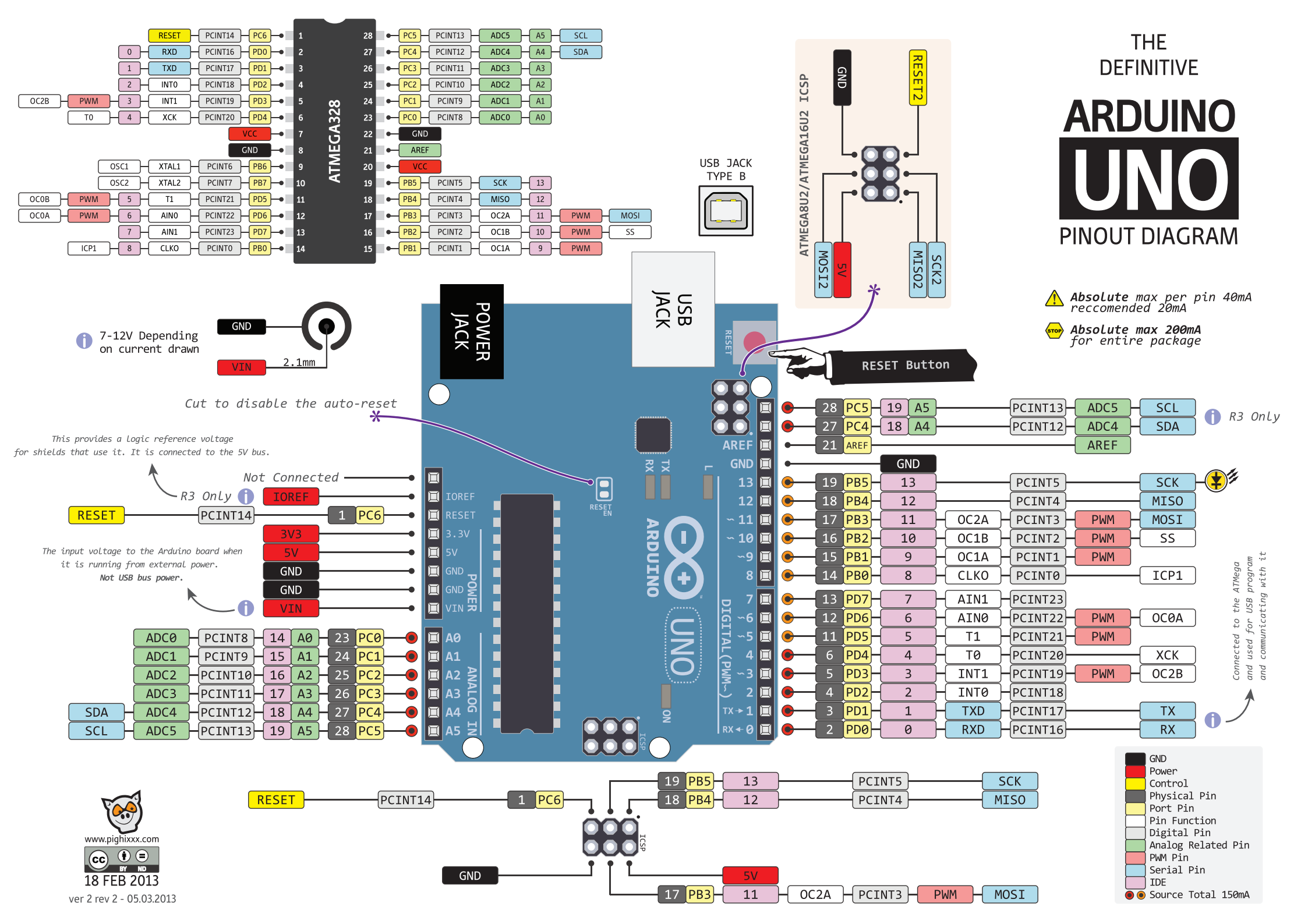
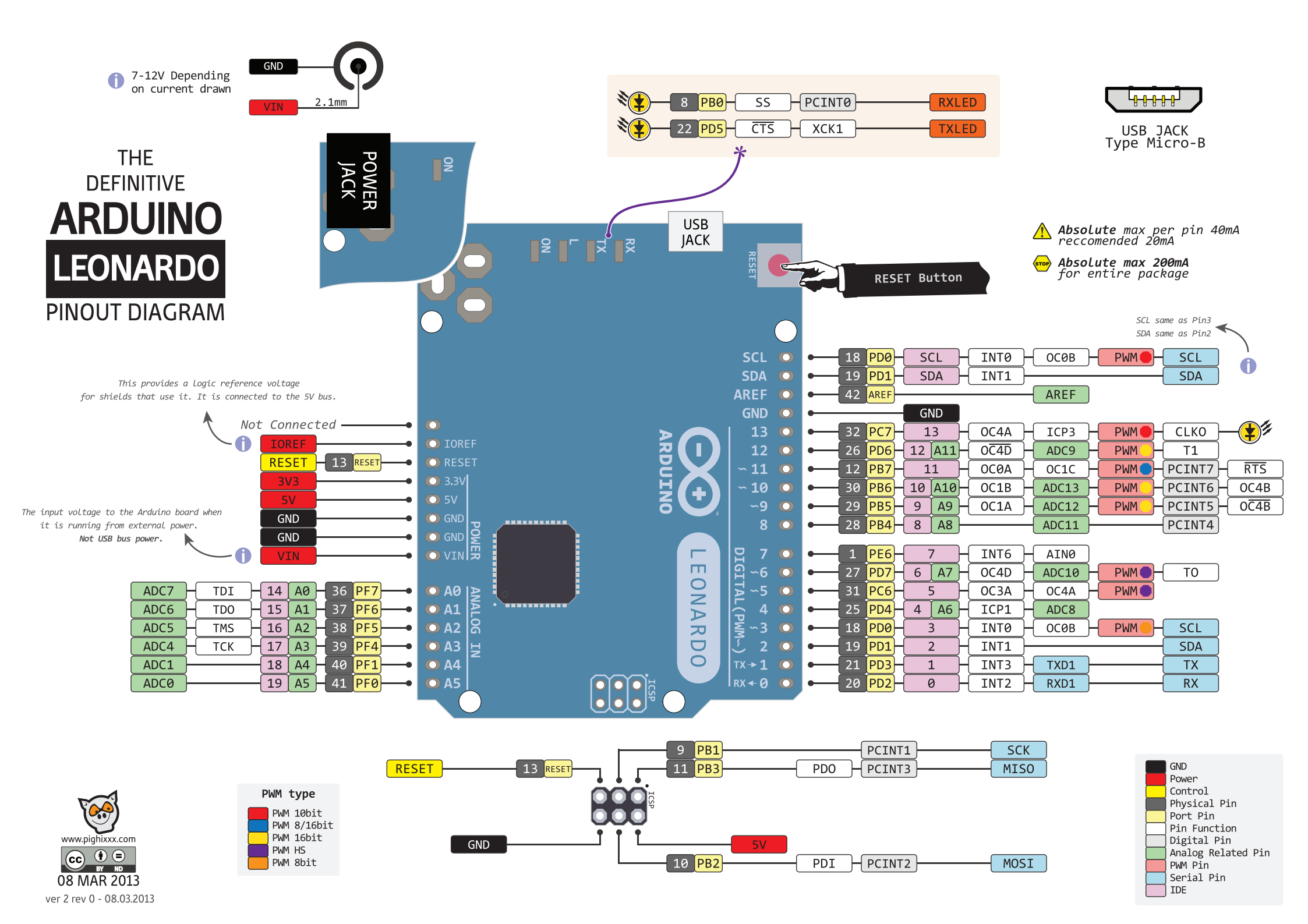

THE DEFINITIVE
ARDUINO UNO
PINOUT DIAGRAM
ATMEGA328
ATMEGA8U2/ATMEGA16U2 ICSP
USB JACK TYPE B
POWER JACK
USB JACK
RESET Button
7-12V Depending on current drawn
2.1mm
Cut to disable the auto-reset
This provides a logic reference voltage for shields that use it. It is connected to the 5V bus.
Not Connected
R3 Only
The input voltage to the Arduino board when it is running from external power.
Not USB bus power.
Absolute max per pin 40mA reccomended 20mA
Absolute max 200mA for entire package
Connected to the ATMega and used for USB program and communicating with it
www.pighixxx.com
18 FEB 2013
ver 2 rev 2 - 05.03.2013
GND
Power
Control
Physical Pin
Port Pin
Pin Function
Digital Pin
Analog Related Pin
PWM Pin
Serial Pin
IDE
Source Total 150mA

THE DEFINITIVE ARDUINO LEONARDO PINOUT DIAGRAM



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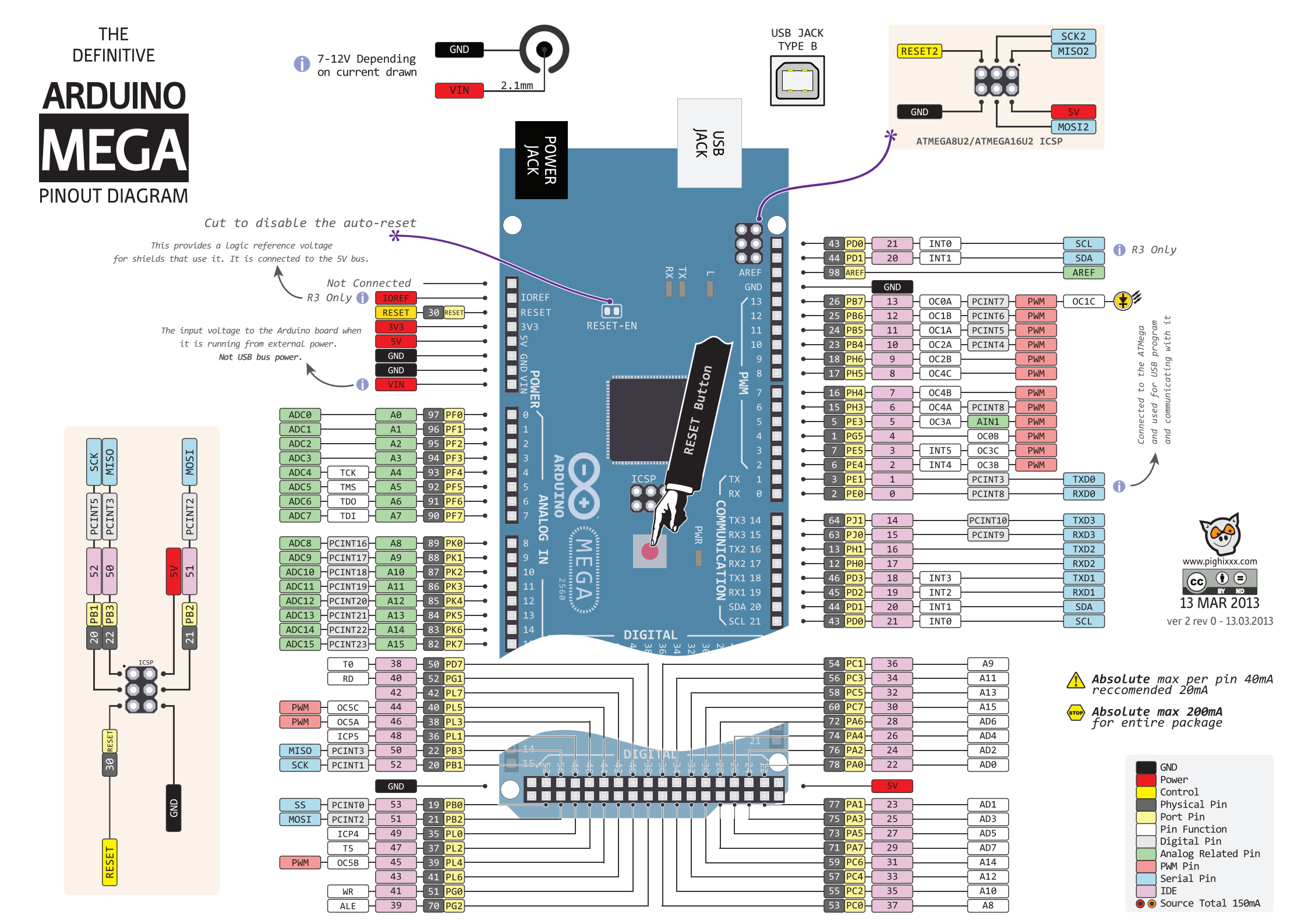
THE DEFINITIVE ARDUINO MEGA PINOUT DIAGRAM



THE
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ARDUINO NANO

PINOUT DIAGRAM

Absolute max per pin 40mA
reccomended 20mA

Absolute max 200mA
for entire package

ICSP
RESET
SCK
MISO
5V
MOSI
GND

Connected to the ATMega
and used for USB program
and communicating with it

	TXD			PCINT17	PD1	31	TX		
	RXD			PCINT16	PD0	30	RX		
				PCINT15	PC6	29	RESET		
							GND		
			INT0	PCINT18	PD2	32	2		
INT1	PWM		OC2B	PCINT19	PD3	1	3		
	XCK		T0	PCINT20	PD4	2	4		
T1	PWM		OC0B	PCINT21	PD5	9	5		
AIN0	PWM		OC0A	PCINT22	PD6	10	6		
			AIN1	PCINT23	PD7	11	7		
	ICP1		CLKO	PCINT0	PB0	12	8		
	PWM		OC1A	PCINT1	PB1	13	9		
SS	PWM		OC1B	PCINT2	PB2	14	10		
MOSI	PWM		OC2A	PCINT3	PB3	15	11		
MISO			OC1A	PCINT4	PB4	16	12		

ICSP

USB JACK

VIN						
GND						
RESET	29	PC6	PCINT15			
+5V						
ADC7	22					
ADC6	19					
ADC5	28	PC5	PCINT13	SCL		
ADC4	27	PC4	PCINT12	SDA		
ADC3	26	PC3	PCINT11			
ADC2	25	PC2	PCINT10			
ADC1	24	PC1	PCINT9			
ADC0	23	PC0	PCINT8			
AREF	20					
3V3						
13	17	PB5	PCINT5	SCK	L	

On version 2
Analog Pins are reversed

e.g. A0➳A7, A7➳A0

LEGEND

- GND
- POWER
- CONTROL
- PHYSICAL PIN
- PORT PIN
- ATMEGA328 PIN FUNC
- DIGITAL PIN
- ANALOG-RELATED PIN
- PWM PIN
- SERIAL PIN

General Information
Pay Attention
No Really
PAY ATTENTION
LED

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THE
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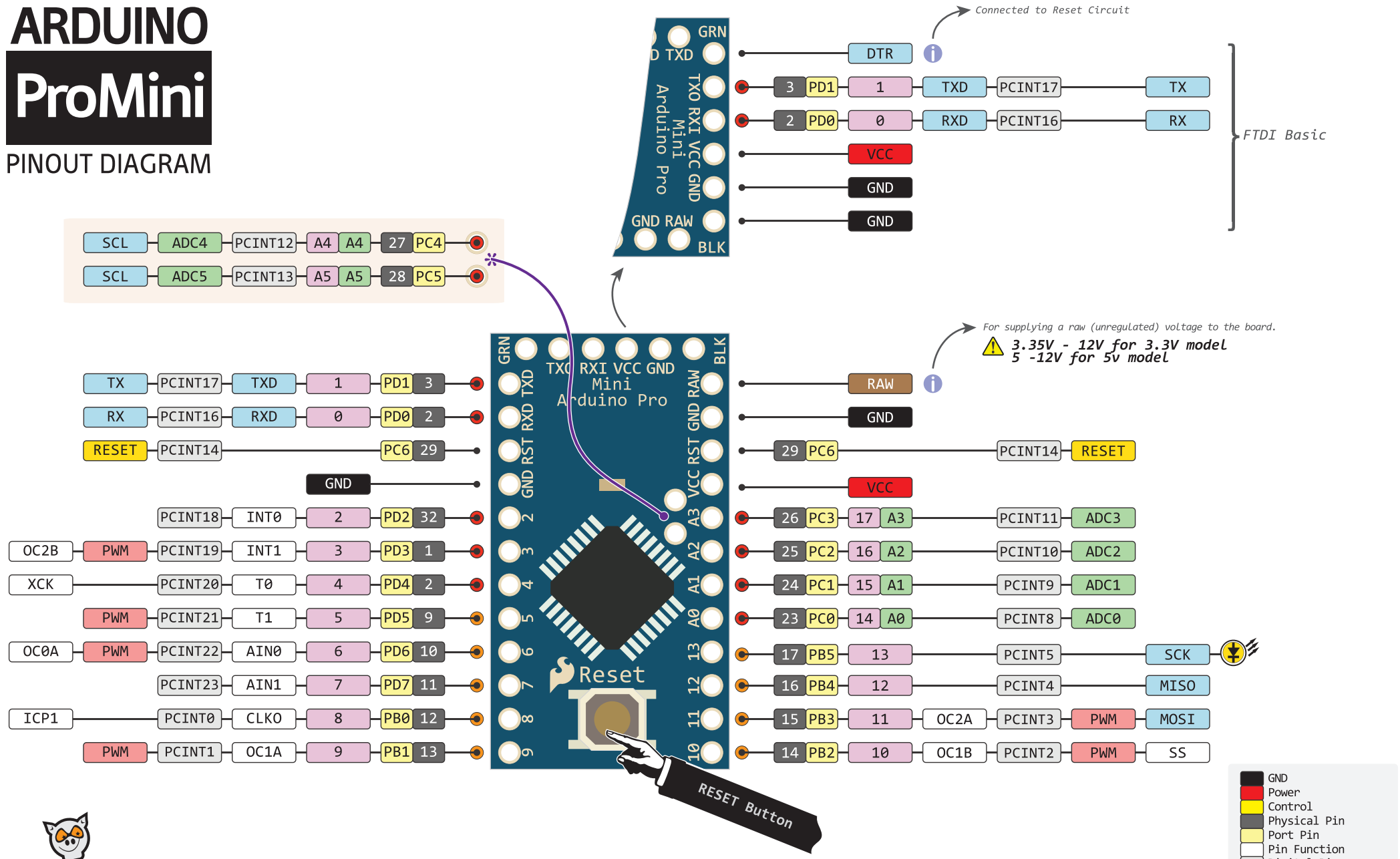
ARDUINO ProMini

PINOUT DIAGRAM



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08 MAR 2013

ver 1 rev 1 - 10.03.2013

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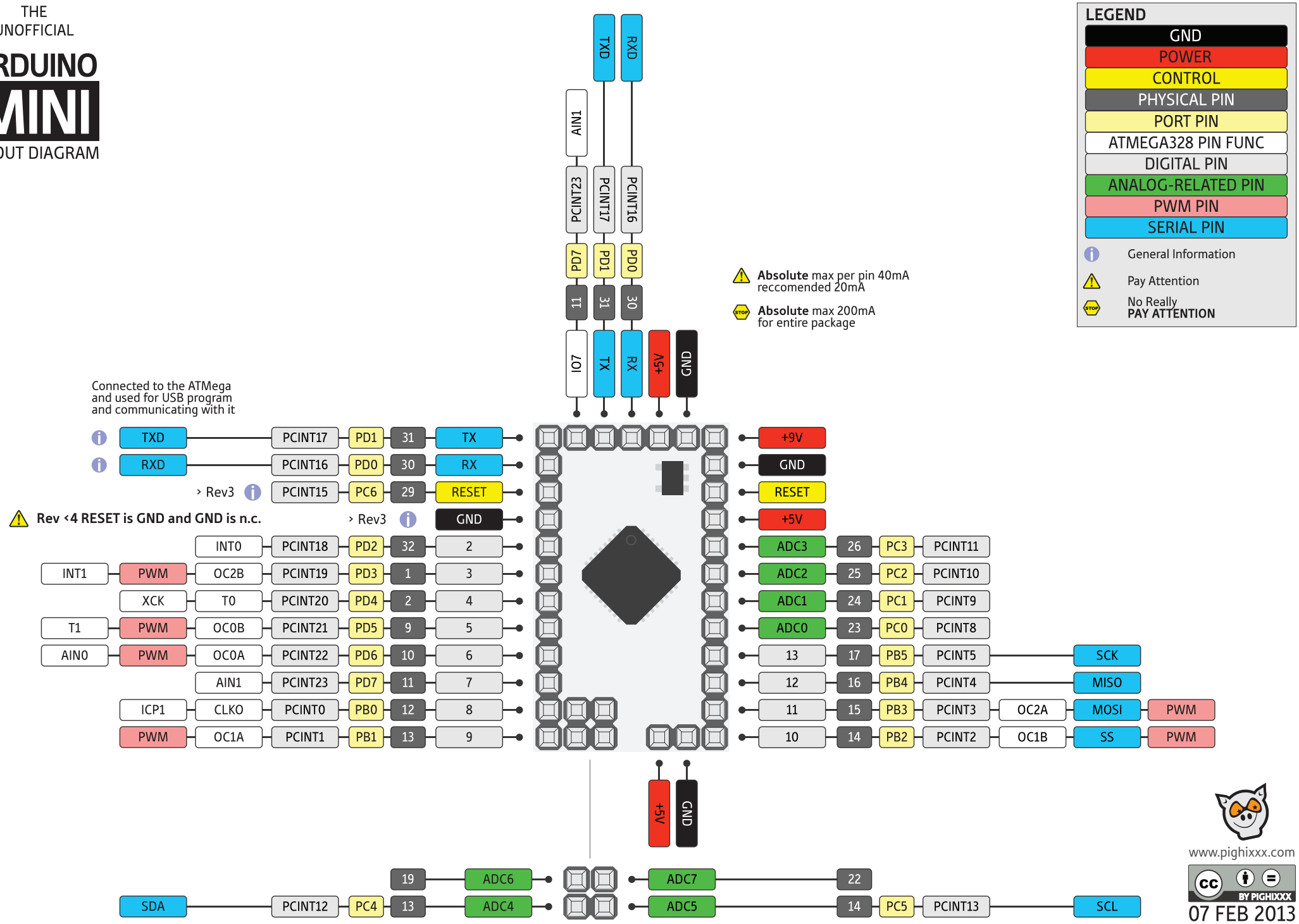
ARDUINO MINI

PINOUT DIAGRAM



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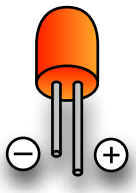
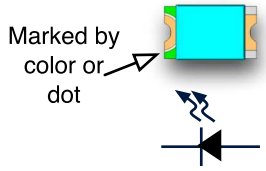
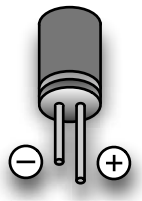
Electronics Reference Sheet v1.1b

LED

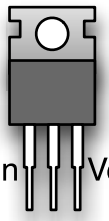




CAPACITOR



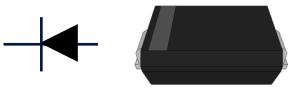
REGULATOR (e.g. LM78xx)

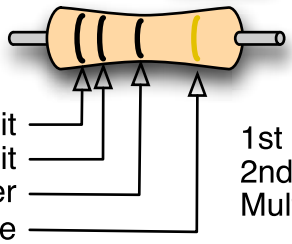


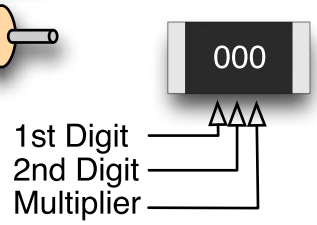
Resistor

	Digit	Multiplier	Tolerance
Silver	-	0.01	±10%
Gold	-	0.1	±5%
Black	0	1	-
Brown	1	10	±1%
Red	2	100	±2%
Orange	3	1k	-
Yellow	4	10k	-
Green	5	100k	±0.5%
Blue	6	1M	±0.25%
Violet	7	10M	±0.1%
Gray	8	-	-
White	9	-	-

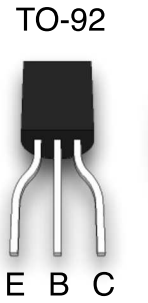
DIODE

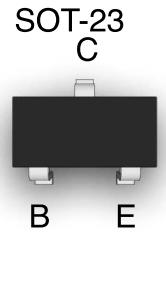


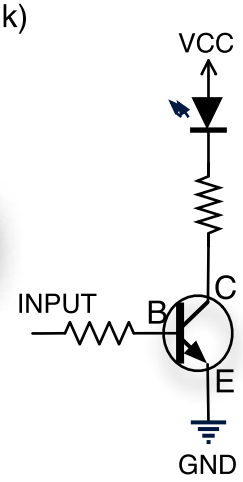




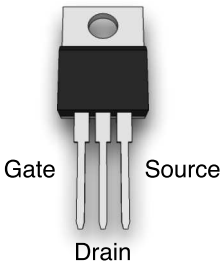
NPN transistor (Current sink) (e.g. PN2222)

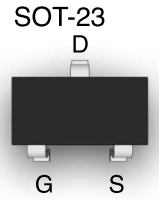


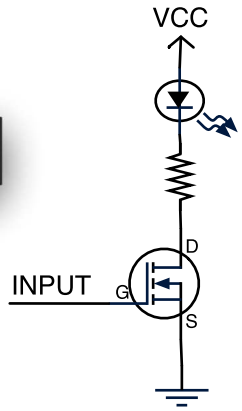




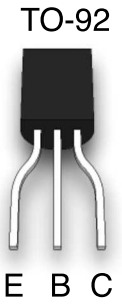
N-channel MOSFET

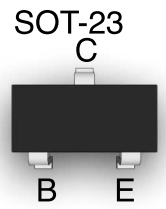


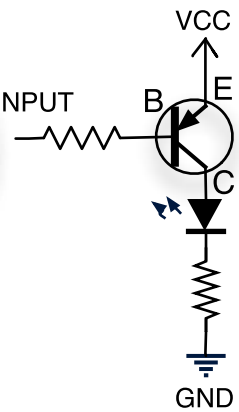




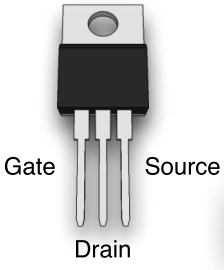
PNP transistor (Current source) (e.g. PN2907)

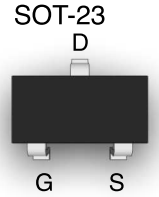


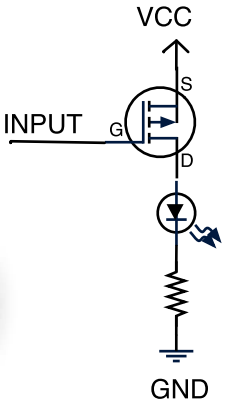




P-channel MOSFET







* Please note that some components may have a different pinout than the one showed above, you should always check the data sheet before using a new component.

