the program number definded.
Audio DID	G1/G2/G3/G4	The HDR-100 can only receive 4 audio channels. The audio DID in the receiver indicates in which embedded audios group will go audio information.
Genlock	Auto/Disable	Auto: Composite video output and SD-SDI and HDSDI outputs are sYnchronized to an external reference. If no input reference signal is inserted the output is synchronized to an internal reference. Disable: Output signals are synchronized to an internal reference..
ASI packets	188/204	Output Transport Stream packet format is defined

Ethernet	Profile: 1…8 Local IP Gateway IP Subnet mask Remote IP Port	Ethernet communication parameters 8 user configurable profiles
Clock and Date	Clock Date	Clock and date configuration
Location Labels	Place From To	Labels to be written by the user.
HD Enable	NO/YES Key:XXXXXXXXXX Code: to be provided by SVP	HD upgrade submenu Contact SVP

Table 3.2 Monitor Status menu option

Función	Opciones	Comentarios
Rx.Frequency	2.0 to 2.7GHz 3.4 to 3.7GHz 10.0 to 10.5GHz	Configured reception frequency (in MHz)
DW. Converter Select	UHF	IF input frequency range indication
DW. Converter Local Osc	Valores SVP: 1840MHz: banda de 2GHz 2900MHz: Banda de 3GHz 9800MHz: Banda de 10GHz	Down converter's local oscillator frequency (MHz)
DW. Converter	Enable/disable	Down converter power supply status indication
Bandwidth	5/6/7/8MHz	Received signal bandwidth
Modul/FEC/GI	QPSK/16QAM/64QAM 1/2, 2/3, 3/4, 5/6, 7/8 1/4, 1/8, 1/16, 1/32	Received signal TPS parameters display
Demodulator	1…6 RF Level (dBm) MER (dB) C/N (dB) PLL Temperature Voltage	Received signal (IF) input level and quality measurements. Those parameters are displayed for each IF input.
BER		BER value before RS
PID Mode	Manual Auto Prog Number	PID selection mode Received service's PIDs
Profile/Level	4:2:2 / 4:2:0	MPEG-2 compression profile
Video formal		Video output format

Audio Options	Audio 1 Rate Audio 2 Rate Audio DID	Received audio signal info. The Audio DID parameter indicates in which audio group are going to be the audios embedded.
Genlock	Auto/Disable	Genlock status
ASI packets	188/204	Output Transport Stream packet size
Rack Temperature	ºC	Displays receivers internal temperature
Battery voltaje	V	Power supply information
Power supply	Battery/Mains	Power supply information
Ethernet	Profile Local IP Gateway IP Subnet mask Remote IP Port	Ethernet configuration parameters are displayed.
Clock and Date	Clock Date	Receiver's clock and data information
Alarms and warnings list		Alarms and warnings are displayed in the momento they occur
Logbook		A list of the last 32 alarms and warnings
S/N and Rev		Receivers serial number and software version
Location Labels	Place From To	Location labels.

4 Receiver operation

Receiver system operation is very easy. It has a display and a keyboard which make possible the configuration from the front panel. The main screen shows all the necessary information to check receiver's status.

To enter the main menu of this equipment Menu button should be pressed. Two options are displayed: Monitor Status and Setup Configuration.

To choose one or the other option up and down arrows are used. Once selected, ent button should be pressed

Figure 4.1Main menu

4.1 Change of a parameter / Setup Configuration Menu

When operating the receiver three parameter types are observed:

1. Parameters with 2 options
2. Parameters with limited options(3 or 4)
3. Parameters with multiple options.

To change the value of parameters with two options, the parameter should be selected using up and down arrows and then Ent button should be pressed to change from one option to the other. Genlock is a parameter with two options: auto/disable.

Figure 4.2 Genlock parameter configuration

To modify a limited options parameter it must be selected using up and down arrow. Once selected pressing right and left buttons the operator navigates through the different available options. When the desired option is on the display the parameter value change has been done. The bandwidth is a parameter with limited options: 5/6/7/8MHz

Figure 4.3 Bandwidth parameter: 7 MHz

After pressing right button:

Figure 4.4 Bandwidth parameter: 8Mhz

To configure a multiple optios parameter, for instance reception frequency, teh parameter has to be selected in the menu using up and down arrows. Afterwards, Ent button should be pressed to enter the parameter and be able to change it. The cursor appears then on the first digit of the parameter to be changed.

Figure 4.5 Reception frequency parameter. Cursos on the first digit

Using up and down arrows the value of the digit selected is increased or decreased. To change to other digits left and right buttons should be used until the cursor is placed on the desired digit.

Once the new frequency value has been set, Ent button should be pressed.

4.2 Monitoring a parameter / Monitor Status Menu

To check status and value of different parameters Monitor Status menu has to be entered. This method of checking status of a parameter is the most secure one, as it does not give the chance to change any parameter.
Parameter changes during a transmission are avoided this way.

