

Cables and Connectors



Overview



Cable types

Connector types

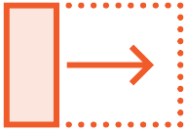
Matching cables and connectors to needs



Cable Types



Peripheral and Network Cables



Standard cables contain one or more copper wires to transmit electricity



Fiber optic cables contain glass or plastic fibers to reflect light wavelengths



Cable length determines signal strength and quality

Cable Transmission Types

Serial

Transmits one bit at a time

More common than parallel

Faster transmission rates

Universal Serial Bus (USB)

Serial ATA (SATA)

Parallel

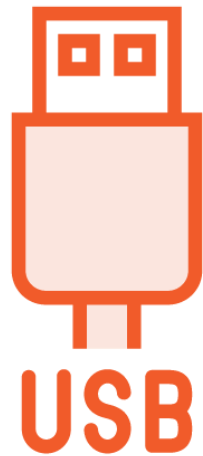
Transmits multiple bits simultaneously

Older cable type

Electrical signal interference from adjacent cables

Smaller transmission distance than serial





USB

- Serial transmission
- Large number of peripheral types
- Consider not only USB cables, but also devices and computer ports
- V 1.1: 12 Mbps
- V 2: 480 Mbps
- V 3: 5 Gbps
- V 3.1: 10 Gbps
- USB C
 - Device battery charging and data transfer

Hard Disk Drive Cables

IDE

Parallel

Also called PATA

40 or 80 wires

SCSI

Parallel

Internal

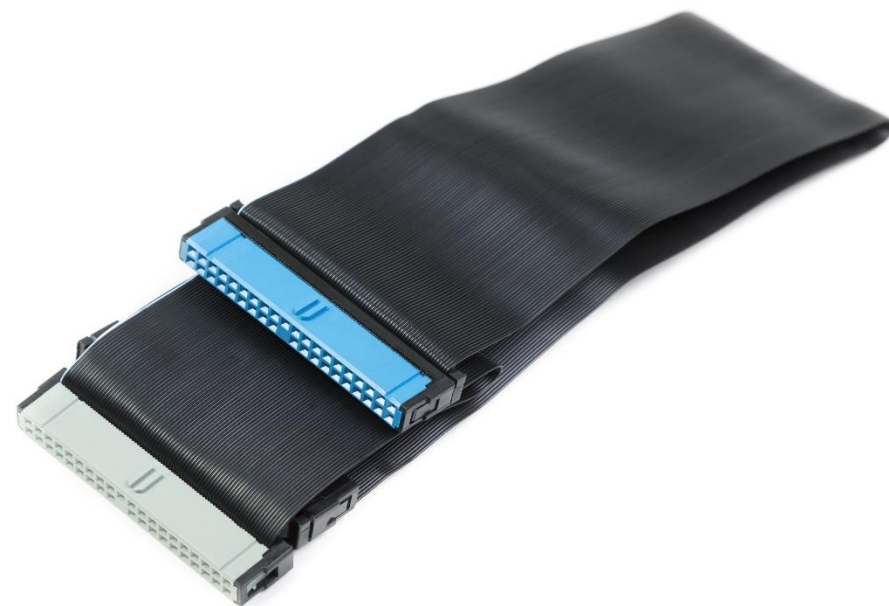
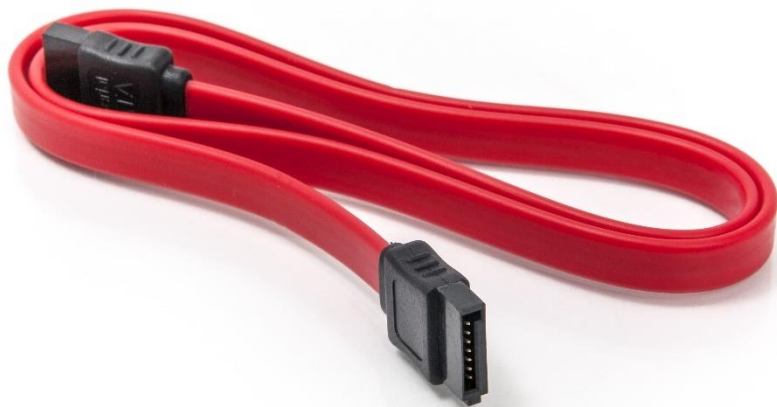
External

