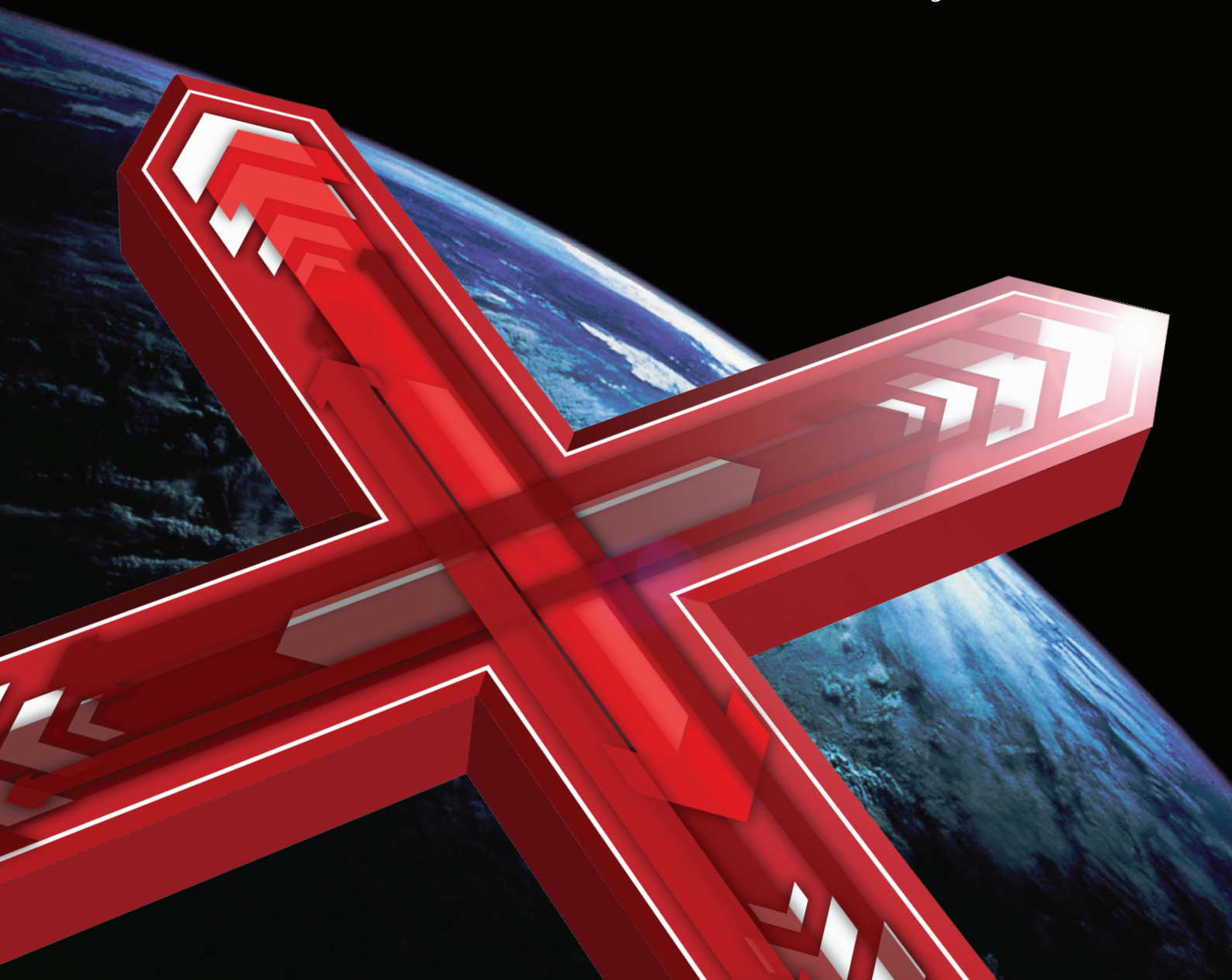# FTDI Chip

INTRODUCING X-CHIP

FTDI's largest product release for USB bridged devices

An abundance of features and system benefits

FTDI proudly announces its new "X-Chip" Series of devices, bringing to engineers an extended feature set to enhance system performance while optimizing board level considerations.

