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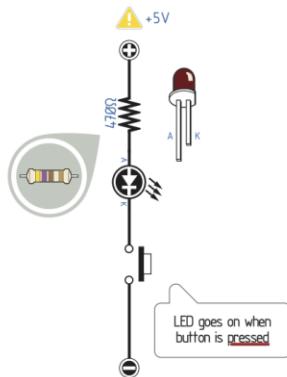
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Light a LED



Light a LED

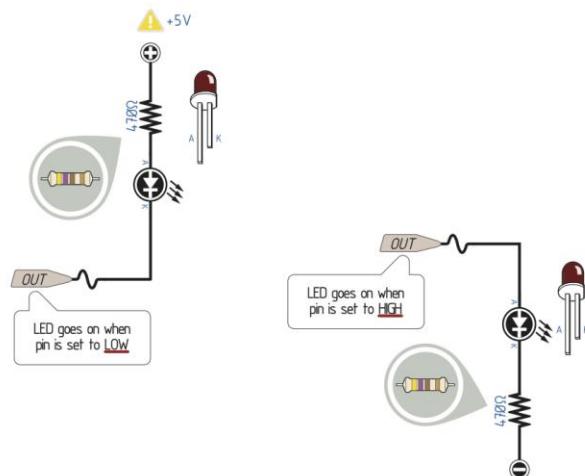


One LED



BASIC CONNECTIONS

One LED

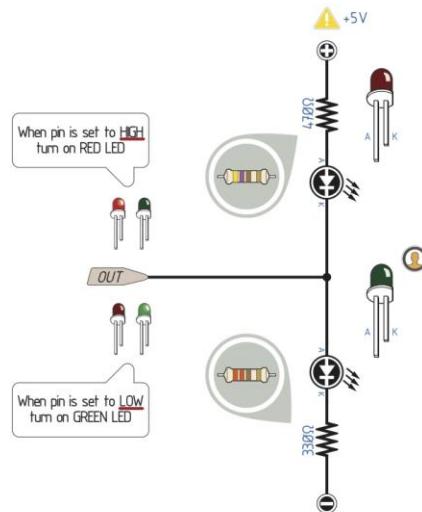


Two LEDs



BASIC CONNECTIONS

Two LEDs

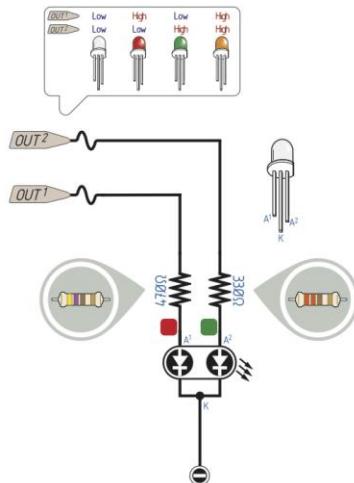


Bicolor LED

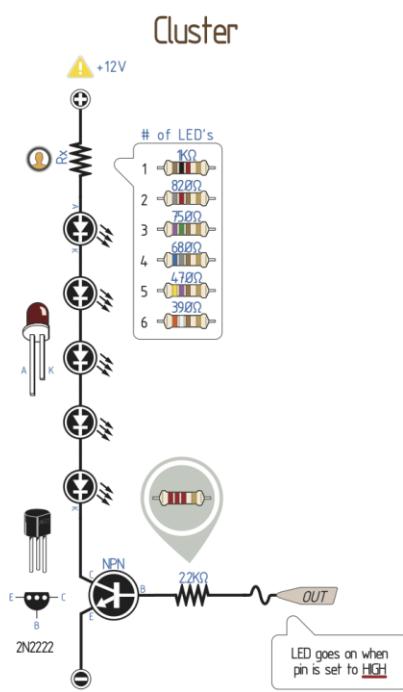


BASIC CONNECTIONS

Bicolor LED



Cluster

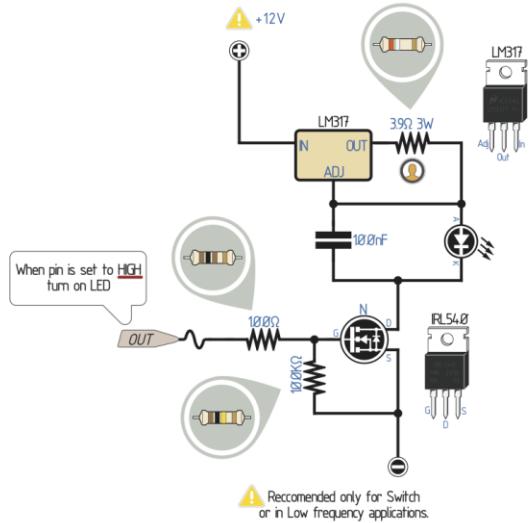


Luxeon



BASIC CONNECTIONS

Luxeon

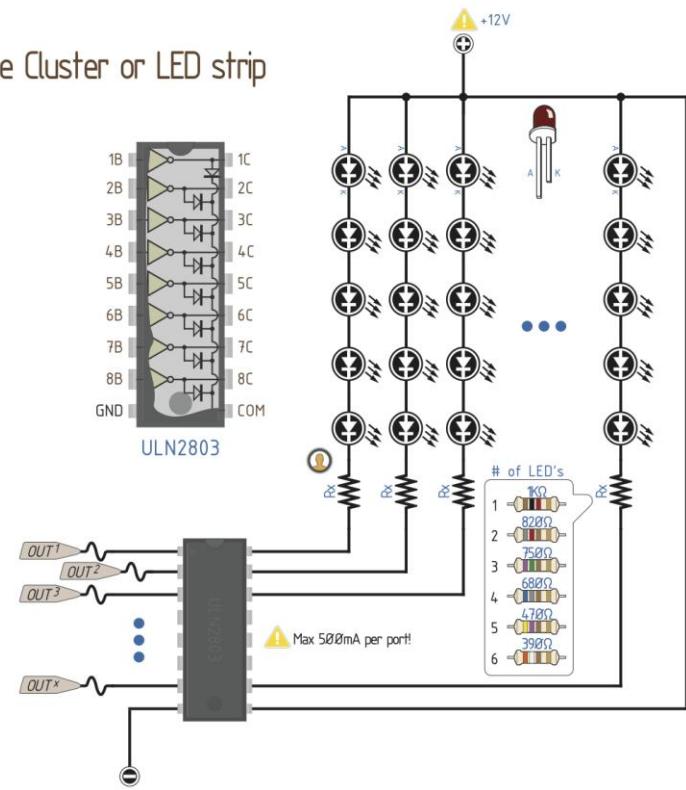


Multiple Cluster or LED strip



BASIC CONNECTIONS

Multiple Cluster or LED strip

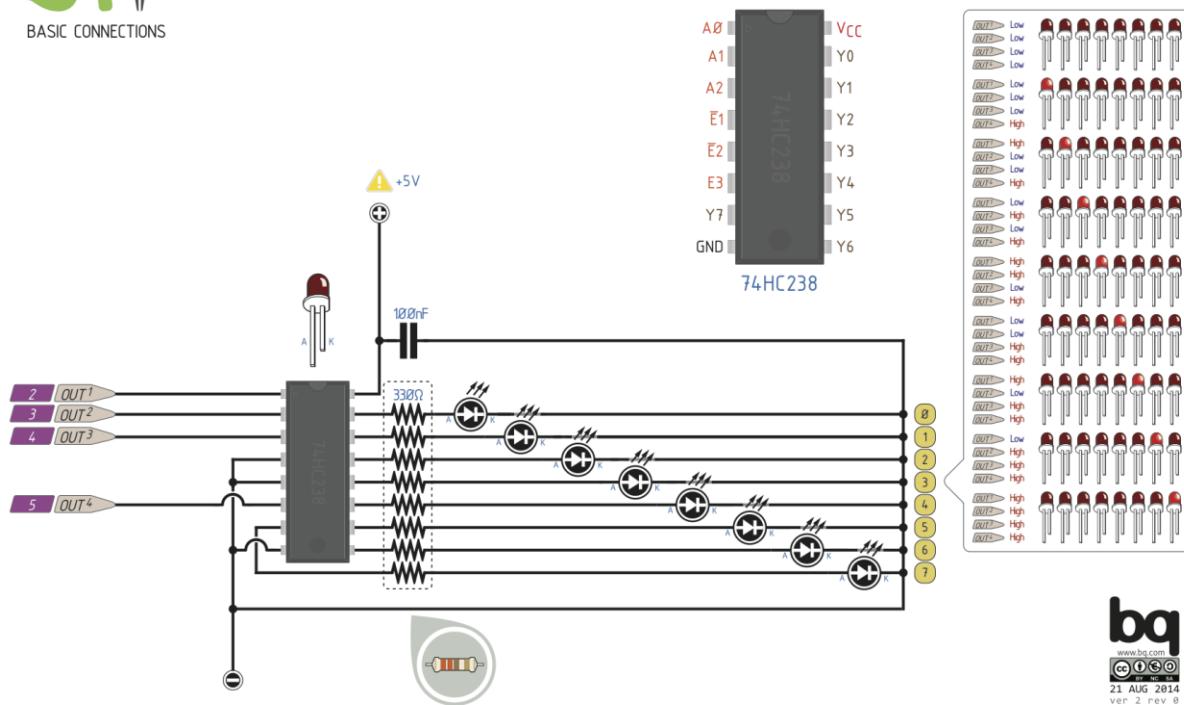


Decoder/Demultiplexer 74HC238



BASIC CONNECTIONS

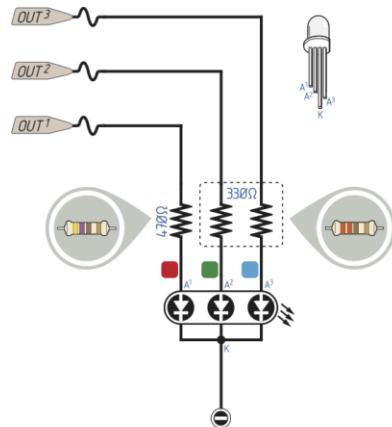
Decoder/Demultiplexer 74HC238



RGB (Common Cathode)



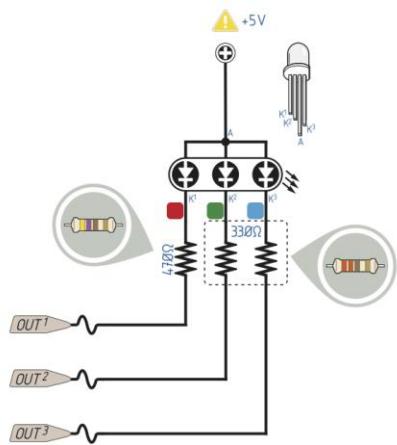
RGB (common Cathode)



RGB (Common Anode)



RGB (common Anode)

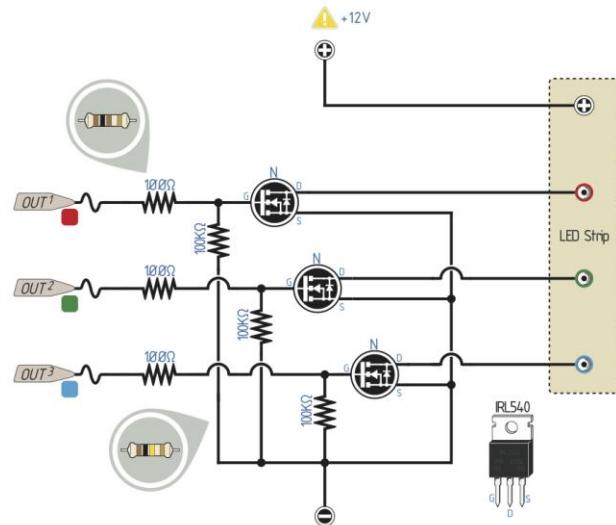


LED strip

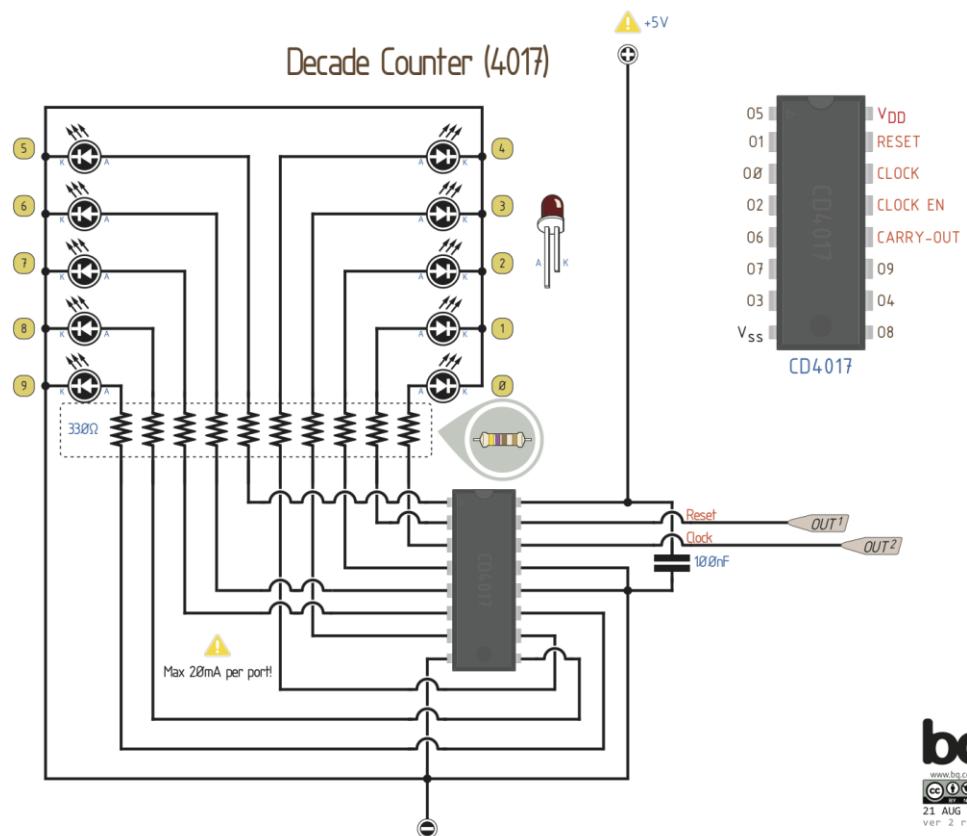


BASIC CONNECTIONS

LED Strip



Decade Counter(4017)

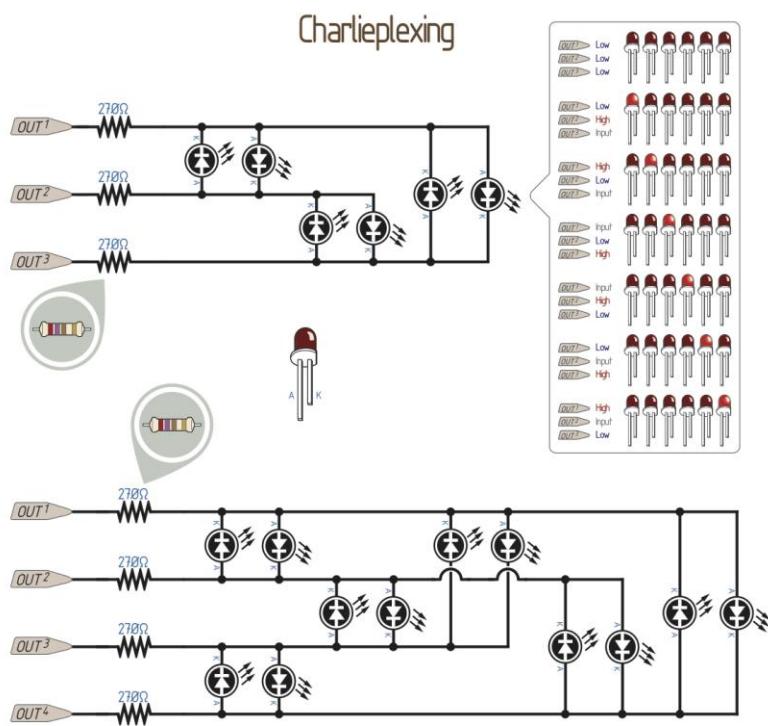


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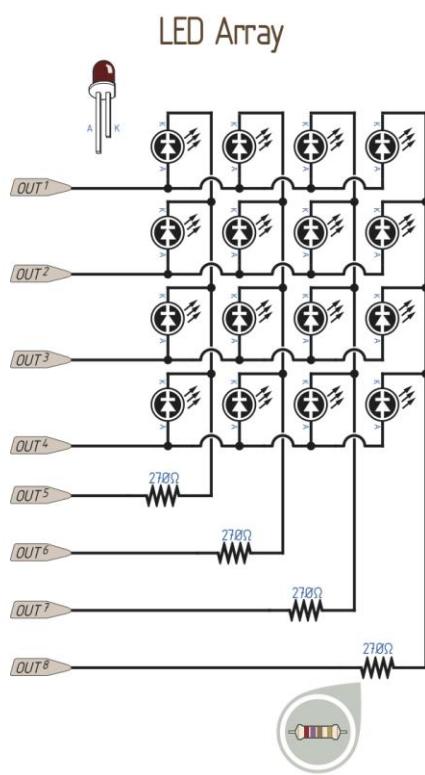
Charlieplexing



Charlieplexing



LED Array

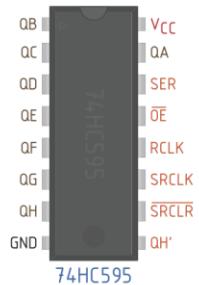
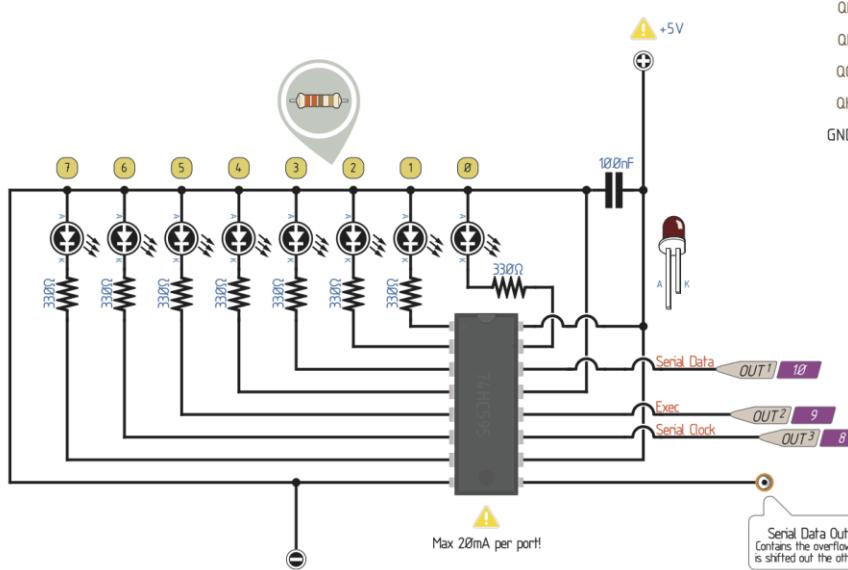