When monitor status menu is entered most parameter's status can be checked using up and down arrows and moving along the menu.

Figure 4.6 Frequency parameter on the Monitor Status Menu

There are several cases in which a submenu has to be accessed to monitor a concrete parameter. When there is a submenu, it is indicated by Enter symbol on the right on the display. Pressing Ent button the submenu is entered and different parameter's values can be checked using up and down arrows to move along this submenu parameters.

Figura 4.1Acceso al submenú PID info

To exit a submenú or a parameter press menu button.

5 Alarms

The HDR-100 series receivers constantly indicate the existence of alarms and/or warnings via the LED next to the ALARM button:

- If this LED is out, there are no active alarms or warnings.
- If this LED lights in orange, the equipment has activated one or more warnings, but no alarms.
- If this LED lights in red, the equipment has activated one or more alarms, although there may also be some warnings.

There are two methods to determine which alarms/warnings have been activated:

- The ALARM button: when this button is pressed, the equipment displays a list of the active alarms and/or warnings. If there are no active alarms or warnings, the unit displays "No alarms" and "No warnings".
- The "MONITOR STATUS" menu: the list of active alarms and warnings can also be viewed via the MONITOR STATUS menu in Alarms and Warnings List submenu.

To exit the alarms menu, simply press the ALARM button.

The parameters that can cause alarms or warnings to be activated are listed below:

5.1 Alarms

***Temperature**:* if the temperature inside the rack-mount unit reaches or exceeds 80ºC, an alarm is triggered and the red LED next to the Alarm button lights. In addition, the temperature displayed in line 15 of the MONITOR STATUS menu blinks. When the temperature drops to 75ºC, the alarm is cancelled.

***Power supply voltage of the unit**:* if the power supply voltage to the demodulator unit is below 11V or above 36V, an alarm is triggered and the red LED next to the Alarm button lights. In addition, the voltage displayed in line 16 of the MONITOR STATUS menu blinks. The unit stops displaying the alarm when the power supply voltage is 11V or greater, but no more than 36V.

Internal equipment error: if this alarm appears, the user should contact SVP's technical department.

5.2 Warnings

Using battery power *(Rack Battery Working):* if the equipment is only receiving battery power, it displays a warning, and the LED next to the Alarm button lights in orange.

No RF signal: if the equipment detects no signal in neither of the IF inputs, it displays a warning, and the LED next to the Alarm button lights in orange.

No MPEG-2 DVB-ASI data *(No MPEG Data):* if the equipment cannot demodulate the IF input signal(s), and therefore cannot extract a valid ASI signal, it displays a warning, and the LED next to the Alarm button lights in orange.

6 HD Upgrade

To HD upgrade an HDR-100 series receiver the following procedure should be followed:

Enter Setup Configuration menu and then move to line 12, HD enable then press Ent button to enter submenu. If the transmitter is HD capable, HD enble: Yes will appear in line 12 and no submenu will be accessible.

Figure 6.1 HD upgrade menu Access

Once HD enable submenu is entered, following parameters are displayed:

- Codeword displayed by the receiver
- Keyword to be introduced.

Figure 6.2 HD upgrade submenú

To upgrade the receiver equipment from SD to HD is necessary to contact SVP and give the codeword and equipment's serial number. SVP will provide the customer with the corresponding keyword.

The receiver gives the user three chances to insert the correct keyword. In case no correct word is introduced the receiver will be blocked in SD an it

will have to be sent to SVP to unblock it and to be able to carry out the HD upgrade.

Chapter 4: SVP software to remotely control one system

1 Introduction

The DR-100 series receivers can be controlled and monitored locally and remotely (via an Ethernet LAN connection).

This chapter explains in detail how to operate the equipment when it is controlled from a remote station.

2 Configuring the equipment

To control the equipment remotely, the following steps are required:

1 The LED next to the REMOTE button must be lit in green. The REMOTE button is used to select the remote control mode. When the LED next to this button is lit in green, the equipment is set for remote control via the Ethernet link, while if this LED is out, the equipment can only be controlled locally. To activate o defuse the remote control, simply press this button.

2 When the equipment is set for remote control (the REMOTE LED is lit in green), the Ethernet communications parameters must be configured, as described in section 5.3 in chapter 5. In line 10 of the SETUP CONFIGURATION menu, pressing the ENT key opens a submenu in which the following parameters can be configured:

a. Local IP address of the receiver: this is the IP address of the receiver within the LAN that it is connected to. This IP address does not have to be fixed.
b. The IP address of the gateway or router: this is the IP address of the router in the LAN to which the receiver is connected.
c. The subnet mask: depending on the configuration of this mask and the remote IP address, packets transmitted by the receiver will either be transmitted within the LAN or outside the LAN, via the router.
d. The public IP address of the remote station to which the receiver must connect. This IP address must be fixed.
e. The communications port to be used for communications between the receiver and the remote station. The router in the LAN to which the remote station is connected must be configured so that packets sent to this port are routed to the IP address configured in point d. This completes the definition of the connection between the receiver and the remote station. This last configuration is set in the router's NAT table (Network Address Translation).

