MikroTik wired interface compatibility

MikroTik SFP/SFP+/SFP28/QSFP+/QSFP28 compatibility

This article shows the compatibility of MikroTik devices with SFP, SFP+, SFP28, QSFP+, and QSFP28 transceivers. It features detailed compatibility tables that provide valuable insights into which transceivers are suitable for use with MikroTik devices. Additionally, some practical configuration examples are provided using the RouterOS CLI to set different data transmission rates. For more detailed descriptions of properties, please refer to the Ethernet user manual.

MikroTik devices and SFP, SFP+, SFP28, QSFP+, and QSFP28 modules do not have any restrictions for other vendor equipment.

While MikroTik cannot ensure full compatibility with modules from all manufacturers, as long as the other vendor modules and devices comply with transceiver multi-source agreement (MSA) they should be compatible with MikroTik.

RouterOS uses a disabled **FEC** mode as the default setting for SFP28 and QSFP28 interfaces. To ensure a successful link with other vendor devices, you may need to enable FEC mode by configuring it to either `fec74` or `fec91`. For more information please refer to the Ethernet user manual.

1G SFP

Model	S-RJ01	S-85DLC05D	S-31DLC20D	S-3553LC20D	S-55DLC80D	S-4554LC80D	SFP CWDM	SFP 1m/3m DAC	S+AO0005 AOC	SFP28 1m/3m DAC
CCR1072-1G-8S+	+	+	+	+	+	+	+	+	+	+
CCR1036-12G-4S	+	+	+	+	+	+	+	+	+	+
CCR1036-8G-2S+	+	+	+	+	+	+	+	+	+	+
CCR1016-12S-1S+	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+	+	+	+
CCR1009-7G-1C	+	+	+	+	+	+	+	+	+	+
CCR1009-8G-1S-1S+	+	+	+	+	+	+	+	+	+	+
CCR1009-7G-1C-1S+	+	+	+	+	+	+	+	+	+	+
CCR2004-1G-2XS-PCIe	-	-	-	-	-	-	-	-	-	-
CCR2004-1G-12S+2XS	+	+	+	+	+	+	+	+	+	+
CCR2004-16G-2S+	+	+	+	+	+	+	+	+	+	+
CCR2116-12G-4S+	+	+	+	+	+	+	+	+	+	+
CCR2216-1G-12XS-2XQ	+	+	+	+	+	+	+	+	+	+
RDS2216-2XG-4S+4XS-2XQ	+	+	+	+	+	+	+	+	+	+
CRS125-24G-1S	+	+	+	+	+	+	+	+	+	+

CRS305-1G-4S+	+	+	+	+	+	+	+	+	+	+
CRS309-1G-8S+	+	+	+	+	+	+	+	+	+	+
CRS312-4C+8XG	-	+	+	+	+	+	+	+	+	+
CRS318-1Fi-15Fr-2S	+	+	+	+	+	+	+	+	+	+
CRS318-16P-2S+	+	+	+	+	+	+	+	+	+	+
CSS318-16G-2S+	+	+	+	+	+	+	+	+	+	+
CRS320-8P-8B-4S+	+	+	+	+	+	+	+	+	+	+
CRS326-4C+20G+2Q+	+	+	+	+	+	+	+	+	+	+
CRS326-24S+2Q+	+	+	+	+	+	+	+	+	+	+
CRS354-48G/P-4S+2Q+	+	+	+	+	+	+	+	+	+	+
CRS418-8P-8G-2S+	+	+	+	+	+	+	+	+	+	+
CRS520-4XS-16XQ	+	+	+	+	+	+	+	+	+	+
CRS518-16XS-2XQ	+	+	+	+	+	+	+	+	+	+
CRS510-8XS-2XQ	+	+	+	+	+	+	+	+	+	+
CSS/CRS326-24G-2S+	+	+	+	+	+	+	+	+	+	+
CRS317-1G-16S+	+	+	+	+	+	+	+	+	+	+
CRS328-4C-20S-4S+	+	+	+	+	+	+	+	+	+	+
CRS328-24P-4S+	+	+	+	+	+	+	+	+	+	+
CRS226-24G-2S+	-	+ 2	+ 2	+ 2	+ 2	+ 2	+	+	+	+
CRS212-1G-10S-1S+	+ 1	+ 1	+ 1	+ 1	+ 1	+ 1	+	+	+	+
CRS210-8G-2S+	-	+ 2	+ 2	+ 2	+ 2	+ 2	+	+	+	+
CRS112-8G/P-4S	+	+	+	+	+	+	+	+	+	+
CRS109-8G-1S	+	+	+	+	+	+	+	+	+	+
CRS106-1C-5S/FiberBox	+	+	+	+	+	+	+	+	+	+
RB5009	+	+	+	+	+	+	+	+	+	+
RB4011	+	+	+	+	+	+	+	+	+	+
RB3011	+	+	+	+	+	+	+	+	+	+
RB2011	+	+	+	+	+	+	+	+	+	+
L009	+	+	+	+	+	+	+	+ 14	+ 14	+ 14
RB260/CSS106	+	+	+	+	+	+	+	+	+	+
RB922/921	+	+	+	+	+	+	+	+	+	+
RB953GS	+	+	+	+	+	+	+	+	+	+
hAP AC	+	+	+	+	+	+	+	+	+	+
hEX PoE/PowerBox Pro	+	+	+	+	+	+	+	+	+	+
hEX S	+	+	+	+	+	+	+	+	+	+
RBFTC11	+	+ 8	+ 8	+ 8	+ 8	+ 8	+ 8	+ 8	+ 8	+ 8
FTC11XG	+	+	+	+	+	+	+	+	+	+
FTC21	+	+	+	+	+	+	+	+ 14	+ 14	+ 14
LHG XL 52 ac	-	+	+	+	+	+	+	+	+	+
RBD22/D23 mANTBox 52 15s/NetMetal ac²	-	+	+	+	+	+	+	+	+	+
L22/mANTBox ax 15s L23/NetMetal ax	+	+ 15	+ 15	+ 15	+ 15	+ 15	+ 15	+ 14	+ 14	+ 14
GPEN21	+	+	+	+	+	+	+	+	+	+
CSS610	+	+	+	+	+	+	+	+	+	+
CRS310-1G-5S-4S+/netFiber 9	+	+	+	+	+	+	+	+	+	+
CRS310-8G+2S+IN	+	+	+	+	+	+	+	+	+	+

