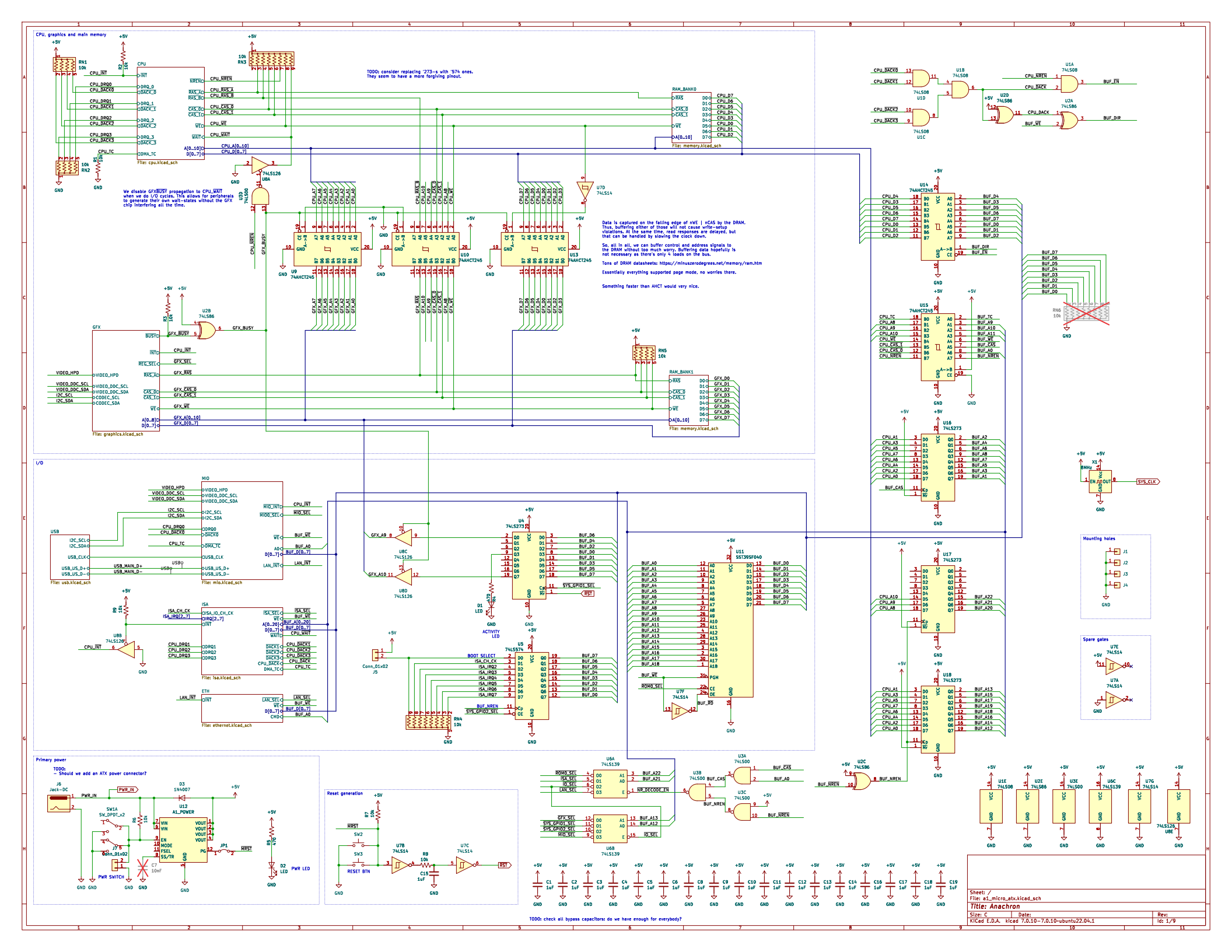
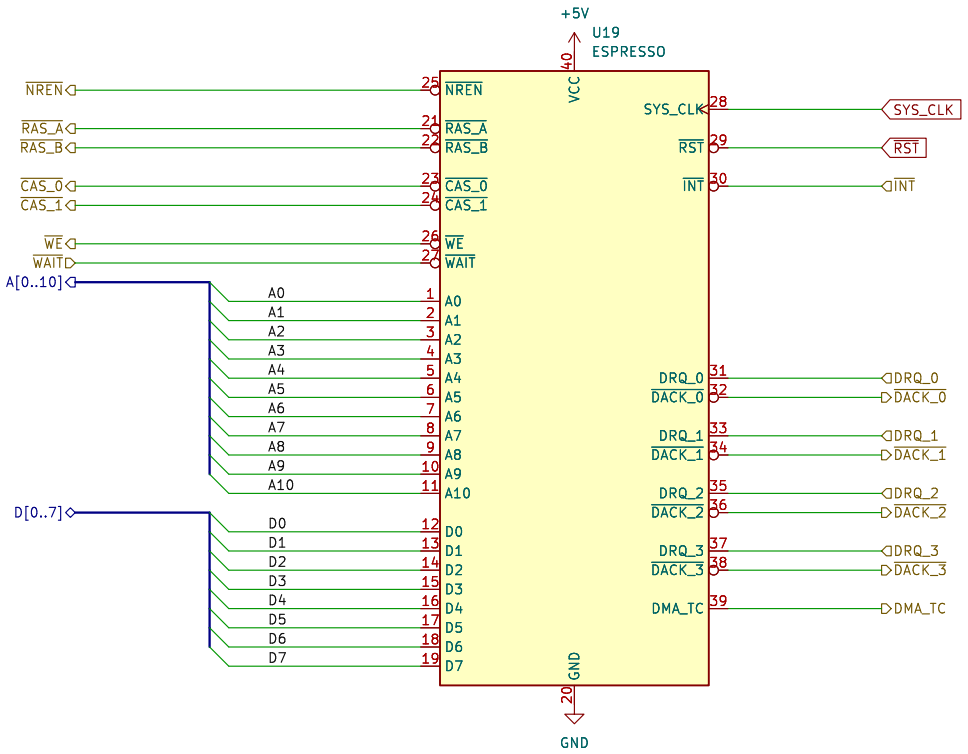