3 The next step is to install the control software, supplied with the equipment on a CD-ROM, in the remote station. For further information on this program, see the next section of this manual.

4 Once all of the parameters have been configured (the local and remote IP addresses, the subnet mask and the port in the receiver) and the software has been installed and is running in the remote equipment, after a few seconds the LED next to the REMOTE button should blink green, indicating that the equipment has established communications with the remote station. In this state, the different parameters of the receiver that can be configured and monitored can be controlled locally and remotely.

3 Installing and using the software

To control the HDR-100 series receiver from a remote station, the software supplied with the equipment must be installed.

Once this software has been installed and is running, a window appears as shown in the figure below:

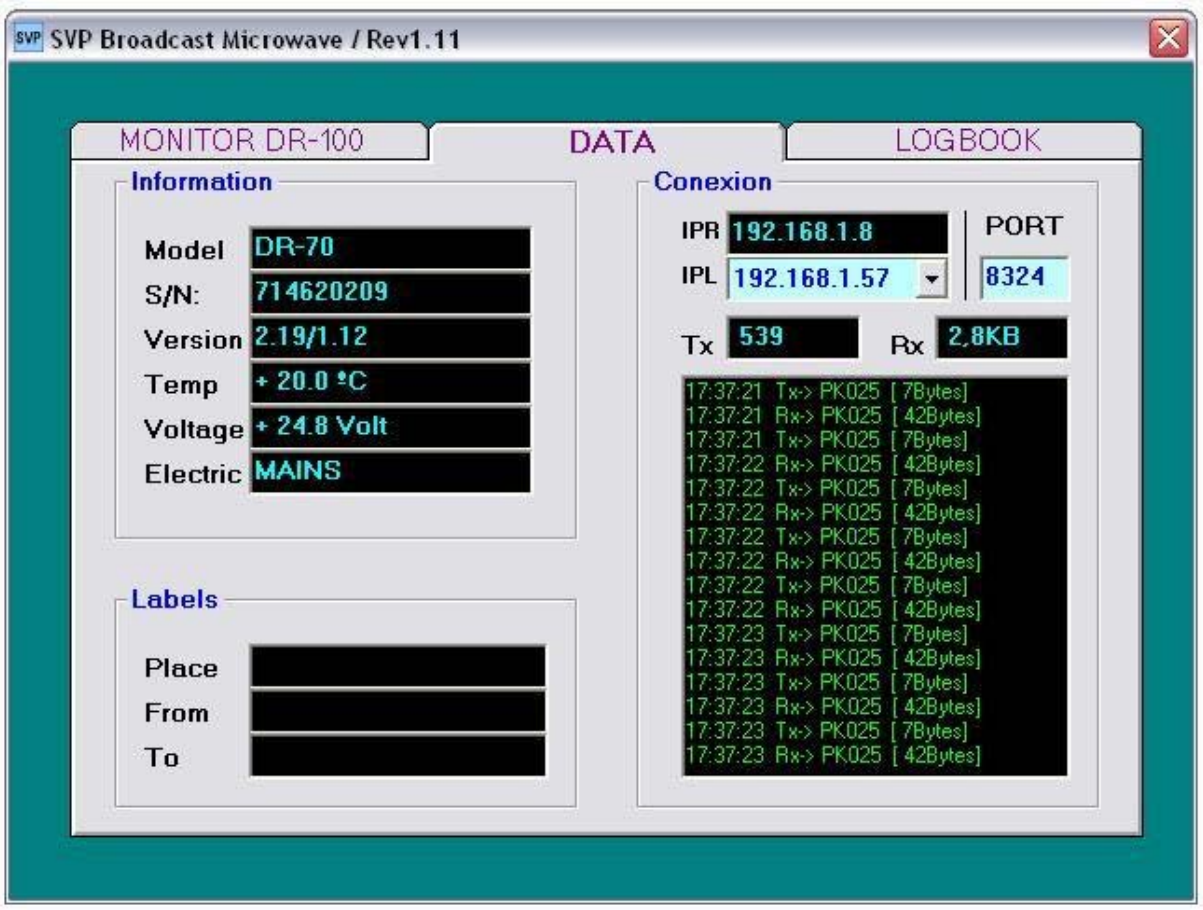

Figure 3.1 The data tab

As can be seen in the figure, the application has three different tabs or windows: general data or information tab, the monitor that shows the received COFDM signal's parameters and finally the logbook.

