THE UNOFFICIAL

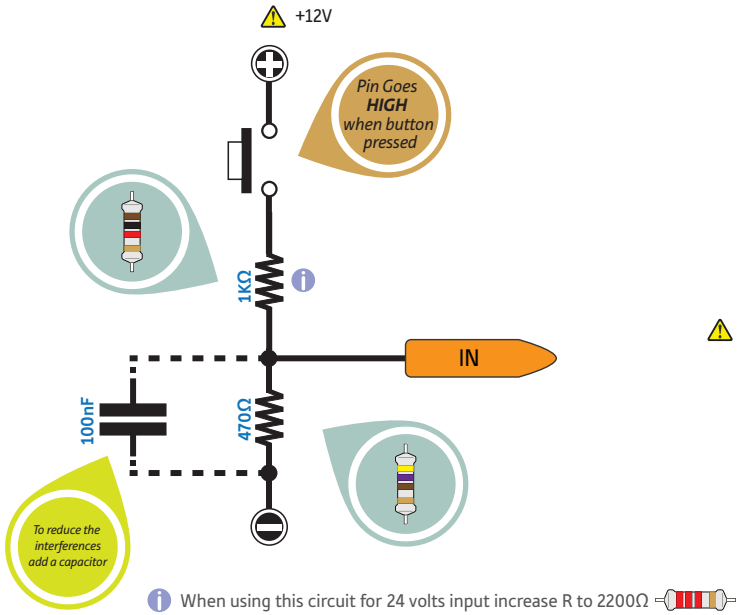
ARDUINO

basic connections

1

Pushbutton to 12V

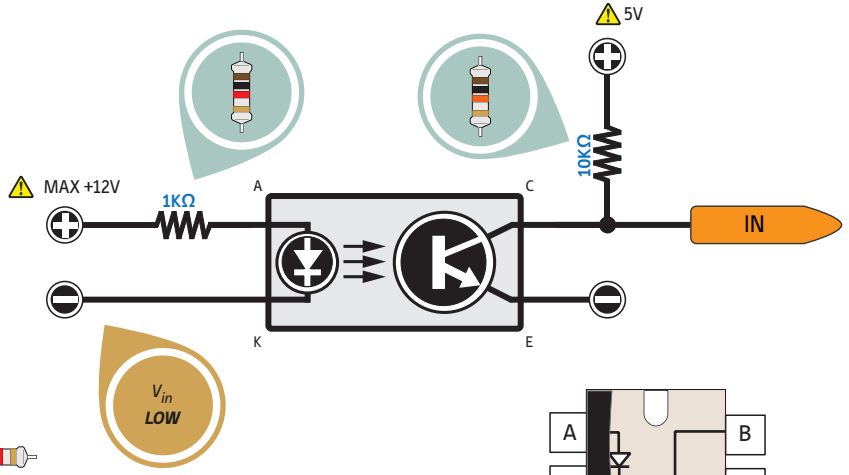
Should you need to connect Arduino inputs to a DC voltage higher than 5V

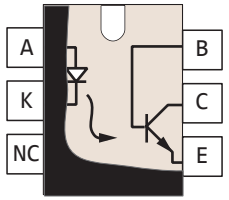


When using this circuit for 24 volts input increase R to 2200Ω

Optocoupled inputs

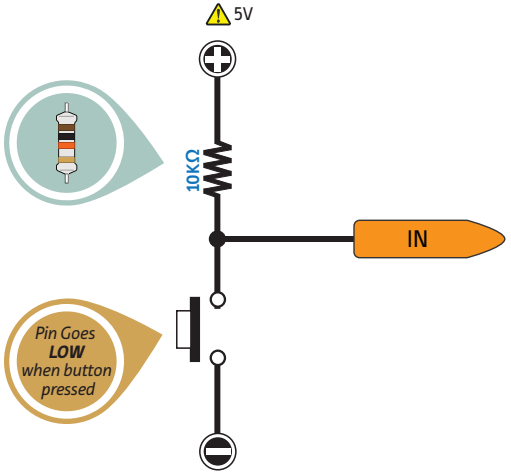
Used when galavanic separation between external circuitry and Arduino circuit is required



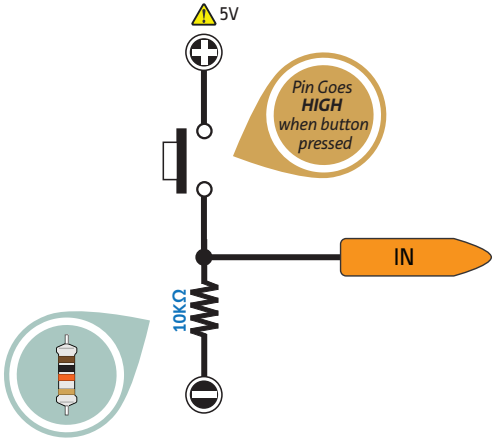


4N25

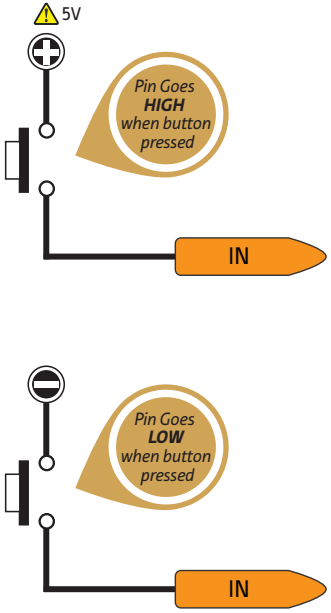
Pushbutton to GND



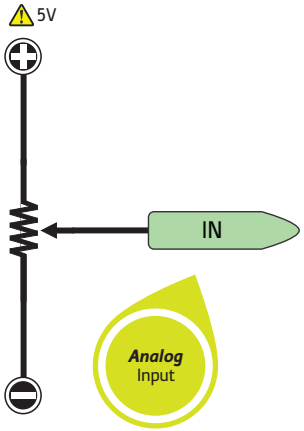
Pushbutton to 5V



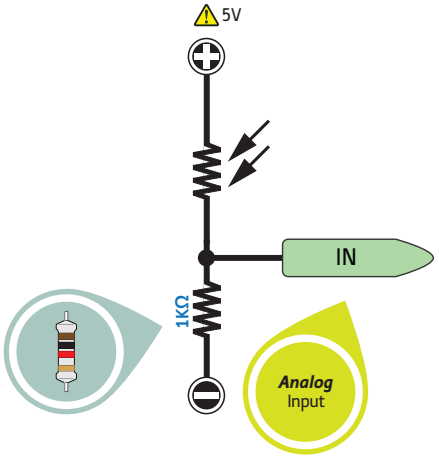
Using Internal Pullup



Trimmer or Potentiometer



Photoresistor



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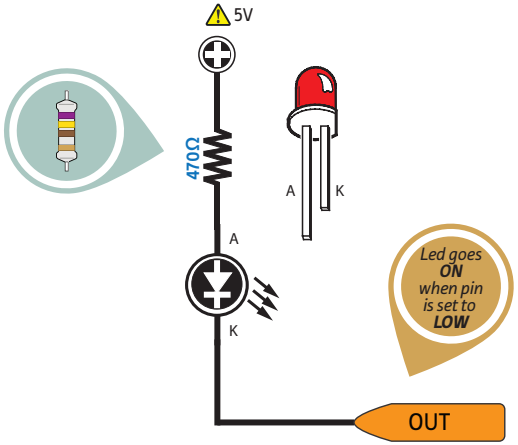
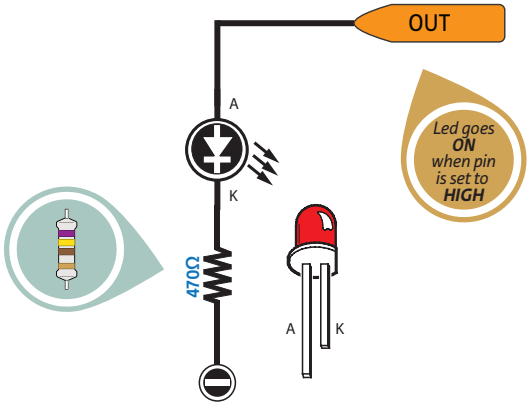
basic connections

2

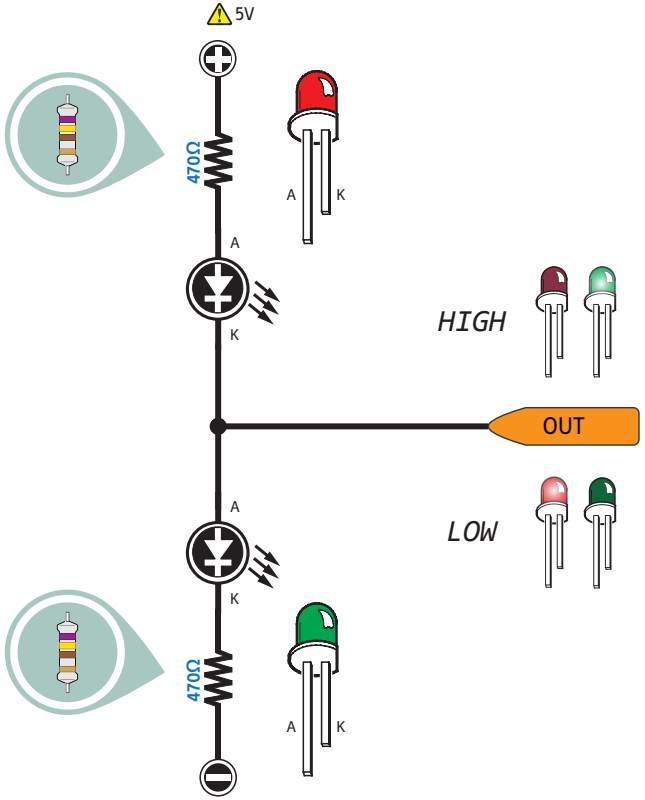
Connect a Led



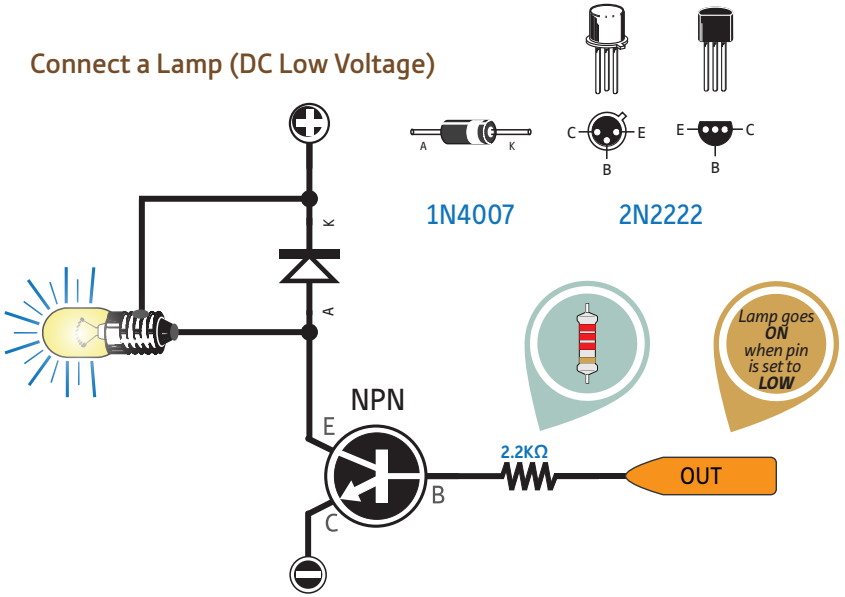
Connect a Led



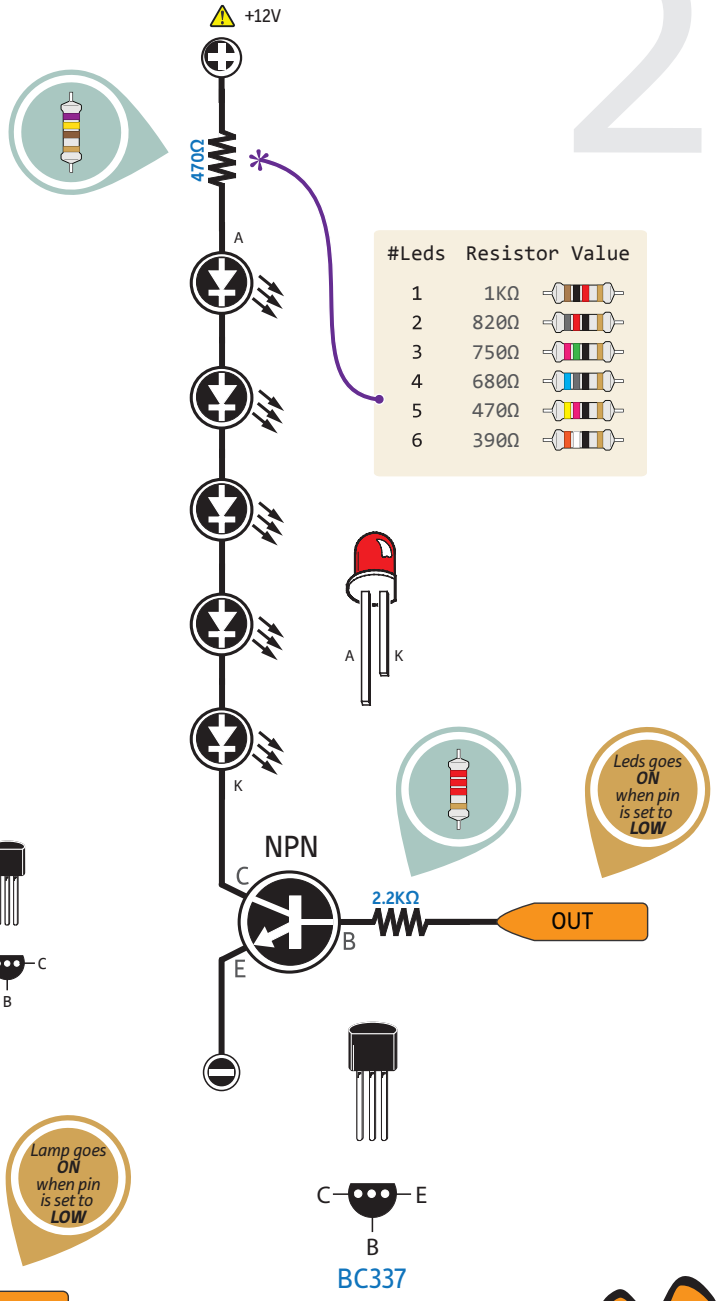
Dual LEDs or bi-color LED



Connect a Lamp (DC Low Voltage)



LED clusters



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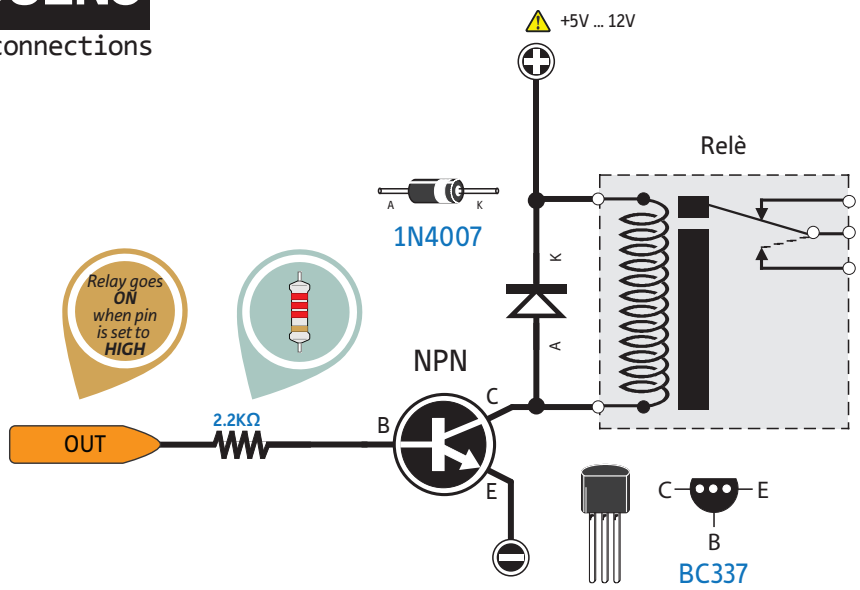
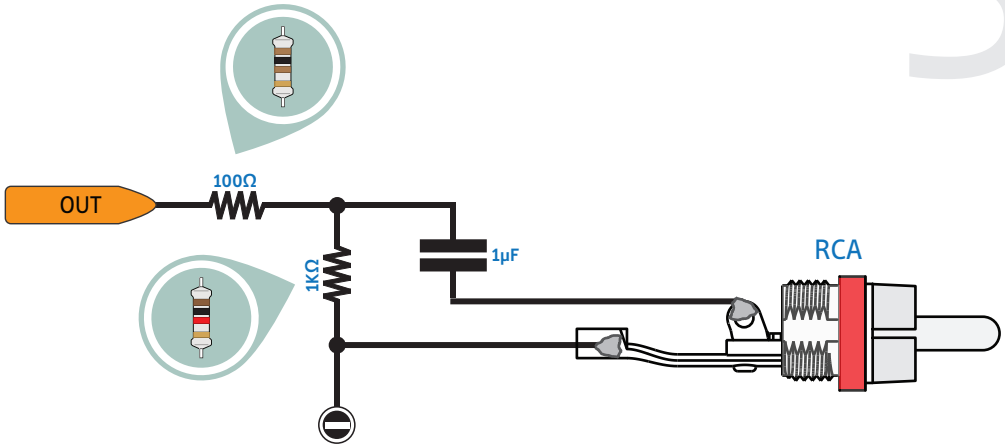
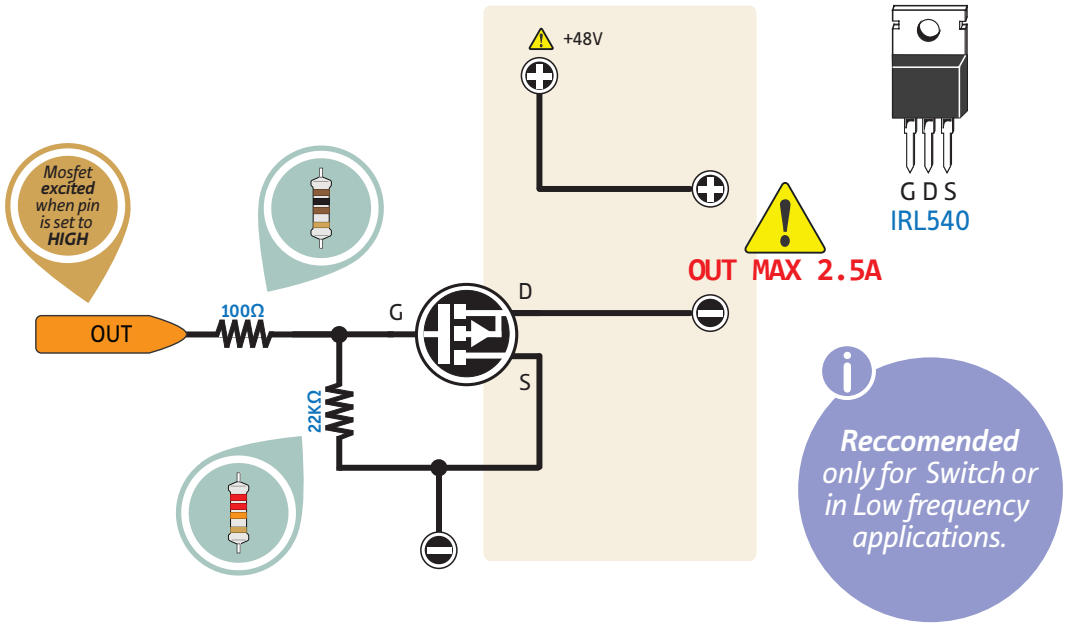
Connect a Relay



Connect an Audio Amplifier

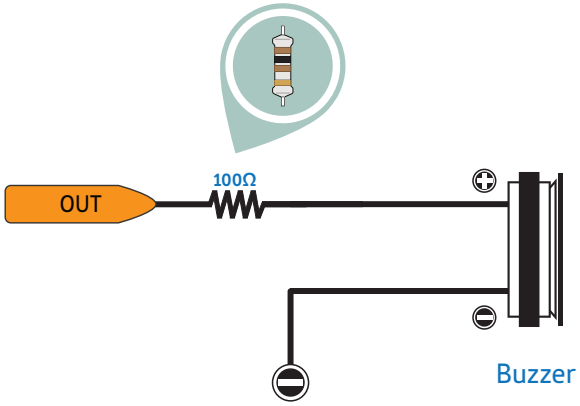


Connect a Mosfet



Reccomended only for Switch or in Low frequency applications.

Connect a Buzzer



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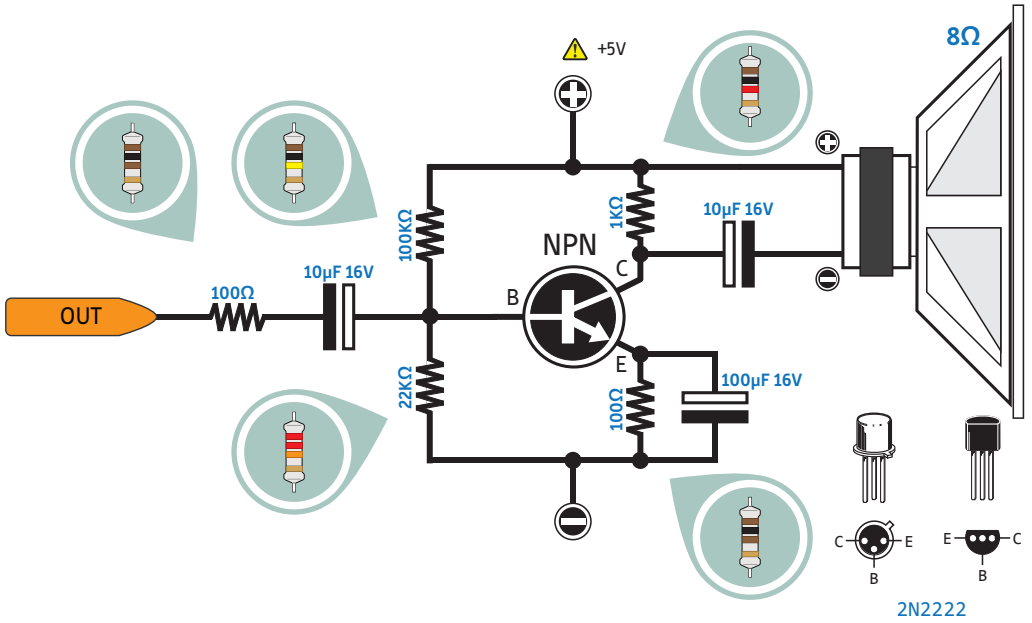
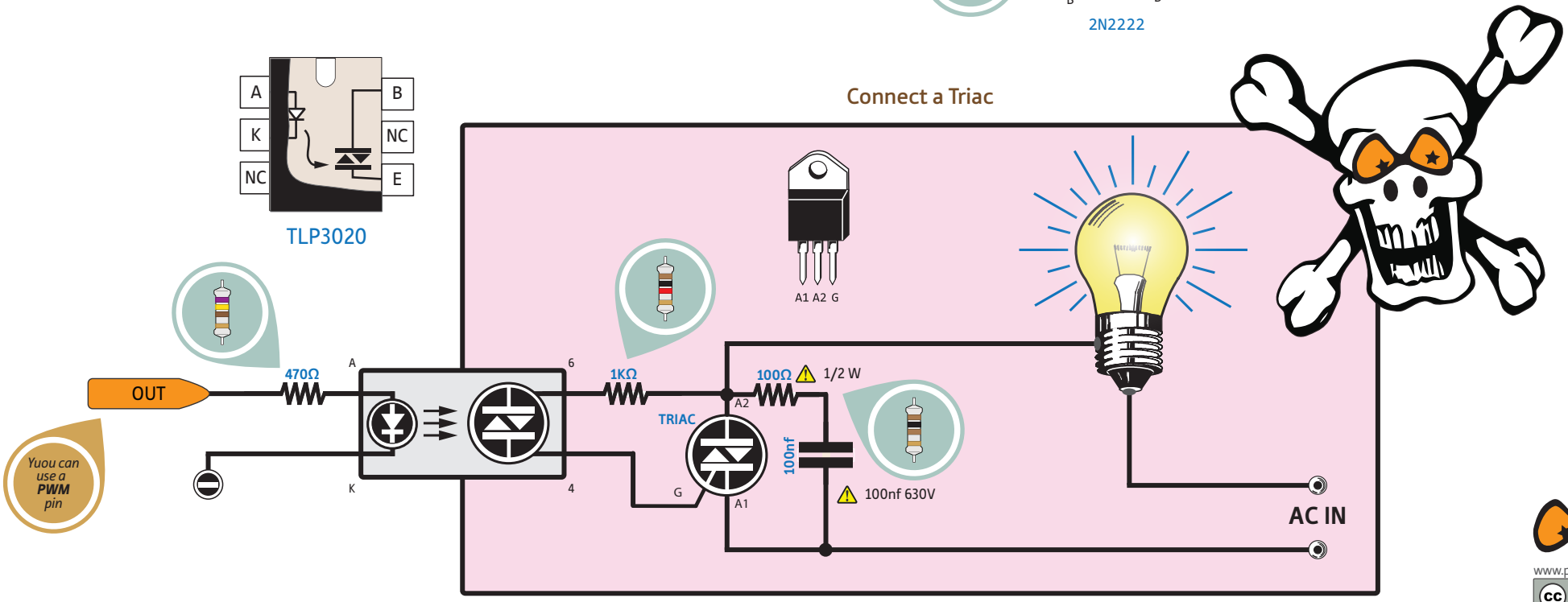
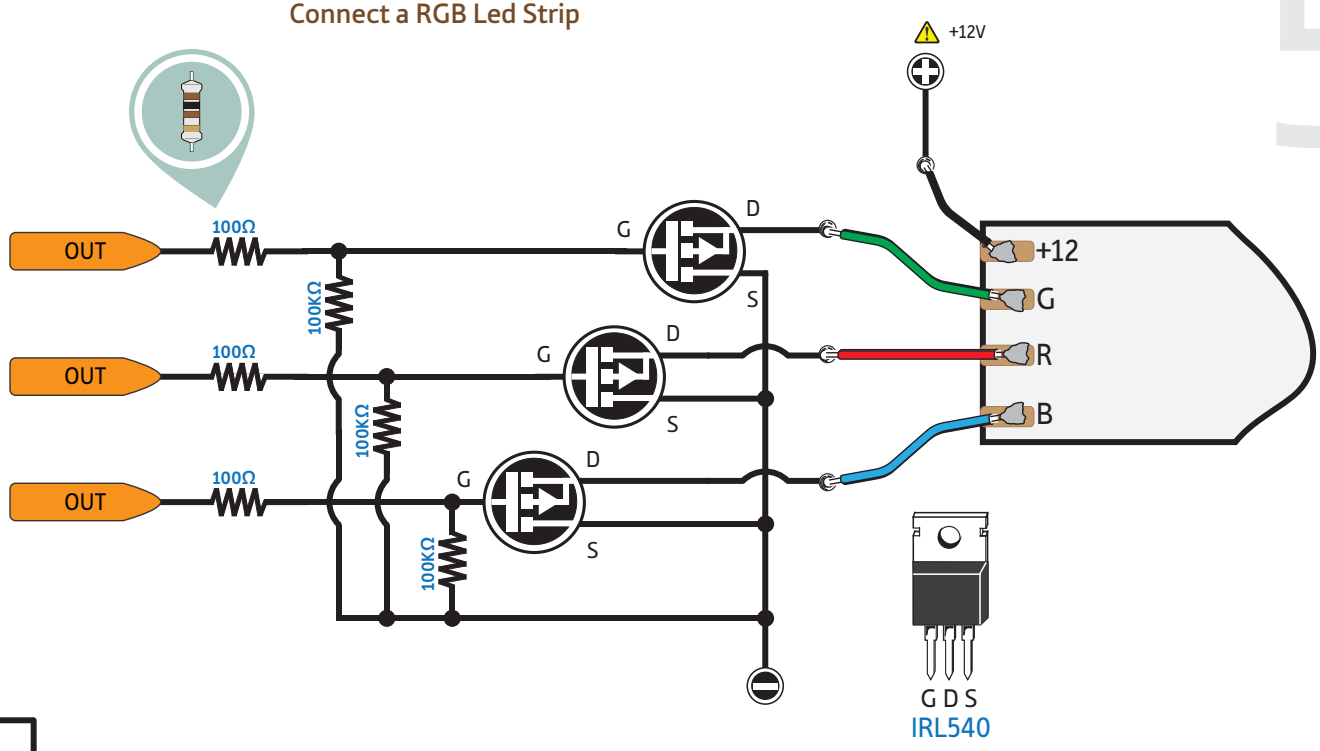
Connect a Speaker



