DRF2580

4-Channel 64 GSPS A/D & D/A System on Module based on the Intel® Agilex® 9 Direct RF-Series

Unique system-on-module approach enables custom deployment

- High-bandwidth data streaming
- Waveform signal generator
- Communication receiver and transmitter
- Electronic Warfare transponder
- Analog I/O for digital recording and playback
- Sensor interfaces



The DRF2580 is a high-performance System on Module (SoM) based on the Intel Agilex 9 SoC FPGA AGRW014. The AGRW014 integrates four RF-class A/D and D/A converters into the Agilex 9 SoC's multiprocessor architecture, creating a multichannel data conversion and processing solution on a single chip.

The DRF2580 has been designed to bring direct RF performance to a wide range of different applications by offering the FPGA in a small system-on-module solution measuring only 2.5 by 3.5 inches. In addition to the Agilex 9 FPGA, the DRF2580 includes all of the support circuitry needed to maximize the performance of the Agilex 9. The DRF2580 is available on standard form factor carriers including SOSA aligned 3U VPX, PCIe, and small form factor enclosures in both commercial and rugged options. In many applications one of these carrier configurations can provide a final, deployable turn-key solution.

In situations where only a custom form factor will satisfy the application requirements, the DRF2580 is supported with a design kit that helps users engineer and build their own custom carrier. As a complete and tested module, the DRF2580 encapsulates best-in-class electrical and mechanical design, eliminating some of the most challenging aspects of embedded circuit design and allowing users to focus on an application-specific carrier design.

FEATURES

- Unique system-on-module approach enables deployment in custom form factors
- Incorporates Intel Agilex 9 SoC FPGA AGRW014
- 16 GB of DDR4 SDRAM
- LVDS connections to the Agilex 9 FPGA for custom I/O
- GT connections for gigabit serial communication
- Ruggedized and conduction-cooled versions available
- Includes a suite of IP functions and example applications
- Board Support Package (BSP) for software development
- FPGA Design Kit (FDK) for custom IP development

BOARD ARCHITECTURE

The DRF2580 board design positions the Agilex 9 as the cornerstone of the architecture. All control and data paths are accessible by the Agilex 9's programmable logic and Hard Processor System. A suite of Mercury IP and software functions utilize this architecture to provide data capture, generation, and processing solutions for many of the most common application requirements. For many applications, the DRF2580's example functions can be used as the foundation for custom applications.

EXTENDABLE IP DESIGN

For applications that require specialized functions, users can install their own custom IP for data processing. Mercury's FPGA Design Kit (FDK) includes the board's entire FPGA design, which can be edited in Intel's Quartus® Design Software. All source code and complete IP core documentation is included. Developers can integrate their own IP along with the factory-installed functions or use the FPGA Design kit to completely replace the Mercury IP with their own.

The Board Support Package (BSP), the companion product to the FDK, provides a complete C-callable library for control of the DRF2580's hardware and IP. The FDK and BSP libraries mirror each other where each IP function is controlled by a matching software function, simplifying the job of keeping IP and software development synchronized.

CARRIER DESIGN PACKAGE

The 4806 Carrier Design Kit assists users in designing their own carrier for the DRF2580 SoM. The kit includes:

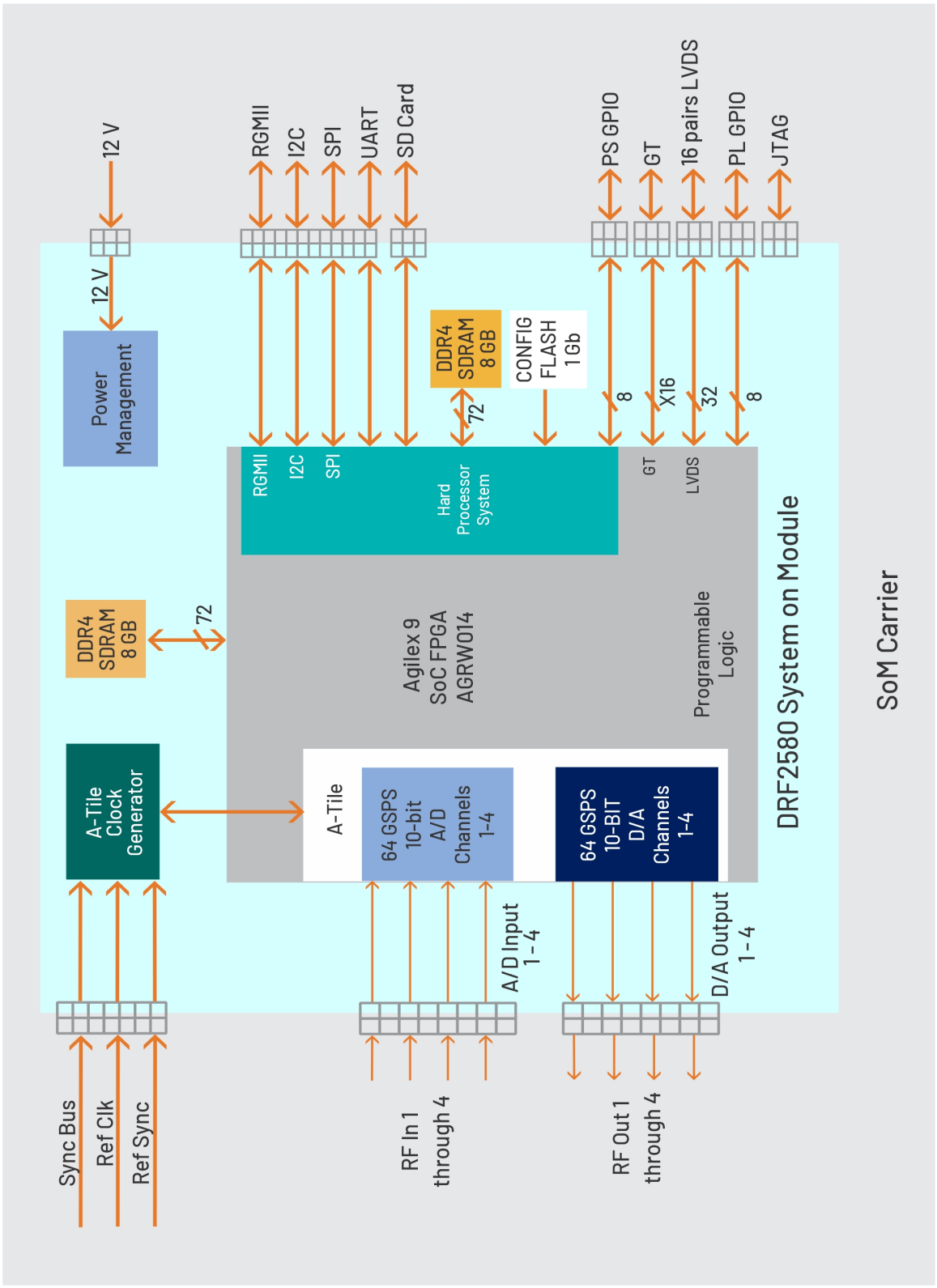
- Pin definitions and electrical specifications of all signals on the module
- 3D models of the module
- Thermal profiles of the module and components
- Carrier reference design schematics
- PCB stack-up recommendations
- PCB design guidelines and routing rules
- Operating system and bootstrap guidelines
- Additional electrical and mechanical engineering guidance

FLEXIBLE MODULAR DESIGN

The unique modular design of the DRF2580 SoM provides the flexibility to deploy this solution in many different situations. The heart of the SoM is a System on Module containing all of the key components including the Intel FPGA, DDR4 SDRAM, and power and clock management.

The DRF5580 mounts the SoM on a SOSA aligned 3U VPX carrier which complements the design with a timing bus generator, analog signal conditioning, and an 8x 25 Gbps optical transceiver. As a module and carrier board set, the DRF5580 is a complete, ready-to-deploy SOSA aligned 3U VPX solution.

DRF2580 BLOCK DIAGRAM



SPECIFICATIONS

Field Programmable Gate Array

Type: Intel Agilex 9 SoC FPGA AGRW014

A-Tile (RF Input/Output)

Analog Inputs

- Quantity: 4
- Connector: Board-to-board, multichannel differential
- Input Type: Differential

A/D Converters

- Quantity: 4
- Sampling Rate: 64 Gsps
- Resolution: 10 bits
- RF Input Bandwidth: Up to 32 GHz (as per Intel datasheet)

Analog Outputs

- Quantity: 4
- Connector: Board-to-board, multichannel differential
- Input Type: Differential

D/A Converters

- Quantity: 4
- Sampling Rate: 64 Gsps
- Resolution: 10 bits

Sample Clock

- Source: Internal
- Mode: Supports A-Tile internal PLL clocking modes

Hard Processor System

Quad-core 64-bit ARM Cortex-A53

- Speed: Up to 1.5 GHz

Programmable Logic I/O

Parallel: 16 pairs of LVDS connections

GPIO: 8 single-ended

Hard Processor I/O

GT: 16 full duplex lanes@ 32 Gb/sec

GPIO: 8 single ended

Additional Interfaces: I2C, SPI, SD/EMMC, UART

Memory

- Type: DDR4 SDRAM
- Quantity: Two banks
- Size: (each bank) 8 GB; 72-bit

Physical

Dimensions:

- Length: 88.9 mm (3.5 in)
- Width: 63.5 mm (2.5 in)
- Height: 16.8 mm (0.7 in)

CARRIERS

The DRF2580 is also available on these carriers:

Model	Description
DRF5580	SOSA aligned 3U VPX board
DRF4580*	Small form factor rugged enclosure
DRF4580L*	Small form factor subsystem
DRF7585*	2-slot PCIe board

*Future availability

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