# SVP
## Broadcast
## Microwave

# HIGH DEFINITION DIGITAL CAMERA TRANSMITTER HDT-02

# USER MANUAL V1.0

# Contents

## *Chapter 1: Introduction*

This first chapter provides a general description of the High definition HDT-02 camera transmitter

## *Chapter 2: Technical features*

This second part offers a detailed description of each connection available on the HDT-02 series camera transmitter. Inputs, outputs, power supply, and transmitter's physical and environmental characteristics are also provided.

## *Chapter 3: Transmitter operation and Menus*

This third part provides the user with all 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, transmitter's menus, alarms, etc.

## *Chapter 4: Applications*

In this last chapter some interesting applications for the HDT-02 transmitter system are shown.

**HDT-02** *High Definition Digital Camera Transmitter*
*USER'S MANUAL V1.0:*

## Dear customer,

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

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.

*HDT-02* *High Definition Digital Camera Transmitter*
*USER'S MANUAL V1.0:*

# Important Notes

1. The HDT-02 series COFDM High Definition camera transmitter is completely compatible with the DVB-T Standard, included in the European Standard ETSI EN300744

2. The HDT-02 digital camera transmitter applies a MPEG-2 compression to either composite video, SD-SDI or HD-SDI input signals. An MPEG-1 layer 2 compression is applied to the corresponding 4 analogue audio channels or digital SDI embedded audio signals. The resulting multiplexed signal is transmitted using COFDM modulation system.

3. The HDT-02 transmitter operates in either 2GHz or 3GHz frequency bands from 2.0 to 2.5GHz, from 2.2 to 2.6GHz and from 3.4 to 3.7GHz respectively.

4. Equipment's maximum output power is 100mWatt.

5. Special care should be taken with SDI cables, quality and length are very important specially when HD-SDI signals are transmitted.

6. It is not recommended to switch the HDT-02 camera transmitter on without antenna or load.

7. When 720p HD-SDI signal is transmitted transmitter's output bitrate should be higher than 8Mbps. On the other hand, if 1080i HD-SDI signal is transmitted, transmitter's output bitrate should be higher than 16Mbps. If the transmitter is not properly configured (modulation, FEC and guard interval) minimum bitrate alarm will occur.

8. When an audio channel is not used it should be disabled.

9. The HDT-02'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. Only authorized personnel should open the product and any repair or warranty will be invalidated if the seals are broken.

# Main Index

*HDT-02 High Definition Digital Camera Transmitter*
*USER'S MANUAL V1.0:*

# Chapter 1: Introduction

The HDT-02 camera transmitter can broadcast High Definition (HD) and Standard Definition (SD) signals using COFDM (Coded Orthogonal Frequency Division Multiplexing) modulation in 2K mode.

HD technology allows the delivery of High Definition images with excellent resolution and detail, SDI signals of up to 1.5Gbps.

Input video signals, composite video, SD-SDI or HD-SDI are MPEG-2 encoded, together with 4 analogue audios or 4 digital audios embedded on the SDI signal. The resulting transport Stream is COFDM 2K mode modulated to make the transmission of all this information possible. MPEG-2 coding can be done using different profiles: MP@HL, MP@ML and 422@ML. Minimum latency when super low delay option is selected is 45ms.

The HDT-02 transmitter has a Transport Stream ASI input so it can be used as a repeater.

It is available in 3 different frequency ranges: from 2.0 to 2.5GHz, from 2.2 to 2.6GHz and from 3.4 to 3.7GHz. Maximum output power is 100mWatt. High quality components have been used to achieve the best output signal quality.

Transmitter system operation is very easy. It has a display and a keyboard which make possible the configuration and monitorization of every parameter of the equipment.

The equipment is fed with DC power supply from 10 to 36V. It can be powered through DC power supply connector or through the battery mount.

Its excellent design, mechanical and electronic assembly make the HDT-02 a robust and reliable solution.



Figure 1.1 HDT-02 camera transmitter

# Chapter 2: Technical Features

## 1   Main characteristics

**RF Section:**

Frequency range:
|  |  |  |
|---|---|---|
| 2GHz A Model: | 2.0 to 2.5GHz |
| 2GHz B Model: | 2.2 to 2.6GHz |
| 3GHz Model: | 3.4 to 3.7GHz |

Output power level:
| Maximum: | 20dBm (100mW) |
|---|---|
| Programmable: | 1 dB steps from 14dBm |

Frequency tuning step     :     500KHz

**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 |

| Video Inputs: | Composite video/ SD-SDI/HD-SDI |
|---|---|
| ASI Input    : | EN50083-9 |
| Composite video Input: | 75Ω, 1Vpp, NTSC/PAL |
| SD/HD SDI Input: | SMPTE 259M/292M (270Mbps – 1.5Gbps) |

