

Technology Primer - SFP Optical Transceiver

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Tech Primer

SFP- small form-factor pluggable is a compact, hot-pluggable transceiver used for both telecommunication and data communications applications. It interfaces a network device mother board (for a switch, router, media converter or similar device) to a fiber optic or copper networking cable.

SFP transceivers are designed to support SONET/SDH, Gigabit Ethernet, Fibre Channel, PON ,CWDM or DWDM.The standard is expanding to SFP+ which will be able to support data rates up to 10.0 Gbit/s.SFP+ will include the data rates for 8 gigabit Fibre Channel, and 10GbE. SFP+ module versions for optics as well as copper are being volume production. In comparison to Xenpak, X2 or XFP type of modules, SFP+ modules leave some of the circuitry to be implemented on the host board instead of inside the module. SFP can be classified with wavelength,application field, Data Rate. 850nm, 1310nm, 1550nm are the mainly used wavelength,also have many precise wavelength used in CWDM or DWDM. Some SFP can comptiable for SONET or SDH, Ethernet, Fiber Channel,but for PON, it's a special application for its burst-mode. Every application have its standard and series data rate,and now 10G bit/s is the top and advance application.

A typical solution of SFP include TOSA, ROSA, Laser Driver and Limiting amplifier. To comply with the SFF8472 standard, an EEPROM is used to store information such as data rata, transmission distance,vendor name,etc.The information can be acesss by I2C bus. Now most of SFP has Digital Diagnostics Monitoring feature,This feature gives the end user the ability to monitor real-time parameters of the SFP, such as optical output power, optical

input power, temperature, laser bias current, and transceiver supply voltage, so a special digital potentiometer with ADC, EEPROM, temperature sensor or a MCU is needed for DDM function.

Other Resources

- [SFP MSA](#)
- [SFF Committee](#)
- [8.5Gigabit and 10 Gigabit SFP+ Module Enabling Next-Generation High Density Switches](#)
- [SFP+ transceivers emerge as key 10GbE trend](#)