3.1 Data tab

Three different types of data are displayed on the data tab:

- Generic data regarding the equipment: the model, serial number and software version of the equipment, its internal temperature, the power supply voltage and the power source (AC mains or battery).
- Location labels: The location of the equipment and the source and destination nodes of the link.
- Connection parameters: the remote IP address (i.e., the IP address of the receiver), the local IP address (the IP address of the remote station) and the communications port. The tab also displays the traffic transmitted to the receiver and the traffic received from it.

3.2 Monitor

The monitor tab displays all data corresponding to the received COFDM signal:

- The signal level: the signal level received in each receiver antenna, shown numerically and graphically.
- C/N: the signal to noise ratio (SNR, s Noise Ratio) received in each receiver antenna. shown numerically and graphically.
- The reception frequency: this parameter is configured by the user.
- Local oscillator frequency: this parameter is also configured by the user.
- The On/Off button.
- Information related to the TPS carriers (constellation, Viterbi coding or FEC, and guard interval).
- Total received bitrate, in bps.
- Bandwidth in MHz.
- Information related to the service being decoded (PID from the PMT table, the PID of the packets that carry the Program Clock Reference [PCR], the program number, video PID, audio 1 PID, audio 2 PID and data PID).

As explained in chapter 5 of this manual, there are two ways to configure the service to be decoded, manually and automatically. In manual mode, the equipment decodes the service corresponding to the PIDs defined by the user in the corresponding text boxes in the lower right corner of the program's MONITOR tab. In automatic mode, the equipment automatically decodes the received service and displays the corresponding PIDs in these text boxes. To change from one mode to the other, press the AUTO button shown in figure 6.2.2. As shown, the equipment is operating in automatic mode. When the equipment is operating in manual mode, the word MANUAL

is shown on this button. In this way, the operating mode of the equipment can always be ascertained.

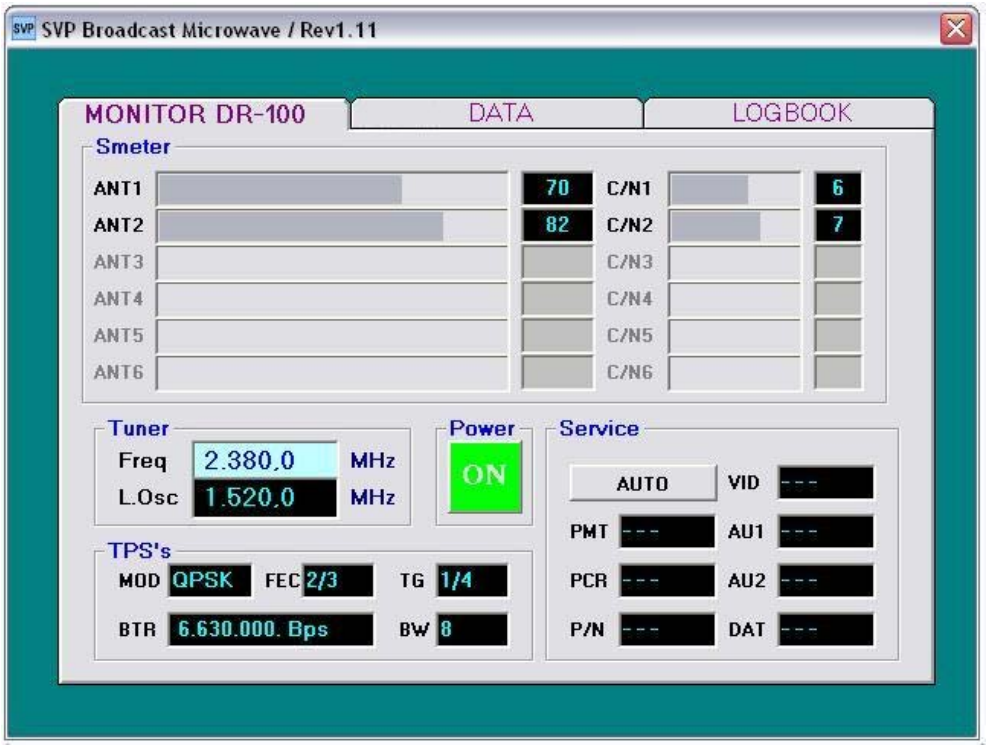

Figure 3.2 The Monitor Tab

Logbook

In the logbook tab an historic of the alarms occurred is displayed. This tab lets the user know which error has occurred and when it has happened.

In this tab is also shown current date and time. These parameters can be changed remotely in the equipment.

In logbook last 32 alarms are displayed. However, every alarm occurred during the day is stored in a file located in the directory in which the program has been installed, usually HDR-100 directory.

