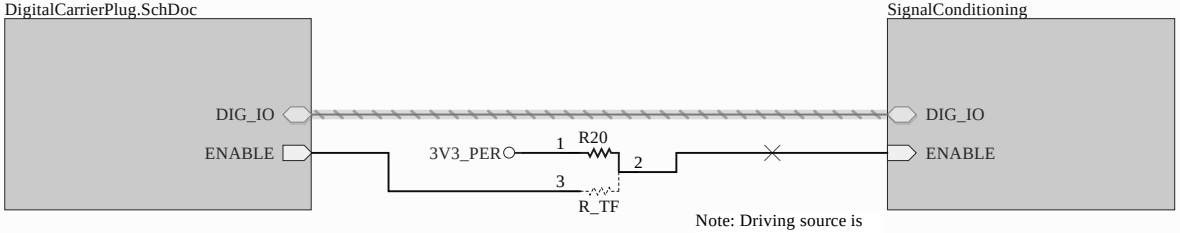
15V_PS
15V_PowerSupply.SchDoc

P1
5V_PER 1 5V
P2
3V3_PER 1 3V3
P3
15V 1 15V
P4
VIN 1 VIN

P5 1 GND
P6 1 GND
P7 1 GND
P8 1 GND
P9 1 GND
P10 1 GND
GND

CarrierConnector
DigitalCarrierPlug.SchDoc

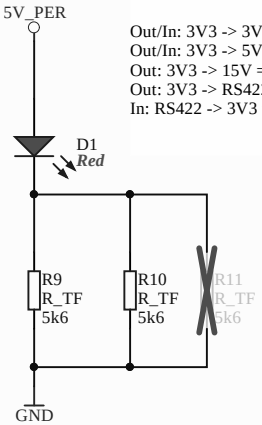
SigCon_top
SignalConditioning



Note: Driving source is external (carrier board or just voltage)

LED to show which variant is chosen
Colors:

Out/In: 3V3 -> 3V3 = Amber (2 resistors, MPN: 150060AS75000)
Out/In: 3V3 -> 5V = Blue (3 resistors, MPN: 150060BS75000)
Out: 3V3 -> 15V = Green (3 resistors, MPN: 150060GS75000)
Out: 3V3 -> RS422 = Red (2 resistors, MPN: 150060RS75000)
In: RS422 -> 3V3 = Yellow (2 resistors, MPN: 150060YS75000)



LOGO

Revision
2v01

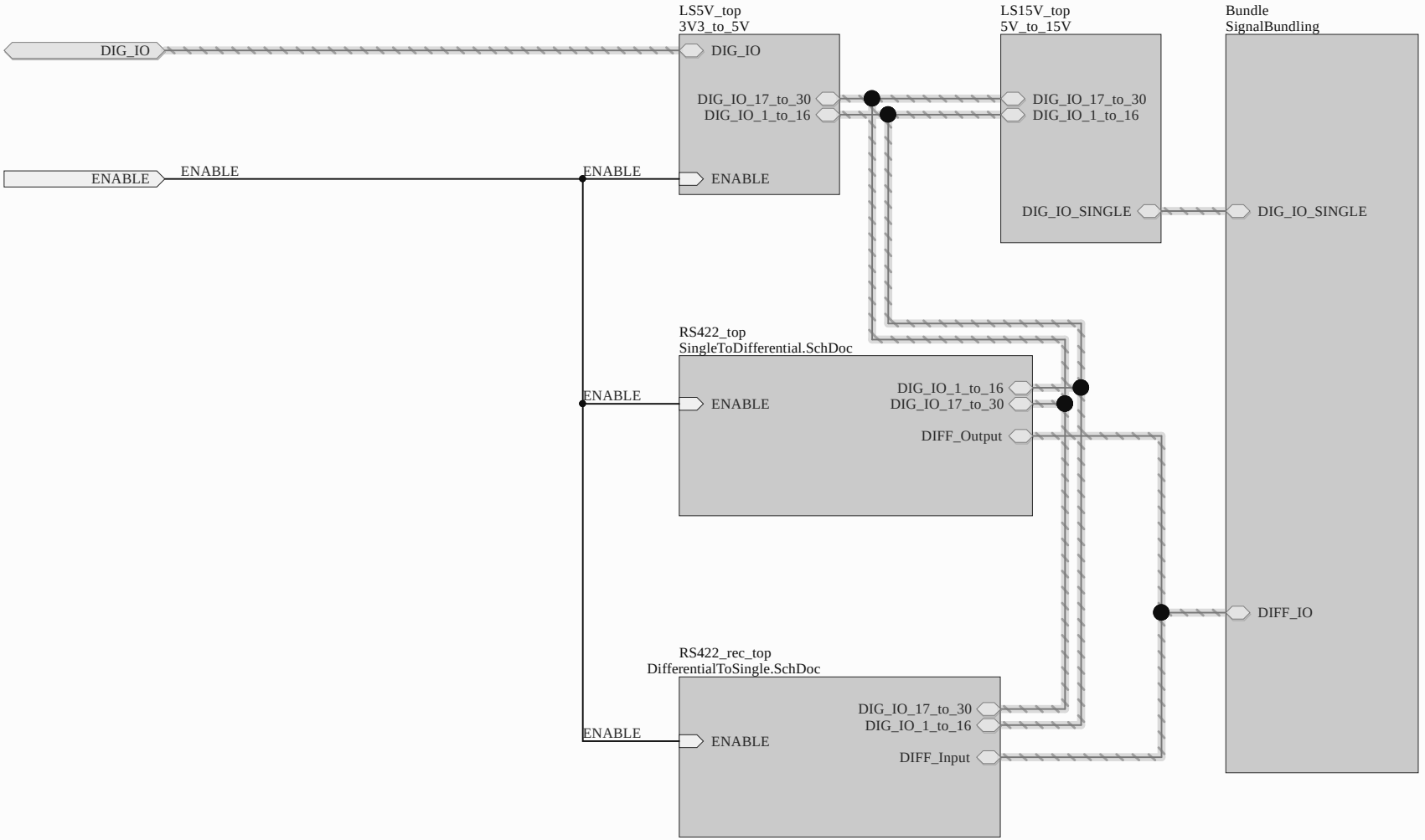
Serial
Serial
Serial #

Project
UltraZohm_DigitalVoltage

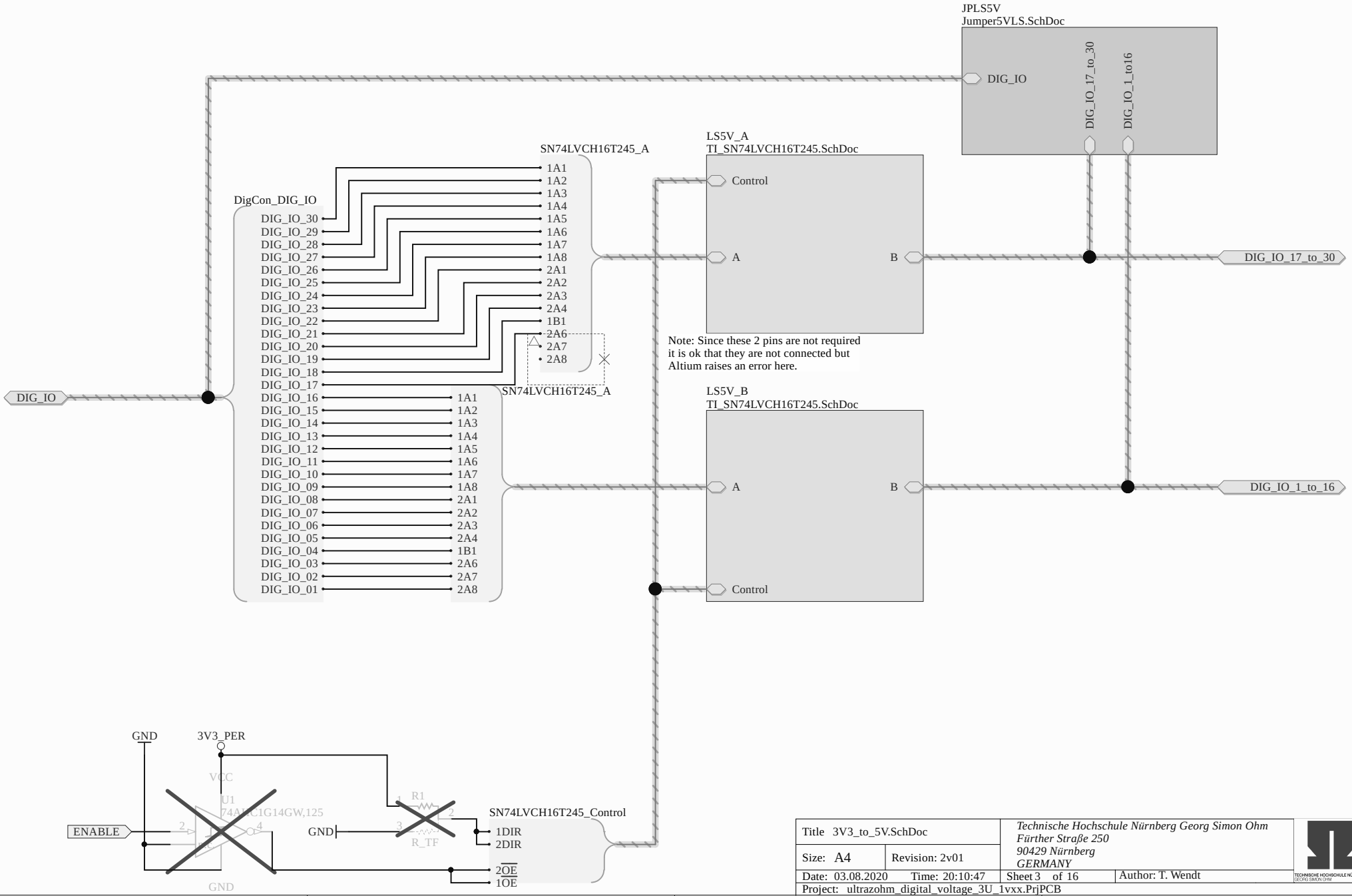
Designer
T. Wendt

Date
08/2020

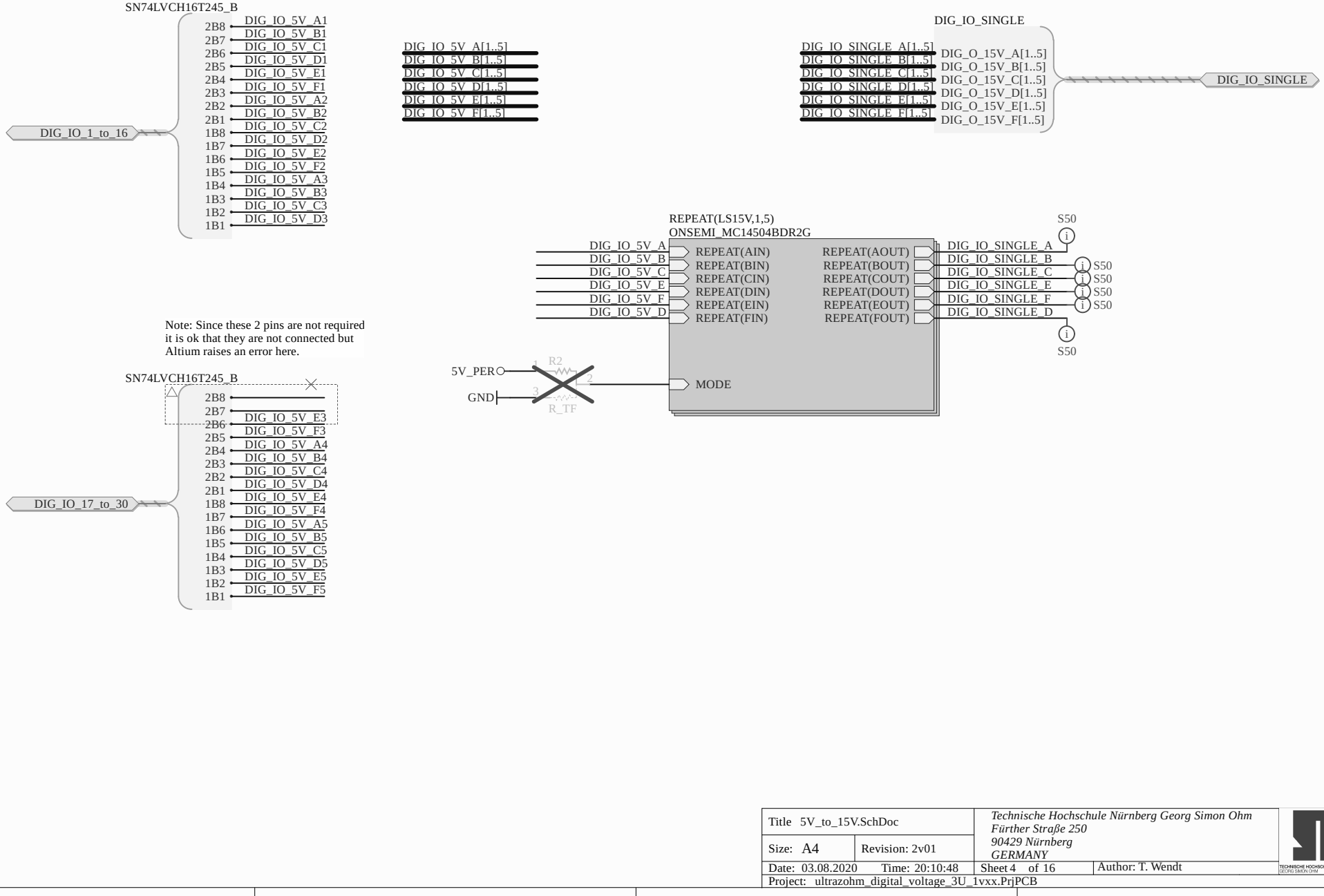
Title TopSheet.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020	Time: 20:10:47	Sheet 1 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			



