

Universal Software Radio Peripheral

The Foundation for Complete Software Radio Systems

THE USRP SYSTEM

The Universal Software Radio Peripheral (USRP) enables engineers to rapidly design and implement powerful, flexible software radio systems. The intuitive USRP design helps you to get your software radio up and running quickly. Simply download GNU Radio, a complete open source software radio and signal processing package, and the USRP is ready to use. Once you install the software and plug the USRP into a host computer, it is ready to transmit and receive a virtually limitless variety of signals.

The true value of the USRP is in what it enables engineers and designers to create on a low budget and with a minimum of effort. A large community of developers and users have contributed to a substantial code base and provided many practical applications for the hardware and software. The powerful combination of flexible hardware, open-source software and a community of experienced users makes it the ideal platform for your software radio development.

BENEFITS

- Low cost, flexible platform
- Large community of developers
- Close coupling with the GNU Radio software radio framework forms a flexible and powerful platform



FEATURES

- Four 64 MS/s 12-bit analog to digital Converters
- Four 128 MS/s 14-bit digital to analog Converters
- Four digital downconverters with programmable decimation rates
- Two digital upconverters with programmable interpolation rates
- High-speed USB 2.0 interface (480 Mb/s)
- Capable of processing signals up to 16 MHz wide
- Modular architecture supports wide variety of RF daughterboards
- Auxiliary analog and digital I/O support complex radio controls such as RSSI and AGC
- Fully coherent multi-channel systems (MIMO capable)

HARDWARE

The USRP can simultaneously receive and transmit on two antennas in real time. All sampling clocks and local oscillators are fully coherent, thus allowing you to create MIMO (multiple input, multiple output) systems.

In the USRP, high sample-rate processing takes place in the field programmable gate array (FPGA), while lower sample-rate processing happens in the host computer. The two onboard digital downconverters (DDCs) mix, filter, and decimate (from 64 MS/s) incoming signals in the FPGA. Two digital upconverters (DUCs) interpolate baseband signals to 128 MS/s before translating them to the selected output frequency. The DDCs and DUCs combined with the high sample rates also greatly simplify analog filtering requirements.

Daughterboards mounted on the USRP provide flexible, fully integrated RF front-ends. A wide variety of available daughterboards allows you to use different frequencies for a broad range of applications. The USRP accommodates up to two RF transceiver daughterboards (or two transmit and two receive) for RF I/O.

Available daughterboards include:

- DC to 30 MHz receiver
- DC to 30 MHz transmitter
- 1 MHz to 250 MHz receiver
- 1 MHz to 250 MHz transmitter
- 50 to 860 MHz receiver
- 800 MHz to 2.4 GHz receiver
- 400-500 MHz transceiver
- 750-1050 MHz transceiver (including cell and ISM bands)
- 1150-1450 MHz transceiver
- 1.5-2.1 GHz transceiver (including PCS bands)
- 2.3-2.9 GHz transceiver (including ISM band)

OPEN SOURCE

The entire USRP design is open source, including schematics, firmware, drivers, and even the FPGA and daughterboard designs. When combined with the open source GNU Radio software, you get a completely open software radio system enabling host-based signal processing on commodity platforms. No software or licenses need to be purchased. It provides a complete development environment to create your own radios.

While most often used with GNU Radio software, the USRP is flexible enough to accommodate other options. Some users have created their own SDR environments for the USRP, while others have integrated the USRP into the LabView and Matlab/Simulink environments.

SPECIFICATIONS

Supported Operating Systems

- Linux
- Mac OS X
- Windows XP, Windows 2000
- FreeBSD, NetBSD

Input

Number of input channels: 4 (or 2 I-Q pairs)

Sample rate: 64 Ms/s

Resolution: 12 bits

SFDR: 85 dB

Output

Number of output channels: 4 (or 2 I-Q pairs)

Sample rate: 128 Ms/s

Resolution: 14 bits

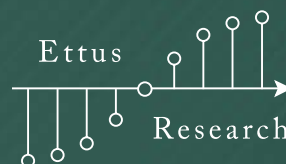
SFDR: 83 dB

Auxiliary I/O

High-speed digital I/O: 64 bits

Analog input: 8 channels

Analog output: 8 channels



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