MAINTENANCE AND OPERATION
INSTRUCTION MANUAL

Model DB5000

RDS/RBDS Radio Data Decoder with
TCP/IP, COM & USB Connectivity

R·D·S
RADIO DATA SYSTEM

DEVA®
BROADCAST

Contents

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Product Description

Model DB5000 is a full-function RDS/RBDS Radio Data Decoder with TCP/IP, COM & USB Connectivity. Incorporated MPX and Antenna Inputs, together with the most popular interfaces make Model DB5000 a multipurpose RDS Monitor. By joining together standalone and remote capabilities DB5000 relays Radio Data on a Front-panel LCD screen, a PC-driven Software or a Web Browser.

Product Features

- Full feature RDS and RBDS decoder
- Front-panel LCD screen
- COM & USB Connectors for Local Connectivity
- TCP/IP Connector for Remote Connectivity
- Front-panel Keyboard for Local Setup
- External composite MPX and RDS input
- Built-in Tuner
- E-mail Notifications on RDS absence, low RDS Level or low RF Level
- Any Web Browser becomes a remote station
- Easy installation and operation

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Product Specifications

FM Antenna input	
Connector	BNC on rear panel
Impedance	75 ohms
External attenuator	No
FM frequency	87.5-108.0 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 60dBµV without modulation
Dynamic	0 to 60dBµV
Attenuator	6dB built-in
MPX & RDS levels	
Multiplex level	Peak level displayed, 1000 samples over 1 second
RDS level	Mean peak level, 1000 samples over 1 second
Accuracy of MPX deviation display	+/- 5KHz, +/- 2KHz typ
Accuracy of RDS sub-carrier level display	+/-10% typical and not guaranteed
RDS/MPX Input	
Connector	BNC on rear panel
Amplitude	max 10Vp-p
RDS Data Decoding	
Standards	European RDS CENELEC United States RBDS NRSC
Error Correction	Yes
AF decoding	Yes
CT	Yes
PI, PTY, DI, MS	Yes
TA/TP	Yes
RT, PS	Yes
EON, PTYN, SLC, ODA	Yes
User interface	
LCD Screen	Monochrome LCD display, 2 lines with 40 characters each, front panel
Indicators	4 LEDs front panel, 1 LED rear panel
Keyboard	5 buttons, front panel
Communication	
USB	USB 2.0 compatible, B-type, rear and front panel
COM	RS-232, DB-9 female, rear-panel
LAN/Internet	Ethernet, RJ-45, rear panel

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Operating conditions	
Equipment operational between	10° and 40°C
EMC immunity	6V/m
Power Requirement	
Power supply	105–130VAC or 210–255VAC, 50/60Hz; 10W
Connector	IEC-320
Size and Weight	
Dimensions (W x H x D)	483 x 45 x 160 mm, 1U
Weight	3 kg

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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 DB5000.

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.

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MOUNTING

RACK REQUIREMENT

The DB5000 mounts in a standard 19-inch equipment rack and requires only 1¾ inches (1U) of vertical rack space. The use of plastic washers is recommended to protect the painted finish around the mounting holes.

HEAT DISSIPATION

Consuming less power than the light in a refrigerator, the DB5000 itself generates negligible heat. The unit is specified for operation within an ambient temperature range extending from freezing to 120°F/ 50°C. But because adjacent, less efficient equipment may radiate substantial heat, be sure that the equipment rack is adequately ventilated to keep its internal temperature below the specified maximum ambient.

MAINS VOLTAGE SELECTOR

Unless specifically ordered for export shipment, the DB5000 is set at the factory for operation from 230V, 50/60Hz AC mains. This can be confirmed by checking the designation next to the mains connector on the rear panel. The inappropriate voltage and fuse value will have been crossed out at the factory with an indelible felt marker. 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.

FUSEHOLDER

The fuseholder is inside the unit next to the voltage selector. Apply downward pressure and pull the cap outward to access the 5mm mains fuse. The cap is reseated by reversing the removal process.

POWER CORD

The detachable IEC-type power cord 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

RADIO FREQUENCY INTERFERENCE (RFI)

Although we have anticipated DB5000 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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Safety Precautions

IMPORTANT: *Carefully read this paragraph as it contains important instructions concerning operator safety and directions regarding the installation, operation and maintenance of the equipment. Failure to observe the safety instructions and information given in this manual constitutes an infringement of the safety rules and design specifications provided for this piece of equipment. DEVA BROADCAST Ltd. declines all responsibility if any one of the safety rules given herein is not observed. DEVA BROADCAST Ltd. declines all responsibility if the end-user resells the product. The equipment is to be used by people capable of operating it in a trouble-free manner and it is assumed that they are aware of the following safety rules.*

◊ Keep this manual with the utmost care and close at hand so that it can be consulted whenever needed
◊ After unpacking the equipment, check it for condition.
◊ Avoid banging the equipment.
◊ The packing material (plastic bags, polystyrene, nails, etc.) must never be left within the reach of the children, as these items are potential sources of danger.
◊ Do not use the equipment in places where the temperature is not within the recommended range, as specified by the manufacturer.
◊ Before connecting the equipment, make sure the nameplate specifications correspond to the mains electricity supply (the nameplate is located on the equipment enclosure).
◊ Do not remove the sticker from the equipment as it contains important specifications and the relevant serial number.
◊ To join the equipment to the mains supply, use the power cord purchased with the equipment.
◊ The equipment must be used only for the purpose it was designed for.
◊ Abuse or misuse of the equipment is extremely dangerous for people, pets and property. The manufacturer declines all responsibility for damage and injury resulting from improper use and mishandling.
◊ Certain basic safety rules must be observed when using electrical equipment, in particular:
  - Never touch the equipment with wet and/or damp hands or other parts of the body.
  - Keep the equipment away from drops of water or sprinkling systems.
  - Never use the equipment near high heat sources or explosive material.
  - Do not introduce any extraneous matter into the equipment.
  - Do not allow children or untrained people to use the equipment.
◊ Before cleaning or servicing the equipment outside, disconnect it from the supply and wait at least 2 seconds before working on it, as recommended by current safety regulations.
◊ In the event of faults and/or improper operation, turn off the equipment, shut off the electrical power and call your dealer.
◊ Do not attempt to make repairs and/or adjustments when covers/guards or circuit boards are to be removed.
◊ Call your dealer for any repairs and be certain original spare parts are used. Failure to observe this rule may adversely affect the safety level of your equipment.
◊ The equipment is to be connected to the mains supply and provided with adequate and efficient earth conductors.
◊ When installing, leave a clearance of at least 1 cm around the equipment to allow air to pass freely.

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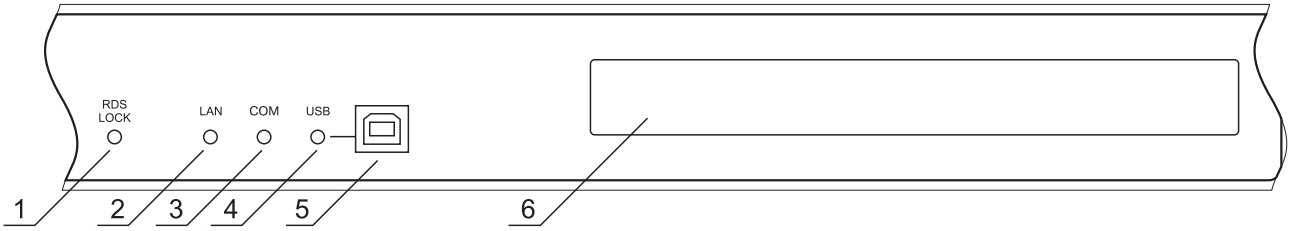
Panel Indicators and Appointments

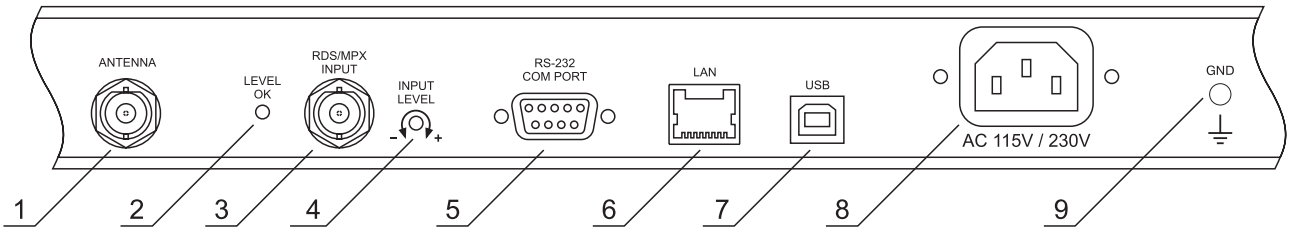
FRONT PANEL



1. RDS LOCK LED indicator - lights whenever the 57kHz RDS subcarrier is present and RDS data is actually received.
2. LAN LED indicator - lights whenever the unit is connected trough TCP/IP
3. COM LED indicator - lights whenever the unit is connected to the PC trough COM
4. USB LED indicator - lights whenever the unit is connected to the PC trough USB
5. USB Connector - B-Type, for interconnection with PC
6. LCD Display

WARNING: Simultaneous connection to Rear and Front USB Connectors is **NOT ALLOWED!**

REAR PANEL



1. ANTENNA INPUT Connector - BNC connector to feed built-in Tuner
WARNING: Do not feed Antenna Input directly from Transmitter Output!
2. LEVEL OK LED indicator - lights whenever a signal from RDS/MPX Input reaches 75kHz deviation (see RDS/MPX Input Level Control)
3. RDS/MPX INPUT Connector - BNC Connector for RDS/MPX signal
4. INPUT LEVEL Trimmer - for Level Adjustment (see RDS/MPX Input Level Control)
5. RS-232 COM PORT Connector - DB-9 Female, for interconnection with PC
6. LAN Connector - RJ-45, for interconnection with LAN/Internet
7. USB Connector - B-Type, for interconnection with PC
8. POWER SUPPLY Connector - IEC-320
9. GND Pin - Chassis Earth Ground

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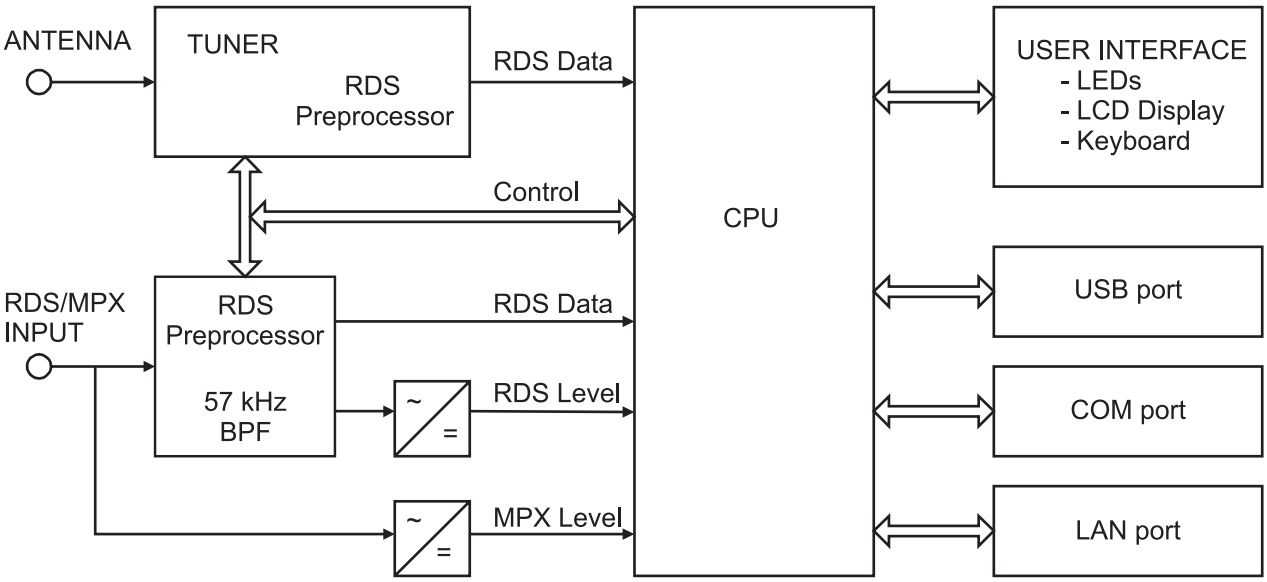
Block Diagram

Figure below, is a simplified Block Diagram of the Model DB5000. Because of the all-digital, minimalist-discrete-component nature of device circuitry, we have not provided schematic diagrams of the Model DB5000 in this Manual. As they say on the back of TV sets:

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



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Interconnections

ANTENNA INPUT

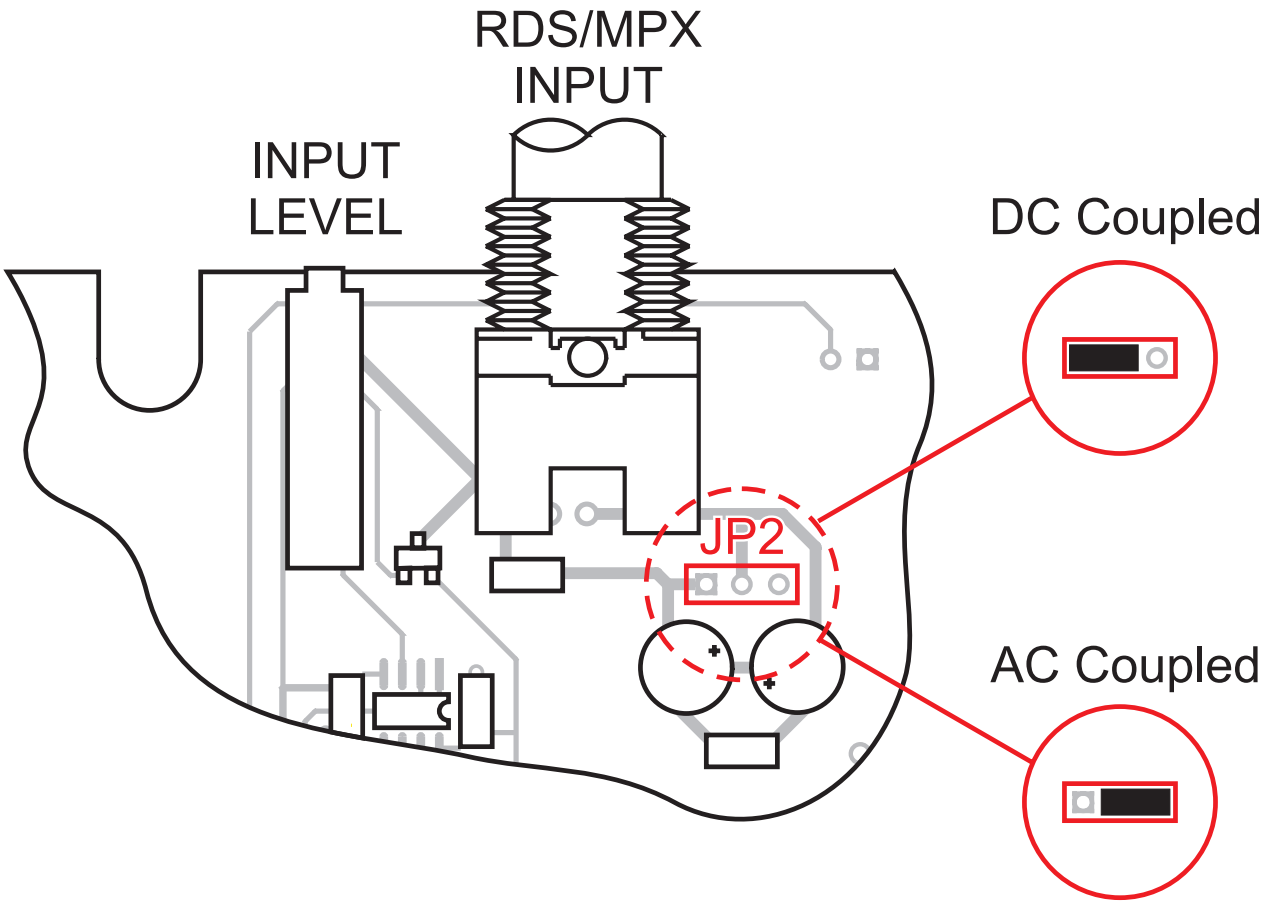
The Built-in FM Tuner Input is asymmetrical with 75Ω Impedance.