Shift Register 74HC595



BASIC CONNECTIONS

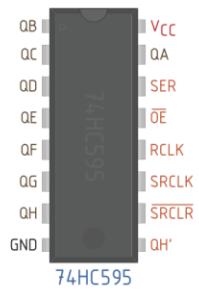
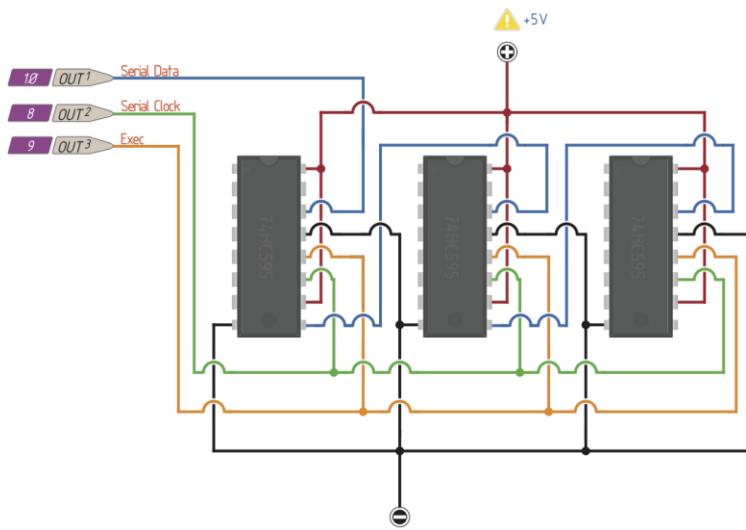
Shift Register 74HC595



Connect multiple 74HC595



Connect multiple 74HC595



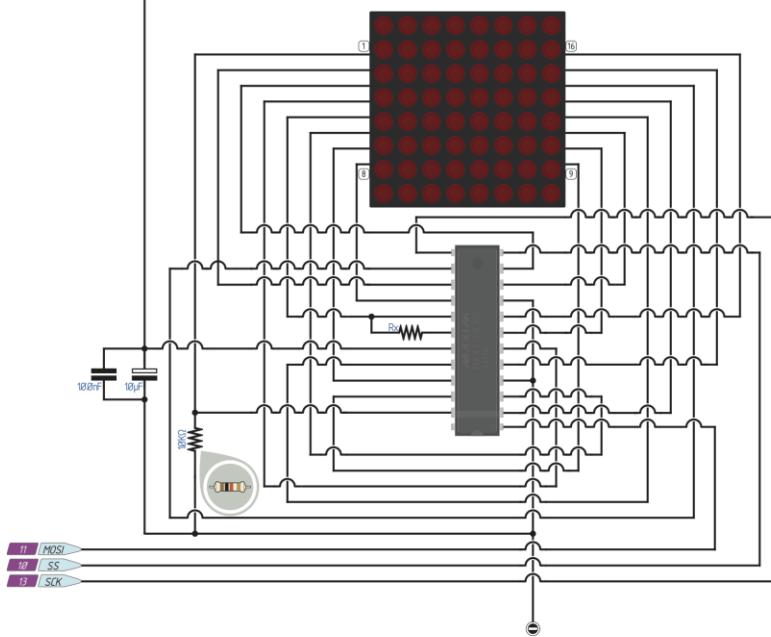
Controlling LED matrix displays with the MAX7219



BASIC CONNECTIONS

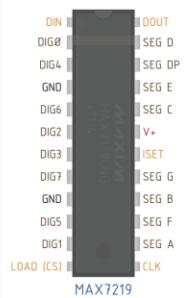
+5V

Controlling LED matrix displays with the MAX7219



Rx (x1000)		V _{LED} (V)				
I _{LED} (mA)	R _x (Ω)	1.5	2.0	2.5	3.0	3.5
4.0	12.2	11.8	11.0	10.6	9.69	
3.0	17.8	17.1	15.8	15.0	14.0	
2.0	29.8	28.0	25.9	24.5	22.6	
1.0	66.7	63.7	59.3	55.4	51.2	

$10.6 \times 1000 = 10.6\Omega$



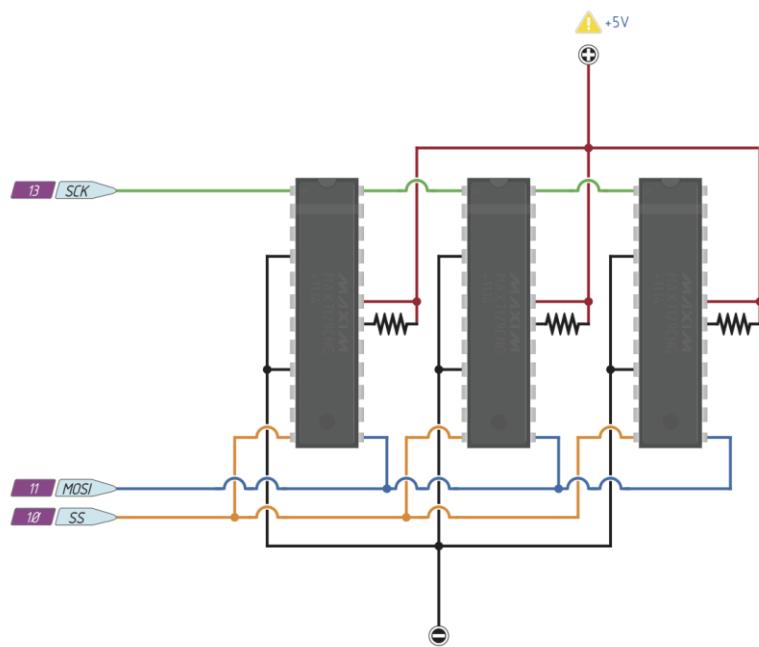
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Connect Multiple MAX7219



BASIC CONNECTIONS

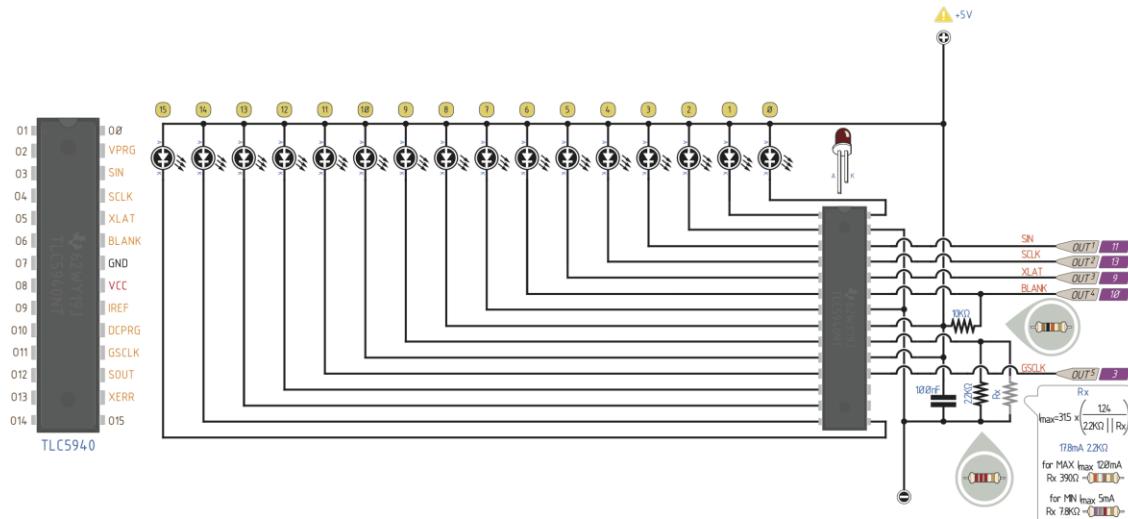
Connect multiple MAX7219



TLC5940



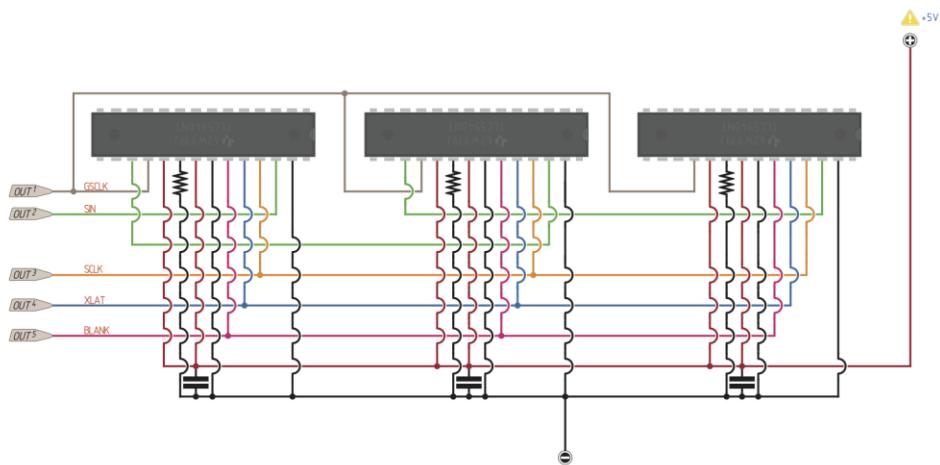
TLC5940



Connect multiple TLC5940



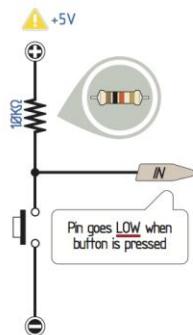
Connect multiple TLC5940



Pushbutton to GND



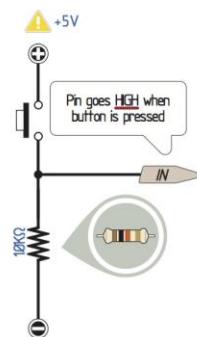
Pushbutton to GND



Pushbutton to 5V



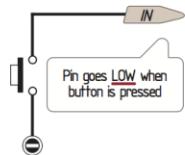
Pushbutton to 5V



Using Internal pullup



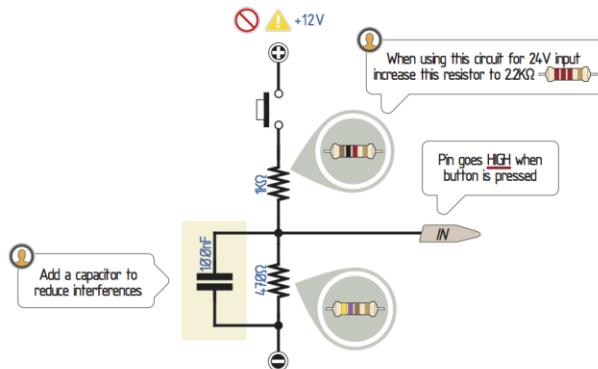
Using Internal pullup



Pushbutton to 12V



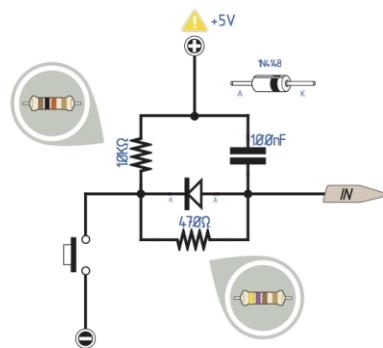
Pushbutton to 12V



Simple Debouncer



Simple Debouncer

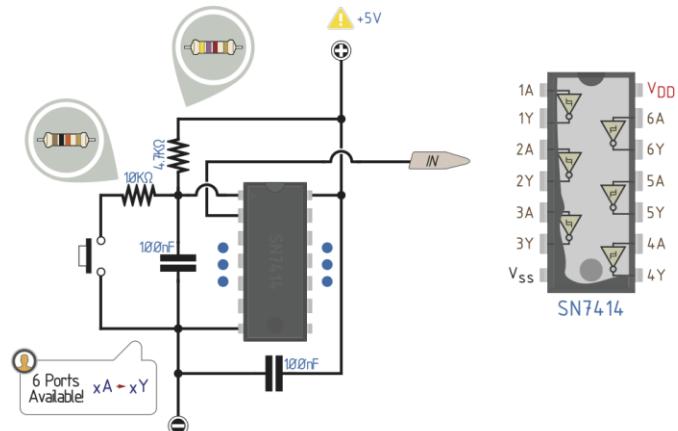


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Debouncing a Pushbutton



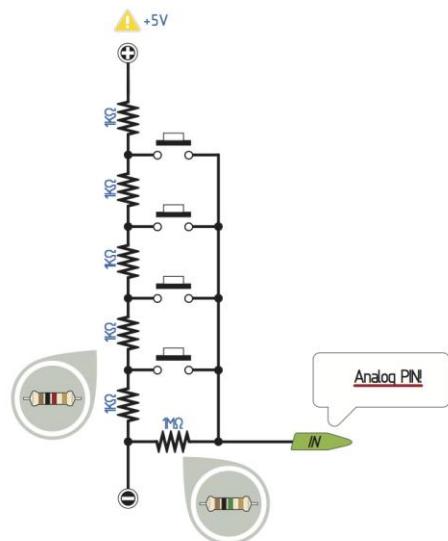
Debouncing a Pushbutton



Multiple Buttons (using 1 analog input)



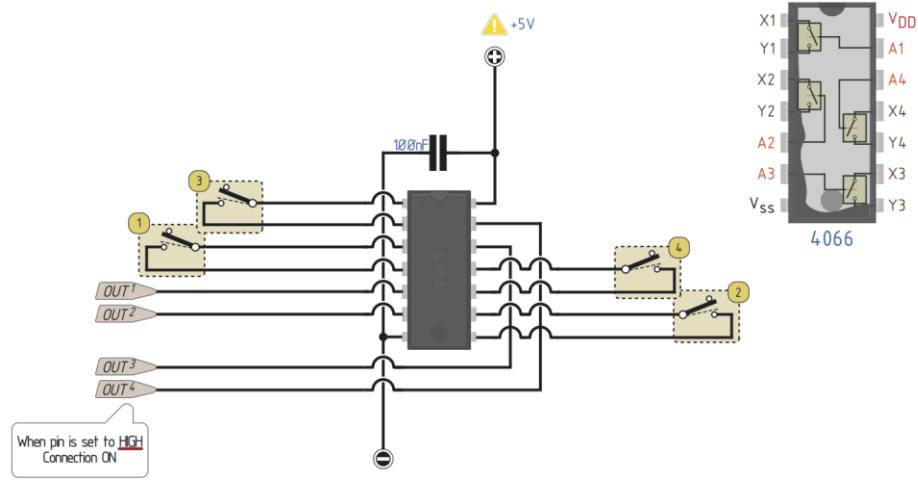
Multiple Buttons (using 1 analog input)



Emulating button presses



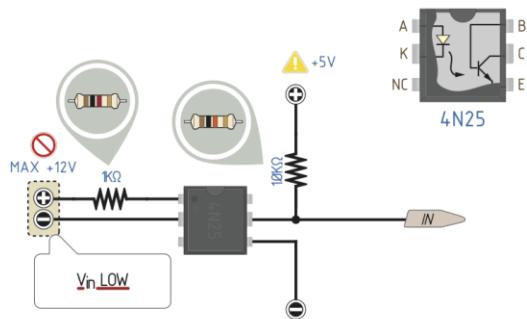
Emulating button presses



Optocoupled Input



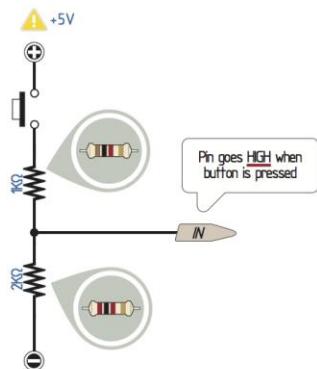
Optocoupled Input



Pushbutton to 3V3 tolerant pins



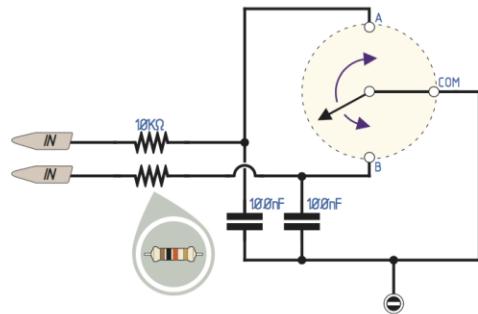
Pushbutton to 3V3 tolerant pins



Connect an encoder (internal pullup)



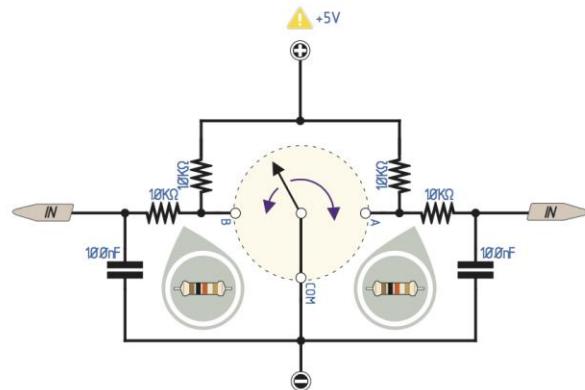
Connect an encoder (Internal pullup)



