

# SFP, SFP+, AND XFP TRANSCEIVERS

SFP, SFP+, and XFP are all terms for a type of transceiver that plugs into a special port on a switch or other network device to convert to a copper or fiber interface. These compact transceivers replace the older, bulkier GBIC interface.

Although these devices are available in copper, their most common use is to add fiber ports. Fiber options include multimode and single-mode fiber in a variety of wavelengths covering distances of up to 120 kilometers (about 75 miles), as well as WDM fiber, which uses two separate wavelengths to both send and receive data on a single fiber strand.



Small Form-Factor Pluggable (SFP) Optical Transceiver

SFPs support speeds up to 4.25 Gbps and are generally used for Fast Ethernet or Gigabit Ethernet applications. The expanded SFP standard, SFP+, supports speeds of 10 Gbps or higher over fiber. XFP is a separate standard that also supports 10-Gbps speeds. The primary difference between SFP+ and the slightly older XFP standard is that the SFP+ moves the chip for clock and data recovery into a line card on the host device. This makes an SFP+ smaller than an XFP, enabling greater port density.

Because all these compact transceivers are hot-swappable, there's no need to shut down a switch to swap out a module—it's easy to change interfaces on the fly for upgrades and maintenance.

Another characteristic shared by this group of transceivers is that they're OSI Layer 1 devices—they're transparent to data and do not examine or alter data in any way. Although they're primarily used with Ethernet, they're also compatible with uncommon or legacy standards such as Fibre Channel, ATM, SONET, or Token Ring.

Formats for SFP, SFP+, and XFP transceivers have been standardized by multisource agreements (MSAs) between manufacturers, so physical dimensions, connectors, and signaling are consistent and interchangeable. Be aware though that some major manufacturers, notably Cisco, sell network devices with slots that lock out transceivers from other vendors