

# Future Technology Devices International Ltd

## Datasheet

### UMFT200XD Breakout Modules



*UMFT200XD is a USB to I<sup>2</sup>C breakout module*

## 1 Introduction

The UMFT200XD breakout module utilizes FTDI's FT200XD IC to convert USB to an I<sup>2</sup>C.

### 1.1 Features

The UMFT200XD is a breakout board that converts USB2.0 Full-Speed to I<sup>2</sup>C. These modules do not have a USB connector; instead the modules plug directly into the USB host connector and the pads of the PCB makes electrical contact with the electrical contacts of the USB connector.

The I<sup>2</sup>C interface operates at +3.3V voltage levels, however all I/Os are 5V tolerant.

### 1.2 Ordering Information

| Module       | Interface        | Features   |
|--------------|------------------|--|
| UMFT200XD-01 | I <sup>2</sup> C | USB to I <sup>2</sup> C with four control bus lines, 3.3V power out limited to 50mA and 5V with as safety fuse. I <sup>2</sup> C signals available via 8 pin female connector.                       |
| UMFT200XD-NC | I <sup>2</sup> C | USB to I <sup>2</sup> C with four control bus lines, 3.3V power out limited to 50mA and 5V with as safety fuse. I <sup>2</sup> C signals available via 8 pads on the PCB                             |
| UMFT200XD-WE | I <sup>2</sup> C | USB to I <sup>2</sup> C with four control bus lines, 3.3V power out limited to 50mA and 5V with as safety fuse. I <sup>2</sup> C signals available via 8, 6" flying leads connected to the PCB pads. |

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## 2 Driver Support

| <b>Royalty-Free DRIVERS for:</b>  | <b>VIRTUAL COM PORT (VCP)</b> | <b>Royalty-Free D2XX Direct Drivers (USB Drivers + DLL S/W Interface):</b>  |
|---|-------------------------------|---|
| <ul style="list-style-type: none"><li>• Windows 10 32, 64-bit</li><li>• Windows 8 / 8.1 32, 64-bit</li><li>• Windows 7 32,64-bit</li><li>• Windows Vista and Vista 64-bit</li><li>• Windows XP and XP 64-bit</li><li>• Windows XP Embedded</li><li>• Server XP / 2003 /2008 / 2016</li><li>• Windows CE 4.2-5.2, 6.0/7.0, 2013</li><li>• Mac OS-X</li><li>• Linux 3.2 and greater</li><li>• Android</li></ul> |                               | <ul style="list-style-type: none"><li>• Windows 10 32, 64-bit</li><li>• Windows 8 / 8.1 32, 64-bit</li><li>• Windows 7 32,64-bit</li><li>• Windows Vista and Vista 64-bit</li><li>• Windows XP and XP 64-bit</li><li>• Windows XP Embedded</li><li>• Server XP / 2003 /2008 / 2016</li><li>• Windows CE 4.2-5.2, 6.0/7.0, 2013</li><li>• Mac OS-X</li><li>• Linux 3.2 and greater</li><li>• Android</li></ul> |

The drivers listed above are all available to download for free from [www.ftdichip.com](http://www.ftdichip.com). Various 3rd Party Drivers are also available for various other operating systems - visit [www.ftdichip.com](http://www.ftdichip.com) for details.

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### 3 UMFT200XD Signals and Configurations

CN1 connects directly to a USB host or HUB port, or can be connected to a USB extension cable. This connects to USB signals, 5V USB Bus power and GND. When connecting the module to a USB host or HUB the signal pads should be facing upwards when connecting to a horizontal connector and be facing right for vertical connectors. If the module is plugged in upside down no connectivity will be made between PCB and HUB, no damage will occur from plugging the module in the wrong way.