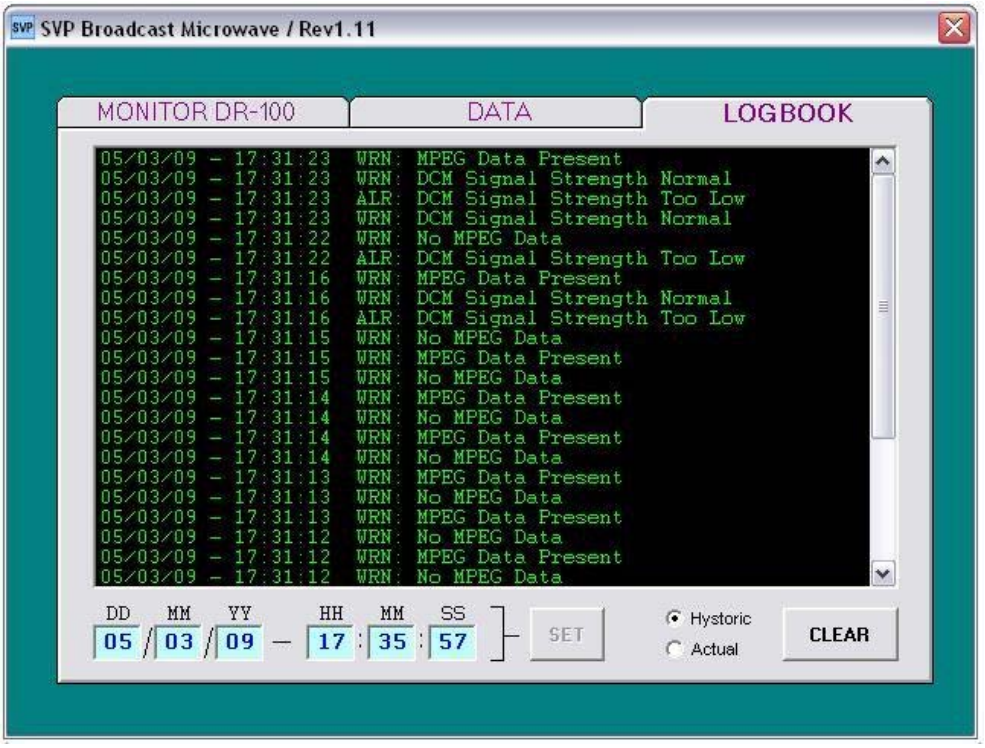

Figure 3.3 The Logbook Tab

Chapter 5: NetC software to control remotely a network of SVP equipment.

1 Introduction

NetC, Network Controller, is the new equipment control software developed by SVP Broadcast Microwave. This new software lets the user control multiple SVP machines simultaneously provided they are connected to the same local area network.

Remote configuration and monitoring of DR-100/HDR-100 series, DR-70/HDR-70 and DT-70/HDT-70 equipment can be carried out with this new software.

Next, installation and operation of this software is described.

2 Installation

To be able to control remotely SVP machines is necessary to install the software and then to configure the machines to make possible their communication with the computer on which the software has been installed.

The control software application is delivered in a CD together with SVP equipments. This software is also available on our web site: http://www.svpbm.com/ing/support.htm. On the web site there will always be available the latest version of this software.

Installation of this software starts when setup file is selected. Then just follow installation process.

To control the equipment remotely, the following steps are required:

1. The LED next to the REMOTE button must be lit in green. The REMOTE button is used to select the remote control mode. When the LED next to this button is lit in green, the equipment is set for remote control via the Ethernet link, while if this LED is out, the equipment can only be controlled locally. To activate o defuse the remote control, simply press this button.

Figure 2.1 Front view of DR-70

2. When the equipment is set for remote control (the REMOTE LED is lit in green), the Ethernet communications parameters must be configured. Go to Setup Configuration Menu, enter Ethernet Parameters submenu and set the following parameters:

a. Local IP address: this is the IP address of the SVP machine within the LAN that it is connected to. This IP address does not have to be fixed.
b. The IP address of the gateway or router: this is the IP address of the router in the LAN to which the receiver is connected.
c. The subnet mask: depending on the configuration of this mask and the remote IP address, packets transmitted by the receiver will either be transmitted within the LAN or outside the LAN, via the router.
d. The public IP address of the remote station to which the SVP machine must connect. This is the IP address of the computer the software is installed on. This IP address must be fixed.
e. The communications port to be used for communications between the machine and the remote station. The router in the LAN to which the remote station is connected must be configured so that packets sent to this port are routed to the IP address configured in point d. This completes the definition of the connection between the receiver and the remote station. This last configuration is set in the router's NAT table (Network Address Translation).

3 Software Operation

Once the installation is done, we can proceed with the execution of the software.

The operation of the control software can be divided into two sections: network configuration and equipment control.

3.1 Network Configuration

When the program is run the main screen appears.

