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Intro to Using MikroTik SFP Products

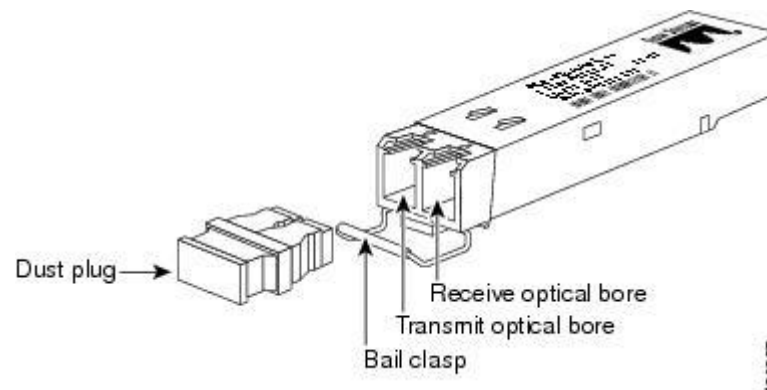


## Intro to Using MikroTik SFP Products



# Small Form Pluggable (SFP)

- A multi-vendor driven form factor that is specified by a Multi-source Agreement (MSA).
- Designed to support SONET, gigabit Ethernet, Fibre Channel, and other standards.
- SFP replaces the ubiquitous gigabit interface converter (GBIC).





# SFP Categories

Type	Name	Lever Color	Wavelength	Data Rate	Distance
Multi Mode	SX	Black Beige	850nm	1.25G	550m
Single Mode	LX	Blue	1310nm	1.25G	10km
Single Mode	EX	Blue	1310nm	1.25G	40km
Single Mode	EZX	Green	1550nm	1.25G	80KM
Single Mode	BX (Pairs)	Blue Yellow	1490nm 1310nm 1550nm	1.25G	10km - 120km
1000Base-T	GigE	N/A	N/A	1.25G	Varies



# SFP+

- The SFP+ standard introduces speeds up to 16G.
- Also introduced Direct Attach for connecting to SFP+ ports without dedicated transceivers.
- SFP+ Ports may be backwards compatible with SFP, but its not required in the standard.





# Small Form Pluggable (SFP)

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- Some vendors engage in vendor lock-in practices whereby they deliberately break compatibility with “generic” SFPs by adding a check in the device firmware that will enable only the vendors own modules. MikroTik, of course, does not.
- The SFP MSA defines a 256-byte memory map into the EEPROM describing the transceiver's capabilities, manufacture, and other information.
- All SFP modules are “hot swappable.”



# Digital Diagnostics Monitoring (DDM)

- Modules with this capability will allow monitoring of things like optical power, temperature, and others.

EEPROM Info

DDM Info

Interface <stp1>

General SFP Ethernet Overall Stats Rx Stats ...

SFP Rate Select: high

Module Present  
 Rx Loss  
 Tx Fault

Connector Type: LC

Link Length 9um: 20000 m  
Link Length 50um:   
Link Length 62um:   
Link Length Copper:

Vendor Name: Mikrotik  
Vendor Part Number: S-31DLC20D  
Vendor Revision:   
Vendor Serial: SG31245002216  
Manufacturing Date: 14-12-17

Wavelength: 131000 nm  
Temperature: 41 C  
Supply Voltage: 3.248 V  
Tx Bias Current: 22 mA  
Tx Power: -5 dBm  
Rx Power: -8 dBm

enabled running slave link ok



# Fiber Cables

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- The fiber itself can transfer up to 1 petabit per second over a distance of 50 kilometers (31 miles).
- Light travels around 180,000 – 200,000 km/s in fiber resulting in 5.0 to 5.5 microseconds of latency per km.(i.e. 1000km would have a latency around 11 milliseconds.)
- The jacket of the patch cable is colored coded to indicate the type of fiber.
- The connector is color coded to indicate the type of connection.





