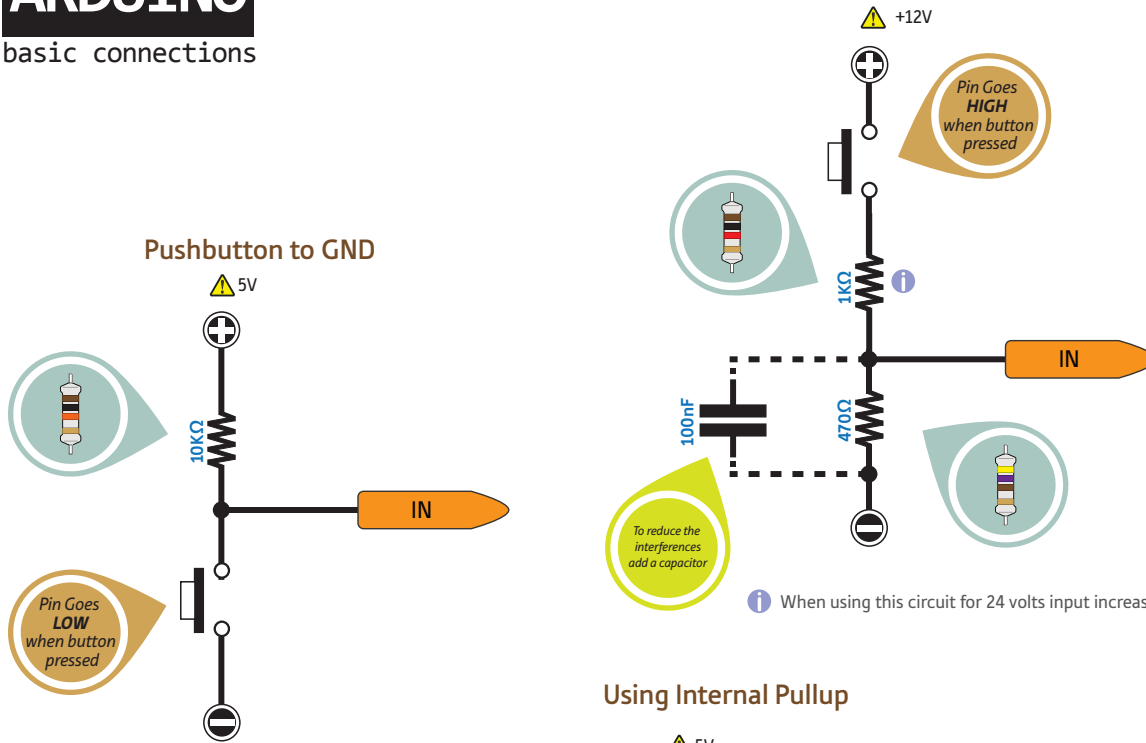


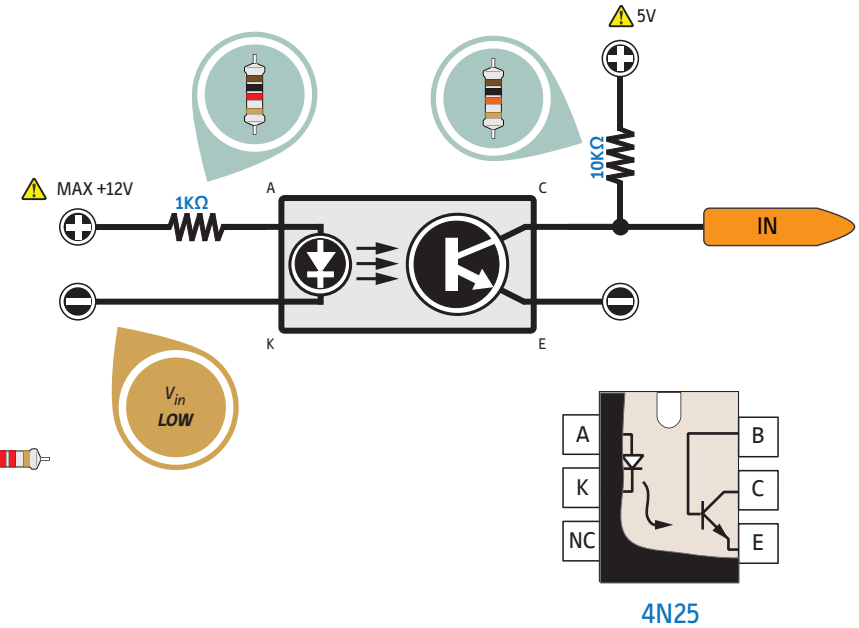
Pushbutton to 12V

Should you need to connect Arduino inputs to a DC voltage higher than 5V

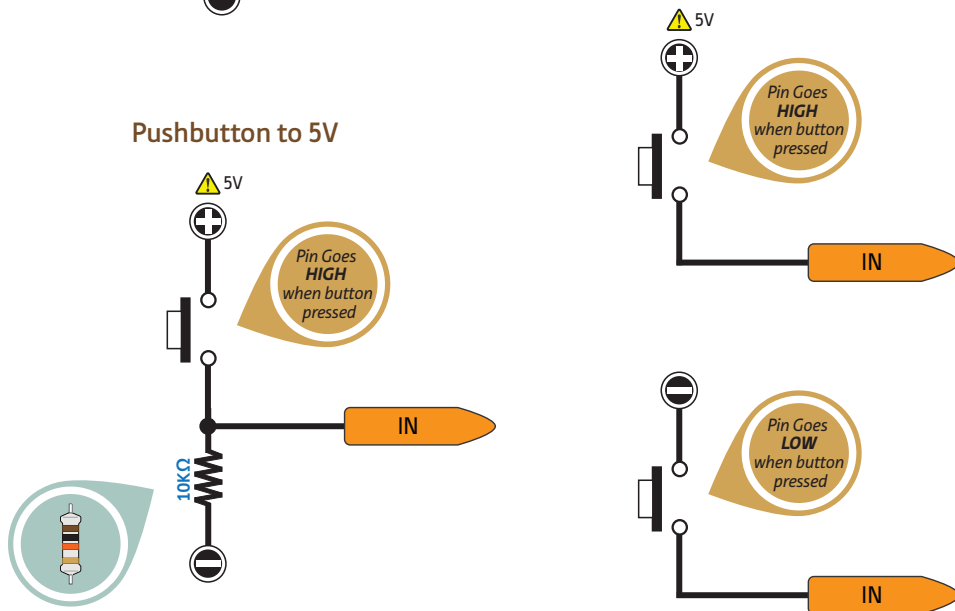


Optocoupled inputs

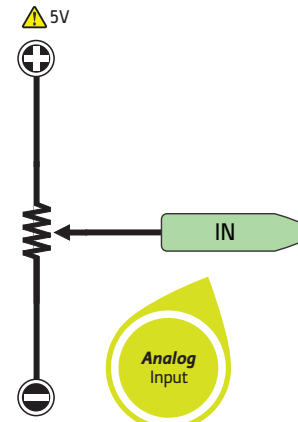
Used when galvanic separation between external circuitry and Arduino circuit is required



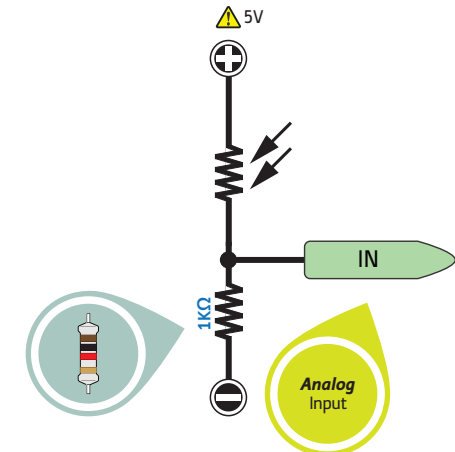
Using Internal Pullup



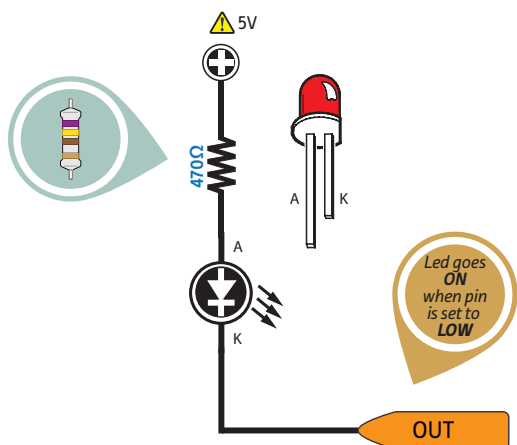
Trimmer or Potentiometer



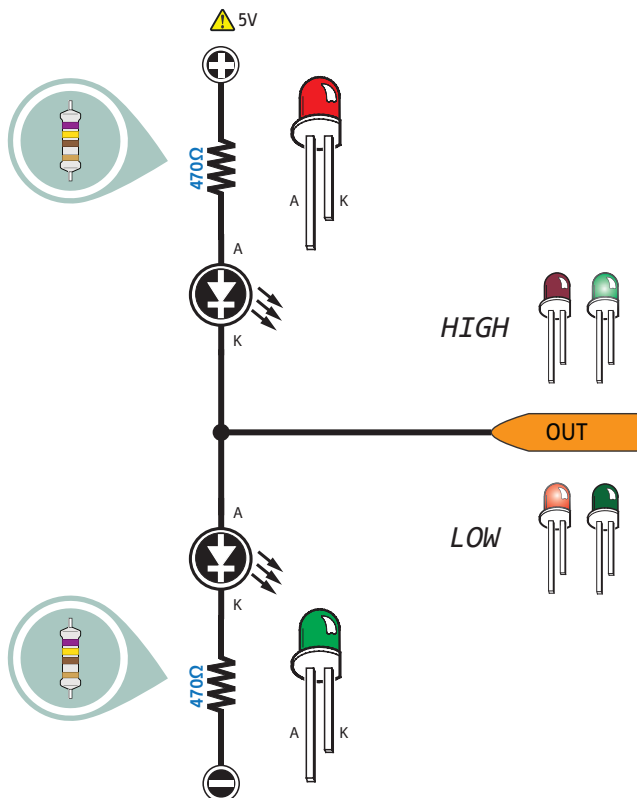
Photoresistor



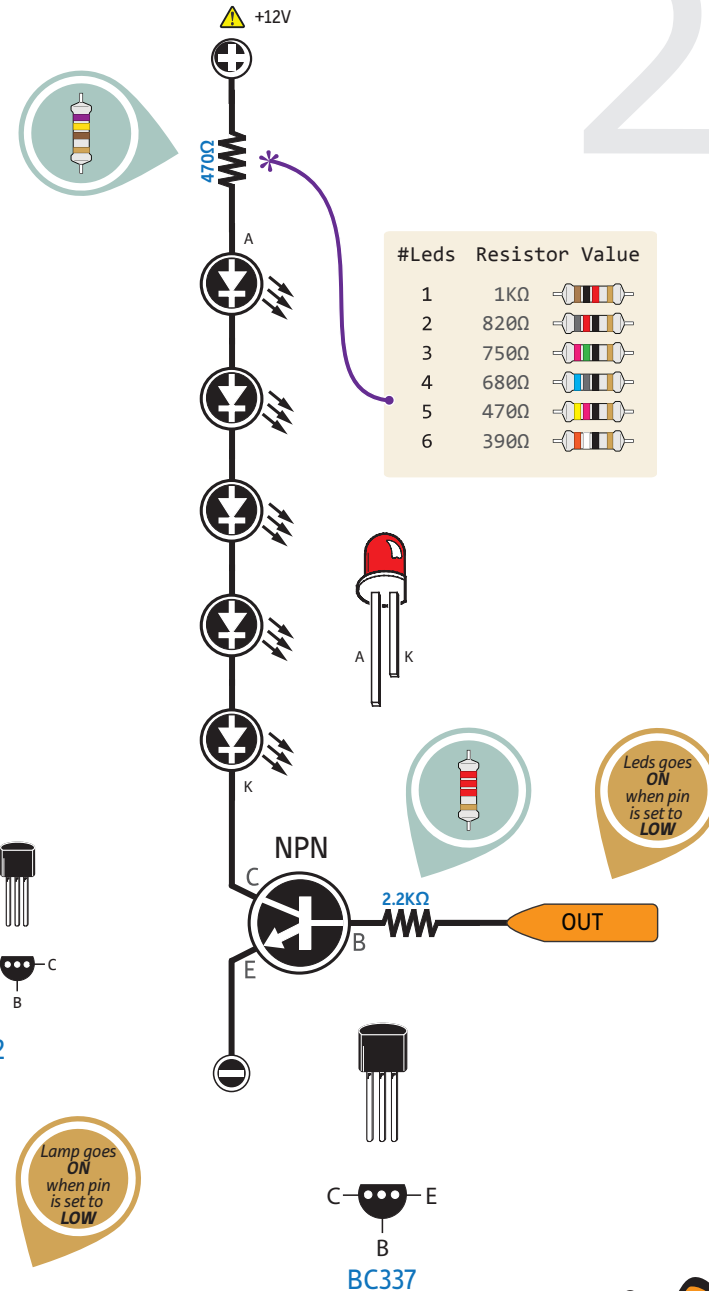
Connect a Led



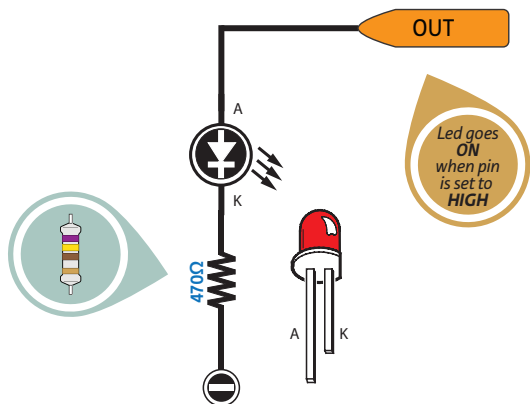
Dual LEDs or bi-color LED



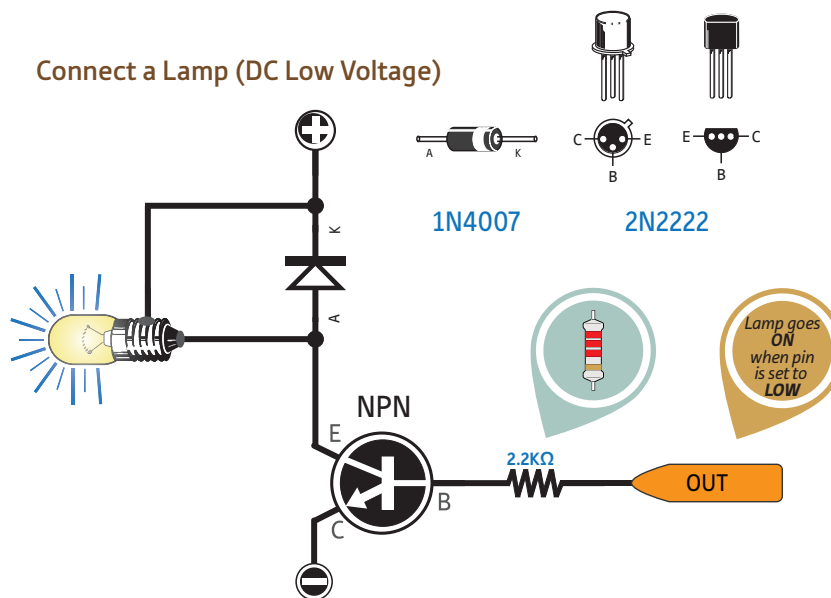
LED clusters



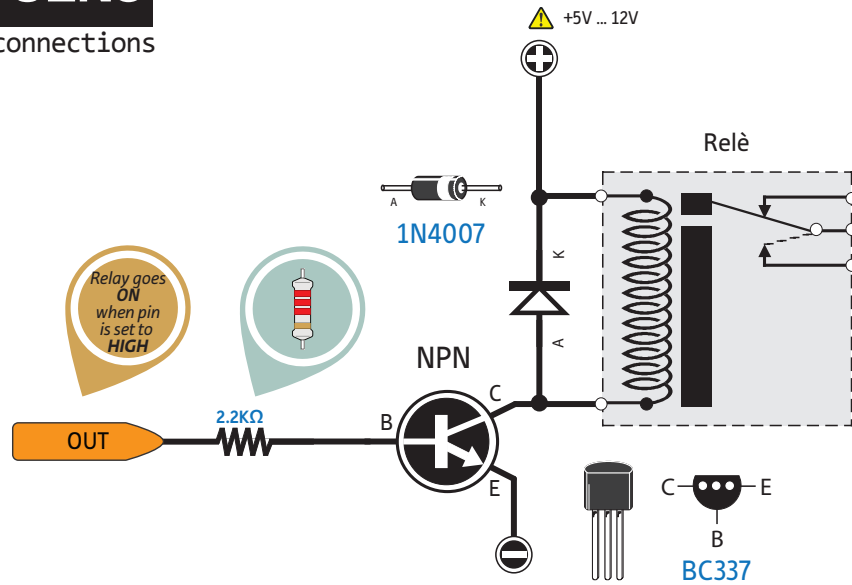
Connect a Led



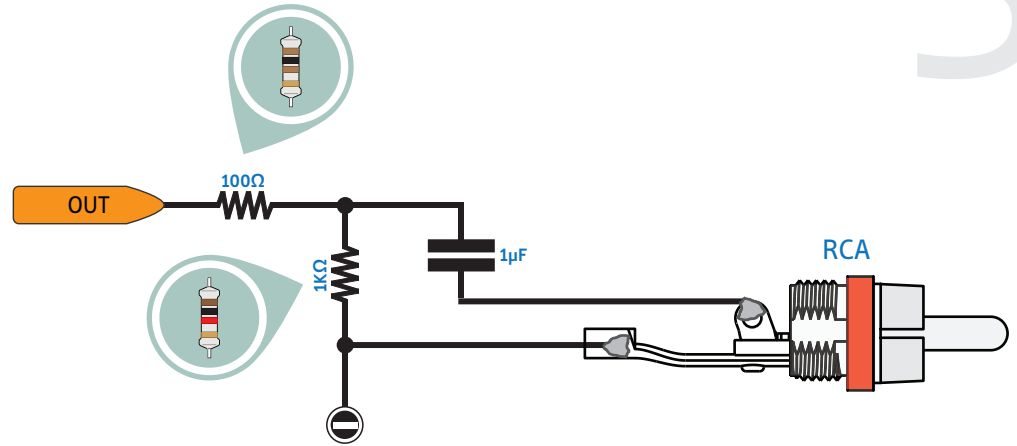
Connect a Lamp (DC Low Voltage)



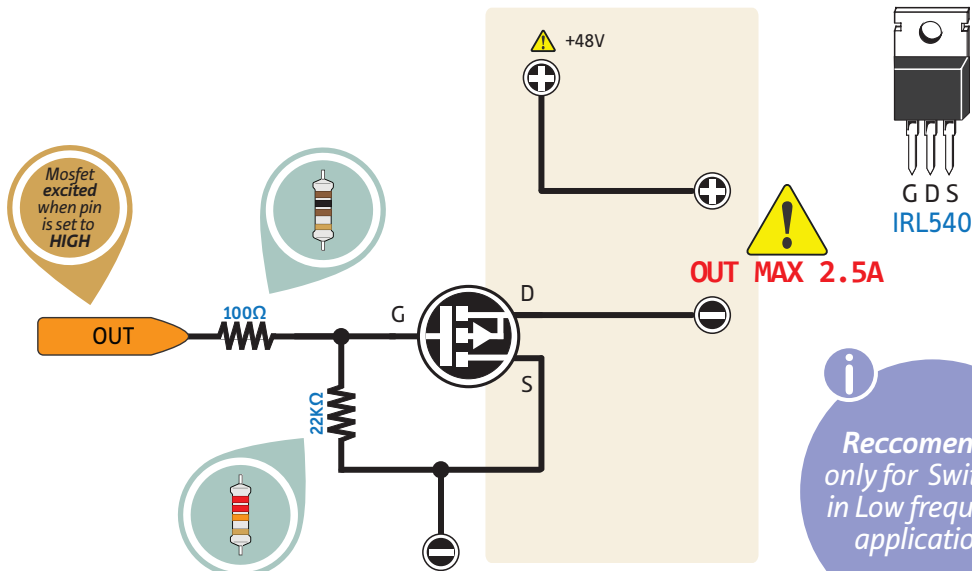
Connect a Relay



Connect an Audio Amplifier

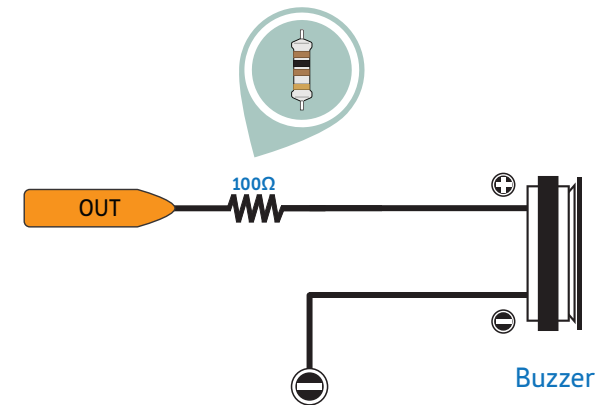


Connect a Mosfet

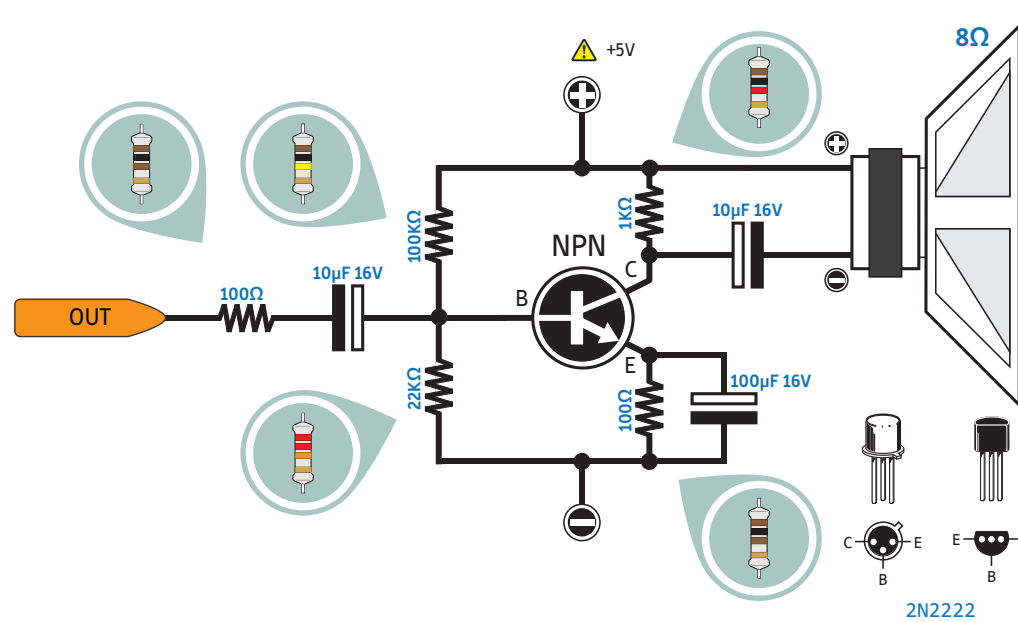


Recommened
only for Switch or
in Low frequency
applications.

