TO DO

To do:
-Inidicators for serial RX/TX
-Power switch
-Reset delay circuit (board-wide)?
-LED indicators for all enable lines
-Move USB serial to a UART other than UART3 to free up PIB
-Move 1602 LCD to external VIA port
-Add VGA 320x240 circuit
-Add PSG
-Add second '265 for video/audio control
-Pin1 markings on headers
-10pF instead of 47/27pF on crystal circuits, along with 150 instead of 1.5k
-Updated crystal 10 MHz actual part
-Replace GAL16 with largest Digital supports
-Add RTC
-Cuttable connections for questionable tracks
-Verify no VCC nets (should be 5V0)
-Swap out crystal
-Verify caps are close to their respective ICs
-Add resistors for SPI
-Rename both GAL's OEBs from generic to specific and verify throughout
-Triple-check decode ranges and enables
-Triple-check PS/2 circuit
-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

System Block Diagram

Conventions (e.g., naming)

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)

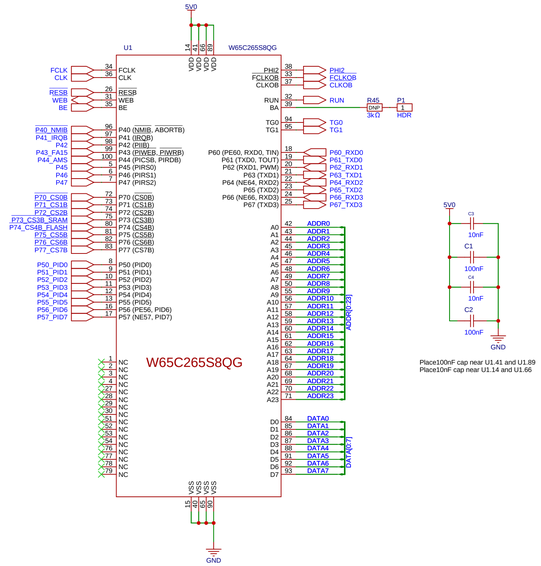
1100: VIA0 C0:xxxx C0:0000 to C0:000F
1101: VIA1 D0:xxxx D0:0000 to D0:000F
1110: VIA2 E0:xxxx E0:0000 to E0:000F
1111: VIA3 F0:xxxx F0:0000 to F0:000F

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

Schematic	Schematic1	Create at	2026-01-02
		Update at	2026-01-03
Board	Board1	Page	Overview
Drawn		W65C265S v0.10	
Reviewed			
		Version	Size	Page 1 Total 12
EasyEDA		V1.0	A4	EasyEDA.com

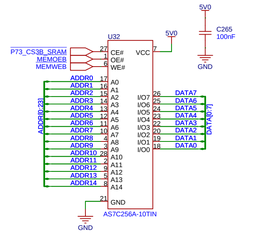
MCU (Primary)

65265 MCU

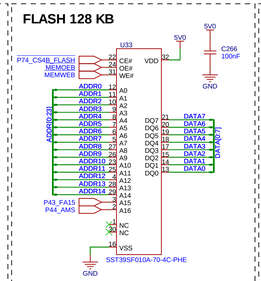


Place100nF cap near U1.41 and U1.89
Place10nF cap near U1.14 and U1.66

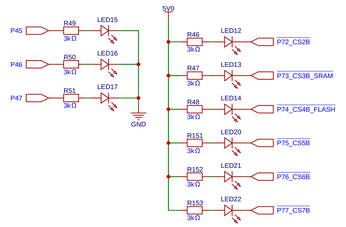
STATIC RAM 32 KB



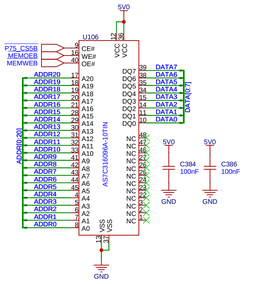
FLASH 128 KB



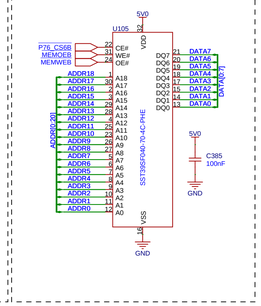
LED INDICATORS



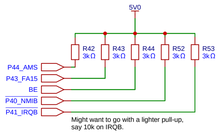
STATIC RAM 2 MB



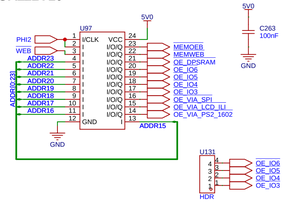
FLASH 512 KB

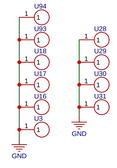


PULL-UPS



GAL22V10





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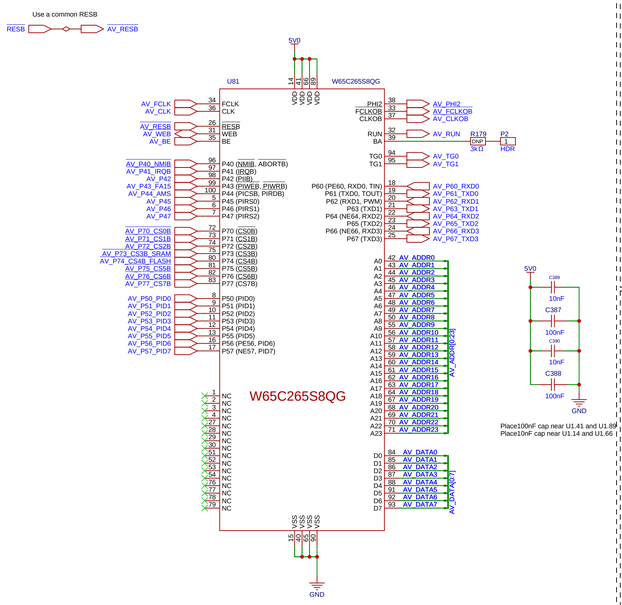
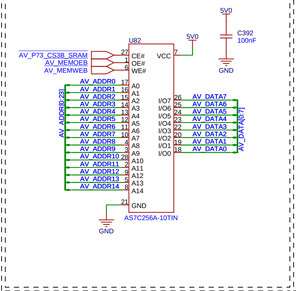
		Update at	2026-01-03
Board	Board1	Page	MCU Primary
Drawn		W65C265S v0.10	
Reviewed			
	Version	Size	Page 2 Total 12
EasyEDA	V1.0	A4	EasyEDA.com