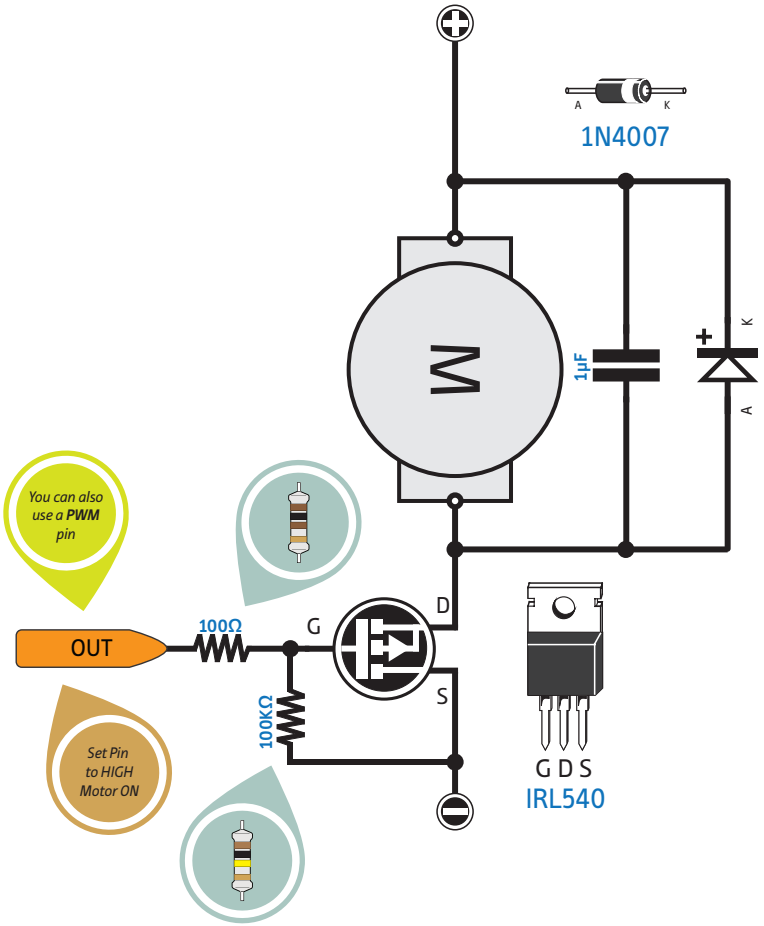
Connect a Triac



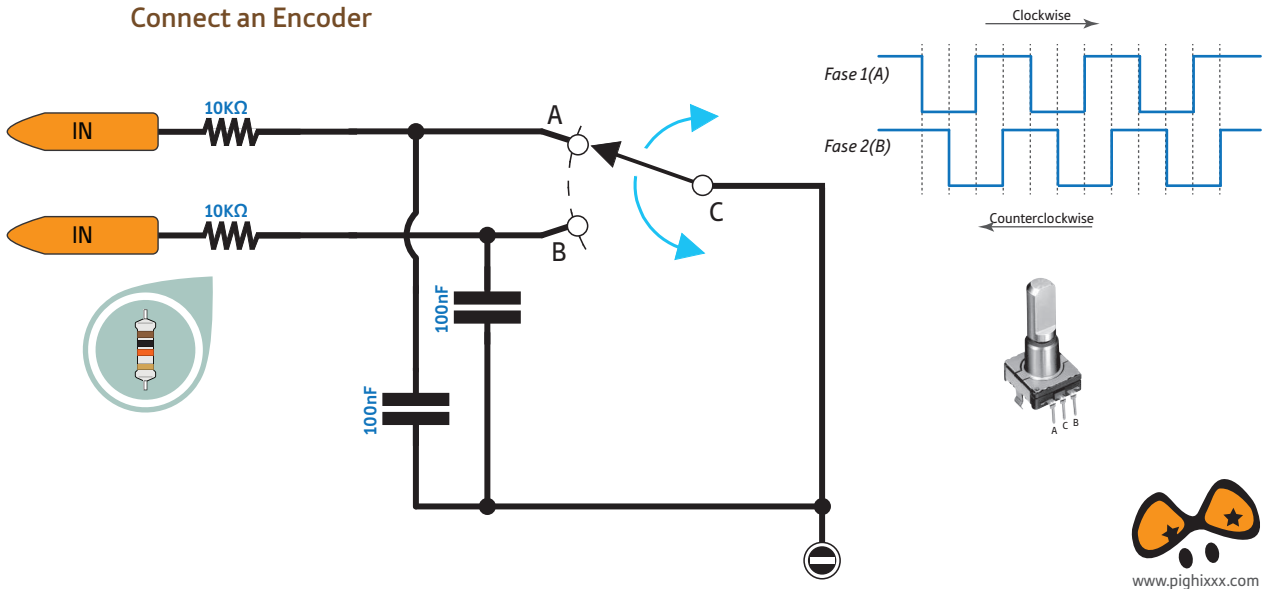
Connect a RGB Led Strip



Connect a DC Motor



Connect an Encoder



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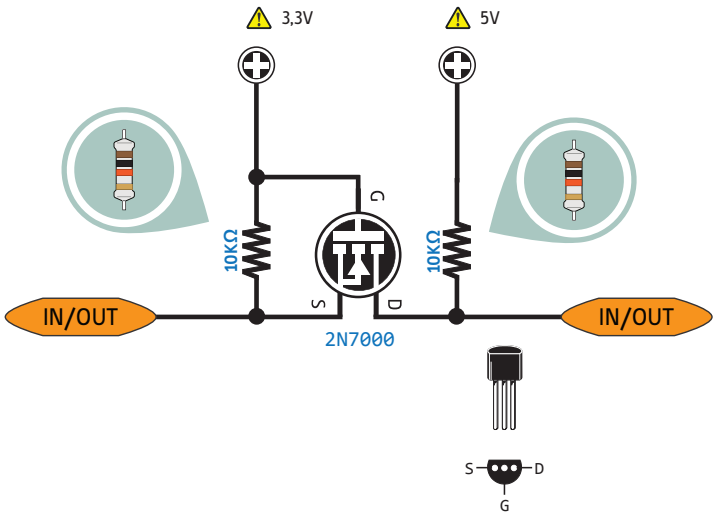
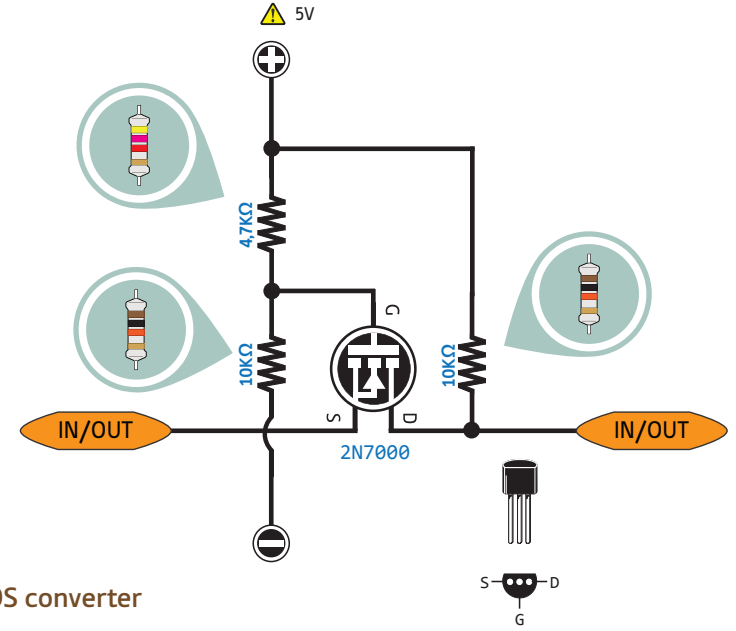
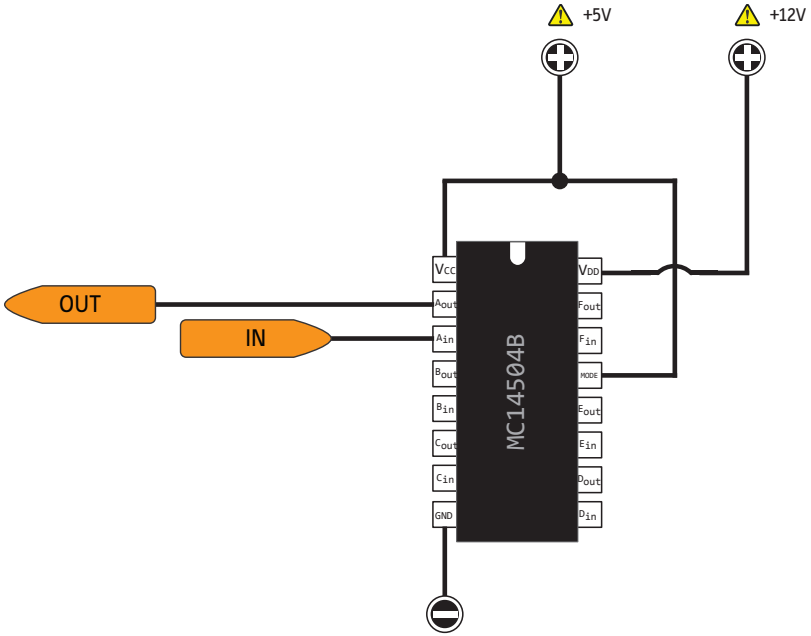
Bi-Directional Voltage Level Converter 3.3V to 5V



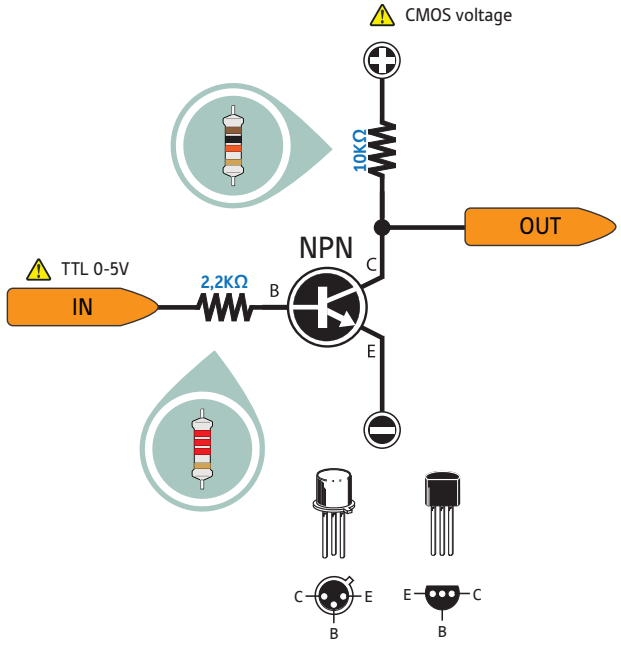
Bi-Directional Voltage Level Converter 3.3V to 5V with voltage divider



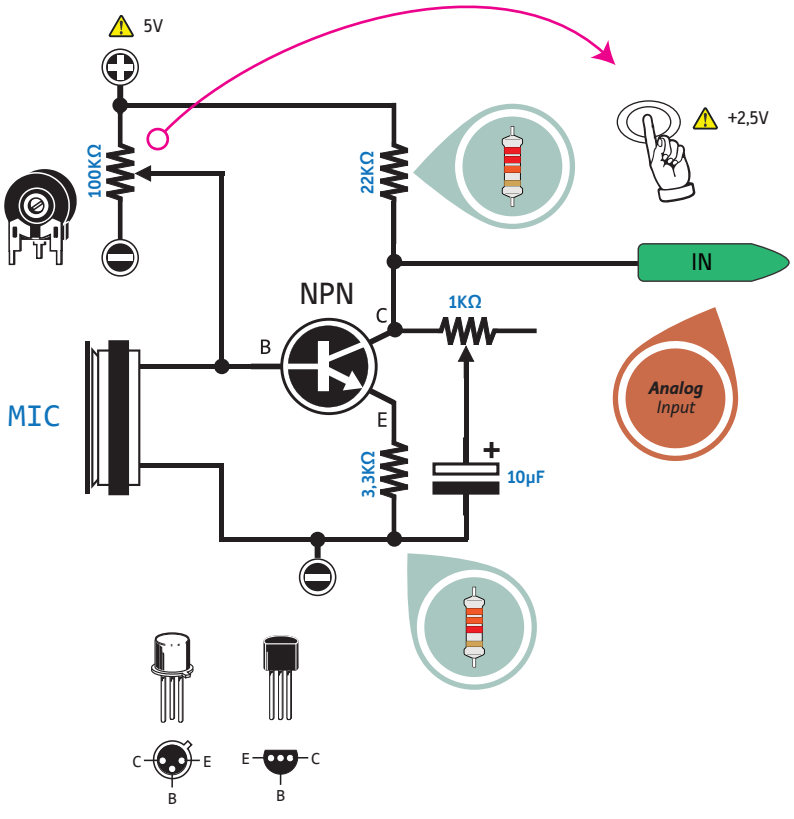
TTL / CMOS converter (6 inputs/outputs)



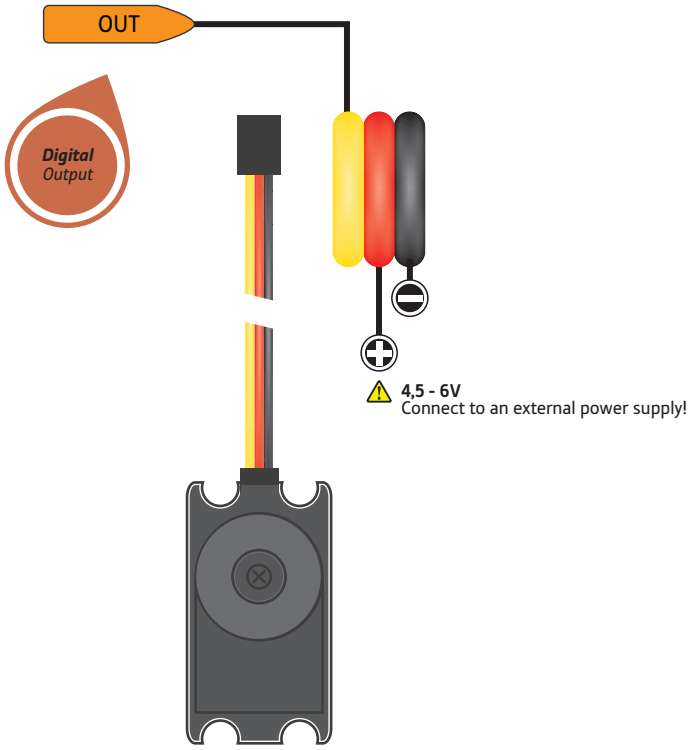
TTL / CMOS converter



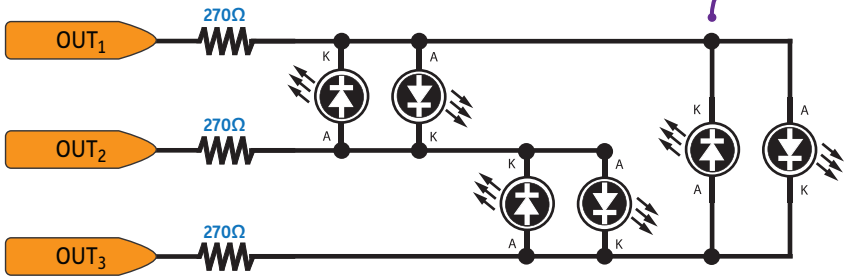
Connect a Microphone



Connect a Servo

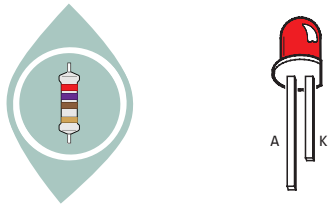


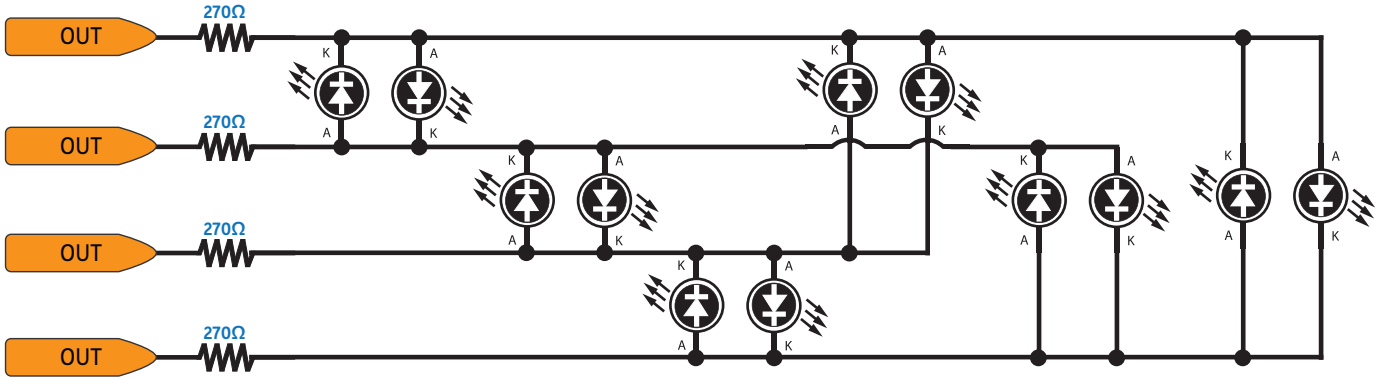
Charlieplexing



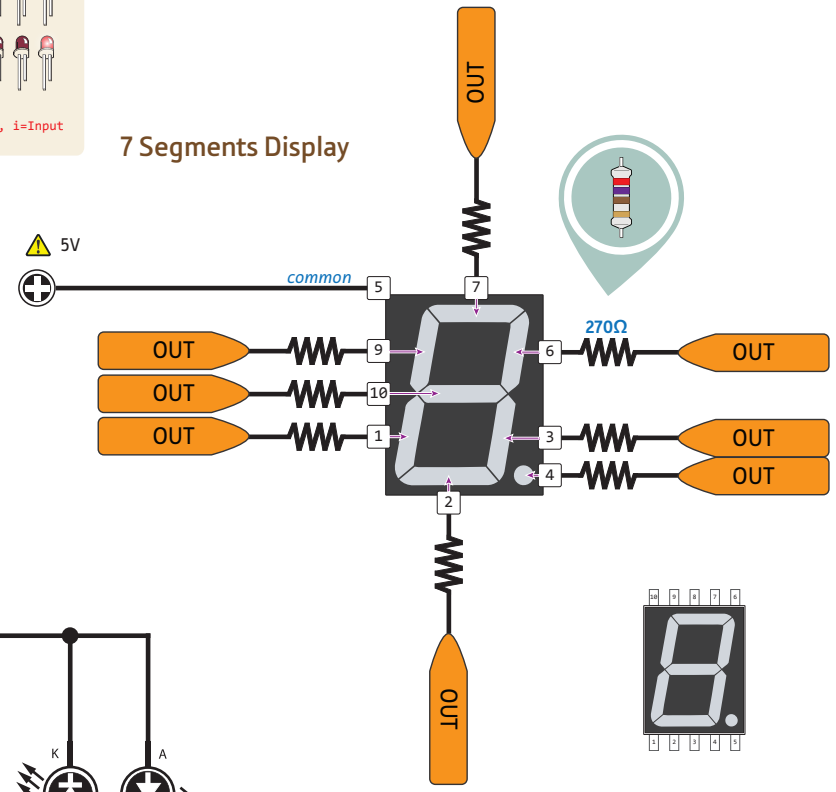
Out_1	Out_2	Out_3	
L	L	L	
L	H	i	
H	L	i	
i	L	H	
i	H	L	
L	i	H	
H	i	L	

