

Top Level

Drawn by: Steven Keys

Sheet: /

File: led_clock.sch

Title: LED Mandala Clock

Size: A

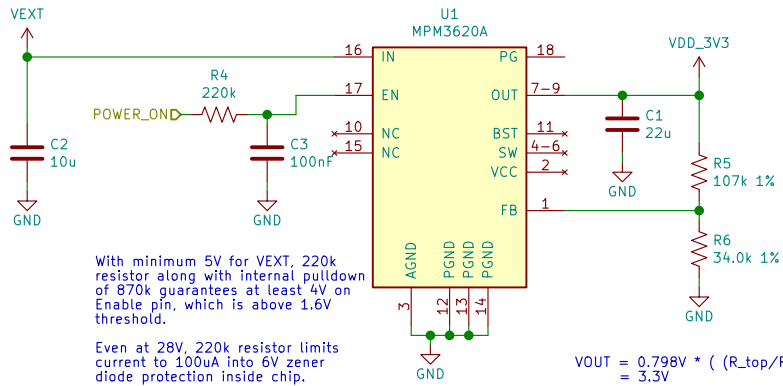
Date:

Rev: 0.1

KiCad E.D.A. kicad 5.0.2-bee76a070ubuntu16.04.1

Id: 1/18

Runs on 5 to 24V
 Absolute maximum rating is 28V



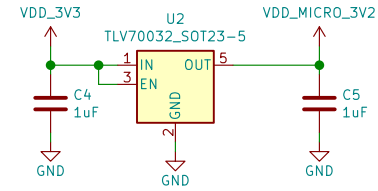
With minimum 5V for VEXT, 220k resistor along with internal pulldown of 870k guarantees at least 4V on Enable pin, which is above 1.6V threshold.

Even at 28V, 220k resistor limits current to 100uA into 6V zener diode protection inside chip.

Debouncing capacitor gives time constant 0T00 100ms

$$V_{OUT} = 0.798V * ((R_{top}/R_{bottom}) + 1) = 3.3V$$

PSSR: apprx -50dB at 2MHz
 Dropout: IN must be apprx 30mV greater than OUT at 30mA



Power

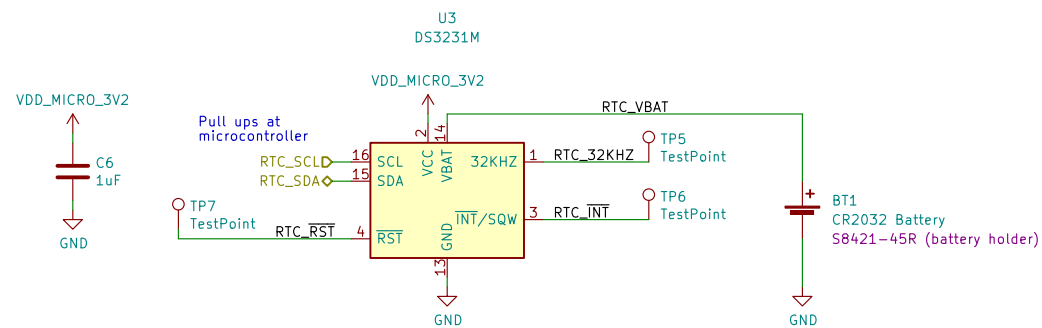
Drawn by: Steven Keyes

Sheet: /Power/
 File: power.sch

Title: LED Mandala Clock

Size: A Date:
 KiCad E.D.A. kicad 5.0.2-bee76a070ubuntu16.04.1

Rev: 0.1
 Id: 2/18



Crystal is internal to device so that
pixies can compensate for temperature

Real-Time Clock

Drawn by: Steven Keyes

Sheet: /Real-Time Clock/

File: rtc.sch

Title: LED Mandala Clock

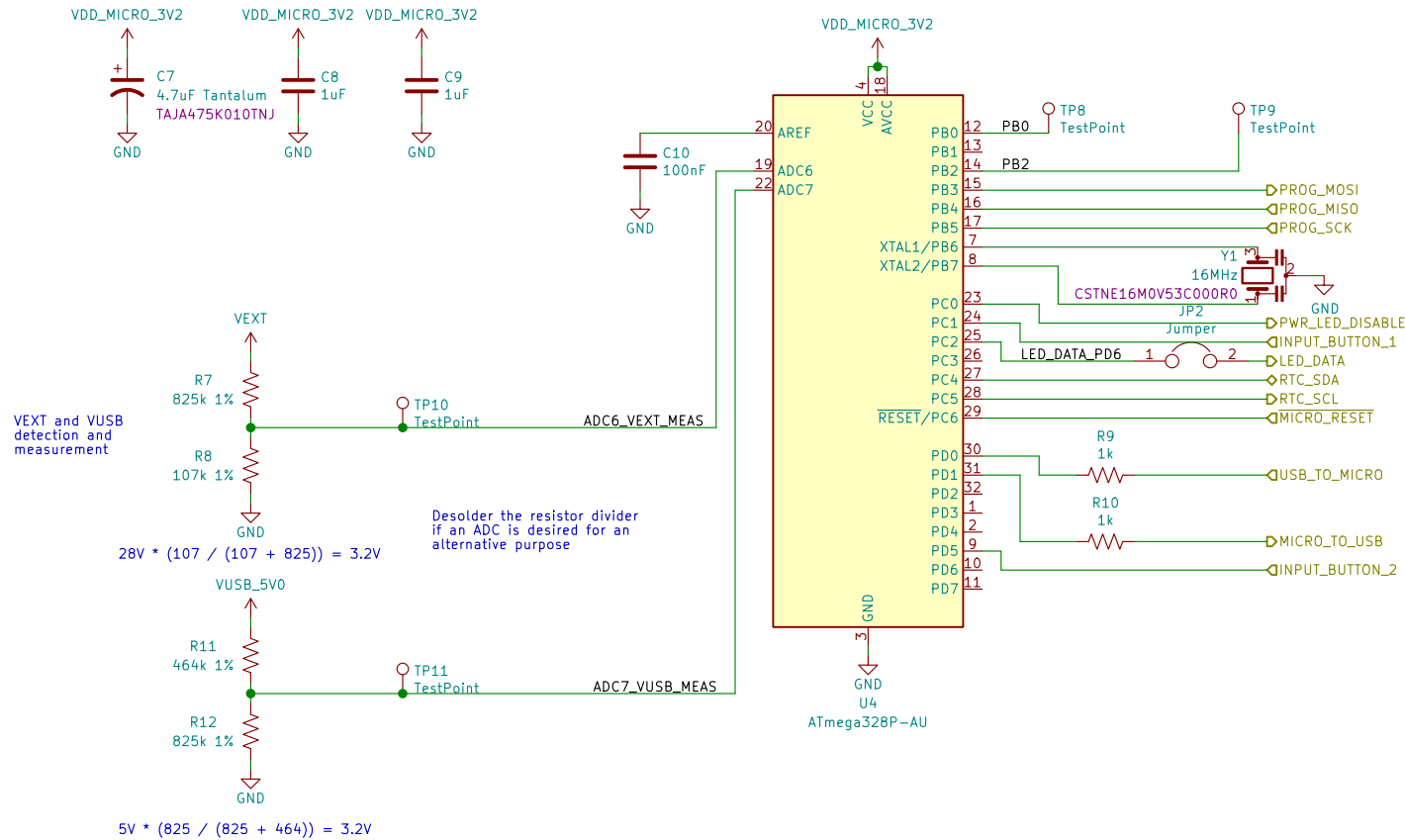
Size: A

Date:

Rev: 0.1

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Id: 3/18



Microcontroller

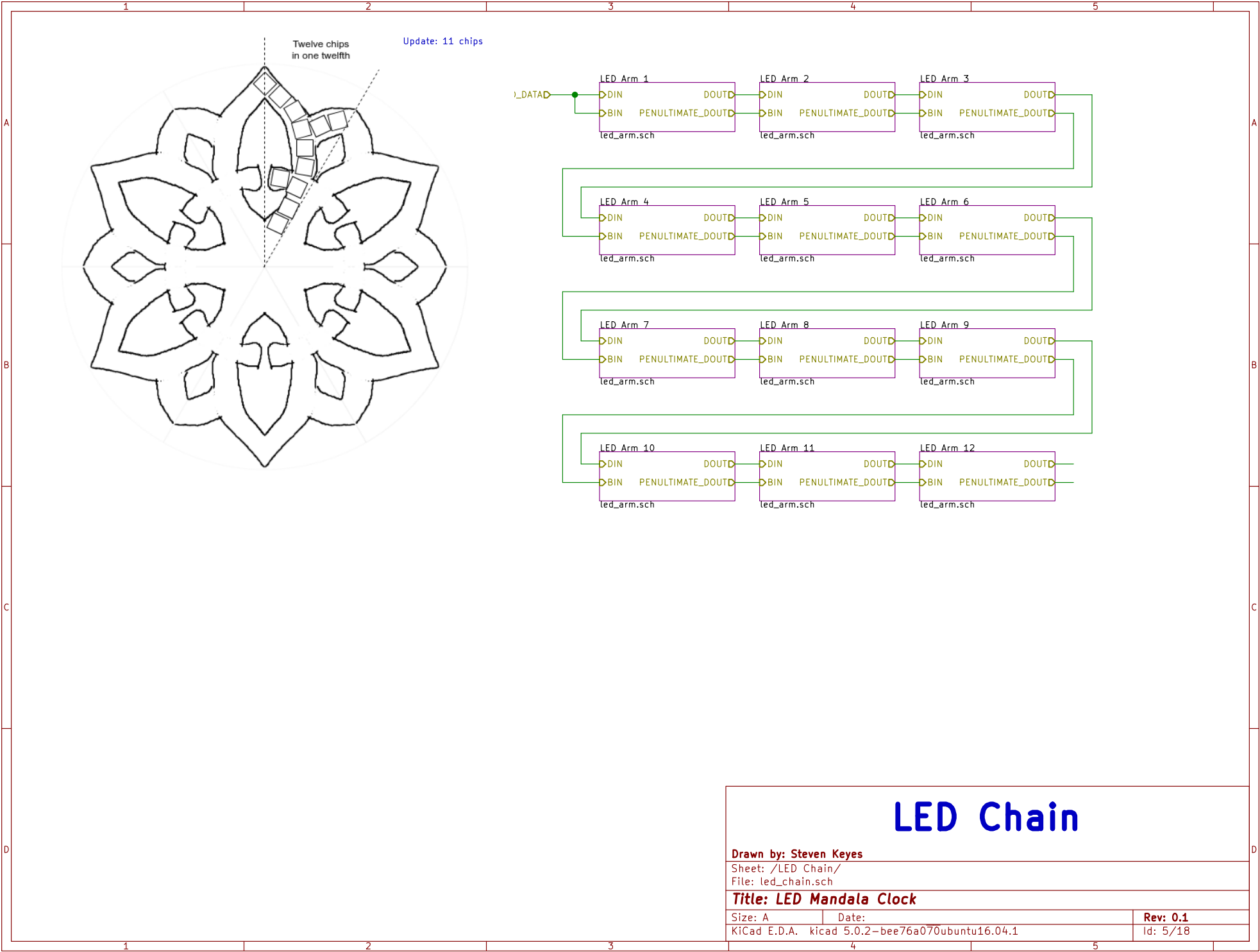
Drawn by: Steven Keyes

Sheet: /Microcontroller/
 File: microcontroller.sch

Title: LED Mandala Clock

Size: A Date:
 KiCad E.D.A. kicad 5.0.2-bee76a070ubuntu16.04.1

Rev: 0.1
 Id: 4/18



LED Chain

Drawn by: Steven Keyes

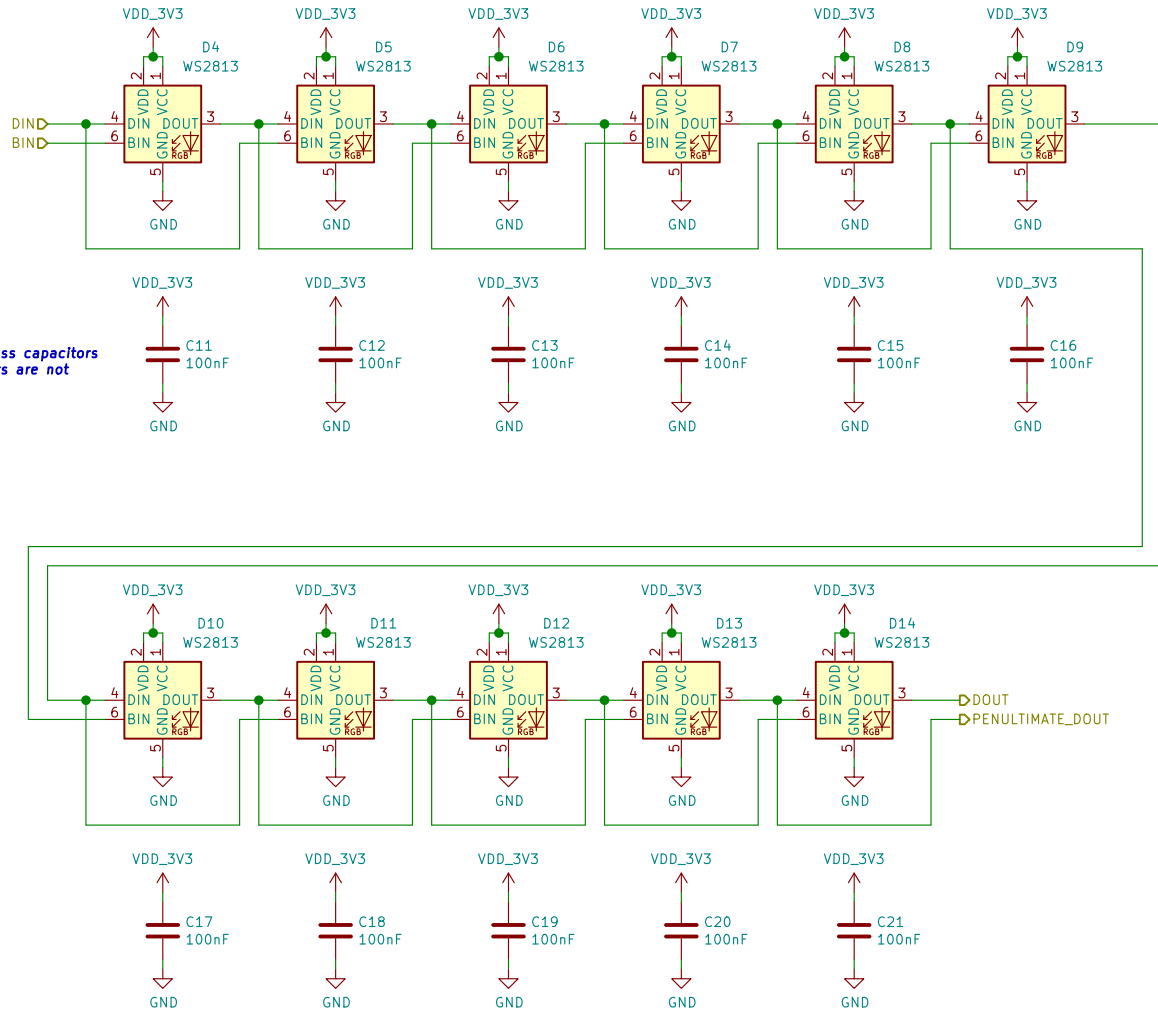
Sheet: /LED Chain/

File: led_chain.sch

Title: LED Mandala Clock

Size: A	Date:	Rev: 0.1
KiCad E.D.A. kicad 5.0.2-ubuntu16.04.1		Id: 5/18

In the case that a chip fails and stops driving its DOUT line, the next chip uses BIN as a backup

