



Connecting Mikrotik With Fiber Optic

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Profile

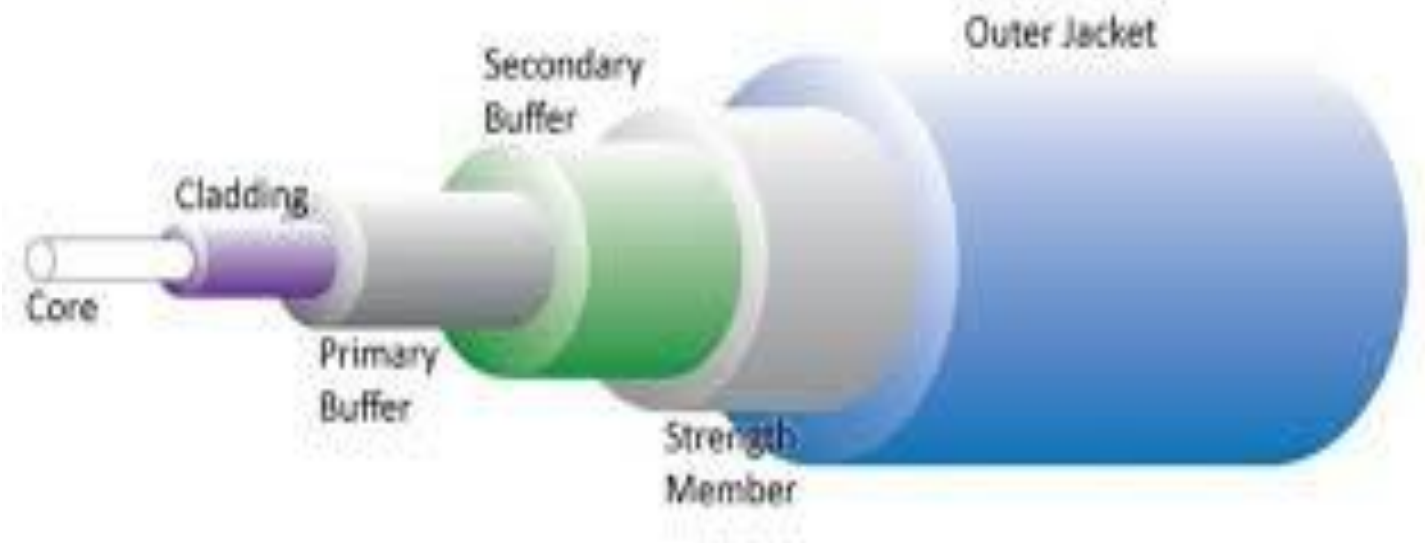
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- Lecturer in Binus Malang, STMIK Pradnya Paramita Malang, Universitas Ma Chung Malang



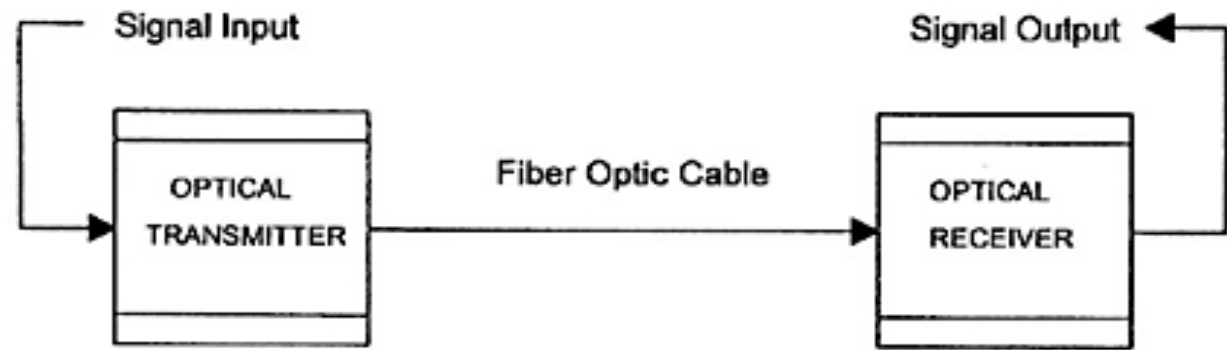
Why Fiber Optics?

