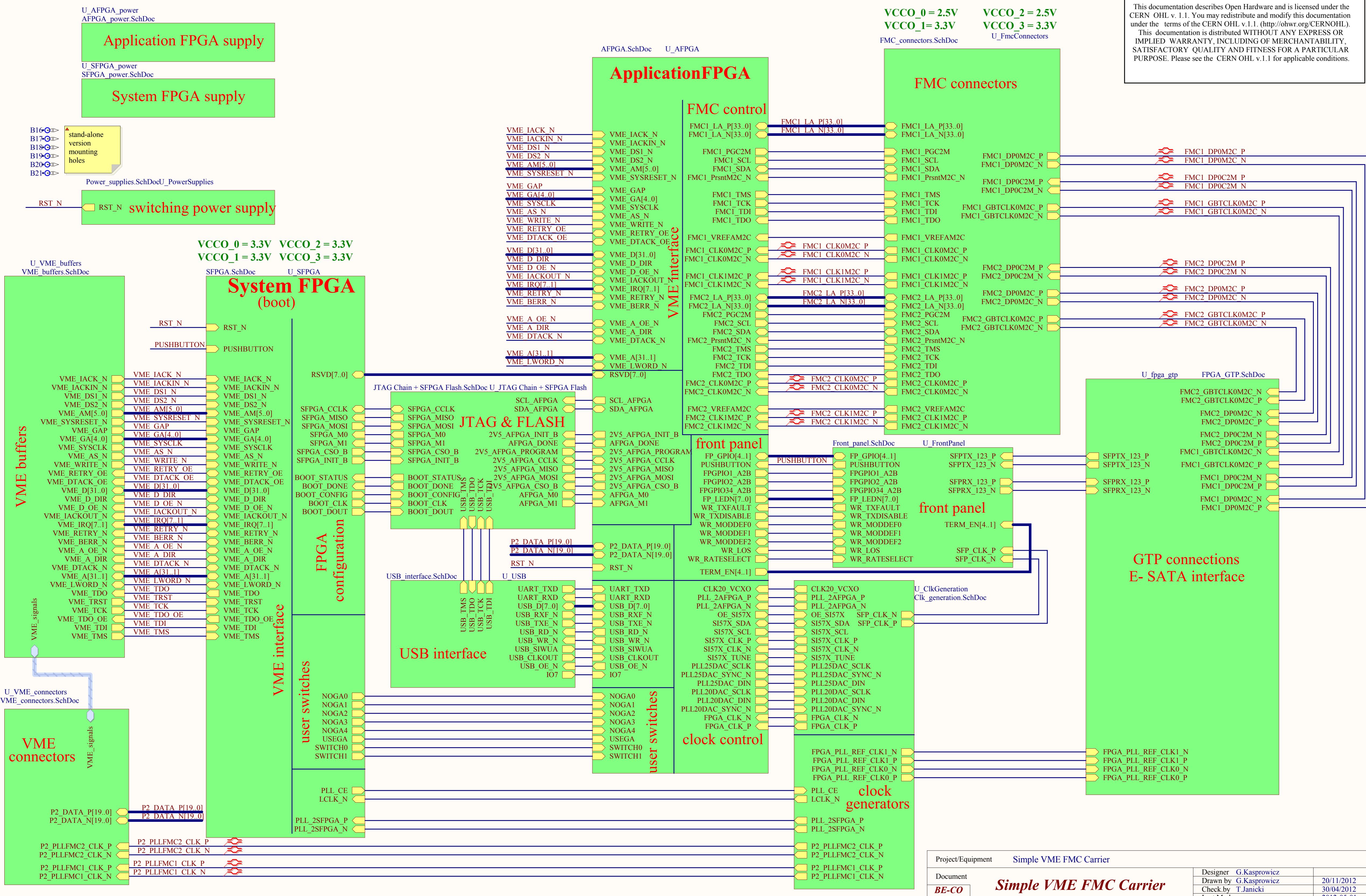
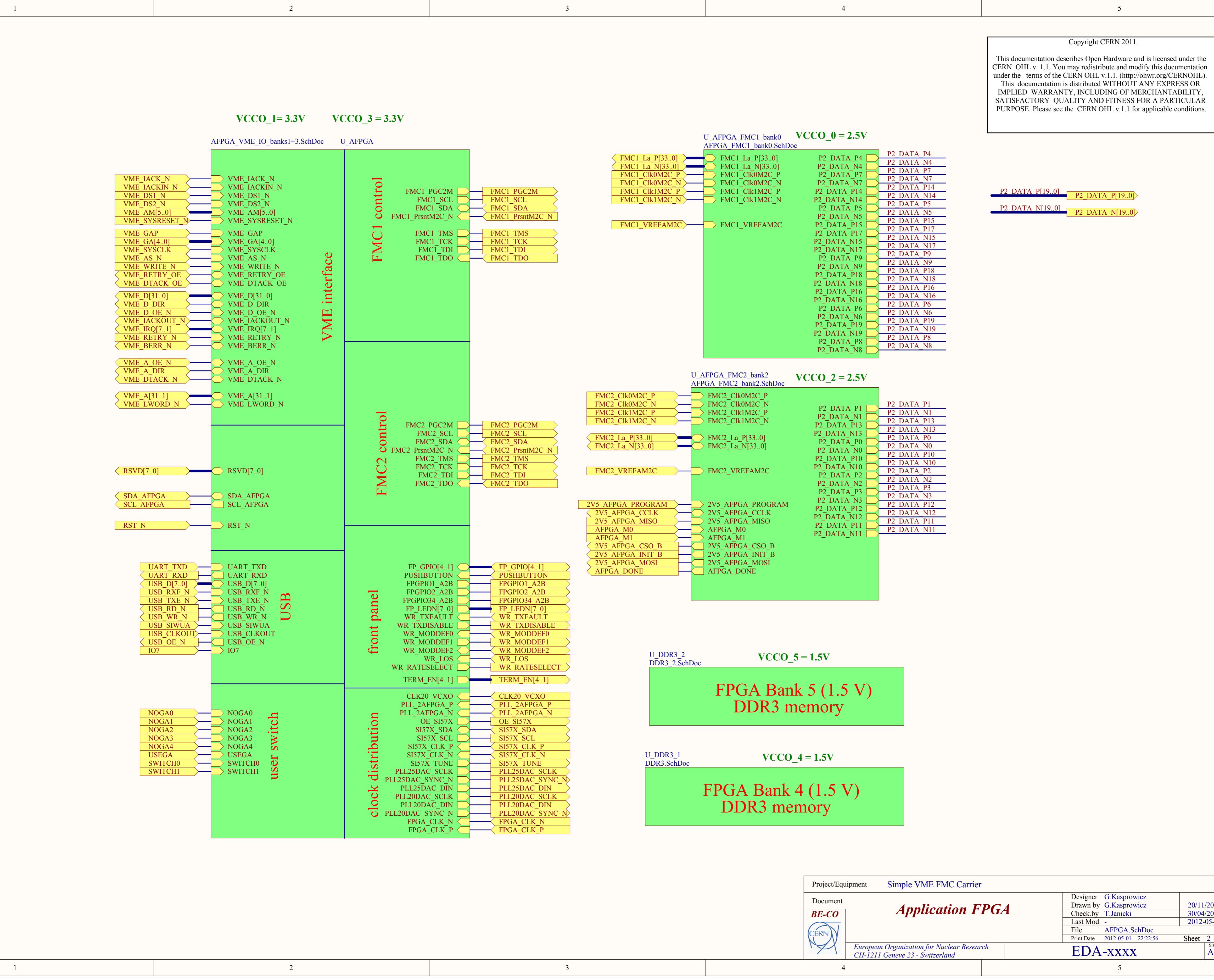


This documentation describes Open Hardware and is licensed under the CERN OHL v. 1.1. You may redistribute and modify this documentation under the terms of the CERN OHL v.1.1. (<http://ohwr.org/CERNOHL>).

This documentation is distributed WITHOUT ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING OF MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE. Please see the CERN OHL v.1.1 for applicable conditions.

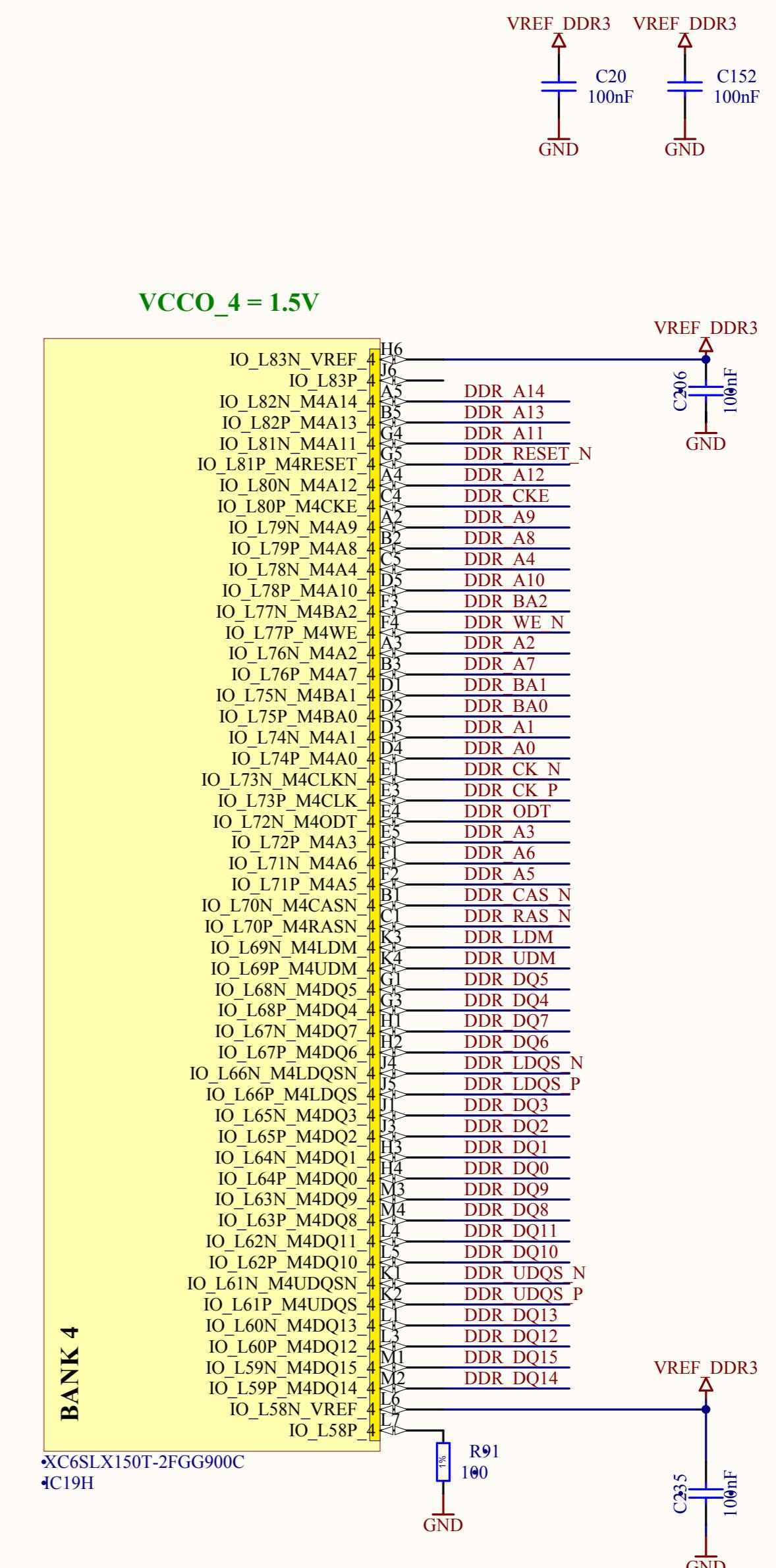
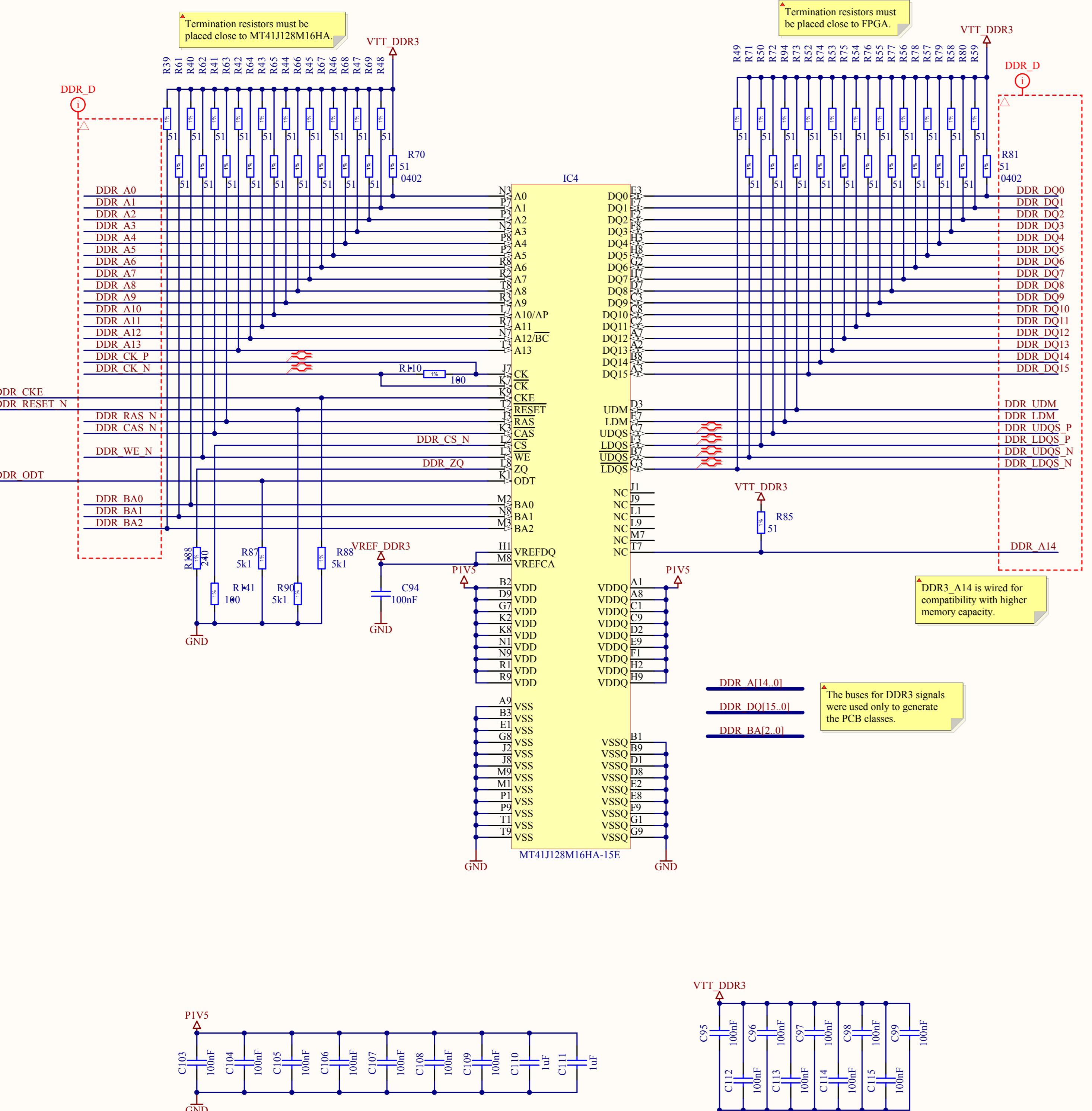




Copyright CERN 2011.

This documentation describes Open Hardware and is licensed under the CERN OHL v. 1.1. You may redistribute and modify this documentation under the terms of the CERN OHL v. 1.1 (<http://ohwr.org/CERNOHL>).

er the terms of the CERN OHL v.1.1. (<http://ohwr.org/CERNOHL>). This documentation is distributed WITHOUT ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING OF MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE. Please see the CERN OHL v.1.1 for applicable conditions.

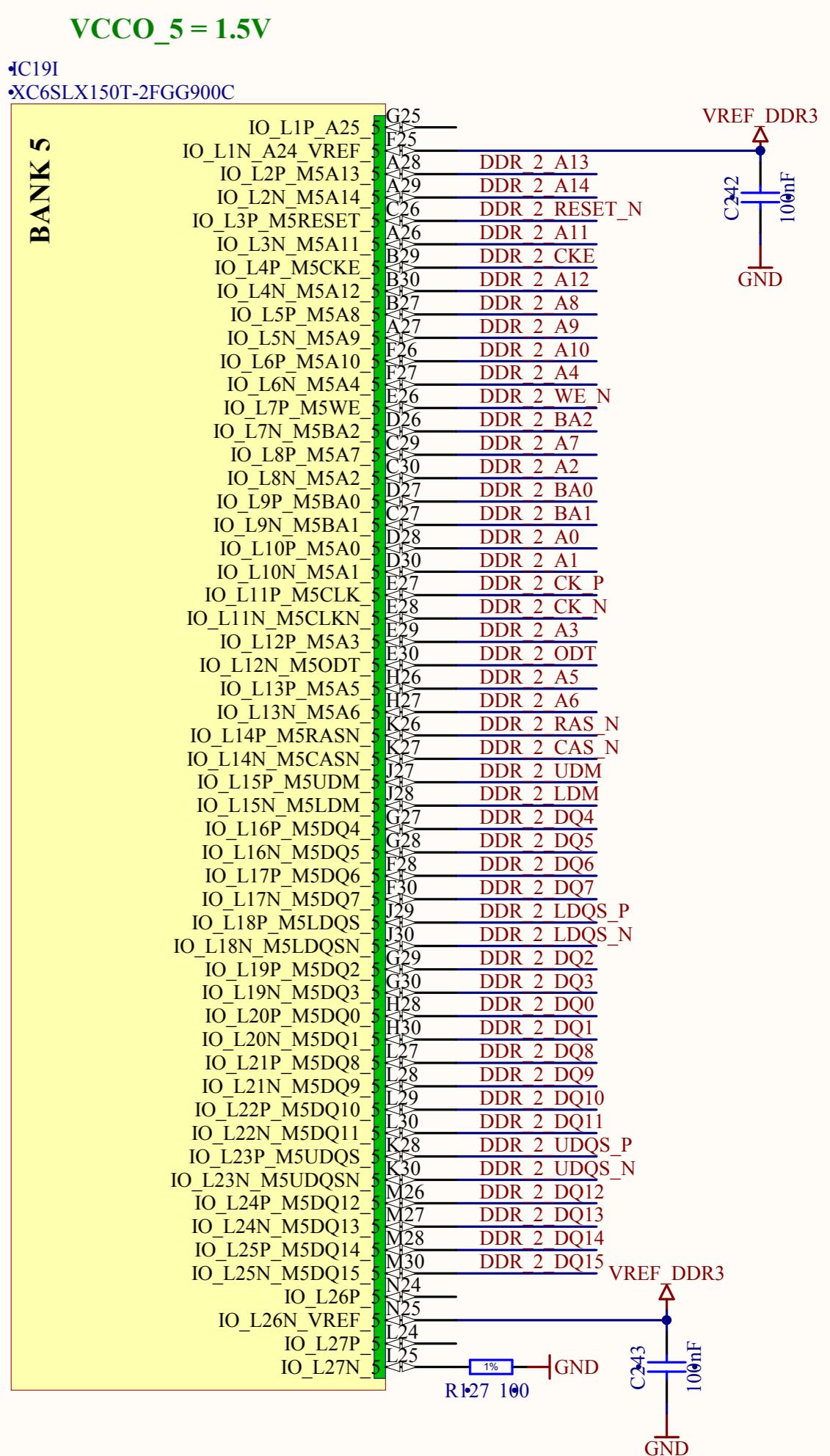
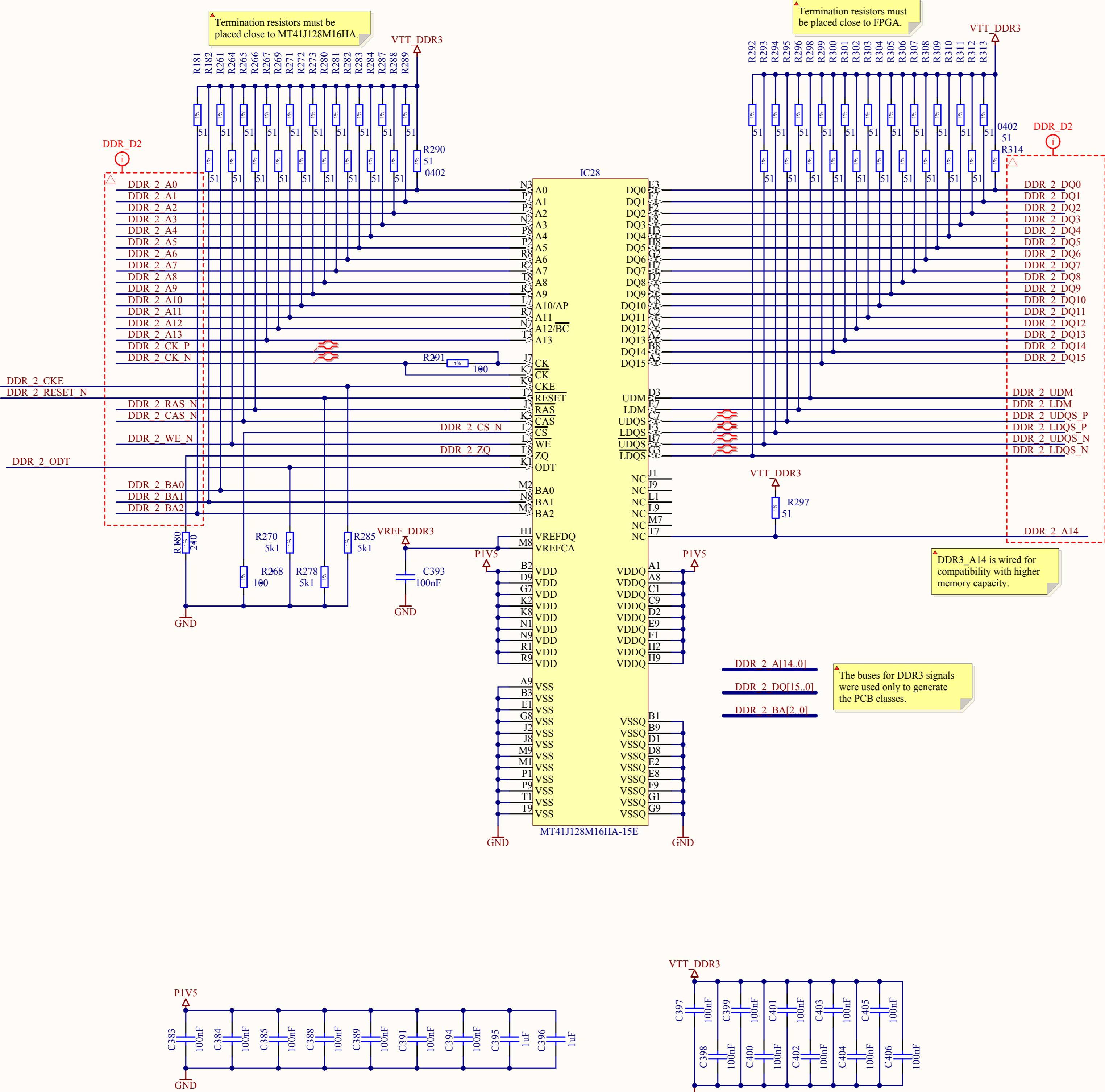


Project/Equipment	Simple VME FMC Carrier	
Document		Designer G.Kasprowicz
BE-CO	<i>DDR3 memory - bank 4 -</i>	Drawn by G.Kasprowicz
		Check by T.Janicki
		Last Mod. -
		File DDR3.SchDoc
		Print Date 2012-05-01 22:22:56
		Sheet 3 of 21
European Organization for Nuclear Research CH-1211 Geneve 23 - Switzerland		Size A3 Rev -
EDA-XXXX		

Copyright CERN 2011.

