MAINTENANCE AND OPERATION
INSTRUCTION MANUAL

DB2004

DVB-T/T2, DVB-S/S2, DVB-C, ISDB-T
Advanced Monitoring Receiver

DEVA® BROADCAST

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65 Aleksandar Stamboliyski Str., 8000 Bourgas, Bulgaria
Tel: +359 56 820027, Fax: +359 56 836700
E-mail: office@devabroadcast.com ,Web: www.devabroadcast.com

Introduction

DEVA Broadcast Ltd. is an international communications and high-technology manufacturing organization, its corporate headquarters and facility located in Burgas, Bulgaria. The company serves the broadcast and corporate markets worldwide – from consumers and small businesses to the largest global organizations. It is dedicated to the research, design, development and provision of advanced products, systems and services. DEVA Broadcast launched its own brand back in 1997 and has nowadays evolved to become known as a market leader and internationally reputed manufacturer of user-friendly, cost-effective and innovative broadcast products.

Creativity and innovation are deeply woven into DEVA Broadcast corporate culture. Through successful engineering, marketing and management our team of dedicated professionals creates future-oriented solutions to improve customers' performance. You may rely that all issues communicated to our crew would be addressed accordingly. We pride ourselves on our pre and post-sales support and purchase services, which along with the outstanding quality of our radio gear have won us due respect and the market authority position.

DEVA Broadcast best-of-breed solutions have become the best sellers for our partners. The strategic partnerships which have been formed with industry leaders during all these years that we have been operating on the broadcasting market, have proved us a reliable business partner and a valuable asset, as our dealers worldwide would confirm. In constant pursuit of precision and long-term satisfaction, DEVA Broadcast enhances the reputation of our partners and clients alike. Furthermore, we have already a proven merit as a credible partner provider.

Our portfolio offers complete line of high quality and competitive products for FM and Digital Radio, Radio Networks, Telecommunication Operators and regulation authorities. For almost two decades of intensive software and hardware development, we have achieved a unique price-performance and endurance of our product lines. Our company's multitude of equipment and services is in line with the latest technologies and key trends. The most recognizable characteristics attributed to DEVA Broadcast products are their clear-cut, streamlined design, easiness of use and cost-effectiveness: simplicity of forms but multiplicity of functions.

For us there is no stage when we deem that we have reached the most satisfactory level in our work. Our engineers are in constant pursuit of new ideas and technologies to be captured in DEVA Broadcast solutions. Simultaneously, a strict control is being exercised at each step of any new development. Experience and hard work are our fundament but the continuous improving process is what we never leave aside. DEVA Broadcast participates on a regular basis in all landmark broadcasting events, not only to promote its products, but to exchange valuable know-how and experience. We are also engaged in international large-scale projects involving radio and audio solutions which makes us even more competitive on the global market.

All DEVA Broadcast products are developed and produced in accordance with the latest ISO 9001 quality control standards.

65 Aleksandar Stamboliyski Str., 8000 Bourgas, Bulgaria
Tel: +359 56 820027, Fax: +359 56 836700
E-mail: office@devabroadcast.com ,Web: www.devabroadcast.com

Typographic conventions

The following table describes important conventions used in the manual.

Convention and Style	Description	Examples
Menu > Sub Menu > Menu Command	A menu item(s) and menu command that you need to click in sequence	Click ***Settings > General***
[Button]	Interface Interactive buttons	Press [OK] to save the changes
NOTE	Important notes and recommendations	**NOTE:** The notification will appear only once
"Reference Name" on Page XXX	References and links	refer to "New Connection" (see "Monitoring" on page 56)
`Example`	Used when example text is cited	Example for E-mail Notification: `Date: 04 Nov 2013, 07:31:11`

General Information

Continuing its mission to deliver innovative, high-performance technology, DEVA proudly presents a next-generation device that brings together the best of three worlds – terrestrial, satellite, and cable – in a single, advanced platform. Designed with versatility and performance in mind, this all-in-one monitoring probe ensures full compliance with DVB-T/T2, DVB-S/S2, DVB-C, and ISDB-T standards, delivering unmatched functionality and precision in one compact solution.

Built around a powerful, DSP-based high-end digital tuner, this unit guarantees accurate and dependable monitoring with detailed component information, PID alarms, and advanced MPEG transport stream decoding. It also supports comprehensive TR 101 290 and ETR290 monitoring (priorities 1, 2, and 3), ensuring full adherence to professional broadcast requirements across all signal types.

This multi-standard monitoring probe provides PLP extraction and TS PLP analysis, as well as sequential monitoring of multiple channel frequencies or PLPs. It also includes adjustable MIN/MAX alarms for RF, SNR, BER, and MER, with flexible alarm dispatch options via email, SNMP ver. 2C, or GPO.

Designed for maximum usability, the device features an intuitive navigational menu, a wide-angle OLED display for easy local monitoring, and built-in WEB and FTP servers for seamless configuration and control. The wide IF filter bandwidth, advanced QAM analyzer, RF Spectrum and Constellation displays allow for in-depth signal analysis and precise carrier inspection. Users can choose between predefined DTV channel scans or manual tuning for each signal type.

The device also includes **built-in storage for transport stream recording and playback**, enabling detailed diagnostics, off-line analysis, and incident review – an essential feature for quality assurance and compliance verification.

Professional-grade features such as a scalable built-in RF attenuator on the antenna port, Service Availability Error and Service Degradation Error functionality further solidify this product as a premium tool for modern broadcast operations. Full remote access is available through a LAN port with TCP/IP control, while compatibility with both Apple and Android devices ensures effortless integration into any workflow.

Firmware upgrades and protected access to device settings guarantee security and continued optimal performance, making this multi-standard monitoring tool the definitive solution for DVB-T/T2, DVB-S/S2, DVB-C, and ISDB-T environments alike.

Reliable. Versatile. Professional. The ultimate DTV monitoring platform!

Product Features

- DVB-T/T2/S/S2/C,ISDB-T Compliant Receiver
- Adjustable MIN/MAX alarms for RF, SNR, CNR, BER, MER
- Advanced MPEG Monitoring and PID Alarms
- Advanced QAM Analyzer
- Alarm dispatch via E-mail, SNMP ver.2C and GPO
- Antenna port with built-in RF attenuator
- Apple and Android devices support
- BandScanner and RF Spectrum Analyzer
- Built-in easy to use WEB and FTP server
- Detailed DVB-T/T2/S/S2/C,ISDB-T component information
- Easy Installation and Setup
- ETR290 Monitoring, Priority 1, 2 and 3
- Firmware updates will ensure improved operation
- LAN port for full TCP/IP remote control and monitoring
- Levels measurement with data history
- PLP extraction and TS PLP analysis
- Predefined DTV channels scan or manual tune
- Protected access to the device settings
- RF Spectrum & Constellation display
- SAE - Service Availability Error
- SDE - Service Degradation Error
- Selectable wide range IF filter bandwidth
- Service Availability Error & Service Degradation Error
- SNTP for automatic synchronization of the built-in clock
- Spectrum analyzer allowing checking of the RF Carrier
- TR 101 290 Monitoring, Priority 1, 2 and 3
- Up to 110 dBµV direct RF Antenna Input
- Very Intuitive Navigational Menu

TECHNICAL SPECIFICATIONS

RF INPUT - DVB-T/T2, ISDB-T	
Tuning Range	Frequency Agile 474-786 MHz; UHF 21-60 Channel
Tuning Step	1 MHz
Tuner Sensitivity	30 dBµV
Antenna Port	N Connector, Female, 50Ω
Internal Attenuator	0, 10, 20 and 30 dB
RF input level	up to 120 dBµV
Supported Standards	DVB-T – ETSI EN 300 744; DVB-T2 & T2 Lite – ETSI EN 302 755 v1.3.1, ETSI TS 102 831; T2-MI – ETSI TS 102 773; ISDB-T
RF INPUT - DVB-S/S2	
Tuning Range	950 to 2150 MHz (LNB down conversion required)
Antenna Port	F Connector, Female, 75Ω
Supported Standards	DVB-S, DVB-S2
DVB-S	QPSK, code rates: 1/2, 2/3, 3/4, 5/6, 7/8
DVB-S2	CCM, VCM and ACM Modes Support; QPSK code rates: 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10; 8PSK code rates: 3/5, 2/3, 3/4, 5/6, 8/9, 9/10; 16APSK code rates: 2/3, 3/4, 4/5, 5/6, 8/9, 9/10; 32APSK code rates: 3/4, 4/5, 5/6, 8/9, 9/10
Symbol rates	DVB-S 65Msps QPSK; DVB-S2 65Msps QPSK , 60Msps 8PSK, 45Msps 16APSK
RF INPUT - DVB-C	
Tuning Range	40-1000 MHz, Frequency Agile
Tuning Step	10kHz
Tuner Sensitivity	30 dBµV
Antenna Port	N Connector, Female, 50Ω
RF input level	up to 120 dBµV
Channel bandwidth	6 & 8 MHz
Symbol rate Modulation	1.8 to 7.2 M symbols/s
Symbol rate Modulation	16QAM, 64QAM, 128QAM, 256QAM, 1024QAM, 4096QAM
Supported Standards	DVB-C
MONITORING FEATURES - DVB-T/T2	
RF input level	30-110 dBµV ±1 dB
MER	0 to 40 dB (±1 dB)
SNR	0 to 40 dB (±1 dB)
BER Before-Viterbi(DVB-T)	1x10-2 to 1x10-5
BER Post-Viterbi(DVB-T)	1x10-2 to 1x10-8
BER (DVB-T2)	Before/Post-LDPC, Post-BCH
Signal Lock	Lock/Unlock
Modulation parameters	L1 signaling in DVB-T2, TPS in DVB-T

SFN Monitor	Channel Impulse Response (CIR); Echoes Delay and Power Level alarms
ETSI TR 101 290 Monitor	ETSI TR 101 290 Priority 1, 2 and 3; MPEG-2 TS Monitor, TS (with MIP packet) Network Delay
T2-MI Monitor	Single/Multi-PLP support; ETSI TR 101 290 T2-MI packet, L1 pre/post signaling; T2-MI Network Delay; PLP extraction and TS PLP analysis (ETR 101 290)
QoS	SAE (Service Availability Error), SDE (Service Degradation Error)
Round-Robin Logger	Monitor sequentially multiple channel frequencies or PLPs
RF Spectrum Display	RF Spectrum with SPAN 10 MHz
Constellation Display	QPSK, 16QAM, 64QAM, 256QAM
Other Features	Audio/Video Freeze Detection, DOCSIS Monitoring
MONITORING FEATURES - DVB-S/S2	
RF input level	30-110 dBµV ±1 dB
MER	0 to 40 dB (±1 dB)
CNR	up to 40 dB ±0.5 dB
BER (DVB-S)	Pre-Viterbi, Post-Viterbi
BER (DVB-S2)	Pre-LDPC, Post-LDPC, PER; Eb/N0, link margin, modulation parameters; MultiStream support, PLS support
Signal Lock	Lock/Unlock
Modulation parameters	L1 part 2 signaling in DVB-C
ETSI TR 101 290 Monitor	ETSI TR 101 290 Priority 1, 2 and 3; MPEG-2 TS Monitor
T2-MI Monitor	Single/Multi-PLP support; PLP extraction and TS PLP analysis (ETR 101 290); SAE (Service Availability Error), SDE (Service Degradation Error); Monitor sequentially multiple channel frequencies or PLPs
QoS Monitor	ETSI TR 101 290 SAE, SDE
Round-Robin Logger	up to 40 channels
RF Spectrum Display	RF Spectrum with SPAN 10 MHz
Constellation Display	QPSK
Other Features	Audio/Video Freeze Detection, DOCSIS Monitoring
MONITORING FEATURES - DVB-C	
RF input level	30-110 dBµV ±1 dB
MER	0 to 40 dB (±1 dB)
SNR	0 to 40 dB (±1 dB)
BER	Viterbi, RS
Signal Lock	Lock/Unlock
Modulation parameters	L1 part 2 signaling in DVB-C
ETSI TR 101 290 Monitor	ETSI TR 101 290 Priority 1, 2 and 3; MPEG-2 TS Monitor

T2-MI Monitor	Single/Multi-PLP support; PLP extraction and TS PLP analysis (ETR 101 290); SAE (Service Availability Error), SDE (Service Degradation Error); Monitor sequentially multiple channel frequencies or PLPs
RF Spectrum Display	RF Spectrum with SPAN 10 MHz
Constellation Display	16QAM, 64QAM, 128QAM, 256QAM, 1024QAM, 4096QAM
Other Features	Audio/Video Freeze Detection, DOCSIS Monitoring
COMMUNICATION INTERFACES	
Type	RJ45 Connector, Ethernet 10/100 Base-T
Supported Protocols	HTTP, FTP, SMTP, SNMP v2/v2C
Device Discovery	UPnP support
MEASUREMENT STORAGE	
Storage	32GB Build-in Memory Card
Monitoring Logs Data format	Text, CSV
OPERATING CONDITIONS	
Temperature	-15°C to 55°C
Humidity	< 95%, non-condensing
Altitude	0 to 5000m above sea level
POWER	
Voltage	100-240V / 50-60 Hz
Power Consumption	20VA
Connector	IEC320, Fused and EMI-suppressed
SIZE AND WEIGHT	
Dimensions (W;H;D)	485 x 44 x 180 mm
Shipping Weight	540 x 115 x 300 mm / 2.700 kg

Front Panel

OLED DISPLAY



DB2004 has easy to read, high-resolution OLED graphical display that visualizes all measurements of the received signal and DB2004 settings.

CONTEXT-SENSITIVE SOFT BUTTONS

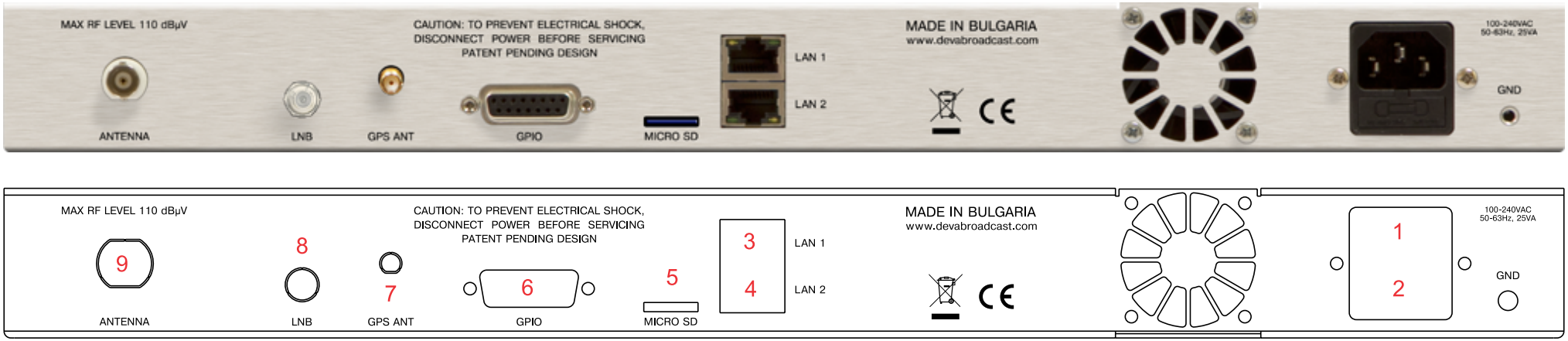
Used for navigation through the menus, quick access to the parameters, modes, functions and to alter their values. The Soft Buttons indicators are placed on the bottom side of the OLED display. Depending on the currently selected menu context the indicators change their function. The Soft Buttons will be referred as (left-to-right) [SB1], [SB2], [SB3] and [SB4].

NAVIGATIONAL BUTTONS

[UP], [DOWN], [LEFT], [RIGHT] and [OK] buttons, as the Soft Buttons, are used to navigate through the menus selecting various functions and parameters of DB2004.

65 Aleksandar Stamboliyski Str., 8000 Bourgas, Bulgaria
Tel: +359 56 820027, Fax: +359 56 836700
E-mail: office@devabroadcast.com ,Web: www.devabroadcast.com

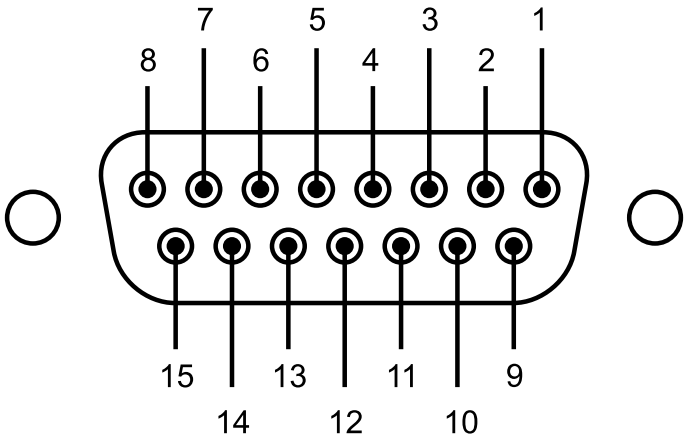
Rear Panel



1. Mains connector, 110-240VAC, IEC-320 C14 type;
2. Fuse holder – 1A;
3. Ethernet T-BASE10/100 RJ45;
4. Ethernet T-BASE10/100 RJ45;
5. Micro SD card slot;
6. GPIO – Opto-isolated, Female D-Sub 15 pins
7. GPS Antenna – SMA connector;
8. LNB - F connector;
9. RF Input (Antenna) – BNC.

65 Aleksandar Stamboliyski Str., 8000 Bourgas, Bulgaria
Tel: +359 56 820027, Fax: +359 56 836700
E-mail: office@devabroadcast.com ,Web: www.devabroadcast.com

THE PINOUT OF A DB15 GPIO CONNECTOR



DB15, Female

Pin	Function	Direction
1	GPO1	Solid State Relay
2	GPO2	Solid State Relay
3	GPO3	Solid State Relay
4	GPO4	Solid State Relay
5	N/C	
6	N/C	
7	GPOCOM	Common GPO rail
8	GND	GPIO Ground
9	GP5V	+5V (Out), Fuse protected (0.5A)
10	GPICOM	Common GPO rail
11	GPI1	Opto isolated Input
12	GPI2	Opto isolated Input
13	GPI3	Opto isolated Input
14	GPI4	Opto isolated Input
15	N/C	

GPI EXAMPLE CONNECTIONS

To activate one Input, GPI pin would be pulled to ground , with a voltage applied on the GPICOM pin (Common to all GPI).

Using external power supply is the recommended method in order to avoid possible ground loops between equipment, as shown in Figure 1-1. The maximum allowed external power supply for logic control is 48 volts DC.

NOTE the presence of Current Limiting Resistors per GPI pin. The intention is to limit the current to 20mA for each GPI pin. Use the table below to choose the suitable Resistor's value.

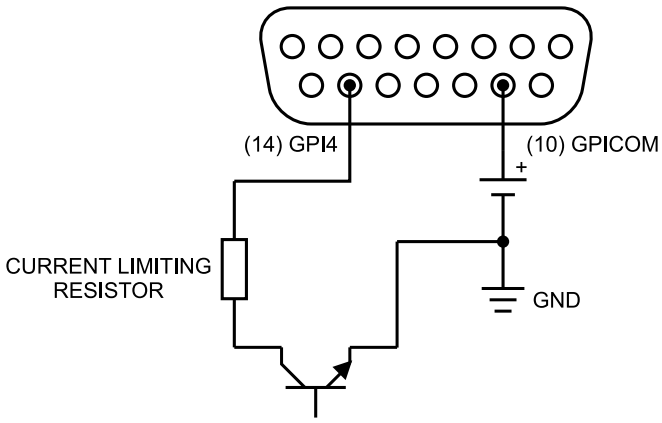


Figure 1-1 - External Power Supply

If the equipment being controlled is electrically isolated, then the use of the GPIO port's power supply is acceptable. The easiest way is shown on Figure 1-2.

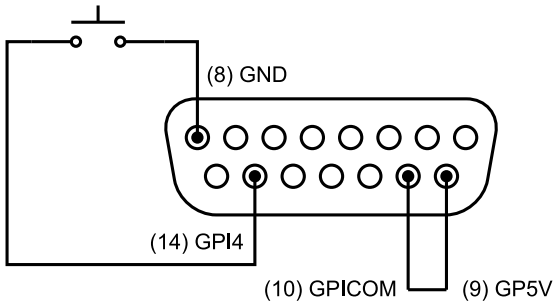


Figure 1-2 - GPIO Port's Power Supply

CAUTION: The use of current limiting resistor per GPI pin is required for some voltages, see table (each input has an internal 330ohms protection).

NOT PROTECTING THE GPI COULD DAMAGE YOUR DEVICE.

VDC	External Resistor
5	0
6	0
12	680 / 0.25Watt
24	1.8k / 0.5Watt
48	3.9k / 1Watt

GPO EXAMPLE CONNECTIONS

The GPO portion of the GPIO port are Solid State Relays. Current should be limited to 100 mA per GPO pin of a port. Maximum allowed voltage is 48 volts. The following diagram shows the recommended connections for outputs with the use of an external power supply.

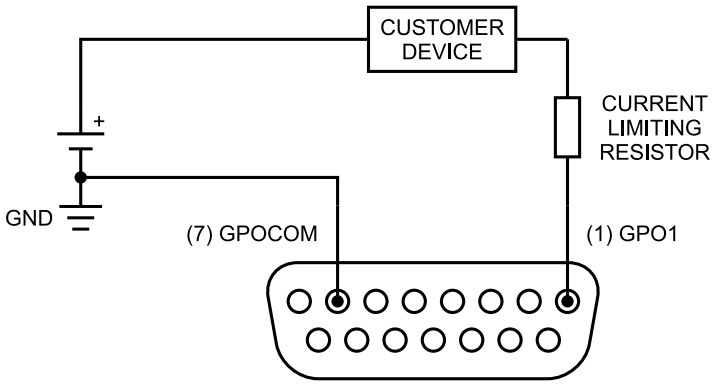


Figure 2-1 - External Power Supply

If necessary, a Current Limiting Resistors must be used to limit the current to 100mA for each GPO pin.