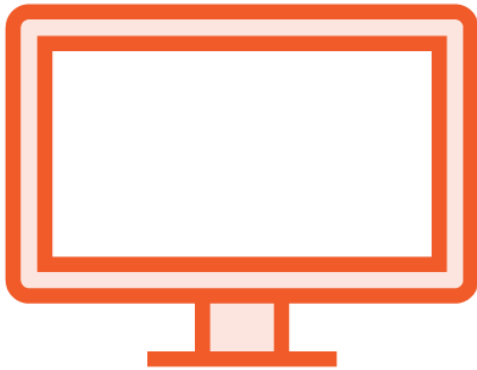
SATA

Serial ATA



SATA and PATA Cables





Video Cables

VGA

- Video Graphics Array
- Analog
- Video only

DVI-D, DVI-A, DVI-I

- Digital, analog or integrated
- Video only

DisplayPort

- Copper or fiber
- 3m up to 15m



HDMI

Video Cables

HDMI

- High-Definition Multimedia Interface
- Digital
- High-definition video
- Multi-channel audio
- Modern monitors and TVs

Mini-HDMI

- Smaller than HDMI
- Cameras, tablets

Micro-HDMI

- Smaller than mini
- Smartphones





HDMI Cable



Network Cables

Twisted Pair

Transmits electrons

Twists reduce
interference

Shielded (STP)

Unshielded (UTP)

Coax

Transmits electrons

Single copper core

Rarely used (primarily
for Cable modems)

