

# USB 3.0 Connector



© 2010 Tyco Electronics Corporation. All Rights Reserved.  
TE logo and Tyco Electronics are trademarks of Tyco Electronics group of companies and its licensors.

# Tyco Electronics 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

---



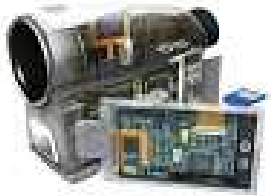
- **Consumer Electronics**

- 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?

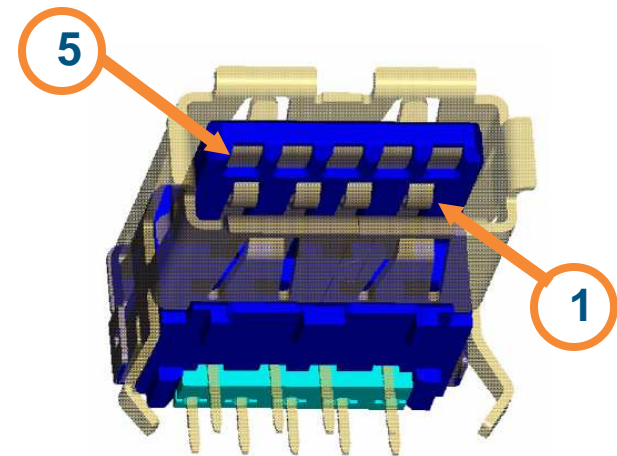
- Flash-based peripherals will require much higher data rates
- User wait time requirement
- Interface performance sets the requirement

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

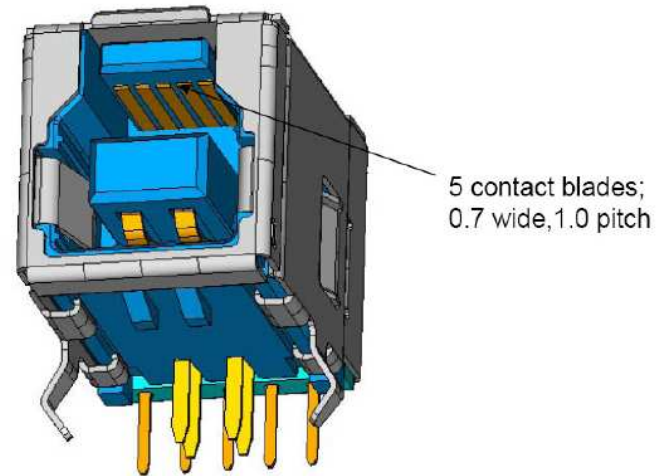
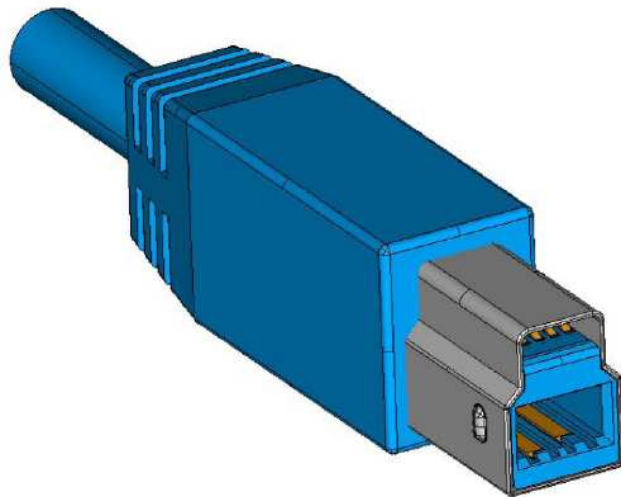
Pin #	Single Name	Description
1	VBUS	Power
2	D-	USB 2.0 differential pair
3	D+	
4	GND	Ground for power return
5	StdA_SSRX-	SuperSpeed receiver differential pair
6	StdA_SSRX+	
7	GND_DRAIN	Ground for signal return
8	StdA_SSTX-	SuperSpeed transmitter differential pair
9	StdA_SSTX+	



# USB 3.0 Standard – B Connector

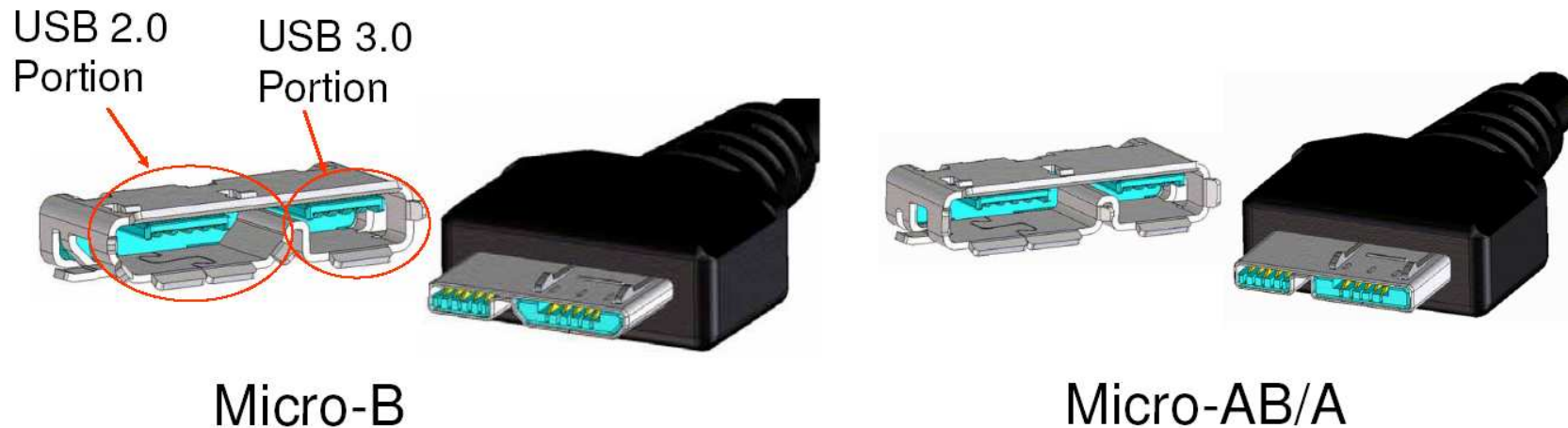
---

- 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 $\Omega$ ; other pins – 50m $\Omega$  max.
- **Dielectric Withstanding Voltage:**
  - 100 VAC
- **Insulation Resistance**
  - 100M $\Omega$
- **Impedance:**
  - 90 $\Omega$  +/- 15 $\Omega$  @ 50 ps rise time (20% - 80%)

# Connector Interoperability Summary

<b>USB Receptacle</b>	<b>USB Plugs Accepted</b>
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**