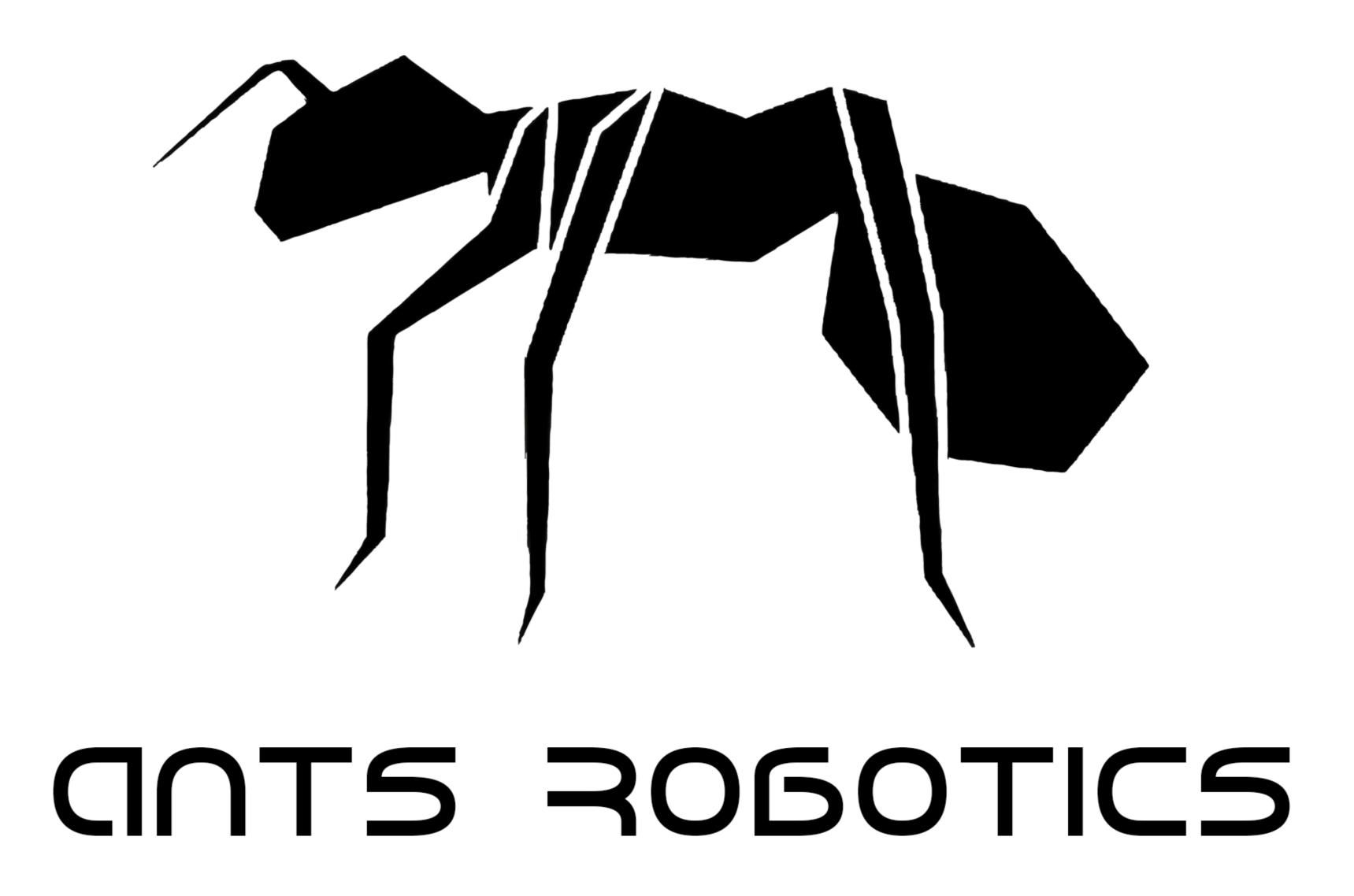
# ANTS Robotics. System Electrical Architecture. Autonomous Mobile Robot Revision B