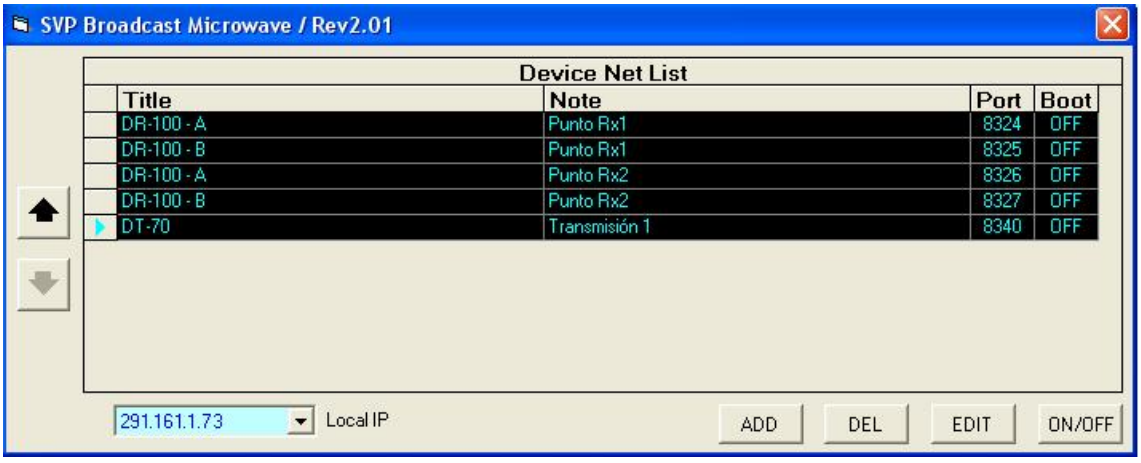

Figure 3.1 Main screen or the NetC program

In this screen following parameters can be configured:

- Add/remove equipments to/from the network
- Edit on each equipment: name, port or notes section
- Open/close the control screen for each equipment
- Organize the list of equipments

To add a new machine, ADD button must be clicked. Then following dialog box will open:

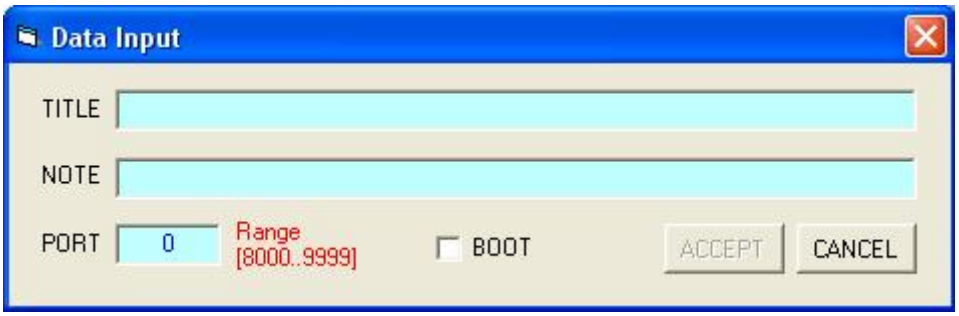

Figure 3.2 Dialog box to add a new machine to the net

- Title: field to assign the name to the equipment that will be remotely controlled.
- Note: paragraph to make any comment on the equipment.
- Port: communications port assigned to the machine that is to be included in the network.
- Boot: If this field is active, the machine's control screen will open automatically when the program is run.

To remove a machine from the network DEL button must be pressed.

Edit button opens the data input dialog box of the equipment that has been previously selected on the main screen. Every field can be changed.

The ON/OFF button opens/closes the control window to manage equipments remotely.

Arrows UP/DOWN are used to modify the position of the selected equipment on the list.

3.2 Equipment control

To open the control interface of SVP equipment, first, the machine must be selected on the main screen and then ON/OFF button must be pressed.

When the ON/OFF button is pressed a window is opened. This window has three tabs: Monitor tab, Data tab and Logbook tab.

3.2.1 Monitor tab

The monitor tab allows the user to configure the most important parameters of each machine. The content of the tab is different depending on the machine that is connected.

Figure 3.3 Monitor tab for DR-100 receiver

For receivers the parameters displayed on the tab are the following:

- Signal Level: received signal level in each antenna. The value is numerically and graphically displayed.
- C/N: signal to noise ratio of the signal present in each antenna. It is shown not only numerically but also graphically.
- Reception frequency: user configurable parameter.
- Local oscillator frequency.
- Power button and shutdown.
- Information of TPS carriers (constellation, FEC code, Viterbi, and guard interval).
- Bitrate total received in bps.
- Bandwidth in MHz
- Decoded information corresponding to the service (table PMT PID, PID for the packets that carry the Program Clock Reference PCR, no agenda, Video PID, Audio PID 1 PID 2 and PID audio data).