#### 3.1 UMFT200XD CN1 Signal Descriptions

| Pin No. | Name | Type   | Description   |
|---------|------|--------|---|
| 1       | VBUS | PWR    | 5V Power input USB port. For a low power USB bus powered design, up to 100mA can be sourced from the 5V supply on the USB bus. A maximum of 500mA can be sourced from the USB bus in a high power USB bus powered design. |
| 2       | D-   | Signal | Negative USB data signal  |
| 3       | D+   | Signal | Positive USB data signal  |
| 4       | GND  | PWR    | Module Ground   |

**Table 3.1 USB Connector Pin Out Description**

#### 3.2 UMFT200XD CN2 Signal Descriptions

| Pin No. | Name       | Type       | Description   |
|---------|------------|------------|---|
| 1       | <u>SCL</u> | Input      | I <sup>2</sup> C clock input  |
| 2       | VBUS       | PWR Output | 5V Power output USB port.   |
| 3       | GND        | PWR        | Module Ground Supply  |
| 4       | RST#       | Input      | Can be used by an external device to reset the FT201X.  |
| 5       | <u>SDA</u> | I/O        | I <sup>2</sup> C bi-directional data line   |
| 6       | 3V3        | Output     | 3.3V output from FT200XD integrated LDO regulator. This pin is decoupled to ground on the module PCB with a 10nF capacitor that offers 3V3 at up to 50mA for external hardware. |
| 7       | CB0        | I/O        | Configurable CBUS0 I/O Pin. Function of this pin is configured in the device internal MTP ROM. See CBUS Signal Options, Table 3.3   |
| 8       | GND        | PWR        | Module Ground Supply  |

**Table 3.2 I<sup>2</sup>C Module Pin Out Description**

### 3.3 CBUS Signal Options

| CBUS Signal Option | Available On CBUS Pin | Description   |
|--------------------|-----------------------|---|
| Tristate           | CBUS0                 | IO Pad is tristated   |
| DRIVE_1            | CBUS0                 | Output a constant 1   |
| DRIVE_0            | CBUS0                 | Output a constant 0   |
| PWREN#             | CBUS0                 | Output is low after the device has been configured by USB, then high during USB suspend mode. This output can be used to control power to external logic P-Channel logic level MOSFET switch. Internal drive configuration consists of an open drain to GND with no pull-up, specially designed for battery charging applications.* |
| SLEEP#             | CBUS0                 | Goes low during USB suspend mode. Typically used to power down an external TTL to RS232 level converter IC in USB to RS232 converter designs.   |
| CLK24MHz           | CBUS0                 | 24 MHz Clock output.**  |
| CLK12MHz           | CBUS0                 | 12 MHz Clock output.**  |
| CLK6MHz            | CBUS0                 | 6 MHz Clock output.**   |
| GPIO               | CBUS0                 | CBUS bit bang mode option. A separate application note, <a href="#">AN232R-01</a> , available from <a href="#">FTDI website (www.ftdichip.com)</a> describes in more detail how to use CBUS bit bang mode.  |
| BCD_Charger        | CBUS0                 | Battery charge Detect, indicates when the device is connected to a dedicated battery charger host. Active high output.  |
| BCD_Charger#       | CBUS0                 | Inverse of BCD Charger  |
| BitBang_WR#        | CBUS0                 | Synchronous and asynchronous bit bang mode WR# strobe output.   |
| BitBang_RD#        | CBUS0                 | Synchronous and asynchronous bit bang mode RD# strobe output.   |
| I2C_TXE#           | CBUS0                 | Transmit buffer empty, used to indicate to I2C master device status of the FT200XD transmit buffer  |
| I2C_RXF#           | CBUS0                 | Receive buffer full, used to indicate to I2C master device status of FT200XD receive buffer   |
| VBUS_Sense         | CBUS0                 | Input to detect when VBUS is present.   |
| Time_Stamp         | CBUS0                 | Toggle signal which changes state each time a USB SOF is received   |
| Keep_Awake#        | CBUS0                 | Active Low input, prevents the chip from going into suspend.  |

**Table 3.3 CBUS Configuration Control**

\* PWREN# must be used with a 10kΩ resistor pull up.

\*\*When in USB suspend mode the outputs clocks are also suspended.

