USB Solutions

Robust USB Portfolio Including Support for USB-C™ and Power Delivery

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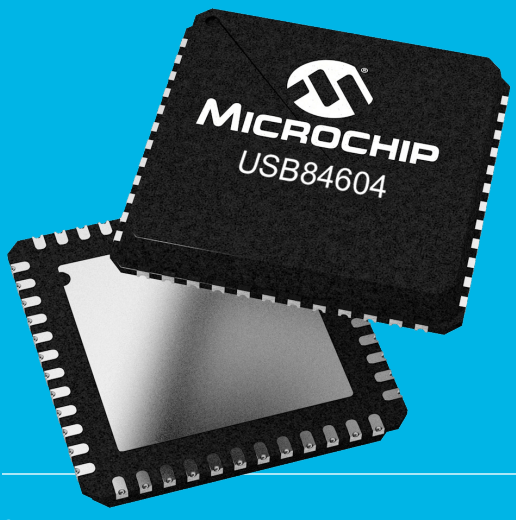
Microchip's USB Solutions

USB Hubs and Devices

Microchip's versatile, cost-effective and power-efficient USB hubs, bridges, switches, transceivers and power delivery controllers deliver industry-leading data throughput in USB environments. The USB hub families provide USB port expansion solutions for USB 2.0 and USB 3.2 applications that demand ultra-low power and a small footprint without compromising on performance.

New SmartHub features include exciting capabilities such as I/O bridging and FlexConnect, integrating more functionality than traditional hubs. Microchip's USB 2.0 family of bridge products combines an ultra-fast interface between a USB host and today's most popular Flash media card and Smart Card formats. Hi-Speed USB 2.0 switches and ULPI-based transceivers provide small footprint and data multiplexing on a common connector with proven ESD protection.



Key Features of Microchip's USB Product Line

- Continued integration of new functionality like I/O bridging reduces risk, design complexity and BOM costs
- Support for USB-C covers basic- to full-featured market tier requirements
- Enables fast battery charging times
- Signal robustness and tuning for optimal design
- Flexible solutions for wide variety of applications and markets

USB 2.0 and 3.2 Hubs

- USB-IF compliant hub
- 2-, 3-, 4- and 7-port configurations
- Hybrid solutions (USB 2.0/3.2 ports)
- I/O bridging for expanded hub functionality
- FlexConnect technology enables host swapping
- USB Type-C support including integrated MUX
- MPLAB® Code Configurator tool for application customization
- USB-IF battery charger v1.2 and legacy devices

USB Automotive Solutions

- AEC-Q100 compliant USB2.0 and USB3.2 Hubs
- CarPlay, Android Auto, and CarLife capabilities
- Android Debug Mode support via FlexConnect
- USB Media Card Bridges
- Advanced features:
  - In-Field update
  - PWMs for lighting
  - Power Balancing and PD3.1

USB 2.0 Media Card Bridges

- Fast Flash media reader/writer for external memory card storage including embedded Flash memory
- Supports SD™, MMC/eMMC interfaces
- Supports 1 and 2-port Smart Card interfaces
- Fully compliant with ISO/IEC 7816, EMV 4.2/4.3, ETSI TS 102 221 and PC/Smart Card standards
- Integrated hub combo devices
- Fully configurable VID and PID

USB 2.0 Transceivers and Switches

- Hi-Speed ULPI+ interface
- Supports USB 2.0 OTG specification
- PHYBoost technology restores USB signal integrity
- VariSense™ technology provides signal level adjustability
- Flexible clocking support for common frequencies
- Hi-Speed USB 2.0 switch with port protection
- USB-IF battery charger v1.2 and legacy devices
- Highly integrated for small-footprint and low-part-count applications

USB Applications

Universal Serial Bus (USB) specifications created over the last two decades have truly lived up to the term “universal”. With over 4 billion units shipping per year with USB ports, USB is integrated into systems from compact mobile phones to full-size SUVs. Although best known as the technology that enable peripherals to connect to personal computers, USB functionality has expanded over the years, with power delivery capable of providing up to 100W of power to both hosts and devices, increasing data rates to 10 Gbps (USB 3.2 Gen2), and embedded applications where USB is used for sub-system connectivity as well as on-board connections via USB Hi-Speed Interchip Communication (HSIC).