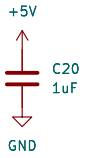
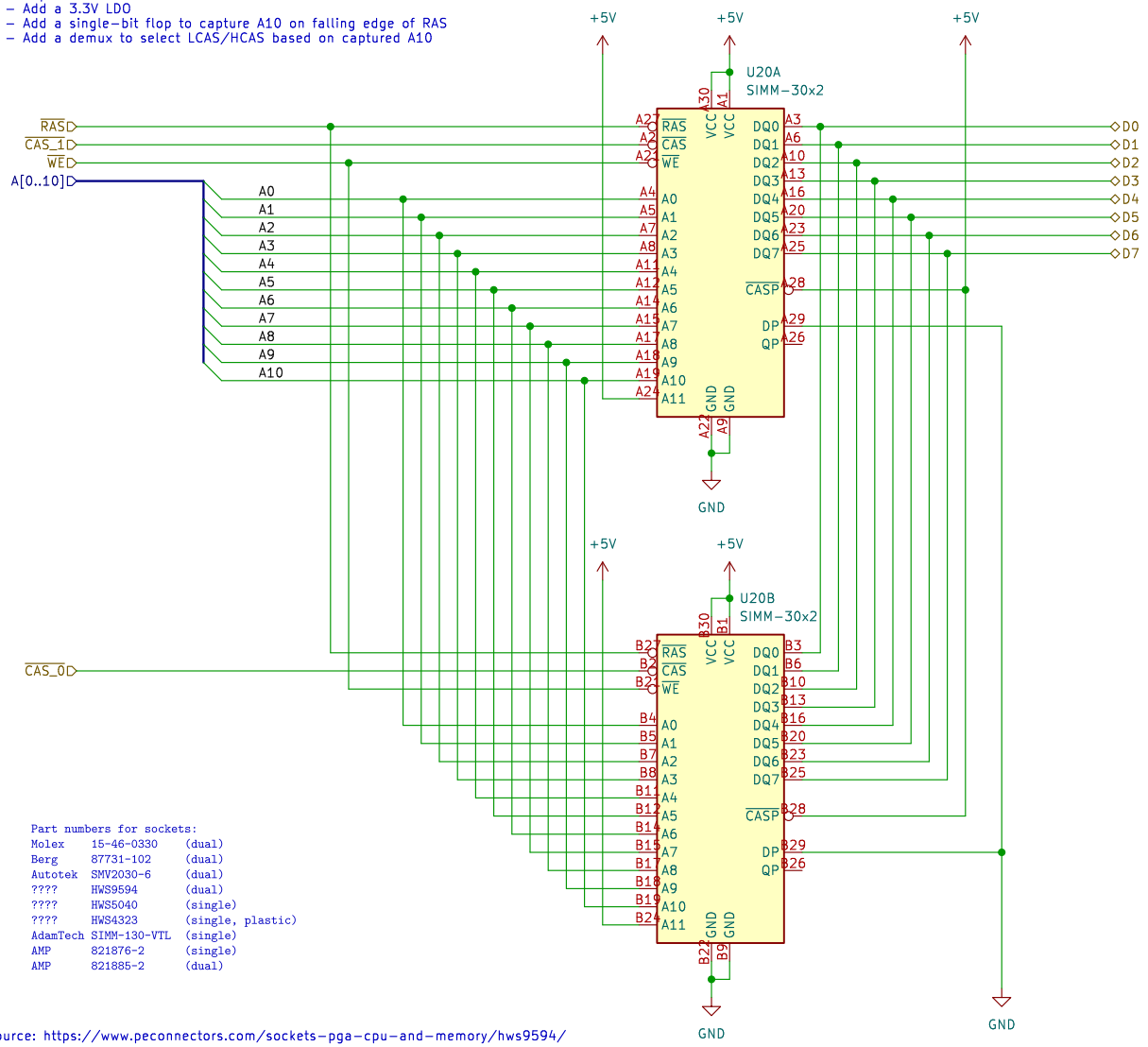

