# FTDI Chip

![FTDI Chip logo]

# FTDI Chip
# USB Solutions

The USB Bridging Solution Specialist

## Modules

## ICs
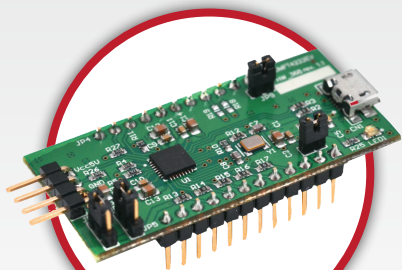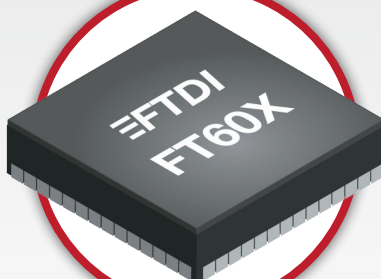
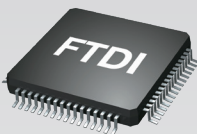FTDI
FT60X

## Cables

# 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, I2C, 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.

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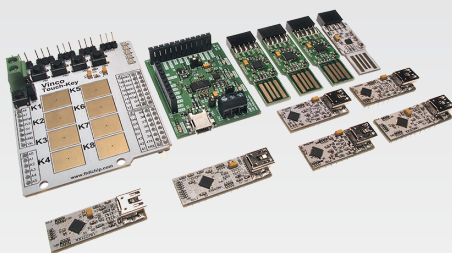
Development modules are available to enable rapid design development. The modules are available in a variety of mechanical formats to allow easy bread-boarding or immediate access to the bridge interfaces. Additionally application modules are available which provide specific system functionality.

## 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 SUPER SPEED
## BRIDGE SOLUTION (FT600 SERIES)

The FT600 SuperSpeed series from FTDI Chip provides a USB3.0 SuperSpeed to FIFO bridge, which provides up to 5Gbps of bandwidth. With optional 16 and 32 bit FIFO interfaces, the FT600 enables connectivity for numerous applications including high resolution cameras and displays, multifunction printers and much more. The device supports Link Power Management (LPM) to enable greater power savings, and also supports Suspend and Remote Wakeup signaling. Moreover, the device provides Battery Charge Detection (BCD) and is supported on major operating systems including Windows, Linux and Mac.

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

This innovative new product is available in two space saving packages – 56QFN and 76QFN.

|  | Application Interface | Channels | Configurable IO Pins | Pkg | USB Class |
|---|---|---|---|---|---|
| **FT600Q** | 16 bit FIFO | 1 / 2 / 4 | 2 | QFN56 | D3xx |
| **FT601Q** | 32 bit FIFO | 1 / 2 / 4 | 2 | QFN76 | D3xx |
| **FT602Q** | 32 bit FIFO | 1 / 2 / 4 | 2 | QFN76 | UVC |

Applications that need to transfer data over USB at faster rates benefit from the FT600 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
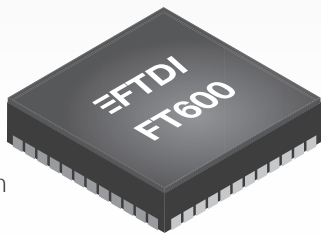
# USB 2.0 HI-SPEED
## BRIDGE SOLUTION

### *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 56 VQFN |
| **FT4232H** | UART MPSSE x2 | 4 | External (12MHz) | External | 12MBaud 30Mbit/s | 64 QFN 64 LQFP 56 VQFN |
| **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 | Configurable CBUS Pins | MTP Memory | Data Throughput | Package |
|---|---|---|---|---|---|---|
| **FT200XD** | I²C | 1 | 1 | Internal | 3.4Mbit/s | 10 DFN |
| **FT201XQ** | I²C | 1 | 7 | Internal | 3.4Mbit/s | 16 QFN |
| **FT201XS** | | | | | | 16 SSOP |
| **FT220XQ** | 4-Bit SPI/ FT1248 | 1 | 1 | Internal | 500kByte/s | 16 QFN |
| **FT220XS** | | | | | | 16 SSOP |
| **FT221XQ** | 8-Bit SPI/ FT1248 | 1 | 1 | Internal | 1MByte/s | 20 QFN |
| **FT221XS** | | | | | | 20 SSOP |
| **FT230XQ** | Basic UART | 1 | 4 | Internal | 3MBaud | 16 QFN |
| **FT230XS** | | | | | | 16 SSOP |
| **FT231XQ** | Full Handshake UART | 1 | 4 | Internal | 3MBaud | 20 QFN |
| **FT231XS** | | | | | | 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 | Configurable CBUS Pins | EEPROM | Data Throughput | Package |
|---|---|---|---|---|---|---|
| **FT232RL** | UART | 1 | 5 | Internal | 3MBaud | 28 SSOP |
| **FT232RQ** | | | | | | 32 QFN |
| **FT245RL** | 8-bit FIFO | 1 | 0 | Internal | 1MByte/s | 28 SSOP |
| **FT245RQ** | | | | | | 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: -40oC to +85oC

