Connecting Mikrotik With Fiber Optic

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2019

Profile

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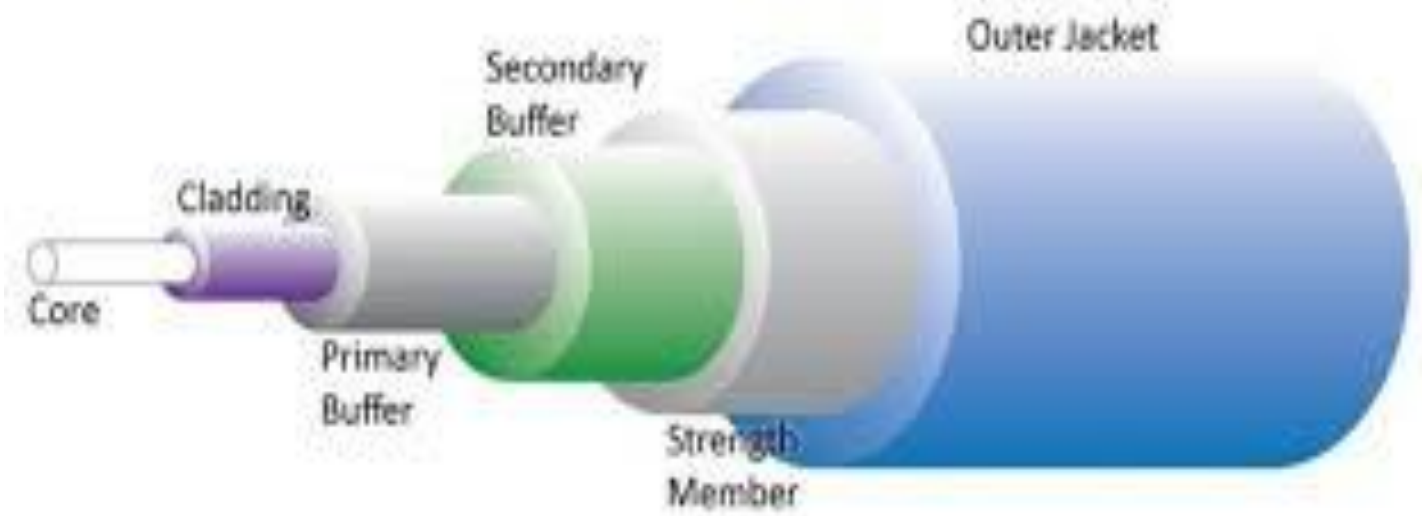
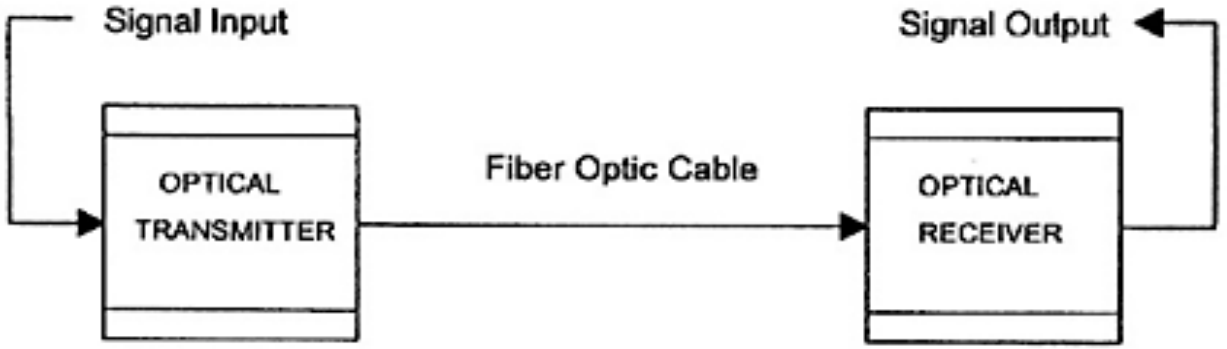
Why Fiber Optics?

