

Synopsis

The following summary of existing LAN technologies supported by each media type has been taken from published industry standards and is intended to guide the choice of media for new installations within a commercial office or light industrial environment. Information is provided for copper, optical fibre and wireless media, and guidance is included on the support of emerging LAN technologies.

Copper Cabling Choice

Supporting existing LAN technologies:

LAN Technology	Bit Rate	Cabling Class/Max Distance		
		Class D/Cat 5e	Class E/Cat 6	Class F/Cat 7
10BASE-T	10 Mbit/s	100m	100m	100m
100BASE-TX	100 Mbit/s	100m	100m	100m
1000BASE-T	1 Gbit/s	100m	100m	100m
1000BASE-TX	1 Gbit/s	not supported	100m	100m
ATM-1200	1.2 Gbit/s	not supported	100m	100m

Supporting emerging LAN technologies:

LAN Technology	Bit Rate	Cabling Class/Max Distance		
		Class E/Cat 6	Class EA/Cat 6A	Class F/Cat 7
10GBASE-T	10 Gbit/s	100m for screened 55m for unshielded	100m	100m

Optical Fibre Cabling Choice

LAN Technology	Bit Rate	Cabling Class/Max Distance				
		62um OM1	50um OM2	50um OM3	OS1	OS2
FDDI-PMD	100 Mbit/s	2,000m	2,000m	2,000m	not supported	not supported
100BASE-FX	100 Mbit/s	2,000m	2,000m	2,000m	not supported	not supported
1000BASE-SX	1 Gbit/s	275m	550m	550m	not supported	not supported
1000BASE-LX	1 Gbit/s	550m	550m	550m	2,000m	> 5,000m
10GBASE-SR	10Gbit/s	33m	82m	300m	not supported	not supported
10GBASE-LR	10Gbit/s	not supported	not supported	not supported	3,000m	>10,000m
10GBASE-ER	10Gbit/s	not supported	not supported	not supported	6,000m	>10,000m
ATM-155(SX)	155 Mbit/s	1,000m	1,000m	1,000m	not supported	not supported
ATM-155(LX)	155 Mbit/s	2,000m	2,000m	2,000m	2,000m	2,000m
ATM-622(SX)	622 Mbit/s	300m	300m	300m	not supported	not supported
ATM-622(LX)	622 Mbit/s	500m	330m	500m	2,000m	2,000m
FC-1062(SX)	1062Mbit/s	300m	500m	500m	not supported	not supported
FC-1062(LX)	1062Mbit/s	not supported	not supported	not supported	2,000m	2,000m

- Notes:**
- 62um OM1** (Multimode) Attenuation = 3.5dB/km (850nm); 1.5dB/km (1300nm)
LED Modal bandwidth = 200MHz.km (850nm); 500MHz.km (1300nm)
 - 50um OM2** (Multimode) Attenuation = 3.5dB/km (850nm); 1.5dB/km (1300nm)
LED Modal bandwidth = 500MHz.km (850nm); 500MHz.km (1300nm)
 - 50um OM3** (Multimode) Attenuation = 3.5dB/km (850nm); 1.5dB/km (1300nm)
LED Modal bandwidth = 1,500MHz.km (850nm); 500MHz.km (1300nm)
Laser Modal bandwidth = 2,000MHz.km (850nm)
 - OS1** (Singlemode) Attenuation = 1.0dB/km (850nm); 1.0dB/km (1300nm)
 - OS2** (Singlemode) Attenuation = 0.4dB/km (850nm); 0.4dB/km (1300nm)
 - Connectors** Lengths are calculated for 1.5dB allocation for connectors and/or splices
 - Detailed Design** Refer to ISO/IEC 11801 or Brand-Rex for detailed design guidance

Wireless Technology Choice

	802.11a IEEE & WiFi	802.11b IEEE & WiFi	Dual Band IEEE & WiFi	802.11g IEEE & WiFi
Raw Data Rate	54 Mbit/s	11 Mbit/s	11 & 54 Mbit/s	54 Mbit/s
Average Throughput	27 Mbit/s	4-5 Mbit/s	4-5 & 27Mbit/s	27 Mbit/s
Frequency Bands	5 GHz	2.4 GHz	2.4 & 5 GHz	2.4 GHz
Available Spectrum	300 MHz	83.5 MHz	83.5/300MHz	83.5 MHz
Compatible with 802.11a devices	Yes	No	Yes	No
Compatible with 802.11b devices	No	Yes	Yes	Yes
Compatible with dual band devices	Yes	Yes	Yes	Yes
Compatible with 802.11g devices	No	Yes	Yes	Yes
Typical Indoor Operating Range	75m	75m	75m	75m
Users per Access Point	64 max	32 max		
User/Bandwidth Density	Higher	Lower		Higher
Use in Public "Hotspots"	No	Yes	No	No

802.11b Wireless LANs are the optimal choice for less dense networks in larger areas. There is a significant installed base in both business and homes, and it is now being deployed in public "hotspots" such as hotels, airports and Starbucks coffee bars. According to market analyst Gartner, 31% of new laptops will be bundled with 802.11b NICs in 2004 and 68% in 2007. Prices of 802.11b devices have eroded substantially due to their market success.

802.11a Wireless LANs have access to almost 4-times the radio spectrum allocated to 802.11b, hence they are the optimal choice for dense networks with bandwidth intensive applications. 802.11a hardware has a higher price point than 802.11b however increased density and throughput will lower the cost per user and the price per Mbit/s.

802.11g Wireless LANs operate in the same radio bands as 802.11b and are limited to the same radio spectrum, while more efficient coding provides up to 5-times the throughput. 802.11g devices are relatively new and are more expensive than 802.11b devices, although they are capable of interoperating with them. This represents the natural upgrade path for 802.11b.

Dual Band 802.11 capability is embedded in Wireless LAN access points, routers and client adapters to provide seamless roaming between 802.11a and 802.11b networks. Dual band devices will also interoperate with 802.11g.

WiFi (Wireless Fidelity) is an independent organisation that tests interoperability of 802.11 products. When a product has been demonstrated to interwork with other manufacturer's compliant products, it will carry a "WiFi" label.

About Brand-Rex

Brand-Rex is a designer and manufacturer of copper and fibre based cabling systems, headquartered in Glenrothes, Scotland with facilities across Europe. Brand-Rex has two primary businesses: Connectivity and Speciality. Its Connectivity division designs and manufactures cabling systems (both copper and fibre) for data communications and is the No.2 player in Europe. The Speciality division exclusively produces cables that are used for control, communications, power and instrumentation within hostile environments.