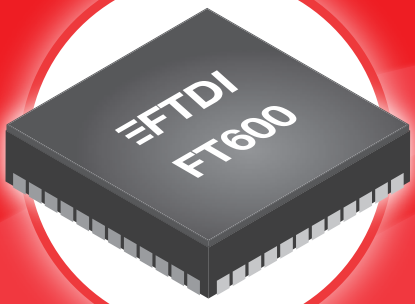
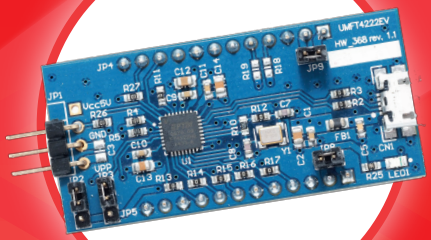
FTDI Chip

BRIDGING TECHNOLOGIES



ICs

Modules



Cables

FTDI Chip USB Solutions

BRIDGING TECHNOLOGIES

www.ftdichip.com

@FTDIChip

USB AS EASY AS 123

FTDI Chip develops innovative silicon solutions that enhance interaction with today's technology. When a designer needs to add a USB port, rest assured that FTDI Chip has a full range of USB solutions to get the job done.

The Universal Serial Bus (USB) interface is now established as the de-facto interface for connecting systems with a reliable, low-cost digital link. USB has expanded beyond PC usage, and can now be found in all market segments, including Industrial, Medical, Consumer, Communications, Networking, and more. Enabling designers to implement USB quickly into a design, FTDI Chip provides total solutions including silicon chips, development tools, application notes, and software support. Expertise in USB bridges provides seamless integration for a variety of interfaces such as UART, FIFO, I^2C, SPI, PWM and GPIO, where the bridge converts the signalling and protocol from the selected interface to USB. USB solutions are delivered in packages as small as 10 pin DFN (3x3mm); in modules that can be inserted into boards for development and production; or in cables that bridge USB to numerous interfaces. Whenever your development or product needs USB, check out FTDI Chip (www.ftdichip.com) for complete solutions that can shorten your design time, while providing robust system implementations, and realise how FTDI Chip makes design easy.

Extensive USB Portfolio

Whether your design needs silicon chips, cables, or modules, check out FTDI Chip's large portfolio of USB and system level products.

Peripheral Or Host

USB connectivity designs are constructed from two distinct functional capabilities: a host and a device/peripheral type. As part of the total solution, FTDI Chip is able to offer both types of capabilities. With over 30 USB peripheral chips offered in 5 product families, designers can choose the device which best matches their system need. On the USB host side, the FT311D targets the Android ecosystem and joins the Vinculum family which provides system level capabilities with its micro-controller capability, USB host, and USB peripheral support.

Speed

FTDI Chip devices are aimed at full, high and super speed solutions. SuperSpeed USB 3.0 provides the greatest level of data throughput, while hi-speed and full speed devices continue to be a robust, growing market where matching system needs with device features can provide the optimum USB implementation.

Advanced Features

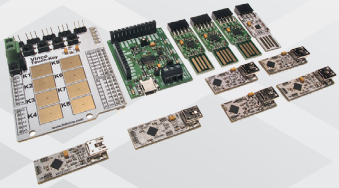
To conserve PCB area and offer additional system value, FTDI Chip adds unique features to enhance USB functionality, like battery charging detection which enables faster charging. FTDI Chip also offers devices linking one USB port to 1, 2, or 4 application interfaces without requiring a USB hub. Save space, power, and system cost when EEPROM (MTP) memory, or unique clocking features are utilized in your system design.

Software

Drivers for most major operating systems such as Windows, MAC OS, Android and Linux are available for free download thus allowing for easy integration with minimum development effort.

The Vinculum family of host controllers is also supported with free, precompiled firmware as well as a free toolchain for designers wishing to tailor the firmware to their specific requirements.

