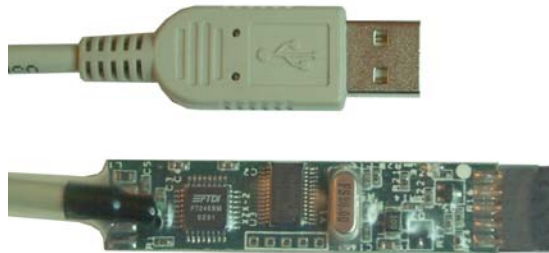# DLP-FLASH

USB-Based FLASH Programmer

The DLP-FLASH is a high-speed, in-system FLASH memory programmer for selected Microchip and Ubicom FLASH-based microcontroller devices. The DLP-FLASH programmer allows in-circuit programming of target microcontrollers, which means all that is needed for device programming on user target boards is a 5-pin header, a few support components, and power isolation if the target electronics draw in excess of 200mA. The microcontroller can be soldered in place during the manufacturing process and programmed at a later time to ensure that your product is shipped with the most recent version of firmware.

DLP-FLASH FEATURES

Compatible with the following microcontrollers:

PIC Microchip		Ubicom
16F84A	16F873	SX28
16F870	16F874	SX48
16F871	16F876	
16F872	16F877	

- No additional cables or external power source required – all power is taken from the USB port via the provided USB cable.
- USB based for FAST read and verify functions
- In-circuit programming, no more loading the target microcontroller into a device programmer

The DLP-FLASH programmer consists of Windows 98/2000/XP compatible software and a small programming board permanently attached to a six-foot USB cable. The most recent versions of the application software and USB drivers for the DLP-FLASH programmer are available as a free download from www.dlpdesign.com.

> NOTE: The DLP-FLASH programmer does not support the adjustment of trim bits for the internal RC oscillator in the Ubicom processors. During firmware programming, the internal RC oscillator is trimmed to its slowest speed.

POWER CONSIDERATIONS

The DLP-FLASH programmer board has the ability to supply 5-volt power to Pin 3 on the programming header to power up the target microcontroller for programming. The circuitry that is connected to Pin 3 of the DLP-FLASH programmer must not draw more than 200mA. If the target electronics draw more than 200mA on the 5-volt line, they must be electrically isolated from Pin 3 and the target microcontroller.

> NOTE: If programming a microcontroller that is installed in target electronics it will most likely be necessary to apply power to the target's circuitry before programming. The DLP Flash programmer can supply a minimal amount of 5-volt power for either a circuit that requires very little power or for just a microcontroller. As a rule of thumb, if the microcontroller to be programmed is connected to target electronics, always apply power to the microcontroller (via USB port or other supply) before starting the firmware upload.

The Setup menu provides the ability to activate power during firmware upload to a microcontroller. By default, the DLP-Flash programmer does not provide 5-volt power on pin 3 and as such power must be provided by the target electronics. If the DLP Flash programmer is used to program microcontrollers that are not connected to user electronics then this setup item must be checked.

QUICK-START GUIDE

Italicized text indicates an item that can be clicked or selected in the DLP-FLASH application software.

This guide requires the use of a Windows 98/2000/XP PC that is equipped with a USB port. If the DLP-FLASH board is connected to your PC, disconnect it at this time.

1. Download the DLP-FLASH application software from www.dlpdesign.com, then unzip and run the program. The application will report that it cannot find the DLL device drivers. Click OK to continue.

2. Download the DLP-FLASH version of the DLL-based device drivers from www.dlpdesign.com. This can be accomplished by either selecting *Download Drivers* from the *Internet* menu on the DLP-FLASH program or by visiting the dlpdesign.com website with your browser. Unzip the drivers onto a blank floppy disk or into a folder on the hard drive.

3. Terminate the DLP-FLASH application program.

4. Connect the DLP-FLASH programmer board to the PC via the provided USB cable. This action initiates the loading of the USB drivers. When prompted, select the folder where the device drivers were stored in Step 2. Windows will then complete the installation of the device drivers for the DLP-FLASH board. The next time the DLP-FLASH module is attached, the host PC will immediately load the correct drivers without any prompting. Reboot the PC if prompted to do so.

At this point, the DLP-FLASH is ready for use. Run the application program again, and it should find the DLP-FLASH programmer board.

The DLP-FLASH version of FTDI's DLL-based drivers has been modified by changing FTDI's description string that appears in the Device Manager window and the default PID code to DLP-FLASH's code of FBF8. Otherwise, there is no difference between the DLP-FLASH and FTDI versions of the DLL drivers.

PROGRAMMER INTERFACE

The programmer interface uses a 5-pin header to facilitate compatibility with both the Ubicom and Microchip devices. The Ubicom devices only require four pins, while the Microchip devices require all five. The following table shows the pinout for the programming interface connector:

Pin #	Ubicom	Microchip
1	OSC1	VPP/MCLR
2	OSC2	B6 (Clock)
3	VCC	VCC
4	GND	GND
5	N/A	B7 (Data)

The white dot on the programmer board appears on both sides and indicates Pin 1. All DLP Design products that are compatible with the DLP-FLASH programmer have this characteristic white dot indicating pin 1.

Even though Ubicom-based hardware designs only require four pins to properly interface to the DLP-FLASH programmer, it is recommended that all designs use a 5-pin header in order to help prevent possible improper connection to the programmer.

BASIC OPERATION

Once again, *italicized* text indicates an item that can be clicked or selected in the DLP-FLASH application software.

The DLP-FLASH application software is compatible with 98/ME/2000/XP versions of the Windows operating system.

