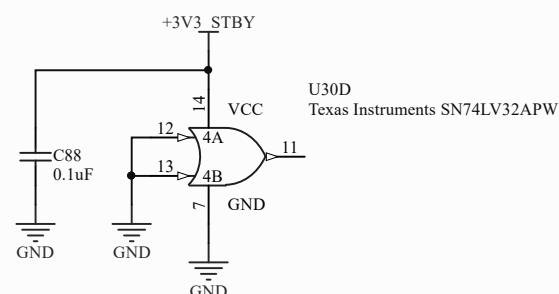
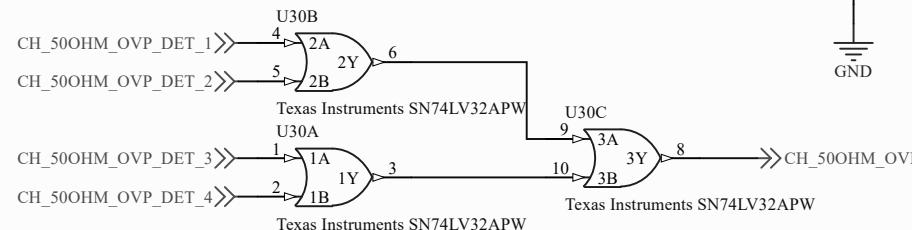
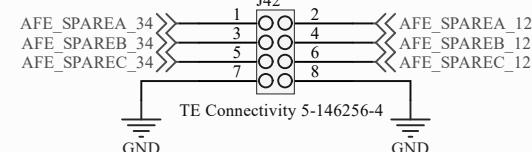
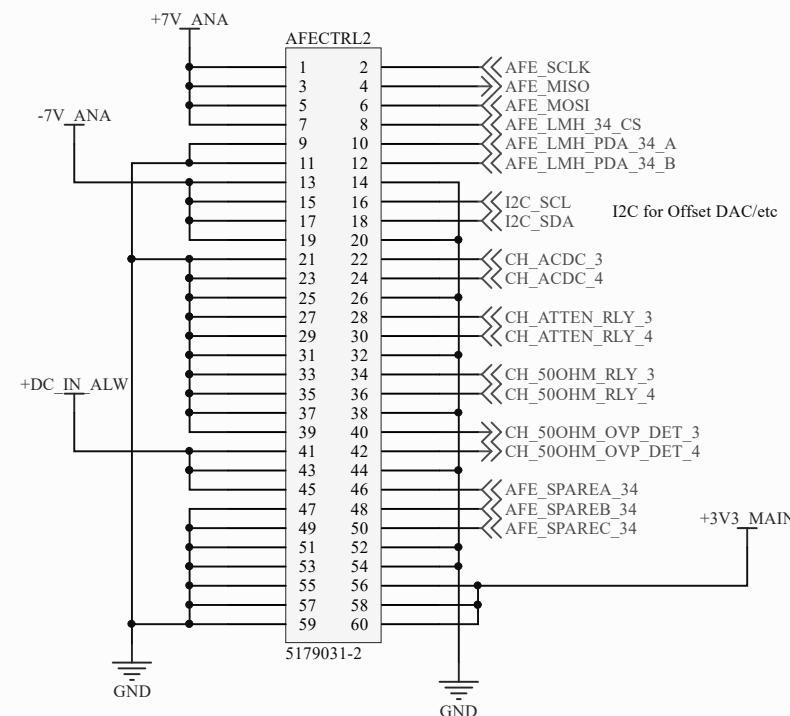
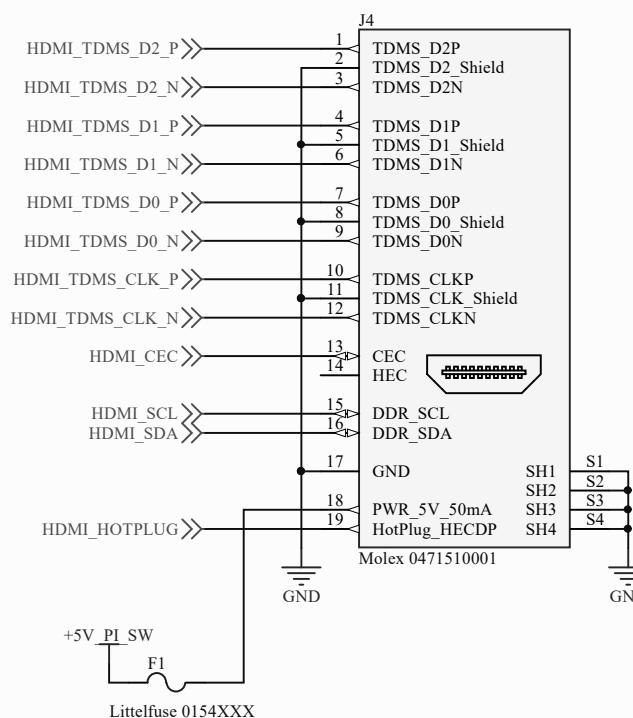
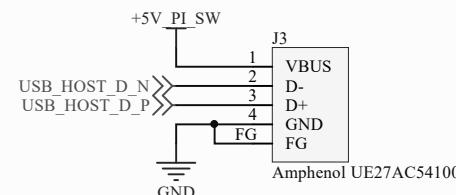
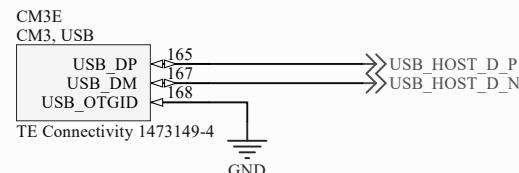
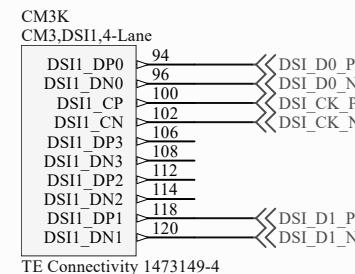
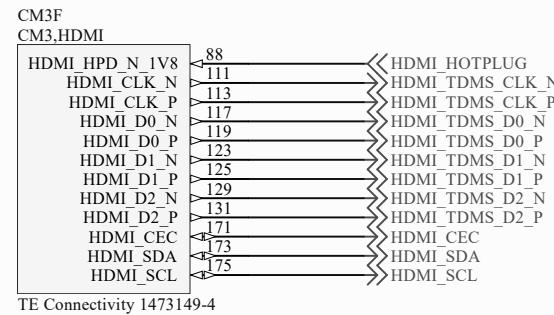
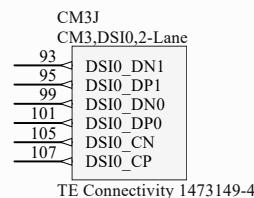
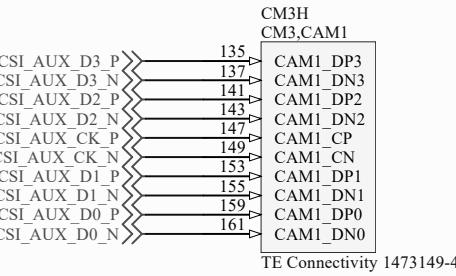
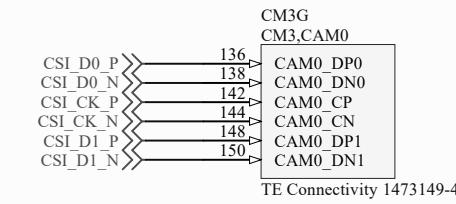


TODO: Check SATA system impedance and design correct impedance matching in



Scopy Minimum Viable Prototype			Tomato Engineering Ltd. 12 Greenfield Avenue Leeds, West Yorkshire LS27 7AH
Size: A4	Engineer: Tom Oldbury	Revision: A	United Kingdom
Date: 28/11/2020	Time: 21:14:11		
File: AFE Module Connections.SchDoc			

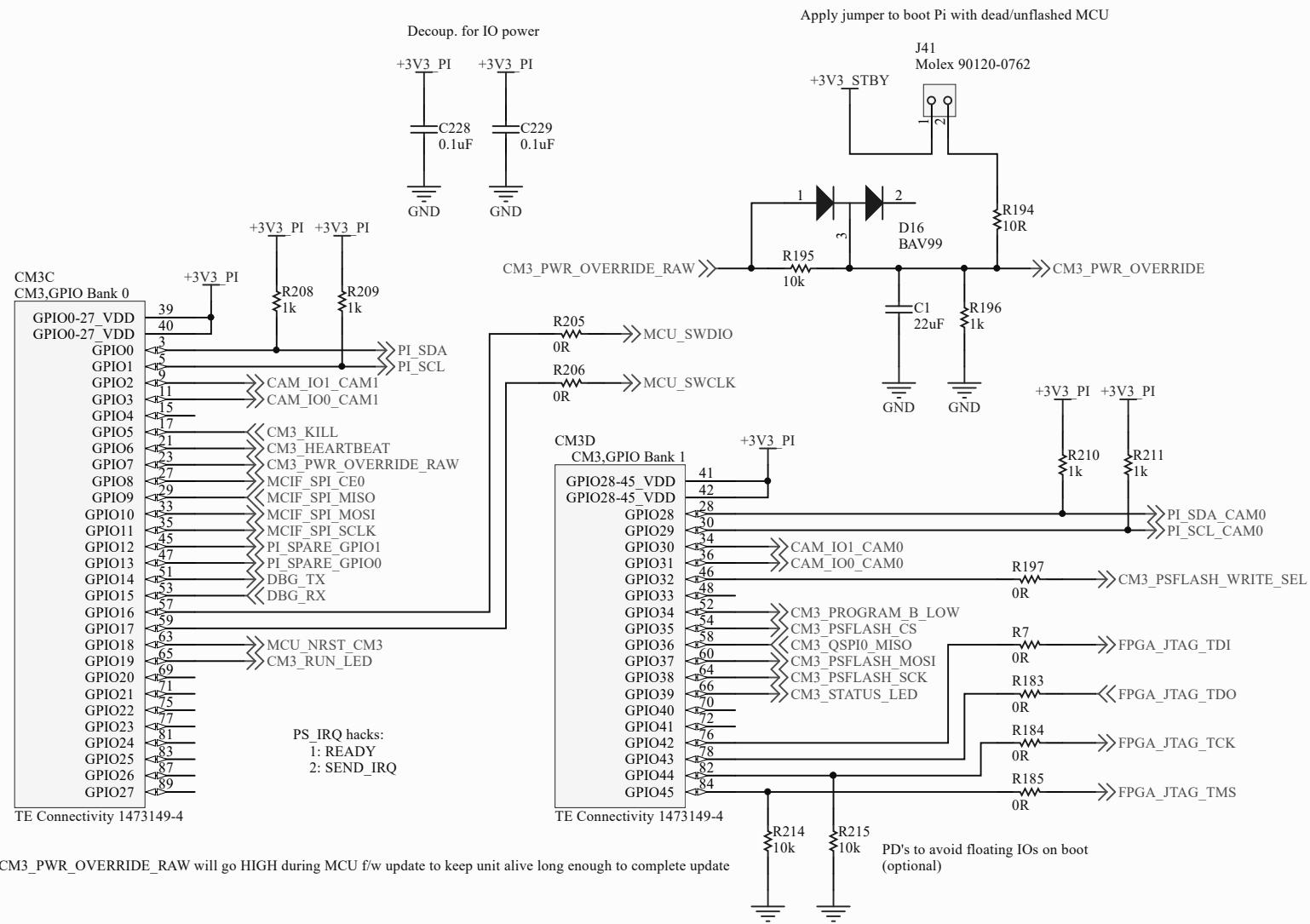
A



Scopy Minimum Viable Prototype

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LS27 7AH
United Kingdom

Size: A4 Engineer: Tom Oldbury Revision: A
Date: 28/11/2020 Time: 21:14:11
File: Compute Module - High Speed IO.SchDoc



