SDRR

LIDO

Variant: Development

Sample Type: B-Sample

07/04/2022

Version and Revision

0 .2

Sch. Freezed

DESIGN CONSIDERATIONS

DESIGN NOTE:
Example text for informational design notes .

DESIGN NOTE:
Example text for cautionary design notes.

DESIGN NOTE:
Example text for debug notes.

DESIGN NOTE:
Example text for critical design notes.

LAYOUT NOTE:
Example text for critical layout guidelines.

TOP VIEW

BOTTOM VIEW

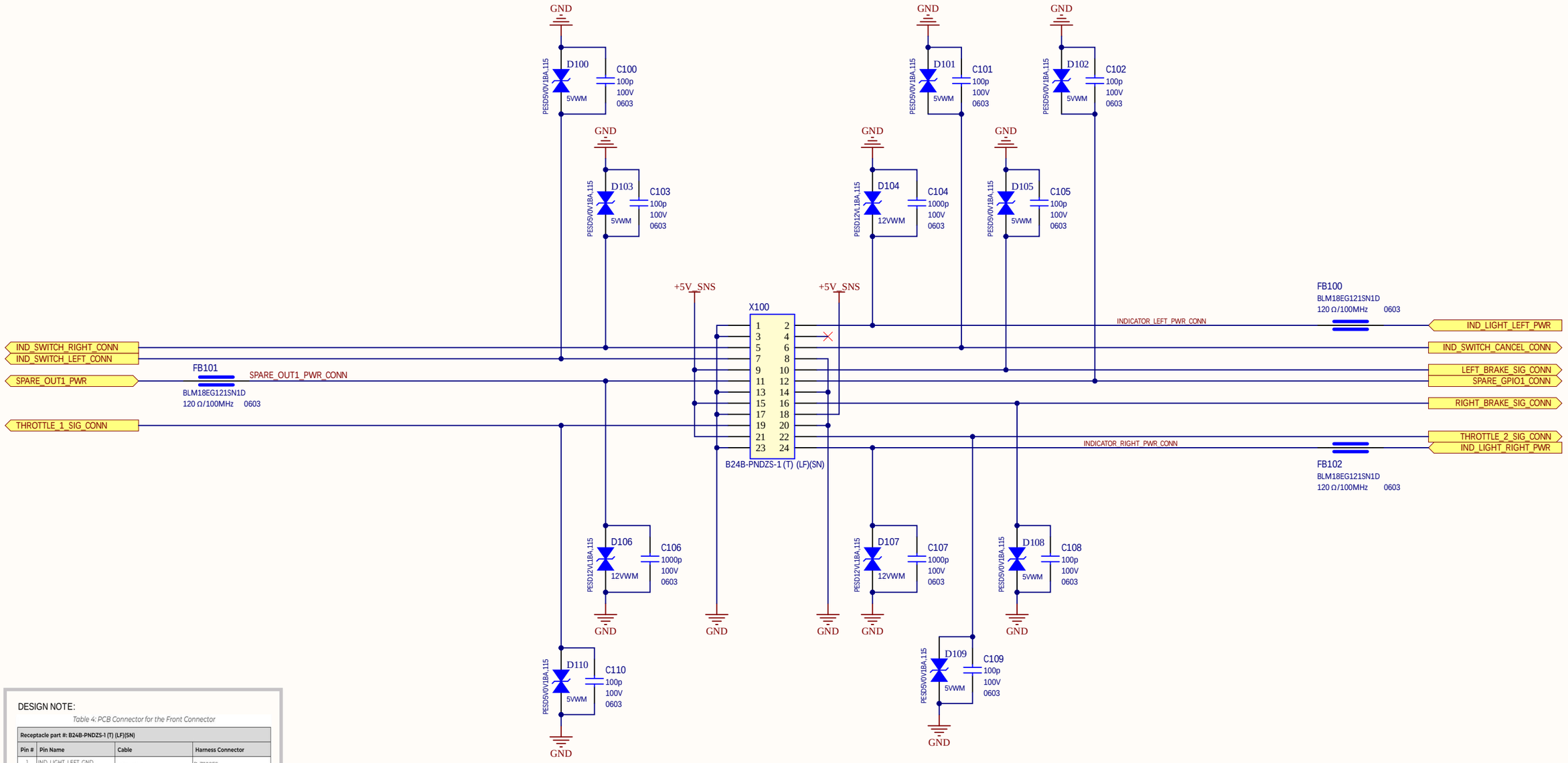
Title: *		Dott (emTransit B.V.)
Date: 11/04/2022 Engineer: FG	Part Number: *xxxxx	Westerdok
	Revision: .2	Van Diemenstraat 292
Size: A3 Sheet 1 of 16 Version: 0	Rev. date: *Param	1013 CR, Amsterdam
Project: LIDO	File: LIDO-HW.001.CoverPage.SchDoc	The Netherlands

ID002 - Revision History

Index	Date	HISTORY
1	29/04/2022	Draft schematic wiht symbo only ready for first reviews within team and Vladimir (external)
2	04/05/2022	V0.1 - Corrections based on the first sch. review meeting.
3	17/05/2022	V0.2 - Vladimir's comments/suggestions added to schematic. Old symbol where replaced by real components (Symbol + Footprint) from the databsae library with the part numbers provided by Vladimir. Some of the part numbers change due to no stock. main parameter remains.

Title: *		Dott (emTransit B.V.)
Date: 11/04/2022 Engineer: FG	Part Number: *xxxxx	Westerdok
	Revision: .2	Van Diemenstraat 292
Size: A3 Sheet 2 of 16 Version: 0	Rev. date: *Param	1013 CR, Amsterdam
Project: LIDO	File: LIDO-HW.002.RevisionHistory.SchDoc	The Netherlands

ID100 - FRONT CONNECTOR



DESIGN NOTE:

Table 4: PCB Connector for the Front Connector

Receptacle part #: B24B-PNDZS-1 (T) (LF)(SN)			
Pin #	**Pin Name**	**Cable**	**Harness Connector**
1	IND_LIGHT_LEFT_GND	Left indicator	D-Z20BFS (D series, 2 pin, female)
2	IND_LIGHT_LEFT_PWR		
3	IND_SWITCH_GND	Control switch	D-Z50BFS (D series, 5 pin, female)
4	NC		
5	IND_SWITCH_RIGHT_CONN		
6	IND_SWITCH_CANCEL_CONN		
7	IND_SWITCH_LEFT_CONN		
8	LEFT_BREAK_SIG_GND	Left brake	D-Z30BFS (D series, 3 pin, female)
9	+5V_SNS		
10	LEFT_BREAK_SIG		
11	SPARE_OUT1_PWR	Spare pins (no cable)	N/A
12	SPARE_GPIO1		
13	SPARE_GPIO1_GND		
14	RIGHT_BRAKE_GND	Right brake	F-Z309FS (F series, 3 pin, female)
15	+5V_SNS		
16	RIGHT_BREAK_SIG		
17	THROTTLE_1_GND	Throttle	F-Z609FS (F series, 6 pin, female)
18	+5V_SNS		
19	THROTTLE_1_SIG		
20	THROTTLE_2_GND		
21	+5V_SNS		
22	THROTTLE_2_SIG		
23	IND_LIGHT_RIGHT_GND	Right indicator	F-Z209FS (F series, 2 pin, female)
24	IND_LIGHT_RIGHT_PWR		

Title: *			
Date: 11/04/2022	Engineer: FG	Part Number: *xxxxx	
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ID003 - Block Diagram

POWER SUPPLIES

U_LIDO-HW.100.VinAndPower
LIDO-HW.100.VinAndPower.SchDoc

+VIN

+12V0
+5V0
+3V3

SNS_OC.EN
SNS_OC.FLT

CONNECTORS

INTERFACES

MCU

SECURITY & BRD TEMP.

U_LIDO-HW.100.FrontConnector
LIDO-HW.100.FrontConnector.SchDoc

THROTTLE_1_SIG_CONN
THROTTLE_2_SIG_CONN
RIGHT_BRAKE_SIG_CONN
LEFT_BRAKE_SIG_CONN
IND_SWITCH_RIGHT_CONN
IND_SWITCH_LEFT_CONN
IND_SWITCH_CANCEL_CONN
SPARE_GPIO1_CONN
IND_LIGHT_RIGHT_PWR
IND_LIGHT_LEFT_PWR
SPARE_OUT1_PWR

U_LIDO-HW.100.RearConnector
LIDO-HW.100.RearConnector.SchDoc

+VIN
VEH_CAN_P
VEH_CAN_N
DISPLAY_UART.TXD_B
DISPLAY_UART.RXD_B
DISPLAY_UART.RTS_B
DISPLAY_UART.CTS_B
SL_I2C.SDA_B_F
SL_I2C.SCL_B_F
ACC_CAN_P
ACC_CAN_N
ACC_UART.TXD_B
ACC_UART.RXD_B
ACC_UART.RTS_B
ACC_UART.CTS_B
SPARE_GPIO2_CONN
SPARE_OUT2_PWR
DISPLAY_PWR
STATUS_LIGHT_PWR
ACCESSORY_PWR
FRONT_LIGHT_PWR

U_LIDO-HW.100.InputStage_1
LIDO-HW.100.InputStage_1.SchDoc

THROTTLE_1_SIG_CONN
THROTTLE_2_SIG_CONN
RIGHT_BRAKE_SIG_CONN
LEFT_BRAKE_SIG_CONN
THROTTLE_1_SIG
THROTTLE_2_SIG
RIGHT_BRAKE_SIG
LEFT_BRAKE_SIG

U_LIDO-HW.100.InputStage_2
LIDO-HW.100.InputStage_2.SchDoc

IND_SWITCH_RIGHT_CONN
IND_SWITCH_LEFT_CONN
IND_SWITCH_CANCEL_CONN
SPARE_GPIO1_CONN
SPARE_GPIO2_CONN
IND_SWITCH_RIGHT_F
IND_SWITCH_LEFT_F
IND_SWITCH_CANCEL_F
SPARE_GPIO1_F
SPARE_GPIO2_F