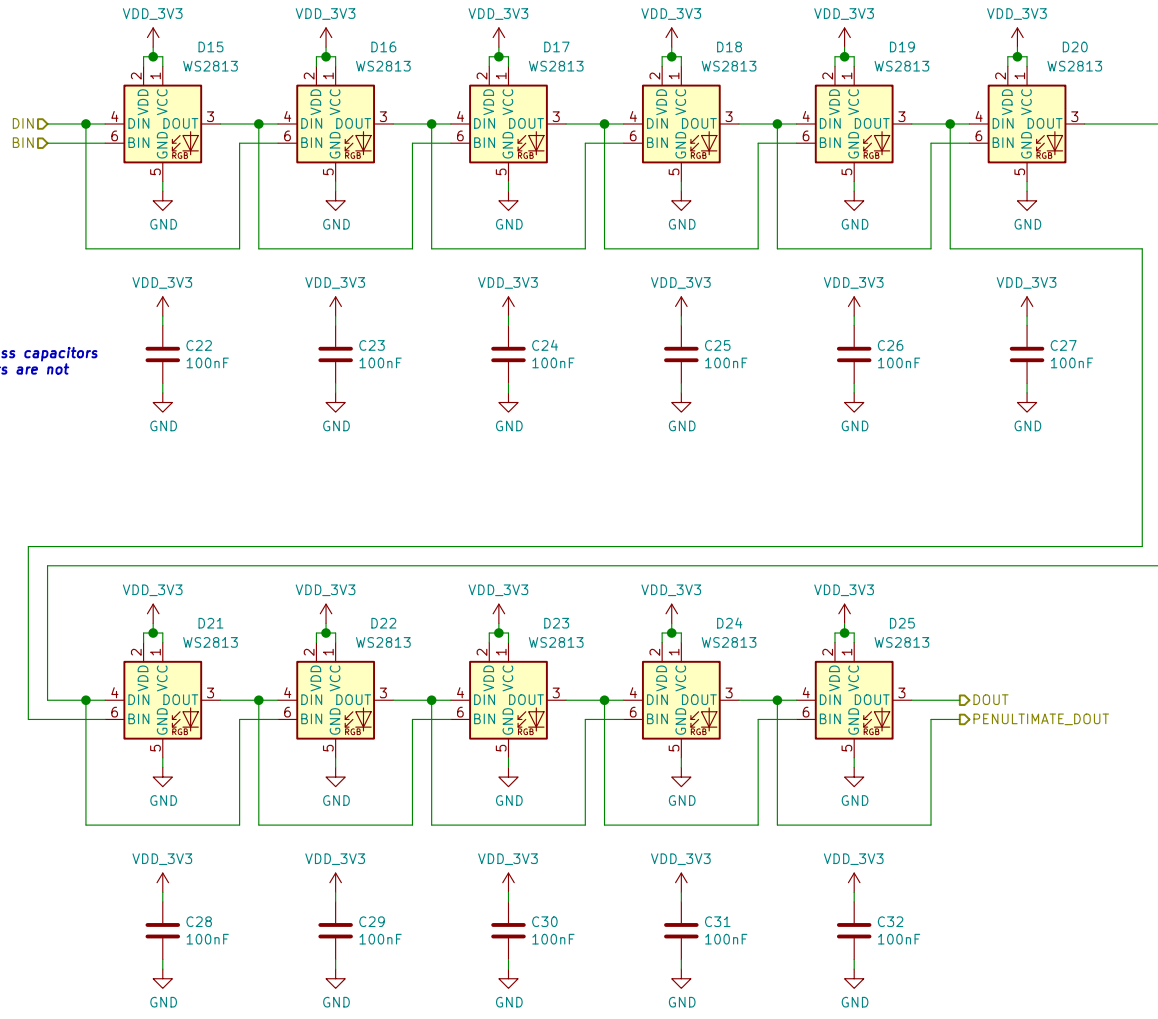


Errata: WS2813 has ceramic bypass capacitors in its package; external capacitors are not needed.

LED Arm

Drawn by: Steven Keyes Sheet: /LED Chain/LED Arm 1/ File: led_arm.sch	
Title: LED Mandala Clock	
Size: A4	Date:
KiCad E.D.A. kicad 5.0.2- bee76a070ubuntu16.04.1	Rev: 0.1 Id: 6/18

In the case that a chip fails and stops driving its DOUT line, the next chip uses BIN as a backup

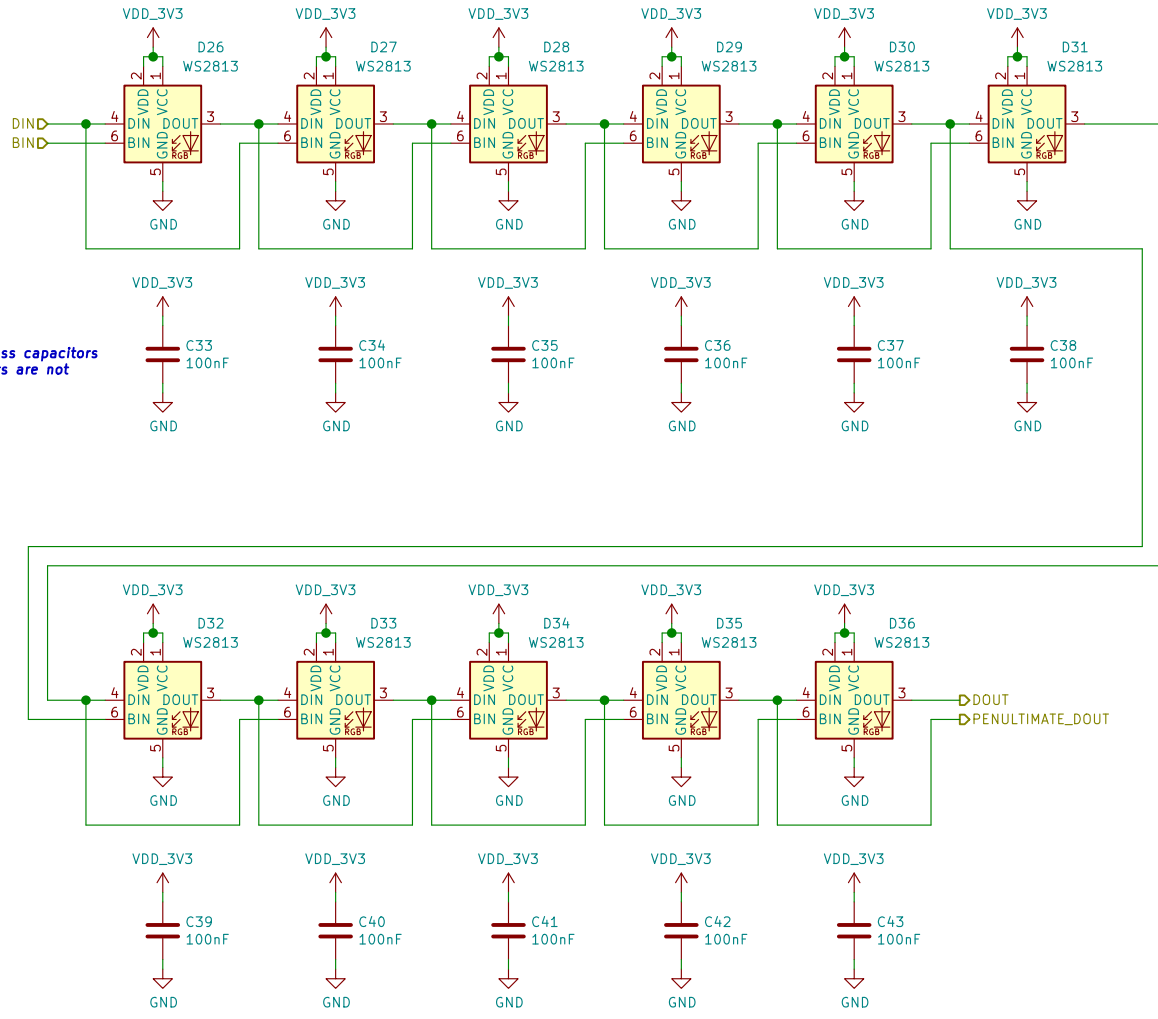


Errata: WS2813 has ceramic bypass capacitors in its package; external capacitors are not needed.