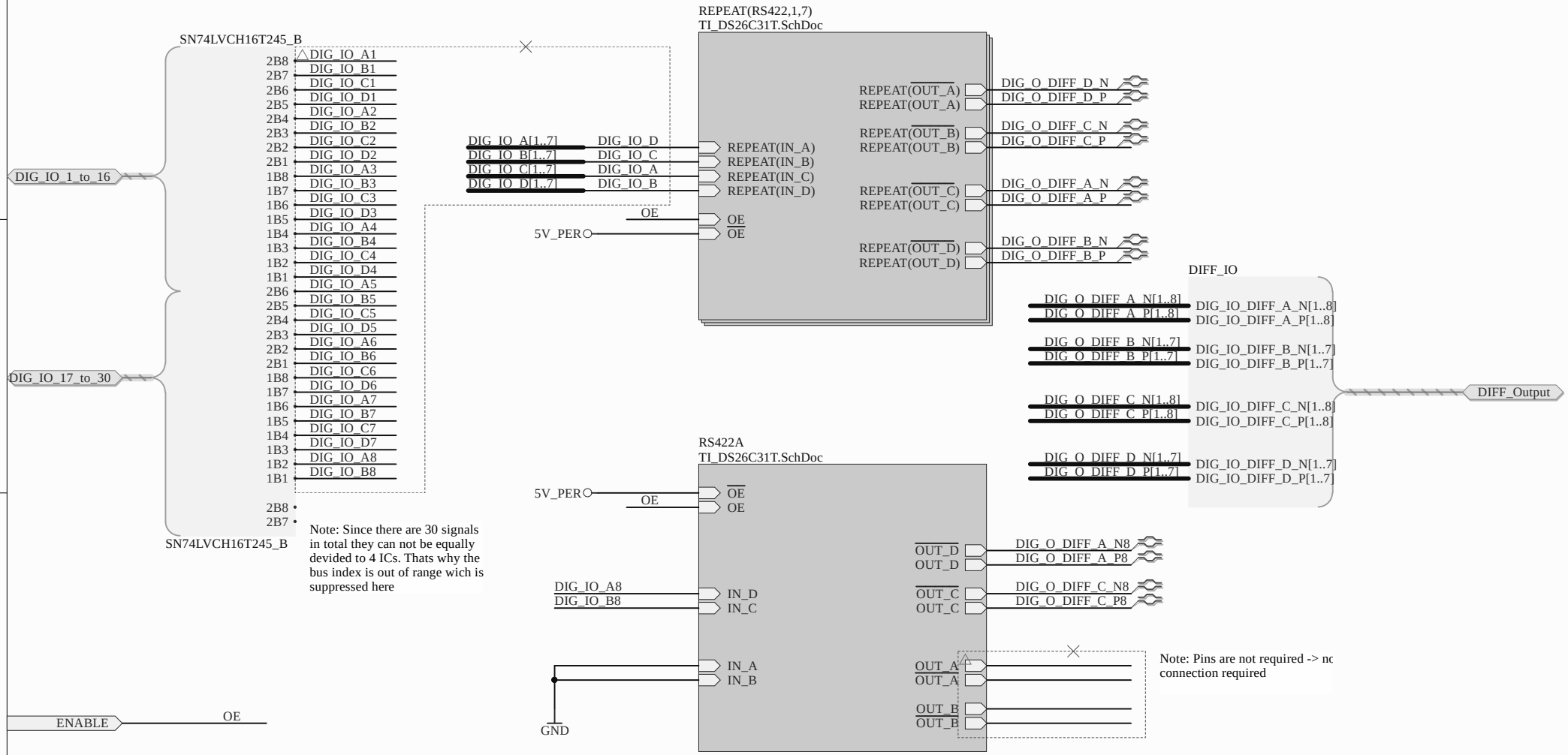
Title SignalConditioning.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020 Time: 20:10:47		Sheet 2 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			



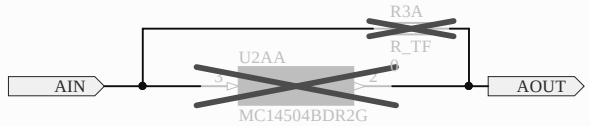
Title 3V3_to_5V.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020	Time: 20:10:47	Sheet 3 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			

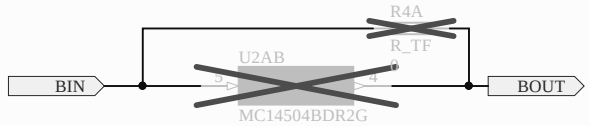


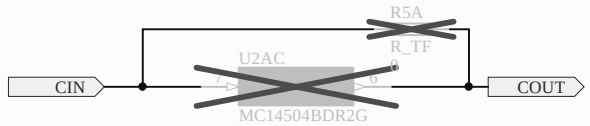
Title 5V_to_15V.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020	Time: 20:10:48	Sheet 4 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			

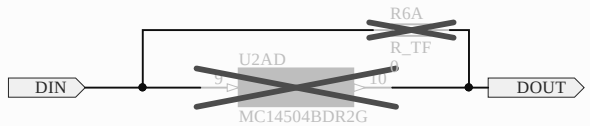


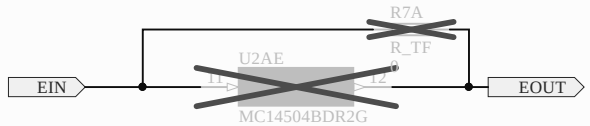
Title SingleToDifferential.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020 Time: 20:10:48		Sheet 5 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			

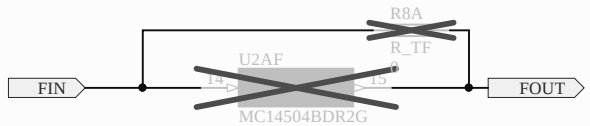


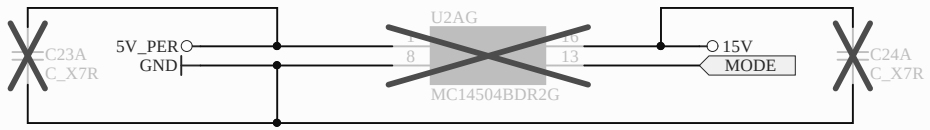








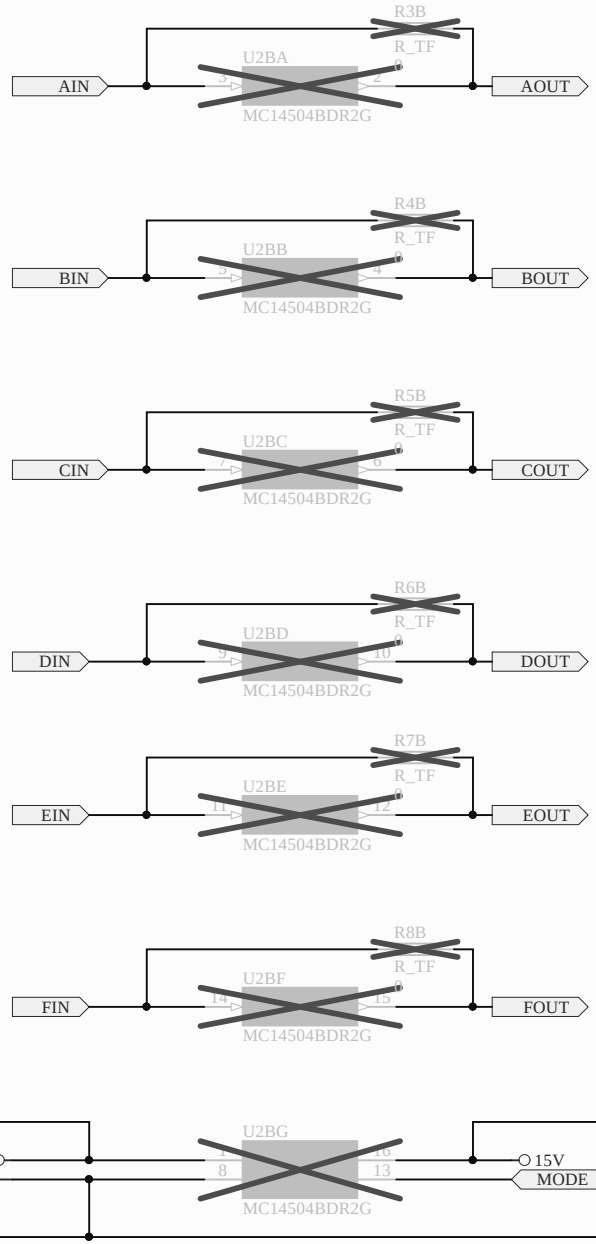




Voltages:
VCC = voltage level of the input signal
VDD = output voltage level

Application:
MODE = VCC -> TTL logic level input
MODE = VSS -> CMOS logic level input

Title ONSEMI_MC14504BDR2G.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*
Size: A4	Revision: 2v01	
Date: 03.08.2020 Time: 20:10:48	Sheet 6 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB		



Voltages:
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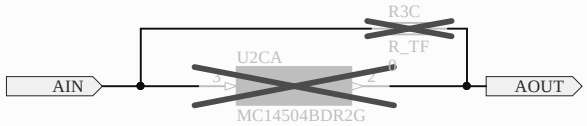
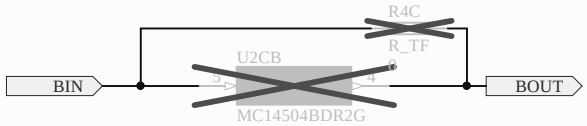
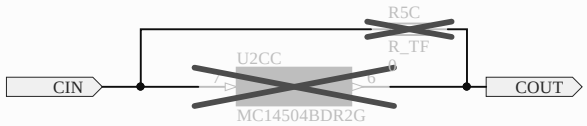
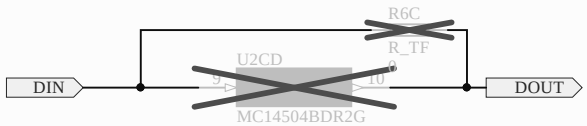
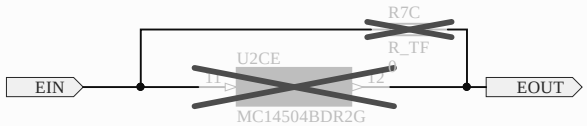
Date: 03.08.2020 Time: 20:10:48	Sheet 6 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB		