Connect an encoder



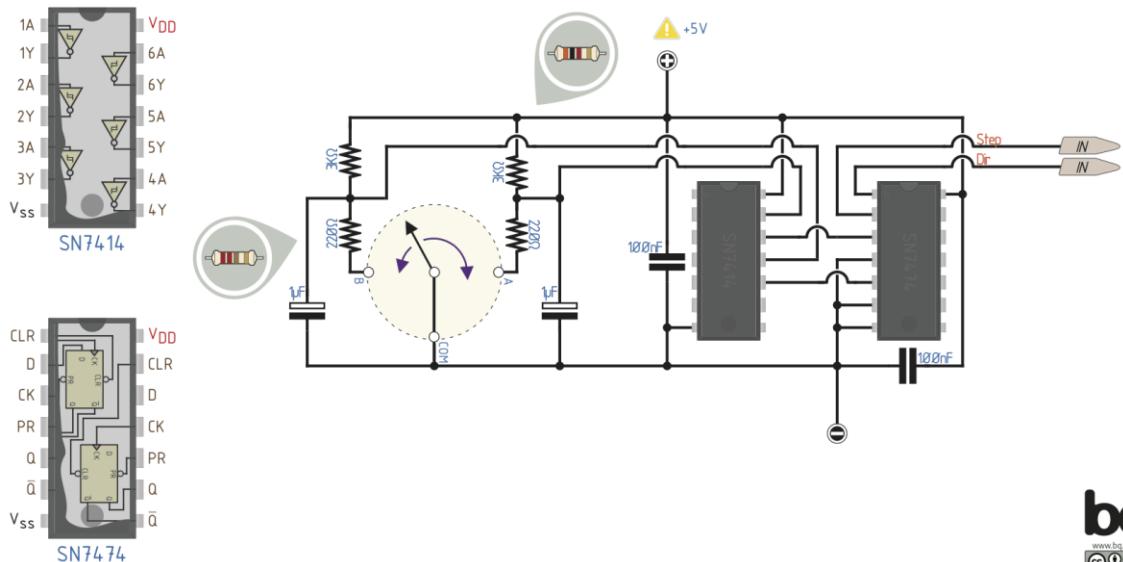
Connect an encoder



Debouncing a Rotary Encoder



Debouncing a Rotary Encoder

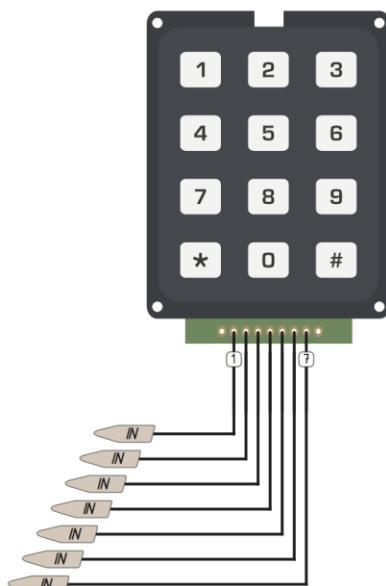


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Connect a Keypad



Connect a Keypad

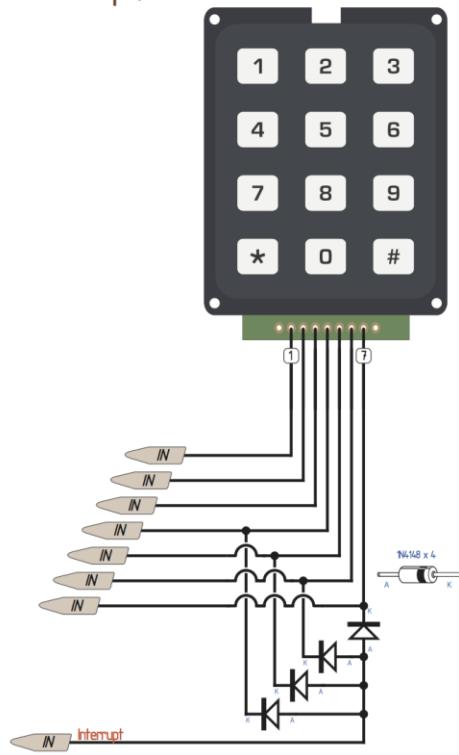


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Connect a Keypad (with interrupt)



Connect a Keypad (with interrupt)

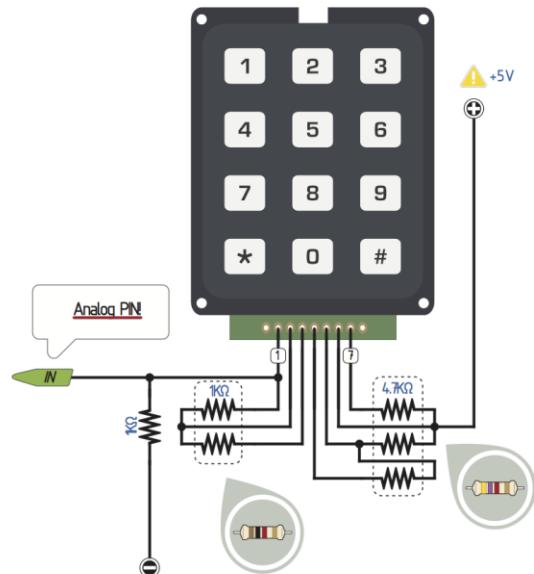


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Connect a Keypad (using 1 analog input)



Connect a Keypad (using 1 analog input)

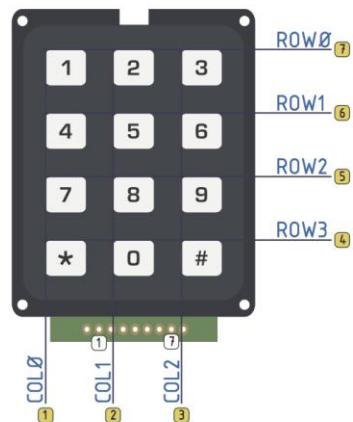


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Keypad



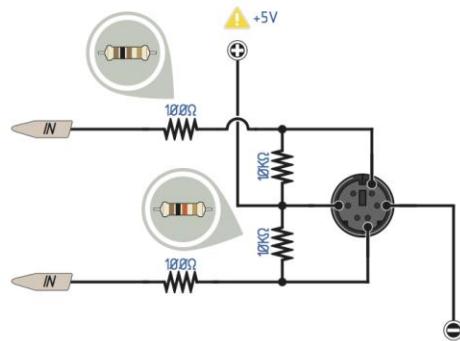
Keypad



Connect a PS2 device



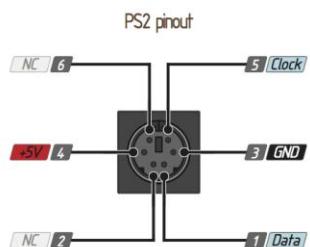
Connect a PS2 device



Keyboard scan codes



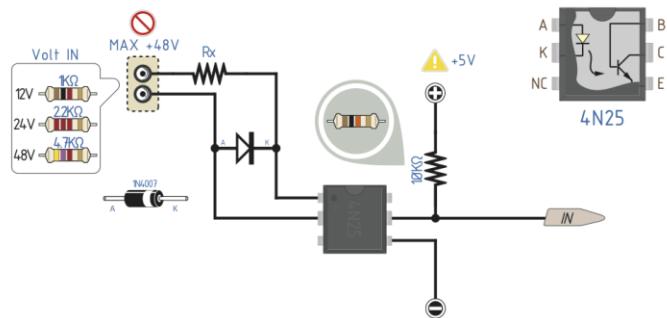
Keyboard scan codes



Optocoupled Input (AC Input)



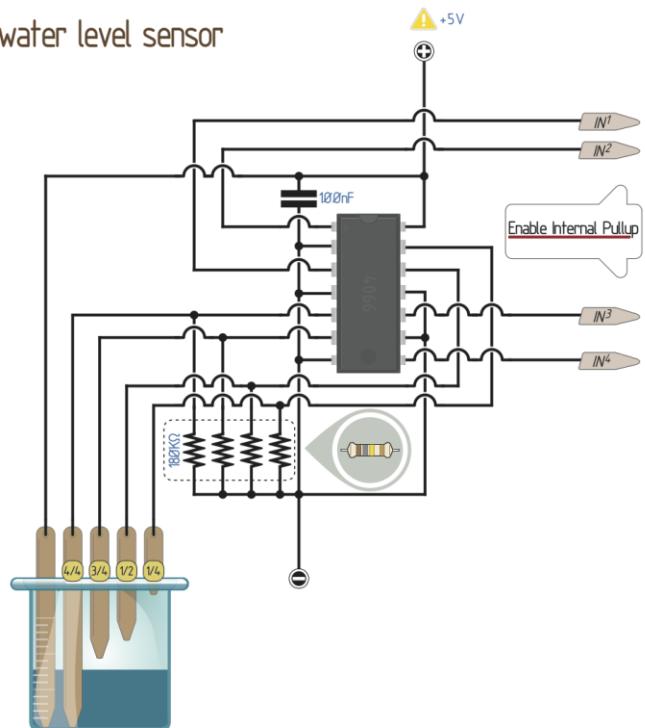
Optocoupled Input (AC Input)



A simple water level sensor



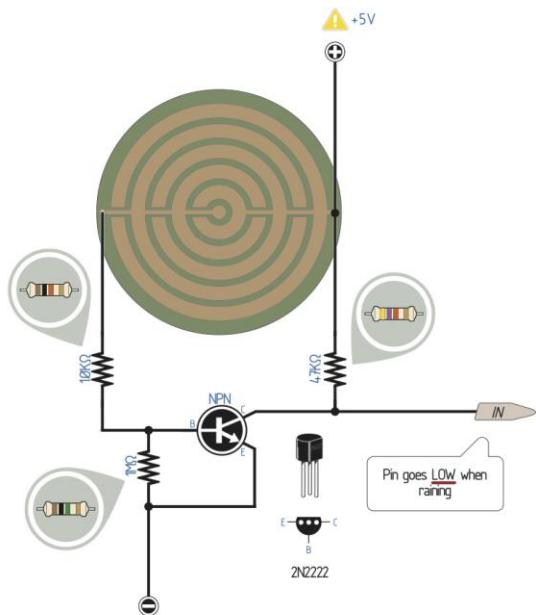
A simple water level sensor



A simple rain sensor



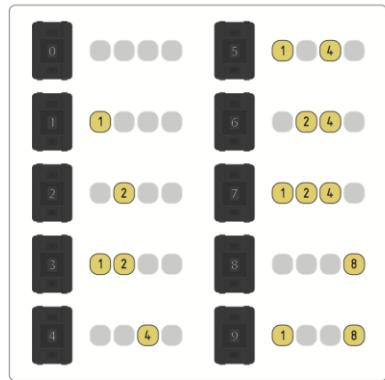
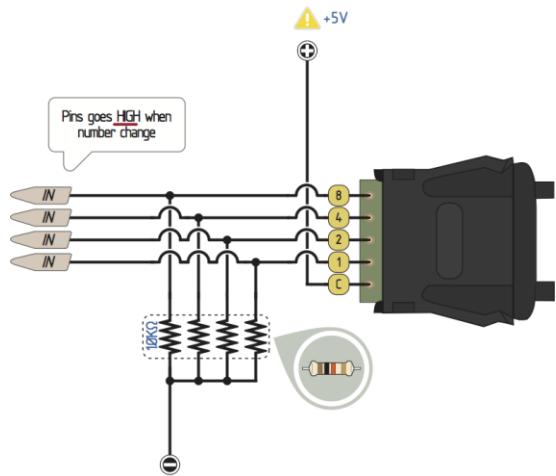
A simple rain sensor



Connect a Thumbwheel switch



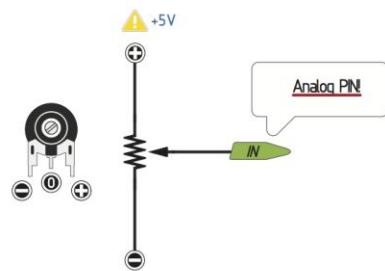
Connect a Thumbwheel switch



Connect a Potentiometer (or Trimmer)



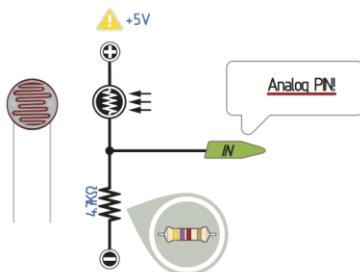
Connect a Potentiometer (or Trimmer)



Connect a Photoresistor



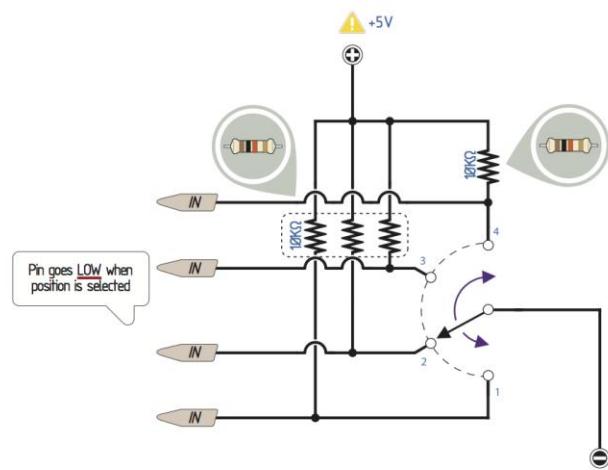
Connect a Photoresistor



Connect a Rotary switch



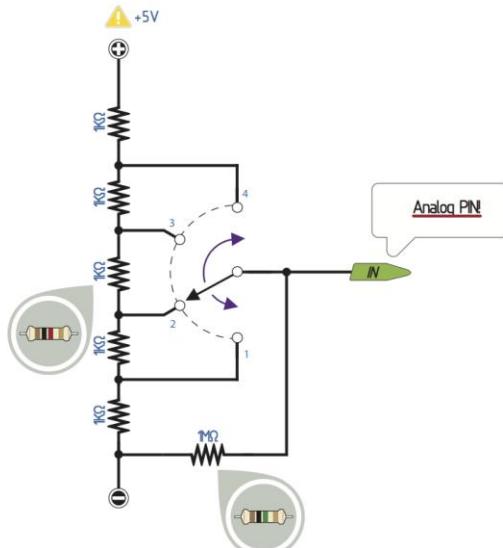
Connect a Rotary switch



Connect a Rotary switch (using 1 analog input)



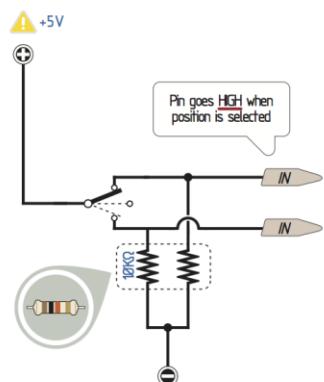
Connect a Rotary switch (using 1 analog input)



Connect a Diverter



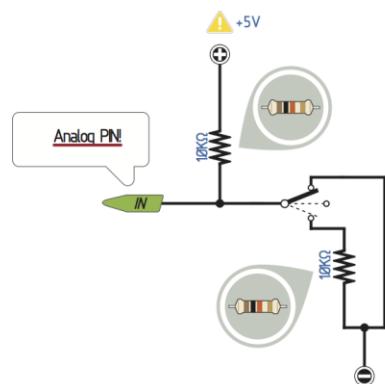
Connect a Diverter



Connect a Diverter (using 1 analog input)



Connect a Diverter (using 1 analog input)

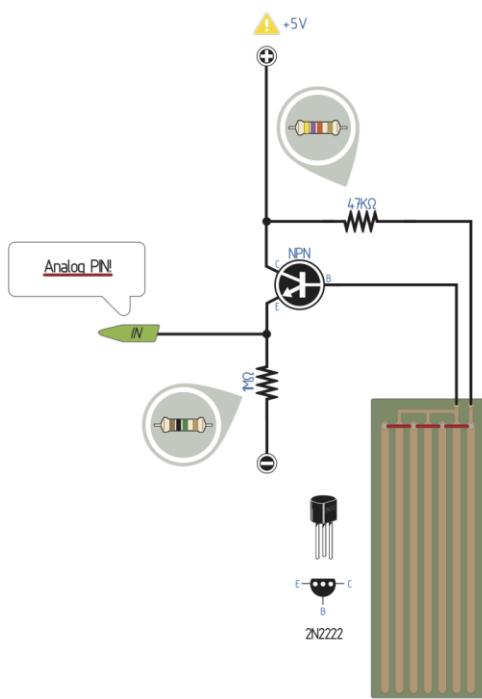


A water level sensor



BASIC CONNECTIONS

A water level sensor

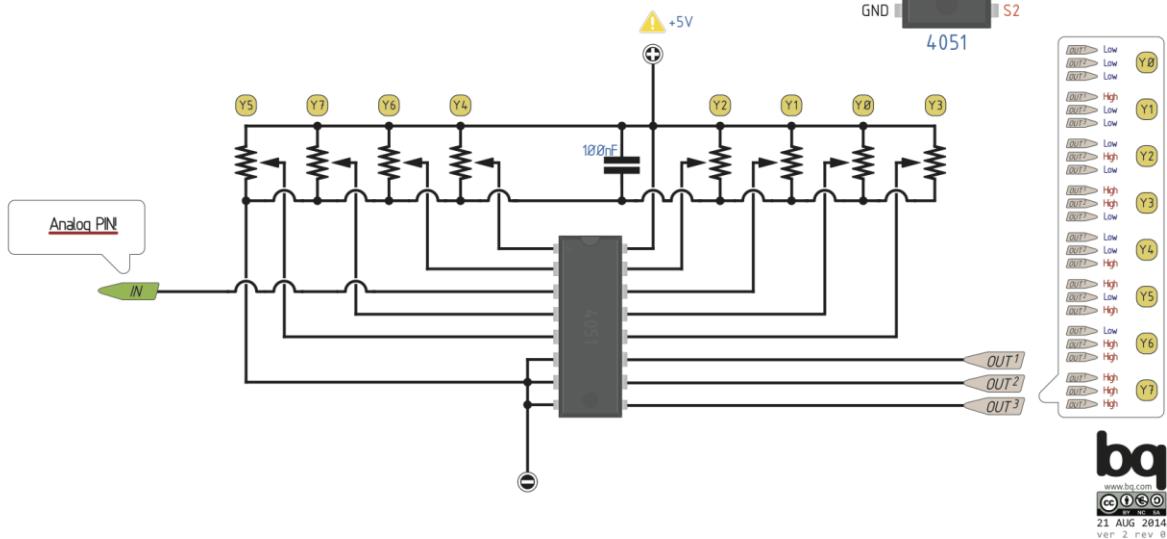
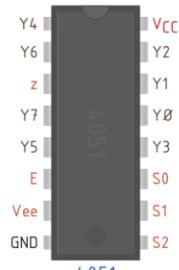


