

PLANET Fiber Transceiver
MFB-Series/MGB-Series/MTB-Series

User's Manual

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FCC NOTICE (Class B)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause un-desired operation.

CE Mark Warning

Operation of this equipment in a residential environment could cause radio interference.

WEEE Warning



To avoid the potential effects on the environment and human health as a result of the presence of hazardous substances in electrical and electronic equipment, end users of electrical and electronic equipment should understand the meaning of the crossed-out wheeled bin symbol. Do not dispose of WEEE as unsorted municipal waste and have to collect such WEEE separately.

Revision

User's Manual of PLANET SFP/SFP+ Mini-GBIC Transceiver

For Models: MFB-SERIES/MGB-SERIES/MTB-SERIES

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1. Overview

Thank you for purchasing PLANET SFP/SFP+ Mini-GBIC Transceiver which includes the Ethernet module of the MFB, MGB and MTB families.

The MFB family's Fast Ethernet SFP module can be installed into PLANET Switch products with 100BASE-FX SFP interface. The distance can be extended from 2km (multi-mode, LC) to up to 120km (single-mode, LC).

The MGB family's Gigabit Ethernet SFP module can be installed into PLANET Switch products with 1000BASE-SX/LX and 2500BASE-X SFP interface. The distance can be extended from 100m (TP) and 2km (multi-mode/single-mode, LC) to up to 120km (single-mode, LC).

The MTB family's 10G Ethernet SFP+ module can be installed into PLANET products with 10G SFP+ interface. The SFP+ transceivers can be extended from a distance of 300m (multi-mode, LC) to up to 80km (single-mode, LC). The deployment distance of 10G can be extended to 30 meters

2. Checklist

Your SFP/SFP+ Package should contain the following items:

- The SFP/SFP+ Transceiver Module x 1
- The User's Manual x 1

If any item is missing or damaged, please consult the dealer from whom you purchased your SFP/SFP+ Mini-GBIC Ethernet transceiver module.

3. Introduction and Model List

3-1 The MFB-Series Mini-GBIC Transceiver Module List

Fast Ethernet Transceiver (100BASE-X SFP)

Model	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (nm)	Operating Temp.
MFB-FX	100	LC	Multi-Mode	2km	1310nm	0 ~ 60°C
MFB-F20	100	LC	Single Mode	20km	1310nm	0 ~ 60°C
MFB-F40	100	LC	Single Mode	40km	1310nm	0 ~ 60°C
MFB-F60	100	LC	Single Mode	60km	1310nm	0 ~ 60°C
MFB-F120	100	LC	Single Mode	120km	1550nm	0 ~ 60°C
MFB-TFX	100	LC	Multi-Mode	2km	1310nm	-40 ~ 85°C
MFB-TF20	100	LC	Single Mode	20km	1310nm	-40 ~ 85°C

Fast Ethernet Transceiver (100BASE-BX, Single Fiber Bi-directional SFP)

Model	DDM	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (TX)	Wavelength (RX)	Operating Temp.
MFB-FA20	--	100	WDM (LC)	Single Mode	20km	1310nm	1550nm	0 ~ 60°C
MFB-FB20	--	100	WDM (LC)	Single Mode	20km	1550nm	1310nm	0 ~ 60°C
MFB-TFA20	--	100	WDM (LC)	Single Mode	20km	1310nm	1550nm	-40~85°C
MFB-TFB20	--	100	WDM (LC)	Single Mode	20km	1550nm	1310nm	-40~85°C
MFB-TFA40	--	100	WDM (LC)	Single Mode	40km	1310nm	1550nm	-40~85°C
MFB-TFB40	--	100	WDM (LC)	Single Mode	40km	1550nm	1310nm	-40~85°C
MFB-TSA	YES	100	WDM (LC)	Multi-Mode	2km	1310nm	1550nm	-40~85°C
MFB-TSB	YES	100	WDM (LC)	Multi-Mode	2km	1550nm	1310nm	-40~85°C



1. When shorter single mode fiber cables are used, you might need to insert an in-line optical attenuator in the link to avoid overloading the receiver. Follow the I-TUT G652 document for the same fiber cable length.
2. The attenuation coefficient mentioned in the following chapters is for reference only.

