

Nixie Clock Main Board

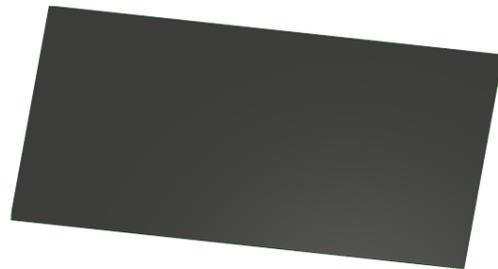
2026-03-19

Variant: DRAFT

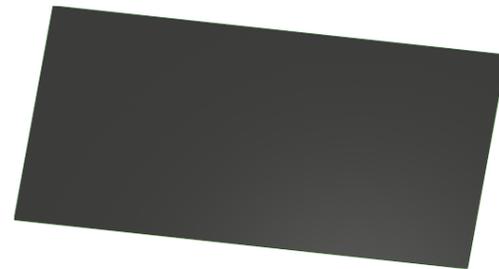
Rev + (Unreleased)

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TOP VIEW



BOTTOM VIEW



NOTES

Comment

Not fitted components are marked as **X**

DRAFT - Very early stage of schematic, ignore details.

PRELIMINARY - Close to final schematic.

CHECKED - There shouldn't be any mistakes. Contact the engineer if you find any.

RELEASED - A board with this schematic has been sent to production.

Date: 19-Mar-2026

DESIGN CONSIDERATIONS

DESIGN NOTE:
Example text for informational design notes.

DESIGN NOTE:
Example text for debug notes.

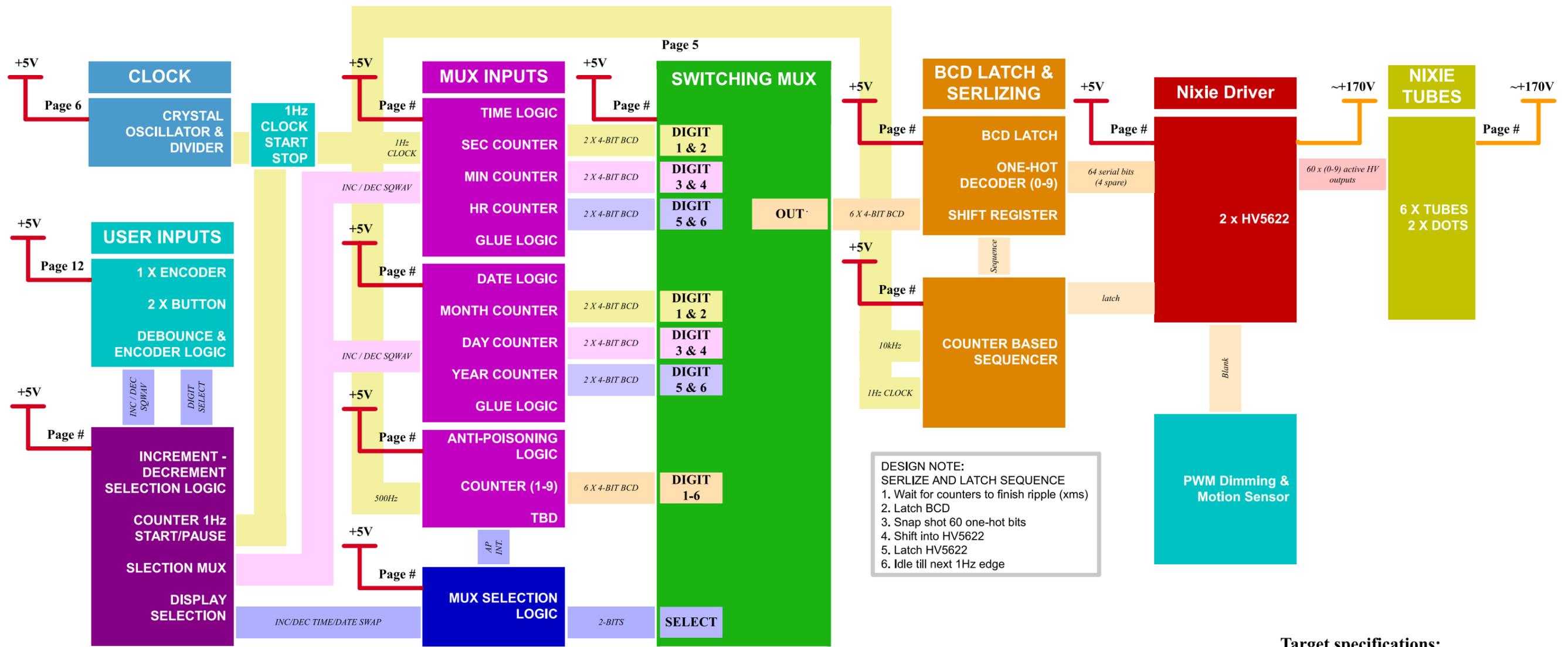
DESIGN NOTE:
Example text for cautionary design notes.

DESIGN NOTE:
Example text for critical design notes.

LAYOUT NOTE:
Example text for critical layout guidelines.

| | | | | |
|--------------|----------------------------|------------------|------------|---------------|
| Comments: | Company: | Variant: | Git Hash: | |
| | Company Name | DRAFT | 1d094e6 | |
| | Board Name: | Project Name: | | |
| Sheet Title: | File Name: | Designer: | Date: | Revision: |
| / | Nixie_Tube_Clock.kicad_sch | Aidan Brzezinski | 2025-01-12 | +(Unreleased) |
| Sheet Path: | Reviewer: | Size: | Sheet: | |
| / | | A3 | 1 of 21 | |

[2] Block Diagram



DESIGN NOTE:
SERLIZE AND LATCH SEQUENCE
1. Wait for counters to finish ripple (xms)
2. Latch BCD
3. Snap shot 60 one-hot bits
4. Shift into HV5622
5. Latch HV5622
6. Idle till next 1Hz edge

DESIGN NOTE:
TIMER FOR AP CYCLE HARD SET ~1HR NOT SURE. INCLUDE BUTTON SOMEWHERE, NOT DIRECT USER INPUT.