Modules

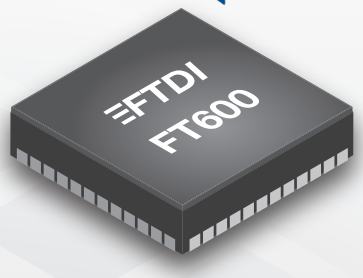


Development modules are available to enable rapid design development. The modules are available in a variety of mechanical formats to allow easy bread-boarding or immediate access to the bridge interfaces. Additionally application modules are available which provide specific system functionality.

Cables

Similar to the module solutions are a range of cables offering TTL, RS232, RS422 or RS485 level interfaces. These cables can be used for development purposes or as accessories for accessing existing products over USB.

USB 3.0 SUPERSPEED BRIDGE SOLUTION (FT60X SERIES)



FTDI Chip is proud to announce its first SuperSpeed series in the FT60X, a sophisticated USB3.0 to FIFO bridge in a low count pin package.

The FT600Q and FT601Q are FTDI Chip's first generation USB 3.0 products that function as SuperSpeed USB 3.0 to FIFO bridges, providing data bursting rates of up to 3.2Gbps. The FT600Q comes in a 56-pin QFN package and has a 16-bit wide FIFO bus interface, while the FT601Q comes in a 76-pin QFN package and has a 32-bit wide FIFO bus interface. Both chips support up to 8 endpoints, other than the management endpoints. The endpoints are linked to a configurable endpoint buffers of 16kByte length for IN and 16kByte for OUT.

Simple to connect and control. No additional firmware development required. Just "fit and forget".

Applications that need to transfer data over USB at faster rates benefit from the FT60X series:

- Multi Function Printers
- Scanners
- High resolution video cameras
- High resolution displays
- Professional still image cameras
- Data acquisition systems that require high bandwidth
- FPGA & MCU development boards that require high bandwidth connectivity

USB 2.0 HI-SPEED BRIDGE SOLUTION

H Chip Series

Fast, flexible, multi-channel USB bridges.

	Application Interface	Channels	Clocking	EEPROM	Data Throughput	Package
FT232H	UART ASYNC FIFO SYNC FIFO MPSSE	1	External (12MHz)	External	12MBaud 10MByte/s 40MByte/s 30Mbit/s	48 QFN 48 LQFP
FT2232H	UART ASYNC FIFO SYNC FIFO MPSSE x 2	2	External (12MHz)	External	12MBaud 10MByte/s 40MByte/s 30Mbit/s	64 QFN 64 LQFP
FT4232H	UART MPSSE x2	4	External (12MHz)	External	12MBaud 30Mbit/s	64 QFN 64 LQFP
FT4222H	SPI/I2C (Master/Slave) GPIO	4 Channel SPI slave selection	External (12MHz)	Internal OTP	Upto 27Mbps	32 VQFN

- IO Levels 3.3V (5V tolerant)
- Typical operating current 70mA
- Extended Temperature Range: -40°C to +85°C

In addition to the higher data rates these devices offer, (upto 40Mbytes/s) when compared to full speed solutions, the Hi-Speed series also offers a range of multi-channel interfacing. The benefits of a multi channel bridge is that the system BOM is reduced by taking away the need for a USB hub chip. Additionally, each channel of the device appears to the host PC as a separate device enabling each channel to be independently configured for different modes, e.g. UART, MPSSE or FIFO and with different parameters such as 4 UARTS all operating with different baud rates.

For portable or battery operated devices the FT4222H also offers support for battery charger detection, enabling higher charge currents to be requested thus reducing battery charge times.

USB 2.0 FULL SPEED BRIDGE SOLUTION

X Chip Series

Optimised for small footprint, low power and battery charger detection.