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

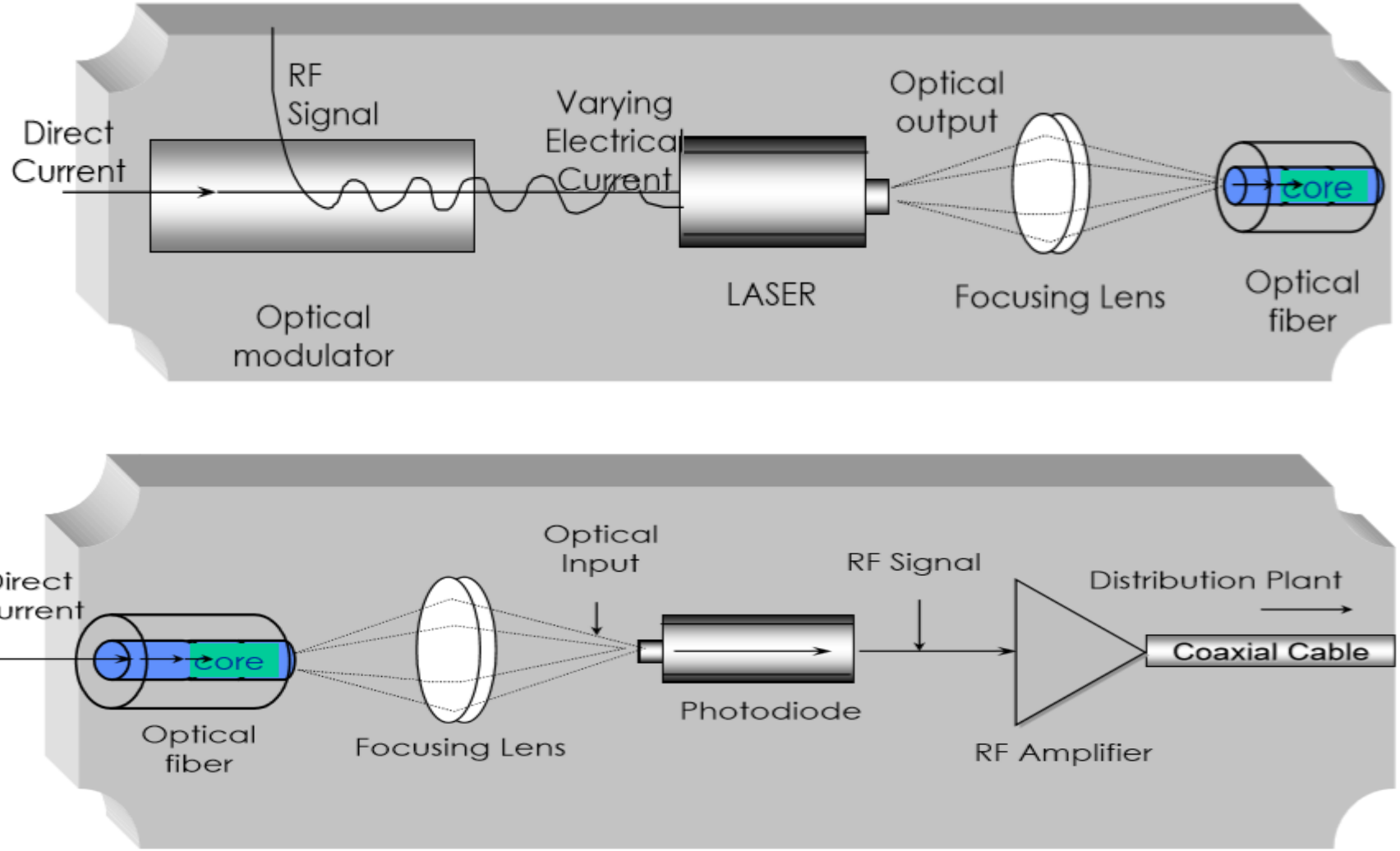


Theory

- 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

Classiffications :

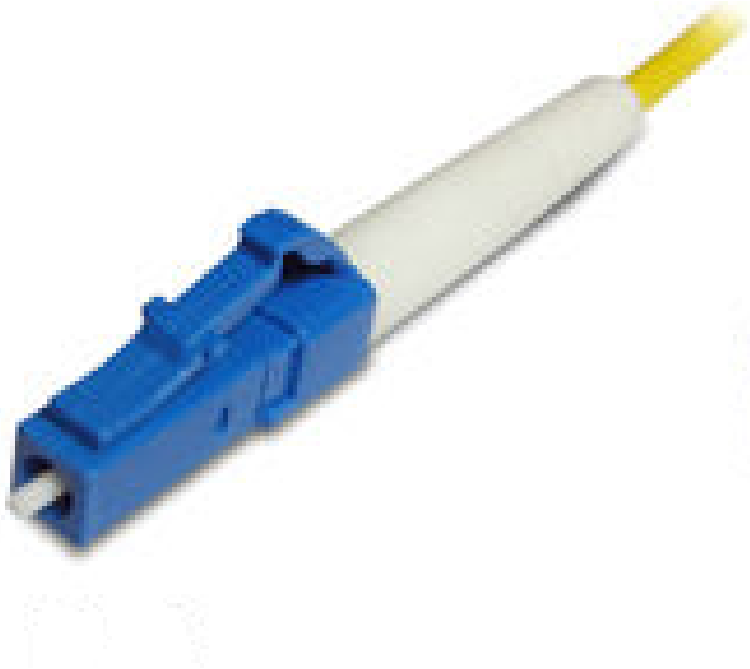
- Fiber to fiber connector .
- Fiber to source connector.
- Fiber to detector connector.
- Multiportcoupler connector.