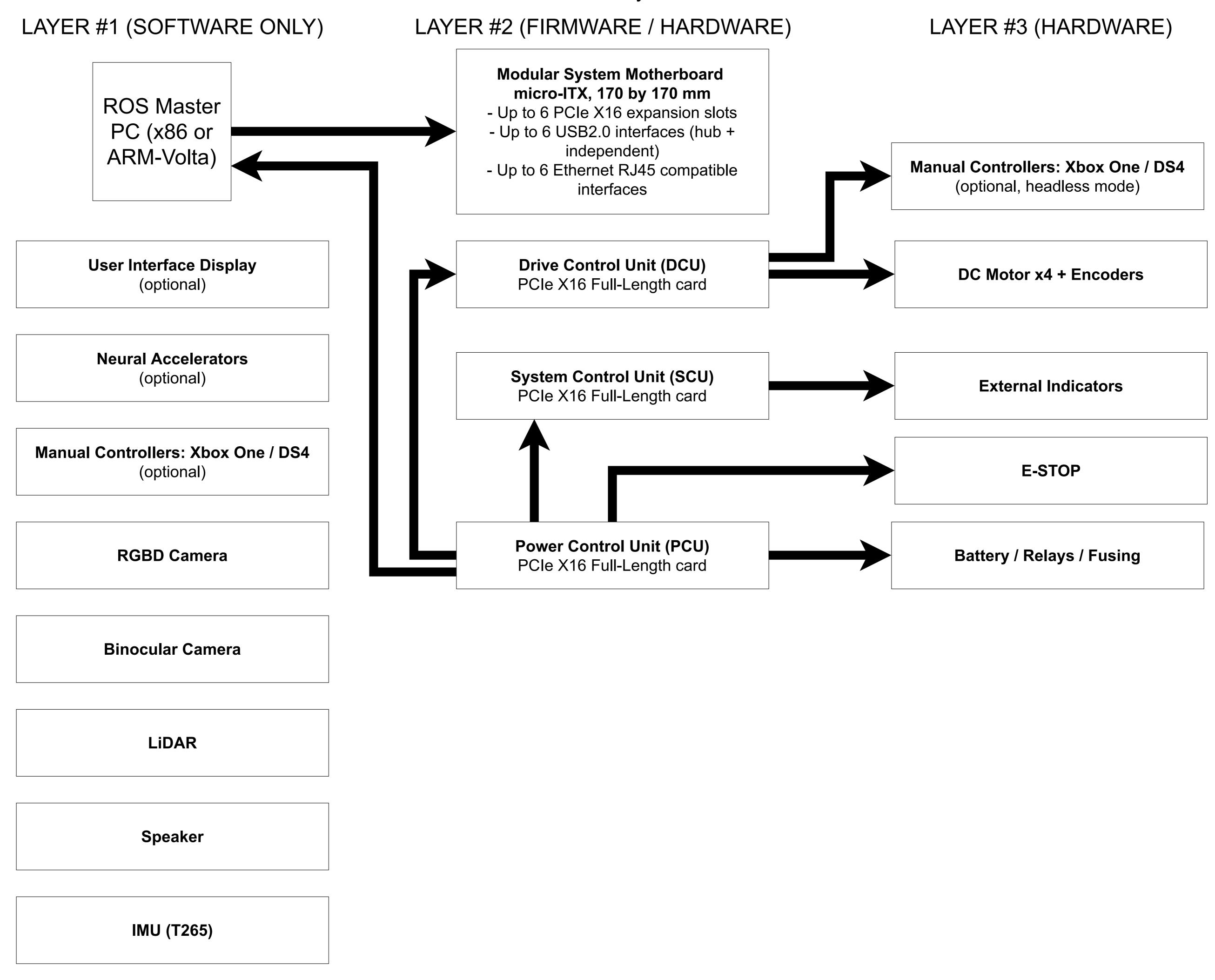
# Revision History:

Revision A. - September 2019 - Developed by Dmitrii Gusev (Lead Electrical Engineer) & Ibrahim Helal (Lead Robotics Engineer)

Revision B. - January 2021 - Developed by Dmitrii Gusev (Lead Electrical Engineer)

