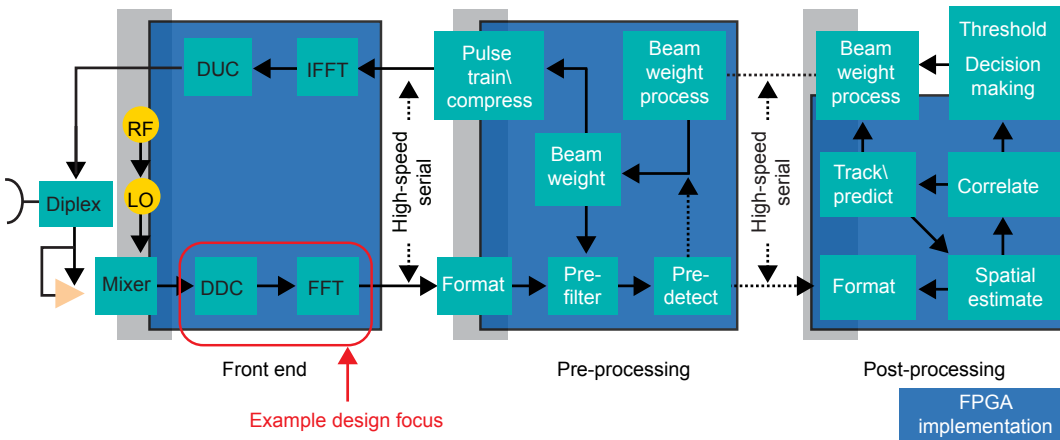


Faster design implementation through automated multi-channel design flow

DSP Builder Advanced Blockset for military applications

DSP Builder Advanced Blockset, a new capability in Altera's Quartus® II design software, provides a timing-driven Simulink design flow for implementing high-speed digital signal processing (DSP) designs. From secure communications to electro-optics, many military DSP applications benefit from the tool's productivity and time-savings advantages.

Military sensor front-end design example



Sensor front-end designs need to operate at high data rates and multiple channels. DSP Builder Advanced Blockset can help you rapidly implement or perform design exploration for the high-performance signal processing stages required. The tool capability is also ideal for implementing back-end DSP algorithms used in many beam-forming applications.

Create high-performance DSP signal chains in minutes

Instead of spending hours hand-optimizing HDL code, you can have your design running at near-peak FPGA performance in minutes. From a high-level parameter file, simply enter your desired system clock frequency. Automatic pipelining lets you achieve parameterizable f_{MAX} performance. Timing-driven synthesis produces small or fast register transfer level (RTL) from the same model based upon the f_{MAX} specified.

DSP Builder Advanced Blockset serves as an interface between Quartus II software and The MathWorks's MATLAB and Simulink tools, converting the Simulink description of the signal chain into a VHDL design ready for placement and routing. Using built-in timing models for each FPGA plus intellectual property (IP) blocks, the tool adds pipeline registers and control logic as needed to achieve the clock rate you've specified.

Library to build custom functions

Using the tool feature's primitive library, you can build custom functions including:

- Complex beam forming algorithms
- Custom mixed radix fast Fourier transforms (FFTs)
- Direct radio frequency (RF) digital up conversion to multi-GSPS data rates
- Direct RF digital down conversion from multi-GSPS analog-to-digital converter data rates

The library elements are independent of device-specific features. Depending upon which device family is targeted, the tool automatically maps from the core library to device-specific features to optimize your design.

After designing a single-channel system, it's simple to convert to a multi-channel system. This allows you to concentrate on designing the single channel correctly while letting the tool automatically optimize the resources for the multi-channel system.

Boost your productivity

One of the main ways that DSP Builder Advanced Blockset enhances design productivity is by hiding the complexities of the FPGA. You don't have to determine how much pipelining is needed to hit your required system clock rate, or how much time-sharing you can exploit to save FPGA resources. The tool feature:

- Removes these complexities through automation.
- Optimizes key DSP design elements.

Zero-latency blocks simplify debugging and modifying. They also enable you to design once and then retarget to different speed grades and device families.

Want to dig deeper?

For more information about how DSP Builder Advanced Blockset can enhance your team's productivity when designing military DSP applications, contact your local Altera sales representative or FAE, or visit www.altera.com/dsp.

Control resource usage

DSP Builder Advanced Blockset balances usage of logic elements (LEs) and block memories/embedded multipliers. Both the memory and multiplier thresholds can be used to influence these tradeoffs, which are provided in Quartus II compilation reports. As an example, with memory thresholds, the tool feature:

- Determines if memories are implemented with registers or one of the embedded memories.
- Indicates the maximum memory bits that can be built using registers before a memory block is consumed.

Learn more through training classes

Choose from a variety of online and instructor-led courses to help you become proficient using DSP Builder Advanced Blockset. For more information, visit www.altera.com/training.

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