

What's new at FTDI?

Vinculum VNC2

Programmable dual USB 2.0 full speed Host / Slave controller with integrated microprocessor core, on-chip Flash and RAM memory. VNC2 comes with pre-compiled firmware images for common USB applications as well as support for user application firmware through the Vinculum Software Development tool suite.

- Two independent USB 2.0 Host / Slave controllers.
- On-chip 16-bit MCU core with 256Kbyte Flash [E-FLASH] and 16KByte RAM.
- Interfaces to UART, FIFO, SPI Slave, SPI Master & PWM.
- Royalty free 'C' based Vinculum Software Development tool suite for firmware development.
- Libraries for several USB classes including support for FAT file systems.
- Debug port for device configuration and user firmware debug.
- Available in a range of package options [32-/48-/64-pin QFN and LQFP packages].



Vinculum VNC2 Development Boards and Modules

Newly launched range of evaluation and prototyping modules to support VNC2 based designs. The range includes:

V2-EVAL

VNC2 Evaluation Kit

A complete evaluation and development kit for VNC2. The V2-EVAL board features USB Host / Slave connectivity with I/O headers providing access to all major VNC2 interfaces, plus a bread board style prototyping area. The board supports VNC2 32/48/64 pin QFN devices via a daughter board connector. An onboard debug interface provides chip level firmware debug capability using the Vinculum software development tool suite, as well as downloading firmware into the on chip VNC2 flash memory.

V2DIP1 / V2DIP2

VNC2 Evaluation Modules with Single/ Dual USB Connectors

The V2DIP modules are compact, VNC2 based, development modules designed to fit into a DIP socket [0.6" for 32/48-pin, 0.8" for 64-pin]. The modules provide access to the VNC2 I/O interfaces via the DIP header pins and also support connectivity to the Vinculum software debug module. The modules are targeted at prototyping or applications looking to integrate USB Host / Slave capability into an existing product.

VNC2 Debug Module

The VNC2 debug module is a USB based module designed to interface to the debug pin of VNC2 to support device configuration and user firmware debug using the Vinculum software development tool suite. The module features a USB type B connector to enable connectivity to a USB host PC running the development software and can be easily connected to a customer board via a 6 pin, 2mm pitch male plug interface or it can be connected to the V2DIP modules to make use of the VNC2 debug interface on these modules.

FT2232H / FT4232H USB 2.0 Hi-Speed ICs and Evaluation Modules

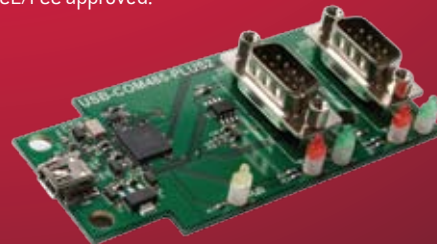
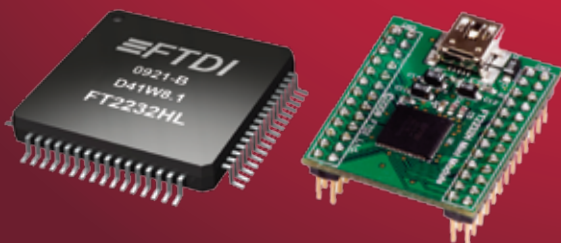
Evaluation modules to aid design development for FT2232H and FT4232H Hi-Speed USB 2.0 devices.

- FT2232H is a Dual Hi-Speed USB to Multipurpose UART/FIFO/MPSSE IC.
- FT4232H is a Quad Hi-Speed USB to Multipurpose UART/MPSSE IC.
- Each IC contains two Multi-Protocol Synchronous Serial Engines [MPSSE] controllers capable of 30Mbits/s operation, supporting a range of serial interfaces such as I2C, JTAG, SPI and others.
- Entire USB protocol on a chip with integrated LDO regulator and PLL.
- Extended temperature range [-40°C to +85°C].
- Evaluation module: Mini-module is USB 2.0 Hi-Speed compatible with mini USB type B connector.

USB-COM-PLUS Serial Converter Modules

A family of single-port and multi-port serial to USB 2.0 Hi-Speed interface modules, which provide a simple solution to the problem of connecting multiple RS232, RS422 or RS485 interfaces to a USB Host.