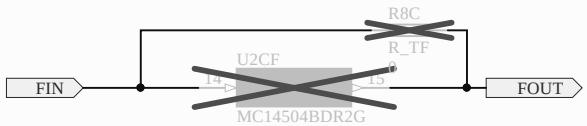


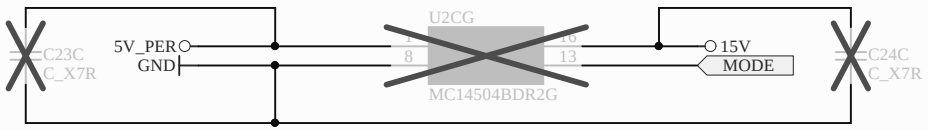








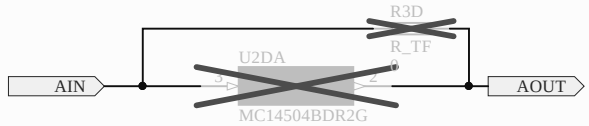


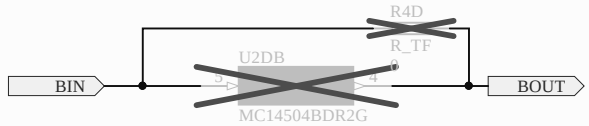


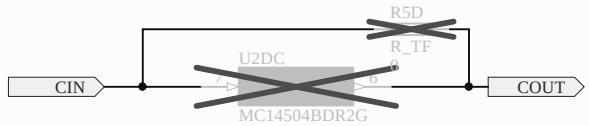
Voltages:
VCC = voltage level of the input signal
VDD = output voltage level

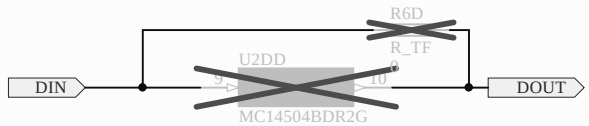
Application:
MODE = VCC -> TTL logic level input
MODE = VSS -> CMOS logic level input

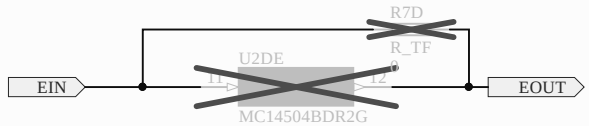
Title ONSEMI_MC14504BDR2G.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020 Time: 20:10:48		Sheet 6 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			

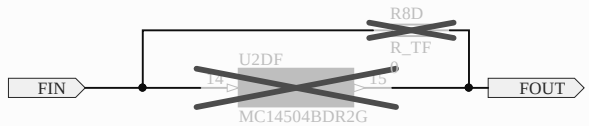


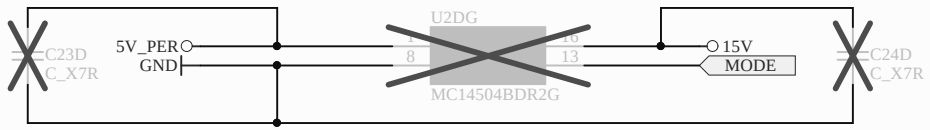












Voltages:
VCC = voltage level of the input signal
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Application:
MODE = VCC -> TTL logic level input
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Title ONSEMI_MC14504BDR2G.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
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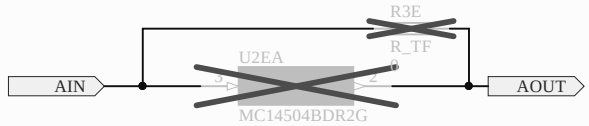
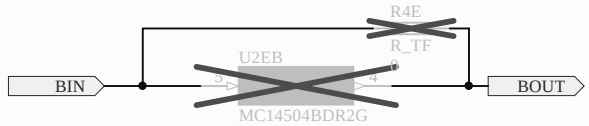
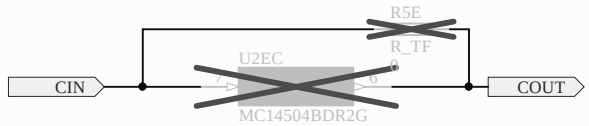
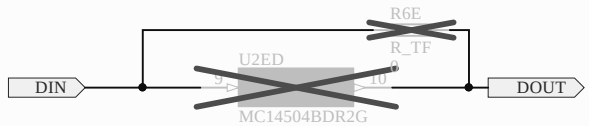
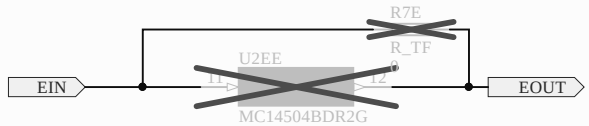
Date: 03.08.2020	Time: 20:10:48	Sheet 6 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			

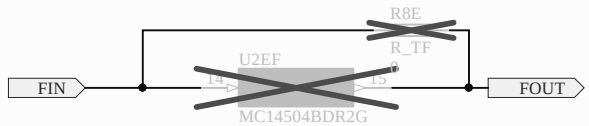


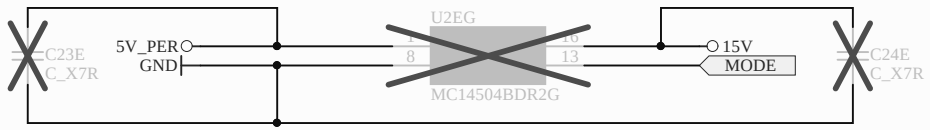












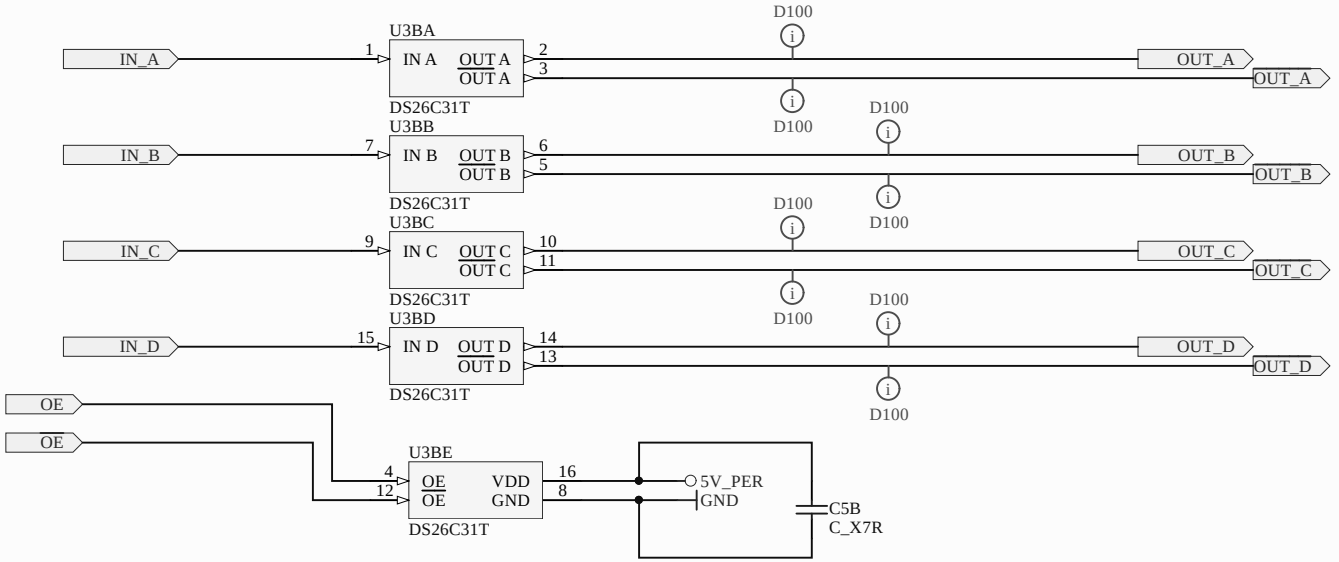
Voltages:
VCC = voltage level of the input signal
VDD = output voltage level

Application:
MODE = VCC -> TTL logic level input
MODE = VSS -> CMOS logic level input

Title ONSEMI_MC14504BDR2G.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*
Size: A4	Revision: 2v01	
Date: 03.08.2020 Time: 20:10:48	Sheet 6 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB		

Application:
VDD_min = 4.5V
VDD_max 5.5V

VIN_high_min = 2.0V
VIN_low_max = 0.8V



Title TI_DS26C31T.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020 Time: 20:10:48		Sheet 7 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			

Application:
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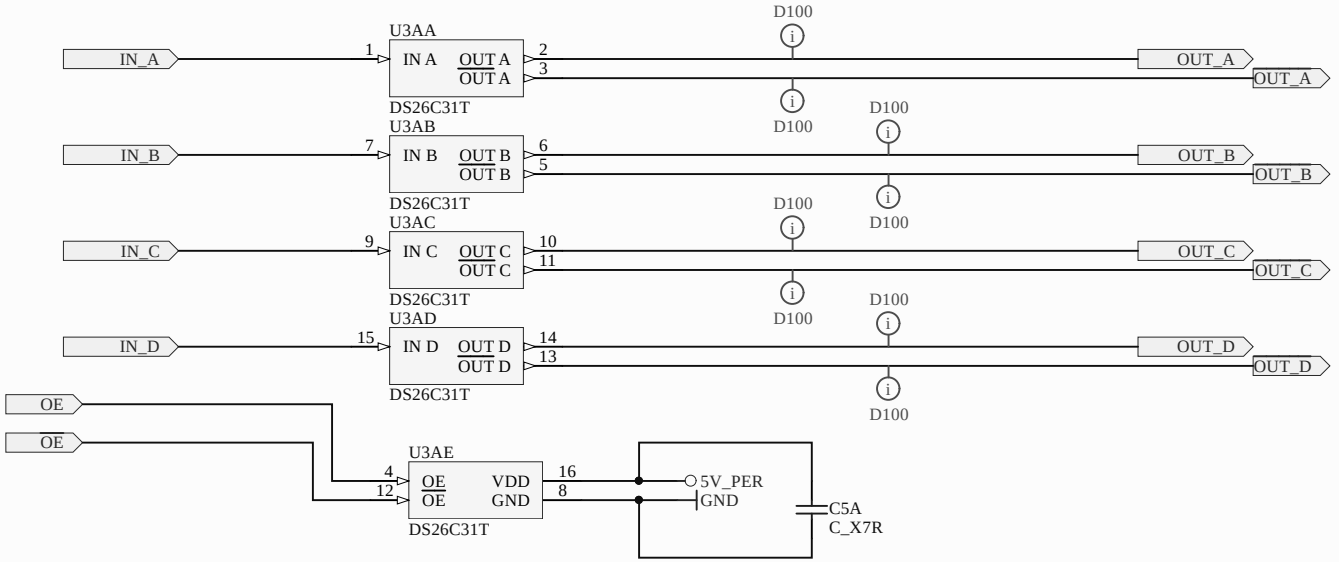

Title TI_DS26C31T.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
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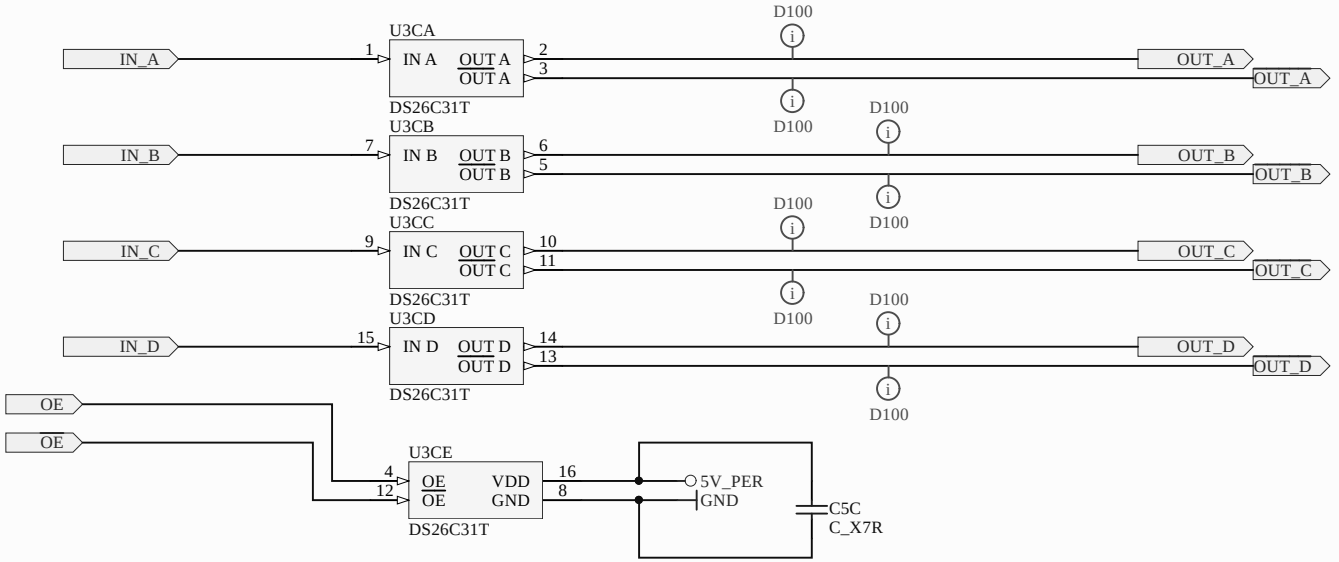

