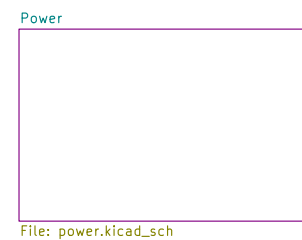
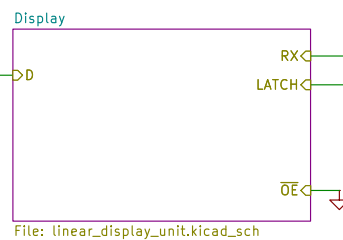
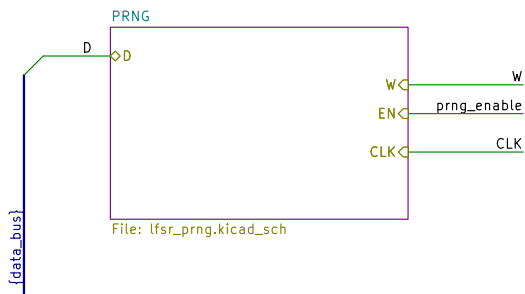
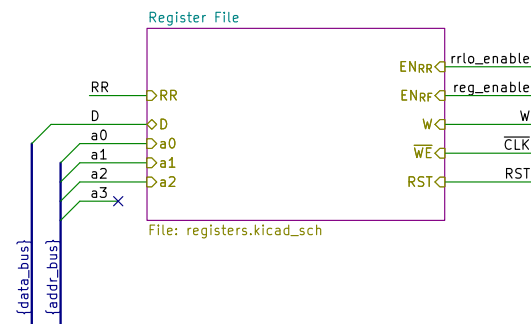
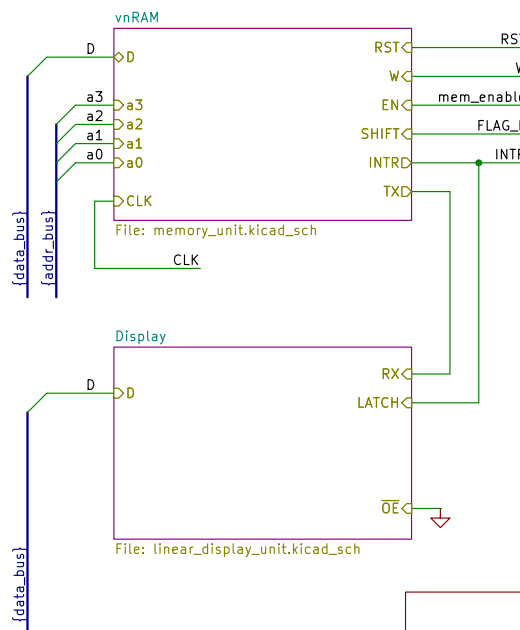
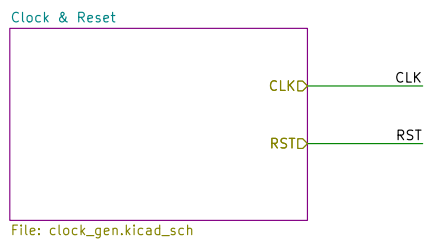


00 10: RR loopback
01 10: PRNG
10 00: external register bit 0
10 01: external register bit 1
10 10: external register bit 2
10 11: external register bit 3
11 10: external register bit 6
others: vnRAM (center, N/E/S/W)



Sheet: /
File: mc14500gol.kicad_sch

Title:

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1 2 3 4 5 6

A

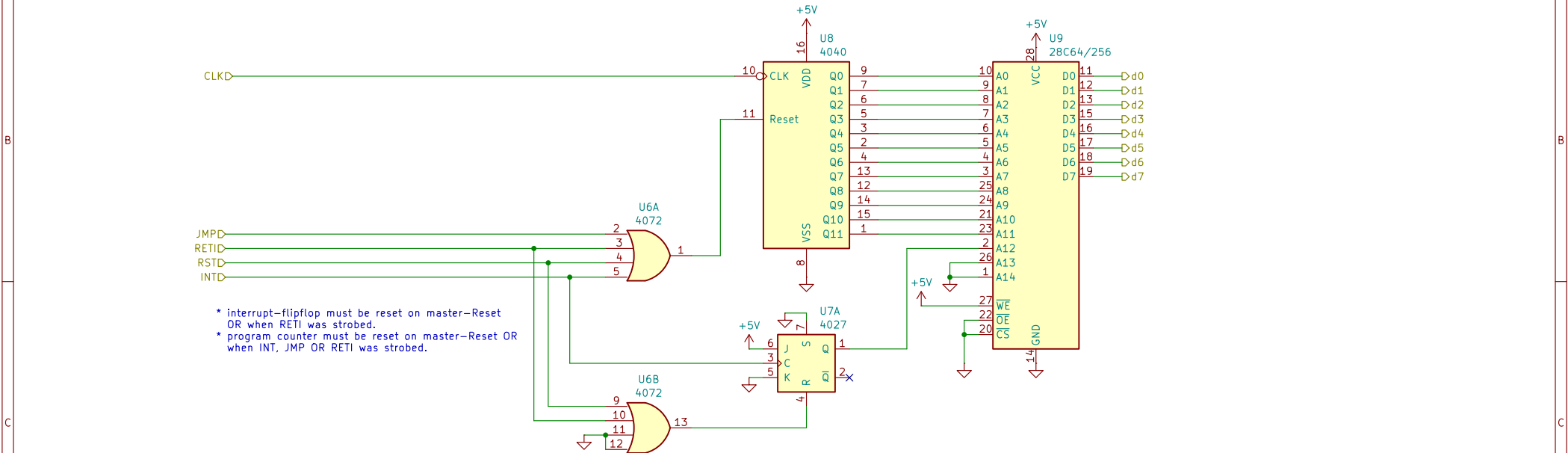
XXX: cd4040 advances on the negative clock edge! but the mc14500 expects stable instruction also on negative clock edge! race condition!!

the mc14500 handbook suggests use of the 4040 as alternative, but the primary suggested counter is positive-edge triggered! it does not mention that discrepancy!

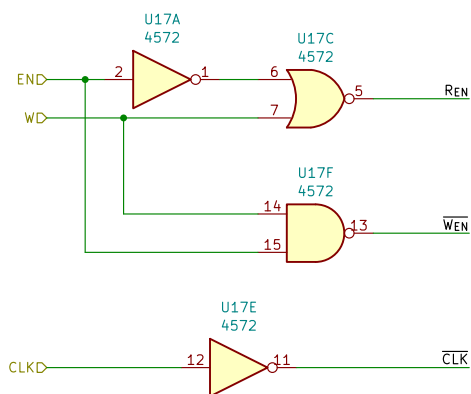
the interrupt flip-flop is also positive-edge triggered, meaning its switching is not synchronized to the rest of the address input.

solution would be to invert the incoming clock.

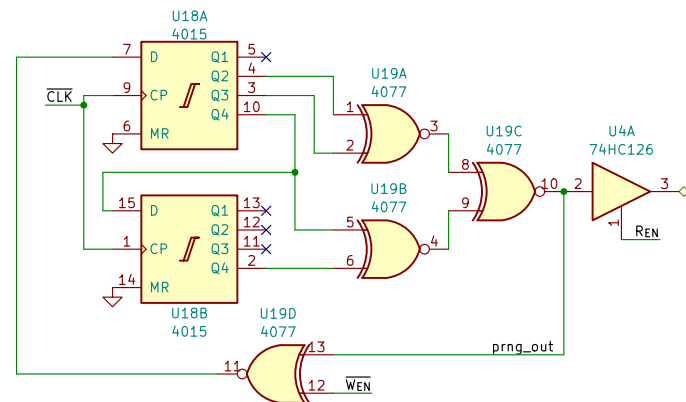
A



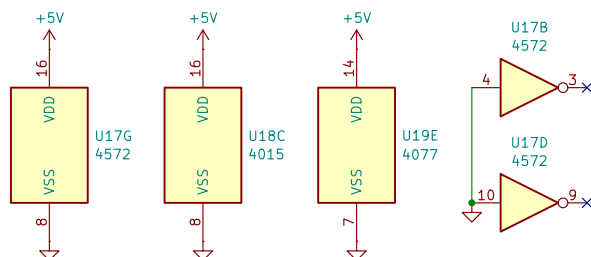
Title:		
Size: A4	Date:	Rev:
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CD4015 triggers on the wrong edge, switching in the middle of when EN is high. Inverting the clock fixes that, so it switches at the same time as EN.



maximum-length linear feedback shift register (period: $2^8-1 = 255$).
by using XNOR instead of XOR, the initial all-zeros state does not result in lock-up.
NOTE: can still end up in all-ones state!
helpful article: <https://www.eetimes.com/tutorial-linear-feedback-shift-registers-lfsrs-part-1/>



