MAINTENANCE AND OPERATION
INSTRUCTION MANUAL

DB46

Compact DAB/DAB+ Monitoring Receiver

DAB+

DEVA® BROADCAST

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Introduction

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

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

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

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

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

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

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

Typographic conventions

The following table describes important conventions used in the manual.

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

General Information

Continuing a tradition for products brought about by creative thinking and technological precision, the DB46 – Compact DAB/DAB+ Monitoring Receiver slots in seamlessly within DEVA's range of monitoring tools by offering another dimension of accuracy and cost-effectiveness. While also retaining the defining characteristics of the DEVA brand, this revolutionary product is specifically dedicated to one of the major areas in the industry - Digital Audio Broadcasting, and fully meets the ETSI EN 300 401 DAB standard.

Along with the guaranteed quality of performance, a crucial asset of this product is its design – compact, smart and extremely practical. Proving that practicality does not come at the cost of efficiency, the DB46 boasts a wealth of capabilities and superb features. It has a highly-selective DSP-based tuner, supports the latest DAB & DAB+ standards.

What is more, it offers support for Program Associated Data (PAD), as well as all standard bitrates and VBR, and automatically displays live metadata. While the signal is being monitored and logged, the DB46 measures the following DAB signals: RSSI, SNR, CNR, FIC Quality, FIB Errors, FFT Offset and the Left & Right Audio level values and stores them, thereby allowing for future analysis. A standard FTP client is all that is required for the collected data to be easily downloaded.

The BandScan function of the DB46 presents an overview of all DAB/DAB+ signals available, plus their RF signal strength. BandScans are possible within any section of Band III. The generated spectrum diagram shows the RF Level vs. the channels.

Another impressive feature of the DB46 is the fact that the tool guarantees no interruption of the broadcast signal. This is achieved through the provided local alarm options and online notifications via rear-panel alarm GPOs, E-mail and SNMP in case there is audio loss or change in the DAB signal and the Left and Right Audio Levels. This allows for a fast response on the part of the maintenance staff so that prolonged signal loss can be prevented.

Users can also easily control and set up their DB46 unit remotely through their PC, tablet or smart phone via a standard web browser; iOS and Android devices are also supported.

Compact and affordable, with a remarkable set of technical characteristics, DEVA's DB46 is a definite must-have for accurate, dependable DAB/DAB+ monitoring.

Product Features

- DAB/DAB+ compliant receiver
- Support for Program Associated Data (PAD)
- Predefined DAB channels scan or manual tune
- Detailed DAB component information
- High-end digital tuner
- Quick Service access via 6 Presets
- Real Time Audio Program Streaming
- Built-in easy to use WEB and FTP server
- Apple and Android devices support
- Protected access to the device settings
- Headphone output with front panel level control
- SNTP for automatic synchronization of the built-in clock
- LAN port for full TCP/IP remote control and monitoring
- Adjustable MIN/MAX alarms for RF, Left & Right Audio Levels
- Alarm dispatch via E-mail, SNMP ver.2C and GPO
- Firmware updates will ensure improved operation

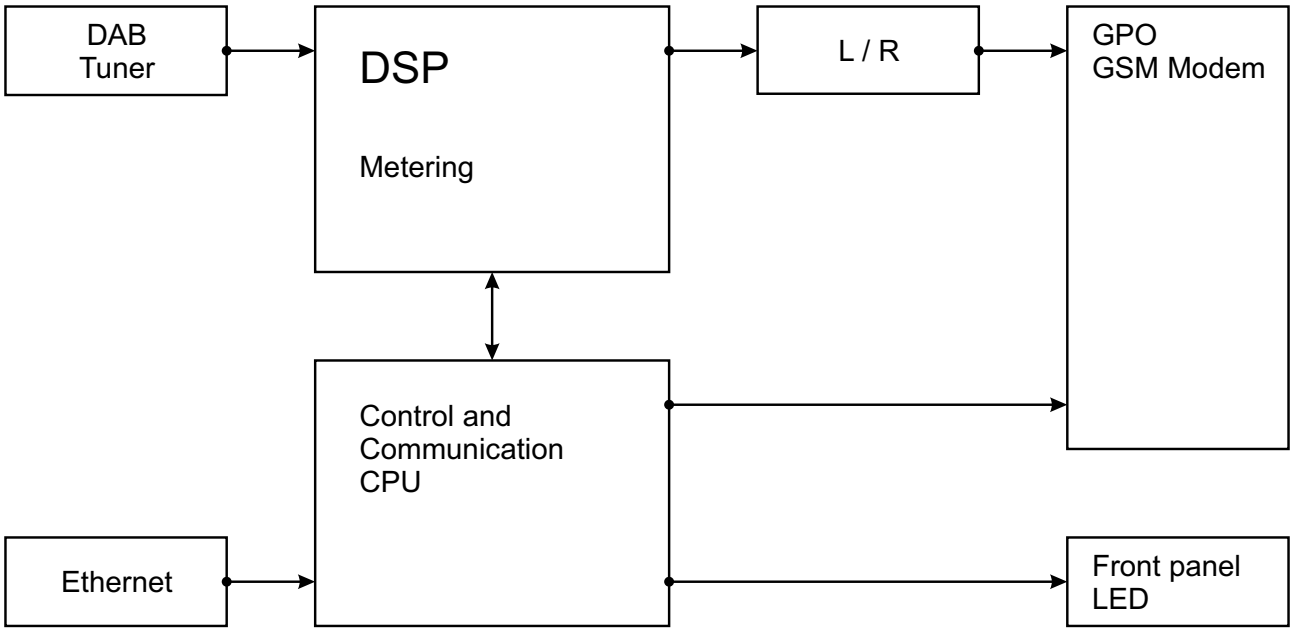
65 Aleksandar Stamboliyski Str., 8000 Bourgas, Bulgaria
Tel: +359 56 820027, Fax: +359 56 836700
E-mail: office@devabroadcast.com ,Web: www.devabroadcast.com

TECHNICAL SPECIFICATIONS

DAB/DAB+ RADIO	
RF frequency range	168 - 240 MHz
DAB/DAB+	Band III Channels 5A - 13F
Sensitivity	18 dBµV
Input connector	BNC 50Ω
In compliance with	ETSI EN 300 401
Ensemble acquisition Time	940 ms
L&R Audio	1%, +5.0 to -50.0 dB, 0.1 dB resolution
DAB/DAB+ METERING	
Quality indicators	RSSI, SNR, CNR, FIC Quality, FIB Errors, FFT Offset
PAD	DLS, MOT
Metadata Displayed	Ensemble Label, Component List & ID, Service List & ID, Dynamic Label, PTY, Sample Rate, Bit Rate, Gain, Mode, Service Mode, Protection Info, Current CU & Address, Country, Language, Time & Date
OUTPUTS	
Audio stream	Icecast/Shoutcast compatible audio stream
Alarms	E-mail, SMS, SNMP
Headphone	1/8” (3.5mm) Phone Jack
GSM Modem	15-pin Male D-Sub Connector
NETWORK	
Connector	RJ-45
Type	Ethernet
Device discovery	UPnP support
MEASUREMENTS AND LOG STORAGE	
Storage	2GB Build-in Memory Card
Data format	Text, CSV
OPERATING CONDITIONS	
Temperature	-15°C to 55°C
Humidity	< 95%, non-condensing
Altitude	0 to 5000m above sea level
POWER SUPPLY	
Voltage	External, 12V/1A
SIZE AND WEIGHT	
Dimensions (W;H;D)	125 x 31 x 160 mm
Shipping Weight	270 x 54 x 230 mm / 1.054 kg

BLOCK DIAGRAM

A simplified block diagram of DB46 is shown below



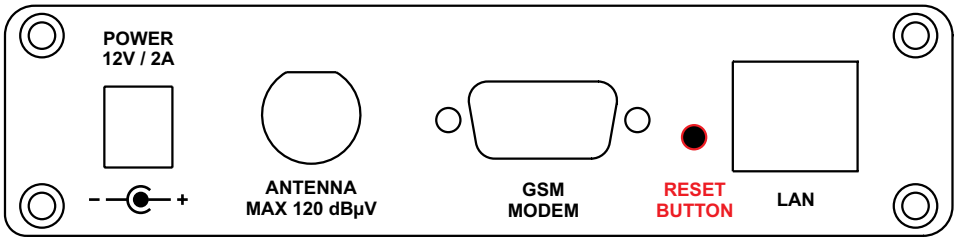
Because of the all-digital, minimalist-discrete-component nature of device circuitry, we have not provided schematic diagrams of the DB46 in this Manual. Please, note that:

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

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

Factory Default Settings

HOW TO RESET THE DB46 TO ITS FACTORY DEFAULTS WITHOUT HAVING ACCESS TO THE WEB INTERFACE?



1. Disconnect the power supply cable from the unit.
2. Find the RESET button on Rear panel (labeled in red on the picture), press and hold it.
3. While pressing the RESET button, connect the power supply cable to the unit and wait until the POWER led starts blinking.
4. Release the RESET button and wait for the DB46 to reboot.
5. Once the reboot is complete, the DB46 will be returned to its factory default settings.

Safety Warning

ALWAYS OBSERVE THE SAFETY PRECAUTIONS.

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

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

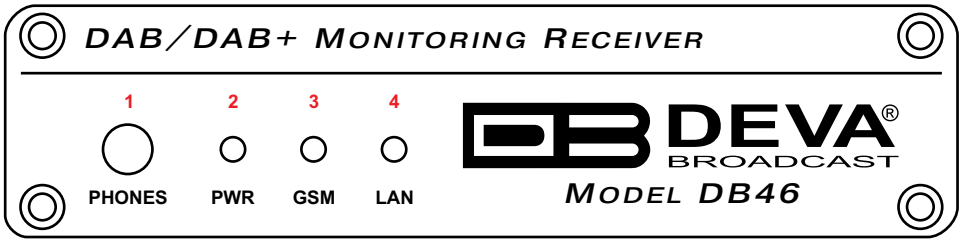
ATTENTION: The device has an internal Lithium battery for RTC timekeeping. Do not try to re-charge this battery!

NOTE: A depleted RTC battery may cause the device to start with an incorrect or random time and date. For the RTC battery replacement procedure, refer to APPENDIX "Battery Replacement Procedure" on page 46.