Title TI_DS26C31T.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
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VIN_high_min = 2.0V
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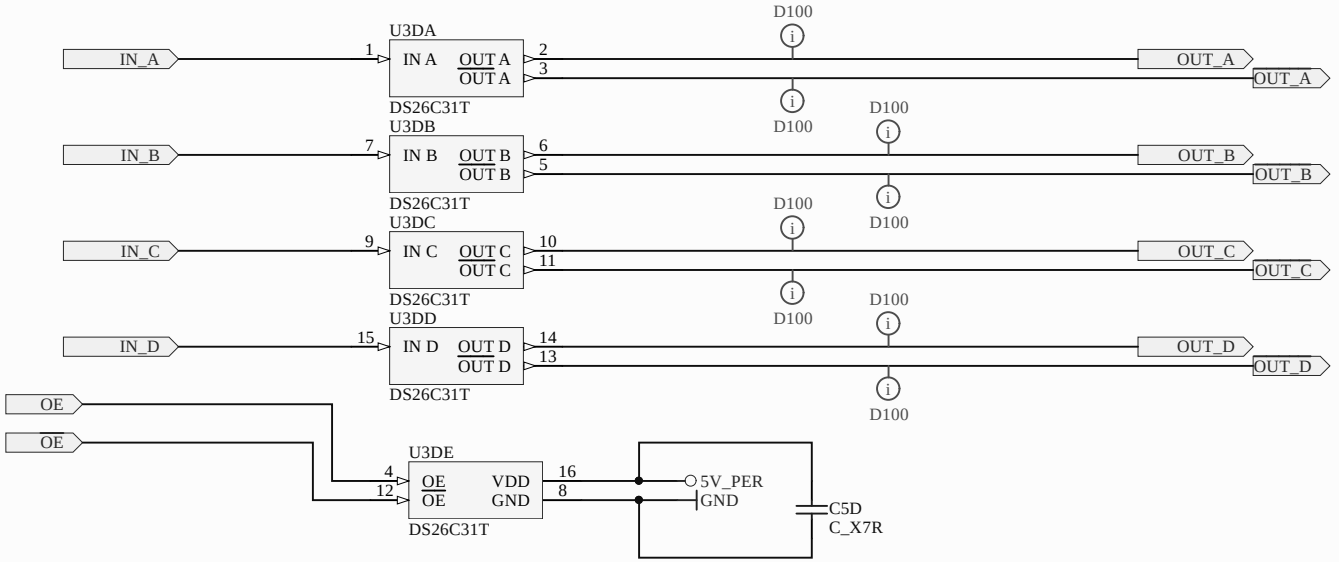

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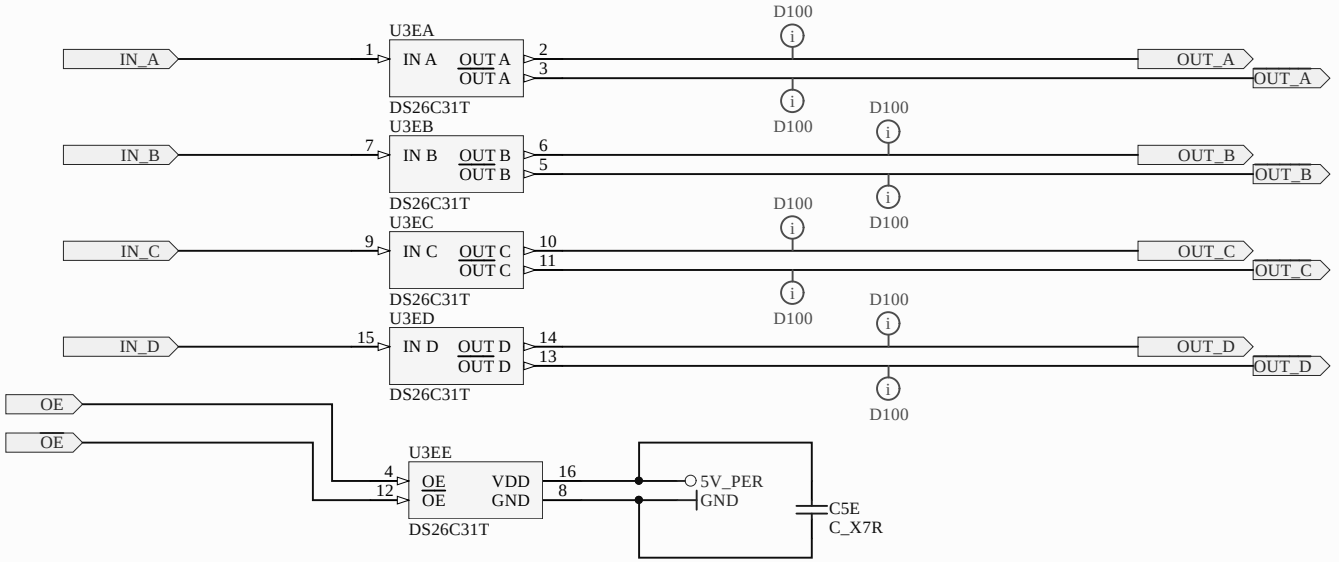
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			

Application:
VDD_min = 4.5V
VDD_max 5.5V

VIN_high_min = 2.0V
VIN_low_max = 0.8V



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VIN_high_min = 2.0V
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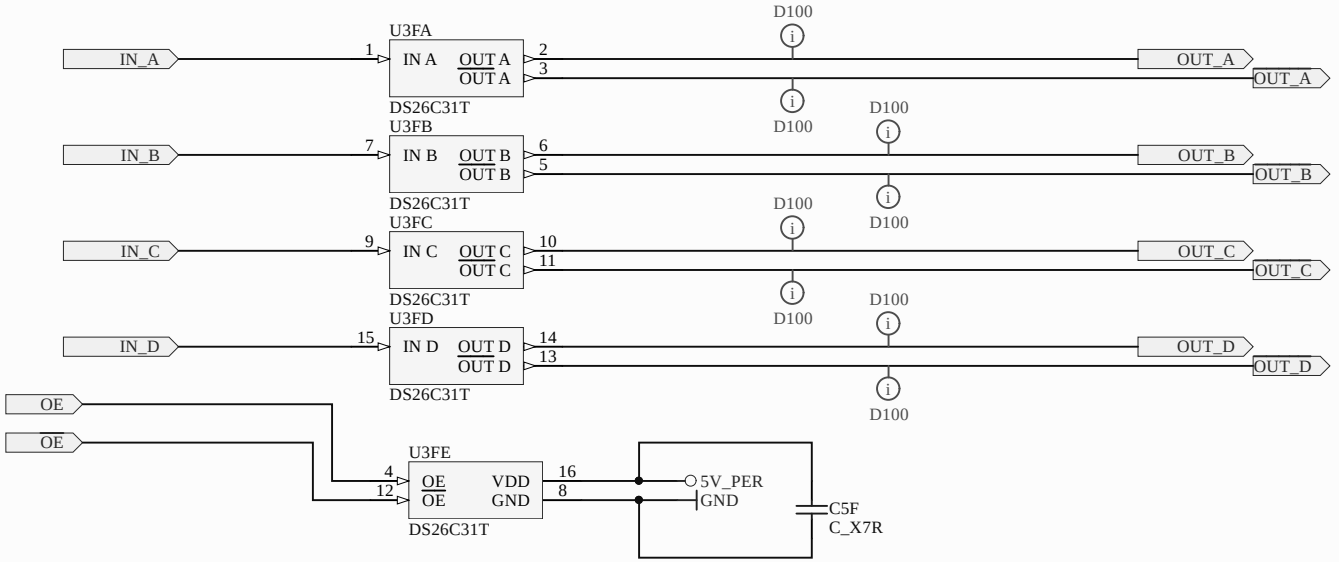
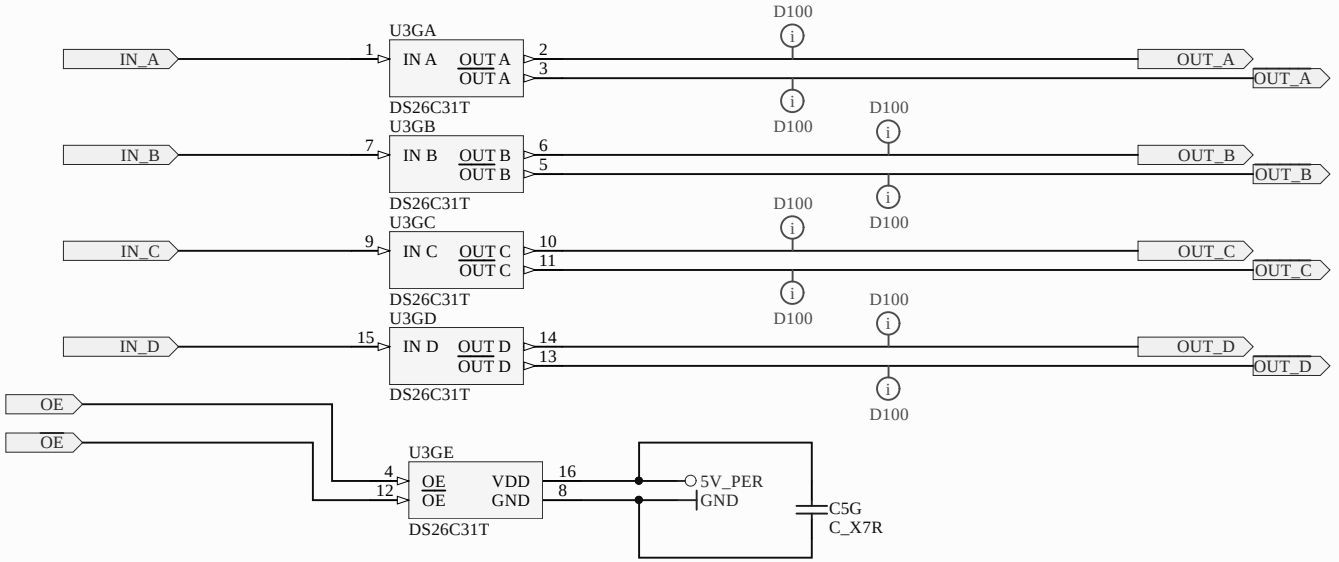


Title TI_DS26C31T.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020	Time: 20:10:49	Sheet 7 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			