	Application Interface	Channels	Configureable CBUS Pins	MTP Memory	Data Throughput	Package
FT200XD	I²C	1	1	Internal	3.4Mbit/s	10 DFN
FT201XQ FT201XS	I²C	1	7	Internal	3.4Mbit/s	16 QFN 16 SSOP
FT220XQ FT220XS	4-Bit SPI/FT1248	1	1	Internal	500kByte/s	16 QFN 16 SSOP
FT221XQ FT221XS	8-Bit SPI/FT1248	1	1	Internal	1MByte/s	20 QFN 20 SSOP
FT230XQ FT230XS	**Basic UART**	**1**	**4**	**Internal**	**3MBaud**	**16 QFN 16 SSOP**
FT231XQ FT231XS	**Full Handshake UART**	**1**	**4**	**Internal**	**3MBaud**	**20 QFN 20 SSOP**
FT234XD	**Basic UART**	**1**	**1**	**Internal**	**3MBaud**	**12 DFN**
FT240XQ	8-bit FIFO	1	2	Internal	1MByte/s	24 QFN
FT240XS						24 SSOP

- IO Levels 1.8V to 3.3V (5V tolerant)
- Typical operating current 8mA
- Battery Charger Detection
- Internal data buffering: TX - 512 bytes, RX – 512 bytes
- Internally generated clocking - No external crystal required.
- Extended Temperature Range: -40°C to +85°C

The X-chip series for full speed USB bridge solutions is the latest generation in full speed USB bridging technology, offering the widest range of interface options all backed up with robust driver support on Windows, Linux, MAC OSX and WinCE.

USB 2.0 FULL SPEED BRIDGE SOLUTION

R Chip Series

Optimised for minimal external components on a PCB design.

	Application Interface	Channels	Configureable CBUS Pins	EEPROM	Data Throughput	Package
FT232RL **FT232RQ**	UART	1	5	Internal	3MBaud	28 SSOP 32 QFN
FT245RL **FT245RQ**	8-bit FIFO	1	0	Internal	1MByte/s	28 SSOP 32 QFN

- IO Levels 1.8V to 5V
- Typical operating current 15mA
- Internal data buffering: TX - 128 bytes, RX – 256 bytes
- Internally generated clocking - No external crystal required.
- Extended Temperature Range: -40℃ to +85℃

The R chip solution offers a highly integrated solution combining USB protocol handling, internal clock control and EEPROM capabilities in one IC package.

BL and D Chip Series

Original, robust and market hardened solution.

	Application Interface	Channels	Clocking	EEPROM	Data Throughput	Package
FT232BL	UART	1	External (6MHz)	External	3MBaud	32 LQFP
FT245BL	8-bit FIFO	1	External (6MHz)	External	1MByte/s	32 LQFP
FT2232D	UART ASYNC FIFO MPSSE*	2	External (6MHz)	External	3MBaud 1Myte/s 5.6Mbit/s	48 LQFP

- IO Levels 3.3V to 5V
- Typical operating current 25mA
- Internal data buffering: TX - 128 bytes, RX – 384 bytes
- Extended Temperature Range: -40℃ to +85℃
- MPSSE - Multi Protocol Synchronous Serial Engine on FT2232D channel A only

USB 2.0 FULL SPEED BRIDGE SOLUTION

FT12 Series

Fully configurable Full Speed USB Device Controller series, to add any class or vendor specific USB device interface support to MCUs.

	Application Interface	Endpoints Supported	Selectable Endpoints	Battery Charger Detection	Data Throughput	Package
FT120	Parallel (MCU)	6	Bulk Isochronous Interrupt	NO	Upto 1MByte/s	28 TSSOP 28 QFN
FT121	SPI slave	8	Bulk Isochronous Interrupt	YES	Upto 1MByte/s	28 TSSOP 28 QFN
FT122	Parallel (MCU)	8	Bulk Isochronous Interrupt	YES	Upto 1MByte/s	28 TSSOP 28 QFN

- IO Levels 3.3V to 5V
- Typical operating current 7mA
- Extended Temperature Range: -40℃ to +85℃

While the other USB bridge devices focus on a fixed vendor USB class with silicon and host driver support both supplied and configured for maximum compatibility and efficiency, the FT12 series allows for something a little different.

The series provides a fully configurable device controlled by an external MCU, allowing the device to be identified as a variety of USB device classes such as BOM (Mass Storage), HID (KeyBoard/Mouse), and CDC (Serial Port), thus enabling generic pre-loaded system drivers to access the USB port.

