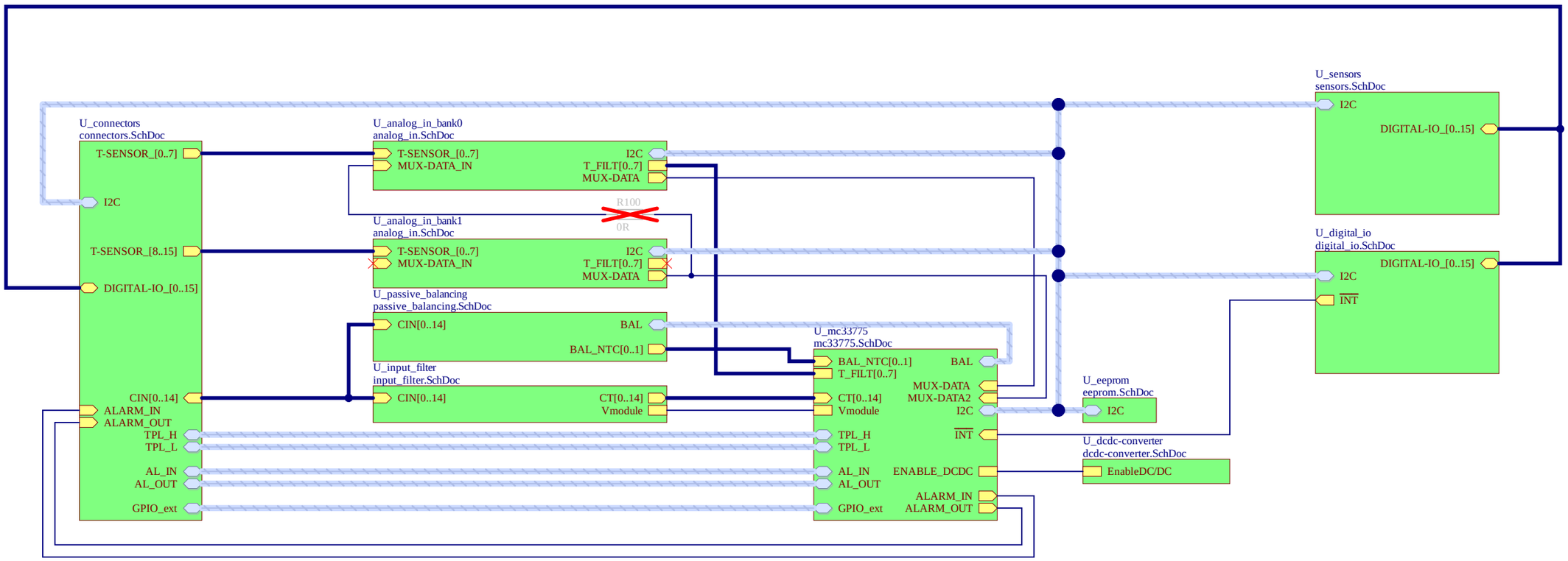

Rationale for creepage and clearance distances

* according to DIN EN 60664-1 (VDE 0110-1):2008-01
* working voltage up to 1600Vdc
* functional isolation for 1600Vdc
* assume "Verschmutzungsgrad 2" and "Isolierstoffklasse 3b"
* creepage distance: 16.0mm (table F.4)
* design note: set creepage distance rule between net classes in PCB design
* assumptions for clearance: 3600V (based on requirements for transient overvoltage), homogenous field: 1.1mm (table F.7)
* design note: set clearances to net classes in PCB design

* take care with the mounting points: The spacing around them (6.05mm) is designed for a working voltage of 605Vdc at "Verschmutzungsgrad 2" and "Isolierstoffklasse 3b" or a working voltage of 1600Vdc at a "Verschmutzungsgrad 1" and "Isolierstoffklasse 3b". Consider potential connections to chassis when mounting the board and critically assess the situation.