- Fiber is the least expensive, most reliable method for high speed and long distance communications

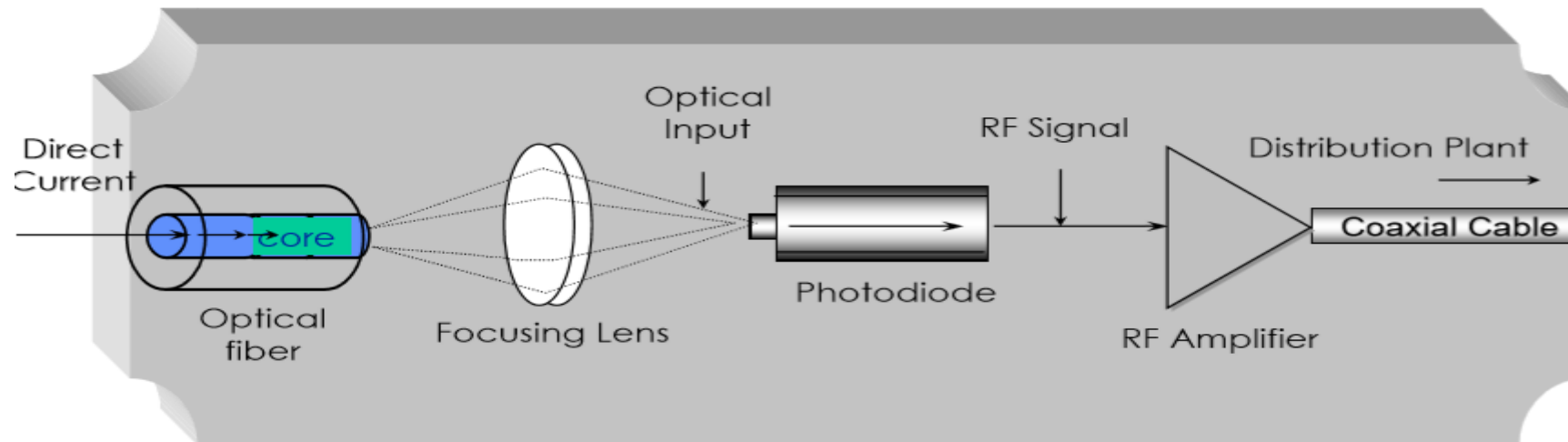
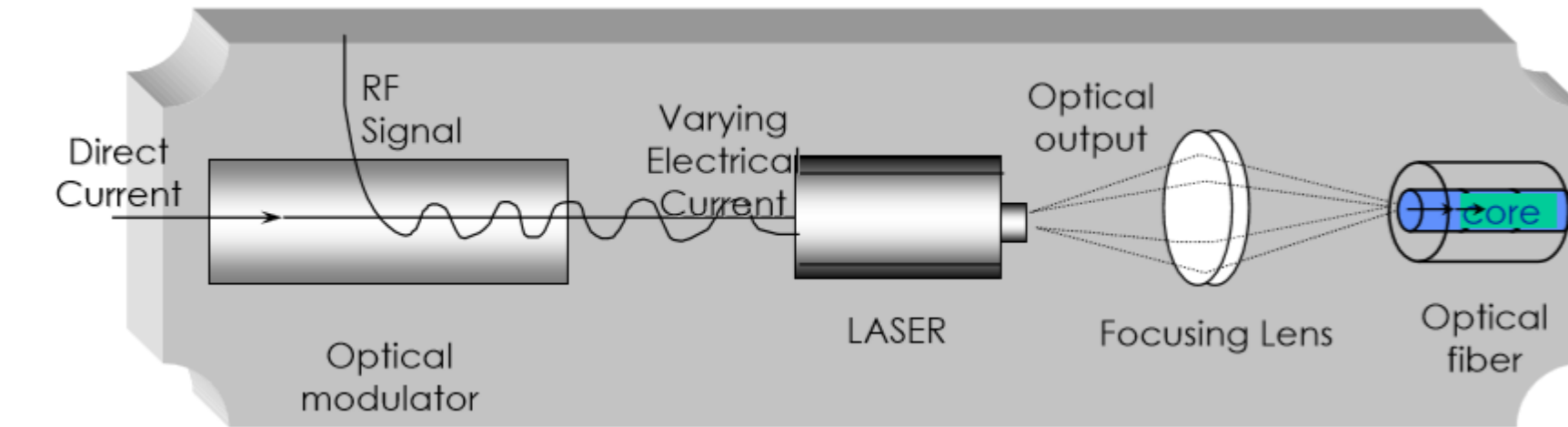


Theory

- A basic fiber optic communications system consists of three basic elements:
 - Fiber media
 - Light sources
 - Light detector



Optical Transmitter Component



Types of Patch Cord

- Single mode
 - only one signal can be transmitted
 - use of single frequency
- Multi mode
 - Several signals can be transmitted
 - Several frequencies used to modulate the signal



Connectors

Connection to terminal devices, optical cross connect panels and couplers

Classifications :

- Fiber to fiber connector .
- Fiber to source connector.
- Fiber to detector connector.
- Multiportcoupler connector.

