The Fiber Optic Association - Tech Topics

Specifications For Fiber Optic Networks

Per current standards and specs, maximum supportable distances and attenuation for optical fiber applications by fiber type.

Multimode Fiber Network Specifications

Application	Parameter	Multimode Fiber Type							
		62.5/125 µm TIA 492AAAA (OM1)		50/125 µm TIA 492AAAB (OM2)		850 nm laser-optimized 50/125 µm TIA 492AAAC (OM3)		850 nm laser-optimized 50/125 µm TIA 492AAAD (OM4)	
	Nominal wavelength (nm)	850	1300	850	1300	850	1300	850	1300
Ethernet 10/100BASE-SX	Channel attenuation (dB)	4.0	-	4.0	-	4.0	-	4.0	-
	Supportable distance m (ft)	300 (984)	-	300 (984)	-	300 (984)	-	300 (984)	-
Ethernet 100BASE-FX	Channel attenuation (dB)	-	11.0	-	6.0	-	6.0	-	6.0
	Supportable distance m (ft)	-	2000 (6560)	-	2000 (6560)	-	2000 (6560)	-	2000 (6560)
Ethernet 1000BASE-SX	Channel attenuation (dB)	2.6	-	3.6	-	4.5	-	4.8	-
	Supportable distance m (ft)	275 (900)	-	550 (1804)	-	800 (2625)	-	880 (2887)	-
Ethernet 1000BASE-LX	Channel attenuation (dB)	-	2.3	-	2.3	-	2.3	-	2.3
	Supportable distance m (ft)	-	550 (1804)	-	550 (1804)	-	550 (1804)	-	550 (1804)
Ethernet 10GBASE-S	Channel attenuation (dB)	2.4	-	2.3	-	2.6	-	3.1	-
	Supportable distance m (ft)	33 (108)	-	82 (269)	-	300 (984)	-	450 (1476)	-
	Channel								

Ethernet 10GBASE-LX4	Channel attenuation (dB)	-	2.5	-	2.0	-	2.0	-	2.0
	Supportable distance m (ft)	-	300 (984)	-	300 (984)	-	300 (984)	-	300 (984)
Ethernet 10GBASE-LRM	Channel attenuation (dB)	-	1.9	-	1.9	-	1.9	-	1.9
	Supportable distance m (ft)	-	220 (720)	-	220 (720)	-	220 (720)	-	220 (720)
Ethernet 40GBASE-SR4	Channel attenuation (dB)	-	-	-	-	1.9	-	1.9	-
	Supportable distance m (ft)	-	-	-	-	100 (328)	-	125 (410)	-
Ethernet 100GBASE-SR10	Channel attenuation (dB)	-	-	-	-	1.9	-	1.9	-
	Supportable distance m (ft)	-	-	-	-	100 (328)	-	125 (410)	-
1G Fibre Channel 100-MX-SN-I (1062 Mbaud)	Channel attenuation (dB)	3.0	-	3.9	-	4.6	-	4.6	-
	Supportable distance m (ft)	300 (984)	-	500 (1640)	-	860 (2822)	-	860 (2822)	-
2G Fibre Channel 200-MX-SN-I (2125 Mbaud)	Channel attenuation (dB)	2.1	-	2.6	-	3.3	-	3.3	-
	Supportable distance m (ft)	150 (492)	-	300 (984)	-	500 (1640)	-	500 (1640)	-
4G Fibre Channel 400-MX-SN-I (4250 Mbaud)	Channel attenuation (dB)	1.8	-	2.1	-	2.9	-	3.0	-
	Supportable distance m (ft)	70 (230)	-	150 (492)	-	380 (1247)	-	400 (1312)	-
10G Fibre Channel 1200-MX-SN-I (10512 Mbaud)	Channel attenuation (dB)	2.4	-	2.2		2.6	-	2.6	-
	Supportable distance m (ft)	33 (108)	-	82 (269)	-	300 (984)	-	300 (984)	-
16G Fibre	Channel								

Channel 1600-MX-SN (10512 Mbaud)	attenuation (dB)	-	-	1.6	-	1.9	-	1..9	-
	Supportable distance m (ft)	-	-	35 (115)	-	100 (328)	-	125 (410)	-
FDDI PMD ANSI X3.166	Channel attenuation (dB)	-	11.0	-	6.0	-	6.0	-	6.0
	Supportable distance m (ft)	-	2000 (6560)	-	2000 (6560)	-	2000 (6560)	-	2000 (6560)

- means Not Applicable

Singlemode Fiber Network Specifications

Application	**Parameter**	**Single-mode**	
		TIA 492CAAA (OS1) or TIA 492CAAB (OS2)	
	Nominal wavelength (nm)	**1310**	**1550**
Ethernet 1000BASE-LX	Channel attenuation (dB)	4.5	-
	Supportable distance m (ft)	5000 (16405)	-
Ethernet 10GBASE-LX4	Channel attenuation (dB)	6.3	-
	Supportable distance m (ft)	10000 (32810)	-
Ethernet 10GBASE-L	Channel attenuation (dB)	6.2	-
	Supportable distance m (ft)	10000 (32810)	-
Ethernet 10GBASE-E	Channel attenuation (dB)		11.0
	Supportable distance m (ft)		40000 (131240)
Ethernet 40GBASE-LR4	Channel attenuation (dB)	6.7	
	Supportable distance m (ft)	10000 (32810)	
Ethernet 100GBASE-LR4	Channel attenuation (dB)	6.3	
	Supportable	10000	