MCU (AV)

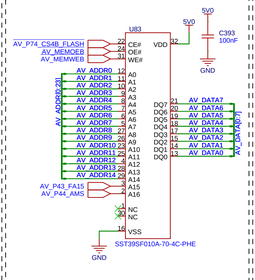
65265 MCU



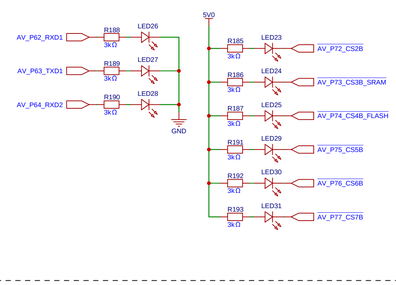
STATIC RAM 32 KB



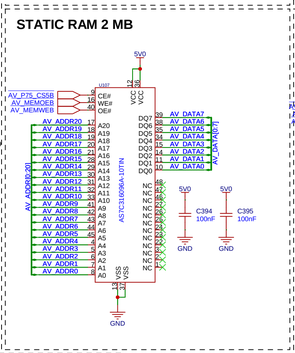
FLASH 128 KB



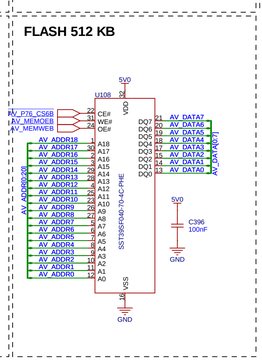
LED INDICATORS



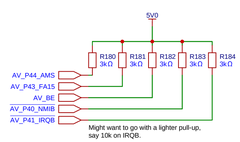
STATIC RAM 2 MB



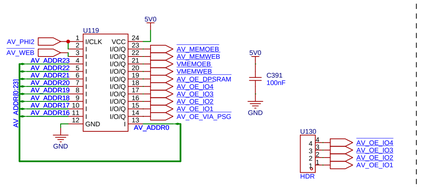
FLASH 512 KB



PULL-UPS

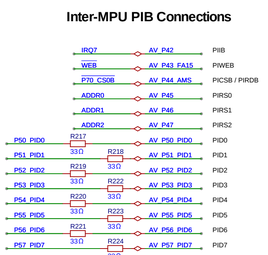


GAL22V10

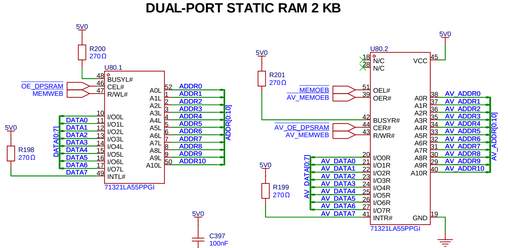


INTER-MPU

Inter-MPU PIB Connections



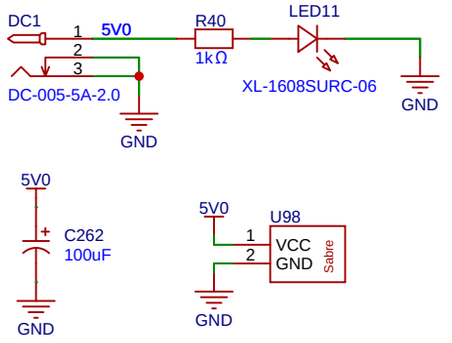
DUAL-PORT STATIC RAM 2 KB



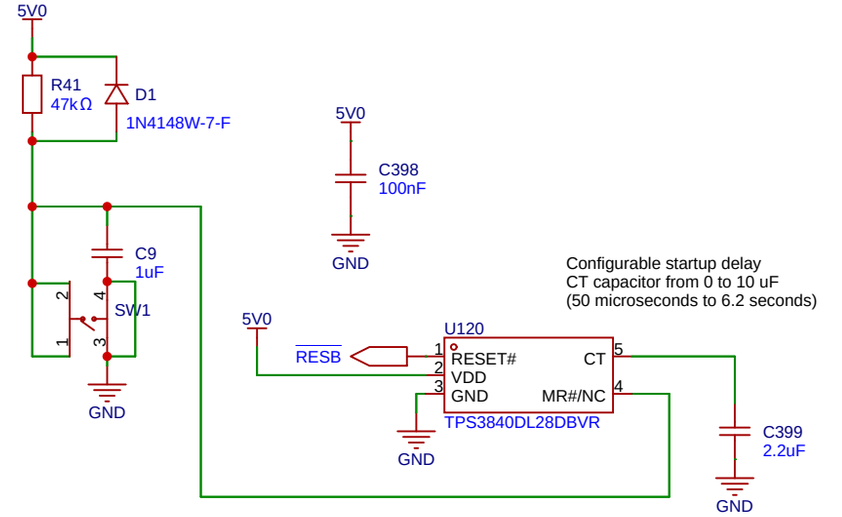
Schematic	Schematic1	Create at	2026-01-02
		Update at	2026-01-03
Board	Board1	Page	MCU AV
Drawn		W65C265S v0.10	
Reviewed			
		Version	Size
EasyEDA		V1.0	A4
		Page 3 Total 12	
		EasyEDA.com	