CPU, graphics and main memory
TODO: consider replacing '273-s with '574 ones.
They seem to have a more forgiving pinout.
We disable GFXBUSY propagation to CPU_WAIT
when we do I/O cycles. This allows for peripherals
to generate their own wait-states without the GFX
chip interfering all the time.
Data is captured on the falling edge of nWE | nCAS by the DRAM.
Thus, buffering either of those will not cause write-setup
violations. At the same time, read responses are delayed, but
that can be handled by slowing the clock down.
So, all in all, we can buffer control and address signals to
the DRAM without too much worry. Buffering data hopefully is
not necessary as there's only 4 loads on the bus.
Tons of DRAM datasheets: https://minuszerodegrees.net/memory/ram.htm
Essentially everything supported page mode, no worries there.
Something faster than AHCT would very nice.
I/O
Mounting holes
Spare gates
Primary power
TODO:
- Should we add an ATX power connector?
Reset generation
TODO: check all bypass capacitors do we have enough for everybody?
Sheet: /
File: a1_micro_atx.kicad_sch
Title: Anachron
Size: C
Date:
Rev:
KiCad E.D.A. kicad 7.0.10-7.0.10-ubuntu22.04.1
Id: 1/9

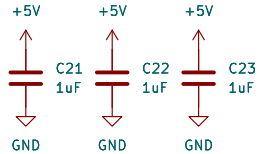




Sheet: /CPU/		
File: cpu.kicad_sch		
Title: Anachron CPU		
Size: A	Date:	**Rev:**
KiCad E.D.A. kicad 7.0.10-7.0.10~ubuntu22.04.1		Id: 2/9

DRAM: There's one FPM DRAM from ISSI still in production: IS41LV16105D.
This is a 1Mx16bit (3.3V) part. To mount it on a SIMM, one would need to:
- Implement level-shifters
- Add a 3.3V LDO
- Add a single-bit flop to capture A10 on falling edge of RAS
- Add a demux to select LCAS/HCAS based on captured A10





Part numbers for sockets:

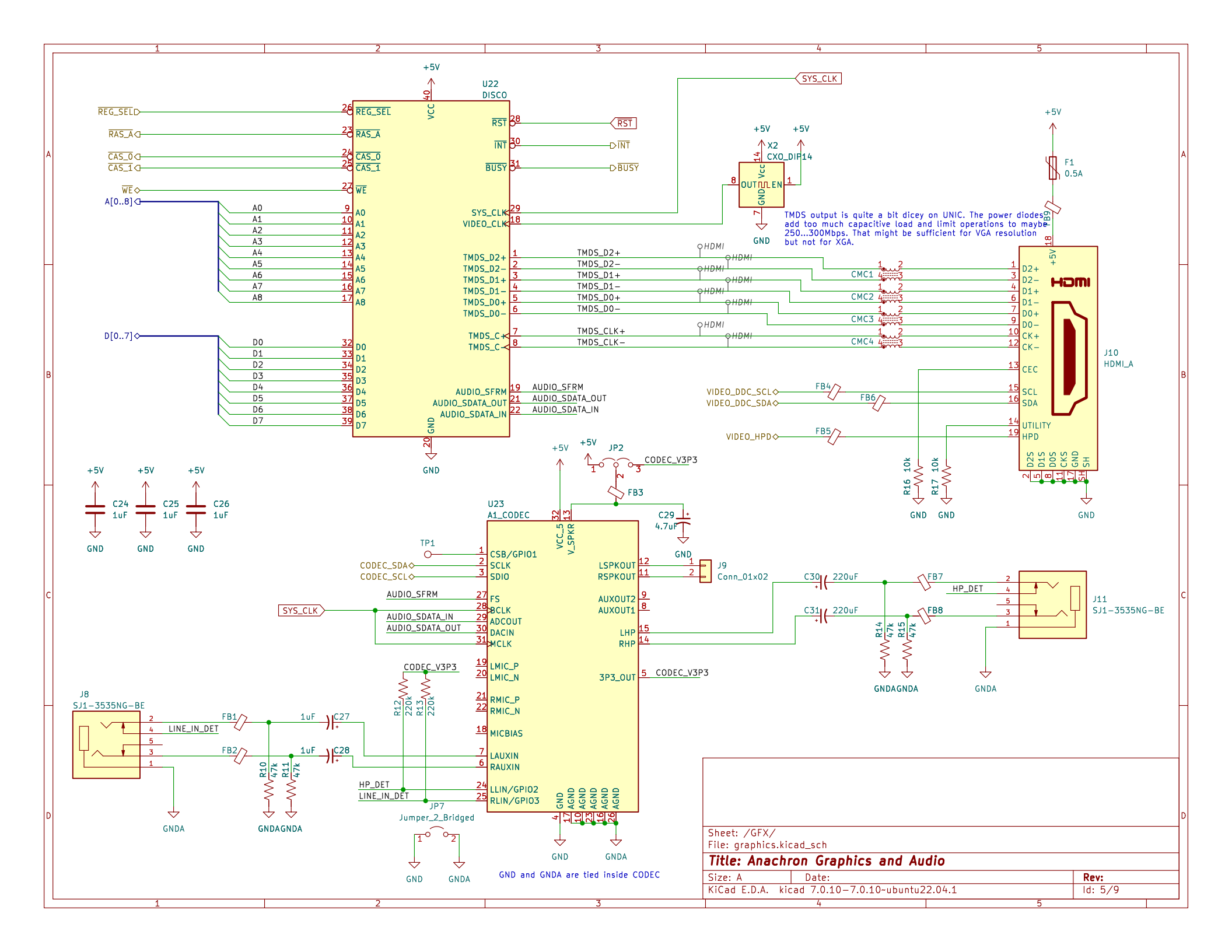
Molex	15-46-0330	(dual)
Berg	87731-102	(dual)
Autotek	SMV2030-6	(dual)
????	HWS9594	(dual)
????	HWS5040	(single)
????	HWS4323	(single, plastic)
AdamTech	SIMM-130-VTL	(single)
AMP	821876-2	(single)
AMP	821885-2	(dual)