H=High, L=Low, i=Input





7 Segments Display



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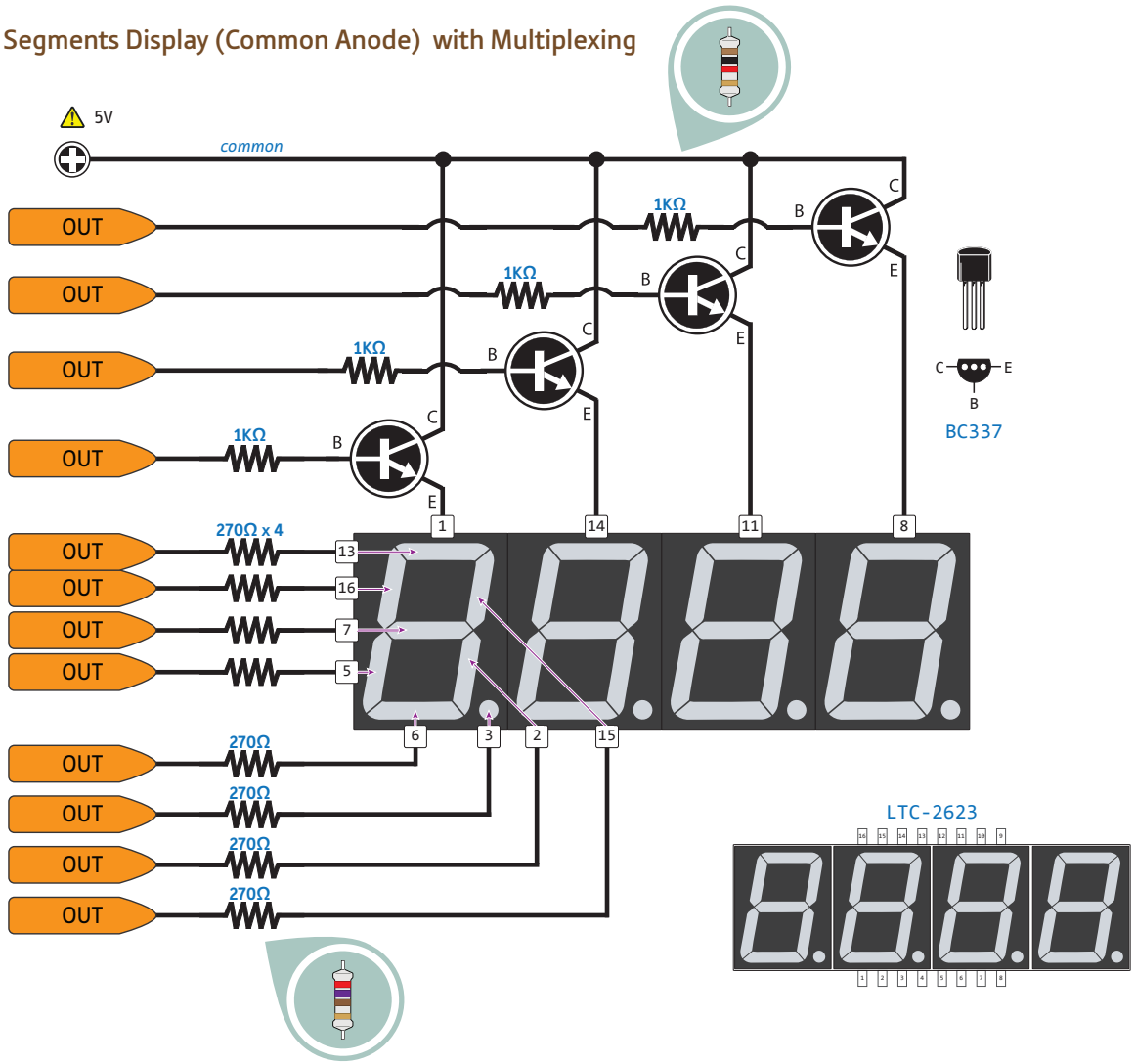
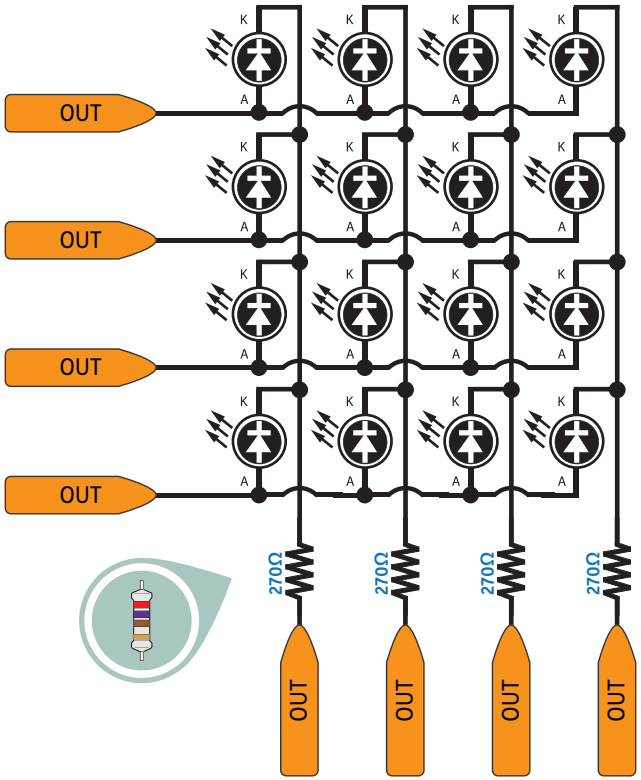
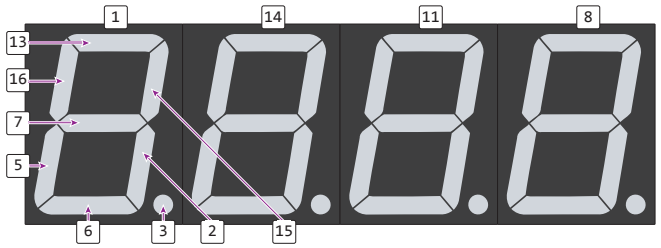
7 Segments Display (Common Anode) with Multiplexing



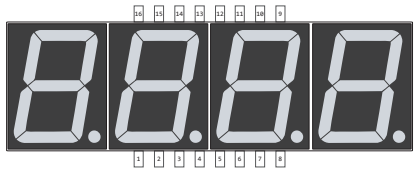
LED Array

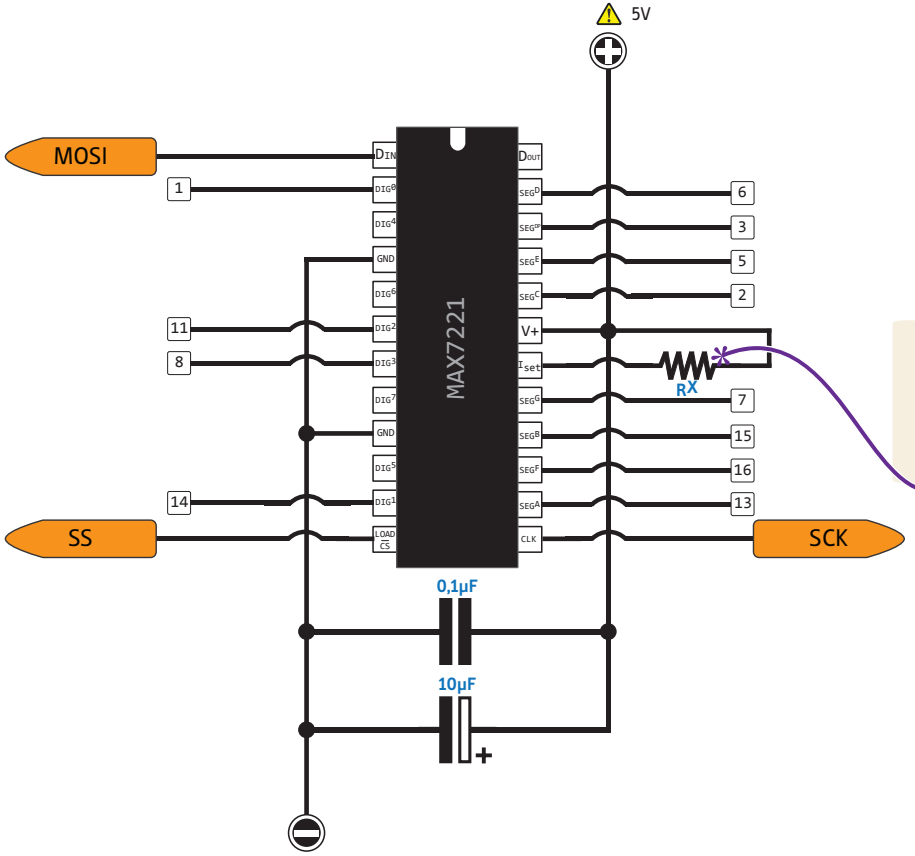


7 Segments Display (Common Anode) with MAX7221

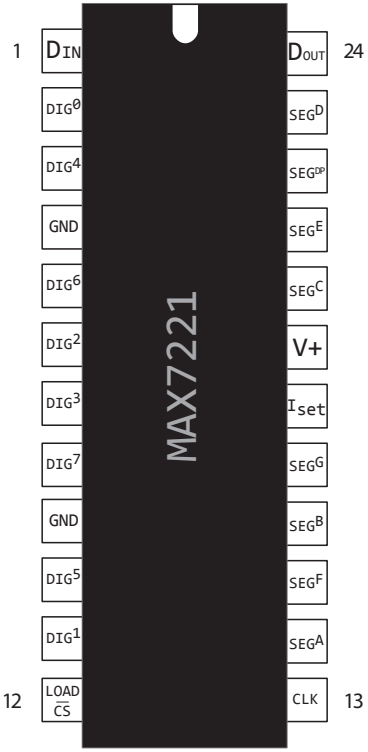


LTC-2623

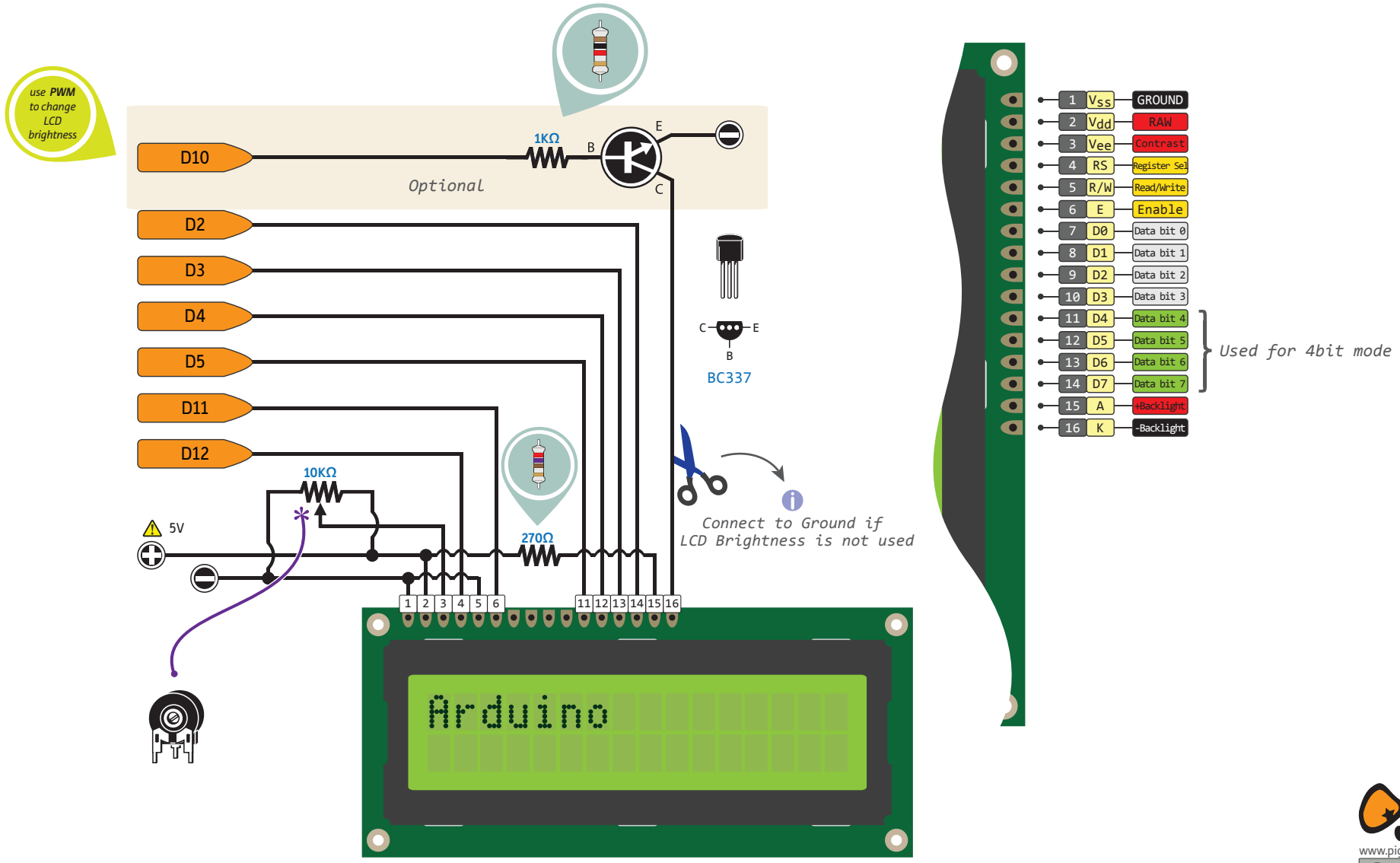




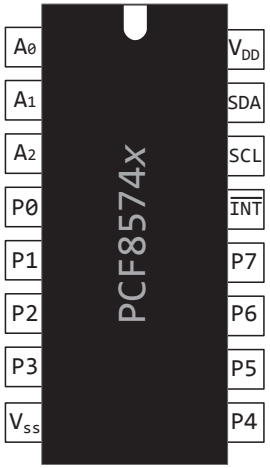
Current	1.5v	2.0v	2.5v	3.0v	3.5v
40ma	12KΩ	12KΩ	11KΩ	10KΩ	10KΩ
30ma	18KΩ	17KΩ	16KΩ	15KΩ	14KΩ
20ma	30KΩ	28KΩ	26KΩ	24KΩ	22KΩ
10ma	68KΩ	64KΩ	60KΩ	56KΩ	51KΩ

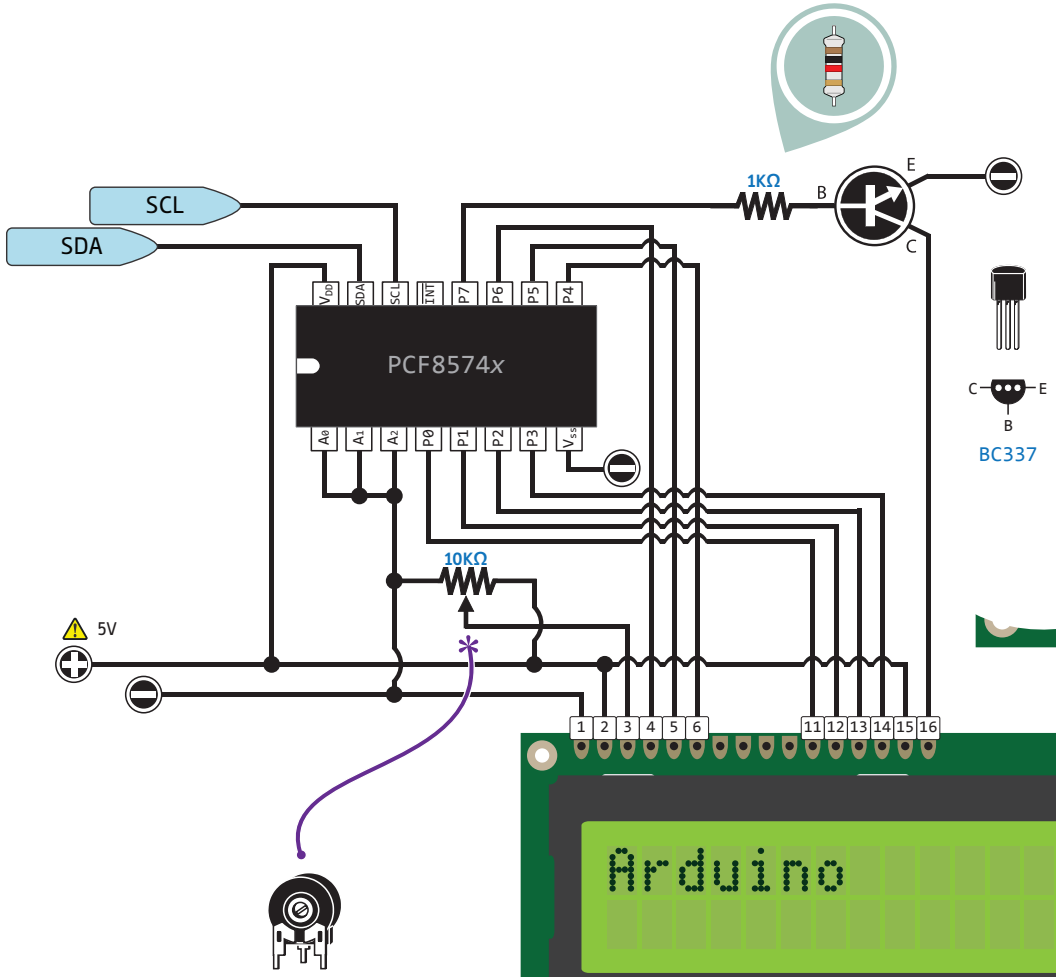


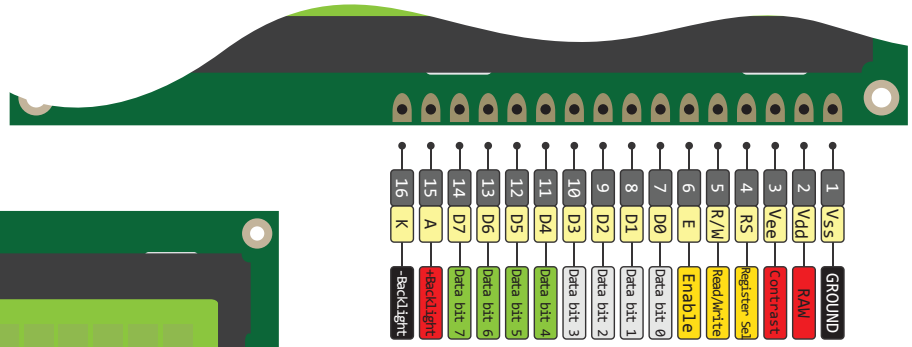
Connect a LCD HITACHI 44780 compatible



Connect via I2C a LCD HITACHI 44780 compatible

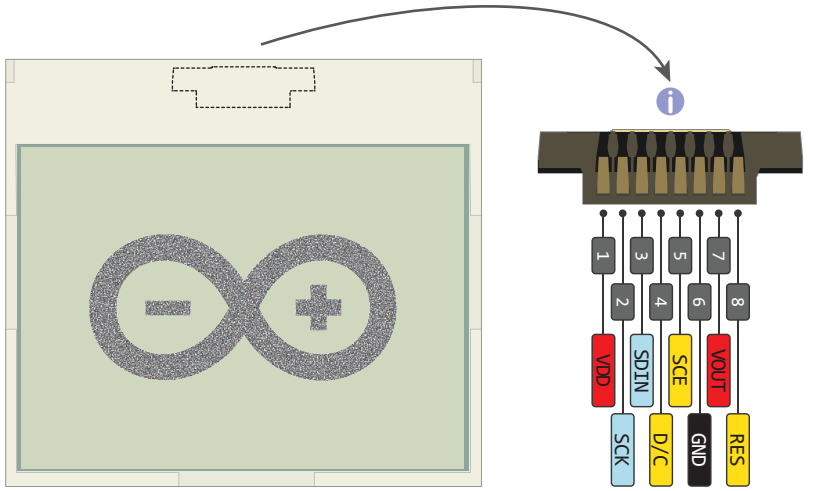




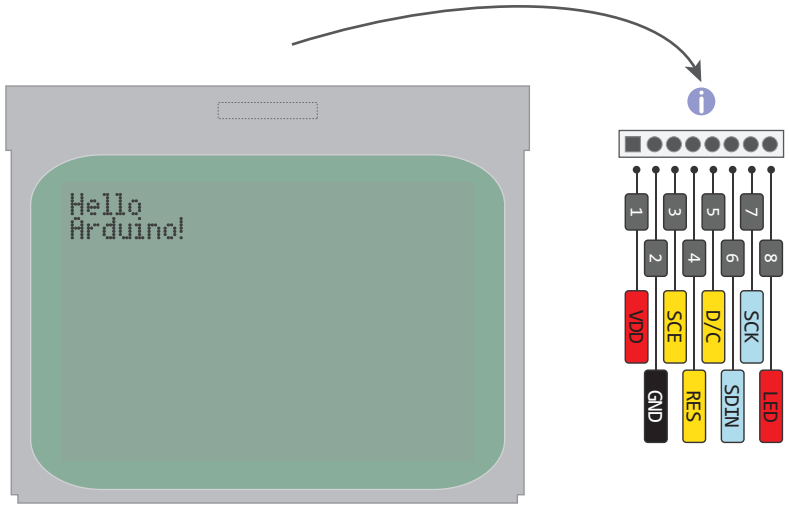


Connect a NOKIA LCD (Basic)

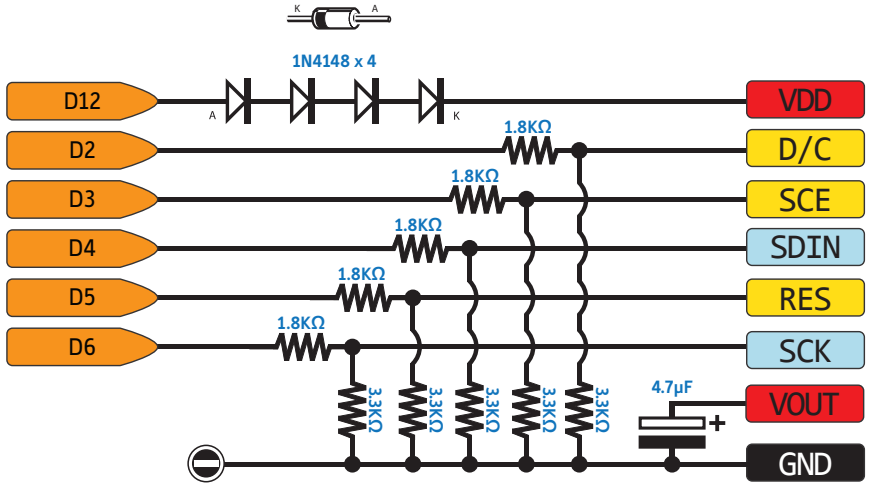
⚠ *Only for 5V Arduino*

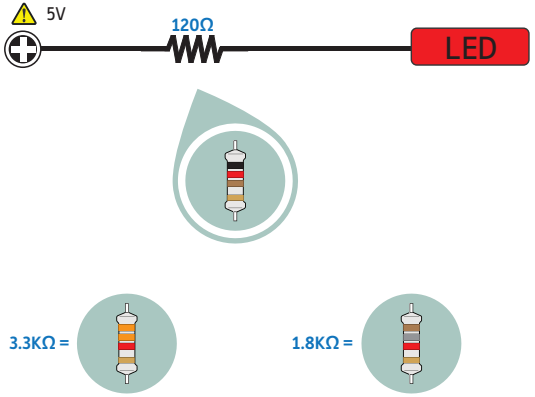


NOKIA 3110

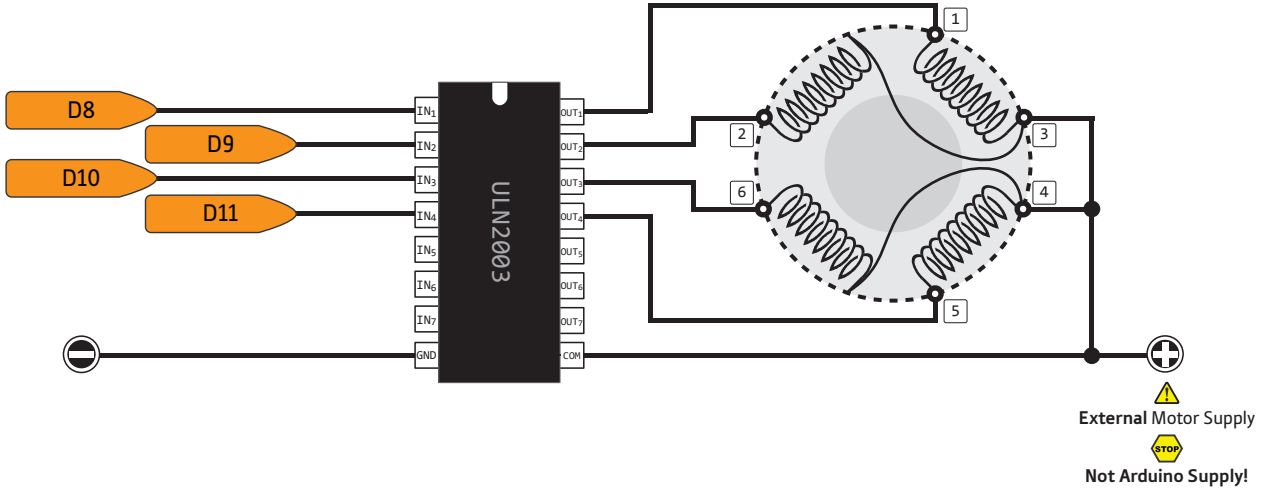


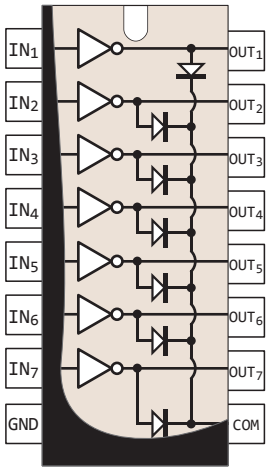
NOKIA 5110



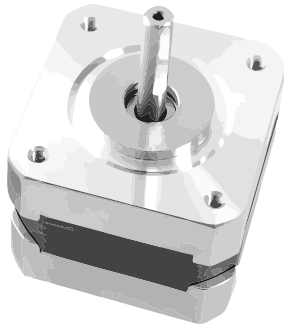


Drive a Unipolar Stepper (Basic 1)