10G SFP+/25G SFP28

Model	S+RJ10	S+85DLC03D	S+31DLC10D	S+2332LC10D	SFP+ CWDM	SFP+ 1m/3m DAC	S+AO0005 AOC	Q+BC0003-S+	XQ+BC0003-XS+	SFP28 1m/3m DAC	SFP28 XS+31LC10D	SFP28 XS+2733LC15D	SFP28 XS+85LC01D
CCR1072-1G-8S+	+	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+
CCR1036-12G-4S	-	+	+	+	+	+	+	-	-	+	+	+	+
CCR1036-8G-2S+	+	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+
CCR1016-12S-1S+	+ 10	+	+	+	+	+	+	+ 1,5	+ 1,5	+	+	+	+
CCR1009-7G-1C	-	+	+	+	+	+	+	-	-	+	+	+	+
CCR1009-8G-1S-1S+	+ 10	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+
CCR1009-7G-1C-1S+	+	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+
CCR2004-1G-2XS-PCIe	+	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+
CCR2004-1G-12S+2XS	+ 11	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+
CCR2004-16G-2S+	+	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+
CCR2116-12G-4S+	+	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+
CCR2216-1G-12XS-2XQ	+	+	+	+	+	+	+	+	+	+	+	+	+
RDS2216-2XG-4S+4XS-2XQ	+	+	+	+	+	+	+	+	+	+	+	+	+
CRS125-24G-1S	-	+	+	+	+	+	+	-	-	+	+	+	+
CRS305-1G-4S+	+ 7	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+
CRS309-1G-8S+	+ 4	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+
CRS312-4C+8XG	+	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+
CRS318-1Fi-15Fr-2S	-	+	+	+	+	+	+	-	-	+	+	+	+
CRS318-16P-2S+	+	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+
CSS318-16G-2S+	+	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+
CRS320-8P-8B-4S+	+	+	+	+	+	+	+	+	+	+	+	+	+
CRS326-4C+20G+2Q+	+	+	+	+	+	+	+	+	+	+	+	+	+
CRS326-24S+2Q+	+ 6	+	+	+	+	+	+	+	+	+	+	+	+
CRS354-48G/P-4S+2Q+	+	+	+	+	+	+	+	+	+	+	+	+	+
CRS418-8P-8G-2S+	+	+	+	+	+	+	+	+	+	+	+	+	+
CRS520-4XS-16XQ	+	+	+	+	+	+	+	+	+	+	+	+	+
CRS518-16XS-2XQ	+	+	+	+	+	+	+	+	+	+	+	+	+
CRS510-8XS-2XQ	+	+	+	+	+	+	+	+	+	+	+	+	+
CSS/CRS326-24G-2S+	+	+	+	+	+	+	+	+ 5	+ 5	+	+ 9	+ 9	+
CRS317-1G-16S+	+ 3	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+
CRS328-4C-20S-4S+	+ 10	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+
CRS328-24P-4S+	+	+	+	+	+	+	+	+ 5	+ 5	+	+ 9	+ 9	+
CRS226-24G-2S+	+	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+
CRS212-1G-10S-1S+	+ 10	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+
CRS210-8G-2S+	+	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+
CRS112-8G/P-4S	-	+	+	+	+	+	+	-	-	+	+	+	+
CRS109-8G-1S	-	+	+	+	+	+	+	-	-	+	+	+	+
CRS106-1C-5S/FiberBox	-	+	+	+	+	+	+	-	-	+	+	+	+
RB5009	+	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+
RB4011	+	+	+	+	+	+	+	+	+	+	+	+	+
RB3011	-	+	+	+	+	+	+	-	-	+	+	+	+
RB2011	-	+	+	+	+	+	+	-	-	+	+	+	+
L009	-	+ 14	+ 14	+ 14	+ 14	+ 14	+ 14	+ 14	+ 14	+ 14	+ 14	+ 14	+ 14
RB260/CSS106	-	+	+	+	+	+	+	-	-	+	+	+	+
RB922/921	-	+	+	+	+	+	+	-	-	+	+	+	+
RB953GS	-	+	+	+	+	+	+	-	-	+	+	+	+
hAP AC	-	+	+	+	+	+	+	-	-	+	+	+	+
hEX PoE/PowerBox Pro	-	+	+	+	+	+	+	-	-	+	+	+	+
hEX S	-	+	+	+	+	+	+	-	-	+	+	+	+
RBFTC11	-	+ 8	+ 8	+ 8	+ 8	+ 8	+ 8	-	-	+ 8	+ 8	+ 8	+ 8
FTC11XG	+	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+

