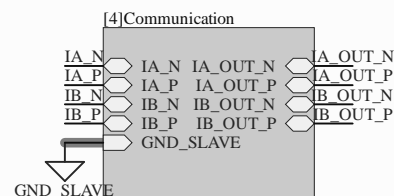
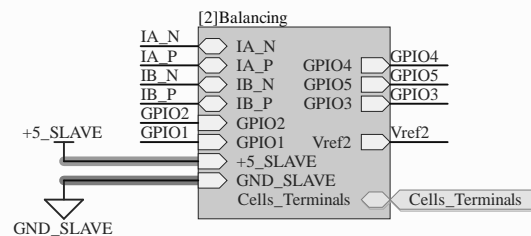
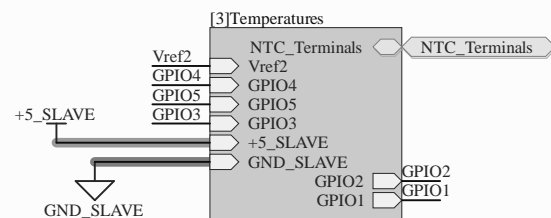


A

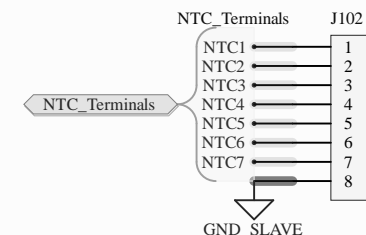
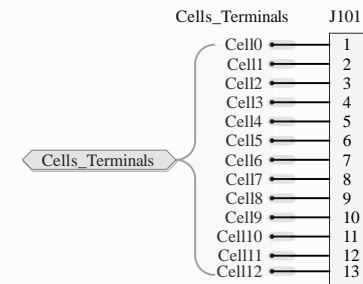
B

C

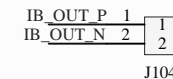
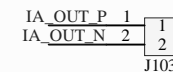
D



TS Connectors



LV Connectors



AMS Slave

This PCB is the AMS (BMS) Slave ECU of the 2023-24 Accumulator from e-Tech Racing Formula Student Team. 3 AMS Slaves are placed on each stack, two of them reading 10 voltages and one of them reading 8. Hence, 15 AMS Slaves are placed on the Accumulator, reading 140 voltages and 120 temperatures in total.

The IC used for the cells voltage monitoring is LTC6811-1, in addition to a multiplexer to monitor 8 NTCs using LTC6811's GPIOs.

The board is capable of reading and processing up to 12 cell voltages and 8 temperature measurements.


The slave communicates via isoSPI in a daisy chain to the master board, which performs all the calculations and controls the safety of the battery.

The majority of the design is based on the LTC6811 datasheet, the DC2259A development board and previous versions of the AMS of the team.

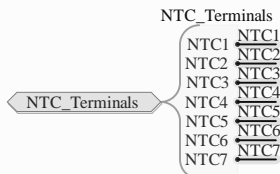
In order to comply with FSG rules this board must be coated with a UL94-V0

Green: isoSPI
Yellow: Measurements
Pink: Balancing
Red: Supply
Gray: GND

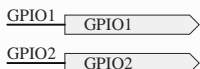
Maximum Input current [U201] is 30mA for the Vreg pin and 0.55 mA for the V+ pin, and 1uA for [U301]. All traces can be 0.2 mm, given that this width can withstand 1 A and all inputs are fused at this value. The board is supplied by the cells it is monitoring, when the LV isn't active, the monitoring IC's enter the sleep mode, reducing their current consumption to 1.9 uA through the V+ pin.

Company: e-Tech Racing		www.e-techracing.es	
Project: AMS Slave		Variant: [No Variations]	
Size: -	Page Contents: [1]SLAVE_HW.SchDoc	Version: 1	Department: PCBs
Author: Andreu Senis andreu.senis@estudiantat.upc.edu		Sheet 1 of 5	
Checked by:		Date: 22/02/2024	

