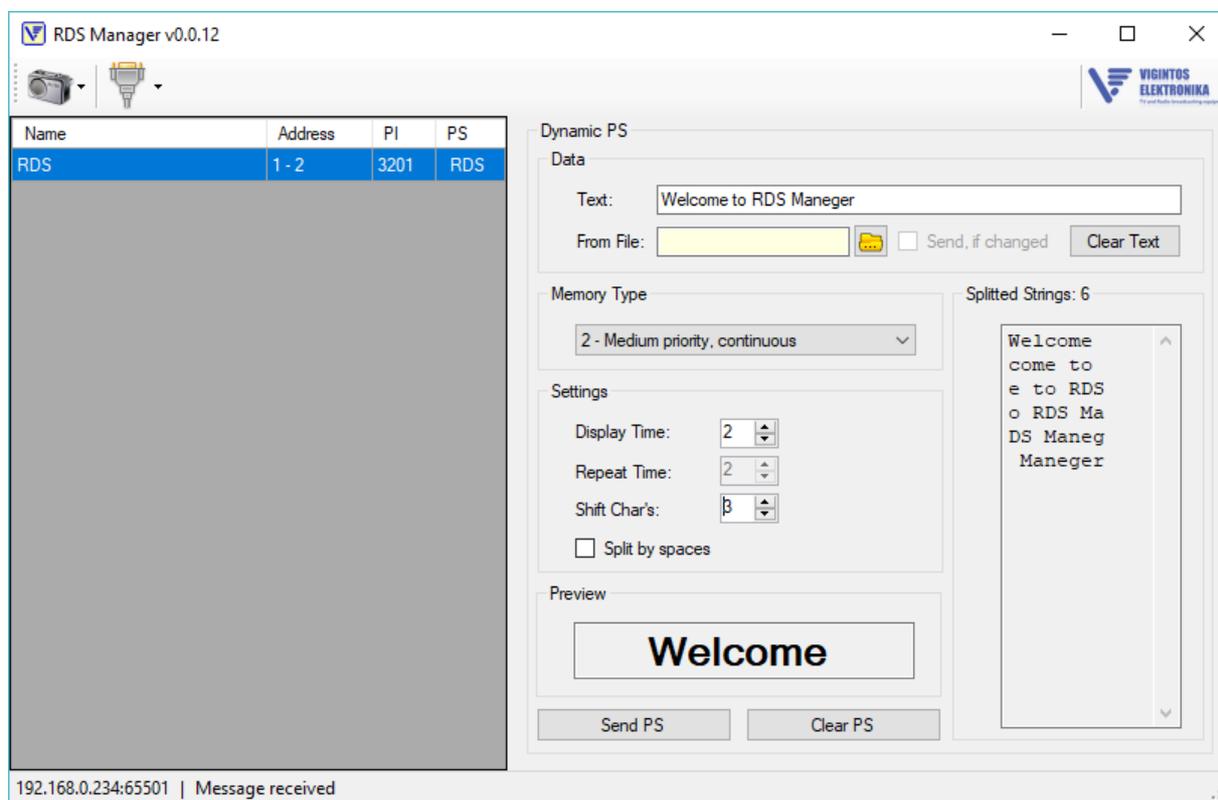


RDS Manager
Manual

The «RDS Manager» application is designed to configure and control the «FORA-600» RDS coders . The RDS coders are produced by the «Vigintos Elektrtonika» company. The UECP protocol is used to control the coders (RDS Universal Encoder Communication Protocol. UECP Version 5.1).

The list of implemented UECP command is in the Annex A.

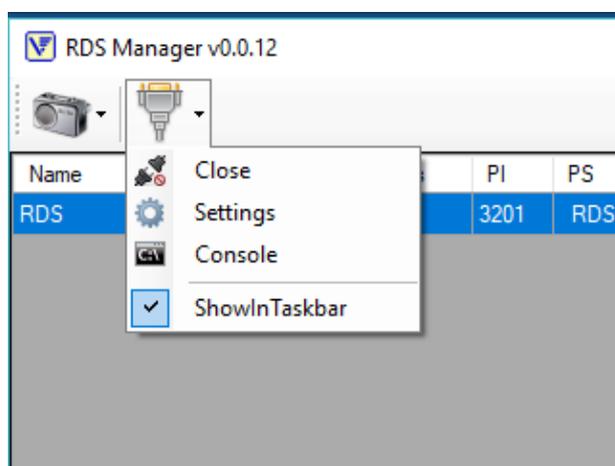
The main panel is shown on the Pict.1



Pict. 1

Connection to RDS encoder

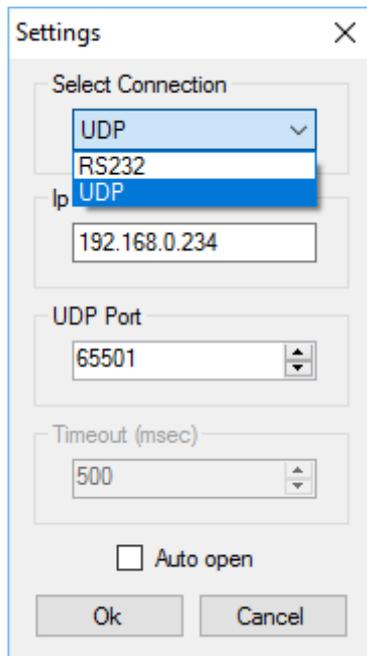
Connection a coder to a computer is done by the RS23 interface or by Ethernet UDP protocol. To control the connection go to «Connection -> Settings» menu (Pict.2)



Pict. 2

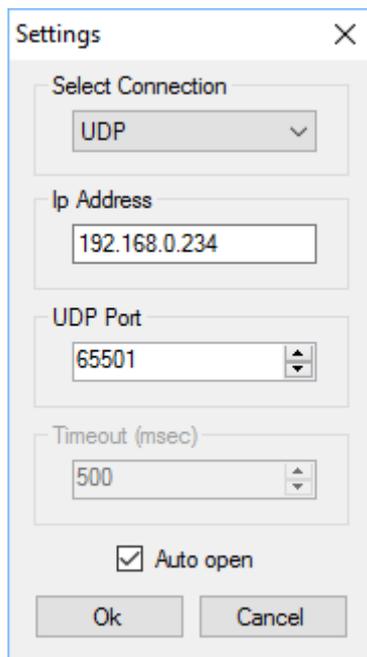
Select “ShowIntaskbar” item to see the program icon in the Task Bar.

To select type of connection take the “Settings” options, and then select the connection type: UDP or RS232 .



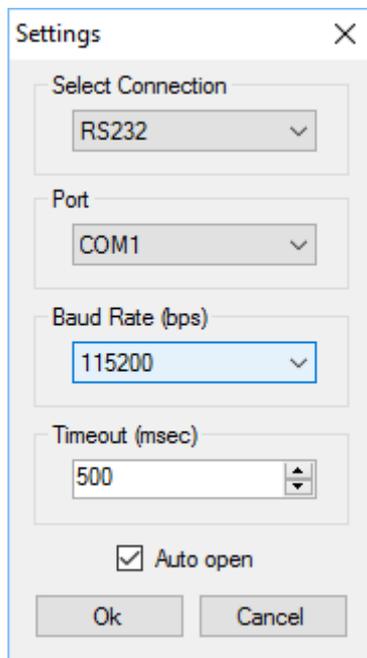
Pict. 3

To adjust Ethernet connection (UDP protocol) set an IP address and a port number. The default IP address is (192.168.0.234:65505). (Pict.4). Then press “Ok” button.