Applications:

- Printers
- Industrial Control
- FPGA USB expansion ports

USB HOST SOLUTIONS

As mobility accelerates, the need for host support in tablets, handsets, and consumer equipment becomes critical to enable USB connections. FTDI Chip is expanding its USB host solutions with a focus on: Android Open Accessories Initiative, add-on USB host capability for USB2.0 Hi-Speed, and continued support for system level solutions that include USB technology (16 bit micro-controller, USB host, and USB device capabilities).

Integrated circuits that provide USB host ports in a system solution are provided in the Vinculum family of devices. The Vinculum II (VNC2) provides ample hardware support including 16 bit microcontroller, USB host and device capabilities, embedded flash memory, and extensive interface options. In addition, the VNC2 has an extensive suite of application ROM design files, and a toolchain for developing application specific designs.

	VNC2	FT311D	FT312D	FT313H
Description	Programmable USB 2.0 Host/Device Controller	ANDROID USB Host	ANDROID USB Host	Programmable USB 2.0 Host
USB Speed	Full (12Mbps) / Low speed (1.5Mbps)	Full-Speed (12Mbps)	Full-Speed (12Mbps)	Hi-Speed (480Mbps)
USB Transfer Types	Bulk, Interrupt, Isochronous	Bulk	Bulk	Bulk, Interrupt, Isochronous
No. of USB ports	2	1	1	1
No. of external channels	Flexible	1	1	1
Supported External Interfaces	ASYNC FIFO, SYNC FIFO, UART, 2 x SPI SLAVE, 1 x SPI MASTER, GPIO, PWM, DEBUG PORT	GPIO, PWM, UART, I²C Master, SPI Master, SPI Slave	UART	8/16 bit multiplexed bus, SRAM, NOR
Core	16/32-bit Harvard MCU Core	-	-	-
Internal Memory	16kB RAM 256kB FLASH	-	512B-Rx, 256B-Tx	320 B
Data rates	Up to 6MBaud	Up to 1MBaud	Up to 1MBaud	2-25 MB/s
Configuration Storage	Internal flash	-	-	Internal Registers
Clocking	12MHz Crystal	12MHz Crystal	12MHz Crystal	6MHz Crustal
Operating temp.	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C
Core supply	1.8V	1.8V	1.8V	3.3V
IO Supply	3.3V	3.3V	3.3V	1.8V to 3.3V
Packages	32/48/64 LQFP and QFN	32 LQFP and QFN	32 LQFP and QFN	64 QFN/LQFP/TQFP

Android Host (FT311D)

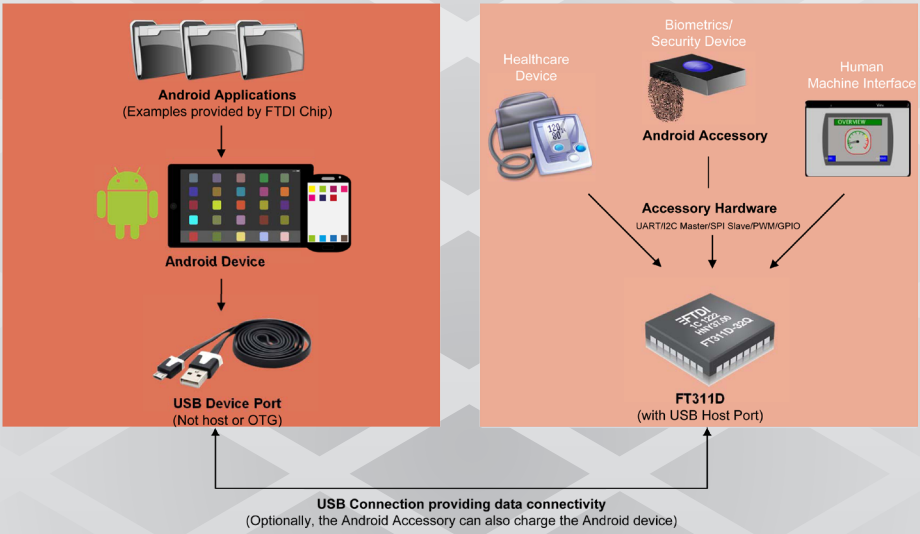
The FT311D IC is designed to specifically host Android platforms that support Android Open Accessories Mode (Android 3.1 onwards). This chip will enumerate and enable an Android platform to provide a bridge to a variety of platforms selectable from 3 GPIO lines. The interfaces include GPIO, UART, PWM, I²C Master, SPI Master and SPI slave. Packaged in 32 pin QFN or LQFP options the device offers a small, reliable bridge to allow Android devices such as mobile phones or tablets to communicate with peripheral hardware over USB. The device does not require any drivers to be loaded on the Android platform and draws no power from the Android USB port as the FT311D is the USB host.