- High data transfer rates [up to 10Mbps - USB 2.0 Hi-Speed modules, 3Mbps - USB 2.0 Full Speed modules].
 - Can be configured to supply up to 250mA on a +5V output [USB-COM232 and all USB-COM485 modules].
 - Ring indicator for remote wakeup - USB-COM232-PLUS1.
 - Up to 4k byte internal Tx/Rx buffers with low data latency.
 - No external power needed. Power supplied from USB port.
 - Extended temperature range [-40°C to +85°C].
- All modules are CE/FCC approved.



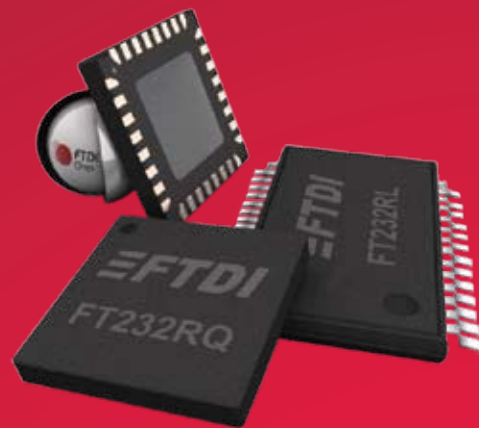
USB MADE EASY

www.ftdichip.com



FTDI's USB Peripheral Range

FTDI provide a range of silicon solutions for providing flexible, easy to use USB connectivity to almost any application. The devices range from our popular USB to serial converters, used to provide USB connectivity to legacy interfaces such as RS232 / RS422 / RS485, to the Vinculum range of Host / Slave controllers which support advanced internal processing capabilities required for many modern day USB-enabled devices. FTDI ICs offer support for a range of industry standard interfaces such as UART, FIFO, I2C and JTAG to enable easy interfacing to an embedded MCU, PLD or FPGA. All devices are supplied with FTDI's royalty free USB driver software, offering a complete ready-to-use USB solution which minimises time to market and development cost.



	Vinculum		FT Series				
Device	VNC1L	VNC2	FT2232H	FT4232H	FT2232D	FT232/245RL FT232/245RQ	FT232/245BL FT232/245BQ
Description	USB 2.0 Host / Slave Controller	Programmable ¹ USB 2.0 Host / Slave Controller	USB 2.0 Slave to Dual UART / FIFO Converter	USB 2.0 Slave to Quad UART / Serial Converter	USB 2.0 Slave to Dual UART / FIFO Converter	USB 2.0 Slave to Dual UART / FIFO Converter	USB 2.0 Slave to Dual UART / FIFO Converter
USB Speed	Full / Low Speed	Full / Low Speed	High / Full Speed	High / Full Speed	Full Speed	Full Speed	Full Speed
USB Transfer Types	Bulk / Interrupt	Bulk / Interrupt / Isochronous	Bulk	Bulk	Bulk	Bulk	Bulk
No. USB Ports	2	2	1	1	1	1	1
No. External Channels	Flexible ²	Flexible ²	2	4	2	1	1
Supported External Interfaces	FIFO, UART SPI, GPIO	FIFO, UART, 2 SPI Slave, 1 SPI Master, GPIO, PWM, Debug port	UART, FIFO, 2 MPSSE ³ , Fast serial, 8051 MCU emulation	UART 2 MPSSE ³ Controllers	UART, FIFO, 2 MPSSE ³ , Fast serial, 8051 MCU emulation	FT232 - UART FT245 - FIFO	FT232 - UART FT245 - FIFO
Core	8-bit Harvard MCU core	16-bit Harvard MCU Core	-	-	-	-	-
Internal Memory	4KB RAM 64KB Flash	16KB RAM 256KB Flash	4KB RX/TX buffer per channel	2KB RX/TX buffer per channel	384Byte – RX 128Byte – TX per channel	128Byte – RX 256Byte – TX	384Byte – RX 128Byte – TX
UART Speeds	Up to 1Mbaud	Up to 3Mbaud	Up to 12Mbaud	Up to 12Mbaud	Up to 3Mbaud	Up to 3Mbaud	Up to 1Mbaud
Configuration Data Storage	Internal Flash	Internal Flash	Via External EEPROM	Via External EEPROM	Via External EEPROM	Via Internal EEPROM	Via External EEPROM
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	0°C to +70°C
Core Power Supply	+3.3V	+1.8V ⁵	+3.3V	+3.3V	+5V	+3.3V to +5.25V ⁴	+5V
I/O Power Supply	+3.3V [5V tolerant]	+3.3V [5V tolerant]	+3.3V	+3.3V	+3.0V to +5.25V	+1.8V to +5.0V	+3.0V to +5.25V
Packages	48-pin LQFP	32/48/64-pin LQFP /32/48/64-pin QFN	64-pin LQFP / 64-pin QFN	64-pin LQFP / 64-pin QFN	48-pin LQFP	32-pin QFN / 28-pin SSOP	32-pin LQFP

