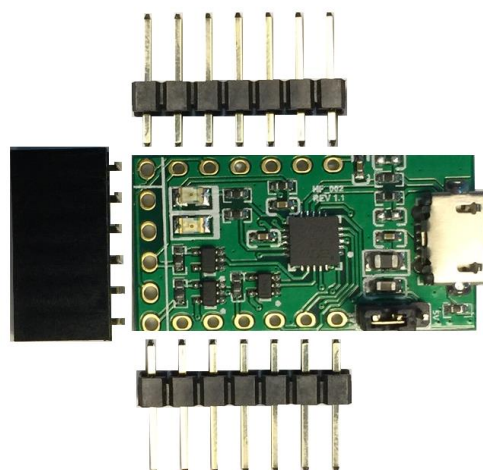


Future Technology Devices International Limited Datasheet LC231X Development Module



1 Introduction

The LC231X module is a low cost USB to serial UART bridge using FTDI's FT231X. The module provides power and a UART interface with full modem handshaking control.

The LC231X IO interface can be either set to 3V3 or 5V, through the on board jumper.

The LC231X module's UART interface is mapped to one 1X6 pin header and the full UART plus modem handshake control signals are mapped to two rows of 1x7 pin header. Note the user cannot fit all connectors at the same time. The two header rows are spaced 0.5" apart along the sides of the board, which allows the module to plug into a solderless breadboard. Each module is supplied with one right angle socket and two 7pin headers included. The user can select which ones to fit.

Furthermore there are TX and RX LEDs to indicate data transmission on the UART signals.

1.1 Features

The LC231X module utilises the FT231X from FTDI. For a full list of the FT231X's features refer to the [FT231X](#) datasheet.

In addition, the LC231X has the following features:

- Small PCB size as 15.24mm X 28.19mm
- Configurable IO voltage interface
- USB 2.0 full speed
- Provides a full modem control interface
- Low supply current :10mA
- Supported baud rates: 300 bps to 3 Mbps
- Power output to external logic 5V/3V3
- -40°C to +85°C operational temperature range
- Full RoHS compliance

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2 Typical Applications

- USB to UART bridge
- Debugger / Programmer for embedded MCU e.g. Arduino
- USB IO extender for small 8-bit micro's

2.1 Driver Support

The LC231X requires USB drivers (listed below), available free from <http://www.ftdichip.com>, which are used to make the module 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 LC231X 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 CE 4.2, 5.0 and 6.0
- Windows Server 2003, 2008 R2, 2012
- Mac 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 CE 4.2, 5.0 and 6.0
- Windows Server 2003, 2008 R2, 2012
- MAC OS-X
- Linux 2.4 and greater
- Android(J2xx)

For driver installation, please refer to the installation guides on our website:

<http://www.ftdichip.com/Support/Documents/InstallGuides.htm>

3 Ordering Information

| Part No. | Description |
|----------|------------------------------------|
| LC231X | Low cost FT231X USB to UART module |

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4 Pin Out and Signal Description