	distance m (ft)	(32810)	
1G Fibre Channel 100-SM-LC-L	Channel attenuation (dB)	7.8	-
	Supportable distance m (ft)	10000 (32810)	-
2G Fibre Channel 200-SM-LC-L	Channel attenuation (dB)	7.8	-
	Supportable distance m (ft)	10000 (32810)	-
4G Fibre Channel 400-SM-LC-M	Channel attenuation (dB)	4.8	-
	Supportable distance m (ft)	4000 (13124)	-
4G Fibre Channel 400-SM-LC-L	Channel attenuation (dB)	7.8	-
	Supportable distance m (ft)	10000 (32810)	-
8G Fibre Channel 800-SM-LC-I	Channel attenuation (dB)	2.6	-
	Supportable distance m (ft)	1400 (4593)	-
8G Fibre Channel 800-SM-LC-L (4250 Mbaud)	Channel attenuation (dB)	6.4	-
	Supportable distance m (ft)	10000 (32810)	-
10G Fibre Channel 1200-SM-LL-L	Channel attenuation (dB)	6.0	-
	Supportable distance m (ft)	10000 (32810)	-
16G Fibre Channel 1600-SM-LC-L	Channel attenuation (dB)	6.4	-
	Supportable distance m (ft)	10000 (32810)	-
FDDI SMF-PMD ANSI X3.184	Channel attenuation (dB)	10.0	-
	Supportable distance m (ft)	10000 (32810)	-

- means Not Applicable

Link Specifications for FTTx

		Single-mode		
	Parameter	**TIA 492CAAB (OS2)**		
Application	Nominal wavelength (nm)	**1270/1310**	**1490**	**1550**
	Channel	3.5	3	-

EPON (IEEE 802.3AH) PX10 1,2	attenuation (dB)			
	Supportable distance m (ft)	10000 (32808)		
EPON (IEEE 802.3AH) PX20 1,2	Channel attenuation (dB)	7	6	-
	Supportable distance m (ft)	20000 (65616)		
10G EPON (IEEE 802.3AV) PR10 /PRX10 1,2	Channel attenuation (dB)	35.	3	2.5
	Supportable distance m (ft)	10000 (32810)		
10G EPON (IEEE 802.3AV) PR20 /PRX20 1,2	Channel attenuation (dB)	7	6	5
	Supportable distance m (ft)	20000 (65616)		
10G EPON (IEEE 802.3AV) PR30 /PRX30 1,2	Channel attenuation (dB)	10.5	9	
	Supportable distance m (ft)	30000 (98424)		
GPON (ITU G.983) Class B+ 1,2	Channel attenuation (dB)	7	6	
	Supportable distance m (ft)	20000 (65616)		
GPON (ITU G.984) Class C+ 1,2	Channel attenuation (dB)	10.5	9	
	Supportable distance m (ft)	30000 (98424)		
10GPON (ITU G.987) Class N1 1,2	Channel attenuation (dB)	7		5
	Supportable distance m (ft)	20000 (65616)		
10GPON (ITU G.987) Class N2 1,2	Channel attenuation (dB)	10.5	9	
	Supportable distance m (ft)	30000 (98424)		
RFOG (SCTE IPS SP910) 1,2	Channel attenuation (dB)	7		5
	Supportable distance m (ft)	20000 (65616)		

- means Not Applicable

Specifications For Legacy Fiber Optic Networks

A listing of many fiber optic LANs and links available in the last 30 years, with basic operational specs.

		Max distance (m)	Link Margin (dB)

Application	Wavelength	for fiber type			for fiber type		
		62.5/125	50/125	SM	62.5	50	SM
10Base-F	850	2000	2000	-	12.5	7.8	-
FOIRL	850	2000	-	-	8	-	-
T oken Ring 4/16	850	2000	2000	-	13	8.3	-
Demand Priority (100VG-AnyLAN)	850	500	500	-	7.5	2.8	-
Demand Priority (100VG-AnyLAN)	1300	2000	2000	-	7.0	2.3	-
100Base-FX (Fast Ethernet)	1300	2000	2000	-	11	6.3	-
10/100Base-SX	850	300	300	-	4.0	4.0	-
FDDI	1300	2000	2000	40,000	11.0	6.3	10-32
FDDI (low cost)	1300	500	500	NA	7.0	2.3	-
ATM 52	1300	3000	3000	15,000	10	5.3	7-12
ATM 155	1300	2000	2000	15,000	10	5.3	7-12
ATM 155	850(laser)	1000	1000	-	7.2	7.2	-
ATM 622	1300	500	500	15,000	6.0	1.3	7-12
ATM 622	850(laser)	300	300	-	4.0	4.0	-
Fibre Channel 266	1300	1500	1500	10,000	6.0	5.5	6-14
Fibre Channel 266	850(laser)	700	2000	-	12.0	12.0	-
Fibre Channel 1062	850(laser)	300	500	-	4.0	4.0	-
Fibre Channel 1062	1300	-	-	10,000	-	-	6-14
1000Base-SX	850(laser)	220	550	-	3.2	3.9	-
1000Base-LX	1300	550	550	5000	4.0	3.5	4.7
ESCON	1300	3000	-	20,000	11	-	16

- means Not Applicable

NS = Not Specified. Most LANs and links not specified to run on SM fiber have media converters available to allow them to run on SM fiber.

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