Designers will continue to experience the ease-of-use, validated embedded USB protocol engine, reliable drivers, and worldwide application support, which they have come to know. With a wide range of supported operating systems, including; Windows, Android, Linux, and MacOS, engineers can be assured in delivering a robust solution to the market.

ARE YOU READY FOR THE X-CHIP FACTOR?

The X-Chip Series has it all, when it comes to an extended feature set, including:

- Battery charging detection to enable higher current, faster charging
- Extensive clocking features; internal clock generation and external clock out
- Internal 3.3V level converter
- Integrated crystal and MTP memory to save board space and maximize flexibility
- Extended temperature range support, -40˚ to +85˚C
- Low power consumption:
  < 8mA active (typ)
  < 125uA suspend (typ)
- Supports 1.8V to 3.3V interfacing with 5V tolerance

The X-Chip Series devices target a wide range of interfaces, including Basic and Full UART, FIFO, I²C, SPI, and FTDI's FT1248, allowing engineers to easily incorporate USB connectivity into their systems. With years of experience and validation, the USB protocol engine that is integrated into each device provides the highest assurance of USB functionality, resulting in robust implementations and the fastest time-to-market – no system software to decompose, redesign, and revalidate.

The X-Chip Series devices are USB 2.0 Full Speed chips which join the USB 2.0 Hi-Speed, H Series of devices, and the popular R Series of integrated circuits already in production today.

Besides offering an expanded, world-class feature set, FTDI has reduced pin counts. Whether the board designer needs a leaded, SSOP package, or a leadless QFN package, pin-outs have been minimized, and range from a 10 pin DFN package for the FT200XD I²C solution to 24 pins for a FIFO to USB bridge (see table for complete package offering).
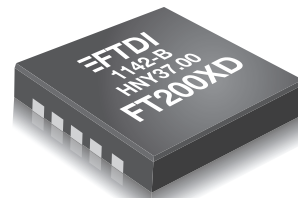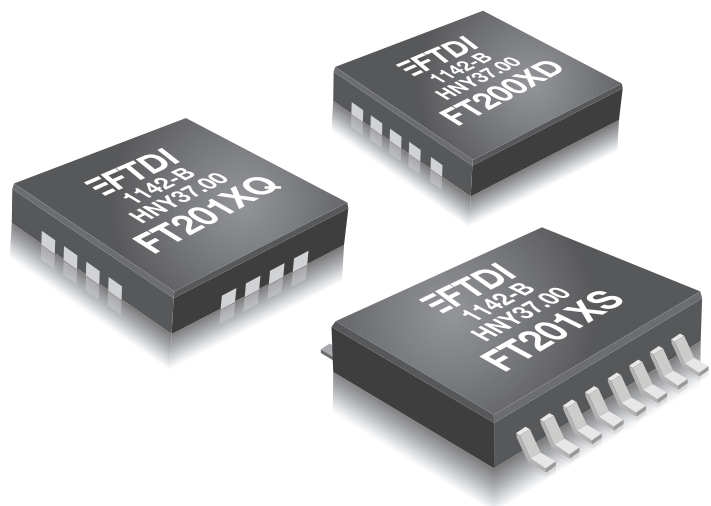
So when it comes to adding USB into your system design, don't compromise ... find the X-Chip Series offered only by FTDI Chip.

Visit **www.ftdichip.com** for complete information, support material, application notes, and development hardware.

The new X-Chip Series of Full Speed USB device bridges offer more interface options with lower power, lower pin count and higher levels of integration.

The new devices all include an internal MTP memory for configuring and storing the device descriptors and an internal clock source.