Pict. 4

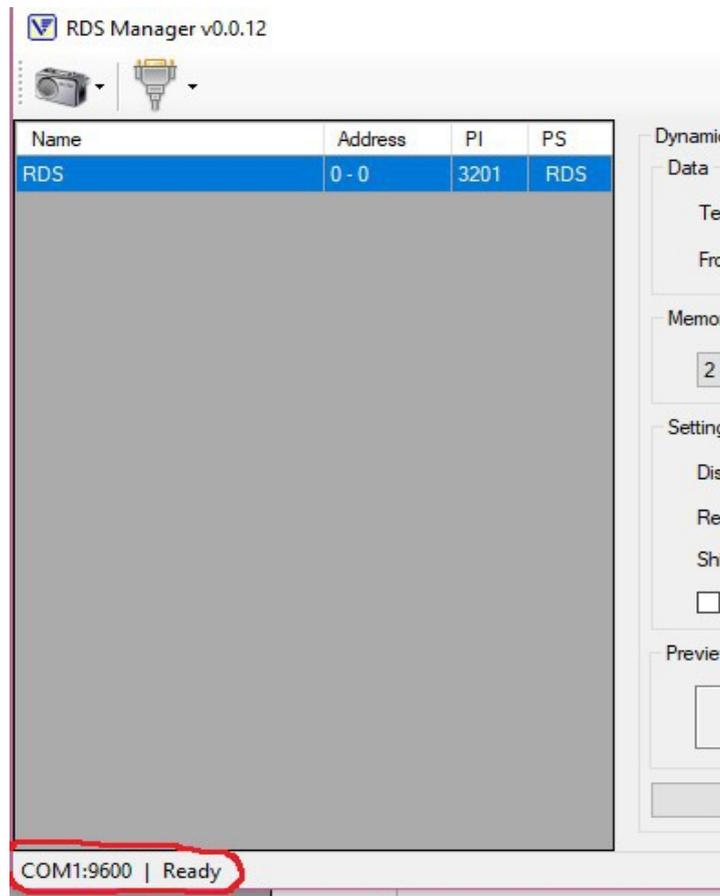
To select a serial port number and baud rate use the connection window (Pict. 5.) The default baud rate is 9600 bps. It is impossible to change the coder baud rate from this window. There is a special UECP command to change coder’s baud rate.



Pict. 5

The time for waiting of RDS response is set in the «Timeout» field. If the «Auto open port» option is selected the serial port will be opened automatically after the application starting. Otherwise to open a port go to «Connection -> Open». If the port is opened in place of «Open» will appear the «Close» item. To close a port select this item.

If the selected connection is free and opened in the infor tray should appear the **Ready** message .



Pict. 6

Use the console-window for monitoring the messages from the PC to an encoder and vice versa. (Pict.7)

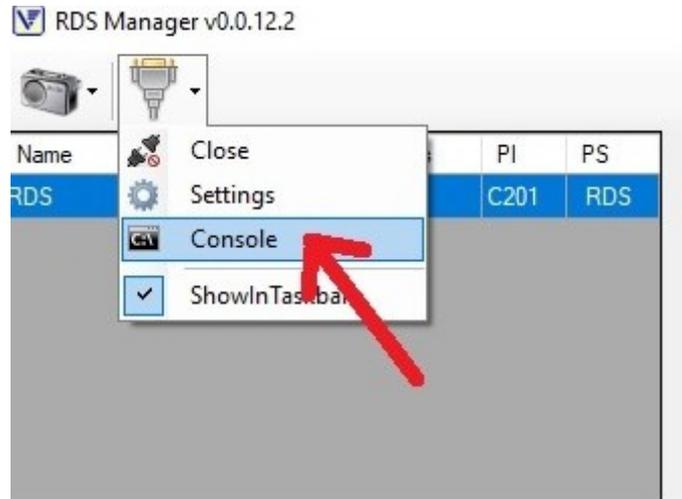
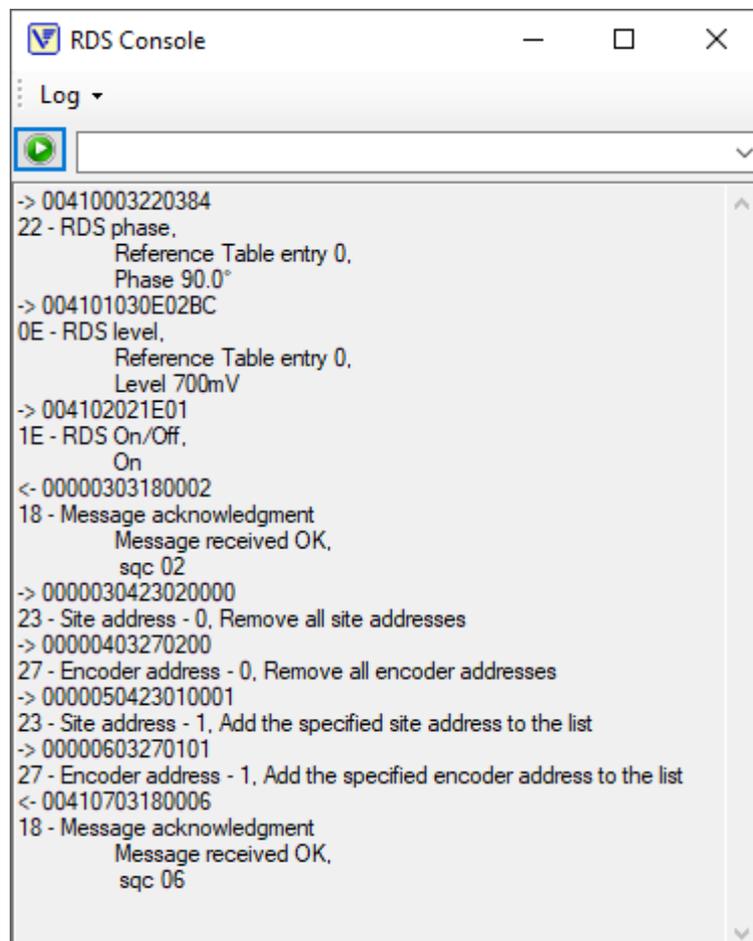


Рис. 7

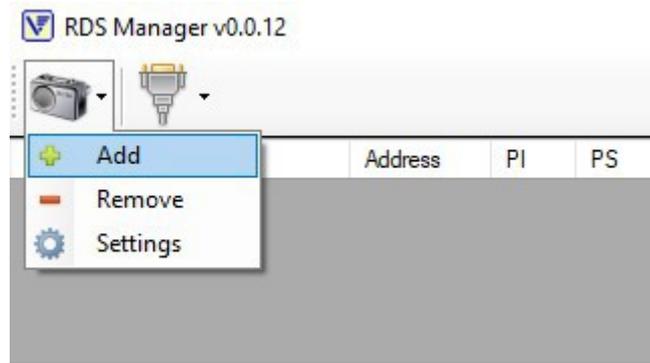
Example of the command for address, phase and level and reply response are at the Pict 8. If a command is sent successful the coder replies OK.



Pict.8

RDS coder's list creation.

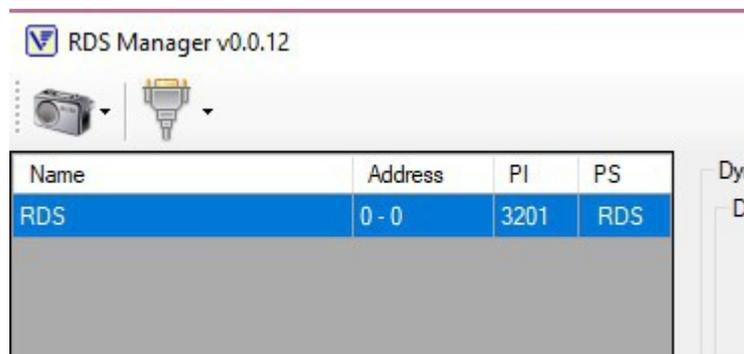
At the first time the coder list is empty. Select **Add** option to insert the encoder to the list (Pict. 9).



