MAINTENANCE AND OPERATION
INSTRUCTION MANUAL

Model DB4000

FM Monitoring Receiver with
TCP/IP Connectivity

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Contents

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Introduction

DEVA Broadcast Ltd. was established in 1997 as a broadcasting and telecommunications equipment importer for Bulgaria and Eastern Europe regions. Subsequently, DEVA Broadcast Ltd. has developed and produced a wide range of low and mid power transmitters, RDS/RBDS Encoders and Decoders, Modulation Monitors, Remote Controls, Site monitoring and other systems for many companies. Our high degree engineers accomplish their bright ideas through successful engineering, marketing and management in DEVA Broadcast Ltd.'s Headquarter in Bulgaria.

During the last ten years the company products have become our partners' best sellers. After detailed marketing analysis, our team has decided to launch its own brand products based on the latest technologies in the broadcasting business. The company's main goal is to design, develop and offer a complete line of high quality and competitive products for FM and Digital Radio, Radio Networks, Telecommunication Operators and regulation authorities. We base our market authority position on our good after sales support and relation with the clients.

Since 2003 DEVA Broadcast Ltd. has been ISO 9001 certified .

The contractors of DEVA Broadcast Ltd. are satisfied with the permanent business comfort and to their own confession they owe it to a great extent as well as their prosperity to the loyal partnership of our company.

General Information

DB4000 is the most cost effective unit for permanent monitoring of the quality and continuity of up to 50 FM Radio Stations with innovative features such as TCP/IP connectivity, audio streaming and automatic alerts on out of predefined ranges in regards with the ITU-R. In case of any faults in the transmission the maintenance staff will be immediately alerted via E-mail or SMS which allows to the technicians to restore a normal service as soon as possible. This tool enhances the radio stations' quality control management.

DB4000 allows you through its TCP/IP and GSM (optional external GSM Modem) Connectivity to monitor all the RDS/RBDS and some other signal parameters from anywhere. You can easily receive the channel status or listen to the audio from anywhere, using your mobile phone. With the external Audio Stream Server option you can even listen to, skim and record the audio from any station.

DB4000 enables you to monitor your own frequency continuously and at the same time to be informed about your neighbouring stations. The included PC software "DB4000 Device Manager" allows you to control unlimited number of field installed units, to observe from the monitoring sites all the parameters and measurement values of your network. "DB4000 Device Manager" is a total control solution for remote monitoring networks. The map interface enables getting immediate and clear view of the monitoring location or to the whole network. Due to the universal cartographic interface any kind of maps can be used. Using the map interface the user is allowed, by a flashing red light, to see quickly which site has an alarm on it. He can access the equipment and the alarm directly from this map just with a click on the desired location.

DB4000's Device Manager Software is the best solution for the management of multi-site remote DB4000 devices. It is a server-based system that can manage alarms, measurements, event logs and data from field units. The controlling software offers a very intuitive interface for creating of schedule for full control of single or big number of monitored radio stations. All the local measurements and logs are saved in an internal device memory. Built-in FTP client downloads the files by a preliminary assigned schedule. All the collected information is centralized in a database and can be revised, played back and dispatched automatically to the qualified staff in case of need. An interactive Log Viewer tool allows the very detailed control and analysis of any station from the list of the monitored channels.

The Band Analyzer function in DB4000 presents an overview of all the FM parameters together with the RF signal strength of the station. The Band Scanning is possible within FM band limits. The generated spectrum diagram shows the RF Level vs. the Frequency.

Together with the included RDS decoding software the "DB4000 Device Manager" can create detailed play list reports for any station that is broadcasting the artist and the song title information through its Radio Text. Managers and Program Directors can compare their own RDS text rotations to other stations' in the market within a minute. Using the software the device sweeps the FM band and logs every signal it comes across. An easy-to-read spectrum display shows carrier level vs. frequency.

In addition to its remote capabilities, DB4000 offers built-in SNMP Agent. Using Network Management System (NMS) Applications all DB4000 settings and parameters could be monitored and controlled.

The Deva Broadcast's DB4000 is a superb controlling system, a solution designed as a powerful tool for permanent off-air monitoring of your stations.

Our product DB4000 is a powerful monitoring system, built on our long-standing expertise in the broadcasting equipment industry. We have created this product in the spirit of innovation and the latest technologies. This is a very important project to us, developed to meet the needs of the most demanding professional radio broadcasting operators and regulatory authorities.

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Hardware Options

NOTE: Hardware Options are provided only on demand.

LIST OF THE HARDWARE OPTIONS

GSM Modem – Most recommended: 'Sierra Fastrack Xtend';
NOTE: Please comply with the "External GSM Modem Settings", if the GSM Modem is not provided by DEVA Broadcast Ltd..

TCP/IP Audio Streamer – Most recommended: DB90-TX, DB9000-TX or 'Barix Instreamer 100'.

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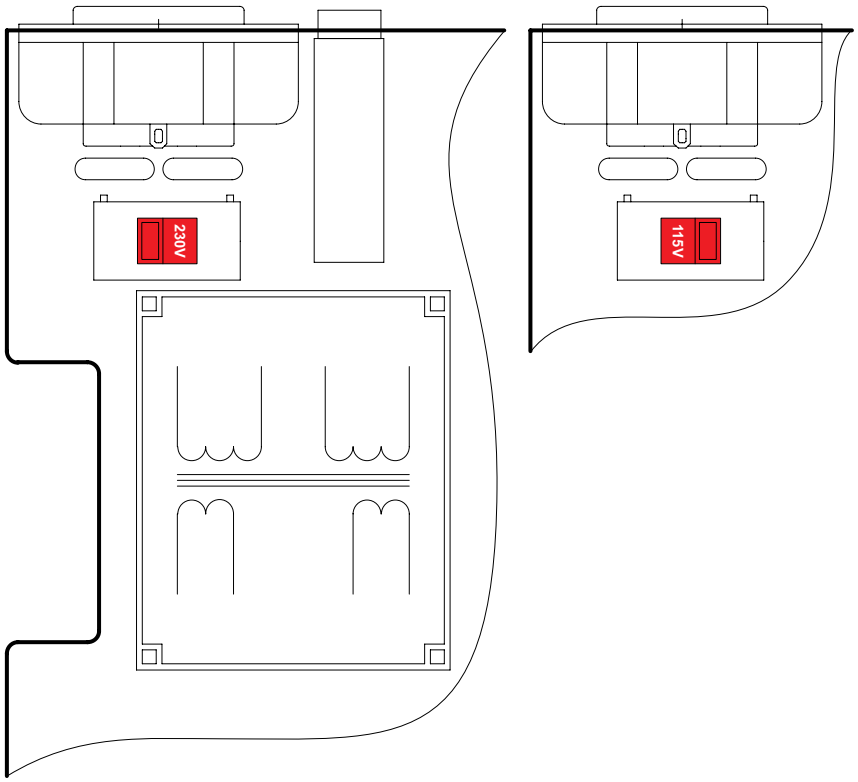
Before you start

MAINS VOLTAGE SELECTOR

Unless specifically ordered for export shipment, the DB4000 is set at the factory for operation from 115V/230V, 50/60Hz AC mains. This can be confirmed by checking the voltage selector inside the unit. To change the mains voltage, first remove the top cover of the unit. A clearly marked slide switch is next to the AC mains connector on the encoder circuit board. *With power disconnected*, use a small screwdriver to set the switch for 115VAC or 230VAC operation. Be sure to install the appropriate fuse, DB4000 is equipped at the factory with 1A fuse.



POWER CORD

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

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

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

SAFETY WARNING

After removing any housing parts and electronic assemblies it is possible to get access to live parts. It is essential to ensure that the subsequent safety rules are strictly observed:

- Servicing of electronic equipment must be performed by qualified personnel only.
- Before removing covers the equipment has to be switched off and the mains cable unplugged.
- When the equipment is open the power supply capacitors have to be discharged by the help of a suitable resistor.
- During servicing unprotected and operating equipment:
  - never touch bare wires or circuitry.
  - use insulated tools only.
  - never touch metal semiconductor cases because they may carry high voltages.
- For removing and installing electronic components, please follow the recommendations concerning the handling of MOS components.

ATTENTION: The device use internal Ni-Cd batteries with 500 recharges life. In case you have to change the battery, please contact us for detailed instructions and more information for the battery type.

OPERATING RECOMMENDATIONS

For the normal and reliable operation of the DB4000 device and reaching better measurements we recommend to follow the next list of instructions:

- Please, install the unit only in places with good air conditioning. The unit has been designed for operation within an ambient temperature range extending from 10 to 50°C. But because adjacent, less efficient equipment may radiate substantial second-hand heat, be sure that the equipment rack is adequately ventilated to keep its internal temperature below the specified maximum ambient. When installing, leave a clearance of at least 1 cm around the equipment to allow air to pass freely.
- We do not recommend installation in rooms with high humidity, dusty places or other aggressive conditions.
- Although it is expected that a DB4000 will be installed close to exciters (or transmitters of even higher-power!), please practice reasonable care and common sense in locating the unit away from abnormally high RF fields.
- Please, use only already checked power supply cables and sources. The shielded cables usage is strongly recommended.
- We strongly recommend connecting the device only to reliable power supply sources. In case of unstable power supply, please use UPS (Uninterruptible Power Supply).
- Please, use the device only with placed top cover to avoid any electromagnetic anomalies which may cause problems of the normal functionality of the unit.
- Please, connect DB4000 only to good quality Internet connection. This is very important for the normal remote operation of the unit.
- Please, check if your network settings pass through all the data traffic required for the normal operation of the DB4000 unit.

INSTALLATION SPECIFICATIONS AND PRECAUTIONS REGARDING THE RF ENVIRONMENT

Attentively observing of the RF Environment, in which DB4000 is disposed and is functioning, is necessary for ensuring of the normal and reliable working of the system. Best conditions in accordance with the standards listed below must be provided for functioning of the system.

Reception system and monitoring site

Depending on the application, the DB4000 monitoring receiver can be installed very close to high power FM transmitters. Usually its antenna port is directly connected to any FM transmitter monitor output or to directional coupler on the output of any combiner system. The typical RF output level of such sources is too high for the normal operation of the DB4000 receiver. We strongly recommend using external RF attenuators with attenuation value between 20 – 90dB for reaching optimal RF output level in the 55-60 dBµV range.

Using external antenna is required when the DB4000 receiver is used for off air monitoring too far from any transmitters or transmitter site. Very important step in such case is selecting the proper outdoor FM antenna, antenna location and direction. The three most popular antenna types are: omnidirectional, unidirectional dipole and directional multi-element array antenna.

The omnidirectional Antenna is not a good choice for using with DB4000, because of the low antenna gain, the very bad signal to noise ratio (compared to any directional antenna) and its high multipath interferences reception.

The other type antennas unidirectional dipole and directional multi-element array antenna have some directivity and antenna gain. These factors make these antennas much proper for your needs. We recommend the usage of factory made antenna or antenna system, manufactured especially for the FM Radio Band 88 – 108 MHz.

After selecting the antenna type that will meet your needs, the next step is the installation of the antenna. You must follow several important principles:

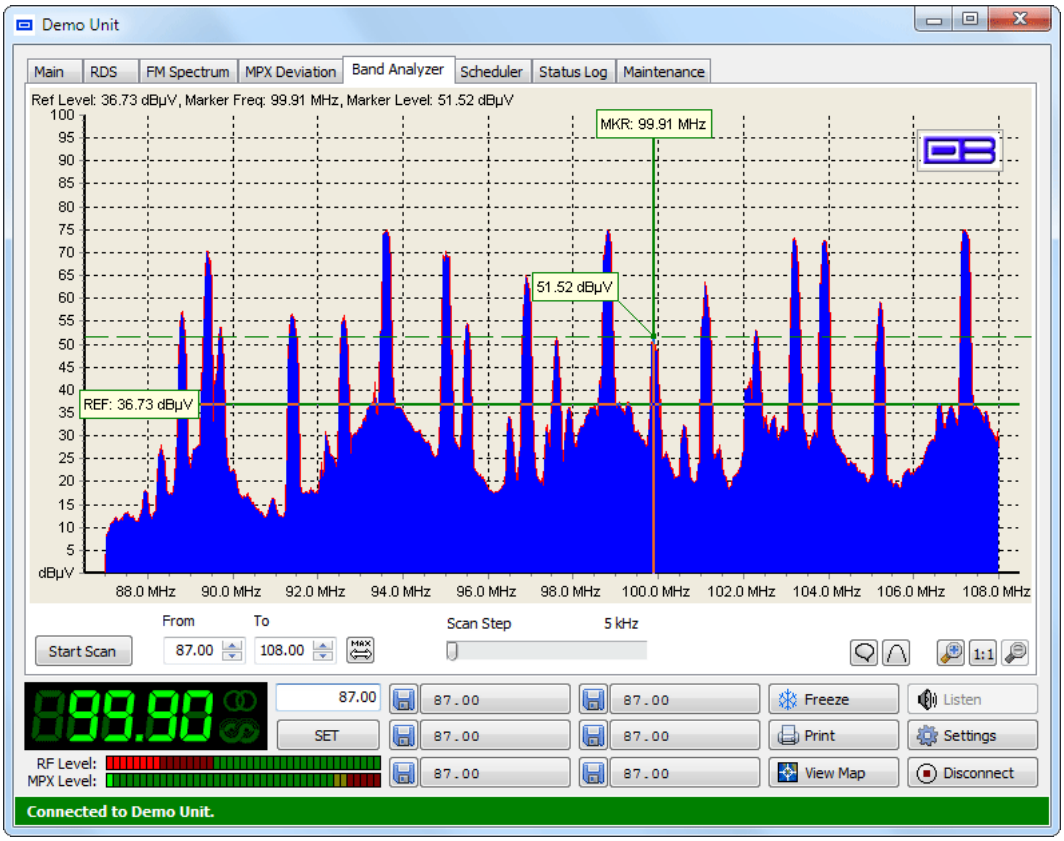
- Install the antenna far enough from any walls, roofs, buildings or any transmitting equipment;
- The minimum spacing between the antenna and the closest object must be more than 3 meters.

One DB4000 monitoring receiver is usually used for the monitoring 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.

If you would like to monitor more than one transmitter site, we recommend using antenna system with separate antennas for each of the monitored directions.

Evaluation of the FM Band

Be sure that the DB4000 monitoring receiver has been connected to the TCP/IP Network, the Power supply and the FM reception antenna. We suggest you then to make an initial 'Band Scan' to see if everything with the unit, its installation and the reception antenna is working normally. Making a band scan, you will be able to see if the RF input level is correct and enough for the proper work of the monitoring tool.



For the normal operation of the DB4000 and acquiring good measurements, we recommend to observe the following:

- RF Level Input range of the stations you would like to watch must be between 30 to 65 dBµV
- Minimum frequency spacing between the closest radio stations monitored must be more than 300 kHz.
- RF noise level must not be higher than 10-15 dBµV
- In case that the RF Level is too high or the noise is higher than the recommended value we suggest installing an external attenuator for reaching the best working conditions for the normal operation of the system.
- If you have some high interference signal on any exact frequency, you can use any type reject filter to ignore this problem without causing any changes over the rest part of the RF spectrum.

Monitoring

When we say 'Monitoring' you have to understand much more than the simple observation of any FM Signal transmitted. You have to know that a lot of factors may reflect on the results acquired by a FM monitoring system. There are a lot of specifics in the FM Radio signal reception such as the atmosphere, the high summer temperature, snow, storms, specific troposphere or e-sporadic radio. All these factors may cause some abnormal changes of the normal measurements and results.

Based on our longtime experience with the FM signal measurement, we suggest initially using the unit without activating its alarm sending features. If you see that after the first setup, the long enough supervising and the measurements collected from DB4000, the unit works normally, the alarm sending options may be activated.

The defining of the alarm thresholds for each parameter that may initiate Alarm Notification, has to be conformable to the results measured by the device. The DB4000 monitoring receiver has preliminary assigned parameters' thresholds, alarm time-out and recovery time for each channel. They can be modified by the user, who have rights to administrate the unit. After spending some time using the factory default parameters you may modify them with high precision to meet your needs at all.

WARNING: There is a risk for generating a lot of Notification messages (E-mail, SMS, SNMP Trap), if the time-out for sending alarm is not assigned correctly.

Product Description

FEATURES

- FM Band 87 - 108 MHz Basic Spectrum Analyzer
- Selectable wide/narrow IF bandwidth
- MPX, PILOT & RDS deviation meters
- Built-in Stereo decoder; Stereo Presence Detection
- LEFT and RIGHT demodulated audio level meters
- Accurate front-panel metering for local use
- Headphones audio output
- RDS and RBDS decoder
- RDS/RBDS Stream BER meter
- 19’’ Professional Case for high RF immunity
- TCP/IP Remote management and control via Internet
- Remote Audio Listening via GSM and Internet
- Alarm dispatch via E-mail, SMS or SNMP Trap
- Complete status reporting with SMS
- Full remote control and monitoring of all parameters and measurement values via TCP/IP
- RF and RDS Measurements (real time & average)
- Audio Program MP3 Streaming
- Archived readings for unlimited time
- Very Intuitive Application Interface
- Alarm centralization
- Cartographic interface with site location
- Remote Site configuration

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TECHNICAL SPECIFICATIONS

FM RECEIVER	
Frequency range	87.0 to 108.0 MHz
Step increment	50 KHz
RDS sensitivity	0 error at Vrf=-90dBµV, 4KHz RDS deviation, no modulation
RF Level evaluation	±4dB from 20°C to 30°C, 20 to 60dBµV without modulation
S/N	60dB
Dynamic	0 to 90dBµV 20 dBµV (-87 dBm) for monaural 43.5 dBµV (-63.5 dBm) for stereo
AUDIO, MPX, PILOT, RDS LEVELS	
Measurement validity	RF level preferably > 50dBµV
Multiplex level	Peak level displayed, 1000 samples over 1 second
Audio level	Peak level displayed, 1000 samples over 1 second
Pilot level	Mean peak level, 1000 samples over 1 second
RDS level	Mean peak level, 1000 samples over 1 second
ACCURACY	
MPX Deviation	±10%, ±5% typically
Audio Level	±5%
Sub-Carrier Level	±10% typical and not guaranteed
FM ANTENNA INPUT	
Connector	BNC on rear panel
Impedance	50Ω
External Attenuator	No
STEREO DECODING	
Stereo Separation	>40dB
De-emphasis	50 or 75µs, Selectable
Audio Frequency Response	±0.5dB, 20 Hz to 15 kHz; follows selected de-emphasis curve
Typical Separation	approximately 26dB to 35dB
RDS DATA DECODING	
Standards	European RDS CENELEC; United States RBDS NRSC
Error Correction	Yes
Error counting	Yes
AF decoding	Yes
CT (Time/Date)	Yes
PI, PTY, DI, MS	Yes
TA/TP	Yes
RT (Radio Text)	Yes
PS (Program Service name)	Yes
MEASUREMENT STORAGE	
Storage	2GB Built in Memory Card
Data formats	Textual and proprietary

USER INTERFACE	
Indicators	4 LEDs and Navigation Buttons (on front panel)
Line output	1/8” (3.5mm) phone jack (on rear panel)
Headphone output	1/4” (6.3mm) phone jack (on front panel)
Display	Superb 2x40 characters, LCD
OPERATING CONDITIONS	
Equipment operational between	10°C to 60°C
EMC immunity	6V/m
FRONT PANEL’S HEADPHONES OUTPUT	
Connector	Stereo, 1/8” (3.5mm) phone jack
Volume	Fixed
TCP/IP COMMUNICATION	
Type	RJ45 Ethernet 10/100M Base-T Port
Connector	RJ45, rear panel
POWER REQUIREMENT	
Power supply	110/220 V (internal switch)
Connector	IEC320, rear panel
SIZE AND WEIGHT	
Dimensions (W x H x D)	1U, 19” x 1.7” x 6.9”, 482mm x 43mm x 175mm
Weight	8 lbs, 3.6kg

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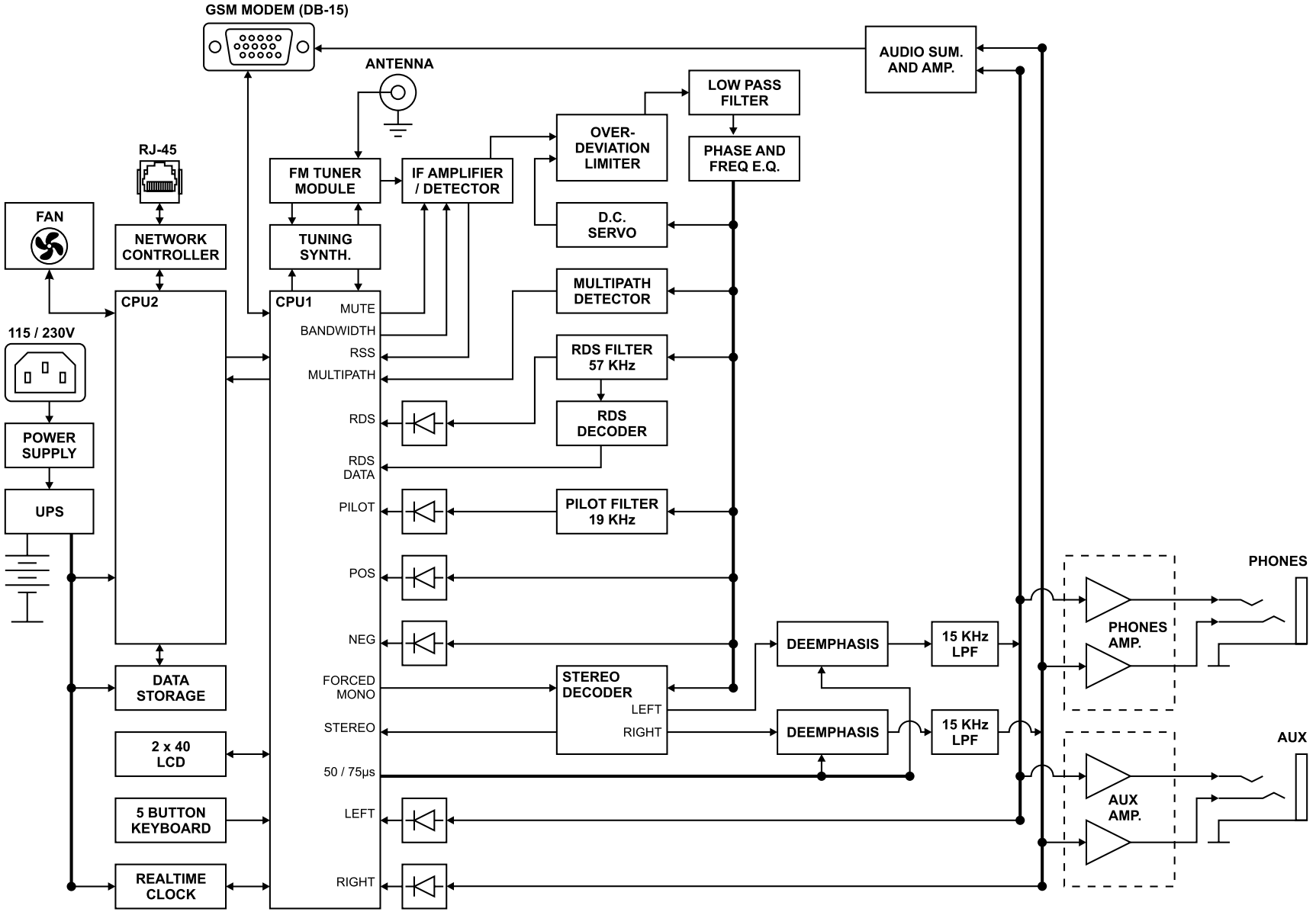
BLOCK DIAGRAM



NETWORK CONFIGURATION

All the built-in communication services and modules are using the following ports:

Server:
- FTP Command Port – default:21(or any other in the range 1024-5000);
- FTP Data Port – default: 3300 (or any other in the range 1024-5000);
- Status Server Port – default:1100 (or any other in the range 1024-5000);
- TCP Application Server Port – default:1050 (or any other in the range 1024-5000);
- SNMP Agent Port (UDP) - default:161 (or any other in the range 1-65535);

Client:
- E-mail Sending (SMTP) Port - default: 25 (or any other in the range 1-65535);
- SNTP Port - 123;
- SNMP Trap Port (UDP) - default:162 (or any other in the range 1-65535);

NOTE: The settings of your Router and Firewall may need some modifications and customizations to meet all the DB4000 communication core requirements, because of your TCP/IP private configuration.