Sheet: /PRNG/
File: lfsr_prng.kicad_sch

Title:

Size: A4

Date:

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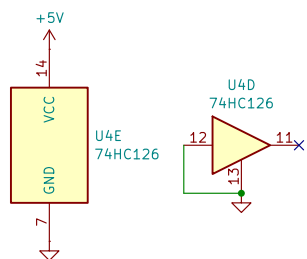
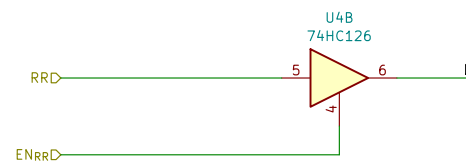
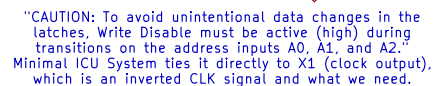
TODO: need ~40kHz for 1 frame/second

maybe? <https://eater.net/schematics/clock.png>

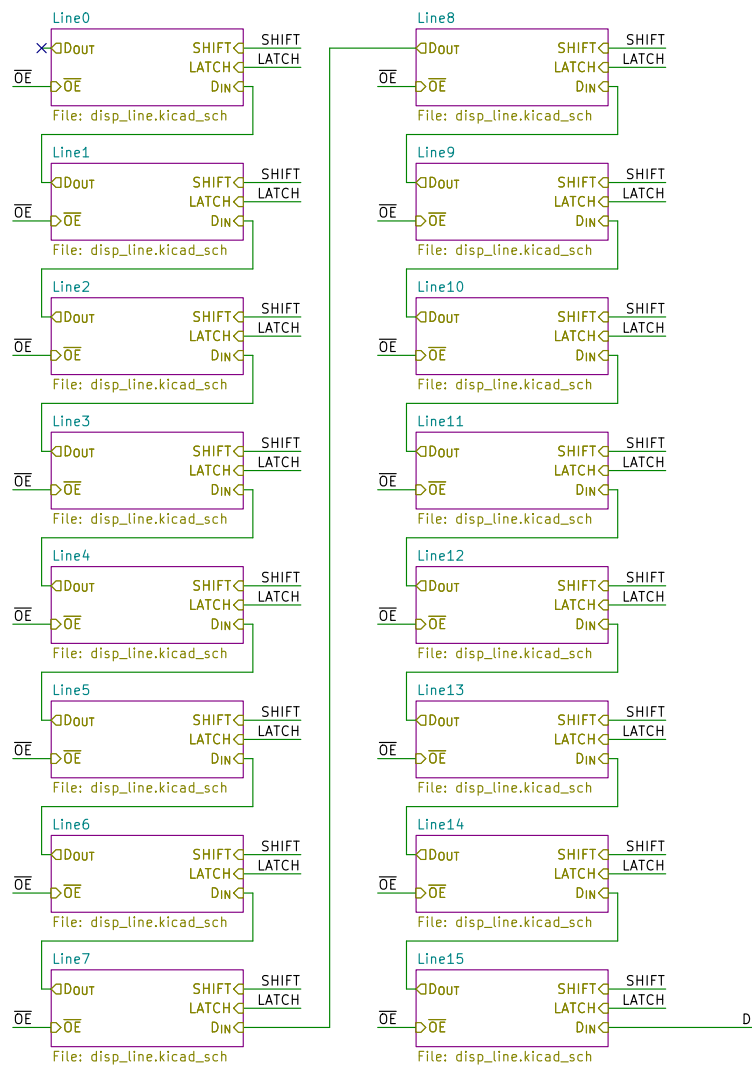
maybe values from usagi's 14500 breadboard build?

DCLK

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N.B.: In order to have the first pixel in the top left corner, the display must be constructed 'backwards' (right-to-left, bottom-to-top). This is because the first pixel will get shifted all the way to the end of the pipeline and the last pixel will end up at zero shifts.

