

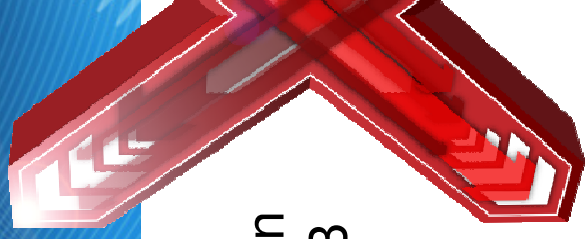
**FTDI**  
Chip

**Introducing the FT-X Series  
of USB2.0 Full Speed  
Peripheral Solutions**



**USB MADE EASY**

# Introducing the FT-X Chip Series



- 13 chip/package options to optimize your design when you need to quickly and easily add a USB port into your system.
- FTDI provides a wide selection of OS support:
  - Windows, Android, Mac OS, and Linux.
- Offering a wide selection of IO bridges including: Basic UART Handshake UART, FIFO, I<sup>2</sup>C, SPI, and FTDI's FT1248 interposer
  - I<sup>2</sup>C to USB bridge in 10 pin DFN package.
- Low power, small device footprints, and abundant features PCB real estate and lowers overall system costs.

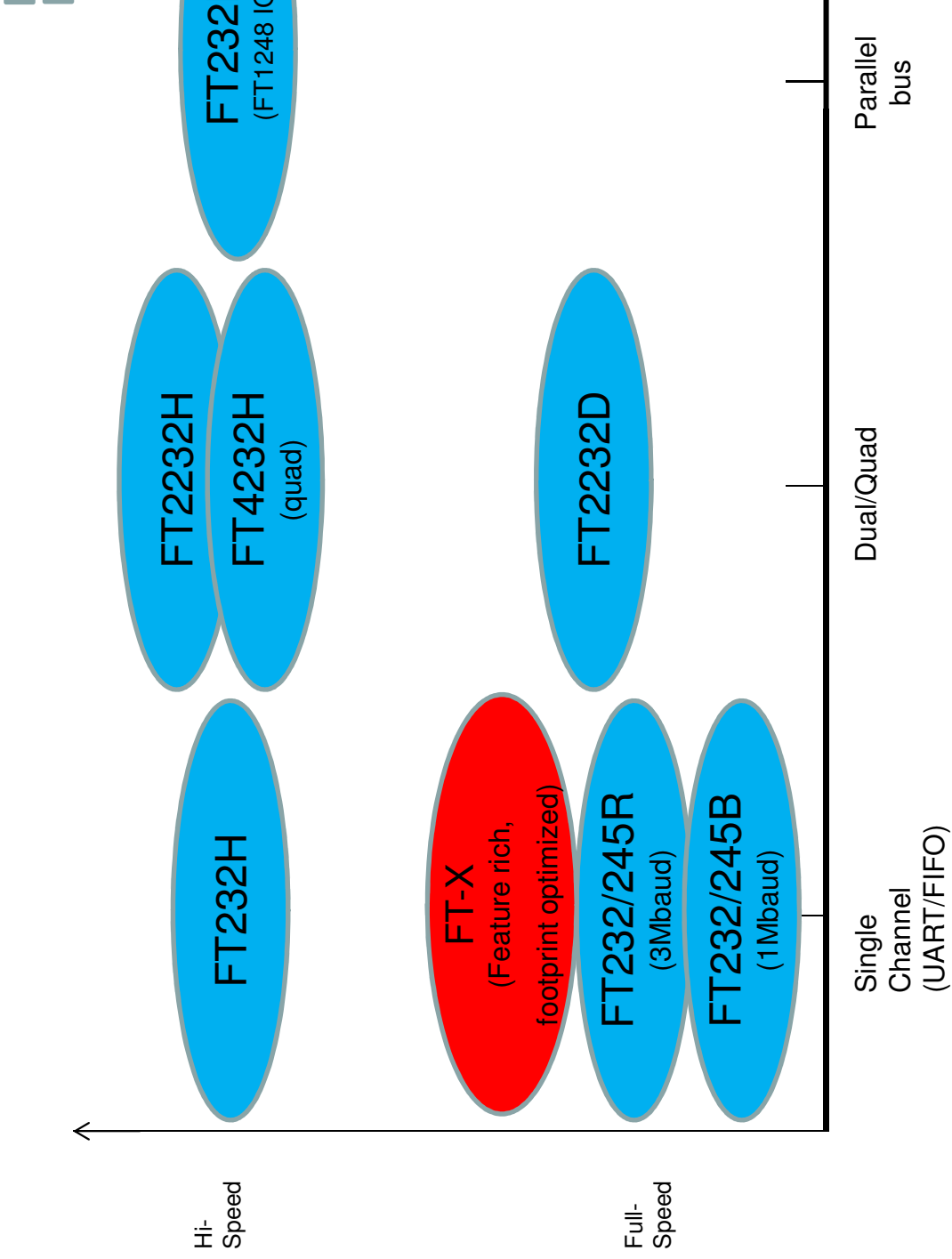
**FT-X Series has I all !!**

# FTDI USB Peripheral Series Strategy

- Extension of FTDI's product mission:
  - Future Technology Devices International (FTDI) specialises design and supply of silicon and software solutions for the Serial Bus (USB). FTDI offers a **simple** route to USB migration by combining **easy** to implement IC devices with **ready-to-use, royalty-free** USB firmware and driver software.
- FTDI offers the **widest selection** of USB chips for USB peripherals:
  - Familiar FT232R and FT245R for ease-of-use and fast time to market.
  - USB2 Hi-Speed solutions, with single and multi-channel FT232H / FT2232H / FT4232H.
  - FT-X Series offering is the PREMIERE cost / benefit performance Full Speed solutions in the market.

