MAINTENANCE AND OPERATION
INSTRUCTION MANUAL

Band Scanner

FM BAND SPECTRUM ANALYZER AND
RDS/RBDS DECODER-READER

R·D·S
RADIO DATA SYSTEM

DEVA®
BROADCAST

Contents

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Product Description

The “Band Scanner” is a simple, low-cost scanning receiver for FM market analysis. This is a market monitoring tool intended to Station engineers, Managers and Program Directors. The “Band Scanner” can create detailed play list reports for any station broadcasting artist and song title information with Radio Text. Managers and Program Directors can compare their own RDS text rotations to other stations in the market. Engineers can monitor real-time field intensity data for any station, as well as review strip charts for analysis of the entire band. Precision MPX peak deviation meter is included in the product. It plugs into the USB port of any PC, and with the supplied Windows® software it sweeps the FM band and logs every signal it comes across. An easy-to-read spectrum display shows carrier level vs. frequency, and stations with an RDS or RBDS presence may be analyzed to show data in all Radio Data groups. Powered by a laptop’s USB connection, the Band Scanner becomes an easy-to-use field tool. The Band Scanner allows the broadcast engineers to decode and analyze all the RDS features with maximum ease and at a minimum of expense. Originally, the Radio Data System developed for use in the U.S. was called the Radio Broadcast Data System, or “RBDS”, to differentiate it from the European RDS standard. Differences between the two systems were gradually reconciled, and the term “RDS” can be legitimately applied to the system as practiced worldwide.

Product Features

- FM Band 87 – 108 MHZ Spectrum analyzer
- MPX deviation meter
- External composite MPX and RDS input
- Built-in Stereo decoder
- Auto search tuning
- Headphones audio output
- Full feature RDS and RBDS decoder
- RDS/RBDS Groups Detector
- RDS/RBDS Groups Analyzer
- RDS/RBDS stream BER meter
- RDS/RBDS Data Logger
- View playlists of the competitive stations
- Saving and exporting the playlists to Excel file
- Compare the signal strength to competitors and other stations
- Pocket size USB powered box. No external power supply required
- Tracking all the detailed histories saved in the RDS Data Log
- TCP/IP Remote management and control via Internet
- Remote audio listening and logging via Internet

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Product Specifications

FM receiver	
FM frequency	87.0-108.0 MHz
RDS sensitivity	0 error at Vrf=-90dBµV, 4KHz RDS deviation, no modulation
Strong fields	AGC
RF level evaluation	+/- 4dB from 20°C to 30°C, from 20dBµV to 80dBµV without modulation
Dynamic	0 to 84dBµV
Attenuator	6dB built-in
MPX level	
Measurement validity	RF level preferably > 50dB
Multiplex level	Peak level displayed, 1000 samples over 1 second
Accuracy of MPX deviation display	+/- 5KHz, +/- 2KHz typ
FM Antenna input	
Connector	'F' on rear panel
Impedance	75 ohms
External attenuator	No
FM Multiplex input	
Connector	BNC, Impedance = 50 Kohms
Max input level	5000mV p-p
Stereo decoding	
Stereo separation	>20dB
Typical separation	Approximately 26dB to 35dB
RDS data decoding	
Standards	European RDS CENELEC United States RBDS NRSC
Error Correction	Yes
Group counting	Yes
Error counting	Yes
AF decoding	Yes
CT	Yes
PI, PTY, DI, MS	Yes
TA/TP	Yes
RT	Yes
PS	Yes
EON	Yes
PTYN	Yes
SLC	Yes
ODA	Yes
Frequency program memories	
FM Tuner Presets	5 frequencies
Measurement storage	
Storage	LOG file
Data formats	Microsoft Excel compatible format (csv)

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User interface	
Indicators	3 LEDs, front panel
Headphone output	1/8'' (3.5mm) phone jack, rear panel
Operating conditions	
Equipment operational between	10° and 40°C
EMC immunity	6V/m
Headphones output	
Connector	Stereo, 1/8" (3.5mm) phone jack
Volume	Fixed
Communication	
Type	USB 2.0 compatible
Connector	B-type, front panel
Power Requirement	
Power supply	USB powered
Connector	B-type, front panel
Size and Weight	
Dimensions (W x H x D)	2.5" x 1" x 3.5"
Weight	2 lbs

MPX/RDS SAMPLE UNIT

This unbalanced input is getting the composite/MPX output from the stereo generator. An MPX level between 0.5 and 5 volts p-p is required, this level referenced to 100% modulation (±75kHz carrier deviation). In the event that the stereo generator is incorporated as part of the exciter, such that a Composite/MPX feed is not available, a direct RDS encoder signal may also be applied to this input.

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RDS APPLICATIONS SUPPORTED

AF - Alternative Frequencies list
The list(s) of alternative frequencies give information on the various transmitters broadcasting the same program in the same or adjacent reception areas, and enable receivers equipped with a memory to store the list(s), to reduce the time for switching to another transmitter. This facility is particularly useful in the case of car and portable radios.

CT - Clock Time and date
Time and date codes should use Coordinated Universal Time (UTC) and Modified Julian Day (MJD). If MJD = 0 the receiver should not be updated. The listener, however, will not use this information directly and the conversion to local time and date will be made in the receiver's circuitry. CT is used as time stamp by various RDS applications and thus it must be accurate.

DI - Decoder Identification and dynamic PTY indicator
These bits indicate which possible operating modes are appropriate for use with the broadcast audio and to indicate if PTY codes are switched dynamically.

ECC - Extended Country Code
RDS uses its own country codes. The first most significant bits of the PI code carry the RDS country code. The four bit coding structure only permits the definition of 15 different codes, 1 to F (hex). Since there are much more countries to be identified, some countries have to share the same code which does not permit unique identification. Hence there is the need to use the Extended Country Code which is transmitted in Variant 0 of Block 3 in type 1A groups and together with the country identification in bits b15 to b12 of the PI code render a unique combination. The ECC consists of eight bits.

EON - Enhanced Other Networks information
This feature can be used to update the information stored in a receiver about program services other than the one received. Alternative frequencies, the PS name, Traffic Program and Traffic Announcement identification as well as Program Type and Program Item Number information can be transmitted for each other service. The relation to the corresponding program is established by means of the relevant Program Identification. Linkage information, consisting of four data elements, provides the means by which several program services may be treated by the receiver as a single service during times a common program is carried. Linkage information also provides a mechanism to signal an extended set of related services.

EWS - Emergency Warning System
The EWS feature is intended to provide for the coding of warning messages. These messages will be broadcast only in cases of emergency and will only be evaluated by special receivers.

IH - In House application
This refers to data to be decoded only by the operator. Some examples noted are identification of transmission origin, remote switching of networks and paging of staff. The applications of coding may be decided by each operator itself.

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M/S - Music Speech switch
This is a two-state signal to provide information on whether music or speech is being broadcast. The signal would permit receivers to be equipped with two separate volume controls, one for music and one for speech, so that the listener could adjust the balance between them to suit his individual listening habits.

ODA - Open Data Applications
The Open Data Applications feature allows data applications, not previously specified in EN 50067, to be conveyed in a number of allocated groups in an RDS transmission. The groups allocated are indicated by the use of type 3A group which is used to identify to a receiver the data application in use in accordance with the registration details in the EBU/RDS Forum - Open Data Applications Directory, and the NRSC Open Data Applications Directory.

PI - Program Identification
This information consists of a code enabling the receiver to distinguish between countries, areas in which the same program is transmitted, and the identification of the program itself. The code is not intended for direct display and is assigned to each individual radio program, to enable it to be distinguished from all other programs. One important application of this information would be to enable the receiver to search automatically for an alternative frequency in case of bad reception of the program to which the receiver is tuned; the criteria for the change-over to the new frequency would be the presence of better signal having the same Program Identification code.

PIN - Program Item Number
The code should enable receivers and recorders designed to make use of this feature to respond to the particular program item(s) that the user has preselected. Use is made of the scheduled program time, to which is added the day of the month in order to avoid ambiguity.

PS - Program Service name
This is the label of the program service consisting of not more than eight alphanumeric characters, which is displayed by RDS receivers in order to inform the listener what program service is being broadcast by the station to which the receiver is tuned. An example for a name is “Radio 21”. The Program Service name is not intended to be used for automatic search tuning and must not be used for giving sequential information.

PTY - Program TYpe
This is an identification number to be transmitted with each program item and which is intended to specify the current Program Type within 31 possibilities. This code could be used for search tuning. The code will, moreover, enable suitable receivers and recorders to be pre-set to respond only to program items of the desired type. The last number, i.e. 31, is reserved for an alarm identification which is intended to switch on the audio signal when a receiver is operated in a waiting reception mode.

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PTYN - Program TYpe Name
The PTYN feature is used to further describe current PTY. PTYN permits the display of a more specific PTY description that the broadcaster can freely decide (e.g. PTY=4: Sport and PTYN: Football). The PTYN is not intended to change the default eight characters of PTY which will be used during search or wait modes, but only to show in detail the program type once tuned to a program. If the broadcaster is satisfied with a default PTY name, it is not necessary to use additional data capacity for PTYN. The Program Type Name is not intended to be used for automatic PTY selection and must not be used for giving sequential information.

RP - Radio Paging
The RP feature is intended to provide radio paging using the existing VHF/FM broadcasts as a transport mechanism, thereby avoiding the need for a dedicated network of transmitters. Subscribers to a paging service will require a special pocket paging receiver in which the subscriber address code is stored.

RT - RadioText
This refers to text transmissions, primarily addressed to consumer home receivers, which would be equipped with suitable display facilities.

TA - Traffic announcement identification
This is an on/off switching signal to indicate when a traffic announcement is on air. The signal could be used in receivers to:

a) Switch automatically from any audio mode to the traffic announcement;

b) Switch on the traffic announcement automatically when the receiver is in a waiting reception mode and the audio signal is muted;

c) Switch from a program to another one carrying a traffic announcement, according to those possibilities. After the end of the traffic announcement the initial operating mode will be restored

TDC - Transparent Data Channels
The transparent data channels consist of 32 channels which may be used to send any type of data.

TMC - Traffic Message Channel
This feature is intended to be used for the coded transmission of traffic information.

TP - Traffic Program identification
This is a flag to indicate that the tuned program carries traffic announcements. The TP flag must only be set on programs which dynamically switch on the TA identification during traffic announcements. The signal shall be taken into account during automatic search tuning.

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Preliminaries

WHAT IS RDS?

RDS is a digital data channel transmitted as a low-level, double-sideband, suppressed-carrier 'subcarrier' at 57kHz. The data transmission rate is a modest 1100 baud, but transmission is quite robust thanks to data redundancy and error correction. It is not within the scope of this Manual to offer a tutorial on RDS coding and modulation details. For this, see either the CENELEC EN50067 or the corresponding United States NRSC Standard. The balance of this Manual deals specifically with RDS implementation afforded by the Band Scanner.

US VS EUROPE

The European Broadcasting Union (EBU) and its member countries developed the concept of transmitting data along with commercial radio broadcasts. The first European RDS specification was published in 1984 and has been revised several times since. Following its introduction, RDS quickly grew in use throughout Europe. By the late 1990s it was nearly universal; that is, it was hard to find a European FM station that did not carry a radio data subcarrier. The popularity of RDS in Europe reflects a 'network' approach to broadcasting that is still practiced in many countries. A disposition toward large numbers of lower-power transmitters to blanket a designated service area can be found both at the national network and at the 'local radio' levels. The European concept of a service area equates to a US broadcaster's market. The semantic difference between these designations further delineates broadcasting practices. RDS benefits the European broadcaster through an almost altruistic endeavor to be of service to his listeners. The US broadcaster is marketing his programming, and is more concerned in how he can make additional profit from RDS and other subcarriers.

UNPACKING AND INSPECTION

Immediately upon receipt of the equipment, inspect for possible shipping damage. If damage is found or suspected, notify the carrier at once, and then contact Deva Broadcast. We recommend that you set aside the original shipping carton and packing materials for possible reuse. In the event of return for Warranty repair, shipping damage sustained as a result of improper packing for return may *invalidate the Warranty*!

IT IS VERY IMPORTANT that you complete and return the Warranty Registration Card included with this Manual. Not only does this assure coverage of the equipment under terms of the Warranty, and provide some means of trace in the case of lost or stolen gear, but also the user will automatically receive specific SERVICE OR MODIFICATION INSTRUCTIONS should these been forthcoming from Deva Broadcast.

RADIO FREQUENCY INTERFERENCE (RFI)

Although we have anticipated Band Scanner installation in the immediate proximity of broadcast transmitters, please do practice some care using the unit away from *abnormally* high RF fields.

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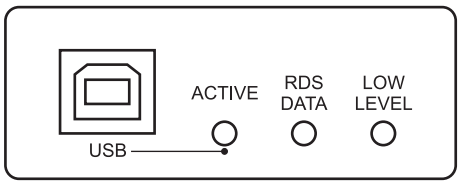
Panel Indicators

FRONT PANEL INDICATORS

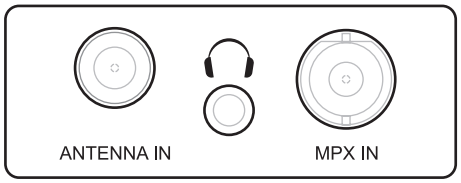


ACTIVE This LED lights whenever the unit is connected to the PC trough USB

RDS DATA This indicator shows that the 57kHz RDS subcarrier is present and RDS data is actually received.

LOW SIGNAL This LED shows that the incoming RF signal of the defined frequency is less that 19dBµV

REAR PANEL APPOINTMENTS



ANTENNA IN The consumer-standard F connector is the ANTENNA IN port

PHONES OUT The 1/8” (3.5mm) phone jack provides the audio signal of tuned station for listening

MPX IN The MPX IN BNC connector must receive a feed of the Composite/MPX signal from the stereo generator.

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Minimal System Requirements

Pentium(R) Processor or Compatible
Windows(R) 98 SE
Windows NT(R) 4 (Service Pack 6)
Windows ME(R)
Windows 2000(R) (Service Pack 2)
Windows XP
Windows Vista
512MB RAM
20MB free hard drive space for installation
16 or 24-bit graphics color depth
1024 by 768 pixels screen resolution
Screen DPI setting to 96 dpi
Universal Serial Bus 2.0

IT IS VERY IMPORTANT to install the supplied software before connecting the Band Scanner to the computer. Be sure to observe this sequence to ensure proper operation.

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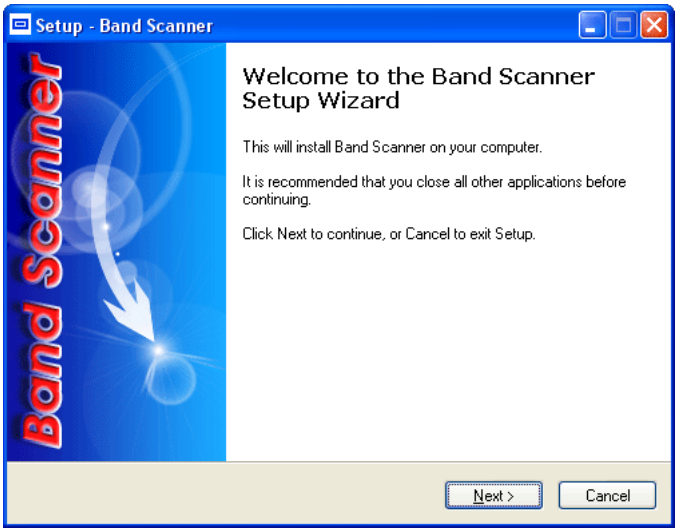
Installing the Software

NOTE: To avoid hardware conflicts and encoder connection problems, install the software before attempting to connect the encoder with the computer.