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Fraunhofer IISB
Schottkystr. 10
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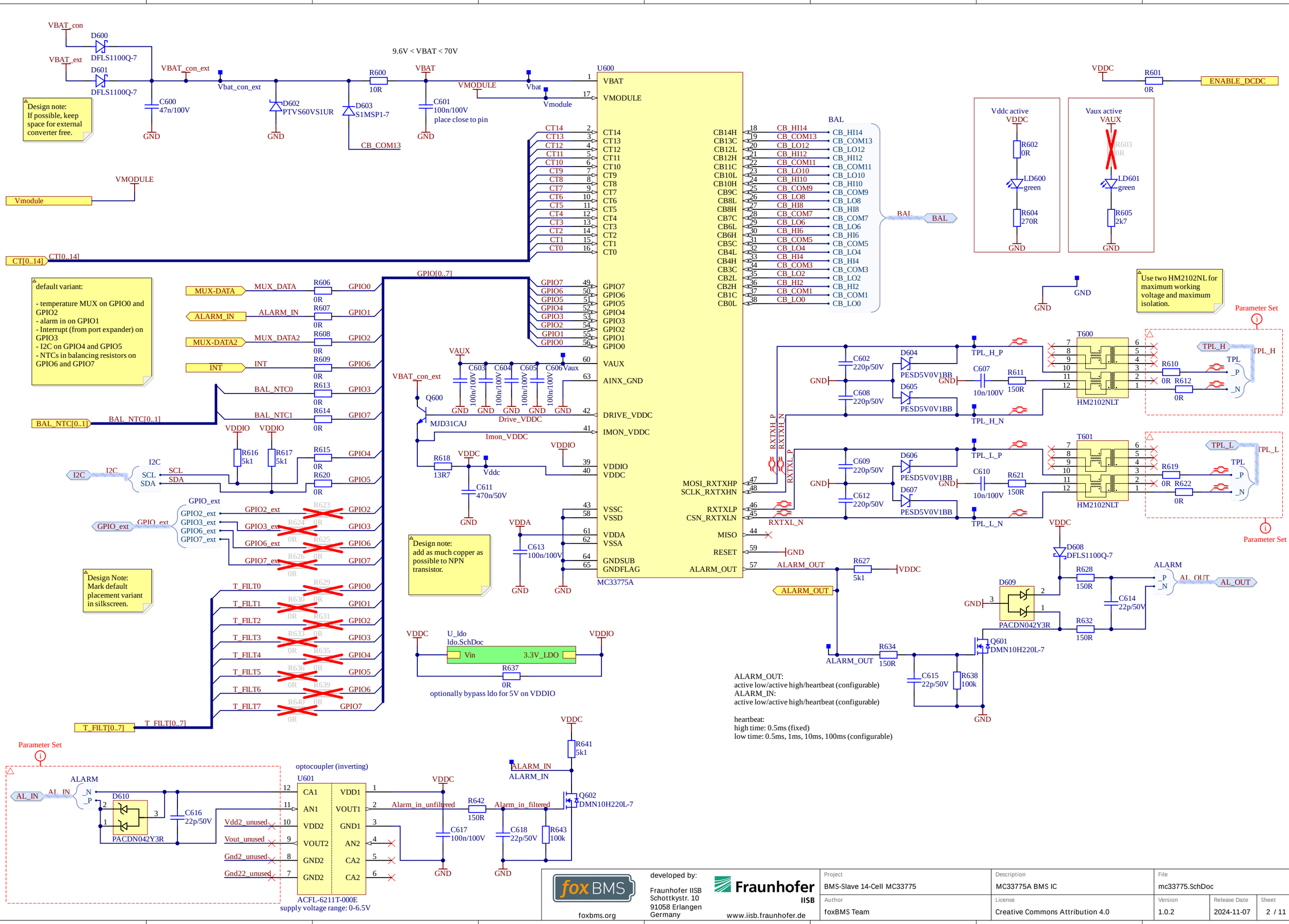
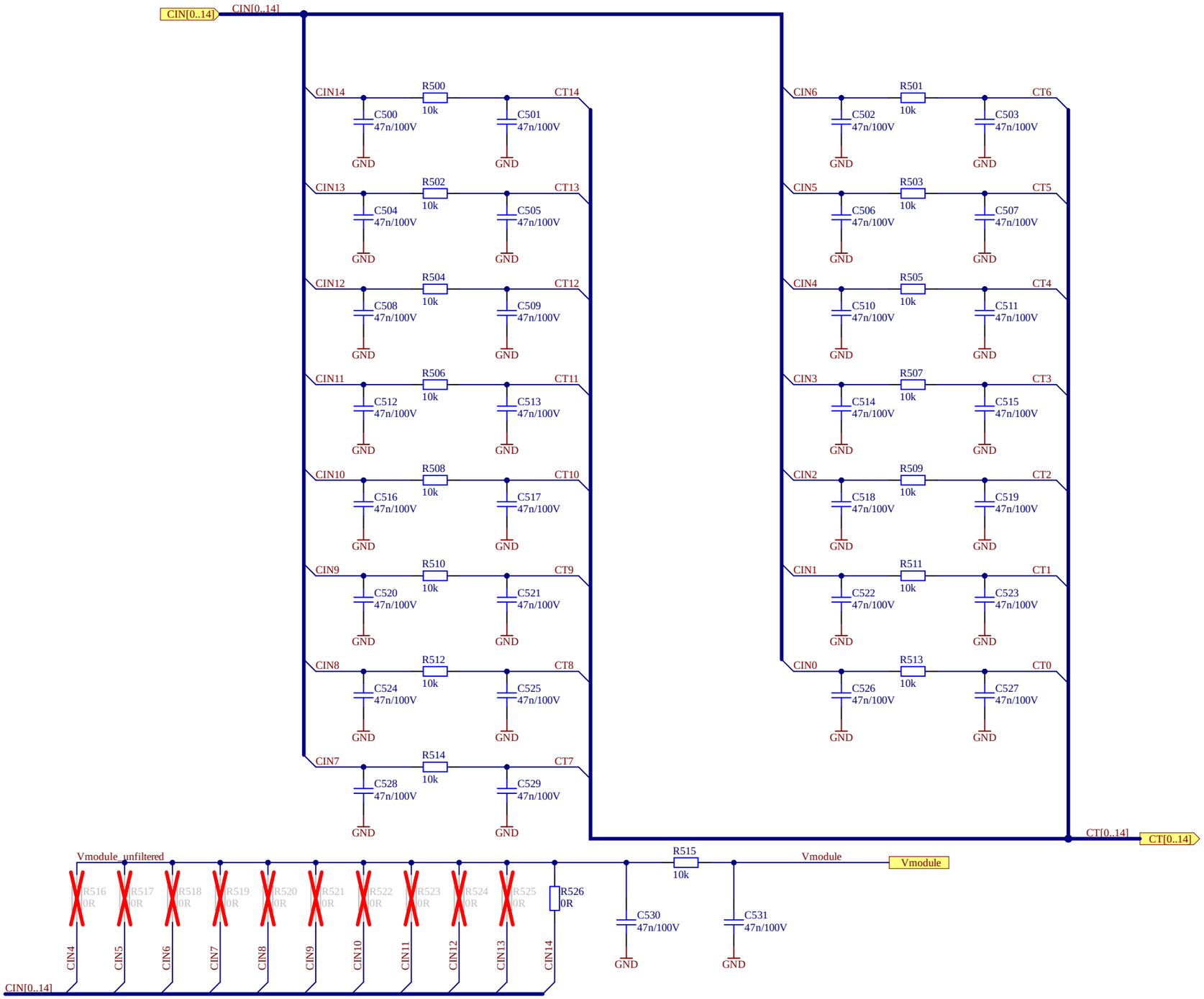
Germany

www.iisb.fraunhofer.de

Project	Description	File		
BMS-Slave 14-Cell MC33775	Overview	slave-14-mc33775.SchDoc		
Author	License	Version	Release Date	Sheet
foxBMS Team	Creative Commons Attribution 4.0	1.0.2	2024-11-07	1 / 11



developed by: Fraunhofer IISB, Schottkystr. 10, 91058 Erlangen, Germany	Project: BMS-Slave 14-Cell MC33775	Description: MC33775A BMS IC	File: mc33775.SchDoc
foxbms.org / www.iisb.fraunhofer.de	Author: foxBMS Team	License: Creative Commons Attribution 4.0	Version: 1.0.2 / Release Date: 2024-11-07 / Sheet: 2 / 11



Use one of these resistors to route Vmodule in cases of cell counts lower than maximum.