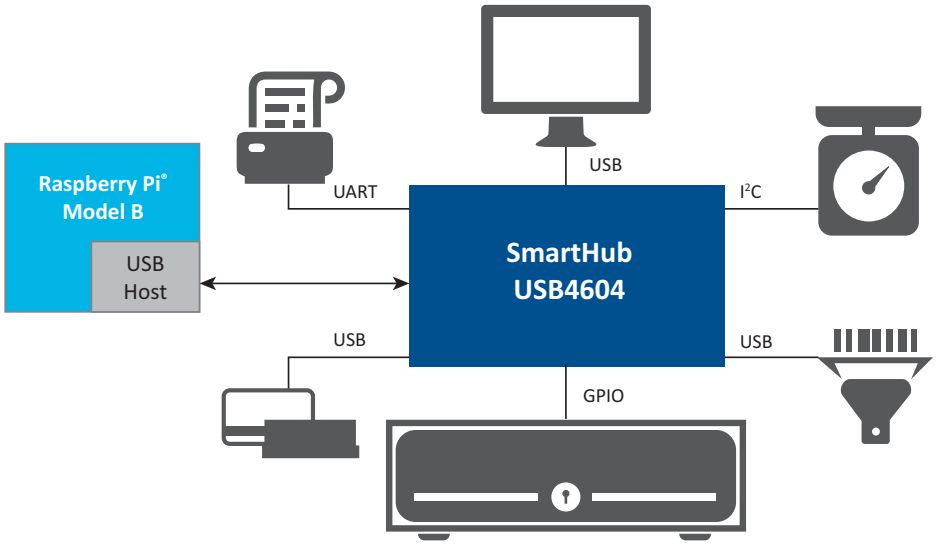
In today’s IoT and automotive applications, Microchip’s USB solutions provide unique products for host/device swapping and integrated Ethernet connectivity. As end systems become more complex, design re-use and system partitioning are vital elements in system design. USB plays a key role for connecting sub-systems with a proven protocol and a wide variety of class drivers to address applications needs from communications, human-interface devices, video streaming, printing and many more.

Microchip offers a range of USB solutions covering USB 2.0 Hi-Speed, 480 Mbps speeds and USB 3.2 SuperSpeed (5 Gbps) and (10 Gbps) solutions, with chip-level integration for USB physical layer devices, USB switches, USB hubs and USB combination hubs that include Ethernet ports and media card support. With patented technologies, including FlexConnect, SmartHub and Multi-Host to name a few, Microchip adds unique features that will enhance and differentiate your system functionality.

Typical Applications

- Docking stations
- LCD monitors
- HDTVs
- Expansion hubs
- PC motherboards
- Gaming consoles
- Multi-function printers
- Cable/DSL modems
- Set-top boxes
- DVD/CD-ROM/DVR
- Digital still and video cameras
- Portable media players
- Entertainment devices
- Video record/playback systems
- Smart phones
- Storage drives
- Headsets
- Media players
- GPS personal navigation
- External hard drives
- Server front/back panels
- Keyboards and KVM switches
- Point-of-Sale (POS) systems
- IP telephony
- Auto/home audio systems
- Industrial products

Example Point-of-Sale System Connects six Peripherals With one USB 2 SmartHub Device



USB SmartHubs

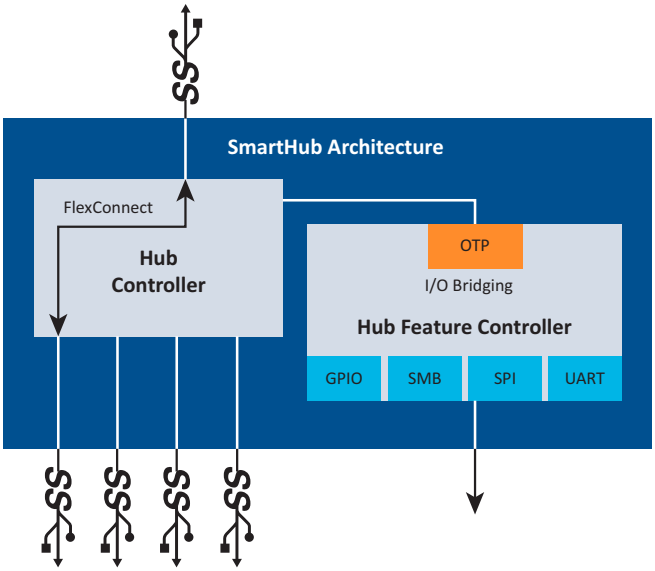
A SmartHub is a USB hub that integrates system-level functions typically associated with a separate MCU or processor. Imagine the SmartHub as having an “extra” port to handle host communication outside of USB. By adding the extra port, the host now has the ability to interact with peripheral components under the USB umbrella without the need for special bridge ICs. I/O Bridging and FlexConnect are two key embedded technologies that make SmartHubs smart. Microchip’s product portfolio includes SmartHubs around USB 2.0 and USB 3.2 solutions.