Fiber

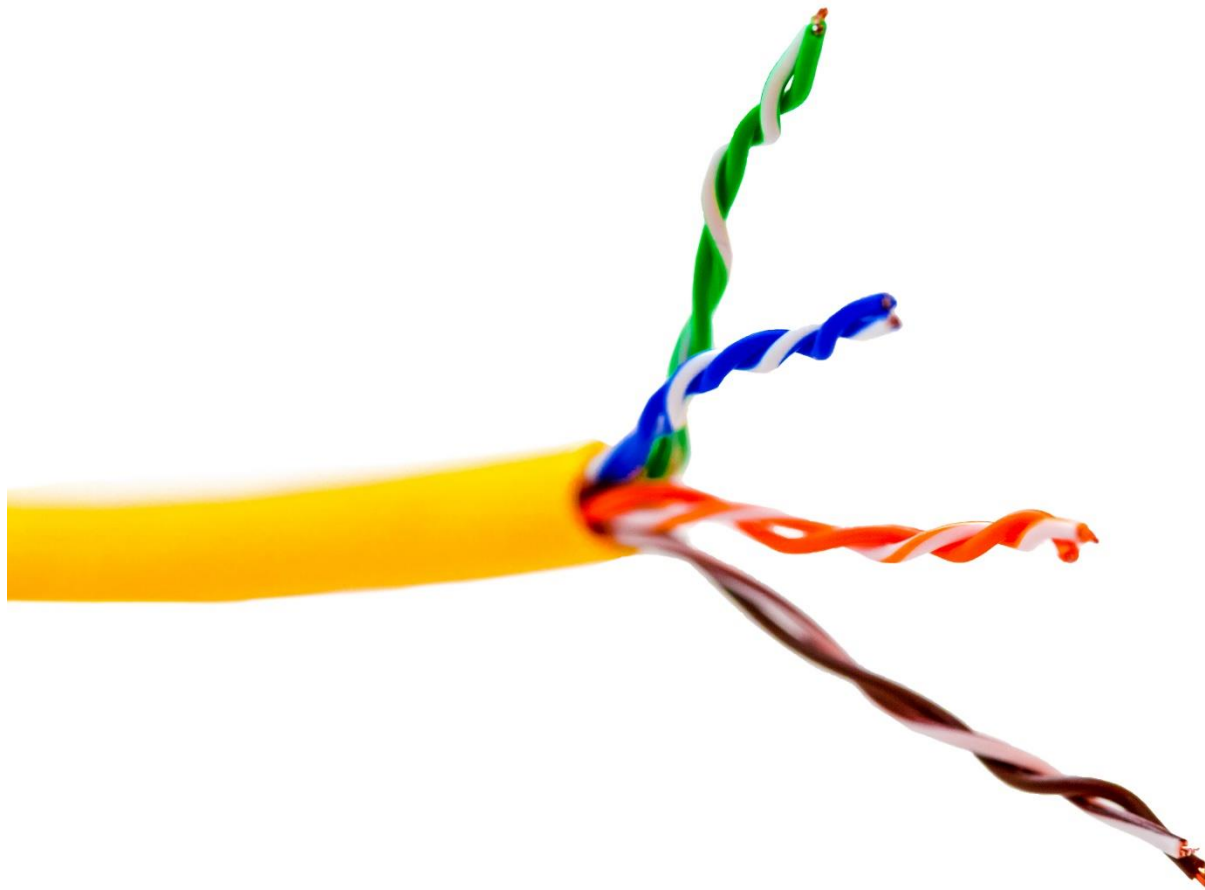
Transmits light

Glass or plastic fibers

Longer distances

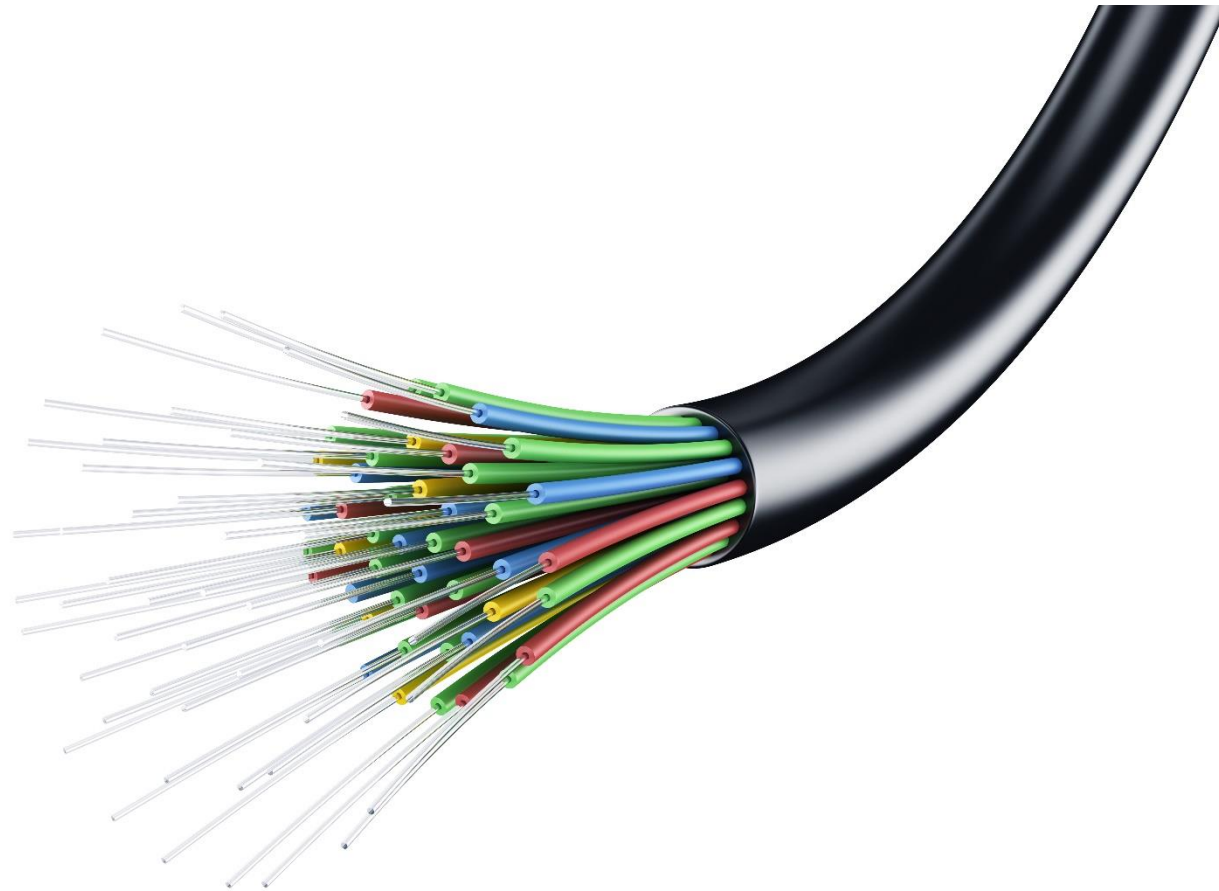


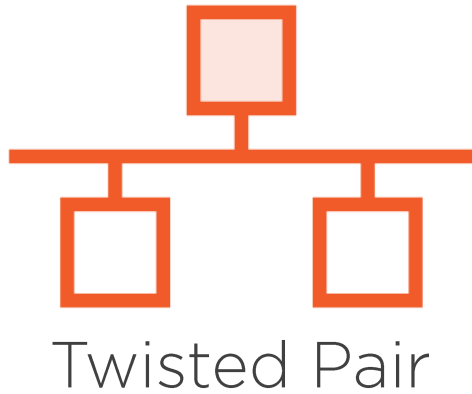
Copper Twisted Pair Cable





Fiber Optic Cable





568A wiring standard

- Crossover cables
- One end of cable

568B wiring standard

- Straight-through cables
- Both ends of cable

Cat5: 100 Mbps

Cat5e: 1000 Mbps

Cat6: 10 Gbps

Multipurpose Cables

Plenum

A type of cable rating
Use in and near air
ventilation systems
Low smoke and toxin if
on fire

Thunderbolt

PCI Express +
DisplayPort
Allows device daisy-
chaining such as
monitors and storage
drives

Lightning

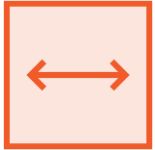
Connectivity between
Apple iOS devices and
peripherals



Connector Types



Connectors



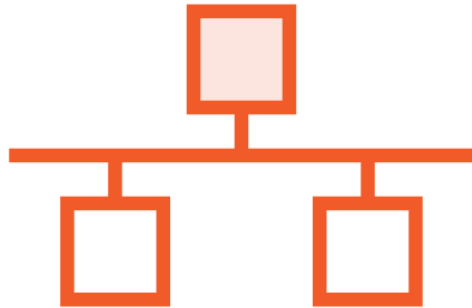
A single cable can have a different connector on either end

Adapters can be used when a cable does not have the appropriate connector, such as serial RS-232 to USB



Crimping tools can be used to attach cable wires to connectors for custom-built cables





Network Connectors

Fiber Optic

- Straight Tip (ST)
- Lucent Connector (LC)