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

Panel Indicators and Appointments

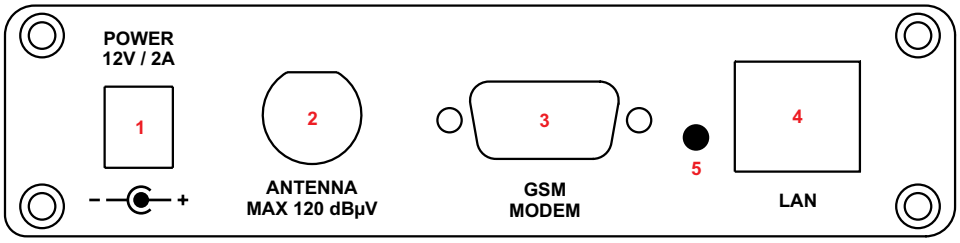
FRONT PANEL



1 - Phones Output – Audio signal from the tuned frequency.
2 - Power LED Indicator
3 - GSM LED Indicator. This LED can in one of the following states:
Off – no GSM Modem;
Fast Blinking – GSM Modem initialization;
Slow Blinking – GSM Modem present and operating;
4 - LAN LED Indicator. This LED can be in one of the following states:
Off – No User Connected, Logger is active;
Blinking – User is connected, Logger is inactive;

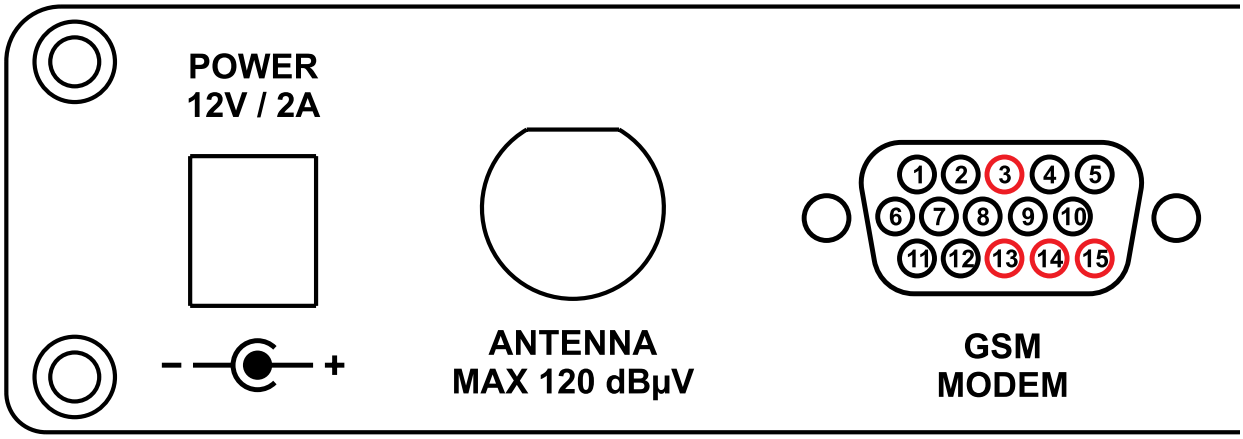
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E-mail: office@devabroadcast.com ,Web: www.devabroadcast.com

REAR PANEL



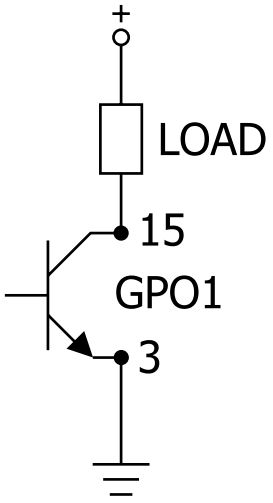
1 - Power Supply (12V, 2A);
2 - Antenna Input – BNC connector for FM Antenna;
3 - GSM Modem Connector – DB-15 male;
4 - LAN Port / Internet Input – standard RJ-45 port;
5 - Factory Defaults reset button.

GPO CONNECTOR PINOUTS



15 - GPO1 Collector
14 - GPO2 Collector
13 - GPO3 Collector

3 - GND



Electrical Characteristics of GPO

Vec < 6V Ic < 50mA
Vce < 45V Pd < 150mW

Getting Started

In order for the normal operation of the DB46 to be guaranteed, you will need fulfill the following conditions:

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

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

CONNECTION

1. Install the unit on its operation place;
2. Using the provided power cable, connect the unit to the power supply network;
3. Connect the antenna cable to the RF antenna input connector located on the rear panel of the device;
4. Connect the DB46 to the TCP/IP network using direct network cable;
5. **IF GSM OPTION IS SUPPORTED** - Using the connection cable provided, connect the optional GSM modem. In order for better GSM network coverage to be achieved, please select proper place for the GSM antenna.

NOTE: The GSM antenna must be installed far enough from the monitoring devices. The GSM modem radiates RF signal that may cause spurious emissions that will may interfere with the accuracy of the measurements. For detailed explanation of the option, please refer to "GSM Modem Option" on page 39.

NETWORK SETTINGS

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

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

NETWORK DISCOVERY

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

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

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

If you have already enabled this function on your computer DB46 will be automatically added to the Device list section. The device will be ready for usage and no additional adjustments will be required except user name and password.

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

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

NETWORK SECURITY RECOMMENDATIONS

1. It is not recommended the DB46 to be directly connected to the Internet. This may lead to unregulated access and/or problematic operation of the device. To ensure secure connection, we recommend the device to be installed behind a router with an active firewall.
2. If remote access to the device is needed, we recommend using VPN to the router or the port of the relevant service (WEB, SNMP, Application, etc.) to be properly NAT forwarded.
3. If NAT forward is used, it is highly recommended random ports of your choice to be used. Not the standard ones (80 for WEB, 161 for SNMP, etc.).
4. Using DMZ connection is not recommended.
5. Make sure to change the standard access credentials (usernames and passwords, SNMP communities).

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

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

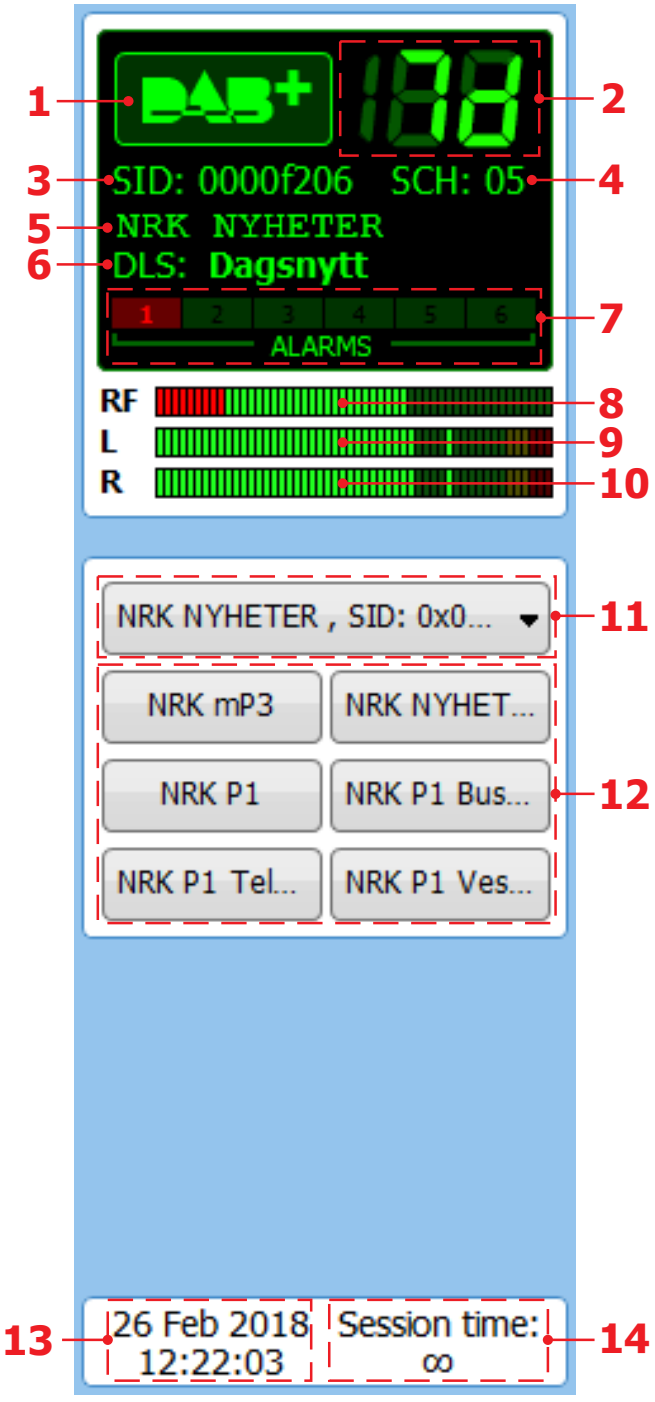
WEB Interface menu pages

DEVICE CONTROL INTERFACE

The WEB Interface is visually divided into two sections Left and Right.

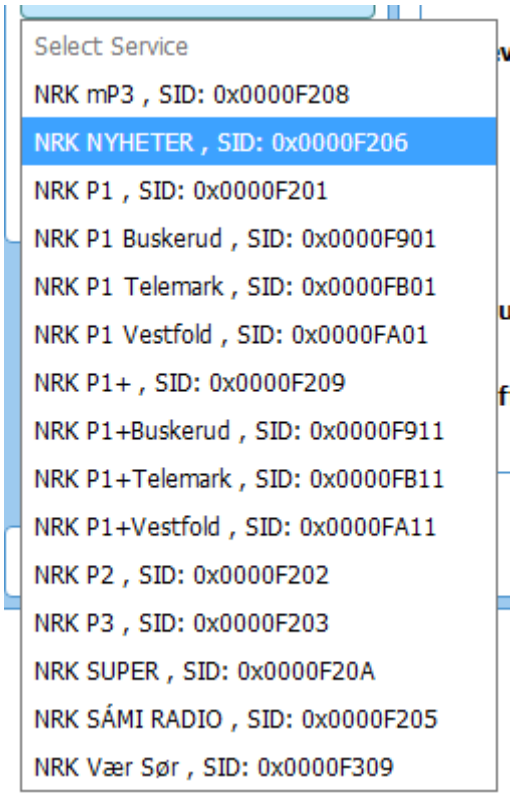
- On the Right are the specific contextual readings of the currently selected menu page.
- On the Left is the so called "dashboard" of the device - General Tuner and Channel readings, functional buttons. This section of the WEB interface is constant part of each screen, hence allowing immediate tuner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

DB46 "dashboard" content:

