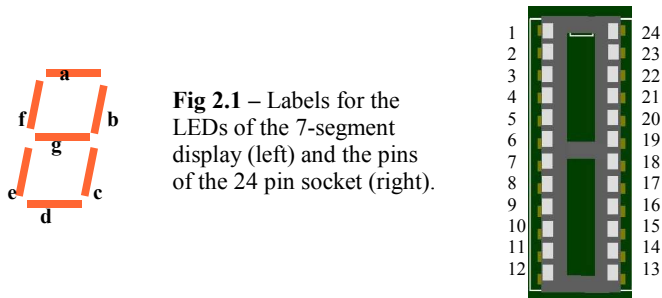


Checking the Completed Board: *Though a complete test would include a multitude of correctly programmed PLDs, there are some preliminary tests that can be done to check the accuracy of the electrical connections.*

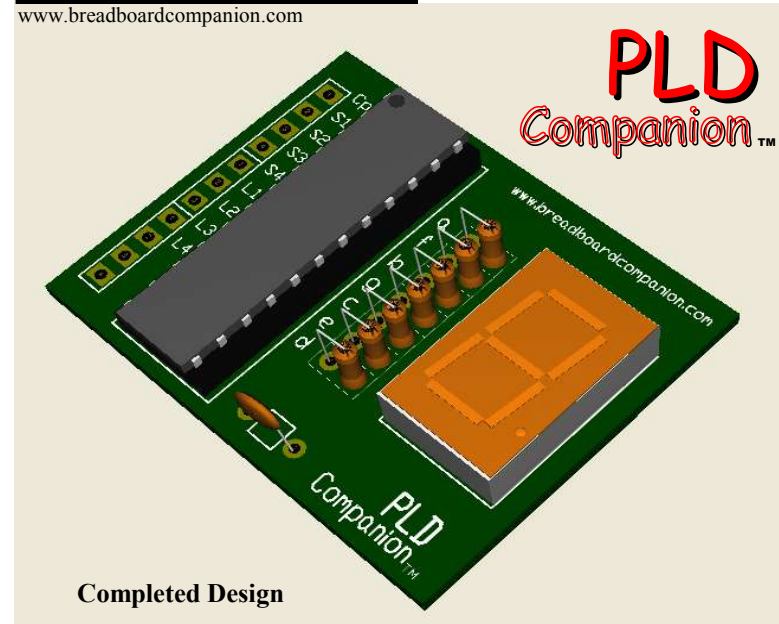
1. Plug a DC transformer or 9V battery into your BBCII or BBCJr power supply kit.
2. Using a voltmeter, put the ground probe on the Gnd loop. Using the other probe of the voltmeter, check pins 12 and 24 (Fig 2.1) of the 24 pin socket. They should read “0V” and “5V” respectively.
3. Using a voltmeter, check the voltage on pins 2-5 of the socket. They should correspond with S1-S4 of the dip switch. Try flipping the switches and see if the voltage reading changes accordingly.
4. Run wires so that pin 2 connects to pin 6 of the socket, pin 3 to pin 7, pin 4 to pin 8, and pin 5 to pin 9. Pins 6-9 are connected to the 4 LEDs on the power supply kit. Notice that the LEDs will default to “on” when no switches are connected to them. Turn on and off S1 through S4 and see if the LEDs light up accordingly. Remove the wires.
5. Run a wire from pin 2 to pin 22 of the socket. Pins 16-22 are connected to the Common Anode, 7 segment Display. “Common Anode” implies that the LEDs in the display are active “low” and turn on when 0V are applied and turn off when 5V are applied. Notice segments *g,c,d,e* will default to “on” when no switches are connected. Try flipping S1 and see if LED segment *a* (Fig 2.1) turns on accordingly.
6. Repeat this process for pins 16-21, using the legend on the board and Figure 2.1 to associate the LED segments with the pins of the socket.
7. Refer to the hand-out “Project Ideas” for help with designing and programming a PLD for use in the PLD Companion.



Troubleshooting: *Upon completion of the soldering, if any part of the board is not working, use an Ohmmeter to check for cold solder joints and bridges.*



Assembly Instructions



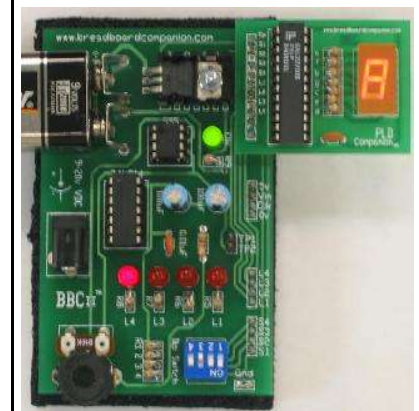
PLD Companion™ -Prototyping Board-

Using a Programmable Logic Device (PLD)[†], this simple little board allows the Breadboard Companion™ power supply kit to prototype digital circuits without the need for a breadboard. Great for final projects!