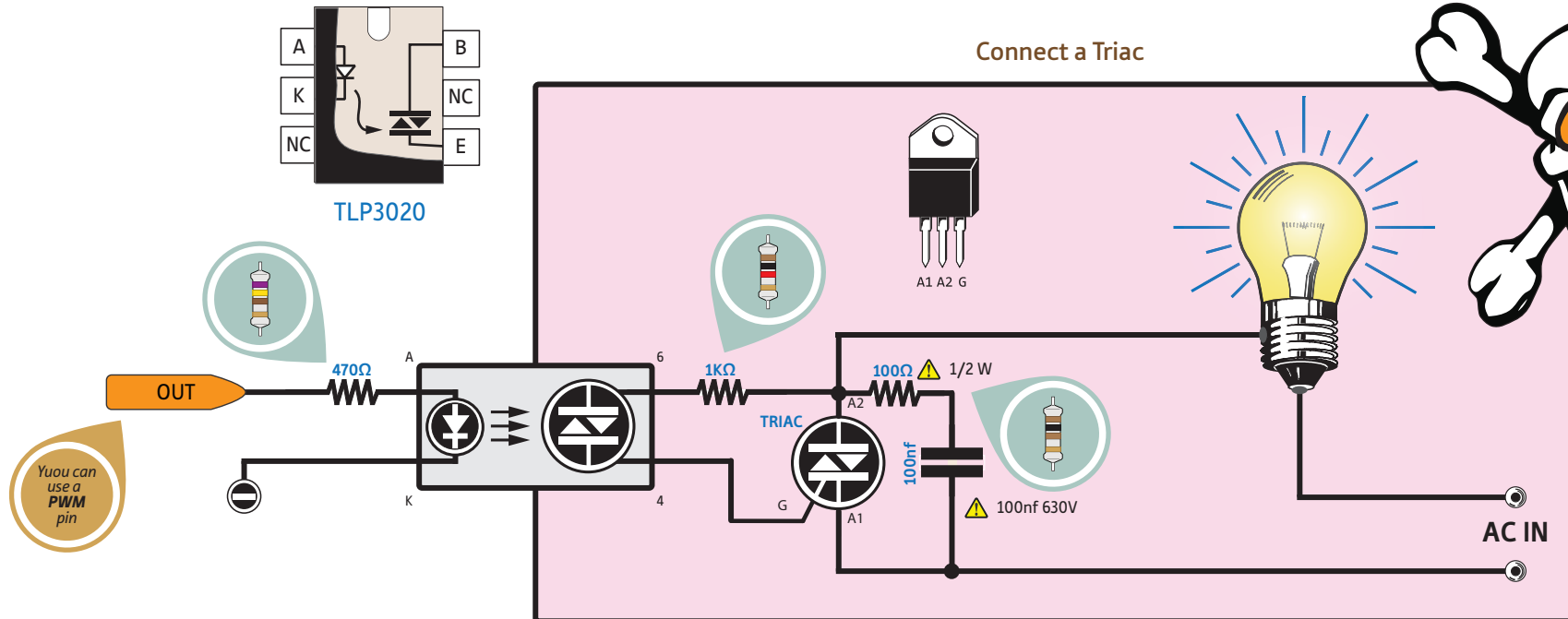
Connect a Buzzer



Connect a Speaker

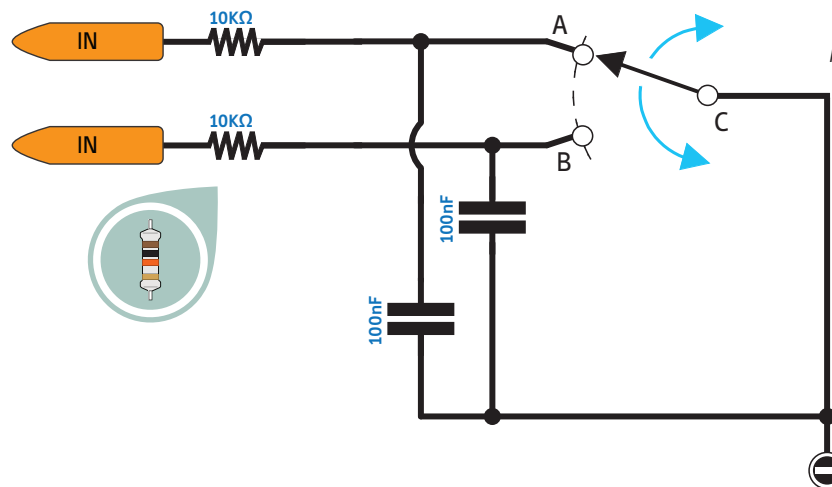
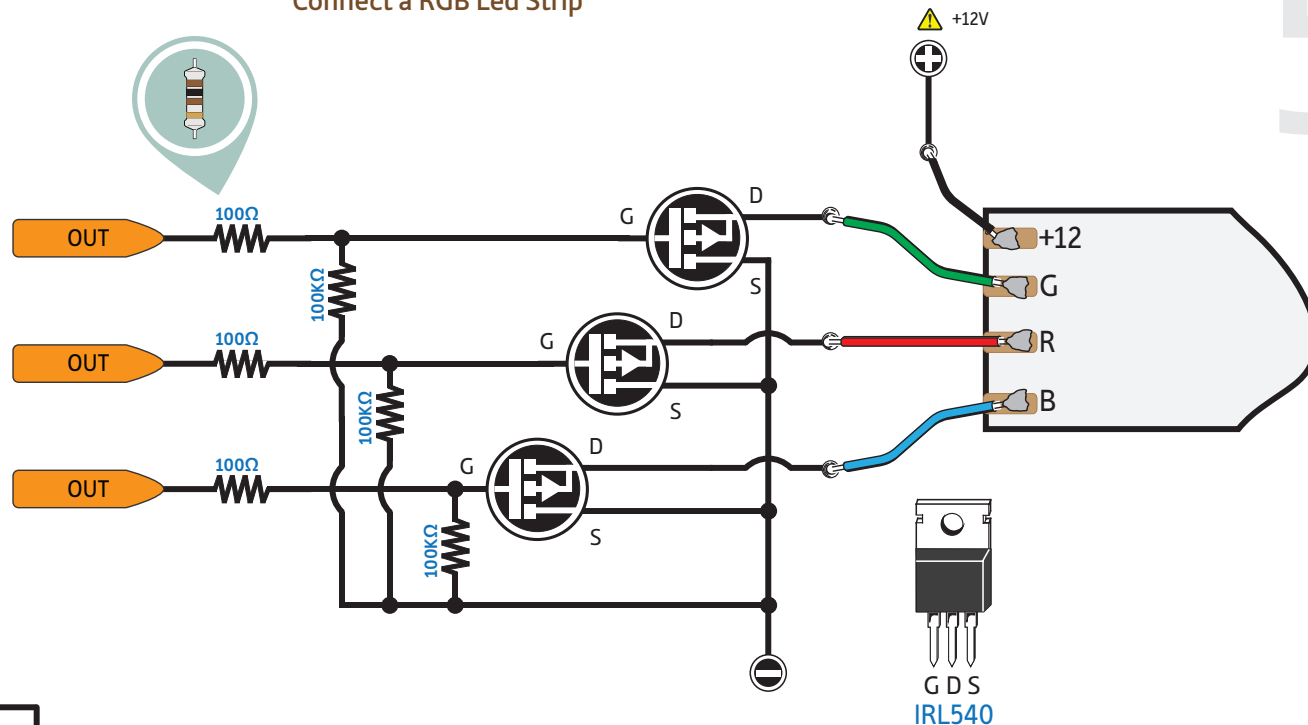


Connect a Triac

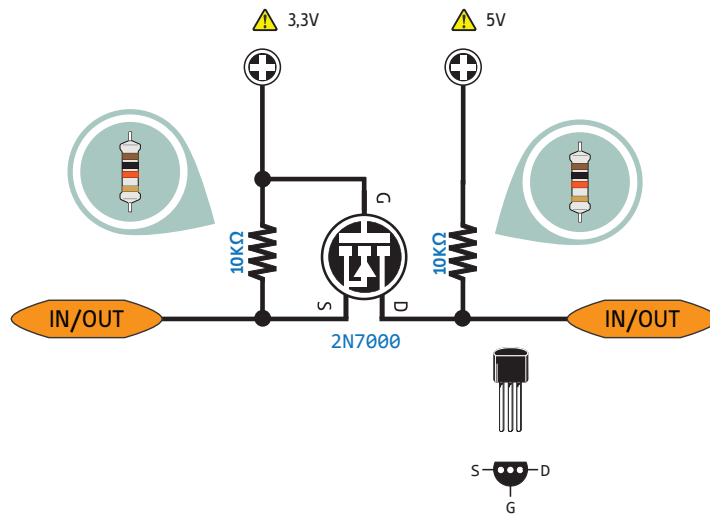


You can use a PWM pin

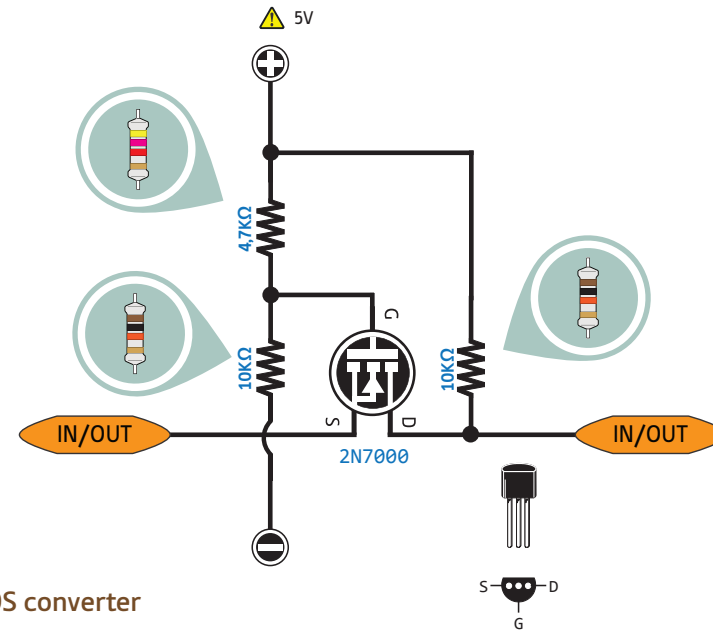
Connect a DC Motor



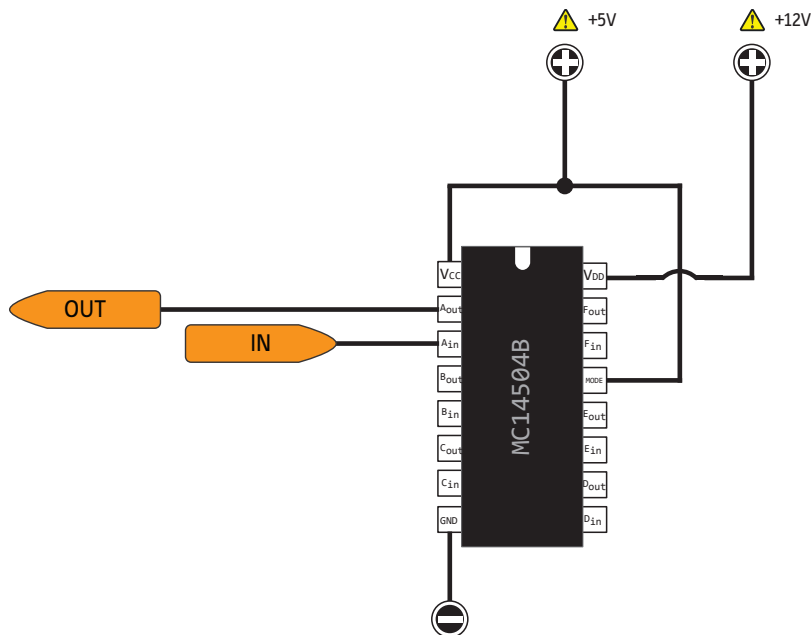
Bi-Directional Voltage Level Converter 3.3V to 5V



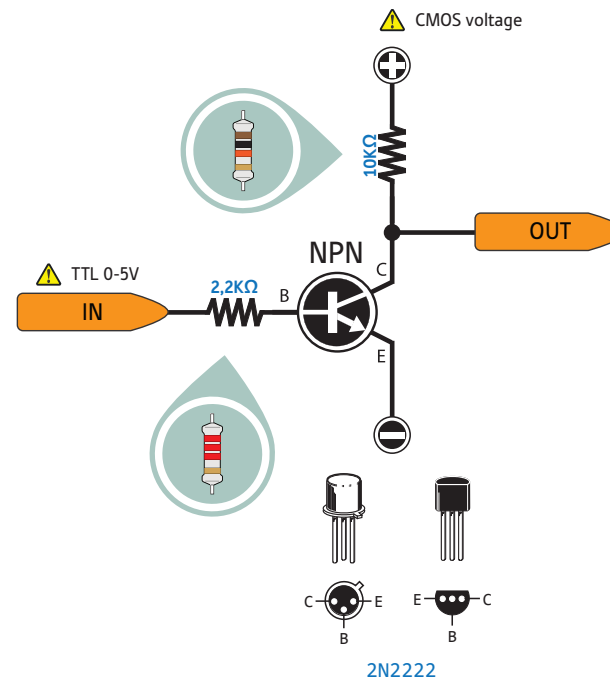
Bi-Directional Voltage Level Converter 3.3V to 5V
with voltage divider



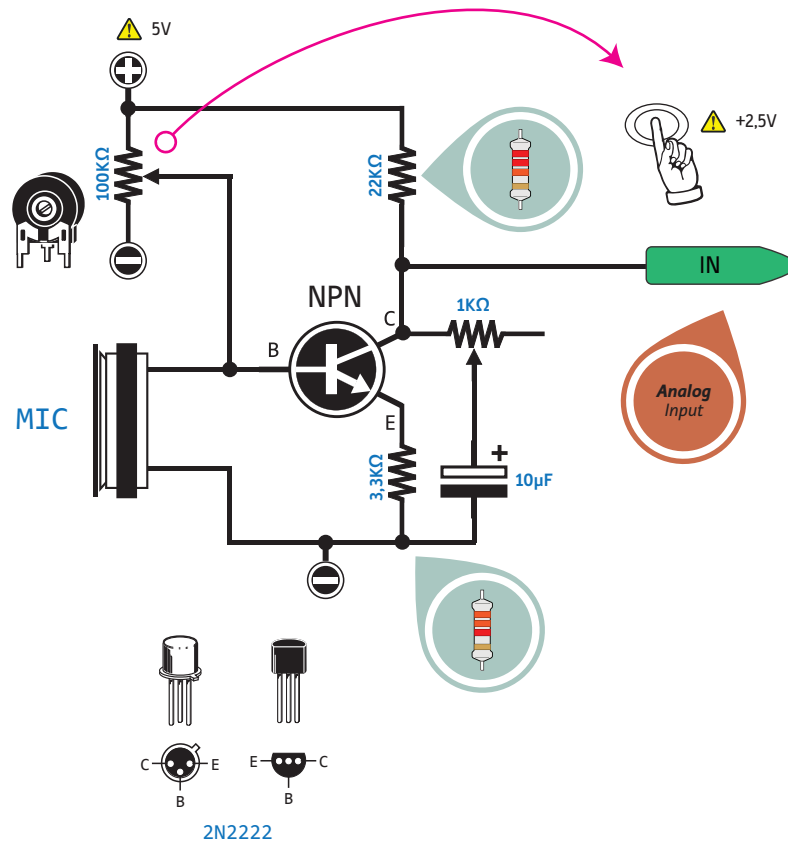
TTL / CMOS converter (6 inputs/outputs)



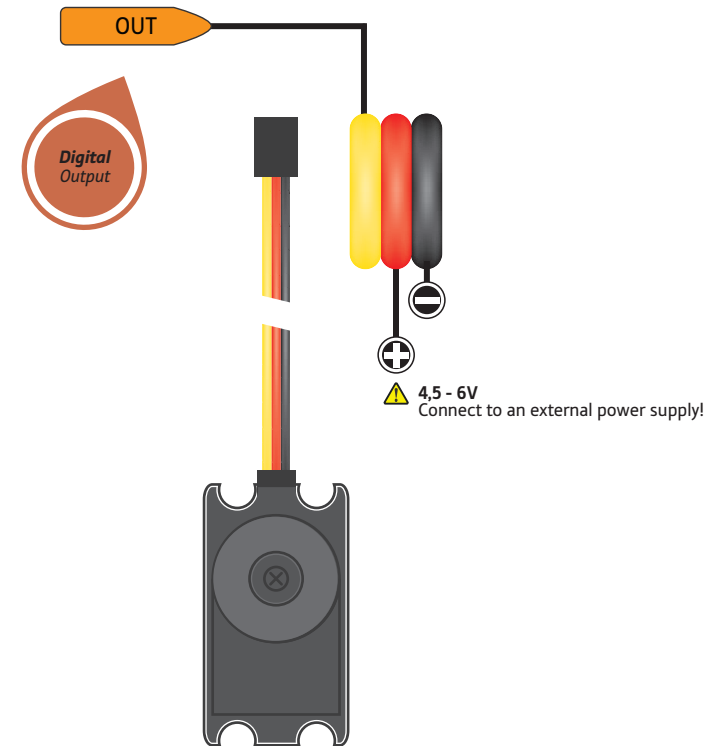
TTL / CMOS converter



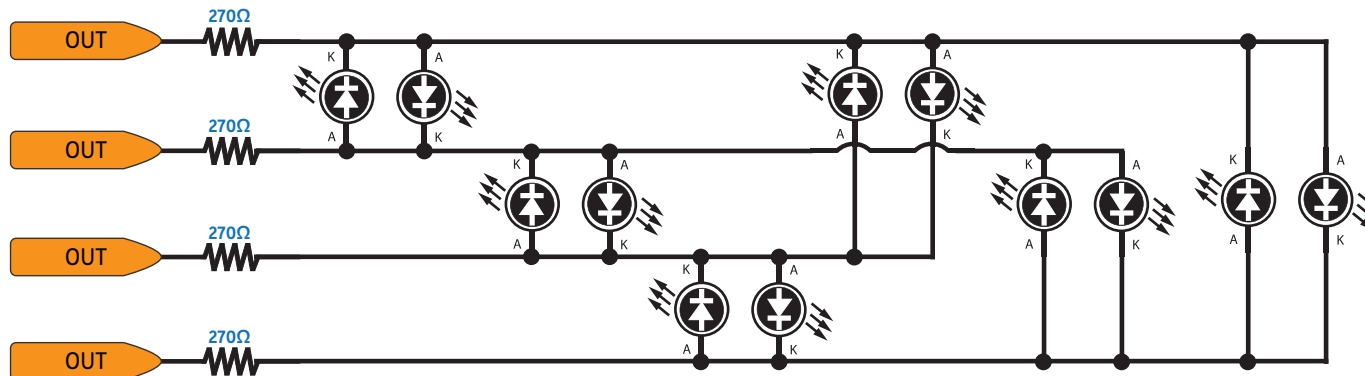
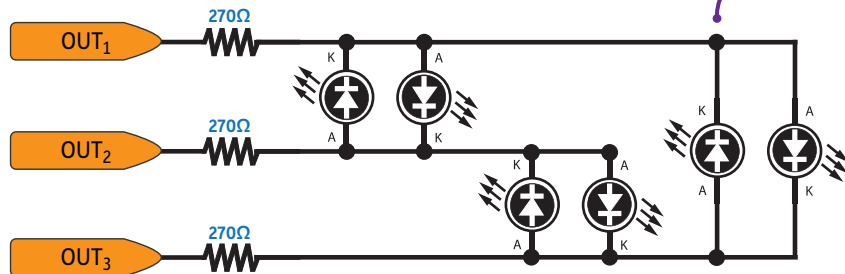
Connect a Microphone