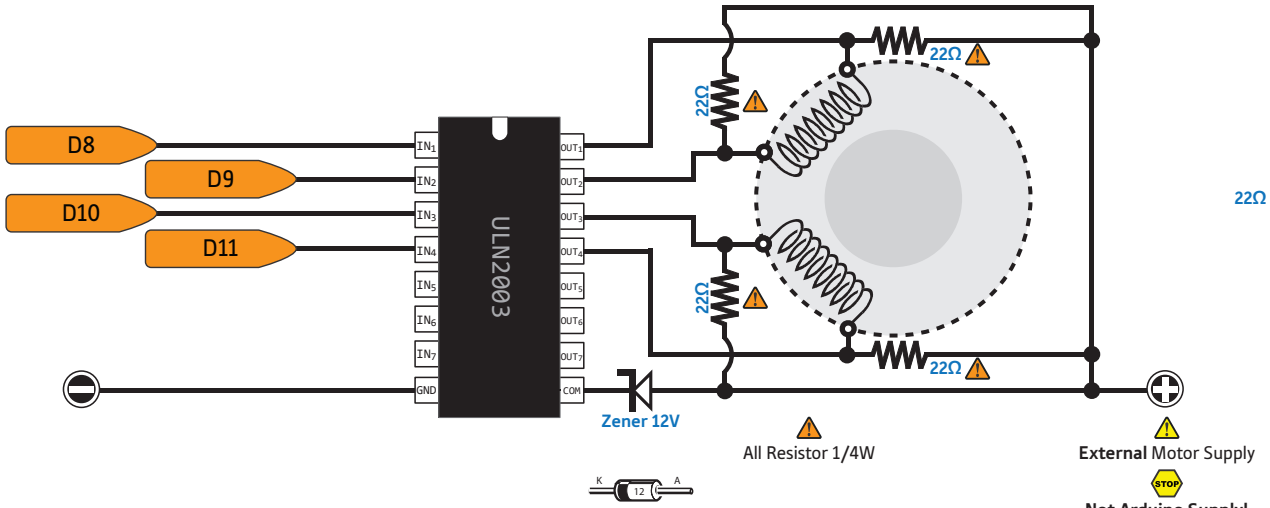




ULN2003

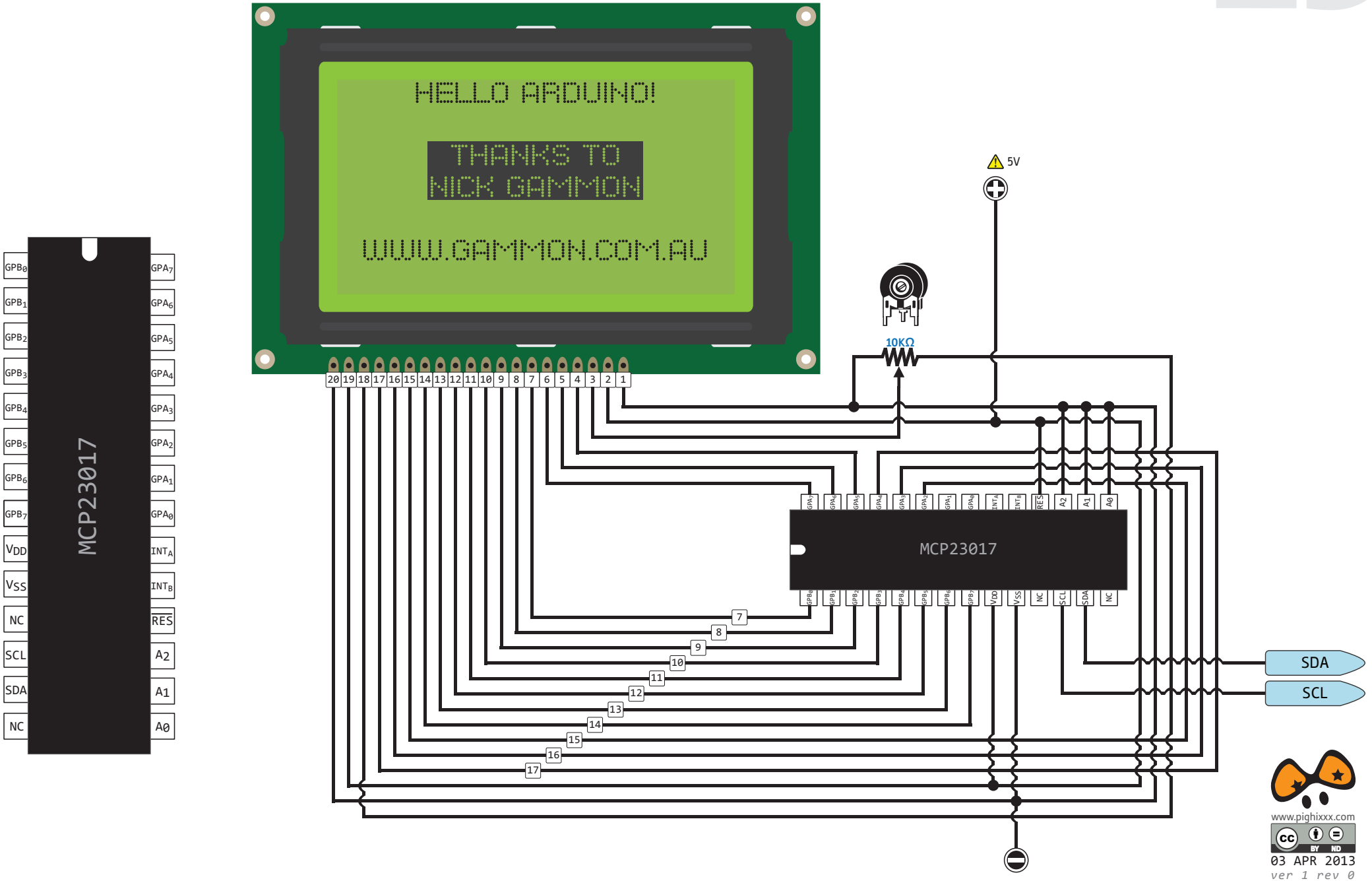


Drive a Bipolar Stepper (Basic 1)

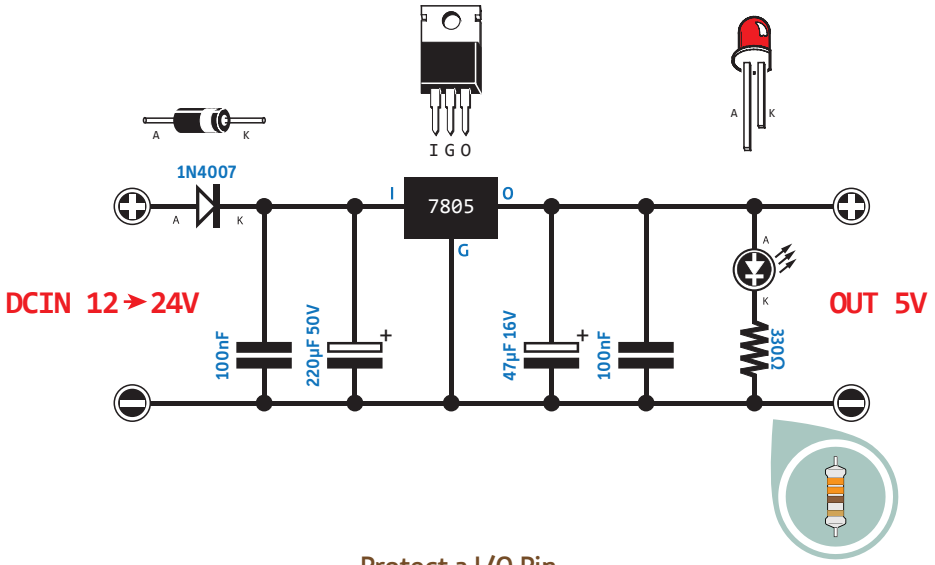


22Ω =

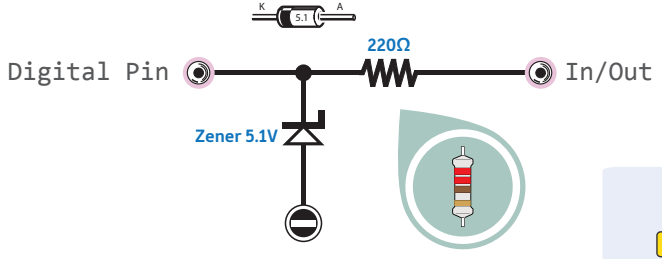
Connect a graphical LCD via I2C



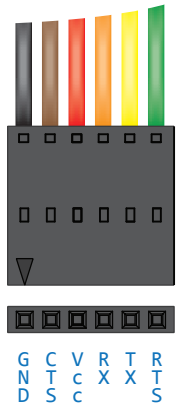
Simple 5V Power Supply



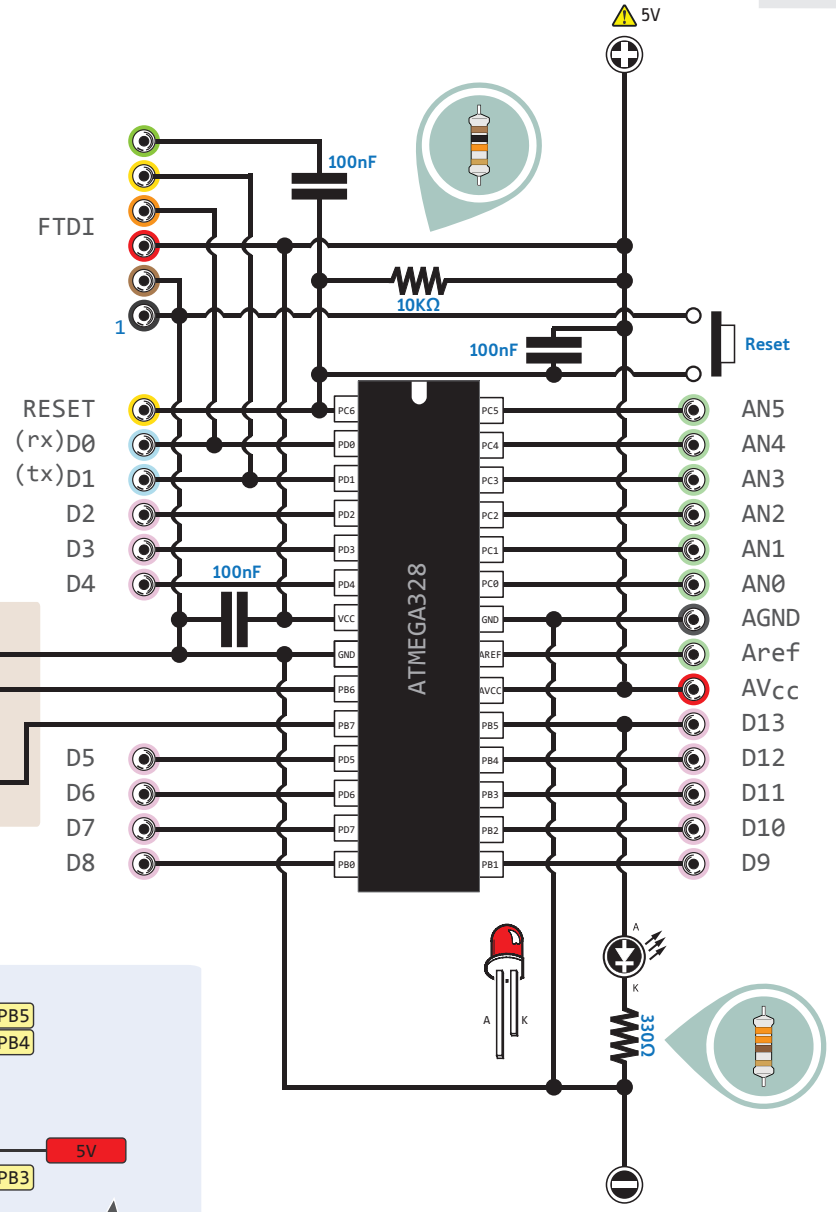
Protect a I/O Pin

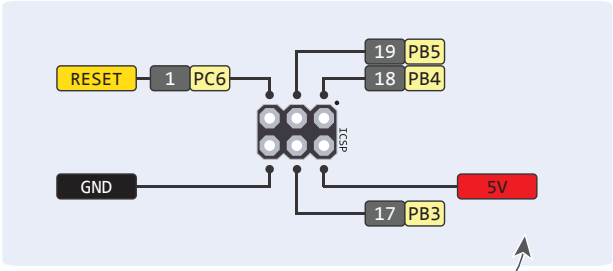


FTDI Connector



DIY Arduino





Recommended ICSP pinout

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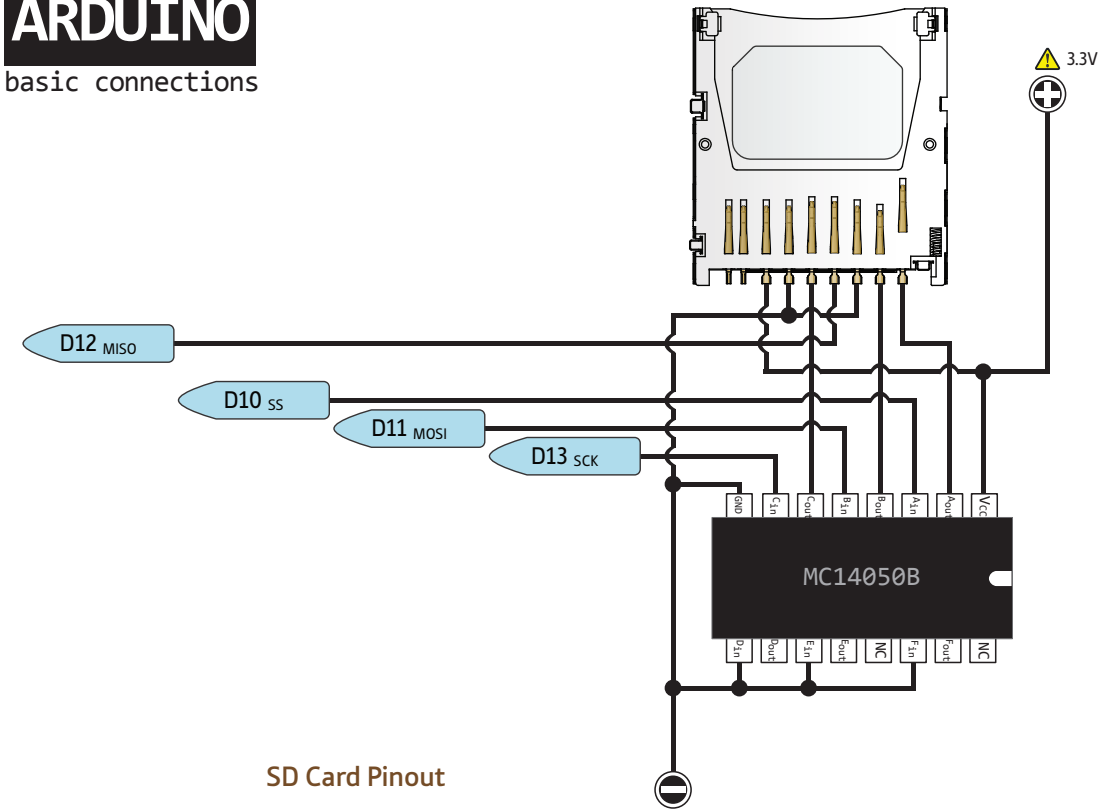
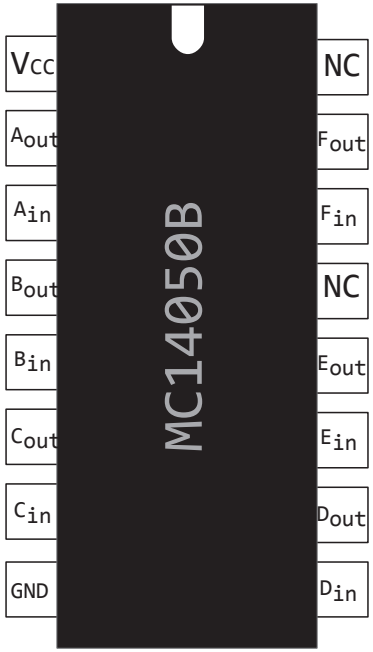
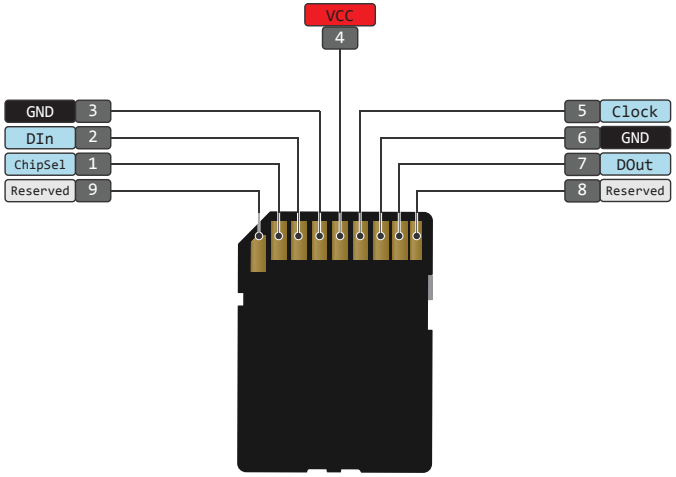
Connect a SD Card



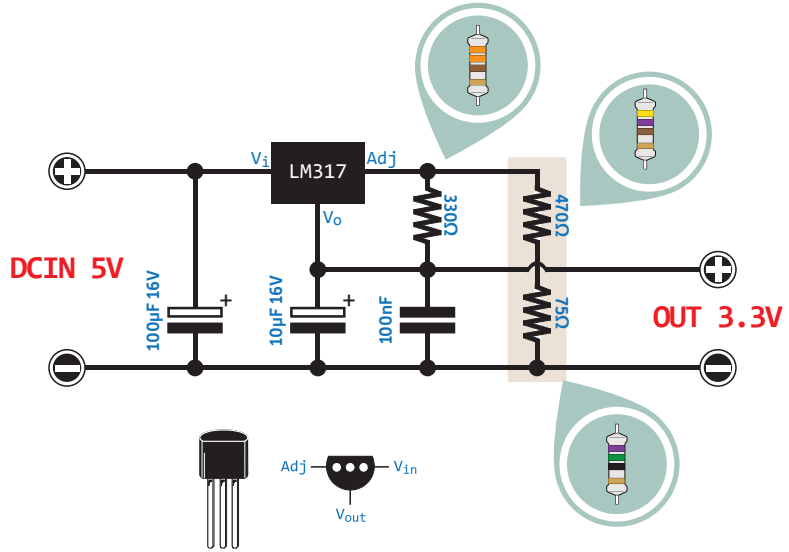


SD Card Pinout



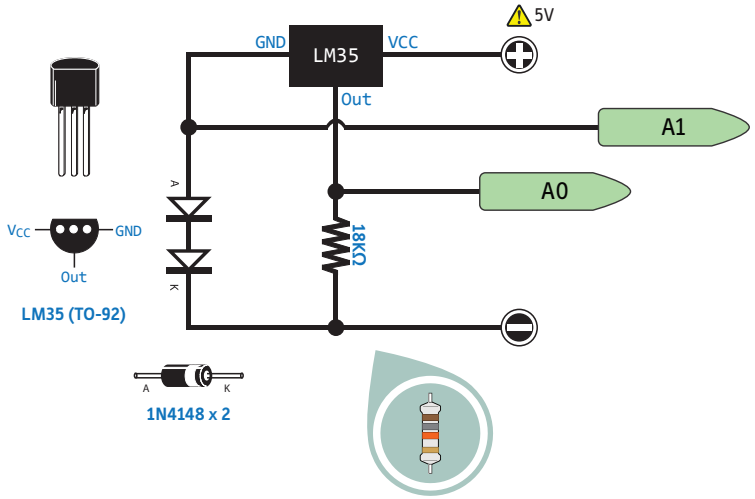
Only for 5V Arduino

Simple 3.3V Power Supply

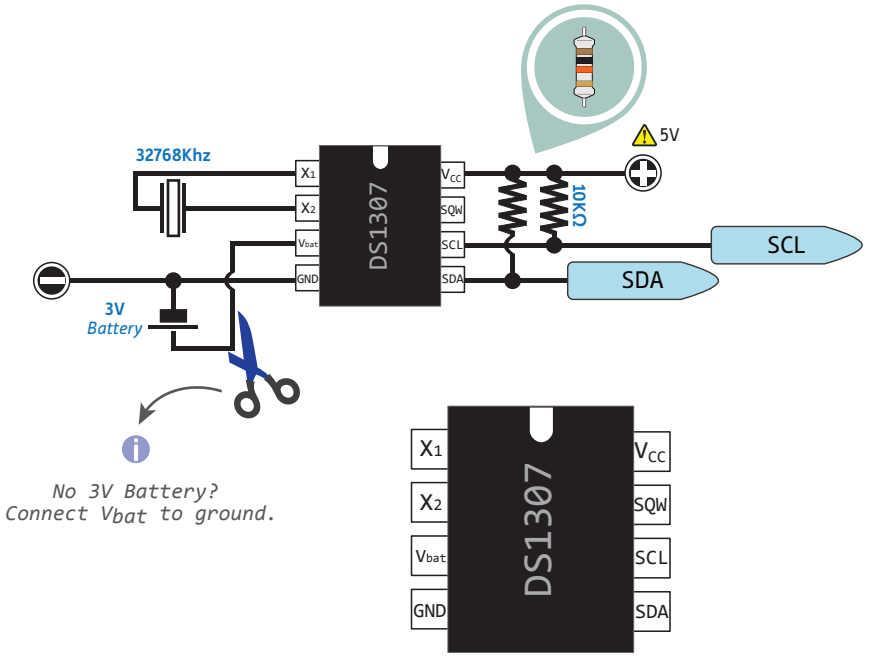


LM317 (TO-92)

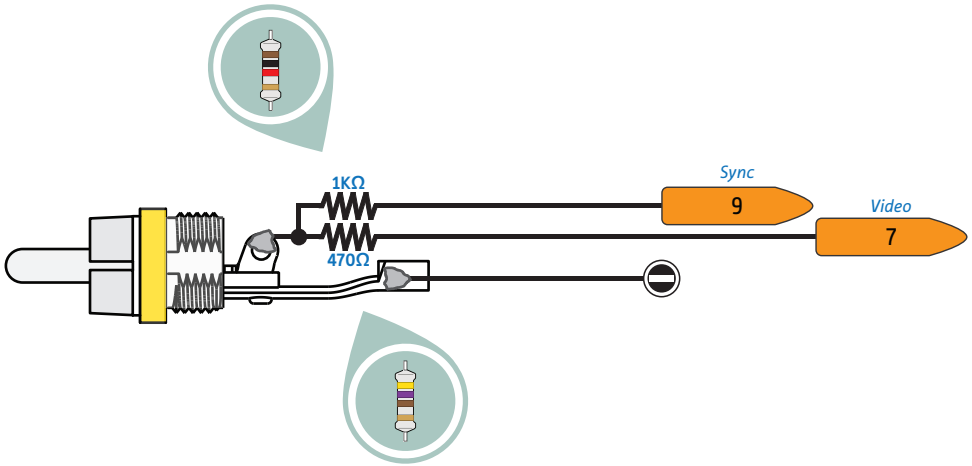
Connect a Temperature Sensor (LM35)



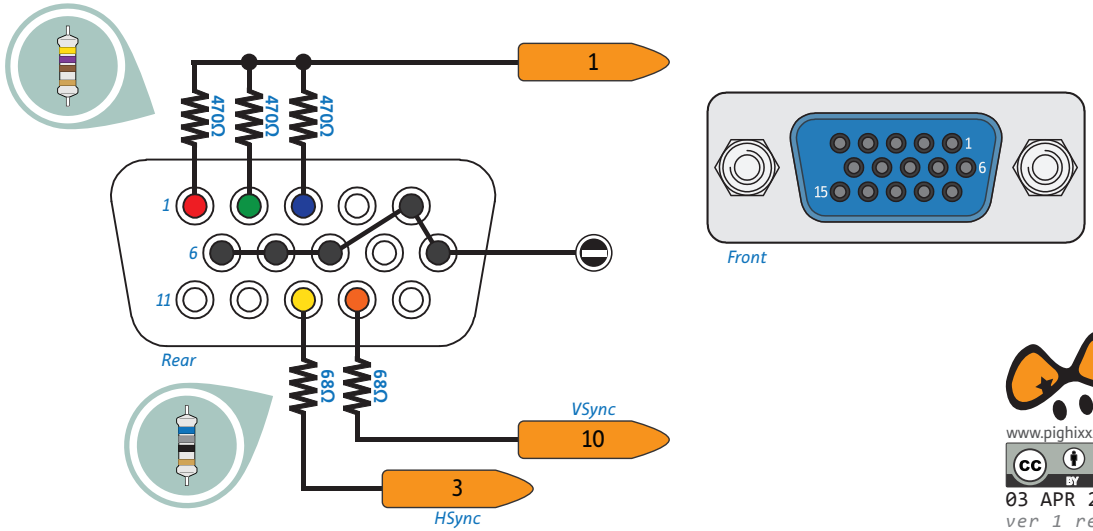
Connect a RTC (DS1307)



