

USB 3.0 Connector

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TE Connectivity Offers USB 3.0 connector

Key Features

- Over 10X performance increase
- Support 5 Gbps data rate for fast sync-n-go
 - Minimizes user wait-time
- Backward compatible with USB 2.0 connector
- Minimize connector form factor variations
- Contain EMI
- Comprehend ease-of-use aspects
- Optimized power efficiency
 - No device polling
 - Lower active and idle power requirements

USB 3.0 Applications

- Storage
 - External hard drives
 - Flashcard readers for digital cameras
- High definition A/V equipment
- Desktop & laptop computers
- Keyboards/ mice/ joysticks
- Printers/ scanners
- Game ports
- Modems
- Cell phones
- GPS devices
- MP3 player
- Set-top-box

Comparison



- **Consumer Electronics**

- Ease-of-use, energy efficiency, and reliability
- Backward compatibility with existing devices/classes



- **Storage**

- SuperSpeed data transfer with large amounts of storage
- Superior power management of mass storage devices



- **High Definition A/V**

- HD and real-time scenarios
- Improved experiences for rich-media devices

Why We Need SuperSpeed USB?

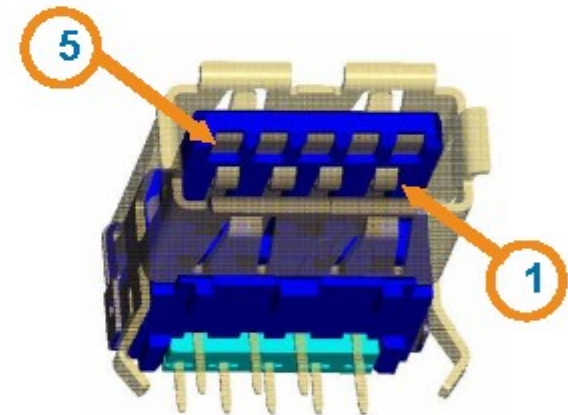
- Flash-based peripherals will require much higher data rates
- User wait time requirement
- Interface performance sets the requirement

	Song / Pic	256 Flash	USB Flash	SD-Movie	USB Flash	HD-Movie
	4MB	256MB	1 GB	6 GB	16 GB	25 GB
USB 1.0	5.3 sec	5.7 min	22 min	2.2 hr	5.9 hr	9.3 hr
USB 2.0	0.1 sec	8.5 sec	33 sec	3.3 min	8.9 min	13.9 min
USB 3.0	0.01 sec	0.8 sec	3.3 sec	20 sec	53.3 sec	70 sec

USB 3.0 Standard – A Connector

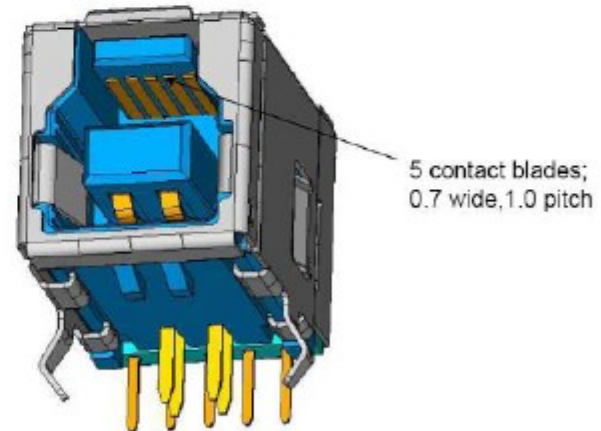
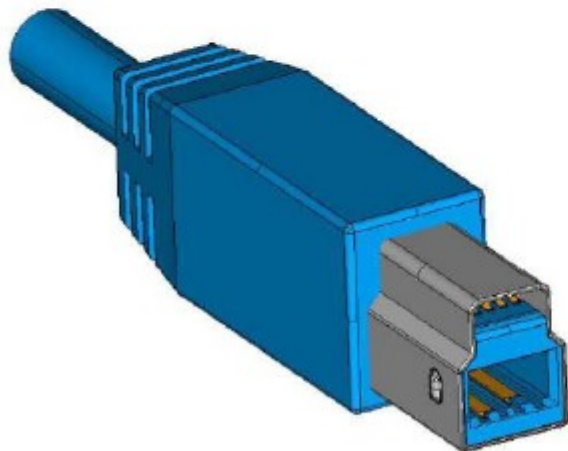
- Same interface as the USB 2.0 standard – A connector, but with added pins for SuperSpeed USB signals
- Complete compatibility with USB 2.0 standard – A connector

