MAINTENANCE AND OPERATION
INSTRUCTION MANUAL

DB7000

DSP-based FM Radio Re-Broadcast Receiver with TCP/IP Connectivity

DEVA® BROADCAST

Publish Date: 06-Dec-2019

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

Typographic conventions

This manual uses the following typographic conventions:

Style	Used for
NOTE	Important notes and recommendations
`Example`	Used when example text is cited
"Menu" on page XX.	References
[OK]	Interface Interactive buttons.
Settings	Menu paths are represented as follows: ***Settings> General> Backup***

General Information

DB7000 is a frequency-agile, digitally-tuned FM Re-Broadcast Receiver equipped with a sophisticated and high-selective DSP based FM-tuner. The RF (IF) signal is digitalized as soon as it enters the device and all signal processing is then made through DSP algorithms. The signal being digitalized in this way, at the input, the equipment acquires measurement reproducibility over time. The high-accuracy DSP based IF bandwidth filters help to solve difficult adjacent-signal. The DB7000 measures conveniently all important parameters of FM transmissions. The built-in monitoring system generates automatic warning messages in case of faulty or missing data. The incredible processing power of the device enables all measurements to be refreshed simultaneously and synchronously, thereby allowing for detailed readings of all the Multiplex FM signal components.

The DB7000 has an easy to read, high-resolution OLED graphical display and ultra-bright alarm indicators that allow reading the signal at a glance. An additional feature to the list of DB7000 characteristics is that the RDS information contained in the processed MPX signal is easily visualized and represented as RDS/RBDS Data and detailed RDS/RBDS Statistics. The DB7000 is designed to support USB and LAN communication interfaces, allowing flexibility in remote connection and control of the unit. Easy channel status monitoring or audio listening from everywhere is possible through your mobile phone. With the Audio Stream Server you can listen to the audio of the received radio program.

The Band Analyzer function of the DB7000 presents an overview of all FM signals available, plus the RF signal strength of these stations. Scans are possible within any section of the band in the FM band in 3 different modes. The generated spectrum diagram shows the RF Level vs. the Frequency. Scheduled Band Scans can also be enabled for RF intruder or pirate transmissions detection. In case of a transmission failure, maintenance staff will be immediately alerted via E-mail, SNMP, or SMS which signals the technicians to restore a normal service as soon as possible. A high performance level and sustained reliability make the DB7000 to satisfy the requirements of the most demanding broadcasters, as well as the satellite and cable operators. This product has been designed with the latest state-of-the-art audio technology in use, and with very low harmonic distortion!

Our DB7000 meets all necessary requirements of high level FM rebroadcasting.

Product Features

- Sophisticated DSP based Digital FM Tuner
- Dual antenna ports with built-in RF attenuator
- Up to 100 dBµV direct RF Antenna Input
- Selectable wide range IF filter bandwidths
- User selectable, 87.1-108 MHz (CCIR), 65-74 MHz (OIRT), 76-95 MHz (Japan)
- Advanced SNMP Ver.2C support
- Fully DSP-based management core
- Wide angle, easy to read OLED display
- Very Intuitive Navigational Menu
- Selectable De-emphasis - Off, 50µs and 75µs
- Built-in high performance Stereo Decoder
- Real Time Audio Program Streaming
- Remote Listening via optional GSM modem
- Easy to use WEB interface
- Apple and Android devices support
- SNTP for automatic sync of the built-in clock
- RDS and RBDS decoder with BER meter
- Alarm dispatch via E-mail, SMS, SNMP and GPO
- Complete status reporting with SMS via optional GSM modem
- Protected access to the device settings
- Balanced Analog Audio Outputs on XLR Connectors
- Professional AES/EBU, SPDIF and Optical Digital audio outputs
- LAN port for full TCP/IP remote control and monitoring
- Adjustable MIN/MAX alarms for RF, Pilot, L & R Audio Levels
- Adjustable MIN/MAX alarms for MPX & RDS
- USB communication interface for local connectivity
- Headphone output with front panel level control
- Easy and intuitive Windows Application
- Firmware updates will ensure improved operation
- Accurate front-panel metering for local use
- Restore Factory Parameters option
- Wide operating voltage range: 100-240V AC
- 19” Professional Case for high RF immunity
- Easy Installation and Setup

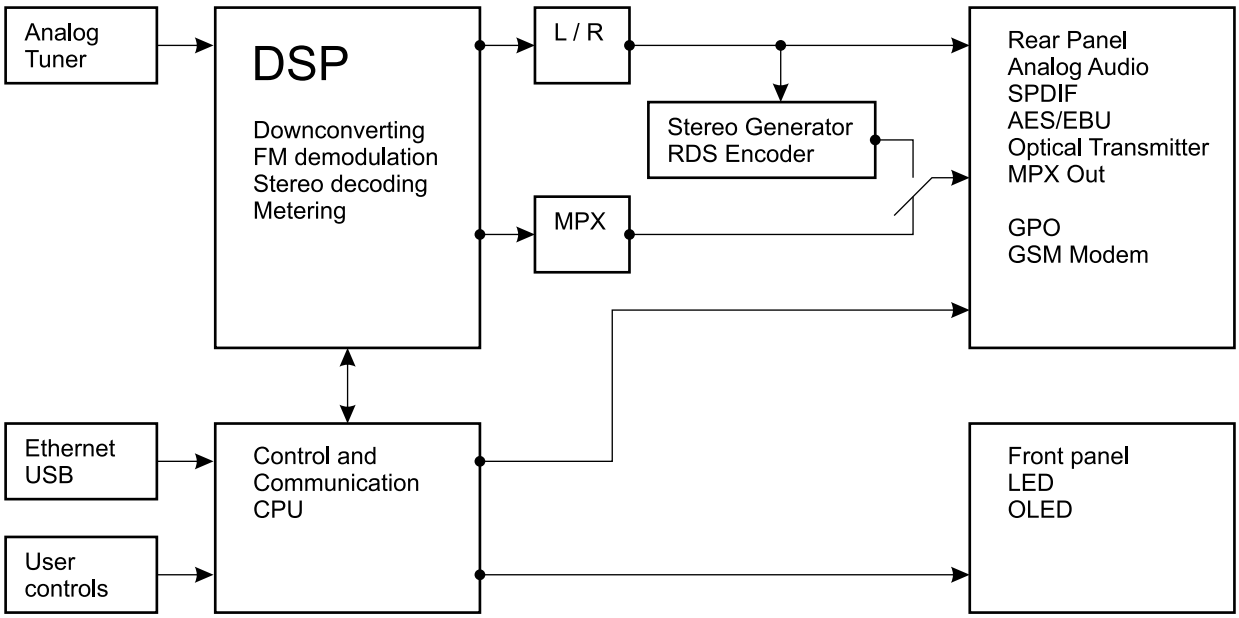
TECHNICAL SPECIFICATIONS

RF INPUT	
Tuning Range	User selectable, 87.1-108 MHz (CCIR), 65-74 MHz (OIRT), 76-95 MHz (Japan)
Tuning Step	10, 20, 50, 100 kHz
Tuner Sensitivity	30 dBµV
Antenna Ports	Dual, 2 x BNC Connectors, 50Ω
Antenna Ports Isolation	> 40 dB
Internal Attenuator	0, 10, 20 and 30 dB
Dynamic range	100 dB
FM DEMOD	
IF Filter Bandwidth	15 Increments (25kHz - 157kHz, Auto)
Frequency Response	±0.1 dB, 10 Hz to 86 kHz
Dynamic range	90 dB
STEREO DECODER	
Frequency Response (L and R)	±0.1 dB, 10 Hz to 15 kHz
SNR (Stereo)	70 dB, 50 µs de-emphasis
THD	0.1%, 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
RT (Radio Text), RT+	Yes
PS (Program Service name)	Yes
ODA	Yes
Group Analyzer	Yes
BER Analyzer	Yes
Group Sequence Display	Yes
RDS RAW Data Display	Yes
METERING ACCURACY	
RF Level	±1 dB, 0 to 100 dBµV
Total, Pos, Neg	±2 kHz, 10 to 100 kHz, 1 kHz resolution
Pilot, RDS	±0.5 kHz, 1 to 12 kHz, 0.2 kHz resolution
Audio	±1 dB, +10.0 to -55.0 dB, 0.1 dB resolution

OUTPUTS	
Composite	3.5 Vp-p @ 75kHz, 75Ω, unbalanced BNC Connector
Audio (L, R)	+6 dBu, 600Ω balanced XLR Connector
AES3 (L, R)	5.0 Vp-p, 110Ω , balanced XLR Connector
SPDIF (L, R)	3.0 Vp-p, 110Ω, unbalanced BNC Connector
Optical (L, R)	Transmitter, TOSLINK
Alarms	Programmable terminals on rear panel, optoisolated
Headphone	6,3mm (1/4”) Phone Jack
COMMUNICATION INTERFACES	
USB	B-type Connector
Ethernet 10/100 Base-T	RJ45 Connector
GSM Modem	15 pin Male D-Sub Connector
MEASUREMENT STORAGE	
Storage	2GB Build-in Memory Card
Data format	Text, CSV
POWER	
Supply	100-240V / 50-60 Hz / 25W
Connector	IEC320
SIZE AND WEIGHT	
Dimensions (W;H;D)	485 x 44 x 180 mm, , 19” x 1.7” x 6.9”
Shipping Weight	3kg, 7lb

BLOCK DIAGRAM

Simplified block diagram of DB7000:



Because of the all-digital, minimalist-discrete-component nature of the device circuitry, we have not provided schematic diagrams of the DB7000 in this Manual. Please, note that:

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

Before you start

SAFETY PRECAUTIONS

- The servicing of electronic equipment should be performed only by qualified personnel;
- Before removing the covers DB7000 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.

ATTENTION: DB7000 has an internal Lithium battery. Do not try to re-charge this battery! Please contact us for detailed instructions in case the battery should be changed.

OPERATING ENVIRONMENT RECOMMENDATIONS

For normal operation of DB7000, we recommend following the instructions listed below.

- Install the unit in places with good air conditioning. DB7000 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;
- Locate the device away from abnormally high RF fields;
- Use only checked power supply cables. We strongly recommend the usage of shielded cables;
- Connect DB7000 only to reliable power supply sources. 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;
- For the normal remote operation of the unit, connect DB7000 to a good quality Internet connection;
- For the normal operation of DB7000, 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 DB7000 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 DB7000 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 DB7000.

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 currently selected FM Radio Band - 87.1-108 MHz (CCIR), 65-74 MHz (OIRT), 76-95 MHz (Japan).

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 DB7000 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.

DE-EMPHASIS AND PRE-EMPHASIS SELECTION

As well known, there are three different de-emphasis selections. One of the problems with the high quality VHF FM transmissions is that the increased audio bandwidth means that background noise can often be perceived. It is particularly noticeable towards the treble end of the audio spectrum, where it can be heard as a background hiss. To overcome this, it is possible to increase the level of the treble frequencies at the transmitter. The frequencies are correspondingly attenuated at the receiver in order to restore the balance. This also has the effect of reducing the treble background hiss which is generated in the receiver. The process of increasing the treble signals is called pre-emphasis, and reducing the treble signals in the receiver is called de-emphasis. The rate of pre-emphasis and de-emphasis is expressed as a time constant. It is the time constant of the capacitor-resistor network used to give the required level of change.

In UK, Europe and Australia the time constant is 50µs whereas in North America it is 75µs. The de-emphasis and pre-emphasis should be selected depending on the region you are located or can be disabled.

CONNECTING – AC POWER AND VOLTAGE SELECTION

Before connecting the AC Power, make sure that the fuse rating is in accordance with the mains supply at your location. DB7000 Power Supply Factory Settings are:

- 100-240 VAC;
- 1Amp Fuse.

CAUTION:

DB7000 will be damaged permanently if improper AC power supply voltage is applied. The warranty DOES NOT cover damages caused by applying improper supply voltage or usage of improper fuse.

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Panel Indicators, Switches and Connectors

OLED DISPLAY

DB7000 has easy to read, high-resolution OLED graphical display that visualizes all measurements of the received signal and DB7000 settings.

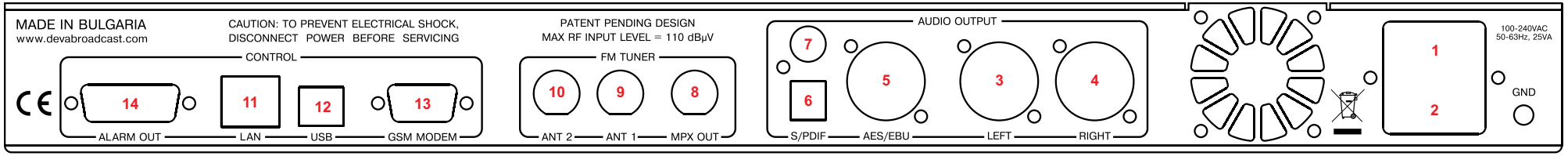
SOFT BUTTONS

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

NAVIGATIONAL BUTTONS

UP–DOWN, LEFT–RIGHT and OK buttons, as the Soft Buttons, are used to navigate through the menus selecting various functions and parameters of DB7000.

REAR PANEL



1. Mains connector, 110-240VAC, IEC-320 C14 type;
2. Fuse holder – 1A;
3. Audio Left Output - XLR;
4. Audio Right Output - XLR;
5. Audio AES/EBU Output - XLR;
6. Audio SPDIF Output - RCA;
7. Audio Optical Output - TOSLINK;
8. MPX Output - BNC;
9. RF Input 1 (Antenna 1) - BNC;
10. RF Input 2 (Antenna 2) - BNC;
11. Ethernet T-BASE10/100 RJ45;
12. USB – type B;
13. GSM Modem – Male D-Sub 15 pins High Density;
14. GPO – Opto-isolated, Female D-Sub 15 pins.

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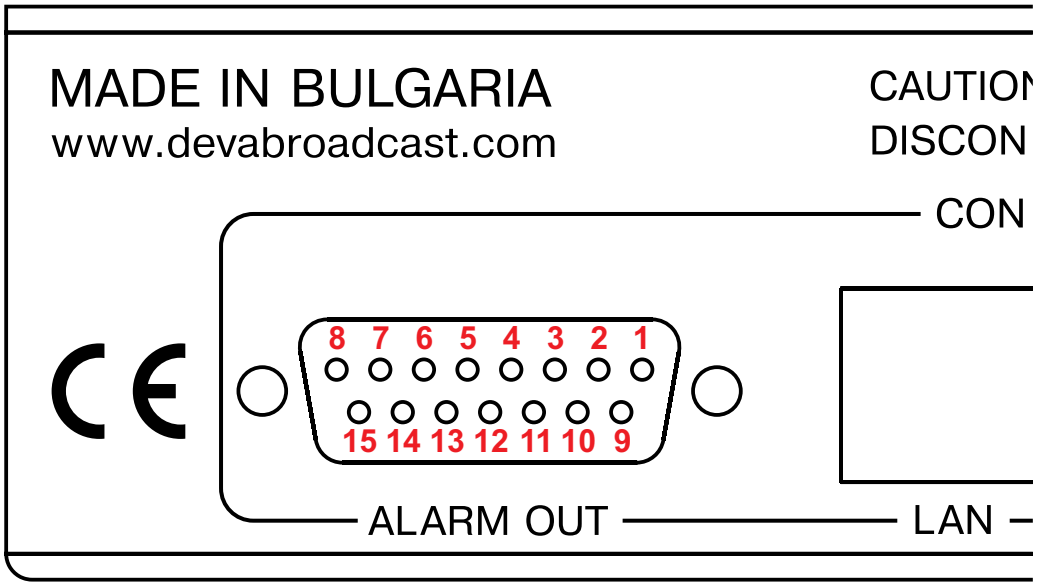
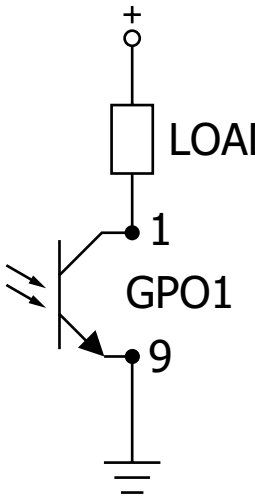
REAR PANEL ALARM TERMINAL

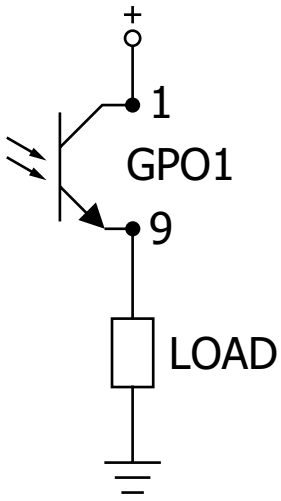


1 - GPO1 Collector
2 - GPO2 Collector
3 - GPO3 Collector
4 - GPO4 Collector
5 - GPO5 Collector
6 - GPO6 Collector
7 - GPO7 Collector

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

8 - GND





Operation

RE-BROADCASTING LIMITATIONS

Signal Strength

The signal strength is a major factor when a signal is re-broadcasted, measured and evaluated. FM compared to AM is less susceptible to the inherent noise of the radio reception.

When speaking about FM broadcasting, it is the monaural reception which can tolerate and profit from a much narrower IF bandwidth. The stereo reception adds all noise present in the 23 – 53 kHz sub-band. The amplitude component (AM) of the sub band is converted down to audible noise and added to the program signal. That is why the noise performance of FM-stereo can be as much as 20 dB worse than that of monaural broadcast.

Better reception and measurement can be obtained by using highly directional outdoors antenna. This will improve the signal strength and contribute in eliminating the multipath distortion.

Multipath Distortion

In FM reception, regardless of overall signal strength, a very important consideration is that obstacles, which an FM signal may encounter in the line-of-sight path tend to reflect and disperse the signal in many directions. In many locations, especially in urban areas where many tall buildings interfere with the direct transmitted signal or in suburban areas surrounded by hills or mountains, an FM receiver may pick up a station's primary signal but, also, several secondary reflections coming from various directions. These reflections arrive at the receiver out-of-phase, slightly delayed in time with the primary signal and tend to blur or distort the principal signal. The degree of distortion depends on the number and relative strength of the reflections.