POWER

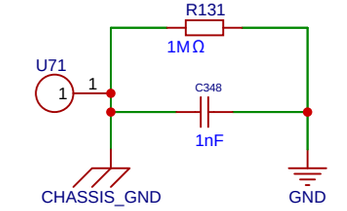
Input



Reset



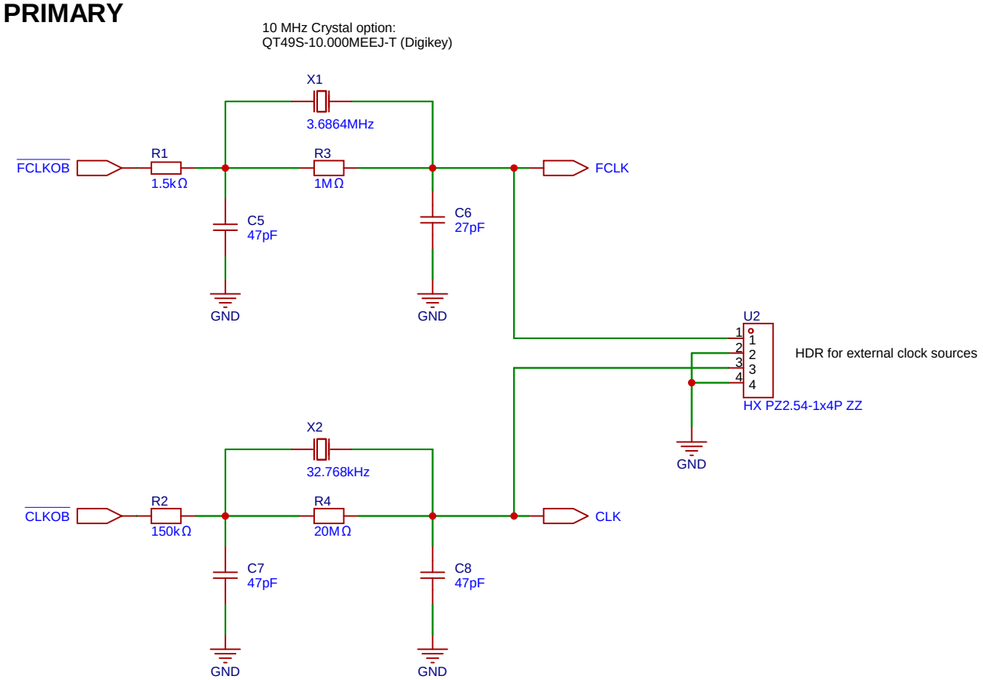
Chassis Ground



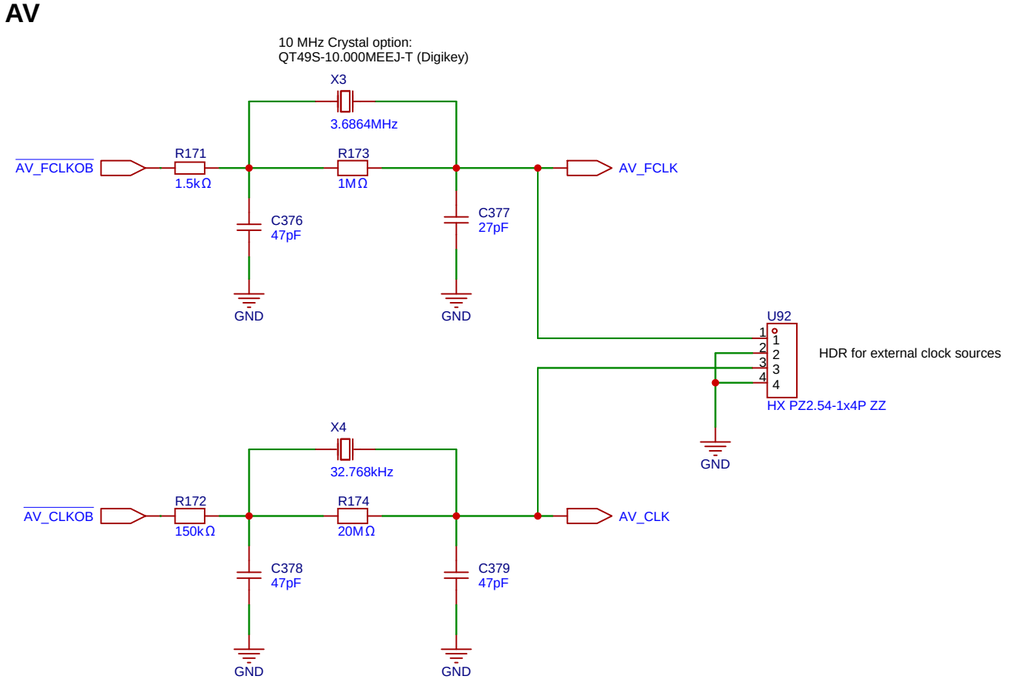
Schematic	Schematic1	Create at	2026-01-02
		Update at	2026-01-02
Board	Board1	Page	Power
Drawn		W65C265S v0.10	
Reviewed			
	Version	Size	Page 4 Total 12
EasyEDA	V1.0	A4	EasyEDA.com