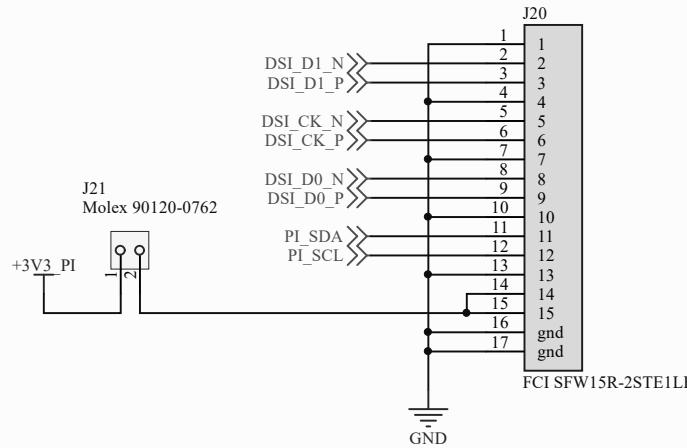
Scopy Minimum Viable Prototype

Size: A4	Engineer: Tom Oldbury	Revision: A
Date: 28/11/2020	Time: 21:14:12	United Kingdom
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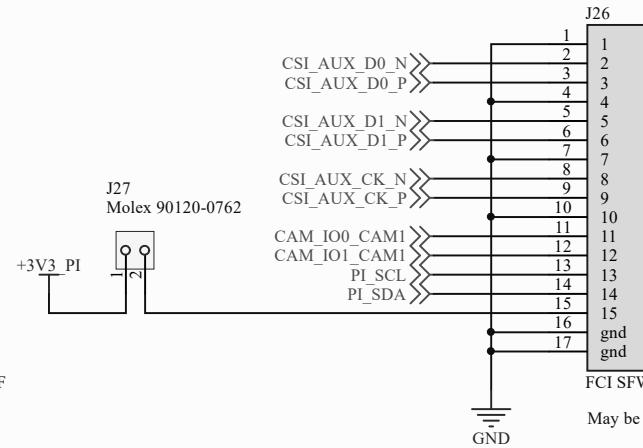
Tomato Engineering Ltd.
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Leeds, West Yorkshire
LS27 7AH
United Kingdom

A

RasPi display connector (option)

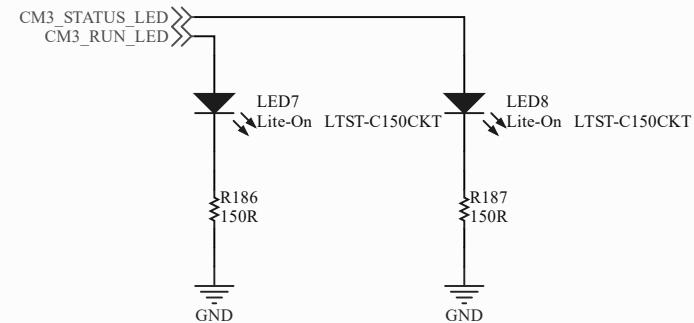
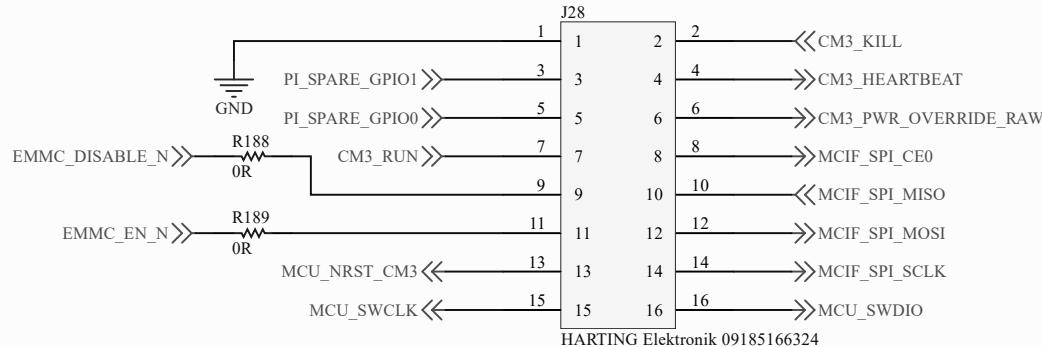


B



Bidirectional camera interface connector
Connected to CAM1 on CM3
May be used by Pi CM3 to connect to ext. camera if FPGA CSI is inhibited

C

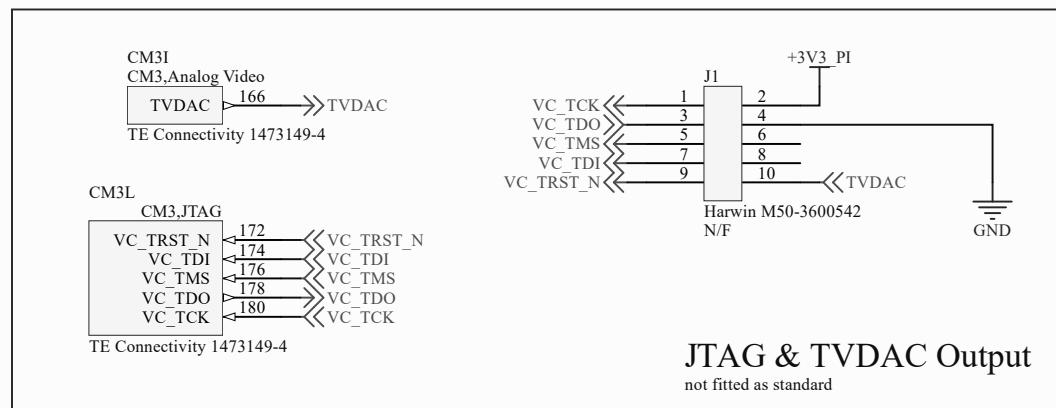


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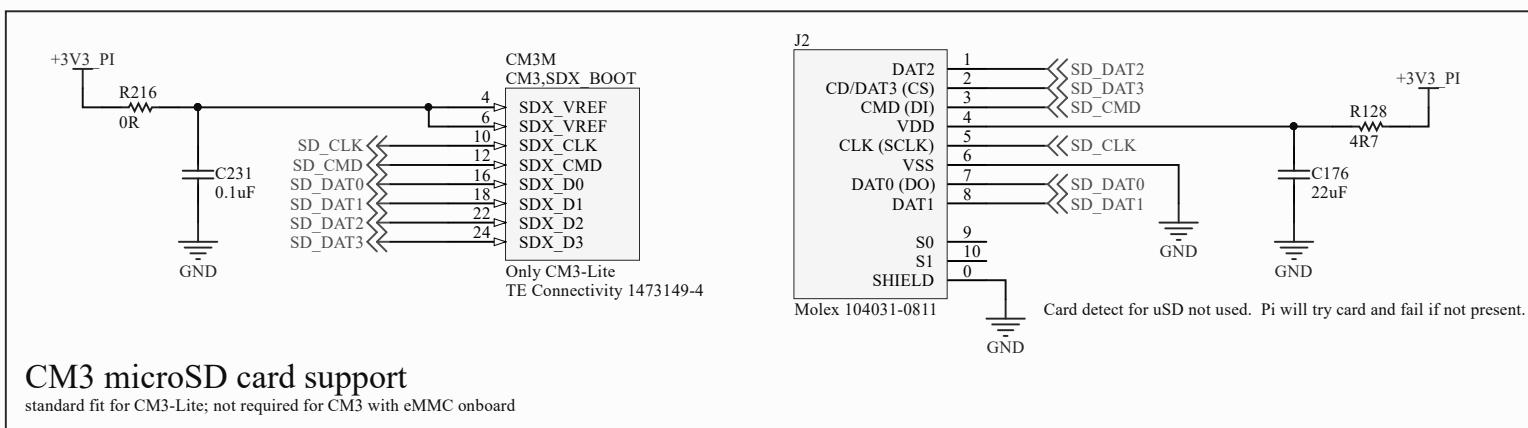
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Date: 28/11/2020	Time: 21:14:12	
File: Compute Module - Misc IO 2.SchDoc		