The result, known as multipath distortion in FM reception can range from a low-level fuzziness to a severely distorted sound quality, particularly at the high frequencies or treble. Multipath distortion is especially troublesome in FM stereo reception.

DB7000 has a multipath distortion detector and Front panel multipath LED indicator with adjustable threshold. A bar graph indicator representing the multipath level of the received signal can be reached under *LEVELS* menu.

Co-channel Interface

In many populated areas, there is not enough space in the radio spectrum and stations might be jam-packed. Poor frequency planning may also result in the mutual interface between the broadcasting stations.

The inherent broad bandwidth of DB7000 re-broadcast receiver is vulnerable from stations working on the nearby frequencies, where signal strength will be the most important factor – the stronger the interfering station, the stronger the interference effect.

We recommend you to observe the independent positive and negative deviation readings in order to identify adjacent channel interference. If the positive deviation is higher than the negative one, interference from a strong station above the monitored frequency would be indicated and vice–versa. For example, the negative deviation can probably be trusted as an indication of total carrier modulation, though this should be confirmed in free of interference RF environment.

Anyhow, the program deviation should be fairly symmetrical about the carrier frequency. Using the built-in Attenuator can be of some help, but the usage of an outdoors directional antenna could improve the situation with unwanted adjacent working stations. Other solutions include a band-pass filter at the primary frequency or a trap at the interfering frequency.

FIRST TIME POWER ON

This chapter will guide you through the initial set up of DB7000 FM Radio re-Broadcast Receiver. Applying these principles, you can simplify the process and save yourself extra time and effort.

The items needed for the configuration are a pair of headphones and connection to an outdoor antenna. The different types of antenna are described previously in this manual (see "RF Environment- precautions, installation specifications and antenna types" on page 15).

1. Install the unit on its operation place;
2. Before connecting the AC Power, make sure that the fuse rating is in accordance with the mains supply at your location. DB7000 Power Supply Factory Settings are: 100-240 VAC; 1Amp Fuse;
3. Connect the antenna cable to the RF antenna input connector located on the rear panel of the device;
4. Plug the headphones into the front panel jack;
5. Use the front panel navigational menu to set the desired station – ***Settings*** > ***Tuner*** > ***Frequency***. The station should be clearly heard through the phones. If needed, reposition the antenna in order to improve the reception.

These are the first basic steps in DB7000 operation. Detailed explanation on how to configure and explore your device is given in the next chapters.

FRONT PANEL

Phones

Phones jack to monitor the signal. Headphones volume can be adjusted in two methods:
1 - Using the *UP* and *DOWN* buttons in the home screen;
2 - Through the front panel navigational menu:
Settings > Audio / MPX Outputs > Phones Volume.

Loss

– The *RF LOSS* will be indicated whenever the level of the *RF* signal drops below the selected threshold. The *RF LOSS* detection threshold and time can be set trough:
Settings > Tuner > RF Loss Threshold / RF Loss Timeout

– The *Audio Loss* will be indicated whenever the level of the Left and Right audio channels drops below the selected threshold. The *Audio LOSS* detection threshold and time can be set trough:
Settings > Device > Loss > Audio Threshold / Audio Timeout

– The *RDS Loss* will be indicated whenever the level of the *RDS* drops below the selected threshold. The *RDS LOSS* detection time can be set trough:
Settings > Device > Loss > RDS Loss Timeout

Multipath

– Indicates the presence of strong multipath distortion of the RF signal. The indication threshold and time can be set trough: ***Settings > Device > Loss > Multipath Threshold / Multipath Timeout***

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FRONT PANEL LCD DISPLAY, NAVIGATIONAL & SOFT BUTTONS

DB7000's OLED display has three function areas: Header, Soft Buttons and Main Screen Work area.

Header Area

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 following functions:

– Frequency Indicator, showing the currently selected frequency, in MHz, is located in the upper left corner;

– Represents the currently selected active Antenna Input.
ANT 1 – Antenna 1 Input is selected. *ANT 2* – Antenna 2 Input is selected;

– Attenuator Indicator – represents the currently selected position of the active Antenna Input. Attenuator's position can be set manually or automatically by the device;

– Indicator for Stereophonic Information-contains information about the received signal and currently selected de-emphasis time constant;

– Indicator for RDS presence of information contained in the received signal;

– Decoded *PS* information from RDS signal;

– Indicator showing the signal level at selected antenna input;

– Indicator showing the phones audio volume;

– Indicator showing the currently selected IF band-pass filter bandwidth.

Soft Buttons

The soft buttons are located on the bottom of the OLED display making the direct transition from one page to another possible. The function of all Soft Button corresponds to the selected menu page. Most pages have the same or similar functional areas. The corresponding functions as Function, Menu Page, Parameter to be changed, etc., linked with the Soft buttons will appear as labels above them.

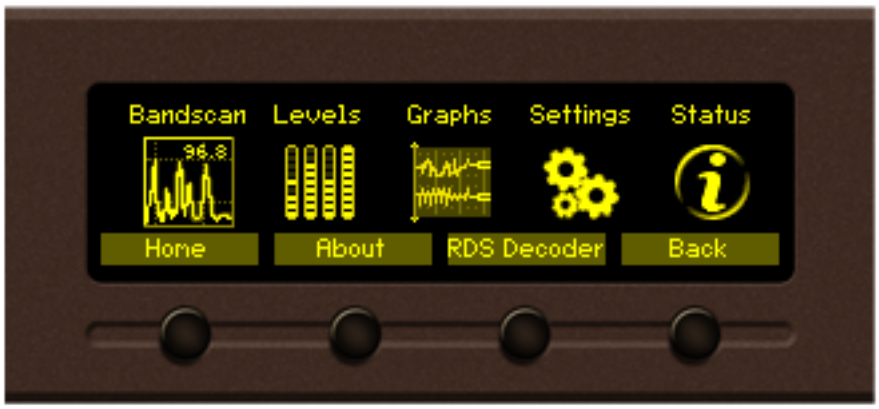
For example:

Cancel – Discard changes being made;
Home – HOME PAGE will be selected;
Back – Return to previous page;
Low ON – Alternating low threshold button;

NOTE: On some pages, the *Header* and *Soft* button area will disappear in order to reveal the content underneath.

Main screen working area

The Main part of the OLED Screen is where the information changes dynamically, depending on the selected working mode. The *Menu Screen* (shown below) appears upon pressing of the "*OK*" Navigational Button. The DB7000's *Menu Page* contains selectable icons and software 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 rectangle focus frame around the icon. Pressing "*OK*" button will navigate to the corresponding page.



The following Operating Modes and Pages can be selected using the Navigational Buttons:
- Home page;
- Bandscan page;
- Levels page;
- Graphs page;
- Settings page;
- Status page;
- About page;
- RDS Decoder page.

RE-BROADCAST SETTINGS

The Stereo MPX is signal used for FM Stereo broadcasting and represents a complex combination of the following signals:

- Sum of the left and right audio channels occupying the band from 0 to 15kHz;
- Difference signal (Left minus Right) located in the band 23-53kHz;
- Pilot tone at exactly 19 kHz;
- RDS signal, used for transmitting text and other data, may also be added. It occupies a narrow band around 57kHz;

The amount of each signal contained in the final MPX signal is called injection level.

DB7000 has a built-in stereo generator and Radio Data Systems (RDS/RBDS) encoder.

MPX out Configuration

There are three types of MPX signal that you can choose from:

1. RAW MPX - Directly modulated by your station RAW MPX without any further processing;
2. Stereo & RDS Gen - Generated by the internal stereo and RDS generators;
3. Calibration Tone 400Hz – used to adjust the transmitter MPX input.

The MPX signal can be configured through the front panel navigational menu:
Settings> MPX> MPX Source

Stereo Generator

The composite multiplex signal, including the pilot tone, is generated through the build-in Stereo generator. The Stereo generator can operate in two modes - Stereo and Mono. In order to overcome the noise of the treble frequencies the Emphasis can be set to Flat, 50µs or 70µs.

Injection levels

The MPX signal is a combination of *Audio*, *Pilot* and *RDS* Signal. This option allows you to adjust the amount of each signal included in the *MPX*. The recommended and default values are: 0dB Audio gain, 7.5kHz Pilot and 5kHz RDS.

MPX limiter

The regulatory authorities, in most countries, require the total deviation not to exceed 75kHz (100%). Therefore, DB7000 has a built-in MPX limiter that restrains the deviation below the predefined threshold. The preset threshold is 75kHz (100%).

The MPX limiter has 6 levels of processing:
- 0 – Soft processing for better sound quality
- 5 – Hard processing with lover processing delay

NOTE: All Stereo Generator Settings can be configured through the front panel navigational menu: ***Settings > MPX***

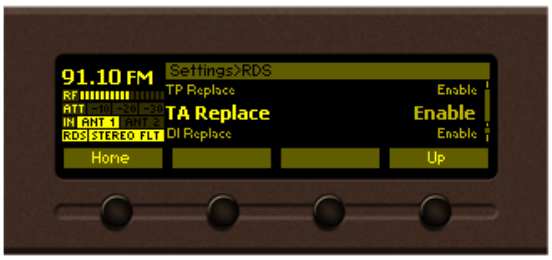
Built-in RDS/RBDS Encoder

The use of RDS/RBDS Encoder will allow branding of your station and will enable the transmission of the *Program Service name* (PS), *Program Identification code* (PI), *Traffic announcement* (TA) and other useful features.

The RDS/RBDS Encoder has four different working modes:

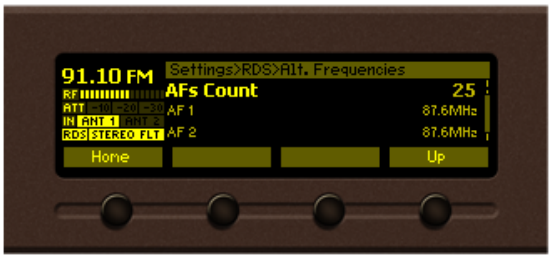
1. Original – Re-broadcast of the original RDS/RBDS data received from the station;
2. Orig/Local fallback – Upon loss of the Original RDS/RBDS the Local data will be used;
3. Replace with local – User-defined combination of the original and local RDS/RBDS data. One or more values from the following can be modified: *Program Identification Code* (PI), *Program service* (PS), *Radio Text* (RT), *Alternative Frequencies* (AFs), *Program type* (PTY), *Decoder Identification control code* (DI), Music – Speech (M/S), T*raffic program code* (TP), *Traffic Announcement* (TA);
4. Local only – User-defined RDS/RBDS data.

NOTE: All RDS/RBDS Encoder Settings can be configured through the front panel navigational menu: ***Settings > RDS***




91.10 FM
Settings>RDS
DI Replace
Enable
AF Replace
Enable
Home
Up


91.10 FM
Settings>RDS>DI Flags
Stereo
Off
Artificial Head
Off
Compressed
Off
Home
Up


91.10 FM
Settings>RDS>Alt. Frequencies
AFs Count
25
AF 1
87.6MHz
AF 2
87.6MHz
Home
Up

Operating Modes and Pages

HOME

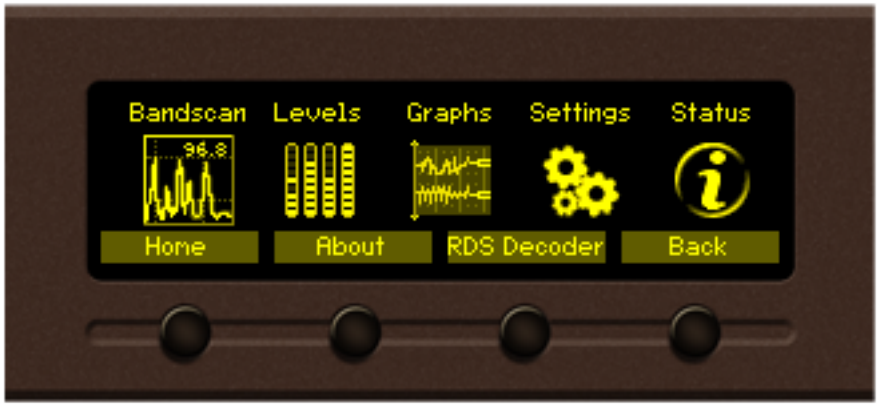
Upon power-up and boot process of DB7000, the *Home page* will be displayed. Transition to *Home page* can be made from any page where Soft Buttons with this option is available. DB7000 provides you with different views of the Home page which are available at:

Settings> Device> Home Screen

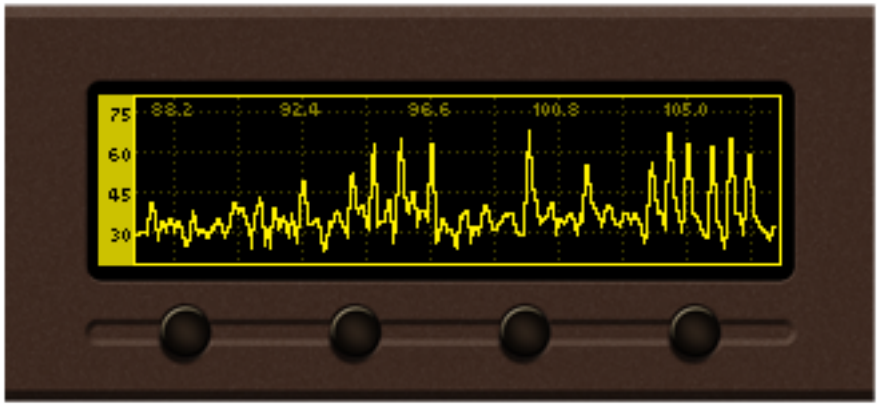
The default home screen contains *Header* area, the most important flags and attributes of the decoded RDS signal (if present) and currently selected frequency indicator. Press any soft button in order to enter the desired menu.

BAND SCAN PAGE

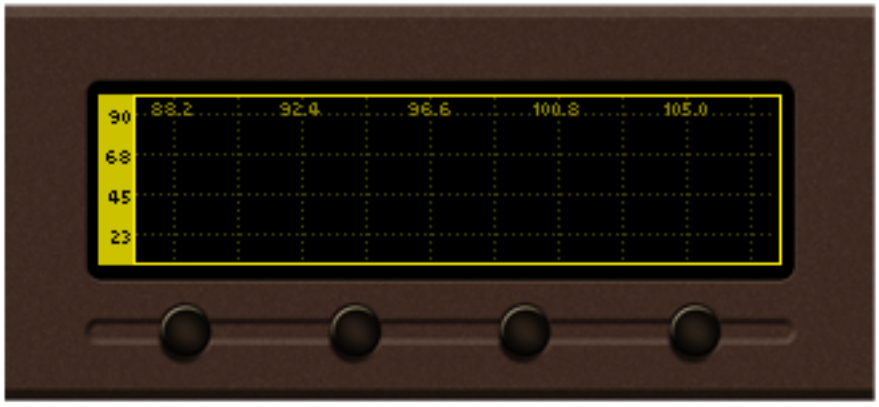
Select *Bandscan* icon from the *Menu page* and press "*OK*" to enter it.



The last *Bandscan* data will be displayed.

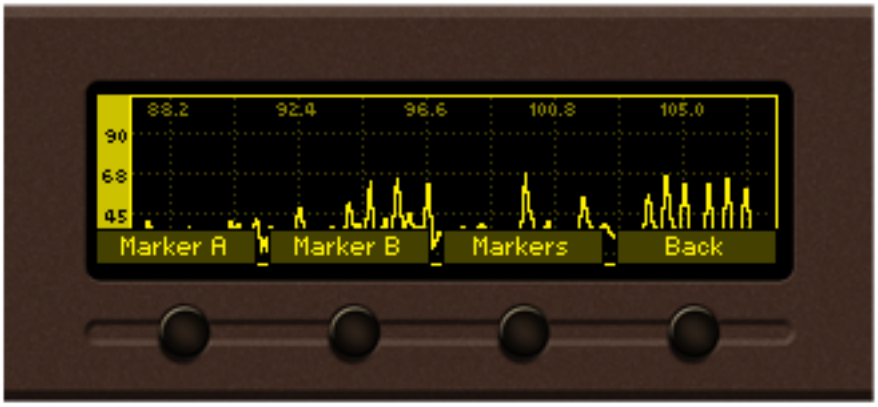


Empty grid will be displayed if no *bandscan* data is available at the moment.



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.

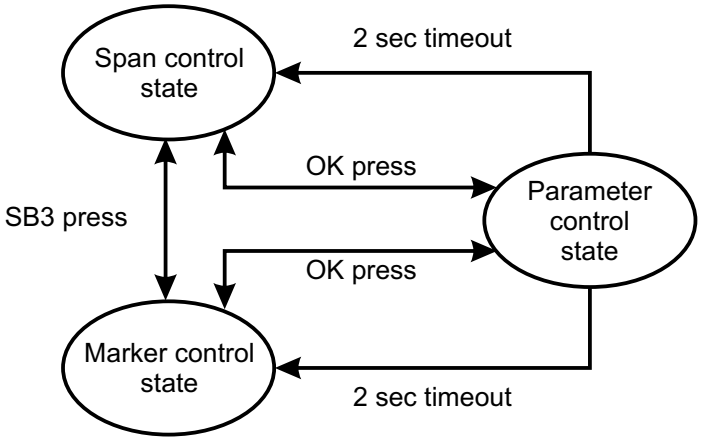
There are three control states in *Bandscan page – Span* control, *Marker* control and *Parameter* control. The states can be identified by the labels of the Soft buttons. If the labels appear as shown on the picture below, the page is in *Marker* control state.



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.