Importance of SmartHub Capabilities

- Expands functionality beyond traditional hubs
- BOM savings through integration of functionality
- Reduces PCB area
- Simplifies hardware design
- Provides flexibility to Host to configure as needed

Other SmartHub Functions

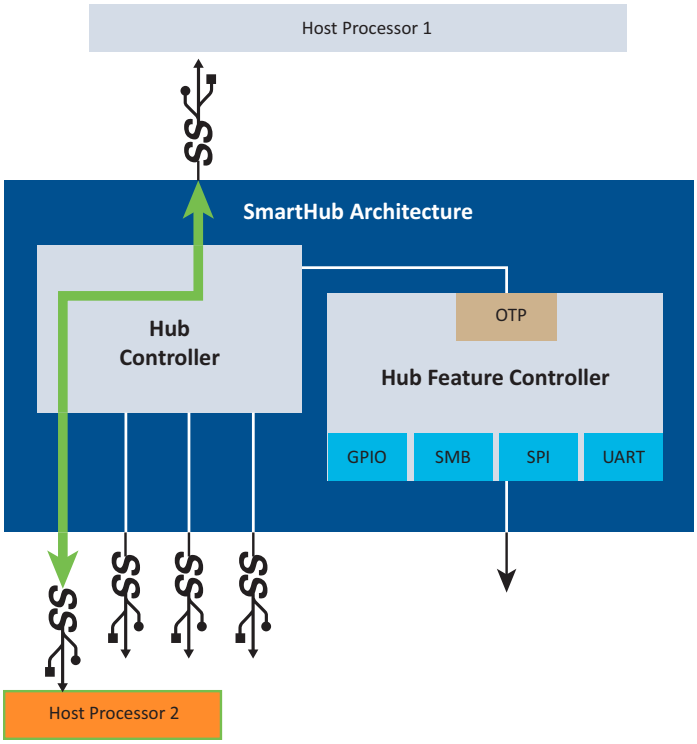
- One Time Programmable (OTP) memory for customization of SmartHub ports
- MPLAB Code Configurator tool for setting the SmartHub configuration or programming SmartHub on manufacturing line
- Availability of configuration straps with predetermined setting to entirely avoid programming



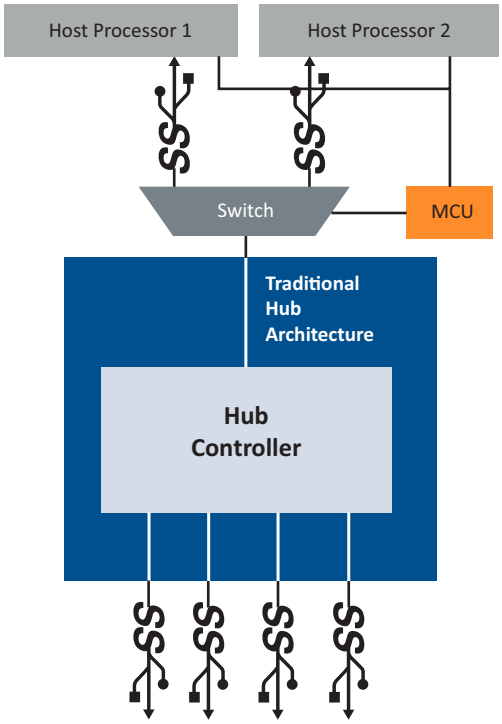
Dynamic Host Switching

- System can be configured to switch between two USB Hosts; any port can support USB host via FlexConnect feature
- Switch can be enabled by a GPIO pin, a USB Host command or through preboot configuration code
- Remaining downstream device can re-enumerate with new Host once switch has been made
- Saves the expense of using a separate 2:1 switch external to the hub
- Simplifies implementation as functionality is integrated in the SmartHub technology

SmartHub FlexConnect



Traditional Flex Architecture



USB 2.0 Hi-Speed Hubs

Microchip offers a wide selection of USB 2.0 Hi-Speed hubs covering basic hub functionality, as well as feature-enhanced, SmartHubs, giving you the choice to optimize your board for cost and functionality. By offering devices with Hi-Speed Inter-Chip (HSIC) interfaces, you also have the choice to connect from one chip to another over USB directly on the PCB.

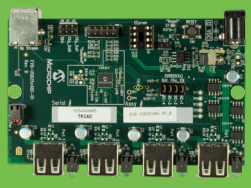
At 480 Mbps, USB 2.0 hubs provide a high-speed bus that is well suited for embedded applications, and connecting sub-systems or modules into a complete design. When coupled with Microchip's PIC32MZ family which incorporates USB 2.0 Hi-Speed hosts, designers have the key building blocks to create high-performance systems.

All device types are supported in commercial and industrial temperature ranges, with a unique package offering including, chip-scale packages to provide the smallest footprint possible for a USB hub implementation.

USB2422 Hi-Speed USB 2.0 Single TT 2-Port Hub with Battery Charging Evaluation Board (EVB-USB2422)

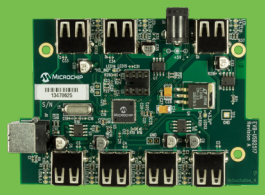
The board includes two downstream ports with individual port power control and battery charging support on each port and is targeted at 2-port, cost-sensitive applications.

USB2534 Hi-Speed USB2.0 4-Port Hub with Battery Charging Evaluation Board (EVB-USB2534BC)



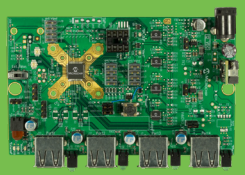
The EVB-USB2534BC is a four-layer RoHS-compliant evaluation board that utilizes the USB2534 to provide a fully functional 4-port high-speed hub with battery charging capabilities, IO bridging and FlexConnect to expand connectivity while lowering system BOM costs.