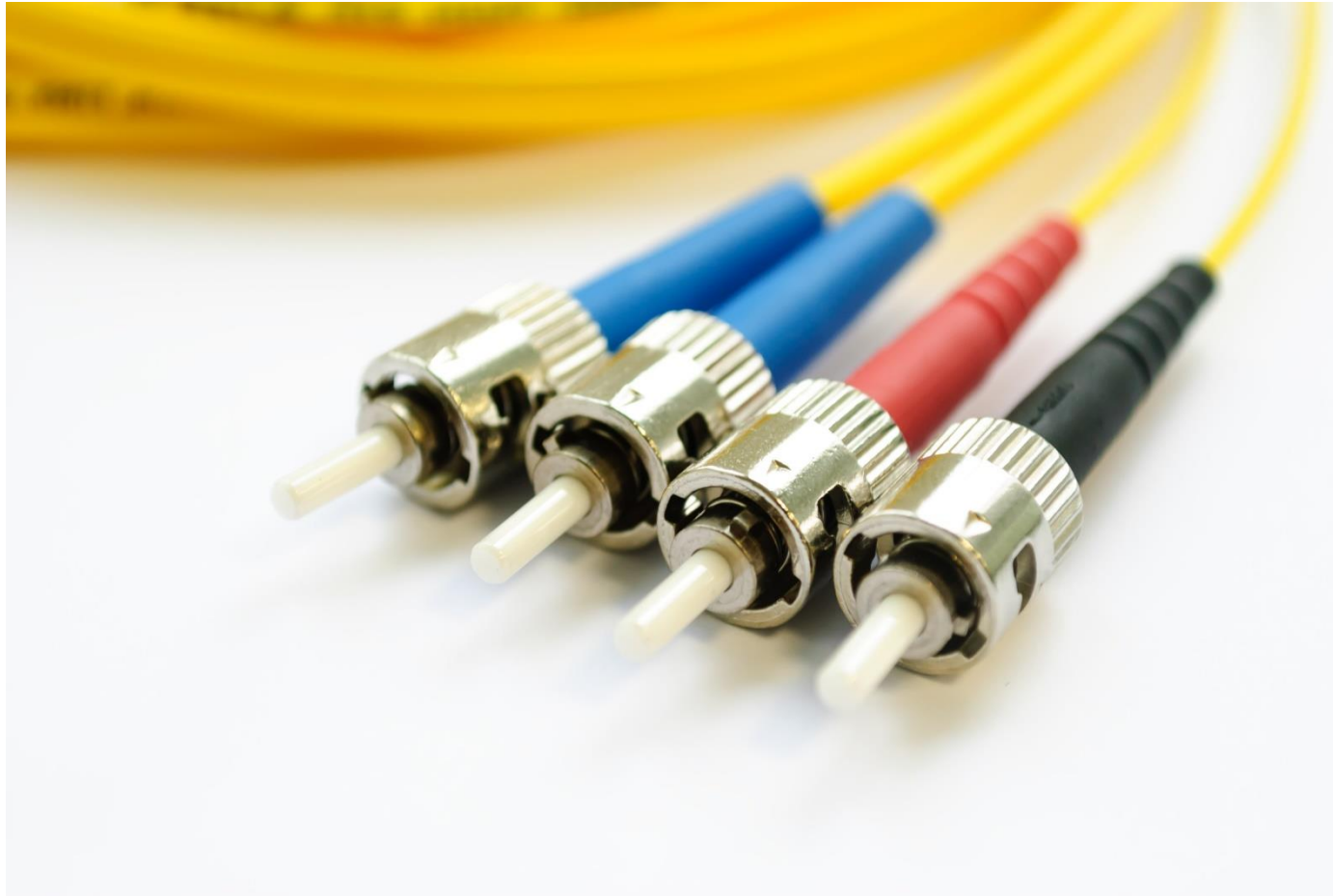
BNC

- Used with coaxial cable
- Cable types such as RG-6, 58, 59

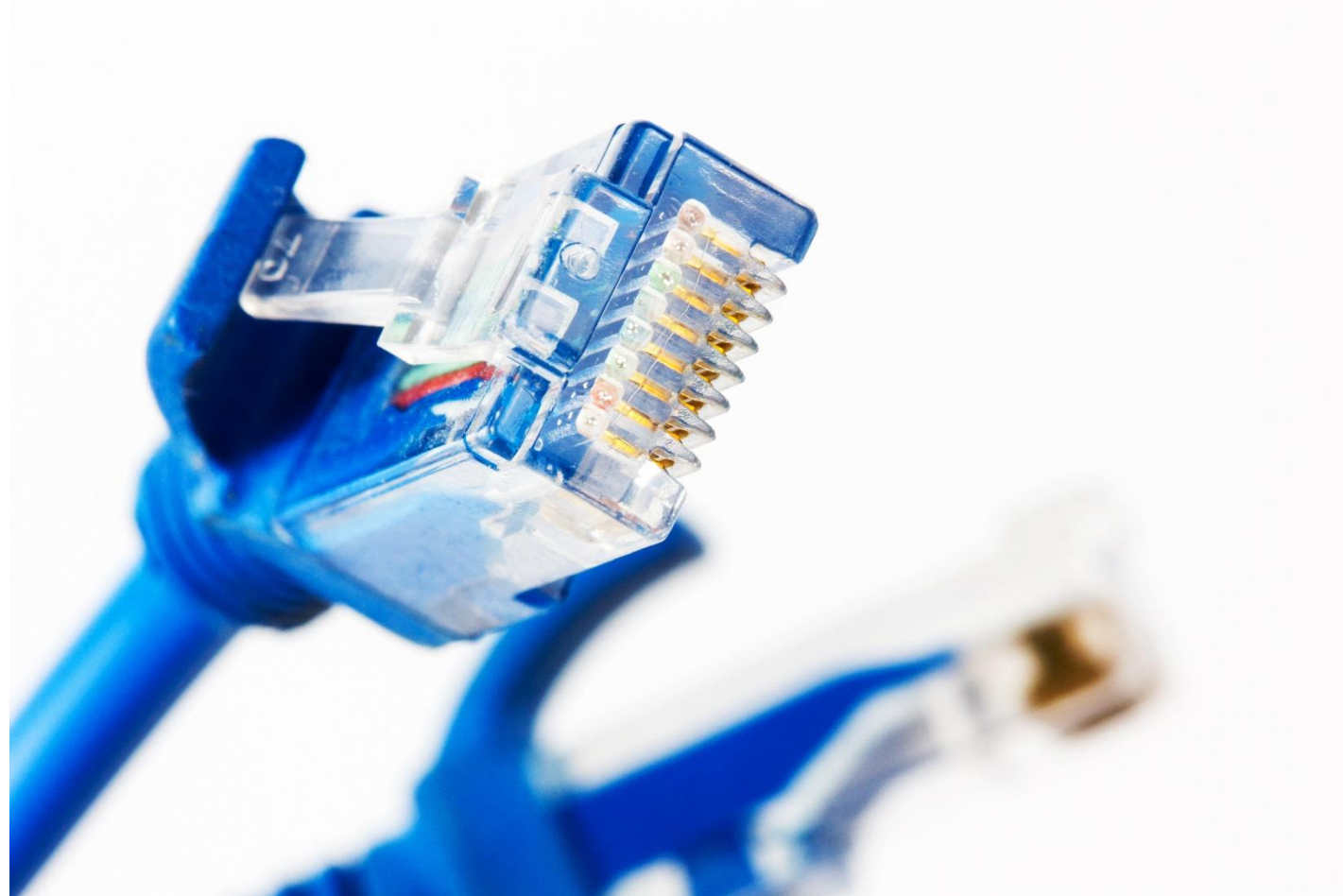
Registered Jack (RJ)

- Used with UTP and STP
- RJ-11: 4 wire telephone
- RJ-45: 8 wire network

Fiber Optic Straight Tip (ST) Connector



Registered Jack (RJ-45) Connector





VGA

Connectors

USB

- Mini-USB: Smartphones, tablets, cameras
- Micro-USB: Smartphones, tablets, cameras, smaller and more rectangular