**Whatever your USB design needs  
FTDI can meet it !!!**

# USB Peripheral / Device Solutions



# FT-X Series – Meet the Family

| Part Number    | Pins | Package | Description                   |
|----------------|------|---------|-------------------------------|
| <b>FT231XS</b> | 20   | SSOP    | Full Handshake UART Interface |
| <b>FT231XQ</b> | 20   | QFN     | Full Handshake UART Interface |
| <b>FT230XS</b> | 16   | SSOP    | Basic UART Interface          |
| <b>FT230XQ</b> | 16   | QFN     | Basic UART Interface          |
| <b>FT221XS</b> | 20   | SSOP    | 8bit SPI/FT1248 Interface     |
| <b>FT221XQ</b> | 20   | QFN     | 8bit SPI/FT1248 Interface     |
| <b>FT220XS</b> | 16   | SSOP    | 4bit SPI/FT1248 Interface     |
| <b>FT220XQ</b> | 16   | QFN     | 4bit SPI/FT1248 Interface     |
| <b>FT201XS</b> | 16   | SSOP    | I <sup>2</sup> C Interface    |
| <b>FT201XQ</b> | 16   | QFN     | I <sup>2</sup> C Interface    |
| <b>FT200XD</b> | 10   | DFN     | I <sup>2</sup> C Interface    |
| <b>FT240XS</b> | 24   | SSOP    | 8bit FIFO Interface           |
| <b>FT240XQ</b> | 24   | QFN     | 8bit FIFO Interface           |

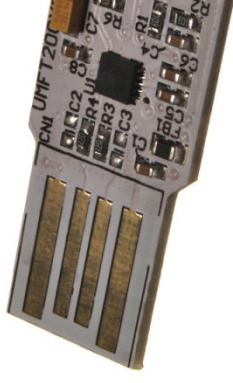
## FT-X Series Features

- X-Chip Factor provides the extra elements/features that add
  - Battery charger detection to current, faster charging.
  - Extensive clocking features generation and external clock
  - Internal 3V3 level converter
  - Integrated crystal and MTP save board space and max
  - Extended temperature range -40° to +85 °C.
  - Low power consumption:
    - 8mA active (typical)
    - 125uA suspend (typical)
  - Input/ output voltage support with 5V tolerance.



# FT-X Series Support, Breakout Modules

- Breakout modules, such as the USB to I<sup>2</sup>C, UMFT200XD, provide the simplest method to connect to a USB host, and interface directly into your system via the appropriate IO.

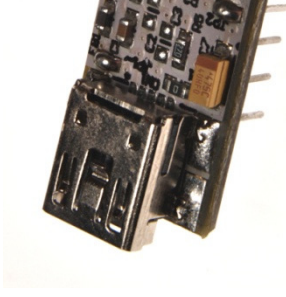


- 4 PCB traces slot directly into a USB Host (A Port)
- USB protocol engine and interface bridge integrated into FT-X Series silicon devices
- Interface connector provided for system integration
- Choice of module per interface required

| Module    |
|-----------|
| UMFT201XB |
| UMFT200XD |
| UMFT220XB |
| UMFT230XB |

# FT-X Series Support, Evaluation Modules

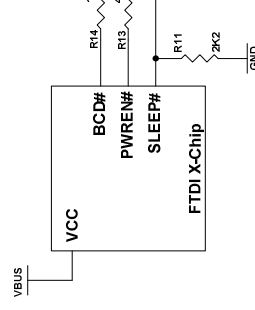
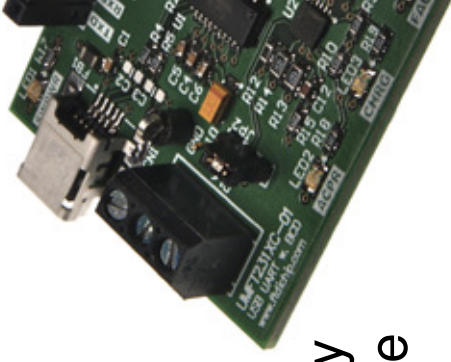
- Evaluation modules are larger than breakout modules, and provide access to all pins.
  - Manufactured in DIP form factor (0.3” wide).
  - Easy to integrate into system boards for thorough prototyping, system emulation, and check-out.
  - USB protocol engine and interface bridge integrated into FT-X Series silicon devices.
  - Choice of module per interface required.



| Module    |
|-----------|
| UMFT201XA |
| UMFT220XA |
| UMFT221XA |
| UMFT230XA |
| UMFT231XA |
| UMFT240XA |

# UMFT231XC - Battery Charging Detection

- Development board provides for USB to UART bridge functionality as well as battery charging detection (BCD), and battery charging via LTC4053.
  - FT231X device supports BCD to simplify and optimize battery charging in portable systems.
    - Detects Dedicated Charging Port (DCP) or Standard Downstream Port (SDP,) enabling selection of higher battery charging current, 1.8A or .5A.
    - CBUS pins enable control of charging rate.
    - Complete sleep and suspend capabilities.



