TO DO

To do:
-pull-ups on VIA CA/CB (four per VIA)
-Pin1 markings on headers
-10pF instead of 47/27pF on crystal circuits, along with 150 instead of 1.5k
-Cuttable connections or 0 ohm resistors for questionable tracks
-Rename both GAL's OEBs from generic to specific and verify throughout
-Triple-check decode ranges and enables
-Verify no components without LCSC equiv. part #
-Print to scale, test fit (especially TFT LCD & ZIFs)
-Review all status LEDs to confirm they are on good pins for showing status
-Verify fill on all layers & rebuild
-External transceivers and/or clock distribution ICs needed? (really long traces)

System Block Diagram

Conventions (e.g., naming)

-Signals for secondary (audio-visual co-processor) MCU prefaced with "AV_"
-Tracks more likely needing bodging on bottom layer
-Horizontal tracks - Top, InnerLower
-Vertical tracks - InnerUpper

Memory Map, Native Decode

W65C265SXB Memory Map				
Start	***End***	***Size***	***Chip Select***	***Description***
(C0)	(FF)	4 MB	CS7B	USER MEMORY (FOR EXPANSION)
(40)	(BF)	8 MB	CS6B	USER MEMORY (FOR EXPANSION)
(00)	(3F)	4 MB	CS5B	MEMORY *See Note 2*
(00)E000 (00)8000	(00)FFFF (00)DEFF	8192 B 24320 B	CS4B	ROM MEMORY (*Note 1*) ROM MEMORY (*Note 1*)
(00)0200	(00)7FFF	32256	CS3B	Cache Memory *See Note 3*
(00)FF00 (00)E000 (00)DF80 (00)DF70 (00)DF50 (00)DF40 (00)DF20 (00)DF00 (00)0000	(00)FFFF (00)FEFF (00)DFBF (00)DF7F (00)DF6F (00)DF4F (00)DF27 (00)DF07 (00)01FF	256 B 7936 B 64 B 16 B 32 B 16 B 8 B 8 B 512 B	CS2B	On Chip Interrupt Vectors On-Chip ROM On-Chip RAM On-Chip Comm. Registers On-Chip Timer Registers On-Chip Control Registers On-Chip IO Registers On-Chip IO Registers On-Chip RAM
(00)DFC0	0xDFFF	64 B	CS1B	External Chip Select 1 (P71)
(00)DF00	0xDF1F	32 B	CS0B	External Chip Select 0 (P70) *See Note 4*

I/O Devices: See GAL Decode

Extended Flash 512 KB

Extended SRAM 2 MB (01):(02)
Dual-port SRAM (03)

Primary Flash 128 KB (four 32 KB sections)

SRAM 32 KB

Note 1 - When on-chip 8K bytes of ROM are enabled:
a.) Addresses (00)E000-FFFF will not appear in CS4B chip select decode.
b.) On Chip addresses (00)DF00-DFFF never appear in CS4B or CS5B chip select decode.

Note 2 - When on-chip ROM, CS3B and/or CS4B are enabled:
a.) CS5B decode is reduced by the addresses used by same.
b.) CS0B and CS1B address space never appears in CS2B, CS4B or CS5B decoded space.

Note 3 - When SSCR2 is "0" (internal RAM), then CS3B is active for addresses (00)0200-7FFF. When SSCR2 is "1" (external RAM), then CS3B is active for addresses (00)0000-7FFF.

Note 4 - CS0B is inactive when 00DF00-00DF07 are used for internal I/O register select (BCR0=0). When (BCR0=1) external memory bus is enabled CS0B is active for addresses 00DF00-00DF1F.

Extended Decode (GAL)

C0:0000 to FF:FFFF CS7B

1100:0000000000000000000 to
1111:1111111111111111111
(range: top two bits are 11)

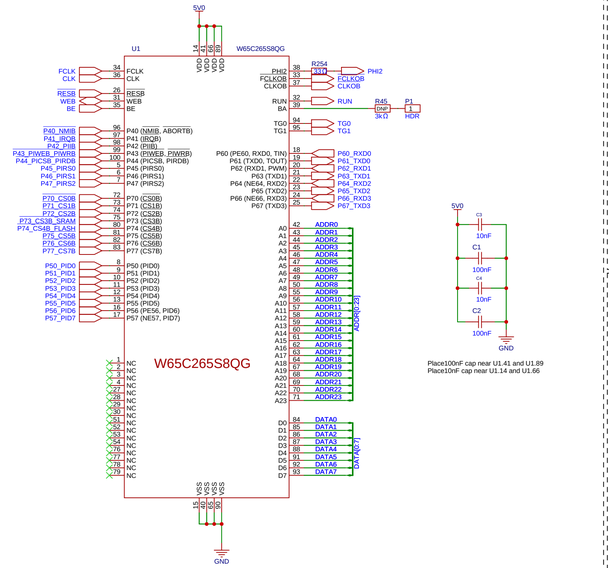
1100: VIA0 C0:xxxx C0:0000 to C0:000F
1101: VIA1 D0:xxxx D0:0000 to D0:000F
1110: VIA2 E0:xxxx E0:0000 to E0:000F
1111: VIA3 F0:xxxx F0:0000 to F0:000F

**re-map I/O by bringing in additional address lines
see Overview page for details

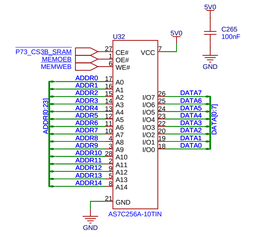
Schematic	Schematic1	Create at	2026-01-05
		Update at	2026-01-07
Board	Board1	Page	Overview
Drawn		W65C265S v0.12	
Reviewed			
		Version	Size	Page 1 Total 12
EasyEDA		V1.0	A4	EasyEDA.com

MCU (Primary)

