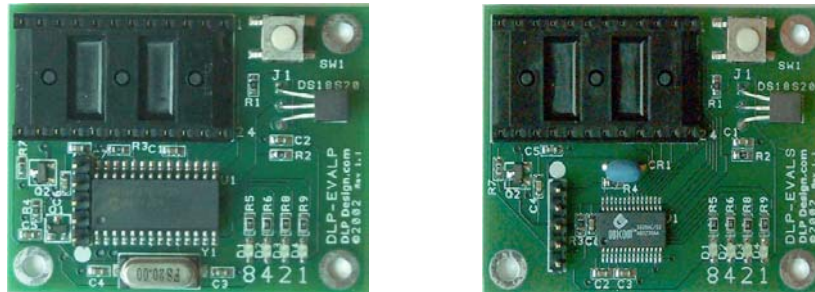




# DLP-EVALP/DLP-EVALS

## Evaluation Boards for the DLP-USB245M USB Adapter



### GENERAL DESCRIPTION

The DLP-EVALP and DLP-EVALS present a straightforward approach to designing target electronics that will both interface with and take all required operational power from the DLP-USB245M USB Adapter. No external power supply is needed while still maintaining compliance with the USB Specification.



Shown here with the DLP-USB245M (purchased separately)

In both designs, an 8-bit microcontroller is used to communicate with the host PC via the DLP-USB245M USB Adapter. The DLP-EVALP uses a Microchip PIC16F870 microcontroller running at 20MHz and the DLP-EVALS uses a Ubicom/Scenix SX28 microcontroller running at 50MHz. Application software is

provided that demonstrates sending and receiving data between the host PC and USB Adapter. Four LED's provide visual feedback of data being received from the PC and a momentary contact, push-button switch instructs the microcontroller to send a 512-byte data packet back to the host.

Serving as a design example, both evaluation boards have a DS-18S20 (TO-92 package) temperature sensor connected to a port pin on the microcontroller. The DLP-EVALP and DLP-EVALS both ship with firmware pre-programmed into their Flash (ROM) microcontroller that implements an interface to Windows PC software that will exercise the temperature sensor, push-button, and LED's. The Windows software with source code (Visual C++ V6.0) and microcontroller firmware (HEX and CCS C source) is available as a free download from **[www.dlpdesign.com](http://www.dlpdesign.com)**

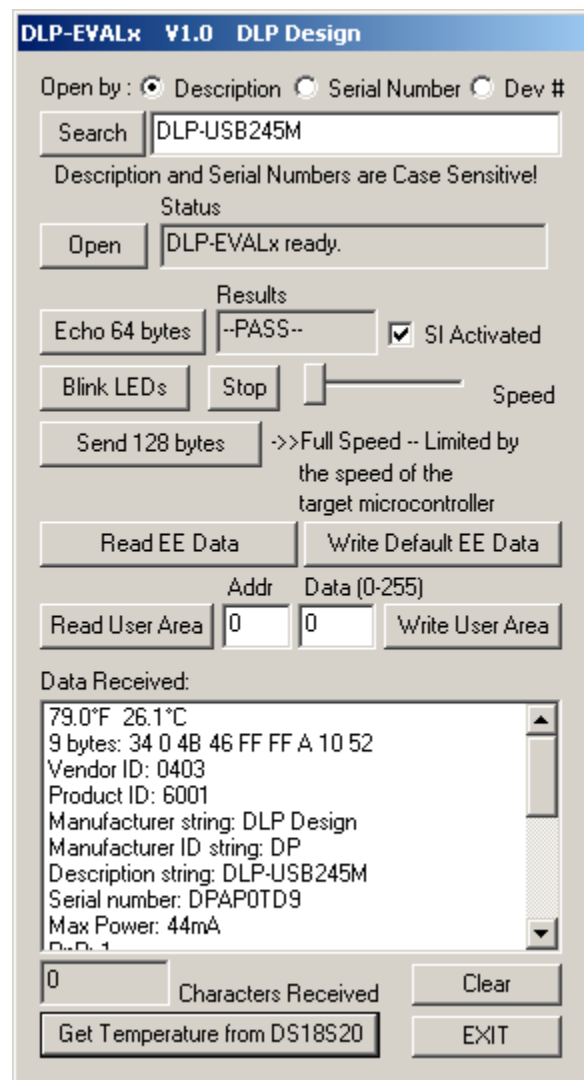
In the event that the user wants to reprogram the microcontroller with different firmware, a 5-pin header is available that is compatible with the DLP-Flash programmer (purchased separately).