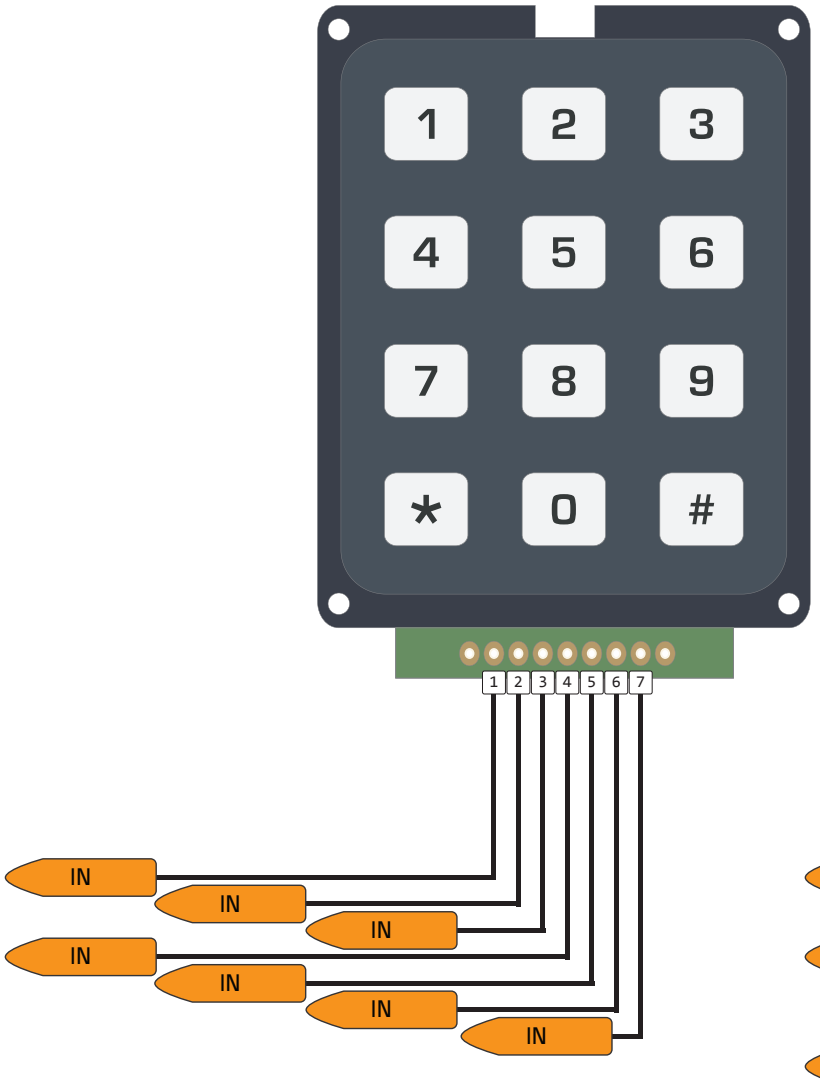
Connect to Composite Video



Connect to VGA

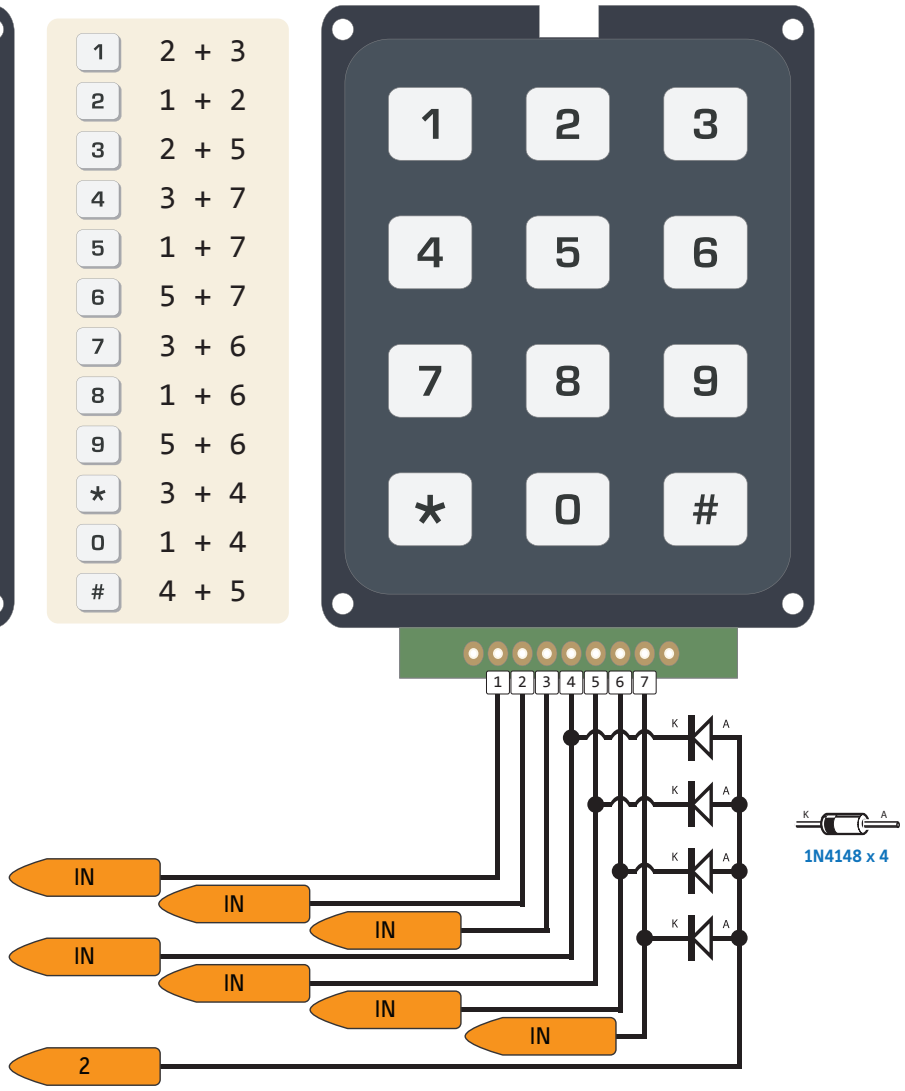


Connect a Keypad

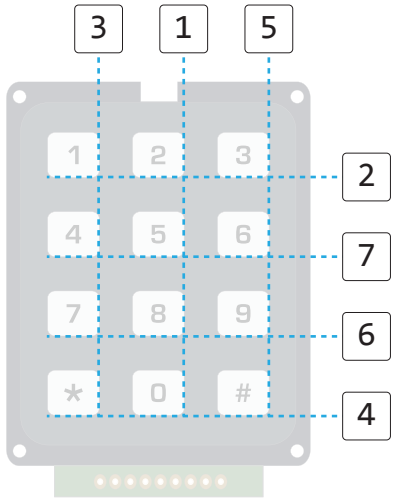


1	2 + 3
2	1 + 2
3	2 + 5
4	3 + 7
5	1 + 7
6	5 + 7
7	3 + 6
8	1 + 6
9	5 + 6
*	3 + 4
0	1 + 4
#	4 + 5

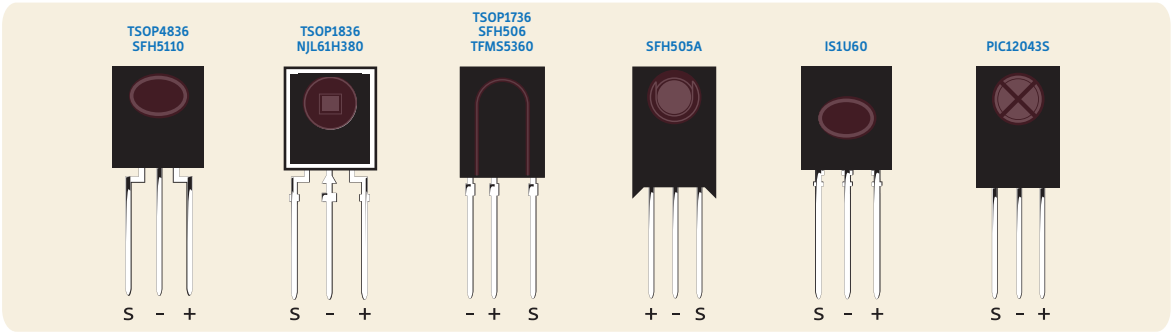
Connect a Keypad (with Interrupt)

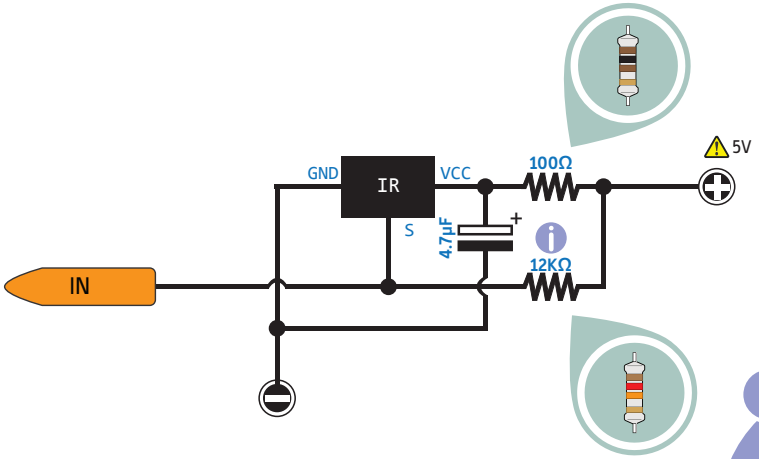


1N4148 x 4



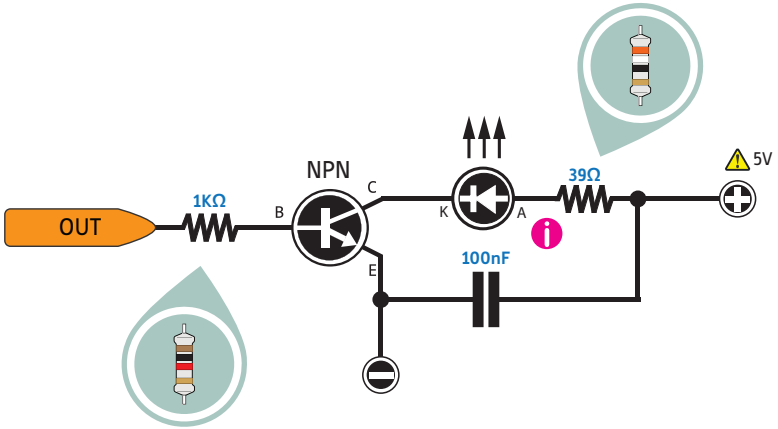
Connect a IR Sensor

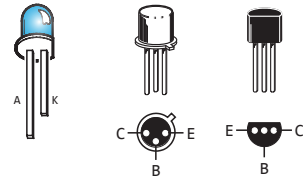




Reccomended to suppress power supply disturbances

Connect a IR Emitter

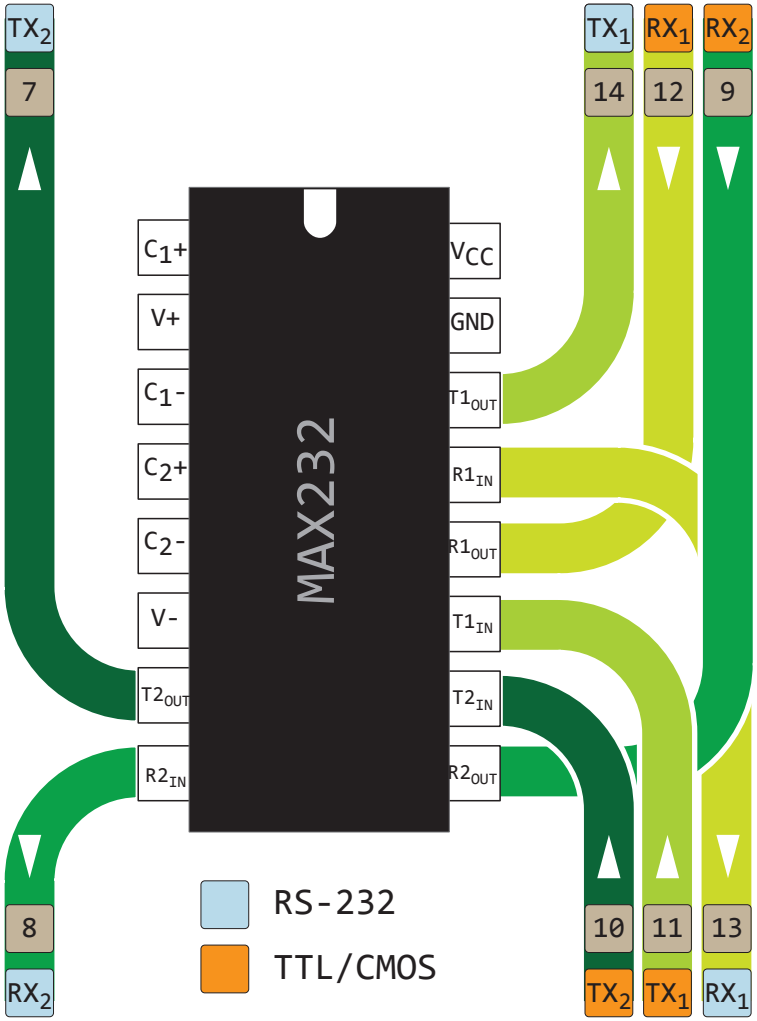




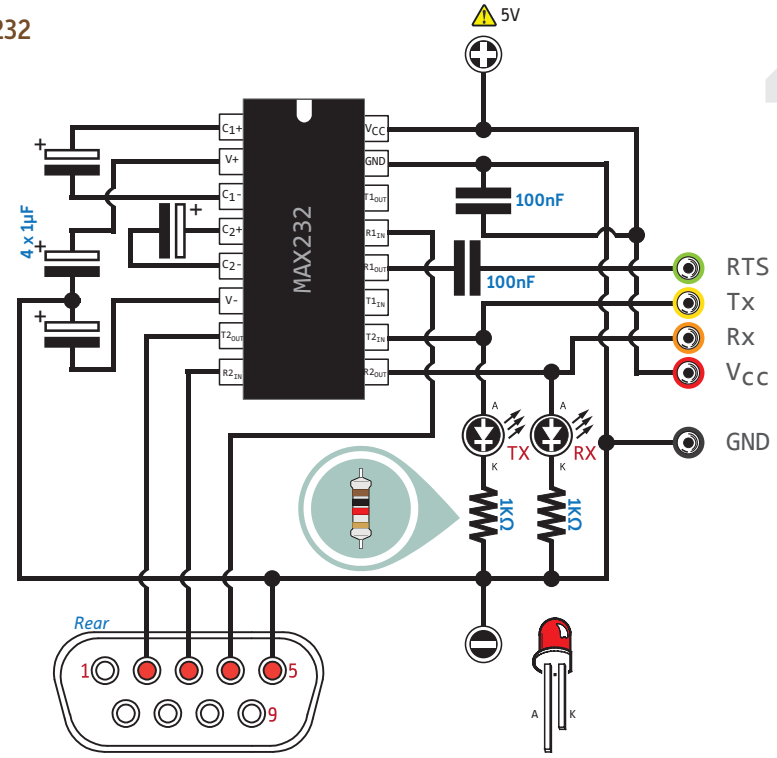
TSAL6200 2N2222

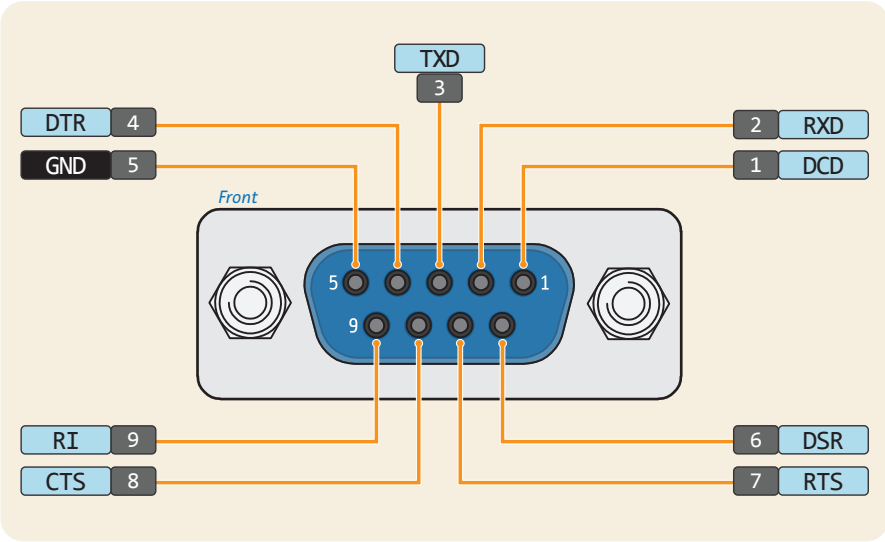
$$R = \frac{V_{in} - V_F}{I_F} * 1000$$

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

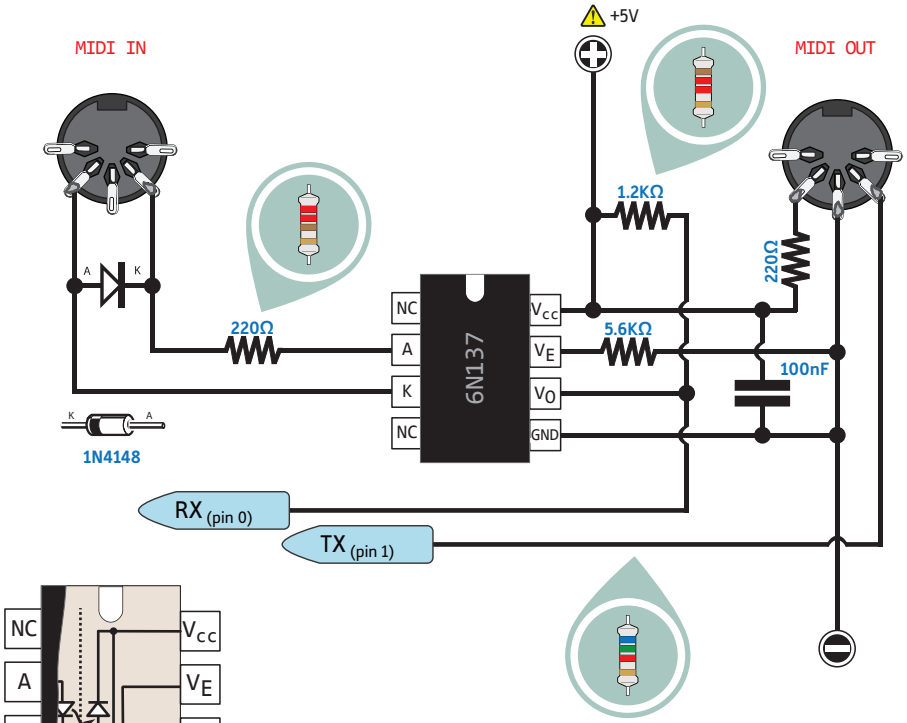


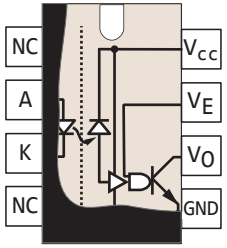
Connect a MAX232



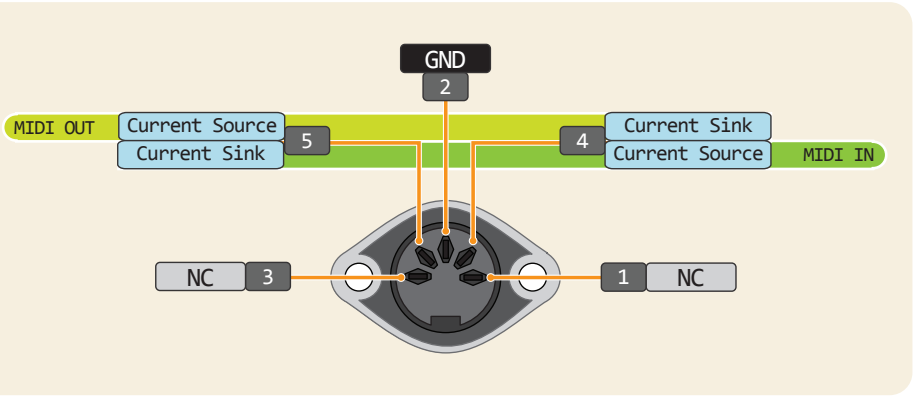


MIDI Interface

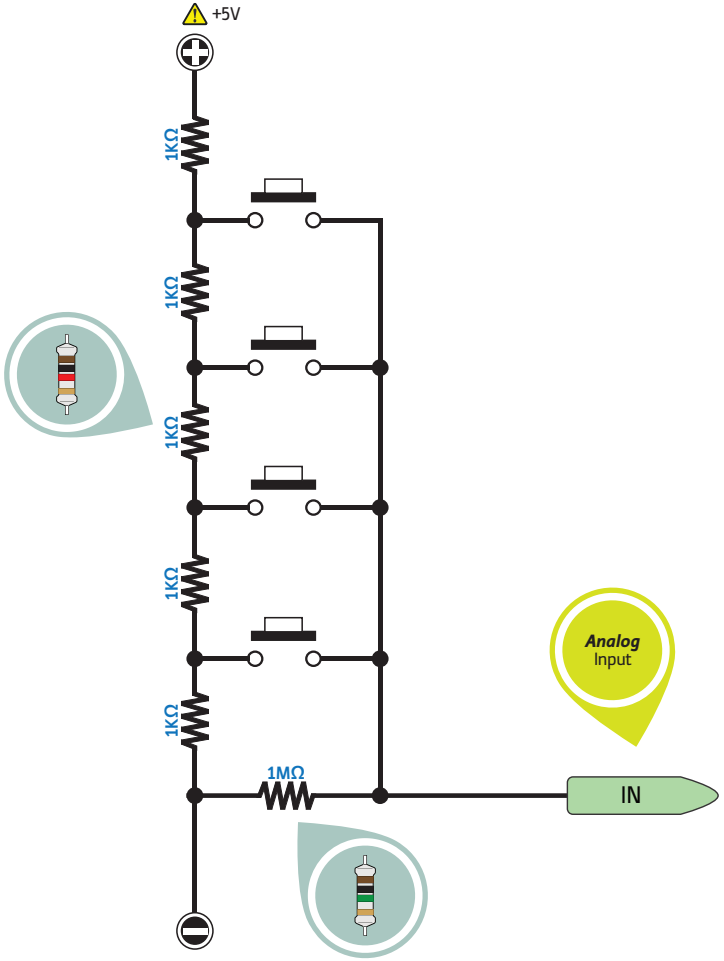




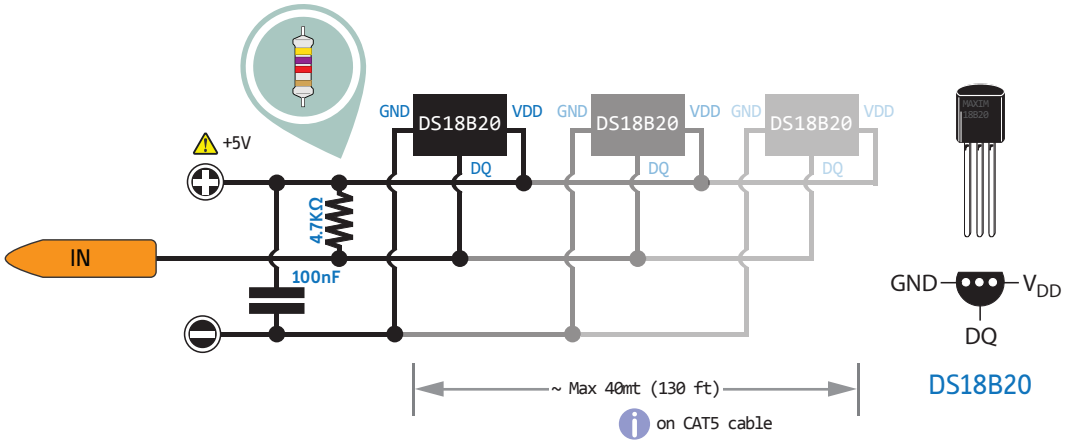
6N137



Multiple Buttons using 1 Analog Input



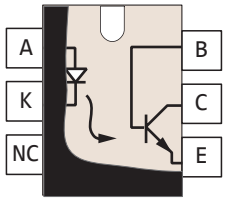
Connect a Digital Temperature Sensor (DS18B20)



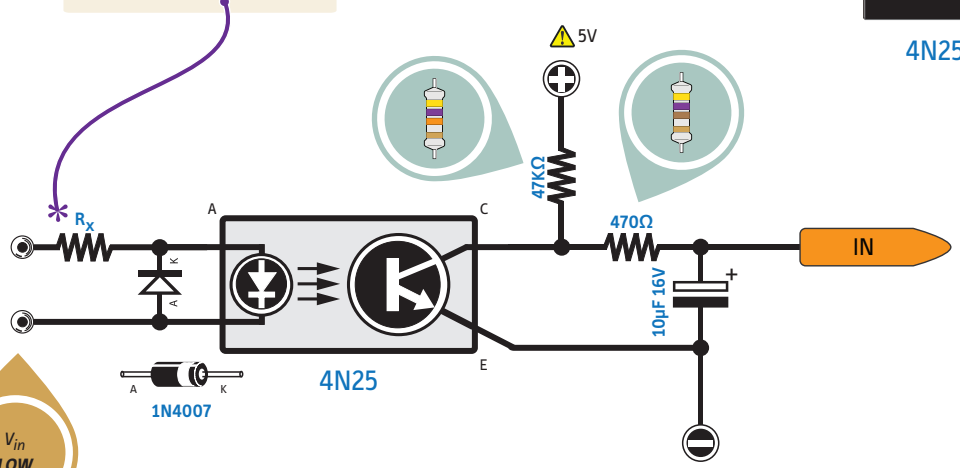
DS18B20

AC input

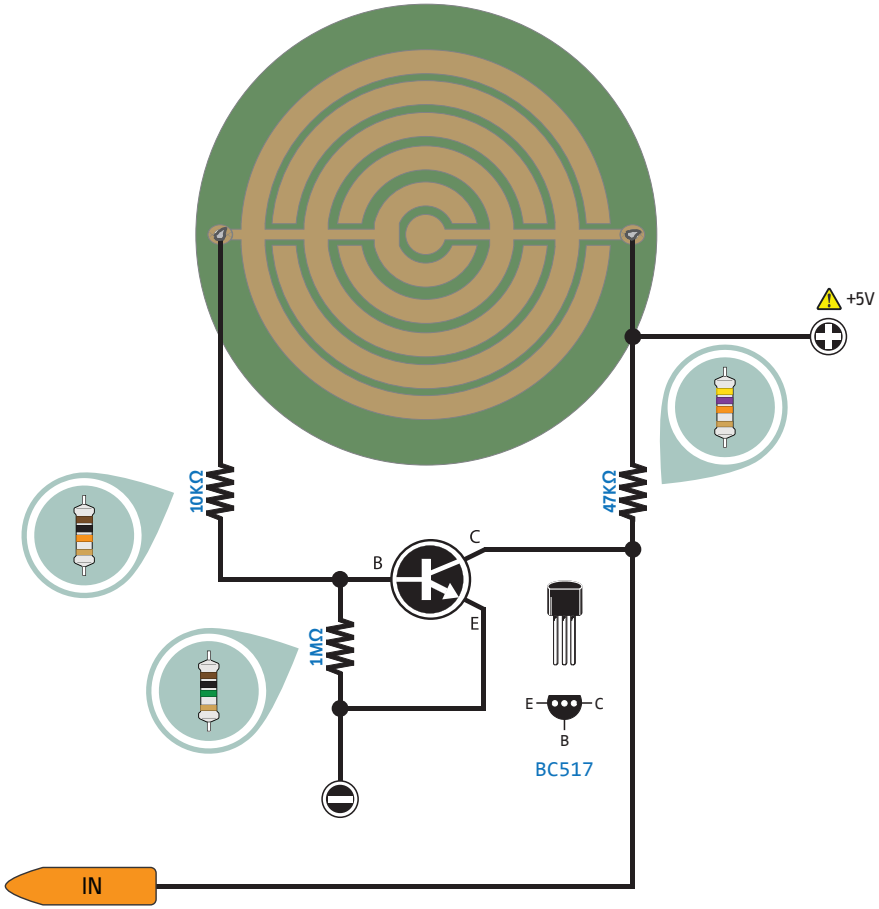
Volt$_{in}$	Resistor Value
12	470Ω
24	1KΩ
48	2.2KΩ