Various Kinds of Connectors

1. SMA (Sub Miniature type A) Connector.
2. Biconic Biconic Connector.
3. ST (straight tip) Connector.
4. SC (Square connector) Connector.
5. FC (Face Contact) Connector.
6. FDDI FDDI (Fiber Distributed Data Interface) Connector.
7. D4 (D in 4 atau Deutsches Institut Normung/German Institute for Standardization).
8. Escon connector.

Connectors



SC



LC



FC

SFP (Small Form-Factor Pluggable)

It is a hot-pluggable transceiver that plugs into the SFP port of a network device

How to choose SFP

- Mode
- Range between Node
- Throughput



SFP

	XFP	SFP	SFP+
Stands for	10 Gigabit Small Form Factor Pluggable	Small Form-factor Pluggable	Small Form-factor Pluggable plus
Data rate	10G	155M/622M/ 1.25G 2.5G/3G/4.25G	6G/8.5G/10G
Terms	Dual fiber Single Fiber/WDM CWDM DWDM	Dual fiber Single Fiber/WDM CWDM DWDM	Dual fiber Single Fiber/WDM CWDM DWDM
Distance	220m/300m/ 2km/10km/ 20km/40km/ 60km/80km/ 120km	300m/2km/ 10km/15km/ 20km/40km/ 60km/80km/ 100km/120km/ 150km	220m/300m/ 2km/10km/ 20km/40km/ 60km/80km
Wavelength	850nm/1310nm/1550nm 1270nm/1330nm 1270nm-1610nm ITU17~ITU61	850nm/1310nm/1550nm 1310nm/1490nm/ 1550nm 1270nm-1610nm ITU17~ITU61	850nm/1310nm/1550nm 1310nm/1490nm/ 1550nm 1270nm-1610nm ITU17~ITU61

SFP (Small Form-Factor Pluggable)



S+DA0003 SFP+
direct attach
cable, 3m



S-85DLC05D SFP
(1.25G) module,
550m, Multi
Mode



S-3553LC20D Two
SFP (1.25G) module
kit, 20Km, single
mode

SFP (Small Form-Factor Pluggable)



S-31DLC20D

SFP (1.25G)
module,
20KM, Single
Mode



S-55DLC80D

SFP 1.25G
module for
80km links
with Dual LC-
connector



S+AO0005

SFP+ Active Optics
direct attach cable,
5m

SFP to Ethernet



S-RJ01 RJ45 SFP
10/100/1000M
copper module

Details

Product code	S-RJ01
Connector	RJ45
Data Rate	1.25Gbps
Distance	100m
Operating Temperature	0 C +85 C

SFP Single Mode



S-31DLC20D SFP
(1.25G) module,
20KM, Single Mode

Details

Product code	S-31DLC20D
Connector	Dual LC UPC
Data Rate	1.25G
Distance	20KM
Format	SFP
Mode	SM
Operating Temperature	-40 to +70C
Wavelength	1310nm

SFP Multi Mode



S-85DLC05D

SFP (1.25G)
module, 550m,
Multi Mode

Product specifications

Details	
Product code	S-85DLC05D
Connector	Dual LC UPC
Data Rate	1.25G
Distance	550M
Format	SFP
Mode	MM
Operating Temperature	-40 to +70C
Wavelength	850nm
Suggested price	\$22.00

SFP



[S+DA0003](#)

SFP+ direct attach
cable, 3m

This is highly cost-effective way to connect two SFP/SFP+ devices (for example two units of CCR1036-8G-2S+) for very short distances, within racks and across adjacent racks.