Pin #	Single Name	Description
1	VBUS	Power
2	D-	USB 2.0 differential pair
3	D+	
4	GND	Ground for power return
5	StdA SSRX-	SuperSpeed receiver differential pair
6	StdA SSRX+	
7	GND DRAIN	Ground for signal return
8	StdA SSTX-	SuperSpeed transmitter differential pair
9	StdA SSTX+	



USB 3.0 Standard – B Connector

- Defined for relatively large, stationary peripherals such as hard drives and printers
- Visually different from USB 2.0 standard – B connector
 - But the receptacle accepts a USB 2.0 standard – B plug



USB 3.0 Micro Connector Family

- Defined for hand held devices
- Backward compatible with USB 2.0 micro connectors
- Based on USB 2.0 micro – B connector with an extended portion for the SuperSpeed USB signals
- USB 3.0 Micro – A and – AB connectors are identical to USB 3.0 Micro – B connector except for different keying



Connector Mechanical Requirements

- **Durability**

- Micro family: 10,000 cycles
- All other connectors
 - Standard durability class: 1,500 cycles
 - High durability class: 5,000 cycles

- **Unmating force**

- 10N min initial, 8N min EOL

- **4-Axis continuity**

- Required for Micro connector family

- **Mated cable assembly voltage drop (Vbus and GND, respectively)**

- 225mV max with a 900mA current

Connector Electrical Requirements

- **Voltage**
 - 30 VA
- **Current**
 - Pin 1 & 4 – 1.8A; other pins – 0.25A min.
- **Contact Resistance**
 - Pin 1 & pin 4 – 30m Ω ; other pins – 50m Ω max.
- **Dielectric Withstanding Voltage:**
 - 100 VAC
- **Insulation Resistance**
 - 100M Ω
- **Impedance:**
 - 90 Ω +/- 15 Ω @ 50 ps rise time (20% - 80%)

Connector Interoperability Summary

USB Receptacle	USB Plugs Accepted
2.0 Standard – A	USB 2.0/ 3.0 Standard (A)
3.0 Standard – A	USB 2.0/ 3.0 Standard (A)
2.0 Standard – B	USB 2.0 Standard (B)
3.0 Standard – B	USB 2.0/ 3.0 Standard (B)
3.0 Powered – B	USB 3.0 Powered (B), USB 2.0/ 3.0 Standard (B)
2.0 Micro – B	USB 2.0 Micro (B)
3.0 Micro – B	USB 2.0/ 3.0 Micro (B)
2.0 Micro – AB	USB 2.0 Micro (B) or (A)
3.0 Micro – AB	USB 2.0/ 3.0 Micro (B), 2.0/ 3.0 Micro (A)

In Summary

- **Over 10X performance increase**
 - Supports 5 Gbps data rate
 - HD-move transfers in 70 sec. vs. 13.9 min. with USB 2.0
- **Fast sync-n-go**
 - Minimizes user wait-time
- **Optimized Power Efficiency**
 - No device polling
 - Lower active and idle power requirements
- **Backward compatible with USB 2.0 connector**



Quick Reference Guide USB 3.0 Connectors

■

TE Connectivity, a voting member of Universal Serial Bus - Implementers Forum (USB-IF), offers a new USB 3.0 connector that retains all the great features of previous generations of USB connectors with even better performance and power management.

TE Connectivity offers a full line of USB 3.0 product solutions, including various configurations of Standard A and B style plugs and receptacles; powered B plugs and receptacles; Micro B and AB plugs and receptacles; and cable assemblies. Various stacked and combination variations are expected to round out the TE Connectivity USB 3.0 portfolio.

