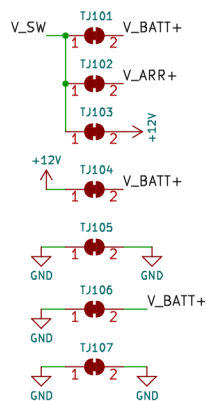


- H101  
Top Left Mounting Hole
- H102  
Top Right Mounting Hole
- H103  
Bottom Left Mounting Hole
- H104  
Bottom Right Mounting Hole



## Sunscatter MPPT

v0.1.1rc

Praise the sun. A student design maximum power point tracker, custom built for the Longhorn Racing Solar car. Optimized to run the latest and greatest MPPT algorithms.

## Errata

v0.1.1rc

- Fix for BNC footprint swapping signal and ground.
- Fix for OPA990 footprint, rotating three pins.
- Fix for mislabeling 1uF 2220 switching cap. This should be 2.2uF.
- Fix for bad ground isolation for current sensors.
- Fix for ERROR LED being hooked up to USB\_DP and CAN1\_TD pin.

v0.2.0 (proposed)

- Remove BNC as no longer necessary.
- Proposed PQ core resize from PQ26/25 to PQ20/16.
- Adjust noted inductance and input/output capacitance based on empirical data.
- Add input and output power fuse.
- Hit broad range efficiency target of >90%, with a MPP efficiency target of >97.5%.

v0.3.0 (proposed)

- Convert STM32 Nucleo to bare chip.
- Add CAN driver, USB port (data only).
- Add port for I2C (Blackbody boards).
- Hit broad range efficiency target of >95%, with a MPP efficiency target of >99%.
- Hit board size, cost target of 75x45 mm<sup>2</sup>, <50\$/board.

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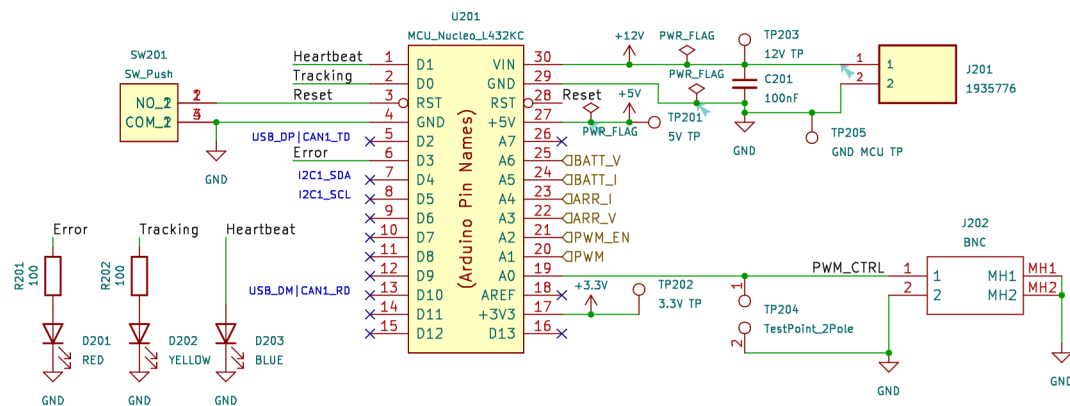
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**Title: Sunscatter MPPT**

Size: A4 Date: 2023-03-26  
KiCad E.D.A. kicad 7.0.1-3b83917a11-172-ubuntu22.04.1

Rev: v0.1.1  
Id: 1/5

D2 and D10 are reserved for USB and CAN communication.  
D4 and D5 are reserved for I2C communication to irradiance,  
temperature sensors.



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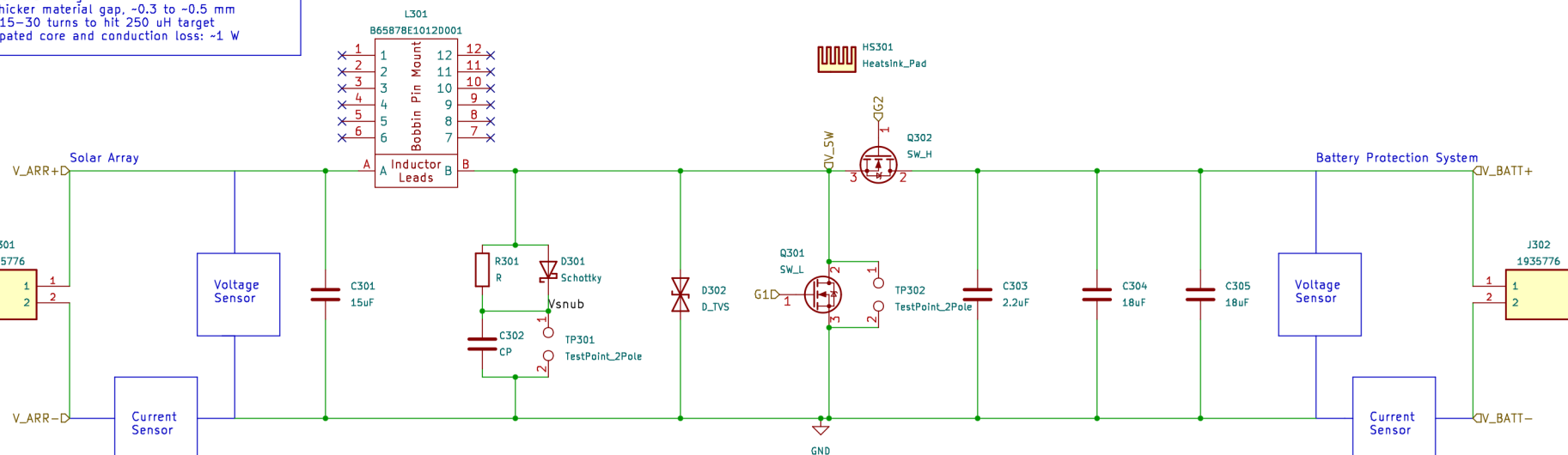
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KiCad E.D.A. kicad 7.0.1-3b83917a11-172-ubuntu22.04.1