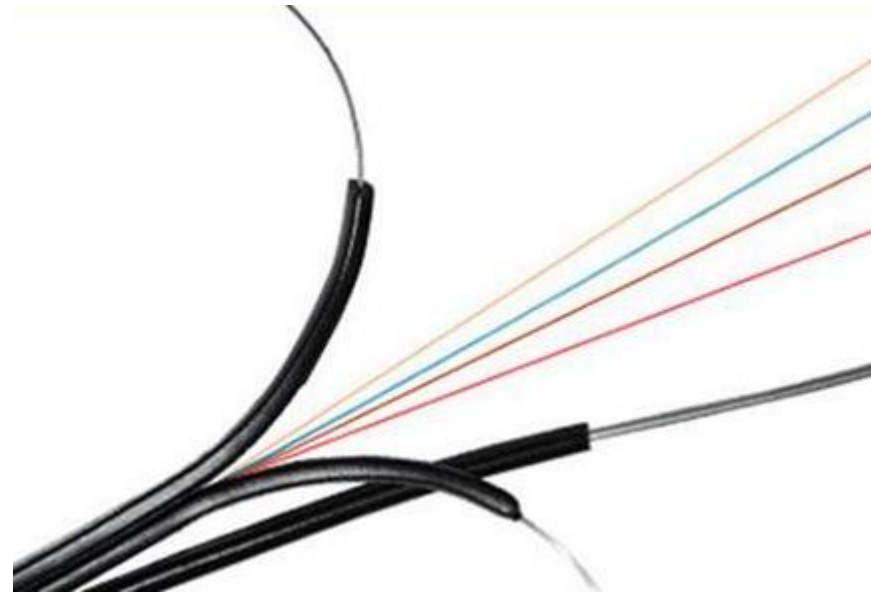


[S+AO0005](#)

SFP+ Active
Optics direct
attach cable, 5m

5m SFP+ 10Gbps Active Optics direct attach cable. This is highly cost-effective way to connect two SFP/SFP+ devices for very short distances, within racks and across adjacent racks. It works with all our products with SFP/SFP+