Various Kinds of Connectors

1. SMA (Sub Minaturetype A)Connector.
2. Biconic BiconicConnector.
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 DeutcheInstitut 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 Plug gable	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/WD M 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/1 550nm 1270nm/1330nm 1270nm-1610nm ITU17~ITU61	850nm/1310nm/1 550nm 1310nm/1490nm/ 1550nm 1270nm-1610nm ITU17~ITU61	850nm/1310nm/1 550nm 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

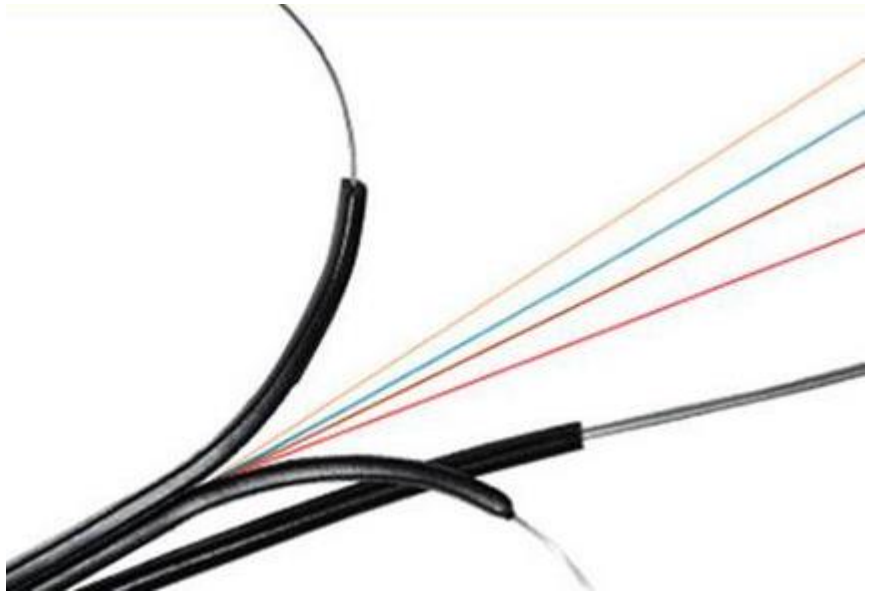
This is highly cost-effective way to connect two SFP/SFP+ devices (for example two units of CCR1036-8G-2S+) for very short distances, within racks and across adjacent racks.