This documentation describes Open Hardware and is licensed under the CERN OHL v. 1.1. You may redistribute and modify this documentation under the terms of the CERN OHL v.1.1. (<http://ohwr.org/CERNOHL>).

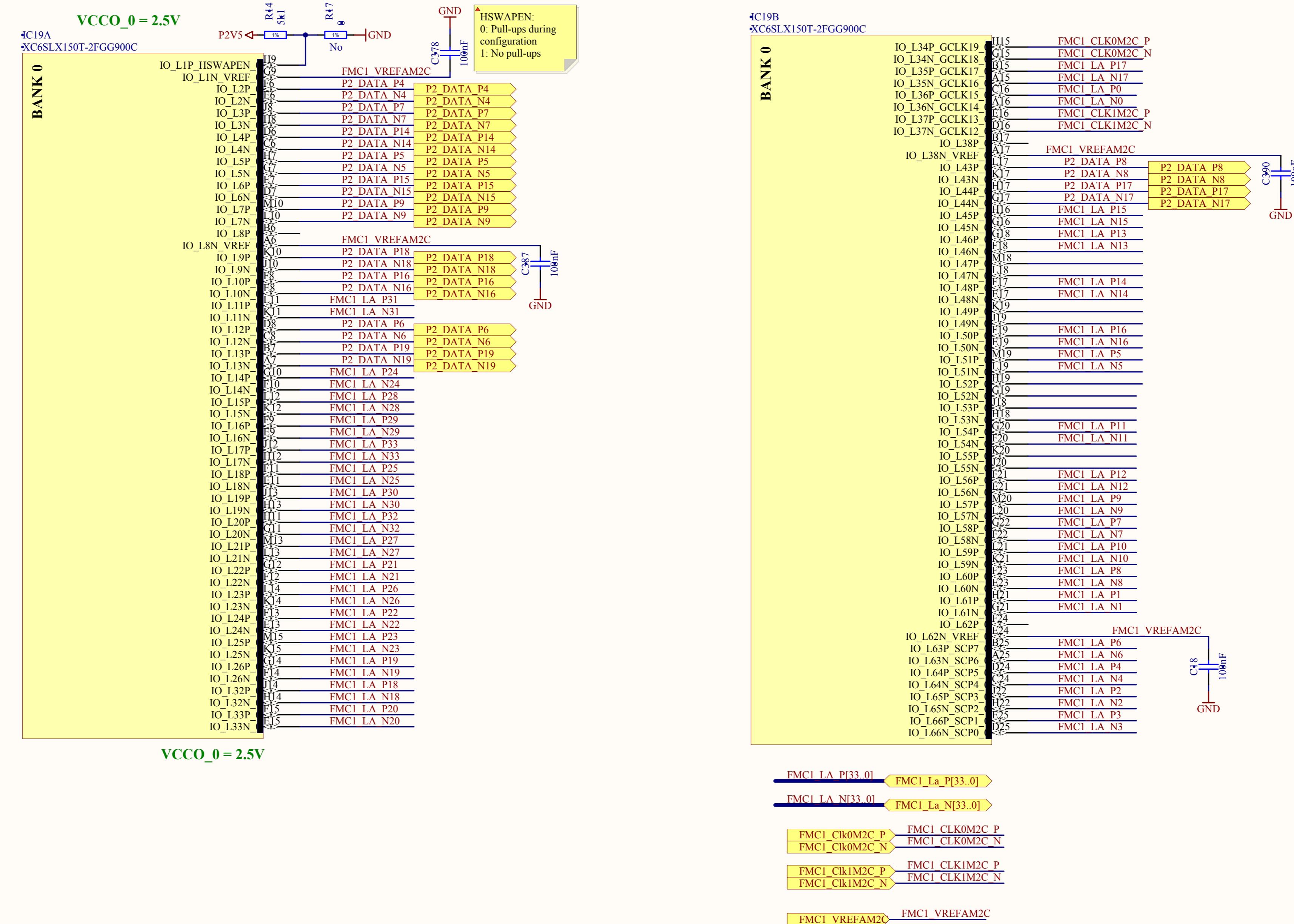
er the terms of the CERN OHL v.1.1. (<http://ohwi.org/CERNOHL>). This documentation is distributed WITHOUT ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING OF MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE. Please see the CERN OHL v.1.1 for applicable conditions.



Project/Equipment	Simple VME FMC Carrier		
Document		Designer G.Kasprowicz	
BE-CO	<i>DDR3 memory - bank 5 -</i>	Drawn by G.Kasprowicz	20/11/2012
		Check by T.Janicki	30/04/2012
		Last Mod. -	2012-05-01
		File DDR3_2.SchDoc	
		Print Date 2012-05-01 22:22:56	Sheet 4 of 21
European Organization for Nuclear Research CH-1211 Geneve 23 - Switzerland		EDA-XXXX	Size A3 Rev -

This documentation describes Open Hardware and is licensed under the CERN OHL v. 1.1. You may redistribute and modify this documentation under the terms of the CERN OHL v.1.1. (<http://ohwr.org/CERNOHL>).

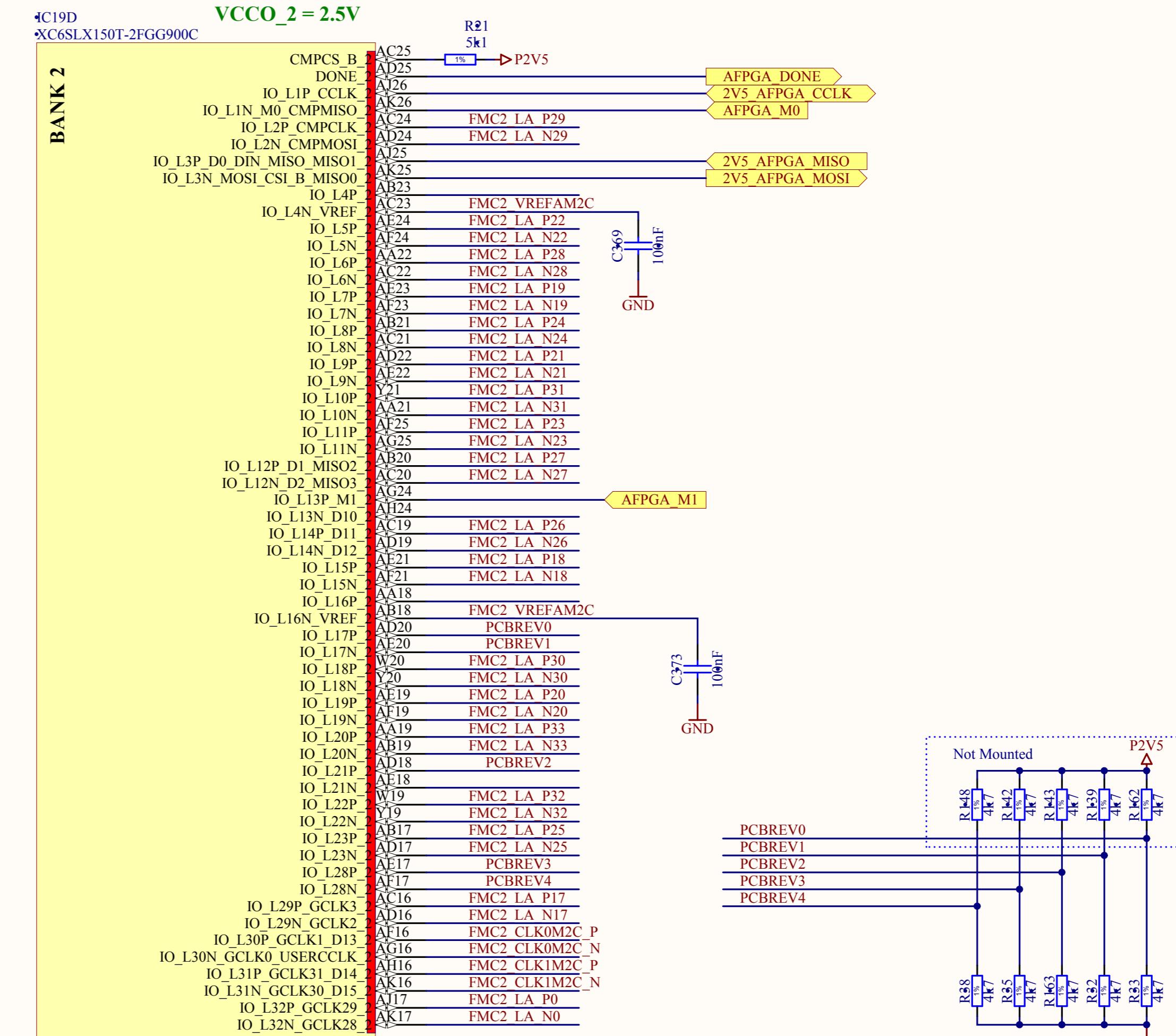
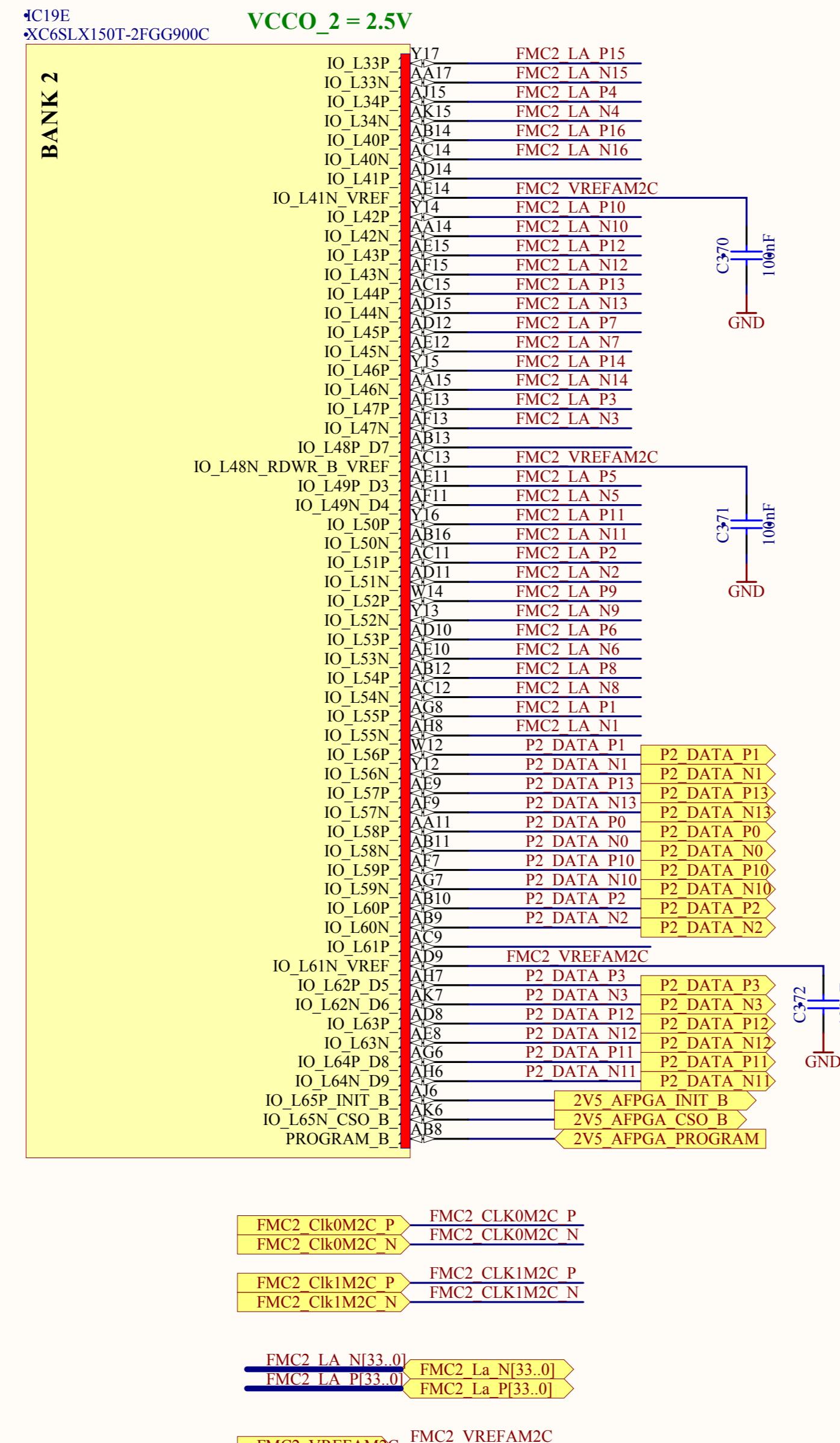
This documentation is distributed WITHOUT ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING OF MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE. Please see the CERN OHL v.1.1 for applicable conditions.



Project/Equipment	Simple VME FMC Carrier	Document	Designer G.Kasprowicz
BE-CO	AFGA FMC1	Drawn by G.Kasprowicz	20/11/2012
	- bank 0 -	Check by T.Janicki	30/04/2012
		Last Mod. -	2012-05-01
		File AFPGA_FMC1_bank0.SchDoc	
		Print Date 2012-05-01 22:22:57	Sheet 5 of 21
		EDA-xxxxx	Size A3 Rev -

This documentation describes Open Hardware and is licensed under the CERN OHL v. 1.1. You may redistribute and modify this documentation under the terms of the CERN OHL v.1.1. (<http://ohwr.org/CERNOHL>)

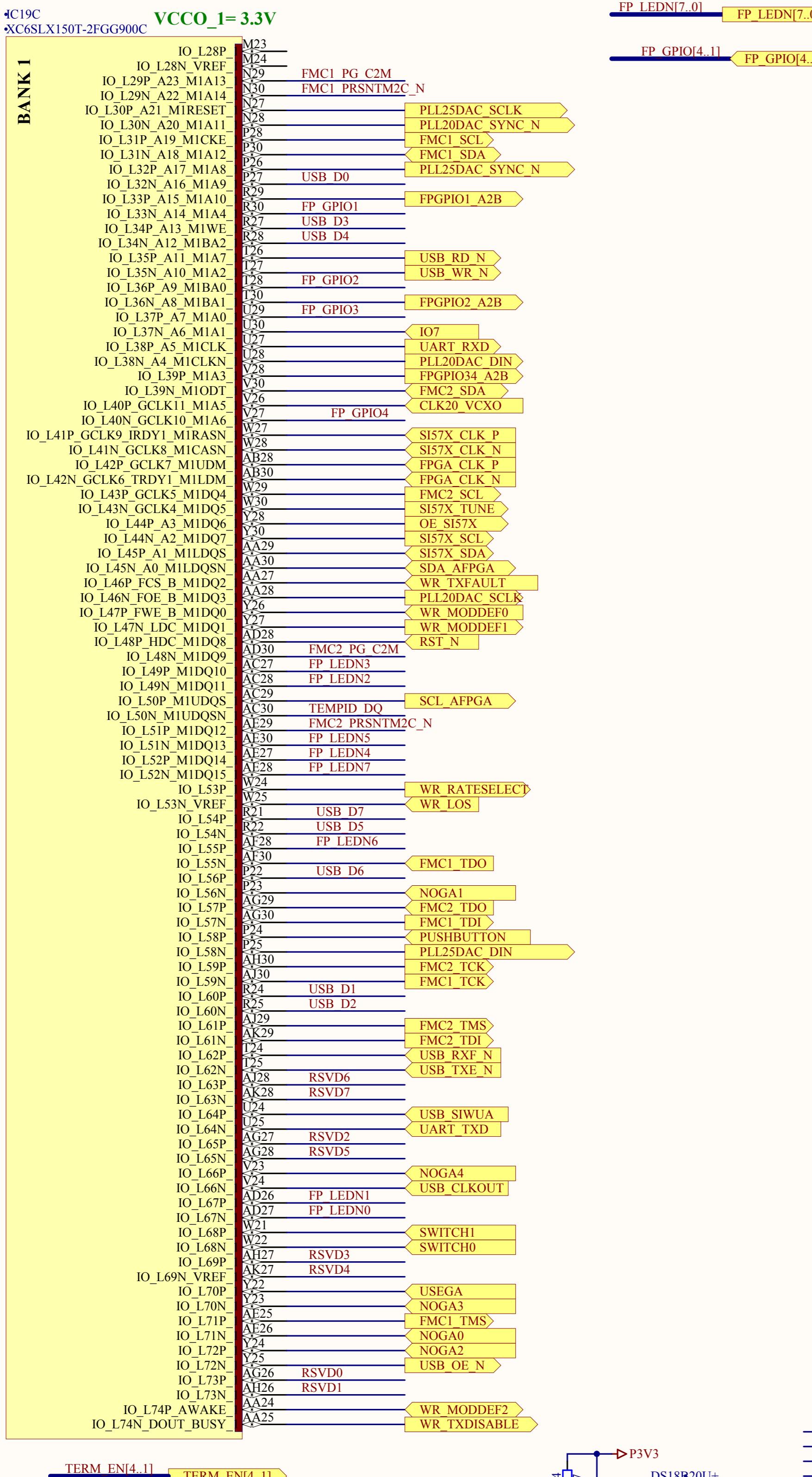
This documentation is distributed WITHOUT ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING OF MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE. Please see the CERN OHL v.1.1 for applicable conditions.



