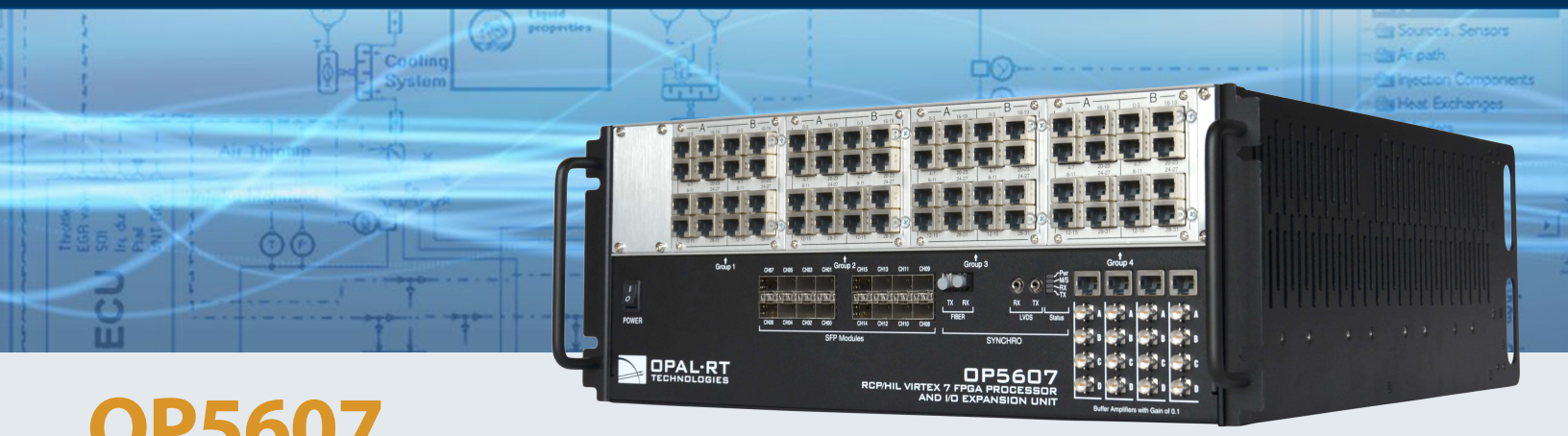


OP5607

RCP/HIL Virtex 7 FPGA Processor & I/O Expansion Unit

The OP5607 is an I/O expansion unit that uses the Xilinx Virtex-7 FPGA to provide additional inputs and outputs for existing OPAL-RT simulators and expansion units. It can provide up to 256 additional I/Os and offers high speed SFP communication links that can be used to communicate with OPAL-RT simulators like the OP4500 in a variety of configurations.

Product Highlights

- 4U expansion unit based on Virtex-7 FPGA technology
- Up to 8 signal conditioning and analog/digital converter modules with 16 or 32 channels each (totalling 128 fast analog or 256 digital signals)
- Supports up to 16 SFP multi-mode fiber optic modules for high speed communication between devices
- Possibility to connect several systems and facilitate communication between FPGAs
- SFP programmable clock reference
- LVDS and fiber optic synchronization
- PCIe and/or JTAG-USB ports for FPGA configuration

Typical Applications

The OP5607 chassis enables users to conduct a number of real-time simulation applications, including:

- Hardware-In-the-Loop testing
- Rapid Control Prototyping laboratory conditioning
- FPGA development projects
- Modular Multilevel Converter (MMC) control
- Complex power grids, micro-grids, wind farms, hybrid vehicles, more electrical aircrafts, electrical ships and power electronic systems can be simulated in real-time.

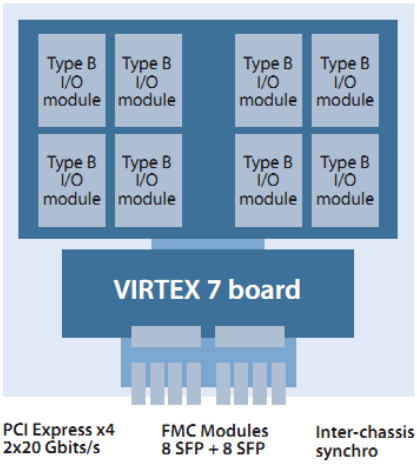
"The OP5607 is an innovative solution for increasing power, enhancing performance and options in everyday real-time simulations." Jean Bélanger, OPAL-RT CEO & CTO

Small Form-Factor Pluggable Transceiver and PCI Express Interfaces

An SFP is a compact, hot-pluggable transceiver used for data communication applications.