Application:
VDD_min = 4.5V
VDD_max 5.5V

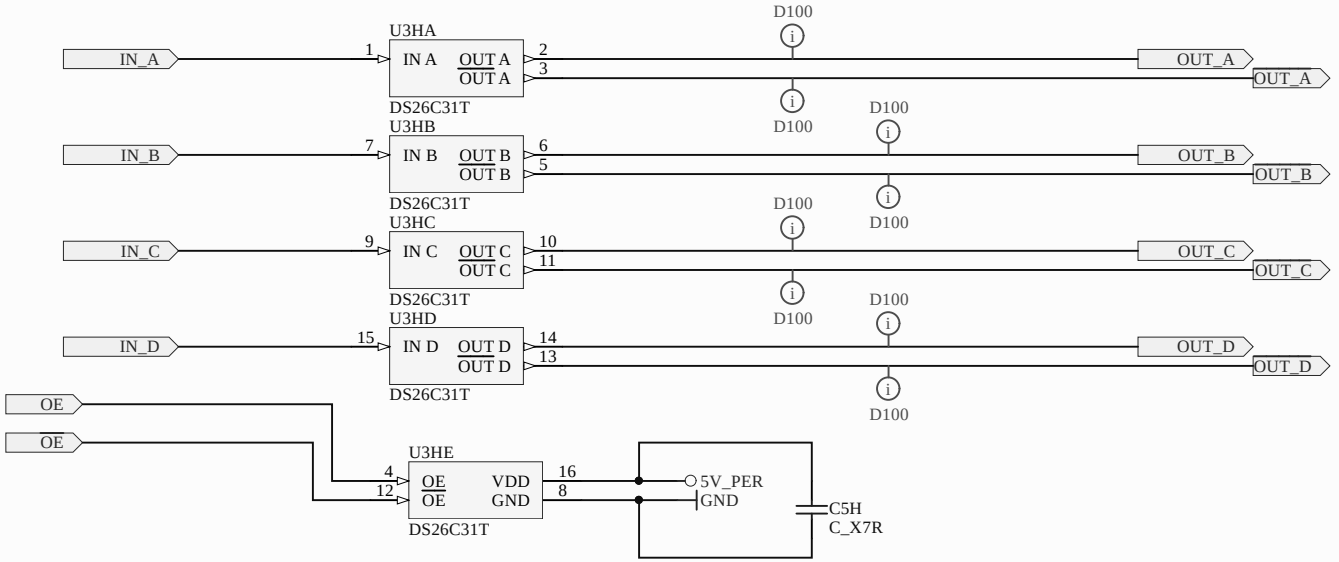
VIN_high_min = 2.0V
VIN_low_max = 0.8V



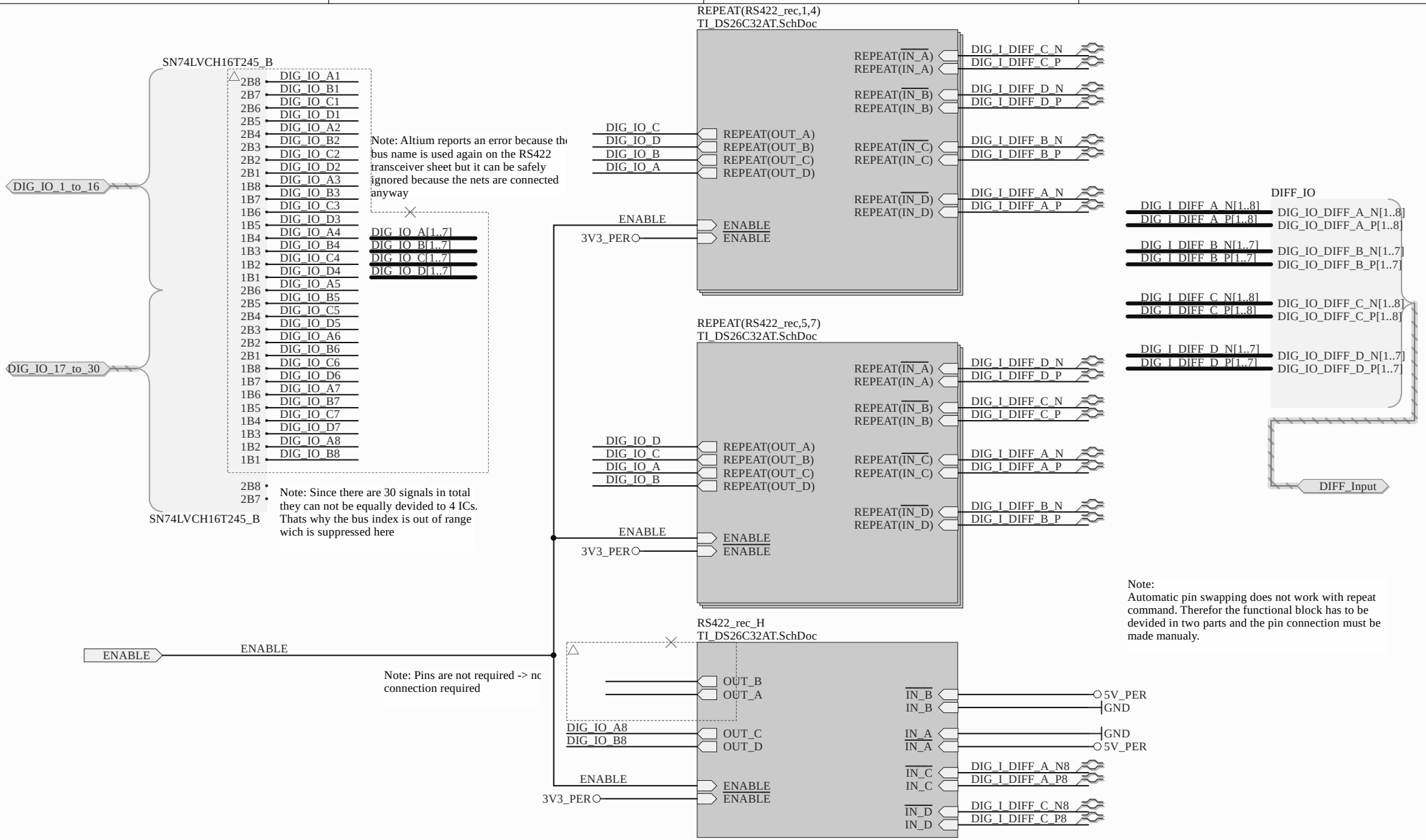
Title TI_DS26C31T.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020	Time: 20:10:49	Sheet 7 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			

Application:
VDD_min = 4.5V
VDD_max 5.5V

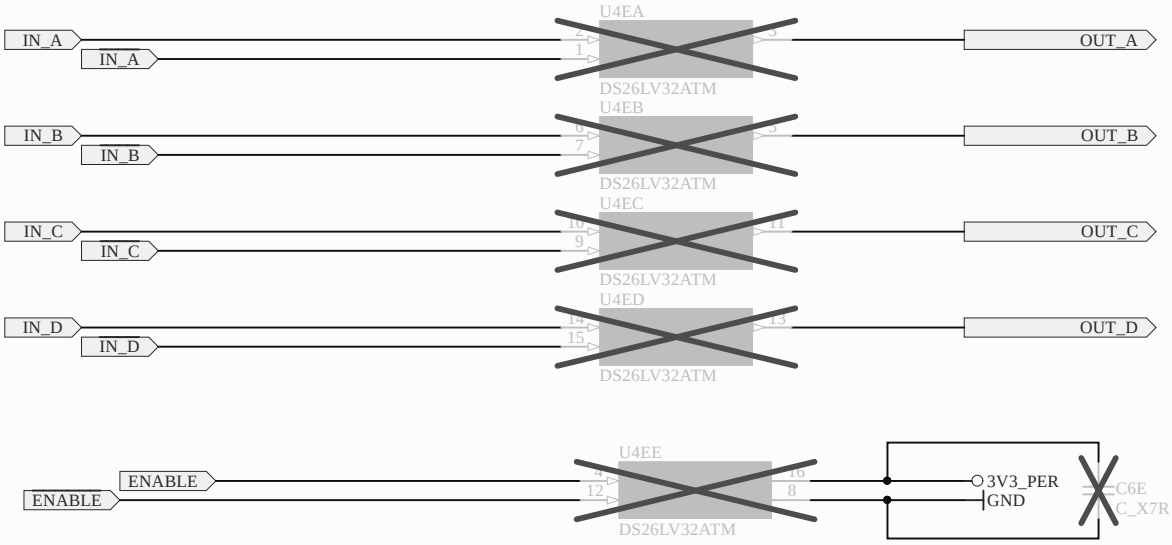
VIN_high_min = 2.0V
VIN_low_max = 0.8V



Title TI_DS26C31T.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020 Time: 20:10:49		Sheet 7 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			

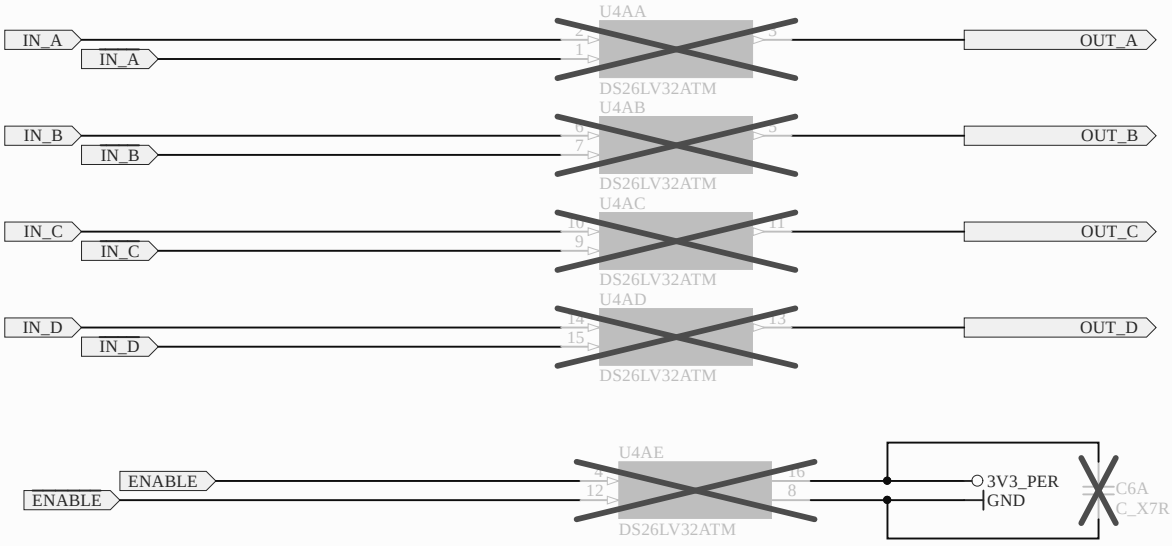


Title DifferentialToSingle.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020	Time: 20:10:49	Sheet 8 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			



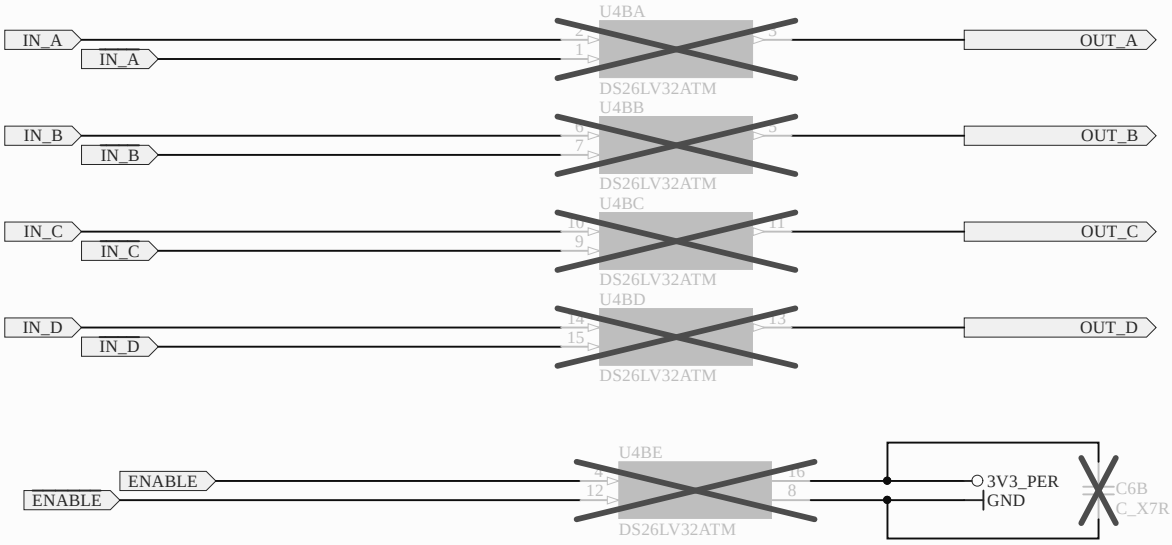
Application:
VDD_min = 3.0V
VDD_max = 3.6V

Title TI_DS26C32AT.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020	Time: 20:10:49	Sheet 9 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			



