PLD Programming Board

Contents

REV 0; December 23, 2016.

0.1 Programming a PLD

Our PLD is a surface-mount part. We have Proto Advantage mount in on a carrier. Xilinx makes a programming pod that (strangely) calls itself "Platform Cable USB." We use Model DLC9G, but the model is not critical. It puts out JTAG signals that talk to the dedicated JTAG pins on the PLD. A very inexpensive DLC9G ($25) is available in quantity on Ebay (http://www.ebay.com/itm/Xilinx-Platform-USB-Download-Cable-Jtag-Programmer-FPGA-CPLD-C-Mod-XC2C64A-M102-/201540354531).

We made up a hand-soldered board that holds a socket (so-called "Zero insertion force"—ZIF—to be kind to both socket and PLD's, on multiple insertions). This socket takes 3.3V power and links the JTAG signals to the appropriate pins. This socket will accept the wide carrier that Proto Advantage provides for the CPLD.

Our arrangement looks like fig1. Pod and 5V supply come in on left.

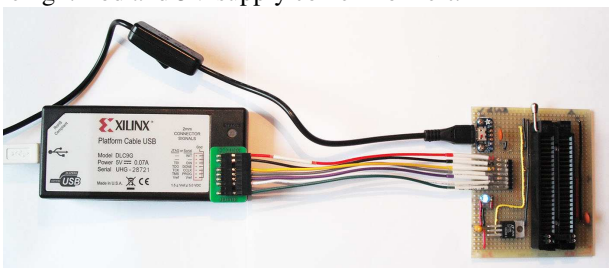

Figure 1: Programmer pod and programming board

0.1.1 Our particular parts

If you want to put together a programming board, knowing the particular parts that we used will be helpful. We use an Ares 48-pin "zero insertion force" socket (ZIF) : (Digikey A308-ND). We power the board from a switching regulator that plugs into the wall and puts out 5.25V at 1 Amp (Adafruit ID:501). That 5.25V reaches the board through a USB-to-microUSB cable (with a handy inline switch (Adafruit ID:2379) that plugs into a micro-USB "breakout board" (Adafruit ID:1833). A regulator IC converts this 5.25V to the 3.3V

needed by the PLD (Digikey 497-15590-5-ND). And a pretty blue LED reassures us by glowing when the board is powered.

Because 44-pin ZIF sockets are hard to find, but 48-pin are common, we used a 48-pin and stuffed a four-pin piece of IC socket (cut from a wire-wrap socket) into the bottom end of the too-long socket. This obstacle lets us avoid worry about placing the 44-pin part wrong in the oversize socket. (The socket is Aries 48-6554-11, Digikay A309-ND.)

The programmer pod ("cable," in Xilinx's terms) connects to the programming board through seven "flying leads." A set of these come with the pod, but if you want to dedicate yours to the programming board, as we did, you may want to get another set. We fed the 7 female connectors onto a right-angle header soldered onto the board. Xilinx should be able to provide these flying leads, but we found a set on Ebay that may be a better deal (http://toolbox.xilinx.com/docsan/xilinx4/data/docs/pac/cables.html).

Fig.2 is a top view, showing some detail:

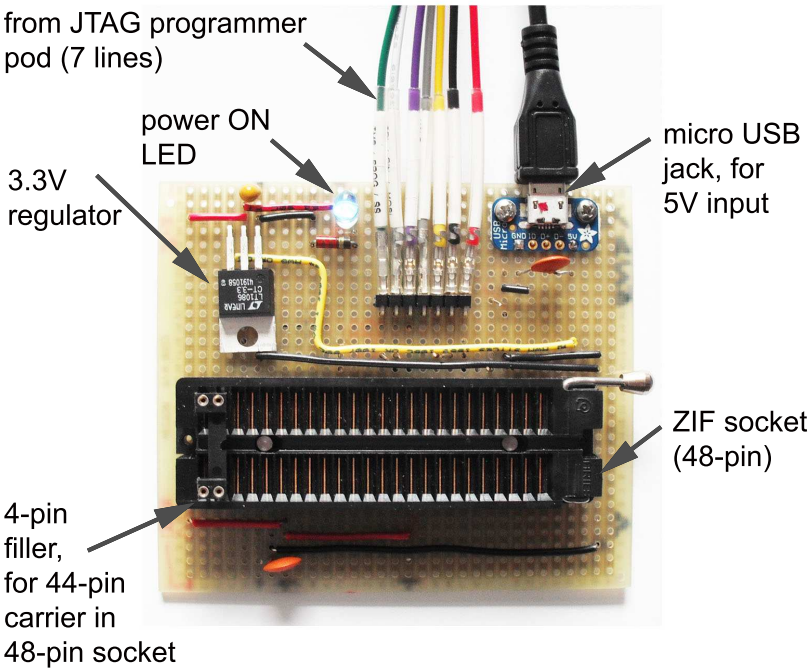

Figure 2: Programmer board, top view

And here, in fig.3, is what it looks like with a carrier plugged in. We show also the underside, in case you're curious to see how we made this rather crude prototype, using perfboard with solder pads on one side. Probably it would have been neater if done with perfboard that had isolated solder pads rather than the lines shown here. We used what we had at hand.

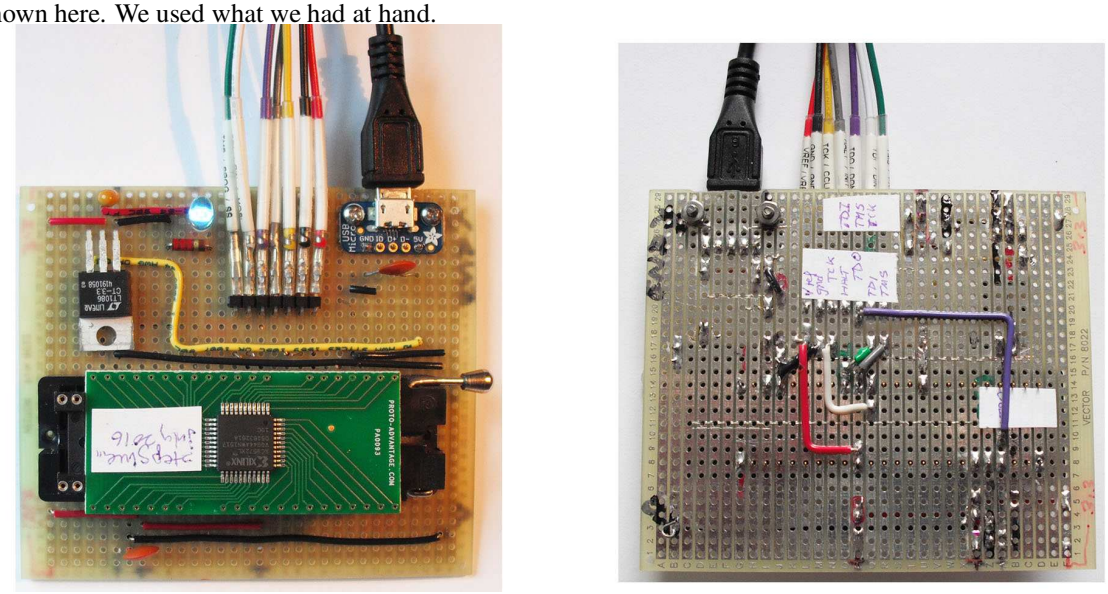

Figure 3: Programmer board with carrier shown—and the raggedy underside, showing connections

0.2 But You're not Obliged to Program Your Own Parts

If all this seems like too much trouble, you can order programmed parts (for the Big Board computer) from Proto Advantage: a 16-bit counter, and the "Glue" PAL that links processor to the computer's other components.

PAL pgmr hardware