MAINTENANCE AND OPERATION
INSTRUCTION MANUAL

DB7002

Professional FM/DAB/DAB+
Monitoring Receiver

DEVA® BROADCAST

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Contents

Introduction **6**
Typographic conventions **7**
General Information **8**
Product Features **9**
Technical Specifications *10*
Block Diagram *12*
Safety Warning **13**
Panel Indicators, Switches and Connectors **14**
Indicators *14*
OLED Display *14*
LED Meters *14*
Context-sensitive soft buttons *14*
Navigational buttons *14*
Rear Panel *15*
Rear Panel Alarm Terminal *16*
Operating Recommendations **17**
RF Environment – precautions, installation specifications and antenna types *18*
AC Mains Power **19**
Fuse holder *19*
Mains Voltage Selector *19*
Power cord *19*
Ground Loops *19*
Getting Started **20**
Connection *20*
Network Settings *21*
Network Discovery *21*
Network Security Recommendations *22*
Front Panel OLED Display, Navigational & Soft Buttons **23**
How to change device parameters *23*
Set-up menu title *23*
Navigation area *23*
Numerical parameter *24*
Enumerated parameter *24*
IP address *24*
IP port *24*
Date *24*
Time *24*
Timer *25*
String *25*
DAB Home Screen *27*
Soft Buttons *27*
FM Home Screen *28*
Soft Buttons *28*
Main Screen working area *29*
Soft Buttons *29*

Navigation Buttons 29
Menu Pages 30
BandScan FM 30
Span control state: 32
Marker control state: 34
Parameter control state: 35
Bandscan page parameters 35
BandScan DAB 36
Span control state: 38
Marker control state: 40
Parameter control state: 41
Bandscan page parameters 41
Levels 42
FM Levels 42
DAB Levels 44
RDS/RBDS Decoder 45
Settings 47
Status 48
Security 49
Keyboard lock 49
Keyboard unlock 49
How to start a Logger campaign using the front panel menu? 49
WEB Interface **50**
Manual IP Address Identification 50
Network Discovery 51
Access 51
WEB Interface Structure **52**
Device control interface 52
FM Dashboard 53
DAB/DAB+ Dashboard 54
WEB Interface FM Section **55**
Main 55
Loudness 56
RDS 57
Basic RDS 57
Band Scan 59
Status 60
WEB Interface DAB/DAB+ Section **61**
Main 61
Loudness 62
Ensemble 63
Ensemble 63
CU Usage 63
Services 63
Service 64
BandScan 65

Status *66*
Web Interface Common Pages **67**
Log *67*
General Settings *68*
FM Tuner Settings *70*
DAB Tuner Settings *71*
FM Logger *72*
FM Channels settings (Channels 1 to 24) *73*
Channel *73*
Alarm *73*
DAB Logger *75*
DAB Logger Service Settings (Service 1) *76*
Service *77*
Alarm *77*
Communication Settings *78*
Network *78*
HTTP Server *78*
FTP Server *78*
Audio Stream Server *78*
SNMP Agent *79*
E-mail *79*
Outputs Settings *80*
Other Settings *81*
Firmware Update *81*
Storage *81*
System Log *81*
Factory Defaults *81*
Reboot Device *81*
APPENDIX A **82**
RDS: Europe vs America *82*
The RDS System *82*
APPENDIX B.1 ..... **83**
PTY Code Description Used in RBDS Mode – North America *83*
APPENDIX B.2 ..... **84**
PTY Code Description Used in RDS Mode – Europe, Asia *84*
APPENDIX C **85**
Alarm Triggers *85*
Alarm Notifications *87*
APPENDIX D **88**
How should I configure the connection between my DEVA Device and an FTP Client? *88*
1. FTP Server Settings *88*
2. IP Router and Port Translation Settings *88*
3. Example of FTP Client (FileZilla) Settings *89*
WARRANTY TERMS AND CONDITIONS **90**
Product Registration Card **91**

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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

DB7002 is a revolutionary solution that combines in a single, high-precision tool the most important functionalities of two separate types of product. To achieve that, our engineers have equipped this model with two independent tuners - one for FM and one for DAB/DAB+, allowing for the device to perform both FM and DAB/DAB+ monitoring in parallel. It provides detailed and accurate measurement of all of the most important signal parameters and also boasts two loggers with 24 channels apiece for FM and DAB/DAB+. The recorded information is stored in log files on an SD card for easy future analysis and can easily be downloaded via a standard FTP client.

As a product that incorporates DAB/DAB+ monitoring capabilities, DB7002 fully meets the ETSI EN 300 401 DAB standard and offers support for Program Associated Data (PAD), as well as all standard bitrates and VBR, and automatically displays live metadata.

As an FM monitoring tool, DB7002 also provides powerful signal processing capabilities through sophisticated DSP algorithms and offers a Loudness Meter, which allows for measurements to be shown as defined by ITU BS.1770-4 and EBU R128 recommendations.

To make sure the transmission is not interrupted, there are local alarm options and online notifications via rear-panel alarm GPOs, E-mail and SNMP in case there is audio loss or a change in the signal.

DB7002 can also be managed without effort. It is easy to program via the front-panel menu or remotely through your PC, tablet or smart phone via a standard web browser; iOS and Android devices are also supported. The high-resolution OLED graphical display and the ultra-bright LED bar graph indicators allow for easy reading of the main signal parameters. A user-friendly front panel menu in addition to the set of four soft buttons provides easy navigation and quick access to each function.

DB7002 is definitely a must-have. Its two independent tuners set it apart from any other product, while its effectiveness and precision make it the perfect monitoring tool.

Product Features

- FM Band 87.1 - 108 MHz Basic Spectrum Analyzer
- Up to 100 dBµV direct RF Antenna Input
- Selectable wide range IF filter bandwidth
- Fully DSP-based core
- Built-in Loudness Analyzer
- Bright bar graph LED metering of the RF and Audio Levels
- Wide angle, easy to read OLED display
- Very Intuitive Navigational Menu
- Levels measurement with data history
- Selectable De-emphasis
- Built-in Stereo Decoder
- RDS and RBDS decoder with BER meter
- Built-in 24 channel FM Data logger
- Real Time Audio Program Streaming
- DAB/DAB+ compliant receiver
- Support for Program Associated Data (PAD)
- Detailed DAB component information
- High-end digital tuner
- Built-in 24 channel DAB/DAB+ Data logger
- Protected access to the device settings
- Wide operating voltage range: 100-240V AC
- Headphone output with front panel level control
- SNTP for automatic synchronization of the built-in clock
- Level Adjustable, Balanced Analog Audio Outputs on XLR Connectors
- Professional AES/EBU Digital audio output
- LAN port for full TCP/IP remote control and monitoring
- Adjustable MIN/MAX alarms for RF, Left & Right Audio Levels
- Alarm dispatch via E-mail, SNMP ver.2C and GPO
- Built-in WEB and FTP server
- Easy to use WEB interface
- Apple and Android devices support
- Firmware updates will ensure improved operation
- Accurate front-panel metering for local use
- Restore Factory Parameters option
- Easy Installation and Setup

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

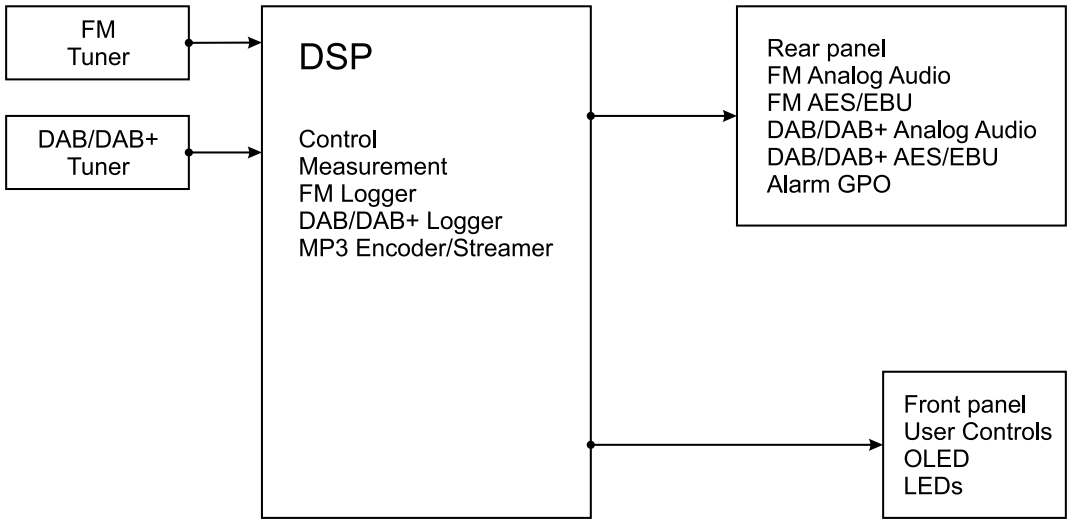
TECHNICAL SPECIFICATIONS

DAB/DAB+ RADIO INPUT	
RF frequency range	168 - 240 MHz
DAB/DAB+	Band III Channels 5A - 13F
Sensitivity	18 dBµV
Input connector	BNC 50Ω
In compliance with	ETSI EN 300 401
Ensemble acquisition Time	940 ms
L&R Audio	1%, +5.0 to -50.0 dB, 0.1 dB resolution
DAB/DAB+ RADIO METERING	
Quality indicators	RSSI, SNR, CNR, FIC Quality, FIB Errors, FFT Offset
PAD	DLS, MOT
Metadata Displayed	Ensemble Label, Component List & ID, Service List & ID, Dynamic Label, PTY, Sample Rate, Bit Rate, Gain, Mode, Service Mode, Protection Info, Current CU & Address, Country, Language, Time & Date
FM RADIO INPUT	
Tuning Range	87.1-108 MHz (CCIR)
Tuning Step	10, 20, 50, 100 kHz
Tuner Sensitivity	30 dBµV
Antenna Ports	BNC Connector, 50Ω
Antenna Ports Isolation	> 40 dB
Dynamic range	100 dB
FM DEMOD	
IF Filter Bandwindth	15 Increments (27kHz - 157kHz, Auto)
Dynamic range	90 dB
STEREO DECODER	
Frequency Response (L and R)	±0.1 dB, 10 Hz to 15 kHz
SNR (Stereo)	60 dB, 50 µs de-emphasis
THD	0.15% @ 1kHz, 0.4% from 10 Hz to 15 kHz, 50 µs de-emphasis
Separation	50 dB, 50 Hz to 10 kHz, 50 µs de-emphasis
Crosstalk	52 dB
RDS DECODER	
Standards	European RDS CENELEC; United States RBDS NRSC
Error Correction & Counting	Yes
AF Decoding	Yes
CT (Time/Date)	Yes
PI, PTY, DI, MS	Yes
TA/TP	Yes
PS (Program Service name)	Yes
Group Analyzer	Yes
BER Analyzer	Yes
Group Sequence Display	Yes

FM RADIO METERING	
RF Level	±1 dB, 0 to 100 dBµV
Audio	±1 dB, +10.0 to -55.0 dB, 0.1 dB resolution
OUTPUTS	
FM Audio (L, R)	+6 dBm, 600Ω, balanced XLR Connector
DAB/DAB+ Audio (L, R)	+12 dBm, 600Ω, balanced XLR Connector
AES3 (L, R)	5.0 Vp-p, 110Ω, balanced XLR Connector
Alarms	7 Programmable terminals on rear panel, optoisolated
Headphone	6,3mm (1/4”) Phone Jack
COMMUNICATION INTERFACES	
Ethernet 10/100 Base-T	RJ45 Connector
MEASUREMENT STORAGE	
Storage	16GB Build-in Memory Card
Data format	Text, CSV
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
HS Code	8527212000

BLOCK DIAGRAM

A simplified block diagram of DB7002 is shown below



Because of the all-digital, minimalist-discrete-component nature of device circuitry, we have not provided schematic diagrams of the DB7002 in this Manual. Please, note that:

**NO USER-SERVICEABLE COMPONENTS INSIDE.
REFER ALL SERVICING TO
QUALIFIED TECHNICAL PERSONNEL.**

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. Do not try to re-charge this battery! In case the battery needs to be changed, please contact us for detailed instructions and information of the battery type.

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

Panel Indicators, Switches and Connectors

INDICATORS

POWER – indicates that the device is powered up and working.

RF LOSS – will be indicated whenever the level of the RF signal of the Main Station drops below the selected threshold.

AUDIO LOSS – will be indicated whenever the level of the Left and Right audio channels drops below the selected threshold.

ALARM – will be lit if an alarm event is detected.

OLED DISPLAY

DB7002 has easy to read, high-resolution OLED graphical display that visualizes all measurements of the received signal and DB7002's settings.

LED METERS

The full-time LED meters allow quick and easy monitoring of the metering, making the setup, adjustment and programming easy.

CONTEXT-SENSITIVE SOFT BUTTONS

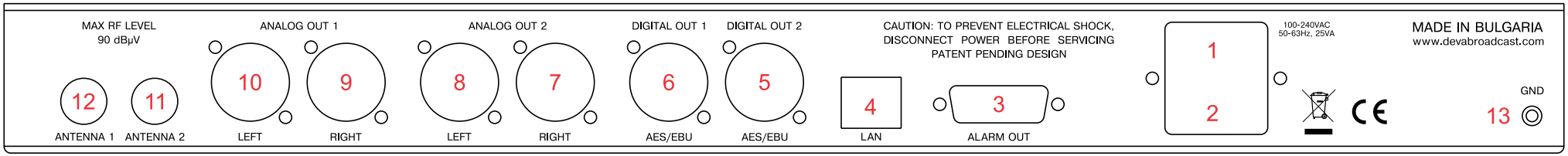
Used for navigation through the menus, quick access to the parameters, modes, functions and to alter their values. The soft buttons indicators are placed on the bottom side of the OLED display. Depending on the currently selected menu context the indicators change their function. The soft buttons will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

NAVIGATIONAL BUTTONS

[UP], [DOWN], [LEFT], [RIGHT] and [OK] buttons, are used to navigate through the menus selecting various functions and parameters of DB7002.

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;
3. GPO – Opto-isolated, Female D-Sub 15 pins.
4. Ethernet T-BASE10/100 RJ45;
5. Audio AES/EBU Output 2 - XLR;
6. Audio AES/EBU Output 1 - XLR;
7. Audio Right Output 2 - XLR;
8. Audio Left Output 2 - XLR;
9. Audio Right Output 1 - XLR;
10. Audio Left Output 1 - XLR;
11. RF Input (Antenna 2) - BNC;
12. RF Input (Antenna 1) - BNC;
13. GND Pin - Chassis Earth Ground;

65 Aleksandar Stamboliyski Str., 8000 Bourgas, Bulgaria
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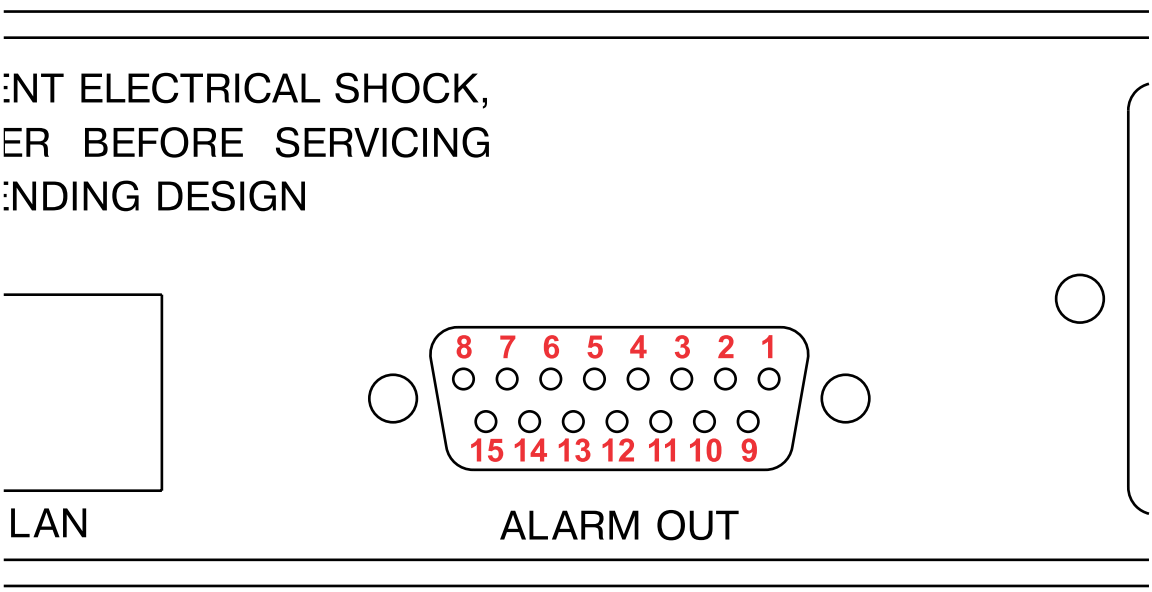
E-mail: office@devabroadcast.com ,Web: www.devabroadcast.com

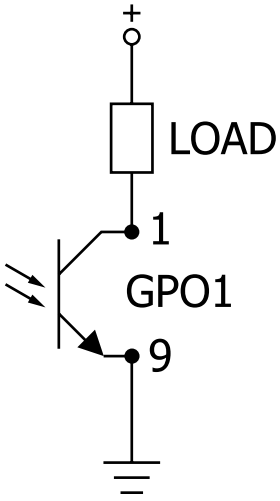
REAR PANEL ALARM TERMINAL

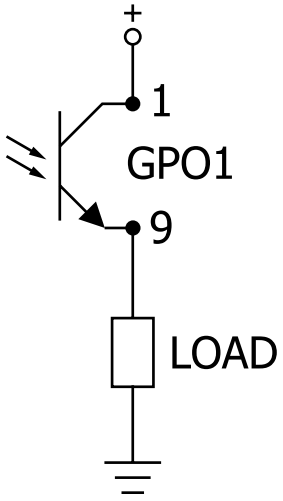


1 - GPO1 Collector
2 - GPO2 Collector
3 - GPO3 Collector
4 - GPO4 Collector
5 - GPO5 Collector
6 - GPO6 Collector
7 - GPO7 Collector

9 - GPO1 Emitter
10 - GPO2 Emitter
11 - GPO3 Emitter
12 - GPO4 Emitter
13 - GPO5 Emitter
14 - GPO6 Emitter
15 - GPO7 Emitter

8 - GND





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.

RF ENVIRONMENT – PRECAUTIONS, INSTALLATION SPECIFICATIONS AND ANTENNA TYPES

The observation of the RF Environment, in which DB7002 is functioning, is necessary for ensuring normal and reliable function of the device. In order for the device to work properly, the best conditions according the standards listed below should be provided.

The usage of an external antenna is required because DB7002 is used for off air re-broadcasting away from the transmitter site. Proper outdoor FM antenna, antenna location and direction should be selected. The three most popular antenna types are: omni directional, unidirectional dipole and directional multi-element array antenna.

Because of the low antenna gain, the bad signal to noise ratio (compared to any directional antenna) and its high multipath interfaces reception, we do not recommend the usage of omni directional antenna with DB7002.

The other type antennas: unidirectional dipole and directional multi-element array antenna are much proper for your needs. We recommend the usage of factory made antenna or antenna system, manufactured specially for the FM Radio Band 88 – 108 MHz.

The recommended working RF signal strength is in the range of 55-90 dBµV. If the input RF level is above this range, we recommend using external RF attenuators with attenuation value between 20 – 90dB.

After selecting the antenna type that will meet your needs, the next step is its installation. The following important principles should be considered:

- Install the antenna far enough from walls, roofs, buildings or any transmitting equipment;
- The minimum spacing between the antenna and the closest object should be more than 3 meters.

One unit DB7002 re-broadcast receiver is used for re-broadcasting of one transmitter site, transmitting more than one program. In such cases, the best antenna that can be used is a directional antenna directed exactly to this site.

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 DB7002 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 DB7002 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 DB7002 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 DB7002 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.

Front Panel OLED Display, Navigational & Soft Buttons

DB7002 has an easy to read, high-resolution OLED graphical display that visualizes all measurements of the received signal and settings. Upon switching it on, the Company Logo and model of the device will be displayed. After a few seconds the start-up screen will disappear, replaced by the main screen. This is the starting point of the navigation process.

DB7002's OLED display has three function areas: header, soft buttons and main screen working area.

HOW TO CHANGE DEVICE PARAMETERS

Set-up menu title

Shows the path to the currently selected menu. Note that the parameter should be included in the settings menu title. For example: ***Setup> Communication> HTTP> Port*** is different from ***Setup> Communication> FTP> Data Port***.

Navigation area

Selection of branches / parameters is made in this area. The selected item is highlighted. All parameters are listed on the left side of the navigational area. All parameter values are displayed on the right side against the parameter name. As the branches have no values associated, tree dots are shown instead. This indicates that a transition to a sub-menu is available.

Front panel buttons usage:

[OK] – Depending on the selected menu element can perform different actions:

- Menu branch – transition to selected sub-menu will be made;
- Menu parameter – when a name of a parameter is highlighted pressing [OK] will highlight the value and switch to edit mode;
- Menu complex parameter (such as ***Alarm***) – the parameter editor screen will be shown.

[UP] / [DOWN] – If edit mode is active, the value of the selected parameter will be changed. Otherwise, are used for navigation through the menu;

[LEFT] / [RIGHT] – Change the selection when the parameter value is in edit mode;

[SB4] – Return one level up or cancel edit mode.

There are several parameter types available in DB7002. The way of editing depends of the parameter type. Every parameter type has its own editing rules.

Numerical parameter

Represents numerical value.

Example: The value ***Frequency*** can be changed in the range of **87.10 MHz** to **108.10 MHz** and ***Frequency Step*** of **10 kHz**, **20 kHz**, **50 kHz** or **100 kHz**.

Front panel buttons usage:

[UP] / [DOWN] – Change the value of the parameter with one step. The step value may vary depending on the selected parameter. The value always stays in permitted parameter range;

[OK] – Accept the changed value and exit edit mode;

[SB4] – will discard the value and cancel edit mode.

Enumerated parameter

Represent the selection of a value among set of predefined enumerated values.

Example: The value ***Attenuator*** can be selected from **Auto**, **OFF**, **-10dB**, **-20dB** and **-30dB**.

Front panel buttons usage:

[UP] / [DOWN] – Cycle through the possible values;

[OK] – Accept the changed value and exit edit mode;

[SB4] – will discard the value and cancel edit mode.

IP address

Represents an IPv4 address.

Example:

Front panel buttons usage:

[LEFT] / [RIGHT] – Select edit marker position;

[UP] / [DOWN] – Cycle through the possible values;

[OK] – Accept the changed value and exit edit mode;

[SB4] – Discards all changes and cancels edit mode.

IP port

Represents TCP or UDP port.

Example:

Front panel buttons usage: Refer to IP address.

Date

Represent date from the calendar.

Example:

Front panel buttons usage:

[LEFT] / [RIGHT] – Selects previous/next segment from the date;

[UP] / [DOWN] – Cycle through the possible values;

[OK] – Accept the changed value and exit edit mode;

[SB4] – Discards all changes and cancels edit mode.

Time

Represent time information.

Example:

Front panel buttons usage: Refer to Date.

Timer

Represents relative time interval.

Example: Screen Saver 2 min

Front panel buttons usage:

[UP] / [DOWN] – Increments/decrements value with one step. The unit value will be changed automatically from seconds to minutes and vice-versa;

[OK] – Accept the changed value and exit edit mode;

[SB4] – Discards all changes and cancels edit mode.

String

Represents string.

Example: User Name user

Front panel buttons usage:

[LEFT] / [RIGHT] – Select edit marker position. If [RIGHT] button is pressed when the marker is at the last character, a space character will be added at the end of the string. When the [LEFT] button is pressed all trailing spaces will be removed;

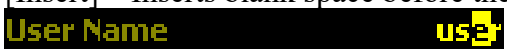
[UP] / [DOWN] – Cycle through the possible values. Depending on the string context there is a limitation in the permitted char set. For example phone number string can contain only `1234567890+` and blank space characters;

[OK] – Accept the changed value and exit edit mode. Some strings, like e-mail addresses, must pass a validation check. If the validation fails, message box will appear. Press [OK] to dismiss the message. Note that edit mode will not be left. For example:

If [OK] is pressed

If [OK] is pressed

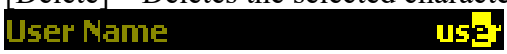
[Insert] – Inserts blank space before the selected character:



– before

– after

[Delete] – Deletes the selected character:



– before

– after

[Cancel] – Discards all changes and cancels edit mode.