WARNING: The maximum input RF signal to the Antenna Input is 100 dBµV. Do not connect Model DB5000 directly to any FM Transmitter's MONITOR Output!

RDS/MPX INPUT

The rear panel RDS/MPX INPUT BNC connector may be fed from the composite/multiplex output of an off-air receiver or the station's Modulation Monitor. This is an unbalanced/bridging input that will accept a composite signal between 1 and 10 volts p-p, corresponding to full carrier modulation of ± 75kHz deviation.

The RDS/MPX INPUT may be configured for DC coupling. Referring to the jumper installation drawing, figure below, locate the 3-terminal jumper strip, located immediately to the RDS/MPX BNC connector on Model DB5000 circuit board. The shorting clip is positioned "left" for DC Coupled, and "right" for AC Coupled.



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USB, COM, TCP/IP

To utilize Remote or PC-driven interconnection with DB5000 it is necessary to connect one of the available communication connectors. Because Model DB5000 is intended to be a single-user device, thus only one connection is served at a time. Every connection has a predefined priority and will automatically disconnect any working connection with lowest priority. USB has the highest priority. TCP/IP has the lowest priority. COM is in between.

USB and COM connections are intended primary for device configuration, while TCP/IP is for remote monitoring. Immediate access to USB/COM connections defines their priority over TCP/IP.

NOTE: There is no warning while Model DB5000 changes its type of connection, which may lead to a confusion.

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Getting Started

RDS/MPX INPUT LEVEL CONTROL

A rear panel multiturn trim control labeled INPUT LEVEL adjusts the sensitivity of the Model DB5000. For basic RDS decoding and display, the setting of this control is not at all critical. As long as the front-panel RDS LOCK indicator lights solidly when an RDS station is tuned, data should be decoded accurately. However, one important function of the Model DB5000 is to display the injection level of the RDS subcarrier directly in percent of the total modulation. To be accurate this reading the trim control must be adjusted properly.

RDS/MPX INPUT CALIBRATION

The Model DB5000 is calibrated with reference to 100% (± 75kHz deviation) modulation. This requires a composite/multiplex input to the Model DB5000 that represents this 100% level. Some Mod-Monitors have an internal calibration source that will supply this signal from the Mod-Monitor's composite output connection. Otherwise, the transmitter exciter should be modulated directly with a sine wave source in the 1kHz to 10kHz frequency range, the test oscillator being adjusted to bring the exciter precisely to 100% carrier modulation, as shown by the station's Mod-Monitor.

During this calibration, the Stereo Generator and any RDS or SCA subcarrier sources must be disconnected so that the sine wave test source to remain the only source of transmitter modulation.

Alternatively, the test oscillator may be fed directly into the Model DB5000, making certain that the output is set to a peak level that precisely matches the 100%-modulation level expected by the receiver or mod-monitor.

With the appropriate 100%-modulation test signal feeding the RDS/MPX INPUT of the Model DB5000 follows the steps described below:

1. Cycle to Source Selection Page using the Up/Down Buttons from the front panel keyboard.

2. With Left/Right Buttons select EXT MPX. Asterisks (*) show the current selection.

3. While EXT MPX is selected press the OK Button. Press Right Button. Page with reading for MPX Level will appear:

4. Adjust the input level using the trimmer INPUT LEVEL from the rear panel, until the LCD Display reads 75kHz. Meanwhile the INPUT LEVEL Led on the rear panel will light up.

5. Input Calibration is finished. Press OK Button to return to Source Selection Page.

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Standalone Mode

NAVIGATION THROUGH LCD MENU

The Basics

Upon power-up, the LCD Screen shows the Company Logo and the Serial Number of the device.

After a few seconds the Initial screen disappears, replaced by Mandatory RDS Readings.

This is the starting point of the navigation process.

Before proceeding further in the menu structure it is important to notice the basic functionality.

The Keyboard that consists of Up, Down, Left, Right and OK Buttons is situated right-hand from the LCD Screen. To find out where to go, follow the flashing symbols, shown in the lower-right corner of the LCD Screen. Every symbol corresponds to a Keyboard Button and more specifically each symbol advises that the pressing of the Button will result a follow-up.

The Main Menu structure has an up-and-down basis, expanded with left-to-right branches. It is easy to reach every “corner” of the Menu, just by following the flashing symbols.

Menu Structure

The following block diagram shows expanded view of the menu structure. To switch over to the different pages use the denoted Buttons.

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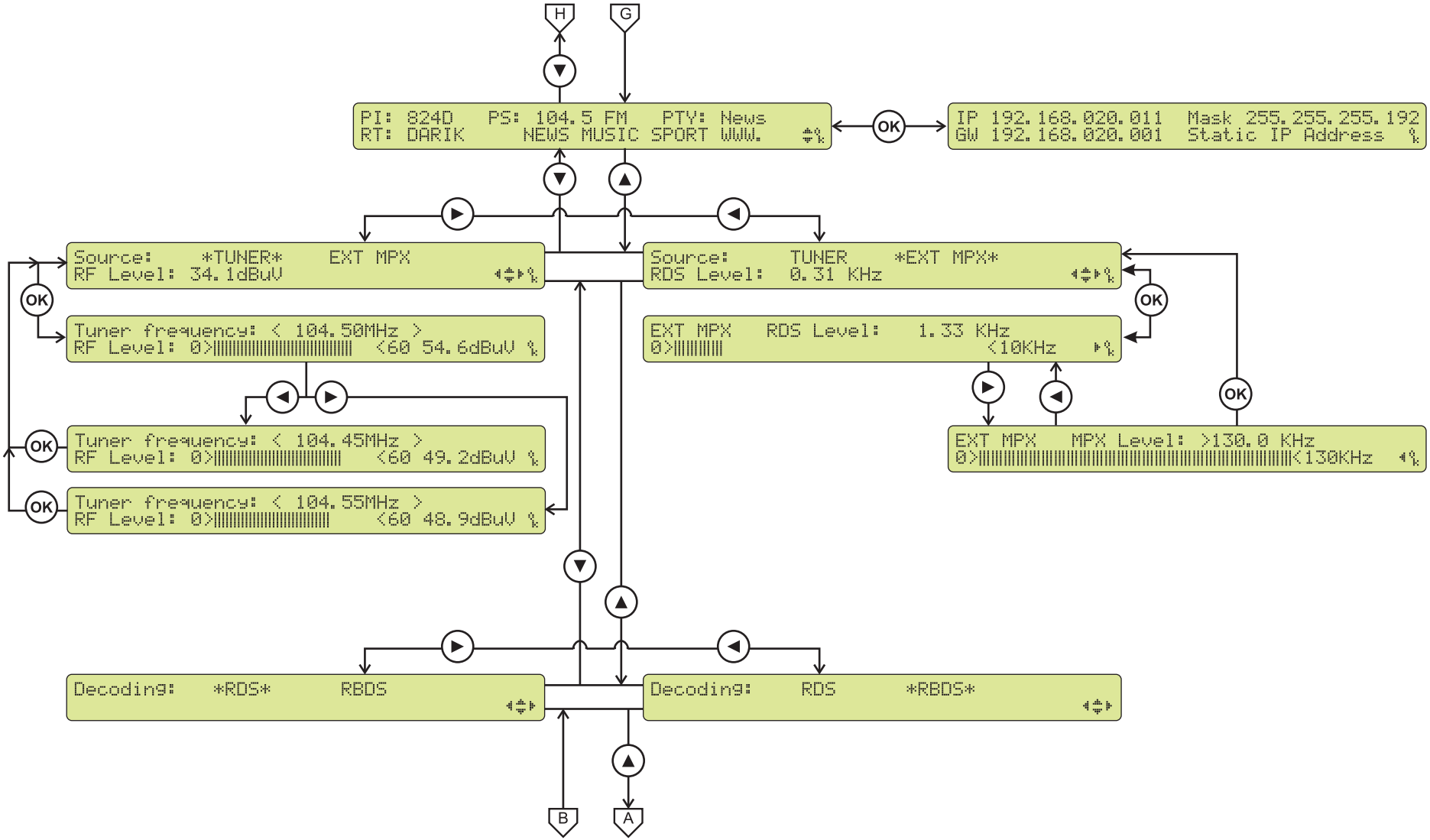

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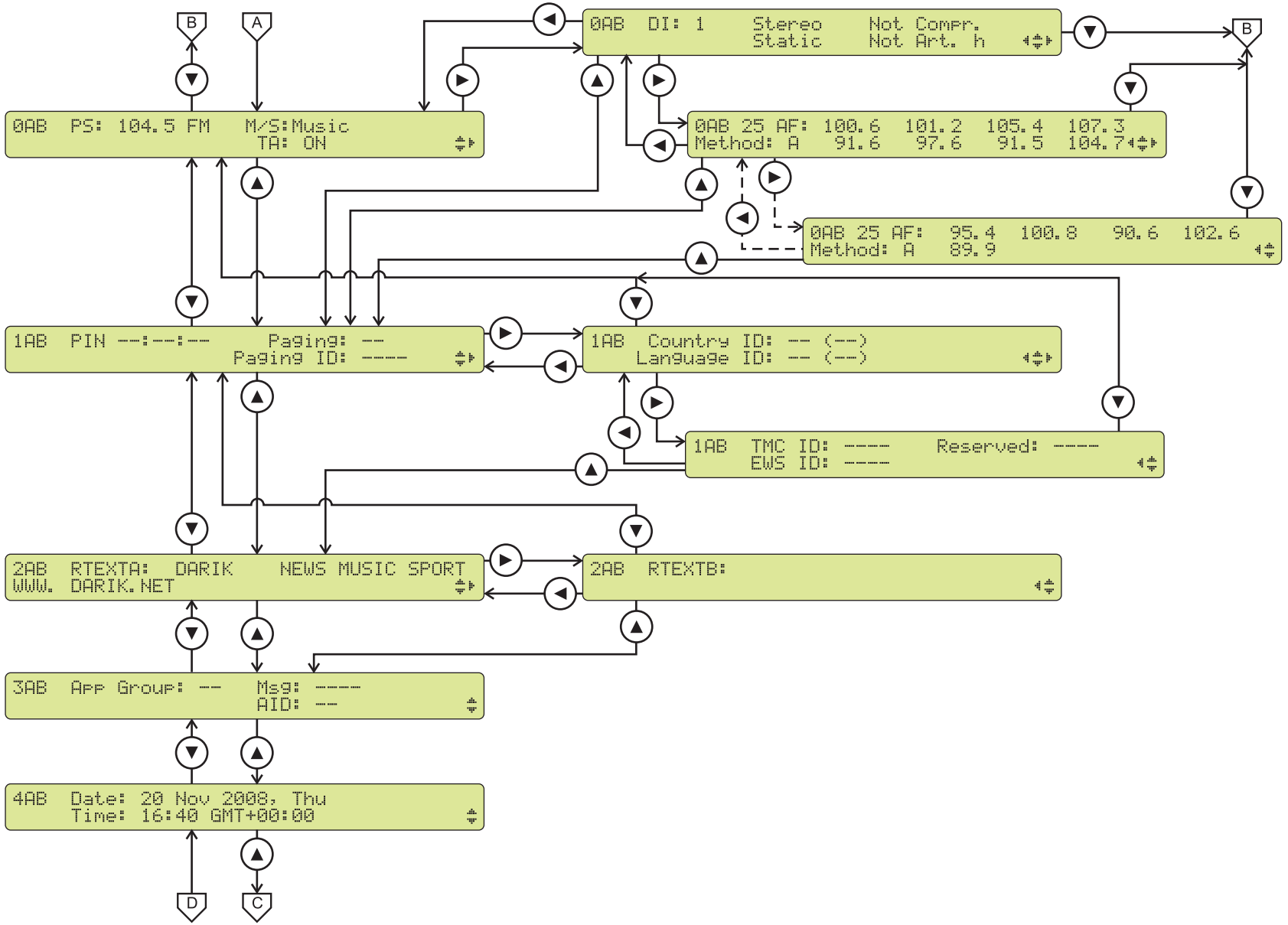

