Digilent Reference Design
High-Current Output using the X-Board and PModOC1

Revision: April 2, 2007

Overview

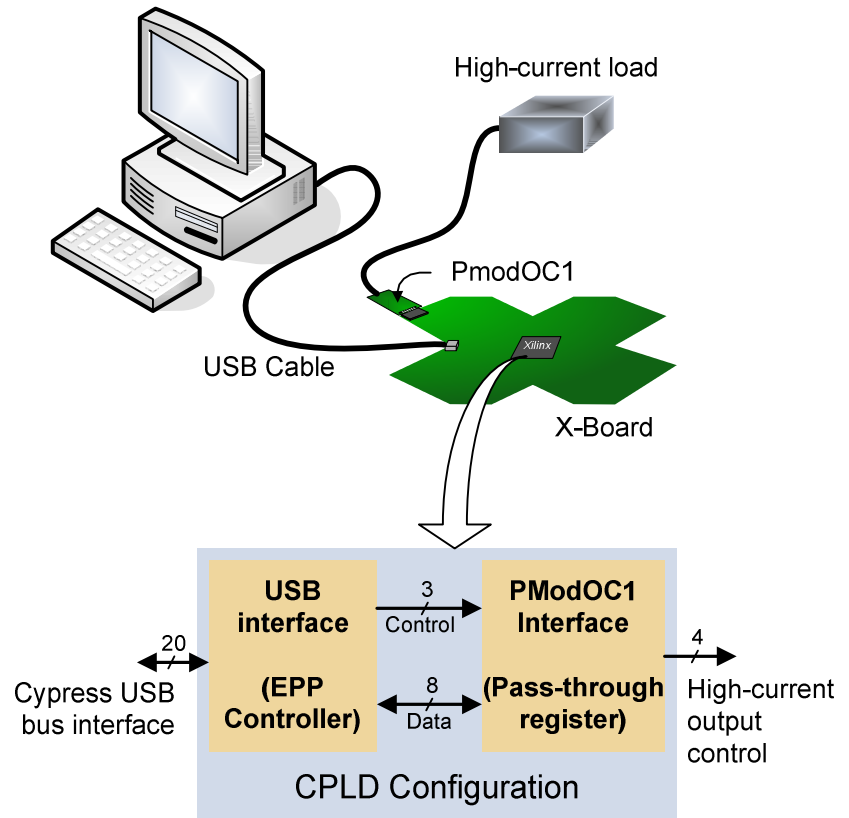The Digilent X-board / PModOC1 reference design demonstrates using the PModOC1 with the X-board to drive high current loads of up to 200mA per output signal. This reference design defines a writeable register in the CPLD, and the register output signals directly drive transistors on the OC1 board.

The X-board is a CPLD demonstration board based on a Xilinx CoolRunner-2 CPLD. The PModOC1 is a Digilent Peripheral Module board that contains four 3904 NPN transistors. The transistor collectors are available at a 100-mil spaced connector for connection to the load device, the bases are driven directly from the X-board, and the emitters are connected to ground.

Digilent's Adept software is used to program the reference design into the CPLD, and to transfer data to the CPLD turn on and off the OC1's transistors. Please refer to the Reference Manuals listed below for more detailed information.

References

Digilent X-board Reference Manual Schematic
Digilent PModOC1 Reference Manual and Schematic
Digilent Adept Reference Manual
Xilinx CoolRunner-2 Data Sheet

Set-up

This reference design requires a PC running the Xilinx ISE or WebPack tools, Digilent's Adept software, an X-board, a Digilent PModOC1, and a load device.
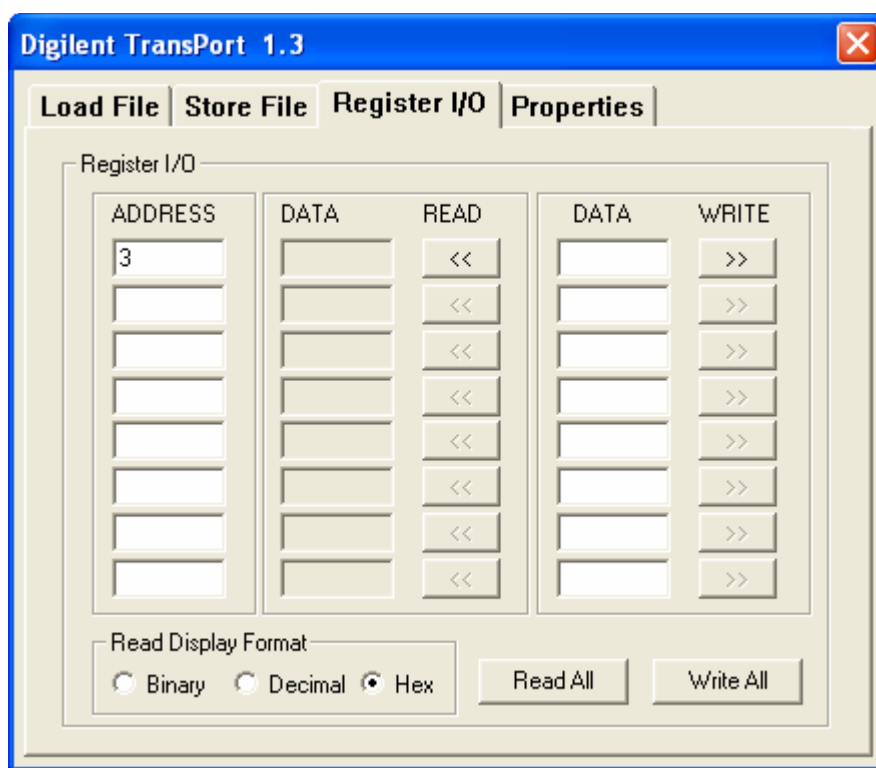
Set the clock frequency select jumper (J11) on the X-board to select 100KHz.

Description

This reference design is composed of a single block – a USB interface that implements a register in the CPLD that Adept can read and write. The register outputs directly drive the transistors on the PModOC1. The USB interface block works with firmware in the USB controller to implement a register in the CPLD that can be accessed from an attached PC. The CPLD register can be read and written from the Transport application that is available as a part of Digilent's freely available Adept software (alternatively, the API's available through Adept can be used to create custom applications to access the CPLD register).

In this reference design, the lower four bits of a single address register can be written to a '1' or '0' turn on and off the four transistors on the OC1. An address register was used so that a single data byte can be written from the PC (via Transport) to control the OC1. To use the reference design "as is", build a project in the Xilinx tools using the VHDL and UCF files that are downloaded from the Digilent website as a part of this reference design. Attach the PModOC1 to the J1 port on the X-board, and attach a load device to the OC1. Program the CPLD on the X-board with the JED file created from the downloaded source files, and then run Digilent's Transport application (available as a part of the Adept software freely available at the Digilent website). Select the Register I/O tab, and type a number containing a '1' for each transistor you wish to turn on in any address box. Click on the write button on the same row, and the corresponding transistors will be turned on. For example, typing 3 in an address box and clicking the write button on the same row will turn on two of the OC1's transistors.

Note that user-written, custom applications can access the X-Board / PModAMP1 hardware using the API's available as a part of Adept.