4.1 Module Description

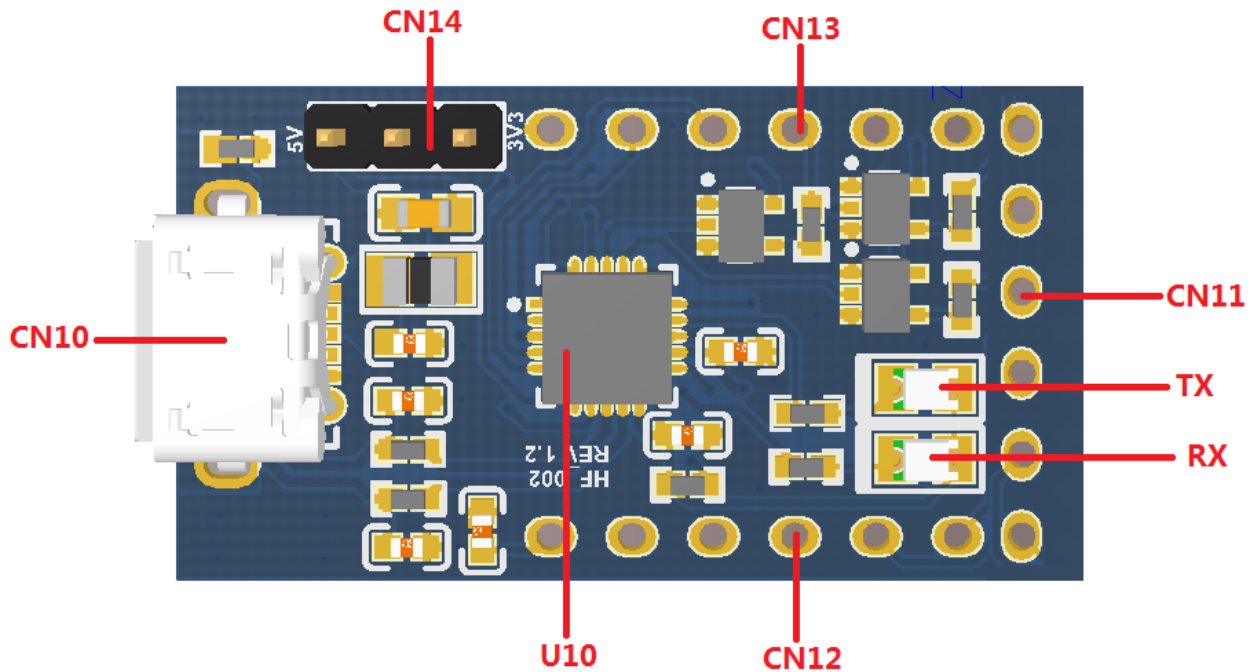


Figure 1 - Module Features

| Feature | Reference Designator |
|--|----------------------|
| Micro USB connector | CN10 |
| IO voltage selection | CN14 |
| 6pin 2.54mm pitch connector UART interface | CN11 |
| 7pin 2.54mm pitch connector full modem control interface | CN12 |
| 7pin 2.54mm pitch connector full modem control interface | CN13 |
| FT231X USB to serial bridge IC | U10 |
| Green color LED | RX |
| Red color LED | TX |

Table 1 - Module Features & Description

4.2 Module Interface Signal Description

The pin description of **CN11** is given in **Table 2**.

| Pin No | Pin Name | Type | Description |
|--------|----------|--------|---|
| 1 | GND | Power | Ground |
| 2 | CTS | Input | Clear To Send Control Input/Handshake signal |
| 3 | VBUS | Power | 5V Supply |
| 4 | TXD | Output | Transmit Asynchronous Data Output |
| 5 | RXD | Input | Receiving Asynchronous Data Input |
| 6 | RTS | Output | Request To Send Control Output/Handshake Signal |

Table 2 - CN11 Pin Description

The LC231X can support both 3.3V and 5V interfacing; the power jumper selection is through **CN14**

| Pin Number | Description |
|------------|-------------------|
| 1-2 | 3.3V IO interface |
| 2-3 | 5V IO interface |

Table 3 - CN14 Jumper Selection

The LC231X module also provides a UART with full modem control interface through **CN12** and **CN13**. The pin description of **CN12** and **CN13** is given by **Table 4** and **Table 5**

| Pin No | Pin Name | Type | Description |
|--------|----------|--------|-----------------------------------|
| 1 | GND | Power | Ground |
| 2 | TXD | Output | Transmit Asynchronous Data Output |
| 3 | RXD | Input | Receiving Asynchronous Data Input |
| 4 | VBUS | Power | 5V Supply at 450mA |
| 5 | CBUS0 | GPIO | Configurable IO port |
| 6 | CBUS3 | GPIO | Configurable IO port |
| 7 | RST | Input | FT231X Reset |

Table 4 - CN12 Pin Description

| Pin | Pin Name | Type | Description |
|-----|----------|------|-------------|
|-----|----------|------|-------------|

| No | | | |
|----|-----|--------|---|
| 1 | RTS | Output | Request To Send Control Output/Handshake Signal |
| 2 | CTS | Input | Clear To Send Control Input/Handshake signal |
| 3 | DSR | Input | Data Set Ready Control Input/Handshake Signal |
| 4 | DTR | Output | Data Terminal Ready Control Output/Handshake Signal |
| 5 | DCD | Input | Data Carrier Detect Control Input |
| 6 | RI | Input | Ring Indicator Input for Remote Wake Up |
| 7 | 3V3 | Power | 3V3 Supply at 50mA |

Table 5 - CN13 Pin Description

5 Devices Characteristics and Ratings

5.1 Electrical Specification

| Parameter | Value | Unit | Conditions |
|---|---------------|-----------|------------|
| Storage Temperature | -30°C to 80°C | Degrees C | |
| Ambient Operating Temperature (Power Applied) | -20°C to 70°C | Degrees C | |