¹ VNC2 supports ability to run user developed custom firmware. Firmware development supported via Vinculum Software tool suite. See VNC2 brochure for more details.

² Vinculum devices support flexible IO configuration. VNC1L IO configuration is set by available firmware image. VNC2 supports user configurable IO settings through the on-chip IO multiplexing feature.

³ MPSSE - Multi-Protocol Synchronous Serial Engine, configurable serial controller for supporting SPI, I2C, JTAG & GPIO interfacing, supports speeds up to 30Mbps.

⁴ Power supply range, using external oscillator +3.0V to +5.25V, using internal oscillator +4.0V to +5.25V.

⁵ Internally generated from +3.3V supply.

All the above products are RoHS compliant and lead-free.



Range of USB to Serial Converter Cables

Custom versions available on request in 1k + quantities.

USB-RS232-WE, USB-RS422-WE and USB-RS485-WE Cables – USB to RS232 / RS422 / RS485 Converter Cables

- USB to serial conversion with entire USB protocol and level shifting carried out within the integrated electronics – all of which is enclosed inside the USB connector.
- Cables support data transfer rates from 300Baud to 3MBaud.
- Support connection to EIA/TIA-232, EIA/TIA-422 and EIA/TIA-485 interfaces with low power requirements.
- Extended temperature range [-40°C to +85°C].



TTL-232R - TTL to USB Converter Cables

- On board FT232RQ provides USB to serial conversion with USB type A connector.
- Entire USB protocol handled by the electronics in the cable.
- 3.3V / 5V IO signal level options available. USB powered - no need for external supply.
- Standard cable is 180cm and wire ended, range of other connector terminations available.



US232R - USB to Legacy RS232 Converter Cables

- Premium class FT232RL based USB to RS-232 serial port converter.
- Special high gloss white finish enclosure design with side-lit blue RXD and TXD traffic indicators.
- Available as a 10cm [US232R-10], 100cm [US232R-100], 500cm [US232R-500] USB cable.



USB-NMC USB Null Modem Cable

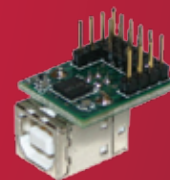
- For PC to PC networking using USB port. Modem replacement for traditional serial null modem cable.
- USB type A connector on both ends of cable, based on FTDI FT232RQ devices.



Miniature USB converter modules based on FTDI ICs

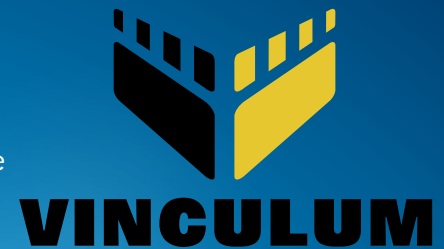
The entire USB protocol is handled on the chip, offering a complete USB solution, ideal for prototyping or low to medium volume production.

	Description	Features
MM232R	FT232R USB to UART Miniature Module	<ul style="list-style-type: none"> • Small form factor module with FT232RQ IC device. • UART interface with RTS/CTS handshaking support. • USB power management support. • Connects to 16-pin 0.1 inch pitch header.
UM245R	FT245R USB to FIFO DIP Module	<ul style="list-style-type: none"> • PCB module with FT245R IC providing access to on-chip FIFO I/O and control pins. • Plugs into standard 24-pin 0.6 inch wide DIP socket. USB "B" socket on-board. • Supports data transfer rates up to 1 MByte/s via FT245R FIFO interface.
UM232R	FT232R USB to UART DIP Module	<ul style="list-style-type: none"> • PCB module with FT232RL IC providing access to UART interface and on-chip I/O pins. • Plugs into standard 24-pin 0.6 inch wide DIP socket. • Supports conversion from USB to RS422/RS485/RS232 interface (external line drivers required).
UB232R	USB Mini-B to UART Module	<ul style="list-style-type: none"> • Micro USB UART module with FT232RQ device and USB mini-B connector. • UART RTS/CTS handshaking support. Supports data transfer rates from 300 Baud to 3 MBaud at TTL signalling levels. • Connects to 8-pin interface – 0.1 inch spaced pin out. • Compact size, ideal for adding USB interface to an existing design.



