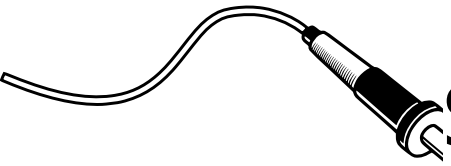


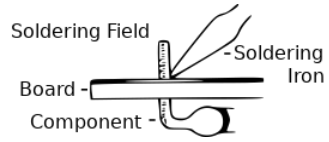
Soldering Instructions for

i4 SPiCboard v3

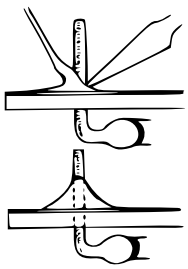
General information

- It may sound trivial, but the soldering iron gets quite hot at the front (approx. 300°C).
  Do not touch the wrong side (tip), do not burn your clothes or other students and return the soldering iron to its stand immediately after use.
- Try not to inhale the fumes directly, they are not beneficial to health.
- Work exactly step by step as specified in this instructions.
  Only ever pick up the components required for the current step - this significantly improves clarity and prevents many errors right from the start. The predefined sequence also supports easy handling, as the component size/height is taken into account.
- Read the instructions carefully first and consult a supervisor if in doubt
  Correcting incorrectly soldered components usually not only costs a lot of time and nerves (both yours and the supervisor's), but may also affects the appearance of your board.
  It is best to start by looking at the samples and the photo on the last page.
- Templates are available for the simple attachment of pin and socket connectors. Please return these quickly and reassembled after use.

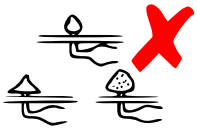
Quick course in correct soldering:



Before adding solder, the soldering point must first be heated with the tip of the soldering iron. The tip is held against the soldering point with light pressure so that the soldering eye on the circuit board and the connecting wire of the component are heated simultaneously. After approx. 1-2 seconds, the solder can be added without removing the soldering iron from the soldering point in the meantime.



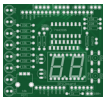
The solder must flow around the wire of the component and enclose the wire cleanly without cratering. Only then can the soldering iron be removed.
A good solder joint can be recognized by the silvery shiny surface and a flat angle of the solder of about 30 degrees (a "volcano"), while the outline of the conductor is still visible.



"Cold" or bad solder joints usually have a matt surface and a lumpy tin distribution - in this case, re-soldering is recommended.
The total time for soldering a single joint should not exceed 5 seconds, otherwise the components may be destroyed. The most common error when soldering, apart from a cold solder joint, is a short circuit caused by a tin bridge or an uncut wire end touching neighboring copper tracks or solder joints.

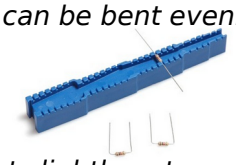
Tip: An unclean soldering tip can be cleaned of impurities by wiping it on the sponge (on the soldering station) so that these do not get into the soldering joint.

Step 1: Resistor

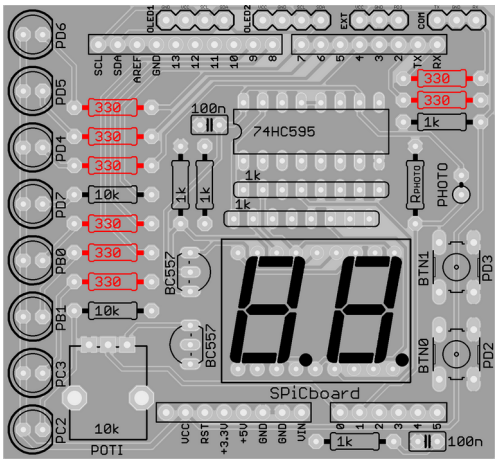
1 × SPiCboard v3 Circuit board 

8 × Resistor 330 Ω 

Tip: The resistors can be bent evenly using a bending gauge!



If the legs are bent slightly outwards after being plugged onto the circuit board, they will have a tight fit and will not fall out when turned over and soldered.

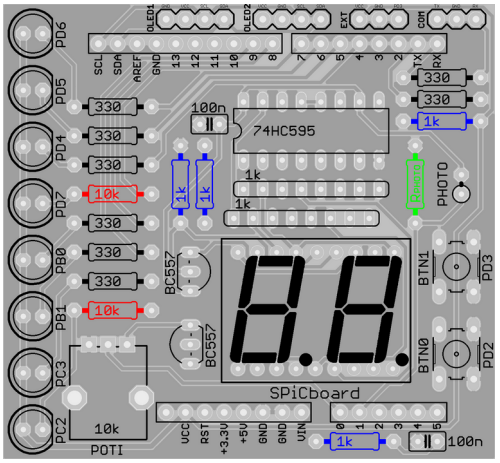


Step 2: more Resistor

1 × Resistor 51 kΩ (R_{PHOTO}) 