**Audio Section:**

| Audio channel number: | 2 pairs stereo, 4 mono |
|---|---|
| Audio input type: | Analogue/Embedded |
| Input level selectable: | Micro /line (Analogue) |
| Phantom voltage: | Selectable (only with micro level) |
| Maximum input level: | +15dBm |
| Signal to noise ratio: | >70dB |
| Input impedance: | 20KΩ |
| Audio coding: | MPEG-2 Layer1 |
| Audio simple rate: | 48 KHz |
| Audio Bitrate: | 128, 192, 256, 384 KHz |

## Coding section

| | |
|---|---|
| Coding profiles: | MP@ML (4:2:0):   1 a 15Mbps |
| | 422@ML (4:2:2)   3 a 31.65Mbps |
| | MP@HL |
| Delay: | Standard mode, super low delay mode |
| Latency: | Super low delay mode: 45 – 54ms |

## Modulation section

| | |
|---|---|
| Modulation system: | COFDM DVB-T, 2K mode |
| 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 |

## Power supply:

| | |
|---|---|
| Input range: | 10 a 36V (Extended range) |
| Consumption: | 18Watt |

## Connections:

| | |
|---|---|
| RF Antenna: | N Female |
| Composite video/SDI/ASI: | 75Ω BNC |
| Audios: | 2 x 5 pin Lemo 0B |
| DC power supply: | 4 pin Lemo 1B |
| Battery adapter: | IDC V Clip or Anton Bauer |

## Physical features:

| | |
|---|---|
| Dimensions: | |
| Width: | 110mm |
| Height: | 45mm |
| Depth: | 175mm |
| | |
| Weight: | 0.95Kg |
| Operation temperature: | -10 a 45ºC |

Audio and power supply cables are supplied with the HDT-02 camera transmitter

*HDT-02* *High Definition Digital Camera Transmitter*
*USER'S MANUAL V1.0:*

## 2  Connections

Every connection of the HDT-02 camera transmitter is on the rear panel, except for the RF antenna connection that is on the front panel.

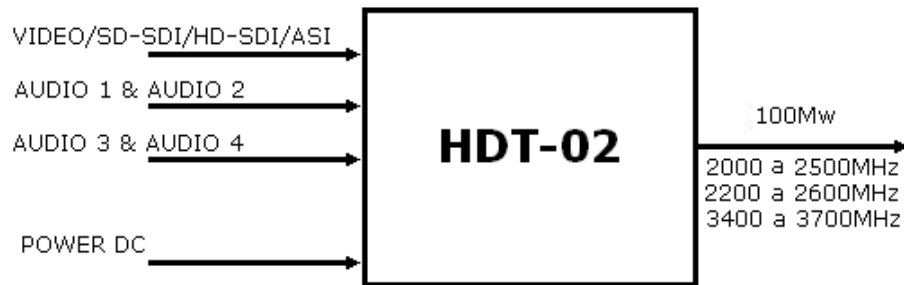All the input/output connections of the camera transmitter are shown in the figure below:



Figure 2.1 HDT-02 Connections

The following figures show the HDT-02's front and rear panel. Connections mentioned in the upper figure are shown below.



Figure 2.2 HDT-02's front panel



Figure 2.3 HDT-02's rear panel

Technical features of each connection are described on the following sections.

## 2.1 Power supply

The equipment is powered by a DC source from 10 to 36V, extended range.

The DC power supply is connected to the equipment via a 4 pin Lemo 1B connector.

Table 2.1 Power supply connection technical features

| Item | Features |
|---|---|
| Connector label | POWER D.C. |
| Connector type | 4 pin Lemo 1B |
| Input voltage range | 10-36 V. |
| Consumption | 18 Watt. |

The pinout of the power supply connector is:
- 1 and 2 pins => ground
- 3 and 4 pins => from 10 to 36V

## 2.2 VIDEO/SD-SDI/HD-SDI/ASI Input

All input signal types share same isolated 75Ω BNC connector. This connector is placed on transmitter's rear panel.

SD-SDI digital video input is compatible with SMPTE-259 Standard and HD-SDI digital video input signal type is SMPTE 292 compliant.

It is important that 75Ω connectors are used. This is because the female input connector of the HDT-02 unit may be damaged and because an impedance mismatch will occur.

