



Future Technology Devices International Ltd.

UB232R

USB Mini-B FT232R Evaluation Module

Datasheet

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1 Introduction

The UB232R is the smallest USB – serial development module in the FTDI product range. To minimise the size of the module, the UB232R uses a standard USB mini-B connector. It is ideal for new development purposes as well as a platform for adding a USB interface to existing product designs.

The UB232R is based on the FTDI FT232RQ USB to Serial UART IC which handles all the USB signalling and protocols. The FT232R datasheet, **DS_FT232R**, is available at <http://www.ftdichip.com>. The UB232R supports RTS/CTS hardware handshaking and is USB powered. The module supports data transfer rates from 300 baud to 3 Mbaud (RS422, RS485, RS232 and at TTL levels). In addition, two of the configurable CBUS pins of the FT232R are made available on the UB232R connector, allowing the UB232R to provide clock signals to external logic or they can be used to drive signal traffic indicator LEDs.

The UB232R is supplied with two 1x4 turned pin board headers with a standard 0.1" pitch. This aids rapid prototyping and development. All components used, including the FT232R are Pb-free (RoHS compliant).

The UB232R requires USB drivers, available free from <http://www.ftdichip.com>, which are used to make the FT232R on the UB232R appear as a virtual COM port (VCP). This then allows the user to communicate with the USB interface via a standard PC serial emulation port (TTY). Another FTDI USB driver, the D2XX driver, can also be used with application software to directly access the FT232R on the UB232R though a DLL. This is illustrated in the Figure 1.1