ENCODER FOR INCRMENT DECRMENT, 1 BUTTON FOR CYCLING THROUGH DIGITS, 1 BUTTON FOR SHOWING DATE ~15 SECONDS.

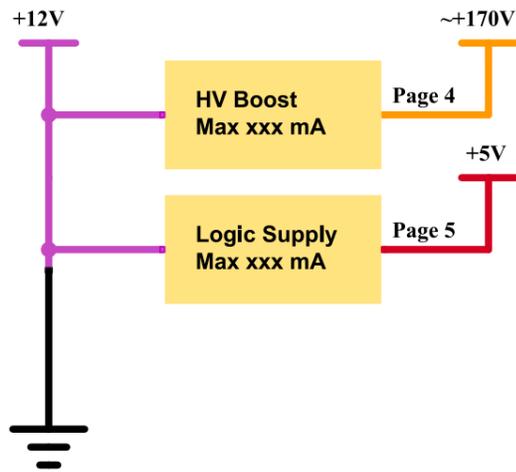
FOR INCREMENT - DECREMENT AN ENCODER INC. AND DEC. AND CYCLE BUTTON. FIRST THE CYCEL BUTTON WILL PAUSE THE 1Hz CLOCK, THEN THE CYCLE BUTTON WILL INCREMENT A COUNTER THAT WILL GO TO A MUX SELECT THAT CHANGES BETWEEN: SS, MM, HH, (AT THIS POINT THE DISPLAY WILL SWAP TOO)MM, DD, YY, THEN ENABLE THE 1Hz CLOCK AGAIN(AND SWAP BACK).

THEN EACH INC, DEC, IS PASSED TROUGH TO THE RESPECTIVE COUNTER AND PUT INTO THE INCREMNT OR DECRMENT INPUT. THE INCRMENT WILL NEED TO BE AND WITH THE RESPECTIVE INCREMNT FOR THAT COUNTER.

IMPORTANT: A COUNTER SHOULD NEVER RECEIVE AN INCREMNT AND DECREMENT AT THE SAME TIME.

Target specifications:

| | |
|----------------|-----------|
| Input voltage: | ?? - ?? V |
| Spec 2 | ?? |
| Spec 3 | ?? |
| Spec 4 | ?? |



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| Comments: | Company: | Variant: | Git Hash: |
| | Company Name | DRAFT | 1d094c6 |
| Sheet Title: | Board Name: | Project Name: | |
| | Block Diagram | Nixie Clock Main Board | Nixie Tube Clock |
| Sheet Path: | File Name: | Designer: | Date: |
| | /Block Diagram/ | Block Diagram.kicad_sch | Aidan Brzezinski |
| | | Reviewer: | Revision: |
| | | | +(Unreleased) |
| | | Size: | Sheet: |
| | | A3 | 2 of 21 |

[3] Project Architecture

Power - HV Boost



File: Power - HV Boost.kicad_sch

Power - Logic Supply



File: Power - Logic Supply.kicad_sch

Clock - Oscillator & Divider



File: Clock - Oscillator & Divider.kicad_sch

User Inputs



File: User Inputs.kicad_sch

Increment Decrement Selection Logic



File: Increment Decrement Selection Logic.kicad_sch

Counter Based Sequencer



File: Counter Based Sequencer.kicad_sch

MUX Inputs - Time Logic



File: Section B - Title B.kicad_sch

MUX Inputs - Date Logic



File: MUX Inputs - Date Logic.kicad_sch

MUX Inputs - Anti-Poisoning Logic



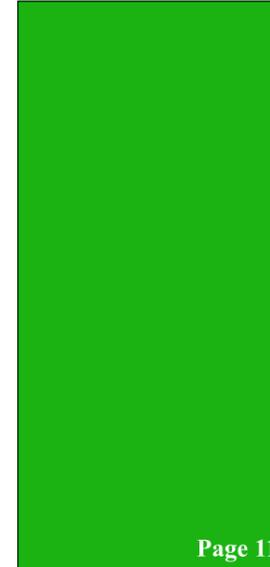
File: MUX Inputs - Anti-Poisoning Logic.kicad_sch