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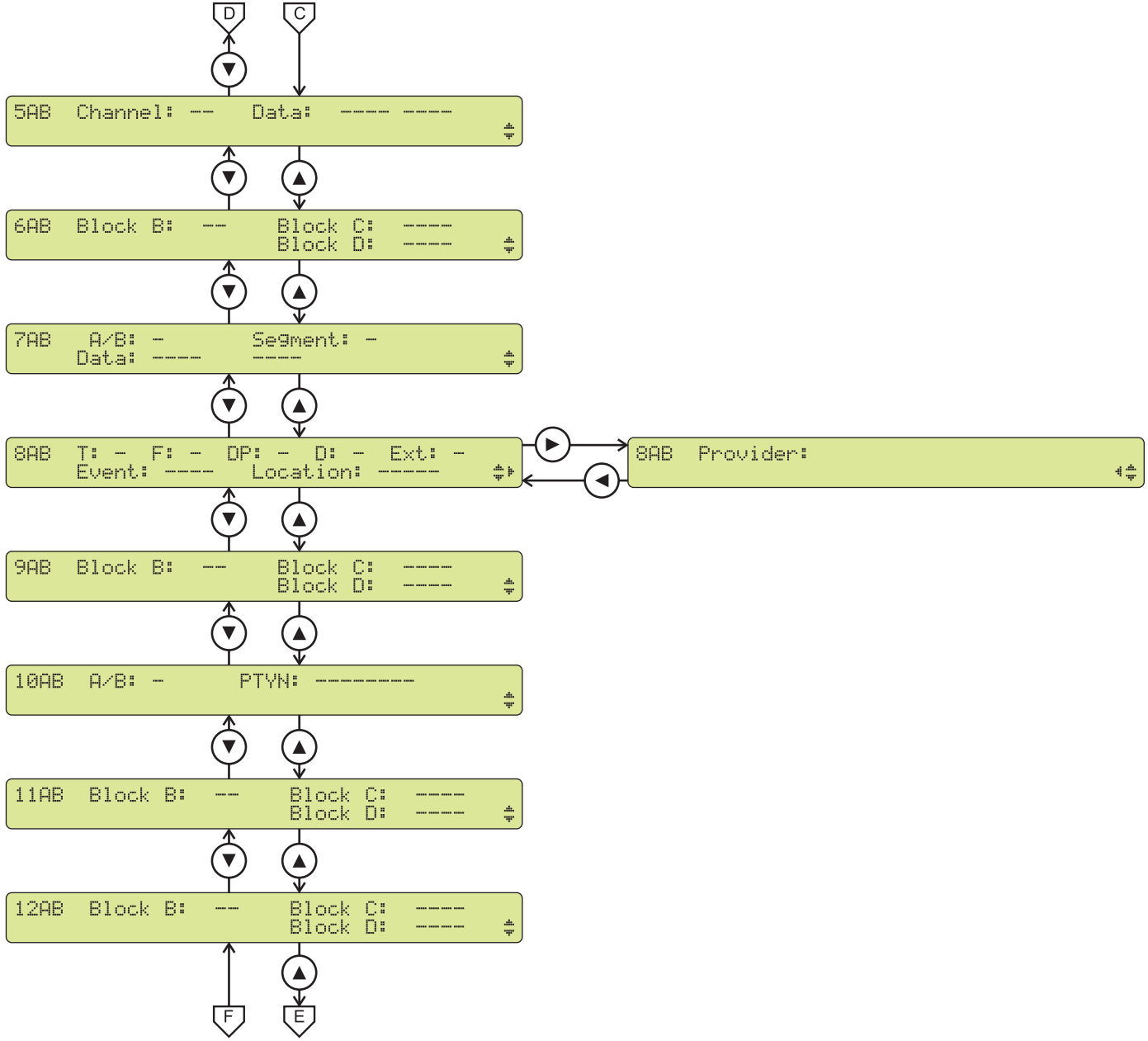

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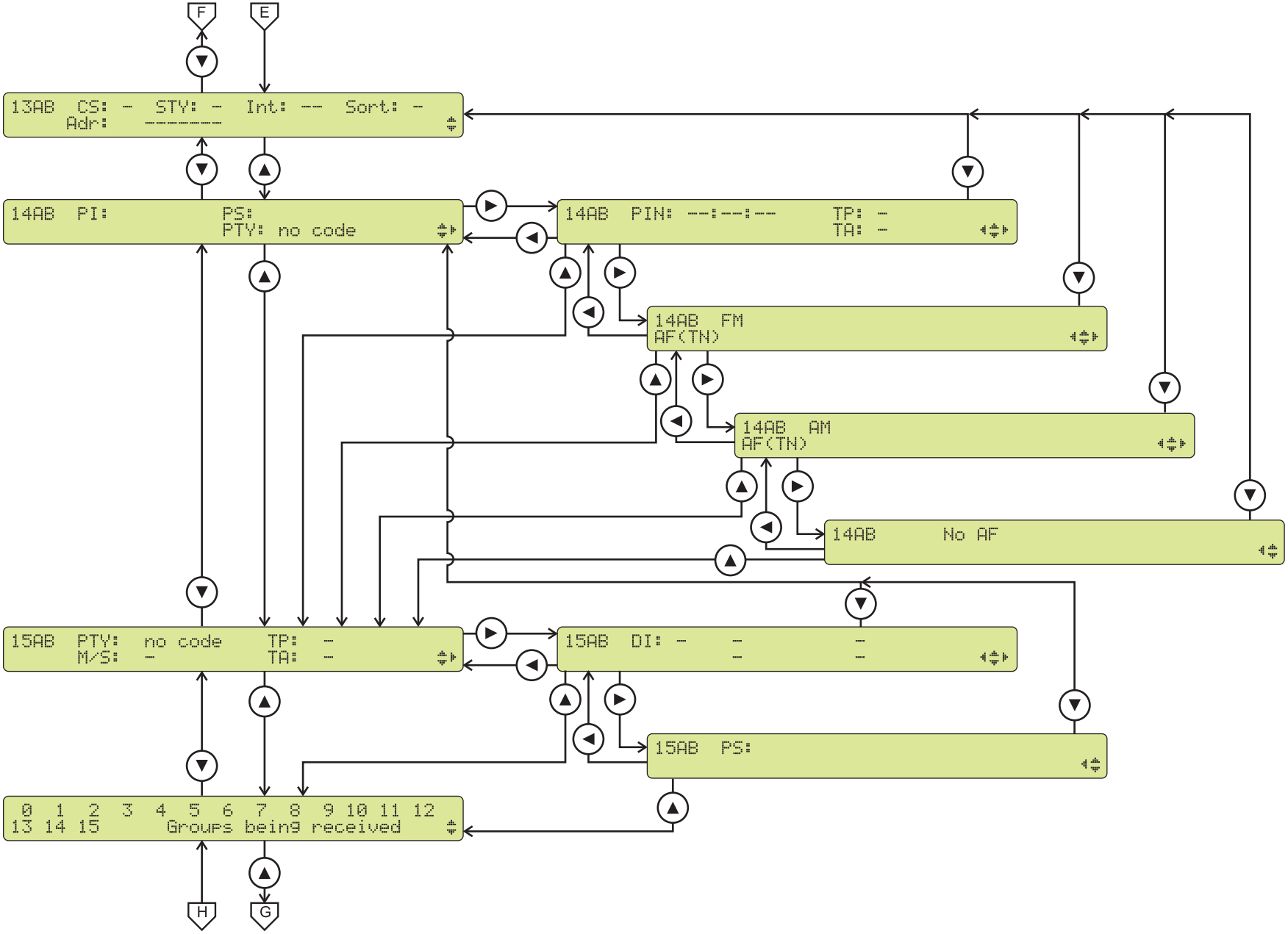

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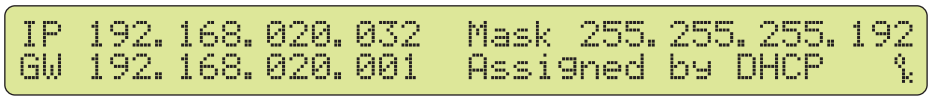
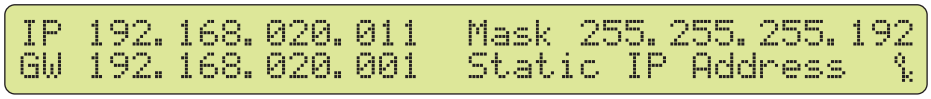
LCD MENU EXPLAINED

Main Screen with Mandatory RDS Readings

This screen shows PI, PS, PTY and RT(Radio Text), which are considered mandatory.
When RDS Lock is missing (see Panel Indicators) "...NO RDS SIGNAL..." will be shown.
Not until at least one character for RT is received "...BUFFERING..." will be shown.
By definition, Radio Text is up to 64 characters long. At the same time LCD Screen has its limitations, therefore a whole RT can not be shown. When RT exceeds the LCD's boundaries it will be scrolled from right to left.

TCP/IP Settings

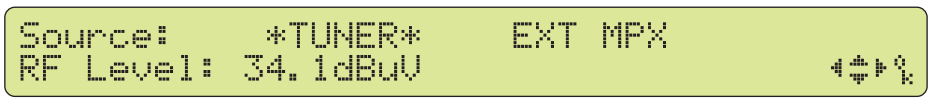




This screen is only informational and may be recalled by pressing the OK Button when the device is in Main Screen.
The IP settings are assigned by default automatically by Dynamic Host Configuration Protocol (DHCP), if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

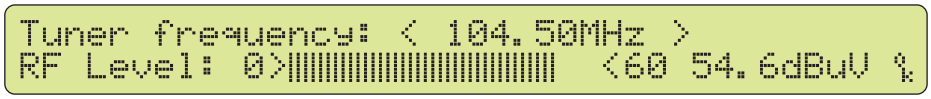
NOTE: TCP/IP Settings may be assigned only by the supplied Software.

Source



This screen shows the selected signal Source and the corresponding measurements.

Tuner Frequency



While Tuner is selected as Source, this screen shows Tuned Frequency. To change Frequency use Left and Right Buttons. For fast forward/backward hold desired button for a few seconds.

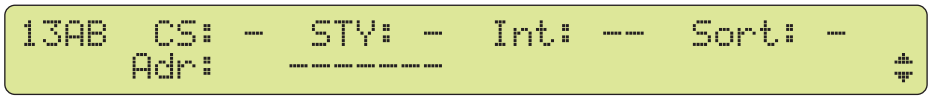
Decoding Standard

This screen shows selected Decoding Standard. (see What is RDS)

RDS - Group-by-Group

Every RDS Group has its own Screen, showing decoded information. To recognize desired Group among all the other screens look at the top-left corner where the Group Number is shown. Groups follow each after another in ascending order.

.
.
.



It is not within the scope of this Manual to offer a tutorial on RDS Groups. For this, see either the CENELEC EN50067 or the corresponding United States NRSC Standard.

Group Detector

This screen shows immediate reading of the existing groups. When group presence is detected, its corresponding number is shown.

This feature offers information about groups being transmitted and their approximate frequency. In case that a specific group information is required, it can be found in the dedicated Group's Screen.

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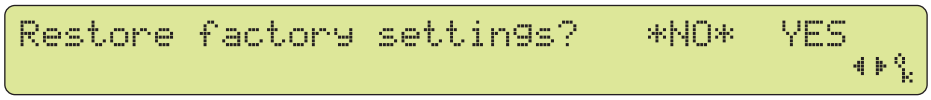
Restore Factory Defaults

When an emergency recover is necessary, which probably will never be used, Model DB5000 can Restore Factory Defaults from its non-volatile memory.

Disconnect/Remove all external appointments except the Mains Power. Press OK Button and hold it for 10 seconds. Following Screen should be displayed:



If intended to Restore Factory Defaults, select YES with Left/Right Buttons and press OK.

Default Settings include: Source, Tuner Frequency, Decoding Standard, Connection Password (set to DEVA), TCP/IP settings (IP set to 192.168.1.2, Mask set to 255.255.255.0), all automatic notifications via email are disabled.

WARNING: Preform Emergency Recover with caution because any remote users would not be aware, hence they may cease to communicate with device.

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Managed Mode

Model DB5000 is supplied with managing software called DB5000 Device Manager. The Software can utilize single device as well as multiple devices situated across different sites. Most of the device settings are accessible only from the software, nevertheless the device can work independently from the software. DB5000 Device Manager grants easy way to monitor one or multiple devices. Observing RDS readings, performing band analyze and having fast glance on device statuses are essential benefits of the software.

Model DB5000 has a feature to send e-mails upon predefined conditions - missing RDS signal, RDS or FM level out of tolerance, but the parameters can be altered only by the software.

DB5000 Device Manager could perform extensive Logging per device, which can be inspected later.

CONNECTION PRIORITY

Model DB5000 has TCP/IP, COM & USB Connectivity. Device Manager is capable to maintain each connection independently. The single-user nature of the device prevents simultaneous connections, but the priority of each connection is controlled by the device, not from the software. (see Interconnections)

USB has the highest priority. TCP/IP has the lowest priority. COM is in between.

While a Connection is under way, any other with highest priority will disconnect it. Once disconnected, the reconnecting must be managed manually.

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Minimal System Requirements

Pentium(R) Processor or Compatible
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 Model DB5000 to a computer. Be sure to observe this sequence to ensure proper operation.

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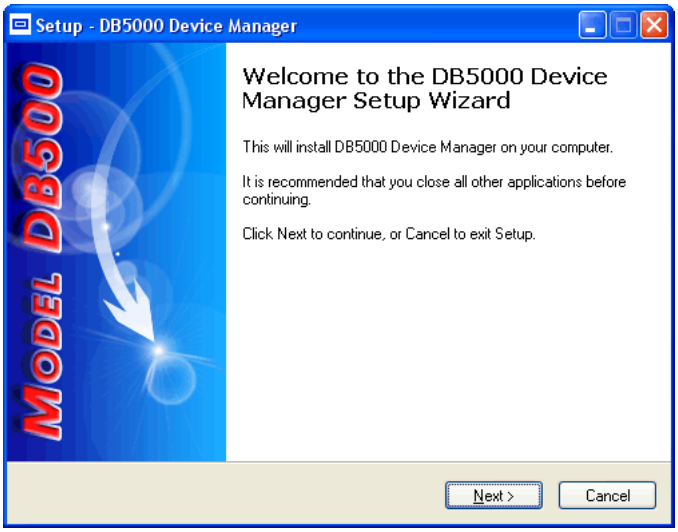
Installing the Software

NOTE: To avoid hardware conflicts and connection problems, install the software before attempting to connect the device 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: DB5000_Device_Manager.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.

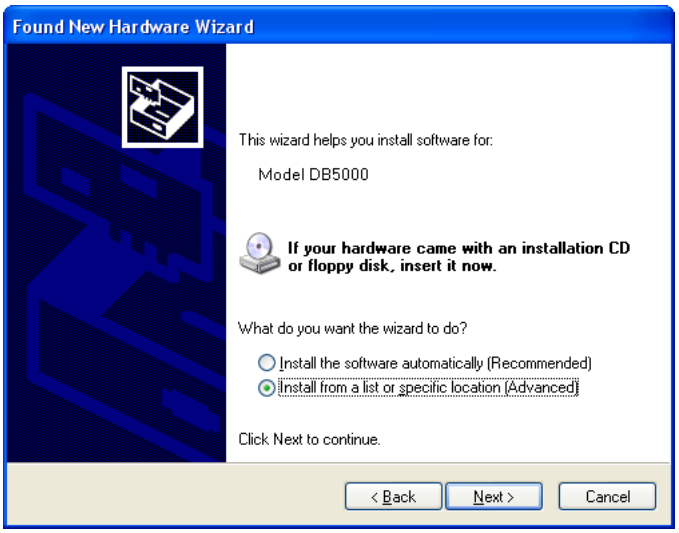
Next, follow the procedure below to install the USB driver.

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 Model DB5000 through the front-panel USB port. The station's 'utility laptop' or other machine used for quick, local decoder setup must have both the programming software and the USB driver installed.

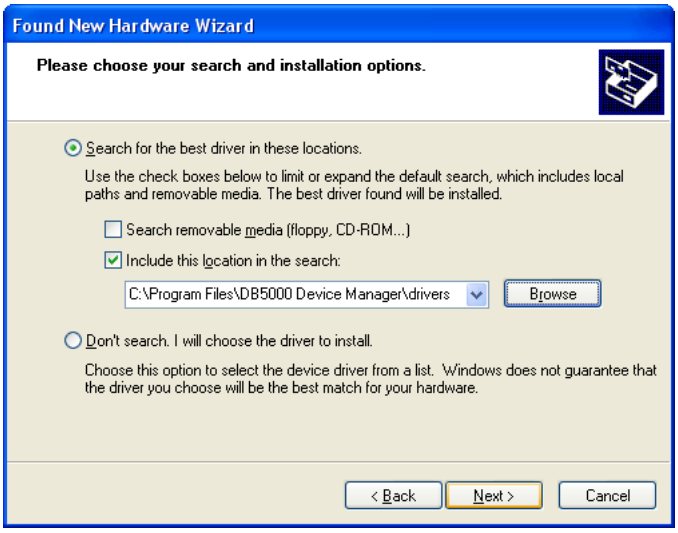
When the software was installed, the USB driver was put into a folder within the DB5000 program path. With a normal installation (as described above) under Windows® XP, the driver will have been located here: My Computer / Local Disk (C:) / Program Files /DB5000 Device Manager / Drivers.