Drop Cable / Drop Wire



Pigtail



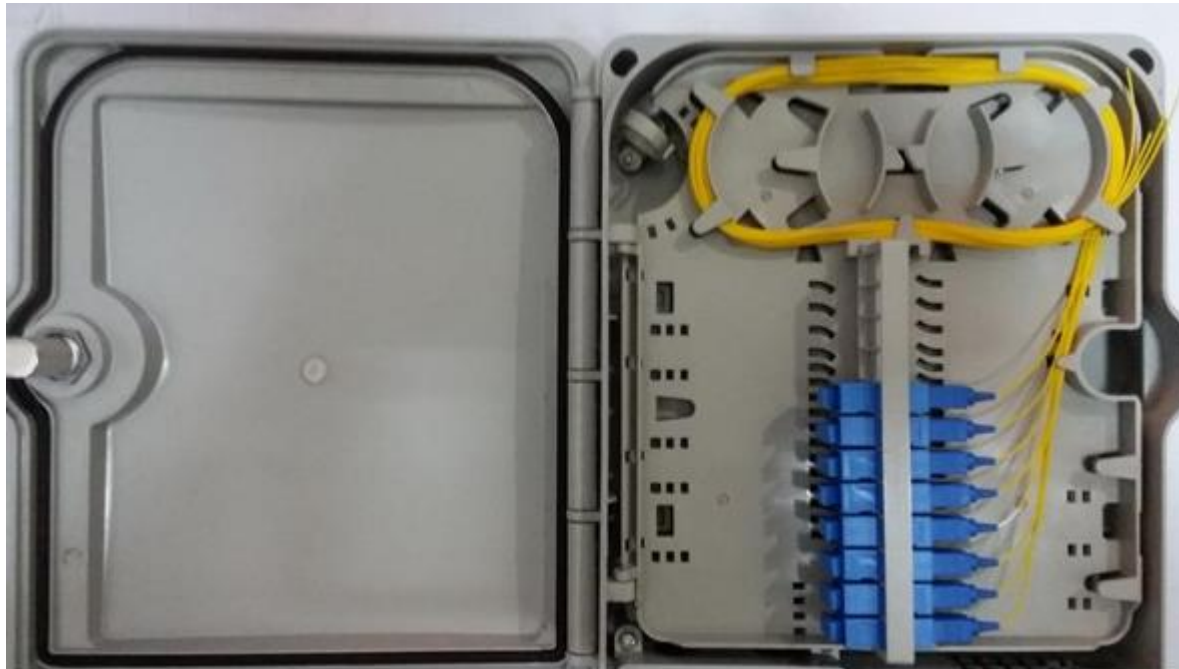
Fast Connector



Adapter SC



ODP



Converter Fiber To Ethernet



Measuring Instruments

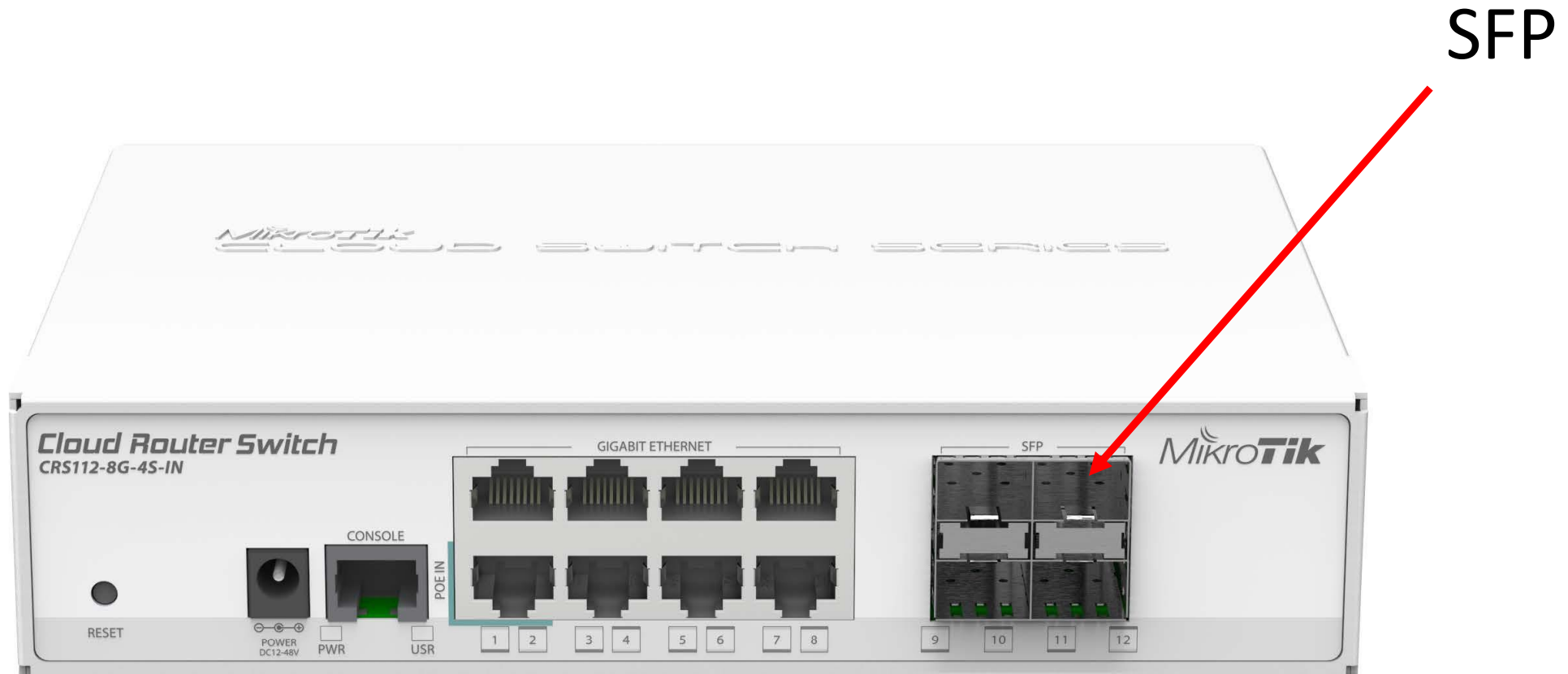


OLS and OPM



Visual Fault Locator

SFP Port Mikrotik



Troubleshooting SFP

Both devices can be connected to each other if SFP Transceivers are installed on both sides in the same mode. But if it turns out that you have used the transceiver in the same mode but failed, then do the following:

First configure the SFP interface. Double click on the SFP interface, then on the Ethernet tab, check auto-negotiation as shown below:

Troubleshooting

Interface <sfp10>

SFP Ethernet Loop Protect Overall Stats Rx Stats ...