**FT-X enables optimal battery charging !**

# FTDI Drivers Architecture

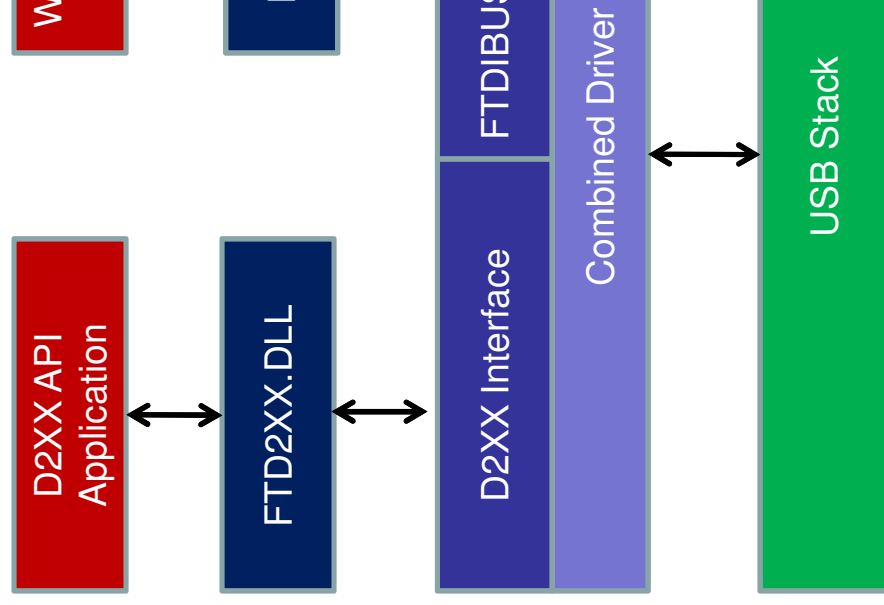
FTDI provides two alternative software interfaces for USB controllers.

## COM Port Application

One interface provides a Virtual COM Port (VCP) which appears to the system as a legacy COM port. Legacy applications should work with VCP drivers with minimal modification.

## D2XX API

The second interface, D2XX, is provided via a proprietary DLL (FTD2XX.DLL). The D2XX interface provides special functions to optimize performance and improve flexibility.





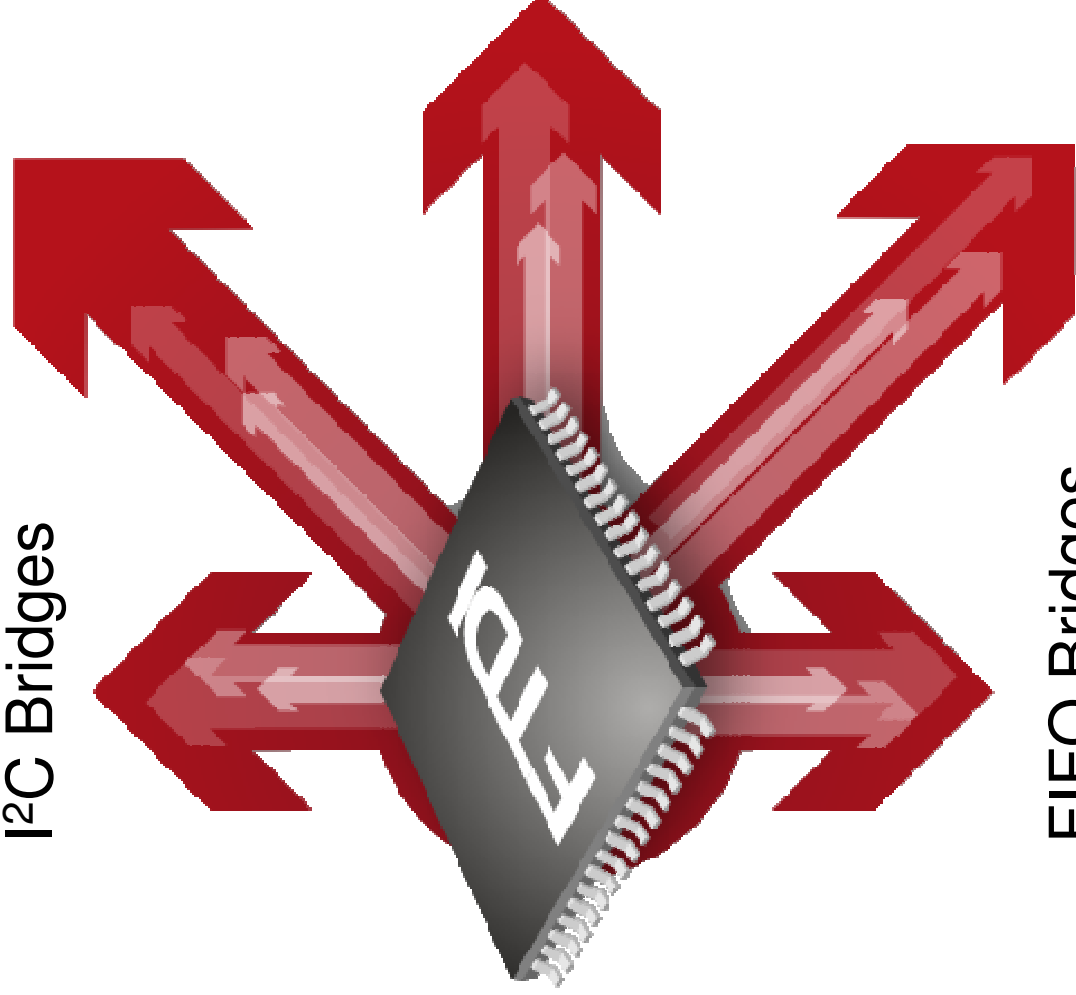
Experience the X Chip Factor !