VGA

- 15 pins, 3 rows

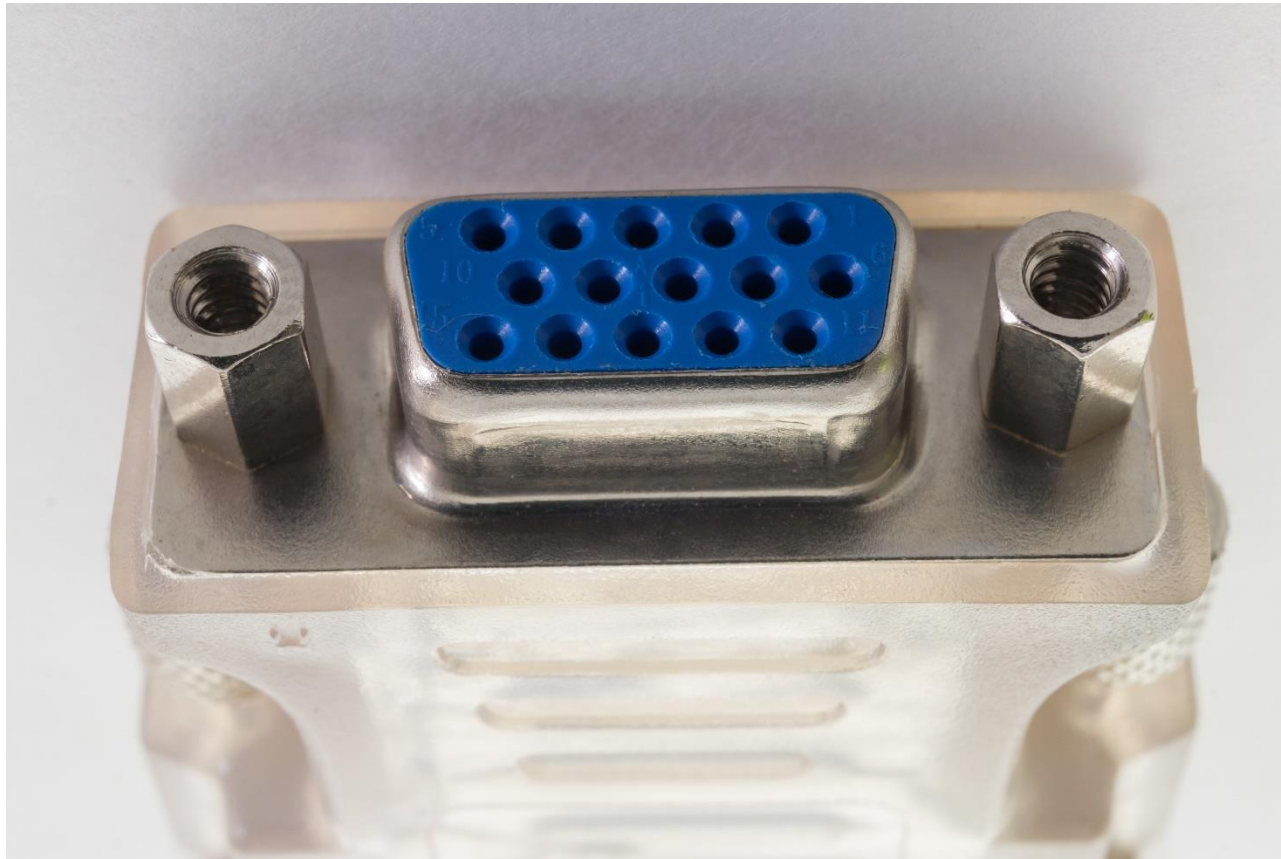
DB-9

- Legacy connector type
- 9 pins
- RS-232 is a common type

USB Connectors



VGA Video Connector





Connectors

Molex

- 4 pin power connector for internal components such as legacy hard drives

Lightning

- Mobile Apple device charging and data transfer (sync)

SCSI

- Legacy internal 50 pin ribbon cable
- Modern SFF-8484 internal SAS

eSATA

- External SATA drive connectivity
- Common port found on laptops



Connector Adapters

DVI

HDMI

DVI

VGA

USB

Ethernet

USB

Serial

Molex

SATA



DVI to VGA Adapter



Molex to SATA Adapter



Match Cables and Connectors to Needs



TV Connectors



Projector Connectors



Cisco router
Local console
management from
laptop
RS-232 port
RJ-45 ports



USB to Serial Adapter



ADSL Internet modem
Connectivity from
modem to wall phone
jack



RJ-11 Telephone Cable
and
a Potential Line Filter



Office desktop
Wired connectivity to
wall Ethernet network
jack
Minimize electrical
interference



Cat 6 STP Cable with RJ-45 Connectors



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