MEMORY MODULE w/segments

32K ROM | 2M RAM

ROM $0000 – $7FFF
RAM $8000 – $200000

Contents of this module include the following:
- 16–bit Memory Address Register (MAR)
- Memory Segments: Data, Code, Stack segments (DS, CS, SS)
- EEPROM & RAM

ROM address space is 15bits wide
RAM address space is 19bits wide

Since there is only 16bits in the MAR for addressing, the following logic explains how chip are selected:

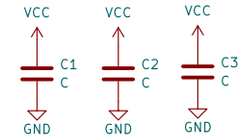
- If any segment is HIGH, or A15 is HIGH then EEPROM is disabled
- Otherwise, EEPROM is active and uses READ only
- The SEGMENT[0..2]'s are used to fill address space 16, 17, & 18
- SEGMENT[3,4] is decoded into 4 values and is used to target different RAM chips

Segment registers are loaded from the shared 8bit bus and can also be asserted back onto the BUS. A reason for asserting is so you can {push ds} onto the stack to store them during interrupts

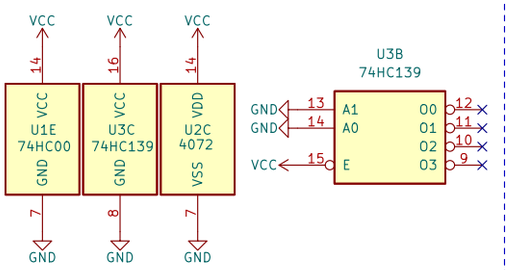
Addressing Key:
S: SEGMENT[3,4]
s: SEGMENT[0..2]
a: MAR[0..15]

0b_SS_sss_aaaa_aaaa_aaaa_aaaa

Smoothing Caps

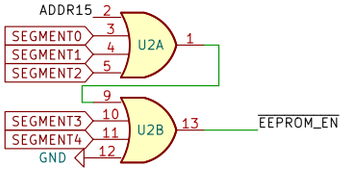


Logic Gate Power

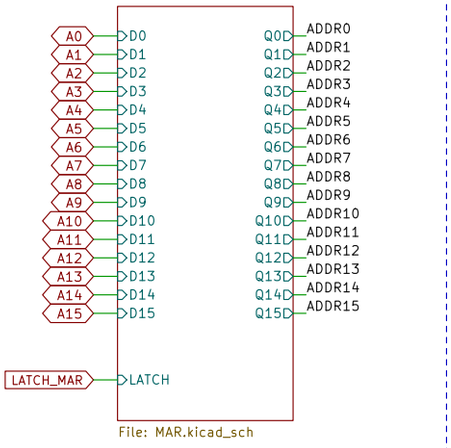


EEPROM ENABLE LOGIC

If any of the following is HIGH
segment[0..4] or A16
Then EEPROM access is disabled

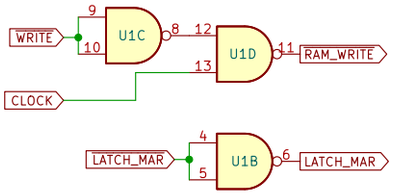


Memory Address Register



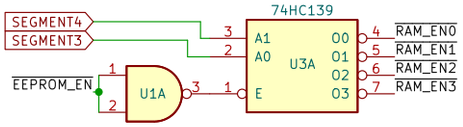
File: MAR.kicad_sch

Control Logic
Active High/Lows

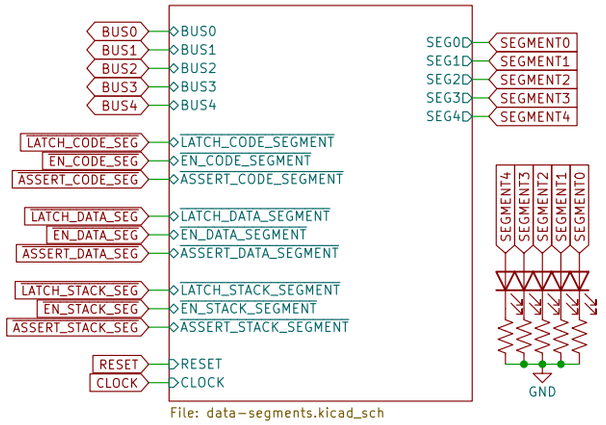


RAM SELECT LOGIC

If EEPROM is HIGH (disabled) then this MUX is enabled. It then uses SEGMENT[3,4] to choose a RAM enable line