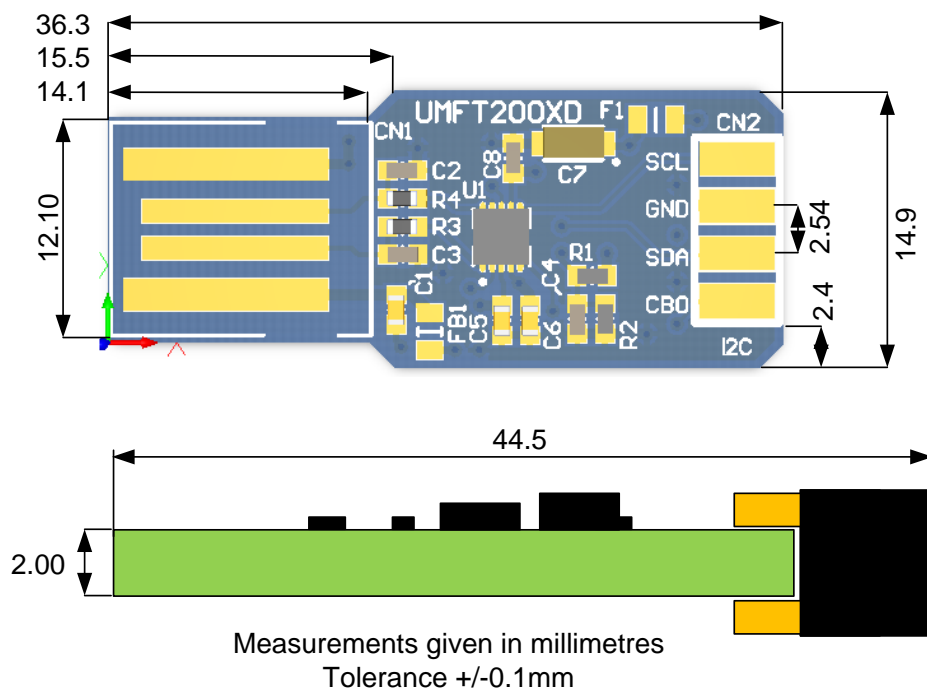
### 3.4 Configuring the MTP ROM

The FT200XD IC on the module contains an embedded MTP ROM, this can be used to specify the functions of the CBUS0 pin, the current drive on each signal pin, current limit for the USB bus and the descriptors of the device. These features can be programmed using FTDI's programming utility FT\_Prog. For details on using FT\_Prog, please see the [FT\\_PROG User Guide](#).

When programming the MTP ROM please note:

- i) The Max Bus Power setting of the MTP ROM should specify the maximum current to be drawn from the USB host/hub when enumerated. For high-powered USB devices the current limit when enumerated is between 100mA and 500mA, for low-powered USB devices the current limit is 100mA.