Project/Equipment		Simple VME FMC Carrier		
Document	BE-CO	Designer	G.Kasprowicz	20/11/2012
		Drawn by	G.Kasprowicz	
		Check by	T.Janicki	30/04/2012
		Last Mod.	-	2012-05-01
		File	AFPGA_FMC2_bank2.SchDoc	
		Print Date	2012-05-01 22:22:57	Sheet 6 of 21
		EDA-xxxxx		Size A3 Rev -

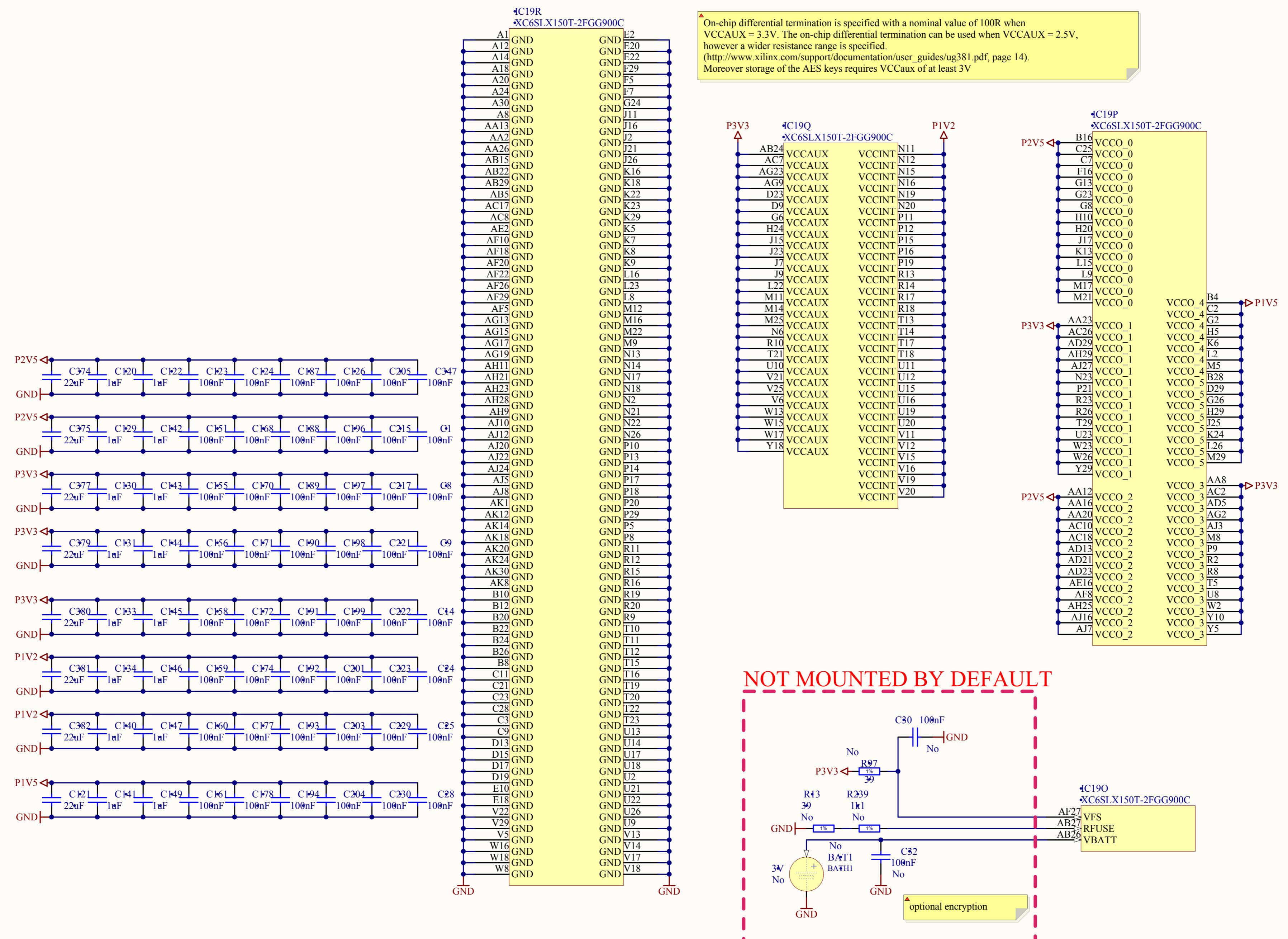
This documentation describes Open Hardware and is licensed under the CERN OHL v. 1.1. You may redistribute and modify this documentation under the terms of the CERN OHL v.1.1. (<http://ohwr.org/CERNOHL>)

This documentation is distributed WITHOUT ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING OF MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE. Please see the CERN OHL v. 1.1 for applicable conditions.



This documentation describes Open Hardware and is licensed under the CERN OHL v. 1.1. You may redistribute and modify this documentation under the terms of the CERN OHL v.1.1. (<http://ohwr.org/CERNOHL>).

This documentation is distributed WITHOUT ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING OF MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE. Please see the CERN OHL v.1.1 for applicable conditions.

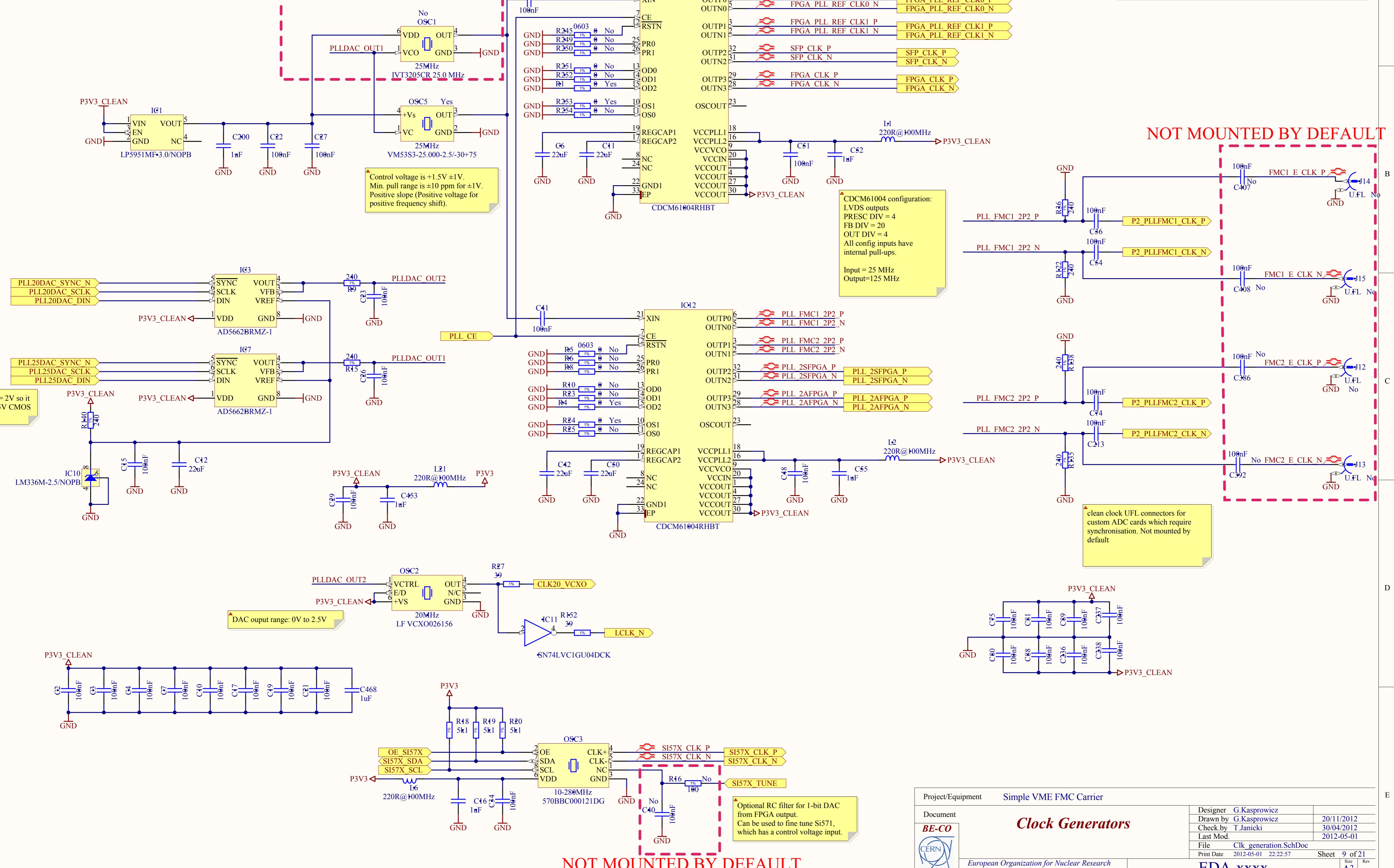


Project/Equipment		Simple VME FMC Carrier		
Document	BE-CO	Designer	G.Kasprowicz	20/11/2012
		Drawn by	G.Kasprowicz	
		Check by	T.Janicki	30/04/2012
		Last Mod.		2012-05-01
		File	AFPGA_power.SchDoc	
		Print Date	2012-05-01 22:22:57	Sheet 8 of 21
		Size	A3	Rev -
European Organization for Nuclear Research CH-1211 Geneve 23 - Switzerland		EDA-xxxxx		

This documentation describes Open Hardware and is licensed under the CERN OHL v. 1.1. You may redistribute and modify this documentation under the terms of the CERN OHL v.1.1. (<http://ohwr.org/CERNOHL>)

This documentation is distributed WITHOUT ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING OF MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE. Please see the CERN OHL v.1.1 for applicable conditions.

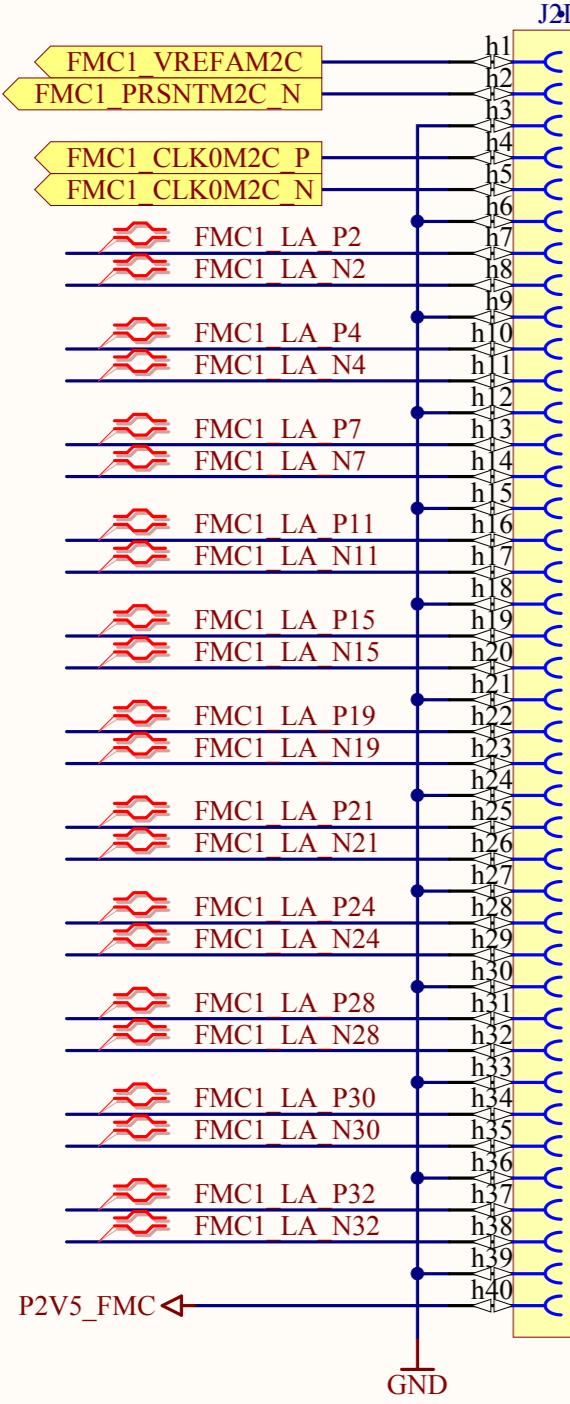
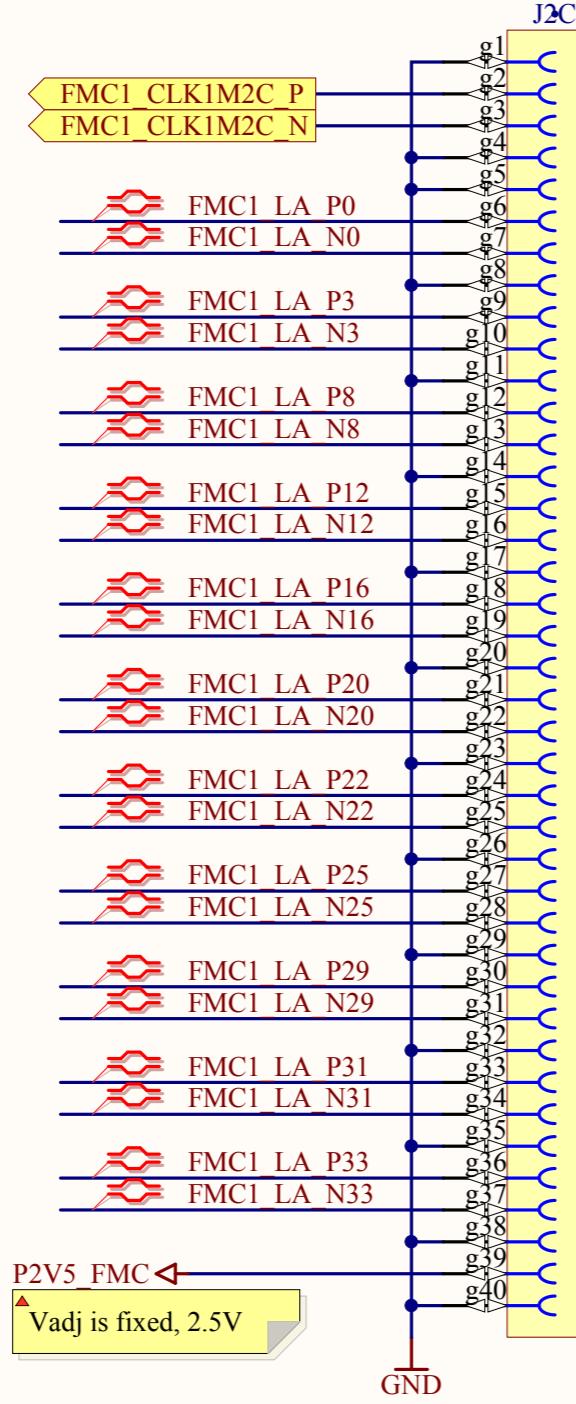
NOT MOUNTED BY DEFAULT



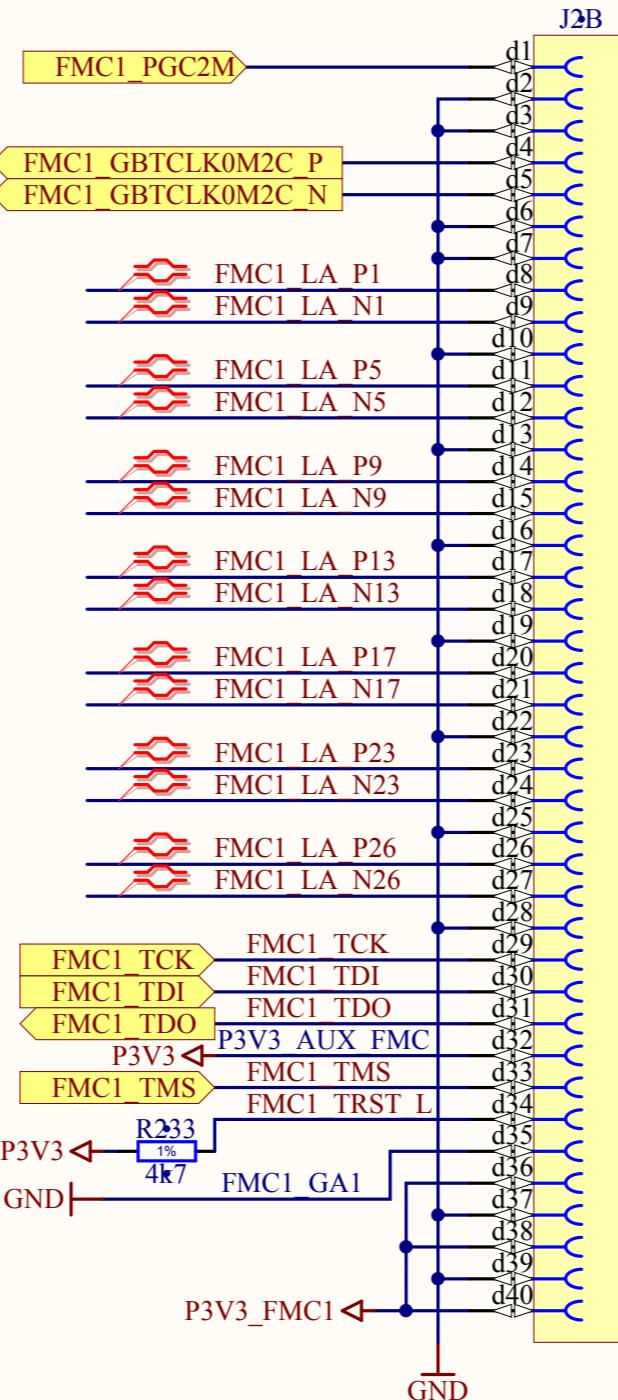
This documentation describes Open Hardware and is licensed under the CERN OHL v. 1.1. You may redistribute and modify this documentation under the terms of the CERN OHL v.1.1. (<http://ohwr.org/CERNOHL>).

This documentation is distributed WITHOUT ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING OF MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE. Please see the CERN OHL v.1.1 for applicable conditions.

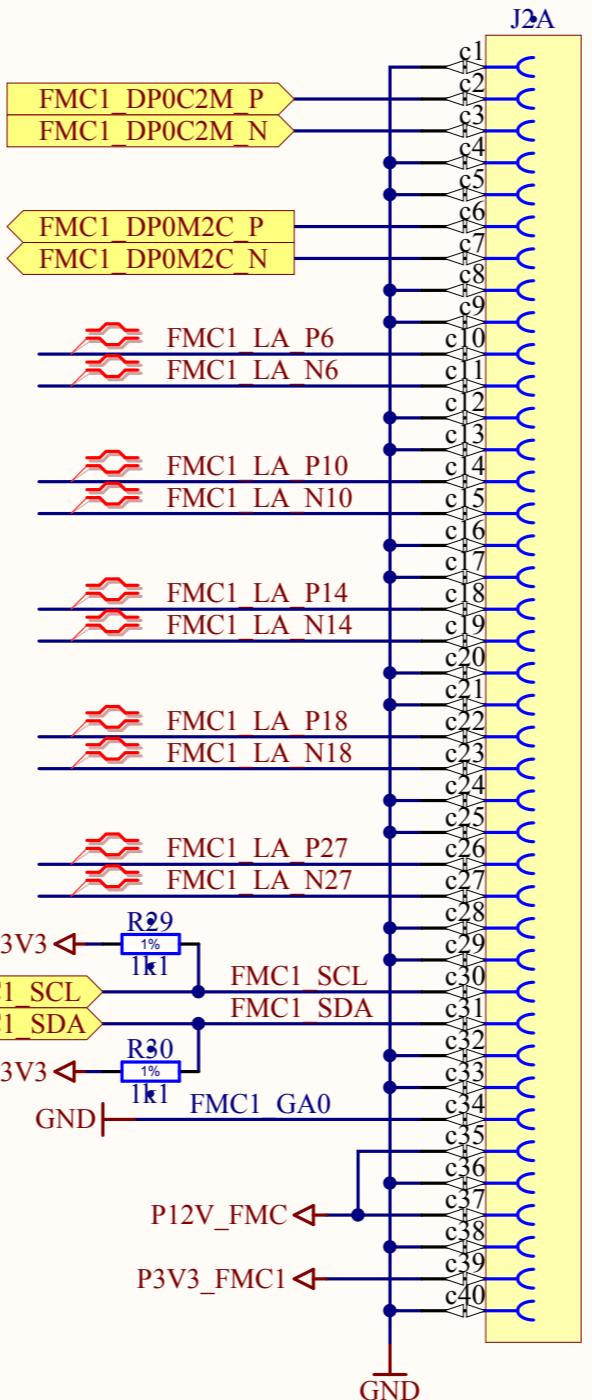
H

FMC slot 1
G

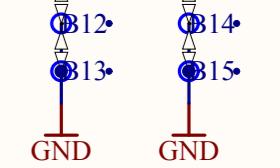
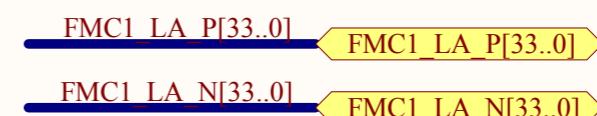
D