Insert the supplied CD. The software has an 'autorun' utility to automatically begin the installation routine. However, in the event that the Setup Wizard does not automatically start, click Start, then My Computer, and then double-click the CD Drive (D:). Within folder "Software" double click the file: Band_Scanner.exe 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, but with these exceptions:

1) When prompted to place an icon on the computer Desktop, check the box to do so.
2) At the final step, select NOT to launch the program.
3) Close the software installation utility.

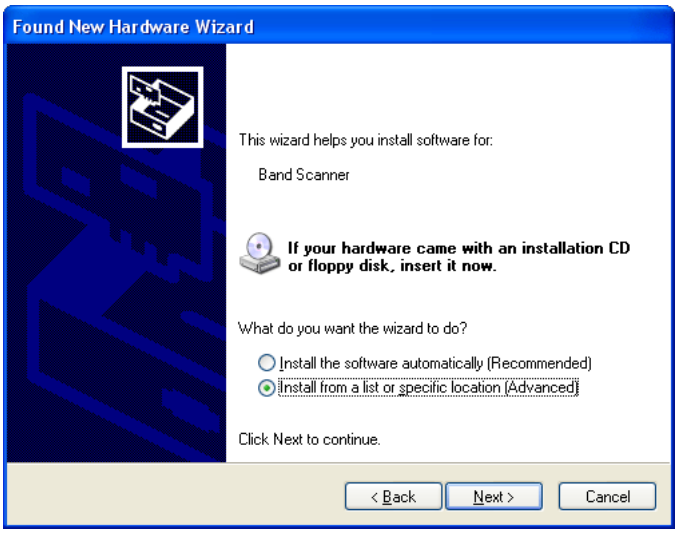
Next, follow the procedure below to install the USB driver.

Once the programming software has been installed on the computer, a special USB port driver must also be installed if that particular computer is ever to address the Band Scanner through the front-panel USB port. The station's 'utility laptop' or other machine used for quick, local encoder programming must have both the programming software and the USB driver installed.

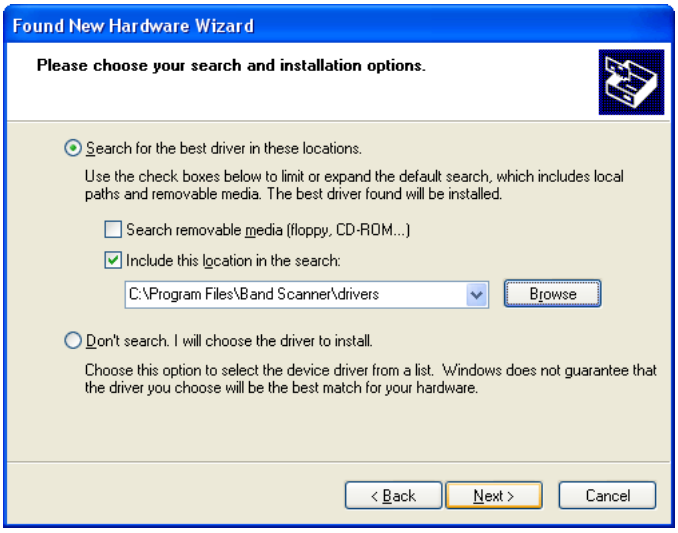
When the software was installed, the USB driver was put into a folder within the Band Scanner program file. With a normal installation (as described above) under Windows® XP, the driver will have been located here: My Computer / Local Disk (C:) / Program Files / Band Scanner / Drivers.

Use the following steps to install this driver:

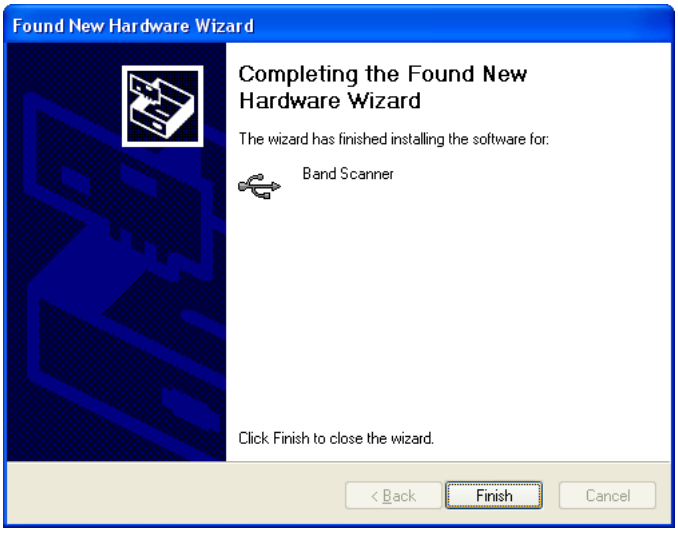
1. With the Band Scanner powered-up, connect the front-panel USB port to the computer using the cable supplied. This should immediately bring up a New Hardware notification above the computer Taskbar and start the Found New Hardware Wizard. Select “No, not this time” and then Next>. Select “Install from a list or specific location (Advanced)” and then Next>.



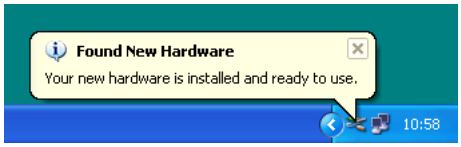
2. This next screen verifies the location of the driver, which resides in folder where the software is installed. Click: Next>.



3. Hardware Wizard will inform you when installation is complete. Click: Finish>.



4. The driver will be installed, and a notification that the hardware is ready to use will appear above the Taskbar.



The software installation will have placed an icon on your computer Desktop. Double-click the icon to start the software.

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Using the Band Scanner

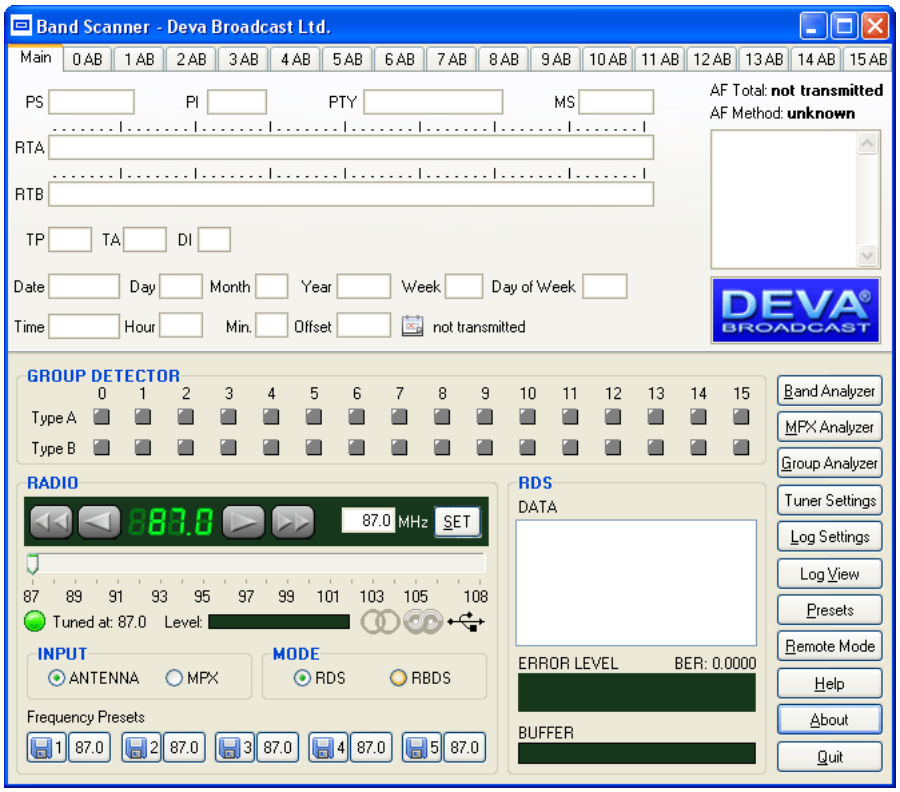
After connecting the Band Scanner to the USB port of any Windows® based PC, it is ready for use and any additional adjustments or settings are not required. In case you would like to measure the band off-air, please connect any external FM antenna to the Antenna In. If any MPX or RDS signal must be analyzed, apply the signal to the MPX/RDS Input.

NOTE: The maximum input RF signal to the Antenna Input is 100 dBµV. Do not connect the Band Scanner directly to any FM Transmitter's MONITOR Output

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

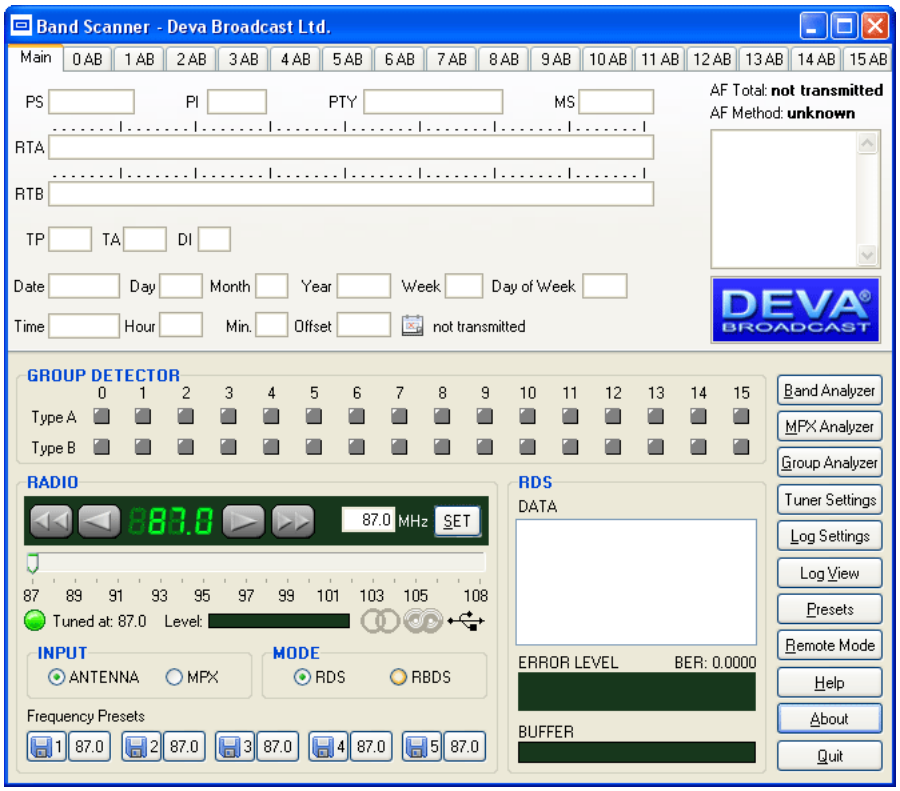
You can launch the program using this shortcut or using Start menu->Programs ->Band Scanner.

If the device is not detected the application software will look like this:



Most of the buttons and functions will be disabled. The USB connectivity indicator will be dimmed too.

After connecting the device to the PC where the software is already installed, the USB indicator will become bright. The software will adjust the unit with the initial data. In case of previous usage of the device, the last settings like frequency and levels will be assigned in the device. If everything is Okay and no problems are detected the software will look like this:



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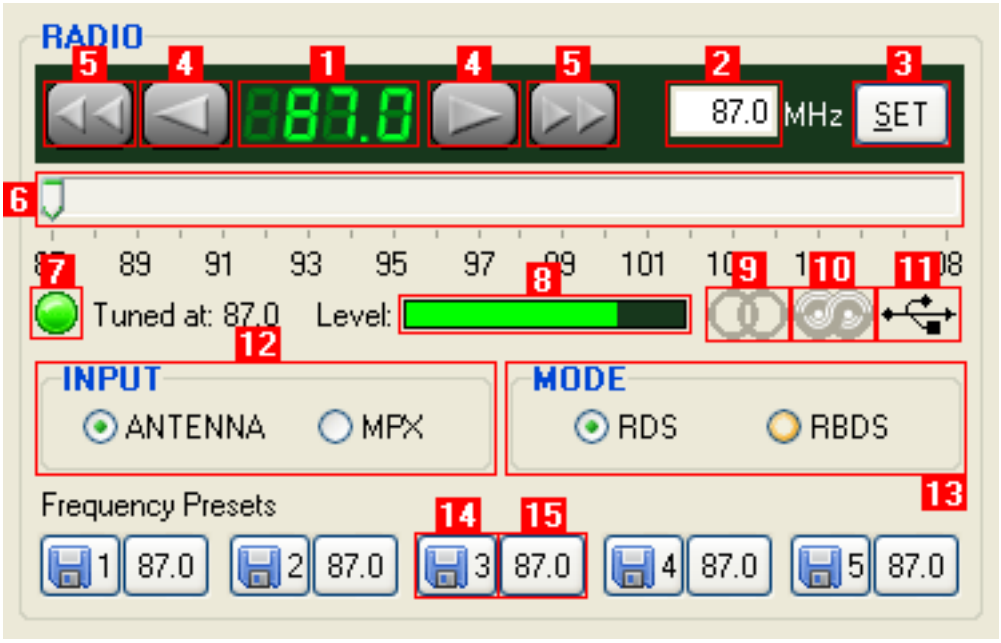
FM Tuner, Modes and Presets



The general management and the most important indications of the Band Scanner are located in this section.

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. UP and DOWN buttons for adjusting the tuner's frequency. For more information about the steps available and more about this section refer to "FM Tuner Settings" Section.

5. SEEK UP and SEEK DOWN Buttons. See also "FM Tuner Settings" section.

6. Slider for manual adjustment of the frequency. The tuner will accept the desired frequency few seconds after any changes were made.

7. PLL Lock Presence Indicator. If it doesn't light, it means that the tuner's PLL is still trying to reach the desired frequency.

8. Field Strength Indicator.

9. Stereo Signal Presence.

10. RDS Signal Presence.

11. USB connection indicator.

12. INPUT Signal Selector – Antenna In or MPX/RDS In.

13. RDS/RBDS Mode Selector.

14. Quick Preset Save buttons. (See Memory Presets)

15. Quick Preset Recall buttons. (See Memory Presets)

NOTE: When the MPX/RDS In is selected, the Band Analyzer and all its features will be disabled.

