

FIBER OPTIC REPEATER SELECTION GUIDE

Fiber optic cables are ideally suited for long distance communications. However, there are situations where link loss (attenuation) is too high due to splice, patch panels, number of connectors, or combination of fiber sizes. In these applications fiber optic repeaters can be used.

To properly select a fiber optic repeater, this guide is prepared important selection criteria:

1. Data rate - Mbps: Determine Data Rate of the application e.g. 10 Mbps or less.
2. Optical Wavelength – Nanometers (nm): What is source wavelength of light in present setup e.g. 850nm, 1310nm.
3. Fiber Size: What is fiber size being used e.g. 62.5/125.
Fiber Type: Multimode or Single mode.
4. Multimode Fiber – Size in Micron: 1000, 200/230, 62.5/125, 50/125
5. Old Fiber Size, New Fiber Size: If fiber is being added to existing link what is old fiber size and type and what is new fiber size and type e.g. 62.5/125 Old and SM – New.
6. Link Loss – Attenuation (dB@nm): What is link loss or distance and at what wavelength.
7. High Speed Systems e.g. 1 or 10 or higher gigabit/sec: For high speed systems there is additional consideration of fiber’s bandwidth which is inherent property of fiber. See bandwidth chart.

Fiber Size and Type	Bandwidth of Common Fiber Types Sizes (MHz/Km)			
	660nm	850nm	1310nm	1550nm
1000 Micron Plastic	10	-	-	-
200 mm	-	20	-	-
62.5 mm (OM 1)	-	200	500	500
50 mm (OM 2)	-	500	600	600
9 (SM) (OS 1 and 2)	-	-	Very High	Very High
OM 3	-	1500	500	500
OM 4	-	3500	500	500

Matching Specific Product to Application

S.I. Tech # 2062 – works with very slow pulse rates and up to 20 Mbps and has various fiber size and type options. See chart:



Fiber Size (Microns)	Attenuation (dB/Km)	Distance (Meters)	Distance (Feet)
50	3.0	2000	6600
62.5	4.0	2000	6600
100	5.0	2000	6600
200	7.0	1000	3300
1000	200	100	330
10*	1.0	10000	33000

- Single mode (observe network timing restrictions) option – 1300nm.

S.I. Tech # 2082 – works at 100 Mbps or 1 Gb and has various fiber size and type options. See chart:



Fiber Size (Microns)	Attenuation (dB/Km)			Distance 100Mbps Meters (Feet)			Distance 1000Mbps Meters (Feet)		
	Wavelength (nm)			Wavelength (nm)			Wavelength (nm)		
	850	1300	1550	850	1300	1550	850	1300	1550
50*	3.0	1.0		2000 (6600)	6000 (20000)	-	500 (1600)	600 (2000)	-
62.5*	4.0	1.0		2000 (6600)	6000 (20000)	-	200 (600)	600 (2000)	-
10**	-	0.35	0.25	-	10000 (33000)	12000 (40000)	-	20000 (66000)	25000 (82500)

- For longer distance at 850nm, use OM3 or OM4 laser enhanced fiber.
- Single mode option (for longer distances, higher power, contact factory). At Gigabit data rate both attenuation and bandwidth of the fiber should be considered to determine distance.

S.I. Tech # 2092 – works at 1 or 10 Gigabit/sec and has various fiber size and type options. See chart:



Fiber Size (Microns)	Attenuation (dB/Km)			Distance 100 Mbps Meters (Feet)			Distance 1000 Mbps Meters (Feet)			Distance 10 Gbps Meters (Feet)		
	Wavelength (nm)			Wavelength (nm)			Wavelength (nm)			Wavelength (nm)		
	850	1300	1550	850	1300	1550	850	1300	1550	850	1300	1550
50*	3.0	1.0	-	2000 (6600)	6000 (20000)	-	500 (1600)	600 (2000)	-	30 (100)	60 (200)	-
62.5*	4.0	1.0	-	2000 (6600)	6000 (20000)	-	200 (600)	600 (2000)	-	15 (50)	60 (200)	-
10**	-	0.35	0.25	-	10000 (33000)	12000 (40000)	-	66000 (20000)	82500 (250000)	-	10Km (33000)	13Km (40000)

- For longer distance at 850nm, use OM3 or OM4 laser enhanced fiber.
- Single mode option (for longer distances, higher power, contact factory). At Gigabit data rate both attenuation and bandwidth of the fiber should be considered to determine distance.