A single MOSFET transistor is used to drop the board's current consumption to nearly zero when the host PC and DLP-USB245M go to Standby mode.

Refer to the schematics for these evaluation boards (available upon purchase) and the datasheets for the Ubicom SX28 and Microchip 16F873 microcontrollers for additional details.

## TEST SOFTWARE

Demonstration software (USBTEST.EXE) for the DLP-EVALx boards can be downloaded from the DLP Design website. The software runs under Windows 98/ME/2000/XP. USBTEST.EXE will read the DS-18S20 sensor and present the temperature data numerically.



USBTEST.EXE exemplifies four communications techniques. The echo or loop-back function sends 64 bytes of data to the USB Adapter and waits for each byte to be echoed back before continuing. The loop-back test can be performed with or without the Send Immediate (SI) feature enabled. If enabled, the SI pin on the FT245BM is strobed low to force the byte in the RX buffer to be immediately sent to the host.

The "Blink LED's" function writes data to the DLP-EVALx board via the DLP-USB245M board that performs a binary count with the LED's. A slider control is provided to increase and decrease the rate at which the individual bytes are sent. When the slider speed control is set to the fastest position, a 64-byte packet is repeatedly sent to the adapter to flash the LED's at the speed of the microcontroller.

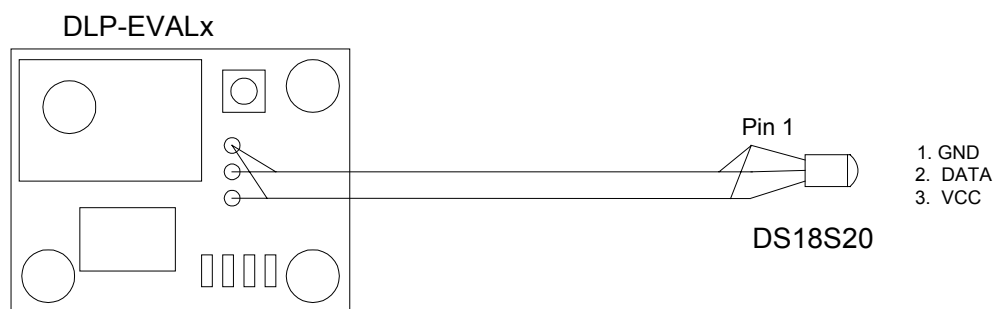
The "Send 128 Bytes" function builds and sends a 128-byte packet of data to the microcontroller. The microcontroller simply reads and discards the data from the FIFO memory in the FT245BM on the DLP-USB245M adapter board. The speed of this test is limited by the speed of the microcontroller.

When the button on the DLP-EVALx board is pressed, the microcontroller creates and sends a 512-byte packet of data to the host via the DLP-USB245M. The returned data is presented in the application's list box.

## TEMPERATURE SENSOR WIRING

The DS-18S20 is interfaced to the microcontroller using a standard port pin and a 1.5K-ohm pull-up resistor. The DS-18S20 can be removed from the DLP-EVALx PC board for the purpose of locating the DS-18S20 at a significant distance from the DLP-EVALx board using Category 5 cable.

