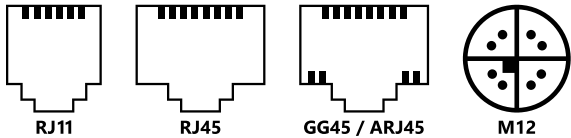# Category Cables Explained

CABLE EDU

What are Category Cables?

Category cables (**CAT**) are used to connect computer network devices such as modems, routers, computers, servers and switches. They are also called **Network**, **LAN** or **Ethernet cables**.

Termination and Connectors

Ethernet cables made from four twisted pairs are terminated using an 8-pin **RJ45** connector. Older telephone cable based on two twisted pairs typically use **RJ11** connectors. **GG45** (**GigaGate 45**) or **ARJ45** (**Augmented RJ45**) is a connector originally developed for use with CAT7 cable. GG45 connectors have 12 pins in total, 8 providing backwards compatibility with CAT6, and an additional 4 pins providing support for frequencies of up to 1000MHz. **M12** coded connectors are found on Ethernet cords designed for industrial applications.

RJ11   RJ45   GG45 / ARJ45   M12

Solid Core vs. Stranded Cables

A solid core cable uses one solid copper wire for each conductor, so a 4-pair cable will have a total of 8 solid copper wires. Solid conductor cable is easy to punch down, making it ideal for structured wiring applications. In situations where a cable is repeatedly flexed or connected and disconnected, choose a stranded cable.

Ethernet Categories

CATEGORY	MAX DATA RATE	BANDWIDTH	MAX DISTANCE	APPLICATIONS
Category 5	100 Mbps	100 MHz	328ft (100m)	100BaseT Ethernet
Category 5e	1 Gbps	100 MHz	328ft (100m)	100BaseT Ethernet and residential homes
Category 6	1 Gbps	250 MHz	328ft (100m)	Gigabit Ethernet and commercial buildings
Category 6a	10 Gbps	500 MHz	328ft (100m)	Gigabit Ethernet in data centers and commercial buildings
Category 7	10 Gbps	600 MHz	328ft (100m)	10 Gbps Core Infrastructure
Category 7a	10 Gbps	1000 MHz	328ft (100m)	10 Gbps Core Infrastructure
Category 8.1	25 Gbps	2000 MHz	98ft (30m)	25 Gbps Core Infrastructure
Category 8.2	40 Gbps	2000 MHz	98ft (30m)	40 Gbps Core Infrastructure

Wire Gauges

CABLE TYPE	TYPICAL GAUGE	DIAMETER (INCHES)	DIAMETER (MM)
CAT8	22 AWG	0.0253in	0.6438mm
CAT6 / CAT6a	23 AWG	0.0226in	0.5733mm
CAT5e	24 AWG	0.0201in	0.5106mm
Slim Line CAT6	26 AWG	0.0159in	0.4039mm
Micro Slim Line CAT6	28 AWG	0.0126in	0.3211mm
Ultra Slim Line CAT6	32 AWG	0.0080in	0.2019mm