NOT PROTECTING THE GPO COULD DAMAGE YOUR DEVICE.

If the device being controlled is electrically isolated, than the internal GP5V supply can be used, maintaining a 100mA limit on current drawn.

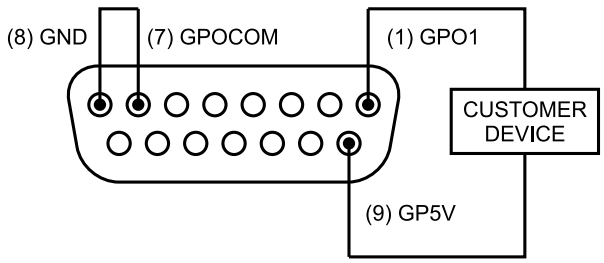


Figure 2-2 - GPIO Port's Power Supply

NOTE: GPO pins and GPOCOM are not polarized, current can flow both directions.

INTERNAL CONNECTIONS OF THE GPIO PORT

GPIO port provides 4 GPI (opto isolated inputs) and 4 GPO (solid state relays). Port is capable of driving a combined current of 100mA. Each GPI pin should be limited to 20mA of current.

Figure 3 shows a simplified diagram of the internal wiring behind the connector. The EMI Filters' parts are omitted for the sake of simplicity.

All of the inputs and all of the outputs on the GPIO port are grouped together. The 4 GPOutputs are on 4 separate output pins, but they share the same "Common Return" connection GPOCOM on pin 7. Similarly, the 4 GPInput pins share one high-side rail GPICOM, connected to pin 10.

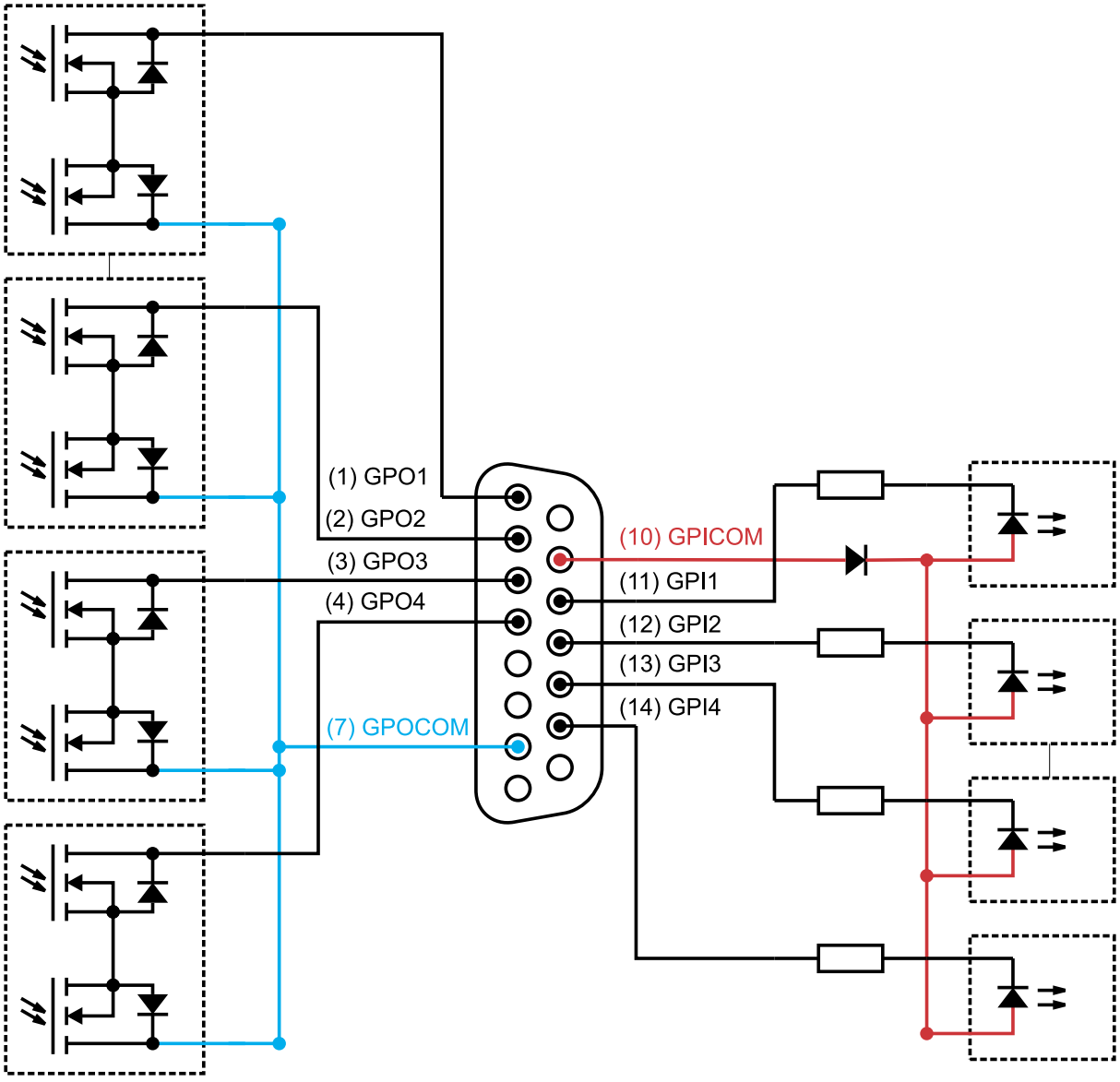


Figure 3

Safety Warning

ALWAYS OBSERVE THE SAFETY PRECAUTIONS.

Careful observance of the safety precautions will help prevent physical injury, damage of the equipment, and extend the equipment life.

- The servicing of electronic equipment should be performed only by qualified personnel;
- Before removing the covers the unit must be switched off and the mains cable unplugged;
- When the equipment is open, the power supply capacitors should be discharged using a suitable resistor;
- Never touch the wires or the electrical circuits;
- Use insulated tools only;
- Never touch the metal semiconductor. They might carry high voltages;
- For removing and installing electronic components, follow the recommendations for handling MOS components.
- Do not remove the factory sticker from the equipment. It contains information as regards the name, serial number and MAC address of the device.
- To join the equipment to the mains supply, use the power cord purchased with the equipment.

ATTENTION: The device has an internal Lithium battery for RTC timekeeping. Do not try to re-charge this battery!

NOTE: A depleted RTC battery may cause the device to start with an incorrect or random time and date. For the RTC battery replacement procedure, refer to APPENDIX "Battery Replacement Procedure" on page 77.

Operating Recommendations

To ensure normal operation of the DEVA unit, we recommend following the instructions listed below.

- Install the unit in places with good air conditioning. The unit is designed to operate within the ambient temperature range of 10 to 50°C. The equipment rack should be ventilated in order for the device to keep its internal temperature below the maximum ambient temperatures;
- We do not recommend installation in rooms with high humidity, dusty places or other aggressive conditions;
- Although the device is intended to be installed closed to exciters or transmitters, we do recommend the device to be located away from abnormally high RF fields.
- Use only checked power supply cables. We strongly recommend the usage of shielded cables;
- Connect the DEVA unit to reliable power supply sources only. In case of unstable power supply, please use Uninterruptible Power Supply (UPS);
- Use the device only with its top cover on to avoid electromagnetic anomalies. Otherwise, this may cause problems with the normal functionality of the unit;
- To ensure normal remote operation of the unit, make sure to connect the device to a good quality Internet connection;
- For the normal operation of your DEVA device, check if the network settings past through all the required data traffic.

Unpacking and inspection

Upon receipt, the equipment should be inspected for possible shipping damages. If such are found or suspected, notify the carrier at once and contact DEVA Broadcast Ltd. The original shipping carton box and packing materials should be kept for possible reuse, in case of return for Warranty repair, for example. Shipping damages as a result of improper packing for return may invalidate the Warranty!

The packing material (plastic bags, polystyrene, nails, etc.) must never be left within reach of children, as these items are potential sources of danger.

IT IS VERY IMPORTANT that the "Product Registration Card" included in the Manual be completed accurately and returned. This will assure coverage of the terms of the Warranty and it will provide a means of trace in case of lost or stolen equipment. In addition, the user will automatically receive SERVICE OR MODIFICATION INSTRUCTIONS from DEVA Broadcast Ltd.

Mounting

RACK REQUIREMENTS 1U

The unit mounts in a standard 19-inch equipment rack and requires only 1¾ inches (1U) of vertical rack space. In order the painted finish around the mounting holes to be protected, the use of plastic washers is recommended.

RACK REQUIREMENTS COMPACT UNITS

Our customized 1U 19-inch rack accessory provides a professional mounting option for up to three compact size DEVA units. It is made of milled aluminum and finished in black powder coat. Two extra blanking panels and set of mounting screws are provided with each rack bracket kit.

STAND-ALONE DEVICES

DEVA's stand-alone units (Radio Explorer series, BandScanner series, DVB Explorer) do not require additional tools or installation brackets.

65 Aleksandar Stamboliyski Str., 8000 Bourgas, Bulgaria
Tel: +359 56 820027, Fax: +359 56 836700
E-mail: office@devabroadcast.com ,Web: www.devabroadcast.com

AC Mains Power

FUSE HOLDER

The fuse holder is placed inside the unit, next to the voltage selector. Apply downward pressure and pull the cap outward to access the 5mm mains fuse. The reverse process will release the cap.

MAINS VOLTAGE SELECTOR

Before connecting the AC Power, make sure that the internal Power Switch is in accordance with the mains supply at your location. The Power Supply Factory Settings are:

- 100 - 240 VAC
- 1 Amp Fuse

CAUTION: Permanent damage will result if improper AC supply voltage is applied to the device. The warranty DOES NOT cover damages caused by applying improper supply voltage or usage of improper fuse.

POWER CORD

The detachable IEC-type power cord is supplied with the unit. The individual cord conductors may be color-coded in either of two ways:

1) In accordance with US standards:
BLACK = AC “HOT”
WHITE = AC NEUTRAL
GREEN = EARTH GROUND

2) To European CEE standards:
BROWN = AC “HOT”
BLUE = AC NEUTRAL
GREEN/YELLOW = EARTH GROUND

GROUND LOOPS

Because the unbalanced INPUTS/OUTPUTS of the device are chassis-ground-referenced, a mains frequency or INPUT/OUTPUT ground loop could be formed between the input or output cable shield grounds and the AC power cord ground. A ‘ground-lifting’ AC adapter may help in this situation, although the chassis must be properly grounded for safety purposes. In general, the equipment being installed in a rack will satisfy the safety requirement.

Getting Started

In order for the normal operation of the DB2004 to be guaranteed, you will need fulfill the following conditions:

1. Standard Ethernet 10/100M connection;
2. Correctly assigned Network configuration and device settings.

To make sure that all the conditions are fulfilled please, follow the instructions below.

CONNECTION

1. Install the unit on its operation place;
2. Using the provided power cable, connect the unit to the power supply network;
3. Connect the antenna cable to the RF antenna input connector located on the rear panel of the device;
4. Connect the DB2004 to the TCP/IP network using direct network cable;
5. **IF GSM OPTION IS SUPPORTED** - Using the connection cable provided, connect the optional GSM modem. In order for better GSM network coverage to be achieved, please select proper place for the GSM antenna.

NOTE: The GSM antenna must be installed far enough from the monitoring devices. The GSM modem radiates RF signal that may cause spurious emissions that will may interfere with the accuracy of the measurements.

NETWORK SETTINGS

After connecting the network cable the Led 'LAN' located on the rear panel must be ON or flashing. The next and most important step for configuration is the adjustment procedure of the Network Communication. The settings shown below are Default Network Settings:

DHCP	Enabled
IP	Assigned by DHCP
Mask	Assigned by DHCP
Gateway	Assigned by DHCP
DNS	Assigned by DHCP
HTTP Port	80

NETWORK DISCOVERY

This is a network setting that defines whether your computer can see (find) other computers and devices on the network and whether other computers on the network can see your computer. By default, Windows Firewall blocks network discovery but you can enable it.

1. Open Advanced sharing settings by clicking the Start button, and then on "Control Panel". In the search box, type "network", click "Network and Sharing Center", and then, in the left pane click "Change advanced sharing settings";
2. Select your current network profile;
3. Click "Turn on network discovery", and then click save changes.

NOTE: If you're prompted for an administrator password or confirmation, type the password, provide confirmation or contact your system administrator.

If you have already enabled this function on your computer DB2004 will be automatically added to the Device list section. The device will be ready for usage and no additional adjustments will be required except user name and password.

NOTE: If the port is different than the default one (80), it is necessary to specify it, for example: `http://192.168.1.2:9000`

ATTENTION: Depending on Internet Protocol Settings, the assigned IP address may not be visible outside your local network, thus the device may be accessed only within that network. Consult with your network administrator for the appropriate IP settings.

NETWORK SECURITY RECOMMENDATIONS

1. It is not recommended the DB2004 to be directly connected to the Internet. This may lead to unregulated access and/or problematic operation of the device. To ensure secure connection, we recommend the device to be installed behind a router with an active firewall.
2. If remote access to the device is needed, we recommend using VPN to the router or the port of the relevant service (WEB, SNMP, Application, etc.) to be properly NAT forwarded.
3. If NAT forward is used, it is highly recommended random ports of your choice to be used. Not the standard ones (80 for WEB, 161 for SNMP, etc.).
4. Using DMZ connection is not recommended.
5. Make sure to change the standard access credentials (usernames and passwords, SNMP communities).

For detailed information as regards the recommendations listed above or need of further instructions, please contact your network administrator.

65 Aleksandar Stamboliyski Str., 8000 Bourgas, Bulgaria
Tel: +359 56 820027, Fax: +359 56 836700
E-mail: office@devabroadcast.com ,Web: www.devabroadcast.com

Front Panel OLED Display

DB2004 has easy to read, high-resolution OLED graphical display that visualizes all measurements of the received signal and DB2004 settings.

Upon powering up, the OLED screen displays the company logo along with the device model. After a few seconds, this initial screen automatically transitions to the Main Menu readings, which serve as the starting point for navigation.



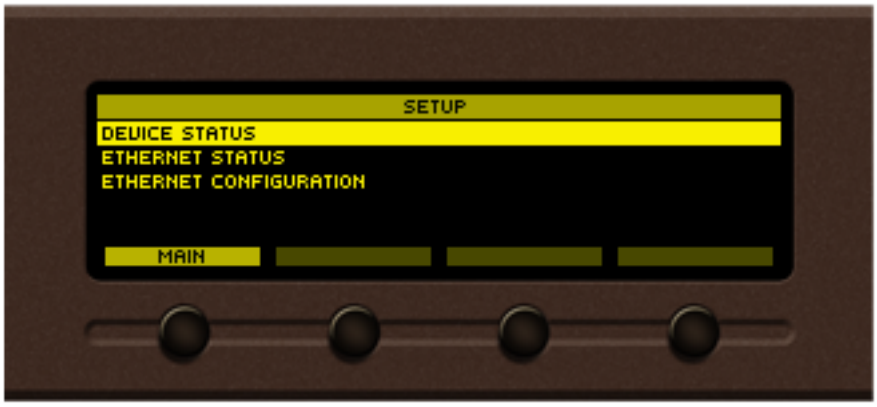
If the front panel remains inactive for 10 seconds, a second Main Menu screen will appear. The display will then alternate between the first and second screens at regular intervals.



Using the [UP] and [DOWN] buttons you can manually alternate between the screens.

SET-UP

The Setup menu is organized into a hierarchical tree menu and all similar parameters are grouped into sections (branches).



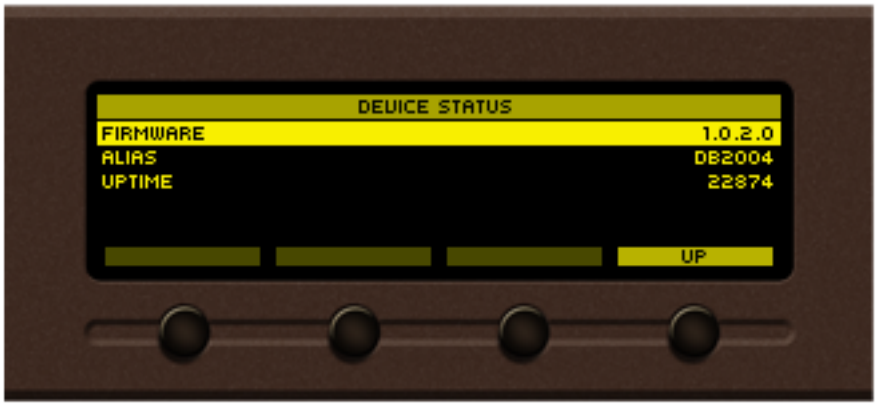
The Setup menu contains the following submenus:

- Device Status
- Ethernet Status
- Ethernet Configuration

Each menu allows you to apply the needed settings to the Device. To enter the menu, just press [OK] once the desired menu is illuminated.

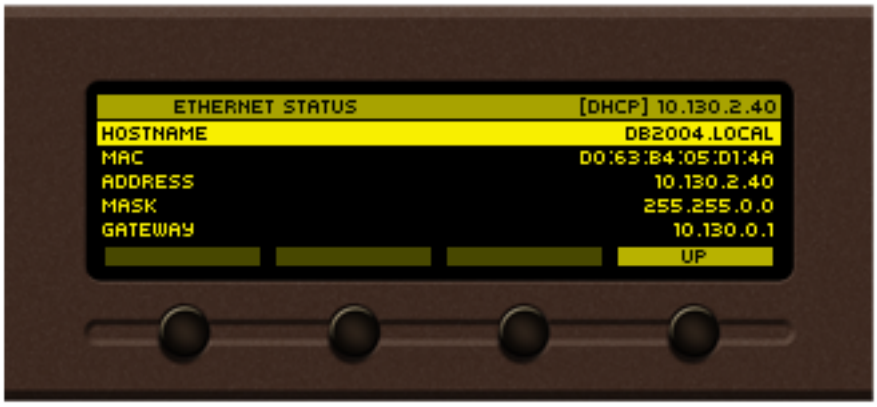
DEVICE STATUS

The basic/general information on the device is found here - **Firmware** version in use, **Alias** and **Uptime**.



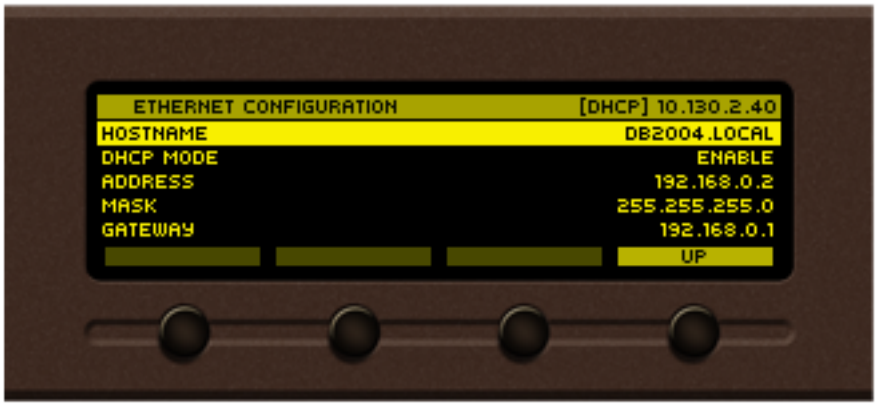
ETHERNET STATUS

This screen displays connection details, including **Host name**, **MAC** and **IP Address**, **Netmask**, and **Gateway**.



ETHERNET CONFIGURATION

This screen allows managing **IP Address**, **DHCP mode**, **Host name**, **Netmask** and **Gateway**.

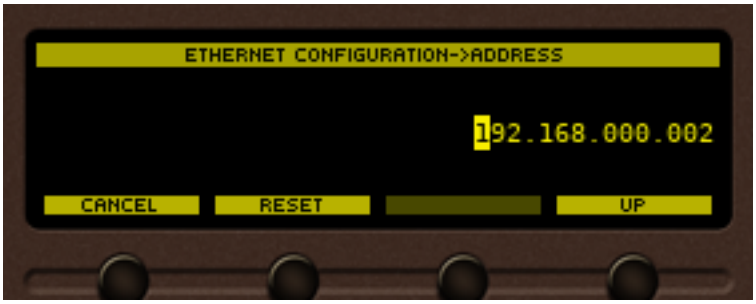


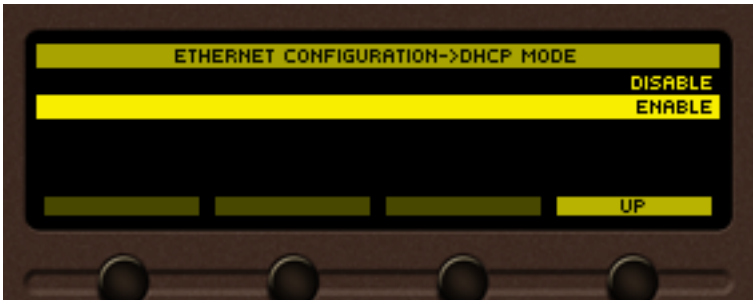
BUTTON ASSIGNMENTS

[OK] – Acts differently depending on current selection.
If selection is:

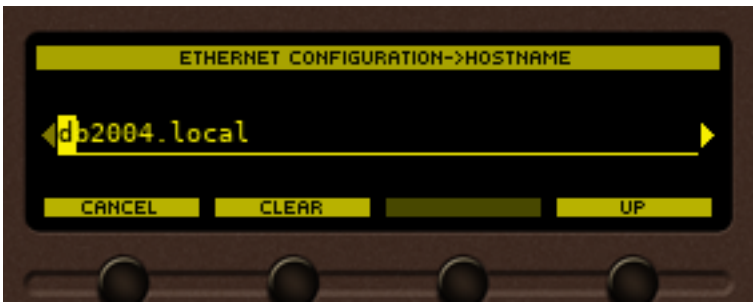
- Menu branch – the transition to selected branch is made and the branch items are listed in navigation area;
- Menu parameter – the value of that parameter is highlighted and edit mode is entered;
- Menu complex parameter – the parameter editor is shown and edit mode is activated;

[Up] / [Down] – If edit mode is active – changes the value of the selected parameter. Otherwise, will move selection in corresponding direction up/down.

