

## IJduino Instructions:

1. Check that you have all the components as shown on the back of this page.

- A. Mini Breadboard
- B. PCB (the green board)
- C. 8x8 LED grid
- D. MAX7219 chip
- E. Atmega328
- F. 10 pin angled male header
- G. 16 pin female header
- H. IC socket for 24 pins
- I. 10 $\mu$ F Electrolytic capacitor
- J. 0.1 $\mu$ F Ceramic capacitor
- K. 10k $\Omega$  Resistor
- L. Button
- M. Battery holder
- N. Solid core wire

You'll also need a soldering iron and side-cutters or something else to snip wires with.

2. Now that you know you have all the components, heat up the soldering iron and you can start constructing your IJduino.

3. Insert the 10k $\Omega$  resistor (long thin device) into its spot on the PCB, it doesn't matter which leg goes into which of the two holes. Bend the legs so it won't fall out and solder them to the board. You can chose to clip the legs off now or do it later.

4. Insert the legs of the 10 $\mu$ F electrolytic capacitor (metal can) on the board should be a small + near one leg. On the capacitor one side has a white band with - on it. Double check that the (marked) negative pin is on the right side.

The capacitor will need to lay flat on the PCB (to fit under the display) so make sure to leave enough extra length in the legs to allow it to be bent backwards as shown in illustration 2.

Solder the capacitor in place.

5. Insert the 0.1 $\mu$ F ceramic capacitor (orange disk) in its spot on the PCB and solder it, like with the resistor it doesn't matter which leg goes into which of the two holes.

6. Break the female headers into two pieces, each with 8 pins. It helps if you use the foam block to support the PCB when soldering to get these headers nicely perpendicular.  
Solder each 8 pin piece on one side of the PCB.

7. Solder the IC socket (24pins) onto the PCB. Make sure to get it the right way around (check the notch on the socket and the notch drawn on the PCB to find the right direction to place it).  
You can now insert the MAX7219 LED controller in it's socket.

8. Break the angled male headers into two pieces, each with 5 pins. Solder one 5 pin piece to the top of the board and the other to the bottom.

You have now completed the MAX7219 display and can test it on someone else's (working) IJduino!

9. Place the Atmega328 chip in the center of the breadboard with the notch to the left, as shown on the back of this page..

10. Take two solid core wires and connect across the chip between pins 7 and 20 for VCC (positive) and 8 and 22 for the ground (negative) GND.

11. Place the button in the position as shown in the illustration on the back of the page.  
Make sure you have it the right way around, the pins should stick out in a similar way to the chip.

12. Connect the battery leads to to VCC and GND and insert the display in the breadboard, from pin 7 to 11, with the driver chip on the bottom and the LED display facing outward.

Congratulations! You have made your own IJduino. Turn it on and you should see animations.

The following steps only apply if you have an Atmel In-System Programmer.

13. Connect the programmer as shown in illustration 4.

14. Download the software from <https://github.com/ijhack/IJduino>

15. Follow the instructions in the readme to flash new software on your IJduino device.



duino v1.0



(PCINT14/ $\overline{\text{RESET}}$ ) PC6	1	28	PC5 (ADC5/SCL/PCINT13)
(PCINT16/RXD) PD0	2	27	PC4 (ADC4/SDA/PCINT12)
(PCINT17/TXD) PD1	3	26	PC3 (ADC3/PCINT11)
(PCINT18/INT0) PD2	4	25	PC2 (ADC2/PCINT10)
(PCINT19/OC2B/INT1) PD3	5	24	PC1 (ADC1/PCINT9)
(PCINT20/XCK/T0) PD4	6	23	PC0 (ADC0/PCINT8)
VCC	7	22	GND
GND	8	21	AREF
(PCINT6/XTAL1/TOSC1) PB6	9	20	AVCC
(PCINT7/XTAL2/TOSC2) PB7	10	19	PB5 (SCK/PCINT5)
(PCINT21/OC0B/T1) PD5	11	18	PB4 (MISO/PCINT4)
(PCINT22/OC0A/AIN0) PD6	12	17	PB3 (MOSI/OC2A/PCINT3)
(PCINT23/AIN1) PD7	13	16	PB2 ( $\overline{\text{SS}}$ /OC1B/PCINT2)
(PCINT0/CLKO/ICP1) PB0	14	15	PB1 (OC1A/PCINT1)