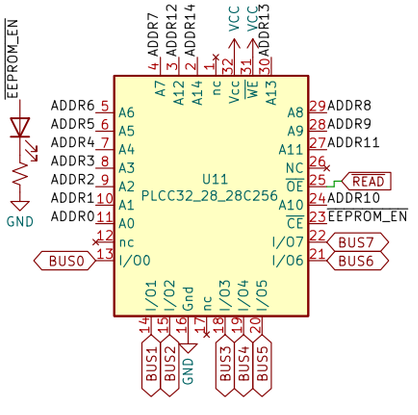


Data Segments

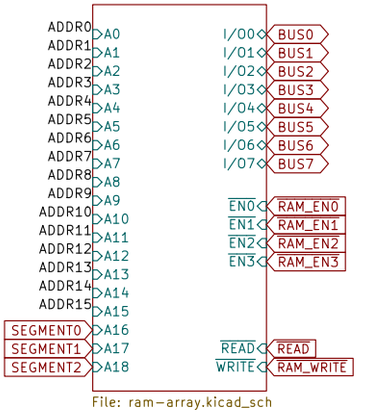


File: data–segments.kicad_sch

EEPROM



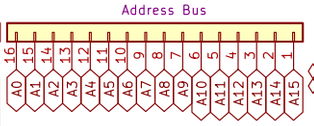
RAM Array



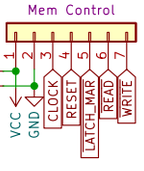
File: ram–array.kicad_sch

Segment Control

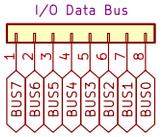
Address Bus



Mem Control



I/O Data Bus



RAM $8000 – $20000
ROM $0000 – $7fff
32K ROM | 2M RAM
Trilobyte – theWickedWebDev/8–bit–computer

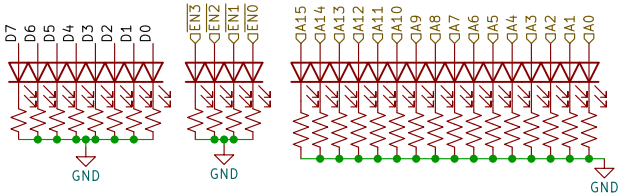
Sheet: /
File: memory.kicad_sch

Title: Memory Module

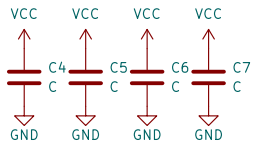
Size: User	Date: 2022–03–11	**Rev: 1.6**
KiCad E.D.A. kicad (6.0.0–0)		Id: 1/7