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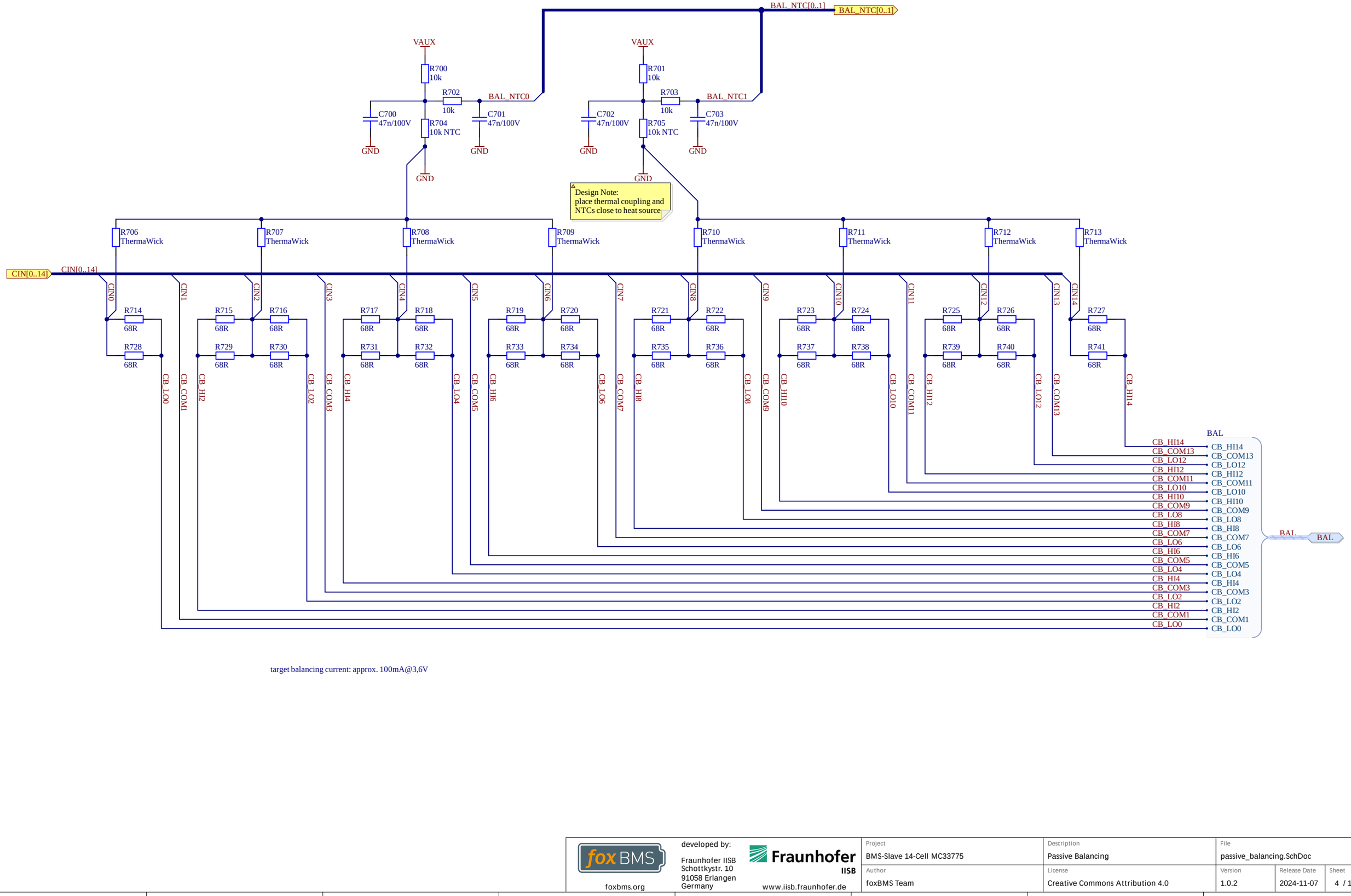
Project	Description	File	
BMS-Slave 14-Cell MC33775	Cell Input Filter	input_filter.SchDoc	
Author	**License**	**Version**	**Release Date** / **Sheet**
foxBMS Team	Creative Commons Attribution 4.0	1.0.2	2024-11-07 / 3 / 11