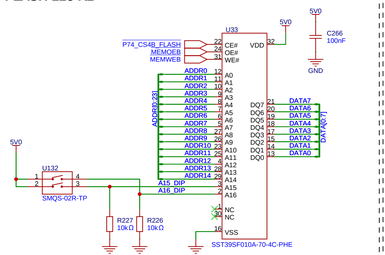
65265 MCU



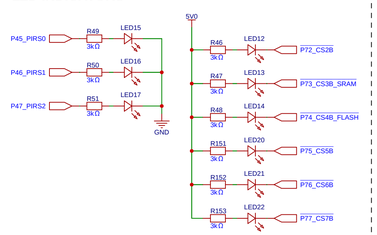
STATIC RAM 32 KB



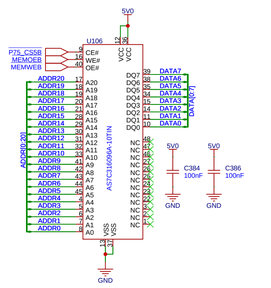
FLASH 128 KB



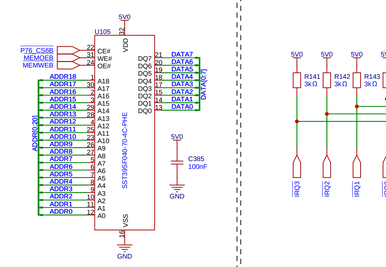
LED INDICATORS



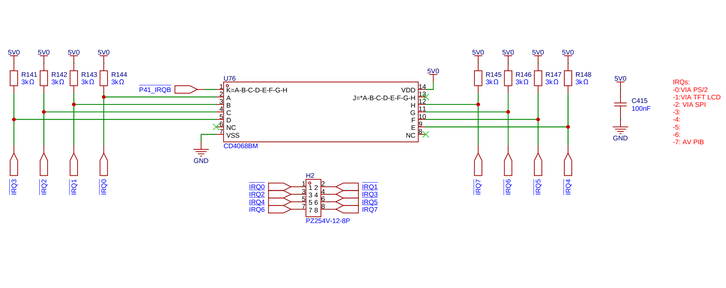
STATIC RAM 2 MB



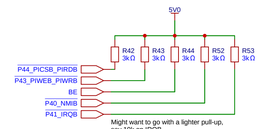
FLASH 512 KB



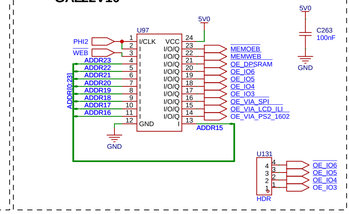
IRQs

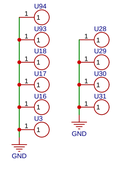


PULL-UPS



GAL22V10

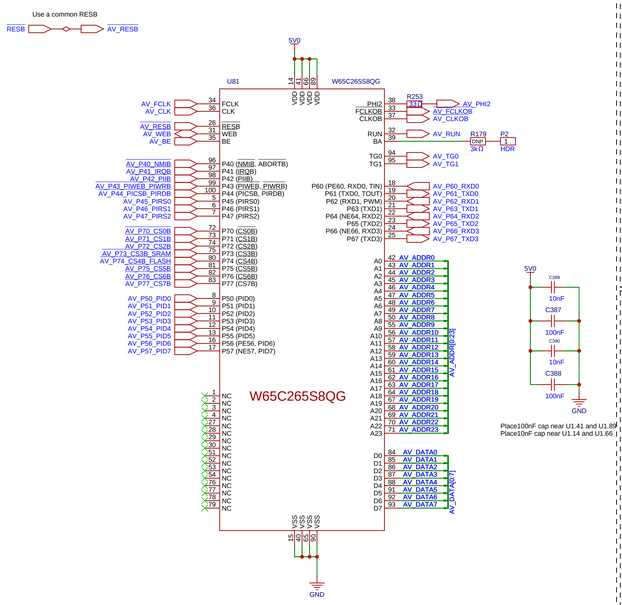




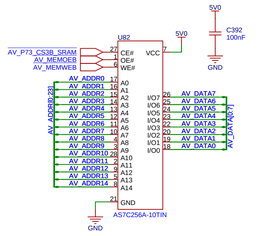
Schematic	Schematic1	Create at	2026-01-05
		Update at	2026-01-06
Board	Board1	Page	MCU Primary
Drawn		W65C265S v0.12	
Reviewed			
		Version	Size	Page 2 Total 12
EasyEDA		V1.0	A4	EasyEDA.com

MCU (AV)