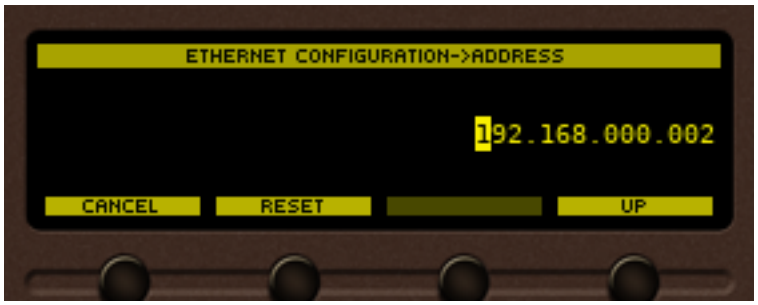




[Left] / [Right] – Changes selection within parameter value in edit mode. See examples below.



[SB1] to [SB4] – Back one level, clear, UP or cancel menu mode.



65 Aleksandar Stamboliyski Str., 8000 Bourgas, Bulgaria
Tel: +359 56 820027, Fax: +359 56 836700
E-mail: office@devabroadcast.com ,Web: www.devabroadcast.com

WEB Interface

MAIN WINDOW



The main window is functionally divided into five main panels – **Alarms Overview**, **RF Signal Quality**, **DVB Parameters**, **Multiplex** and **Constellation**. This allows you to have a quick view of all the mandatory parameters. A click on the [More] button (placed in the top right corner of each section) will lead you to the WEB page of the relevant parameter/data.

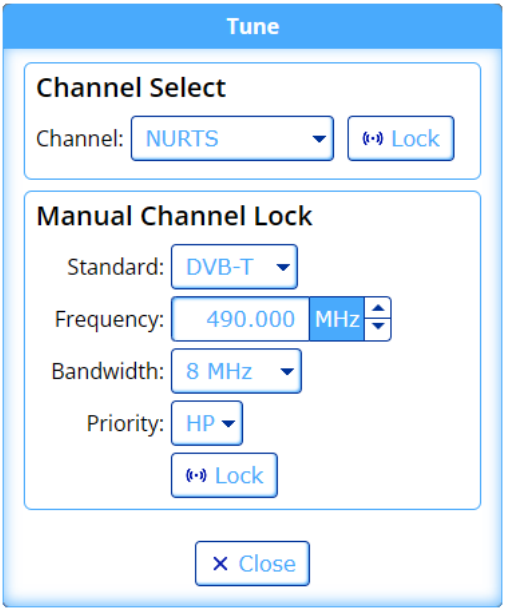
The Multiplex view displays real-time information of the analyzed multiplex: name, frequency, Network ID, TS ID, net/overall bitrate information. Pressing the [More] button will open the **Multiplex** tab of the **Monitoring section**.

The bottom section (Status bar panel) of the main screen collects data on all the mandatory information as regards the device – session time activity, currently selected Multiplex and other important parameters such as Overall bitrate, Net bitrate, Device Firware version, WEB version and etc. It is always visible. It also allows the user to start a Round-robin, lock a channel or to initiate recording.

Multiplex channel change



The Status bar panel allows fast change of the Multiplex signal or starting a Round-Robin. Pressing the interactive button will open the Tune window that is divided in two sections – Channel Select that opens a list of all available (pre-defined channels) and Manual channel lock that allows new channel to be added.



The **Record (TS Mode)** button from the bottom status bar must be used in order to control a TS recording. The MPEG-2 TS recording is possible only when a single channel is monitored. When Round-Robin option is selected, the button will be inactive.

TS Record button status

This button is disabled if the Record Storing option is disabled (***Settings > Memory Management***). An ongoing TS recording will be automatically stopped if the maximum allocated size for the TS record files has been reached.



The Record Storing option is disabled.



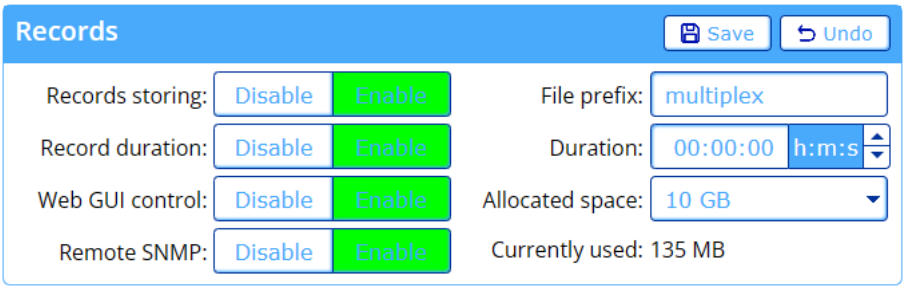
The Record Storing option is enabled and a new TS recording can be started. Press the button to start a TS recording.



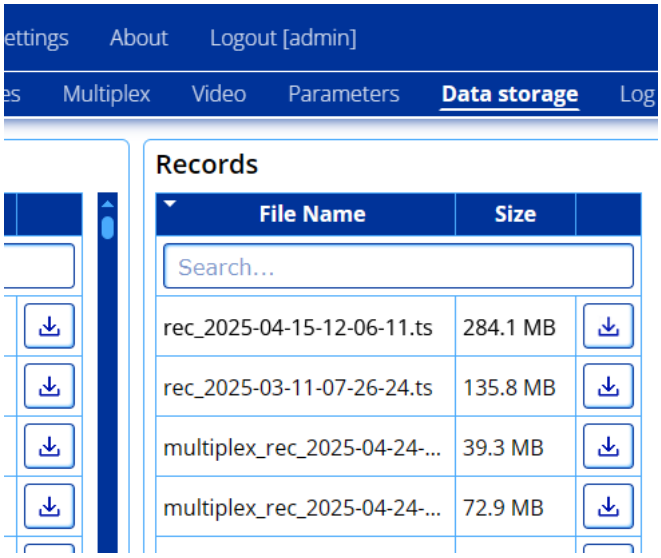
The Record Storing option is enabled and a TS recording is ongoing. Press the button to stop the recording.

TS Record settings

A recording can be started manually via the WEB interface and via SNMP, if enabled in ***Settings>Memory Management***. This page also allows preferred duration time and allocated space to be set. Once the time mark or allocated space elapses, the recording will be automatically stopped. The recording can also be stopped manually by pressing the [Stop] button.

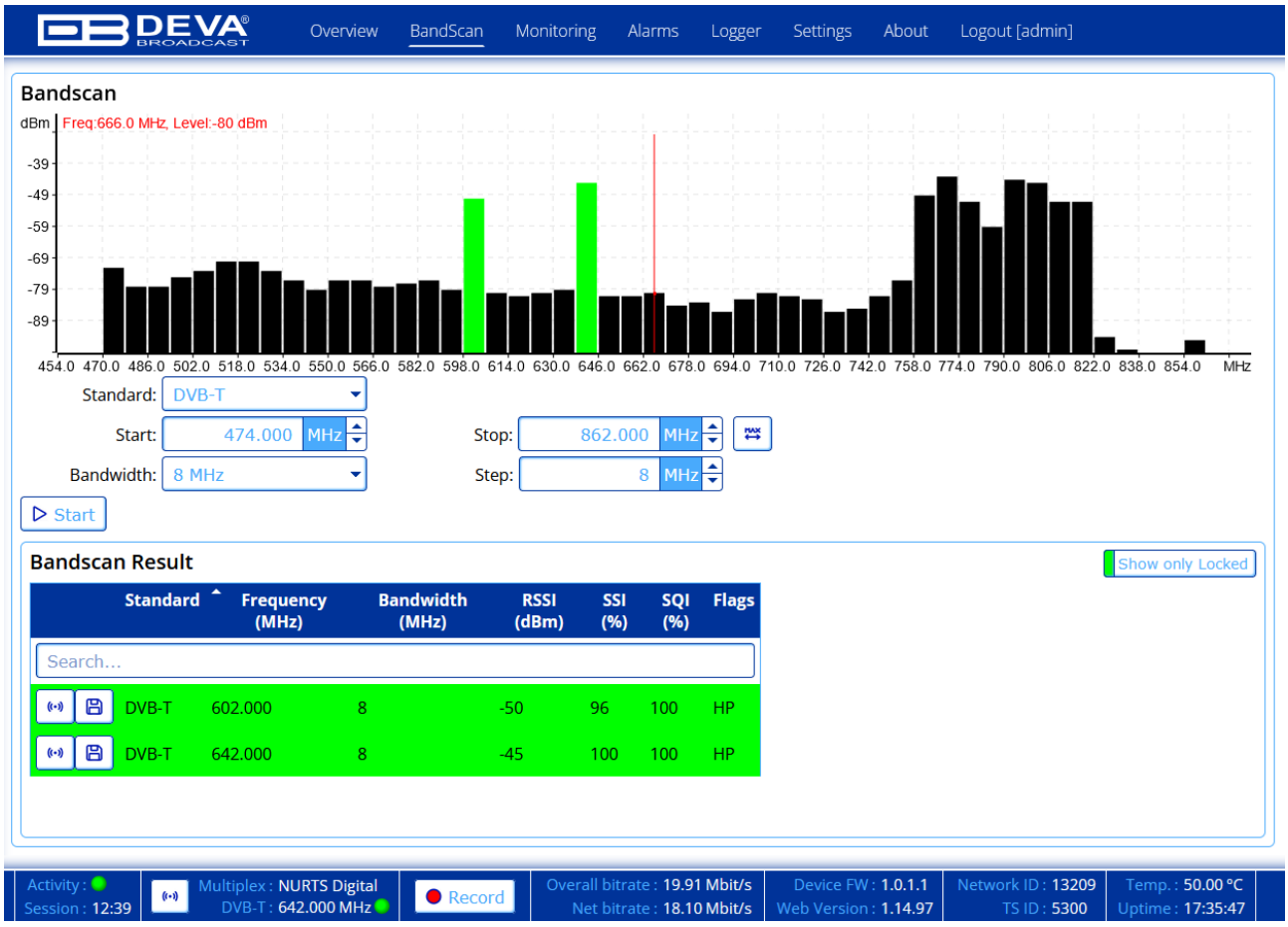


The recorded file (in TS format) can be downloaded from the ***Monitoring > Data Storage*** section of the WEB interface and played via VLC or any other compatible video players. The name file is generated in the following format file **`prefix`**`_rec_YYYY-MM-DD-HH-MM-SS.ts`



65 Aleksandar Stamboliyski Str., 8000 Bourgas, Bulgaria
Tel: +359 56 820027, Fax: +359 56 836700
E-mail: office@devabroadcast.com ,Web: www.devabroadcast.com

BANDSCAN



The scanning parameters must be selected in succession, then the [Start] button is pressed and the scanning starts. The scanning process can be stopped by clicking on the [Stop] button. During that process, each newly-found channel is added to the list of channels in the lower section of the window.

A click on the [Save] button adds the selected channel to the end of the related channel list.

[Show only Locked] will filter-out only the locked channels.

MONITORING

FFT

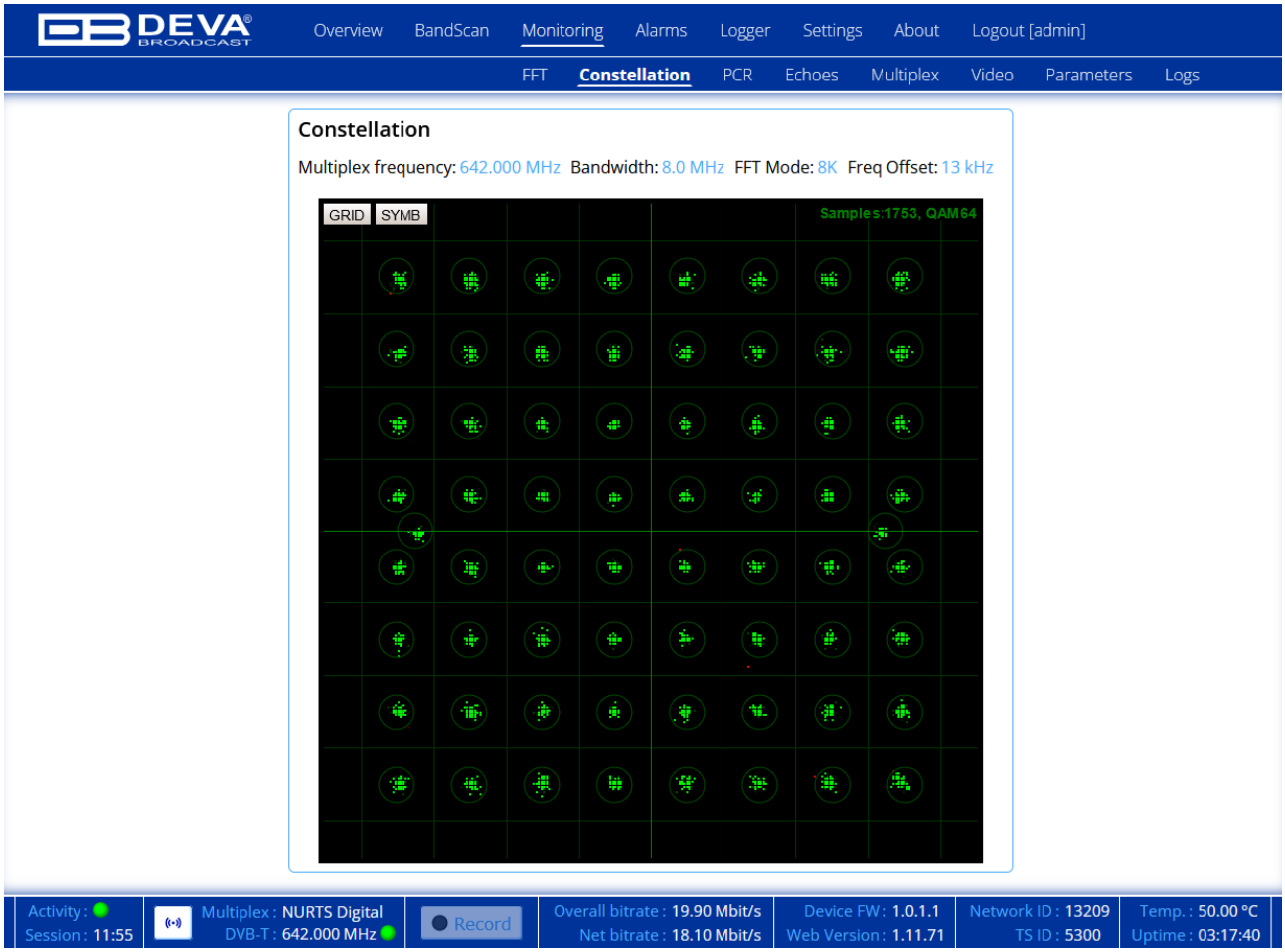


The Discrete Fourier Transform is a simple but fairly time-consuming algorithm. To obtain the precise result of the Fourier Transform, a time-domain signal would have to be observed for an infinitely long period of time. In the case of the Discrete Fourier Transform, however, a signal segment is only observed for a finite period of time and transformed. The result of the DFT or FFT, respectively, will thus always differ from that of the Fourier Transform.

It has been seen that, in principle, this analyzed time segment is converted into periodic signals in the DFT, i.e., the result of the DFT must be considered to be the Fourier Transform of this converted time segment.

The FFT signal processing block, the sampling window of which is controlled by the time synchronization, transforms the COFDM symbols back into the frequency domain. In short, Fast Fourier Transform (FFT) is a means of generating and demodulating a COFDM signal.

Constellation

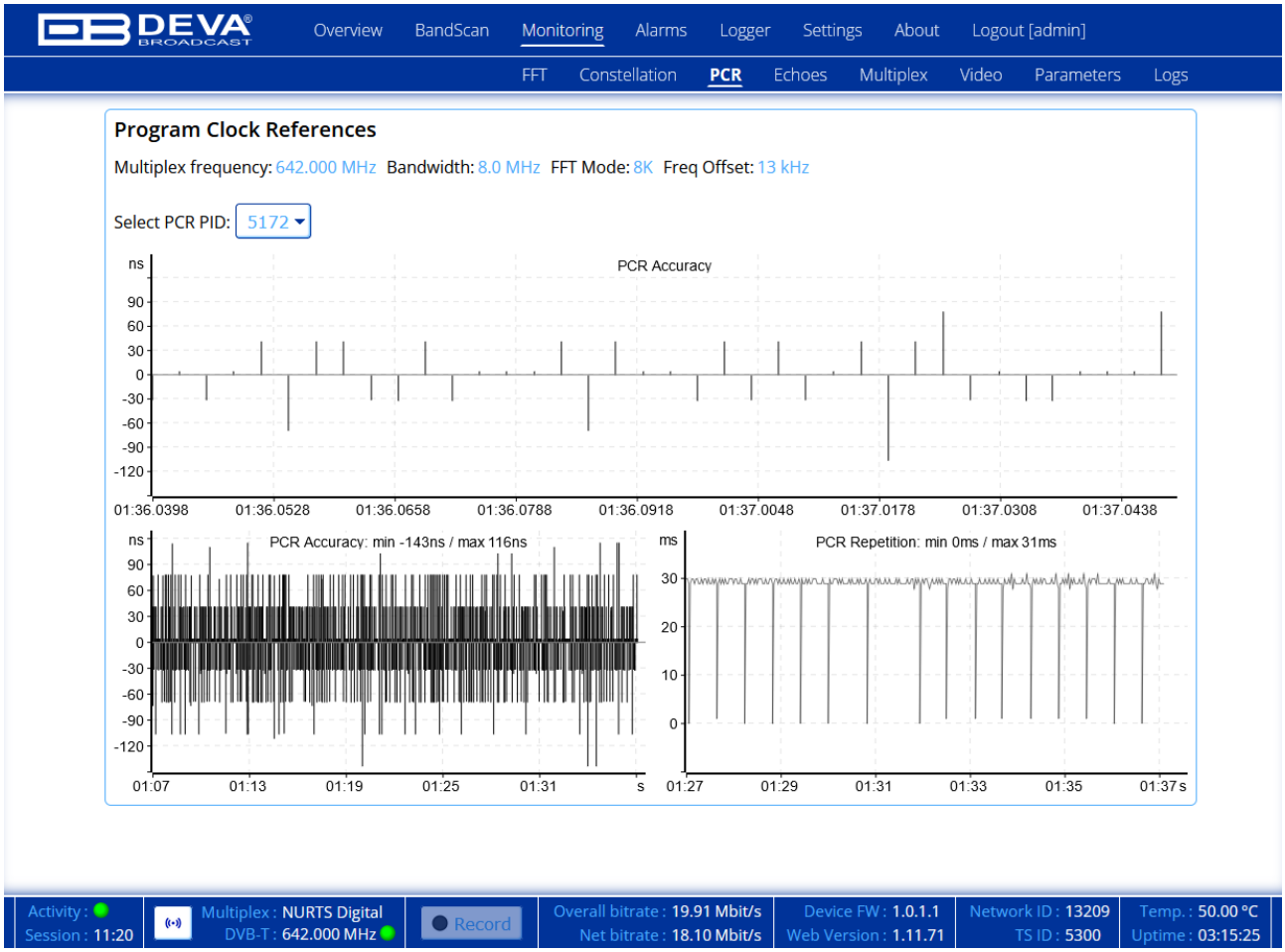


This view displays the constellation of the received signal. The constellation diagram is a graphic representation (I/Q) of the digital symbols received over a period of time. There are different types of constellation diagrams for the different modulation modes. In the case of an ideal transmission channel, free of noise and interferences, all symbols are recognized by the demodulator without mistakes. In this case, they are represented in the constellation diagram as well defined points hitting in the same area and forming a clear dot.

Noise and impairments cause the demodulator to not always read the symbols correctly. In this case the hits disperse and create different shapes that at the end will allow to determine at a glance the type of noise in the signal.

For example, the modulation error rate (MER) is a generalized parameter in which all interfering signals affecting a digitally modulated signal are mapped. Any disturbing event or impact can be described by an error vector that pushes the point of the constellation out of the ideal center of the decision field. In addition, the constellation diagram itself is displayed graphically and can then be assessed visually.

PCR



PCR analysis of the stream providing real-time display of the delay as well as history graph. A transport stream is a multiplex of several TV programs and these may have originated from widely different locations. It is impractical to expect all the programs in a transport stream to be genlocked and so the stream is designed from the outset to allow unlocked programs. A decoder running from a transport stream has to genlock to the encoder and the transport stream has to have a mechanism to allow this to be done independently for each program. The synchronizing mechanism is called program clock reference (PCR).

This screen gives information about the available PCR PIDs in TS through time. When selecting a PCR PID from the drop-down, the charts show graphical information followed in the ETSI TR 101 290 standard.

PCR Accuracy – This error can occur when the PCR accuracy of the selected program is outside the range of ±500 ns.

PCR Repetition – This error occurs when the time interval between two consecutive PCR values is more than 100 ms.

Echoes

Available for DVB-T, DVB-T2 and ISDB-T standards only.



This view displays the instantaneous Channel Impulse Response detected by the receiver. User can check the power level and delay of other echoes from main echo by dragging the red line pointer over the echo. Values are displayed in the upper left corner of the graph (in red color).

Echoes, i.e. multipath reception, lead to frequency-selective fading. Coded orthogonal frequency division multiplex (COFDM) is a transmission method which, instead of one carrier, uses a large number of subcarriers in one transmission channel. It is especially designed for the characteristics of a terrestrial transmission channel containing multiple echoes. The information to be transmitted is provided with error protection (COFDM) and distributed over all these subcarriers. The subcarriers are vector modulated and in each case transmit a part of the information. COFDM produces longer symbols than single-carrier transmission and, as a result, and with the aid of a guard interval, intersymbol interference due to echoes can be eliminated. Due to the error protection and the fact that the information is distributed over the many subcarriers, it is possible to recover the original data stream free of errors in spite of any fading due to echoes.