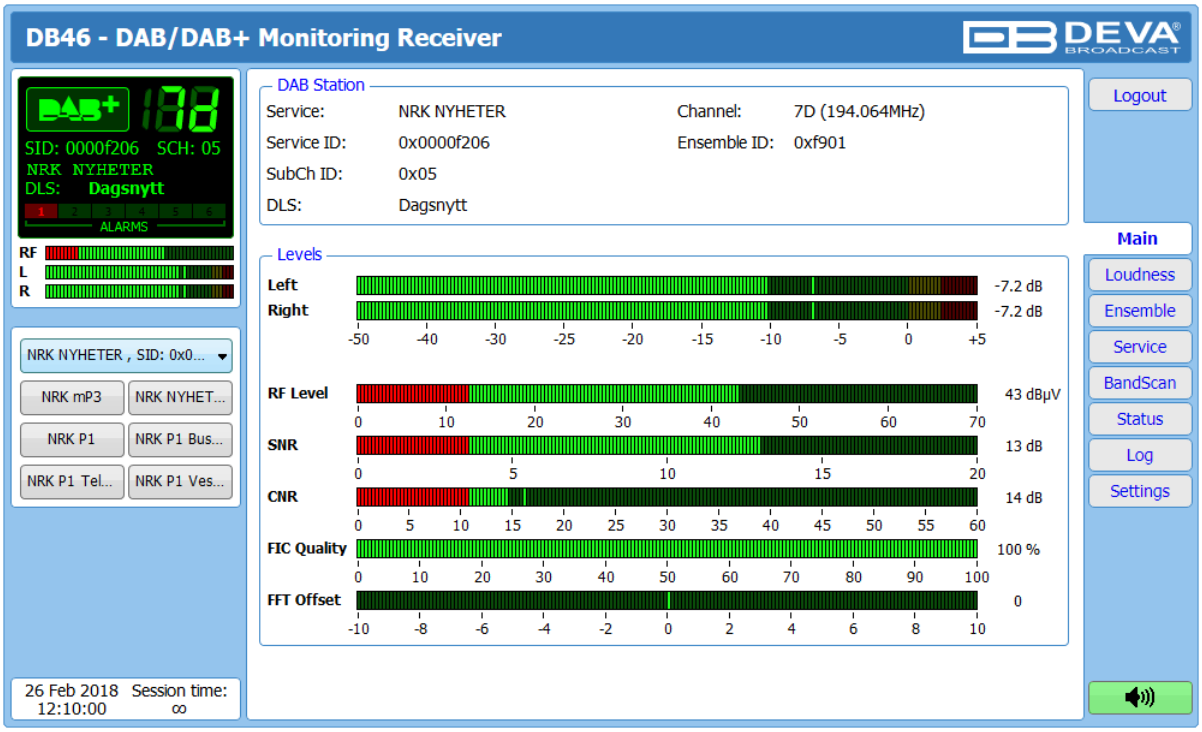


1. DAB+ Logo
2. Frequency indicator showing currently tuned frequency;
3. SID – This 16-bit field shall specify the DAB Service Identifier (SID) to which the information block data applies;
4. SCH – Sub Channel ID;
5. Currently selected service label;
6. DLS – (Dynamic Label Segment) scrolling text;
7. Alarm presence indicator – will be lit in red when an alarm on at least one channel is detected;
8. RF Level indicator. The red zone (low level) indicates low RF level;
9. Left Audio indicator;
10. Right Audio indicator;
11. Drop-down Select Service menu;
12. Service Preset Buttons – when one of the buttons is pressed, the Tuner will be set to the predefined service.
13. Device Time and Date;
14. Session time;

Drop-down Select Service menu options:
A list containing all services available in the current Ensemble.



MAIN

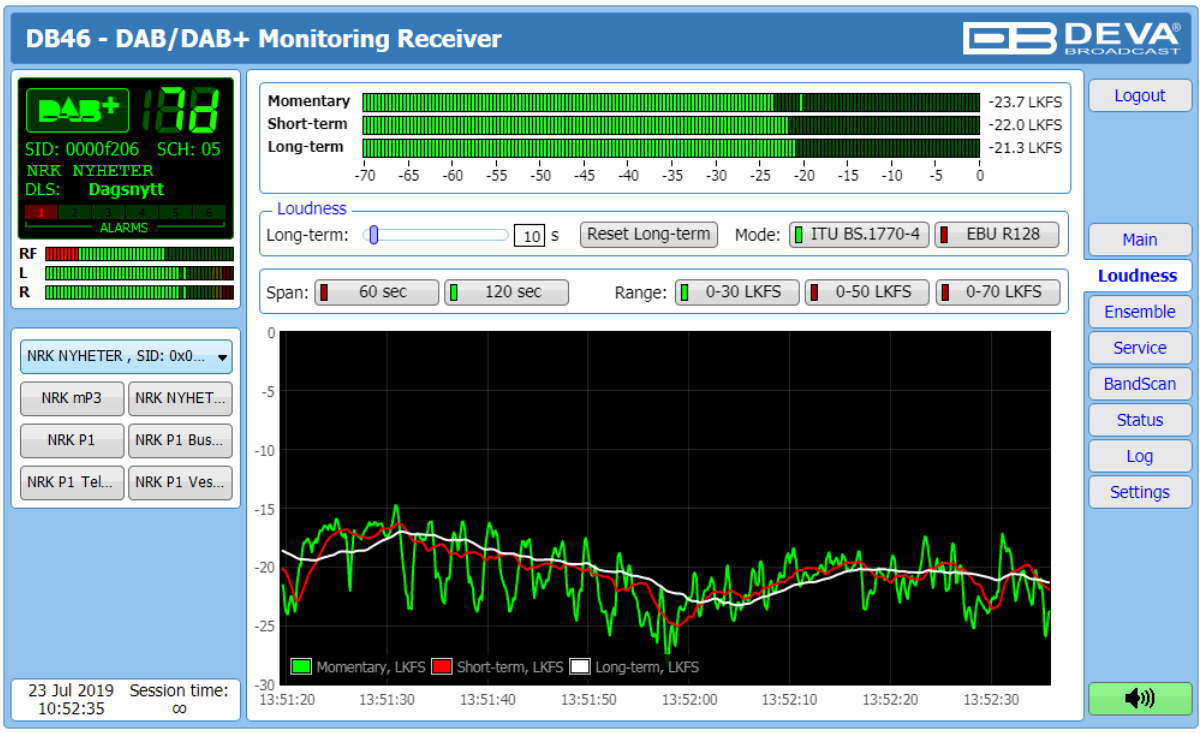


The Main Screen of the WEB Interface shows all the mandatory parameters represented as LED readings and the current DAB station status (DAB Station).

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

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

LOUDNESS



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

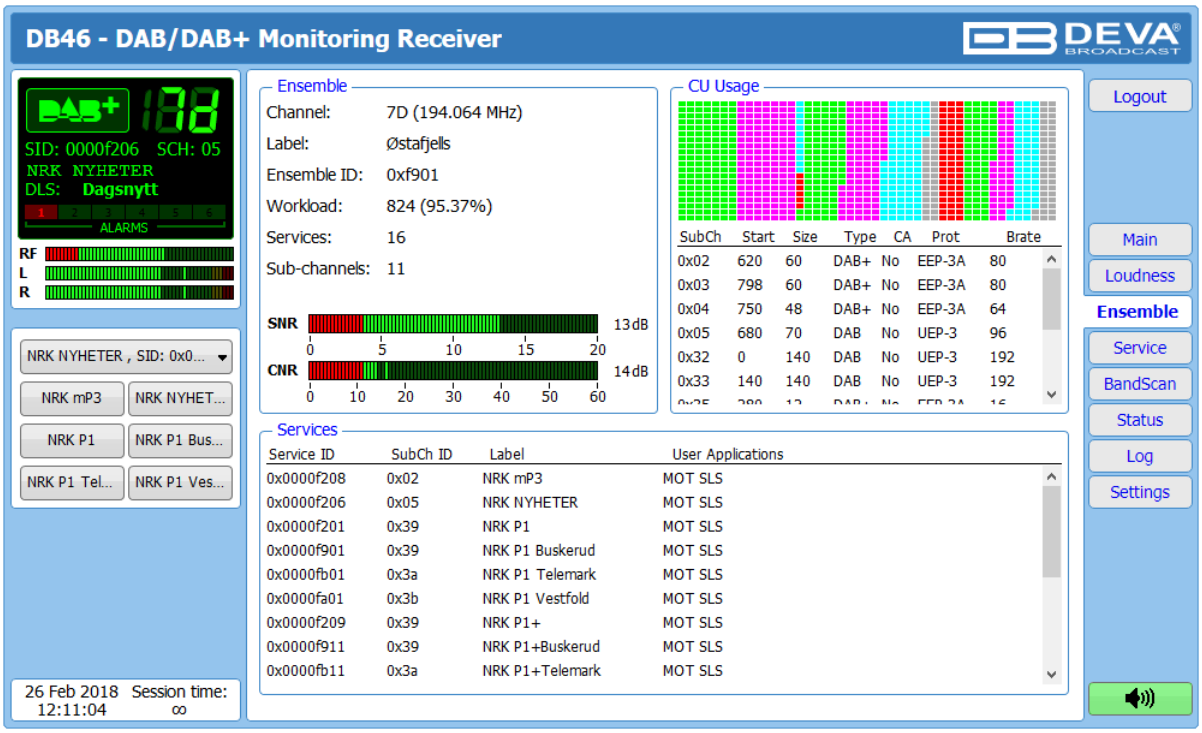
- **Momentary** – average program loudness measured over a 0.4s sliding time window, not gated;
- **Short-term** – average program loudness measured over a 3s sliding time window, not gated;
- **Long-term** – average program loudness measured over a variable sliding time window, gated as described in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