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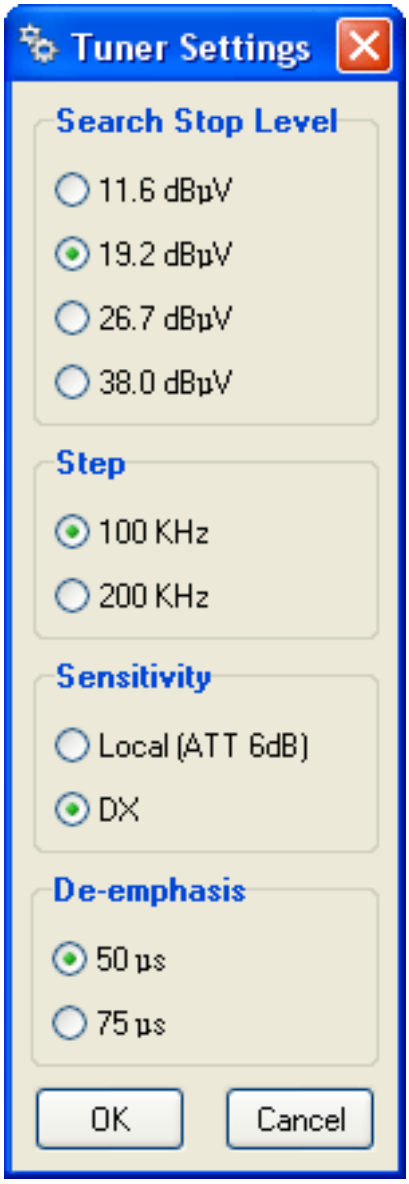
FM TUNER SETTINGS



Search Stop Level – Tuner sensitivity threshold in Auto Search Mode

Step – You can choose the frequency adjustment step. Usually it is 100kHz for Europe and 200kHz for the US

Sensitivity – Sensitivity mode of the input RF signal. The Local mode is recommended in case the tool used is close to the transmitter sites. It will enable 6 dB attenuation of the RF input stage. The DX mode is intended in case when weak signal must be received and analyzed. Using this mode will disable any input attenuation of the RF input.

De-emphasis - Selectable de-emphasis for the Demodulator.

NOTE: The tuner settings are uninfluential when the Band Scanner is used with MPX /RDS input signals.

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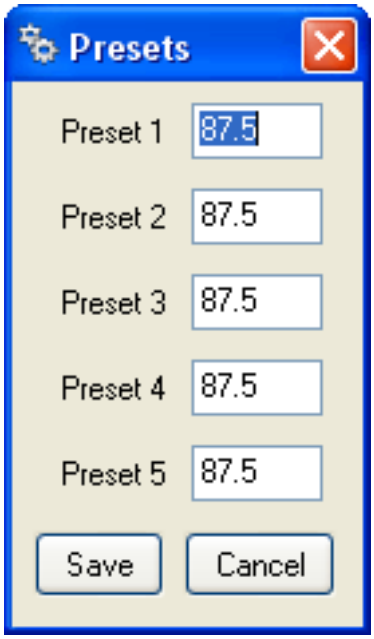
MEMORY PRESETS

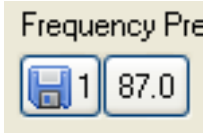


Using this feature you can assign up to 5 easy to access memory presets (See FM Tuner, Modes and Presets - 14,15). Frequencies assigned here, correspond directly to the quick preset buttons situated along with the rest of the tuner controls. Intended to serve as a quick access to 5 favorite stations, 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*".

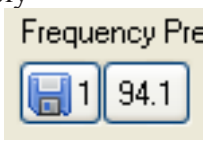
Here is an example:

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.

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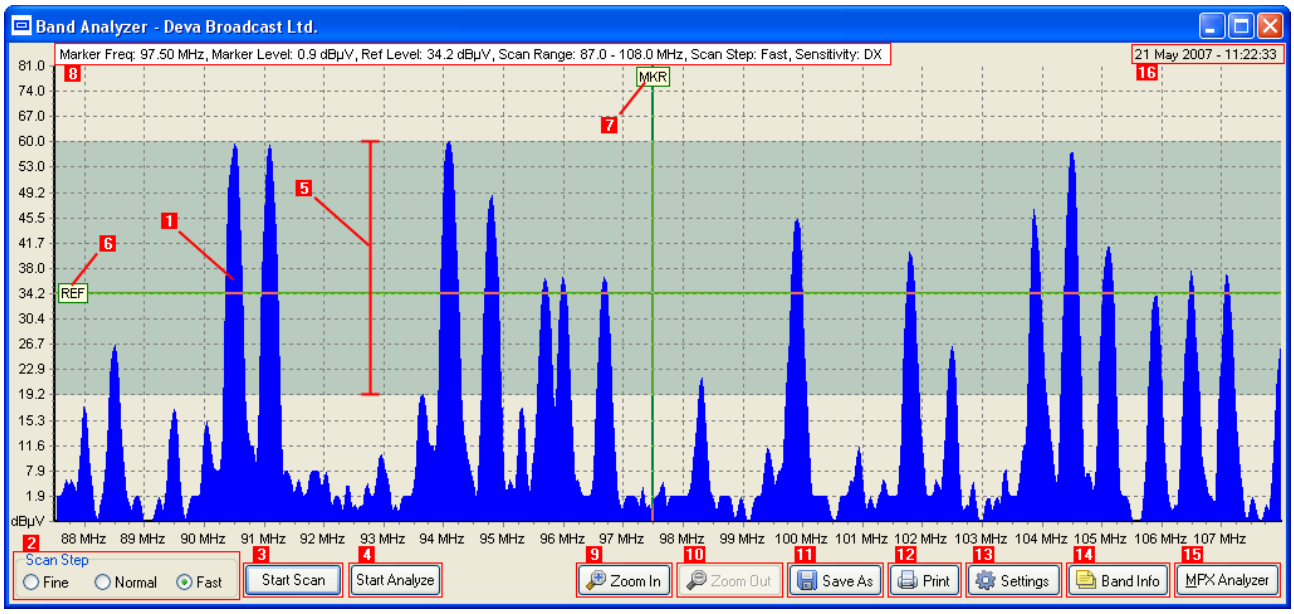
FM Band Spectrum Analyzer



1. FM Band Spectrum. The horizontal scale shows the frequencies. The vertical their measured levels.

2. Band Scanning mode. The software provides three different types of Band Scan:
- *Fine* – Scanning mode with fine frequency resolution;
- *Normal* – mode with satisfying resolution;
- *Fast* – mode for quick scanning with maximum frequency step.

The selected scanning mode defines the scan speed vs. scan details.

3. Button for **starting scanning process**. It changes itself to "Stop Scan" button and allows to stop the process at any time. Otherwise the scanning ends at the end of the band. (See Band Analyzer Settings)

4. Button for **starting analyzing process**. Inactive if the scanning is not performed. The button changes itself to "Stop Analyze" and allows to stop the process at any time.

5. Sensitivity zone. This is the zone where the tuner is under seeking mode. (See FM Tuner Settings)

6. Reference Level Marker. (See Band Analyze)

7. Marker. By moving Marker along the Band Spectrum displays corresponding level for the frequency under it. (See also Band Info Table)

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8. Information for current Markers data and last Scan process settings.
- *Marker Freq* – frequency under the marker
- *Marker Level* – corresponding level of the frequency under the marker
- *Ref Level* – choosen reference level
- *Scan Range* – frequency range of last Scan process
- *Sensitivity* – tuner sensitivity apllied within last Scan process. (See FM Tuner Settings)

9. Button for **Zooming In** part of Band Spectrum. (See Band Analyzer Settings, Band Analyzer Extras)

10. Button for **Zooming Out** part of Band Spectrum.

11. Button for **Saving** the current graphic. (See Band Analyzer Results Saving)

12. Button for **Printing** the current graphic. (See Printing of the Band Analyzer Results)

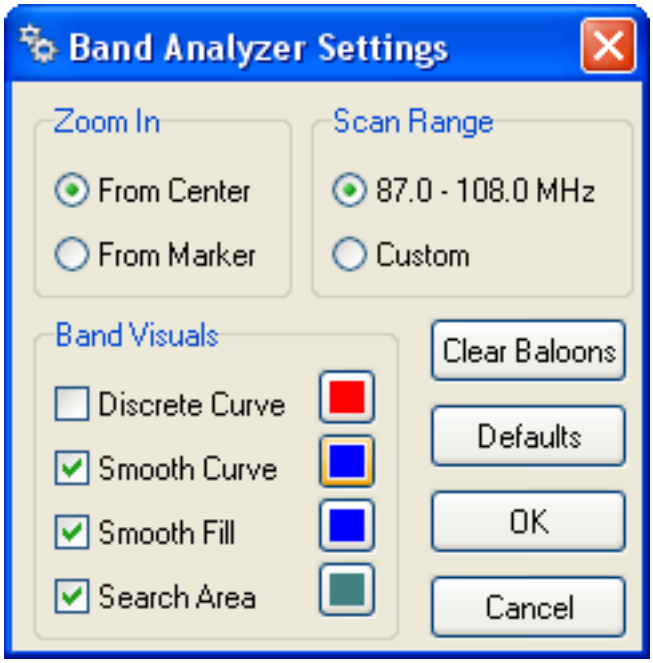
13. Button for **Band Analyzer Settings**. (See Band Analyzer Settings)

14. Button for bringing up the information collected from Band Analyze (See Band Info Table)

15. Button for fast recall of the **MPX Analyzer** Tool. (See MPX Analyzer)

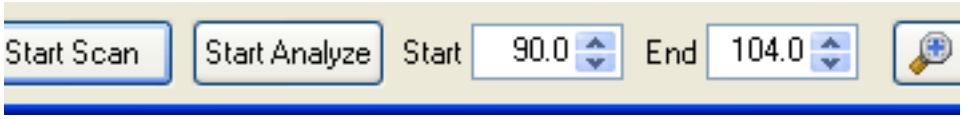
16. Current date/time Information. Useful in case of saving or printing - registers date/time of save/print.

BAND ANALYZER SETTINGS



Zoom In – Settings for button Zoom In behaviour. (See FM Band Spectrum Analyzer - 9)
From Center – the zooming is performed towards the center of the frequency band.
From Marker – the zooming is performed towards the position of the marker. (See FM Band Spectrum Analyzer - 7)

Scan Range – Settings for Range of the Scanning Process.
87.0-108.0 MHz – full band (default).
Custom – Allows to customize band scanning by setting in and out frequency of the band. Fields for Start and End frequency entry will appear beside the Start Analyze button.



Band Visuals – Settings for appearance of Band Spectrum. Allows changes in the color of some Band graphic visuals as well as their visibility (visibility takes place after the Scan Process stops).

Clear Baloons – Clears all "LABELs" from the last Analyze Process. (See Band Analyze)

Defaults – Reset all settings to their default values.

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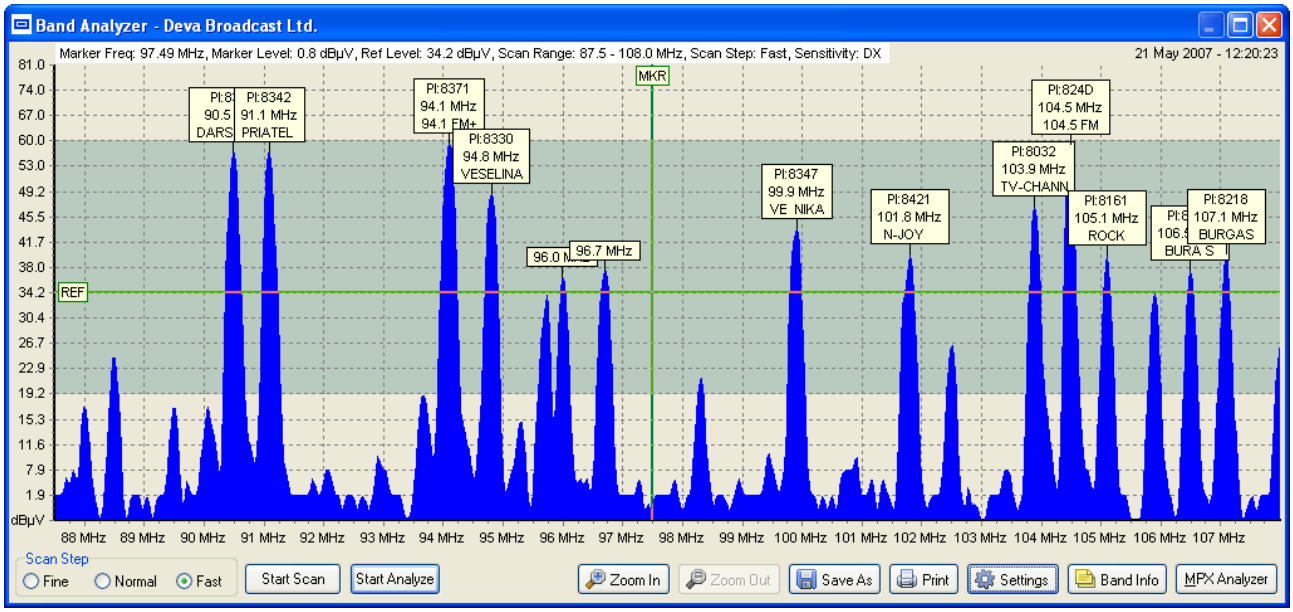
BAND ANALYZE



"BAND ANALYZE" - WHAT IS IT ALL ABOUT?

First step of Analyze Process is defining the "zone for analyze". Selecting the reference level (See FM Band Spectrum Analyzer - 6) defines the bottom of the zone. Top is defined by the maximum measured level. Left and Right edges of the zone are defined by the scanned range (See Band Analyzer Settings).

Next, after the zone is defined all the peaks within are separated and Analyzing Process starts. Every peak is analyzed for a period of few seconds and report is generated for frequency and RDS data (if any available - PI/CALL and PS are shown).

The report from the Analyze Process is visible as "LABELS" above every analyzed peak. More detailed information can be found under the Band Info Table.

The Analyze Process can be stopped at any time.

Right after the analyzing is finished/stopped, the tuner retunes to the frequency before the start of Analyze Process.

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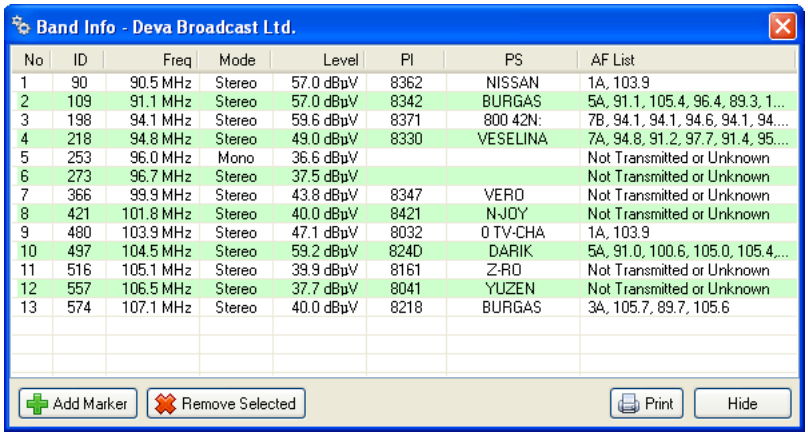
BAND INFO TABLE



No	ID	Freq	Mode	Level	PI	PS	AF List
1	90	90.5 MHz	Stereo	57.0 dBµV	8362	NISSAN	1A, 103.9
2	109	91.1 MHz	Stereo	57.0 dBµV	8342	BURGAS	5A, 91.1, 105.4, 96.4, 89.3, 1...
3	198	94.1 MHz	Stereo	59.6 dBµV	8371	800 42N:	7B, 94.1, 94.1, 94.6, 94.1, 94....
4	218	94.8 MHz	Stereo	49.0 dBµV	8330	VESELINA	7A, 94.8, 91.2, 97.7, 91.4, 95....
5	253	96.0 MHz	Mono	36.6 dBµV			Not Transmitted or Unknown
6	273	96.7 MHz	Stereo	37.5 dBµV			Not Transmitted or Unknown
7	366	99.9 MHz	Stereo	43.8 dBµV	8347	VERO	Not Transmitted or Unknown
8	421	101.8 MHz	Stereo	40.0 dBµV	8421	N-JOY	Not Transmitted or Unknown
9	480	103.9 MHz	Stereo	47.1 dBµV	8032	0 TV-CHA	1A, 103.9
10	497	104.5 MHz	Stereo	59.2 dBµV	824D	DARIK	5A, 91.0, 100.6, 105.0, 105.4,...
11	516	105.1 MHz	Stereo	39.9 dBµV	8161	Z-RO	Not Transmitted or Unknown
12	557	106.5 MHz	Stereo	37.7 dBµV	8041	YUZEN	Not Transmitted or Unknown
13	574	107.1 MHz	Stereo	40.0 dBµV	8218	BURGAS	3A, 105.7, 89.7, 105.6

Band Info Table represents an additional information from the Analyze of the frequency band.