2 × Resistor 10 kΩ 

4 × Resistor 1 kΩ 

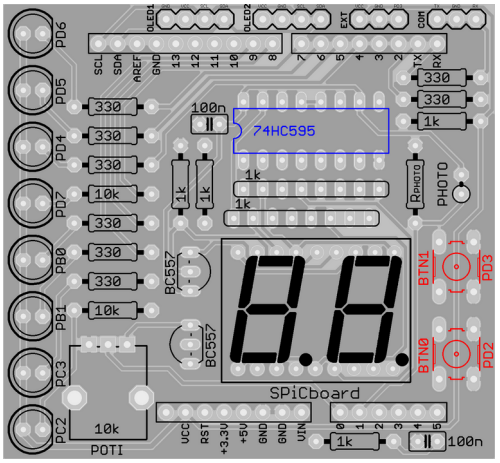


Step 3: Shift register & Button

2 × Button (BTN0 & 1) 

1 × Shift register (74HC595) 

Note the orientation of the shift register (notch)! Therefore, solder two pins first and then show them to a supervisor for checking.

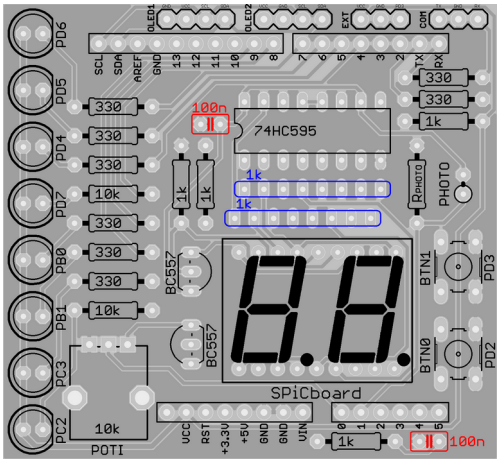


Step 4: Resistor network & Capacitor

2 × Capacitor (100 nF) 

2 × Resistor network (8 Pin, 1 kΩ) 

Tip: If only one pin is initially soldered to the resistor network, the angle of inclination can be easily influenced by briefly heating the pin.



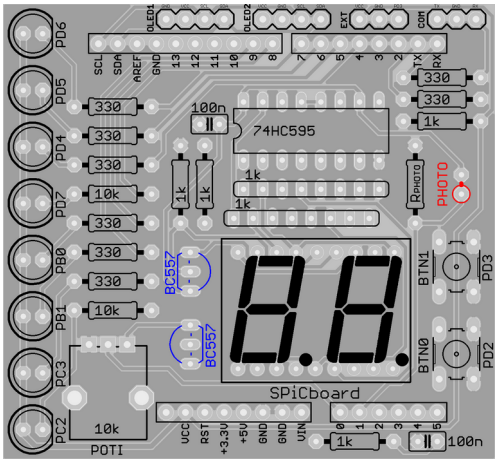
Step 5: Transistors

1 × Phototransistor (PHOTO)

2 × Transistor PNP (BC557)

Mind the orientation!
Insert the long leg (anode) of the phototransistor through the soldering eye marked with a circle.

Align the convex side of the transistor analogous to the marking on the circuit board.



Step 6: LEDs

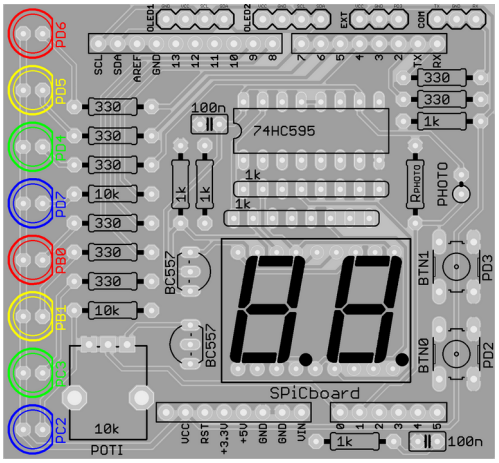
2 × LED red (an PD6 & PB0)

2 × LED yellow (an PD5 & PB1)

2 × LED green (an PD4 & PC3)

2 × LED blue (an PD7 & PC2)

Ensure correct sequence and orientation!
Align the flattened side (shorter leg) of the LEDs in accordance with the marking.