Equalizer

Available for DVB-C, DVB-S and DVB-S2



The digital channel equalizer serves to correct transmission errors. The channel equalizer block also includes a matched filter which performs roll-off filtering.

This equalizer operates in accordance with the maximum likelihood principle, i.e. it is intended to optimize the signal quality by “tweeking” digital “setscrews” which are the taps of the digital filter. The signal, thus optimized, passes into the demapper where the data stream is recovered.

Multiplex

The main window is functionally divided into five main panels – Channel select, Manual Lock, Multiplex info, Services, MPEG tables.

The following MPEG-2 PSI (Program Specific Information) tables are included: Program Association Table (PAT), Program Map Table (PMT), Network Information Table (NIT). Besides the mandatory tables, the device also finds and decodes Service Description Table (SDT), Event Information Table (EIT), Electronic programming guides (EPG), Time and Date Table (TDT), Time Offset Table (TOT).

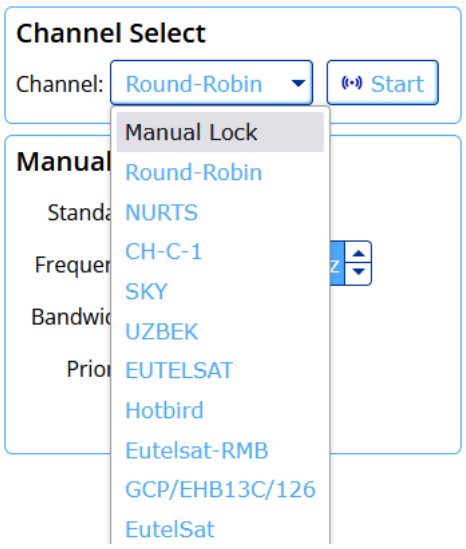
A list of all services, to allow a quick access with a click, is available in the Services section of the web page.

On the left side of the screen you will find the Channel Select and Manual Channel Lock options. All the values are selected via the drop-down menus.

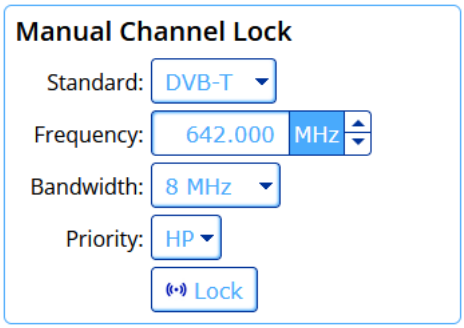
Channel Select allows you to choose the preferred monitoring option – Round Robin, Manual Lock or a specific channel.

Manual Channel Lock – For different modulation/streaming standards there are different settings. For example, for DVB-T choosing the proper carrier bandwidth 6MHz, 7MHz or 8MHz is done through DVB-T Settings menu. An option to start a Round Robin in the Multiplex page is also available.

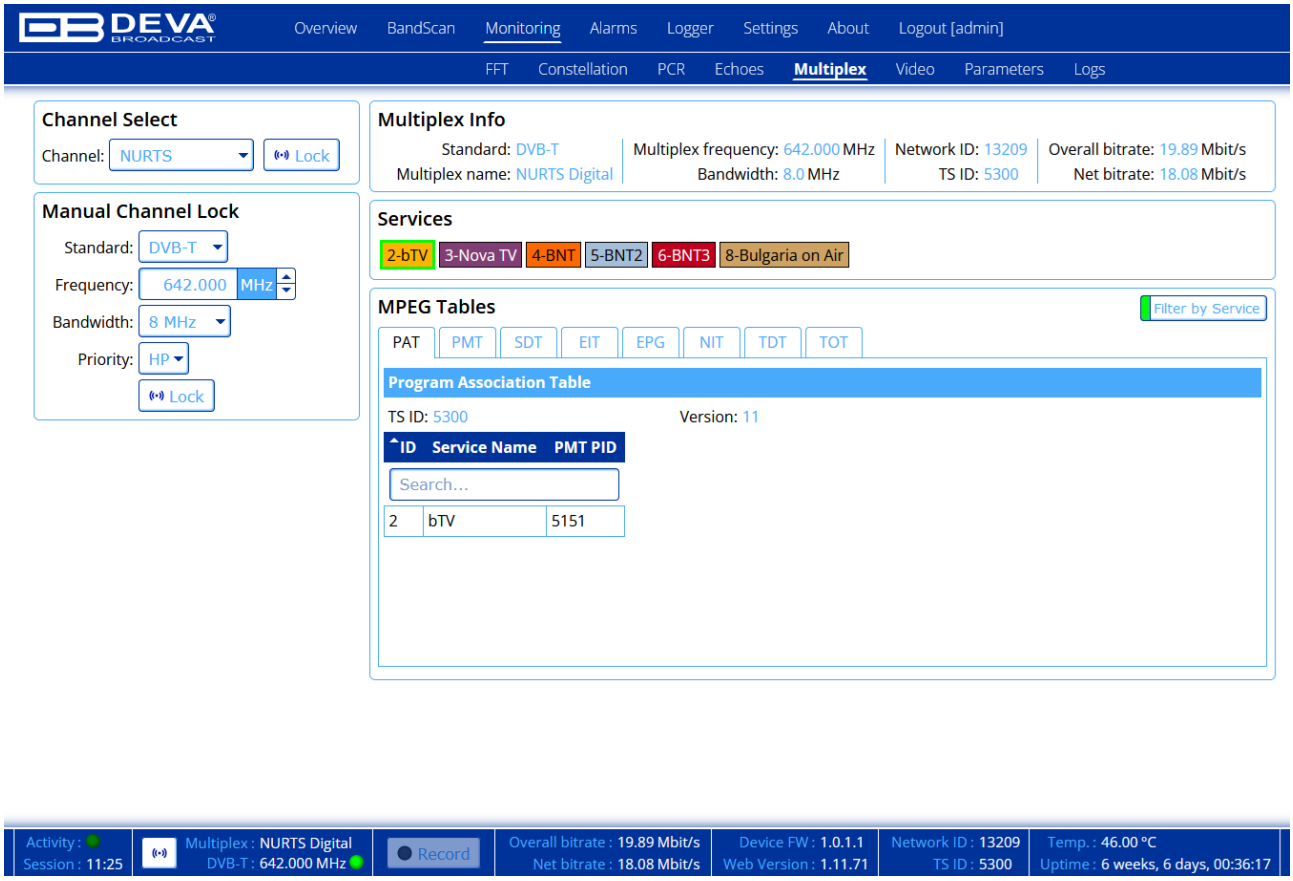
When changing the Channel Select or Manual Channel Lock options, make sure to press the [Lock] or [Start] buttons.



Channel Select

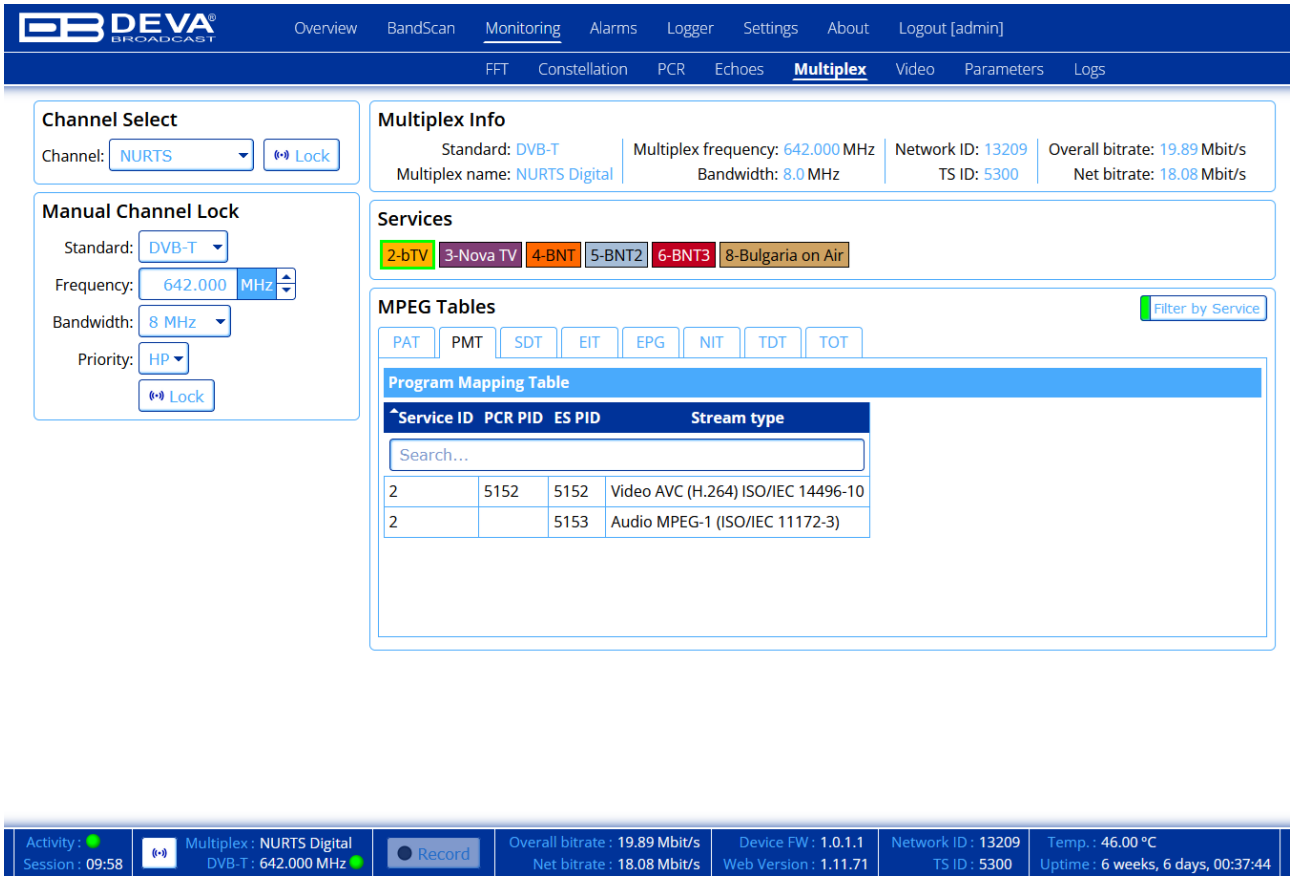


Manual Channel Lock



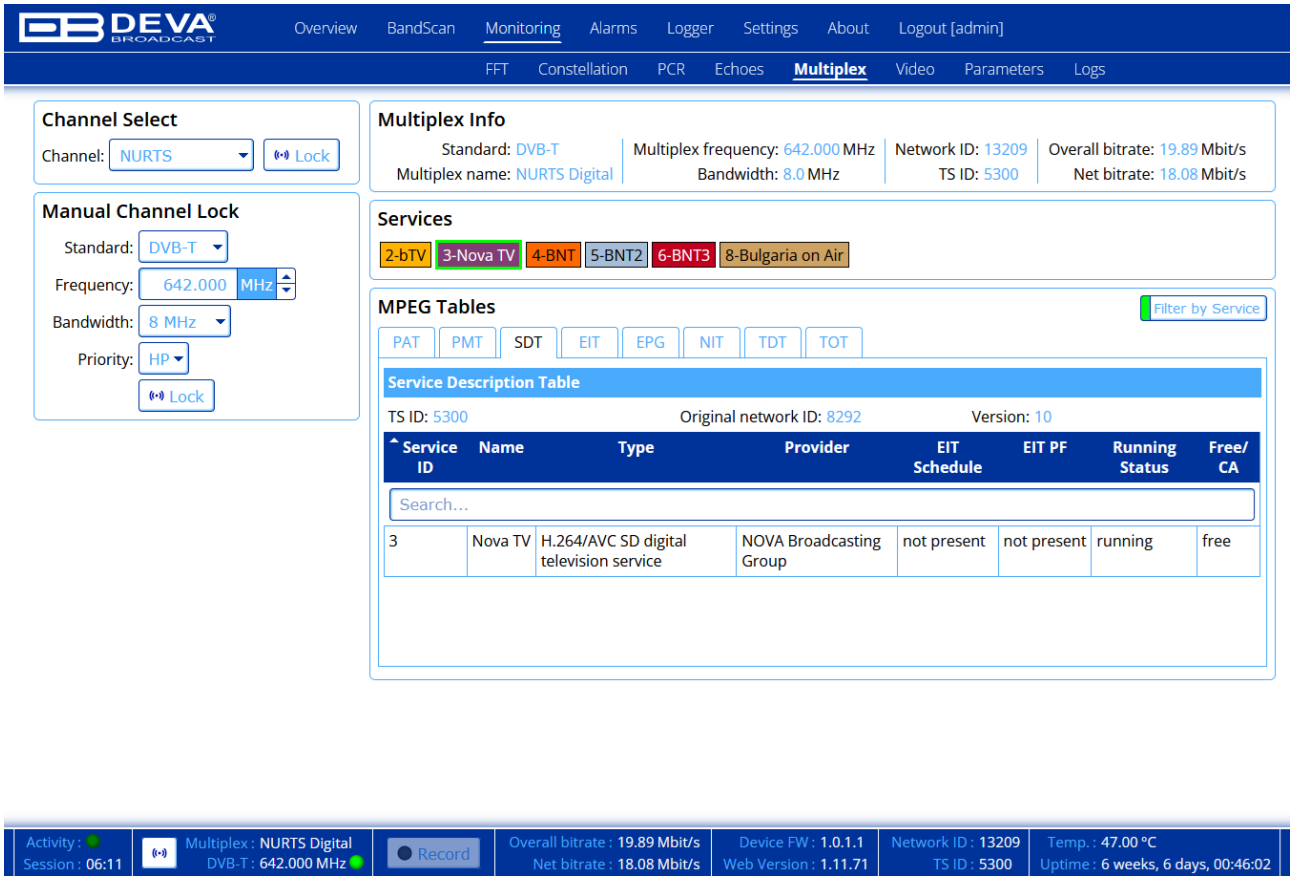
Program Association Table (PAT)

PAT (Program Association Table) – Displaying PMT table PIDs for each of the services in the MPEG TS stream.



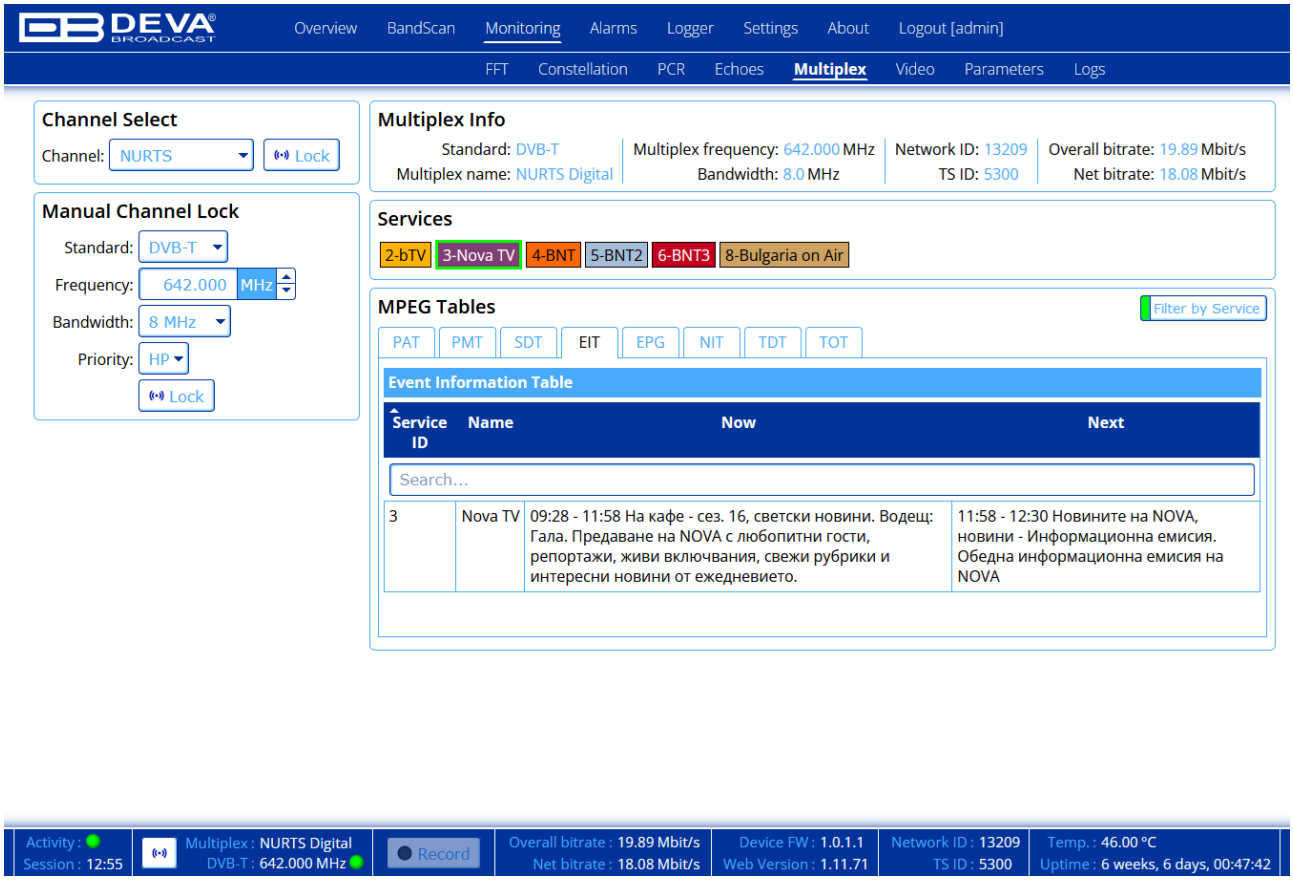
Program Map Table (PMT)

PMT (Program Mapping Table) – used to indicate different PIDs related to one service. PIDs for audio, video, subtitles and others.



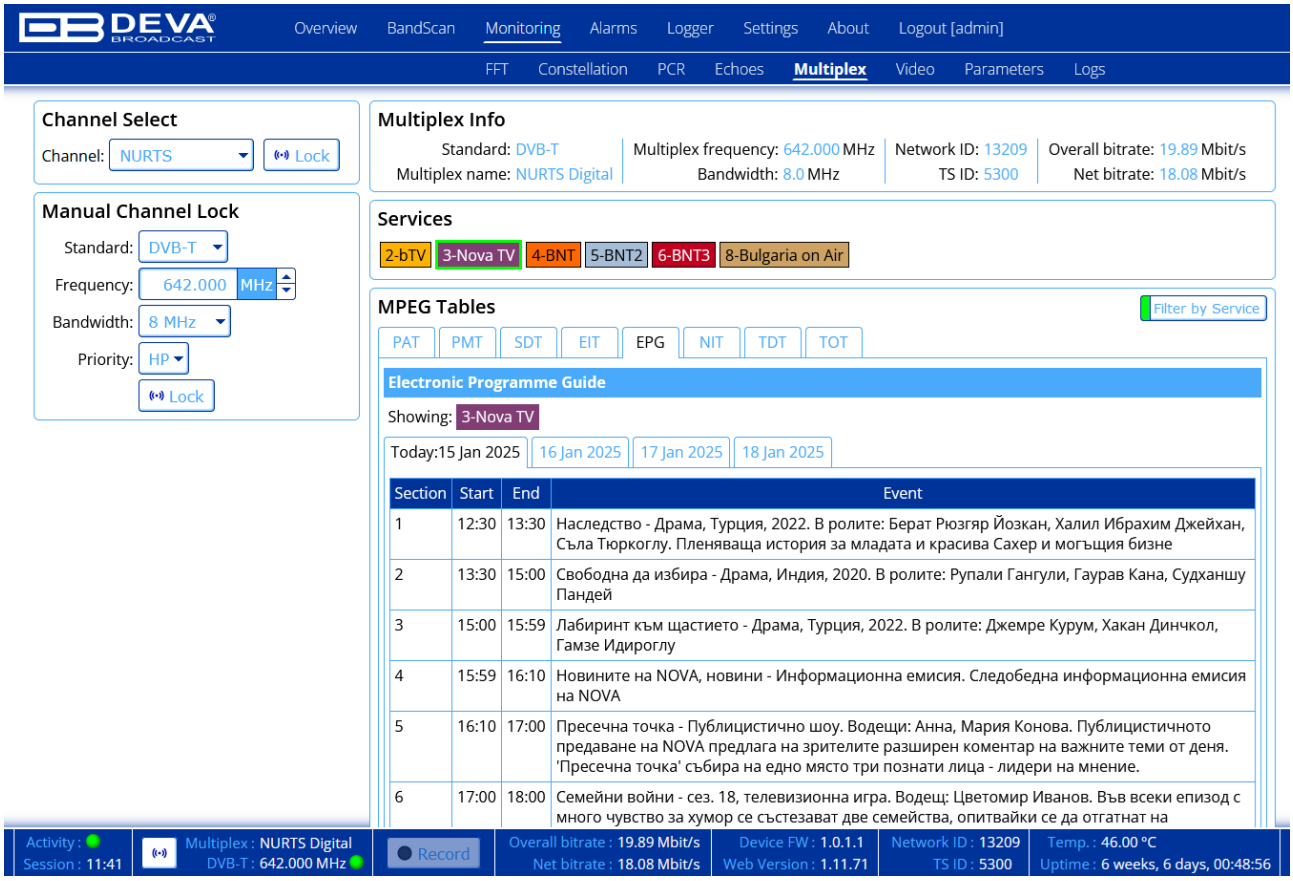
Service Description Table (SDT)

SDT (Service Description Table) – Is used to transmit service names and other descriptive information for all the services in the network. The selected service will be colored if "Filter by Service" is not selected.