DAB HOME SCREEN

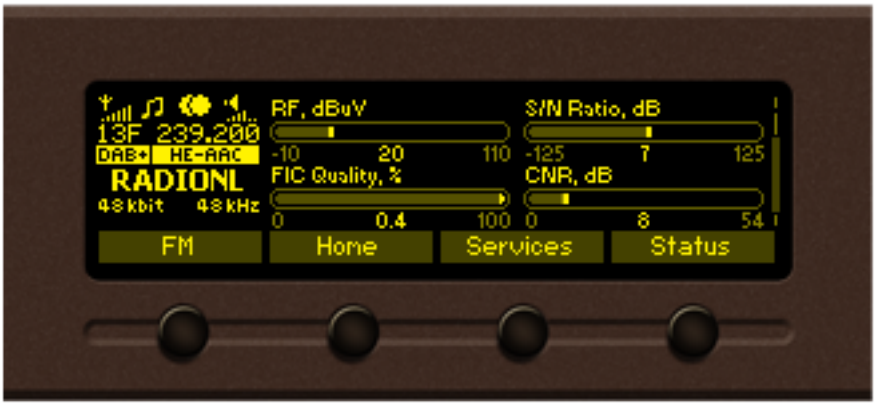
The DAB home screen contains all the needed information as regards the currently selected station. The header is located on the left part of the screen. The header content is determined according to the work area context and may include the functions described below.

1. Parameter FIC quality (0 to 100%)
2. Audio transmit mode
3. Channel mode – Mono, Stereo, Dual channels. The graphic indicator will change depending on the channel mode.
4. Speakers volume indicator (0 to 100%)
5. Channel number
6. Channel frequency (in MHz)
7. Indicates whether the device is in DAB or DAB+ mode
8. Indicates the audio codec in use
9. Service name
10. Bit Rate and Sample Rate
11. Ensemble name
12. Date and Time – transmitted by DAB/DAB+
13. Indicates whether there is multimedia object transport (MOT) at the current service
14. Genre
15. DLS

Soft Buttons

[SB1] – ***FM*** – Switches to the FM Home Screen;

[SB2] – ***Levels*** – Displays all the mandatory parameters of the current DAB Station. Use [UP] and [DOWN] arrow buttons to scroll through available parameters.



[SB3] – ***Services*** – Displays a list containing all services available in the current Ensemble;

[SB4] – ***Status*** – Displays Device Status Screen (see “Status” on page 48)

FM HOME SCREEN

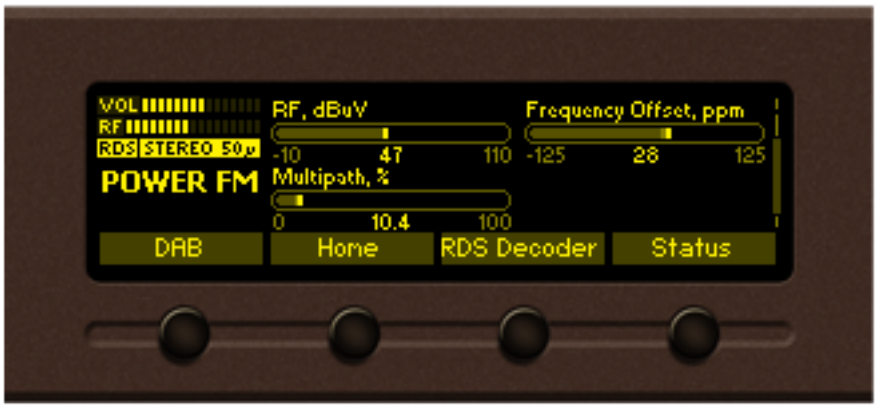
The FM home screen contains all the needed information as regards the current Station. The header is located on the left part of the screen. The header content is determined according to the work area context and may include the functions described below.

1. Frequency Indicator, showing the currently selected frequency, in MHz;
2. Indicator showing the phones audio volume;
3. Indicator showing the signal level at selected antenna input;
4. Indicator for RDS presence of information contained in the received signal;
5. Indicator for Stereophonic Information-contains information about the received signal and currently selected de-emphasis time constant;
6. Decoded PS information from RDS signal;
7. Decoded RT (RadioText) information from RDS signal;
8. Decoded PI/CALL information from RDS signal;
9. Decoded PTY information from RDS signal;
10. Decoded TP information from RDS signal;
11. Decoded TA information from RDS signal;

Soft Buttons

[SB1] – ***DAB*** – Switches to the DAB Home Screen;

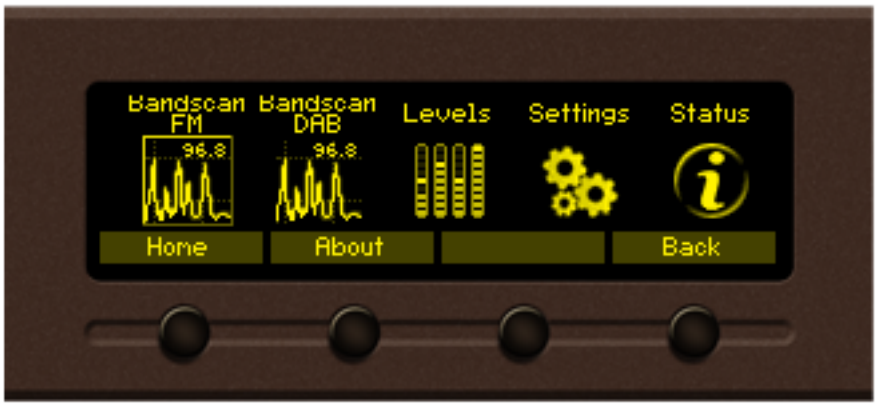
[SB2] – ***Levels*** – Displays all the mandatory parameters of the current FM Station. Use [UP] and [DOWN] arrow buttons to scroll through available parameters.



[SB3] – ***RDS Decoder*** – Displays RDS Decoder information of the current FM Station (see "RDS/RBDS Decoder" on page 45);

[SB4] – ***Status*** – Displays Device Status Screen (see "Status" on page 48)

MAIN SCREEN WORKING AREA



The main part of the OLED screen is where the data changes dynamically, depending on the selected operating mode. The ***Menu*** screen (shown above) appears upon pressing of the [OK] button. DB7002's ***Menu*** page contains selectable icons and soft buttons for selecting modes and functions. Pressing [LEFT] and [RIGHT] arrow buttons will change the icon selection on the ***Menu*** page. The current selection is shown as a rectangle focus frame around the icon. Pressing [OK] button will navigate to the corresponding page.

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 to as (left-to-right) [SB1], [SB2], [SB3] and [SB4]. The purpose of all soft button corresponds to the selected menu page. Most pages have the same or similar functional areas. The corresponding functions as Menu page, parameter to be changed, etc., linked with the soft buttons will appear as labels above them. For example:

[SB1] – ***Home***
[SB2] – ***About***
[SB3] – Unused
[SB4] – ***Back***

NOTE: On some pages, the header and soft button area will disappear in order to expose the content underneath.

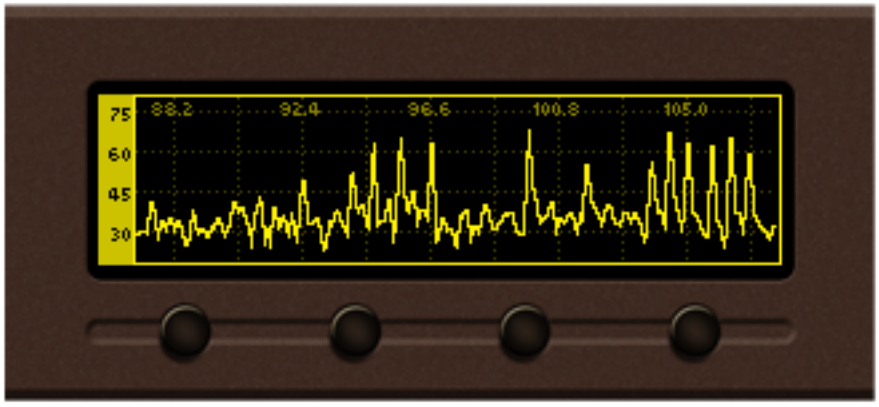
NAVIGATION BUTTONS

[UP], [DOWN], [LEFT], [RIGHT] and [OK] buttons are used to navigate through the menus, for selecting various functions and parameters of DB7002. The main menu structure has an up-and-down basis, expanded with left-to-right branches.

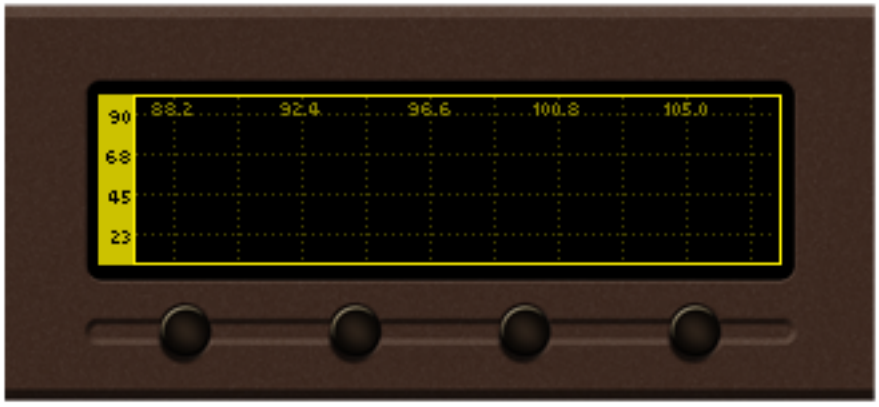
MENU PAGES

BANDSCAN FM

Upon enetering the last *Bandscan* data will be displayed.

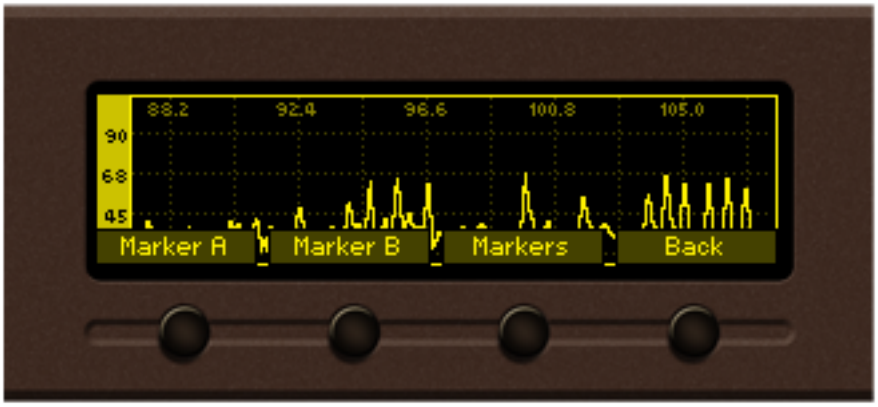


Empty grid will be displayed if no *bandscan* data is available at the moment.



To ensure better reading of the data plot, the *Header area* and the *Soft Buttons* labels will be hidden automatically short time after the soft button is released. Pressing a button will display the function labels again.

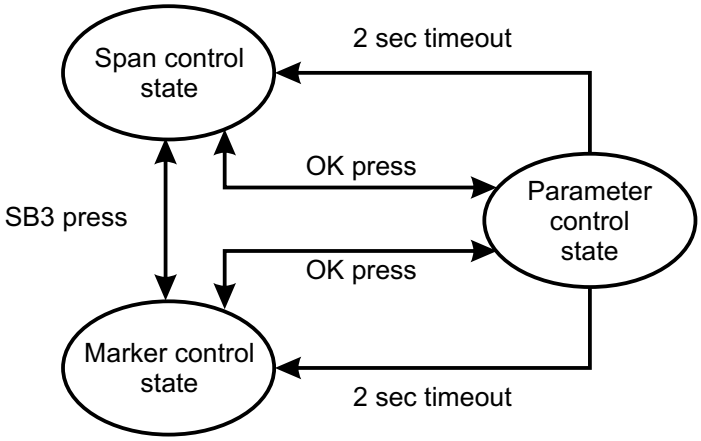
There are three control states in *Bandscan page – Span* control, *Marker* control and *Parameter* control. The states can be identified by the labels of the Soft buttons. If the labels appear as shown on the picture below, the page is in *Marker* control state.



For example: When the following menu is selected, pressing [SB3] will change the screen from *Marker* to *Span* control and vice-versa. All Soft buttons labels will change according to the sub-menu. The control state of the page will change upon every [SB3] pressing.

Pressing the [OK] button either in *Marker* or *Span* control state will make transition to *Parameter* control state. The screen will be visible until the [OK] button is pressed again or the timeout of 2 seconds elapses.

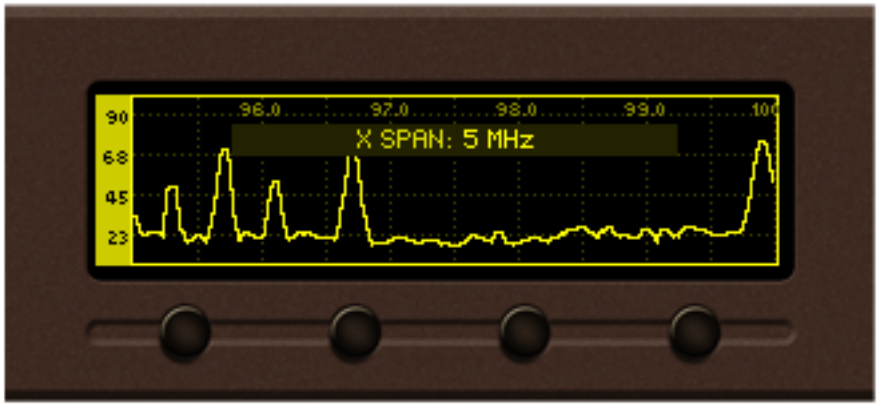
Diagram representing the control state transitions:



Span control state:

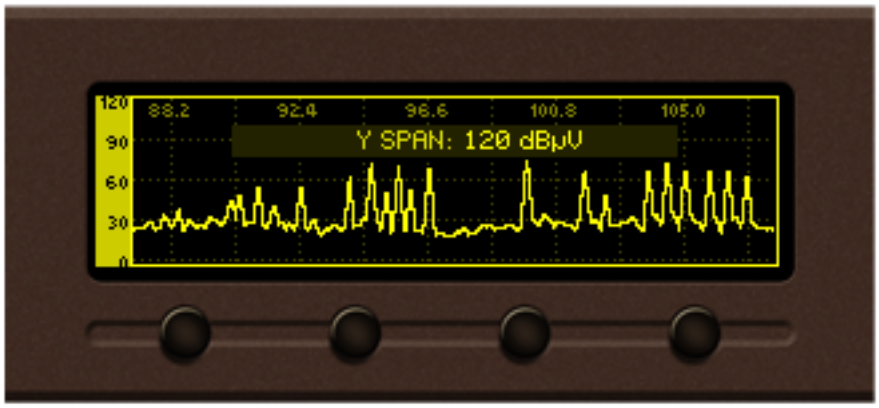
[SB1], [SB2] and [Arrow] buttons control the *Span* of the data plot. Depending on the *Span* control state the Soft buttons have different usage.

X Span – [SB1] cycles through available span values for X axis of the data plot. The possible values vary between 3 and 21 MHz in 1 MHz increments. Note that changing X span may also change the center frequency in order to keep data plot in bounds. When a key is pressed next span value will be selected and displayed on the screen.



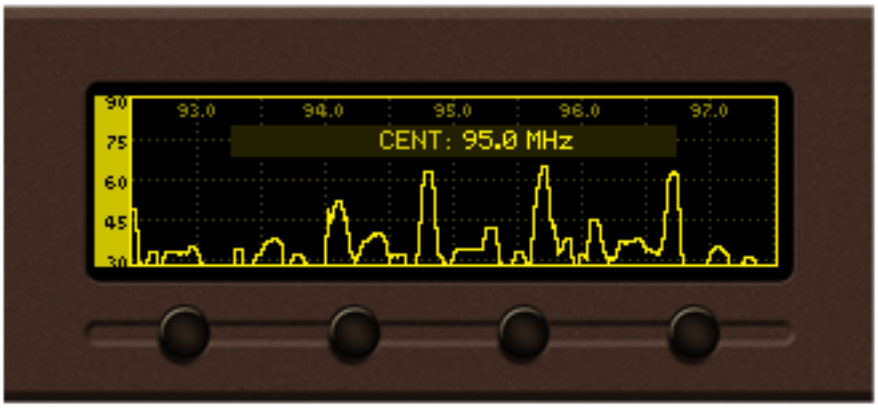
5MHz X span is selected

Y Span – [SB2] cycles through available span values for *Y axis* of the data plot. The possible values are 30, 60, 90, and 120 dBµV. Note that in order to keep the data plot in bounds changing *Y span* may also change the *Y reference*. When the button is pressed new value will be selected and displayed on the screen.



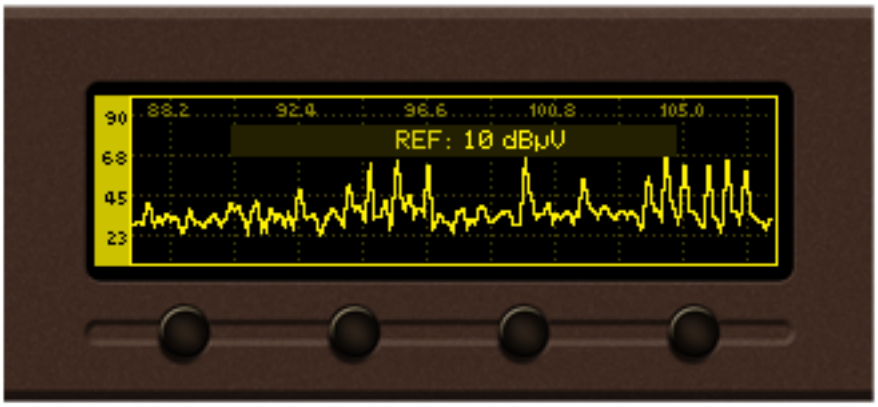
120 dBµV Y span is selected

[LEFT] / [RIGHT] Buttons – change the *center frequency* of the data plot on 500 kHz increments. The center frequency permitted values depend on the currently selected *X span*. The selected center frequency value is briefly displayed on the screen.



95 MHz center frequency is selected

[UP] / [DOWN] Buttons – changes *Y axis reference* (the value for the bottom of the Y scale). Permitted values vary from -20dBµV to 110dBµV in 10dBµV increments. The upper limit of the *Y reference* depends on the currently selected *Y span*. Upon selection, the *Y reference* is briefly displayed on the screen.



10 dBµV reference is selected

Marker control state:

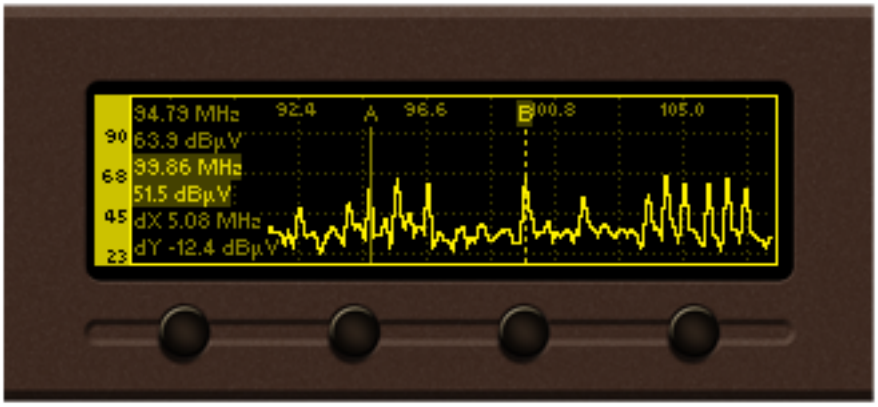
Two markers, named "*A*" and "*B*" are available in *Bandscan page*. [SB1], [SB2], [LEFT] and [RIGHT] buttons control the visibility and position of the *Markers*.

Buttons [SB1] / [SB2] control Marker A / Marker B appearance. According to your needs the markers can be:

- hidden – marker is not visible;
- shown – marker is visible but not selected;
- selected – marker is visible and selected.

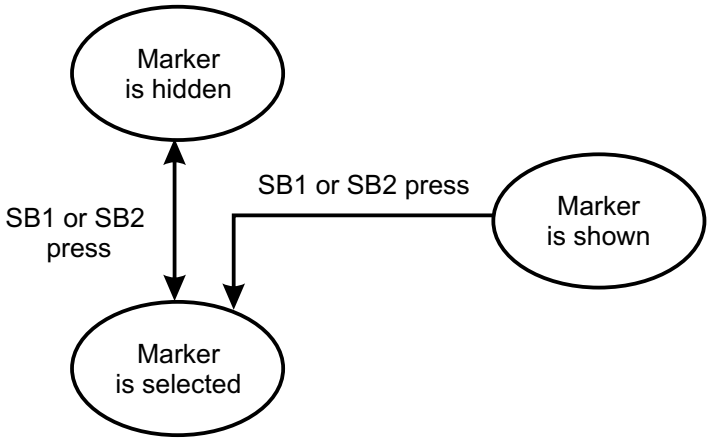
When markers "A" and/or "B" are visible (shown or selected) a readout about X and Y axes will appear on the left side of the data plot. If both markers are visible, the differential "Marker B minus Marker A" value will be displayed at the bottom left of the screen.

The selected marker is represented as highlighted, dashed line; marker's readout is also highlighted. Only one marker at a time can be selected. If only one of the markers is visible, it will be always selected.



Marker A is shown, Marker B is selected

Following is a diagram explaining the transition between these states:



[LEFT] / [RIGHT] Buttons – move the selected marker to the left or right with one screen pixel increment.

NOTE: The step resolution of marker movement depends from the selected *X span*.

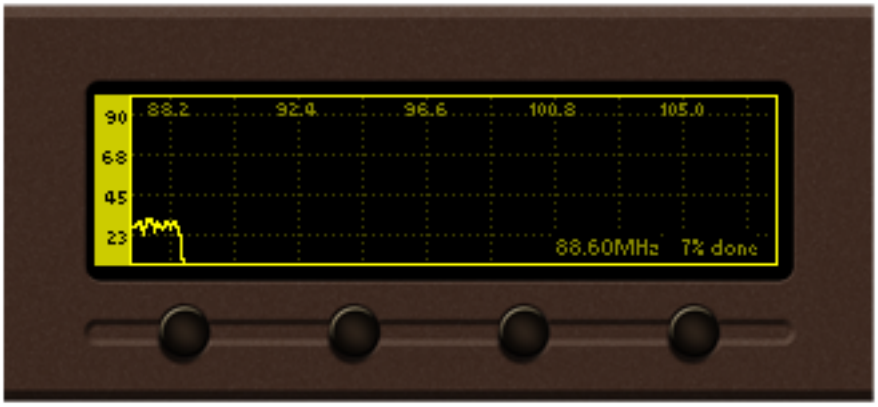
[UP] / [DOWN] Buttons are used to change the *Y reference* like in *Span control* state.

Parameter control state:

Parameter control state allows specific parameters to be set before starting the bandscan.
[OK] – show/hide Parameter control
[Left] / [Right] Buttons – cycle through the available parameters.
[Up] / [Down] Buttons – change the value of the selected parameter.
The name and value of the selected parameter appear briefly on the data plot.
NOTE: Parameter control state will automatically disappear from the screen if no button is pressed for 2 seconds.

Bandscan page parameters

Bandscan: Start / Stop – Used for starting/stopping of the *bandscan process*. Information about the progress will be displayed on the right bottom corner of the data plot. Upon completion, the *Bandscan parameter* value will be automatically set to "Stop".



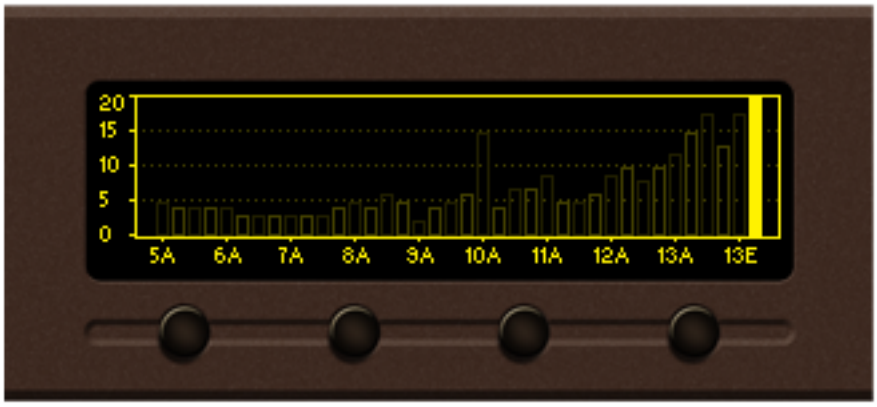
Bandscan in progress

Running *bandscan* can be stopped manually by setting the *Bandscan parameter* value to "Stop".
Start Frequency: – set the start frequency of the *bandscan*.
End Frequency: – set the end frequency of the *bandscan*.
Step: 10, 20, 50 or 100 kHz – set the step increments of the band. Small steps lead to higher resolution but slower *bandscan*;
Pressing [SB4] in *Bandscan page* will lead back to the previous page.