Table 2.2 Video input signal connection features

| Item | Features | |
|---|---|---|
| Connector label | VIDEO/SDI/ASI | |
| Input signal type | VIDEO | SDI |
| Connector type | Isolated BNC female | |
| Impedance | 75Ω | |
| Input level | 1 Vpp over 75Ω | 800mVpp nominal ±10% |
| Return losses | >25dB @ 5MHz | > 15 dB, 5-1500 MHz |
| Standard | PAL/NTSC | SMPTE-259M and SMPTE-272M SMPTE-292M and SMPTE-299M |
| Video coding standard | MPEG-2 (ISO/IEC 13818-2) | |

Table 2.3 DVB-ASI Transport Stream Connection features

| Item | Features |
|---|---|
| Connector label | VIDEO/SDI/ASI |
| Connector type | Isolated BNC female |
| Impedance | 75Ω |
| Standard | EN50083-9 |
| Maximum Bitrate | 31.65 Mbit/s |

## 2.3 Audio inputs

The HDT-02 has 4 analogue audio input signals that are inserted in pairs via two 5 pin Lemo 0B connectors on equipment's rear panel. Only balanced audio signals are accepted. Audio cables are supplied with the equipment.

Input audio signal level can be micro or line and it is selectable from the front panel of the equipment. When micro input level is selected phantom voltage can be enabled or disabled.

The HDT-02 also accepts four digital audio signals embedded on the SD-SDI and HD-SDI video signals. The audio signals must be compliant with SMPTE-272M standard when embedded on SD-SDI video signal and with SMPTE-299M standard when embedded on HD-SDI video signal.

Table 2.4 Audio connection's technical features

| Item | Features |
|---|---|
| Audio channel number | 4 |
| Connector labels | AUDIO 1<br>AUDIO 2 |
| Connector type | 5 pin Lemo 0B |
| Impedance | 20KΩ |
| Sampling frequency | 48 KHz |
| Bit rate | 128, 192, 256,o 384 Kbit/s selectable |
| Coding standard | MPEG-1 L2 |
| Signal to noise ratio | >70dB |

The pinout of the audio connector is:
- Pin 3 => Ground
- Pins 1 and 2 => Audio L signals
- Pins 4 and 5 => Audio R signals

## 2.4 RF output/Antena

The antenna is directly connected to the female N-type connector on the front panel of the HDT-02 camera transmitter.

Table 2.5 RF output characteristics

| Item | Features |
|---|---|
| Connector label | RF ANTENNA |
| Connector type | N female |
| Output frequency range | 2.0-2,5GHz<br>2.2-2.6GHz<br>3.4-3.7GHz |
| Impedance | 50Ω |
| Output power | Maximum: 100 mWatt |

*HDT-02* *High Definition Digital Camera Transmitter*
*USER'S MANUAL V1.0:*

# Chapter 3: Transmitter operation and menus

This third chapter provides the user with all necessary information to control, configure and operate the equipment properly.

## 1 Display and LED

To turn the equipment on and off, keep ON/OFF button pressed for several seconds. When the equipment is turned on, the display will show the start-up message (model and version of the equipment) for two seconds, and then it will display the main screen.

In the main screen the following parameters are displayed:
- Frequency (MHz)
- Input selection (Composite video, SDI or DVB-ASI Transport Stream)
- Input signal detection (presence/absence)
- Audios status indication (enabled/disabled)
- Input video signal type: SD Standard definition or HD High definition
- If ASI input signal is selected, the input bitrate is displayed
- If composite video or SDI input signal is selected the video encoding profile used is displayed (MPEG-2 4:2:2 or MPEG-2 4:2:0)
- Latency (Standard delay or Super Low Delay)
- Modulation Scheme (QPSK, 16QAM o 64QAM)
- FEC (1/2, 2/3, 3/4, 5/6 o 7/8)
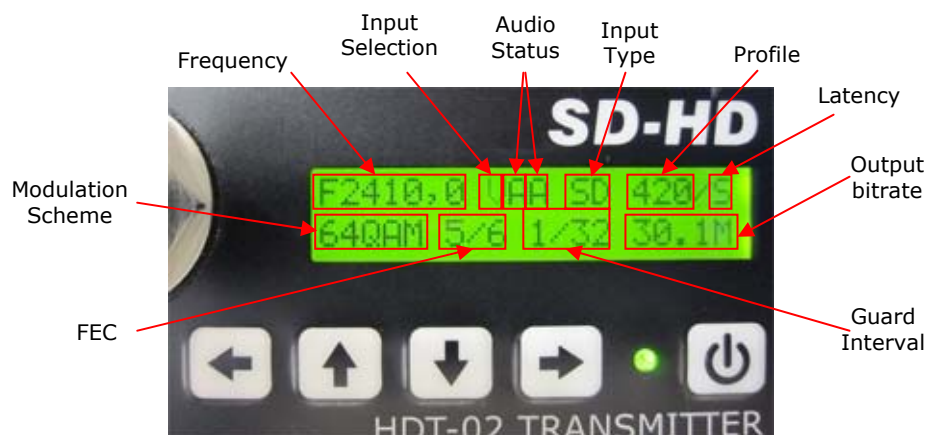- Guard Interval (1/4, 1/8, 1/16 o 1/32)
- Transmitted bitrate (Mpbs)



Figure 1.1 HDT-02's front panel/ Main screen

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 power into the equipment but it is turned off
- The Led lights up in green when the equipment is turned on
- If the equipment is locked the Led flashes in green
- The Led flashes green and red if the HDT-02 is alarmed.

