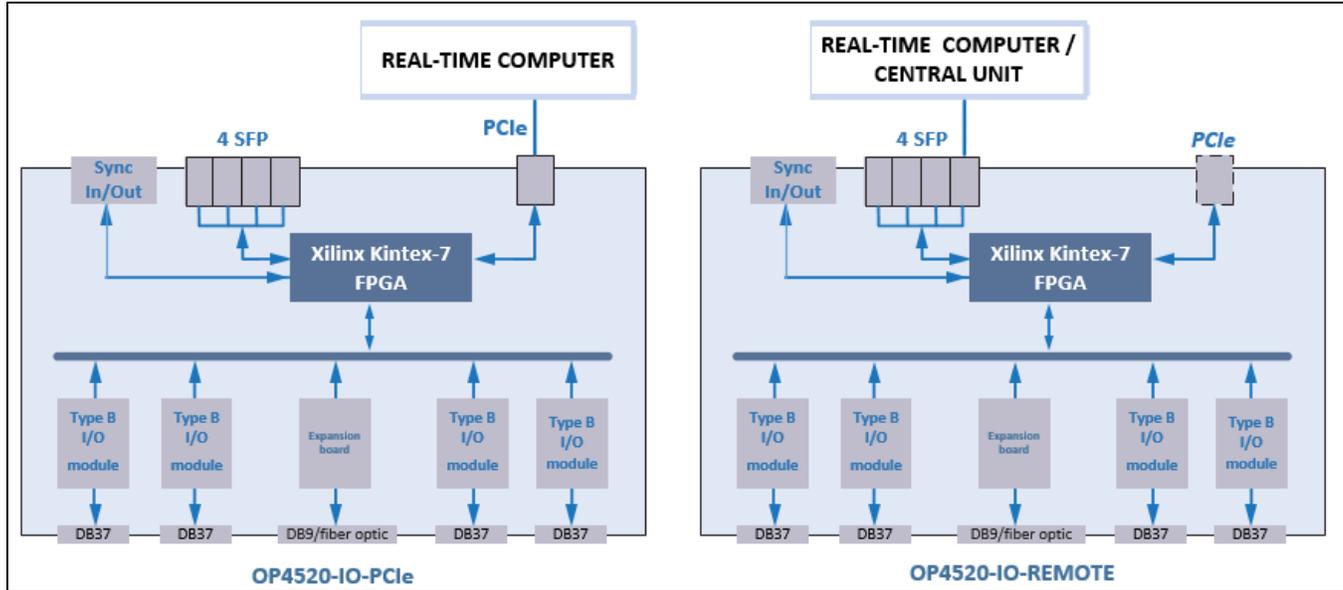


OP4520 System Description

- [System Architecture](#)

The OP4520 is a compact device that was designed as an expansion box version of the OP4510; it offers 128 fast I/O channels with signal conditioning, 12 optional channels for RS422 or low-speed fiber-optic communication, and 4 SFP sockets for high-speed communication.

The OP4520 is available in two versions:



- **OP4520-IO-PCle:** uses a PCIe link to communicate with the real-time computer.
- **OP4520-IO-REMOTE:** uses one SFP socket configured with OPAL-RT's [Multi-System Expansion \(MuSE\)](#) link to communicate with the real-time computer.

I/O channels are controlled by the Kintex7 325T FPGA module. A series of standardized I/O configurations are available with the OP4520, each targeting specific applications. The System Description document provides detailed information for the I/O configuration purchased by the customer (type and location of I/O mezzanine modules, connector pinouts, and other application-specific parameters).