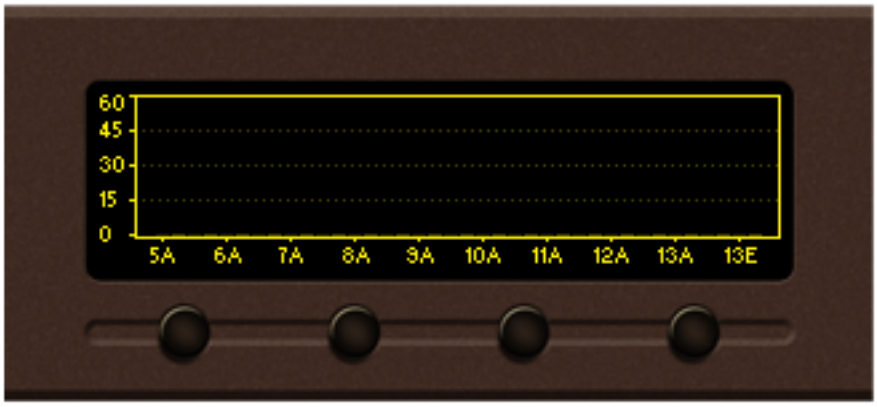
NOTE: Leaving the page will not stop the *bandscan process*. The process will continue until it is finished or the *Bandscan parameter* value is set to "Stop".

BANDSCAN DAB

Upon enetering the last *Bandscan* data will be displayed.



Empty grid will be displayed if no *bandscan* data is available at the moment.



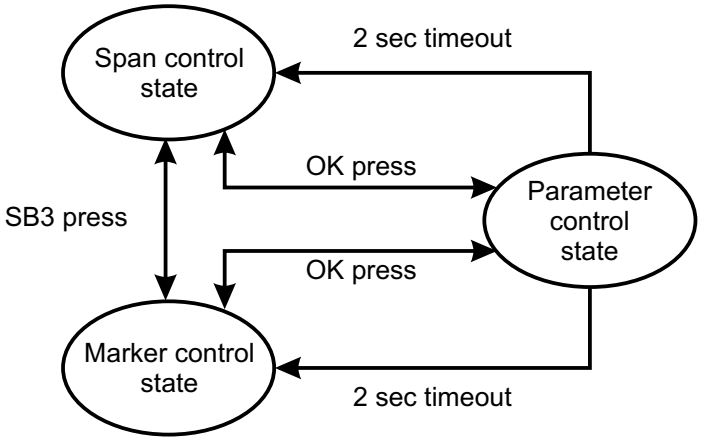
To ensure better reading of the data plot, the *Header area* and the *Soft Buttons* labels will be hidden automatically short time after the soft button is released. Pressing a button will display the function labels again.

There are three control states in *Bandscan page – Span* control, *Marker* control and *Parameter* control. The states can be identified by the labels of the Soft buttons. If the labels appear as shown on the picture below, the page is in *Marker* control state.

For example: When the following menu is selected pressing [SB3] will change the screen from *Marker* to *Span* control and vice-versa. All Soft buttons labels will change according to the sub-menu. The control state of the page will change upon every [SB3] pressing.

Pressing the [OK] button either in *Marker* or *Span* control state will make transition to *Parameter* control state. The screen will be visible until the [OK] button is pressed again or the timeout of 2 seconds elapses.

Diagram representing the control state transitions:



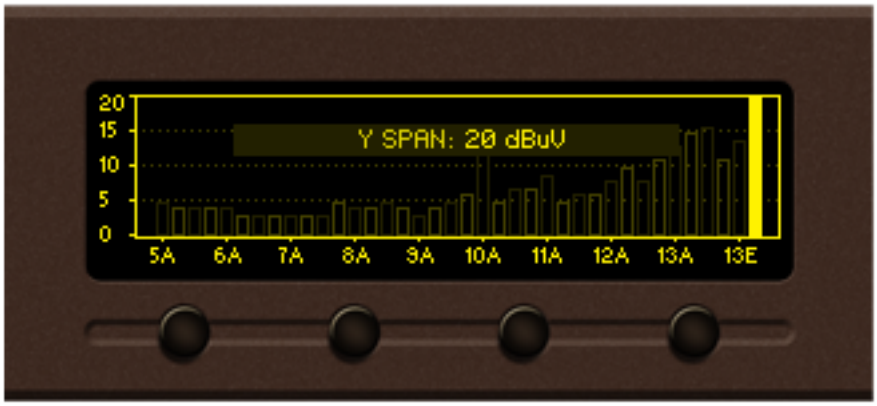
Span control state:

[SB1], [SB2] and [Arrow] buttons control the *Span* of the data plot. Depending on the *Span* control state the Soft buttons have different usage.

X Span – [SB1] cycles through available span values for X axis of the data plot. The possible values vary between 26, 30, 34 and 38 channels. Note that changing X span may also change the center frequency in order to keep data plot in bounds. When a key is pressed next span value will be selected and displayed on the screen.

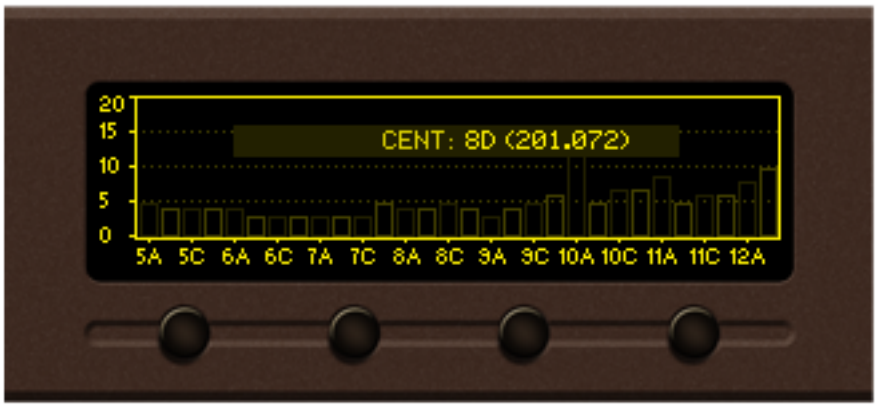
34 X span is selected

Y Span – [SB2] cycles through available span values for *Y axis* of the data plot. The possible values are 20, 30, 40, 50 and 60 dBµV. Note that in order to keep the data plot in bounds changing *Y span* may also change the *Y reference*. When the button is pressed new value will be selected and displayed on the screen.



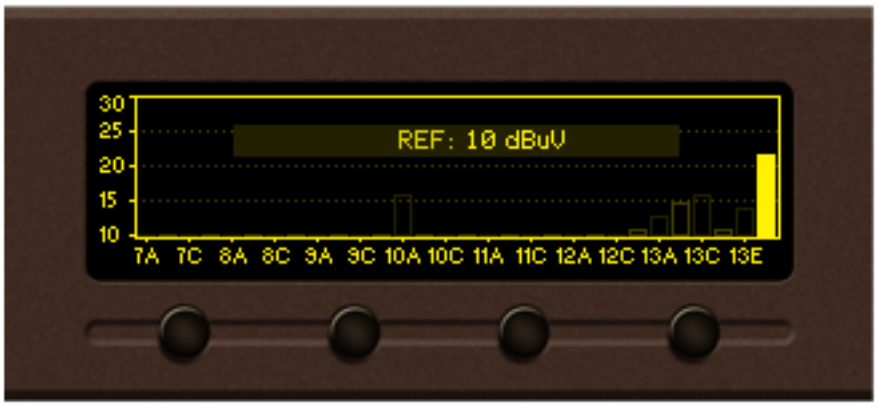
20 dBµV Y span is selected

[LEFT] / [RIGHT] Buttons – change the *center channel (frequency)* of the data plot on 1 channel increments. The center channel permitted values depend on the currently selected *X span*. The selected center channel(frequency) value is briefly displayed on the screen.



8D center channel is selected

[UP] / [DOWN] Buttons – changes *Y axis reference* (the value for the bottom of the Y scale). Permitted values vary from 0dBµV to 40dBµV in 10dBµV increments. The upper limit of the *Y reference* depends on the currently selected *Y span*. Upon selection, the *Y reference* is briefly displayed on the screen.



10 dBµV reference is selected

Marker control state:

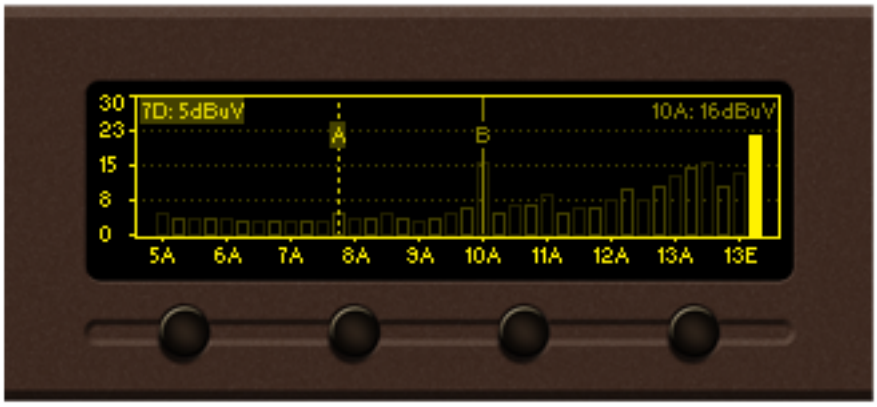
Two markers, named "*A*" and "*B*" are available in *Bandscan page*. [SB1], [SB2], [LEFT] and [RIGHT] buttons control the visibility and position of the *Markers*.

Buttons [SB1] / [SB2] control Marker A / Marker B appearance. According to your needs the markers can be:

- hidden – marker is not visible;
- shown – marker is visible but not selected;
- selected – marker is visible and selected.

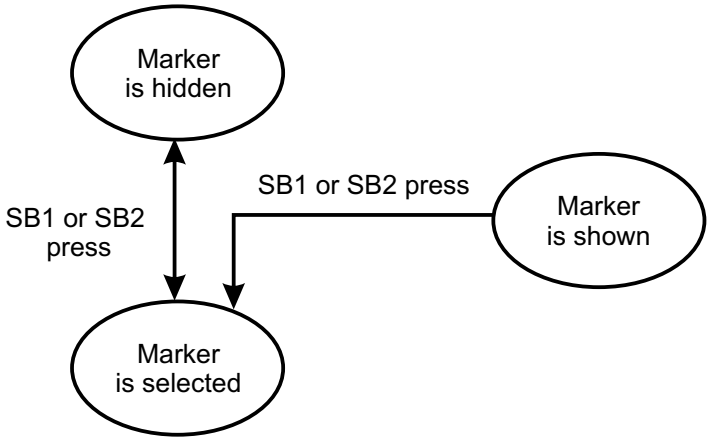
When markers "A" and/or "B" are visible (shown or selected) a readout about X and Y axes will appear on the left side of the data plot.

The selected marker is represented as highlighted, dashed line; marker's readout is also highlighted. Only one marker at a time can be selected. If only one of the markers is visible, it will be always selected.



Marker A is selected, Marker B is shown

Following is a diagram explaining the transition between these states:



[LEFT] / [RIGHT] Buttons – move the selected marker to the left or right with one screen pixel increment.

NOTE: The step resolution of marker movement depends from the selected *X span*.

[UP] / [DOWN] Buttons are used to change the *Y reference* like in *Span control* state.

Parameter control state:

Parameter control state allows specific parameters to be set before starting the bandscan.
[OK] – show/hide Parameter control
[Left] / [Right] Buttons – cycle through the available parameters.
[Up] / [Down] Buttons – change the value of the selected parameter.
The name and value of the selected parameter appear briefly on the data plot.
NOTE: Parameter control state will automatically disappear from the screen if no button is pressed for 2 seconds.

Bandscan page parameters

Bandscan: Start / Stop – Used for starting/stopping of the *bandscan process*. Information about the progress will be displayed on the right bottom corner of the data plot. Upon completion, the *Bandscan parameter* value will be automatically set to "Stop".

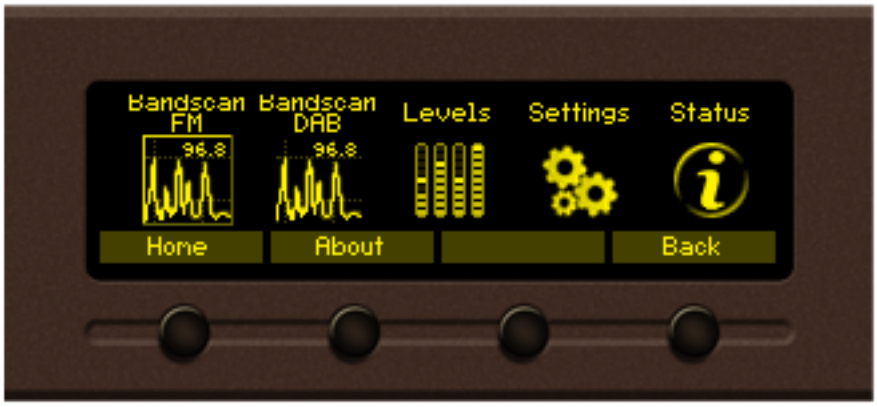
Bandscan in progress

Running *bandscan* can be stopped manually by setting the *Bandscan parameter* value to "Stop".
Start Channel: – set the start frequency of the *bandscan*.
End Channel: – set the end frequency of the *bandscan*.
Pressing [SB4] in *Bandscan page* will lead back to the previous page.

NOTE: Leaving the page will not stop the *bandscan process*. The process will continue until it is finished or the *Bandscan parameter* value is set to "Stop".

LEVELS

Enter the *Main Menu page* and select the *Level icon*, press [OK] button to enter the menu.



Levels page shows bar graph representation of the different signals, measured by DB7002. The parameters are divided into groups. Each bar graph displays the low, average and high values of the signal. The number in the center below represents the average value. The shaded color number, placed on the left and right bottom edges, denotes the measurement range of the signal. Measurement units and name of the signal are written above the corresponding bar graph.

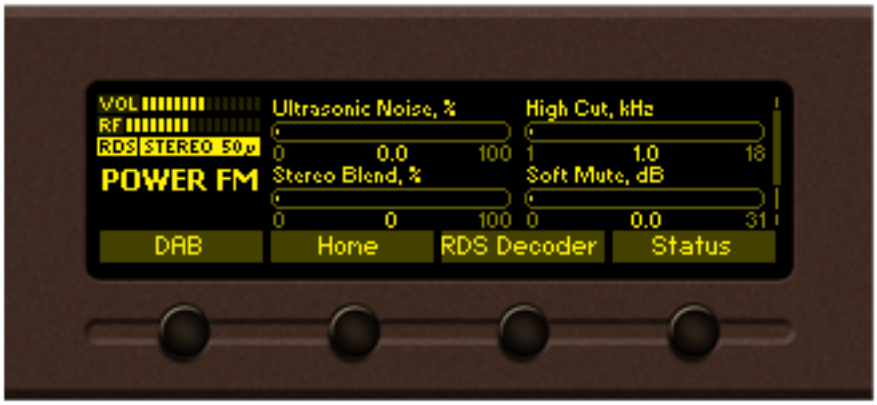
Buttons usage:
[OK] – leads to Main menu page;
[Up]/[Down] – Changes the currently displayed bar graph group;
[SB1] – Switches between FM and DAB Levels;
[SB2] – lead to Home Screen;
[SB3] – leads to RDS Decoder (see “RDS/RBDS Decoder” on page 45) when in FM and to a list containing all Services available in the current Ensemble when in DAB
[SB4] – leads to Status Screen (see “Status” on page 48)

FM Levels

FM Group 1. RF, Multipath and Frequency offset parameters

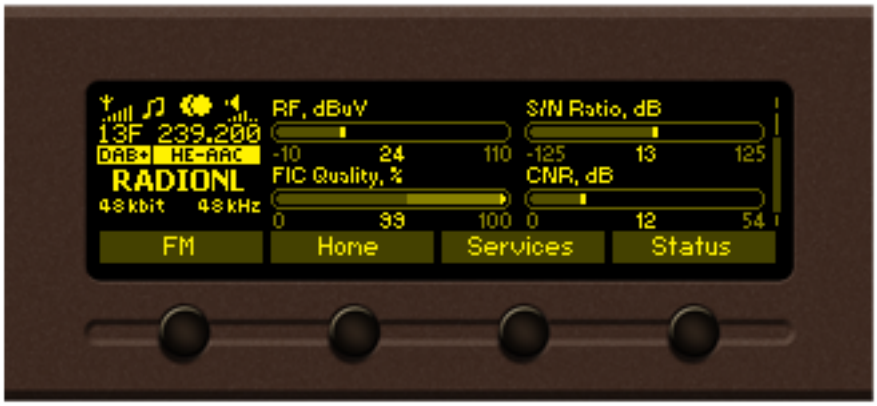
FM Group 2. Left, Right, Left+Right, Left–Right parameters

FM Group 3. Loudness related parameters



FM Group 4. Reception quality related levels

DAB Levels



DAB Group 1. RF, SNR, FIC, CNR parameters

DAB Group 2. Left and Right Audio parameters

DAB Group 3. Loudness related parameters

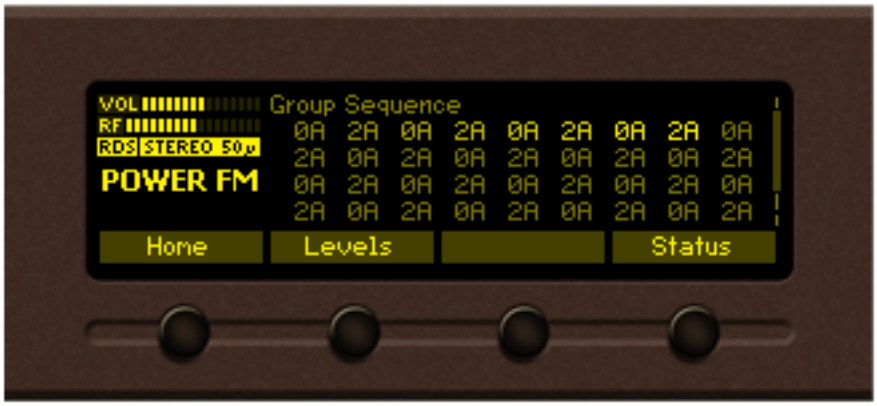
65 Aleksandar Stamboliyski Str., 8000 Bourgas, Bulgaria
Tel: +359 56 820027, Fax: +359 56 836700
E-mail: office@devabroadcast.com ,Web: www.devabroadcast.com

RDS/RBDS DECODER

RDS/RBDS Page Main View

RDS/RBDS AF list View

RDS/RBDS Statistics view



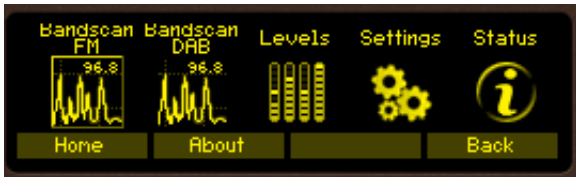
RDS/RBDS Sequence view

RDS/RBDS RAW Data view

Front panel buttons usage:
[OK] – leads to Main menu page.
[Up]/[Down] – Changes the currently displayed RDS decoder screen.
[SB1]-[SB4] – lead to different screens of the menu.

SETTINGS

Enter the main ***Menu*** page, select Settings icon and press [OK] button.

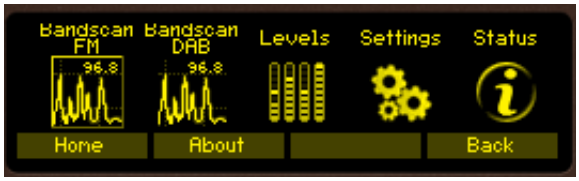


The ***Setup*** menu is organized into a hierarchical tree menu and all similar parameters are grouped into sections (branches). The structure of the menu is:

- **Tuner FM** - allows you to change the Tuner related settings as **Frequency**, **Frequency Step, De-emphasis**, **RDS Mode**, **IF Bandwidth**, **Stereo Blend**, **High Cut**, **High Blend**, **Soft Mute**, **Audio Cut** as well as **Average** and **Peak** function parameters.
- **Tuner DAB -** allows you to change **DAB Channel** and **DAB Time Zone**.
- **Communication** – grants you access to the ***General Setup*** (to enable or disable the functions included in the menu), **Ethernet**, **SNMP**, **HTTP**, **FTP**, **SNTP** and **Email**.
- **Security** – From here you could set-up, change or disable the password protected access to the ***Front Panel*** or ***Remote access***.
- **Logger FM** – Trough this section, FM Channels could be chosen and monitored, by applying the needed settings.
- **Logger DAB** – Trough this section, DAB Channels could be chosen and monitored, by applying the needed settings.
- **GP Outputs** – The General Purpose Outputs settings are applied through this page. **Function**, **Type** and **Pulse Time** for each of the GPOs could be set individually.
- **Device** – allows you to change the name of the device, set-up the ***Date/Time***, change the default settings of the OLED graphical display (menu ***Front panel***), change the ***Home Screen***, specify the ***Weblog Max Days***, average and peak values and finally to return the device to its ***Factory Defaults***. ***Country Region*** allows you to specify the region in which the device will be used - Europe, USA and Japan. The RDS standard utilized will be changed accordingly.

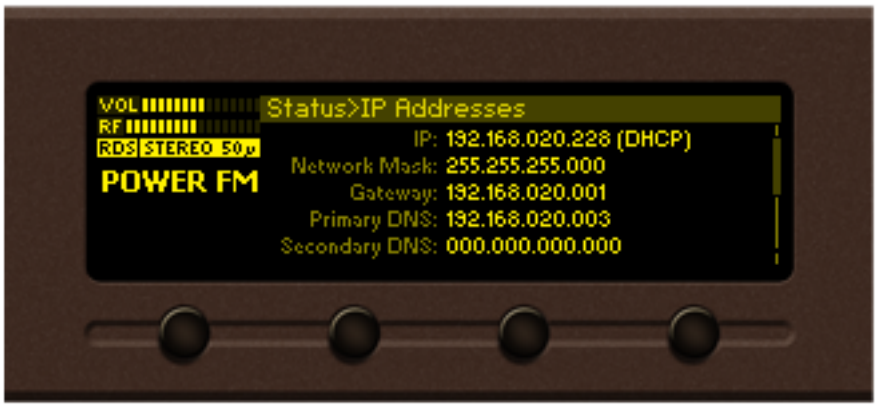
STATUS

Enter the main ***Menu*** page, select Status icon and press [OK] button.



The basic/general information on the device is found here:

- Device – Model, Serial number, Firmware version in use, Calibration, Storage capacity;
- IP address – IP, Network Mask, Gateway, Primary DNS, Secondary DNS;



SECURITY

Keyboard lock

To prevent unauthorized local access, the DB7002 offers password protected keyboard locking. By default the keyboard is unprotected. To enable this function, using the front panel navigational menu, go to ***Setup> Security> Front Panel***, then press [OK] and **Enable** the ***Access Control*** function. Set the preferred 5 digit password and ***Access Timeout***. Once the keyboard lock function is enabled, every attempt to use it will require a password:

`ENTER PASSWORD:0****`. Access will be denied upon false entry.

Keyboard unlock

If the keyboard unlock function has been activated by mistake, try to unlock it using the default password **01234**. In order to deactivate the code protection, once the front panel menu is unlocked follow the menu path ***Setup> Security> Front Panel> Access Control*** and then select **Disabled**. If you do not manage to unlock the front panel with the default password, nevertheless whether it has been changed intentionally or not, DB7002 should be returned to its factory defaults in order for the password security to be disabled.

NOTE: The password consists of 5 digits. The leading zeroes are not shown in the menu, but should be specified when entering the unlock password. For example, if your password is `123`, when entering the password `00123` should be written.

HOW TO START A LOGGER CAMPAIGN USING THE FRONT PANEL MENU?

In order to set up a campaign via the front panel menu, the following steps should be completed:

1. Press the [OK] button to enter the ***Main menu> Settings*** and again press [OK];
2. Then select ***Logger XX> Channel I***;
3. Specify name of the Channel, frequency and for 'Active' - select Antenna 1; to exclude a station from the campaign the "Disable" button should be selected;
4. Change the Acquisition time as per your preferences. We recommend setting it to 10 seconds;
5. Change the alarm parameters as per your preferences;
6. Steps from 2 to 4 should be applied for each of the channels to be monitored. Once all Channels are set you can proceed to the last step
7. Go to ***Settings> Logger XX> Logger Mode*** and as a value set 10 seconds. In order for a campaign to be commenced the device should be inactive for the specified time.

NOTE: The front panel inactivity time should expire prior the Logger mode countdown to begin.