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

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

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

ENSEMBLE



Ensemble

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

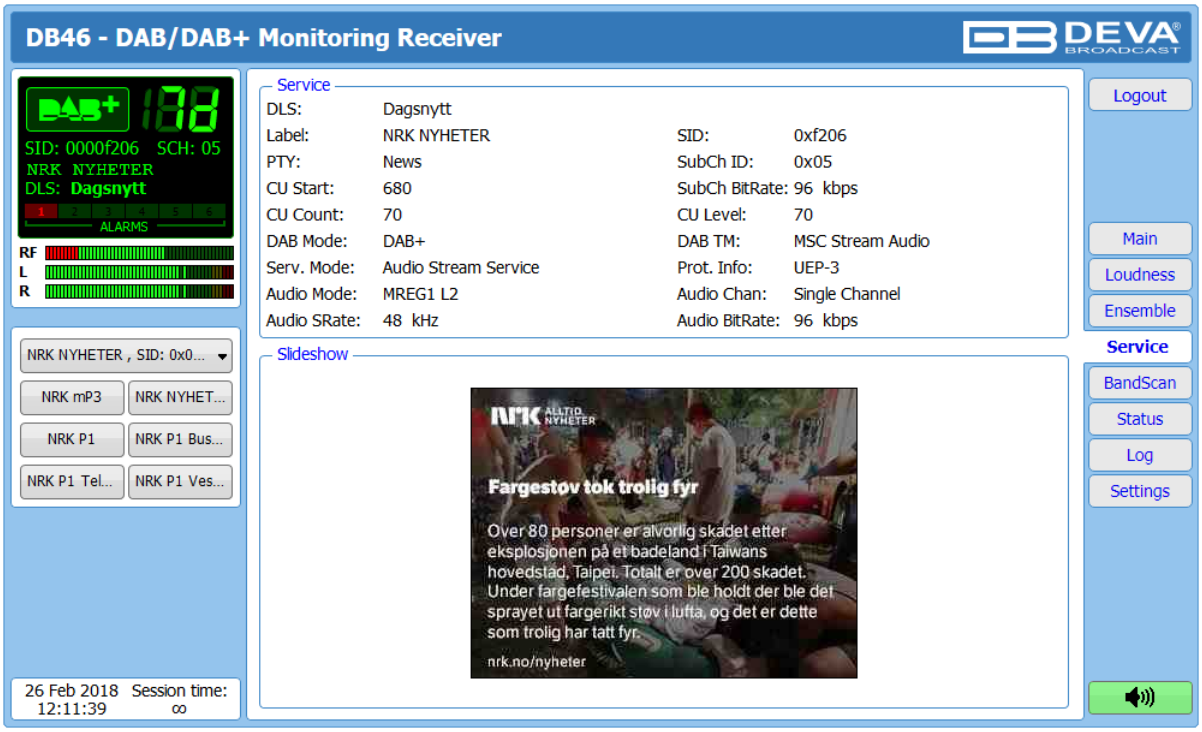
CU usage

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

Services

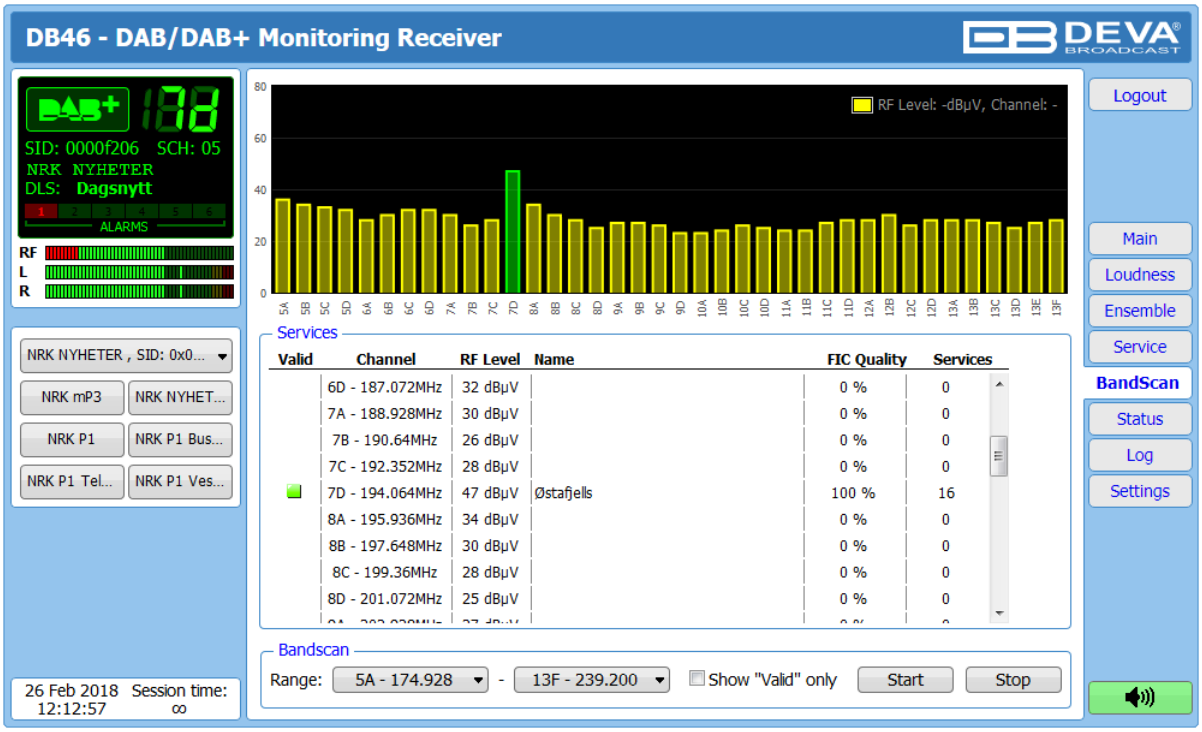
An Ensemble will typically carry multiple services from multiple radio networks. List of the available Services can be found in this tab.

SERVICE



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

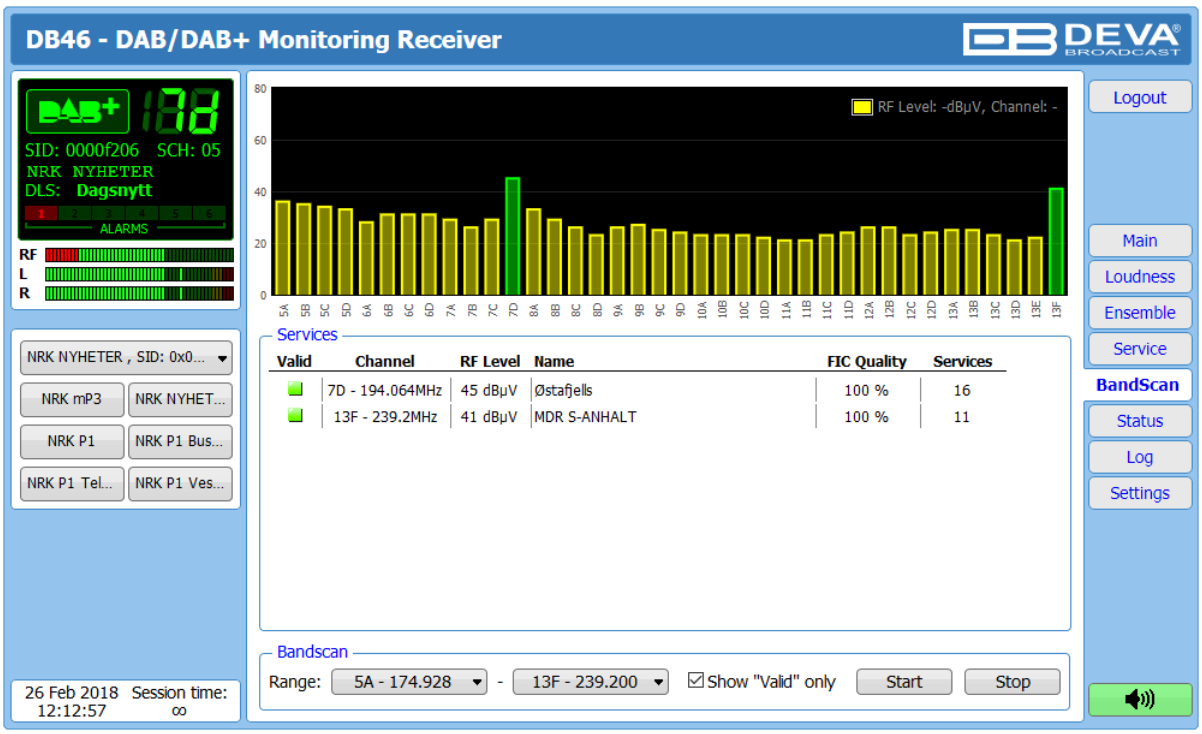
BAND SCAN



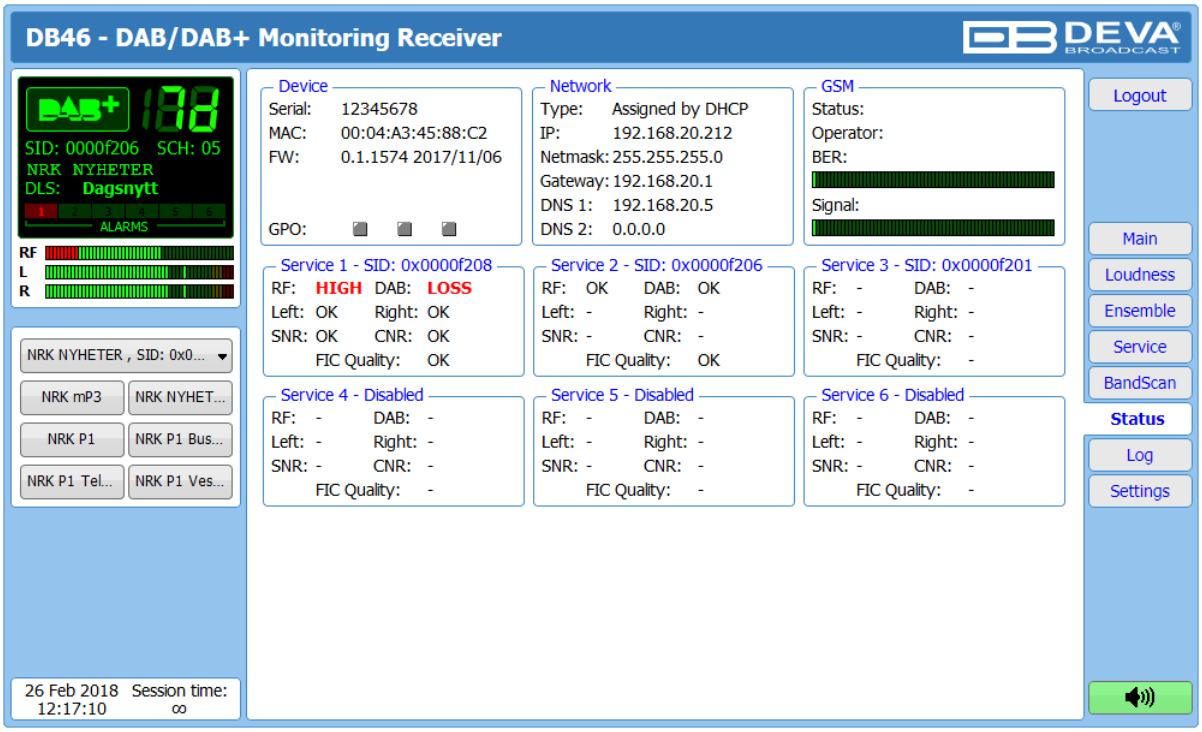
The bandscanning mode is easily customized by setting range of the scan. To start a bandscan follow the instructions listed below:

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

All valid results will be illuminated in green. When Valid only is selected, the services list will look like this:



STATUS

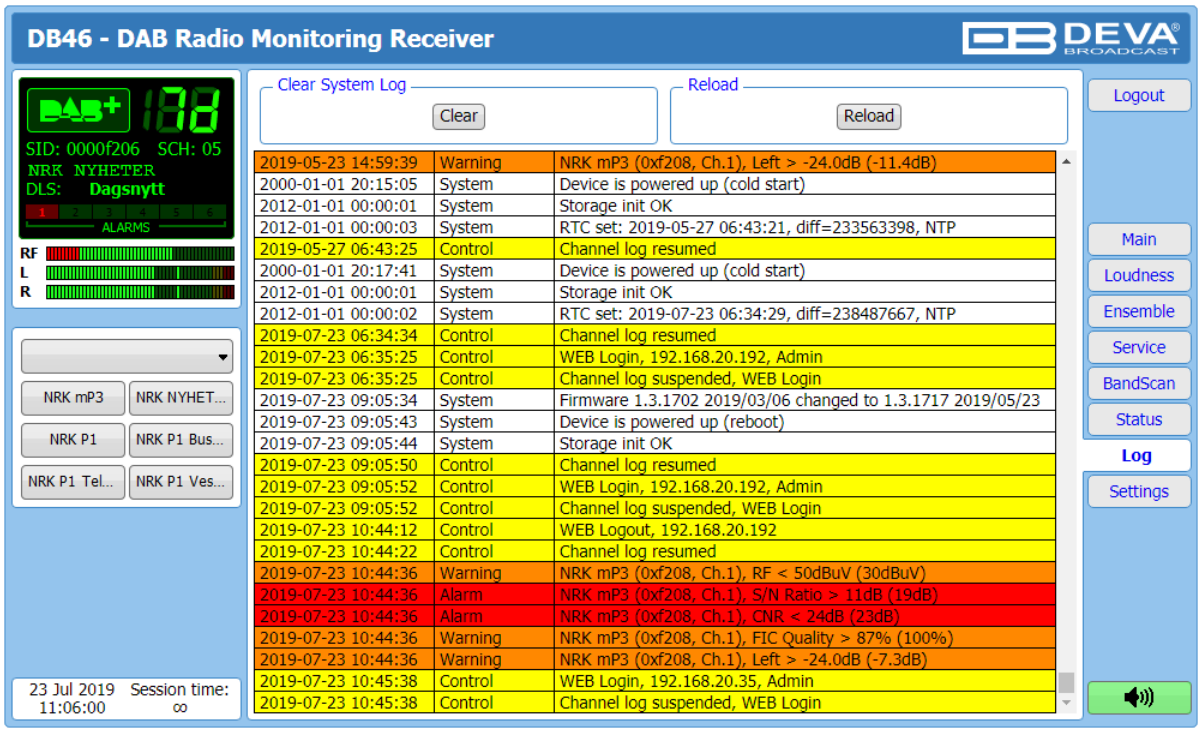


The status tab shows the alarm status of each parameter of the preset frequencies, along with the basic device and network status (IP address, MAC, etc.). If a GSM modem is connected, the status of the modem will also be depicted in the relevant section.

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

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

LOG

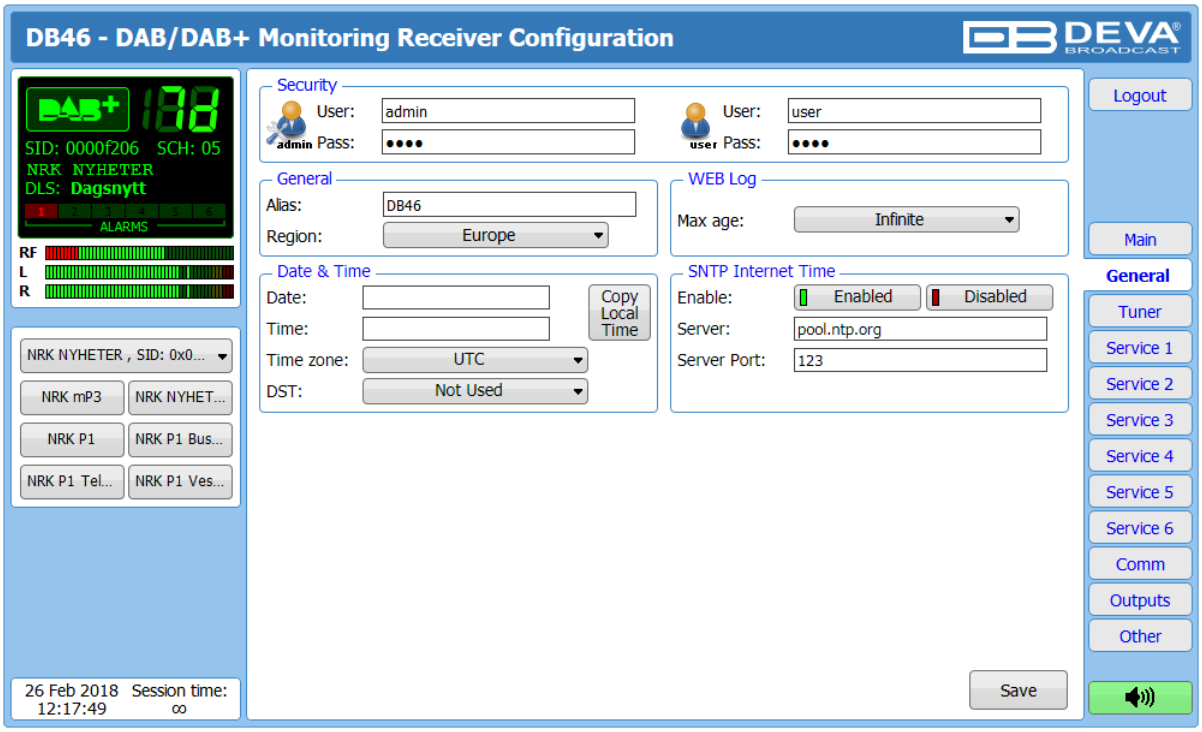


Here are listed all the Device System Events. The local measurements and logs are saved in the internal device memory. All log files can be downloaded via the built-in FTP server. For information on how the connection between the DB46 and an FTP Client should be configured, please refer to "Download files via FTP" on page 44.

[Clear] will delete the System log.

[Reload] will refresh the information.

GENERAL SETTINGS



DB46 provides you with protected access to the device settings. You can choose between two types of log in.

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

In order for the security of DB46 to be enhanced, a new **username** and **password** could be set from the Security section. By choice, you can change the name of the device (General section). Later on, it will be used as a title name for all WEB pages. Customizing the name will make the device more recognizable.

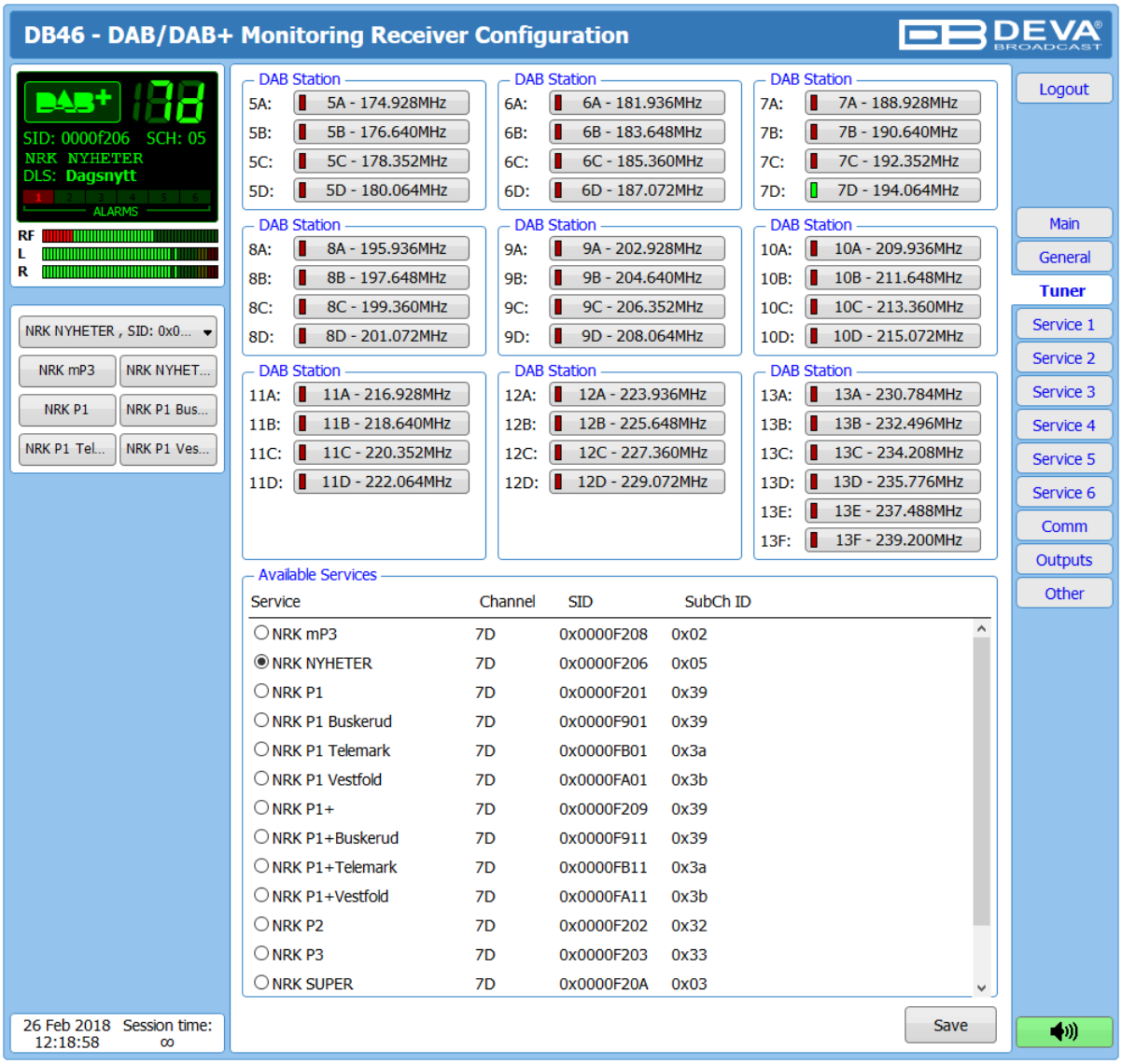
WEB Log – the maximum storage time of the System Log file is chosen from here. If the file is older than the specified maximum will be deleted.

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

SNTP Internet Time – Synchronizes automatically the DB46 clock to a millisecond with the Internet time server. Enable this function in order to use it. (Specifying the server closest to your location will improve the accuracy).