USB2517 Hi-Speed USB 2.0 Multi TT 7-Port Hub Customer Evaluation Board (EVB-USB2517)



The USB2517 with MultiTRAK™ technology is a low-power, full-featured High-Speed USB 2.0 compliant hub with seven down-stream ports. With seven ports, sub-system expansion is maximized.

USB4604 Hi-Speed USB 2.0 4-Port SmartHub with Battery Charging Evaluation Board (EVB-USB4604)



The Microchip USB4604 is a low-power, OEM configurable, MTT (Multi-Transaction Translator) USB 2.0 hub controller with four downstream ports and advanced features for embedded USB applications. The USB4604 provides the most package pins (48) allowing extensive IO bridging.

USB 2.0 Hub Products

	Downstream Ports	Port Type (Up/Down)	Hub Feature Controller/ SmartHub	FlexConnect	Supply/Internal Reg.	Link Power Management	Charging Profiles	Packages	PHYBoost PortMap PortSwap
USB2422	2*	USB/USB	–	–	3.3V/Yes	–	BC1.1	24-pin SQFN	Yes
USB2517	7	USB/USB	–	–	3.3V/Yes	–	–	64-pin QFN	Yes
USB251xB	2, 3, 4	USB/USB	–	–	3.3V/Yes	–	BC1.1	36-pin SQFN, 36-pin VQFN	Yes
USB3503	3	HISC/USB	–	–	3.3V/Yes	–	BC1.1	25-pin WLCSP, 32-pin SQFN	Yes***
USB3803	3**	USB/USB	–	–	3.3V/Yes	–	BC1.1	25-pin WLCSP	Yes***
USB3813	3	USB/HISC or USB	Yes	Yes	V_{BUS}, V_{BAT}, 3.3V/Yes	Yes	BC1.2, Apple®, China	30-pin WLSCP	Yes***
USB3613	3	HSIC/USB	Yes	Yes	V_{BUS}, V_{BAT}, 3.3V/Yes	Yes	BC1.2, Apple, China	30-pin WLCSP	Yes***
USB253x	2, 3, 4	USB/USB	Yes	Yes	3.3V/Yes	Yes	BC1.2, Apple, China	36-pin SQFN	Yes***
USB46x4	4	USB or HSIC/ USB or HSIC	Yes	Yes	V_{BUS}, V_{BAT}, 3.3V/Yes	Yes	BC1.2, Apple, China	48-pin QFN	Yes***
USB4715	4	USB/USB	Yes	Yes	3.3V/Yes	Yes	BC1.2, Apple, China	48-pin QFN	Yes***

*Single transaction translator for cost effectiveness **Single port bypass ***Plus VariSenseTM Technology

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USB 2.0 Bridges and Combo Products

Microchip's family of Hi-Speed USB 2.0 bridging controllers provides a high-speed interface between a USB host controller and Flash media like SD Cards and eMMC ICs. Offering USB 2.0 compliance and interoperability, each product family is engineered to provide flexibility for system designers to choose independent or simultaneous access to a wide selection of Flash media and smart card readers. Microchip's family of full-speed USB 2.0 bridges are low-cost, low-power, single-chip smart card controllers with USB or UART interfaces. Up-to-date EMV and USB certifications enhance interoperability with all of the latest and legacy SmartCards and host operating systems.

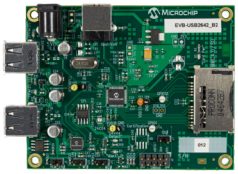
Key Features

- Low-cost and low-power
- USB 2.0 Hi-Speed, Smart Card bridges
- Single-chip controllers and combo implementations
- SD, SDHC, SDXC, MMC and eMMC Media formats
- Ready-to-use USB Chip Card Interface Device (CCID)
- One-Time Programmable (OTP) memory

USB2642 Hi-Speed USB 2.0 2-Port Hub and Fast Flash Media Reader Evaluation Board (EVB-USB2642)

The EVB-USB2642 is a customer evaluation board that contains an ultra-fast USB 2.0 multi-format Flash media controller, a USB 2-port hub combo and a UCS81001 port power controller with charger emulation. This evaluation board includes a SMBus header interface to monitor I²C traffic from the USB to I²C bridge, as well as either an external I²C EEPROM or SPI Flash device for customized functionality.

Smart Card Bridge to USB2.0/UART Evaluation Board (EVB-SEC1210)



The SEC1210 is a low-cost, low-power, dual port Smart Card controllers with USB or UART interfaces. The SEC1210 utilizes TrustSpan technology which enables digital systems to securely communicate, process, move and store information on system boards, across networks and through the cloud.