SIMM socket source: https://www.peconnectors.com/sockets-pga-cpu-and-memory/hws9594/

Sheet: /RAM_BANK0/
File: memory.kicad_sch

Title: Anachron RAM bank

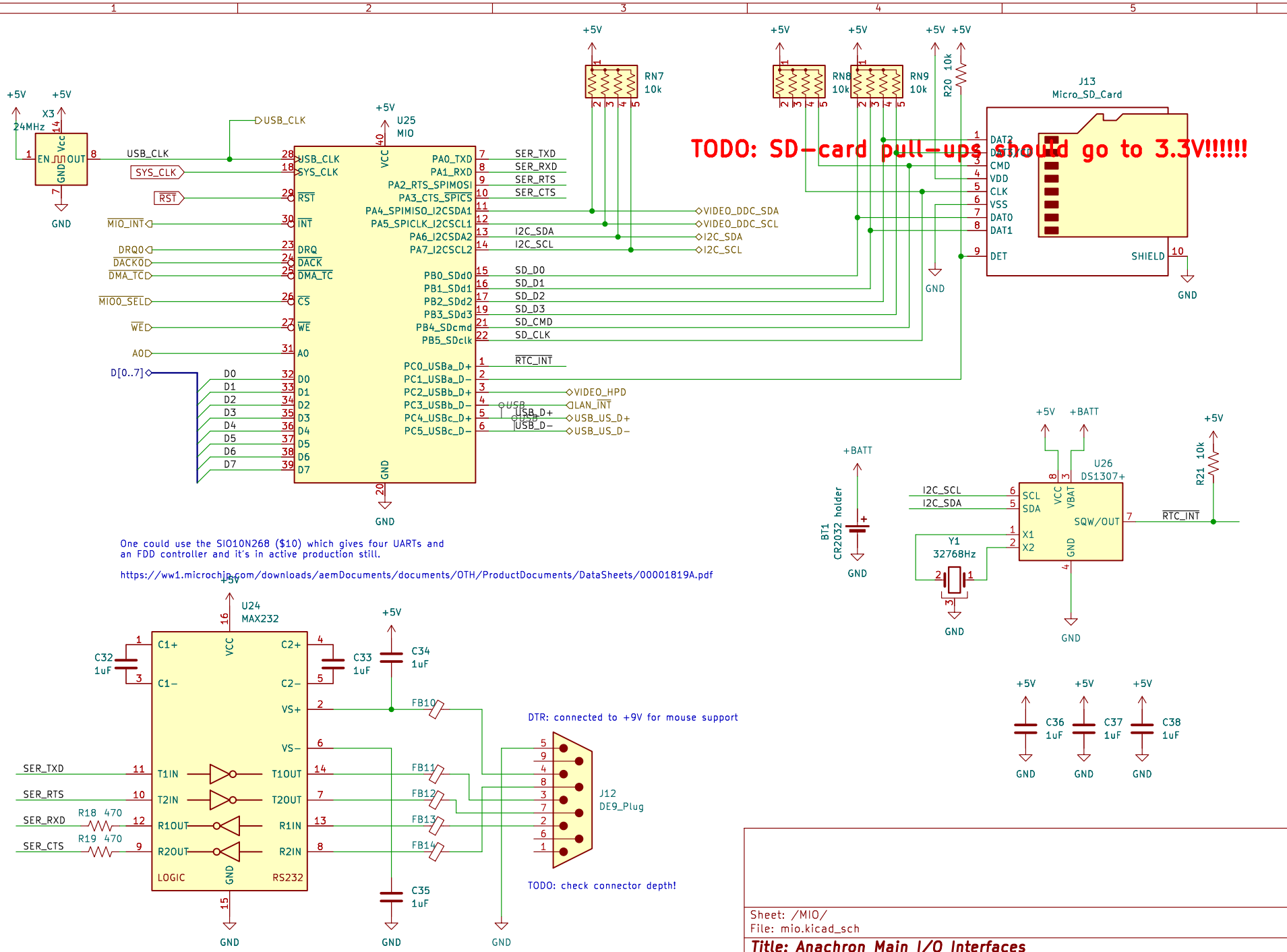
Size: A	Date:	Rev:
KiCad E.D.A. kicad 7.0.10-7.0.10~ubuntu22.04.1		Id: 3/9