Use the following steps to install this driver:

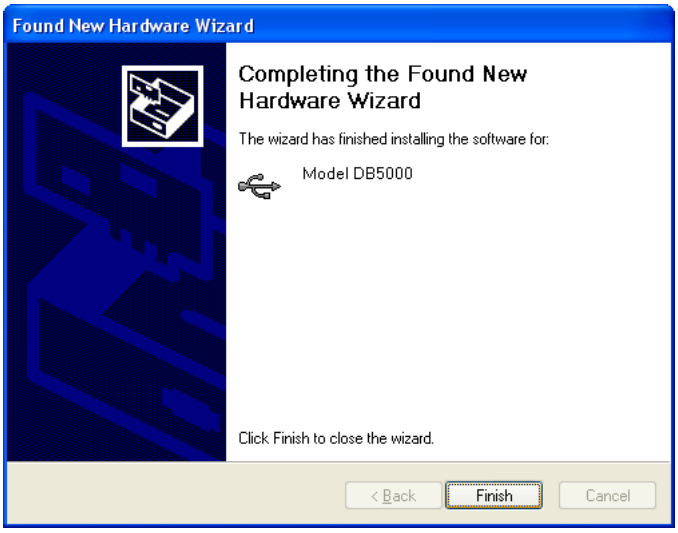
1. With the DB5000 powered-up, connect the front/rear-panel USB port to the computer using the cable supplied. This should immediately bring up a New Hardware notification above the computer Taskbar and start the Found New Hardware Wizard. Select “No, not this time” and then Next>. Select “Install from a list or specific location (Advanced)” and then Next>.



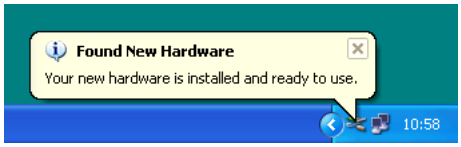
2. This next screen verifies the location of the driver, which resides in folder where the software is installed. Click: Next>.



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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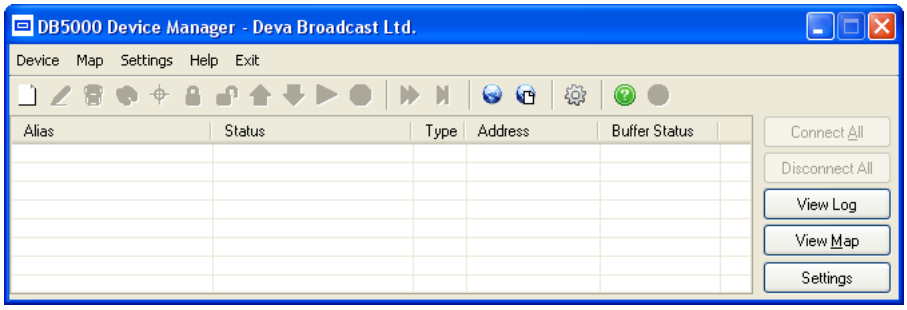
Using the DB5000 Device Manager

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\Programs\DB5000 Device Manager\DB5000 Device Manager.

The main application window looks as shown below:



Most of the functions are disabled because this is Device Manager and no devices are listed.

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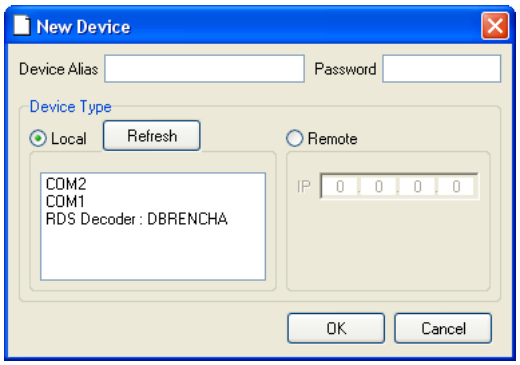
NEW DEVICE

To define a New Device:

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

The following prompt will appear:



Fill up Device Alias, which best suits you. Enter Password, used for establishing connection with the device. Select Device type: Local for COM and USB devices, Remote for TCP/IP devices.

Device Alias is intended to be unique for each device, and to recall the general idea for the device location (site, town, country, etc.).

Password is exactly 4 characters long, case sensitive, including small, capital letters, digits and punctuation marks.

ATTENTION: Default password is 'D E V A'. Regarding security, please change it without further delay upon startup device installation.

Device Type defines what kind of connection will be utilized for the device. Once device is registered with a particular type of connection, this connection will no longer be shown/allowed, until device or connection removal.

NOTE: One and the same device may be registered with different connection types, but only one connection may be utilized at a time. See Connection Priority.

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EDIT DEVICE

To Edit Device select a device from Device List and:

- press  (Edit Device Button);
- or select 'Edit Device' from Device Menu;
- or press F2;

The following prompt will appear:

Here Device Alias can be changed as well as Password and IP address only if Device Type is TCP/IP.

Any changes must be confirmed with Old Device Password, otherwise they will not be accepted.

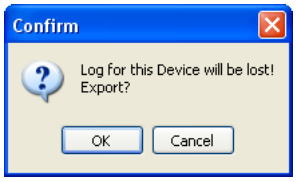
REMOVE DEVICE

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

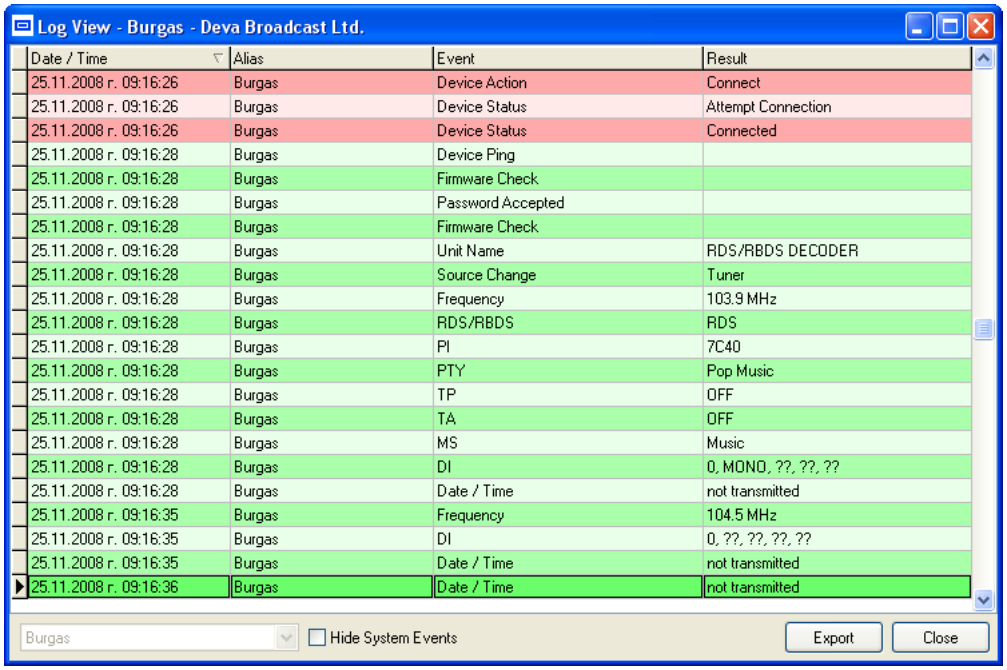
- press  (Remove Device Button);
- or select 'Remove Device' from Device Menu;

You will be prompted for confirmation.

If confirmed with OK, prompt for Log Export will appear:



Upon confirming the Log View will appear, showing only records considering the selected device.



Press 'Export' button to save the showed records into Comma Delimited (CSV) format.
See Log Capabilities for further Log explanations.

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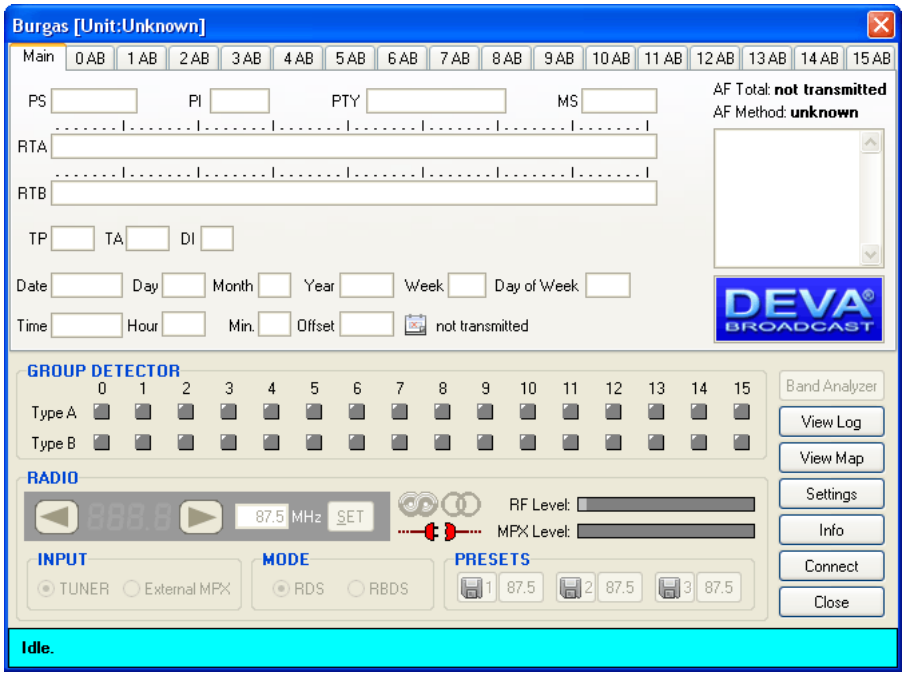
VIEW DEVICE

To View Device select a device from Device List and:

- press  (View Device Button);
- or select 'View Device' from Device Menu;
- or press F3;

Device Control Window will appear:



Functions represented here will be discussed later. See Device Control Window.

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LOCATE ON MAP

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

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

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

LOCK & UNLOCK POSITION

To Lock/Unlock Device Position on Map select 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 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.

While Lock is straight forward, Unlock requires password confirmation.

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

MOVE UP & DOWN

To Move Device Up/Down (rearrange) select 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 meaning to rearrange them along the Device List, supposing some devices requires significant attention and can be found right away at the top of Device List.

Device order is considered upon startup while 'Connect & View All Devices on Startup' option is selected (See Program Settings). Device on top of the Device List will be showed and connected first, whereas the bottom one will be the last.

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CONNECT & DISCONNECT DEVICE

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

- respectively press  (Connect Device Button) or  (Disconnect Device Button);
- or select 'Connect Device' / 'Disconnect Device' from Device Menu;
- or press Ctrl-C (for Connect) or Ctrl-D (for Disconnect);

Connect and Disconnect permits each other, i.e. Connected device could be only Disconnected and vice versa.

CONNECT & DISCONNECT ALL

To Connect/Disconnect all available devices:

- respectively press  (Connect All Button) or  (Disconnect All Button);
- or select 'Connect All' / 'Disconnect All' from Device Menu;
- or press Ctrl-A (for Connect All);

While Connecting All, already connected devices will remain connected, i.e. connection will not be reset.

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VIEW MAP

To View User Defined Map:

- press  (View Map Button);
- or select 'View Map' from Map Menu;
- or press F5;

This will open User Defined Map (See Map). If Map is undefined yet, New Map dialog will appear.

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, which can be either JPEG (.jpg, .jpeg) or Bitmap (.bmp).

WARNING: Existing Map will be lost. Don't misuse with extremely big pictures, which may lead to low performance and undesired effects.

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: 
- under Program Setting, press 'Clear Map' Button;

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

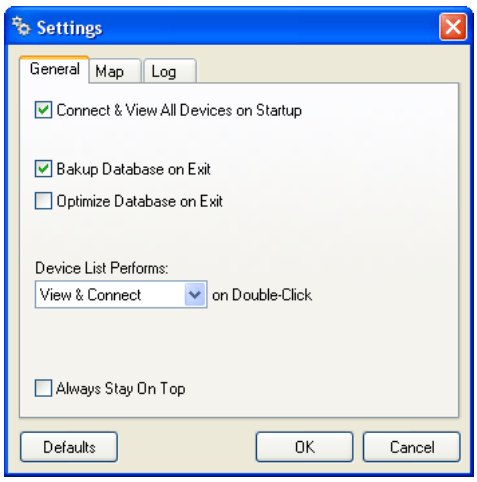
Program Settings

To Open Program Settings:

- press  (Settings Button);
- or select 'Settings' form Settings Menu;
- or press Ctrl+O;
- or press 'Settings' Button from main application window;

NOTE: Program Settings are global, not per device.

GENERAL SETTINGS



Connect & View All Devices on Startup

Upon program startup if this option is selected, all registered devices will open their Control Window and perform Connection.

Backup and Optimize Database on Exit

Over time Database keeps growing, mainly if Log capabilities are active. To reduce Database size select 'Optimize' option. To produce a backup copy of the Database select 'Backup' option.

Device List Performs on Double-Click

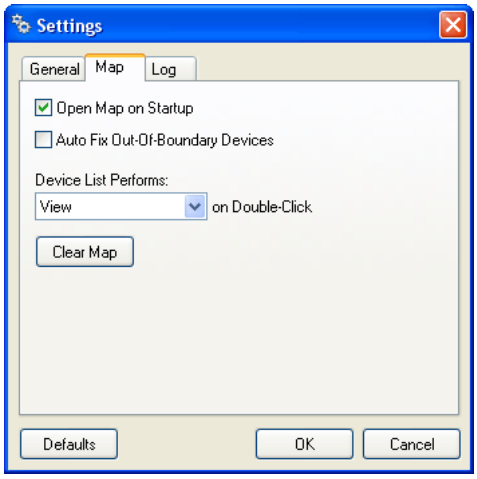
This option associates selected action when double-clicking is performed over the Device List. Available options are:

- Edit - brings Device Edit Dialog;
- View - opens Device Control Window (See View Device);
- View & Connect - simultaneously opens Device Control Window and performs Connect;
- Connect/Disconnect - toggles Connection;

Always Stay On Top

Program always stays on top of other programs.

MAP SETTINGS



Open Map on Startup

Opens Map when Program starts. If User Map is not defined this option is meaningless.

Auto Fix Out-Of-Boundary Devices

Every Map is defined by its size, thus changing bigger with smaller one may lead to 'ghost' devices. Because device positions are not affected when Map is changed, this option allows automatic device reposition. When device is positioned outside of Map's boundaries and Auto Fix is selected, device is automatically positioned at top-left corner of the map.