A



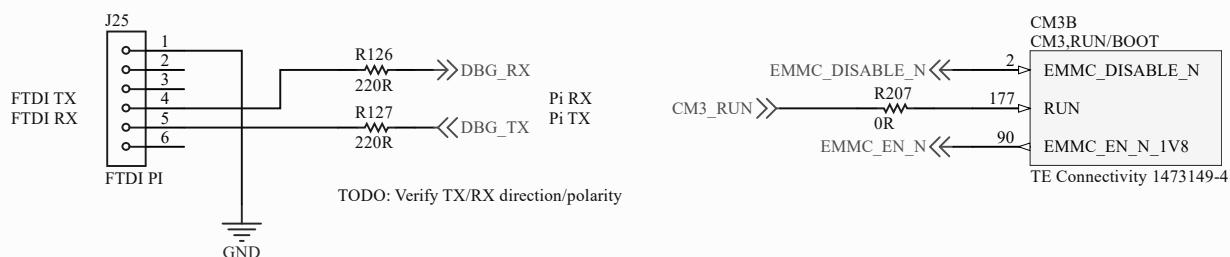
A

B



B

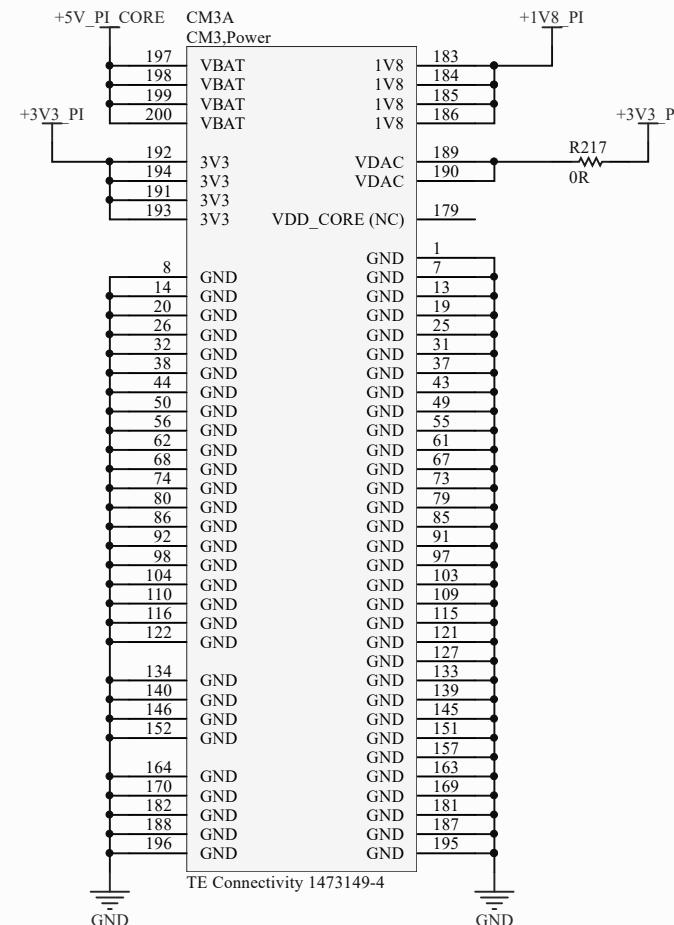
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C

D

Scopy Minimum Viable Prototype			Tomato Engineering Ltd. 12 Greenfield Avenue Leeds, West Yorkshire LS27 7AH United Kingdom
Size: A4	Engineer: Tom Oldbury	Revision: A	
Date: 28/11/2020	Time: 21:14:12		
File: Compute Module - Misc IO 3.SchDoc			



Scopy Minimum Viable Prototype

*Tomato Engineering Ltd.
12 Greenfield Avenue
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United Kingdom*

Size: A4 Engineer: Tom Oldbury Revision: A

Date: 28/11/2020 Time: 21:14:12

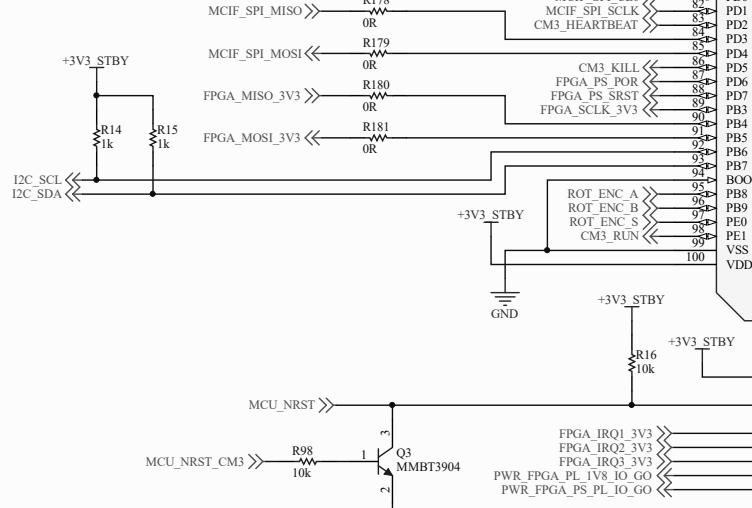
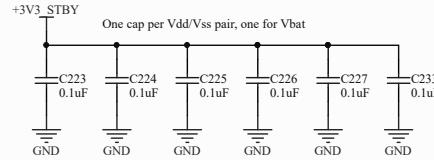
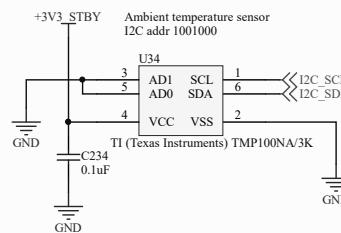
1

1

2

13

4



MCU_NRST >>
MCU_NRST_CM3 >>

R98
10k
Q3
MMBT3904

These can also be general IOs or heartbeats etc from the Zynq PS

DBG LED_1
DBG LED_2
DBG LED_3
SPARE_PC1

FPGA_IRO1_3V3
FPGA_IRO2_3V3
FPGA_IRO3_3V3
PWR_FPGA_PL_I18_IO_GO
PWR_FPGA_PS_PL_IO_GO

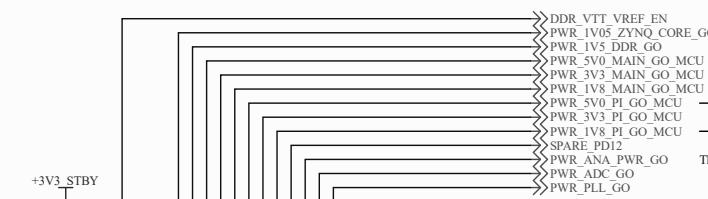
PWR_FPGA_AUX_PLL_ADC_GO
FPGA_PS_IRO1
FPGA_PS_IRO2
FPGA_PS_IRO3
FPGA_PS_IRO4

These can also be general IOs or heartbeats etc from the Zynq PS

DBG LED_1
DBG LED_2
DBG LED_3
SPARE_PC1

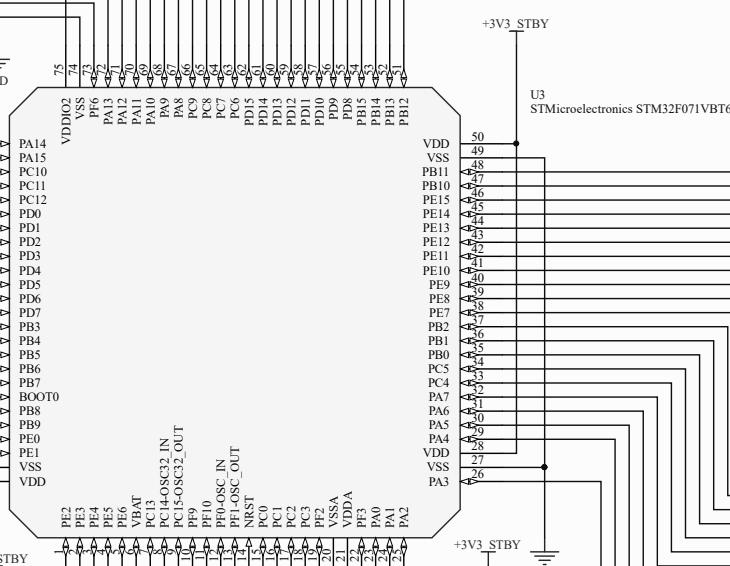
FPGA_IRO1_3V3
FPGA_IRO2_3V3
FPGA_IRO3_3V3
PWR_FPGA_PL_I18_IO_GO
PWR_FPGA_PS_PL_IO_GO