Besides frequency, PI/CALL and PS, are shown station mode (stereo or mono), RF Level and AF List if during the period of peak analyze there were enough RDS data to extract AFs.

By using the button **Add Marker** it is possible to add other frequencies. The desired frequency is selected by the Marker (See FM Band Spectrum Analyzer - 7).

The button **Remove Selected** will erase the selected entry from the table.

NOTE: Adding or Removing frequencies manually is irrelevant to analyzing process.

In case of a double click with the mouse on some of the rows in the table the Band Scanner switches in Real-time Watching of the corresponding frequency. (See Band Analyzer Extras)

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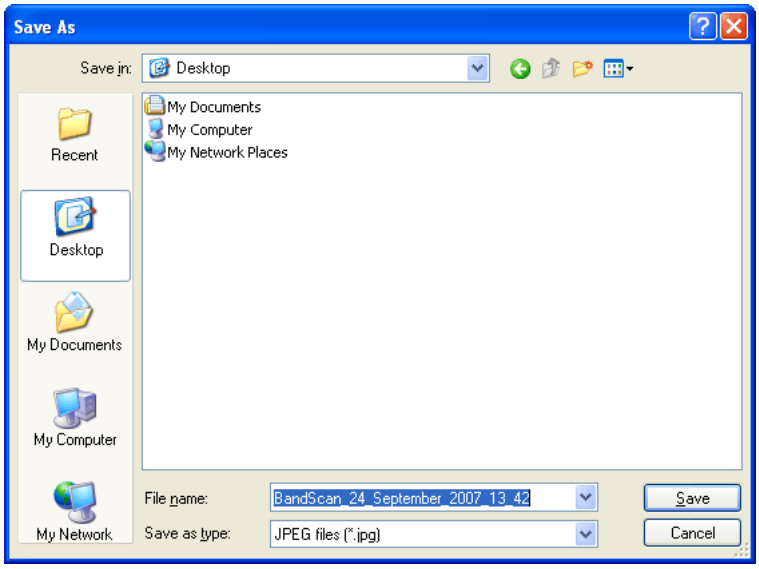
BAND ANALYZER RESULTS SAVING



Select the desired folder. Write new file name, or leave the default one which contains current date and time.

Select file type from the “Save as type” drop-down. When you press the Save button the file representing the current graphic from Band Analyze will be saved into the selected folder.

NOTE: Possible file types are: JPG, BMP, WMF and EMF.

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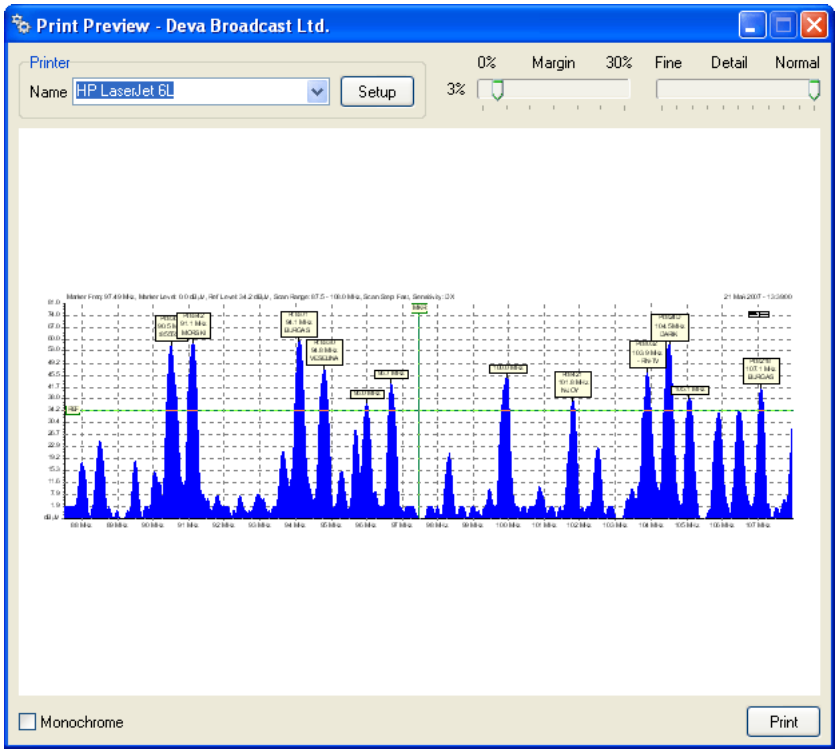
PRINTING OF THE BAND ANALYZER RESULTS



Select the printer from the Printer drop-down. From the Setup button you can modify your Printer settings if necessary. The "**Margin**" slider defines the distance between graphic and edge of the page. The "**Detail**" slider provides option to adjust the image quality (details). The "**Monochrome**" check box provides option to convert the graphic from color to monochrome. After adjusting all of the properties you are able to print the graphic just by pressing the "**Print**" button.

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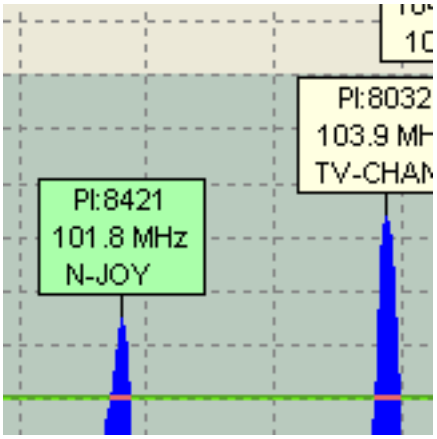
BAND ANALYZER EXTRAS

The Band Analyzer provides the user with the opportunity to watch in real-time every existing channel. Selecting the channel happens by double clicking over the peak from the Band Spectrum or by double clicking on any station from the Band Info Table. If the Reference Level line does not cross the selected peak, no selection will occur.

After selecting the station the tuner will automatically set the peak frequency and will enable the real-time watching of the channel. All the incoming data will appear in the Band Info Table and in the "LABEL" over the analyzed channel. The LABEL color will changes to green which indicates the currently selected channel.



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MPX Analyzer

The Band Scanner has MPX deviation meter built-in. It allows to measure and display the MPX Deviation.

INTEGRATION DEFINED

"Peak Integration" is a euphemistic reference to the practice of allowing brief overdeviations of the FM carrier to sneak by unnoticed. In the case of the Band Scanner, non-repetitive modulation peaks lasting less than a predetermined period will not be displayed on the CARRIER MODULATION Time Graph display. Broadcasting regulations, including those of the FCC in the US, are often a bit vague on the subject of peak integration. Nearly all Modulation Monitors include some provision for ignoring exceedingly fast program peaks, sometimes called "peaks of infrequent occurrence" or other similarly tenuous term. Certainly, non-repetitive overshoots that do not materially increase the broadcaster's occupied bandwidth, and thus pose no threat of interference to an adjacent-channel signal, may legitimately be ignored in a measurement of total carrier deviation. But by allowing peaks resulting from, and directly related to, the dynamics of the program signal to "slide on by", the broadcaster is courting the wrath of his appropriate regulatory agency.

US FCC MEASUREMENT METHOD

One reliable guideline in determining just how far you can go with respect to total carrier modulation is to be aware of how at least one government authority monitors a broadcaster's signal. As far as we have been able to determine, the United States FCC does not use a commercial Modulation Monitor with a metered readout. Instead they connect an oscilloscope to the composite baseband output of a wideband FM receiver and look for deviations beyond a predetermined peak-to-peak amplitude. As divulged by one Field Engineer, the FCC is not looking for the occasional overshoot, but for consistent and flagrant overmodulation, which is invariably noticed and complained about before the station is flagged for scrutiny.

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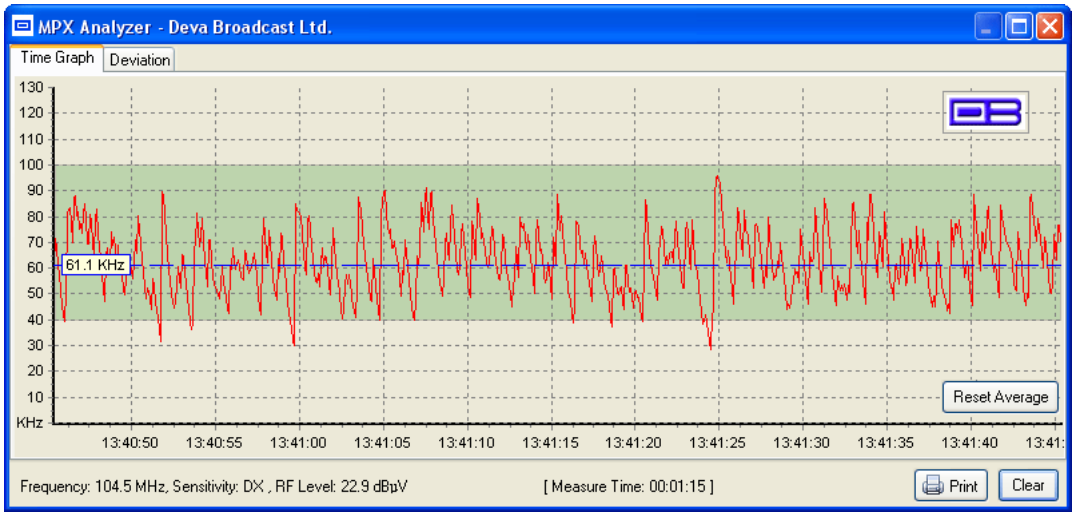
MPX TIME GRAPH



This graphic represents MPX deviation over the past 1 minute.

"**Reset Average**" button - resets average counters. Usable, when unexpected signal fluctuation occurs.

"**Clear**" button - clears all collected data, cleans graphic and resets average counters.

"**Print**" button - prints current graphic.

Vertical scale units depend on Tuner Mode (RDS - KHz, RBDS - %).

Green Zone defines common safety range for MPX deviation amplitude.

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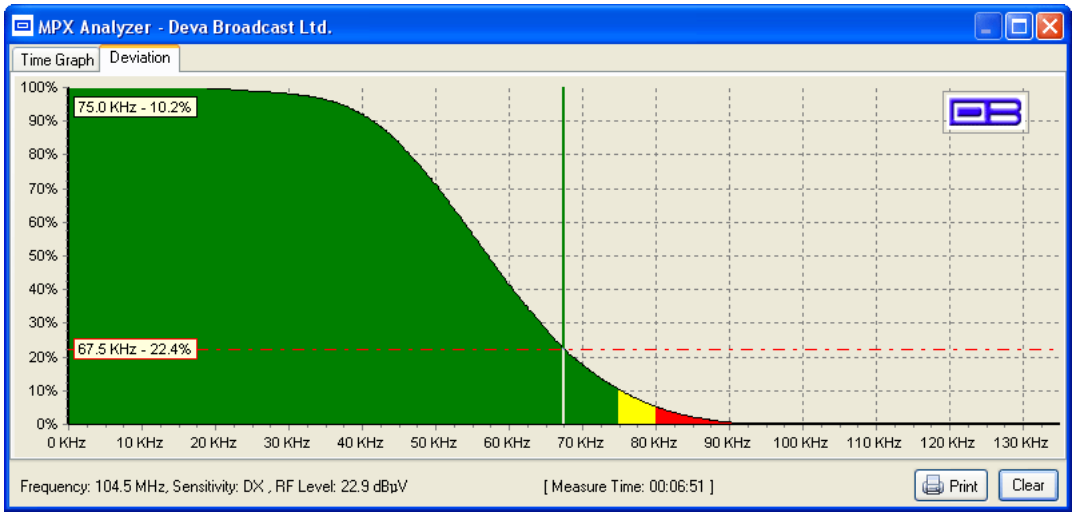
MPX DEVIATION



This graphic represents MPX Deviation overshoot (in percent) over time.

"**Clear**" button - clears all collected data and cleans graphic.

"**Print**" button - prints current graphic.

Standard overshoot is measured at 75 KHz and is indicated at the top-left corner of the graphic. 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.

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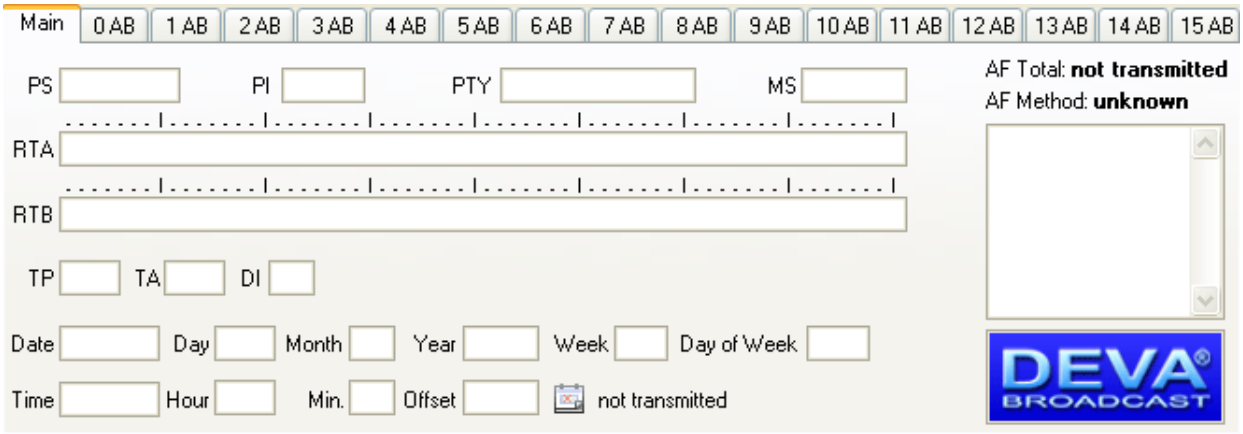
RDS Data and Detailed RDS Group's Analyzer

SECTION "MAIN" WITH ALL MANDATORY RDS FUNCTIONS

In this section the Band Scanner Software visualizes the main RDS features like PS, Radio Texts, PI, PTY, MS, TP, TA, DI and Alternative Frequency Table giving information about the AF method used.



PS – This is the label of the program service consisting of not more than eight alphanumeric characters, which is displayed by RDS receivers in order to inform the listener what program service is being broadcast by the station to which the receiver is tuned. An example for a name is "Radio 21".

PI - This information consists of a code enabling the receiver to distinguish between countries, areas in which the same program is transmitted, and the identification of the program itself. The code is not intended for direct display and is assigned to each individual radio program, to enable it to be distinguished from all other programs. One important application of this information would be to enable the receiver to search automatically for an alternative frequency in case of bad reception of the program to which the receiver is tuned; the criteria for the change-over to the new frequency would be the presence of better signal having the same Program Identification code.

PTY - **P**rogram **TY**pe codes - This is an identification number to be transmitted with each program item and which is intended to specify the current Program Type (detailed description follows in Appendix A and B). This code could be used for search tuning. The code will, moreover, enable suitable receivers and recorders to be pre-set to respond only to program items of the desired type.

