

Designing Remote Radio Head Applications with FPGAs

Remote radio head (RRH) technology is evolving at a rapid pace to accommodate higher bandwidth requirements including discontinuous spectrum, higher-order multiple input/multiple output (MIMO), and diverse form factors such as active antennas and small cells. Altera's broad portfolio of 28-nm FPGAs and ASICs combined with productivity-enhancing software tools, development boards, intellectual property (IP), and reference designs enable you to future proof and differentiate your RRH designs.

Faster and Differentiated Designs, Lower Total Cost

Our technologies enable future-proof, multimode RF/RRH development, while also providing tools to help accelerate your design cycle and lower total cost of ownership (TCO).

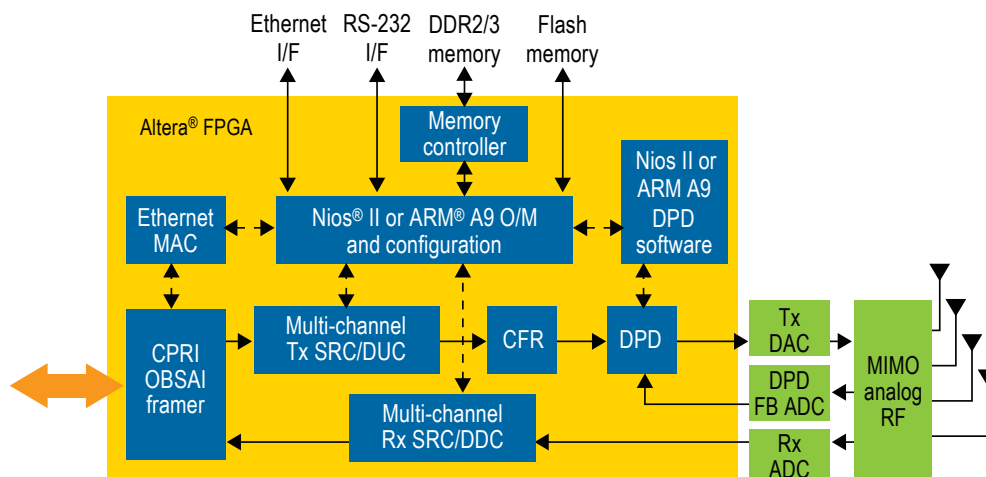
Comprehensive portfolio of FPGA and ASIC platforms

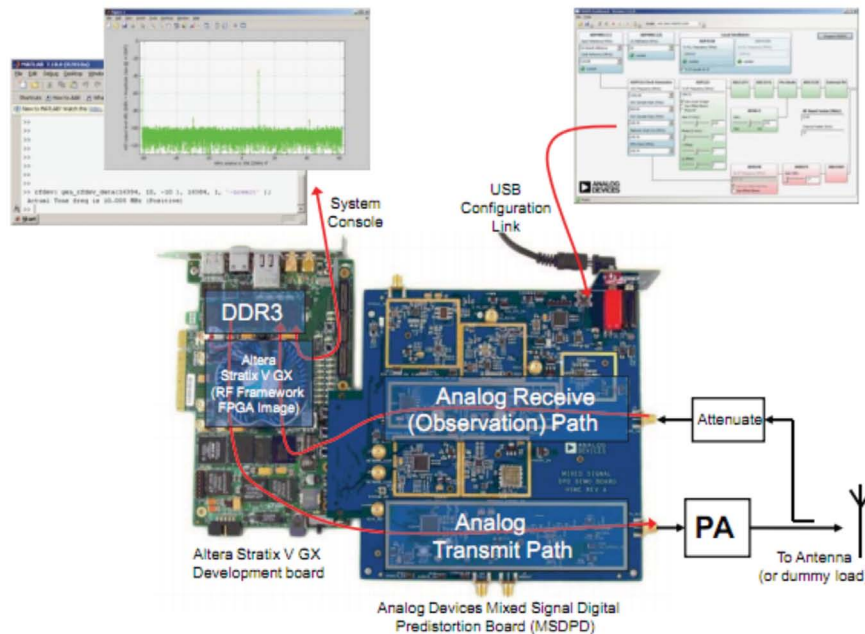
- Stratix® V GS FPGAs for higher-order MIMO and high-bandwidth RRH designs
- Arria® V SoC FPGAs for low-cost, integrated designs including active antennas
- Cyclone® V FPGAs for low-end RRH designs, active antennas, and small cells
- HardCopy® V ASICs for lowest-cost and lowest-power designs with the smallest board size

Productivity-enhancing tools, IP, and development boards

- Easy multichannel digital upconverter (DUC) and digital downconverter (DDC) reference design with DSP Builder Advanced Blockset library
- Crest factor reduction (CFR) and digital predistortion (DPD) reference designs
- Off-the-shelf IP cores for Common Public Radio Interface (CPRI), Open Base Station Architecture Initiative (OBSAI), and JESD204B interfaces
- State-of-the-art RF hardware development and demonstration kits

Integrated, Scalable, and Flexible RRH Designs





Altera's Wireless RF Framework

Altera's wireless RF framework enables you to rapidly prototype and test new algorithms and architectures in hardware, addressing evolving system-level RRH requirements.

Altera's RF framework components include:

- Any of Altera's 40-nm and 28-nm FPGA development boards with HSMC connector
- Third-party RF analog boards such as Analog Devices' MSDPD board with HSMC connector
- Qsys system integration tool subsystem with FPGA logic that interfaces to the analog-to-digital converters and digital-to-analog converters (ADCs/DACs), and plays out and captures data between external memory and the analog hardware
- System console-based communication between FPGA and host computer for easy control of IP components from MathWorks' MATLAB® environment
- DSP Builder Advanced Blockset-based designs enable rapid development of DUC, DDC, CFR, and DPD forward path and matrix inversion blocks without the need for register transfer level (RTL) design

Altera's Connectivity Cores

You can also select from our suite of connectivity cores for commodity interfaces such as CPRI, OBSAI, and the emerging JESD204B-based serial interface to data converters. We performed JESD204A/B interoperability demonstrations with leading data converter manufacturers including Analog Devices and NXP Semiconductor.

Want to dig deeper?

For more information about how Altera's 40-nm transceiver-based device portfolio can support your RRH applications, contact your local representative, or visit www.altera.com/wireless.

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