Rev: v0.1.1  
Id: 2/5

- Core:
- Existing:
    - PQ 26/25 N97 TDK core (871-B65877A0000R097)
    - Associated bobbin (871-B65878E1012D001)
    - Used 21 AWG wiring
    - Thinnest material gap
    - 175uH, ~9 turns
    - Likely core and conduction loss: 5% of P\_TRANSFER, mostly core loss
  - Proposed:
    - PQ 20/16 N95 Ferroxcube core (1779-1173-ND)
    - Associated bobbin (1779-1380-ND)
    - Use 19 AWG wiring
    - Use thicker material gap, ~0.3 to ~0.5 mm
    - Use ~15-30 turns to hit 250 uH target
    - Anticipated core and conduction loss: ~1 W



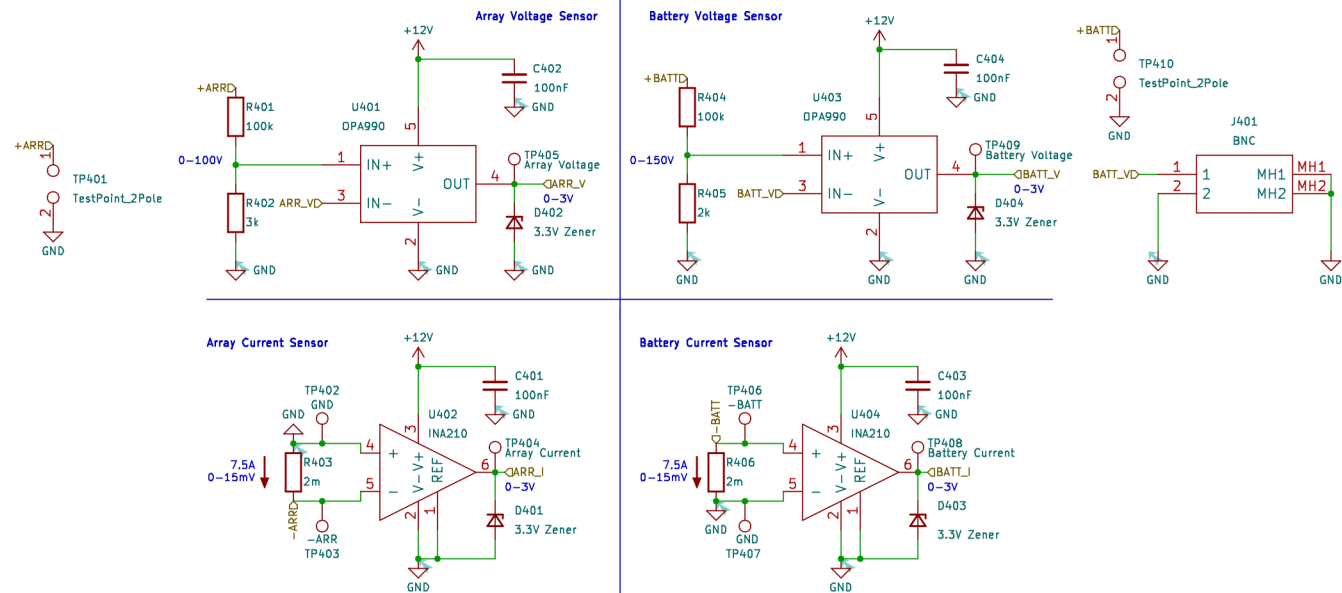
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Sheet:  
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**Title: Sunscatter MPPT**

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Rev: v0.1.1  
Id: 3/5



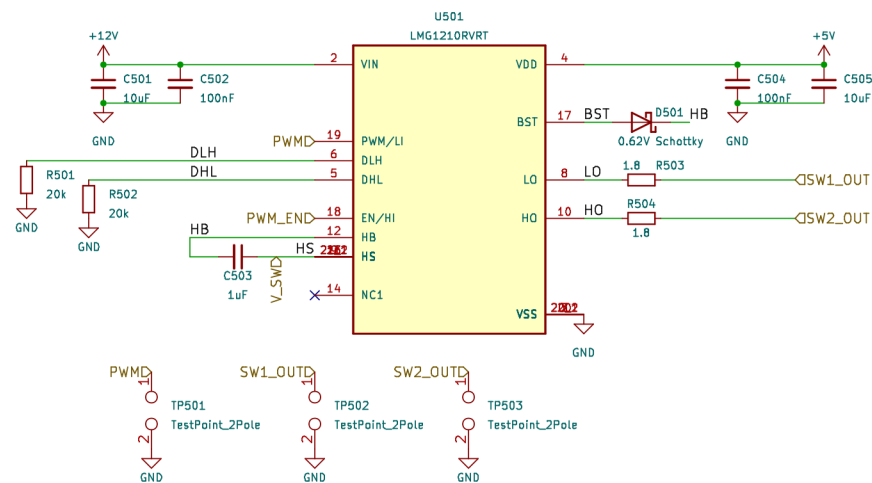
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KiCad E.D.A. kicad 7.0.1-3b83917a11-172-ubuntu22.04.1

Rev: v0.1.1  
Id: 4/5



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Sheet:  
File: gate\_driver.kicad\_sch

**Title: Sunscatter MPPT**

Size: A4 Date: 2023-03-26  
KiCad E.D.A. kicad 7.0.1-3b83917a11-172-ubuntu22.04.1

**Rev: v0.1.1**  
Id: 5/5