PWR_FPGA_AUX_PLL_ADC_GO
FPGA_PS_IRO1
FPGA_PS_IRO2
FPGA_PS_IRO3
FPGA_PS_IRO4



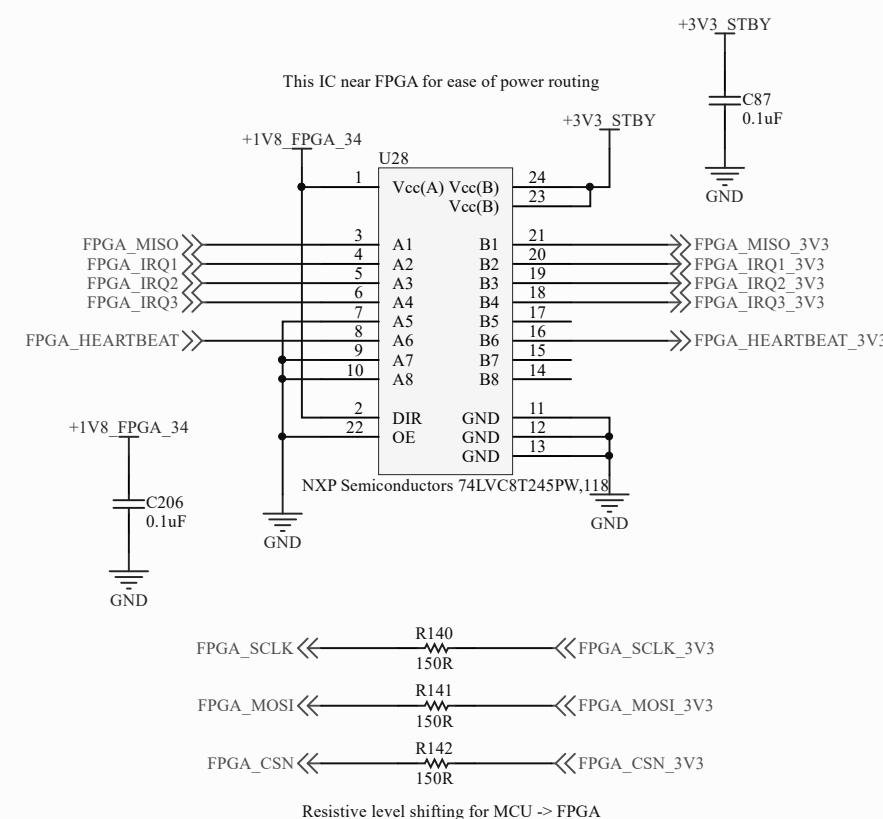
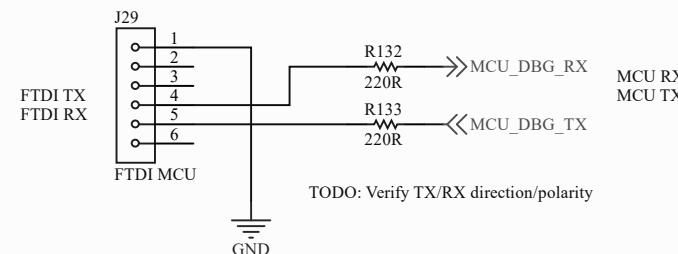
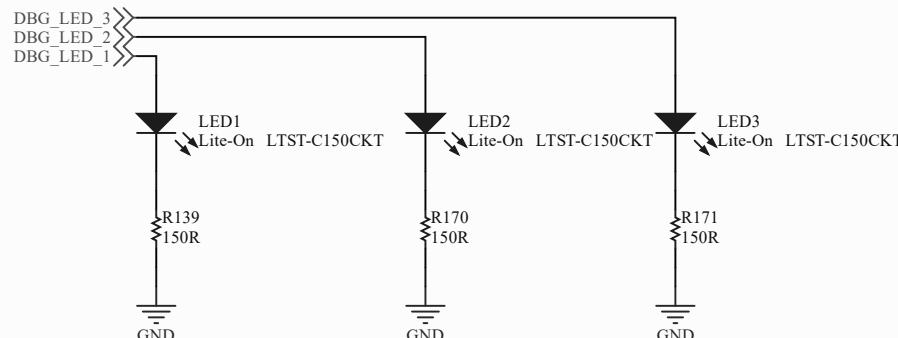
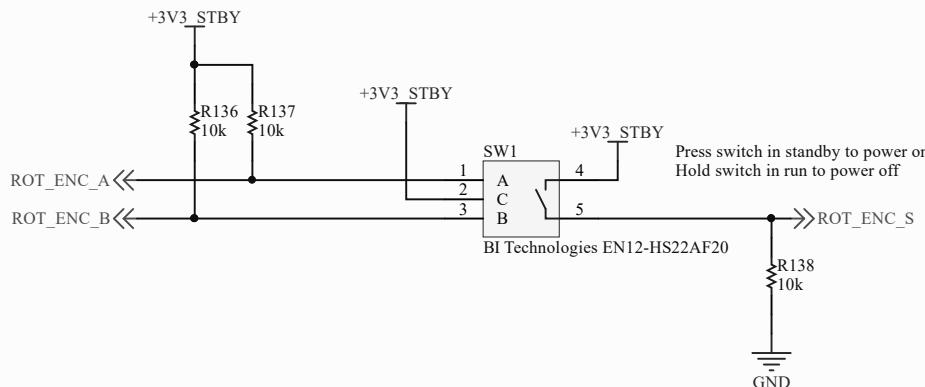
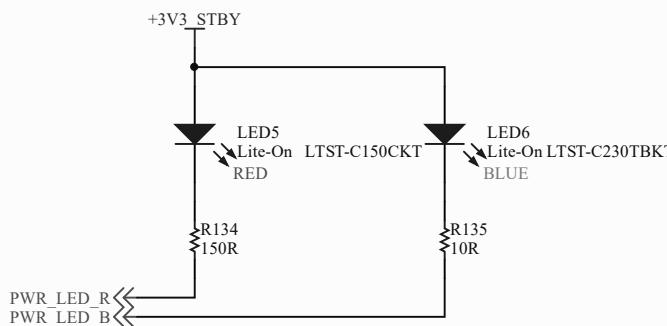
This line exported to external +/-7V power supply board

MCU SPI config:
MCIF - from CM3 - is slave
FPGA - to Zynq PL - is master
ADC - bitbanged - is master (no rx)
PLL - bitbanged - is master (no rx)
AFE - bitbanged - is master (unlikely to rx)



CH_500HM_OVP
CH_ACDC_3
CH_ACDC_4
CH_ATTEM_RLY_3
CH_ATTEM_RLY_4
CH_500HM_RLY_3
CH_500HM_RLY_4
CH_ACDC_1
CH_ACDC_2
CH_ATTEM_RLY_1
CH_500HM_RLY_1
CH_500HM_RLY_2

PLL_LOCKDET
PLL_RFPDN
PLL_SDATA
PLL_CSN
PLL_LE
PLL_SCLK
AFE_LMH_34_CS
AFE_LMH_12_CS
AFE_LMH_PDA_34_A
AFE_LMH_PDA_34_B
AFE_LMH_PDA_12_A
AFE_LMH_PDA_12_B
AFE_MOSI
AFE_MISO
AFE_SCLK
ADC_RSTN_3V3
ADC_PD_3V3
ADC_CSN_3V3
ADC_SDATA_3V3
ADC_SCLK_3V3

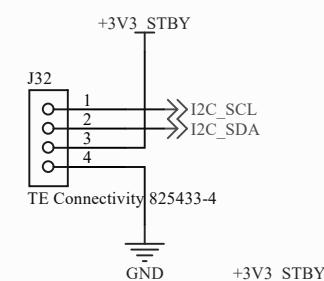
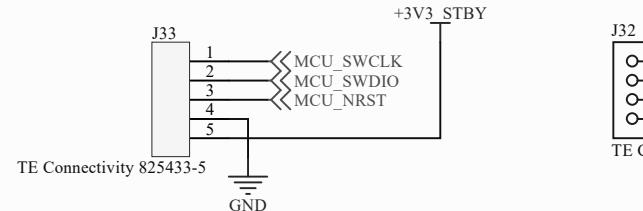


Scopy Minimum Viable Prototype

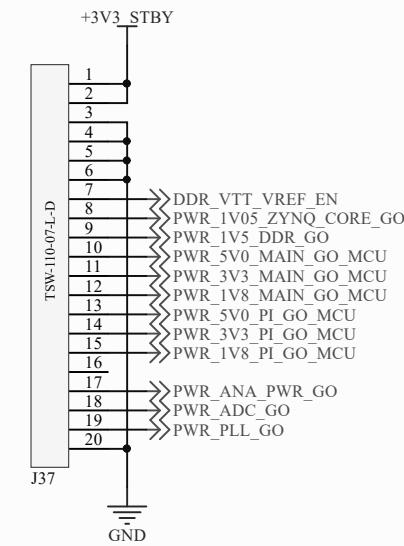
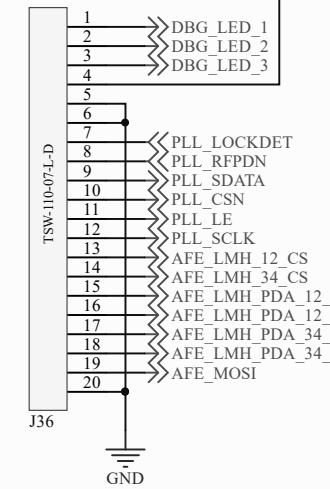
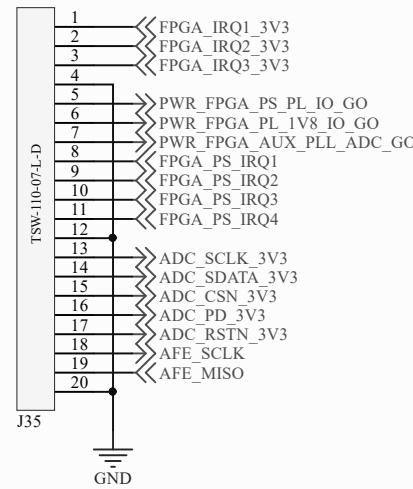
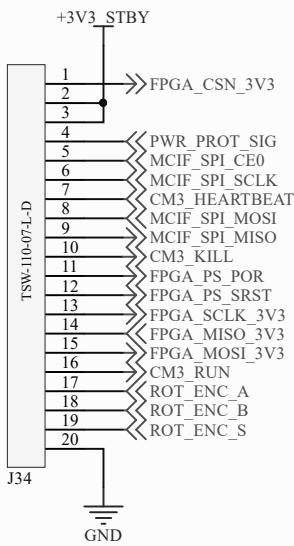
Size: A4	Engineer: Tom Oldbury	Revision: A
Date: 28/11/2020	Time: 21:14:12	
File: Control MCU 2.SchDoc		Tomato Engineering Ltd. 12 Greenfield Avenue Leeds, West Yorkshire LS27 7AH United Kingdom

Headers to test/replace/expand MCU signals if needed

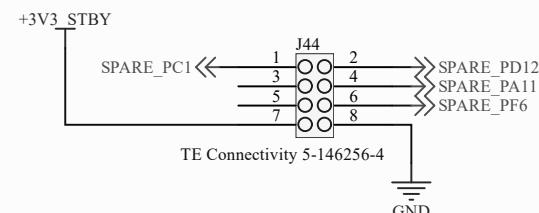
A



B



C



Scopy Minimum Viable Prototype			Tomato Engineering Ltd. 12 Greenfield Avenue Leeds, West Yorkshire LS27 7AH United Kingdom
Size: A4	Engineer: Tom Oldbury	Revision: A	
Date: 28/11/2020	Time: 21:14:12		
File: Control MCU 3.SchDoc			

