

## Generic Parts

<https://www.youtube.com/playlist?list=PLowKtXNTByGqImE405J2565dvjafglHU>

Part	Amount	Description	Datasheet
22 gauge wire	-		
Breadboard	16	830 tie point solderless breadboard	
EEPROM programmer (optional)	1	Used to program the EEPROM chips	<a href="http://www.ebay.com/itm/191816776888">http://www.ebay.com/itm/191816776888</a>
Jumper wires	-		

## Clock Module

<https://www.youtube.com/watch?v=SmQ5K7UQPMM>

Part	Amount	Description	Datasheet
555 timer	3		<a href="http://www.ti.com/lit/ds/symlink/lm555.pdf">http://www.ti.com/lit/ds/symlink/lm555.pdf</a>
74LS04	1	Hex inverter	<a href="http://www.ti.com/lit/ds/symlink/sn74ls04.pdf">http://www.ti.com/lit/ds/symlink/sn74ls04.pdf</a>
74LS08	1	Quad AND gate	<a href="http://www.ti.com/lit/ds/symlink/sn74ls08.pdf">http://www.ti.com/lit/ds/symlink/sn74ls08.pdf</a>
74LS32	1	Quad OR gate	<a href="http://www.ti.com/lit/ds/symlink/sn54ls32.pdf">http://www.ti.com/lit/ds/symlink/sn54ls32.pdf</a>
Capacitor 0.01 $\mu$ F	3		
Capacitor 0.1 $\mu$ F	2		
Capacitor 2 $\mu$ F	1		
LED (blue)	1		
Momentary switch	1	Microtivity 6mm tact switch	
Resistor 1k $\Omega$	5		
Resistor 1M $\Omega$	1		
Toggle switch	1	Double-pole toggle switch	
Trimpot 1M $\Omega$	1	Variable resistor	

## A Register

<https://www.youtube.com/watch?v=9WE3Obdjtv0>

Part	Amount	Description	Datasheet
74LS173	2	4-bit D-type register	<a href="http://www.ti.com/lit/ds/symlink/sn74173.pdf">http://www.ti.com/lit/ds/symlink/sn74173.pdf</a>
74LS245	1	Octal bus transceiver	<a href="http://www.ti.com/lit/ds/symlink/sn74ls245.pdf">http://www.ti.com/lit/ds/symlink/sn74ls245.pdf</a>
LED (red)	8		

## B Register

<https://www.youtube.com/watch?v=9WE3Obdjtv0>

Part	Amount	Description	Datasheet
74LS173	2	4-bit D-type register	<a href="http://www.ti.com/lit/ds/symlink/sn74173.pdf">http://www.ti.com/lit/ds/symlink/sn74173.pdf</a>
74LS245	1	Octal bus transceiver	<a href="http://www.ti.com/lit/ds/symlink/sn74ls245.pdf">http://www.ti.com/lit/ds/symlink/sn74ls245.pdf</a>

LED (red)	8
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## Instruction Register

<https://www.youtube.com/watch?v=9WE3Obdjtv0>

Part	Amount	Description	Datasheet
74LS173	2	4-bit D-type register	<a href="http://www.ti.com/lit/ds/symlink/sn74173.pdf">http://www.ti.com/lit/ds/symlink/sn74173.pdf</a>
74LS245	1	Octal bus transceiver	<a href="http://www.ti.com/lit/ds/symlink/sn74ls245.pdf">http://www.ti.com/lit/ds/symlink/sn74ls245.pdf</a>
LED (blue)	4		
LED (yellow)	4		

## ALU

<https://www.youtube.com/watch?v=S-3fXU3FZQc>

Part	Amount	Description	Datasheet
74LS245	1	Octal bus transceiver	<a href="http://www.ti.com/lit/ds/symlink/sn74ls245.pdf">http://www.ti.com/lit/ds/symlink/sn74ls245.pdf</a>
74LS283	2	4-bit binary full adder	<a href="http://www.ti.com/lit/ds/symlink/sn54s283.pdf">http://www.ti.com/lit/ds/symlink/sn54s283.pdf</a>
74LS86	2	Quad XOR gate	<a href="http://www.ti.com/lit/ds/symlink/sn74ls86a.pdf">http://www.ti.com/lit/ds/symlink/sn74ls86a.pdf</a>
LED (red)	8		