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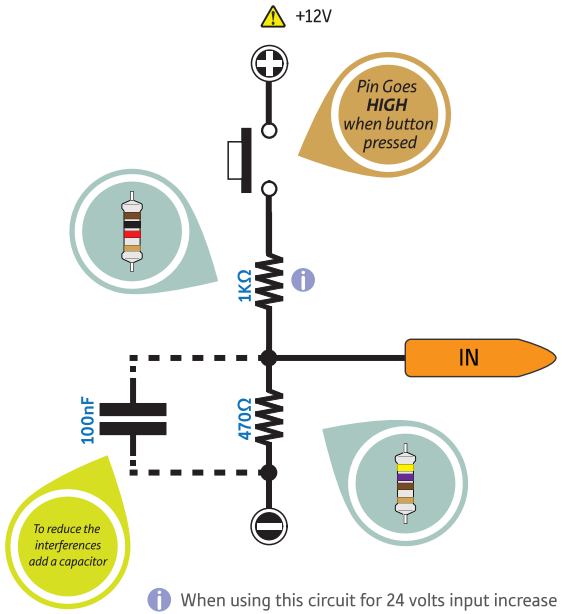
ARDUINO

basic connections

1

Pushbutton to 12V

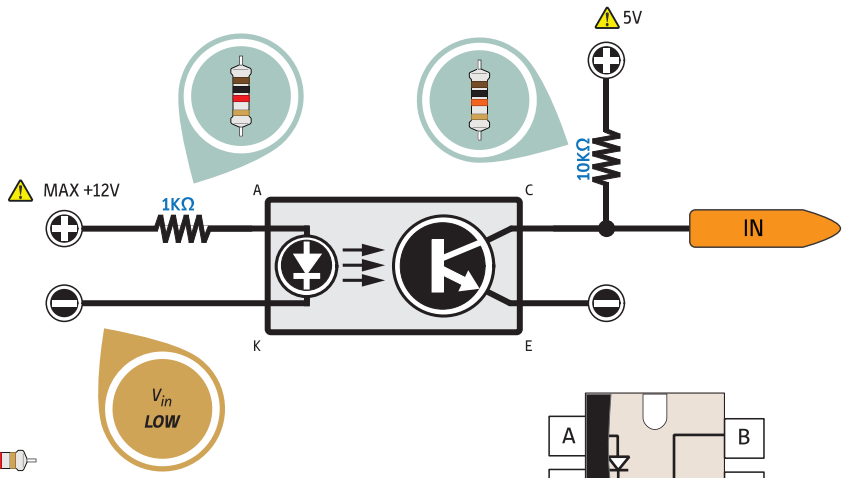
Should you need to connect Arduino inputs to a DC voltage higher than 5V

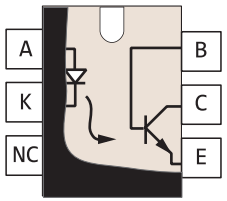


When using this circuit for 24 volts input increase R to 2200Ω

Optocoupled inputs

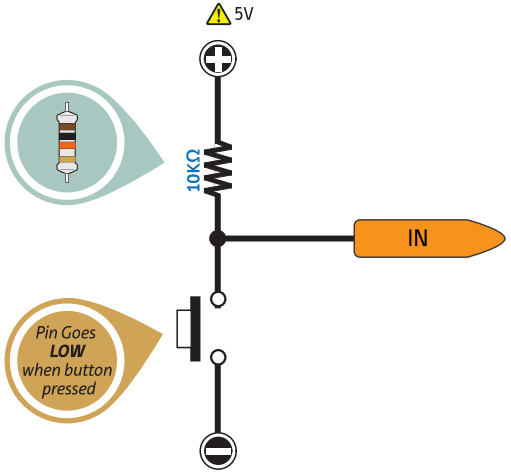
Used when galavanic separation between external circuitry and Arduino circuit is required



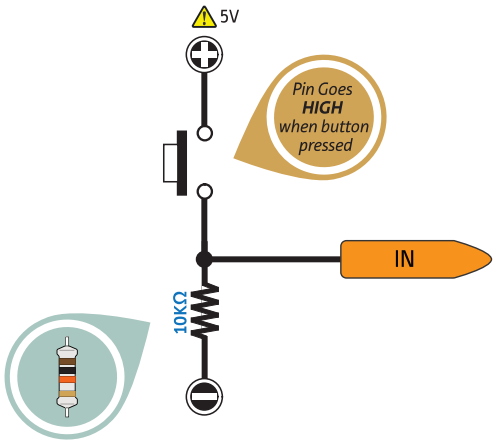


4N25

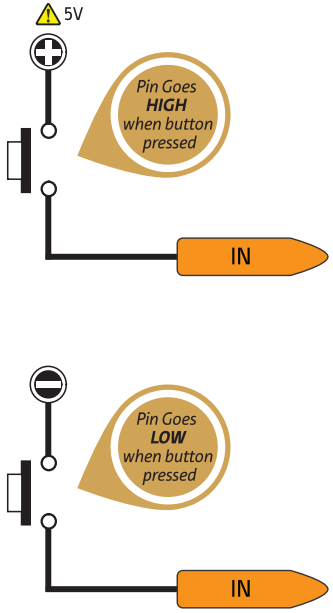
Pushbutton to GND



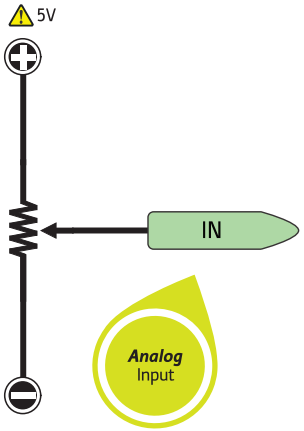
Pushbutton to 5V



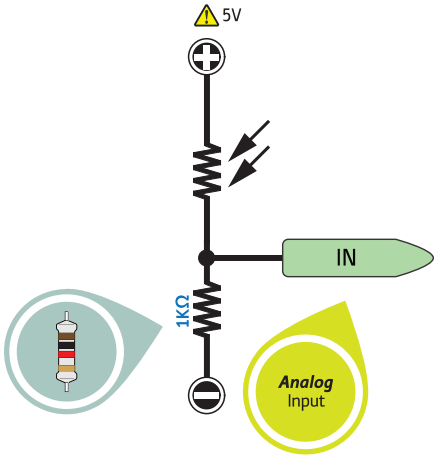
Using Internal Pullup



Trimmer or Potentiometer



Photoresistor



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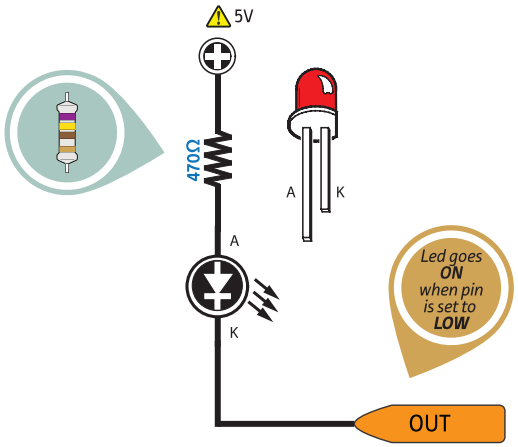
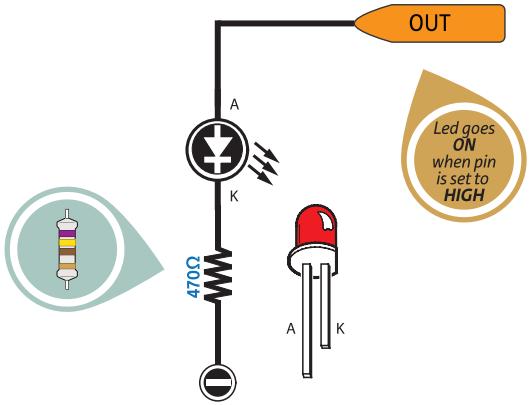
basic connections

2

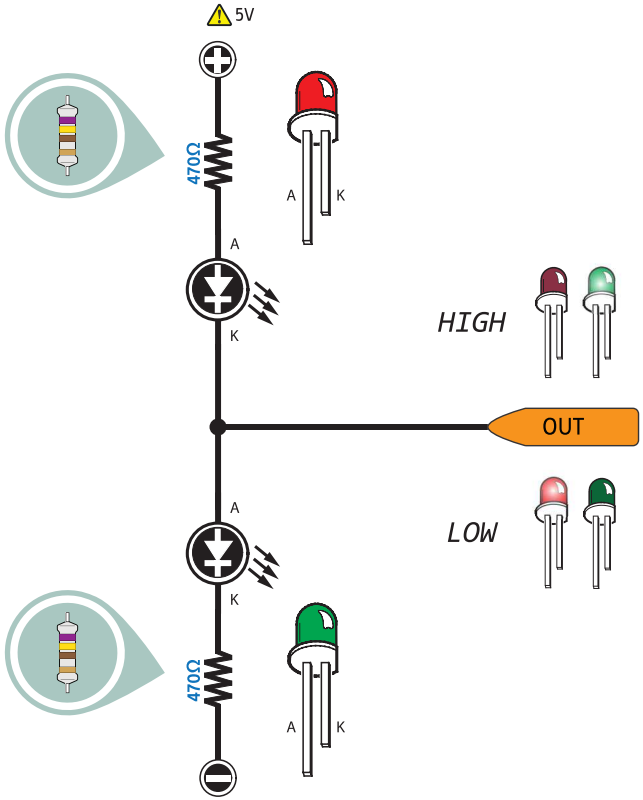
Connect a Led



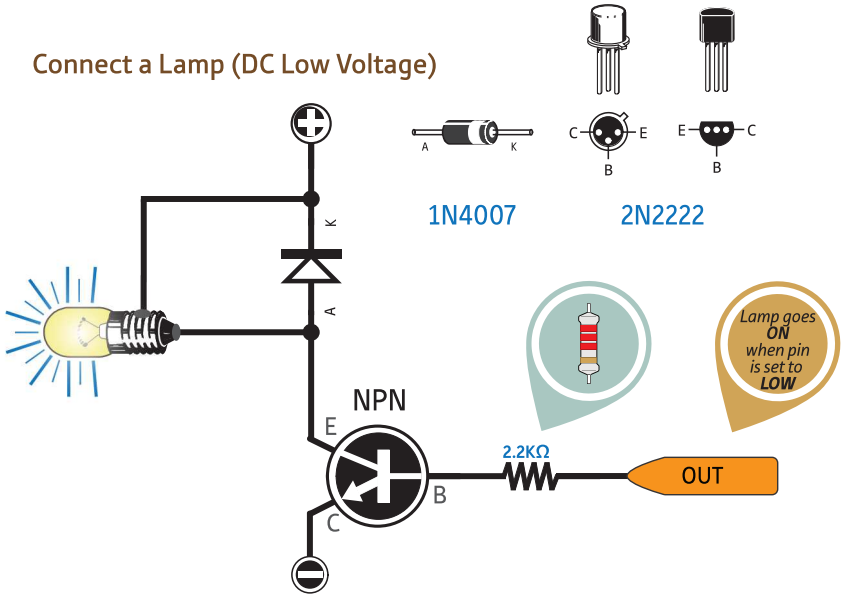
Connect a Led



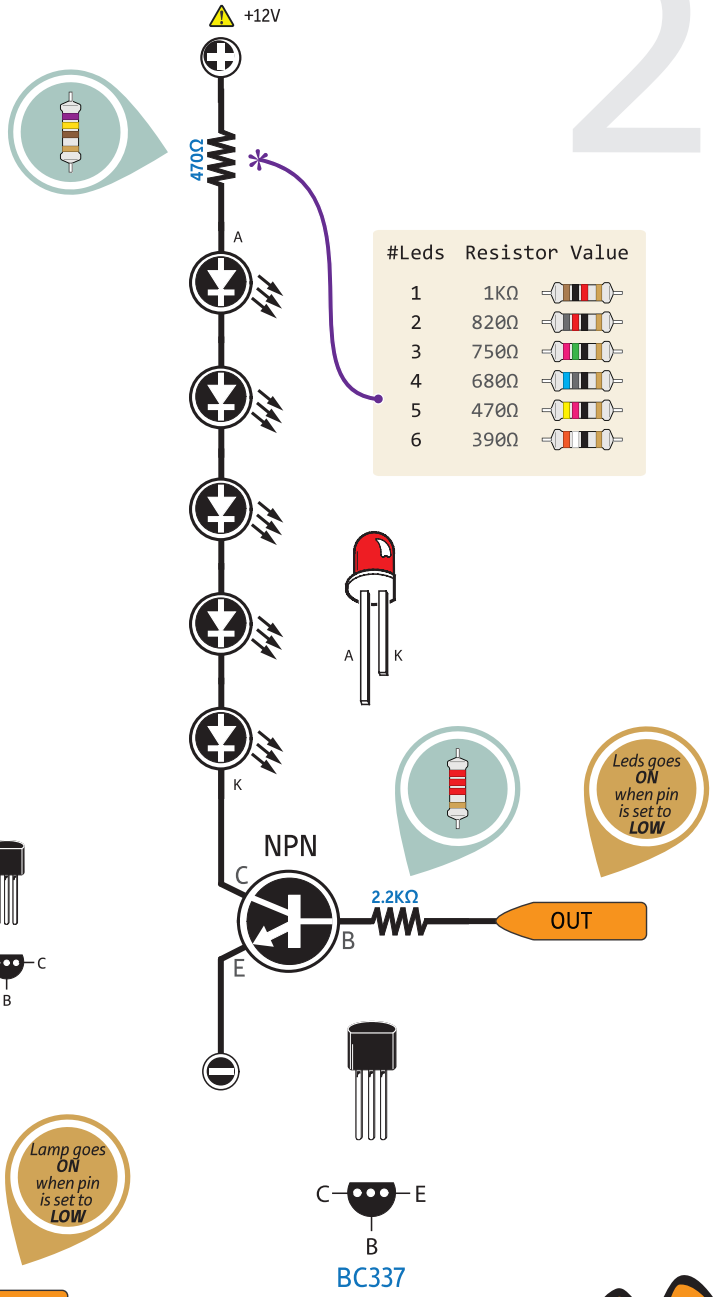
Dual LEDs or bi-color LED



Connect a Lamp (DC Low Voltage)



LED clusters



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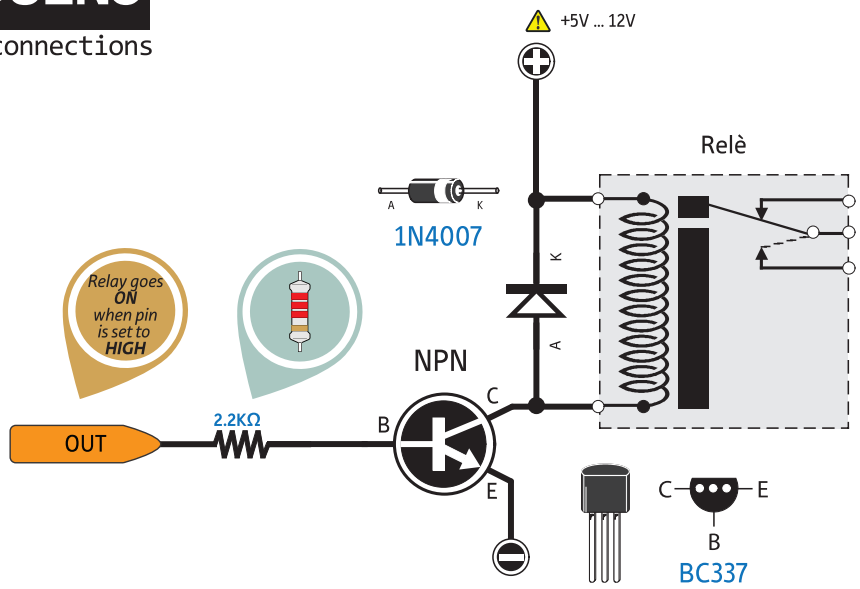
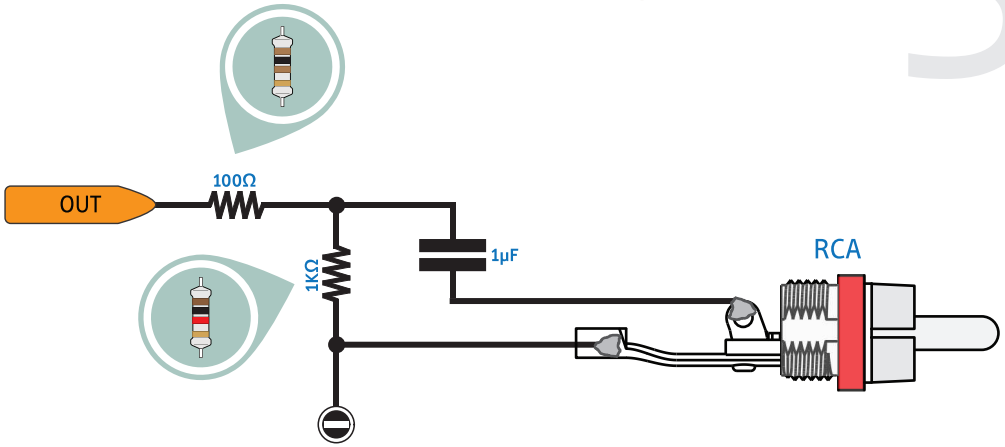
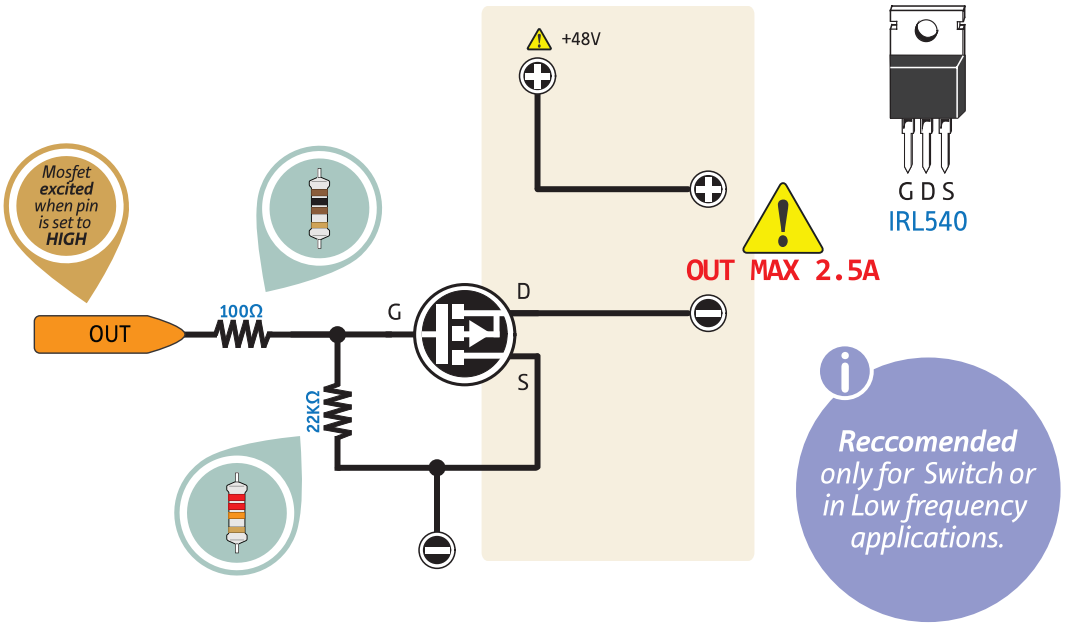
Connect a Relay



Connect an Audio Amplifier

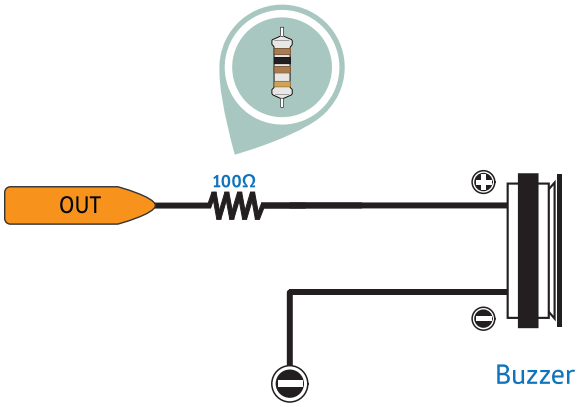


Connect a Mosfet



Reccomended only for Switch or in Low frequency applications.

Connect a Buzzer



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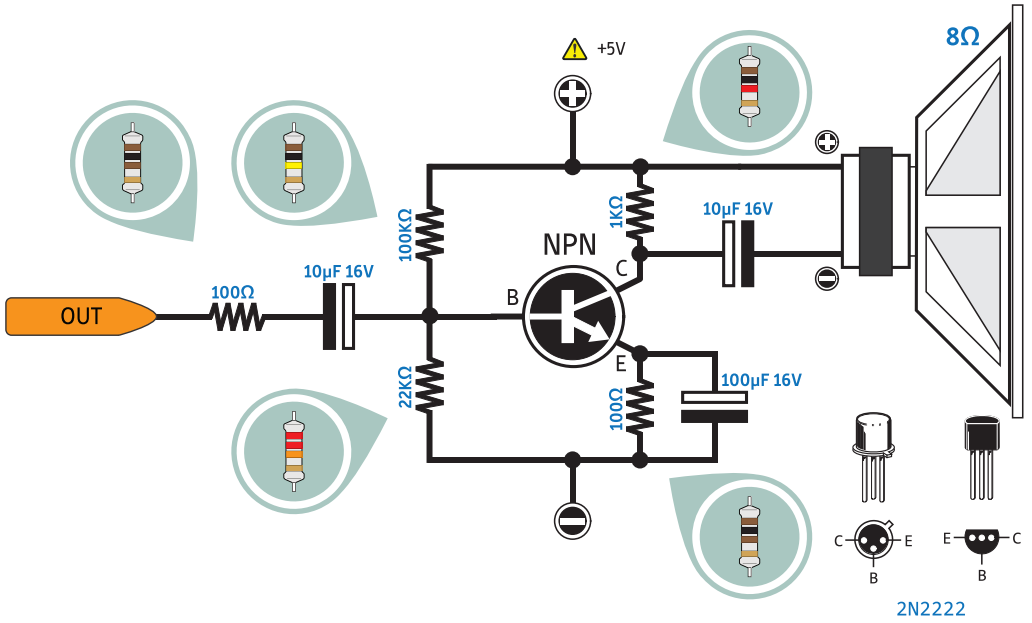
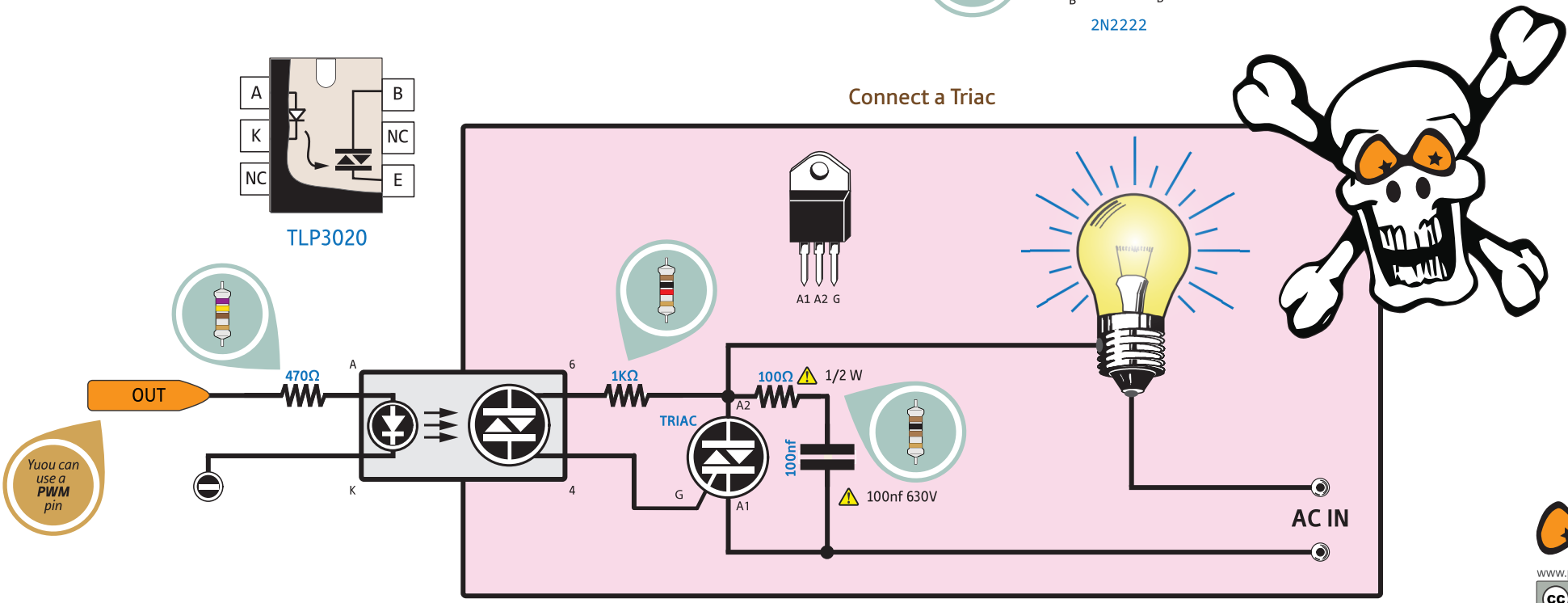
Connect a Speaker



Connect a Triac



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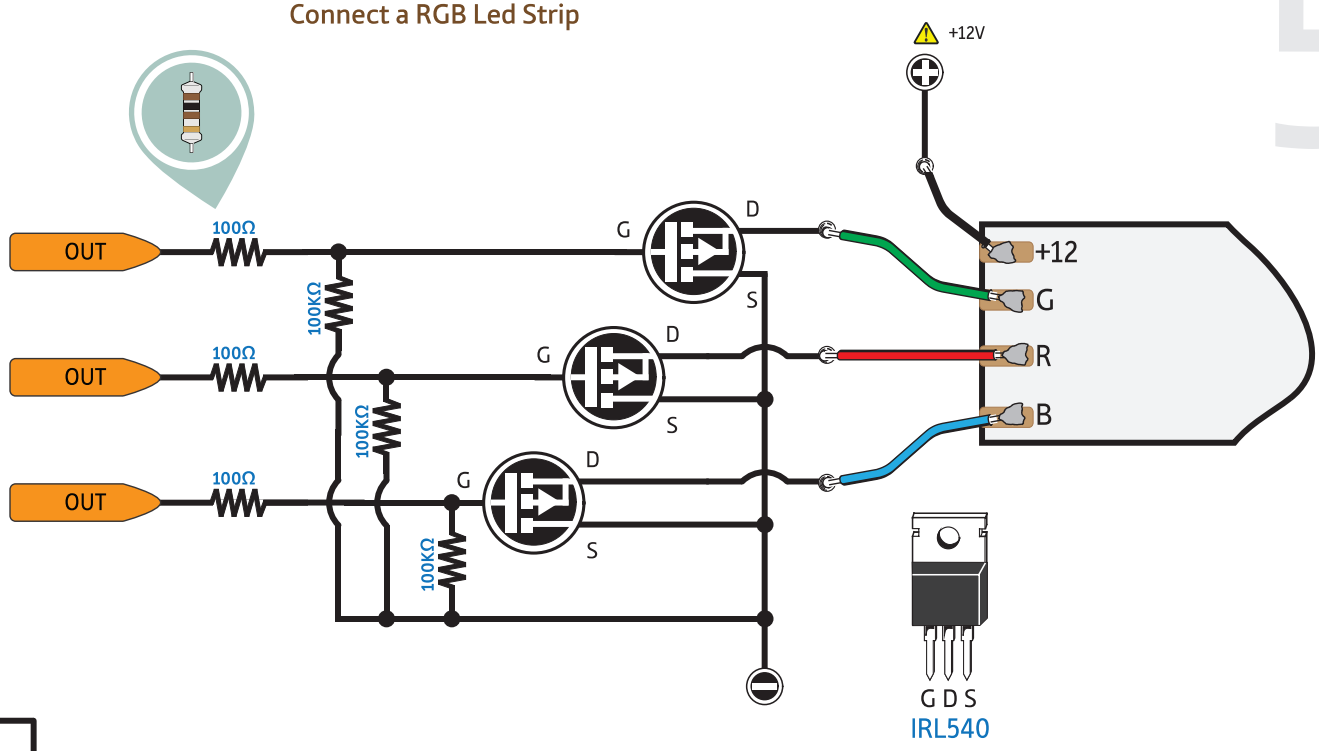
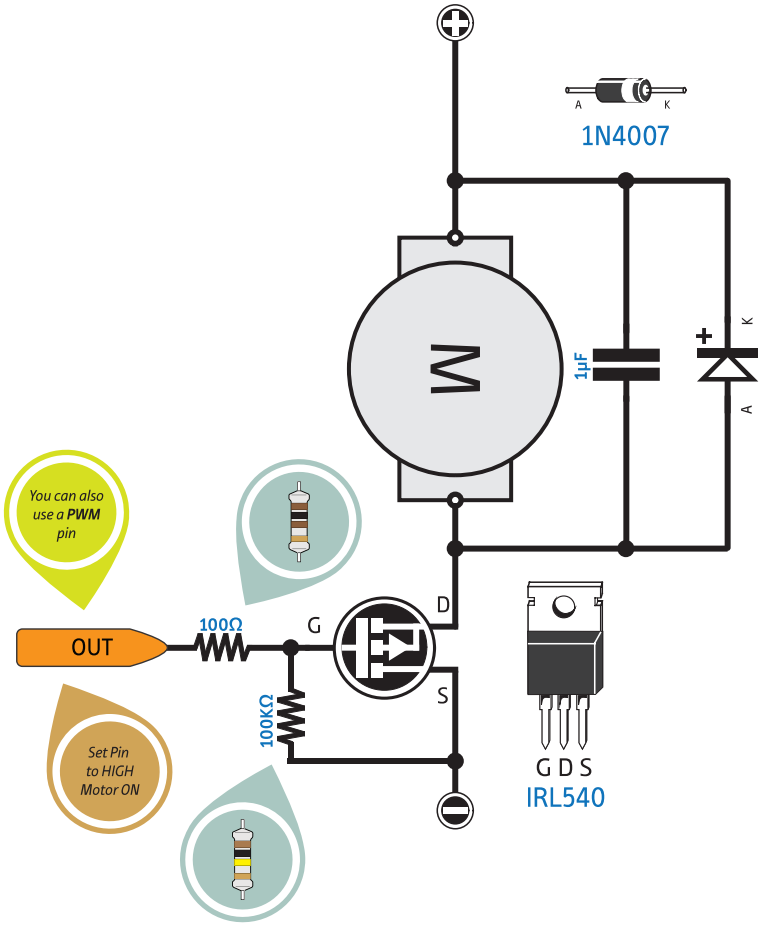
basic connections