D

A

A

B

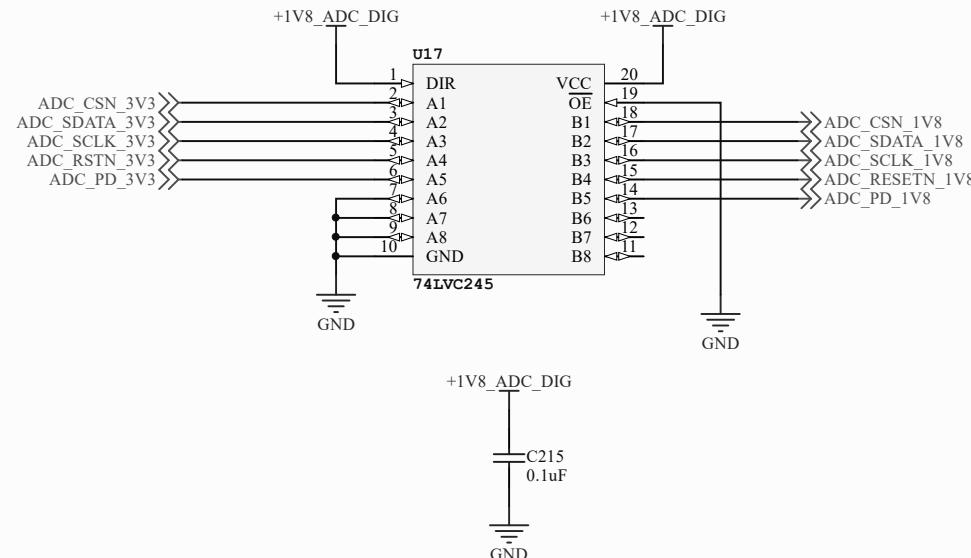
B

C

C

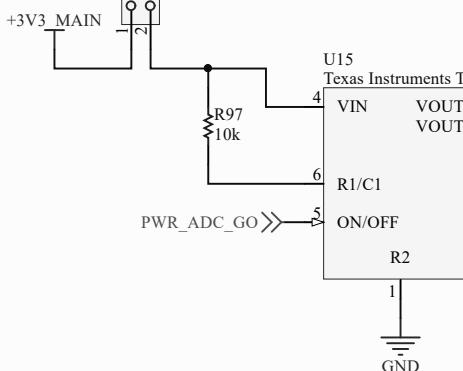
D

D

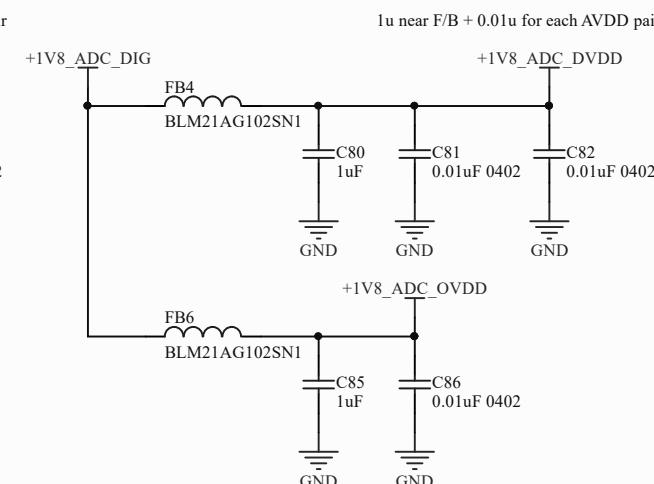
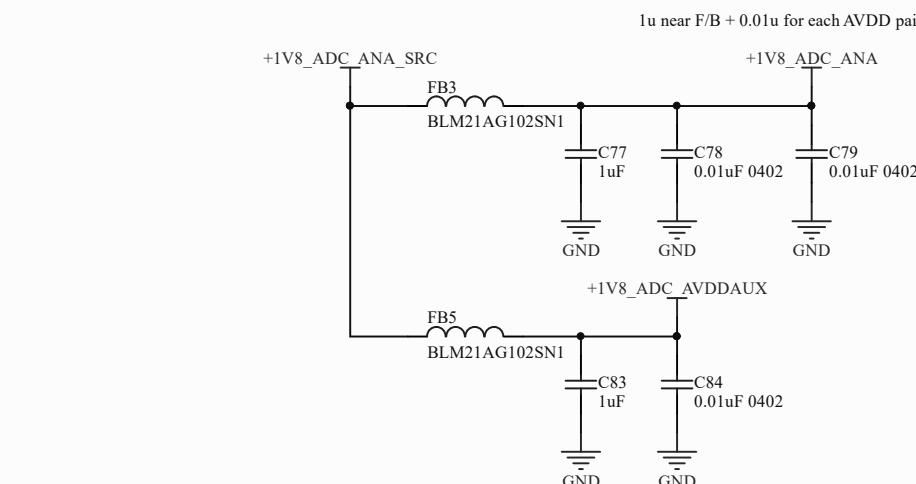
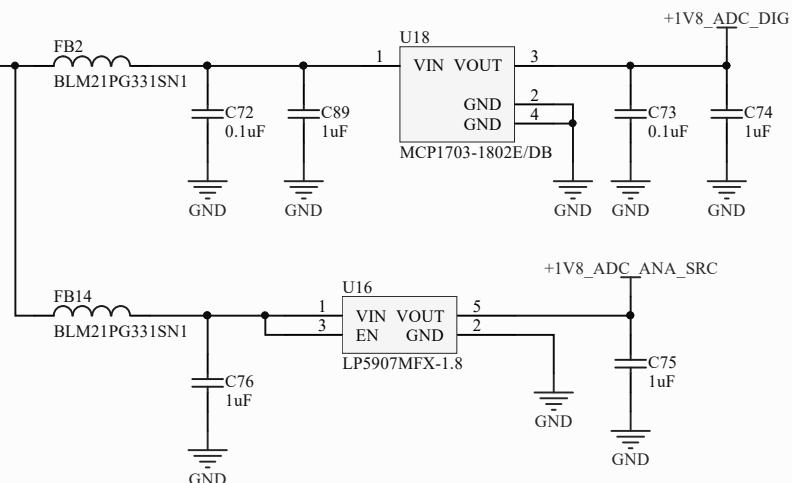

Scopy Minimum Viable Prototype

Size: A4	Engineer: Tom Oldbury	Revision: A
Date: 28/11/2020	Time: 21:14:12	United Kingdom
File: Main ADC - Level Shifter.SchDoc		

1 2 3 4

J7
Molex 90120-0762

Ferrite bead choices:
 BLM41PG181SN1L - Low RF impedance (180R @ 100MHz), 0.02R DCR, 3.5A rating
 BLM21PG331SN1 - Mid RF impedance (330R @ 100MHz), 0.07R DCR, 1A rating
 BLM21AG102SN1 - High RF impedance (1k @ 100MHz), 0.27R DCR, 600mA rating

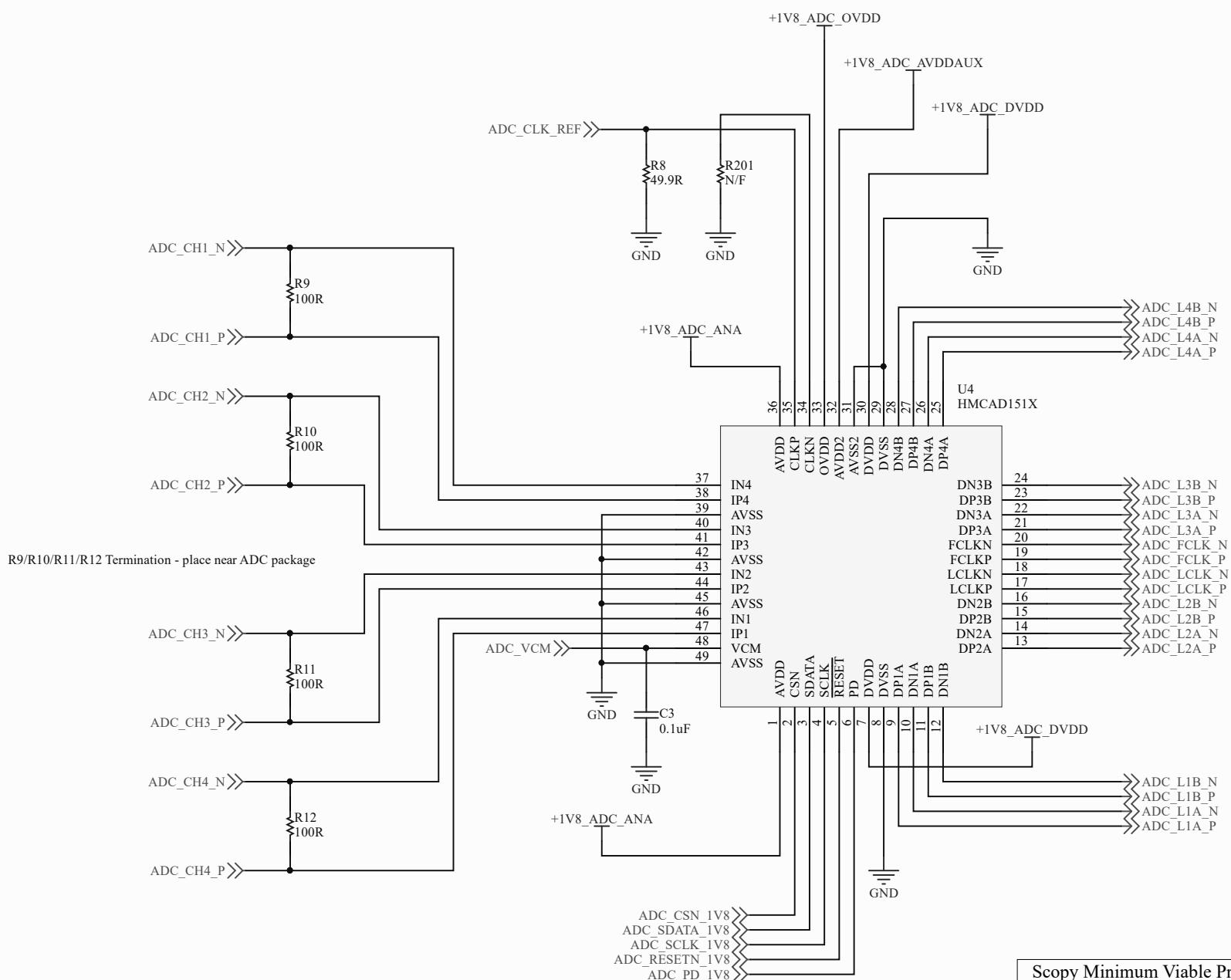


Scopy Minimum Viable Prototype

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 United Kingdom

Size: A4	Engineer: Tom Oldbury	Revision: A
Date: 28/11/2020	Time: 21:14:12	
File: Main ADC - Power.SchDoc		