# FT-X Series

## World-Class Features

- Low power
- Battery Charge
- Internal Regulation
- Extended clock
- MTP memory
- Extended Temperature support

I<sup>2</sup>C Bridges



UART Bridges

Flexible FT1248  
Interface

FIFO Bridges

# FT-X Series – Meet the Family

| FT-X Series      |  |  |   |  |                                  |                    |
|------------------|--|--|---|--|----------------------------------|--------------------|
| Device           | FT200XD                                      | FT201X                                       | FT220X                                    | FT221X                                   | FT230X                           | FT                 |
| Description      | I <sup>2</sup> C slave to USB 2.0 Full Speed | I <sup>2</sup> C slave to USB 2.0 Full Speed | SPI/FT1248 (4-bits) to USB 2.0 Full Speed | SPI/FT1248 (8-bits) to USB2.0 Full Speed | Basic UART to USB 2.0 Full Speed | Full USB 2.0 Speed |
| Performance      | 3.4 Mbits/sec                                | 3.4 Mbits/sec                                | .5 MByte/sec                              | 1 MByte/sec                              | 3 Mbaud                          | M                  |
| CBUS Pins *      | 1  | 6  | 1   | 1  | 4                                |                    |
| Clock Oscillator | Internal                                     | Internal                                     | Internal                                  | Internal                                 | Internal                         | Int                |
| EE/MTP Memory    | Internal                                     | Internal                                     | Internal                                  | Internal                                 | Internal                         | Int                |
| Packages         | 10-pin DFN                                   | 16-pin SSOP/<br>16-pin QFN                   | 16-pin SSOP/<br>16-pin QFN                | 20-pin SSOP/<br>20-pin QFN               | 16-pin SSOP/<br>16-pin QFN       | 20-pin<br>20-pin   |

\* Configurable as GPIO, LED drivers, or clock signals

- All devices, -40 to 85 °C
- All devices IO, 1.8V to 3.3V (5V tolerant)
- All devices, 8 mA (active-typical), 125 uA (suspend-typical)

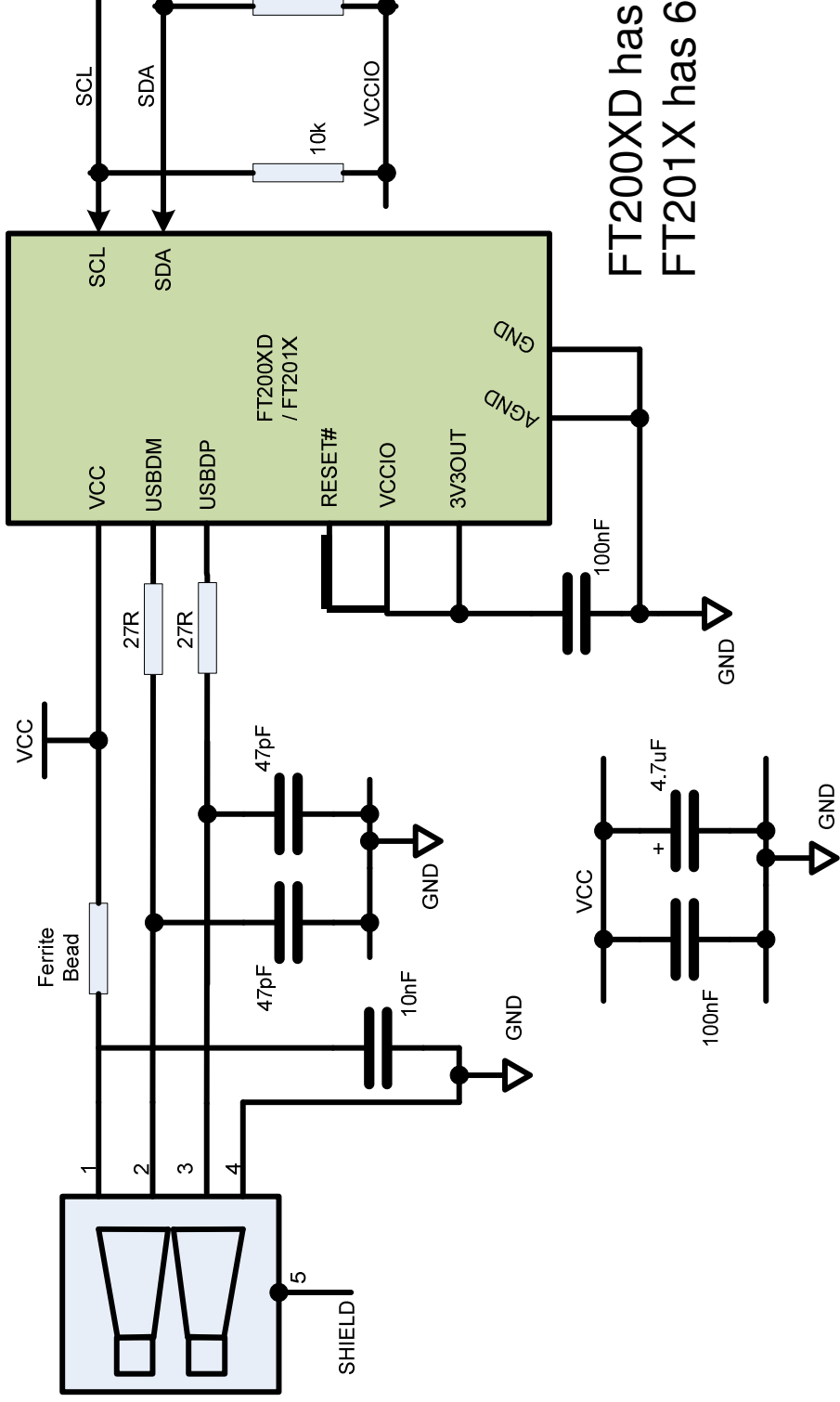
# FT200XD/FT201X - USB for 'those tight

With FTDI's I<sup>2</sup>C solutions, designers can maximize performance whilst minimising space and power.