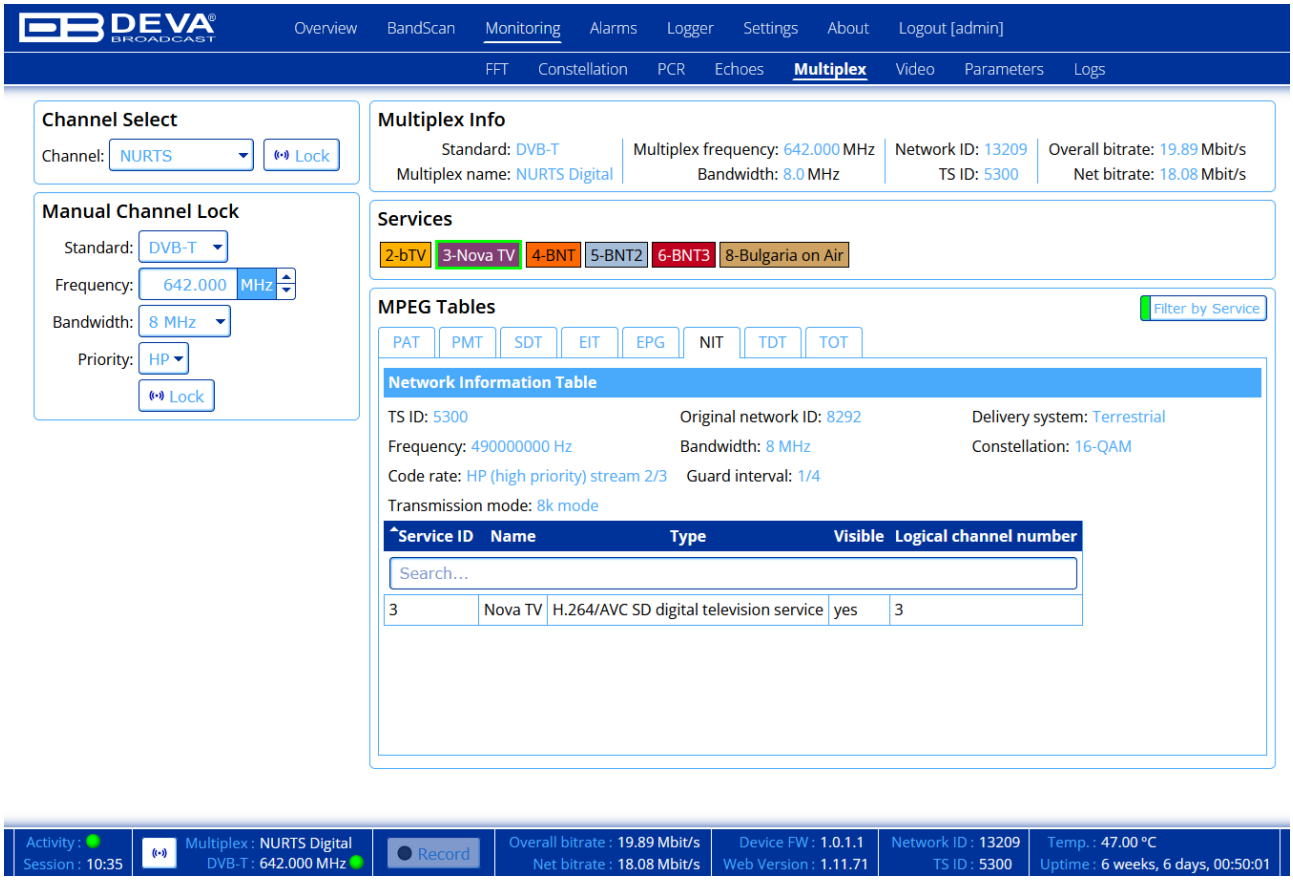
Event Information Table (EIT)

The Event Information Table (EIT) contains data concerning events (a grouping of elementary broadcast data streams with a defined start and end time).



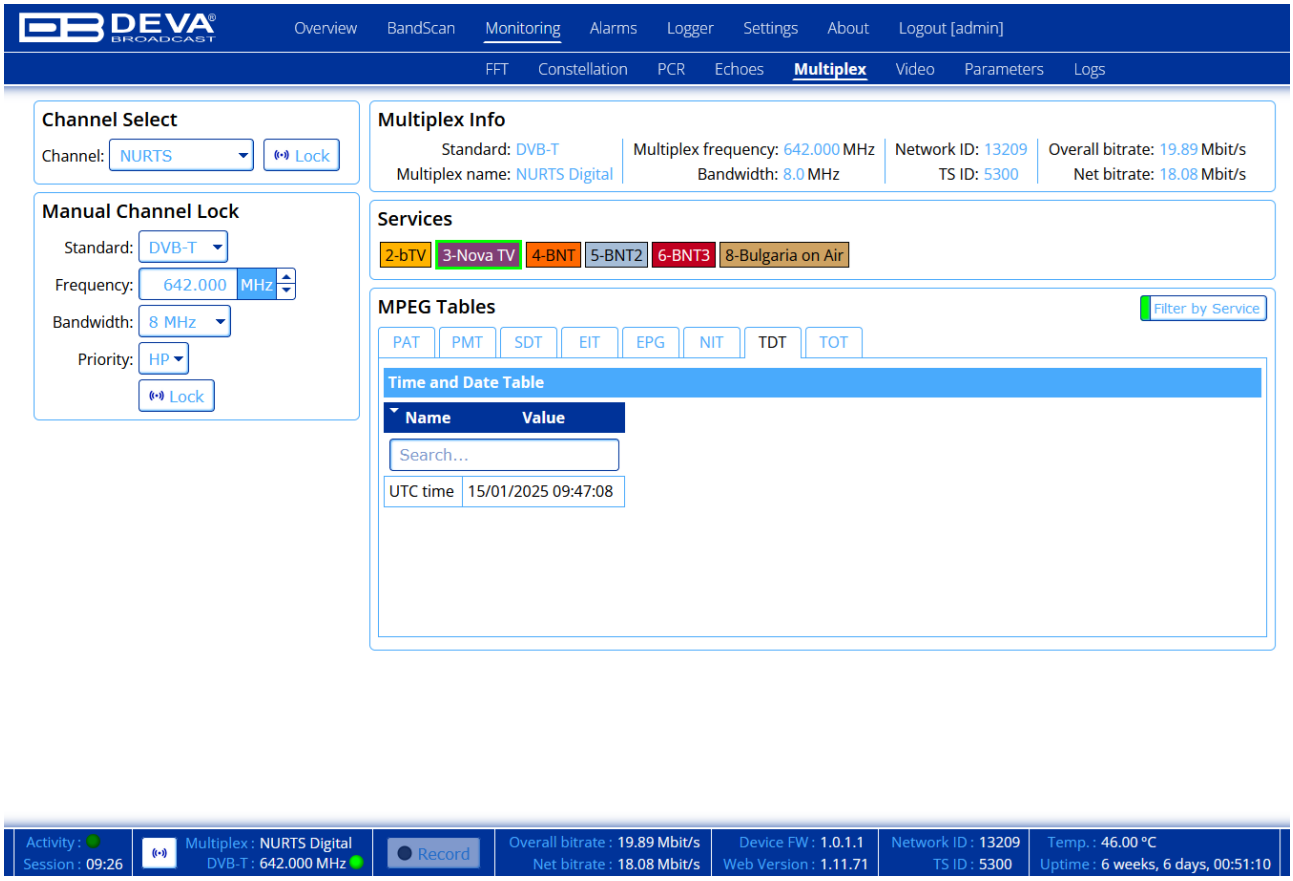
Electronic programming guides (EPG)

Electronic programming guides (EPGs) displays scheduling information for current and upcoming broadcast programming (TV listings). Selecting a new service will show the currently available information.



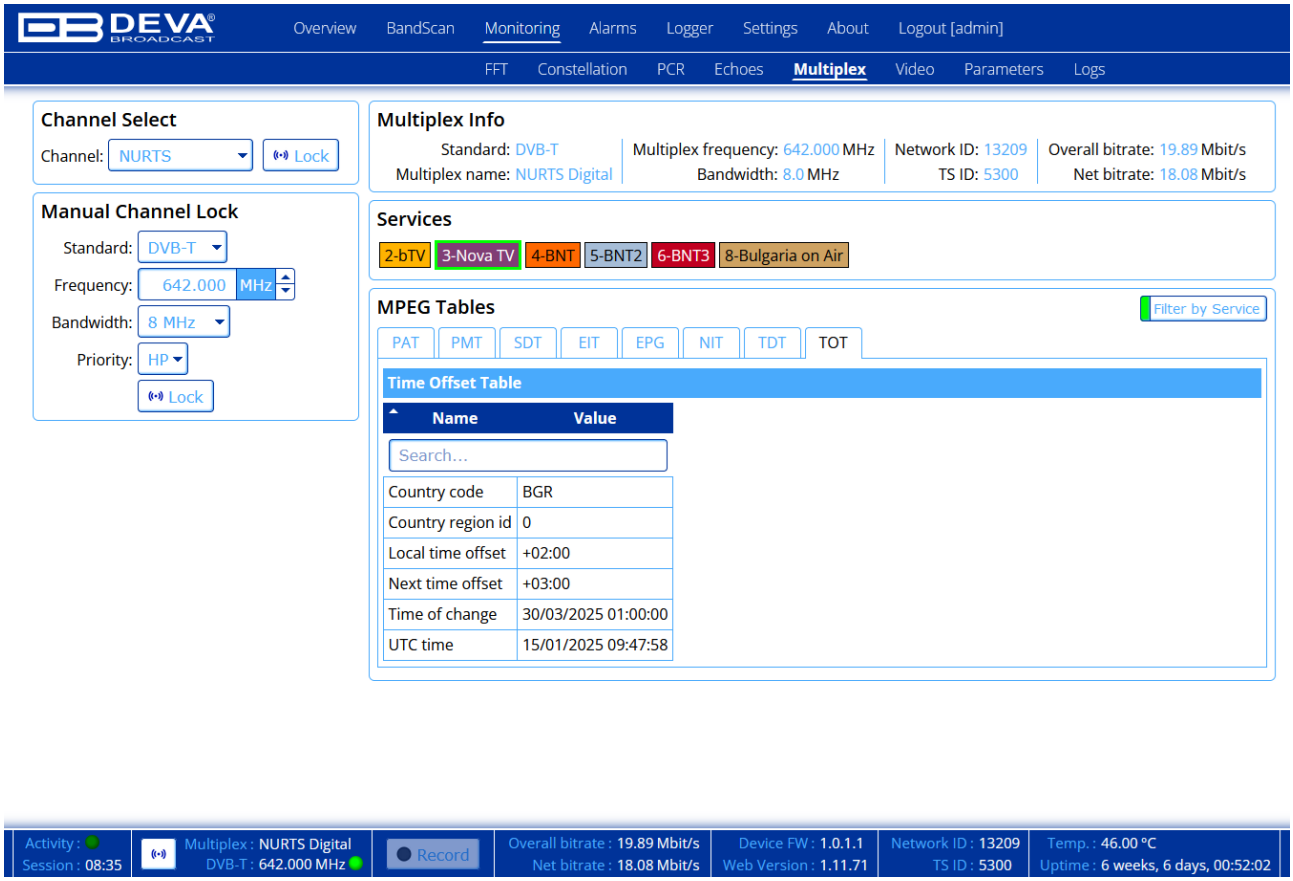
Network Information Table (NIT)

NIT (Network Information Table) – Is used to indicate modulation and frequencies of all the carriers in the current network. It is also used during frequency search and installation.



Time and Date Table (TDT)

Time and Date Table holds the current UTC (Coordinated Universal Time) date and time.



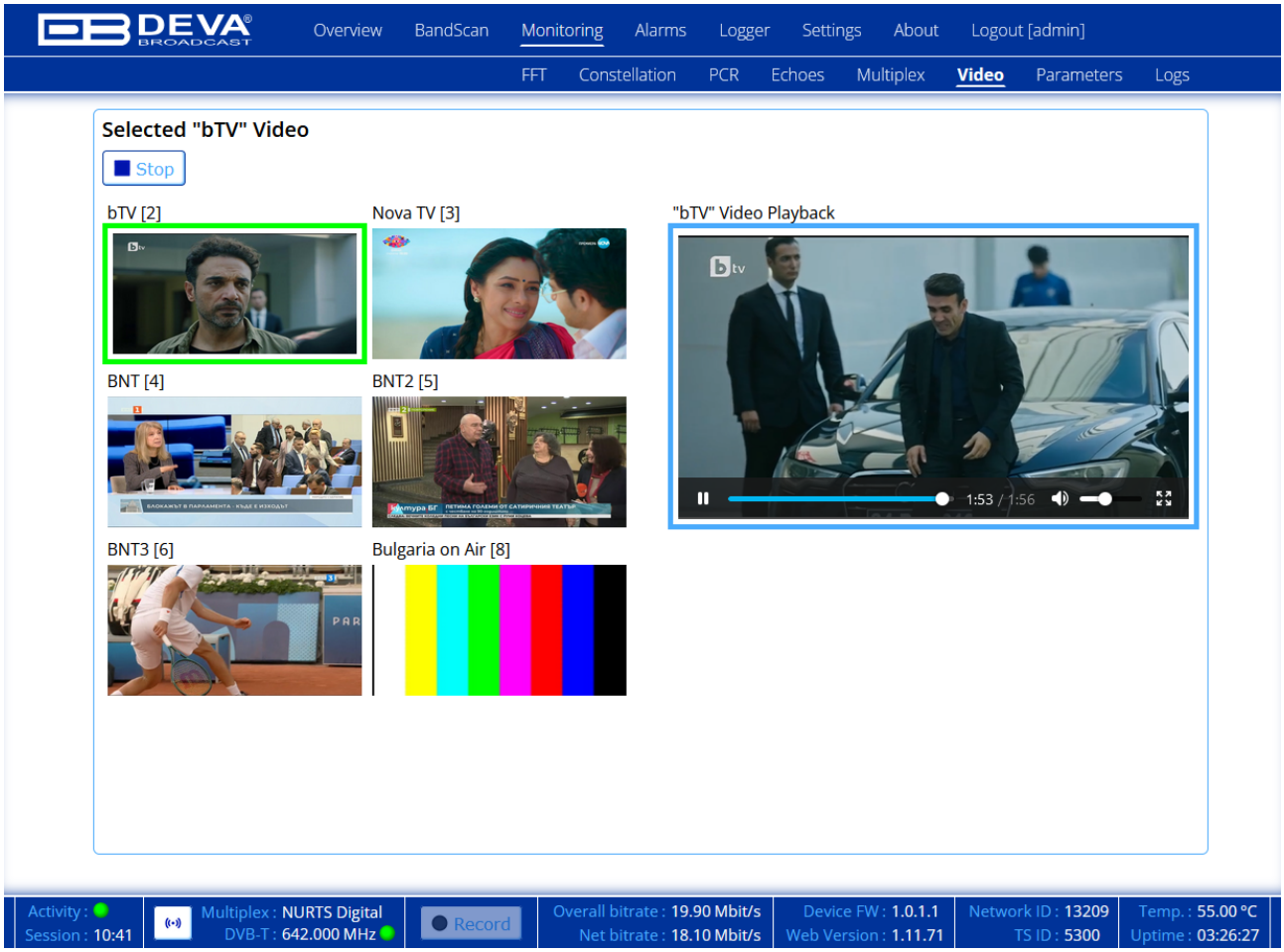
Time Offset Table (TOT)

Time Offset Table displays the offset/time in the chosen location.

Video



This screen has a built-in audio-video player, with which the TS service containing radio and TV can be reviewed.



Once the program is selected a Video playback will be depicted on the right side of the screen by pressing the [Play] button.

The buttons on the bottom of the video screen have the following designations: Play, Pause, and Rewind (by slider). An option to regulate or mute the audio is also available.

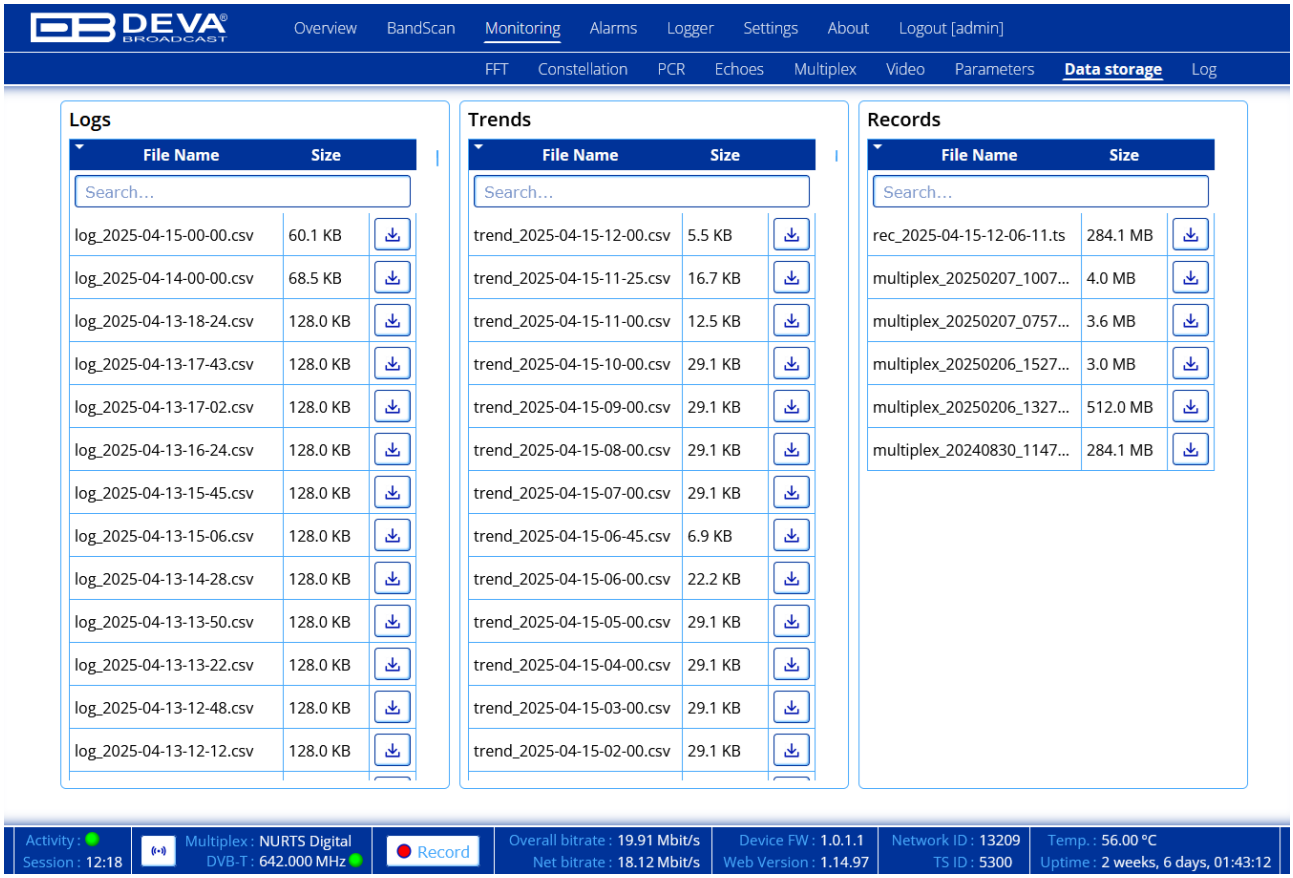
The feed can also be displayed in full screen via the Full screen option. This can also be achieved by a double click with the mouse on the player screen. To exit the full screen mode, the [ESC] key can be used or once again a double click with the mouse on the screen.

Parameters



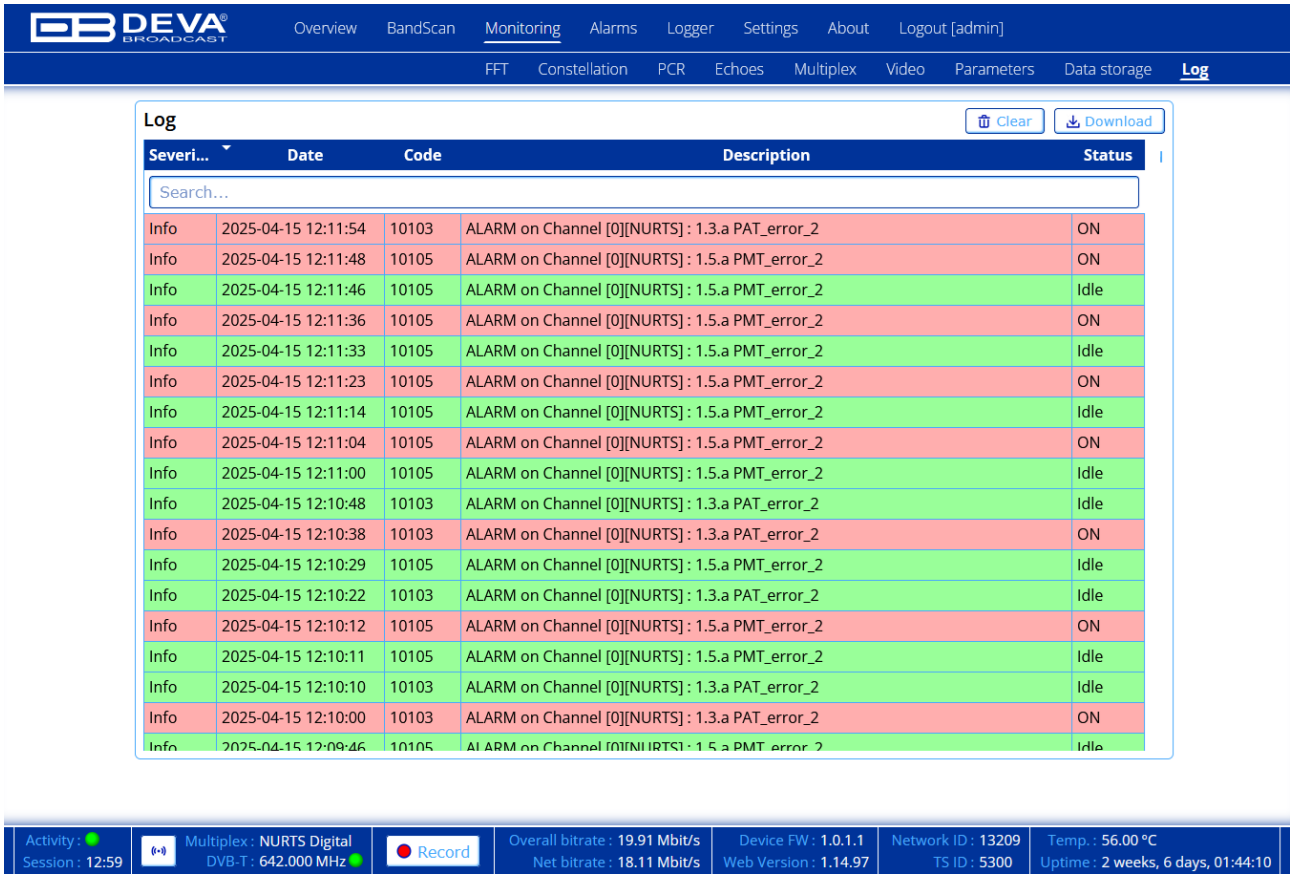
All the needed information on the DVB parameters is available in this tab.

