Connecting Mikrotik With Fiber Optic

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MUM Indonesia
2019
Profile

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• Mikrotik Trainer and Consultant
• Instructor Cisco Academy, Oracle Academy and Oracle WDP
• Ph.D Student in Universiti Teknikal Malaysia Melaka (UTEM) Malaysia
• 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 Minaturetype 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 DeutcheInstitut Normung/German Institute for Standardization).
8. Escon connector.
Connectors

SC  LC  FC

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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
<table>
<thead>
<tr>
<th></th>
<th>XFP</th>
<th>SFP</th>
<th>SFP+</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stands for</strong></td>
<td>10 Gigabit Small Form Factor Pluggable</td>
<td>Small Form-factor Pluggable</td>
<td>Small Form-factor Pluggable plus</td>
</tr>
<tr>
<td><strong>Data rate</strong></td>
<td>10G</td>
<td>155M/622M/1.25G/2.5G/3G/4.25G</td>
<td>6G/8.5G/10G</td>
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<tr>
<td><strong>Terms</strong></td>
<td>Dual fiber Single Fiber/WDM CWDM DWDM</td>
<td>Dual fiber Single Fiber/WDM CWDM DWDM</td>
<td>Dual fiber Single Fiber/WDM CWDM DWDM</td>
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<tr>
<td><strong>Distance</strong></td>
<td>220m/300m/2km/10km/20km/40km/60km/80km/120km</td>
<td>300m/2km/10km/15km/20km/40km/60km/80km/100km/120km/150km</td>
<td>220m/300m/2km/10km/20km/40km/60km/80km</td>
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</tbody>
</table>
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**

<table>
<thead>
<tr>
<th>Details</th>
<th></th>
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<tbody>
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<td>S-RJ01</td>
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<tr>
<td>Connector</td>
<td>RJ45</td>
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<tr>
<td>Data Rate</td>
<td>1.25Gbps</td>
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<tr>
<td>Distance</td>
<td>100m</td>
</tr>
<tr>
<td>Operating</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>0 C +85 C</td>
</tr>
</tbody>
</table>

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SFP Single Mode

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

<table>
<thead>
<tr>
<th>Details</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product code</td>
<td>S-31DLC20D</td>
</tr>
<tr>
<td>Connector</td>
<td>Dual LC UPC</td>
</tr>
<tr>
<td>Data Rate</td>
<td>1.25G</td>
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<tr>
<td>Distance</td>
<td>20KM</td>
</tr>
<tr>
<td>Format</td>
<td>SFP</td>
</tr>
<tr>
<td>Mode</td>
<td>SM</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40 to +70C</td>
</tr>
<tr>
<td>Wavelength</td>
<td>1310nm</td>
</tr>
</tbody>
</table>
SFP Multi Mode

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

### Product specifications

<table>
<thead>
<tr>
<th>Details</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product code</td>
<td>S-85DLC05D</td>
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<tr>
<td>Connector</td>
<td>Dual LC UPC</td>
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<tr>
<td>Data Rate</td>
<td>1.25G</td>
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<tr>
<td>Distance</td>
<td>550M</td>
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<tr>
<td>Format</td>
<td>SFP</td>
</tr>
<tr>
<td>Mode</td>
<td>MM</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40 to +70C</td>
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<tr>
<td>Wavelength</td>
<td>850nm</td>
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<tr>
<td>Suggested price</td>
<td>$22.00</td>
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</tbody>
</table>
SFP

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+DA0003
SFP+ direct attach cable, 3m
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
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.

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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
IP Address

- R1

- R2
### Interface

![Interface Interface](image)

<table>
<thead>
<tr>
<th>Connector Type:</th>
<th>LC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link Length 9um</td>
<td>10000 m</td>
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<tr>
<td>Link Length 50um</td>
<td>550 m</td>
</tr>
<tr>
<td>Link Length 62um</td>
<td>550 m</td>
</tr>
<tr>
<td>Link Length Copper:</td>
<td></td>
</tr>
</tbody>
</table>

**Vendor Name:** MIKROBITS  
**Vendor Port 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
Interface
Result

• From R1 to R2

```
[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  1ms  
 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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