# Patch Cable Color Codes

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Buffer/jacket color	Meaning
Orange	multi-mode optical fiber
Aqua	OM3 or OM4 10 gig laser-optimized 50/125 micrometer multi-mode optical fiber
Violet	OM4 multi-mode optical fiber (some vendors) <sup>[15]</sup>
Grey	outdated color code for multi-mode optical fiber
Yellow	single-mode optical fiber
Blue	Sometimes used to designate polarization-maintaining optical fiber



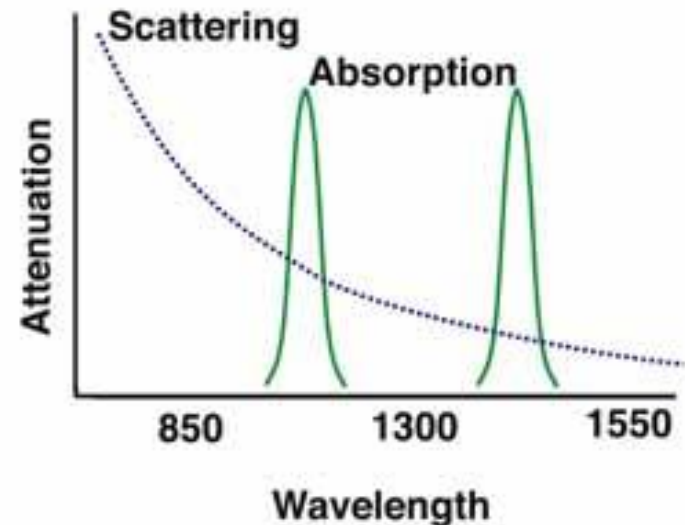
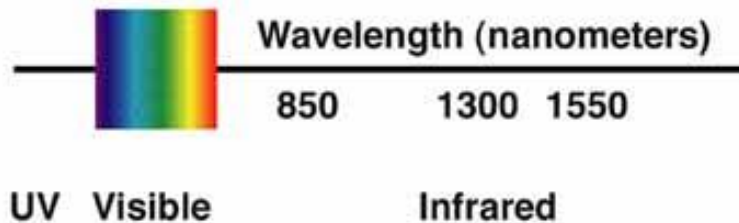
# Patch Cable Color Codes

Connector Boot		Meaning	Comment
Blue		Physical Contact (PC), 0°	mostly used for single mode fibers; some manufacturers use this for polarization-maintaining optical fiber.
Green		Angle Polished (APC), 8°	
Black		Physical Contact (PC), 0°	
Grey,	Beige	Physical Contact (PC), 0°	multimode fiber connectors
White		Physical Contact (PC), 0°	
Red			High optical power. Sometimes used to connect external pump lasers or Raman pumps.



# Wavelength

- ▶ The higher the wavelength to less loss over distance.
- ▶ Most of the light used is invisible, but some visible light will be present.





# Single Mode Vs Multi Mode

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## Single Mode

- ▶ Offer high bandwidth at long distances.
- ▶ Uses only one light frequency (path or mode).
- ▶ Usually around 1300nm

## Multi Mode

- ▶ Offers high bandwidth at medium distances.
- ▶ Uses multiple light frequencies (paths or modes).
- ▶ Usually around 850nm and 1300nm