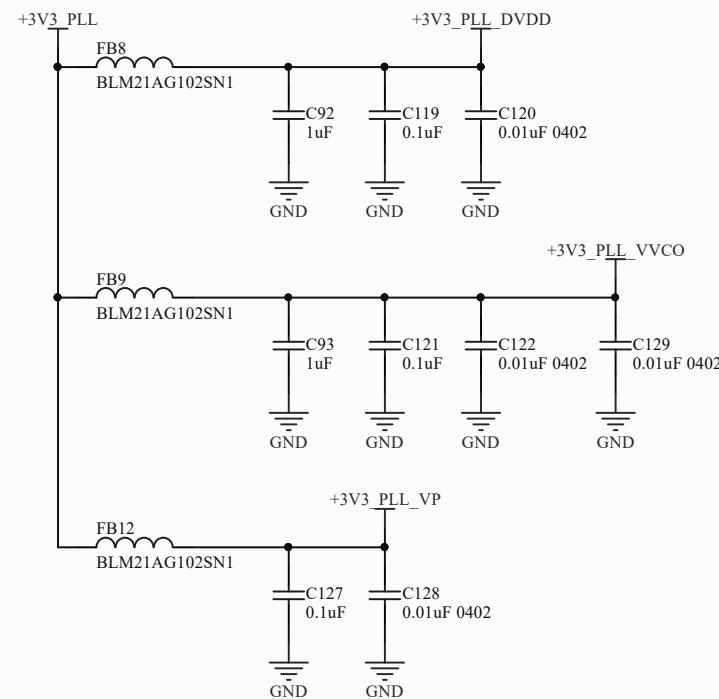
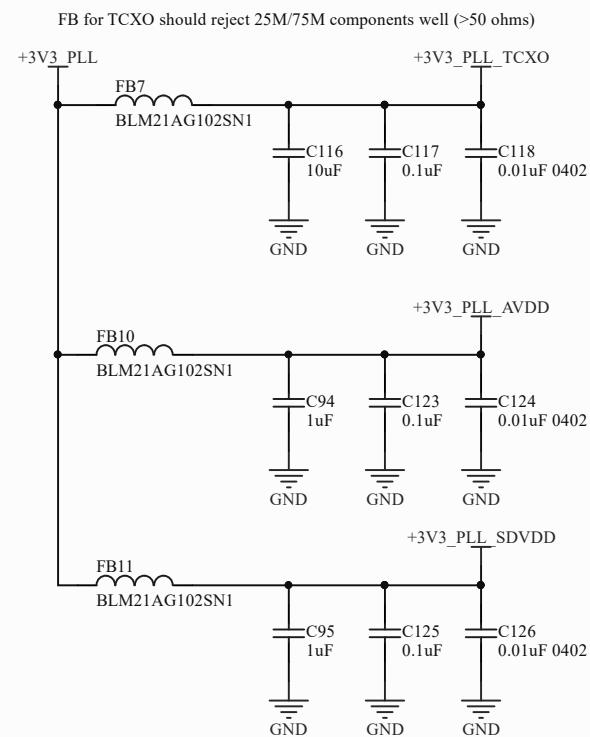
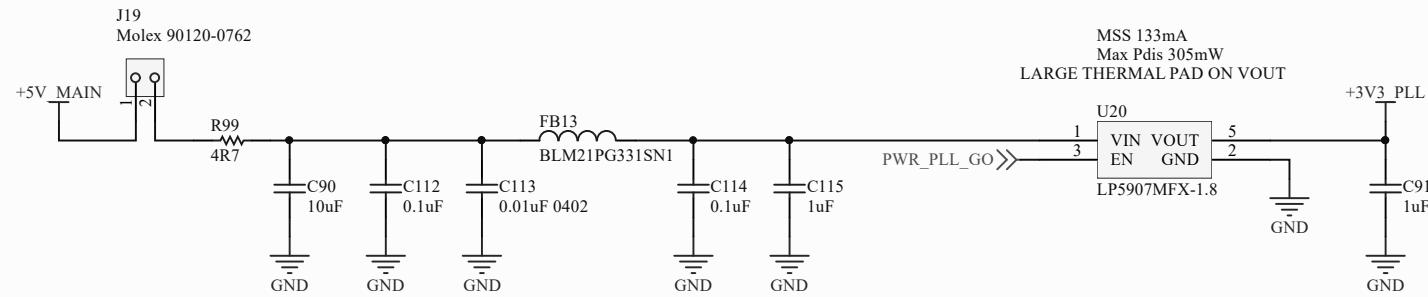
1 2 3 4



Note: ADC Grounding. Very low impedance GND plane used, with tight coupling of 0402 decoupling caps around package.

Scopy Minimum Viable Prototype			Tomato Engineering Ltd. 12 Greenfield Avenue Leeds, West Yorkshire LS27 7AH United Kingdom
Size: A4	Engineer: Tom Oldbury	Revision: A	
Date: 28/11/2020	Time: 21:14:12		
File: Main ADC.SchDoc			

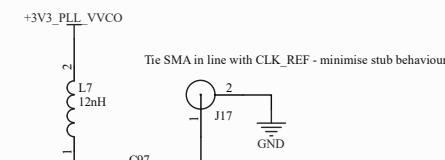
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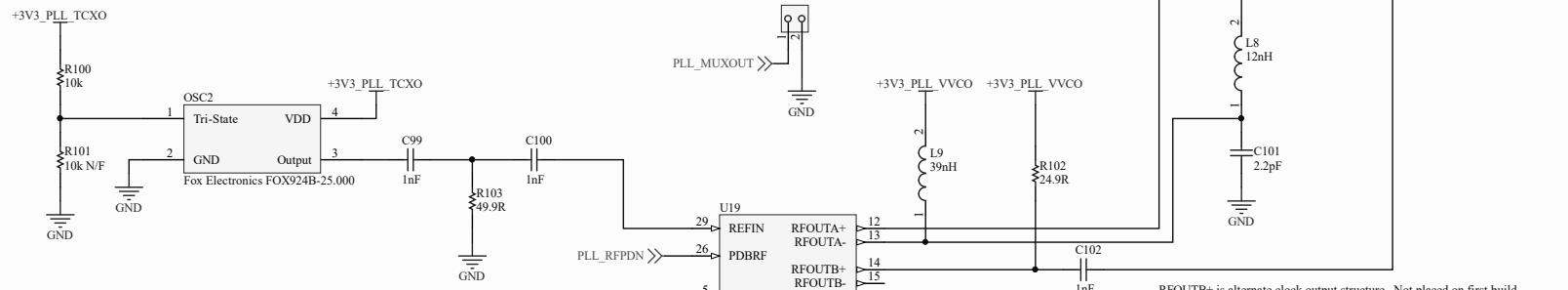
Scopy Minimum Viable Prototype			Tomato Engineering Ltd. 12 Greenfield Avenue Leeds, West Yorkshire LS27 7AH United Kingdom
Size: A4	Engineer: Tom Oldbury	Revision: A	
Date: 28/11/2020	Time: 21:14:12		
File: Main PLL - Power.SchDoc			

1 2 3 4

A



B



C

D

Scopy Minimum Viable Prototype	Tomato Engineering Ltd.
Size: A3	Engineer: Tom Oldbury
Date: 28/11/2020	Revision: A
File: Main_PLL.SchDoc	Lite-On LTST-C150CKT
Scopy Minimum Viable Prototype	Tomato Engineering Ltd.
12 Greenfield Avenue	Leeds, West Yorkshire
LS27 7AH	United Kingdom

1

2

3

4

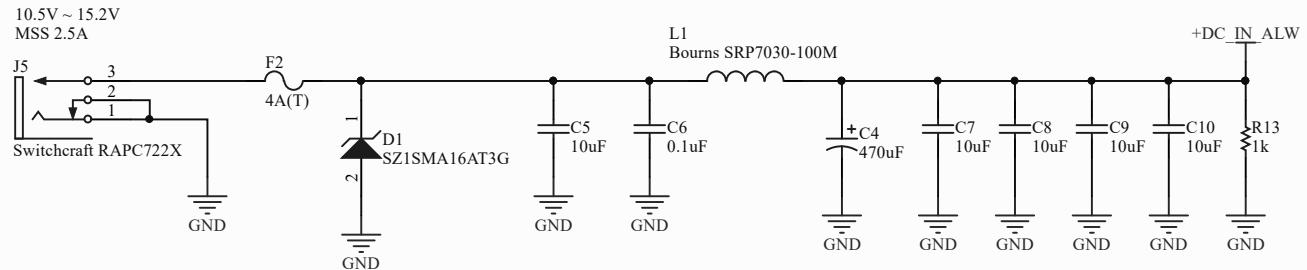
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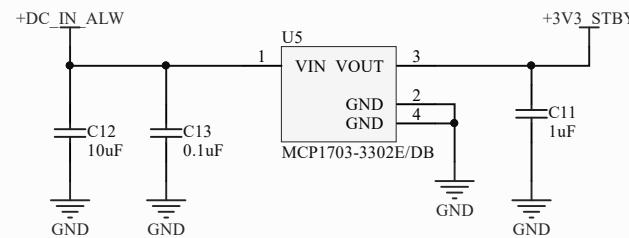
7