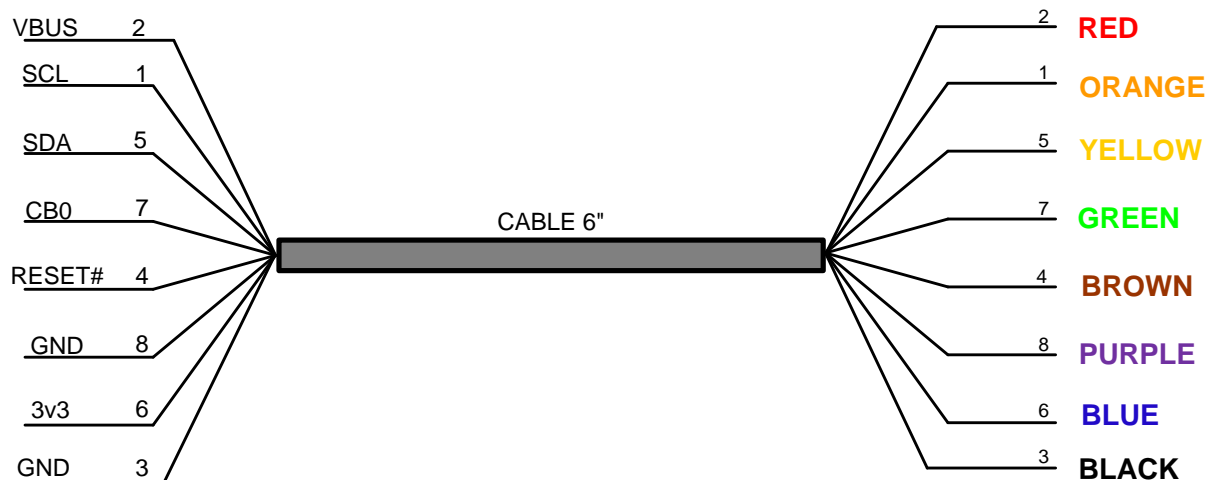
## 4 Module Dimensions



**Figure 4.1 UMFT200XD-01 Module Dimensions**

## 5 Module Wire Connections

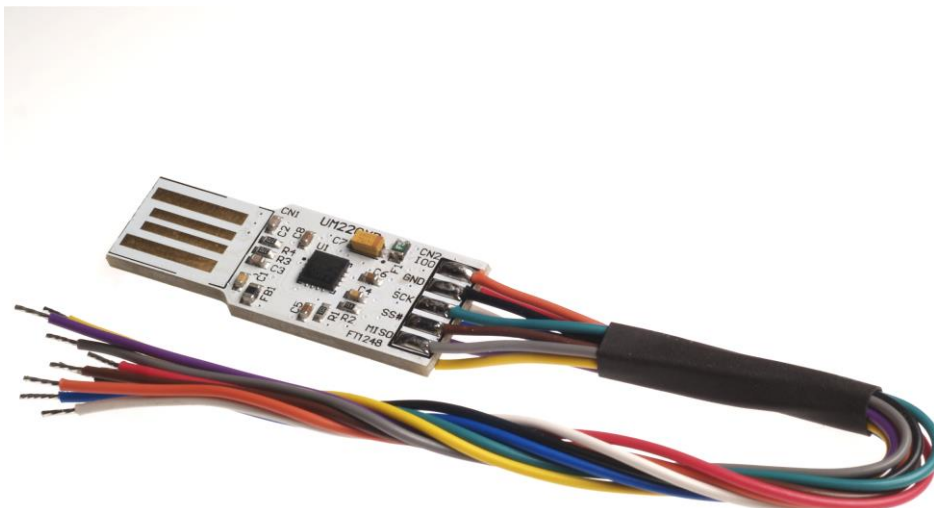
### 5.1 UMFT200XD-WE Wire Connections



**Figure 5.1 UMFT200XD-WE Wire Connections (numbers refer to pad numbers on the PCB)**

Figure 5.1 illustrates the -WE product as a cable. This is only for illustration purposes. The wire ended product consists of individual wires – not a cable

### 5.2 UMFT200XD-WE

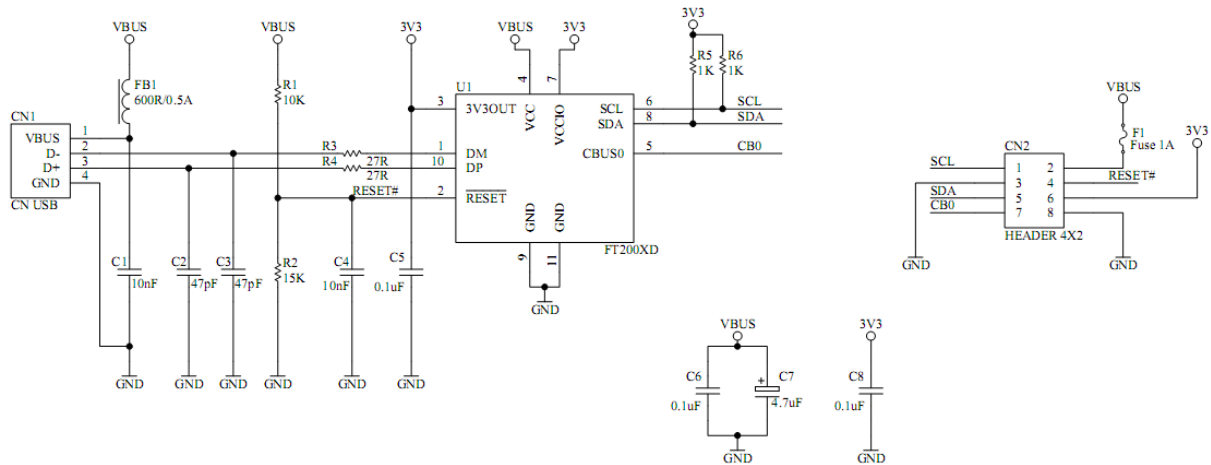


**Figure 5.2 UMFT200XD-WE Image**



## 6 Module Circuit Schematic

### 6.1 UMFT200XD Schematic



**Figure 6.1 UMFT200XD Circuit Schematic**

## **7 Environmental Compliances**

The UMFT200XD modules exclusively use lead free components, and are fully compliant with European Union directive 2002/95/EC.