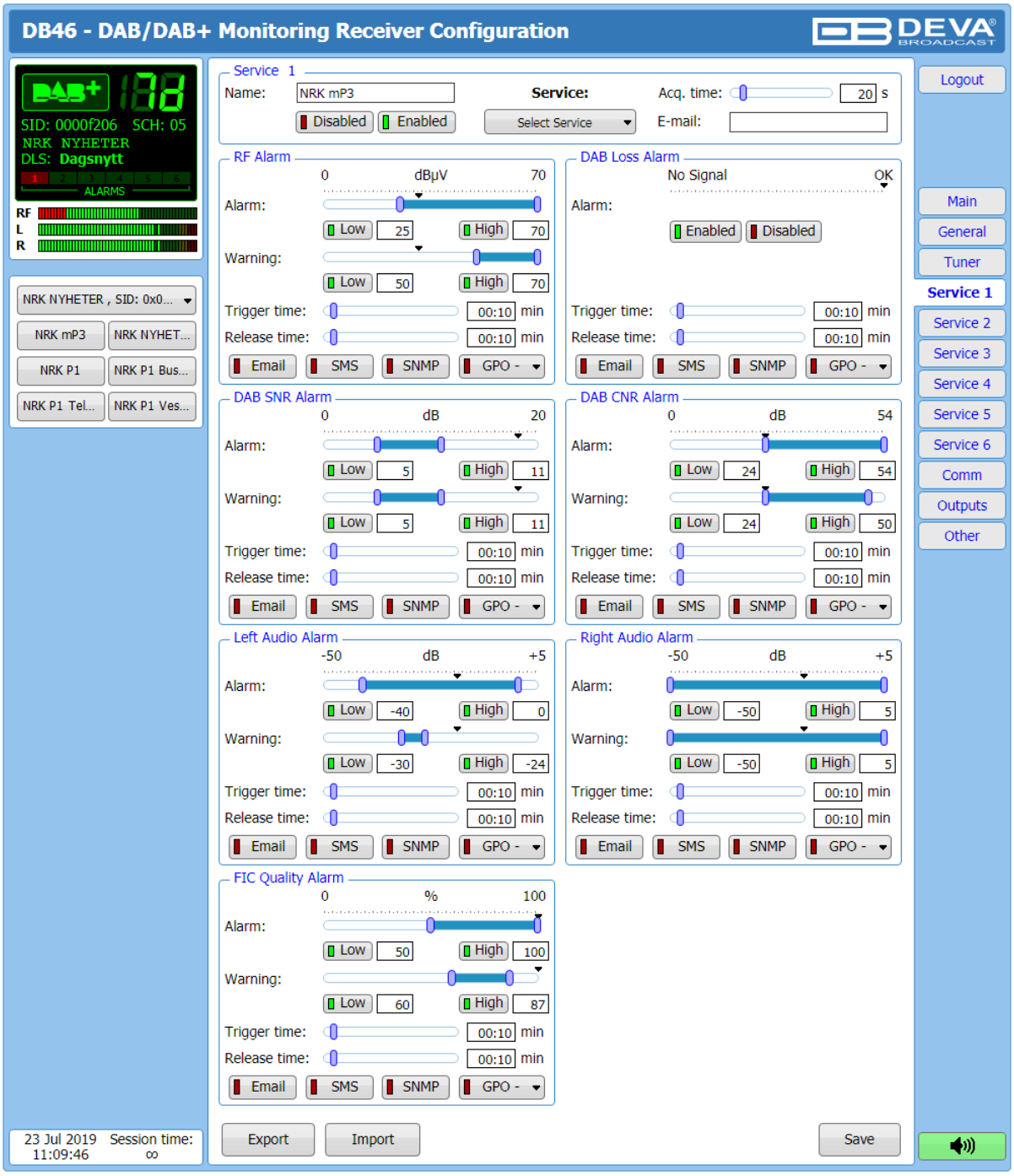
NOTE: In order for the applied settings to be used press the [Save] button, placed on the bottom right part of the screen.

TUNER SETTINGS



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

SERVICE SETTINGS (SERVICES 1 TO 6)



The DB46 can monitor up to 6 preset DAB Services at regular intervals and send alarm notification via E-mail, SMS, SNMP and GPO. Each preset has its own configuration page that contains a group of settings used for monitoring and alerting.

Measurement windows can be set for each of the six parameters: RF, Left and Right audio levels, DAB Loss, DAB SNR, DAB CNR, FIC quality. Trigger and alarm release times can be set for each alarm.

Please bear in mind that the type of alarm notification (Email, SMS, SNMP, GPO) is set for each parameter individually. To enable the preferred notification method, press the relevant button so that it could be illuminated in green.

Service

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

Alarm

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

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

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

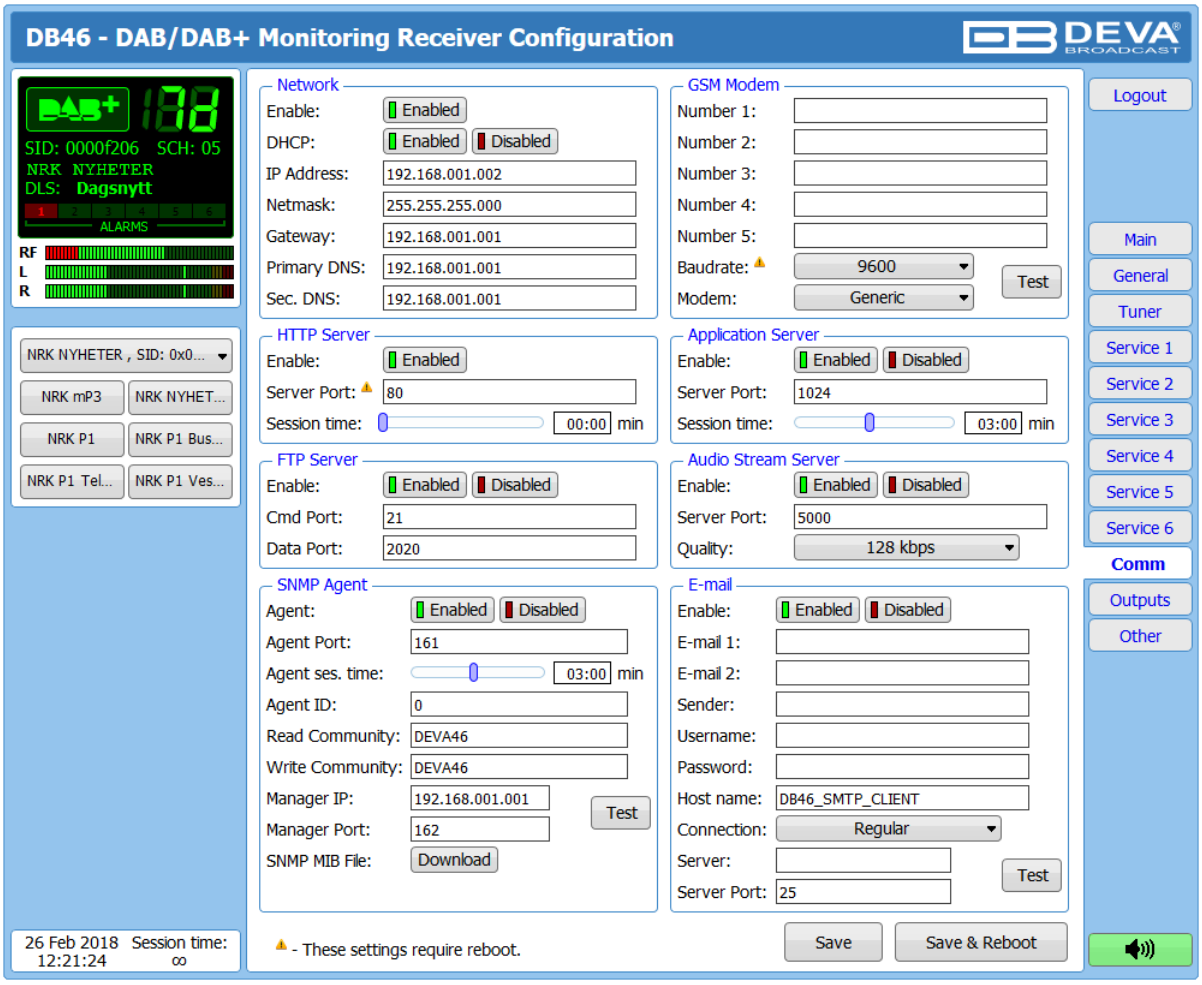
NOTE: When setting Trigger and Release times, have in mind that 01:00 means 1 minute, and 00:01 means 1 second.

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

[Export] will export the currently applied alarms settings.

[Import] allows you to import the Service settings from other DB46.

COMMUNICATION SETTINGS



Network

The network addresses could be set manually (static IP) or automatically via a DHCP server. To set static IP, MASK, GATEWAY and DNS addresses, the DHCP should be disabled. In order for the built-in DHCP client to be activated, the function should be enabled. When the DHCP client is activated, all assigned values will be shown in the relevant fields on the Status Screen. If due to any reason, the DHCP procedure cannot be completed, DB46 will use AutoIP and will generate an IP Address.

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:

```
DB46 Test Message.
```

NOTE: The current condition of the GSM Modem could be checked in the Status Screen. For detailed information on the option, please refer to "GSM Modem Option" on page 39.

HTTP Server

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

FTP Server

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

Audio Stream Server

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

SNMP Agent

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

Specify Agent ID, Agent Port, Read/Write Communities, Manager IP, Manager Port and session timeout. Agent ID is used for identification of the device among others, when an SNMP notification is being sent.

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

Press the [Download] button to download the latest available DB46 SNMP MIB file.

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

E-mail

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

1. Enter the desired alarm recipients in e-mail 1 and/or e-mail 2 fields.
2. Fill in your e-mail account settings: Sender, Username and Password, Server, SNMP port and connection type.
3. It is mandatory the type of connection with the server to be specified from Connection - Regular, Encrypted.
4. The Server port will be changed accordingly. Please note that the most commonly used port will be entered in the field. If the port that is to be used is different, change it manually to the correct value.
5. We recommend you to use the [Test] button and generate a test e-mail, which upon success will be delivered to the specified E-mail 1 and/or E-mail 2. Example of Test E-mail Message:

```
DB46 Test Message.
Please do not reply to this e-mail.
```

If you experience difficulties in the set-up, or would like to use DEVA account for sending of alarm email notifications, press the [DEVA] button option, and:

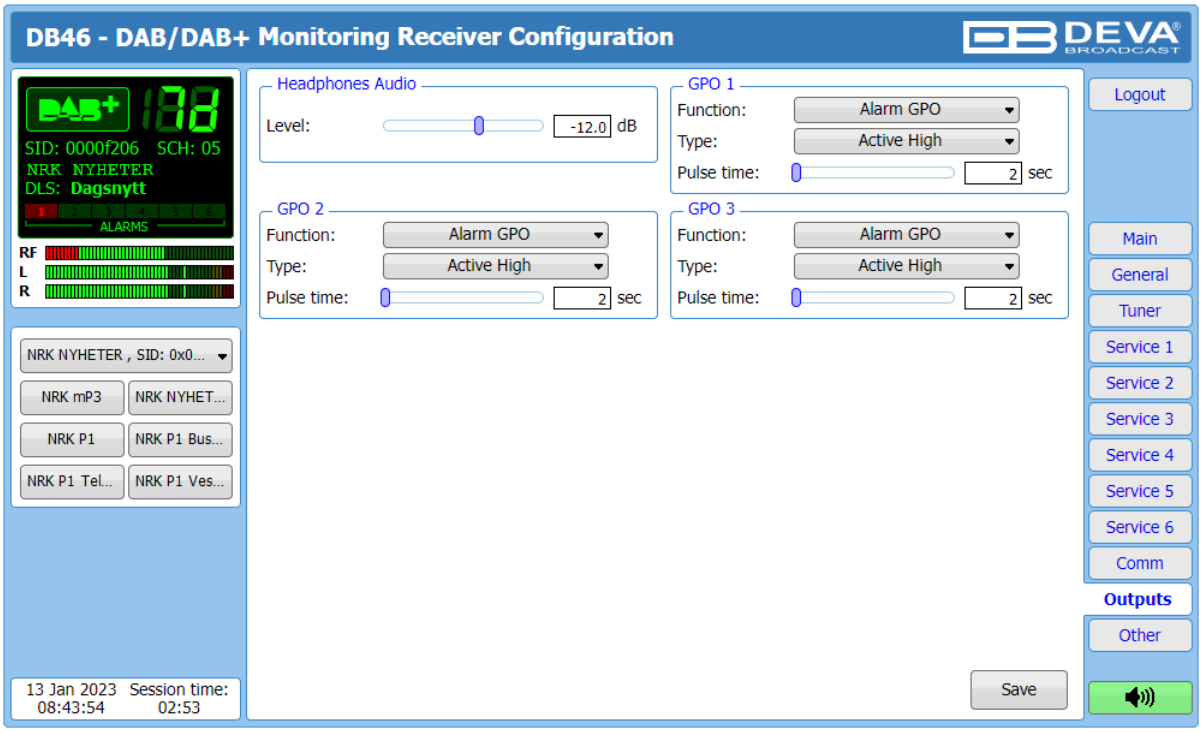
1. Complete the recipient emails (E-mail 1 and E-mail 2) only.
2. The other fields must be left blank, otherwise the email notification option will not be working.
3. We recommend you to use the [Test] button and generate a test e-mail, which upon success will be delivered to the specified E-mail 1 and/or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

```
DB46 Test Message.
Please do not reply to this e-mail.
```

Even though using the DEVA account eases the set-up process, we recommend user account to be used for sending of email notifications, and the DEVA account for test purposes. When using DEVA account, please note that the stable 24/7 connection depends on the mail service provider and cannot be guaranteed.