target balancing current: approx. 100mA@3,6V

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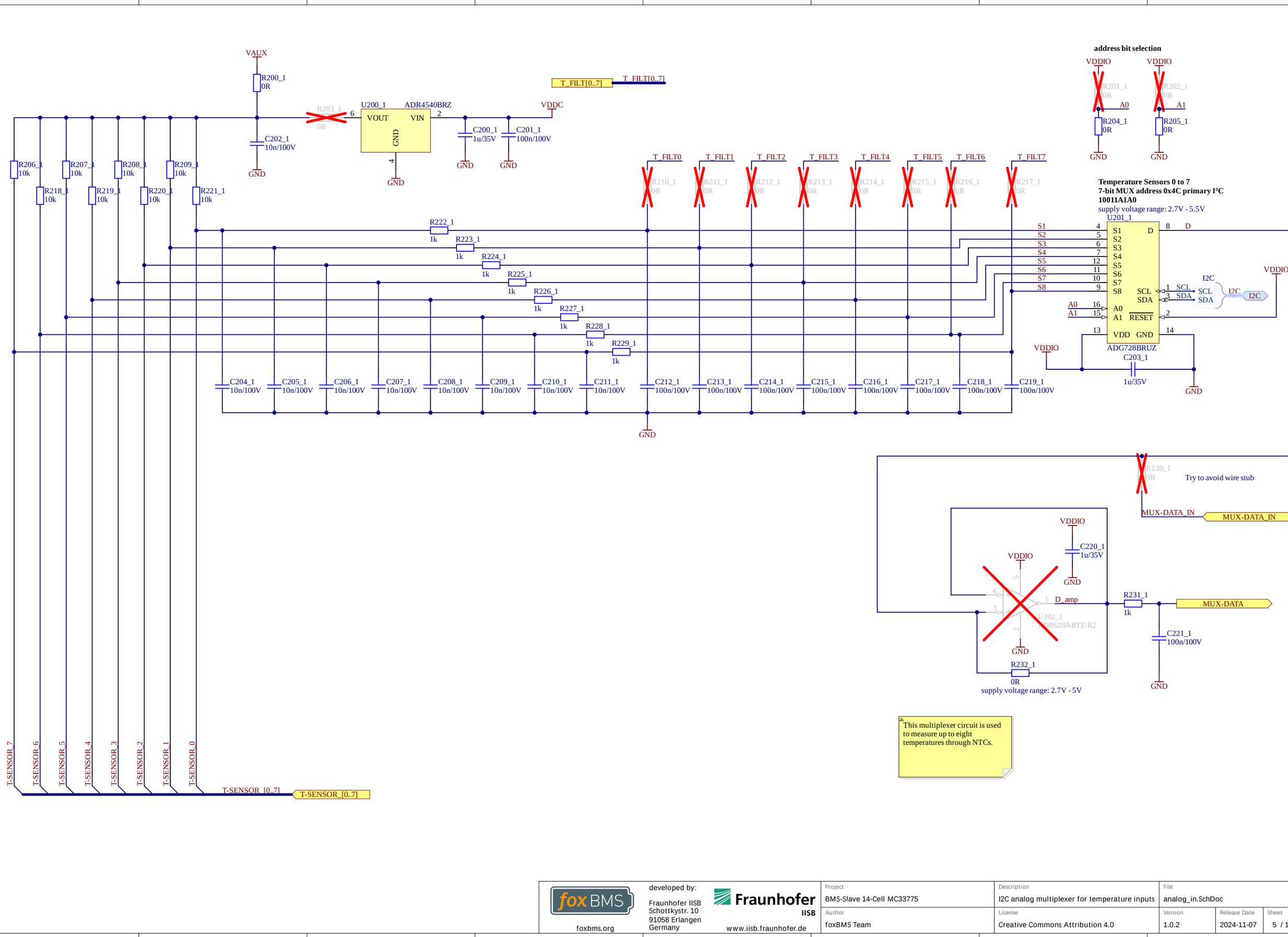
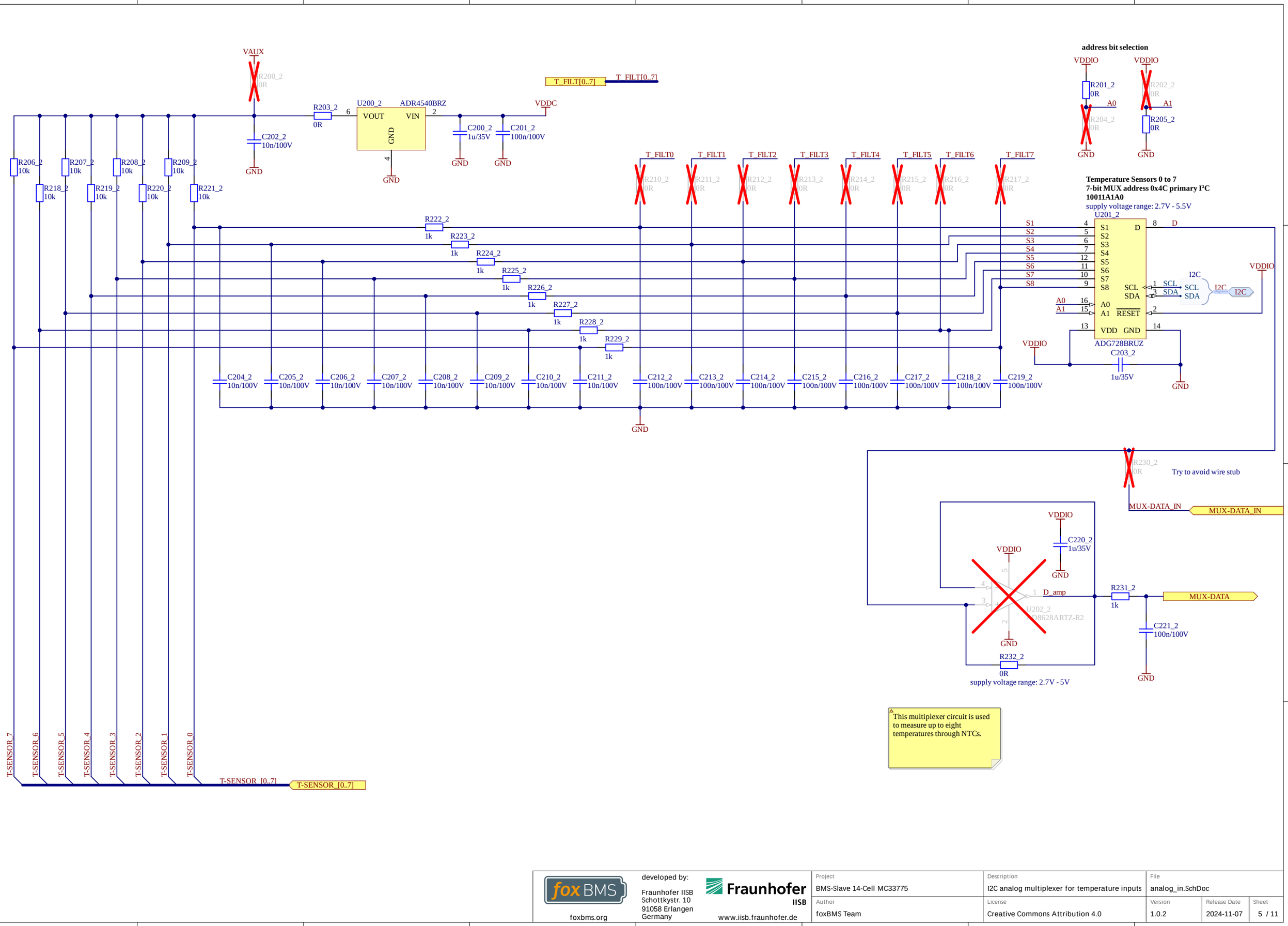
Project	Description	File		
BMS-Slave 14-Cell MC33775	Passive Balancing	passive_balancing.SchDoc		
Author	License	Version	Release Date	Sheet
foxBMS Team	Creative Commons Attribution 4.0	1.0.2	2024-11-07	4 / 11