To support the FT311D host chip, FTDI is offering a development kit and GPIO interface board to jump-start engineers' designs and provide easy access and integration into users' end systems.

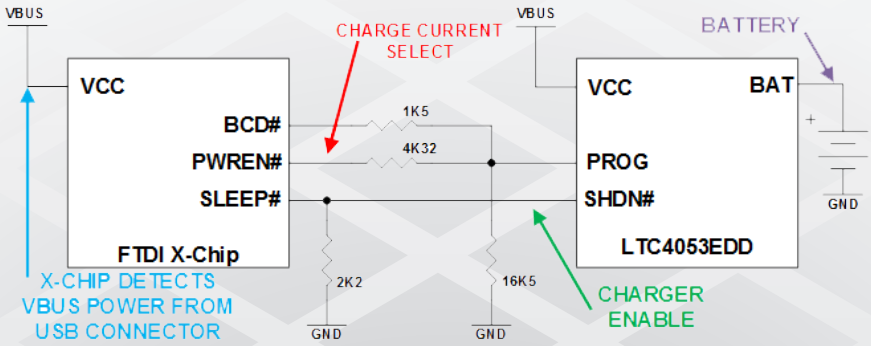
With this fixed function, bridged host chip, designers can quickly and easily add USB functionality into products and connect to the expanding Android ecosystem.

USB2.0 Hi-Speed Host Solution (FT313H)

The FT313H offers a fast rate of data transfer at 480Mpbs. The device interfaces a single USB channel to a parallel bus, with DMA engine for optimized data transfer. The device also supports battery charge host emulation.



X CHIP BATTERY CHARGER DETECTION



VBUS	BCD#	PWREN#	*SLEEP#	CHG CURRENT
0V	Logic 0	Logic 0	Logic 0	0 – In Shutdown
5V Dedicated Charger	Logic 0	Logic 1	Logic 1	1.1A
5V Standard Downstream Port (Enumerated)	Logic 1	Logic 0	Logic 1	0.44A

* SLEEP# can be programmed to be de-activated when connected to a dedicated charger port in the FT-X MTP ROM.

Charge current is determined by the resistance to gnd on the prog pin of the LTC4053.

For more information, please visit our website to access Application Note 175: Battery Charger Detection over USB with FT-X Devices.

DEVELOPMENT MODULES

USB HOST SUPPORT

UMFT311EV

Description: FT311 host development module connects to an Android USB device port. This development system enables the bridge from SPI master, SPI slave, I²C, UART, GPIO, and PWM to a USB host port.

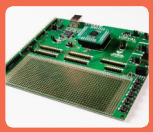
USB connector: 1 x Type-A

UMFT313EV

Description: FT313 Hi-Speed USB host development module

USB connector: 1 x Type-A

V2EVAL



Description: Motherboard for VNC2 daughter cards. Includes connectors for all IO and USB plus a prototyping area

USB connector: Type-B for debug port. 2 x Type-A

Notes: Supports 3 VNC2 package sizes

EXT32
(32 pin daughter card)

EXT48
(48 pin daughter card)

EXT64
(64 pin daughter card)

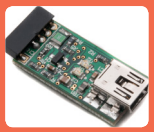
VINCO

Description: Arduino inspired form factor for VNC2 development. Based on VNC2-64L and includes additional 10-bit ADC

USB connector: Type A and mini-B

Notes: May be used with Arduino or VNC2 shields

VNC2 Debugger / Programmer



Description: VNC2 Programmer/debugger module for use with the IDE development tools