5

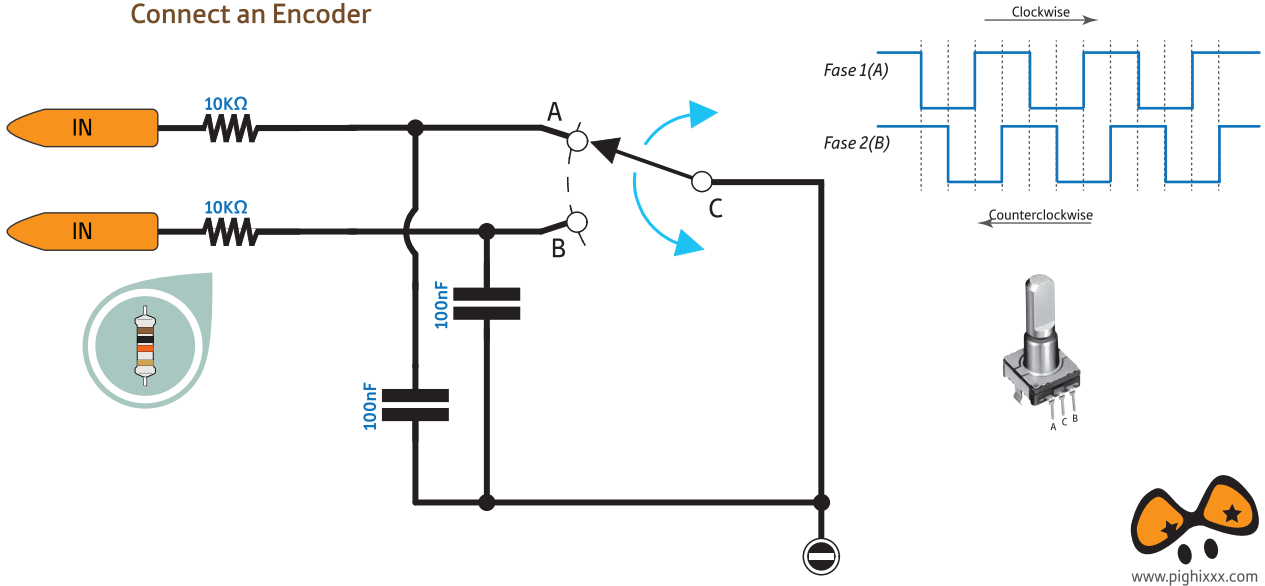
Connect a RGB Led Strip



Connect a DC Motor



Connect an Encoder



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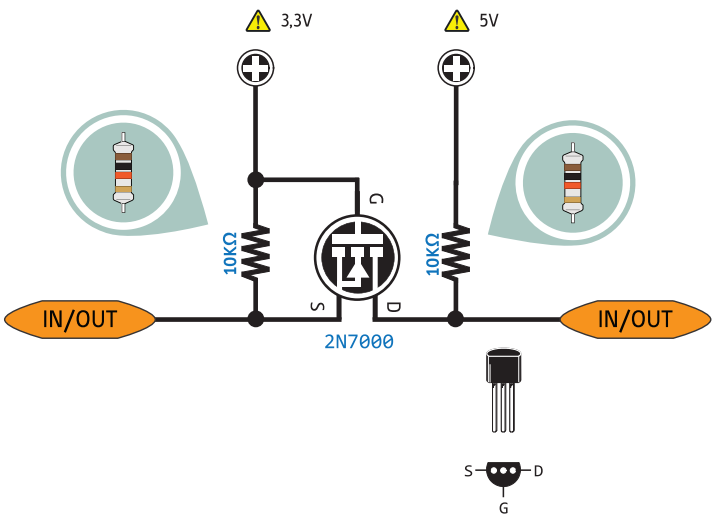
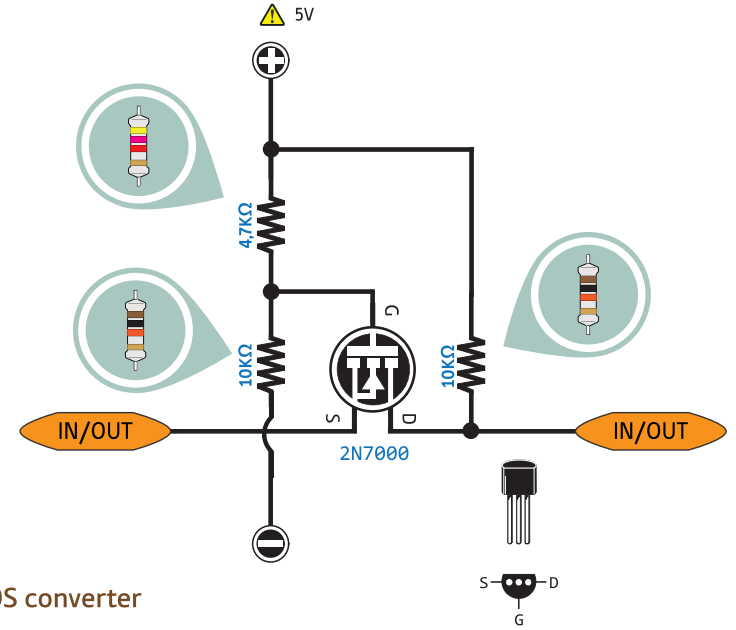
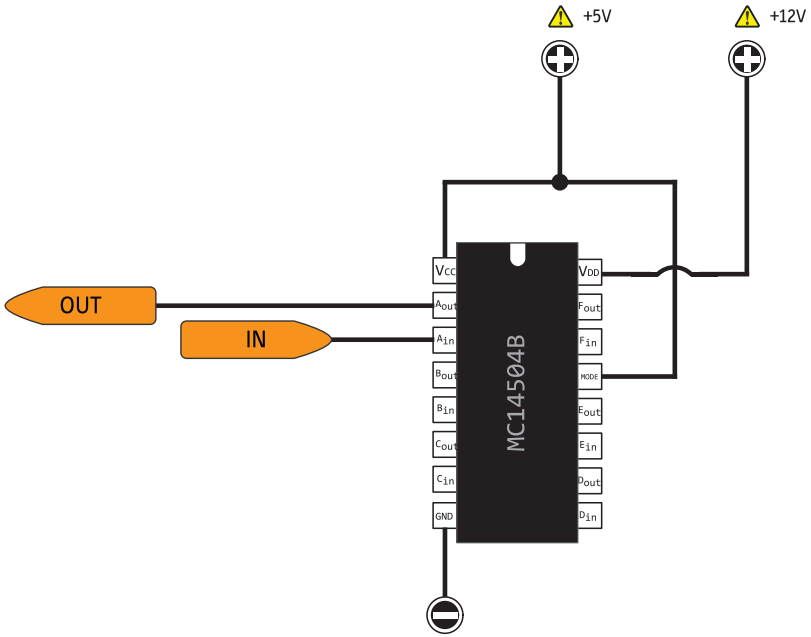
Bi-Directional Voltage Level Converter 3.3V to 5V



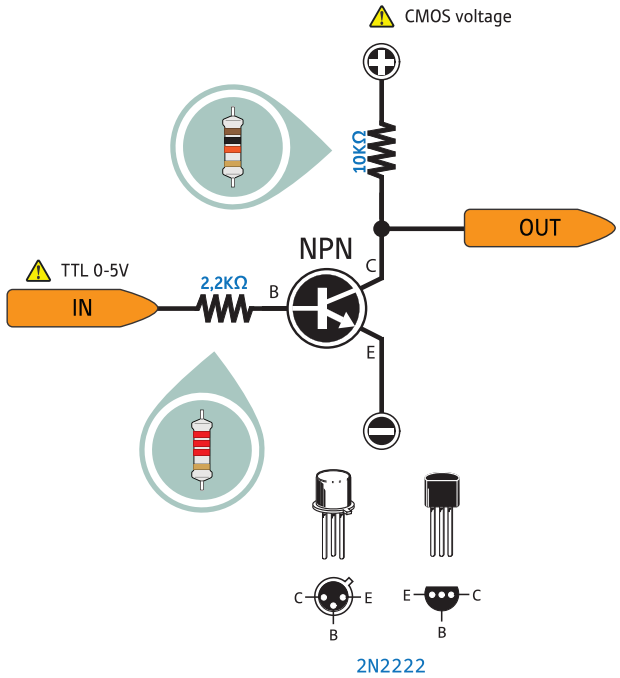
Bi-Directional Voltage Level Converter 3.3V to 5V with voltage divider



TTL / CMOS converter (6 inputs/outputs)



TTL / CMOS converter



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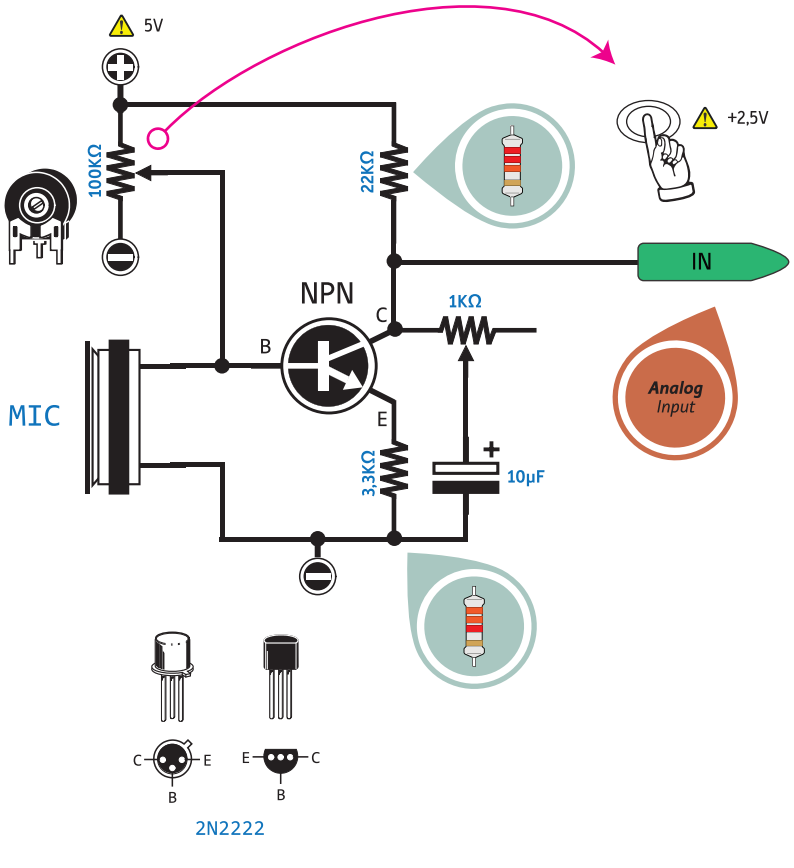
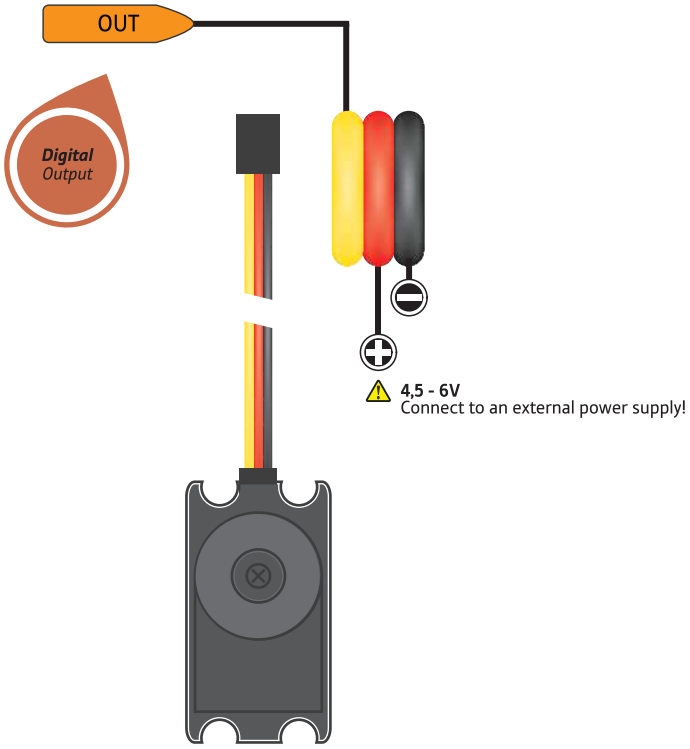
Connect a Microphone



Connect a Servo



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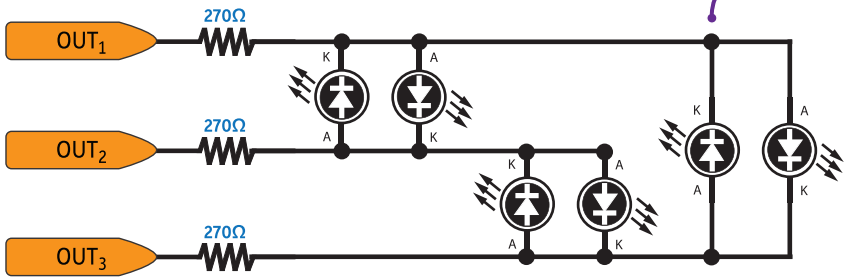
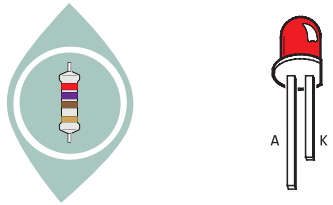
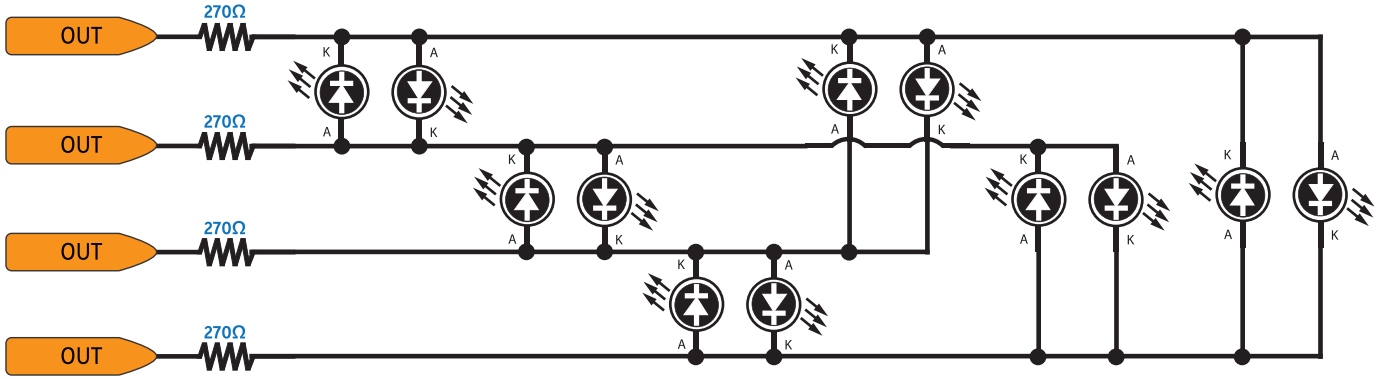
Charlieplexing



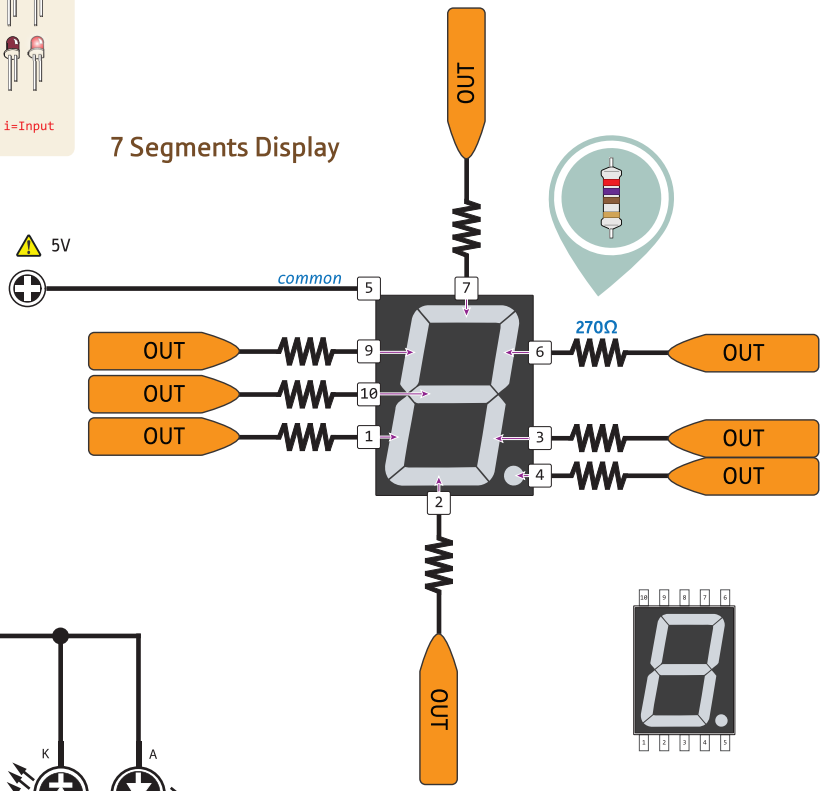
Out_1	Out_2	Out_3	
L	L	L	
L	H	i	
H	L	i	
i	L	H	
i	H	L	
L	i	H	
H	i	L	

H=High, L=Low, i=Input





7 Segments Display



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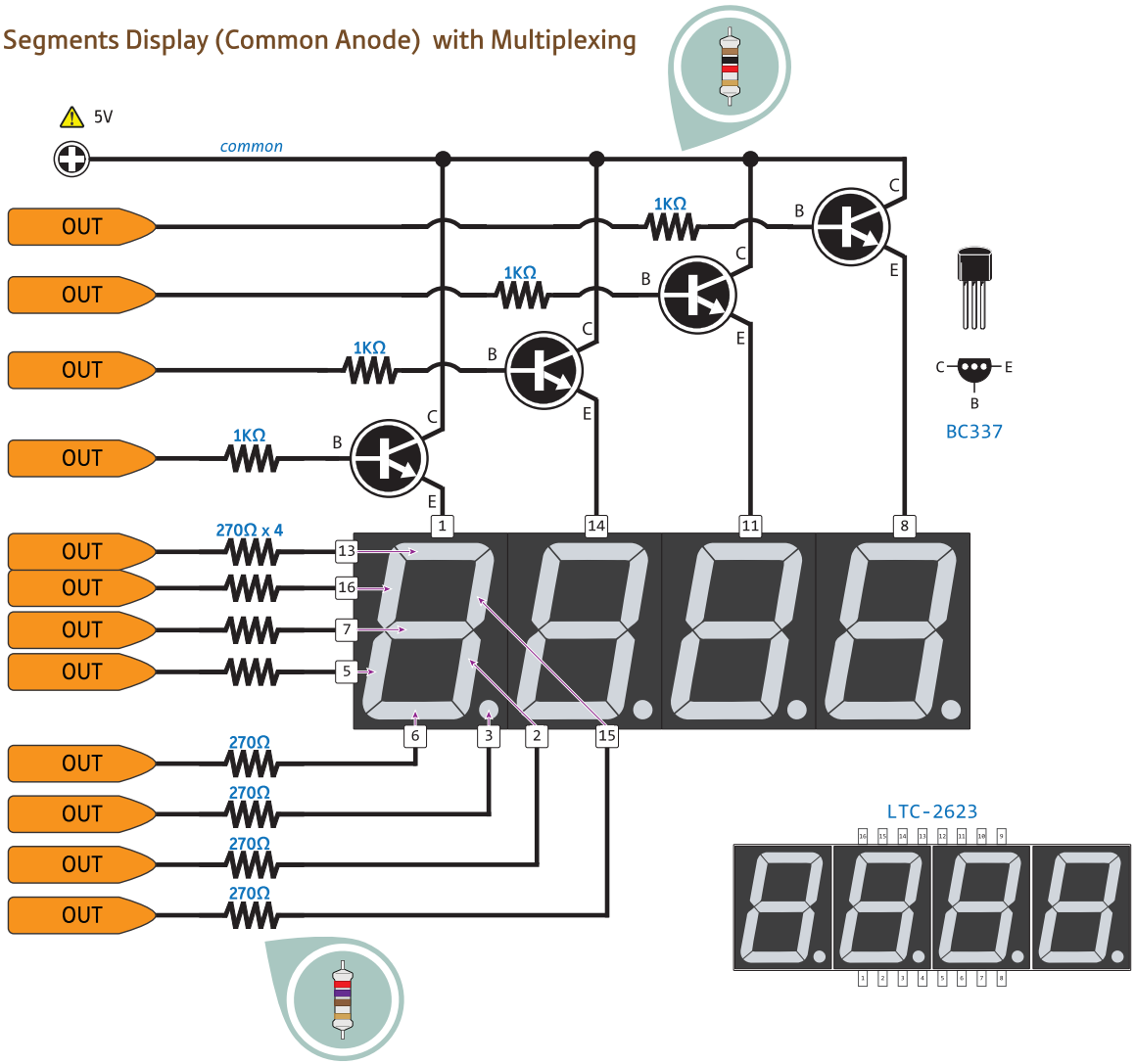
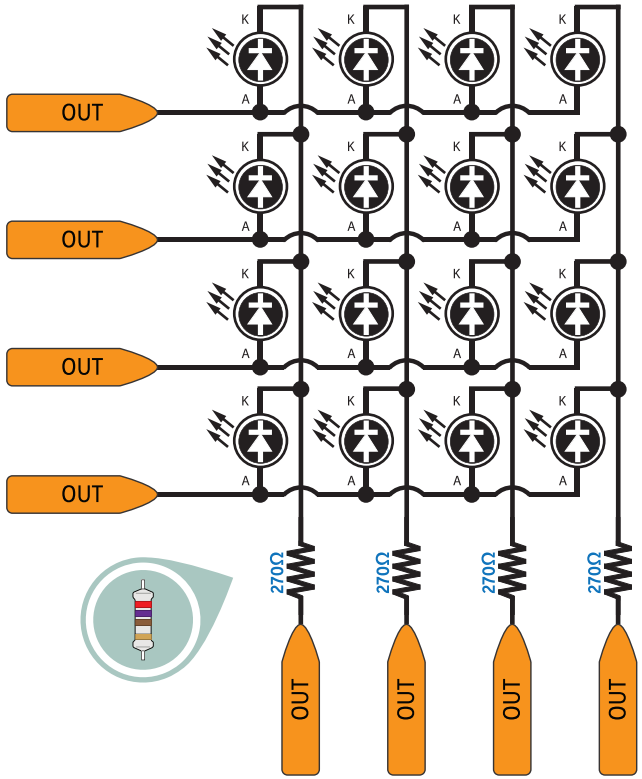
7 Segments Display (Common Anode) with Multiplexing



BC337

LTC-2623

LED Array



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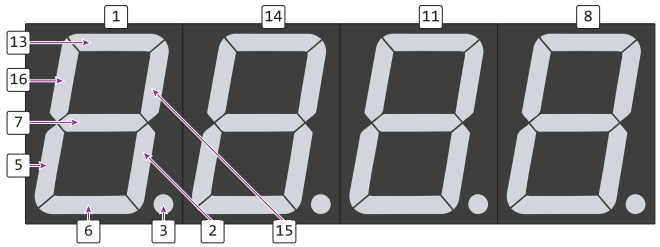
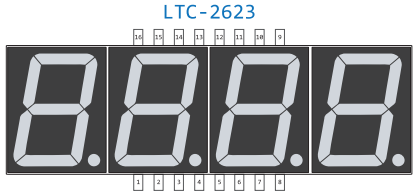
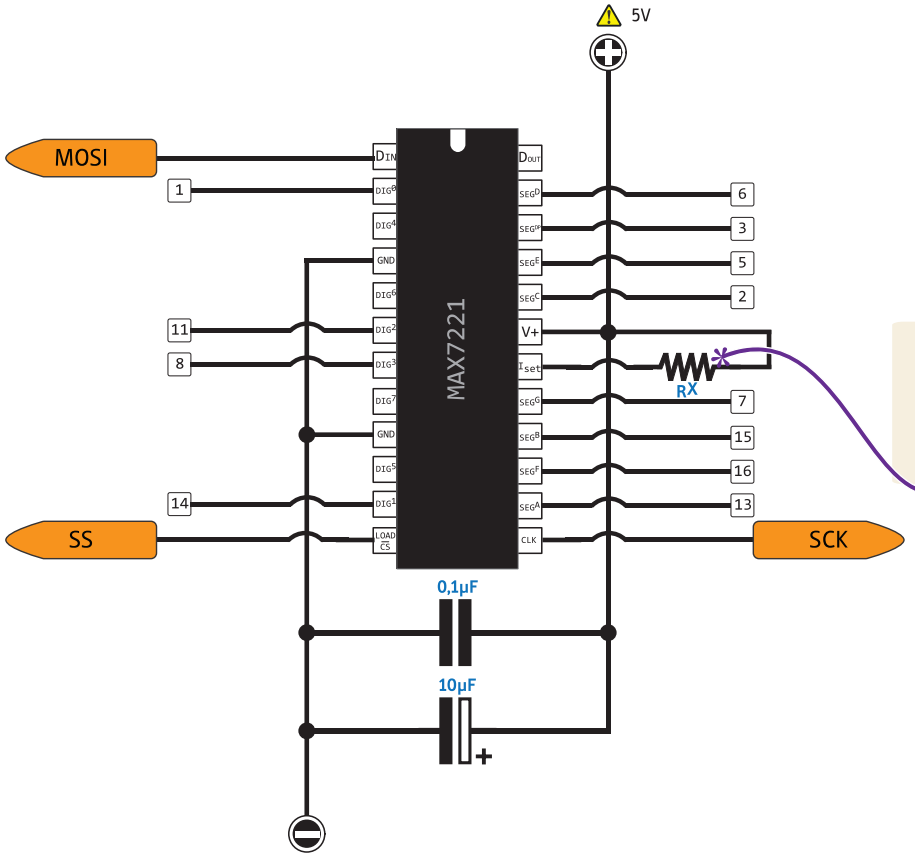
7 Segments Display (Common Anode) with MAX7221

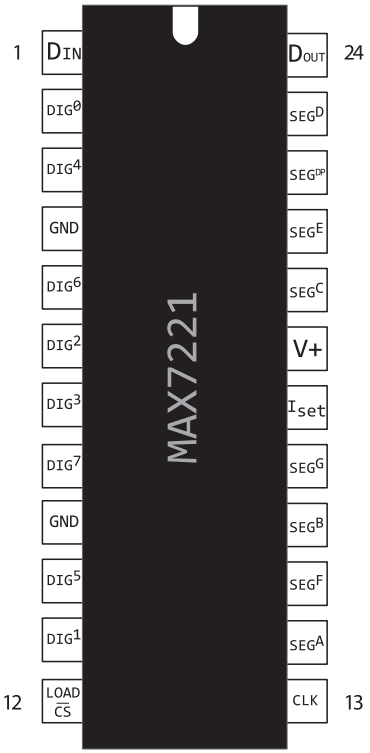


LTC-2623





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



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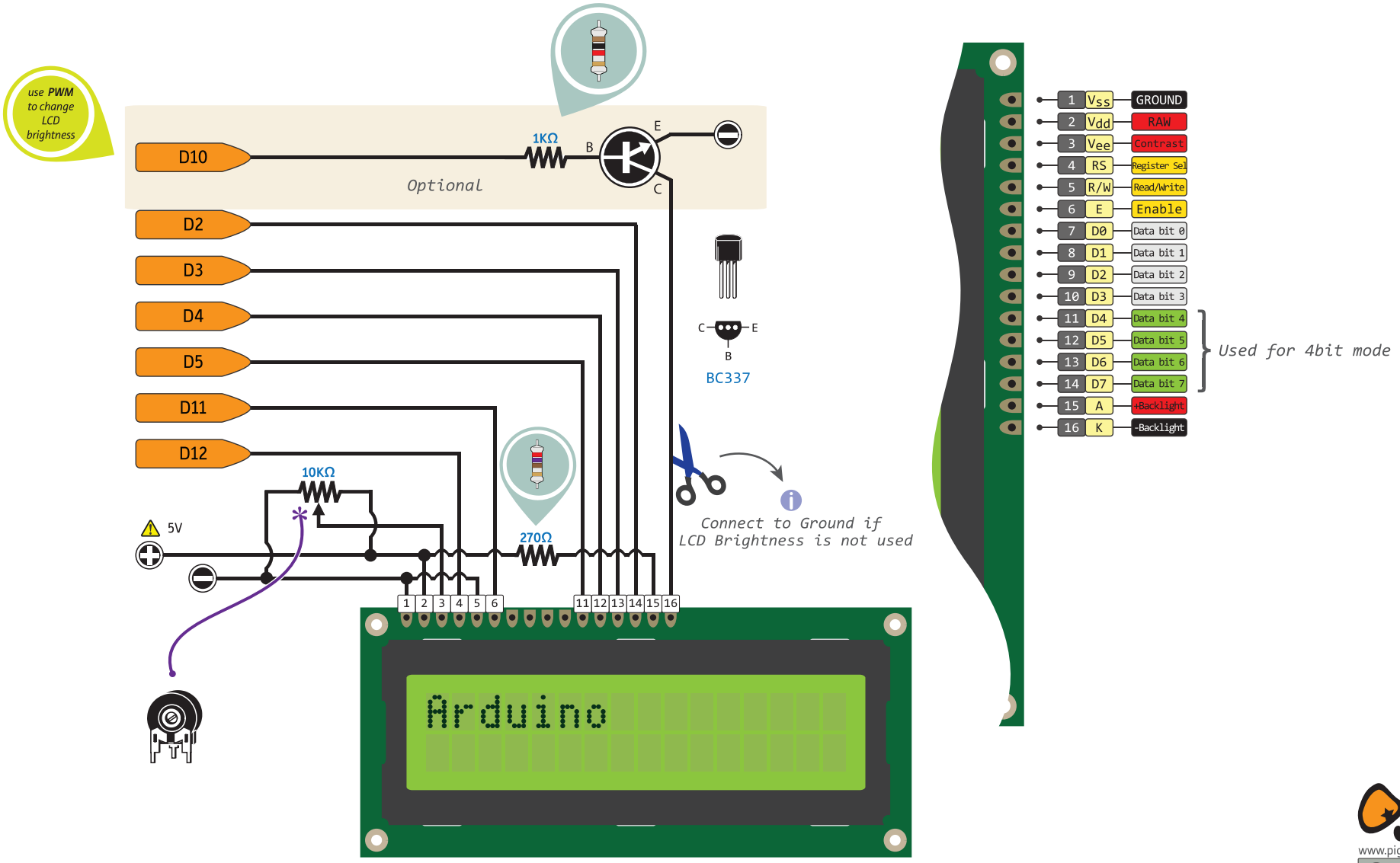
Connect a LCD HITACHI 44780 compatible