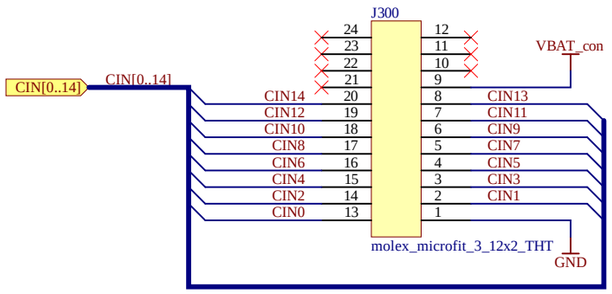


foxbms.org	developed by: Fraunhofer IISB Schottkystr. 10 91058 Erlangen Germany	www.iisb.fraunhofer.de	Project: BMS-Slave 14-Cell MC33775	Description: I2C analog multiplexer for temperature inputs	File: analog_in.SchDoc
			Author: foxBMS Team	License: Creative Commons Attribution 4.0	Version: 1.0.2 / Release Date: 2024-11-07 / Sheet: 5 / 11

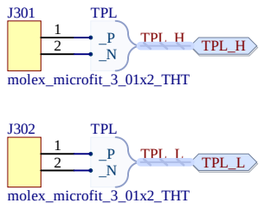


foxbms.org	developed by: Fraunhofer IISB Schottkystr. 10 91058 Erlangen Germany	www.iisb.fraunhofer.de	Project: BMS-Slave 14-Cell MC33775	Description: I2C analog multiplexer for temperature inputs	File: analog_in.SchDoc
			Author: foxBMS Team	License: Creative Commons Attribution 4.0	Version: 1.0.2 / Release Date: 2024-11-07 / Sheet: 5 / 11