USB connector: Mini-B

Notes: Used to load and debug firmware in VNC2 devices, via the debug pin

H-CHIP SERIES SUPPORT

USB2.0 Hi-Speed support with multi-channel capabilities

UM232HB

Chip: FT232HL

USB connector: PCB tracks only

Form Factor: Breakout module

Application: USB to UART, ASYNC FIFO, SYNC FIFO, or MPSSE

UM232H

Chip: FT232HL

USB connector: Mini-B

Form Factor: 28 pin 0.6" wide DIP

Application: USB to UART, ASYNC FIFO, SYNC FIFO, or MPSSE

FT2232H Mini Module

Chip: FT2232HL

USB connector: Mini-B

Form Factor: Two 26 pin double row headers

Application: USB to UART, ASYNC FIFO, SYNC FIFO, or MPSSE x 2

FT4232H Mini Module

Chip: FT4232HL

USB connector: Mini-B

Form Factor: Two 26 pin double row headers

Application: USB to UART or MPSSE x 2

FT4232H Hi-Speed Serial/Hub

Chip: FT4232HL

USB connector: Type A

Form Factor: 36 pin 0.6" wide DIP with one USB upstream connector and two downstream connectors.

Application: USB to UART, MPSSE or a USB hub. May act as an expansion device to VNC2 USB host.

UMFT4222EV

Chip: FT4222H

USB connector: Type A

Form Factor: Standard 20.2mm (0.8") wide 24 pin DIP socket. Pins are on a 2.60mm (0.1") pitch.

Application: USB to SPI/I²C master/slave.

UMFT4222HPROG

Chip: FT4222H

USB connector: Type A

Form Factor: 42.38mm x 41.23mm board mounted with components and connectors.

Application: For Programming the FT4222H IC descriptors.

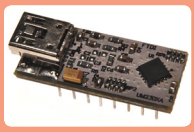
X-CHIP SERIES SUPPORT

An advanced USB2.0 Full Speed Family with optimized power, footprint and feature set

UMFTxxxXB*

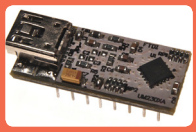
Description:
Breakout Module
Supported IC's:
FT200XD, FT201XQ, FT220XQ, FT230XQ
USB connector: PCB tracks only

UMFTxxxXA*



Description:
0.3" wide development
Supported IC's:
FT201XS, FT220XS, FT221XS, FT230XS, FT231XS, FT240XS
USB connector: Mini-B

UMFTxxxXE*



Description:
0.6" wide development
Supported IC's:
FT201XS, FT221XS, FT231XS, FT240XS
USB connector: Mini-B

UMFT231XC

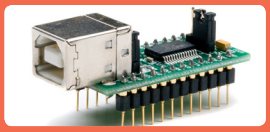
Description:
Battery Charger Detection Module
Supported IC's:
FT231XS
USB connector: Micro-B

* 'xxx' correlates to the numbers of the supported part types

R-CHIP SERIES SUPPORT

FTDI Chip's popular USB2.0 Full Speed Family

UM232R

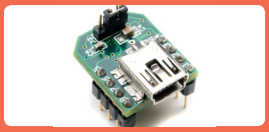


Chip: FT232RL
USB connector: Type B
Form Factor: 24 pin, 0.6" wide DIP
Application: USB to UART

MM232R

Chip: FT232RQ
USB connector: Type B
Form Factor: 16 pin 0.1" pitch
Application: USB to UART

UB232R



Chip: FT232RQ
USB connector: Type B
Form Factor: 8 contacts, 0.1" pitch
Application: USB to UART

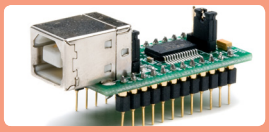
EVAL232R

Chip: FT232RL
USB connector: Type B
Form Factor: USB to DB9 converter
Application: USB to RS232