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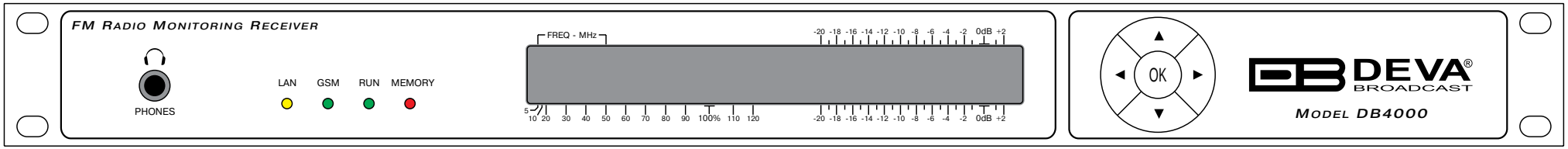
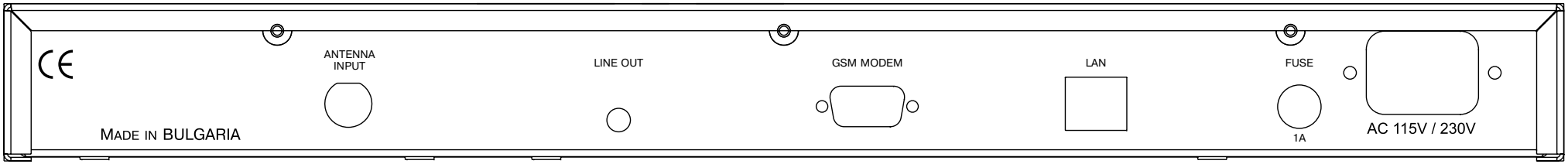
FRONT PANEL



PHONES - stereo 1/4” (6.3mm) jack output for headphones;
LAN LED - indicates LAN presence;
GSM LED - indicates GSM presence;
RUN LED - indicates Logger Mode;
MEMORY LED - indicates operations with ‘Data Storage’;

REAR PANEL



ANTENNA INPUT - BNC connector for FM Antenna;
LINE OUT - stereo 1/8” (3.5mm) jack output;
GSM MODEM - DB-15 connector for connecting external GSM Modem;
LAN - RJ-45 connector for TCP/IP connection;
FUSE - 1A

Getting Started

For the normal operation of DB4000, you will need the following conditions:
- Standard Ethernet 10/100M connection;
- Correct assigned Network configuration and device settings;
- Correct assigned Network configuration and correct settings in the "DB4000 Device Manager" software

To provide all these conditions please, follow the instructions below.

CONNECTION

- Install the unit on its operation place;
- Connect the unit via grounding cable to the ground network of the room where the unit is installed;
- Connect the unit to the power supply network using the power cable provided with the unit;
- Connect the antenna cable to the RF antenna input connector located on the rear panel of the device;
- Connect DB4000 to the TCP/IP network using direct network cable;
- Connect the optional GSM modem via the connection cable provided with the GSM modem. Please, locate and select proper place of the GSM antenna for achieving better GSM network coverage.

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

CONFIGURING YOUR PC TO COMMUNICATE WITH THE UNIT

To communicate with DB4000 you must install "DB4000 Device Manager" Software (see "Installing the DB4000 Device Manager Software" on page 37). The Software has no special preliminary configurations to operate, but it depends on your PC's network configuration. Connect your PC to Internet or to your local network. The network must be properly configured to allow access to the device via TCP/IP.

If DB4000 is connected directly to the computer where the Software is installed then the WAN IP Address must be equal to that of IP Address (WAN IP address = IP address). If a networking device (router for example) is used, then the DB4000 WAN IP Address must be equal to that of the router.

To register the device in the software you must know its Serial Number and IP Address.

PRODUCT ID

Each DB4000 unit has its own authentic serial number. This number is required for the initial configuration of the software for remote communication. This number is factory assigned and can be found on the rear panel of the device. The other place you can refer to for checking this number is the Device Configuration Menu `6. 7 SERIAL AND MAC` accessible from the front panel.

NETWORK SETTINGS

After connecting the network cable the Led 'LAN' located on the front 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 can be modified via the Network Configuration Menu `3. NETWORK CONFIG` accessible from the front panel.

```
3.1  IP       : 192.168.020.020
3.2  GATEWAY  : 192.168.020.001
3.3  MASK     : 255.255.255.192
3.4  DNS      : 192.168.020.005
3.5  DHCP     :Disabled
3.6  TCP CON. PORT:1050
3.7  FTP CMD  PORT: 21
3.8  FTP DATA PORT:3100
3.9  HTTP PORT    : 80
3.10 STATUS PORT  :1100
3.11 WAN IP   : 192.168.020.020
3.12 BACK
```

Using the Up and Down buttons you can select the desired parameter to be changed. Use the OK button to edit the selected parameter. The position to be edited is marked with flashing cursor. Use the Left and Right buttons to change cursor's position. Use the Up and Down buttons to increment/decrement the value of the selected position. Press the OK button once or the Left button repeatedly to went out of editing mode. Keep the OK button pressed for about 2-3 seconds for exiting to the main menu or by choosing `3. 12 BACK` item from the menu.

NOTE: Please note that before exiting from `3. NETWORK CONFIG` menu, a short dialog for confirmation will appear. You must confirm the new settings by selecting `Save & Quit` or to cancel them by choosing `Quit`.

The network settings can be assigned in two different modes depending on the TCP/IP network properties.

Configuration using Static IP address:

Before setting up the device in this mode, please, refer to your network administrator to obtain all the settings required. The other way to obtain all this settings is by using the internal DHCP client. It will obtain the settings automatically. GATEWAY, MASK, and DNS values could be seen under `3. Network Config` menu. Then disable the DHCP client and fill the IP address in the Network Config manually.

Configuration using DHCP Server:

Activate the DHCP client via the `3. Network Config` menu. If your network uses DHCP server for assigning IP Addresses, such would be assigned automatically to DB4000.

IMPORTANT: Insure yourself that your network DHCP server supports 'automatic allocation' or 'static allocation' methods (Static DHCP Assignment), before using the DHCP client. When these modes are activated, DHCP server keeps a table of past IP address assignments (bounded to DB4000's MAC address), so that it can preferentially assign to the device the same IP address that the client previously had. If you are not enough aware with this matter, please, consult with your network administrator for the appropriate settings and further assistance.

The most important communication ports are as follow:

- TCP Connection Port – This is the main device port used for communication between the DB4000 and the Device Manager Software.
- FTP Command Port – This is the DB4000's FTP client communication port for sending instructions to the FTP server in DB4000.
- FTP Data Port – This is the DB4000's FTP client data port for transfer data with the FTP server in DB4000.
- HTTP Port – Internal WEB server's port.
- Status Port – This is a port used by the device manager for internal management of the DB4000 device.

Default Network Settings:

```
IP       : 192.168.001.020
GATEWAY  : 192.168.001.001
MASK     : 255.255.255.000
DNS      : 008.008.008.008
DHCP     :Disabled
TCP CON. PORT:1050
FTP CMD  PORT: 21
FTP DATA PORT:3100
HTTP PORT     : 80
STATUS PORT   :1100
WAN IP   : 192.168.001.020
```

NOTE: 'TCP Connection Port' and 'Status Port' are required by "DB4000 Device Manager" Software for device registration (see "New Device" on page 39) or when network settings are changed locally by the device.

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Remote Application Presentation

WORKING PRINCIPLE

DB4000 was developed as a product with very wide range of applications. It can be used as a stand-alone measurement device and FM modulation monitor. This unit can be also used as a remote FM Monitoring Receiver. It can be a part of a whole remote FM network. Used in such application DB4000 can provide a real time data transfer to any place and to send notifications by E-mail, SMS and/or SNMP trap, in case some of the monitored parameters exceed out of the preliminary assigned limits.

FUNCTIONS

The DB4000 Monitoring Receiver has, on the front panel a very simple and intuitive user interface, based on 2 x 40 LCD display, several LEDs and 5 navigation buttons. Through this interface the user can check or modify any parameter and setting, browsing in the device's menu. Operating with device's display and menus is easy and simple job, we call this mode of usage "Local Mode".

The main function of DB4000 is the real time remote monitoring and access via Internet connection and the user software called "DB4000 Device Manager". We call this mode of usage "TCP/IP Connection Mode". The Device Manager Software allows a real time monitoring, logging of measurements of multiple numbers of channels, downloading logs generated by the unit's scheduler. This software is the tool for making remotely any device's settings.

One of the most attractive features of DB4000 is the possibility for sending alarms or status information for the channels monitored. This is accomplished via the GSM network using an external optional GSM Modem. We call this 'GSM Mode'. Once equipped with GSM Modem, DB4000 becomes a powerful tool for remote monitoring at any time from any place. Along with the SMS sending by the scheduler, in case of any alarm, DB4000 can receive requests from authorized users for sending back status information for the requested channel. Audio listening via the GSM network is also possible. All that is necessary is just to send a SMS with 'listening request' of the desired frequency. The device will initiate a phone call to the user sent the request for audio check-up. The call duration can be adjusted via the menu, accessible from the front panel or via the "DB4000 Device Manager" Software. An alert, showing the 'GSM Operation' and the number that accesses the unit, appears on the front LCD, when the unit receives request from the GSM network.

The most important function of DB4000 is probably the possibility for continuously, 24 hours per day, monitoring of up to 50 radio stations in the preliminary assigned schedule. We call this 'Logger Mode'. The internal FM tuner is changing its frequency according to the schedule and observes every channel for a predefined time (Channel Hold Time). Meantime a powerful CPU is making detailed measurements of all important parameters and saves them in a log.

After collecting all the data the DB4000 microprocessor core compares the values measured with the predefined by the user threshold levels for all the channels monitored. In case that any parameter is out of its limits, the device will initiate the sending of alarm notification via the alarm type selected. All the alarms are stored in the device's log. You have to have in mind that, if there is a very short fault of the signal, with duration less than the 'channel hold time', the device would not be capable to send notification.

ALARM TRIGGERS

There are several Alarm Triggers for the following parameters: RF, MPX, Left/Right Audio, RDS and Pilot levels. There is an option for defining different limits for each of the parameters. All these values, the 'alarm time' and the 'recovery time' have to be assigned separately for each of the channels. You can adjust all these settings via the 2. LOGGER SETTINGS or using the "DB4000 Device Manager" software.

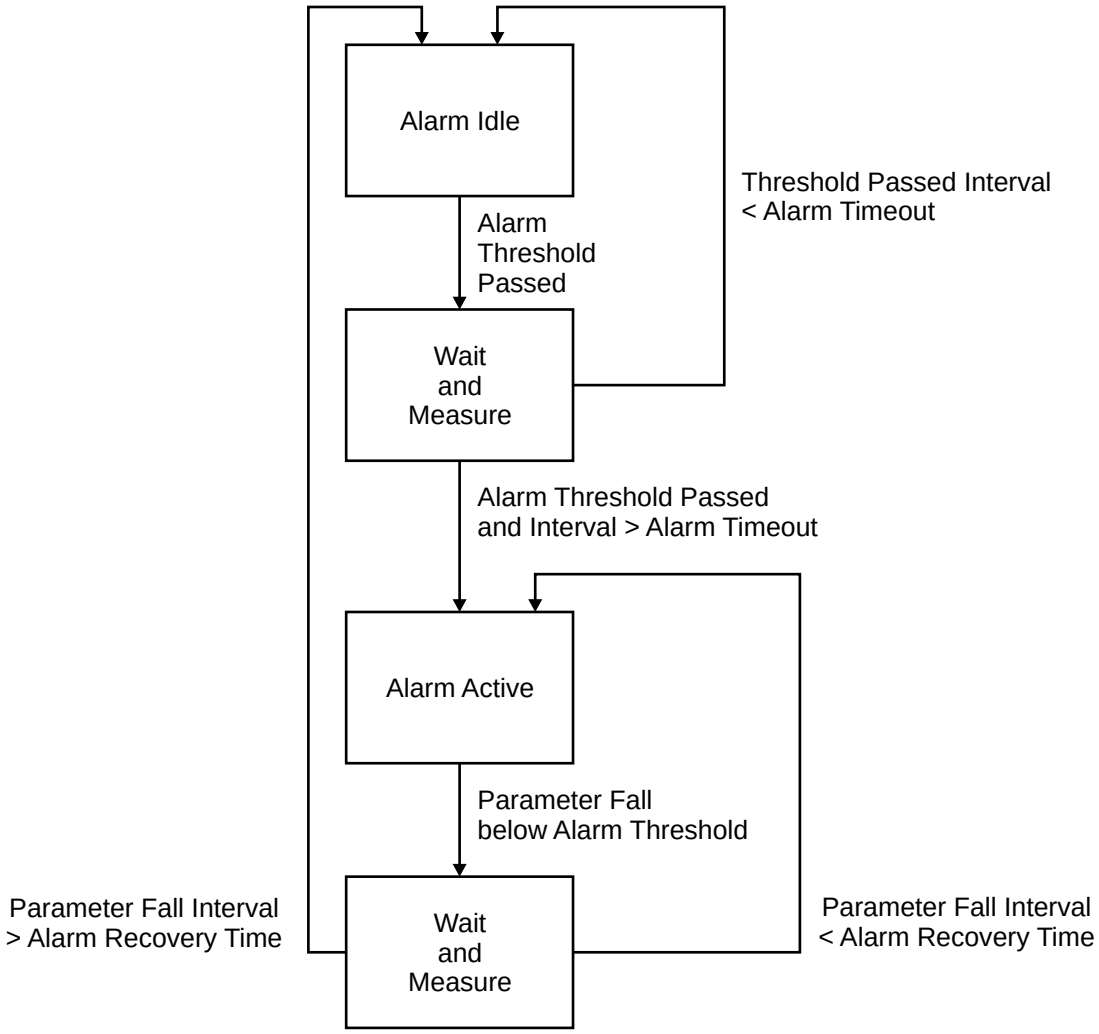
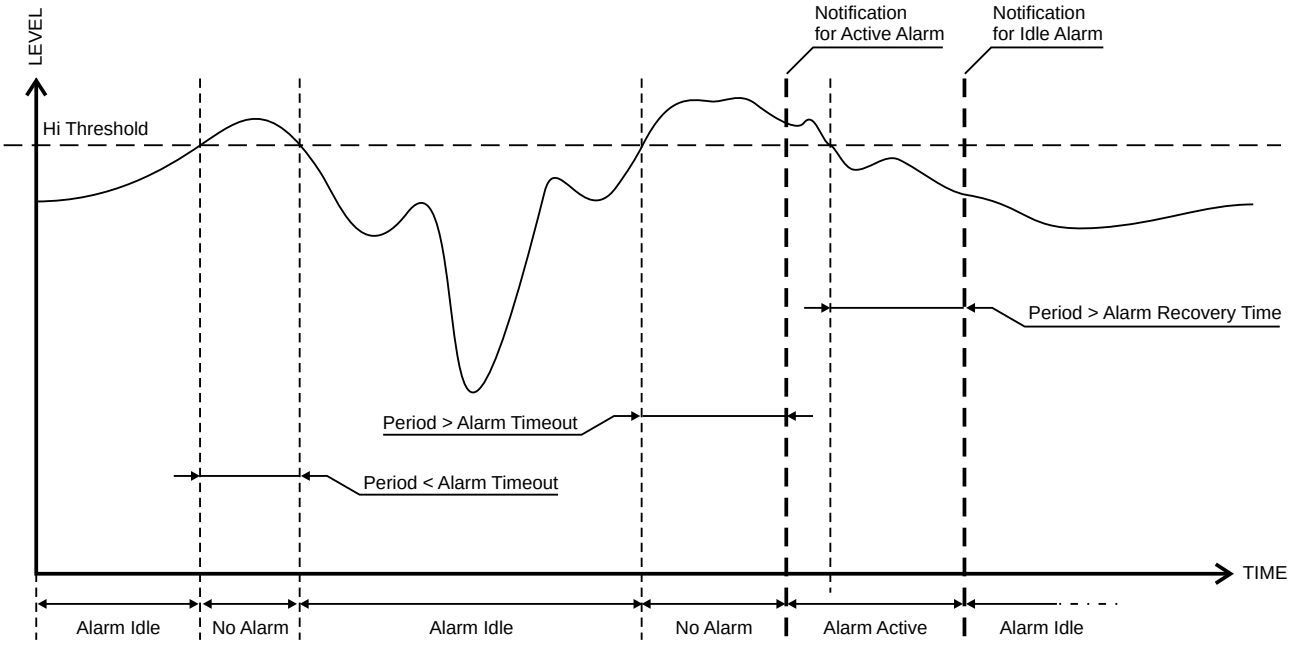


fig.1. Block Diagram of Alarm Automata

Every time an observation event takes place, the Alarm Trigger's State of the channel refreshes (if necessary). For example: Let's suppose that the Alarm Trigger is in Idle state. Note, that an alarm is not triggered immediately when a parameter level passes over threshold (above High Threshold or under Low Threshold). If the parameter level becomes stable (within Thresholds) and Alarm Time-out is not elapsed, then Alarm Trigger returns to Idle state. If Alarm Time-out expires and the parameter level is still out of bounds, then Alarm Trigger changes its state to Active. This causes predefined actions - Alarm Notifications (E-mail, SMS, SNMP trap) and Save a Log Record. The state will not be immediately changed to Active when the parameter stabilizes (within Threshold levels), but will wait until 'Alarm Recovery Time' is elapsed. Meanwhile if the parameter passes over again any Threshold, the Alarm Trigger will remain in Active state. If the parameter remains within Threshold levels after the time-out expires, Alarm Trigger switches to Idle state and again predefined actions are initiated (as when entering Active state).