Inputs

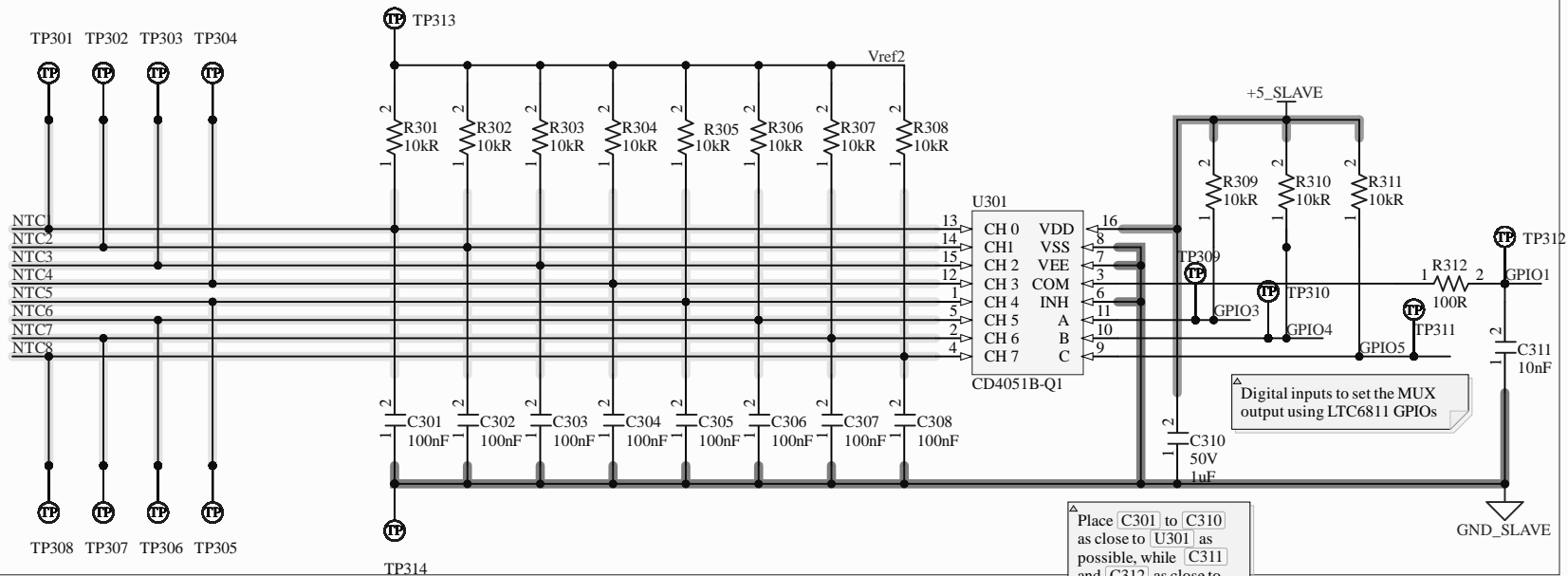


Outputs

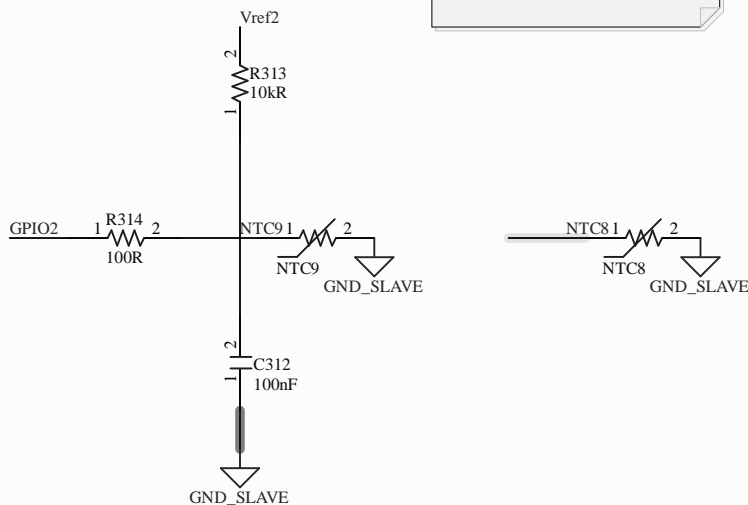



30% of the cells are monitored, using NTCs, each measuring 2 cells.
30% · 700 / (2 cells per sensor · 15 slaves) = 7.