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

# HID CLASS USB SOLUTIONS

USB devices are not all the same. The descriptors for a device categorise the devices into different classes.

Classes include mass storage (for memory devices), CDC (for communication devices e.g. wireless dongles), printer, audio and HID (Human Interface Devices such as a keyboard) classes. FTDI's traditional USB bridge devices use a special vendor class, as USB to Serial is not strictly covered by the standard classes. This is why FTDI also offer free dedicated drivers for their devices.

However as the Internet of Things evolves and more and more devices are connecting on a variety of different embedded systems a market is emerging which is more suited to a standard class of device such as HID. The key benefit to the end user is that it is more likely a standard class driver will exist for these many platforms as opposed to vendor class drivers.

Selecting HID as the standard bridge class FTDI has developed the FT260 Full speed HID class device enabling USB to bridge with I2C Master, UART or GPIO peripherals. This opens up access to many sensor applications critical in a smart connected world.

| | Application Interface | Channels | Configurable IO Pins | Package |
|---|---|---|---|---|
| **FT260Q** | I2C, UART, GPIO | 1 / 2 | 14 | QFN28 |
| **FT260S** | I2C, UART, GPIO | 1 / 2 | 14 | SSOP28 |

- Standard USB device class requires no custom drivers
- Configurable interface selection for UART, I2C or both
- Wide IO voltage supporting from 1.8V to 3.3V output and 1.8V to 5V input
- Battery Charger Detection supported
- Provide internal E-Fuse for some basic configuration and external EEPROM for future settings
- Internally generated clock – NO external crystal required.
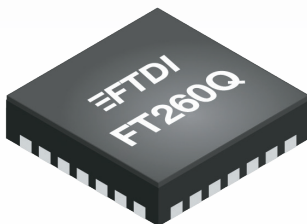
# HID CLASS USB SOLUTIONS

Human Interface Device (HID) is one of the most popular USB device classes. This protocol was developed to simplify the process of connecting accessories such as a mouse, keyboard or touchpad to the PC. HID was originally developed to run on USB or Bluetooth. For Windows 8, Microsoft created a new type of device called "HID-over-I2C", which allows the device to communicate using the HID protocol over an Inter-Integrated Circuit (I2C) bus. "HID-over-I2C" devices are only supported natively by Microsoft Windows 8 and above.

The FT260 is able to connect a "HID-over-I2C" device via the I2C bus and uses FT260`s EEPROM or Efuse for configuration.

The FT260 helps to communicate USB HID requests from a PC to the device, and allows it to perform as a normal USB HID device without any additional coding. With FT260, an I2C slave that is compliant with the "HID-over-I2C" protocol can communicate directly with the USB HID class driver through the USB connection.