Data Storage



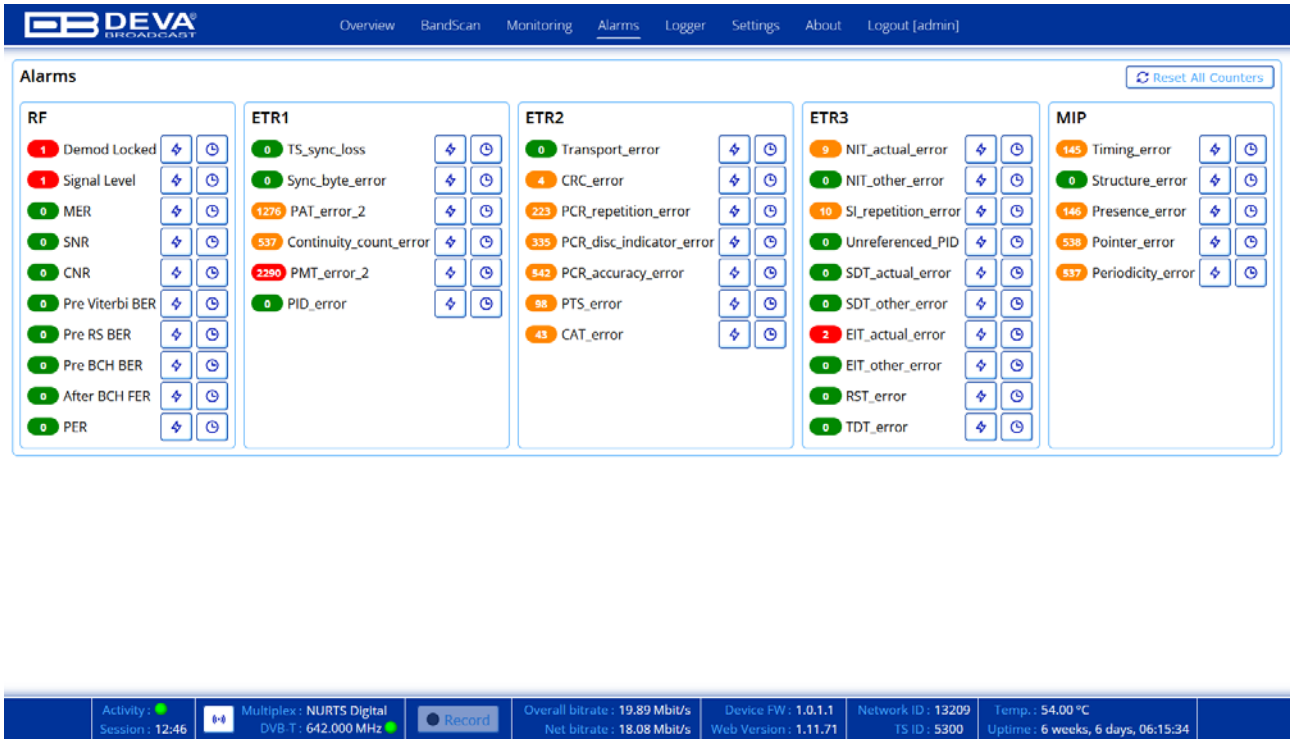
Displays a list of the logged alarms and TS recordings that are saved in the device's internal memory. Each file contains detailed information for an hour. In case the observation hour has not elapsed, the information depicted will be full as of the time period at which the file was downloaded. The Logs and Trend files can be downloaded in a CSV file that can be opened and reviewed.

Log



Here are listed all Device System Events. The Event Log is saved in the internal device memory. Log file can be downloaded via the [Download] button available at the upper right corner. [Clear] will delete the accumulated Log information.

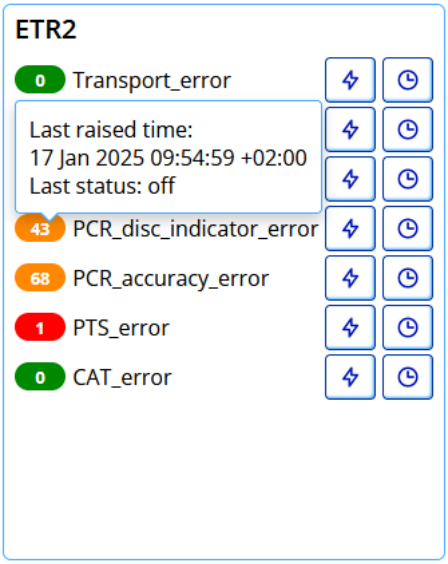
ALARMS



Displays all the currently activated Alarms. It also allows the user to view the last raised event by pressing the [clock] button or to reset the alarms via the [bolt] button. All alarms can be reset via the [Reset All Counters].

Alarms color codes:

Green	No alarm condition has been raised
Orange	An alarm condition has been raised but is no longer present
Red	An alarm condition has been raised and is still present



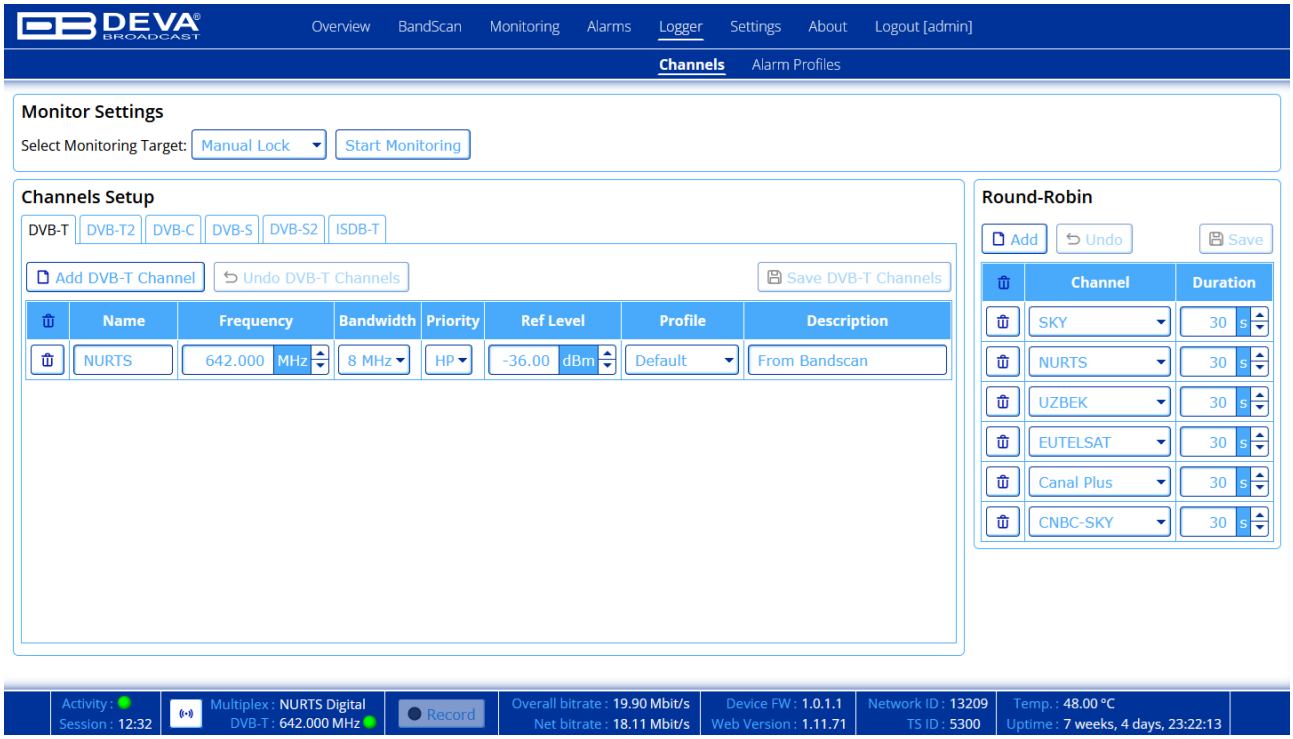
The **general monitoring information** includes the following alarms:

RF	Current alarm status and number of alarm conditions raised for RF input monitoring: Demod Locked, Signal Level, MER, C/N, BER parameters.
ETR1	Current alarm status and number of alarm conditions raised for ETSI TR 101 290 Priority 1
ETR2	Current alarm status and number of alarm conditions raised for ETSI TR 101 290 Priority 2
ETR3	Current alarm status and number of alarm conditions raised for ETSI TR 101 290 Priority 3
MIP	Current alarm status and number of alarm conditions raised for MIP monitoring

LOGGER

Channels

Allows new items (streams/carriers) to be added, to reconfigure or delete an item and configure all the settings for each carrier type.



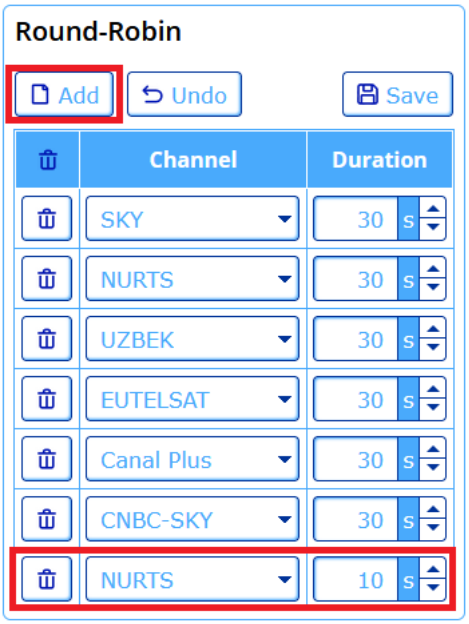
Monitor Settings

Allows the user to select a monitoring target from the drop-down menu. It could be a single channel or a group of channels. To monitor a group of channels, the Round-Robin option should be selected. Once the preferred option is selected, press [Start Monitoring].

Round Robin

To add a new channel to the Round-Robin list, follow the instructions listed below:

1. Press the [Add] button. This will add a new channel field:



2. Then select the program from the drop-down list and set the preferred duration time;
3. Press [Save].

The [Undo] button will undo all the applied changes.

Channels Set-up

There are 6 different standards DVB-T/T2 (Broadcast), DVB-S/S2 (Satellite), DVB-C (Cable) and ISDB-T. For each standard, in addition to the frequency, there are also several different parameters that are involved in localization. The number of channels for each standard is limited to 64.

The Channels Set-up allows you to set-up those parameters and add DTV channels.

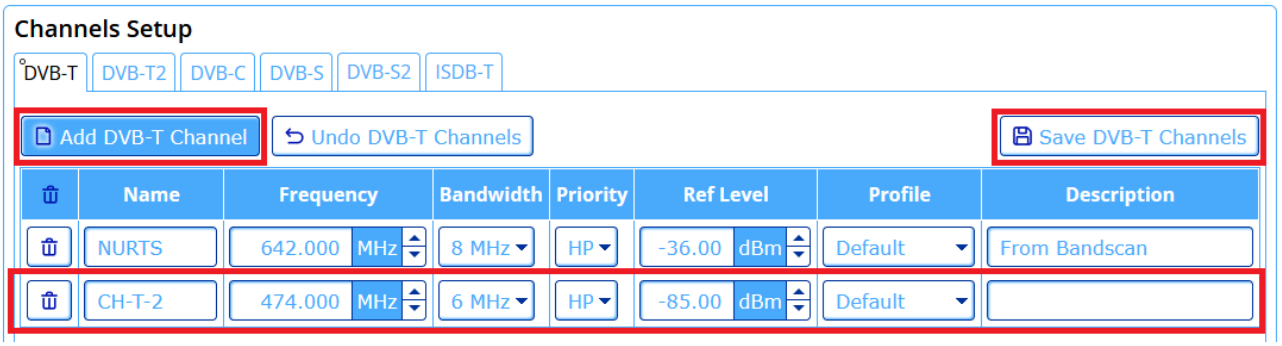
How to add a new channel

When channels are added from BandScan, the channel parameters are filled in automatically.

When set by the [Add STD Channel] button, the parameters must be entered manually. If not, the default values will be used.

The [Save] button must be pressed in order for the applied changes to take effect.

Adding a new channel via [Add STD Channel] button



1. Press [Add STD Channel]. This will add a new channel field;
2. Add name and all the mandatory parameters for the newly added channel;
3. **IMPORTANT** – Profile is used to specify the Alarm profile to be applied to the channel. The Alarm profiles are user-defined. A different profile can be set for each channel.
4. Press [Save].

Alarms Profiles

The Alarm Profiles allows creation and configuration of alarm templates.

An alarm profile can be set and then applied to a channel for monitoring. The DB2004 allows different alarm profiles (alarm templates) to be defined and used for specific input channels. The maximum of 16 profiles can be added. Each profile is user-configured. Each alarm profile (template) will allow setting up alarms for:

- RF;
- ETR 101 290 Priority 1;
- ETR 101 290 Priority 2;
- ETR 101 290 Priority 3;
- MIP.

For the different DTV standards, the monitored parameters (especially RF) are in a different range. For ETR sections analyzing TS MPEG there are cases where not all tables are available. Bear in mind that more profiles allow for more flexible analysis of different standard channels.

Once an alarm is raised, it will not only be recorded (if Log level is set to Info), but also a notification will be generated. There are several Notification options:

- None – an alarm event will not be generated;
- SNMP – notification via SNM will be generated;
- Email – notification via email will be send in case of an alarm event;
- SNMP+Email – combined alarm notification. Also used as a default value.

Each alarm can be assigned a specific alarm level: "**Critical**", "**Warning**", "**Info**". This level helps filtering events in the log file.

To [Add New Profile] press the button, placed on the upper right corner of the webpage.

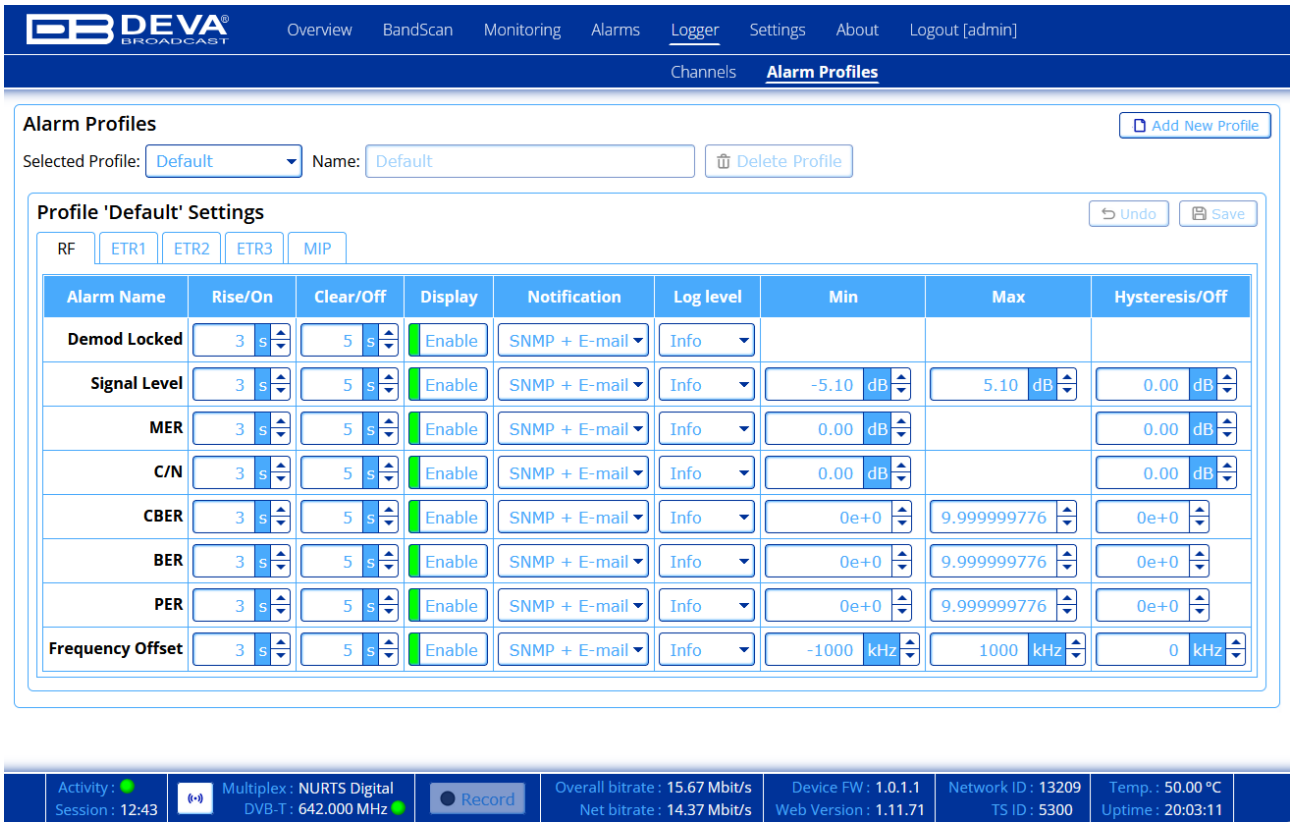
To enable an alarm, press the [Enable] button for each alarm option, apply the desired thresholds and notification options.

Depending on the monitored channel type (input type RF, ASI, IP, input standard), only the applicable alarms are computed and displayed. For example, when monitoring a DVB-T2 RF signal, the ASI or IP related alarms are not applicable, therefore, they will not be computed.

When monitoring **ETR 101 290** many errors can be detected for a short period of time. To avoid flooding the Network Monitoring System with alarm on/off traps, the DB2004 provides an alarm trigger on occurrence mechanism, by using two additional alarm parameters: **Nb Errors** and **Over Last**:

- An alarm will be raised (triggered) if an error occurred at least **Nb Errors** times during a period of **Over Last**.
- An alarm will be triggered OFF once there is no more error during the set **Over Last** period (in seconds).

The [Save] button must be pressed in order for the applied changes to take effect.



RF Parameters

The monitored signal can fluctuate around the threshold value, so many errors can be raised during a short period of time. To prevent flooding the Network Monitoring System with notifications, The DB2004 applies the following Hysteresis mechanism:

- An alarm will go OFF if the monitored value's is in the interval [min + Hysteresis value, max – Hysteresis value].

All these parameters pertain to an "Alarm Profile", so it is possible, for example, to enable SNMP trap generation for a specific parameter in one profile and disable it in another profile.

RF Alarm Settings

Demod Locked – applied to all standards. Status of the demodulation front-end. Locked means:

- a valid RF DTV signal is received
- Selected PLP is present
- MPEG-TS stream is successfully decoded

An alarm is raised if the status goes to unlocked.

Signal Level – applied to all standards. Signal level variation of the RF signal compare to the "Reference Signal Level". An alarm is raised if the value goes below "min" settings or above "max" settings. Set in dB, Range: -6dB to +6dB. Symmetrical intervals are not mandatory.

MER mode – applied to DVB-T standard. The MER measure for DVB-T can be computed in two modes:

- TX sites: when the DB2004 is installed on TX sites and the RF signal comes from the modulator output
- Echoes: when the DB2004 is installed in reception sites with strong echo conditions (multipath and destructive echoes), and the RF signal comes from off-air antenna. This measure mode requires a 2 minutes initialization period. Therefore if in Scanning (Round-Robin) mode, the scanning duration should be superior to two minutes.

SNR – Signal to Noise Ratio of the RF signal. A measure of the received carrier strength relative to the strength of the received noise. It is measured before modulation. For DVB-T/T2/C standard only.

CNR – Carrier to Noise Ratio of the RF signal. A measure of the received carrier strength relative to the strength of the received noise. It is measured after modulation. For DVB-S/S2 standard only.

Pre Viterbi BER – Measured Bit Error Rate before the Viterbi correction. For DVB-T/S standard only.