Device List Performs on Double-Click

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

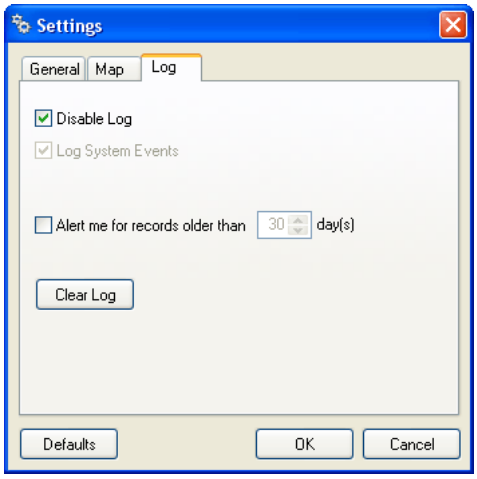
- View - opens Device Control Window (See View Device);
- Connect/Disconnect - toggles Connection;

NOTE: Don't confuse Map's Device List with Main Application Device List, although they represent equal devices, their functionality is different.

Clear Map

Empties Map Picture. Devices keeps their current positions.

LOG SETTINGS



Disable Log

Disables all Log Capabilities.

NOTE: This affects all available devices i.e. no matter what are independent log settings for the device they will be disabled.

Log System Events

If selected, all system-wide events will be logged, including device creation & deletion, program start & stop and etc.

Alert me for records older than

This option is considered upon program startup. Records from Log, which are older than specified days will be prompted for deletion and export.

Thinking of this option as Auto-sweep, Log capacity may be kept consistent by duration, as well reducing the Database size.

NOTE: Record age is compared against most recent Record, not against System time.

Clear Log

Clears entire Log. Before Clearing export option is prompted.

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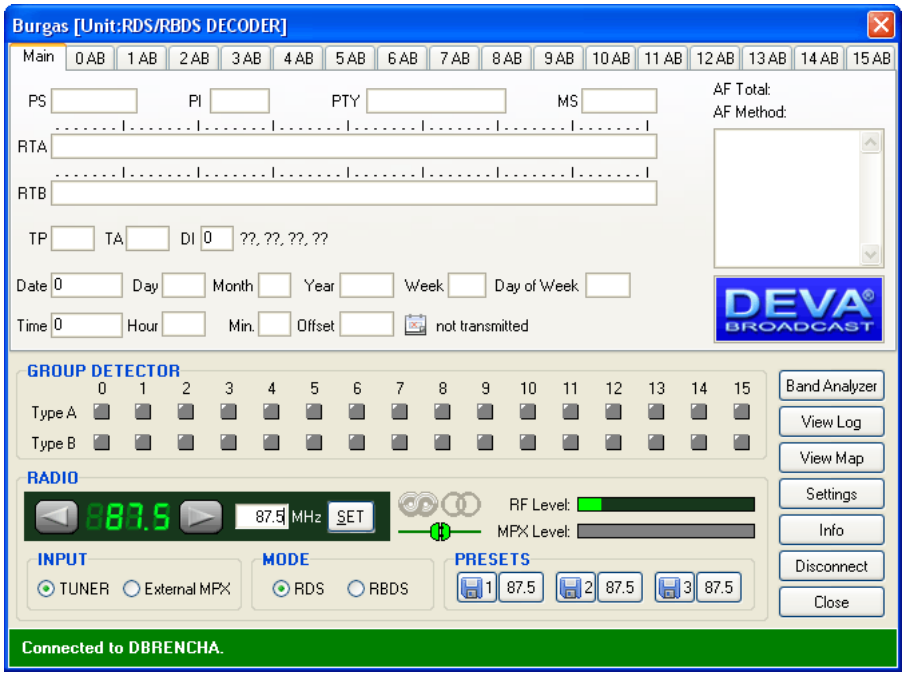
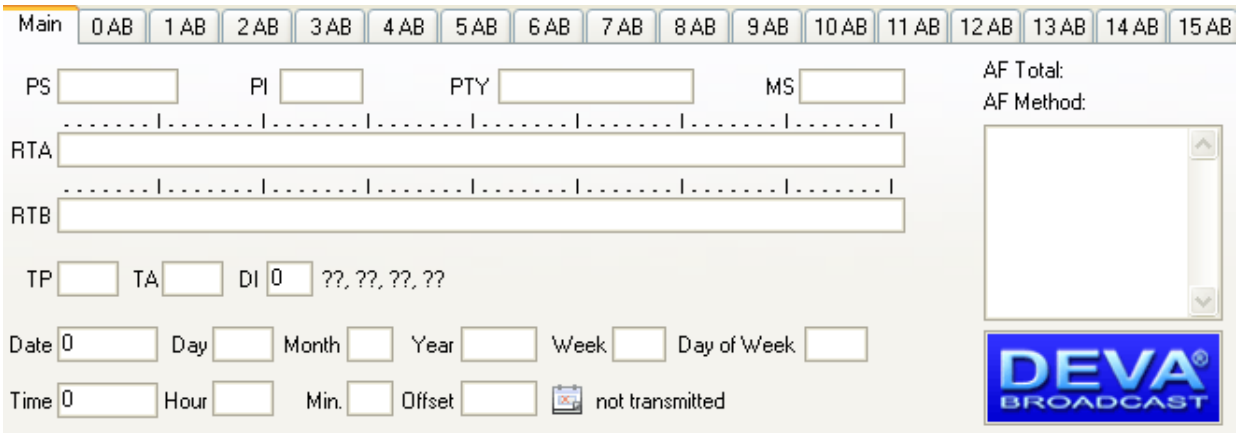
Device Control Window

Every device has its own Control Window, which encloses device specific funtions and readings. While device is not connected most of the functions and buttons will be disabled, otherwise Control Window looks like this:



SECTION "MAIN" WITH ALL MANDATORY RDS FUNCTIONS

In this section are visualized 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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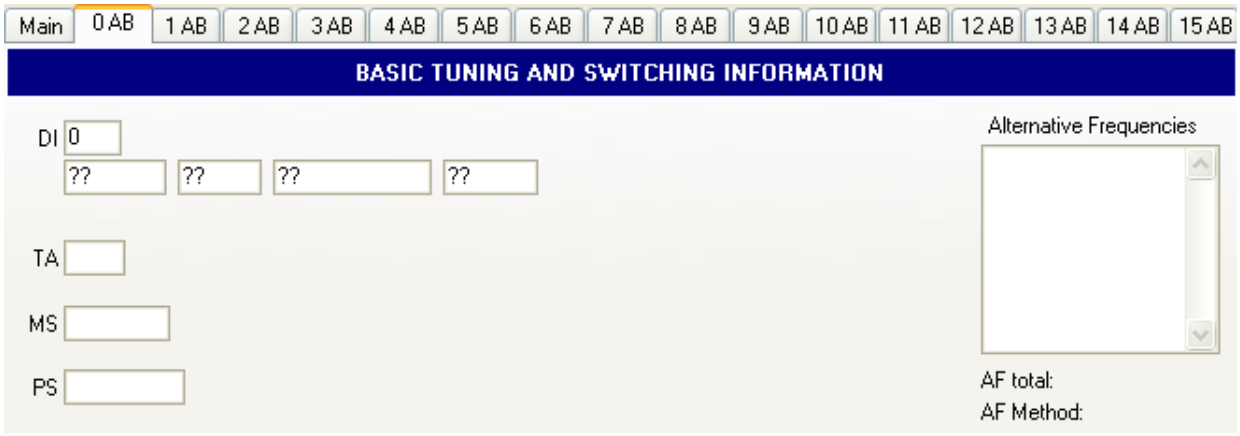
TYPE 0A & 0B GROUPS: BASIC TUNING AND SWITCHING INFORMATION

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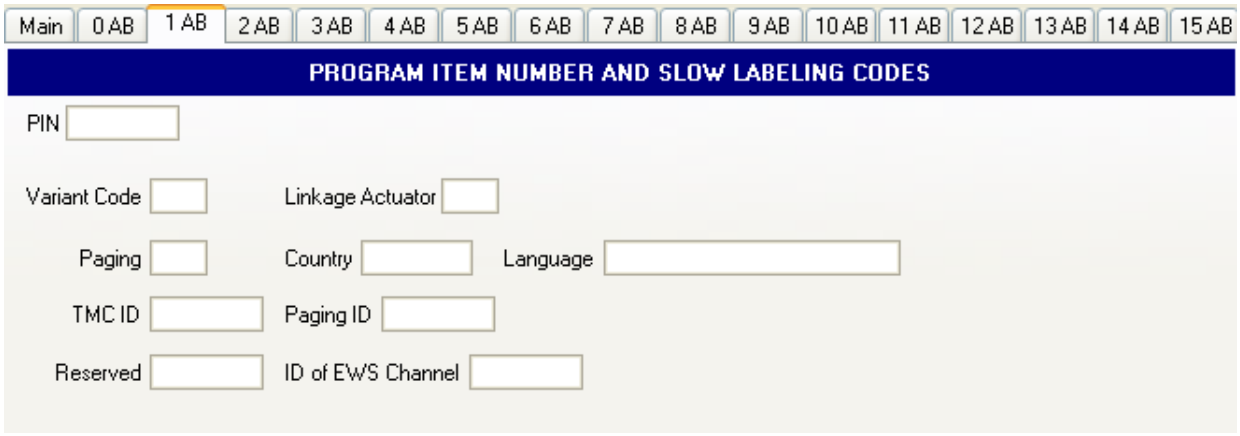
TYPE 1A & 1B GROUPS: PROGRAM ITEM NUMBER AND SLOW LABELING CODES

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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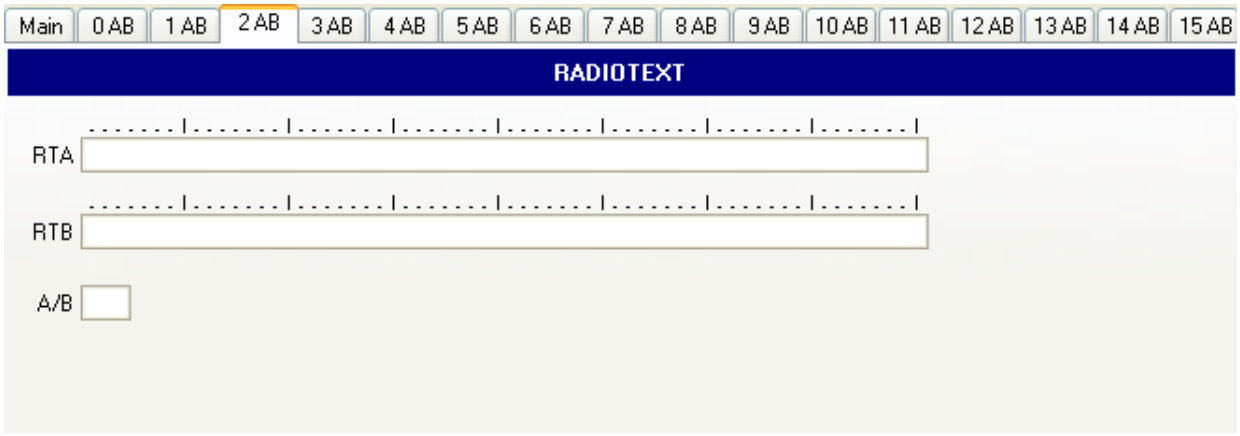
TYPE 2A & 2B GROUPS: RADIOTEXT

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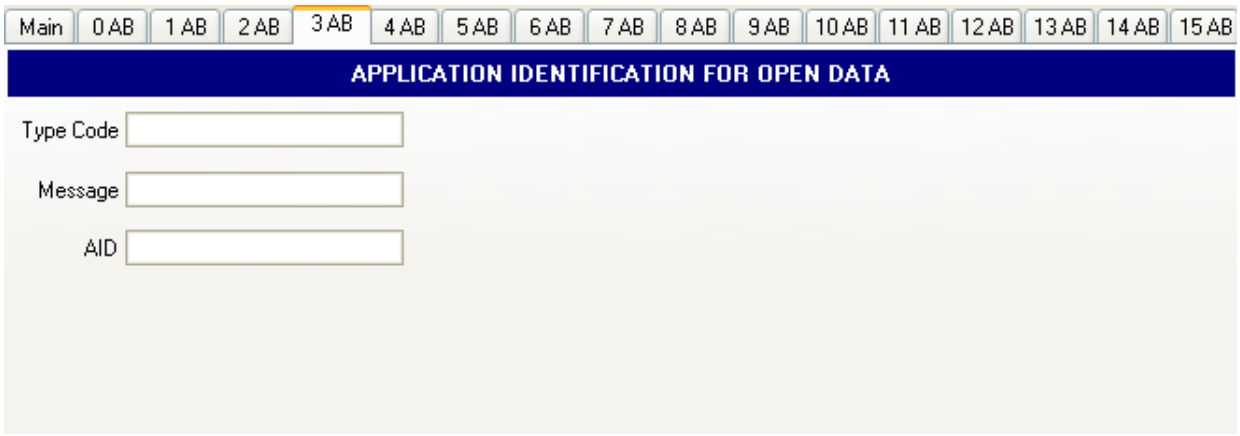
TYPE 3A & 3B GROUPS: APPLICATION IDENTIFICATION FOR OPEN DATA

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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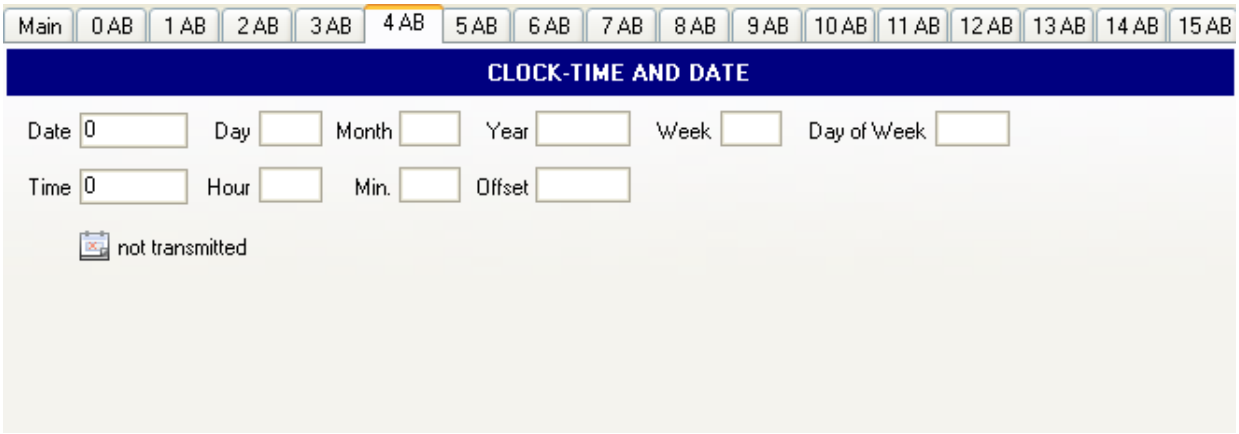
TYPE 4A GROUPS: CLOCK-TIME AND DATE

