Introducción a la sección:
Cableado de las redes

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- ✓ Tipos de cableado
- ✓ Estándares de cableado “Twisted Pair”
- ✓ Straight through vs. Cross over
- ✓ Fibra óptica
- ✓ Cual cable escoger?

Tipos de cableado

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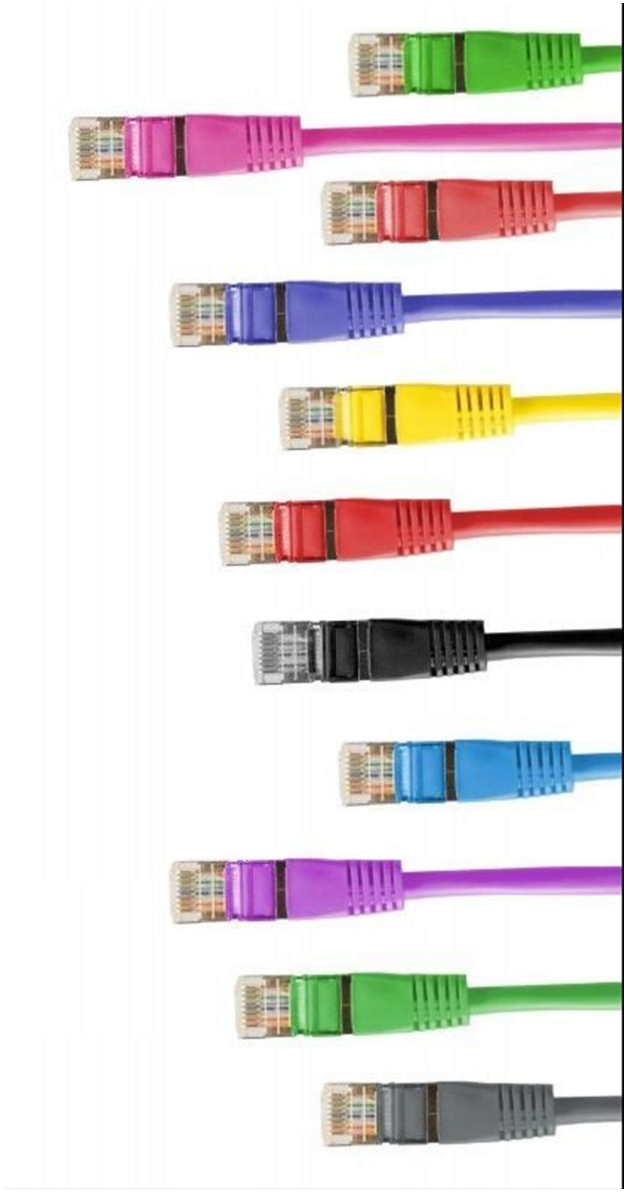
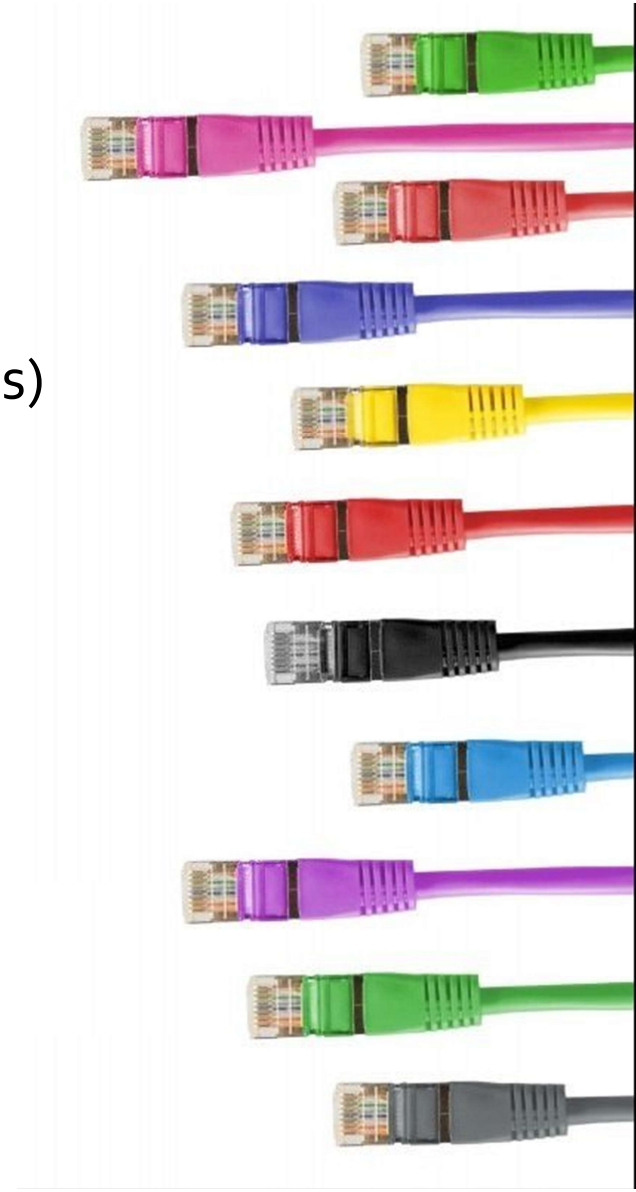