Connect a Servo



Charlieplexing

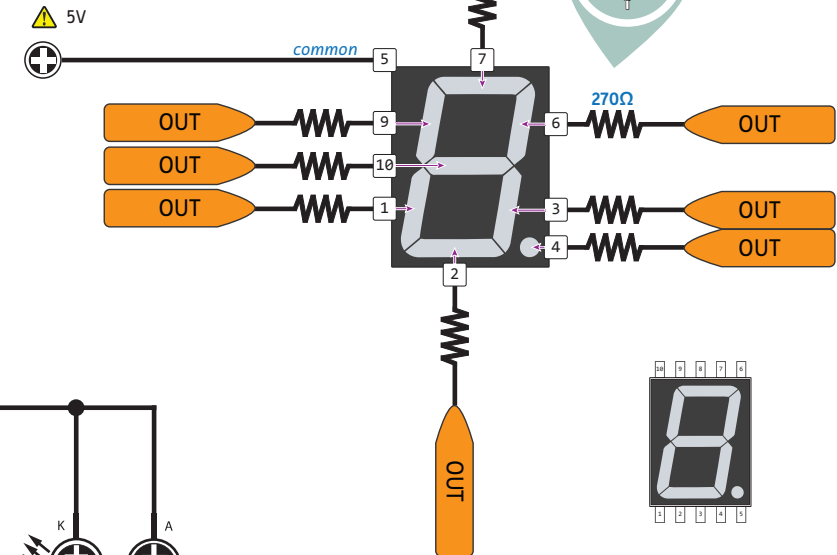


Out₁ Out₂ Out₃

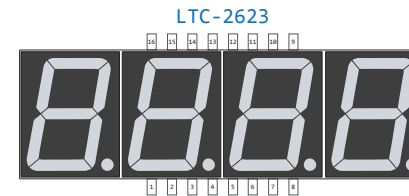
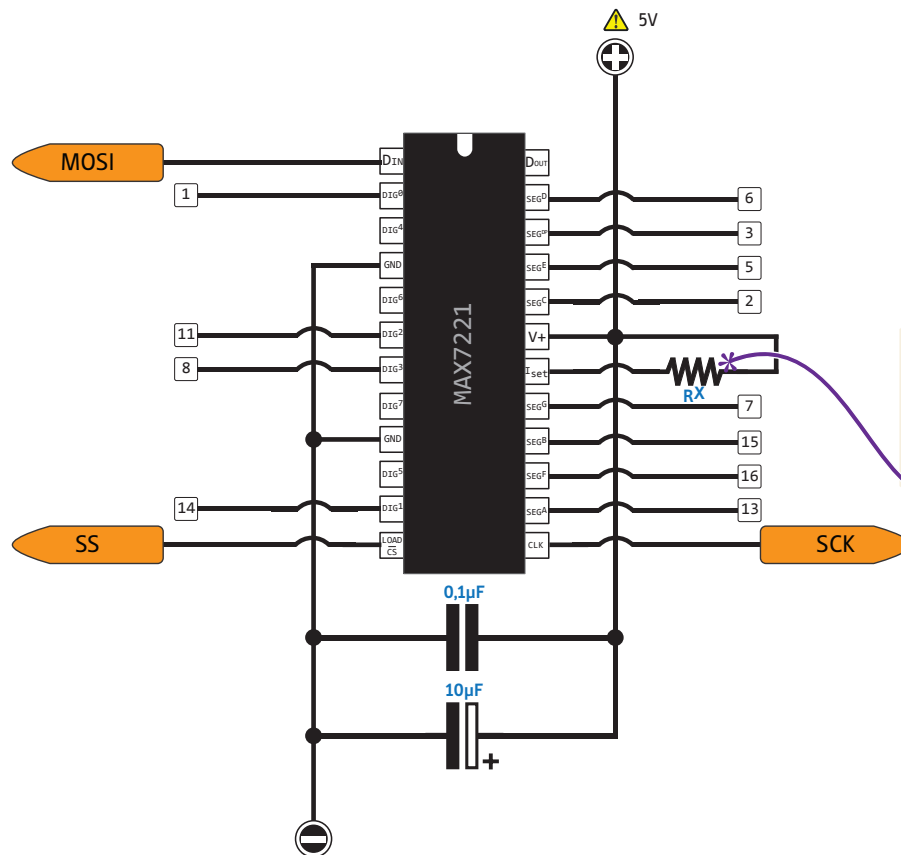
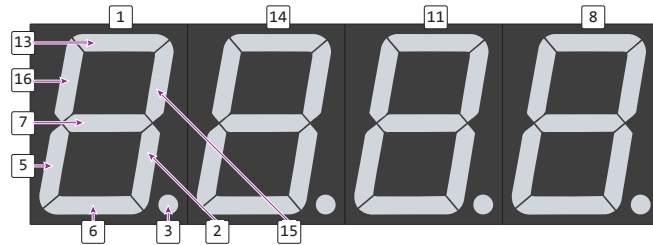
| | | |
|---|---|---|
| L | L | L |
| L | H | i |
| H | L | i |
| i | L | H |
| i | H | L |
| L | i | H |
| H | i | L |

H=High, L=Low, i=Input

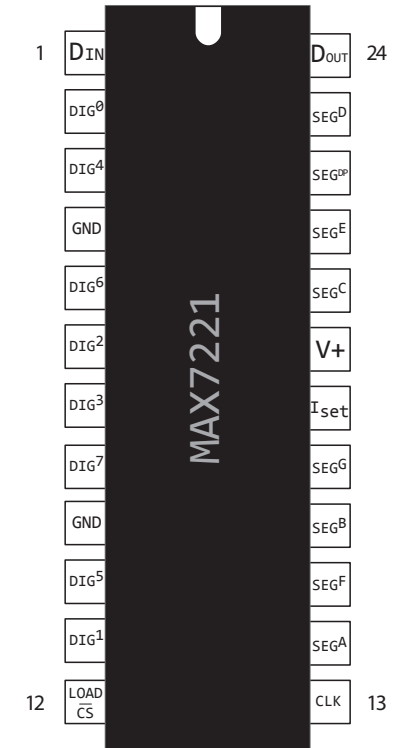
7 Segments Display



7 Segments Display (Common Anode) with MAX7221

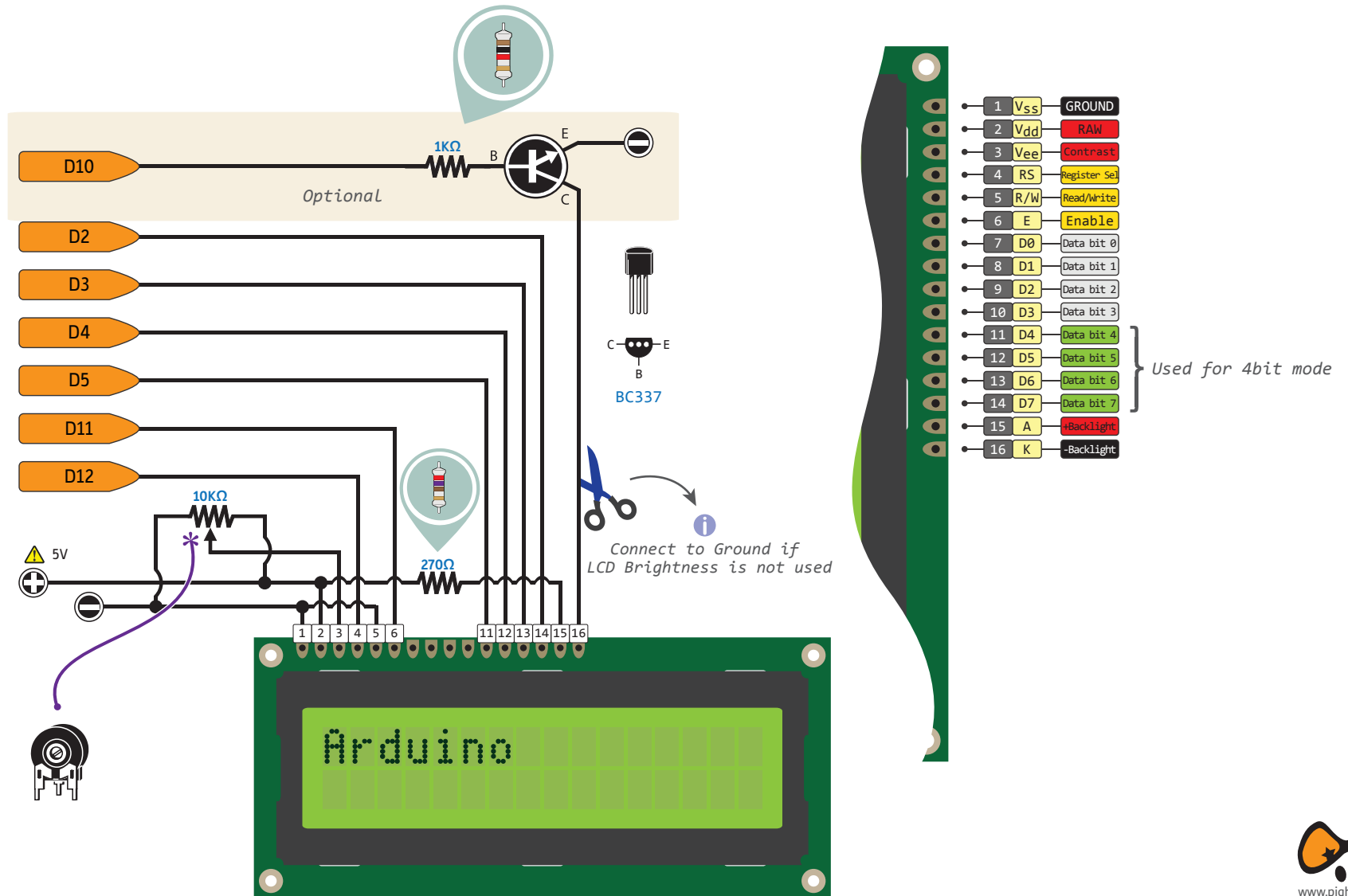


| Current | 1.5v | 2.0v | 2.5v | 3.0v | 3.5v |
|---------|------|------|------|------|------|
| 40ma | 12KΩ | 12KΩ | 11KΩ | 10KΩ | 10KΩ |
| 30ma | 18KΩ | 17KΩ | 16KΩ | 15KΩ | 14KΩ |
| 20ma | 30KΩ | 28KΩ | 26KΩ | 24KΩ | 22KΩ |
| 10ma | 68KΩ | 64KΩ | 60KΩ | 56KΩ | 51KΩ |

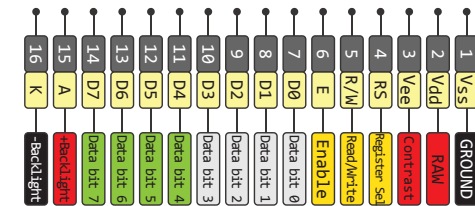
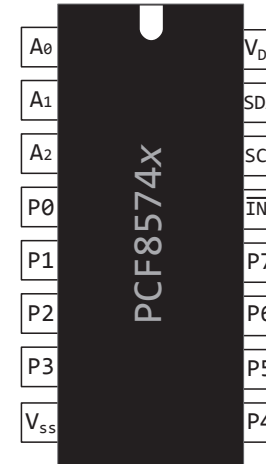
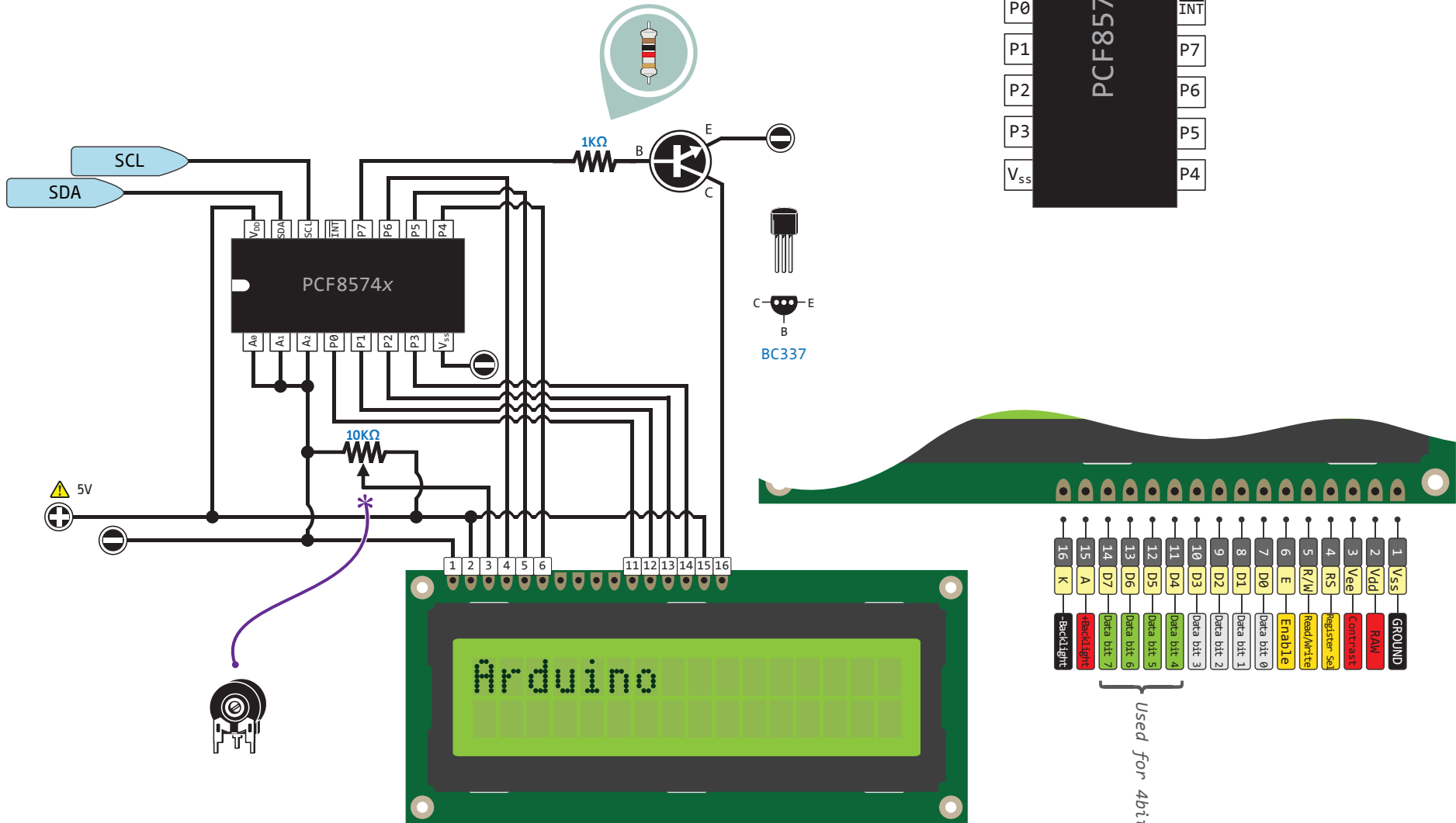


Connect a LCD HITACHI 44780 compatible

use PWM
to change
LCD
brightness



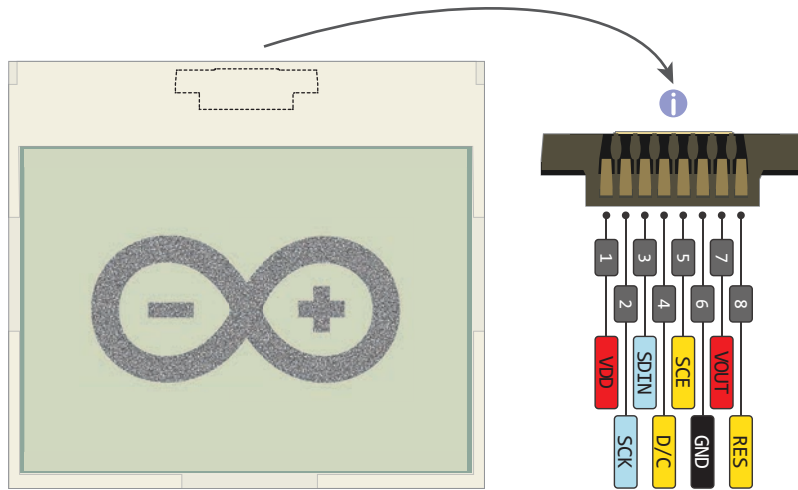
Connect via I2C a LCD HITACHI 44780 compatible



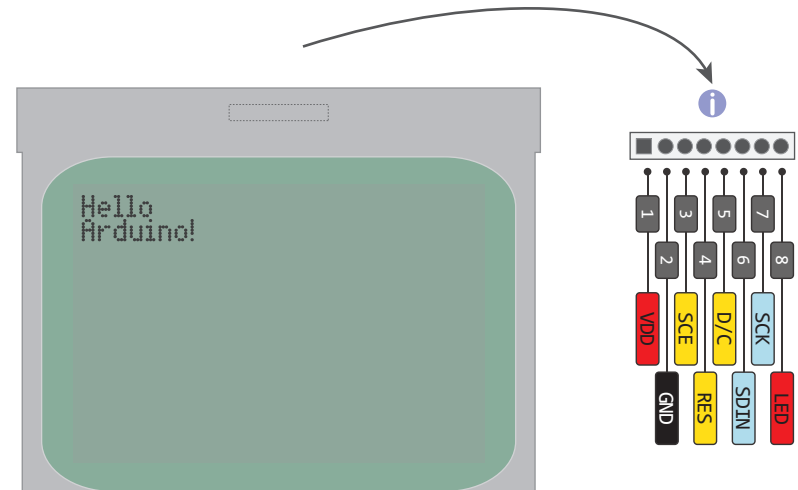
Used for 4bit mode

Connect a NOKIA LCD (Basic)

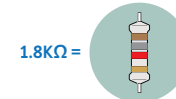
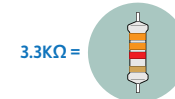
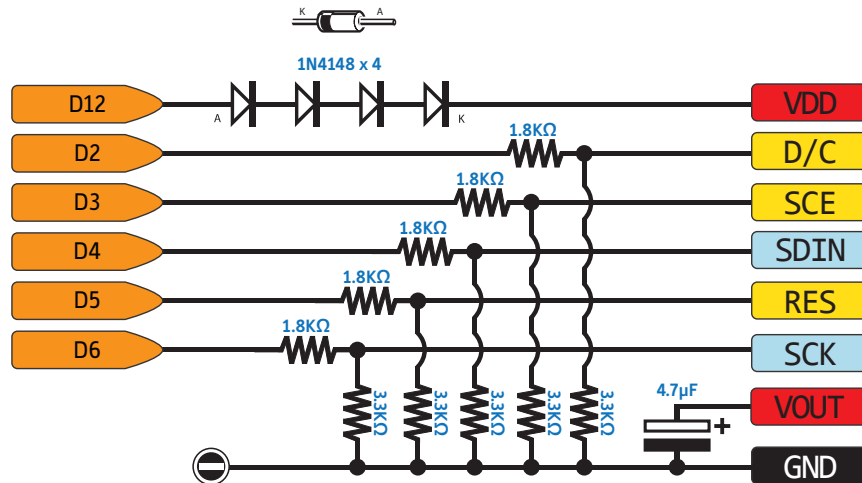
⚠ Only for 5V Arduino



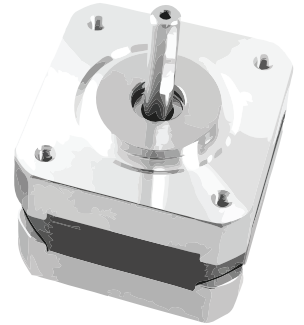
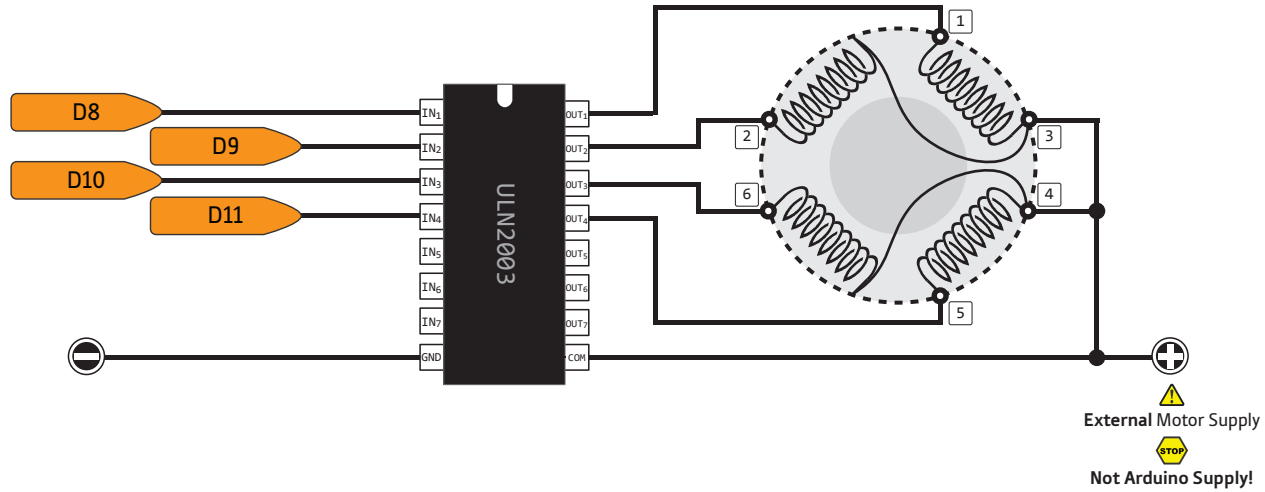
NOKIA 3110



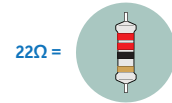
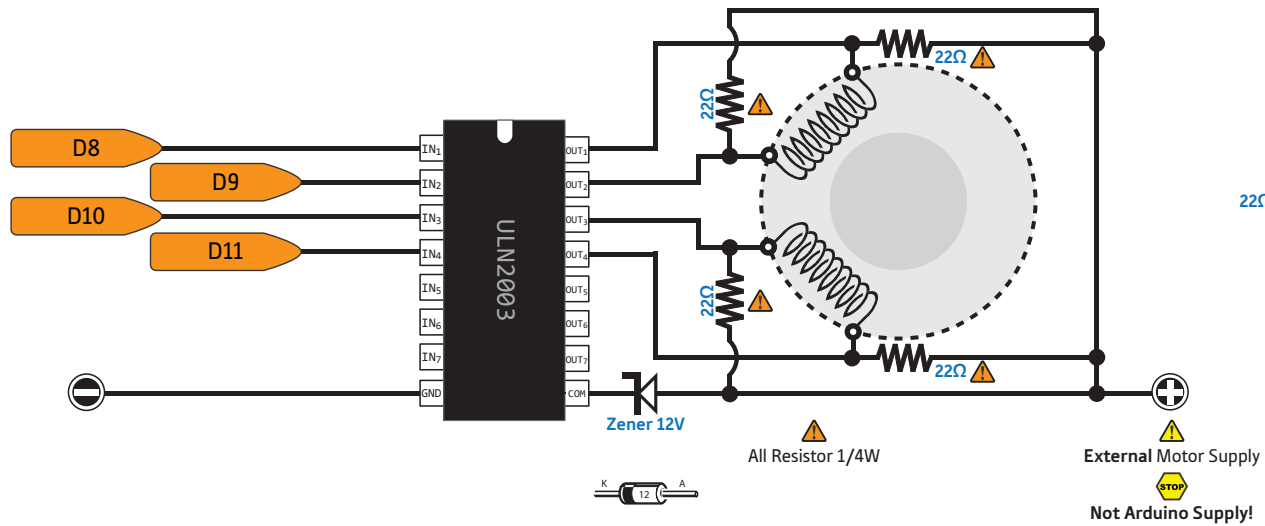
NOKIA 5110