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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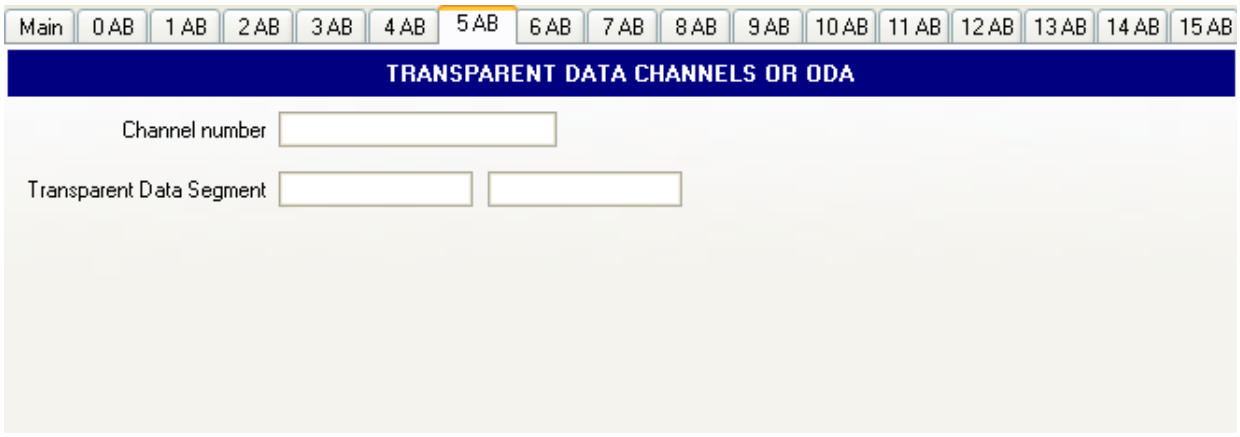
TYPE 5 GROUPS: TRANSPARENT DATA CHANNELS OR ODA

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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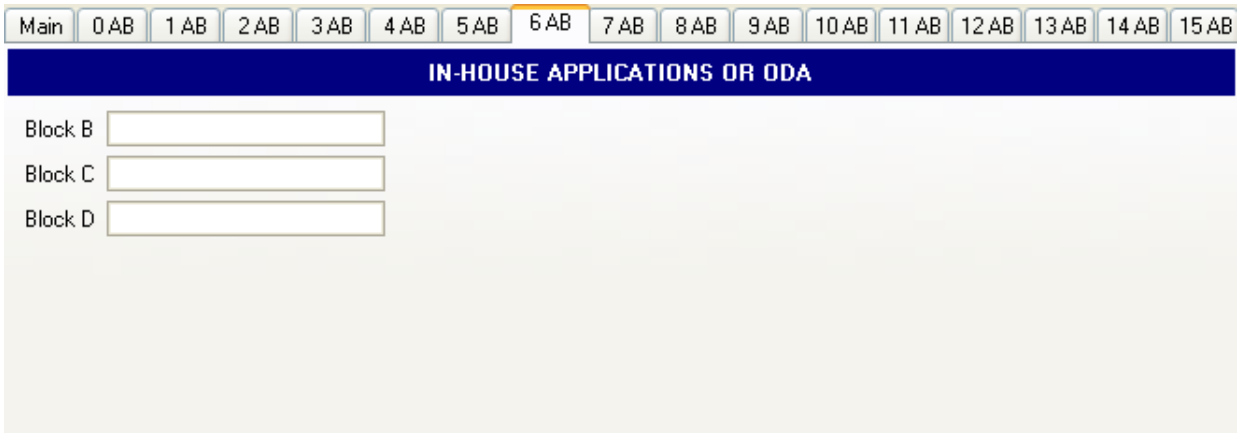
TYPE 6 GROUPS:
IN-HOUSE APPLICATIONS OR ODA

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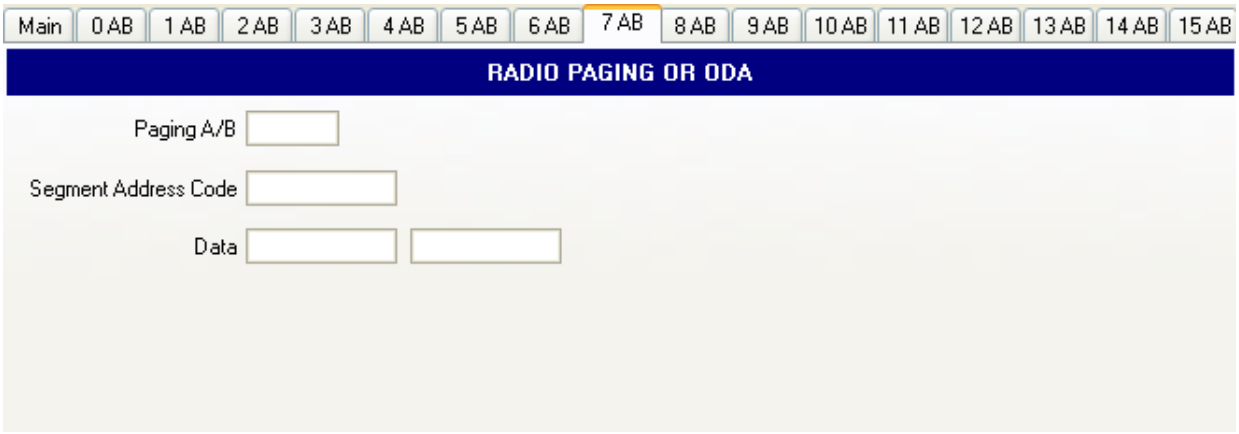
TYPE 7A & 7B GROUPS: RADIO PAGING OR ODA

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



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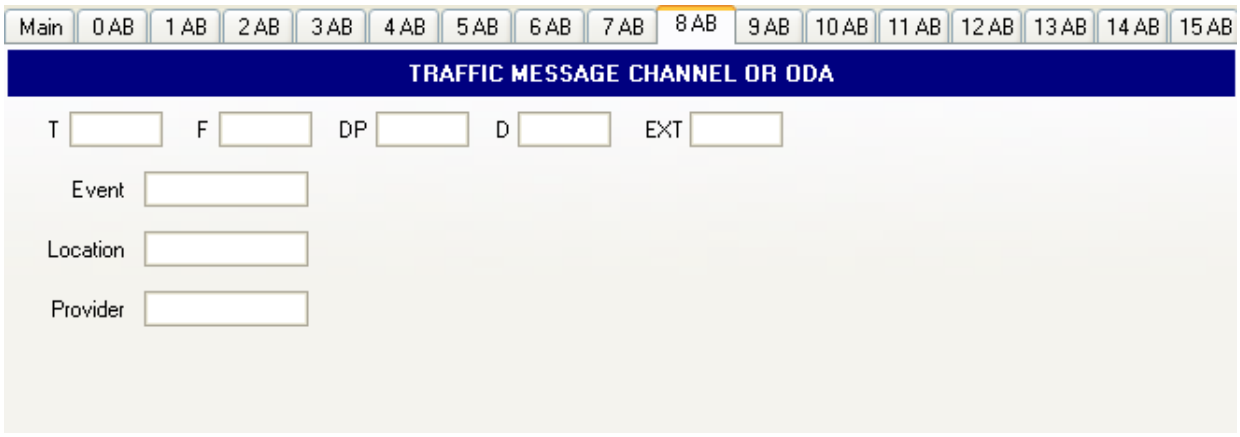
TYPE 8 GROUPS:
TRAFFIC MESSAGE CHANNEL OR ODA

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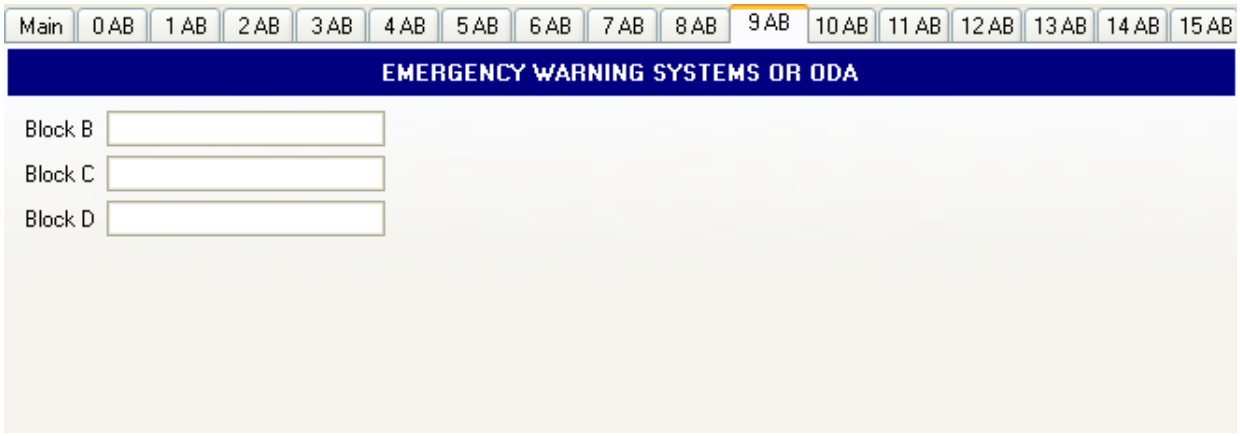
TYPE 9A & 9B GROUPS: EMERGENCY WARNING SYSTEMS OR ODA

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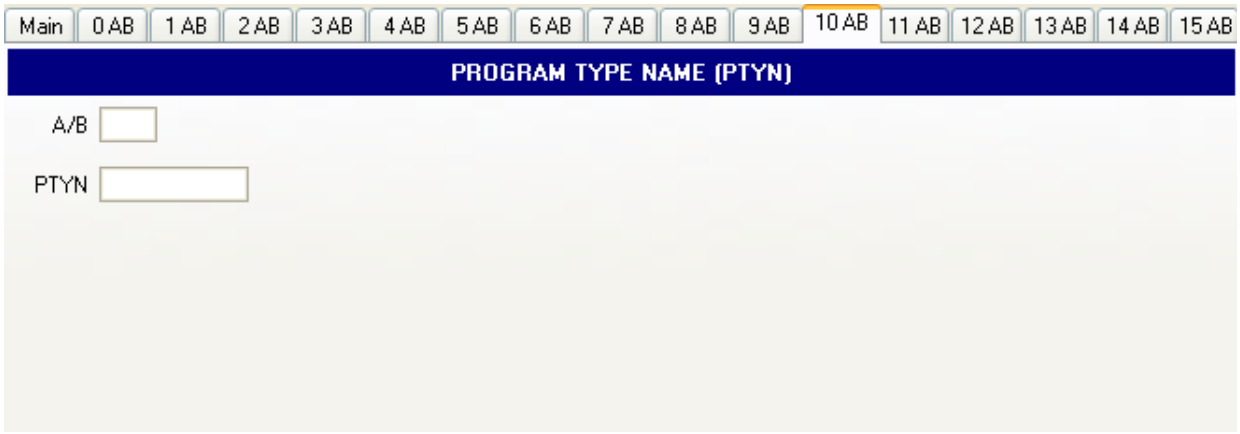
TYPE 10A & 10B GROUPS: PROGRAM TYPE NAME (10A) AND OPEN DATA (10B)

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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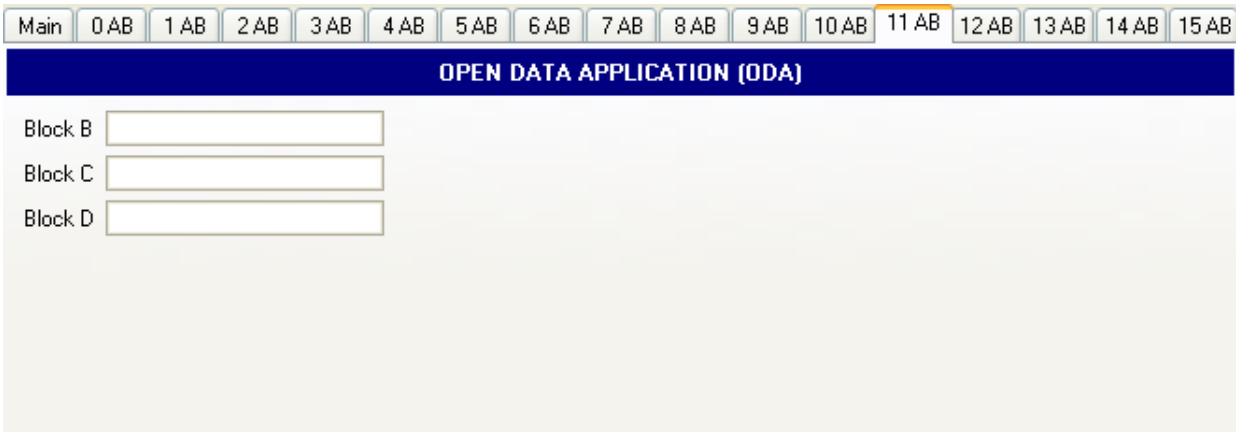
TYPE 11 GROUPS:
OPEN DATA APPLICATION

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



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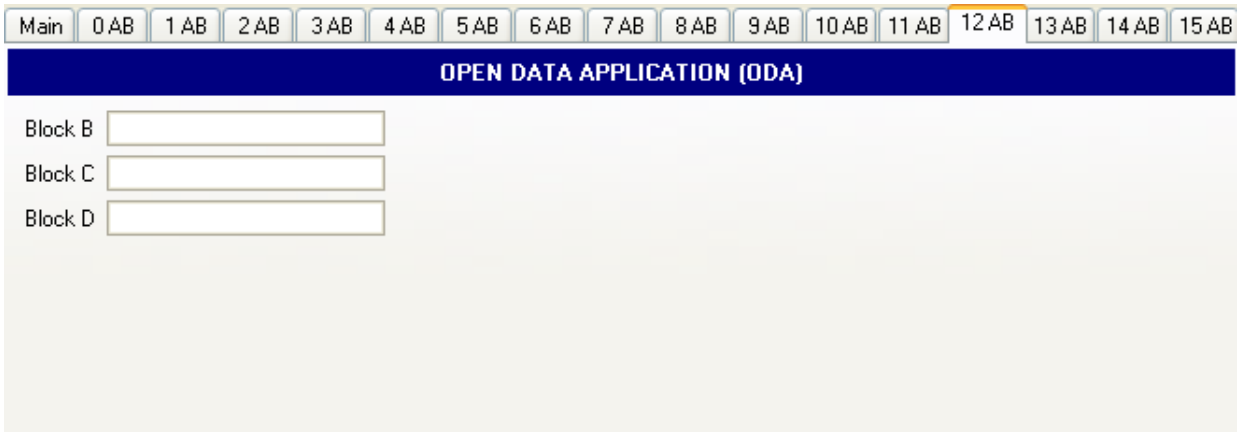
TYPE 12 GROUPS:
OPEN DATA APPLICATION