For transmitters the parameters displayed on the tab are the following:

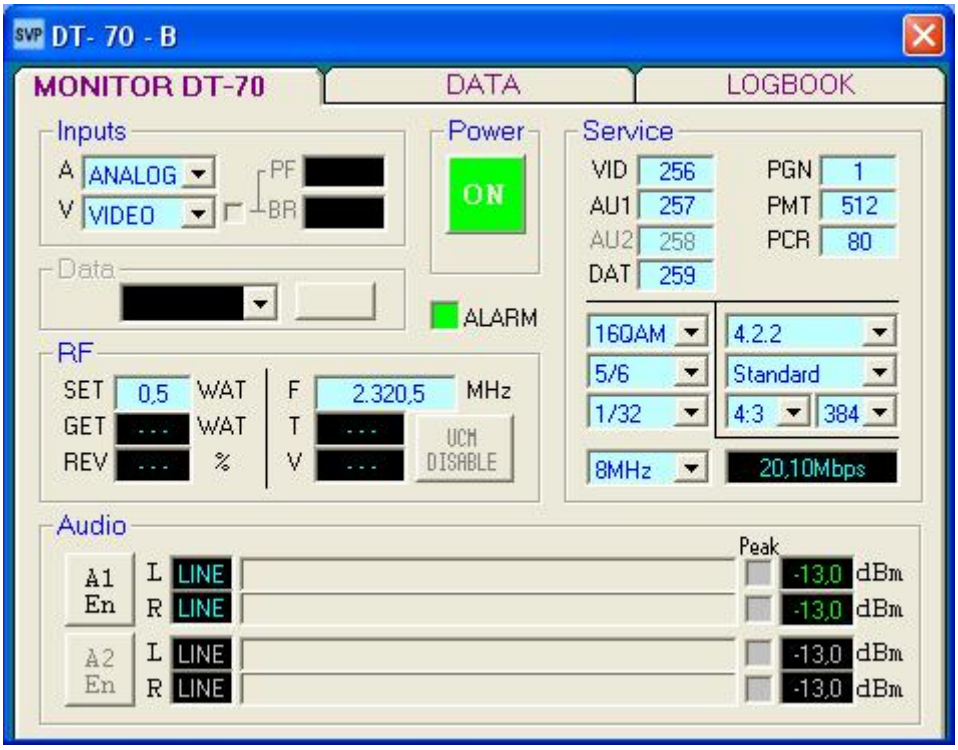

Figure 3.4 Monitor tab for DT-70 transmitter

The monitor tab for the transmitters, displays all data corresponding to the transmitted COFDM signal; MPEG-2 codification, COFDM modulation, transmission frequency and transmission power. The monitor tab is divided in the following fields:

- Input: In this field audio and video input types are configured and monitored
  - Audio options: analogue or digital, embedded in SDI signal.
  - Video options: composite analogue, PAL, digital SDI or DVB-ASI Transport Stream.

  When DVB-ASI input is selected the two fields on the right side are active, one monitors the input bit rate of the ASI Transport Stream and the other shows the packet format. There is also an overflow indicator.
- Power: the On/Off button
- RF field: the parameters of the up converter are monitored and some of them can be configured. The parameters to configure the up-converter are:
  - Transmission frequency
  - Power supply, to feed the up-converter.

  The parameters monitored are:
  - Real transmitted power
  - Reverse power
  - Up-converter temperature
  - Power supply voltage
  - Up converter status (Enable/disable).

- Service: In this field parameters related to video encoding, Transport Stream and COFDM modulation are configured:
  - Transport Stream: Video packets PID
    Audio 1 (pair 1) PID
    Audio 2 (pair 2) PID
    Program number
    PMT table PID
    PCR (Program Clock Reference) PID
  - COFDM modulation: Constellation (QPSK, 16QAM or 64QAM)
    FEC (1/2, 2/3, 3/4, 5/6 or 7/8)
    Guard Interval (1/4, 1/8, 1/16 ó 1/32)
    Channel bandwidth (5, 6, 7 or 8MHz)
  - Video coding: MPEG-2 422 or 420
  - Latency: Super low delay or Standard delay.
  - Aspect ratio (4/3 ó 16/9).
  - Each audio pair bitrate.
  - Total transmitted bitrate.

- Audio: in this field each audio pair can be enabled or disabled. Besides, each audio level is monitored with a graphic bar and also with a numeric value. It also points out the maximum peak value reached. This measurement is only available when audio input signal is analogue.

3.2.2 Data tab

Provides general information about the machine connected to the local area network: Local IP, Remote IP, port, device model, serial number, version, temperature, etc.