USB 2.0 Bridges and Combo Products

Part Number	Hub and/or Bridge	Port Type (Upstream)	Port Type (Downstream)	Supports	Supply/ Internal Reg.	USB-to-I²C Bridge	Packages	PHYBoost PortMap PortSwap
USB2240*	Bridge	USB 2.0	Card reader	SD 2.0, MMC 4.2	3.3V/Yes	Yes	36-pin QFN	–
USB2244*	Bridge	USB 2.0	Card reader	SD 2.0, MMC 4.2	3.3V/Yes	–	36-pin QFN	–
USB2250*	Bridge	USB 2.0	Card reader	SD 2.0, MMC 4.2	3.3V/Yes	Yes	128-pin VTQFP	–
USB2251*	Bridge	USB 2.0	Card reader	SD 2.0, MMC 4.2	3.3V/Yes	Yes	128-pin QFN	–
USB2642*	Hub and Bridge	USB 2.0	2x USB 2.0 plus card reader	SD 2.0, MMC 4.2	1.8V, 3.3V/ No	Yes	48-pin QFN	Yes
USB2660*	Hub and Bridge	USB 2.0	2x USB 2.0, plus 2x card reader	SD 2.0, MMC 4.2	3.3V/Yes	–	64-pin QFN	Yes
SEC1110*	Bridge	USB 2.0	smartcard reader	ISO/IEC 7816	3V to 5.5V/ Yes	–	16-pin QFN	–
SEC1210*	Bridge	USB 2.0 or UART	2x smartcard reader	ISO/IEC 7816	3V to 5.5V/ Yes	–	24-pin QFN	–

*Supports SDXC – Extended capacity of 2 TB

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USB3.2 Gen 1 Hubs With Power Delivery Support

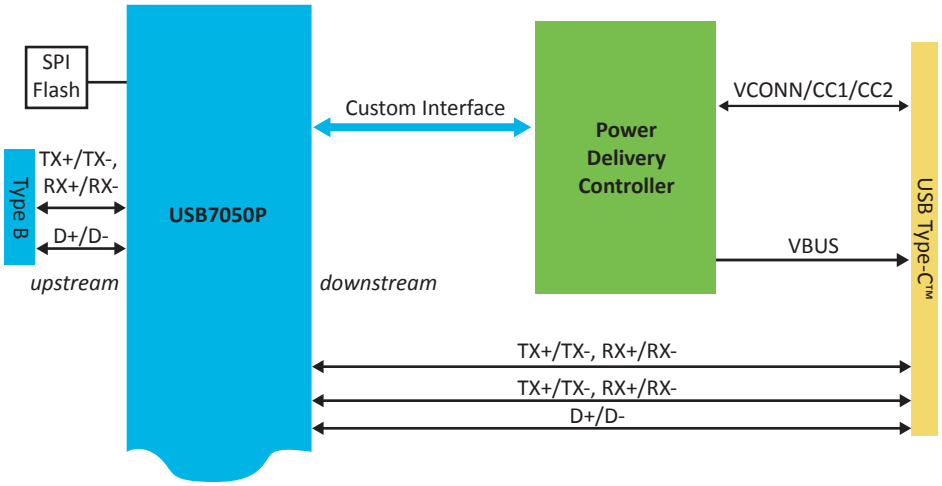
Power Delivery (PD) can be an essential component of designs that require power and data over the same cable. Microchip offers USB3.2 Gen1 Hub solutions that seamlessly connect with I^2C and GPIO based solutions.

Microchip USB3.2 Gen 1 Hubs offer two methods for supporting Power Delivery designs in computing and embedded applications: Tailored and Generic.

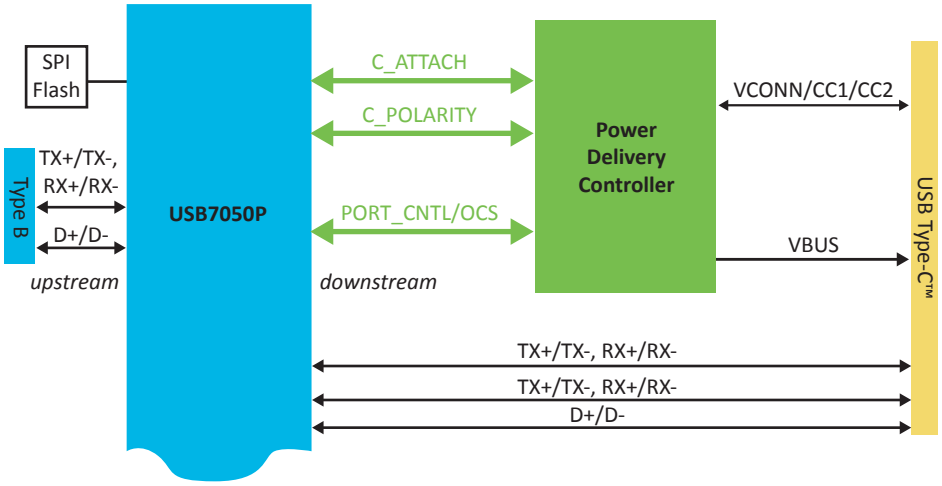
Tailored designs offer some configuration of the PD controller from either the SOC, USB Hub or power-supply chip. Microchip offers this option to large customers to enable advanced features like power balancing and thermal response.