WEB Interface

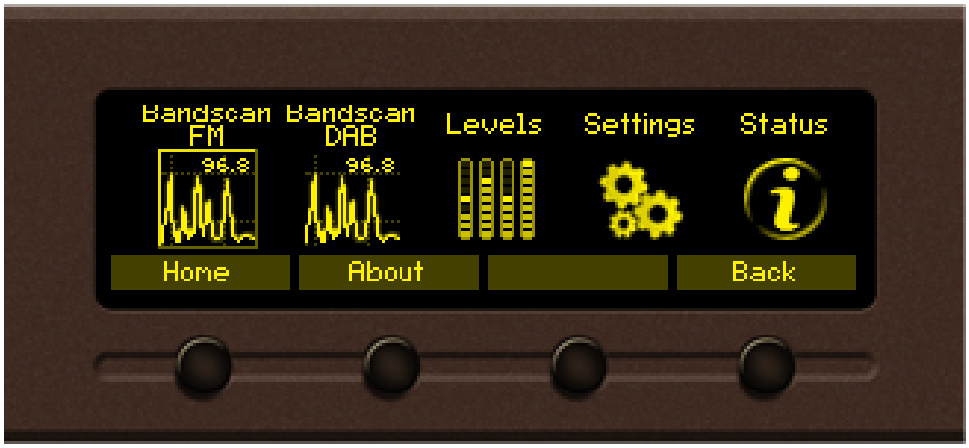
DB7002 can be controlled through the built-in web server. A standard web browser can be used to monitor the status of the device or to make some adjustments.

There are two options for access to the WEB Interface of DB7002. The first one is through manual identification of the IP address of the device, and the second one is through the Network discovery option (For Windows 7 and above users only).

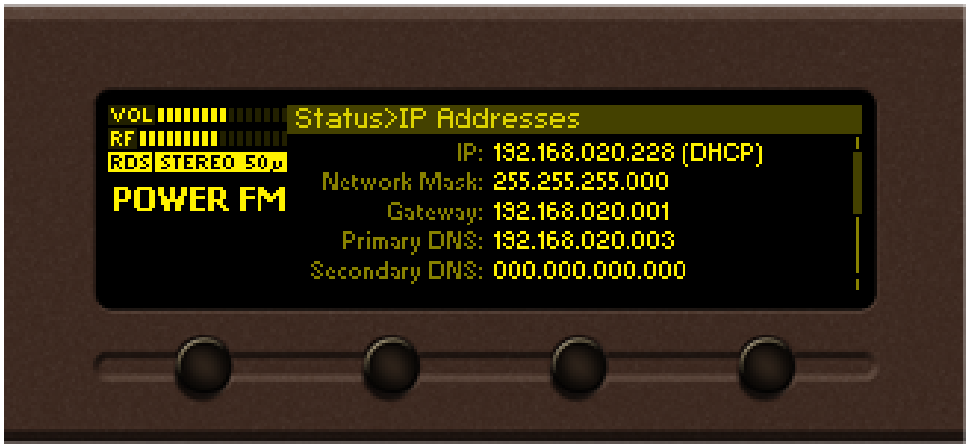
MANUAL IP ADDRESS IDENTIFICATION

Connect the device to a local network or to the Internet by the applied LAN cable. Through the Front panel navigational menu, pressing the [OK] button you will be enabled to enter the device main menu.

Using the [RIGHT] navigational button find the "*Status*" section, located at the end of the Menu.

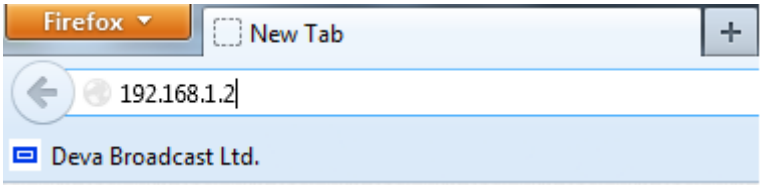


Press the [OK] Button to enter the "*Status*" section. Via the Front panel navigational menu press the [DOWN] button.



This operation will visualize the screen containing information about the IP Address of the device.

Open a new WEB Browser and enter the device IP address in the address field, then press [Enter].



NOTE: Due to the inability of some WEB Browsers to read the IP address format displayed on the screen of the device, the numbers included in the IP Address must be written without the leading zeros. For example: 192.168.020.095 must be written as 192.168.20.95

A window that requires username and password will appear.

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 “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, DB7002 will be automatically added to the Device list section. The device will be ready for usage and no additional adjustments will be required except for user name and password.

ACCESS

The DB7002 provides you with a protected access to the device settings. You can choose between two types of log in:

1. **As an Administrator** – which will give you full control over the settings (*username*: admin, *password*: pass);
2. **As a User** – this type of log-in will allow you to monitor the device and to choose different stations without applying settings (*username*: user, *password*: pass).

In order to make the necessary adjustments to the device, please log in as Administrator.

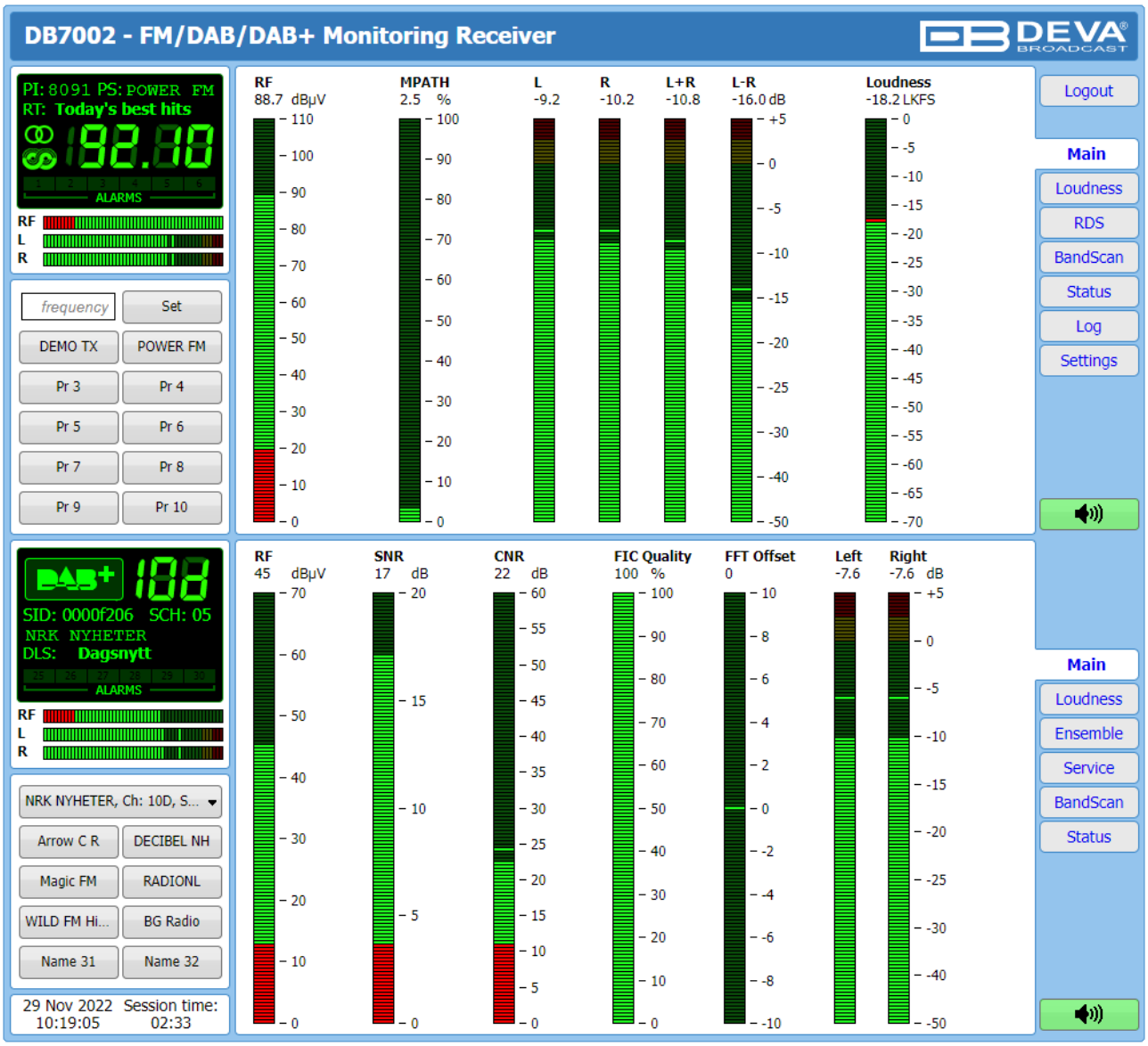
65 Aleksandar Stamboliyski Str., 8000 Bourgas, Bulgaria
Tel: +359 56 820027, Fax: +359 56 836700
E-mail: office@devabroadcast.com ,Web: www.devabroadcast.com

WEB Interface Structure

DEVICE CONTROL INTERFACE

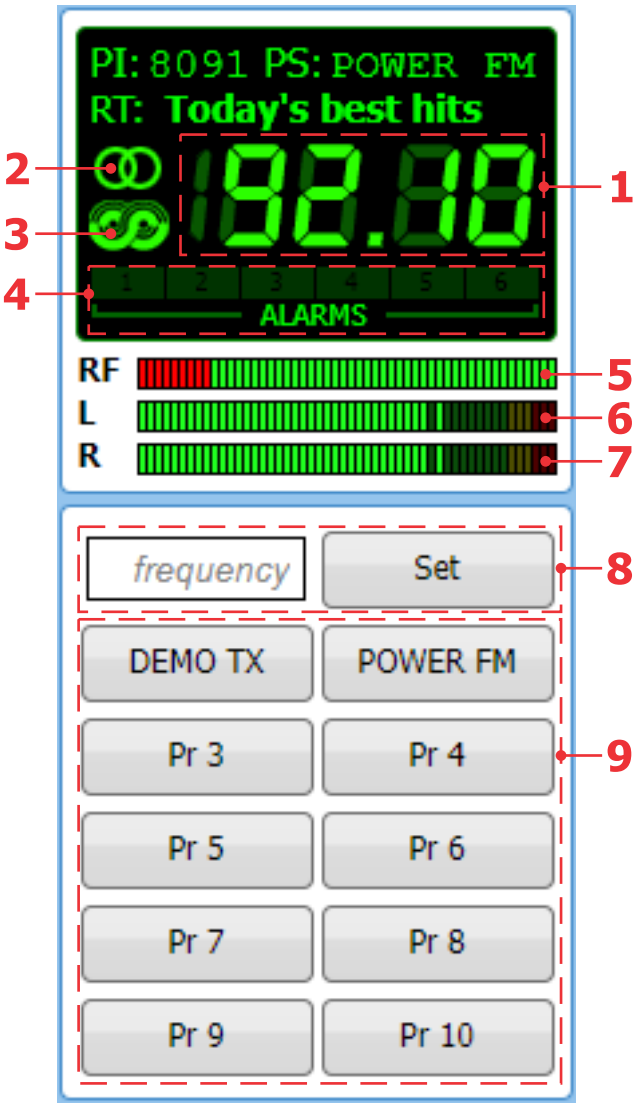
The WEB Interface is visually divided into two Main sections – FM (located at the upper part of the screen) and DAB/DAB+ (located at the lower part of the screen). Every Main Section is subdivided into Left and Right sections.

- On the Right are all the specific contextual readings of the currently selected menu page.
- On the Left is the so called "dashboard" of the device - General Tuner and Channel readings, functional buttons. This section of the WEB interface is constant part of each screen, hence allowing immediate tuner interactions.



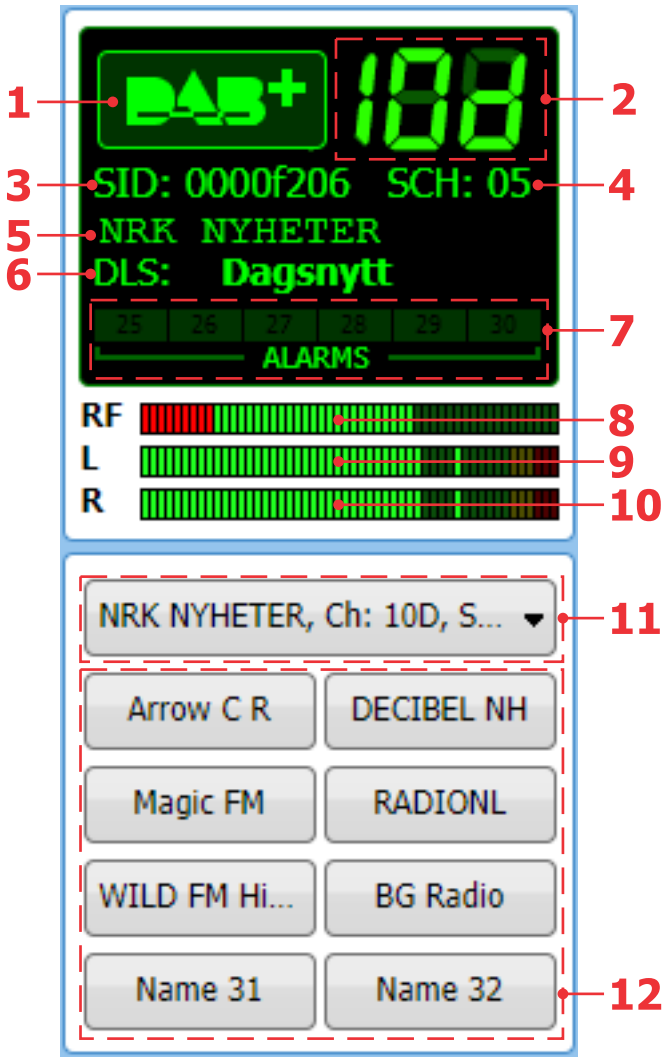
65 Aleksandar Stamboliyski Str., 8000 Bourgas, Bulgaria
Tel: +359 56 820027, Fax: +359 56 836700
E-mail: office@devabroadcast.com ,Web: www.devabroadcast.com

FM DASHBOARD

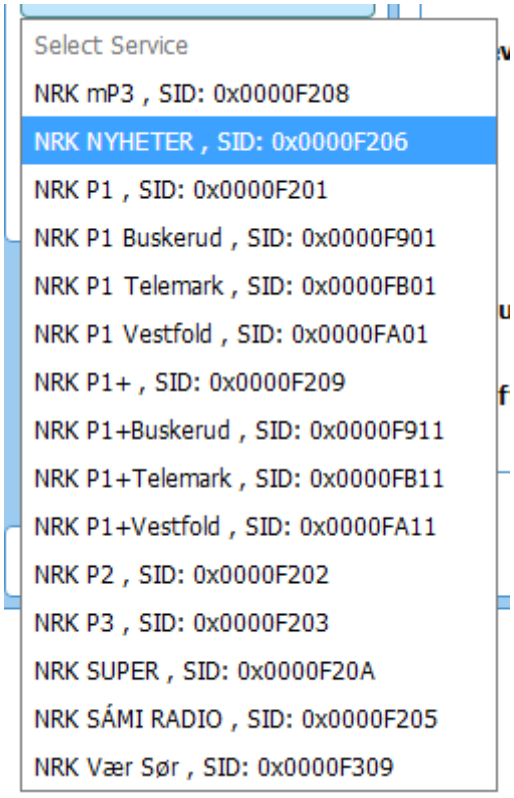


1. Frequency indicator showing currently tuned frequency;
2. Stereo indicator;
3. RDS/RBDS presence indicator;
4. Channel Alarms indicator – will be lit in red when the Logger has detected an alarm on channel;
5. RF Level indicator. The red zone (low level) indicates low RF level;
6. Left Audio Indicator;
7. Right Audio indicator;
8. Frequency set buttons;
9. Channel Preset Buttons – when one of the buttons is pressed, the Tuner will be set to the predefined frequency.

DAB/DAB+ DASHBOARD



1. DAB/DAB+ signal lock indicator;
2. Frequency indicator showing currently tuned frequency;
3. SID – This 16-bit field shall specify the DAB Service Identifier (SID) to which the information block data applies;
4. SCH – Sub Channel ID;
5. Currently selected service label;
6. DLS – (Dynamic Label Segment) scrolling text;
7. Alarm presence indicator – will be lit in red when an alarm on at least one channel is detected;
8. RF Level indicator. The red zone (low level) indicates low RF level;
9. Left Audio indicator;
10. Right Audio indicator;
11. Drop-down Select Service menu – A list containing all services available in the current Ensemble.

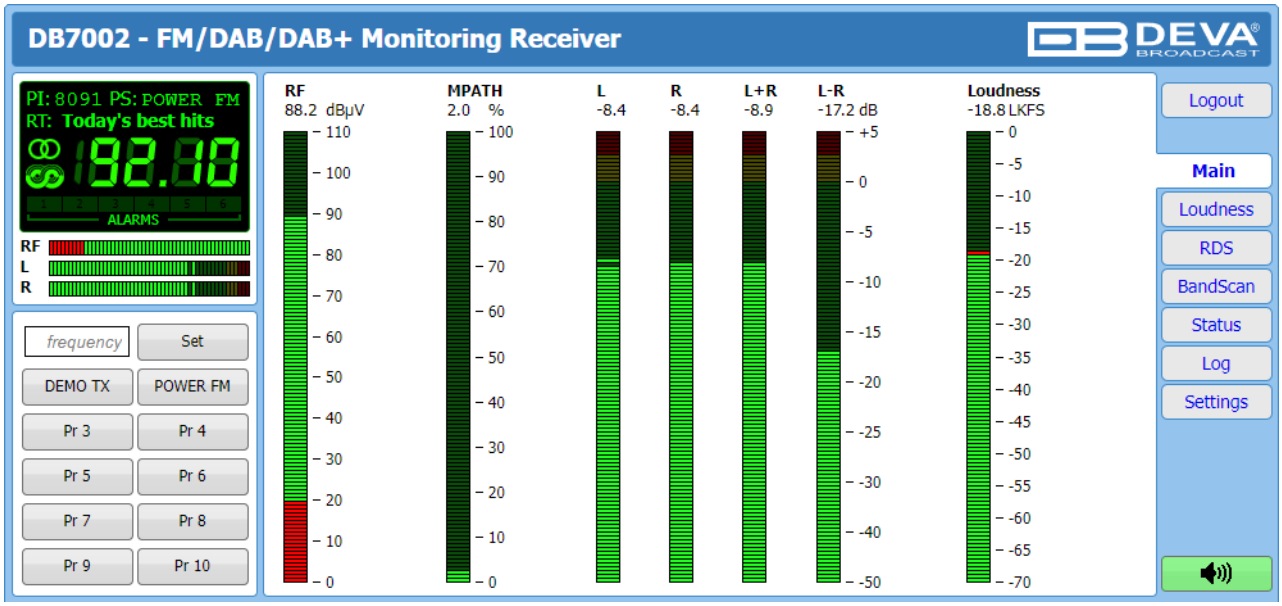


12. Service Preset Buttons – when one of the buttons is pressed, the Tuner will be set to the predefined service.

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 FM Section

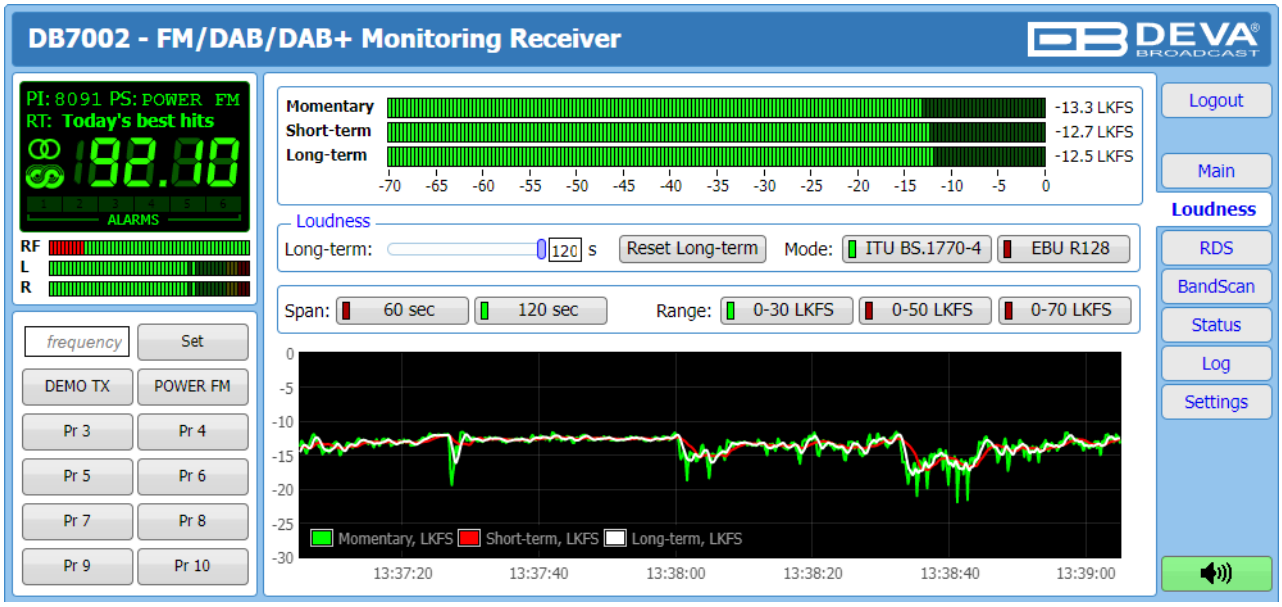
MAIN



This Screen shows all the mandatory parameters represented as LED readings. You can easily select the preferred audio frequency using the selection buttons, placed on the left part of the screen. All station presets are defined by the user.

[Listen] button – used to Play/Stop the current audio stream (an audio device will be required).

LOUDNESS



The average program loudness measurements as defined by the ITU BS.1770-4 and EBU R128 recommendations are represented at this page. The following measurements are available:

- **Momentary** – average program loudness measured over a 0.4 seconds sliding time window, not gated;
- **Short-term** – average program loudness measured over a 3 seconds sliding time window, not gated;
- **Long-term** – average program loudness measured over a variable sliding time window, gated as described in ITU BS.1770-4. The time window can be varied between 10 seconds and 120 seconds.

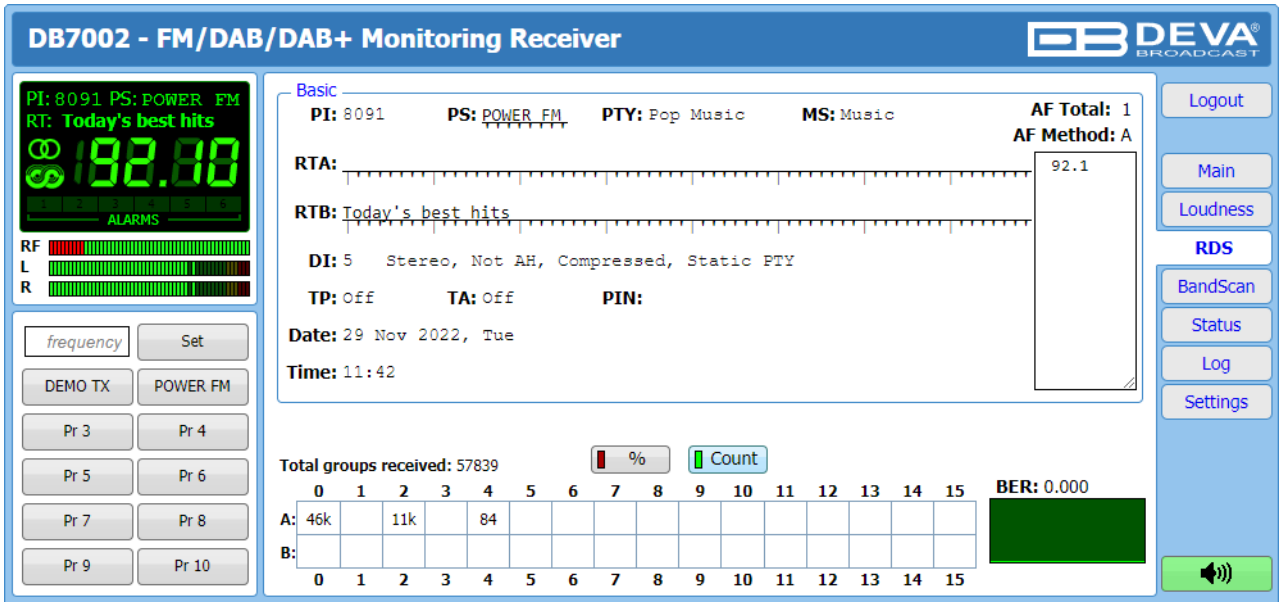
The page offers all the above measurements in two display forms – high refresh rate bar graphs for displaying current values and a time graph for extended visualization over time.