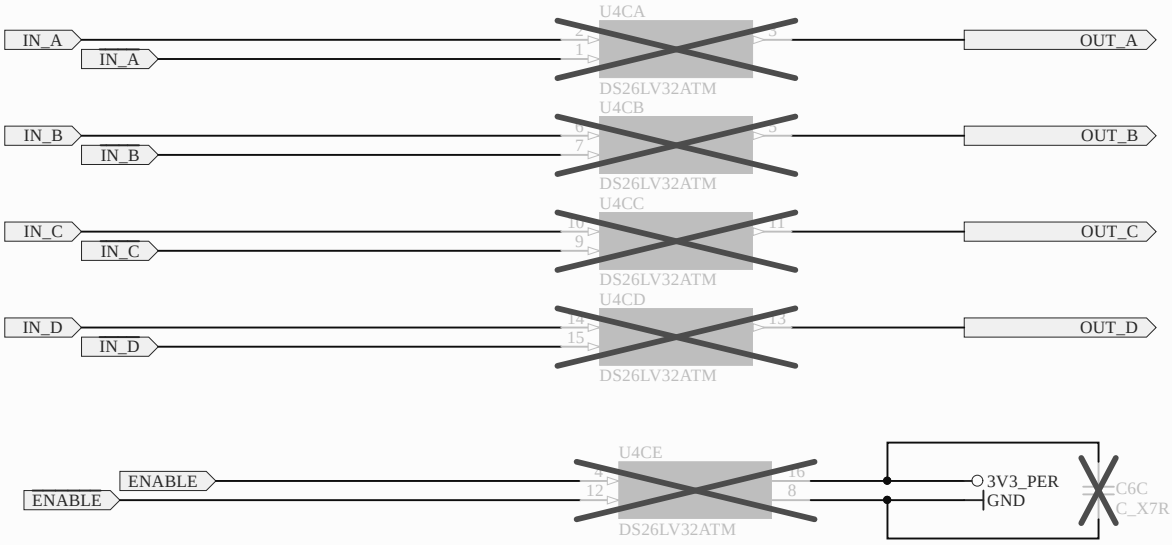
Application:
VDD_min = 3.0V
VDD_max = 3.6V

Title TI_DS26C32AT.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020	Time: 20:10:49	Sheet 9 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			



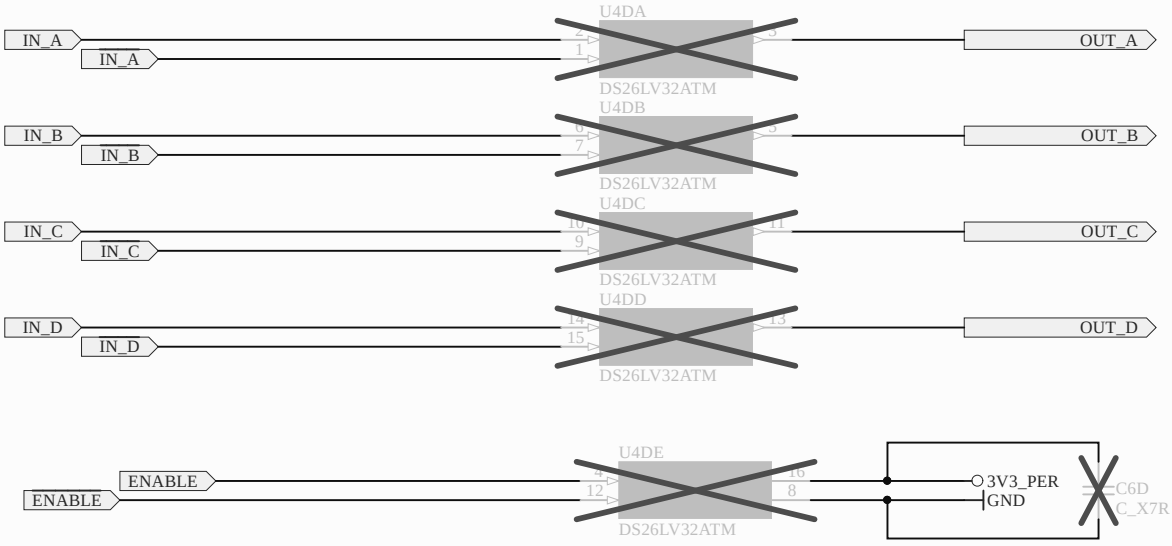
Application:
VDD_min = 3.0V
VDD_max = 3.6V

Title TI_DS26C32AT.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020 Time: 20:10:50		Sheet 9 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			



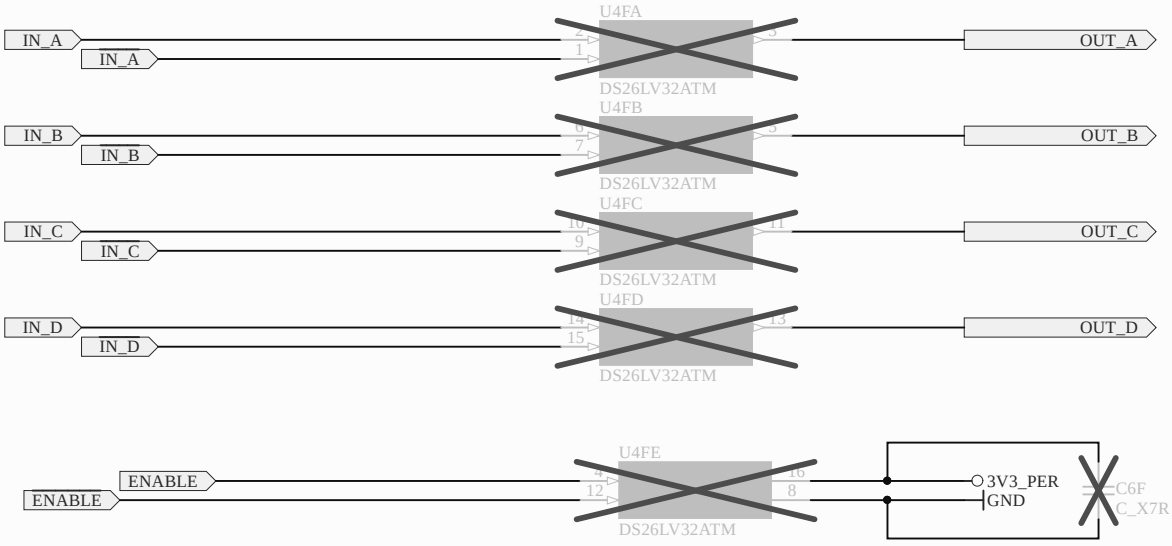
Application:
VDD_min = 3.0V
VDD_max = 3.6V

Title TI_DS26C32AT.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020	Time: 20:10:50	Sheet 9 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			



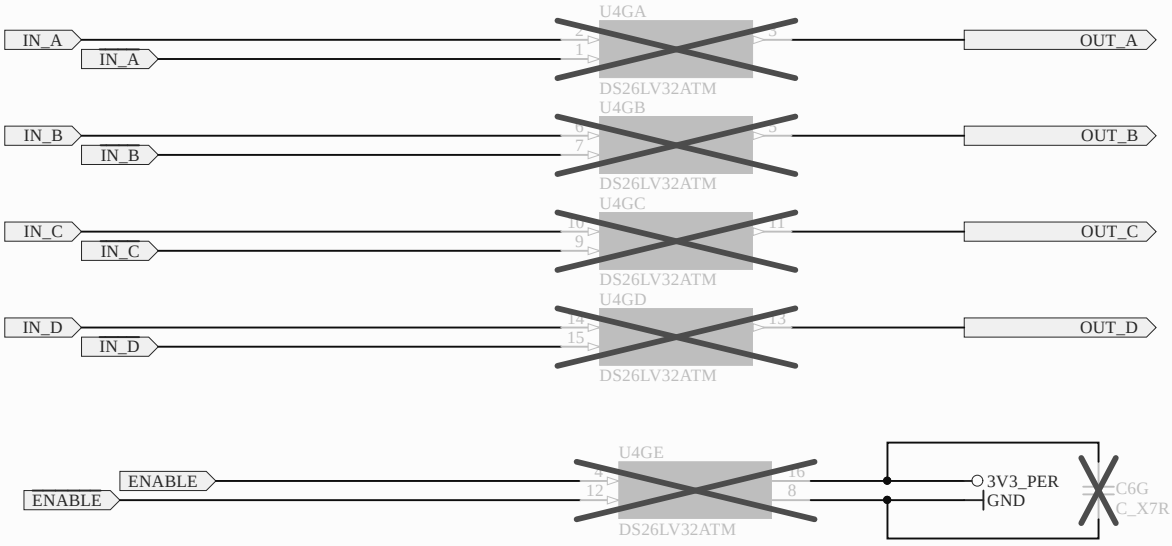
Application:
VDD_min = 3.0V
VDD_max = 3.6V

Title TI_DS26C32AT.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020	Time: 20:10:50	Sheet 9 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			



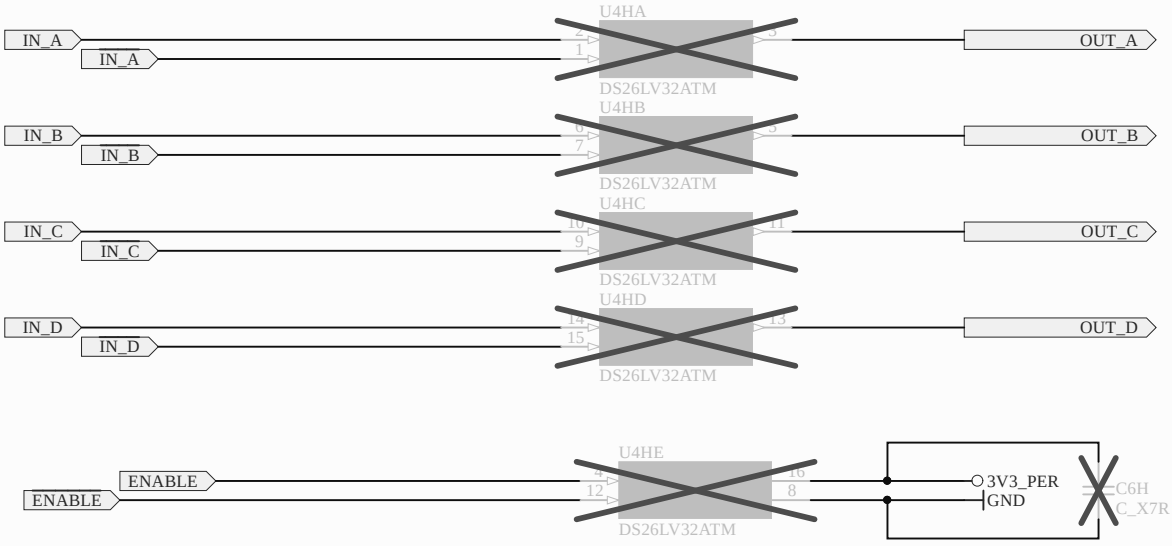
Application:
VDD_min = 3.0V
VDD_max = 3.6V

Title TI_DS26C32AT.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020	Time: 20:10:50	Sheet 9 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			