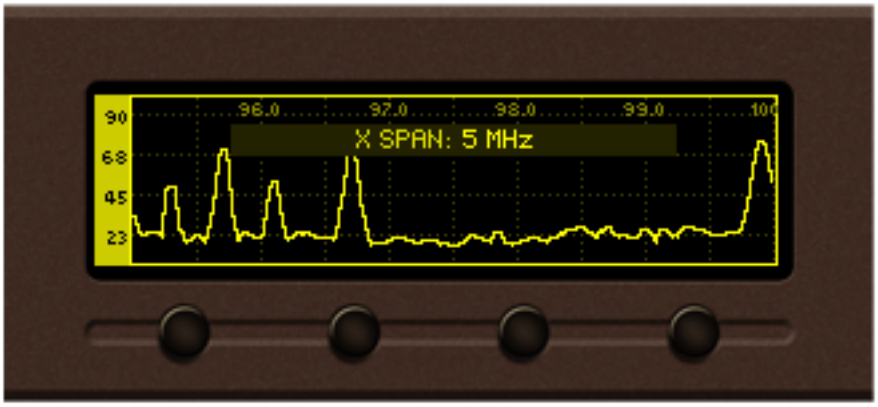
Diagram representing the control state transitions:



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.

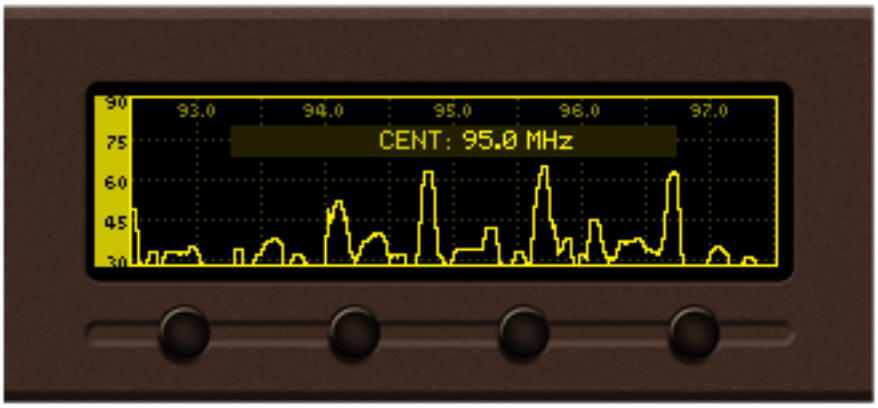


5MHz X span is selected

Y Span – (SB1) 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.

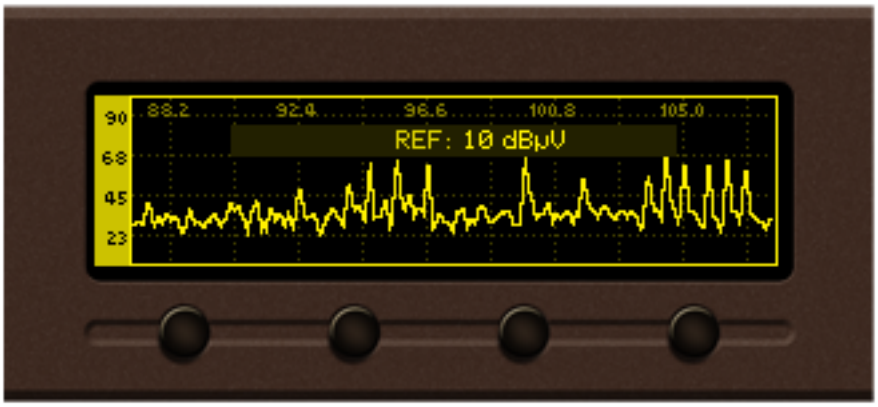
120 dBµV Y span is selected

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:

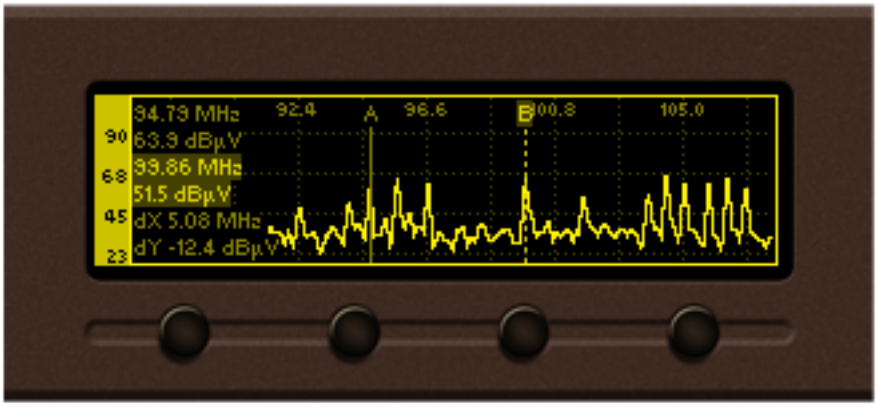
Two markers, named "*A*" and "*B*" are available in *Bandscan page*. *SB1*, *SB2*, *Left* and *Right* buttons control the visibility and position of the *Markers*.

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.

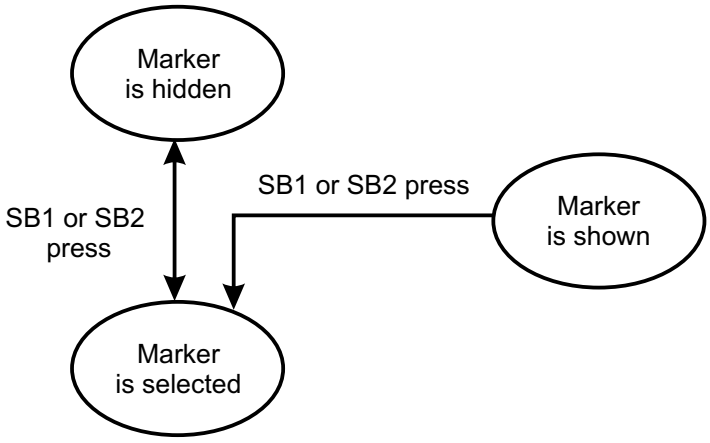
When markers "A" and/or "B" are visible (shown or selected) a readout about X and Y axes will appear on the left side of the data plot. If both markers are visible, the differential "Marker B minus Marker A" value will be displayed at the bottom left of the screen.

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:



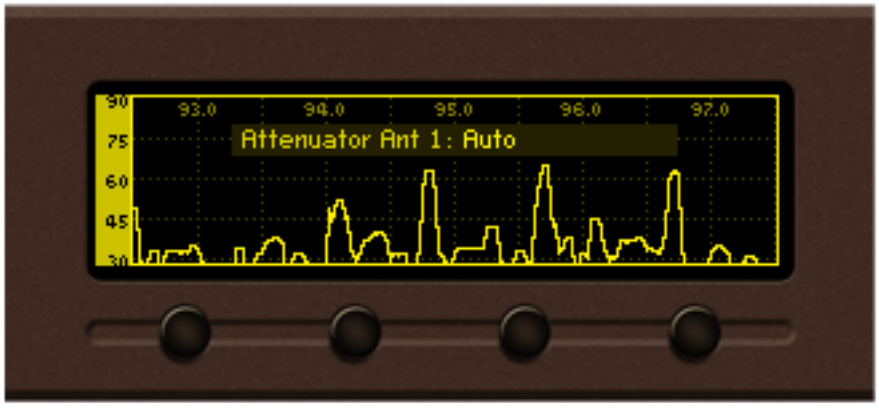
Left / *Right* Buttons – move the selected marker to the left or right with one screen pixel increment.

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.

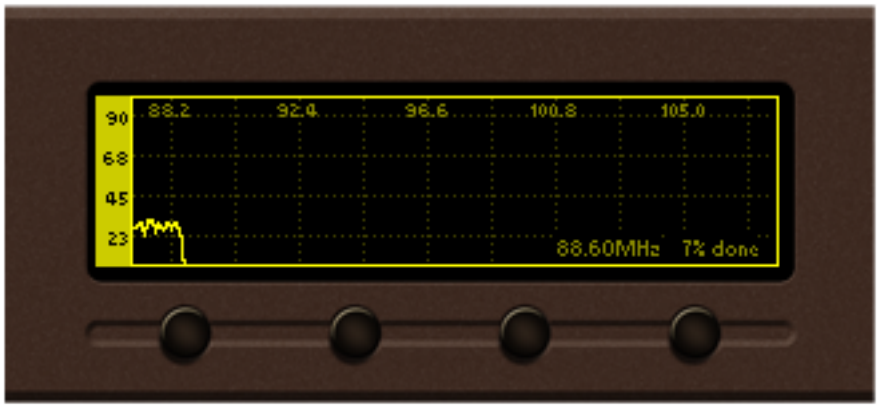
Parameter control state:

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*;
RF Input: *Antenna 1*/*Antenna 2* – select the antenna input to be used during *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".

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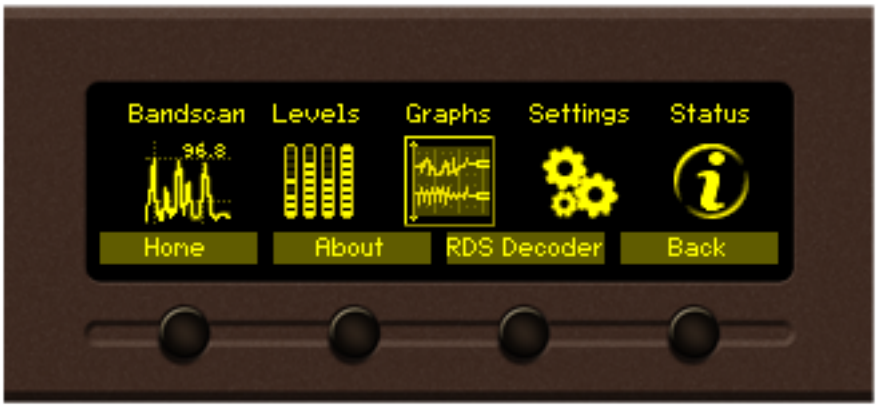
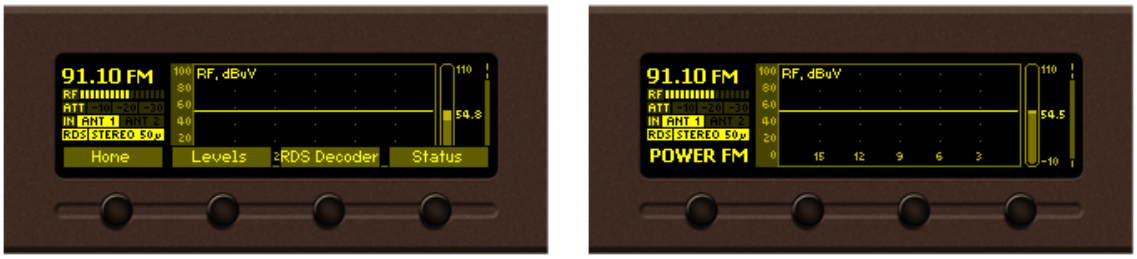
GRAPHS PAGE

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



Graph page represents the value of a measured signal over time. The X axis of the data plot area represents the elapsed time in seconds. New peak value sample is added to the data graph every 125ms. Up to 20 seconds of measurement history is available for each signal. The newest sample is on the right side of the graph. The current signal name and measurement unit are displayed in the top left corner of the data plot.

A bar graph indicator, placed on the right part of the screen, is used to display the instantaneous value of the selected signal. The low, average and high values of the measured signal are represented in shaded color.



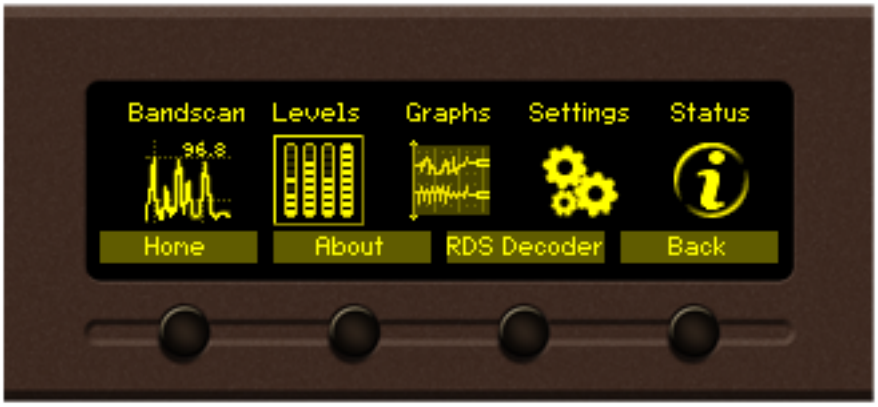
Graph history of RF level

Buttons:
SB1 to *SB4* – lead to different screens of the menu
OK – leads back to Main menu page.
Up/*Down* – Change the currently displayed signal. The following signals can be selected:

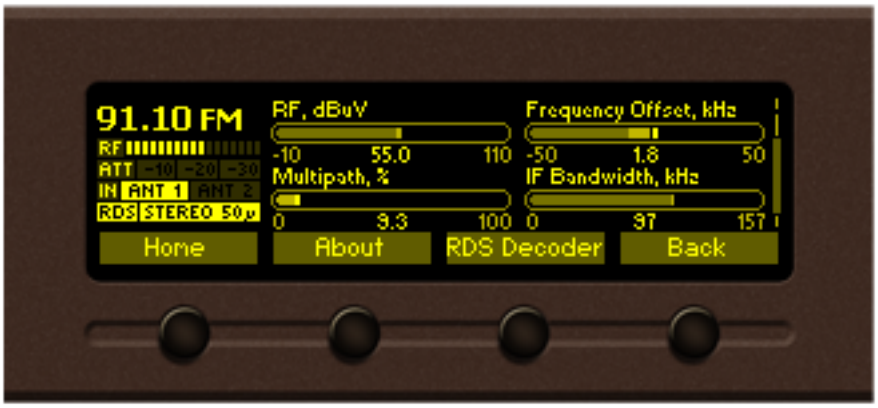
- RF Level – from -10 to 110 in dBµV;
- Multipath level from 0 to 50 in % (percent);
- Total MPX deviation from 0 to 125 in kHz;
- Pilot level from 0 to 15 in kHz;
- RDS level from 0 to 15 in kHz;
- Left audio level from -60 to 10 in dB;
- Right audio level from -60 to 10 in dB;
- Frequency offset of the RF carrier from -50 to 50 in kHz;
- Temperature in the device from -10 to 90°C.

LEVELS PAGE

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 DB7000. 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.



Group 1. RF carrier related parameters

The *RF level* at the selected antenna input is measured in dBµV. The RF attenuation is included in the level calculation.

The *Frequency offset* of the *RF carrier* is measured in kHz. This signal measures the misalignment between the modulation and demodulation frequency. As the misalignment is expected to be small, a large offset will indicate disturbance (for example adjacent channel breakthrough).

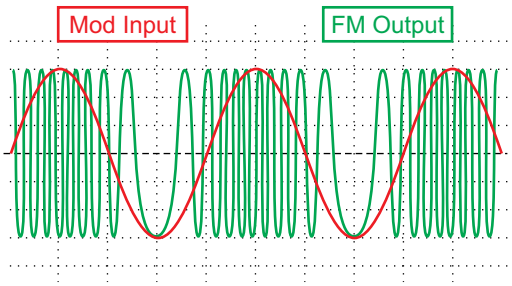
The Frequency offset is measured with better accuracy if there is no modulation of the carrier. The usable range depends on the selected *IF filter bandwidth*. For better results, we recommend the IF filter bandwidth to be manually set to 153 kHz.

The *Level of multipath* reception is measured in percents. The *multipath* detector measures the amplitude fluctuations of the signal. The FM signal is broadcast with a fixed level; therefore the level fluctuations will indicate degraded signal quality. At *multipath* conditions, large level fluctuations can be measured. Install the antenna at the reception point with the lowest *multipath level* in order to achieve better re-broadcast.

IF Bandwidth - Shows the currently IF filter bandwidth.

Group 2. Stereo multiplex related parameters

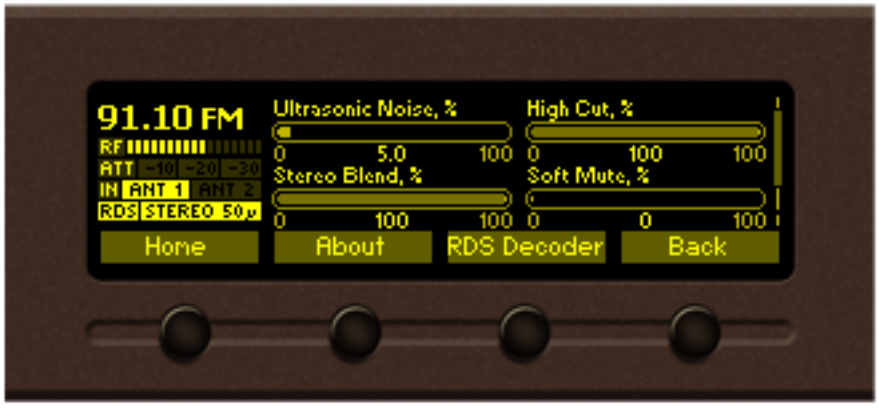
MPX Positive and *MPX Negative* - These bar graphs represent the positive and negative deviation component of the *MPX signal*. In *wideband FM*, used in wireless broadcasting, the instantaneous frequency varies above and below the frequency of the carrier with no modulation. The carrier frequency shifts in one direction when the instantaneous input wave is with positive polarity and vise-verse - when the instantaneous input wave is with negative polarity, the carrier frequency shifts in the opposite direction. At every instant in time, the extent of carrier-frequency shift (the deviation) is directly proportional to the extent to which the signal amplitude is positive or negative.



Pilot – Represents the deviation caused by *Pilot tone injection*. Our practice shows that the pilot deviation should be about 10% of the total deviation of the *RF carrier*.

RDS – Represents the deviation caused by *RDS subcarrier*. Our practice shows that the *RDS deviation* should be about 5% of the total deviation of the *RF carrier*.

