

RADIO Checker Pro Manual

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About

User manual for RADIO Checker Pro. v.1.5.1.3

What is RADIO Checker Pro

RADIO Checker Pro - Audio sample detector for retransmit broadcasters. Allows to detect sample presence in incoming audio signal and send command to start your playlist. Detects Wave samples and DTMF codes.

Works with RADIO Player Pro and can be used as a separate module for third party software.

Software functions

- Detects concurrence of a radio signal (sent on an input of a sound card) with given sample in WAVE PCM format
- Frequency signals detection (DTMF, MKTT and others.)
- Loss / appearance of a signal detection
- Can detect up to 10 samples simultaneously
- Base of samples with adjustments for each of them
- Frequency signals settings
- Log file record
- Adapted to work with RADIO Player Pro and other external programs

Working with RADIO Checker Pro

Startup settings

The subsequent recommendations explains some questions connected with initial program setup and work concept.

The program is used to detect sample presence in incoming audio signal and send command to start your playlist. Detects Wave samples and DTMF codes.

These are basic steps to perform after which you can use this program.

Step 1: Select recognition device

Sound capture device is required for RADIO Checker Pro.

Specify the corresponding device in section of [Settings - Detection](#).

After device selection press " **Check for compatibility** " button to check if the chosen device is compatible with program requirements.

Use Windows system audio mixer (icon near to system hours) to specify which input is used for record purposes.

Step 2: Frequency commands setup

Skip this step if you are not using RADIO Checker Pro to detect DTMF or other frequency commands.

To enable frequency sequence detection (for example, DTMF) check the list of commands in [Settings - Frequency setup](#).

Specified frequency commands can be used in samples.

Program has initial adjustments of frequency commands for DTMF and MKTT standards.

To use other sets of frequencies you should create them in addition to existing commands.

See [Frequency setup](#) and [Frequency properties](#) for more details.

Step 3: Create samples

To start sample detection you should create samples first.

To create samples use [Samples](#) panel.

Some recommendations for sample creation can be found in [Creating samples](#) chapter.

More detailed description of various settings of the program can be found in section of [Setting](#).

Frequently asked questions

1. [Why sample is turned off even when "Turn off sample after detection" option is unchecked?](#)
2. [Why sample is not detected each time?](#)

Why sample is turned off even when "Turn off sample after detection" option is unchecked

When you use RADIO Player Pro it switches on/off samples by itself.

It was made for this purposes:

1. Economy of CPU resources
2. Prevention of wrong (double) detections
3. Each block can have the own samples for detection.

Why sample is not detected each time

Quality of recognition (detection) of the sample depends on amplitude of an incoming signal.

Insufficient loudness of a signal causes such problems.

It is recommended to raise loudness of a signal.

If it does not help increase sensitivity level of the sample in [Sample properties](#).

Creating samples

Create "File" sample.

To create a file sample you can use any wave editor (Sound Forge, CoolEdit, WaveLab, etc.).

Sample creation process is important, since accuracy of definition depends on it.

After successful file creation specify filename in [Sample properties](#).

There are some recommendations which can help you to create a sample.

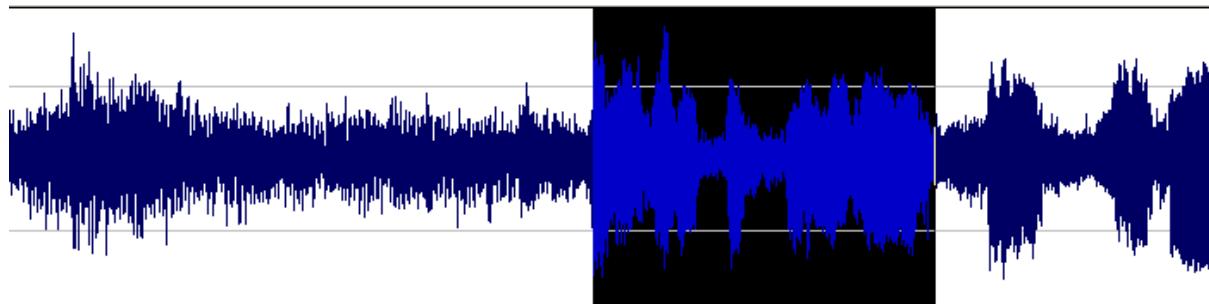
1. Use the same sound card to record sample and to detect it with RADIO Checker Pro.