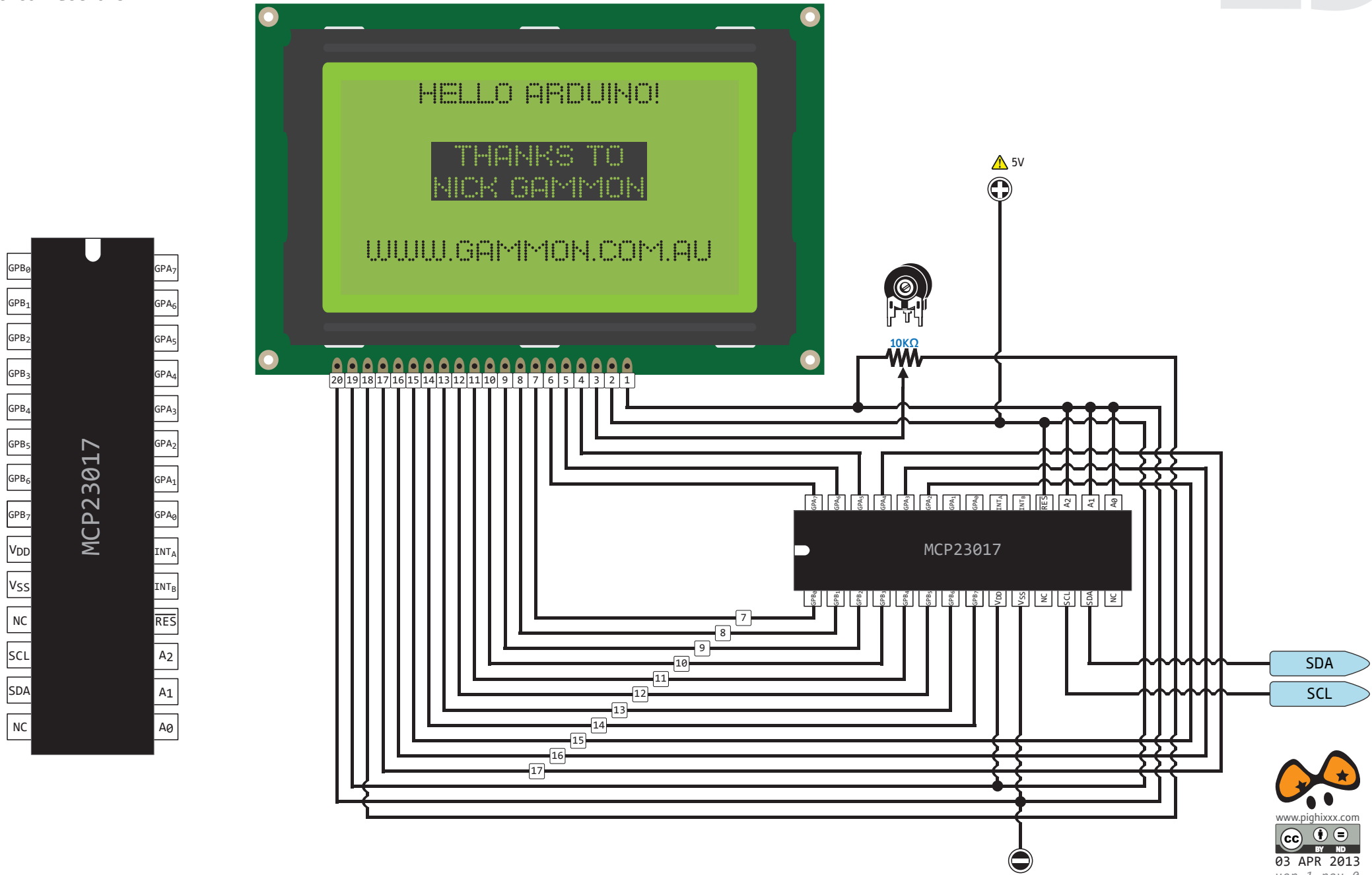
Drive a Unipolar Stepper (Basic 1)



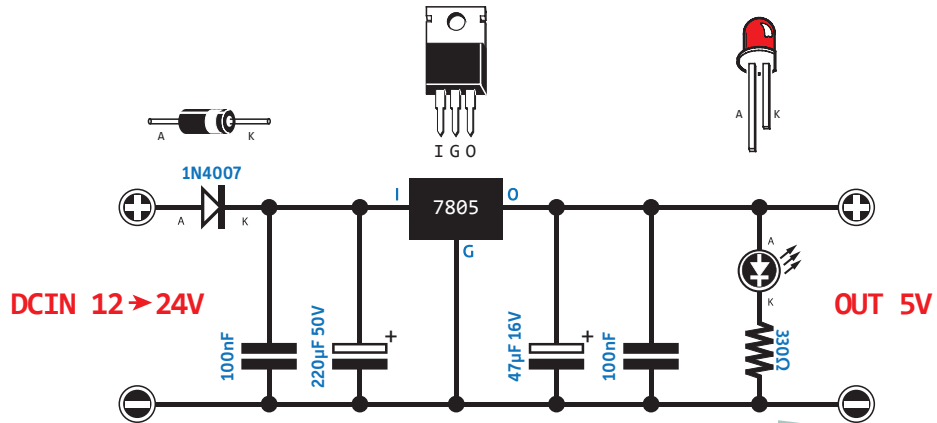
Drive a Bipolar Stepper (Basic 1)



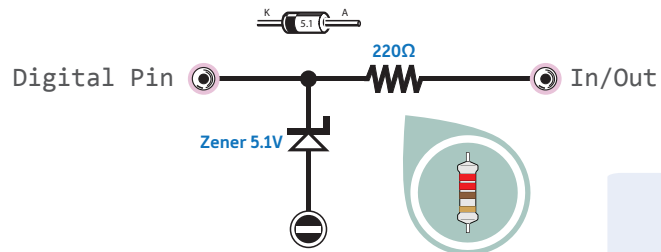
Connect a graphical LCD via I2C



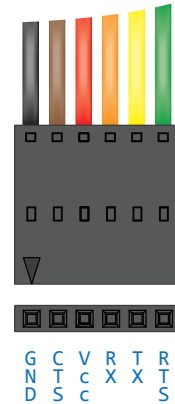
Simple 5V Power Supply



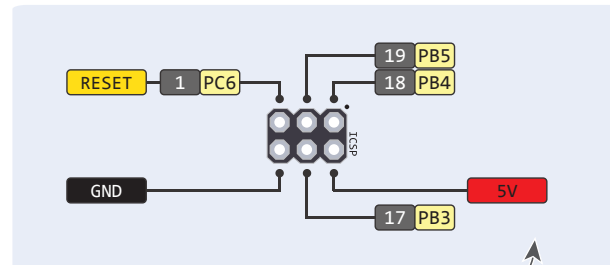
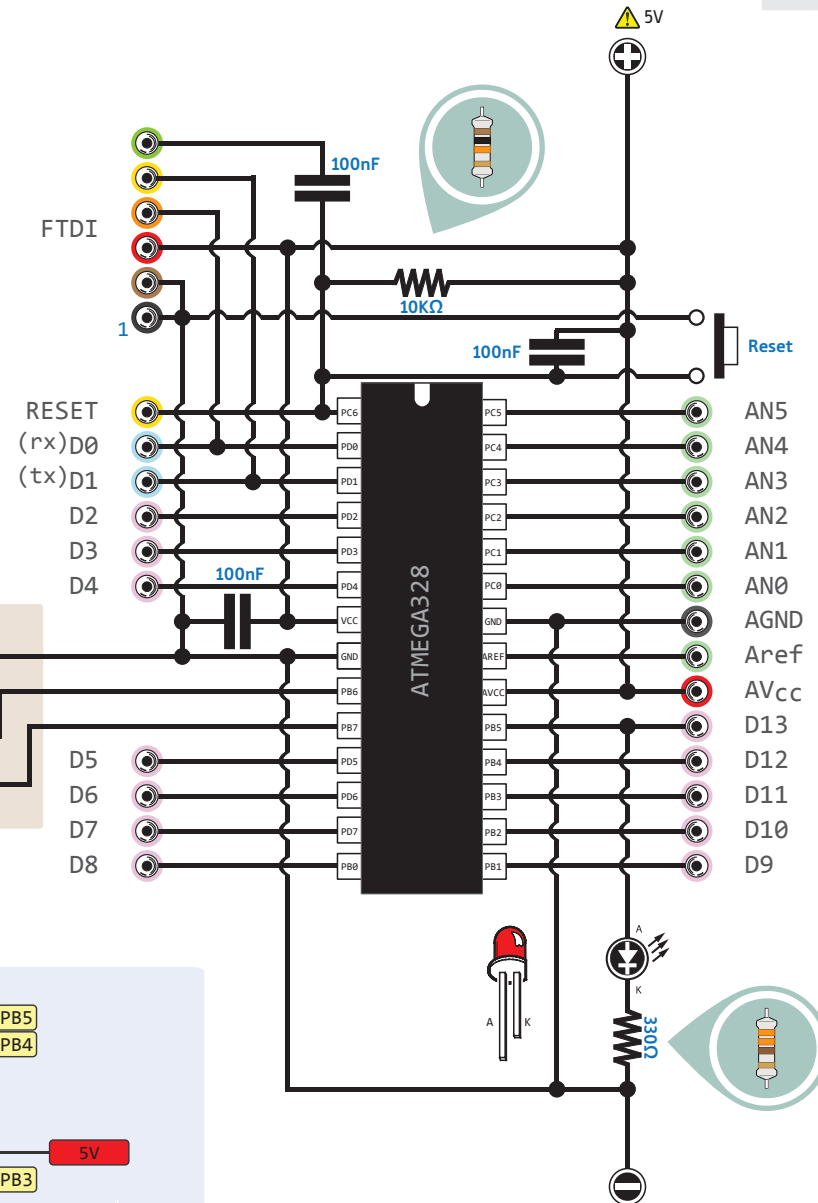
Protect a I/O Pin



FTDI Connector

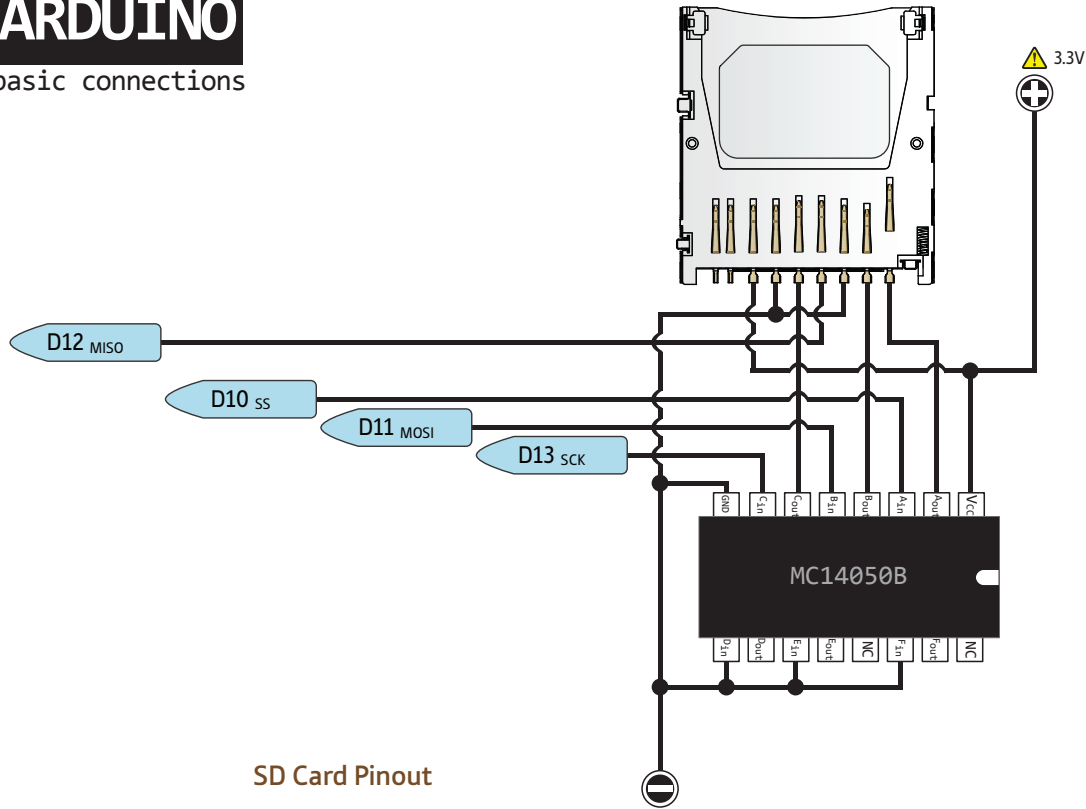


DIY Arduino

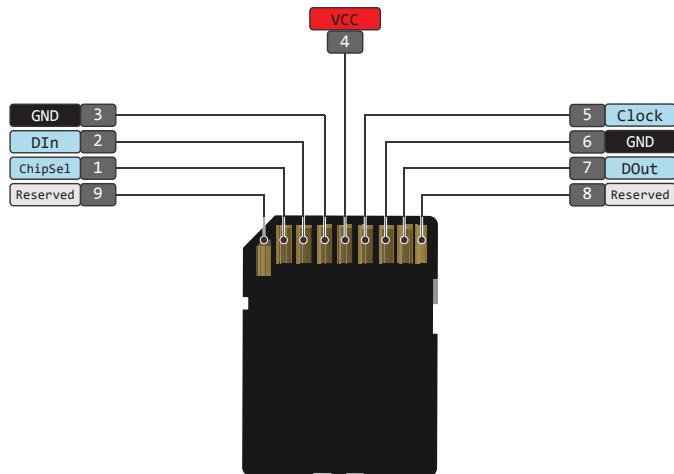


i Recommended ICSP pinout

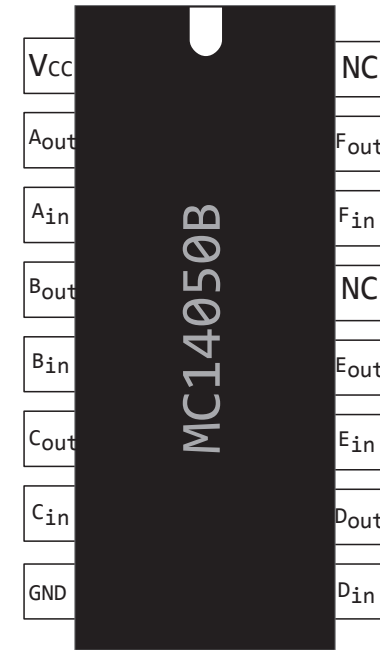
Connect a SD Card



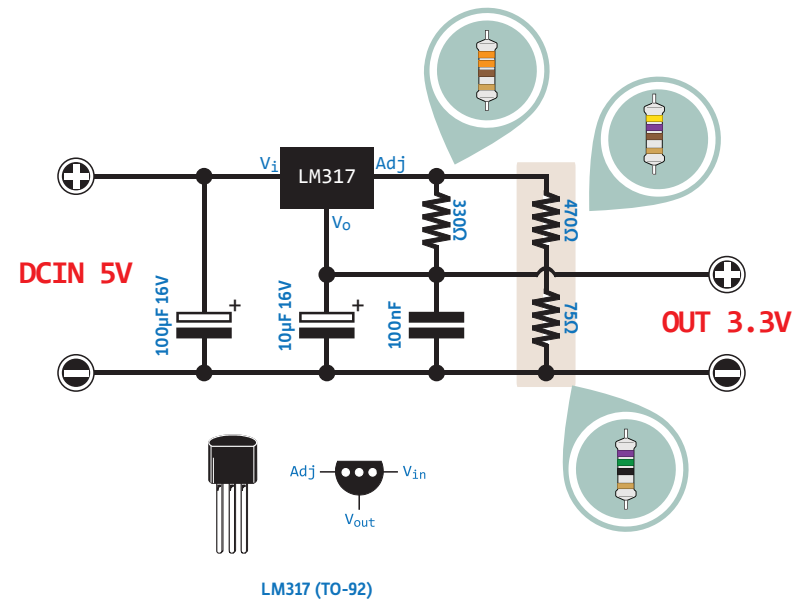
SD Card Pinout



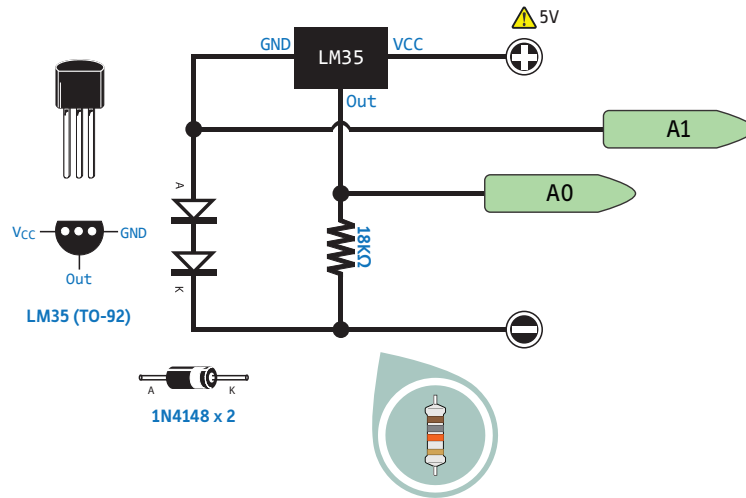
⚠ Only for 5V Arduino



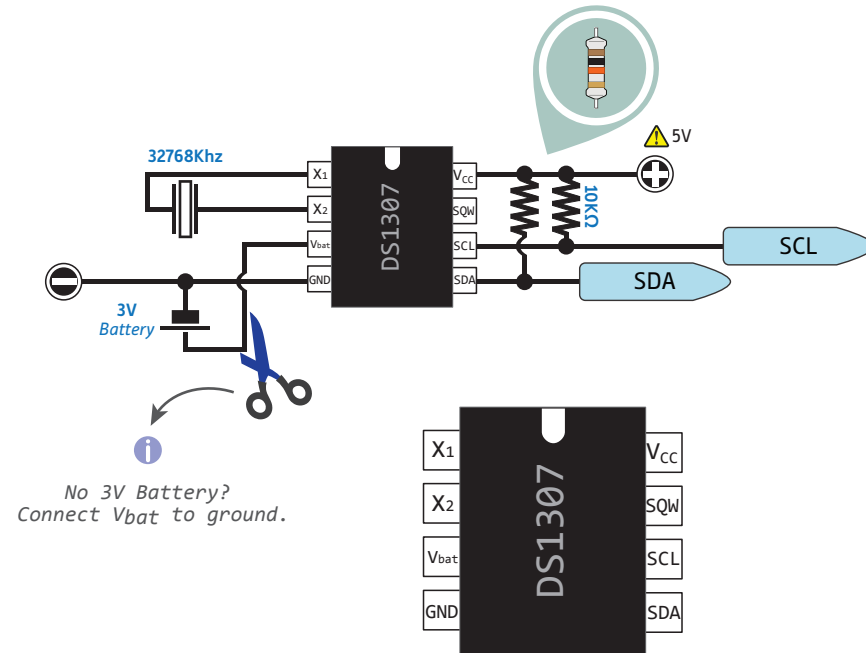
Simple 3.3V Power Supply



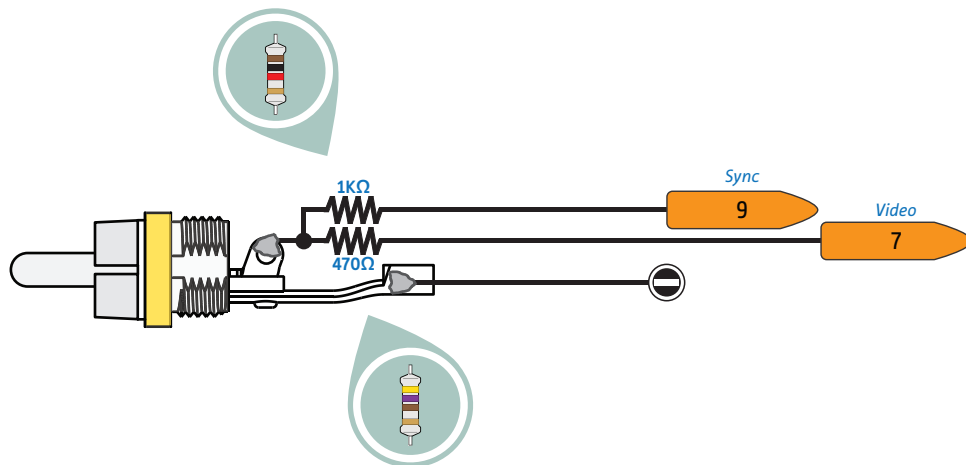
Connect a Temperature Sensor (LM35)



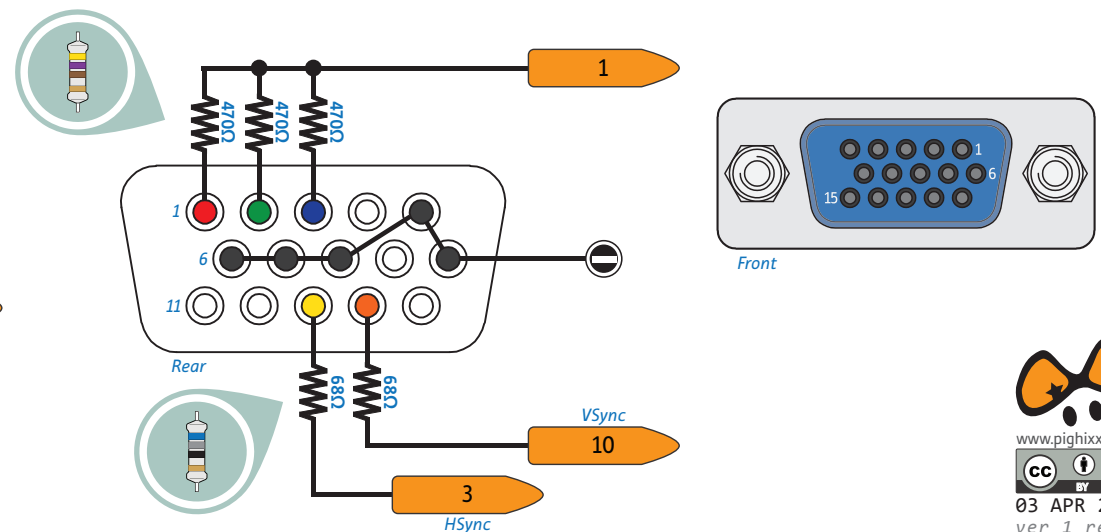
Connect a RTC (DS1307)