CLOCKS

PRIMARY



AV



Schematic	Schematic1	Create at	2026-01-02
		Update at	2026-01-02
Board	Board1	Page	Clocks
Drawn		W65C265S v0.10	
Reviewed			
		Version	Size / Page 5 Total 12
EasyEDA		V1.0	A4 / EasyEDA.com

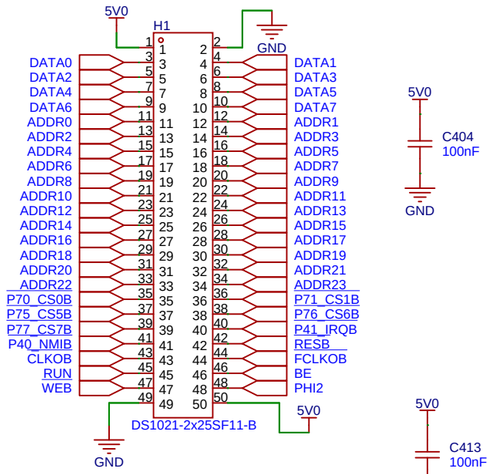
EXPANSION

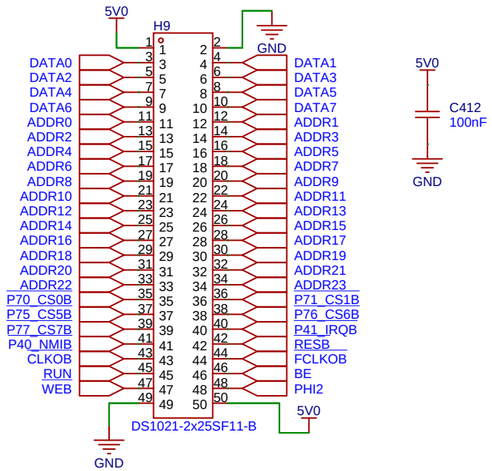
Used:

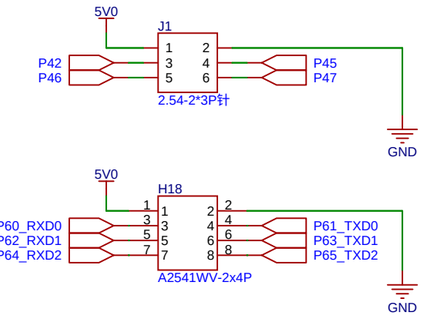
P50:56 - 1602 LCD
P51 - Available

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

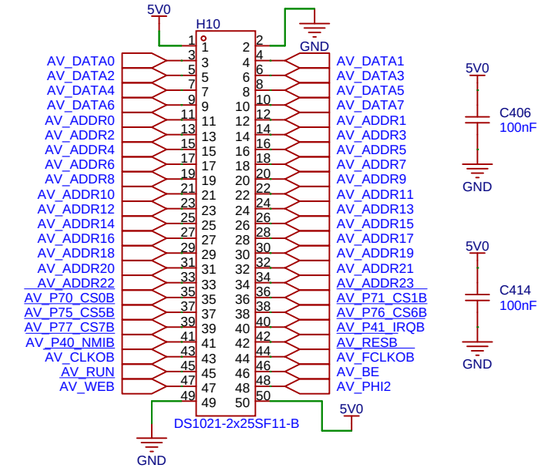
Primary XBus265

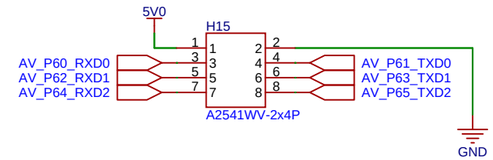






AV XBus265

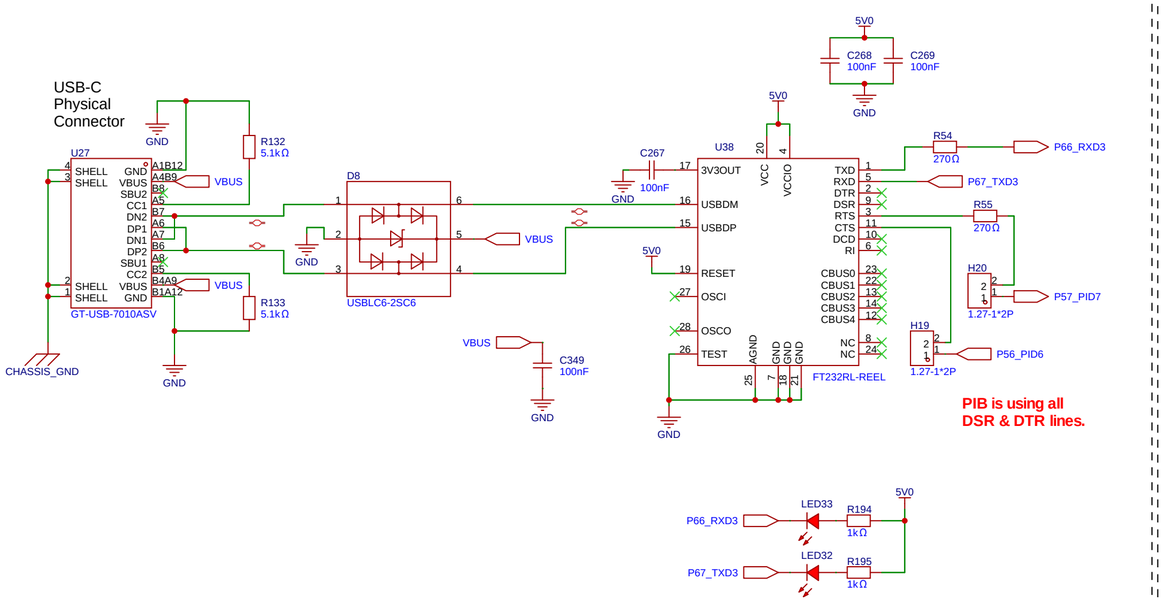




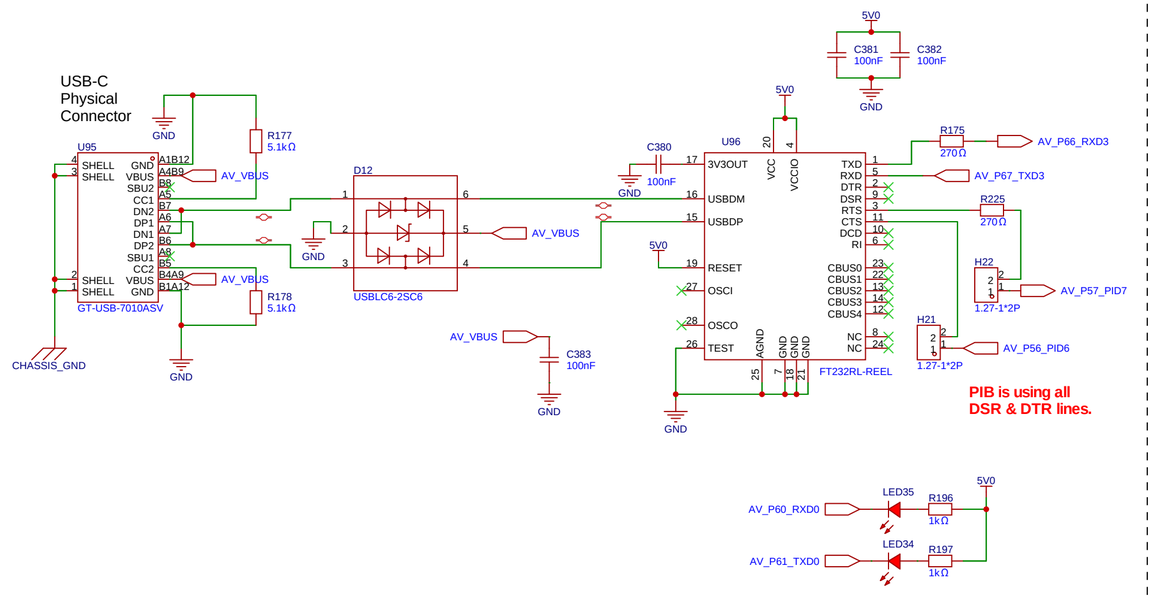
Schematic	Schematic1	Create at	2026-01-02
		Update at	2026-01-03
Board	Board1	Page	Expansion
Drawn		W65C265S v0.10	
Reviewed			
		Version	Size / Page 6 Total 12
EasyEDA		V1.0	A4 / EasyEDA.com