Auto Negotiation

Tx Flow Control: ▾

Rx Flow Control: ▾

Advertise: 10M half 10M full
 100M half 100M full
 1000M half 1000M full

Connecting Mikrotik

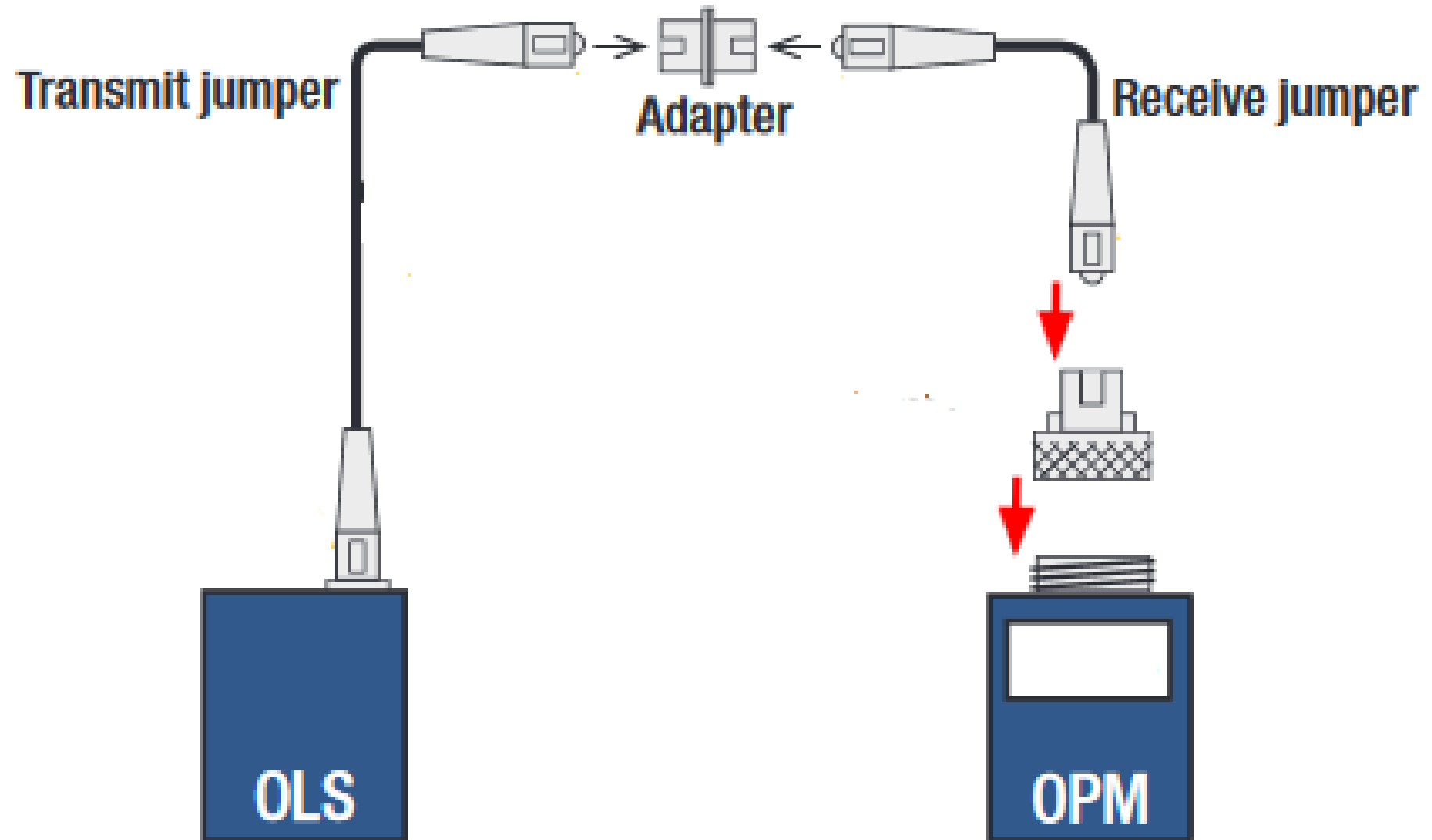
CRS112-8G-4S-IN



ODP



Measuring Instrument



How to using OPM and OLS

In OLS and OPM, there are several settings, Lambda / or wavelength:

- 850 nm is used to measure multimode
- 1310 nm is used to measure singlemode with a relatively short distance (10 km).
- 1550 nm is used to measure single mode with a long distance backbone (above 10 km)

Testing Procedure

- Connect the optical light source to the transmitting end of the test cable.
- Connect the power meter to the receiving end of the test cable.
- Turn on the source and select the wavelength you want for the loss test.
- Turn on the meter, select the “dBm” or “dB” range and select the wavelength you want for the loss test.
- Measure the power and loss at the meter.

Splicer

- A fiber optic fusion splicer is a device that uses an electric arc to melt two optical fibers together at their end faces, to form a single long fiber.



Stripper and Cleaver



The process of fusion splicing

1. Stripping the fiber

Stripping is the act of removing the protective polymer coating around optical fiber in preparation for fusion splicing through a mechanical stripping device similar to a wire-stripper.