Group 3. Audio related levels

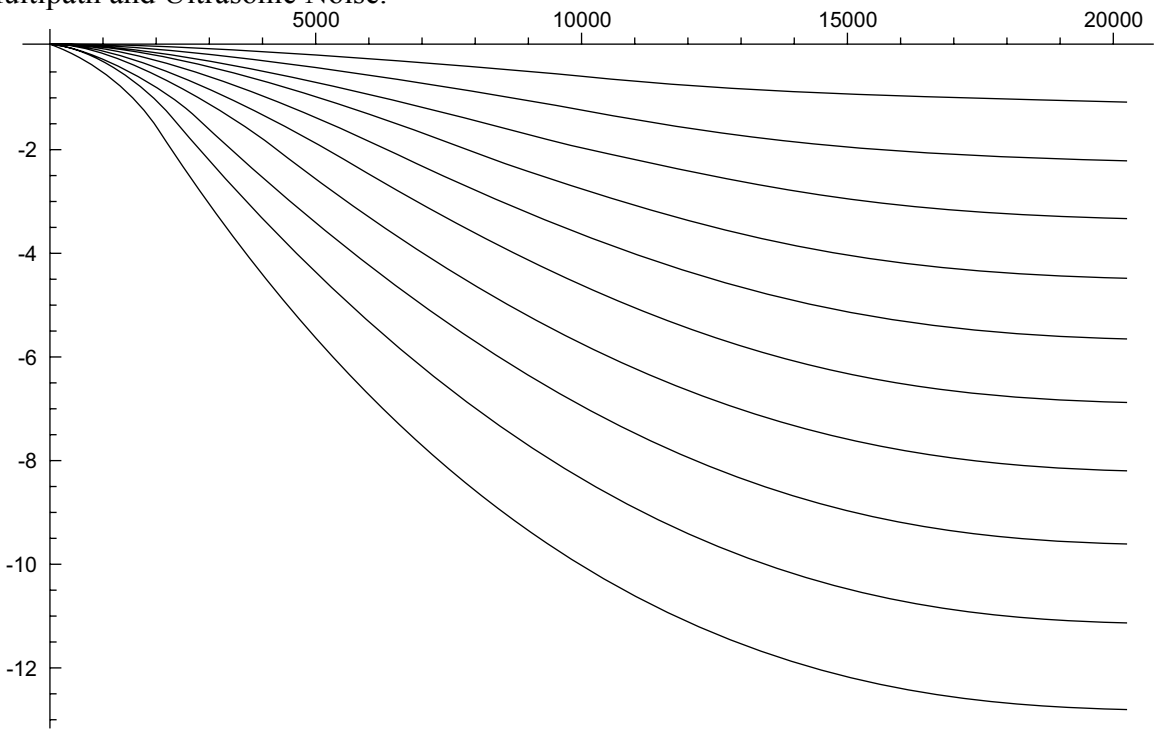


Group 4. Reception quality related levels

Ultrasonic Noise bar graph - Indicates the *MPX signal amplitude* in the approximate bandwidth of 80 kHz – 150 kHz.

Stereo Blend bar graph - In stereo signals, the difference (L-R) component of the MPX signal is more susceptible to disturbances than the sum (L+R) signal. Therefore, the separation of the left and right audio channels can be decreased in order the audibility of the disturbance to be reduced. This channel separation reduction is called “stereo blending”. A value of 100% indicates that no reduction is applied. The level of stereo blending depends on the following input signals: RF Signal Level, Multipath, Ultrasonic Noise and Pilot tone deviation.

High Cut bar graph –Audio disturbance effect is mostly present in the high frequencies. Therefore, a means of reducing the effect of disturbances is to filter the high frequencies. The audio bandwidth reduction is called “high cut”. A value of 100% indicates that no “high cut” is applied. The applied High Cut level depends on the following input signals: RF Signal Level, Multipath and Ultrasonic Noise.



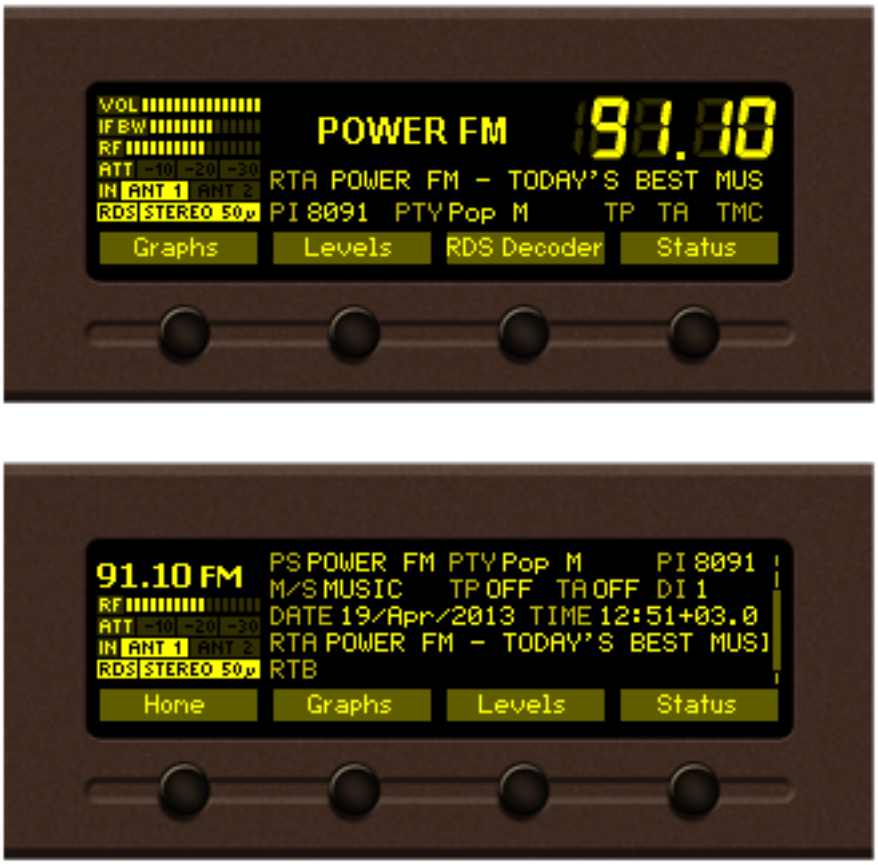
Response of the FM High Cut function for several reduction values

Soft Mute bar graph - If a disturbance is present in the received signal, the perceived effect can be reduced by attenuating the audio signal. The reduction of audio volume is called “soft mute”. A value of 0% indicates that no “soft mute” is applied. Soft Mute depends on the following input signals: RF Signal Level, Multipath and Ultrasonic Noise.

Front panel buttons usage:
OK – leads to Main menu page.
Up/*Down* – Changes the currently displayed bar graph group 1 – 4.
SB1-*SB4* – lead to different screens of the menu

RDS/RBDS DECODER PAGE

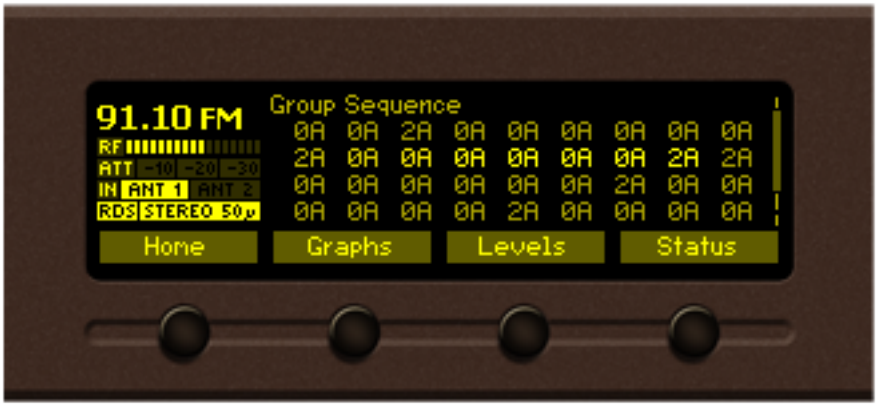
Enter the Main Menu page and press *SB3* to enter the *RDS decoder page*.



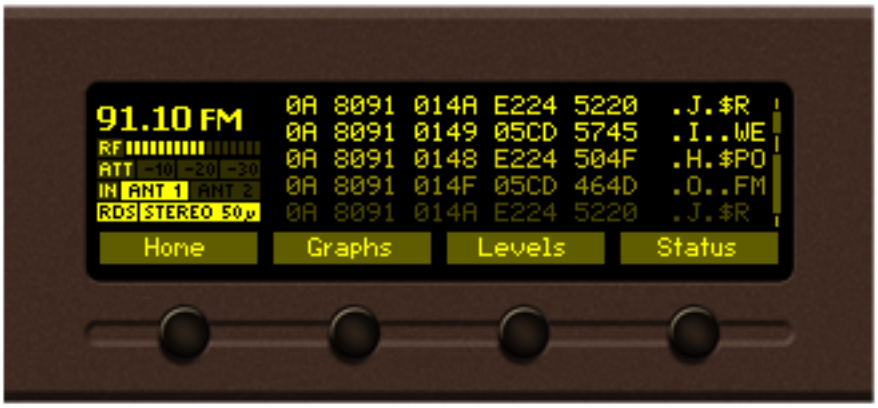
RDS/RBDS Page Main View

RDS/RBDS AF list View

RDS/RBDS Statistics view



RDS/RBDS Sequence view

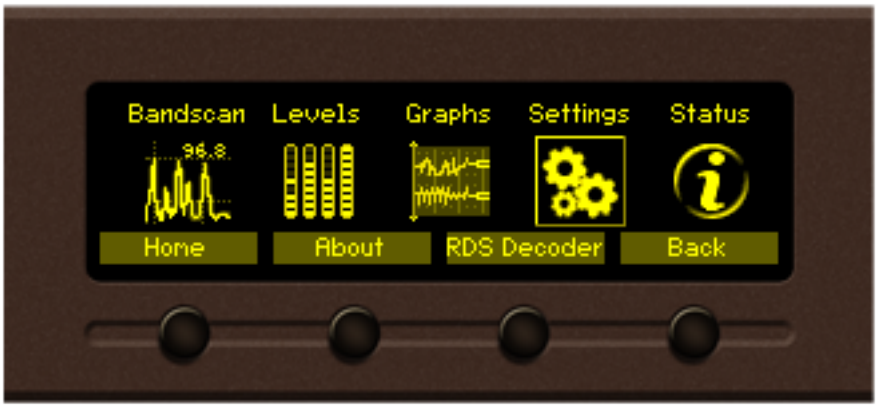


RDS/RBDS RAW Data view

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 PAGE

Enter the *Main Menu page*, select *Settings Icon* and press *OK*.



The Settings menu is organized into a hierarchical tree menu and all similar parameters are grouped into sections (branches). The structure of the menu is shown below.

"Tuner" section (branch) of the root Settings menu

"Frequency" parameter from "Tuner" branch

Settings Menu screen structure

Settings menu title

– shows the path to the currently selected menu. Note that the parameter should be included in the settings menu title.

For example: ***Settings > Communication > Application - Port*** is different from ***Settings > Communication > HTTP - 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. Since 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 value of a parameter is highlighted pressing OK will 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 DB7000. The way of editing depends of the parameter type. Every parameter type has its own editing rules.

Numerical parameter (**INT**). Represents numerical value.

Example: The value **frequency** can be changed in the range of 87.1-108 MHz (CCIR), 65-74 MHz (OIRT), 76-95 MHz (Japan) and step of 10, 20, 50 or 100 kHz.

INT mode, 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 (**ENUM, TZONE**). 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”.

ENUM mode, 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 (**IP**). Represents an IPv4 address.
Example:  , 
IP mode, 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 (**PORT**). Represents TCP or UDP port.
Example: 
IP **port** mode, front panel buttons usage:
Refer to "IP mode, front panel buttons usage".

RDS Program Identification (**PI**). Represents RDS Program Identification.
Example: 
RDS **PI** edit mode, front panel buttons usage:
Refer to "IP mode, front panel buttons usage".

Date (**DATE**). Represent date from the calendar.
Example: 
DATE mode, 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 (**TIME**). Represent time information.
Example: 
TIME mode, front panel buttons usage:
Refer to "DATE mode, front panel buttons usage".

Timer (**TIMER**). Represents relative time interval.
Example: 
TIMER mode, 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 (**STR, EMAIL, TEL, HOST**). Represents string.
Example: 
STR mode, 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:

OK press

OK press

• SB2 – Inserts blank space before the selected character:

User Name – before;

User Name – after.

• SB3 – Deletes the selected character:

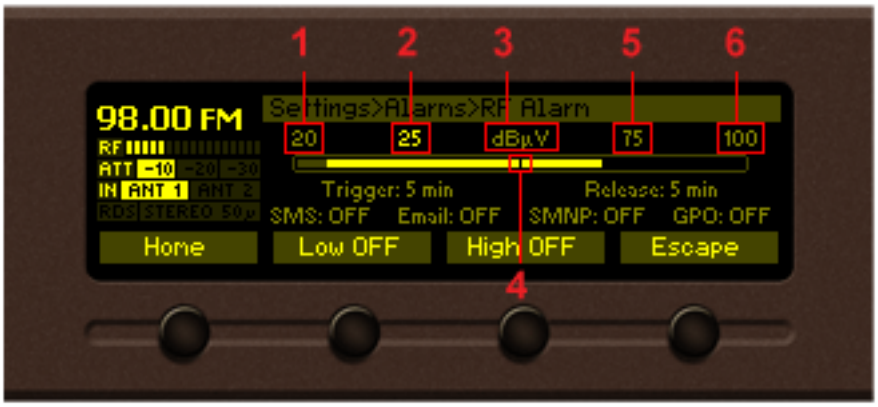
User Name – before;

User Name – after.

• SB4 – Discards all changes and cancels edit mode.

Alarm (**ALARM**). Alarm is a special parameter type with its own dialog editor. Each alarm parameter is composed of the following sub-parameters:

- Low threshold – the lower alarm limit of the measured signal. If the value stays below this limit for predefined time "low alarm" event will be generated;
- High threshold – the higher alarm limit of the measured signal. If the value stays above this limit for predefined time "high alarm" event will be generated;
- Trigger time – waiting time before a "low alarm" or "high alarm" event is generated;
- Release time – waiting time before an "idle alarm" event is generated;
- Set of notification channels – In case of alarm, maintenance staff will be immediately alerted via E-mail, SNMP, GPO or SMS (the additional GSM modem should be installed), which allows technicians to restore the normal service as soon as possible.



The picture above shows the structure of the alarm editor dialog. The bar graph indicates the signal range of the alarm. The highlighted area represents the permitted signal value range. If current signal value (pos. 4) is in this range, no alarm event will be generated. Basic elements of the alarm editor dialog:

1. Lower limit of the alarm range;
2. Low threshold value;
3. Measurement unit;
4. Current value of the signal;
5. High threshold;
6. Higher limit of the alarm range.

ALARM edit dialog, front panel buttons usage:

Left/Right – Selects previous/next sub-parameter of the alarm.

Up/Down – Change the value of the selected (highlighted) sub-parameter. The value always stays in the permitted parameter range. Low threshold value cannot exceed the high threshold and vice-versa;

OK – Accept the value and exits edit dialog;

SB2 – Toggles ON/OFF the low alarm generation;

SB3 – Toggles ON/OFF the high alarm event generation;

SB4 - Discards all changes and cancels edit mode.

Active Alarm Action - In this sub-menu are defined the actions to be undertaken in case of an RF, Audio, MPX, Pilot or PI Protection alarm is generated. The following options for reaction are available - Audio Mute, MPX Mute, Switch to Backup Station.

'Active Alarm Action' Screen

Types of alarms

Alarm actions

Settings > Tuner > Backup Station

In this sub-menu are defined all mandatory settings to the backup station.

How to change the tuning range

Settings > Device > Region

DB7000's tuning range is user selectable, 87.1-108 MHz (CCIR), 65-74 MHz (OIRT), 76-95 MHz (Japan). Changing/selecting the Region setting, will modify all tuner frequencies so that they could be within the FM band limits of the region chosen. This includes all Presets and Logger Channel frequencies.

WEB Interface

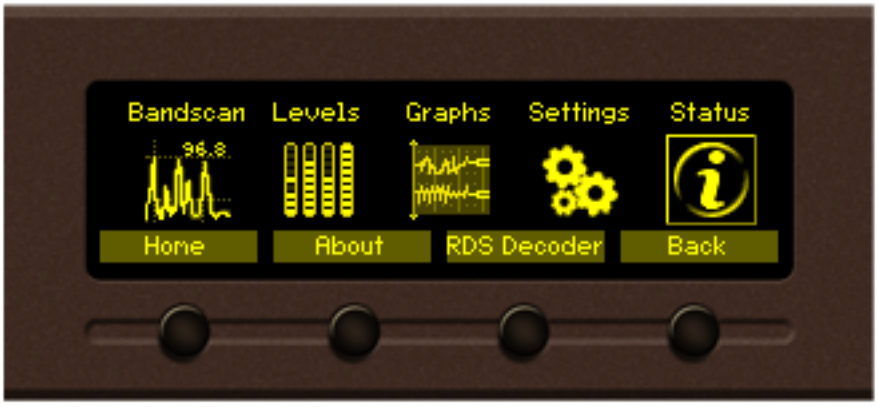
DB7000 can be controlled through the built-in web server. A standard web browser can be used to monitor the status of the device or to make some adjustments

There are two options for access to the WEB Interface of DB7000. 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 users only).

