DLP-FLASH2
LEAD-FREE

USB-BASED FLASH PROGRAMMER/DEBUGGER

1.0 INTRODUCTION

The DLP-FLASH2 is a complete in-circuit debugging and programming solution for Microchip's PIC16Fxx and PIC18Fxx PIC® MCUs. The DLP-FLASH2 can debug all PIC16 and PIC18 targets that support debug mode. It also provides in-circuit serial programming (ICSP) support for FLASH-based PIC microcontrollers. The DLP-FLASH2 unit is compatible with the CCS PCW debugger or the standalone ICD control software. The PCW debugger is integrated into the IDE of the PCW and PCWH compilers and provides very detailed debugging information at the C level. The standalone ICD control software ships with CCS compilers and allows you to quickly program target chips using ICSP. The ICD control software also facilitates updating the DLP-FLASH2's firmware without having to connect to a device programmer.

The DLP-FLASH2 allows in-circuit programming of target microcontrollers. All that is needed for device programming on user target designs is a 6-pin header plus a few support components and power isolation if the target electronics draw in excess of 300mA at 5 volts or operate at a voltage other than 5 volts. The microcontroller can be soldered in place during the manufacturing process and programmed at a later date to ensure that the final product is shipped with the most recent firmware version.

NOTE: The DLP-FLASH2 only works with CCS Software. The MPLAB® IDE is not supported.

2.0 DLP-FLASH2 FEATURES

The DLP-FLASH2 is compatible with over 200 PIC microcontrollers. For a complete list of supported devices, visit the CCS website:

http://www.ccsinfo.com/devices.php?page=icddevices

- No additional cables or external power source are required – all power is taken from the host USB port.

- USB based for compatibility with most PCs.

- In-circuit programming; no more loading the target microcontroller into a device programmer.

The DLP-FLASH2 programmer is compatible with the family of CCS C compilers. The DLP-FLASH2 is directly supported by the IDE programming environment as well as by the ICD programming software available from CCS.

3.0 POWER CONSIDERATIONS

The DLP-FLASH2 programmer board has the ability to supply 5-volt power—via the programming header—to the target microcontroller for programming and debug. The circuitry that is connected to Pin 5 of the DLP-FLASH2 programmer must not draw more than 300mA. If the target electronics draw more than 300mA on the 5-volt line or the target operates at a voltage other than 5 volts, then they must be externally powered and electrically isolated from the DLP-FLASH2 by removing the TPWR jumper.

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-FLASH2 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 and remove the TPWR jumper before connecting to the DLP-FLASH2.

4.0 QUICK-START GUIDE

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

1. Download the CDM drivers from this page: www.dlpdesign.com/flash2/. Unzip the drivers into a folder on the hard drive. (Be sure to "Extract" the files from the archive so as to maintain the folder structure.)

2. Connect the DLP-FLASH programmer board to the PC. A USB extension cable of 10 feet or less in length can be used to allow more freedom of movement with the DLP-FLASH2.

3. This action initiates the loading of the USB drivers. When prompted, select the folder where the device drivers were stored in Step 1. Windows will then complete the installation of the device drivers for the DLP-FLASH2 board. The next time the DLP-FLASH2 module is attached, the host PC will immediately load the correct drivers without any prompting. Reboot the PC if prompted to do so.

4. At this point, the DLP-FLASH2 is ready for use. Run the CCS IDE software or the ICD control software.

For additional information on how to use the CCS debugger, visit the CCS website:
http://www.ccsinfo.com/content.php?page=debugger

5.0 PROGRAMMER/DEBUGGER INTERFACE

The DLP-FLASH2 programmer/debugger utilizes a 6-pin, 2mm female header for connection to the target device. The following shows the pinout for the programming interface connectors:

Pin 1

Pin 2

DLP-FLASH2   Target Header
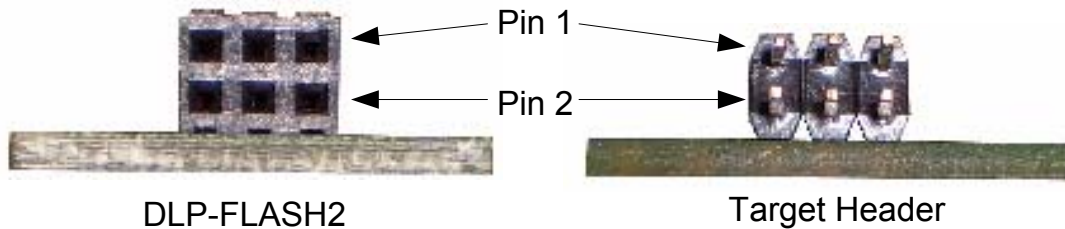
Pin #	Description	Alternate Name
1	PGM	B3
2	PGC	B6
3	PGD	B7
4	Ground	
5	Target Power	TVDD
6	MCLR	Vpp

The DLP-FLASH2 is powered by the host's USB port and requires approximately 50 mA of current for normal operation. If the target provides its own power or operates at a power supply voltage other than 5 volts, then the TPWR jumper must be removed and the target must be self-powered.

