

Thanks for purchasing true's RGBLED solder kit. Your support makes projects like this possible.

If you have trouble assembling this during DC30, you can find **true** in the WP suite for help.

This is not a beginner kit. If you are a beginner though, you can still do this – several of us are here to help. Don't give up.

After DC30, a step by step photo solder and assembly guide will be available at <https://dc30.truecontrol.org>.

If you are new to soldering, here are some videos to help you learn correct technique:

- [youtube.com/watch?v=vAx89WhpZ3k](https://www.youtube.com/watch?v=vAx89WhpZ3k) (through hole devices)
- [youtube.com/watch?v=_6tpQE7ptqo](https://www.youtube.com/watch?v=_6tpQE7ptqo) (2 terminal SMT devices, such a resistors)

Tools required:

- Decent soldering iron, with decent solder (see below)
- Flush cutters, tweezers (angled 7SA type preferred), #2 Phillips screwdriver

Tools recommended:

- Craft knife, very strong adhesive, or other tool to remove paper backing from acrylic
- Pliers or wrench to hold standoffs in place
- Solder wick
- Small flat screwdriver

PLEASE don't use that crap 1% flux chinese solder, like the cheap stuff commonly found on Amazon. You'll likely get very poor results. Use a quality solder; ideally a 63/37, 2.2% or higher RA or RMA flux, 0.03 to 0.04 size.

I recommend and personally use Kester 285 (P/N 24-6337-9710) or Kester 44 (P/N 24-6337-0027) for this kind of work.

Don't know what soldering iron to get? Ask **true** for recommendations.

Recommended assembly order and general directions:

- Solder shorter components before taller components.
- **If you opted for the advanced kit**, solder all SMT components first in an order where your soldering iron will not be blocked by other components. Solder C2, C8, U3, and U4 on the sub PCB. Leave C8, U3, and U4 empty on the main PCB.
- The main PCB should have C8, U3, and U4 unpopulated under the microcontroller socket.
- On the main PCB, solder components in this order:
 - R20 resistor on reverse side, R15 resistor on component side
 - Central board to board connector
 - Microcontroller socket
 - Short components such as the capacitors and crystal (you can lay the xtal down and solder to the solder tab)
 - LEDs (long pin goes in the square hole)
 - Switches (buttons), transistors (be careful not to mix them up)
 - Through-hole resistors (bend one lead over and solder upright)
 - Reverse side components: reset button (optional but recommended), OLED module
- On the sub PCB, solder the board to board connector, switches (buttons), resistors R11 and R2, and transistor Q3. Solder jumper links using leftover lead wire from resistors between pads indicated with white lines: *Q2 pins 5-D, U1 pins 6-7, 8-9, and 10-12*. These jumpers are required for power and button operation on the sub PCB.
- Resistor R16 (3K) on the main board and R21 (10K) on both main and sub boards are not mandatory. Only solder these if there are issues with the unit locking up, or OLEDs corrupting and not displaying data. If you suspect a fault, try soldering R21 on either board before trying R16.
- On the center PCB:
 - Solder the flat flex connector first using SMT soldering techniques.
 - Solder the LEDs by inserting into a set of 4 holes with the long lead going into the square hole. The LED body should be on the same side as the controller IC with the leads extending on the opposite side. Insert as far as you wish (depending on whether you want the LEDs to be proud or not), then bend 90 degrees. Keep outer LEDs angled toward the nearby mounting pin holes. You are provided a extra LEDs so that you can play with the bend angle.
 - If you have questions or run into issues, find **true** for help.

Assembling the kit:

- Remove paper backing on all spacers.
- Remove paper backing on reverse side of one thin clear acrylic top piece. Keep the paper backing on the top side of thin clear acrylic piece until assembly is complete. (The top side is the side with the screw head recesses.)
- Remove paper backing on non-decorated side of a decorated face piece, or both sides of a flat face piece.
- Insert short screws into the prepared acrylic thin top piece. Stack onto this the face piece (if decorated, stack the non-decorated flat side touching the top piece), two spacers aligned to the SHORT edge of the OLED module, and the main PCB, OLED side first. So from top to bottom: thin clear → thick face → spacers → main PCB.
- Using a Phillips screwdriver, screw the short screws into the female side of the female-to-male standoffs. Do not use too much force during assembly, or you may strip the screw.
- Attach ribbon cable from main PCB to center PCB, making sure that the cut LED pin lead side on the center PCB faces toward main PCB. Review the PCB for cable orientation. The blue tab on the flat flex cable should be visible (on top) after insertion. The flat flex cable is a friction fit on the main PCB side and may take some force to insert, so be careful. On the center PCB, a ZIF type flat flex connector is used. To insert the flat flex cable, carefully lift the brown tab (such as with a small flat screwdriver), insert the flat flex cable fully, then close the tab.
- Attach battery to main PCB.
- Stack center PCB onto female-to-male standoff. Screw female-to-female standoff to female-to-male standoff.
- Route battery wire through LEDs so that the wire will pass to the top LED side of the center PCB.
- Attach ribbon cable from center PCB to sub PCB. Align battery on the center board so that it will fit between the side switches (buttons) of the sub PCB.
- Remove paper backing on reverse side of the other thin clear acrylic top piece. Keep the paper backing on the top side of thin clear acrylic piece until assembly is complete.
- Remove paper backing on non-decorated side of the other decorated face piece, or both sides of a flat face piece.
- Insert long screws into acrylic thin piece. Stack onto this the face piece, two spacers aligned to the SHORT edge of the OLED module, the sub PCB, and two more spacers opposite the buttons on the sub PCB aligned with the first two.
- Carefully maneuver both halves together and screw the sub PCB side to the female-to-female standoffs. The battery should be centered between the center and sub boards, held in place by the rear of the LEDs on one side and the spacer on the other. You may use your fingers, pliers, or a wrench to hold the standoffs while screwing them together. Do not use too much force during assembly, or you may strip the screw.
- Assembly should be complete. Try powering on the device and see if the RGBLEDs light. If not, there is a problem that you will need to troubleshoot, or the battery is dead. Try charging the battery.
- If the LEDs light, then remove the paper from the top acrylic pieces. You should see something displayed on each OLED module.
- Congratulations, you are done! (pew)

Parts List:

- This guide, printed schematic
- 1x main PCB, 1x sub PCB (same PCB design with different populated components), 1x center PCB
- 1x battery
- PIC16LF1459 microcontroller with socket
- Acrylic top plates, faces, and spacers
- 14x RGBLEDs, 1x red LED, 1x green LED, 1x blue LED
- 4x buttons, 2x OLED modules, 1x lithium battery
- 4x 15mm M3 screws ("long"), 4x 12mm M3 screws ("short")
- 4x 12mm female-to-male standoffs, 4x 12mm female-to-female standoffs
- 1x sheet with taped components (see parts sheet for specific parts included)

If anything is missing from the kit, let me know! I have all the parts on hand at DC30. Enjoy!