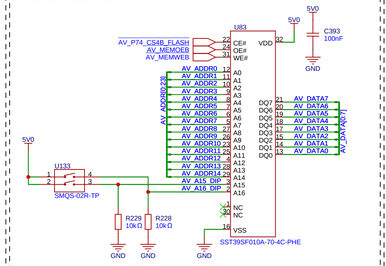
65265 MCU



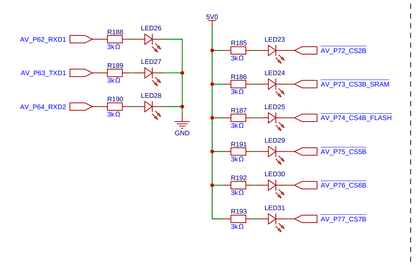
STATIC RAM 32 KB



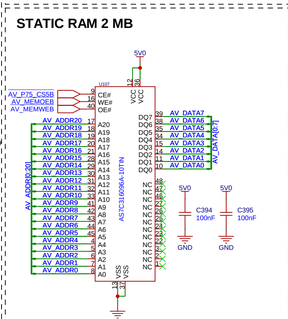
FLASH 128 KB



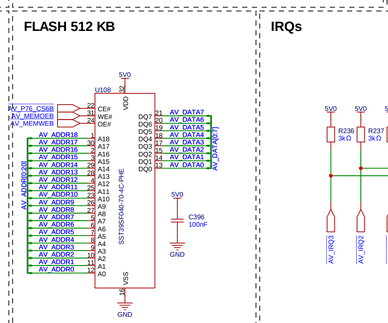
LED INDICATORS



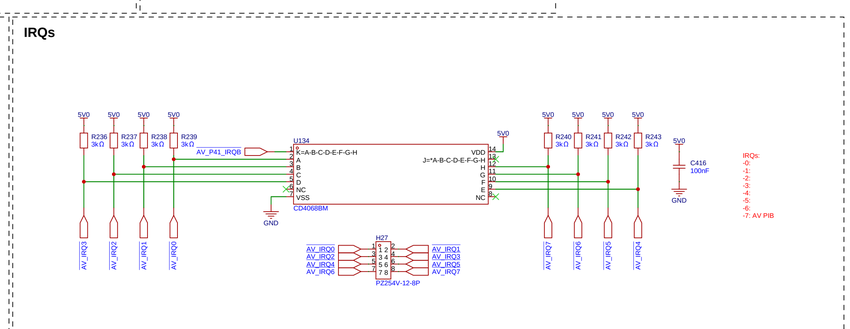
STATIC RAM 2 MB



FLASH 512 KB

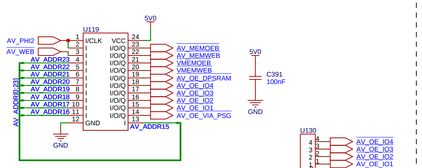


IRQs



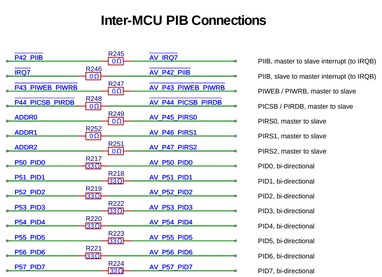
PULL-UPS

GAL22V10



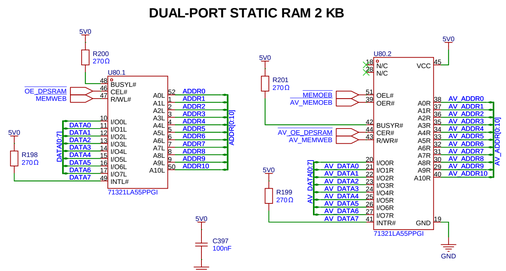
INTER-MCU

Inter-MCU PIB Connections



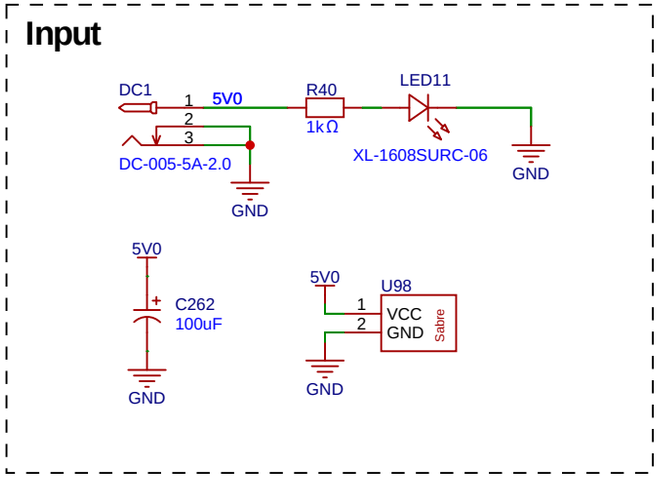
PIIB, master to slave interrupt (to IRQ6)
PIIB, slave to master interrupt (to IRQ6)
PIWEB / PIWRB, master to slave
PICSB / PIRDB, master to slave
PIRS0, master to slave
PIRS1, master to slave
PIRS2, master to slave
PID0, bi-directional
PID1, bi-directional
PID2, bi-directional
PID3, bi-directional
PID4, bi-directional
PID5, bi-directional
PID6, bi-directional
PID7, bi-directional

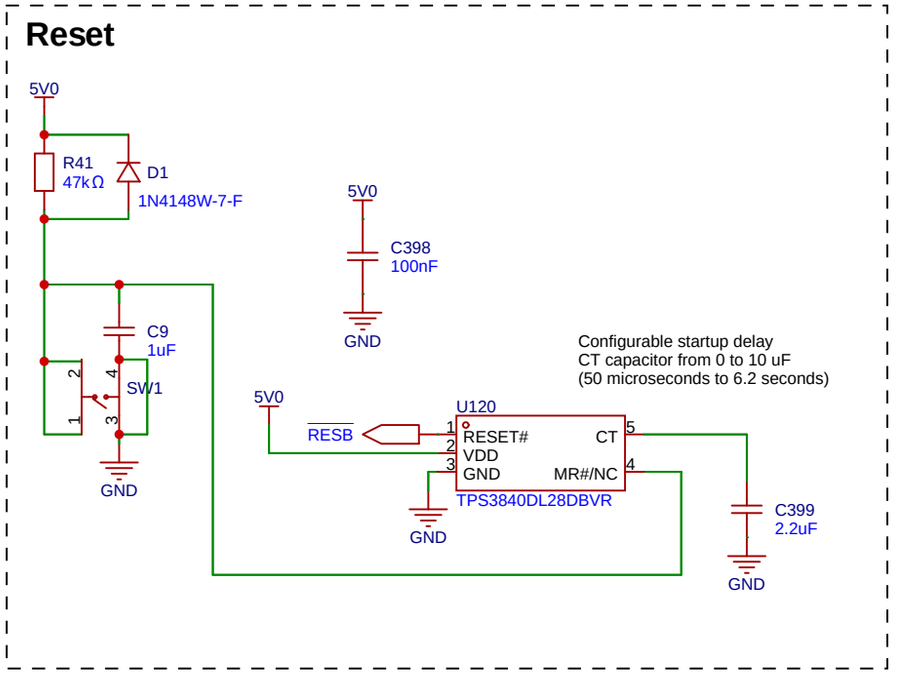
DUAL-PORT STATIC RAM 2 KB

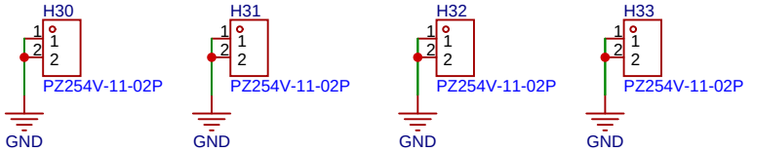


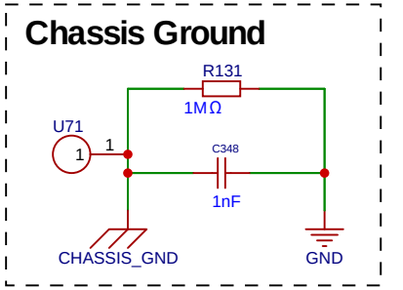
Schematic	Schematic1	Create at	2026-01-05
		Update at	2026-01-06
Board	Board1	Page	MCU AV
Drawn		W65C265S v0.12	
Reviewed			
		Version	Size
EasyEDA		V1.0	A4
		Page 3 Total 12	
		EasyEDA.com	