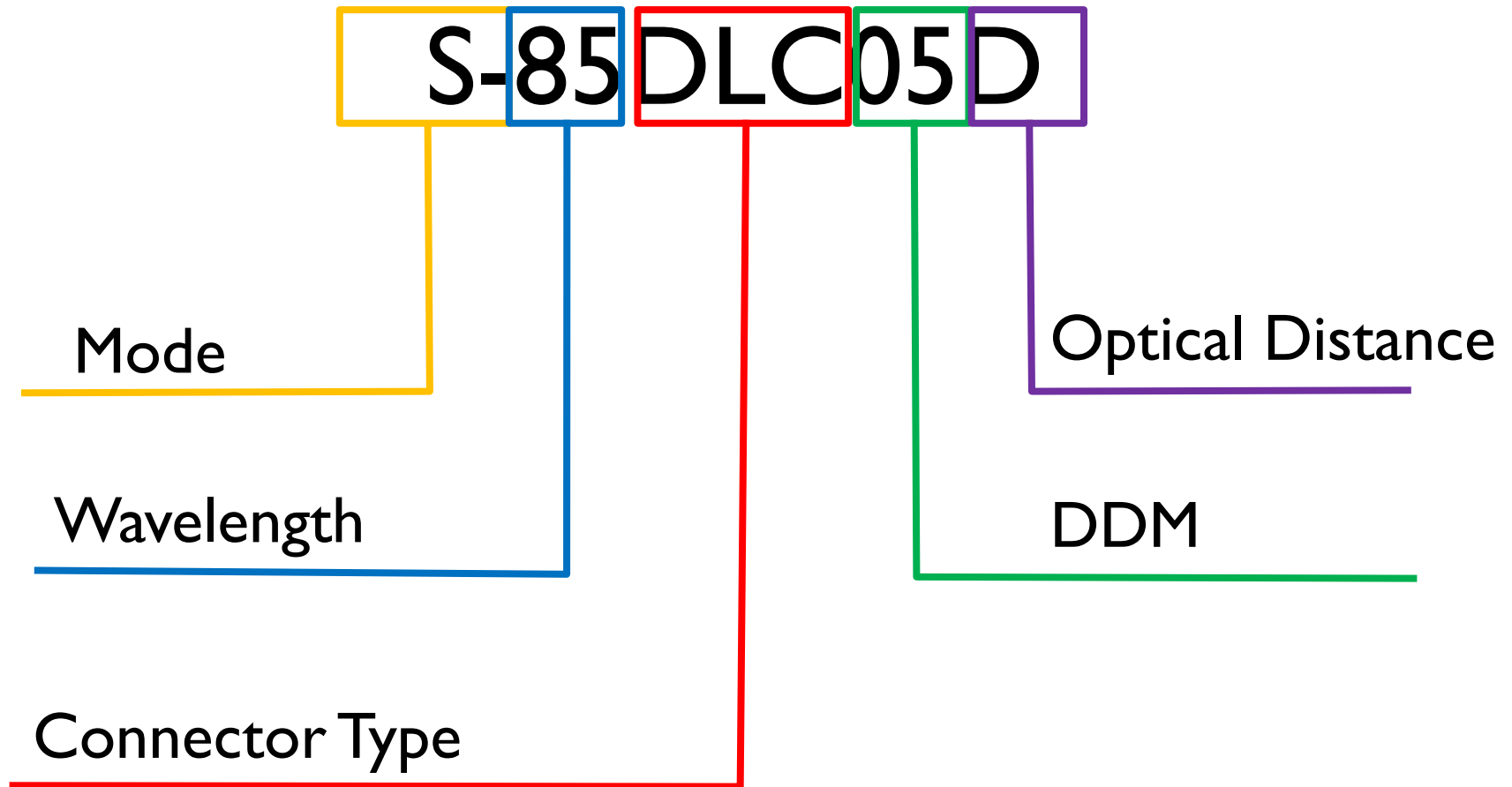


# MikroTik SFP Modules

Product	Form Factor	Data Rate	Mode	Wavelength	Distance	Lever Color
S-RJ01	RJ-45	1.25Gps	N/A	N/A	100M	N/A
S-85DLC05D	DLC	1.25Gps	Multi	850nm	550M	Black
S-31DLC20D	DLC	1.25Gps	Single	1310nm	20KM	Blue
S-3553LC20D 2 TXCR Kit	LC LC	1.25Gps	Single Multi	1310nm 850nm	20KM	Blue Yellow
S+85DLC03D	DLC	10G	Multi	850nm	300M	Black
S+31DLC10D	DLC	10G	Single	1310nm	10KM	Black
S+2332LC10D 2 TXCR Kit	LC LC	10G	Multi Single	1310nm 1310nm	10KM	Yellow Blue
SFP+ 1M DAC	SFP(+)	10G	N/A	N/A	1M	N/A
SFP+ 3M DAC	SFP(+)	10G	N/A	N/A	3M	N/A



# MikroTik SFP Modules





# MikroTik SFP Modules

## S-RJ01



## S-31DLC20D



## S-85DLC05D



## S-3553LC20D





# MikroTik SFP Modules

S+85DLC03D



S+2332LC10D



S+31DLC10D



SFP+ 1M DAC + 3M DAC







**End of Module**