Multiplexing 8 potentiometers



BASIC CONNECTIONS

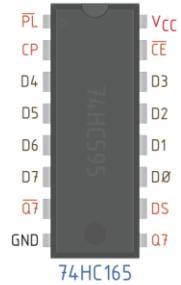
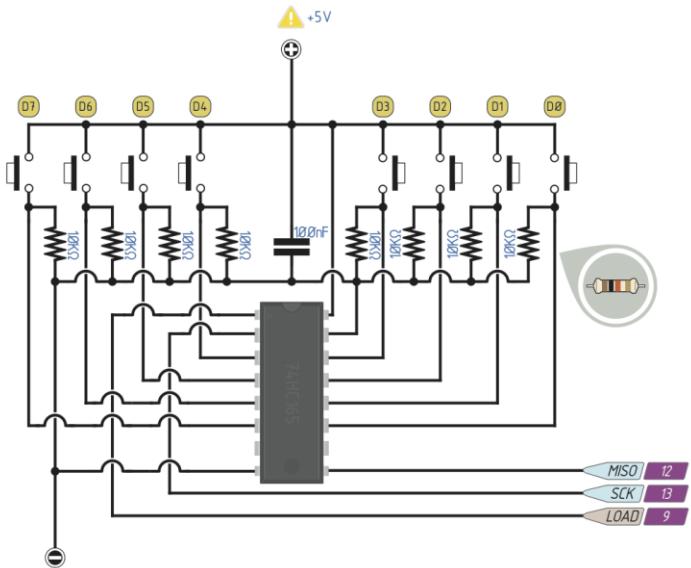
Multiplexing 8 potentiometers



Connect 8 difital inputs via SPI



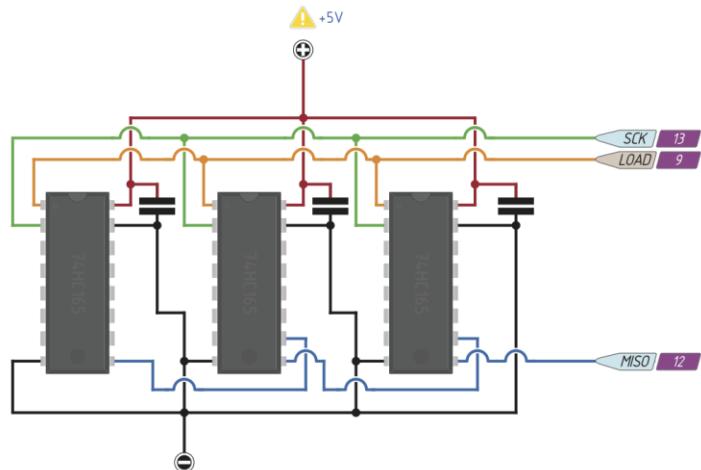
Connect 8 digital inputs via SPI



Connect multiple 74HC165



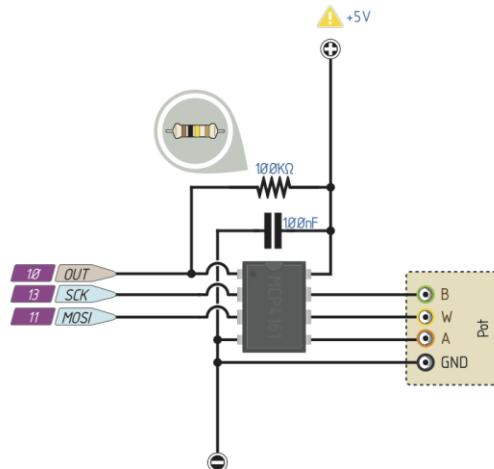
Connect multiple 74HC165



Connect a Digital Potentiometer (MCP4161)



Connect a Digital Potentiometer (MCP4161)

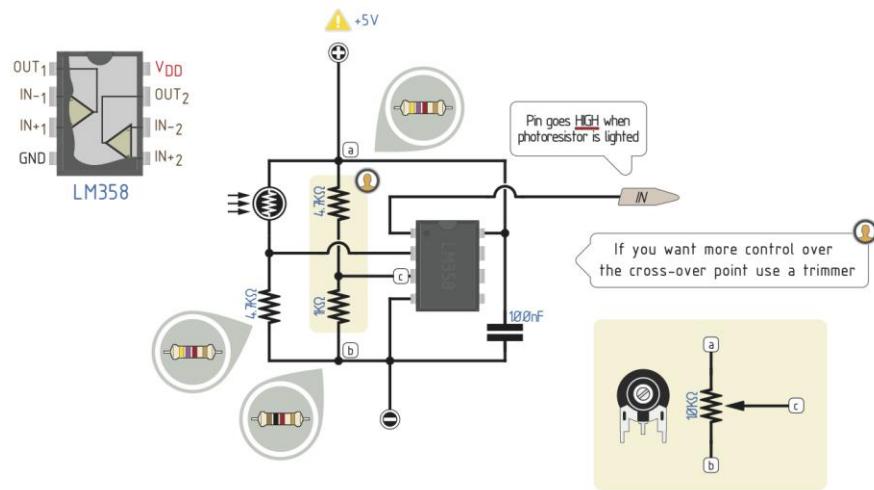


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Use a Photoresistor as digital ON/OFF signal



Use a Photoresistor as digital ON/OFF signal

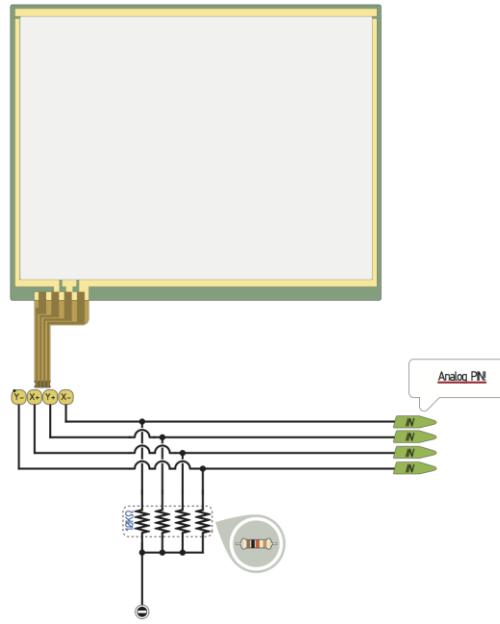


Connect a DS Touchscreen



BASIC CONNECTIONS

Connect a DS Touchscreen



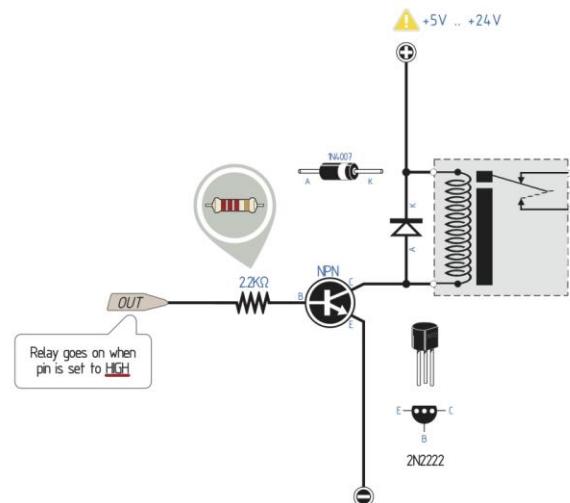
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Connect a Relay



BASIC CONNECTIONS

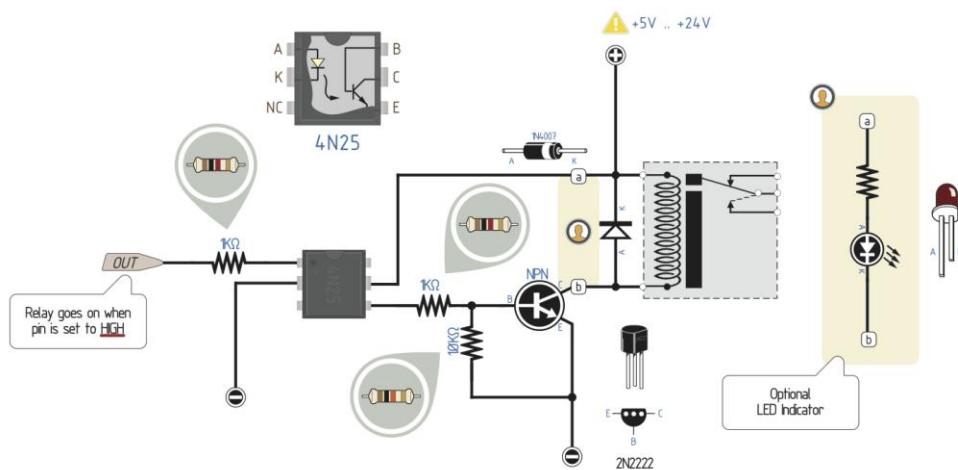
Connect a Relay



Connect a Relay (Optoisolated)



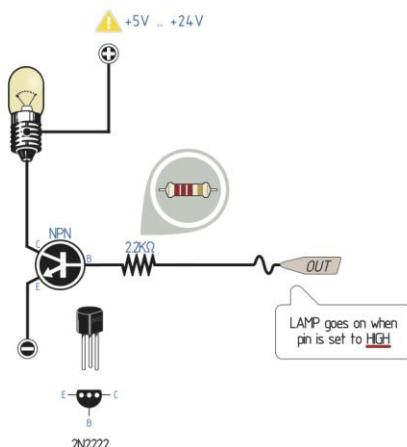
Connect a Relay (Optoisolated)



Connect a Lamp (DC LOW Voltage)



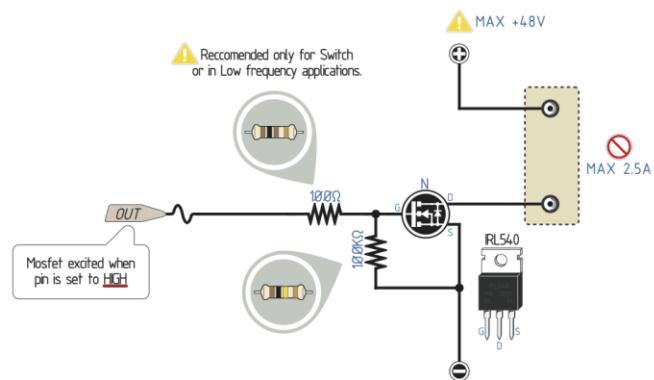
Connect a Lamp (DC LOW Voltage)



Connect a Mosfet



Connect a Mosfet

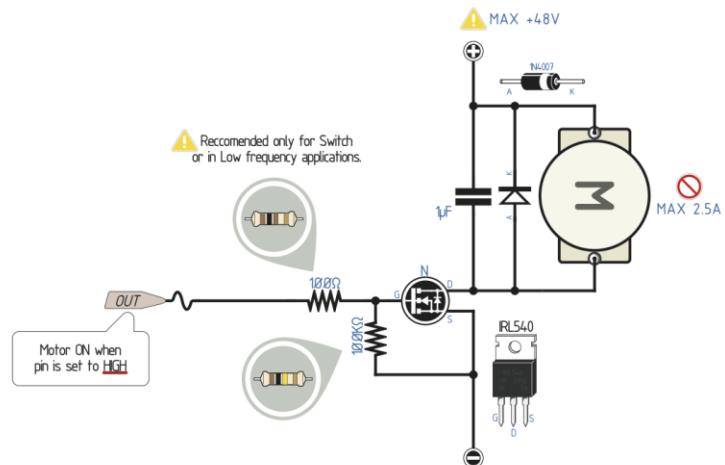


Connect a DC Motor



BASIC CONNECTIONS

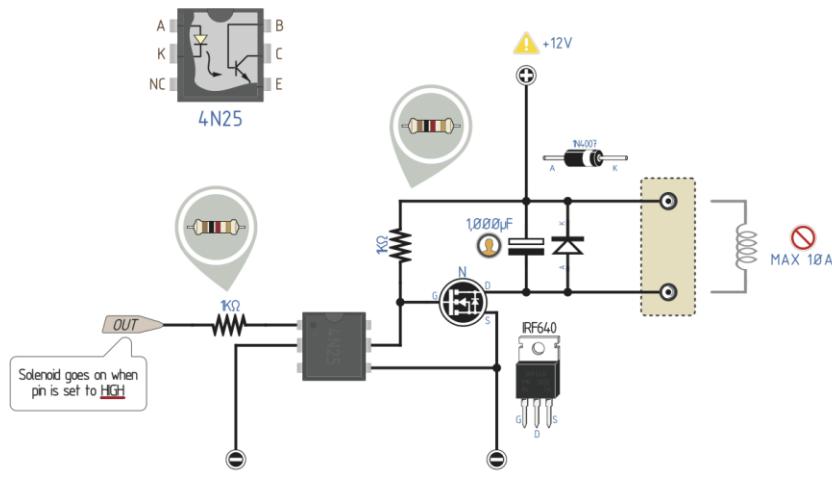
Connect a DC Motor



Connect a Solenoid



Connect a Solenoid

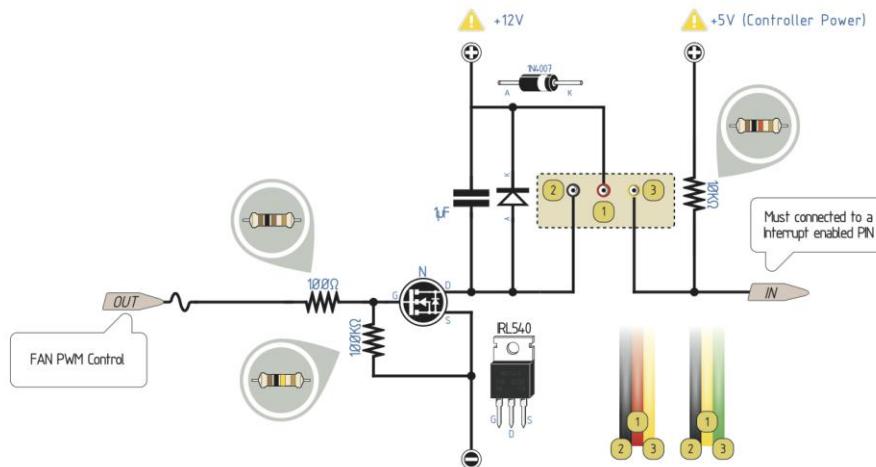


The large electrolytic capacitor is very important, as it is used to help supply the large current draw of the solenoid

Connect a Computer Fan (3 Wire)



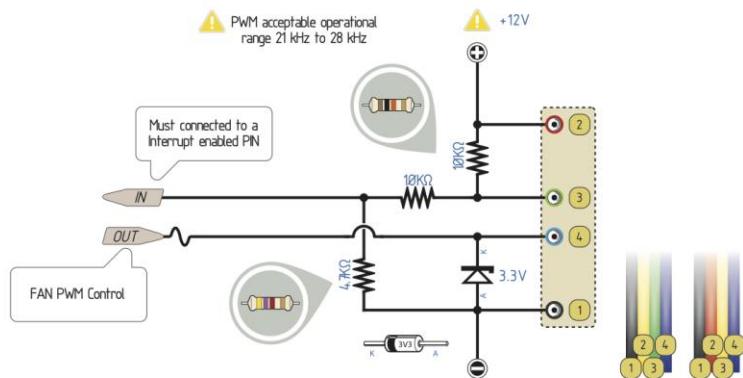
Connect a Computer Fan (3 Wire)



Connect a Computer Fan (4 Wire)



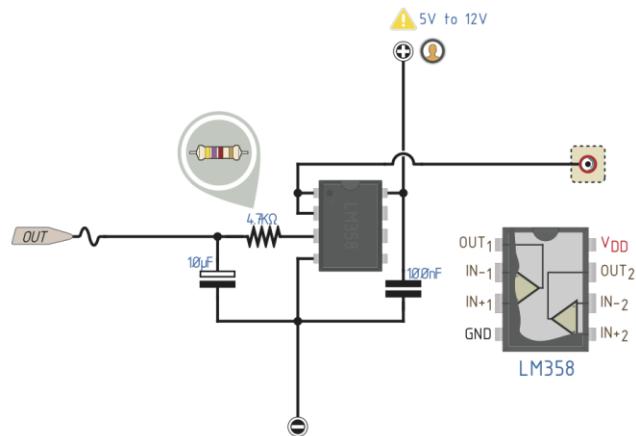
Connect a Computer Fan (4 Wire)



Buffer Out



Buffer Out



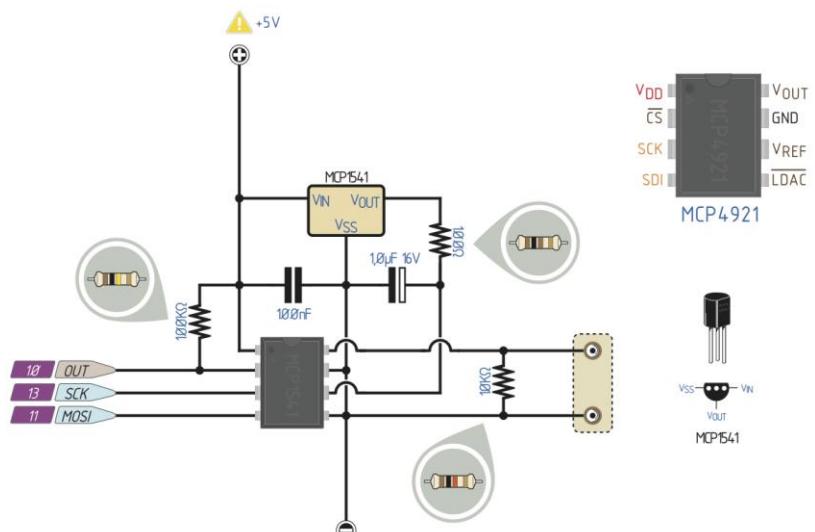
⚠ If supply voltage is 5V it outputs a maximum of about 3.4V.
Suggested 7V for 5V output