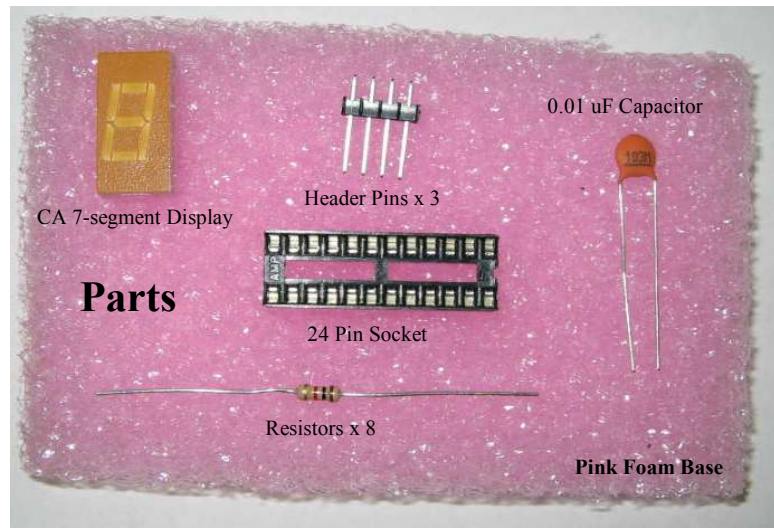
Projects can include:

- **Sequential Logic Circuits** (BBCII)
- **Combinational Logic Circuits** (BBCII or BBCJr)
- Regulated, adjustable clock pulse (BBCII only)
- Four digital inputs
- Four digital outputs *or*
- Output to a 7-segment display

Includes Anti-Static Foam Base



[†] PLD not included



Tools Needed:

Necessary Equipment:

Useful Equipment:

- | | |
|-------------------|---------------------|
| 1. Soldering Iron | 1. Needle Nose |
| 2. Solder | 2. Diagonal Cutters |
| 3. Multimeter | 3. Soldering Flux |
| 4. Wire Cutters | 4. Solder Braid or |
| 5. Pliers | Desoldering Tool |

Before Soldering: *If you are inexperienced at soldering, refer to the hand-out "Tips on Soldering."*

Note: With the exception of the header pins, all components go through the top of the board (side with print) and are soldered on the bottom.
ALWAYS USE SAFETY GOGGLES WHEN CLIPPING THE SOLDERED PINS.

Assembling the Board: *Listed below is a suggested order in which to assemble the kit. There are several details to watch out for.*

1. Seven Segment Display: Be careful not to apply too much heat to the pins of the display.
2. Resistors and the 0.01uF capacitor : These are not polarized and it does not matter which way you put them in. All the resistors are the same (but may have different colors than the one in the photo) and they go in the spots labeled a,f,b,g,c,e,d. All of the resistors stand up and you are given one more than you need. Refer to the Completed Design on front cover for placement of the 0.01 uF capacitor.

3. 24 Pin Socket: This is what the PLD plugs into. The orientation of the socket itself does not matter. Make sure not to "plug" in any PLD until you are done soldering. The orientation of the PLD chip is such that the notch/dot is closest to the top of the board as viewed from the Completed Design.
4. Header Pins: These pins can be broken into groups of any desired amount. All the header pins will be placed in the section of 11 holes adjacent to the 24 pin socket. To ensure that the pins remain straight and aligned, plug the long end into a breadboard and place the board over the shorter end of the pins while soldering. **SOLDER THE PINS TO THE TOP OF THE BOARD.** This will leave the long pins straight and protruding from the bottom (Fig 1.1). You are given one extra header pin.

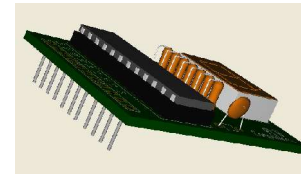


Fig 1.1 – Header Pin Arrangement

5. Soldering the PLD Companion to the Breadboard Companion™ power supply kit (BBCII or BBCJr): Find the 11 open holes on your Breadboard Companion power supply kit. They will be aligned with the other header pins. Place the PLD Companion through those holes so that the header pins on the PLD companion goes through the top of the power supply kit (Fig 1.2). Solder the header pins to the bottom of the power supply kit.

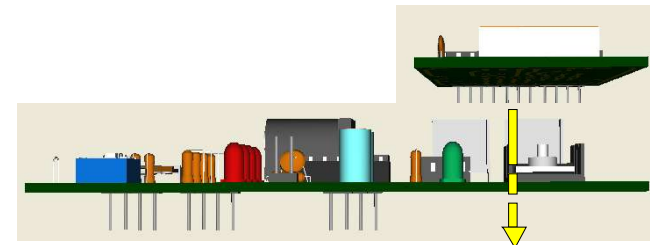


Fig 1.2 – Attaching to BBCII

6. Clipping the Header Pins: Once the header pins have been soldered to the power supply kit, they are no longer needed for any electrical connections. However, you may choose to leave them for added mechanical stability when plugged into a breadboard or inserted into the included foam base.

See reverse for testing the attached kit.