REFERENCE GUIDE

HITACHI

2GHz Wireless HD System Fibre Package

(HITACHI OEM Version)

V 1.0

PRELIMINARY / DRAFT

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Broadcast Microwave Services Europe GmbH & Co. KG

Registered Address:
Schwalbacher Straße 12
65321 Heidenrod – Kemel
Germany

Registered Company Number HRA 6230

Contents

About this Reference Guide

This Reference Guide provides instructions and information for the installation and operation of the HITACHI wireless transmitter. It is not a comprehensive manual for all camera functions.

This Reference Guide should be kept in a safe place for reference for the life of the equipment. It is not intended that this Reference Guide will be amended by the issue of individual pages. Any revision will be by a complete reissue. If passing the equipment to a third party, please also pass on the relevant documentation.

Issues of this Reference Guide are listed below:

Issue	Date	Build Version	Comments
1	March 2010	1.0	Draft

Warnings, Cautions and Notes

Heed Warnings

All warnings on the product and in the operating instructions should be adhered to. The manufacturer can not be held responsible for injuries or damage where warnings and cautions have been ignored or taken lightly.

Read Instructions

All the safety and operating instructions should be read before this product is operated.

Follow Instructions

All operating and use instructions should be followed.

Retain Instructions

The safety and operating instructions should be retained for future reference.

Warning

Warnings give information which, if strictly observed, will prevent personal injury or death, OR DAMAGE TO PERSONAL PROPERTY OR THE ENVIRONMENT. They are boxed and shaded for emphasis, as in this example, and are placed immediately preceding the point at which the reader requires them.

Cautions

Cautions give information which, if strictly followed, will prevent damage to equipment or other goods. They are boxed for emphasis, as in this example, and are placed immediately preceding the point at which the reader requires them.

Notes

Notes provide supplementary information. They are highlighted for emphasis, as in this example, and are placed immediately after the relevant text.

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Broadcast Microwave Services Europe GmbH + Co. KG

Schwalbacher Straße 12

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1 Introduction

1.1 Preliminary remarks

The present document, "Reference Guide, HITACHI Wireless Camera (HITACHI OEM Version)", is intended to be used for the proper set-up and operation of the wireless transmitter unit of the HITACHI camera system.

1.2 Designation

Designation	HITACHI 2GHz Wireless HD System Fibre Package (HITACHI OEM Version)
Manufacturer:	Broadcast Microwave Services Europe GmbH + Co. KG

1.3 Delivered items

1 x DR2420ODU-Fibre (P/N 12.1617.000)

1 x ModulaRX IDU Fibre (P/N 12.1620.000)

1 x OEM;CW-HD1000 (P/N 11.2501.000)

1.4 Application of the HITACHI wireless transmitter

1.4.1 Typical application of the HITACHI fibre system

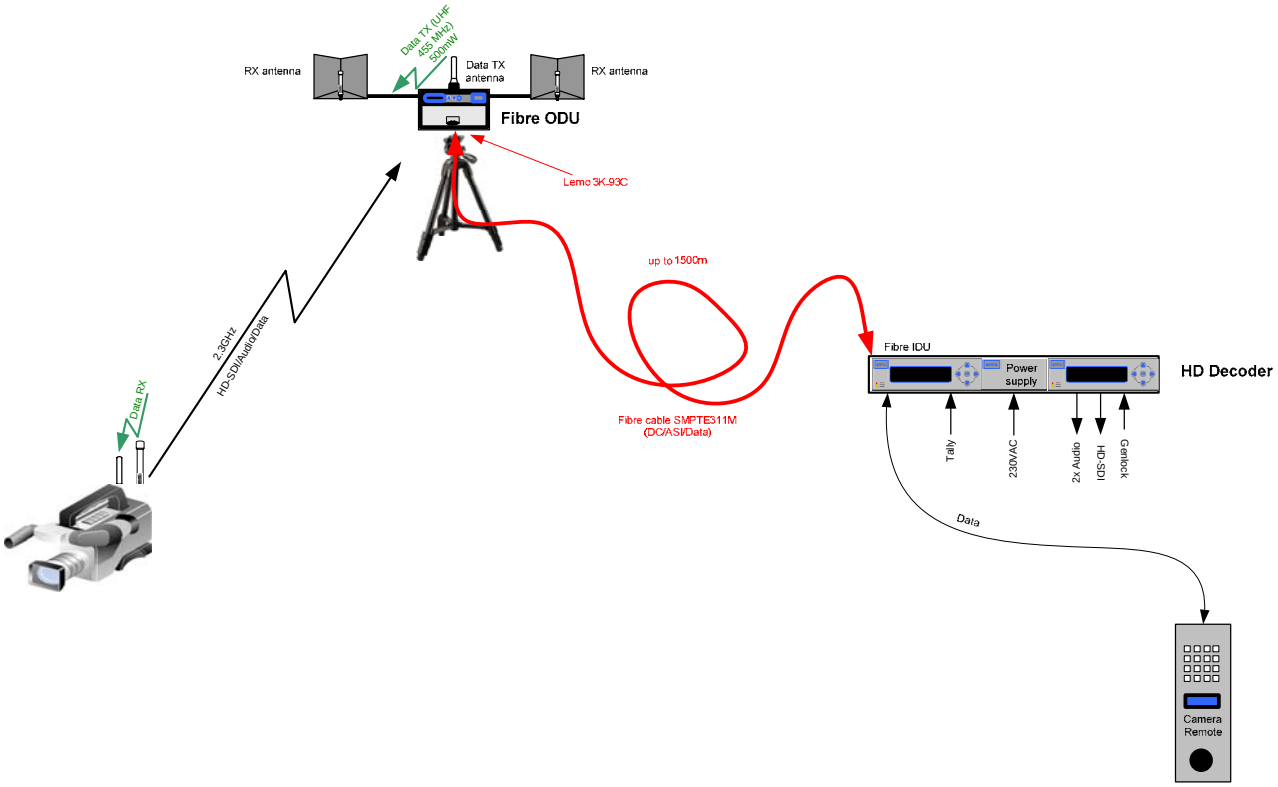


Figure 1: Typical Application

2 Getting started

2.1 Safety instructions

Warning

The regulations of VDE0100 must be observed for installation and operation of the unit.

Caution

- Before powering up the camera for the first time make sure all connections are completed.
- Pay attention to all warnings in this document.
- Make sure that the ventilation openings of the camera are not obstructed to ensure efficient heat dissipation.
- The camera should be protected against moisture and humidity.

2.2 Installing the HITACHI wireless camera components

The wireless transmitter of the HITACHI camera is integrated into the camera housing.

2.3 Connectors

Please make sure you connect all antennas and cables to the below described connector jacks.

2.3.1 Antennas

Figure 2: Antenna Sockets

2.3.1.1 UHF Antenna

Socket number 1 in Figure 2 is the UHF input for the intercom connection. To this socket a 50-Ohm UHF antenna must be mounted.

2.3.1.2 RF antenna

Connect an active RF antenna to socket number 2 in Figure 2. You may need to apply an N-N adaptor. The impedance is 50 Ohm.

Caution

If you wish to connect other than the specified components (eg power amplifier or passive antennas) a DC blocker must be applied. Otherwise, your HITACHI Wireless Camera and/or other connected equipment may be damaged.