Both these features result in a lower cost solution for a reduced Bill of Materials and lower PCB real estate required to realise the design.
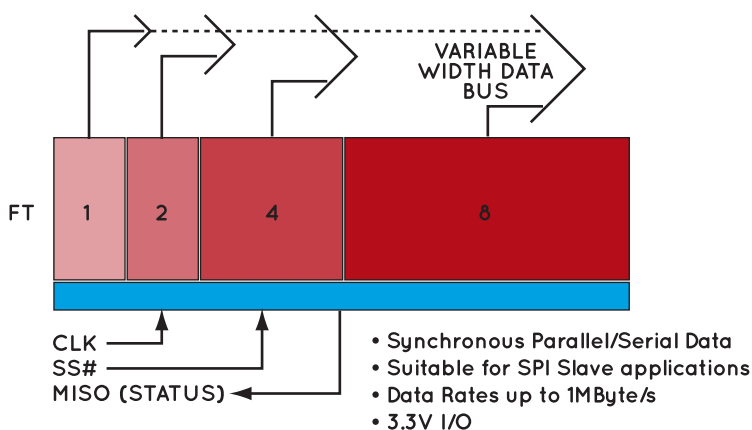
Device	FT200XD	FT201X	FT220X	FT221X	FT230X	FT231X	FT240X
Description	I^2C interface	I^2C interface	4bit SPI/FT1248 Interface [1]	8bit SPI/FT1248 Interface	Basic UART Interface [2]	Full Handshake UART Interface	8bit FIFO Interface
Data rates	3.4Mbit/s	3.4Mbit/s	500kByte/s	1MByte/s	3MBaud	3MBaud	1MByte/s
MTP memory	Internal	Internal	Internal	Internal	Internal	Internal	Internal
Clock Oscillator	Internal	Internal	Internal	Internal	Internal	Internal	Internal
CBUS PINS[3]	1	6	1	1	4	4	2
I/O Power Supply	I/O levels from 1.8V to 3.3V. (5V tolerant inputs)	I/O levels from 1.8V to 3.3V. (5V tolerant inputs)	I/O levels from 1.8V to 3.3V. (5V tolerant inputs)	I/O levels from 1.8V to 3.3V. (5V tolerant inputs)	I/O levels from 1.8V to 3.3V. (5V tolerant inputs)	I/O levels from 1.8V to 3.3V. (5V tolerant inputs)	I/O levels from 1.8V to 3.3V. (5V tolerant inputs)
Operational current	8mA	8mA	8mA	8mA	8mA	8mA	8mA
Operating Temperature	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C
Packages	10-Pin DFN	16-pin QFN 16-pin SSOP	16-pin QFN 16-pin SSOP	20-pin QFN 20-pin SSOP	16-pin QFN 16-pin SSOP	20-pin QFN 20-pin SSOP	24-pin QFN 24-pin SSOP

[1] Limited to 4 bit wide data to keep pin count low   [2] No DTR, DSR, DCD, RI to keep pin count low
[3] CBUS pins are configurable pins for various functions e.g. GPIO, LED driving, clock signals or BCD signal

FT1248 Bus Interface

FTDI's flexible parallel/serial bus interface, FT1248, offers the flexibility of 1, 2, 4, or 8 bit wide data, allowing for designs to be optimized for speed or pin count. In 1-bit mode the FT1248 provides the equivalent of an enhanced SPI interface.

VARIABLE WIDTH DATA BUS

FT   1   2   4   8

CLK
SS#
MISO (STATUS)

• Synchronous Parallel/Serial Data
• Suitable for SPI Slave applications
• Data Rates up to 1MByte/s
• 3.3V I/O

MEET THE FAMILY

Breakout Modules

Breakout modules provide the smallest and simplest development hardware for the X-Chip Series of devices. To reduce cost the USB interconnect is simply tracked on the PCB which plugs directly into the USB host socket. The interface connector is a standard 0.1" pitch socket. The module is ready to use when plugged in to enable instant development work to begin.
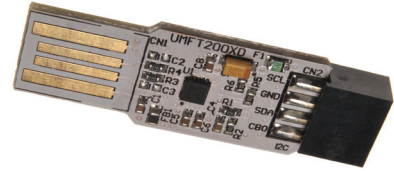
	UMFT200XD	UMFT201XB	UMFT220XB	UMFT230XB
BASE IC	FT200XD	FT201XQ	FT220XQ	FT230XQ
Description	Full speed USB to I^2C	Full speed USB to I^2C	Full speed USB to 4-bit FT1248	Full speed USB to Basic-UART
Data rates	3.4Mbit/s	3.4Mbit/s	500kByte/s	3MBaud
Interface connector	8 pin, 0.1" socket	10 pin, 0.1" socket	10 pin, 0.1" socket	10 pin, 0.1" socket
CBUS pins	1	4	1	2

*Breakout modules available in 3 alternative assemblies: with interface connector, without interface connector or with 6" flying leads.

