

DRF2380

4-Channel 32 GSPS A/D & 16 GSPS D/A System on Module based on the AMD Versal™ RF

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 DRF2380 is a high-performance System on Module (SoM) based on the AMD Versal RF VR1652. The VR1652 integrates four RF-class A/D and D/A converters into the Versal RF SoC's multiprocessor architecture, creating a multichannel data conversion and processing solution on a single chip.

The DRF2380 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 VR1652, the DRF2380 includes all of the support circuitry needed to maximize the performance of the Versal RF. The DRF2380 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 DRF2380 is supported with a design kit that enables engineers to design and build their own custom carrier. As a complete and tested module, the DRF2380 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 standard and custom form factors
- Incorporates AMD Versal RF VR1652
- 16 GB of LPDDR5 SDRAM
- LVDS connections to the Versal RF 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
- Navigator MX Board Support Package (BSP) for software development
- Navigator MX FPGA Design Kit (FDK) for custom IP design

BOARD ARCHITECTURE

The DRF2380 board design positions the Versal RF as the cornerstone of the architecture. All control and data paths are accessible by the Versal RF's programmable logic and processing system. A suite of Mercury IP and software functions utilize this architecture to provide data capture, signal generation, and processing solutions for many of the most common application requirements. For many applications, the DRF2380's example functions can be used as the foundation for custom development.

EXTENDABLE IP DESIGN

For applications that require specialized functions, users can install their own custom IP for data processing. Mercury's Navigator MX FPGA Design Kit (FDK) includes the board's entire FPGA design, which can be edited in AMD's Vivado Design Suite. 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 FDK kit to completely replace the Mercury IP with their own.

Mercury's Navigator MX Board Support Package (BSP), the companion product to the FDK, provides a complete C-callable library for control of the DRF2380'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 4808 Carrier Design Package assists users in designing their own carrier for the DRF2380 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