8

A



B



H1

B&F Fastener Supply MPMS 003 0005 PH

H2

B&F Fastener Supply MPMS 003 0005 PH

H3

B&F Fastener Supply MPMS 003 0005 PH

H4

B&F Fastener Supply MPMS 003 0005 PH

On later variant consider grounding these via 1kV cap

C

D

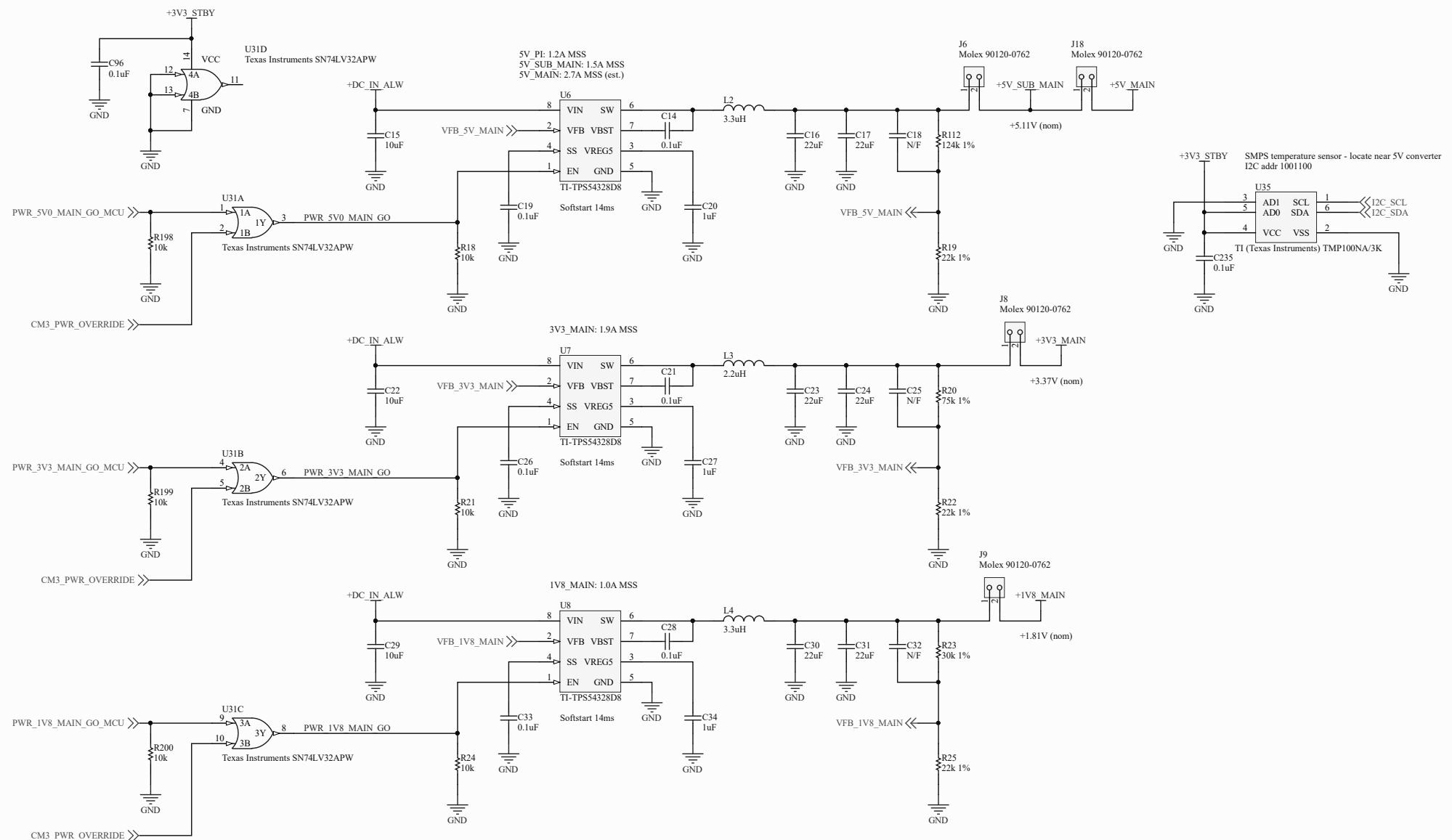
Scopy Minimum Viable Prototype

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 United Kingdom

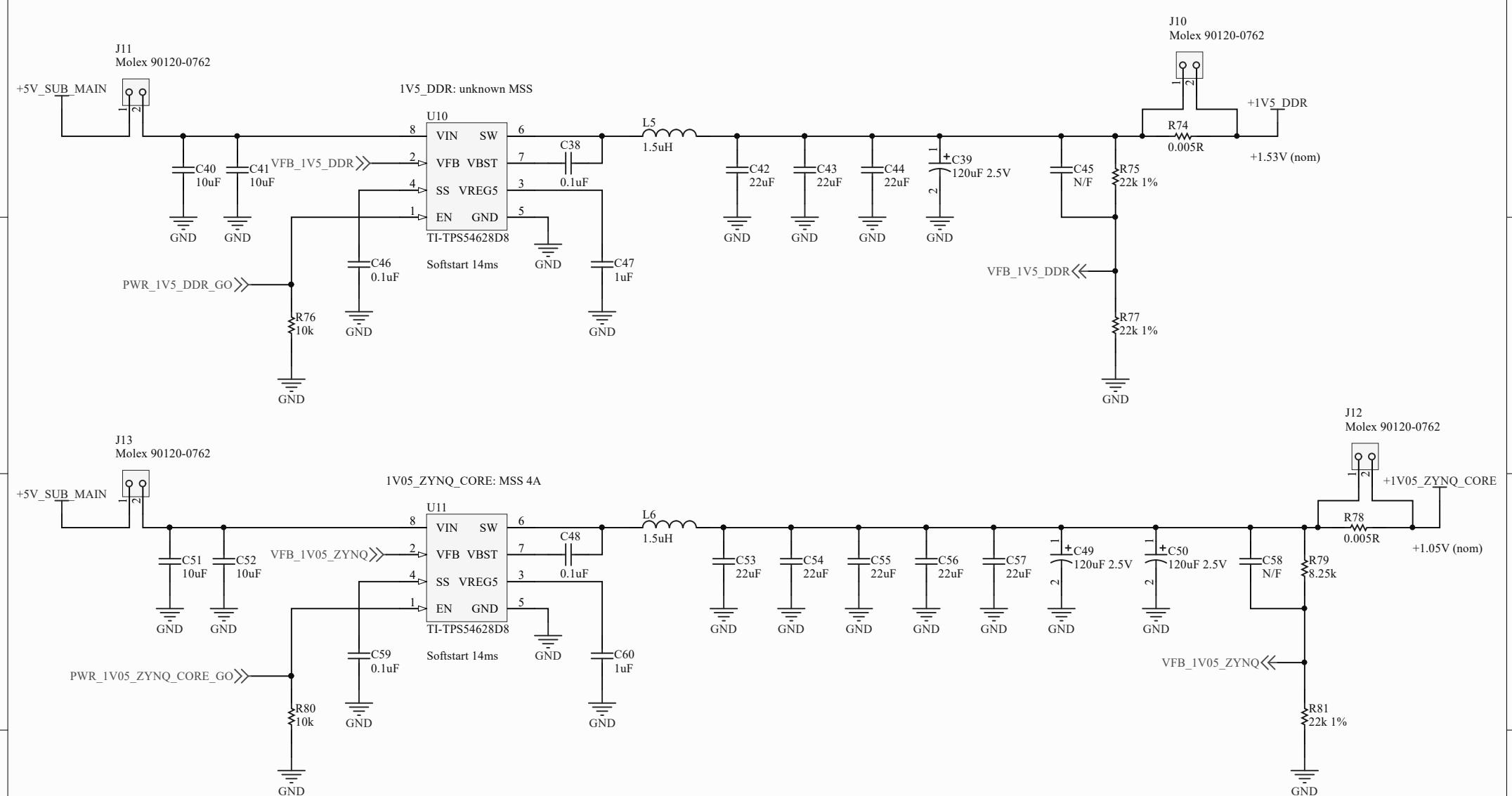
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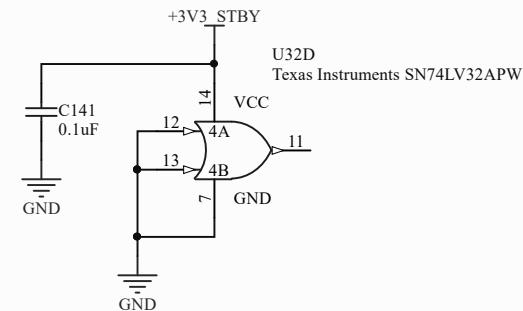
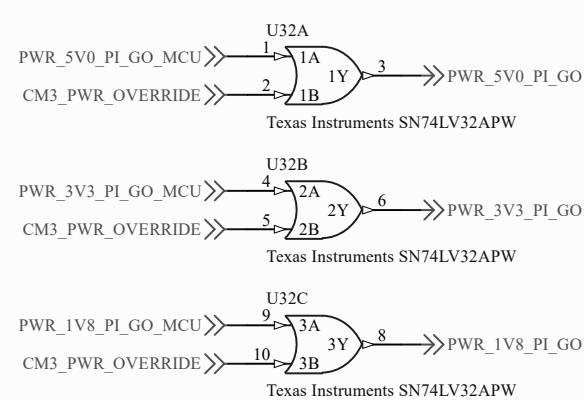
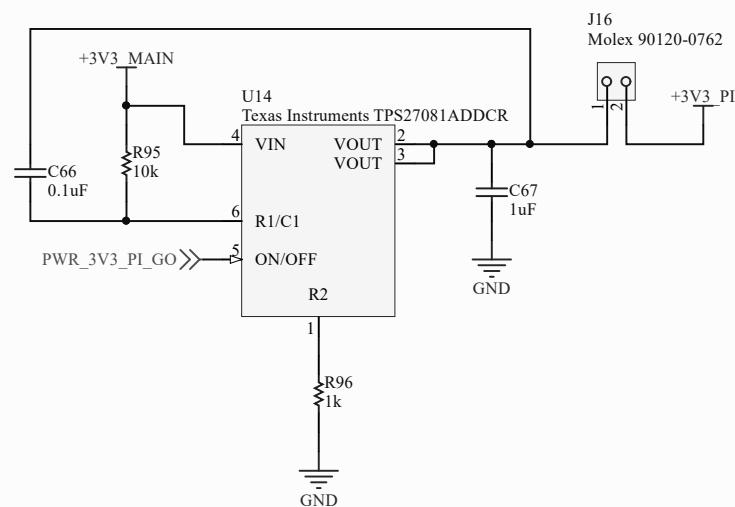
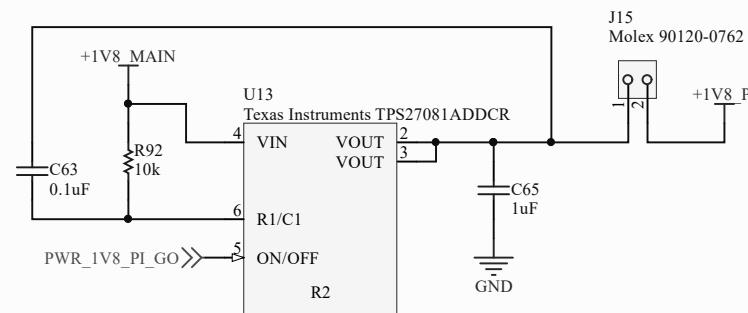
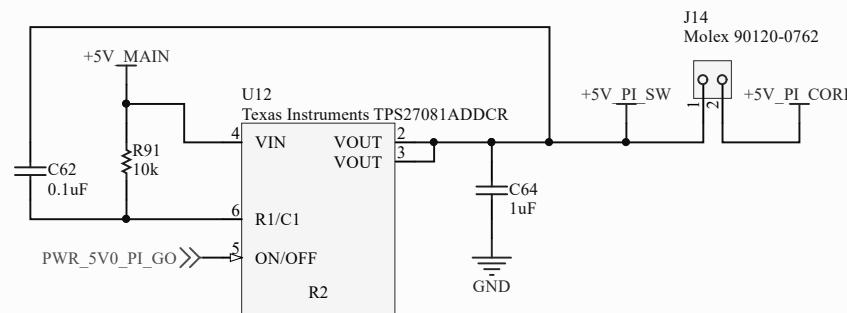