U_LIDO-HW.300.VehicleInterface
LIDO-HW.300.VehicleInterface.SchDoc

VEH_CAN_P
VEH_CAN_N
VEH_CAN.TXD
VEH_CAN.RXD
VEH_CAN.STBY
VEH_CAN.TERM

U_LIDO-HW.300.DisplayInterface
LIDO-HW.300.DisplayInterface.SchDoc

DISPLAY_UART.TXD_B
DISPLAY_UART.RXD_B
DISPLAY_UART.RTS_B
DISPLAY_UART.CTS_B
DISPLAY_UART.TXD
DISPLAY_UART.RXD
DISPLAY_UART.RTS
DISPLAY_UART.CTS

U_LIDO-HW.300.StatusLightInterface
LIDO-HW.300.StatusLightInterface.SchDoc

SL_I2C.SDA_B_F
SL_I2C.SCL_B_F
SL_I2C.SDA
SL_I2C.SCL

U_LIDO-HW.400.AccessoryInterfaces
LIDO-HW.400.AccessoryInterfaces.SchDoc

ACC_CAN_P
ACC_CAN_N
ACC_UART.TXD_B
ACC_UART.RXD_B
ACC_UART.RTS_B
ACC_UART.CTS_B
ACC_CAN.TXD
ACC_CAN.RXD
ACC_CAN.STBY
ACC_CAN.TERM
ACC_UART.TXD
ACC_UART.RXD
ACC_UART.RTS
ACC_UART.CTS

U_LIDO-HW.100.OutputStage
LIDO-HW.100.OutputStage.SchDoc

IND_LIGHT_RIGHT_PWR
IND_LIGHT_LEFT_PWR
SPARE_OUT1_PWR
SPARE_OUT2_PWR
DISPLAY_PWR
STATUS_LIGHT_PWR
ACCESSORY_PWR
FRONT_LIGHT_PWR
DVR.RESET
DRV_SPI0.SCK
DRV_SPI0.MOSI
DRV_SPI0.MISO
DRV_SPI0.CS

U_LIDO-HW.200.MCU_Peripherals_1
LIDO-HW.200.MCU_Peripherals_1.SchDoc

THROTTLE_1_SIG
THROTTLE_2_SIG
I2C0.SDA
I2C0.SCL
TMP_PWRLERT
IND_SWITCH_RIGHT_F
IND_SWITCH_LEFT_F
IND_SWITCH_CANCEL_F
SPARE_GPIO1_F
SPARE_GPIO2_F
VEH_CAN.TXD
VEH_CAN.RXD
VEH_CAN.STBY
VEH_CAN.TERM
DISPLAY_UART.TXD
DISPLAY_UART.RXD
SL_I2C.SDA
SL_I2C.SCL
ACC_CAN.TXD
ACC_CAN.RXD
ACC_CAN.STBY
DVR.RESET

U_LIDO-HW.200.MCU_Peripherals_2
LIDO-HW.200.MCU_Peripherals_2.SchDoc

RIGHT_BRAKE_SIG
LEFT_BRAKE_SIG
SNS_OC.EN
SNS_OC.FLT
ACC_CAN.TERM
ACC_UART.TXD
ACC_UART.RXD
ACC_UART.RTS
ACC_UART.CTS
DISPLAY_UART.RTS
DISPLAY_UART.CTS
DRV_SPI0.SCK
DRV_SPI0.MOSI
DRV_SPI0.MISO
DRV_SPI0.CS

U_LIDO-HW.200.MCU_SWD_Reset
LIDO-HW.200.MCU_SWD_Reset.SchDoc

U_LIDO-HW.200.SecurityAndTemperature
LIDO-HW.200.SecurityAndTemperature.SchDoc

I2C0.SDA
I2C0.SCL
TMP_PWRLERT

Title: *			
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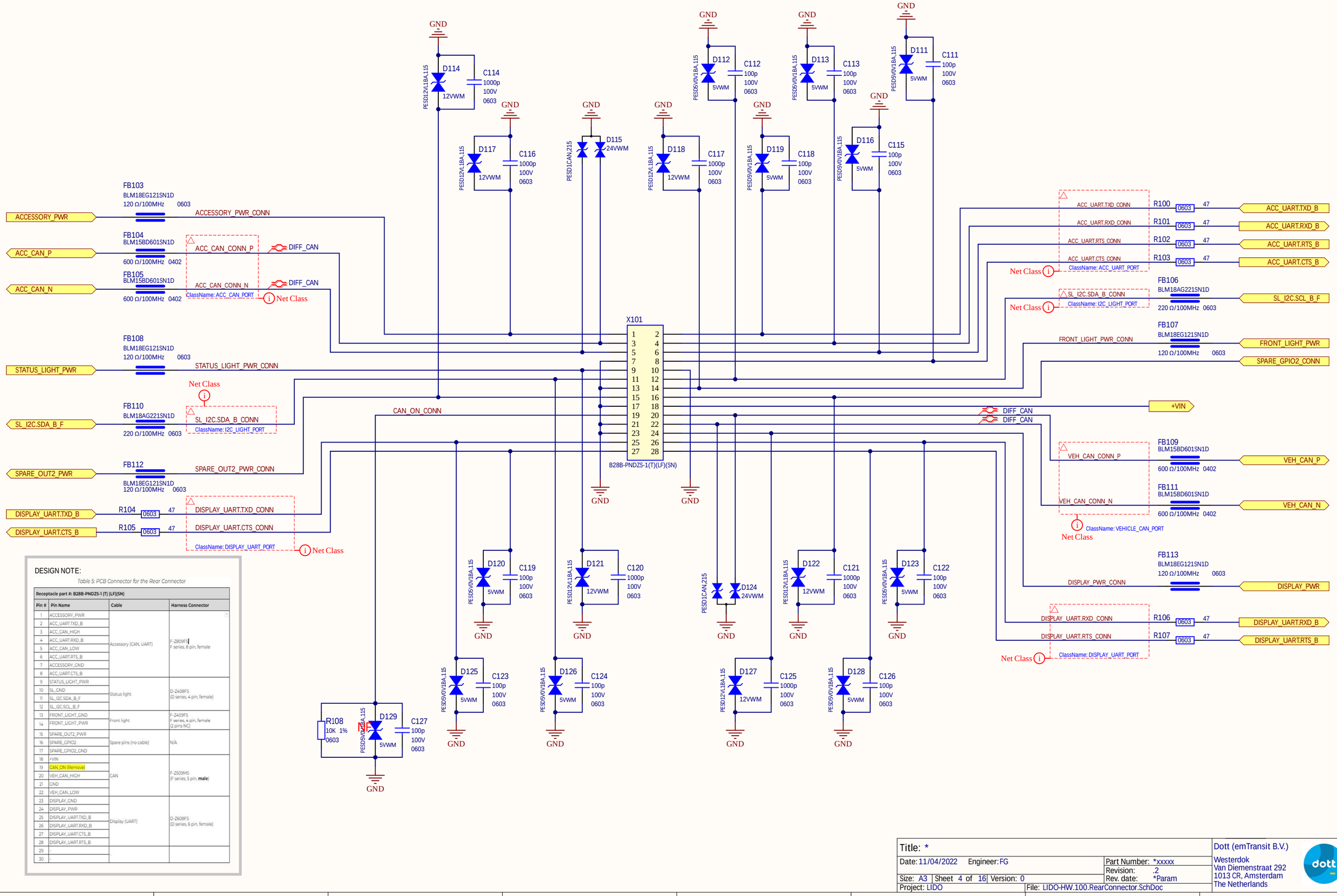
The Netherlands

ID100 - REAR CONENCTOR



DESIGN NOTE:

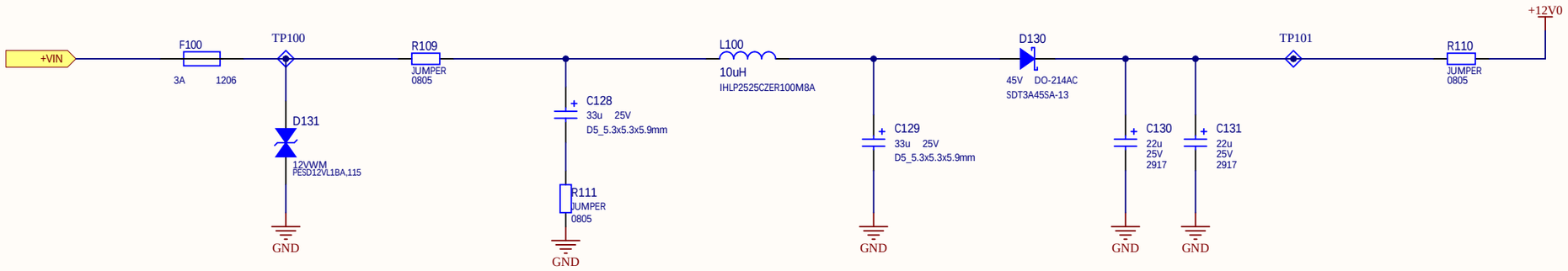
Table 5: PCB Connector for the Rear Connector