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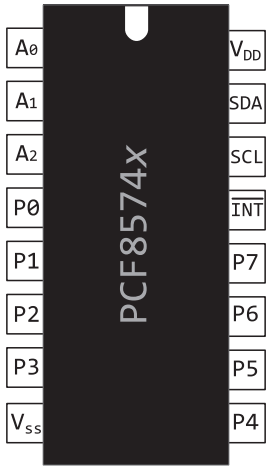
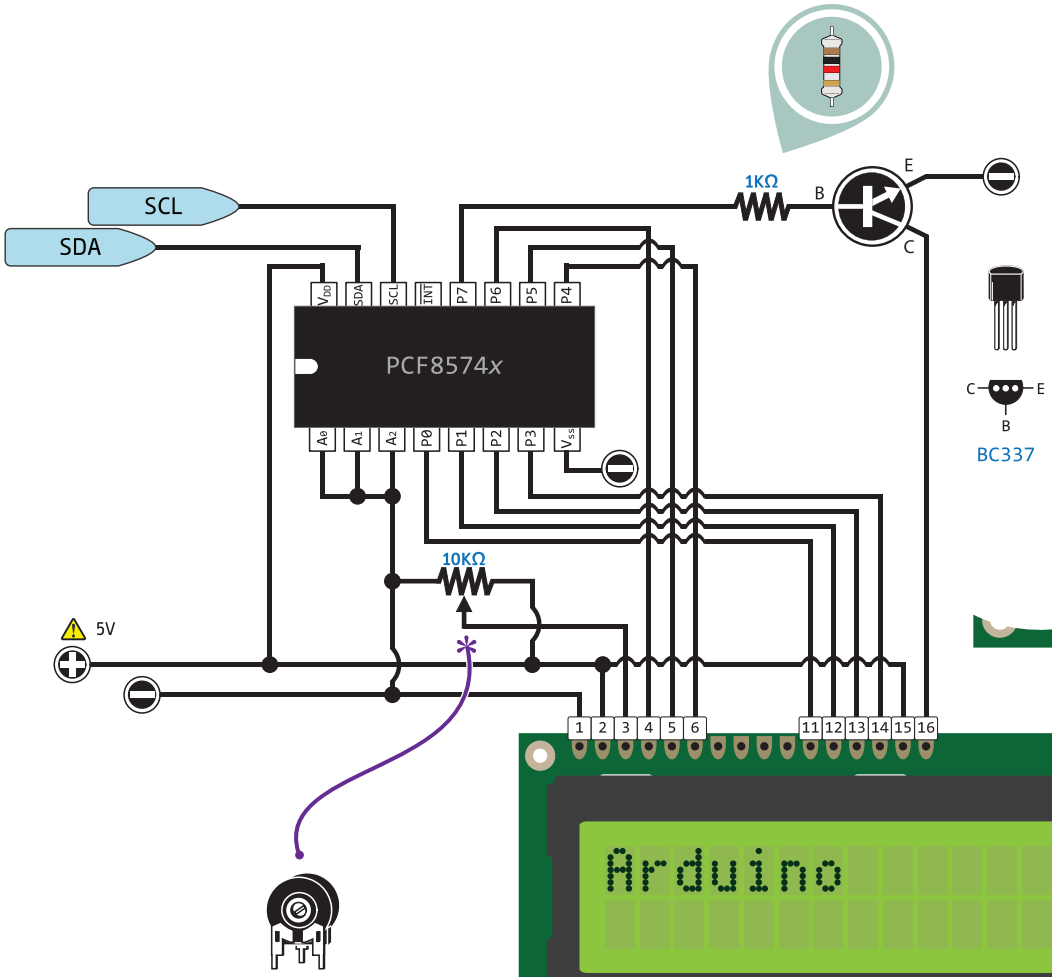
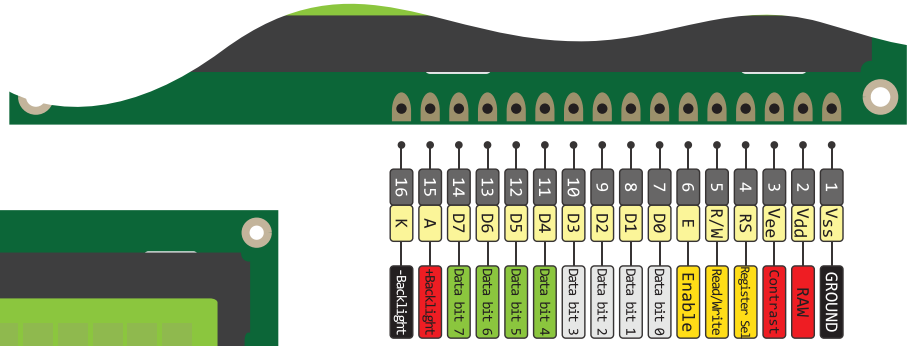
Connect via I2C a LCD HITACHI 44780 compatible







Used for 4bit mode

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Connect a NOKIA LCD (Basic)

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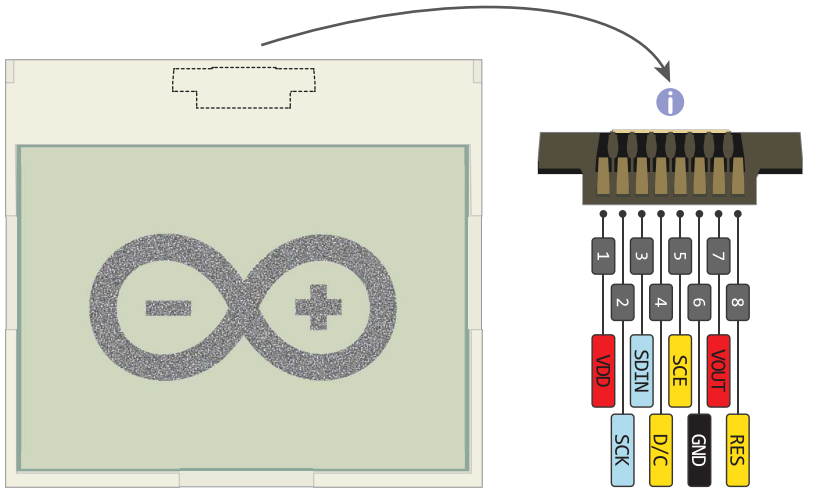
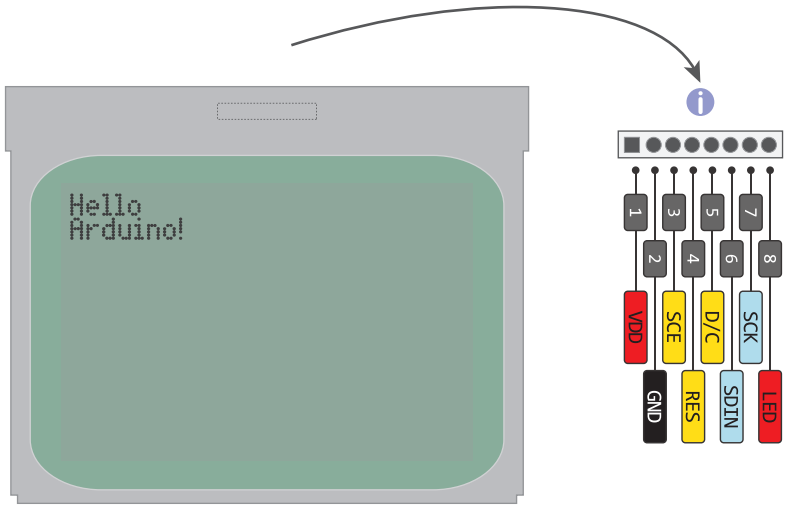
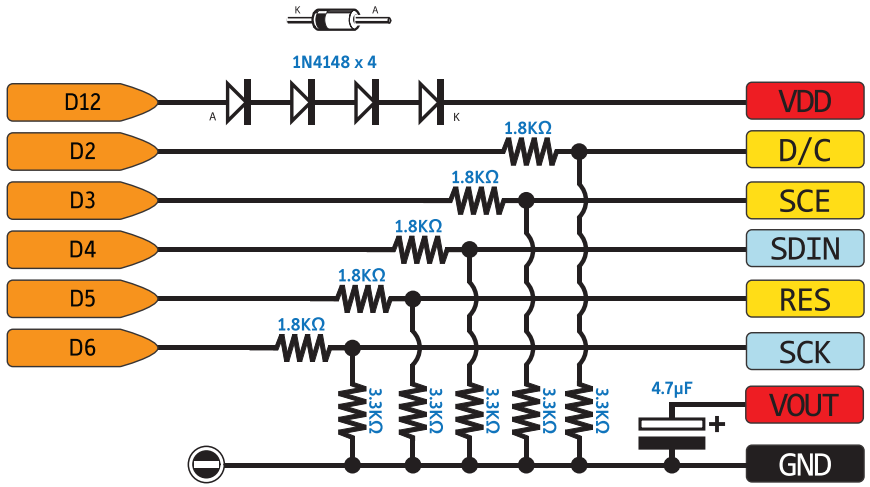
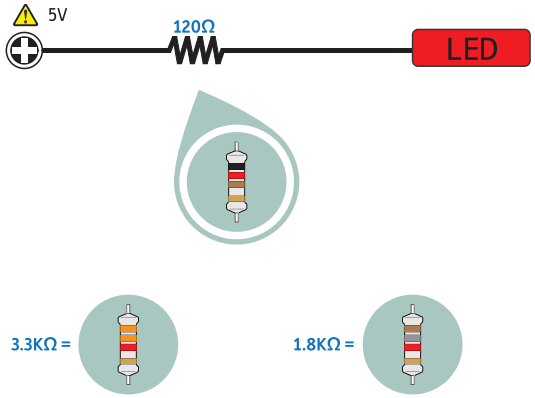


NOKIA 3110



NOKIA 5110





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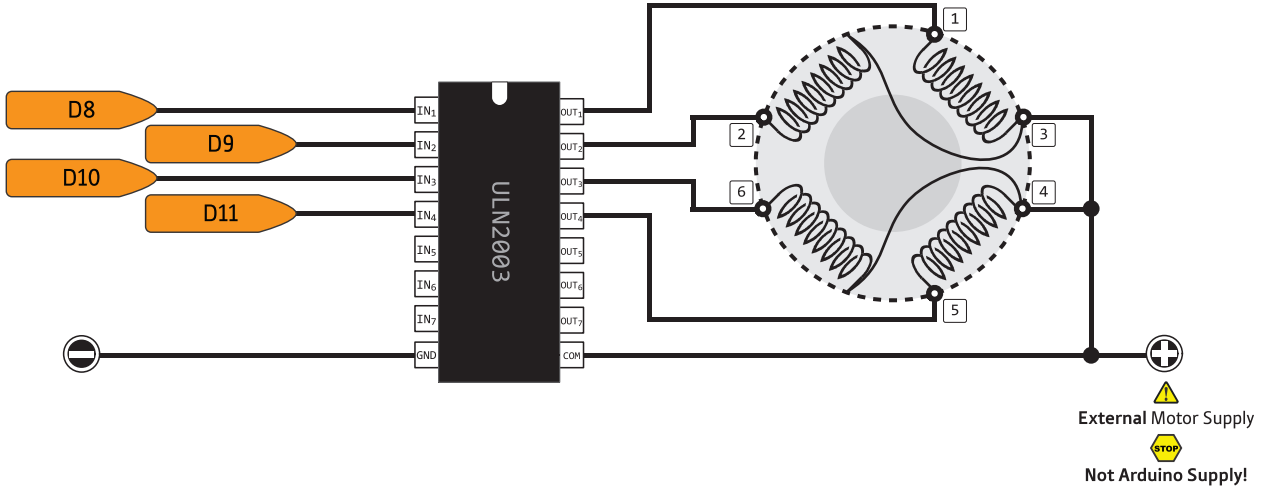
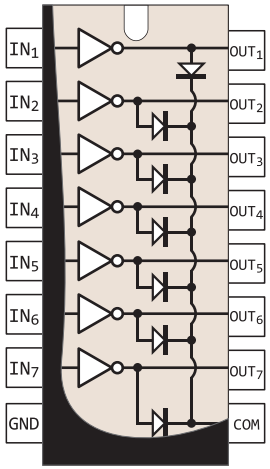
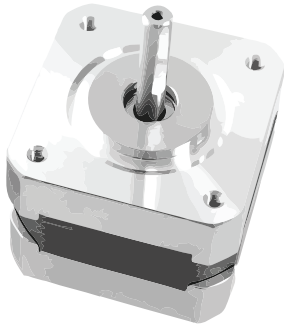
Drive a Unipolar Stepper (Basic 1)

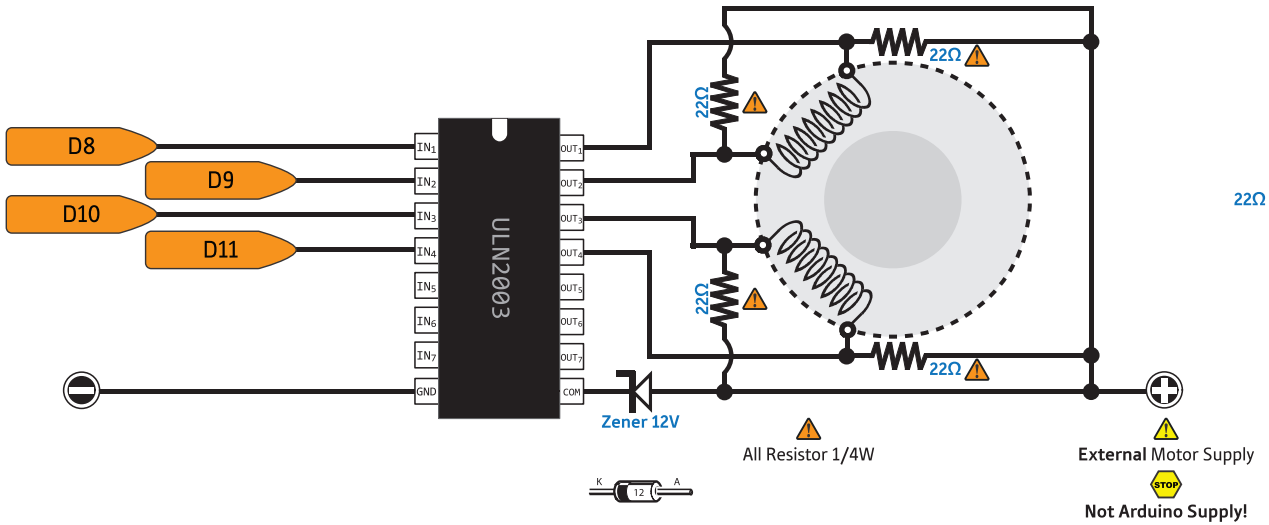




ULN2003



Drive a Bipolar Stepper (Basic 1)



22Ω =

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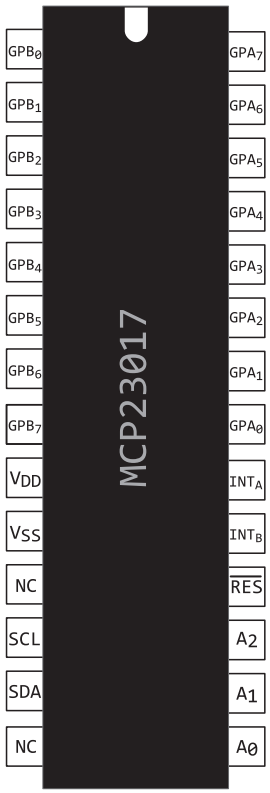
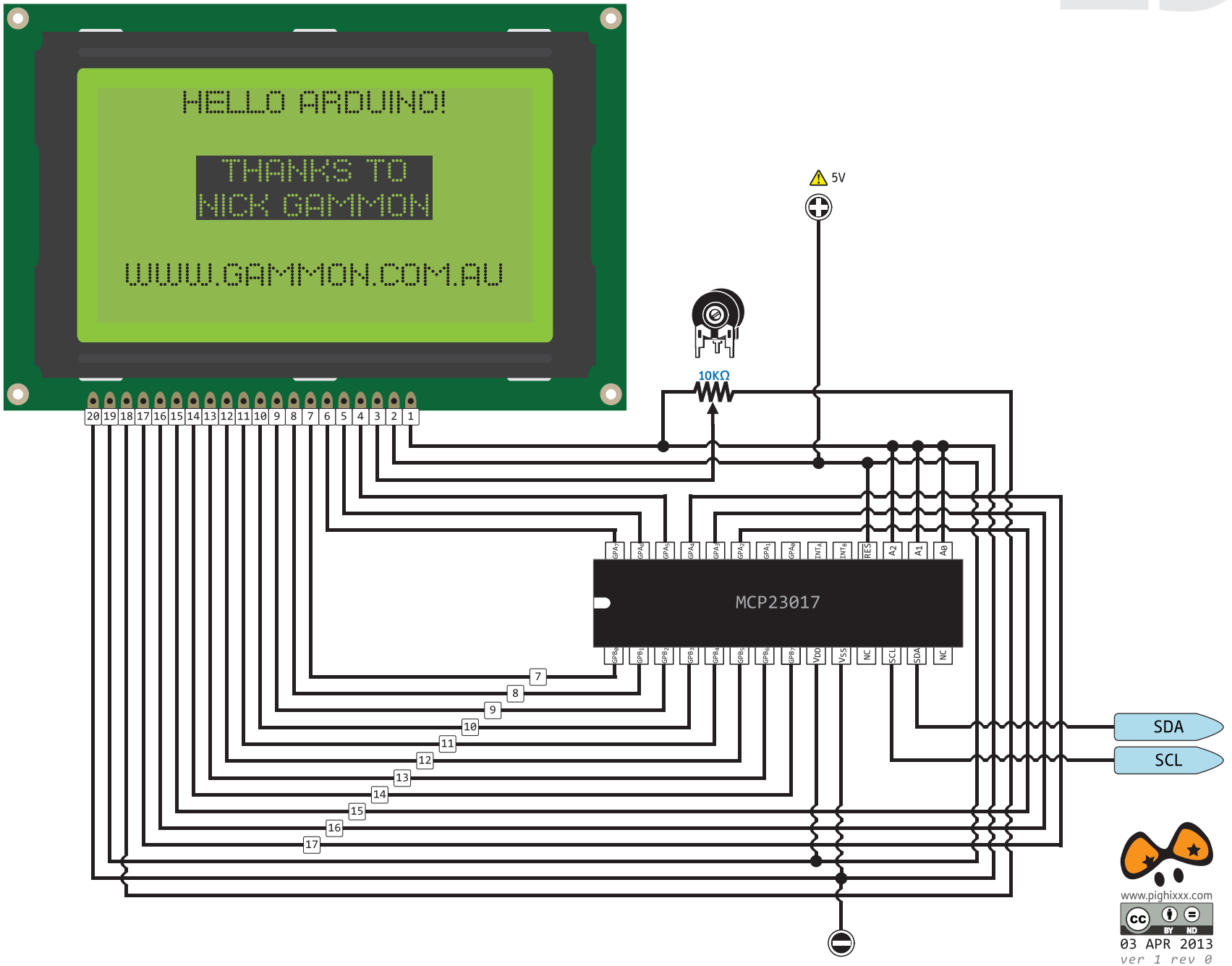
Connect a graphical LCD via I2C





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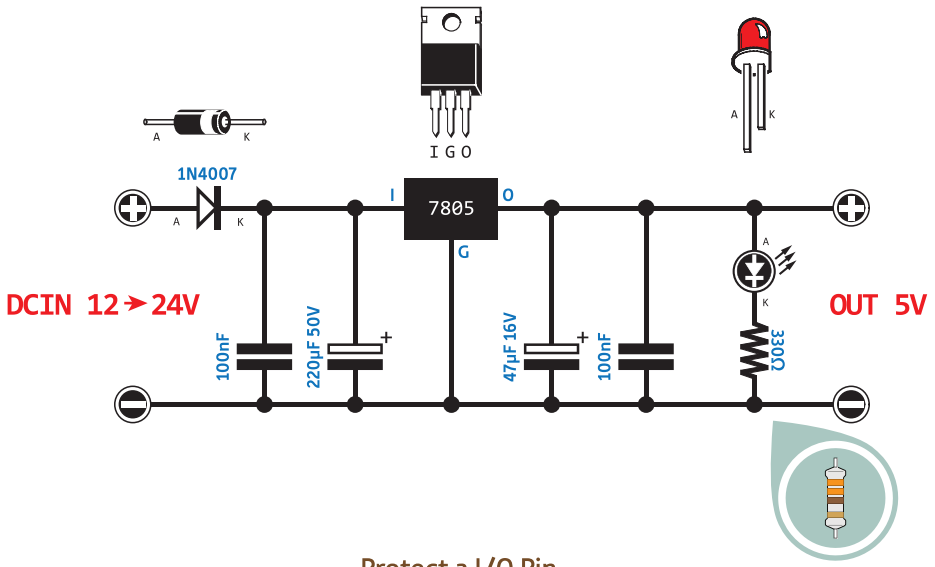
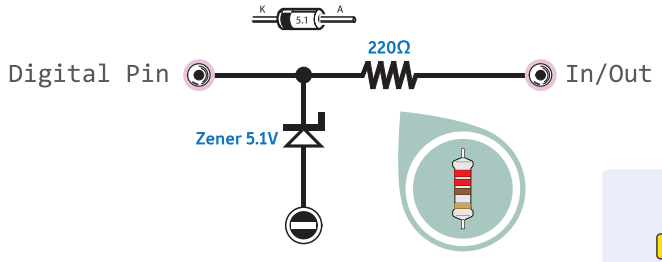
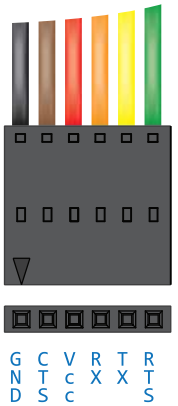
Simple 5V Power Supply



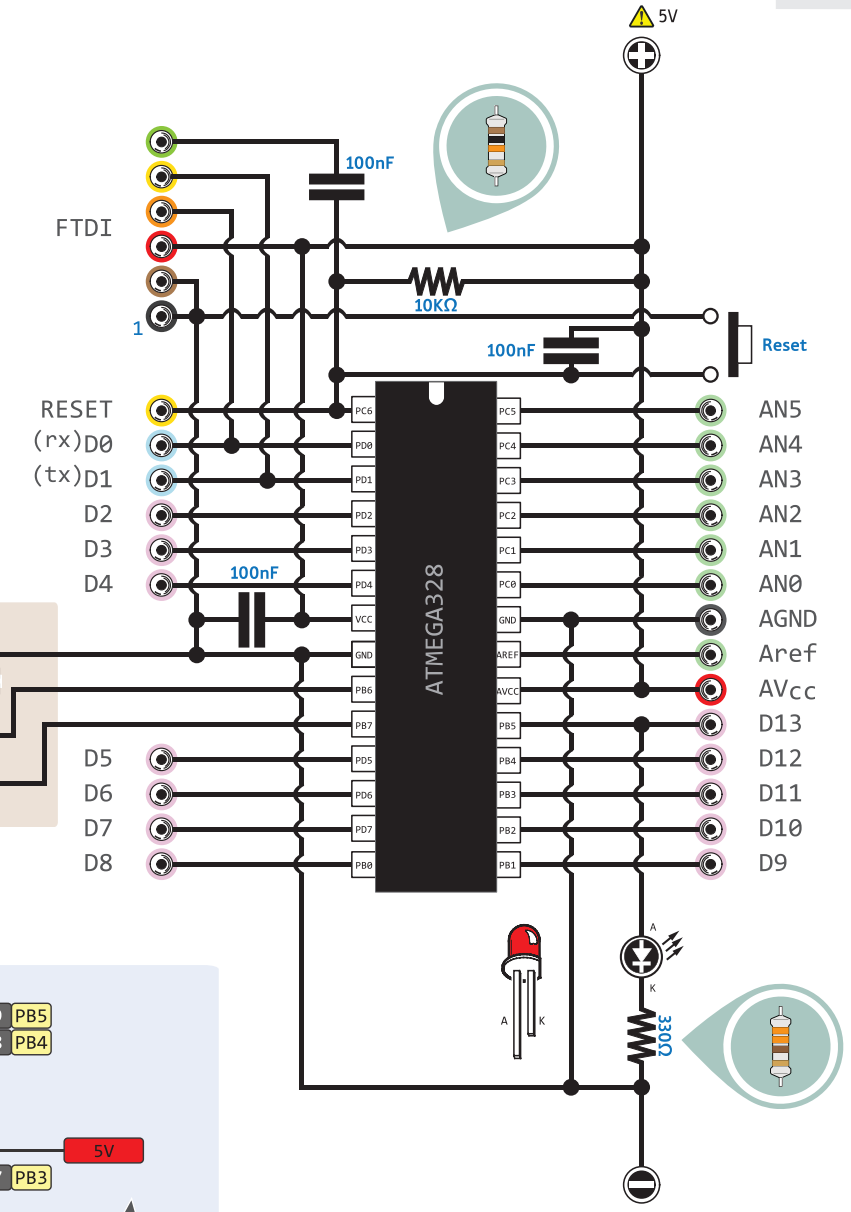
Protect a I/O Pin

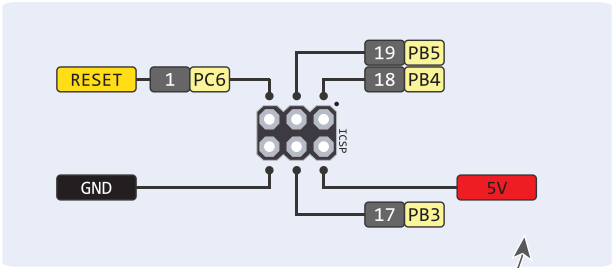


FTDI Connector



DIY Arduino





Recommended ICSP pinout

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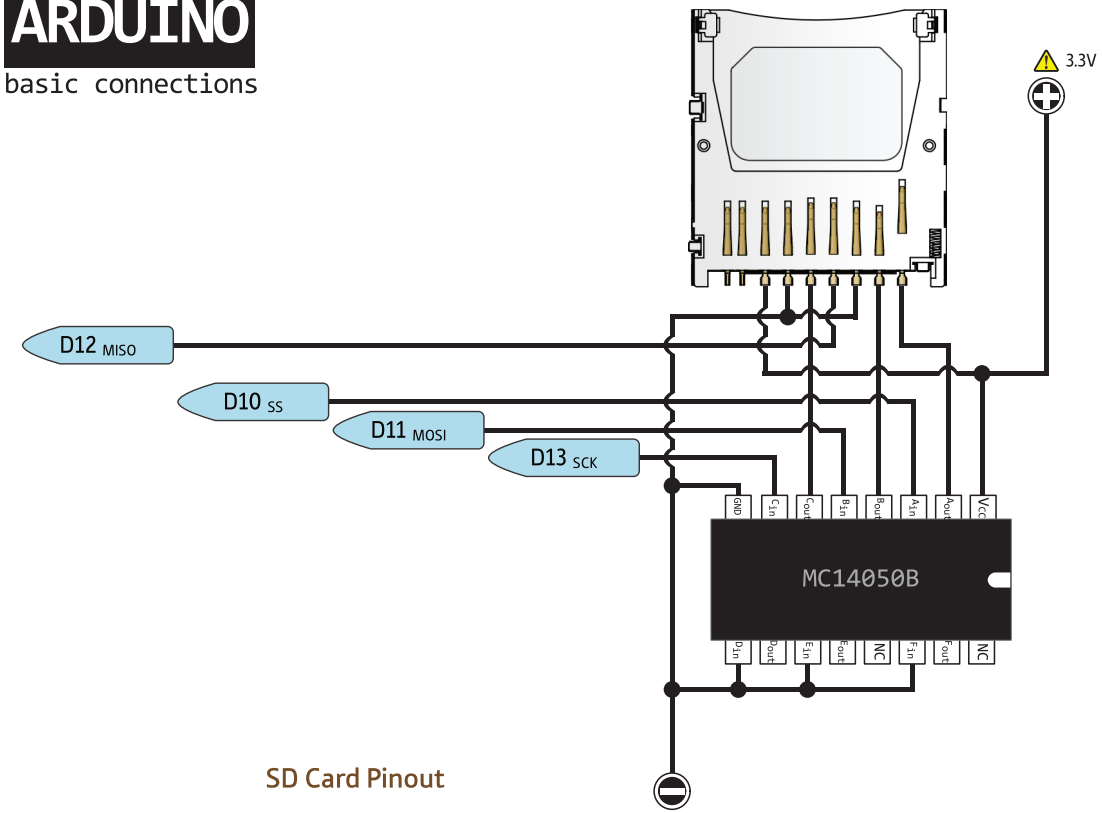
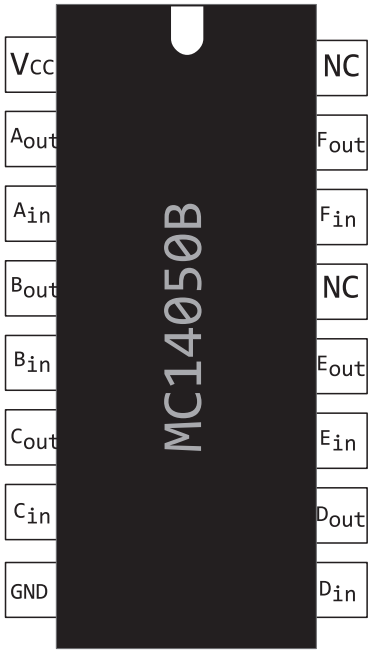
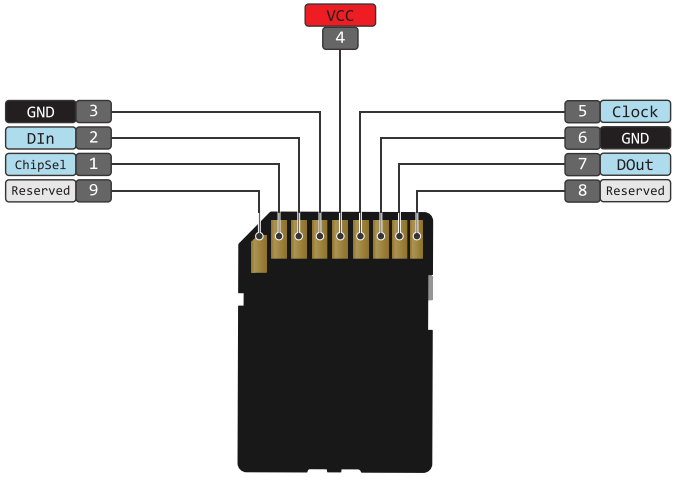
Connect a SD Card