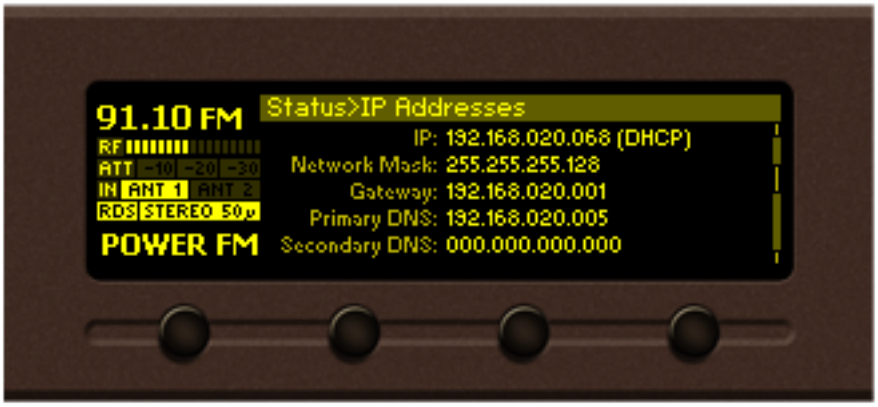
MANUAL IP ADDRESS IDENTIFICATION

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.

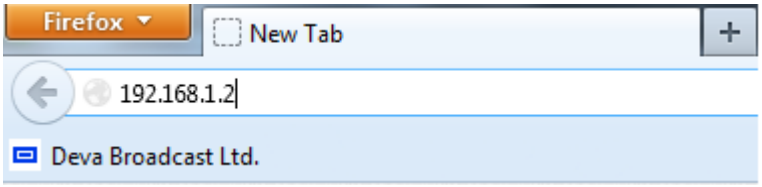


Press the "*OK*" Button to enter the "Status" section. Via the Front panel navigational menu press the "*DOWN*" button.



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 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, DB7000 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.

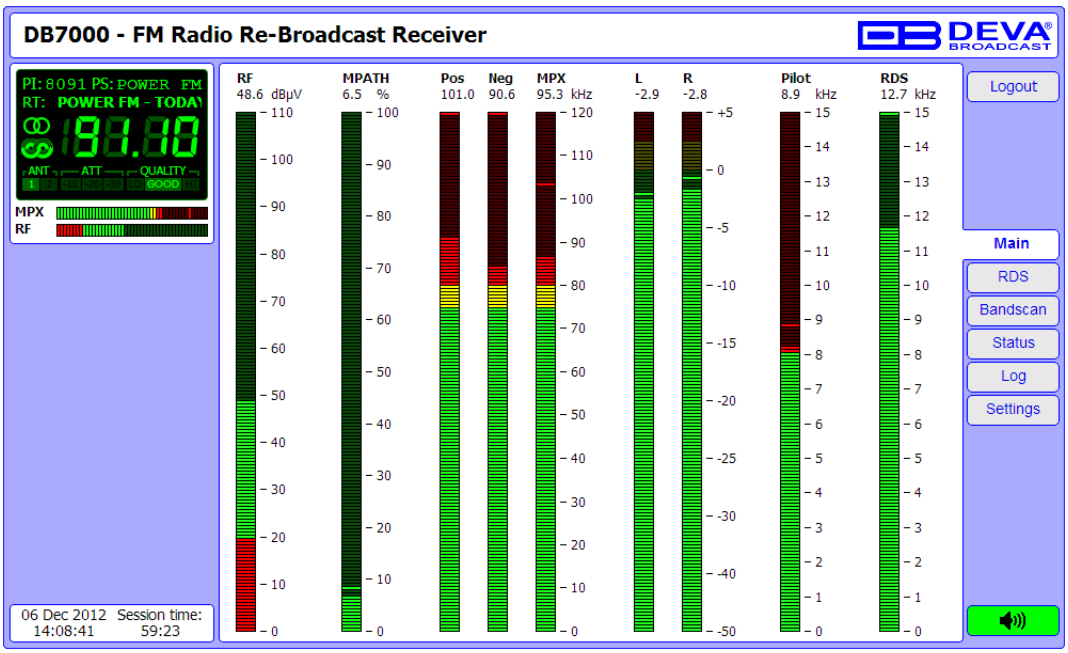
ACCESS

The DB7000 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).

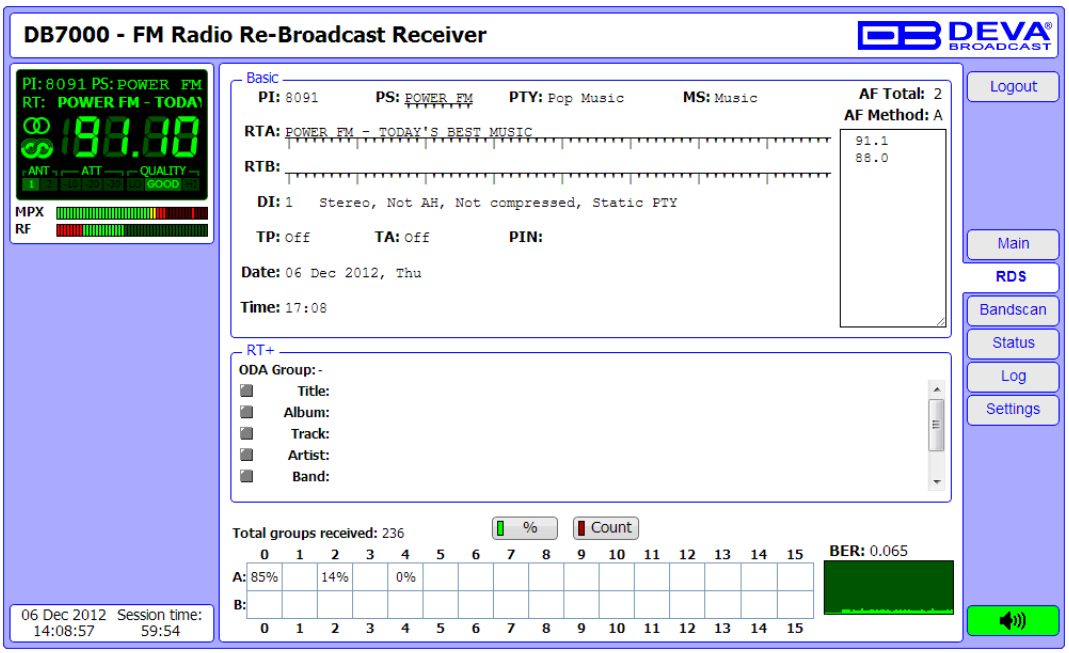
In order to make the necessary adjustments to the device, please log in as Administrator.

MAIN SCREEN



The Main Screen of the WEB Interface shows all the mandatory parameters represented as LED readings - RF level, measured multipath level, baseband modulation (positive and negative peaks), audio levels, PILOT and RDS/RBDS levels.

RDS/RBDS SCREEN



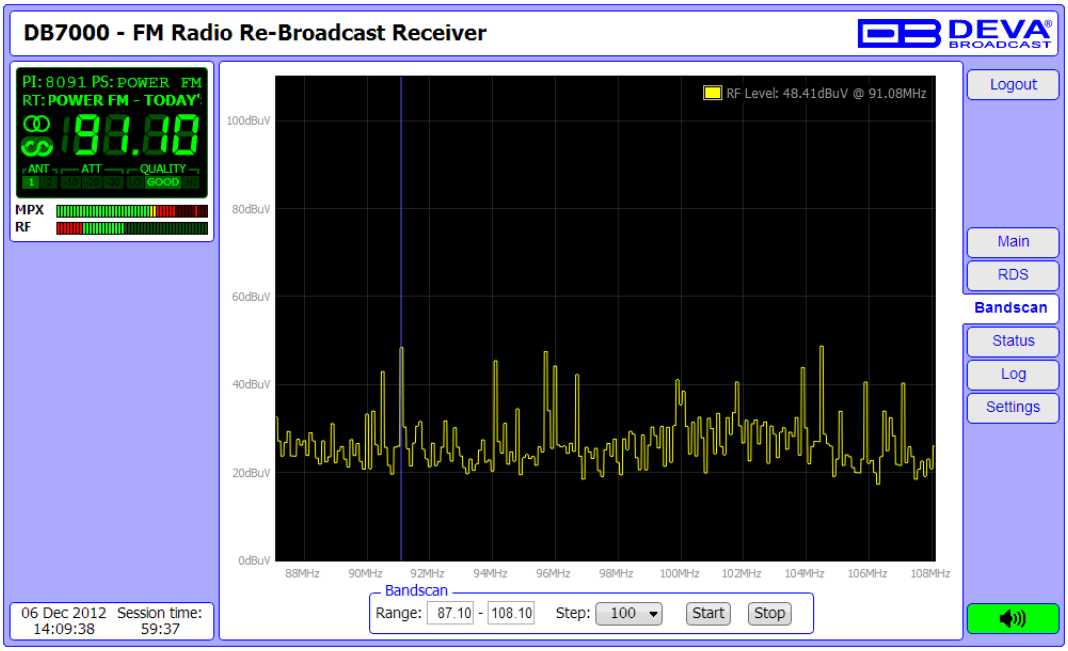
All basic elements of the RDS/RBDS are displayed on the screen – PI, PS, RT, TA/TP, etc. The Alternative frequencies are also available, represented in a list. DB7000 supports one of the most used ODA Applications - Radio Text Plus. If your Radio station has RT+, DB7000 will display the information.

Total groups 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 represented: as Percents (%) or as Count, by selecting the corresponding button.

A BER Indicator with graphics is placed at the right bottom part of the screen, showing 60 sec. history of the BER quantities.

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 the observed 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.

BANDSCAN SCREEN

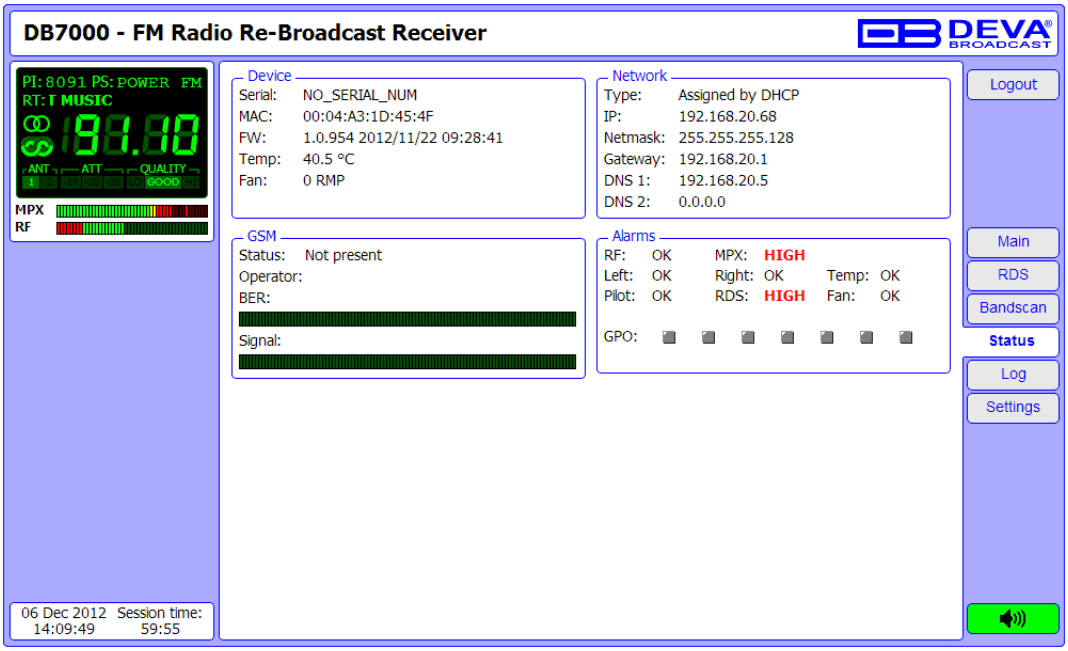


This Screen evaluates FM broadcast band congestion by sweeping the tuner across the FM band, logging every carrier and generating a spectrum display of carrier level vs. frequency.

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 SCREEN

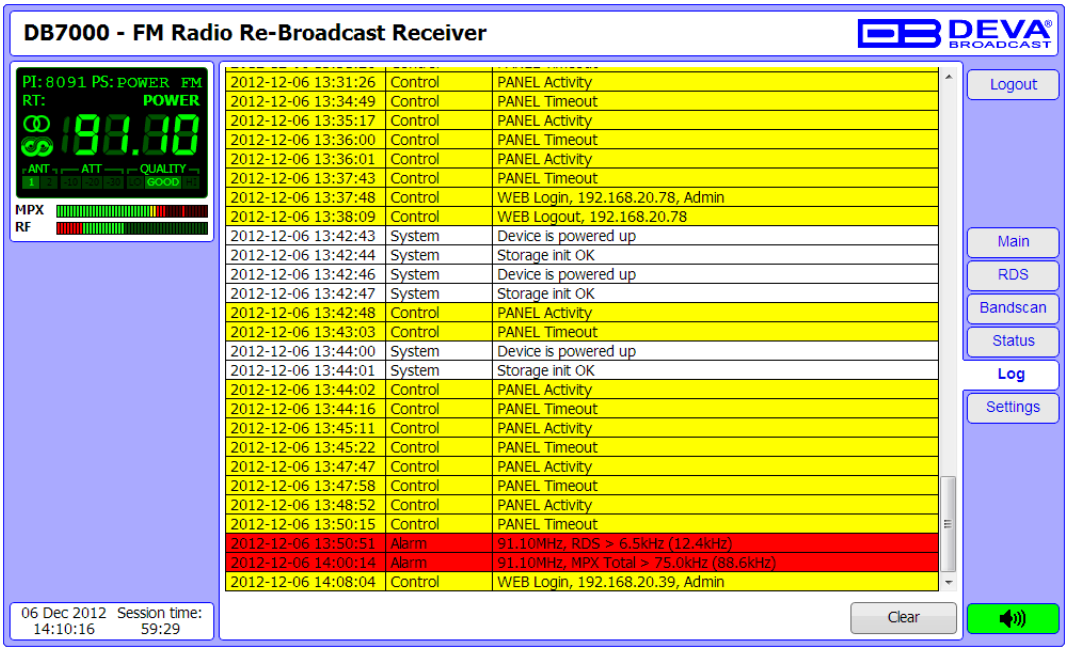


The status tab shows the alarm status of each parameter, along with the basic device and network status (IP address, MAC, etc.).

The Alarm parameters (RF, MPX, Pilot etc.) have several conditions:

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

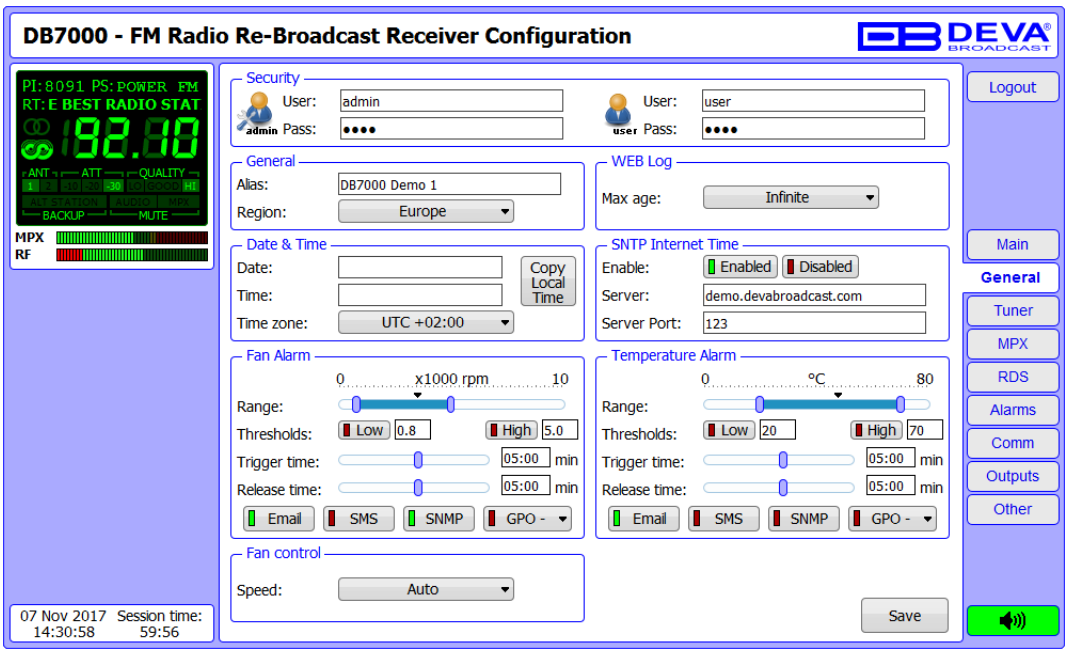
LOG SCREEN



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 DB7000 and an FTP Client should be configured, please refer to “Download files via FTP” on page 87.

GENERAL SETTINGS SCREEN



DB7000 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 device's settings;
- 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 DB7000 to be enhanced, a new username and password could be set from the "Security" section.

Alias – allow the name of the device to be changed. Later on, it will be used as a title name on all WEB pages. Customizing the name will make the device more recognizable.

Region – DB7000's tuning range is user selectable, 87.1-108 MHz (CCIR), 65-74 MHz (OIRT), 76-95 MHz (Japan). Changing/selecting the Region setting, will modify all tuner frequencies so that they could be within the FM band limits of the region chosen. This includes all Presets and Logger Channel frequencies.

Fan control – set the preferred speed of the built-in Fan.

Date & Time – used to 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 DB7000 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).