RAM Array Module

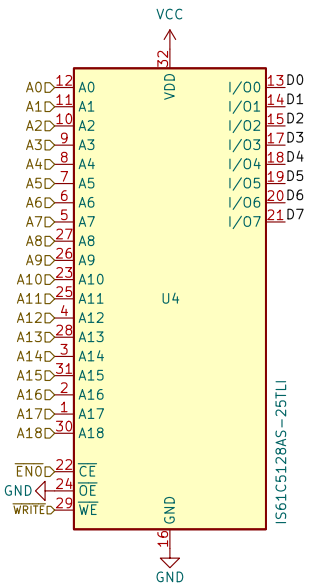
LED Indicators



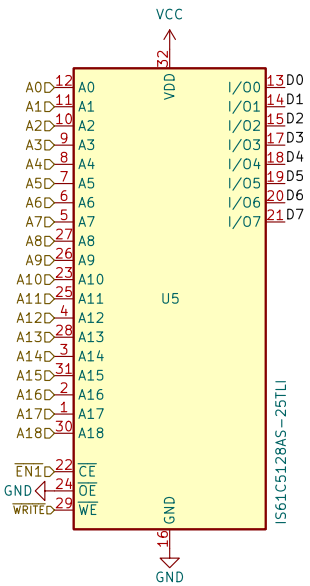
Smoothing Caps



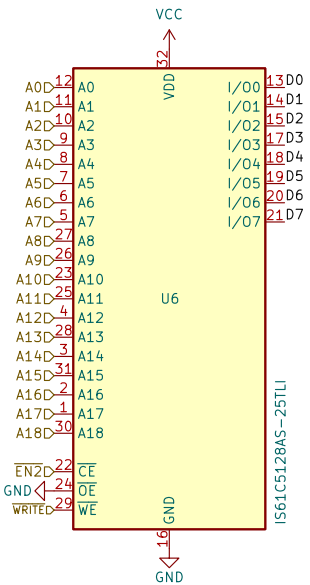
SRAM 512k 0



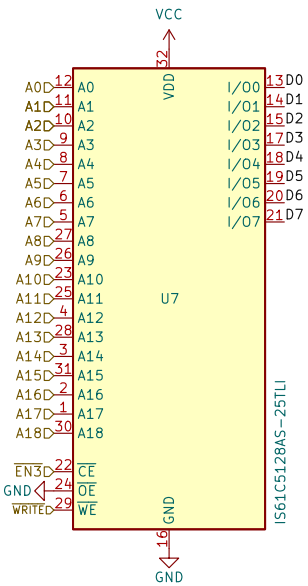
SRAM 512k 1



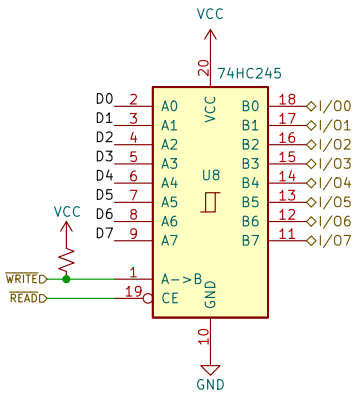
SRAM 512k 2



SRAM 512k 3

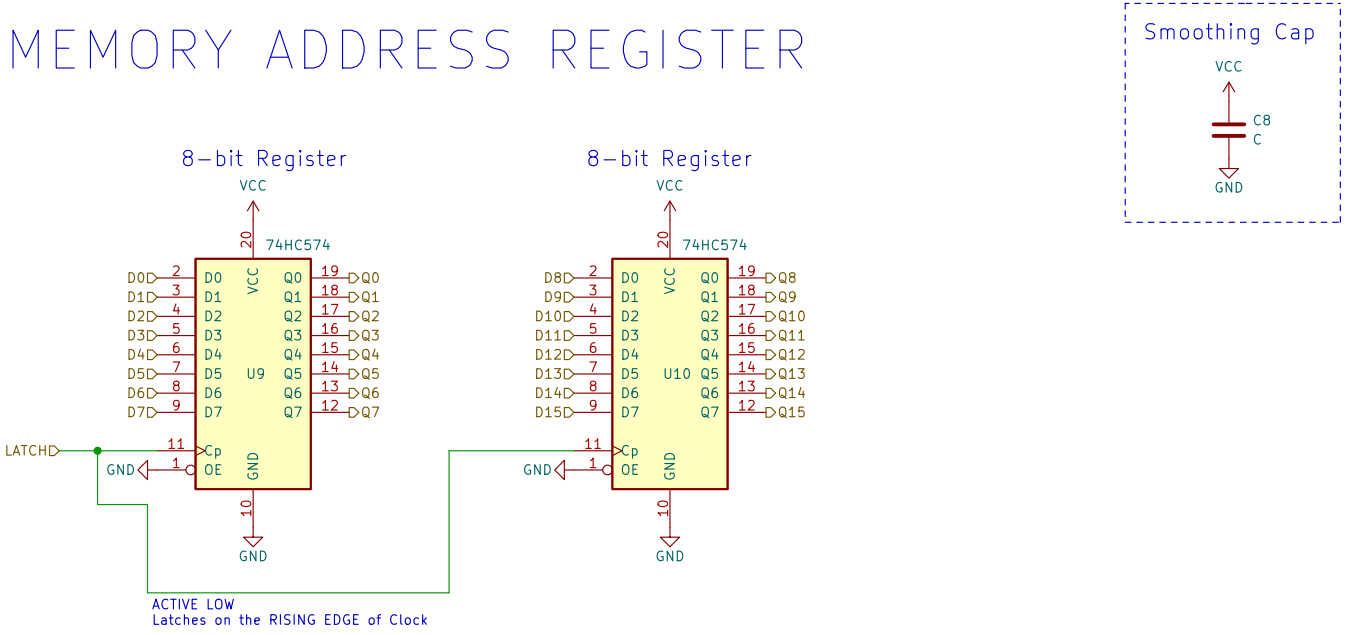


Data BUS Tranceiver



Sheet: /RAM Array/		
File: ram-array.kicad_sch		
Title:		
Size: User	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.0-0)		Id: 2/7