Note

The HF output supplies 5 VDC for an active antenna.

2.3.2 Power supply

Most likely, your camera will be fed by a rechargeable battery. A V-mount bracket on the back side of the camera supports the battery housing.

If you desire to use an external power supply, you will find a 4-pole XLR 12 VDC input on the back side of the camera. As When connected to an external power supply the camera will switch from battery operation to the external power supply.

2.3.3 Intercom headset

Connect the intercom headset to the 5-pole XLR socket on the back side of you camera.

2.3.4 Microphones

The HITACHI Wireless Camera is equipped with two microphone input sockets on the back side. Connect your external microphones to these 3-pole XLR connectors.

2.3.5 RS 232

For servicing (eg software updates of the control panel) the wireless transmitter unit of the camera you may need to connect a PC to the RS 232 socket found below the control panel.

3 Configuring the HITACHI wireless camera digital transmitter

3.1 Control panel

The digital transmitter unit of your HITACHI wireless camera is equipped with a control panel including control buttons and an LC display.

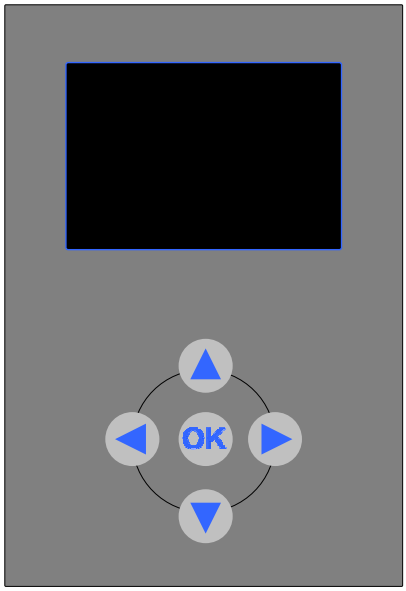


Figure 3: Transmitter Unit Control Panel

The control panel allows you to easily adjust the settings of the digital transmitter unit of your HITACHI Wireless Camera.

Note

While configuring the digital transmitter you must not disconnect the power supply from the camera. This may cause loss of presets.

3.1.1 The LC display

The HITACHI Wireless Camera digital transmitter unit is equipped with an LC display. This display simplifies the configuration.

Figure 4: LC Display

Unless you are adjusting your transmitter parameters, the display shows the signal strength of the received camera control UHF signal in the upper left corner, an error code in the upper right corner and the adjusted transmitting frequency of the video and audio signal.

3.1.2 The control buttons

The control buttons are located below the LC display on the control panel. These buttons are used for the navigation through the different menu items. Depending on the parameter to be changed the operator can use the control buttons “Up”/”Down” and/or “Left”/”Right”.

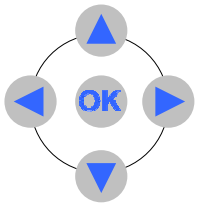


Figure 5: Control Buttons

3.2 Menu structure

After you switched on the HITACHI Wireless Camera the control panel of the digital transmitter unit shows an initialisation message. Once the initialisation phase has finished the main display (see Figure 4) is shown. Now you can access to the menu and adjust the different settings.

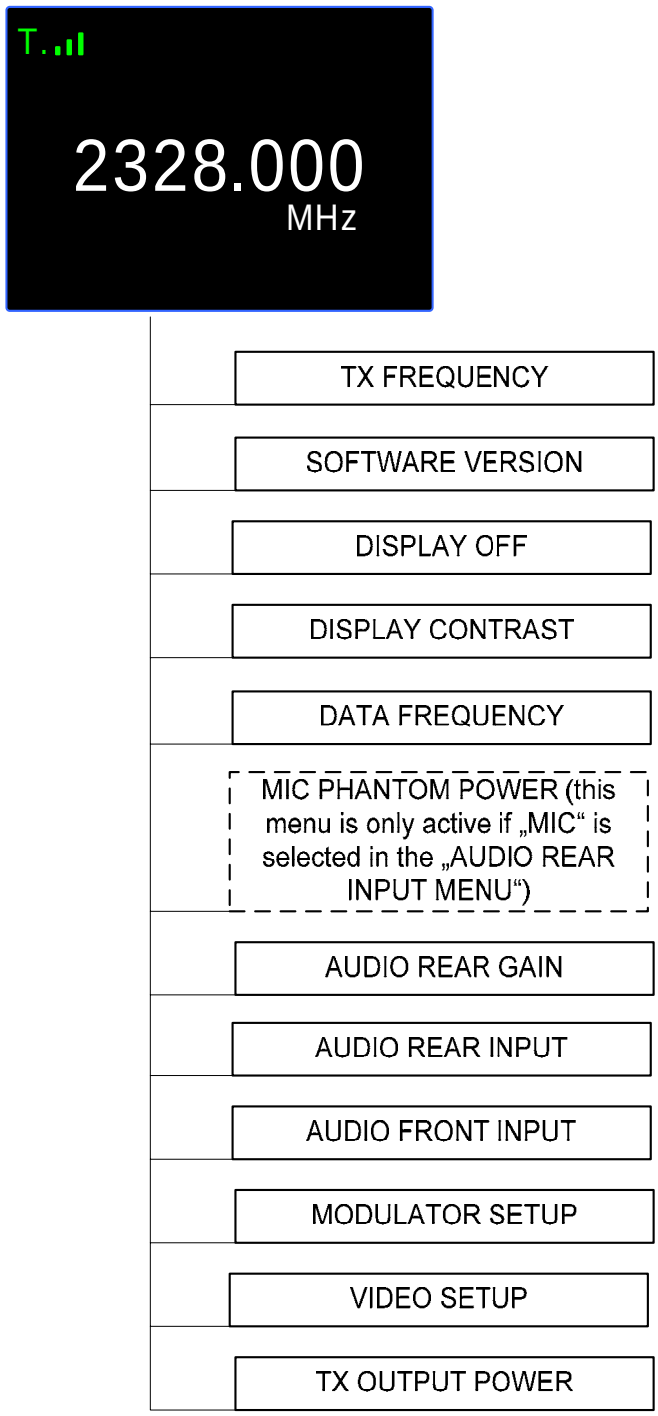


Figure 6: Menu Structure

3.2.1 Frequency

On the main display, press the button “OK” for approximately 3 seconds. The current frequency is shown.

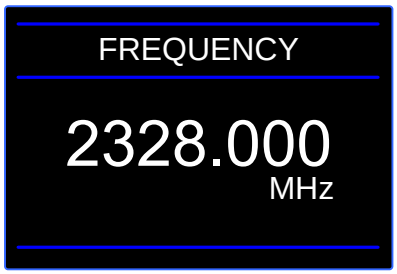


Figure 7: Frequency Menu

After pressing “OK” another time for approximately 3 seconds the first digit of the frequency is highlighted and the display looks like shown in Figure 8. Press the “UP” control button to increase the value or the “DOWN” control button to decrease. To move to the next digit press the “RIGHT” control button or press the “LEFT” control button to jump back to the previous digit. Now adjust the frequency you wish to use.