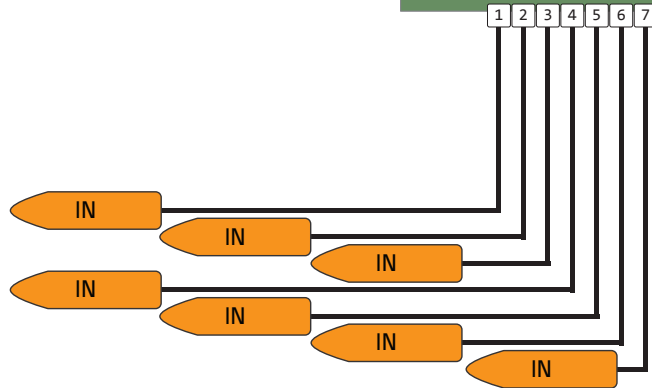
Connect to Composite Video



Connect to VGA

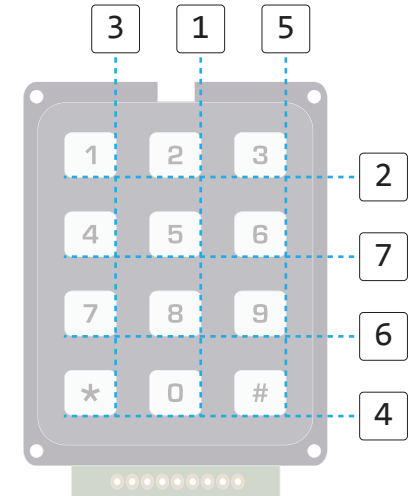
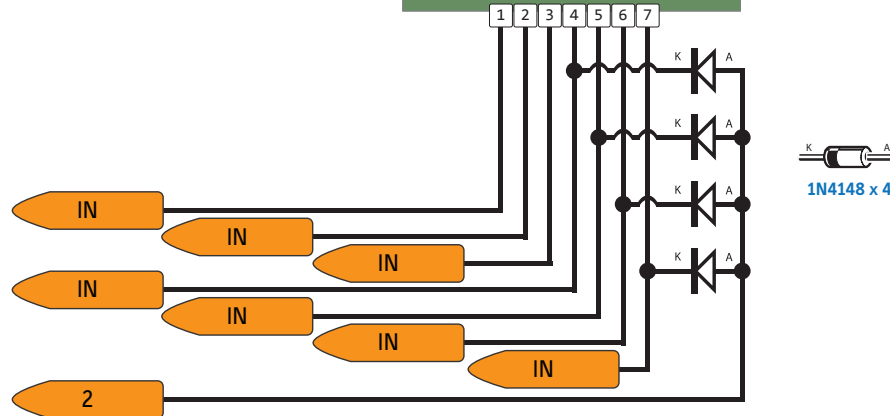


Connect a Keypad

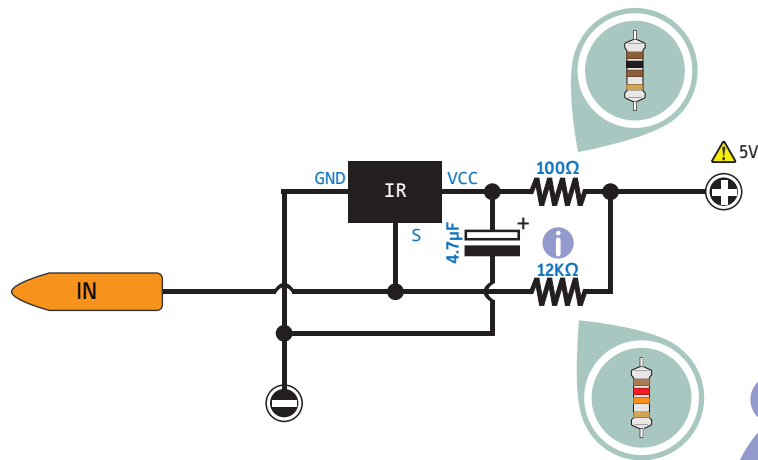
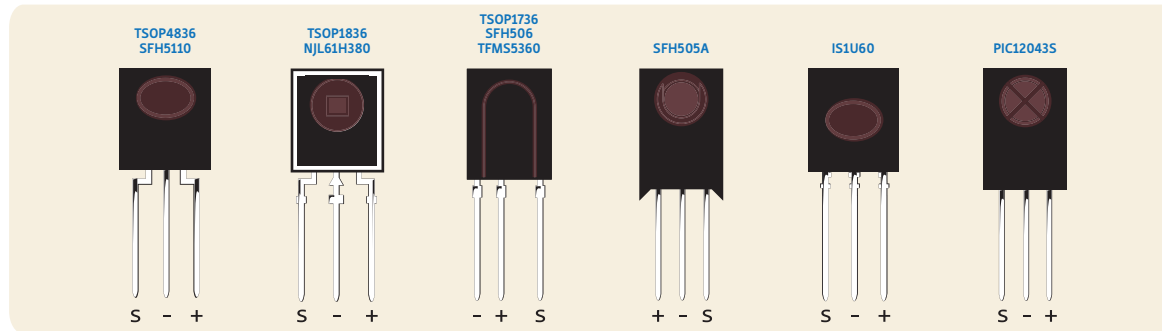


Connect a Keypad (with Interrupt)

| | |
|---|-------|
| 1 | 2 + 3 |
| 2 | 1 + 2 |
| 3 | 2 + 5 |
| 4 | 3 + 7 |
| 5 | 1 + 7 |
| 6 | 5 + 7 |
| 7 | 3 + 6 |
| 8 | 1 + 6 |
| 9 | 5 + 6 |
| * | 3 + 4 |
| 0 | 1 + 4 |
| # | 4 + 5 |

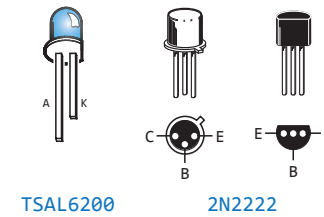
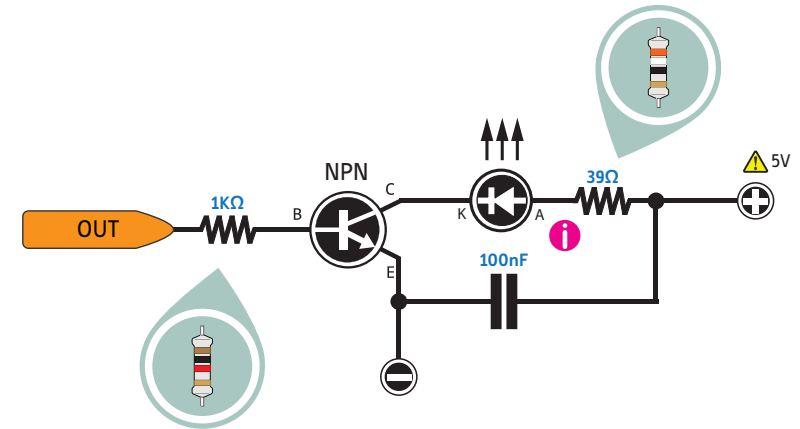


Connect a IR Sensor



i
Reccomended
to suppress
power supply
disturbances

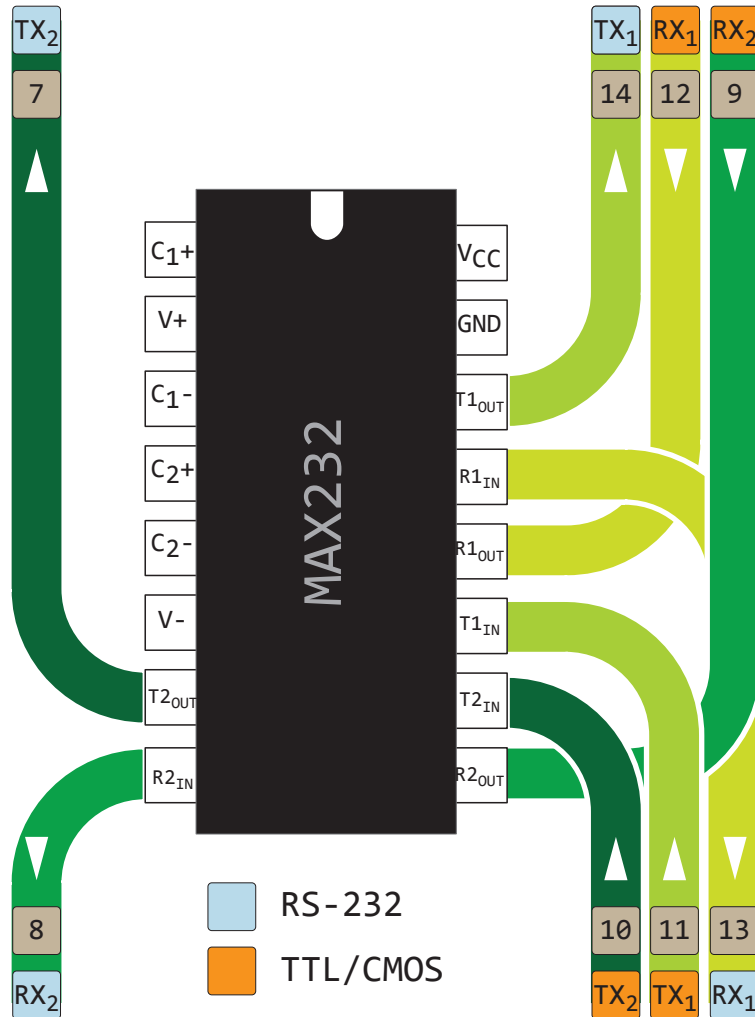
Connect a IR Emitter



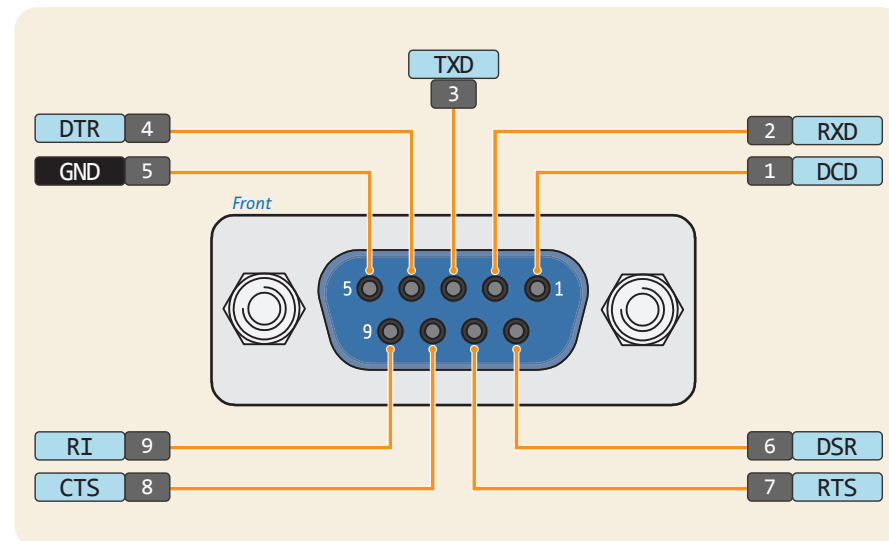
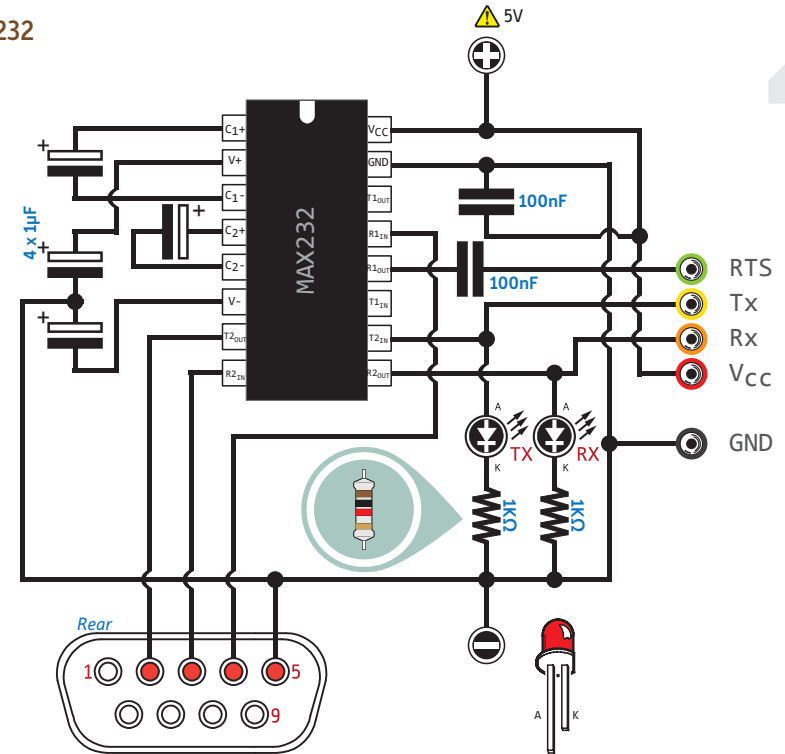
i

$$R = \frac{V_{in} - V_F}{I_F} * 1000$$

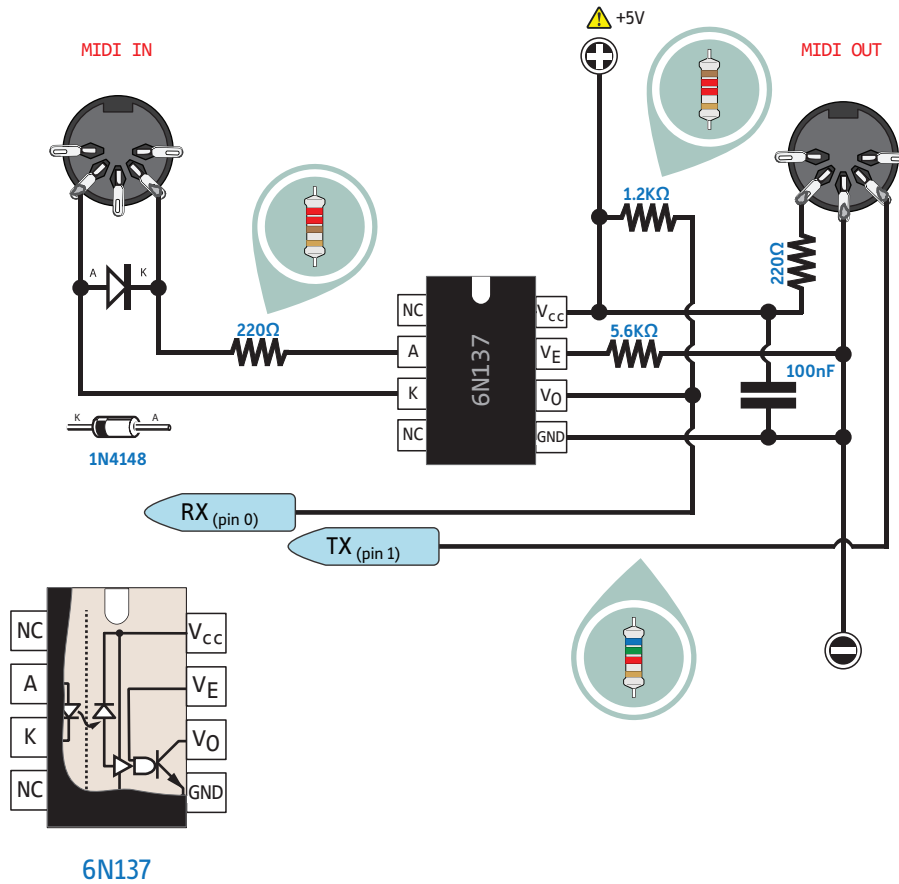
V_{in} Source Voltage
 V_F Forward Voltage Led
 I_F Forward Current Led



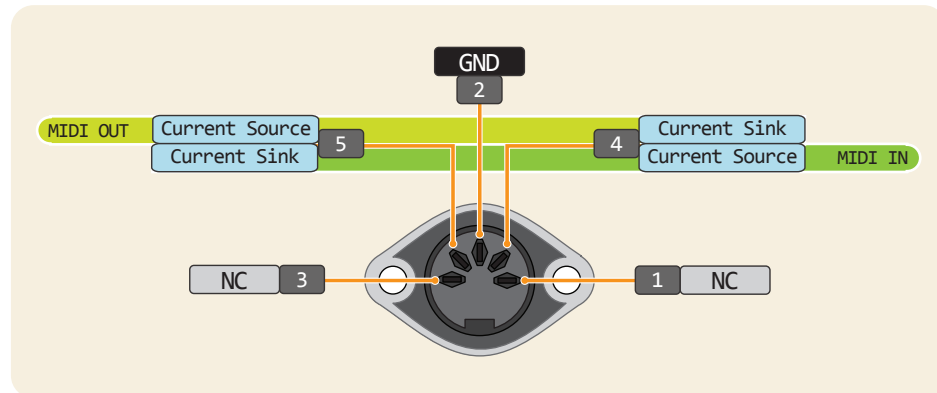
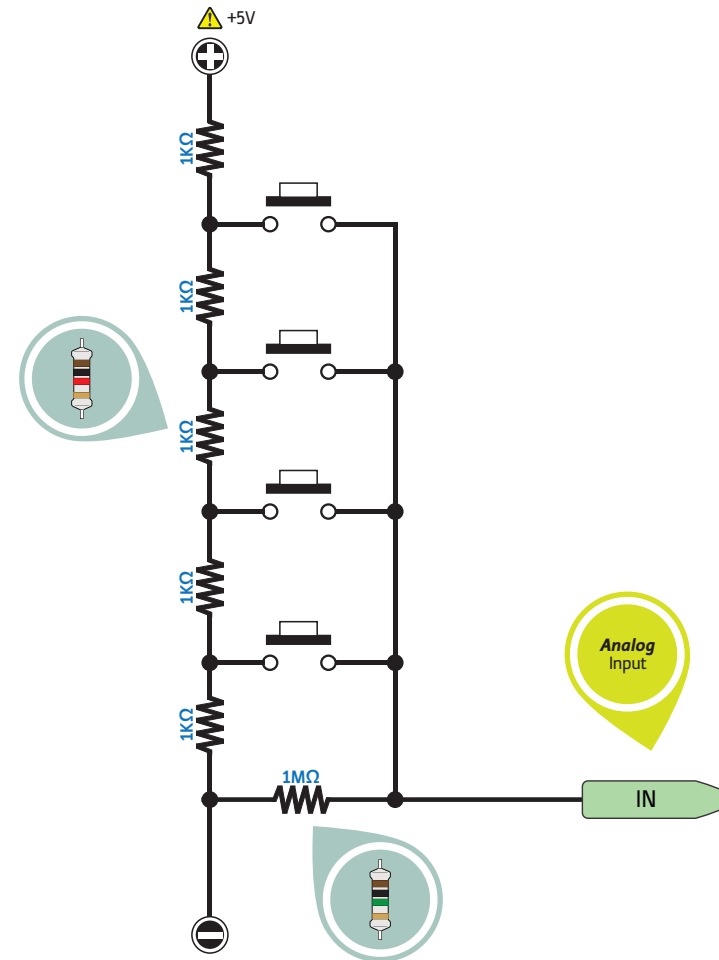
Connect a MAX232



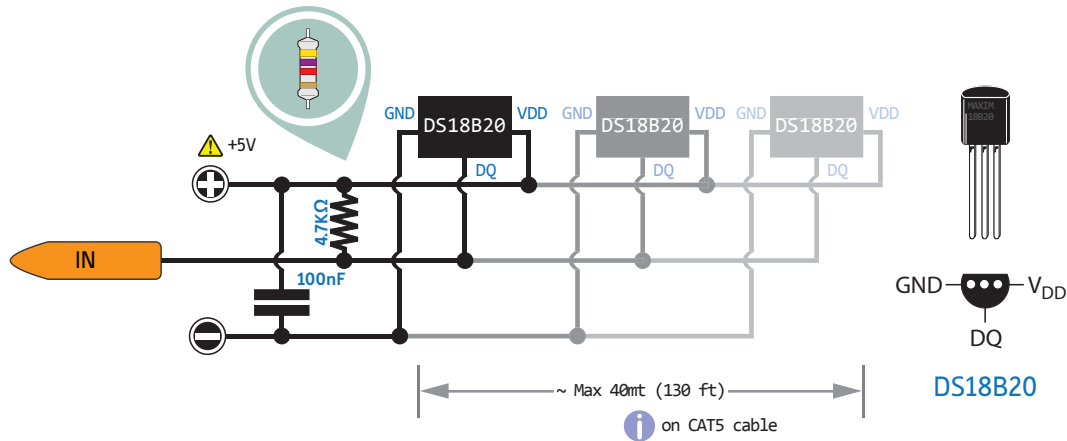
MIDI Interface



Multiple Buttons using 1 Analog Input



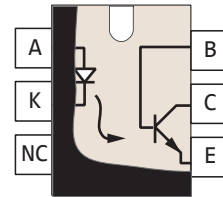
Connect a Digital Temperature Sensor (DS18B20)