Pict. 9

The row with RDS encoder name, address PI and PS will appear (Pict. 10). The name is used to the encoder identification only and is not transmitted to the encoder.

PI - Programme Identification Code. **PS** –Programme Service Name. **Address** — RDF encoder address consists from the site address and the encoder address within the site. The default address is 0-0. It is broadcasting address that allows to send message to all encoder connected to the PC.



Pict. 10

To see, configure and set the coder settings go to «RDS -> Settings» or double click on the row. The Setting windows description is followed.

Dynamic PS.

PS (Program service name) – is the name that is displayed on the receiver's screen. It informs on which station the radio is tuned to. The PS string must contain 8 characters, including spaces. This is because most car receivers have an 8-digit display, which by default displays PS.

For dynamic PS the special command **2D xx 4F4170** is used. The command description is in the Annex A. RDS Manager has a window for entering dynamic PS. (Pict. 11) In the window on the right there is a field for entering, setting and sending dynamic PS lines.

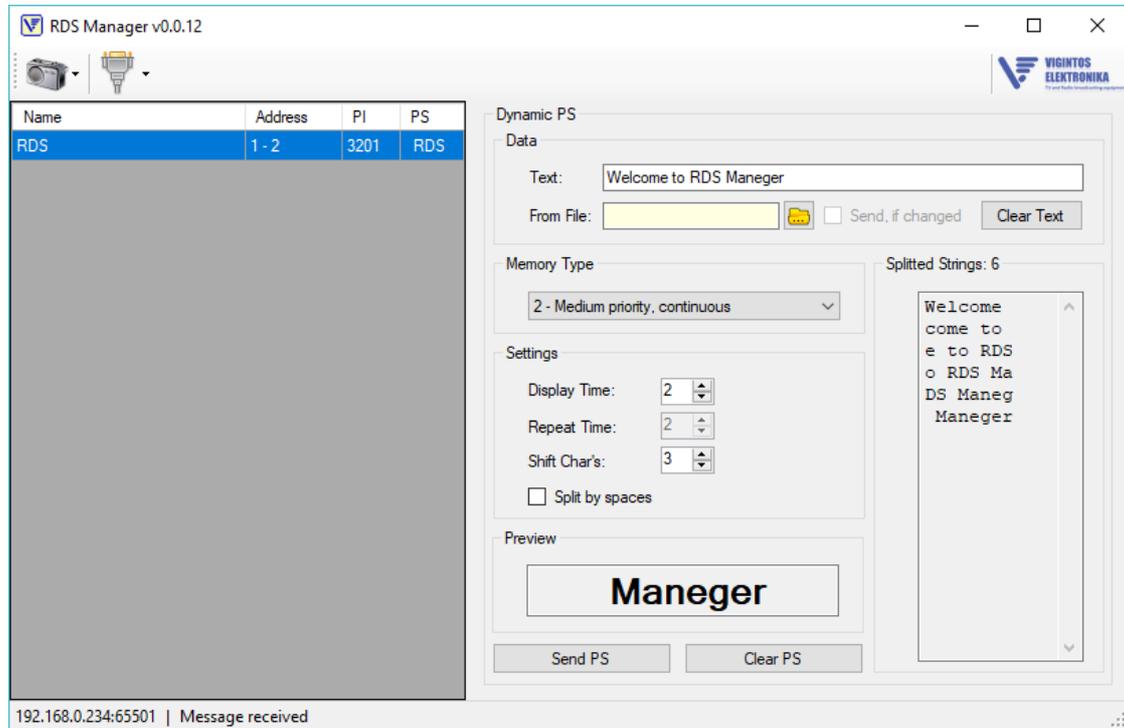
There are three type of memory for dynamic PS.

1. *Low Priority*. This memory is saved after power off. The data is transferred cyclically an unlimited number of times. This data are transmitted only if the memory with medium and high priorities is cleared. It is not recommended to use this type of memory for frequently changed information , since over-overwriting can lead to chip failure.
2. *Medium Priority*. The memory with the middle priority. After the coder turned off the data will be lost. The PS string transmitting is cyclic and unlimited. This transmitting is executed if high priority memory is empty. This region of memory may be rewritten many times.

3. *High Priority*. The memory with high priority. Data from this region of memory will be lost after power turned off. Data from this region is transmitted required times and then cleared automatically. This region of memory may be rewritten many times.

You can use a file to enter data for dynamic PS. Only the first line of the file is transmitted and the Medium Priority memory is used only. The program also tracks changes in the file, and if the top line has changed, reads it for later transfer to the encoder. This line is displayed in the "Text" field. The Clear Text button clears the Text and From File fields. You can select a file by double-clicking on the "Text" field, or by clicking the button located to the right of this field. The selected file must be a plain text file, in ASCII format.

The string from «Text» field is splitted according to «Shift Char's» option and is displayed in the «Splitted Strings» window.