The DLP-FLASH2 does not use the Low Voltage Programming Mode. The source code for all C programs should set the NOLVP Fuse. The target chip oscillator must be running for the debugger to operate. Programming a *.hex file to a microcontroller's program memory can be performed without the oscillator running.

The B3 Pin is optional and is not used for programming. However, the Monitor feature of the debugger does use B3. It is possible to program and debug (without the Monitor) and allocate B3 to the target hardware. In this case, do not connect B3 to the target's 6-pin connector. If the Monitor feature is not used; userstream can be disabled in the Configure tab, and the B3 Pin made available for connection to user electronics.

To program and/or debug in circuit, two I/O pins (B6, B7) are reserved. If debugging is not required, then these pins may also be used in the target circuit. However, care must be taken to ensure that B6 and B7 are at high impedance during programming.

6.0 DISCLAIMER

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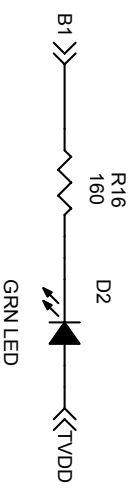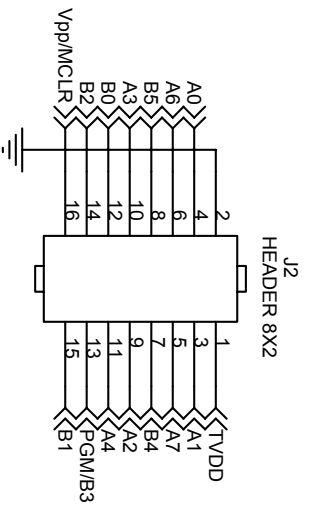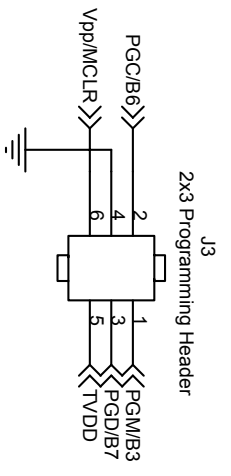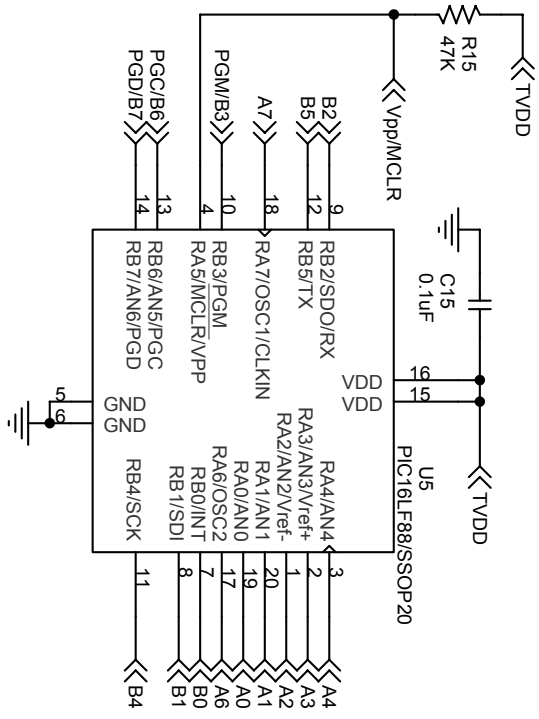

7.0   CONTACT INFORMATION

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DLP-uCF88
TARGET BOARD - 16F88

DLP Design

U5
PIC16LF88/SSOP20

- PGD/B7 — 14 — RB7/AN6/PGD
- PGC/B6 — 13 — RB6/AN5/PGC
- PGM/B3 — 4 — RB3/PGM
- A7 — 10 — RA5/MCLR/VPP
- B5 — 18 — RA7/OSC1/CLKIN
- B2 — 12 — RB5/TX
- 9 — RB2/SDO/RX
- Vpp/MCLR
- GND — 5
- GND — 6
- VDD — 16
- VDD — 15
- RA4/AN4 — 3 — A4
- RA3/AN3/Vref+ — 2 — A3
- RA2/AN2/Vref- — 1 — A2
- RA1/AN1 — 20 — A1
- RA0/AN0 — 19 — A0
- RA6/OSC2 — 17 — A6
- RB0/INT — 7 — B0
- RB1/SDI — 8 — B1
- RB4/SCK — 11 — B4

R15
47K

TVDD

C15
0.1uF

TVDD

J2
HEADER 8X2

Vpp/MCLR — 16
B2 — 14
B0 — 12
A3 — 10
B5 — 8
A6 — 6
A0 — 4
— 2 — TVDD
— 1
— 3 — A1
— 5 — A7
— 7 — B4
— 9 — A2
— 11 — A4
— 13 — PGM/B3
— 15 — B1

J3
2x3 Programming Header

PGC/B6 — 2 — 1 — PGM/B3
Vpp/MCLR — 4 — 3 — PGD/B7
— 6 — 5 — TVDD

B1
R16
160
D2
GRN LED
TVDD