- The OP5607 accommodate up to 16 high-speed fiber optic modules
- Communication layer provided to exchange thousands of gating signals and measurements
- Protocols are based on customer requirements and built on top of standard Aurora or Gigabit Ethernet communication layers
- OP5607 are interfaced with high-performance OPAL-RT real-time simulators like OP4500 or OP5600 using PCI Express Gen2x4 for the simulation of complex AC-DC grids

Hardware Architecture - I/O



Carrier board with 8 Type B I/O module

16 ch per analog module (A/D or D/A)
32 ch per digital module (DI or DO)

All I/O converters are directly interfaced to the FPGA board

All FPGAs intercommunication enabled

OPAL-RT TECHNOLOGIES

From Imagination... to Real-Time

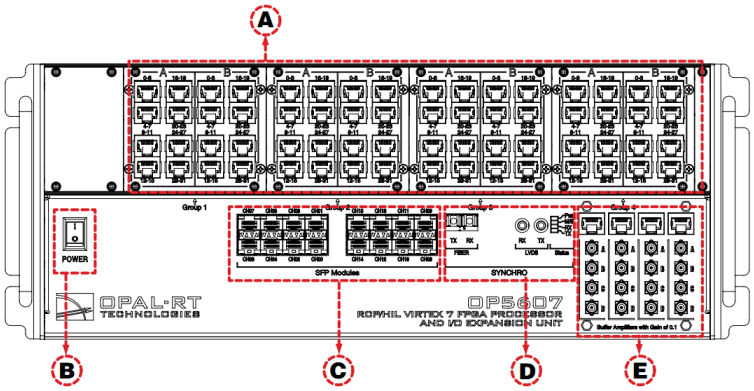
General Specifications

Product name	OP5607 RCP/HIL Virtex 7 FPGA Processor & I/O Expansion Unit
FPGA	VIRTEX 7 FPGA (1 FPGA VIRTEX 7 simulates up to 1500 cells at 500 nanoseconds) Slices: 75900, Each 7 series FPGA slice contains four LUTs and eight flip-flops RAM: 37080 kb (37080 x 1024 bits) DSP: 2800, Each DSP slice contains a pre-adder, a 25 x 18 multiplier, an adder, and an accumulator
Communication systems with RT-LAB simulators	PCI Express Gen2 x4
Number of SFP	Up to 16 with speeds from 1 to 5 Gbps
Protocols standard	Aurora (1 to 5 Gbits) and Gigabit Ethernet (1 Gbit); custom protocol can be implemented
Dimensions (WxDxH)	48.3cm (19in) x 45.7 (18in) x 17.8 (7in)

Optional FPGA Models and Software

Pre-made MMC model	Time step of 500 nanos, fault simulation, capability, standard configuration: 255 cell/arm * 6 arms, or 511 cell/arm * 3 arms ; other configurations are available
eHS FPGA nodal solver	To simulate any power electronic circuits using the circuit diagram editor of SimPowerSystem, PLECS and PSIM
RT-XSG	This Simulink™ toolbox generates custom application specific models implemented onto FPGAs

Hardware Interface



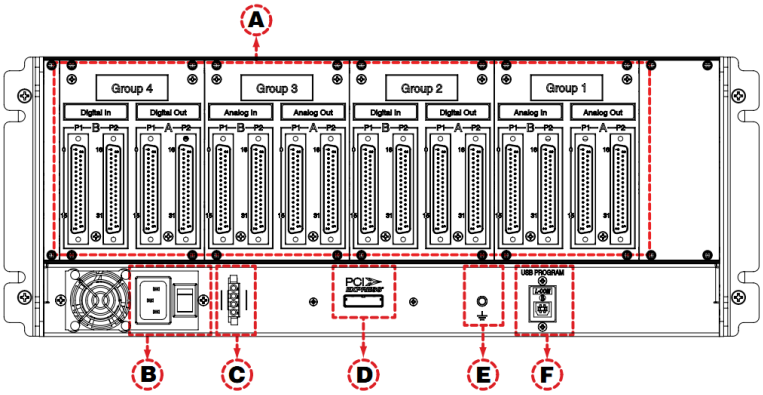
A RJ45 connector panels provide connections to monitor signals from mezzanine I/O boards. Each connector is linked to one mezzanine on the carrier board.

B Power switch

C SFP modules connectors

D Synchronisation connectors

E RJ45 connectors with mini-BNC terminals for monitoring



A DB37F I/O connectors

B Power connector and power On/Off switch

C +5/+12V connector

D PCIe connector for communication link to the PC

E Chassis ground

F USB JTAG for VC707 connection

NOTE: TECHNICAL DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE.

About OPAL-RT TECHNOLOGIES

OPAL-RT is the world leader in the development of PC/FPGA Based Real-Time Digital Simulator, Hardware-In-the-Loop (HIL) testing equipment and Rapid Control Prototyping (RCP) systems to design, test and optimize control and protection systems used in power grids, power electronics, motor drives, automotive industry, trains, aircrafts and various industries, as well as R&D centers and universities.

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