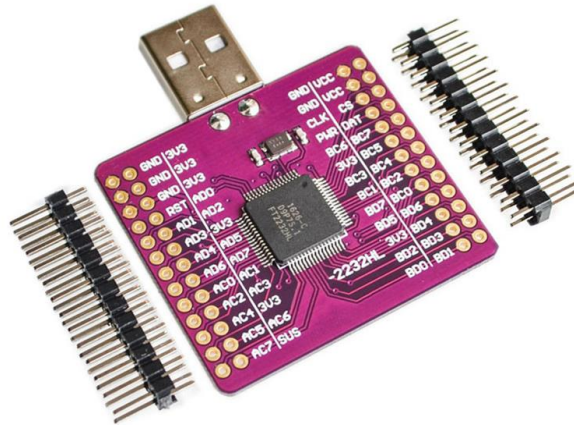




## ***USB to UART/FIFO/SPI/I2C/JTAG/RS232 Module***

***Model: MCU-2232***



### **Description:**

The FT2232HL is FTDI's 5<sup>th</sup> generation of USB devices. The FT2232HL is a USB 2.0 High Speed (480Mb/s) to UART/FIFO IC. It has the capability of being configured in a variety of industry standard serial or parallel interfaces.

### **Features:**

- Single chip USB to dual serial / parallel ports with a variety of configurations.
- Entire USB protocol handled on the chip. No USB specific firmware programming required.
- USB 2.0 High Speed (480Mbits/Second) and Full Speed (12Mbits/Second) compatible.
- Dual Multi-Protocol Synchronous Serial Engine (MPSSE) to simplify synchronous serial protocol (USB to JTAG, I2C, SPI or bit-bang) design.
- Dual independent UART or FIFO or MPSSE ports.
- Independent Baud rate generators.
- RS232/RS422/RS485 UART Transfer Data Rate up to 12Mbaud. (RS232 Data Rate limited by external level shifter).
- USB to parallel FIFO transfer data rate up to 8 Mbyte/Sec.
- Single channel synchronous FIFO mode for transfers up to 40 Mbytes/Sec
- CPU-style FIFO interface mode simplifies CPU interface design.
- MCU host bus emulation mode configuration option.
- Fast Opto-Isolated serial interface option.
- FTDI's royalty-free Virtual Com Port (VCP) and Direct (D2XX) drivers eliminate the requirement for USB driver development in most cases.
- Adjustable receive buffer timeout.
- Option for transmit and receive LED drive signals on each channel.
- Enhanced bit-bang Mode interface option with RD# and WR# strobes

- FT245B-style FIFO interface option with bidirectional data bus and simple 4 wire handshake interface.
- Highly integrated design includes +1.8V LDO regulator for V<sub>CORE</sub>, integrated POR function and on chip clock multiplier PLL (12MHz - 480MHz).
- Asynchronous serial UART interface option with full hardware handshaking and modem interface signals.
- Fully assisted hardware or X-On / X-Off software handshaking.
- UART Interface supports 7/8 bit data, 1/2 stop bits, and Odd/Even/Mark/Space/No Parity.
- Auto-transmit enable control for RS485 serial applications using TXDEN pin.
- Operational configuration mode and USB Description strings configurable in external EEPROM over the USB interface.
- Configurable I/O drive strength (4, 8, 12 or 16mA) and slew rate.
- Low operating and USB suspend current.
- Supports bus powered, self-powered and high power bus powered USB configurations.
- UHCI/OHCI/EHCI host controller compatible.
- USB Bulk data transfer mode (512 byte packets in High Speed mode).
- +1.8V (chip core) and +3.3V I/O interfacing (+5V Tolerant).
- Extended -40°C to 85°C industrial operating temperature range.
- +3.3V single supply operating voltage range.
- ESD protection for FT2232H IO's: Human Body Model (HBM)  $\pm 2\text{kV}$ , Machine Mode (MM)  $\pm 200\text{V}$ , Charge Device Model (CDM)  $\pm 500\text{V}$ , Latch-up free.

### Typical Applications:

- Single chip USB to dual channel UART (RS232, RS422 or RS485).
- Single chip USB to dual channel FIFO.
- Single chip USB to dual channel JTAG.
- Single chip USB to dual channel SPI.
- Single chip USB to dual channel I2C.
- Single chip USB to dual channel Bit-Bang.
- Single chip USB to dual combination of any of above interfaces.
- Single chip USB to Fast Serial Optic Interface.
- Single chip USB to CPU target interface (as memory), double and independent.
- Single chip USB to Host Bus Emulation (as CPU).
- PDA to USB data transfer.
- USB Smart Card Readers.
- USB Instrumentation.
- USB Industrial Control.
- USB MP3 Player Interface.
- USB FLASH Card Reader / Writers.
- Set Top Box PC - USB interface.
- USB Digital Camera Interface.
- USB Bar Code Readers.