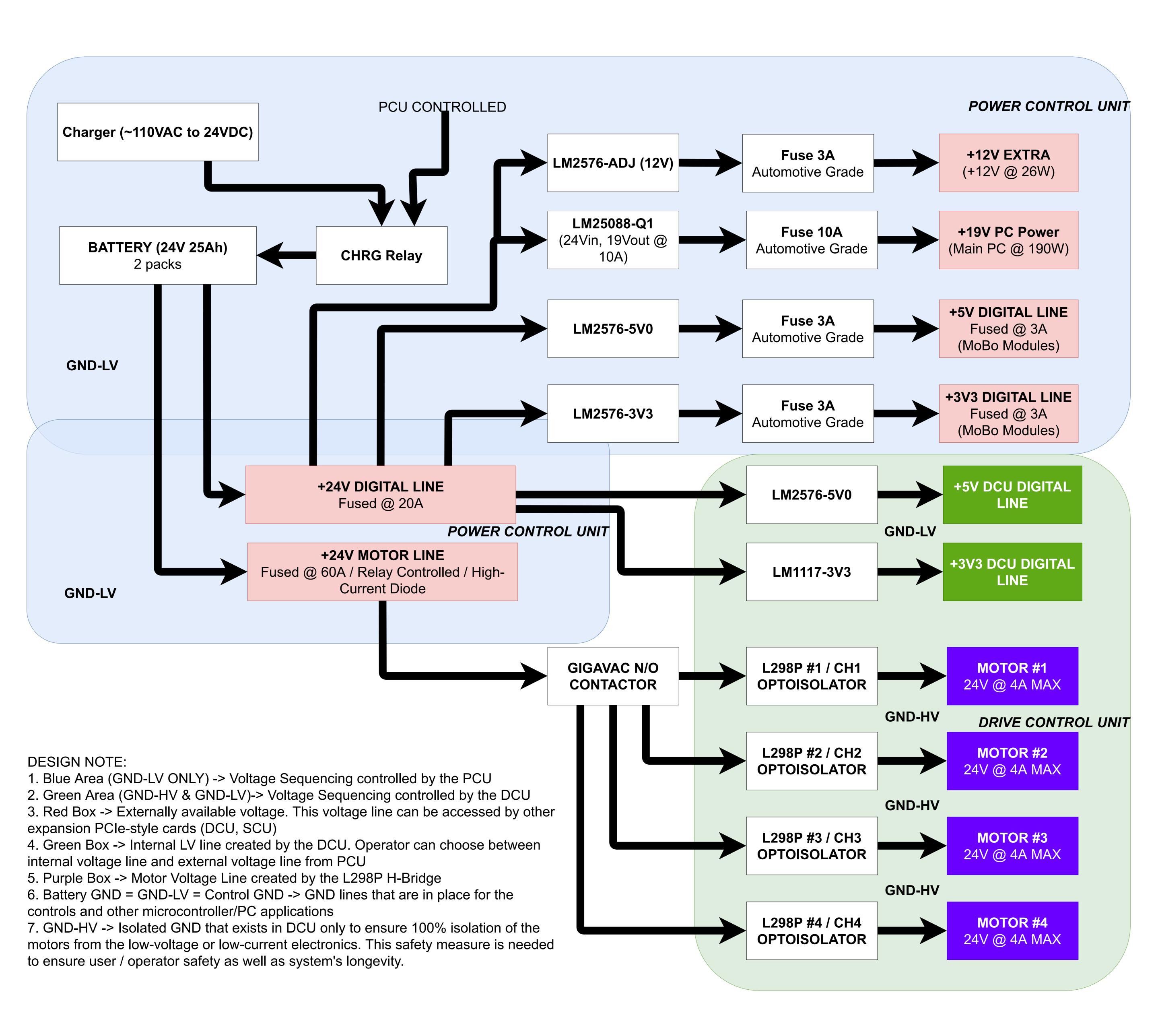
#### ANTS Robotics Electrical Architecture. GENERAL.

Original: Rev A. September 2019. Rev B. January 2021.