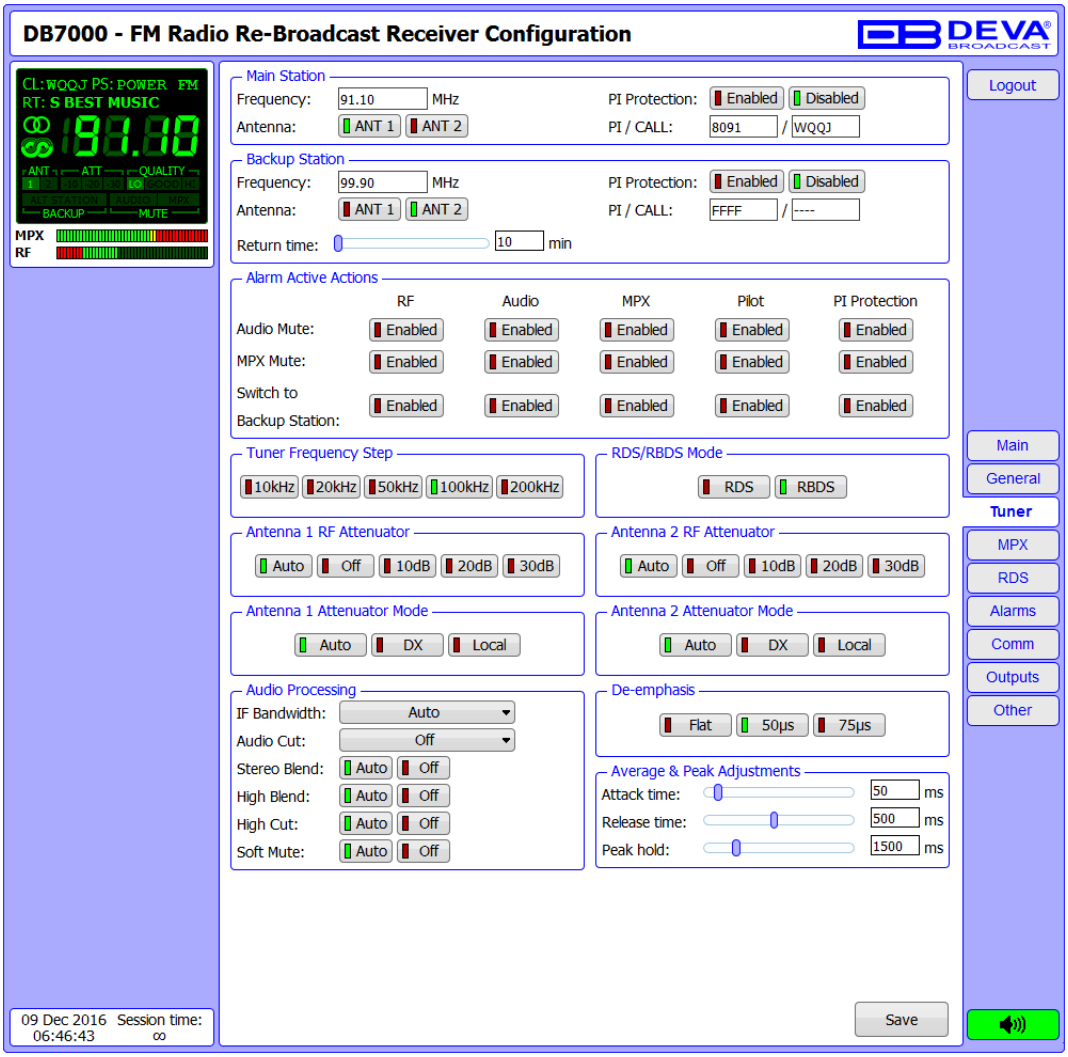
Temperature Alarm – Detects abnormal temperature of the equipment. Define the parameters under which a temperature alarm to be generated.

Fan Alarm - Detects abnormal operation of the built-in fan. Define the parameters under which a fan alarm to be generated.

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.

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

TUNER SETTINGS SCREEN



The Tuner Section gives full control over the two RF Antenna Inputs, Tuner and Audio Processing settings. These settings provide all the needed adjustments to the algorithm which DB7000 demodulates and manipulates the signal.

'Backup Station' section – This functionality will help prevent audio loss in case a problem with the main station occurs.

Switch to backup station will be performed once an alarm event is registered. In order for this to happen, the switch option for the relevant alarm event should be selected. DB7000 will stay on the predefined backup frequency for the user-defined time and will return back to the main station upon it expires. The backup hold time is from 10 to 60 minutes. If the alarm conditions are still present, the alarm will be re-triggered and the unit will switch to the backup station again. The procedure will be repeated until the main station's signal is recovered. The switching time is bounded with and depends from the alarm trigger time that is set. For further information on the alarm trigger time and how to set it up, please refer to the "Alarms" subsection.

'Alarm Active Action' section - In this section are defined the actions to be undertaken in case of an RF, Audio, MPX, Pilot or PI Protection alarm is generated. The following options for reaction are available - Audio Mute, MPX Mute, Switch to Backup Station. The applied settings are applicable for both – the main and backup stations, the option "Switch to backup station" excluded as it is applicable only for the main station.

NOTE: For further information on how to set the Alarms refer to "Alarms Settings Screen" on page 65.

Antenna 1/Antenna 2 RF Attenuator Mode - Allows attenuator mode depending on the location of the device to be selected. The following options are available:

- Auto – device will automatically choose the proper set-up;
- DX – recommended mode when the device is away from the transmitter site;
- Local – recommended mode when the device is at or near a transmitter site.

RDS/RBDS Mode

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

Tuner Frequency Step and De-emphasis

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

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

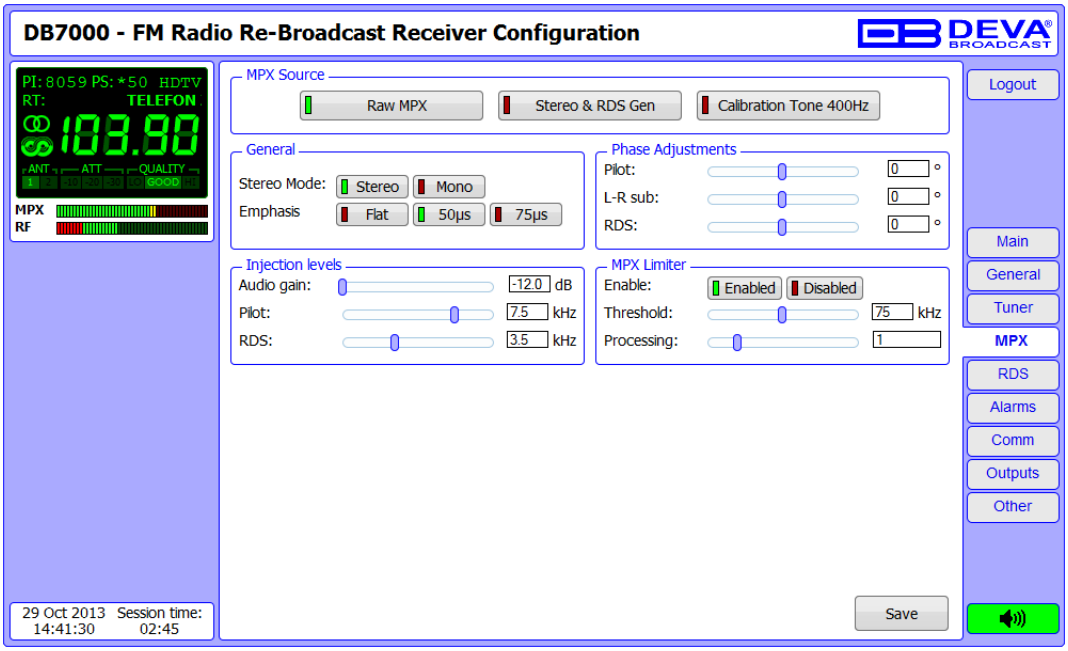
- **Attack time** and **Release time** set the rate in which the indicators' level will change in response to the signal. For most of the applications (including this one), the recommended attack time is shorter than the release time.
- **Peak-hold time** – Permits retaining and displaying the peak value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

Audio Processing

If 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.

MPX SETTINGS SCREEN



MPX Source – Set the preferred MPX Source. The following options are available:

- RAW MPX – demodulated MPX received from the currently selected station;
- Stereo & RDS Gen – MPX generated from the built-in Stereo and RDS Generator;
- Calibration Tone 400Hz – single tone of 400Hz, used for calibrating of the inputs of the devices connected to the MPX output.

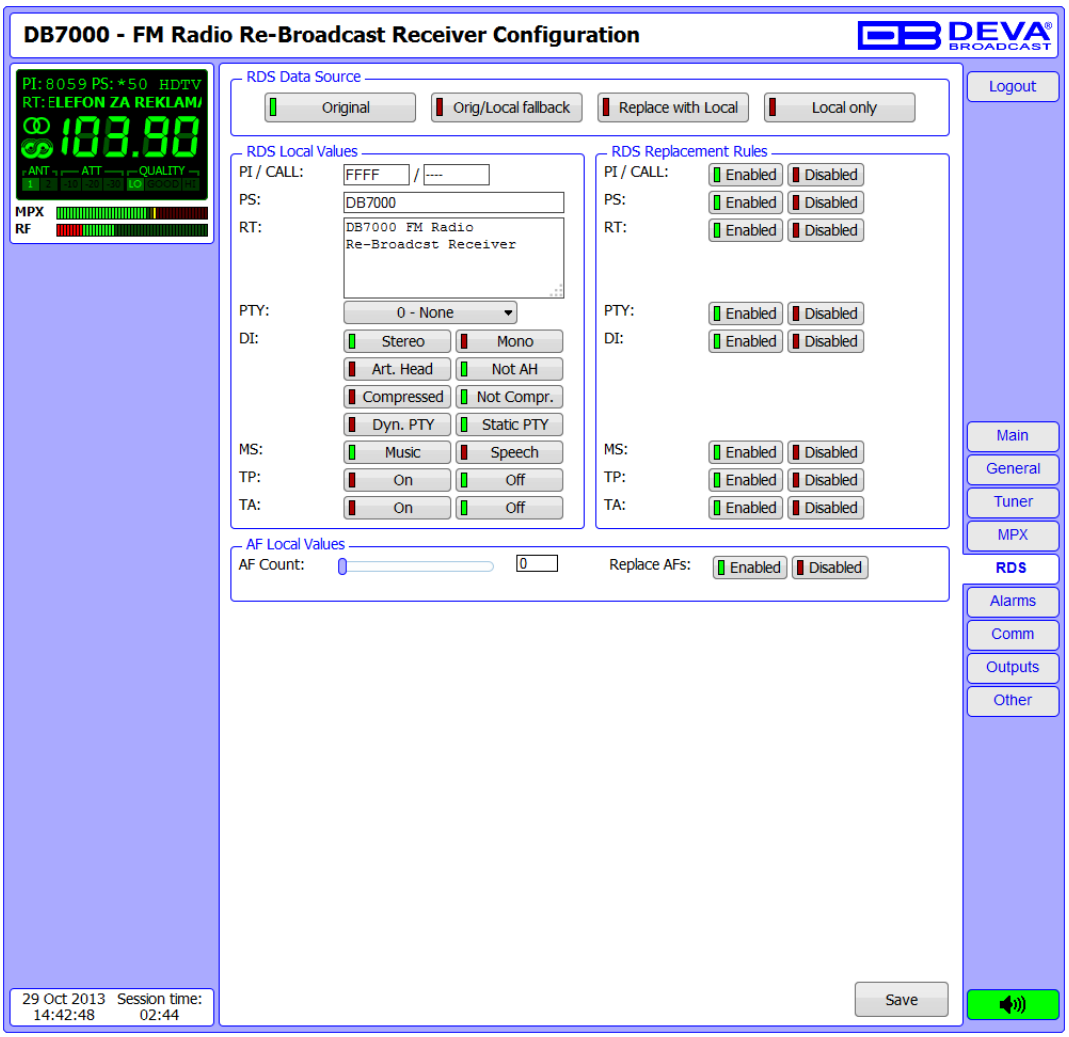
General Settings – The settings of the Stereo Generator are applied through this section. Stereo or Mode processing and user-defined Emphasis could be set.

Injection levels – Set the levels of the components included in the obtained final Stereo Multiplex Signal.

Phase Adjustments – The phase of the Pilot, L-R sub and RDS are set through this section.

MPX Limiter – Enable/Disable the MPX Limiter and set the desired Threshold and Processing mode.

RDS/RBDS SETTINGS SCREEN



RDS Data Source:

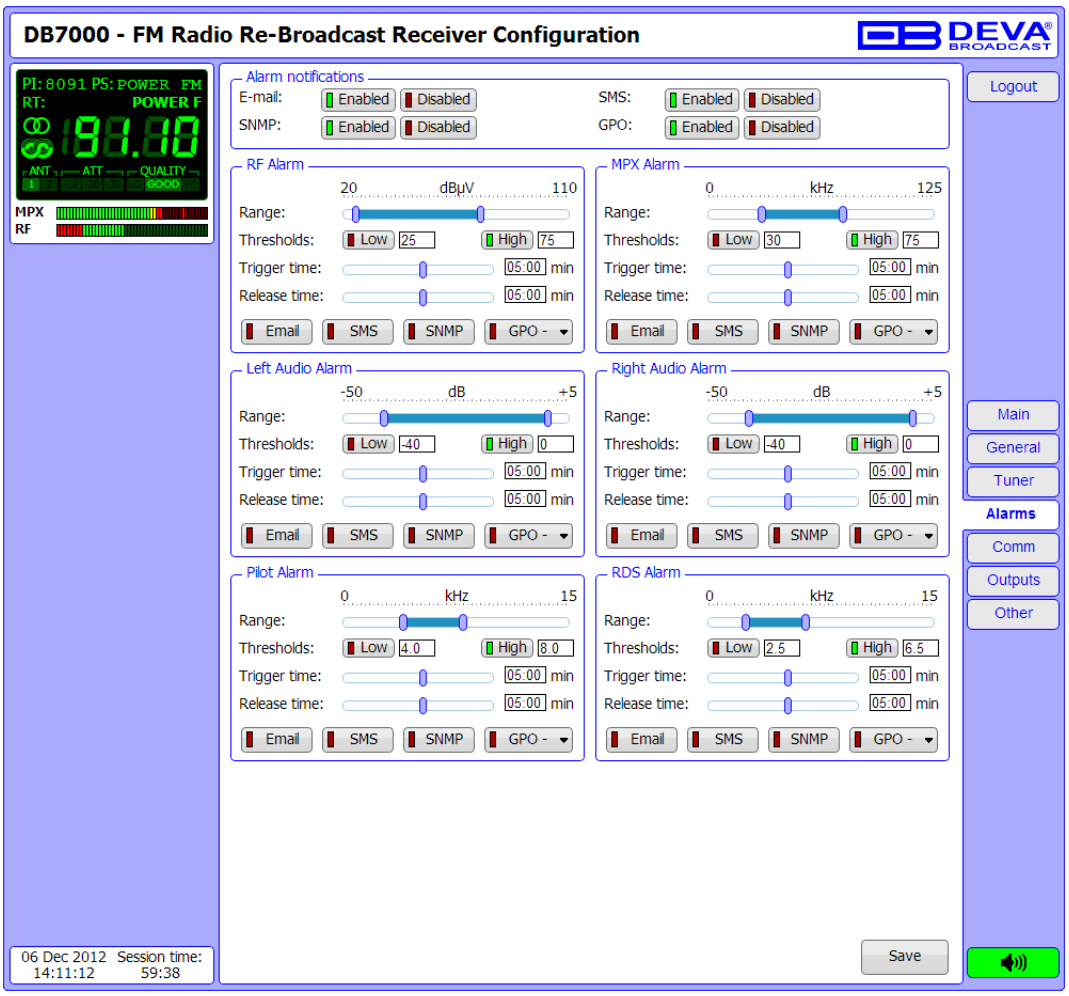
- Original – Original RDS/RBDS data received from the station;
- Original/Local fallback – Upon loss of the original RDS/RBDS the local data will be used;
- Replace with local – User-defined combination of the original and local RDS/RBDS data;
- Local only – User-defined local RDS/RBDS data only.

When Replace with local RDS Data Source is chosen, the RDS/RBDS parameters could be replaced with the specified in RDS Local Values section. Whether a parameter would be changed to its local value on the fly, is specified in section RDS Replacement Rules.

RDS Local Values – RDS/RBDS Local Values are defined through this section.

AF Local Values – Set the total needed number of alternative frequencies and their value.

ALARMS SETTINGS SCREEN



Alarm notifications

- E-mail – global enable/disable E-mail notification;
- SMS – global enable/disable SMS notification;
- SNMP – global enable/disable SNMP notification;
- GPO – global enable/disable GPO actions.

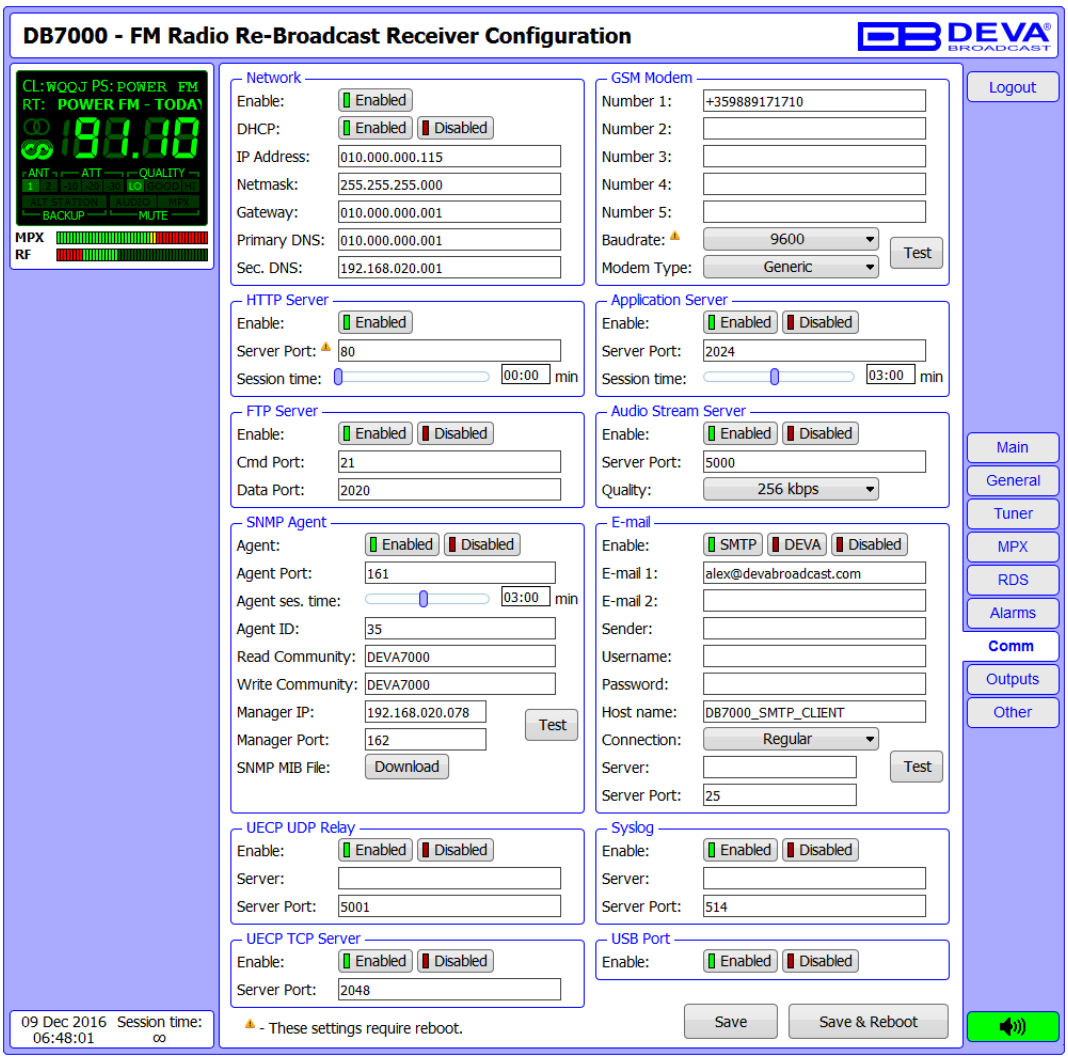
NOTE: If the monitoring option is disabled, notifications will not be sent, nevertheless whether they are enabled or disabled.