MUX Selection Logic



File: MUX Selection Logic.kicad_sch

Switching MUX



File: Switching MUX.kicad_sch

BCD Latch and Serializing



File: BCD Latch and Serializing.kicad_sch

BCD to One-Hot Decoder



File: BCD to One-Hot Decoder.kicad_sch

Nixie Driver



File: Nixie Driver.kicad_sch

Nixie Tubes



File: Nixie Tubes.kicad_sch

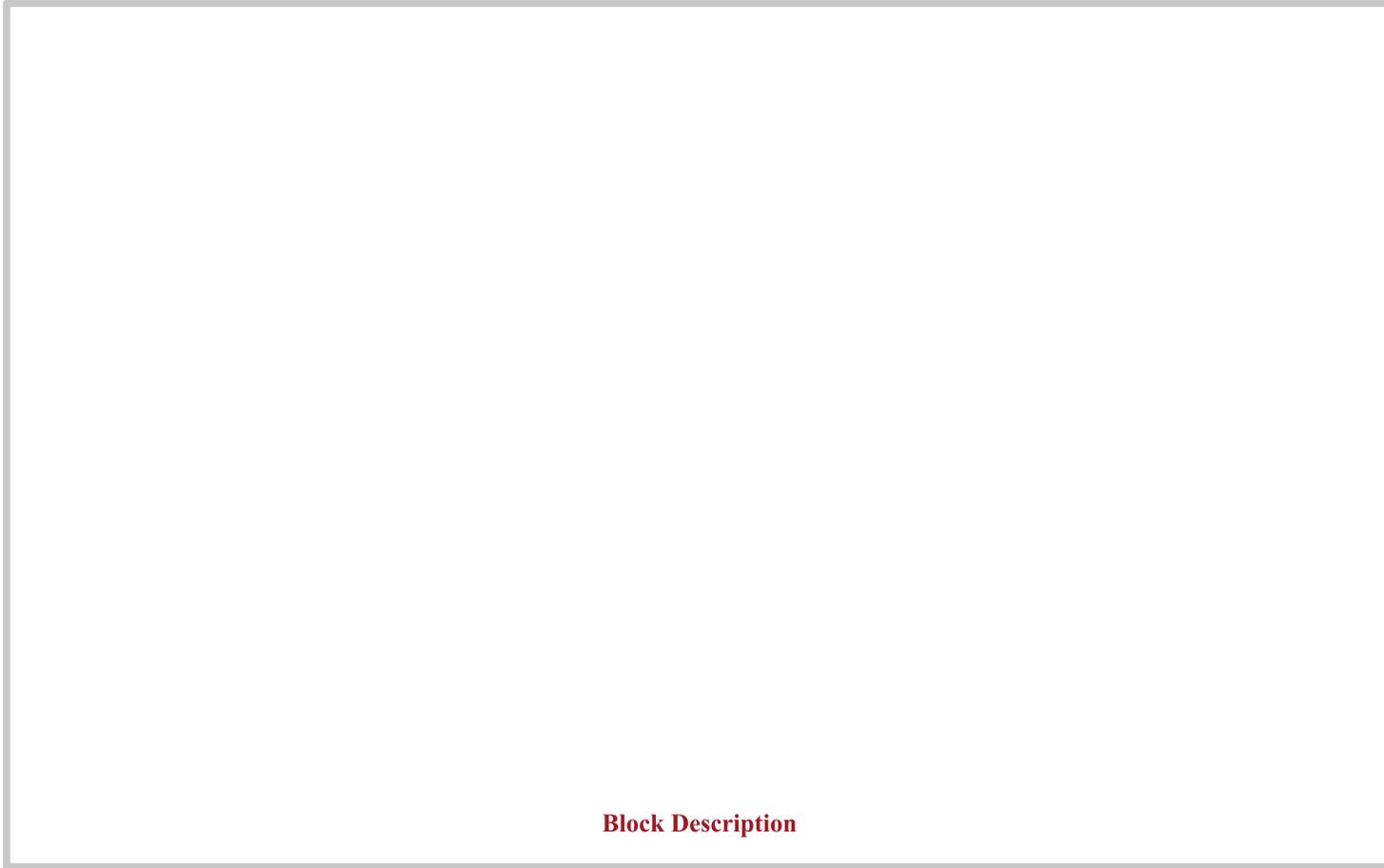
PWM Dimming & Motion Detection



File: Nixie Tubes.kicad_sch

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| | Comments: | Company: Company Name | Variant: DRAFT | Git Hash: 1d094e6 |
| | Sheet Title: Project Architecture | File Name: Project Architecture.kicad_sch | Designer: Aidan Brzezinski | Date: 2025-01-12 |
| | Sheet Path: /Project Architecture/ | Reviewer: | Size: A3 | Revision: + (Unreleased) |
| | | Board Name: Nixie Clock Main Board | Project Name: Nixie Tube Clock | |
| | | | Date: 2025-01-12 | Revision: + (Unreleased) |
| | | | Size: A3 | Sheet: 3 of 21 |