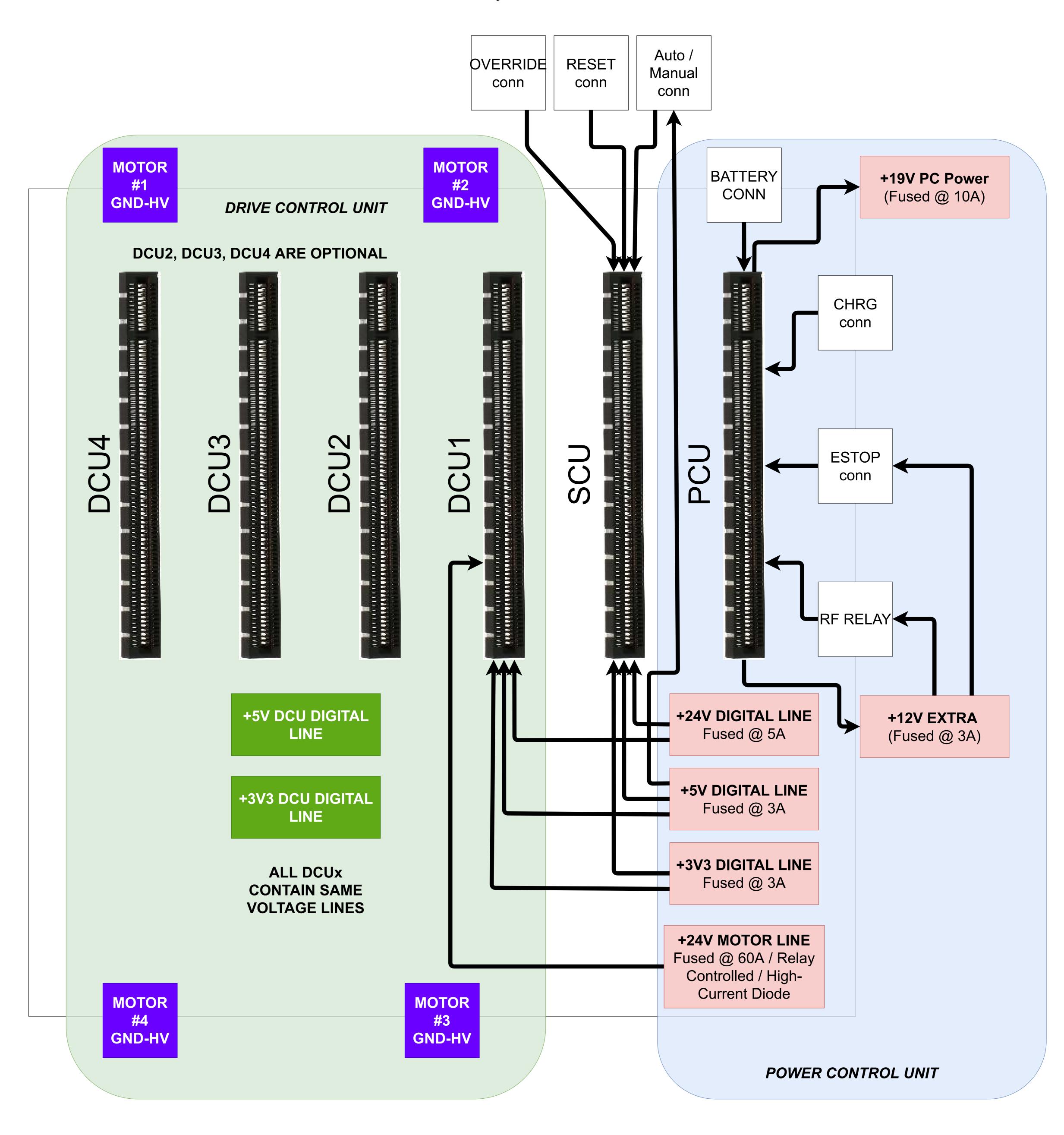
#### ANTS Robotics Electrical Architecture. Voltage Sequencing and Power Architecture.

Rev B. February 2021.



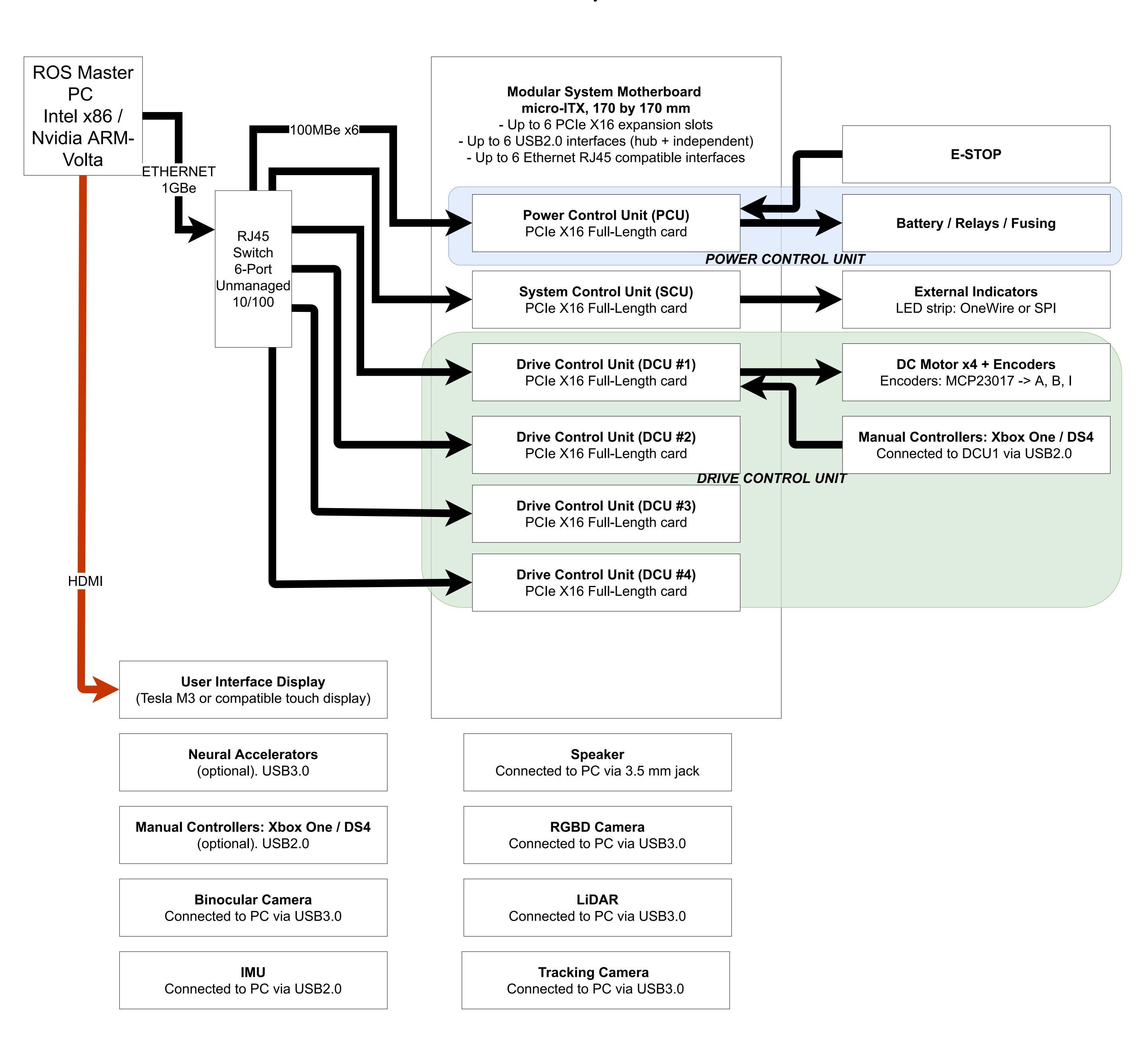
## ANTS Robotics Electrical Architecture. Motherboard Voltage Layout.