Tipos de cableado

- Capacidad de transferencia (data rates)
- Capacidad de distancia o alcance
- Coberturas exteriores e interiores
- Modo de conectividad
- Costos y Variaciones



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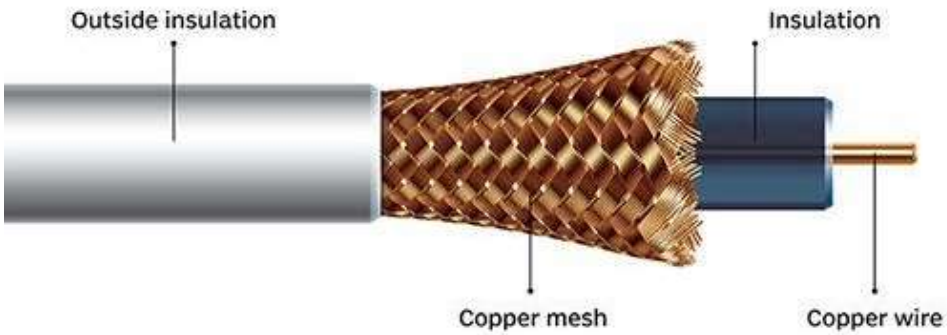
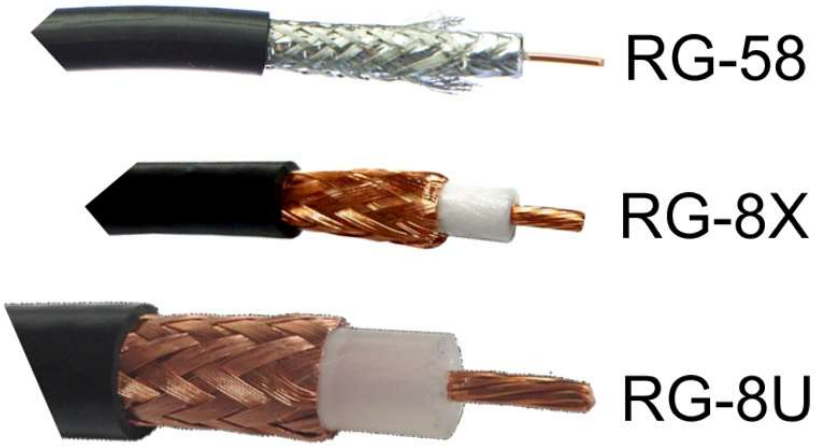
Un poco de historia..

