

## Generic Parts

<https://www.youtube.com/playlist?list=PLowKtXNTBypGqImE405J2565dvjafglHU>

Part	Amount	Description
22 gauge wire	-	
Breadboard	16	830 tie point solderless breadboard
EEPROM programmer (optional)	1	Used to program the EEPROM chips
Jumper wires	-	

## Clock Module

<https://www.youtube.com/watch?v=SmQ5K7UQPM>

Part	Amount	Description
555 timer	3	
74LS04	1	Hex inverter
74LS08	1	Quad AND gate
74LS32	1	Quad OR gate
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
74LS173	2	4-bit D-type register
74LS245	1	Octal bus transceiver
LED (red)	8	

## B Register

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

Part	Amount	Description
74LS173	2	4-bit D-type register
74LS245	1	Octal bus transceiver
LED (red)	8	

## Instruction Register

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

Part	Amount	Description
74LS173	2	4-bit D-type register
74LS245	1	Octal bus transceiver
LED (blue)	4	
LED (yellow)	4	

## ALU

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

Part	Amount	Description
74LS245	1	Octal bus transceiver
74LS283	2	4-bit binary full adder
74LS86	2	Quad XOR gate
LED (red)	8	

## RAM Module

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

Part	Amount	Description
74LS00	1	Quad NAND gate
74LS04	2	Hex inverter
74LS157	4	Quad 2-to-1 line data selector
74LS173	1	4-bit D-type register
74LS189	2	64-bit RAM
74LS245	1	Octal bus transceiver
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 1k $\Omega$	2	
Toggle switch	1	Double-pole toggle switch

## EEPROM Programmer (optional)

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

Part	Amount	Description
74HC595	2	8-bit serial-in, parallel-out shift register
Arduino Nano	1	Microcontroller

## Output Module

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

Part	Amount	Description
555 timer	1	
74LS139	1	Dual 2-to-4 line decoder
74LS76	1	Dual JK flip-flop
7-segment display	4	Common cathode 7-segment display
Capacitor 0.01 $\mu$ F	2	
CAT28C16AP	1	16 Kbit CMOS parallel EEPROM
Resistor 100k $\Omega$	1	
Resistor 1k $\Omega$	1	

## Program Counter Module

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

Part	Amount	Description
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74LS161	1	4-bit synchronous binary counter
74LS245	1	Octal bus transceiver
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 l*

Part	Amount	Description
74LS08	1	Quad AND gate
74LS273	1	Octal D-type flip-flop with clear

## Data Bus

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

Part	Amount	Description
LED (red)	8	Data bus LEDs
Resistor 10kΩ	8	

## Control Unit

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

Part	Amount	Description
74LS161	1	4-bit synchronous binary counter
74LS245	1	Octal bus transceiver
LED (green)	4	

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**Datasheet**

<http://www.ebay.com/itm/191816776888>

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**Datasheet**

<http://www.ti.com/lit/ds/symlink/lm555.pdf>  
<http://www.ti.com/lit/ds/symlink/sn74ls04.pdf>  
<http://www.ti.com/lit/ds/symlink/sn74ls08.pdf>  
<http://www.ti.com/lit/ds/symlink/sn54ls32.pdf>

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**Datasheet**

<http://www.ti.com/lit/ds/symlink/sn74173.pdf>  
<http://www.ti.com/lit/ds/symlink/sn74ls245.pdf>

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<http://www.ti.com/lit/ds/symlink/sn74ls245.pdf>

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**Datasheet**

<http://www.ti.com/lit/ds/symlink/sn74ls245.pdf>

<http://www.ti.com/lit/ds/symlink/sn54s283.pdf>

<http://www.ti.com/lit/ds/symlink/sn74ls86a.pdf>

**Datasheet**

<http://www.ti.com/lit/ds/symlink/sn7400.pdf>

<http://www.ti.com/lit/ds/symlink/sn74ls04.pdf>

<http://www.ti.com/lit/ds/symlink/54ls157.pdf>

<http://www.ti.com/lit/ds/symlink/sn74173.pdf>

<http://www.ndatasheet.com/datasheet-frame/300/mdownload.php?id=529296>

<http://www.ti.com/lit/ds/symlink/sn74ls245.pdf>

**Datasheet**

[http://www.nxp.com/documents/data\\_sheet/74HC\\_HCT595.pdf](http://www.nxp.com/documents/data_sheet/74HC_HCT595.pdf)

<https://www.arduino.cc/en/uploads/Main/ArduinoNanoManual23.pdf>

**Datasheet**

<http://www.ti.com/lit/ds/symlink/lm555.pdf>

<http://www.ti.com/lit/ds/symlink/sn54ls139a.pdf>

<http://www.ti.com/lit/ds/symlink/sn5476.pdf>

<http://www.alldatasheet.com/datasheet-pdf/pdf/57374/CATALYST/CAT28C16AP-20T.html>

**Datasheet**

<http://www.ti.com/lit/ds/symlink/sn74ls161a.pdf>  
<http://www.ti.com/lit/ds/symlink/sn74ls245.pdf>

*have the additional 74LS273 which is not used in any other module (so far)*

**Datasheet**

<http://www.ti.com/lit/ds/symlink/sn74ls08.pdf>  
<http://www.ti.com/lit/ds/symlink/sn74ls273.pdf>

**Datasheet**

**Datasheet**

<http://www.ti.com/lit/ds/symlink/sn74ls161a.pdf>  
<http://www.ti.com/lit/ds/symlink/sn74ls245.pdf>