4N25

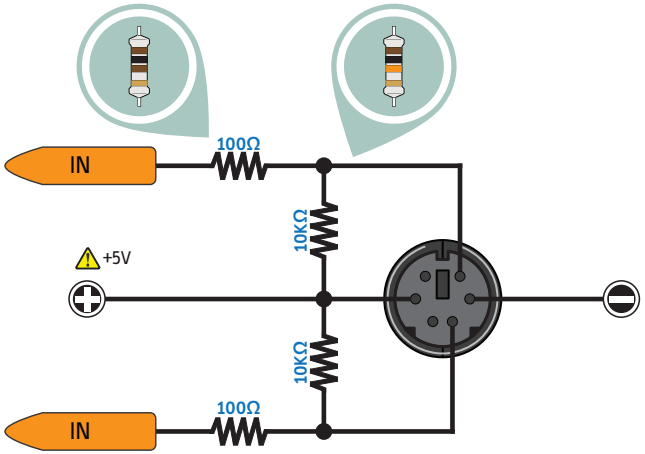


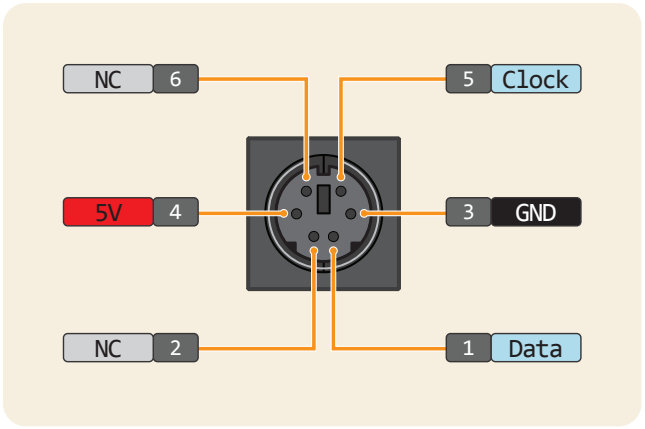
A simple Rain Sensor with Arduino



BC517

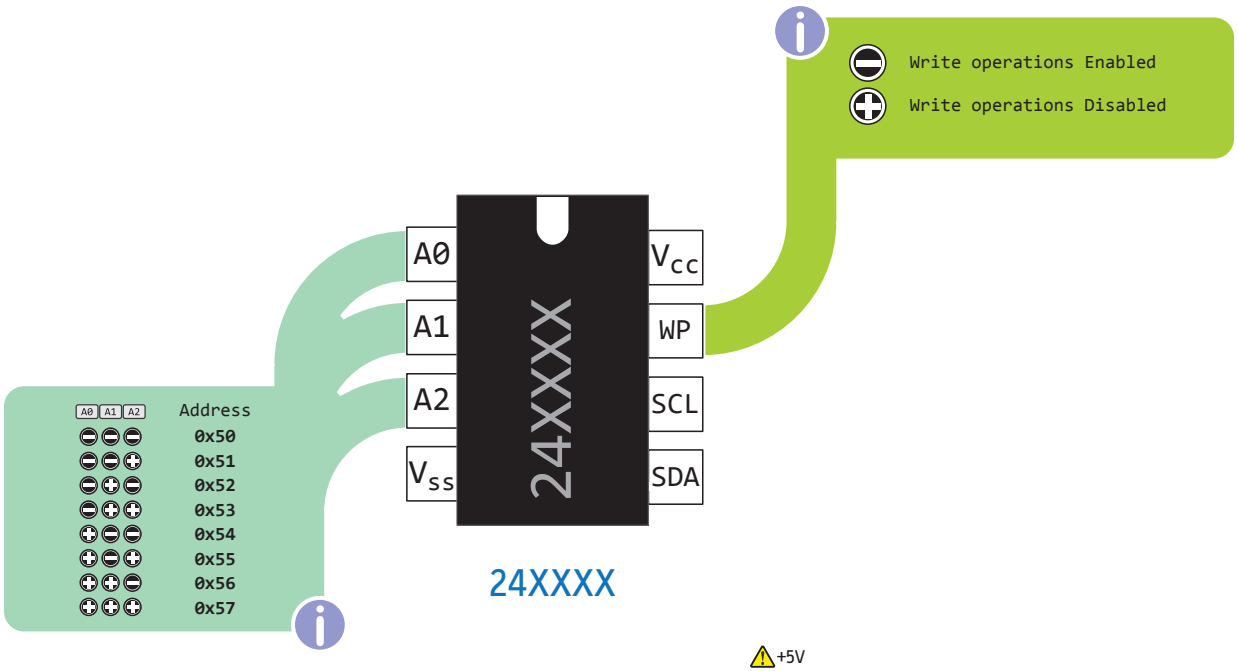
Connect a PS2 Keyboard



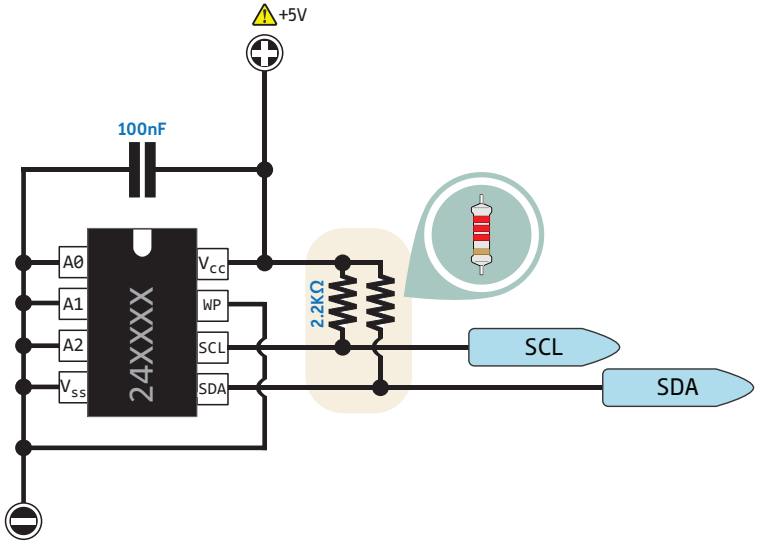


Scan Codes

Connect a EEPROM via I2C

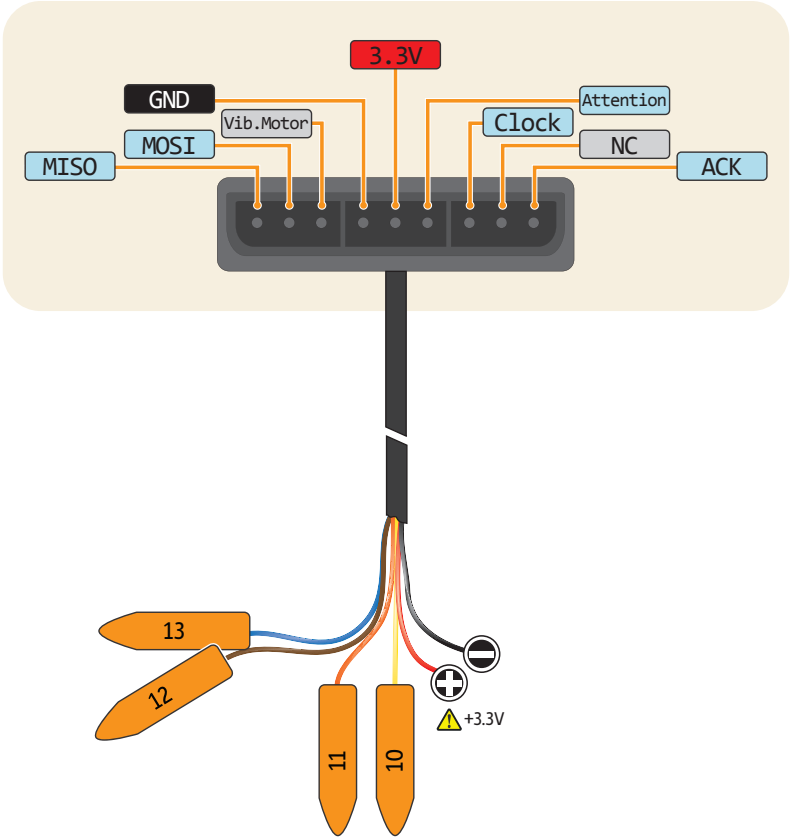


24XXXX

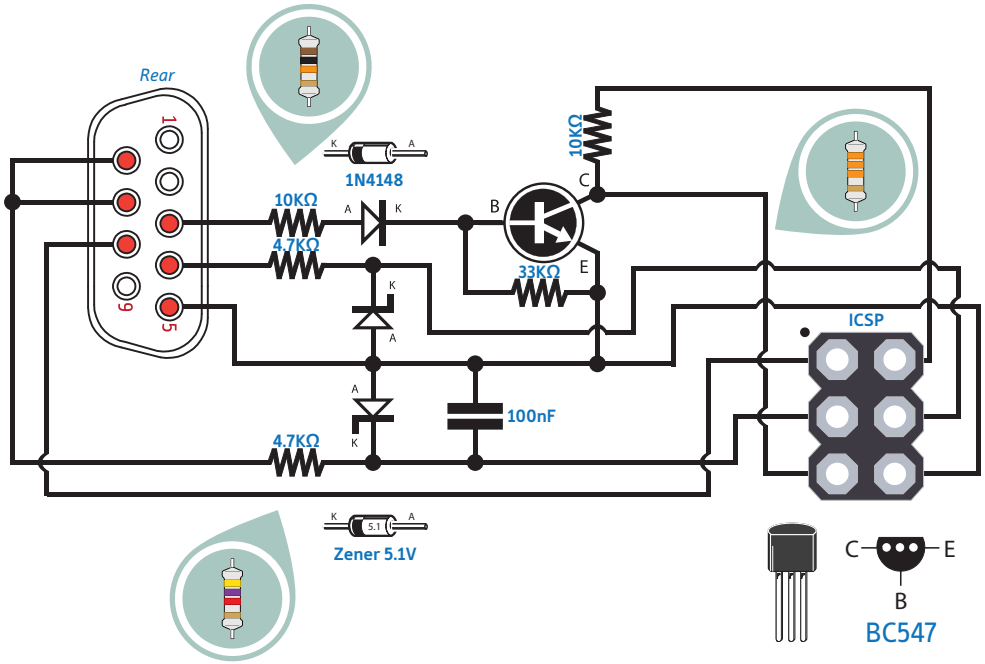


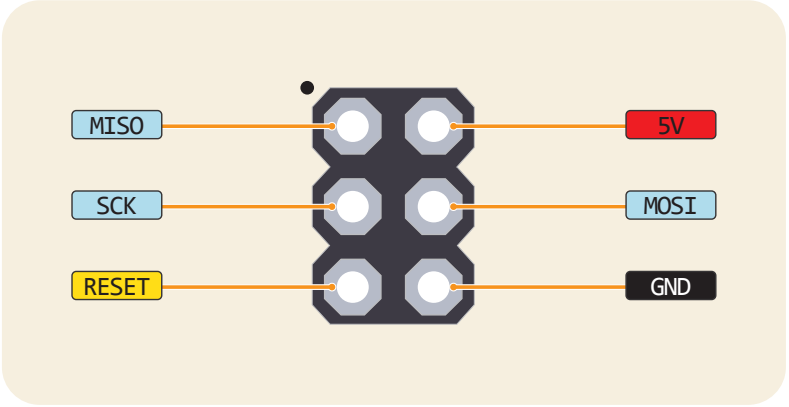
xx24x01x	1Kb	xx24x32x	32Kb
xx24x02x	2Kb	xx24x64x	64Kb
xx24x04x	4Kb	x24x128x	128Kb
xx24x08x	8Kb	x24x256x	256Kb
xx24x16x	16Kb	x24x512x	512Kb

Connect a PS2 Dualshock® controller

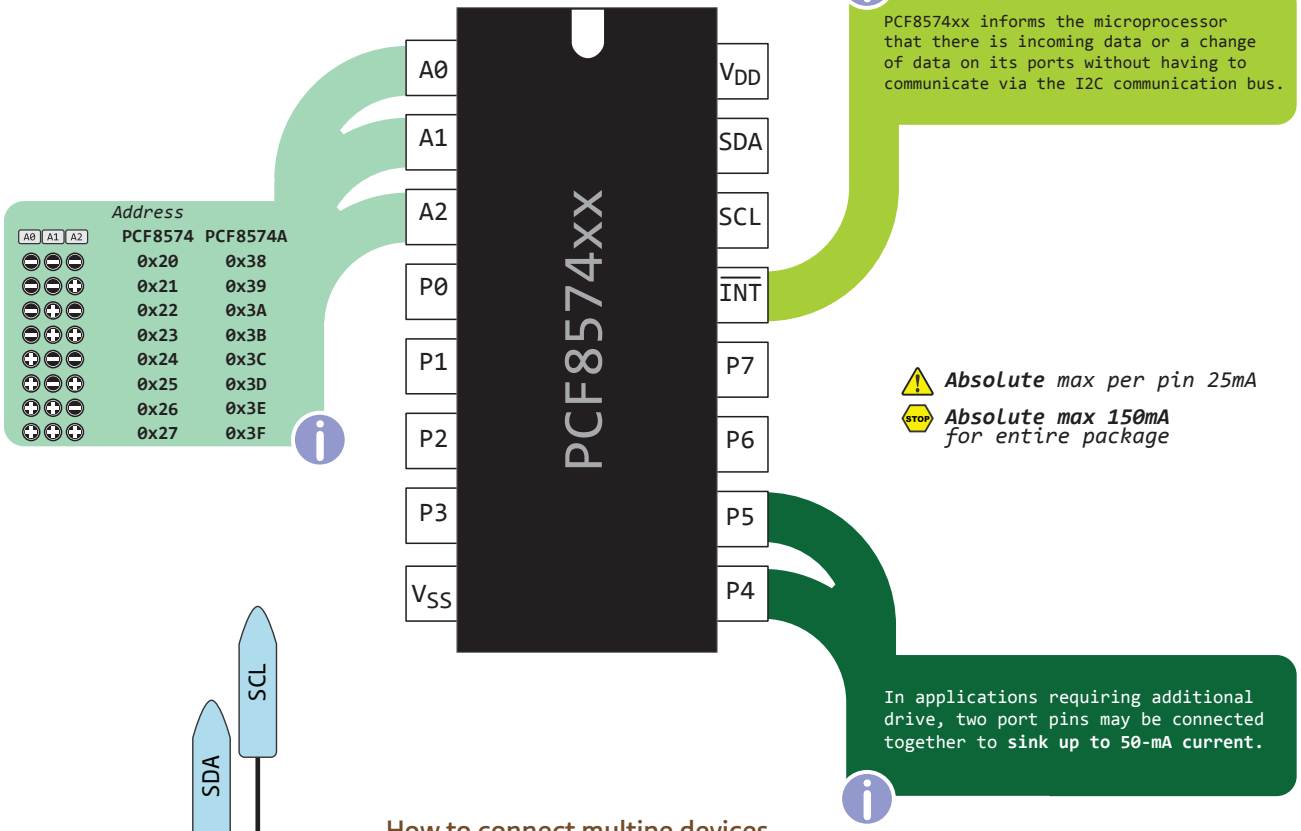


A Simple programmer

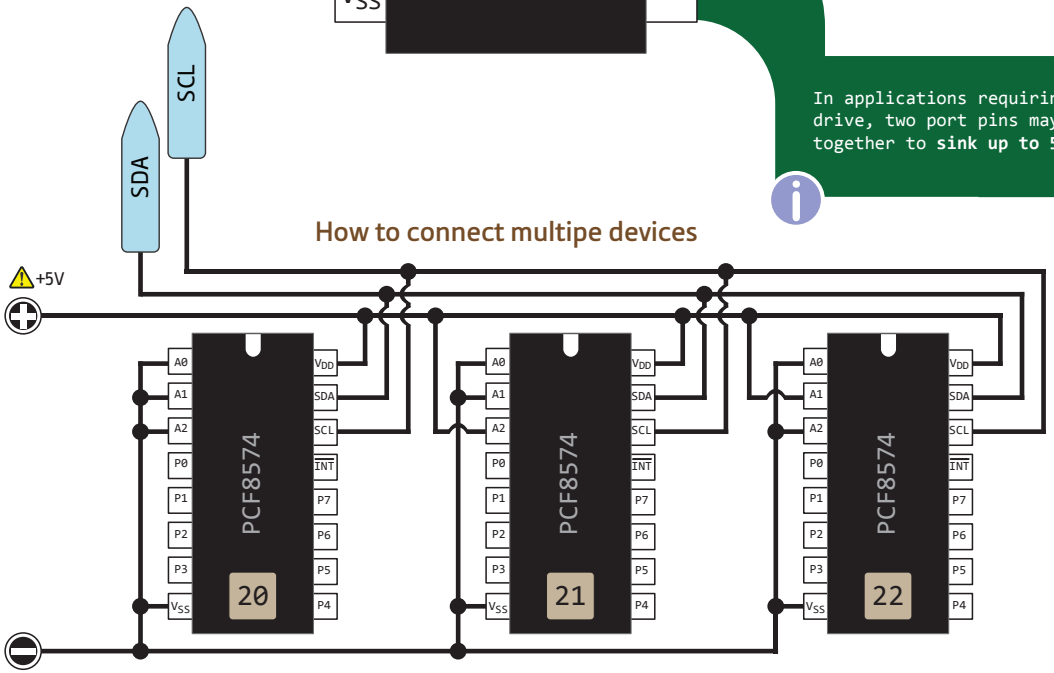




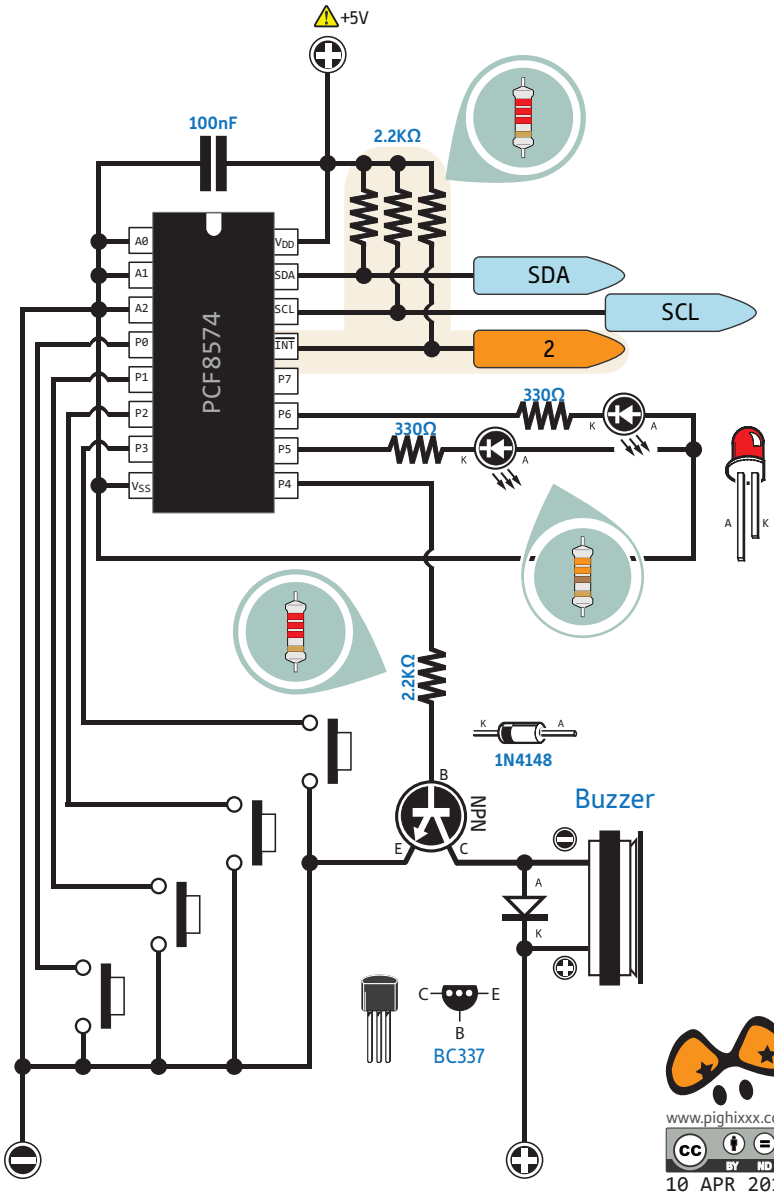
Port Expander (PCF8574xx)