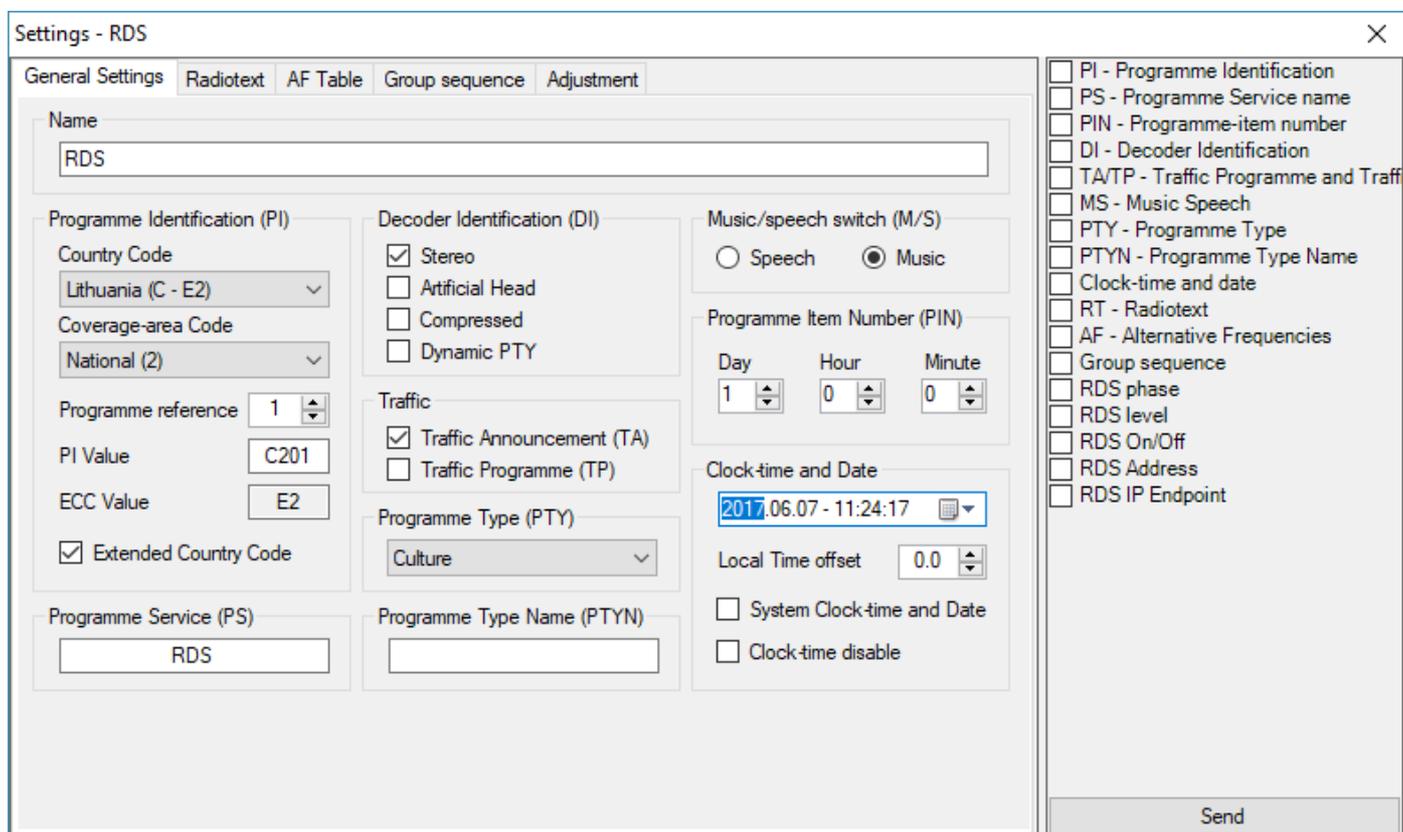


Pict. 11

You may divide string by space is select «Split by spaces» option. The «Display Time» option set show time in seconds. The «Preview» fields shows how the string will be displayed by the coder. To send data to coder press the «Send» button. The previous data will be replaced by the sent data. To clear «Text» and «From File» fields press the «Clear Text» button. If the «Text» field is empty, when press the «Send» button, the corresponding memory region will be cleared. It is useful for first and second memory type, as the third memory type is cleared automatically. The «Repeat Time» field is useful for third type memory only. This field sets the number of cycles to repeat the transmission. To send a dynamic PS to coder press the «Send PS» button. If the «Send, if changed» field is selected the data will be sent automatically after the string changed. To send PS the 0A or 0B groups are used.

RDS coder settings.

The encoder settings program window is presented in Pict 12. All data is given as an example and should be set in accordance with the user requirements.



Pict. 12

The RDS coder tuning setting panel is at left, and sending messages and the button to send are at right side of the main window. Each selected messages are sent to the RDS coder when the «Send» button is pressed. The message configuration is at left side, and consists of six tabs. All settings which are not listed below are standard and conform to the European RDS standard: "Specification of the radio data system (RDS) for VHF/FM sound broadcasting in the frequency range from 87,5 to 108,0 MHz" European Standard 50067.

Tab «**General Settings**» (Pict. 12) consists of the settings for PI, PS, PIN, DI, TA/TP, MS, PTY, PTYN, Clock Time and date messages.

Field «*Name*»: the coder name in the coder list . This name is informative and is not sent to the coder.

Field «*Programme Identification (PI)*» combines the data from which the programmatic identifier (PI) is created. This is very important data for RDS operationable. This data is transmitted in all groups. PI is formed from the Country Code, the Coverage-area Code, and a link to the program. The country code is specified in the standard. The Coverage-area codes have following options: International – The same programme is also transmitted in other countries.; National – The same programme is transmitted throughout the country.; Supra-regional - The same programme is transmitted throughout a large part of the country; R1- R12 – regional programme; Local – the programme transmitted via a single transmitter only during the whole transmitting time. Programme reference number- uses to identification of the programme broadcasting family.

Field «*Extended Country Codes (ECC)*». As the Country Code has only 15 values, additional codes are used to uniquely identify a specific country (see standard). If the Extended Country Codes field is checked, then the message (PI) will send with the message (ECC). To transmit ECC over the air, group 1A must be included in the sequence of groups.

Field «*Programme Service (PS)*» contains the 8-character static PS. This string will be displayed if all dynamic PS memories are empty. By default the firmware version is used as PS. The PS is transmitted with 0A or 0B groups. Usually four groups are required for one static PS. The group 0A is used if alternative frequencies exist for the broadcast transmission. If alternative frequencies are not set, then the groups 0B can be used. The same groups are used to transmit a dynamic PS.

In the field «*Clock Time and date*» the «*System Clock Time and date*» option select what the time and data will be send to encoder. If the «*Clock-time disable*» is selected, the time and date do not sending. If the «*System Clock Time and date*» is selected the system (computer) time will be sending to encoder. If no, you can set this data manually. The

time and date information is transmitted by the 4A group. Then, if the «Clock-time disable» is unselected, the encoder will automatically send a group of 4A, even if it is not in the sequence of groups.

In the «Decoder Identification» field it is set the various modes to switch receiver decoders, such as mono, stereo, etc., as well as the ability to dynamically switch the type of transmission (PTY). This information is transmitted by the 0A or 0B groups.

The “Program Type” (PTY) field sets the static transmission type. This is the identification number that is transmitted during the broadcast of each program. It is used by the receiver for faster tuning to the selected type of program (sports, news, etc.). This information is transmitted by all groups.

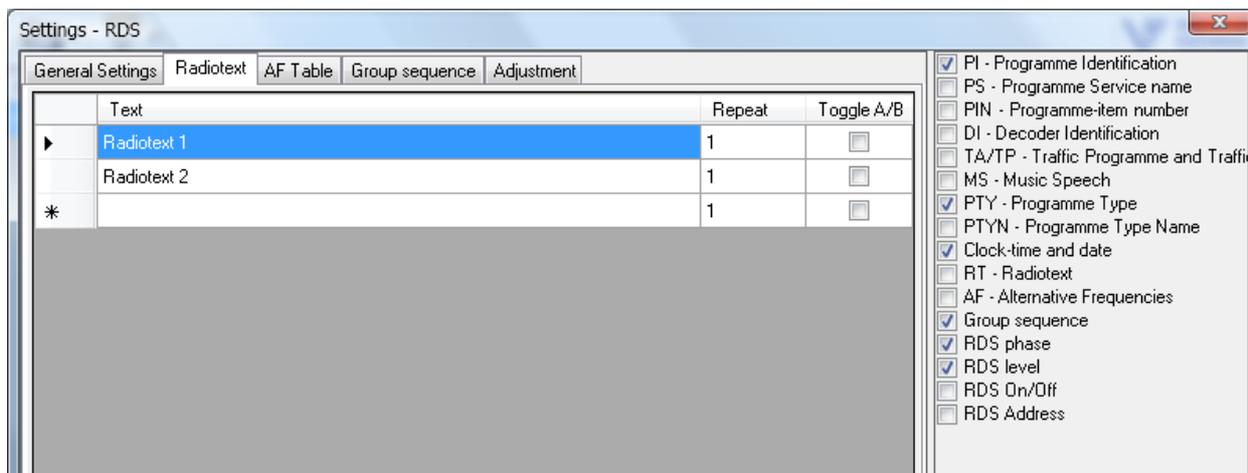
The “Program Type Name” (PTYN) field is used for a more detailed definition of the type of transmission. For example, PTY is a sport, and PTYN is a football. This information is optional and is transmitted at the request of the broadcaster. The group 10A is required to transmit this information.

The “Traffic” field contains two flags: “Traffic Announcement” (TA) and “Traffic Program” (TP). Enable flag “Traffic Announcement” means that a traffic message is being broadcast currently. Depending on the settings, there is either an automatic switch from audio to the traffic message mode, or wake up from sleep mode to the traffic message transmission, or switching to another program that transmits the traffic message. The “Traffic Program” flag means that the program is currently transmitting a traffic message. TP information is transmitted by all groups, and TA information is transmitted by the 0A or 0B groups.