- USB to I<sup>2</sup>C Slave bridge with speeds up to 3.4Mbit/s.
  - FT200XD is 10 pin DFN package – smallest solution.
  - FT201X is 16 pin QFN/SSOP packages – more GPIO lines
- Low power – typically 8mA active / 125uA suspend.
- Configurable CBUS pins for BCD, driving LED, clock-out, on-chip
- USB Battery Charger Detection function.
- Internal 2KB, MTP can be reprogrammed via both USB and I<sup>2</sup>C
- FTDI Chip-ID security feature.
- VCC, 5V (single-supply) or 3.3V.
  - Internal regulator for 3.3V supplies.
  - Supports Bus-Powered (5V) or Self-Powered (3.3V).

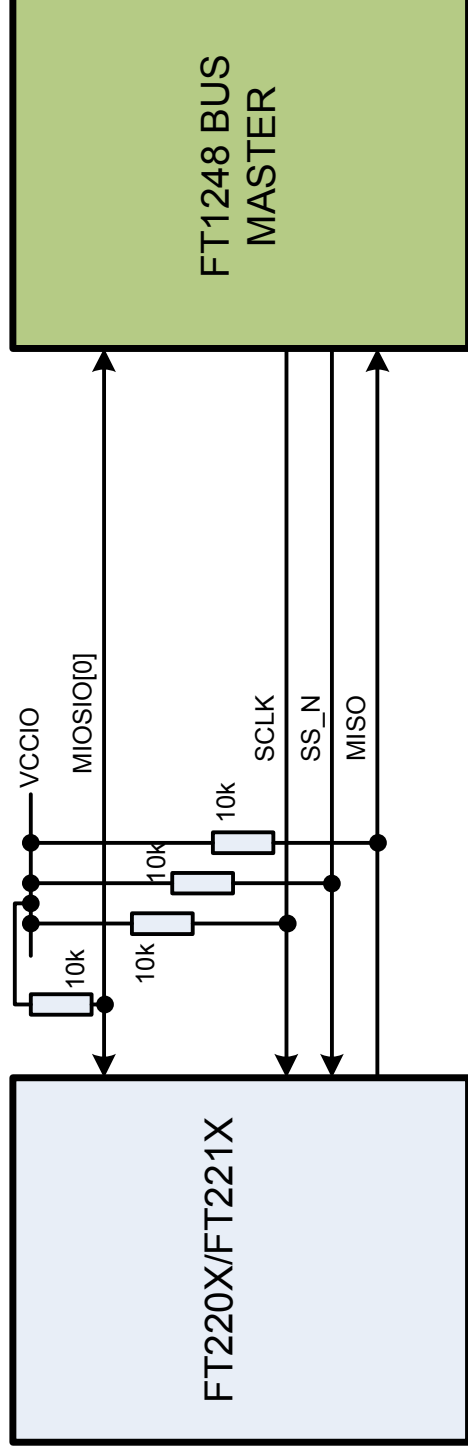
# FT200XD/FT201X USB to I<sup>2</sup>C Slave Conversion

FT200XD/FT201X supports standard I<sup>2</sup>C data rates such as 100 kbit/mode (SM), 400 kbit/s fast mode (FM), 1 Mbit/s Fast mode plus (FM+) Mbit/s High Speed mode (HS).



# FT220X / FT221X USB to FT1248 Interface

- FT1248 interface is a synchronous serial / parallel interface.
  - Provides for flexibility depending upon IO constraints.
  - Allows for pin usage / bus performance trade-offs.
- Flexible interface may be 1, 2, 4, or 8 bits wide.
  - 1, 2, or 4 bit interface for FT220X in 16 pin packages.
  - Extended 8 bit wide for FT221X in 20 pin packages.
- FT220/221X contains the complete FT-X Series feature set



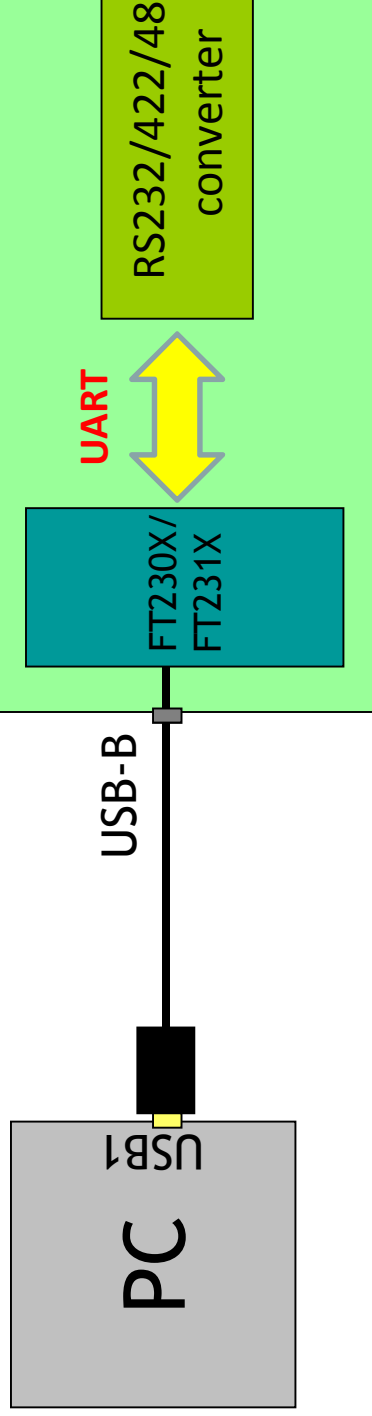
# FT220X / FT221X Advantages

- Optimal pin / performance choices when IO considerations
  - FT220X – 16 pin SSOP/QFN options 1, 2, or 4 bit wide interface
  - FT221X – 20 pin SSOP/QFN options – 1, 2, 4, or 8 bit wide interface
- Functions similar to SPI slave.
- Low power option – typically 8mA active / 125uA suspend.
- Configurable CBUS pins for BCD, driving LED, clock-out, or other
- USB Battery Charger Detection function.
- Internal 2KB, MTP could be reprogrammed via USB or FT11
- FTDI Chip-ID security feature.
- 1.8V to 3.3V IO (5V Tolerant).
- VCC, 5V (single-supply) or 3.3V.
  - Internal regulator for 3.3V supplies.
  - Supports Bus-Powered (5V) or Self-Powered (3.3V).