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



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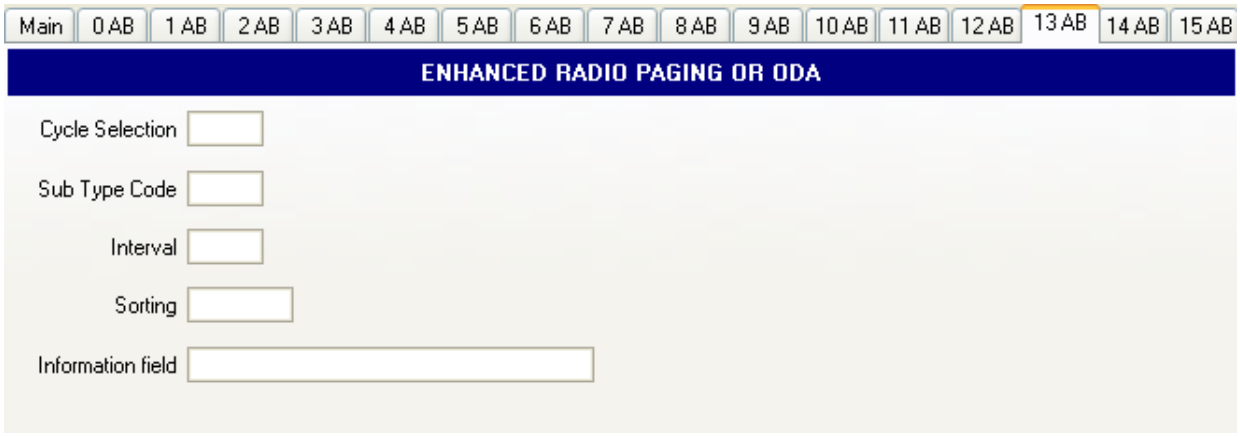
TYPE 13A GROUPS:
ENHANCED RADIO PAGING OR ODA

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

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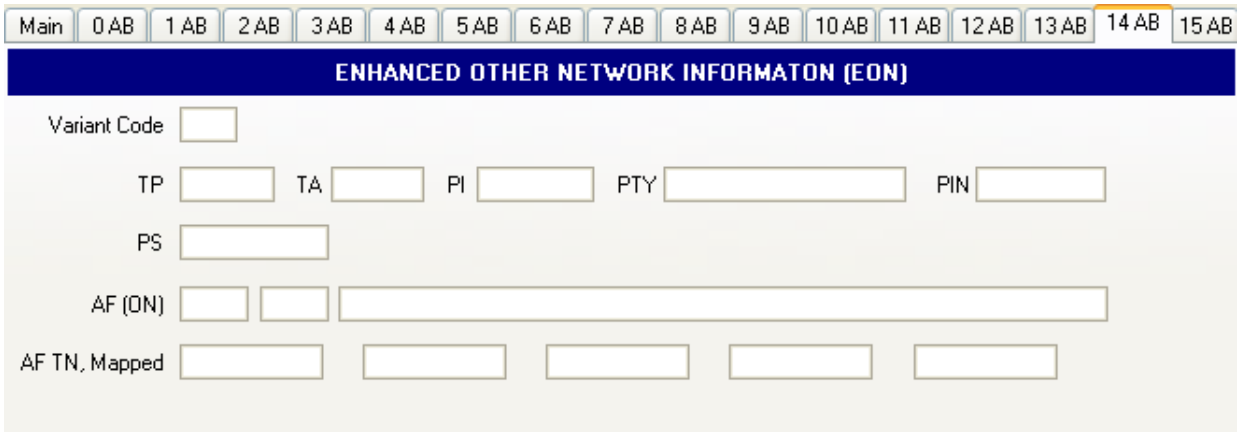
TYPE 14 GROUPS:
ENHANCED OTHER NETWORKS INFORMATION

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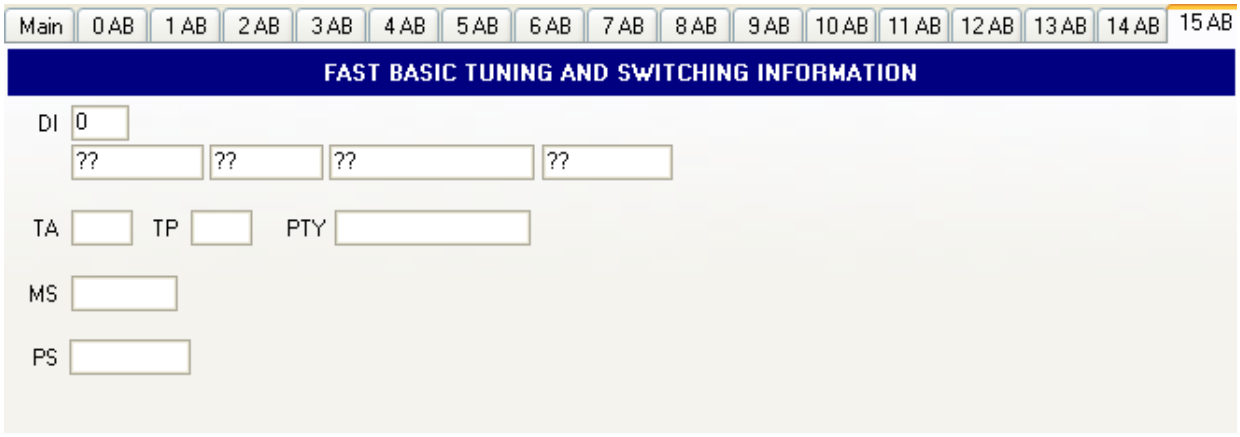
TYPE 15A & 15B GROUPS: FAST BASIC TUNING AND SWITCHING INFORMATION

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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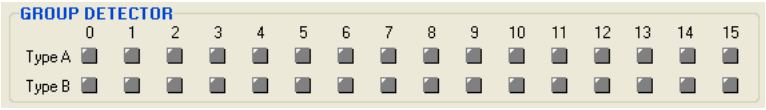
GROUP DETECTOR

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.

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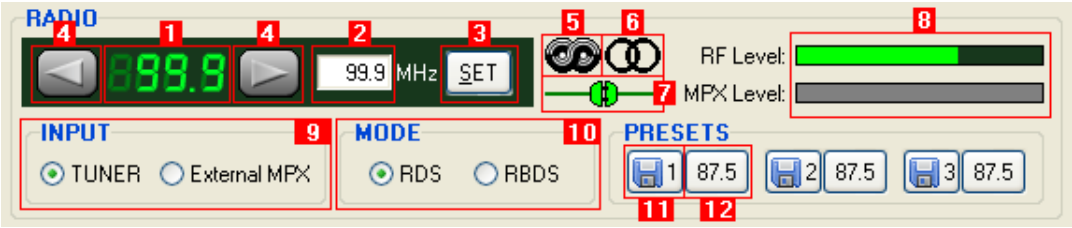
TUNER, MODES AND PRESETS



The general management and the most important indications of the DB5000 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. Frequency is stepped by 100 kHz.
5. RDS Signal Presence.
6. Stereo Signal Presence.
7. Connection Status indicator.
8. Level Strength Indicators. Active indicator depends on selected Input (9).
9. Input Source. TUNER selects signal from Antenna Input, MPX selects RDS/MPX Input (See Panel Indicators and Appointments).
10. RDS/RBDS Mode Selector.
11. Quick Preset Save button. (See Device Settings)
12. Quick Preset Recall button. (See Device Settings)

NOTE: When the MPX Input is selected, all Tuner specific tools and functions will be disabled.

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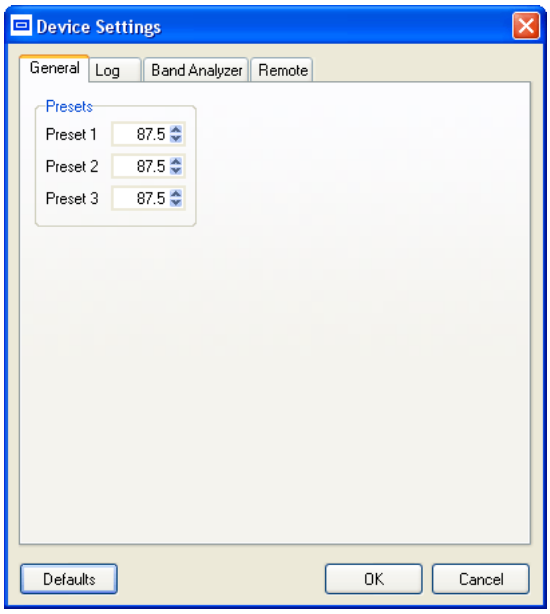
Device Settings

GENERAL SETTINGS



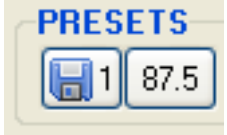
Here Presets could be edited.

Up to 3 easy to access memory presets (See Tuner, Modes and 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 3 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

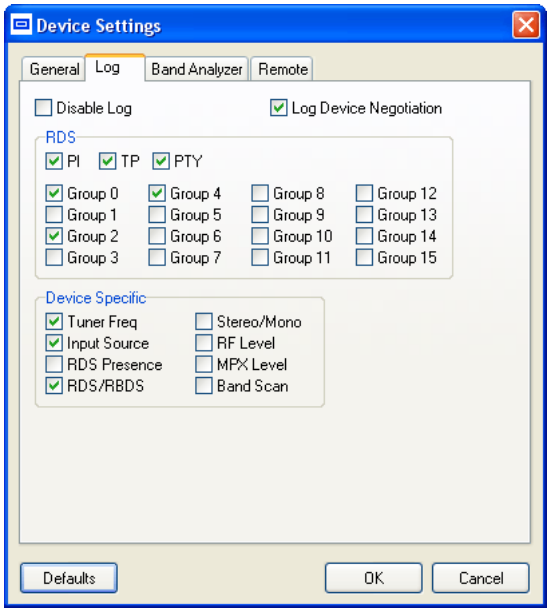
2. Press one of the Save Preset buttons



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.

LOG SETTINGS



Disable Log

Disables all Device Specific Log Capabilities.

NOTE: While Program Log Settings are disabled, all Device Log Settings are ignored. See Program Log Settings)

Log Device Negotiation

If selected, all Device Negotiation Information will be logged. Device negotiation is performed upon Connection. Unless Device fails connection turn this option off, supposing it is usable only when some device issues occur.

RDS

Here can be selected which RDS readings (per group) to be logged.

Device Specific

Selected Device Specific Options will be logged. Tuner Freq, Input Source, RDS/RBDS and Band Scan can be altered directly from user, while RDS Presence, Stereo and Levels are dependent on specific signal fed to the device.

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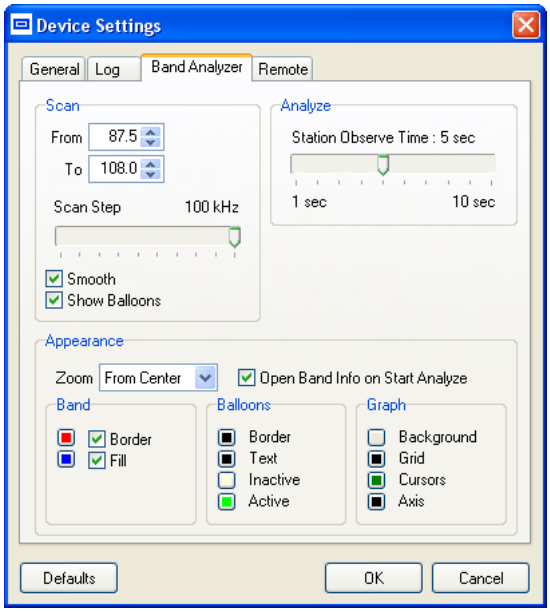
BAND ANALYZER SETTINGS



Scan

- From - Starting frequency of scanning range;
- To - Ending frequency of scanning range;
- Scan Step - frequency stepping through scanning range. From 10 kHz to 100 kHz;

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

- Smooth - performs interpolated smoothing of Band Image;
- Show Balloons - Show/Hides Balloons over Band Peaks. (See Band Analyzer);

Analyze

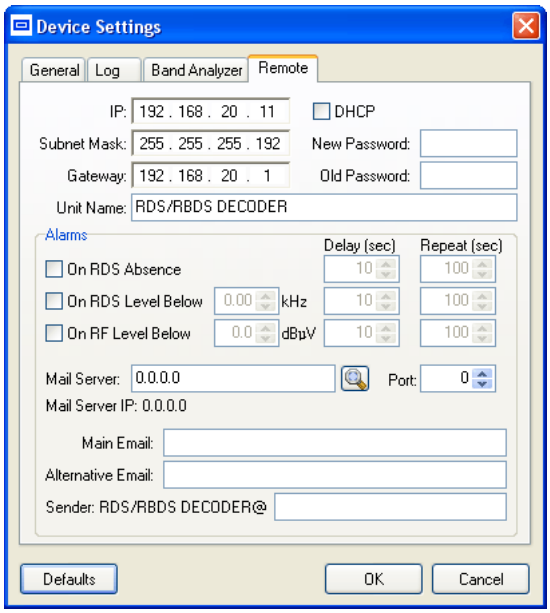
- Station Observe Time - Observation time per Station (peak) when Analyze process is running.

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;
- 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;
- Graph - supplementary coloring of the Band Analyzer interior.

REMOTE SETTINGS

This section describes settings related to TCP/IP connection and email notifications. For security reasons this section can only be altered through COM or USB connections despite they are unrelated with this settings.



IP, Subnet Mask, Gateway

These are Internet Protocol settings. TCP/IP connections and Email notifications utilized by DB5000 depends on this settings. Consult with your network administrator for the appropriate IP settings.

DHCP

Enables Dynamic Host Configuration Protocol (DHCP) if your network supports this capability, which automatically assigns IP settings.

Alarms

Alarms are defined by condition/tolerance, delay after the condition is met and interval for continuous notification while the condition still exists.

- On RDS Absence - notification when RDS signal is lost. Only selected Source is monitored (Antenna or RDS/MPX Input, see Panel Indicators and Appointments);

- On RDS Level Below - notification when RDS Level is below defined value. Applicable only for RDS/MPX Input Source.

- On RF Level Below - notification when RF Level is below defined value. Applicable only for Antenna Input Source.

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Mail Server

Enter either IP or name of your Mail Server.

To check if input is valid press  button - program will try to auto-resolve the entered name, and will inform you about resolving result. Internet connection must be available, otherwise resolving will fail.

Unless your Mail Server is customized, standard Port must be 25, otherwise enter custom.

Main & Alternative Email

These are Emails used to send to possible Notifications.

When sending notification to Main Email fails fr some reason, Alternative will be used, thus its a good practice both emails to be from different domains.

Sender

This will be filled as Sender of Email when Notification is mailed.

