

SO2R Mini Construction Steps

Dennis, W1UE and Marty, NN1C

SO2R.ORG

Parts Inventory

There are 33 soldered on components in the SO2R. Before you begin construction, inventory all of the parts in your kit. In the package there should be the following inventory. If you believe you are missing something, please contact the SO2R Mini team.

- (4) 1000 ohm, ¼ watt resistors (brown-black-red)
- (7) 1nF 50v capacitors
- (4) 2N2222A or similar transistors
- (5) ST-4235 Double 3.5mm jacks.
- (4) SM-LP-5001 Audio transformers
- (3) G6K-2P-Y-DC5 Relays
- (1) Arduino Nano V3 /w (2) solder headers
- (2) 15pin female sockets
- (3) 1N400x diodes

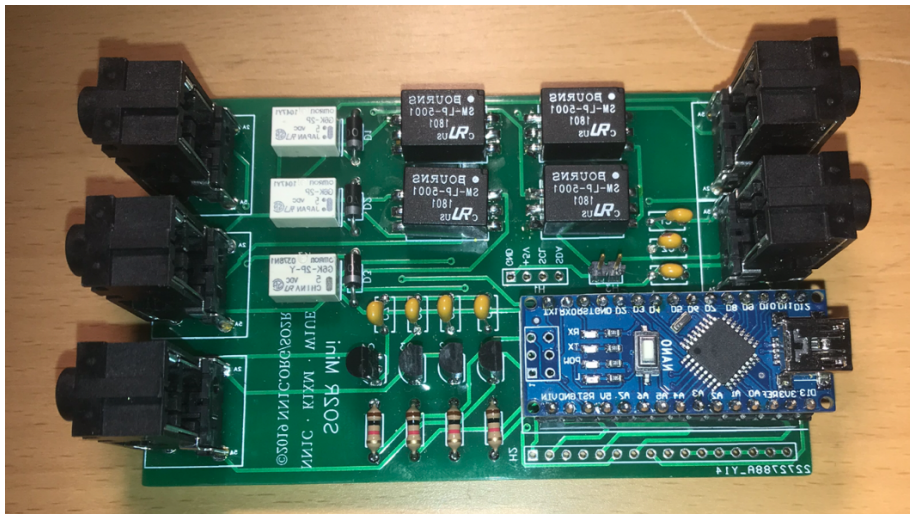
A Few Precautionary Notes

If you should install something incorrectly, it may be impossible to remove the part from PCB without ruining either the part or the pc board, or both. When installing each component, place the part on the board, check alignment, then solder one pin. Then, check alignment again, make sure you can see the leads of the part coming through the PCB, and then, solder the rest of the pins.

Component Installation

1. Solder the four audio transformers on the board (T1, T2, T3, and T4) Install all four in the same orientation. We find it is easiest to solder one pad on these pseudo-SMT parts, check alignment, and/or correct alignment, and finish soldering the remaining pads. The middle pads are not used, and if needed, can be cut for more working room.
2. Install the four resistors (R1, R2, R3, and R4). Bend the leads to a right angle, flush with the resistor body. All four are 1k Ohms. R5-R8 are extra for adding LED indicators, and are not needed for a basic SO2R Mini, nor are they included.
3. Install the three diodes (D1, D2, and D3). Bend the leads to a right angle, flush with the diode body. Make sure to match the band on the diodes with the band on the board silkscreen.
4. Install the seven capacitors. (C1 – C7) Depending on the style of capacitors, it may or may not be necessary to bend the leads.

5. Install the four transistors (Q1-Q4) There are 2 styles that may be in your kit- a round metal can, or a dark plastic body. In the case of the dark plastic body, match PCB silkscreen. If you have the metal can, orient the transistor as on the supplied picture.
6. Install the three relays. The dark grey line should be on the side closest to the diodes and match up with the diode band. Make sure you can see all 8 relay pins sticking through to the bottom of the board before soldering, and that the part is oriented correctly. Check each relay after soldering one pin for alignment before continuing.
7. Each side of the Arduino has 17 holes in it; if you look at the holes, you will see that the end holes on both sides of the Arduino don't have anything to solder to, so you want to center the male headers in the middle 15 holes. Solder any pin somewhere in the middle of each side. Now put the female headers onto the pc board and solder a pin somewhere in the middle. Now take the Arduino/male header assembly and test that the pins line up with the female header. **DO NOT MATE THE HEADERS AT THIS POINT!** If they don't line up, heat the one pin that you soldered and change the alignment of the header; repeat that as necessary until they do line up. Once they line up, solder the rest of the pins on both the Arduino board and the pc board. The Arduino should plug into and out of the header with no mechanical stress on either board. The Arduino plugs in with the Mini USB connector facing out.
8. Install the five dual 3.5mm jacks. You may have to wiggle them a little bit to get them to seat in the holes. Inspect each jack to make sure that all 6 leads on each jack extend through to the bottom of the board. On each jack, solder one lead, check for proper alignment, and for mating pins, and then solder the rest. Repeat for each jack set.
9. WooHooo! You completed an SO2R Mini.



One completed SO2R Mini. Note the transformers all in the same direction, and the diode polarity. Note that the SO2R Mini depicted in this photo differs slightly from the production version.

Basic SO2R Mini Testing – DO THIS BEFORE YOU APPLY POWER

1. Visually inspect the bottom of the PCB for unsoldered leads and solder bridges. If found, correct them!
2. Using flush cutters, make sure all leads are clipped flush with the board. It is not necessary to clip the leads from the double jacks, Arduino Nano headers, or relays, as they will not extend far enough below the board to short to the metal case.
3. Using an ohmmeter, measure the resistance from Arduino D09, D10, D11, D02, D03, D04, and D05 to ground. Resistances may vary, but none of them should be a short (0 ohms).

Congrats! You have a working SO2R Mini. Follow “SO2R Mini Connector Guide” which can be found on our website, SO2R.org for next steps. Questions? Shoot us an email, help@so2r.org.