Attenuation coefficient	Wavelength region	Typical link value
	1260nm-1360nm	0.5 dB/km
1530nm-1565nm	0.4 dB/km	

Physical Fiber Cable Length "n" km \ SFP Model	MFB-F20 MFB-TF20	MFB-F40	MFB-F60	MFB-F120
10 < n < 20	2 dB	4-6 dB	8-10 dB	25-27 dB
20 < n < 40	--	2-4 dB	6-8 dB	23-25 dB
40 < n < 60	--	--	2-4 dB	18-20 dB

Physical Fiber Cable Length "n" km \ SFP Model	MFB-TSA MFB-TSB	MFB-TFA10 MFB-TFB10	MFB-FA20 / MFB-FB20 MFB-TFA20 / MFB-TFB20	MFB-TFA40 MFB-TFB40
0.22 < n < 2	1 dB	--	--	--
10 < n < 20	--	--	2 dB	4-6 dB
20 < n < 40	--	--	--	2-4 dB
40 < n < 60	--	--	--	--

3-2 The MGB-Series Mini-GBIC Transceiver Module List

Gigabit Ethernet Transceiver (1000BASE-X SFP)

Model	DDM	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (nm)	Operating Temp.
MGB-GT	--	1000	Copper	--	100m	--	0 ~ 60°C
MGB-SX(V2)	YES	1000	LC	Multi Mode	550m	850nm	0 ~ 60°C
MGB-SX2(V2)	YES	1000	LC	Multi Mode	2km	1310nm	0 ~ 60°C
MGB-LX(V2)	YES	1000	LC	Single Mode	20km	1310nm	0 ~ 60°C
MGB-L40	YES	1000	LC	Single Mode	40km	1310nm	0 ~ 60°C
MGB-L80	YES	1000	LC	Single Mode	80km	1550nm	0 ~ 60°C
MGB-L120(V2)	YES	1000	LC	Single Mode	120km	1550nm	0 ~ 60°C

MGB-TGT	--	1000	Copper	--	100m	--	-40 ~ 85°C
MGB-TSX	YES	1000	LC	Multi Mode	550m	850nm	-40 ~ 85°C
MGB-TSX2	YES	1000	LC	Multi Mode	2km	1310nm	-40 ~ 85°C
MGB-TLX(V2)	YES	1000	LC	Single Mode	20km	1310nm	-40 ~ 85°C
MGB-TL30	YES	1000	LC	Single Mode	30km	1310nm	-40 ~ 85°C
MGB-TL40	YES	1000	LC	Single Mode	40km	1310nm	-40 ~ 85°C
MGB-TL70	YES	1000	LC	Single Mode	70km	1550nm	-40 ~ 85°C
MGB-TL80	YES	1000	LC	Single Mode	80km	1550nm	-40 ~ 85°C

Gigabit Ethernet Transceiver (1000BASE-BX, Single Fiber Bi-directional SFP)

Model	DDM	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (TX)	Wavelength (RX)	Operating Temp.
MGB-LA10(V2) MGB-LB10(V2)	YES	1000	WDM (LC)	Single Mode	10km	1310nm	1550nm	0 ~ 60°C
		1000	WDM (LC)	Single Mode	10km	1550nm	1310nm	0 ~ 60°C
MGB-LA20(V2) MGB-LB20(V2)	YES	1000	WDM (LC)	Single Mode	20km	1310nm	1550nm	0 ~ 60°C
		1000	WDM (LC)	Single Mode	20km	1550nm	1310nm	0 ~ 60°C
MGB-LA40(V2) MGB-LB40(V2)	YES	1000	WDM (LC)	Single Mode	40km	1310nm	1550nm	0 ~ 60°C
		1000	WDM (LC)	Single Mode	40km	1550nm	1310nm	0 ~ 60°C
MGB-LA80 MGB-LB80	YES	1000	WDM (LC)	Single Mode	80km	1490nm	1550nm	0 ~ 60°C
		1000	WDM (LC)	Single Mode	80km	1550nm	1490nm	0 ~ 60°C