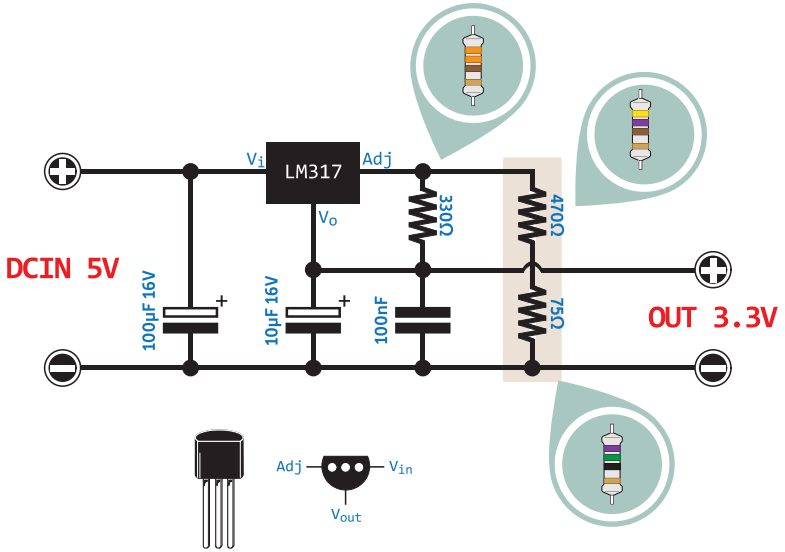


SD Card Pinout



⚠ *Only for 5V Arduino*

Simple 3.3V Power Supply



LM317 (TO-92)

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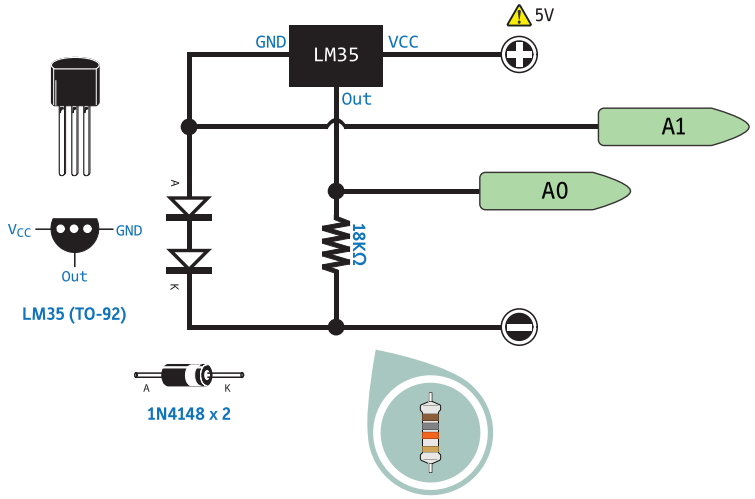
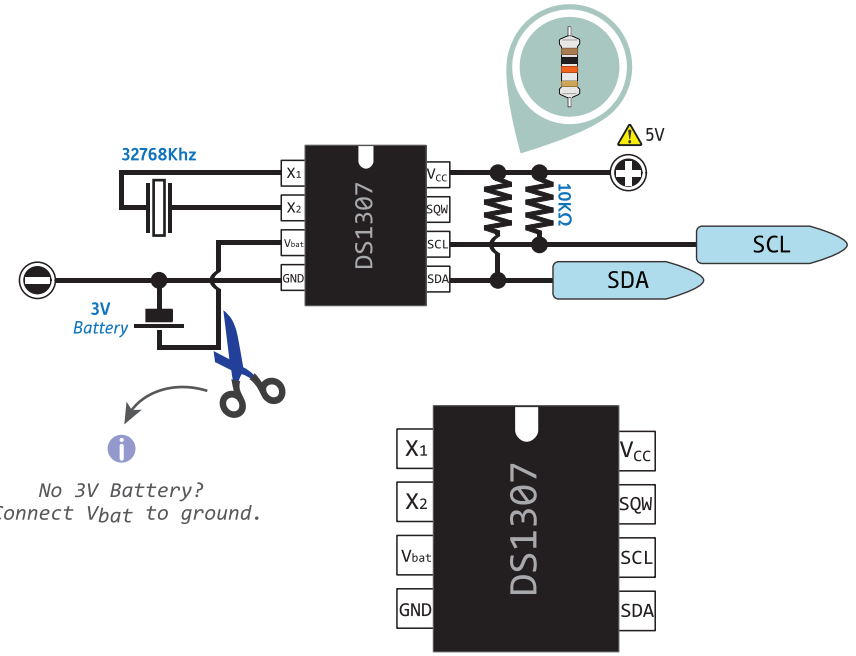
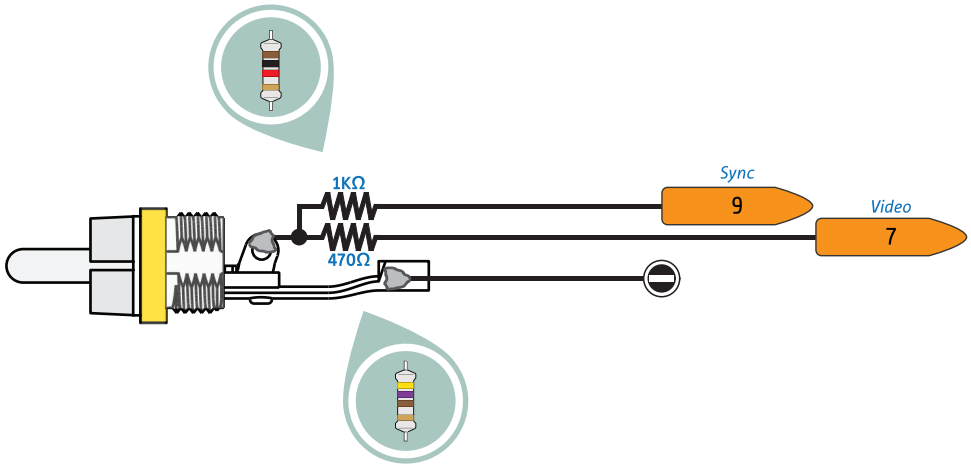
Connect a Temperature Sensor (LM35)



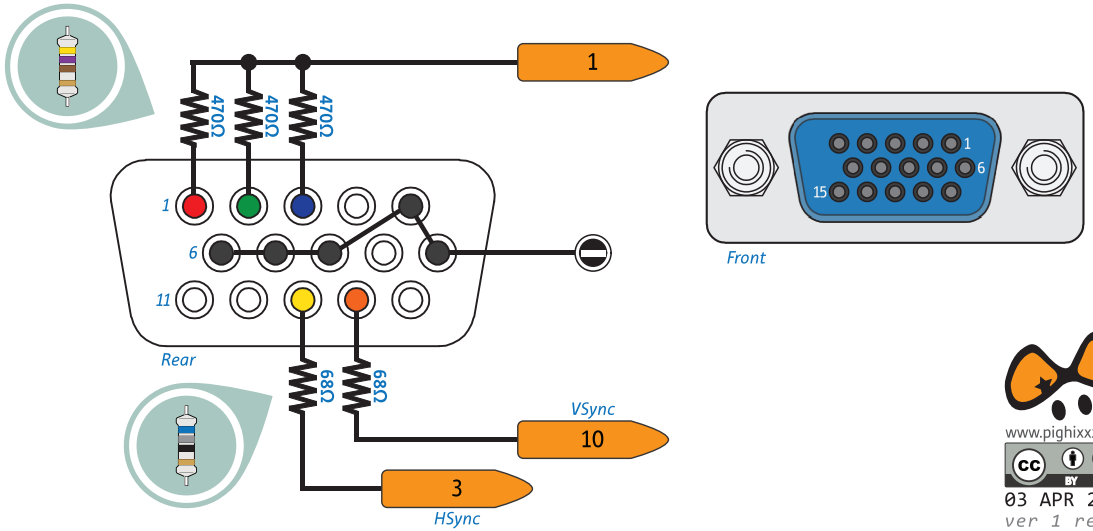
Connect a RTC (DS1307)



Connect to Composite Video



Connect to VGA



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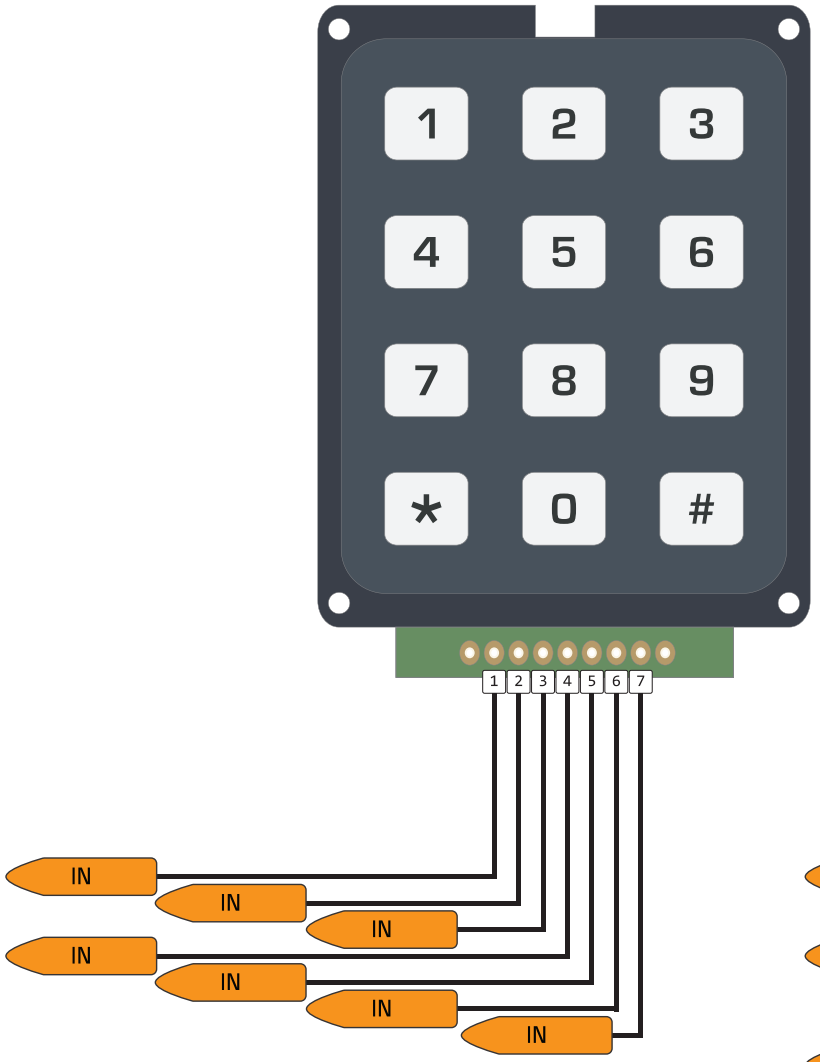
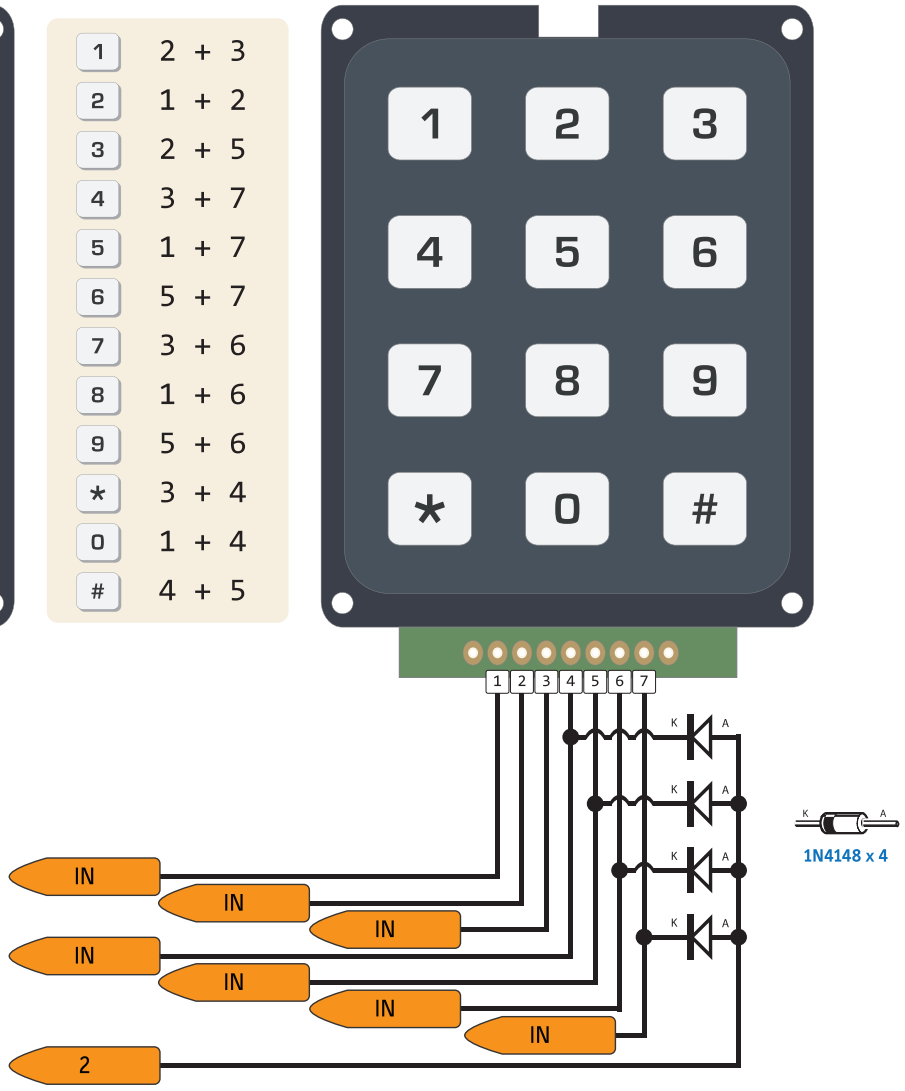
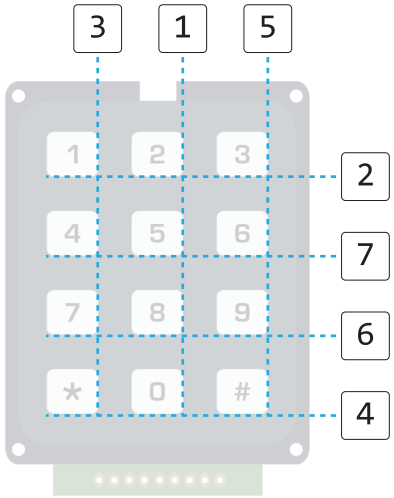
Connect a Keypad



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)





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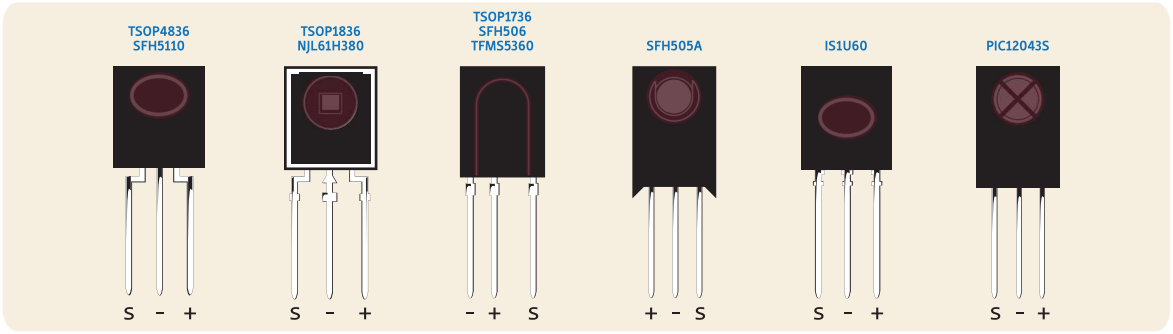
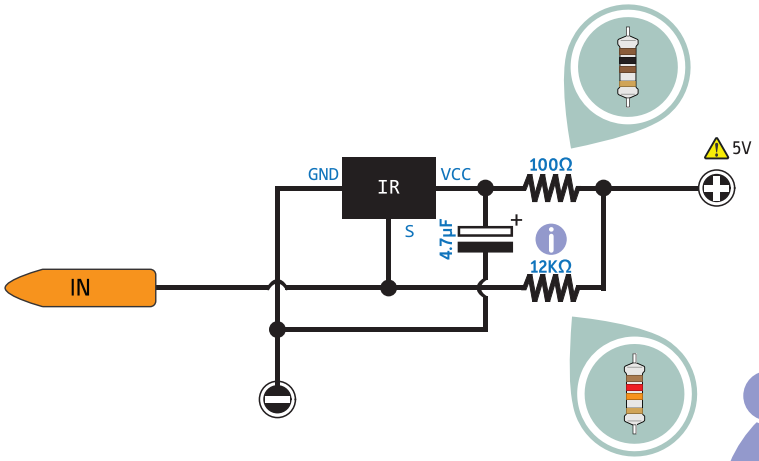
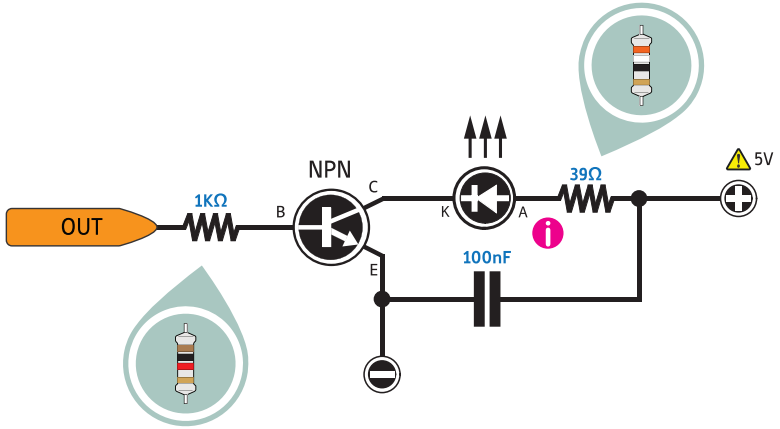
Connect a IR Sensor

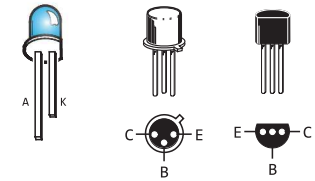




Reccomended to suppress power supply disturbances

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

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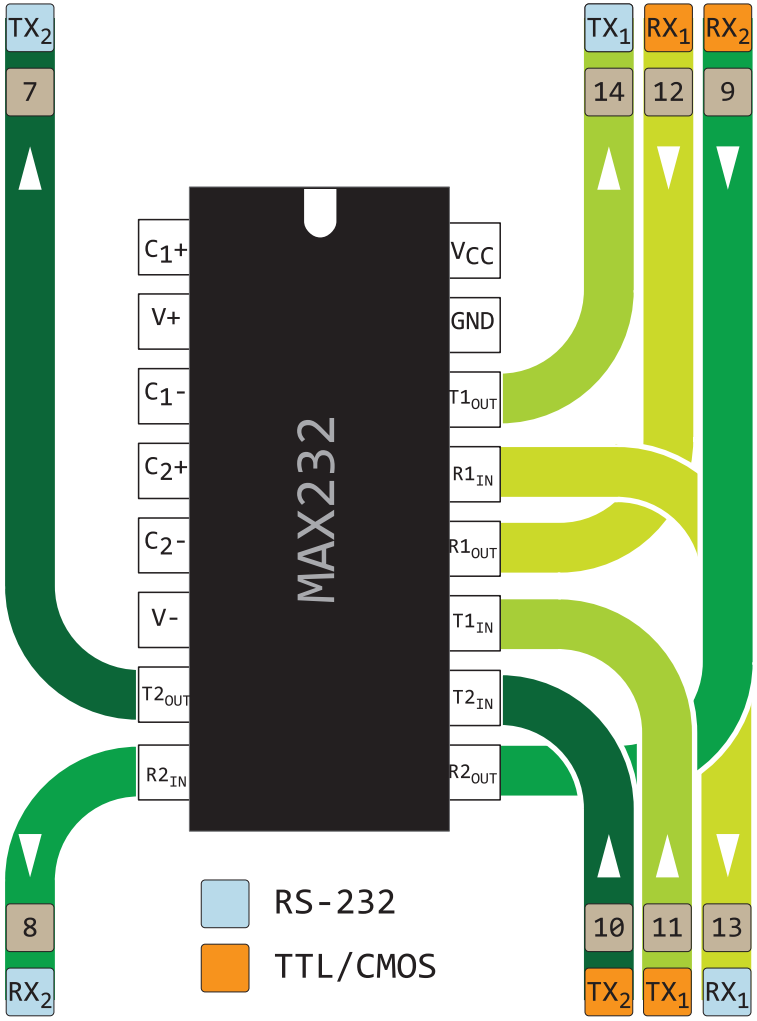
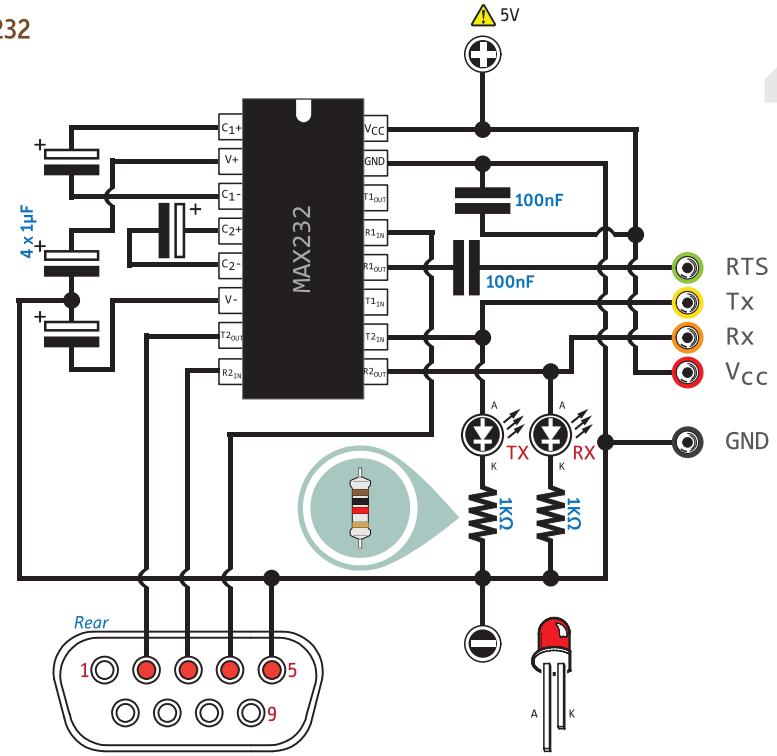
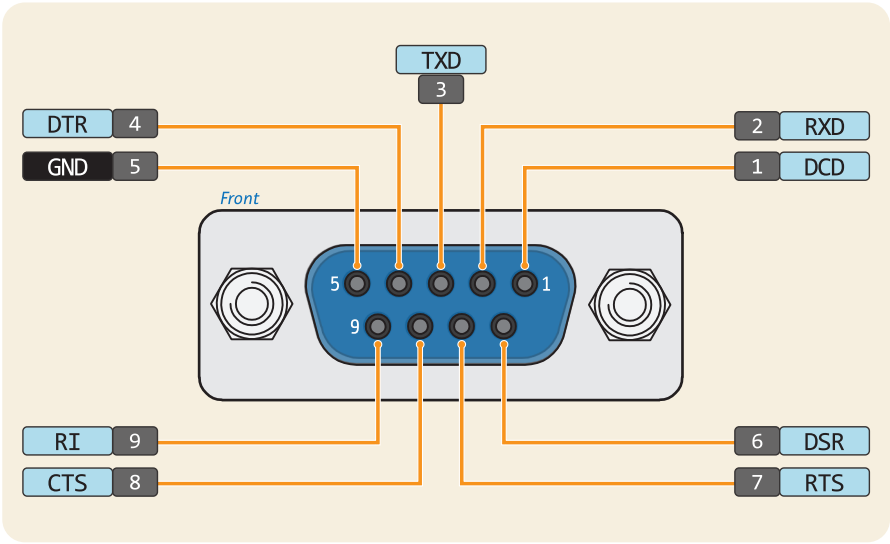