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

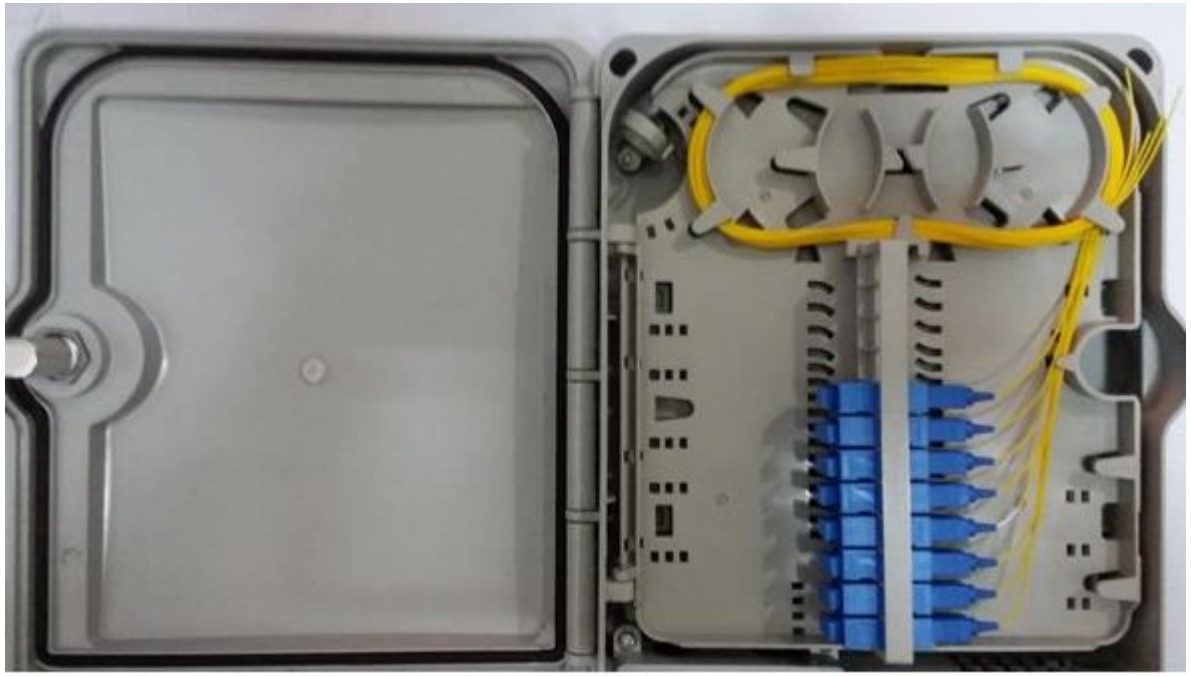


Pigtail

Fast Connector

Adapter SC

ODP



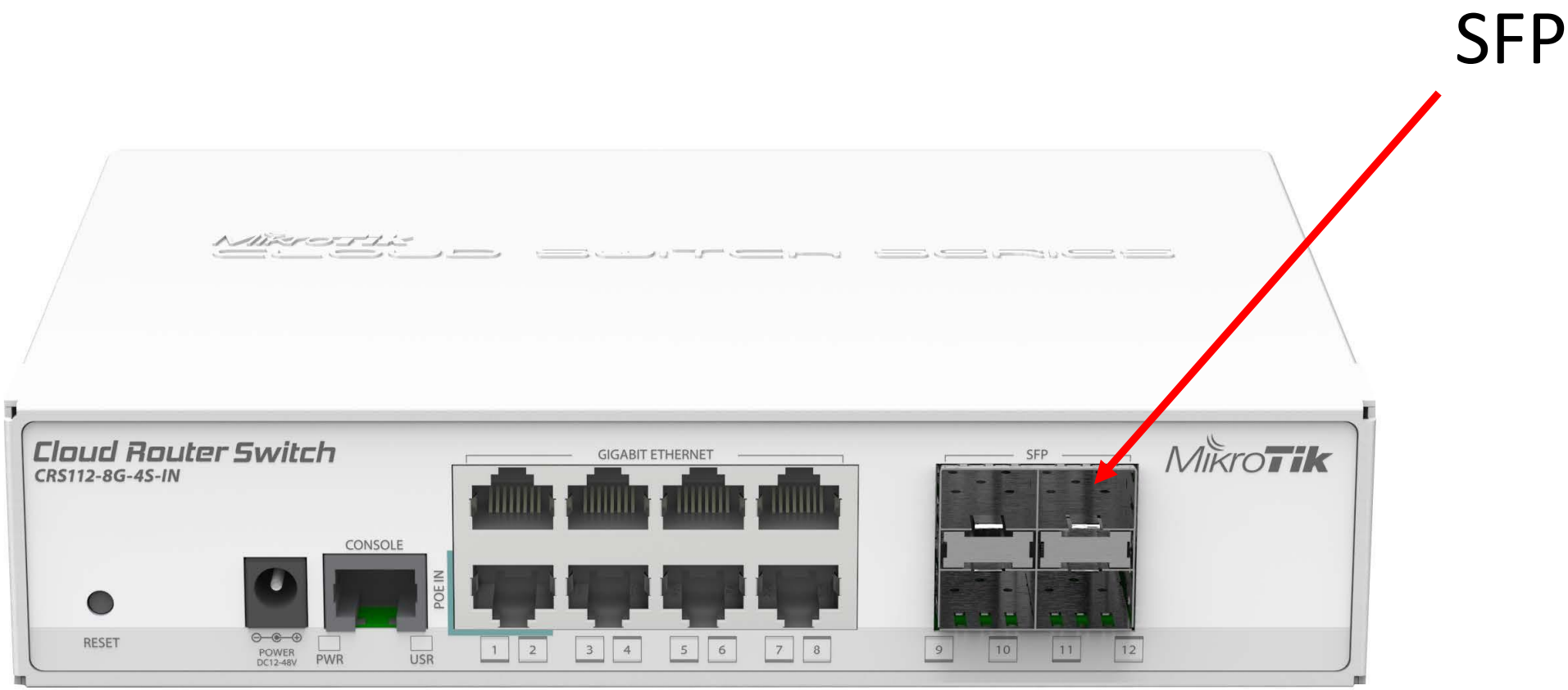
Converter Fiber To Ethernet