FTC21	-	+ 14	+ 14	+ 14	+ 14	+ 14	+ 14	+ 14	+ 14	+ 14	+ 14	+ 14	+ 14
LHG XL 52 ac	-	+	+	+	+	+	+	-	-	+	+	+	+
RBD22/D23 mANTBox 52 15s /NetMetal ac²	-	+	+	+	+	+	+	-	-	+	+	+	+
L22/mANTBox ax 15s L23/NetMetal ax	-	+ 14	+ 14	+ 14	+ 14	+ 14	+ 14	+ 14	+ 14	+ 14	+ 14	+ 14	+ 14
CSS610	+	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+
CRS310-1G-5S-4S+ /netFiber 9	+ 10	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+
CRS310-8G+2S+IN	+	+	+	+	+	+	+	+ 5	+ 5	+	+	+	+

40G QSFP+

Model	QSFP+ Q+DA0001	Q+85MP01D	Q+BC0003-S+
CRS326-4C+20G+2Q+	+	+	+
CRS326-24S+2Q+	+	+	+
CRS354-48G/P-4S+2Q+	+	+	+
CRS504-4XQ-IN	+	+	+
CRS504-4XQ-OUT	+13	+	+13
CRS510-8XS-2XQ	+	+	+
CRS518-16XS-2XQ	+	+	+
CRS520-4XS-16XQ	+	+	+
CCR2216-1G-12XS-2XQ	+	+	+
RDS2216-2XG-4S+4XS-2XQ	+	+	+

100G QSFP28

Model	XQ+31LC10D	XQ+31LC02D	XQ+85MP01D	XQ+DA0001	XQ+DA0003	XQ+BC0003-XS+	XQ+CM0000-XS+
CRS326-4C+20G+2Q+	-	-	+	+	+	+	+
CRS326-24S+2Q+	-	-	+	+	+	+	+
CRS354-48G/P-4S+2Q+	-	-	+	+	+	+	+
CRS504-4XQ-IN	+	+	+	+	+	+	+
CRS504-4XQ-OUT	+	+	+	+13	+13	+13	+
CRS510-8XS-2XQ	+	+	+	+	+	+	+
CRS518-16XS-2XQ	+	+	+	+	+	+	+
CRS520-4XS-16XQ	+	+	+	+	+	+	+
CCR2216-1G-12XS-2XQ	+	+	+	+	+	+	+
RDS2216-2XG-4S+4XS-2XQ	+	+	+	+	+	+	+

Legend		
Color codes:	Not supported	Check notes below

Notes:

1. **CCR1016-12S-1S+**, **CRS212-1G-10S-1S+** the SFP+1 interface does not work on any other link speed than 10G (does not support 1.25 G fiber optic transceivers)
2. **CRS226-24G-2S+**, **CRS210-8G-2S+** - the SFP+1 interface also supports SFP 1.25G fiber optic transceivers, SFP+2 works only with 10G transceivers/links.
3. **CSS/CRS317-1G-16S+** - power controller supports up to 10 simultaneous S+RJ10 modules.
4. **CSS/CRS309-1G-8S+** - supports up to 4 simultaneous S+RJ10 modules. We do not recommend using S+RJ10 in passive cooling devices without additional cooling, as they have relatively high power consumption and in turn high operating temperature.
5. **Q+BC0003-S+**, **XQ+BC0003-XS+** - SFP+ connector support in the SFP+/SFP28 cages
6. **CSS/CRS326-24S+2Q+** - supports up to 12 simultaneous S+RJ10 modules
7. **CSS/CRS305-1G-4S+** - supports up to 2 simultaneous S+RJ10 modules.
8. **RBFTC11** - works connected to other device 1G SFP port.
9. **XS+31LC10D**, **XS+2733LC15D** - full support has been added to CSS/CRS326-24G-2S+ and CRS328-24P-4S+ switches manufactured from October 2021.
10. **S+RJ10** - support in the SFP+ cages.
11. **CCR2004-1G-12S+2XS** - supports up to 6 simultaneous S+RJ10 modules.
12. **CCR2004-1G-2XS-PCIe** - supports only the same speed in both SFP28 ports (2 x 25G or 2 x 10G modes).
13. **CRS504-4XQ-OUT** - reduce IP code from IP66 to IP54.
14. **L009, L22/mANTBox ax 15s, L23/NetMetal ax, FTC21** - supports up to 2.5G rate (works with forced speed setting).
15. **L22/mANTBox ax 15s, L23/NetMetal ax** - works with forced speed setting

S-RJ01

Table that states in what link rates if mounted in specific MikroTik devices S-RJ01 module will be able to work. Use these modules only with auto-negotiation enabled, forced link speeds are not supported. They will negotiate to correct duplex and highest possible rate.

Model	1000	100	10
RB5009	+	+	+
RB4011	+	+	+
RB3011	+	+	+
RB922	+	+	+
RB921	+	+	+
hAP ac	+	+	+
hEX PoE	+	+	+
hEX S	+	-	-
RB953	+/+	-/+	-/+
RB2011	+	-	-
RB260/CSS106	+	-	-
RBFTC11	+	-	-
LHG XL 52 ac	-	-	-
RBD22/D23 mANTBox 52 15s/NetMetal ac²	-	-	-
CRS106	+	+	+
CRS112	+	+	+
CRS125/CRS109	+	+	+
CRS212	+	+	+
CRS226/CRS210	-	-	-
CSS/CRS305-1G-4S+	+	+	+

CSS/CRS309-1G-8S+	+	+	+
CRS318-1Fi-15Fr-2S	+	+	+
CRS318-16P-2S+	+	+	+
CSS/CRS326-24G-2S+	+	+	+
CRS354	+	+	+
CSS/CRS328-4C-20S-4S+	+	+	+
CSS/CRS328-24P-4S+	+	+	+
CSS/CRS317-1G-16S+	+	+	+
CRS326-4C+20G+2Q+	+	+	+
CRS326-24S+2Q+	+	+	+
CSS610	+	+	+
FTC11XG	+	+	+
CRS310-1G-5S-4S+/netFiber 9	+	+	+
CRS310-8G+2S+IN	+	+	+
CCR1009	+/+	+/+	+/+
CCR1016-12S-1S+	+	+	+
CCR1036-12G-4S	+	+	+
CCR1036-8G-2S+	+	+	+
CCR1072-1G-8S+	+	+	+

Notes

- Rate works fine: **+**
- Rate does not work: **-**
- RB953: SFP1/SFP2
- CCR1009: SFP+/SFP

10 Gigabit Ethernet

S+RJ10

Use these modules **only in 10G SFP+ ports with auto-negotiation enabled**, forced link speeds and configurable link speed advertisements are not supported. They will negotiate to correct duplex and highest possible rate. For proper S+RJ10 module installation and recommended use case scenarios, please read S+RJ10 General Guidance.

Speed	Cable type	S+RJ10 to Ethernet port
10BASE-T	Cat5e/6	100m
100BASE-T	Cat5e/6	100m
1000BASE-T	Cat5e/6	100m
2.5GBASE-T	Cat5e/6 UTP	100m
2.5GBASE-T	Cat5e/6 STP	100m
5GBASE-T	Cat5e/6	100m
10GBASE-T	Cat6/7	30m

The negotiated speed is highly dependent on the quality and length of the cables used.

S+RJ10 to S+RJ10 will always negotiate to the highest possible rate.