Suitable for Trackpad, Touchscreen, or other Human Machine Interface (HMI) applications.
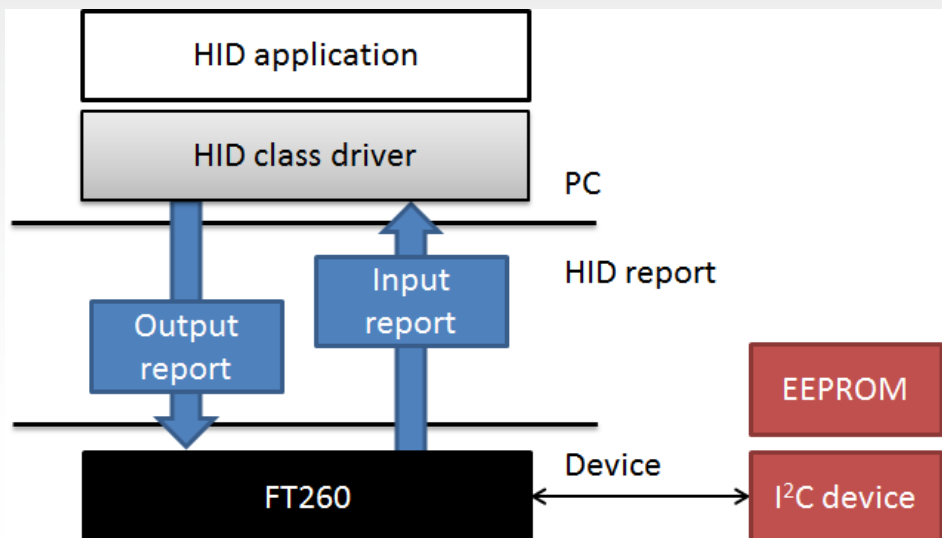
# USB HOST SOLUTIONS

As mobility accelerates, the need for host support in tablets, handsets, and consumer equipment it 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 Crystal |
| **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 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
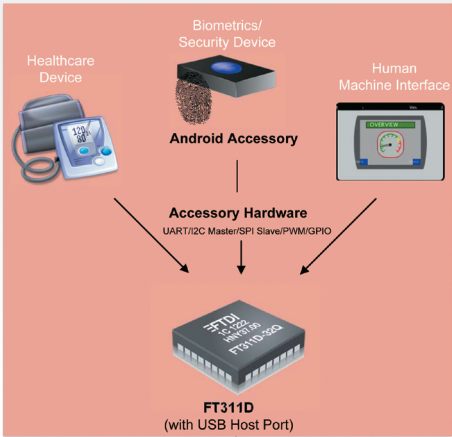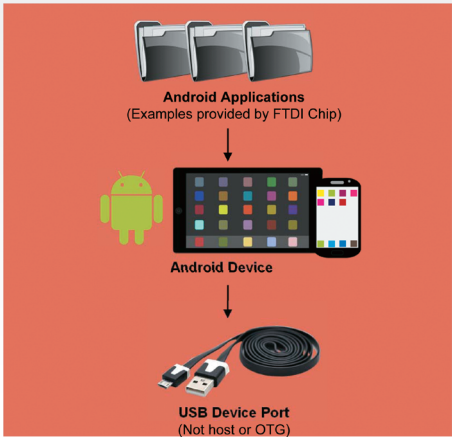


**USB Connection providing data connectivity**
(Optionally, the Android Accessory can also charge the Android device)

# USB TO RS232 DESIGN.

The simplest and most common use of FTDI devices is for the purpose of bridging USB ports to a UART peripheral interface. The UART interface may operate at 1.8V to 5V in which case it is possible to realize the design with only one IC such as the FT231X which will handle all the protocol translation on chip. If the design is connecting to either RS232, RS422, RS485 then the design will require an additional transceiver to convert the FT231X UART signals to the appropriate levels.

| | TTL UART | RS232 | RS422 | RS485 |
|---|---|---|---|---|
| **Signal Swing** | 0V to 3V3/5V | +/-5V to +/-15V | +/-2V | +/-1.5V |
| **Termination** | Single ended | Single Ended | Differential | Differential |
| **Transmission length** | ~2m | ~15m | ~1200m | ~1200m |
| **No of transmitters/ receivers on a line** | 1 Driver 1 Receiver | 1 Driver 1 Receiver | 1 Driver 10 Receiver | 32 Driver 32 Receiver |
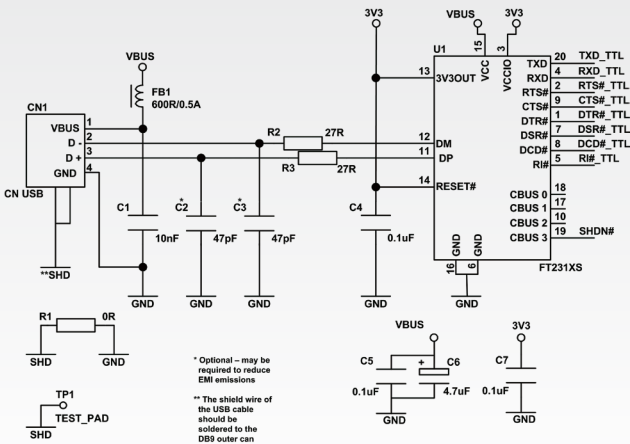