Rev B. February 2021.



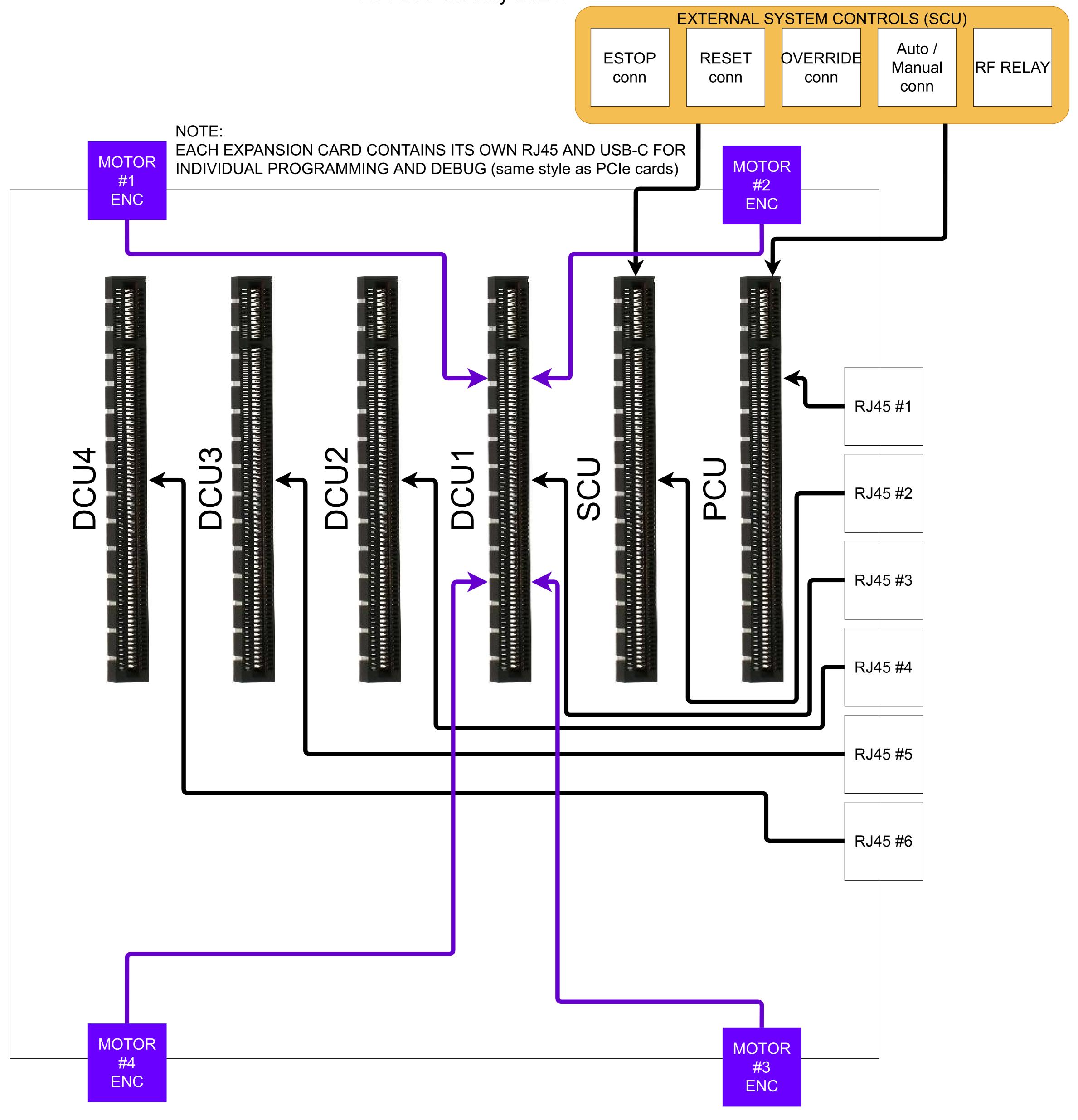
#### ANTS Robotics Electrical Architecture. Overall Digital Layout.