The “Music / Speech” switch set the type of broadcasting: music or speech, as some receivers provide different levels of sound for the convenience of the user. MS information is transmitted by the 0A or 0B groups.

The “Program Item Number” field allows you to send a special events associated with the programme. Typically, it is the start time of the programme broadcast. Transmitted by the 1A or 1B groups.

The «**Radiotext**» tab is used for radiotext data. The radiotext strings are sent by the RT messages. This text is stored in coder EEPROM. The “radiotext” strings are placed in the «Text» column. One string length must be less than 64 symbols. The «Repeat» column contains the display time in seconds for each string. The last column indicates the A/B flag switching (see the European RDS standard). To add string enter the text at the lowest row. To delete rows set the cursor at the left from the row and so select the deleted area. Then press DELETE button at the keyboard. To clear the radiotext from coder send the RT message with empty «Text» field.



Pict. 13

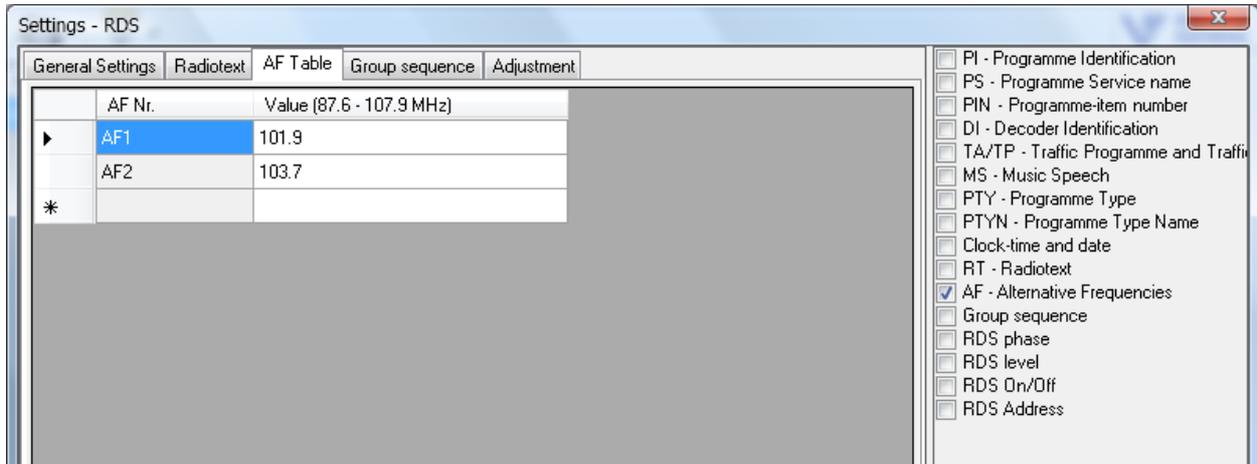
The radiotext strings are transmitted by the 2A or 2B groups. One 2B group can send 2 ASCII symbols, and one 2A group can send 4 symbols. The both groups can address only 16 segments of the radio text. Therefore, group 2A is used to transfer radio text strings of more than 32 characters, and group 2B can be used to transfer shorter strings (up to 32 characters). The maximum length of the radio text string must not exceed 64 characters. To save the addressing of radio text segments the groups 2A and 2B must not be mixed.

The text A/B flag is used as followed:

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

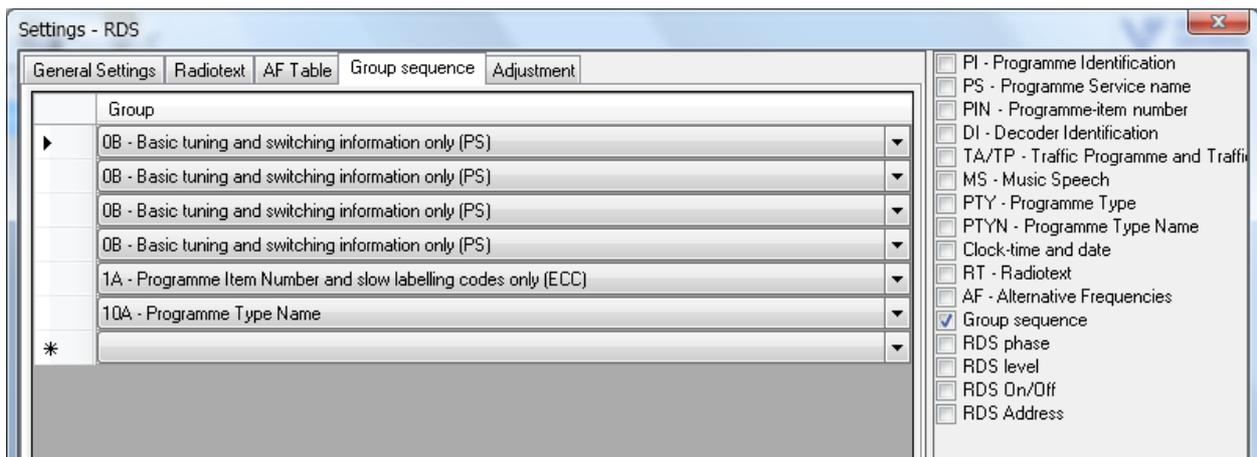
If the receiver detects no change in the flag, then the received text segments or characters should be written into the existing displayed message and those segments or characters for which no update is received should be left unchanged.

The «**AF Table**» tab contains the table of alternative AF frequencies (Pict 14). The AF frequency are sent by AF message. Adding and deleting lines in the table is the same as in the “radio text” tab described above. You can add up to 25 alternative frequencies to the table. To transmit alternative frequencies on the air, you need the OA group.