Alarm

- Range – interactive slider used to adjust the Low & High thresholds at which an alarm will be generated;
- Trigger Time – waiting time before Active Alarm is generated;
- Release Time – waiting time before Idle Alarm is generated;
- RDS/RBDS Group Alarm – alarm only for selected groups will be generated.

NOTE: For detailed information on Alarm trigger and notifications refer to "APPENDIX 1: Alarm Triggers" on page 71.

COMMUNICATION SETTINGS SCREEN



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, DB7000 will use AutoIP and will generate an IP Address.

HTTP Server

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

FTP Server

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

SNMP Agent

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

Agent - enables/disables SNMP Agent.

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

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

Press the 'Download' button to download the latest available DB7000 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.

Syslog

Enable or disable the Syslog feature. Specify Server address and port to be used.

GSM Modem

Up to five numbers for SMS control and alarm notifications could be set. Baud Rate is mandatory for the proper operation of the GSM Modem.

We recommend that a test SMS to be generated (via pressing the 'Test' button), once all needed settings are applied. Upon success, the SMS will be delivered to all the specified GSM numbers.

Example of Test SMS Message:

DB7000 Test Message.

NOTE: The current condition of the GSM Modem could be checked in the "Status Screen".

Application Server

Enable/Disable the DEVA Device Manger Application Server. Specify the Server Port and session timeout.

Audio Stream Server

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.

E-mail

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

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

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

Example of Test E-mail Message:

DB7000 Test Message.

Please do not reply to this e-mail.

UECP Relay

The unit can relay the received RDS as a UECP stream. There are two possible options:

Option 1 – via UDP, where the device sends the received RDS as UECP encoded UDP packets unconditionally to the specified IP Address and Port. The receiver could be an RDS/RBDS Encoder SmartGen, other RDS Encoder, or Monitoring Software.

Option 2 – via TCP. The unit has built in server and a Monitoring Software to receive the UECP encoded RDS data could be connected to the unit.

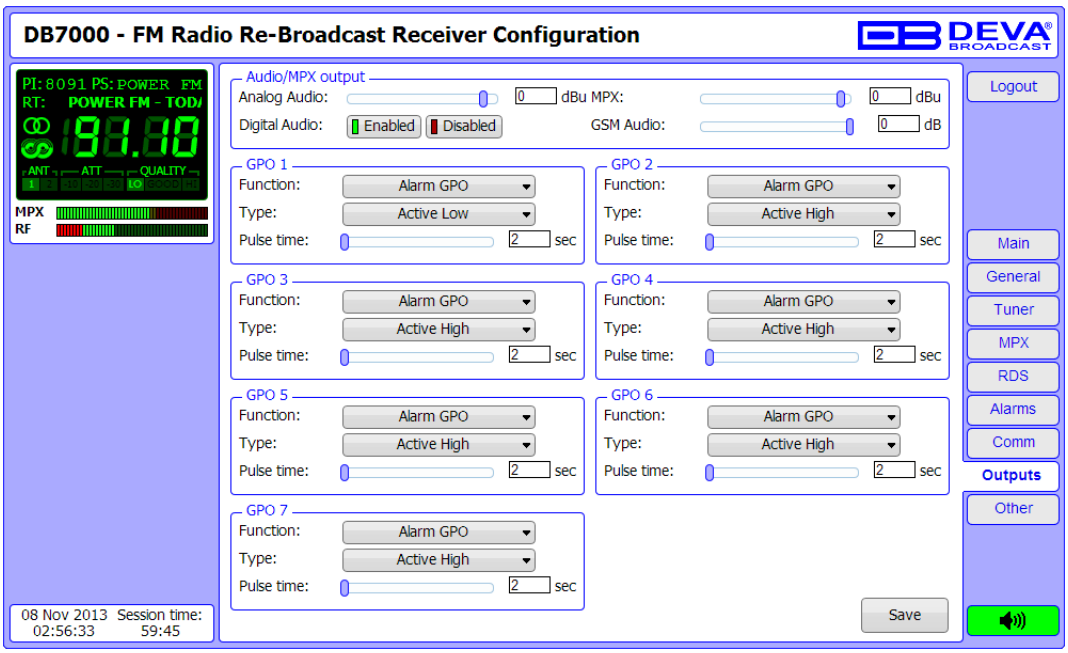
USB Port

Enable/Disable the USB port.

WARNING: The applied changes will take effect upon pressing the SAVE button. All settings marked with require Reboot, therefore the Save & Reboot button should be used.

NOTE: The edited field will become red if the new value is invalid or out of range.

OUTPUTS SETTINGS SCREEN

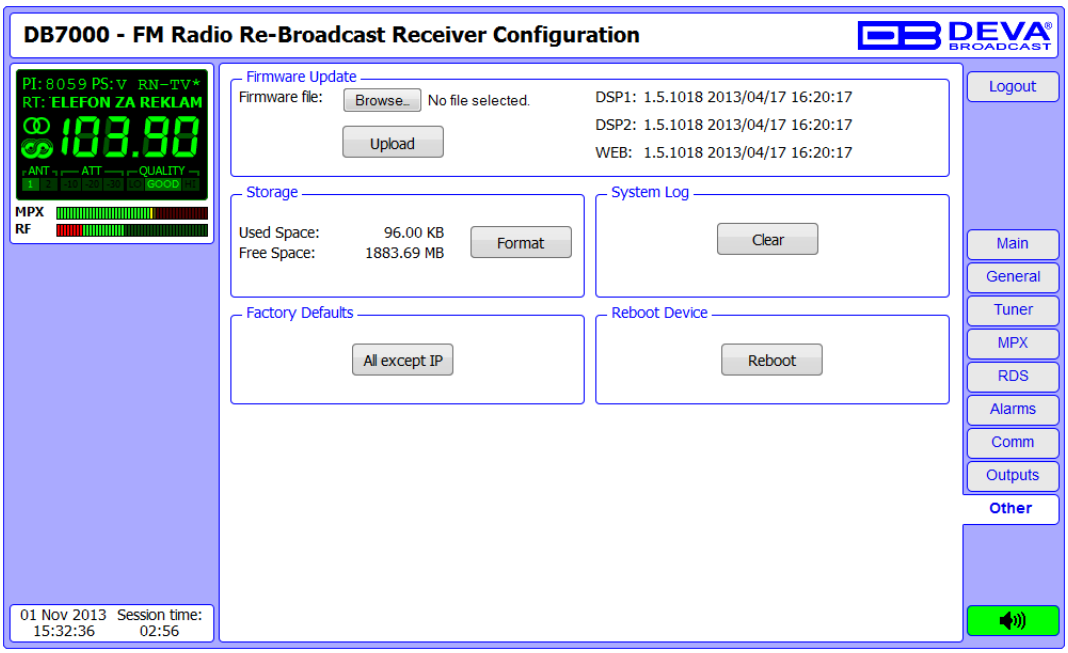


The general purpose outputs settings are applied through this page. The Audio/MPX output section allows the setting of the Audio and MPX Outputs, according to your needs.

Function, type and pulse time for each of the GPOs could be set individually. You can choose between the following functions: Alarm GPO, RDS Lock, TA Flag and TP Flag. '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 the selfsame is chosen as a preferred alarm, notifications will not be indicated, nevertheless one is being generated.

OTHER SETTINGS SCREEN



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 DSP1, DSP2 and WEB is also found in this section.

Storage

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

System Log

By pressing the 'Clear' button, all recorded in the system log information will be deleted.

Factory Defaults

All except IP – all settings except for the Network settings (IP Address) will be deleted;

To restore DB7000 to its Factory Defaults you should first select the desired option and then press the relevant button. A new window will appear - confirm that you want to restore the factory defaults and wait for the process to be completed. On completion of the process, the settings should have the proper default values.

Reboot

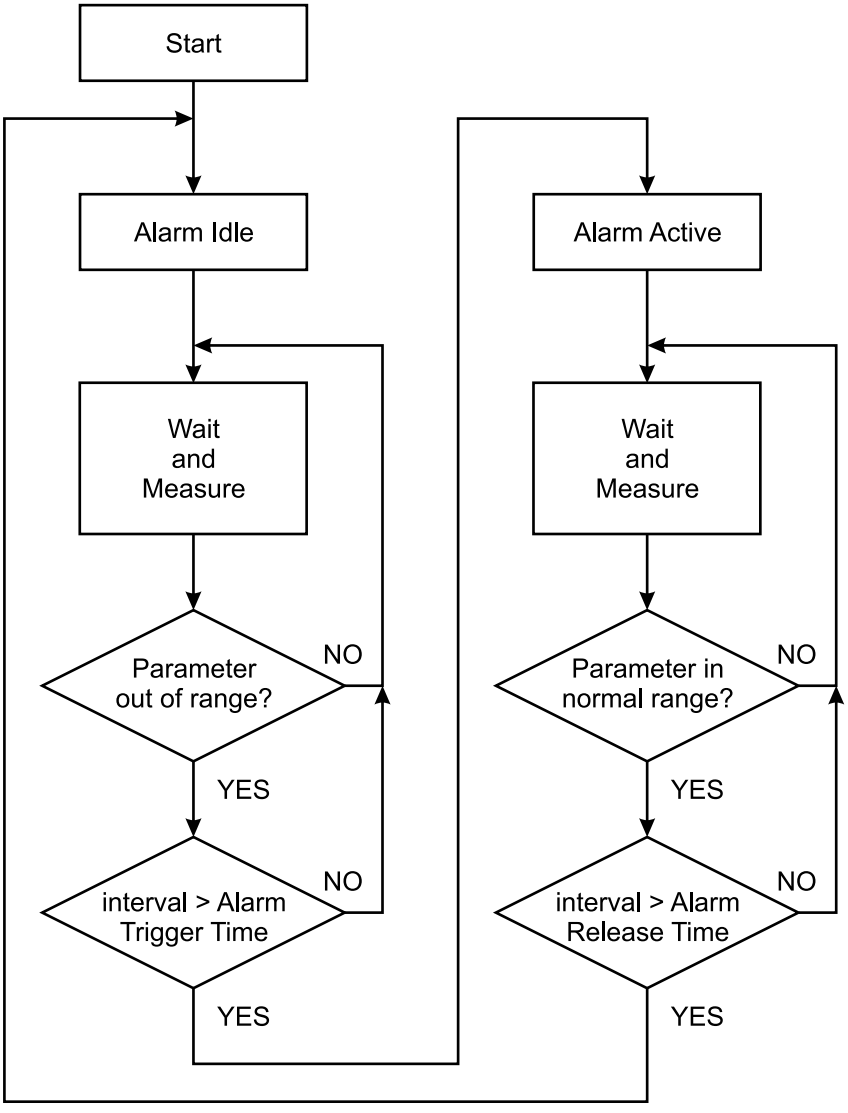
To start Rebooting of DB7000, press the Reboot button. A dialog warning window will appear. Confirm that you want to reboot the device and wait for the process to be completed.

APPENDIX 1: Alarm Triggers

ALARM TRIGGERS

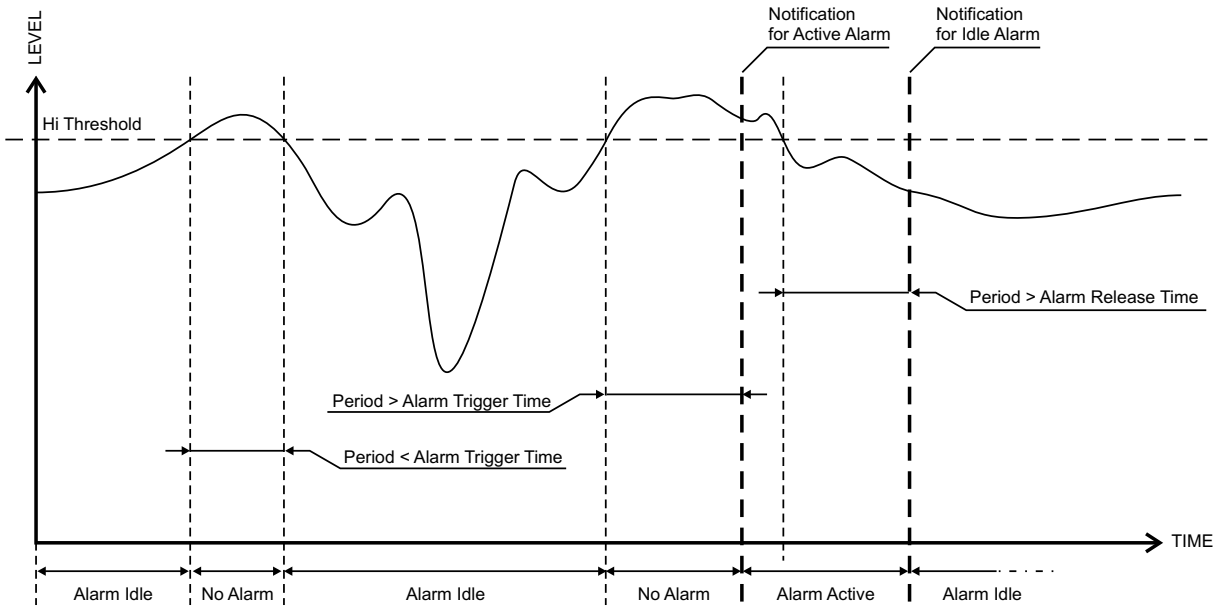
After collecting all the data, the DSP-based core compares the values measured with the predefined by the user threshold levels, for all the alarms monitored. In case that a parameter is beyond limits, the device will initiate the sending of an alarm notification via the selected communication path. 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, MPX, MPX Power, Left/ Right Audio, RDS Group loss, Pilot and RDS levels. 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 NOTIFICATION

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

Example for E-mal Notification:
Date: 04 Nov 2012, 07:31:11

DB7000 reports ACTIVE alarm on 99.90MHz

Alarm: RDS > 6.5kHz

Signal parameters:
RF: 51.5dBuV
MPX Total: 89.9kHz
MPX Power: -128.0dBr
Pilot: 7.5kHz
RDS: 11.4kHz
Left: -7.2dB
Right: -8.2dB

Example for SMS Notification:
ACTIVE ALARM
27.09.2013 09:08:34
FREQ:95.7MHz
RF:35.0dBuV *L*
MPX:60.3kHz
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.