The latest revision of S+RJ10 contains "/r2" by the end of serial number. It comes with following improvements:

- Jumbo frames up to 10218 Bytes at 2.5G, 5G and 10G speeds;
- Actual link speed reporting;
- DDM monitoring (Supply Voltage, Module temperature).

Link Speed	Max MTU
10Gbps	10218
5Gbps	10218
2.5Gbps	10218
1000Mbps	1504
100Mbps	1504
10Mbps	1504

CRS312-4C+8XG

10GE ports maximum supported cable length.

Speed	Cable type	10 Gigabit Ethernet ports
10BASE-T	Cat5e/6	100m
100BASE-T	Cat5e/6	100m
1000BASE-T	Cat5e/6	100m
2.5GBASE-T	Cat5e/6	100m
5GBASE-T	Cat5e/6	100m
10GBASE-T	Cat6/7	30m

The negotiated speed is highly dependent on the quality and length of the cables used.

10GE ports do not support half-duplex mode with forced link speeds.

SFP interface compatibility with 100M optical transceivers

SFP interface on the listed devices is compatible with fast ethernet fiber links.

Compatible devices (interface):

- CCR1009-7G-1C (combo1)
- CCR1009-7G-1C-1S+ (combo1)
- CRS106-1C-5S (combo1)
- CRS328-4C-20S-4S+ (combo1 - combo4 and SFP1 - SFP20)
- LHG XL 52 ac

- RBD22/D23/mANTBox 52 15s/NetMetal ac²

SFP+ interface compatibility with 1G optical transceivers

For MikroTik devices with SFP+ interface that support both 10G and 1G link rate, following settings must be set on both linked devices for required interfaces. These settings only relate when optical SFP transceivers are used. In order to get them working in 1G link rate, use the following configuration:

```
# Since RouterOS v7.12
/interface ethernet set sfp-sfpplus1 auto-negotiation=no speed=1G-baseX

# Older RouterOS
/interface ethernet set sfp-sfpplus1 auto-negotiation=no speed=1Gbps full-duplex=yes
```

- auto-negotiation disabled
- port speed 1G
- full-duplex

Devices which SFP+ ports support 1G links:

- CCR2004-1G-12S+2XS - All SFP+ interfaces can be used in 1G mode if required.
- CCR2004-16G-2S+ - All SFP+ interfaces can be used in 1G mode if required.
- CCR1072-1G-8S+ - All SFP+ interfaces can be used in 1G mode if required.
- CCR1036-8G-2S+ - All SFP+ interfaces can be used in 1G mode if required.
- CCR1009-8G-1S-1S+ - All SFP+ interfaces can be used in 1G mode if required.
- CCR1009-7G-1C-1S+ - All SFP+ interfaces can be used in 1G mode if required.
- CSS326-24G-2S+RM - All SFP+ interfaces can be used in 1G mode if required.
- CRS3xx series switches - All SFP+ interfaces can be used in 1G mode if required.
- RB5009 series - SFP+1 interface can be used in 1G mode if required.
- RB4011 series - SFP+1 interface can be used in 1G mode if required.
- CRS226-24G-2S+ - Only SFP+1 supports 1G link speed, SFP+2 is for 10G links only.
- CRS210-8G-2S+ - Only SFP+1 supports 1G link speed, SFP+2 is for 10G links only.
- CSS610 series switches - All SFP+ interfaces can be used in 1G mode if required.
- FTC11XG - SFP+1 interface can be used in 1G mode if required.

Devices which SFP+ interfaces can be used only for 10G links:

- CCR1016-12S-1S+
- CRS212-1G-10S-1S+

SFP+ interface compatibility with 10G/25G optical transceivers

MikroTik devices with SFP+ ports can establish 10G links using 10G/25G optical fiber transceivers, however additional SFP Rate Select setting must be configured to avoid data corruption during transmission. The following settings are required on the SFP+ interface:

```
# Since RouterOS v7.12
/interface ethernet set sfp-sfpplus1 auto-negotiation=no speed=10G-baseSR-LR sfp-rate-select=low

# Older RouterOS
/interface ethernet set sfp-sfpplus1 auto-negotiation=no speed=10Gbps full-duplex=yes sfp-rate-select=low
```

This requirement applies to MikroTik 10G/25G modules:

- XS+31LC10D
- XS+2733LC15D

SFP+/SFP28 interface compatibility with 2.5G transceivers

The 2.5G link rate support is implemented since RouterOS v7.3. MikroTik devices with SFP+ and SFP28 interfaces that support 2.5G link rate require following settings to be set on both linked device interfaces.

```
# Since RouterOS v7.12
/interface ethernet set sfp-sfpplus1 auto-negotiation=no speed=2.5G-baseX

# Older RouterOS
/interface ethernet set sfp-sfpplus1 auto-negotiation=no speed=2.5Gbps full-duplex=yes
```