Generic designs require a minimal amount of interface to the Microchip hub. The USB7050P provides two pins – C_Attach and C_Polarity-that allow the PD controller to enable and orient the USB Type-C ports.

Tailored Design



Generic Design

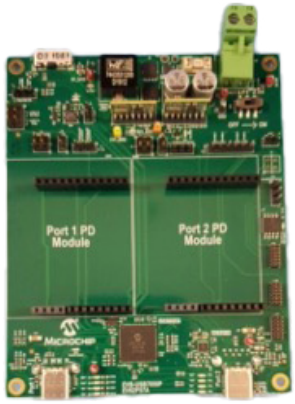


Generic Design Continued:

Key Features

- Support for all External PD Controllers with Microchip USB3.2 Gen1 Hubs
- Dedicated pins to manage USB Type-C port interface

USB7050P USB3.2 Gen1 Evaluation Board



The USB7050P is a demonstration and evaluation platform of the USB7050P SmartHub on a 4-Layer RoHS-compliant Printed circuit Board (PCB). The 4-port USB7050P is compliant with the USB 3.2 Gen1 USB specification and supports SuperSpeed (SS), Hi-Speed (HS), Full-Speed (FS) and Low-Speed (LS) USB signaling. The board includes a PD interface socket (HAT) to add standard PD solutions for evaluation and test. Details on the interface itself is available on the Microchip website.

USB3.2 Gen1 Hub Products supporting Power Delivery

Part Number	Type C Upstream	Downstream Ports	Type C Down	PD Supported	Type A Down	Flex Connect	Billboard Support	USB-IF Certification
USB7050P	No	4	2 ports	Yes, 2 ports	1x USB3/2, 1x USB2	Yes	Yes	TBD

USB 3.2 Gen1 Hubs (5 Gbps)

Microchip offers a wide selection of USB 3.2 Gen1 SuperSpeed hubs covering basic hub functionality, as well as feature enhanced SmartHubs, giving you the choice to optimize your board design for cost and functionality. By offering devices that support USB Type-C, Microchip also enables you to build a USB subsystem supporting power delivery.

At 5 Gbps, USB 3.2 Gen1 hubs provide a SuperSpeed bus that is well suited for computing platforms, embedded applications, and connecting sub-systems or modules into a complete design. When coupled with a high-performance processor which incorporates USB 3 SuperSpeed hosts, these key building blocks create high-performance USB systems.

USB 3.2 Gen1 4-Port SmartHub Evaluation Board (EVB-USB5734)

The EVB-USB5734 is a demonstration and evaluation platform for the USB5734 SmartHub on a 4-layer RoHS-compliant printed circuit board (PCB). The 4-port USB5734 is compliant with the USB 3.2 Gen1 USB specification and supports Super Speed (SS), Hi-Speed (HS), Full-Speed (FS) and Low-Speed (LS) USB signaling for complete coverage of all defined USB operation speeds. Five I/O daughter cards are included to demonstrate SmartHub functionality, FlexConnect and I/O bridging.

USB 3.2 Gen1 6-Port SmartHub Evaluation Board (EVB-USB5806)

The EVB-USB5806 is a demonstration and evaluation platform for the USB5806, a 6-Port SS/HS USB SmartHub on a 4-layer RoHS-compliant PCB. The EVB-USB5806 supports six downstream ports that are USB 2.0 and USB 3.2 Gen1 compliant, battery charging on all downstream ports (maximum of 13A) and is configured for operation through internal default settings, SMBus or through an external SPI Flash device.

USB 3.2 Gen1 4-Port SmartHub with USB-C Evaluation Board (EVB-USB7052N)

The EVB-USB7052N is a demonstration and evaluation platform for evaluating the USB7052N, a 4-Port SS/HS USB SmartHub on a 6-layer RoHS-compliant PCB. The EVB-USB7052N supports four downstream ports; two USB-C USB 3.2 Gen 1 ports with integrated MUX and 2 type A ports (1x USB Gen2, 1x USB 2.0).