'Trigger Hierarchy' is utilized to minimize generation of redundant alarms. Their priority (in descending order) is as follows:

RF low,
RF Hogh,
MPX Low,
MPX High,
L/R low,
L/R High,
Pilot low,
Pilot High,
RDS low,
RDS High

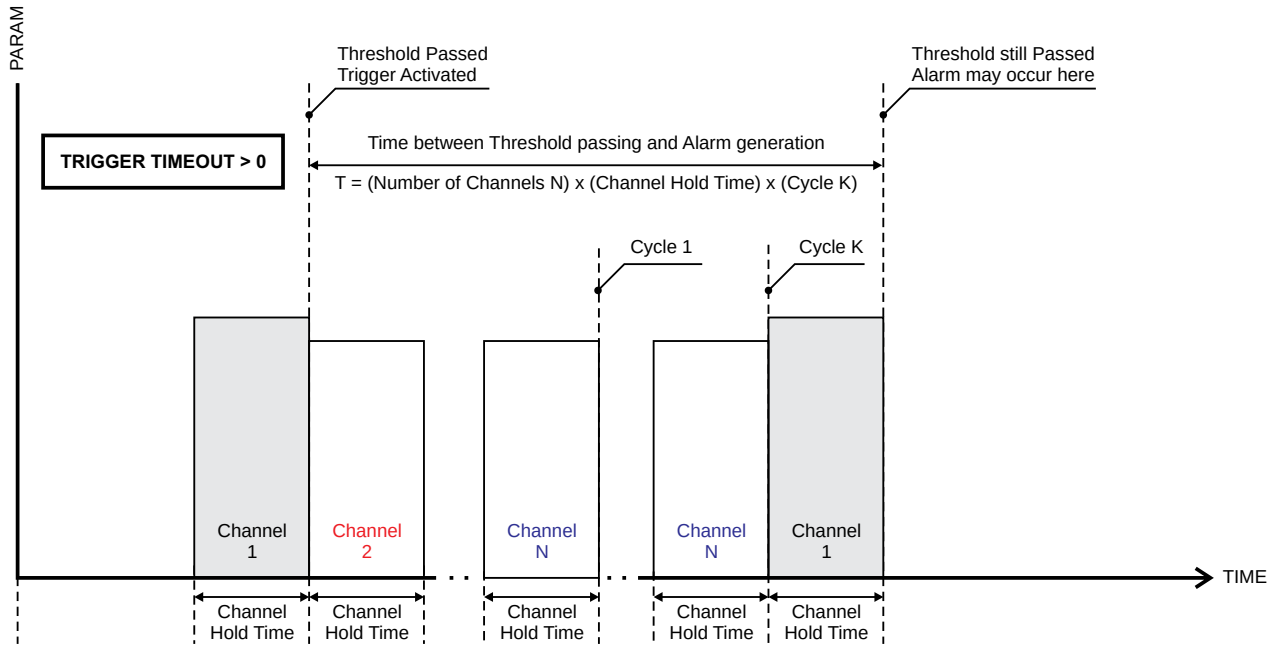
Active Alarm is generated (Alarm threshold is passed and Alarm Time-out is elapsed) according to first enabled Trigger with highest priority. The rest of the triggered alarms, with lower priority, will be ignored/suppressed.

Idle Alarm is generated only when all enabled for monitoring parameters are within their bounds.

NOTE: For clarity, the above presentation describes the processes (of Monitoring and Alarm Generation) comprising only one channel. In general case the monitoring includes more than one channel, which requires attention on the following characteristics:

The comparison of averaged values (for period) of monitoring parameters with their respective triggering thresholds is accomplished at the END OF "Channel Hold Time" (end of monitoring) for each channel. In case where a threshold is passed, the start of Time-out is set just after comparison. When threshold is passed and Time-out is not defined (set to 0) the Alarm will be generated immediately. When Time-out is non-zero, during the monitoring of remaining channels, the Time-out period for active Trigger will continue to increase, although the channel is not currently monitored. When the schedule has completed and the channel takes place again, at the end of "Channel Hold Time" the Time-out period is increased by number of all active channels multiplied by "Channel Hold time". At the channel re-entry there are several options:

- the monitoring parameter is still out of range, but the Time-out period is not expired - the Trigger will remain active;
- the monitoring parameter is still out of range and Time-out period is expired - Alarm will be generated;
- the monitoring parameter is in bounds - the Trigger is deactivated.



Considering the above, always have in mind the following conclusion: in schedule with multiple channels, for channels with Time-out set to non-zero, the minimum time for generating Alarms is equal to one schedule cycle. Consider this when choosing appropriate values for "Alarm After" and "Alarm Recovery Time".

ALARM NOTIFICATIONS

Alarm Notifications (E-mail, SMS, SNMP trap) consist of Device ID, date and time of Alarm triggered, channel number, frequency and information for Alarm activation or deactivation. The basic signal parameters are evaluated and included as well.

Because of the SMS length limitations, only most important parameters are included, when sending SMS Notifications.

Example for E-mal Notification:
018B31FF
Date:09.02.11; Time:15:53:23
DB4000 MONITORING TOOL reports ACTIVE alarm on preset #1, frequency:99.90 MHz!
Alarm:RF Min < 30dBuV.

Signal parameters:
RF:53.6 dBuV
Average Deviation: 52.3 kHz
Peak Deviation: 59.2 kHz
Min. Deviation:51.2 kHz
Audio Left:-5.4 dB
Audio Right:-5.9 dB
Pilot:7.6 kHz
RDS:3.2 kHz
Multipath:3.2 %

Mono/Stereo:Stereo
RDS:Yes

RDS Properties:
RDS Signal Quality:69.2 %
RDS BER:0.0000
PI:83C1
PS:VERONIKA
PTY:Pop Music
TP:On
TA:Off
DI:01h
MS:Music
AF Method:A
AF Count :6

Example for SMS Notification:
ACTIVE:PR#1
11.07.09 09:08:34
FREQ:104.50MHz
RF Lvl:22.1dBuV *L*
MPX Lvl:74.1kHz
Left:-11.7dB
Right:-12.3dB
Pilot:7.5kHz
Stereo
RDS Level:4.1kHz
PI:824D

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

OPERATING MODES

DB4000 has several operating modes which are hierarchically dependent from each other, as shown on fig.2.

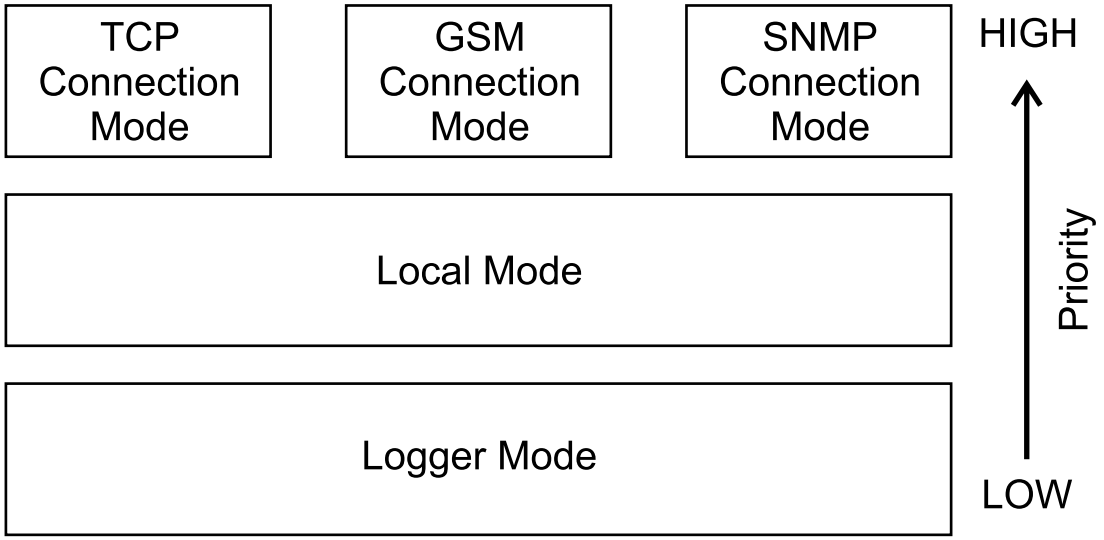


fig.2. Modes Hierarchy

Logger Mode is with the lowest priority and can be interrupted by any of the modes above. While DB4000 is in Logger Mode, pressing any key from the front panel keyboard will switch the Device to Local Mode. When no user interaction is performed within the range of 1 minute from the last keyboard action, the Device switches back to Logger Mode. But in case that the logger capabilities of the Device have meanwhile been disabled through the local menu, the Device will remain in Local Mode. On the other hand Local Mode can be interrupted by TCP Mode, GSM Mode or SNMP Mode, because they are with higher priority. Because TCP, GSM and SNMP Modes are equal in hierarchy they will not interrupt one to another, they will be accepted according to the incoming order. When the active mode (TCP, GSM or SNMP) terminates and there are no other pending modes, the Device switches to Logger Mode (if not being disabled) or Local Mode.

SNMP ‘GET’ requests will not force DB4000 to switch to SNMP Mode, but SNMP ‘SET’ request will do. One minute after last ‘SET’, DB4000 switches back to Logger/Local Mode.

Configuring

PRODUCT IDENTIFIERS

Site Name

Site Name is kept into the Device and represents textual identification, helping for distinguishing different devices. When E-mail Notification is sent, Site Name is used as Sender.

It is recommended to assign sensible meanings to Site Name, which will recall general idea for the device classification e.g. geographical position.

Site Name is set to 'DB4000 MONITORING TOOL' by default, and can be changed from the device, using `5.1.1 SITE NAME` menu or from "DB4000 Device Manager" Software. (see "General Settings" on page 70)

Serial Number

Each DB4000 has unique Serial Number, which is factory assigned and could not be changed (in contrast to Site Name). Serial Number ensures true differentiation among all the DB4000 devices. "DB4000 Device Manager" requires this Serial Number and uses it to prevent device duplication. Serial Number could be taken from the rear panel of the device or from the device menu:

`6.7 SERIAL AND MAC`

DATE AND TIME SETTINGS

When DB4000 operates in Logger Mode it is most important to setup properly the built-in real-time clock. The time value from the real-time clock is used as a timestamp when creating Log Records or sending E-mail/SMS Notifications, as well as to determine when to finish and start the log files.

DB4000 Time Setup is possible only locally, through the device keyboard using `6.1 TIME SETTINGS` menu.

Sub-menu items are as follows:

```
1. TIME & DATE
2. ZONE:+2.00
3. DST :ON
4. SNTP:OFF
5. BACK
```

WARNING: Changing any Time Setting will erase all saved logs from device. Prior any change attempts you will be prompted:

```
WARNING : After this update all data will
be LOST. Press "->" to proceed.
```

While 'Time Settings Menu' is active, at the beginning of the second line of the LCD Display, current local time is shown, for example: `Sa 11.04.12 14:34:28`.

`1. TIME & DATE`

This menu enables changing Local Date and Time. Use Left and Right button from the keyboard to navigate among the parameters. For changing values use Up and Down buttons. For exiting the menu press OK button.

`2. ZONE`

Zone represents offset from UTC (Coordinated Universal Time or Greenwich Mean Time) and may be selected from predefined list of time zones. To select Zone use Left and Right buttons until reaching the desired value.

`3. DST`

Daylight Saving Time (also Summer Time in British English) is additional offset (typically +1) to ZONE. Typically clocks are one hour forwards adjusted at the beginning of the spring and are backwards adjusted in the autumn. DST can be ON (+1) or OFF (+0). Refer to your local Time Zone and choose suitable DST.

`4. SNTP`

The Network Time Protocol (NTP) is a protocol, for synchronizing the computer systems' clocks, over packet-switched, variable-latency data networks. A less complex form of NTP that does not require storing information about previous communications is known as Simple Network Time Protocol or SNTP. SNTP uses UDP on port 123 as its transport layer and DB4000 is bound to NPT server pool.ntp.org.

The SNTP option allows automatic synchronization of the built-in clock. When the option is turned ON, DB4000 is rebooted and clock synchronizing is performed. SNTP option automatically switches to OFF regardless of synchronization success.

SNTP operations are DNS-dependent. See "Network Settings" for proper DNS setup.

NOTE: SNTP provides only the UTC time, and no information about Time Zones or Daylight Saving Time (DST). This information is outside its scope and is obtainable separately from the Zone and DST settings.

SMTP MAIL CLIENT

DB4000 has got built-in SMTP (Simple Mail Transfer Protocol) client and can send e-mails independently. For generally enabling/disabling the e-mail sending use the following menu:

2.4.1 E-MAIL GENERAL:ON/OFF

Each channel has its own option for sending e-mails. When turning the 'E-mail General' option to ON the Device will consider with every individual channels' e-mail settings. Turning the option to OFF will disable the complete e-mail output regardless of the independent channels' settings.

DB4000 can be configured to utilize two different e-mail servers, but this could be done only by "DB4000 Device Manager". (see "E-mail Settings" on page 73)

KEYBOARD LOCK

To prevent unauthorized local access DB4000 offers password protected keyboard locking. By default the keyboard is unprotected. To enable protection, navigate to 6.11.2 ENABLED:YES/NO and select YES. From 6.11.1 PASSWORD:0000 select desired 4 digit password. Once the keyboard password is enabled it will be indicated with the following symbol . From now on every attempt to use keyboard will be prompted for password: ENTER PASSWORD:0***, and access will be denied upon false entry.

IF MUTE

When it is necessary to prevent false/noise signals to be measured/reported, enable IF Mute option form 1.4 IF MUTE:ENABLED/DISABLED. Threshold, below which, the IF Mute will be performed could be adjusted from 1.5 IF THRESHOLD:35dBuV in ranges from 10 to 50 dBµV.

When IF Mute is enabled and IF Level is below defined threshold, all signals (except RF Level) will be reported/logged as 0. IF Level triggering has ±2dBµV hysteresis.

EXTERNAL GSM MODEM SETTINGS

To fulfill the Remote Monitoring Functions via GMS it is necessarily to connect an external GSM modem to DB4000. To do this, connect the GSM Modem to the rear panel DB-15 male connector through the cable provided. Modem must be powered by 12V, 2A power supply. A GSM Antenna must be supplied and connected to the SMA connector of the GSM Modem.

IMPORTANT: Position the GSM Antenna as far as possible from the DB4000's FM Antenna.

The GSM Modem must be configured with the following settings:
Baud rate: 9600 bps
Data bits: 8
Stop bit: 1
Parity: None
Hardware Flow Control: None

NOTE: The GSM Modems provided by DEVA Broadcast Ltd. are pre-configured. In case of using different modems, please comply with the settings above.

To ensure proper installation of the GSM Modem, please observe the following sequence:
1. Install and connect the GSM Antenna according to the above recommendations.
2. Insert the SIM card into the holder. Card must be with deactivated PIN request.
3. Connect the GSM Modem and DB4000 with the communication cable.
4. Power-up the GSM Modem.
5. Power-up DB4000.

If the installation is proper, the GSM Modem will immediately startup. This will be noticed by the fast blinking of the 'GSM' Led on the DB4000's front panel. The status of the GSM Modem will also be exposed on LCD Display. Few seconds are usually necessary for the GSM Modem to initialize and to register into the GSM Network. When the GSM Modem is Ready the 'GSM' Led will start blinking slowly. The GSM Opeartor's Logo and the Field Strength will be also shown on the LCD Display.

If, for any reason, the initialization has been delayed and the 'GSM Status' Screen is hidden, the 'GSM Status' could be recalled using the device menu: `5.2 GSM STATUS` or under the "Maintenance" tab in "DB4000 Device Manager" Software.

It is important to define the call duration, otherwise the GSM connection may turn overused. This can be done by using device menu: `5.1.3 CALL DURATION`

'Call Duration' defines the maximum outgoing call duration, which will be hanged-up by DB4000 when it reaches the defined value. Duration can be set from 30 to 300 seconds.

Only authorized GSM numbers can request remote notifications and remote listening. To register up to three GSM numbers use device menu: `5.1.2 GSM NUMBERS` or 'DB4000 Device Manager' Software.

It is important to enter the GSM numbers properly, using the correct prefix for the country. For example: +359898123456

This can be done also using "DB4000 Device Manager" Software - (see "GSM Settings" on page 74).

NOTE: The GSM Modem may be connected to DB4000 without shutting down the device - so called 'Hot Plug'. When disconnected or powered down, the GSM Modem can be reconnected after the 'GSM' Led stops blinking (about 5 seconds). To prevent possible problems, we recommend, when possible, not to use 'Hot Plug'.

'Status Request' Command Format:

```
Status FFF.FF
```

'Remote Audio Listening' Command Format:

```
Listen FFF.FF
```

Where FFF.FF is the frequency to Tune in the range of 87 to 108 MHz.
For example: "Status 102.55" or "Listen 88.80".

IMPORTANT: Do not include leading zeroes such as "Listen 089.90". Fill in with trailing zeroes up to two digits after the decimal symbol. Decimal symbol may be "." or ","

If DB4000 receives an authorized 'Status Request' command, the device will switch to 'GSM Mode'. After a short interval (about 5 seconds), in which DB4000 has to retune and collect summarized data, the Caller will receive a SMS response. For Example:

```
STATUS:
11.07.09 09:08:34
FREQ:102.50MHz
RF Level: 55.1dBuV
MPX Level: 74.1kHz
Left: -11.7dB
Right: -12.3dB
Pilot: 7.5kHz
Stereo
RDS Level: 4.1kHz
PI:824D
```

'Remote Audio Listening' command will generate (only if the calling number is authorized) a response call from DB4000 to the command sender. DB4000 will wait for answer, and will hang-up after 30 seconds, if there is no incoming answer. When a call is accepted, the duration of 'listening' is determinate by 'Call Duration' interval or until the call is ended.

NOTE: Because TCP, SNMP and GSM Modes are equal in hierarchy they will not interrupt one to another. When 'TCP Connection', or 'SNMP Connection' is underway, completing the 'Status' and 'Listen' requests will be delayed until the 'TCP Connection' or 'SNMP Connection' disconnects. Delayed response may also be caused by problems in your GSM Network.

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Monitoring Configuration

MANAGING CHANNELS

Adding New Channel to the Monitoring List

To add (activate) new channels to the Monitoring List use device menu

`2.3.1 CHANNEL EDITOR`

or "DB4000 Device Manager" Software under the 'Scheduler' tab (device must be registered as Logger).

Use the devices keyboard's Up and Down buttons to position the cursor (›)to the desired channel (from 1 to 50). Channel will be marked with '`OFF`' if inactive. Press the Right button to enter in Editing Mode (cursor will change to '→'). Use Up and Down buttons to change channel status to '`ON`'. Press Right button to enter in Frequency Editing. Use Up and Down buttons to adjust the desired frequency. Meanwhile brief information (RF Level, Stereo/Mono Status, PI) about selected frequency appears in the beginning of the second LCD line. Headphones can also be used for listening to the channel audio. To exit Editing Mode press OK button, or press Left button several times until reaching the start position. Holding OK button for few seconds will return the device to Main Screen.

Delete a Channel from the Monitoring List

To delete (deactivate) Channel from the Monitoring List do the same action as above but turn the channel in '`OFF`' state.

Adding and **Deleting** can be done using "DB4000 Device Manager" Software (see "Scheduler" on page 60).

CHANNEL CONFIGURATION

Scheduler Configuration

An important option is Channel Hold Time. It specifies how long a channel will be observed before switching to the next channel. Hold Time can be from 1 to 255 seconds and can be adjusted from device menu

`2.2 CH. HOLD TIME` or from DB4000 Device Manager Software. (see "Scheduler" on page 60)

When the channels are configured, it is necessary to enable the 'Logger Mode'. This can be done from device menu

`2.1 LOGGER STATUS:ON` or from DB4000 Device Manager Software. (see "Scheduler" on page 60)

NOTE: If the 'Logger Mode' has been activated from the keyboard, the actual mode switching will perform 1 minute after the last button operation.

Because Logger Mode is with the lowest priority and can be interrupted by any of the other Modes, each interruption will be recorded into the current log, marking the time and type of interruption.

Alarm Threshold Configuration

Each channel has triggering threshold levels for RF, MPX, Left/Right Audio, Pilot and RDS levels. Each parameter has its minimum and maximum thresholds that can be turned ON or OFF independently. To adjust Alarm Thresholds use device menu
2.3.2 ALARM LEVELS or from "DB4000 Device Manager" Software (see "Scheduler" on page 60).
Select the desired channel from the list, using Up and Down buttons and press OK. A List with Alarm Thresholds will appear. For example:

```
RF    MIN:15  dBuV ON
RF    MAX:65  dBuV OFF
MPX   MIN:5   kHz  ON
MPX   MAX:80  kHz  ON
L/R   MIN:-20 dB   OFF
L/R   MAX:+1  dB   ON
PILOT MIN:5   kHz  ON
PILOT MAX:9   kHz  ON
RDS   MIN:1   kHz  ON
RDS   MAX:6   kHz  OFF
BACK
```

Select the desired parameter and press Left button. Use Up and Down buttons tho switch between ON and OFF. To exit Editing Mode press OK button, or press Left button several times until reaching the start position. Holding OK button for few seconds will return the device to Main Screen.

ATTENTION: Minimum and maximum values for one and the same parameter can not overlap each other e.g. maximum value can not be equal or less than minimum value and vice versa.

Alarm Time-out And Output Configuration

Alarm Output settings are listed under device menu 2.3.3 ALARM CONFIG
First select the desired channel then press the OK button. The following parameters will be shown:

```
TIMEOUT          :10 min.
RECOVERY TIME    :15 min.
ALARM VIA E-MAIL:OFF
ALARM VIA GSM    :OFF
ALARM VIA SNMP   :OFF
BACK
```

The Time-out and Recovery Time application has already been explained under "Alarm Triggers". Assign values of 0(OFF) to 180 minutes to them. 'Alarm Via' options defines if the specified type (SMS, E-MAIL, SNMP) of Alarm Notification is active.
It is possible to enable/disable all the channel's alarm notifications without independently going through each of the channels. This can be done by selecting ON or OFF from device menu
2.4 ALARM OUTPUT

Channel Configuration can be done using "DB4000 Device Manager" Software (see "Scheduler" on page 60).