Rev B. January 2021.



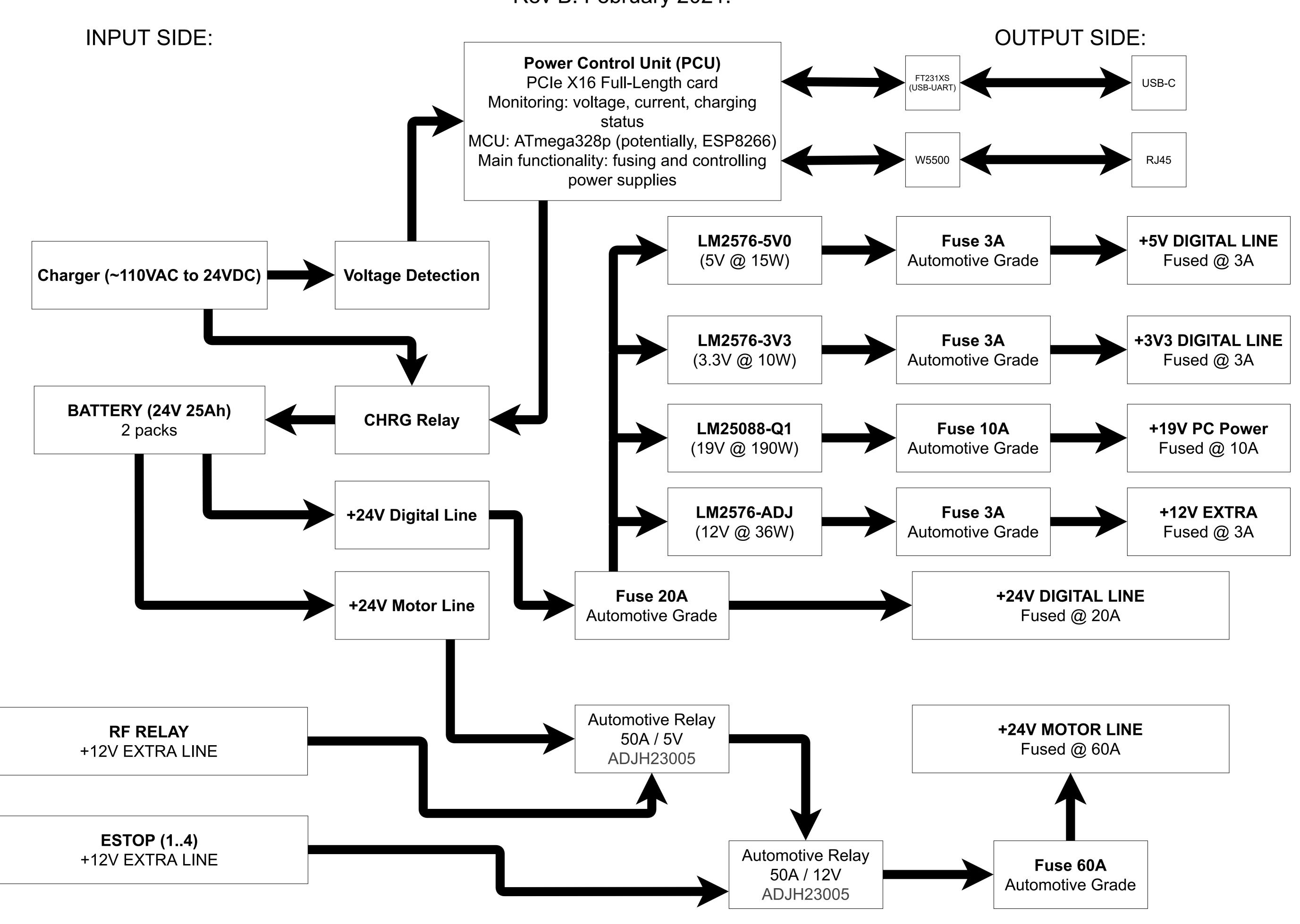
## ANTS Robotics Electrical Architecture. Motherboard Digital Layout...