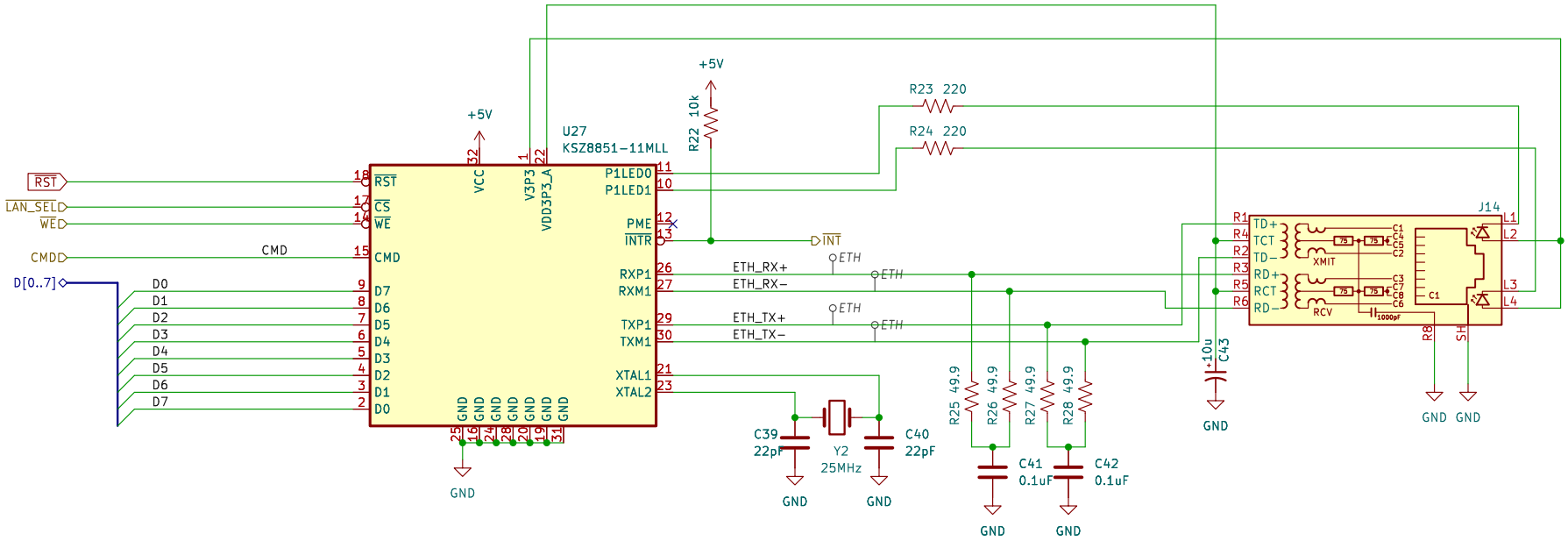


Sheet: /GFX/
File: graphics.kicad_sch

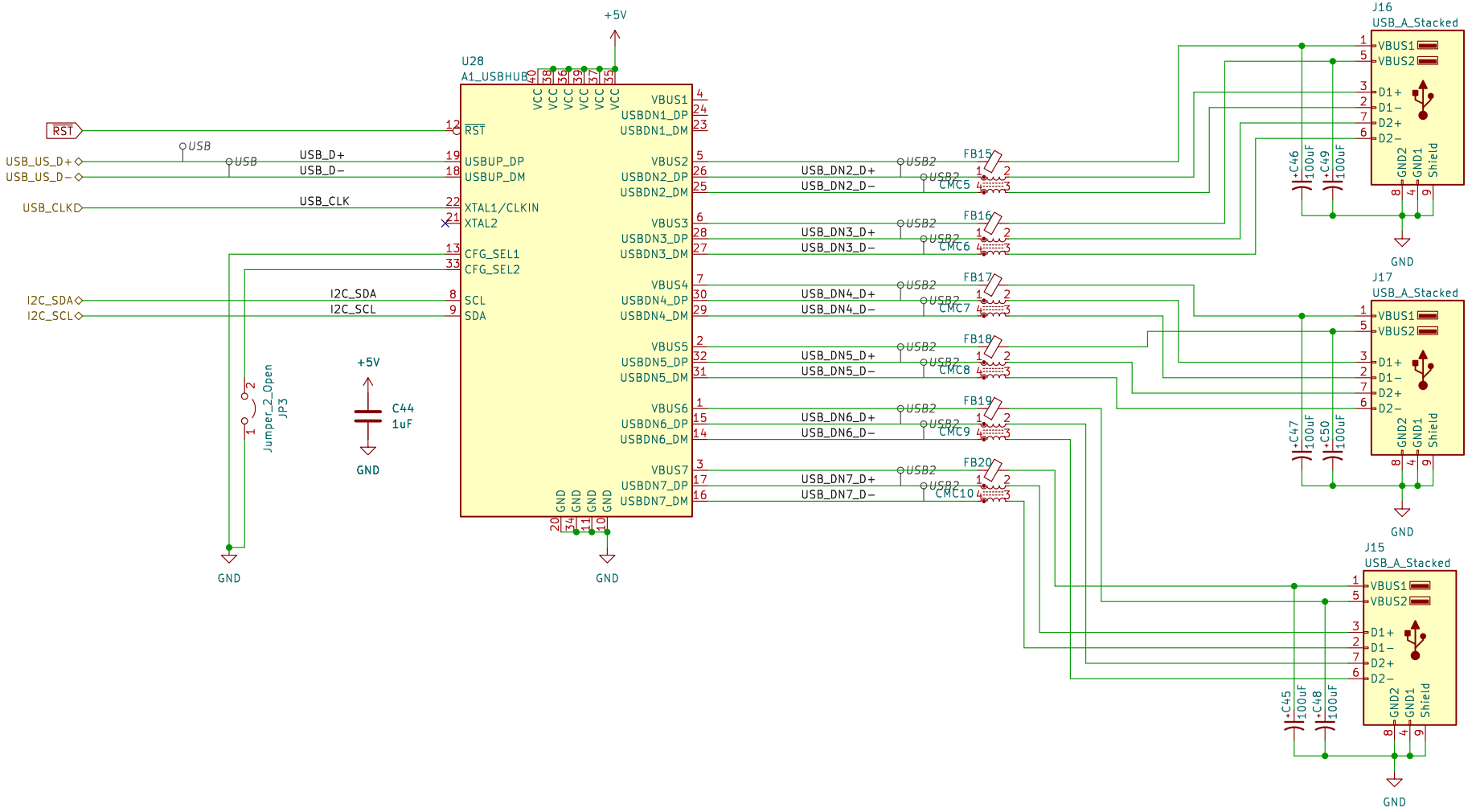
Title: Anachron Graphics and Audio

Size: A	Date:	Rev:
KiCad E.D.A. kicad 7.0.10-7.0.10~ubuntu22.04.1		Id: 5/9

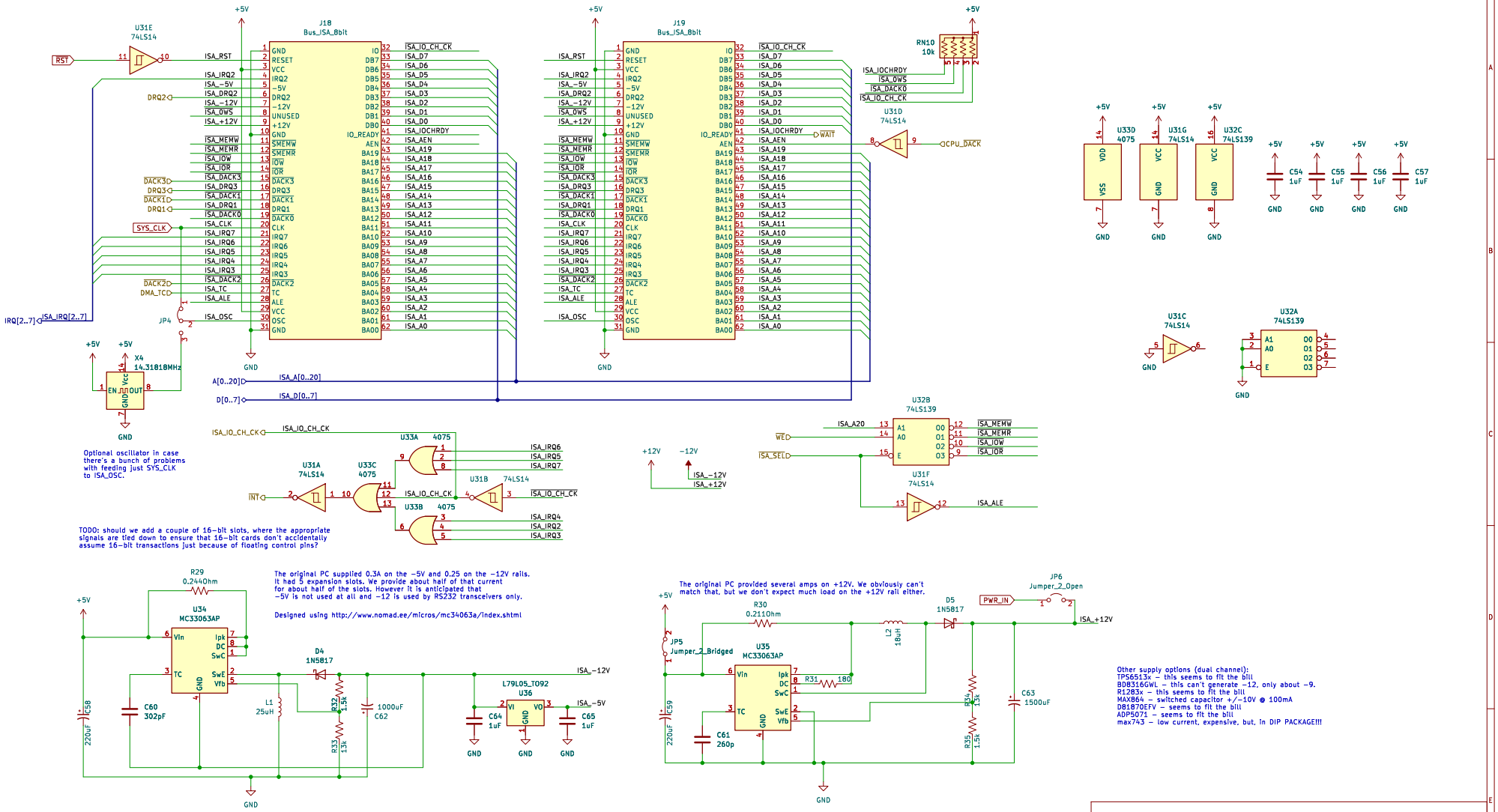

TODO: SD-card pull-ups should go to 3.3V!!!!!!
One could use the SIO10N268 ($10) which gives four UARTs and
an FDD controller and it's in active production still.
https://ww1.microchip.com/downloads/aemDocuments/documents/OTH/ProductDocuments/DataSheets/00001819A.pdf
DTR: connected to +9V for mouse support
TODO: check connector depth!
U25
MIO
U24
MAX232
U26
DS1307+
J13
Micro_SD_Card
J12
DE9_Plug
X3
24MHz
BT1
CR2032 holder
Y1
32768Hz
RN7
10k
RN8
10k
RN9
10k
R20 10k
R21 10k
R18 470
R19 470
C32
1uF
C33
1uF
C34
1uF
C35
1uF
C36
1uF
C37
1uF
C38
1uF
FB10
FB11
FB12
FB13
FB14
USB_CLK
SYS_CLK
RST
INT
DRQ0
DACK0
DMA_TC
MIO0_SEL
WE
A0
D[0..7]
SER_TXD
SER_RXD
SER_RTS
SER_CTS
VIDEO_DDC_SDA
VIDEO_DDC_SCL
I2C_SDA
I2C_SCL
SD_D0
SD_D1
SD_D2
SD_D3
SD_CMD
SD_CLK
RTC_INT
VIDEO_HPD
LAN_INT
USB_US_D+
USB_US_D-
+5V
+BATT
GND
Sheet: /MIO/
File: mio.kicad_sch
Title: Anachron Main I/O Interfaces
Size: A
Date:
Rev:
KiCad E.D.A. kicad 7.0.10-7.0.10~ubuntu22.04.1
Id: 7/9



Sheet: /ETH/		
File: ethernet.kicad_sch		
Title:		
Size: A	Date:	**Rev:**