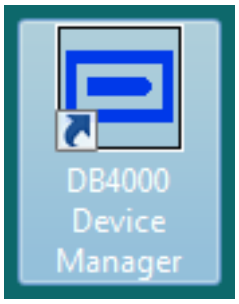
Installing the DB4000 Device Manager Software

Insert the supplied CD. Click Start, then My Computer, and then double-click the CD Drive (typically D:). Open the DB4000 folder and double click the installation file to launch the Wizard (shown here) that will guide you through the several installation steps.

Unless you have a specific reason to make changes, simply accept the default recommendations and click Next> at each step.

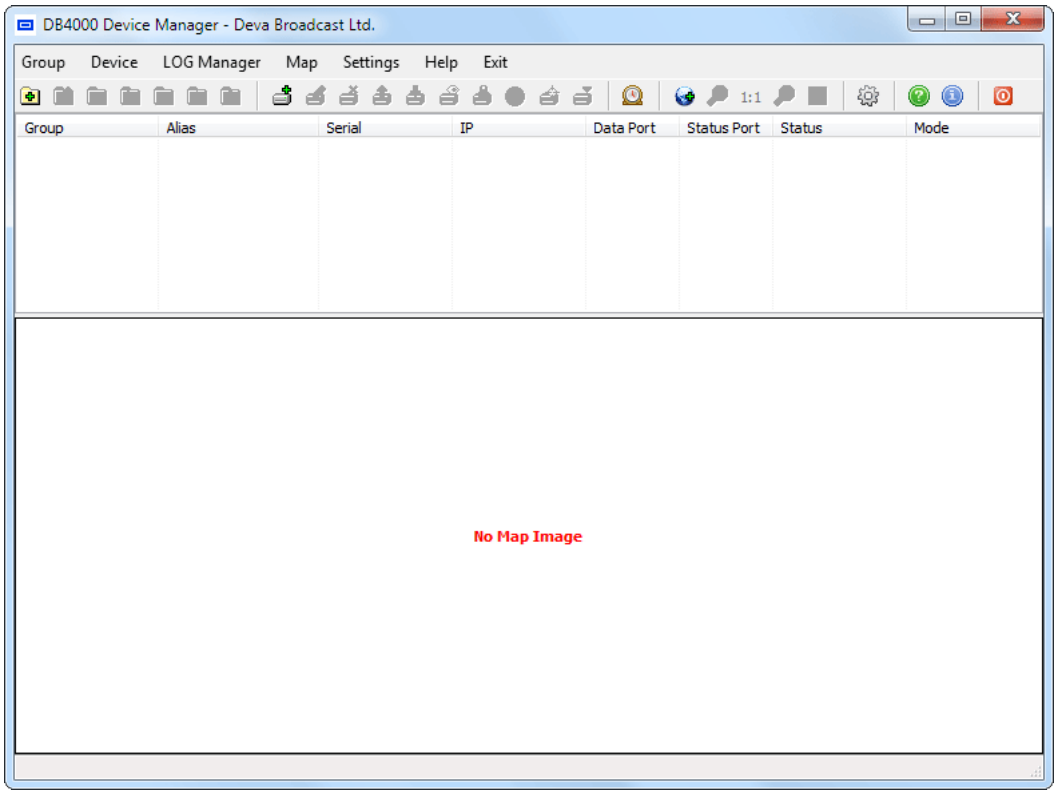
Using the DB4000 Device Manager

After the initial software installation, the following shortcut of the software will appear on the desktop.



You can launch the program using this shortcut or using Start\Programs\DB4000 Device Manager\DB4000 Device Manager.

The main application window looks as shown below:



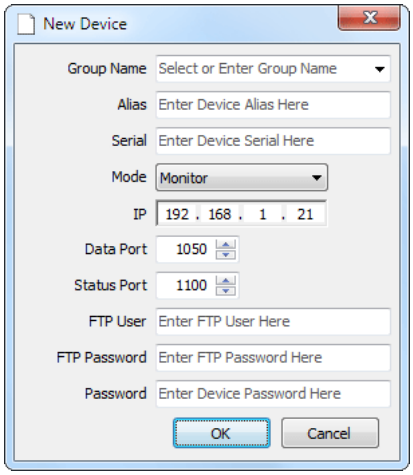
Most of the functions are disabled because this is Device Manager but there are no Devices listed.

NEW DEVICE

To define a New Device:

- press  (New Device Button);
- or select 'New Device' from Device Menu;

The following prompt will appear:



Group Name is for grouping purposes, and to recall the general idea for the device location (site, town, country, etc.).

NOTE: It is not necessarily that Group is created in advance. Non-existing Groups will be auto-created.

Alias is the user-defined name for each device, and together with Group Name makes the devices unique and more easily distinguishable from each other.

Serial Number is the factory number of the Device. It is prerequisite for further device operations. Serial Number can not be further changed.

Mode defines the software behaviour for the Device (it has no impact on Device functions). Mode can be *Monitor* or *Logger*.

IP Address is the address on which the Device is configured to listen to. Must be configured and taken from the Device.

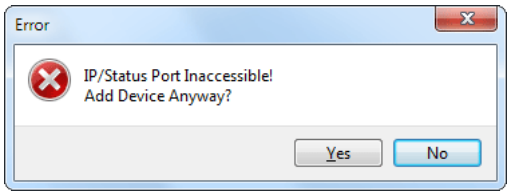
Data Port is the main communication port used by the software.

Status Port is for the status query.

FTP User and ***FTP Password*** are for FTP access only. They must match the configured such on the Device.

Password is to protect from unauthorized access. Initially must be taken from the Device. Password is case sensitive.

Immediate after the entered data is confirmed by pressing the OK button, the software will try to establish a connection on specified IP and Status Port to verify the Device existence. If the connection is successful, the Device will be added promptly, otherwise software will ask for further action:



Confirming with 'Yes' will add anyway the Device, but the proper communication with the Device will not be guaranteed.

ATTENTION: Default Device password is '1234'. Regarding security, please change it upon startup device installation.

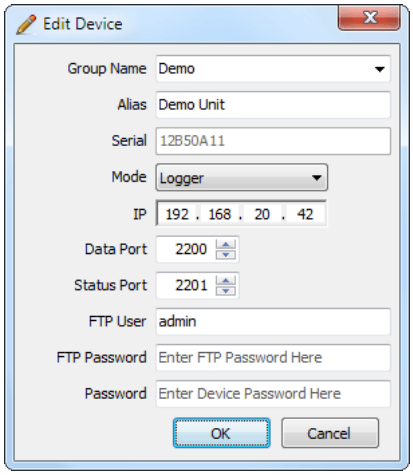
NOTE: Device could not be added twice with same Serial Number. Adding Devices with same IP Addresses, Data Port and Status Port is restricted too.

EDIT DEVICE

To Edit Device select a device from Device List and:

- press  (Edit Device Button);
- or select 'Edit Device' from Device Menu;

The following prompt will appear:



All the Device properties, except Serial Number, can be changed here.

NOTE: Leaving FTP Password empty will keep the existing one.

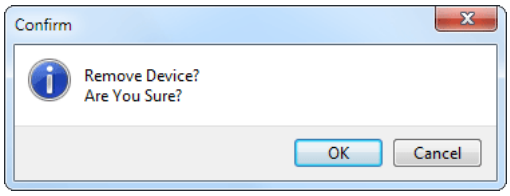
ATTENTION: The Password is required for confirming any changes. Be sure that you enter the correct Device Password, otherwise the Device will refuse connection. The unit Password could not be changed from here, but must be altered into the software, if it has been changed in the unit manually.

REMOVE DEVICE

To Remove Device, select a device from Device List and:

- press  (Remove Device Button);
- or select ‘Remove Device’ from Device Menu;

You will be prompted for confirmation.



If confirmed with ‘OK’ the Device will be removed permanently.

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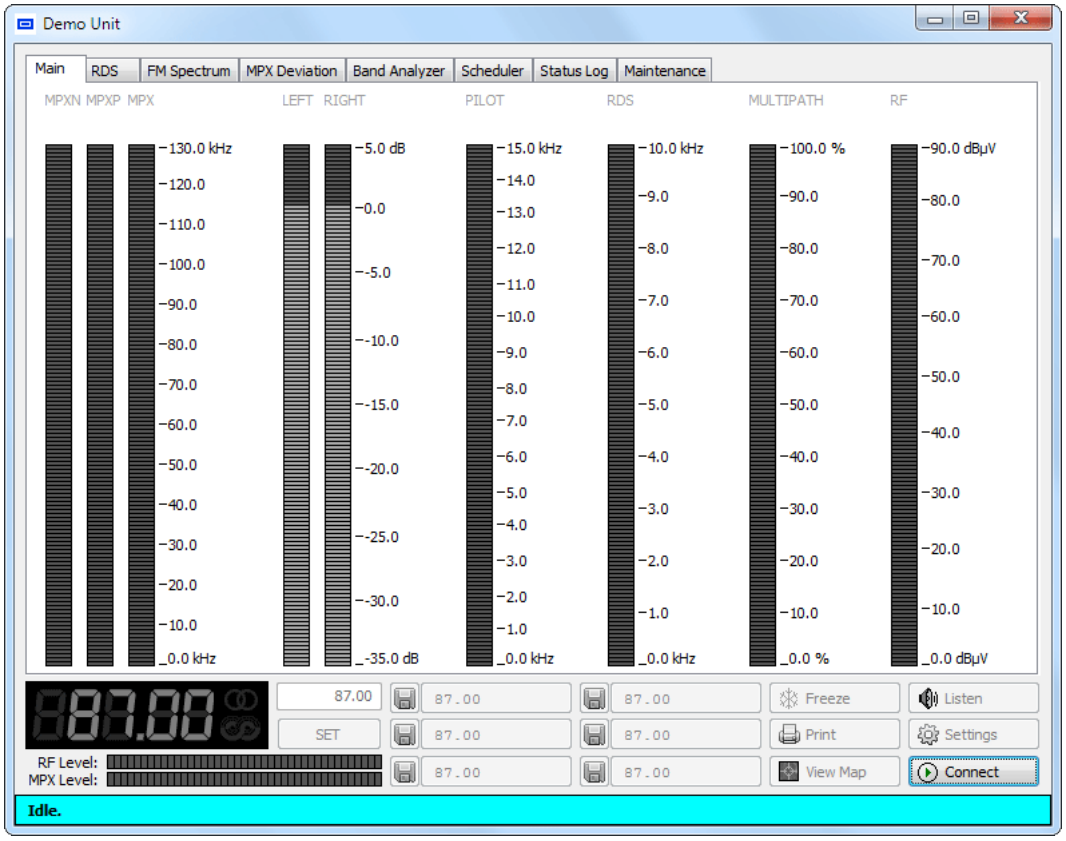
VIEW DEVICE

To View Device select a device from Device List and:

- press  (View Device Button);
- or select 'View Device' from Device Menu;

Device Control Window will appear:



Functions represented here will be discussed later. (see "Device Control Window" on page 51)

LOCATE ON MAP

To Locate Device on Map select a device from Device List and:

- press  (Locate on Map Button);
- or select 'Locate on Map' from Device Menu;

If Map is visible, the selected device will be positioned in the center of the Map visual area.
See "Map" for detailed explanations on Map and Map controls.

LOCK & UNLOCK POSITION

To Lock/Unlock Device Position on the Map select a device form Device List and:

- respectively press  (Lock Position Button) or  (Unlock Position Button);
- or select 'Lock Position'/'Unlock Position' from Device Menu;

Lock and Unlock permit one to another, i.e. locking the position disables further locking and permits unlocking and vice versa.

Locking the Device prohibits its reposition on the User Map.

Lock/Unlock Position has no practical use, if User Map is not available (see "Map" on page 76).

MOVE UP & DOWN DEVICE

To Move Device Up/Down (rearrange) select a device from Device List and:

- respectively press  (Move Up Button) or  (Move Down Button);
- or select 'Move Up' / 'Move Down' from Device Menu.

Moving devices has the purpose to rearrange them along the Device List, supposing that some devices require significant attention and it is intended to be placed at the top of the Device List.

The device on the top of the Device List will be shown and connected first, whereas the final one will be the last.

CONNECT & DISCONNECT DEVICE

To Connect/Disconnect device, select a device from Device List and:

- respectively press  (Connect Device Button) or  (Disconnect Device Button);
- or select ‘Connect Device’ / ‘Disconnect Device’ from Device Menu;

Connect and Disconnect permit one to another, i.e. Connected device could be only Disconnected and vice versa.

DOWNLOAD DEVICE

To ‘Download‘ device, select a device from Device List and:

- press  (Download Device Button);
- or select ‘Download Device’ from Device menu;

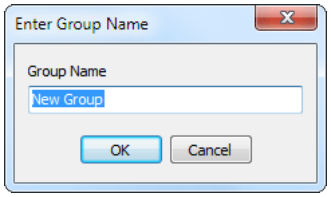
‘Downloading’ will enqueue Device into “LOG Manager”. Devices registered as Monitors will be ignored from Downloader.

NEW GROUP

To define a New Group:

- press  (New Group Button);
- or select ‘New Group’ from Group Menu;

The following prompt will appear:



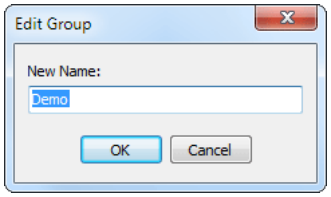
Enter desired Group Name and press OK. Further devices could be added to this group.

RENAME GROUP

To Rename Group, select a Group from Device List and:

- press  (Rename Group Button);
- or select ‘Rename Group’ from Group Menu;

The following prompt will appear:



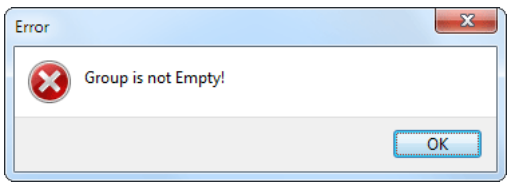
NOTE: Software will not prevent existence of groups with duplicated names.

REMOVE GROUP

To Remove Group, select a group from Device List and:

- press  (Remove Group Button);
- or select ‘Remove Group’ from Group Menu;

NOTE: Group removal will be prevented if group is not empty. The following alert will appear:



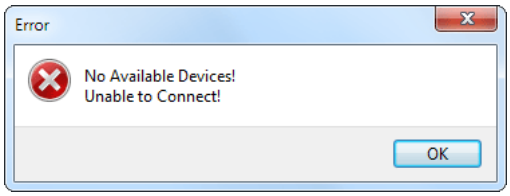
Remove Devices, or move them into another group prior Group Removal.

CONNECT GROUP

To Connect Group, select a Group from Device List and:

- press (Connect Group Button);
- or select 'Connect Group' from Group Menu;

NOTE: Connect Group is not a straightforward process and sometimes may lead to different results. While performing 'Connect on Group' first the Devices defined as Monitors are selected. Then sequentially they are checked for availability and the first available Device will be popped-up and connected. If no Monitor Devices are available or all Devices are busy the following warning will be displayed:



DOWNLOAD GROUP

To Download Group, select a Group from Device List and:

- press (Download Group Button);
- or select 'Download Group' from Group Menu;

Download Group will queue all the Devices from the selected Group into "LOG Manager".

MOVE UP & DOWN GROUP

To Move Group Up/Down (rearrange) select a Group from Device List and:

- respectively press (Move Up Button) or (Move Down Button);
- or select 'Move Up' / 'Move Down' from Group Menu.

Moving groups has the meaning to rearrange them along the Device List, supposing some groups require significant attention and can be found at the top of Device List.

NEW MAP

To Load (Define) New User Map:

- press  (New Map Button);
- or select ‘New Map’ from Map Menu;

File Open Dialog will appear, prompting for map picture, that can be either JPEG (.jpg, .jpeg), Bitmap (.bmp), Portable Network Graphic (.png), Enchanced Metafile (.emf) or Metafile (.wmf).

WARNING: The existing Map will be lost. Do not misuse with extremely big pictures, because this may lead to low performance and undesired effects.

The devices will keep their existing Map Positions, thus manual rearrange is required.

CLEAR MAP

To Clear (remove) Map:

- select ‘Clear Map’ from Map Menu under this icon: 

Clearing the Map empties only Map Picture, while devices keep their current positions.

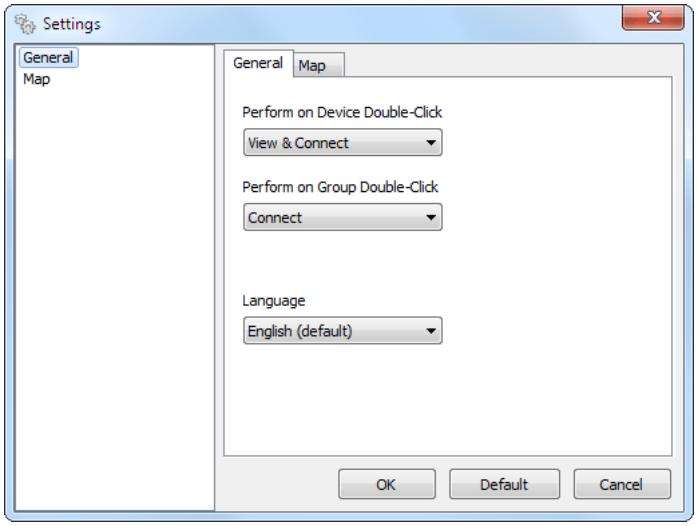
Program Settings

To Open Program Settings:

- press  (Settings Button);
- or select 'Settings' from Settings Menu;

NOTE: Program Settings are global, not per separate device.

GENERAL SETTINGS



Perform on Device Double-Click

This option will associate selected action when double-clicking over the Device in Device List is performed. Available options are:

- Edit - shows Device Edit Dialog (see "Edit Device" on page 41);
- View - opens Device Control Window (see "View Device" on page 43);
- View & Connect - subsequently opens "Device Control Window" and performs Connect;

Perform on Group Double-Click

This option will associate selected action when double-clicking over the Group in Device List is performed. Available options are:

- Collapse/Expand;
- Edit - to edit Group name;
- Connect - performs Connect on the first available device;
- Download - performs Download of a selected group in LOG manager

Language

This option will change program interface to selected language if language pack is installed.

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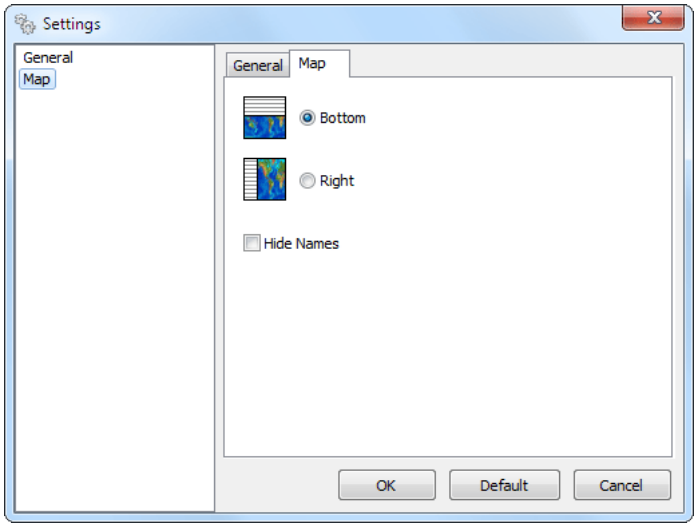
MAP SETTINGS



Bottom - selecting this option will situate Map beneath Device List.
Right - selecting this option will situate Map right from Device List.
Hide Names - will prevent device names from showing on Map.

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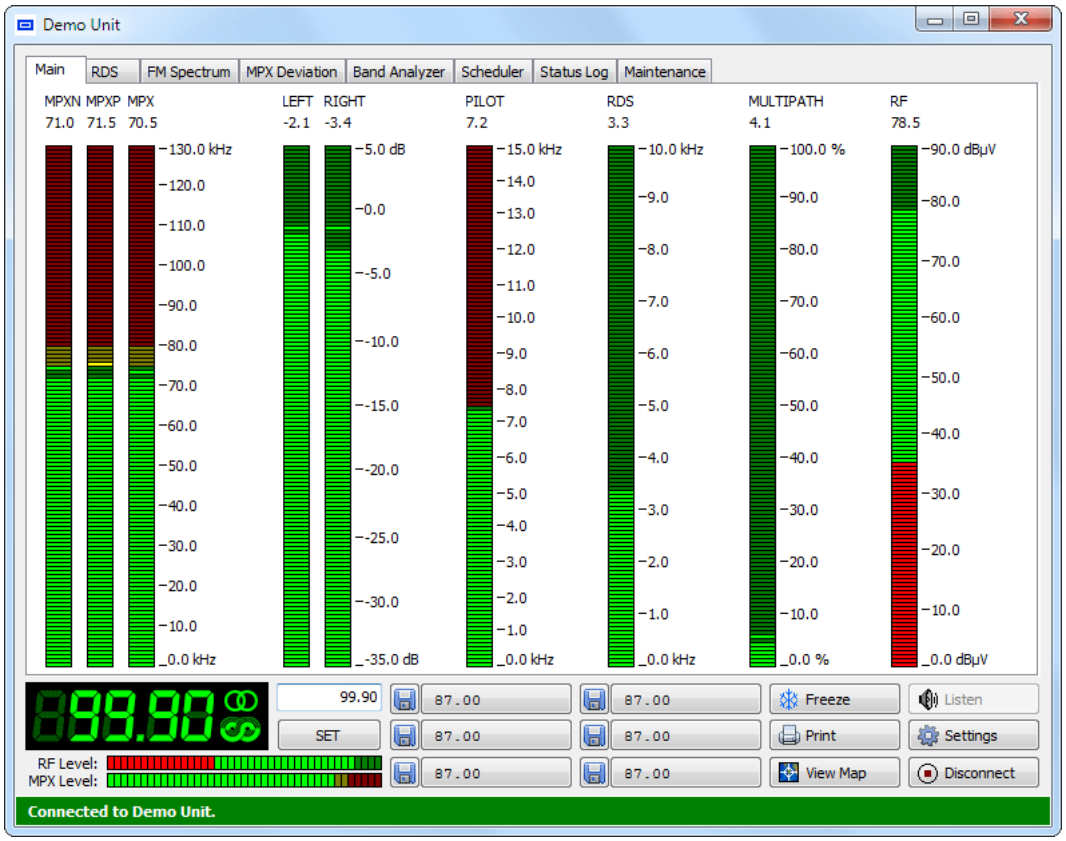
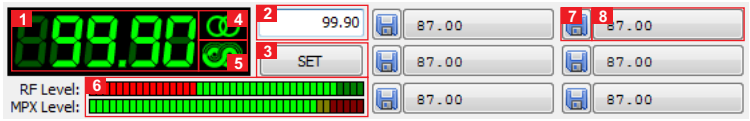
Device Control Window

Each device has its own Control Window, which encloses device specific functions and readings.