Connect a DAC



BASIC CONNECTIONS

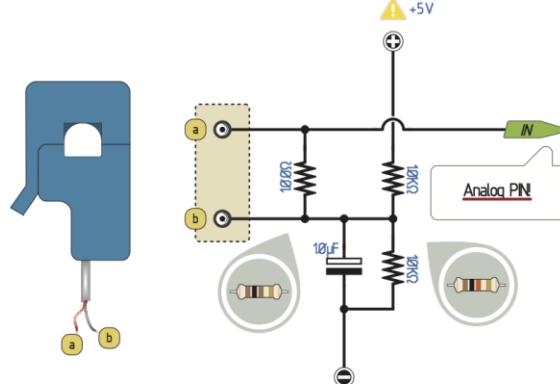
Connect a DAC



Connect a CT Sensor



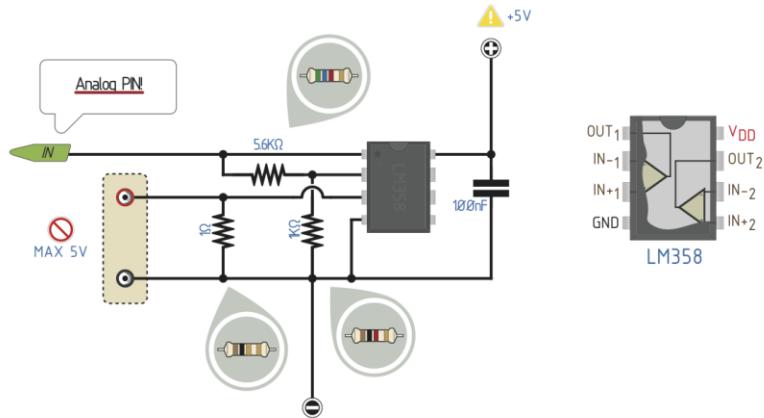
Connect a CT Sensor



current Sensor



Current Sensor

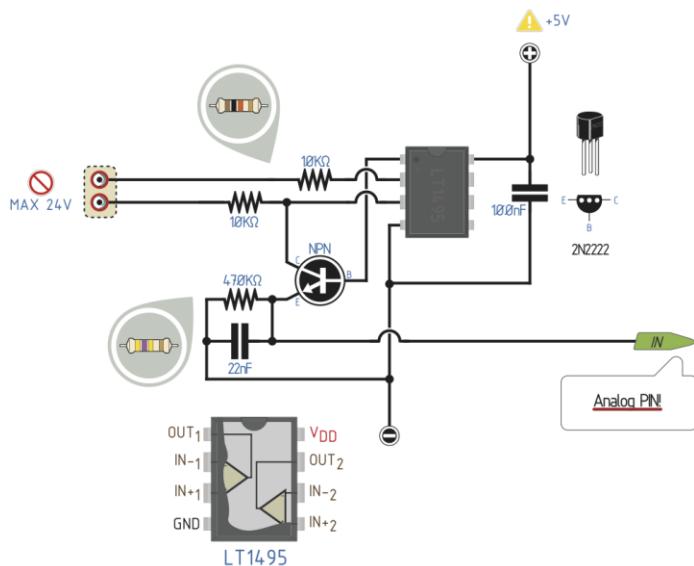


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Measuring DC current (With LT1495)



Measuring DC current (With LT1495)

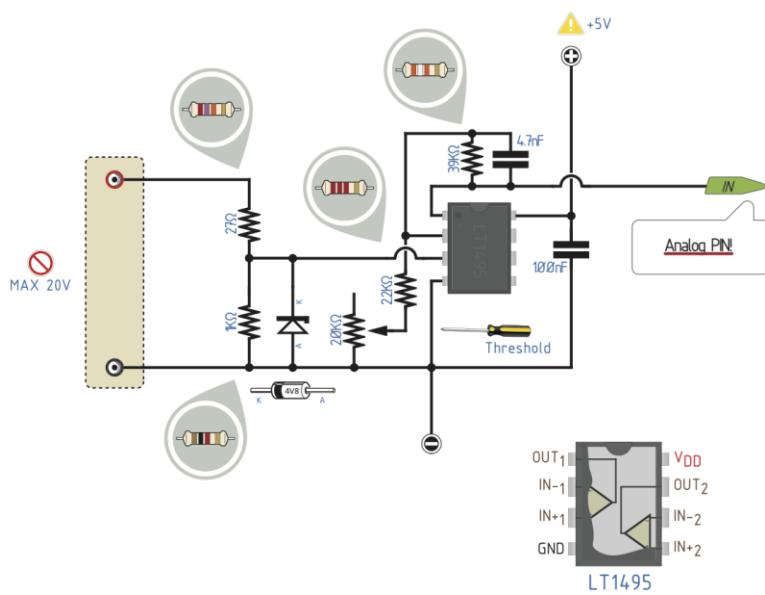


Voltage Measurement



BASIC CONNECTIONS

Voltage Measurement



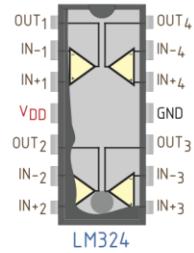
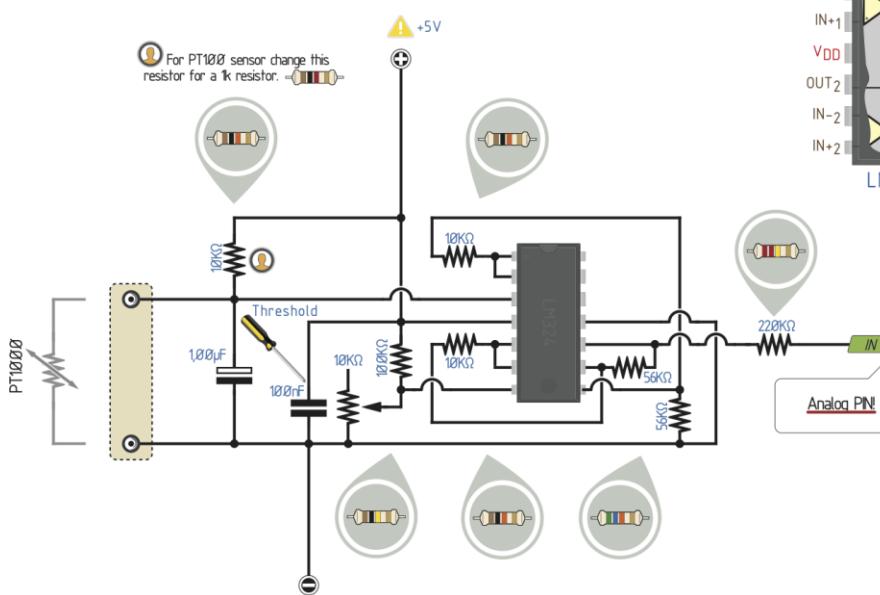
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Connect a RTD Temperature Sensor



BASIC CONNECTIONS

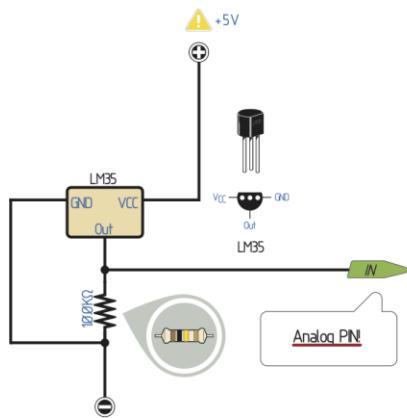
Connect a RTD Temperature Sensor



Connect a LM35 Temperature Sensor



Connect a LM35 Temperature Sensor

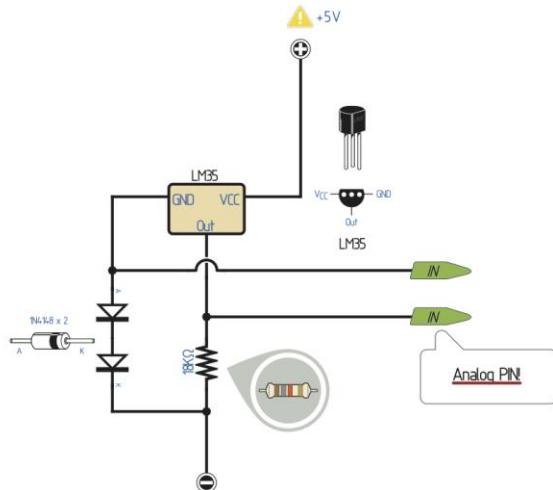


Connect a LM35 Temperature Sensor (Full range scale application)



BASIC CONNECTIONS

Connect a LM35 Temperature Sensor (Full range scale application)

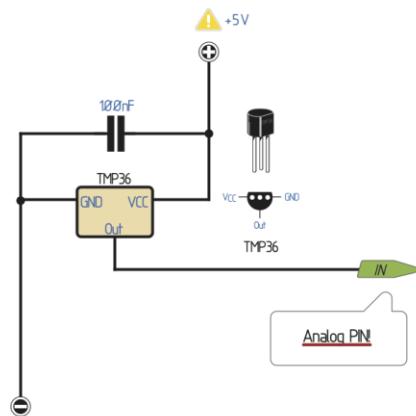


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Connect a TMP36 Temperature Sensor



Connect a TMP36 Temperature Sensor

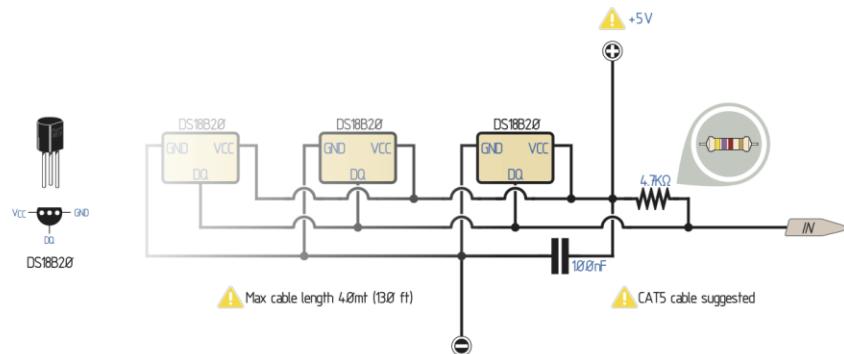


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Connect a DS18B20 Digital Temperature Sensor



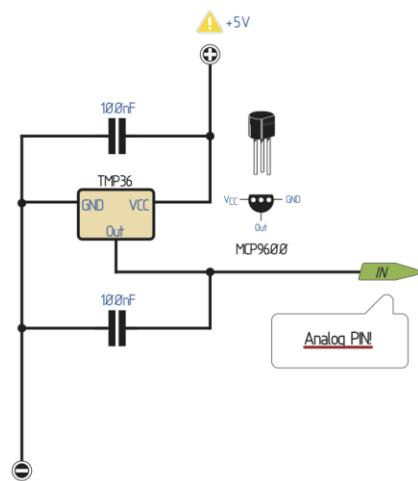
Connect a DS18B20 Digital Temperature Sensor



Connect a MCP9600 Temperature Sensor



Connect a MCP9600 Temperature Sensor



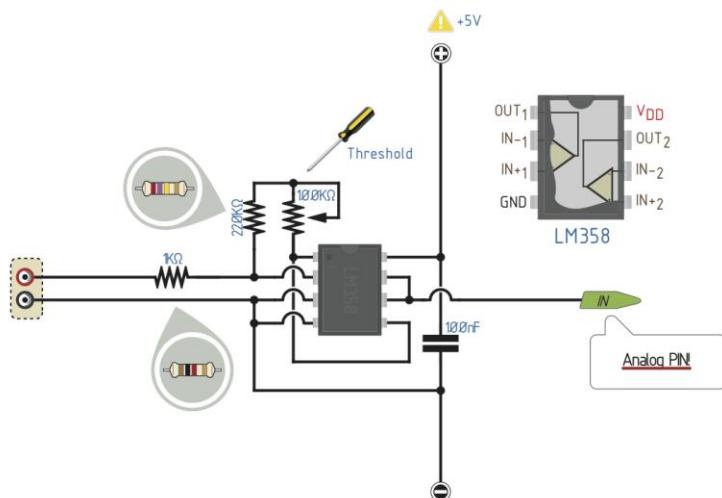
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Connect a Thermocouple



Connect a Thermocouple

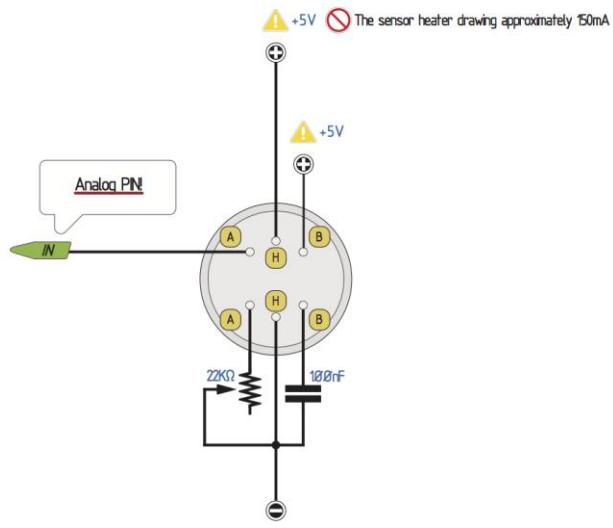


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Connect a Gas Sensor



Connect a Gas Sensor

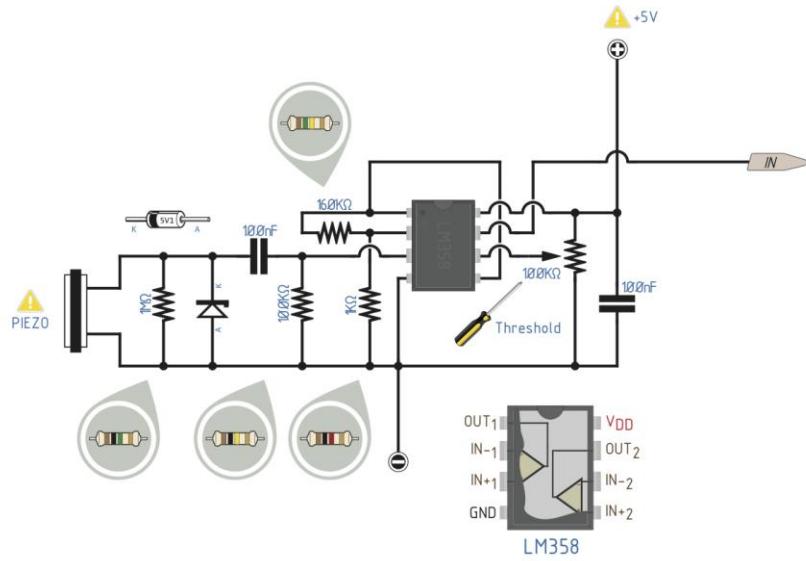


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A Vibation Sensor



A Vibration Sensor

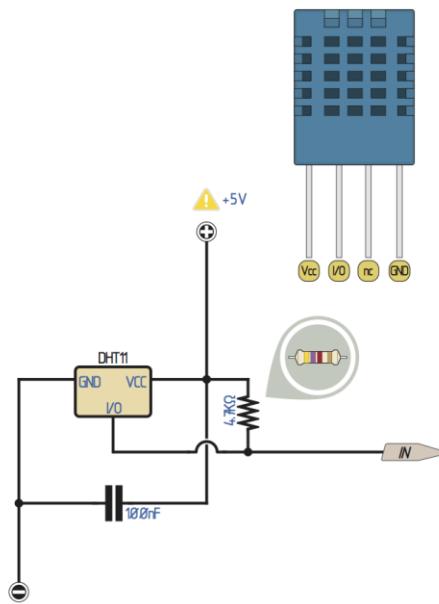


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Connect a DHT11 Temperature & Humidity Sensor



Connect a DHT11 Temperature & Humidity Sensor



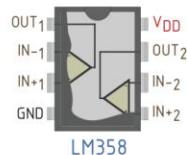
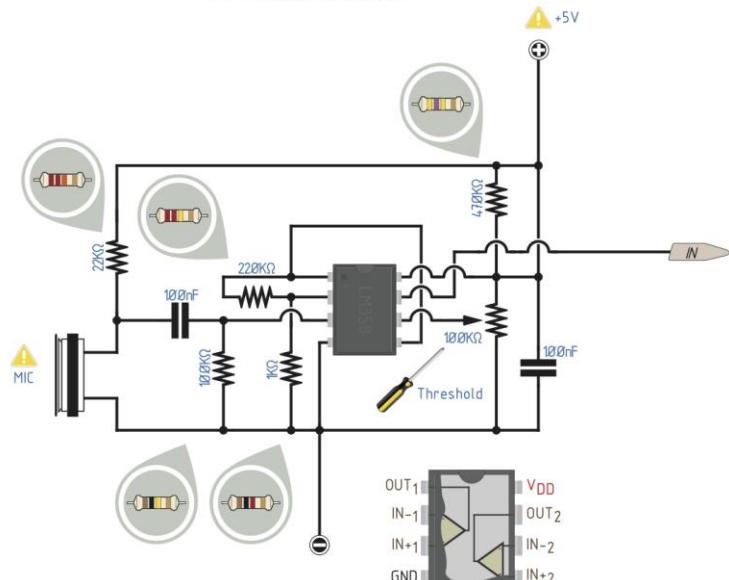
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A Sound Sensor



BASIC CONNECTIONS

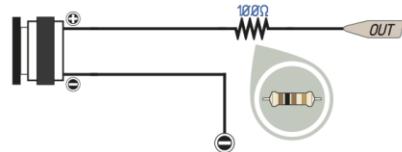
A Sound Sensor



Connect a Buzzer



Connect a Buzzer

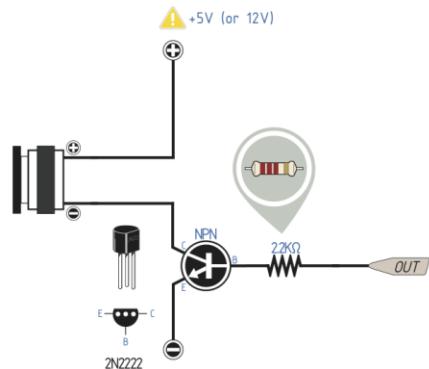


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Connect a Buzzer (With Transistor)