Receptacle part #: B28B-PNDZS-1 (T) (LF)(SN)			
Pin #	Pin Name	Cable	Harness Connector
1	ACCESSORY_PWR	Accessory (CAN, UART)	F-Z809FS F series, 8 pin, female
2	ACC_UART.TXD_B		
3	ACC_CAN_HIGH		
4	ACC_UART.RXD_B		
5	ACC_CAN_LOW		
6	ACC_UART.RTS_B		
7	ACCESSORY_GND		
8	ACC_UART.CTS_B		
9	STATUS_LIGHT_PWR	Status light	D-Z408FS (D series, 4 pin, female)
10	SL_GND		
11	SL_I2C.SDA_B_F		
12	SL_I2C.SCL_B_F		
13	FRONT_LIGHT_GND	Front light	F-Z409FS F series, 4 pin, female (2 pins NC)
14	FRONT_LIGHT_PWR		
15	SPARE_OUT2_PWR	Spare pins (no cable)	N/A
16	SPARE_GPIO2		
17	SPARE_GPIO2_GND		
18	+VIN	CAN	F-Z509MS (F series, 5 pin, **male**)
19	CAN_ON (Remove)		
20	VEH_CAN_HIGH		
21	GND		
22	VEH_CAN_LOW		
23	DISPLAY_GND	Display (UART)	D-Z608FS (D series, 6 pin, female)
24	DISPLAY_PWR		
25	DISPLAY_UART.TXD_B		
26	DISPLAY_UART.RXD_B		
27	DISPLAY_UART.CTS_B		
28	DISPLAY_UART.RTS_B		
29	-		
30	-		

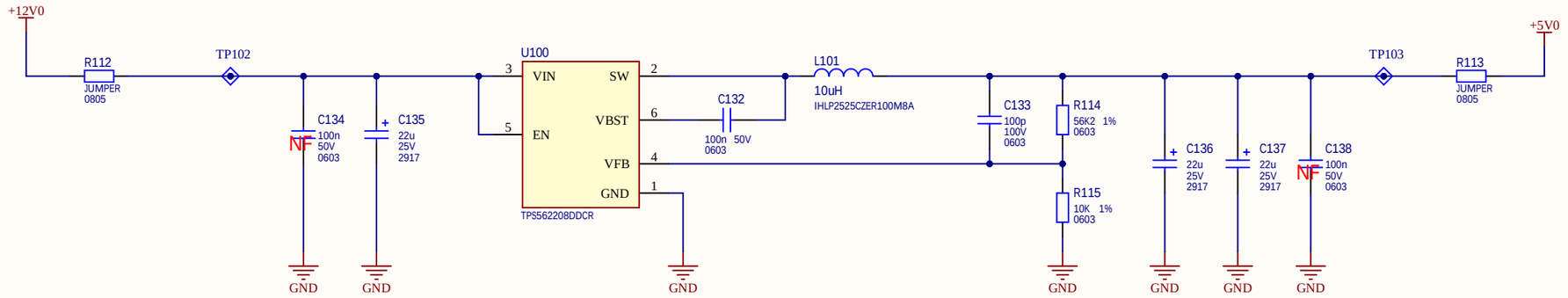
Title: *			Dott (emTransit B.V.)
Date: 11/04/2022	Engineer: FG	Part Number: *xxxxx	Westerdok Van Diemenstraat 292 1013 CR, Amsterdam The Netherlands
Size: A3	Sheet 4 of 16	Revision: .2	
Project: LIDO	Version: 0	Rev. date: *Param	
	File: LIDO-HW.100.RearConnector.SchDoc		

ID100 - INPUT VOLTAGE AND POWER SUPPLIES

INPUT VOLTAGE AND FILTER

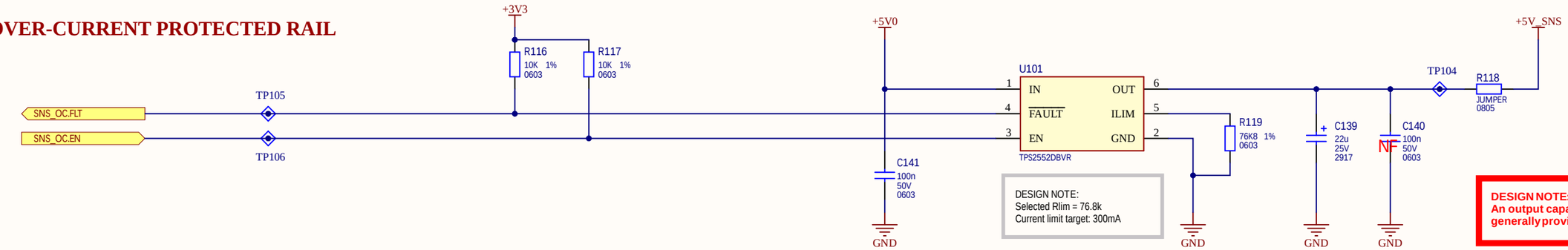


+5V POWER RAIL



TPS56220x LAYOUT NOTE:
4. Keep the SW trace as physically short and wide as practical to minimize radiated emissions.
5. Do not allow switching current to flow under the device.
6. A separate VOUT path should be connected to the upper feedback resistor.
7. Make a Kelvin connection to the GND pin for the feedback path.
8. Voltage feedback loop should be placed away from the high-voltage switching trace, and preferably has ground shield.

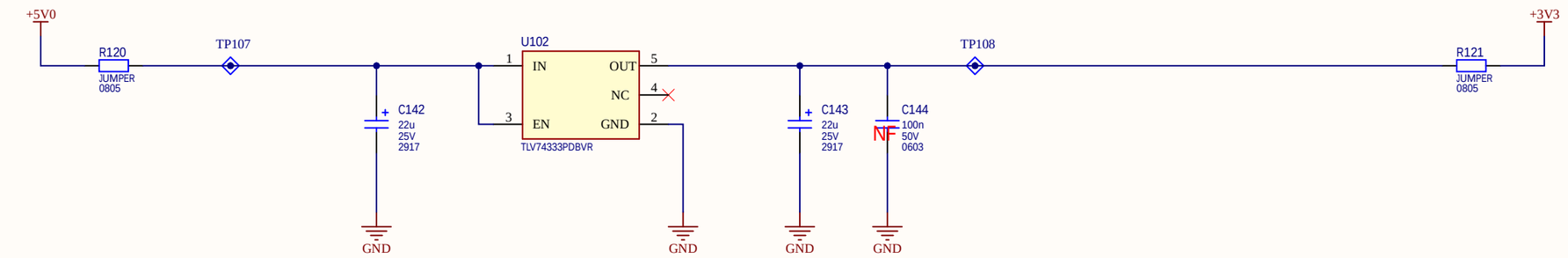
+5V OVER-CURRENT PROTECTED RAIL



DESIGN NOTE:
Selected Rlim = 76.8k
Current limit target: 300mA

DESIGN NOTE:
An output capacitance of 1 µF or larger generally provides good dynamic response.

+3V3 POWER RAIL



Title: *		
Date: 11/04/2022 Engineer: FG		Part Number: *xxxxx
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Size: A3 Sheet 5 of 16 Version: 0		Rev. date: *Param
Project: LIDO	File: LIDO-HW.100.VinAndPower.SchDoc	

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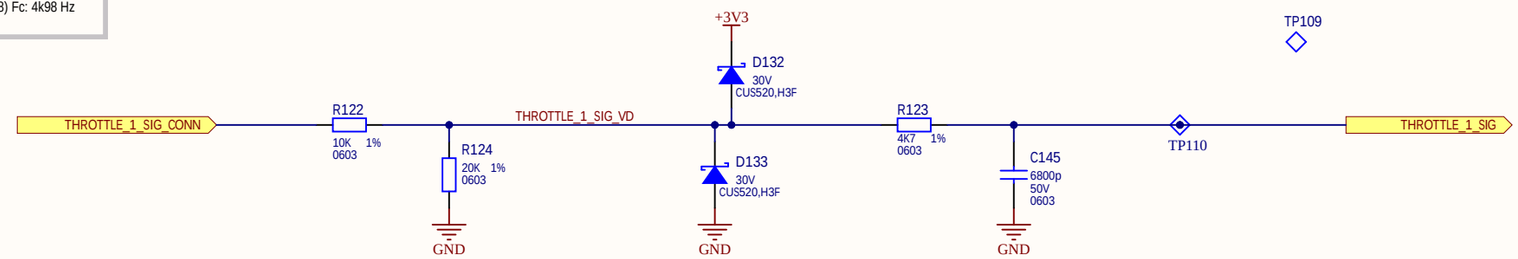
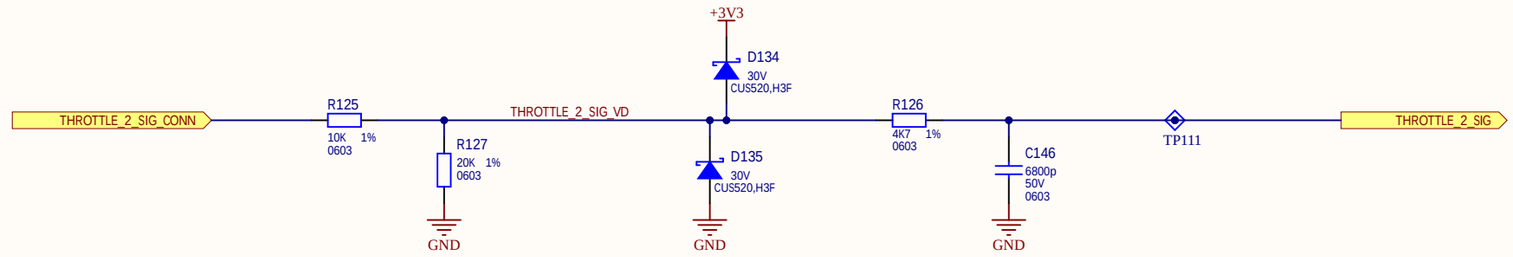
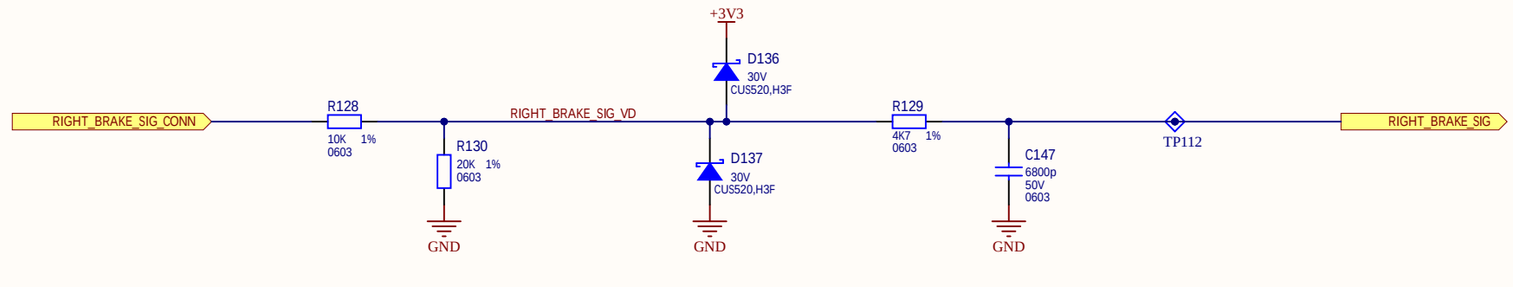
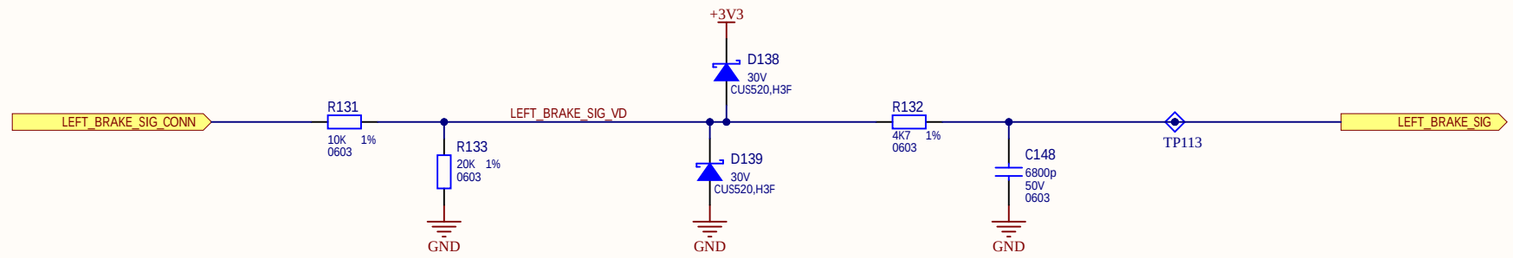
ID100 - INPUT STAGE