USB SERIAL, PS/2 KEYBOARD

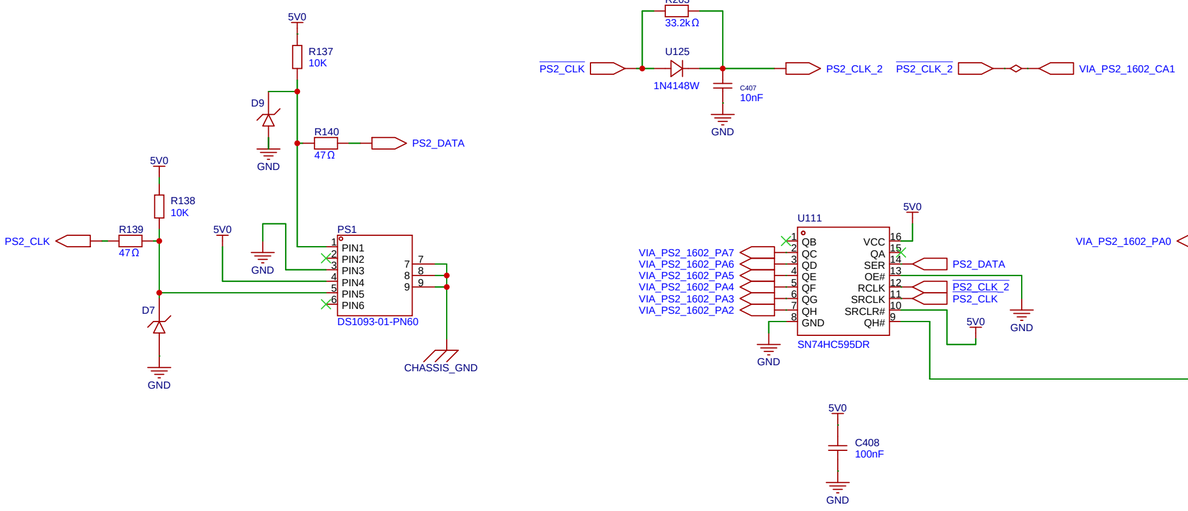
Primary



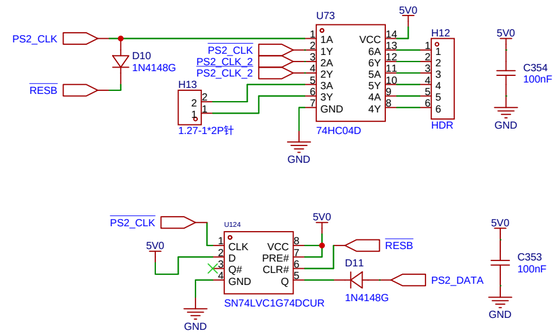
AV



PS/2 Keyboard - Primary



PS/2 Auto-reset

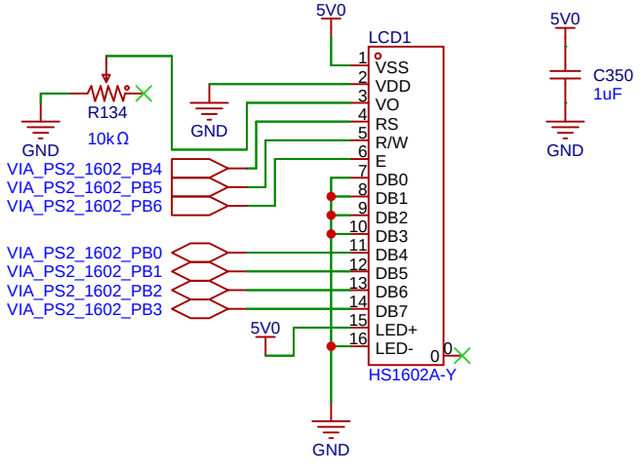


Auto-reset for keyboards that require it.
*credit to u/gfoot360 (George Foot)

Temporary: unconnected pins
for inputs to be grounded

Schematic	Schematic1	Create at	2026-01-02
		Update at	2026-01-03
Board	Board1	Page	Serial & PS2
Drawn		W65C265S v0.10	
Reviewed			
		Version	Size	Page 7 Total 12
EasyEDA		V1.0	A4	EasyEDA.com

LCD 1602



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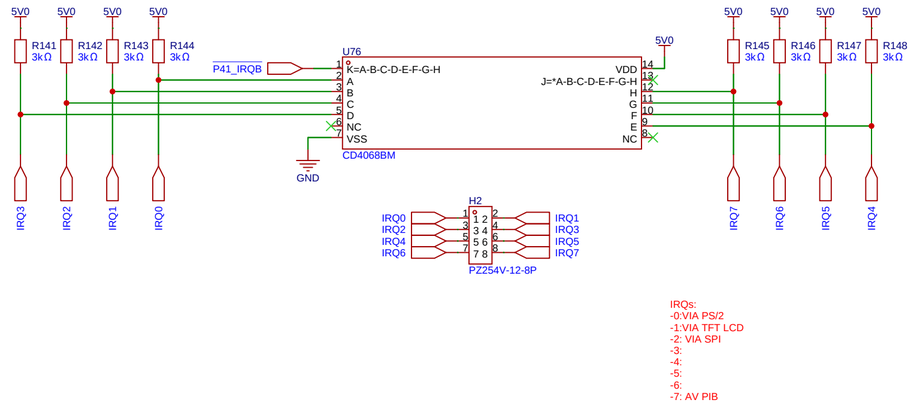
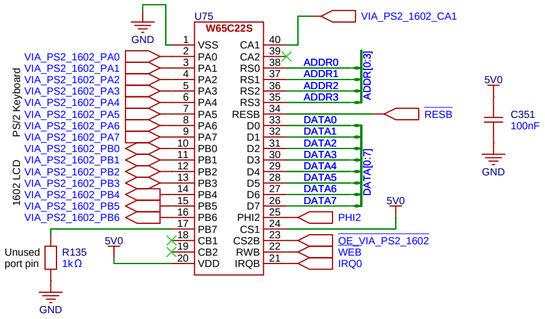
		Update at	2026-01-02
Board	Board1	Page	LCD_1602
Drawn		W65C265S v0.10	
Reviewed			
		Version	Size	Page 8 Total 12
EasyEDA		V1.0	A4	EasyEDA.com

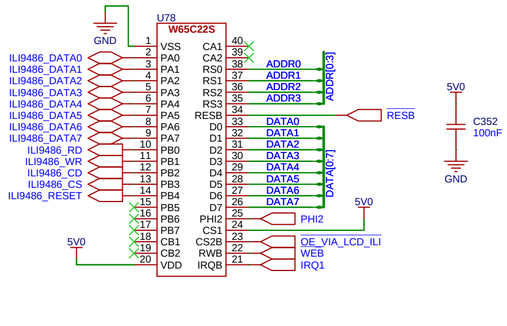
VIAs



PS/2 Keyboard, 1602 LCD



TFT LCD (ILI)