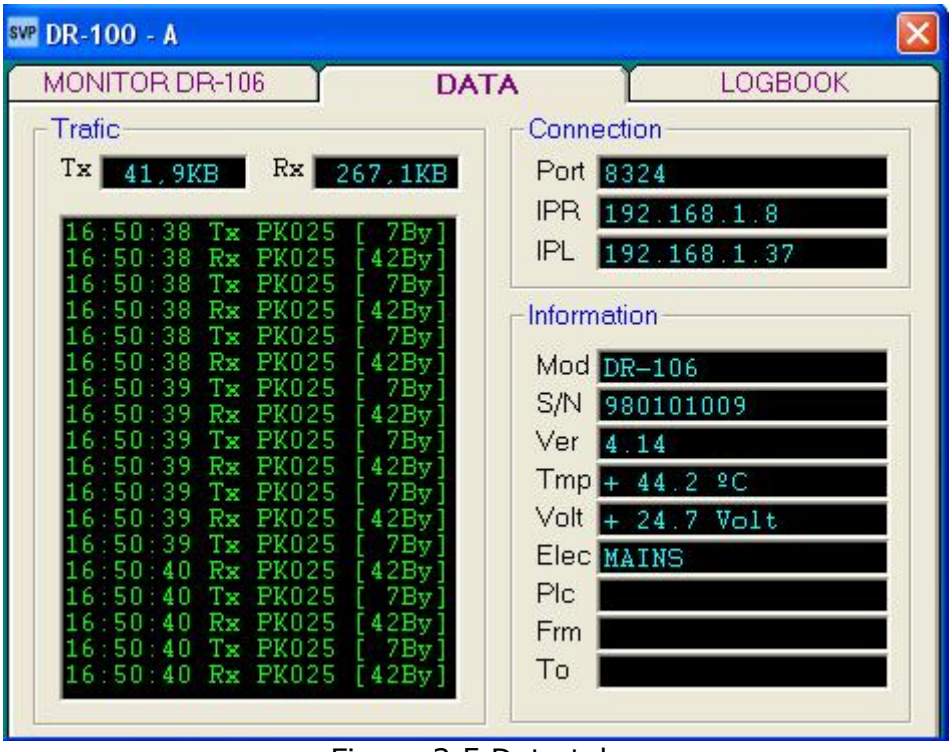

Figure 3.5 Data tab

3.2.3 Logbook tab

The logbook tab shows the last 32 warnings/alarms. However all the alarms occurred during the day are stored in a file.

In the directory where NetC software has been installed there is a folder named logbook. Inside logbook directory there are several folders one for each SVP equipment on the net. The name of each folder is the text written in Title field when the machine was added to the network. The file with the logbook information, alarms and warnings, is stored in the corresponding folder.

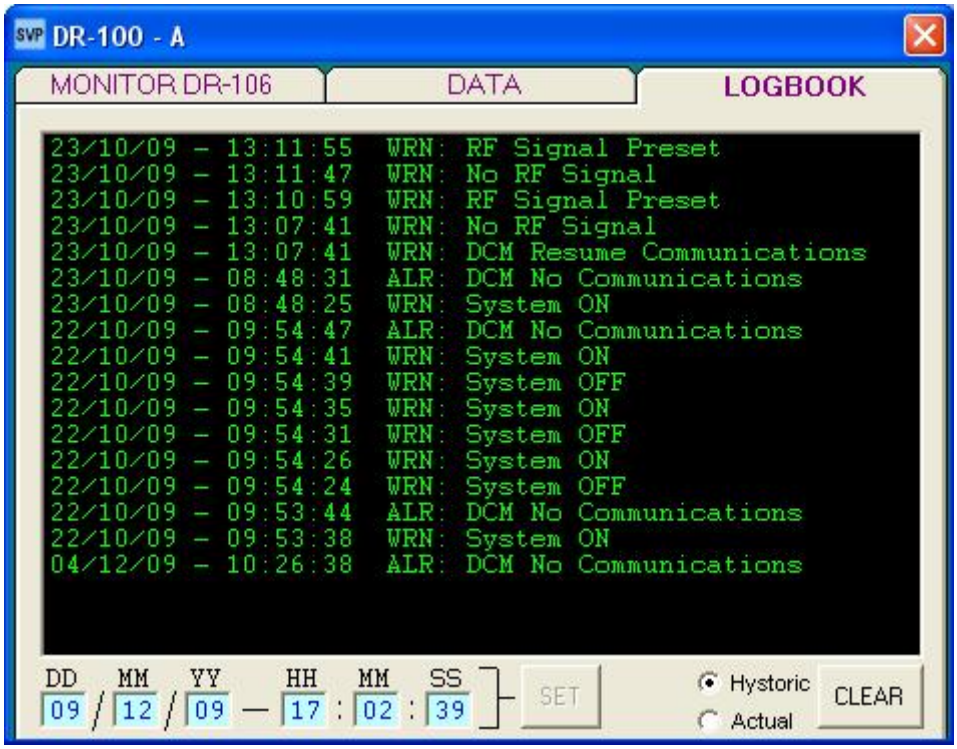

Figure 3.6 Logbook Tab

Notes:

Final note

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

Therefore, we ask you to understand that modifications may occur in designs, equipment and technology. Consequently, no responsibility can be derived from the information, illustrations or descriptions contained in this manual.

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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