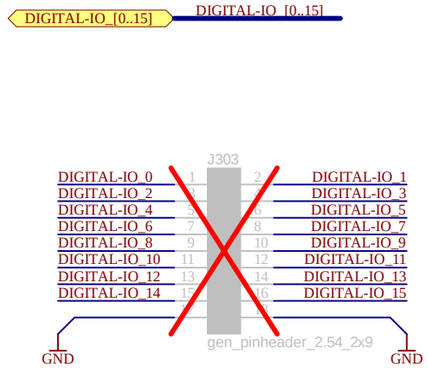
Battery cell connector



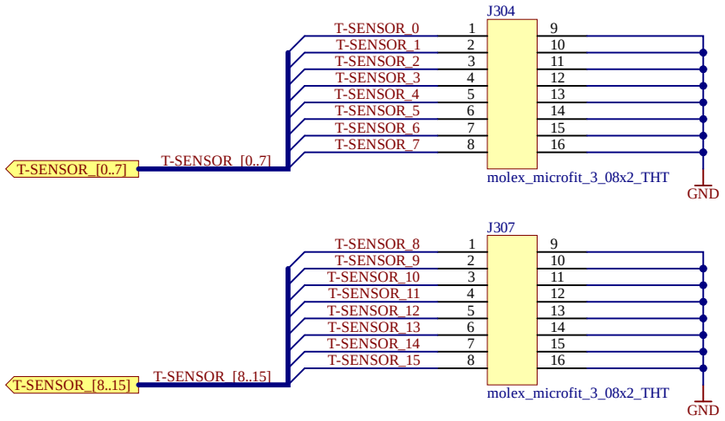
TPL communication connectors



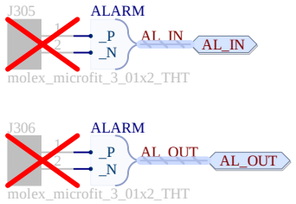
GPIO extension



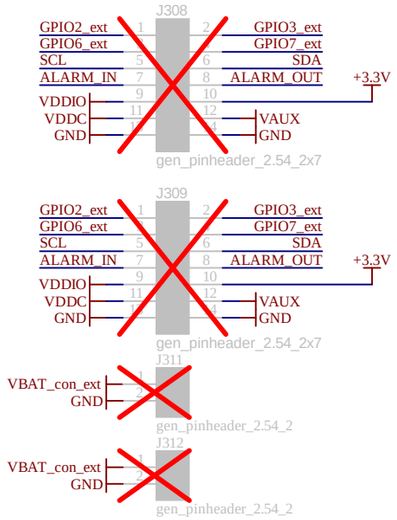
Temperature sensor connector

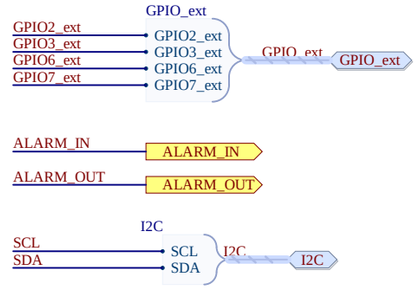


Alarm communication connectors

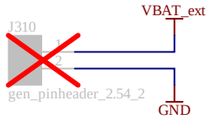


Extension connectors



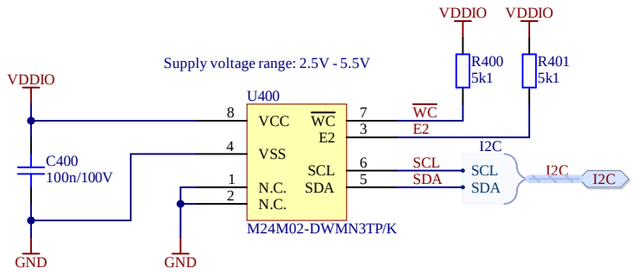


External supply connector



foxBMS / foxbms.org	developed by: Fraunhofer IISB, Schottkystr. 10, 91058 Erlangen, Germany	Fraunhofer IISB / www.iisb.fraunhofer.de	Project: BMS-Slave 14-Cell MC33775	Description: Connectors	File: connectors.SchDoc
			Author: foxBMS Team	License: Creative Commons Attribution 4.0	Version: 1.0.2 / Release Date: 2024-11-07 / Sheet: 6 / 11

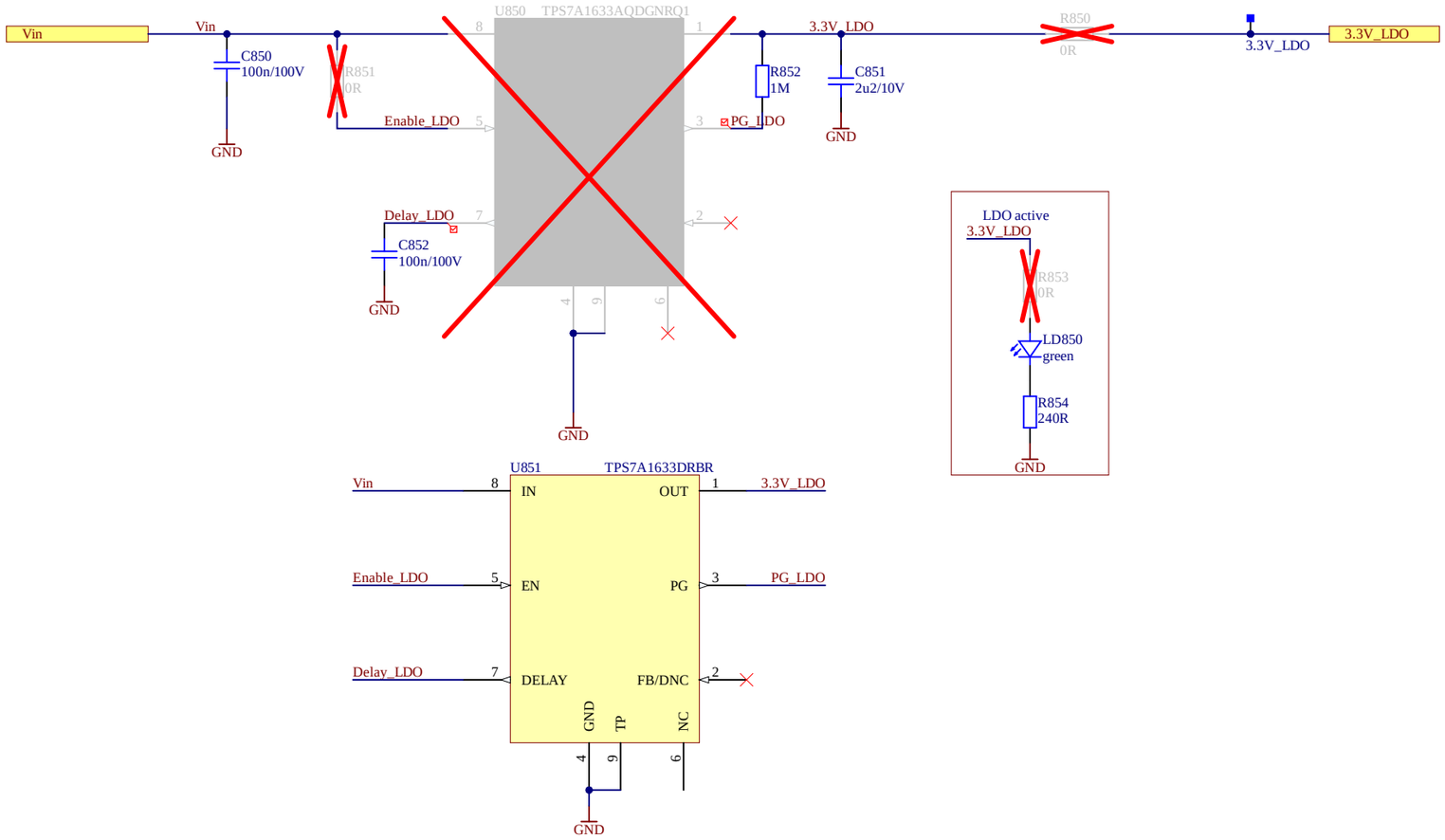
EEPROM
7-bit base address: 1010 (E2) (A17) (A16)
E2: E2 pin state (high=1, floating=0)
A17, A16: MSB address bits