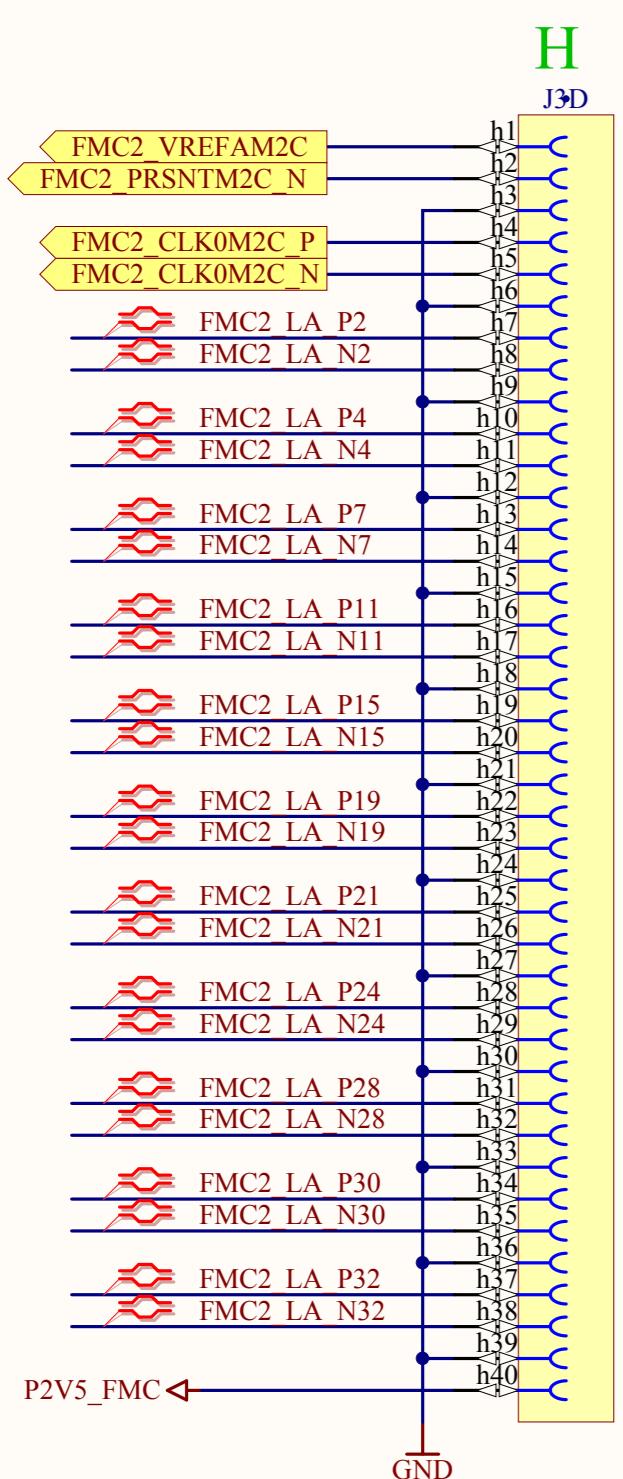
C



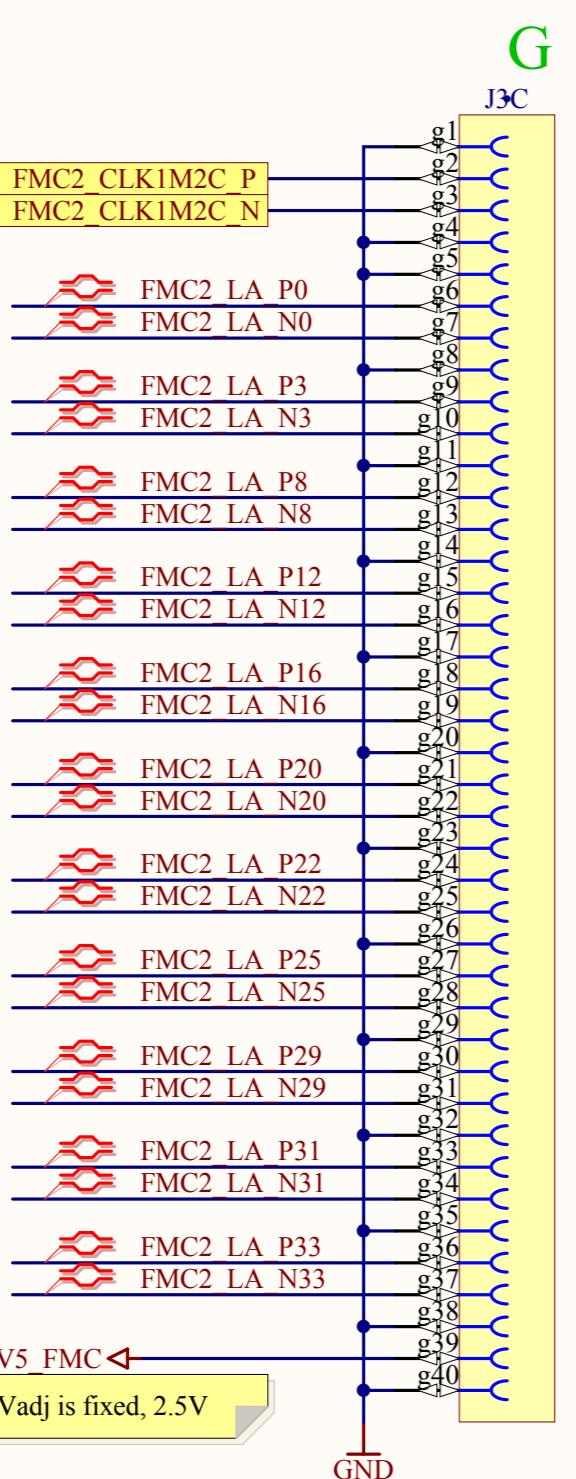
FMC1_LaP and FMC1_LaN are 100ohms diff. pairs



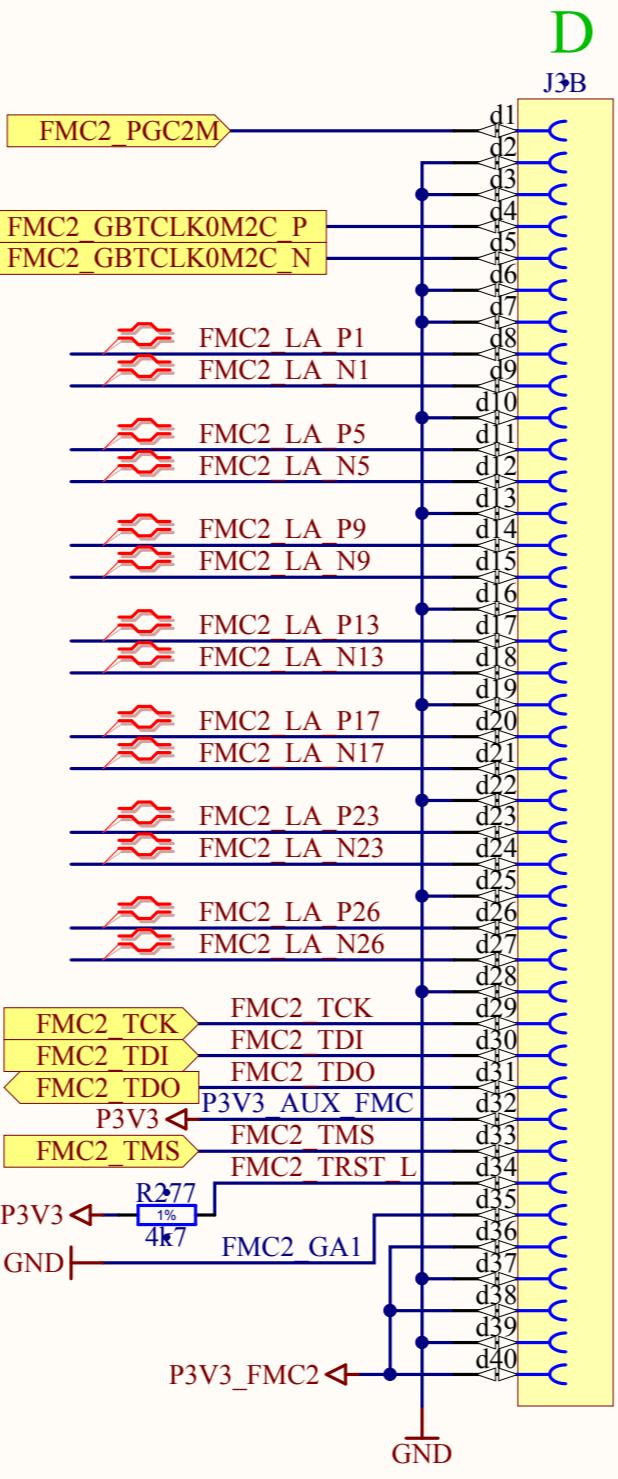
H



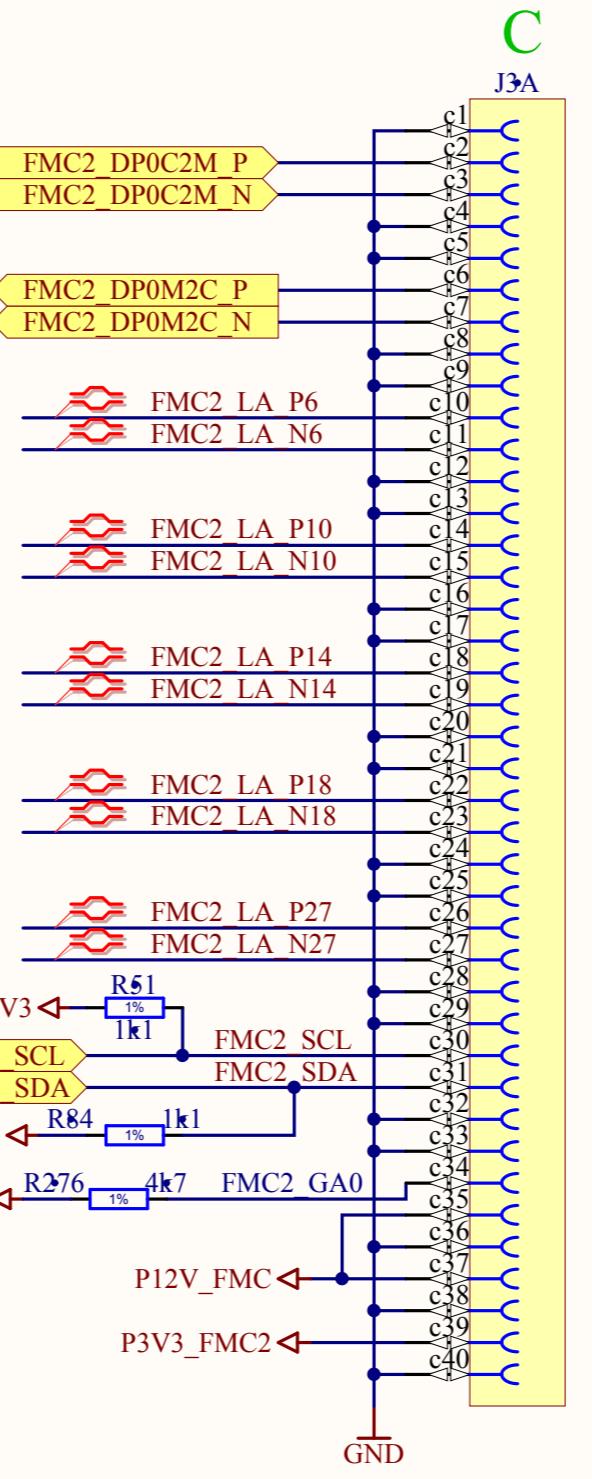
FMC slot 2



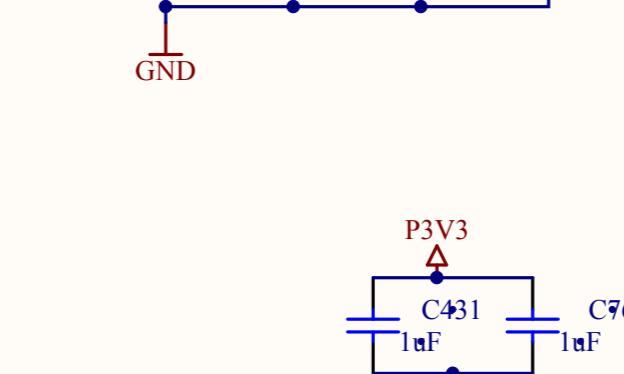
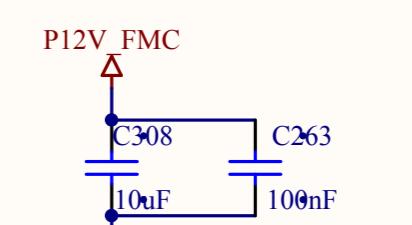
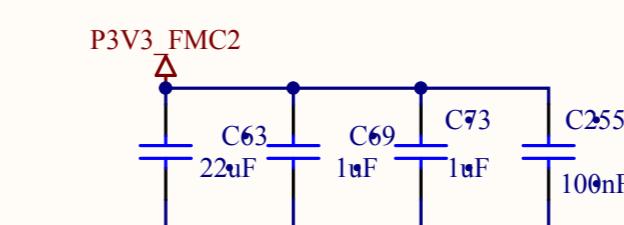
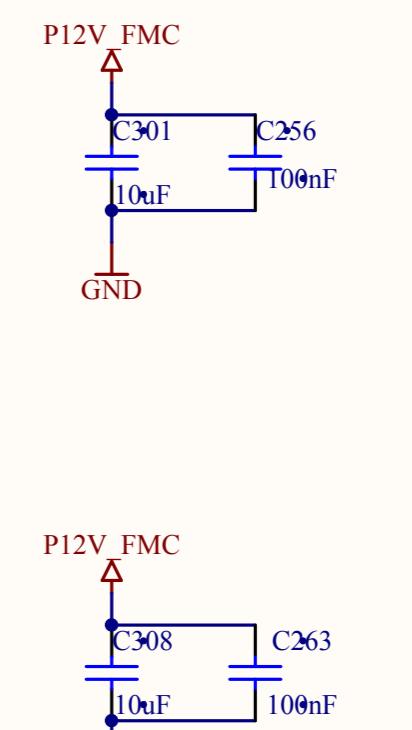
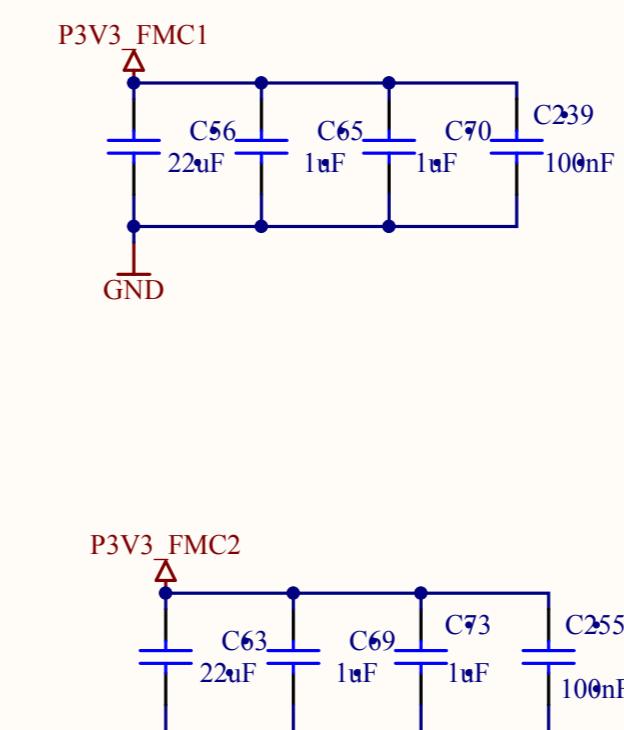
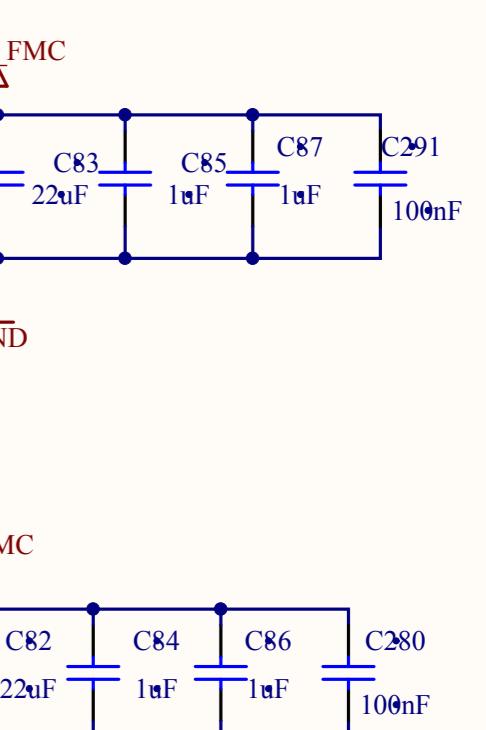
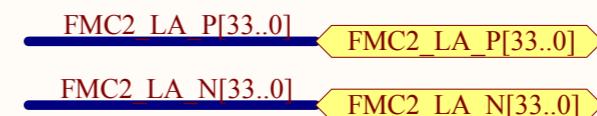
D



C



FMC2_LaP and FMC2_LaN are 100ohms diff. pairs

Project/Equipment: Simple VME FMC Carrier
Document: BE-CO

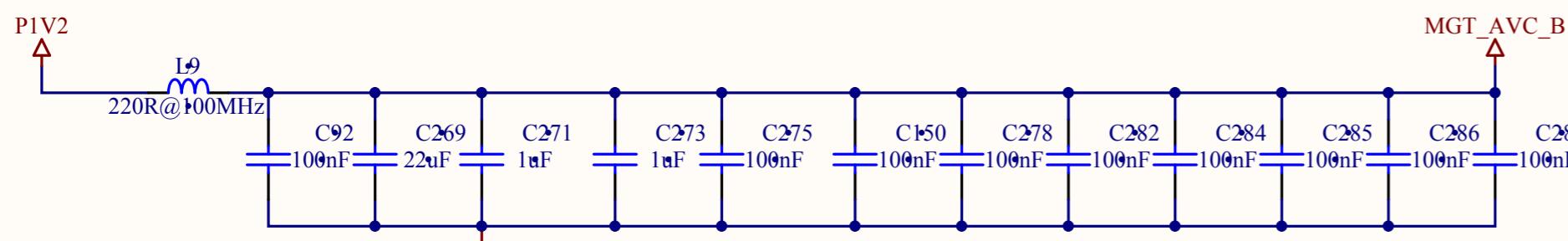
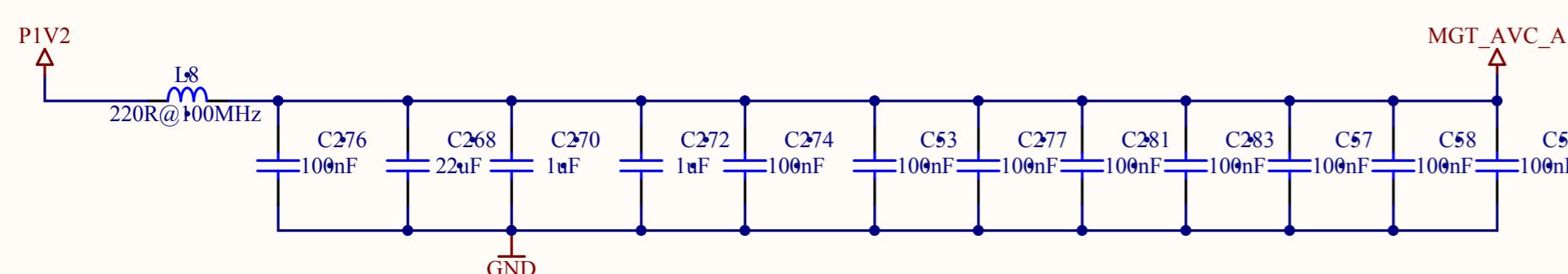
Designer: G.Kasprowicz	Drawn by: G.Kasprowicz	20/11/2012
Check by: T.Janicki		30/04/2012
Last Mod.:		2012-05-01
File: FMC_CONNECTORS.SchDoc		
Print Date: 2012-05-01 22:22:57		
Sheet: 10 of 21		
Size: A3	Rev: -	

European Organization for Nuclear Research
CH-1211 Geneve 23 - Switzerland

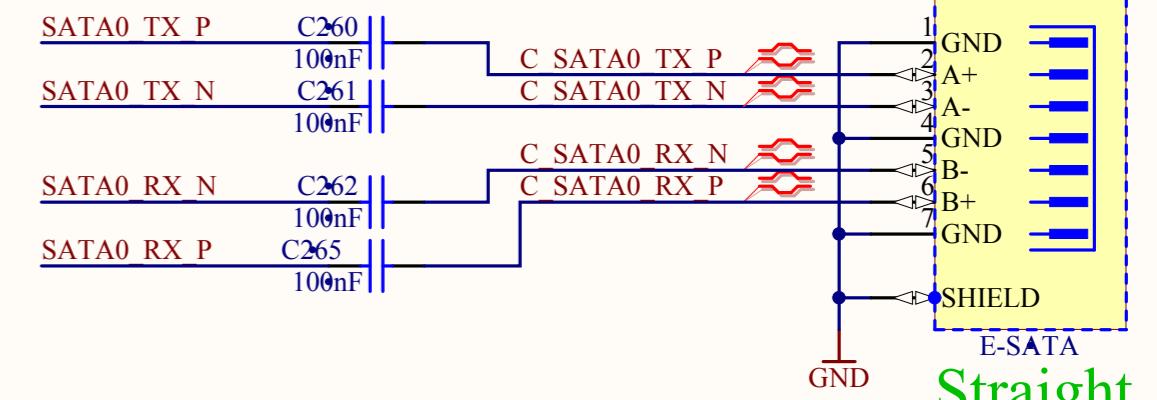
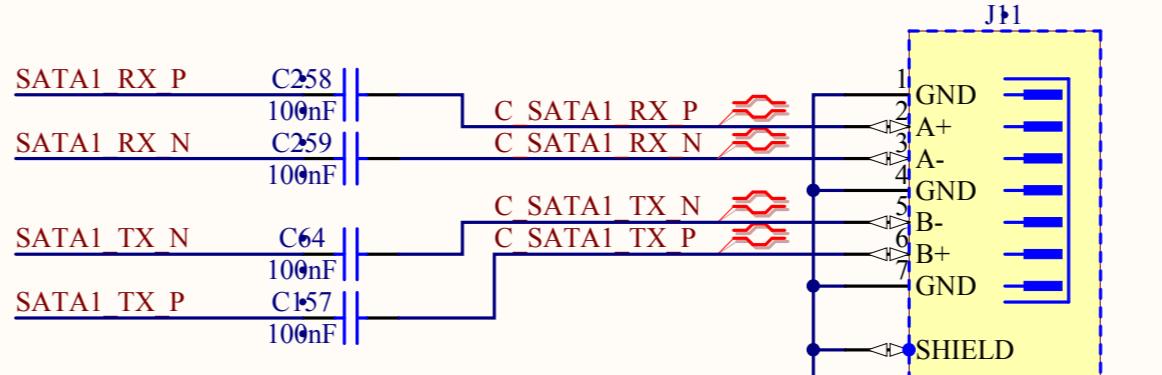
EDA-xxxxx

This documentation describes Open Hardware and is licensed under the CERN OHL v. 1.1. You may redistribute and modify this documentation under the terms of the CERN OHL v.1.1. (<http://ohwr.org/CERNOHL>).

