

DUCK Construction Kit

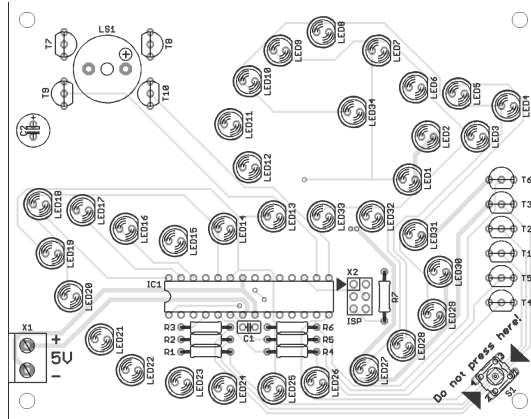
Contents:

- 1 PCB "DUCK Rev. 1.0"
- 1 Controller ATmega8 (programmed)
- 1 28-pin IC Socket (narrow)
- 8 NPN Transistors BC337-40
- 2 PNP Transistors BC327-40
- 35 LEDs yellow, super bright (L-53SYDK)
- 7 Resistors, 1 kΩ

- 1 Ceramic Capacitor, 100 nF
- 1 Electrolytic Capacitor, 220 μF
- 1 Mini Loudspeaker, electromagnetic, 16 Ω
- 1 Push-button, 6x6 mm
- 1 Terminal Block, 2-pin
- 1 2x3 Pin Header
- 1 Battery Holder for 3x AA
- 1 Battery Clip (for battery holder)

General Soldering Advice

Insert the components one at a time and bend the leads outward slightly to prevent the component from falling out. Heat up the solder joint for a second before feeding the solder wire between the soldering iron's tip, the board and the component's lead. Wait for a few more seconds before removing the tip from the solder joint. Don't move the board before the solder has solidified. After soldering, trim the leads with a wire cutter to about 1-2 mm length. See http://mightyohm.com/files/soldercomic/FullSolderComic_EN.pdf for more detailed instructions.

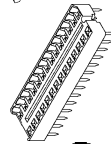


I recommended soldering the components in the order listed below.

1. Resistors (R1~R7): Bend the leads 90° gently before inserting them into the board. Orientation doesn't matter.



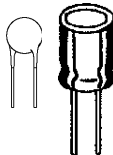
2. IC Socket (IC1): Insert the IC socket into the board, making sure the orientation of the small notch matches the silkscreen outline on the board. You can bend two diagonally opposite pins of the socket if you like, but setting the board with the socket inserted upside-down on a flat surface usually works just as well.



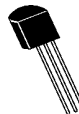
3. Push-button (S1): Insert the push-button to the intended location on the board. The push-button will fit in two orientations, you can use either of them.



4. Capacitors (C1, C2): C1 is a ceramic capacitor which doesn't have a specific orientation. It is marked "104" (for 10·10⁴ pF = 100 nF). For the electrolytic capacitor C2 (marked "220 μF"), the orientation is important. The *negative* side is indicated with a printed bar containing (-) signs on the side of the capacitor. On the PCB, the *positive* side is marked with a small (+) sign next to the pad. Insert C2 and bend the leads 90° so it lies flat against the board before soldering.



5. Transistors (T1~T10): There are two types of transistors in the kit with very similar part numbers, make sure you insert the transistors to the correct locations. Orientation is important, the flat side of the transistor must match the silkscreen outline.



Transistor	Type	Part number / marking
T1~T8	NPN	BC337-40
T9, T10	PNP	BC327-40

6. LEDs (LED1~LED34): The orientation is important for the LEDs. Make sure the flat side of the LED (cathode) matches the silkscreen outline. The flat side of the LED also corresponds to the shorter lead. Start with 3 or 4 LEDs, one in each corner, then add the other LEDs one at a time. Try to avoid bending the leads outward, as this will make it harder to remove the LED again. Don't solder too long on the LEDs, they will have reduced brightness if they become too hot during soldering.



7. Pin Header (X2): Insert the short end into the board. Orientation is not important. You can connect an Atmel ISP programmer to X2 to reprogram the microcontroller.



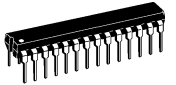
8. Terminal Block (X1): Insert the terminal block, turn the board over and solder it. Orientation doesn't matter, but it is recommended that the openings face toward the edge of the board.



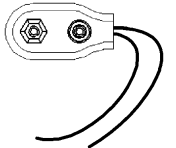
9. Loudspeaker (LS1): Bend the two leads of the speaker slightly outward to make it fit into the board and push it in as far as possible. Orientation is not important. If there is a label on top of the speaker, remove it after soldering.



10. Controller (IC1): Insert the controller into the IC socket. You may have to bend the pins inward slightly before it will fit. Make sure the controller's notch matches that of the socket and the silkscreen outline. Sometimes, the notch is replaced by a tiny dot near pin one, which should also face toward the notch of the socket.



11. Battery Clip: Bend the exposed sections of the wires back to lie flat against the insulation. Insert the wires into the terminal block and fasten the screws. Sometimes you need to loosen the screws before you can insert the wires. The red wire goes into the upper terminal (marked "+" on the board), the black wire goes into the lower terminal (marked "-" on the board).



12. Batteries: Insert three AA batteries (not included) into the battery holder and connect the battery clip to the battery holder. **Never connect a 9 V battery!**

Turn it on! Push and hold the button and the animation should start after about a second. If it doesn't, disconnect the batteries and start looking for mistakes. If only one LED doesn't work correctly, it is likely that you inserted it the wrong way around. You can remove it by heating both pins at the same time with a large soldering iron tip while gently pulling on the LED (with your fingers or needle-nose pliers), then use desoldering braid or a desoldering pump to get the remaining solder out of the holes.

Make it quack: push the button for a short time.

Turn it off: push and hold the button for at least one second, until the LEDs turn off.

Always-on mode: insert a jumper between X2 pins 4 and 6 (middle right and bottom right). The duck will turn on automatically when power is applied and can't be turned off with the button.

Questions? Problems? Comments? Ideas? Please contact me!
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Project webpage: <http://wiki.blinkenarea.org/index.php/DuckEnglish>