USB-Key

Chip: FT232RL
USB connector: Type A
Form Factor: Dongle
Application: ChipID

UM245R

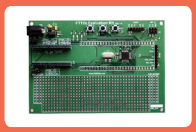


Chip: FT245RL
USB connector: Type B
Form Factor: 24 pin 0.6" wide DIP
Application: USB to FIFO

FT12 SERIES SUPPORT

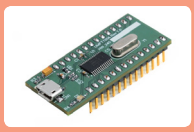
Inspired by the D12, industry standard, with value-added features and footprints

UMFT12XEV



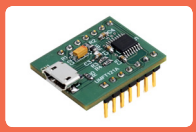
Description: Development system with LPC1114 micro-controller for use with daughter-cards for system development

UMFT120DC



Chip: FT120T
USB Connector: Micro-B
Footprint: 28 pin 0.8" wide DIP

UMFT121DC



Chip: FT121T
USB Connector: Micro-B
Footprint: 14 pin 0.8" wide DIP

UMFT122DC

Chip: FT122T
USB Connector: Micro-B
Footprint: 28 pin 0.8" wide DIP

CABLE SOLUTIONS

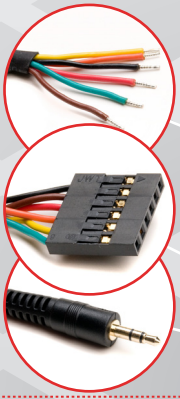
USB TO LEGACY RS232 CONVERTER CABLES

	PART NUMBER	IO LEVELS
Premium USB to Legacy RS232 Converter	US232R-10	RS232
	US232R-100	
	US232R-500	
USB-Serial Converter	UT232R-200	RS232
	UT232R-500	
Chipi-x	CHIPI-X10	RS232

USB TO LEGACY RS232 OR RS422 OR RS485 CONVERTER CABLES

	PART NUMBER	IO LEVELS
RS232 Converter	USB-RS232-WE-1800-BT_0.0	RS232
	USB-RS232-WE-1800-BT_3.3	
	USB-RS232-WE-1800-BT_5.0	
	USB-RS232-WE-5000-BT_0.0	
	USB-RS232-WE-5000-BT_3.3	
	USB-RS232-WE-5000-BT_5.0	
RS422 Converter	USB-RS422-WE-1800-BT	RS422
	USB-RS422-WE-5000-BT	
RS485 Converter	USB-RS485-WE-1800-BT	RS485
	USB-RS485-WE-5000-BT	

USB TO TTL SERIAL CABLES



	PART NUMBER	IO LEVELS
Type A USB to wire end TTL Serial	TTL-232RG-VREG1V8-WE	1.8V
	TTL-232RG-VREG3V3-WE	3.3V
	TTL-232RG-VSW3V3-WE	3.3V
	TTL-232RG-VSW5V-WE	5V
	TTL-232RG-VIP-WE	1.8V to 5.25V[1]
	TTL-232R-3V3-WE	3.3V
	TTL-232R-5V-WE	5V
Type A USB to SIP Connector	TTL-232R-5V	5V
	TTL-232R-3V3	3.3V
	TTL-232R-3V3-2MM	3.3V
Type A USB to 3.5mm Audio Jack	TTL-232R-5V-AJ	5V
	TTL-232R-3V3-AJ	3.3V

USB HI SPEED CABLES

	PART NUMBER	IO
Usb Hi Speed To MPSSE Cables	C232HM-DDHSL-0	
	C232HM-EDHSL-0	
Usb Hi-Speed To UART Cables	C232HD-DDHSP-0	
	C232HD-EDHSP-0	

FTDI Chip's instant USB converter cables provide connectivity options from USB to RS232, RS422, or RS485 and TTL based signalling interfaces. The cables feature integrated electronics assemblies by using FTDI Chip's ICs, to provide an easy-to-use USB conversion. Custom cable versions are available upon request.