MEMORY ADDRESS REGISTER



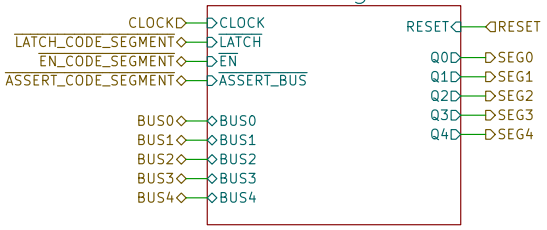
Sheet: /Memory Address Register/
File: MAR.kicad_sch

Title:

Size: A5	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.0-0)		Id: 3/7

Segments

Code Segment



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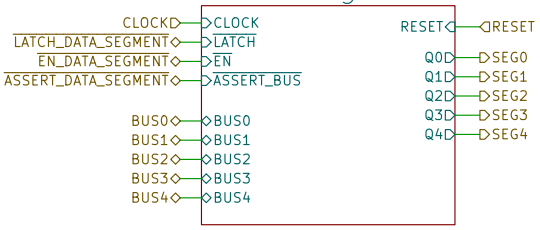
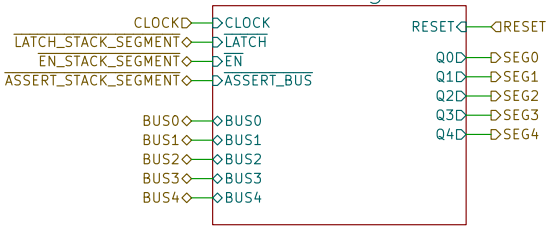
Data Segment



File: segment-register.kicad_sch

Stack Segment



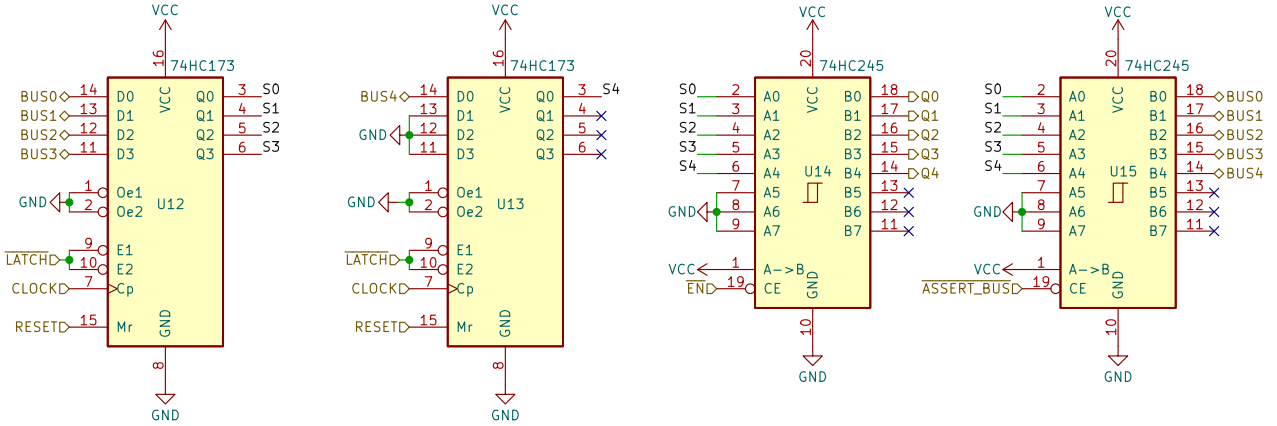
File: segment-register.kicad_sch

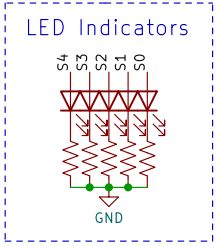
Sheet: /Data Segments/
File: data-segments.kicad_sch

Title:

Size: User	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.0-0)		Id: 5/7

Segment Registers: Data, Code & Stack





Sheet: /Data Segments/Data Segment/
File: segment-register.kicad_sch

Title:

Size: A5	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.0-0)		Id: 6/7