MGB-TSA MGB-TSB	YES	1000	WDM (LC)	Single Mode	2km	1310nm	1550nm	-40 ~ 85°C
		1000	WDM (LC)	Single Mode	2km	1550nm	1310nm	-40 ~ 85°C
MGB-TLA10(V2) MGB-TLB10(V2)	YES	1000	WDM (LC)	Single Mode	10km	1310nm	1550nm	-40 ~ 85°C
		1000	WDM (LC)	Single Mode	10km	1550nm	1310nm	-40 ~ 85°C
MGB-TLA20 MGB-TLB20	YES	1000	WDM (LC)	Single Mode	20km	1310nm	1550nm	-40 ~ 85°C
		1000	WDM (LC)	Single Mode	20km	1550nm	1310nm	-40 ~ 85°C
MGB-TLA40 MGB-TLB40	YES	1000	WDM (LC)	Single Mode	40km	1310nm	1550nm	-40 ~ 85°C
		1000	WDM (LC)	Single Mode	40km	1550nm	1310nm	-40 ~ 85°C
MGB-TLA60 MGB-TLB60	YES	1000	WDM(LC)	Single Mode	60km	1310nm	1550nm	-40 ~ 85°C
		1000	WDM(LC)	Single Mode	60km	1550nm	1310nm	-40 ~ 85°C

MGB-TLA80 MGB-TLB80	YES	1000	WDM (LC)	Single Mode	80km	1490nm	1550nm	-40 ~ 85°C
		1000	WDM (LC)	Single Mode	80km	1550nm	1490nm	-40 ~ 85°C
MGB-TLA120 MGB-TLB120	YES	1000	WDM(LC)	Single Mode	120km	1490nm	1550nm	-40 ~ 85°C
		1000	WDM(LC)	Single Mode	120km	1550nm	1490nm	-40 ~ 85°C

Gigabit Ethernet Transceiver (2500BASE-X SFP)

Model	DDM	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (nm)	Operating Temp.
MGB-2GTSR	YES	2500	LC	Multi Mode	300m	850nm	-40 ~ 85°C
MGB-2GTLR2	YES	2500	LC	Single Mode	2km	1310nm	-40 ~ 85°C
MGB-2GTLR20	YES	2500	LC	Single Mode	20km	1310nm	-40 ~ 85°C

Gigabit Ethernet Transceiver (1000BASE-BX, Single Fiber Bi-directional SFP)

Model	DDM	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (TX)	Wavelength (RX)	Operating Temp.
MGB-2GTLA20	YES	2500	WDM(LC)	Single Mode	20km	1310nm	1550nm	-40 ~ 85°C
MGB-2GTLB20		2500	WDM(LC)	Single Mode	20km	1550nm	1310nm	-40 ~ 85°C

Physical Fiber Cable Length "n" km	SFP Model	MGB-LX	MGB-L40	MGB-L80	MGB-L120
	10 < n < 20		--	5-7 dB	13-15 dB
20 < n < 40		--	3-5 dB	10-12 dB	23-25 dB
40 < n < 60		--	--	5-7 dB	18-20 dB

Physical Fiber Cable Length "n" km \ SFP Model	MGB-TLX	MGB-TL40	MGB-TL80
10 < n < 20	--	5-7 dB	13-15 dB
20 < n < 40	--	3-5 dB	10-12 dB
60 < n < 80	--	--	5-7 dB

Physical Fiber Cable Length "n" km \ SFP Model	MGB-LA10 MGB-LB10 MGB-TLA10 MGB-TLB10	MGB-LA20 MGB-LB20 MGB-TLA20 MGB-TLB20	MGB-LA40 MGB-LB40 MGB-TLA40 MGB-TLB40	MGB-LA60 MGB-LB60 MGB-TLA60 MGB-TLB60	MGB-LA80 MGB-LB80 MGB-TLA80 MGB-TLB80
10 < n < 20	--	2 dB	4-6 dB	8-10 dB	13-15 dB
20 < n < 40	--	--	2-4 dB	6-8 dB	10-12 dB
40 < n < 60	--	--	--	2-4 dB	5-7 dB
60 < n < 80	--	--	--	--	2-4 dB