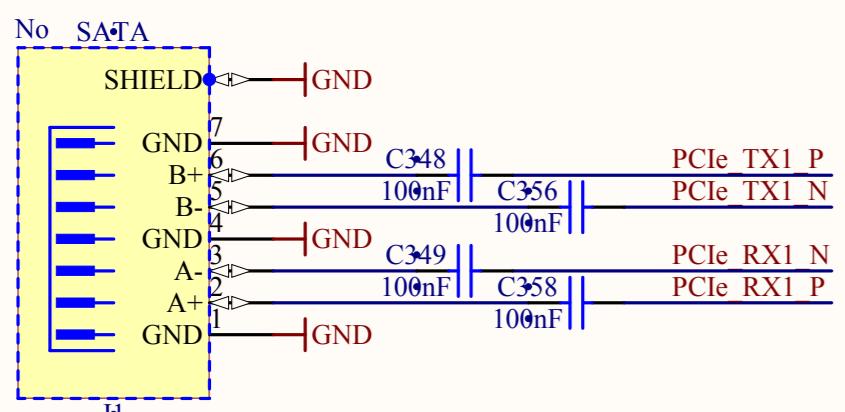
This documentation is distributed WITHOUT ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING OF MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE. Please see the CERN OHL v.1.1 for applicable conditions.



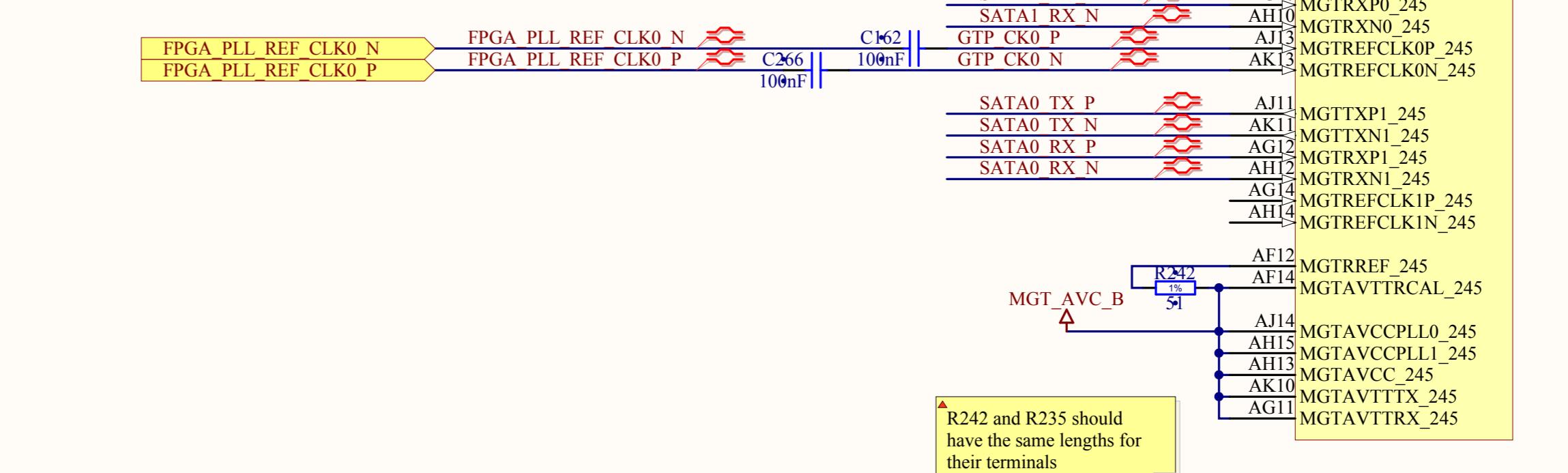
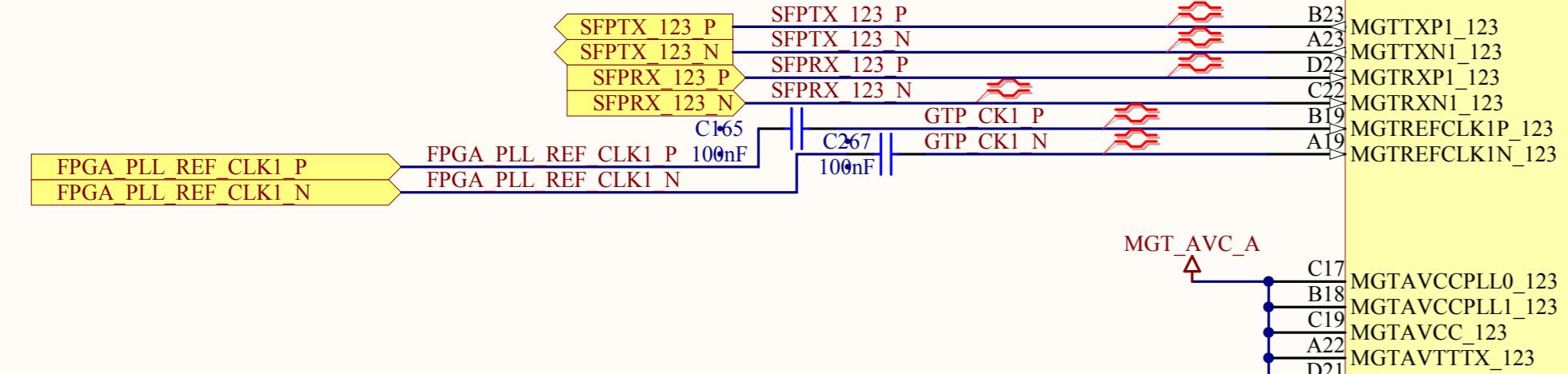
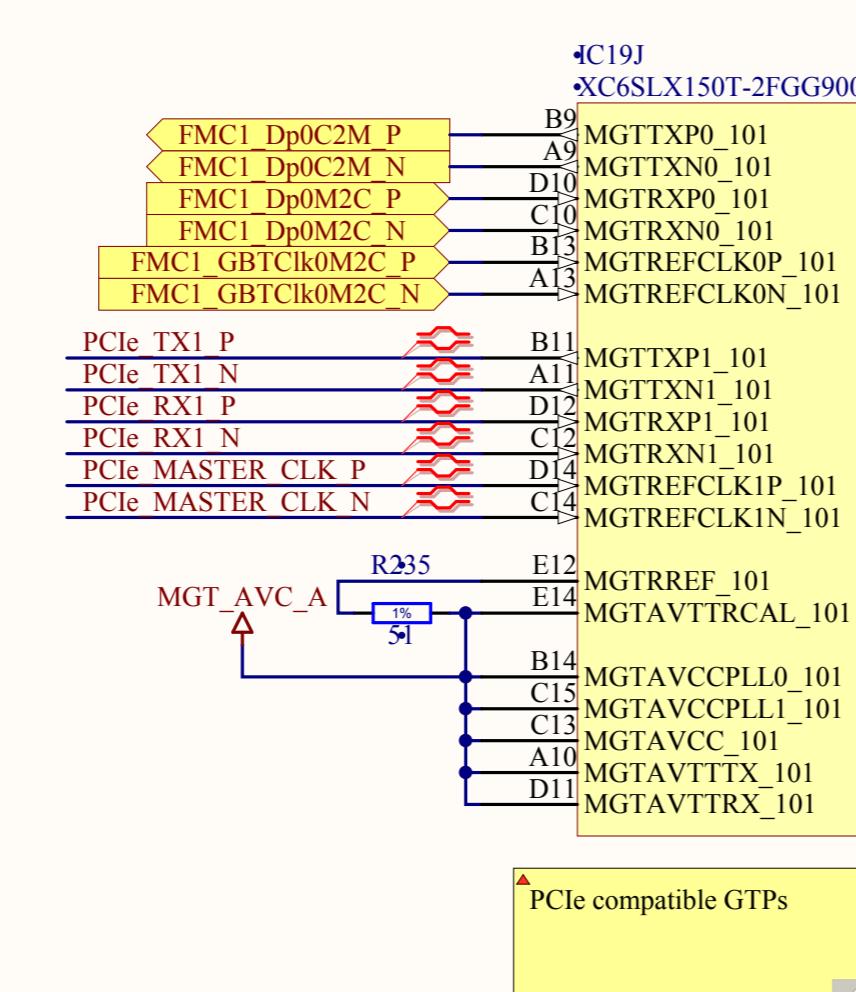
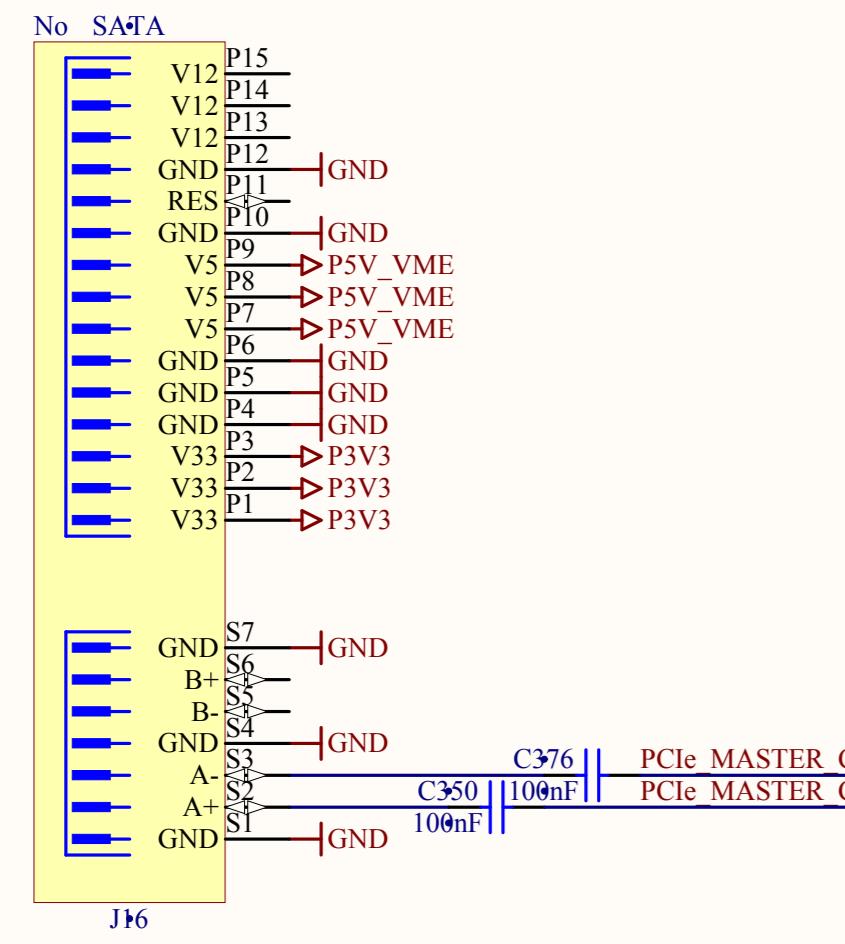
E-SATA connectors



NOT MOUNTED BY DEFAULT



Stand-alone power port and PCIe interface



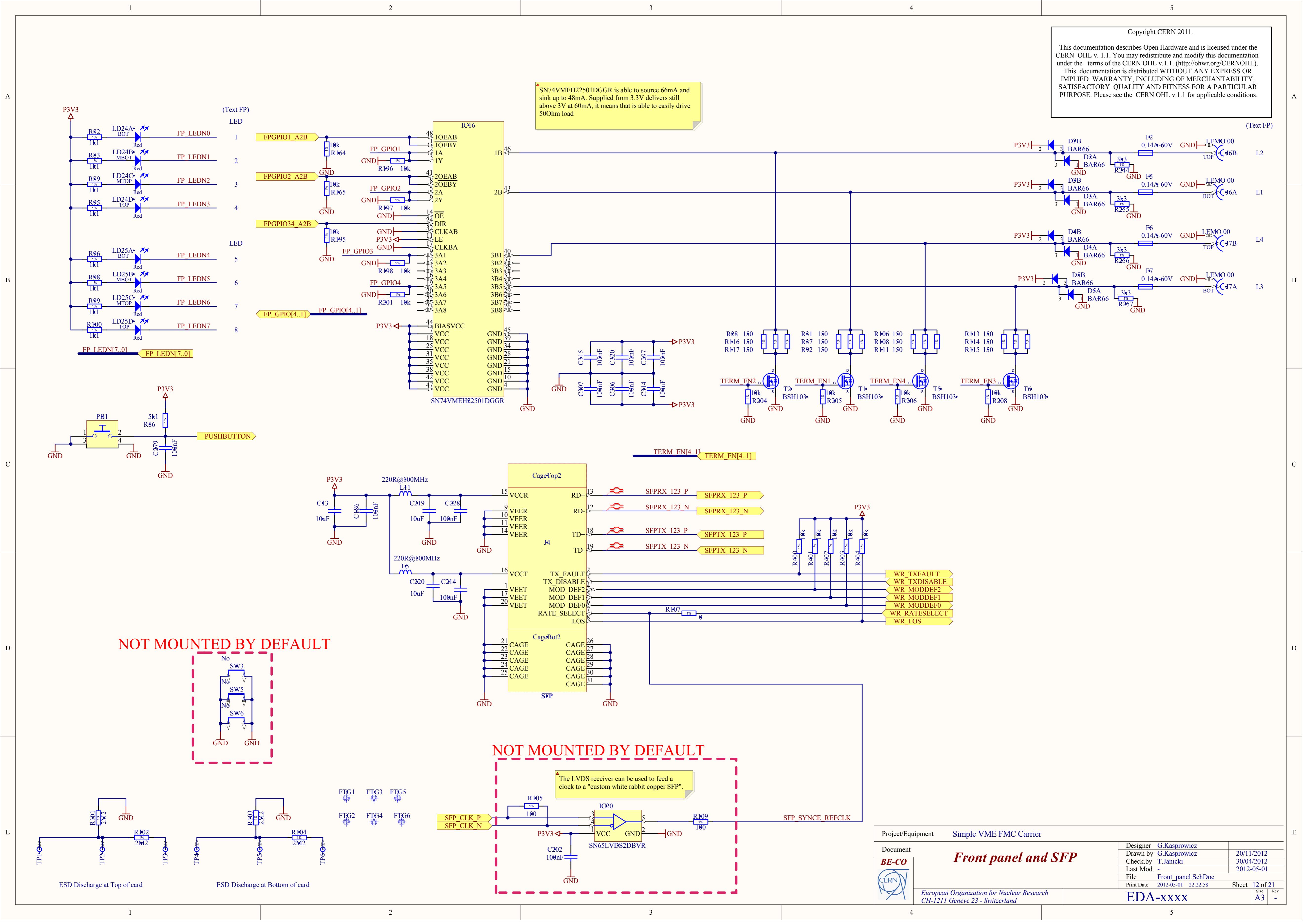
R242 and R235 should have the same lengths for their terminals



Project/Equipment		Simple VME FMC Carrier		
Document	BE-CO	Designer	G.Kasprowicz	20/11/2012
		Drawn by	G.Kasprowicz	
		Check by	T.Janicki	30/04/2012
		Last Mod.		2012-05-01
		File	FPGA_GTP.SchDoc	
		Print Date	2012-05-01 22:22:57	Sheet 11 of 21
		EDA-xxxxx		Size A3 - Rev -

This documentation describes Open Hardware and is licensed under the CERN OHL v. 1.1. You may redistribute and modify this documentation under the terms of the CERN OHL v.1.1. (<http://ohwr.org/CERNOHL>).

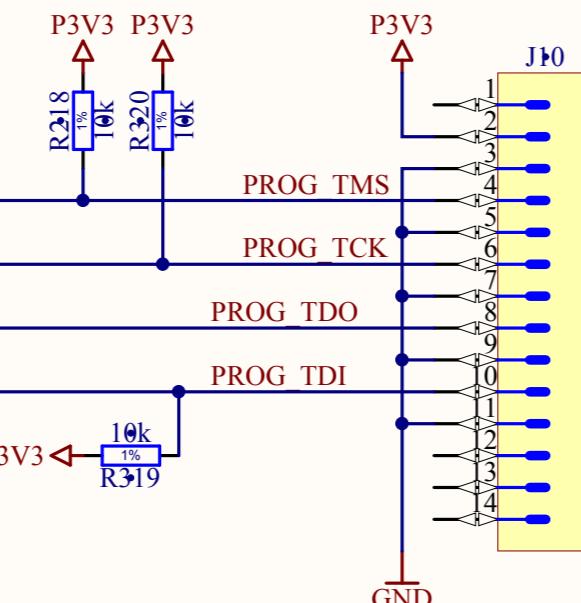
This documentation is distributed WITHOUT ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING OF MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE. Please see the CERN OHL v.1.1 for applicable conditions.



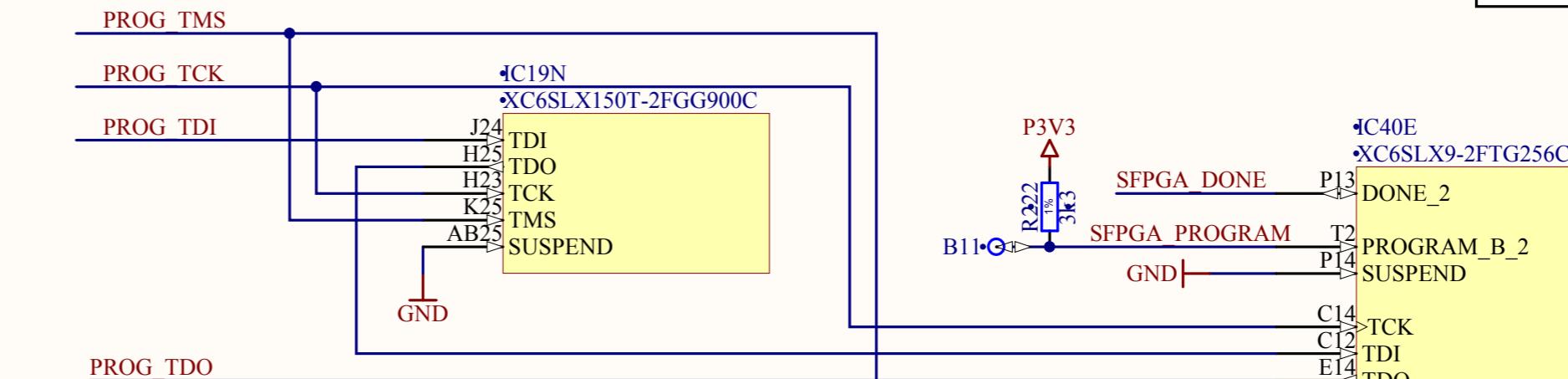
This documentation describes Open Hardware and is licensed under the CERN OHL v. 1.1. You may redistribute and modify this documentation under the terms of the CERN OHL v.1.1. (<http://ohwr.org/CERNOHL>).

This documentation is distributed WITHOUT ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING OF MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE. Please see the CERN OHL v.1.1 for applicable conditions.