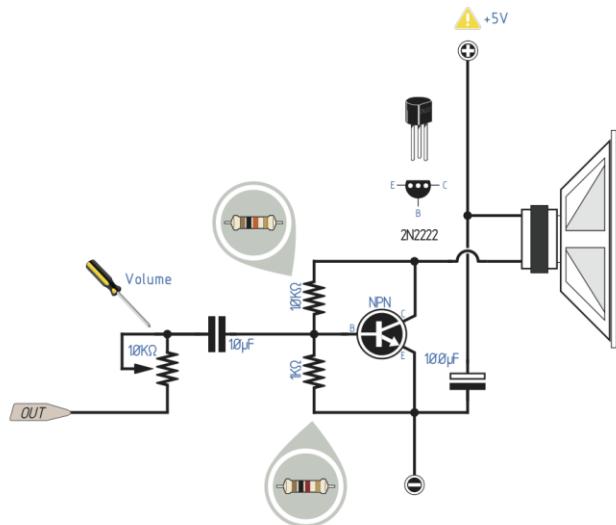
Connect a Buzzer (With Transistor)



A 1 transistor Audio Amplifier



A 1 transistor Audio Amplifier

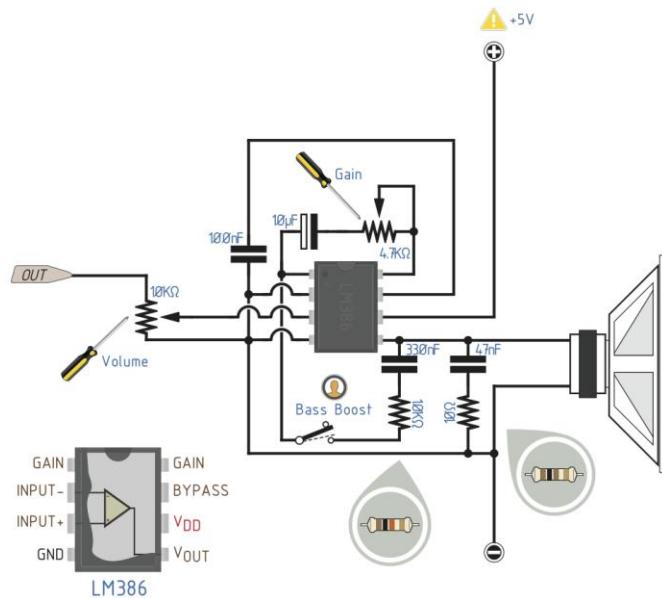


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Audio Amplifier



Audio Amplifier

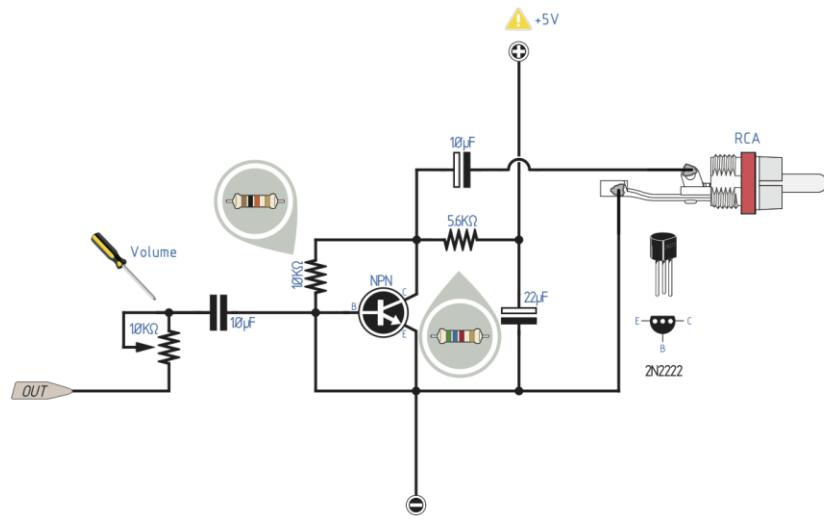


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Connect an Audio Amplifier



Connect an Audio Amplifier



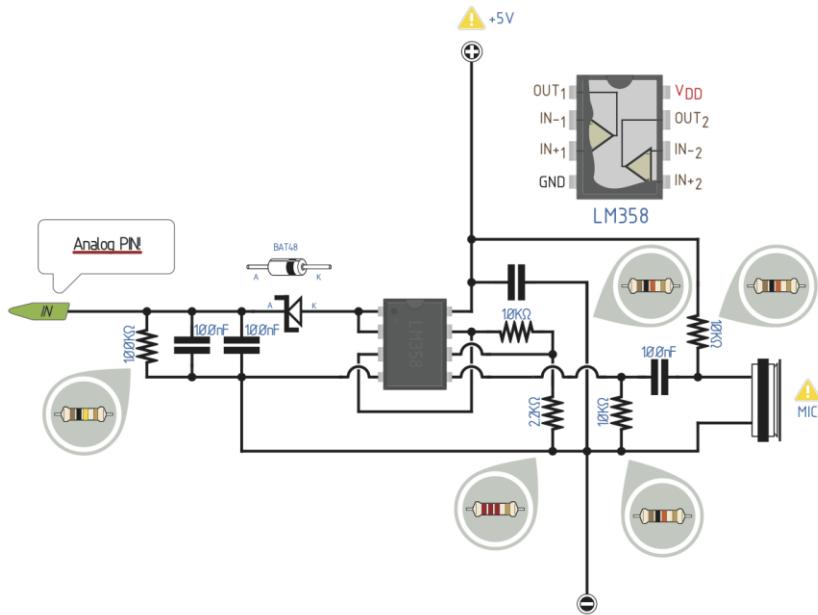
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Connect a Microphone



BASIC CONNECTIONS

Connect a Microphone

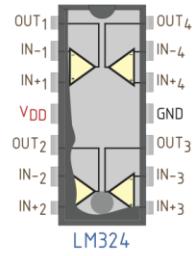
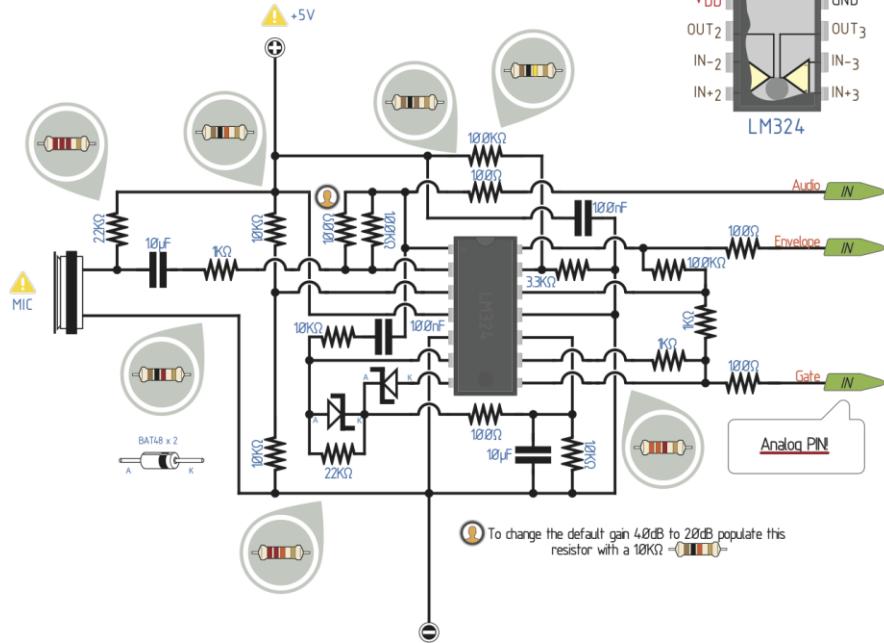


Connect a Microphone (Advanced)



BASIC CONNECTIONS

Connect a Microphone (Advanced)



LM324

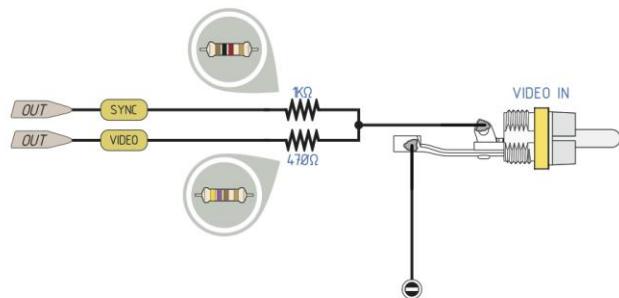


Connect to Composite Video



BASIC CONNECTIONS

Connect to Composite Video

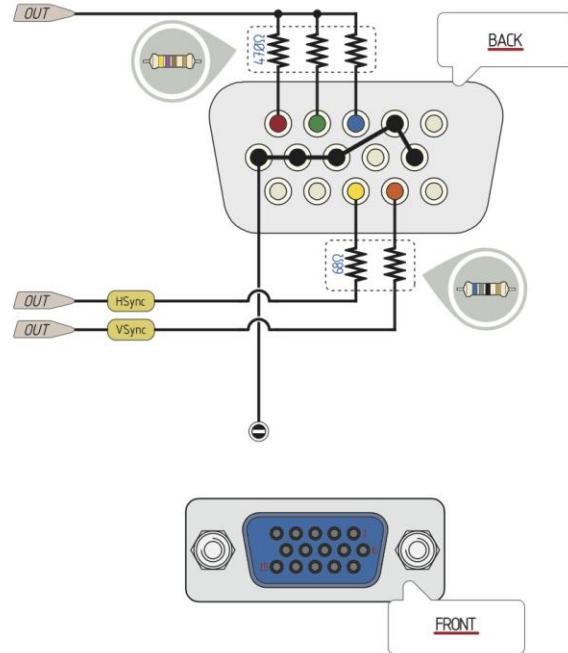


Connect to VGA



BASIC CONNECTIONS

Connect to VGA

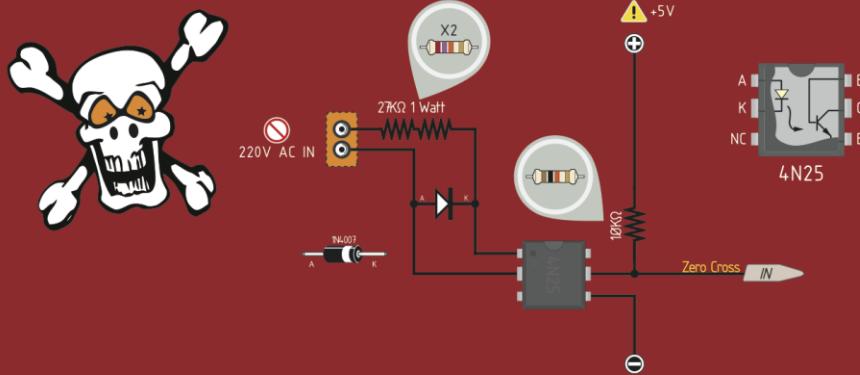


Zero crossing detect

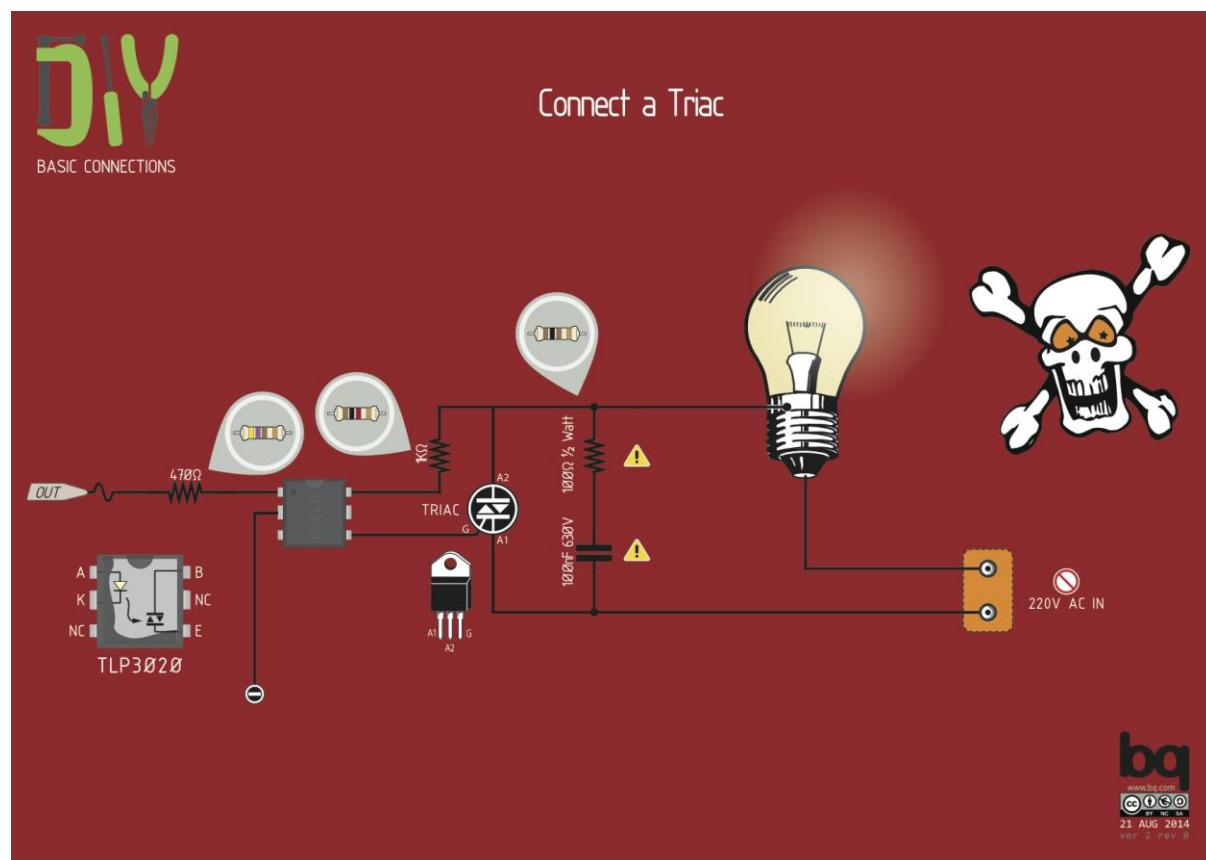


BASIC CONNECTIONS

Zero crossing detect



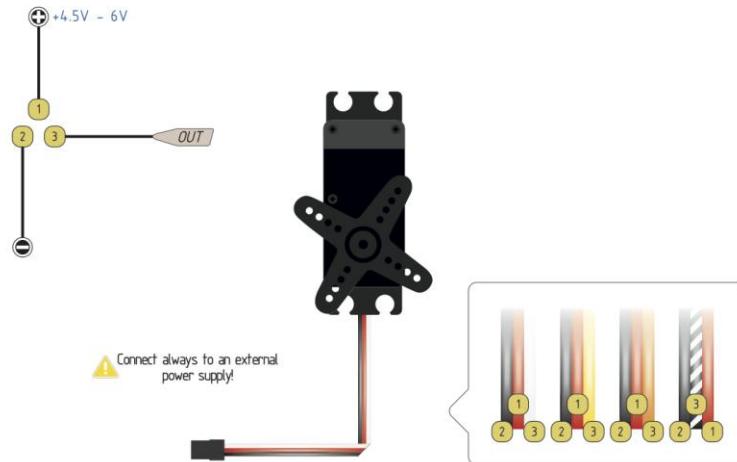
Connect a Triac



Connect a Servo



Connect a Servo

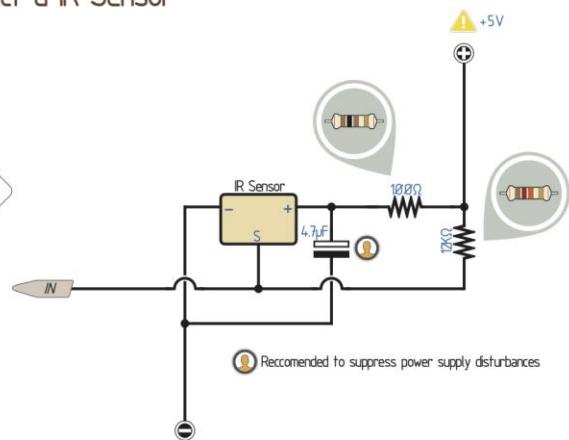
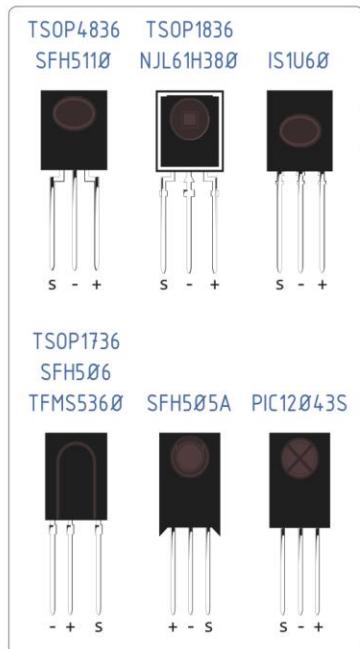


Connect a IR Sensor



BASIC CONNECTIONS

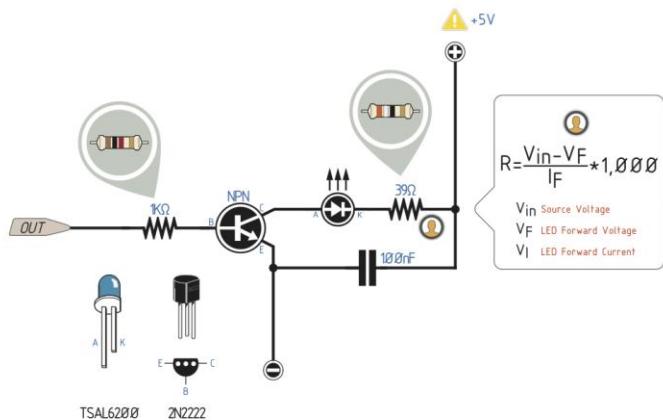
Connect a IR Sensor



Connect a IR Emitter



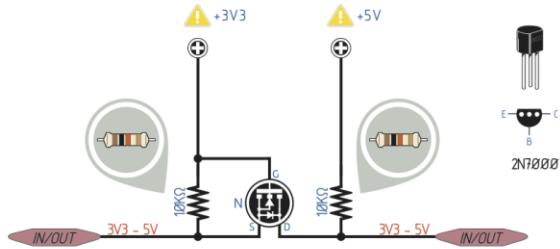
Connect a IR Emitter



Bi-Directional Voltage Level Converter 3.3V to 5V



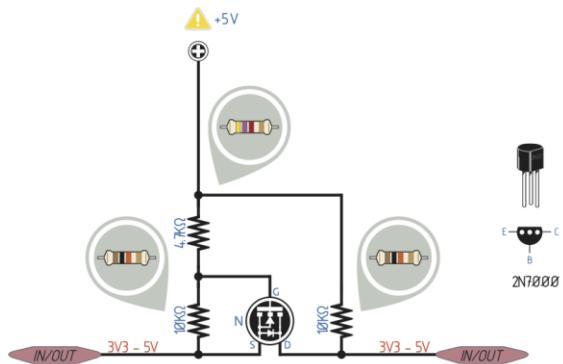
Bi-Directional Voltage Level Converter 3.3V to 5V