Use loud input signal. You can achieve the best results if you use the same computer for record and detection.

2. Sample should begin with a characteristic sound of high amplitude.

Samples beginning with a noise will have detection problems.

This is a sample picture where high amplitude part was selected to use as a sample.



3. Normalize function can be used for signals with low amplitude.

Create "Command" sample.

Command sample is a sequence of frequency commands.

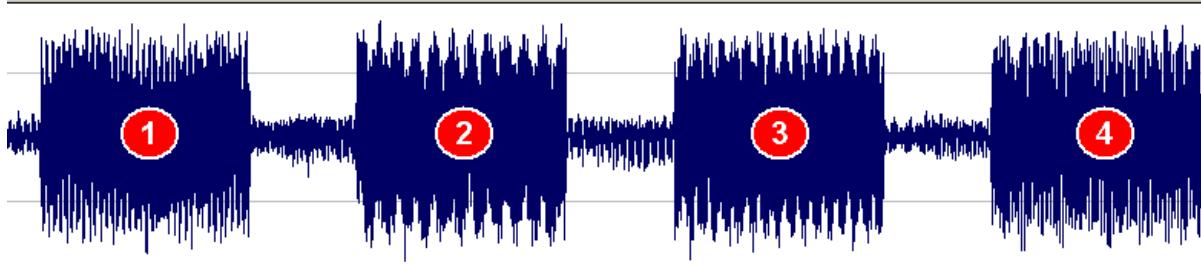
Below you can see an example of DTMF sample creation.

You can specify your own commands ([Frequency setup](#)) and detect other frequencies than DTMF ones.

RADIO Checker Pro already contains DTMF commands list. DTMF related information can be found [here](#).

If you know DTMF sequence you can simply enter it in [Sample properties](#).
If you don't know - you can detect it using instructions listed below.

This is a sample signal which contains 4 DTMF tones.



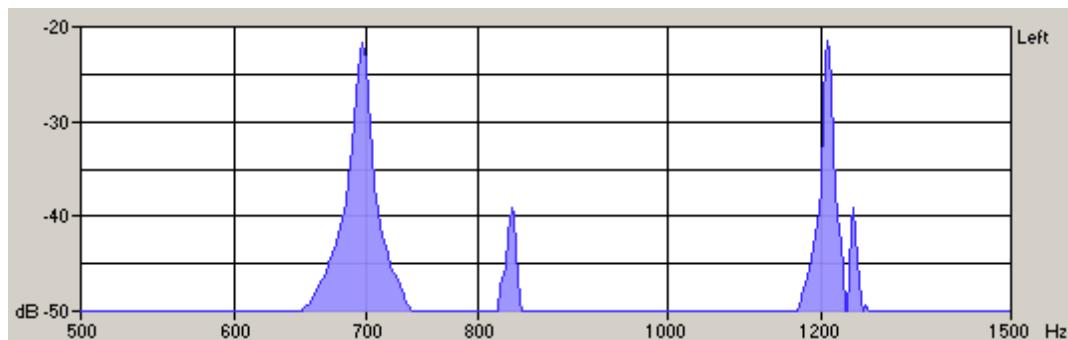
APPROACH 1. Detect DTMF sequence using spectrum analyzer

You can define what sequence is used, using the spectrum analyzer in wave editor (for example, Sound Forge).

Spectrum shows what frequencies present in signal.

Select one DTMF tone and start spectrum analyzer.

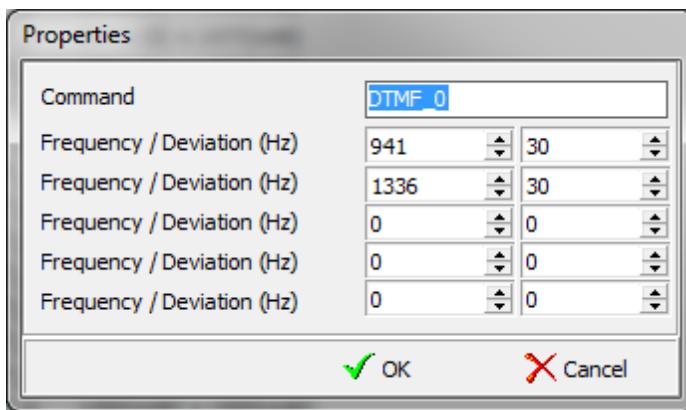
NOTE!!! Don't select more than one DTMF tone , because this will not allow to detect DTMF sequence.