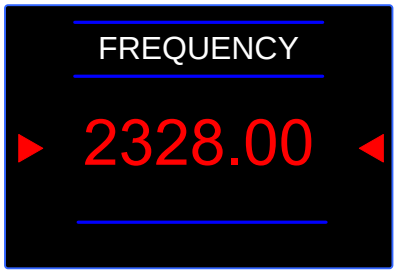


Figure 8: Adjusting the Frequency

To confirm the selected frequency press the “OK” button and the main menu will be shown.

3.2.2 Software version

The control panel gives you the opportunity to show the recently installed software version. On the main display, press again the button “OK” for approximately 3 seconds. The current frequency is shown. Now use the “UP”/”DOWN” buttons to go to the “SOFTWARE” menu.

No further adjustments can be made. The LC display shows the software version.

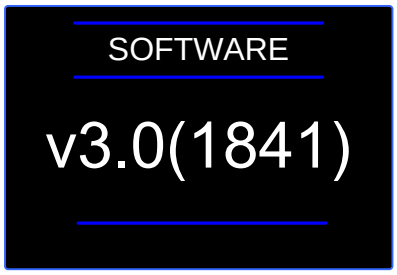


Figure 9: Software Version Display

3.2.3 Display off

In certain production environments you may want to switch the LC display off.

On the main display, press the button “OK” for approximately 3 seconds. The current frequency is shown. Now use the “UP”/”DOWN” buttons to go to the “DISPLAY OFF” menu.

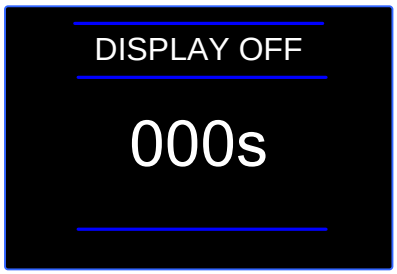


Figure 10: Display Off Menu

Press the “OK” button again for approximately 3 seconds and the current display-off time level is highlighted. Use the “UP”/”DOWN” buttons in order to increase or decrease the display brightness in a range from 0 to 240 seconds in steps of 15 seconds. This is the time your display switches off after no button was pressed on the control panel. If you adjust the value to 0 seconds the display remains switched on.

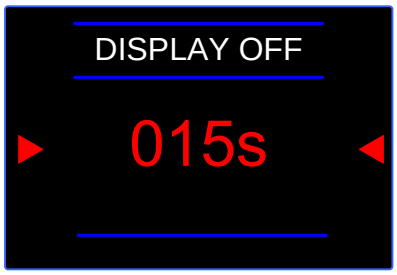


Figure 11: Display-off Time Adjustment

To confirm the selected display-off time press the “OK” button and the main menu will be shown.

> **Note**
>
> Once the display is switched off simply by pressing the “OK” button for

approximately 3 seconds it switches on again and you can use the menu. After the previously adjusted time without any action the display automatically switches off again.

3.2.4 Display brightness

You may wish to adjust the brightness of the LC display to your production environment.

On the main display, press the button “OK” for approximately 3 seconds. The current frequency is shown. Now use the “UP”/”DOWN” buttons to go to the “CONTRAST” menu.

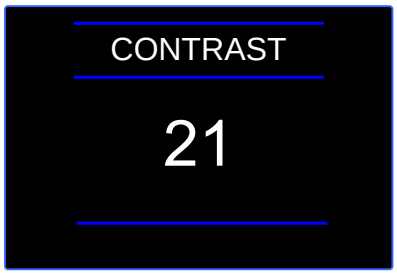


Figure 12: Contrast Menu

Press the “OK” button again for approximately 3 seconds and the current contrast level is highlighted. Use the “UP”/”DOWN” buttons in order to increase or decrease the display brightness in a range from 0 to 15. 0 is the darkest adjustment, 15 the highest brightness.

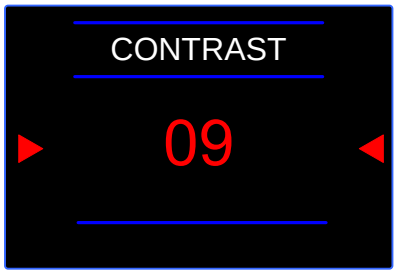


Figure 13: Display Brightness Adjustment

To confirm the selected brightness level press the “OK” button and the main menu will be shown.

3.2.5 Data frequency

The camera may be connected to a CCU via an UHF wireless connection. In the “DATA FREQUENCY” menu you have the possibility to adjust the frequency of the channel.

On the main display, press the button “OK” for approximately 3 seconds. The current frequency is shown. Now use the “UP”/”DOWN” buttons to go to the “DATA FREQUENCY” menu.

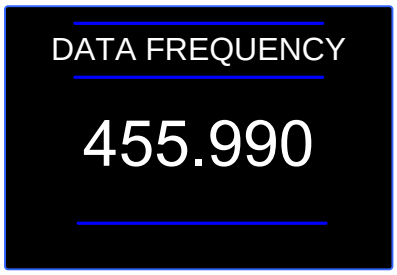


Figure 14: Data Frequency Menu

After pressing “OK” another time for approximately 3 seconds the data frequency is shown red. Use the control buttons to adjust the frequency in steps of 0.01 MHz.

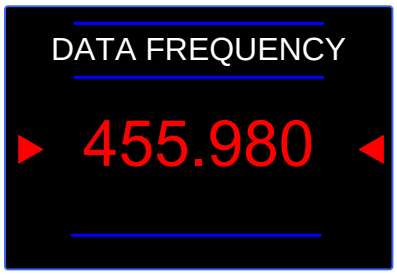


Figure 15: Adjusting the Data Frequency

To confirm the selected frequency press the “OK” button and the main menu will be shown.

3.2.6 Transmission power

In order to trim the transmission power to your environment you can choose between three preset power levels in the “OUTPUT POWER” menu.

On the main display, press the button “OK” for approximately 3 seconds. The current frequency is shown. Now use the “UP”/”DOWN” buttons to go to the “OUTPUT POWER” menu.

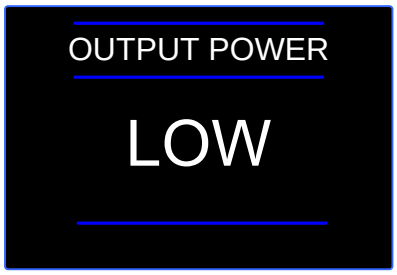


Figure 16: Output Power Menu

Press the “OK” button again for approximately 3 seconds and the current output power level is highlighted. With the “UP”/”DOWN” control buttons you can choose between low, medium and high transmission power.

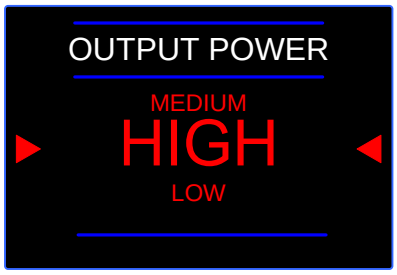


Figure 17: Output Power Adjustment

(Low=10mW; Medium=100mW; High=400mW).To confirm the selected power level press the “OK” button and the main menu will be shown.

3.2.7 Mic Phantom Power

The control panel gives you the opportunity to enable the MIC phantom power if “MIC” is selected in the menu “AUDIO REAR INPUT”.

