System Demonstration Platform Eases Transition from Evaluation to Prototyping

By Rosemary Ryan

Introduction
To simplify the process of selecting components for new designs, Analog Devices provides design engineers with evaluation boards and application software. After the initial evaluation has been completed, a few aspects of the design typically require further investigation. How will the component hook up to the system’s FPGA, microcontroller, or digital signal processor (DSP)? Can the interface and application code be verified before finalizing the system design? Can HDL coding be started while waiting for a printed circuit board to arrive? The best way to save time and increase the chance of success is to have the code and interface ready before the board is built. While the System Demonstration Platform (SDP) from Analog Devices is primarily an evaluation tool, it was designed to allow this type of prototyping, making it simpler than ever to kick start system development.

System Demonstration Platform
The low cost, reusable SDP evaluation platform, shown in Figure 1, was designed with versatility in mind. Comprising controller boards, interposer boards, and daughter evaluation boards, the platform facilitates quick, easy movement from evaluation to prototyping.

The two-board evaluation system includes a controller board that can be reused with multiple daughter boards. The controller board connects to a personal computer over USB 2.0 and provides the daughter board with a series of commonly used communication interfaces through a standard 120-pin connector. Over 180 compatible boards for product evaluation and reference circuit evaluation are available, all with the same 120-pin connector, which also connects to the input and output signals of the component being evaluated. The full range of product evaluation boards includes those for ADCs, DACs, DDS, RF PLLs, and MEMS microphones. Reference circuit evaluation boards are available for all applications in which ADI components are used, including automotive, healthcare, process control, and industrial automation. Figure 2 shows the SDP-B controller board connected to a PulSAR® ADC evaluation board. A complete list of available boards can be found at www.analog.com/sdp.

The platform also includes a series of interposer boards that allow the wide range of daughter boards to connect directly to third-party evaluation tools, such as Xilinx® FPGA evaluation boards or the BeMicro Software Development Kit (SDK). These interposer boards, which connect the inputs and outputs of the component on the ADI evaluation board to a Xilinx or Altera® FPGA, are the key that enables quick, easy prototyping with ADI evaluation boards and third-party tools.

Interposer Boards
Interposer boards connect to a daughter board through the standard 120-pin connector. They then route the signals from the 120-pin connector to a second connector, allowing the user to connect the daughter board to their choice of FPGA evaluation board. Interposer boards, which do not include any additional logic or signal conditioning, simply route signals from the SDP connector to the second connector—the VITA 57 standard FMC connector, for example. Three interposer boards are available, including the SDP-I-FMC interposer, BeMicro SDK/SDP interposer, and SDP breakout board.

SDP-I-FMC Interposer
The SDP-I-FMC interposer, shown in Figure 3, connects any SDP-compatible evaluation board to a Xilinx FPGA evaluation board that supports 3.3-V I/O. It includes the standard 120-pin connector and a low-pin-count (LPC) FMC connector, which is part of the industry-standard VITA 57 specification that outlines I/O connectivity to FPGAs. The 120-pin connector on the daughter board connects to the 120-pin receptacle on the SDP-I-FMC interposer. The FMC connector on the SDP-I-FMC interposer then connects to the FMC connector of the Xilinx evaluation board.

Figure 1. System demonstration platform overview.

Figure 2. Evaluation hardware setup with the SDP-B and a PulSAR ADC evaluation board.

Figure 3. SDP-I-FMC interposer.
The Kintex KC705 is an example of a Xilinx evaluation board that has 3.3-V I/O and the FMC connector. Therefore, it can connect to an ADI evaluation board through the SDP-I-FMC, as shown in Figure 4. Example code for a large number of SDP-compatible evaluation boards is available on the ADI wiki site, allowing users to start their FPGA development as early as possible. Further details on the SDP-I-FMC, including a schematic and ordering information, can be found at www.analog.com/sdpFMC. The board retails for $49.

The BeMicro SDK is an Altera Cyclone IV-based hardware evaluation platform for creating, compiling, running, and debugging embedded software with the NIOS II processor. Developed by Arrow, in conjunction with Altera, it provides a small, low cost, easy to use FPGA evaluation and development platform. BeMicro SDK example projects for a large number of SDP-compatible evaluation boards are available at wiki.analog.com/resources/alliances/altera. An excellent starting point, the many available component interface examples can decrease FPGA system development time.

**SDP Breakout Board**
The SDP breakout board has four 120-pin connectors. Two (J1 and P1) are used with the SDP and SDP-compatible evaluation boards; and two (J2 and P2) are used with the ADSP-BF60x EZ-KIT. The primary use of this board is signal monitoring. Each probe point represents a pin on the connector, allowing an oscilloscope to monitor activity on that pin. The board is also an effective tool for prototyping when dedicated interposer board hardware does not exist.
Figure 9. SDP breakout board connects the AD7291 evaluation board to Renesas evaluation board.

In the example setup, shown in Figure 9, the SPI pins of the SDP breakout board are wired to the Renesas RL78 evaluation board. The example code, available on the wiki site for many component evaluation boards, can be found via links on individual product pages on www.analog.com or in the microcontroller examples section of the ADI wiki.

Further details on the SDP breakout board, including the schematic and ordering information, can be found at www.analog.com/EI3Breakout. The board retails for $49.

Conclusion
Many options are available to help speed the design process when moving from evaluation to prototyping. With dedicated hardware, customizable hardware, and example code, ADI provides a range of solutions to meet a wide variety of needs. The System Demonstration Platform is constantly evolving, so we encourage your feedback regarding the prototyping hardware and software that would be most helpful to your design process.

Author
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