- auto-negotiation disabled
- port speed 2.5G
- full-duplex

Devices which support 2.5G links in SFP/SFP+/SFP28 ports:

- CRS3xx series switches - All SFP+ interfaces can be used in 2.5G mode if required.
- CCR2004-1G-12S+2XS - All SFP+ and SFP28 interfaces can be used in 2.5G mode if required.
- CCR2116-12G-4S+ - All SFP+ interfaces can be used in 2.5G mode if required.
- CRS5xx series - All SFP28 interfaces can be used in 2.5G mode if required.
- CCR2216-1G-12XS-2XQ - All SFP28 interfaces can be used in 2.5G mode if required.
- RB5009 series - SFP+ interface can be used in 2.5G mode if required.
- L009 series - SFP interface can be used in 2.5G mode if required.
- L23 series - SFP interface can be used in 2.5G mode if required.
- CSS610 series switches - All SFP+ interfaces can be used in 2.5G mode if required.
- FTC11XG - SFP+1 interface can be used in 2.5G mode if required.

QSFP+/QSFP28 interface supported link rates

In RouterOS, QSFP+ and QSFP28 interfaces are designed to handle high-speed data transmission by utilizing multiple channels. Each QSFP+ or QSFP28 interface is divided into four sub-interfaces, each corresponding to a transmission channel necessary for proper operation.

The naming convention for QSFP+ and QSFP28 sub-interfaces includes two parts:

- The first digit following "qsfpplus" or "qsfp28-" represents the QSFP+ or QSFP28 physical interface.
- The second digit, ranging from 1 to 4, denotes each of the individual channels.

Below are examples of how QSFP+ and QSFP28 interfaces appear in RouterOS:

```
# QSFP+
/interface ethernet print
Flags: R - RUNNING
Columns: NAME, MTU, MAC-ADDRESS, ARP, SWITCH
 #   NAME            MTU  MAC-ADDRESS        ARP      SWITCH
 1   qsfpplus1-1    1500  48:8F:5A:B6:09:8C  enabled  switch1
 2   qsfpplus1-2    1500  48:8F:5A:B6:09:8D  enabled  switch1
 3   qsfpplus1-3    1500  48:8F:5A:B6:09:8E  enabled  switch1
 4   qsfpplus1-4    1500  48:8F:5A:B6:09:8F  enabled  switch1

# QSFP28
/interface ethernet print
Flags: R - RUNNING
Columns: NAME, MTU, MAC-ADDRESS, ARP, SWITCH
 #   NAME         MTU  MAC-ADDRESS        ARP      SWITCH
 1   qsfp28-1-1  1500  DC:2C:6E:9E:11:14  enabled  switch1
 2   qsfp28-1-2  1500  DC:2C:6E:9E:11:15  enabled  switch1
 3   qsfp28-1-3  1500  DC:2C:6E:9E:11:16  enabled  switch1
 4   qsfp28-1-4  1500  DC:2C:6E:9E:11:17  enabled  switch1
```

Configuration and monitoring for these sub-interfaces may vary based on factors such as auto-negotiation, advertised speeds, and the type of transceiver (e.g., break-out cable or single fiber). The following sections will provide guidance on the configuration necessary for each use case.

Disabling or enabling any of the four sub-interfaces will trigger a reconfiguration of the entire port group, restarting all four channels.

QSFP+

For MikroTik CRS3xx series devices, QSFP+ interfaces support the following link speeds:

- 1x 40G
- 4x 10G
- 4x 1G

Link Configuration:

- **40G**: Can be configured with either auto-negotiation or a forced 40G speed.
- **4x10G and 4x1G**: Must be set with a forced speed mode and auto-negotiation disabled.

Starting from RouterOS version 7.12, in addition to choosing the right transmission rate, it's important to specify the correct link mode. For example, you might use **CR4** for DAC(Direct Attach Copper) or **SR4-LR4** for optical fiber.

