

Network Cabling Physical Media Distances



Last Updated: January 29, 2003

Fiber Ethernet	Media	Meters	Km	Feet	Miles
10BaseFL	MMF (full duplex)	2,000	2	6,561	1.24
10BaseFL	SMF	10,000	10	32,808	6.21
10BaseFL	MMF (half duplex)	400	0.4	1,312	0.25
100BaseFX	MMF	2,000	2	6,561	1.24
100BaseFX	SMF	10,000	10	32,808	6.21
1000BaseSX	[WS-G5484] MMF 62.5u (850nm) - MBW 160khz [1]	220	0.22	721	0.14
1000BaseSX	[WS-G5484] MMF 62.5u (850nm) - MBW 200khz	275	0.28	902	0.17
1000BaseSX	[WS-G5484] MMF 50u (850nm) - MBW 400khz	500	0.5	1,640	0.31
1000BaseSX	[WS-G5484] MMF 50u (850nm) - MBW 500khz	550	0.55	1,804	0.34
1000BaseLX/LH	[WS-G5486] MMF 62.5u (1310nm) - MBW 500khz [2]	550	0.55	1,804	0.34
1000BaseLX/LH	[WS-G5486] MMF 50u (1310nm) - MBW 400khz [2]	550	0.55	1,804	0.34
1000BaseLX/LH	[WS-G5486] MMF 50u (1310nm) - MBW 500khz [2]	550	0.55	1,804	0.34
1000BaseLX/LH	[WS-G5486] SMF 8/9/10u (1310nm) - MBW 500khz	10,000	10	32,808	6.21
1000BaseZX	[WS-G5487] [3] SMF 9/10u (1550nm) - MBW not conditional	70,000	70	229,658	43.5
1000BaseZX	[WS-G5487] [3] SMF 8u (1550nm) - MBW not conditional	100,000	100	328,084	62.14
10GBaseSR/SW [4]	MMF 62.5u (850nm) - MBW 160khz [1] - Serial	26	0.026	85	0.016
10GBaseSR/SW [4]	MMF 62.5u (850nm) - MBW 200khz - Serial	33	0.033	108	0.021
10GBaseSR/SW [4]	MMF 50u (850nm) - MBW 400khz - Serial	66	0.066	217	0.041
10GBaseSR/SW [4]	MMF 50u (850nm) - MBW 500khz - Serial	82	0.082	269	0.051
10GBaseSR/SW [4]	MMF 50u (850nm) - MBW 2000khz [5] - Serial	300	0.3	984	0.19
10GBaseLR/LW [4]	SMF 9u (1310nm) - Serial	10,000	10	32,808	6.21
10GBaseER/EW [4]	SMF 9u (1550nm) - Serial	40,000	40	131,233	24.85
10GBaseLX4 [4]	MMF 62.5u (1310nm) - MBW 160khz [1] - WWDM [7]	[6] 300	0.3	984	0.19
10GBaseLX4 [4]	MMF 62.5u (1310nm) - MBW 200khz - WWDM [7]	[6] 300	0.3	984	0.19
10GBaseLX4 [4]	MMF 50u (1310nm) - MBW 400khz - WWDM [7]	240	0.24	787	0.15
10GBaseLX4 [4]	MMF 50u (1310nm) - MBW 500khz - WWDM [7]	300	0.3	984	0.19
10GBaseLX4 [4]	SMF 9u (1310nm) - WWDM [7]	10,000	10	32,808	6.21
10GBaseEX4 [8]	SMF 9u - WWDM	50,000	50	164,042	31.07

[1] Commonly referred to as "FDDI grade fiber".

[2] Requires a mode conditioning patch cable (CAB-GELX-625) for distances that are longer than than 984 feet.

[3] You can have a maximum of 12 1000BASE-ZX GBICs per system to comply with EN55022 Class B and 24 1000BASE-ZX GBICs per system to comply with FCC Class A regulations.

[4] JUST barely ratified IEEE standard (IEEE 802.3ae) - Watch out for interoperability issues!

[5] Sometimes referred to as "10 Gigabit Ethernet MMF Fiber". Detailed in TIA-492AAAC.

[6] 300m@500MHz*km³ - 62.5 micron MMF fiber has a modal bandwidth of 500 MHz*km at 1300 nm as opposed to 160 or 200 MHz*km at 850 nm.

[7] Wide Wavelength Division Multiplexing (WWDM) PMD is only defined for use in a LAN PHY.