USB 3.2 Gen1 Hub Products

Part Number	Downstream Ports	Port Type (Upstream)	Port Type (Downstream)	Hub Feature Controller (I/O Bridging)	FlexConnect	Billboard Support for Power Delivery	Packages	PortMap PortSplit
USB5742	2	Type B	Type A	–	–	–	56-pin QFN	Yes/No
USB5744	4	Type B	Type A	–	–	–	56-pin QFN	Yes/No
USB5734	4	Type B	Type A	Yes	Yes	–	64-pin QFN	Yes/No
USB5807C	7	Type B	Type A	–	–	–	100-pin QFN	Yes/Yes
USB5806C	6	Type B	Type A	Yes	Yes	Yes	100-pin QFN	Yes/Yes
USB5816C	6	Type B	Type A, 1x USB-C™*	Yes	Yes	Yes	100-pin QFN	Yes/Yes
USB5826C	6	Type B	Type A, 2x USB-C*	Yes	Yes	Yes	100-pin QFN	Yes/Yes
USB5906C	6	USB-C*	Type A	Yes	Yes	Yes	100-pin QFN	Yes/Yes
USB5916C	6	USB-C*	Type A, 1x USB-C*	Yes	Yes	Yes	100-pin QFN	Yes/Yes
USB5926C	6	USB-C*	Type A, 2x USB-C*	Yes	Yes	Yes	100-pin QFN	Yes/Yes
USB7002	4	USB-C*	Type A, 2x USB-C*	Yes	Yes	Yes	100-pin QFN	Yes/Yes
USB7006	6	Type B	Type A	Yes	Yes	Yes	100-pin QFN	Yes/Yes
USB7016	5	Type B	Type A, 1x USB-C*	Yes	Yes	Yes	100-pin QFN	Yes/Yes
USB7052N	4	Type B	Type A, 2x USB-C*	Yes	Yes	Yes	100-pin QFN	Yes/Yes

*USB-C ports include an integrated MUX
Note: All USB 3.2 products support: PHYBoost (USB 2.0), VariSense™ Technology (USB 2.0), BC1.2, Apple®, China charging

www.microchip.com/USBhubs

USB 3.2 Gen2 Hubs

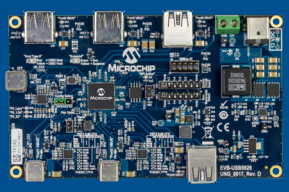
Microchip offers a wide selection of USB 3.2 Gen2 SuperSpeed+ hubs covering basic hub functionality, as well as feature enhanced SmartHubs, giving you the choice to optimize your board design for cost and functionality. By offering devices that support USB Type-C, Microchip also enables you to build a USB subsystem supporting power delivery.

At 10 Gbps, USB 3.2 Gen2 hubs provide a SuperSpeed+ bus that is well suited for performance-driven computing platforms, embedded applications, and connecting sub-systems or modules into a complete design. When coupled with a high-performance processor which incorporates USB 3 SuperSpeed hosts, you have the key building blocks to create high-performance USB systems.

USB 3.2 Gen2 6-Port SmartHub Evaluation Board (EVB-USB7206)

The EVB-USB7206 is a demonstration and evaluation platform for the USB7206C SmartHub on 4-layer RoHS-compliant Printed Circuit Board (PCB). The 6-port USB7206C is compliant with the USB 3.2 Gen2 USB specification and supports SuperSpeed+ (SS+), Hi-Speed (HS), Full-Speed (FS) and Low-Speed (LS) USB signaling for complete coverage of all defined USB operation speeds. Five I/O daughter cards are included to demonstrate SmartHub functionality like FlexConnect and I/O bridging.

USB 3.2 Gen2 4-Port SmartHub with USB-C Evaluation Board (EVB-USB7252)



The EVB-USB7252 is a demonstration and evaluation platform for evaluating the USB7252C, a 4-Port SS/HS USB SmartHub on a 6-layer RoHS-compliant PCB. The EVB-USB7252 supports four downstream ports; two USB-C USB 3.2 Gen2 ports with integrated MUX and 2 Type A ports (1x USB Gen2, 1x USB 2.0).

USB 3.2 Gen2 Hub Products

Part Number	Downstream Ports	Port Type (Upstream)	Port Type (Downstream)	Hub Feature Controller (I/O Bridging)	FlexConnect	Billboard Support for Power Delivery	Packages	PortMap PortSplit
USB7206C	6	Type B	Type A	Yes	Yes	Yes	100-pin QFN	Yes/Yes
USB7216C	5	Type B	Type A, 1x USB-C*	Yes	Yes	Yes	100-pin QFN	Yes/Yes
USB7252C	4	Type B	Type A, 1x USB-C*	Yes	Yes	Yes	100-pin QFN	Yes/Yes

*USB-C ports include an integrated MUX
Note: All USB 3.2 products support: PHYBoost (USB 2.0), VariSense™ Technology (USB 2.0), BC1.2, Apple®, China charging

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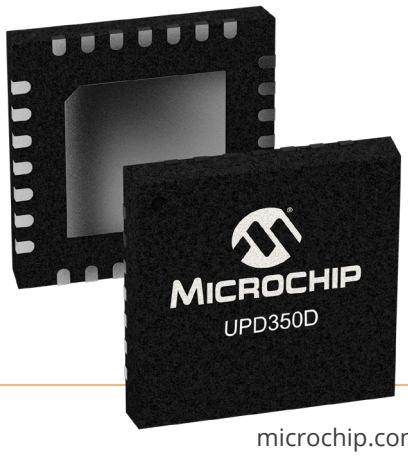


USB 2.0 PHYs and Switches

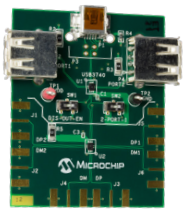
Microchip's families of Hi-Speed USB 2.0 transceivers deliver enhanced USB functionality for the portable market with support for the latest USB-IF Battery Charging (BC 1.2) specification. This family of devices dramatically reduces system Bill of Material (BOM) costs by up to 60% over competitive solutions.