Pict. 14

The «Group sequence» (Pict. 15) consists of the sequence group table

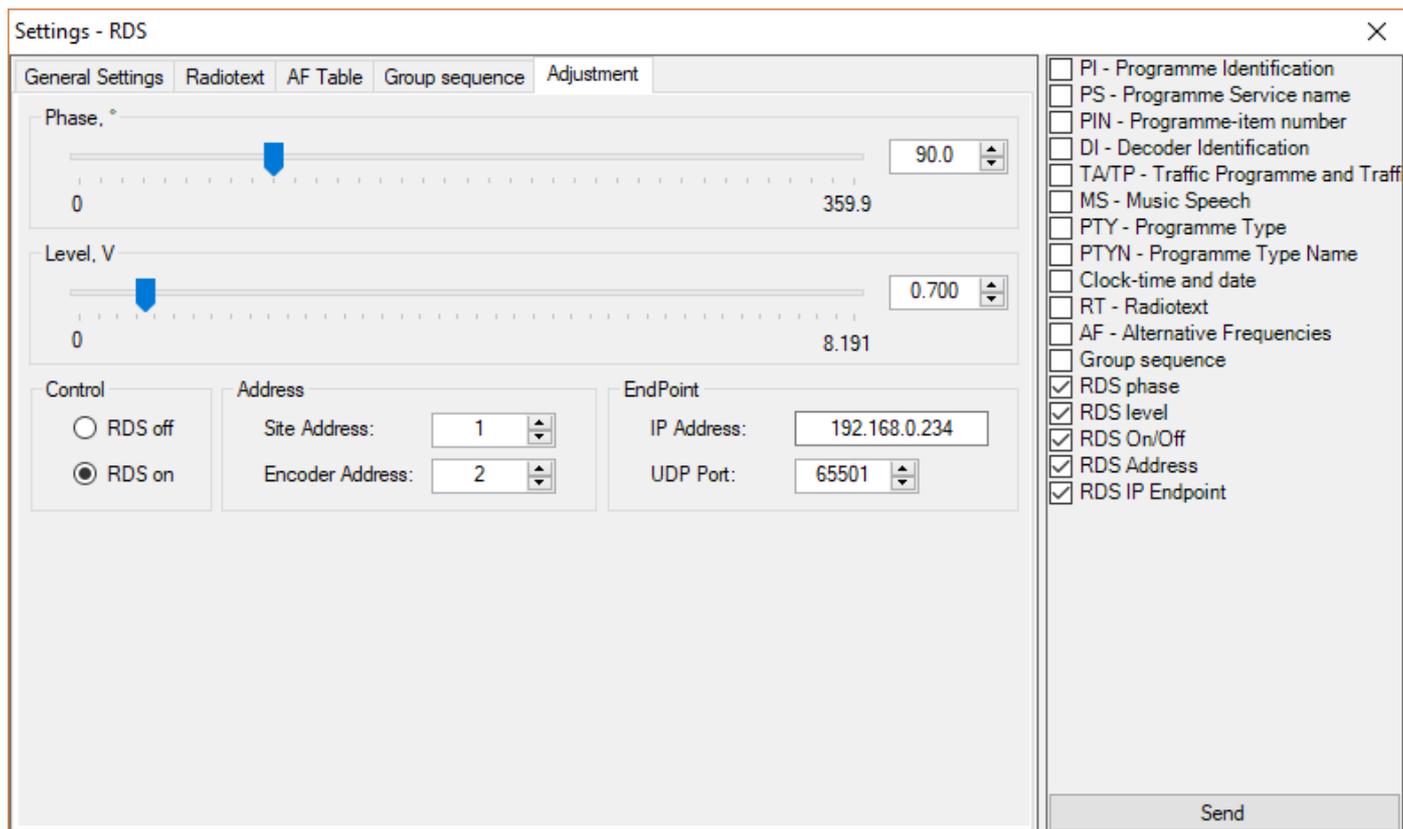


Pict. 15

The sequence of groups is sent to the encoder by the message “Group sequence”. The transmission and display of information depends on that group sequence. Some information, such as PI, is present in all groups. The other, for example, alternative frequencies, is present only in one group (OA). If this group is not included in the sequence, the receiver will not receive a list of alternative frequencies, even if the list was sent to the RDS encoder. Also the speed of updating information in the receiver is depending of the number of transmitted groups. So the groups containing the most important or frequently changing information should be transmitted more frequently. After receiving the “Group sequence” command, the encoder restarts the generation of a sequence of groups. The transmission time of one group is 87.6 ms. For reliable operation of PS and AF, it is necessary to transmit at least 2 groups of OA every second.

The «**Adjustment**» tab contains the settings of the RDS encoder itself (Fig.16). The messages associated with this tab are “RDS phase”, “RDS level”, “RDS On / Off”, “RDS Address” and “RDS IP Endpoint”. Here you can adjust the phase, level, enable or disable the encoder. You can also set an address to the encoder to which you can send messages only to this encoder. Messages with a zero address are sent to all encoders connected to the common network. If it is necessary to send any information to a specific coder, then it needs to assign a unique address, and send messages to this address. Other encoders will ignore such information. The “Site Address” field specifies the address of a group of encoders, and

the “Encoder Address” field specifies the address of the encoder itself within this group. The “RDS Address” command is always sent with a zero address.

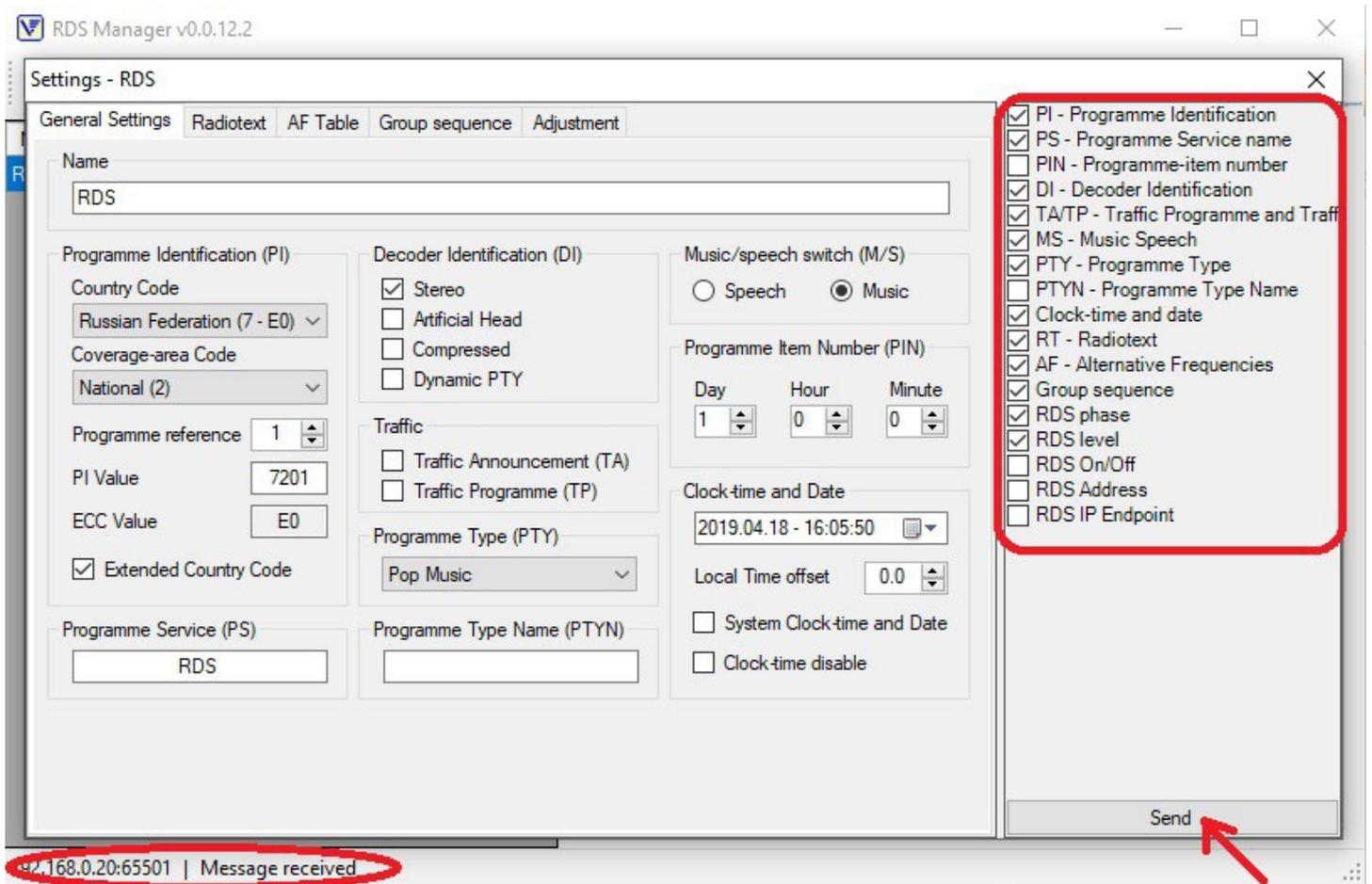


Pict. 16

To delete a unique address of an encoder or a group of addresses, send the “RDS Address” command with empty address fields. When changing the address, the address in the list of encoders will also change (Pict.10). If you want to set an IP address at the first time is best done using an RS232 connection. Default IP address is 192.168.0.234:65501. If you changed the IP address of the encoder, do not forget to change the UDP connection settings (Pict.4). To set a new IP address, use the RDS IP Endpoint message. The address setting is described in the Annex B.

