

DataSoft SDR Development Kit

General Description

The DataSoft SDR (Software Defined Radio) Development Kit is an affordable, wide-band, high performance baseband and RF development and test platform capable of deploying the next generation of commercial waveforms including 4G (LTE, WiMAX), TV Whitespace, and emerging standards for Smart Grids and Home Networks. It is reconfigurable and reprogrammable, making it ideal for Cognitive Radio applications.

The configuration includes the DataSoft Monsoon™ RF Transceiver, the Mistral OMAP 35X EVM Development board, and an optional RF Front End Module all operating in an open source Linux-based environment.

The Monsoon™ RF Transceiver is a full-duplex wide-band transceiver that allows SDR developers to work much closer to the low-power real-time OMAP 35x processor for truly embedded wireless applications

An optional Front End module delivering 1W of linear power and < 10dB noise figure covering 400 MHz to 1000 MHz is available for field testing and deployment.

Benefits

- Wide RF operating range: 400 MHz - 4.0 GHz
- Frequency covers a variety of wireless protocol applications – UHF, White Space, WiFi, WiMax, LTE
- Enables SDR development on OMAP platform
- Comes with schematics and fast-start templates
- Comes with reference waveform implementation

Applications

- PHY-MAC and router Applications
- Cross layer WF optimization designs
- Design, implementation of networked cognitive spectrally fragmented WFs
- 802.x WF PHY MAC layer simulation and prototyping
- Spectrum Agile WF Development

Monsoon™ Transceiver Features (details on back)

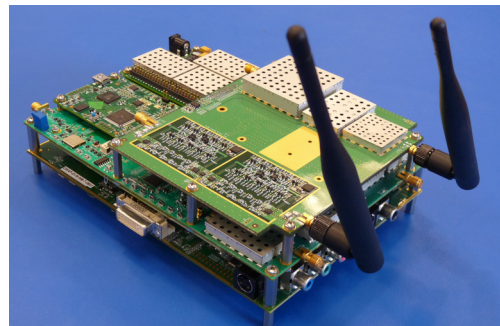
- Full-duplex (FDD, TDD) transceiver architecture with programmable signal bandwidths from 50 KHz to 20 MHz
- Dual-channel ADCs, 12-bits at 100 Msps
- Dual-channel DACs, 16-bits at 800 Msps
- TX: Quadrature Modulator
- RX: Direct Conversion
- Xilinx Spartan-6 FPGAs
- Optional 1W linear power Front End Module

Monsoon™ Front End Module Features

- Variable Output Linear Power 0.1 W – 1.0 W
- RF Frequency covers 400 MHz - 1.0 GHz
- Provides output power amplification, low noise amplification and preselect filtering
- Allows Monsoon™/Mistral Hardware to operate in an electromagnetic environment

Mistral Features

- Low cost, easy to use baseband platform based on TI's OMAP 35x multimedia applications processor
- Advanced Superscaler ARM® Cortex™ RISC core with a C64x+ DSP core.
- Multiple Data and User Interfaces



HW configuration of complete SDR

- Mistral OMAP 35X for GPP/DSP
- Monsoon™ Transceiver for RF/Modem FPGA
- Monsoon™ Front End Module for field testing

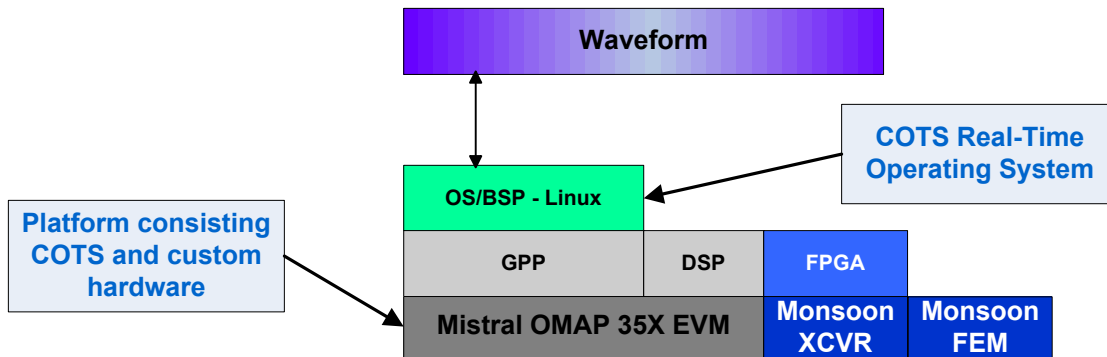
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Monsoon™ RF Transceiver Preliminary Specifications

Description	Specification
Overall	
Full duplex symbol rates	up to 20 Msym/s
Interoperates with RF front-end boards	
Frequency Stability	+/- 2.5 ppm
Transmitter (ZIF)	
Output Impedance (nominal)	50 ohms
Output Return Loss	10 dB
Frequency Range	400 MHz to 4000 MHz
Frequency Resolution	10 Hz
Output Power	-15 to 0 dBm
P1dB	+11 dBm
Output IP3	+25 dBm
SSB Phase Noise	Offset from Fcenter = 1GHz
	-60 dBc/Hz @ 100 Hz
	-72 dBc/Hz @ 1 KHz
	-86 dBc/Hz @ 10 KHz
	-110 dBc/Hz @ 100 KHz
	-135 dBc/Hz @ 1 MHz
Noise Floor	-163 dBm/Hz
Signal Bandwidth	50 KHz to 20 MHz
Carrier Feedthrough	-40 dBm
Sideband Suppression	-42 dBc
Max DAC Rate (16-bit)	800 Msps
Mechanical	
Size	8 x 5.5 x 2.5"
Weight	< 16 oz
Power Consumption (+6V in)	< 10 watts

Description	Specification
Direct Conversion Receiver (ZIF)	
Input Impedance (nominal)	50 ohms
Input Return Loss	10 dB
Noise Figure	< 10 dB (FEM Dependent)
Frequency Range	400 MHz to 4000 MHz
Frequency Resolution	10 Hz
Maximum Composite Input Power	+5 dBm
Expected Input Power	-20 dBm
Input IP3	+20 dBm
SSB Phase Noise	Offset from Fcenter = 1GHz
	-65 dBc/Hz @ 100 Hz
	-75 dBc/Hz @ 1 KHz
	-93 dBc/Hz @ 10 KHz
	-120 dBc/Hz @ 100 KHz
	-139 dBc/Hz @ 1 MHz
-155 dBc/Hz @ 10 MHz	
Baseband Gain	+40 dB
Sensitivity (25 KHz)	-110 dBm
Programmable Signal Bandwidth	50 KHz to 20 MHz
Channel Selectivity	-30 dBc +/- 1.5 BW Fcenter
	-50 dBc +/- 3 BW from Fcenter
Max ADC Rate (12-bit)	100 Msps
Environmental	
Operating Temperature Range	0 to +70 C
Storage Temperature Range	-40 to +85 C

The above specification table contains engineering estimates that are believed to be accurate and reliable. The information is subject to change without notice



Block Diagram of a complete SDR system including HW and SW

About DataSoft

DataSoft specializes in software and hardware research, design, and engineering of customized components, HW & SW products, middleware, and protocols for communication systems based on software-defined radio technologies.

As the recipient of multiple Department of Defense SBIR grants, DataSoft is actively working on projects for the Joint Tactical Radio System (JTRS) that enable superior wireless communications capabilities. Expertise includes SCA, MANET, tunable RF components, network protocols, advanced network management, modeling and simulation.

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