POWER







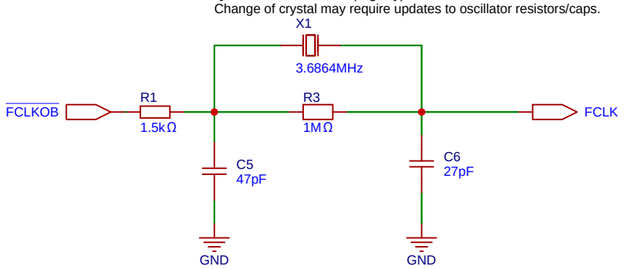


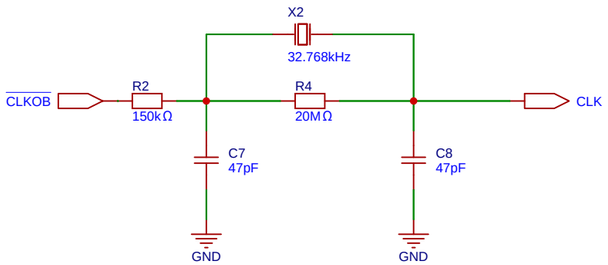
Schematic	Schematic1	Create at	2026-01-05
		Update at	2026-01-06
Board	Board1	Page	Power
Drawn		W65C265S v0.12	
Reviewed			
	Version	Size	Page 4 Total 12
EasyEDA	V1.0	A4	EasyEDA.com

CLOCKS

PRIMARY

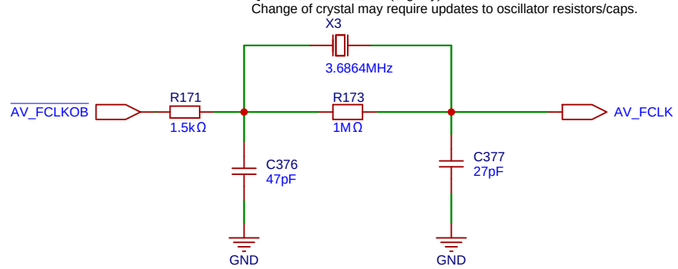
10 MHz Crystal option:
QT49S-10.000MEEJ-T (Digikey)
Change of crystal may require updates to oscillator resistors/caps.

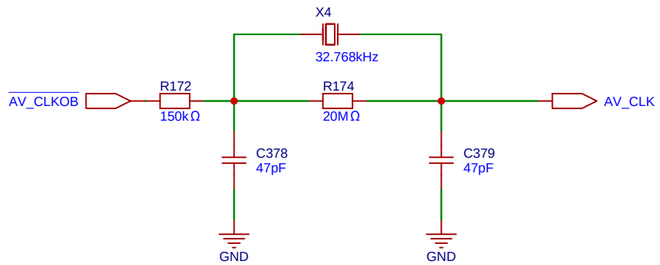




AV

10 MHz Crystal option:
QT49S-10.000MEEJ-T (Digikey)
Change of crystal may require updates to oscillator resistors/caps.





Schematic	Schematic1	Create at	2026-01-05
		Update at	2026-01-04
Board	Board1	Page	Clocks
Drawn		W65C265S v0.12	
Reviewed			
		Version	Size	Page 5 Total 12
EasyEDA		V1.0	A4	EasyEDA.com

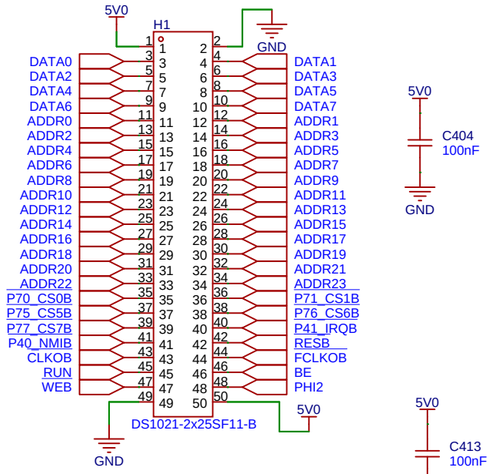
EXPANSION

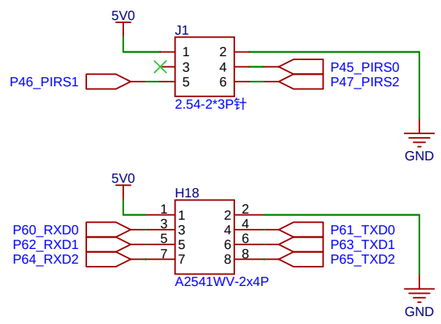
Used:

P50:56 - 1602 LCD
P51 - Available

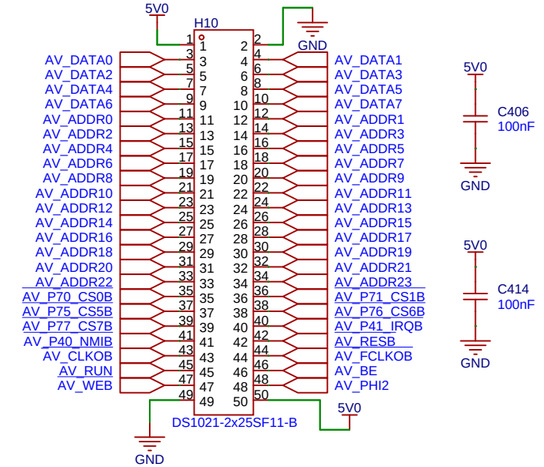
P62 - PS2KBD DATA
P64 - PS2KBD CLK
P66 - RXD3
P67 - TXD3