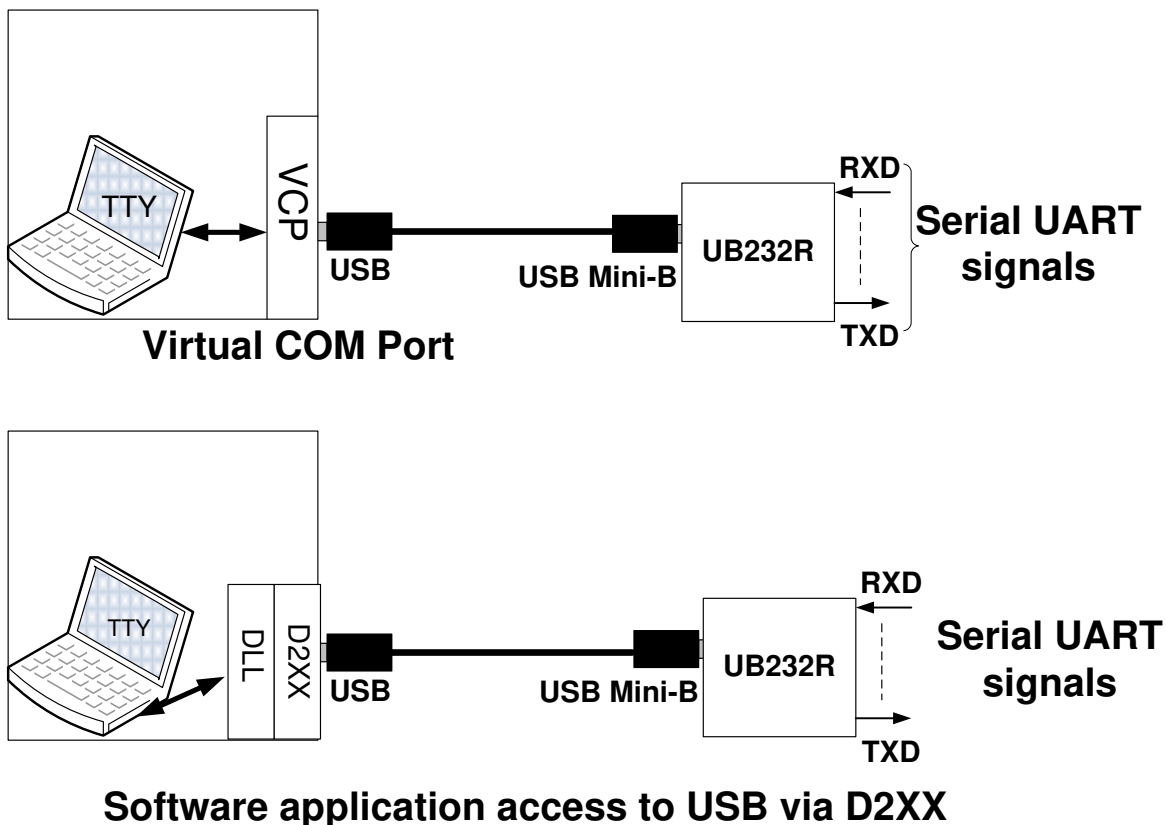


Figure 1.1 Using the UB232R

Drivers for the UB232R are available free from <http://www.ftdichip.com>.

1.1 USB Compliant

The UB232R is fully compliant with USB 2.0 specification



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2 Typical Applications

- Rapid USB integration into existing electronic systems.
- Prototyping platform for USB interface on new systems.
- USB Instrumentation integration.
- PCB real estate sensitive designs integrating smallest FTDI USB module available.

2.1 Driver Support

Royalty-Free VIRTUAL COM PORT (VCP) DRIVERS for:

- Windows 7 32, 64-bit
- Windows Vista
- Windows XP 64-bit
- Windows XP Embedded
- Windows 98, 98SE, ME, 2000, Server 2003, XP and Server 2008
- Windows CE.NET 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 7 32, 64-bit
- Windows Vista
- Windows XP 64-bit
- Windows XP Embedded.
- Windows 98, 98SE, ME, 2000, Server 2003, XP and Server 2008
- Windows CE.NET 4.2, 5.0 and 6.0
- Linux 2.4 and greater

The drivers listed above are all available to download for free from www.ftdichip.com. Various 3rd Party Drivers are also available for various other operating systems – see www.ftdichip.com for details.

2.2 Features

The UB232R has the following feature:

- Reduced development time.
- Rapid integration into existing systems.
- USB powered – no external power supply needed.
- Based on FT232RQ device.
- Entire USB protocol handled by USB module.
- Small USB Type B connector to minimise PCB real estate usage.
- Data transfer rates from 300 baud to 3 Mbaud at TTL levels
- Lower Operating (15mA) and USB suspend mode current (70µA).
- Supports FT232R FTDIChip-ID™ with a unique USB serial number.
- Support for USB suspend and resume.
- UHCI / OHCI / EHCI host controller compatible.
- USB 2.0 Full Speed compatible.
- -40°C to +85°C operating temperature range.

3 Electrical Details

The electrical details and connections to the UB232R module are shown in Figure 3.1, Table 3.1 and Table 3.2.

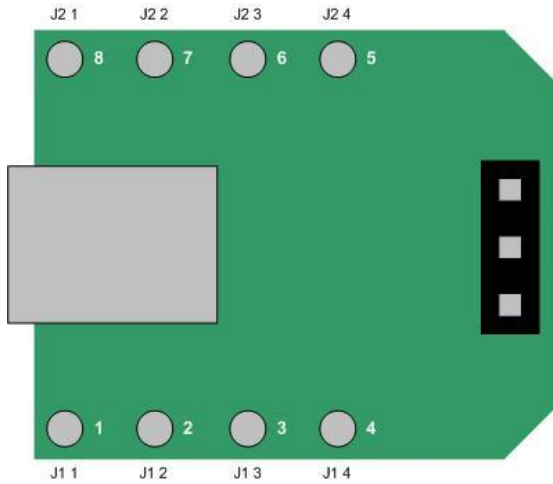


Figure 3.1 UB232R Electrical Connections (Top View)

| Silkscreen Pin | Connector Pin | Name | Description |
|----------------|---------------|-------|------------------------------|
| 1 | J1-1 | GND | OV Power pin |
| 2 | J1-2 | VCC | +5V Power from USB Interface |
| 3 | J1-3 | CTS# | FT232R CTS pin |
| 4 | J1-4 | RTS# | FT232R RTS pin |
| 5 | J2-4 | CBUS1 | FT232R CBUS1 pin |
| 6 | J2-3 | CBUS0 | FT232R CBUS0 pin |
| 7 | J2-2 | RXD | FT232R RXD pin |
| 8 | J2-1 | TXD | FT232R TXD pin |