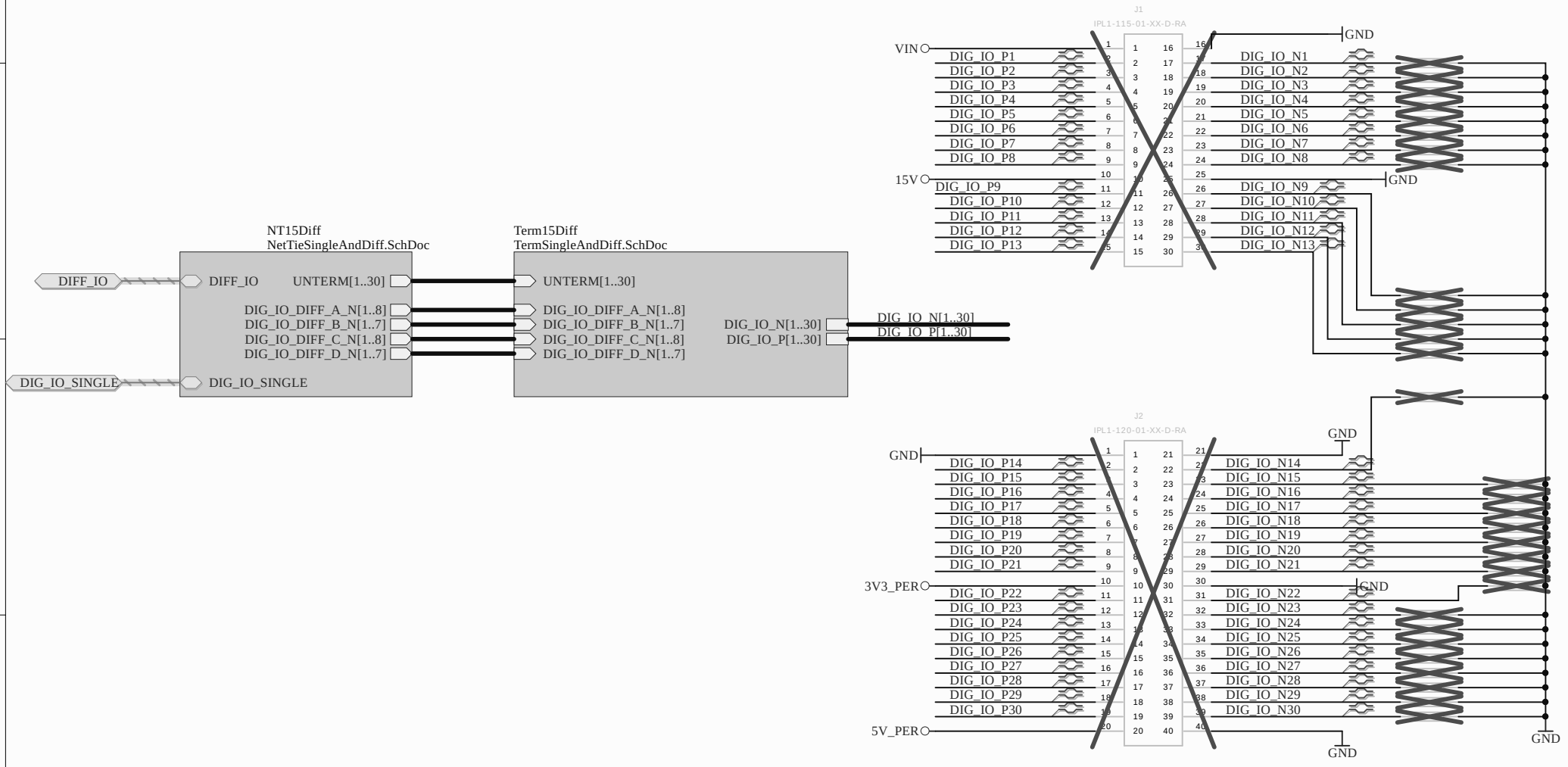
Application:
VDD_min = 3.0V
VDD_max = 3.6V

Title TI_DS26C32AT.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020	Time: 20:10:50	Sheet 9 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			

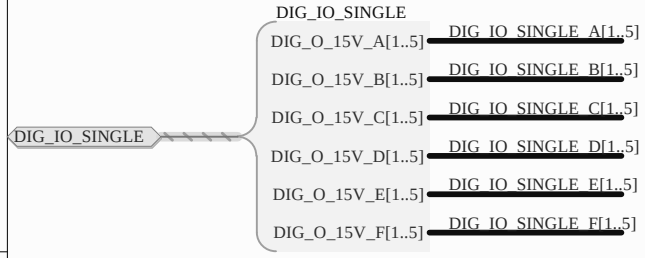


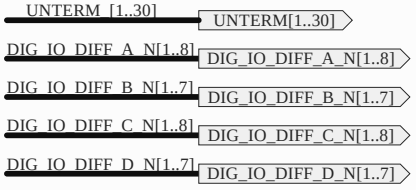
Application:
VDD_min = 3.0V
VDD_max = 3.6V

Title TI_DS26C32AT.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020 Time: 20:10:50		Sheet 9 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			

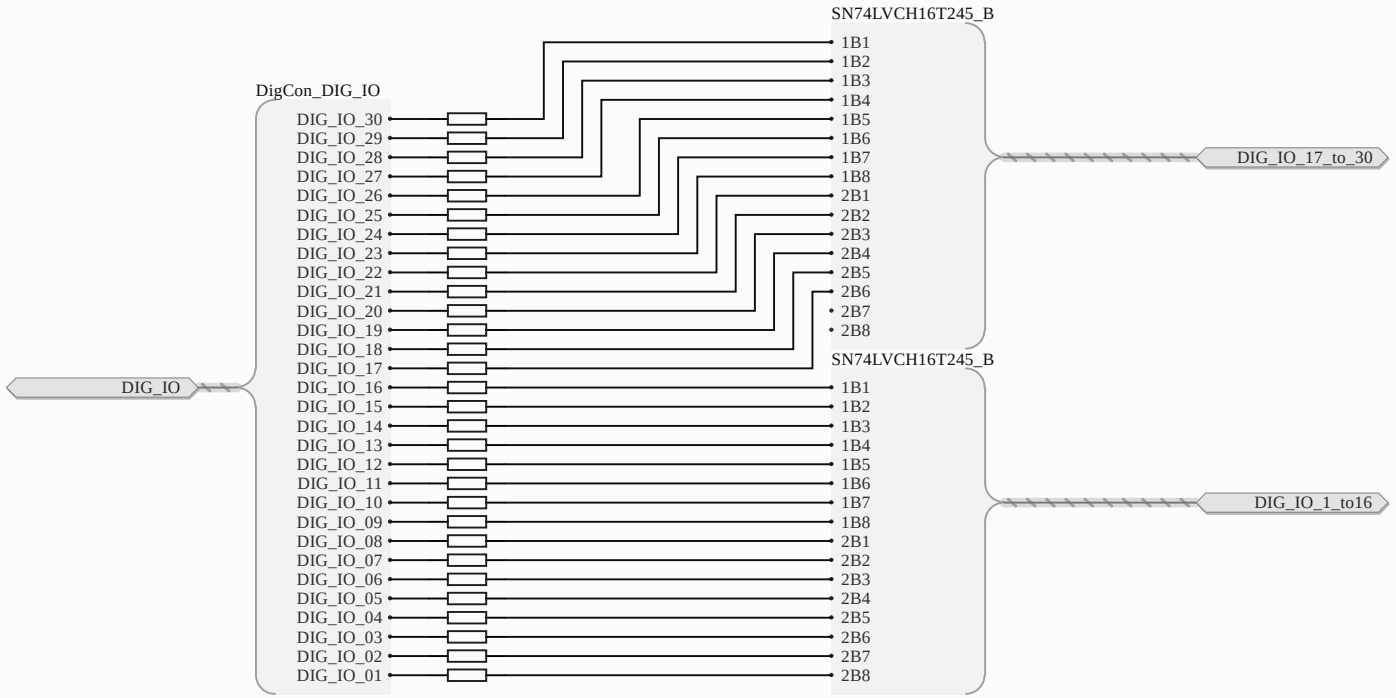


Title SignalBundling.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020	Time: 20:10:50	Sheet 10 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			

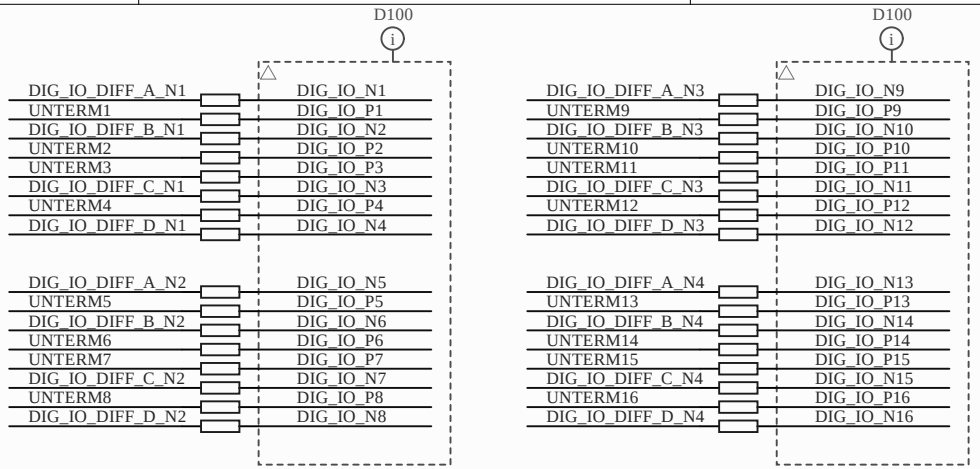


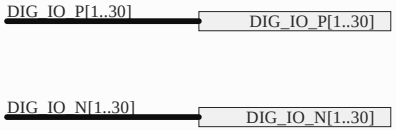


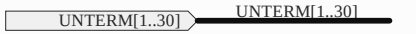
Title NetTieSingleAndDiff.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020	Time: 20:10:50	Sheet 11 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			

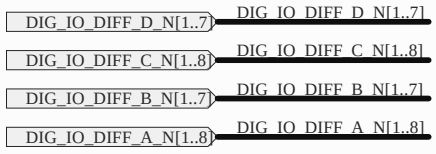


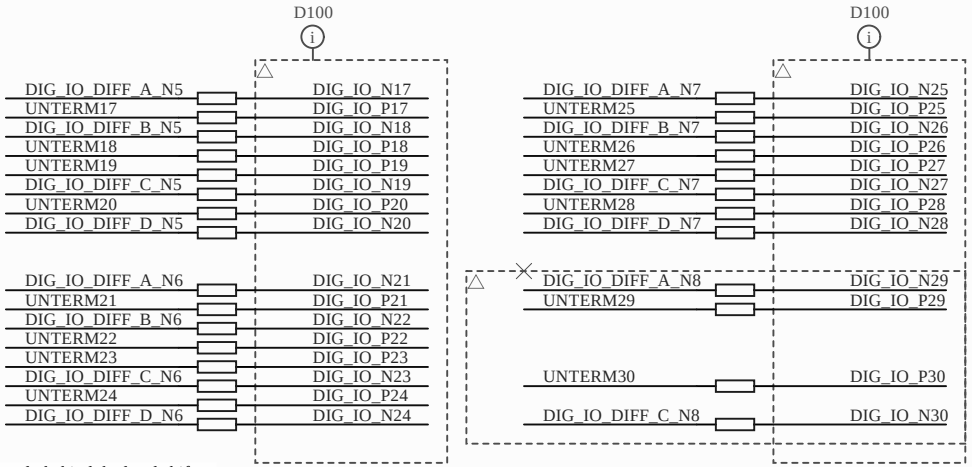
Title Jumper5VLS.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020	Time: 20:10:50	Sheet 12 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			