LED Arm

Drawn by: Steven Keyes	
Sheet: /LED Chain/LED Arm 2/ File: led_arm.sch	
Title: LED Mandala Clock	
Size: A4	Date:
KiCad E.D.A. kicad 5.0.2-bee76a070ubuntu16.04.1	
Rev: 0.1	
Id: 7/18	

In the case that a chip fails and stops driving its DOUT line, the next chip uses BIN as a backup

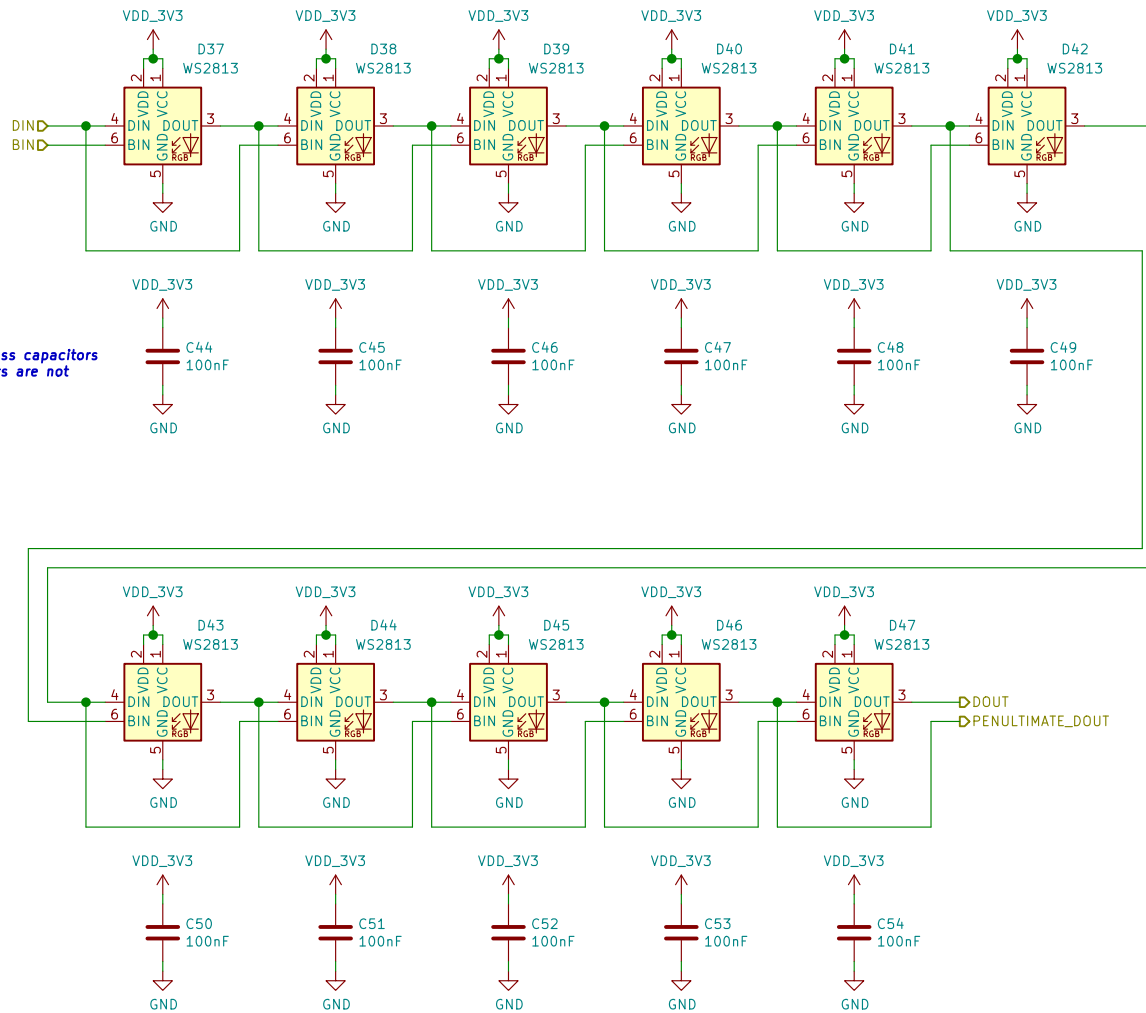


Errata: WS2813 has ceramic bypass capacitors in its package; external capacitors are not needed.

LED Arm

Drawn by: Steven Keyes	
Sheet: /LED Chain/LED Arm 3/ File: led_arm.sch	
Title: LED Mandala Clock	
Size: A4	Date:
KiCad E.D.A. kicad 5.0.2-bee76a070ubuntu16.04.1	
Rev: 0.1	
Id: 8/18	

In the case that a chip fails and stops driving its DOUT line, the next chip uses BIN as a backup



Errata: WS2813 has ceramic bypass capacitors in its package; external capacitors are not needed.

LED Arm

Drawn by: Steven Keyes

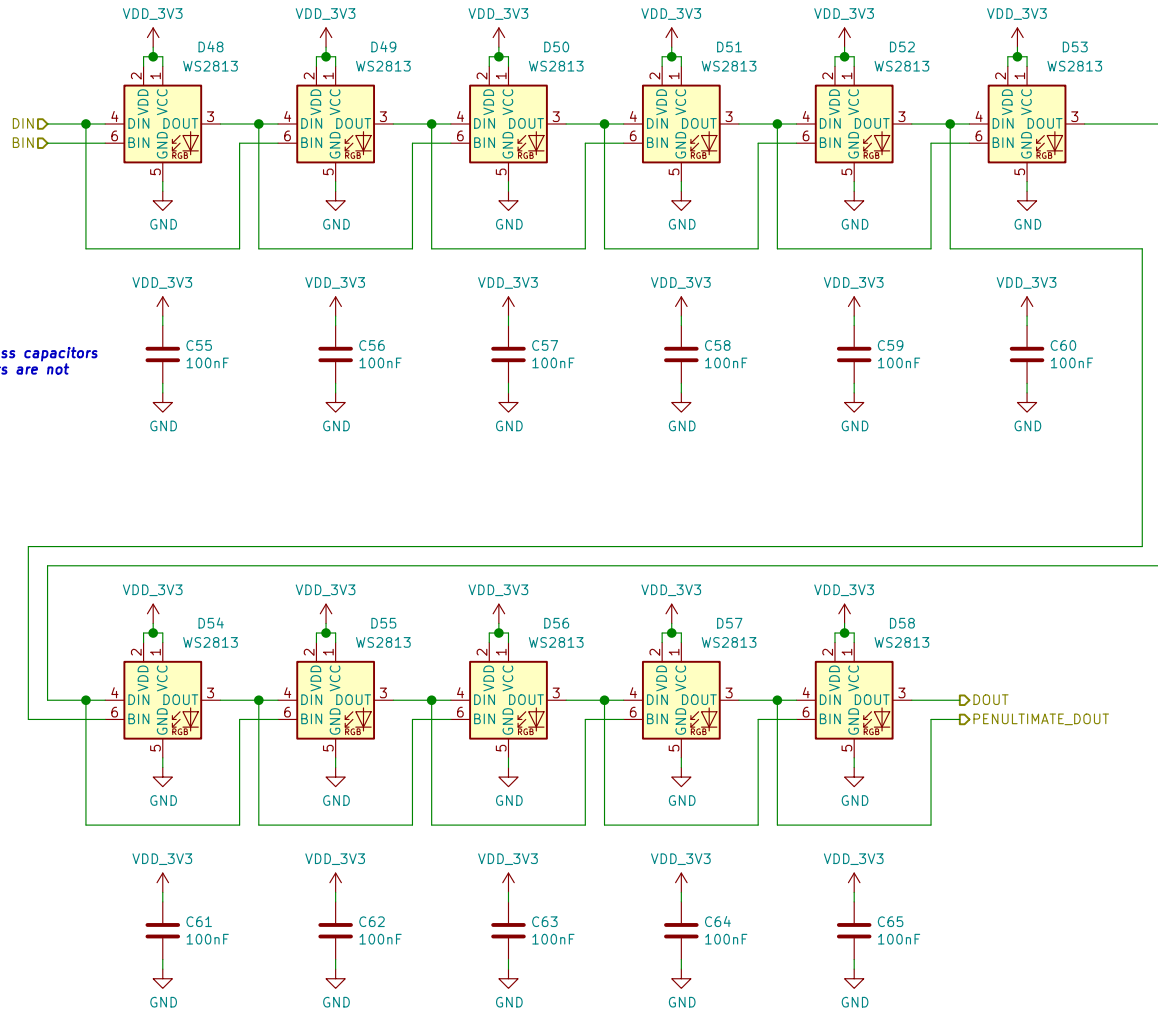
Sheet: /LED Chain/LED Arm 4/
File: led_arm.sch

Title: LED Mandala Clock

Size: A4 Date:
KiCad E.D.A. kicad 5.0.2-ubuntu16.04.1

Rev: 0.1
Id: 9/18

In the case that a chip fails and stops driving its DOUT line, the next chip uses BIN as a backup