Figure 13: Software Version Display

3.2.8 Audio Rear Gain

If you connect an audio signal to the “Rear Audio” connector at the back of the camera, then you can adjust the gain of the signal. In order to adjust the audio gain you can choose between the values +30….-10dB in the “AUDIO REAR GAIN” menu.

On the main display, press the button “OK” for approximately 3 seconds. The current frequency is shown. Now use the “UP”/”DOWN” buttons to go to the “AUDIO REAR GAIN” menu.

Figure 14: Audio Rear Gain

Press the “OK” button again for approximately 3 seconds and the current gain level is highlighted. With the “UP”/”DOWN” control buttons you can choose between the values +30….-10dB.

3.2.9 Audio Rear Input

In order to select the audio input you can choose between “LINE” and “MIC”

On the main display, press the button “OK” for approximately 3 seconds. The current frequency is shown. Now use the “UP”/”DOWN” buttons to go to the “AUDIO REAR INPUT”” menu.

Figure 15: Audio Rear Input

Press the “OK” button again for approximately 3 seconds and the current input is highlighted. With the “UP”/”DOWN” control buttons you can choose between “MIC” and “LINE”.

Note

If you select “LINE” you will not see the “MIC PHANTOM POWER” sub menu

3.2.10 Audio Front Input

Having VF SETUP selected in this sub menu you will be able to adjust the audio of the front microfone through the viewfinder menu.

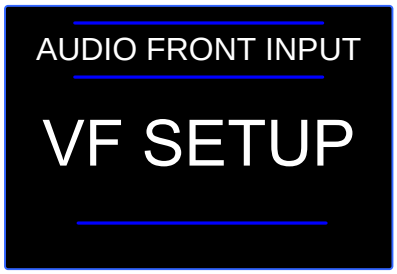


Figure 16: Audio Front Input

3.2.11 Modulator Setup

This setup shows you the current modulation of the transmitter. It is not possible to change something.

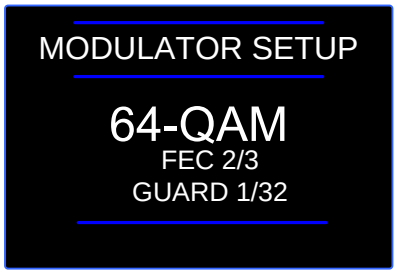


Figure 17: Modulator Setup

3.2.12 Video Setup

This setup shows you the current video parameters. It is not possible to change something.

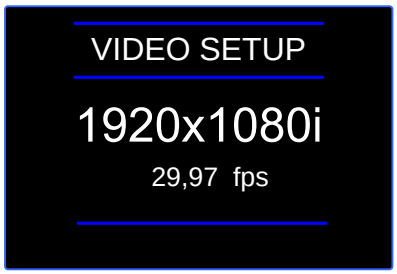


Figure 17: Modulator Setup

4 Configuring the HITACHI Receive units

4.1 Connection of the indoor units

In the figure 18 you can see how to connect the devices with the delivered cables.

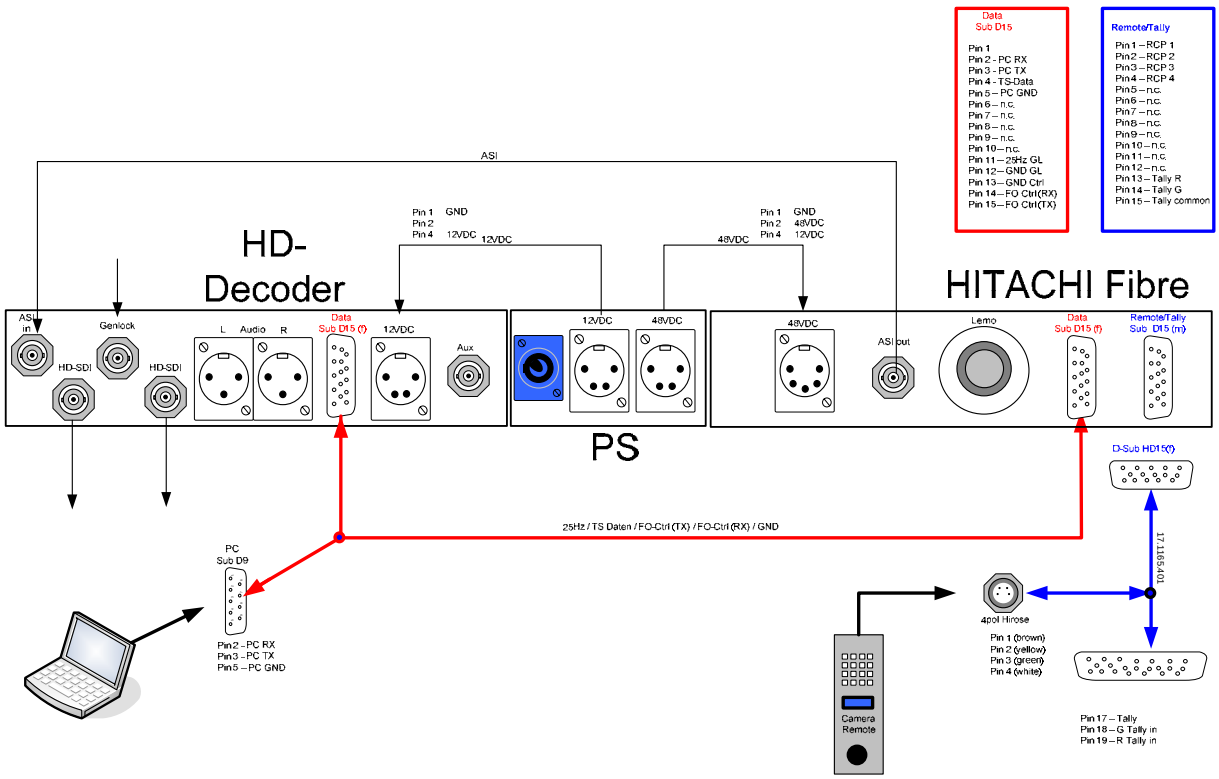


Figure 18: How to connect the cables to the devices

4.2 Installing the DR2500HD Receiver

The DR2505-ASI decoder can be accommodated in a 19" rack with a height of 1 RU.

4.3 Control buttons and Alarm status at the front of the device

4.3.1 The Display

A LC display is used to show the RF and COFDM parameters and the configuration parameters.

Figure 19: LCD Display

4.3.2 The control buttons

The control buttons are located on the right side of the front panel. They allow navigation of the different receiver DR2500HD menus. Depending on the parameter to be changed the operator can use the control buttons “UP”/”Down” and/or “Left”/”Right”

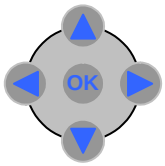


Figure 20: Control buttons

4.3.3 Alarm and Status

Alarm

Lights up, when the tuned Frequency differs from the allowed Frequency range of the receiver (Fibre-ODU). The DR2500-ASI switches automatically to the next highest or lowest adjustable Frequency.

Status

Lights up, when the DR2500ASI doesn’t receive any signals (Unlocked). Once a signal is received, the light switches off.

Power

Lights up, when the DR2500-ASI is powered by the power supply.