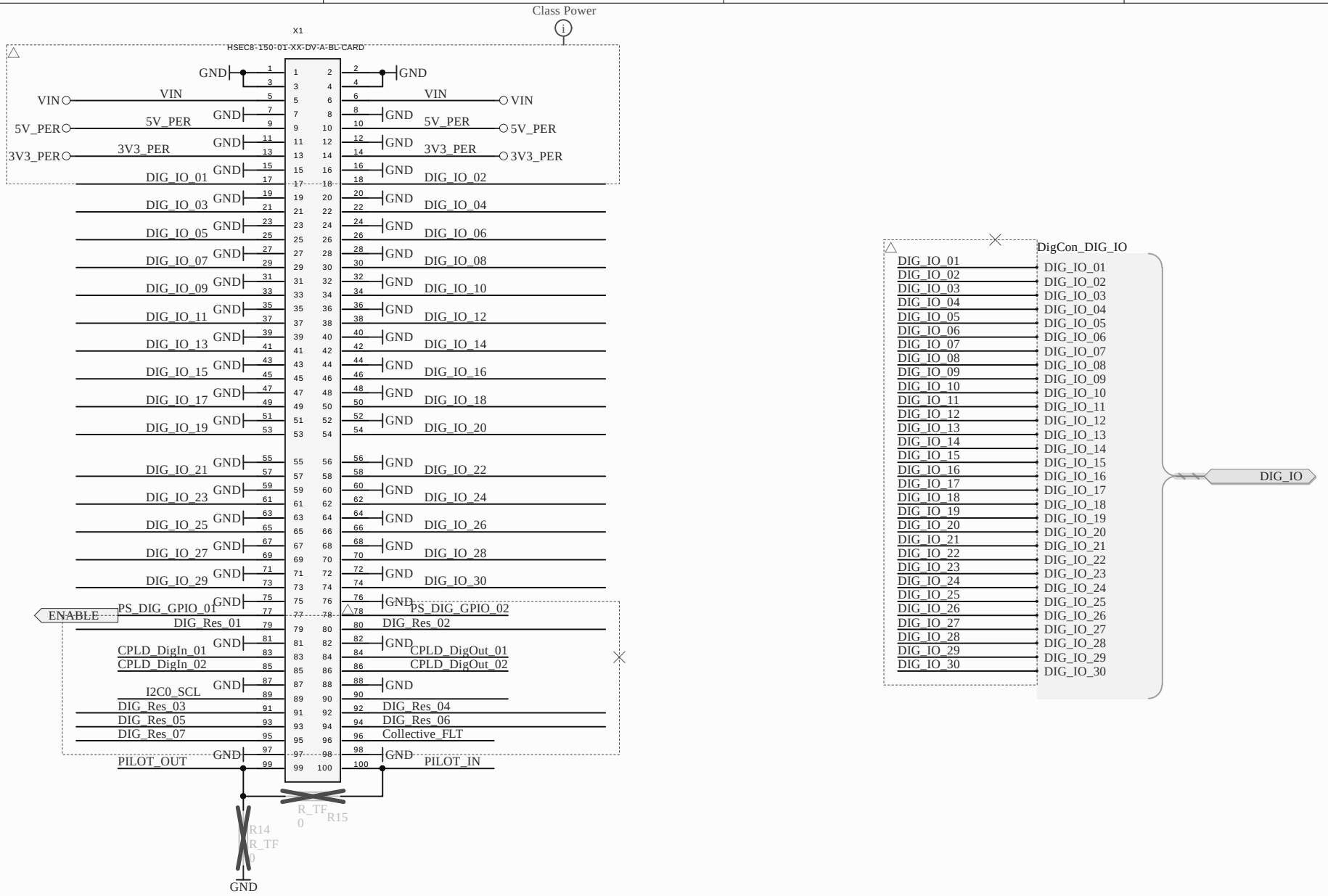




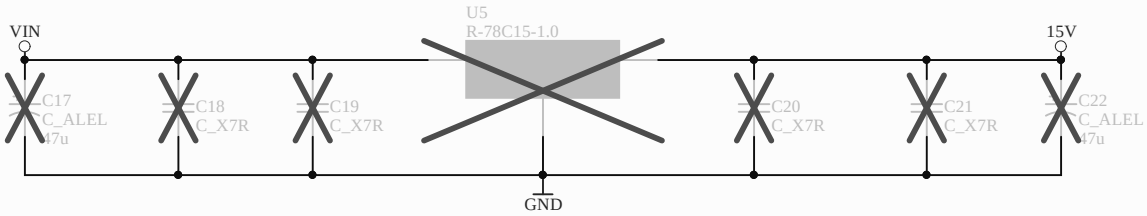
Note: The serial termination resistors are placed at the IO interface and not directly behind the level shifter from 3V3 to 5V, because 30 extra resistors would be required which implies additional assembly effort.

Note: If the board is configured as a receiver, the termination resistors can be replaced with jumpers.

Title TermSingleAndDiff.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020	Time: 20:10:51	Sheet 13 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			



Title DigitalCarrierPlug.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020 Time: 20:10:51		Sheet 14 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			



Totally integrated DCDC swichting converter.

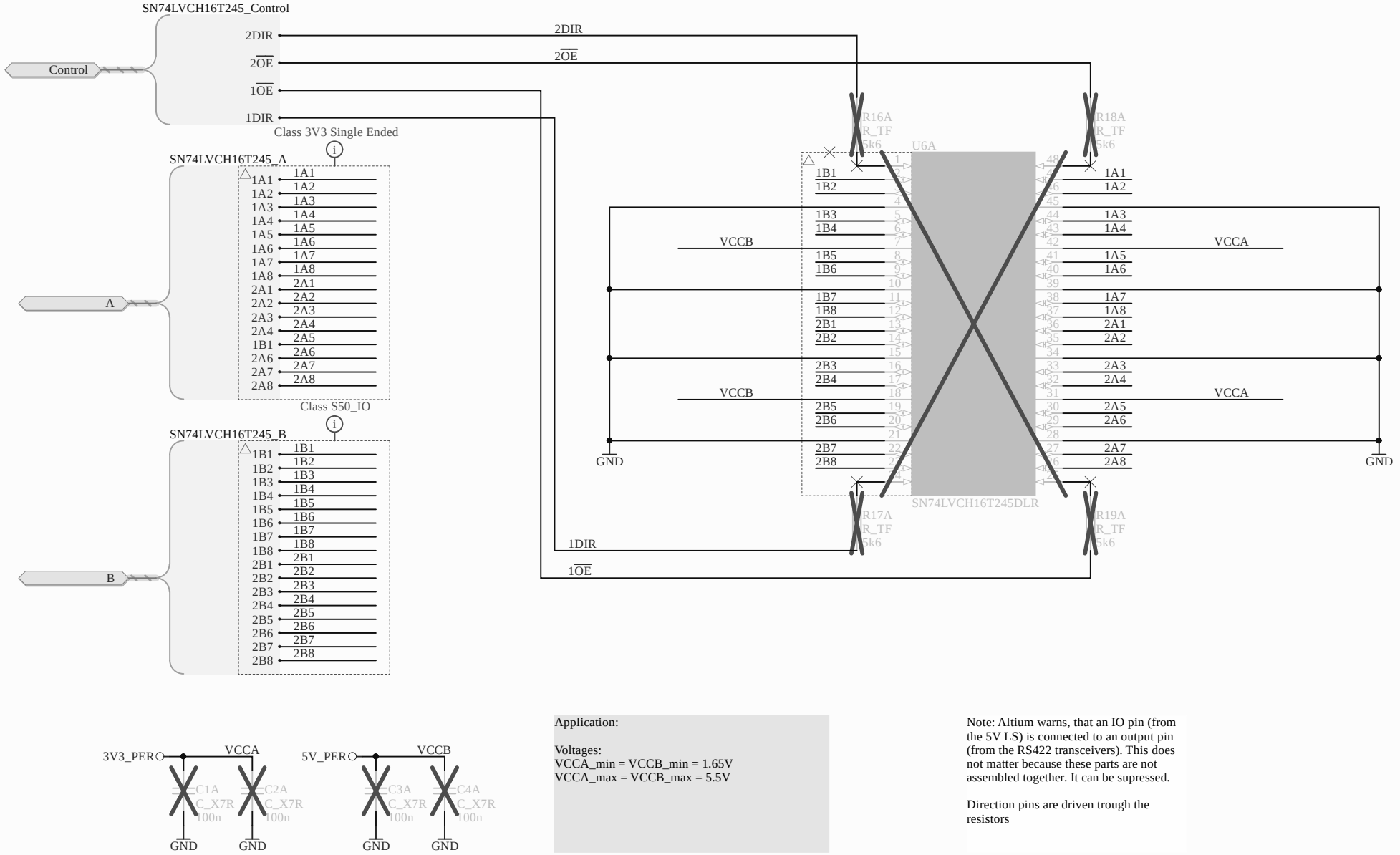
Voltages:
Vin_max = 42V
Vin_min = 18V

Vout = 15V

Current:
Iout_max = 1A

Parameters:
VoutName = Name of the net of Vout
VinName = Name of the net of Vin

Title 15V_PowerSupply.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*	
Size: A4	Revision: 2v01		
Date: 03.08.2020 Time: 20:10:51		Sheet 16 of 16	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB			



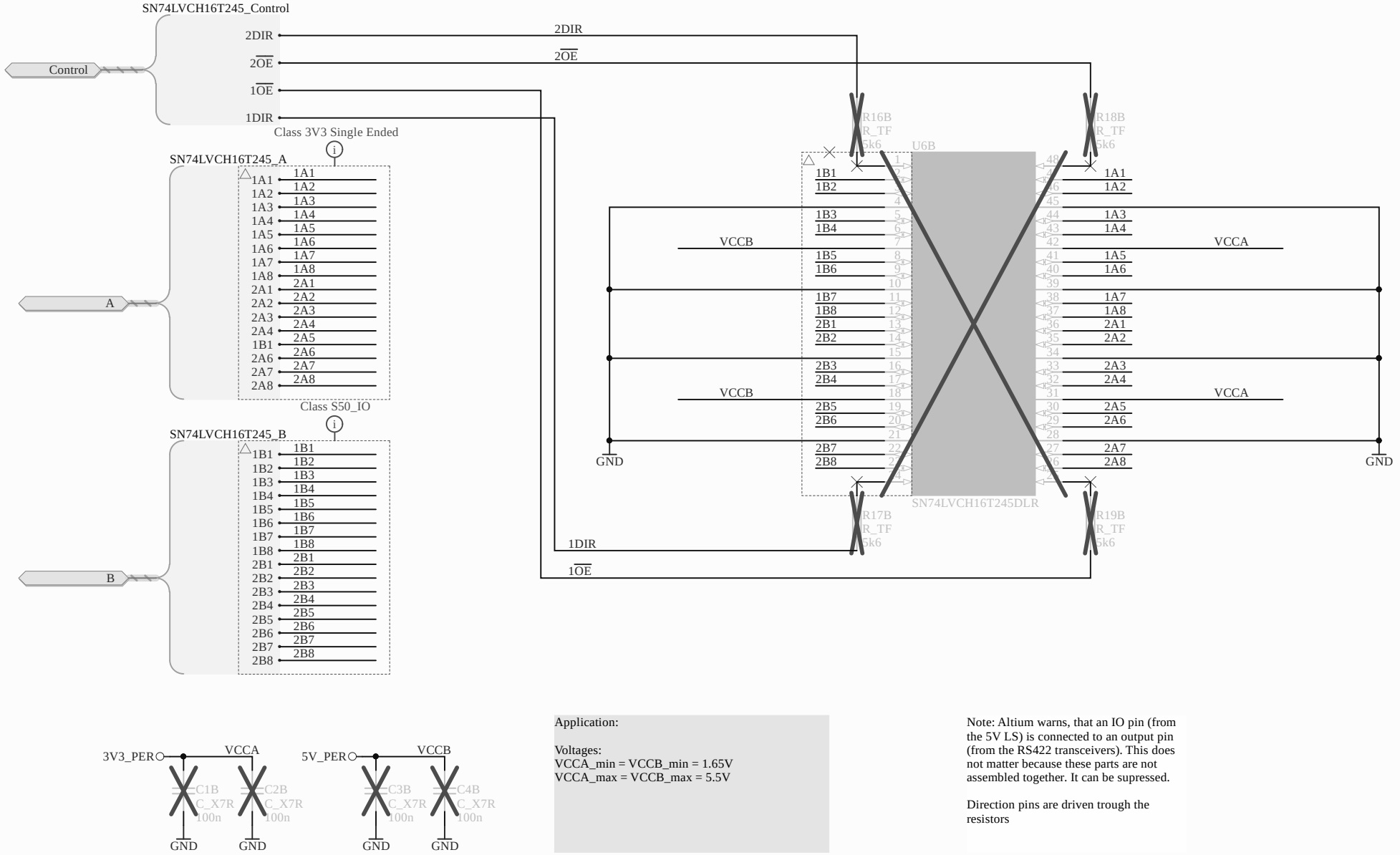
Application:

Voltages:
VCCA_min = VCCB_min = 1.65V
VCCA_max = VCCB_max = 5.5V

Note: Altium warns, that an IO pin (from the 5V LS) is connected to an output pin (from the RS422 transceivers). This does not matter because these parts are not assembled together. It can be supressed.

Direction pins are driven trough the resistors

Title TI_SN74LVCH16T245.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*
Size: A4	Revision: 2v01	
Date: 03.08.2020 Time: 20:10:51	Sheet 17 of 17	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB		



Application:

Voltages:
VCCA_min = VCCB_min = 1.65V
VCCA_max = VCCB_max = 5.5V

Note: Altium warns, that an IO pin (from the 5V LS) is connected to an output pin (from the RS422 transceivers). This does not matter because these parts are not assembled together. It can be supressed.

Direction pins are driven trough the resistors

Title TI_SN74LVCH16T245.SchDoc		*Technische Hochschule Nürnberg Georg Simon Ohm* *Fürther Straße 250* *90429 Nürnberg* *GERMANY*
Size: A4	Revision: 2v01	
Date: 03.08.2020 Time: 20:10:51	Sheet 17 of 17	Author: T. Wendt
Project: ultrazohm_digital_voltage_3U_1vxx.PrjPCB		