Configuration Examples:

For RouterOS v7.12 and later:

```
# 1x40G - DAC
/interface ethernet set qsfpplus1-1 auto-negotiation=no speed=40G-baseCR4

# 1x40G - Optical
/interface ethernet set qsfpplus1-1 auto-negotiation=no speed=40G-baseSR4-LR4

# 4x10G - DAC
/interface ethernet set qsfpplus1-1 auto-negotiation=no speed=10G-baseCR
/interface ethernet set qsfpplus1-2 auto-negotiation=no speed=10G-baseCR
/interface ethernet set qsfpplus1-3 auto-negotiation=no speed=10G-baseCR
/interface ethernet set qsfpplus1-4 auto-negotiation=no speed=10G-baseCR

# 4x10G - Optical
/interface ethernet set qsfpplus1-1 auto-negotiation=no speed=10G-baseSR-LR
/interface ethernet set qsfpplus1-2 auto-negotiation=no speed=10G-baseSR-LR
/interface ethernet set qsfpplus1-3 auto-negotiation=no speed=10G-baseSR-LR
/interface ethernet set qsfpplus1-4 auto-negotiation=no speed=10G-baseSR-LR
```

⚠ In single-link mode, only the first QSFP+ sub-interface needs to be configured, while the remaining sub-interfaces should remain enabled.

For RouterOS versions earlier than v7.12:

```
# 1x40G - DAC/Optical
/interface ethernet set qsfpplus1-1 auto-negotiation=no speed=40Gbps full-duplex=yes

# 4x10G - DAC/Optical
/interface ethernet set qsfpplus1-1 auto-negotiation=no speed=10Gbps full-duplex=yes
/interface ethernet set qsfpplus1-2 auto-negotiation=no speed=10Gbps full-duplex=yes
/interface ethernet set qsfpplus1-3 auto-negotiation=no speed=10Gbps full-duplex=yes
/interface ethernet set qsfpplus1-4 auto-negotiation=no speed=10Gbps full-duplex=yes
```

QSFP28

For MikroTik CRS5xx series and CCR2216 devices, QSFP28 interfaces support the following link speeds:

- 1x 100G
- 2x 50G (available since RouterOS v7.12)
- 1x 40G
- 4x 25G
- 4x 10G
- 4x 1G

⚠ Not supported: 50G over single channel, 2x 40G

Link Configuration:

- **100G**: Can be configured with either auto-negotiation or a forced 100G speed.
- **2x50G, 1x40G, 4x25G, 4x10G, and 4x1G**: Must be set with a forced speed mode and auto-negotiation disabled.

Starting from RouterOS version 7.12, in addition to choosing the right transmission rate, it's important to specify the correct link mode. For example, you might use **CR4** for DAC(Direct Attach Copper) or **SR4-LR4** for optical fiber.

Configuration Examples:

For RouterOS v7.12 and later:

```
# 1x100G - DAC
/interface ethernet set qsfp28-1-1 auto-negotiation=no speed=100G-baseCR4

# 1x100G - Optical
/interface ethernet set qsfp28-2-1 auto-negotiation=no speed=100G-baseSR4-LR4

# 2x50G - DAC
/interface ethernet set qsfp28-1-1 auto-negotiation=no speed=50G-baseCR2
/interface ethernet set qsfp28-1-3 auto-negotiation=no speed=50G-baseCR2

# 2x50G - Optical
/interface ethernet set qsfp28-1-1 auto-negotiation=no speed=50G-baseSR2-LR2
/interface ethernet set qsfp28-1-3 auto-negotiation=no speed=50G-baseSR2-LR2

# 4x25G - DAC
/interface ethernet set qsfp28-1-1 auto-negotiation=no speed=25G-baseCR
/interface ethernet set qsfp28-1-2 auto-negotiation=no speed=25G-baseCR
/interface ethernet set qsfp28-1-3 auto-negotiation=no speed=25G-baseCR
/interface ethernet set qsfp28-1-4 auto-negotiation=no speed=25G-baseCR

# 4x25G - Optical
/interface ethernet set qsfp28-1-1 auto-negotiation=no speed=25G-baseSR-LR
/interface ethernet set qsfp28-1-2 auto-negotiation=no speed=25G-baseSR-LR
/interface ethernet set qsfp28-1-3 auto-negotiation=no speed=25G-baseSR-LR
/interface ethernet set qsfp28-1-4 auto-negotiation=no speed=25G-baseSR-LR
```

⚠ In single-link mode, only the first QSFP28 sub-interface needs to be configured, while the remaining sub-interfaces should remain enabled. Similarly, for 2x50G link mode, only the master interfaces (e.g., qsfp28-1-1 and qsfp28-1-3) need to be configured, but the other sub-interfaces must remain enabled.

For RouterOS versions earlier than v7.12:

```
# 1x100G - DAC/Optical
/interface ethernet set qsfp28-1-1 auto-negotiation=no speed=100Gbps full-duplex=yes

# 4x25G - DAC/Optical
/interface ethernet set qsfp28-1-1 auto-negotiation=no speed=25Gbps full-duplex=yes
/interface ethernet set qsfp28-1-2 auto-negotiation=no speed=25Gbps full-duplex=yes
/interface ethernet set qsfp28-1-3 auto-negotiation=no speed=25Gbps full-duplex=yes
/interface ethernet set qsfp28-1-4 auto-negotiation=no speed=25Gbps full-duplex=yes
```

QSFP+/QSFP28 interface compatibility with breakout cables

MikroTik devices can establish links between QSFP+/QSFP28 and SFP+/SFP28 ports using breakout cables.