3-3 The MTB-Series Mini-GBIC Transceiver Module List

10Gbps SFP+ (10G Ethernet/10GBASE)

Model	DDM	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (nm)	Operating Temp.
MTB-RJ	--	10G	Copper	--	30m	--	0 ~ 70°C
MTB-SR	YES	10G	LC	Multi-Mode	Up to 300m	850nm	0 ~ 60°C
MTB-SR2	YES	10G	LC	Multi-Mode	2km	850nm	0 ~ 60°C
MTB-LR	YES	10G	LC	Single Mode	10km	1310nm	0 ~ 60°C
MTB-LR20	YES	10G	LC	Single Mode	20km	1310nm	0 ~ 60°C
MTB-LR40	YES	10G	LC	Single Mode	40km	1310nm	0 ~ 60°C
MTB-LR60	YES	10G	LC	Single Mode	60km	1550nm	0 ~ 60°C

MTB-LR80	YES	10G	LC	Single Mode	80km	1550nm	0 ~ 60°C
MTB-TSR	YES	10G	LC	Multi-Mode	Up to 300m	850nm	-40 ~ 85°C
MTB-TSR2	YES	10G	LC	Multi-Mode	2km	1310nm	-40 ~ 85°C
MTB-TLR	YES	10G	LC	Single Mode	10km	1310nm	-40 ~ 85°C
MTB-TLR20	YES	10G	LC	Single Mode	20km	1310nm	-40 ~ 85°C
MTB-TLR40	YES	10G	LC	Single Mode	40km	1310nm	-40 ~ 85°C
MTB-TLR60	YES	10G	LC	Single Mode	60km	1550nm	-40 ~ 85°C
MTB-TLR80	YES	10G	LC	Single Mode	80km	1550nm	-40 ~ 85°C

10Gigabit Ethernet Transceiver (10GBASE-BX, Single Fiber Bi-directional SFP)

Model	DDM	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (TX)	Wavelength (RX)	Operating Temp.
MTB-LA10 MTB-LB10	YES	10G	WDM(LC)	Single Mode	10km	1270nm	1330nm	0 ~ 60°C
		10G	WDM(LC)	Single Mode	10km	1330nm	1270nm	0 ~ 60°C
MTB-LA20 MTB-LB20	YES	10G	WDM (LC)	Single Mode	20km	1270nm	1330nm	0 ~ 60°C
		10G	WDM (LC)	Single Mode	20km	1330nm	1270nm	0 ~ 60°C
MTB-LA40 MTB-LB40	YES	10G	WDM (LC)	Single Mode	40km	1270nm	1330nm	0 ~ 60°C
		10G	WDM (LC)	Single Mode	40km	1330nm	1270nm	0 ~ 60°C
MTB-LA60 MTB-LB60	YES	10G	WDM (LC)	Single Mode	60km	1270nm	1330nm	0 ~ 60°C
		10G	WDM (LC)	Single Mode	60km	1330nm	1270nm	0 ~ 60°C

MTB-LA70 MTB-LB70	YES	10G	WDM(LC)	Single Mode	70km	1270nm	1330nm	0 ~ 60°C
		10G	WDM(LC)	Single Mode	70km	1330nm	1270nm	0 ~ 60°C
MTB-TLA20 MTB-TLB20	YES	10G	WDM(LC)	Single Mode	20km	1270nm	1330nm	-40 ~ 85°C
		10G	WDM(LC)	Single Mode	20km	1330nm	1270nm	-40 ~ 85°C
MTB-TLA40 MTB-TLB40	YES	10G	WDM(LC)	Single Mode	40km	1270nm	1330nm	-40 ~ 85°C
		10G	WDM(LC)	Single Mode	40km	1330nm	1270nm	-40 ~ 85°C
MTB-TLA60 MTB-TLB60	YES	10G	WDM(LC)	Single Mode	60km	1270nm	1330nm	-40 ~ 85°C
		10G	WDM(LC)	Single Mode	60km	1330nm	1270nm	-40 ~ 85°C