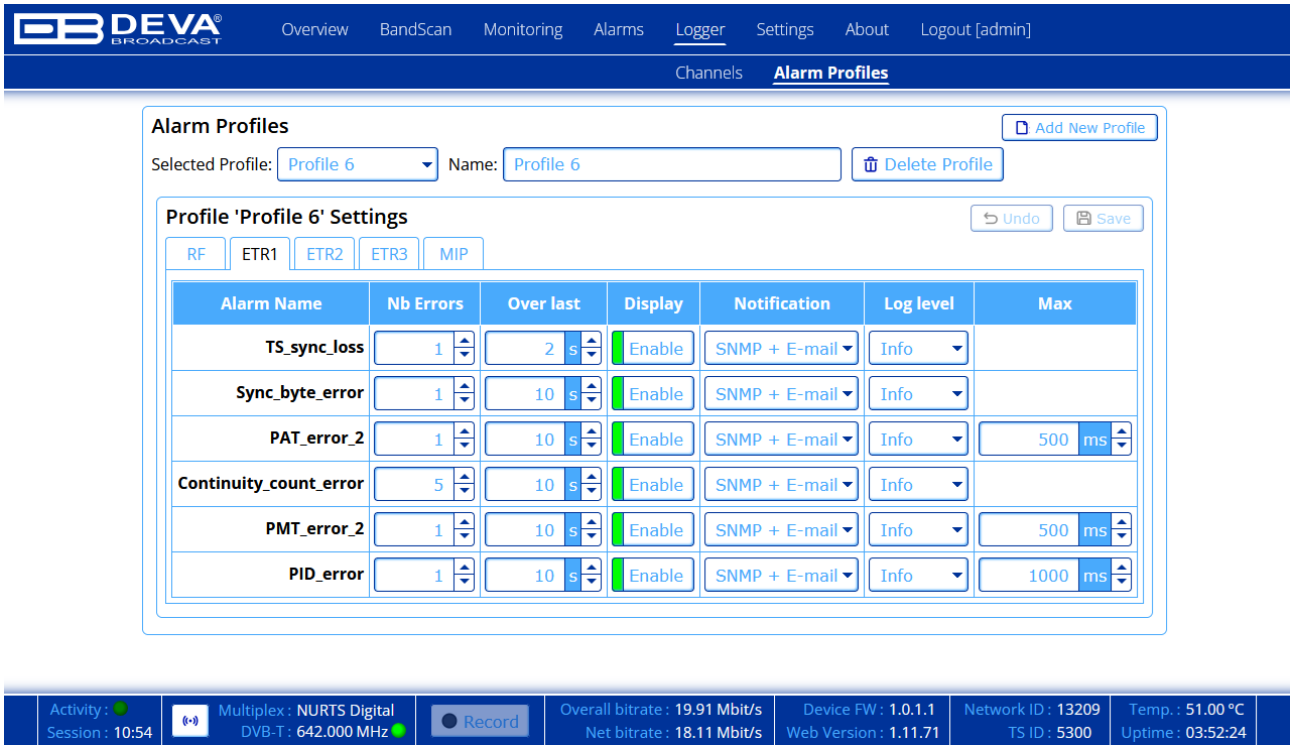
Pre RS BER – Measured Bit Error Rate before the Reed-Solomon correction. For DVB-T/C/S standard only.

Pre BCH BER – Measured Bit Error Rate before the BCH correction. For DVB-T2/S2 standard only.

After BCH FER – Measured Frame Error rate after the BCH correction. For DVB-T2/S2 standard only.

PER – Applied to all standard. Packet Error rate after the BCH correction. An alarm is raised if the value goes below "min" settings or above "max" settings.

ETR 101 290 Priority 1 Settings



ETR1 Parameters

TS_sync_loss – Loss of synchronization with consideration of hysteresis parameters

Sync_byte_error – Sync_byte not equal 0x47

PAT_error_2 – Program Association Table :

- PID 0x0000 does not occur at least every 0.5 s;
- PID 0x0000 does not contain a table_id 0x00 (i.e. a PAT);
- Scrambling_control_field is not 00 for PID 0x0000

The repetition time is set in ms, ranging from 50 to 5000ms. The ETR recommended value: 500ms

Continuity_count_error – Incorrect packet order a packet occurs more than twice lost packet

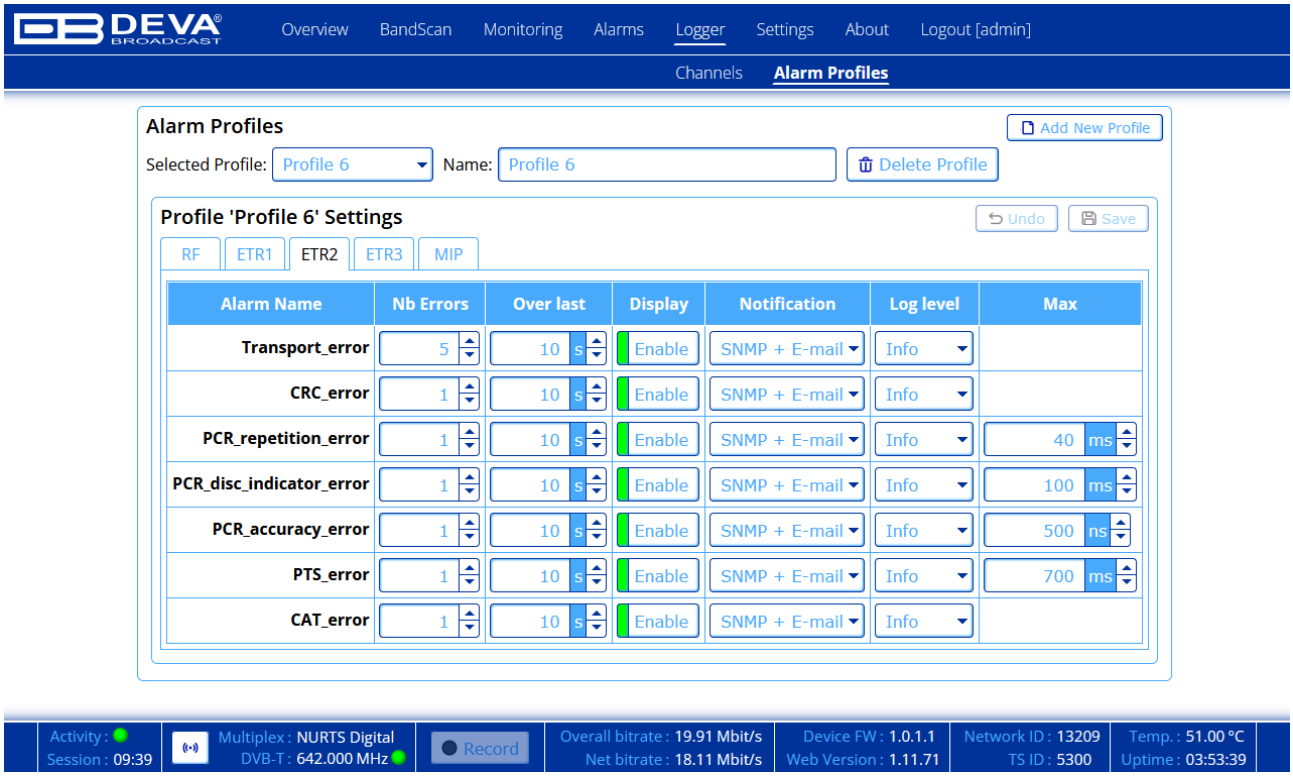
PMT_error_2 – Program Map Table

- Sections with table_id 0x02, (i.e. a PMT), do not occur at least every 0.5s on each program_map_PID which is referred to in the PAT
- Scrambling_control_field is not 00 for all packets containing information of sections with table_id 0x02 (i.e. a PMT) on each program_map_PID which is referred to in the PAT

The repetition time is set in ms, ranging from 50 to 5000ms. The ETR recommended value: 500ms

PID_error – Referred PID does not occur for a user specified period. The repetition time is set in ms, ranging from 1000 to 80000ms. The ETR recommended value: 1000ms

ETR 101 290 Priority 2 Settings



ETR2 Parameters

Transport_error – Transport_error_indicator in the TS-Header is set to "1"

CRC_error – Cyclic Redundancy Check, CRC error occurred in CAT, PAT, PMT, NIT, EIT, BAT, SDT or TOT table

PCR_repetition_error – Program Clock Reference, Time interval between two consecutive PCR values more than 40 ms. The repetition time is set in ms, ranging from 0 to 5000ms. The ETR recommended value: 40ms

PCR_disc_indicator_error – The difference between two consecutive PCR values (PCRi+1 – PCRi) is outside the range of 0...100ms without the discontinuity indicator set. The repetition time is set in ms, ranging from 0 to 10000ms. The ETR recommended value: 100ms

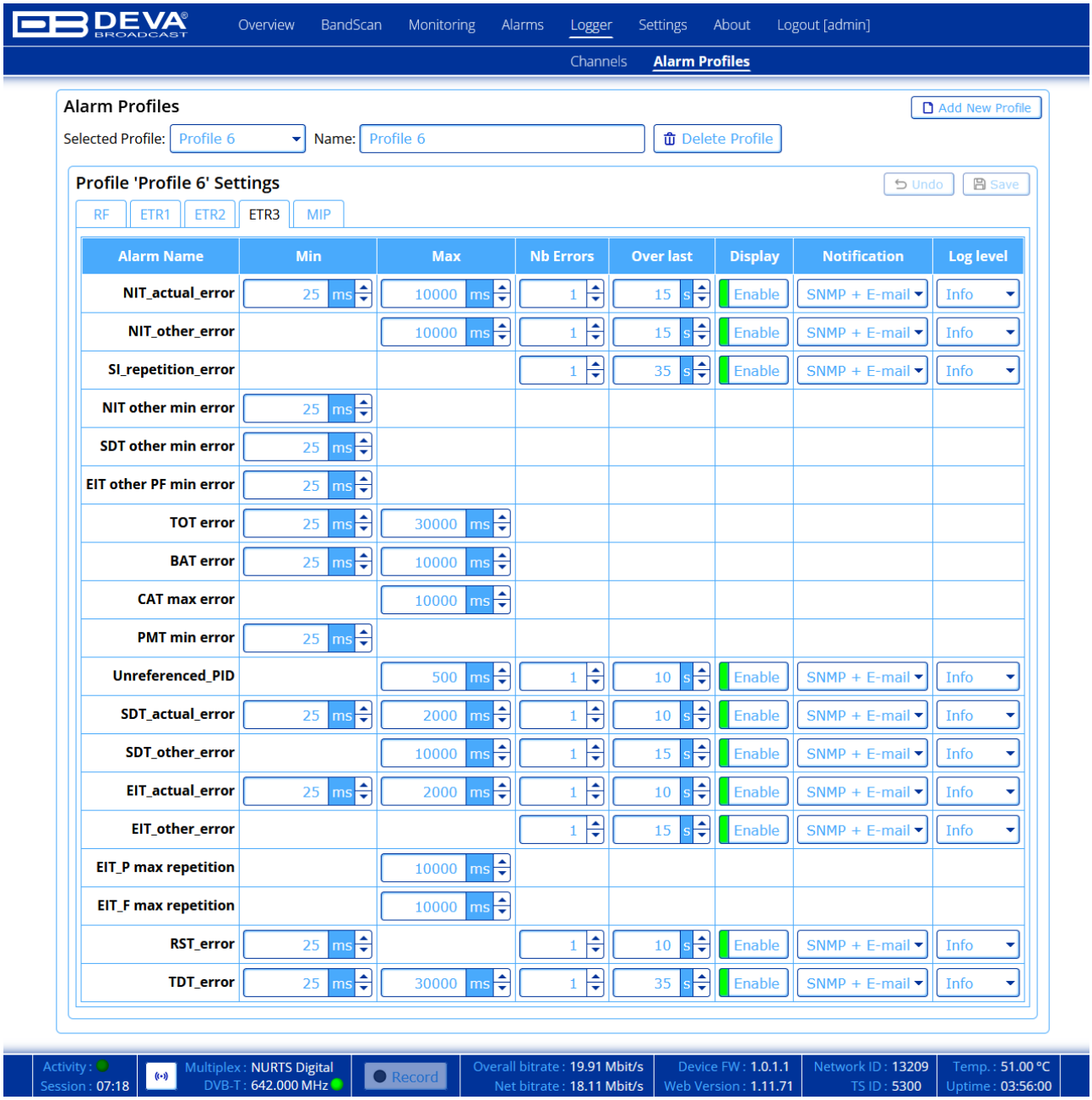
PCR_accuracy_error – PCR accuracy of selected program is not within ±500ms. The repetition time is set in ms, ranging from 0 to 50000ms. The ETR recommended value: 500ms

CAT_error – Conditional Association Table

- Packets with transport_scrambling_control not 00 present, but no section with table_id = 0x01 (i.e. a CAT) present
- Section with table_id other than 0x01 (i.e. not a CAT) found on PID 0x0001

PTS Error – presentation time stamp error. Set in ms, ranging from 0 to 70000ms.

ETR 101 290 Priority 3 Settings



ETR3 Parameters

NIT_actual_error – Network Information Table

- Section with table_id other than 0x40 or 0x41 or 0x72 (i.e. not an NIT or ST) found on PID 0x0010.
- No section with table_id 0x40 (i.e. an NIT_actual) in PID value 0x0010 for more than 10s.
- Any two sections with table_id = 0x40 (NIT_actual) occur on PID 0x0010 within a specified value (25ms or lower).

The interval time is set in ms. The range varies from 0 to 100ms for min and 1000 to 30000ms for max. ETR recommended value: 25ms for min and 10000ms for max

NIT_other_error – Interval between sections with the same section_number and table_id = 0x41 (NIT_other) on PID 0x0010 longer than a specified value (10 s or higher). The interval time in ms. The range varies from 1000 to 30000ms for max . ETR recommended value: is 10000ms for max

SI_repetition_error – Repetition rate of SI tables outside of specified limits. The SI tables taken into consideration: all the SI tables mentioned in the ETR3 alarm configuration menu, plus the following:

- NIT other min error: range: 0 to 100ms, ETR recommended value is 25ms
- SDT other min error: range: 0 to 100ms, ETR recommended value is 25ms
- EIT other PF min error: range: 0 to 100ms, ETR recommended value is 25ms
- TOT error: range: 0 to 120000ms for min and 5000 to 120000ms for max, ETR recommended value: 25ms for min and 30000ms for max
- BAT error: range: 0 to 50000ms for min and 2000 to 50000ms for max, ETR recommended value: 25ms for min and 10000ms for max
- CAT max error: range: 100 to 100000ms, ETR recommended value is 10000
- PMT min error: range: 0 to 100ms, ETR recommended value is 25ms

Unreferenced_PID – PID (other than PAT, CAT, CAT_PIDs, PMT_PIDs, NIT_PID, SDT_PID, TDT_PID, EIT_PID, RST_PID, reserved_for_future_use PIDs, or PIDs user defined as private data streams) not referred to by a PMT within 0.5s. The interval time is set in ms. The range varies from 400 to 1000ms for max . ETR recommended value: is 500ms for max

SDT_actual_error – Service Description Table

- Sections with table_id = 0x42 (SDT, actual TS) not present on PID 0x0011 for more than 2s.
- Sections with table_ids other than 0x42, 0x46, 0x4A or 0x72 found on PID 0x0011.
- Any two sections with table_id = 0x42 (SDT_actual) occur on PID 0x0011 within a specified value (25ms or lower)

Repetition time is set in ms. The range varies from 0 to 100ms for min and 500 to 30000ms for max. ETR recommended value: 25ms for min and 2000ms for max.

SDT_other_error – Interval between sections with the same section_number and table_id = 0x46 (SDT, other TS) on PID 0x0011 longer than a specified value (10s or higher). Interval time is set in ms. Range: 1000 to 30000ms for max. ETR recommended value: is 10000ms for max.

EIT_actual_error – Event Information Table

- Section '0' with table_id = 0x4E (EIT-P, actual TS) not present on PID 0x0012 for more than 2s
- Section '1' with table_id = 0x4E (EIT-F, actual TS) not present on PID 0x0012 for more than 2s
- Sections with table_ids other than in the range 0x4E - 0x6F or 0x72 found on PID 0x0012.
- Any two sections with table_id = 0x4E (EIT-P/F, actual TS) occur on PID 0x0012 within a specified value (25ms or lower).

Repetition time is set in ms; Range: 0 to 100ms for min and 500 to 30000ms for max. ETR recommended value: 25ms for min and 2000ms for max

EIT_other_error – Interval between sections '0' with table_id = 0x4F (EIT-P, other TS) on PID 0x0012 longer than a specified value (10s or higher);

- EIT_P max repetition: range: 100 to 100000ms, ETR recommended value is 10000

Interval between sections '1' with table_id = 0x4F (EIT-F, other TS) on PID 0x0012 longer than a specified value (10s or higher)

- EIT_F max repetition: range: 100 to 100000ms, ETR recommended value is 10000

RST_error – Running Status Table

- Sections with table_id other than 0x71 or 0x72 found on PID 0x0013.
- Any two sections with table_id = 0x71 (RST) occur on PID 0x0013 within a specified value (25ms or lower).

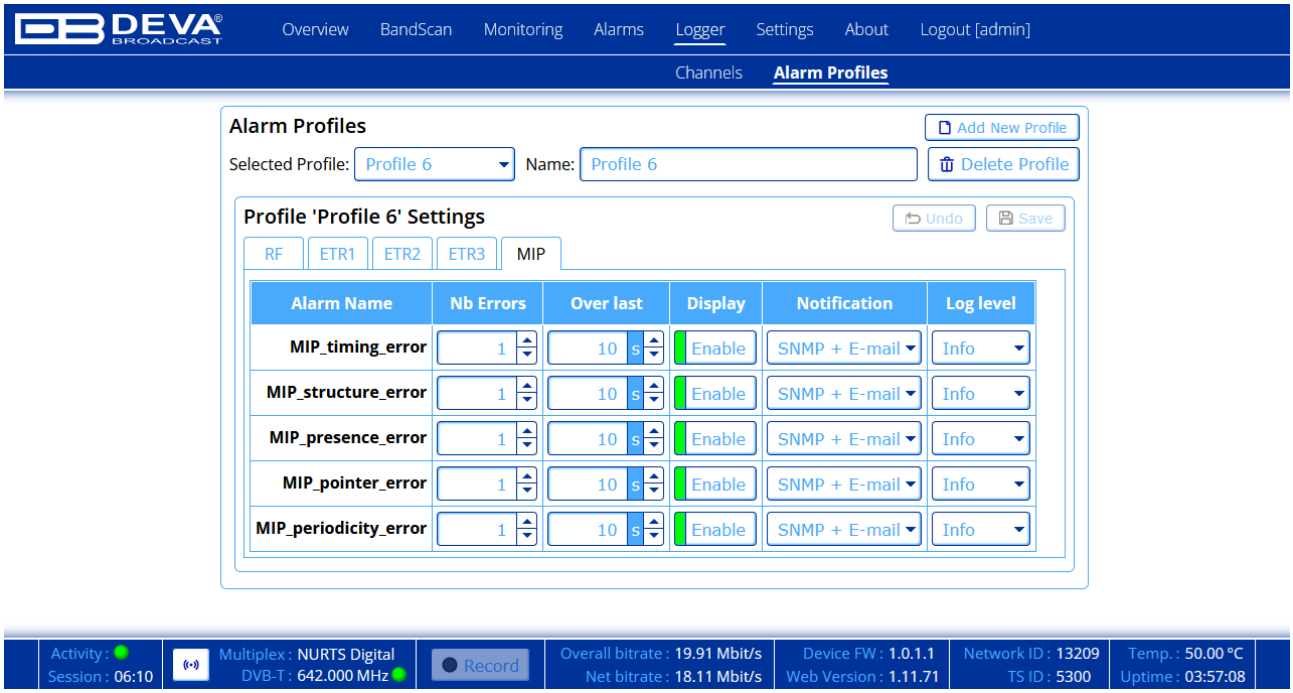
Repetition time is set in ms. The range varies from 0 to 100ms for min. ETR recommended value is 25ms

TDT_error – Time and Date Table

- Sections with table_id = 0x70 (TDT) not present on PID 0x0014 for more than 30s.
- Sections with table_id other than 0x70, 0x72 (ST) or 0x73 (TOT) found on PID 0x0014.
- Any two sections with table_id = 0x70 (TDT) occur on PID 0x0014 within a specified value (25ms or lower).

Repetition time is set in ms. Range: 0 to 100ms for min and 500 to 120000ms for max. ETR recommended value: 25ms for min and 30000ms for max

MIP Settings



MIP Parameters

MIP Presence – Check that the MIP packet is inserted into the transport stream only once per megaframe. Applicable for DVB-T/T2 RF input signals monitoring.

ALARM PRIORITIES

First priorities

TS Lock – Constantly follows for a valid impulse for the synchronization of every 188 bytes. After synchronization has been achieved the evaluation of the other parameters can be carried out.

PAT – PID 0x0000 is not transmitted every 500 milliseconds or less. A section with a table number different than 0x00 is found at PID 0x0000 (Program Allocation Table). If the PAT is missing then the decoder can do nothing, no program is decodable.

Continuity – This error indicates incorrect packet sorting. A packet has been sent more than twice at the same time or lost altogether. For this indicator three checks are combined: “Incorrect packet order”, “Lost packet” or “Duplicated packet”.

PMT – Sections with table number 0x02 (Program Map Table) are not transmitted every 500 milliseconds or less to the PID, referenced from the PAT table. Parts in this context are the video stream and the audio streams and the data stream. Without a PMT the corresponding program is not decodable.

Missing PID – This error indicates that certain PIDs are not transmitted for a specified amount of time. It is checked whether there exists a data stream for each PID that occurs in the PMT table.

Second priorities

Transport error – the mistake indicator in the transport stream is “1”

CRC - The CRC (Cyclic Redundancy Check) can indicate an error in the transmission of any of the following tables: CAT, PAT, PMT, NIT (Network Information Table), EIT (Event Information Table), BAT (Bouquet Association Table), SDT (Service Description Table) and TOT (Timing Offset Table).

PCR – If PCR is missing for more than 100 milliseconds without indication of interruption. Also when the time interval between two PCR reports is larger than 50 milliseconds.

PTS – PTS should occur at least every 800ms. It is only accessible if the TS is not scrambled.

CAT – A CAT error means that there are encrypted packets in the transport stream, but there is a missing table with number 0x01 (CAT) at PID 0x0001

Third priorities

NIT – Active when sections with table numbers, other than 0x40, 0x41 or 0x72, found at PID 0x0010. It is checked whether NITs are present in the TS and whether they have the correct PID.

SI repetition rate – Repetition of the service tables is over the specified thresholds. For SI tables a maximum and minimum periodicity are specified in EN 300 468 and TR 101 211. This is checked for this indicator.