It is possible for the design to simply use RXD and TXD signals but with FTDI solutions the option to implement full modem control is also provided.
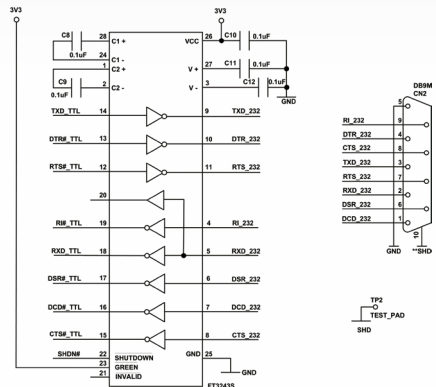
# X-CHIP BATTERY CHARGER DETECTION
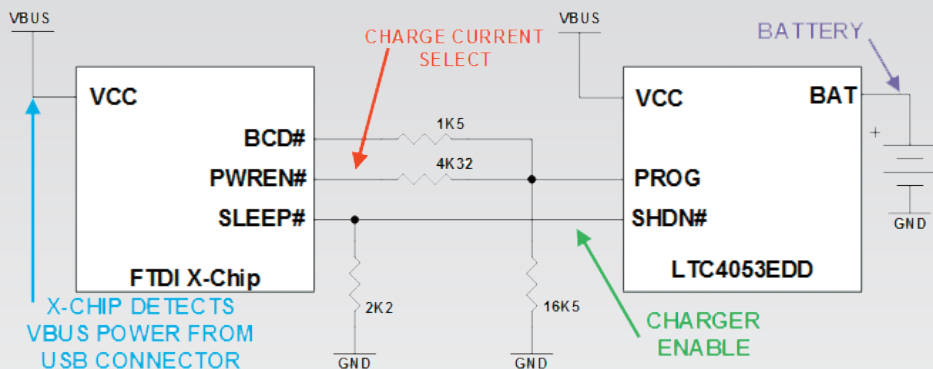


| VBUS | BCD# | PWREN# | *SLEEP# | CHG CURRENT |
|------|------|--------|---------|-------------|
| 0V | LOGIC 0 | LOGIC 0 | LOGIC 0 | 0 – IN SHUTDOWN |
| 5V DEDICATED CHARGER | LOGIC 0 | LOGIC 1 | LOGIC 1 | 1.1A |
| 5V STANDARD DOWNSTREAM PORT (ENUMERATED) | LOGIC 1 | LOGIC 0 | LOGIC 1 | 0.44A |

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

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

More information in Application Note 175: Battery charger detection over usb with FT-X devices.

# DEVICE DRIVER SUPPORT

Developing a USB solution is a two step process

1. The silicon required to translate the different protocols.
2. The drivers to communicate with the silicon.

FTDI offers among the most comprehensive range of OS supporting drivers on the market, thus facilitating one hardware solution to run on multiple platforms .

Drivers from FTDI can create virtual COM ports to allow legacy apps to control the USB device while talking to a UART interface or bus level drivers offering extended device control.

| WINDOWS CERTIFIED | OTHERS |
|---|---|
| Windows 10 (32/64 bit) | Linux |
| Windows 8.1 (32/64 bit) | MAC OSX |
| Windows 8 (32/64 bit) | Windows CE (v4.2 and above) |
| Windows 7 (32/64 bit) | Windows RT |
| Windows Server 2012 R2 x64 | Android* |
| Windows Server 2008 R2 x64 | |

*Android OS is supported though a JAVA interface, J2xx offering similar functionality to the bus level driver used on the other OS.

+Virtual COM Port drivers are shipped as part of the MAC OSX and Linux OS. As such this is often the simplest driver to use on these OS as to use the bus driver requires the VCP driver to first be disabled.

+Drivers for Windows must be installed by the user. However VCP and bus level drivers are supplied in a combined driver and can be installed together. 3 installation options are provided by FTDI.

1. Windows update will install drivers if the PC is connected to the internet and the device is plugged in. This is perhaps the simplest for most users.
2. Windows provides a setup wizard that will start automatically if the device is plugged in and windows update is not used. This allows the most user control over the installation and setup.
3. A setup exe which automates the installation for non networked PCs. This 3rd option is a hybrid of options 1 and 2.