When device is not connected most of the functions and buttons are disabled, otherwise Control Window looks like this:



TUNER AND PRESETS



The general management and the most important indications of DB4000 are situated at the bottom of Control Window (constant from tab to tab).

1. Frequency Indicator – Shows the working frequency of the unit.
2. Working frequency entering cell.
3. This button will set the unit at the frequency defined in cell 2.
4. RDS Signal Presence.
5. Stereo Signal Presence.
6. Level Strength and MPX Level Indicators.
7. Quick Preset Save button. (see “Local Device Settings” on page 63)
8. Quick Preset Recall button. (see “Local Device Settings” on page 63)

SIDE BUTTONS

- opens associated media player and connects to DB4000 Streamer (if available). (see “Audio Streaming Settings” on page 68)

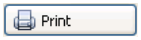
- freezes/ unfreezes data visualization;

NOTE: Freezing do not stops data flow, just holds the visualization.

- selects and centers device on Map;

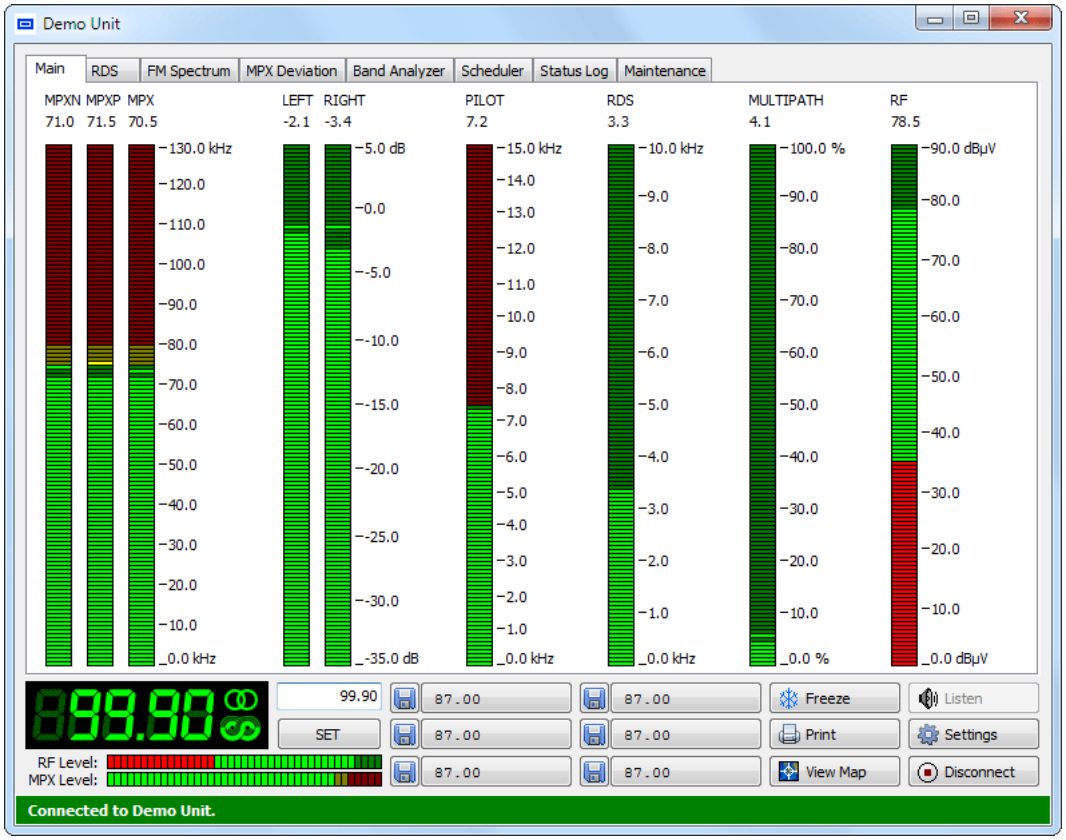
- opens Device Settings;

- Connects/Disconnects device.



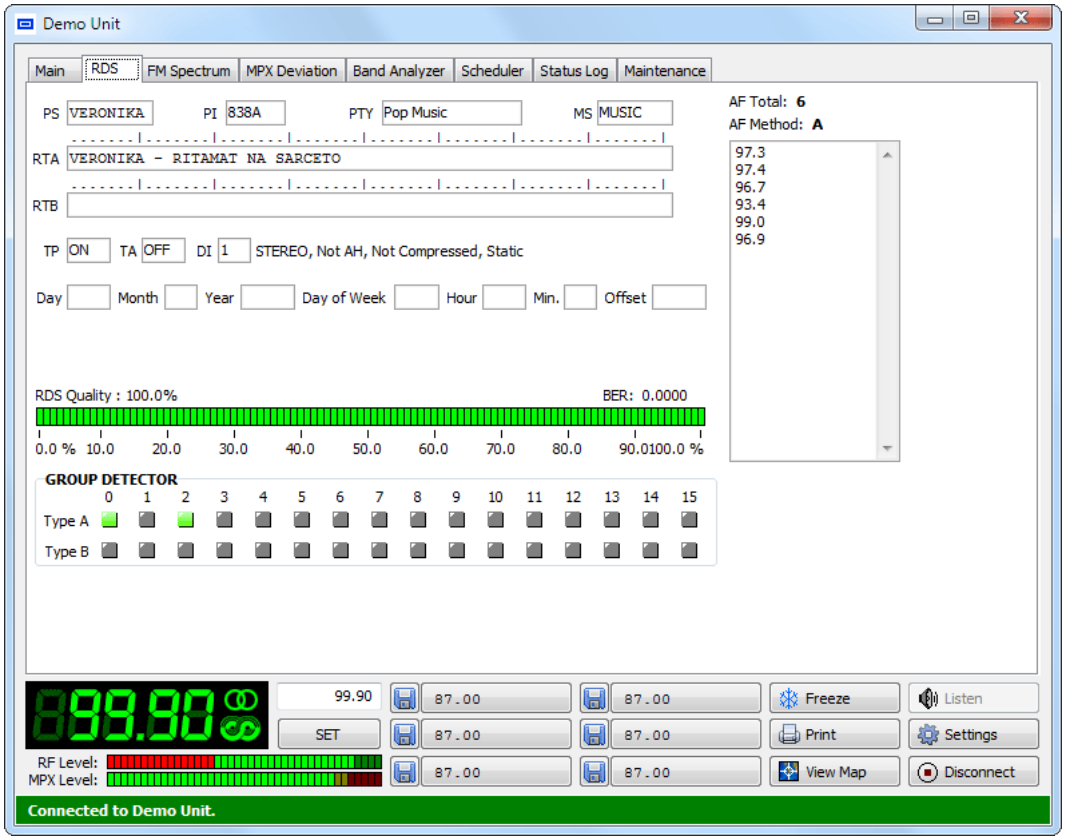
- opens Print dialog. FM Spectrum, MPX Deviation and Band Spectrum (if Band Scan is performed) could be printed.

MAIN SCREEN



This screen shows all mandatory parameters represented as LED readings. It is possible to make fast evaluation of any selected station from this screen.

RDS



This screen shows all mandatory RDS readings if there is RDS for the tuned station.

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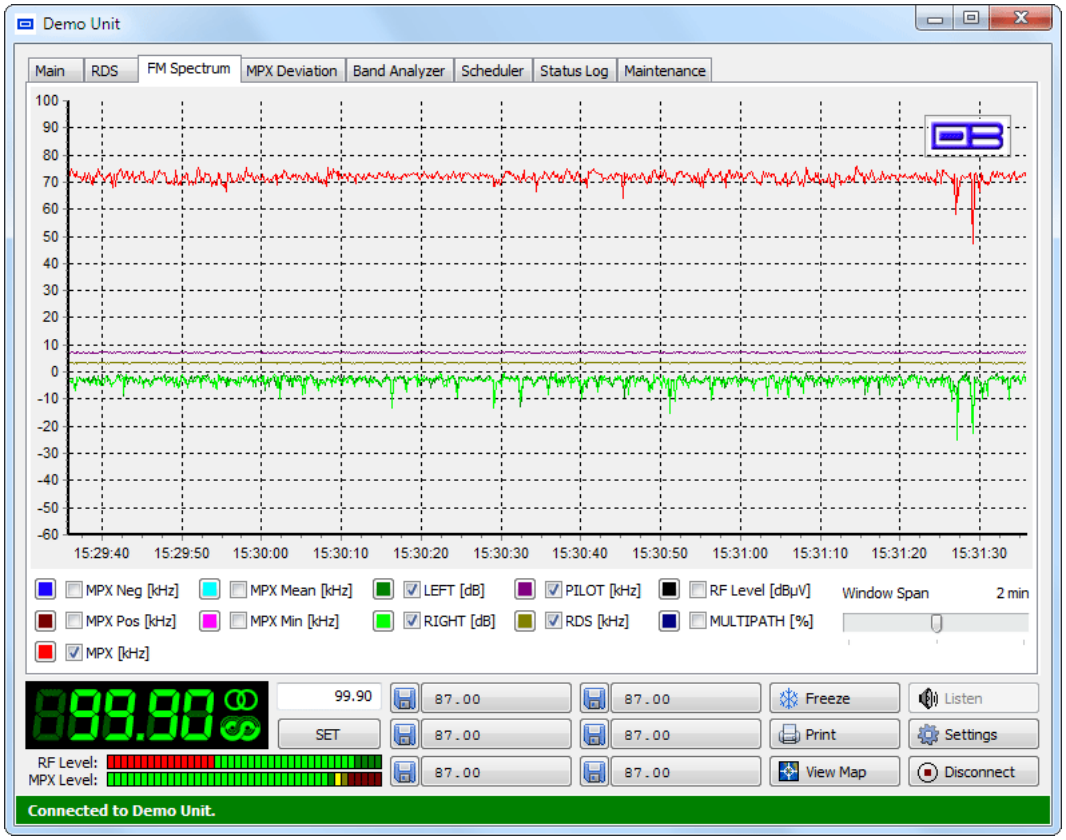
FM SPECTRUM



This screen represents all mandatory parameters in the selected time slice (Window Span).

Each parameter has its own color representation and measurement units, which are visible below the graph. Color can be changed upon clicking on square button at the front of the parameter's name. Units are tuner-dependent i.e. when the Tuner is in RDS mode - MPX, RDS and PILOT reading are in kHz, RBDS mode - %.

Parameters can be shown or hidden by clicking on the corresponding check-box.

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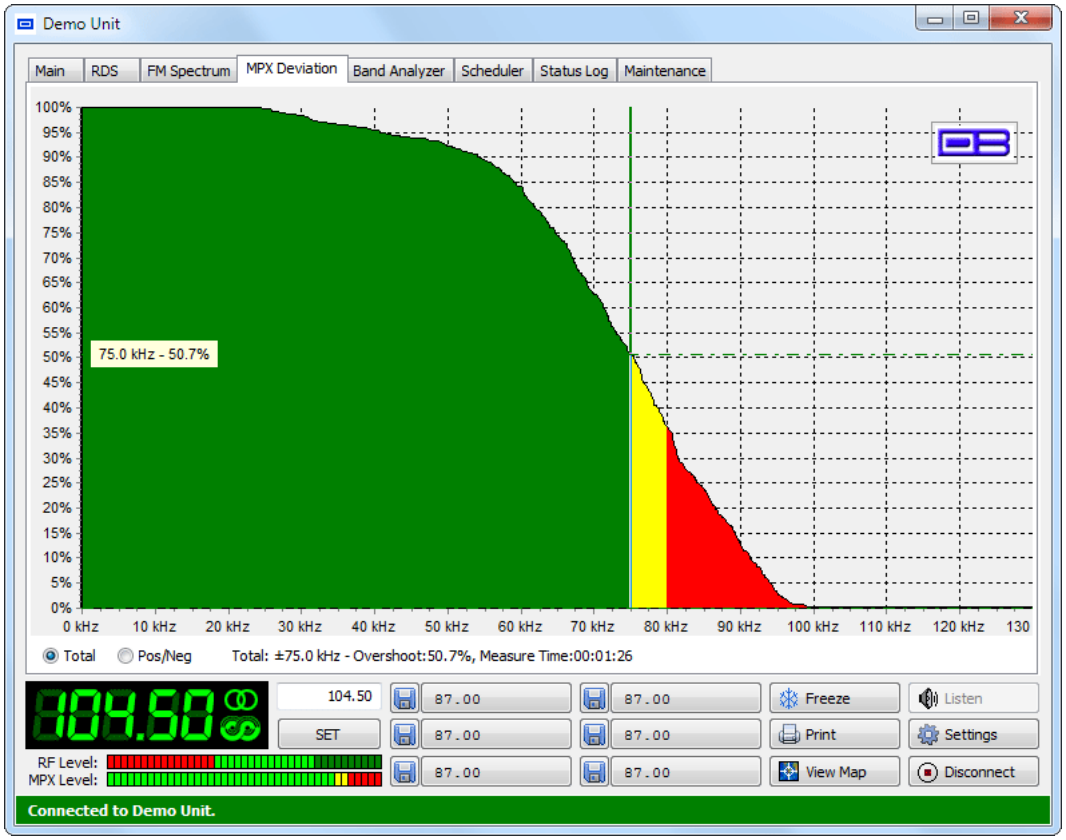
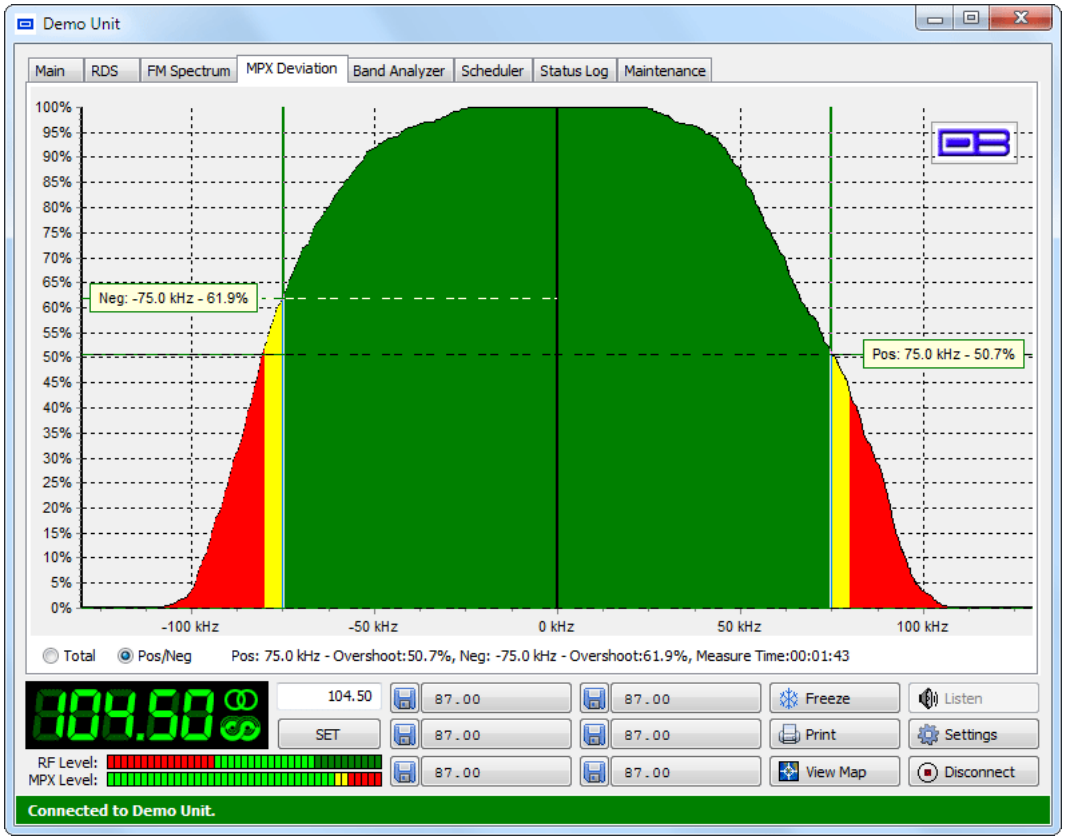
MPX DEVIATION



This screen represents Total MPX Deviation overshoot (in percentage) over time.

Standard overshoot is measured at 75 kHz (see “Thresholds Settings” on page 69) and is indicated with the start of the yellow zone.

User-defined frequency can be selected by moving vertical marker along the horizontal scale. Overshoot will be indicated at the cross-point with the horizontal dotted line.



This screen represents Positive (right) and Negative (left) MPX Deviation overshoot (in percentage) over time.

Standard overshoot is measured at 75 kHz (see “Thresholds Settings” on page 69) and is indicated with the start of the yellow zone.

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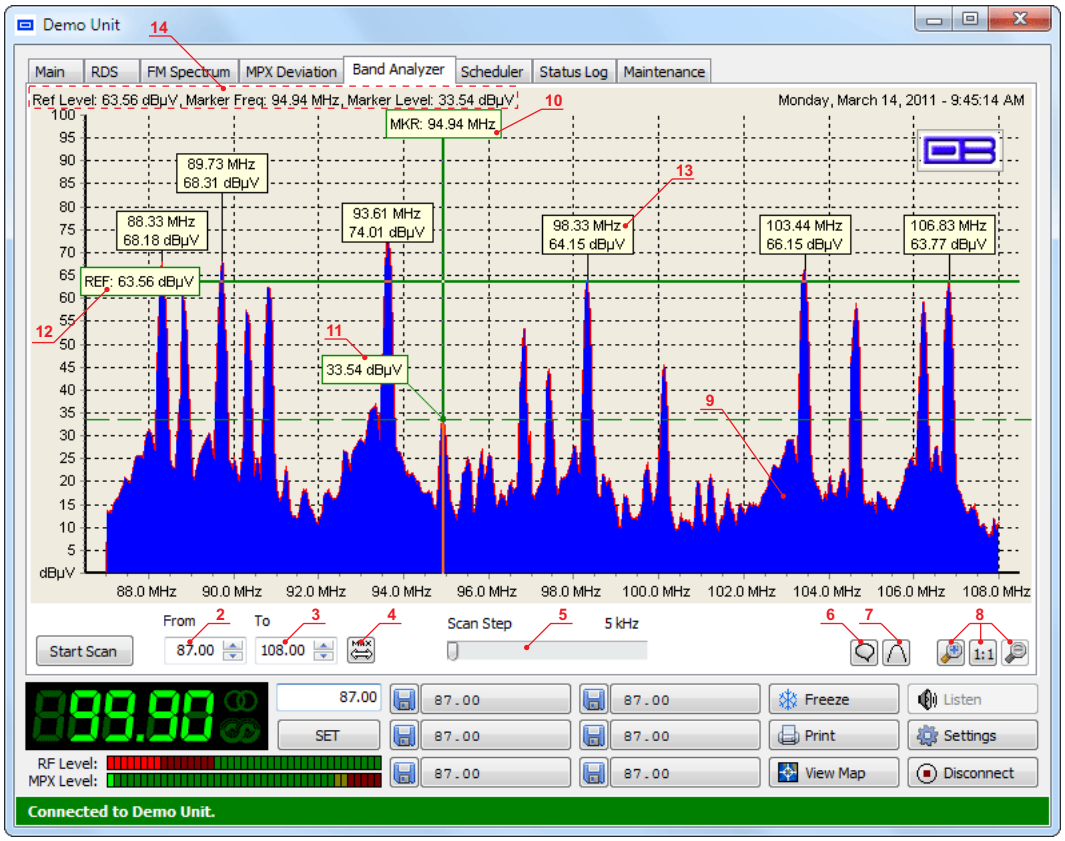
BAND ANALYZER



1. Button for starting scanning process.
2. Starting Frequency.
3. Ending Frequency.
4. Button for Adjusting Starting(2) and Ending(3) frequencies to cover entire FM Band (87-108 MHz)
5. Scan Step - frequency stepping (resolution) through scanning range. The selected step defines the scan speed vs. scan details.
6. Button for enable/disable the Balloons above peaks.
7. Button for switching between ‘smooth’ and ‘rough’ spectrum.
8. Zooming Control.
9. FM Band Spectrum. The horizontal scale shows the frequencies, the vertical - their levels measured.
10. Marker - By moving Marker along the Band Spectrum, frequency and corresponding level are being displayed into the information field (14).
11. Marker Cross-point - displays corresponding level of the Marker.
12. Reference Level Marker.
13. Information Balloon.
14. Information Field:
- Ref Level – level under the Reference Marker;
- Marker Freq – frequency under the Marker;
- Marker Level – corresponding level of the frequency under the Marker;

Band Analyze Basics

The first step of the Analyze Process is the defining the “zone for analyze”. Band Spectrum itself, as a result from the Scan Process, defines the left and right edges of the “zone for analyze”. Selecting the reference level, by moving the Reference Marker, defines the bottom of the zone, while the top is defined by the maximum level measured.