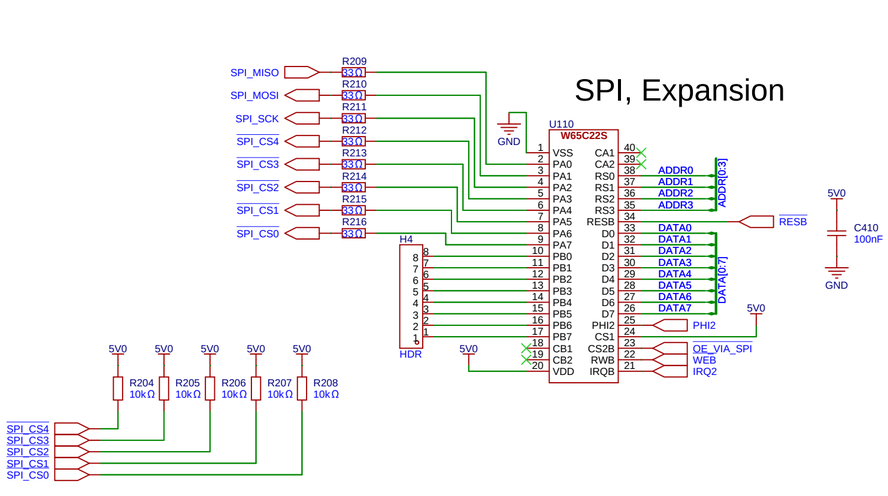


C0:0000 to FF:FFFF CS7B

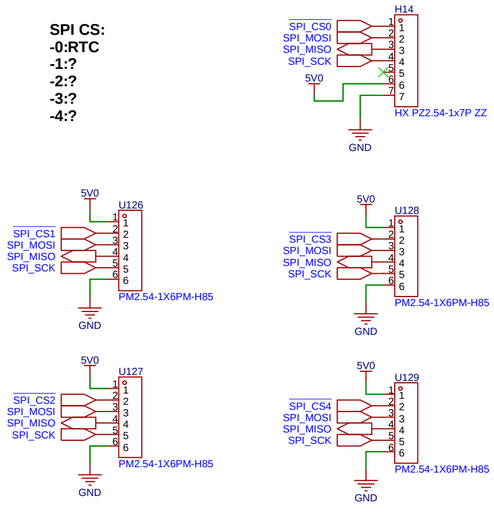
1100:0000000000000000000 to
1111:1111111111111111111
(range: top two bits are 11)

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



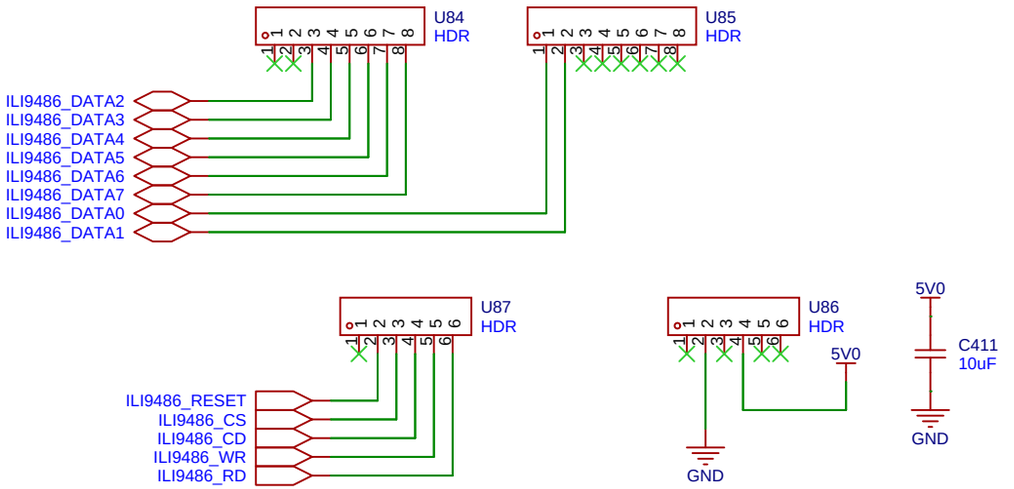
SPI CS:
-0:RTC
-1:?
-2:?
-3:?
-4:?



Schematic	Schematic1	Create at	2026-01-02
		Update at	2026-01-02
Board	Board1	Page	VIAs
Drawn		W65C265S v0.10	
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	2026-01-02
		Update at	2026-01-02
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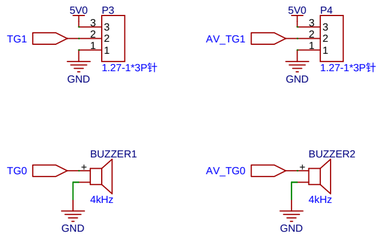
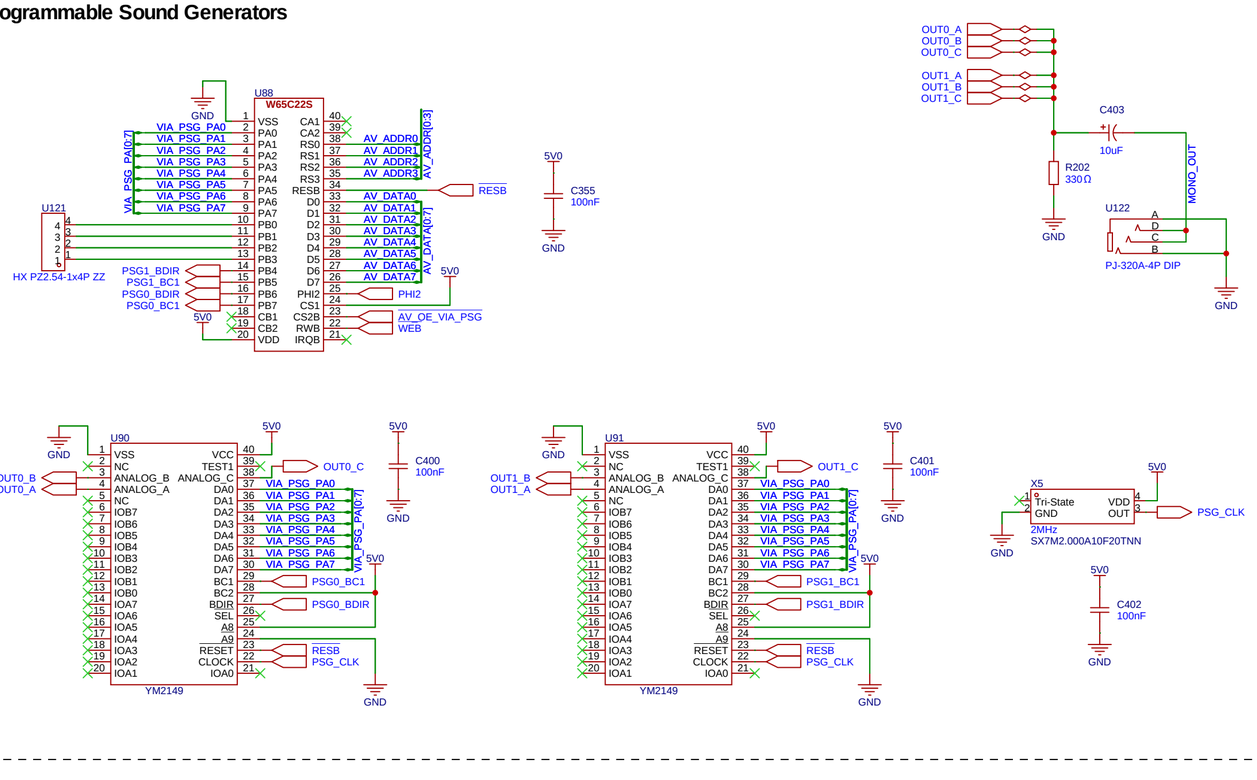
Drawn		W65C265S v0.10	
Reviewed			
		Version	Size	Page 10 Total 12
EasyEDA		V1.0	A4	EasyEDA.com