Using DTMF frequency [table](#), we detect DTMF command.

For our example we have: $697 \text{ Гц} + 1207 \text{ Гц} = 1$.

In command list we have DTMF_1 command.



Use the same approach to detect other commands.

Detected DTMF sequence should be specified in sample properties.

For sequence (1 2 3 4) sample should have "DTMF_1,DTMF_2,DTMF_3,DTMF_4" command sequence.

APPROACH 2. Detecting using several samples

Create several samples with ONLY ONE DTMF command in each one.

Do not forget to clean a checkbox "Turn off sample after definition" in sample properties.

For all DTMF commands you will have 16 samples.

Start recognition of all created samples.

The program will now show you sequence of found DTMF commands.

ATTENTION! The given way can show false detections of commands. It is better to start detection directly before DTMF signal sequence..

External usage

RADIO Checker Pro has Windows API interface for communicating with other softwares .

Listed below sample code was written for using with Delphi.

It can be easily ported for using with C++ or other languages.

Checker Window handle should be found to interact with RADIO CHECKER PRO .

```
function GetCheckerHandle: Integer;
begin
  Result := FindWindow('TRadioChecker', nil);
end;

// Store Handle
CheckerHandle := GetCheckerHandle;
```

Send your program window class name to Radio Checker Pro to receive messages from it.

```
function SendWindowClassName(ClassName: string): Integer;
var
  Struct: COPYDATASTRUCT;
  pch: array[0..255] of Char;
```

Working with RADIO Checker Pro

```
begin
    Struct.dwData := 1000;
    Struct.lpData := StrPCopy(pch, ClassName);
    Struct.cbData := StrLen(Struct.lpData) + 1;
    SendMessage(CheckerHandle, WM_COPYDATA, 0, LPARAM(@Struct));
end;
```

You can also send your program window handle to Radio Checker Pro when several programs with the same title is used.

```
SendMessage(CheckerHandle, WM_USER, 100, Handle);
```

Main window handle can be retrieved as shown below:

```
Handle := Application.MainForm.Handle
```

To send a command for RADIO Checker PRO use this function

```
SendMessage(CheckerHandle, WM_USER, Cmd, Param);
```

Action	Cmd	Param
Turn on sample and start detection	2012	Sample base number -1
Turn on sample and stop detection	2013	Sample base number -1
Update detection state. Depends on sample states	4000	0
Turn on sample and do not start detection	4001	Sample base number -1
Turn off sample and do not stop detection	4002	Sample base number -1
Turn on all samples and start detection	3000	0
Turn off all samples and stop detection	3001	0

To receive back messages from RADIO Checker Pro.

You should declare procedure which will receive WM_USER messages .

Detection message has

```
wParam = 2000,
lParam = Sample base number -1
```

Delphi code sample.

```
procedure CheckerMessage (var Msg: TMessage); message WM_USER;
...
procedure TCheckerHandler.CheckerMessage (var Msg: TMessage);
begin
  case a.wParam of
```

Working with RADIO Checker Pro

```
2000: DetectedSampleIndex := Msg.lParam + 1;  
end;  
end;
```

Menu

Menu

Menu "File"

Close

Close the program

Menu "Language"

Language selection menu.

Selecting default language will cause program restart.

Files of language support are stored in sub folder [Language](#), in the folder with program.
Expansion of files is *.Ing.

To translate interface to a new language:

- open RCPro*.Ing file with [notepad](#)
- translate all values after = sign in file *.Ing
- save this file with a new name
- restart a program
- select new translation from Language menu.

Menu "Help"

Help

Shows this help.

Startup settings

Shows help for [Startup settings](#)

Frequently asked questions

Shows help for [Frequently Asked Questions](#)

Menu "About"

Version

Shows "About" window with information on the version of the program and it's owner.

What's new?

Shows the list of changes.

Check for a new version

Checks for new version on official site via internet.

Check for a new version on startup

When switched on - checks for new version on program startup

Menu

Home page (Internet)

Opens [home page](#) in Internet.

Suggestions

Use this item for the message on yours offers and wishes.

Need help

Use this item for getting help from the author concerning the problems with program.