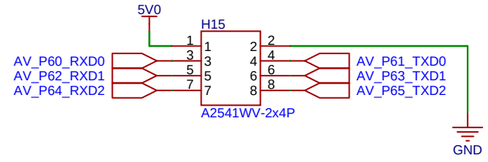
Primary XBus265





AV XBus265

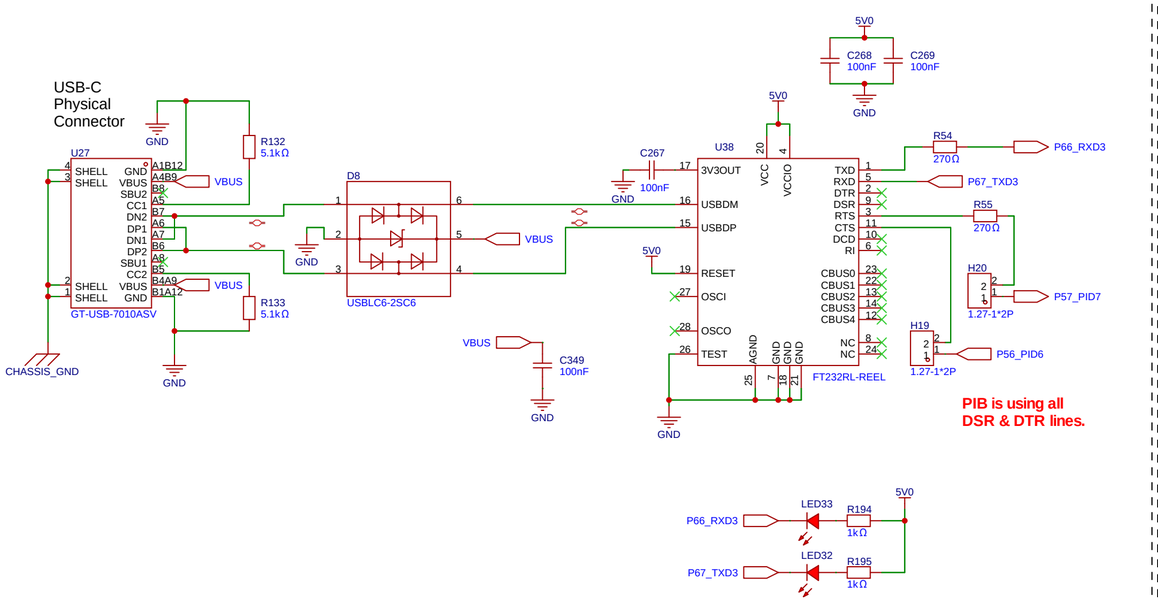




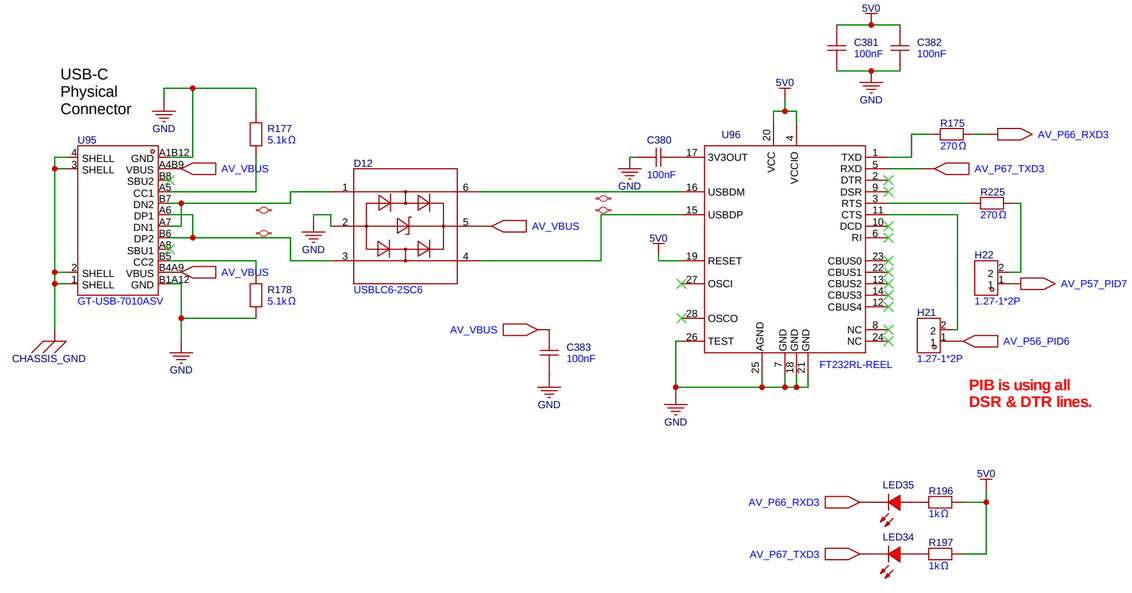
Schematic	Schematic1	Create at	2026-01-05
		Update at	2026-01-06
Board	Board1	Page	Expansion
Drawn		W65C265S v0.12	
Reviewed			
		Version	Size	Page 6 Total 12
EasyEDA		V1.0	A4	EasyEDA.com