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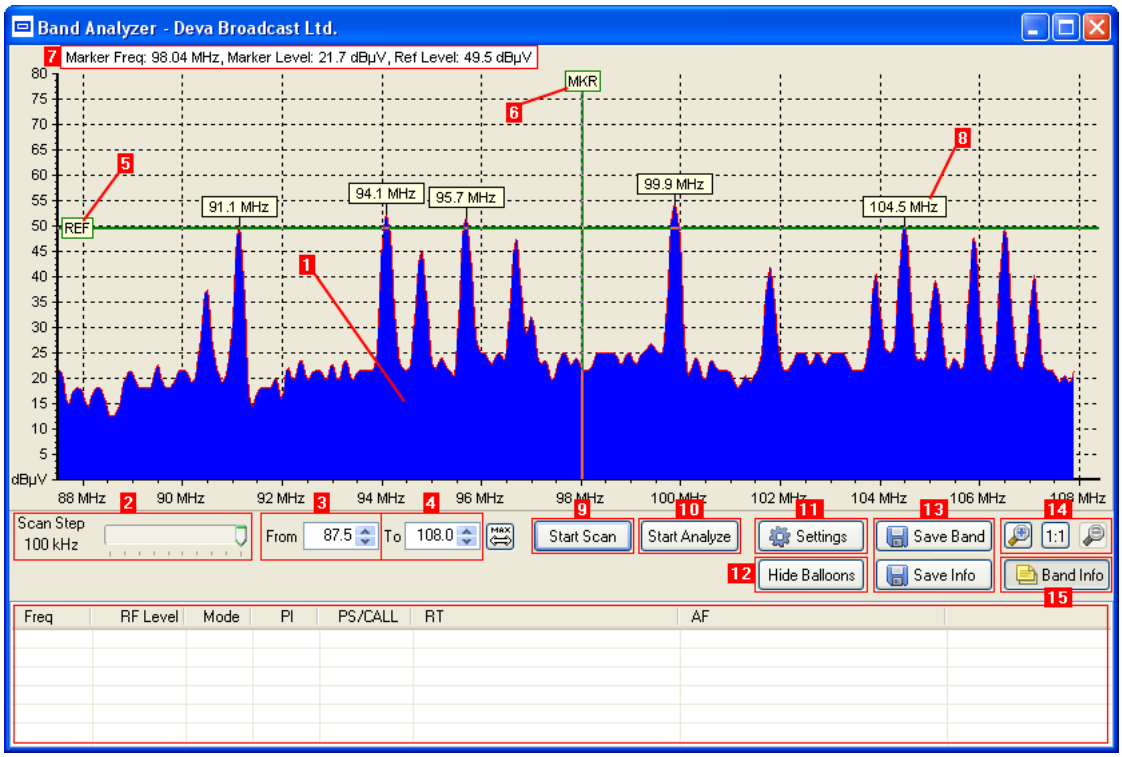
Band Analyzer



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

2. Scan Step - frequency stepping (resolution) through scanning range. Selected step defines the scan speed vs. scan details.

3. Starting Frequency.

4. Ending Frequency.

Starting and Ending Frequencies defines the Scanning Range. Pressing the button will adjust starting and ending frequency to extend to whole FM Range.

5. Reference Level Marker - see Band Analyze Basics.

6. Marker - By moving Marker along the Band Spectrum, frequency and corresponding level is displayed into information field (7).

7. Information Field:

- Marker Freq – frequency under the Marker
- Marker Level – corresponding level of the frequency under the Marker
- Ref Level – level under the Reference Marker

8. Information Balloon - see Band Analyze Basics.

9. Button for **starting scanning process**. It changes itself to "Stop Scan" button and allows to stop the process at any time. Otherwise the scanning stops at the Ending Frequency (4).

While Scanning Process is underway Model DB5000 will display following screen on LCD Display:

```
Bandscan in progress
Press % to cancel      %
```

Scanning Process could be interrupted by pressing OK from DB5000 keyboard.

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10. 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.

11. Settings button - brings up Band Analyzer Settings.

12. Hide/Show Balloons - Hides/Shows Information balloons.

13. Save Band & Info - buttons for exporting the information from Scanning and Analyzing processes.

14. Zooming Control - see Band Analyzer Settings.

15. Band Info - button ‘Band Info’ toggles visibility of Band Info Table, where information from Analyze Process is represented. (See Band Info Table)

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BAND ANALYZE BASICS

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

While adjusting the Reference Marker, all peaks within analyzed zone are calculated automatically and Information Balloon holding peak frequency is showed above.

Supposing that defined zone contains at least one peak, Analyzing Proccess may start.

Analyzing sweeps through available peaks. Every peak defines to what frequency Tuner will be tuned. Each Peak is ‘observed’ for a predefined time (see Band Analyzer Settings) and status information is collected.

Final result from Analyze Process is repersented as Information Ballons above every peak analyzed. While balloons hold only frequency, PI and PS, additional details can be found under 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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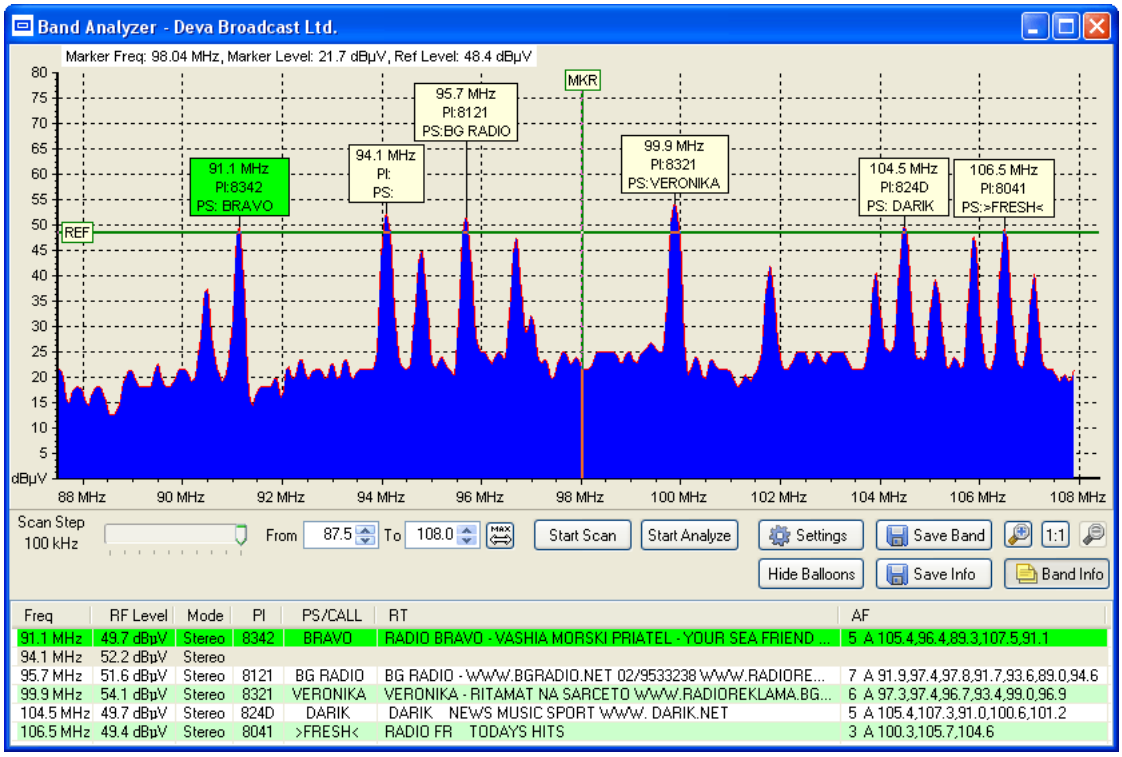
BAND INFO TABLE



Band Info Table represents an additional information from the Analyze Process.

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

Upon double click with the mouse on some of the rows in the table the software switches to Real-time Watching of the corresponding frequency. (See Band Analyzer Supplementals).

Pressing ‘Delete’ key will remove selected row, but coresponding Information Balloon will remain.

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BAND ANALYZER SUPPLEMENTALS

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

Real-time Watching occurs when one of the Information Balloons holds frequency which is currently Tuned. Balloon is colored as active (see Band Analyzer Settings) and updated with underflying infromation. Corresponding row in Band Info Table (added if not exist) is colored and updated simultaneously.

Double click near peak switches to Real-time Watching according to peak frequency.

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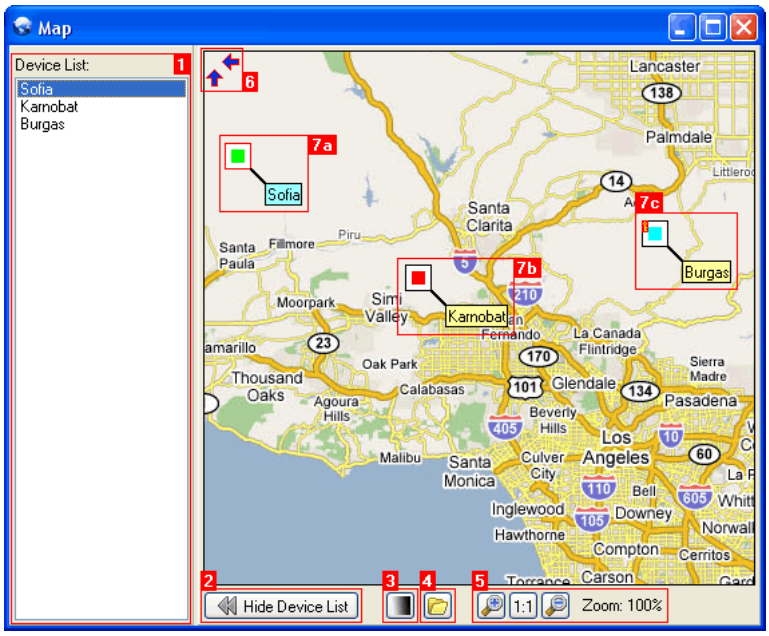
Map

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



1. Device List - all registered devices are listed here;

2. Hide/Show Device List button - Hides/Shows Device List, accordingly Map is expanded/colapsed;

3. Color/Grayscale Mode - Switches between Color and Gray Map. Gray Map is generated automatically, thus only color version is required.

4. Load New Map - loads new User Map from JPEG or BMP file.

WARNING: Existing Map will be lost. Don't misuse with extremely big pictures, which may lead to low performance and undesired effects. Devices will keep their existing Map Positions, thus manual rearrange is required.

5. Zoom controls.

6. Overflow indicator - indicates that left or/and top parts of the Map are hidden. Entirely disappears while Map position is at left-top corner.

7. Devices.

7a. Selected, Connected

7b. Disconnected

7c. Locked, Idle

MAP INTERACTIONS

Moving the Map

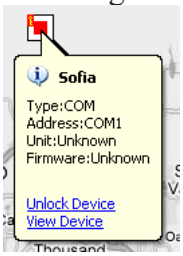
Map could be moved (repositioned) simply by holding mouse button over it (no device under) and moving in desired direction.

Device Reposition

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

Map Baloons

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 View Map from Device Manager:

- press  (View Map Button);
- or press 'View Map' from right-side buttons;
- or select 'View Map' from Map Menu;
- or press F5;

This will open User Defined Map. If Map is undefined yet, New Map dialog will appear.

To Locate Device on Map from Device Manager:

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

If Map is visible, 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 Locate Device on Map from Map Device List;

- click on desired device;

To Lock/Unlock Device Position from Device Manager:

- 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.

While Lock is straight forward, Unlock requires password confirmation.

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

Map Coloring

Curently 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;

Double click on Map Device List

Action upon double click can be associated under Program's Map Settings.

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Log Capabilities

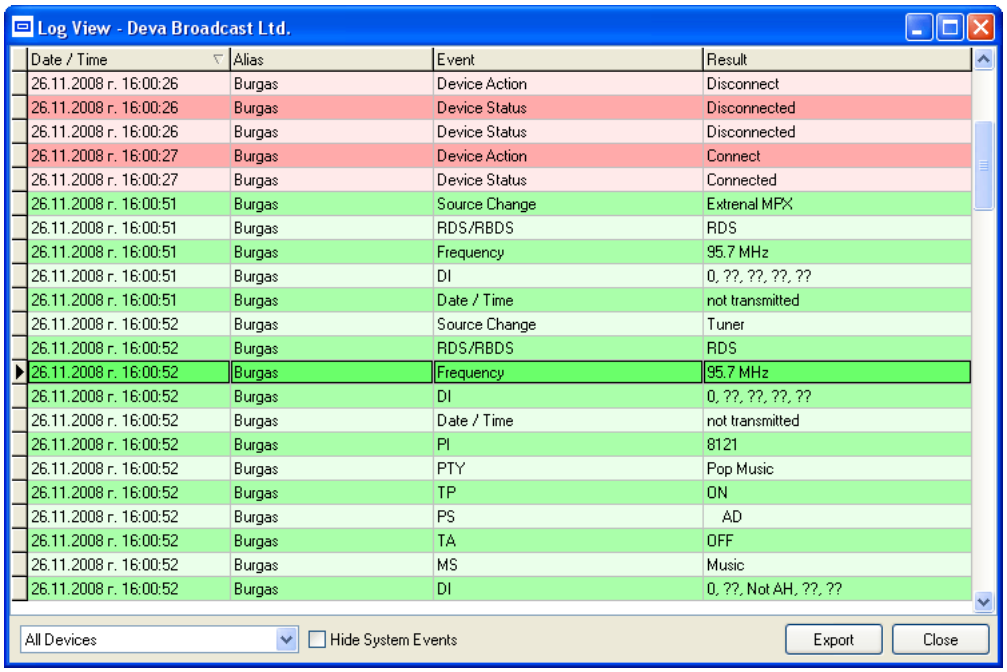
LOG SETTINGS

DB5000 Device Manager comprises two levels of data logging. Main level takes care for Log consistency and tracks all system events. Subsequent level handles all incoming data from devices.

General Log properties can be found under Program's Log Settings. Have in mind that each device holds separate settings, thus log settings are different across devices (see Device Log Settings).

While General Log is disabled, Devices' Log is disabled too, because Devices subordinate to Device Manager.

LOG VIEW



This is general appearance of Log View. While Log is opened from Device Manager (under 'View Log' button), information from all devices is shown and can be filtered per device accordingly. Opening Log from Device Control Window, infromation is automatically filtered to show only specific device.

Green colored rows contains common data, while red-colored are system events. To hide all system events check 'Hide System Events' check-box.

Rows can be sorted by pressing the corresponding column header.

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LOG EXPORT

Pressing the ‘Export’ button from Log View will export all visible records into Comma Delimited (CSV) format.

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WEB Mode

Model DB5000 can be accessed through Internet using your favorite browser. No additional software is required.

To access Device Web Interface it is necessary to know what IP address is assigned to device. (see Device Remote Settings) and device password.

Into browser's address field type device IP, e.g. http://192.168.20.16. Depending on browser it may be required to specify port, which is appended after IP address and in our case must be :80.

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

Web Interface can be accessed simultaneously by multiple users, but only the first who logged in may utilize it. Access to rest of the users will be denied.

Also access denial may occur when device is in Managed Mode (see Connection Priority).

To initiate connection to device, enter password and press 'Connect'.

Web Interface is almost identical to the software (see Device Control Window). Access to Settings, Map and Log Capabilities is not available, also Band Analyzer is simplified.

WARNING: Changing Tuner Frequency or/and Input Source is permanent. After Web Mode is disconnected device switches back to Standalone Mode but changes remain. Uncoordinated access may lead to confusion, e.g. expected log or email notifications could be for different station.

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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.