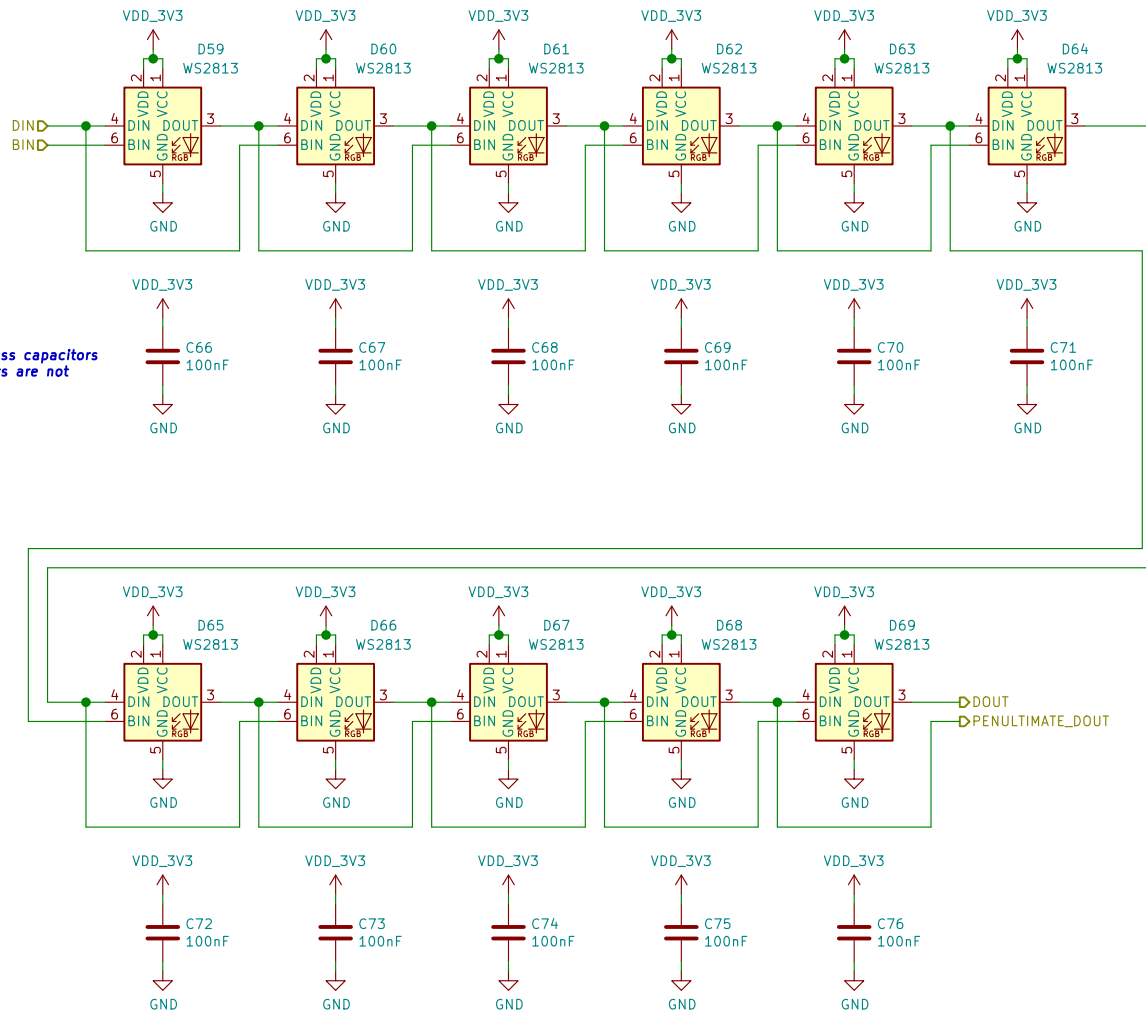


Errata: WS2813 has ceramic bypass capacitors in its package; external capacitors are not needed.

LED Arm

Drawn by: Steven Keyes Sheet: /LED Chain/LED Arm 5/ File: led_arm.sch	
Title: LED Mandala Clock	
Size: A4	Date:
KiCad E.D.A. kicad 5.0.2- <small>bee76a070ubuntu16.04.1</small>	Rev: 0.1 Id: 10/18

In the case that a chip fails and stops driving its DOUT line, the next chip uses BIN as a backup



Errata: WS2813 has ceramic bypass capacitors in its package; external capacitors are not needed.

LED Arm

Drawn by: Steven Keyes

Sheet: /LED Chain/LED Arm 6/

File: led_arm.sch

Title: LED Mandala Clock

Size: A4

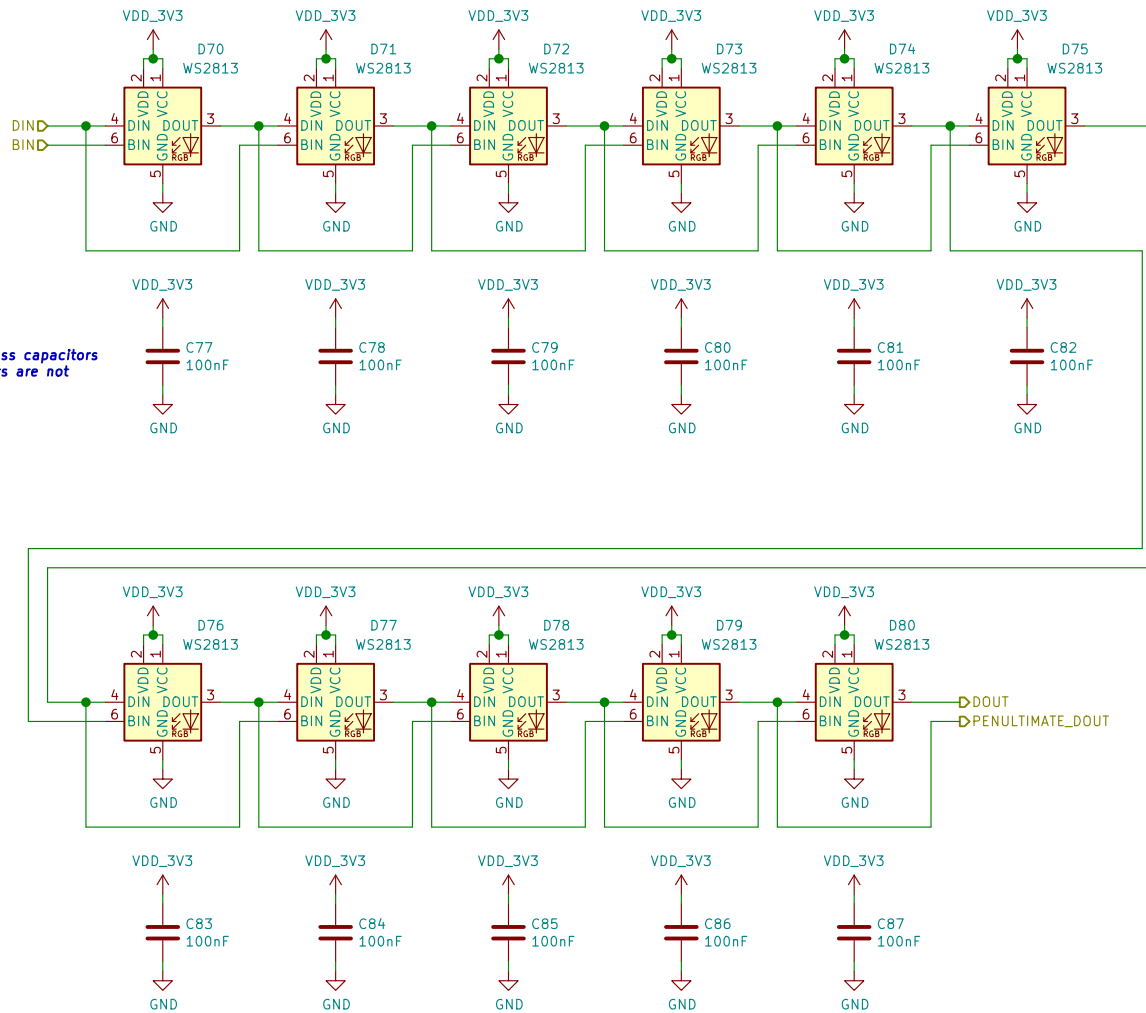
Date:

Rev: 0.1

KiCad E.D.A. kicad 5.0.2-[bee76a070ubuntu16.04.1](https://www.ubuntu.com/)

Id: 11/18

In the case that a chip fails and stops driving its DOUT line, the next chip uses BIN as a backup



Errata: WS2813 has ceramic bypass capacitors in its package; external capacitors are not needed.