[4] Sheet Title B



Block Description

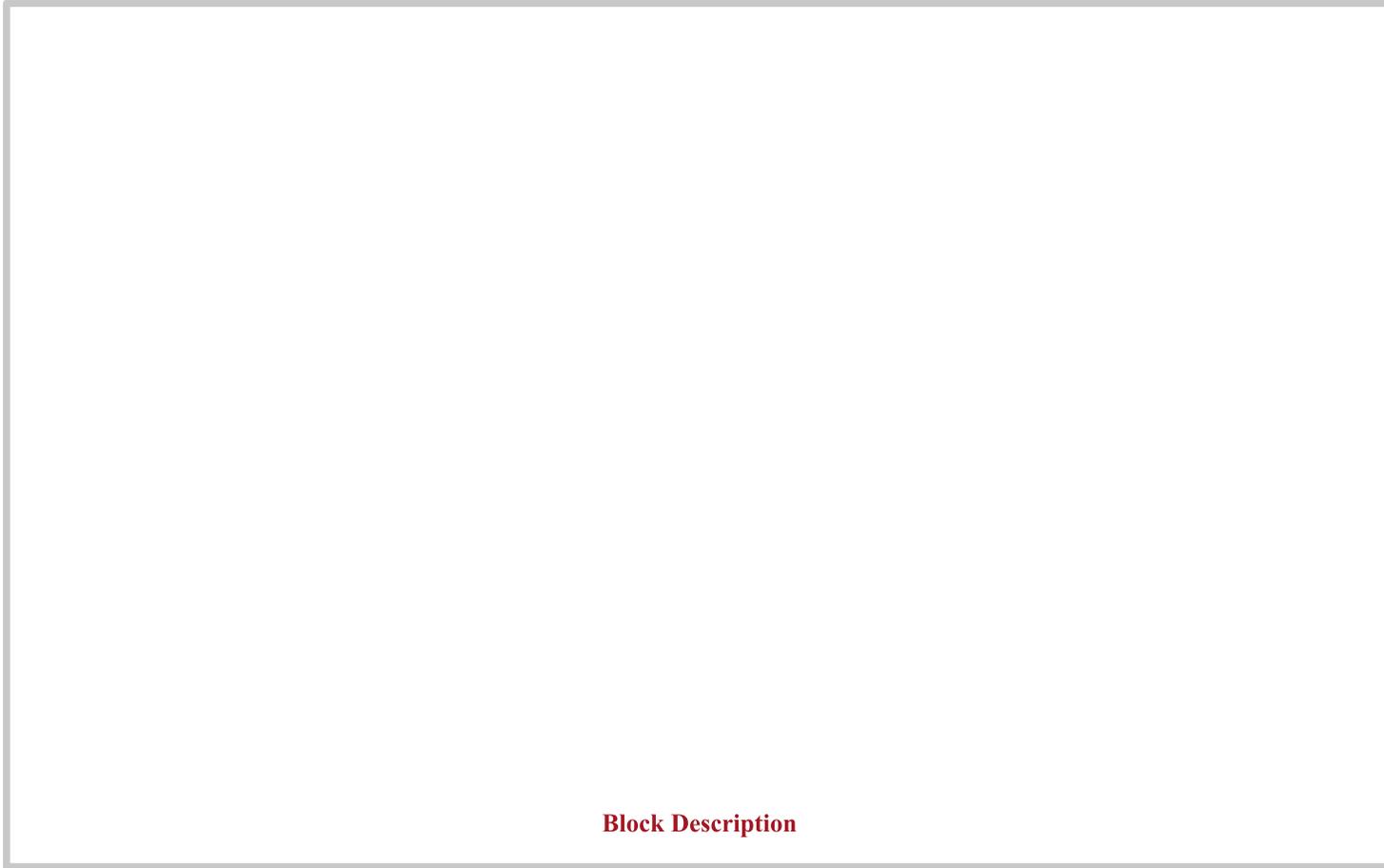
LAYOUT NOTE:
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DESIGN NOTE:
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| | Comments: | Company: | Variant: | Git Hash: |
| | | Company Name | DRAFT | 1d094e6 |
| | Board Name: | Project Name: | | |
| | Nixie Clock Main Board | Nixie Tube Clock | | |
| Sheet Title: | File Name: | Designer: | Date: | Revision: |
| Power - HV Boost | Power - HV Boost.kicad_sch | Aidan Brzezinski | 2025-01-12 | + (Unreleased) |
| Sheet Path: | Reviewer: | Size: | Sheet: | |
| /Project Architecture/Power - HV Boost/ | | A4 | 4 of 21 | |

[5] Sheet Title B



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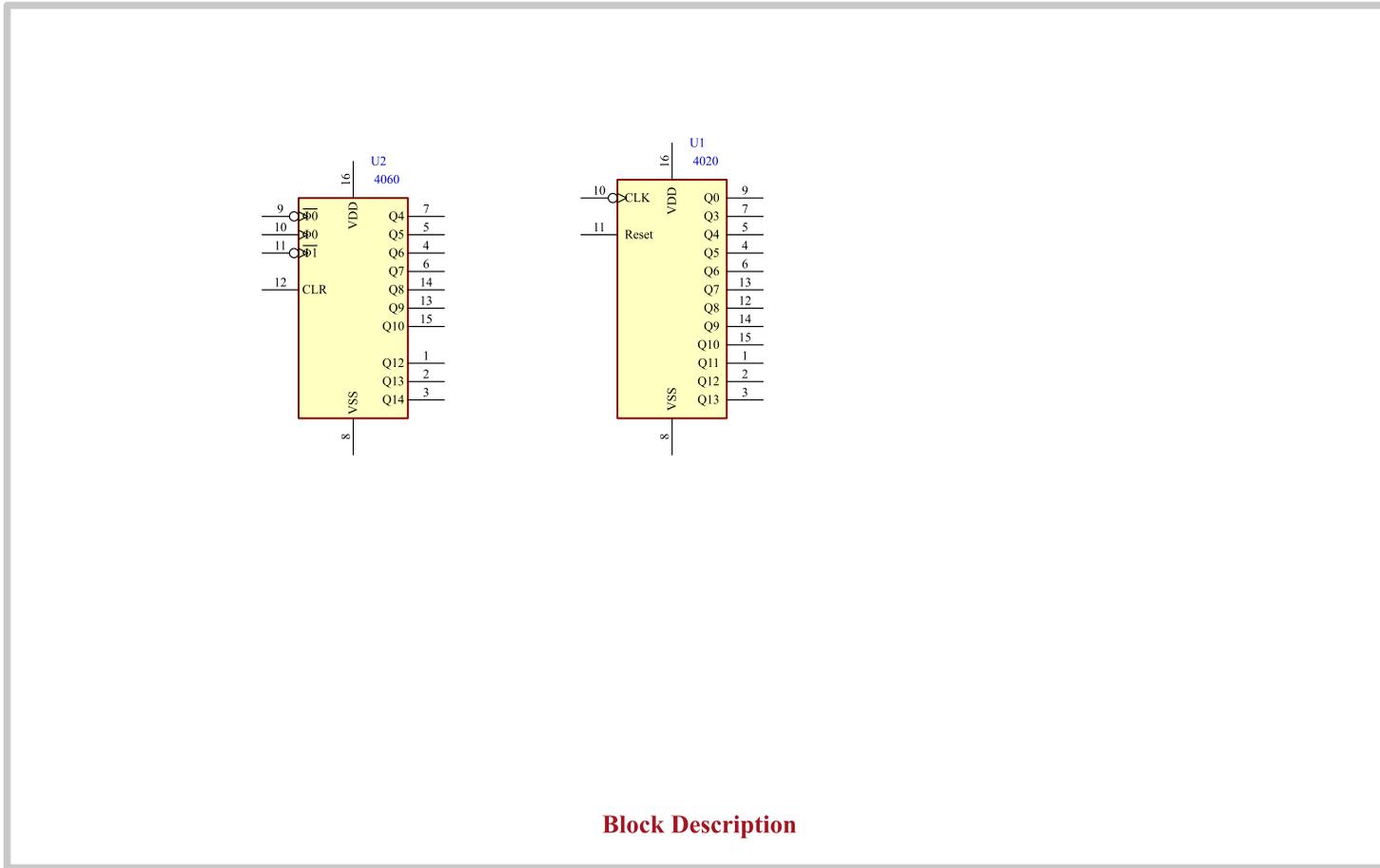
LAYOUT NOTE:
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DESIGN NOTE:
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| | Comments: | Company: | Variant: | Git Hash: |
| | | Company Name | DRAFT | 1d094e6 |
| | Board Name: | Project Name: | | |
| | Nixie Clock Main Board | Nixie Tube Clock | | |
| Sheet Title: | File Name: | Designer: | Date: | Revision: |
| Power - Logic Supply | Power - Logic Supply.kicad_sch | Aidan Brzezinski | 2025-01-12 | + (Unreleased) |
| Sheet Path: | Reviewer: | Size: | Sheet: | |
| /Project Architecture/Power - Logic Supply/ | | A4 | 5 of 21 | |