Music/Speech (M/S) switch code

This is a 1-bit code. A "0" indicates that speech, at present, is being broadcast and a "1" indicates that music, at present, is being broadcast. When the broadcaster is not using this facility the bit value will be set at "1".

Use of the **TP** and **TA** features (Type 0, 15B and 14 groups)

For the tuned program service, the code TP=0 in all groups and TA=1 in type 0 and 15B groups indicates that this program broadcasts EON information which cross-references at least to one program service which carries traffic information. RDS receivers which implement the EON feature may use this code to signify that the listener can listen to the tuned program service and nevertheless receive traffic messages from another program service. RDS receivers which do not implement the EON feature must ignore this code. Program services which use the code TP=0, TA=1 must broadcast type 14 B groups (at the appropriate times) relating to at least one program service which carries traffic information, and has the flag TP=1. The TA flag within variant 13 of a type 14A group is used to indicate that the cross-referenced service is currently carrying a traffic announcement. This indication is intended for information only (e.g. for monitoring by broadcasters) and must not be used to initiate a switch even if traffic announcements are desired by the listener. A switch to the cross-referenced traffic announcement should only be made when a TA=1 flag is detected in a type 14B group.

CT – **C**lock **T**ime and date

Time and date codes should use Coordinated Universal Time (UTC) and Modified Julian Day (MJD). If MJD = 0 the receiver should not be updated. The listener, however, will not use this information directly and the conversion to local time and date will be made in the receiver's circuitry. CT is used as time stamp by various RDS applications and thus it must be accurate.

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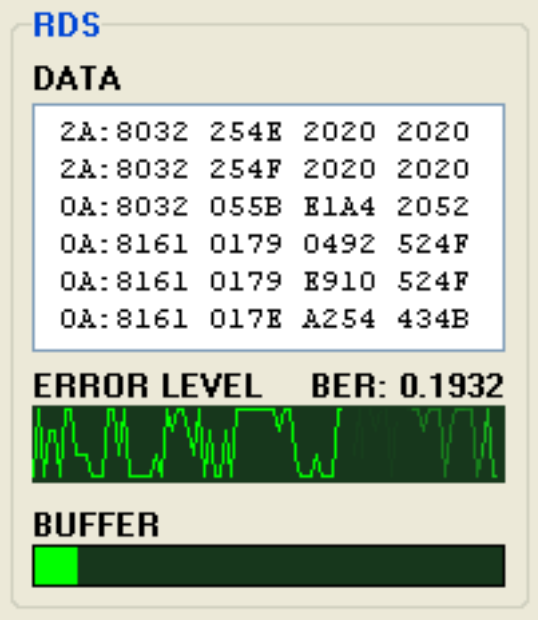
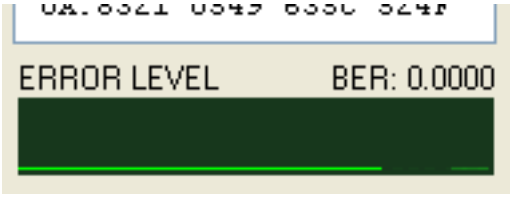
RAW RDS DATA STREAM

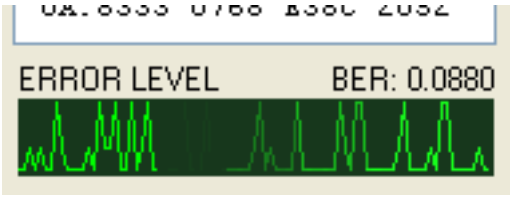
This section contains data about the RDS stream, in case the incoming stream carry RDS data.



The **ERROR LEVEL** indicator shows the Stream's quality. In case of 100% errors free stream the indicator will draw flat line like this:



In case the stream is coming with errors, the line will indicate the error's level like this:



In the **DATA** field the last 6 decoded groups appear in raw format.

BER (**B**it to **E**rror **Ratio**) is the ratio between all the valid and non valid RDS data. In case the RDS is coming with 100% valid data stream, the BER indicator will measure 0. If some errors are detected, the BER reading may rise.

The **BUFFER** indicator reads the condition of the incoming data buffer. If the decoder is working properly and all Minimal System Requirements are covered this indicator will be green and near minimum. When indicator constantly grows and becomes red at some point, in most cases this means that system is overloaded.

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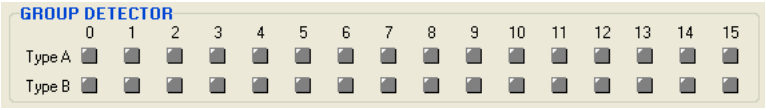
GROUP DETECTOR

The **Group Detector** function is located in the center of the screen for immediate reading of the existing groups. When group presence is detected, corresponding LED illuminates in green.



Using this feature the user will have information about groups being transmitted and their appropriate frequency. In case more information is required, it can be found in the tabs where all the information about the selected group is analyzed or within **Group Analyzer**.

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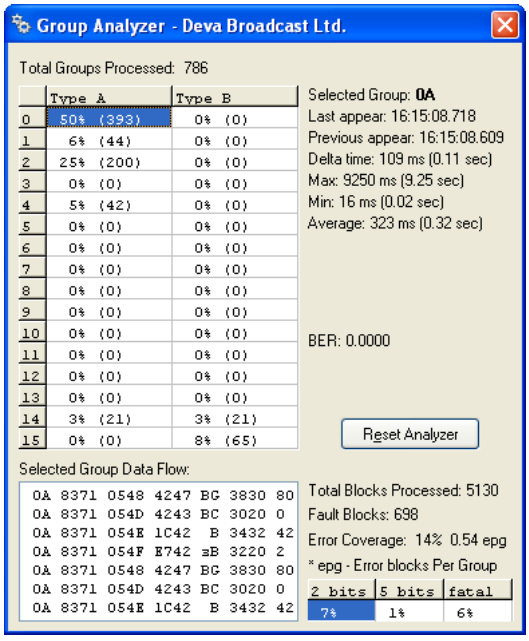
GROUP ANALYZER



This window gives the user statistical analyze of the incoming RDS/RBDS data stream. Detailed report for the groups' quantity and ratio is included. Each group timing presence is reported in a separate table. The number of the valid or non-valid blocks processed is contained in this screen.

The refreshing of the statistical data depends on the selected group. The time of the last showing of the group, and time differences between any groups appearing is calculated. The average time of group appearing is also displayed.

The "**Reset Analyzer**" button resets all of the buffered data and starts all over. Changing tuned frequency also resets Group Analyzer.

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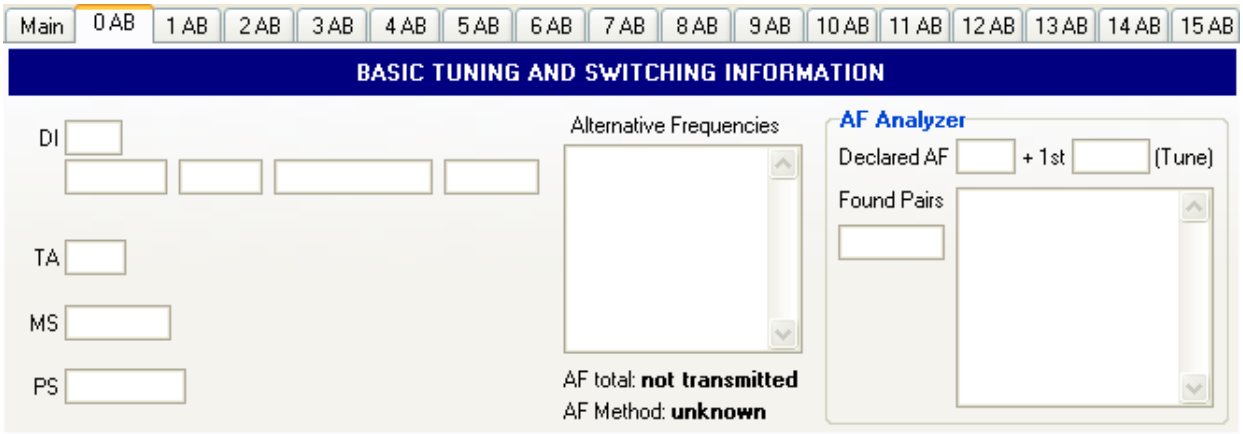
Short description of all groups analyzed

TYPE 0A & 0B GROUPS: BASIC TUNING AND SWITCHING INFORMATION

Type 0A groups are usually transmitted whenever alternative frequencies exist. Type 0B groups without any type 0A groups may be transmitted only when no alternative frequencies exist. There are two methods (A and B) for transmission of alternative frequencies. The PS function is also part from this group. The Program Service name comprises eight characters. It is the primary aid to listeners in program service identification and selection.



The Program Service name is to be used only to identify the station or station program. The PS may be changed as required by the station. Nowadays this feature is used for transmitting artist names, song titles, promos or some kind of advertisement texts.

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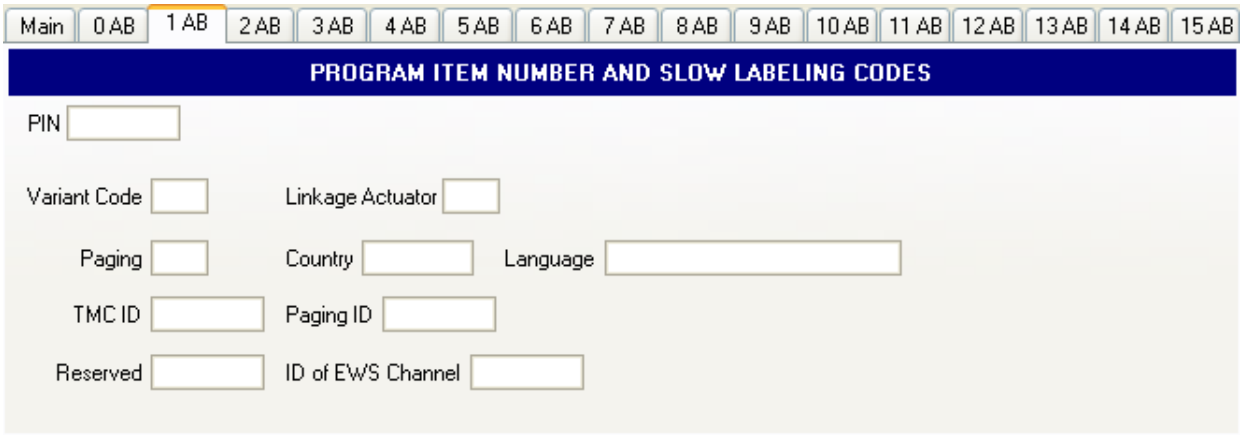
TYPE 1A & 1B GROUPS: PROGRAM ITEM NUMBER AND SLOW LABELING CODES

Program Item Number, Type 1B group - The Program Item Number is the scheduled broadcast start time and day of month as published by the broadcaster. The day of month is transmitted as a five-bit binary number in the range 1-31. Hours are transmitted as a five-bit binary number in the range 0-23. The spare codes are not used. Minutes are transmitted as a six-bit binary number in the range 0-59. The spare codes are not used.



The most significant five bits in block 4 which convey the day of the month, if set to zero, indicate that no valid Program Item Number is being transmitted. In this case, if no Radio Paging is implemented, the remaining bits in block 4 are undefined. However, in the case of type 1A groups only, if Enhanced Radio Paging is implemented, the remaining bits carry Service Information.

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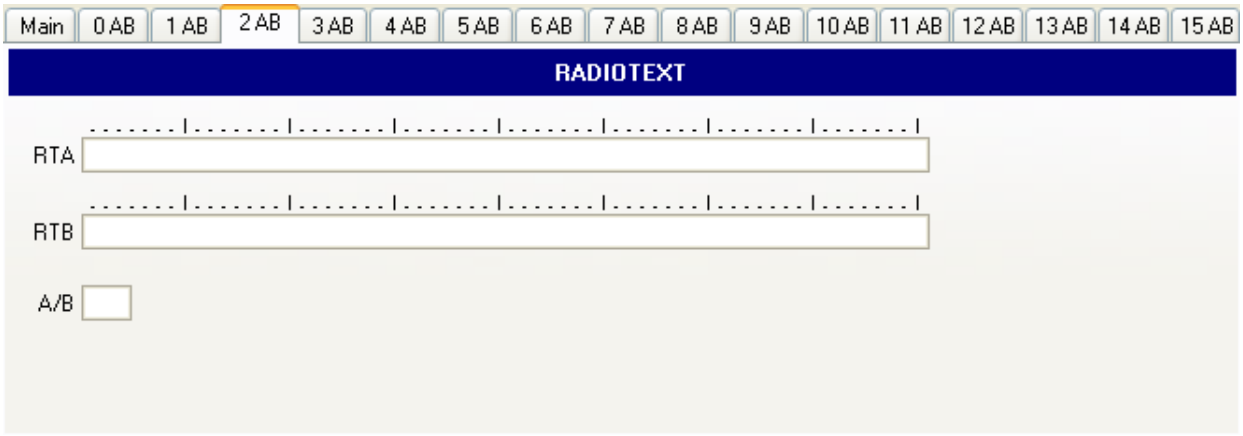
TYPE 2A & 2B GROUPS: RADIOTEXT

The 4-bit text segment address defines in the current text the position of the text segments contained in the third (version A only) and fourth blocks. Since each text segment in version 2A groups comprises four characters, messages of up to 64 characters in length can be sent using this version. In version 2B groups, each text segment comprises only two characters and therefore when using this version the maximum message length is 32 characters.



If a display which has fewer than 64 characters is used to display the radiotext message then memory should be provided in the receiver/decoder so that elements of the message can be displayed sequentially. This may, for example, be done by displaying elements of text one at a time in sequence, or, alternatively by scrolling the displayed characters of the message from right to left.

- An important feature of type 2 groups is the Text A/B flag contained in the second block. Two cases occur:

If the receiver detects a change in the flag (from binary “0” to binary “1” or vice-versa), then the whole radiotext display should be cleared and the newly received radiotext message segments should be written into the display.

- If the receiver detects no change in the flag, then the received text segments or characters should be written into the existing displayed message and those segments or characters for which no update is received should be left unchanged.

When this application is used to transmit a 32-character message, at least three type 2A groups or at least six type 2B groups should be transmitted in every two seconds.