KiCad E.D.A. kicad 7.0.10-7.0.10~ubuntu22.04.1		Id: 7/9



Sheet: /USB/		
File: usb.kicad_sch		
Title:		
Size: A	Date:	**Rev:**
KiCad E.D.A. kicad 7.0.10−7.0.10~ubuntu22.04.1		Id: 8/9


J18
Bus_ISA_8bit
J19
Bus_ISA_8bit
U31E
74LS14
RST
ISA_RST
ISA_IRQ2
ISA_-5V
ISA_DRQ2
ISA_-12V
ISA_0WS
ISA_+12V
ISA_MEMW
ISA_MEMR
ISA_IOW
ISA_IOR
ISA_DACK3
ISA_DRQ3
ISA_DACK1
ISA_DRQ1
ISA_DACK0
ISA_CLK
ISA_IRQ7
ISA_IRQ6
ISA_IRQ5
ISA_IRQ4
ISA_IRQ3
ISA_DACK2
ISA_TC
ISA_ALE
ISA_OSC
ISA_IO_CH_CK
ISA_D7
ISA_D6
ISA_D5
ISA_D4
ISA_D3
ISA_D2
ISA_D1
ISA_D0
ISA_IOCHRDY
ISA_AEN
ISA_A19
ISA_A18
ISA_A17
ISA_A16
ISA_A15
ISA_A14
ISA_A13
ISA_A12
ISA_A11
ISA_A10
ISA_A9
ISA_A8
ISA_A7
ISA_A6
ISA_A5
ISA_A4
ISA_A3
ISA_A2
ISA_A1
ISA_A0
DRQ2
DACK3
DRQ3
DACK1
DRQ1
SYS_CLK
DACK2
DMA_TC
JP4
IRQ[2..7]
ISA_IRQ[2..7]
+5V
GND
RN10
10k
U31D
74LS14
WAIT
CPU_DACK
U33D
4075
U31G
74LS14
U32C
74LS139
C54
1uF
C55
1uF
C56
1uF
C57
1uF
U31C
74LS14
U32A
74LS139
X4
14.31818MHz
Optional oscillator in case there's a bunch of problems with feeding just SYS_CLK to ISA_OSC.
A[0..20]
ISA_A[0..20]
D[0..7]
ISA_D[0..7]
U31A
74LS14
U33A
4075
U33C
4075
U33B
4075
U31B
74LS14
INT
U32B
74LS139
U31F
74LS14
WE
ISA_SEL
ISA_A20
ISA_MEMW
ISA_MEMR
ISA_IOW
ISA_IOR
ISA_ALE
+12V
-12V
TODO: should we add a couple of 16-bit slots, where the appropriate signals are tied down to ensure that 16-bit cards don't accidentally assume 16-bit transactions just because of floating control pins?