1844 - May 24th - The Telegraph invented by Samuel Morse.
1845 - English patent for a telegraph by William Cooke and Charles Wheatstone.
1846 - A man called Royal House invented a printing telegraph which required two operators at each end.
1851 - Western Union Company was formed by the merger of 12 telegraph companies.
1861 - German inventor Phillip Reis invented a device for transmitting musical tones called a 'Telephone'.
1874 - Jean-Maurice-Emile Baudot patented the Baudot telegraph code.
1876 - February 14th - Alexander Graham Bell filed a patent for the Telephone.
1876 - February 14th - A few hours after Bell, Elisha Gray filed a patent for the Telephone.
1889 - Almon Brown Strowger invented the 'Dial Telephone' and 'Strowger Switch'.
1948 - Bell Labs invented the transistor.
1966 - ASCII code was devised.
1969 - RS232 serial standard was established.
1976 - Paper on Ethernet was published by Bob Metcalfe and David Boggs at PARC.
1979 - DEC and Intel join forces with Xerox to develop Ethernet.
1980 - DEC, Intel and Xerox publish the 'Ethernet Blue Book' or DIX standard.
1983 - IEEE 802.3 Ethernet standard.
1984 - IBM introduce 4Mbps Token Ring.
1985 - IEEE 802.3a Thin Ethernet standard, 10Base2.
1985 - IEEE 802.3b Ethernet standard 10Broad36, 10Mbps using broad band.
1987 - IEEE 802.3d Fibre Optic Inter-Repeater Link (FOIRL) & IEEE 802.3e 1Mbps Ethernet over twisted pair.
1990 - IEEE 802.3i Ethernet standard, 10BaseT.
1991 - July - EIA/TIA 568 standard for telecommunications wiring in commercial buildings.
1991 - August - EIA/TIA TSB 36 for higher grade cables (Cat 4 and Cat 5).
1992 - August - EIA/TIA TSB 40 for higher grade connecting hardware.
1993 - IEEE 802.3j Ethernet standard 10BaseFL, Ethernet fibre links up to 2km.
1994 - January - EIA/TIA TSB 40A - included patch cords and testing in more detail.
1994 - January - EIA/TIA 568 revised to EIA/TIA 568A and included TSB 36, TSB 40A and other amendments.
1995 - IEEE 802.3u Fast Ethernet standards 100BaseTX (2 pair Cat 5), 100BaseT4 (4 pair Cat 3), 100BaseFX.
1997 - IEEE 802.3x Full duplex Ethernet standard.
1997 - IEEE 802.3y 100BaseT2 Fast Ethernet standard (2 pair Cat 3).
2001 - Cat 5e standard - ANSI/TIA/EIA-568-B.2
2002 - Cat 6 standard - ANSI/TIA/EIA-568-B.2-1
2008 - Cat 6A standards - ANSI/TIA/EIA-568-B.2-10
2008 - Class EA and FA standards - Amendment 1 to ISO/IEC 11801, 2nd Ed

Coaxial





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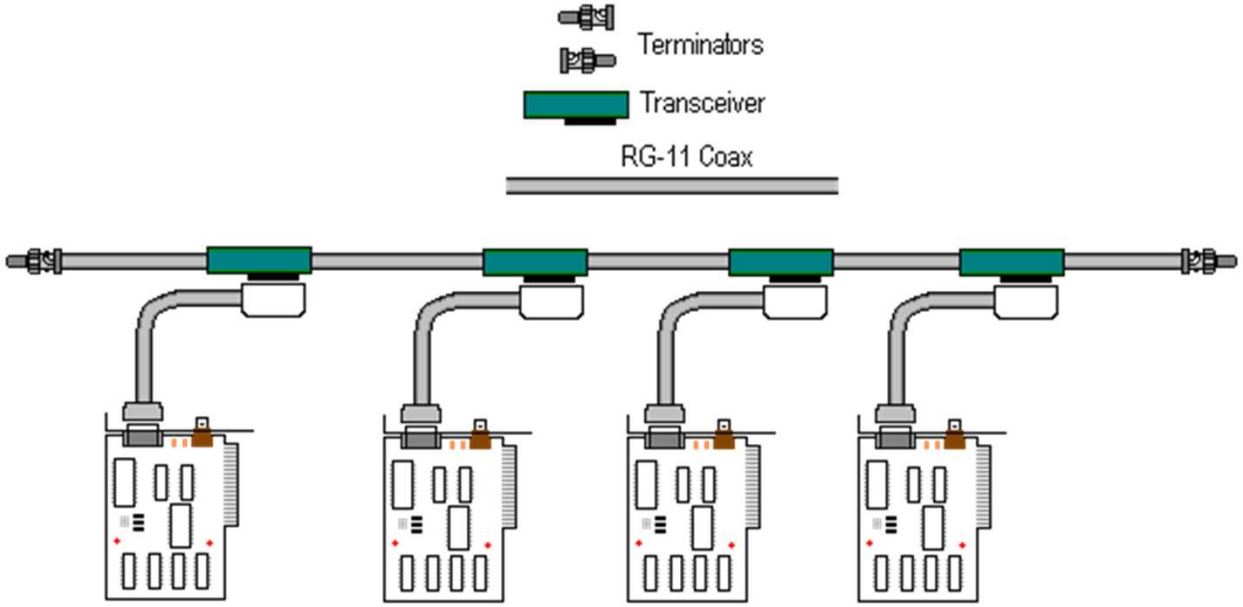
Coaxial