DD D
RXD SHIFT
LATCHD LATCH
OED OE

Sheet: /Display/
File: linear_display_unit.kicad_sch

Title:

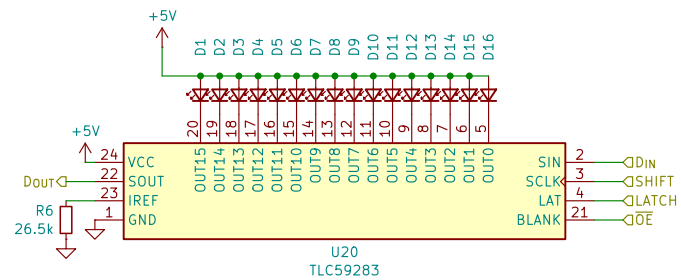
Size: A4

Date:

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<https://www.ti.com/lit/ds/symlink/tlc59283.pdf> §7.3.1

$$R_{IREF} \text{ (k}\Omega\text{)} = 52.9104 / I_{OLC} \text{ (mA)}$$

26.5k is the recommended value for 2mA, the lowest supported current.

Sheet: /Display/Line0/
File: disp_line.kicad_sch

Title:

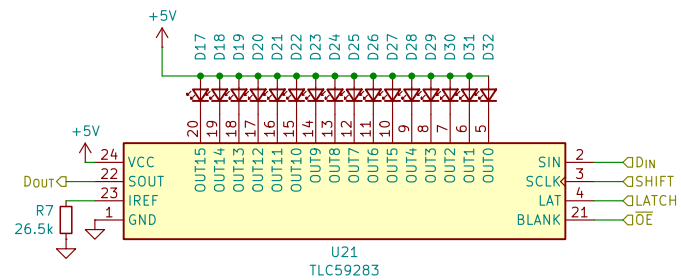
Size: A4

Date:

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Rev:

Id: 8/24



<https://www.ti.com/lit/ds/symlink/tlc59283.pdf> §7.3.1

$$R_{REF} \text{ (k}\Omega\text{)} = 52.9104 / I_{OLC} \text{ (mA)}$$

26.5k is the recommended value for 2mA, the lowest supported current.

Sheet: /Display/Line1/
File: disp_line.kicad_sch

Title:

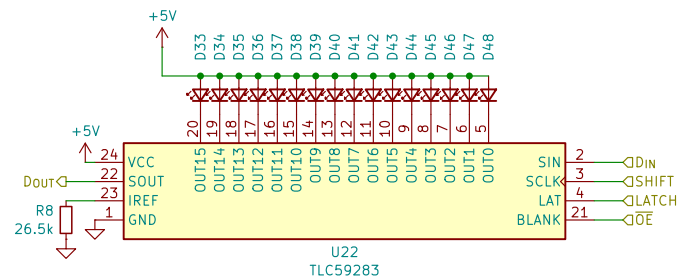
Size: A4

Date:

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Rev:

Id: 9/24



<https://www.ti.com/lit/ds/symlink/tlc59283.pdf> §7.3.1

$$R_{REF} \text{ (k}\Omega\text{)} = 52.9104 / I_{OLC} \text{ (mA)}$$

26.5k is the recommended value for 2mA, the lowest supported current.

Sheet: /Display/Line2/
File: disp_line.kicad_sch

Title:

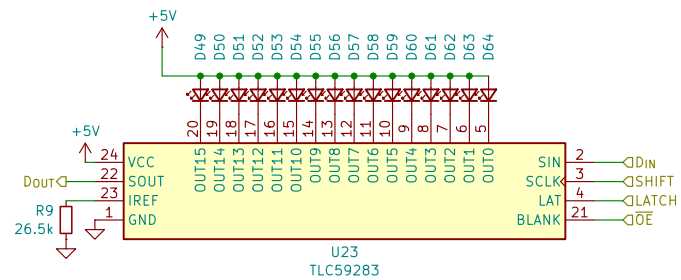
Size: A4

Date:

KiCad E.D.A. 8.0.9

Rev:

Id: 10/24



<https://www.ti.com/lit/ds/symlink/tlc59283.pdf> §7.3.1

$$R_{IREF} \text{ (k}\Omega\text{)} = 52.9104 / I_{OLC} \text{ (mA)}$$

26.5k is the recommended value for 2mA, the lowest supported current.