DESIGN NOTE:
Low-pass Filter (R= 4k7 & C= 6n8) Fc: 4k98 Hz









Title: *			Dott (emTransit B.V.)
Date: 11/04/2022	Engineer: FG	Part Number: *xxxxx	Westerdok
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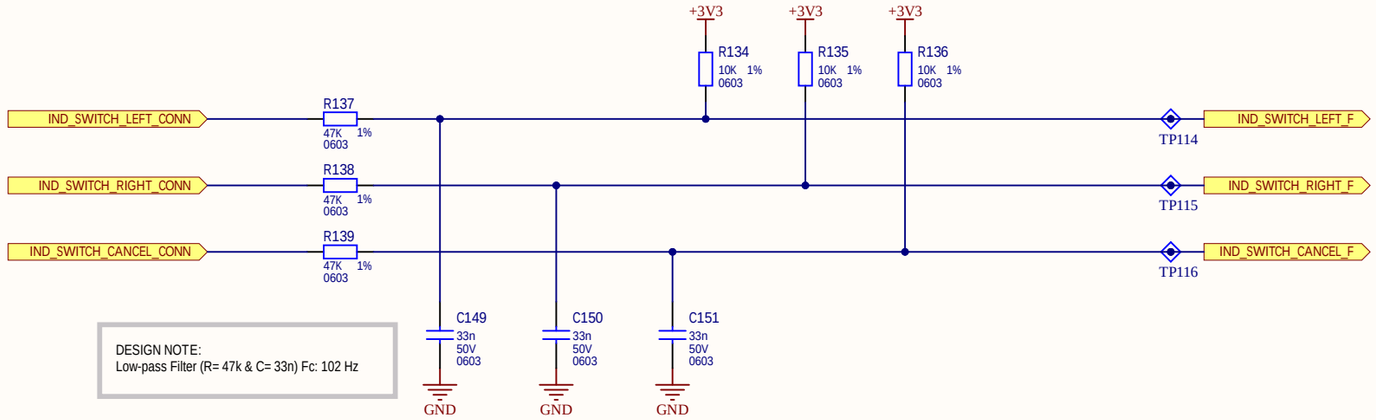
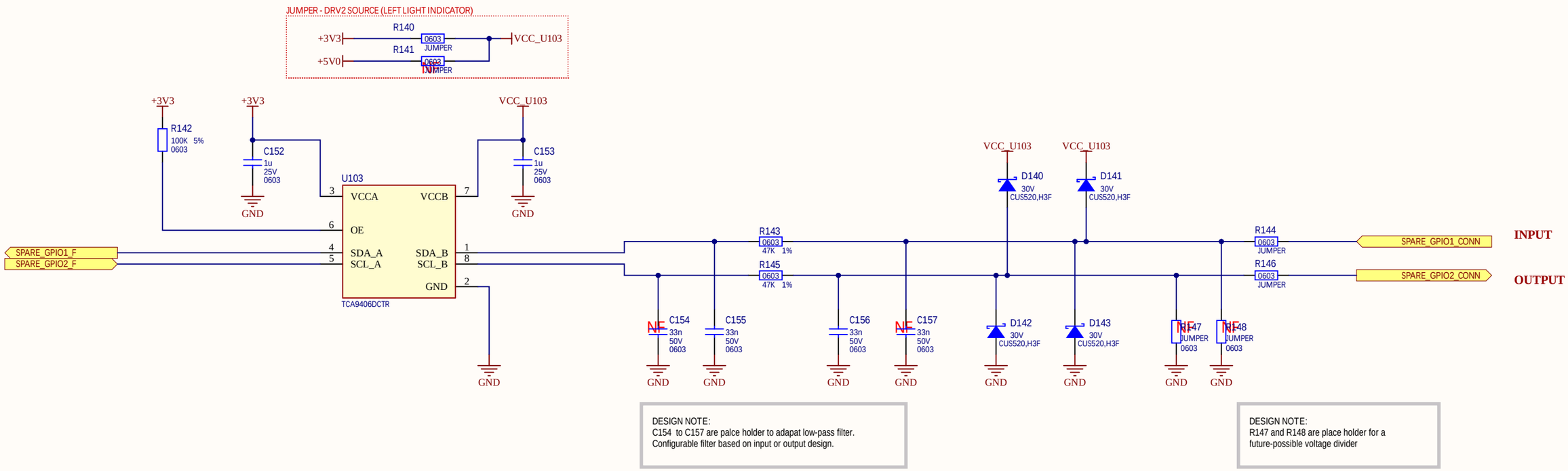
Project: LIDO	File: LIDO-HW.100.InputStage_1.SchDoc		

ID100 - INPUT STAGE

SENSOR SIGNALS



GENERIC GPIO



Title: *		Dott (emTransit B.V.)
Date: 11/04/2022 Engineer: FG	Part Number: *xxxxx	Westerdok
	Revision: .2	Van Diemenstraat 292
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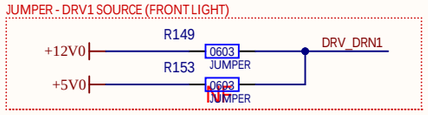
Project: LIDO	File: LIDO-HW.100.InputStage_2.SchDoc	The Netherlands

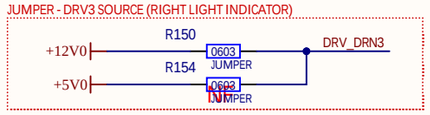
ID100 - OUTPUT STAGE

DRIVER VOLTAGE SELECTOR

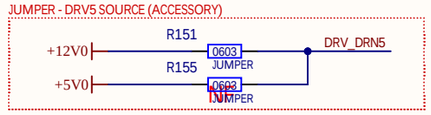
JUMPER - DRV1 SOURCE (FRONT LIGHT)



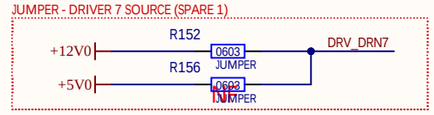
JUMPER - DRV3 SOURCE (RIGHT LIGHT INDICATOR)



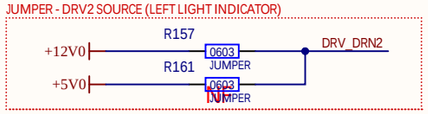
JUMPER - DRV5 SOURCE (ACCESSORY)



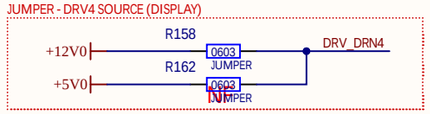
JUMPER - DRIVER 7 SOURCE (SPARE 1)



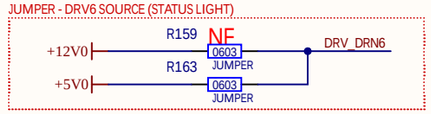
JUMPER - DRV2 SOURCE (LEFT LIGHT INDICATOR)



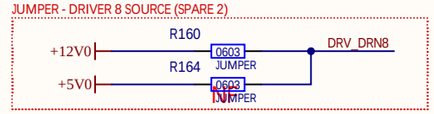
JUMPER - DRV4 SOURCE (DISPLAY)