USB SERIAL, PS/2 KEYBOARD

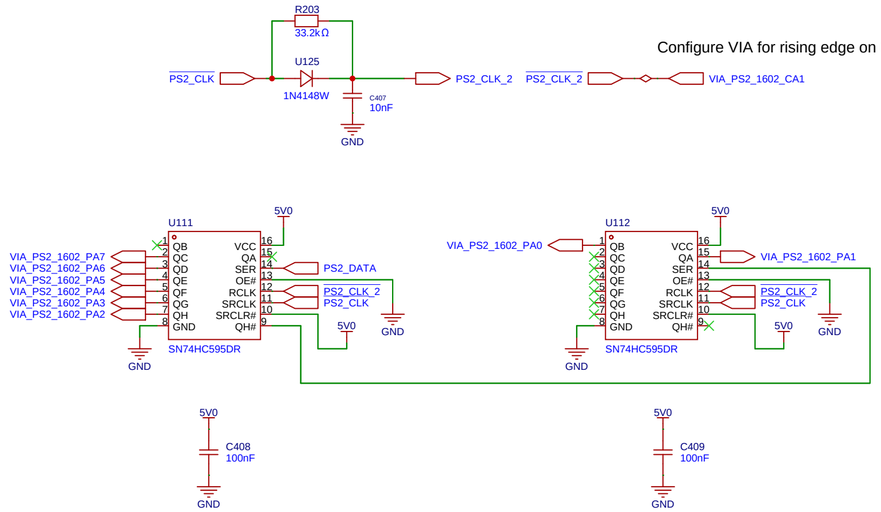
Primary



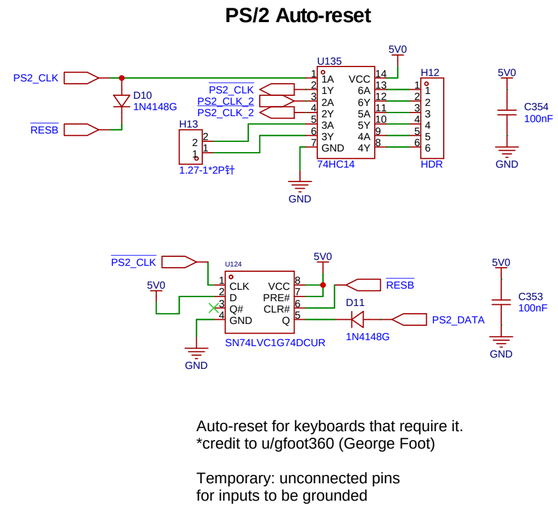
AV

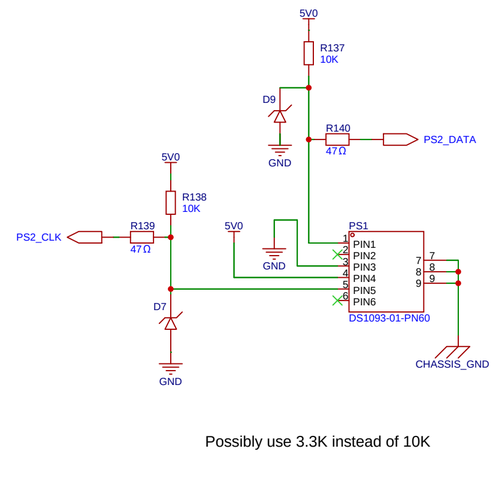


PS/2 Keyboard - Primary



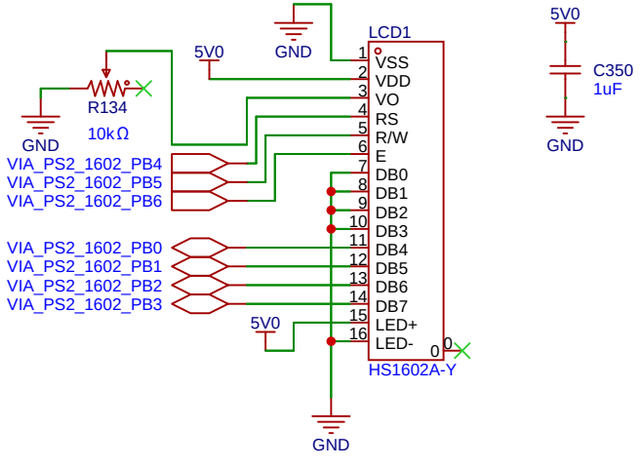
PS/2 Auto-reset





Schematic	Schematic1	Create at	2026-01-05
		Update at	2026-01-07
Board	Board1	Page	Serial & PS2
Drawn		W65C265S v0.12	
Reviewed			
		Version	Size	Page 7 Total 12
EasyEDA		V1.0	A4	EasyEDA.com

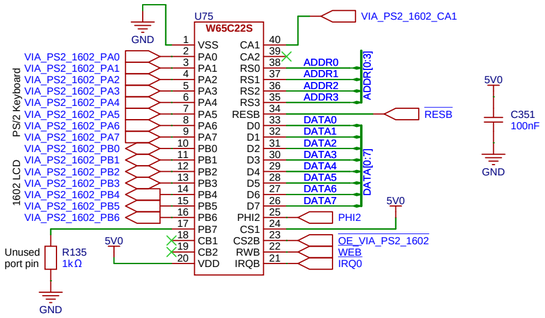
LCD 1602



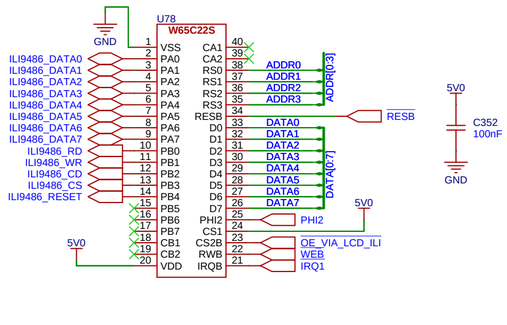
Schematic	Schematic1	Create at	2026-01-05
		Update at	2026-01-07
Board	Board1	Page	LCD_1602
Drawn		W65C265S v0.12	
Reviewed			
	Version	Size	Page 8 Total 12
EasyEDA	V1.0	A4	EasyEDA.com

VIAs

PS/2 Keyboard, 1602 LCD



TFT LCD (ILI)

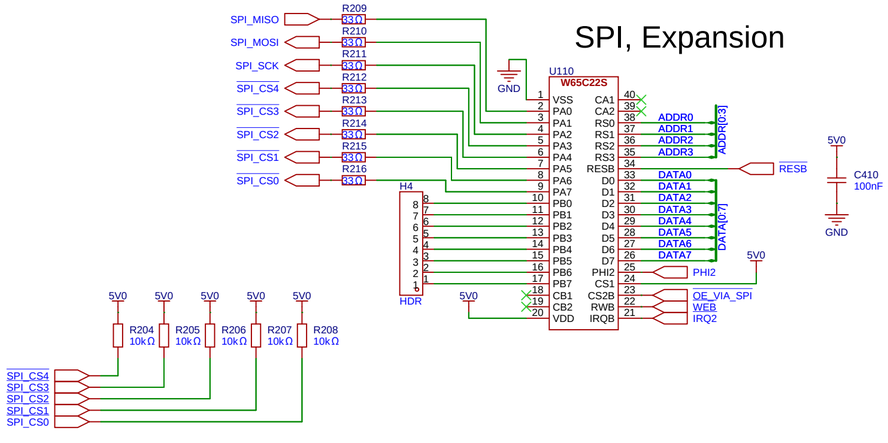


C0:0000 to FF:FFFF CS7B

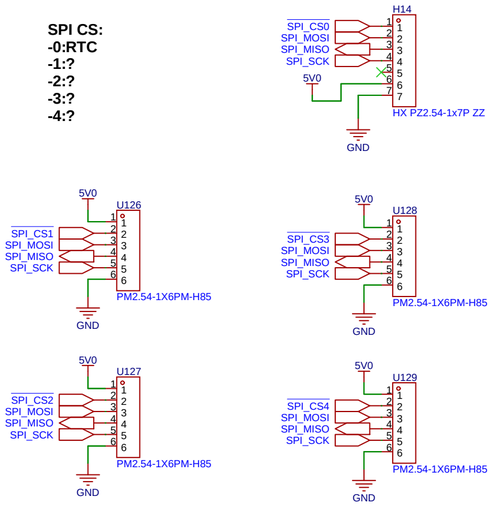
1100:0000000000000000000 to
1111:1111111111111111111
(range: top two bits are 11)