Rev B. February 2021.



#### ANTS Robotics Electrical Architecture. Power Control Unit (PCU).

Original: Rev A. September 2019. Rev B. February 2021.



## NOTE @ INPUT SIDE:

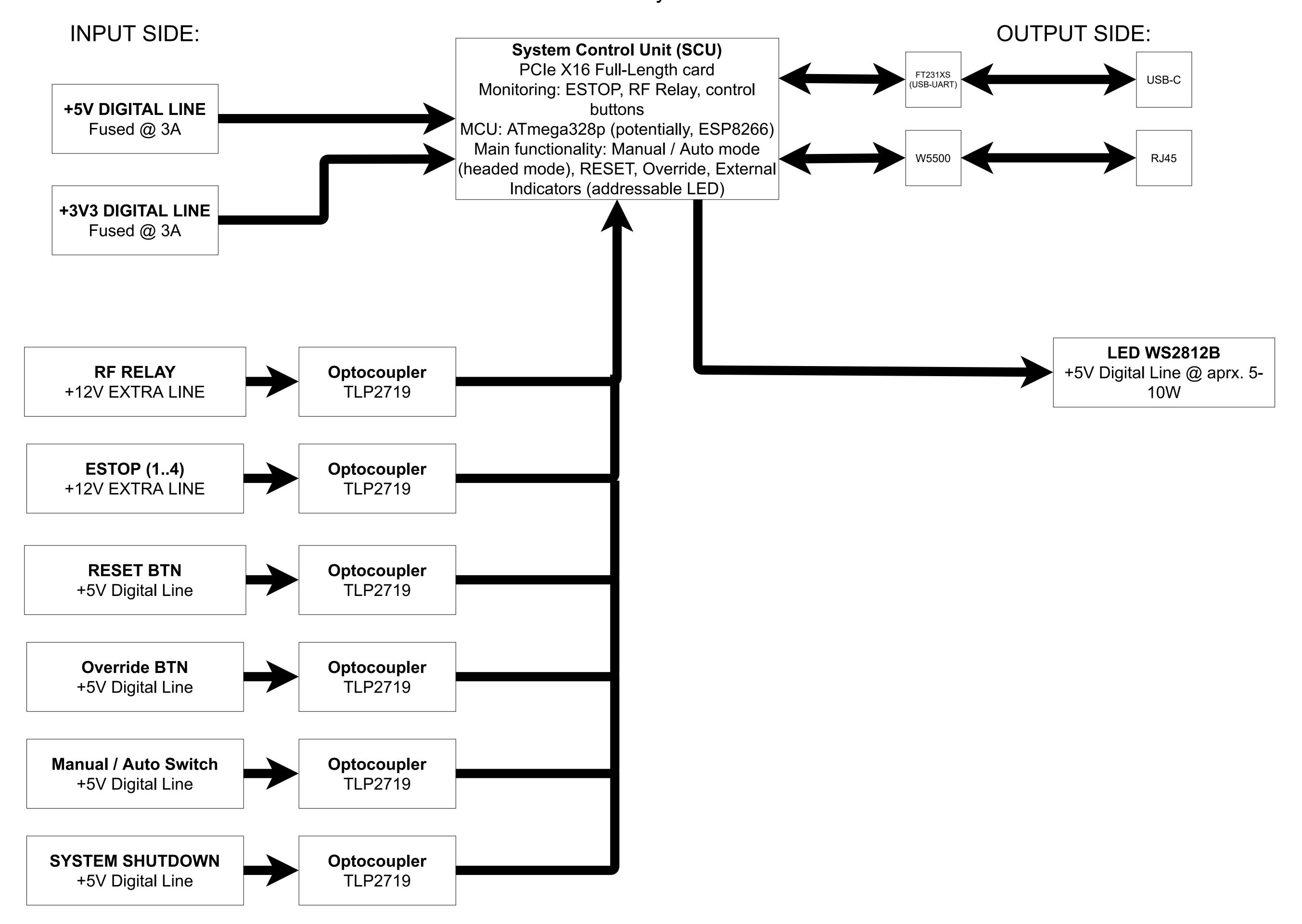
- 1. RF Relay and ESTOPs take 12V from the Digital Line and pass it to the external connector.
- 2. Batteries are self-balanced using Chinese 4S modules
- 3. Charging detection should prevent movement (software only)
- 4. Battery contains ACS712 and LM741
- 5. Charger containts ACS712 and LM741

# NOTE @ OUTPUT SIDE:

- 1. Each Voltage Line contains ACS712 current sensor
- 2. Each Voltage Line contains LM741 Voltage Sensor