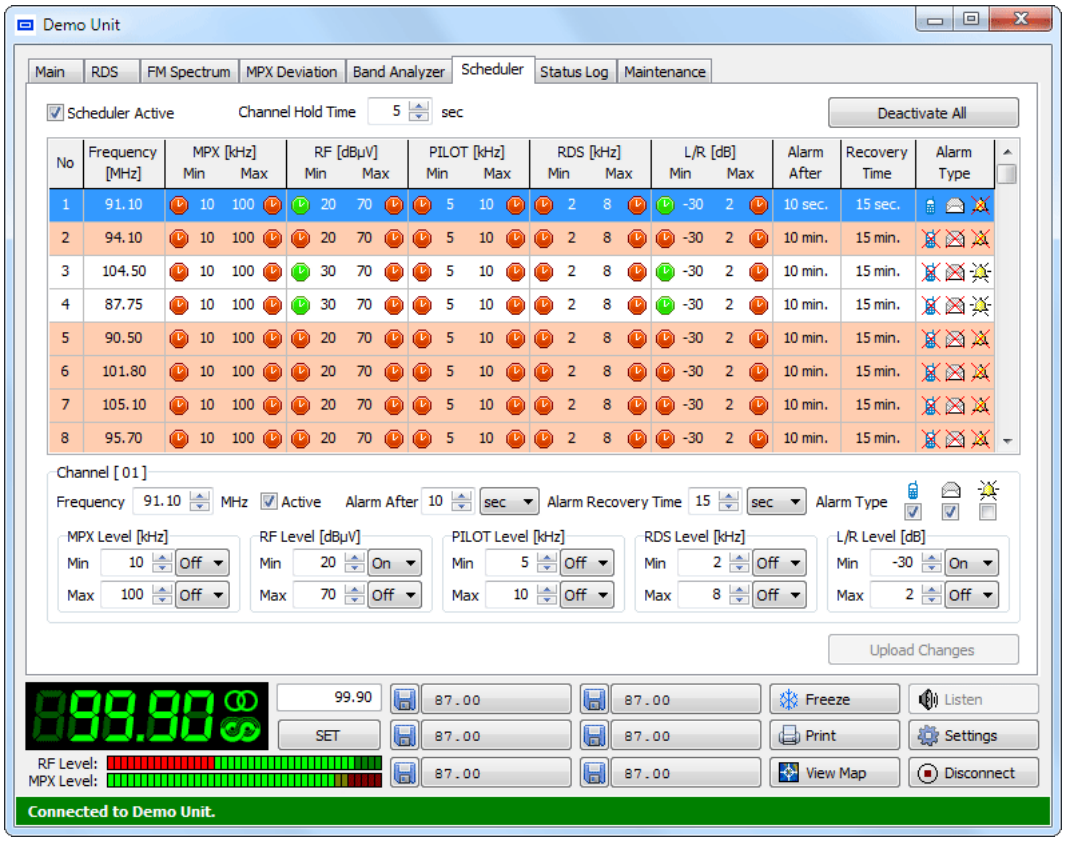
While adjusting the Reference Marker, all the peaks within the “zone for analyze” are automatically calculated and Information Balloon, holding peak frequency and RF Level, is showed above.

Band Analyzer Supplements

Information Balloons could be rearranged by moving them up and down with the mouse.

Double click near peak tunes the Device according to peak frequency. Corresponding balloon over the peak is colored as active.

SCHEDULER



This screen is available only if Device is registered as Logger.

Scheduler Active - enables/disables 'Logger Mode' of the device;
NOTE: Disabling Scheduler do not forbid Channel Editing.

Channel Hold Time - defines time interval before switching to next channel;

Here are listed all (50) channels with their individual settings.

In the table above is visible a brief information about every channel. Lines colored in red shows that corresponding channel is disabled from Monitoring List. Clocks beside minimum and maximum threshold values represent ON and OFF state of the Threshold Alarm. Icons for the Alarm Type respectively shows when GSM, E-mail, SNMP Notifications are enabled/disabled.

Below the channel list is situated editing place for the currently selected channel. Every field is self-explanatory. Refer to hardware manual for channel settings and Logging Mode operations.

NOTE: Changes are showed immediately in the table above, but will be uploaded to the device only when the 'Upload to Device' button is pressed. Additionally user will be notified while trying to navigate to different tab and changes are not uploaded to device. While there are no changes made, 'Upload to Device' button will be disabled.

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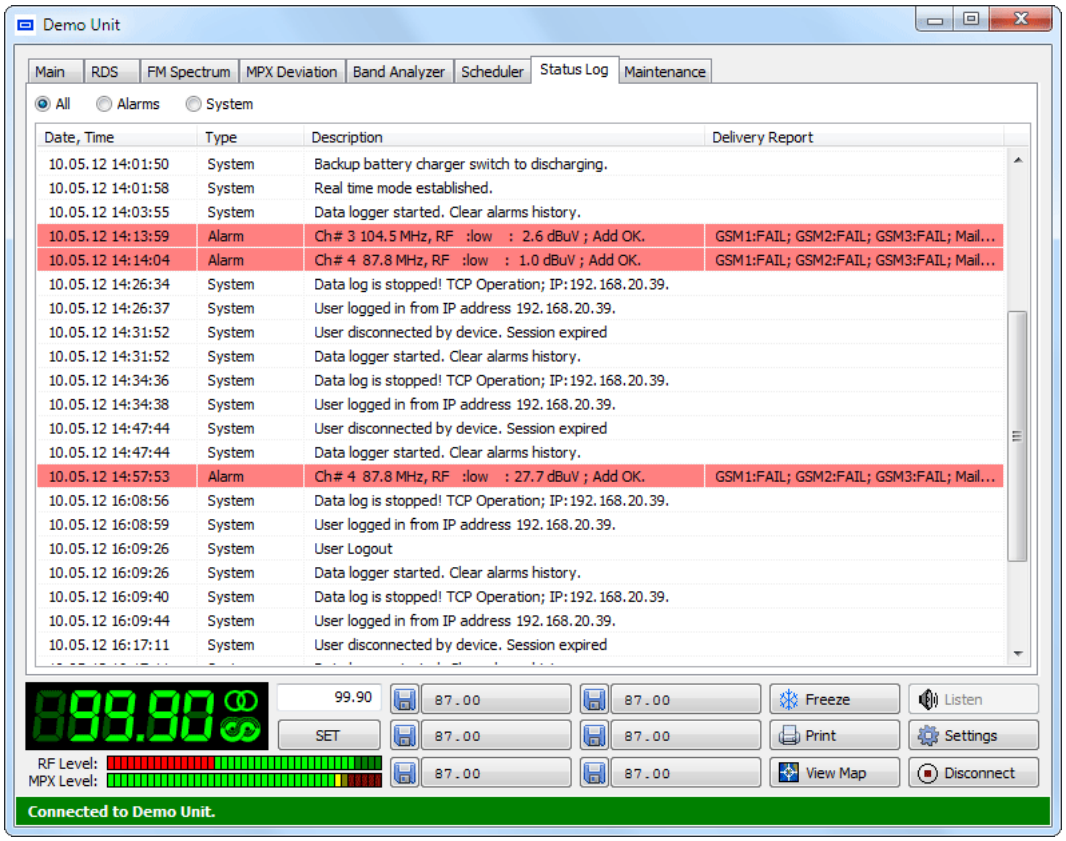
STATUS LOG

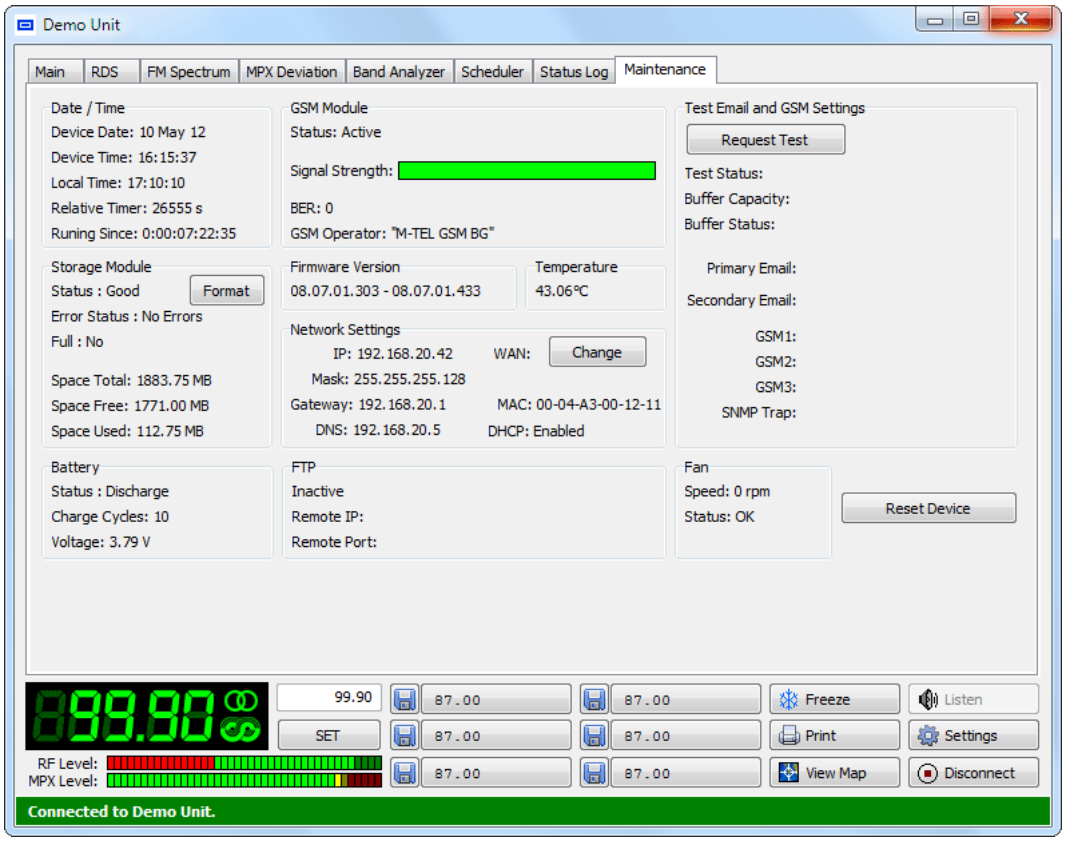


This screen is available only if Device is registered as Logger.

Here are listed Device System Events as well Alarms generated. Alarm entries are color-coded by delivery status - green for success, red for fail. List could be filtered by Alarm or by System type events.

Status Log retention is 2 days.

MAINTENANCE



This screen shows maintenance information about device.
All information is helpful for service personnel and has relation only to device condition.
From here can be readied MAC and WAN Address when is necessary.
Device may be set in 'Cold' state by pressing the 'Reset Device' button. Do not overuse!!!

Resetting Device and Formatting Storage Module are critical operations and to avoid accidental events the functions are password protected.
For Reset Device : @dmin
For Format : form@t

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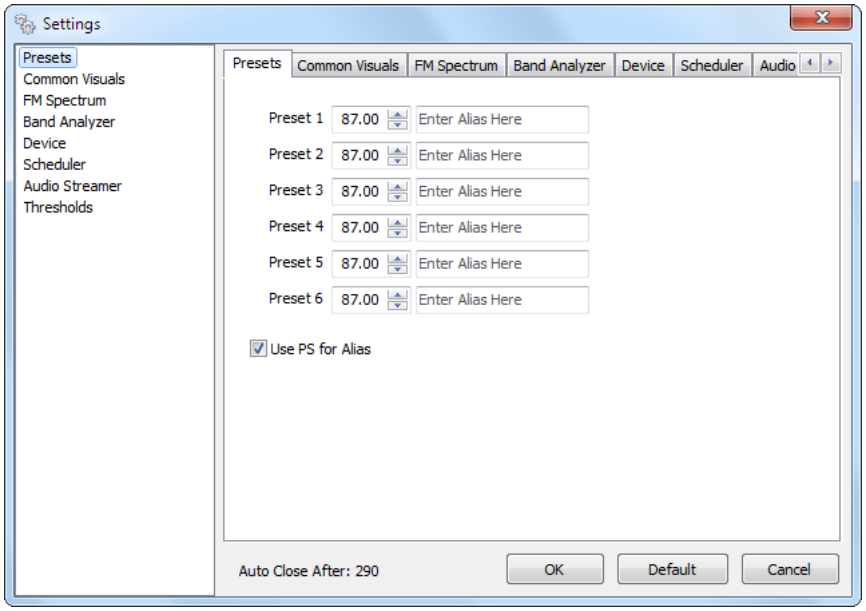
Local Device Settings

IMPORTANT: All Settings except Device Settings are stored Locally on the PC where the software is installed. The Device Settings are saved within device to guarantee equal experience from everywhere.

PRESETS

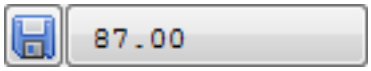


Up to 6 easy to access memory presets can be assigned here. Frequencies assigned, correspond directly to the quick preset buttons situated along with the rest of the tuner controls. Intended to serve as a quick access to 6 favorite stations, preset button needs no more than a click. Presets can be assigned from here as well as from Quick Save buttons. Saving and Recalling is very easy which explains why they are “Quick Presets”.

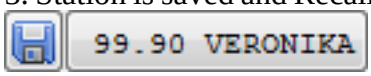
Here is an example:

1. Tune to desired station

2. Press one of the Save Preset buttons



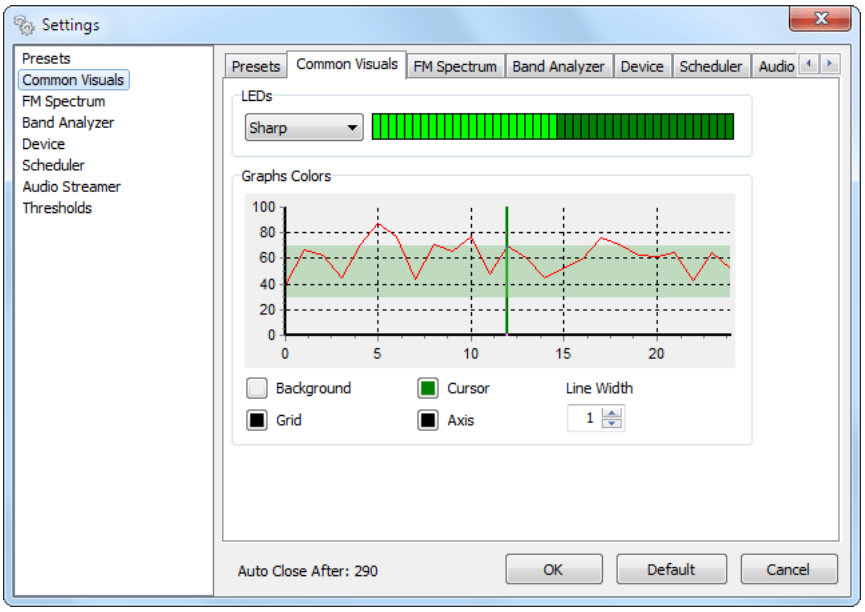
3. Station is saved and Recall button (right next to pressed Save button) is changed immediately



4. To recall saved station, simply press Recall button which holds the frequency of the desired station.

If option ‘Use PS for Alias’ is checked PS will be placed automatically when ‘Save Preset’ button is pressed, but only if RDS data is available. Otherwise Recall button will be labeled only with the frequency.

COMMON VISUALS

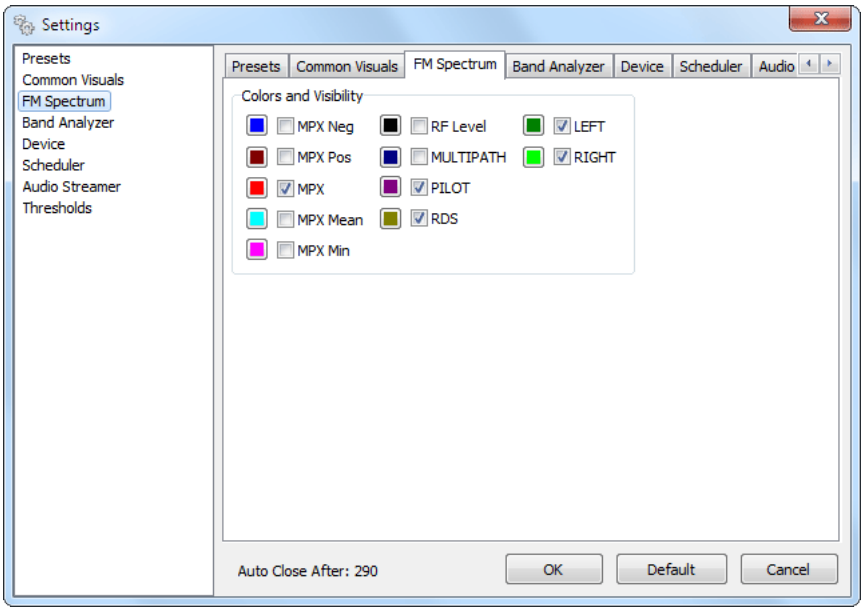


LEDs - select visual appearances for LEDs:

 - Sharp  - Semi-Sharp  - Semi-Clear  - Clear

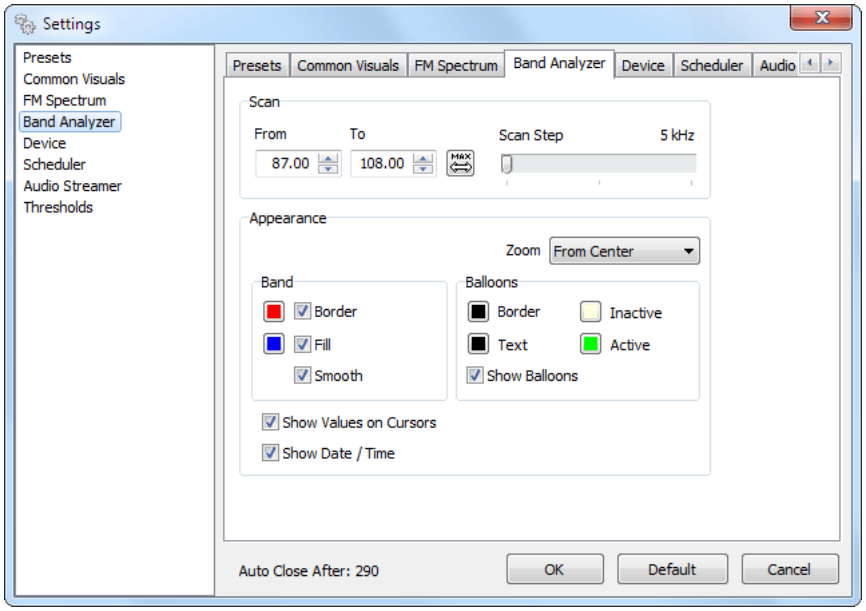
Graph Colors - coloring of the Graphs interior.

FM SPECTRUM SETTINGS



Every FM spectrum parameter has its own color representation, which are visible on the FM Spectrum graph. Colors can be changed upon clicking on square button in front of parameter's name. Parameters can be visible or hidden by clicking on corresponding check-box. (see "FM Spectrum" on page 55)

BAND ANALYZER SETTINGS



Scan

From - Starting frequency of scanning range;

To - Ending frequency of scanning range;

Scan Step - frequency stepping through scanning range - 5, 10 or 15 kHz;

ATTENTION: Small Steps produces more accurate Band Image, but reduces the speed of evaluation.

Appearance

Zoom - Band Zooming Behaviour:

- From Center - Visible area is expanded/shrinked starting from Band Center;
- From Marker - Visible area is expanded/shrinked starting from Marker position;

Band:

- Border - defines border color and visibility;
- Fill - defines fill color and visibility;
- Smooth - performs interpolated smoothing of Band Image;

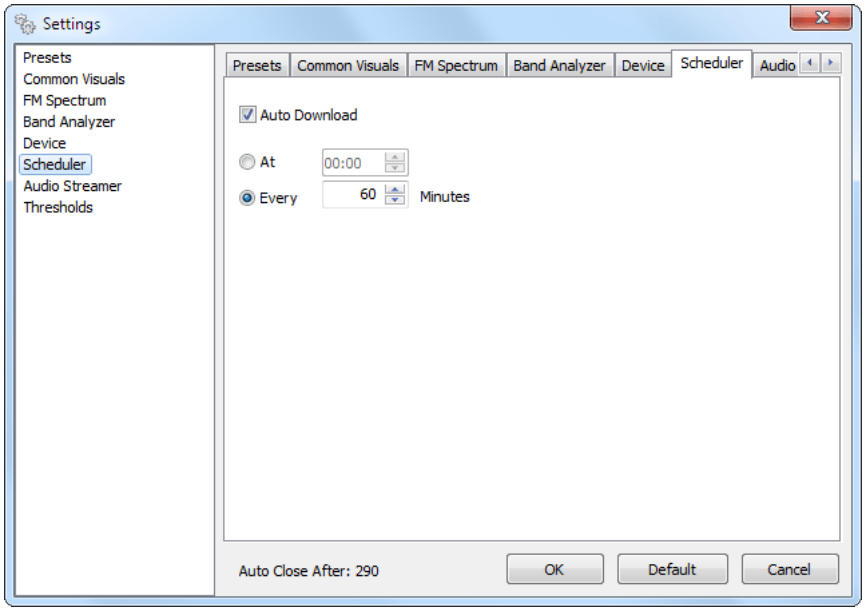
Balloons:

- Border - defines border color;
- Text - defines color of the text inside the balloon;
- Inactive - defines fill color when balloon is inactive;
- Active - defines fill color when balloon is active;
- Show Balloons - Show/Hides Balloons over Band Peaks. (see “Band Analyzer” on page 58);

Show Values on Cursors - shows immediate value under cursor beside cursor name.