LED Arm

Drawn by: Steven Keyes

Sheet: /LED Chain/LED Arm 7/

File: led_arm.sch

Title: LED Mandala Clock

Size: A4

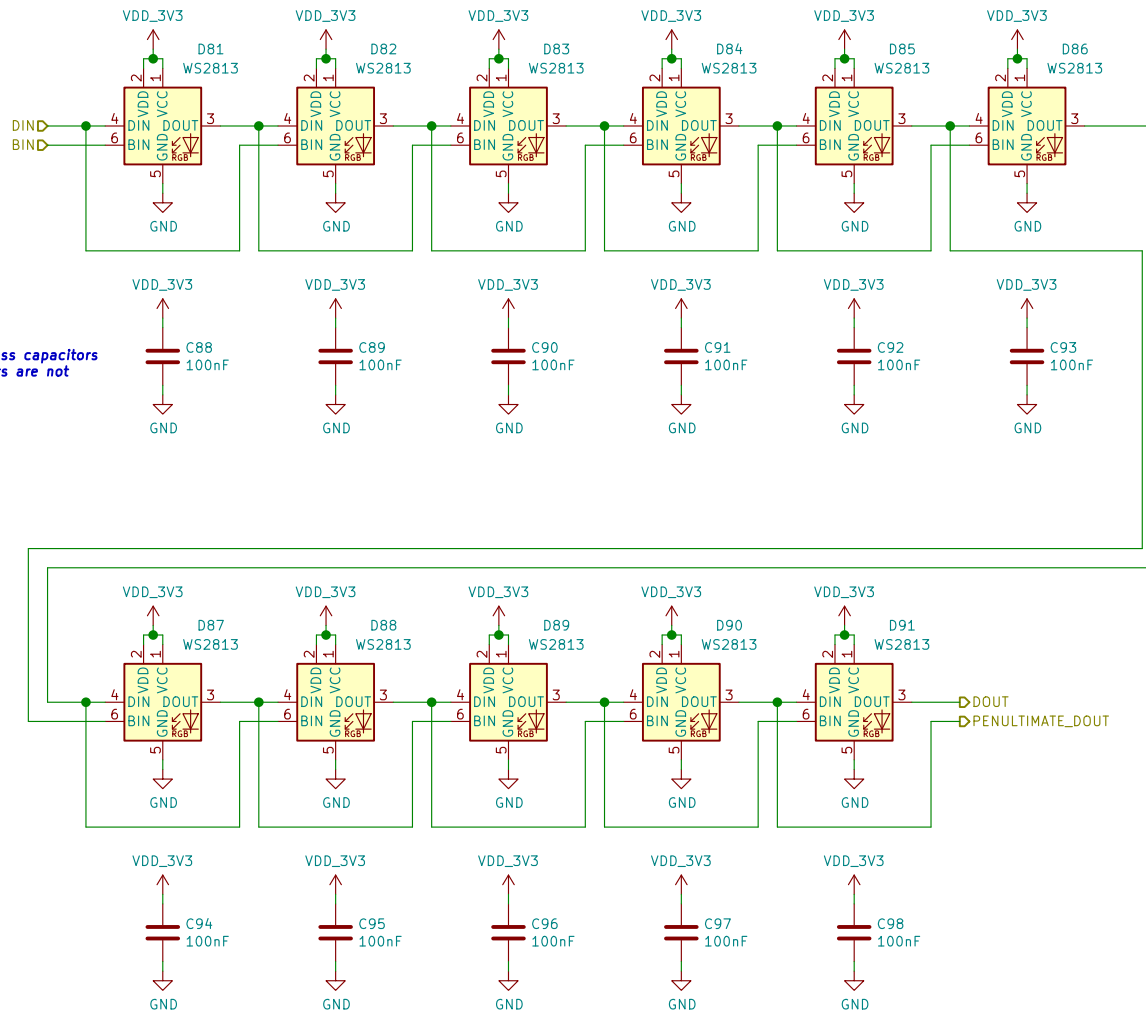
Date:

Rev: 0.1

KiCad E.D.A. kicad 5.0.2-bee76a070ubuntu16.04.1

Id: 12/18

In the case that a chip fails and stops driving its DOUT line, the next chip uses BIN as a backup



Errata: WS2813 has ceramic bypass capacitors in its package; external capacitors are not needed.

LED Arm

Drawn by: Steven Keyes

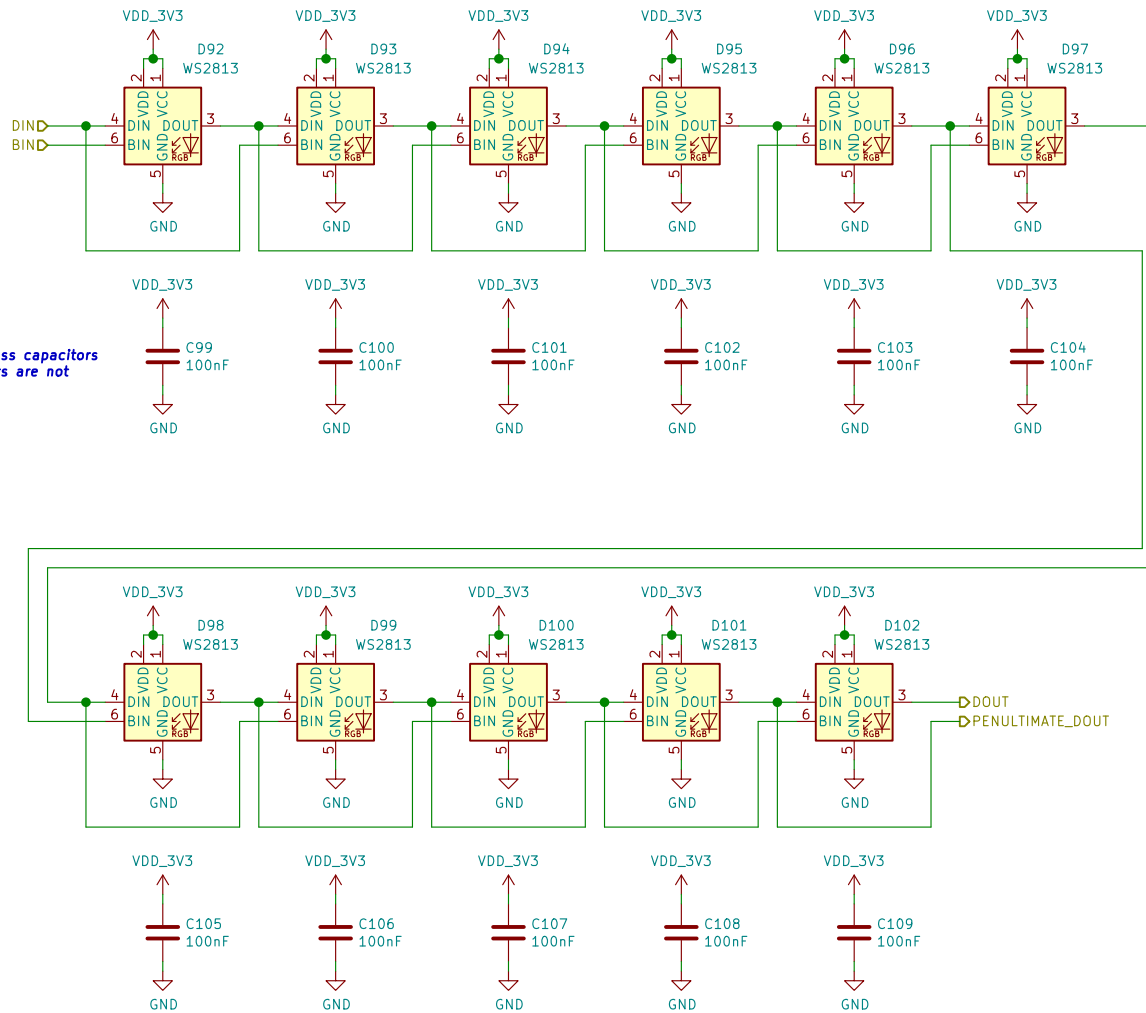
Sheet: /LED Chain/LED Arm 8/
File: led_arm.sch

Title: LED Mandala Clock

Size: A4 Date:
KiCad E.D.A. kicad 5.0.2-bee76a070ubuntu16.04.1

Rev: 0.1
Id: 13/18

In the case that a chip fails and stops driving its DOUT line, the next chip uses BIN as a backup



Errata: WS2813 has ceramic bypass capacitors in its package; external capacitors are not needed.