Measuring Instruments

OLS and OPM

Visual Fault Locator

SFP Port Mikrotik

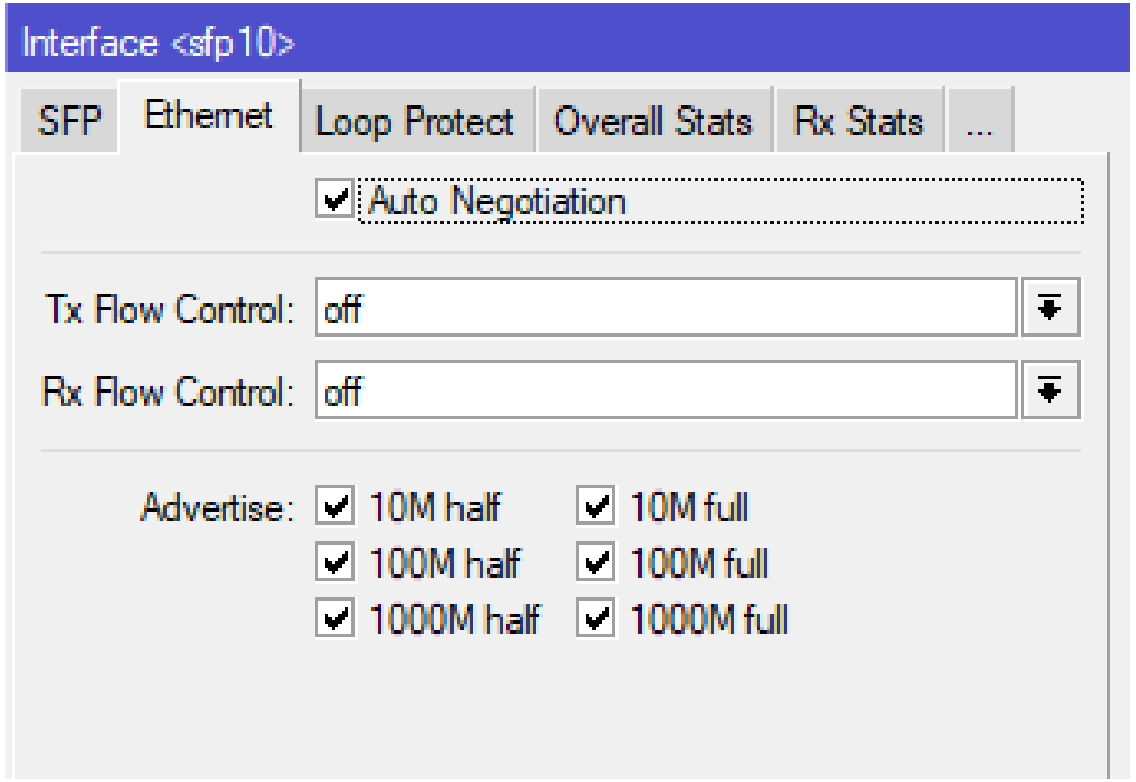


Troubleshooting SFP

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