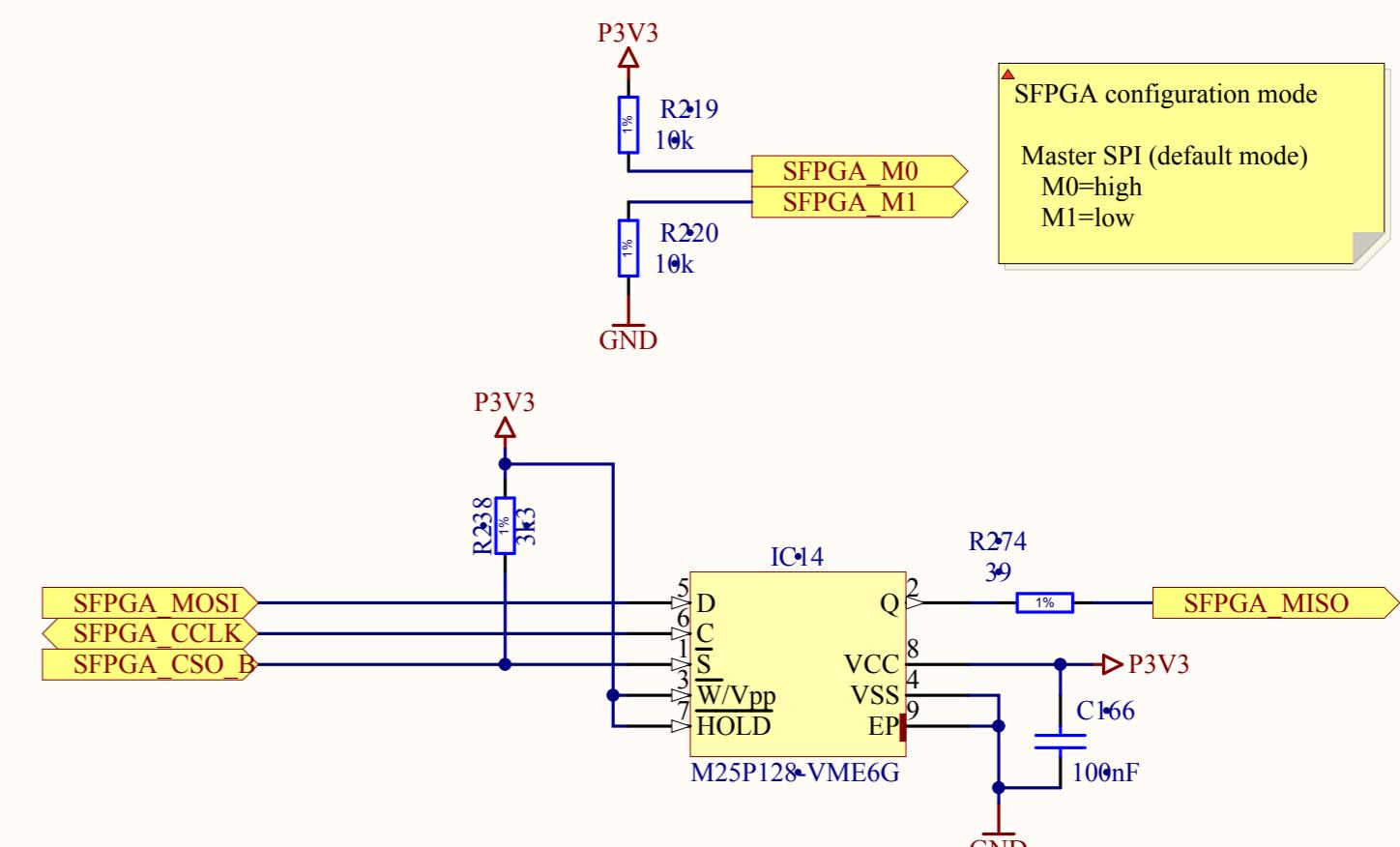
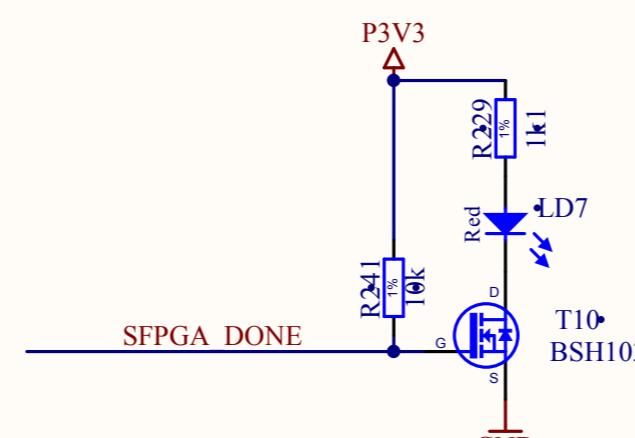
NOT MOUNTED BY DEFAULT



Optional FPGA configuration via USB - FTDI chip simulating Parallel Cable under IMACT



SFPGA configuration mode
Master SPI (default mode)
M0=high
M1=low



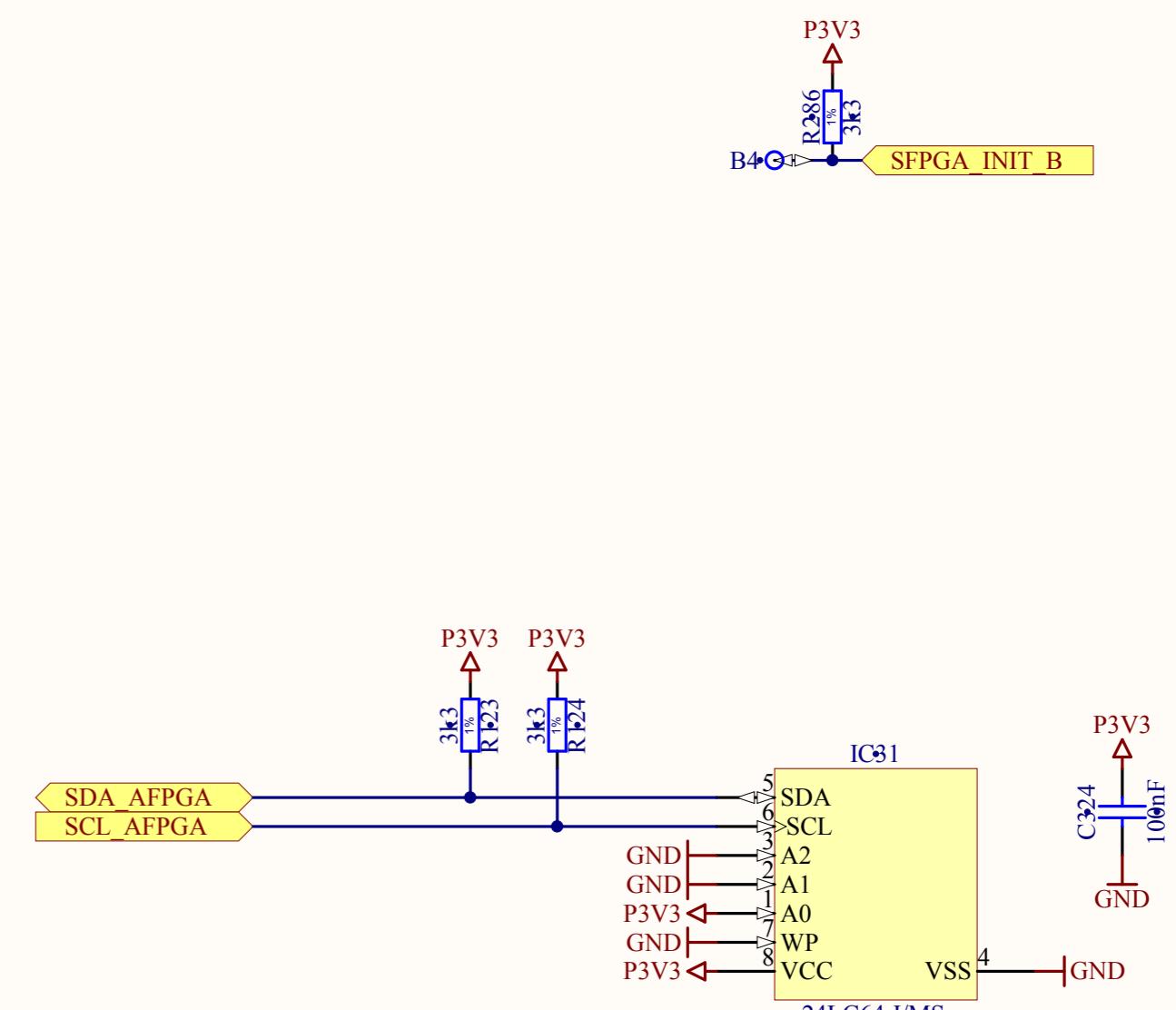
AFPGA_M0
AFPGA_M1

BOOT_CONFIG
BOOT_STATUS
BOOT_DONE
BOOT_CLK
BOOT_DOUT

2V5_AFPGA_PROGRAM
2V5_AFPGA_INIT_B
2V5_AFPGA_DONE
2V5_AFPGA_CCLK
2V5_AFPGA_MISO

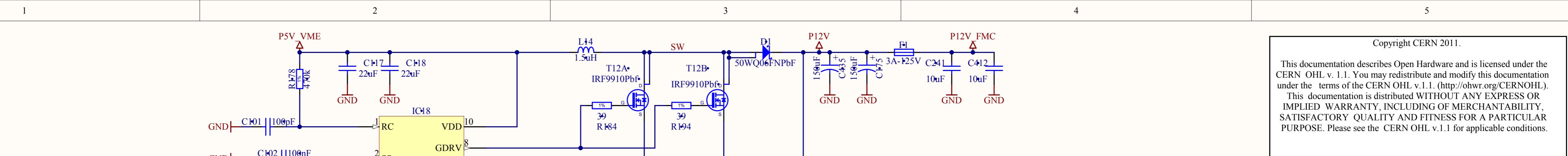
2V5_AFPGA_CS0_B
2V5_AFPGA_MOSI

2V5_AFPGA_SDA
2V5_AFPGA_SCL



Project/Equipment		Simple VME FMC Carrier	
Document	BE-CO	Designer	G.Kasprowicz
		Drawn by	G.Kasprowicz
		Check by	T.Janicki
		Last Mod.	2012-05-01
		File	JTAG Chain + SFPGA Flash.SchDoc
		Print Date	2012-05-01 22:22:58
		Sheet	13 of 21
European Organization for Nuclear Research CH-1211 Geneve 23 - Switzerland		EDA-xxxxx	

JTAG chain +
FPGA flash



A

B

C

D

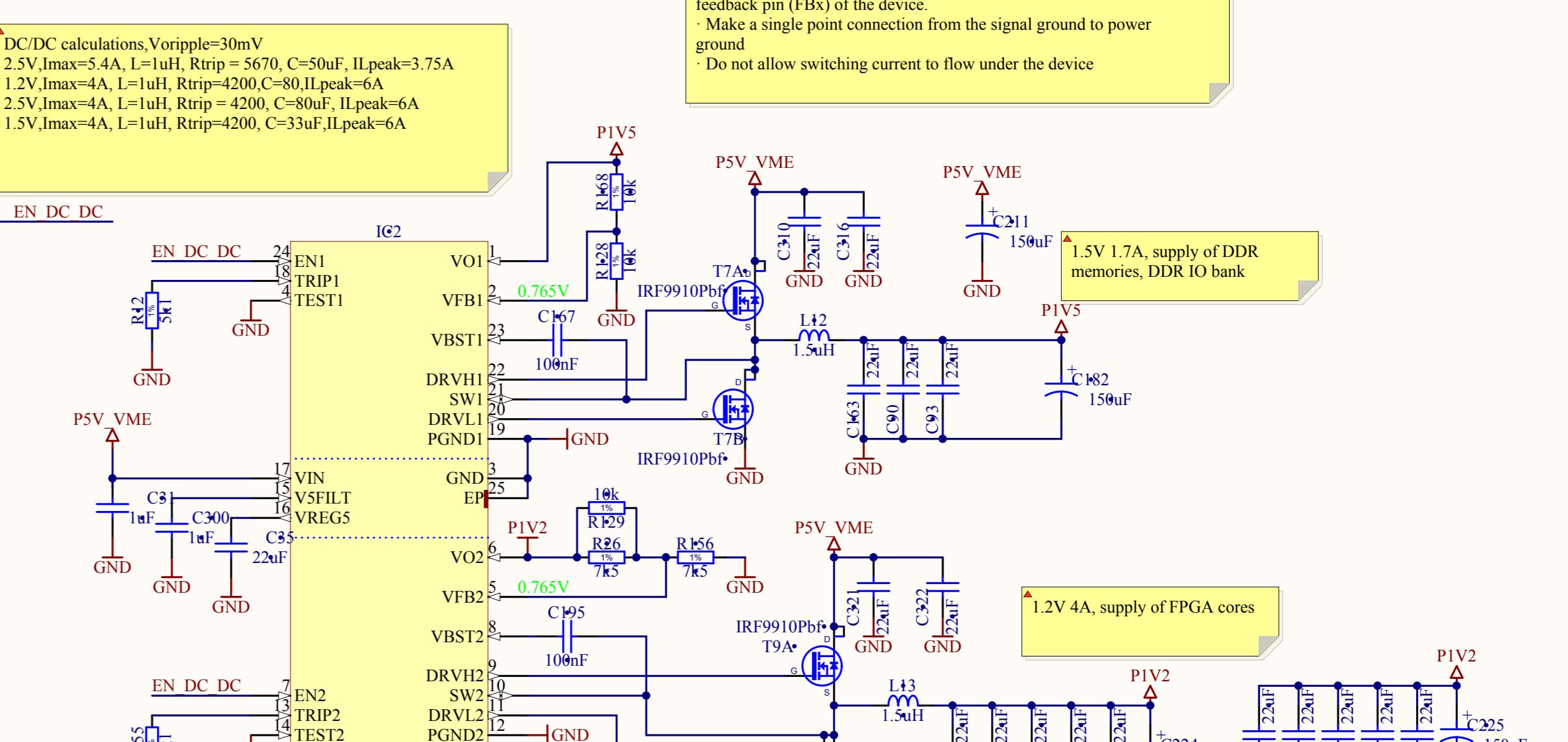
E

Power estimation:

- P1V2 AFPGA 3A SFGA 500mA
- P1V5 AFPGA 1A + 2x DDR3 (max 2x 530mW) (http://download.micron.com/pdf/technotes/ddr3/TN41_01DDR3%20Power.pdf) estimated power from P1V5 is about 1.5A
- P2V5 AFPGA 2A
- P2V5_FMC1 FMC slot 2A (HPC = 4A, LPC = 2A)
- P2V5_FMC2 FMC slot 2A (HPC = 4A, LPC = 2A)
- P3V3_FMC1 FMC slot 3A
- P3V3_FMC2 FMC slot 3A
- P12V_FMC1 1A P12V_FMC2 1A
- P3V3 AFPGA+SFGA (Vccaux, IO) 3A VME interface 1A

LAYOUT NOTES:

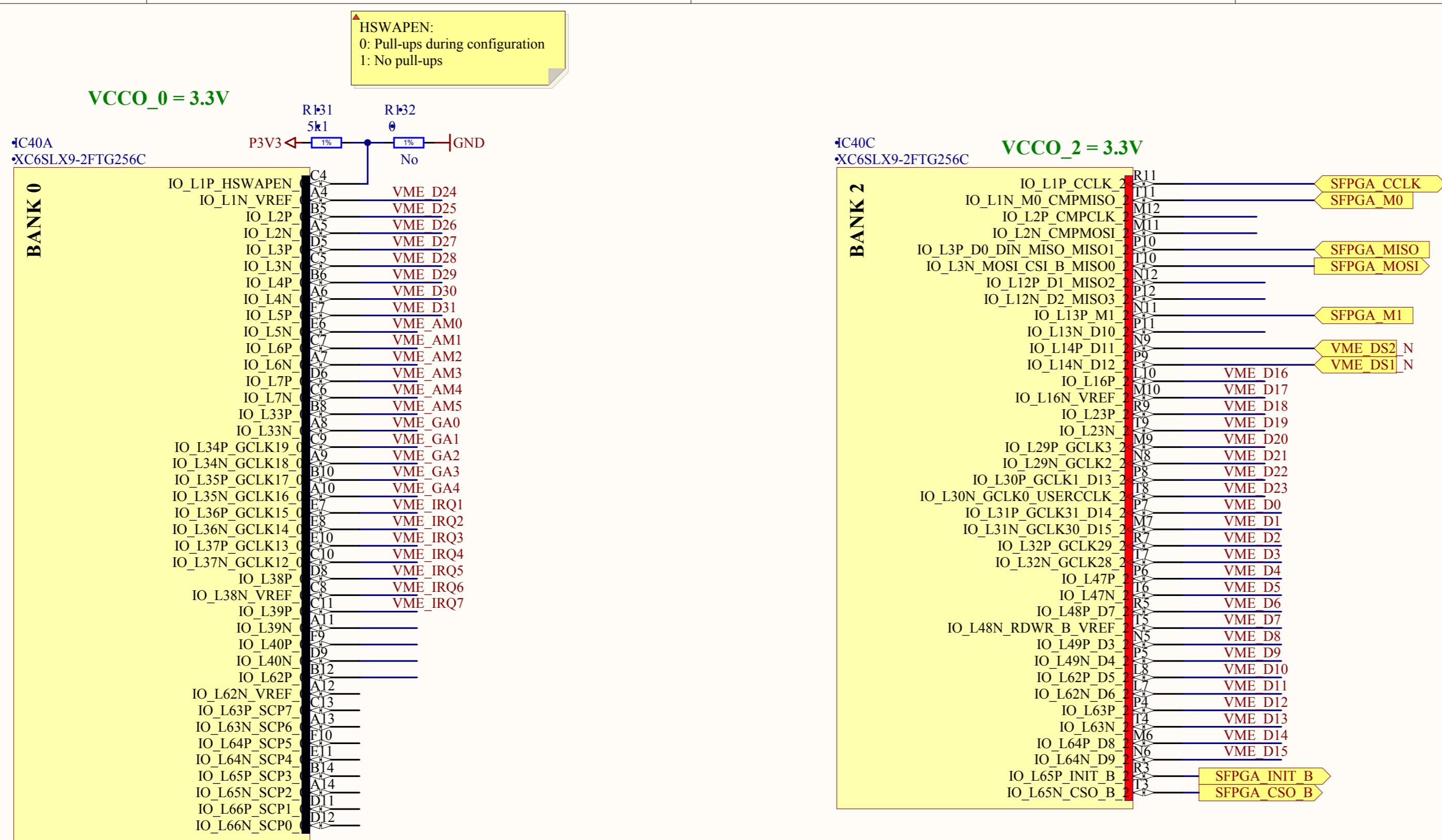
- Place the input capacitor close to the top switching FET. The output current loop should also be kept as small as possible.
- Keep the SW node as physically small and short as possible as to minimize parasitic capacitance and inductance and to minimize radiated emissions Kelvin connections should be brought from the output to the feedback pin (FBx) of the device.
- Make a single point connection from the signal ground to power ground
- Do not allow switching current to flow under the device



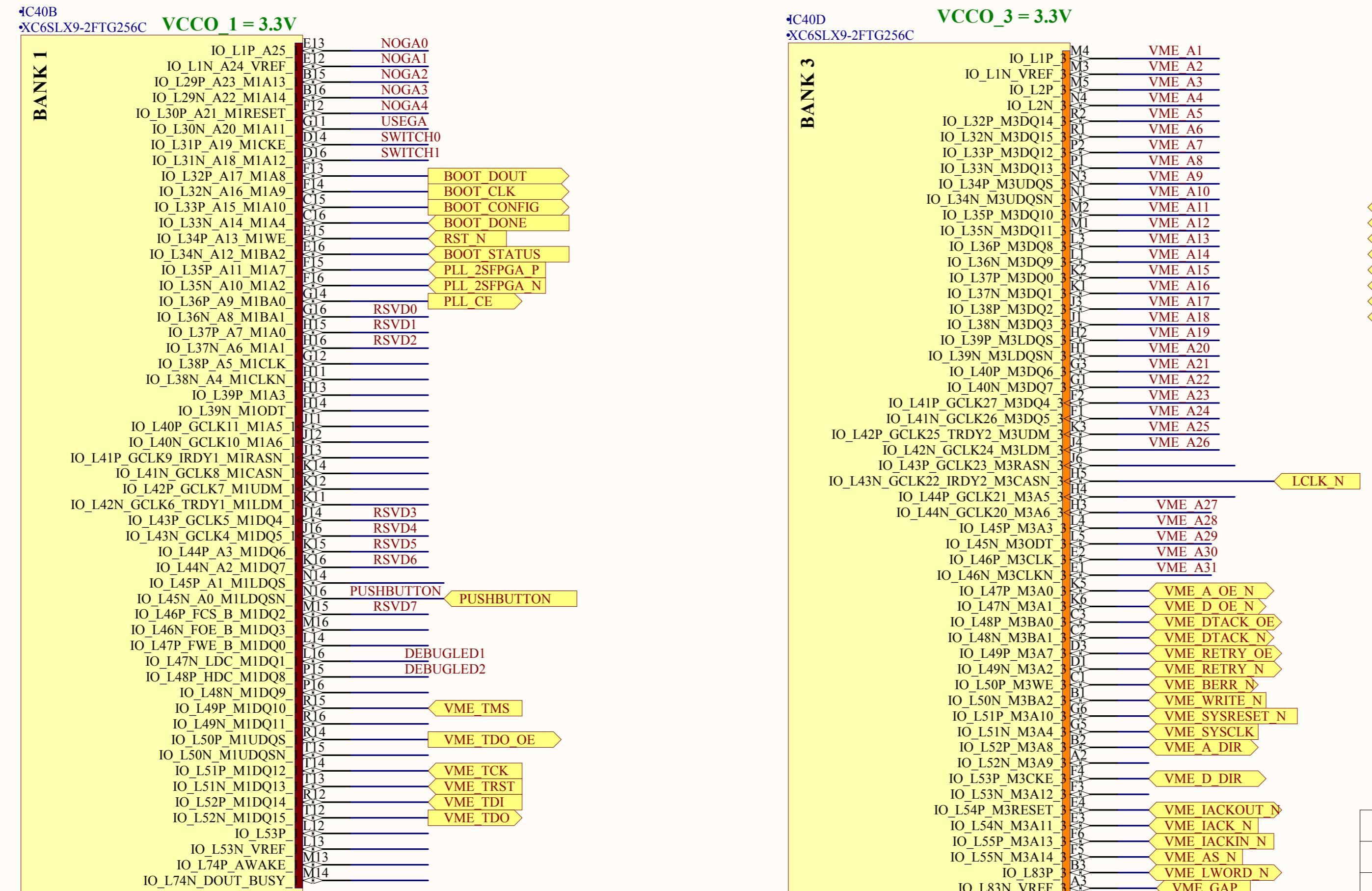
Project/Equipment	Simple VME Carrier Board
Document	Switching power supply
Designer	G.Kasprowicz
Drawn by	G.Kasprowicz
Check by	T.Janicki
Last Mod.	2012-05-01
File	Power_supplies.SchDoc
Print Date	2012-05-01 22:22:58
Sheet	14 of 21
European Organization for Nuclear Research CH-1211 Geneve 23 - Switzerland	EDA-xxxx
Size	A3
Rev	-

This documentation describes Open Hardware and is licensed under the CERN OHL v. 1.1. You may redistribute and modify this documentation under the terms of the CERN OHL v.1.1. (<http://ohwr.org/CERNOHL>).