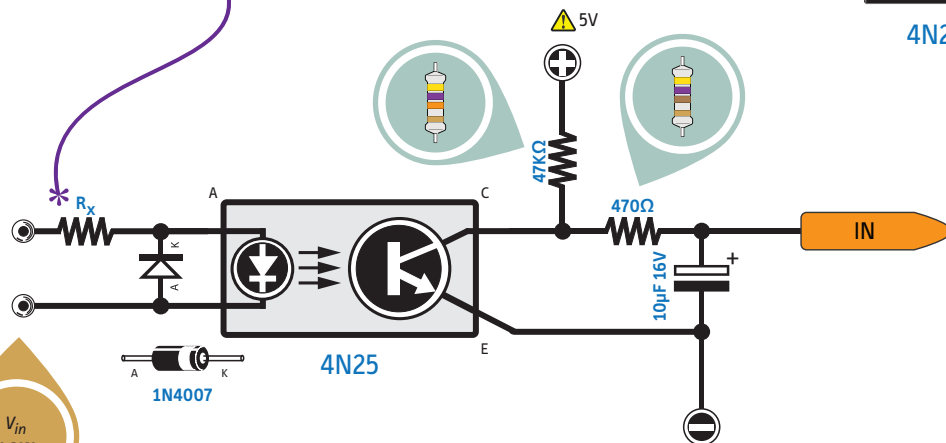
AC input

Volt_{in} Resistor Value

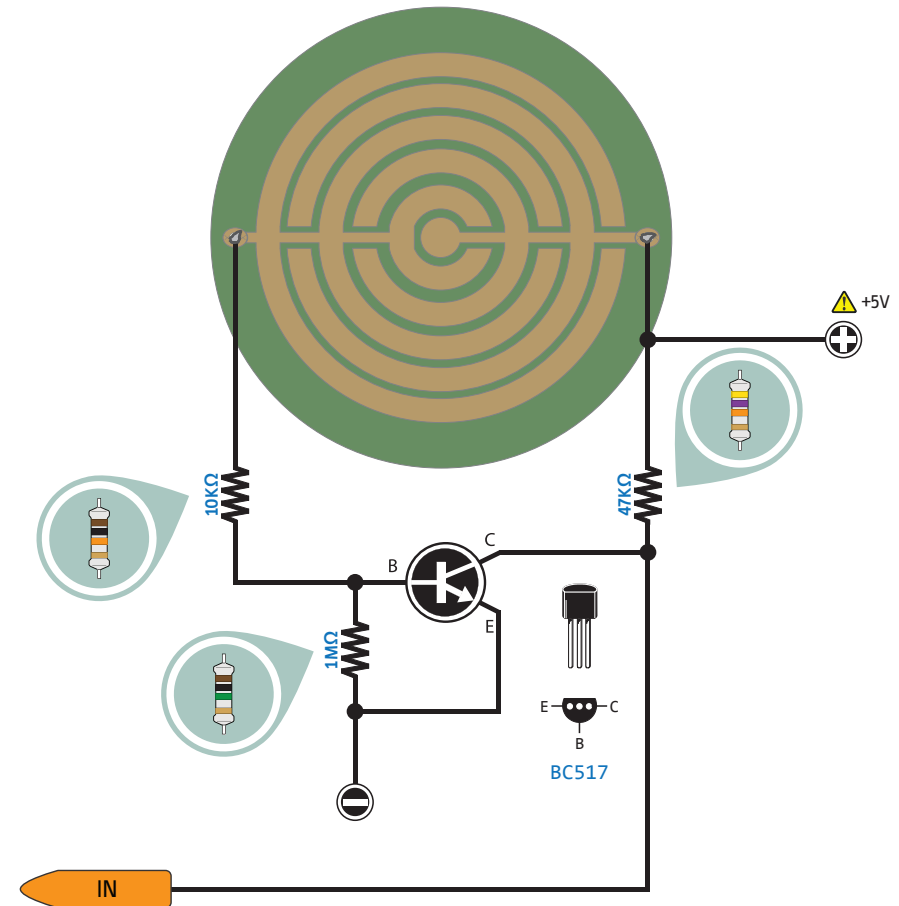
| | | |
|----|-------|--|
| 12 | 470Ω | |
| 24 | 1KΩ | |
| 48 | 2.2KΩ | |



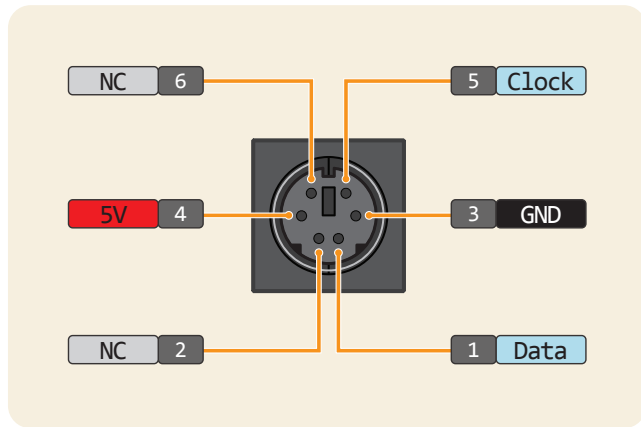
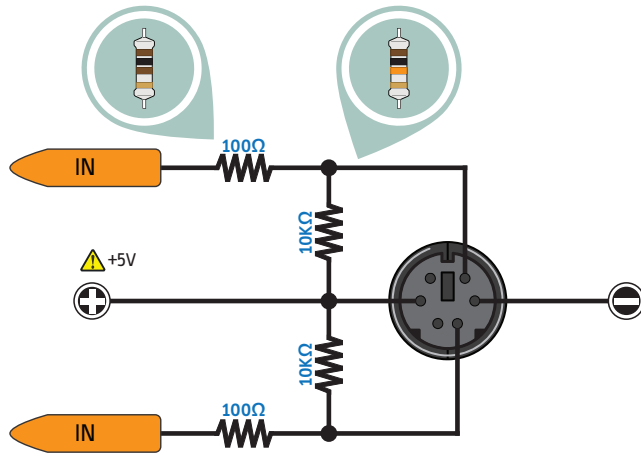
4N25



A simple Rain Sensor with Arduino



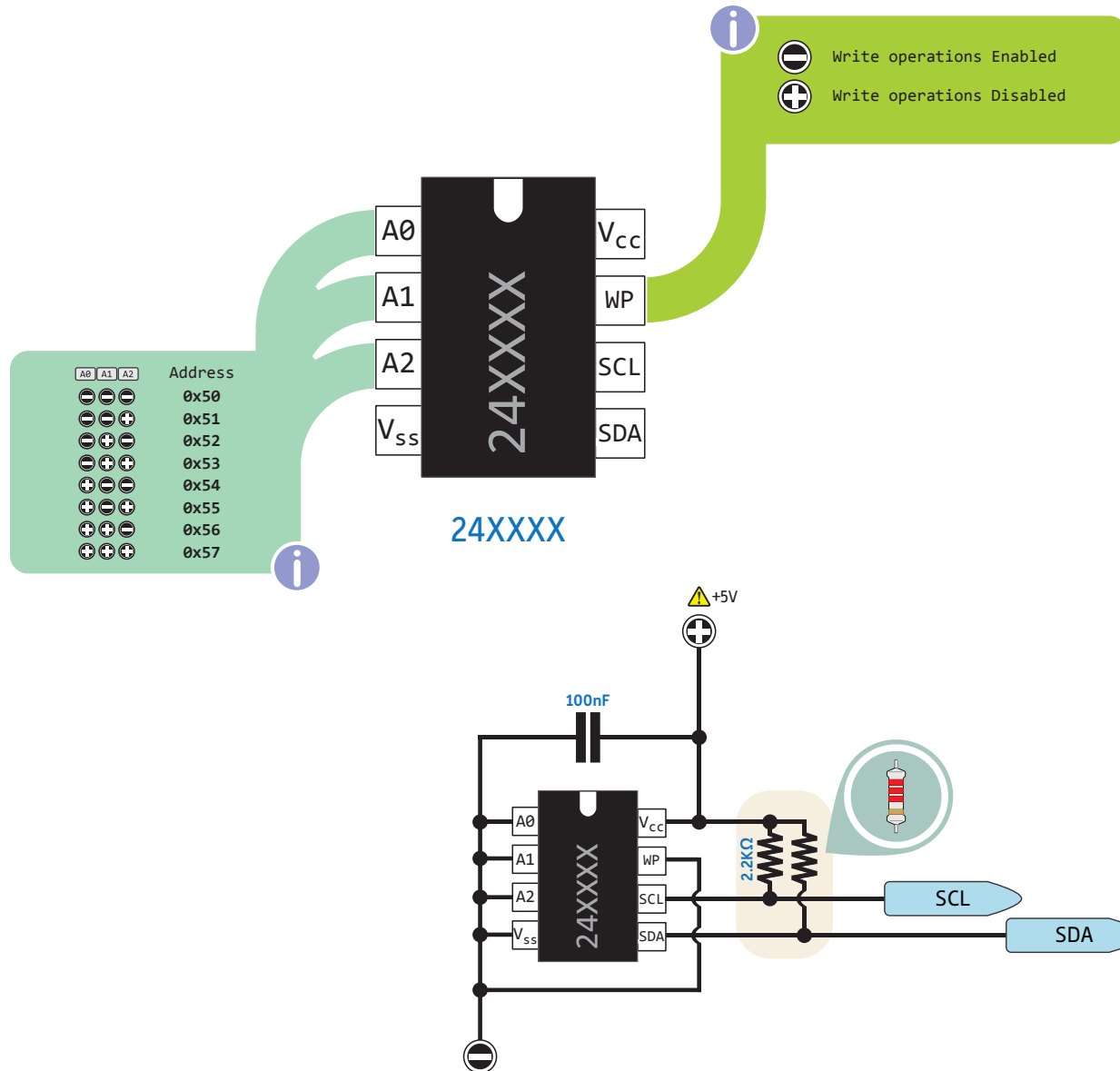
Connect a PS2 Keyboard



Scan Codes

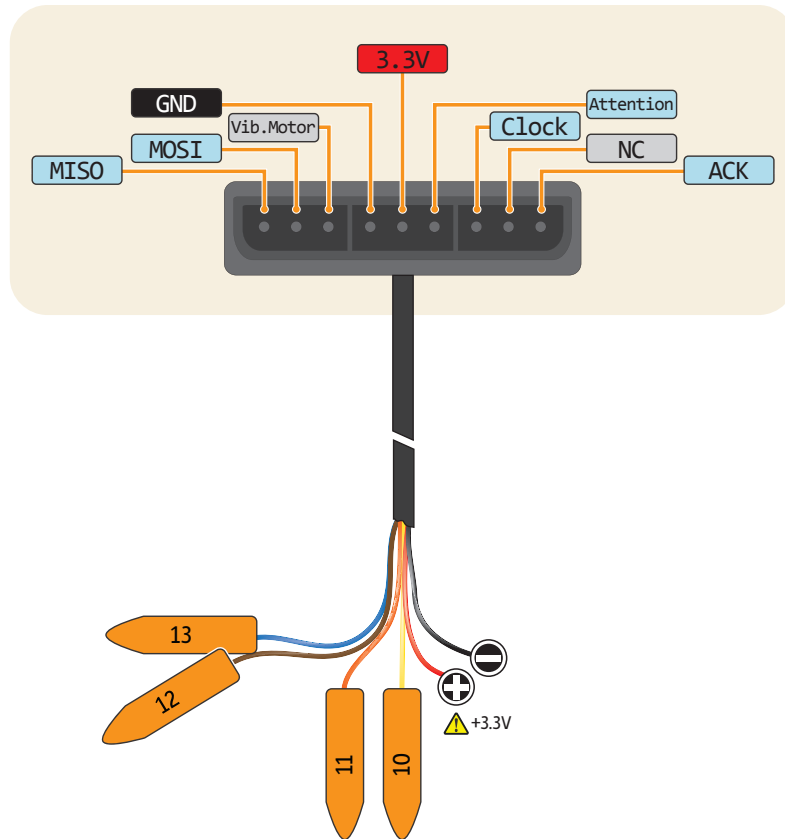


Connect a EEPROM via I2C

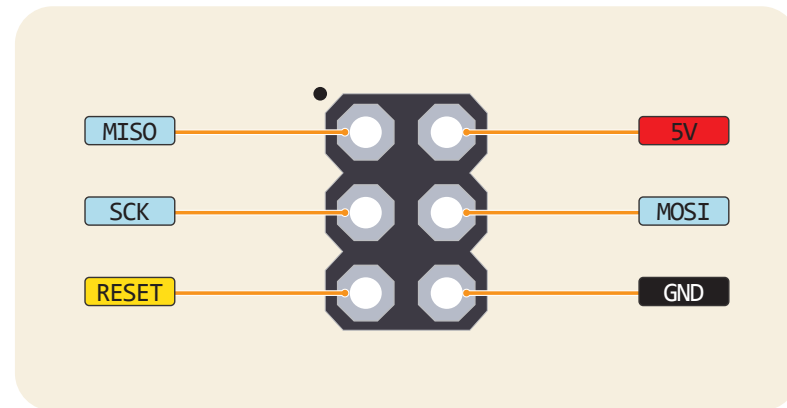
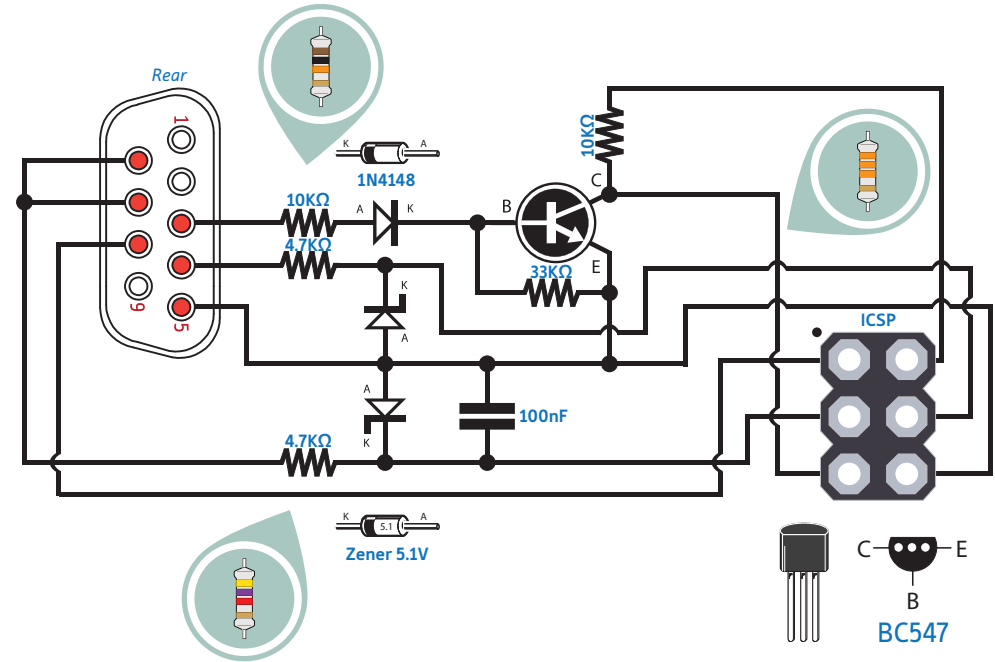


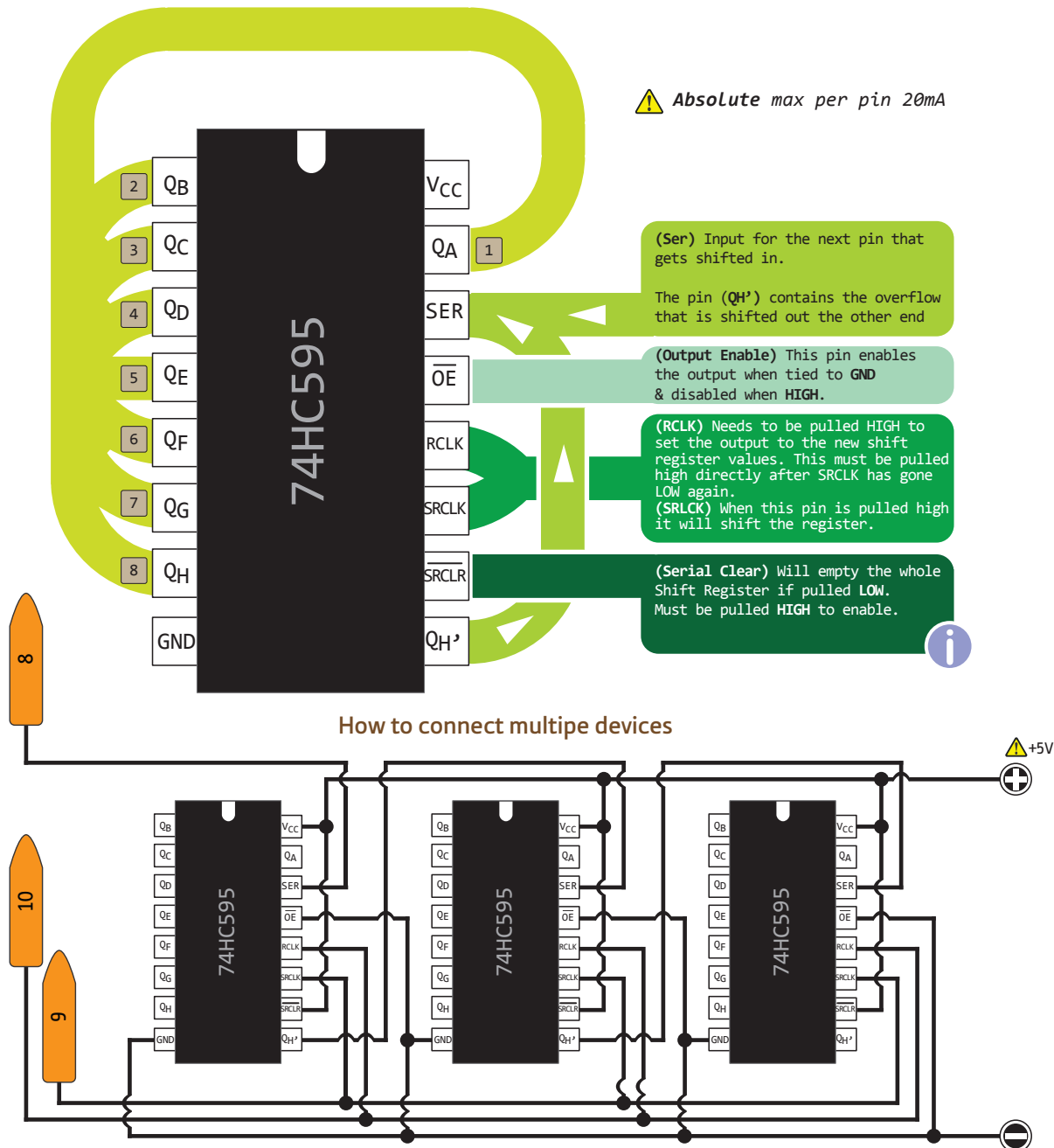
| | | | |
|--|------|--|-------|
| | 1Kb | | 32Kb |
| | 2Kb | | 64Kb |
| | 4Kb | | 128Kb |
| | 8Kb | | 256Kb |
| | 16Kb | | 512Kb |

Connect a PS2 Dualshock® controller

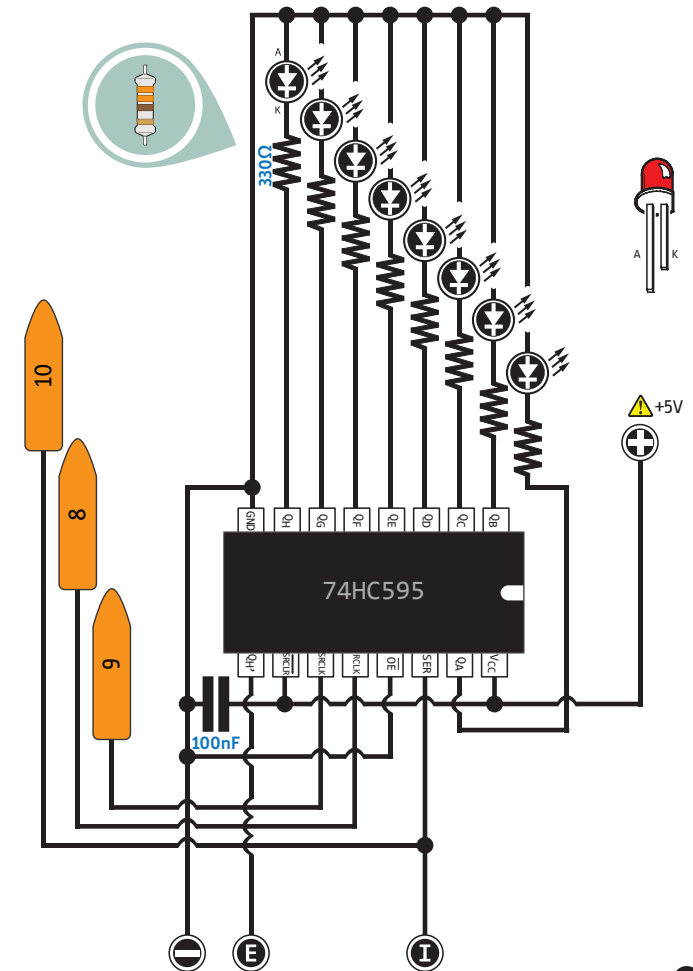


A Simple programmer

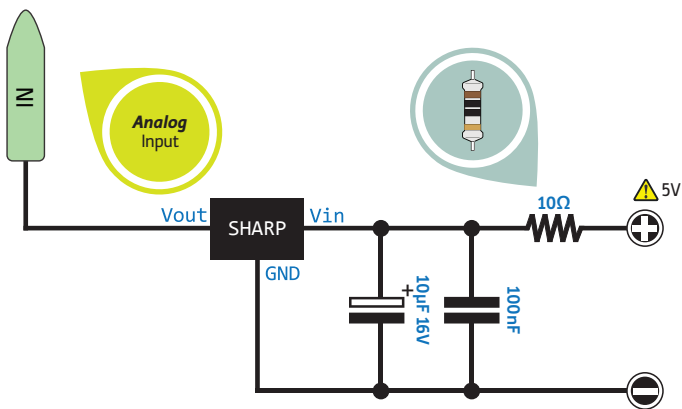
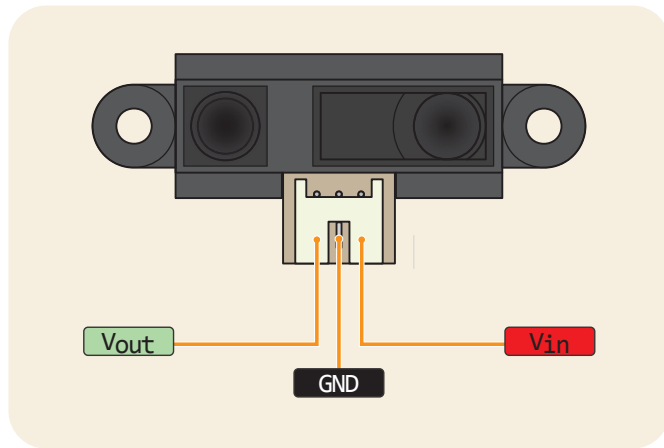