Connect a MAX232





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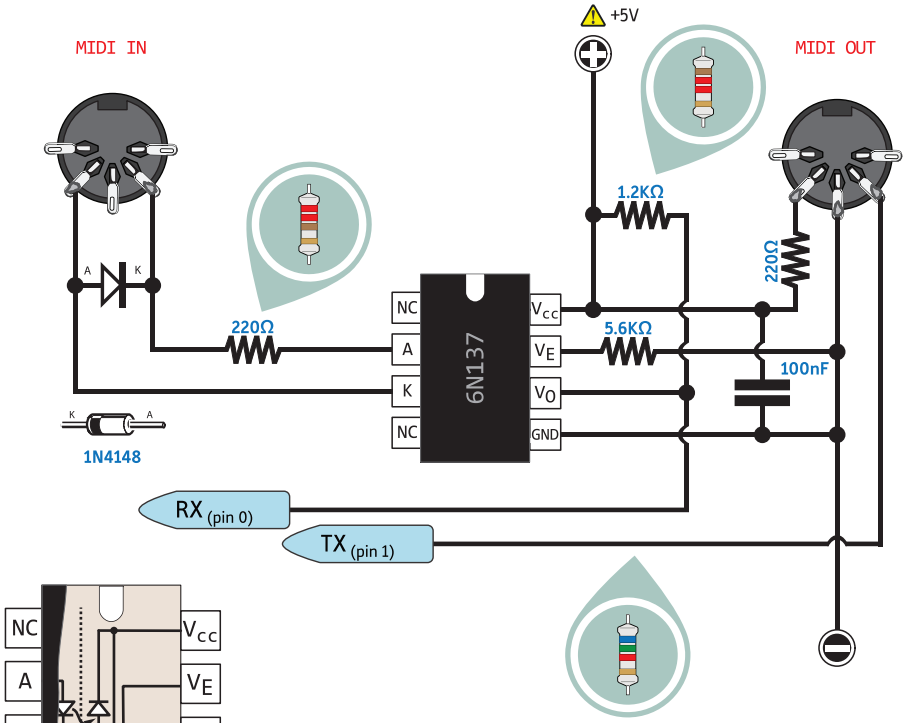
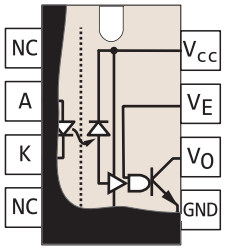
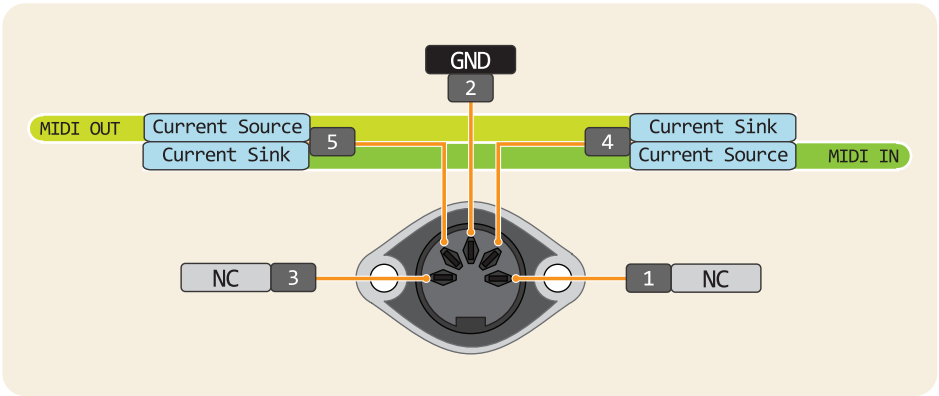
MIDI Interface

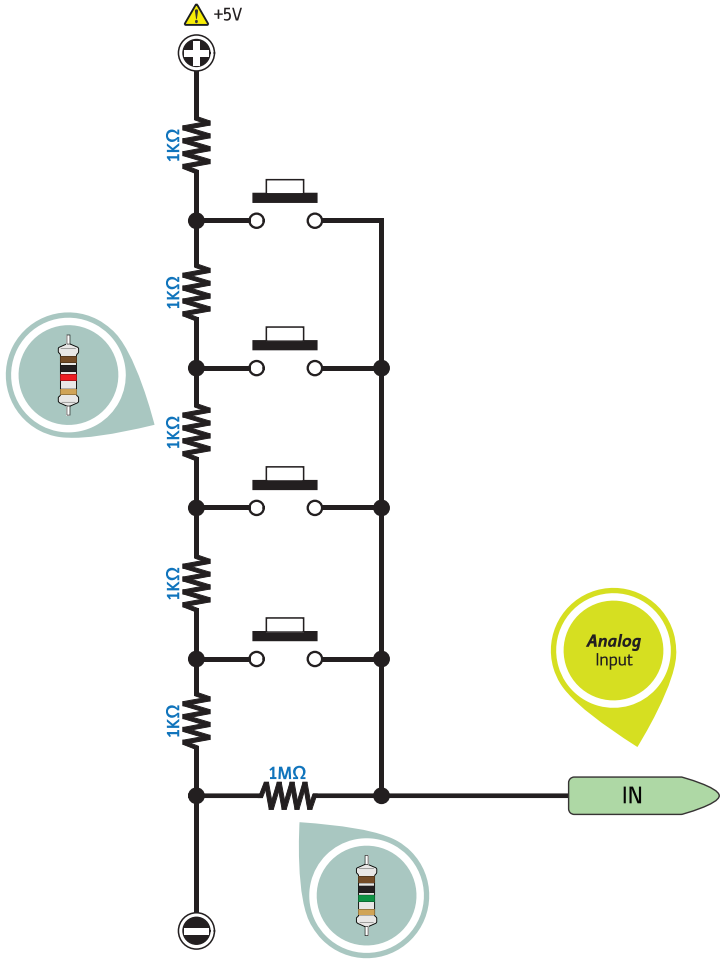




6N137



Multiple Buttons using 1 Analog Input



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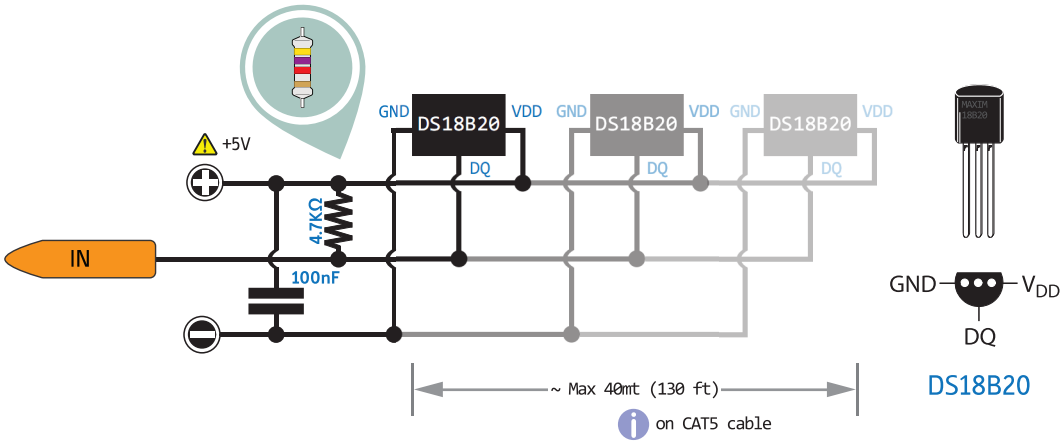
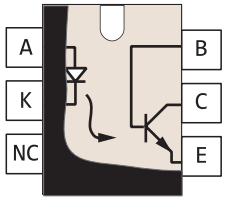
Connect a Digital Temperature Sensor (DS18B20)



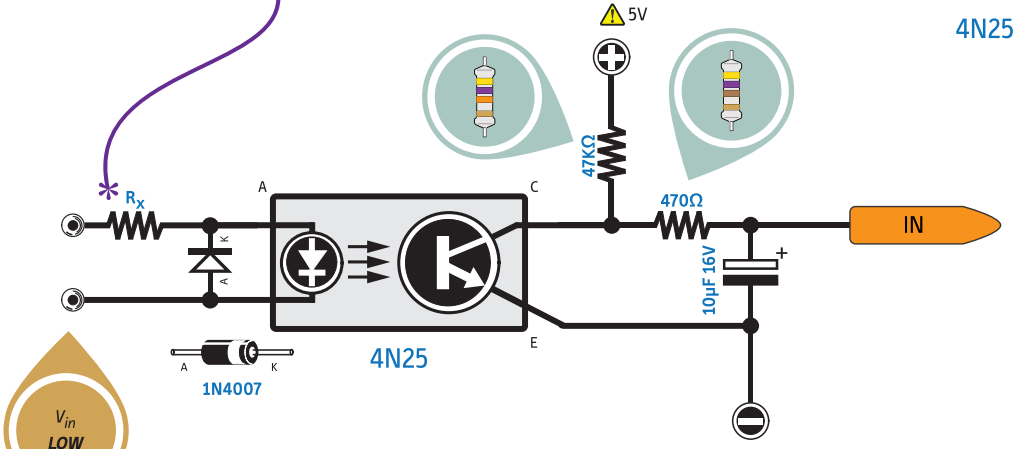
DS18B20

AC input

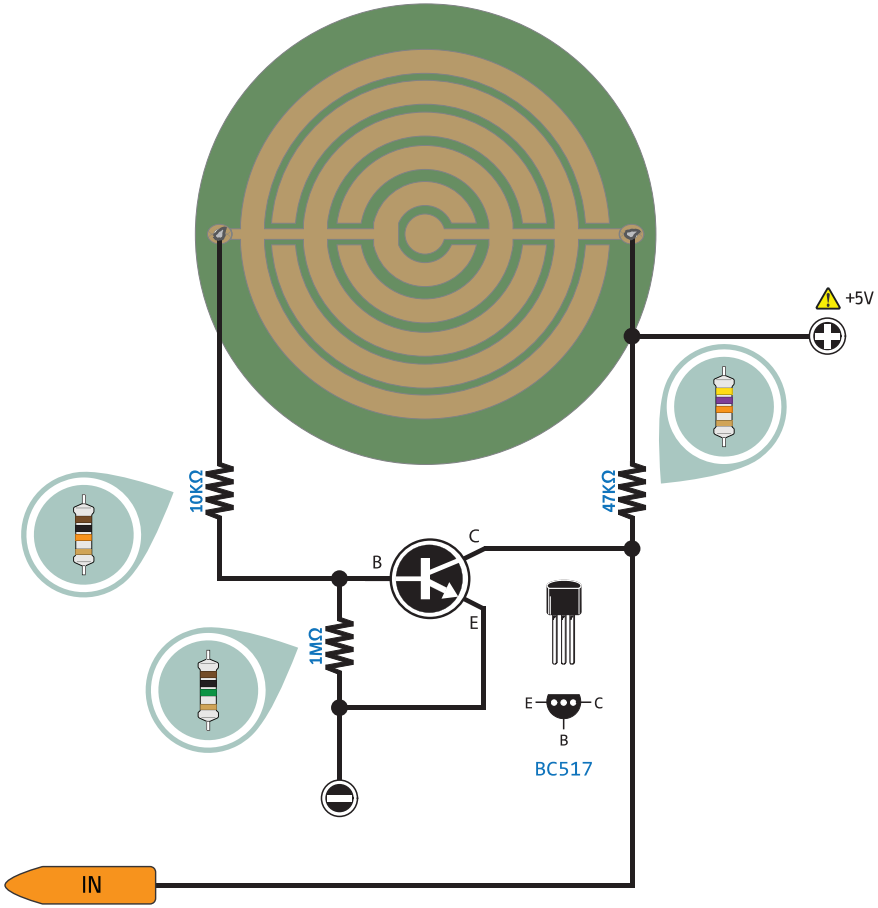
Volt$_{in}$	Resistor Value
12	470Ω
24	1KΩ
48	2.2KΩ



4N25



A simple Rain Sensor with Arduino



BC517

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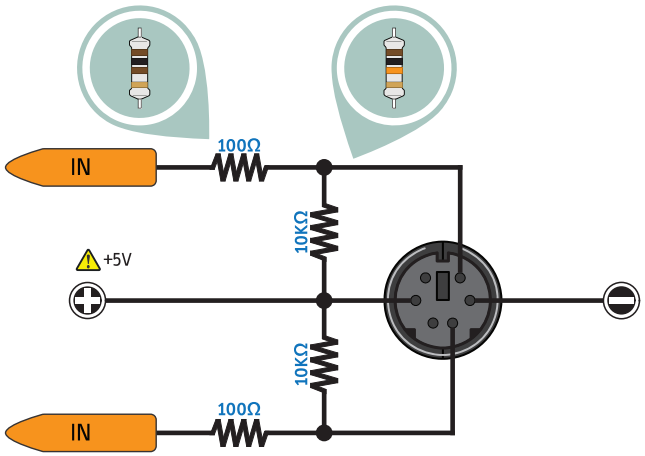
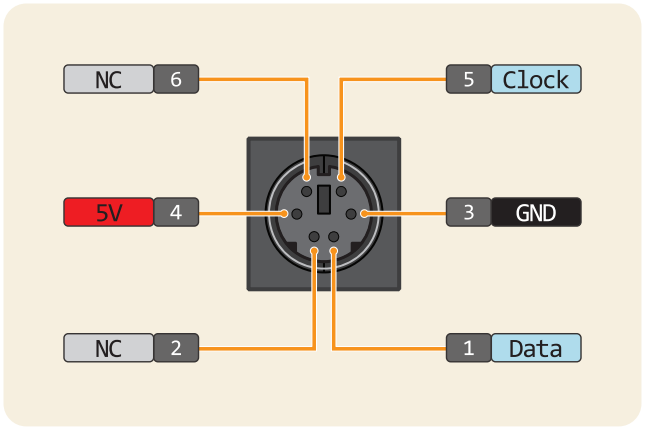
Connect a PS2 Keyboard





Scan Codes

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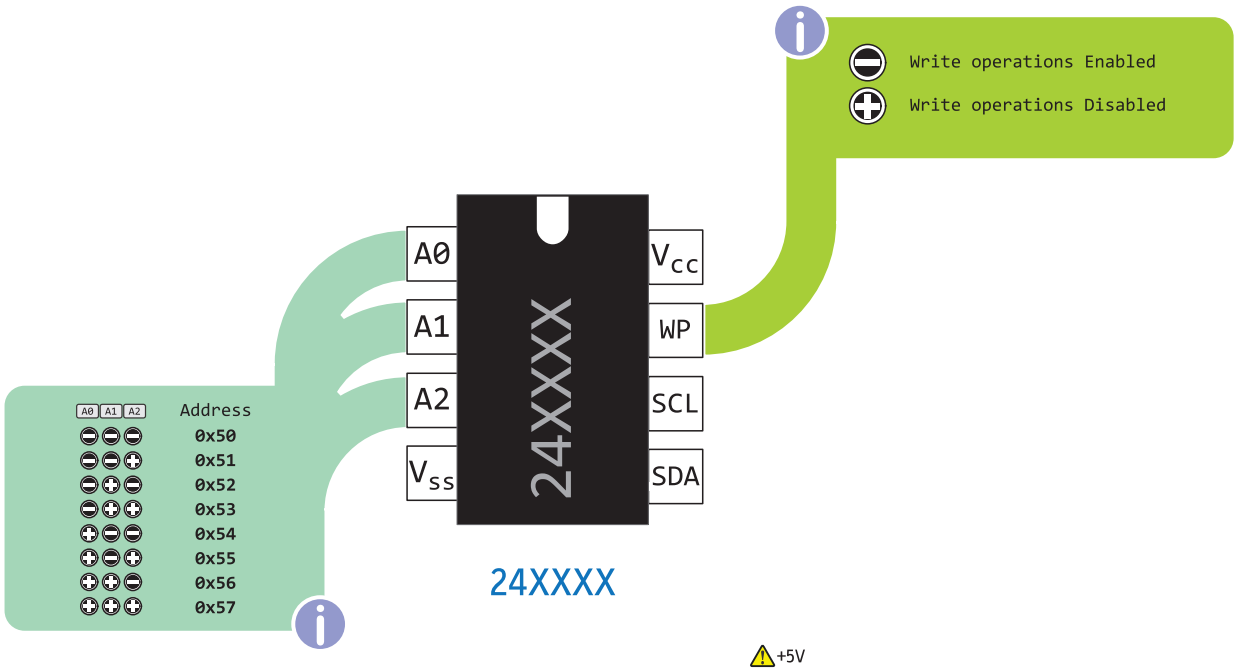
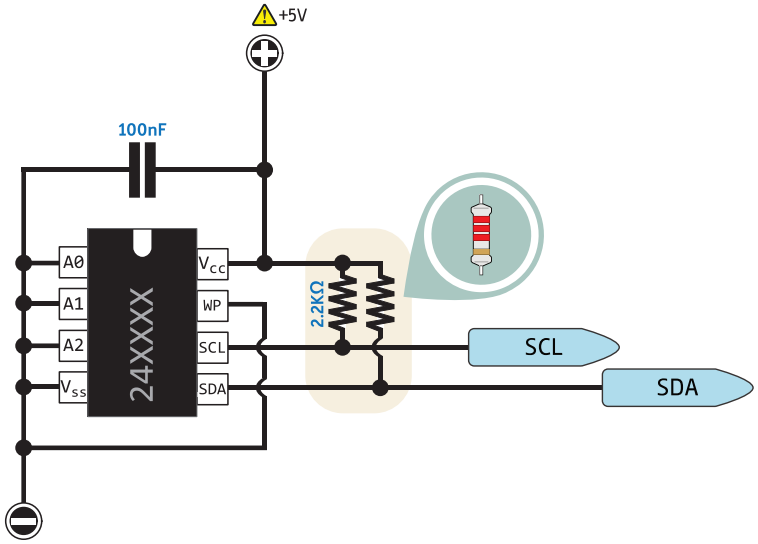
Connect a EEPROM via I2C



24XXXX



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

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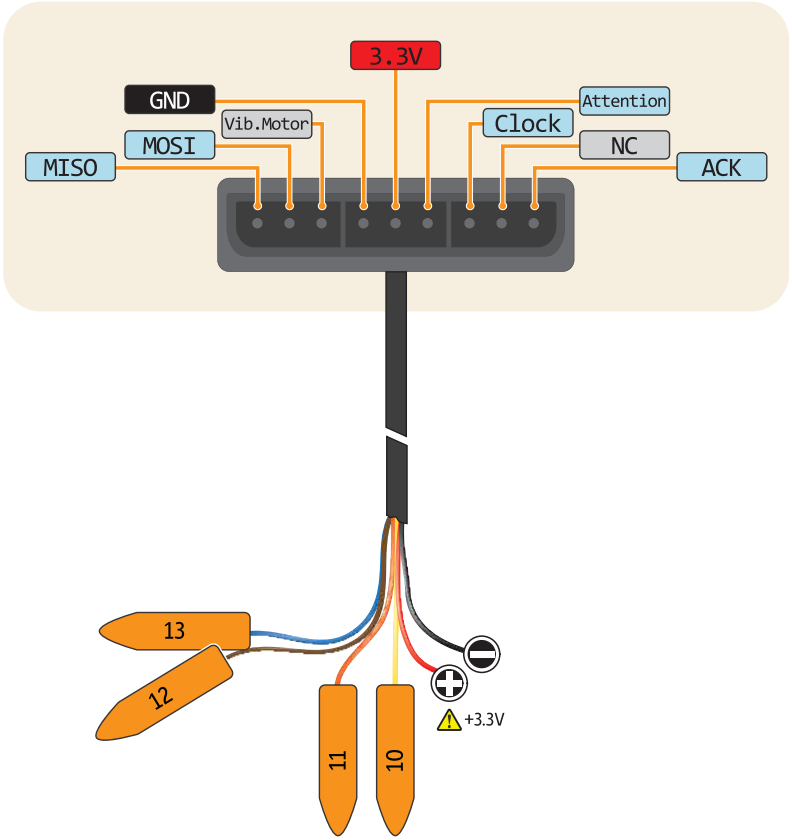
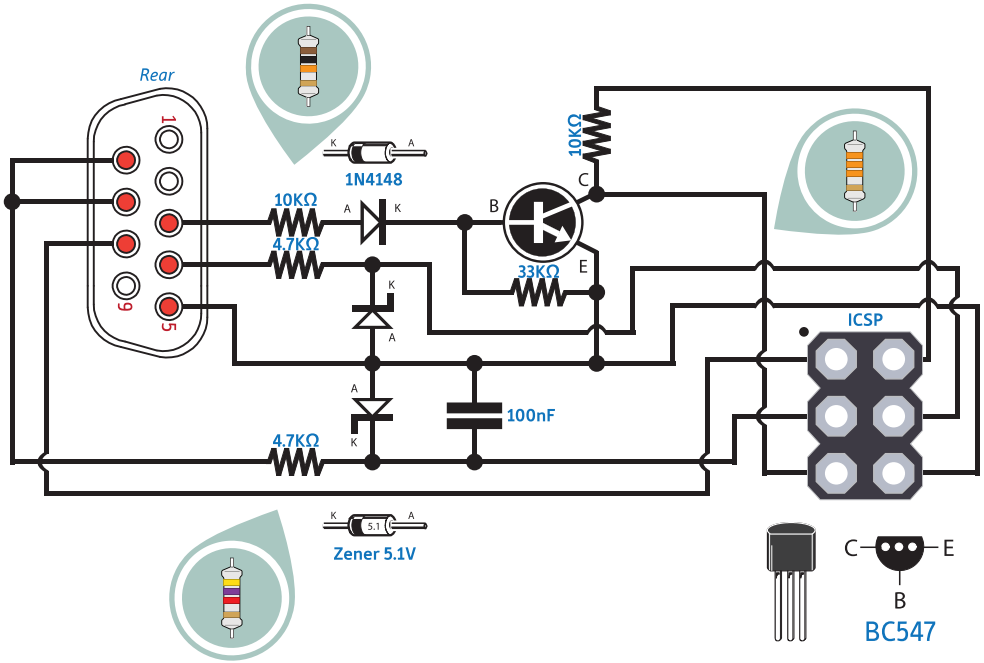
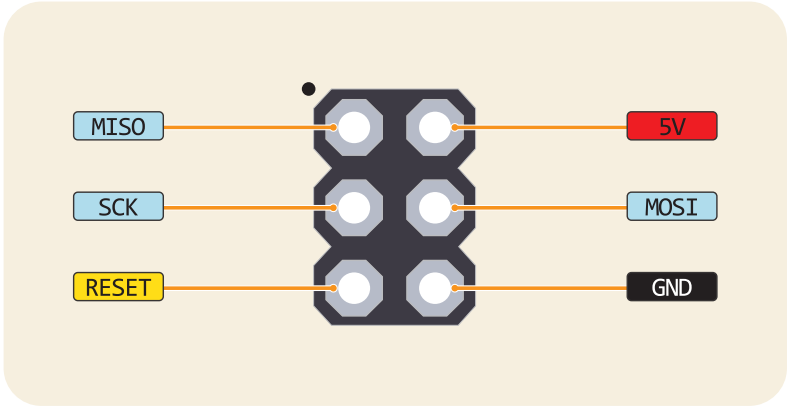
Connect a PS2 Dualshock® controller



A Simple programmer





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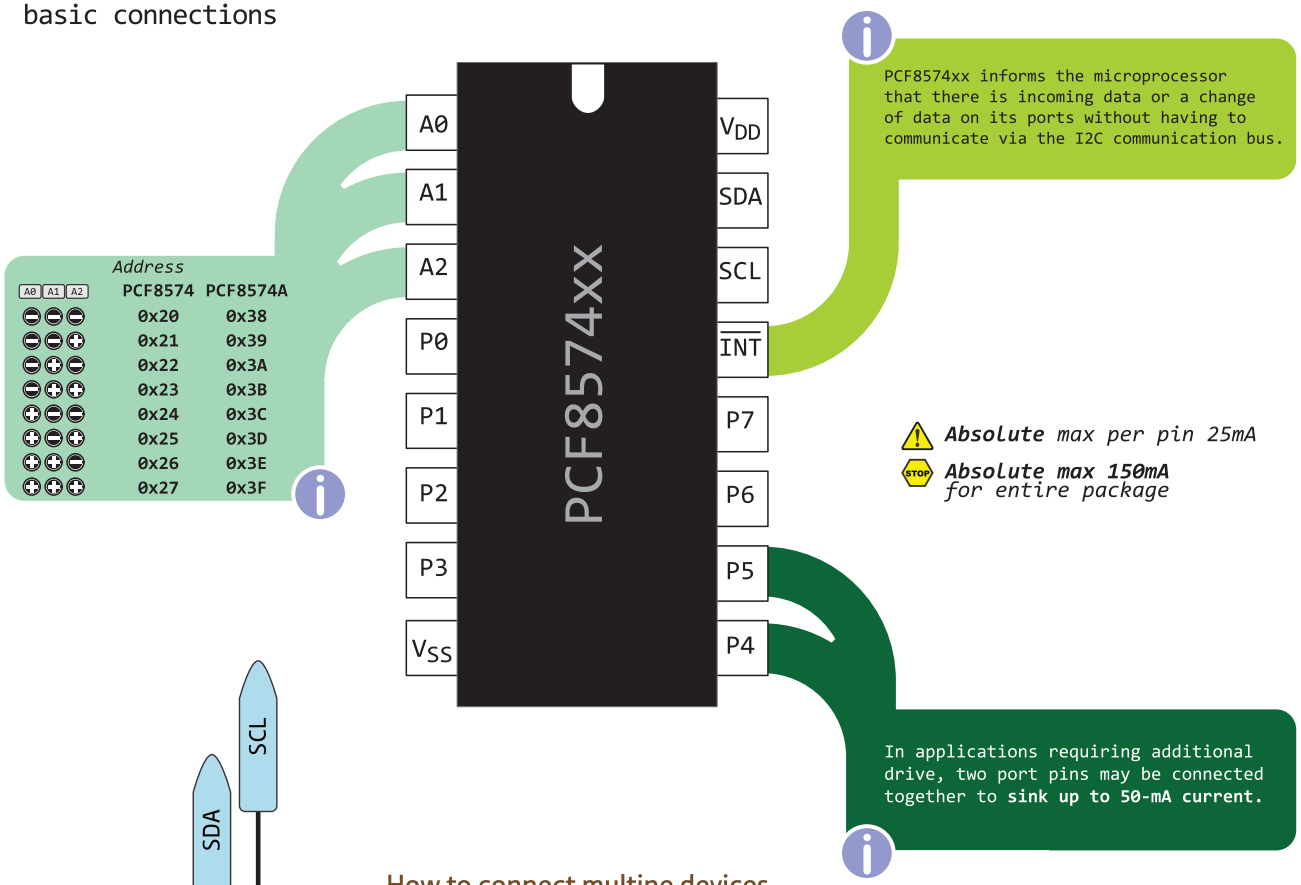
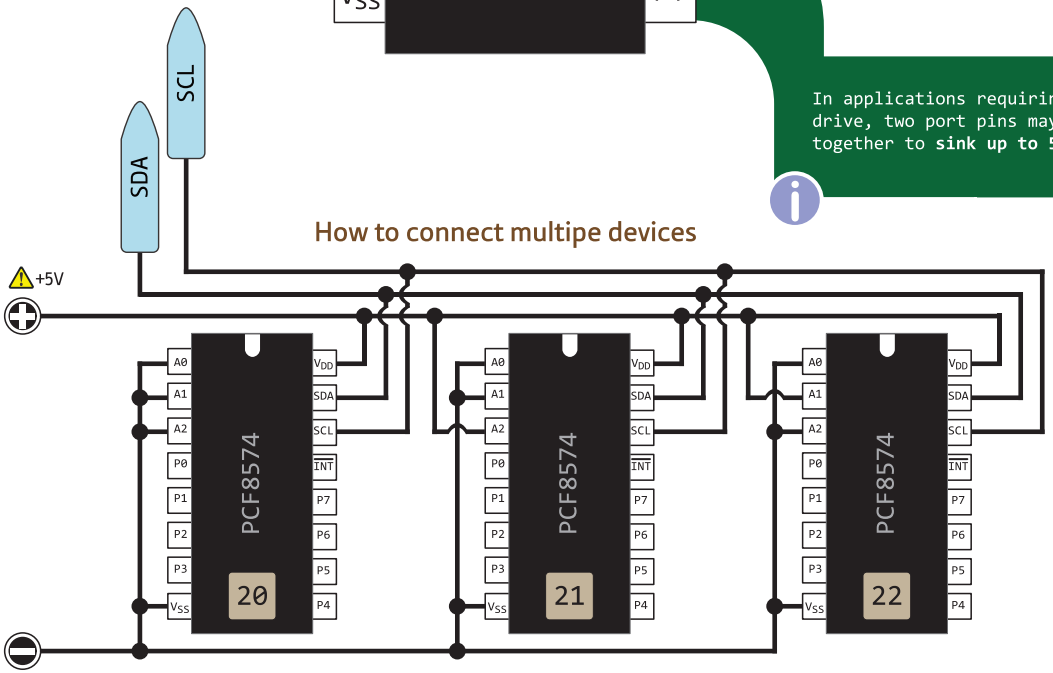
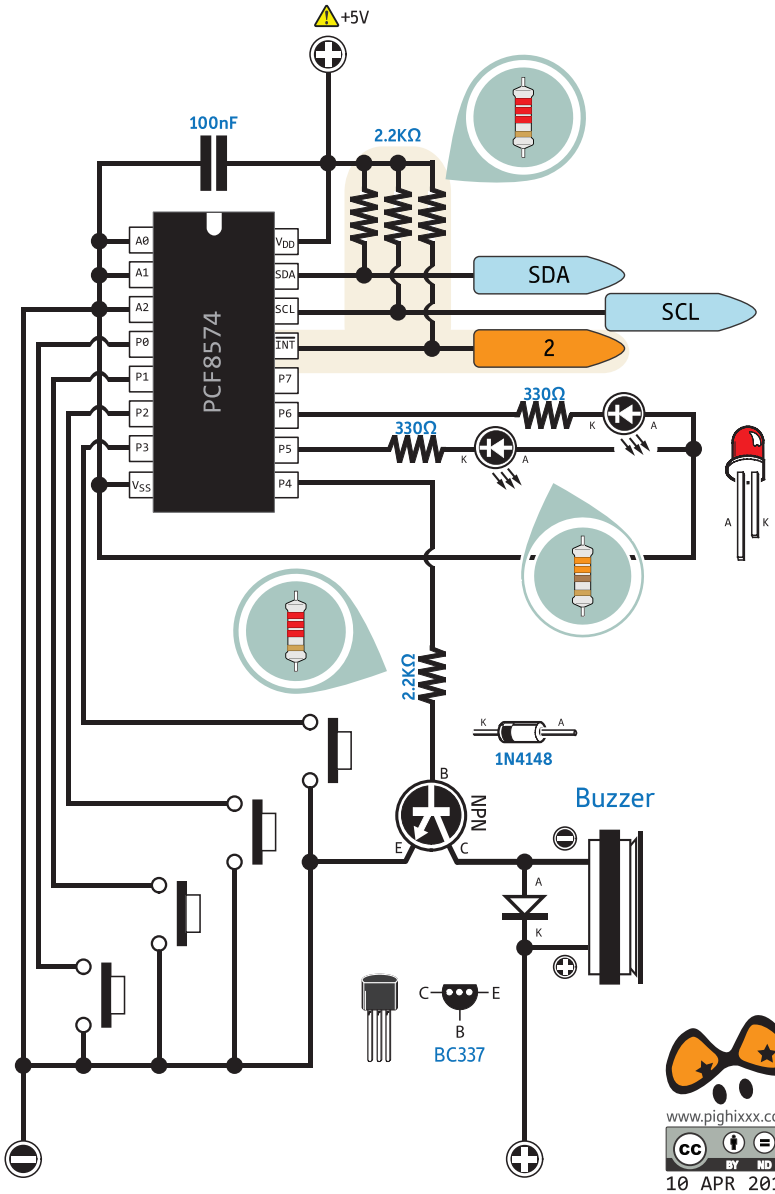
Port Expander (PCF8574xx)