Physical Fiber Cable Length "n" km	SFP Model	MTB-LA20 MTB-LB20	MTB-LA40 MTB-LB40	MTB-LA60 MTB-LB60
	10 < n < 20		2 dB	4-6 dB
20 < n < 40		--	2-4 dB	6-8 dB
40 < n < 60		--	--	2-4 dB

4. Installation and Removal of Transceiver Module

4-1 Installing the SFP/SFP+ Mini-GBIC Transceiver Module

Please follow these steps to install the SFP/SFP+ Mini-GBIC module:

1. Power on the Switch and place the Switch on a flat surface. Install the new SFP/SFP+ Mini-GBIC module by inserting it into the slot and sliding it in until it stops (See **Figure 1**). Press it firmly until you hear the module snap into place. Never force, twist or bend the SFP/SFP+ Mini-GBIC module. The SFP/SFP+ Mini-GBIC module slides in smoothly and the Switch will automatically detect the new module.

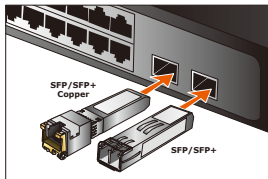


Figure 1: Inserting the SFP/SFP+ Mini-GBIC Module

2. After the TP/Fiber connection is made successfully, check the LEDs to verify that if there is a link and a proper connection at the port.

Please refer to the user's manual for more about the Switch or module's management.

4-2 Removing the SFP/SFP+ Transceiver Module

1. Make sure there is no network activity by consulting or checking with the network administrator.
2. Remove the Fiber Optic Cable gently (See **Figure 2**).
3. Turn the handle of the SFP/SFP+ Transceiver module to the horizontal level.
4. Pull out the SFP/SFP+ Transceiver module gently through the handle.

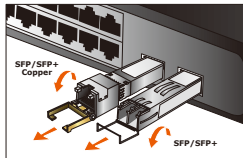


Figure 2: Removing the SFP/SFP+ Mini-GBIC Module



Warning

Never pull out the SFP/SFP+ Transceiver module without pulling the handle or the push bolts on the module. Directly pulling out the SFP/SFP+ Transceiver module would damage the SFP/SFP+ Transceiver module of the device.

4-3 Connecting the UTP Cable

The 1G/2.5G/5G/10GBASE-T port uses RJ45 socket -- similar to phone jack -- for connection of unshielded twisted-pair cable (UTP). The 802.3ab/802.3bz/802.3ae Ethernet standard requires Category 5 UTP for 100Mbps 100BASE-TX. 1G/2.5G/5G/10GBASE-T uses Cat5e/6/7 UTP (see table below). Maximum distance is 100 meters (328 feet).

Standard	Transfer Speed	Cable Requirement 100M
10GBASE-T	10000Mbit/s	Cat 6A/7
5GBASE-T	5000Mbit/s	Cat 6/6A/7
2.5GBASE-T	2500Mbit/s	Cat 5e/6/6A/7
1000BASE-T	1000Mbit/s	Cat 5e/6/6A/7



Note

Be sure the connected network devices support MDI/MDI-X. If it does not support, then use the crossover Category 5e cable.

Appendix A

A.1 Fiber Optic Cable Connection Parameters

The wiring details are shown below:

■ **Fiber Optic Patch Cables:**

Standard	Fiber Type	Cable Specifications
100BASE-FX	Multi-mode	50/125 μ m or 62.5/125 μ m
100BASE-FX	Single mode	9/125 μ m
100BASE-BX	Multi-mode	50/125 μ m
1000BASE-SX	Multi-mode	50/125 μ m or 62.5/125 μ m
1000BASE-LX	Single mode	9/125 μ m
1000BASE-BX	Single mode	9/125 μ m

10GBASE-SR	Multi-mode	50/125 μ m or 62.5/125 μ m
10GBASE-LR	Single mode	9/125 μ m
10GBASE-BX	Single mode	9/125 μ m

Safety Notice

Fiber-optic SFP modules are equipped with a Class 1 laser, which emits invisible radiation. Read the following safety warning carefully.



Note

Class 1 Laser Product
Complies with FDA Regulation 21 CFR 1040.10 and 1040.11



Warning

Class 1 radiation is present when the device or system is powered up.



Warning

Only trained and qualified personnel should be allowed to install or replace these modules.