Sheet: /Display/Line3/
File: disp_line.kicad_sch

Title:

Size: A4

Date:

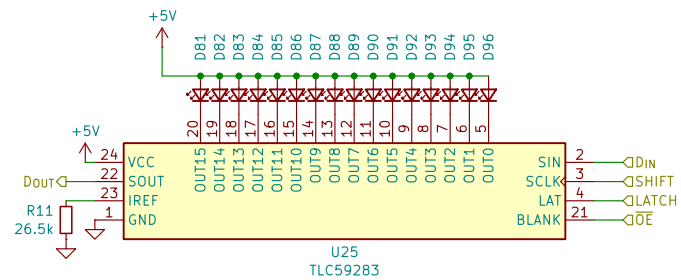
KiCad E.D.A. 8.0.9

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Sheet: /Display/Line4/ File: disp_line.kicad_sch		D
Title:		
Size: A4	Date:	
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<https://www.ti.com/lit/ds/symlink/tlc59283.pdf> §7.3.1

$$R_{REF} \text{ (k}\Omega\text{)} = 52.9104 / I_{OLC} \text{ (mA)}$$

26.5k is the recommended value for 2mA, the lowest supported current.

Sheet: /Display/Line5/
File: disp_line.kicad_sch

Title:

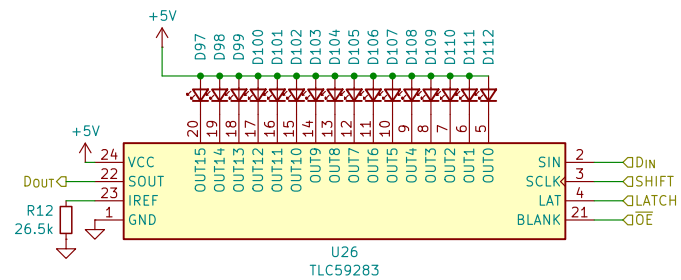
Size: A4

Date:

KiCad E.D.A. 8.0.9

Rev:

Id: 13/24



<https://www.ti.com/lit/ds/symlink/tlc59283.pdf> §7.3.1

$$R_{IREF} \text{ (k}\Omega\text{)} = 52.9104 / I_{OLC} \text{ (mA)}$$

26.5k is the recommended value for 2mA, the lowest supported current.

Sheet: /Display/Line6/
File: disp_line.kicad_sch

Title:

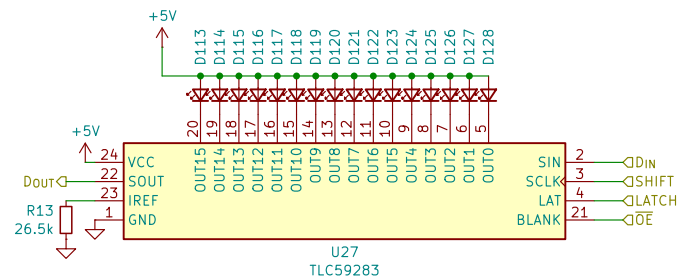
Size: A4

Date:

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Rev:

Id: 14/24



<https://www.ti.com/lit/ds/symlink/tlc59283.pdf> §7.3.1

$$R_{IREF} \text{ (k}\Omega\text{)} = 52.9104 / I_{OLC} \text{ (mA)}$$

26.5k is the recommended value for 2mA, the lowest supported current.

Sheet: /Display/Line7/
File: disp_line.kicad_sch

Title:

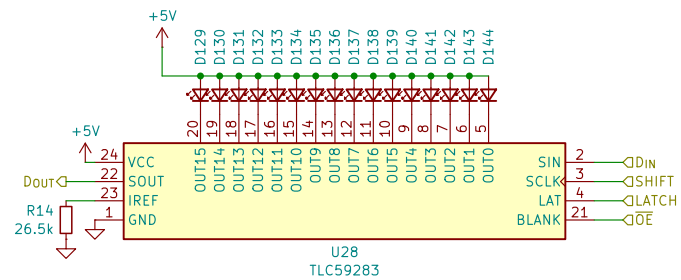
Size: A4

Date:

KiCad E.D.A. 8.0.9

Rev:

Id: 15/24



<https://www.ti.com/lit/ds/symlink/tlc59283.pdf> §7.3.1

$$R_{IREF} \text{ (k}\Omega\text{)} = 52.9104 / I_{OLC} \text{ (mA)}$$

26.5k is the recommended value for 2mA, the lowest supported current.