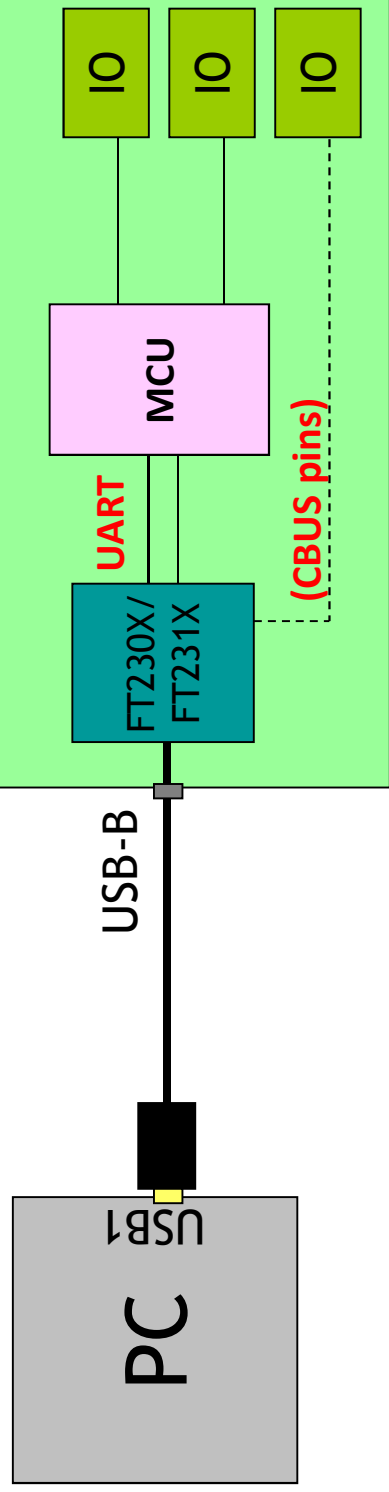
# FT230X/FT231X USB to UART Converter

Experience FTDI's World-Class, leadership UART s

- USB to RS232/422/485 Cable or Adaptors



- Integrate UART interface into embedded system application



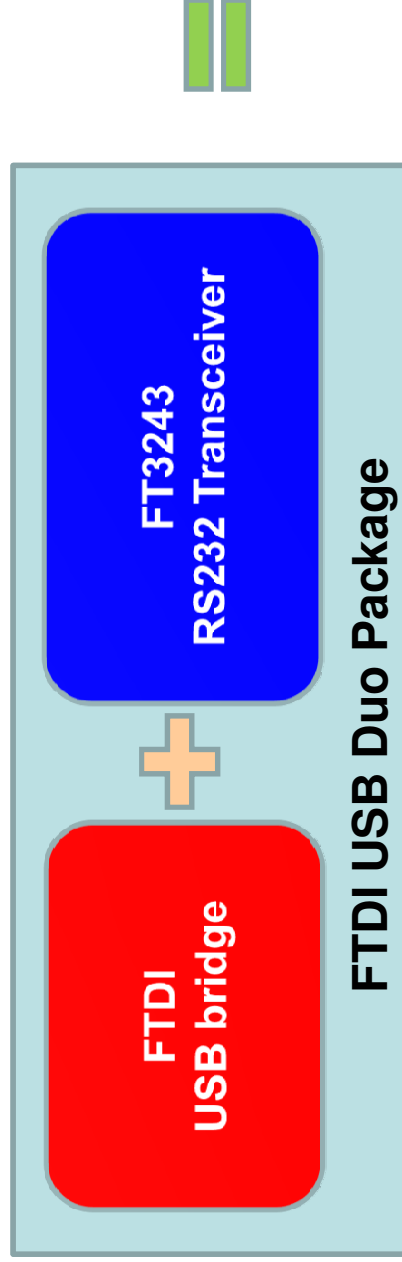
# FT230X / FT231X Advantages

- Match your UART configuration to minimize PCB area / system cost
  - FT230X – 16 pin SSOP/QFN options – RXD/TXD/RTS/CTS
  - FT231X – 20 pin SSOP/QFN options – full modem control.
- Up to 3M Baud data rates.
- Low power option – typically 8mA active / 125uA suspend
- Configurable CBUS pins for BCD, driving LED, clock-out,
- USB Battery Charger Detection function.
- Internal 2KB, MTP could be reprogrammed via USB.
- FTDI Chip-ID security feature.
- 1.8V to 3.3V IO (5V Tolerant).
- VCC, 5V (single-supply) or 3.3V.
  - Internal regulator for 3.3V supplies.
  - Supports Bus-Powered (5V) or Self-Powered (3.3V).