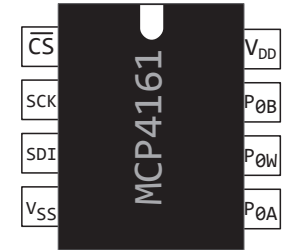
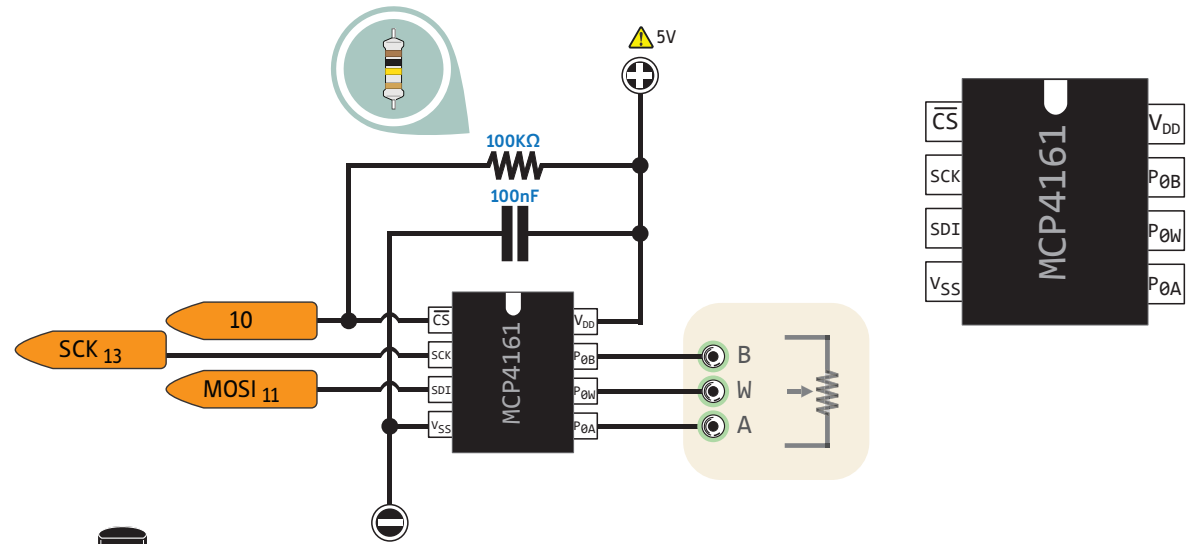
A typical Application



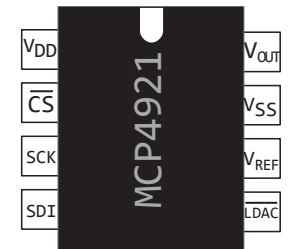
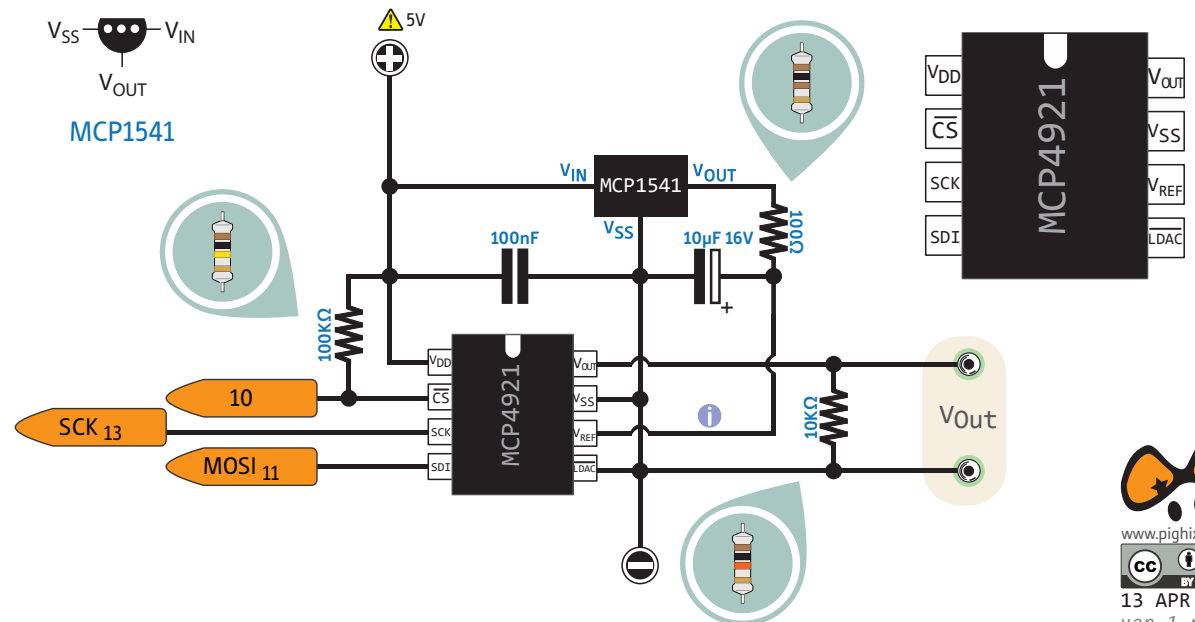
Connect a Distance Sensor (Sharp GP2Y0A21)

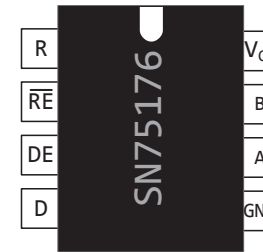


Connect a Digital Potentiometer (MCP4161)

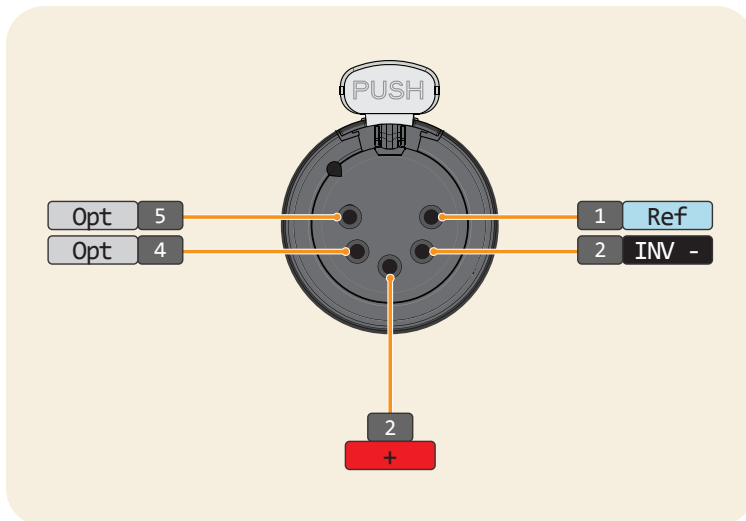


Connect a DAC (MCP4921)



[illegible]

| First | Middle | Last |
|-------|--------|--------|
| Node | Node | Node |
| J1 on | J1 off | J1 off |
| J2 on | J2 off | J2 off |
| J3 on | J3 off | J3 on |



The diagram shows the basic wiring for an SN75176 X Controller. A 5V power supply is connected to the V_{CC} pin of the SN75176 chip. A 100nF capacitor is connected between the V_{CC} pin and ground. A 100Ω resistor is connected between the RE pin and ground. The chip's pins are also connected to a 3-pin connector labeled 1, 2, and 3. The output of the chip is labeled OUT.

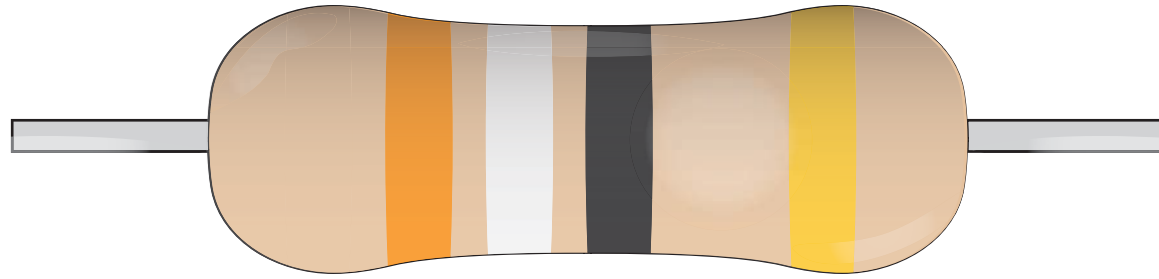
TOLERANCE

GOLD

±5%

SILVER

±10%



BLACK

0

0

x1Ω

BROWN

1

1

x10Ω

RED

2

2

x100Ω

ORANGE

3

3

x1,000Ω

YELLOW

4

4

x10,000Ω

GREEN

5

5

x100,000Ω

BLUE

6

6

x1,000,000Ω

VIOLET

7

7

GRAY

8

8

WHITE

9

9

$K\Omega = x1,000\Omega$

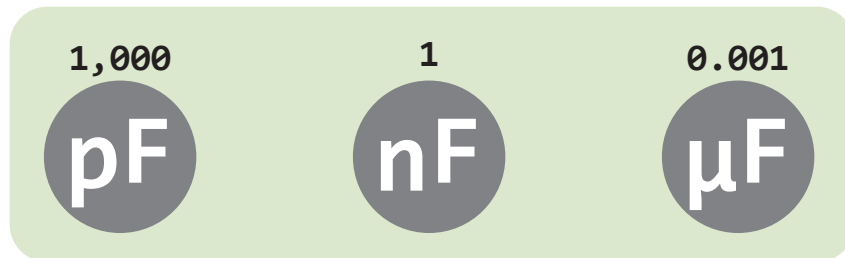
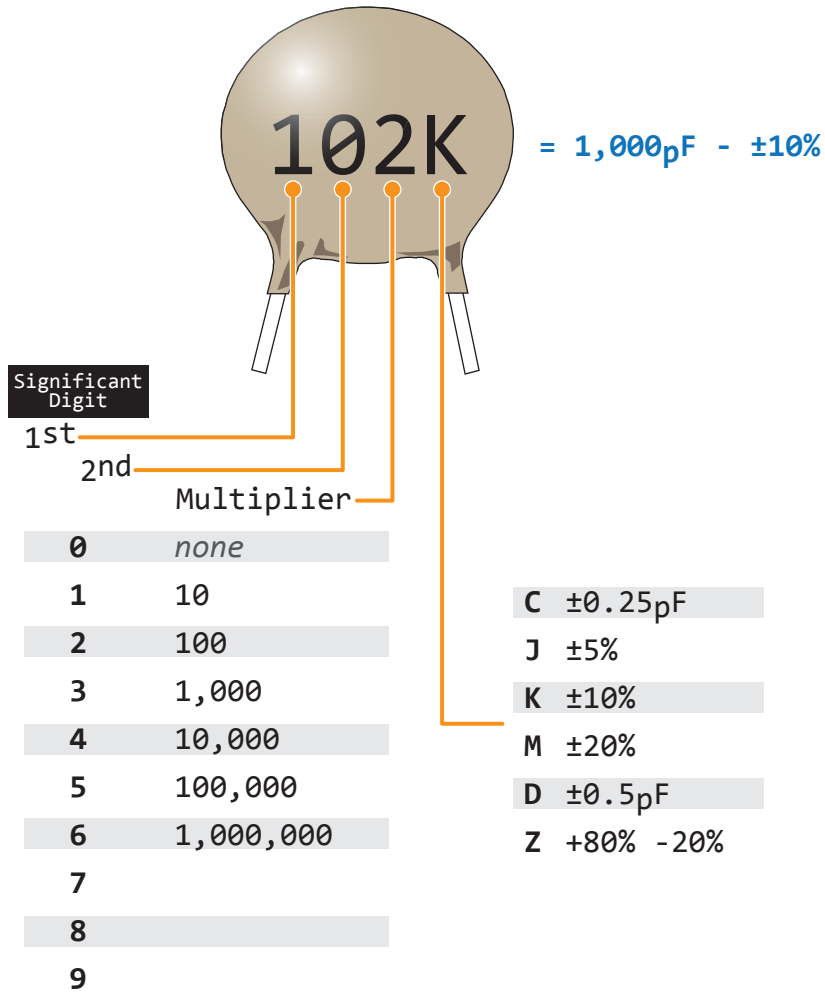
$M\Omega = x1,000,000\Omega$



MULTIPLIER

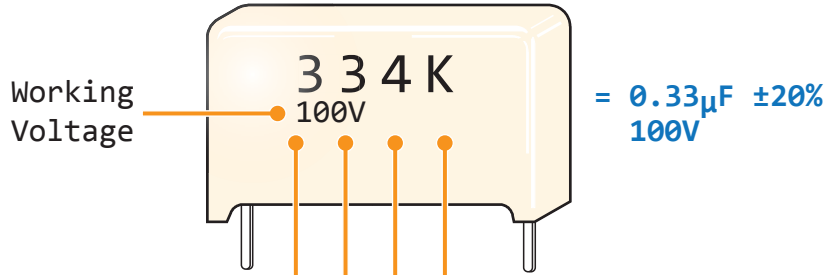


Ceramic Capacitor Code



| | | | | | | | |
|-----|-----|-------|----|------|-----|-----|-------|
| 1 | 1p0 | 1pF | 10 | 10pF | 101 | n10 | 100pF |
| 1.2 | 1p2 | 1.2pF | 12 | 12pF | 121 | n12 | 120pF |
| 1.5 | 1p5 | 1.5pF | 15 | 15pF | 151 | n15 | 150pF |
| 1.8 | 1p8 | 1.8pF | 18 | 18pF | 181 | n18 | 180pF |
| 2.2 | 2p2 | 2.2pF | 22 | 22pF | 221 | n21 | 220pF |
| 2.7 | 2p7 | 2.7pF | 27 | 27pF | 271 | n27 | 270pF |
| 3.3 | 3p3 | 3.3pF | 33 | 33pF | 331 | n33 | 330pF |
| 3.9 | 3p9 | 3.9pF | 39 | 39pF | 391 | n39 | 390pF |
| 4.7 | 4p7 | 4.7pF | 47 | 47pF | 471 | n47 | 470pF |
| 5.6 | 5p6 | 5.6pF | 56 | 56pF | 561 | n56 | 560pF |
| 6.8 | 6p8 | 6.8pF | 68 | 68pF | 681 | n68 | 680pF |
| 8.2 | 8p2 | 8.2pF | 82 | 82pF | 821 | n82 | 820pF |

Polyester Film-Mylar Capacitor Code



Significant
Digit

1st

2nd

Multiplier

0 none

1 10

2 100

3 1,000

4 10,000

5 100,000

6

7

8

9

F 1~2%

G 2%

J 5%

K 10%

M 20%

1,000

pF

1

nF

0.001

μF

| | | | | | | | | | | | |
|-----|-----|-------|---------|-----|-----|------|----------|-----|------|-----|-----------|
| 102 | 1n | .001 | 1,000pF | 103 | 10n | .01 | 10,000pF | 104 | 100n | .1 | 100,000pF |
| 122 | 1n2 | .0012 | 1,200pF | 123 | 12n | .012 | 12,000pF | 124 | 120n | .12 | 120,000pF |
| 152 | 1n5 | .0015 | 1,500pF | 153 | 15n | .015 | 15,000pF | 154 | 150n | .15 | 150,000pF |
| 182 | 1n8 | .0018 | 1,800pF | 183 | 18n | .018 | 18,000pF | 184 | 180n | .18 | 180,000pF |
| 222 | 2n2 | .0022 | 2,200pF | 223 | 22n | .022 | 22,000pF | 224 | 220n | .22 | 220,000pF |
| 272 | 2n7 | .0027 | 2,700pF | 273 | 27n | .027 | 27,000pF | 274 | 270n | .27 | 270,000pF |
| 332 | 3n3 | .0033 | 3,300pF | 333 | 33n | .033 | 33,000pF | 334 | 330n | .33 | 330,000pF |
| 392 | 3n9 | .0039 | 3,900pF | 393 | 39n | .039 | 39,000pF | 394 | 390n | .39 | 390,000pF |
| 472 | 4n7 | .0047 | 4,700pF | 473 | 47n | .047 | 47,000pF | 474 | 470n | .47 | 470,000pF |
| 562 | 5n6 | .0056 | 5,600pF | 563 | 56n | .056 | 56,000pF | 564 | 560n | .56 | 560,000pF |
| 682 | 6n8 | .0068 | 6,800pF | 683 | 68n | .068 | 68,000pF | 684 | 680n | .68 | 680,000pF |
| 822 | 8n2 | .0082 | 8,200pF | 823 | 82n | .082 | 82,000pF | 824 | 820n | .82 | 820,000pF |



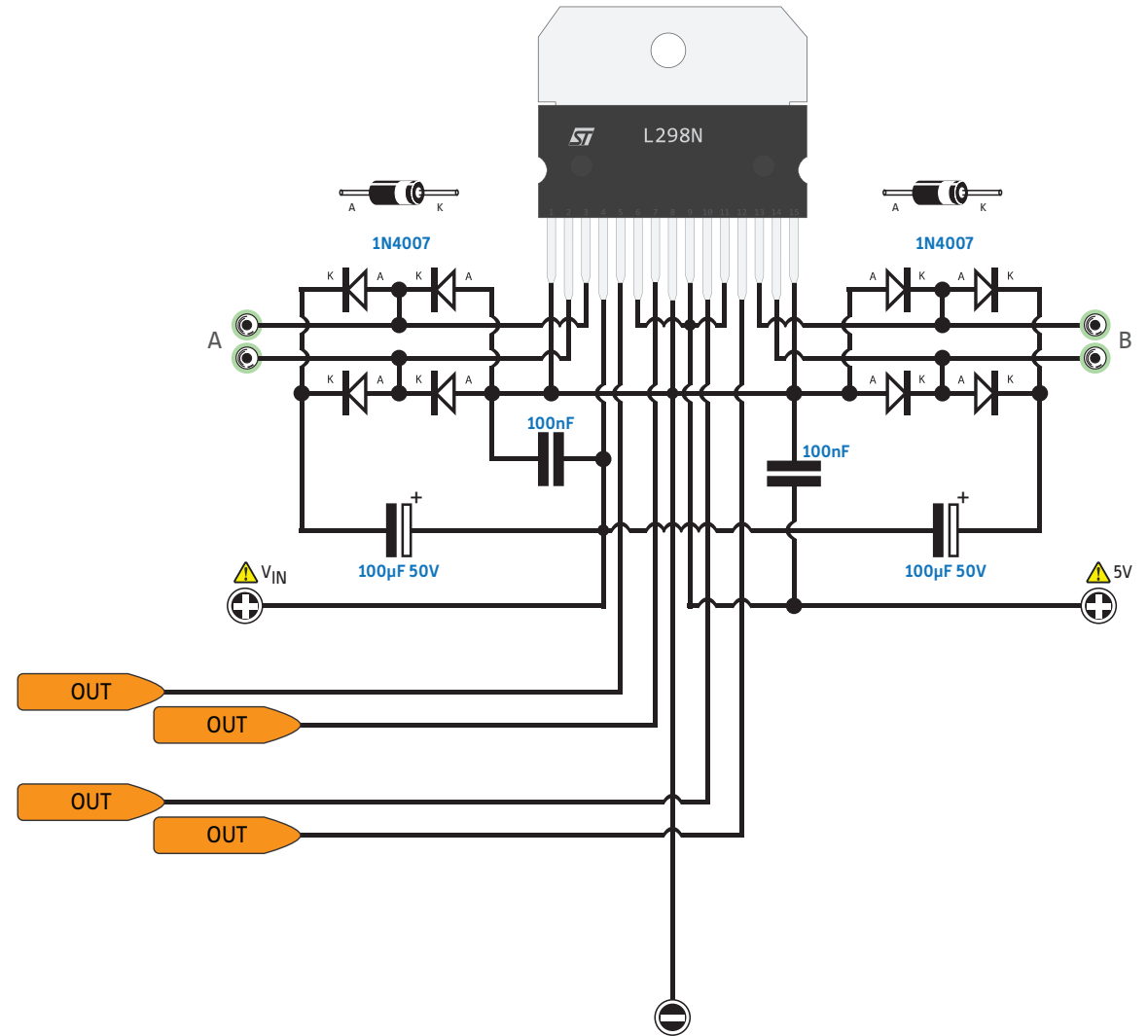
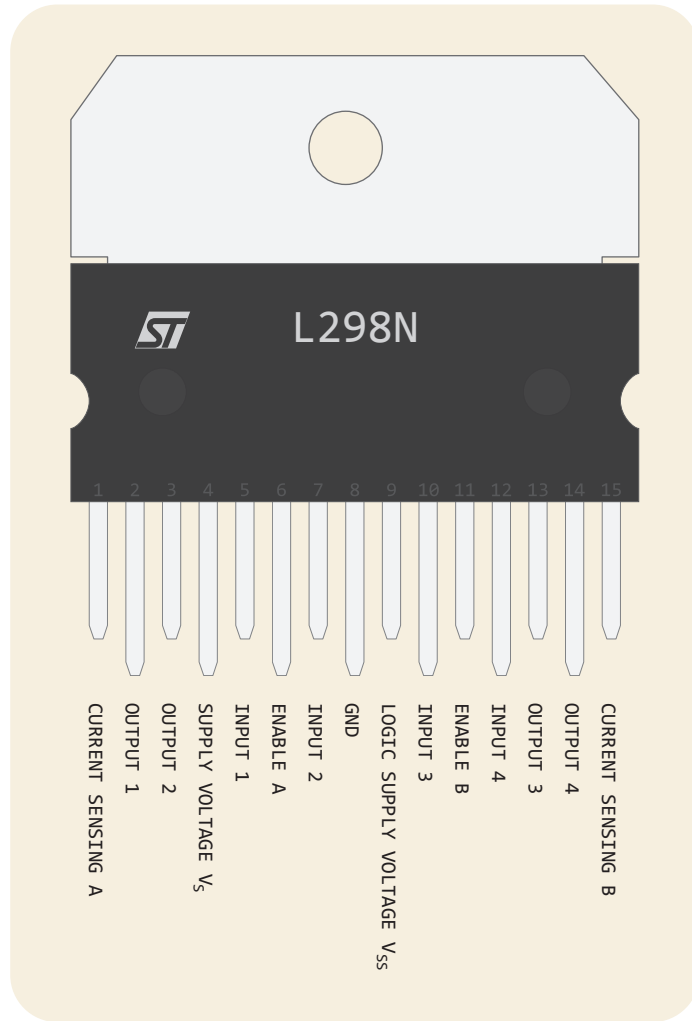
www.pighixx.com