The user can modify the processing and appearance of the measurement using the following settings:

- **Long-term** – allows the user to select the length of the Long-term loudness measurement sliding time window. The time-based sliding window could be set with length from 10 to 120 seconds;
- **[Reset Long-term]** – resets the Long-term measurement;
- **Mode** – allows the user to select/change between [ITU BS.1770-4] and [EBU R128] mode;
- **Span** – sets the time graph span. Options of [60 seconds] and [120 seconds] are available;
- **Range** – the option buttons allow the user to set the preferred time graph measurement range.

IMPORTANT NOTE: Depending on the currently opened screen, the Loudness meter incorporated in the DB7002 switches between FM and DAB/DAB+.

RDS



One of our core competencies lies in the RDS/RBDS. The RDS/RBDS page is very comprehensive, with a display of the RadioText (RTA and RTB), basic RDS/RBDS fields and a table of all decoded RDS/RBDS groups with a percentage measurement based on the overall RDS/RBDS data stream or group count. A very useful graph on this display is the rolling RDS/RBDS bit error rate (BER) display.

Total groups received indicator – all received groups are systematized into a table, representing the percentage/quantity of the groups in the received RDS/RBDS signal. The user selects how the "Total groups received" data should be displayed: as Percents [%] or [Count], by selecting the corresponding button.

NOTE: The bit error rate or bit error ratio (BER) is the number of bit errors divided by the total number of transferred bits during a studied time interval. Result closer or equal to 0 indicates that no bit errors are detected and vice versa result closer or equal to 1 indicates that the received transferred bits are only errors.

Basic RDS

PI/CALL (Program Identification) – The PI code is your station's 'digital address'. It is a hexadecimal code that is assigned by an appropriate broadcasting authority in most countries, but in the United States the PI code is numerically calculated from the station's call sign. We have provided a calculator utility within the DB7002. An in-depth discussion of the mathematical calculation is given in RDS/RBDS Standard.;

PS (Program Service Name) – This is the station's "street name" that will appear on the receiver faceplate display. The PS can be up to eight characters in length (including spaces) and can be as simple as the station's call letters: `KWOW` or `KWOW FM`, or a slogan: `NEWSTALK` or `LIVE 95`.

PTY (Program Type) – The PTY data flag identifies the station format from a pre-defined categories. Many RDS receivers are able to seek the listener's preferred format automatically. This means that a car radio can switch from a fading station to a stronger one that carries the same variety of music, though not the very same program, as provided by AF switching. The PTY function of RDS helps a broadcaster catch 'transient audience' share. The PTY code is not meant to change from song to song or to accommodate a top-of-the-hour newscast, however.

MS (Music/Speech Switch) – This flag simply indicates whether music or speech is the primary broadcast programming.

RT (Radio Text) – This is a 64-character block of plain text that the listener can select for visual display on the faceplate of the radio by pressing an INFO button on the receiver. This function is not available on many automobile radios for safety reasons, which has precipitated the frowned-upon practice of scrolling the PS field instead. The Radio Text can announce song titles and performers, run special promotions or contests, or broadcast sponsors' messages.

DI (Decoder Information) – This is one of several 'flags' that convey yes/no or other very basic data. This particular flag tells the receiver whether the broadcast is monaural, or is being transmitted in any of several methods of stereo or binaural broadcasting.

TP (Traffic Program Identification) – The TP flag identifies the station as one that routinely broadcasts traffic bulletins for motorists as part of its normal, everyday programming. When the TP flag is displayed on the receiver faceplate, the radio is searching for traffic announcements. The radio keeps track of TP stations offering this service to speed up the search-and-switch process.

TA (Traffic Announcement) – This is a temporary flag added to the RDS data stream only when a traffic bulletin is being aired. Some RDS car radios can be set to search for traffic bulletins among various TP stations while tuned to a listener's preferred program, or even while playing a tape or CD. As soon as any TP station broadcasts a traffic bulletin, the receiver temporarily switches-over to receive it. When the bulletin is finished, the receiver switches back to the original program, tape or CD.

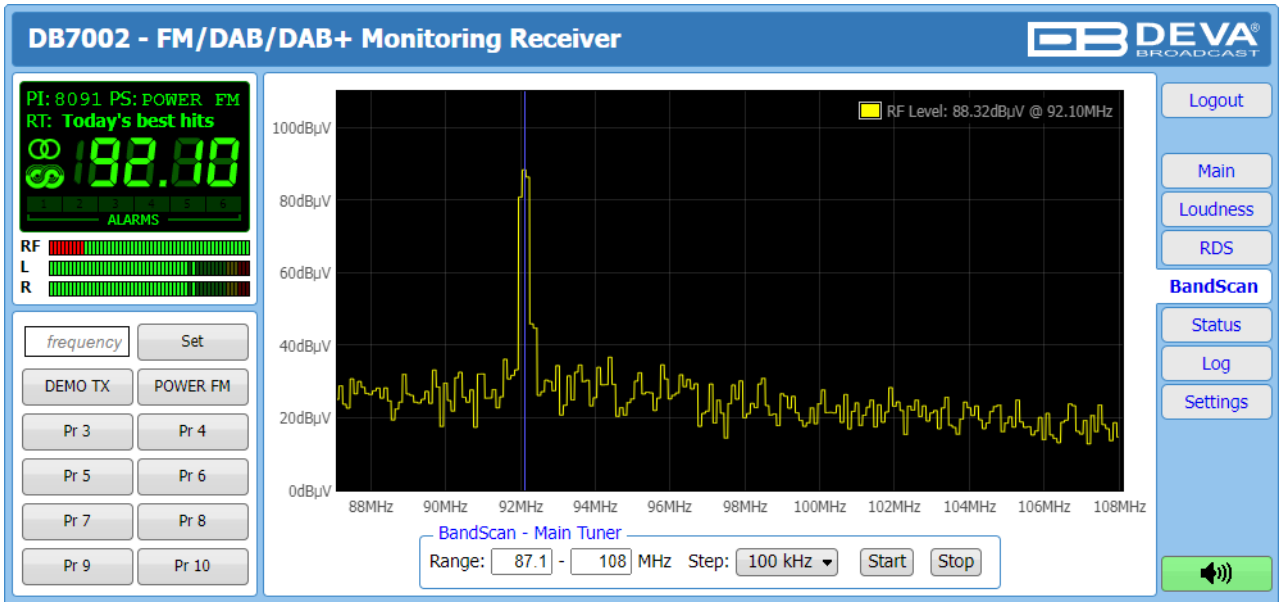
List of Alternative Frequencies – A network broadcaster, or one with low-power rebroadcast transmitters (translators) to fill holes in his coverage area, can include a list of all frequencies where the identical program can be heard simultaneously. The RDS receiver (particularly the upscale car radio) constantly searches for the best signal that carries the very same program. When a better signal is found, the radio re-tunes with no noticeable interruption. The principal utility of this RDS function is with European radio networks and US stations with 'translators.'

PIN - Program Item Number: The code enables the designed to use this feature receivers and recorders to respond to the preselected by the user program item(s).This feature is used via scheduled program time, to which in order to avoid ambiguity is added the day of the month.

Date and **Time** – Decoded CT 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

BAND SCAN

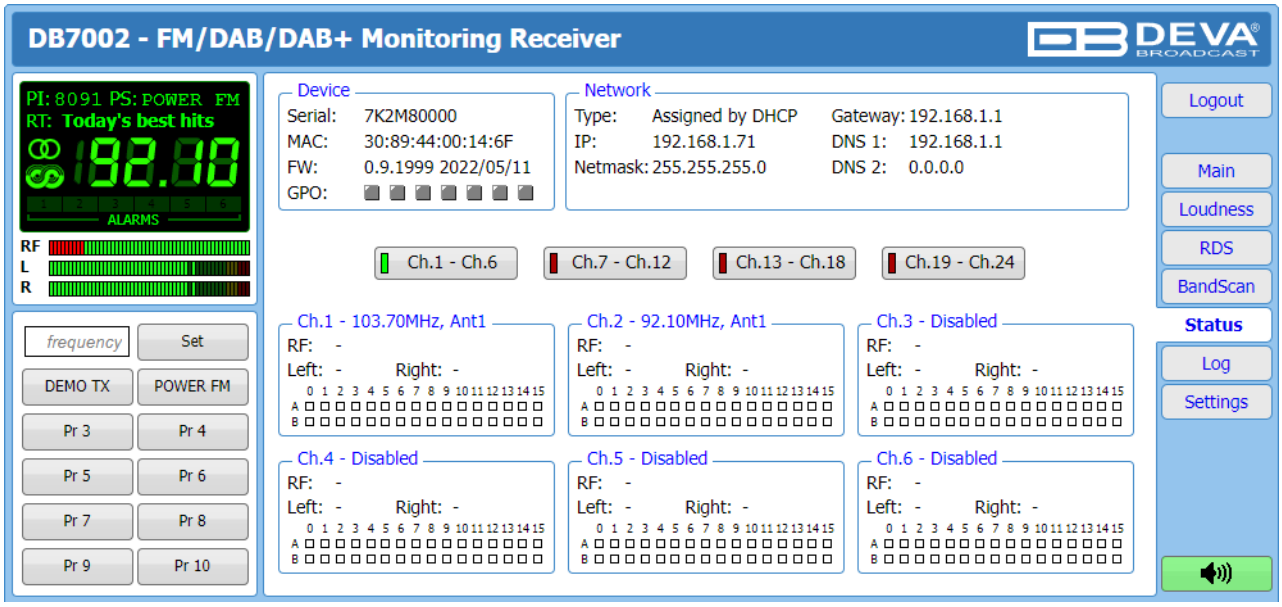


This Screen evaluates FM broadcast band congestion by sweeping the tuner across the FM band, logging every carrier and generating a spectrum display of carrier level vs. frequency.

The Bandscan application utilizes four different types of Bandscan, depending on the preferred signal frequency step. The bandscanning mode could be customized by setting low and high frequency limits of the scan. Once you have set the frequency step and low/high frequencies, the [Start] button should be pressed in order for the Bandscan process to be initiated. The current scan could be stopped at any time by pressing the [Stop] button.

To evaluate the RF level of the specified frequency, move the vertical marker along the horizontal scale. The Values at the cross-point will be shown at the top right corner of the graph.

STATUS



This Screen shows the alarm status of each parameter of the preset frequencies, along with the basic device and network status (IP address, MAC, etc.).

The Channel parameters (RF, LEFT, RIGHT) have several conditions:

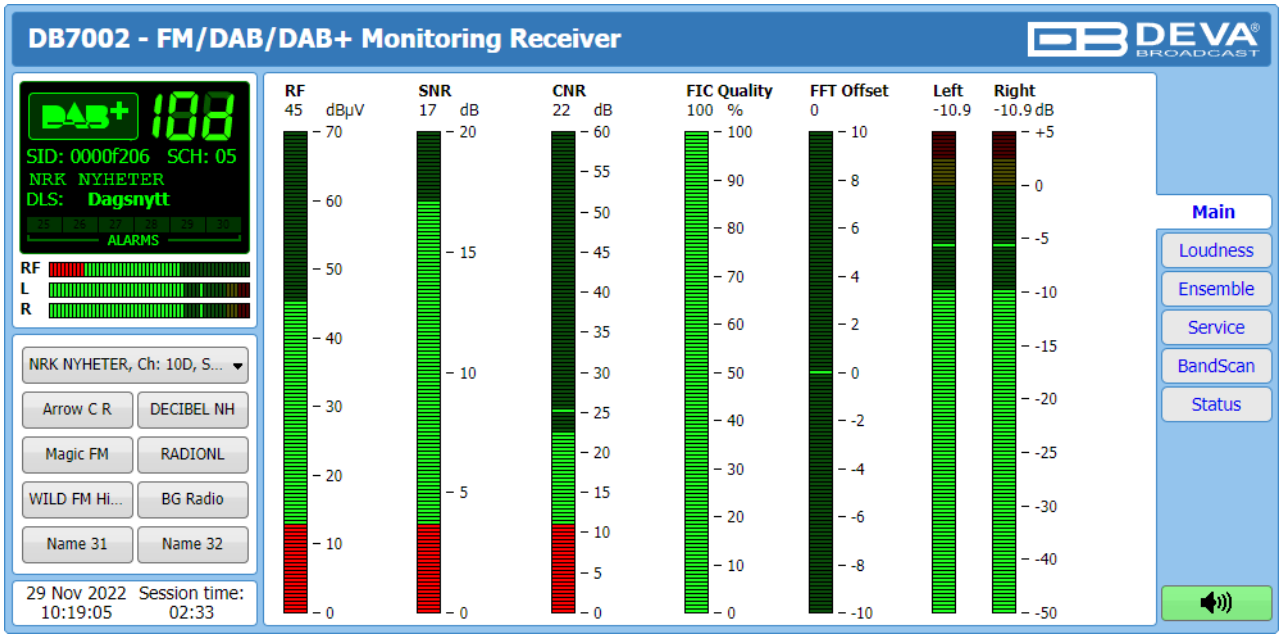
- In range - green OK;
- Out of range - red LOW, HIGH or LOSS;
- Signal monitoring is not enabled - n/a.

The status of the RDS/RBDS Groups Alarm is displayed on the bottom of the channels' section:

- Green - RDS/RBDS Group is received;
- Red - RDS/RBDS Group is not received and an alarm has been triggered;
- White (blank) - RDS/RBDS Group is not received and no alarm has been triggered.

WEB Interface DAB/DAB+ Section

MAIN



The main screen contains information on the mandatory parameters for the currently selected DAB/DAB+ station, represented as LED readings.

You can easily select the preferred audio frequency by using the selection buttons, placed on the left part of the screen. All station presets are user defined.

[Listen] button – used to Play/Stop the current audio stream (audio device will be required).

65 Aleksandar Stamboliyski Str., 8000 Bourgas, Bulgaria
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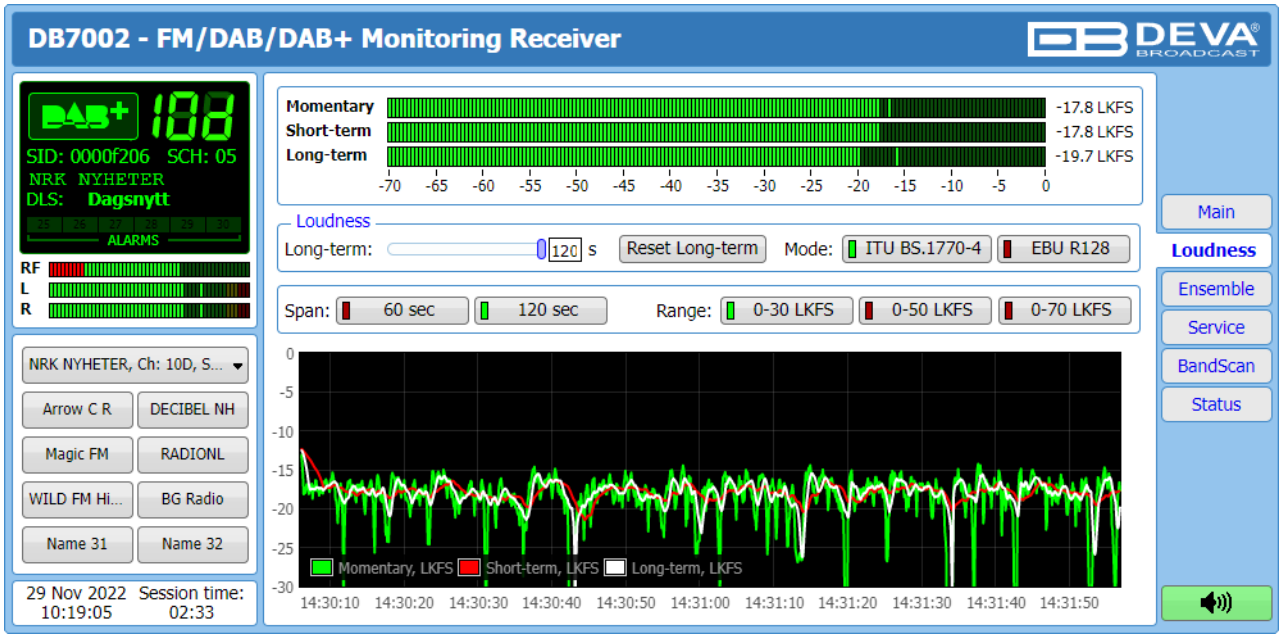
E-mail: office@devabroadcast.com ,Web: www.devabroadcast.com

LOUDNESS



The average program loudness measurements as defined by the ITU BS.1770-4 and EBU R128 recommendations are represented at this page. The following measurements are available:

- **Momentary** – average program loudness measured over a 0.4 seconds sliding time window, not gated;
- **Short-term** – average program loudness measured over a 3 seconds sliding time window, not gated;
- **Long-term** – average program loudness measured over a variable sliding time window, gated as described in ITU BS.1770-4. The time window can be varied between 10 seconds and 120 seconds.

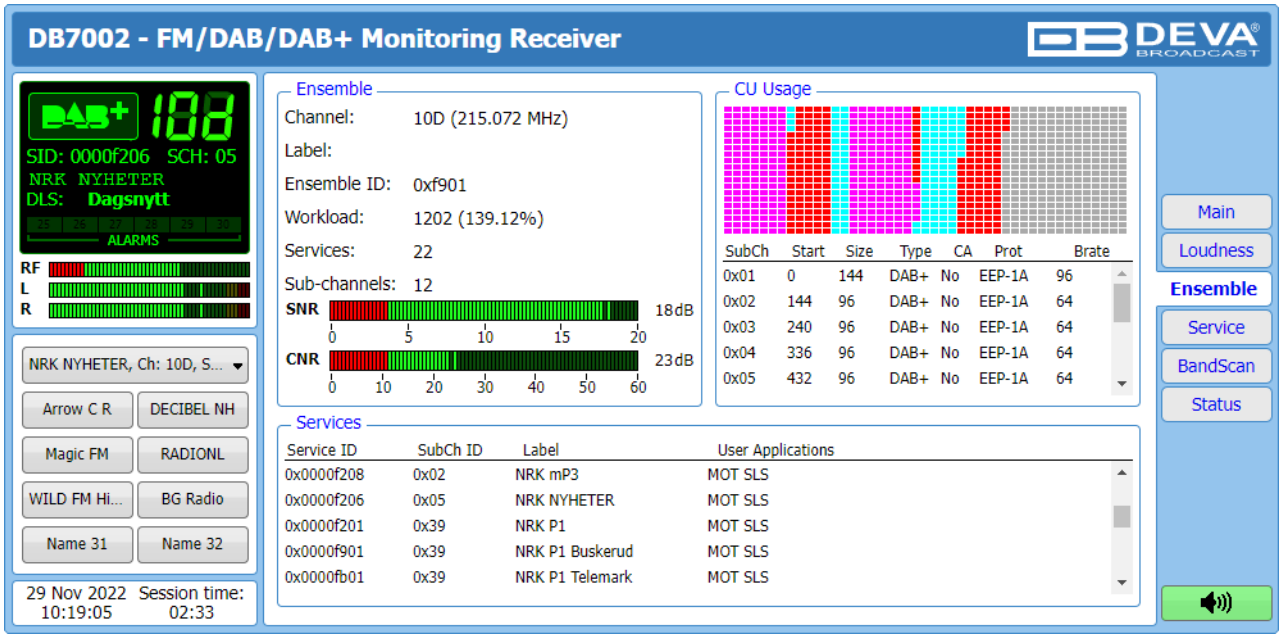
The page offers all the above measurements in two display forms – high refresh rate bar graphs for displaying current values and a time graph for extended visualization over time.

The user can modify the processing and appearance of the measurement using the following settings:

- **Long-term** – allows the user to select the length of the Long-term loudness measurement sliding time window. The time-based sliding window could be set with length from 10 to 120 seconds;
- **[Reset Long-term]** – resets the Long-term measurement;
- **Mode** – allows the user to select/change between [ITU BS.1770-4] and [EBU R128] mode;
- **Span** – sets the time graph span. Options of [60 seconds] and [120 seconds] are available;
- **Range** – the option buttons allow the user to set the preferred time graph measurement range.

IMPORTANT NOTE: Depending on the currently opened screen, the Loudness meter incorporated in the DB7002 switches between FM and DAB/DAB+.

ENSEMBLE



Ensemble

This section provides information about the currently selected ensemble - Channel, Label, Ensemble ID, Workload, number of available Services and Sub-channels. SNR (signal-to-noise) and CNR (carrier-to-noise) indicators in dB, represented as LED readings, are also available.

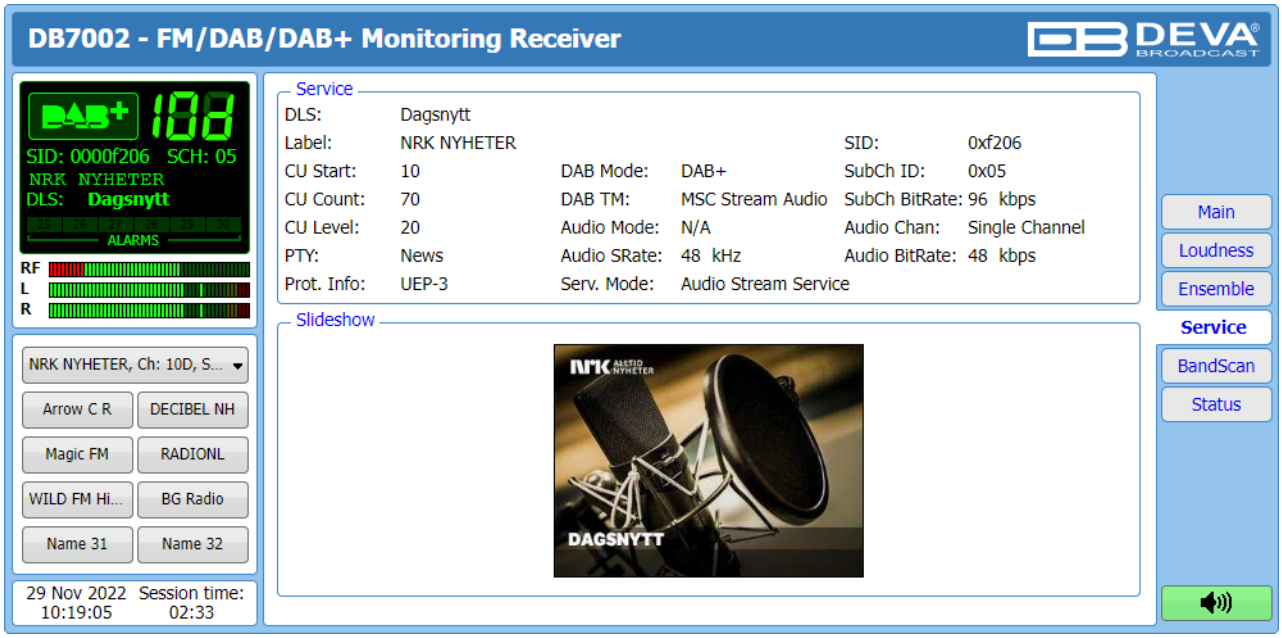
CU Usage

Visual representation of the CU usage of the Ensemble is available in this section of the WEB Interface. An ensemble has a maximum bit rate that can be carried. It depends on the used error protection level. Usually all DAB multiplexes can carry a total of 864 “capacity units”. Having said that the number of capacity units (or CU) that a certain bit-rate level requires, depends on the amount of error correction added to the transmission.

Services

An Ensemble will typically carry multiple services from multiple radio networks. List of the available Services can also be found in this tab.

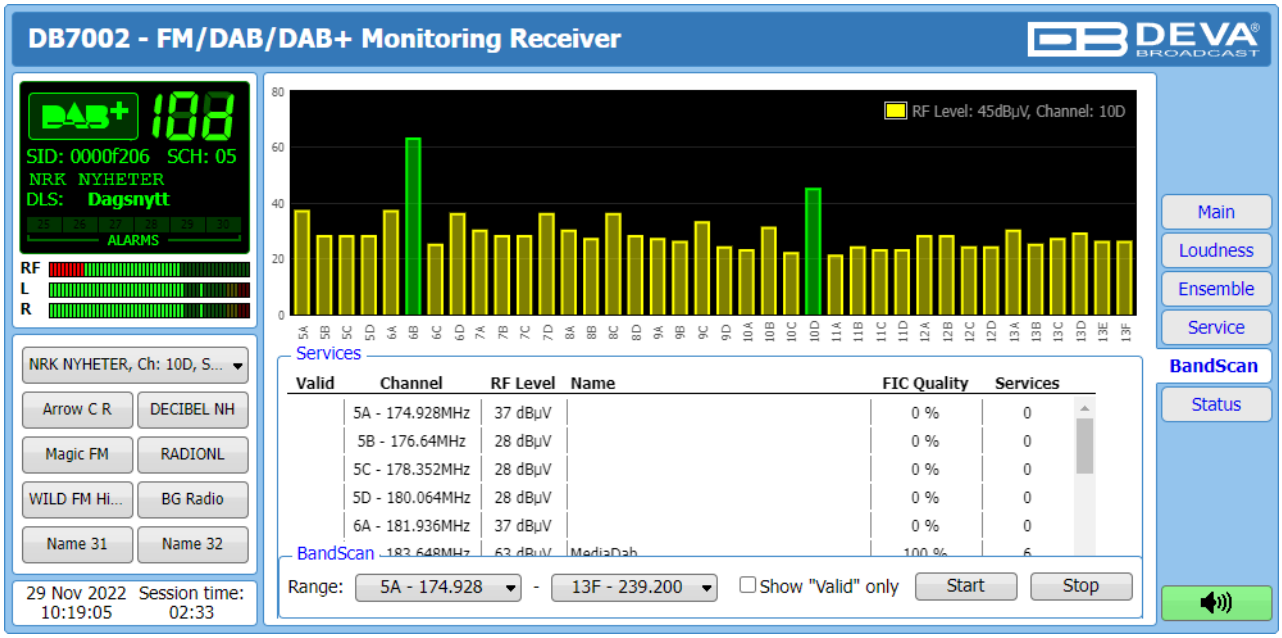
SERVICE



This Screen contains information on all the mandatory parameters of the currently selected service. Slideshow is also displayed (if available).