The original PC supplied 0.3A on the -5V and 0.25 on the -12V rails. It had 5 expansion slots. We provide about half of that current for about half of the slots. However it is anticipated that -5V is not used at all and -12 is used by RS232 transceivers only.
Designed using http://www.nomad.ee/micros/mc34063a/index.shtml
R29
0.244Ohm
U34
MC33063AP
D4
1N5817
L1
25uH
C60
302pF
C58
220uF
R32
1.5k
R33
13k
C62
1000uF
L79L05_TO92
U36
C64
1uF
C65
1uF
ISA_-5V
The original PC provided several amps on +12V. We obviously can't match that, but we don't expect much load on the +12V rail either.
JP6
Jumper_2_Open
PWR_IN
JP5
Jumper_2_Bridged
R30
0.211Ohm
U35
MC33063AP
D5
1N5817
L2
18uH
R31
180
C59
220uF
C61
260p
R34
13k
R35
1.5k
C63
1500uF
ISA_+12V
Other supply options (dual channel):
TPS6513x - this seems to fit the bill
BD8316GWL - this can't generate -12, only about -9.
R1283x - this seems to fit the bill
MAX864 - switched capacitor +/-10V @ 100mA
D81870EFV - seems to fit the bill
ADP5071 - seems to fit the bill
max743 - low current, expensive, but, in DIP PACKAGE!!!
Sheet: /ISA/
File: isa.kicad_sch
Title: Anachron ISA bus interface
Size: B
Date:
Rev:
KiCad E.D.A. kicad 7.0.10-7.0.10-ubuntu22.04.1
Id: 9/9