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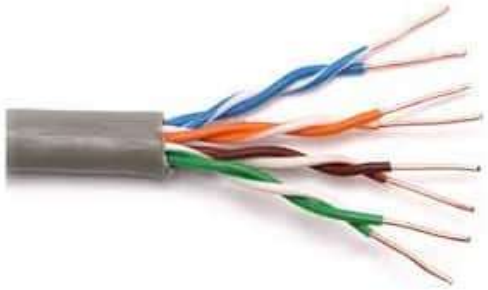
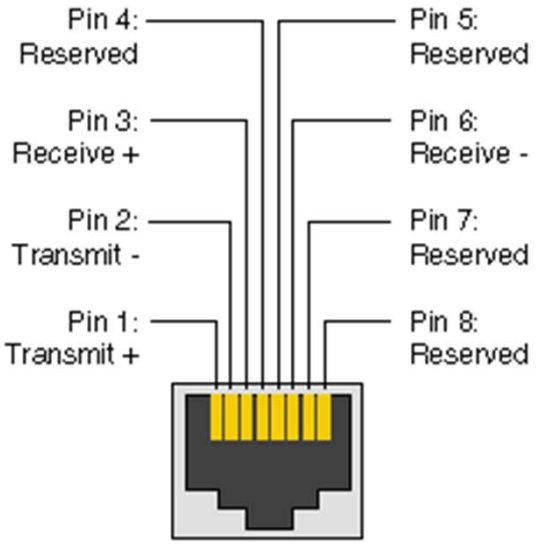
Twisted Pair



UTP Cable

STP Cable



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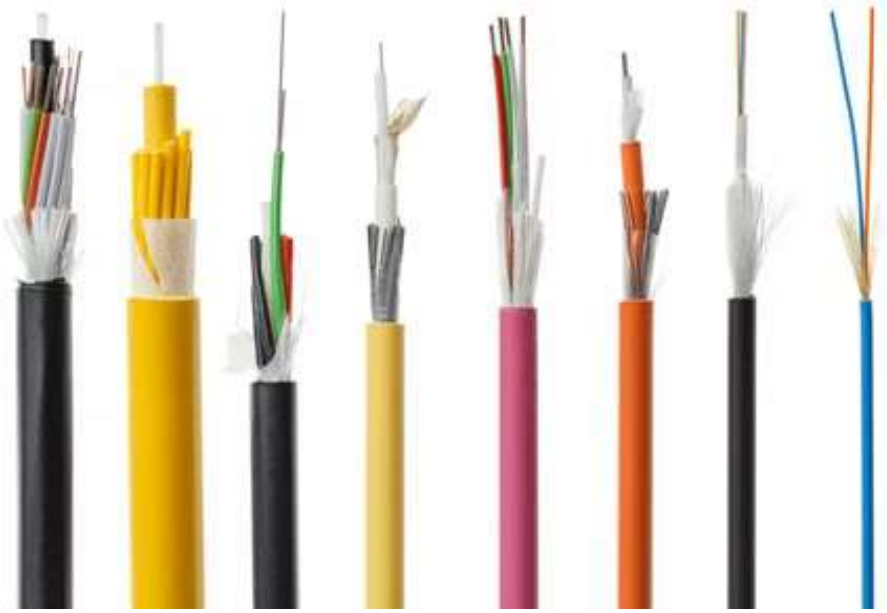
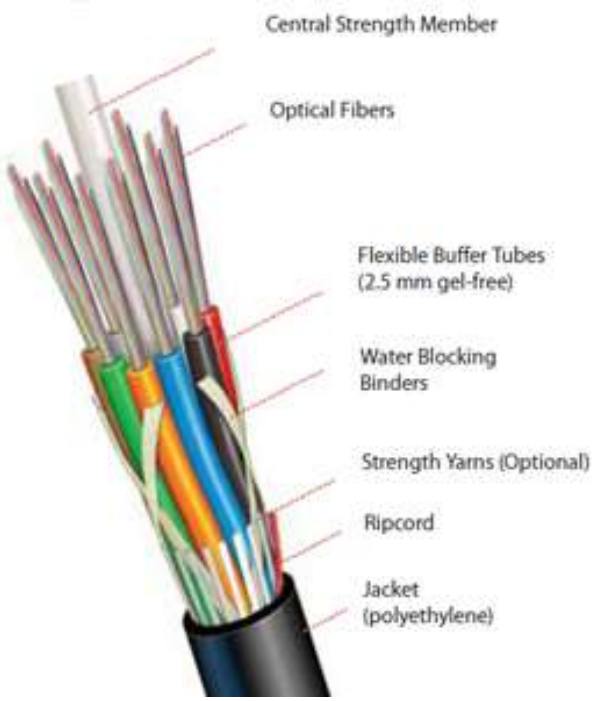
Fibra óptica





