



The PiRa's

RDS Encoder

User Manual

Introduction

This dynamic stand-alone RDS encoder is ideal for use in RSL or small FM radio stations. It holds all common functions and meets requirements of most users while maintaining a low price. It can be used with virtually all FM transmitters.

Simple and modern concept of the RDS encoder uses two programmed microcontrollers for clock and data stream generating. Spectral purity around the 57 kHz subcarrier is very good due to digitally generated modulation signal using D/A converter.

For stereo transmission it's preferable to synchronise the RDS subcarrier with the 19 kHz pilot signal. The RDS encoder has 19 kHz input for this purpose. To take advantage of this, the stereo device must provide the 19 kHz pilot signal on its output.

Physical characteristics of the output signal are configured internally on the RDS encoder's board. Other features are controlled by software through parallel port. Control software includes MS-DOS and MS Windows versions and in addition to basic functions gives the RDS encoder some advanced possibilities.

Technical specifications

Dimensions: 148 x 129 x 57 mm (5,8 x 5,1 x 2,2 inch)

Supply voltage: 8-20 V

Supply current: typ. 30 mA

Output RDS signal level: adjustable 0-1.3 V p-p

RDS signal bandwidth: +/- 2.4 kHz (40 dB)

57 kHz carrier suppression: 50 dB

Phase adjustment: 0-90 degrees

19 kHz input sensitivity: 10 mV p-p for square, 100 mV rms for sine

19 kHz input impedance: >100 kOhm

MPX retransmission gain: 1

MPX input impedance: 25 kOhm

Max. output voltage: 3.6 V p-p

Signal connectors: asymmetrical

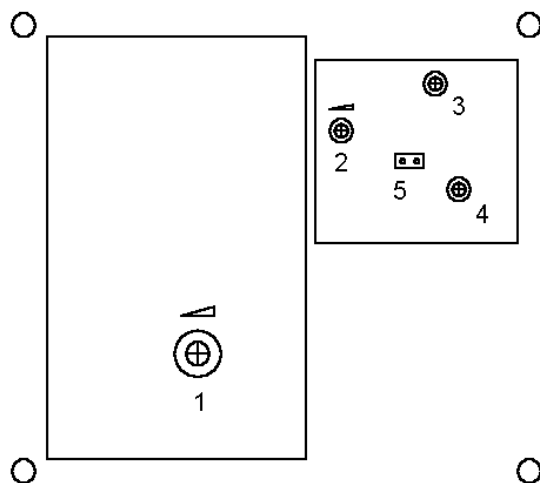
Power supply connector: central conductor is positive (+)

RDS features supported: PI, DI, M/S, PTY, TP, TA, PS, RT, AF

Note: The MPX loopthrough can't be used if the transmitter works with input MPX level higher than 3.6 V p-p for 75 kHz deviation (this applies only to some professional transmitters).

Description

Composition

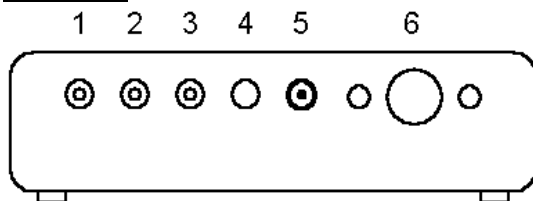


Adjustable elements:

- 1 - RDS signal output level
- 2 - 19 kHz input sensitivity
- 3 - Phase shift
- 4 - 57 kHz free running oscillator
- 5 - Internal/automatic 57 kHz reference set

Note: To open the cover of the RDS encoder slacken four screw from bellow in corners.

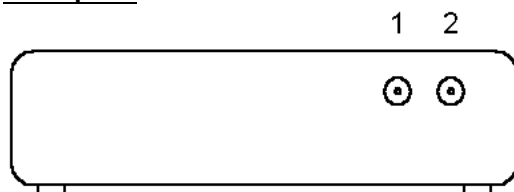
Rear panel



Connectors:

- 1 - 19 kHz input
- 2 - MPX input
- 3 - MPX+RDS output
- 4 - Memory bank switch
- 5 - Power supply
- 6 - Parallel port interface

Front panel



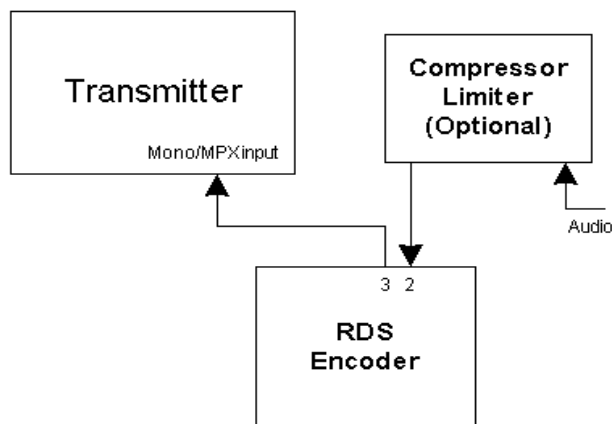
LED indicators:

- 1 - Operation (flashing)
- 2 - 19 kHz in-lock

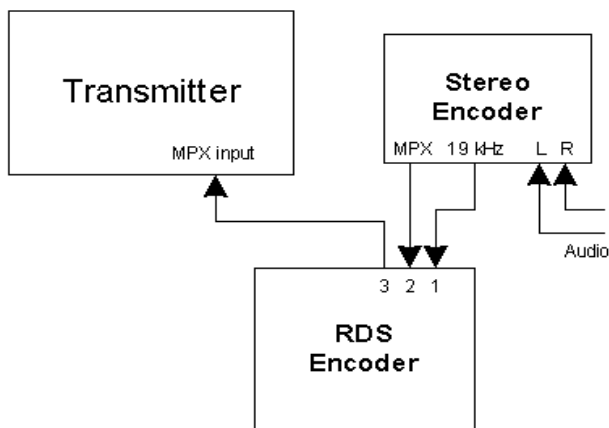
Installation

Connection

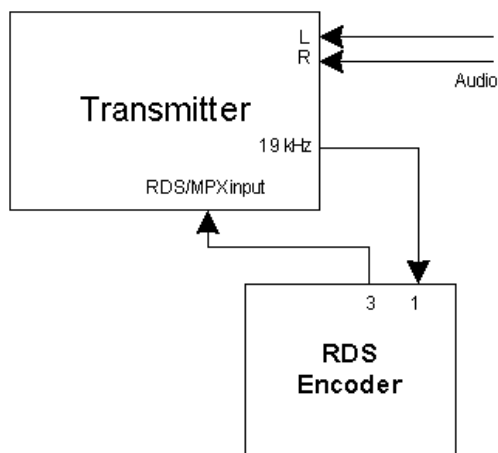
The following figures show various situations and corresponding methods of connection:



Mono transmitter and mono audio source



Mono transmitter with external stereo encoder



Stereo transmitter

Power supply

The RDS encoder can be supplied from any power supply, which delivers a voltage between 8 and 20 V DC and a current at least 50 mA. The RDS encoder has polarity protection and own voltage stabilizer. The central conductor of the power supply connector is positive (+).

Adjustment

For mono transmission there is only one item to adjust - RDS signal output level. The right level should be between 3 and 11 % of the audio signal, measured in peak-to-peak values. Recommended value is about 6 %, which results in 4 kHz deviation of the FM carrier. Don't forget that maximum FM carrier deviation with RDS and audio signal is 75 kHz.

The 57 kHz reference set jumper should be open when the RDS encoder is used for mono transmission to set the internal 57 kHz reference.

For stereo transmission it's necessary to set-up the pilot lock circuit. This can be done in several steps:

1. Adjust right RDS signal output level.
2. Short the 57 kHz reference switch.
3. Set almost maximum 19 kHz input sensitivity by trimmer 2. Fetch a 19 kHz signal to the 19 kHz input and set the trimmer 4 to the position where the LED is lighting.
Note: When you receive the RDS encoder, the trimmer 4 is set to the right position. In this case you may skip this step.
4. Fetch 19 kHz signal from a stereo encoder to the 19 kHz input and adjust right input sensitivity (start on zero position) - the LED 2 must light for all positions of trimmer 3.
5. Adjust right phase shift (0 or 90 degrees phase shift between 19 kHz pilot tone and 57 kHz RDS subcarrier, measured on transmitter input). This adjustment is impossible without an oscilloscope. Never mind, if you don't have this equipment. Simply set the trimmer 3 to the position where you think the signal is the best. Be sure that it's difficult to recognize any differences...
6. If needed, repeat from step 4.

Connecting to a computer

Note: The RDS encoder is designed as stand-alone. It doesn't need a computer to be connected. All the features including dynamic work as well with a computer as without it.

When the RDS encoder is connected to a computer, the interface with the software provides control of the RDS encoder features. The data stays in the RDS encoder even if you switch off the power supply due to using an EEPROM memory.

Connect enclosed parallel cable to the RDS encoder on the side with DIN connector and to the computer on the side with D-SUB male connector. Then you can start to use the control software.

Memory bank switch

The RDS encoder has two memory banks. Each bank may contain different information as set by the control software. This allows you to:

- ◆ control Traffic Announcement flag with external switch. The traffic announcement can have especial PS, dynamic PS text, radiotext etc.
- ◆ use up to 18 dynamic PS labels (1+8 labels in each bank).
- ◆ use 2 radiotexts or dynamic PS texts with automatic or manual switching.

For manual switching between the memory banks connect a cable with a switch to the memory bank jack connector. If the switch is switched on, the bank 2 is selected. If the switch is switched off or no switch is connected, the bank 1 is selected.

Contact and support

Web page: <http://www.pira.cz/rds>

E-mail: mail@pira.cz

The web page includes new software versions, frequently asked questions, schematics etc.