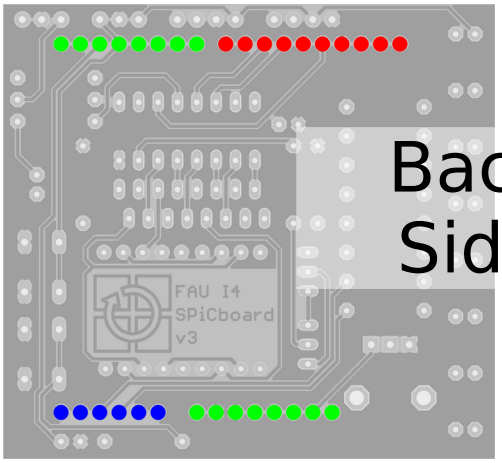
Step 7: Pin headers at the back

1 × Pin headers 1×10 Pin

2 × Pin headers 1×8 Pin

1 × Pin headers 1×6 Pin

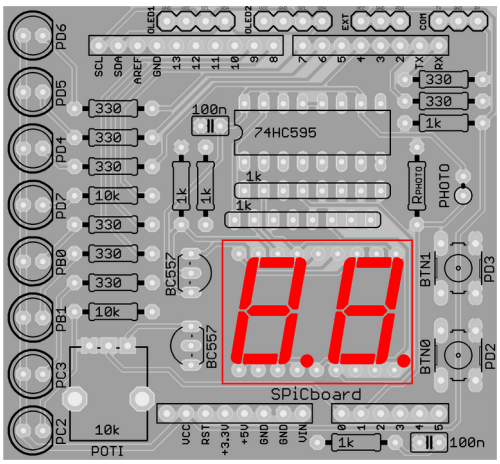
The pin headers must be attached to the **back** (the short side is soldered on) - they will connect the SPiCboard to the Xplained mini.
Tip: You can easily solder the pin headers evenly using the templates provided.



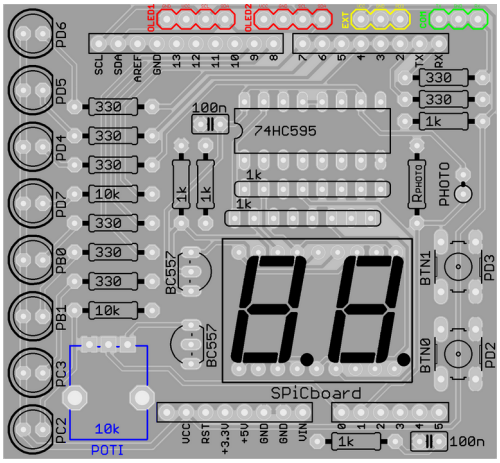
Step 8: Display

1 × 7-segment display (double-digit)

Mind the orientation (decimal points)!
Therefore, solder two pins first and then show them to a supervisor for checking.



Step 9: Socket connector and potentiometers



2 × Socket connector 1x4 Pin (OLED1 & 2)

1 × Socket connector 1x3 Pin (EXT)

1 × Socket connector 1×3 Pin (COM)

1 × Potentiometers (POTI)

Congratulations, your SPiCboard is now theoretically fully equipped.
Have it tested by the supervisors.
If it is found to be functional, you will then receive the **ATmega328PB Xplained mini**.

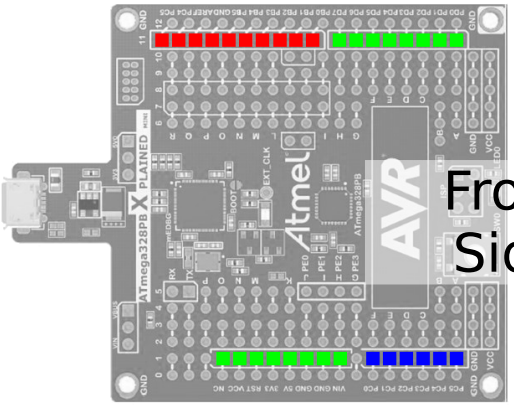
ATmega328PB Xplained mini assemble

1 × Socket connector 1x10 Pin

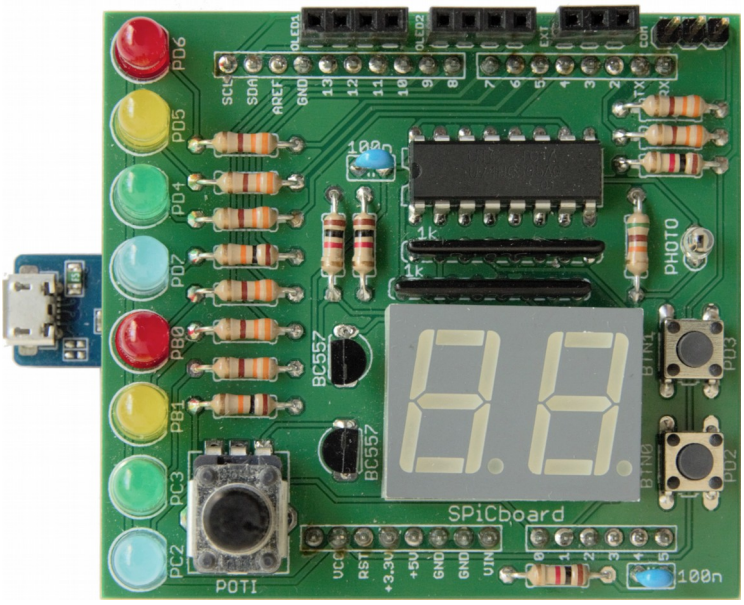
2 × Socket connector 1×8 Pin

1 × Socket connector 1×6 Pin

Tip: The relevant pins for the socket strips are framed in white. Using the templates provided, you can simply solder the socket strips evenly in parallel.



You can now (carefully) place the SPiCboard circuit board you have soldered onto the Xplained mini and then connect it to the test computer using the micro USB cable in order to install the latest firmware and a test application.



Have fun with your new SPiCboard and good luck in SLP!