Table 6 - Temperature Parameters

DC Characteristics (Ambient Temperature = -20°C to +70°C)

IO interface: 5V

| Parameter | Description | Minimum | Typical | Maximum | Units | Conditions |
|-----------|----------------------|---------|---------|---------|-------|--|
| V_{bus} | Output Power Voltage | 4.75 | | 5.25 | V | |
| I_o | Supply current | | 450 | | mA | Assuming connected to direct to a host port or a powered hub, and enumerated |
| V_{oh} | Output Voltage High | 3.2 | 4.1 | 4.9 | V | |
| V_{ol} | Output Voltage Low | 0.3 | 0.4 | 0.6 | V | |

Table 7 - 5V Interface Operating Voltage and Current

DC Characteristics (Ambient Temperature = -20°C to +70°C)

IO interface: 3V3

| Parameter | Description | Minimum | Typical | Maximum | Units | Conditions |
|-----------|----------------------|---------|---------|---------|-------|--|
| V_{bus} | Output Power Voltage | 4.75 | | 5.25 | V | |
| I_o | Supply current | | 450 | | mA | Assuming connected to direct to a host port or a powered hub, and enumerated |
| V_{oh} | Output Voltage High | 2.2 | 2.8 | 3.2 | V | |
| V_{ol} | Output Voltage Low | 0.3 | 0.4 | 0.6 | V | |