Estándares de “Twisted Pair”

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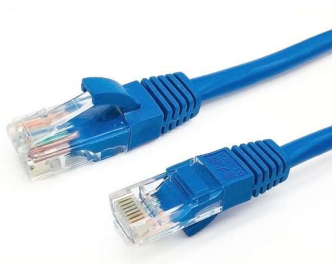
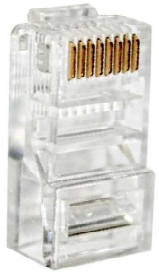
Twisted Pair

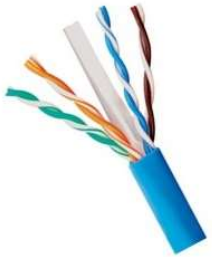


CATEGORY	BANDWIDTH (MHz)	MAXIMUM DATA RATE	APPLICATION
CAT1	<1	<100 Kbps	Telephone/ISDN
CAT2	4	4 Mbps	IBM Token ring LANs / T1-Lines
CAT3	16	16 Mbps (3-4 twists/ foot)	10 Base-T LANs Currently used in Telephone Lines
CAT4	20	20 Mbps	16 Mbps Token ring LANs
CAT5	100	100 Mbps 1000 Mbps (using 4 pairs) (3-4 twists/ inch)	100 Base – T (Fast Ethernet) 155 Mbps ATM / Gigabit Ethernet
CAT5E	100	100 Mbps 1000 Mbps (using 4 pairs)	100 Base – T (Fast Ethernet) 155 Mbps ATM / Gigabit Ethernet
CAT6	200-250	1 Gbps	Gigabit Ethernet
CAT7	600	1 Gbps	Gigabit Ethernet (over long distance than CAT6)



Twisted Pair

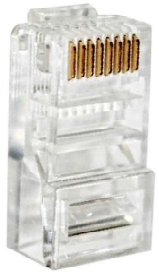
Cat5e



Cat6

Cat6a

Cat7



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Twisted Pair

	Frequency Mhz	EN 50173	ISO/ IEC 11801 2 ed
	100 MHz	Cat 5e Classe D	Cat 5e Classe D
	250 MHz	Cat 6 Classe E	Cat 6 Classe E
	500 MHz	Cat 6_A Classe E_A	Cat 6_A Classe E_A
	600 MHz	Cat 7 Classe F	Cat 7 Classe F
	1200 MHz	Cat 7_A Classe F_A	Cat 7_A Classe F_A
	1200 MHz	Cat 7_A Classe F_A	Cat 7_A Classe F_A
	1600/2000 MHz	Cat8.2 Class I+II	Cat8.2 Class I+II

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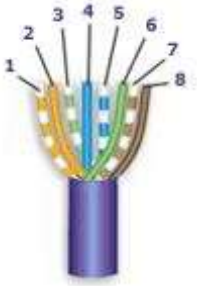
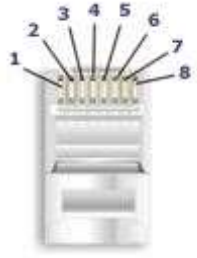
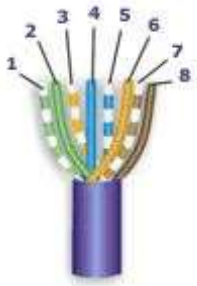
“Twisted Pair”