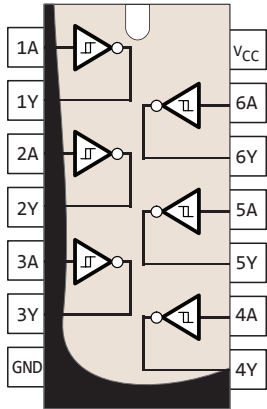
CC BY ND

11 APR 2013

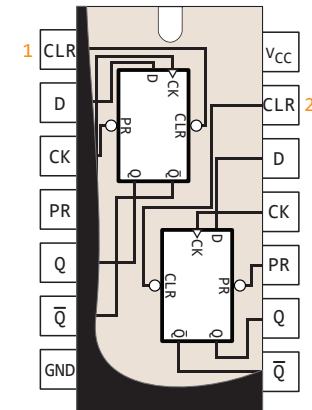
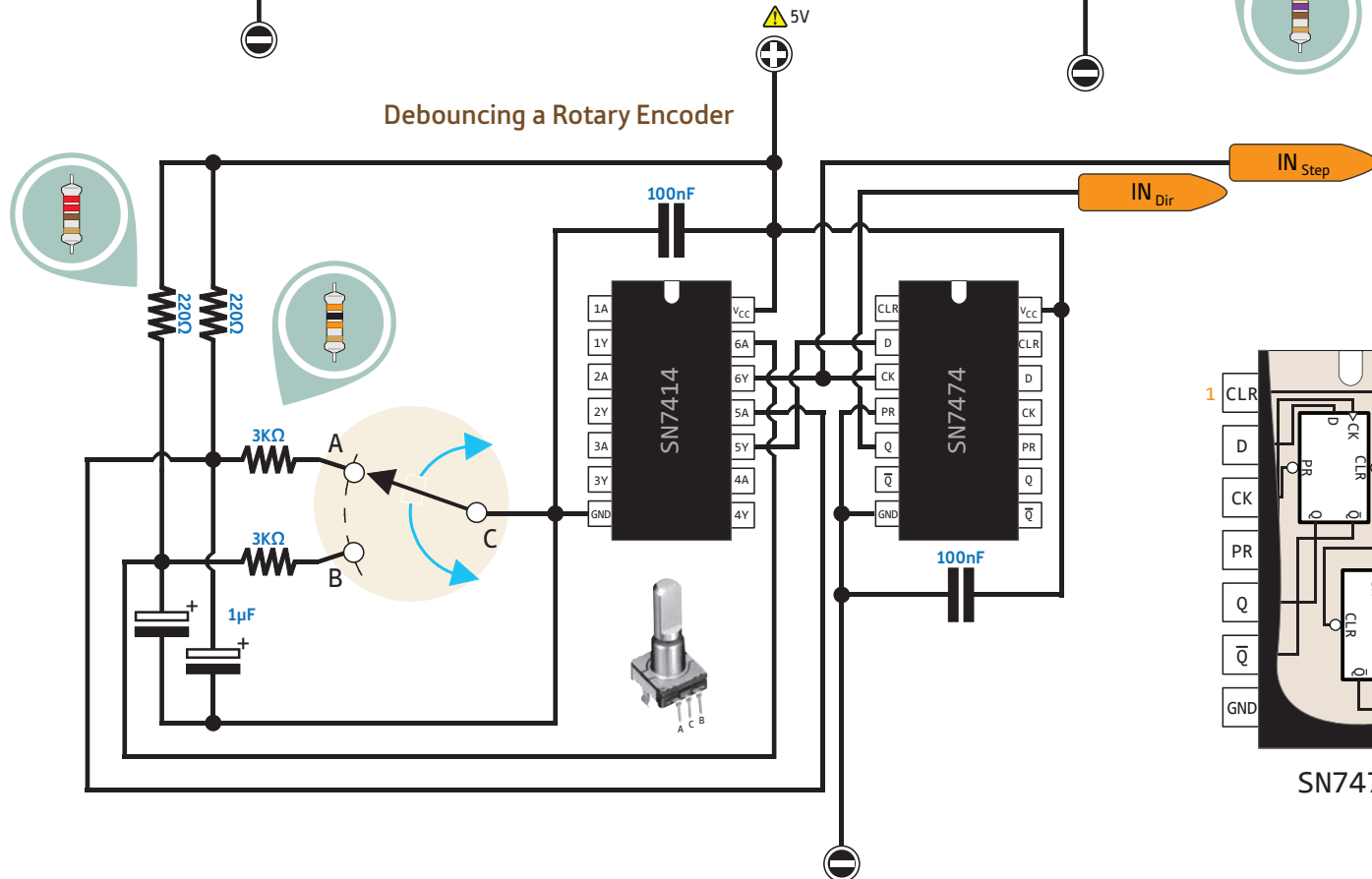
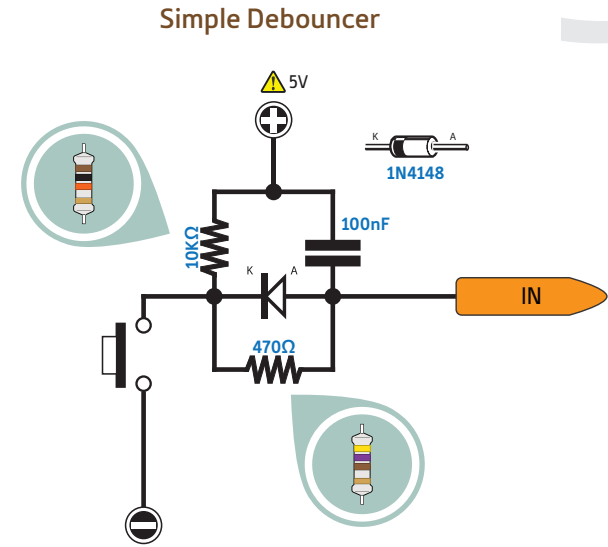
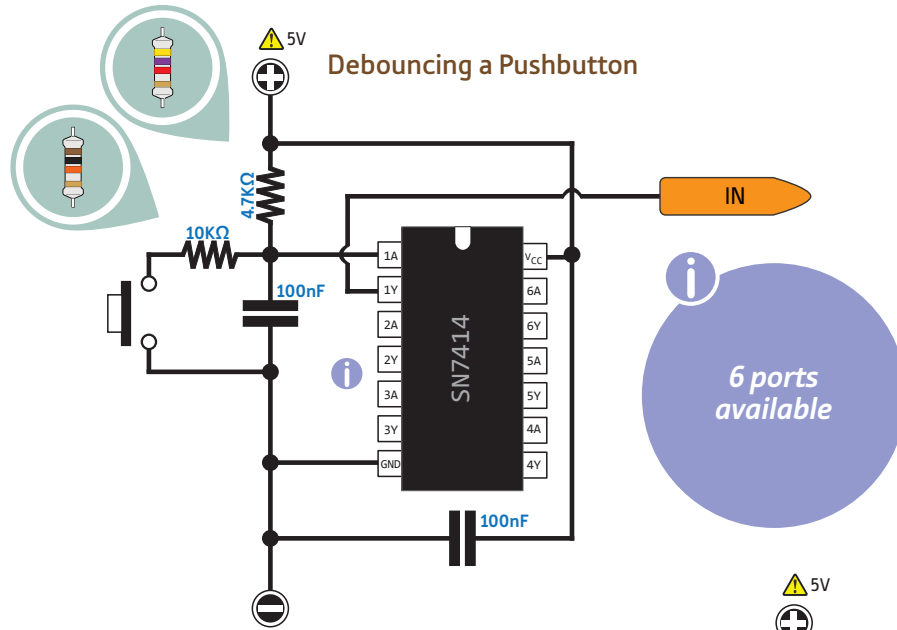
ver 1 rev 1

Drive a Motor (L298)



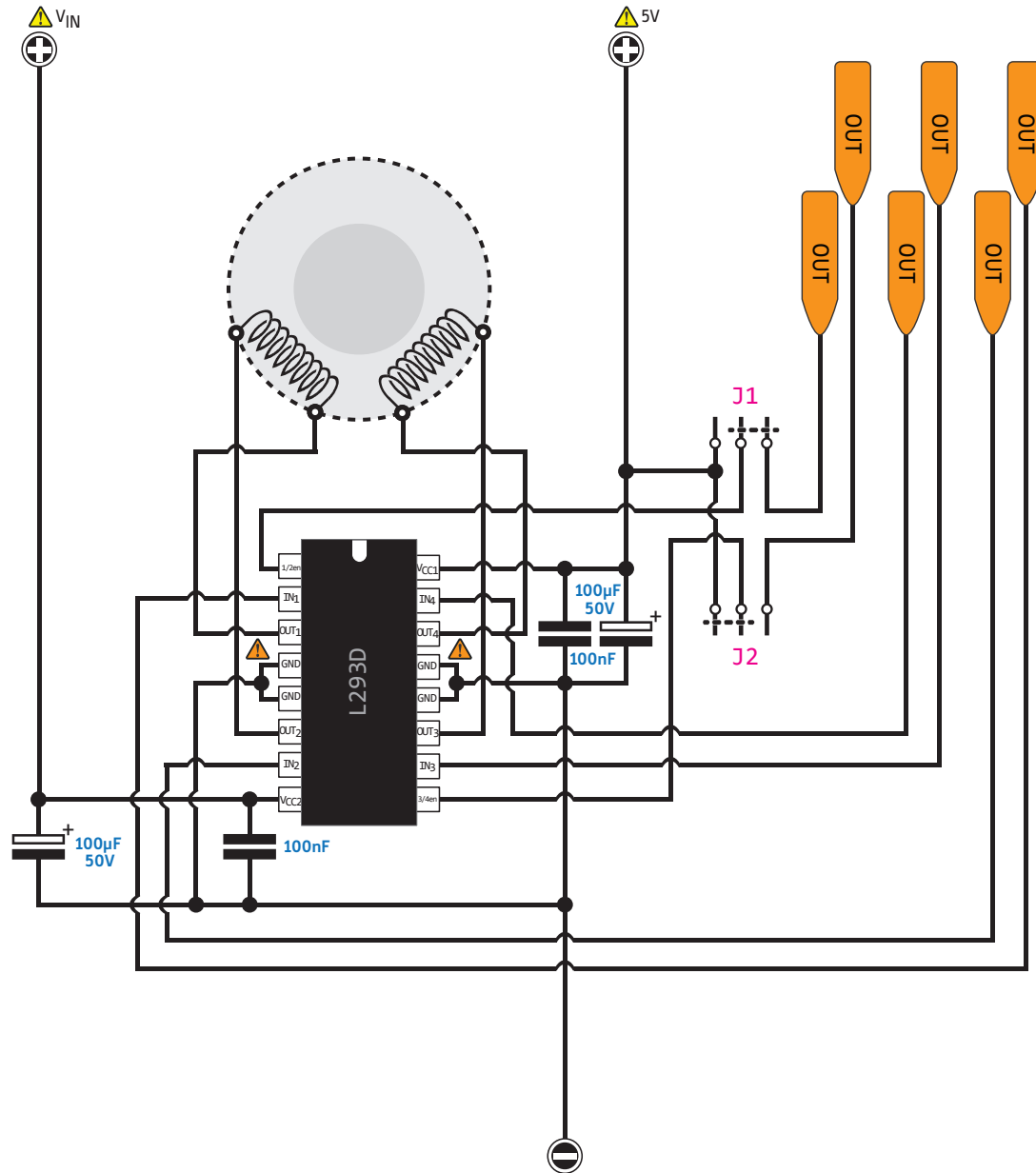
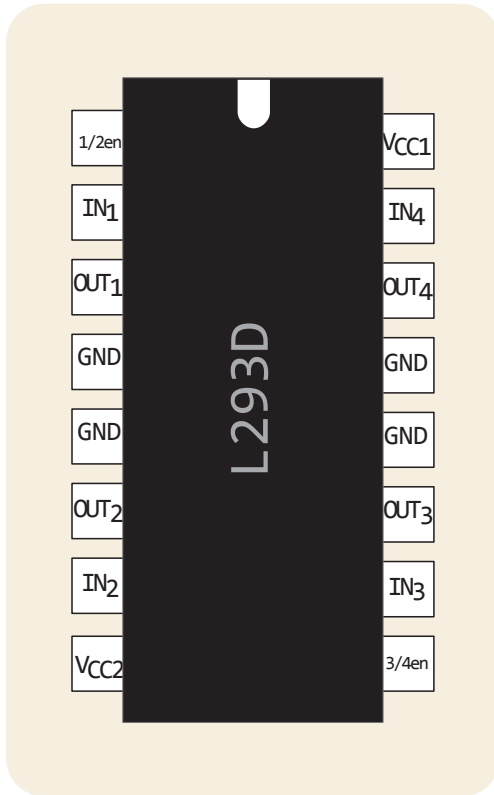


SN7414

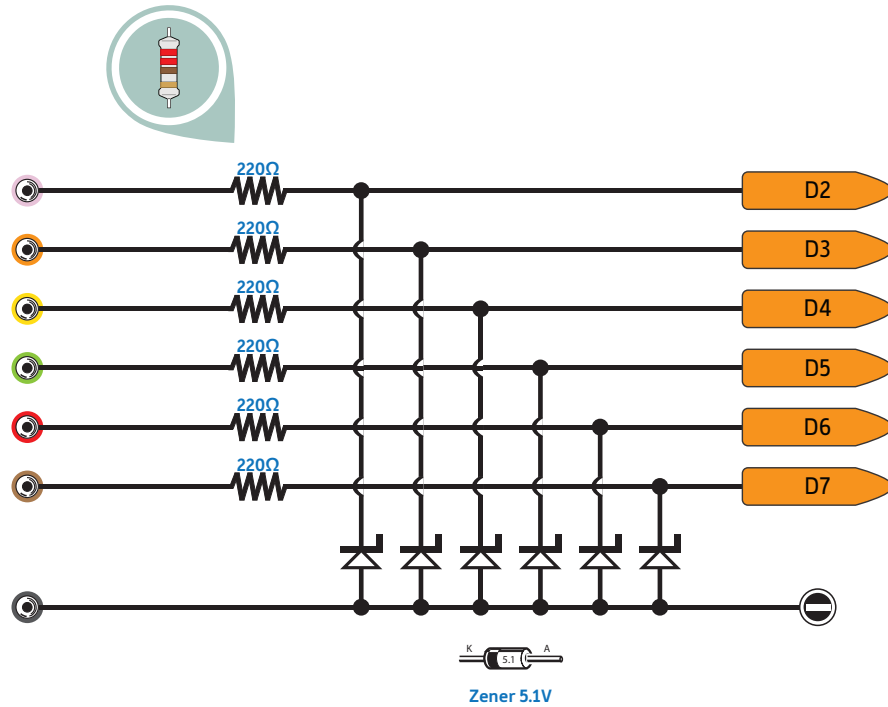


SN7474

Drive a Stepper (L293)

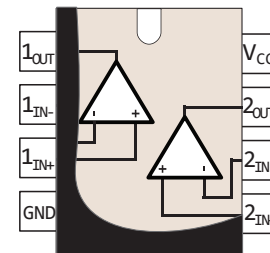
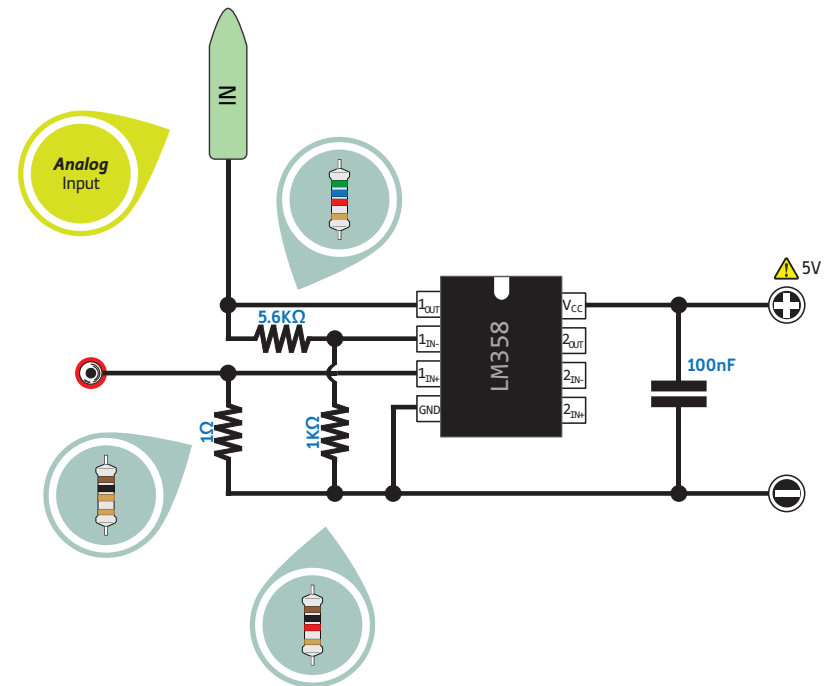


Arduino Logic Analyzer



See instructions
at
la.pighixxx.com

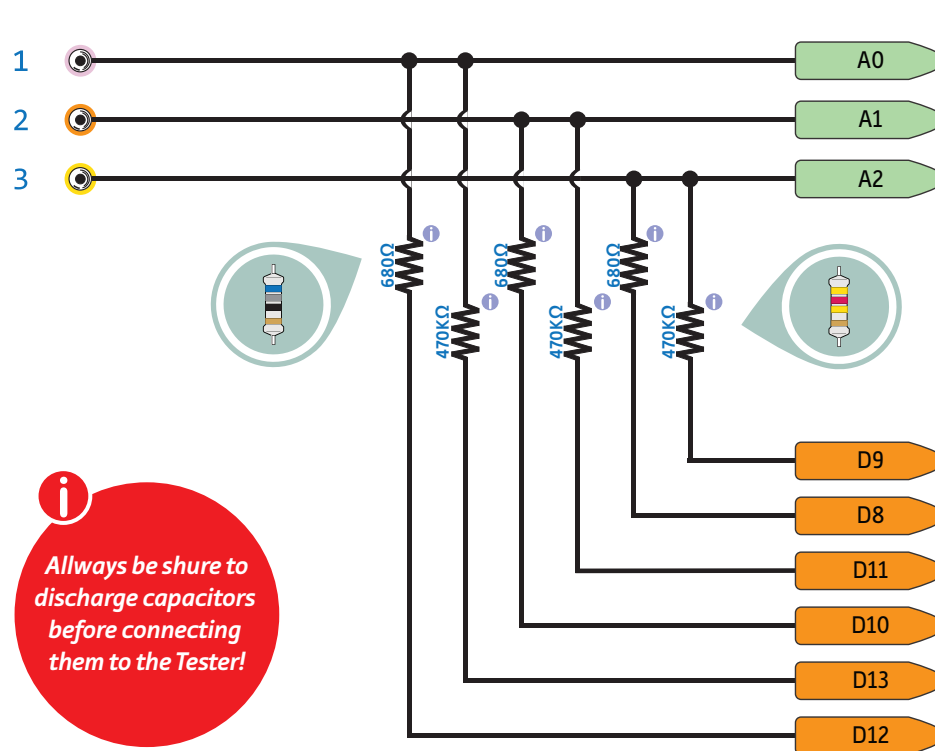
Current Sense



LM358



Arduino Component Tester (basic)



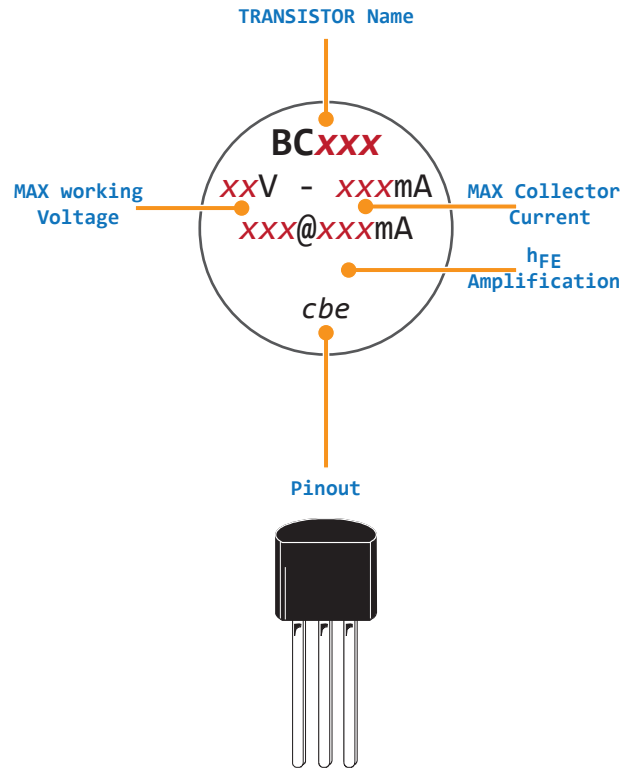
i
Always be shure to
discharge capacitors
before connecting
them to the Tester!

i
To get full
accuracy
use 1% tolerance
resistors

i
Download sketch
at
at.pighixx.com

Simple Transistor Comparison Table

IV



☐ NPN

☐ PNP