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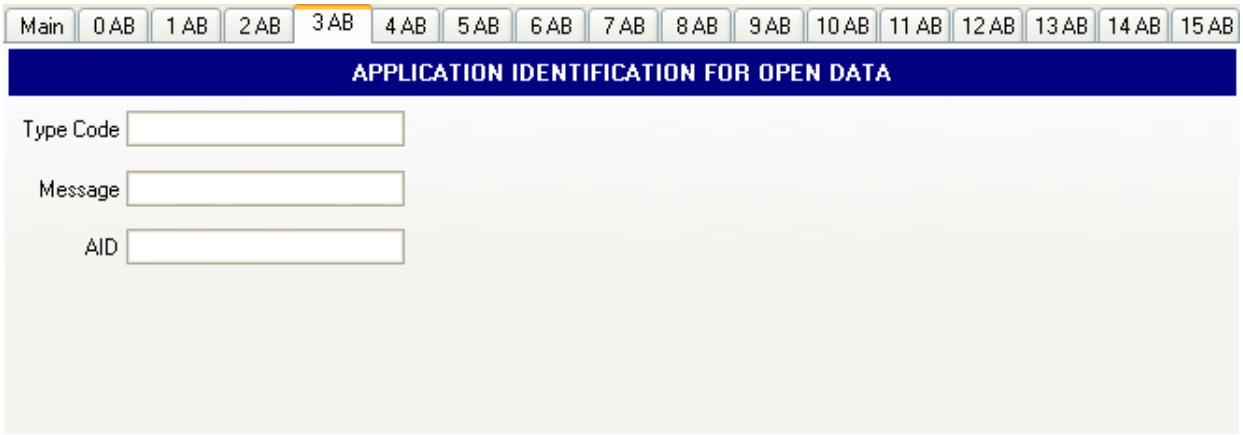
TYPE 3A & 3B GROUPS: APPLICATION IDENTIFICATION FOR OPEN DATA

The type 3A group conveys, to a receiver, information about which Open Data Applications are carried on a particular transmission and in which groups they will be found. The type 3A group comprises three elements:

- Application Group type code used by that application, 16 message bits for the actual ODA and the Applications

- Identification (AID) code. Applications which actively utilize both, type A and B groups, are signaled using two type 3A groups. The Application Group type code indicates the group type used, in the particular transmission, to carry the specified ODA. Two special conditions may be indicated: 00000 - Not carried in associated group; 11111 - Temporary data fault (Encoder status) which means that incoming data to the encoder cannot be transmitted. The AID determines which software handler a receiver needs to use. This supplements information carried in the type 1A group and permits groups specified in this standard for EWS, IH, RP and TMC to be re-allocated when these features are not used. This method of allocating and defining Open Data Applications in an RDS transmission allows the addition and subtraction of ODAs, without constraint or the need to await the publication of new standards. For each group type addressed by the Application Group Type codes of a particular transmission, only one application may be identified as the current user of the channel.



- The AID code 0000 (Hex) may be used to indicate that the respective group type is being used for the normal feature specified in this standard. Application Identification codes 0001 to FFFF (Hex) indicate applications as specified in the ODA Directory. The ODA Directory specification associated with a particular AID code defines the use of type A and type B groups as follows:

-type A groups used alone (mode 1.1)
-type B groups used alone (mode 1.2)
-type A groups and type B groups used as alternatives (mode 2)
-type A groups and type B groups used together (mode 3)

It is important to note that the ODA Directory specification must not specify the actual type A and type B groups to be used, since these are assigned in each transmission by the type 3A group. The AID feature indicates that a particular ODA is being carried in a transmission. Each application will have unique requirements for transmission of its respective AID, in terms of repetition rate and timing. These requirements must be detailed in the respective ODA specification. The specification must also detail the AID signaling requirements for such times when an application assumes or loses the use of a group type channel.

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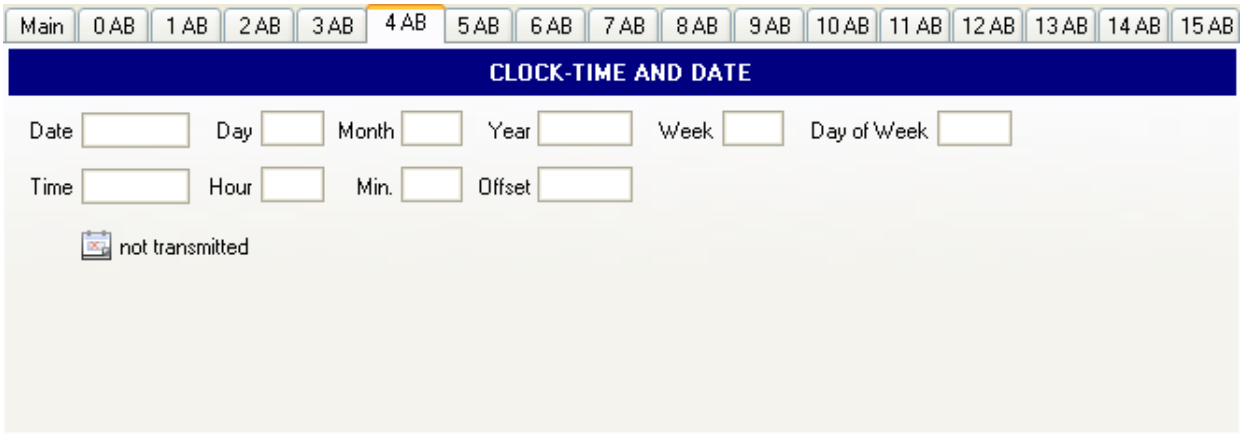
TYPE 4A GROUPS: CLOCK-TIME AND DATE

The transmitted clock-time and date shall be accurately set to UTC plus local offset time. Otherwise the transmitted CT codes shall all be set to zero. When this application is used, one type 4A group will be transmitted every minute. The local time is composed of Coordinated Universal Time (UTC) plus local time offset. The local time offset is expressed in multiples of half hours within the range -12h to +12h and is coded as a six-bit binary number. "0" = positive offset (East of zero degree longitude), and "1" = negative offset (West of zero degrees longitude). The information relates to the epoch immediately following the start of the next group. The Clock time group is inserted so that the minute edge will occur within ± 0.1 seconds of the end of the Clock time group.



Minutes are coded as a six-bit binary number in the range 0-59. The spare codes are not used. Hours are coded as five-bit binary number in the range 0-23. The spare codes are not used. The date is expressed in terms of Modified Julian Day and coded as a 17-bit binary number in the range 0-99999. Note that the Modified Julian Day date changes at UTC midnight, not at local midnight. Accurate CT based on UTC plus local time offset must be implemented on the transmission where TMC and/or Radio paging is implemented.

TYPE 4B GROUPS: OPEN DATA APPLICATION

These groups are usable for Open data (see Type 3A & 3B groups description)

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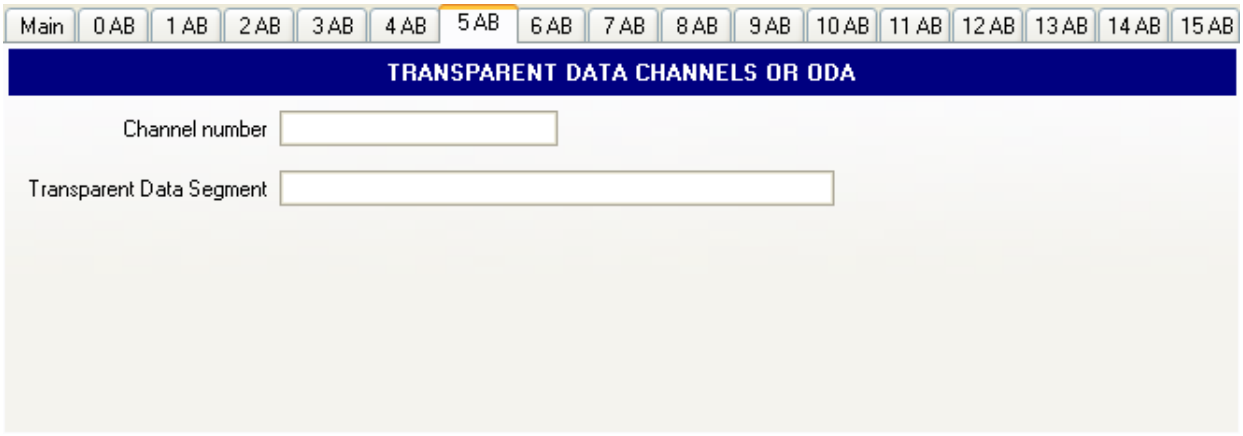
TYPE 5 GROUPS:
TRANSPARENT DATA CHANNELS OR ODA

These channels may be used to send alphanumeric characters, or other text (including mosaic graphics), or for transmission of computer programs and similar data not for display. Details of implementation of these last options are to be specified later. The repetition rate of these group types may be chosen to suit the application and the available channel capacity at the time.



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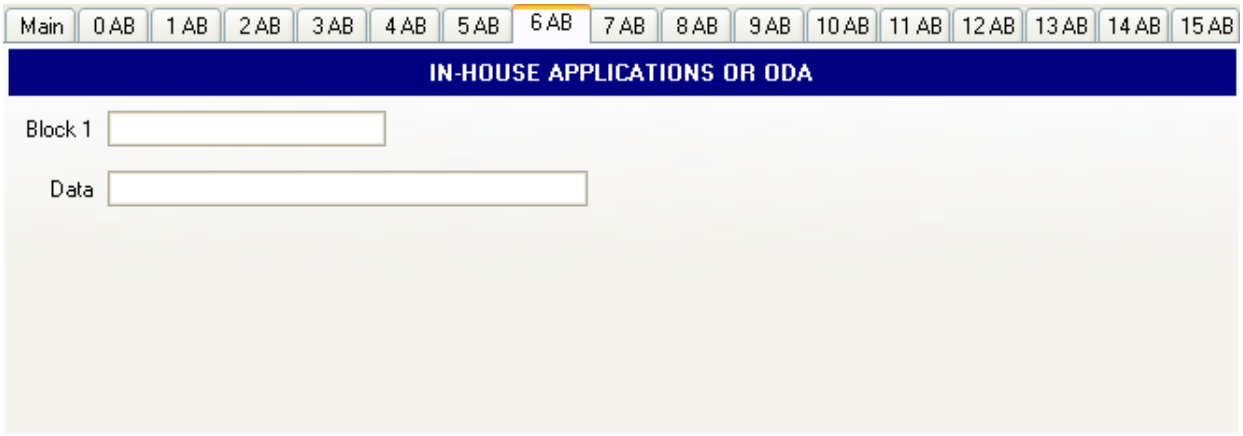
TYPE 6 GROUPS:
IN-HOUSE APPLICATIONS OR ODA

Type 6A groups are used for ODA and IH. In case this group is used for ODA applications see Type 3A & 3B groups' description. There are some unreserved bits in these groups. The contents of the unreserved bits in these groups may be defined unilaterally by the operator. Consumer receivers should ignore the in-house information coded in these groups. The repetition rate of these group types may be chosen to suit the application and the available channel capacity at the time.



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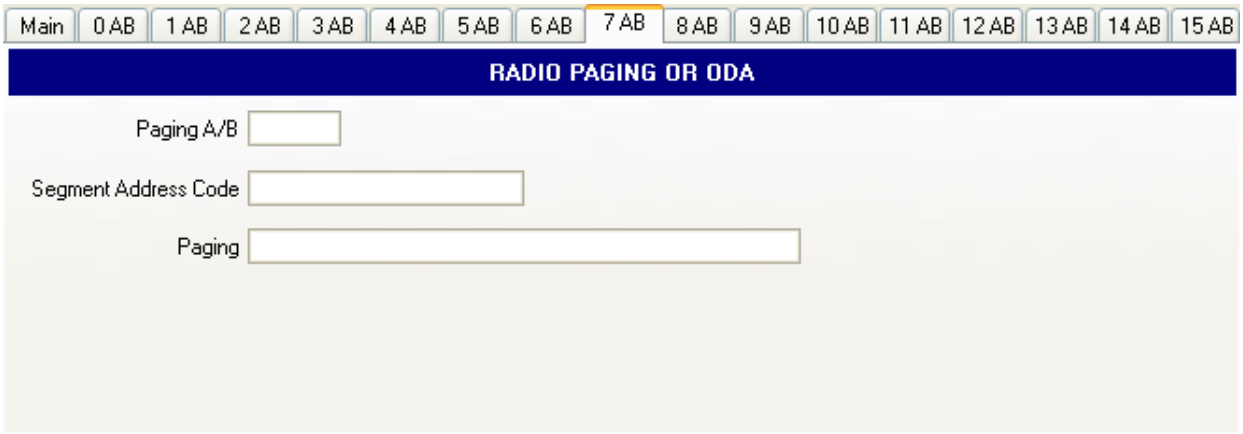
TYPE 7A & 7B GROUPS: RADIO PAGING OR ODA

Type 7A groups are used for Radio Paging or ODA see Type 3A & 3B groups' description.



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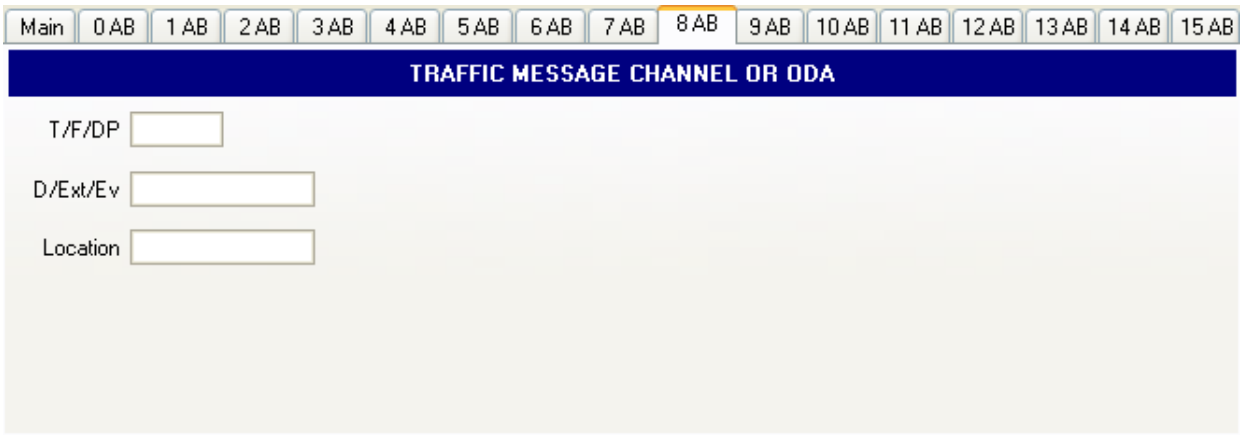
TYPE 8 GROUPS:
TRAFFIC MESSAGE CHANNEL OR ODA

Type 8A groups are used for Traffic Message Channel (TMC); if used for ODA see Type 3A & 3B groups' description. This group carries the TMC messages. The specification for TMC, using the so called ALERT C protocol also makes use of type 1A and/or type 3A groups together with 4A groups



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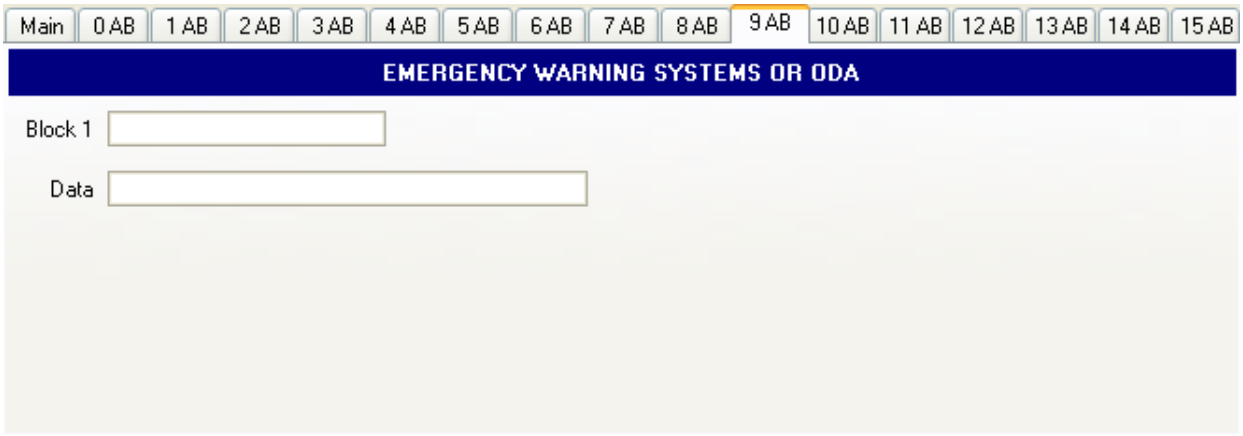
TYPE 9A & 9B GROUPS: EMERGENCY WARNING SYSTEMS OR ODA

These groups are transmitted very infrequently, unless an emergency occurs or test transmissions are required. Type 9A group is used for EWS; if used for ODA, see Type 3A & 3B groups' description. The ODA may be used only in type B of these groups. Format and application of the bits allocated for EWS messages may be assigned unilaterally by each country. However the ECC feature must be transmitted in type 1A groups when EWS is implemented.