How to connect multipe devices



A typical Application



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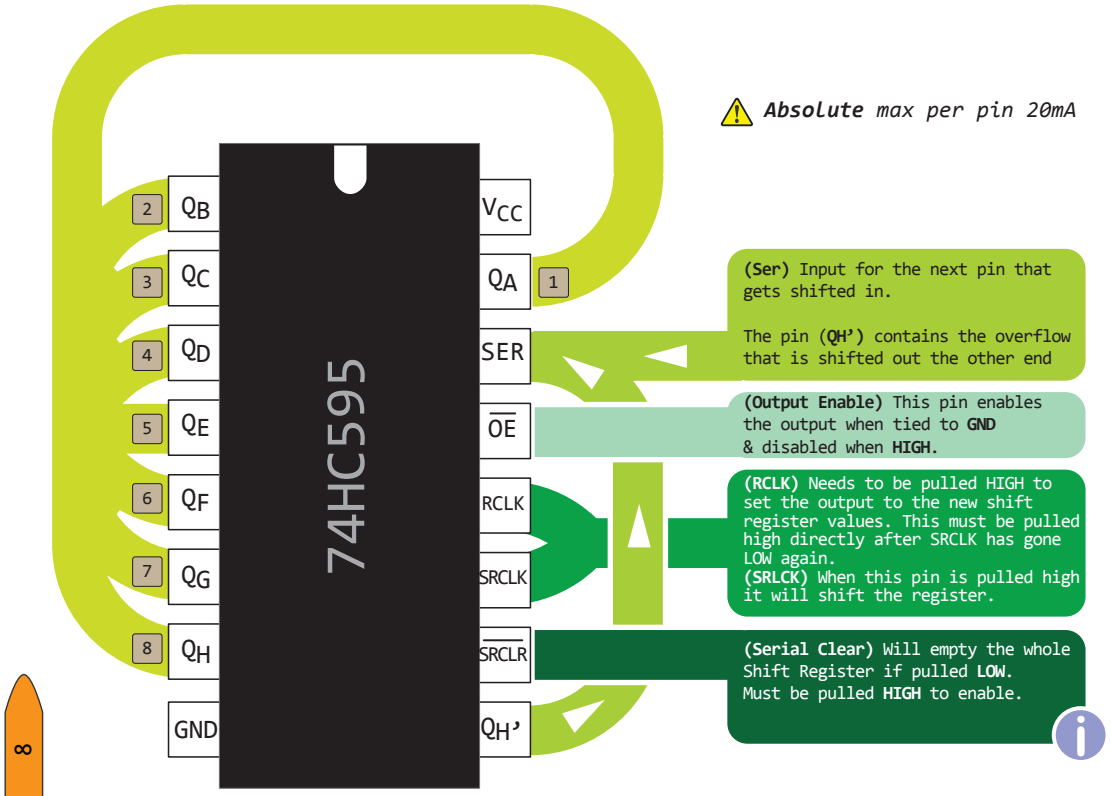
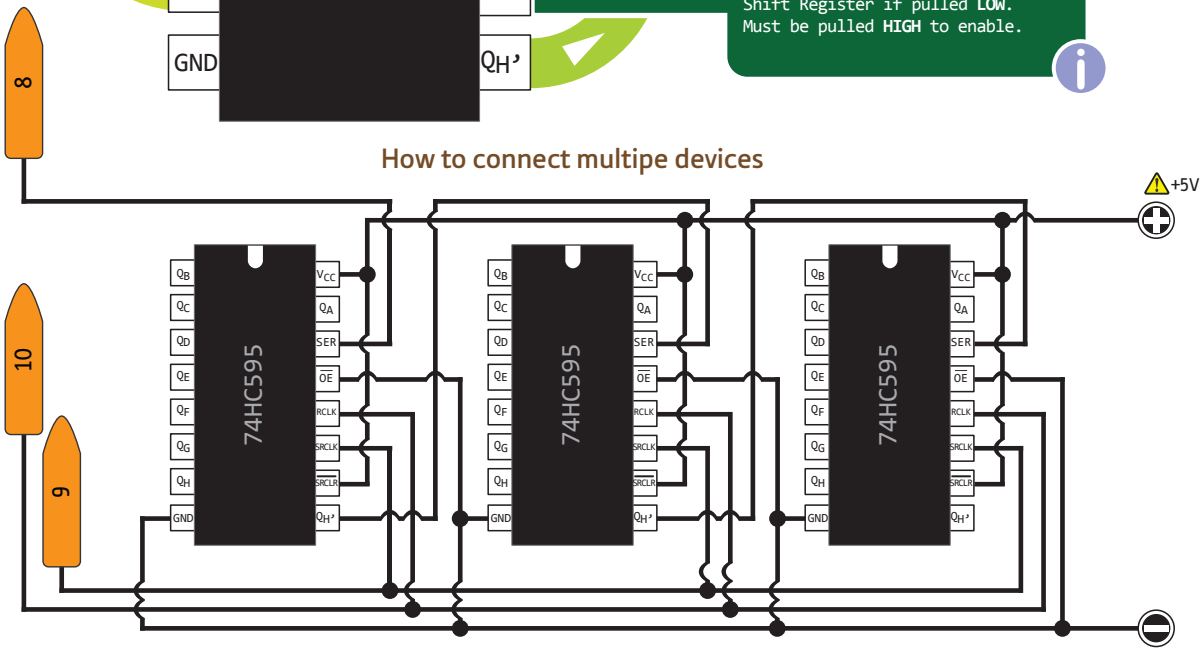
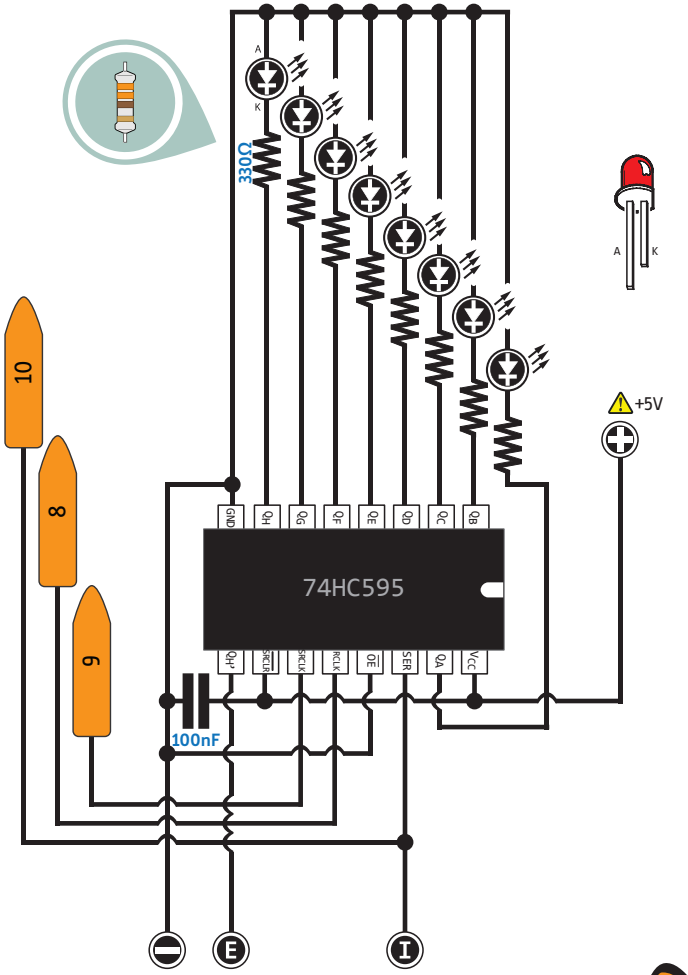
Shift Register (74HC595)



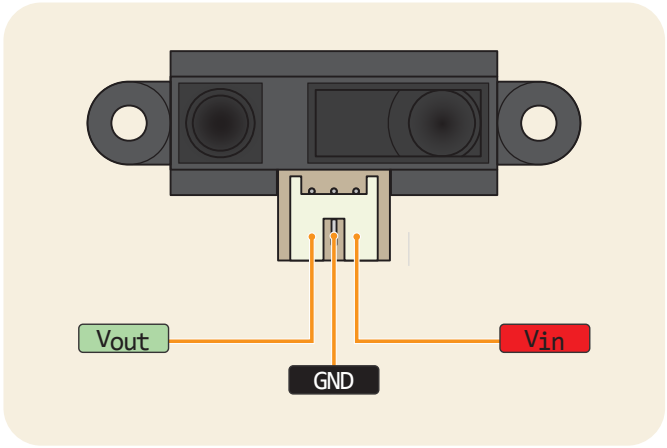
How to connect multipe devices

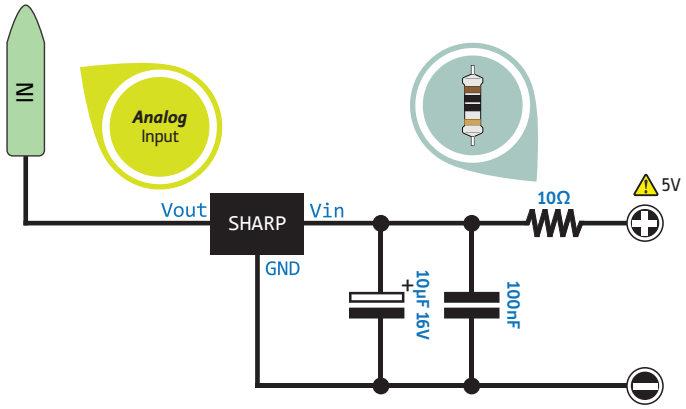


A typical Application

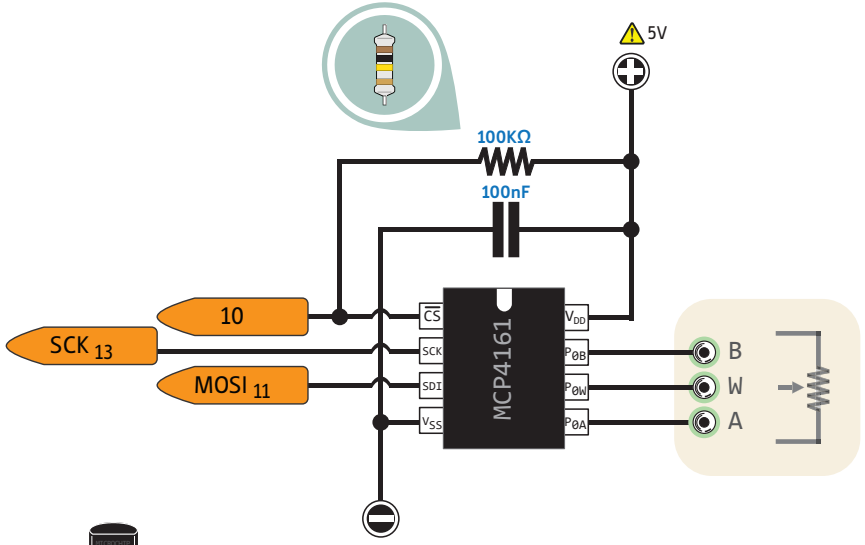


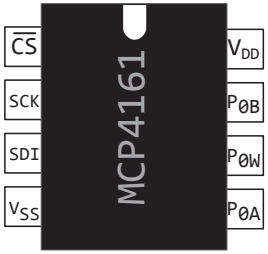
Connect a Distance Sensor (Sharp GP2Y0A21)

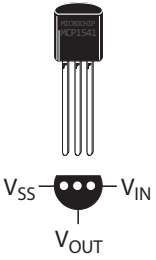




Connect a Digital Potentiometer (MCP4161)

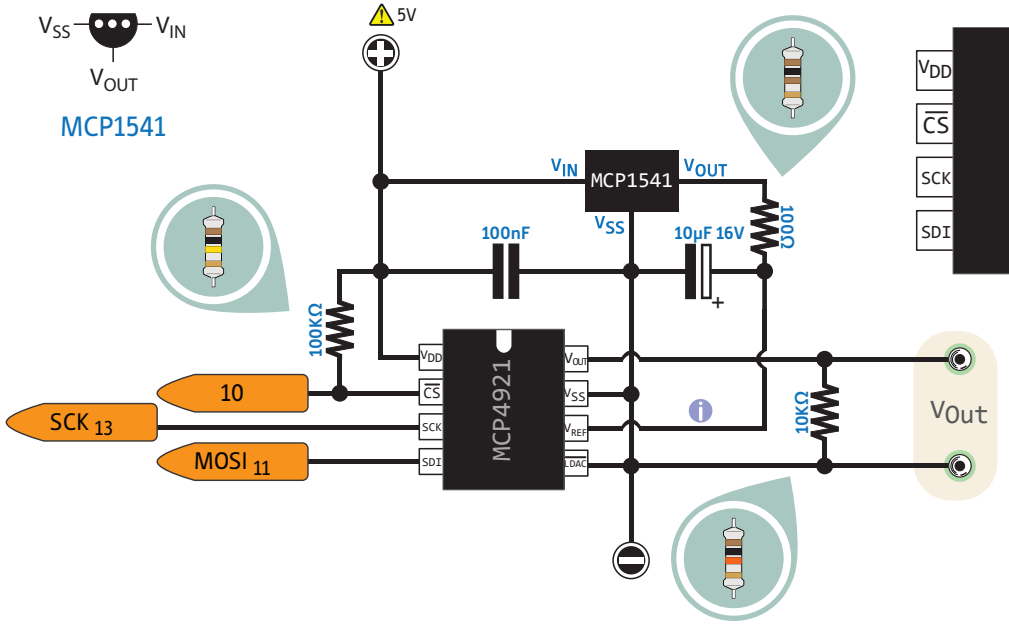


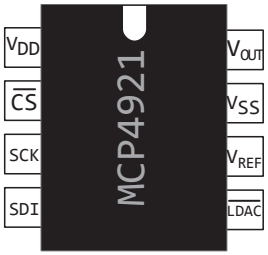




MCP1541

Connect a DAC (MCP4921)





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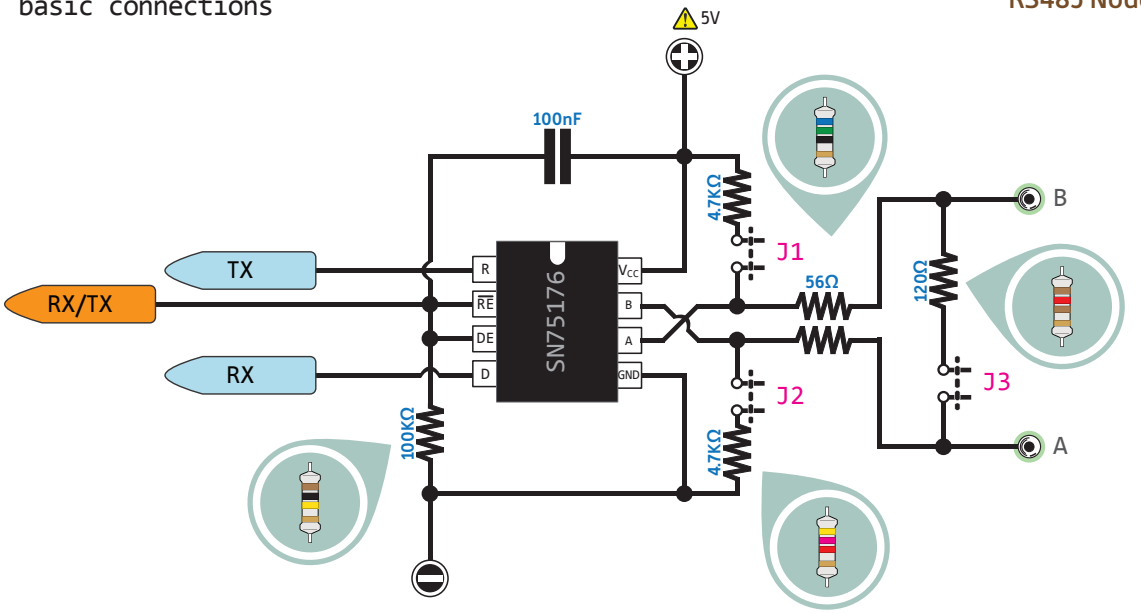
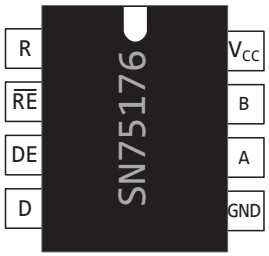
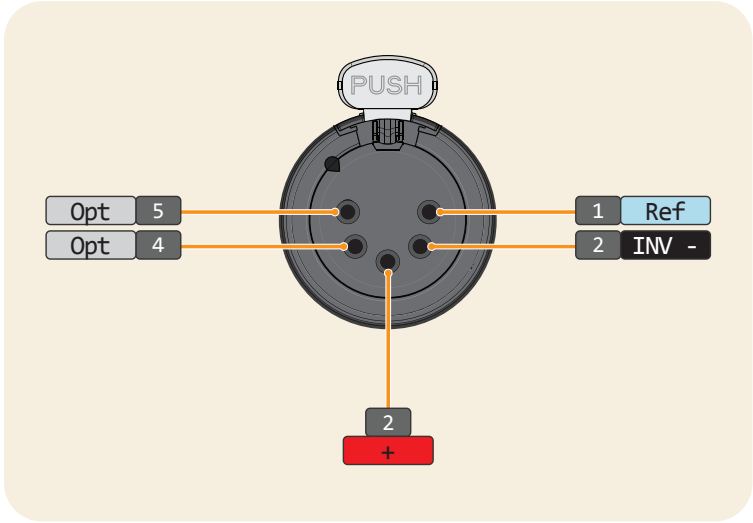
RS485 Node



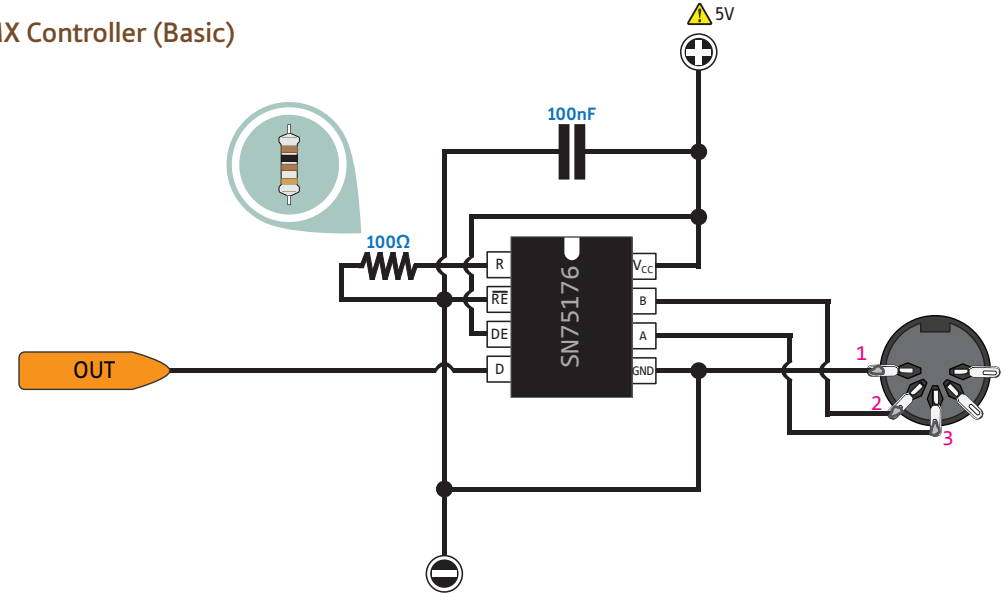


Node termination jumpers config

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



DMX Controller (Basic)



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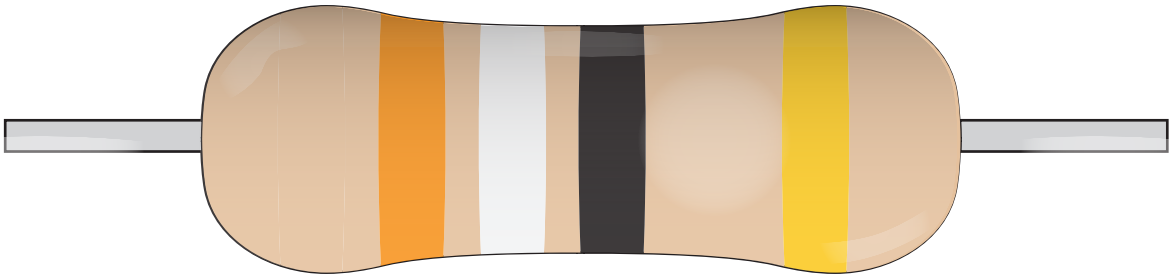
ARDUINO

basic connections

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	

MULTIPLIER

KΩ =x1,000Ω

MΩ =x1,000,000Ω

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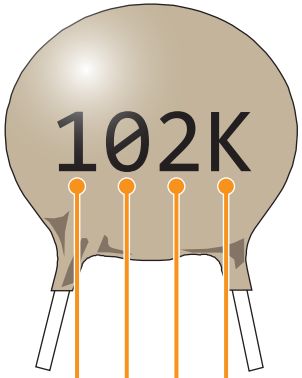
Ceramic Capacitor Code

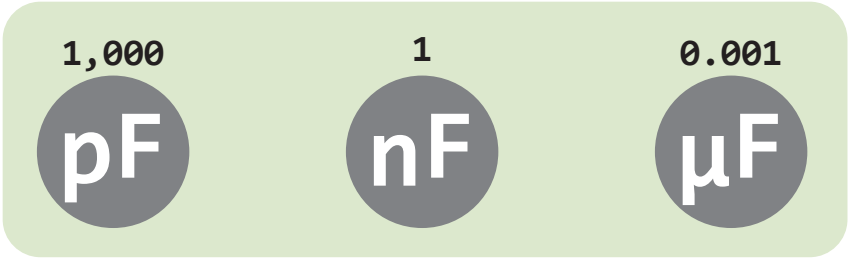


= 1,000pF - ±10%

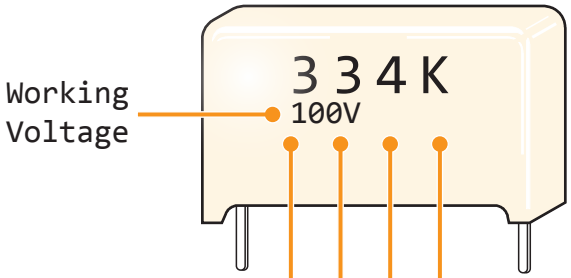
Significant Digit
1st
2nd
Multiplier

0	*none*
1	10
2	100
3	1,000
4	10,000
5	100,000
6	1,000,000
7	
8	
9	

C	±0.25pF
J	±5%
K	±10%
M	±20%
D	±0.5pF
Z	+80% -20%



Polyester Film-Mylar Capacitor Code



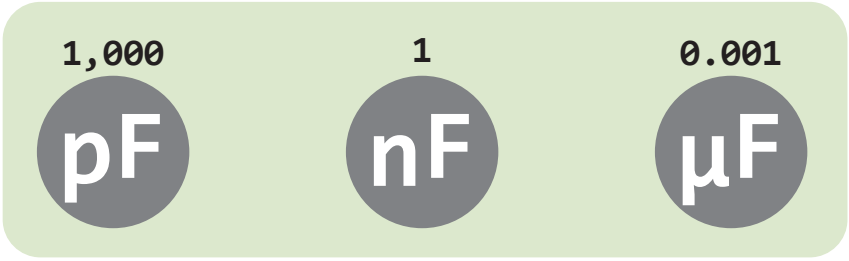
= 0.33µF ±20% 100V

Significant Digit
1st
2nd
Multiplier

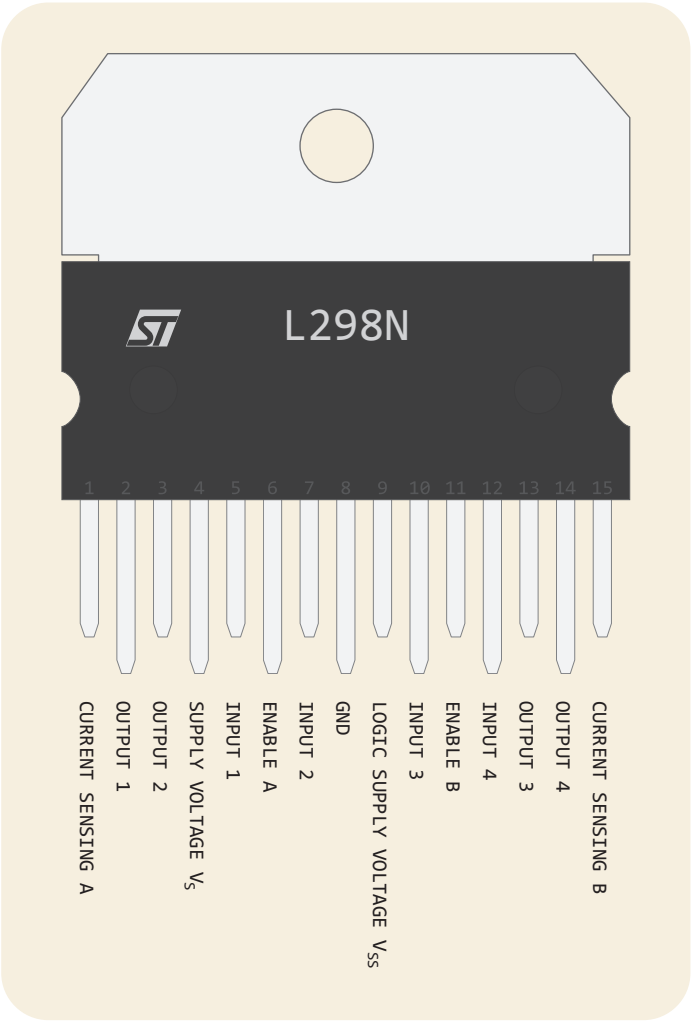
0	*none*
1	10
2	100
3	1,000
4	10,000
5	100,000
6	
7	
8	
9	