Sound

Tone Generators



Programmable Sound Generators



Schematic	Schematic1	Create at	2026-01-02
		Update at	2026-01-02
Board	Board1	Page	Sound
Drawn		W65C265S v0.10	
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 [us]
Visible area32012.711
Front porch80.318 320 101000000
Sync pulse481.907 328 101001000
Back porch240.953 376 101111000
Whole line40015.889 400 110010000

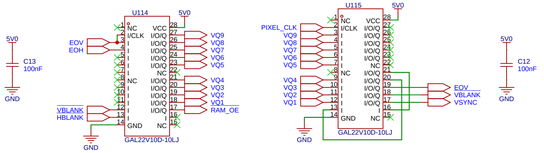
Vertical timing (frame)
Polarity of vertical sync pulse is negative.
Frame partLinesTime [ms]
Visible area48015.253
Front porch100.318 480 0111100000
Sync pulse20.064 490 0111101010
Back porch331.049 492 0111101100
Whole frame52516.683 525 1000001101

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

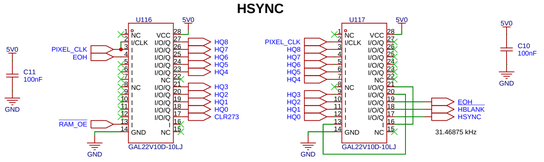
IO2_EN OR'd with MEMR#/MEMW# to generate VMEMOEB and VMEMEWB

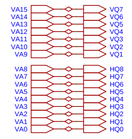
CS7B is C0:0000 to FF:FFFF
OE3B is E0:0000 to EF:0000
Video MRB/MWB are EA:0000 to EB:FFFF

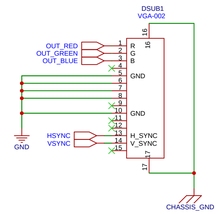
VSYNC



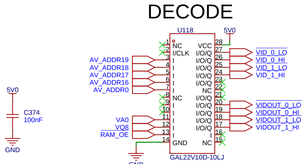
HSYNC







DECODE

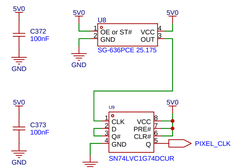


VRAM
0x0A0000-0BFFFF

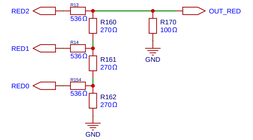
Video address (for enable)
A19=1
A18=0
A17=1

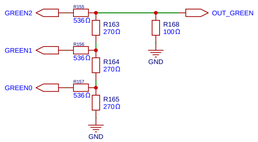
When A16=0, lower 64K (first two SRAMs)
When A16=1, upper 64K (last two SRAMs)

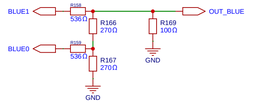
When A0=0, LO byte
When BHE (IA0) =0, HI byte



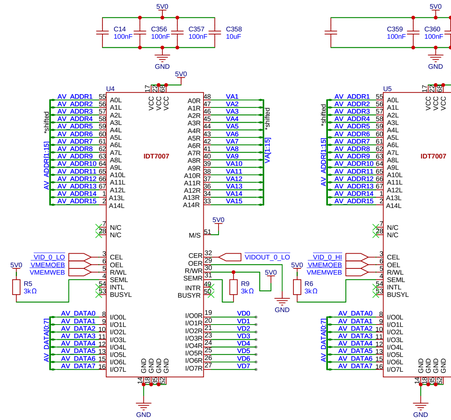
To do:
-fill top / bottom layers with GND
- same with inner signal



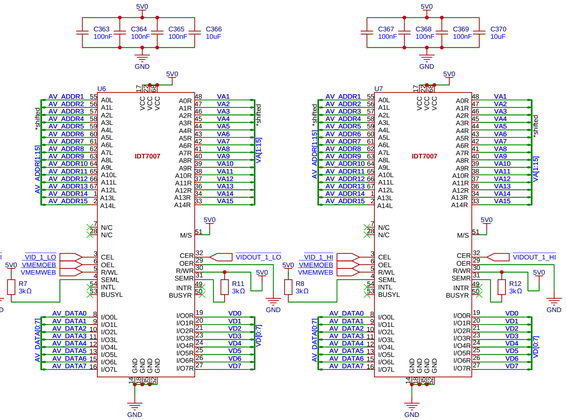


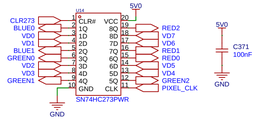


LOWER 64K (VID_0)



UIPPER 64K (VID_1)





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Reviewed			
		Version	Size	Page 12 Total 12
EasyEDA		V1.0	A4	EasyEDA.com