1100: VIA0 C0:xxxx C0:0000 to C0:000F
1101: VIA1 D0:xxxx D0:0000 to D0:000F
1110: VIA2 E0:xxxx E0:0000 to E0:000F
1111: VIA3 F0:xxxx F0:0000 to F0:000F

SPI, Expansion



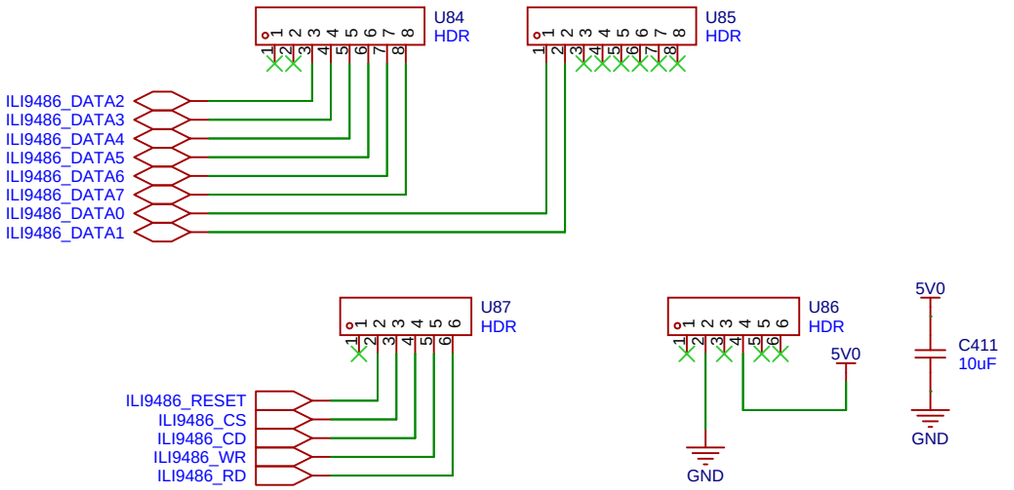
SPI CS:
-0:RTC
-1:?
-2:?
-3:?
-4:?



Schematic	Schematic1	Create at	2026-01-05
		Update at	2026-01-04
Board	Board1	Page	VIAs
Drawn		W65C265S v0.12	
Reviewed			
		Version	Size	Page 9 Total 12
EasyEDA		V1.0	A4	EasyEDA.com

LCD - ILI

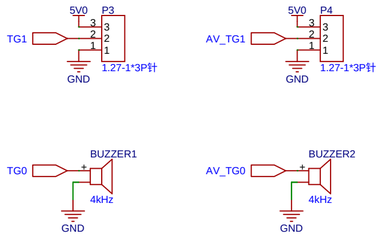
Arduino-style header for DIYables TFT LCD



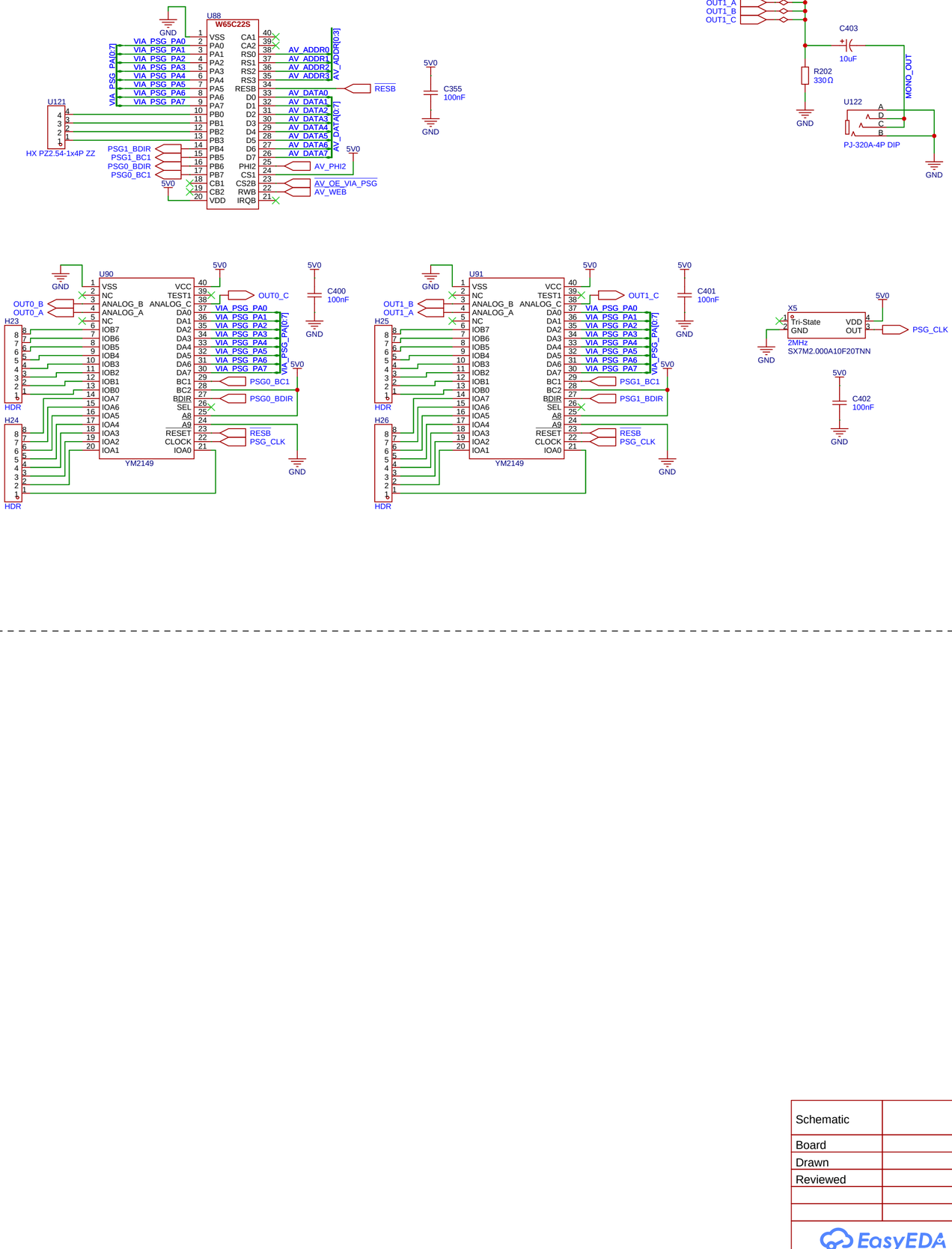
Schematic	Schematic1	Create at	2026-01-05
		Update at	2026-01-04
Board	Board1	Page	LCD_ILI
Drawn		W65C265S v0.12	
Reviewed			
		Version	Size	Page 10 Total 12
EasyEDA		V1.0	A4	EasyEDA.com