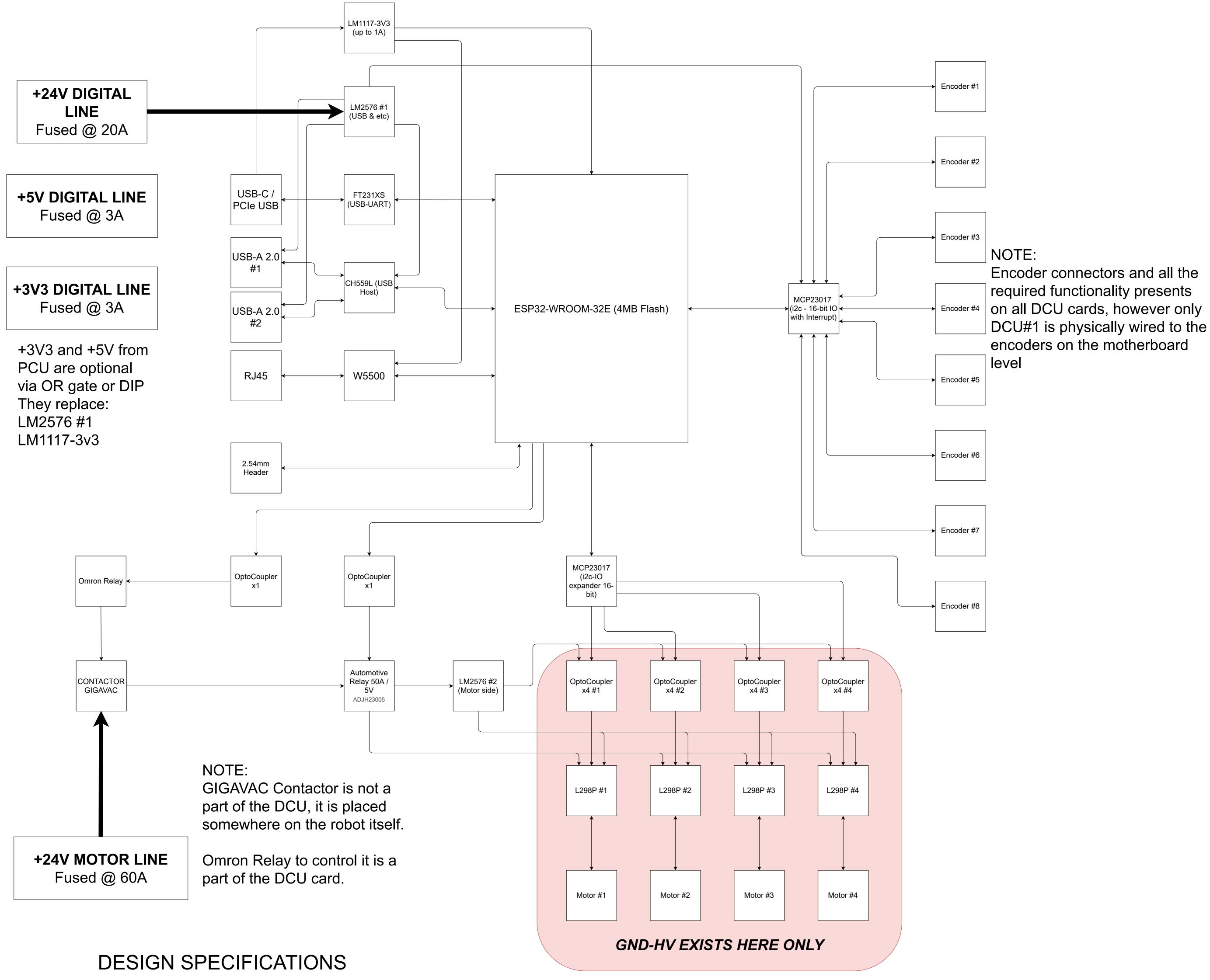
#### ANTS Robotics Electrical Architecture. System Control Unit (SCU).

Original: Rev A. September 2019. Rev B. February 2021.



#### ANTS Robotics Electrical Architecture. Drive Control Unit (DCU).

Original: Rev A. September 2019. Rev B. February 2021.



- 1. Supports between 12V and 36V input, nominal voltage @ 24V
- 2. ESP32 can be powered originally only via USB-C or PCIe, power via 24V is possible if jumper applied
- 3. ESP32 and LV systems have separate ground GND\_LV
- 4. HV systems have separate ground GND\_HV
- 5. GND-LV and GND-HV are not connected together except for the L298P side via 5 mOhm shunt resistor or via low power fuse to ensure gnd isolation
- 6. Powering Sequence: ESP32 (Type-C) -> 5V\_LOW (on-board circuits that require 5V with digital signals) -> 5V\_HIGH (on-board circuits that require high-power 5V) & 24V Main power to Motors