[6] Clock



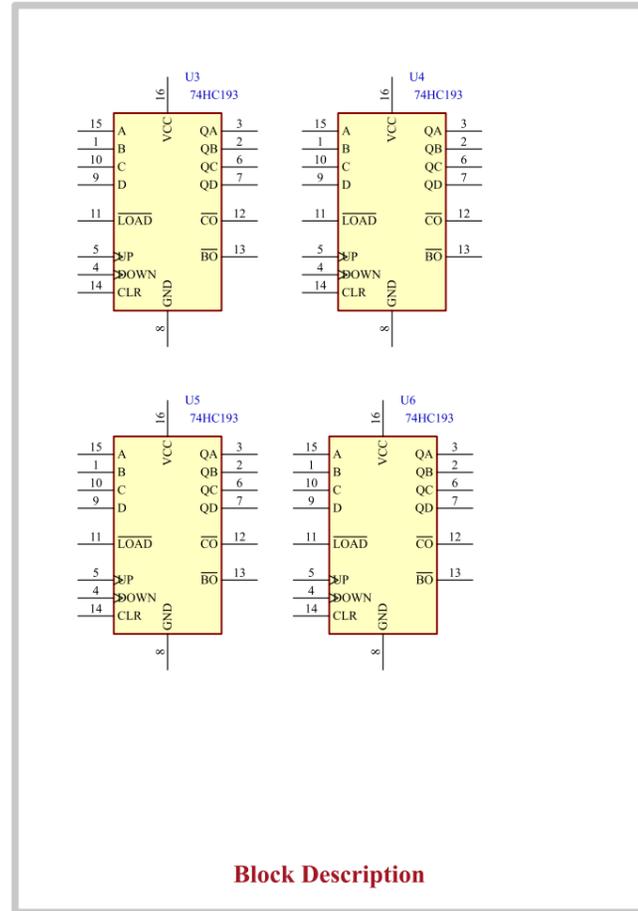
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LAYOUT NOTE:
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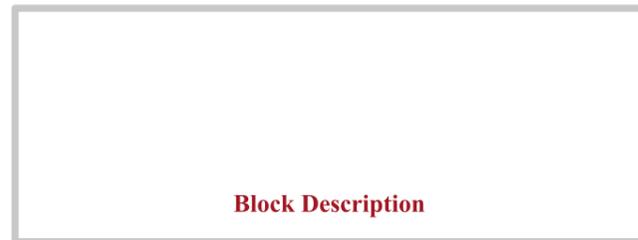
DESIGN NOTE:
blablabla

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|---|---|--|---|--|
| <p>Comments:</p> <p>AN5346</p> <p>STM32G474 Datasheet p.81</p> <p>J. Pieper ADC investigation</p> | <p>Company:</p> <p>Company Name</p> | | <p>Variant:</p> <p>DRAFT</p> | <p>Git Hash:</p> <p>1d094e6</p> |
| | <p>Board Name:</p> <p>Nixie Clock Main Board</p> | | <p>Project Name:</p> <p>Nixie Tube Clock</p> | |
| <p>Sheet Title:</p> <p>Clock - Oscillator & Divider</p> | <p>File Name:</p> <p>Clock - Oscillator & Divider.kicad_sch</p> | <p>Designer:</p> <p>Aidan Brzezinski</p> | <p>Date:</p> <p>2025-01-12</p> | <p>Revision:</p> <p>+ (Unreleased)</p> |
| <p>Sheet Path:</p> <p>/Project Architecture/Clock - Oscillator & Divider/</p> | | <p>Reviewer:</p> | <p>Size:</p> <p>A4</p> | <p>Sheet:</p> <p>6 of 21</p> |