Bug report

Use this item when the program made raised an exception and you want to inform the author about it. Describe all your actions which helps to reproduce this error.

Registration information

Shows a window with the [Registration / Purchase](#) information

Registration FORM

Shows a window with the form that should be filled for registration of the program.

Load registration key

Use this item if you want load registration key for program.

Tabs

Tabs

Samples

Sample list is used to add/delete/edit/enable/disable samples.

Sample list buttons



Add sample

Creates new sample. [Sample properties](#) dialog is shown.



Delete sample

Removes selected samples from the list.



Sample properties

[Sample properties](#) dialog is shown.



Enable/Disable sample

Enables/Disables selected samples.



Enable sample

Enables selected samples.



Disable sample

Disables selected samples.



Enable all samples

Enables all samples.



Disable all samples

Disables all samples.



Emulate sample detection

Program performs the same actions as if sample was really found.

Can be used for checking external program connection with RADIO Checker Pro without real signal detection.

Message log

Program saves all actions like sample detection, enabling/disabling sample. error messages as log messages.

"Clear messages" button can be used to clear current messages.

Settings

The Settings panel is used for changing program settings and parameters.
After change of settings it is recommended to press the button

Tabs



In this case after system halt or emergency end of work of the program you will not lose settings.

For getting help on certain section choose it in a contents tree on the left.

Program settings

Maximum log message count

Maximum log message count in [Samples](#) panel.

Save log to file

Turn on/off file logging.

Log can be found in "Program_Folder\Log\Year\Month\Date-Month-Year.log"

View as

Taskbar only

View as standard button when minimized.

System tray

View as icon near system hours when minimized.

Wait while external program is processing message

If turned on - this ensures that no new messages will be posted until previous is processed.

Minimize application window after start

Application will be minimized (button or tray icon) after start if checked

Detection

Device

Select a device used for signal capture.

Button "Check compatibility"

Checks device compatibility

Requirements: 44100 Hz/16 Bit/Stereo recording format support.

Frequency setup

Frequency command

Frequency command is set of frequencies of a high amplitude which are present in a signal.

Sets of frequencies (up to 5 simultaneously) can be used as a frequency command in the program.



Add

Add frequency command. Dialog [Frequency properties](#) is shown.



Delete

Removes selected commands.



Properties

Dialog [Frequency properties](#) is shown.

Tabs

E-mail

E-Mail messages can be send by the program. It can be used for sending messages to mobile phone via E-mail gate.

Send messages to E-mail

On/off sending E-mail messages.

Message types

Select message type which can be sent to E-mail.

Message in Subject

If switched on - message text will be in subject, otherwise in Email body.

From (E-mail)

Sender's E-mail address.

To (E-mail)

Receiver's E-mail address.

SMTP Settings

Settings for internal SMTP client.

Server

SMTP server address.

Port

SMTP server port value. Default is 25.

User name

SMTP user name. Leave blank if authorization is not needed.

Password

SMTP password. Leave blank if authorization is not needed.

Configuration

Backup folder

Default zip archive folder location

Settings

Automatically backup data on program exit

On/Off automatic data backup on program exit.

Backup will not be created if any error occurs on program startup.

Automatically backup data on time

On/Off automatic data backup by time and interval.

Archive will be created when program runs only.

01:30 Backup time

Time for creating backup.

Tabs

 **Interval (days)**

Day interval for creating new archives

Use limited number of archives

When option is turned on then older archive file will be deleted if maximum archive count is reached.

 **Maximum number of archive files**

Maximum number of archive files. Older ones will be deleted on new archive creation.

Data

Settings

All settings from Setting tab will be stored

Messages

Store application messages log

Actions

Save to archive

ZIP archive storage procedure of current selected Data.

Restore from archive

Restore selected Data from the selected ZIP archive.

Reset data

Reset all selected Data to the default state.

Information

DTMF signals

Multi-frequency signals

If the signal contains a combination of frequencies - it is called multi-frequency signal.

Each signal consists of two sound frequencies considerably distinguished from each other.