Microchip's family of Hi-Speed USB switches are specifically designed to enable a range of applications to achieve single-port connectivity. Their design provides a substantial 1 GHz of bandwidth, allowing for the passage of robust USB 2.0 signals. High-performance USB 2.0 switches provide excellent flexibility, with very-low current consumption in an extremely small package.

USB3330 Transceiver with ULPI Interface, Multi-Frequency Reference Clock Evaluation Board

The USB333x family of Hi-Speed USB 2.0 transceivers delivers enhanced USB functionality for the portable market with support for the latest USB-IF Battery Charging 1.2 (BC 1.2) specification. This board provides an excellent compliment to USB charging ports by enabling portable devices to negotiate up to three times the charging current compared to a standard USB port, resulting in faster battery charging.

Hi-Speed USB2.0 Switch Evaluation Board (EVB-USB3740)



The USB3740 family of Hi-Speed USB switches were specifically designed to enable a range of applications to achieve single-port connectivity. Their design provides a substantial 1 GHz of bandwidth, allowing for the passage of robust USB 2.0 signals.

Part Number	PHY or Switch	Port Type (Upstream)	Reference Clock	Supply/ Internal Reg.	I²C Interface	Charging Profiles	Packages	Dead Battery Support
USB333x	PHY	ULPI	Multi, 19.2, 26, 38.4 MHz	1.8V, 3.3V/ Yes	–	–	25-pin WLCSP	–
USB334x	PHY	ULPI	Multi, 19.2, 26, 27 MHz	1.8V, 3.3V/ Yes	–	–	24- or 32-pin QFN	–
USB3740	Switch	USB 2.0	–	5V/No	–	–	10-pin QFN	–
USB3750A-1	Switch	USB 2.0	–	5V/No	Yes	BC 1.2, Apple®, China	16-pin QFN	–
USB3751A-x	Switch	USB 2.0	–	5V/No	Yes	BC 1.2, Apple, China	16-pin QFN	Yes

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USB Automotive Support

Microchip provides innovative USB products for the automotive segment with complete AEC-Q100 qualification (grade 2 and 3). Whether your design needs:

- High-performance switch
- ULPI transceiver
- USB Type-C support
- USB power delivery
- Card readers
- USB 2.0 Hi-Speed or USB 3.2 SuperSpeed Hubs

Microchip offers high-quality proven automotive solutions. As more and more handsets offer automotive capabilities to render applications from your mobile to the vehicle's display, Microchip has developed unique, patented architectures that are integrated into many automotive hubs. Three methods (FlexConnect, Dual-Upstream and Multi-Host) are available depending upon system needs of bandwidth and head unit connections.

Microchip now offers a wide range of data-rates as well as the capability to provide charging control and management. The production portfolio includes USB2.0 Hi-Speed (480Mbps) and USB3.2 Super-Speed (5 Gbps), which are optimal for the longer distances required in vehicles. Silicon devices offering 10 Gbps are also available but require technical application analysis. Microchip's automotive offering focuses on USB hubs with value-added features providing optimized BOM cost, small board area, and robust / validated operation.

System level features include:

- Power Delivery with power balancing and thermal response for multiple port systems
- PWM capabilities to enable port illumination
- Integrated USB Host enabling in-field updates as Power Delivery evolves, including security challenges

Part Number	Downstream Ports	USB Technology	Dual Role (Method)	Dual Role with Persistent USB	Battery Charging	SmartHub Bridging	Upstream Ports
USx4702/4	2, 4	USB 2.0	No	No	BC 1.2, Apple, China	No	1 (Host)
USB84602/4	2, 4	USB 2.0	Yes (FlexConnect)	No	BC 1.2, Apple, China	Yes	1 (Host or OTG)
USB4712/5	1/4	USB 2.0	Yes (FlexConnect)	No	BC 1.2, Apple, China	Yes	1 (Host or OTG)
USB4912/4/6	1/3/5	USB 2.0	Yes (Multi-Host)	Yes	BC 1.2, Apple, China	Yes	1 (Host or OTG)
USB4925/7	3/5	USB 2.0	Yes (Dual Upstream)	Yes	BC 1.2, Apple, China	Yes	1 (Host or OTG)
USB7002*	4	USB 3.2	Yes (Multi-Host)	Yes	BC 1.2, Apple, China	Yes	1 (Host or OTG)
USB7050P	4	USB 3.2	Yes (Multi-Host)	Yes	BC 1.2, Apple, China	Yes	1 (Host or OTG)
USB24913/5**	2/4	USB 2.0	Yes (Multi-Host)	Yes	BC 1.2, Apple, China	Yes	1 (Host or OTG)
USB24926**	4, 6	USB 2.0	Yes (Dual Upstream)	Yes	BC 1.2, Apple, China	Yes	2 (Host or OTG)

*CC pin support

** Embedded PD controlled and USB host functions

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