Development Modules

Development modules are slightly larger than the breakout modules but offer access to all the device pins.
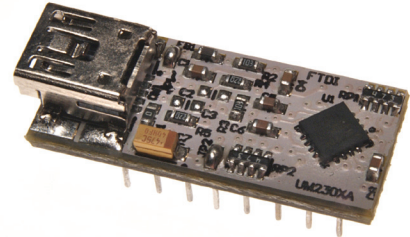
|	UMFT201XA	UMFT220XA	UMFT221XA	UMFT230XA	UMFT231XA	UMFT240XA
BASE IC	FT201XQ	FT220XQ	FT221XQ	FT230XQ	FT231XQ	FT240XQ
Description	Full speed USB to I^2C	Full speed USB to 4-bit FT1248	Full speed USB to 8-bit FT1248	Full speed USB to Basic-UART	Full speed USB to Full-UART	Full speed USB to FIFO
Data rates	3.4Mbit/s	500kByte/s	1MByte/s	3MBaud	3MBaud	1MByte/s
Interface connector	0.3" Wide, 16 pin DIP	0.3" Wide, 16 pin DIP	0.3" Wide, 20 pin DIP	0.3" Wide, 16 pin DIP	0.3" Wide, 20 pin DIP	0.3" Wide, 24 pin DIP
CBUS pins	6	1	1	4	4	2

UMFT231XC

Full speed USB to Full Handshake UART + Battery Charge Detection development module based on the FT231XS. Can be used to verify the battery charge detection capability of the X-Chip Series of devices as well as provide a USB to UART bridge.

• Includes 10 pin 0.1" female header used for UART signals,
  12 pin 0.1" female header for power and control
• Status LEDs
• Mini-B USB connector

Other features common to all module types.
• CBUS pins may be configured to different functionality as defined in the device datasheet
• I/O levels from 1.8V to 3.3V (5V tolerant)
• Operating current 8mA
• Operating temp -40°C to +85°C
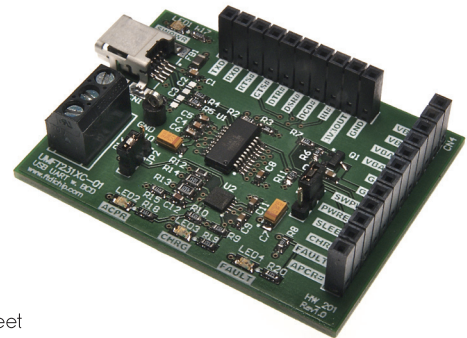
FTDI Tools and Support

In addition to the excellent devices that FTDI provide to make adding USB interfaces into a system easy. There is also a wide range of support collateral to assist with the design-in.

FTDI Driver Support:

The first item a user needs when connecting a peripheral to a host PC is driver support.

FTDI offer two driver interfaces. The VCP driver creates a Virtual COM Port on the host PC allowing legacy applications that were used to control serial ports to connect over USB with minimal changes to existing application software. The D2xx driver interface operates more directly with the device and offers greater control to access features such as on-chip memory for storing device descriptors.

The FT-X Series of devices is supported for all Windows OS from Windows XP through to Windows 7 including 32 and 64 bit support. These drivers are approved by Microsoft via their WHQL certification program.

Linux is supported in both VCP and D2xx variants of the driver. The VCP driver will become part of the kernel, while the D2xx driver may be freely downloaded and installed by the user.

MAC OSX is also supported in both VCP and D2xx formats, as is Android and WinCE.

All drivers may be downloaded from:
www.ftdichip.com/FTDrivers.htm

FTDI Documentation:

A comprehensive suite of datasheets, application notes and technical notes are also available on the FTDI website:
www.ftdichip.com/Support/FTDocuments.htm

FTDI Application Engineers:

For any enquiry not covered by the online literature or supporting utilities FTDI have a global team of application engineers based in UK, USA, China and Taiwan, with many years of experience in designing in FTDI chipsets, available to offer direct and **free** one to one support via e-mail or phone.