Show Date / Time - shows current date and time information.

LOG MANAGER SCHEDULER

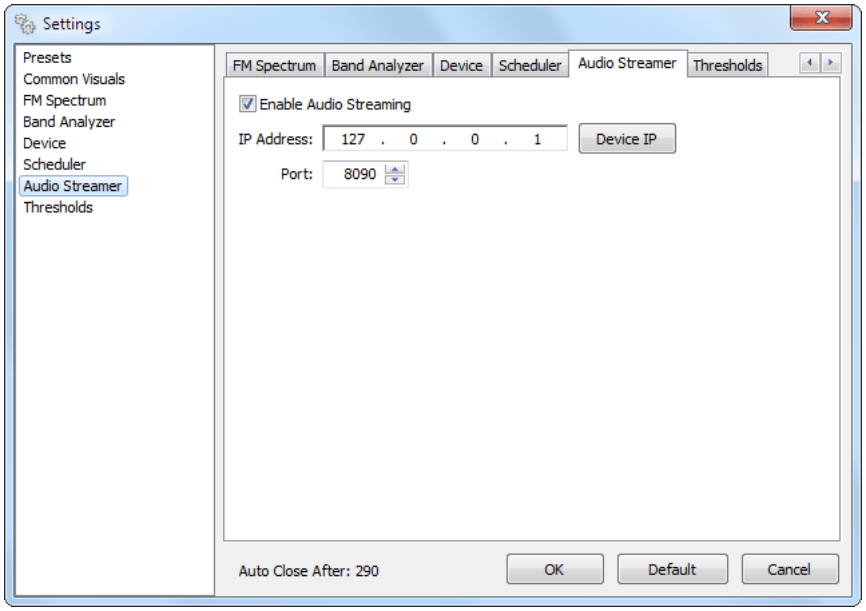


When “Auto Download” is checked, Software automatically will enqueue the Device to be downloaded either “at” specified time or “on every” XX minutes.

(see “LOG Manager” on page 78)

ATTENTION: Audio Streaming Settings are not disabled when optional Streamer is missing, but are unusable until Streamer is attached to device.

AUDIO STREAMING SETTINGS



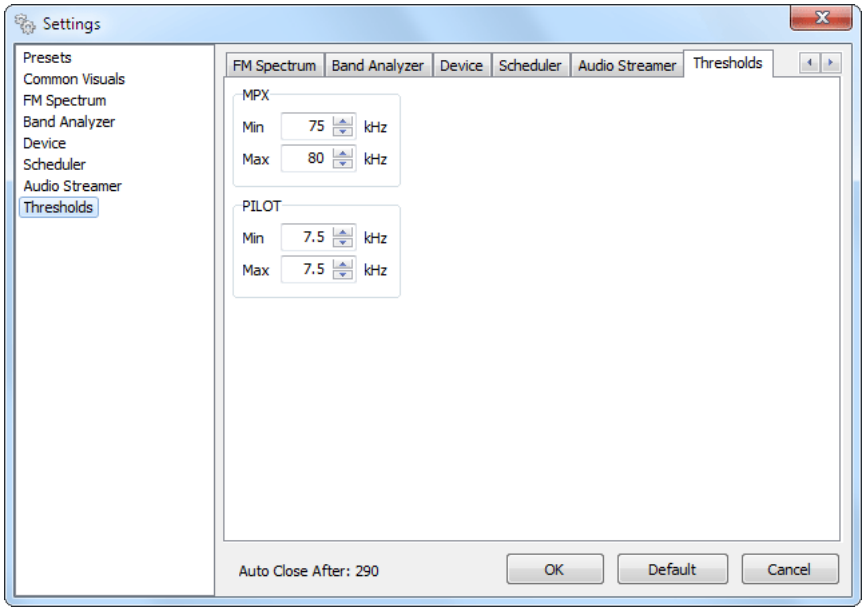
Enable Audio Streaming - enables/disables 

button.

From **IP Address** and **Port** is formed listen address which is passed to audio program.

Device IP - automatically fills current device IP.

THRESHOLDS SETTINGS



MPX - defines boundary for measured parameter. This values affect bargraphs representing MPX values as well MPX Deviation Overshoot graphic.

PILOT - defines boundary for measured parameter. This values affect bargraphs representing PILOT values.

RF Level - defines boundary for measured parameter. This values affect bargraphs representing RF values.

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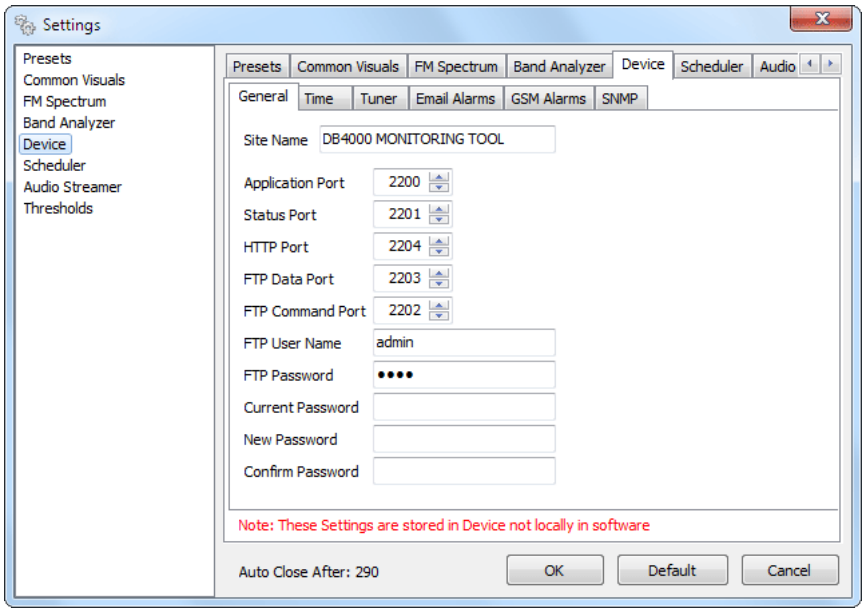
Remote Device Settings

ATTENTION: Remote Settings will be available only when device is registered as Logger.

WARNING: Changes made to Remote Settings will require authentication with the device password.

GENERAL SETTINGS

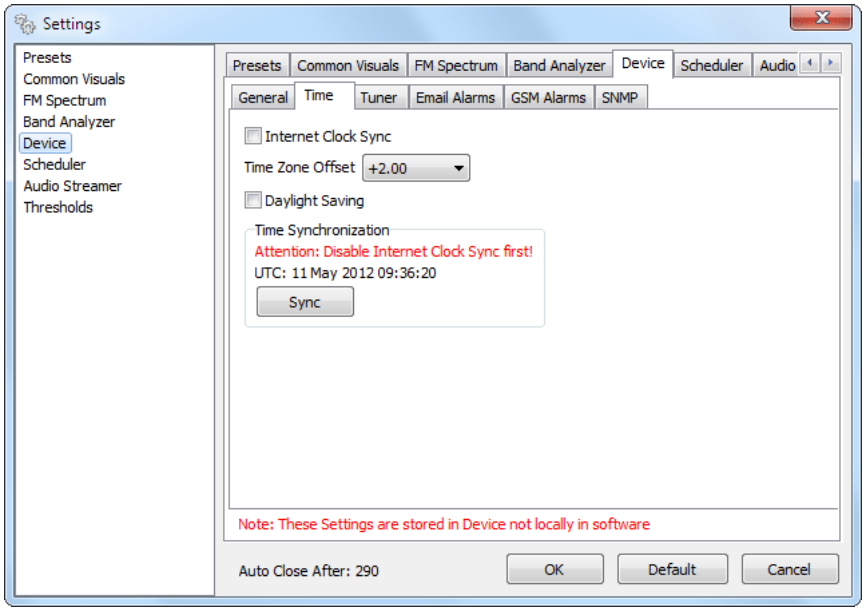


Here can be adjusted device identification for notifications (Site Name), communication properties. Also can be changed device password.

Fields are filled automatically with parameters stored into device, except password, which is required to authenticate changes.

To change password, first type the current password into ‘Password’ field, next type new password into ‘New Password’ field and Confirm it by retyping it again into ‘Confirm Password’ field.

TIME SETTINGS



Internet Clock Sync - enable/disable SNTP time synchronization;

Time Zone Offset - Choose Offset to be added according to your geographic position;

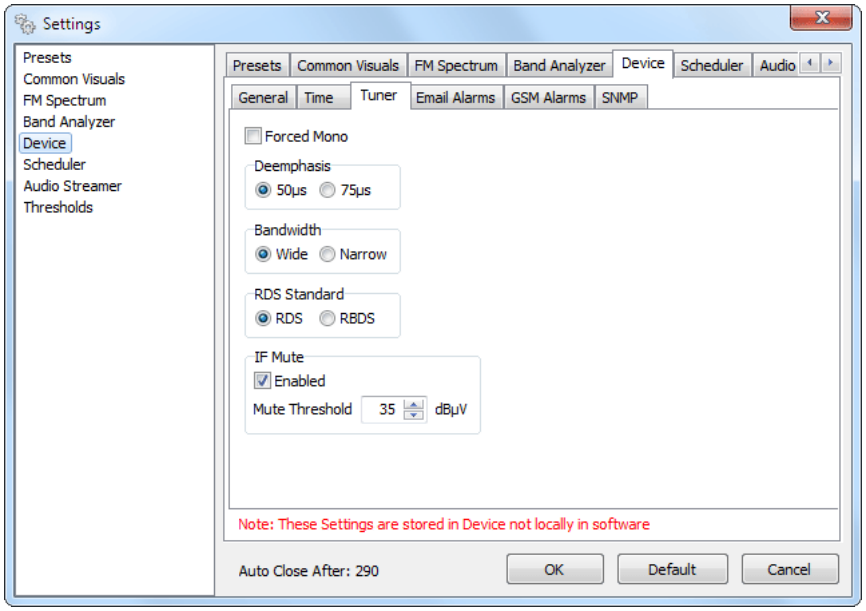
Daylight Saving - enables/disables DST adjustment;

NOTE: Time Zone and DST have sense for the device location, not for where you reside.

Sync - will adjust time according to computer's local date/time, represented in its UTC form. Use only when SNTP is not possible.

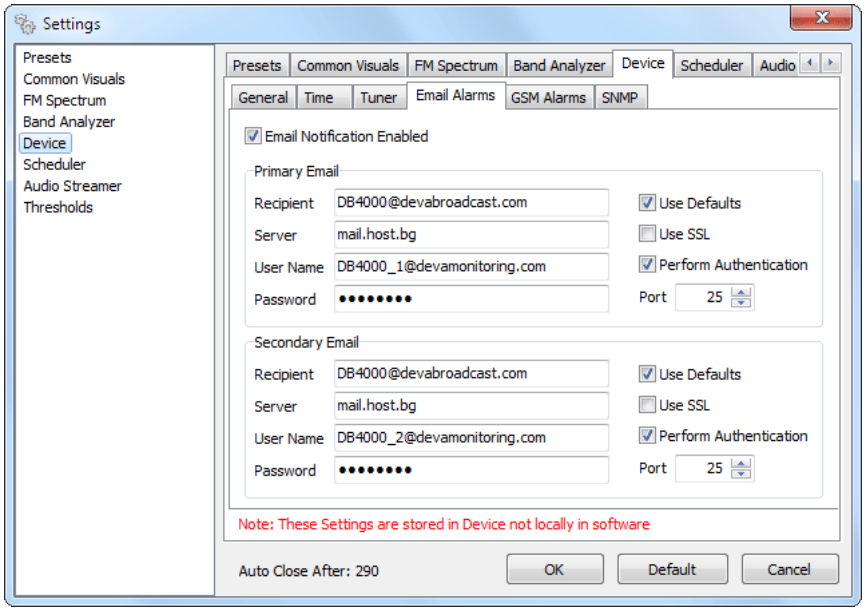
WARNING: Changing any Time Setting will cause Device to ERASE ALL saved log files.

TUNER SETTINGS



Here can be adjusted common Tuner properties.

E-MAIL ALARMS SETTINGS



E-mail Notification Enabled - enables/disables e-mail notification in general, regardless of individual channel settings for notification.

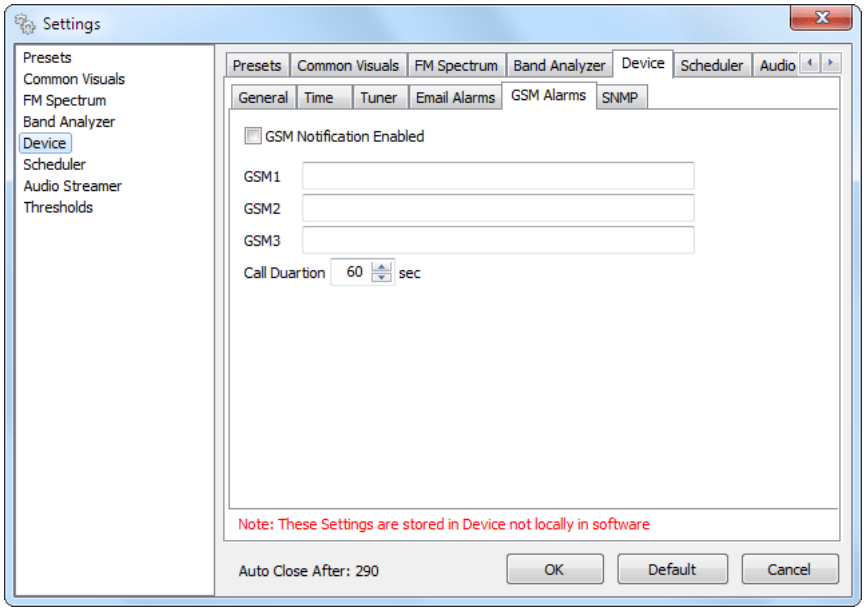
Two independent E-mails can be edited here, consisting of Recipient, Server, User Name and Password.

When Primary E-mail fails for some reason, secondary will be used.

Check appropriate options when the Server used requires to Perform Authentication or/and SSL connection.

ATTENTION: GSM Settings are not disabled when optional GSM modem is missing, but are discarded until GSM modem is attached to device.

GSM SETTINGS



GSM Notification Enabled - enables/disables SMS notification in general, regardless of individual channel settings for notification.

Up to 3 number can be remembered and granted access to Remote GSM Service.

Call Duration - defines maximum duration of each GSM call.

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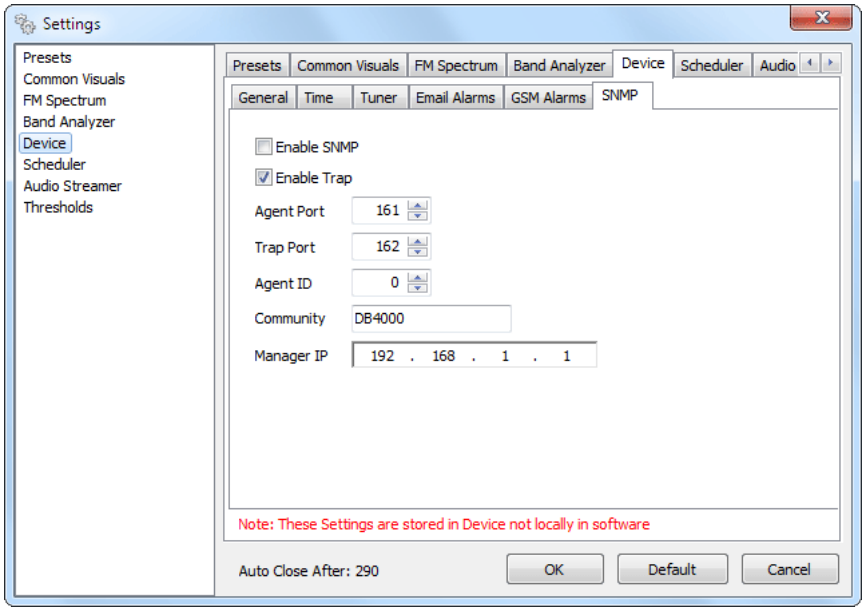
SNMP SETTINGS



Enable SNMP - enables/disables SNMP Agent;

Enable Trap - enables/disables Trap Alerts;

Agent Port - specify port number on which Agent will operate;

Trap Port - specify port number on which Agent will generate Trap Alerts;

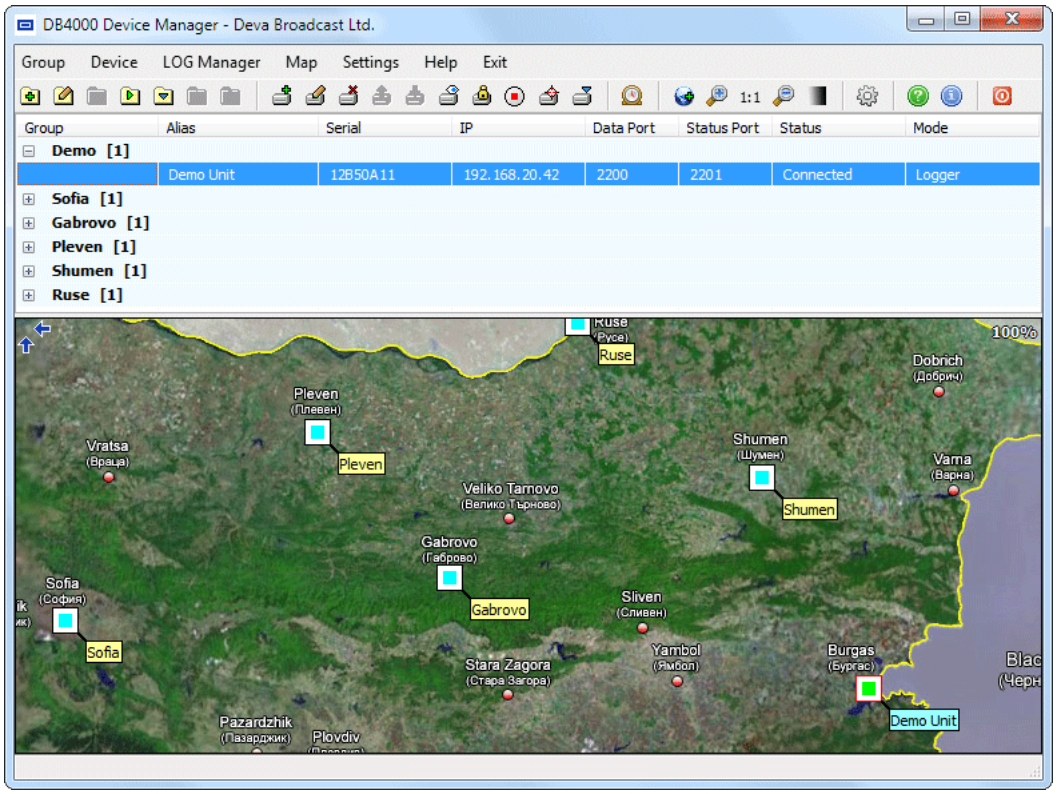
Agent ID - device specific number, which must be unique among other devices within same management system, allowing to distinguish devices one to another.

Community - Authentication in SNMP is a password (community string) sent between a Manager and Agent;

Manager IP - address of the Manager who receives notifications.

Map

Map is additional tool for fast evaluation of device conditions by visually representing each device situated on User Defined Picture (Map).



MAP INTERACTIONS

Moving the Map

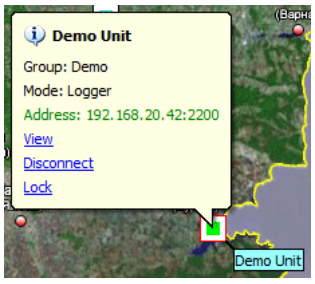
Map could be moved (repositioned) simply by holding mouse button over it (no device under) and moving in desired direction.

Device Reposition

Clck and hold over desired device and drag it to new position, unless device is not locked.

Map Balloons

Hovering mouse over any device will pop-up simplified device balloon:



From this balloon device can be Locked/Unlocked or Viewed (opens "Device Control Window")

To Locate Device on Map from Device Manager:

- press  (Locate on Map Button);
- or select 'Locate on Map' from Device Menu;

Selected device will be positioned in center of Map visual area.

To Locate Device on Map from Device Control Window:

- press 'View Map' button - 

;

To Lock/Unlock Device Position:

- respectively press  (Lock Position Button) or  (Unlock Position Button);
- or select 'Lock Position'/'Unlock Position' from Device Menu;

Lock and Unlock permits each other, i.e. locking the position disables further locking and permits unlocking and vice versa.

Locking the Device prohibits its reposition on the User Map.

Unless User Map is available, Lock and Unlock Position has no practical use.