Message list

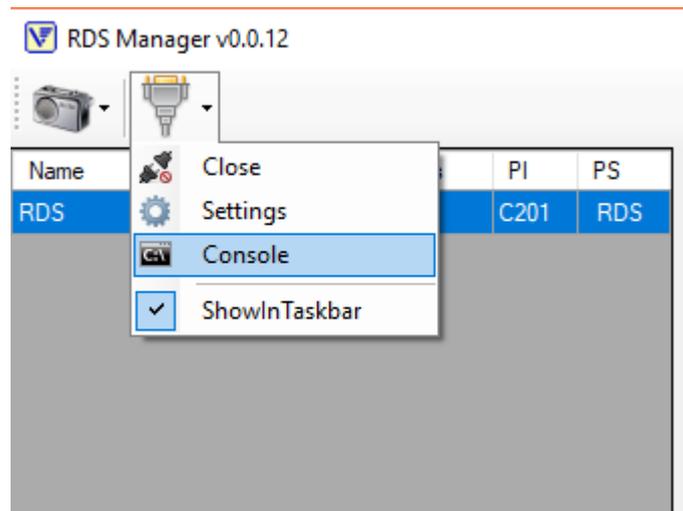
The right side of the settings window displays a list of all commands that can be sent to the encoder (Pict. 17). Each group of parameters has its own message. Messages can be sent separately or in groups. To do this, select the desired message and click the Send button. The most frequently used messages are marked. After the message has been sent, «*Message received*» should appear in the information tray. This means that the message was received by the encoder.



Pict. 17

Console

To send the special commands to an encoder the Console window is used. (Pict.18)



Pict. 18

To send to the coder special data use a console. To call the console go to the «Connection -> Console» (Pict. 18). The console window (Pict.19) and the console icon in the Windows tray will appear. Enter the message at the white field. All messages have to be in the UECP format. UECP is the universal RDS communication protocol. All messages supported by «FORA-600» «Vigintis Elektrtonika» coders are listed at the Annex A. The message has to be typed in the hex format, if special keys are not used. One byte has to be entered by two symbols. The blanks can be between the symbols. A text string is typed by the ASCII symbols and is enclosed in quotations. This quotation is not sent. If the message consists of the byte for the message's length, it may be replaced by the two xx symbol. The application will substitute these symbols with the real message's length automatically. If a semicolon without quotations will be found at the message, the next data will be ignored. It may be useful for comments.

The special keys are followed:

\b – binary byte; lower bit is at right; the number of symbols should not be more than 8, but can be less. The blank has to be at the end.

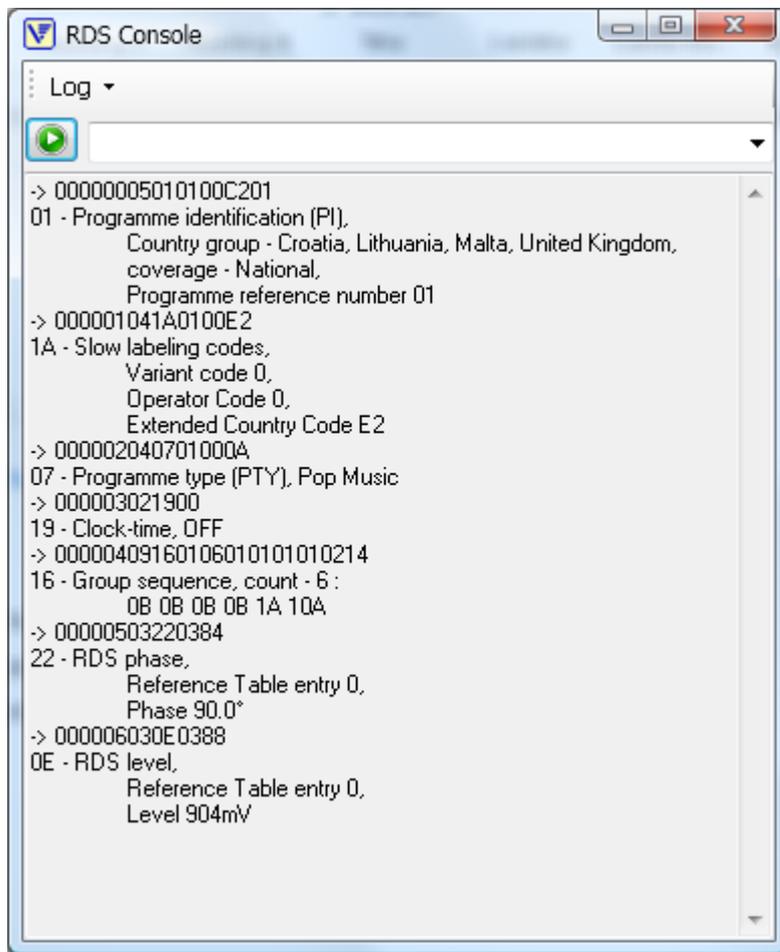
\g – the group indication; the number of group is at the first, and then is an A or B character.

\d – the decimal number indication; the number should not exceed the byte size. A blank has to be at the end.

\s – the group address indication; hex-format is used; the maximum value=0x3FF; three hex symbols should be typed. If it is no address, zero address will be used automatically.

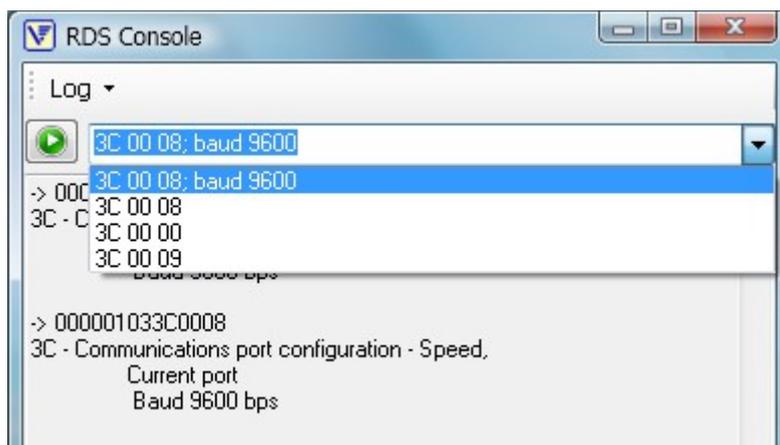
\e – the coder address; hex-format is used; the maximum value=0x3F; two hex symbols should be typed. If it is no address, zero address will be used automatically.

\c – is used for the OD message only (Real time clock); it sets the system time;



Pict.19

Any correct sent message is saved in the message history (Pict.15). History is saved automatically when the console window is closed. To save history at other file or load it from any file use the «Log» drop-down menu. To send message with the text field data send the green button with white arrow. If the text field is empty, when this button is pressed all messages from history will be sent.



Pict. 20

Annex A

The list of the consummated UECP commands for the RDS coder
Fully implemented UECP commands:

PI
PS
PIN
DI
TA/TP
MS
PTY
Paging network group designation
RDS on/off
RDS phase
RDS level
Group sequence
Site address
Encoder address
CT On/Off
Program TYpe Name (PTYN)

ECP command with restrictions.

The differences are in the brackets with asterisks. The rest is according to the UECP protocol.