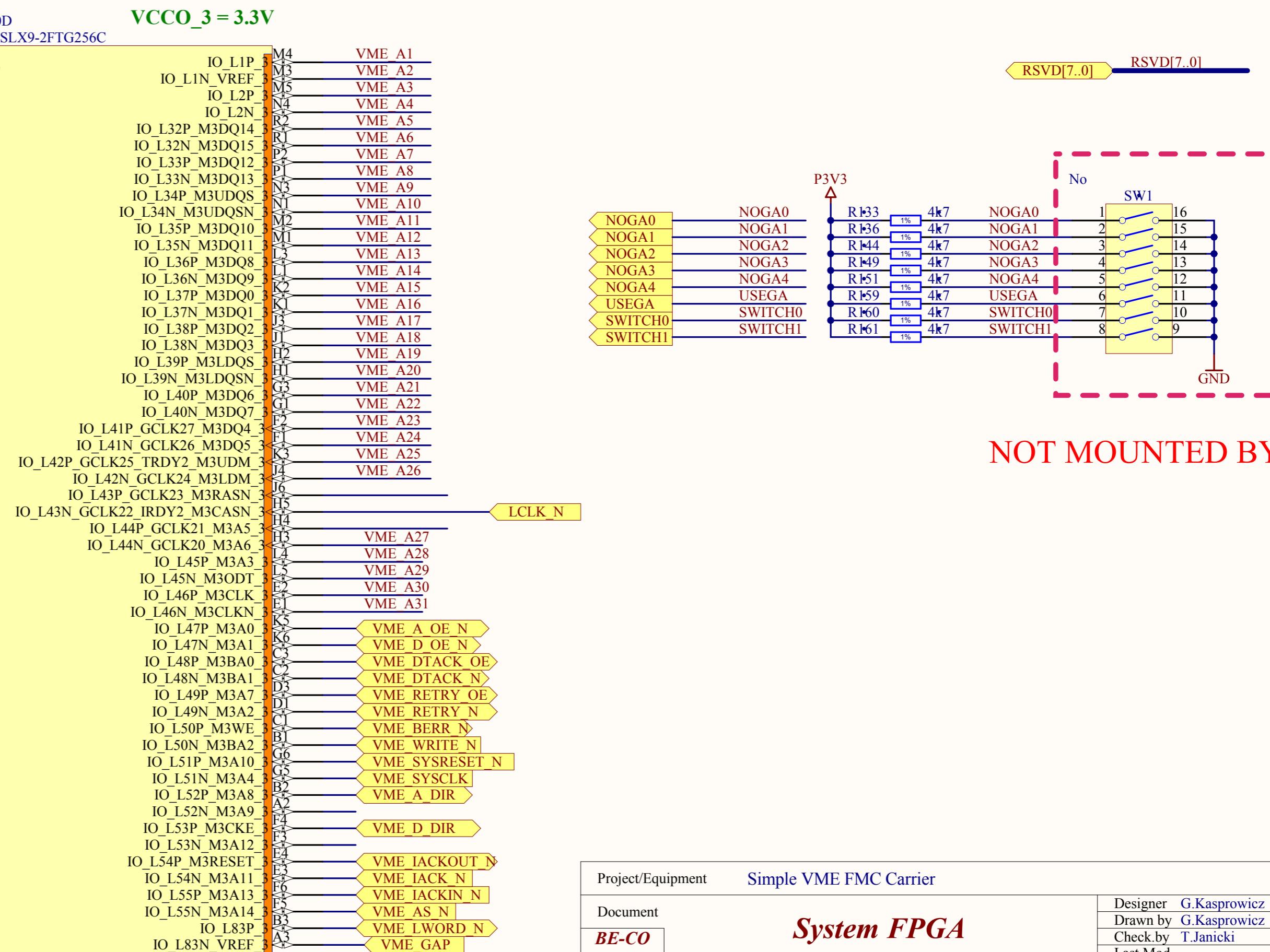
This documentation is distributed WITHOUT ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING OF MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE. Please see the CERN OHL v.1.1 for applicable conditions.



A



B



Project/Equipment		Simple VME FMC Carrier		
Document	BE-CO	Designer	G.Kasprowicz	
		Drawn by	G.Kasprowicz	20/11/2012
		Check by	T.Janicki	30/04/2012
		Last Mod.		2012-05-01
		File	SFPGA.SchDoc	
		Print Date	2012-05-01 22:22:58	
		Sheet	15 of 21	
		EDA-xxxx		
		Size	A3	-

This documentation describes Open Hardware and is licensed under the CERN OHL v. 1.1. You may redistribute and modify this documentation under the terms of the CERN OHL v.1.1. (<http://ohwr.org/CERNOHL>).

This documentation is distributed WITHOUT ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING OF MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE. Please see the CERN OHL v.1.1 for applicable conditions.

A

B

A

B

C

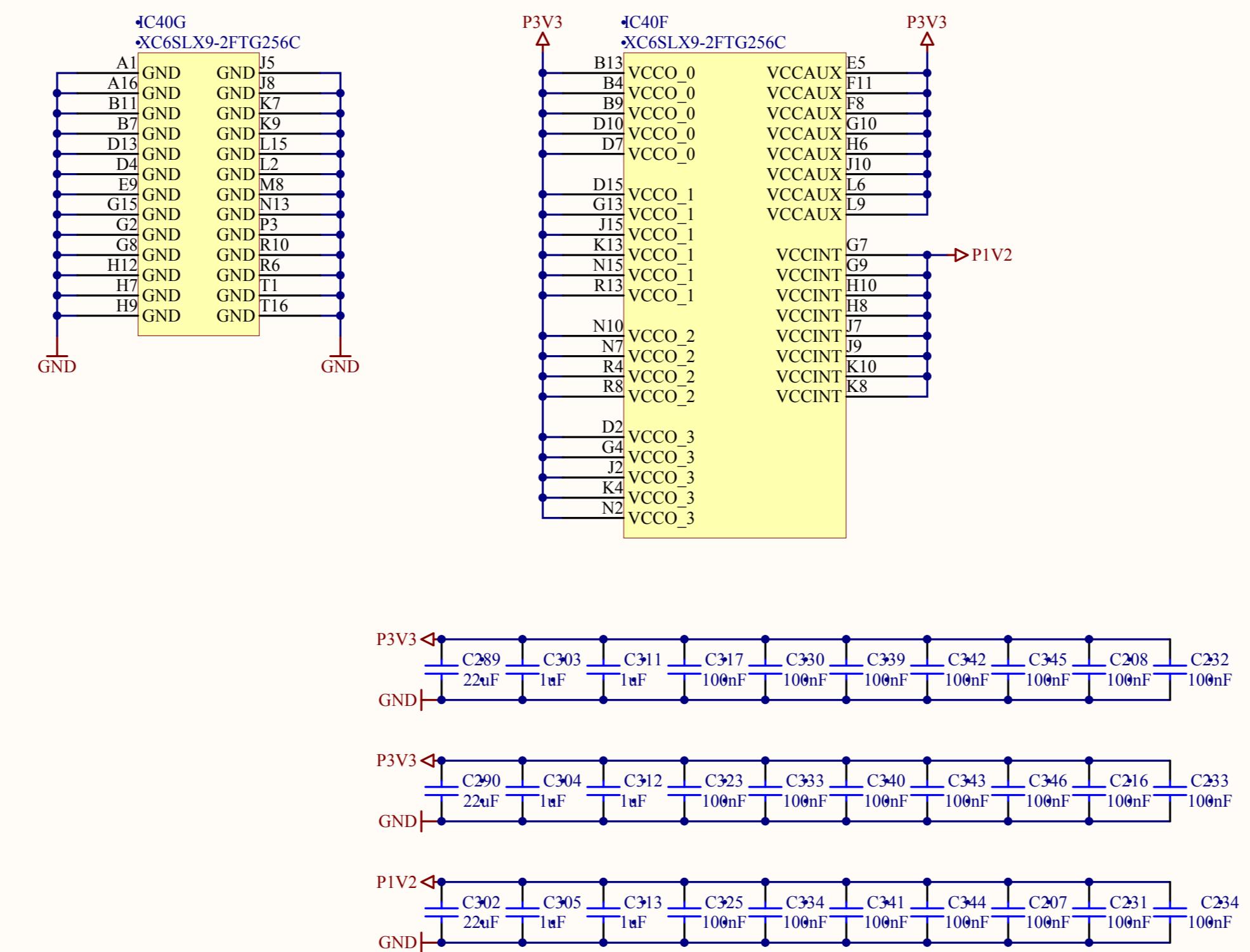
C

D

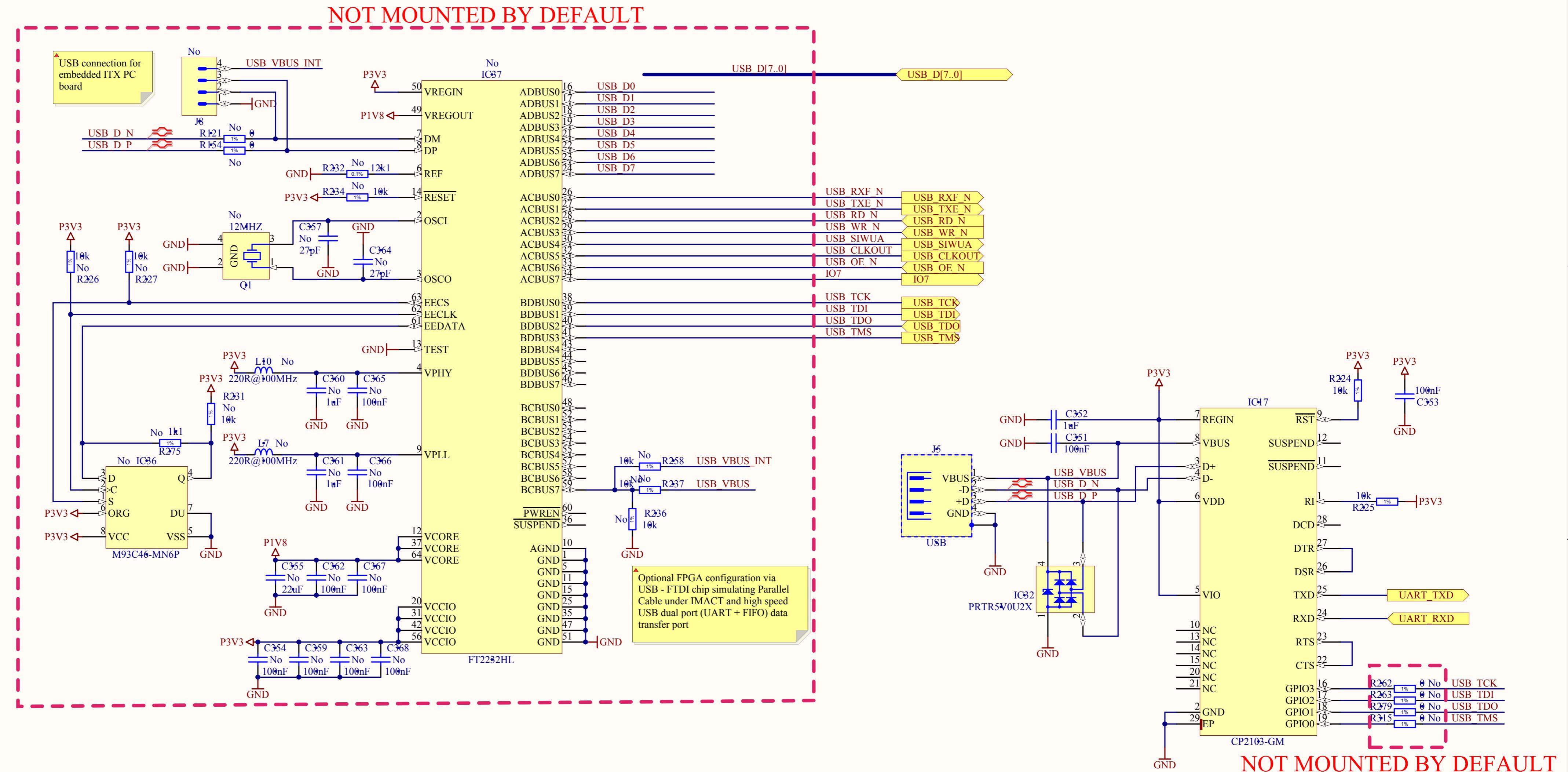
D

E

E

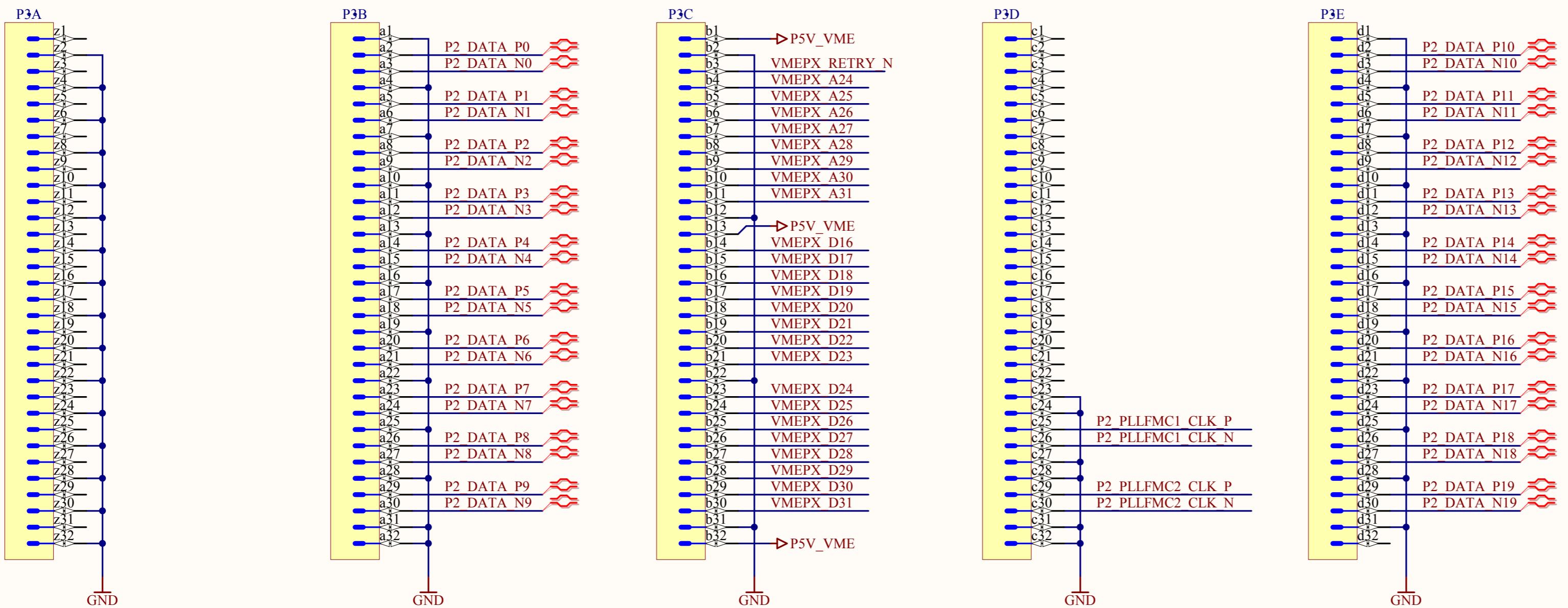


Project/Equipment		Simple VME FMC Carrier		
Document	BE-CO	System FPGA power		
Designer	G.Kasprowicz			
Drawn by	G.Kasprowicz			20/11/2012
Check by	T.Janicki			30/04/2012
Last Mod.				2012-05-01
File	SFPGA_power.SchDoc			
Print Date	2012-05-01 22:22:58	Sheet	16 of 21	
European Organization for Nuclear Research CH-1211 Geneve 23 - Switzerland		EDA-xxxx		Size A3 Rev -



This documentation describes Open Hardware and is licensed under the CERN OHL v. 1.1. You may redistribute and modify this documentation under the terms of the CERN OHL v.1.1. (<http://ohwr.org/CERNOHL>).

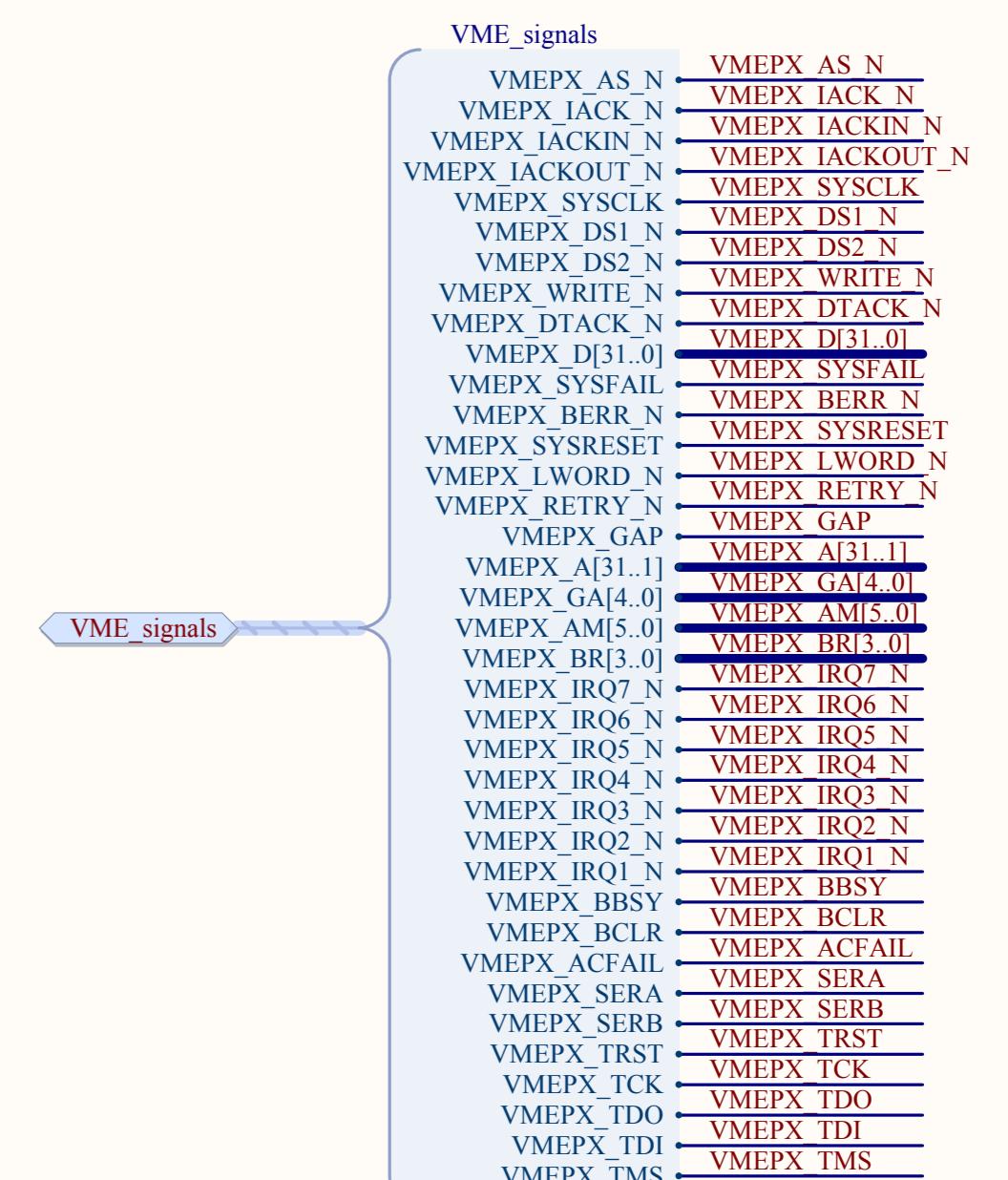
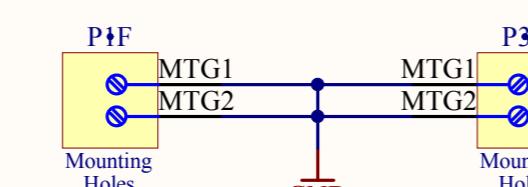
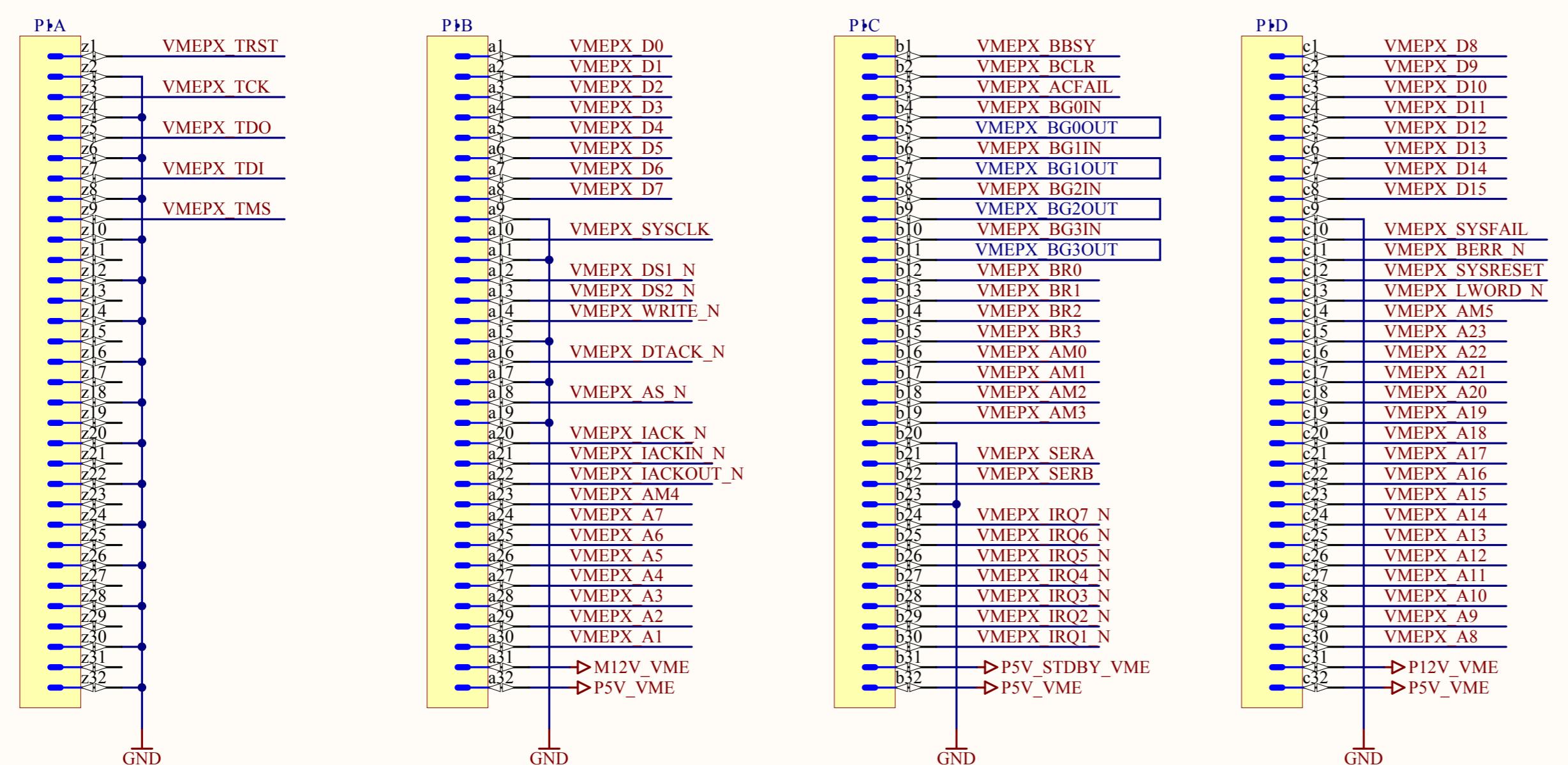
This documentation is distributed WITHOUT ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING OF MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE. Please see the CERN OHL v.1.1 for applicable conditions.