When the input signal type is configured to be composite video a "V" is displayed in the input signal selection. On the other hand, if the selected input signal type is SDI an "S" is displayed in the main screen.



Figure 1.2 HDT-02's Main screen. Selected input signal: SDI

The audio status indicator shows an "A" when the selected input audio signals are analogue. On the other hand, if the audios are embedded in the SDI input signal the equipment should be configured to extract the audios from the SDI signal. In this case an "E" is displayed in the audio status indicator.

If the selected input signal type is composite video the audios cannot be configured as embedded as they cannot be extracted from the SDI signal.

When the selected input type is ASI, the main screen shows:
- Input Bitrate
- Signal presence/absence



Figure 1.3 Main screen. Selected input type: ASI Transport Stream

*HDT-02* *High Definition Digital Camera Transmitter*
*USER'S MANUAL V1.0:*

If the input bitrate is higher than the transmitted bitrate, there is an overflow and the input bitrate value blinks in the main screen showing an alarm.

Configured modulation scheme, FEC, guard interval and output bitrate are displayed on the second line of the main screen.

# 2  Front panel

The HDT-02 camera transmitter is configured following a menus structure on the display. The front panel has 5 buttons to enter and exit the equipment's control menus and submenus and to navigate through them. Functions of each button are detailed in the following sections.


Figure 2.1 HDT-02's front panel

## 2.1  ON/OFF Button

To turn the equipment on and off, keep this button pressed for several seconds. When the equipment is turned on, the display will show the start-up message (model and version of the equipment) for two seconds, and then 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 2.2 ON/OFF button

**HDT-02** *High Definition Digital Camera Transmitter*
*USER'S MANUAL V1.0:*

## 2.2 Left Button

This button is used to:
- Enter and exit equipment's main menu
- Exit equipment's submenus
- Once the parameter to change has been selected, it is used to move the cursor towards the digit immediately on the left

## 2.3 Right Button

This buttons has several functions:
- Enter submenus and parameters to be changed.
- Every parameter except for the frequency and the PIDs has limited options. Once a parameter has been selected, pressing this button the selected option changes. For example the modulation scheme has 3 options: QPSK, 16QAM or 64QAM. Input video type has also 3 options: composite video, SDI or Transport Stream. Pressing right button a change from one option to another occurs.
- To introduce the frequency, the PIDs values, the parameter is selected and then right button has to be pressed to be able to change the frequency value. Once the parameter value has been changed, to store de value, right button has to be pressed again.
- Unlock. If the equipment has not being operated for 3 minutes the keypad is locked. The Led flashes in green. To unlock the keypad the right arrow has to be pressed until a "bip" sound indicates that is has been unlocked.

## 2.4 Up and Down button

- The up and down arrow buttons allow navigation in the main menu and the rest of submenus. Using this buttons the submenu to be entered or the parameter to be changed is selected. Once selected, to enter it right button has to be pressed.
- This buttons are also used to change the frequency and PID parameter's values. Pressing up and down arrows the value of those parameters can be changed, increased or decreased respectively.
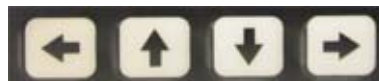


Figure 2.3 Left, Up, Down and Right buttons

# 3  Menus

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

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

The greyed out parameters are not selectable with the current version.

## Table 3.1Setup menu options

| Menu Line | Options | Comments |
|---|---|---|
| 1. Frequency | 2.0 to 2.5GHz | Transmission frequency configuration |
| | 2.2 to 2.6GHz | Frequency range depends on HDT-02 model |
| | 3.4 to 3.7GHz | If configured frequency is out of equipment's frequency range the transmitter adjusts it to nearest frequency inside allowed frequency band |
| 2. Tx Power | 100mWatt (20dBm) | Transmitted output power |
| | Low (14dBm) | |
| | Adjustable (1dB Steps) | |
| 3. Input. Sel | Video/SDI/ASI | Input signal type selection. |
| | | The transmitter detects automatically SDI input signal type SD-SDI o HD-SDI |
| 4. Modul | QPSK/16QAM/64QAM | Modulation scheme selection |
| 5. FEC | 1/2,2/3, 3/4, 5/6, 7/8 | FEC Selection |
| 6. Guard | 1/4, 1/8, 1/16, 1/32 | Guard Interval selection |
| 7. Bandwidth | 5/6/7/8MH | Channel bandwidth selection |
| 8.TS Parameters | Video PID | Transport Stream parameters configuration, PID number. |
| | Audio1 PID | |
| | Audio2 PID | |
| | PMT PID | |
| | PCR PID | |
| | Prog. Number | |
| 9. Video options | Profile: 4:2:0/4:2:2 | Coding parameters configuration |
| | Delay: Standard/SuperLD | |