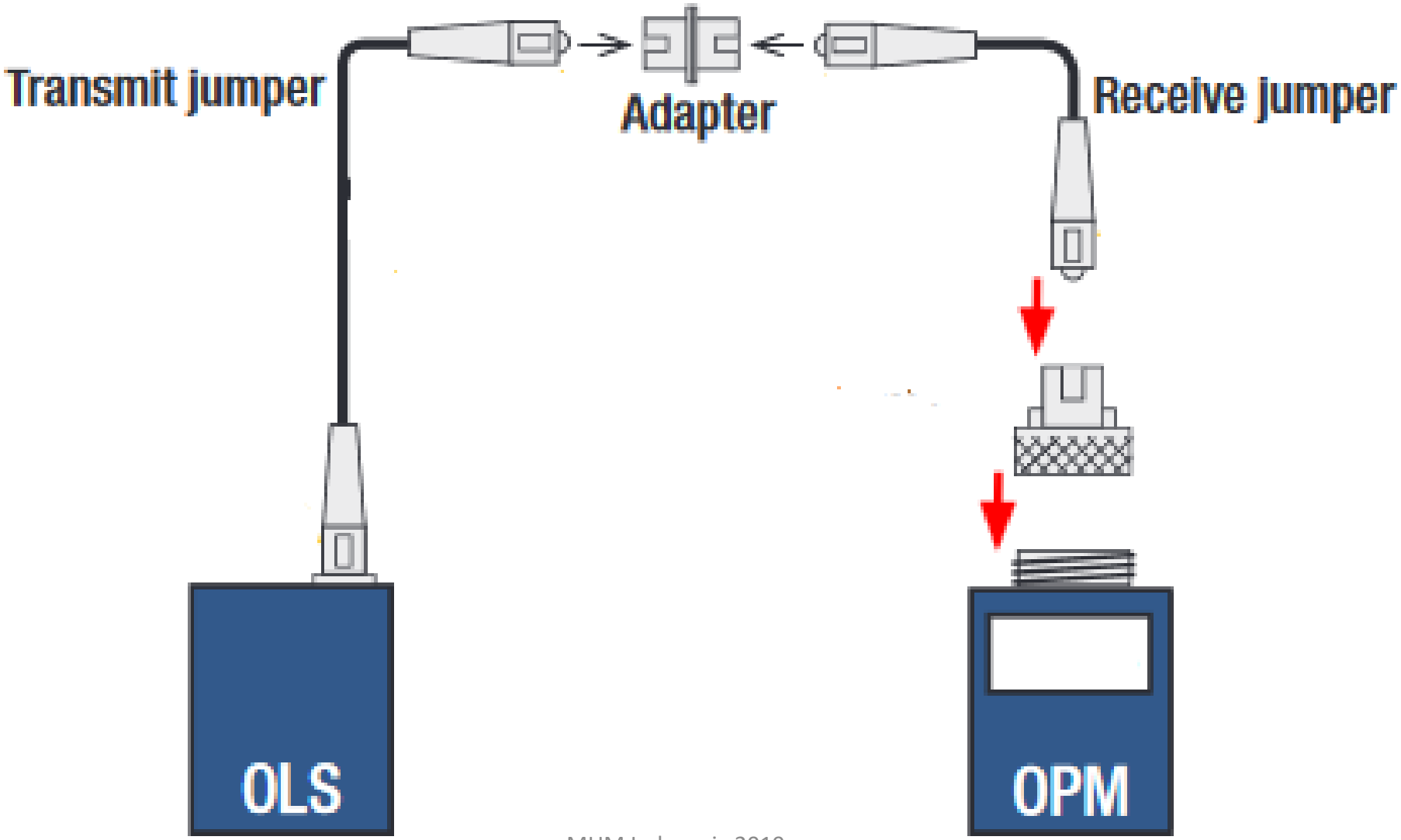


Connecting Mikrotik

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**

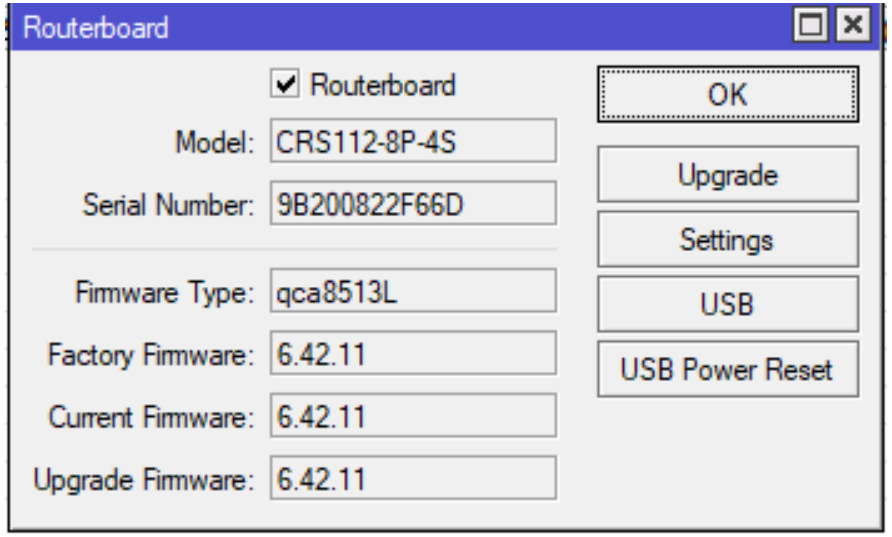
   Clean bare fibers is with alcohol and wipes