Unreferenced PID – PID, other than PMT PIDs, PIDs with numbers between 0x00 and 0x1F or PIDs which are defined as client data streams, which are not referenced by PMT or PAT tables in 500 milliseconds. Each non-private program data stream should have its PID listed in the PMTs.

SDT – Sections with table numbers 0x42 missing in PID 0x0011 for more than 2 seconds. Sections with numbers other than 0x42, 0x46, 0x4A or 0x72 found at PID 0x0011. The SDT describes the services available to the viewer. It is split into sub-tables containing details of the contents of the current TS (mandatory) and other TS (optional). Without the SDT, the receiver is unable to give the viewer a list of what services are available.

EIT – Sections with table numbers 0x4E missing in PID 0x0012 for more than 2 seconds. Sections with numbers other than the range of 0x4E-0x6F or 0x72 found at PID 0x0012.

The EIT (Event Information Table) describes what is on now and next on each service, and optionally details the complete programming schedule. The EIT schedule information is only accessible if the TS is not scrambled.

RST – Sections with table numbers, other than 0x71 and 0x72, found at PID 0x0013. Two sections with table numbers 0x71 (RST) at PID 0x0013 for less than 25 milliseconds.

The RST is a quick updating mechanism for the status information carried in the EIT.

TDT – Sections with table number 0x70 (TDT) missing at PID 0x0014 for more than 30 seconds. Sections with table number other than 0x70, 0x72 (ST), 0x73 (TOT), found at PID 0x0014. Two sections with table number 0x70 (TDT) at PID 0x0014 for less than 25 milliseconds.

The TDT carries the current UTC time and date information. In addition to the TDT, a TOT can be transmitted which gives information about a local time offset in a given area.

CONDITIONAL ACCESS ALARMS (CA)

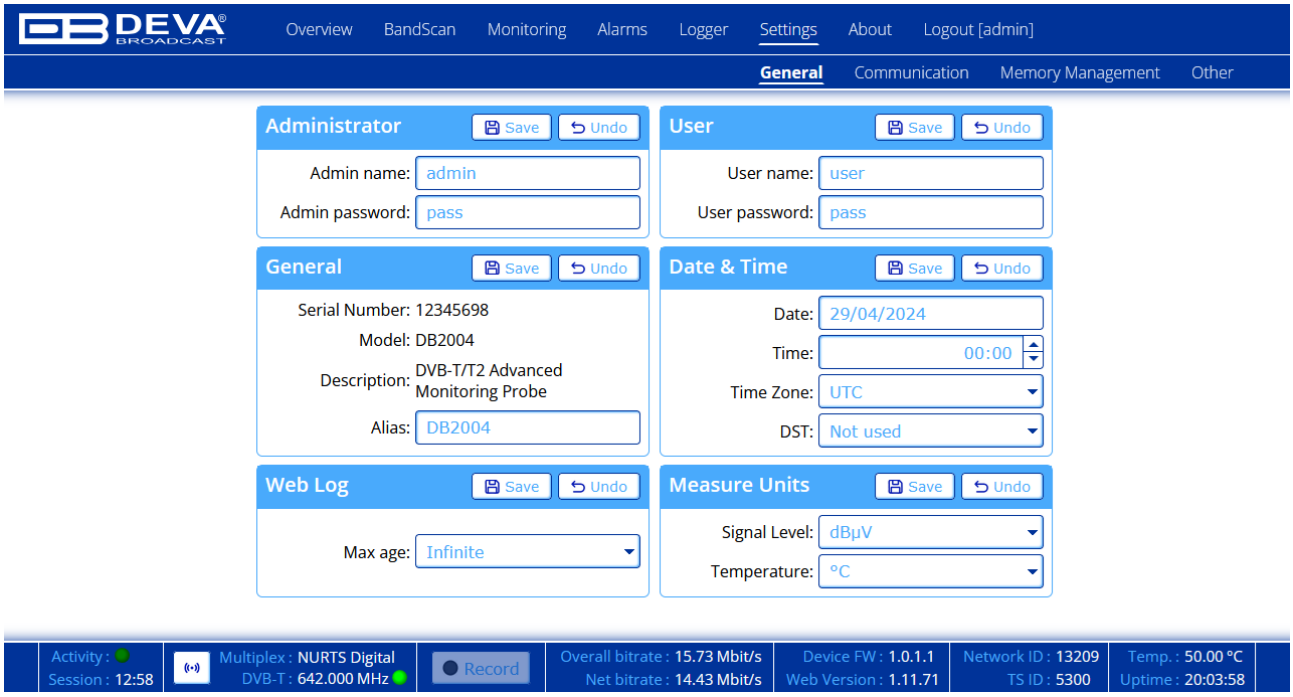
Under the DVB standard, conditional access system (CAS) standards are defined in the specification documents for DVB-CA (conditional access), DVB-CSA (the common scrambling algorithm) and DVB-CI (the Common Interface). These standards define a method by which one can obfuscate a digital-television stream, with access provided only to those with valid decryption smart-cards. This is achieved by a combination of scrambling and encryption. The data stream is scrambled with a 48-bit secret key, called the control word. Knowing the value of the control word at a given moment is of relatively little value, as under normal conditions, content providers will change the control word several times per minute. The control word is generated automatically in such a way that successive values are not usually predictable.

In order for the receiver to unscramble the data stream, it must be permanently informed about the current value of the control word. In practice, it must be informed slightly in advance, so that no viewing interruption occurs. Encryption is used to protect the control word during transmission to the receiver: the control word is encrypted as an entitlement control message (ECM). The CA subsystem in the receiver will decrypt the control word only when authorized to do so; that authority is sent to the receiver in the form of an entitlement management message (EMM). The control word can be transmitted through different ECMs at once. This allows the use of several conditional access systems at the same time.

The contents of ECMs and EMMs are not standardized and as such they depend on the conditional access system being used.

Settings

GENERAL



DB2004 provides you with protected access to the device settings. You can choose between two types of log in.

- **Administrator** – It will give you full control over the settings of the device;
- **User** – that will allow you to just monitor the device and to choose different stations, while the Settings bar remains locked.

In order for the security of DB2004 to be enhanced, a new username and password could be set for both – the **Administrator** and **User**.

General – information as regards the serial number and model can be found here. **Alias** allow the name of the device to be changed. Later on, it will be used as a title name on all WEB pages. Customizing the name will make the device more recognizable.

Date & Time – used to manually set the current Date and Time.

WEB Log – the maximum storage time of the System Log file is chosen from here. If the file is older than the specified maximum will be deleted.

Measure Units – set the preferred Signal Level and Temperature measurement units.

NOTE: In order for the applied settings to be used press the [Save] button in the designated section.

COMMUNICATION



Ethernet

The network addresses could be set manually (static IP) or automatically via a DHCP server. To set static IP, MASK, GATEWAY and DNS addresses, the DHCP should be disabled. In order for the built-in DHCP client to be activated, the function should be enabled. When the DHCP client is activated, all assigned values will be shown in the relevant fields on the “Status Screen”. If due to any reason, the DHCP procedure cannot be completed, DB2004 will use AutoIP and will generate an IP Address.

HTTP Server

Enable/Disable the HTTP Server. Specify the Server Port and session timeout.

E-mail

Enter the desired alarm recipients in e-mail 1 and/or e-mail 2 fields. Fill in your e-mail account settings: Sender, Username and Password, Server, SNMP port and connection type. It is mandatory the type of connection with the server to be specified from Connection - Regular, Encrypted. The Server port will be changed accordingly. Please note that the most commonly used port will be entered in the field. If the port that is to be used is different, change it manually to the correct value.

If you experience difficulties in the set-up, or would like to use DEVA account for sending of alarm email notifications, press the [DEVA] button option, and complete the recipient emails (E-mail 1 and E-mail 2) only. The other fields must be left blank, otherwise the email notification option will not be working. Even though using the DEVA account eases the set-up process, we recommend user account to be used for sending of email notifications, and the DEVA account for test purposes. When using DEVA account, please note that the stable 24/7 connection depends on the mail service provider and cannot be guaranteed.

We recommend you to use the [Test] button and generate a test e-mail, which upon success will be delivered to the specified E-mail 1 and/or E-mail 2.

Example of Test E-mail Message:

```
DB2004 Test Message.
Please do not reply to this e-mail.
```

SNTP Internet Time

Automatically synchronizes the DB2004 clock to a millisecond with the Internet Time Server. Enable this function in order to use it. (Specifying the server closest to your location will improve the accuracy).

FTP Server

Enable/Disable the FTP Server. Specify the Command and Data Ports to be used.

SNMP Agent

Specify Agent ID, Agent Port, Read/Write Communities, Manager IP, Manager Port and session timeout.

Agent – enables/disables SNMP Agent.

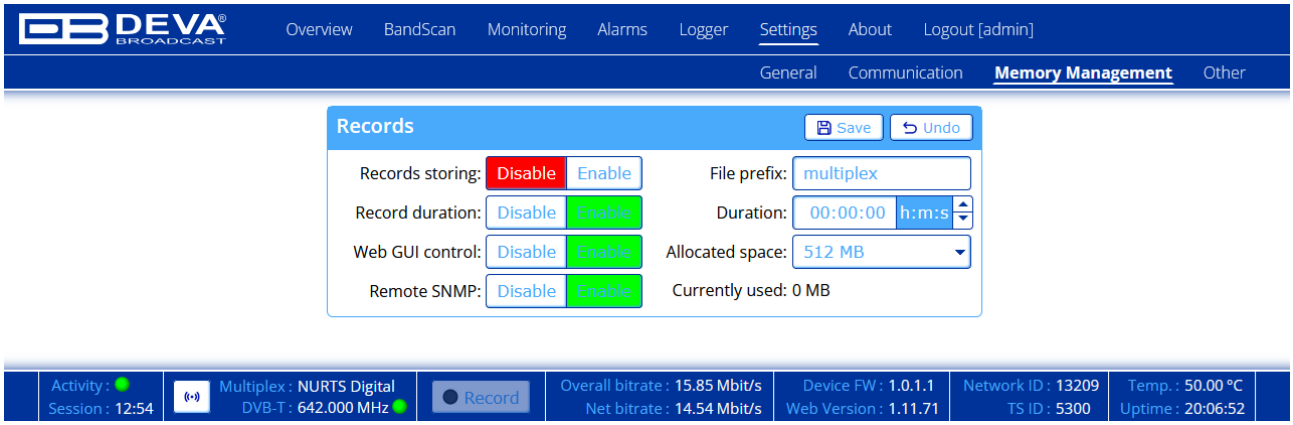
Agent ID is used for identification of the device among others, when an SNMP notification is being sent.

Once all needed settings are applied, use the [Test] button to generate a test notification, which upon success will be received by the SNMP Manager.

Press the [Download] button to download the latest available DB2004 SNMP MIB file.

NOTE: The MIB file may vary from one firmware revision to another. Downloading this file from the device, guarantees that you have the proper MIB file.

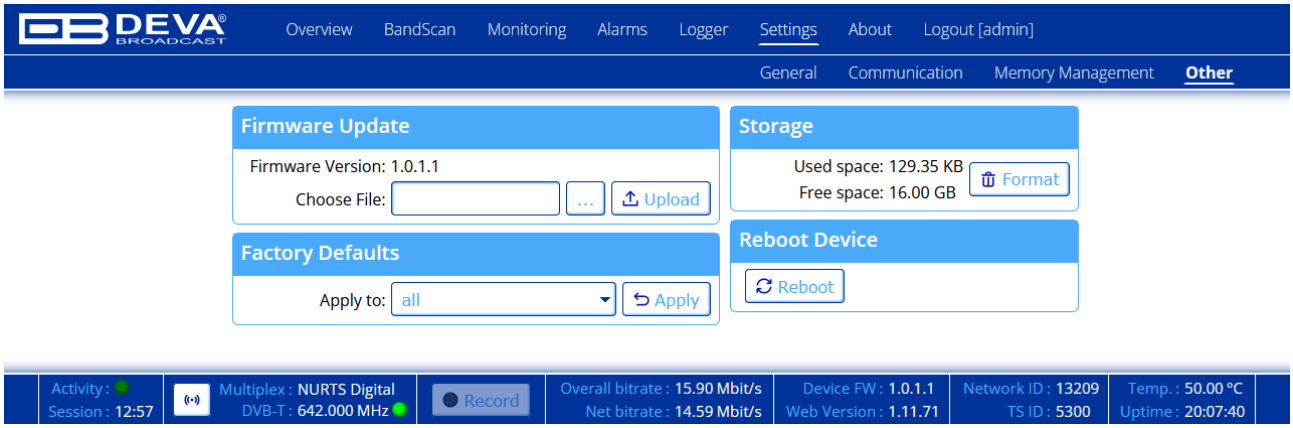
MEMORY MANAGEMENT



This page of the WEB interface provides quick access and set-up to the supported Memory Management functionalities needed for the TS recording option.

In order for a recording to be started, the Records Storing option must be enabled. This page also allows preferred duration time and allocated space to be set. Once the time mark or allocated space elapses, the recording will be automatically stopped. It also allows user-defined prefix to be set.

OTHER



Firmware Update

To update the device firmware, select the new firmware file by pressing the [...] button. Press the [Upload] button and wait for the process to complete.

Storage

Information about the device storage space is found in this section. The entire internal storage could be deleted by pressing the [Format] button.

Factory Defaults

To restore DB2004 to its Factory Defaults you should first select the desired option and then press the relevant button. A new window will appear – confirm that you want to restore the factory defaults and wait for the process to be completed. On completion of the process, the settings should have the proper default values.

Reboot Device

To start Rebooting of DB2004, press the [Reboot] button. A dialog warning window will appear. Confirm that you want to reboot the device and wait for the process to be completed.

65 Aleksandar Stamboliyski Str., 8000 Bourgas, Bulgaria
Tel: +359 56 820027, Fax: +359 56 836700
E-mail: office@devabroadcast.com ,Web: www.devabroadcast.com

About



This section of the WEB interface provides information on the device's basic information - serial number, firmware version and etc.

The interactive buttons allow you to:

[See official product page] Will open the official product WEB page.

[Identify] Will help you identify the DB2004 Advanced Monitoring Probe – the LED on the front panel will start blinking for 10 seconds.

[Reboot] Will reboot the device. A dialog warning window will appear. Confirm that you want to reboot the device and wait for the process to be completed.

[MIB] Use icon to download a zip file with the MIB file(s).

[Resources] will open the downloads section of DEVA's website and allow you fast access to all the user manuals.

APPENDIX B

HOW SHOULD I CONFIGURE THE CONNECTION BETWEEN MY DEVA DEVICE AND AN FTP CLIENT?

In order for a connection to be established the following setting should be applied:

1. FTP Server Settings

The built-in FTP Server has four important parameters that should be configured: Command Port, Data Port, User name and Password. These parameters are to be used in the FTP client's connection configuration. Further information on how to change the FTP Server's settings and their respective default values can be found in the device's User manual.

WE RECOMMEND the usage of FileZilla (https://filezilla-project.org). This is a widespread open source software distributed free of charge, hence available for downloading from the Internet.

NOTE: The FTP Server can manage only one connection at a time. The FTP Server works in Passive mode. Hence, the FTP Client should also be set in passive mode.

2. IP Router and Port Translation Settings

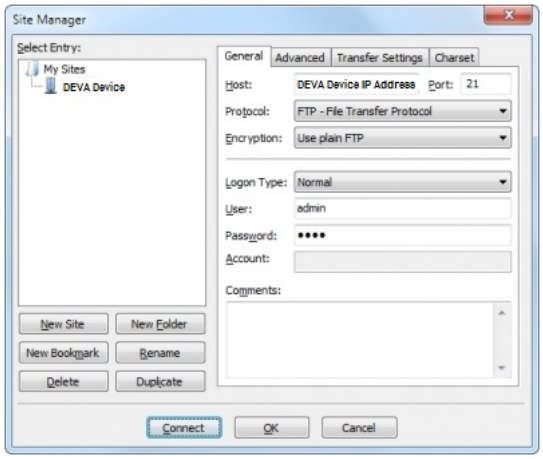
If the connection to the device is made through a Network address translation (NAT) router or firewall, the port forwarding feature of the router should be configured. The port forwarding is usually set in the firewall section of the router's menu. As each router has different port forwarding procedure, we recommend you to refer to its complete manual. To allow proper data flow through the router, the FTP Command and FTP Data ports should be open.

NOTE: The FTP port numbers to be used in the port forwarding feature configuration can be found in the device.

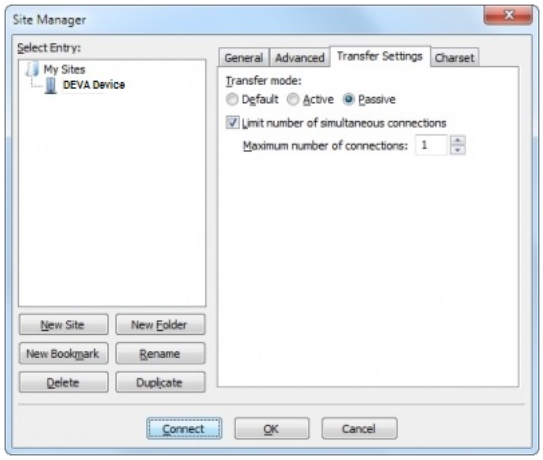
3. Example of FTP Client (FileZilla) Settings

In some cases, FileZilla's "Quick connect" feature is not able to connect with the DEVA unit. That is why we recommend the device to be assigned in the program manually.

Enter the FTP Client and go to: ***File > Site manager > New Site***. A dialog box requiring obligatory information about the device will appear. Fill in the needed information and press "OK".



Select "Transfer Settings" sub-menu and apply the settings as shown below:



APPENDIX C

BATTERY REPLACEMENT PROCEDURE

IMPORTANT: Before starting the procedure, power off and disconnect the device. Perform the battery replacement on a static-resistant work surface and follow all applicable safety precautions.

REPLACEMENT

1. Using a suitable screwdriver, remove the bolts securing the top cover to the chassis.
2. Handle the motherboard with care and avoid applying excessive force.
3. Locate the RTC battery socket on the motherboard.
4. Remove the depleted battery from the socket.
5. Insert a new **3V Lithium CR2032** battery into the battery socket. Ensure that the battery is correctly oriented and securely seated in the socket.

REASSEMBLY

1. Align the top cover with the chassis.
2. Using a suitable screwdriver, tighten the bolts securely. Do not overtighten.
3. Power on the device and verify that the time and date are displayed correctly.

VERIFICATION

If the time and date are retained correctly after the device is powered off and restarted, the RTC battery replacement has been completed successfully.

65 Aleksandar Stamboliyski Str., 8000 Bourgas, Bulgaria
Tel: +359 56 820027, Fax: +359 56 836700
E-mail: office@devabroadcast.com ,Web: www.devabroadcast.com

WARRANTY TERMS AND CONDITIONS

I. TERMS OF SALE: DEVA Broadcast Ltd. products are sold with an understanding of "full satisfaction"; that is, full credit or refund will be issued for products sold as new if returned to the point of purchase within 30 days following their receipt, provided that they are returned complete and in an "as received" condition.

II. CONDITIONS OF WARRANTY: The following terms apply unless amended in writing by DEVA Broadcast Ltd.

A. The Warranty Registration Card must be completed and returned to DEVA Broadcast Ltd. within 10 days of delivery. Product registration can also be done digitally at https://www.devabroadcast.com/members/product-registration, after registering on our website, within 10 days of delivery.

B. This Warranty applies only to products sold "as new." It is extended only to the original end-user and may not be transferred or assigned without prior written approval by DEVA Broadcast Ltd.

C. This Warranty does not apply to damage caused by improper mains settings and/or power supply.

D. This Warranty does not apply to damage caused by misuse, abuse, accident or neglect. This Warranty is voided by unauthorized attempts at repair or modification, or if the serial identification label has been removed or altered.

III. TERMS OF WARRANTY: DEVA Broadcast Ltd. products are warranted to be free from defects in materials and workmanship.

A. Any discrepancies noted within TWO YEARS of the date of purchase will be repaired free of charge, or the equipment will be replaced with a new or remanufactured product at DEVA Broadcast Ltd. option.

B. Parts and labor for factory repair required after the two-year Warranty period will be billed at prevailing prices and rates.

IV. RETURNING GOODS FOR FACTORY REPAIR:

A. Equipment will not be accepted for Warranty or other repair without a Return Material Authorization (RMA) number issued by DEVA Broadcast Ltd. prior to its return. An RMA number may be obtained by placing an RMA request at https://www.devabroadcast.com/rma. The number should be prominently marked on the outside of the shipping carton.

B. Equipment must be shipped prepaid to DEVA Broadcast Ltd. Damage sustained as a result of improper packing for return to the factory is not covered under terms of the Warranty and may occasion additional charges.

V. UPDATES TO THE TERMS OF SERVICE:

For the most up-to-date, valid, and accurate terms, conditions, and product documentation, please visit the official DEVA Broadcast Ltd. website downloads section at https://www.devabroadcast.com/downloads/deva-documents. Printed documents may not reflect recent amendments. Reviewing the current online versions ensures you have the latest information.

65 Aleksandar Stamboliyski Str., 8000 Bourgas, Bulgaria
Tel: +359 56 820027, Fax: +359 56 836700
E-mail: office@devabroadcast.com ,Web: www.devabroadcast.com

PRODUCT REGISTRATION CARD

• All fields are required, or warranty registration is invalid and void

Your Company Name_____

Contact_____

Address Line 1_____

Address Line 2_____

City_____

State/Province_____ ZIP/Postal Code_____

Country_____

E-mail_____ Phone_____ Fax_____

Which DEVA Broadcast Ltd. product did you purchase?_____

_____

_____

Product Serial #_____

Purchase date_____/_____/_____ Installation date_____/_____/_____

_____
Your signature*

*Signing this warranty registration form you are stating that all the information provided to DEVA Broadcast Ltd. are truth and correct. DEVA Broadcast Ltd. declines any responsibility for the provided information that could result in an immediate loss of warranty for the above specified product(s).

Privacy statement: DEVA Broadcast Ltd. will not share the personal information you provide on this card with any other parties.