## 8 Internal MTP ROM Configuration

Following a power-on reset or a USB reset the FT200XD will scan its internal MTP ROM and read the USB configuration descriptors stored there. The default values programmed into the internal MTP ROM in the FT200XD used on the UMFT200XD are shown in Table 8.1.

| Parameter                         | Value       | Notes  |
|-----------------------------------|-------------|--|
| USB Vendor ID (VID)               | 0403h       | FTDI default VID (hex)   |
| USB Product ID (PID)              | 6015h       | FTDI default PID (hex)   |
| Serial Number Enabled?            | Yes         |  |
| Serial Number                     | See Note    | A unique serial number is generated and programmed into the MTP ROM during final test of the UMFT200XD-01 module.            |
| Pull down I/O Pins in USB Suspend | Disabled    | Enabling this option will make the device pull down on the UART interface lines when the power is shut off (PWREN# is high). |
| Manufacturer Name                 | FTDI        |  |
| Product Description               | UMFT200XD   |  |
| Max Bus Power Current             | 90mA        |  |
| Power Source                      | Bus Powered |  |
| Device Type                       | FT200DX     | FT200DX = 0x03   |
| USB Version                       | 0200        | Returns USB 2.0 device description to the host. Note: The device is a USB 2.0 Full Speed device (12Mb/s).                    |
| Remote Wake Up                    | Enabled     | Taking RI# low will wake up the USB host controller from suspend.  |
| High Current I/Os                 | Disabled    | Enables the high drive level on the serial and CBUS I/O pins.  |
| Load VCP Driver                   | Enabled     | Makes the device load the VCP driver interface for the device.   |
| CBUS0                             | GPIO        |  |

**Table 8.1 Default Internal MTP ROM Configuration**

The internal MTP ROM in the FT200X can be programmed over USB using the utility program FT\_PROG. FT\_PROG can be downloaded from the [www.ftdichip.com](http://www.ftdichip.com). Users who do not have their own USB vendor ID but who would like to use a unique Product ID in their design can apply to FTDI for a free block of unique PIDs. Contact [FTDI Support](mailto:support1@ftdichip.com) (support1@ftdichip.com) for this service.

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## Appendix A - References

### Document References

[AN232R-01](#)

[FT\\_PROG User Guide](#)

### Acronyms and Abbreviations

| Terms  | Description   |
|--------|---|
| DLL    | Dynamic Link Library                                |
| BCD    | Battery Charger Detection                           |
| EEPROM | Electrically Erasable Programmable Read Only Memory |
| I2C    | Inter-Integrated Circuit                            |
| LDO    | Low Drop Out Regulator                              |
| PCB    | Printed Circuit Board                               |
| TTL    | Transistor-Transistor Logic                         |
| USB    | Universal Serial Bus                                |
| UART   | Universal Asynchronous Receiver/Transmitter         |
| VCP    | Virtual COM Port                                    |

## Appendix B - List of Figures and Tables

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## Appendix C - Revision History

Document Title: UMFT200XD Datasheet  
Document Reference No.: FT\_000543  
Clearance No.: FTDI# 274  
Product Page: <http://www.ftdichip.com/FT-X.htm>  
Document Feedback: [Send Feedback](#)

| Revision    | Changes   | Date       |
|-------------|---|------------|
| Version 1.0 | Initial Datasheet Created   | 2012-02-09 |
| Version 1.1 | Corrected IC part number to FT200XD and added a photo of the wire ended cable       | 2012-06-12 |
| Version 1.2 | Corrected -01 variant part number   | 2015-07-03 |
| Version 1.3 | Removed TXLED/RXLED/TX&RXLED CBUS functionality.<br>Document template changes made. | 2019-02-22 |