MAX BAUD RATE	RX/TX LED	CABLE LENGTH	CABLE TERMINATION	TEMPERATURE RANGE	NOTES
1 Mbaud	RX/TX LED	10cm 1m 5m	DB9	-20°C to +80°C	Retaining nut on DB9 connector.
1 Mbaud	–	2m 5m	DB9	-20°C to +80°C	Thumb screw on DB9 connector.
250 kBaud	–	10cm	DB9	-40°C to +85°C	

POWER OUTPUT PIN	MAX BAUD RATE	RX/TX LED	CABLE LENGTH	CABLE TERMINATION	TEMPERATURE RANGE	NOTES
0V	1 Mbaud	RX/TX LED	1.8m	Wire ended	-40°C to +85°C	Option of transparent or black USB connector. LEDs for visual indication of traffic on the cable. Also available as PCB.
3.3V			1.8m			
5V			1.8m			
0V			5m			
3.3V			5m			
5V			5m			
0V	3 Mbaud	RX/TX LED	1.8m	Wire ended	-40°C to +85°C	
			5m			
0V	3 Mbaud	RX/TX LED	1.8m	Wire ended	-40°C to +85°C	
			5m			

POWER OUTPUT PIN	MAX BAUD RATE	RX/TX LED	CABLE LENGTH	CABLE END	TEMPERATURE RANGE	NOTES
1.8V@100mA	3 Mbaud	RX/TX LED	1.8m	Wire ended	-40°C to +85°C	LEDs for visual indication of traffic on the cable. Transparent USB connector.
3.3V@250mA						
3.3V@50mA						
5V@450mA						
1.8V to 5.25V[1]						
5V@75mA		–				Available as PCB.
5V@75mA						
5V@75mA	3 Mbaud	–	1.8m	Single in line socket	-40°C to +85°C	0.1" pitch 2mm pitch, for VMUSIC2 and VDRIVE2
5V@75mA						
5V@75mA						
–	3 Mbaud	–	1.8m	Audio Jack	-40°C to +85°C	Tip - Tx, Ring - Rx, Sleeve - Ground

LEVELS	MAX DATA RATE	RX/TX LED	CABLE LENGTH	CABLE TERMINATION	TEMPERATURE RANGE	NOTES
3.3V	30Mbps	RX/TX LED**	0.5M	Wire ended	-40°C to +85°C	**In UART Mode Only
5V						
3.3V	12 Mbaud	RX/TX LED	1.8M	Wire ended	-40°C to +85°C	
5V						

[1] adj.logic threshold level (from external supply)

* All cables are powered from the host USB port, except TTL-232RG-VIP-WE
All cables use FTDI royalty free drivers - available on Windows, MAC, Linux, and WinCE
All cables FCC/CE approved • Custom cable options on request subject to MOQ/NRE

About FTDI Chip

FTDI Chip develops innovative silicon solutions that enhance interaction with the latest in global technology. The major objective from the company is to 'bridge technologies' in order to support engineeers with highly sophisticated, feature-rich, robust and simple-to-use product platforms. These platforms enable creation of electronic designs with high performance, few peripheral component requirements, low power budgets and minimal board real estate.

FTDI Chip's long-established, continuously expanding Universal Serial Bus (USB) product line boasts such universally recognized product brands as the ubiquitous R-Chip, X-Chip, Hi-Speed and SuperSpeed USB 3.0 series. In addition to both host and bridge chips, it includes highly-integrated system solutions with built-in microcontroller functionality. The company's Embedded Video Engine (EVE) graphic controllers each pack display, audio and touch functionality onto a single chip. The unique, streamlined approach utilised by these ICs allow dramatic reductions in the development time and bill-of-materials costs involved in next generation Human Machine Interface (HMI) implementation. FTDI Chip also provides families of highly-differentiated, speed-optimised microcontroller units (MCUs) with augmented connectivity features, specifically designed with compatibility to its USB and Display product lines in mind. These MCUs are targeted at key applications where they can add value with their superior processing performance and high levels of operational efficiency.

FTDI Chip is a fab-less semiconductor company, partnered with the world's leading foundries. The headquarter is located in Glasgow, UK and is supported with research and development facilities in Glasgow, Singapore and Taipei (Taiwan) plus regional sales and techical support sites in Glasgow, Taipei, Tigard (Oregon, USA) and Shanghai (China).

For more information go to: www.ftdichip.com

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