Sheet: /Display/Line8/
File: disp_line.kicad_sch

Title:

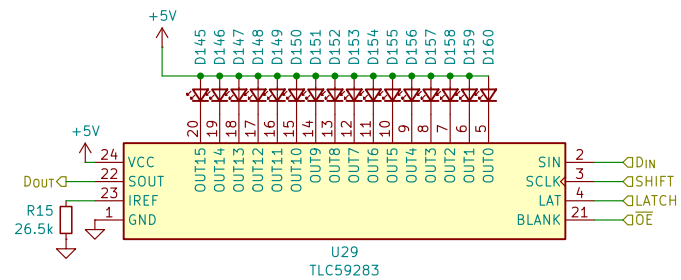
Size: A4

Date:

KiCad E.D.A. 8.0.9

Rev:

Id: 16/24



<https://www.ti.com/lit/ds/symlink/tlc59283.pdf> §7.3.1

$$R_{REF} \text{ (k}\Omega\text{)} = 52.9104 / I_{OLC} \text{ (mA)}$$

26.5k is the recommended value for 2mA, the lowest supported current.

Sheet: /Display/Line9/
File: disp_line.kicad_sch

Title:

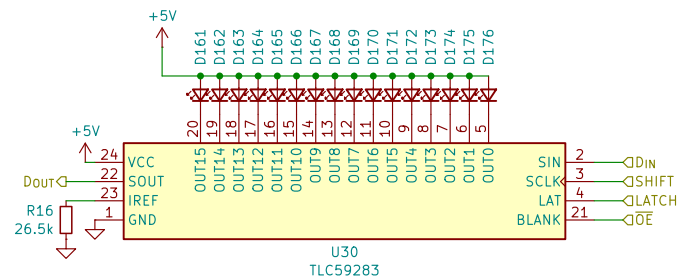
Size: A4

Date:

KiCad E.D.A. 8.0.9

Rev:

Id: 17/24



<https://www.ti.com/lit/ds/symlink/tlc59283.pdf> §7.3.1

$$R_{IREF} \text{ (k}\Omega\text{)} = 52.9104 / I_{OLC} \text{ (mA)}$$

26.5k is the recommended value for 2mA, the lowest supported current.

Sheet: /Display/Line10/
File: disp_line.kicad_sch

Title:

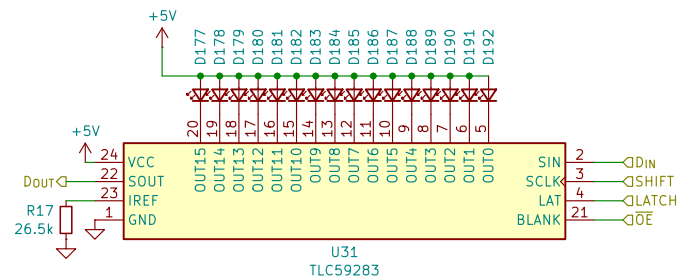
Size: A4

Date:

KiCad E.D.A. 8.0.9

Rev:

Id: 18/24



<https://www.ti.com/lit/ds/symlink/tlc59283.pdf> §7.3.1

$$R_{IREF} \text{ (k}\Omega\text{)} = 52.9104 / I_{OLC} \text{ (mA)}$$

26.5k is the recommended value for 2mA, the lowest supported current.

Sheet: /Display/Line11/
File: disp_line.kicad_sch

Title:

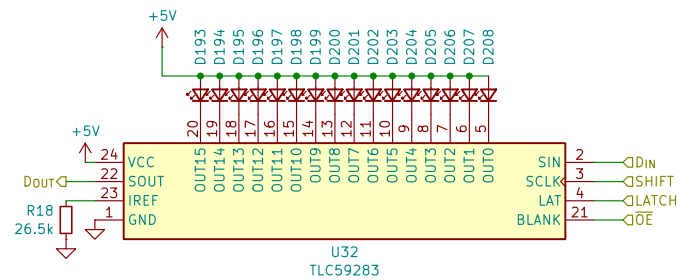
Size: A4

Date:

KiCad E.D.A. 8.0.9

Rev:

Id: 19/24



<https://www.ti.com/lit/ds/symlink/tlc59283.pdf> §7.3.1

$$R_{REF} \text{ (k}\Omega\text{)} = 52.9104 / I_{OLC} \text{ (mA)}$$

26.5k is the recommended value for 2mA, the lowest supported current.