DTMF standard

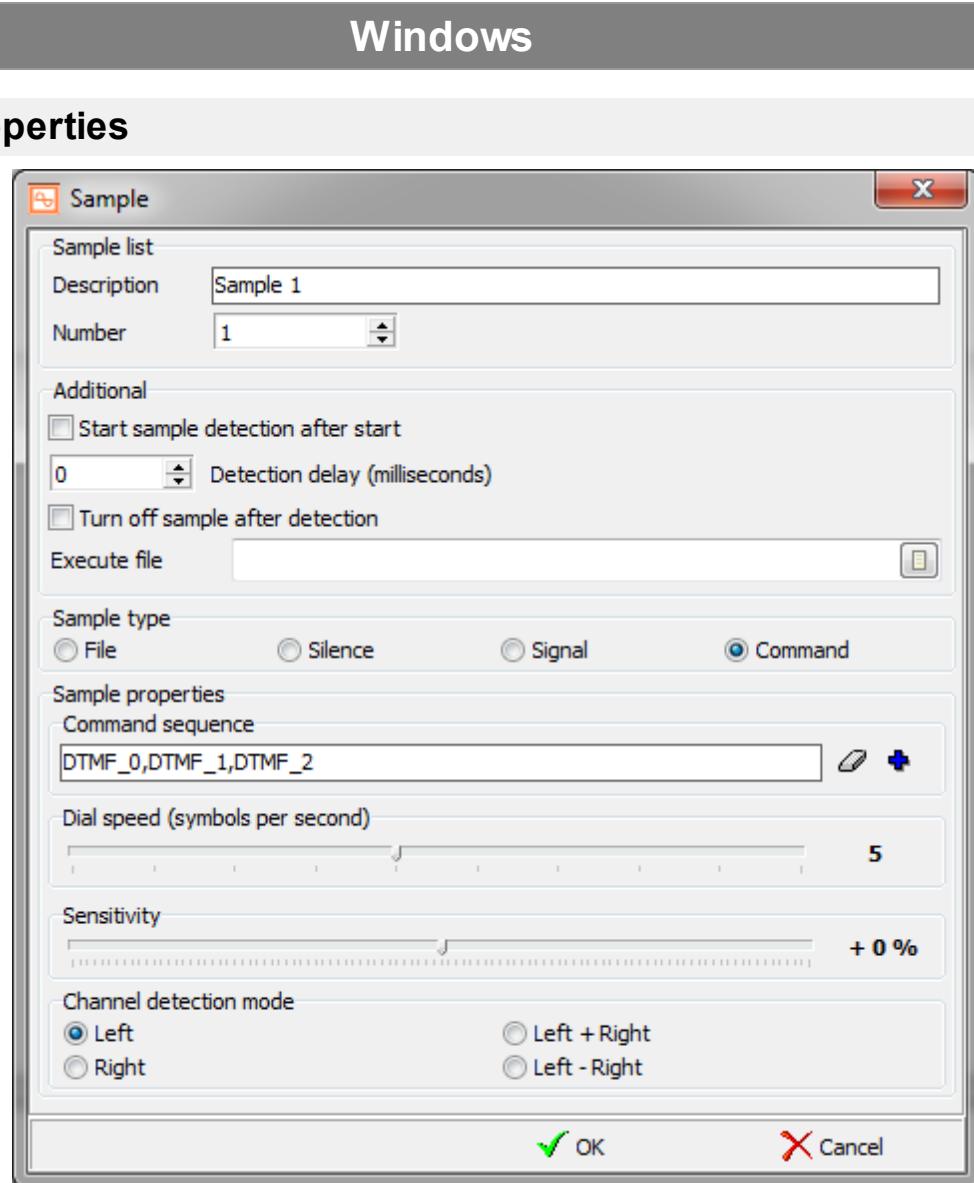
Each signal consists of frequencies of two groups:

- bottom group of frequencies - 697 Hz, 770 Hz, 852 Hz, 941 Hz;
- top group of frequencies - 1209 Hz, 1336 Hz, 1477 Hz, 1638 Hz.

Such code provides 16 combinations of frequencies.

Frequency	1209Hz	1336Hz	1477Hz	1633Hz
697Hz	1	2	3	A
770Hz	4	6	6	B
882Hz	7	8	9	C
941Hz	*	0	*	D

DTMF Standard



Sample properties window.

Sample list

Description

Sample description. It is used in sample list..

Number

Unique sample number. Used to manage with samples from external programs.

Additional

Start sample detection after start

Sample will be activated for detection φаeyк application start



Detection delay (milliseconds)

Delay time before sample detection message appears.

Can be used to correct detection time for external programs.