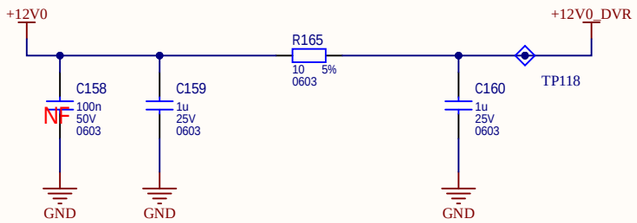


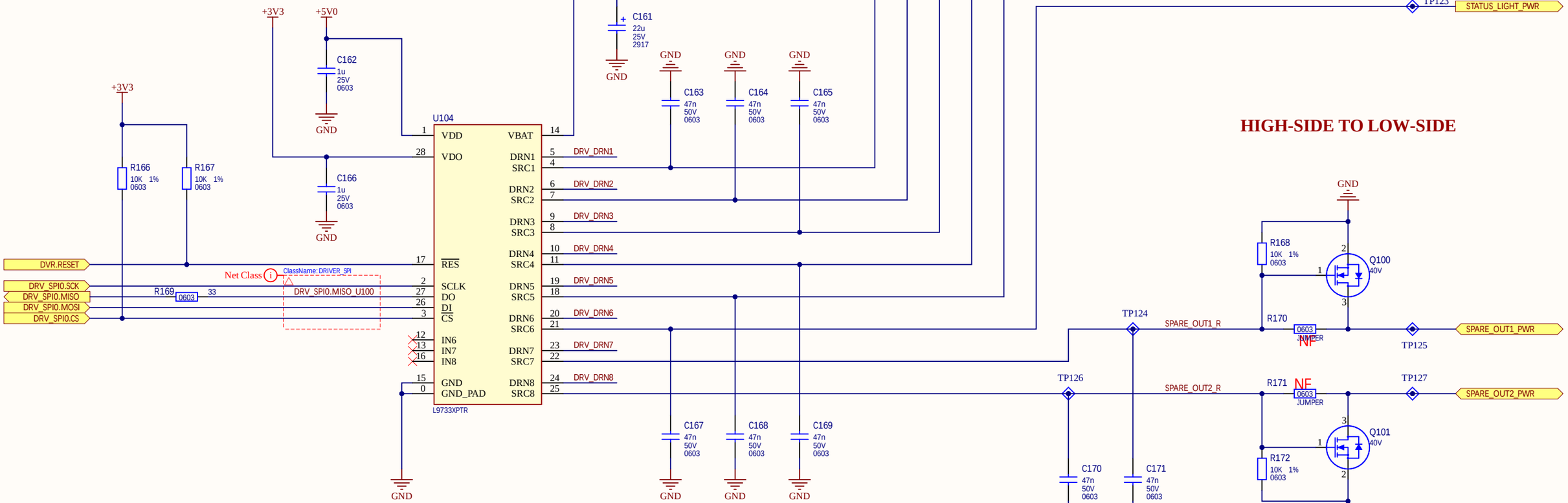
JUMPER - DRV6 SOURCE (STATUS LIGHT)



JUMPER - DRIVER 8 SOURCE (SPARE 2)







Title: *			Dott (emTransit B.V.)
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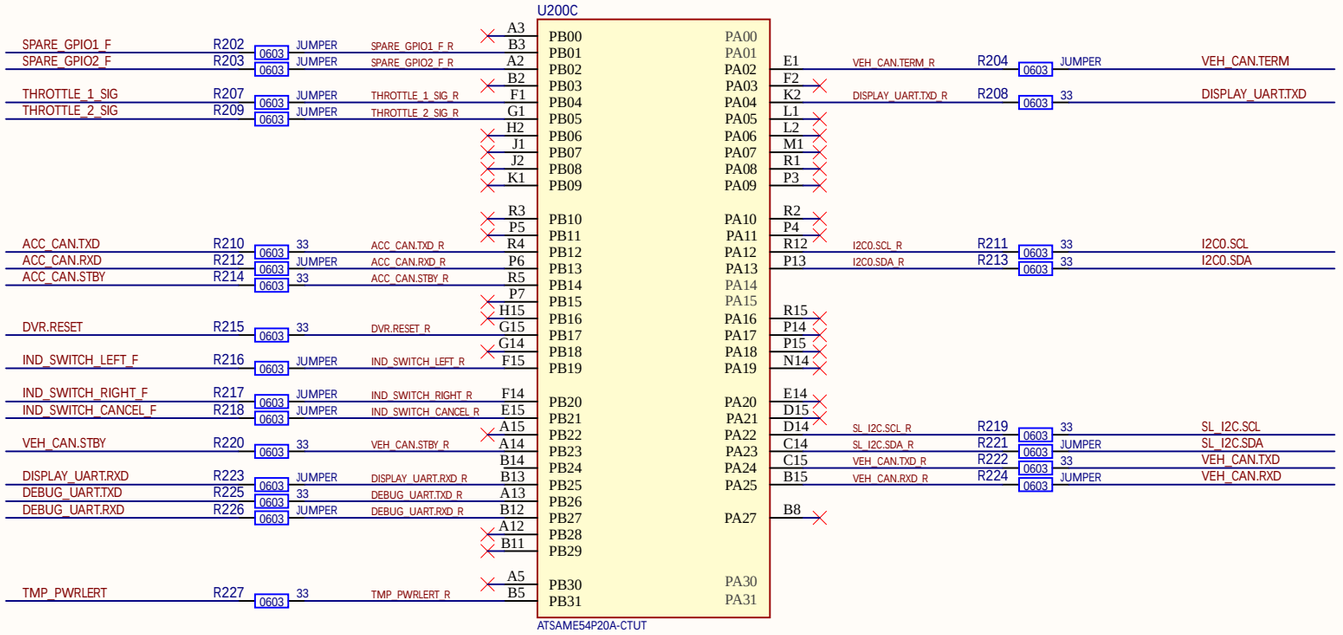
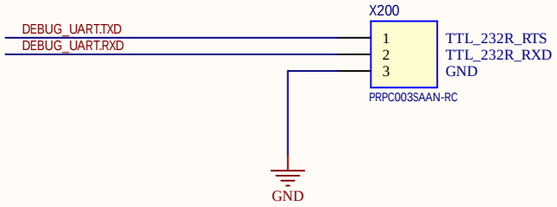
Project: LIDO	File: LIDO-HW.100.OutputStage.SchDoc		The Netherlands

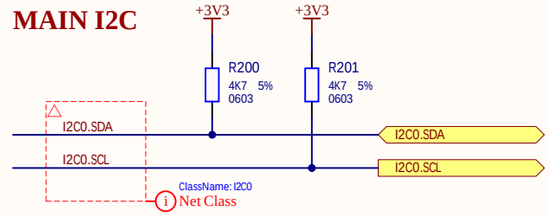
ID200 - MCU PERIPHERALS



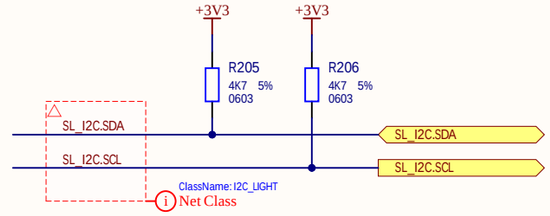
UART DEBUG CONNECTOR



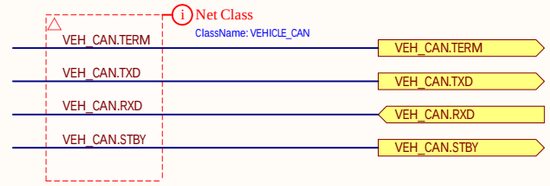
MAIN I2C



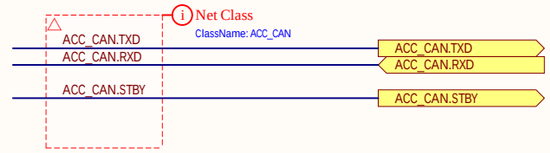
STATUS LIGHT I2C



VEHICLE CAN



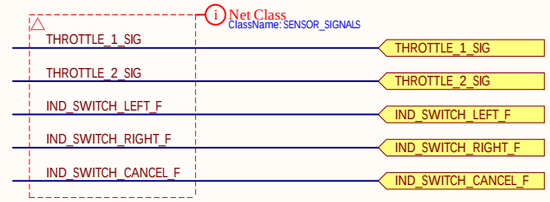
ACCESSORY CAN



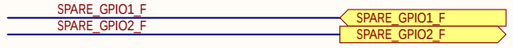
DISPLAY UART

HIGH-SIDE DRIVER

INPUT SENSORS



GPIO



TEMP. SENSOR INTERRUPT

Title: *			
Date: 11/04/2022	Engineer: FG	Part Number: *xxxxx	
Size: A3	Sheet 9 of 16	Version: 0	Revision: .2
Project: LIDO		File: LIDO-HW.200.MCU_Peripherals_1.SchDoc	Rev. date: *Param