Table 3.1 UB232R Module Connection

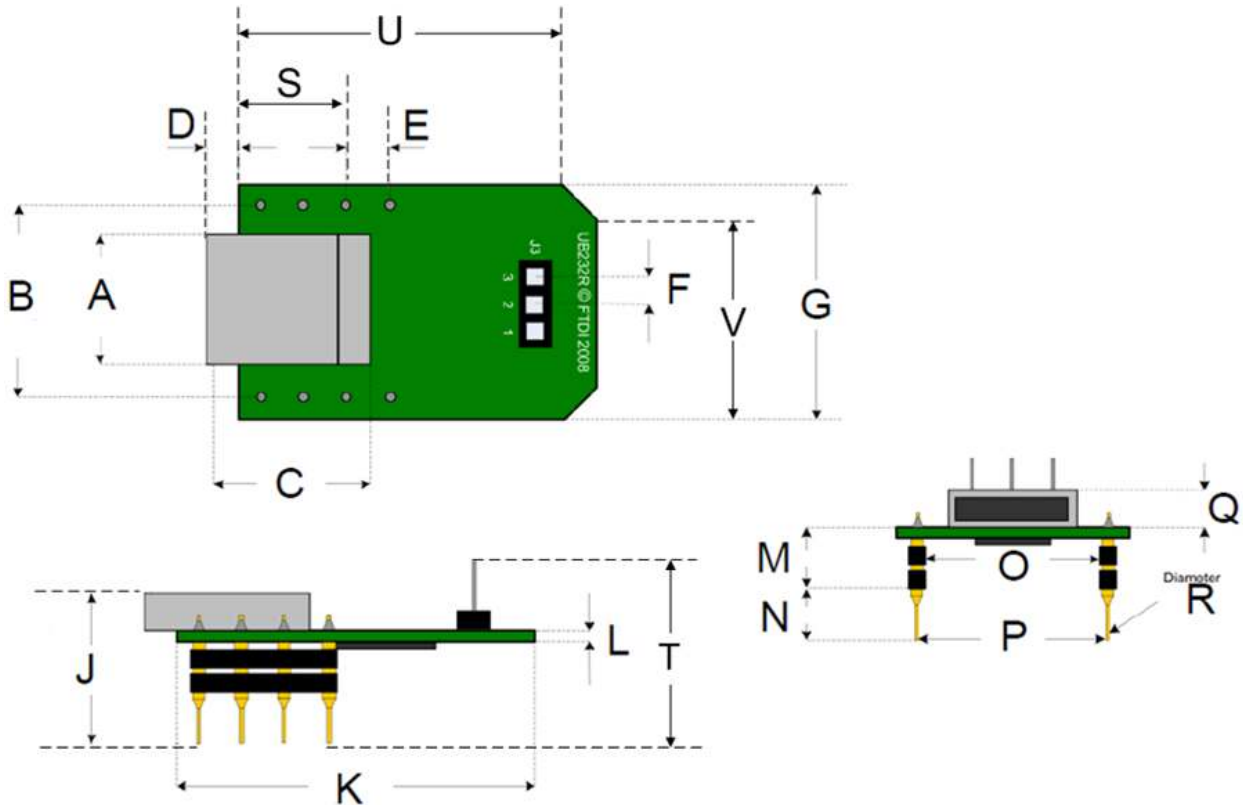
The signal output level on connectors J1 and J2 are controlled by the voltage supplied to the VCCIO pin 4 on the FT232R. The VCCIO is selected between the +5V (VCC from USB) or the output of the FT232R Low Drop Out (LDO) +3.3V regulator. The VCCIO selection is done by fitting a link on connector J3. The selection is shown in Table 3.2.