[7] Sheet Title B



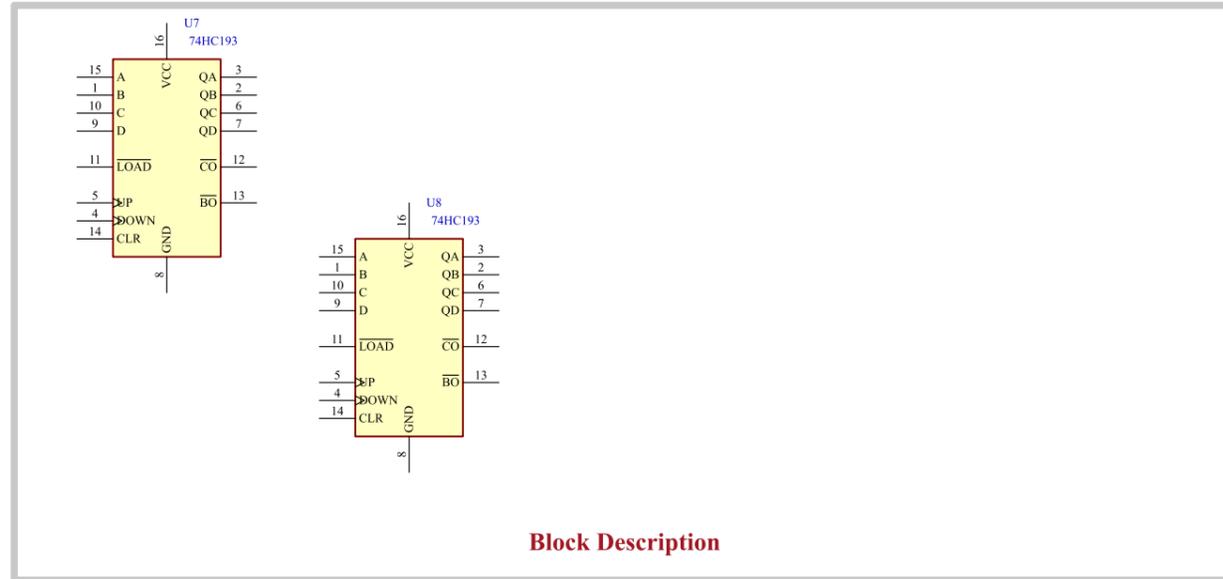
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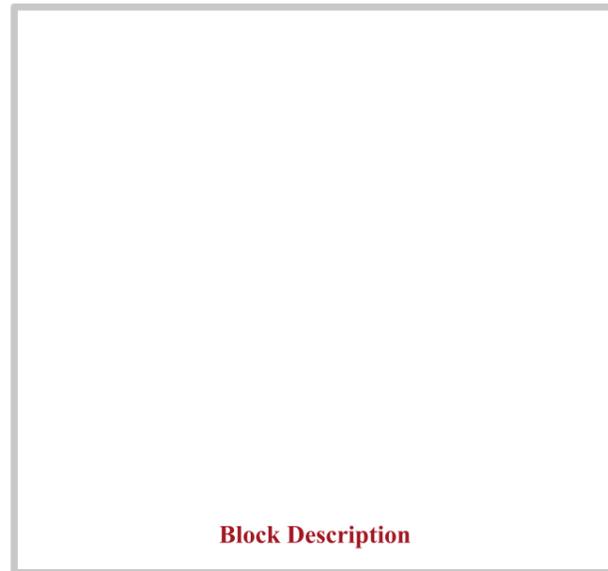
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Block Description



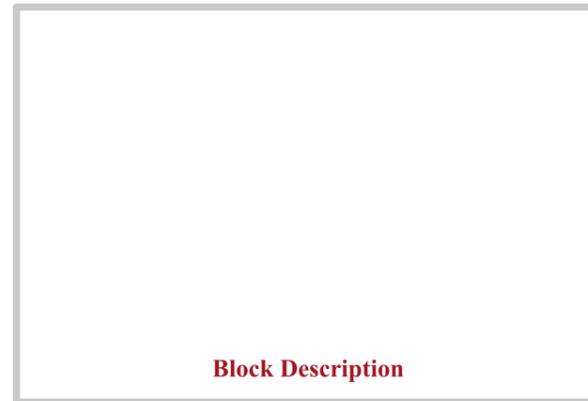
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| Comments: References: Flexible I/O worked examples Flexible I/O source configuration | Company: Company Name | | Variant: DRAFT | Git Hash: 1d094e6 | |
| | Board Name: Nixie Clock Main Board | | | Project Name: Nixie Tube Clock | |
| | Sheet Title: MUX Inputs - Time Logic | File Name: Section B - Title B.kicad_sch | Designer: Aidan Brzezinski | Date: 2025-01-12 | Revision: + (Unreleased) |
| Sheet Path: /Project Architecture/MUX Inputs - Time Logic/ | | | Reviewer: | Size: A3 | Sheet: 7 of 21 |

[8] Sheet Title B

Block Description

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|--|---|---|---------------------------------|------------------------------------|
| | Comments: | Company: | Variant: | Git Hash: |
| | References: Flexible I/O worked examples Flexible I/O source configuration | Company Name: Board Name: Nixie Clock Main Board | DRAFT | 1d094e6 |
| Sheet Title: MUX Inputs - Date Logic | File Name: MUX Inputs - Date Logic.kicad_sch | Designer: Aidan Brzezinski | Date: 2025-01-12 | Revision: + (Unreleased) |
| Sheet Path: /Project Architecture/MUX Inputs - Date Logic/ | Reviewer: | Size: A3 | Sheet: 8 of 21 | |

[9] Sheet Title B

Block Description

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|--|---|---|---------------------------------|------------------------------------|
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| | References: Flexible I/O worked examples Flexible I/O source configuration | Company Name: Board Name: Nixie Clock Main Board | DRAFT | 1d094e6 |
| Sheet Title: MUX Inputs - Anti-Poisoning Logic | File Name: MUX Inputs - Anti-Poisoning Logic.kicad_sch | Designer: Aidan Brzezinski | Date: 2025-01-12 | Revision: + (Unreleased) |
| Sheet Path: /Project Architecture/MUX Inputs - Anti-Poisoning Logic/ | Reviewer: | Size: A3 | Sheet: 9 of 21 | |

[10] Sheet Title B

Block Description

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| | References: Flexible I/O worked examples Flexible I/O source configuration | Company Name: Board Name: Nixie Clock Main Board | DRAFT | 1d094e6 |
| Sheet Title: MUX Selection Logic | File Name: MUX Selection Logic.kicad_sch | Designer: Aidan Brzezinski | Date: 2025-01-12 | Revision: + (Unreleased) |
| Sheet Path: /Project Architecture/MUX Selection Logic/ | Reviewer: | Size: A3 | Sheet: 10 of 21 | |

