USB 3.0 Connectors

EVERY CONNECTION COUNTS

TE connectivity

TE Connectivity offers USB 3.0 Connectors

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 Do We Need SuperSpeed USB?

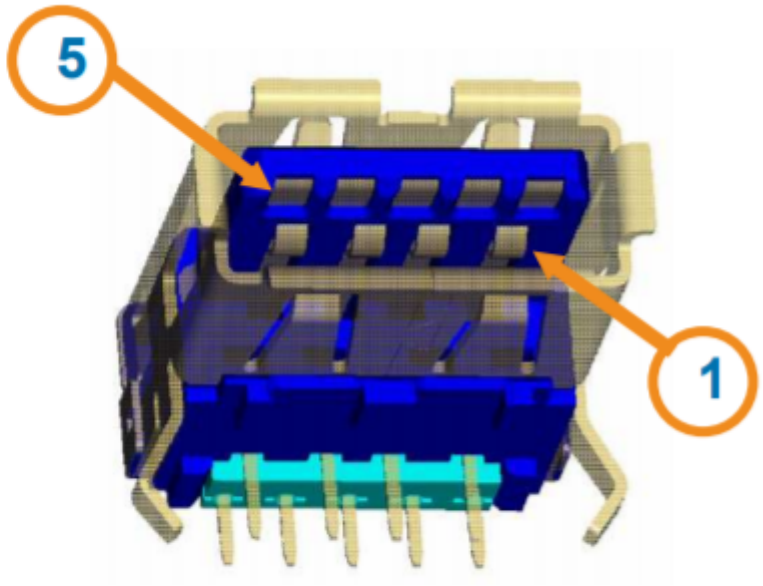
- Flash-based peripherals will require much higher data rates
- User wait time requirement
- Interface performance sets the requirement

	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

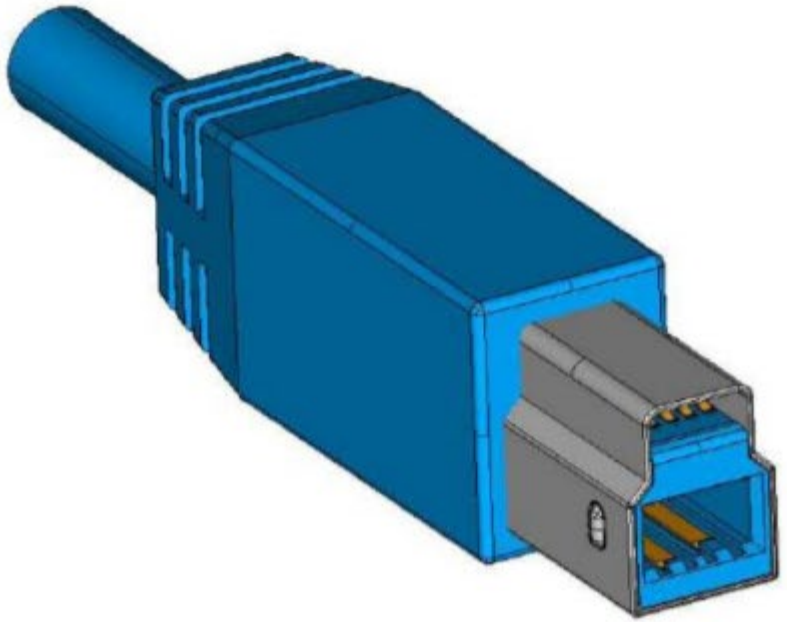
- Same interface as the USB 2.0 standard – A connector, but with added pins for SuperSpeed USB signals
- Complete compatibility with USB 2.0 standard – A connector

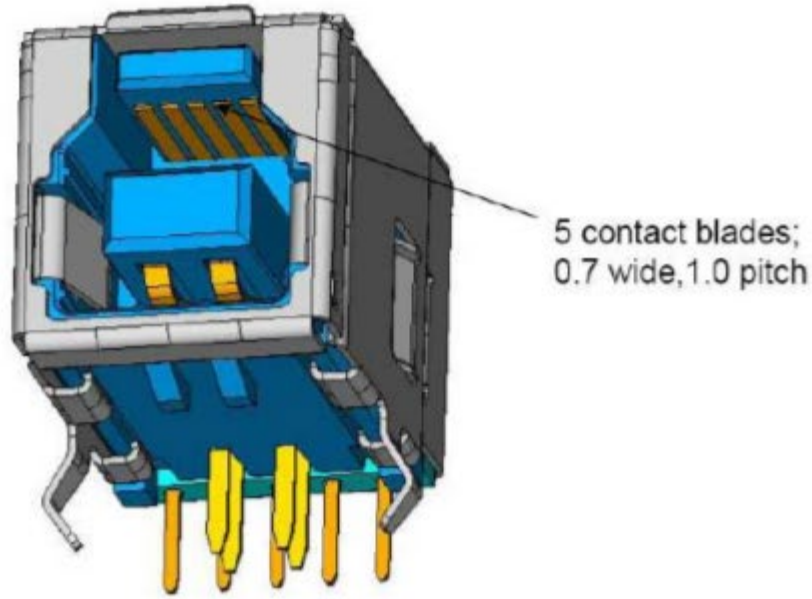
Pin #	Singla Name	Description
1	VBUS	Power
2	D-	USB 2.0 differential pair
3	D+	
4	GND	Ground for power return
5	StdA_SSRX-	SuperSpeed receiver differential pair
6	StdA_SSRX+	
7	GND_DRAIN	Ground for signal return
8	StdA_SSTX-	SuperSpeed transmitter differntial pair
9	StdA_SSTX+	



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





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USB 3.0 Micro Connector Family

- Defined for handheld 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 – 30Ω; other pins – 50mΩ max.
- Dielectric Withstanding Voltage
  - 100 VAC
- Insulation Resistance
  - 100MΩ
- Impedance
  - 90Ω +/- 15Ω @ 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