4.4 Connectors and indicators at the rear of the device

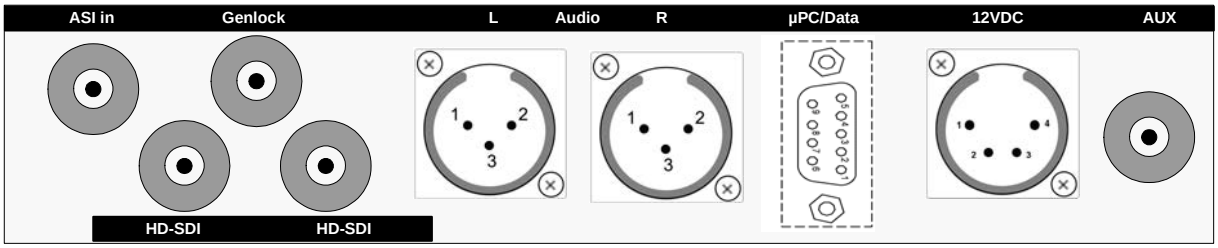


Figure 21: Rear of the DR2500ASI

At the rear of the DR2500HD Diversity Receiver:

- 1 X “ASI in”, this is the ASI signal which comes from the Fibre-IDU
- 1 X “Genlock in” for Synchronization [SD- or HD-SDI], BNC female
- 2 X “SDI out” for video, BNC female
- 1 X "12-18V-DC" 4-pol XLR connector for 12-18V DC power supply
- “Ant.1” and “Ant.2”are 2 X SMA (f) sockets for RF input
- 1 X “uPC/Data” is a Serial 9 pin Sub-D (f) socket for remote control RX and data output
- “Audio L” and “Audio R” are 3-pol XLR connector for audio out

Caution

Be sure that the ventilation openings are not obstructed.

5 Operating the DR2500ASI decoder

When the DR2500ASI is connected to a power supply, the display at the front of the unit will light up.

During the **initialisation phase**, the company's name, receiver's name as well as the software version are displayed.

The operation of the unit is controlled using the control elements located at the front panel.

Figure 22: Initalisation phase

After that the initialisation phase is done the receiver switches automatically to the "Main Display" see *Figure 6.*

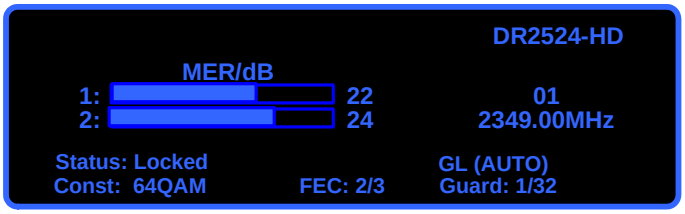


Figure 23: Main display

In case that there is good transmission at the set frequency, you will get the overview displayed like in the Picture shown in "Figure 6"

On top of the right side you can see the model name of the receiver and under the model name are displayed the selected preset and the frequency which is stored in that preset.

On the left side the bar graph for the MER value is shown. In "Figure 6" the bar graph value would be 0 in case of bad reception, because no transmission is received at the moment by the receiver. Bar graph "1:" shows the MER from antenna 1 and "2:" shows the value from antenna 2.

Note

The modulation error ratio (MER) is a measure of the SNR in a digitally modulated signal. Like SNR, MER can be expressed in dB.

Signal-to-noise (SNR or S/N) is an electrical engineering measurement, defined as the ratio of a signal power to the noise power corrupting the signal. Signal-to-noise ratio compares the level of a desired signal to the level of background noise. The higher the ratio, the less obtrusive the background noise is.

- **Status**: Unlocked : will be displayed when any signal is received
  Locked : will be displayed when a signal is received

At the bottom of the display the Constellation, FEC and Guard Interval will be shown automatically, if a signal is received and decoded by the receiver.

- **Guard**: 1/4, 1/8, 1/16, 1/32 can be displayed depending on the bandwidth of the transmitted signal

In COFDM, the beginning of each symbol is preceded by a **guard interval**. As long as the echoes fall within this interval, they will not affect the receiver's ability to safely decode the actual data, as data is only interpreted outside the guard interval.

Longer guard periods allow more distant echoes to be tolerated. However, longer guard intervals reduce the channel efficiency. In DVB-T, four guard intervals are available (given as fractions of a symbol period): 1/32 ; 1/16 ; 1/8 ; 1/4

Hence, 1/32 gives lowest protection and the highest data rate. 1/4 results in the best protection but the lowest data rate

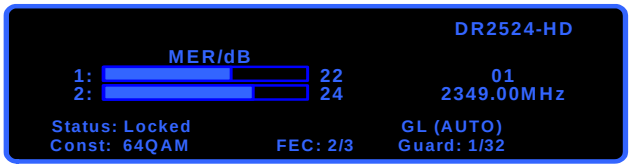
- **FEC**: 1/2, 2/3, 3/4, 5/6 can be displayed depending on the FEC of the transmitted signal

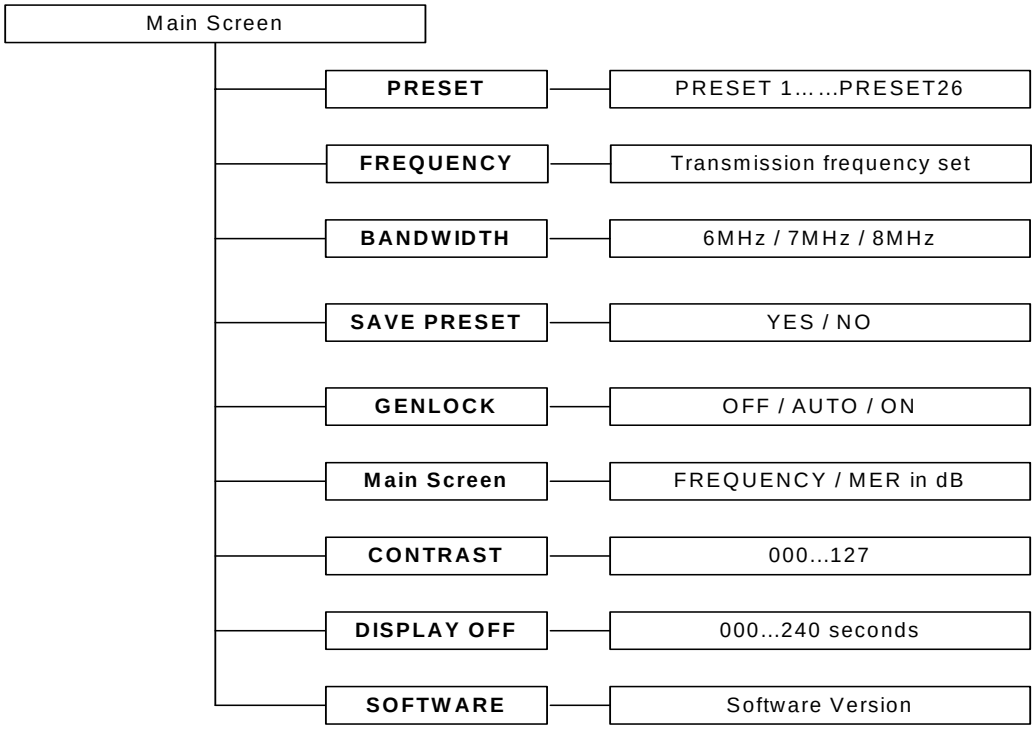
Forward **E**rror **C**orrection (FEC) is a system of error control for data transmission, whereby the sender adds redundant data to its messages, also known as an error-correction code. This allows the receiver to detect and correct errors (within some bound) The advantage of forward error correction is that a back-channel is not required, at the cost of higher bandwidth requirements on average.