3. **Cleaving the fiber**

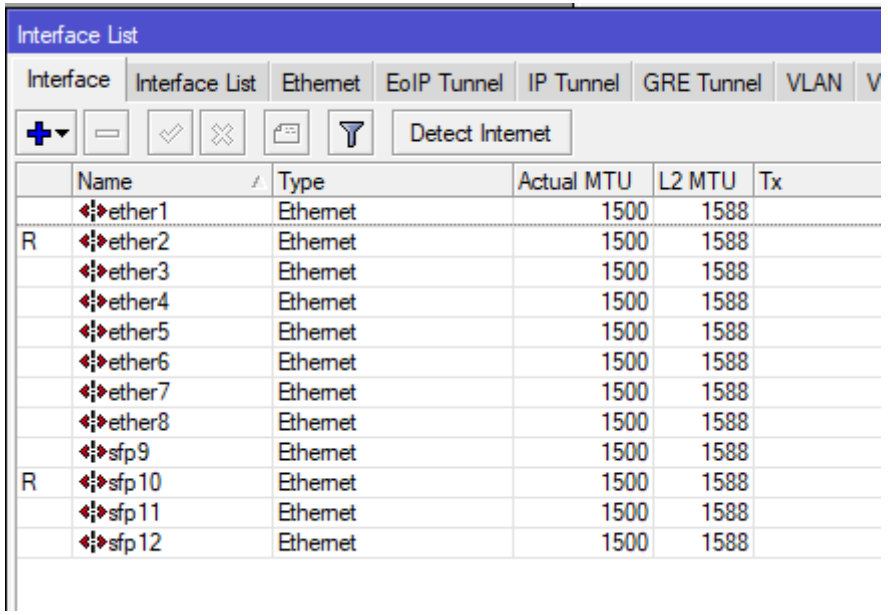
   The fiber is cleaved by Cleaver

4. **Splicing the fibers**

Implementation in Mikrotik

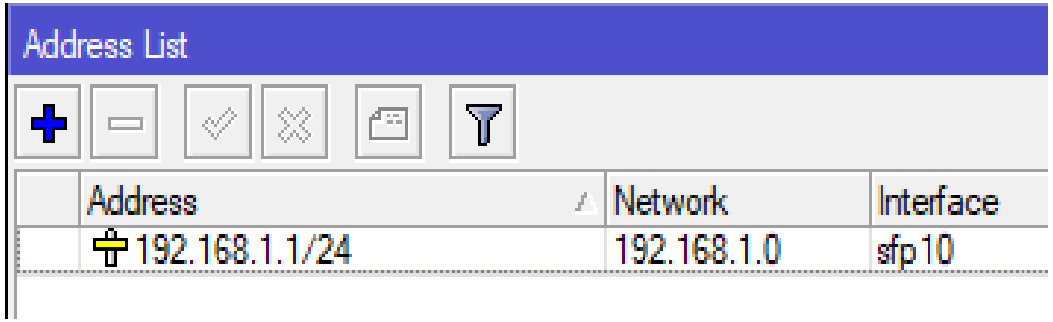


Interface

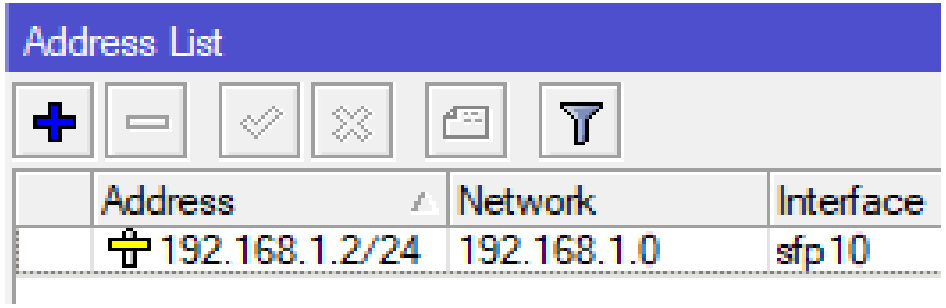

Interface List
Interface
Interface List
Ethernet
EoIP Tunnel
IP Tunnel
GRE Tunnel
VLAN
Detect Internet
Name
Type
Actual MTU
L2 MTU
Tx
ether1 Ethernet 1500 1588
R ether2 Ethernet 1500 1588
ether3 Ethernet 1500 1588
ether4 Ethernet 1500 1588
ether5 Ethernet 1500 1588
ether6 Ethernet 1500 1588
ether7 Ethernet 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