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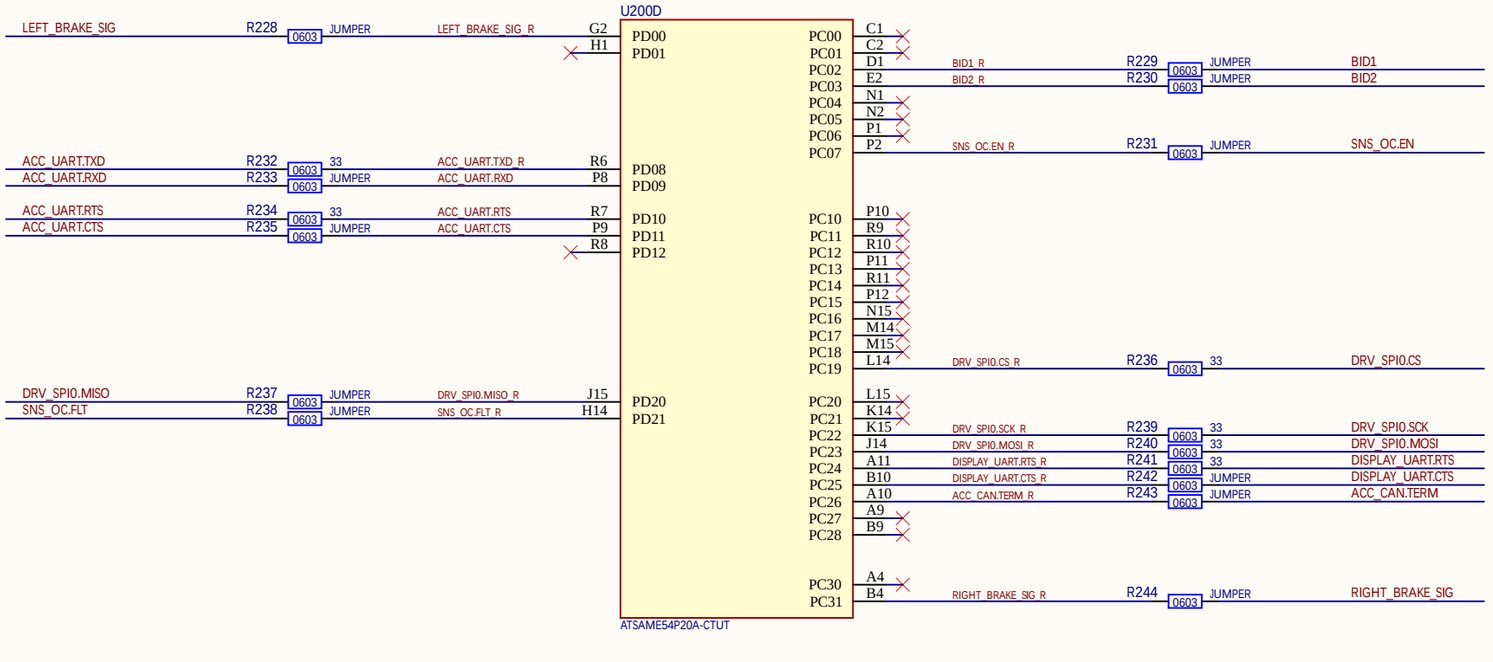
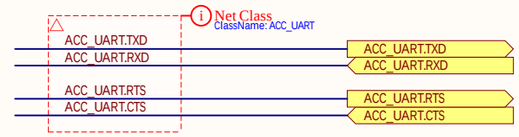
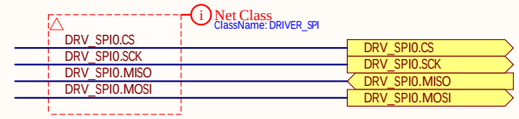
ID200 - MCU PERIPHERALS



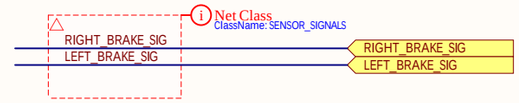
ACCESSORY UART



HIGH-SIDE DRIVER



INPUT SENSORS

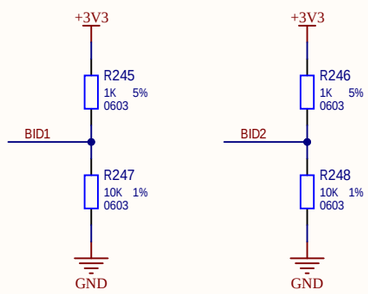


ACCESSORY CAN

DISPLAY UART

OVER-CURRENT SWITCH

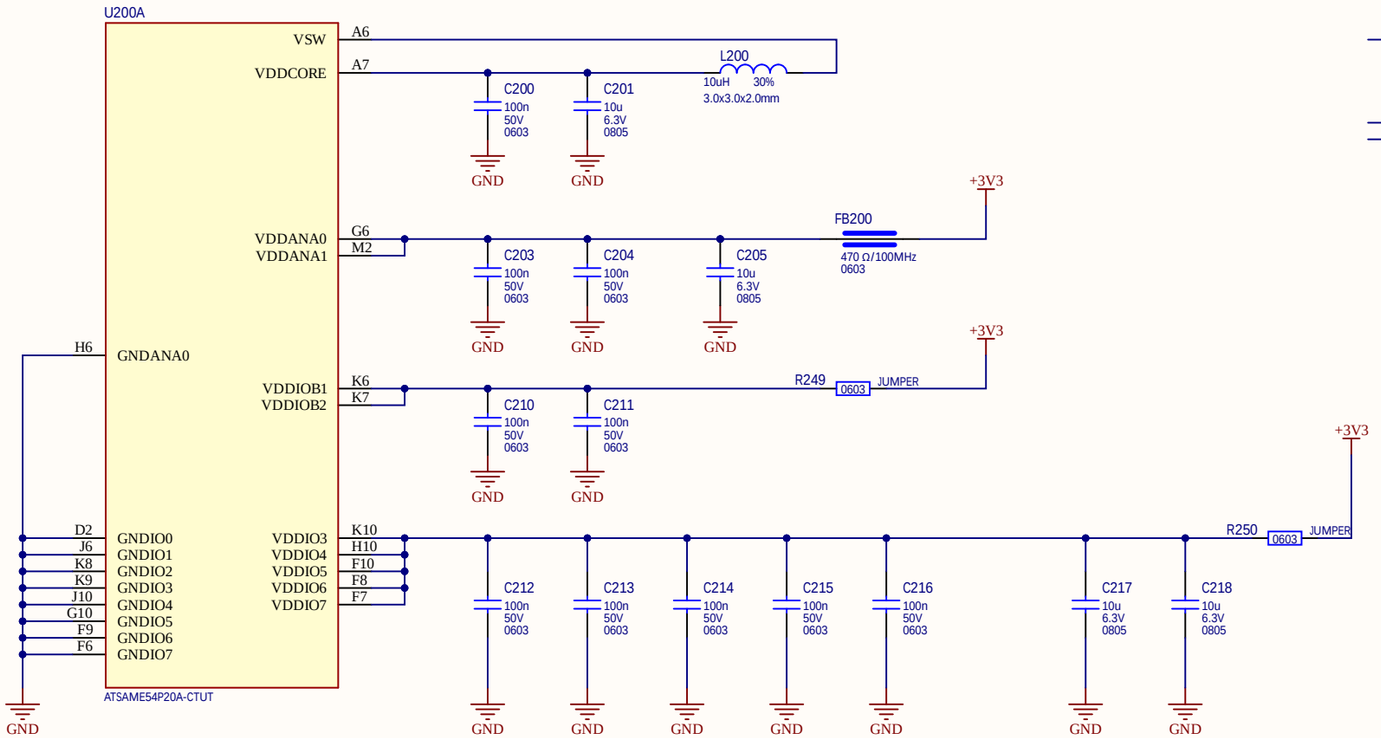
BOARD ID

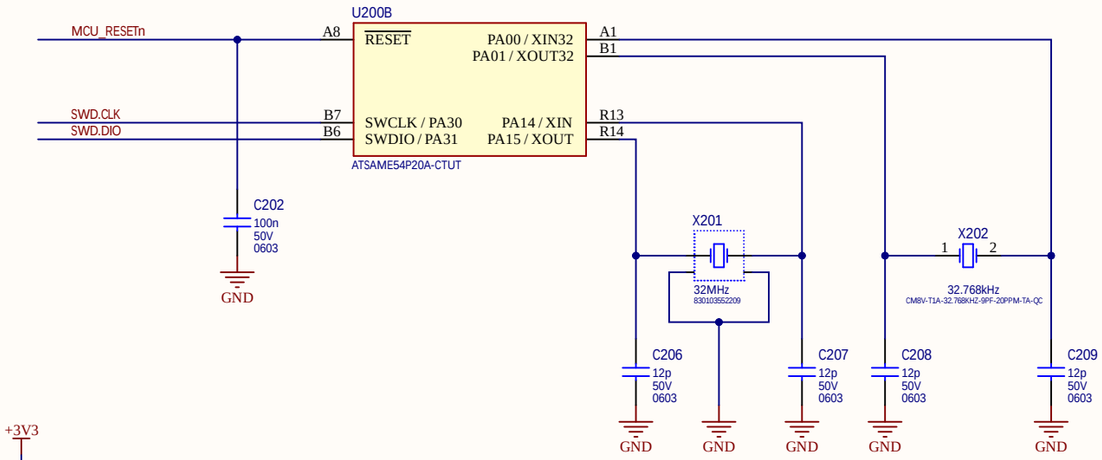


DESIGN NOTE:

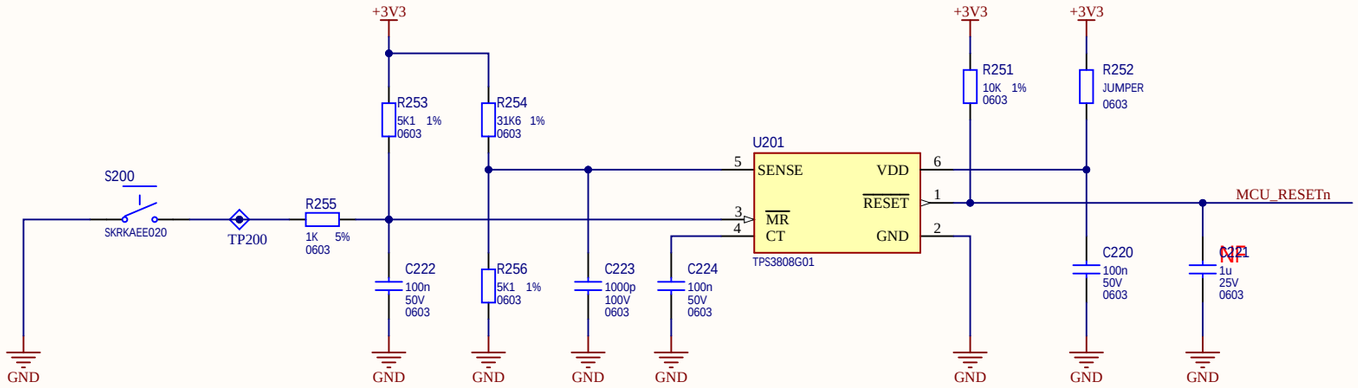
Title: *			Dott (emTransit B.V.)
Date: 11/04/2022	Engineer: FG	Part Number: *xxxxx	Westerdok
		Revision: .2	Van Diemenstraat 292
Size: A3	Sheet 10of 16	Version: 0	Rev. date: *Param	1013 CR, Amsterdam
Project: LIDO		File: LIDO-HW.200.MCU_Peripherals_2.SchDoc	The Netherlands