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

OUTPUTS SETTINGS

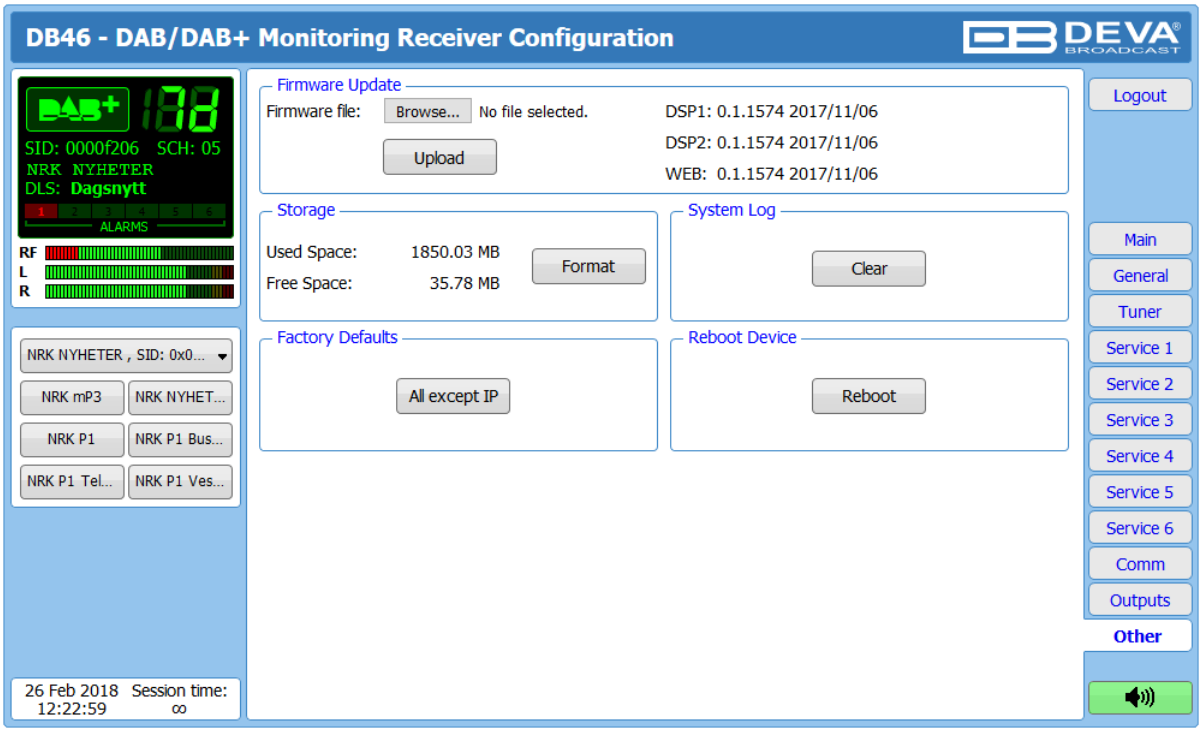


The general purpose outputs settings are applied through this page. Function, type and pulse time for each of the GPOs could be set individually. You can choose between the available functions. Type is used for specifying of the active level. When an alarm is generated the output can change the level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

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

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

OTHER SETTINGS



Firmware Update

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

Storage

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

System Log

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

Factory Defaults

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

To restore DB46 to its Factory Defaults, press [All except IP]. A new window will appear – confirm that you want to restore the factory defaults and wait for the process to be completed. On completion of the process, the settings should have the proper default values.

Reboot

To start Rebooting of DB46, press the [Reboot] button. A dialog warning window will appear. Confirm that you want to reboot the device and wait for the process to be completed.

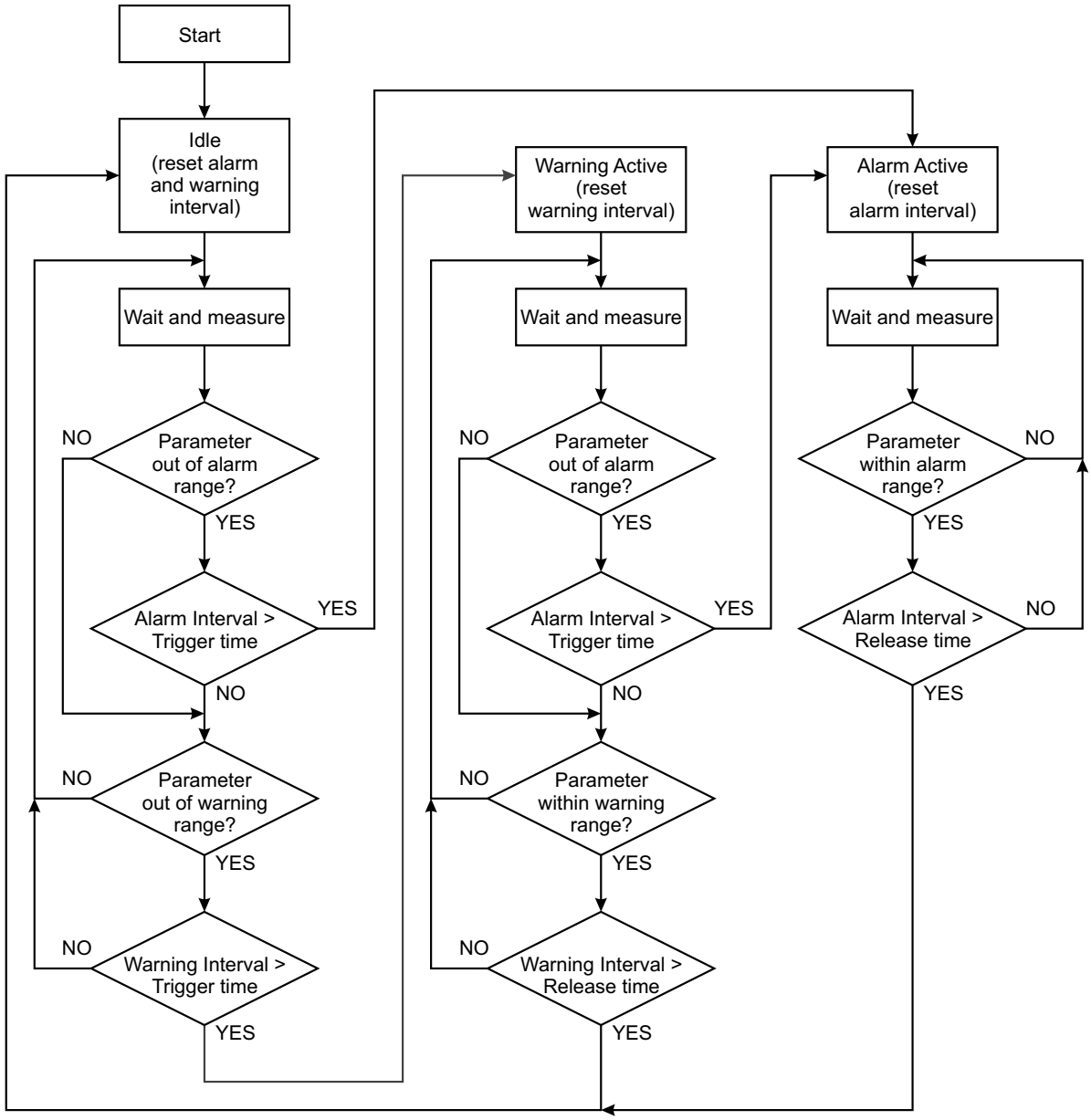
65 Aleksandar Stamboliyski Str., 8000 Bourgas, Bulgaria
Tel: +359 56 820027, Fax: +359 56 836700
E-mail: office@devabroadcast.com ,Web: www.devabroadcast.com

APPENDIX B

ALARM TRIGGERS

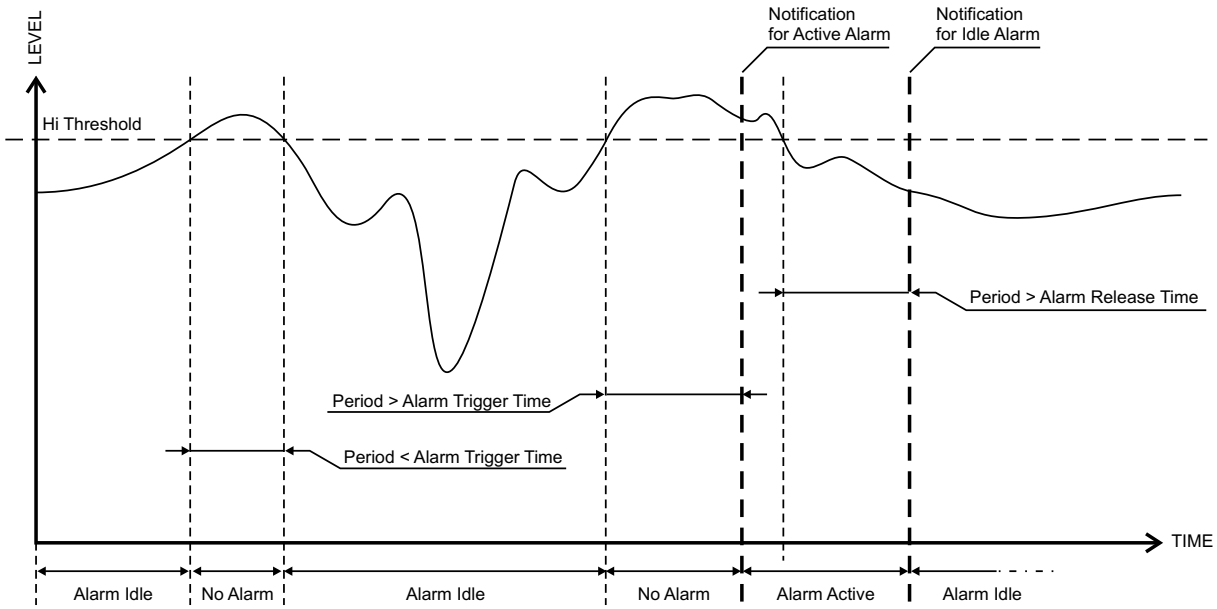
After collecting all the data, the DSP-based core compares the values measured with the predefined by the user threshold levels, for all the alarms monitored. In case that a parameter is beyond limits, the device will initiate the sending of an alarm notification via the selected communication path.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

There are several Alarm Triggers for the following parameters: RF, DAB, DAB SNR, DAB CNR, Left/Right, FIC Quality. 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.