[11] Sheet Title B

Block Description

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| | Comments: | Company: | Variant: | Git Hash: |
| | References: Flexible I/O worked examples Flexible I/O source configuration | Company Name: Board Name: Nixie Clock Main Board | DRAFT | 1d094e6 |
| Sheet Title: Switching MUX | File Name: Switching MUX.kicad_sch | Designer: Aidan Brzezinski | Date: 2025-01-12 | Revision: + (Unreleased) |
| Sheet Path: /Project Architecture/Switching MUX/ | Reviewer: | Size: A3 | Sheet: 11 of 21 | |

[12] Sheet Title B

Block Description

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|--|---|---|----------------------------------|------------------------------------|
| | Comments: | Company: | Variant: | Git Hash: |
| | References: Flexible I/O worked examples Flexible I/O source configuration | Company Name: Board Name: Nixie Clock Main Board | DRAFT | 1d094e6 |
| Sheet Title: User Inputs | File Name: User Inputs.kicad_sch | Designer: Aidan Brzezinski | Date: 2025-01-12 | Revision: + (Unreleased) |
| Sheet Path: /Project Architecture/User Inputs/ | Reviewer: | Size: A3 | Sheet: 12 of 21 | |

[13] Sheet Title B

Block Description

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|--|---|---|----------------------------|------------------------------------|
| | Comments: | Company: | Variant: | Git Hash: |
| | References: Flexible I/O worked examples Flexible I/O source configuration | Company Name: Board Name: Nixie Clock Main Board | DRAFT | 1d094e6 |
| Sheet Title: Increment Decrement Selection Logic | File Name: Increment Decrement Selection Logic.kicad_sch | Designer: Aidan Brzezinski | Date: 2025-01-12 | Revision: + (Unreleased) |
| Sheet Path: /Project Architecture/Increment Decrement Selection Logic/ | | Reviewer: | Size: A3 | Sheet: 13 of 21 |

[14] Sheet Title B

Block Description

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|--|---|---|----------------------------------|------------------------------------|
| | Comments: | Company: | Variant: | Git Hash: |
| | References: Flexible I/O worked examples Flexible I/O source configuration | Company Name: Board Name: Nixie Clock Main Board | DRAFT | 1d094e6 |
| Sheet Title: BCD Latch and Serializing | File Name: BCD Latch and Serializing.kicad_sch | Designer: Aidan Brzezinski | Date: 2025-01-12 | Revision: + (Unreleased) |
| Sheet Path: /Project Architecture/BCD Latch and Serializing/ | Reviewer: | Size: A3 | Sheet: 14 of 21 | |

[15] Sheet Title B

Block Description

| | | | | |
|---|---|---|----------------------------------|------------------------------------|
| | Comments: | Company: | Variant: | Git Hash: |
| | References: Flexible I/O worked examples Flexible I/O source configuration | Company Name: Board Name: Nixie Clock Main Board | DRAFT | 1d094e6 |
| Sheet Title: BCD to One-Hot Decoder | File Name: BCD to One-Hot Decoder.kicad_sch | Designer: Aidan Brzezinski | Date: 2025-01-12 | Revision: + (Unreleased) |
| Sheet Path: /Project Architecture/BCD to One-Hot Decoder/ | Reviewer: | Size: A3 | Sheet: 15 of 21 | |

[16] Sheet Title B

Block Description

| | | | | |
|--|---|---|----------------------------------|------------------------------------|
| | Comments: | Company: | Variant: | Git Hash: |
| | References: Flexible I/O worked examples Flexible I/O source configuration | Company Name: Board Name: Nixie Clock Main Board | DRAFT | 1d094e6 |
| Sheet Title: Counter Based Sequencer | File Name: Counter Based Sequencer.kicad_sch | Designer: Aidan Brzezinski | Date: 2025-01-12 | Revision: + (Unreleased) |
| Sheet Path: /Project Architecture/Counter Based Sequencer/ | Reviewer: | Size: A3 | Sheet: 16 of 21 | |

[17] Sheet Title B

Block Description

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|---|---|---|---|------------------------------------|
| | Comments: | Company: | Variant: | Git Hash: |
| | References: Flexible I/O worked examples Flexible I/O source configuration | Company Name: | DRAFT | 1d094e6 |
| | Sheet Title: Nixie Driver | Board Name: Nixie Clock Main Board | Project Name: Nixie Tube Clock | Revision: + (Unreleased) |
| Sheet Path: /Project Architecture/Nixie Driver/ | File Name: Nixie Driver.kicad_sch | Designer: Aidan Brzezinski | Date: 2025-01-12 | Sheet: 17 of 21 |

[18] Sheet Title B

Block Description

| | | | | | |
|--|---|---|--------------------------------------|---|----------------------------------|
| | Comments: | Company: | Variant: | Git Hash: | |
| | References: Flexible I/O worked examples Flexible I/O source configuration | Company Name: Board Name: Nixie Clock Main Board | DRAFT | 1d094e6 | |
| | Sheet Title: Nixie Tubes | File Name: Nixie Tubes.kicad_sch | Designer: Aidan Brzezinski | Project Name: Nixie Tube Clock | |
| Sheet Path: /Project Architecture/Nixie Tubes/ | | Date: 2025-01-12 | Revision: + (Unreleased) | Size: A3 | Sheet: 18 of 21 |