The application will search all connected USB devices attempting to locate one with a device description of "DLP-FLASH". Once the programmer is located, the main program window will appear. If one is not found, an error message will be displayed.

Select the device type you wish to program using the *drop-down device selector box* to the left of the *HEX file selector box*.

To select a HEX file for programming, click inside the *HEX file edit box* or select *File|Open hex file* with the mouse. Double-click on the appropriate file to load it.

Click on the *Set* buttons to open the configuration bits dialogs. Select the appropriate configuration by clicking on the desired options. The resulting configuration word will appear on the main window. If the selected hex file contains configuration bit setup information, the configuration windows will be automatically updated to match the configuration. Any configuration data contained in the hex file can be overridden in the setup window after the file is loaded.

The Configuration Fuses and Fusex windows will open if a Ubicom device is selected. Just the Configuration window will be available if a Microchip device is selected.

For a complete description of the configuration bits, refer to the datasheet for the device being programmed.

Connect the DLP-FLASH programmer board to the 5-pin header on the board that has the device to be programmed, ensuring that the white dot on the programmer board lines up with the white dot on the board to be programmed (Pin 1 to Pin 1).

Click the *Program* button or select *Commands|Program* to program the microcontroller.

The DLP-FLASH application will remember its last position on the screen. If the application's main window is ever repositioned off the screen such that it cannot be seen, right click on the program's button at the bottom of the screen and select About DLP FLASH…, and then click on Restore Window Position. This will relocate the main window to the upper-left corner of the screen.

DLP-FLASH MENU OPTIONS AND BUTTONS

File|Open Hex File…
Opens a HEX file for writing to FLASH memory. A dialog window is displayed to view the data as shown below. If the selected HEX file contains configuration/fuse data, then the GUI is updated appropriately.
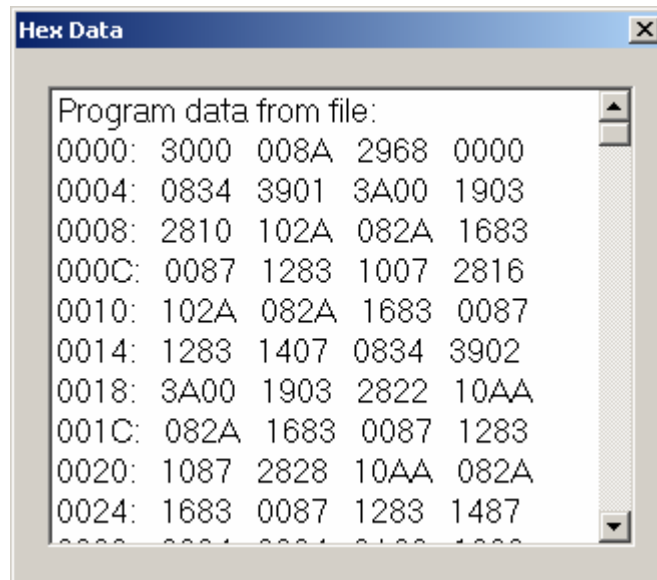
File|Exit

This selection terminates the program.

Setup|Connect To DLP FLASH Programmer

Establishes communication between the application and programmer board if the board was connected to host PC after running the application.

Setup|Setup USB Description String…

This menu item displays the description string that the application will search for at program startup.

Setup|Enable Erase Before Program

If this item is checked, the FLASH memory in the device to be programmed is erased before it is programmed. This feature is enabled by default.

Setup|Test Communication

This feature quickly tests the connection to the programmer board.

Setup | Allow Target Power From DLP Flash

If selected, this setup item will instruct the DLP Flash programmer to provide minimal 5-volt power to the device being programmed via pin 3.

Commands|Blank Check

Checks to see if the FLASH memory in the device to be programmed has been erased. If erased, every location in the FLASH memory will be set to 0xFFF or 0x3FFF (Ubicom or Microchip respectively).

Commands|Erase

This function performs a bulk erase of the FLASH memory in the device to be programmed.

Commands|Program

This function writes the selected HEX file to the target's FLASH memory. If the Enable Erase Before Program feature is selected in the Setup menu, the target's FLASH memory will be bulk erased prior to programming. The DLP-FLASH programmer sets the internal RC oscillator of the Ubicom devices to minimum speed for the programming process. The DLP-FLASH programmer does not support the setting of the oscillator trim bits.

Commands|Verify

This function verifies that the HEX program data in the target microcontroller matches the currently selected HEX file. The configuration bit settings in the target microcontroller are also verified against the selections made in the DLP-FLASH program window. The settings in the program window have priority over any configuration/fuse data that may be located in the selected Hex file for both the Program and Verify functions. The Verify function will fail if the device is code protected.

Commands|Read

This feature reads the contents of the target microcontroller and displays the program data in a pop-up dialog window. The Configuration/Fuse/FuseX bits are also read and displayed in the appropriate program window. If the device is code protected, then the data read will be all zeros.

Commands|Apply Target Power

This feature will apply minimal 5-volt power to Pin 3 of the programming header. Note: Care must be taken to ensure that the total current drawn from Pin 3 does not exceed 200mA.

Internet|Goto DLP Design

This feature will launch the default browser and connect to DLP Design's website. This feature assumes that the PC is connected to the Internet.

Internet|Goto FTDI

This feature will launch the default browser and connect to FTDI's website. This feature assumes that the PC is connected to the Internet.

Internet|Download Drivers

This feature will assist in downloading the most recent versions of both the DLP Flash Programmer's drivers and FTDI's standard USB drivers. The default browser will be launched and a dialog window will appear asking which version of the drivers to download.

DISCLAIMER

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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.

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