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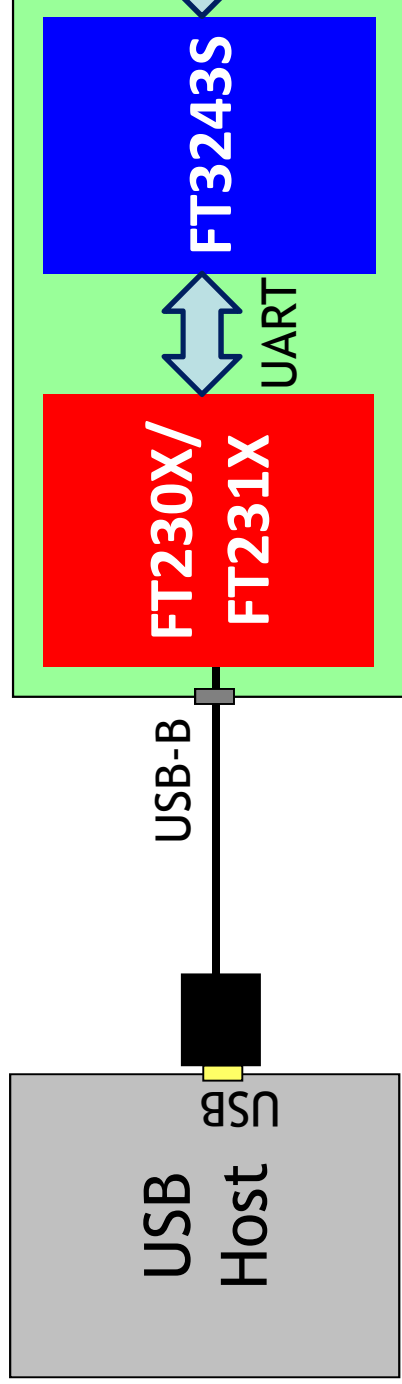
# USB-Duo maximizes your system

- FTDI USB Duo package provides complete function for a single
- FTDI's X chip factor provides optimal USB functionality with an feature set.



# FTDI USB-Duo

- FTDI provides a USB to RS232 total solution
  - Bundling a USB bridge controller and RS232 Transceiver IC
- The solution maximizes functionality and optimizes system price
- Integrated crystal and MTP to reduce BOM cost and PCB size
- FTDI provides Royal Free Driver Supported for both Virtual COM (VCP) and D2XX options.



Best Benefit for Price,  
Functions and PCB size

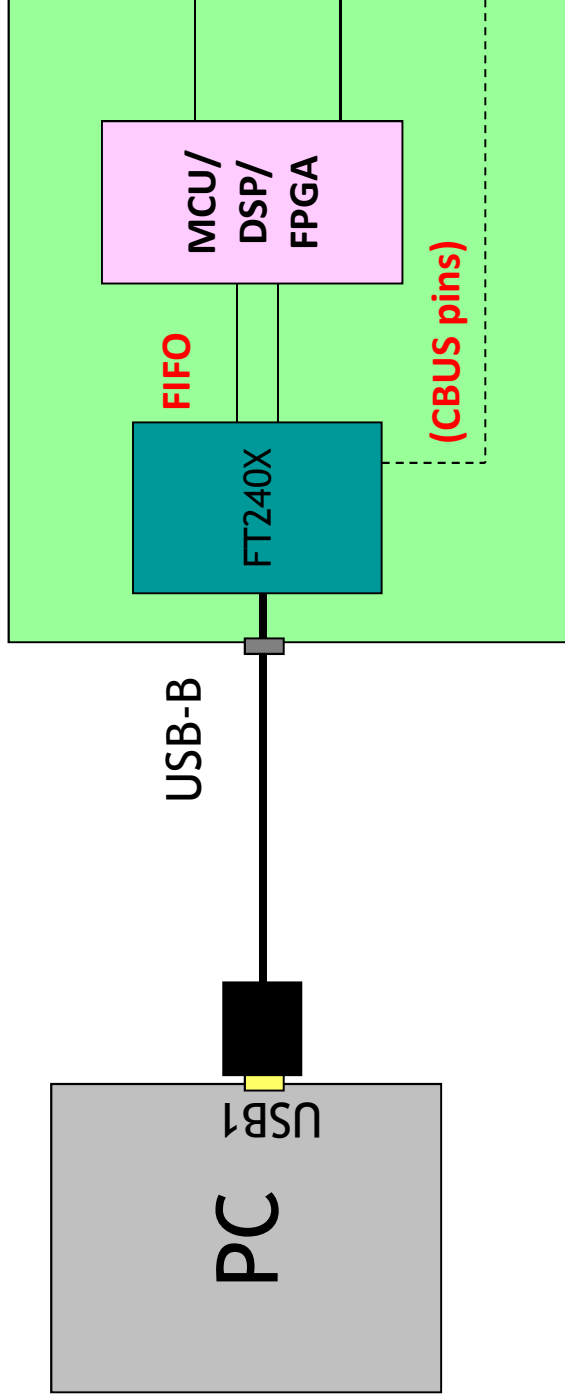
## FT3243S Low power 3.3V RS232 Transceiver

- Meets or Exceeds the EIA/TIA-232F and CCITT V.28/V.24 specifications at +3.3V  $\pm 10\%$  and +5V  $\pm 10\%$  Operations
- Interoperable with EIA/TIA-232 and adheres to EIA/TIA-562 down to power source
- Low quiescent current – 0.5mA typ., 1mA max. Low shutdown current (applicable) - 1 $\mu$ A; typical, 10 $\mu$ A max.
- Guaranteed data rate 250kbps
- Proprietary Switch-Capacitor Regulated Voltage Converters (patented)
- 28 Pins SSOP package
- Extended -40°C to 85°C; industrial operating temperature range.
- Latch-up Free and 15KV ESD Protection for RS-232 I/O's
- Drop-in Replacements for MAX3243E, ICL3243E, ISL4243E, ZT2344 and SP3243E

# FT240X USB to FIFO Converter

The FT240X is a USB to parallel FIFO interface which can be integrated into embedded system application easily.