ID200 - MCU POWER, SWD AND RESET

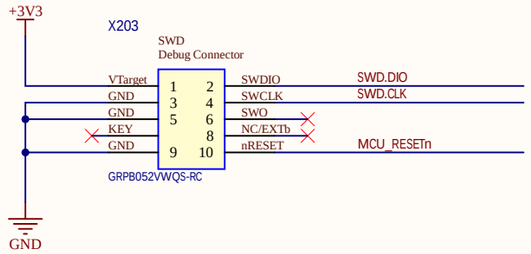




RESET SUPERVISOR



SWD DEBUG CONNECTOR



Title: *	
Date: 11/04/2022 Engineer: FG	Part Number: *xxxxx
	Revision: .2
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Project: LIDO	File: LIDO-HW.200.MCU_SWD_Reset.SchDoc

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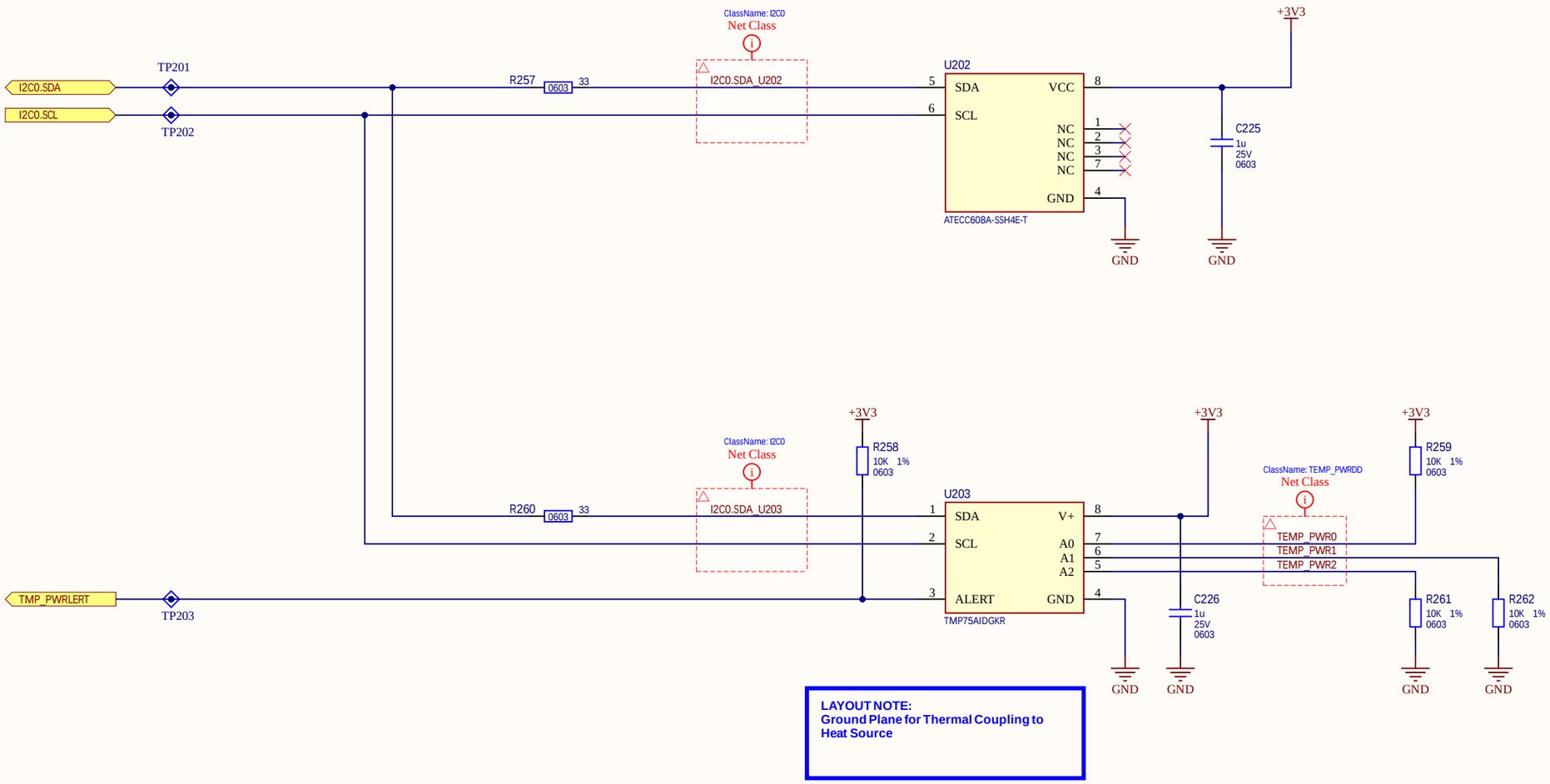
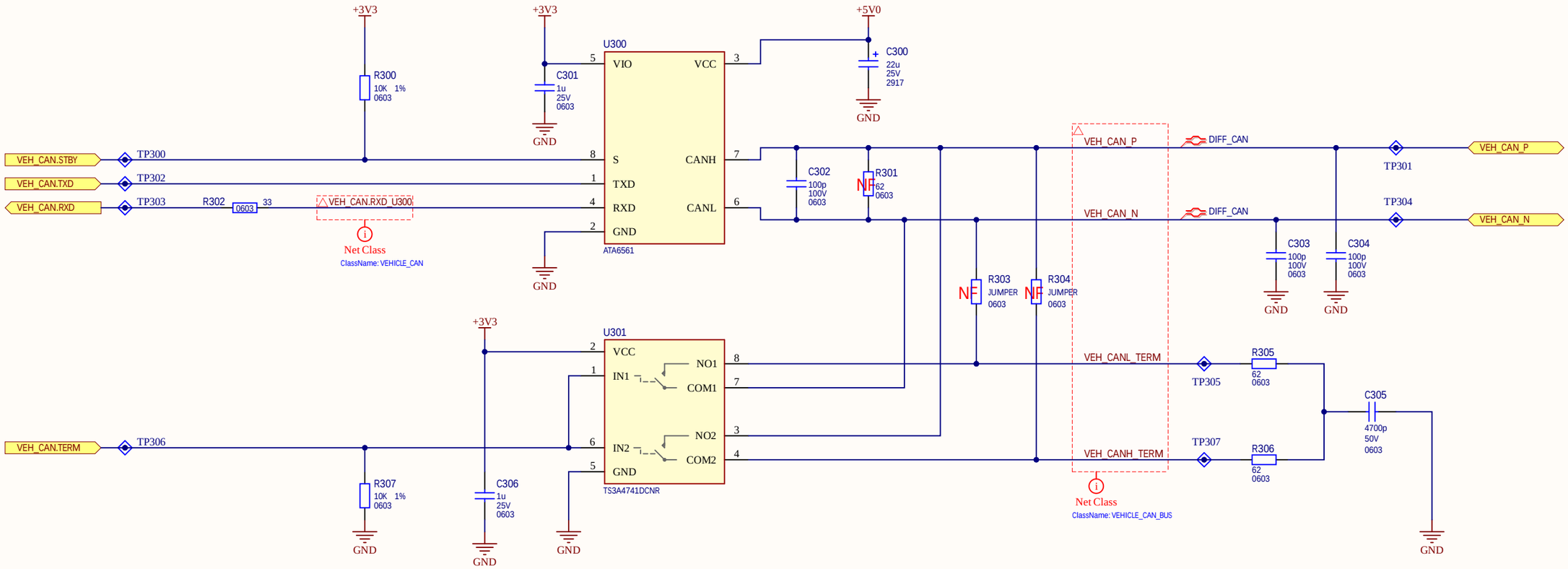
ID200 - SECURITY CHIP AND TEMPERATURE SENSOR



Title: *		Dott (emTransit B.V.)
Date: 11/04/2022 Engineer: FG	Part Number: *xxxxx	Westerdok
	Revision: .2	Van Diemenstraat 292
Size: A3 Sheet 12of 16 Version: 0	Rev. date: *Param	1013 CR, Amsterdam
Project: LIDO	File: LIDO-HW.200.SecurityAndTemperature.SchDoc	The Netherlands