# 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)

### 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-SpeedSerial/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.
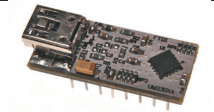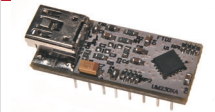**Application:** USB to SPI/I2C master/ slave.

### UMFT4222HPROG

**Chip:** FT4222H
**USB connector:** Type A
**Form Factor:** 42.38mm x 41.23mm board mounted with components and connectors.
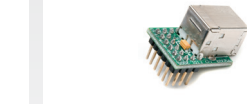**Application:** For Programming the FT4222H IC descriptors.
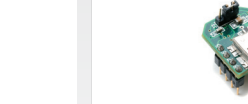
# X-CHIP SERIES SUPPORT

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

# DEVELOPMENT MODULES

## – FT60x-CHIP SERIES SUPPORT

An advanced USB3.0 Super Speed Family with multichannel support

| UMFT600A | UMFT600X | UMFT601A | UMFT601X |
|---|---|---|---|
| **Chip:** FT600Q | **Chip:** FT600Q | **Chip:** FT601Q | **Chip:** FT601Q |
| **USB Connector:** USB 3.0 micro-B connector to USB host | **USB Connector:** USB 3.0 micro-B connector to USB host | **USB Connector:** USB 3.0 micro-B connector to USB host | **USB Connector:** USB 3.0 micro-B connector to USB host |
| **Application connector:** HSMC connector to external FIFO master | **Application connector:** FMC connector to external FIFO master | **Application connector:** HSMC connector to external FIFO master | **Application connector:** FMC connector to external FIFO master |
| **Application:** USB to multi-channel FIFO (16 bits wide) | **Application:** USB to multi-channel FIFO (16 bits wide) | **Application:** USB to multi-channel FIFO (32 bits wide) | **Application:** USB to multi-channel FIFO (32 bits wide) |

## FT260 HID Class Series Support

Full Speed HID Class devices ideal for USB sensors and no driver installation required

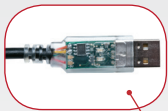| UMFT260EV1A | UMFTPD3A |
|---|---|
| **Chip:** FT260 | **Description:** Programmer module to link FT_PROG with either FT260 or FT4222 devices. Provides programming voltages to access on chip OTP for updating device descriptors. |
| **USB Connector:** micro-B Application connector | |
| **Form factor:** 24 pin 0.8" wide DIP | |
| **Application:** HID class USB to UART or I2C Bridge | |

# CABLE SOLUTIONS

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

| | 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 | |

| | 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 |
| | 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 |
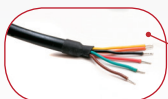
FTDI Chip's instant USB converter cables provide connectivity options from USB to RS232, RS422, or RS485 and TTL based signalling interfaces. The cables feature integrated electronics assemblies by using FTDI Chip's ICs, to provide an easy-to-use USB conversion. Custom cable versions are available upon 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. |
| 3.3V | | | 1.8m | | | |
| 5V | | | 1.8m | | | LEDs for visual indication of traffic on the cable. |
| 0V | | | 5m | | | |
| 3.3V | | | 5m | | | |
| 5V | | | 5m | | | Also available as PCB. |
| 0V | 3 Mbaud | RX/TX LED | 1.8m / 5m | Wire ended | −40°C to +85°C | |
| 5V | 3 Mbaud | RX/TX LED | 1.8m / 5m | Wire ended | −40°C to +85°C | |

| 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. |
| 3.3V@250mA | | | | | | |
| 3.3V@50mA | | | | | | |
| 5V@450mA | | | | | | Transparent USB connector. |
| 1.8V to 5.25V | | | | | | |
| 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 |
| 5V@75mA | | | | | | 2mm pitch, for VMUSIC2 and VDRIVE2 |
| 5V@75mA | | | | | | |
| – | 3 Mbaud | – | 1.8m | Audio Jack | −40°C to +85°C | Tip - Tx, Ring - Rx, Sleeve - Ground |

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 today's technology. The company prides itself on its existence as a USB bridging solution specialist, and applies this principle by supporting engineers with highly sophisticated, feature-rich, robust and simple-to-use products. This enables creation of electronic designs with higher performance, fewer peripheral components, lower power budgets and diminished 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, Vinculum, and H-Series.

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

▶ www.youtube.com/FTDIChip

f www.facebook.com/FTDIDesignMadeEasy

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