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

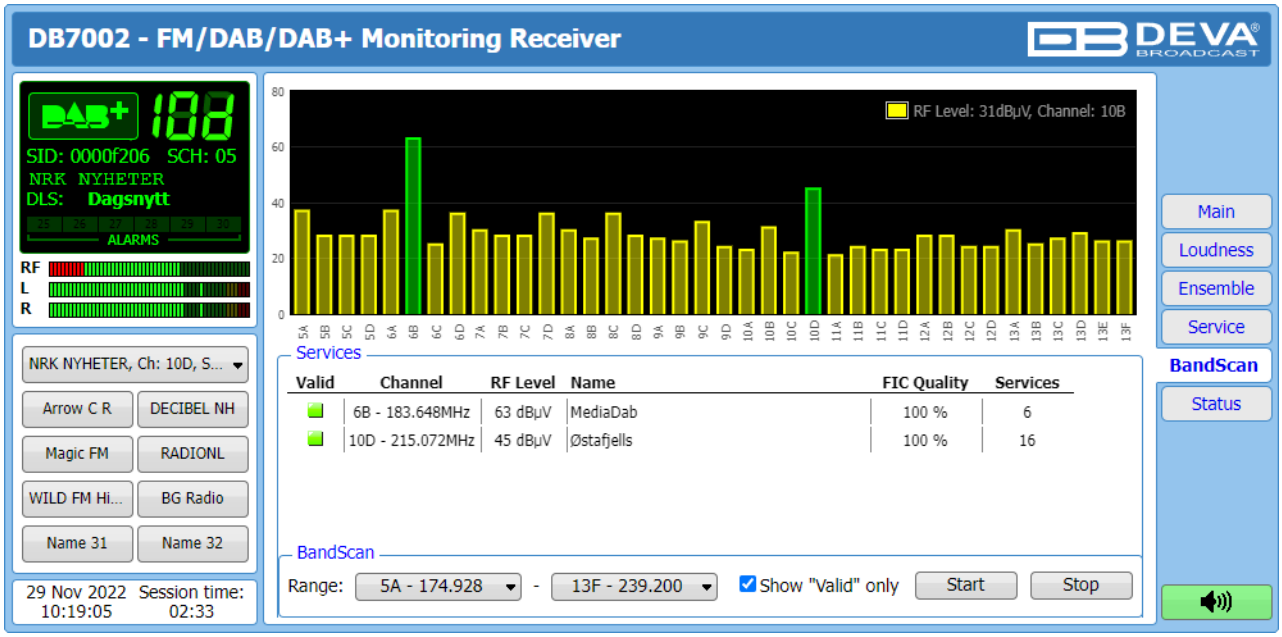
BANDSCAN



The bandscanning mode is easily customized by setting range of the scan. To start a bandscan follow the instructions listed below:

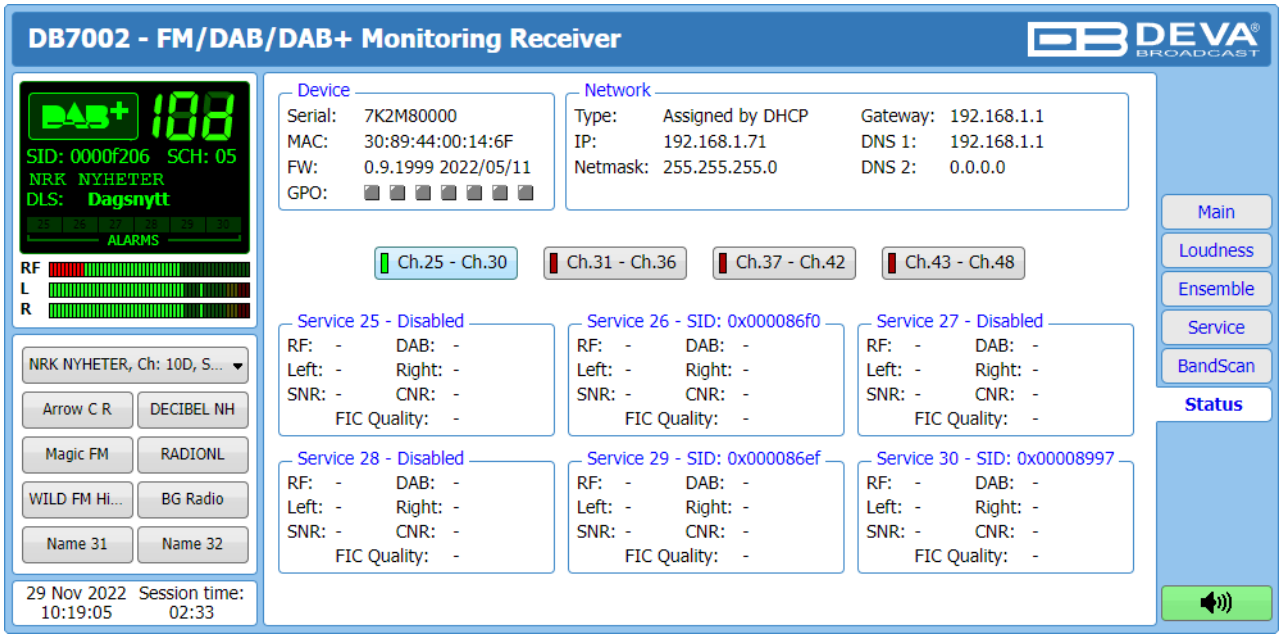
1. Set the bandscan range;
2. Specified whether all results or the Valid only will be shown;
3. Press the [Start] button;
4. The scan can be stopped at any point by pressing the [Stop] button.

If the **Show "Valid" only** option is enabled, only the valid results will be listed. If not, all the results will be visible and the valid ones will be illuminated in green.



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

STATUS



This Screen shows the alarm status of each parameter of the preset frequencies, along with the basic device and network status (IP address, MAC, etc.).

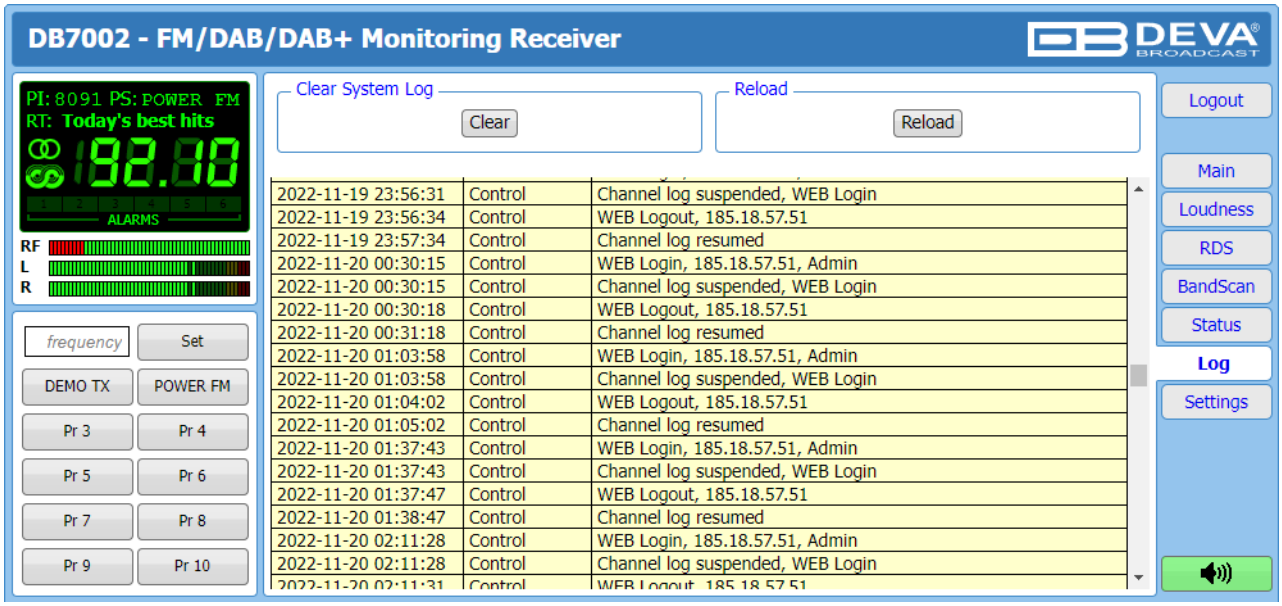
The Service parameters (RF, SNR, CNR etc.) have several conditions:

- In range – green OK;
- Out of range – red LOW, HIGH or LOSS;
- Signal monitoring is not enabled – n/a.

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 Common Pages

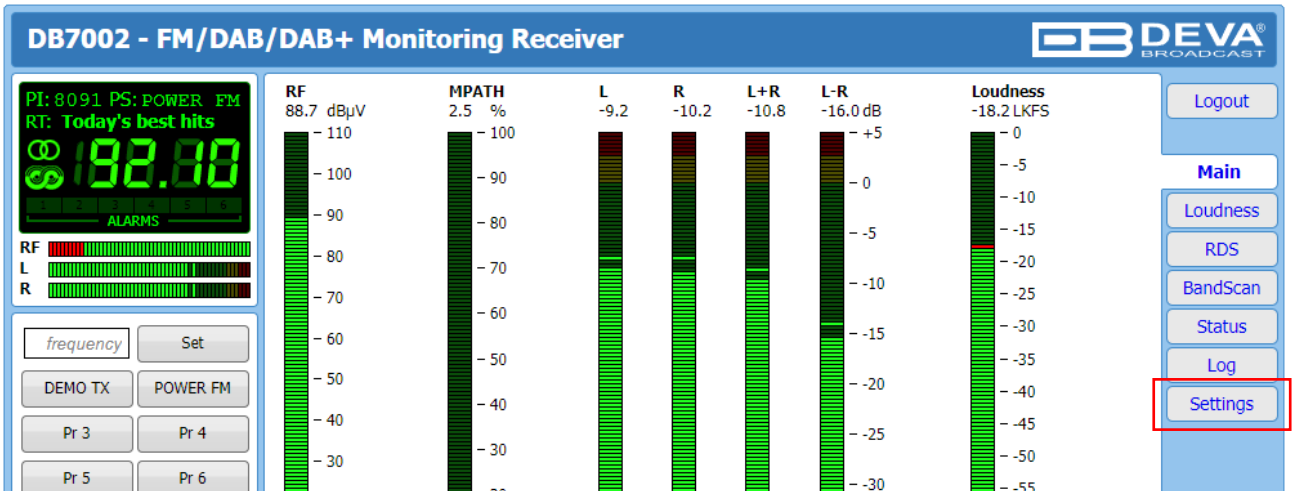
LOG

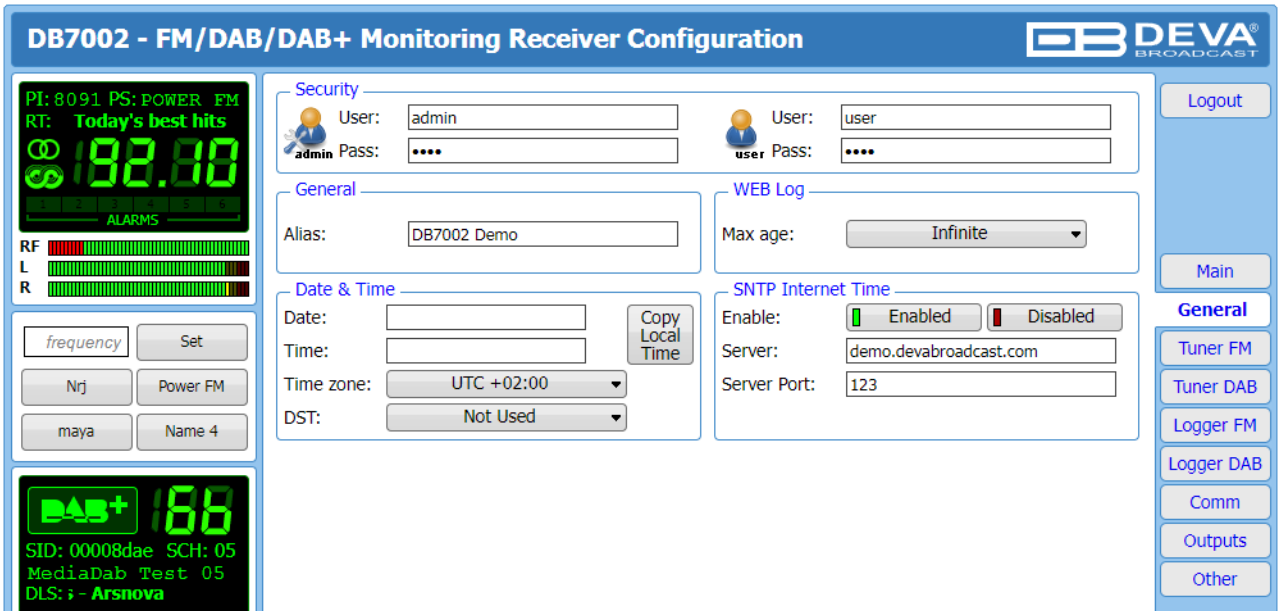


Here are listed all the Device System Events. The local measurements and logs are saved in the internal device memory. All log files can be downloaded via the built-in FTP server. For information on how the connection between the DB7002 and an FTP Client should be configured, please refer to "Download files via FTP" on page 88.

GENERAL SETTINGS

Please bear in mind that the settings for both the FM and DAB/DAB+ options of the DB7002 are available trough the Settings button located in the FM Section (upper part of the WEB Interface).





DB7002 provides you with protected access to the device settings. You can choose between two types of log in.

- As an Administrator – It will give you full control over the settings of the device;
- As a 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 DB7002 to be enhanced, a new **username** and **password** could be set from the Security section. By choice, you can change the name of the device (General section). Later on, it will be used as a title name for all WEB pages. Customizing the name will make the device more recognizable.

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.

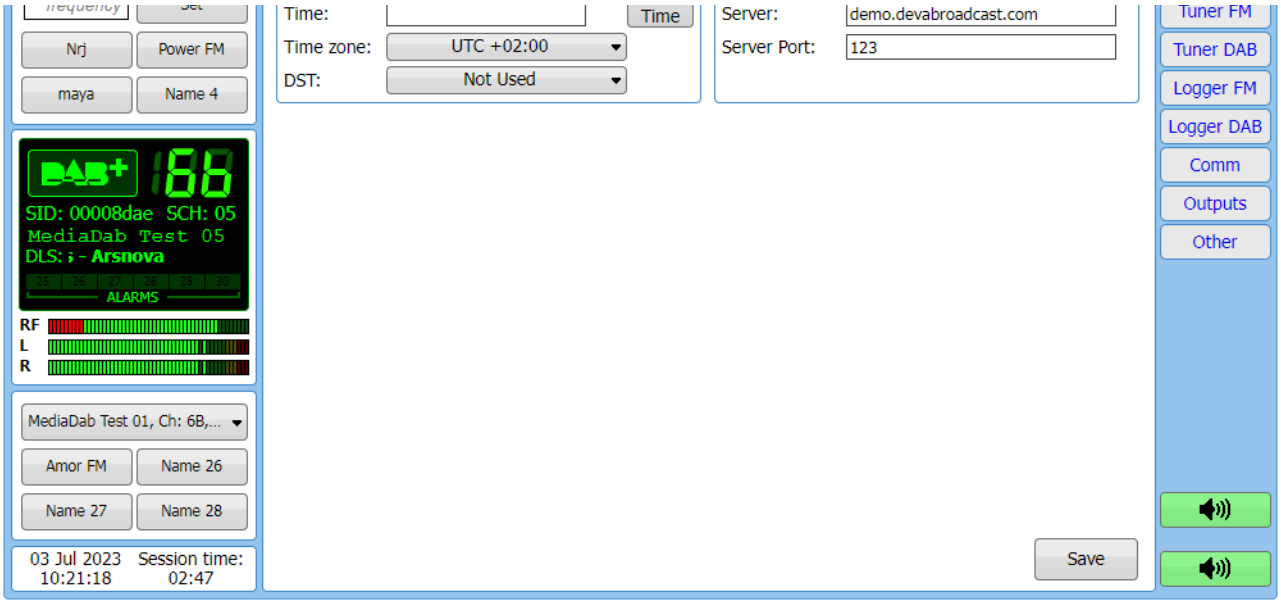
Date & Time – used for manually set the current Date and Time. [Copy Local Time] button will set the Date and Time to correspond to that of your computer.

SNTP Internet Time – Synchronizes automatically the DB7002 clock to a millisecond with the

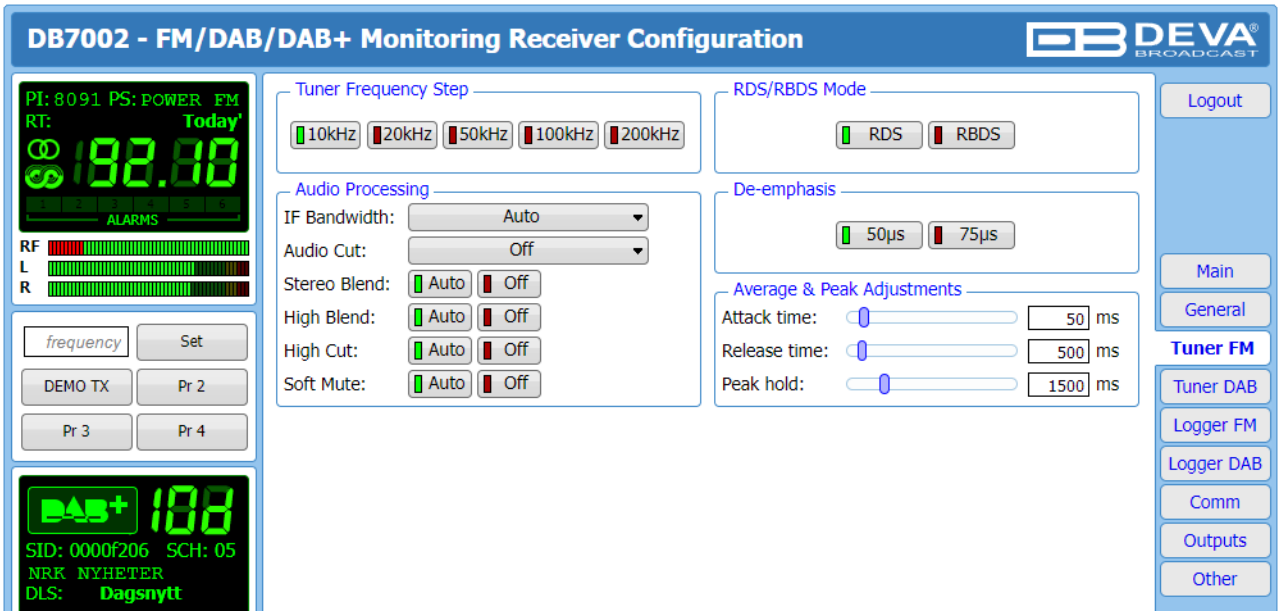
Internet time server. Enable this function in order to use it. (Specifying the server closest to your location will improve the accuracy).

NOTE: In order for the applied settings to be used press the [Save] button, placed on the bottom right part of the screen.

On the bottom right corner you will find 2 speaker buttons. One for the currently tuned FM and one for the DAB signals.



FM TUNER SETTINGS



The Tuner Section gives full control over Tuner settings.

Tuner Frequency Step – Allows tuner frequency step value to be set.

RDS/RBDS Mode – Depending on the client's preferences, the deviation could be measured in % [RBDS] or in kHz [RDS].

De-emphasis – User defined De-emphasis could be set, where the default values are 50 kHz Frequency Step and 50µs De-emphasis.

Audio Processing – If the IF Bandwidth is set to Auto, these settings depend on the quality of the received signal (RF Level, Multipath, and etc.). If any changes in the signal are detected, the unit will automatically adjust to the correct values.

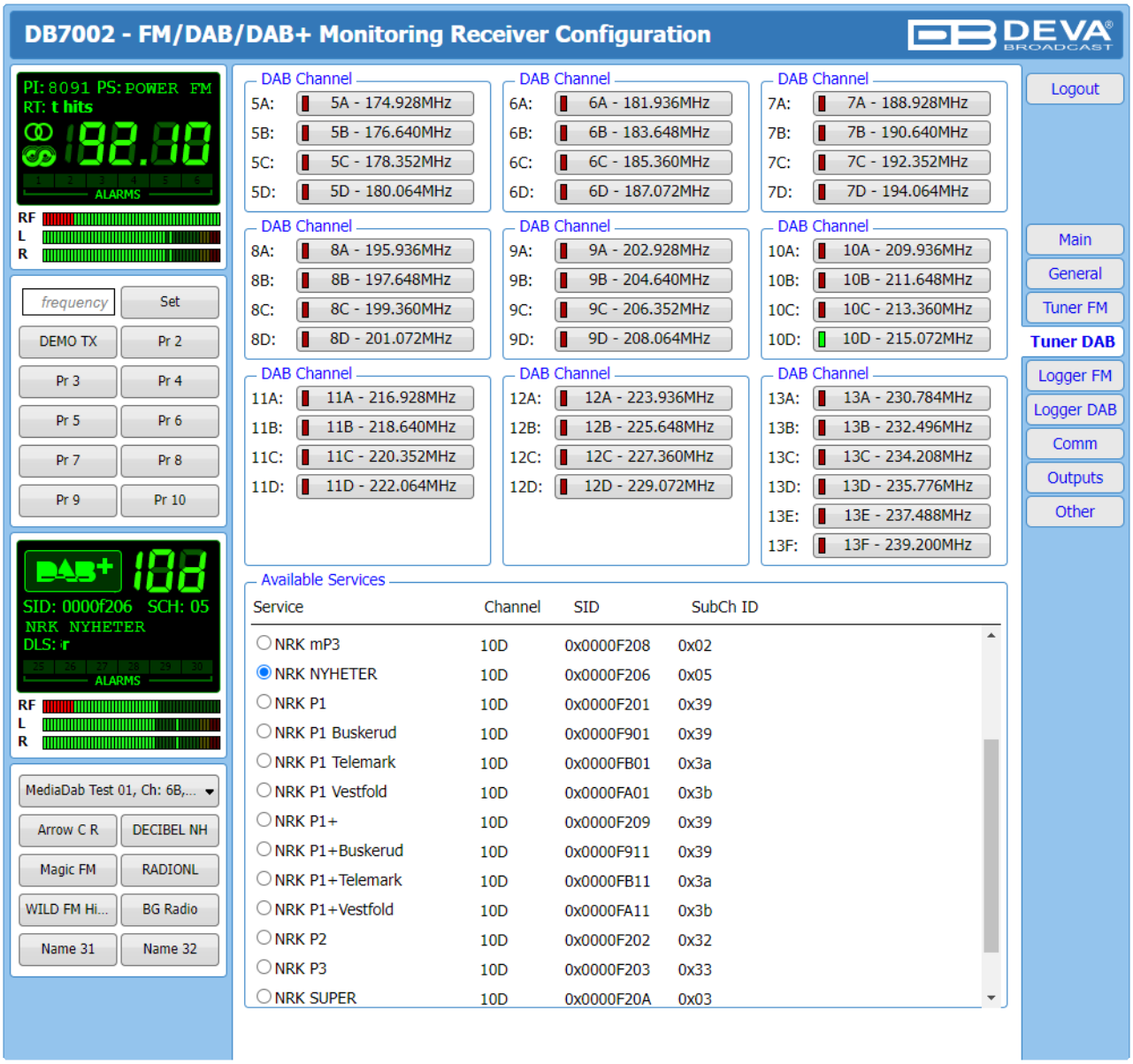
- Stereo Blend – reduces the stereo separation if the received signal is bad;
- High Blend – applies low pass filter to the L-R audio levels;
- High Cut – applies low pass filter to the L+R audio levels;
- Soft Mute – reduces the level of the audio if the RF level is too low.