Vinculum

Vinculum is FTDI's family of USB Host / Slave controllers designed to provide USB 2.0 Host Controller connectivity to a product. The devices are targeted at applications such as Digital Cameras, PDAs, communications devices and other USB peripherals. The Vinculum family of devices offer a cost-effective solution by delivering the complete the USB solution in a single device with ready-to-use firmware resources supporting common USB applications. The Vinculum range consists of the VNC1L and VNC2 devices.



Vinculum VNC2- Latest addition to the Vinculum family

- Enhanced processing capabilities with a 16-bit Harvard architecture MCU core.
- Resources to support custom user developed firmware. Please refer to the VNC2 brochure for further details.

Vinculum VNC1L

- 2 x USB 2.0 Host / Slave controllers independently configurable with Low speed or Full speed support.
- Integrated 8-bit V-MCU core plus 32bit co-processor, 4KBytes data SRAM and 64KBytes of Flash (E-FLASH) memory to store firmware.
- Configurable options to interface to UART, FIFO or SPI Slave interfaces.
- Royalty free, upgradable firmware, offering support for common USB functions such as FAT format Flash disk management and music playback



V2-EVAL – Complete VNC2 Evaluation & Development Kit

- VNC2 socket site supporting 32/48/64-pin devices via daughter board.
- 2 USB type A connectors for USB interfacing from VNC2. Single type B USB connector available for software configuration.
- Onboard debug interface for connecting to Vinculum Software debug tools.
- Large breadboard style prototyping area with 1100 x 0.1" pitch holes.
- Board supplied as a complete kit with power supply, USB gender changer and USB A/B cable.



V2DIP1 – VNC2 Evaluation Module with Single USB Connector

- VNC2 development module designed to fit 0.6" or 0.8" pitch DIP sockets to support 32/48/64-pin package types.
- Single USB interface connection via type A connector.
- Access to VNC2 interfaces via DIP header pins. Additional header for connecting to VNC2 debug module.



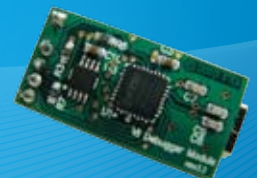
V2DIP2 – VNC2 Module with Two USB Connectors

- VNC2 development module designed to fit 0.6" or 0.8" pitch DIP sockets to support 32/48/64-pin package types.
- Two USB connections via 2 type A connectors.
- DIP header pins provide access to I/O interfaces on VNC2. Additional header for connecting to VNC2 debug module.



VNC2 Debug Module

- Debug module which provides access to silicon level debug of user firmware via Vinculum software development tool suite, via USB type B connection to USB host PC.
- 6-pin, 2mm pitch socket, can be easily integrated into customer board designs. Supports connection to V2DIP modules.



Vinculum VNC1L Development Modules

- V-EVAL – Evaluation and prototyping board for VNC1L. Features an onboard VNC1L device, with 2 x USB type A connectors, I/O headers, switches, and large breadboard style prototyping area. Board supplied complete as a kit, with power supplies, cables and configuration software.
- VDIP1 – VNC1L development module with single USB connector, designed to fit a 24-pin DIP socket.
- VDIP2 – Development module with VNC2 and two USB connectors. Designed to fits a 40-pin DIP socket.

Application Modules

- VMUSIC2 – Music player module. Compact size. Ideal for adding USB based music playback to an existing product.
- VDRIVE2 – Easy solution for adding USB Flash drive capability to a product



VMUSIC2

Tools:

- VPROG-1 – Kit for programming VNC1L and VNC2 devices. Supports programming of up to 10 devices at a time. Can be used to program VDIP modules.



VPROG-1

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