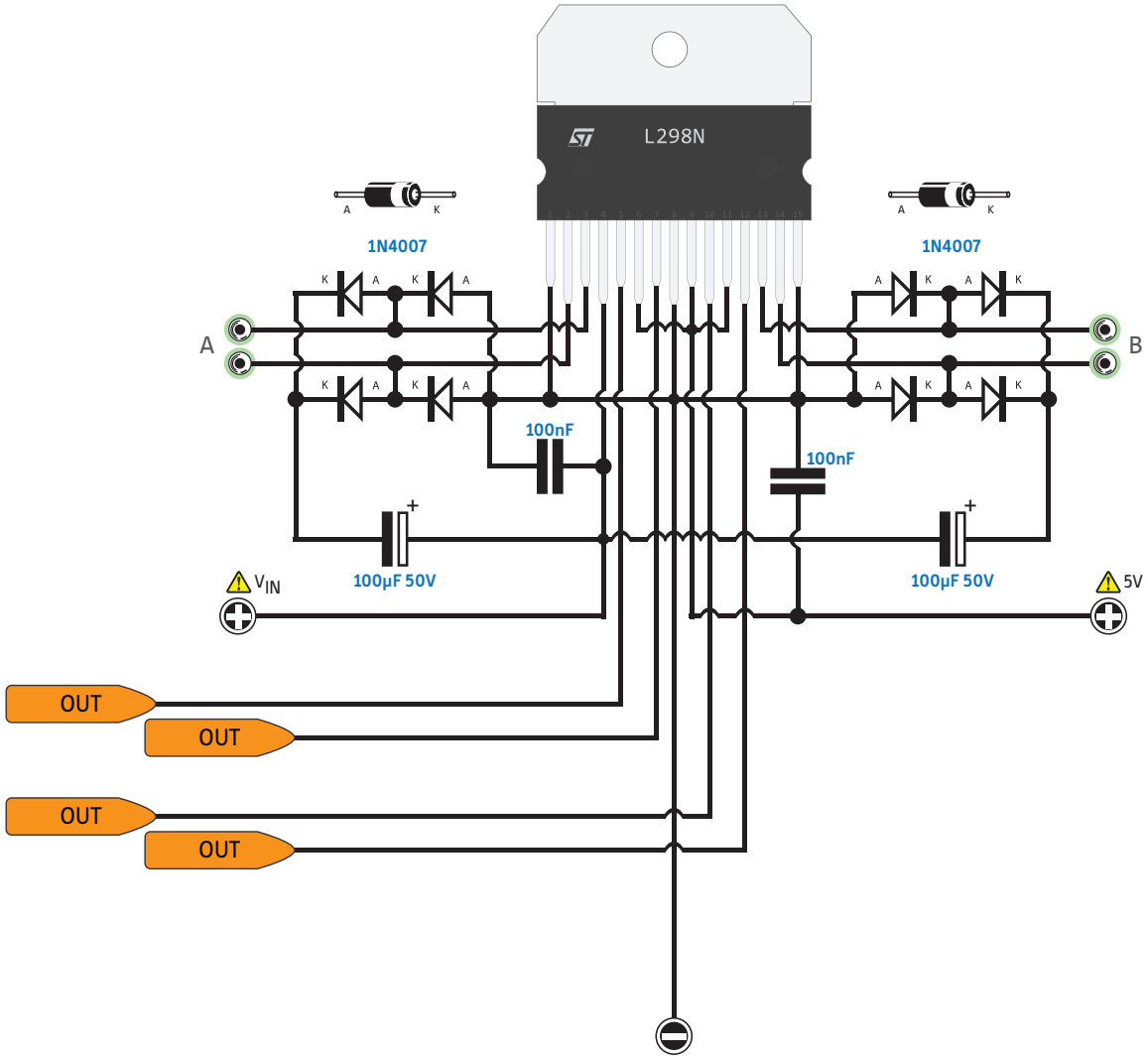
F	1~2%
G	2%
J	5%
K	10%
M	20%

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

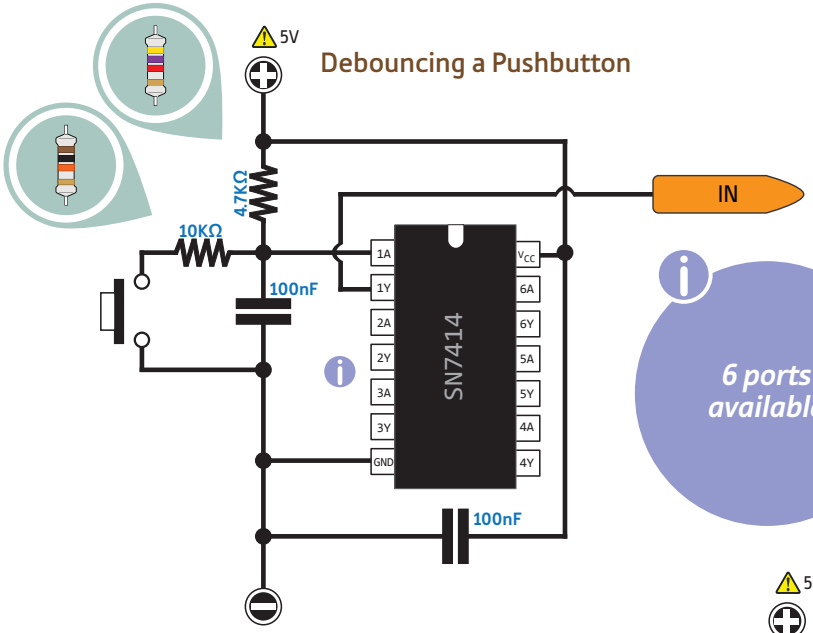


Drive a Motor (L298)



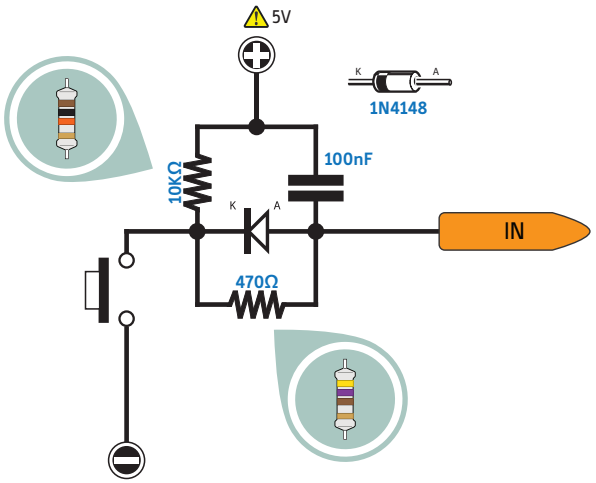


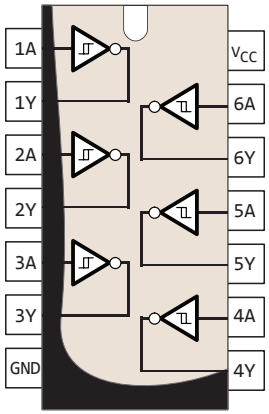
Debouncing a Pushbutton



6 ports available

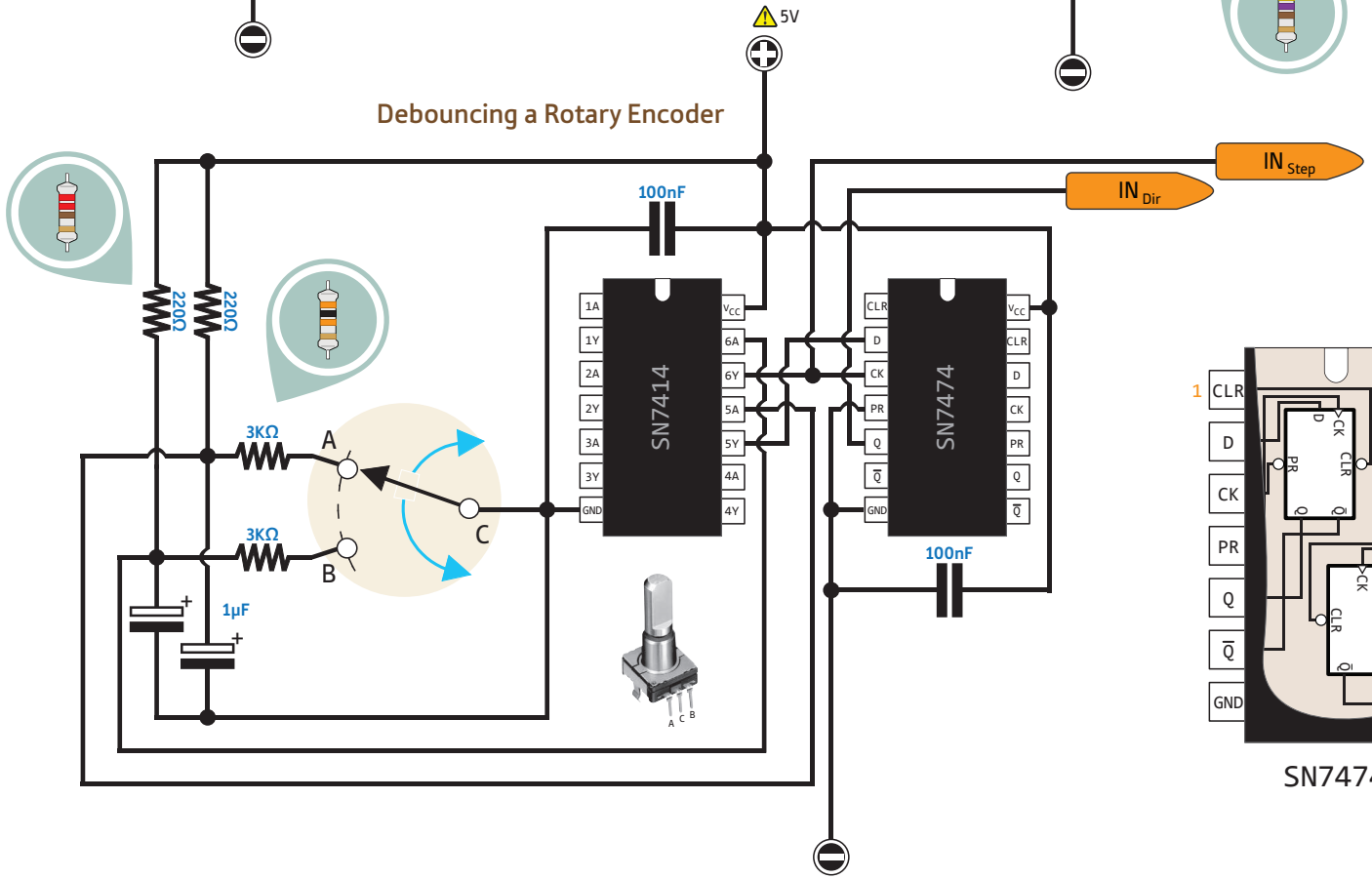
Simple Debouncer

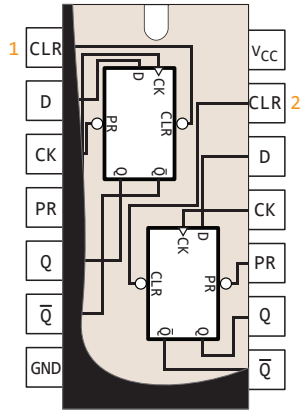




SN7414

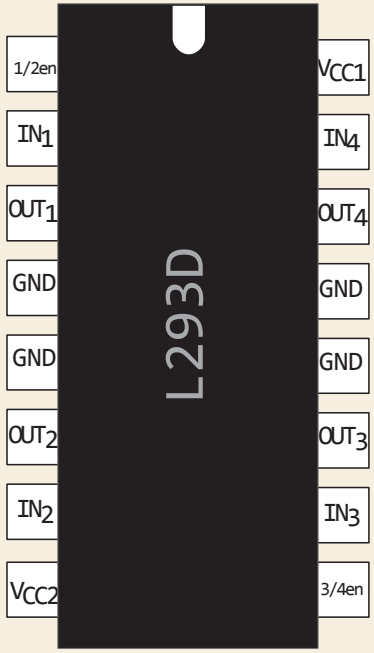
Debouncing a Rotary Encoder

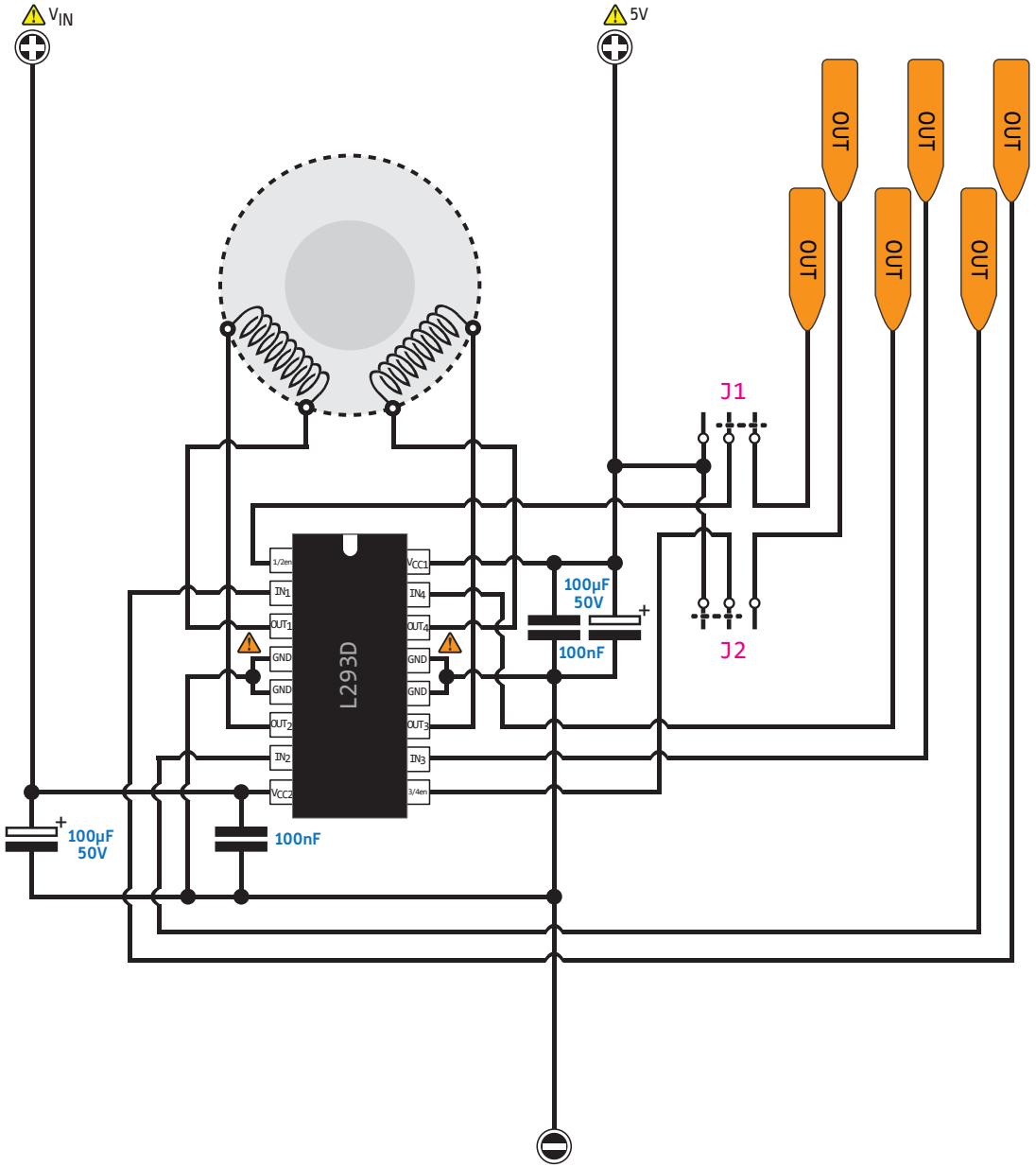




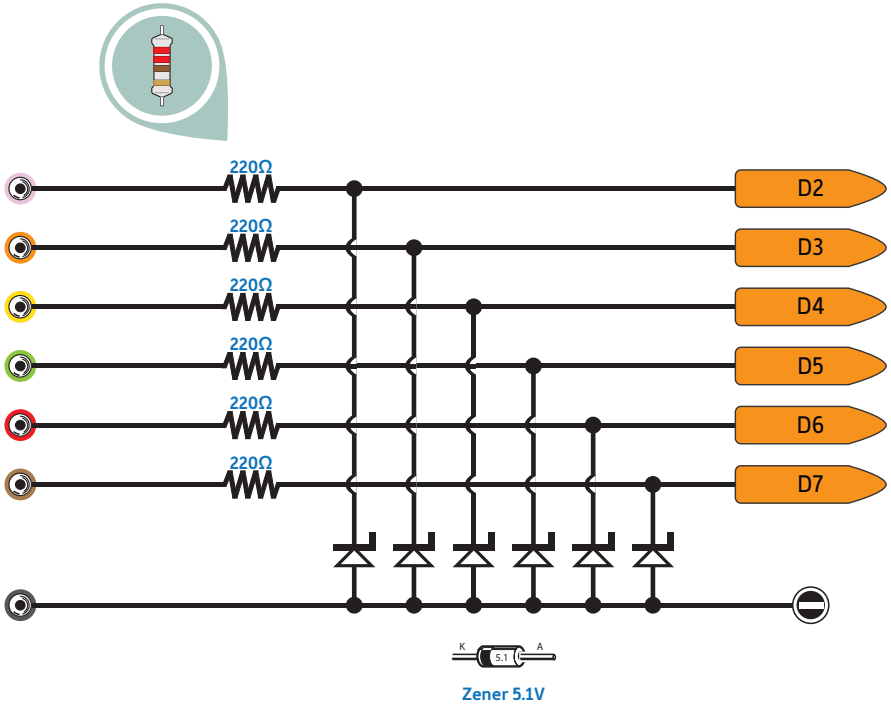
SN7474

Drive a Stepper (L293)



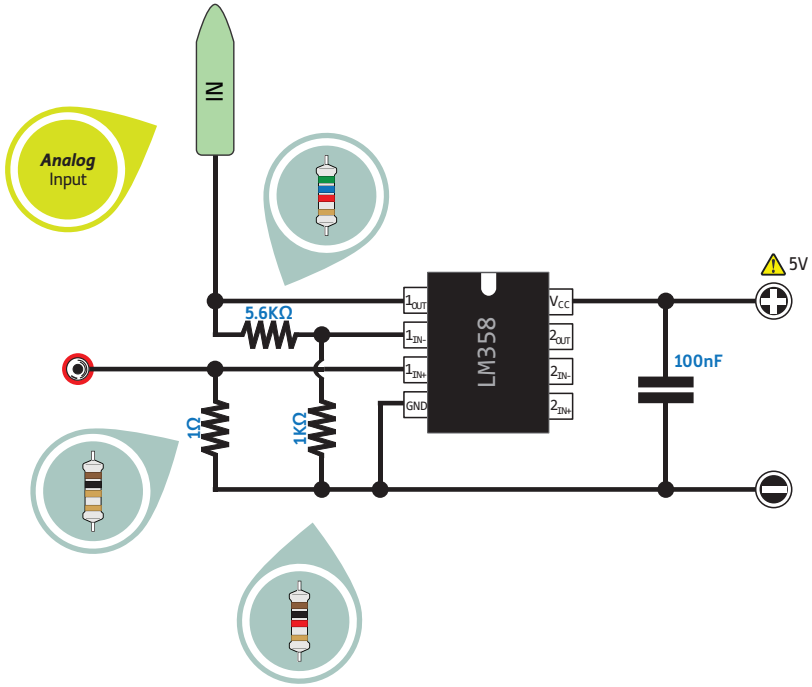


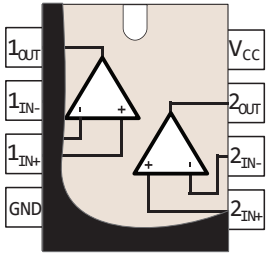
Arduino Logic Analyzer



Zener 5.1V

Current Sense

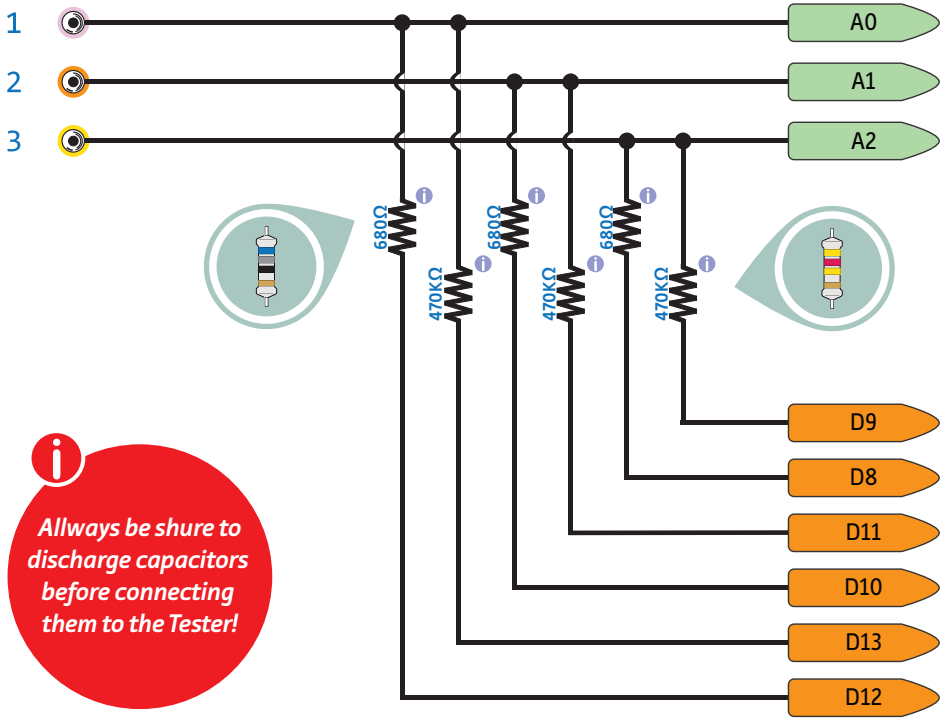




LM358

16 APR 2013
ver 1 rev 1

Arduino Component Tester (basic)



To get full accuracy use 1% tolerance resistors

Allways be shure to discharge capacitors before connecting them to the Tester!

Download sketch at at.pighixxx.com

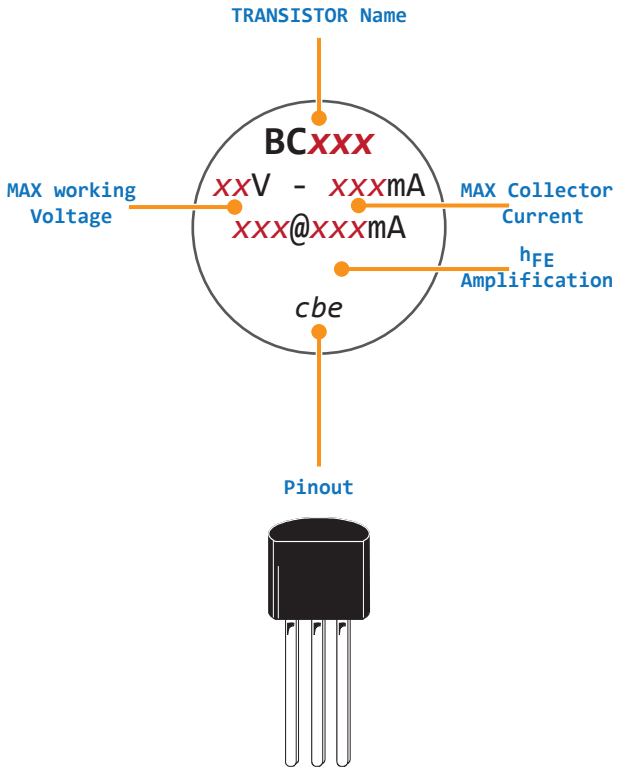
Original Project by Markus Frejek AVR-Transistortester, Embedded Projects Journal, 11. Ausgabe, 2011
Arduino version by PighiXXX

THE UNOFFICIAL

ARDUINO

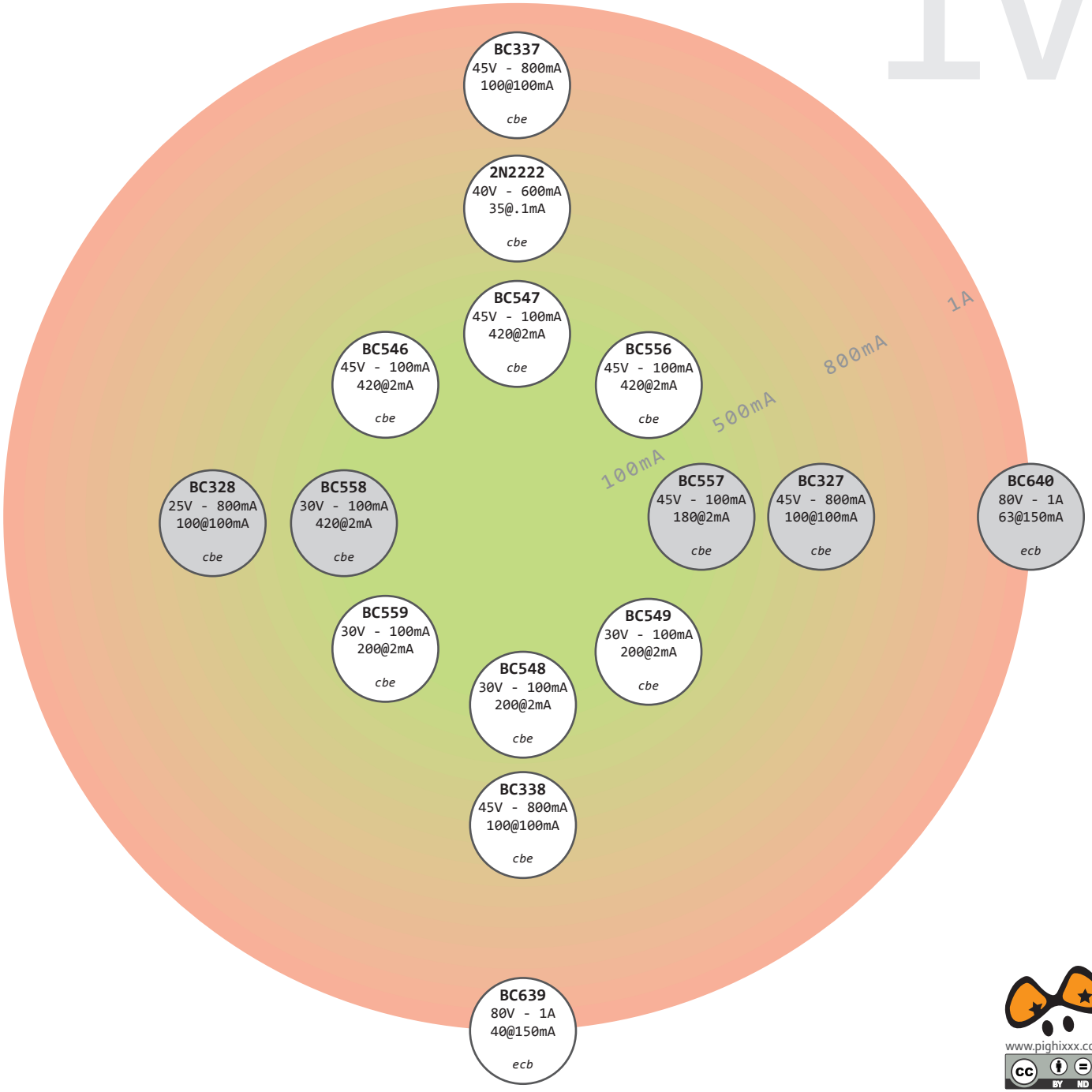
basic connections

Simple Transistor Comparison Table



NPN

PNP



25 APR 2013
ver 1 rev 1