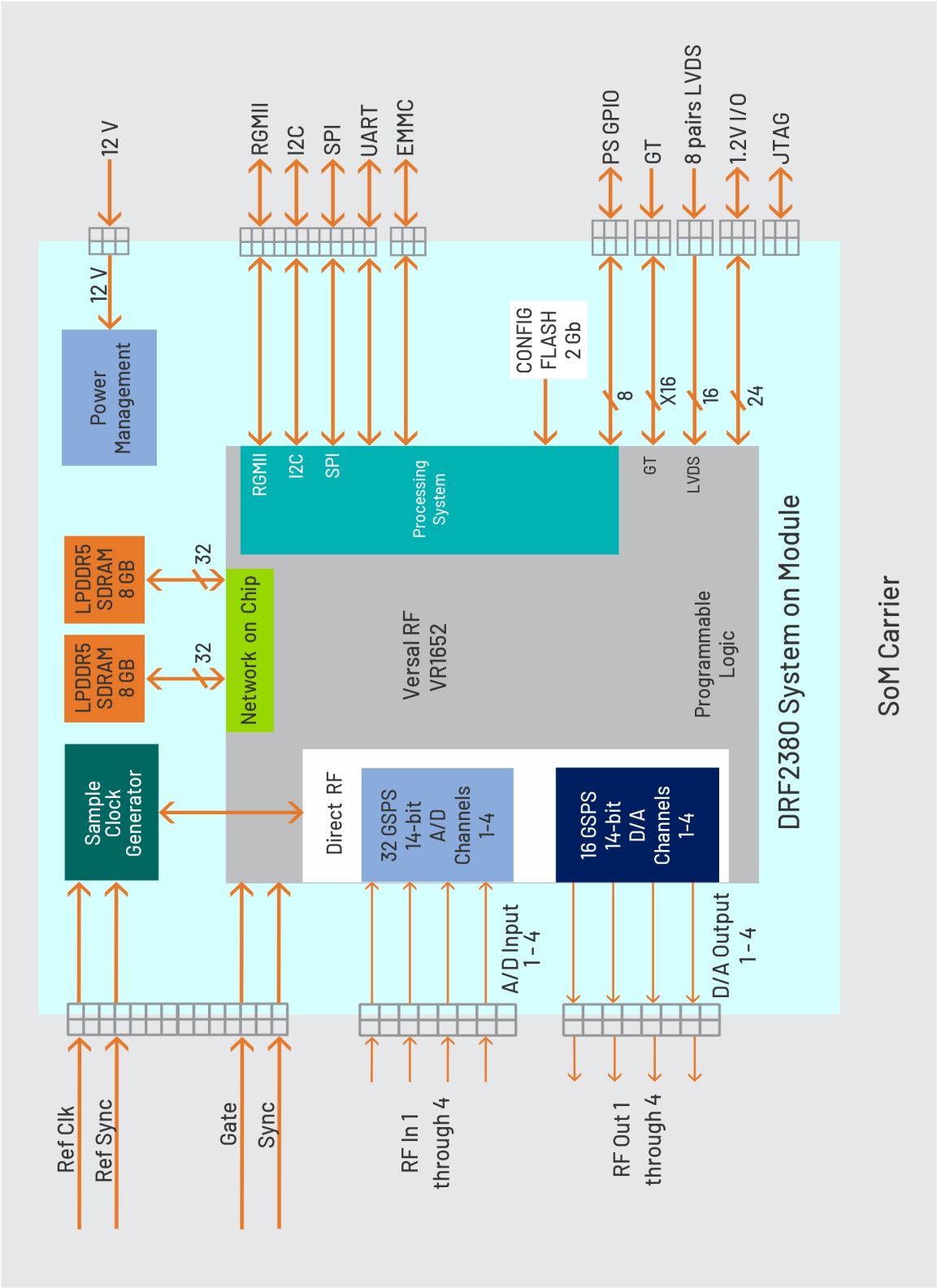
FLEXIBLE MODULAR DESIGN

The unique modular design of the DRF2380 SoM provides the flexibility to deploy this solution in many different situations. The heart of the architecture is a System on Module containing all of the key components including the AMD Versal RF, LPDDR5 SDRAM, and power and clock management.

The DRF5380 mounts the SoM on a SOSA aligned 3U VPX carrier which complements the design with a timing bus generator, modular analog signal conditioning, and an 8x 25 Gbps optical transceiver. As a module and carrier board set, the DRF5380 is a complete, ready-to-deploy SOSA aligned 3U VPX solution.

Similar to the DRF5380, the DRF4380L carrier provides all connections to the DRF2380 SoM. The DRF4380 is a Small Form Factor carrier designed to deploy in conduction-cooled enclosures or in air-cooled environments with the optional heatsink and fan assembly.

DRF2380 BLOCK DIAGRAM



SPECIFICATIONS

Field Programmable Gate Array

Type: AMD Versal RF VR1652

RF Input/Output

Analog Inputs

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

A/D Converters

- Quantity: 4
- Sampling Rate: 32 Gsps
- Resolution: 14 bits
- RF Input Bandwidth: Up to 18 GHz (as per AMD datasheet)

Analog Outputs

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

D/A Converters

- Quantity: 4
- Sampling Rate: 16 Gsps
- Resolution: 14 bits

- RF Output Bandwidth: Up to 18 GHz (as per AMD datasheet)

Sample Clock

- Source: Internal or external reference

Processing System

Dual-core ARM Cortex-A72

Dual-core ARM Cortex-R5F

Programmable Logic I/O

Parallel: 8 pairs of LVDS inputs, 24 single-ended 1.2V I/Os

Serial: GT: 16 full duplex lanes@ 32 Gb/sec

I/O

GPIO: 8 single ended

Additional Interfaces: RGMII, I2C, SPI, EMMC, UART

Memory

- Type: LPDDR5 SDRAM
- Quantity: Two banks
- Size: (each bank) 8 GB: 32-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 DRF2380 is also available on these carriers:

Model	Description
DRF5380	SOSA aligned 3U VPX board
DRF4380*	Small form factor enclosure
DRF4380L	Small form factor module
DRF4381L*	Very small form factor module
DRF7380*	2-slot PCIe board

*Future availability



Corporate Headquarters

50 Minuteman Road
Andover, MA 01810 USA

+1 978.967.1401 tel

+1 866.627.6951 tel

+1 978.256.3599 fax

International Headquarters

Mercury International

Avenue Eugène-Lance, 38
PO Box 584

CH-1212 Grand-Lancy 1
Geneva, Switzerland

+41 22 884 5100 tel

Learn more

Visit: mrcy.com/directrf

Contact: mrcy.com/contact-us



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