How to connect multipe devices



A typical Application



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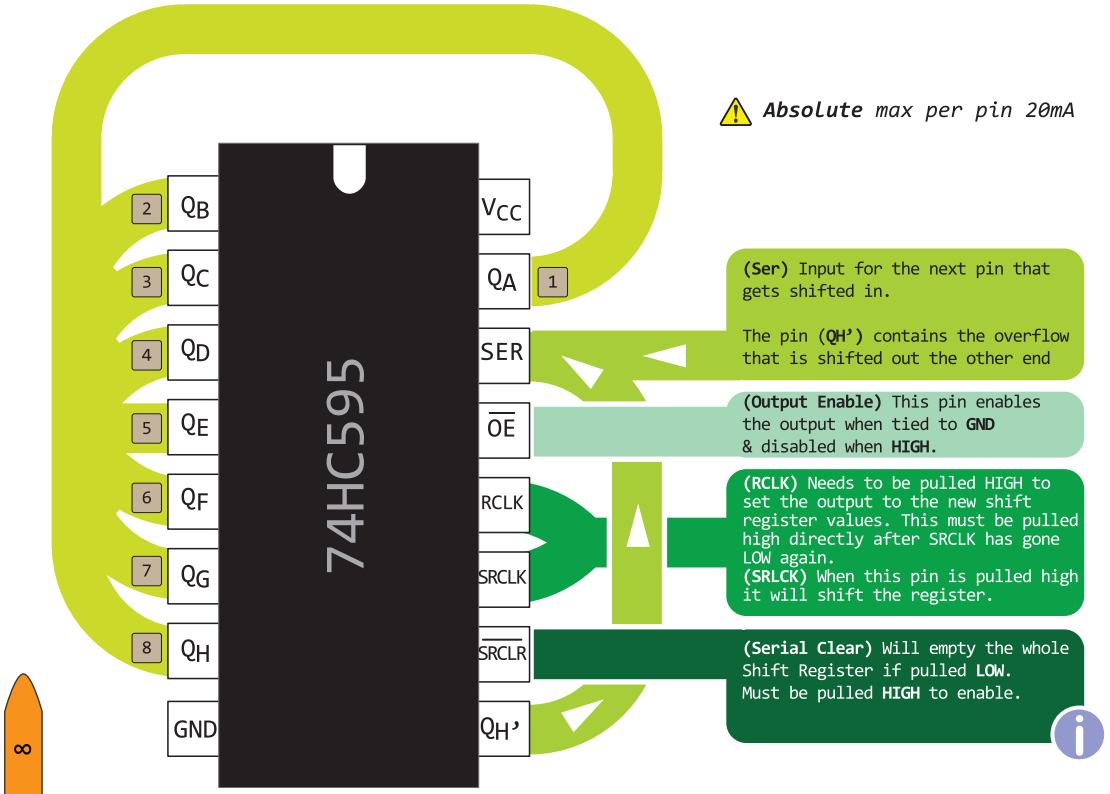
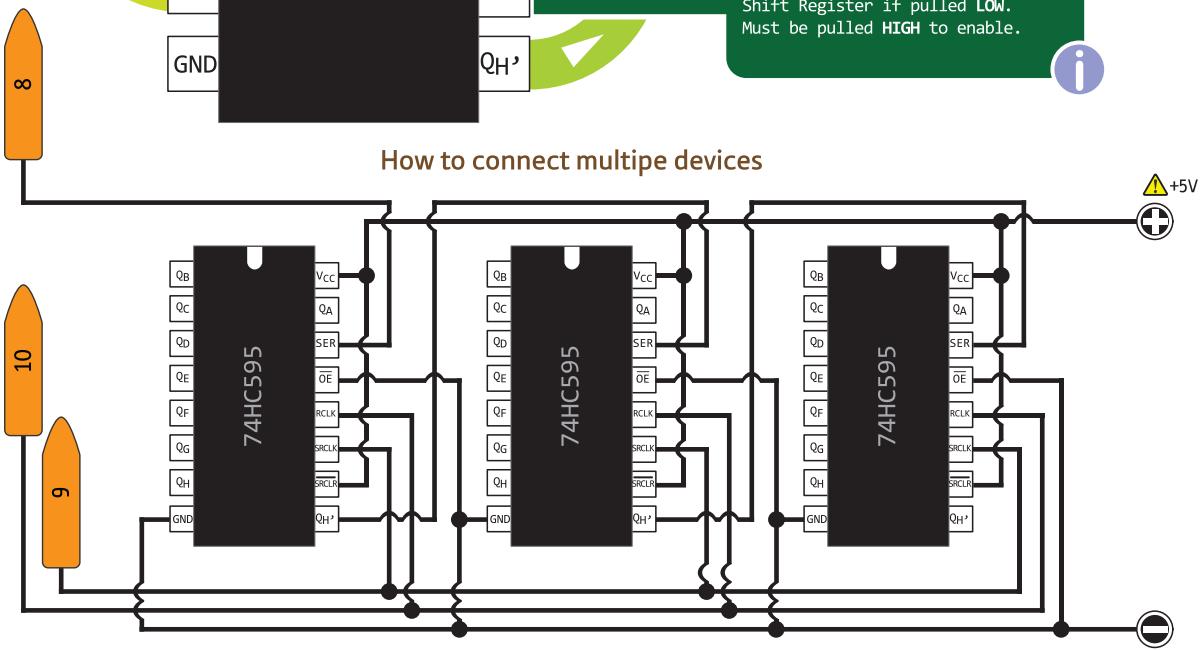
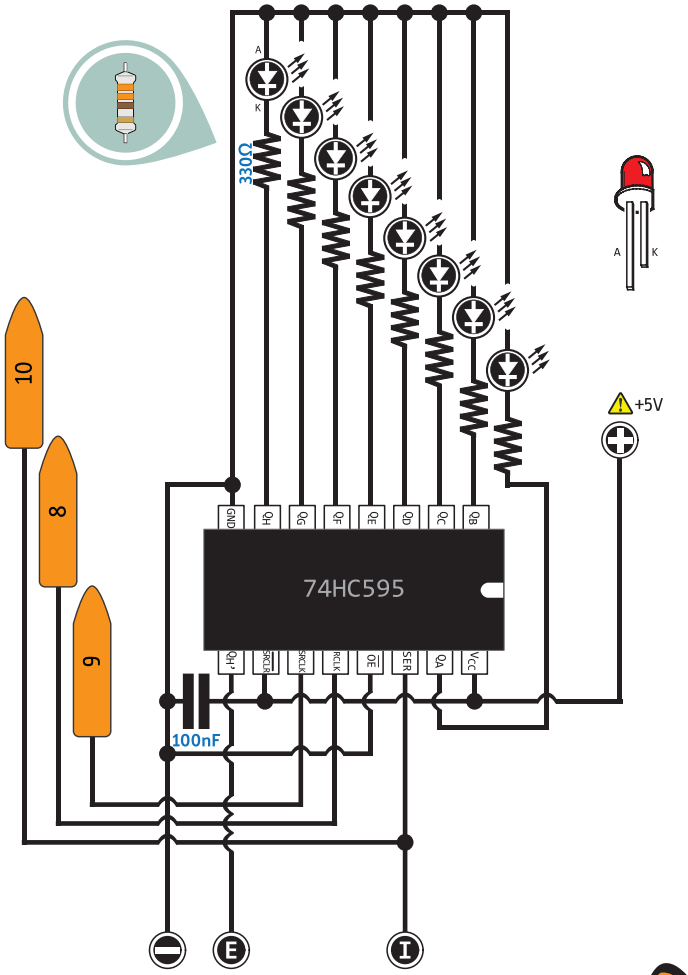
Shift Register (74HC595)



How to connect multipe devices



A typical Application



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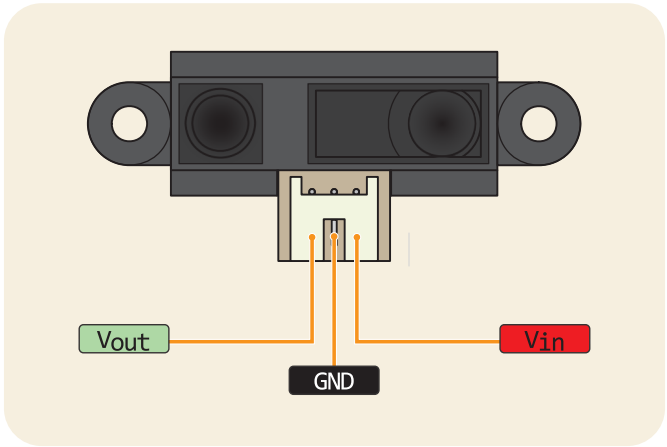
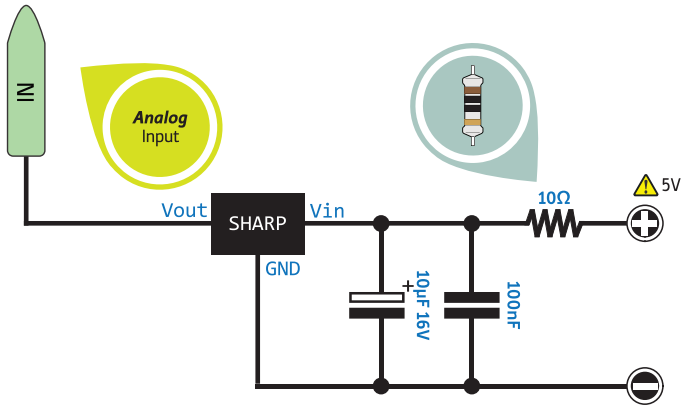
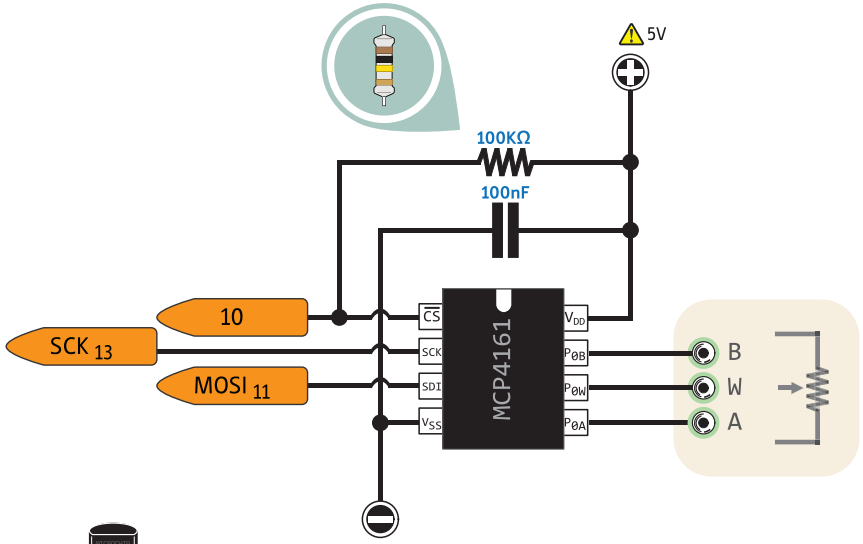
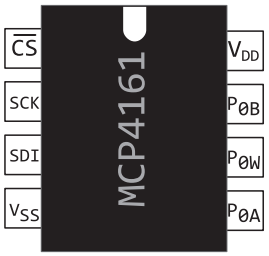
Connect a Distance Sensor (Sharp GP2Y0A21)

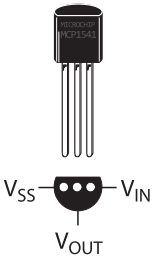




Connect a Digital Potentiometer (MCP4161)

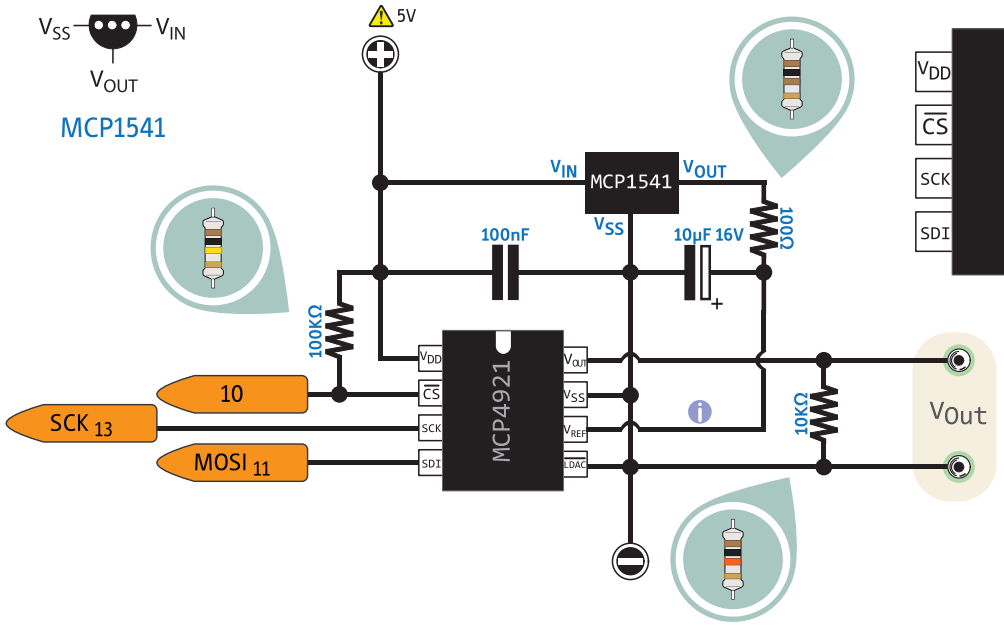


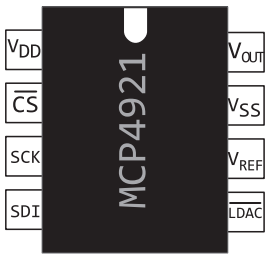




MCP1541

Connect a DAC (MCP4921)





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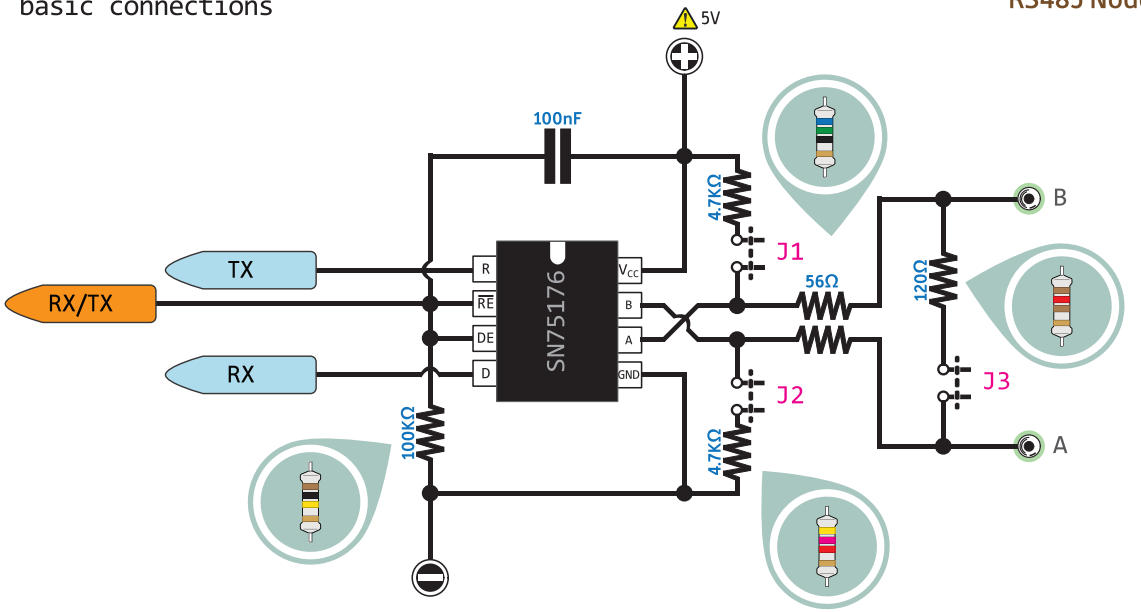
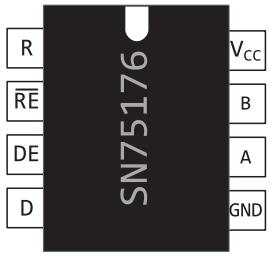
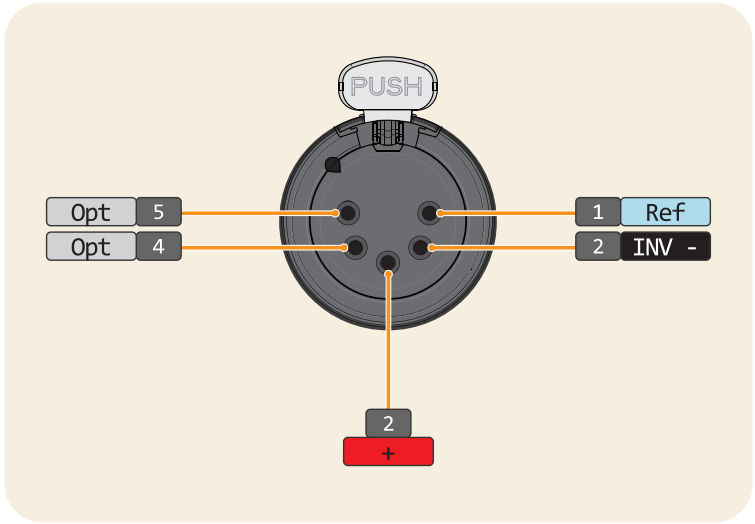
RS485 Node



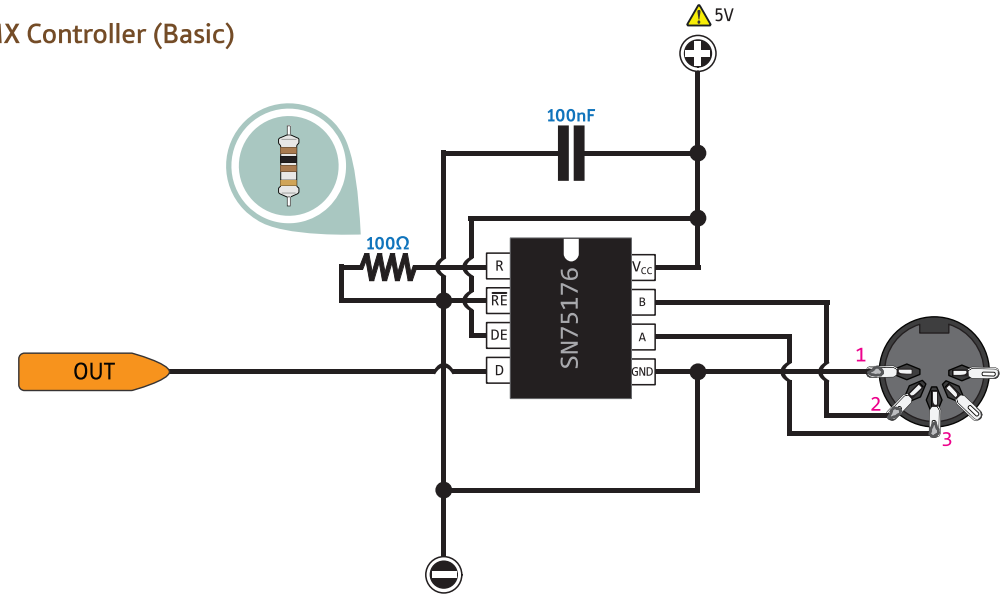


Node termination jumpers config

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



DMX Controller (Basic)



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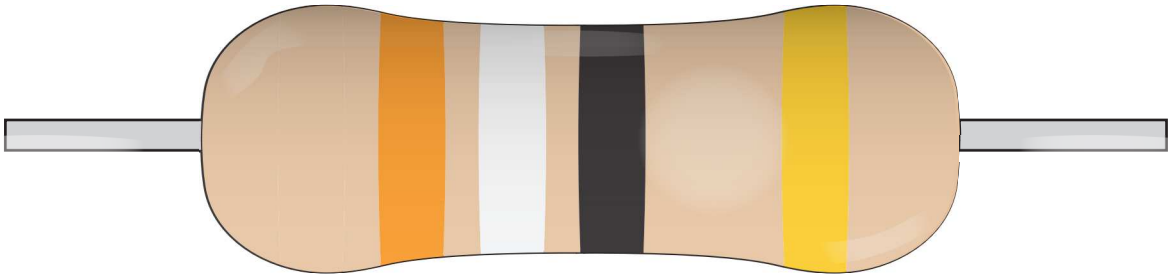
ARDUINO

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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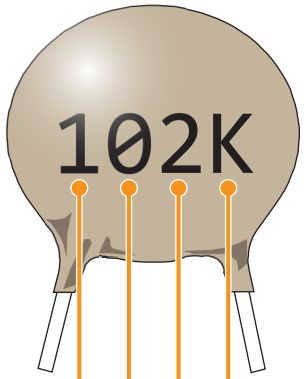
Ceramic Capacitor Code



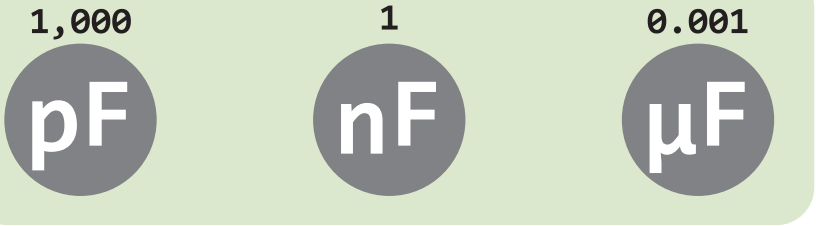
= 1,000pF - ±10%

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

1st
2nd

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

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



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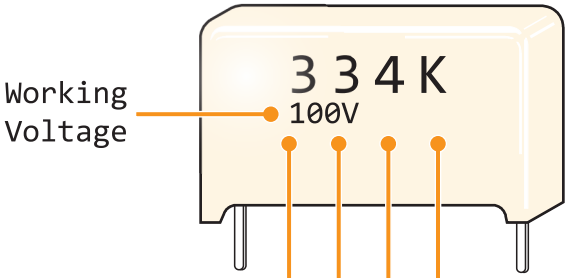
III

Polyester Film-Mylar Capacitor Code



= 0.33µF ±20% 100V

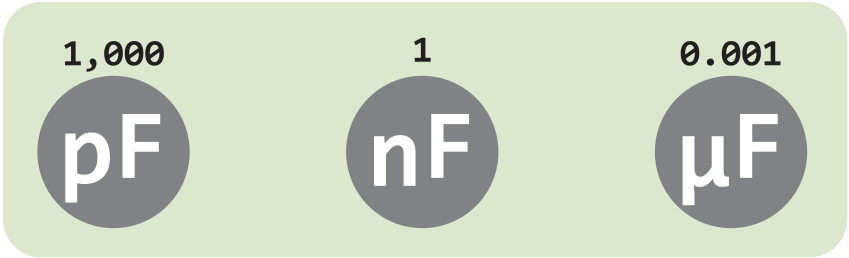
Significant Digit

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



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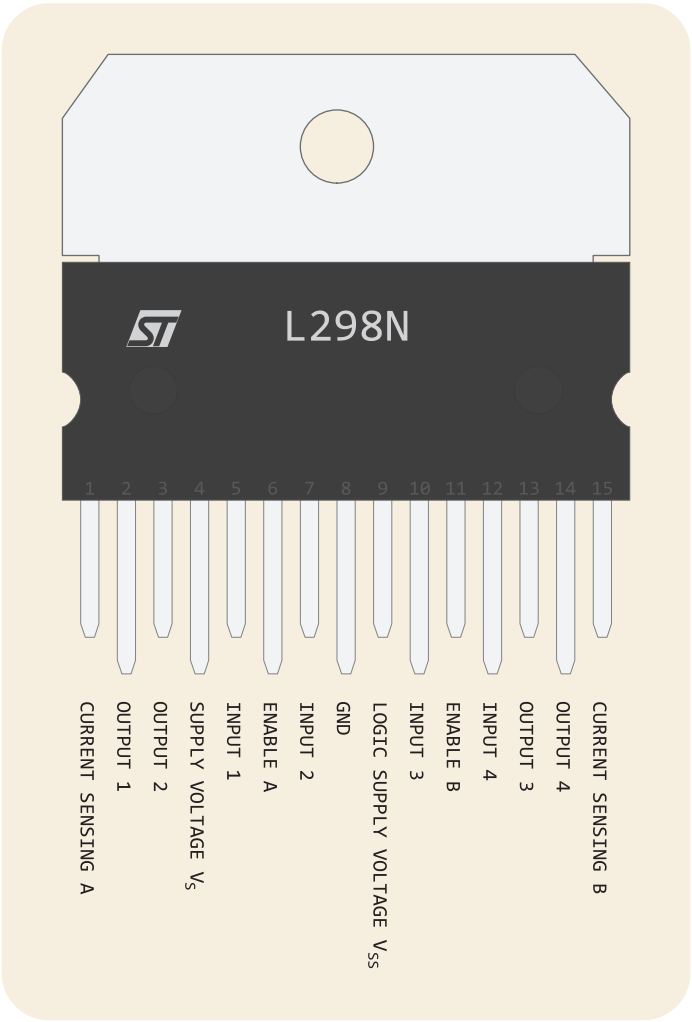
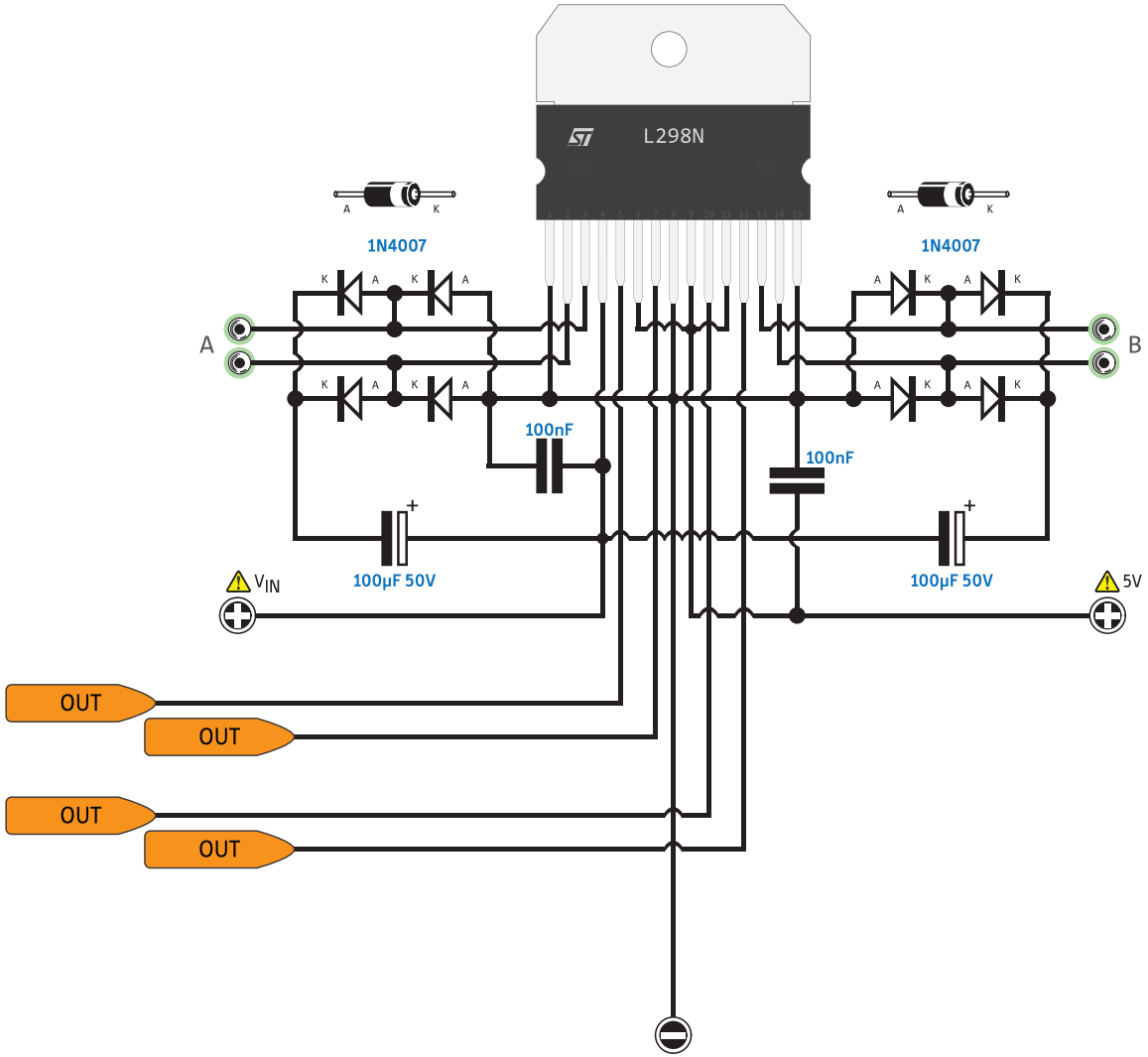
Drive a Motor (L298)