- **Const**: QPSK, 16 QAM, 64 QAM can be displayed depending on the modulation mode of the transmitted signal

Constellation (DVB-T Modulation) mode can be between QPSK, 16QAM and 64QAM. QPSK is the default mode (in SD transmission) and will give the strongest most rugged RF link performance. Selecting 16QAM reduces the link performance by 5dB but improves the link data throughput, giving significantly better video quality. **64QAM** is the constellation mode **for HD transmission** due to the high data rate.

5.1 Menu structure





5.2 PRESETS

Press the button “OK” for 2-3 seconds to enter the main menu.

The first submenu is the “PRESET”-menu, where it is possible to select 26 different presets. Each preset can contain a different frequency which the customer can assign due to his needs.

To change the preset number press again the button “OK” for 2-3 seconds to be able to change the preset. Two small triangle will show that the change mode is activated.

Now it is possible to select with the UP/DOWN button 1 of 26 presets. To confirm the selected preset press the “OK” button and after that it will appear “UPDATING DEVICE”.

Note

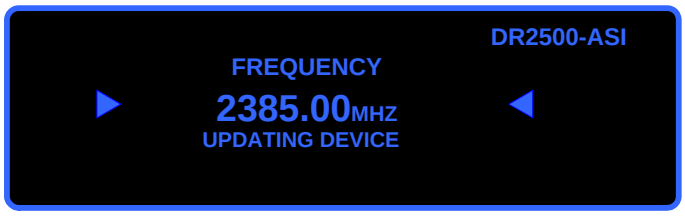
A quick button press will return you to the previous menu to effect and save the changes and another quick press takes you away from the main menu

5.3 Frequency assignment

Press the button “OK” for 2-3 seconds to enter in the main menu and one time the right button for the frequency option. This menu gives the user the possibility to set the frequency manually without using the preset option.

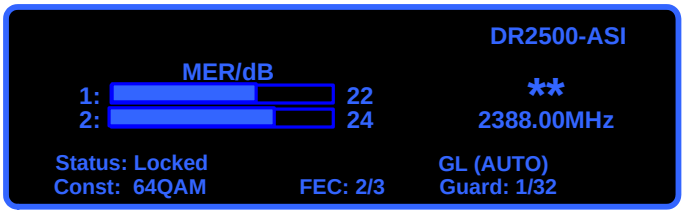
Press again the button “OK” for 2-3 seconds to be able to change the frequency range. After pressing “OK” for the second time the first digit is highlighted and the display looks like in *figure 7.* Press the “UP” control button to increase the digit and the “DOWN” to decrease, to move to the second digit press the “RIGHT” control button or Press the “LEFT” to come back to the previous digit.

To confirm the frequency press the “OK” button and after that it will appear “UPDATING DEVICE”.



Note

A quick button press will return you to the previous menu to effect and save the changes and another quick press takes you away from the main menu



At the position where normally the preset number is shown, there are displayed two stars “***”, which is an indication for the user, that no preset is set, but a manually frequency.

5.4 Bandwidth selection

Press the button “OK” for 2-3 seconds to enter the main menu.

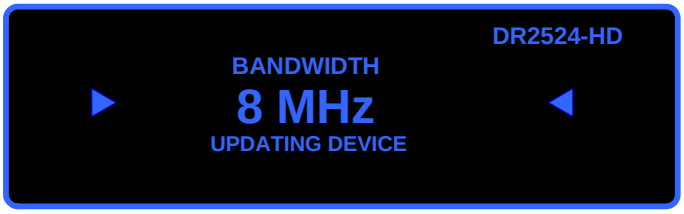
The third submenu is the “BANDWIDTH”-menu, where it is possible to select 3 different bandwidth (6 / 7 / or 8 MHz). Before changing the bandwidth, please check the bandwidth setting of your transmitter.

Note

For HD transmission you have to set the bandwidth to 8 MHz.

To change the bandwidth press again the button “OK” for 2-3 seconds to be able to change the setting. Two small triangle will show that the change mode is activated.

Now it is possible to select with the UP/DOWN button the bandwidth of the transmitted signal you want to receive. To confirm the selected preset press the “OK” button and after that it will appear “UPDATING DEVICE”.



Note

A quick button press will return you to the previous menu to effect and save the changes and another quick press takes you away from the main menu

5.5 Save Preset

If a frequency has been set in the “Frequency” option, described in Chapter 3.3, it is possible to save this frequency in one of the 26 Preset options. To save a frequency in a Preset, follow the steps:

1. Select the Preset you want to store the new frequency (Chapter 3.2)
2. Set the new frequency (Chapter 3.3)
3. Save preset:

   Press the button “OK” for 2-3 seconds to enter in the main menu and two times the right button for the “SAVE PRESET” option.

This menu gives the user the possibility to save a frequency under the current preset.

Now press again the button “OK” for 2-3 seconds and you will have the choice between “YES” (to save frequency to current preset) and press the OK button.

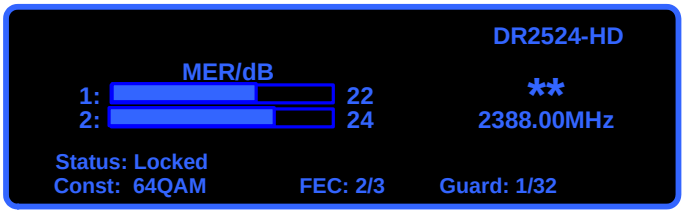
Now the frequency is stored to the preset.

5.6 Genlock

If a genlock is used with the DR2500HD receiver, the user will have some options to set the genlock function.

Press the button “OK” for 2-3 seconds to enter in the main menu and three times the right button for the “GENLOCK” option and press again the “OK” button for 2-3 seconds. Press the “UP” or “DOWN” control button to select one of the three options which are given to the user in this menu: OFF / AUTO / ON

1) **OFF** – the receiver will not use any external genlock

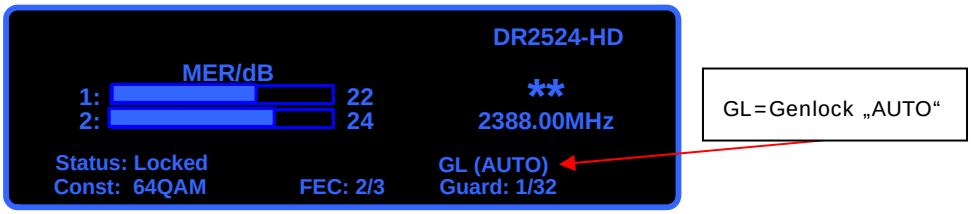


2) **ON** - the receiver will use the external genlock

Note

If Genlock “ON” is selected but no Genlock signal is present, the decoder will not be able to decode any signal

3) **AUTO** – the receiver will detect automatically if an external genlock is connected



Now press again the button “OK” for 2-3 seconds to confirm your choice.