Bi-Directional Voltage Level Converter 33V to 5V (with Voltage Divider)



Bi-Directional Voltage Level Converter 3.3V to 5V (with Voltage Divider)



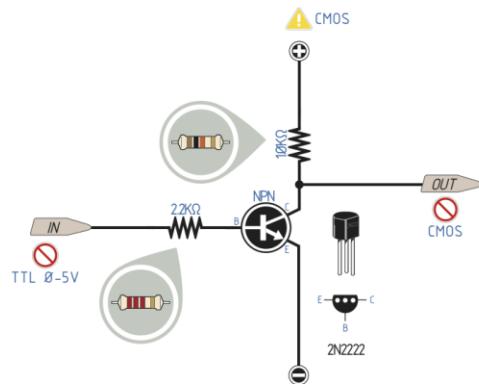
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A simple TTL/CMOS Converter



A simple TTL/CMOS Converter

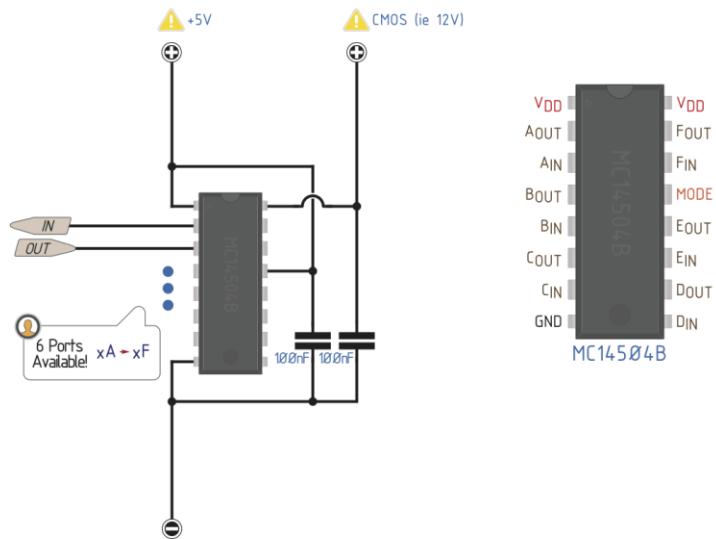


TTL/CMOS Converter (6 Ports)



BASIC CONNECTIONS

TTL/CMOS Converter (6 ports)

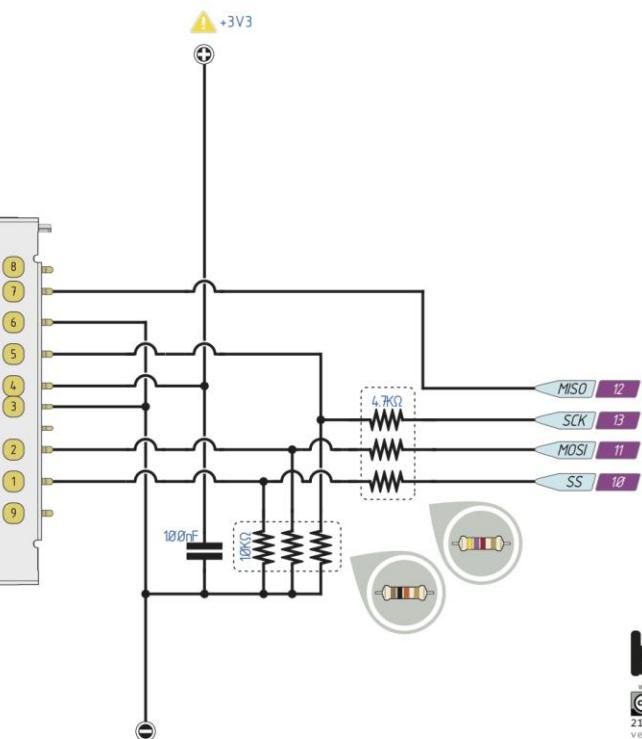
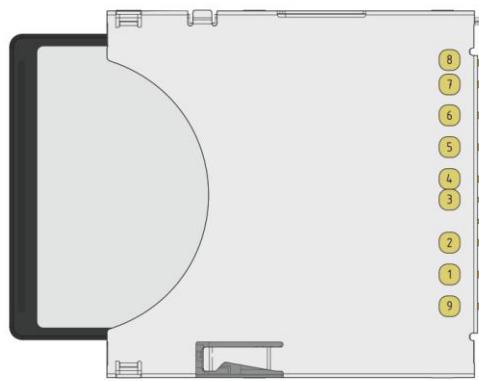


Connect a SD Card (Simple)



BASIC CONNECTIONS

Connect a SD Card (Simple)



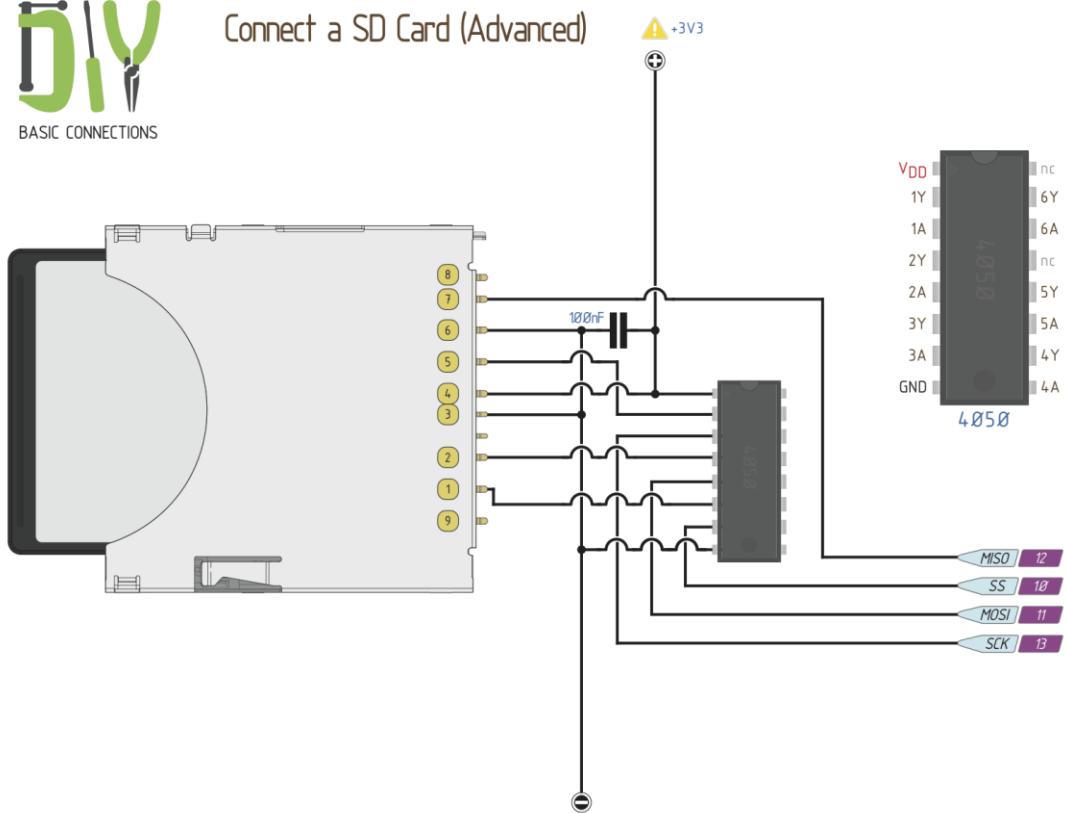
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Connect a SD Card (Advanced)



BASIC CONNECTIONS

Connect a SD Card (Advanced)

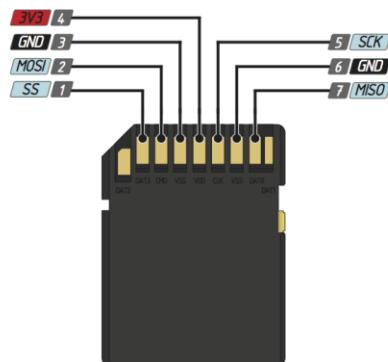


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SD Card Pinout



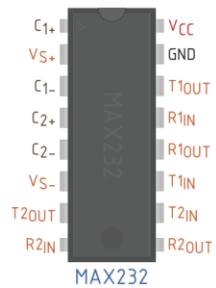
SD Card pinout



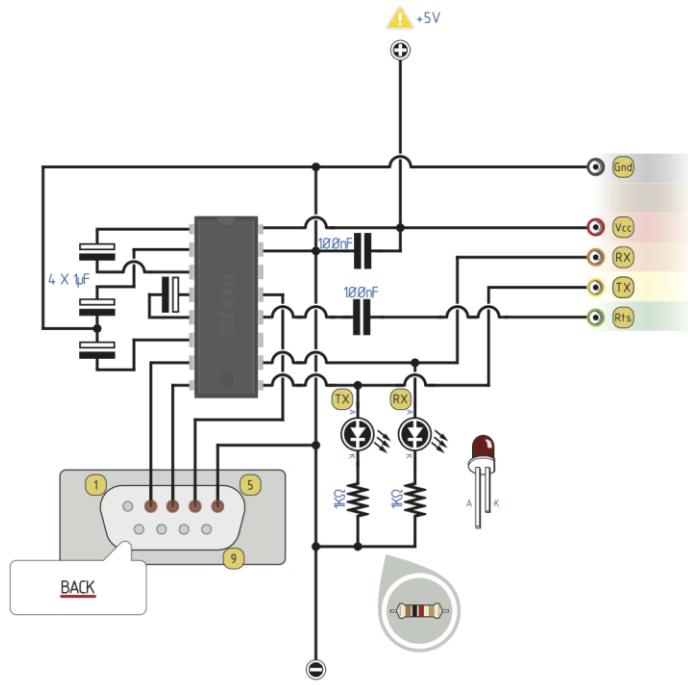
A Simple Serial interface



BASIC CONNECTIONS



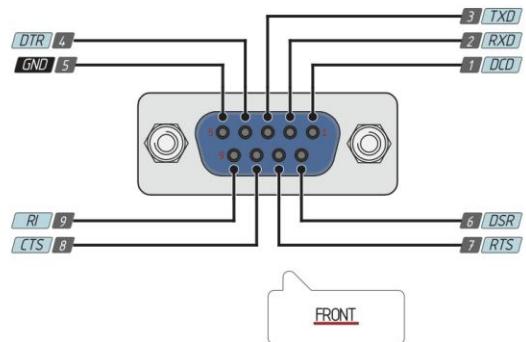
A Simple Serial interface



RS232 Pinout



RS232 Pinout

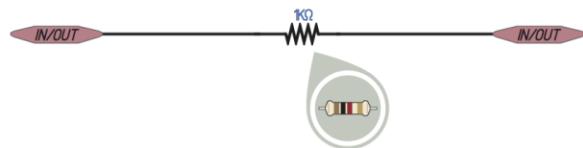


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Connect 2 MPU's



Connect 2 MPU's

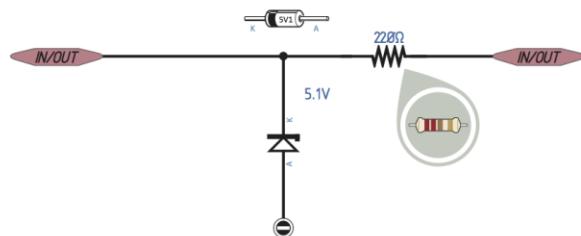


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Protect a I/O Pin



Protect a I/O Pin

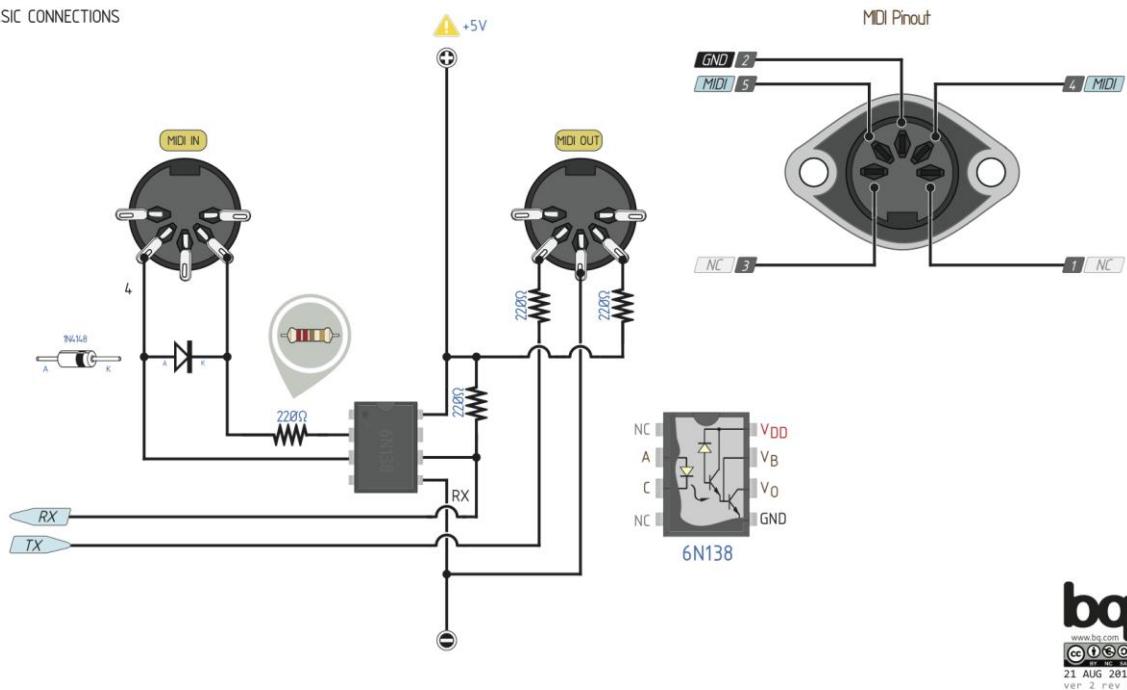


MDI Interface



BASIC CONNECTIONS

MIDI Interface



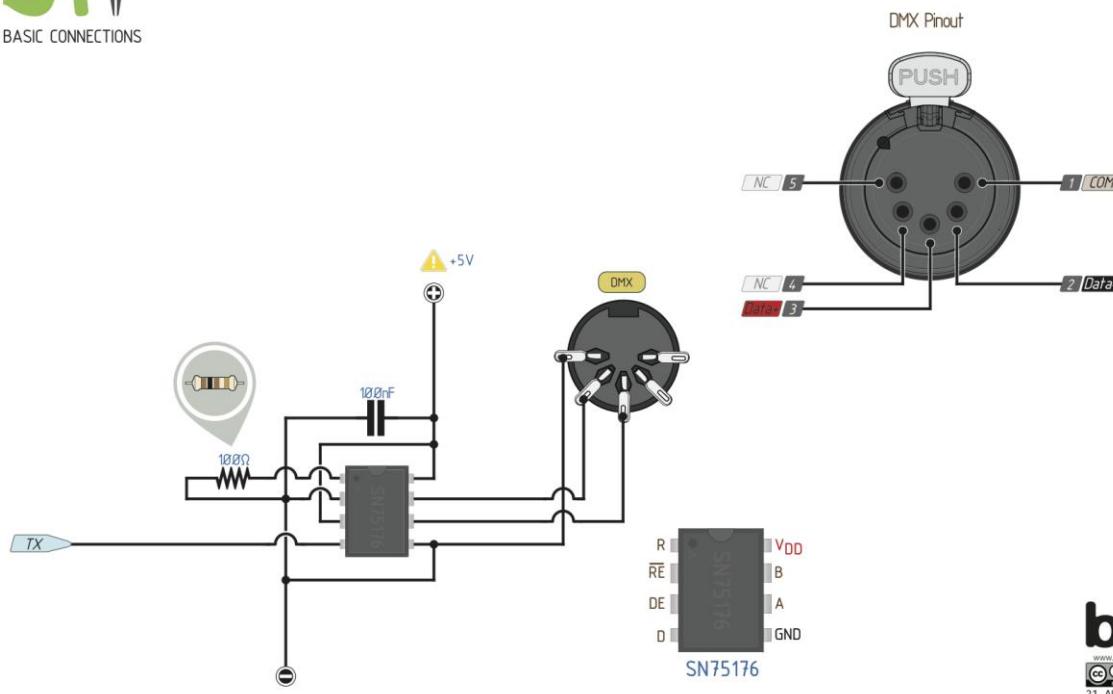
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A simple DMX interface



A simple DMX Interface

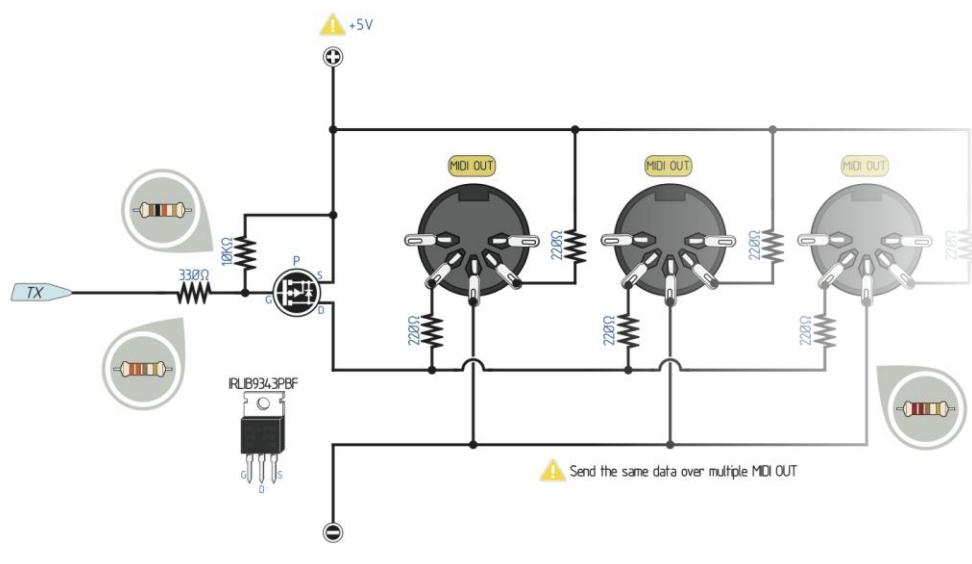


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Driving multiple MIDI Outputs