2. Cleaning the fiber

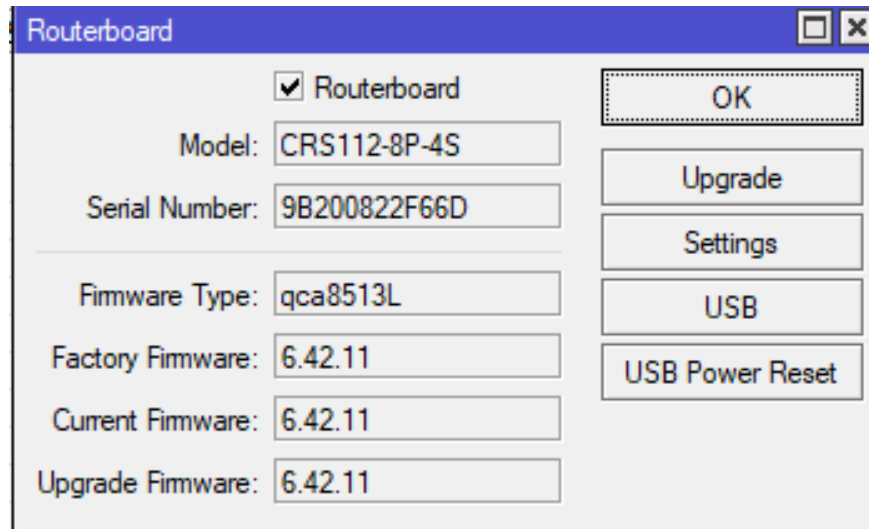
Clean bare fibers is with alcohol and wipes

3. Cleaving the fiber

The fiber is cleaved by Cleaver

4. Splicing the fibers

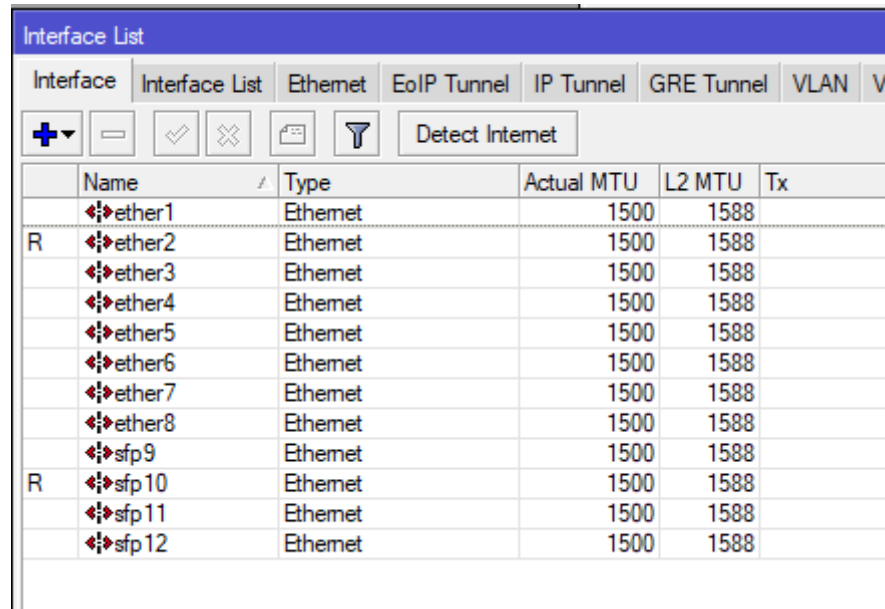
Implementation in Mikrotik



The image shows a screenshot of the Mikrotik Routerboard configuration window. The window title is "Routerboard". It contains several fields and buttons:

- Routerboard
- Model: CRS112-8P-4S
- Serial Number: 9B200822F66D
- Firmware Type: qca8513L
- Factory Firmware: 6.42.11
- Current Firmware: 6.42.11
- Upgrade Firmware: 6.42.11
- Buttons: OK, Upgrade, Settings, USB, USB Power Reset

Interface



	Name	Type	Actual MTU	L2 MTU	Tx
	ether1	Ethernet	1500	1588	
R	ether2	Ethernet	1500	1588	
	ether3	Ethernet	1500	1588	
	ether4	Ethernet	1500	1588	
	ether5	Ethernet	1500	1588	
	ether6	Ethernet	1500	1588	
	ether7	Ethernet	1500	1588	
	ether8	Ethernet	1500	1588	
	sfp9	Ethernet	1500	1588	
R	sfp10	Ethernet	1500	1588	
	sfp11	Ethernet	1500	1588	
	sfp12	Ethernet	1500	1588	

