

# Category 6 Cable

## UTP Installation Do's and Don'ts.

<b>Do</b>	Run all cables in a Star Configuration so that all network links are distributed from, or homerun to, one central hub. Visualize a wagon wheel where all of the spokes start from on central point, known as the hub of the wheel.
<b>Do</b>	Keep Each cable run must be kept to a maximum of 295 feet (90 meters), so that with patch cords, the entire channel is no more than 328 feet (100 meters). This is a requirement of the standard.
<b>Do</b>	Maintain the twists of the pairs as close as possible to the point of termination, or no more than 0.5"(one half inch) untwisted.
<b>Do Not</b>	Skin off more than 1" of jacket when terminating UTP
<b>Do</b>	Make only gradual bends in the cable where necessary to maintain the minimum bend radius of 4 times the cable diameter or approximately 1" radius (about the roundness of a half-dollar).
<b>Do Not</b>	Allow the cable to be sharply bent, twisted, or kinked at any time. This can cause permanent damage to the geometry of the cable and cause transmission failures.
<b>Do</b>	Dress the cables neatly with Velcro cable ties, using low to moderate pressure.
<b>Do Not</b>	Over tighten cable ties or use plastic ties.
<b>Do</b>	Cross-connect cables (where necessary), using appropriately rated punch blocks and components.
<b>Do Not</b>	Splice or bridge UTP cable at any point. There should never be multiple appearances of cable.
<b>Do</b>	Use low to moderate force when pulling cable. The standard calls for a maximum of 25 lbf (pounds of force).
<b>Do Not</b>	Use excessive force when pulling cable.
<b>Do</b>	Use cable pulling lubricant for cable runs that may otherwise require great force to install. (You will be amazed at what a difference the cable lubricant will make)
<b>Do Not</b>	Use oil or any other lubricant not specifically designed for UTP network cable pulling as they can infiltrate the cable jacket, causing damage to the insulation.
<b>Do</b>	Keep UTP cables as far away from potential sources of EMI (electrical cables, transformers, light fixtures, etc.) as possible. Cables should maintain a 12-inch separation from power cables.
<b>Do Not</b>	Tie cables to electrical conduits, or lay cables on electrical fixtures.
<b>Do</b>	Install proper cable supports, spaced no more than 5 feet apart.
<b>Do Not</b>	Install cable that is supported by the ceiling tiles. This is unsafe, and is a violation of the building codes.
<b>Do</b>	Always label every termination point at both ends. Use a unique number for each network link. This will make moves, adds, changes, and troubleshooting as simple as possible. The TIA-606A administration standard provides guidance for properly labeling an installation.
<b>Do</b>	Always test every installed segment with a cable tester. "Toning" alone is not an acceptable test.. "Toning" alone, is not an acceptable test.

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<b>Do</b>	Always install jacks in such a way as to prevent dust and other contaminants from settling on the contacts. The contacts (pins) of the jack should face up on flush mounted plates, or left, right, or down (never up) on surface mount boxes.
<b>Do</b>	Always leave extra slack neatly coiled up in the ceiling or nearest concealed place. It is recommended that you leave at least 5 feet of slack at the work outlet end, and 10 feet of slack at the patch panel end.
<b>Do Not</b>	Never install cables taught. A good installation should have the cables loose, but never sagging.
<b>Do</b>	Always use grommets to protect cable when passing through metal studs or anything that can possibly cause damage.
<b>Do</b>	Choose either 568A or 568B wiring scheme before you begin your project. Wire all jacks and patch panels for the same wiring scheme (A or B).
<b>Do Not</b>	Mix 568A and 568B wiring on the same installation.
<b>Do Not</b> (1 exception)	Use staples on UTP cable that crimp the cable tightly. The common T-18 and T-25 cable staples are not recommended for UTP cable. However, the T-59 insulated staple gun is ideal for fastening both UTP and fiber optic cabling, as it does not put any excess pressure on the cable.
<b>Do</b>	Always obey all local and national fire and building codes. Be sure to firestop all cables that penetrate a firewall. Use plenum rated cable where it is mandated.

## Category 6 cable (wikipedia)

**Category 6 cable**, commonly referred to as **Cat 6**, is a cable standard for [Gigabit Ethernet](#) and other network [physical layers](#) that is [backward compatible](#) with the [Category 5/5e](#) and [Category 3 cable](#) standards. Compared with Cat 5 and Cat 5e, Cat 6 features more stringent specifications for [crosstalk](#) and system noise. The cable standard provides performance of up to 250 MHz and is suitable for [10BASE-T](#), [100BASE-TX](#) (Fast Ethernet), [1000BASE-T/1000BASE-TX](#) (Gigabit Ethernet) and [10GBASE-T](#) (10-Gigabit Ethernet).

Whereas Category 6 cable has a reduced maximum length when used for 10GBASE-T; Category 6a cable, or Augmented Category 6, is characterized to 500 MHz and has improved [alien crosstalk](#) characteristics, allowing 10GBASE-T to be run for the same distance as previous protocols.

## Category 6

Like most earlier cables, Category 6 cable contains four [twisted wire pairs](#). Although it is sometimes made with 23 [AWG](#) wire, the increase in performance with Cat 6 comes mainly from better insulation; 22 to 24 AWG copper is allowed if the [ANSI/TIA-568-B.2-1](#) performance specifications are met. Cat 6 patch cables are normally terminated in [8P8C](#) modular connectors.