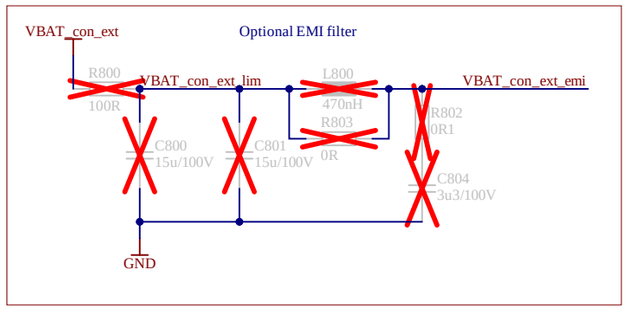
W\C\:
floating: write operation enabled
pulled high: write operations disabled

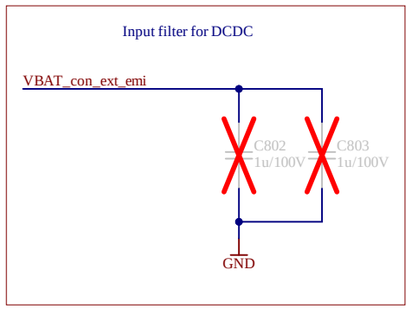
When Write Control (WC) is driven high, device select and address bytes are acknowledged,
data bytes are not acknowledged.

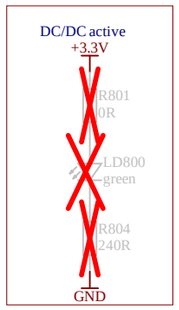
Replace with Cypress CY15B256J-SXE (supply voltage range: 2.0V - 3.6V) for FRAM option.

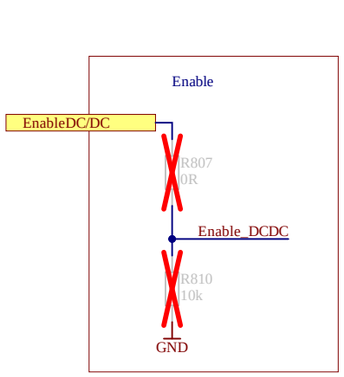


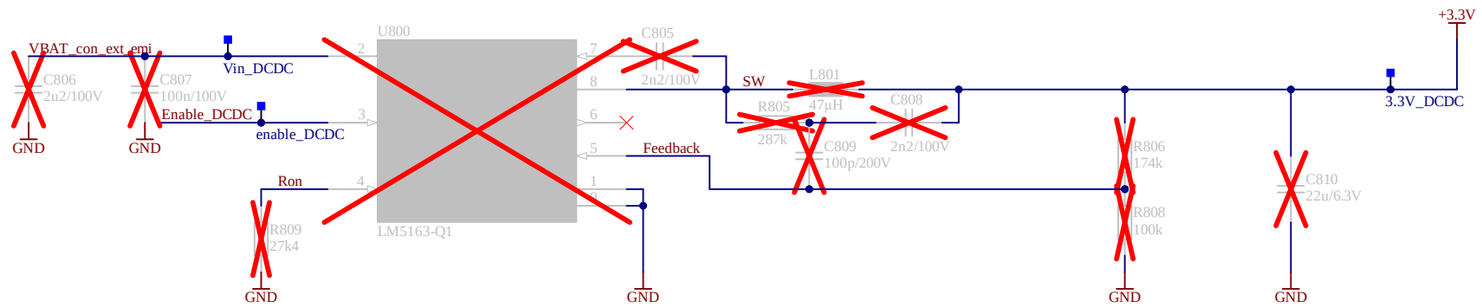
foxbms.org	developed by: Fraunhofer IISB Schottkystr. 10 91058 Erlangen Germany	www.iisb.fraunhofer.de	Project: BMS-Slave 14-Cell MC33775	Description: LDO supply for VDDIO	File: ldo.SchDoc
			Author: foxBMS Team	License: Creative Commons Attribution 4.0	Version: 1.0.2 / Release Date: 2024-11-07 / Sheet: 8 / 11











The DC/DC converter is used for applications where larger currents than the LDO can supply are needed.

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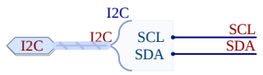
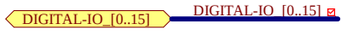
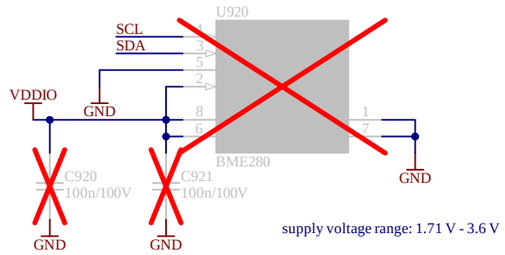
Project	Description	File		
BMS-Slave 14-Cell MC33775	DC/DC-Converter	dcdc-converter.SchDoc		
Author	License	Version	Release Date	Sheet
foxBMS Team	Creative Commons Attribution 4.0	1.0.2	2024-11-07	9 / 11



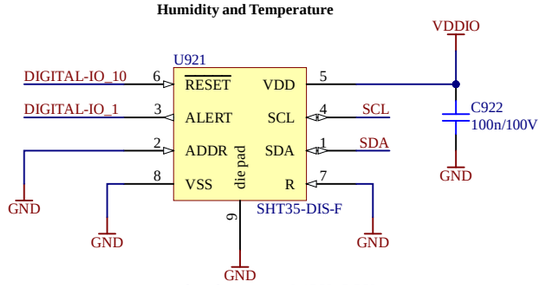


Humidity, Pressure and Temperature



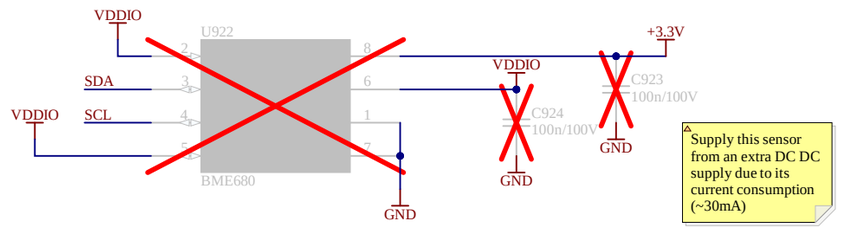
supply voltage range: 1.71 V - 3.6 V

Humidity and Temperature



supply voltage range: 2.15 V - 5.5 V

Humidity, Pressure, Temperature, Volatile Organic Compounds (VOC)

