Product Feature

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Compact SDR Scans DC to 6 GHz

This direct-conversion SDR and its digital architecture provide the flexibility to cover many different radio communications formats and applications with one design.

SOFTWARE-DEFINED RADIOS (SDRs) offer the potential to be all things to all people. With sufficient bandwidth and processing power, a single SDR can serve almost any application within its frequency range, from commercial communications to military radar and test equipment. The Crimson TNG ("The Next Generation") from Per Vices Corporation (www.pervices.com) is designed to be that single-SDR solution for applications from dc to 6 GHz.

Packed with digital processing power, the Crimson TNG software-defined radio (SDR) supports applications from dc to 6 GHz with wide bandwidths.

This SDR packs high-speed analog-to-digital converters (ADCs), digital-to-analog converters (DACs), and a good amount of computer processing power into a compact 1U-high rack-mount enclosure. As a receiver, it can digitize input signals quickly and accurately. As a transmitter, it can generate output waveforms with wideband modulation using four receive and four transmit channels—each with as much as 322-MHz bandwidth—for a total RF bandwidth of more than 1,200 MHz.

The Crimson TNG SDR *(see figure)* is a true single-radio solution for modern communications systems, including third-generation (3G), fourth-generation (4G), and even proposed fifth-generation (5G) cellular radio standards. It is also capable of operating within signal intelligence (SIGINT) systems, commercial and military radar systems, and test-and-measurement applications. Each of its multiple receive and transmit channels can be independently controlled, allowing the SDR to perform such functions as scanning for signals while transmitting a wide variety of modulated waveforms.

The SDR is capable of phase-coherent operation of all four transmit and all four receive channels for implementation of phase-modulated signal formats with in-phase (I) and quadrature (Q) signal components. Software support enables automatic phase calibration of the four receive and transmit channels, as well as automatic calibration of I and Q amplitude and phase imbalances, using finite-impulse-response (FIR) filtering.

The SDR is based on high-quality components, including two model DAC38J84 quad-channel DACs and four model ADC16DX370 dual-channel, 16-b ADCs from Texas Instruments (www.ti.com), along with a model 5ASTMD3E3F31I3N Arria V field-programmable gate-array (FPGA) system-on-chip (SoC) from Altera Corp. (www.altera.com). The FPGA SoC has an on-chip dual-core ARM Cortex-A9 microprocessor and web-based interface to simplify access to and remote control of the SDR. The radio's integral FPGA and built-in microprocessor combine for programmable flexibility in orchestrating almost any modulation format.

The SDR housing measures 482.6 × 500 × 43.69 mm and weighs 5.4 kg. The direct-conversion transceiver derives excellent frequency accuracy from an internal 10-MHz oven-controlled crystal-oscillator (OCXO) frequency reference with ±5-ppb stability. The SDR supports its digital components with excellent analog front-end filtering with high isolation and rejection of out-of-band signals on the receive side and suppression of spurious signal content on the transmit side.

The Crimson TNG also offers the capability for spectrum monitoring, as well as signal generation and analysis in test systems. It includes an internet interface and UHD compatibility for ease of data transport. mw

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