LED Arm

Drawn by: Steven Keyes

Sheet: /LED Chain/LED Arm 9/

File: led_arm.sch

Title: LED Mandala Clock

Size: A4

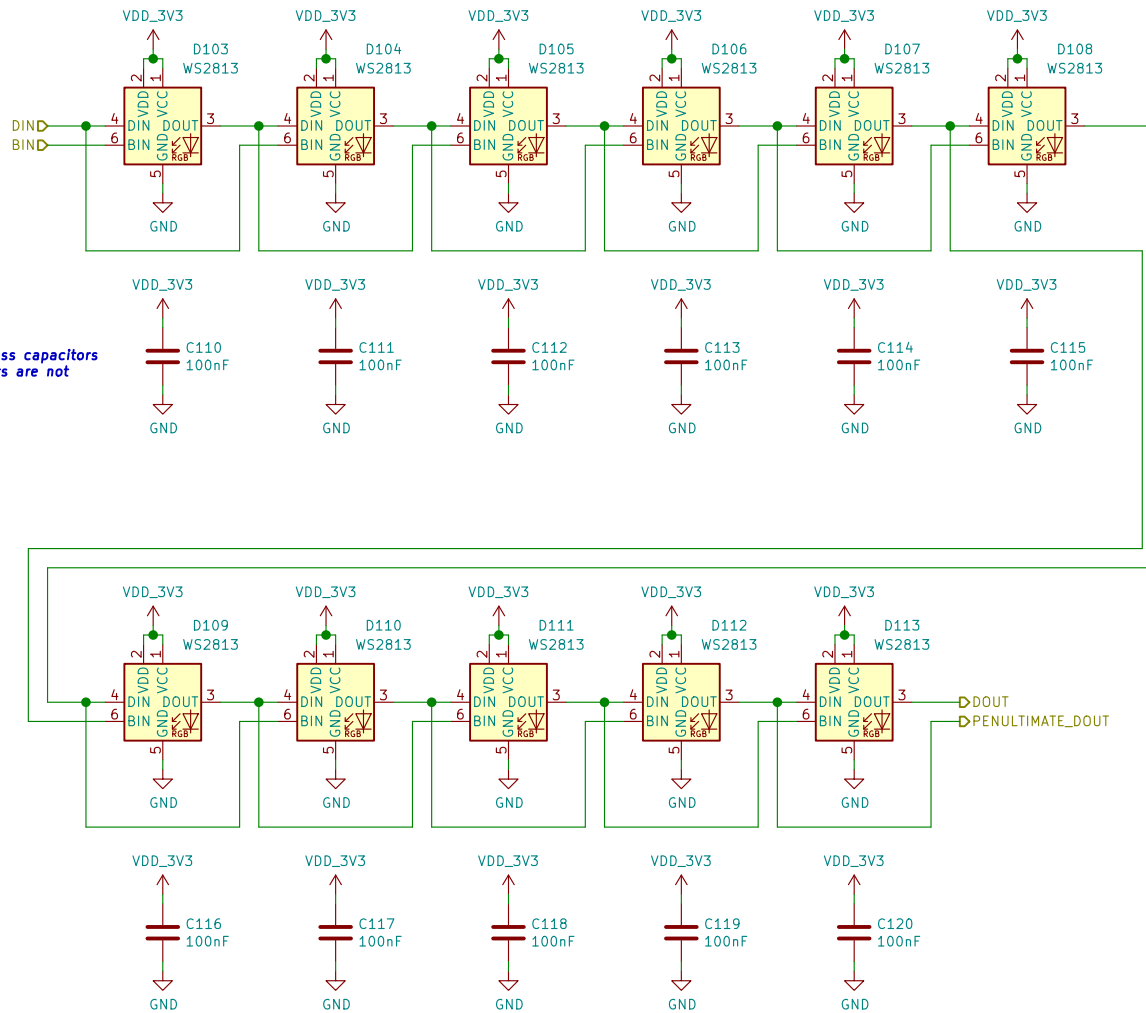
Date:

Rev: 0.1

KiCad E.D.A. kicad 5.0.2-ubuntu16.04.1

Id: 14/18

In the case that a chip fails and stops driving its DOUT line, the next chip uses BIN as a backup



Errata: WS2813 has ceramic bypass capacitors in its package; external capacitors are not needed.

LED Arm

Drawn by: Steven Keyes

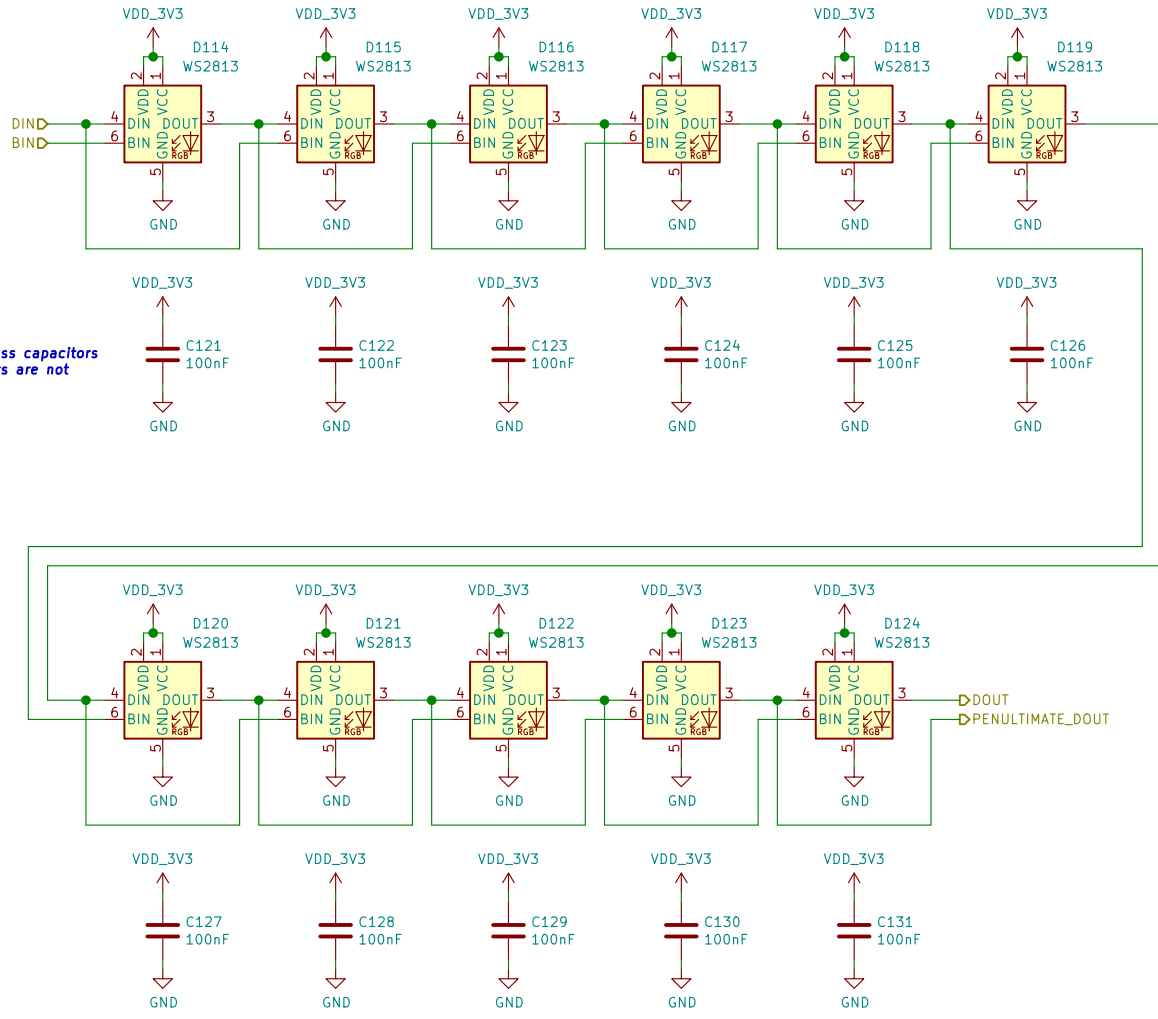
Sheet: /LED Chain/LED Arm 10/
File: led_arm.sch