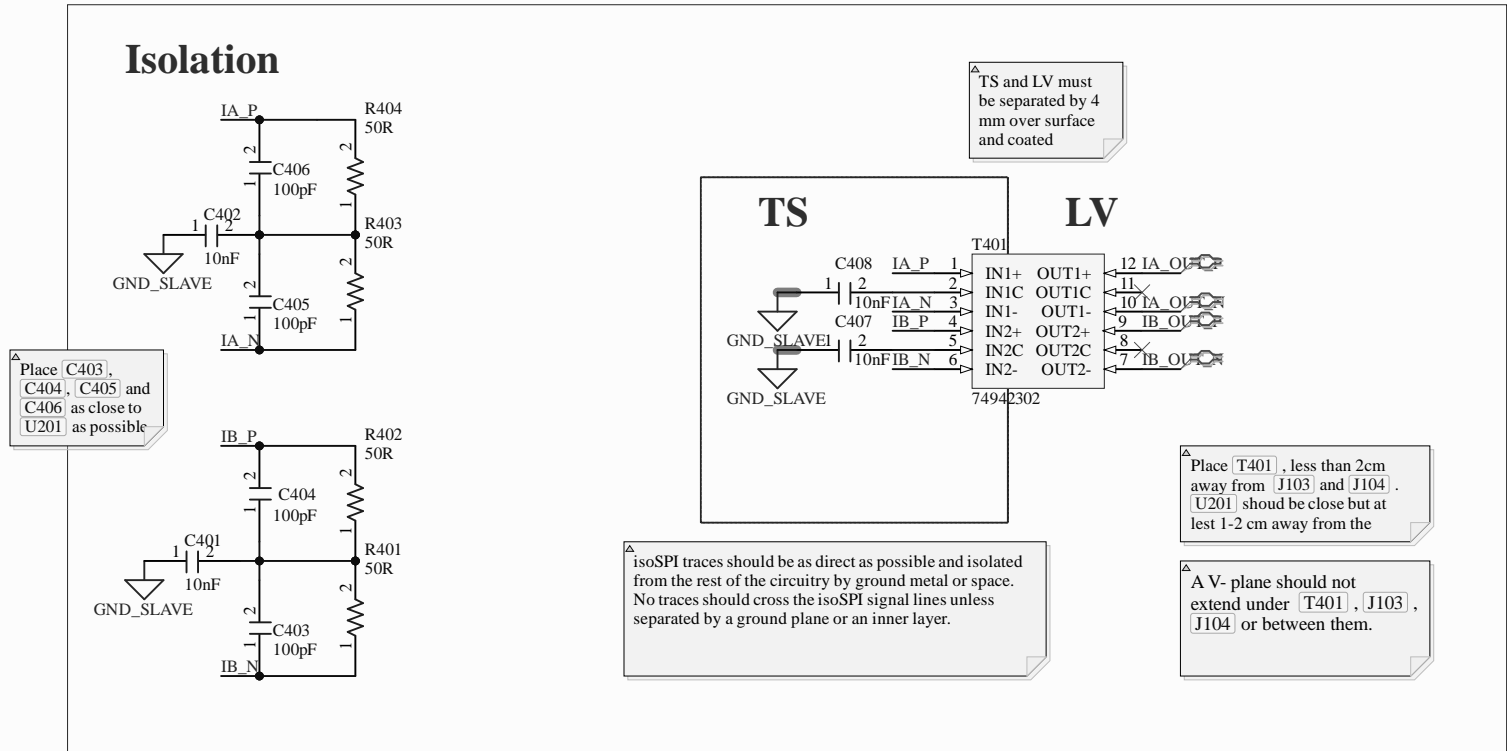
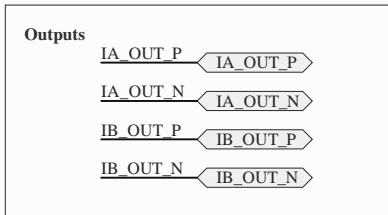
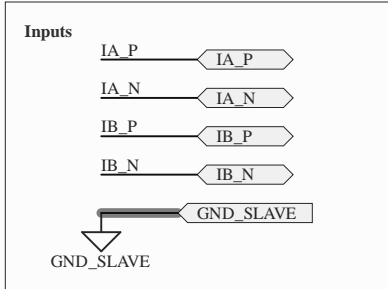
Multiplexer




Balancing NTCs



Company: e-Tech Racing		www.e-techracing.es		
Project: AMS Slave		Variant: [No Variations]		
Size: -	Page Contents: [3]Temperatures.SchDoc		Version: 1	Department: PCBs
Author: Andreu Senis		andreu.senis@estudiantat.upc.edu		
Checked by:		Date: 22/02/2024		Sheet 4 of 5



Company: e-Tech Racing		www.e-techracing.es	
Project: AMS Slave		Variant: [No Variations]	
Size: -	Page Contents: [4]Communication.SchDoc		Version: 1
			Department: PCBs
Author: Andreu Senis andreu.senis@estudiantat.upc.edu			Sheet 5 of 5
Checked by:			Date: 22/02/2024