## RAM Module

<https://www.youtube.com/watch?v=5rl1tEFXKt0>

Part	Amount	Description	Datasheet
74LS00	1	Quad NAND gate	<a href="http://www.ti.com/lit/ds/symlink/sn7400.pdf">http://www.ti.com/lit/ds/symlink/sn7400.pdf</a>
74LS04	2	Hex inverter	<a href="http://www.ti.com/lit/ds/symlink/sn74ls04.pdf">http://www.ti.com/lit/ds/symlink/sn74ls04.pdf</a>
74LS157	4	Quad 2-to-1 line data selector	<a href="http://www.ti.com/lit/ds/symlink/54ls157.pdf">http://www.ti.com/lit/ds/symlink/54ls157.pdf</a>
74LS173	1	4-bit D-type register	<a href="http://www.ti.com/lit/ds/symlink/sn74173.pdf">http://www.ti.com/lit/ds/symlink/sn74173.pdf</a>
74LS189	2	64-bit RAM	<a href="http://www.ndatasheet.com/datasheet-frame/300/mdownload.php?id=529296">http://www.ndatasheet.com/datasheet-frame/300/mdownload.php?id=529296</a>
74LS245	1	Octal bus transceiver	<a href="http://www.ti.com/lit/ds/symlink/sn74ls245.pdf">http://www.ti.com/lit/ds/symlink/sn74ls245.pdf</a>
DIP switch (4 bit)	1		
DIP switch (8 bit)	1		
LED (green)	1		
LED (red)	9		
LED (yellow)	4		
Momentary switch	1	Microtivity 6mm tact switch	
Resistor 1kΩ	2		
Toggle switch	1	Double-pole toggle switch	

## EEPROM Programmer (optional)

<https://www.youtube.com/watch?v=K88pgWhEb1M>

Part	Amount	Description	Datasheet
74HC595	2	8-bit serial-in, parallel-out shift register	<a href="http://www.nxp.com/documents/data_sheet/74HC_HCT595.pdf">http://www.nxp.com/documents/data_sheet/74HC_HCT595.pdf</a>
Arduino Nano	1	Microcontroller	<a href="https://www.arduino.cc/en/uploads/Main/ArduinoNanoManual23.pdf">https://www.arduino.cc/en/uploads/Main/ArduinoNanoManual23.pdf</a>

## Output Module

<https://www.youtube.com/watch?v=5r1tEFXKt0>

Part	Amount	Description	Datasheet
555 timer	1		<a href="http://www.ti.com/lit/ds/symlink/lm555.pdf">http://www.ti.com/lit/ds/symlink/lm555.pdf</a>
74LS139	1	Dual 2-to-4 line decoder	<a href="http://www.ti.com/lit/ds/symlink/sn54ls139a.pdf">http://www.ti.com/lit/ds/symlink/sn54ls139a.pdf</a>
74LS76	1	Dual JK flip-flop	<a href="http://www.ti.com/lit/ds/symlink/sn5476.pdf">http://www.ti.com/lit/ds/symlink/sn5476.pdf</a>
7-segment display	4	Common cathode 7-segment display	
Capacitor 0.01μF	2		
CAT28C16AP	1	16 Kbit CMOS parallel EEPROM	<a href="http://www.alldatasheet.com/datasheet-pdf/pdf/57374/CATALYST/CAT28C16AP-20T.html">http://www.alldatasheet.com/datasheet-pdf/pdf/57374/CATALYST/CAT28C16AP-20T.html</a>
Resistor 100kΩ	1		
Resistor 1kΩ	1		

## Program Counter Module

[https://www.youtube.com/watch?v=tNwU7pK\\_3tk](https://www.youtube.com/watch?v=tNwU7pK_3tk)

Part	Amount	Description	Datasheet
74LS161	1	4-bit synchronous binary counter	<a href="http://www.ti.com/lit/ds/symlink/sn74ls161a.pdf">http://www.ti.com/lit/ds/symlink/sn74ls161a.pdf</a>
74LS245	1	Octal bus transceiver	<a href="http://www.ti.com/lit/ds/symlink/sn74ls245.pdf">http://www.ti.com/lit/ds/symlink/sn74ls245.pdf</a>
LED (green)	4		

## Output Register

<https://www.youtube.com/watch?v=-6JAgFWCL9w>

*This module can also be build in the same way as the A/B/Instruction Register if you don't have the additional 74LS273 which is not used in any other module (so far)*

Part	Amount	Description	Datasheet
74LS08	1	Quad AND gate	<a href="http://www.ti.com/lit/ds/symlink/sn74ls08.pdf">http://www.ti.com/lit/ds/symlink/sn74ls08.pdf</a>
74LS273	1	Octal D-type flip-flop with clear	<a href="http://www.ti.com/lit/ds/symlink/sn74ls273.pdf">http://www.ti.com/lit/ds/symlink/sn74ls273.pdf</a>

## Data Bus

<https://www.youtube.com/watch?v=-6JAgFWCL9w>

Part	Amount	Description	Datasheet
LED (red)	8	Data bus LEDs	
Resistor 470Ω	8	Current limiting resistors for the LEDs	
Resistor 10kΩ	8	Pull down resistors	

## Control Word

<https://www.youtube.com/watch?v=AwUirxi9eBg>

Part	Amount	Description	Datasheet
74LS04	2	Hex inverter	<a href="http://www.ti.com/lit/ds/symlink/sn74ls04.pdf">http://www.ti.com/lit/ds/symlink/sn74ls04.pdf</a>
Resistor 470Ω	15		
LED (blue)	15		