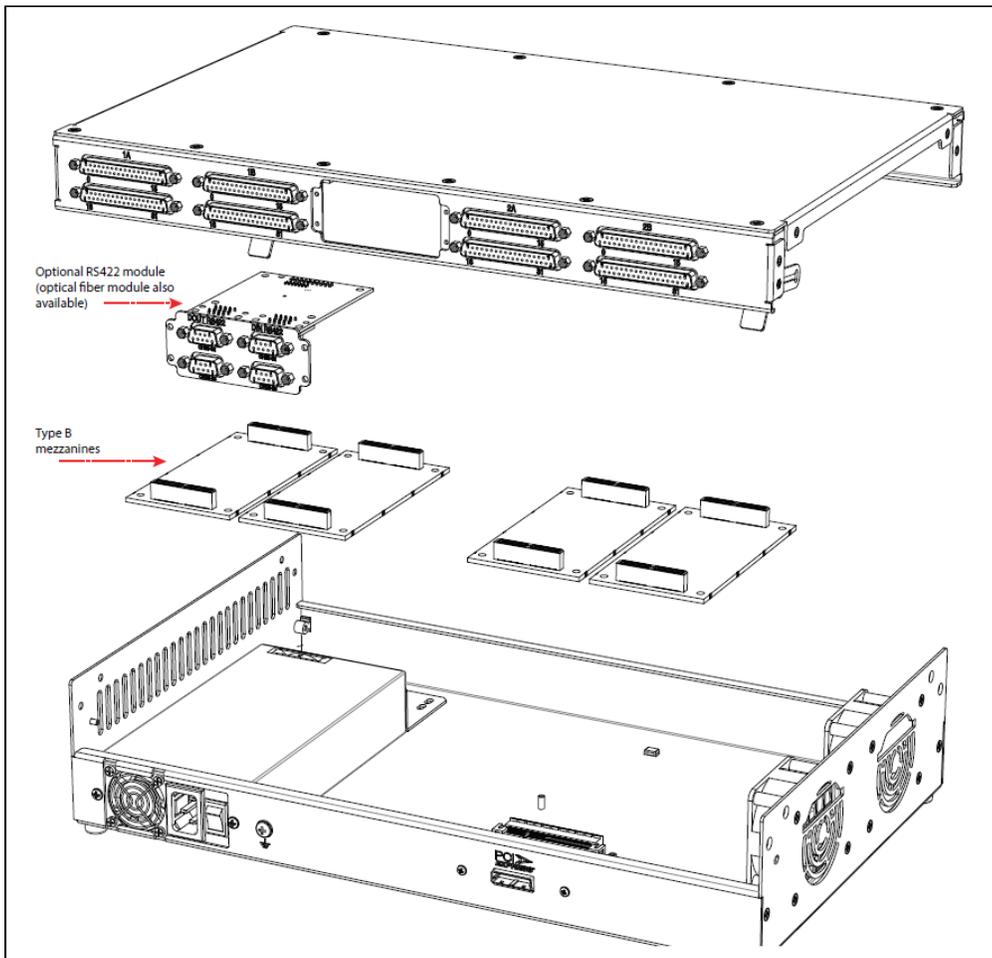
Communication between the OP4520 and an OPAL-RT simulator is achieved either via the PCIe connector at the rear of the chassis (OP4520-IO-PCle), or the SFP port in the front (OP4520-IO-REMOTE).

- PCIe connection uses point-to-point standard PCIe interface between the simulator and the expansion unit, similar to other OPAL-RT I/O expansion units (OP5600-IO, OP7000, OP5607, OP7020).
- SFP connection allows high-speed communication (up to 5 Gbps) between the unit's FPGA module and an external device. This mode can be used either for OPAL-RT [Multi-system Expansion \(MuSE\)](#) communication (connected to a high-speed link compatible real-time simulator) or standard Aurora-based communication between any two units (either OPAL-RT or another third-party manufacturer). The FPGA bitstreams must be prepared for each FPGA module using either the MuSE (see note) option or the Generic Aurora block provided in OPAL-RT's RT-XSG toolbox.

NOTE: Restrictions to using MuSE with OPAL-RT board software architecture may apply depending on your application and software configuration. Please contact your sales representative or field application engineer to verify compatibility.

System Architecture

The following image illustrates the unit's architecture for each option using assembly views of the simulation hardware components within the OP4520 chassis. The OP4520 contains an FPGA carrier, which can accept four standard OPAL-RT mezzanine boards, and an additional (optional) module that provide 12 RS422 or optical fiber channels.



The OP4520's carrier can hold a combination of four OPAL-RT [OP5300 mezzanine modules](#) (also called Type B modules). The standard assembly contains two digital and two analog modules. These mezzanine modules interface with external devices using DB37 connectors at the back of the chassis. Four pairs of DB37F connectors provide up to 128 channels (the number of channels depends on the types of modules: analog modules provide 16 channels and digital modules provide 32 channels).

When installed at the back of the chassis, an additional I/O expansion board provides 12 RS422 channels through DB9 connectors or 6 pairs of RX/TX optical transceivers.

The OP4520 offers two types of synchronization, either LVDS or fiber optic, making it easy to synchronize the unit with any other OPAL-RT chassis.