Map Coloring

Currently Selected Device - Device Rectangle is bordered in red. Device Alias is typed on light blue background;

Idle Status - Device Rectangle filling is light blue;

Connected Status - Device Rectangle filling is green;

Disconnected Status - Device Rectangle filling is red;

Locked Device - small key image is visible at top-left corner of Device Rectangle;

To switch between Color and Grayscale Mode:

- respectively press  (Color Map Button) or  (Grayscale Map Button);
- or select 'Color Map'/'Grayscale Map' from Map Menu

Gray Map is generated automatically, thus only color version is required.

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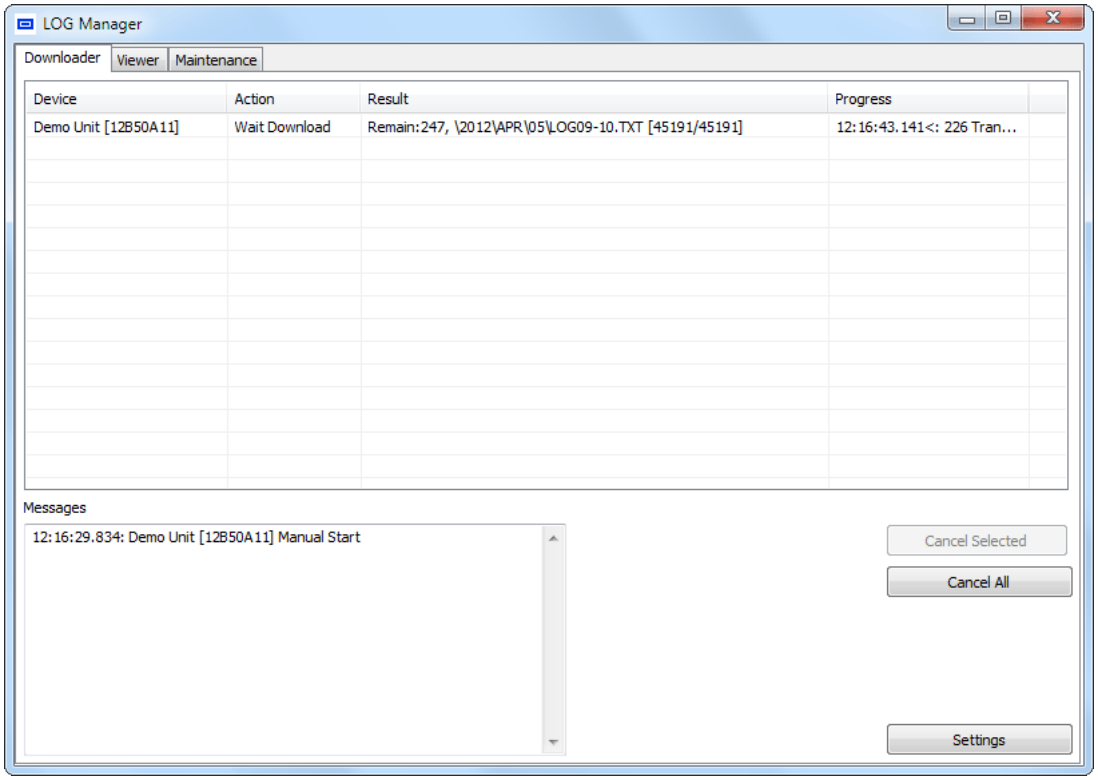
LOG Manager

This is a module which takes care for downloading and visualizing the accumulated log-files from registered devices. LOG Manager operates independently regardless of per-device operations.

DOWNLOADER



Downloader shows currently performed device downloads. Multiple devices could be managed simultaneously either by predefined Scheduling Settings (see “LOG Manager Scheduler” on page 67) or by enqueue manually (see “Download Device” on page 45)(see “Download Group” on page 47).

Each device download is listed in table above, showing current progress.

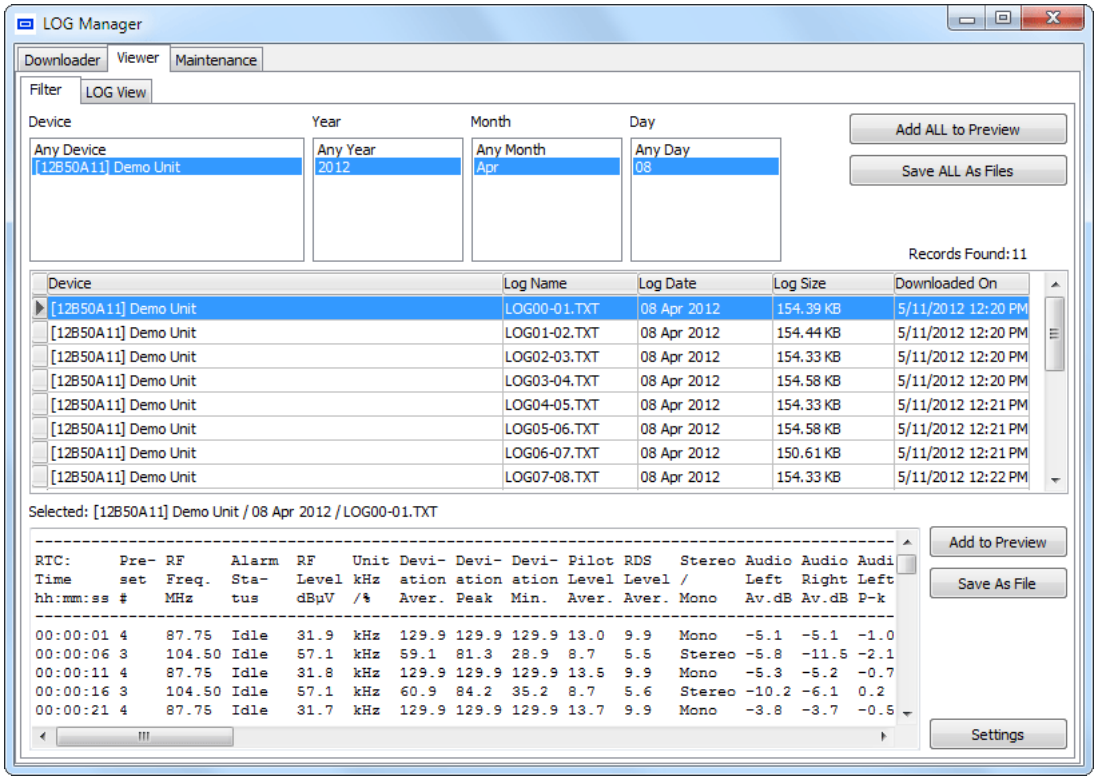
Cancelation of the downloading could be performed by selecting individual device from list and pressing ‘Cancel Selected’ button or by pressing ‘Cancel All’ button to cancel all downloads at once.

NOTES:

All devices will be checked for their current status, but only devices registered as ‘Logger’ will be processed further for log download.

Downloader will skip duplicated files. This could be consequence from cancelation or ‘Keep Files’ option (see “Downloader Settings” on page 83).

FILTER



Filter is prerequisite step before collected information from devices will be loaded for visualization.

Here are showed all available LOGs, downloaded previously from devices.

To visualize single LOG, first select Filter criteria, then select desired entry from listed below. Next press 'Add to Preview' button and "LOG View" will be showed with visualization of selected LOG.

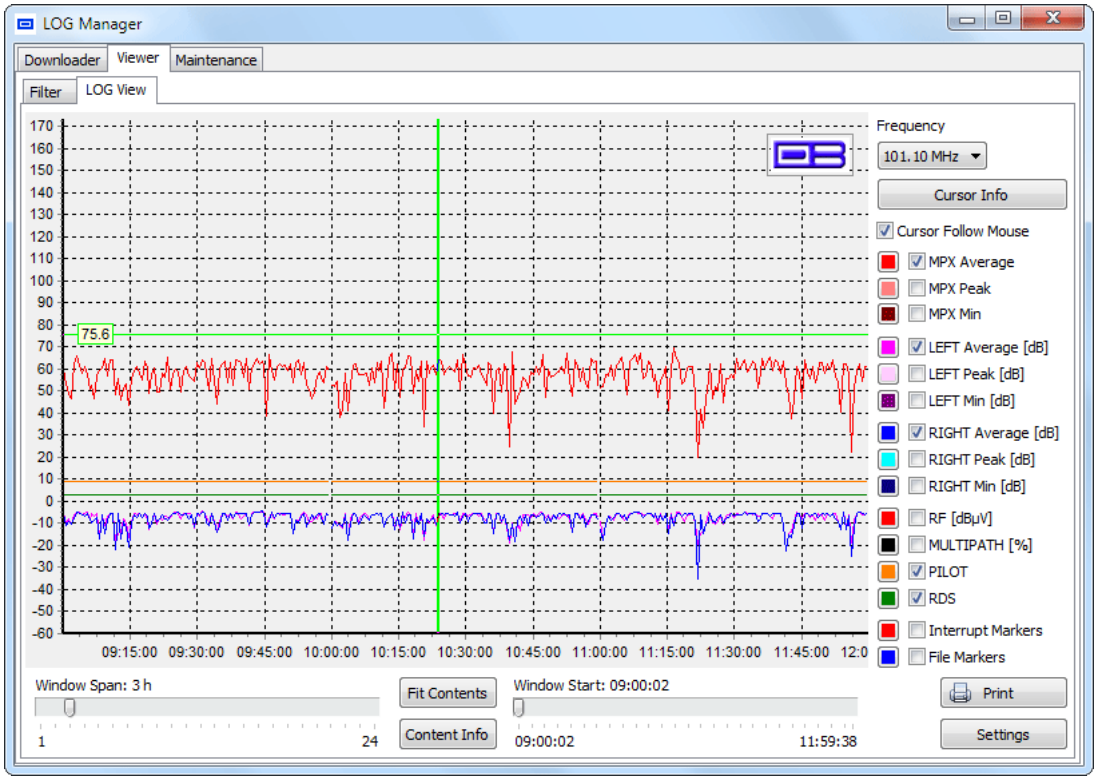
To visualize whole day, Filter 'Filter' requires to be selected exactly 'one day for one device'. First select Device, next Year, then Month and at last Day. You will be automatically prompted about loading information for visualization. If confirmed, LOGs will be loaded into viewer and showed up, otherwise you can use the 'Add to Preview'/'Add ALL to Preview' button to do so. 'Add ALL to Preview' button will be disabled if filter rule (one day for one device) is not met.

Additionally LOG-files could be saved using 'Save As File'/'Save ALL As Files' button into user-selected folder.

NOTE: 'Save ALL As Files' do not care about filter rule and will export all LOGs listed in table above. In this manner you can export, for example, entire month or year.

Beside visualization, each LOG file could be examined in its raw form (visible at the bottom).

LOG VIEW



Here are visualized LOGs selected with 'Filter'.

Graph represents values over time of all selected parameters.

Depending on Channel Settings (see "Scheduler" on page 60) multiple frequencies may be available and may be selected from '**Frequency**' drop-down.

Every parameter on the graph may be toggled and colored independently using corresponding check-box and color button.

Cursor Info - brings-up Cursor Info Tool.
Cursor Follow Mouse - enables cursor to follow mouse, or to be manually dragged.
Interrupt Markers - shows position of every interruption market into log-file.
File Markers - shows position of end of file and begin of next.
Fit Content - automatically adjusts 'Window span' to fit all available data into view.
Window Span - defines how many hours of data will be visible at once.
Window Start - defines starting time of visible window.
Content Info - shows information which LOG files are included into visualisation.

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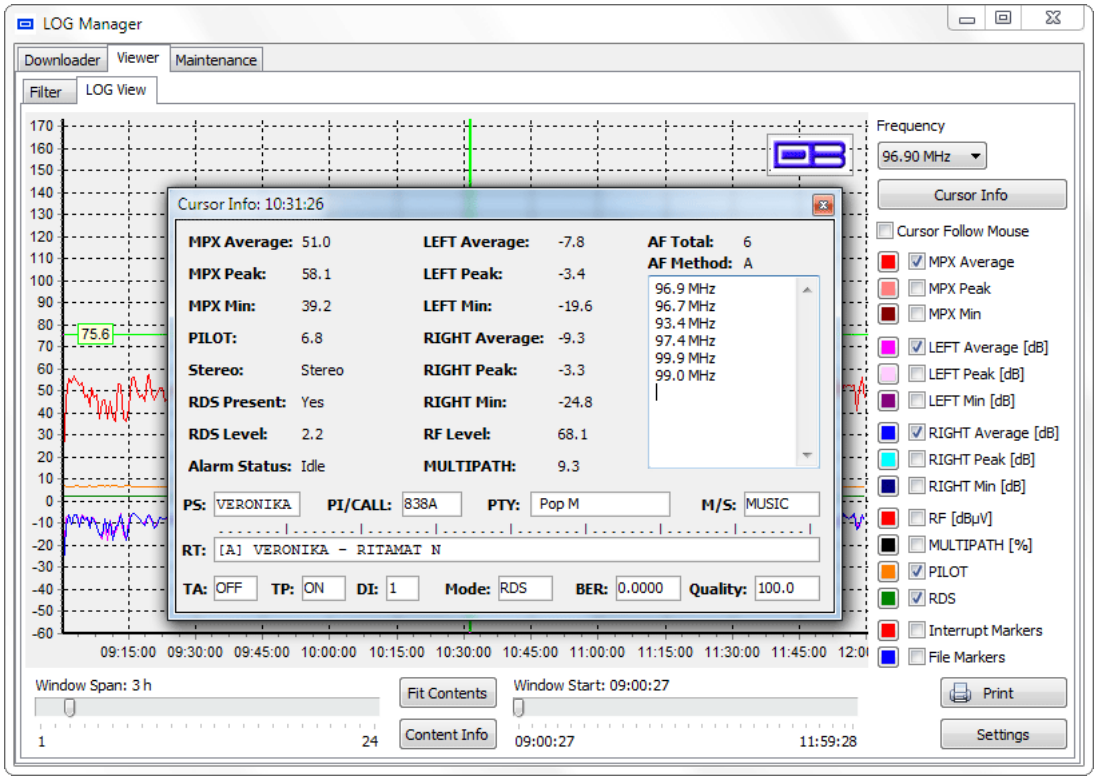
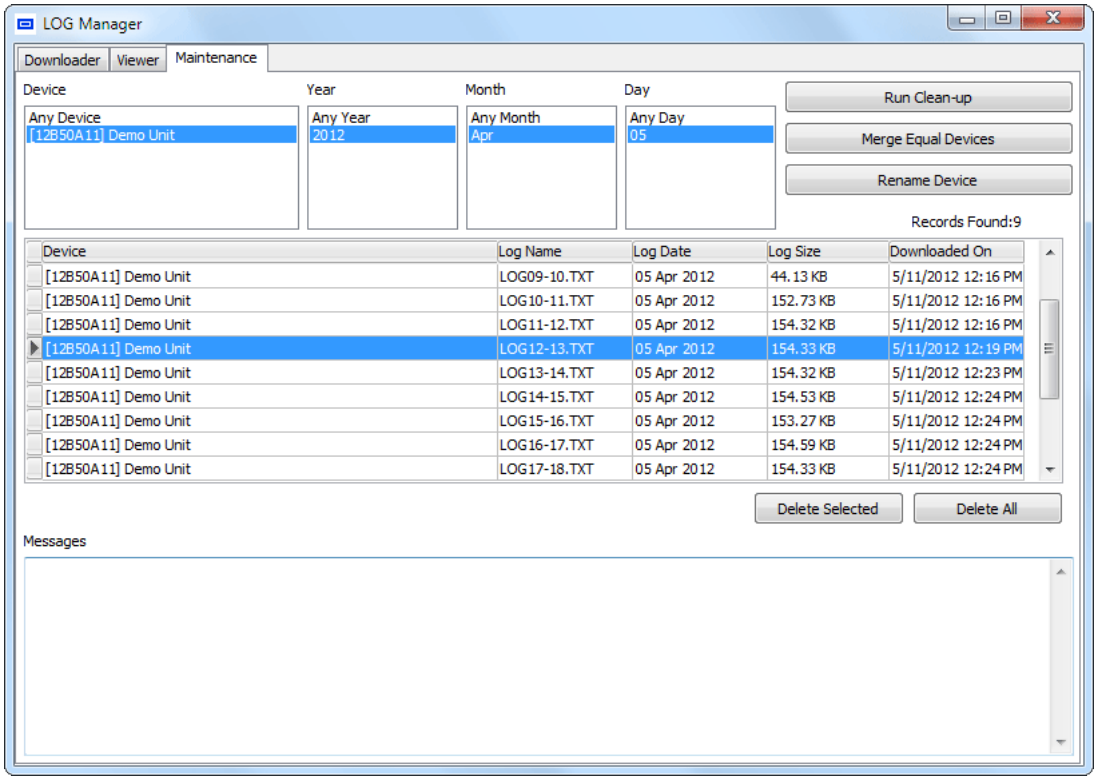
CURSOR INFO TOOL



Here is showed all information under the cursor.

NOTE: Cursor Info Tool always stays on top of other windows.

MAINTENANCE



Here are listed all available LOGs, downloaded previously from devices. Similarly to 'Filter' LOGs are filtered out depending on choosen criteria.

Run Clean-up will perform cleanup of the database, cleaning 'garbage' accumulated over time.

Devices within 'LOG Manager' are not directly bonded with those in Device Manager List, which means that removing device from one place will not automatically remove same device from other. This may lead to some confusion as non-existent devices or device with two names.

Use **Merge Equal Devices** to equlize devices, which exist with two different names (devices are unique by their serial number).

To rename particular device, select it from device list and press **Rename Device** button. Note that renaming device here will not affect Device Alias into Device Manager List, thus future downloads will be associated again with Device Alias.

To remove one or group of LOGs use **Delete Selected** or **Delete All** button.

ATTENTION: Make sure to save LOGs beforehand - manually or automatically (see "Downloader Settings" on page 83). To prevent accidental loss, deleted LOGs are automatically archived into 'backup' folder.

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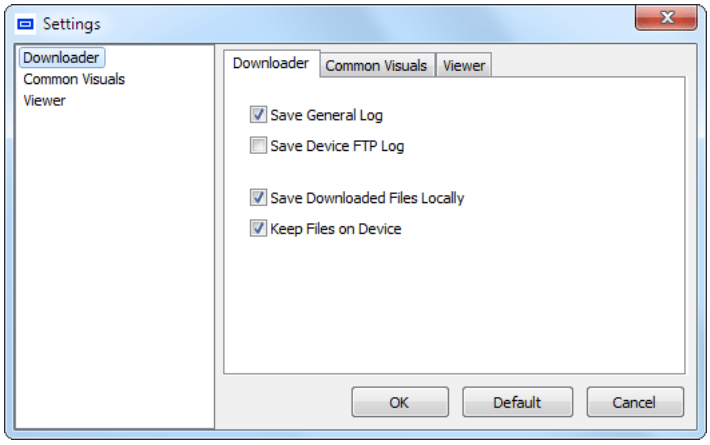
Log Manager Settings

DOWNLOADER SETTINGS



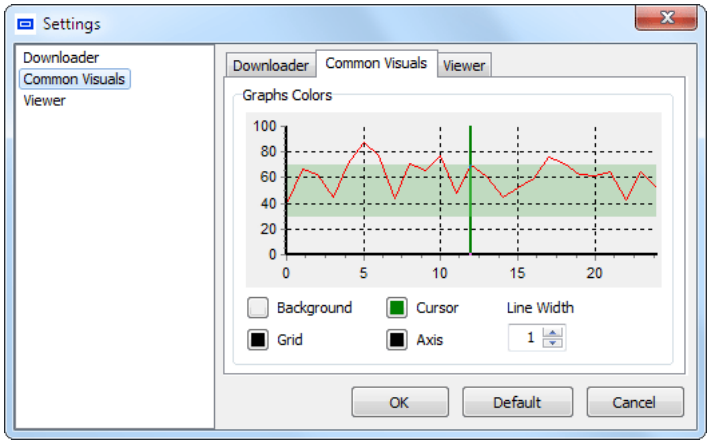
Save General Log - log file (LogMngr.log) ,with general information about downloader operations, will be saved under 'Logs' folder within software installation folder.

Save Device FTP Log - separate log for FTP opertions on every device will be saved.

Save Downloaded Files Locally - every downloaded file will be saved automatically in its raw form, in separate folder (within software installation folder) formed by device alias and log date.

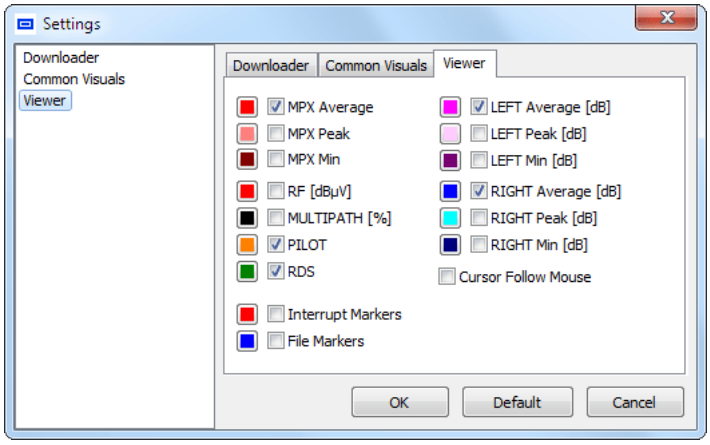
Keep Files on Device - Downloader will not perform deletion of LOGs on device.

VISUAL SETTINGS



Coloring of the Log View Graph interior.

VIEWER SETTINGS



Every FM spectrum parameter has its own color representation, which are visible on the Log View graph. Colors can be changed upon clicking on square button in front of parameter's name. Parameters can be visible or hidden by clicking on corresponding check-box.

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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 one-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_____

Adress 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).

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