FEATURES AND BENEFITS

- Supports up to 5 Gbps
- 10X faster than USB 2.0
- Optimized power efficiency
- Backward compatible with USB 2.0
- Minimized connector form factor variations

PRODUCT APPLICATIONS

- Desktop and laptop computers
- Cameras
- Digital audio
- High-volume storage devices
- High definition A/V equipment
- Keyboards / Mice / Joysticks

Quick Reference Guide

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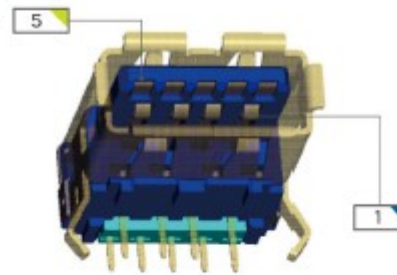
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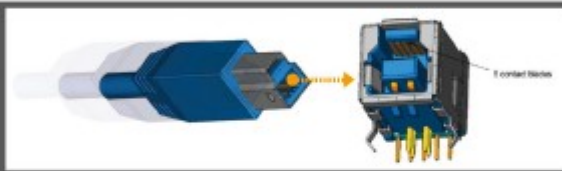
USB 3.0 has a 10x performance increase over USB 2.0

- Standard A Receptacle has same interface as the USB 2.0, but with added pins for SuperSpeed USB signals

Pin #	Signal Name	Description
1	VBUS	Power
2	D-	USB 2.0 differential pair
3	D+	
4	GND	Ground for power return
5	SSA_SSRX-	SuperSpeed receiver
6	SSA_SSRX+	differential pair
7	GND_DRAIN	Ground for signal return
8	SSA_SSTX-	SuperSpeed transmitter
9	SSA_SSTX+	differential pair



Standard B connector is visually different from USB 2.0 but the receptacle accepts a USB 2.0 Standard - B plug



USB 3.0 has better power optimization than USB 2.0

- Up to 80% more power
- Elimination of device polling



Minimized connector form variations

- Mini and Micro consolidated into Micro USB 3.0



FULL SIZE USB 3.0 Connectors

	Base Part #	Type	Plug/Recept	Ports	TH/SMT	Orientation	Std/Rvs	Offset
	1932286	A	Plug	1	-	-	Std	-
	1932269	A	Recept	1	TH	RA	Std	-
	1932658	A	Recept	1	TH	RA	Rvs	-
	1932354	A	Recept	1	TH	RA	Rvs	CL = 1.75
	1932295	A	Recept	1	TH	RA	Rvs	CL = 0.14
	2041179	A	Recept	1	TH	RA	Std	CL = 1.04
	1932305	A	Recept	2	TH	RA	Std	-
	1932269	B	Recept	1	TH	RA	Std	-

USB 3.0 Cable Assemblies

Base Part #	Description	Color
2117154	Std A to Std B	Black
2117155	Std A to Micro B	Black
2117156	Std A Male to Std A Male	Black
2117157	Std A Male to Std A Female	Black
2117158	Std A Male to Open	Black
2117159	Micro A to Micro B	Black
2117160	Micro A to Open	Black

USB 3.0 Connectors Overview

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TE's USB 3.0 connector meets all standards of USB-IF. It supports 5 Gbps data rate for fast sync-n-go, a 10X performance increase over USB 2.0 which makes downloading your favorite HD movie a snap. Besides, the USB 3.0 connector is backward compatible with USB 2.0 while offering optimized power efficiency by eliminating device polling and reducing active and idle power requirements. It allows for the unit load of 150mA (which is a 50% increase over the minimum unit load of USB 2.0) up to 6 unit loads (which is 900 mA, an 80% increase over USB 2.0 at a registered maximum of 500 mA). This means that USB 3.0 has up to 80% more power based on the configuration of the device.

According to the USB-IF, the standards body controlling the USB specification, the USB connector is the most popular form of interconnect in the consumer electronics marketplace today -- based on broad proliferation, versatility and ease of use. This interconnect clearly found its place in the PC and PC peripheral arena and can be found in nearly every consumer device produced in the last decade.

Key Features

- ▶ Minimizes user wait-time
- ▶ Backward compatible with USB 2.0 connector
- ▶ Minimize connector form factor variations
- ▶ Comprehend ease-of-use aspects
- ▶ Optimized power efficiency
- ▶ Plug and Play capacity

Applications

- ▶ Desktop and Laptop Computers
- ▶ Camera
- ▶ Digital Audio
- ▶ High-volume Storage Devices
- ▶ Scanners
- ▶ Game ports
- ▶ GPS Devices
- ▶ MP3 Players
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