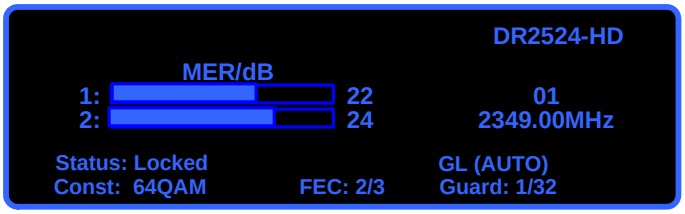
5.7 Main Sreen

It is possible to choose between two Main Screens. Press the button “OK” for 2-3 seconds to enter in the main menu and four times the right button for the “Main Screen” option and press again the “OK” button for 2-3 seconds. Press the “UP” or “DOWN” control button to select one of the two options: Frequency or MER in dB.

1) Main Screen (**FREQUENCY**)

In this display you will get only the frequency displayed and the device model.

2) Main Screen (**MER in dB**)



The display shows you different information at the same time:

- MER/dB for antenna1 and antenna 2
- Status of incoming signal (locked or unlocked)
- Modulation of received and decoded Signal (QPSK/16QAM/64QAM)
- FEC (1/2;2/3;4/4;5/6;7/8)
- Guard interval (1/4;1/8;1/16;1/32)
- Genlock setting (- [Genlock OFF]; GL [Genlock ON]; GL (AUTO); [Genlock AUTO])
- Preset number and frequency (if preset is selected) or only frequency if no preset is selected

5.8 Contrast

Press the button “OK” for 2-3 seconds to enter in the main menu, and then press twice the control button “RIGHT” to select the sub menu “CONTRAST”.

Press again the button “OK” for 2-3 seconds and then press the control button “UP” or “DOWN” to choose between a range from 000 to 127. The higher the digit the brighter the display.

> Note
>
> A quick button press short will return you to the previous menu and save the changes. A quick button press exits the main menu

5.9 Display OFF

Press the button “OK” for 2-3 seconds to enter in the main menu, then press three times the control button “RIGHT” to select the sub menu “DISPLAY OFF”.

Press again the button “OK” for 2-3 seconds and then press the control button “UP” or “DOWN” to choose between 000s to 240s. The user can choose the time after which the unit would automatically switch off the display.

Note

A quick button press will return you to the previous menu and save the changes Another quick press exits the main menu.

5.10 Software

Press the button “OK” for 2-3 seconds to enter in the main menu, then press four times control button “RIGHT” control button to navigate in the main menu and select the “SOFTWARE”.

The software version will be displayed.

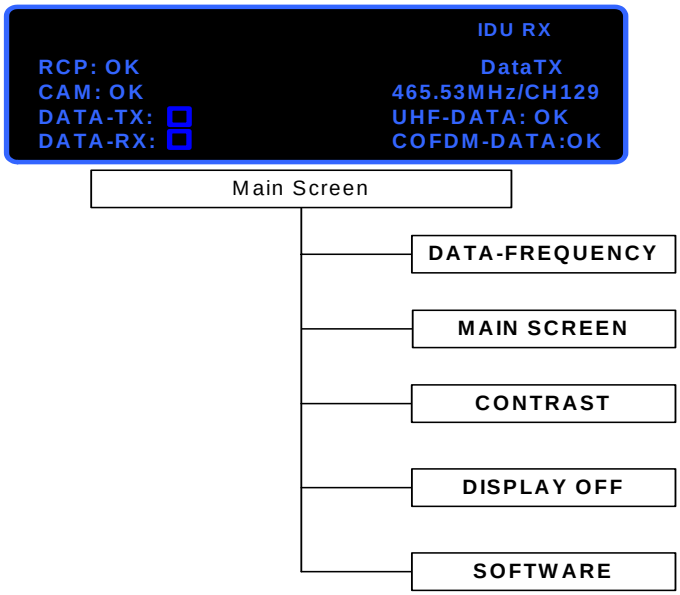
Note

A quick press returns you to the main menu

6 Operating the ModulaRX IDU Fibre

6.1 ModulaRX IDU Fibre Unit

6.2 Menu structure



Alarm and Status

The following chapter describes the meaning of the different status of the unit.

DataTX

Shows the current frequency from the data transmitter which is inbuilt into the out-door unit.

COFDM o.k.

“OK” lights up, when the transmission between the camera transmitter and the Fibre ODU Diversity receiver is properly.

When “fail” appears, please check the transmission between the CT2020 transmitter and the diversity receiver.

UHF o.k.

“OK” lights up, when the transmission between UHF transmitter and the camera transmitter is properly.

When “fail” appears, please check if all cables are properly connected at the UHF transmitter site.

Data-TX

Lights up, when data is transmitted to the camera

Light up permanently only when data are transmitted.

RCP

Lights up, when the RCP is not connected or configured wrong

In normal mode the light should be switched off

Camera

“OK” lights up, when the Camera is transmitting

“FAIL” will show a problem with the transmitter.

UHF transmitter

To power supply the UHF transmitter, connect the 12VDC power supply to the 4-XLR (m) connector of the UHF transmitter.

Connect the “DATA IN” by using the BNC cable from the OCP Interface “DATA out”.

UHF frequency set up

Press the button (o) for to enter in the main menu and a second time to change the frequency. Then set up the frequency using the “up” and “down” control buttons.

6.3 Intermodulation distortion

Intermodulation distortion, commonly known as Intermods, is a type of interference that can occur in any non-linear junction. It exists when more than one signal is present at the same time. These fundamentals signals, known as carrier signals, can combine to create new, unwanted frequencies resulting in interference. E.g. using many UHF transmitters at the same time can produce intermodulation interference.

To avoid the third order intermodualtion interference and/or near far problem, which can be an issue when many channels are being used in the same area. We recommend to create a channel plan by using software packages which can assist in calculating intermodulation products.

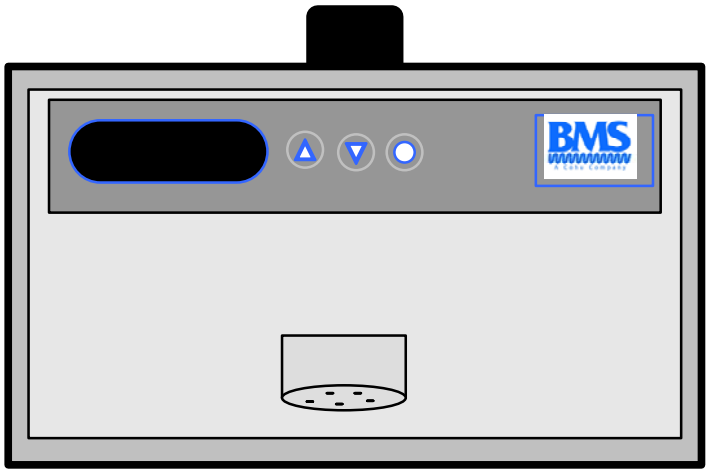
6.4 Frequency table for data transmission