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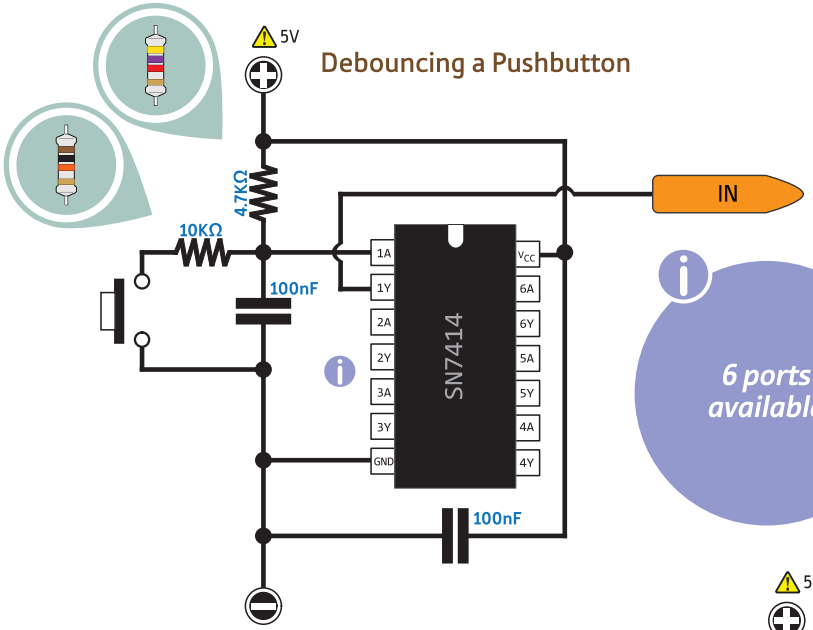
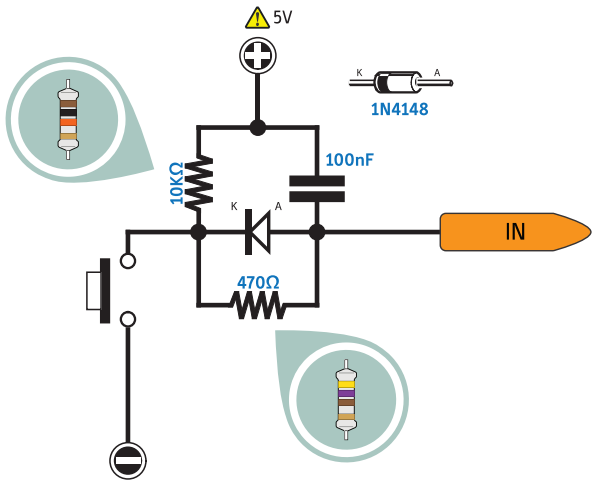
Debouncing a Pushbutton

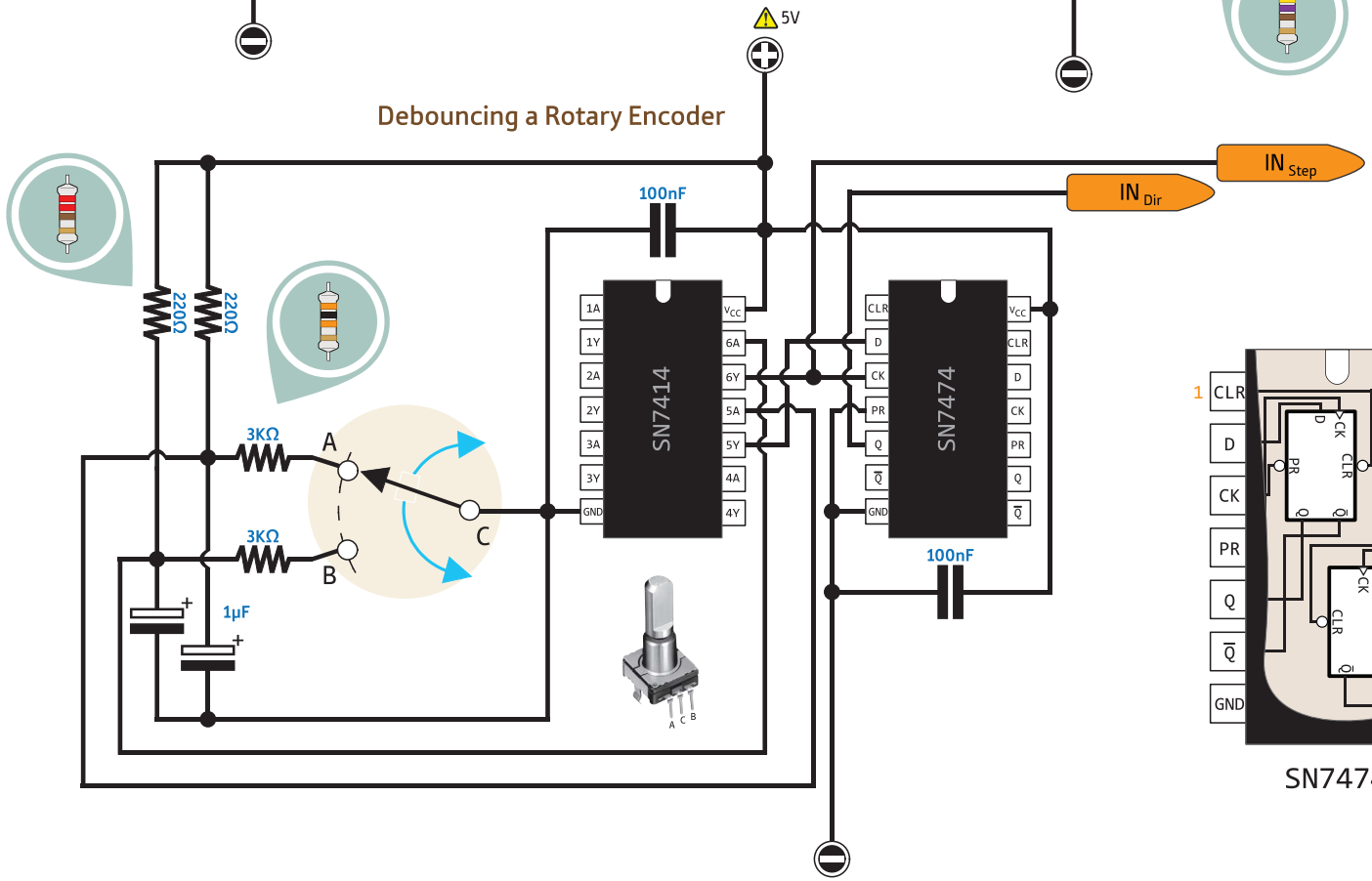


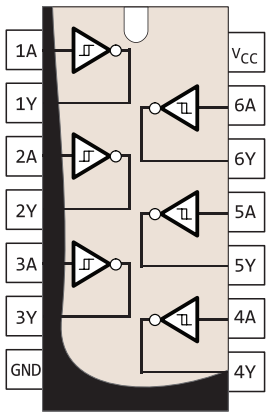
6 ports available

Simple Debouncer

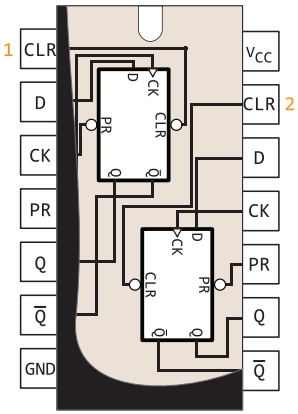


Debouncing a Rotary Encoder





SN7414



SN7474

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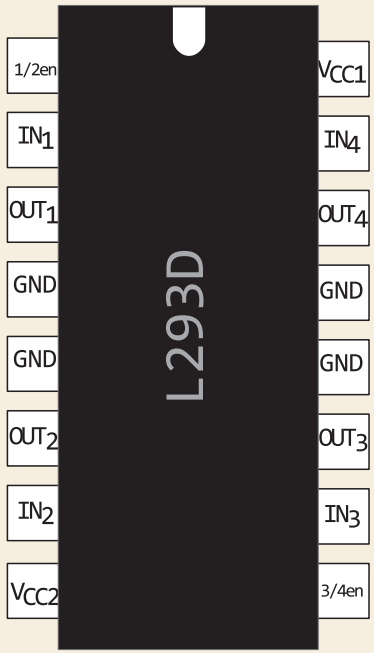
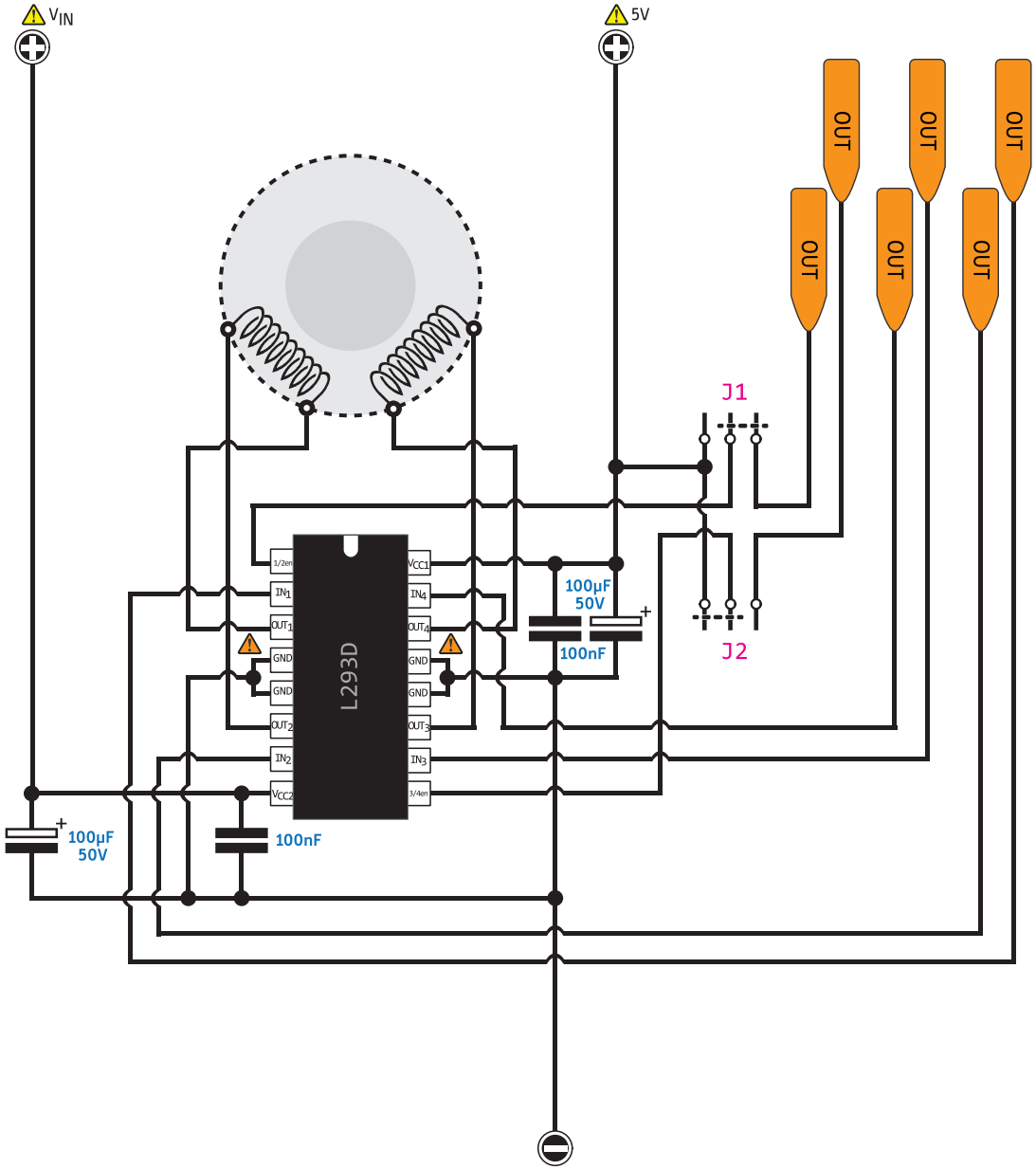
Drive a Stepper (L293)





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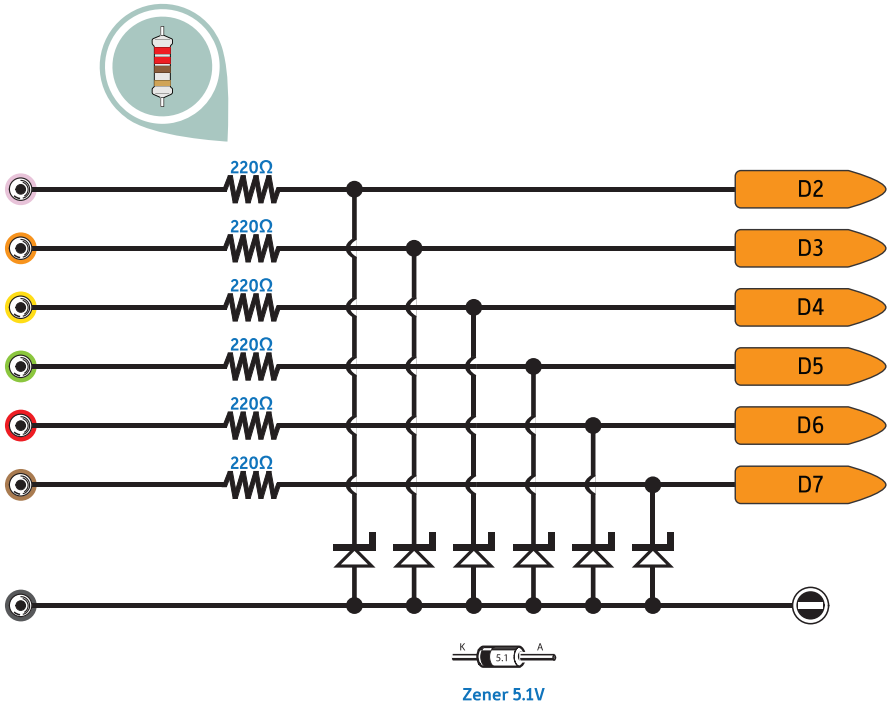
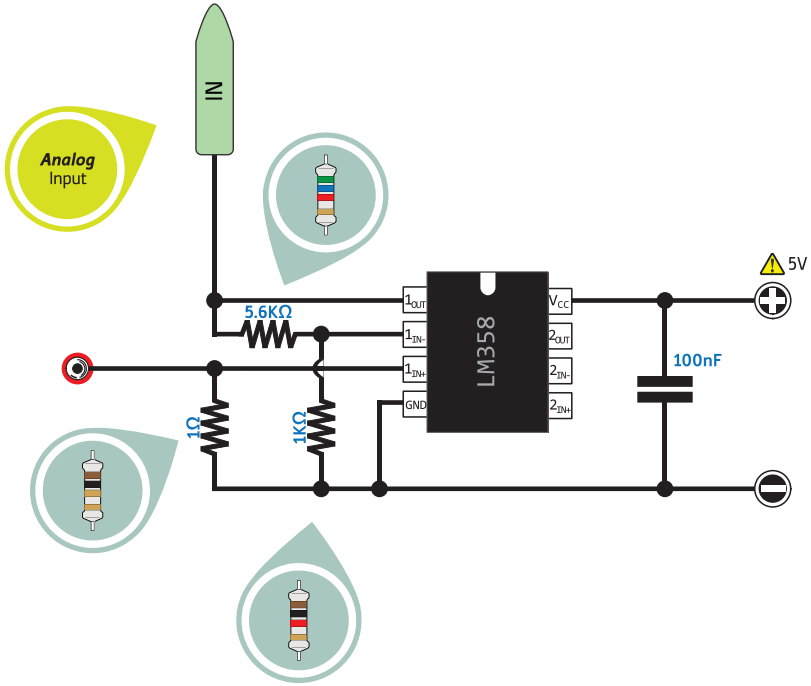
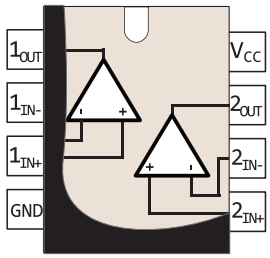
Arduino Logic Analyzer



See instructions at la.pighixxx.com

Current Sense





LM358

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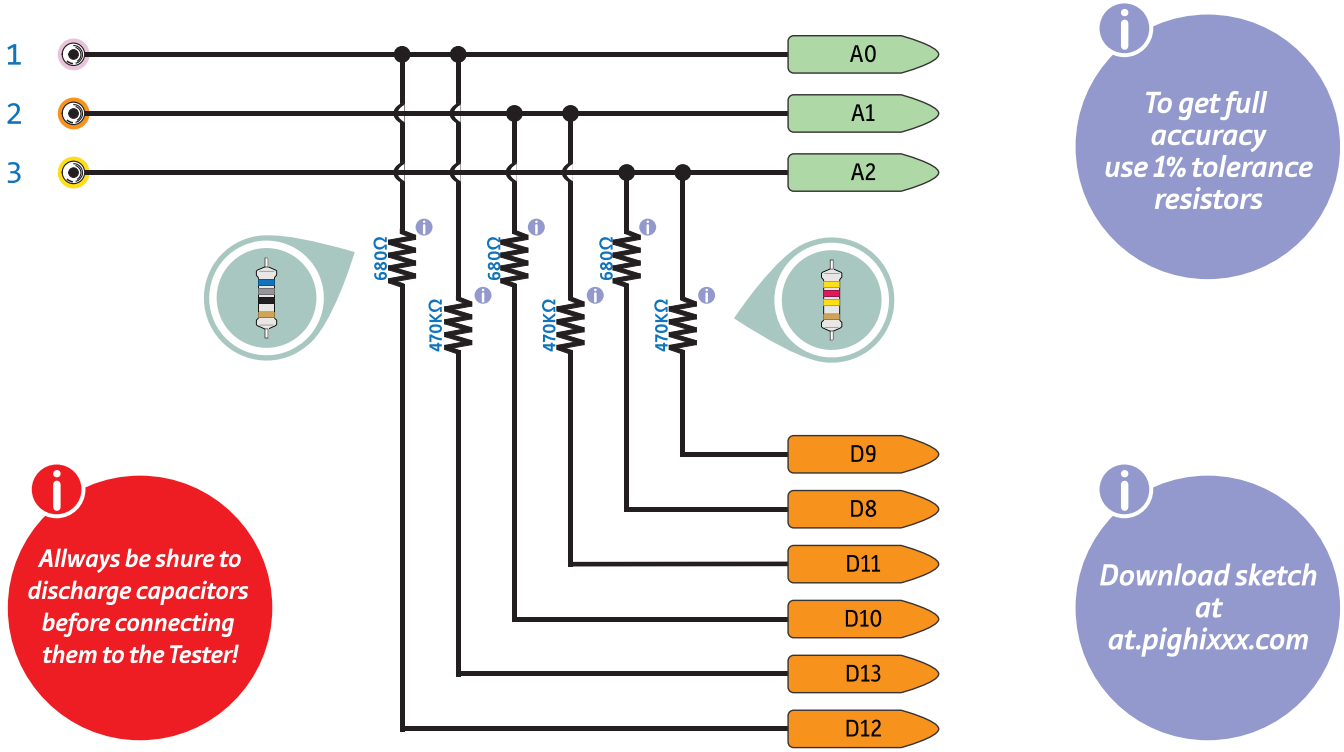
Arduino Component Tester (basic)



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

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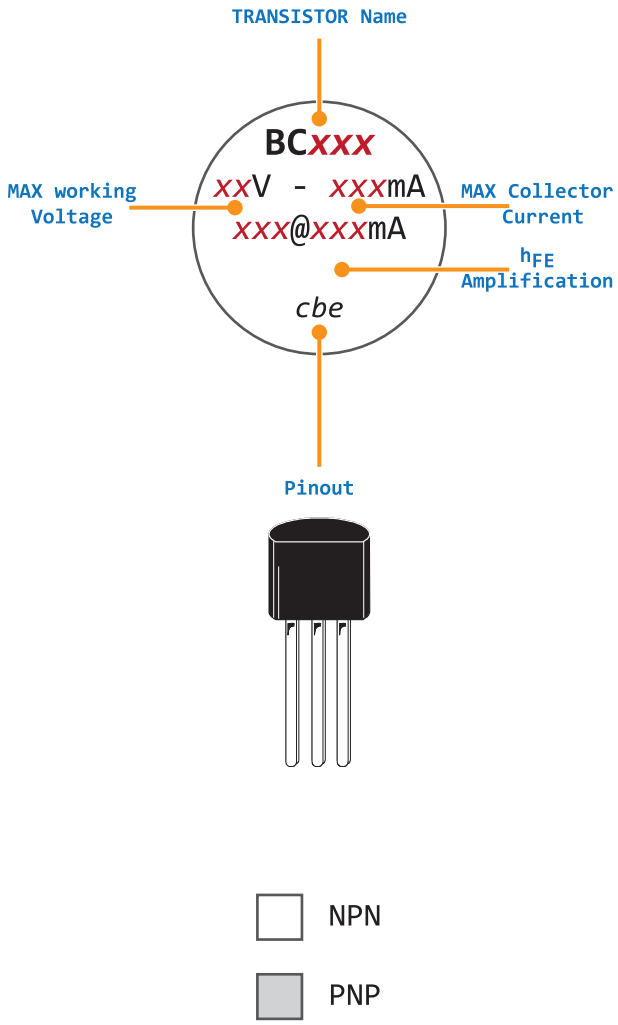
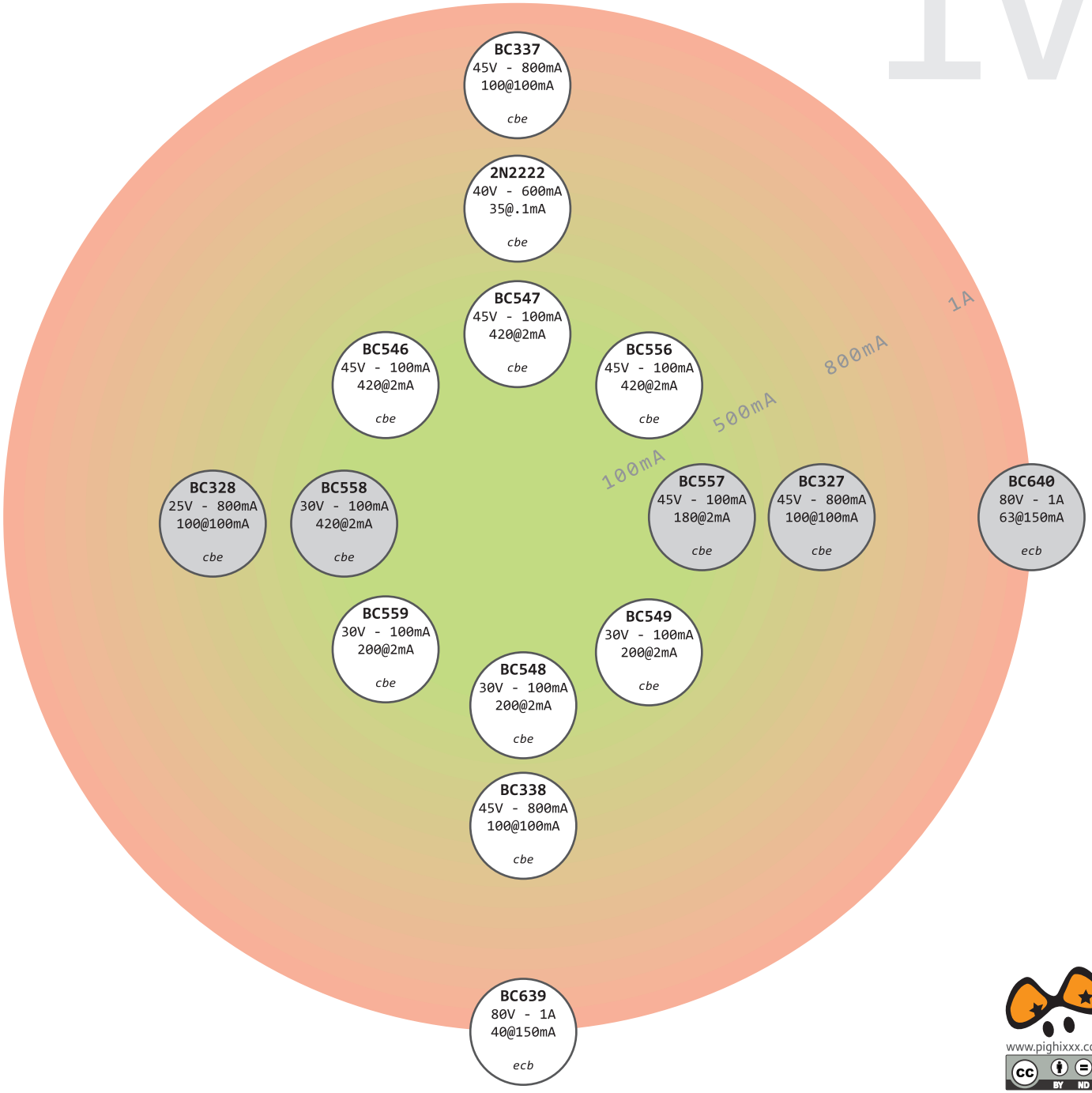
THE
UNOFFICIAL
ARDUINO
basic connections

Simple Transistor Comparison Table

IV





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25 APR 2013

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