Title: LED Mandala Clock

Size: A4 Date:
KiCad E.D.A. kicad 5.0.2-bee76a070ubuntu16.04.1

Rev: 0.1
Id: 15/18

In the case that a chip fails and stops driving its DOUT line, the next chip uses BIN as a backup

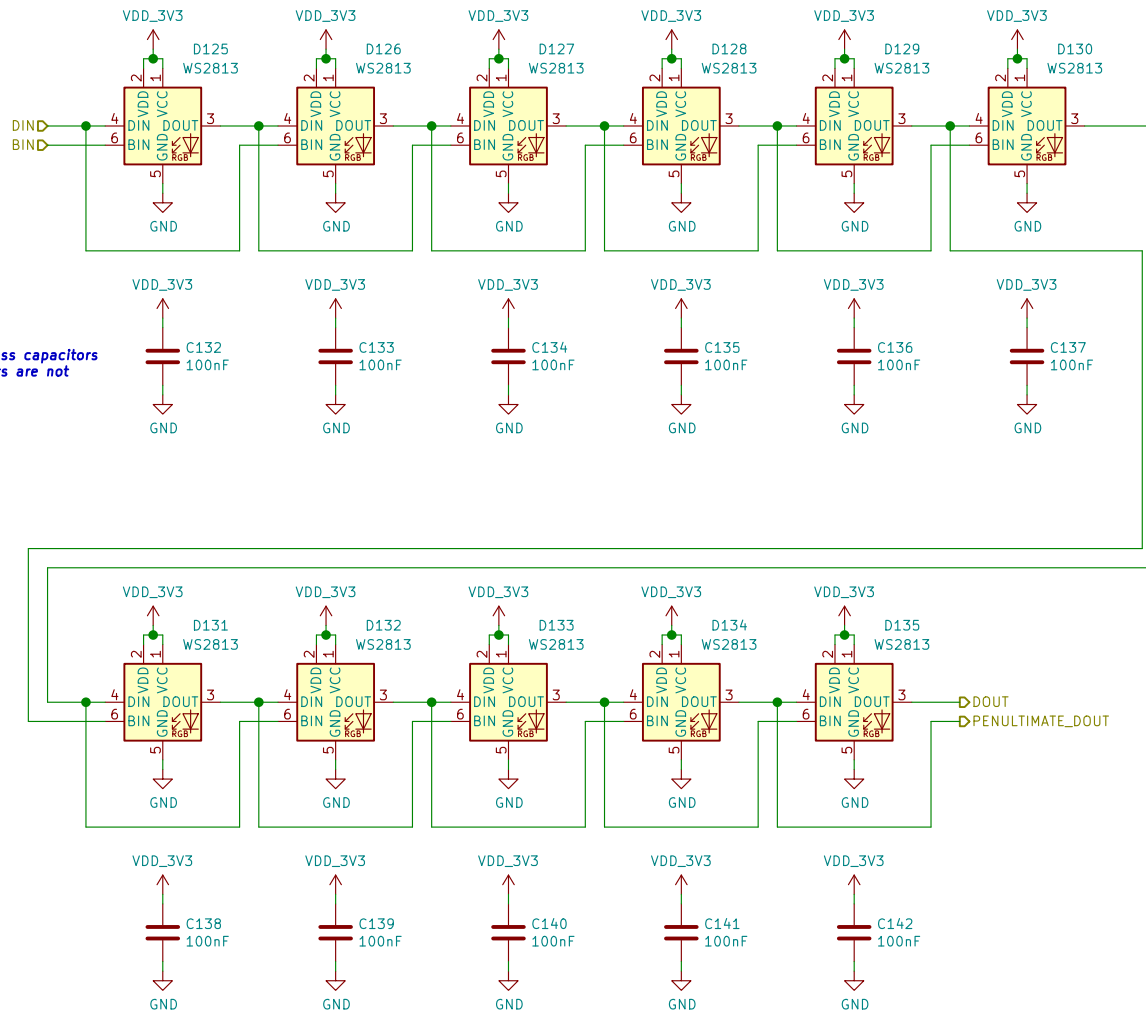


Errata: WS2813 has ceramic bypass capacitors in its package; external capacitors are not needed.

LED Arm

Drawn by: Steven Keyes	
Sheet: /LED Chain/LED Arm 11/ File: led_arm.sch	
Title: LED Mandala Clock	
Size: A4	Date:
KiCad E.D.A. kicad 5.0.2- bee76a070ubuntu16.04.1	
Rev: 0.1	
Id: 16/18	

In the case that a chip fails and stops driving its DOUT line, the next chip uses BIN as a backup



Errata: WS2813 has ceramic bypass capacitors in its package; external capacitors are not needed.

LED Arm

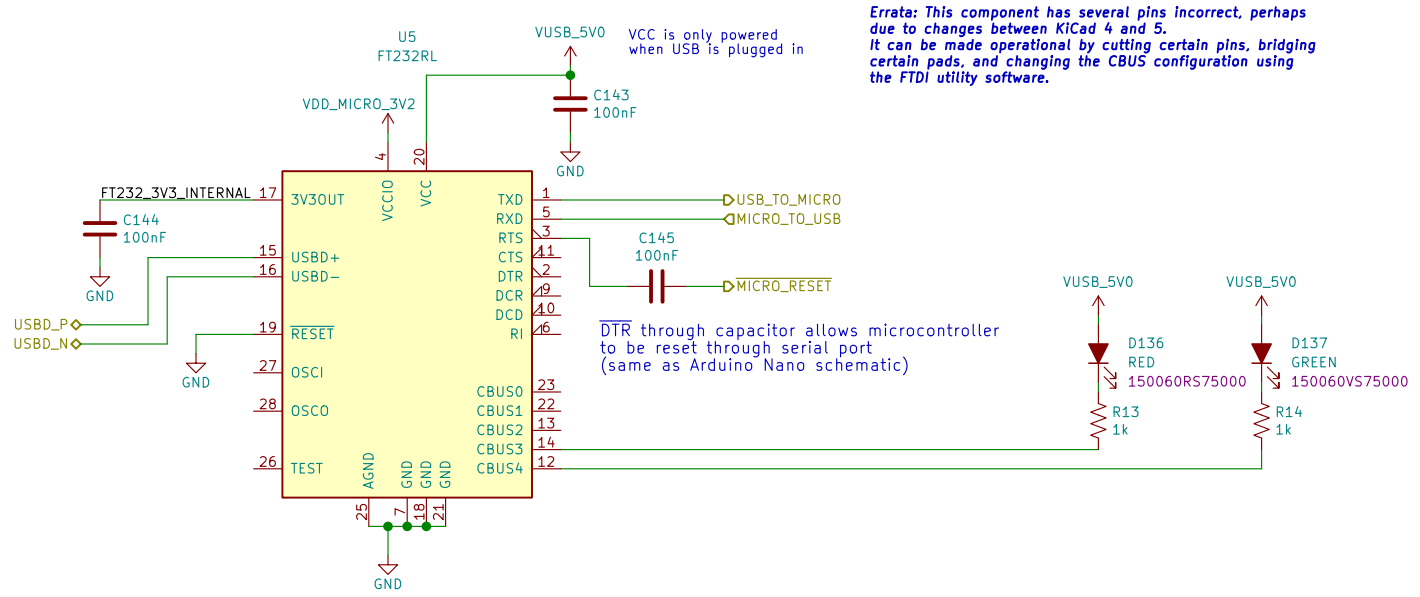
Drawn by: Steven Keyes

Sheet: /LED Chain/LED Arm 12/
File: led_arm.sch

Title: LED Mandala Clock

Size: A4 Date:
KiCad E.D.A. kicad 5.0.2-bee76a070ubuntu16.04.1

Rev: 0.1
Id: 17/18



USB Serial

Drawn by: Steven Keyes

Sheet: /USB Serial/
File: usb_serial.sch

Title: LED Mandala Clock

Size: A	Date:	Rev: 0.1
KiCad E.D.A. kicad 5.0.2- bee76a070ubuntu16.04.1		Id: 18/18