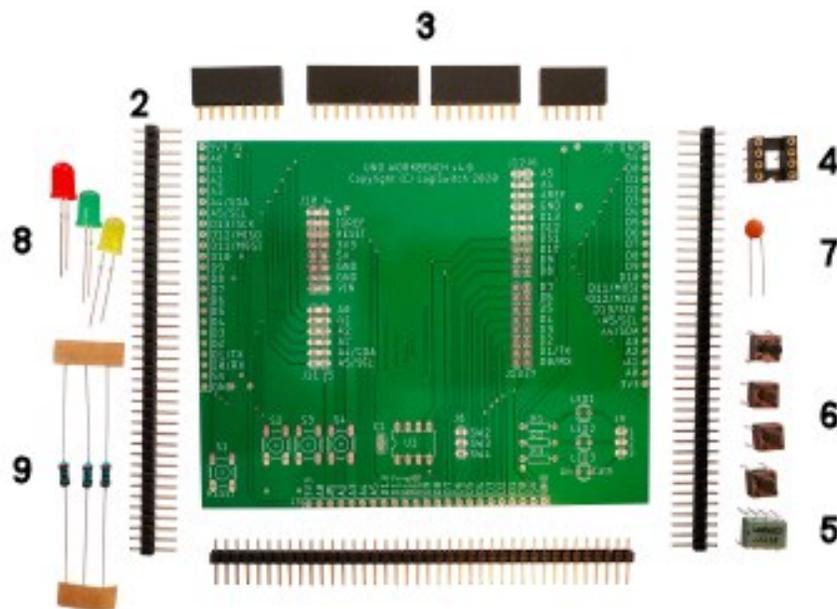


WorkBench User Assembly Guide

By Michael H. Pelkey, Founder & CEO, LogiSwitch LLC

Overview

The WorkBench™ Protoextender board is supplied in kit form. The purpose of this guide is to provide suggestions on the most efficient way to build the board.



Bill of Materials:

1. WorkBench 4.0 PCB
2. (3) 40-pin Male Headers
3. Female Headers (1) 10-pin, (1) 6-pin, (2) 8-pins
4. IC Socket, 8-pin DIP

5. LogiSwitch Switch Debouncer IC, LS18 or LS118
6. (4) Tactile Switches
7. Capacitor 0.1uF
8. LEDs (1) Red, (1) Green, (1) Yellow
9. (3) Resistors, 680 Ohm, 1/4W

Assembly

Start with preparation of the Male Header strips, Item 2.

1. Cut (1) 23-pin, (1) 10-pin and (1) 6-pin from the 1st strip.
2. Cut (1) 23-pin and (2) 8-pin strips from the 2nd strip.
3. Cut (1) 23-pin and (2) 3-pin strips from the 3rd strip.

Soldering:

NOTE: Throughout this guide all references will be referred to with respect to the side of the board onto which the component(s) will be inserted. It will be assumed that the soldering will take place on the other side, i.e., a resistor inserted to the TOP of the board will be turned over and soldered to the bottom; or a connector installed to the BOTTOM of the board will be soldered to the top.

4. Insert the long ends of the cut 6, 8 and 10-pin male header strips into the connectors at the TOP of the Arduino Uno. Do not solder.
5. Place the WorkBench pads J4 – J7 onto the short ends of the cut male header strips protruding from the Uno into the BOTTOM of the WorkBench. Do not solder yet.
6. It is advised to insert the Female Headers (3) into the J10 – J17 pads at the TOP of the WorkBench to act as barriers to help prevent inadvertent solder flow over to the open J10 - J13 pins as the J4 – J7 connections are being soldered. Do not solder yet.
7. Now solder the J4 – J7 connections. Be sure that the PCB is seated square with the connectors below as the solder is applied.
8. Solder the female headers J10 – J13 inserted at the TOP of the WorkBench PCB. With these connectors it is suggested practice to press the connector to the PCB with one hand and apply solder with the other. This will allow you to feel the connection to hold it square with the board. Solder a pin at each end of the board while held this way to tack

it squarely in place. Repeat this step with each item 3 component. Once they are tacked squarely in place, solder all the other connections.

9. Now we assemble the J1 – J3 23-pin connectors. Note that they are assembled with the short ends inserted through the BOTTOM of the PCB, the same orientation as the cut strips at J4 – J7 from step 5 above. It is recommended to first tack each end while holding them with one hand as in step 8 above in order to feel when they are flat to the board.

NOTE 2: If you are assembling an LS400-BB Barebones WorkBench, insert the tact switch to the TOP of the board at location S1 and solder in place. Your installation is complete. Enjoy prototyping with the LogiSwitch WorkBench.

NOTE 3: All subsequent component placement will be to the TOP of the board.

10. The four tact switches (6) are inserted to the TOP of the board at locations S1 – S4 and soldered in place. Note that these switches are polarized. Their footprint is nearly square but they only fit properly and work one way. They should easily snap in place when they are correctly oriented. Note that Switch S1 is routed to the Reset pin of the Arduino.
11. Insert the .01uF capacitor (7) at C1 and solder. Trim the leads after soldering.
12. Place the IC socket (7) at U1 and solder.
13. Install the cut 3-pin male header strips at J8 and J9 and solder.
14. Bend the leads of Resistors R1 – R3 (9). Install and solder. Trim the leads after soldering.
15. Now the LEDs will be inserted. Note that the slightly longer lead of each LED is the anode. Insert the anode lead in the mounting hole to the left as shown on the board legend. Normally the preferred order is that of a traffic light – Red on top, Yellow in the middle and Green on the bottom. Solder each LED and trim the leads after soldering.
16. Place the LogiSwitch IC (5) in the socket (4). Do not solder. The three debounced outputs are routed to J8, pins SW2, SW3 and SW4. The normally high outputs of the LS18 go low when the switch is pressed. If the LS118 is used, the normally low output goes high when the switch is pressed.

17. The three LEDs (8) are routed to J9, pins 1 – 3. A low level on J9-1 illuminates the Red LED1. A low level on J9-2 illuminates the Yellow LED2, and a low level on J9-3 illuminates the Green LED3.

Switch S1 is routed to the Reset pin of the Arduino.

About the Author

Michael H. Pelkey, Founder and CEO, LogiSwitch LLC

Mike is a serial inventor and serial entrepreneur who has a broad background in designing, using, and manufacturing electronic systems and equipment. In his younger years, Mike pioneered the sport of [BASE Jumping](#).

Prior to founding LogiSwitch, Mike was an Automation Engineer at Jaxx Manufacturing where he designed and built assembly and metalworking machines to increase production rates, such as automatic screwdrivers, optical cut to length machines, and a variety of machines, jigs and fixtures to automate printed circuit assembly operations.

Mike's 40+ year career goes back to the early days of the microprocessor where he was the lead engineer for the first microprocessor-based product in the numerical control industry a Z-axis controller called the Micro-Z. Mike also developed the world's first networked cash register in the mid-1970s, and he founded Macrotech International Corporation, which was a major manufacturer of board-level computer products in the late-1970s and early-1980s.