Average & Peak Adjustments Section is used for setting of the indicators response times.

- Attack time and Release time set the rate in which the indicators' level will change in response to the signal. For most of the applications (including this one), the recommended attack time is shorter than the release time.
- Peak-hold time – Permits retaining and displaying the peak value reached by the signal for a period of time predefined by the user, in milliseconds.

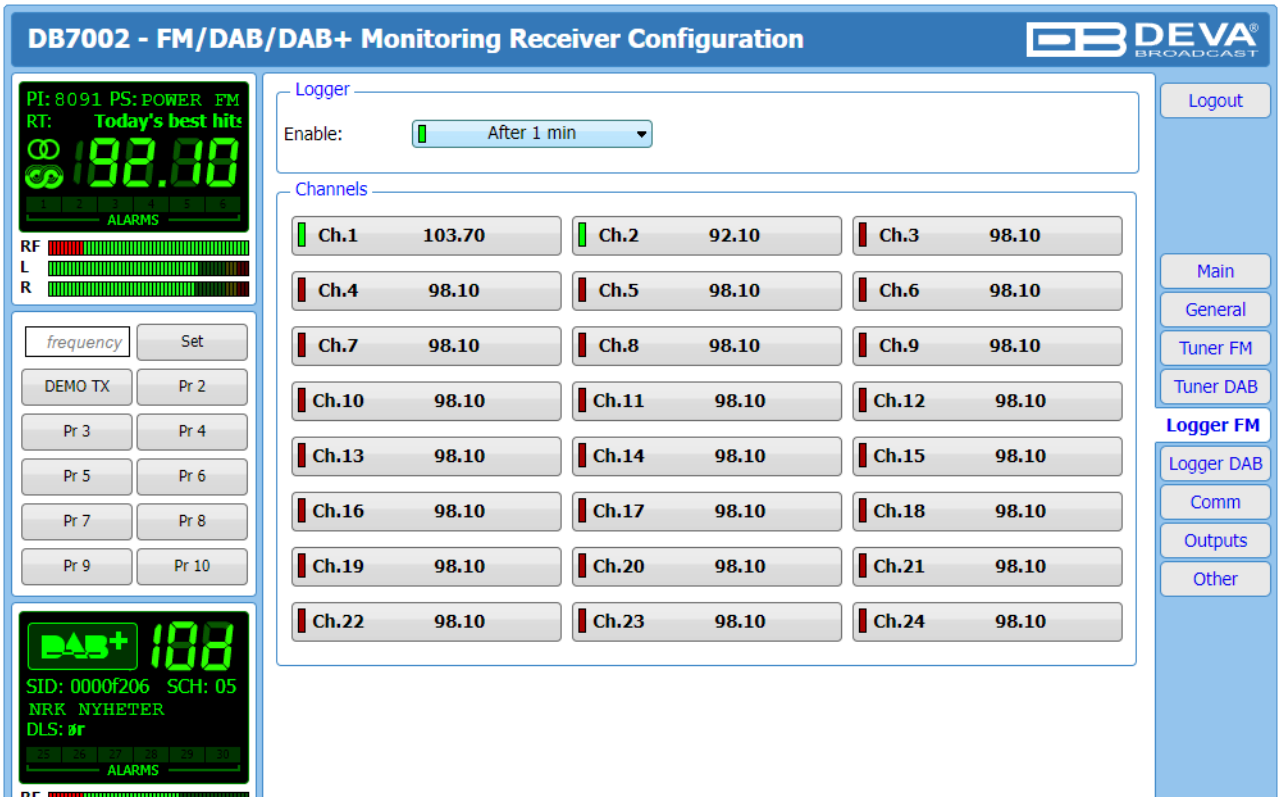
NOTE: In order for the applied settings to be used press the [Save] button, placed on the bottom right part of the screen.

DAB TUNER SETTINGS



The Tuner Section gives control over Tuner settings, allowing you to select a DAB channel and service. All available services will be listed below once the list is collected from the multiplex data.

FM LOGGER



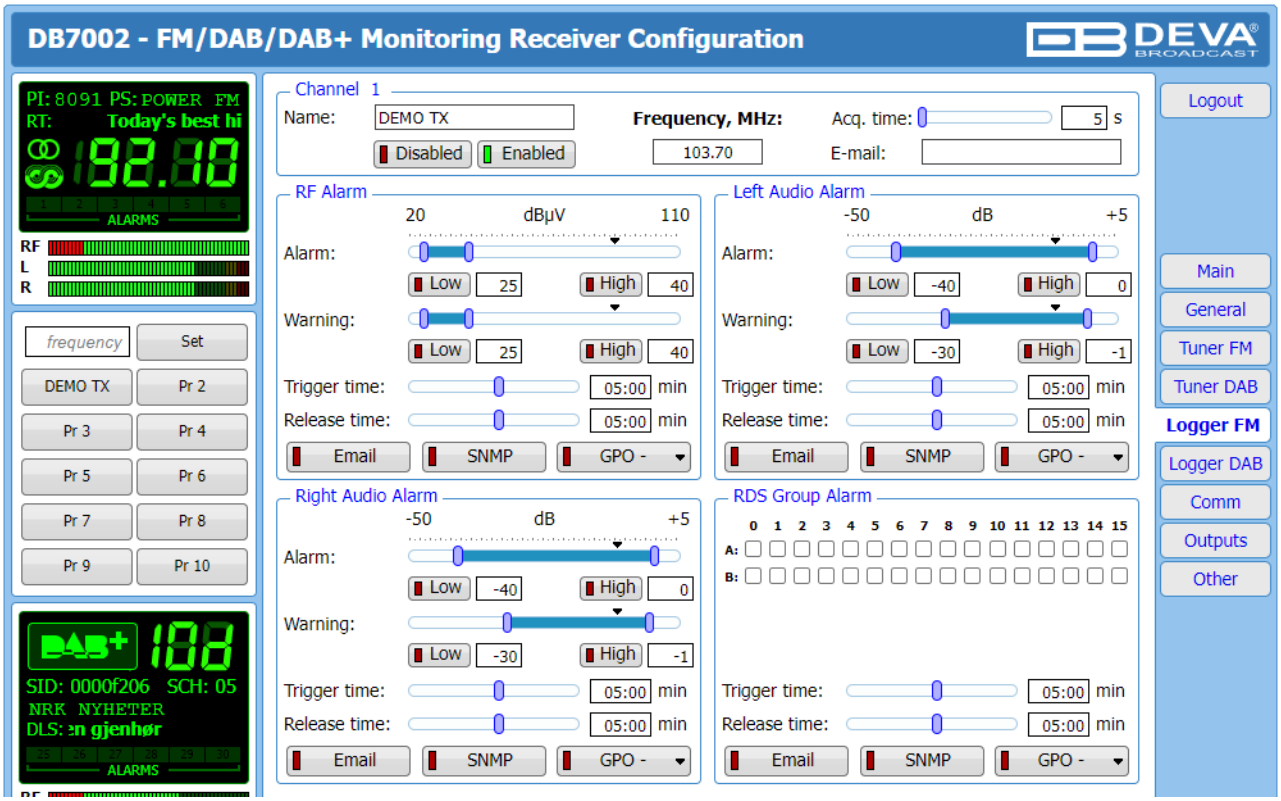
Trough this section of the WEB Interface, FM Channels could be chosen and monitored, by applying the needed settings.

When the desired adjustments are being made, DB7002 will monitor all of the selected channels at regular intervals. All of the collected information is accessible through the built-in FTP Server. (see “Download files via FTP” on page 88)

Follow the steps below to initiate the simplified process of starting a Logger mode:

- Set the Logger’s start time delay;
- Click on a Channel to open the settings page;
- Set the Name and Frequency parameters for each of the channels;
- Set the Acquisition time for each service;
- In order for a service to be included in the campaign, the [Enable]/[Disable] button should be selected. To exclude a Channel from the campaign select the [Disable] button.

FM CHANNELS SETTINGS (CHANNELS 1 TO 24)



The DB7002 can monitor up to 24 FM Stations at regular intervals and send warning and alarm notifications via E-mail, SNMP and GPO. Every Channel consists of a group of settings (explained in details below), which are used when monitoring and alerting. Each preset has its own page where it is being configured. Measurement windows can be set for each of the parameters: RF, Left and Right audio levels. Trigger and alarm release times can be set for each alarm.

The notification means (Email, SNMP, GPO) is set for each parameter individually. To enable the notification, press on the relevant button so that it could be illuminated in green.

Channel

- [Enabled] / [Disabled] channel monitoring and sending of warnings and alarms. If the channel is not generally enabled, the frequency will not be monitored and alarm notifications will not be received;
- Frequency – specify the frequency to be monitored;
- Name – channel alias. The same name will appear on the quick access buttons in the "dashboard";
- Acquisition time – specify the observation time for the current station (before switching to the next channel).
- E-mail – set email address that will receive warning and alarm notifications for this service only.

Alarm

- Alarm Range – interactive slider used to adjust the Low & High thresholds at which an alarm will be generated;
- Warning Range – interactive slider used to adjust the Low & High thresholds at which a warning will be generated;
- Threshold – buttons to enable/disable alarm range limits;

- Trigger Time – waiting time before Active Alarm/Warning is generated;
- Release Time – waiting time before Idle Alarm/Warning is generated;
- RDS/RBDS Group Alarm – alarm only for selected groups will be generated.

IMPORTANT NOTE: Warnings and alarms are generated only when the Logger mode is running. While there is any user interaction, warning or alarm will not be generated and send. The Logger starts running once the user logs out of the WEB interface.

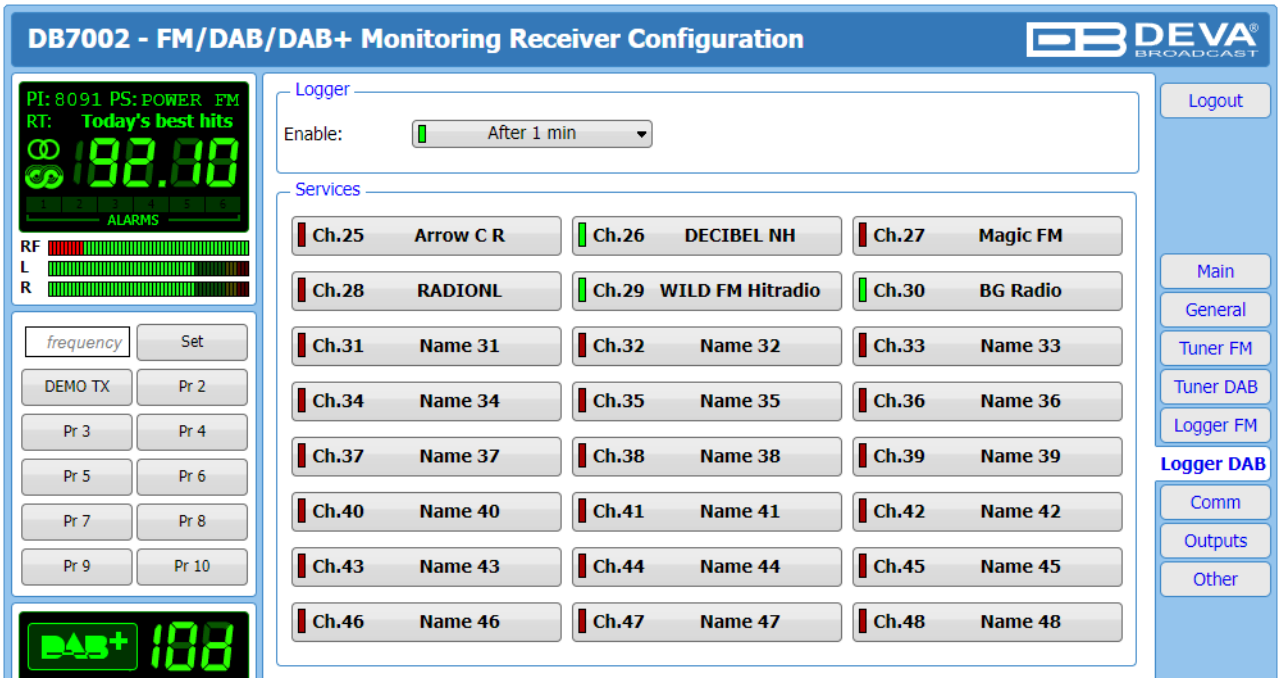
Trigger and Release times define the time, which should elapse in order for the received signal to be defined as low/high/lost or restored/OK. What we recommend is the release time to be bigger than the trigger time.

NOTE: When setting Trigger and Release times, have in mind that 01:00 means 1 minute, and 00:01 means 1 second.

NOTE: In order for the applied settings to be used press the [Save] button, placed on the bottom right part of the screen.

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

DAB LOGGER



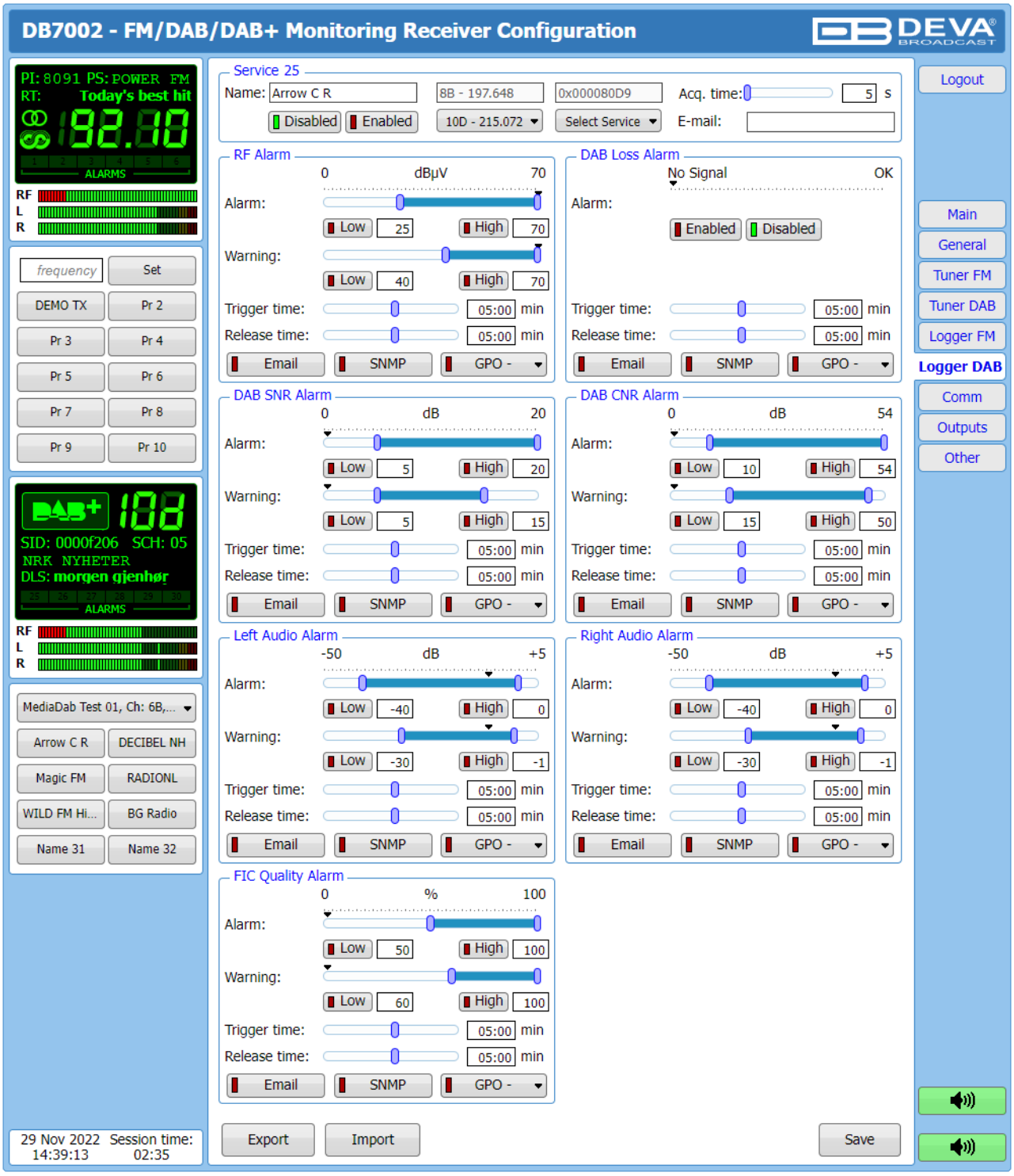
Trough this section of the WEB Interface, services could be chosen and monitored, by applying the needed settings.

When the desired adjustments are being made, DB7002 will monitor all of the selected services at regular intervals. All of the collected information is accessible through the built-in FTP Server. (see “Download files via FTP” on page 88)

Follow the steps below to initiate the simplified process of starting a Logger mode:

- Set the Logger’s start time delay;
- Click on a service to open the settings page;
- Set the Channel and Service ID parameters for each of the channels;
- Set the Acquisition time for each service;
- In order for a service to be included in the campaign, the [Enable]/[Disable] button should be selected. To exclude a station from the campaign select the [Disable] button.

DAB LOGGER SERVICE SETTINGS (SERVICE 1)



The DB7002 can monitor up to 24 preset DAB Services at regular intervals and send alarm notification via E-mail, SNMP and GPO. Every Channel consists of a group of settings (explained in details below), which are used when monitoring and alerting. Each preset has its own page where it is being configured. Measurement windows can be set for each of the six parameters: RF, Left and Right audio levels, DAB Loss, DAB SNR, DAB CNR, FIC quality. Trigger and alarm release times can be set for each alarm.

The notification means (Email, SNMP, GPO) is set for each parameter individually. To enable the notification, press on the relevant button so that it could be illuminated in green.

Service

- Name – preset alias. The same name will appear on the quick access buttons in the "dashboard";
- [Enabled]/[Disabled] channel monitoring and sending of warnings and alarms. If the channel is not generally enabled, the frequency will not be monitored and alarm notifications will not be received;
- Channel - select the desired DAB Channel from the drop-down menu;
- Service – select the desired Service from the drop-down menu;
- Acquisition time – specify the observation time for the current station (before switching to the next channel);
- E-mail – set email address that will receive alarm notifications for this service only.

Alarm

- Alarm Range – interactive slider used to adjust the Low & High thresholds at which an alarm will be generated;
- Warning Range – interactive slider used to adjust the Low & High thresholds at which a warning will be generated;
- Threshold –buttons to enable/disable alarm range limits;
- Trigger Time – waiting time before Active Alarm/Warning is generated;
- Release Time – waiting time before Idle Alarm/Warning is generated;
- Alarm notification option.

IMPORTANT NOTE: Warnings and Alarms are generated only when the Logger mode is running. While there is any user interaction, alarm will not be generated and send. The Logger starts running once the user logs out of the WEB interface.

Trigger and Release times define the time, which should elapse in order for the received signal to be defined as low/high/lost or restored/OK. What we recommend is the release time to be bigger than the trigger time.

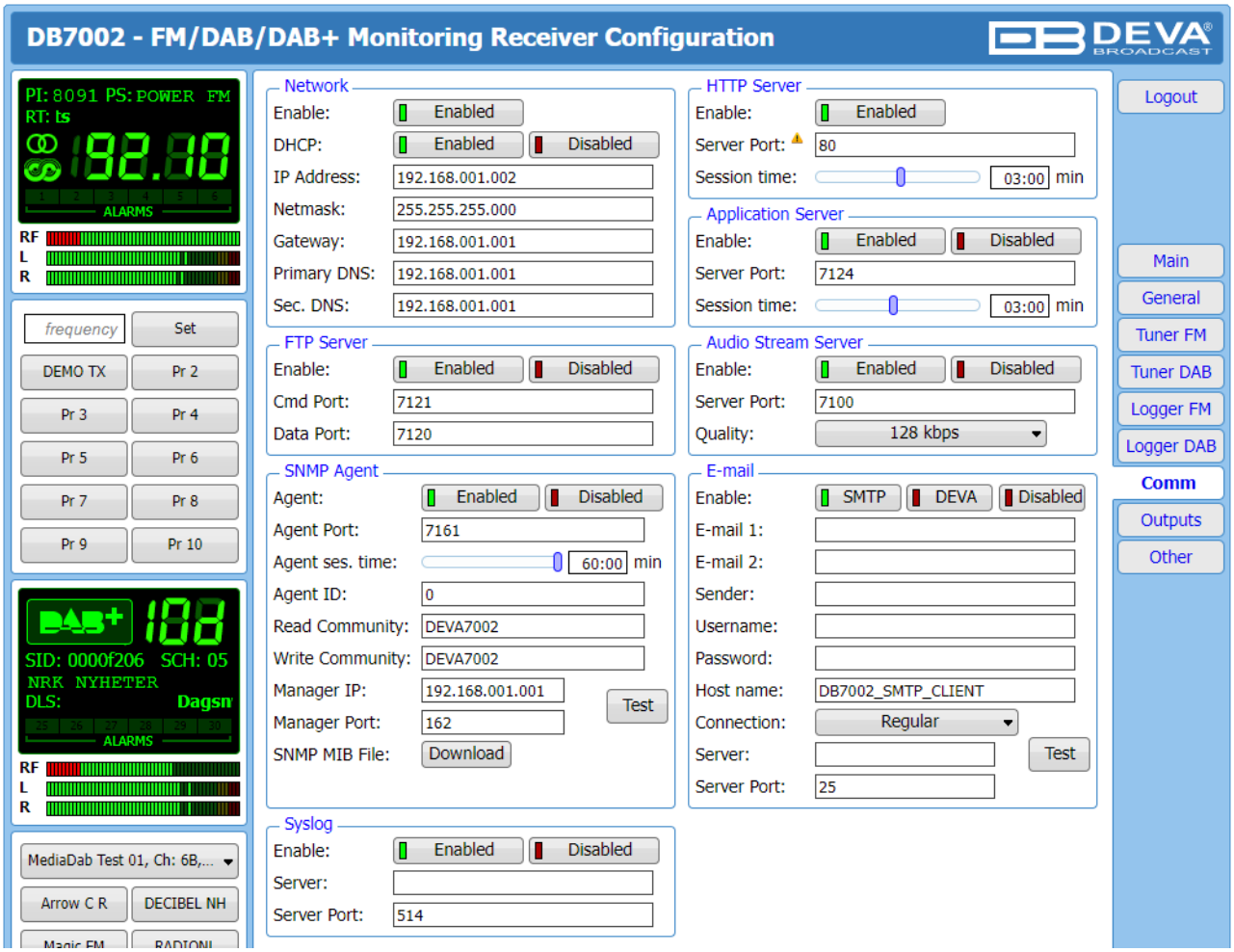
NOTE: When setting Trigger and Release times, have in mind that 01:00 means 1 minute, and 00:01 means 1 second.

NOTE: In order for the applied settings to be used press the [Save] button, placed on the bottom right part of the screen.

[Export] will export the currently applied alarms settings.

[Import] allows you to import the Service settings from other DB7002.

COMMUNICATION SETTINGS



Network

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, DB7002 will use AutoIP and will generate an IP Address.

HTTP Server

[Enabled] the HTTP Server. Specify the Server Port and session timeout. If the [Enabled] button is not illuminated in green, the option is disabled.

FTP Server

[Enabled]/[Disabled] the FTP Server. Specify the Command and Data Ports to be used.

Audio Stream Server

[Enabled]/[Disabled] the Audio Stream Server. Then specify Port for audio Streaming, and Quality (64, 96, 128, 192 or 256 kbps). The Audio Stream could be heard using suitable audio player (Media Player, Winamp, etc.) or through the WEB interface by pressing the [Listen] button.

SNMP Agent

Agent – [Enabled]/[Disabled] the SNMP Agent.

Specify Agent ID, Agent Port, Read/Write Communities, Manager IP, Manager Port and session timeout. 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 DB7002 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.