Sheet: /Display/Line12/
File: disp_line.kicad_sch

Title:

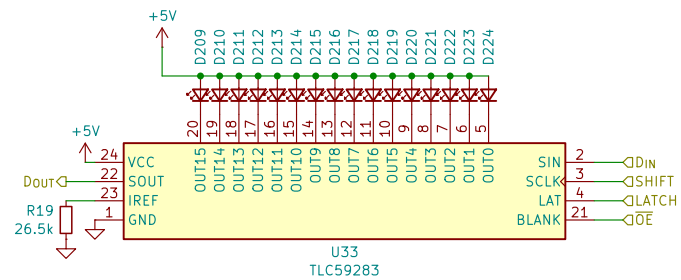
Size: A4

Date:

KiCad E.D.A. 8.0.9

Rev:

Id: 20/24



<https://www.ti.com/lit/ds/symlink/tlc59283.pdf> §7.3.1

$$R_{IREF} \text{ (k}\Omega\text{)} = 52.9104 / I_{OLC} \text{ (mA)}$$

26.5k is the recommended value for 2mA, the lowest supported current.

Sheet: /Display/Line13/
File: disp_line.kicad_sch

Title:

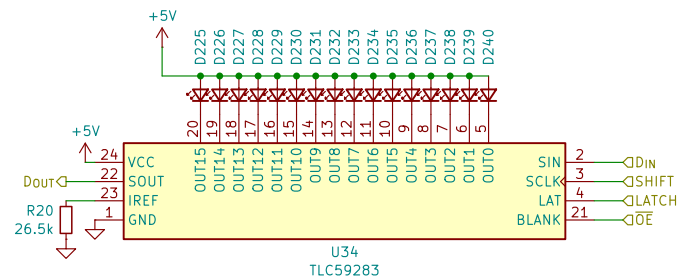
Size: A4

Date:

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Rev:

Id: 21/24



<https://www.ti.com/lit/ds/symlink/tlc59283.pdf> §7.3.1

$$R_{IREF} \text{ (k}\Omega\text{)} = 52.9104 / I_{OLC} \text{ (mA)}$$

26.5k is the recommended value for 2mA, the lowest supported current.

Sheet: /Display/Line14/
File: disp_line.kicad_sch

Title:

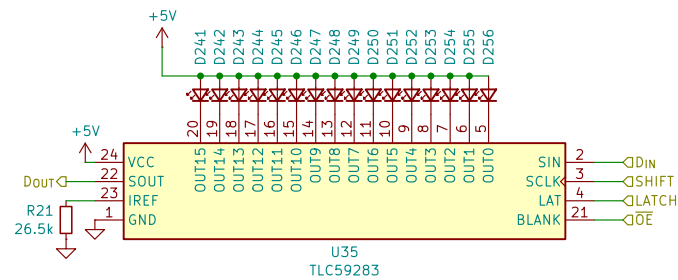
Size: A4

Date:

KiCad E.D.A. 8.0.9

Rev:

Id: 22/24



<https://www.ti.com/lit/ds/symlink/tlc59283.pdf> §7.3.1

$$R_{REF} \text{ (k}\Omega\text{)} = 52.9104 / I_{OLC} \text{ (mA)}$$

26.5k is the recommended value for 2mA, the lowest supported current.

Sheet: /Display/Line15/
File: disp_line.kicad_sch

Title:

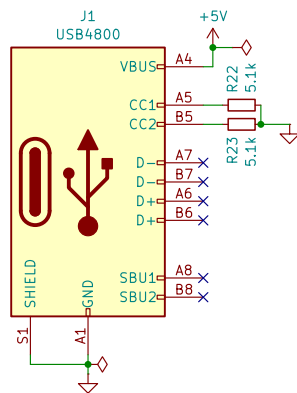
Size: A4

Date:

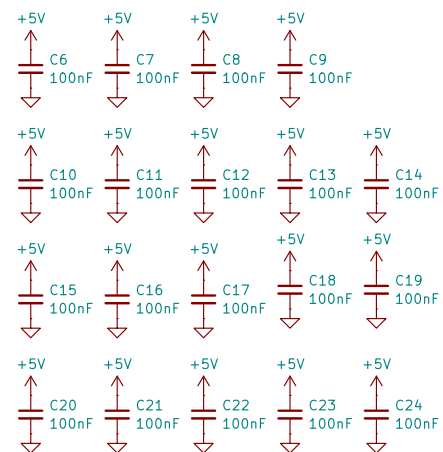
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Rev:

Id: 23/24



<https://hackaday.com/2023/08/07/all-about-usb-c-example-circuits/>



Sheet: /Power/
File: power.kicad_sch

Title:

Size: A4

Date:

KiCad E.D.A. 8.0.9

Rev:

Id: 24/24