Care must be taken to ensure correct wiring as the distance between the DLP-EVALx and DS-18S20 sensor increases. Category 5 network cable must be used for distances greater than about 10 feet to keep the capacitance low. Use one twisted pair for power and ground, and a second twisted pair for data and ground.

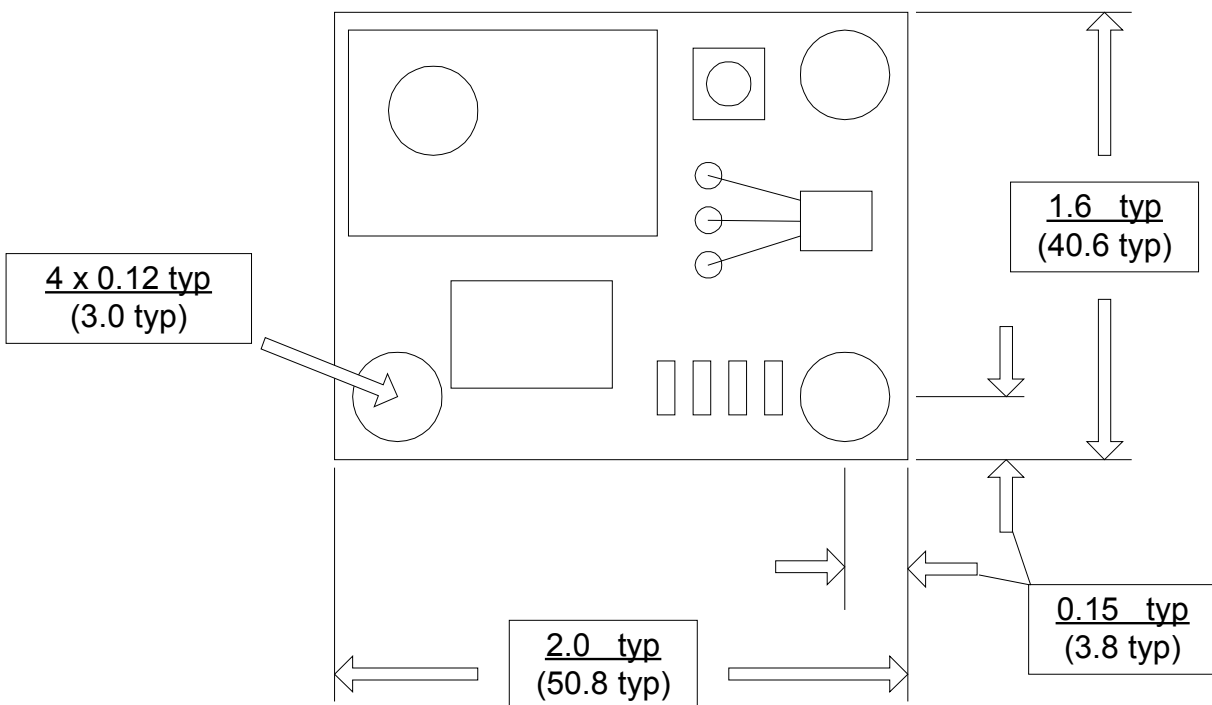


## POWER SUPPLY

The DLP-EVALx boards take all needed operational power from the host PC's USB port via the DLP-USB245M USB Adapter. When the host PC goes to standby mode, the DLP-USB245M will also go to standby mode after 3 milliseconds of no USB activity. When the DLP-USB245M goes to standby mode, it takes SLEEP high, which powers down the DLP-EVALx board.

Both the EVALP and EVALS circuits employ a P-channel MOSFET to control power. Once Windows has enumerated the DLP-USB245M module, the FT245BM takes its SLEEP line low. This circuit could also be used to control power to higher-current applications since the RC network connected to the gate of the MOSFET sets the rise-time (limiting the inrush current) for the power going to the target electronics.

## MECHANICAL DRAWINGS (PRELIMINARY): [Inches (millimeters) unless otherwise noted]



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