Sound

Tone Generators



Programmable Sound Generators



Schematic	Schematic1	Create at	2026-01-05
		Update at	2026-01-05
Board	Board1	Page	Sound
Drawn		W65C265S v0.12	
Reviewed			
		Version	Size / Page 11 Total 12
EasyEDA		V1.0	A4 / EasyEDA.com

VGA 320x240 x1Byte

RRRGGGBB

VGA Signal 320 x 240 @ 60 Hz

General timing
Screen refresh rate60 Hz
Vertical refresh31.46875 kHz
Pixel freq.12.5875 MHz

Horizontal timing (line)
Polarity of horizontal sync pulse is negative.
Scanline partPixelsTime [µs]
Visible area32012.711
Front porch80.318 320 101000000
Sync pulse481.907 328 101001000
Back porch240.953 376 101111000
Whole line40015.889 400 110010000

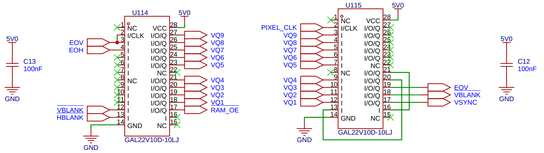
Vertical timing (frame)
Polarity of vertical sync pulse is negative.
Frame partLinesTime [ms]
Visible area48015.253
Front porch100.318 480 0111100000
Sync pulse20.064 490 0111101010
Back porch331.049 492 0111101100
Whole frame52116.683 525 1000001101

320x240 x1Byte
-3bit Red
-3bit Green
-2bit Blue

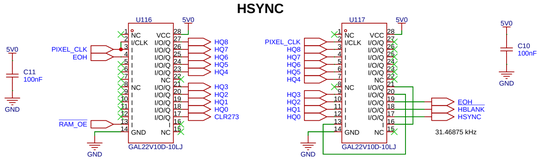
IO2_EN OR'd with MEMR#/MEMW# to generate VMEMOEB and VMEMEWB

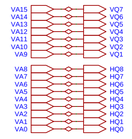
CS7B is C0:0000 to FF:FFFF
OE3B is E0:0000 to EF:0000
Video MRB/MWB are EA:0000 to EB:FFFF

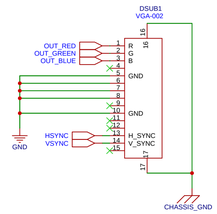
VSYNC



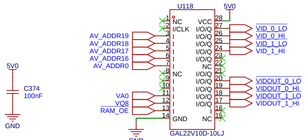
HSYNC







DECODE

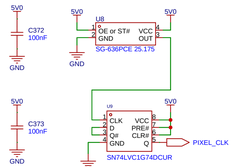


VRAM
0x0A0000-0BFFFF

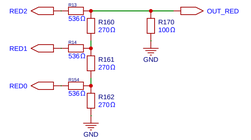
Video address (for enable)
A19=1
A18=0
A17=1

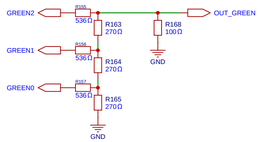
When A16=0, lower 64K (first two SRAMs)
When A16=1, upper 64K (last two SRAMs)

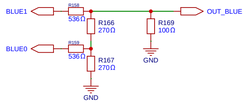
When A0=0, LO byte
When BHE (IA0) =0, HI byte



To do:
-fill top / bottom layers with GND
- same with inner signal

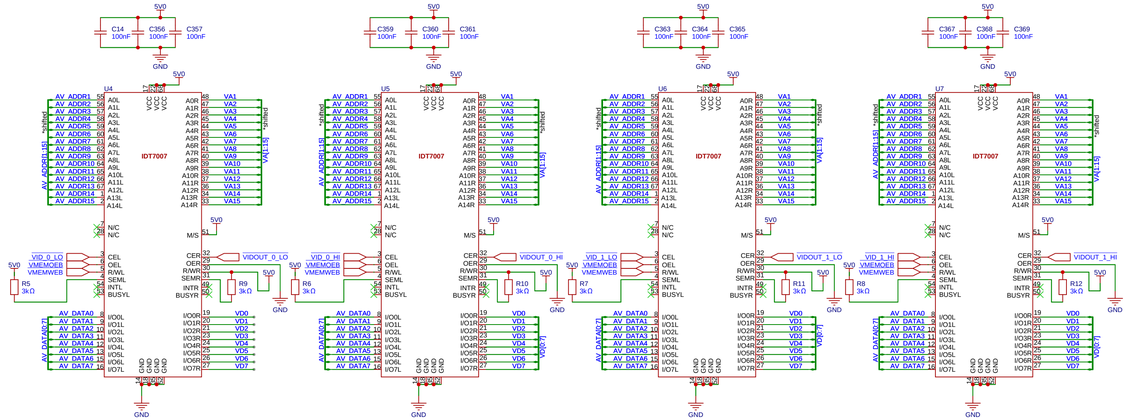


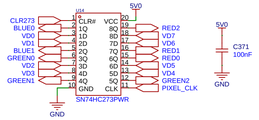




LOWER 64K (VID_0)

UIPPER 64K (VID_1)





Schematic	Schematic1	Create at	2026-01-05
Board	Board1	Update at	2026-01-04
Drawn		Page	VGA
Reviewed		W65C265S v0.12	
		Version	Size
EasyEDA		V1.0	A4
		Page 12 Total 12	
		EasyEDA.com	