| | | |
|---|---|---|
| 10 Audio Options | Input Sel: Analog/SDI_embd<br>Audio DID: G1/G2/G3/G4<br>Audio1: Enable/Disable<br>Audio1 Rate: 128K/192K/<br>256K/384K<br>Audio1L: Line/mic/mic_phan<br>Audio1R: Line/mic/mic_phan<br>Audio2: Enable/Disable<br>Audio2 Rate: 128K/192K/<br>256K/384K<br>Audio2L: Line/mic/mic_phan<br>Audio2R: Line/mic/mic_phan | Audio channels configuration |
| 11. Test Generator | | Video generator |
| 12. HD Enable | NO/YES<br>Key:XXXXXXXXXX<br>Code: to be provided by SVP | HD upgrade submenu<br>Contact  SVP |

## Table 3.2 Monitor Menu options

| Función | Opciones | Comentarios |
|---|---|---|
| Frequency | 2.0 to 2.5GHz<br>2.2 to 2.6GHz<br>3.4 to 3.7GHz | Configured transmission frequency (in MHz) |
| Tx Power | High (20dBm)<br>Low (14dBm)<br>Adjustable: other value | Selected output power |
| Input. Sel | Video/SDI/ASI | Input type |
| Modul | QPSK/16QAM/64QAM | Modulation scheme |
| FEC | 1/2,2/3, 3/4, 5/6, 7/8 | FEC |
| Guard | 1/4, 1/8, 1/16, 1/32 | Guard Interval |
| Bandwidth | 5/6/7/8MH | Channel bandwidth |
| PLL Lock | Yes/No | PLL status |
| TS Parameters | Video PID<br>Audio1 PID<br>Audio2 PID<br>PMT PID<br>PCR PID<br>Prog. Number | PID values |
| Tx. BitR: | 4.95 – 31.65Mpbs | Transmitted bitrate. Depends on modulation scheme, FEC and guard interval used. |

*HDT-02* *High Definition Digital Camera Transmitter*
*USER'S MANUAL V1.0:*

| | | |
|---|---|---|
| Video options | Profile: 4:2:0/4:2:2 | Input signal and coding info. |
| | Delay: Standard/SuperLD | |
| | Info: Input signal format | |
| | Aspect Ratio: 4:3/16:9 | |
| | Video present: Yes/No | |
| Audio Options | Input Sel: Analog/SDI_embd | Audio channel configuration. |
| | Audio DID: G1:767/G2:509 | |
| | G3:507/G4:761 | |
| | Audio1: Enable/Disable | |
| | Audio1 Rate: 128K/192K/ | |
| | 256K/384K | |
| | Audio1L: Line/mic/mic_phan | |
| | Audio1R: Line/mic/mic_phan | |
| | Audio2: Enable/Disable | |
| | Audio2 Rate: 128K/192K/ | |
| | 256K/384K | |
| | Audio2L: Line/mic/mic_phan | |
| | Audio2R: Line/mic/mic_phan | |
| ASI Input | ASI Present: Yes/No | ASI input characteristics |
| | Bitrate | |
| | Overflow: Yes/No | |
| | Packet format:188/204 | |
| Test Gen | | Video generator information |
| Voltage | 10-36V | Power supply information |
| Temperatura | ºC | Transmitter Works properly in -10 to +45ºC range |
| Rev | X.XX | Software version |
| SN | XXXXXXXX | Serial number |

# 4  Transmitter operation

Transmitter 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 transmitter's status.

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

Figure 4.1 Main menu.

## 4.1 Change of a parameter/ SETUP Menu

When operating the transmitter, two parameter types can be observed:
1. Parameters with limited options (2 or 3 options)
2. Parameters with multiple options

To modify a limited options parameter, it must be selected using up and down arrows. Once selected, pressing right button the operator navigates through the different available options. When the desired option is on the display the modification, parameter value change, has been done.

Modulation scheme parameter example:

Once the parameter has been selected, as right button is pressed, the operator navigates through the different options for the modulations scheme parameter: QPSK, 16QAM or 64QAM.