E-mail

To use the email notification option, please make sure it is [Enabled] by pressing the relevant button. Then follow the instructions below:

1. Enter the desired alarm recipients in e-mail 1 and/or e-mail 2 fields.
2. Fill in your e-mail account settings: Sender, Username and Password, Server, SNMP port and connection type.
3. It is mandatory the type of connection with the server to be specified from Connection - Regular, Encrypted.
4. 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.
5. 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:

```
DB7002 Test Message.
Please do not reply to this e-mail.
```

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:

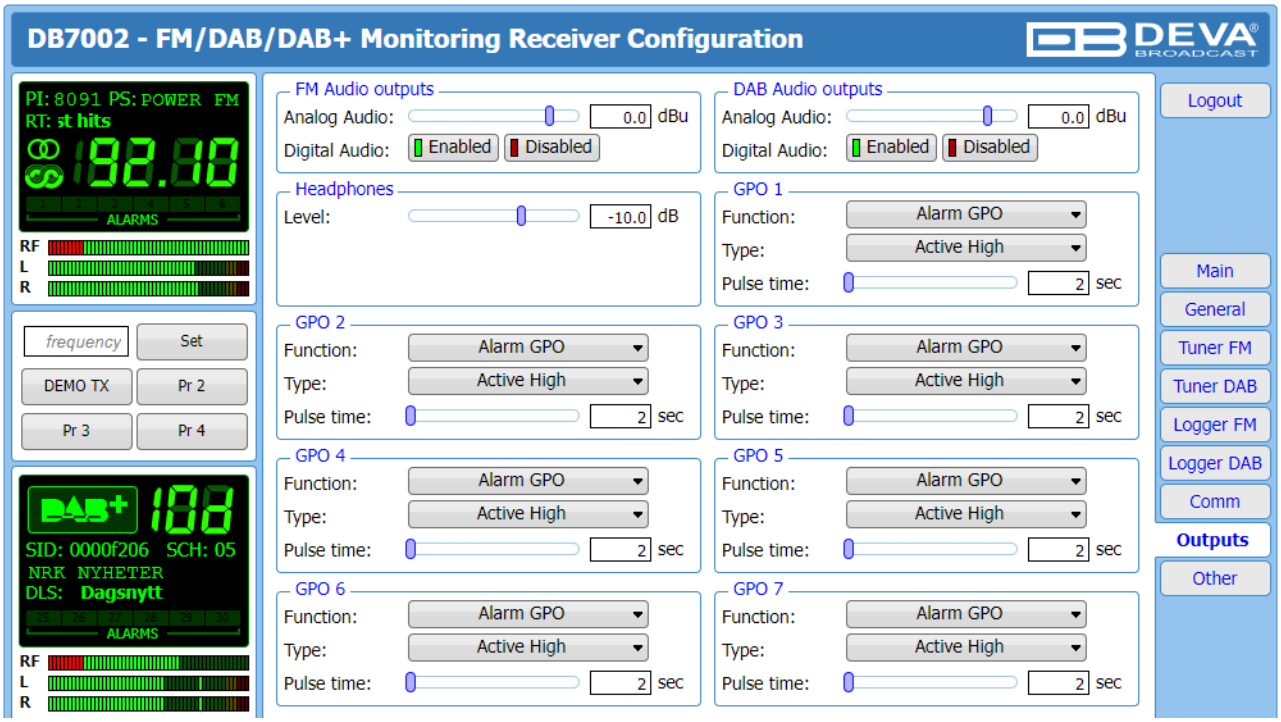
1. Complete the recipient emails (E-mail 1 and E-mail 2) only.
2. The other fields must be left blank, otherwise the email notification option will not be working.
3. We recommend you to use the [Test] button and generate a test e-mail, which upon success will be delivered to the specified E-mail 1 and/or E-mail 2. Example of Test E-mail Message:

```
DB7002 Test Message.
Please do not reply to this e-mail.
```

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.

NOTE: In order for the applied settings to be used press the [Save] button, placed on the bottom right part of the screen.

OUTPUTS SETTINGS

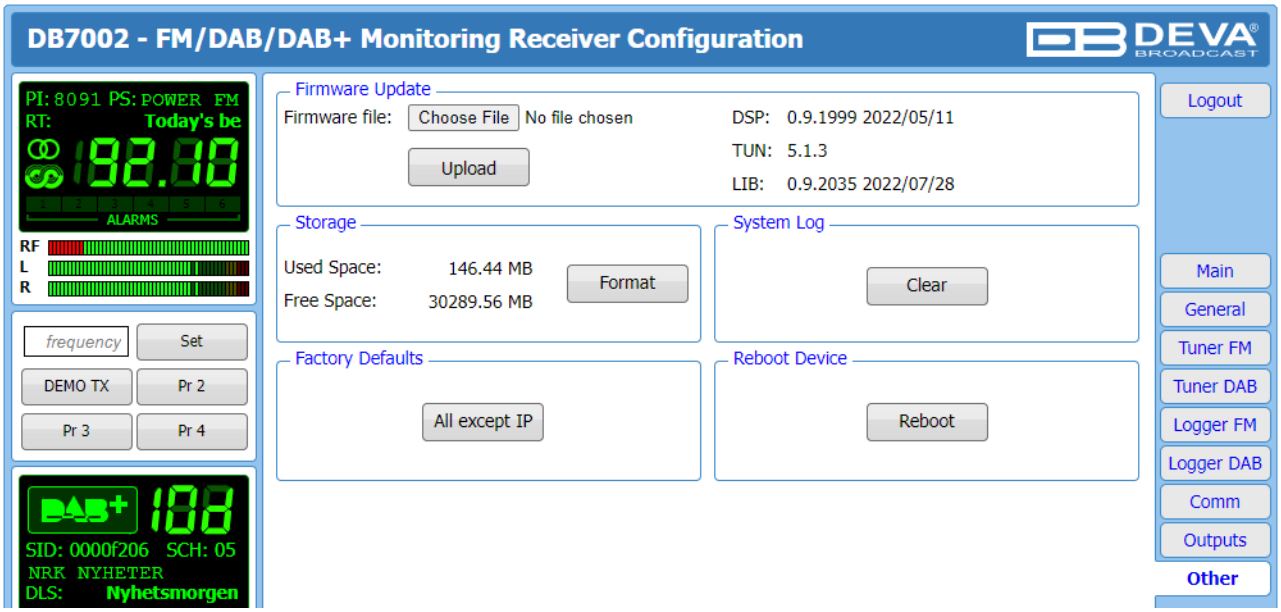


The general purpose outputs settings are applied through this page. Function, type and pulse time for each of the GPOs could be set individually. You can choose between the available functions. Type is used for specifying of the active level. When an alarm is generated the output can change the level to Active High/Low or to generate High/Low Pulse.

PLEASE NOTE that if the GPO's function is not assigned as Alarm GPO and is chosen as a preferred alarm, notifications will not be indicated, nevertheless one is being generated.

The Outputs page also allows you to set the Headphones Audio level.

OTHER SETTINGS



Firmware Update

To update the device firmware, select the new firmware file. After having pressed the Upload button, a dialog window will appear. Confirm the firmware update and wait for the process to complete. Information on current DSP1, DSP2 and WEB version is also found in this section.

Storage

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

System Log

By pressing the [Clear] button, all records in the system log will be deleted.

Factory Defaults

[All except IP] – all settings, except for the Network settings (IP Address) will be deleted.

To restore DB7002 to its Factory Defaults, press [All except IP]. 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 DB7002, 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.

APPENDIX A

RDS: EUROPE VS AMERICA

The European Broadcasting Union (EBU) and its member countries originated the concept of "Radio Data" transmission. The European RDS specification, CENELEC Standard EN50067, was first published in 1984. It was revised in 1986, 1990, 1991 and 1992.

European RDS has grown in use following initial adoption of the Standard. RDS is nearly universal throughout Europe; it is almost impossible to find a European FM broadcasting station that does not carry a radio data subcarrier.

The popularity of RDS in Europe is very much in contrast with initial reluctance on the part of US broadcasters to embrace this technology. This can be ascribed to material differences in broadcasting practices.

Almost without exception, FM broadcasting in the United States is 'detached' and independent - each station originates its own programming. America's National Public Radio might be considered as an exception, though for most of the broadcast day even NPR stations originate, or at least schedule, their own programs.

Most of European broadcasting is similar to the concept of network radio that was common in the US prior to the 1950s. In Europe, a central program originator may have many transmitting facilities of modest power situated throughout the country, at several different frequencies to blanket a designated service area. The European disposition, toward lower-power transmitters can be found on the "local radio" level, as well.

The European concept of a service area equates to the US broadcaster's market. The subtle difference between these designations further characterizes broadcasting practices and ethics. RDS benefits the European broadcaster through almost an altruistic endeavor to be of service to his listeners. The US broadcaster is marketing his programming and is primarily interested in how he can create additional revenue from RDS.

THE RDS SYSTEM

RDS is a digital data channel, transmitted as a low-level subcarrier above the range of the composite stereo program signal in the FM baseband. The data transmission (baud) rate is comparatively low, yet it is quite robust because of data redundancy and effective error correction.

It is not within the scope of this Manual to cover the details of RDS subcarrier coding and modulation. For this, the reader is directed to the Specification appropriate to his location either the CENELEC EN50067 Specification for Europe or the United States NRSC Specification. Since the Manual will deal with specific implication of RDS implemented with the DB7002, it is assumed that the user is familiar with the RDS concept.

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

APPENDIX B.1

PTY Code Description Used in RBDS Mode – North America

PTY	Short Name	Description
1	News	News reports, either local or network in origin.
2	Information	Programming that is intended to impart advice.
3	Sports	Sports reporting, commentary, and/or live event coverage, either local or network in origin.
4	Talk	Call-in and/or interview talk shows either local or national in origin.
5	Rock	Album cuts.
6	Classic Rock	Rock oriented oldies, often mixed with hit oldies, from a decade or more ago.
7	Adult Hits	An up-tempo contemporary hits format with no hard rock and no rap.
8	Soft Rock	Album cuts with a generally soft tempo.
9	Top 40	Current hits, often encompassing a variety of rock styles.
10	Country	Country music, including contemporary and traditional styles.
11	Oldies	Popular music, usually rock, with 80% or greater non-current music.
12	Soft	A cross between adult hits and classical, primarily non-current softrock originals.
13	Nostalgia	Big-band music.
14	Jazz	Mostly instrumental, includes both traditional jazz and more modern “smooth jazz.”
15	Classical	Mostly instrumentals, usually orchestral or symphonic music.
16	Rhythm and Blues	A wide range of musical styles, often called “urban contemporary.”
17	Soft R and B	Rhythm and blues with a generally soft tempo.
18	Foreign Language	Any programming format in a language other than English.
19	Religious Music	Music programming with religious lyrics.
20	Religious Talk	Call-in shows, interview programs, etc. with a religious theme.
21	Personality	A radio show where the on-air personality is the main attraction.
22	Public	Programming that is supported by listeners and/or corporate sponsors instead of advertising.
23	College	Programming produced by a college or university radio station.
24	Spanish Talk	Call-in shows, interview programs, etc. in the Spanish language
25	Spanish Music	Music programming in the Spanish language
26	Hip-Hop	Popular music incorporating elements of rap, rhythm-and-blues, funk, and soul
27-28	Unassigned	
29	Weather	Weather forecasts or bulletins that are non-emergency in nature.
30	Emergency Test	Broadcast when testing emergency broadcast equipment or receivers. Not intended for searching or dynamic switching for consumer receivers. Receivers may, if desired, display “TEST” or “Emergency Test”.
31	Emergency	Emergency announcement made under exceptional circumstances to give warning of events causing danger of a general nature. Not to be used for searching - only used in a receiver for dynamic switching.

NOTE: These definitions can differ slightly between various language versions.

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

APPENDIX B.2

PTY Code Description Used in RDS Mode – Europe, Asia

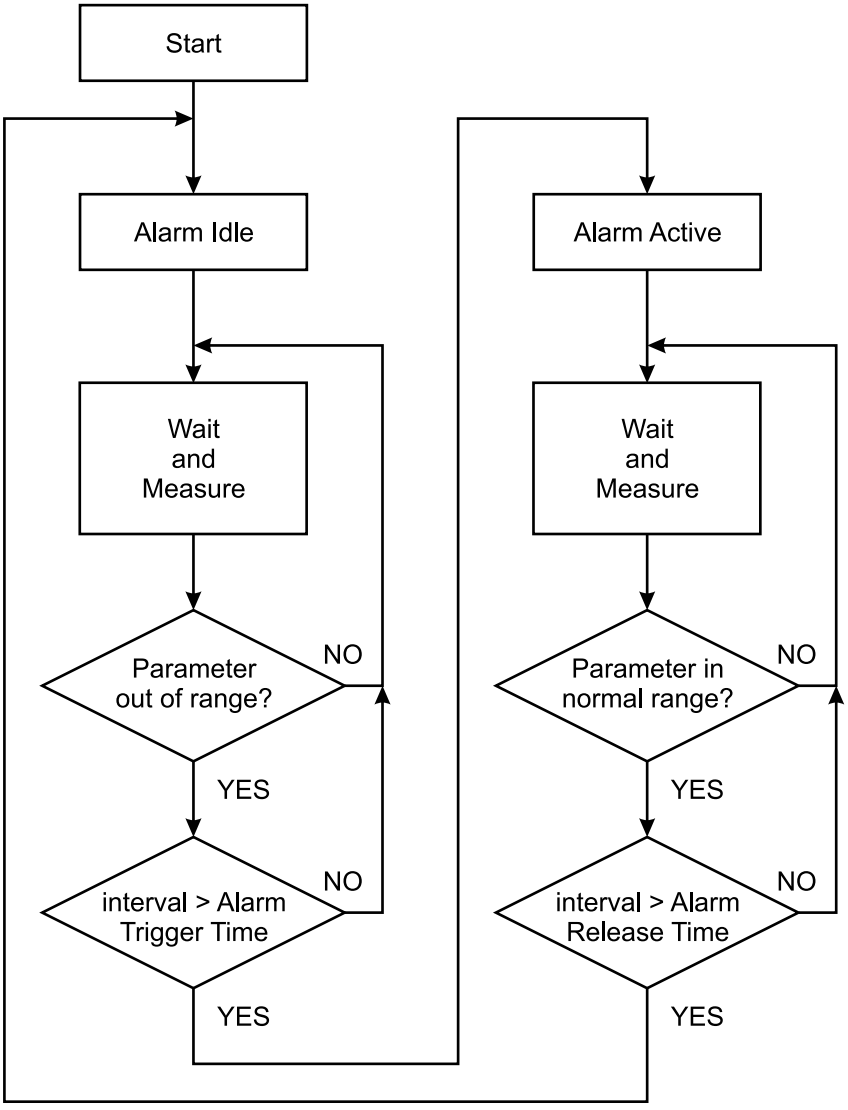
PTY	Short Name	Description
1	News	Short accounts of facts, events and publicly expressed views, reportage and actuality.
2	Current affairs	Topical program expanding or enlarging upon the news, generally in different presentation style or concept, including debate, or analysis.
3	Information	Program the purpose of which is to impart advice in the widest sense.
4	Sport	Program concerned with any aspect of sport.
5	Education	Program intended primarily to educate, of which the formal element is fundamental.
6	Drama	All radio plays and serials.
7	Culture	Programs concerned with any aspect of national or regional culture.
8	Science	Programs about the natural sciences and technology.
9	Varied	Used for mainly speech-based programs usually of light-entertainment nature, not covered by other categories. Examples include: quizzes, games, personality interviews.
10	Pop	Commercial music, which would generally be considered to be of current popular appeal, often featuring in current or recent record sales charts.
11	Rock	Contemporary modern music, usually written and performed by young musicians.
12	Easy Listening	Current contemporary music considered to be “easy-listening”, as opposed to Pop, Rock or Classical, or one of the specialized music styles, Jazz, Folk or Country. Music in this category is often but not always, vocal, and usually of short duration.
13	Light classics	Classical Musical for general, rather than specialist appreciation. Examples of music in this category are instrumental music, and vocal or choral works.
14	Serious classics	Performances of major orchestral works, symphonies, chamber music etc., and including Grand Opera.
15	Other music	Musical styles not fitting into any of the other categories. Particularly used for specialist music of which Rhythm & Blues and Reggae are examples.
16	Weather	Weather reports and forecasts and Meteorological information.
17	Finance	Stock Market reports, commerce, trading etc.
18	Children’s programs	For programs targeted at a young audience, primarily for entertainment and interest, rather than where the objective is to educate.
19	Social Affairs	Programs about people and things that influence them individually or in groups. Includes: sociology, history, geography, psychology and society.
20	Religion	Any aspect of beliefs and faiths, involving a God or Gods, the nature of existence and ethics.
21	Phone In	Involving members of the public expressing their views either by phone or at a public forum.
22	Travel	Features and programs concerned with travel to near and far destinations, package tours and travel ideas and opportunities. Not for use for Announcements about problems, delays, or roadworks affecting immediate travel where TP/TA should be used.
23	Leisure	Programs concerned with recreational activities in which the listener might participate. Examples include, Gardening, Fishing, Antique collecting, Cooking, Food & Wine etc.
24	Jazz Music	Polyphonic, syncopated music characterized by improvisation.
25	Country Music	Songs which originate from, or continue the musical tradition of the American Southern States. Characterized by a straightforward melody and narrative story line.
26	National Music	Current Popular Music of the Nation or Region in that country’s language, as opposed to International ‘Pop’ which is usually US or UK inspired and in English.
27	Oldies Music	Music from the so-called “golden age” of popular music.
28	Folk Music	Music which has its roots in the musical culture of a particular nation, usually played on acoustic instruments. The narrative or story may be based on historical events or people.
29	Documentary	Program concerned with factual matters, presented in an investigative style.
30	Alarm Test	Broadcast when testing emergency broadcast equipment or receivers. Not intended for searching or dynamic switching for consumer receivers.. Receivers may, if desired, display “TEST” or “Alarm Test”.
31	Alarm	Emergency announcement made under exceptional circumstances to give warning of events causing danger of a general nature. Not to be used for searching - only used in a receiver for dynamic switching.

APPENDIX C

ALARM TRIGGERS

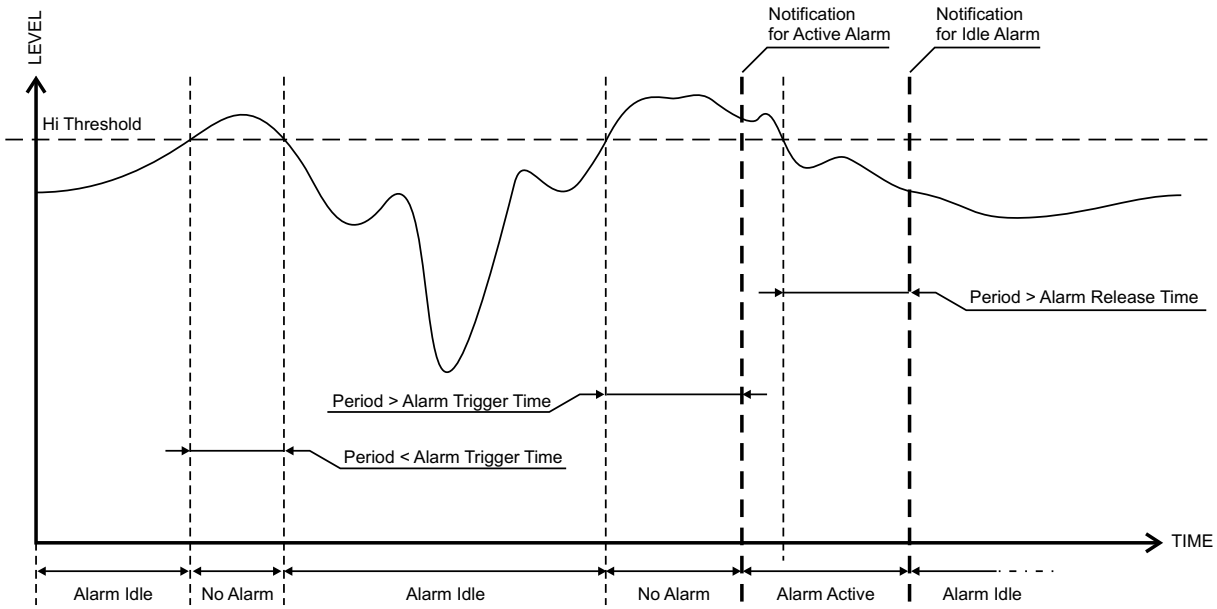
After collecting all the data, the DSP-based core compares the values measured with the predefined by the user threshold levels, for all the alarms monitored. In case that a parameter is beyond limits, the device will initiate the sending of an alarm notification via the selected communication path. All the alarm events are stored in the device's log. It is essential that, if there is a very short fault of the signal, with duration shorter than the 'alarm trigger time', the device would not trigger an alarm.

There are several Alarm Triggers for the following parameters: RF, DAB, DAB SNR, DAB CNR, Left/Right, FIC Quality.RDS Group loss, An option for defining different limits for each of the parameters is present. All these values, the 'trigger time' and the 'release time have to be assigned separately for each of the alarms.



Block Diagram of Alarm Automata

When an observation event takes place, the Alarm Trigger's State will refresh, if necessary. Should we consider an instance when the Alarm Trigger is in Idle state, having in mind that an alarm is not triggered immediately when a parameter level passes beyond threshold: If the parameter level becomes stable, within Thresholds, and the Alarm Trigger Time is not elapsed, then the Alarm Trigger remains in Idle state. If the Alarm Trigger Time expires and the parameter level is still beyond limits, the Alarm Trigger would change its state to High/Low. This would result in predefined actions - Alarm Notifications (E-mail, SMS, SNMP trap) and Save a Log Record. The state will not be immediately switched into Idle when the parameter stabilizes, within Threshold levels, not up until the 'Alarm Release Time' is elapsed. Meanwhile, if the parameter crosses again any Threshold, the Alarm Trigger will remain in Active state. If the parameter remain within the Threshold levels and the Alarm Release Time expires, then the Alarm Trigger would switch into Idle state and again predefined actions would be initiated.



If the RDS Group has not been received within the Alarm Trigger Time, the state would be changed into Active. If the Active state and the Release Time have elapsed and the RDS Group is received, the state is changed to Idle. Should the RDS Group is received before the Release Time is elapsed, the state would remain Active.

ALARM NOTIFICATIONS

The E-mail, SMS, SNMP trap Alarm Notifications contain the following information - device's Alias, date and time of Alarm triggered, channel number, frequency and information about the Alarm activation/deactivation. The basic signal parameters are also included.

Example for E-mal Notification:

```
Date: 04 Nov 2013, 07:31:11

DB7002 reports ACTIVE alarm on 91.10MHz – Power FM (CH1)

Alarm: RDS > 6.5kHz

Signal parameters:
RF: 51.5dBuV
Pilot: 7.5kHz
RDS: 11.4kHz
Left: -7.2dB
Right: -8.2dB
```

Example for SMS Notification:

```
ACTIVE ALARM:CH#2
27.09.2013 09:08:34
FREQ:95.7MHz
RF:35.0dBuV *L*
Left:-2.8dB
Right:-3.1dB
Pilot:7.92kHz
RDS:4.12kHz
```

NOTE: *L* for LOW (below threshold), *H* for HIGH (above threshold)

ATTENTION: Because of the SMS length limitations, only the most important parameters are included.

APPENDIX D

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

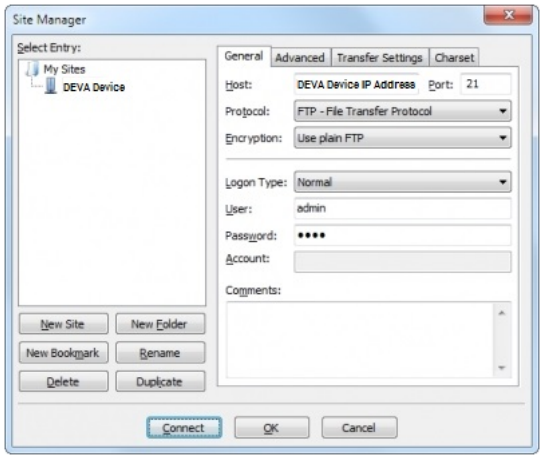
If the connection to the device is made through a Network address translation (NAT) router or firewall, the port forwarding feature of the router should be configured. The port forwarding is usually set in the firewall section of the router's menu. As each router has different port forwarding procedure, 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.

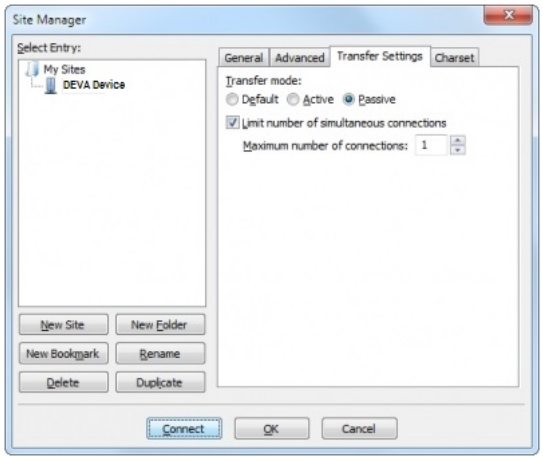
3. Example of FTP Client (FileZilla) Settings

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:



65 Aleksandar Stamboliyski Str., 8000 Bourgas, Bulgaria
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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 supplied with this product must be completed and returned to DEVA Broadcast Ltd. 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 delivery 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 calling the factory. The number should be prominently marked on the outside of the shipping carton.

B. Equipment must be shipped prepaid to DEVA Broadcast Ltd. Shipping charges will be reimbursed for valid Warranty claims. 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.

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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.