Turn off sample after detection

Sample will be turned off after fires detection.

Used to avoid further false detections.

Note!

When you use RADIO Player Pro it switches on/off samples by itself.

So sample will be turned off even when checkbox is not checked.

Sample type

Type of a sample

File

Wave PCM or MP3 file.

Silence

Silence detector. Detects if signal level is below the edge level.

Signal

Signal detector. Detects if signal level is above the edge level.

Command

Frequency command detector. DTMF and other user-defined sequences can be used.

Sample properties

Sample type = File

File

Specify Wave PCM or MP3 file stored on your HDD or Network Drive.

Play control buttons allow to listen to file.

Recommended sample properties:

Format: WAVE PCM / 44100 kHz / 16 bit / Stereo

Duration: 1-3 sec.

It is not recommended to use MP3 file as a sample, cause it has the deformed frequency characteristics which are not heard but decreases detection accuracy.

Information on sample creation process can be found [here](#).

Detection accuracy

Specify detection accuracy used to compare sample and signal.

Higher accuracy avoids false sample detection, lower accuracy increases sample detection quality.

Normal level is recommended.

Detect frequency absence

Turn this option if you want the program to detected absent frequencies within a sample, This avoids false sample detection for speech samples.
Samples which are mixed with other sounds will not be detected.

Sample type = Silence



Edge level (dB)

Level in dB which is used as a threshold level for detection.



Detection time

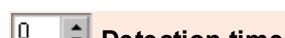
Duration of absence of a signal after which sample will be found.

Sample type = Signal



Edge level (dB)

Level in dB which is used as a threshold level for detection.



Detection time

Duration of presence of a signal after which sample will be found.

Sample type = Command

Command sequence

Specify command sequence. Command properties can be set at [Settings - Frequency setup](#).

Example:

DTMF sequence 1,2,3,4.

Enter the following string: DTMF_1,DTMF_2,DTMF_3,DTMF_4.



Dial speed (symbols per second)

Number of commands per one second.

Faster command change speed needs higher dial speed.

Common settings



Sensitivity

Sample sensitivity increasing/decreasing level.

It is recommended to use increased sensitivity when sample detection fails.

Try to use lower sensitivity increment to avoid false detections.

It is NOT recommended to use Sensitivity above +20-30%.



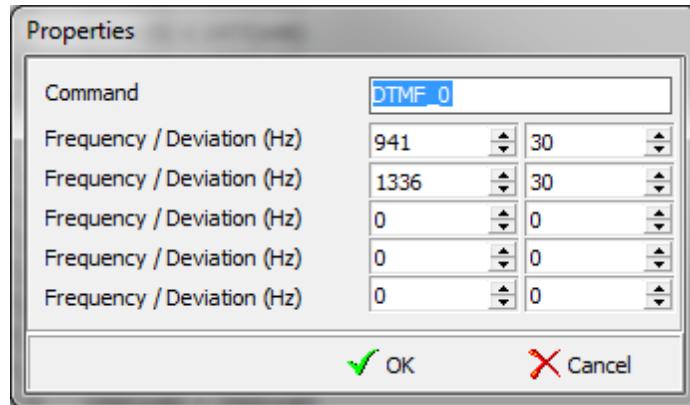
Channel detection mode

Sample channel detection mode. Mode choice depends on signal channel information.

It is recommended to use Left + Right for cophased signals and Left - Right for antiphased signals.

Left or Right mode can be used for any signals.

Frequency properties



Frequency properties.

Frequency

Frequency in Hertz (Hz)

Deviation

Value in Hz which is used as a possible deviation of frequency from the given parameter.
Deviation should be approximately 1-2 % from value of frequency.

Example:

Frequency: 1000, Deviation - 25

Frequencies from 975 up to 1025 Hz will be detected.

Registration / Purchase

Demo restrictions

Before registration program RADIO Checker Pro works in a demonstration mode.

After registration all restrictions will be removed.

The information on registration [here](#).

DEMO restrictions.

1. After 10-th detected sample program will not interact with external software.
2. Startup splash screen

Other functions should work like in full version.

License

License purchase

Visit our [Home page](#) to find latest actual licensing information.

Contact Information

E-mail:

Technical support

support@radiosoft.pro

Licensing

license@radiosoft.pro

Home page:

<http://radiosoft.pro>