Figure 4.2 Modulation scheme selection: QPSK



Figure 4.3 Modulation scheme selection: 16QAM

*HDT-02* *High Definition Digital Camera Transmitter*
*USER'S MANUAL V1.0:*

Figure 4.4 Modulation scheme selection: 64QAM

To configure a multiple options parameter, for instance the frequency, the parameter has to be selected in the menu using up and down arrows. Afterwards, Right 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 Frequency parameter modification. The cursor on the first digit

Using up and down buttons the value of the digit 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, right button should be pressed until the cursor reaches the last digit. Then, press right arrow again and the equipment will be locked onto that frequency


Figure 4.6 Frequency parameter configuration. The cursor on the las digit

20

*HDT-02 High Definition Digital Camera Transmitter*
*USER'S MANUAL V1.0:*

To exit the parameter without saving the changes press repeatedly the left arrow until it is over the first digit and then press it again.

## 4.2  Monitoring a parameter/MONITOR menu

To check the status and value of different parameters Monitor menu has to be entered. This method of checking the 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 menu is entered most parameter's status can be checked using up and down arrows and moving along the menu.


Figure 4.7 Frequency parameter on the monitor 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 of the display. Pressing right button the submenu is entered and different parameter's value can be checked using up and down arrows to move along this submenu parameters.


Figure 4.8 TS parameter submenu access

To exit a submenu or a parameter press Left arrow.

# 5 Alarms

If an alarm is triggered in the HDT-02 camera transmitter, the led in the front panel flashes red and green. To determine which alarm has been triggered the display in the front panel should be observed. The value of the parameter that has triggered the alarm will blink in the display.

## 5.1 Input signal type alarm.

The HDT-02 equipment accepts three input signal types: VIDEO (composite video signal, PAL o NTSC), SDI (Digital video signal Serial Digital Interface) or ASI (DVB-ASI Transport Stream, Asynchronous Serial Interface). The user has to select which input signal type is going to be transmitted.

If no input signal is being introduced or if the signal introduced is not the selected signal type then, an alarm is triggered. The input signal type indicator in the main screen blinks.



Figure 5.1Main screen. Input signal type alarm (blinks)

## 5.2 Minimum bitrate alarm

When 720p HD-SDI signal is transmitted, transmitter's output bitrate should be higher than 8Mbps. On the other hand, if 1080i HD-SDI signal is transmitted, transmitter's output bitrate should be higher than 16Mbps.

If the transmitter is not properly configured (modulation, FEC and guard interval) so that the output bitrate is higher than the minimum bitrate needed for each input signal type, minimum bitrate alarm will occur.

When minimum bitrate alarm occurs, output bitrate and input signal type indicatos blink.

Figure 5.2Main Screen. Minimum bitrate alarm

## 5.3 ASI Overflow alarm

In case the equipment detects that the input ASI signal has a bit rate superior to the maximum allowed for the defined modulation scheme, FEC and guard interval, an alarm is triggered and the input bitrate value in the main screen blinks.

Therefore, transmitter configuration, constellation scheme, guard interval and/or convolutional coding will have to be changed so that overflow does not occur.


Figure 5.3 Main Screen. ASI Overflow signal

## 5.4 Transmission frequency alarm

Once the frequency has been set if there is any RF problem and the equipment is not locked onto that frequency the frequency value blinks on the display.

Blinks



Figure 5.4Main Screen. Transmission frequency alarm

## 5.5 Power supply voltage alarm

If the power supply voltage to the transmitter is below 10V or exceeds 35,5V, an alarm is triggered and the second line in the main screen is alternated every three seconds with another line where temperature and voltage values are displayed. The field of the voltage blinks. When the power supply voltage is between 10V and 35,5V the alarm is cancelled.

If the power supply voltage is below 9V or exceeds 36V the equipment is automatically turned off. It automatically is turned on when the input signal reaches 9.2V or 35.5V respectively
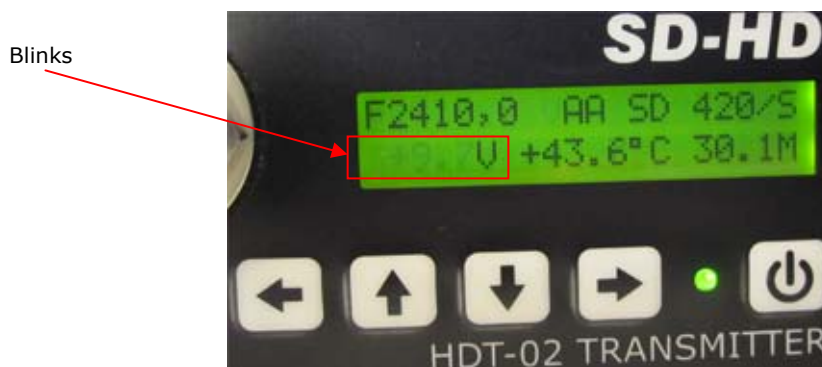
Blinks