Kanal	Frequenz [MHz]	Kanal	Frequenz [MHz]
1	455,8500	**129**	465,5300
2	455,8600	**130**	465,5400
3	455,8700	**131**	465,5500
4	455,8800	**132**	465,5600
5	455,8900	**133**	465,5700
6	455,9000	**134**	465,5800
7	455,9100	**135**	465,5900
8	455,9200	**136**	465,6000
9	455,9300	**137**	465,6100
10	455,9400	**138**	465,6200
11	455,9500	**139**	465,6300
12	455,9600	**140**	465,6400
13	455,9700	**141**	465,6500
14	455,9800	**142**	465,6600
15	455,9900	**143**	465,6700
16	456,0000	**144**	465,6800
17	456,0100	**145**	465,6900
18	456,0200	**146**	465,7000
19	456,0300	**147**	465,7100
20	456,0400	**148**	465,7200
21	456,0500	**149**	465,7300
22	456,0600	**150**	465,7400
23	456,0700	**151**	465,7500
24	456,0800	**152**	465,7600
25	456,0900	**153**	465,7700
26	456,1000	**154**	465,7800
27	456,1100	**155**	465,7900
28	456,1200	**156**	465,8000
29	456,1300	**157**	465,8100
30	456,1400	**158**	465,8200
31	456,1500	**159**	465,8300
32	456,1600	**160**	465,8400
33	456,1700	**161**	465,8500

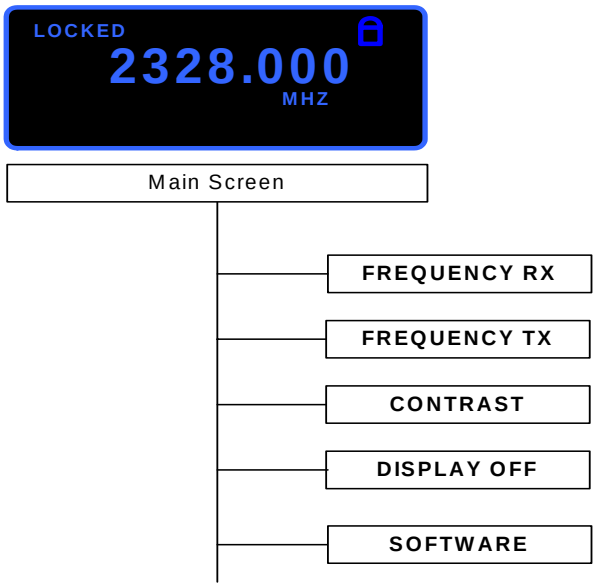
34	456,1800	**162**	465,8600
35	456,1900	**163**	465,8700
36	456,2000	**164**	465,8800
37	456,2100	**165**	465,8900
38	456,2200	**166**	465,9000
39	456,2300	**167**	465,9100
40	456,2400	**168**	465,9200
41	456,2500	**169**	465,9300
42	456,2600	**170**	465,9400
43	456,2700	**171**	465,9500
44	456,2800	**172**	465,9600
45	456,2900	**173**	465,9700
46	456,3000	**174**	465,9800
47	456,3100	**175**	465,9900
48	456,3200	**176**	466,0000
49	456,3300	**177**	466,0100
50	456,3400	**178**	466,0200
51	456,3500	**179**	466,0300
52	456,3600	**180**	466,0400
53	456,3700	**181**	466,0500
54	456,3800	**182**	466,0600
55	456,3900	**183**	466,0700
56	456,4000	**184**	466,0800
57	456,4100	**185**	466,0900
58	456,4200	**186**	466,1000
59	456,4300	**187**	466,1100
60	456,4400	**188**	466,1200
61	456,4500	**189**	466,1300
62	456,4600	**190**	466,1400
63	456,4700	**191**	466,1500
64	456,4800	**192**	466,1600
65	456,4900	**193**	466,1700
66	456,5000	**194**	466,1800
67	456,5100	**195**	466,1900
68	456,5200	**196**	466,2000
69	456,5300	**197**	466,2100
70	456,5400	**198**	466,2200
71	456,5500	**199**	466,2300
72	456,5600	**200**	466,2400
73	456,5700	**201**	466,2500
74	456,5800	**202**	466,2600
75	456,5900	**203**	466,2700
76	456,6000	**204**	466,2800
77	456,6100	**205**	466,2900
78	456,6200	**206**	466,3000
79	456,6300	**207**	466,3100
80	456,6400	**208**	466,3200
81	456,6500	**209**	466,3300
82	456,6600	**210**	466,3400
83	456,6700	**211**	466,3500
84	456,6800	**212**	466,3600
85	456,6900	**213**	466,3700
86	456,7000	**214**	466,3800
87	456,7100	**215**	466,3900
88	456,7200	**216**	466,4000

89	456,7300	**217**	466,4100
90	456,7400	**218**	466,4200
91	456,7500	**219**	466,4300
92	456,7600	**220**	466,4400
93	456,7700	**221**	466,4500
94	456,7800	**222**	466,4600
95	456,7900	**223**	466,4700
96	456,8000	**224**	466,4800
97	456,8100	**225**	466,4900
98	456,8200	**226**	466,5000
99	456,8300	**227**	466,5100
100	456,8400	**228**	466,5200
101	456,8500	**229**	466,5300
102	456,8600	**230**	466,5400
103	456,8700	**231**	466,5500
104	456,8800	**232**	466,5600
105	456,8900	**233**	466,5700
106	456,9000	**234**	466,5800
107	456,9100	**235**	466,5900
108	456,9200	**236**	466,6000
109	456,9300	**237**	466,6100
110	456,9400	**238**	466,6200
111	456,9500	**239**	466,6300
112	456,9600	**240**	466,6400
113	456,9700	**241**	466,6500
114	456,9800	**242**	466,6600
115	456,9900	**243**	466,6700
116	457,0000	**244**	466,6800
117	457,0100	**245**	466,6900
118	457,0200	**246**	466,7000
119	457,0300	**247**	466,7100
120	457,0400	**248**	466,7200
121	457,0500	**249**	466,7300
122	457,0600	**250**	466,7400
123	457,0700	**251**	466,7500
124	457,0800	**252**	466,7600
125	457,0900	**253**	466,7700
126	457,1000	**254**	466,7800
127	457,1100	**255**	466,7900
128	457,1200	**256**	466,8000

7 Operating the Fibre ODU



7.1 Menu structure of Fibre IDU



7.2 Unlock Keyboard

To be able to enter the submenu you must unlock the keyboard. Press the two arrow buttons at the same time to unlock the keyboard

7.3 Frequency RX

In this menu you can set the frequency for the reception of the camera signal.

Press the button (o) for 2-3 seconds to enter in the main menu and a second time to change the frequency. Then set up the RX frequency using the “up” and “down” control buttons. Please be sure that the frequency you set is the same frequency the camera is transmitting.

7.4 Frequency TX

In this menu you can set the frequency for the data transmitter for the remote control of the camera.

Press the button (o) for 2-3 seconds to enter in the main menu and a second time to change the frequency. Then set up the frequency using the “up” and “down” control buttons.

7.5 Contrast

Press the button (o) for 2-3 seconds to enter in the main menu and a second time to change the contrast of the display.

Press again the button (o) for 2-3 seconds and then press the control button “UP” or “DOWN” to choose between a range from 000 to 127. The higher the digit the brighter the display.

7.6 Display OFF

Press the button (o) for 2-3 seconds to enter in the main menu and a second time to change the display off value.

Press again the button “OK” for 2-3 seconds and then press the control button “UP” or “DOWN” to choose between 000s to 240s. The user can choose the time after which the unit would automatically switch off the display.