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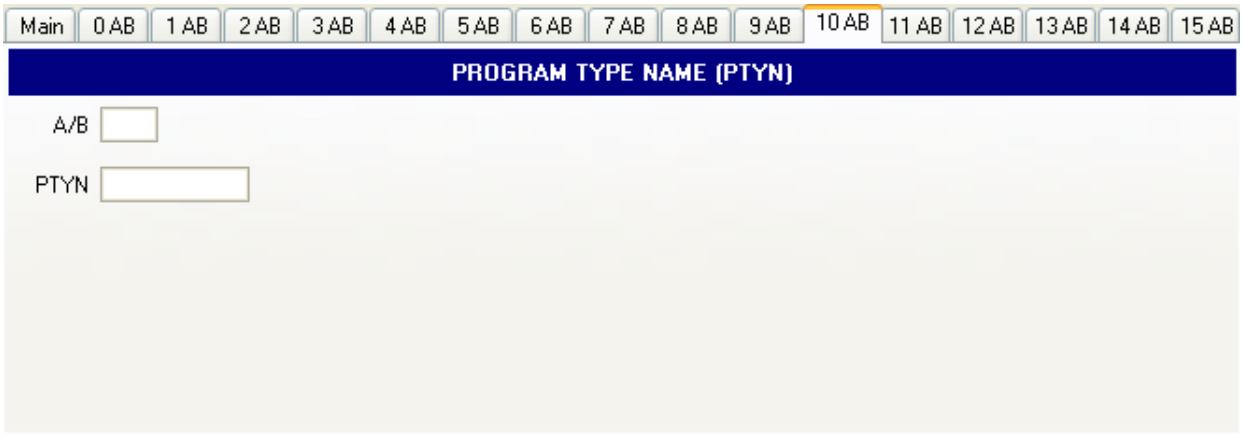
TYPE 10A & 10B GROUPS: PROGRAM TYPE NAME (10A) AND OPEN DATA (10B)

The type 10A group allows further description of the current Program Type, for example, when using the PTY code 4: SPORT, a PTYN of "Football" may be indicated to give more detail about that program. PTYN must only be used to enhance Program Type information and it must not be used for sequential information. The A/B flag is toggled when a change is made in the PTYN being broadcast. Program Type Name (PTYN) (for display) is transmitted as 8-bit characters as defined in the 8-bit code tables in annex E. Eight characters (including spaces) are allowed for each PTYN and are transmitted as four character segments in each type 10A group. ODA - Type 10B group see Type 3A & 3B groups' description.



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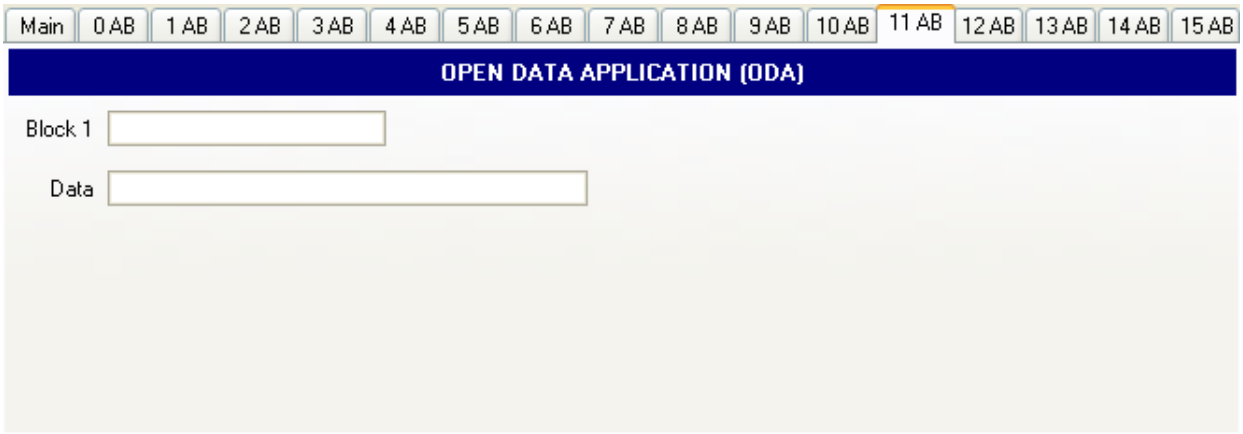
TYPE 11 GROUPS:
OPEN DATA APPLICATION

Open data - Type 11A and 11B groups see Type 3A & 3B groups' description



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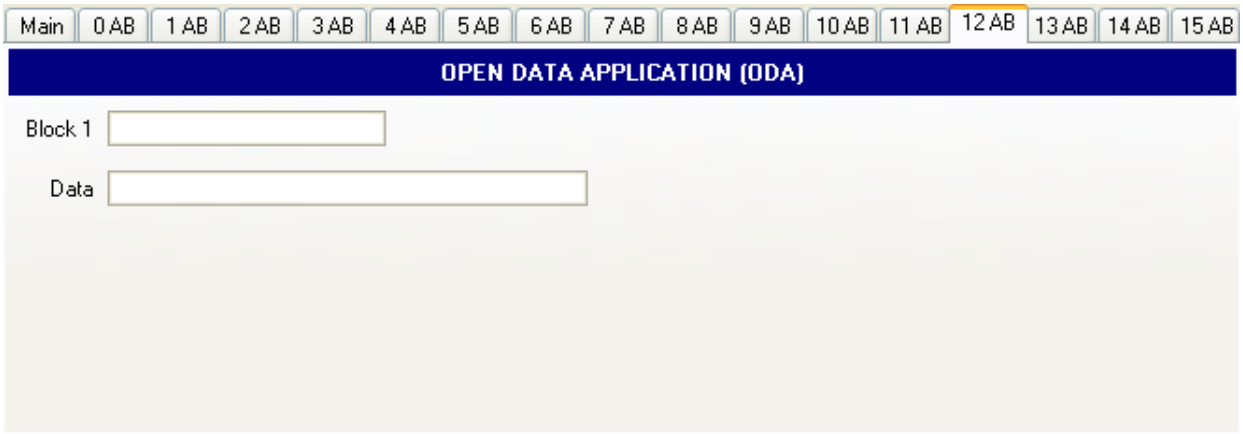
TYPE 12 GROUPS:
OPEN DATA APPLICATION

Open data - Type 12A and 12B groups see Type 3A & 3B groups' description



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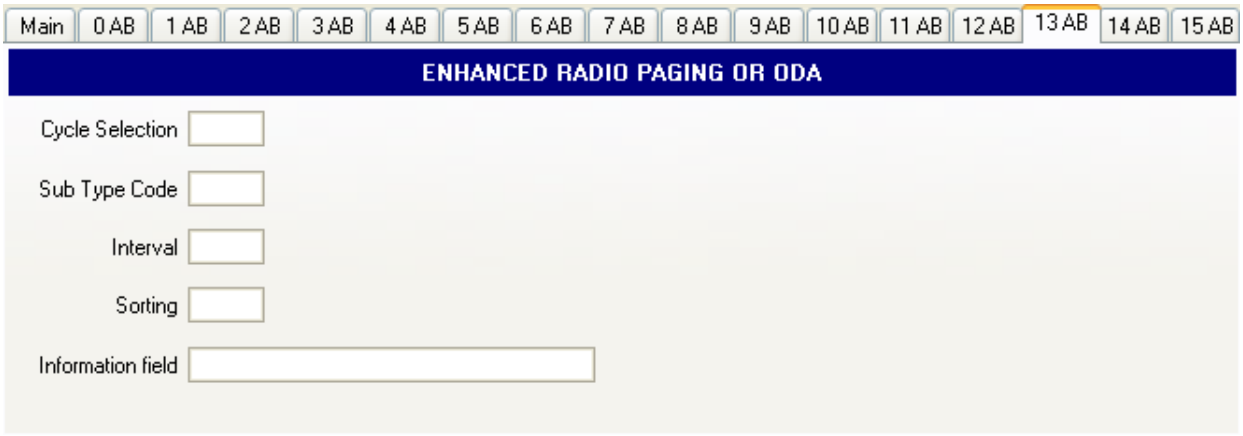
TYPE 13A GROUPS:
ENHANCED RADIO PAGING OR ODA

The type 13A group is used to transmit the information relative to the network and the paging traffic. Its primary purpose is to provide an efficient tool for increasing the battery life time of the pager. These groups are transmitted once or twice at the beginning of every interval (after the type 4A group at the beginning of each minute or after the first type 1A group at the beginning of each interval).

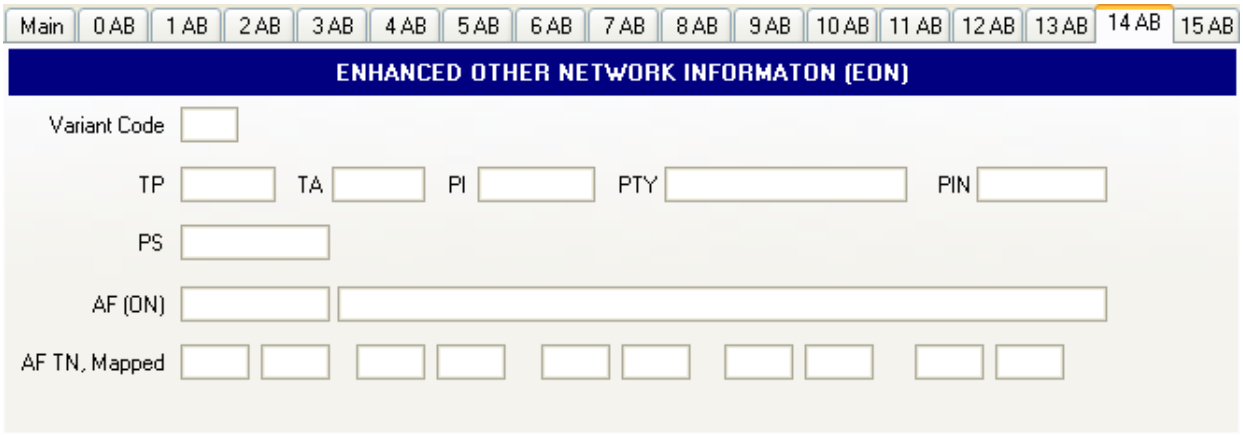


TYPE 13B GROUPS:
OPEN DATA APPLICATION

These groups are usable for Open data see Type 3A & 3B groups' description

TYPE 14 GROUPS:
ENHANCED OTHER NETWORKS INFORMATION

These groups are transmitted if Enhanced Other Networks information (EON) is implemented. AF codes in type 14A groups are used to refer to frequencies of other networks. There are two AF methods for transmitting this information. Variant 4 utilizes AF method A coding to transmit up to 25 frequencies; the coding method is as described above for type 0A groups. The PI code of the other network to which the AF list applies is given in block 4 of the group. Variant 5 is used for the transmission of "Mapped frequency pairs". This is used to specifically reference a frequency in the tuned network to a corresponding frequency in another network. This is particularly used by a broadcaster that transmits several different services from the same transmitter tower with the same coverage areas. The first AF code in block 3 refers to the frequency of the tuned network, the second code is the corresponding frequency of the other network identified by the PI code in block 4. Where it is necessary to map one tuning frequency to more than one VHF/FM frequency for the cross-referenced program service (due to multiple use of the tuning frequency or because the cross-referenced program is receivable at more than one frequency within the service area associated with the tuning frequency), then variants 6, 7 and 8 are used to indicate second, third and fourth mapped frequencies, respectively. LF/MF mapped frequencies are implicitly signaled by using variant 9. AF Code 250 is not used with the mapped AF method.



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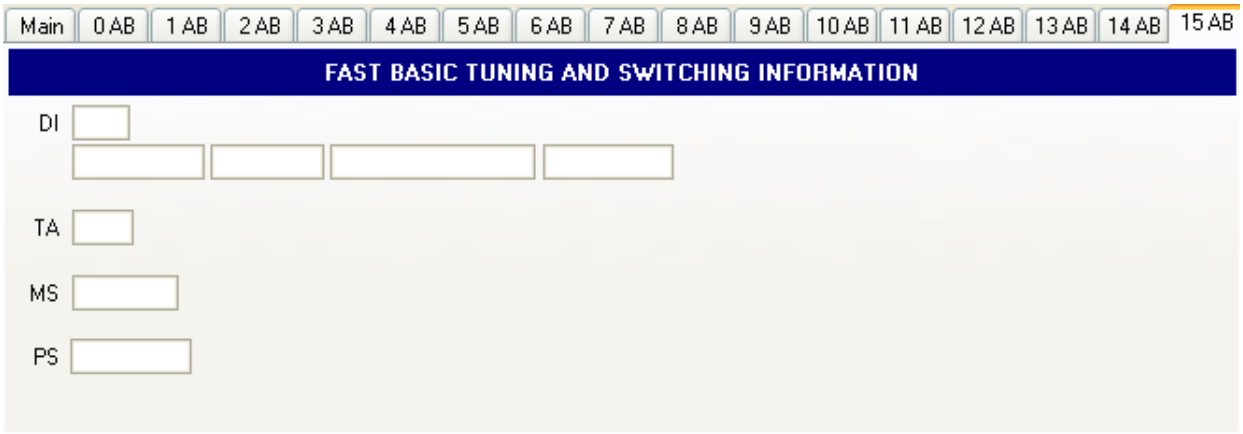
TYPE 15A & 15B GROUPS: FAST BASIC TUNING AND SWITCHING INFORMATION

Encoder manufactures usually eliminate this group type on new equipment. The RDS standard currently has no definition for this group. It is intended that type 15A groups should be inserted where it is desired to speed up acquisition time of the PS name. No alternative frequency information is included in 15A groups, and this group will be used to supplement type 0B groups. If alternate frequencies exist, type 0A will still be required. It is intended that type 15B groups should be inserted where it is desired to increase the repetition rate of the switching information contained in block 2 of type 0 groups without increasing the repetition rate of the other information contained in these groups. No alternative-frequency information or program-service name is included in 15B groups, and this group will be used to supplement rather than to replace type 0A or 0B groups.



When groups of this type are transmitted, the repetition rate may be chosen to suit the application and the available channel capacity at the time.

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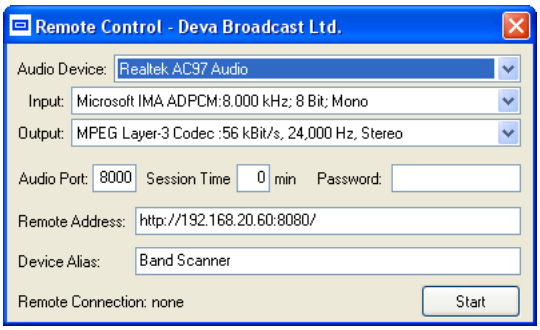
Remote Mode

Remote mode allows Band Scanner to act as a remote site and to transmit all essential data to distant locations. Pressing the "**Remote Mode**" button will bring up the following dialog:



When in Remote Mode, the Band Scanner combines together the following two functions:

AUDIO SERVER:

Band Scanner will serve the audio stream, which can be received and played back, using appropriate programs such as Windows Media Player or Winamp (http://www.winamp.com). Audio quality mainly depends on signal reception i.e. Band Scanner serves what it "hears".