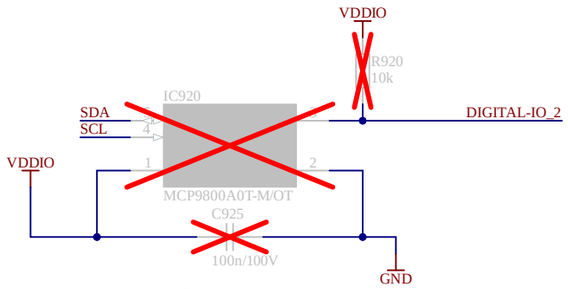


supply voltage range: 1.71 V - 3.6 V

I²C addresses

Analog MUX bank0:	1001100
Analog MUX bank0:	1001101
port expander:	0100000
M24M02-A125:	101xxxx
CY15B256J-SXE:	1010xxx
SHT35:	1000100
MCP9800A0T:	1001000
BME280:	1110110
BME680:	1110111

Temperature Sensor
7-bit address 0x48 primary I²C
1001000



supply voltage range: 2.7 V - 5.5 V

±0.5°C (typ.) at +25°C
±1°C (max.) from -10°C to +85°C
±2°C (max.) from -10°C to +125°C
±3°C (max.) from -55°C to +125°C

Attention: use -A0T Type (I2C address conflict otherwise)!

Alert temperature can be configured via I2C

Temperature Sensor MCP9800 is qualified AEC-Q100

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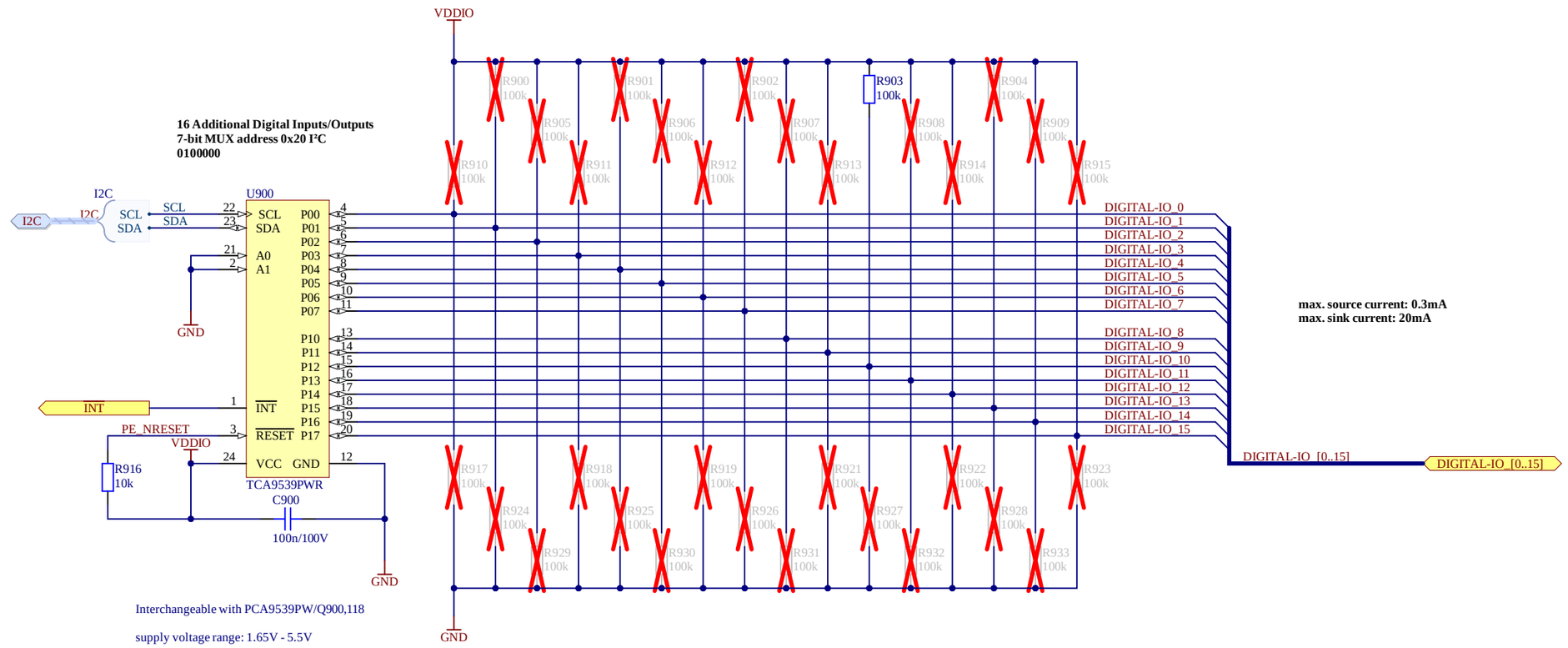
Project: BMS-Slave 14-Cell MC33775	Description: Environmental Sensors	File: sensors.SchDoc	
Author: foxBMS Team	License: Creative Commons Attribution 4.0	Version: 1.0.2	Release Date: 2024-11-07 / Sheet: 10 / 11



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			Author: foxBMS Team	License: Creative Commons Attribution 4.0	Version: 1.0.2	Release Date: 2024-11-07	Sheet: 11 / 11