ID300 - VEHICLE INTERFACE

CAN 0 BUS



Title: *	Dott (emTransit B.V.)
Date: 11/04/2022 Engineer: FG	Part Number: *xxxxx
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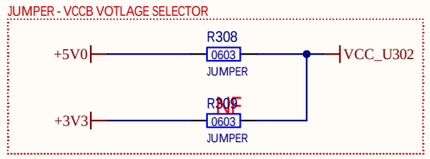
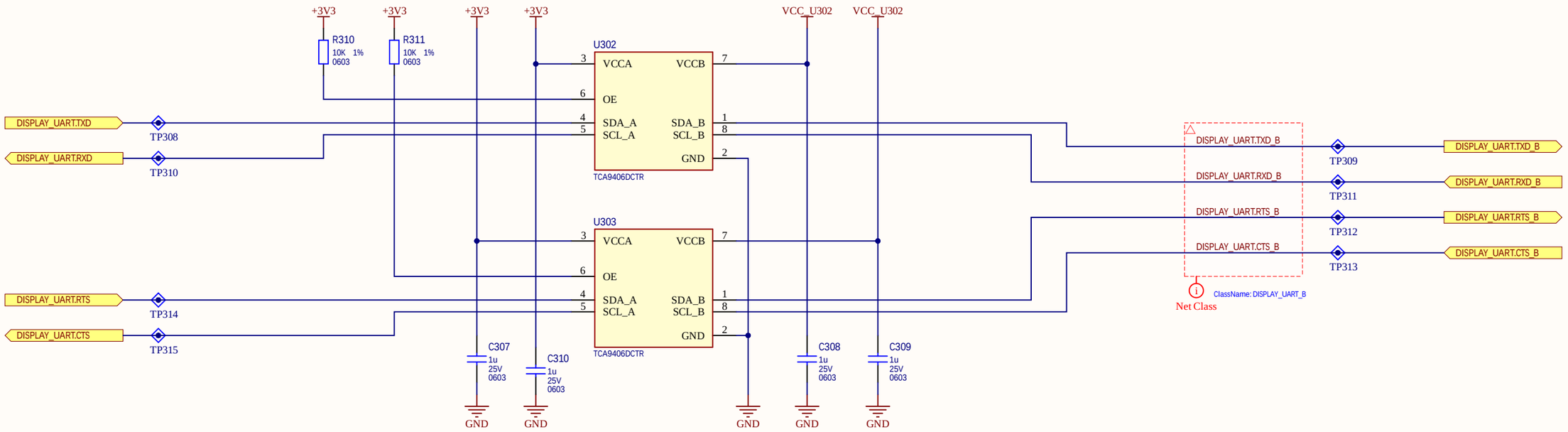
Project: LIDO File: LIDO-HW.300.VehicleInterface.SchDoc	Rev. date: *Param
	Westerdok Van Diemenstraat 292 1013 CR, Amsterdam The Netherlands

ID300 - DISPLAY INTERFACE



UART1



Title: *	
Date: 11/04/2022 Engineer: FG	Part Number: *xxxxx
	Revision: .2
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Project: LIDO	File: LIDO-HW.300.DisplayInterface.SchDoc

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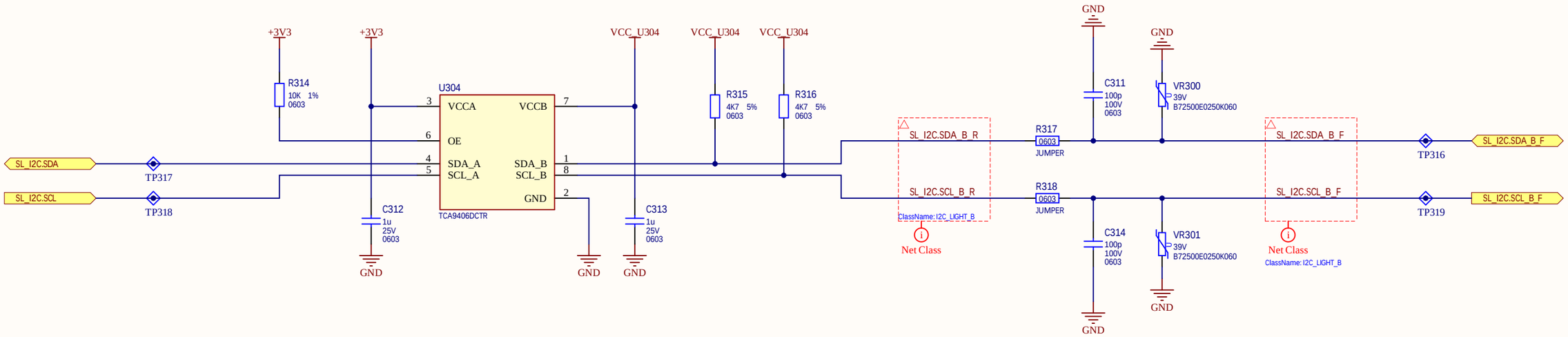
ID300 - STATUS LIGHT INTERFACE

JUMPER - VCCB VOTLAGE SELECTOR

+5V0 — R312 0603 JUMPER — VCC_U304

+3V3 — R313 0603 JUMPER

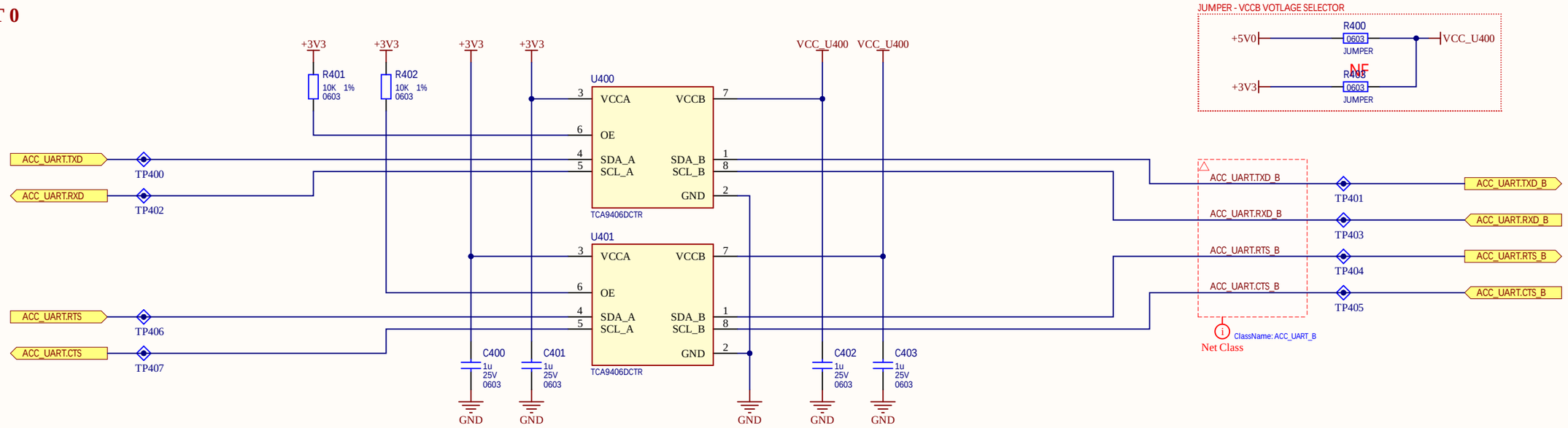
I2C1



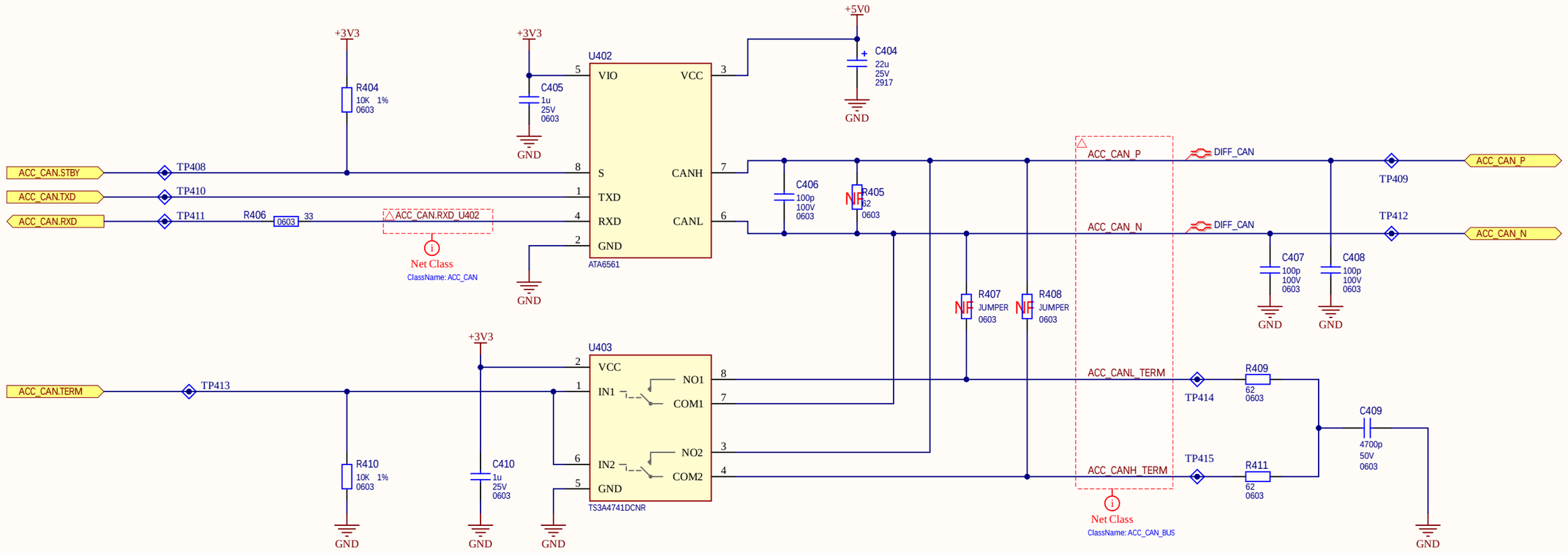
Title: *			Dott (emTransit B.V.)
Date: 11/04/2022	Engineer: FG	Part Number: *xxxxx	Westerdok
		Revision: .2	Van Diemenstraat 292
Size: A3	Sheet 15of 16	Version: 0	Rev. date: *Param	1013 CR, Amsterdam
Project: LIDO	File: LIDO-HW.300.StatusLightInterface.SchDoc		The Netherlands

ID400 - ACCESORY INTERFACES

ACCESSORY DISPLAY
UART 0



ACCESSORY CAN BUS
CAN 1



Title: *	
Date: 11/04/2022 Engineer: FG	Part Number: *xxxxx
Size: A3 Sheet 16of 16 Version: 0	Revision: .2
Project: LIDO	Rev. date: *Param
File: LIDO-HW.400.AccessoryInterfaces.SchDoc	

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