P2_PLLFMC1_CLK_P
P2_PLLFMC1_CLK_N
P2_PLLFMC2_CLK_P
P2_PLLFMC2_CLK_N

100ohms diff. pairs

P2_DATA_P[19..0] P2_DATA_P[19..0]
P2_DATA_N[19..0] P2_DATA_N[19..0]

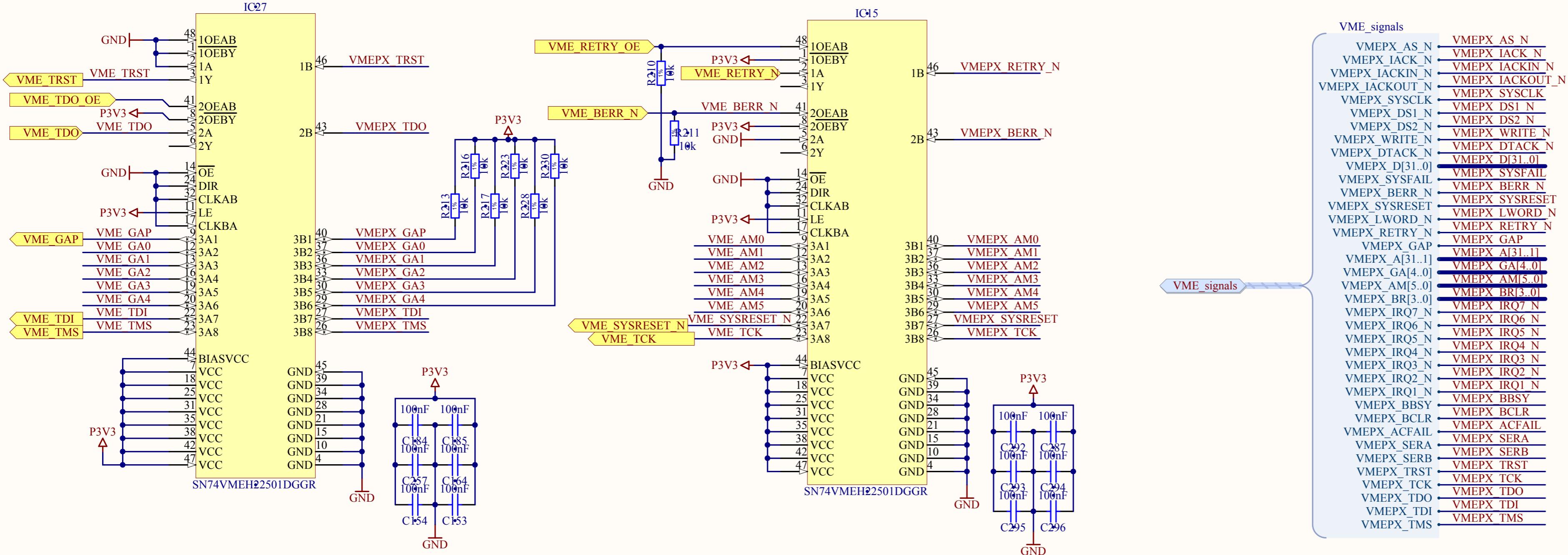


Project/Equipment		Simple VME FMC Carrier		
Document		Designer	G.Kasprowicz	26/04/2012
BE-CO		Drawn by	G.Kasprowicz	
		Check by	T.Janicki	30/04/2012
		Last Mod.	-	2012-05-01
		File	VME_connectors.SchDoc	
		Print Date	2012-05-01 22:22:59	Sheet 18 of 21
		EDA-xxxxx		Size A3 - Rev -

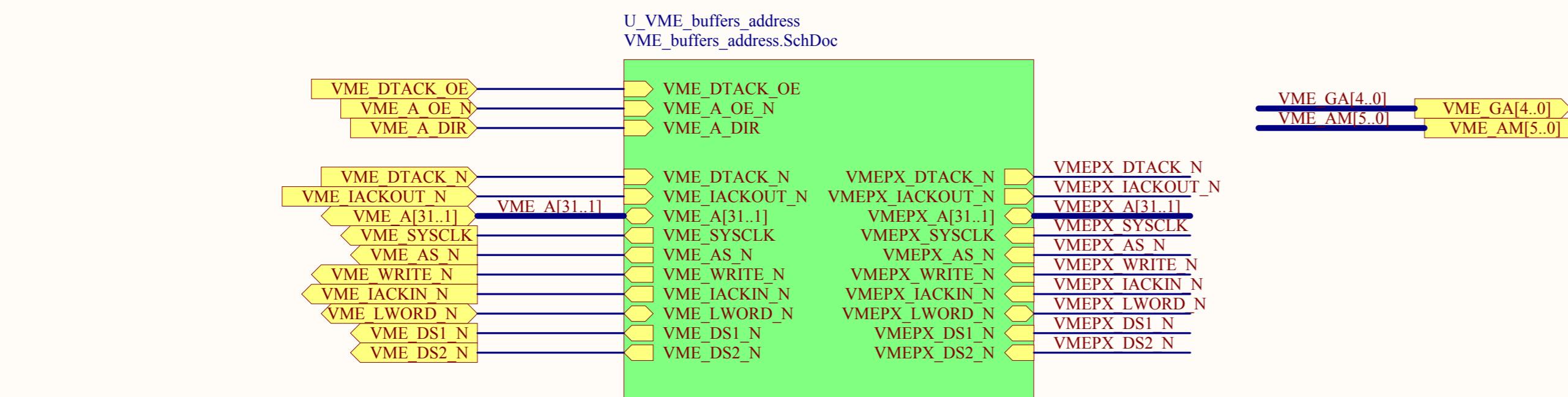
This documentation describes Open Hardware and is licensed under the CERN OHL v. 1.1. You may redistribute and modify this documentation under the terms of the CERN OHL v.1.1. (<http://ohwr.org/CERNOHL>).

This documentation is distributed WITHOUT ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING OF MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE. Please see the CERN OHL v.1.1 for applicable conditions.

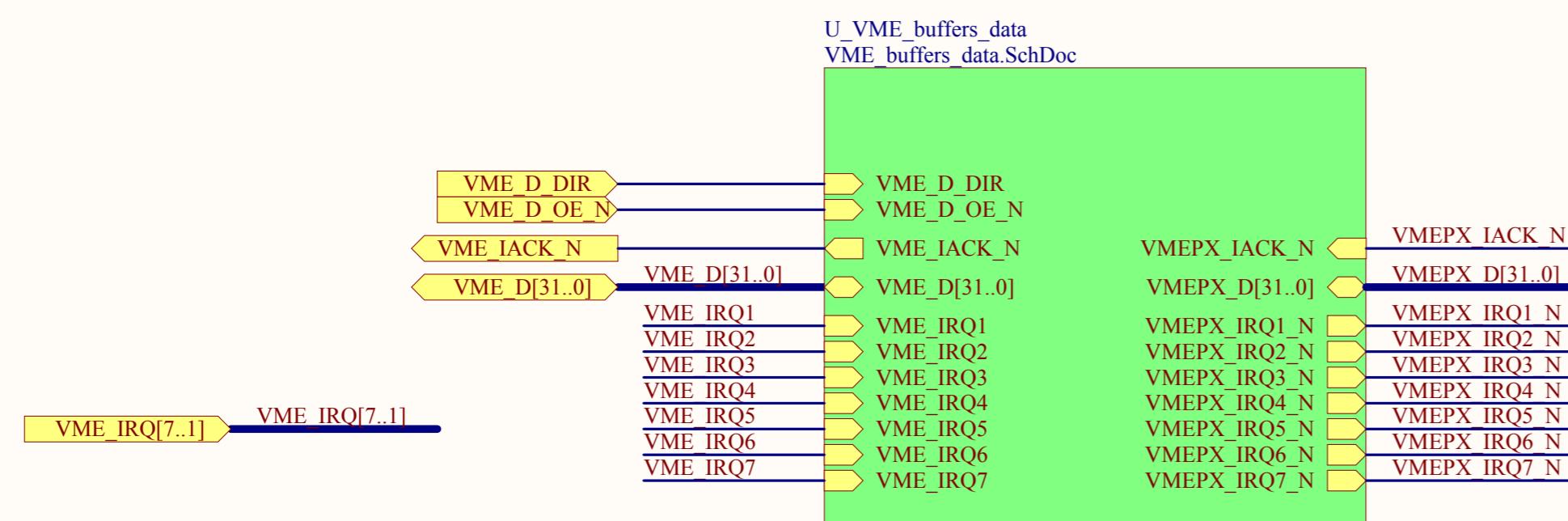
A



C



D

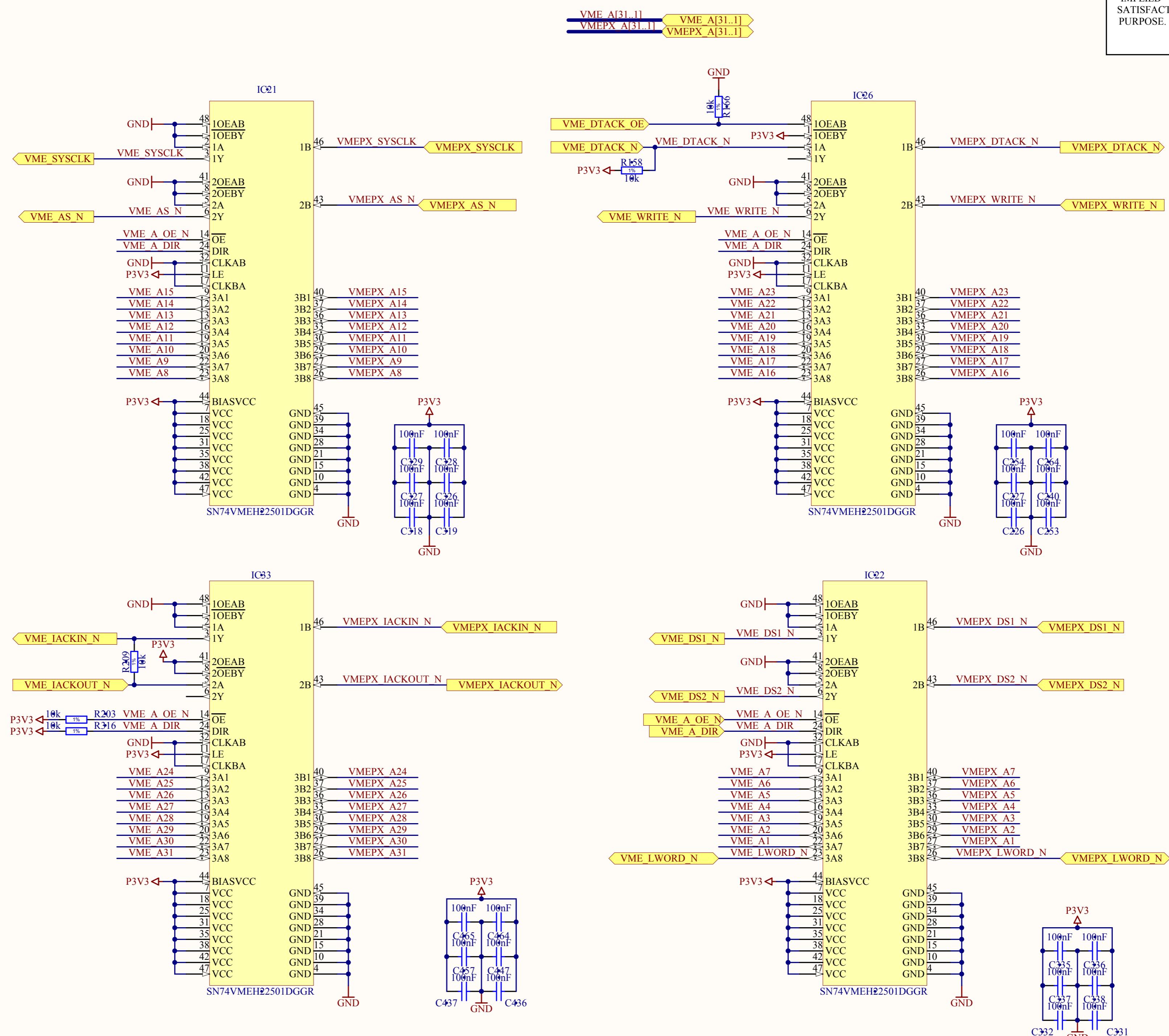


E

Project/Equipment		Simple VME FMC Carrier		
Document	VME buffers			Rev
BE-CO	G.Kasprowicz	Drawn by	G.Kasprowicz	26/04/2012
		Check by	T.Janicki	30/04/2012
		Last Mod.	-	2012-05-01
		File	VME_buffers.SchDoc	
		Print Date	2012-05-01 22:22:59	Sheet 19 of 21
		European Organization for Nuclear Research CH-1211 Geneve 23 - Switzerland		Size A3
			EDA-xxxxx	Rev -

This documentation describes Open Hardware and is licensed under the CERN OHL v. 1.1. You may redistribute and modify this documentation under the terms of the CERN OHL v.1.1. (<http://ohwr.org/CERNOHL>).

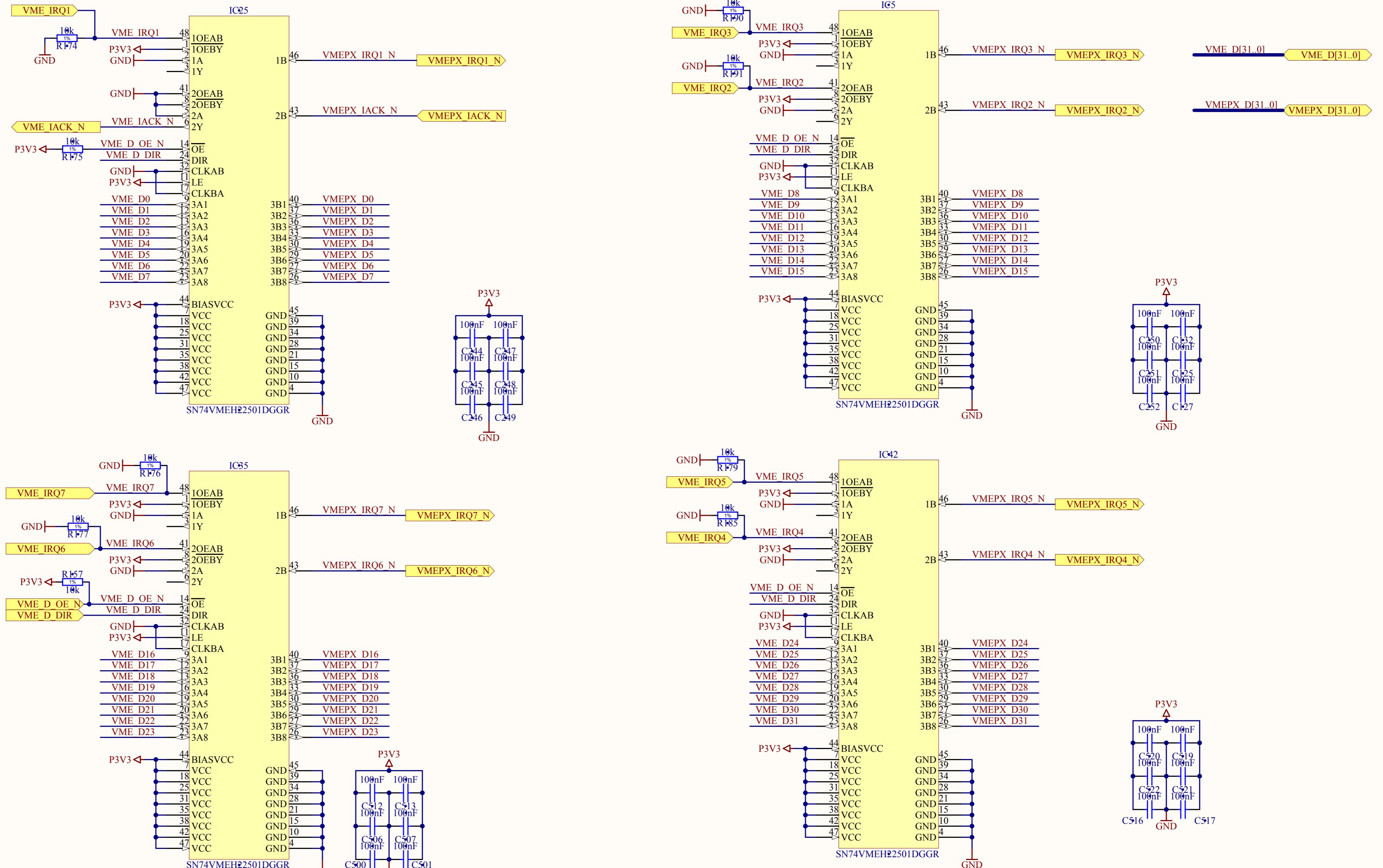
This documentation is distributed WITHOUT ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING OF MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE. Please see the CERN OHL v.1.1 for applicable conditions.



Project/Equipment		Simple VME FMC Carrier		
Document	BE-CO	Designer	G.Kasprowicz	30/04/2012
		Drawn by	G.Kasprowicz	
		Check by	T.Janicki	30/04/2012
		Last Mod.	-	2012-05-01
		File	VME buffers address.SchDoc	
		Print Date	2012-05-01 22:22:59	Sheet 20 of 21
		Size	A3	Rev -
European Organization for Nuclear Research CH-1211 Geneve 23 - Switzerland			EDA-xxxx	

This documentation describes Open Hardware and is licensed under the CERN OHL v. 1.1. You may redistribute and modify this documentation under the terms of the CERN OHL v.1.1. (<http://ohwr.org/CERNOHL>).

This documentation is distributed WITHOUT ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING OF MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE. Please see the CERN OHL v.1.1 for applicable conditions.



Project/Equipment	Simple VME FMC Carrier	Document	Designer
BE-CO	VME buffers - data part -	G.Kasprowicz	
CERN		Drawn by	G.Kasprowicz
		Check by	T.Janicki
		Last Mod.	-
		Date	2012-05-01
		File	VME buffers_data.SchDoc
		Print Date	2012-05-01 22:22:59
		Sheet	21 of 21
		Size	A3
		Rev	-

European Organization for Nuclear Research
CH-1211 Geneve 23 - Switzerland

EDA-xxxxx