Software-Defined Radio with Zynq using Simulink

Training Objectives

This hands-on, one-day course focuses on modeling designs based on software-defined radio in MATLAB® and Simulink® and configuring and deploying on the ADI RF SOM. Topics include:

- Modeling communications systems using Simulink
- Implementing Radio I/O with ADI RF SOM and Simulink
- Prototype deployment with real-time data via HW/SW co-design

Prerequisites

Programming Xilinx Zynq SoCs with MATLAB and Simulink. Knowledge of concepts of communications and hardware design.

Products

- MATLAB
- Simulink
- Communications System Toolbox™
- RF Blockset™
- MATLAB Coder™
- Simulink Coder™
- Embedded Coder®
- HDL Coder™
- Fixed-Point Designer™
- Stateflow®

Course Outline

Day 1 of 1

Model Communications System using Simulink (1.5 hrs)

Objective: Model and simulate RF signal chain and communications algorithms.

- Overview of software-defined radio concepts and workflows
- Model and understand AD9361 RF Agile Transceiver using Simulink
- Simulate a communications system that includes a transmitter, AD9361 Transceiver, channel and Receiver (RF test environment)

Implement Radio I/O with ADI RF SOM and Simulink (1.5 hrs)

Objective: Verify the operation of baseband transceiver algorithm using real data streamed from the AD9361 into MATLAB and Simulink.

- Overview of System object and hardware platform
- Set up ADI RF SOM as RF front-end for over-the-air signal capture or transmission
- Perform baseband processing in MATLAB and Simulink on captured receive signal
- Configure AD9361 registers and filters via System object
- Verify algorithm performance for real data versus simulated data

Prototype Deployment with Real-Time Data via HW/SW Co-Design (4.0 hrs)

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Objective: Generate HDL and C code targeting the programmable logic (PL) and processing system (PS) on the Zynq SoC to implement TX/RX.

- Overview of Zynq HW/SW co-design workflow
- Implement Transmitter and Receiver on PL/PS using HW/SW co-design workflow
- Configure software interface model
- Download generated code to the ARM processor and tune system parameters in real-time operation via Simulink
- Deploy a stand-alone system