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Tel: +359 56 820027, Fax: +359 56 836700
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APPENDIX 2: List of DB7000 settings

Parameter Name	Type	Range	Default value [, Unit]	Description
Tuner				Tuner related submenu
Frequency	INT	User selectable, 87.1-108 MHz (CCIR), 65-74 MHz (OIRT), 76-95 MHz (Japan)	98.1, MHz	Currently set frequency
RF Input	ENUM	Antenna 1, Antenna 2	Antenna 1	Active RF antenna input
Attenuator Ant 1	ENUM	Auto, OFF, -10dB, -20dB, -30dB	Auto	Attenuator setting for antenna input 1
Attenuator Ant 2	ENUM	Auto, OFF, -10dB, -20dB, -30dB	Auto	Attenuator setting for antenna input 2
Frequency Step	ENUM	10, 20, 50, 100, 200	50, kHz	Step for frequency tuning
IF Bandwidth	ENUM	27, 36, 45, 53, 62, 71, 79, 88, 97, 105, 114, 123, 131, 140, 149, 157, Auto	Auto, kHz	IF filter bandwidth
Stereo Blend	ENUM	Auto, Off	Auto	Stereo blend level
High Cut	ENUM	Auto, Off	Auto	High cut level
High Blend	ENUM	Auto, Off	Auto	High blend level
Soft Mute	ENUM	Auto, Off	Auto	Soft mute level
Audio Cut	ENUM	5, 10, 15, Off	Off, kHz	Audio cut level
Deemphasis	ENUM	FLAT, 50, 75	50, µs	De-emphasis settings
RDS Mode	ENUM	RDS, RBDS	RDS	RDS decoder mode
PI Protection	ENUM	Enable, Disable	Disable	PI Protection Enable
PI	PI			PI Protection code
RF Loss Threshold	INT	0 … 110, step 1	40, dBµV	RF threshold level
RF Loss Timeout	TIMER	1 … 60, step 1	1, s	RF timeout
Average and Peak				Signal averaging related submenu
Attack Time	INT	0 … 500, step 10	50, ms	Attack time for signal measuring
Release Time	INT	50 … 1000, step 10	500, ms	Release time for signal measuring
Peak Hold	INT	500 … 5000, step 500	1500, ms	Peak hold time

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Parameter Name	Type	Range	Default value [, Unit]	Description
MPX Generator				MPX Generator Settings
MPX Source	ENUM	RAW MPX, Stereo Gen, Test Tone 400Hz	RAW MPX	MPX Source
Stereo Mode	ENUM	Mono, Stereo	Stereo	Stereo mode
Pre Emphasis	ENUM	FLAT, 50, 75	50, µs	Pre Emphasis
Audio Gain	INT	-12 … 3, step 0.5	0, dB	Audio gain for MPX
Pilot Injection	INT	0 … 10, step 0.5	7.5, kHz	Pilot injection level
RDS Injection	INT	0 … 10, step 0.5	5, kHz	RDS injection level
Pilot Phase	INT	-90 … 90, step 1	0, kHz	Pilot phase adjustment
L-R Phase	INT	-90 … 90, step 1	0, kHz	L-R subcarrier phase adjustment
RDS Phase	INT	-90 … 90, step 1	0, kHz	RDS subcarrier phase adjustment
MPX Limiter	ENUM	Enable, Disable	Enable	MPX Limiter
MPX Threshold	INT	40 … 110, step 1	75, kHz	MPX Limiter threshold
MPX Processing	INT	0 … 5, step 1	0	MPX Limiter processing
RDS Generator				RDS Encoder settings
Source	ENUM	Original, Local Fallback, Local, Replace	Original	RDS Data Source
PI	PI	all valid RDS/RBDS PI values	FFFF	Local PI
PS	STR		DB7000	Local PS
Radio Text	STR		DB7000 FM Radio Re-Broadcast Receiver	Local Radio Text
PTY	ENUM	see “APPENDIX C.1” & “APPENDIX C.2”	None	Local PTY
MS	ENUM	Speech, Music	Music	Local MS flag
TP	ENUM	Off, On	Off	Local TP flag
TA	ENUM	Off, On	Off	Local TA flag

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Parameter Name	**Type**	**Range**	Default value [, Unit]	**Description**
DI Flags				DI Flags
Stereo	ENUM	Off, On	Off	DI Flag Stereo
Artificial Head	ENUM	Off, On	Off	DI Flag Artificial Head
Compressed	ENUM	Off, On	Off	DI Flag Compressed
Dynamic PTY	ENUM	Off, On	Off	DI Flag Dynamic PTY
AF List				Local Alternative frequencies list
AFs Count	INT	0 … 25, step 1	0	Local AF List length
AF 1	INT	87.6 … 107.9, step 0.1	87.6, MHz	Local AF 1
…	…	…	…	…
AF 25	INT	87.6 … 107.9, step 0.1	87.6, MHz	Local AF 25
PI Replace	ENUM	Enable, Disable	Enable	Replace PI with local
PS Replace	ENUM	Enable, Disable	Enable	Replace PS with local
RT Replace	ENUM	Enable, Disable	Enable	Replace Radio text with local
PTY Replace	ENUM	Enable, Disable	Enable	Replace PTY with local
MS Replace	ENUM	Enable, Disable	Enable	Replace MS with local
TP Replace	ENUM	Enable, Disable	Enable	Replace TP with local
TA Replace	ENUM	Enable, Disable	Enable	Replace TA with local
DI Replace	ENUM	Enable, Disable	Enable	Replace DI with local
AF Replace	ENUM	Enable, Disable	Enable	Replace AF with local

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Parameter Name	Type	Range	Default value [, Unit]	Description
Communication				Communication related submenu
General Setup				General communication settings
Ethernet	ENUM	Enable, Disable	Enable	Ethernet port (general)
SNMP	ENUM	Enable, Disable	Enable	SNMP protocol
Application	ENUM	Enable, Disable	Enable	Application proprietary protocol
HTTP	ENUM	Enable, Disable	Enable	HTTP protocol (WEB server)
FTP	ENUM	Enable, Disable	Enable	FTP protocol
Email	ENUM	Enable, Disable	Enable	SMTP protocol (email)
SNTP	ENUM	Enable, Disable	Enable	SNTP protocol (Internet time)
Audio Stream	ENUM	Enable, Disable	Enable	Audio streaming
Syslog	ENUM	Enable, Disable	Enable	SYSLOG protocol
USB	ENUM	Enable, Disable	Enable	USB port
UPnP	ENUM	Enable, Disable	Enable	UPnP protocol
Ethernet				Ethernet related submenu
DHCP	ENUM	Enable, Disable	Enable	DHCP Client
IP	IP		192.168.1.2	IP address (static)
Network Mask	NETMASK		255.255.255.0	Network mask (static)
Gateway	IP		192.168.1.1	Gateway address (static)
Primary DNS	IP		192.168.1.1	Primary DNS IP address (static)
Secondary DNS	IP		192.168.1.1	Secondary DNS IP address (static)
SNMP				SNMP related submenu
Manager IP	IP		192.168.1.1	Manager IP address
Manager Port	PORT	1 … 65535, step 1	162	Manager port
Agent Port	PORT	1 … 65535, step 1	161	Agent port
Agent ID	INT	0 … 255, step 1	0	Agent ID for the device
Read Community	STR		DEVA7000	Read community password
Write Community	STR		DEVA7000	Write community password

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Parameter Name	Type	Range	Default value [, Unit]	Description
Session Timeout	TIMER	10 … 3600, step 10	180, s	Inactivity timeout - for SNMP write only
Application				Application related submenu
Port	PORT	1 … 65535, step 1	1024	Application port
Session Timeout	TIMER	10 … 3600, step 10	180, s	Application inactivity timeout
HTTP				HTTP related submenu
Port	PORT	1 … 65535, step 1	80	WEB server port
Session Timeout	TIMER	10 … 3600, step 10	180, s	WEB session timeout
FTP				FTP related submenu
Data Port	PORT	1 … 65535, step 1	2020	FTP data port
Command Port	PORT	1 … 65535, step 1	21	FTP command port
SNTP				SNTP related submenu
Time Server	HOST		pool.ntp.org	Time server host name
Server Port	PORT	1 … 65535, step 1	123	Time server port
Email				Email related submenu
Mail Server	HOST		(blank)	Outgoing server host name
Server Port	PORT	1 … 65535, step 1	25	Outgoing server port
Email Address 1	EMAIL		(blank)	First recipient email address
Email Address 2	EMAIL		(blank)	Second recipient email address
Sender Name	STR		(blank)	Sender name
User Name	STR		(blank)	Outgoing server user name
User Password	STR		(blank)	Outgoing server password
Host name	HOST		DB7000_SMTP_CLIENT	Client Hostname
Connection Type	ENUM	Regular, Encrypted	Regular	Connection Type
Streamer				Audio streamer related submenu
Server Port	PORT	1 … 65535, step 1	5000	Audio streamer server port
Bitrate	INT	64 … 256, step 32	128, kbps	Audio bitrate

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Parameter Name	Type	Range	Default value [, Unit]	Description
Syslog				SYSLOG related submenu
Server	HOST		(blank)	Server host name
Port	PORT	1 … 65535, step 1	514	Server port
GSM Modem				GSM modem related submenu
Modem Type	ENUM	Generic	Generic	Denotes used GSM modem type
Baudrate	ENUM	4800, 9600, 19200, 38400, 57600	9600, bps	GSM modem communication speed
Number 1	TEL		(blank)	First allowed phone number
Number 2	TEL		(blank)	Second allowed phone number
Number 3	TEL		(blank)	Third allowed phone number
Number 4	TEL		(blank)	Fourth allowed phone number
Number 5	TEL		(blank)	Fifth allowed phone number
Security				Security related submenu
Panel				Panel security settings
Access Control	ENUM	Enable, Disable	Disable	Front panel access control
Access Code	PORT	0 … 9999, step 1	1234	Front panel access code
Access Timeout	TIMER	60 … 3600, step 1	300, s	Access is granted timeout
Remote Access				Remote control security settings
Admin Name	STR		admin	Admin access level name
Admin Password	STR		pass	Admin access level password
User Name	STR		user	User access level name
User Password	STR		pass	User access level password

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Parameter Name	Type	Range	Default value [, Unit]	Description
Alarms				Alarms related submenu
Alarm Events				Alarm events control settings
Email	ENUM	Enable, Disable	Enable	Alarm through email
SMS	ENUM	Enable, Disable	Enable	Alarm through SMS
SNMP Trap	ENUM	Enable, Disable	Enable	Alarm through SNMP trap
GPO	ENUM	Enable, Disable	Enable	Alarm through GPO pin
Alarms GPO				GPO pins settings
GPO1 Type	ENUM	Level High, Level Low, Pulse High, Pulse Low	Level High	GPO pin 1 active level
GPO1 Pulse Time	TIMER	1 … 120, step 1	2, s	GPO pin 1 pulse duration
GPO2 Type	ENUM	Level High, Level Low, Pulse High, Pulse Low	Level High	GPO pin 2 active level
GPO2 Pulse Time	TIMER	1 … 120, step 1	2, s	GPO pin 2 pulse duration
GPO3 Type	ENUM	Level High, Level Low, Pulse High, Pulse Low	Level High	GPO pin 3 active level
GPO3 Pulse Time	TIMER	1 … 120, step 1	2, s	GPO pin 3 pulse duration
GPO4 Type	ENUM	Level High, Level Low, Pulse High, Pulse Low	Level High	GPO pin 4 active level
GPO4 Pulse Time	TIMER	1 … 120, step 1	2, s	GPO pin 4 pulse duration
GPO5 Type	ENUM	Level High, Level Low, Pulse High, Pulse Low	Level High	GPO pin 5 active level
GPO5 Pulse Time	TIMER	1 … 120, step 1	2, s	GPO pin 5 pulse duration
GPO6 Type	ENUM	Level High, Level Low, Pulse High, Pulse Low	Level High	GPO pin 6 active level
GPO6 Pulse Time	TIMER	1 … 120, step 1	2, s	GPO pin 6 pulse duration
GPO7 Type	ENUM	Level High, Level Low, Pulse High, Pulse Low	Level High	GPO pin 7 active level
GPO7 Pulse Time	TIMER	1 … 120, step 1	2, s	GPO pin 7 pulse duration
RF Alarm	ALARM	see “Note 1”		RF level alarm settings
MPX Alarm	ALARM	see “Note 1”		MPX total deviation alarm settings
Pilot Alarm	ALARM	see “Note 1”		Pilot level alarm settings
RDS Alarm	ALARM	see “Note 1”		RDS subcarrier level alarm settings
RDS Group Alarm	ALARM	see “Note 1”		RDS group presence alarm settings
Left Alarm	ALARM	see “Note 1”		Left audio level alarm settings

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Parameter Name	Type	Range	Default value [, Unit]	Description
Right Alarm	ALARM	see "Note 1"		Right audio level alarm settings
Temperature Alarm	ALARM	see "Note 1"		Device temperature alarm settings
Fan Speed Alarm	ALARM	see "Note 1"		Device fan speed alarm settings
Audio / MPX Outputs				Audio / MPX output related submenu
Phones Volume	INT	-60 … 0, step 1	-12, dB	Head phones audio level
Audio Volume	INT	-60 … 6, step 1	0, dBu	Audio output level
MPX Volume	INT	-60 … 4, step 1	0, dBu	MPX output level
GSM Volume	INT	-60 … 0, step 1	0, dB	GSM audio level
Digital Out	ENUM	Enable, Disable	Disable	Digital audio output control
Device				Device related submenu
Alias	STR		DB7000	Alias name for device
Date / Time				Date / Time settings
Date	DATE	01-Jan-2012 … 31-Dec-2100	0, dd-mm-yyyy	Manual set Date
Time	TIME	0:0:0 … 23:59:59, step 1	0, hh:mm:ss	Manual set Time
Timezone	TZONE	-12:00 … 14:00, step 30 min	0, hh:mm	Timezone
Front Panel				Front panel settings
Display Brightness	INT	0 … 100, step 10	50, %	Display brightness
Display Contrast	INT	0 … 100, step 10	100, %	Display contrast
LED Brightness	INT	0 … 100, step 10	60, %	LED bars brightness
Screen Saver	ENUM	Disable, 1 min, 2 min, 5 min, 10 min	2, min	Screen saver control
Panel Timeout	TIMER	10 … 600, step 10	10, s	Panel inactivity timeout
Loss				Loss LED settings
Audio Threshold	INT	-100 … 0, step 1	-50, dB	Audio threshold level
Audio Timeout	TIMER	1 … 60, step 1	1, s	Audio timeout
Multipath Threshold	INT	0 … 100, step 1	15, %	Multipath threshold level
Multipath Timeout	TIMER	1 … 60, step 1	1, s	Multipath timeout
RDS Timeout	TIMER	1 … 60, step 1	1, s	RDS timeout

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Parameter Name	Type	Range	Default value [, Unit]	Description
Home Screen	INT	0 … 3, step 1	1	Select Device's home screen
Fan Control	ENUM	Auto, 25 %, 50%, 75%, 100%	Auto, %	Fan speed control
Weblog Max Days	ENUM	Infinite, 5, 10, 15, 20, 25, 30	Infinite, days	Maximum age of WEB system log
Factory Defaults				Factory defaults settings
Apply to	ENUM	None, Channels, Retain Comm, All	None	Selects parameter group to apply defaults
Execute	ENUM	Done, Proceed	Done	Revert defaults to selected parameter goup

NOTE 1: Default values for complex alarm parameters are as follows:

Parameter Name	Type	Range	Default value [,Unit]	Description
For all Alarms				
Trigger	TIMER	1 … 600, step 1	300, sec	Alarm active event delay
Release	TIMER	1 … 600, step 1	300, sec	Alarm idle event delay
SMS	ENUM	ON, OFF	OFF	SMS notification control
Email	ENUM	ON, OFF	OFF	Email notification control
SMNP	ENUM	ON, OFF	OFF	SNMP notification control
GPO	ENUM	1, 2, 3, 4, 5, 6, 7, OFF	OFF	GPO pin assignment control
RF Alarm				
Low threshold	INT	20 … (High threshold)	25, dBµV	Low alarm trigger level
High threshold	INT	(Low threshold) … 100	75, dBµV	High alarm trigger level
MPX Alarm				
Low threshold	INT	0 … (High threshold)	30, kHz	Low alarm trigger level
High threshold	INT	(Low threshold) … 125	75, kHz	High alarm trigger level
Pilot Alarm				
Low threshold	INT	0 … (High threshold)	4, kHz	Low alarm trigger level
High threshold	INT	(Low threshold) … 15	8, kHz	High alarm trigger level
RDS Alarm				

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Parameter Name	Type	Range	Default value [,Unit]	Description
Low threshold	INT	0 … (High threshold)	2.5, kHz	Low alarm trigger level
High threshold	INT	(Low threshold) … 15	6.5, kHz	High alarm trigger level
Left Alarm and Right Alarm				
Low threshold	INT	-50 … (High threshold)	-40, dB	Low alarm trigger level
High threshold	INT	(Low threshold) … 5	0, dB	High alarm trigger level
Temperature Alarm				
Low threshold	INT	0 … (High threshold)	20, °C	Low alarm trigger level
High threshold	INT	(Low threshold) … 80	70, °C	High alarm trigger level
Fan Alarm				
Low threshold	INT	500 … (High threshold)	800, rpm	Low alarm trigger level
High threshold	INT	(Low threshold) … 10000	5000, rpm	High alarm trigger level
RDS Group Alarm				
Group selector	-	All groups deselected		RDS Group selector

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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 Authorization (RA) number issued by DEVA Broadcast Ltd. prior to its return. An RA 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.

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 DB7000, it is assumed that the user is familiar with the RDS concept.

APPENDIX B

DOWNLOAD FILES VIA FTP

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. TheFTP Server works in Passive mode. Hence, the FTP Client should also be set in passive mode.

2. IP Router and Port Translation Settings

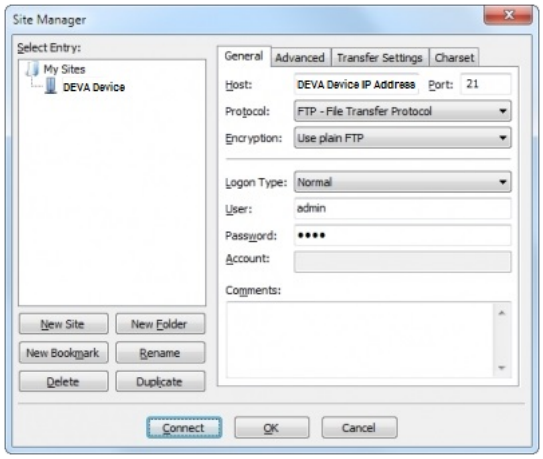
If the connection to the device is made through a Network address translation (NAT) router or firewall, the port forwarding feature of the router should be configured. The port forwarding is usually set in the firewall section of the router's menu. As each router has different port forwarding procedure,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

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

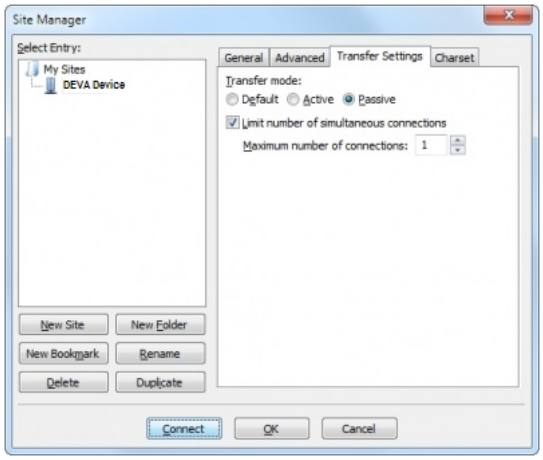
3. Example of FTP Client (FileZilla) Settings

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

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



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



APPENDIX C.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.

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APPENDIX C.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.