Important thing to remember: Band Scanner doesn't have a feature to digitalize the audio signal, hence Remote Mode utilizes audio devices (if present) on computer where Band Scanner resides.

Audio interconnection must be prepared before further actions, otherwise the software will transmit silence. Simply connect Phones Out on Band Scanner rear panel to Line In on your sound card.

After selecting a preferred Audio Device it is important to select a suitable Input and Output audio formats. Variety of choices depends on the installed codecs. Recommended Input formats are PCM (pulse-code modulation), ADPCM (Adaptive Differential pulse-code modulation) or any format which guarantee lossless compression. Output formats are reduced to MP3. When selecting corresponding samples per second, bits per sample and speed, have in mind that this is crucial for audio reception in remote locations - high values brings better audio, but the consequence is heavier internet traffic. If you lack internet speed, we recommend output no more than 56 kBit/s, 16000 Hz, Stereo.

Next, select the Audio Port which will be used for audio streaming, or leave the default one. Acceptable port values are from 8000 and above, except 8080 and 8001 which are reserved for Data Server.

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DATA SERVER:

Data Server manages the data flow towards both locations remote and local, through HTTP protocol. In remote site is applicable any Web Browser together with installed Adobe Flash Player 9 (or higher) (http://www.adobe.com).

Specify Session Time to limit connection time per remote session. 0 means unlimited time.

Select Password, which prohibits unauthorized access.

Specify Device Alias, as its purpose is only informative and its aim is to reduce misleading when more than one Band Scanner is operational.

Remote Address is auto generated starting point for using Band Scanner Remote Mode. It is based on computer's IP configuration and can't be altered in direct way. Copy the Remote Address and submit it to authorised personnel.

Remote Mode is activated by clicking the "Start" button, which automatically changes to "Stop" and terminates Remote Mode upon clicking.

Remote Address and Password are necessary to access Band Scanner remotely. Entering Remote Address in Web Browser will bring the initial Login page of Remote Server, where you will be asked for a password. If the correct password is supplied, the remote session is established. Remote interface is almost identical to the software. Information is reduced only to the most essential, thus remote interface doesn't cover all functions present in the software.

Online listening depends on correct login as well and can be accessed from Remote interface under "Listen" Button.

NOTES:

Remote Mode is not capable of managing connections behind Proxy servers and it is necessary to configure the computer and/or the Proxy server manually.

Check your Firewall settings for restrictions on ports 8080, 8001 and chosen Audio Port.

Remote Mode is intended to serve only one remote session and will reject subsequent connections while session is still active. Select adequate Session Time to allow multiple users to connect.

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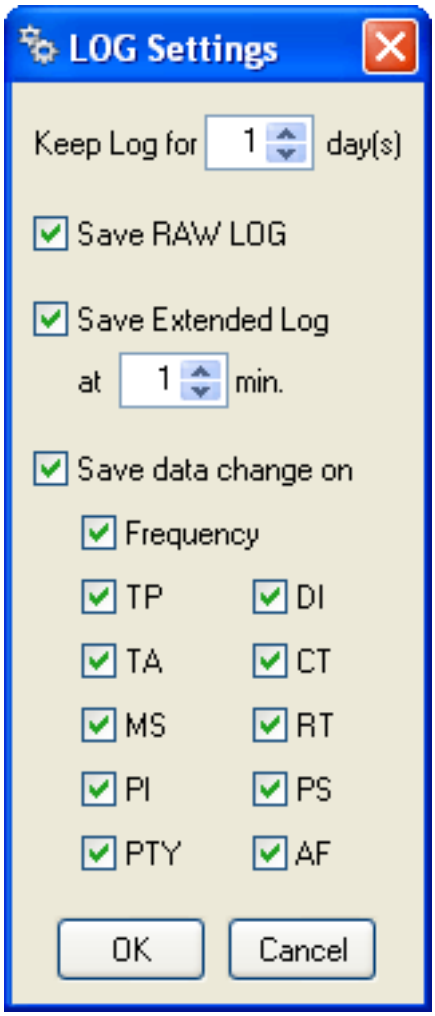
Log Capabilities

LOG SETTINGS



Keep Log – In this field you must select the length of the log in days. Maximum value: 30days. Data older than the maximum assigned period will be erased from the Log automatically.

Save RAW Log – By selecting this option the saving of the RAW data stream will be enabled.

ATTENTION: Be careful when using the "**Save RAW Log**" feature. Use it only if you really need it, because the RAW RDS data stream generates high capacity of stored data files. This may cause creating of big files and slowing down your PC functionality. Such kind of a problem may happen especially when Minimal System Requirements are not covered or near minimum.

Save Extended Log – This option allows saving of the main RDS parameters and the tuner condition. The saving period may be changed up to 30 minutes.

Save data change on – Enabling this feature allows saving all of the changes, detected in listed parameters.

NOTE: In case of changing the working frequency or the input signal source, the "Change On" log conditions are reset and the incoming data will be treated as new.

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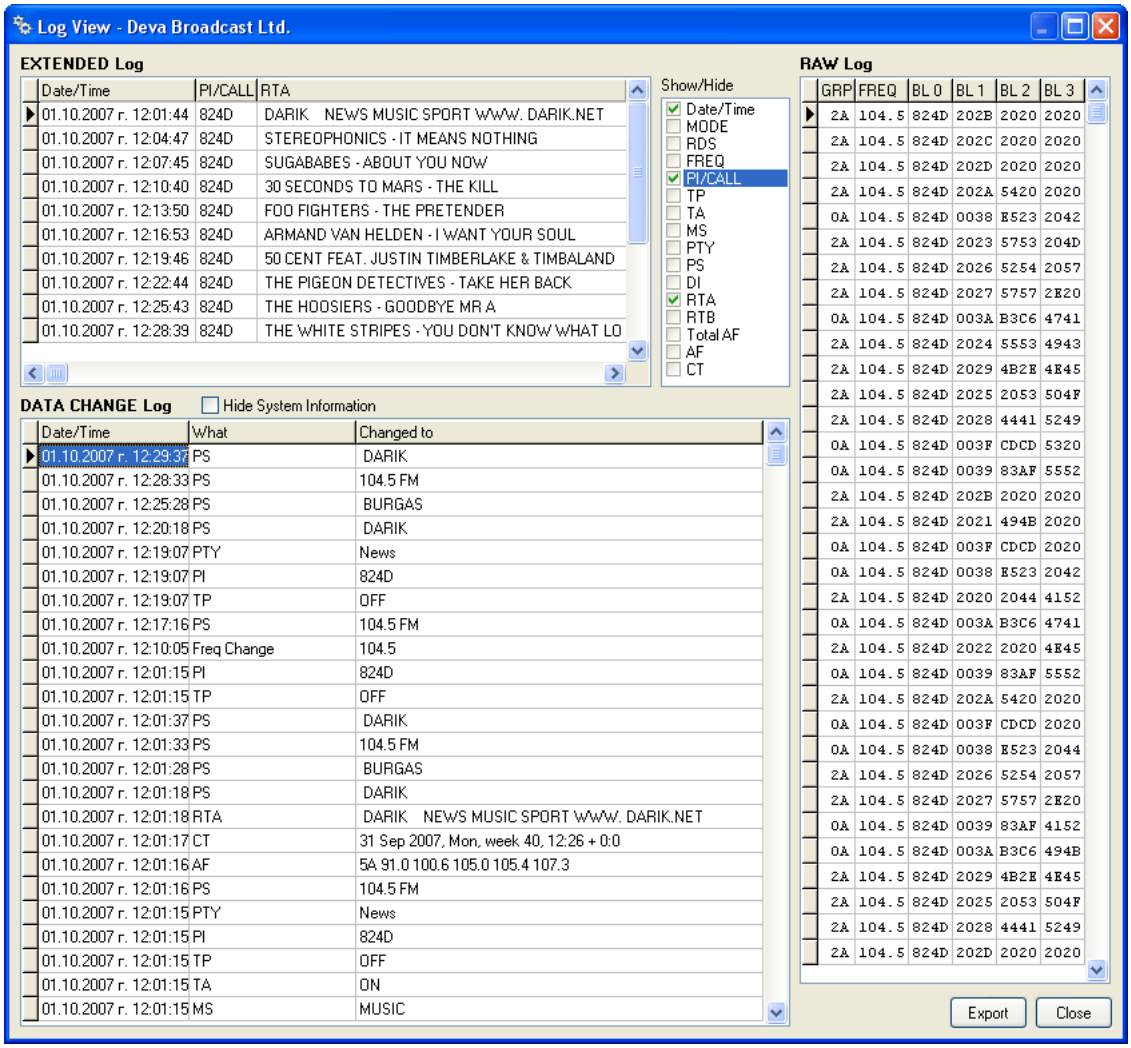
TRACKING THE HISTORY SAVED IN THE LOG



Using the **LOG VIEW** function makes possible to track and analyze all of the RDS data, saved in the history. Each one LOG provides access to all the actions and records made by a previously assigned schedule.

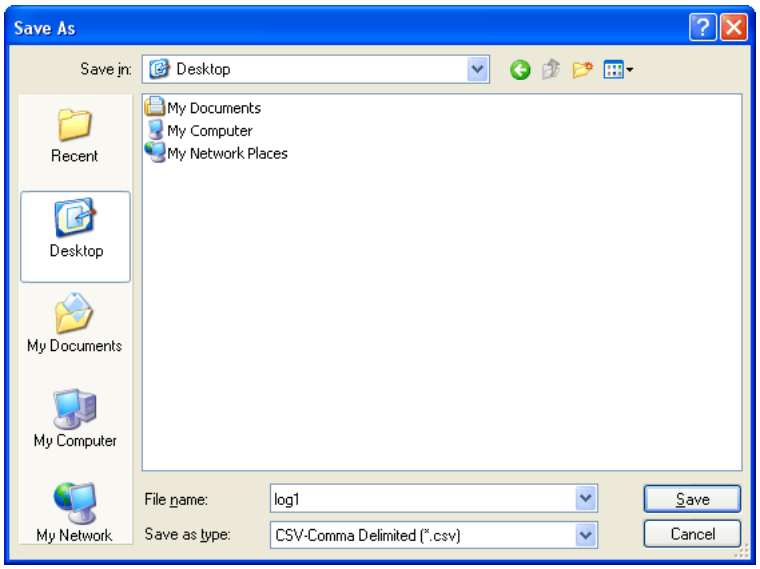
In the **Extended Log** sub window, is located the check box area required for selecting options for visualization of the columns.

In the **Data Change Log** you can hide all the System change messages. All the System messages carry information about the system's changes and have no direct influence on the RDS parameters reading.

LOG EXPORT

If you want to use the log for any other needs or just to save it as a file, use the EXPORT button and select the log which you would like to save. By default all the three logs available will be exported.

After making your choice is necessary to select folder and file name.



The software will automatically generate extensions to the selected name. In our example, 3 files such as these will be created: log1_change_log.csv, log1_extended_log.csv and log1_raw_log.csv. The file format is CSV and it can be opened and used with Microsoft Excel or any CVS-compatible software.

NOTE: Erasing or modifying of the exported files do not cause any influence to the normal program execution.

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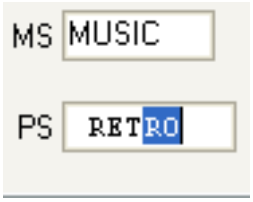
Specialities

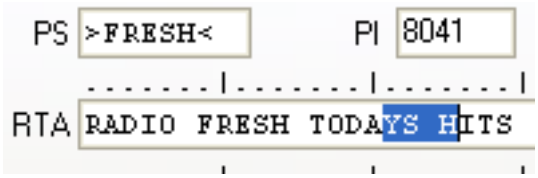
MAIN-PS OR 0AB-PS

Band Scanner program vizualizes PS in 2 different places - “Main” tab and “0AB” tab. At first glance, there is nothing in particular, but the difference is significant and may cause some misleadings!

In “Main” tab PS is visualized by “Whole PS” rule. “Whole PS” means that between 1-st and 8-th symbol there are no breakings. Even 1 missed symbol causes the rule to be wrong. This rule is used also when detecting “Change On” and in Band Analyzing.

In “0AB” tab “Whole PS” rule has no use - every arrived PS symbol is visualized, no matter of the previous one or its place. Clicking inside the PS field you will notice that selection moves across the field, indicating where the current symbols were inserted. Same “selection crawl” can be found on “Main” tab along with both RT fields.





NOTE: In case the RDS stream is coming with errors, the “Whole PS” rule will be wrong at most of the cases, even PS may not be shown at all.

WHERE MY ALTERNATIVE FREQUENCIES GONE?

Sometimes AF List on “Main” tab is constantly empty. Don’t panic, simply open “0AB” tab. There you’ll find the AF Analyzer Tool. So where has the AFs disappeared? Many reasons may exist, but we will pay attention to the most frequent 2:

A) The tuned station doesn’t transmit AF and/or “Declared AF” field reads 0 (zero).

B) The program can’t “catch” all AF repetitions (errors in the stream). But AF Analyzer reports some readings. First the number of AFs must be transmitted followed by the AFs as described in the RDS/RBDS Standard. In this case the announced number of AFs doesn’t cover the received AFs, thus the program can’t specify the full AF List and indicates nothing or “not transmitted”.

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Technical Matters

The Band Scanner is simple and small. It utilizes surface-mounted (SMD) components, some of which are 'application-specific'. Moreover, certain chips require 'firmware' programming. To a large extent this precludes servicing the unit in the field. For these reasons, and also because of the small format of this Manual, we have elected to dispense with the schematic diagram, servicing instructions and a parts listing. Because it is so small and light (and because it is not in the program signal path!), returning a product such as the Band Scanner for factory servicing is an option that we encourage. Deva Broadcast has never considered factory repair charges as a significant source of revenue; you would be astonished at how reasonable our rates actually are! Having said all that, our policy has always been one of 'full disclosure.' We feel that, unless you are doing something nefarious, there should be no reason to hide anything. With a clear conscience we will cheerfully provide additional documentation and divulge any secrets concerning the Band Scanner upon request.

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WARRANTY

I. TERMS OF SALE: Deva Broadcast 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 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.

C. 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 ONE YEAR 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's 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 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. Shipping charges will be reimbursed for valid Warranty claims. Damage sustained as a result of improper packing for return to the factory is not covered under terms of the Warranty and may occasion additional charges.

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PRODUCT REGISTRATION CARD

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

Your Company Name _____

Contact _____

Address Line 1 _____

Address Line 2 _____

City _____ State/Province _____ ZIP/Postal Code _____

Country _____

E-mail _____ Phone _____ Fax _____

Which Deva Broadcast 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 are truth and correct. Deva Broadcast declines any responsibility for the provided information that could result in an immediate loss of warranty for the above specified product(s).
Privacy statement: Deva Broadcast Ltd. will not share the personal information you provide on this card with any other parties.

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APPENDIX A

PTY Code Description Used in RBDS Mode - North America

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

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

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APPENDIX B

PTY Code Description Used in RDS Mode – Europe, Asia

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