| Connector J3 | Function |
|--------------------|---|
| Link 1-2 connected | VCCIO and RESET# driven connected to VCC (+5V) |
| Link 2-3 connected | VCCIO and RESET# driven connected to +3.3V output of FT232R LDO regulator |

Table 3.2 UB232R Module VCCIO selection

4 Mechanical details

The mechanical details of the UB232R are shown in Figure 4.1:



| | Dimensions (mm) | | Dimensions (mm) | | Dimensions (mm) | | Dimensions (mm) |
|----------|-----------------|----------|-----------------|----------|-----------------|----------|-----------------|
| A | 7.0 +/- 0.1 | F | 2.0 +/- 0.005 | M | 8.0 +/- 0.1 | R | 0.5 +/- 0.005 |
| B | 12.7 +/- 0.1 | G | 15.24 +/- 0.2 | N | 5.0 +/- 0.1 | S | 6.35 +/- 0.005 |
| C | 7.0 +/- 0.1 | J | 17.0 +/- 0.2 | O | 10.0 +/- 0.1 | T | 18.90 +/- 0.005 |
| D | 2.0 +/- 0.005 | K | 17.78 +/- 0.2 | P | 12.7 +/- 0.1 | U | 15.24 +/- 0.005 |
| E | 2.54 +/- 0.005 | L | 1.60 +/- 0.005 | Q | 4.0 +/- 0.1 | V | 12.70 +/- 0.005 |