Table 8 - 3V3 Interface Operating Voltage and Current

6 Board Schematic

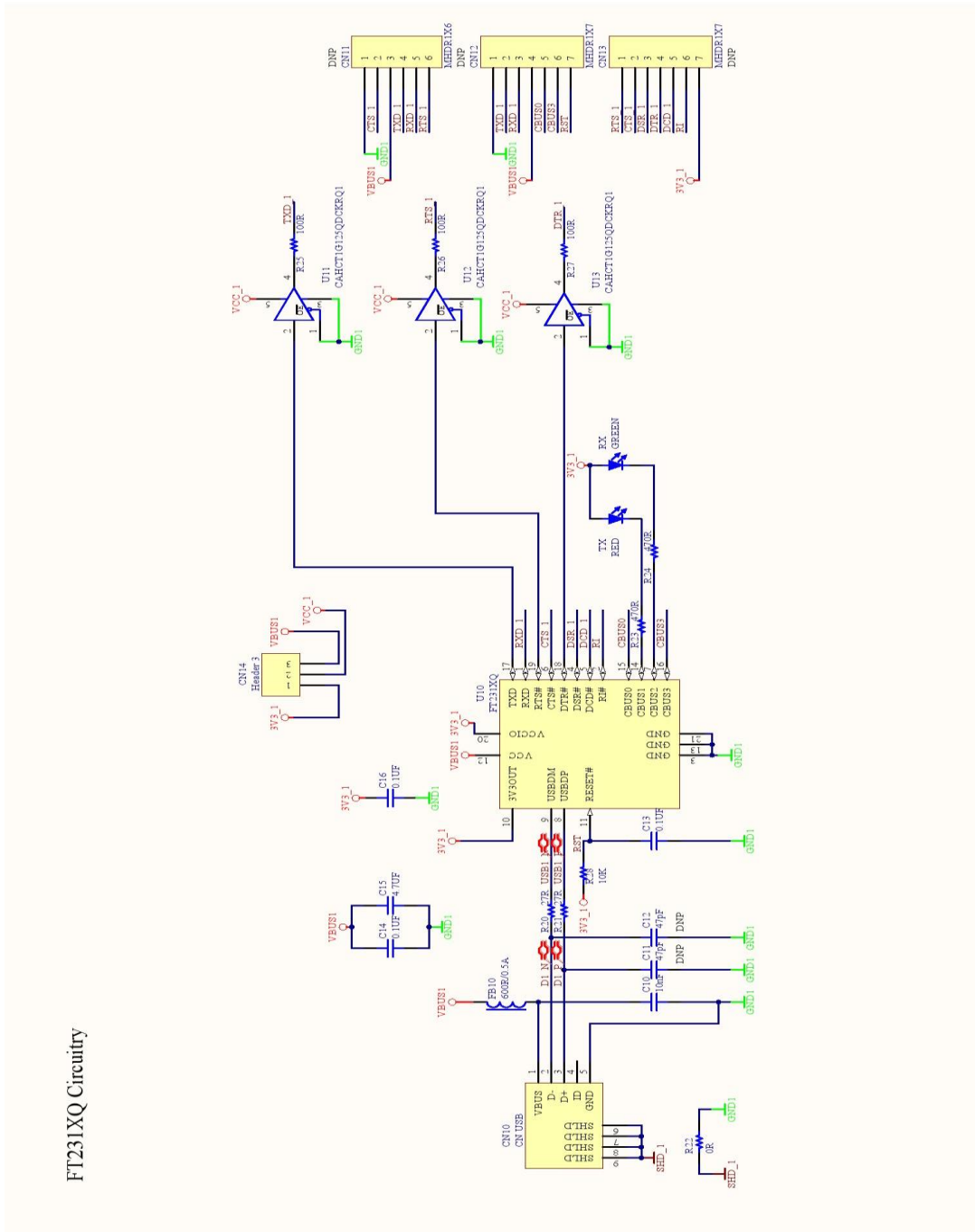


Figure 2 – FT231X Schematics

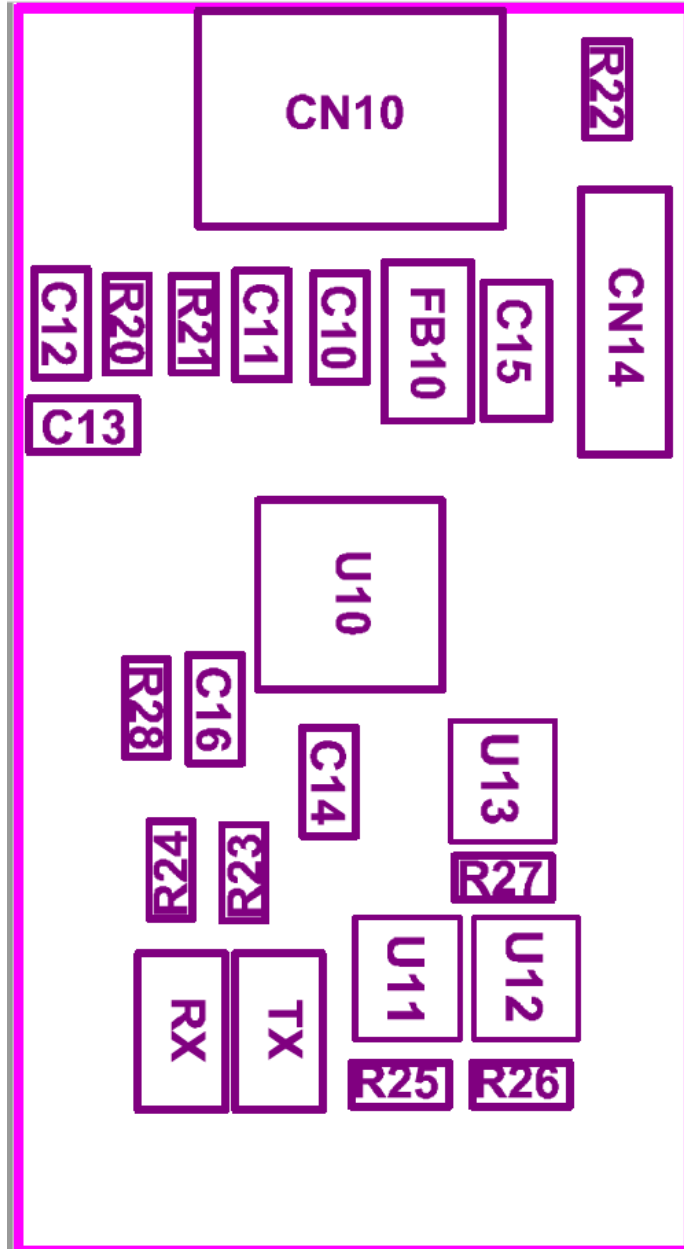


Figure 3 - LC231X Module Component Placement

7 Mechanical Dimensions

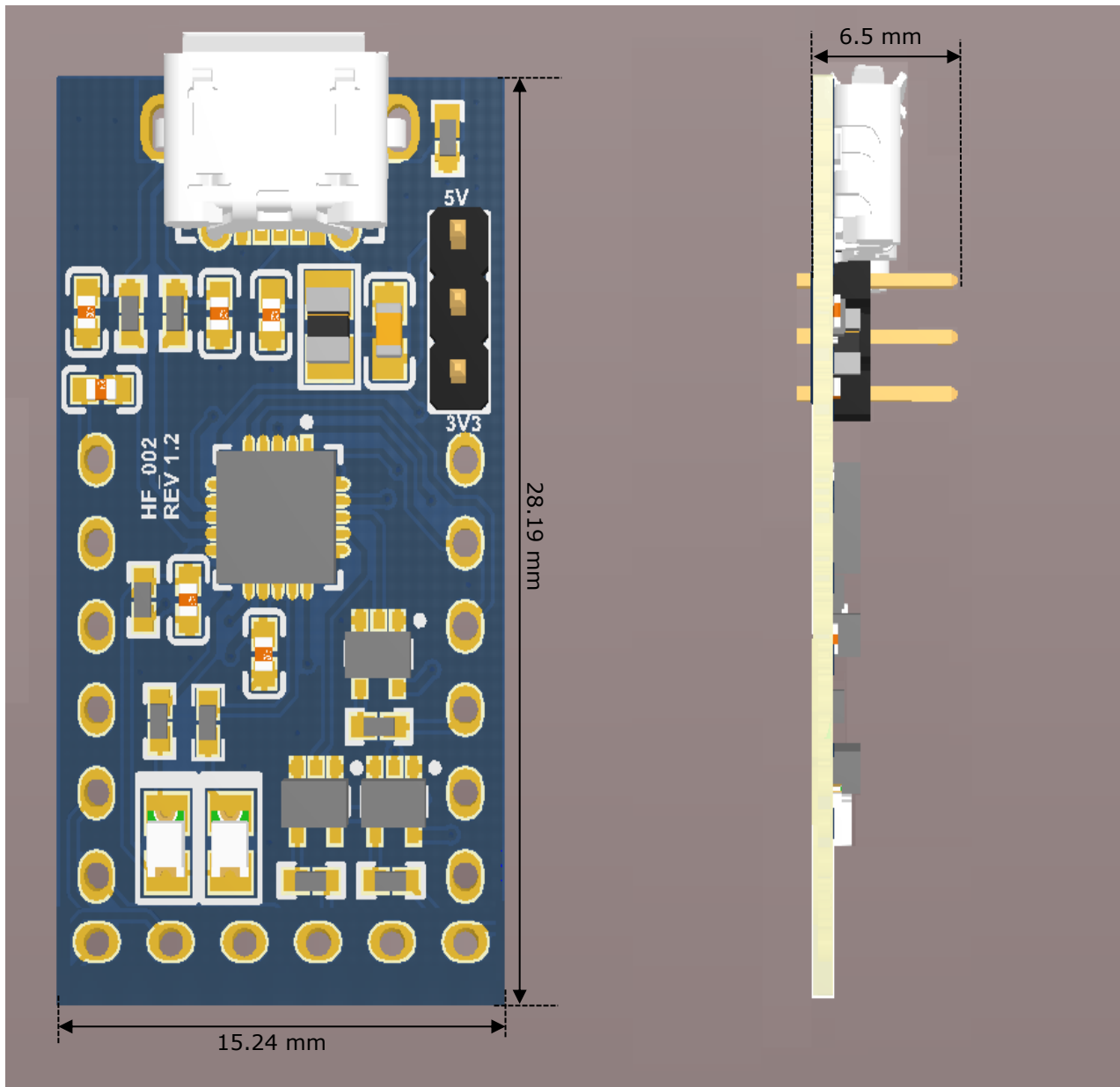


Figure 4 - LC231X Module Dimensions

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Appendix A – References

Document References

For module documentations, please refer to URL below:

FT231X datasheet: [FT231X Datasheet](#)

Acronyms and Abbreviations

| Terms | Description |
|-------|---|
| UART | Universal Asynchronous Receiver/Transmitter |
| USB | Universal Serial Bus |
| LED | Light-emitting diode |

Appendix B - List of Figures and Tables

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Appendix C – Revision History

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Document Reference No.: FT_001388
Clearance No.: FTDI# xxx
Product Page: <http://www.ftdichip.com/LC231X.htm>
Document Feedback: [Send Feedback](#)

| Revision | Changes | Date |
|-------------|-----------------|------------|
| Version 1.0 | Initial Release | 2017-02-21 |