568-B Wiring

Pair #	Wire	Pin #
1-White/Blue	White/Blue	5
	Blue/White	4
2-Wht./Orange	White/Orange	1
	Orange White	2
3-White/Green	White/Green	3
	Green/White	6
4-White/Brown	White/Brown	7
	Brown/White	8
< 568-B Diagram		





568-A Wiring

Pair #	Wire	Pin #
1-White/Blue	White/Blue	5
	Blue/White	4
2-White/Green	White/Green	1
	Green/White	2
3-White/Orange	White/Orange	3
	Orange/White	6
4-White/Brown	White/Brown	7
	Brown/White	8
< 568-A Diagram		

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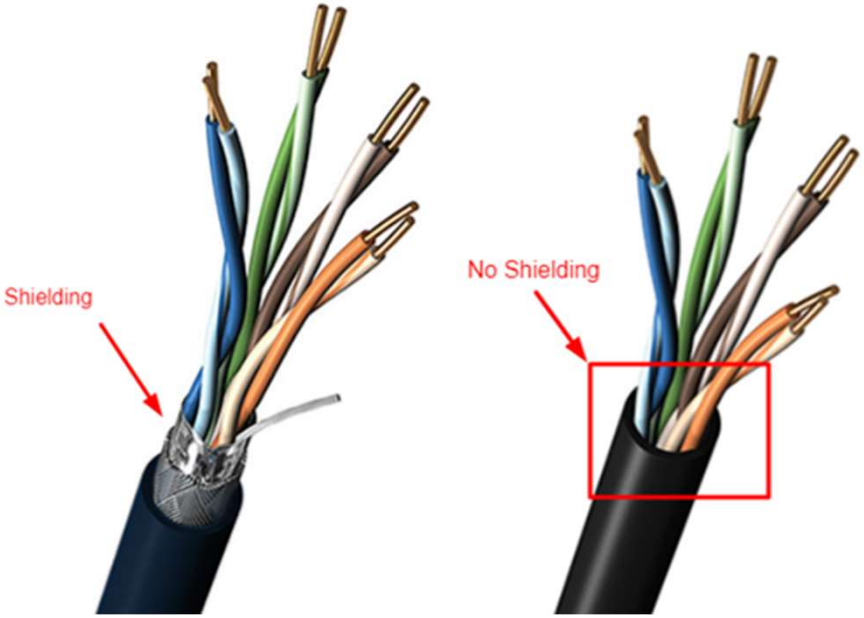
UTP & STP



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Diferencia entre
Straight Thru vs. Cross Over

Diferencia entre Straight Thru vs. Cross Over

	PC	HUB	Bridge	Switch	Router
PC	Cross Cable	Straight	Cross Cable	Straight	Cross Cable
HUB	Straight	Cross Cable	Straight	Cross	Straight
Bridge	Cross Cable	Straight	Cross Cable	Straight	Cross Cable
Switch	Straight	Cross	Straight	Cross Cable	Straight
Router	Cross Cable	Straight	Cross Cable	Straight	Cross Cable

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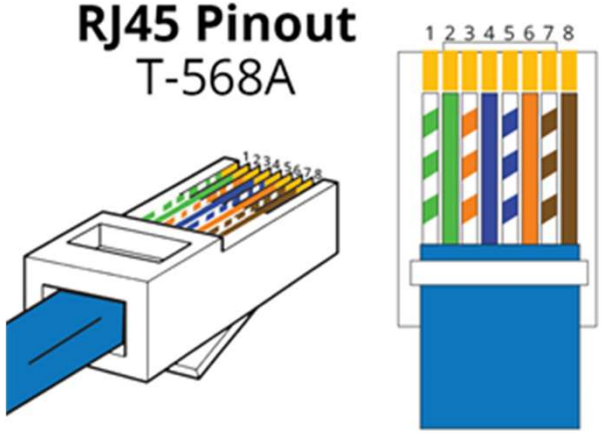
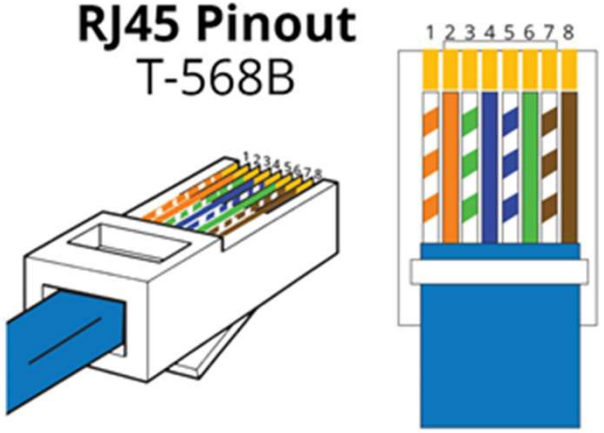
Straight Through & Cross Over