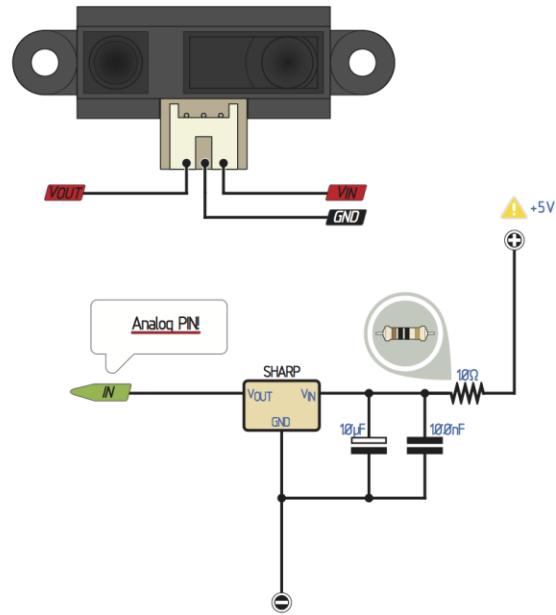
Driving multiple MIDI Outputs



Connect a SHARP GP2Y0A21 Distance Sensor



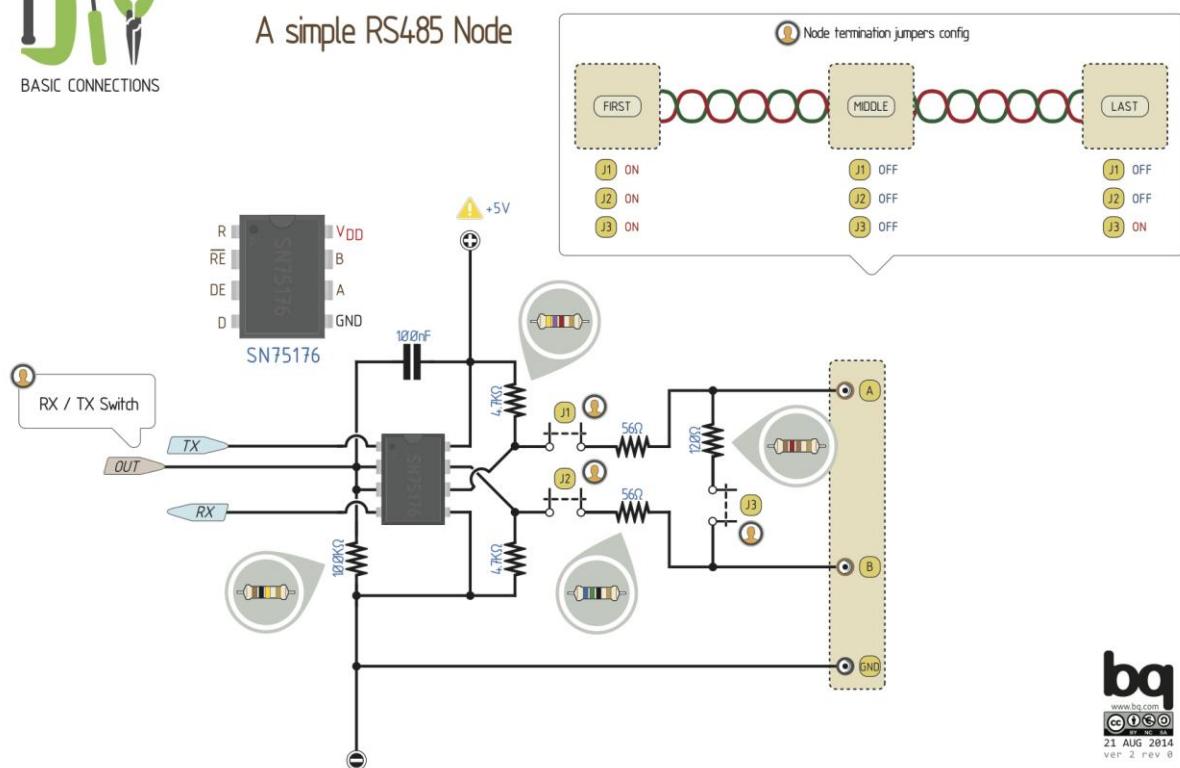
Connect a SHARP GP2Y0A21 Distance Sensor



A simple RS485 Node



A simple RS485 Node

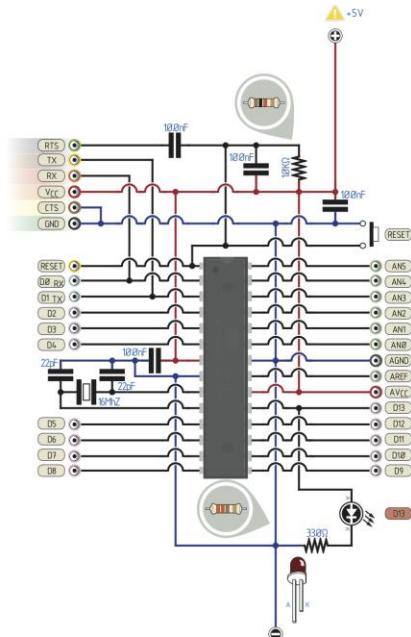


DIY Board



BASIC CONNECTIONS

DIY Board

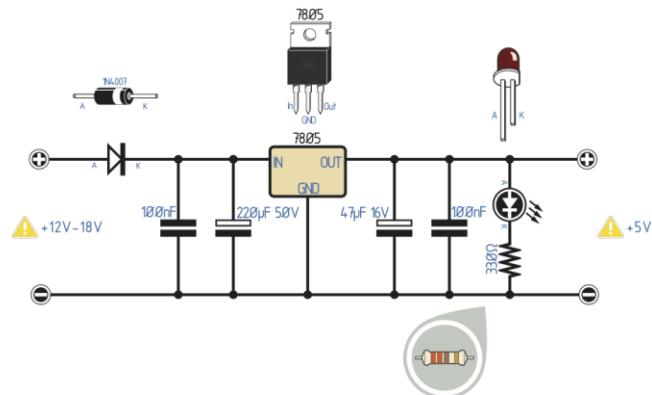


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Simple 5V Power Supply



Simple 5V Power Supply

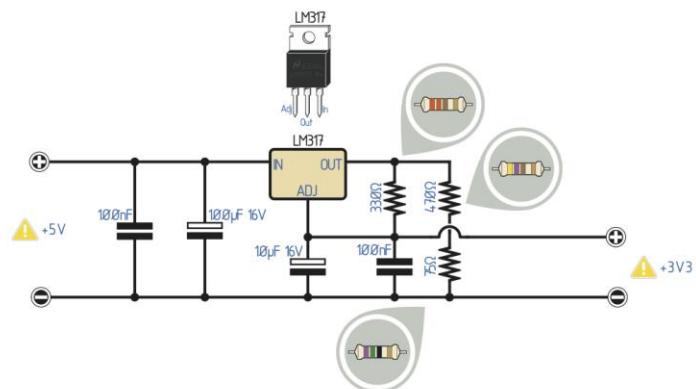


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Simple 3V3 Power Supply



Simple 3V3 Power Supply

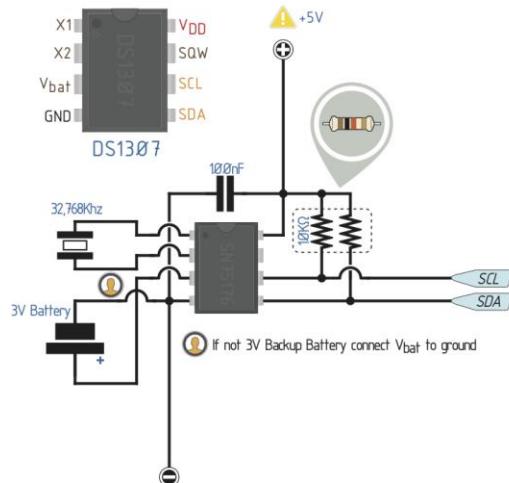


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Connect a RTC



Connect a RTC

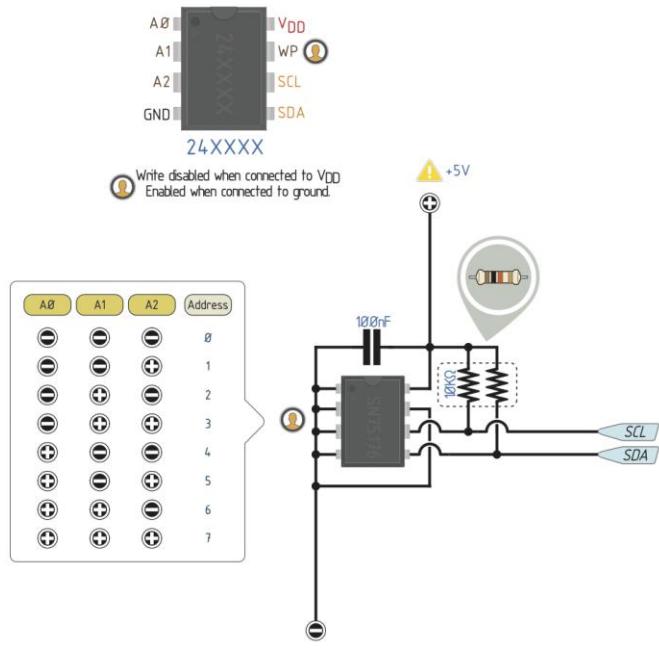


Connect a EEPROM



BASIC CONNECTIONS

Connect a EEPROM

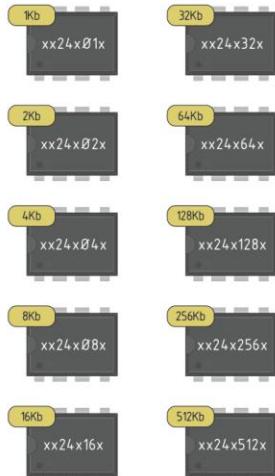


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EEPROM Wiki



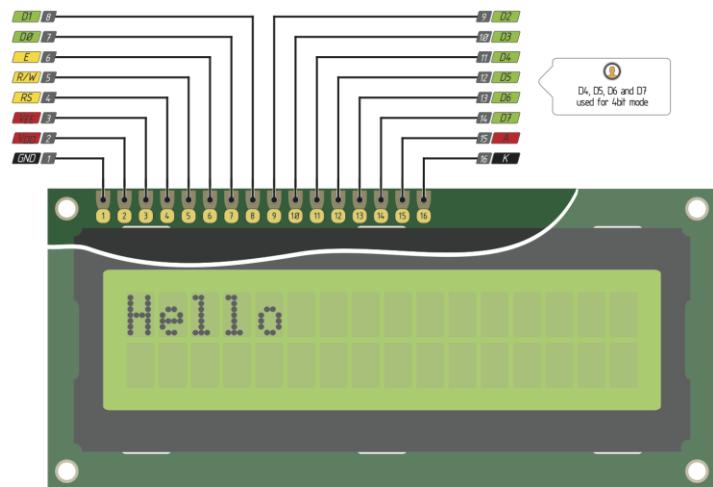
EEPROM Wiki



Hitachi 44780 Compatible pinout



Hitachi 44780 Compatible pinout

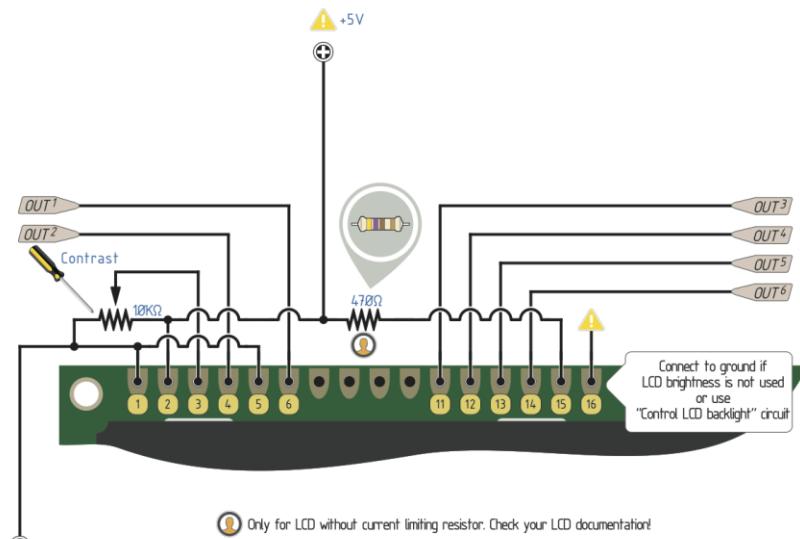


Connect a LED Hitachi 44780 Compatible



BASIC CONNECTIONS

Connect a LCD Hitachi 44780 Compatible



Only for LCD without current limiting resistor. Check your LCD documentation!

Normally the LCD backlight is composed of LEDs in series.
The total voltage drop across these LEDs is typically 4.2 V and the
recommended current through the LEDs is 120 mA.
You should use a current limiting resistor R_{LIMIT} where:

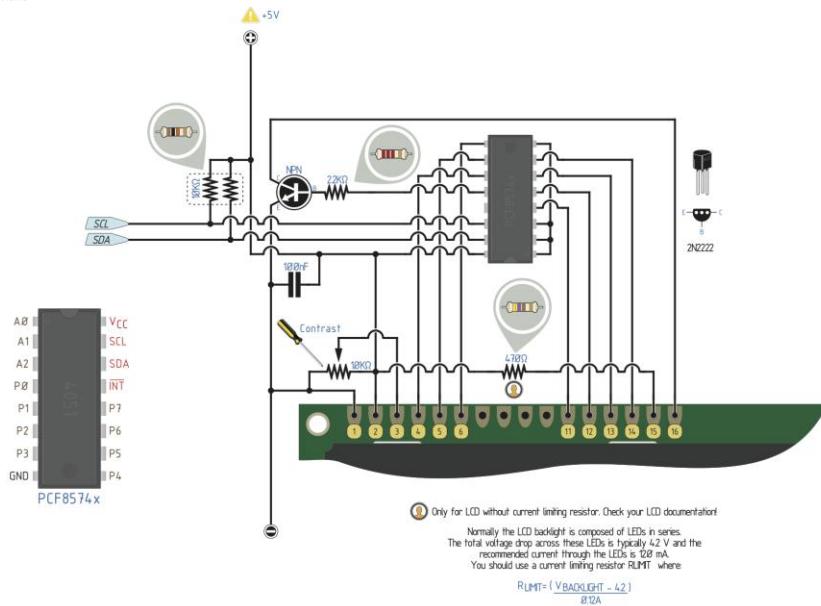
$$R_{LIMIT} = \frac{(V_{BACKLIGHT} - 4.2)}{0.12A}$$

Connect a LED Hitachi 44780 Compatible via I2C



BASIC CONNECTIONS

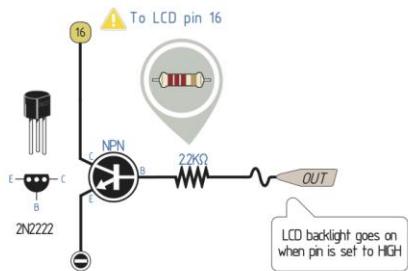
Connect a LCD Hitachi 44780 Compatible via I2C



Control LCD Backlight



Control LCD backlight

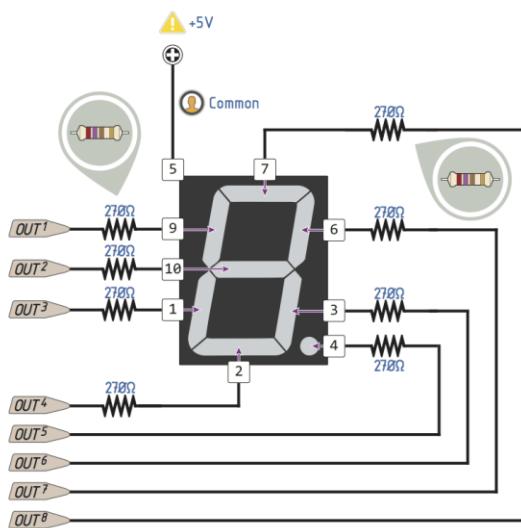


7 segments Display



BASIC CONNECTIONS

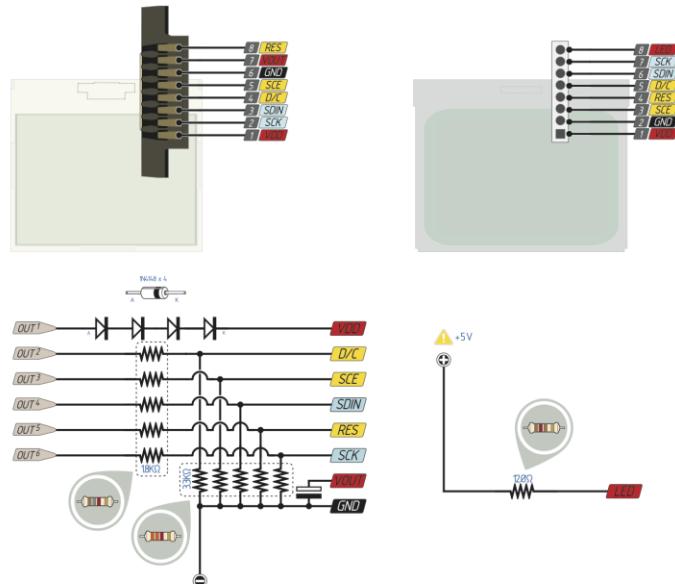
7 segments display



Connect a Nokia LCD



Connect a Nokia LCD



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