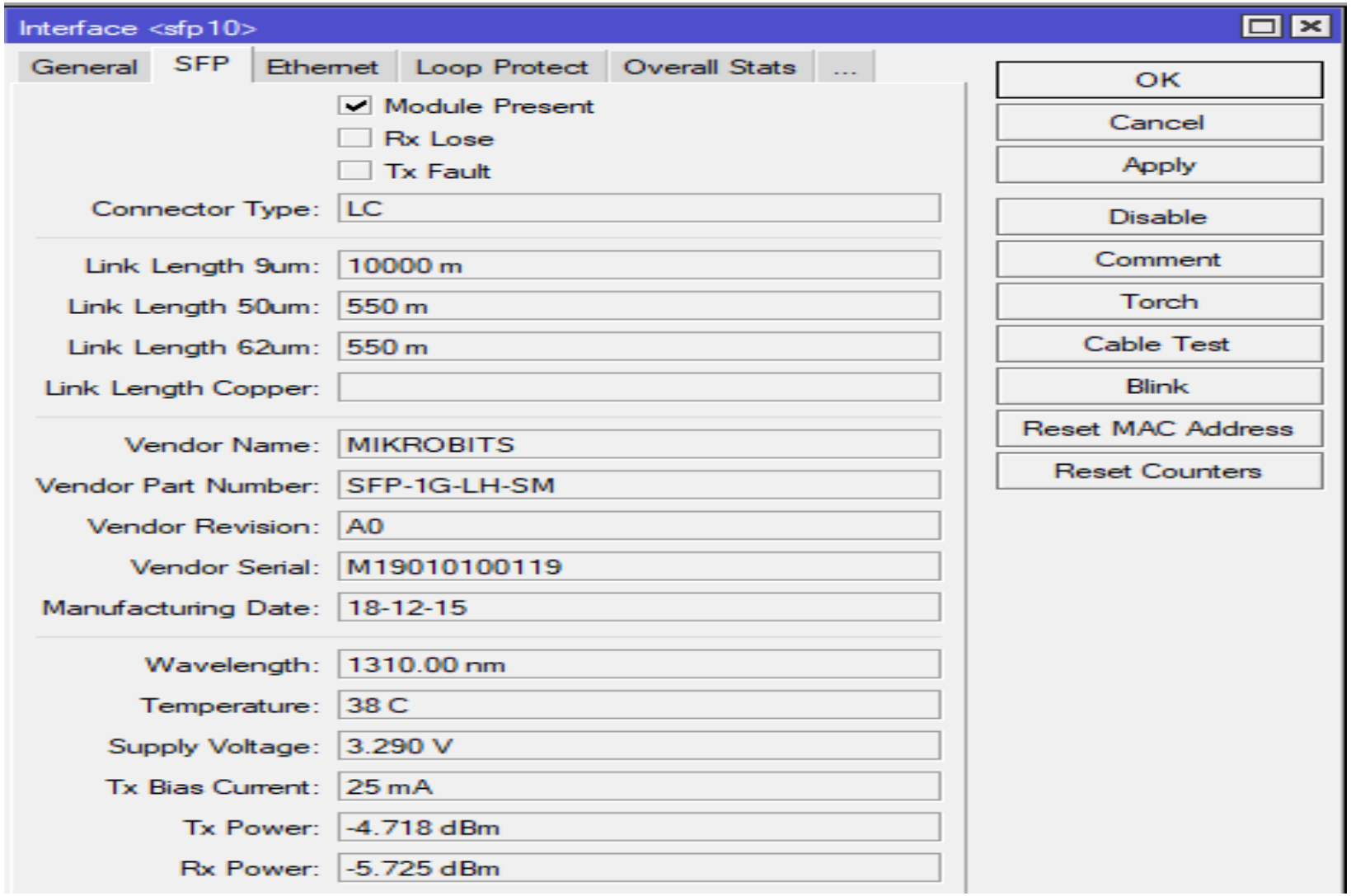
- R1



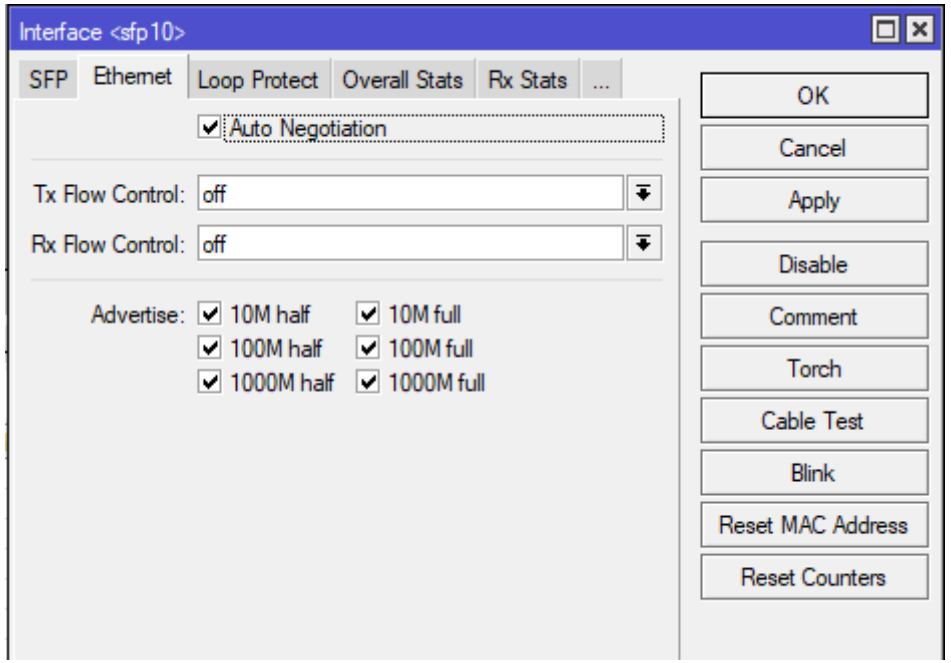
R2



Interface


Interface <sfp10>
General
SFP
Ethernet
Loop Protect
Overall Stats
...
Module Present
Rx Lose
Tx Fault
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
OK
Cancel
Apply
Disable
Comment
Torch
Cable Test
Blink
Reset MAC Address
Reset Counters

Interface


Interface <sfp10>
SFP
Ethernet
Loop Protect
Overall Stats
Rx Stats
...
Auto Negotiation
Tx Flow Control: off
Rx Flow Control: off
Advertise: 10M half
10M full
100M half
100M full
1000M half
1000M full
OK
Cancel
Apply
Disable
Comment
Torch
Cable Test
Blink
Reset MAC Address
Reset Counters

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

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