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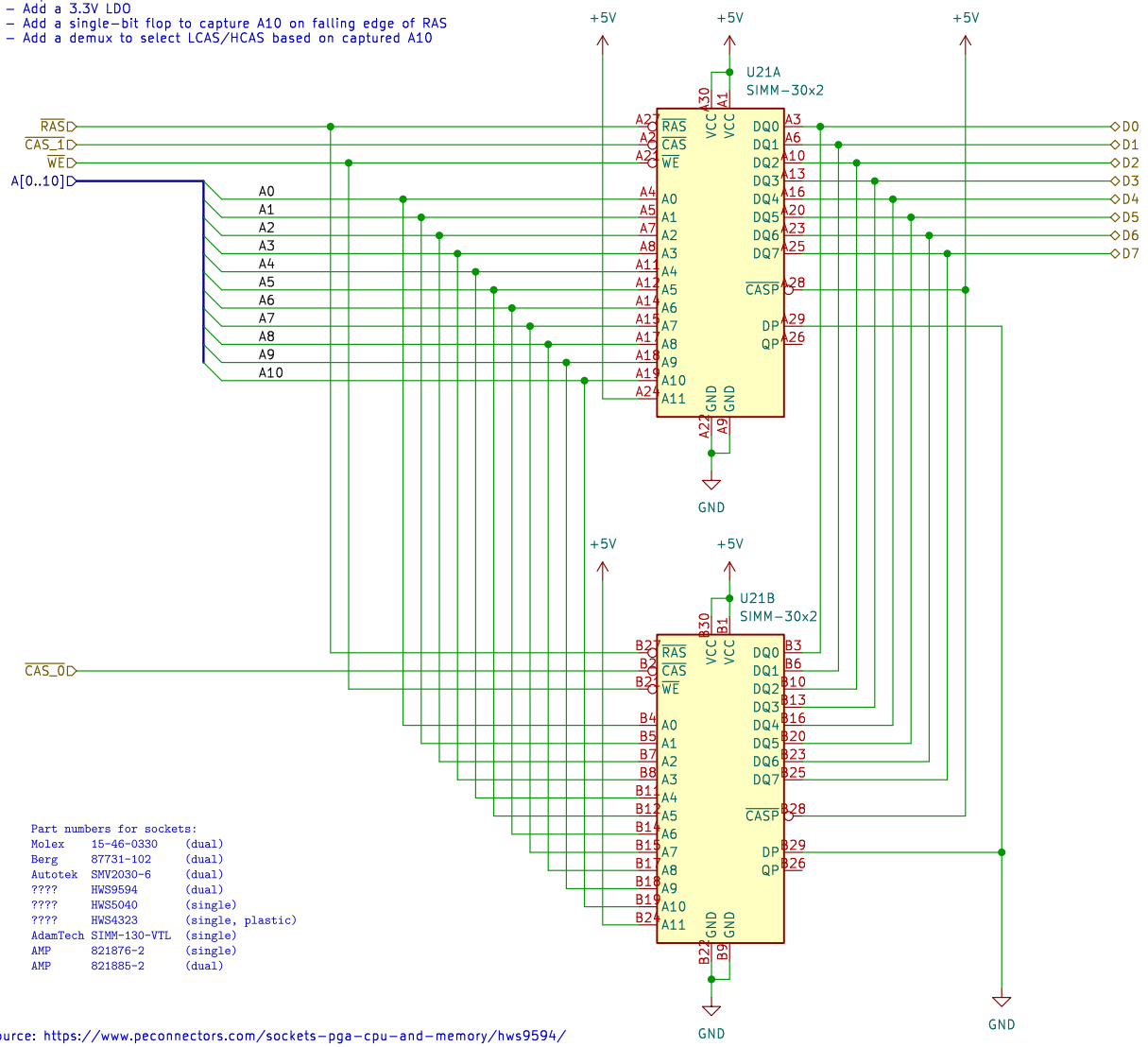

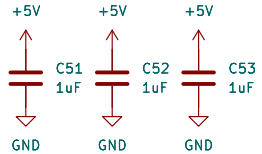

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SIMM socket source: https://www.peconnectors.com/sockets-pga-cpu-and-memory/hws9594/

Sheet: /RAM_BANK1/
File: memory.kicad_sch

Title: Anachron RAM bank

Size: A	Date:	Rev:
KiCad E.D.A. kicad 7.0.10-7.0.10~ubuntu22.04.1		Id: 9/9