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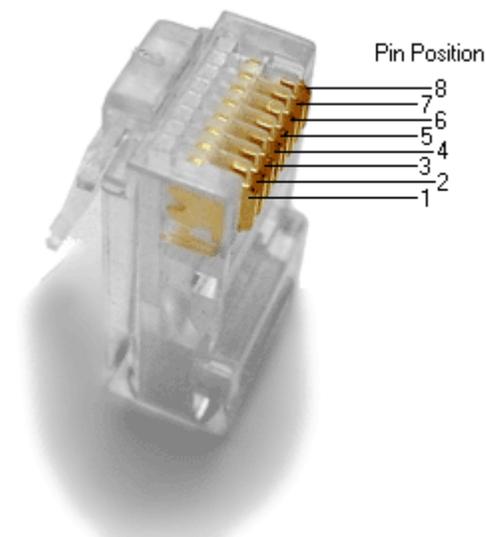
[Attenuation](#), near end [crosstalk](#) (NEXT), and [PSNEXT](#) (power sum NEXT) in Cat 6 cable and connectors are all significantly lower than Cat 5 or Cat 5e, which also uses 24 AWG wire.

The heavier insulation in some Cat 6 cables makes them too thick to attach to [8P8C](#) connectors without a special modular piece, resulting in a technically out-of-compliance assembly. [\[citation needed\]](#)

Connectors use either [T568A or T568B](#) pin assignments; the choice is arbitrary provided both ends of a cable are the same.

. If Cat 6 rated patch cables, jacks, and connectors are not used with Cat 6 wiring, overall performance is degraded to that of the cable or connector. [\[citation needed\]](#)

Because the conductor sizes are generally the same, Cat 6 jacks may also be used with Cat 5e cable. [\[citation needed\]](#)



Pins on 8P8C plug face

8P8C Wiring ([T568A](#) termination)

Pin	Pair	Wire	Color
1	3	1	 white/green
2	3	2	 green
3	2	1	 white/orange
4	1	2	 blue
5	1	1	 white/blue
6	2	2	 orange
7	4	1	 white/brown
8	4	2	 brown

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## 8P8C Wiring ([T568B](#) termination)

Pin	Pair	Wire	Color
1	2	1	 white/orange
2	2	2	 orange
3	3	1	 white/green
4	1	2	 blue
5	1	1	 white/blue
6	3	2	 green
7	4	1	 white/brown
8	4	2	 brown

## USOC/[RJ61](#) Wiring

Pin	Pair	Wire	Color
1	4	1	 white/brown
2	3	1	 white/green
3	2	1	 white/orange
4	1	2	 blue
5	1	1	 white/blue
6	2	2	 orange
7	3	2	 green
8	4	2	 brown

Note: This is from left to right, with the (plastic) tab faced away from you.

Category 6 cable can be identified by the printing on the side of the cable sheath.<sup>[1]</sup>

## Category 6a

The latest standard from the [TIA](#) for enhanced performance standards for twisted pair cable systems was defined in February 2008 in ANSI/TIA/EIA-568-B.2-10. **Category 6a** (or **Augmented Category 6**) is defined at frequencies up to 500 MHz—twice that of Cat. 6.

Category 6a performs at improved specifications, in particular in the area of alien crosstalk as compared to Cat 6 UTP, which exhibited high alien noise in high frequencies.

The global cabling standard ISO/IEC 11801 has been extended by the addition of amendment 2. This amendment defines new specifications for Cat. 6A components and Class EA permanent links. These new global Cat. 6A/Class EA specifications require a new generation of connecting

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hardware offering far superior performance compared to the existing products that are based on the American TIA standard.<sup>[2]</sup>

The most important point is a performance difference between ISO/IEC and EIA/TIA component specifications for the NEXT transmission parameter. At a frequency of 500 MHz, an ISO/IEC Cat. 6A connector performs 3 dB better than a Cat. 6A connector that conforms with the EIA/TIA specification. 3 dB equals 100% increase of near-end crosstalk noise reduction when measured in absolute magnitudes; see [3dB-point](#).<sup>[2]</sup>

Confusion therefore arises because of the different naming conventions and performance benchmarks laid down by the International ISO/IEC and American TIA/EIA standards, which in turn are different from the regional European standard, EN 50173-1. In broad terms, the ISO standard for Cat6A is the highest, followed by the European standard and then the American.<sup>[3][4]</sup>

## Maximum length

When used for [10/100/1000](#) BASE-T, the maximum allowed length of a Cat 6 cable is 100 meters (330 ft) This consists of 90 meters (300 ft) of solid "horizontal" cabling between the patch panel and the wall jack, plus 10 meters (33 ft) of stranded patch cable between each jack and the attached device. Since stranded cable has higher attenuation than solid cable, exceeding 10 metres of patch cabling will reduce the permissible length of horizontal cable.

When used for 10GBASE-T, Cat 6 cable's maximum length is 55 meters (180 ft) in a favourable alien crosstalk environment, but only 37 meters (121 ft) in a hostile alien crosstalk environment such as when many cables are bundled together.

## Installation caveats

Category 6 and 6a cable must be properly installed and terminated to meet specifications. Incorrect installation practices include kinking or bending the cable too tightly. The cable bend radius should be no less than 4 times the outer diameter of the cable.<sup>[citation needed]</sup> Incorrect termination practices include untwisting the wire pairs or stripping the outer jacket back more than 1/2 inch.

All shielded cables must be grounded for safety and effectiveness. A continuous shield connection maintained from end to end.<sup>[5]</sup> [Ground loops](#) develop when there is more than one ground connection and the difference in common mode voltage potential at these ground connections introduces noise into the cabling.<sup>[</sup>