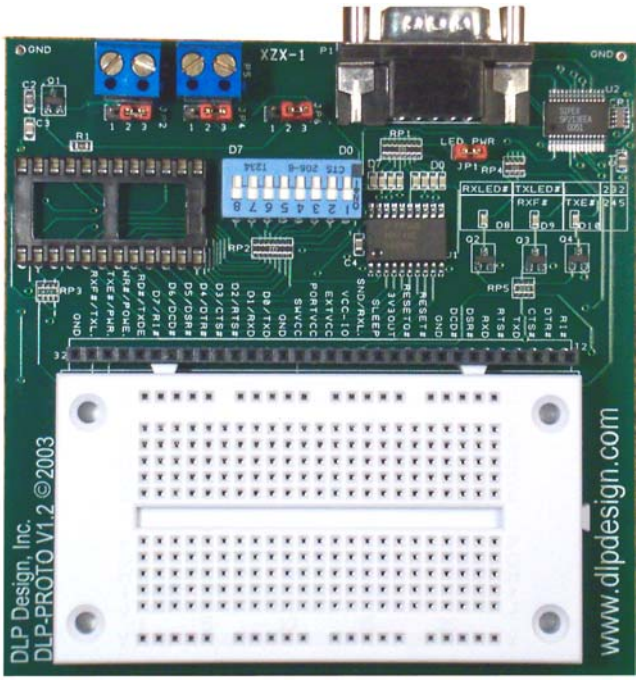
DLP-PROTO

Prototyping Board for the DLP-USB245M and DLP-USB232M USB Adapters



GENERAL DESCRIPTION

The DLP-PROTO makes easy work of experimenting with the DLP-USB245M and DLP-USB232M USB adapter modules. It is perfectly suited for prototyping a USB to RS-232 converter design or becoming familiar with the FT2xxBM's newest feature known as the Bit-Bang Mode. Or, you can add your own microcontroller to the prototyping area to get a jumpstart on developing your new product.

The DLP-PROTO directly accepts either the DLP-USB245M or DLP-USB232M USB adapter modules. Eight LED's and eight switches are provided for use with the Bit-Bang Mode and can be disabled in designs that require the use of all available power from the host PC. Three additional LED's are provided for monitoring the status of the RXLED#, TXLED#, RXF#, and TXE# signals. External power jacks and selection jumpers are provided to allow power source selection. Power for the DLP-USB2xxM module and DLP-PROTO board can be taken from either the host computer (PC or Mac) or from your external

5-volt power source. Additionally, an external power jack and a selection jumper are provided to allow for an external +3.0 to +5.25 volt power source for designs that use lower-voltage circuitry to interface to the DLP-USB245M or DLP-USB232M USB adapter modules.

Additional circuitry and a DB9 male connector are provided for implementing a USB to RS-232 converter. All standard RS-232 signals (RX, TX, DTR, CTS, RTS, DSR, and DCD) have been included in the design and can be easily selected or disabled using jumper wires.

A single MOSFET transistor is used to drop the board's current consumption to nearly zero when the host computer and DLP-USB2xxM go to Standby mode. Jumper JP6 allows selection of the sleep mode that the board is to follow.

(Refer to the schematics for the DLP-PROTO board located at the end of this document for additional details.)

USB ADAPTER SOCKET

The DLP-PROTO works with either the DLP-USB232M or the DLP-USB245M.

Certain power-up default conditions are met via the resistor pack RP3. The first resistor is used to pull the RESET# line high so that the DLP-USB2xxM will not remain in Reset mode. This pull up is needed for both the DLP-USB232M and the DLP-USB245M. The second resistor is used to pull the CTS# line low on the DLP-USB232M board, which is all that is needed if handshaking is enabled by the host application but not used (this assumes your target electronics are guaranteed to accept data sent from the FT232BM). This resistor has no effect on the operation of the DLP-USB245M board other than to place a slight load on Data Pin D3. The third resistor makes the DLP-USB232M board default to bus powered configuration. Tie the PWRCTL line high and set JP2 to positions 2 and 3 if the board is to be configured as a self-powered device.

POWER-SELECTION JUMPERS

Jumpers JP2 and JP4 allow a power source to be selected as well as the required voltage for the interface logic on the FT2xxBM USB chip which is located on the DLP-USB232M or DLP-USB245M module. Jumper JP2 selects between using the host PC/Mac's 5-volt power (Pins 1 and 2 jumpered) and an externally connected (customer supplied) 5-volt power source (Pins 2 and 3 jumpered). External Jack P3 is used to supply the board with external 5-volt power.

Jumper JP4 selects the power source for the interface logic on the FT2xxBM USB chip. The pin on the USB chip that receives this power is labeled VCCIO (Pin 13). Jumper JP4 Pins 1 and 2 if you want the interface logic to operate at the same 5-volt level at which the USB chip operates. Jumper JP4 Pins 2 and 3 if you want to connect an external power source to jack P5. The acceptable range for the external power source is +3.0 to +5.25 volts.

SWITCHES AND LED'S

The switches and LED's on the DLP-PROTO board are used primarily by Bit-Bang Mode. In Bit-Bang Mode, when the data direction of a particular data line of the USB chip is set to output, the state of each output line is held at the state last written to the data bus. If a data line is set to be an input, the FT2xxBM USB chip will pull the line high with an internal ~200K-Ohm pull-up resistor unless it is driven by external circuitry. The eight-position DIP switch provides the means to pull each line to a logic low level if the data line is currently set to input. A 2.2K resistor is connected in series with each switch to limit current in the even that a switch is closed while a data line is set to output.

When the FT2xxBM USB chip is not set to Bit-Bang Mode, data on the data lines will only be present when the RD# line is pulled low to read data from the FIFO or when data is placed on the data lines by user electronics. The rest of the time, the data bus is in high-impedance mode with the internal 200K-Ohm resistors pulling the data lines high.

The LED's that monitor the data bus during Bit-Bang Mode are buffered using a 74HC540 driver IC. This IC inverts the logic such that when the logic line is high, the associated LED is on. The current taken from the data line by the driver IC is minimal (10uA max).

Three other LED's are provided to monitor the state of the RXF#, TXE#, TXLED#, and RXLED# lines.

If all 11 LEDs are on at the same time, as much as 180mA could be taken from the USB port if this board is configured to take power from the USB port. For this reason, a jumper (JP1) is provided to remove power from the LED's if all available USB port power is needed for user electronics.

RS-232 INTERFACE

The DLP-PROTO allows for easy implementation of a USB to RS-232 converter. A SP213E high-performance RS232 transceiver can be connected between the DLP-USB232M and a DB9 male connector by simply inserting jumper wires into the J2 header. All eight standard RS232 signals (RX, TX, RI, DTR, CTS, RTS, DSR, and DCD) are available for use in your design.

The SP213E is rated for a maximum baud rate of 230,000 bits per second and guarantees proper operation at 120Kbps.

DISCLAIMER

This product and its documentation are supplied on an as-is basis, and no warranty as to their suitability for any particular purpose is either made or implied. DLP Design will not accept any claim for damages whatsoever arising as a result of use or failure of this product. Your statutory rights are not affected.

This product or any variant of it is not intended for use in any medical appliance, device, or system in which the failure of the product might reasonably be expected to result in personal injury.

This document provides preliminary information that may be subject to change without notice.

CONTACT INFORMATION

DLP Design
P.O. Box 503762
San Diego, CA 92150-3762

Phone: 858-513-2777
Fax: 858-513-2777
Email: support@dlpdesign.com
Internet:http://www.dlpdesign.com

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DLP-USB232M or
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