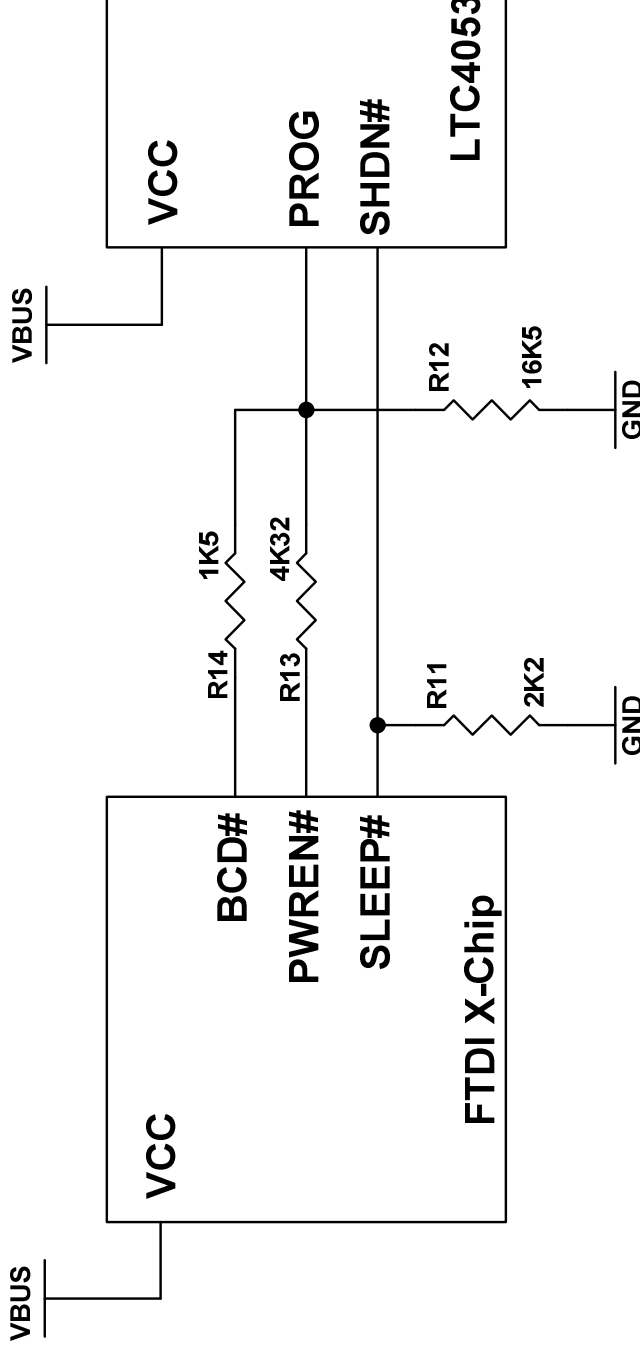
The Data transfer rates can up to 1Mbyte / second



# FT240X Advantages

- Reduced pin count for space critical designs.
  - FT240X – 24 pin SSOP/QFN options – 8-bit wide FIFO.
- 1MByte/s data rates.
- Low power option – typically 8mA active / 125uA suspend
- Configurable CBUS pins for BCD, driving LED, clock-out,
- USB Battery Charger Detection function.
- FTDI Chip-ID security feature.
- 1.8V to 3.3V IO (5V Tolerant).
- Internal 2KB, MTP could be reprogrammed via USB.
- VCC, 5V (single-supply) or 3.3V.
  - Internal regulator for 3.3V supplies.
  - Supports Bus-Powered (5V) or Self-Powered (3.3V).

# FT-X Series Enables Optimal Battery Charging



- Detects DCP (Dedicated Charging Port) or S (Standard Downstream Port), enabling selection of higher battery charging current, 1.8A or .5A.
- CBUS pins enable control of charging rate
- Complete sleep and suspend capabilities

# FTEx Development Modules

- Rapid prototyping
- Limited development
- Maximum Flexibility

| Breakout Module<br>(USB trace connections<br>plug PCB direct into<br>host port) | Evaluation Modules<br>(Mini-B USB connector,<br>with DIP PCB insert) | Battery Charge<br>Evaluation |
|---|--|------------------------------|
| UMFT200XD   | UMFT201XA  | UMFT231XA                    |
| UMFT201XB   | UMFT220XA  |                              |
| UMFT220XB   | UMFT221XA  |                              |
| UMFT230XB   | UMFT230XA  |                              |
|   | UMFT231XA  |                              |
|   | UMFT240XA  |                              |

# FTDI Web Resources



## Visit [www.ftdichip.com](http://www.ftdichip.com)

- Drivers : Newest VCP and D2XX driver
- Data Sheets : FTDI Data Sheets for production released chips available
- Application Notes : Application notes for basic and advanced development
- Technical Notes : Providing application background and system considerations
- Software Utilities : Beneficial programs for design creation and manufacturing support
- Software Examples : Sample example code to assist in the development
- FAQs : Useful Frequently Asked Questions

# FTDI Contact

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FTDI are ISO9001:2008 certified.

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- [FTDI, Future Technology Devices International Ltd Information](#)

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- ✓ Obsolete Management
- ✓ Cost Control Management
- ✓ Shortage Management
- ✓ Alternative Solution
- ✓ Excess Inventory Management