IP Address

- R1

Address List			
+ - ✓ ✕ 📄 🔍			
	Address	Network	Interface
	+ 192.168.1.1/24	192.168.1.0	sfp10

R2

Address List			
+ - ✓ ✕ 📄 🔍			
	Address	Network	Interface
	+ 192.168.1.2/24	192.168.1.0	sfp10

Interface

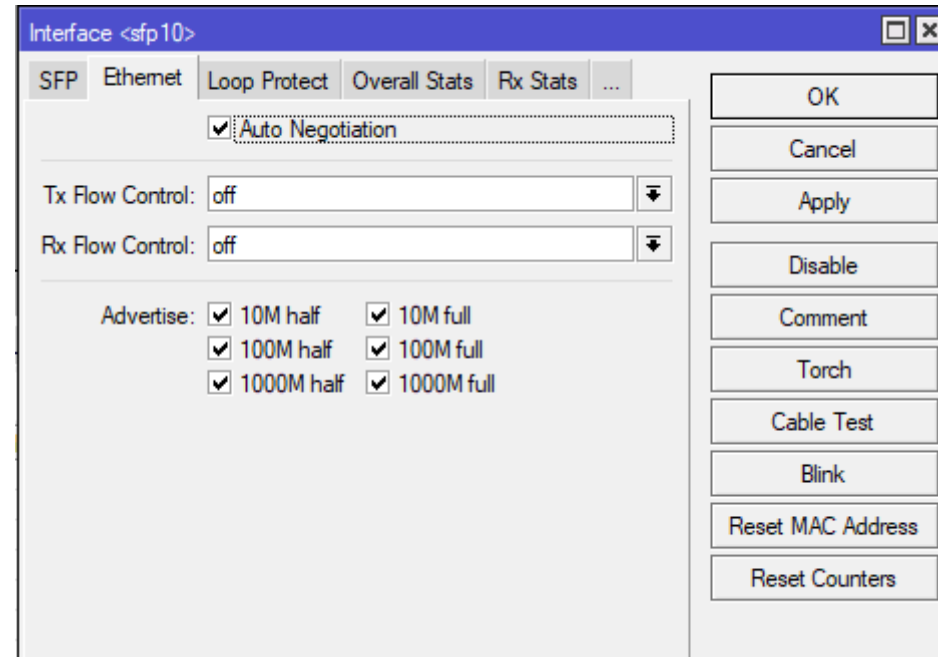
The image shows a software window titled "Interface <sfp 10>". It has several tabs: "General", "SFP", "Ethernet", "Loop Protect", and "Overall Stats". The "SFP" tab is selected. The window contains various configuration fields and a list of actions on the right side.

Field	Value
Module Present	<input checked="" type="checkbox"/>
Rx Lose	<input type="checkbox"/>
Tx Fault	<input type="checkbox"/>
Connector Type	LC
Link Length 9um	10000 m
Link Length 50um	550 m
Link Length 62um	550 m
Link Length Copper	
Vendor Name	MIKROBITS
Vendor Part Number	SFP-1G-LH-SM
Vendor Revision	A0
Vendor Serial	M19010100119
Manufacturing Date	18-12-15
Wavelength	1310.00 nm
Temperature	38 C
Supply Voltage	3.290 V
Tx Bias Current	25 mA
Tx Power	-4.718 dBm
Rx Power	-5.725 dBm

Buttons on the right side of the window:

- OK
- Cancel
- Apply
- Disable
- Comment
- Torch
- Cable Test
- Blink
- Reset MAC Address
- Reset Counters

Interface



Result

- From R1 to R 2

```
[admin@R1] > ping 192.168.1.2
```

SEQ	HOST	SIZE	TTL	TIME	STATUS
0	192.168.1.2	56	64	3ms	
1	192.168.1.2	56	64	2ms	
2	192.168.1.2	56	64	1ms	
3	192.168.1.2	56	64	9ms	
4	192.168.1.2	56	64	1ms	

■

- From R2 to R1

```
[admin@R2] > ping 192.168.1.1
```

SEQ	HOST	SIZE	TTL	TIME	STATUS
0	192.168.1.1	56	64	3ms	
1	192.168.1.1	56	64	1ms	
2	192.168.1.1	56	64	2ms	
3	192.168.1.1	56	64	1ms	

■

Demo Live

Thank You
dutymlg@gmail.com
0816559940