1B Paging call with alphanumeric message (80 characters)

MED: First byte:

Bits 7..4: Number of repetitions (* always 0001, the message is sent one time and cleared *)

Bits 3..0: Pager address (MSB)

0D Real Time Clock

MED: First byte: 00..63 Last two decimal digits of Year expressed as hex (* 00..FF, 2000 year = 64 *)

MED: Byte 7: Centiseconds (* Ignore *)

3C Communications port configuration - Speed

To set coder's baud rate send following command "3C FF XX", where XX – is a speed index according to table:

00 -00,

75 - 01,

150 - 02,

300 - 03,

600 - 04,

1200 - 05,

2400 - 06,

4800 - 07,

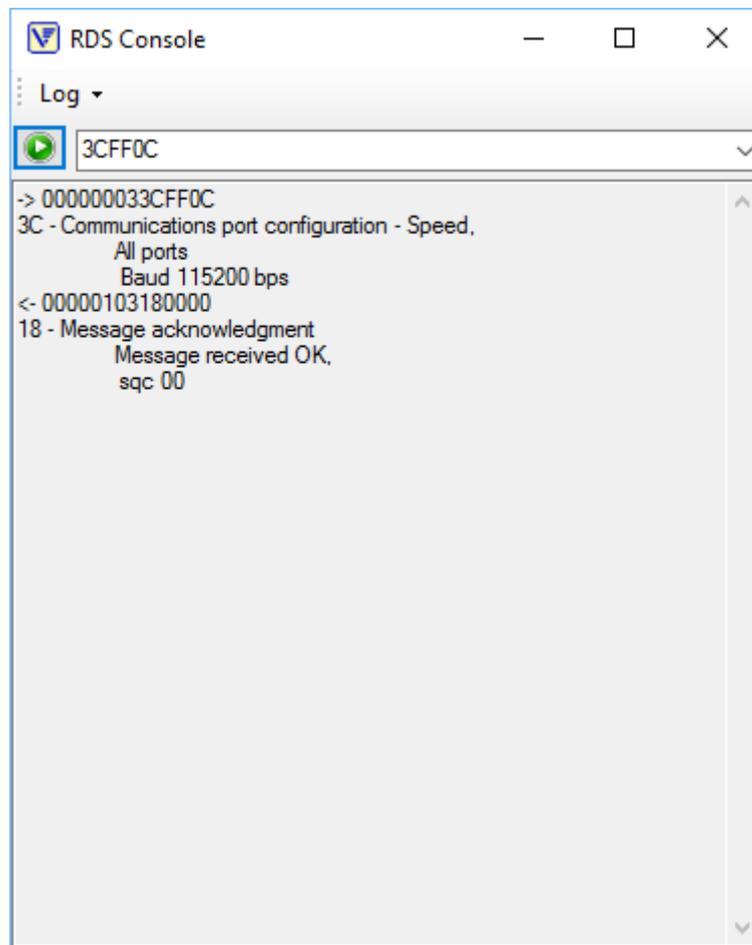
9600 - 08,

19200 -09,

38400 – 0A,

57600 – 0B,

115200 – 0C.



Pict. A_1

If this command is sent via RS232 protocol, there will be no response, since the encoder will change the transmission rate. After this command it is necessary to set new baud rate for the host. (Pict 5).

13 AF

(* cthe AF list is fully reload without adding or deleting any items. Maximum list length is 0xFB.*)

MED: байты 1,2: Start Location (* always 0000h *)

MED: last byte (* always 00h, Terminator *)

2C Communication mode

At mode 2 (Bi-directional mode, spontaneous response) the coder gives an acknowledgment message (18 Message Acknowledgement).

0A RT

MEL: 01..41 (* не 00..41 *)

MED: First byte

Bit 7: Reserved

Bits 6..5: Buffer configuration (* 110 if MEL>1 – add the radiotext, 00 if MEL=1 – clear the radiotext buffer*)

Bits 4..1: Number of transmissions

Bit 0: A/B status control

2D xx 4F4170 (dynamical PS)

MEL: 09

MED: First byte

Bit 7: Reserved

Bits 6..5: Buffer configuration (10 if MEL>1 - add PS, 00 if MEL=1 – clear the buffer and add PS)

Bits 4..1: Display time(1..15, not less then In seconds)

Bit 0: Memory type (0-EEPROM, 1-RAM)

MED: bytes 2-9

PS text. If the 0 symbol is present, the coder's current time will be sent instead.

MED: byte 10:

Without this byte the type 2 or 3 buffer is used. If this byte is present and lowest bit is set to 1, the type 4 buffer is used.

Bit 7: The last string flag. If it has been set the all PS strings will be moved to the type 4 buffer for the transfer start. Is used for synchronization.

Bits 6..0 – number of repetitions for the PS string for the dynamic type 4 (1..127). Use the same number for the each strings from the PS text.

5A – command for restart coder into loader mode.

5C – command for coder EEPROM flushing. After that all coder settings are reset to default. Baud rate is 9600 bps. The default IP address is 192.168.0.234:65501.

Other coder features:

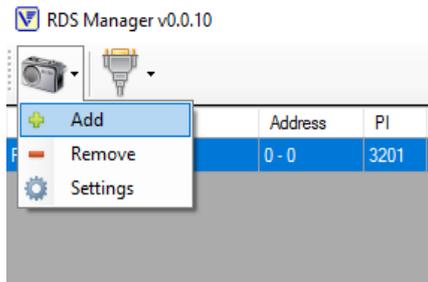
DSN: always 1

PSN: always 0

Annex B

RDS address setting

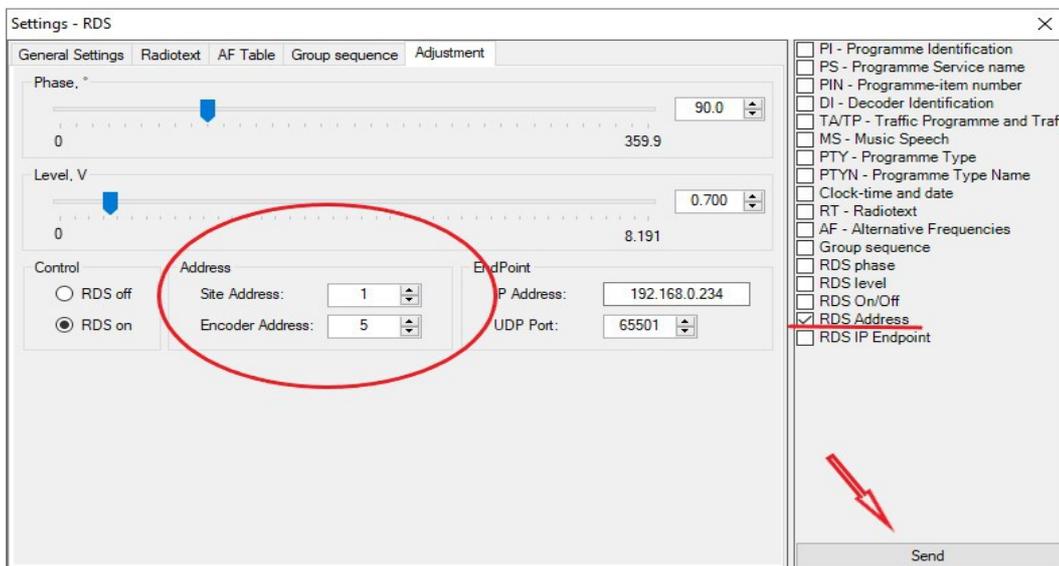
The address setting command is executed at the broadcasting mode, so the address is set for each encoder separately. Connect the encoder to the computer. Set the connection type (RS232 or UDP). Click on the RDS and Add icon.



The RDS encoder with address 0-0 will appear.

Set the *Settings* option or double-click on the encoder row. The RDS Setting window will open

Set the necessary site address and encoder address, select the command RDS Address and click Send.



In the Encoder list the row with the same address will appear. The *Message received* string is a sign of successful command.