IMPORTANT NOTE: When in Logger Mode, the alarm notification works as follows: if the observation time is set to 10 seconds, and during this time the RF level (for example) is below the specified threshold, but the timeout has not expired, an alarm will be generated upon the channel's next time slot if the level is still below the specified threshold and the timeout expires.

ALARM NOTIFICATIONS

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

Example for E-mal Notification:

```
Date: 04 Nov 2018, 07:31:11

DB46 reports ACTIVE alarm on 0x1234 - Power FM (CH1)

Alarm: S/N Ratio < 16dB

Signal parameters:
RF: 31dBuV
DAB: LOSS
S/N Ratio: 0dB
CNR: 0dB
Left: -60.0dB
Right: -60.0dB
FIC Quality: 0%
```

Example for SMS Notification:

```
ACTIVE ALARM:CH1
27.09.2018 09:08:34
SERV:0x1234
RF:31dBuV
DAB:LOSS
SNR:0dB *L*
CND:0dB
Left:-60.0dB
Right:-60.0dB
FICQ:0%
```

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

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

APPENDIX C

GSM MODEM OPTION - FEATURES AND USAGE

The described Features and Usage of the GSM Option is compatible with following DEVA Units:
- **DB46** – Compact DAB/DAB+ Monitoring Receiver
- **DB7012** – Professional DSP-based DAB/DAB+ Monitoring Receiver

The DEVA DAB/DAB+ Monitoring receivers supports a very wide range of GSM Modems. However, we suggest the usage of the following model - Sierra Wireless AirLink. This is the modem that is provided from DEVA Broadcast if the feature has been ordered along with the DEVA Units.

The GSM modem model is directly PIN to PIN compatible with the DEVA Units GSM Modem's connector, and by simply using a direct cable, you will have not any troubles with the data communication and audio insertion.

Before connecting the GSM Modem to the DEVA Unit, it is necessary to set up the parameters for normal operation. Please bear in mind that:

- GSM modem does not have an automatic detection of the baud rate (AUTOBAUD function). The most important thing is to set up the GSM Modem communication settings. The Communication speed must be 9600 bps, Data Bits: 8; Parity: None; Stop Bits:1.
- The SIM Card PIN code must be disabled in order to avoid a configuration problem of the modem. We suggest you to do this procedure using a GSM phone device of choice. This will save you a lot of time for reading the GSM Modem documentation. In case you decide to do that using the GSM Modem please refer to its User Manual for details.

IMPORTANT: Once the GSM modem is properly installed, the DEVA Unit must be pre-configured to receive messages from up to 5 authorized numbers. This can be made via the WEB interface of the device. Upon successful installation, a notification message will appear on the unit's LCD/OLED screen (if such is available). Using this screen you can find the best place with good GSM Network coverage for the installation of the GSM modem.

NOTE: For information, how the DEVA Unit can be accessed via the WEB Interface, please refer to the respective quick user guide for the device in question. All the documents are available at www.devabroadcast.com/downloads

REMOTE STATUS REQUEST

The described Feature is compatible with following DEVA Units:
- **DB46** – Compact DAB/DAB+ Monitoring Receiver
- **DB7012** – Professional DSP-based DAB/DAB+ Monitoring Receiver

The DEVA Unit can send you a report with the values of the most important parameters at any time. Upon receiving your request via SMS, the device's tuner will be adjusted on the requested service number and will make measurement of all the available parameters. Once the procedure is completed, an SMS message will be generated and sent to the requestor's GSM. Command Example:

`Status F`

IMPORTANT:
Where **F** is service number (preset number set in the device) to Tune.
Do not include leading zeroes such as "`Status 06`"

The Device will shortly respond back with SMS with the available parameters.

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

INITIALIZATION PROCEDURE FOR SIERRA WIRELESS AIR-LINK FXT009 GSM MODEM

in regards with the following DEVA Units:
- **DB46** – Compact DAB/DAB+ Monitoring Receiver
- **DB7012** – Professional DSP-based DAB/DAB+ Monitoring Receiver

1. Setting up the modem

Prior to connecting/using the GSM modem for the first time, kindly read the manufacturer's user manual. The document can be found on https://source.sierrawireless.com/resources/airlink/hardware_reference_docs/airlink_fxt_series_user_guide/

The appropriate values should be assigned via the RS232 interface of the GSM modem. A custom made cable and a terminal program of any kind should be used. The cable specifications should be as follows:

To PC DB 9 female pin		GSM modem DB 15 male pin	Note
1	–>	1	Data Carrier Detect
2	–>	6	com TX
3	–>	2	com RX
4	–>	8	DTR
5	–>	9	GND
6	–>	7	DSR
7	–>	12	RTS
8	–>	11	CTS
9	–>	13	RI

Next, the following settings should be applied to the terminal program:

Speed	115200 bps.
Flow control	hardware (CTS/RTS)
Parity	none
Data bits	8
Stop bits	1

To check the communication type the command "AT" in the terminal program and press Enter. The modem will/should respond with "OK".

Upon powering on, the modem should start working with its factory settings. To see these settings type the command "AT&V". The modem will respond with the factory default settings:

```
Q:0 V:1 S0:000 S2:043 S3:013 S4:010 S5:008
+CR:0 +CRC:0 +CMEE:0 +CBST:0,0,1
+SPEAKER:1 +ECHO:0 &C:0 &D:2 %C:0
+IPR:115200 +ICF:3,4 +IFC:2,2
```

ATTENTION: If the displayed parameters differ from one listed above, we recommend you to return the modem to its factory defaults. In order for this to happen, the command "AT&F1" should be typed.

NOTE: For further information on the AT commands, please refer to the GMS Modem complete user manual.

Once the modem is returned to its factory defaults, you can proceed with following commands:

COMMAND	DESCRIPTION	NOTE
ATE0	This command will turn Echo Off	
AT+ICF=3,4	8n1, no parity	
AT+IFC=0,0	no flow control	
AT+IPR=9600	set com speed	Change terminal speed to 9600 bps (if needed)
AT&W	save configuration	After this command turn power Off and On
AT&V	display new configuration	

NOTE: After every command, the modem should respond with "OK".

Once all changes/modifications are applied, the modem should respond with the following adjustments:

```
Q:0 V:1 S0:000 S2:043 S3:013 S4:010 S5:008
+CR:0 +CRC:0 +CMEE:0 +CBST:0,0,1
+SPEAKER:1 +ECHO:0 &C:1 &D:2 %C:0
+IPR:9600 +ICF:3,4 +IFC:0,0
```

Upon applying all the described settings, the modem should be fully compatible for operation with DEVA Unit.

2. Connecting with DEVA Unit

Communication Cable Description:

DEVA Unit port DB 15 female pin		GSM modem DB 15 male pin	Note
2	–>	2	com TX
4	–>	4	mic (+)
5	–>	5	mic (-)
6	–>	6	com RX
9	–>	9	gnd

APPENDIX D

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

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

1. FTP Server Settings

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

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

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

2. IP Router and Port Translation Settings

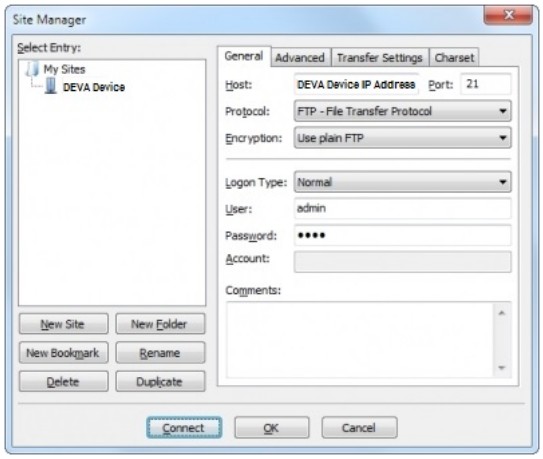
If the connection to the device is made through a Network address translation (NAT) router or firewall, the port forwarding feature of the router should be configured. The port forwarding is usually set in the firewall section of the router's menu. As each router has different port forwarding procedure,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

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

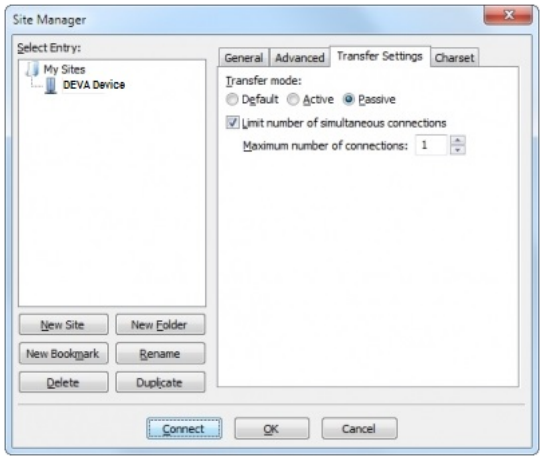
3. Example of FTP Client (FileZilla) Settings

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

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



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



APPENDIX E

BATTERY REPLACEMENT PROCEDURE

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

REPLACEMENT

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

REASSEMBLY

1. Align both ends of the motherboard with their respective slots and carefully slide the motherboard into position simultaneously from both sides.
2. Make sure that the LED indicators are correctly aligned with their respective openings.
3. Reinstall the bolts securing the back panel to the chassis.
4. Using a suitable screwdriver, tighten the bolts securely. Do not overtighten.
5. Power on the device and set the correct time or wait for it to sync over the Internet.
6. Remove the power to the device and wait for a few seconds.
7. Power on the device again and verify that the time and date are displayed correctly.

VERIFICATION

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

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

WARRANTY TERMS AND CONDITIONS

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

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

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

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

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

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

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

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

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

IV. RETURNING GOODS FOR FACTORY REPAIR:

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

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

V. UPDATES TO THE TERMS OF SERVICE:

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

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

PRODUCT REGISTRATION CARD

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

Your Company Name_____

Contact_____

Address Line 1_____

Address Line 2_____

City_____

State/Province_____ ZIP/Postal Code_____

Country_____

E-mail_____ Phone_____ Fax_____

Which DEVA Broadcast Ltd. product did you purchase?_____

_____

_____

Product Serial #_____

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

_____
Your signature*

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

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