Figure 5.5Main Screen. Power supply voltage alarm

## 5.6 Temperature alarm

When the temperature inside the HDT-02 camera transmitter reaches or exceeds 65ºC, an alarm is triggered and the second line on the main screen is alternated every three seconds with another line where temperature and voltage values are displayed. The field of the temperature blinks. When the temperature drops to 60ºC, the alarm is cancelled. (See 5.4 figure)

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*USER'S MANUAL V1.0:*

# 6  HD Upgrade

To HD upgrade an HDT-02 camera transmitter the following procedure should be followed:

Enter setup menu and then move to line 12, HD enable, then press right button to enter the submenu. If the transmitter is HD capable, HD Enable: yes will appear on line 12 and no submenu will be accessible.


Figure 6.1 HD Upgrade submenu access

Once HD enable submenu is entered following parameters are displayed.
  * Code word given by the transmitter
  * Keyword to be introduced


Figure 6.2 HD upgrade submenu

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

The transmitter gives the user three choices to insert the correct keyword. In case no correct word is introduced the transmitter is blocked in SD and it will have to be sent to SVP to unblock it and to be able to carry out the HD upgrade.

# Chapter 4: Applications

## 1  Introduction

The HDT-02 camera transmitter is a very versatile equipment. Used together with other SVP Broadcast Microwave equipments much more than a camera transmitter is achieved

This equipment allows multiple configurations:
1. On its own it is a robust, lightweight, easy-to-use camera transmitter. It has a display and a keypad on the front panel.
2. Together with the PA-04 amplifier, high power transmitter is achieved, which can be used as mobile or portable transmitter.
3. HDT-02 camera transmitter has DVB-ASI Transport Stream input, this makes possible to use it together with a PA-04 o PA-20 power amplifier as a repeater.

This configurations offer lots of advantages:

Configuration 1: working just with the camera transmitter. Advantages:
    a. A lightweight transmitter.
    b. The cameraman can move freely.
    c. Equipment's parameters are configurable from the front panel
    d. With a quick look the operator can check which is the equipment's status

Configuration 2: Operating together with the PA-04. Advantages:
    a. Compact and lightweight high power transmitter
    b. Installation in vehicles is not a problem because both equipments have a wide power supply range.
    c. Both equipments have inside a DC/DC converter, so that they are completely immune to any fluctuation or noise that the power supply input may have. This feature is very interesting in mobile installations, such as motorbikes, airplanes, cars ,etc.
    d. It is a very interesting pack to make live TV
    e. The status of both equipments is known at all times.

Configuration 3: Operating as a repeater together with the PA-04 or PA-20 amplifier:
    a. The ASI input in the HDT-02 has makes possible this configuration.
    b. A high power transmitter is achieved without a modulator equipment.
    c. The repeater (HDT-02 & PA-04/PA-20) has a reduced size.
    d. Installation in vehicles is not a problem because both equipments have a wide power supply range.
Both equipments have inside a DC/DC converter, so that they are completely immune to any fluctuation or noise that the power supply input

may have. This feature is very interesting in mobile installations, such as motorbikes, airplanes, cars ,etc.

# 2  Applications example ciones

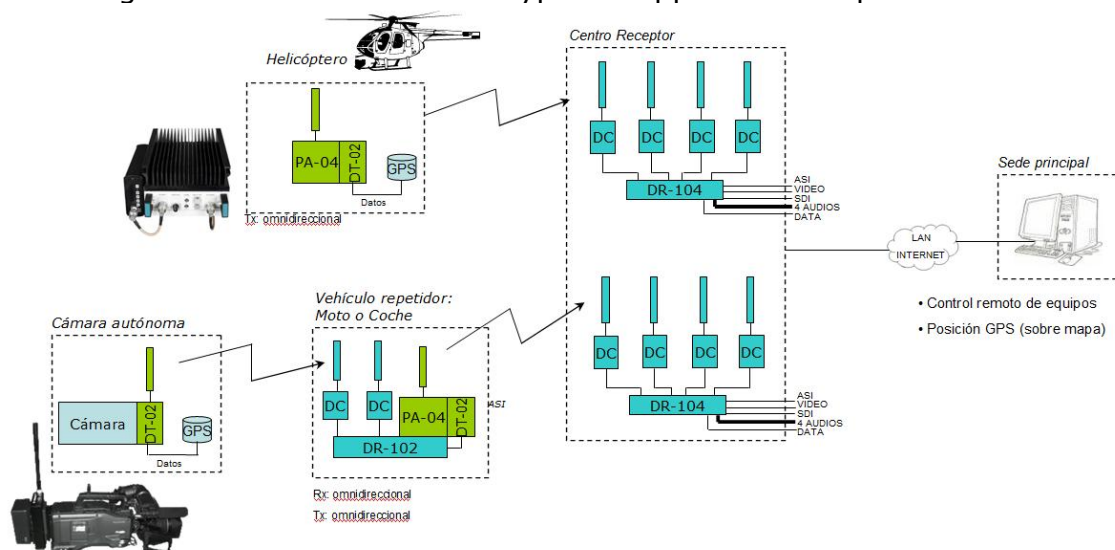The image below shows the three types of applications explained before.