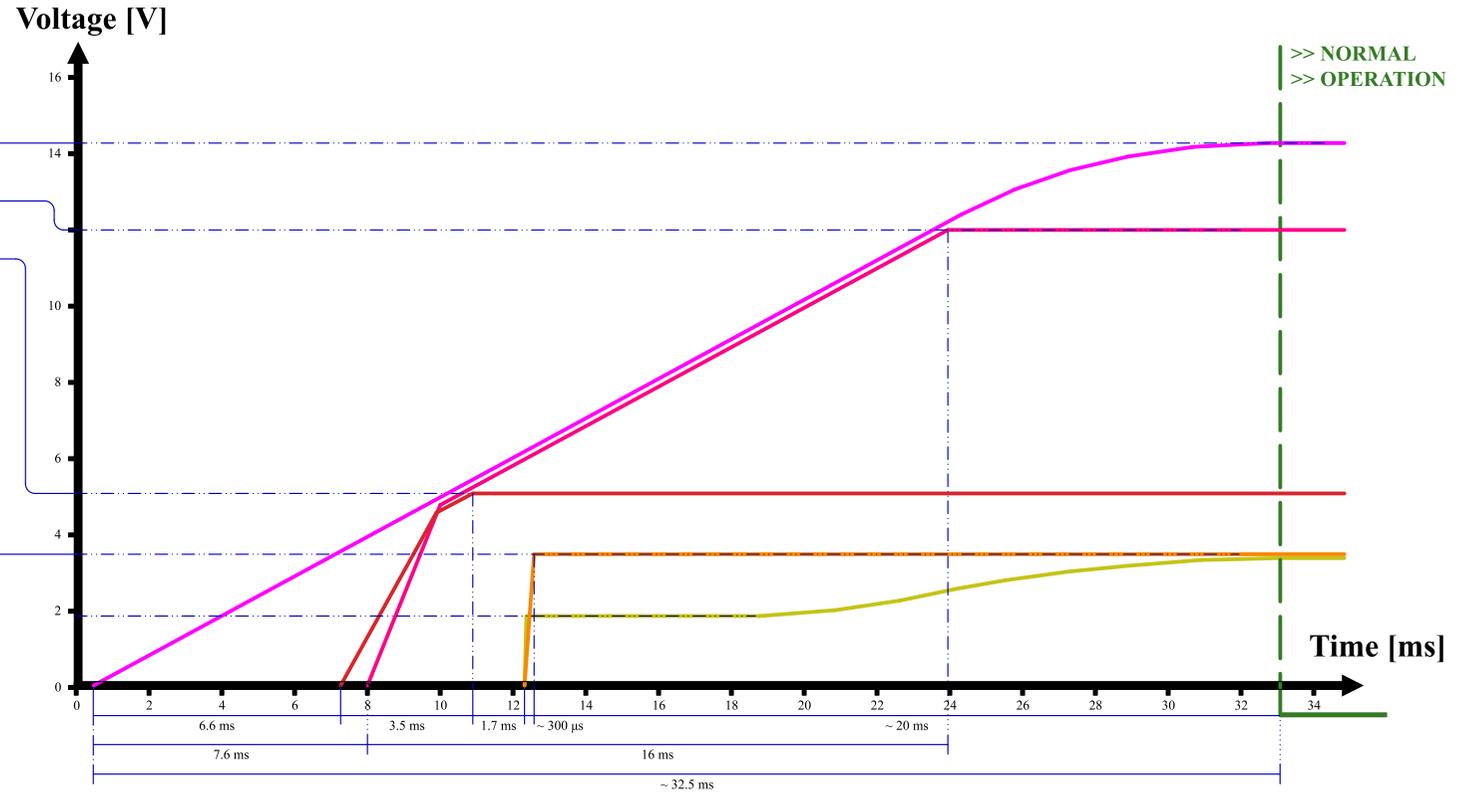
[19] Sheet Title B

Block Description

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| | References: Flexible I/O worked examples Flexible I/O source configuration | Company Name: Board Name: Nixie Clock Main Board | DRAFT | 1d094e6 |
| Sheet Title: PWM Dimming & Motion Detection | File Name: Nixie Tubes.kicad_sch | Designer: Aidan Brzezinski | Date: 2025-01-12 | Revision: + (Unreleased) |
| Sheet Path: /Project Architecture/PWM Dimming & Motion Detection/ | Reviewer: | Size: A3 | Sheet: 19 of 21 | |

[20] Power - Sequencing

| NAME | SOURCE | LEVEL |
|------|--------|-------------|
| +V?? | ?? | ? - ? ± ??% |
| +V?? | ?? | ? - ? ± ??% |
| +V?? | ?? | ? - ? ± ??% |
| +V?? | ?? | ? - ? ± ??% |
| +V?? | ?? | ? - ? ± ??% |



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|----------------------|-------------------------------|-------------------------|------------------------|----------------|
| | Comments: | Company: | Variant: | Git Hash: |
| | | Company Name | DRAFT | 1d094e6 |
| | Board Name: | Project Name: | | |
| | Nixie Clock Main Board | Nixie Tube Clock | | |
| Sheet Title: | File Name: | Designer: | Date: | Revision: |
| Power - Sequencing | Power - Sequencing.kicad_sch | Aidan Brzezinski | 2025-01-12 | + (Unreleased) |
| Sheet Path: | Reviewer: | Size: | Sheet: | |
| /Power - Sequencing/ | | A4 | 20 of 21 | |

[21] Revision History

| | | | | |
|--------------------|----------------------------|-------------------------------|-------------------------|----------------|
| | Comments: | Company: | Variant: | Git Hash: |
| | | Company Name | DRAFT | 1d094e6 |
| | | Board Name: | Project Name: | |
| | | Nixie Clock Main Board | Nixie Tube Clock | |
| Sheet Title: | File Name: | Designer: | Date: | Revision: |
| Revision History | Revision History.kicad_sch | Aidan Brzezinski | 2025-01-12 | + (Unreleased) |
| Sheet Path: | Reviewer: | Size: | Sheet: | |
| /Revision History/ | | A4 | 21 of 21 | |