Configuration Examples:

For RouterOS v7.12 and later:

```
# QSFP+ - DAC
/interface ethernet set qsfpplus1-1 auto-negotiation=no speed=10G-baseCR
/interface ethernet set qsfpplus1-2 auto-negotiation=no speed=10G-baseCR
/interface ethernet set qsfpplus1-3 auto-negotiation=no speed=10G-baseCR
/interface ethernet set qsfpplus1-4 auto-negotiation=no speed=10G-baseCR

# QSFP+ - Optical
/interface ethernet set qsfpplus1-1 auto-negotiation=no speed=10G-baseSR-LR
/interface ethernet set qsfpplus1-2 auto-negotiation=no speed=10G-baseSR-LR
/interface ethernet set qsfpplus1-3 auto-negotiation=no speed=10G-baseSR-LR
/interface ethernet set qsfpplus1-4 auto-negotiation=no speed=10G-baseSR-LR

# QSFP28 - DAC
/interface ethernet set qsfp28-1-1 auto-negotiation=no speed=25G-baseCR
/interface ethernet set qsfp28-1-2 auto-negotiation=no speed=25G-baseCR
/interface ethernet set qsfp28-1-3 auto-negotiation=no speed=25G-baseCR
/interface ethernet set qsfp28-1-4 auto-negotiation=no speed=25G-baseCR

# QSFP28 - Optical
/interface ethernet set qsfp28-1-1 auto-negotiation=no speed=25G-baseSR-LR
/interface ethernet set qsfp28-1-2 auto-negotiation=no speed=25G-baseSR-LR
/interface ethernet set qsfp28-1-3 auto-negotiation=no speed=25G-baseSR-LR
/interface ethernet set qsfp28-1-4 auto-negotiation=no speed=25G-baseSR-LR
```

It is also possible to use QSFP28 to 2x50G QSFP28 Breakout Cables:

```
# 2x50G - DAC
/interface ethernet set qsfp28-1-1 auto-negotiation=no speed=50G-baseCR2
/interface ethernet set qsfp28-1-3 auto-negotiation=no speed=50G-baseCR2

# 2x50G - Optical
/interface ethernet set qsfp28-1-1 auto-negotiation=no speed=50G-baseSR2-LR2
/interface ethernet set qsfp28-1-3 auto-negotiation=no speed=50G-baseSR2-LR2
```

Or to configure different speed rates for each QSFP+/QSFP28 sub-interfaces:

```
# QSFP28 - DAC
/interface ethernet set qsfp28-1-1 auto-negotiation=no speed=25G-baseCR
/interface ethernet set qsfp28-1-2 auto-negotiation=no speed=25G-baseCR
/interface ethernet set qsfp28-1-3 auto-negotiation=no speed=10G-baseCR
/interface ethernet set qsfp28-1-4 auto-negotiation=no speed=10G-baseCR

# QSFP28 - Optical
/interface ethernet set qsfp28-1-1 auto-negotiation=no speed=25G-baseSR-LR
/interface ethernet set qsfp28-1-2 auto-negotiation=no speed=25G-baseSR-LR
/interface ethernet set qsfp28-1-3 auto-negotiation=no speed=10G-baseSR-LR
/interface ethernet set qsfp28-1-4 auto-negotiation=no speed=10G-baseSR-LR
```

For RouterOS versions earlier than v7.12:

```
# QSFP+ - DAC/Optical
/interface ethernet set qsfpplus1-1 auto-negotiation=no speed=10Gbps full-duplex=yes
/interface ethernet set qsfpplus1-2 auto-negotiation=no speed=10Gbps full-duplex=yes
/interface ethernet set qsfpplus1-3 auto-negotiation=no speed=10Gbps full-duplex=yes
/interface ethernet set qsfpplus1-4 auto-negotiation=no speed=10Gbps full-duplex=yes

# QSFP28 - DAC/Optical
/interface ethernet set qsfp28-1-1 auto-negotiation=no speed=25Gbps full-duplex=yes
/interface ethernet set qsfp28-1-2 auto-negotiation=no speed=25Gbps full-duplex=yes
/interface ethernet set qsfp28-1-3 auto-negotiation=no speed=25Gbps full-duplex=yes
/interface ethernet set qsfp28-1-4 auto-negotiation=no speed=25Gbps full-duplex=yes
```