Figure 2.1 DT-02 applications example

These applications aim to simplify easy but also complicated life TV (see figure) signal transmissions.

The use of the HDT-02 camera transmitter makes possible to reduce the space needed for the transmission equipment. Besides, due to the DC/DC converter in the equipments it is possible to install them in vehicles as cars, motorbikes, helicopters, etc.
The HDT-02 camera transmitter is a very versatile equipment.

## 2.1  Iphone application

To take a step forward in life transmissions/broadcast the transmission operator should be able to control the receiver and monitor the received signal.

To reach this aim the following working scheme is suggested. First, the receivers should be connected via Ethernet or Internet to a computer located in the headquarters. In this computer the software to control de receivers should be installed. The software is provided with the receiver equipments. Multiple receivers can be controlled from the computer located in the headquarters.

On the other hand the transmission operator should have an Iphone or a PDA with connection to GPRS or 3G network to be able to be connected to the computer in the headquarters. Using the PDA/Iphone the computer in the headquarters can be controlled. So, by means of the control of the

computer located in the headquarters the receivers can be controlled and monitored using the PDA or the Iphone.
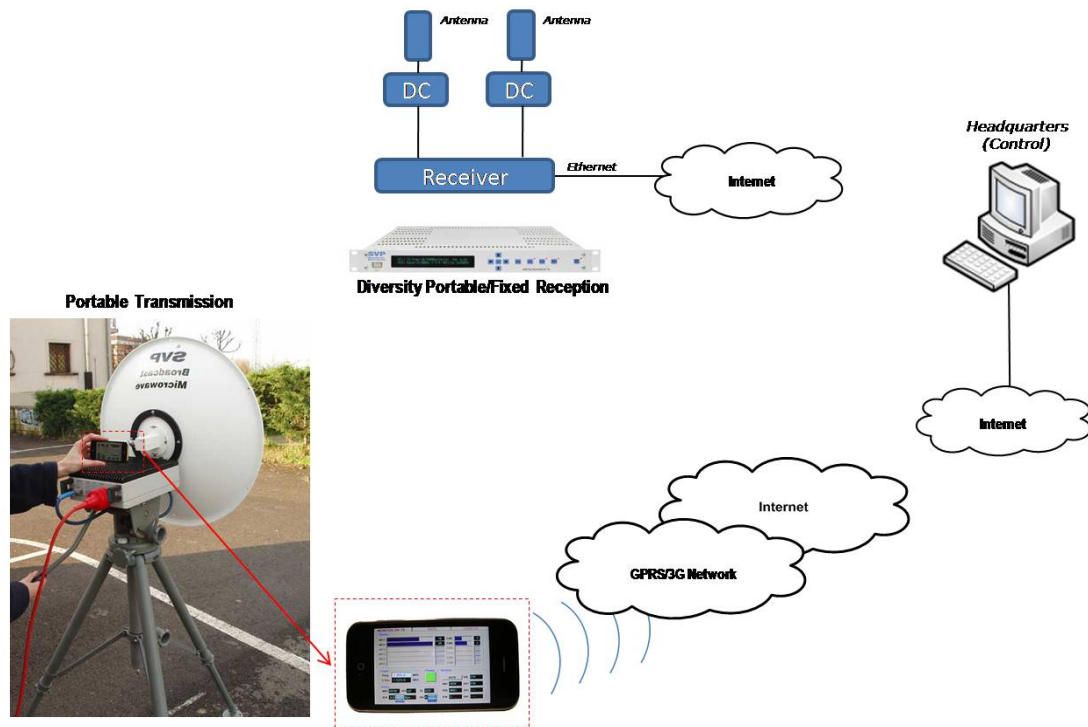
The figure below shows the scheme to be used:



Figure 2.2 Iphone application

*HDT-02* *High Definition Digital Camera Transmitter*
*USER'S MANUAL V1.0:*

## Notes:

**HDT-02** *High Definition Digital Camera Transmitter*
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# Final note

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*HDT-02* *High Definition Digital Camera Transmitter*
*USER'S MANUAL V1.0:*

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# SVP
## Broadcast
## Microwave

C/Uralde, 2
48215  Iurreta
Vizcaya – España

Tel: (+34) 94620 3722
Fax: (+34) 94620 4356

svpbm@svpbm.com

www.svpbm.com