Figure 4.1 UB232R Module Dimensions

Figure 4.1 UB232R Module Dimensions

5 Schematic Diagram

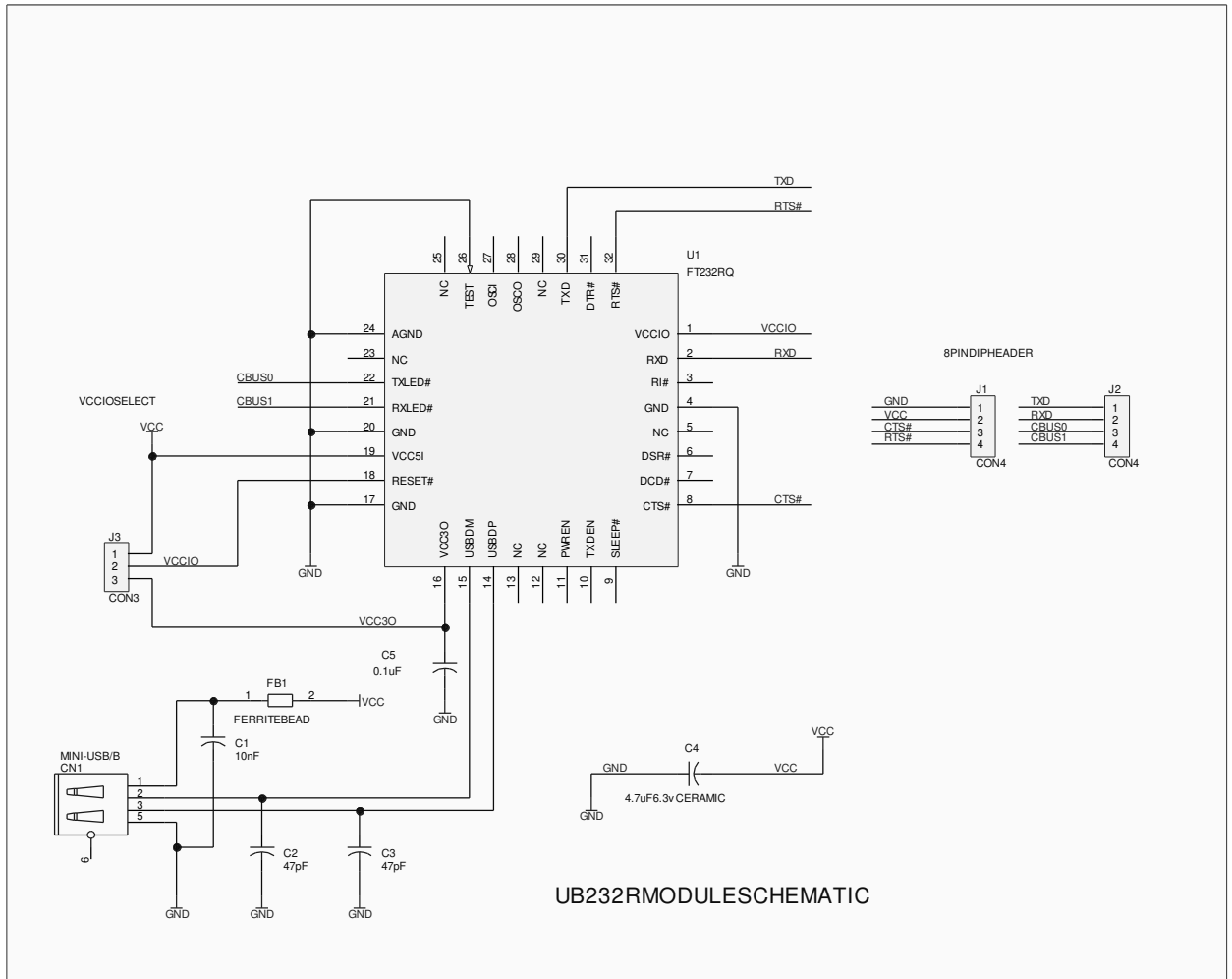


Figure 5.1 UB232R Module Schematic

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Appendix A – FT232R EEPROM Configuration

This FT232R device within the UB232R module contains an EEPROM which contains the USB configuration descriptors for that device. When the UB232R is plugged into a PC or a USB reset is performed, the PC will read these descriptors. The default values stored into the internal EEPROM are defined in Table 6.1

| Parameter | Value | Notes |
|-----------------------------------|-------------|---|
| USB Vendor ID (VID) | 0403h | FTDI default VID (hex) |
| USB Product UD (PID) | 6001h | FTDI default PID (hex) |
| Serial Number Enabled? | Yes | |
| Serial Number | See Note | A unique serial number is generated and programmed into the EEPROM during device final test. |
| 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 | UB232R | |
| Max Bus Power Current | 90mA | |
| Power Source | Bus Powered | |
| Device Type | FT232R | |
| USB Version | 0200 | Returns USB 2.0 device description to the host. Note: The device is be a USB 2.0 Full Speed device (12Mb/s) as opposed to a USB 2.0 High Speed device (480Mb/s). |
| Remote Wake Up | Enabled | Taking RI# low will wake up the USB host controller from suspend. |
| High Current I/Os | Enabled | Enables the high drive level on the UART and CBUS I/O pins. |
| Load VCP Driver | Disabled | Makes the device load the VCP driver interface for the device. |
| Invert TXD | Disabled | Signal on this pin becomes TXD# if enable. |
| Invert RXD | Disabled | Signal on this pin becomes RXD# if enable. |
| Invert RTS# | Disabled | Signal on this pin becomes RTS if enable. |
| Invert CTS# | Disabled | Signal on this pin becomes CTS if enable. |

Table 6.1 Default Internal EEPROM Configuration

The internal EEPROM in the FT232R can be re-programmed over USB using the utility program FT_PROG. FT_PROG can be downloaded from the 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 for this service.

Appendix B – Revision History

| | | |
|--------------|---|-------------------------------|
| Version 1.00 | Full datasheet released | July 2008 |
| Version 1.01 | Table 3.1 (CTS# and RTS#) Corrected the pin out Contact information Update Added Windows 7 32,64 bit driver support . Added FT_PROG reference. | November 2009 |
| Version 1.02 | Edited mechanical dimensions figure 4.1 Released | January 2010 February 2010 |
| Version 1.1 | Updated contact information | April 2010 |
| Version 1.11 | Added RoHs compliant statement in section 1 Added section 1.1 USB compliant Logo | July 2010 |
| Version 1.12 | Edited mechanical dimensions figure 4.1 Added dimension S, T, U and V Updated the disclaimer | Dec 2010 |