RJ45 Pinout
T-568A



1. White Green	5. White Blue
2. Green	6. Orange
3. White Orange	7. White Brown
4. Blue	8. Brown

RJ45 Pinout
T-568B



1. White Orange	5. White Blue
2. Orange	6. Green
3. White Green	7. White Brown
4. Blue	8. Brown

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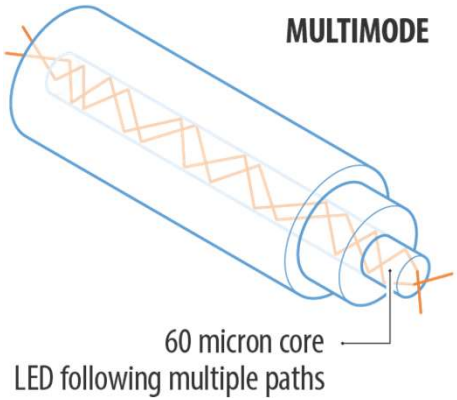
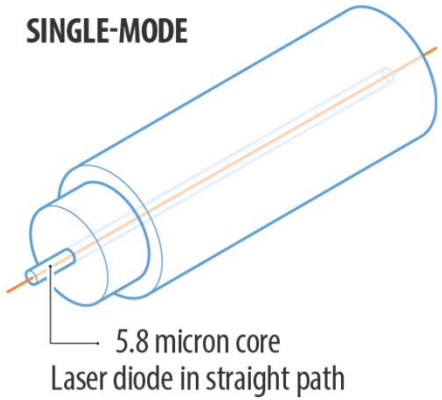
Fibra óptica

Fibra Optica





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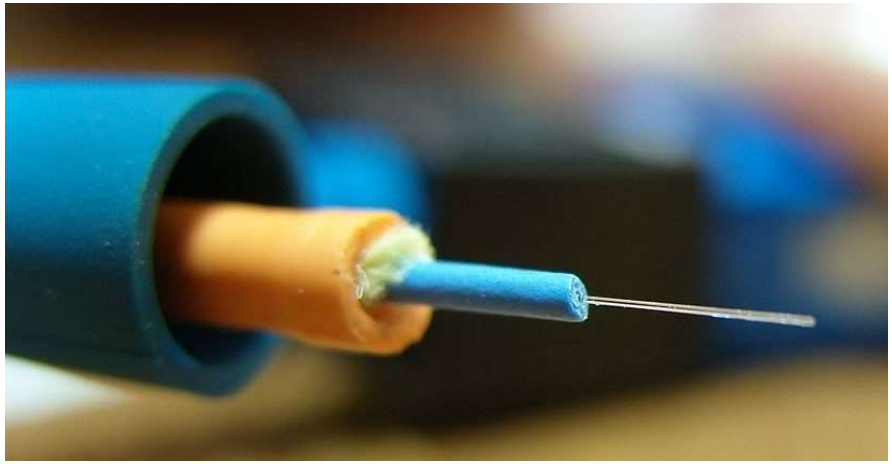
Fibra Optica

Single Mode	Multi-Mode
Filamento es mas pequeño	Filamento es mas grande
Menos dispersion	Mas dispersion
Carga solo 1 rayo de luz	Carga varios rayos en distintos angulos
Distancias largas aprox 100Km	Distancias cortsas aprox 2Km
Utilizando para conectividad "backbone" y largas distanticias	Utilizado mayormente en distancias mas cortas e interconexiones
Mas costoso	Menos costoso



¿Cuál tipo de cable escoger?

Cual tipo de cable escoger?

- Determinar donde se utilizará el cableado
- Determinar capacidad de transferencia requerida
- Determinar distancias entre un punto de interconexión a otro
- Que tipo de equipos se interconectarán?
- Cual es el presupuesto disponible?
- Cuales son las herramientas necesarias?

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Cual tipo de cable escoger?

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