### Driver Support:

The FT2232H requires USB drivers (listed below), available free from <http://www.ftdichip.com>, which are used to make the FT2232H appear as a virtual COM port (VCP). This allows the user to communicate with the USB interface via a standard PC serial emulation port (for example TTY). Another FTDI USB driver, the D2XX driver, can also be used with application software to directly access the FT2232H through a DLL.

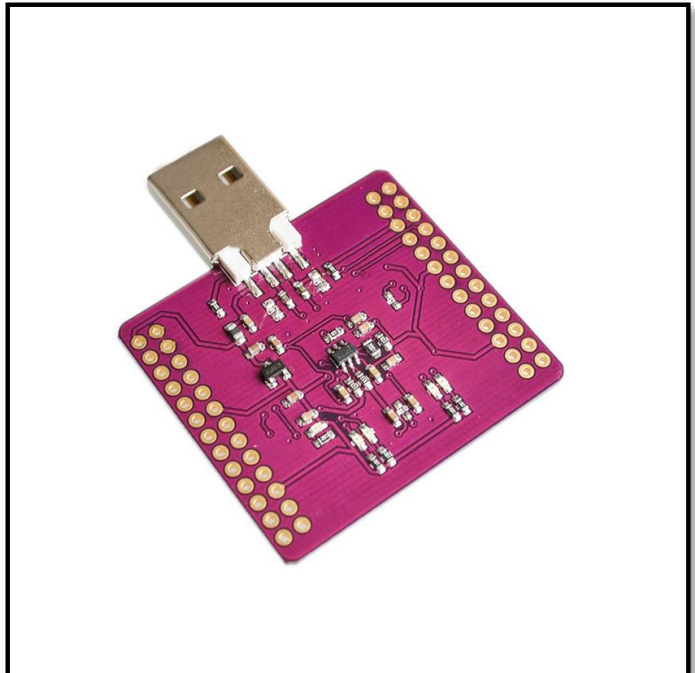
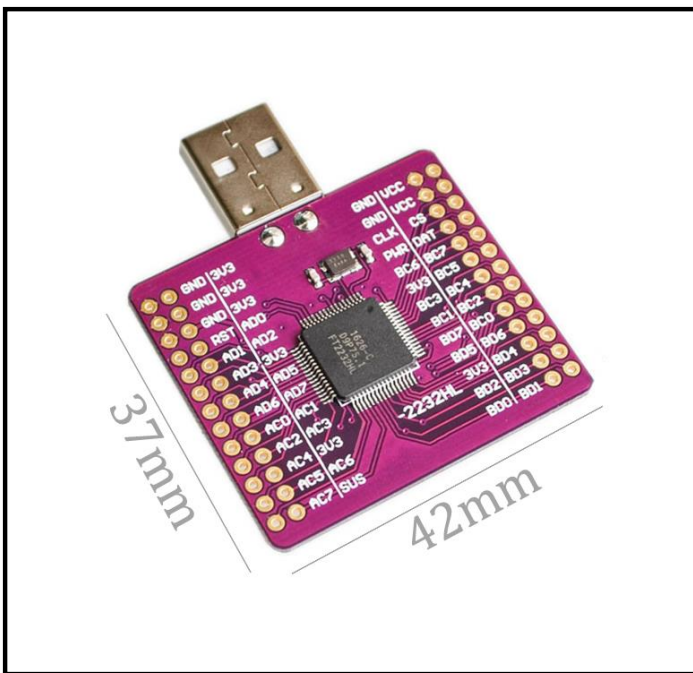
#### **Royalty free VIRTUAL COM PORT (VCP) DRIVERS for...**

- Windows 10 32,64-bit
- Windows 8/8.1 32,64-bit
- Windows 7 32,64-bit
- Windows Vista and Vista 64-bit
- Windows XP and XP 64-bit
- Windows 98, 98SE, ME, 2000, Server 2003, XP, Server 2008 and server 2012 R2
- Windows XP Embedded
- Windows CE 4.2, 5.0 and 6.0
- Mac OS 8/9, OS-X
- Linux 2.4 and greater

#### **Royalty free D2XX Direct Drivers (USB Drivers + DLL S/W Interface)**

- Windows 10 32,64-bit
- Windows 8/8.1 32,64-bit
- Windows 7 32,64-bit
- Windows Vista and Vista 64-bit
- Windows XP and XP 64-bit
- Windows 98, 98SE, ME, 2000, Server 2003, XP, Server 2008 and server 2012 R2
- Windows XP Embedded
- Windows CE 4.2, 5.0 and 6.0
- Linux 2.4 and greater
- Android(J2xx)

### More Detailed Photos:



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