

Category 7 and Category 7a Overview

Category 7 (Cat7) and Category 7a (Cat7a) are the newest cable standards for Ethernet and other interconnect technologies. Cat 7 cable was developed with strict specifications on crosstalk and EMI protection. Cat 7 cable features four individually shielded pairs as well as an overall cable shield to protect the signals from crosstalk and EMI. Cat7 cable provides a copper solution for 10-Gigabit Ethernet at 100 meters.

Cat7 cable is commonly terminated using a GG45 connector, which is a connector that is backwards compatible with the 8p8c RJ45 connectors used on Cat6 or Cat5e cable. The GG45 connector has four additional conductors that provide support for frequencies of up to 600MHz, and up to 1000MHz using Cat7a. The higher frequencies allow Cat 7 cable to support 10-Gigabit Ethernet. Cat7 cable may also be terminated using TERA connectors, which were developed by Siemon™. The TERA connector has a unique footprint and is not compatible with a standard 8p8c (RJ45) connector. The TERA connector is also capable of supporting frequencies of up to 600MHz, up to 1000MHz using Cat7a cable. The ability to support the higher frequencies allows Cat7 and Cat7a cable to carry more data. This allows Cat7 and Cat7a cable to support Ethernet applications up to 10-Gigabit Ethernet.



GG45 Connector (Front)



GG45 Connector



TERA Cable



TERA Connector (Front)

What is the application for a data center?

Cat7 and Cat7a cabling will be used for backbone connections between servers within a data center. This provides a high-speed interconnect used for data transfer within the network.

Does this replace fiber?

This provides an alternative to using fiber optic cabling within the data center. Cat7 and Cat7a cabling will provide similar performance to some fiber solutions. The cost of equipment that supports copper cabling is typically less than equipment that supports fiber cabling. Another advantage is that the copper cabling is not as fragile as fiber cabling.

What's the practical performance difference with Cat5e/6?

Cat7 and Cat7a cable are designed to support much higher frequency signals than Cat5e and Cat6. This allows Cat7 and Cat7a cabling to carry a larger amount of information. Cat7 and Cat7a cable are also able to better protect the signals traveling over the cable. The shielding as well as the tighter twists of the pairs in Cat7 and Cat7a cable lessens the effects of crosstalk and EMI.

Is Cat 7 widely used?

Currently, Cat7 is not widely adopted. Cat5e and Cat6 solutions sufficiently support the bandwidth requirements of today's data centers, networks, and end users. Using Cat7 for a connection to a desktop would be unnecessary because the bandwidth would not be utilized. It may also be an unnecessary expense for many data center applications for the same reason. However, as technology advances and requirements increase, Cat7 cable will become more relevant in the data center and desktop connections.

Category Cable Comparison

	Frequency Supported *	Ethernet Signal Supported	Shielded	Connector	Conductor Pairs	Applications
Cat 5	1 - 100MHz	10/100Base T	Optional	8p8c RJ45	4	Small office, home office, schools
Cat5	1 - 100MHz	10/100Base T Gigabit Ethernet	Optional	8p8c RJ45	4	
Cat5e	1 - 250MHz	10/100Base T Gigabit Ethernet	Optional	8p8c RJ45	4	Large enterprise, university campuses, high speed applications
Cat6a	1 - 500MHz	10/100Base T Gigabit Ethernet 10Gig Ethernet	Optional	8p8c RJ45	4	
Cat7	1 - 600MHz	10/100Base T Gigabit Ethernet 10Gig Ethernet	Individual Pair & Overall Cable Shield	GG45 TERA	4	Data center backbone, high speed and bandwidth intensive applications
Cat7a	1 - 1000MHz	10/100Base T Gigabit Ethernet 10Gig Ethernet	Individual Pair & Overall Cable Shield	GG45 TERA	4	

*The frequency value listed corresponds to the value of the original specification. Many cables available on the market are built to exceed the specification standards.



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