[8] NOT a ratified IEEE standard (Cisco Proprietary so far) - Used in Metro deployments (WS-X6501-10GEX4).

Note: "R" IN THE 10GBASE nomenclature denotes the use of a LAN PHY while "W" denotes the use of a WAN PHY making the integration of 10GE and OC-192 easier (Ethernet packet in SONET frame). Both PHYs share the same PMDs (Physical Media Sublayer) and hence, same distances for both LAN and WAN PHYs. Only Nortel has announced support for the WAN PHY at this point.

Copper Ethernet	Media	Meters	Km	Feet	Miles
10baseT	Category 3 or higher cable	100	0.1	328	0.06
100baseT	Category 5 or higher cable	100	0.1	328	0.06
1000baseT	[WS-G5482 [1] & WS-G5483] Category 5 or higher cable	100	0.1	328	0.06
10Base2	50 ohm coaxial cable (thinnet - RG-58u - 0.2")	185	0.19	606	0.11
10Base5	50 ohm coaxial cable (thicknet - 0.5" - "standard" Ethernet)	500	0.5	1,640	0.31

[1] EOS

OCx interfaces	Media	Meters	Km	Feet	Miles
OC-3c/STM-1c	Category 5 UTP - 155 Mbps over Copper	100	0.1	328	0.06
OC-3c/STM-1c	SMF - 155 Mbps	15,000	15	49,212	9.32
OC-3c/STM-1c	SMF Extended Reach - 155 Mbps	30,000	30	98,425	18.64
OC-3c/STM-1c	SMF Long Reach - 155 Mbps	40,000	40	131,233	24.85
OC-3c/STM-1c	MMF - 155 Mbps	2,000	2	6,561	1.24
OC-12c/STM-4c	SMF - 622 Mbps	15,000	15	49,212	9.32
OC-12c/STM-4c	SMF Long Reach [1] - 622 Mbps	40,000	40	131,233	24.85
OC-12c/STM-4c	MMF Short Reach - 622 Mbps	500	0.5	1,640	0.31
OC-48c/STM16c	SMF - 2488 Mbps	2,000	2	6,561	1.24
OC-48c/STM16c	SMF Intermediate Reach [1] - 2488 Mbps	15,000	15	49,212	9.32
OC-48c/STM16c	SMF Long Reach [1] - 2488 Mbps	80,000	80	262,467	49.71
OC-192c/STM-64c VSR-1 [2]	MMF 62.5u (850nm) Very Short Reach - MBW 400nm - 10Gbps	300	0.3	984	0.19
OC-192c/STM-64c VSR-2	SMF (1310nm) Very Short Reach - 10Gbps	600	0.6	1,969	0.37
OC-192c/STM-64c	SMF (1310nm) Short Reach - 10Gbps	2,000	2	6,562	1.24
OC-192c/STM-64c	SMF (1550nm) Intermediate Reach [1] - 10Gbps	40,000	40	131,234	24.85

[1] If attaching a short cable to this port adapter or interface module, you must add 10 dB of attenuation to the cable or the transmitter might overdrive the receiver and introduce data errors.

[2] VSR-1 uses 12 multiplexed fibers, VSR-2 uses a single fiber

WAN Interfaces	Media	Meters	Km	Feet	Miles
ATM-25	Category 5 UTP - 25Mbps	100	0.1	328	0.06
T1	Category 5 twisted-pair - 1.544 Mbps	198	0.2	649	0.12
E1	Category 5 twisted-pair and FTP (120 ohms), 2.048 Mbps	198	0.2	649	0.12
E1	Coaxial cable (75 ohms) - 2.048 Mbps	198	0.2	649	0.12
CE1	Category 5 twisted-pair - 2.048 Mbps	198	0.2	649	0.12
CES T1	Category 5 twisted-pair and FTP	198	0.2	649	0.12
CES E1	Category 5 twisted-pair and FTP (120 ohms)	198	0.2	649	0.12
CES E1	Coaxial cable (75 ohms)	198	0.2	649	0.12
DS3	Coaxial cable - 45 Mbps	137	0.14	449	0.09
E3	Coaxial cable - 34 Mbps	396	0.4	1,299	0.25
CDS3	Coaxial cable - 45 Mbps	137	0.14	449	0.09

Notes

MMF = Multi-Mode Fiber

SMF = Single Mode Fiber