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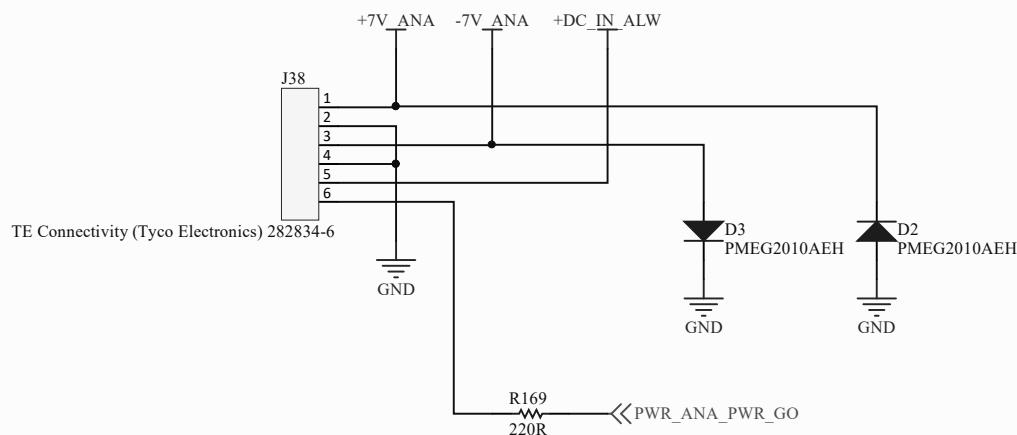
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Size: A4	Engineer: Tom Oldbury
Date: 28/11/2020	Revision: A
Time: 21:14:13	United Kingdom

1 2 3 4

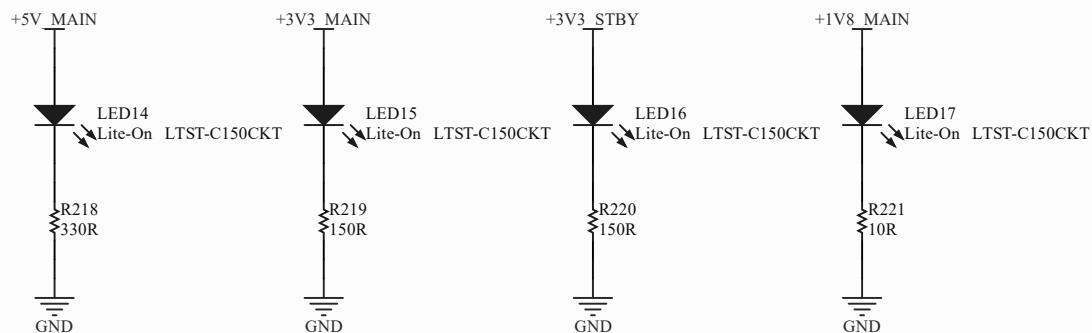


Scopy Minimum Viable Prototype			Tomato Engineering Ltd. 12 Greenfield Avenue Leeds, West Yorkshire LS27 7AH United Kingdom
Size: A4	Engineer: Tom Oldbury	Revision: A	
Date: 28/11/2020	Time: 21:14:13		
File: Power 4.SchDoc			

Schematic block to allow connection of external +/-7V power supply



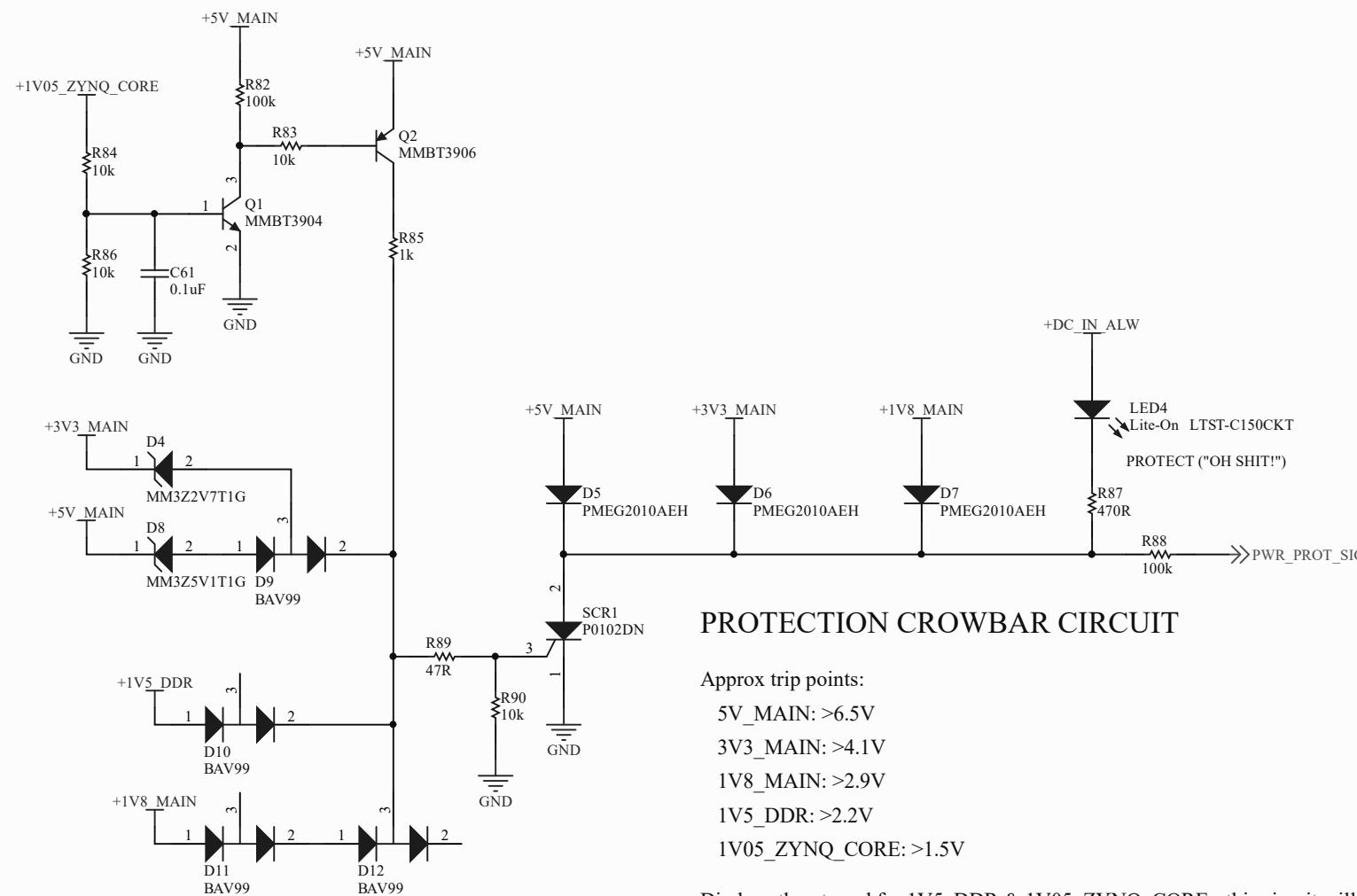
Rail power indicators



Scopy Minimum Viable Prototype

Size: A4	Engineer: Tom Oldbury	Revision: A
Date: 28/11/2020	Time: 21:14:13	United Kingdom
File: Power 5.SchDoc		

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LS27 7AH
United Kingdom



PROTECTION CROWBAR CIRCUIT

Approx trip points:

- 5V_MAIN: >6.5V
- 3V3_MAIN: >4.1V
- 1V8_MAIN: >2.9V
- 1V5_DDR: >2.2V
- 1V05_ZYNQ_CORE: >1.5V

Scopy Minimum Viable Prototype			Tomato Engineering Ltd. 12 Greenfield Avenue Leeds, West Yorkshire LS27 7AH
Size: A4	Engineer: Tom Oldbury	Revision: A	United Kingdom
Date: 28/11/2020	Time: 21:14:13		
File: Power Protect.SchDoc			

ROOT - This sheet in place for technical reasons only. Disregard for electrical purposes.

■

A

A

B

B

C

C

D

D

Scopy Minimum Viable Prototype

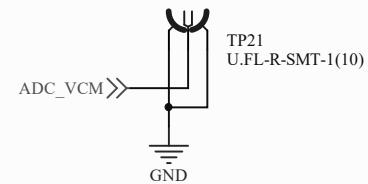
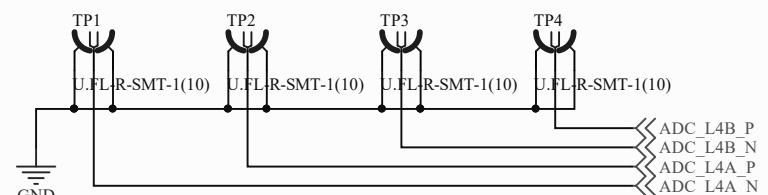
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Leeds, West Yorkshire
LS27 7AH
United Kingdom

Size: A4 Engineer: Tom Oldbury Revision: A

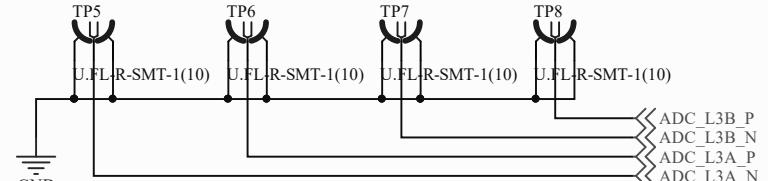
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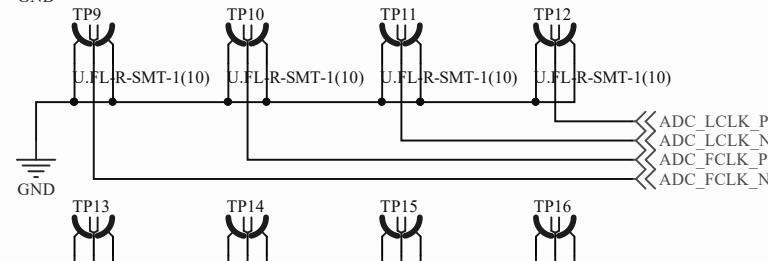
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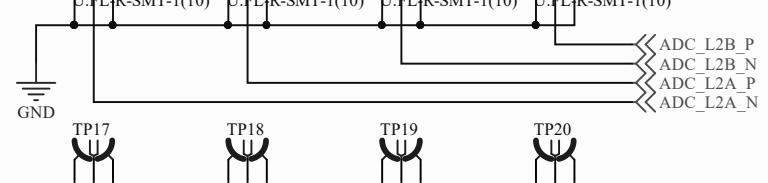
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A

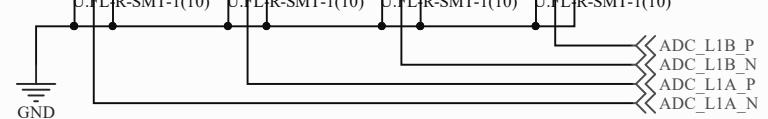


B



C

C



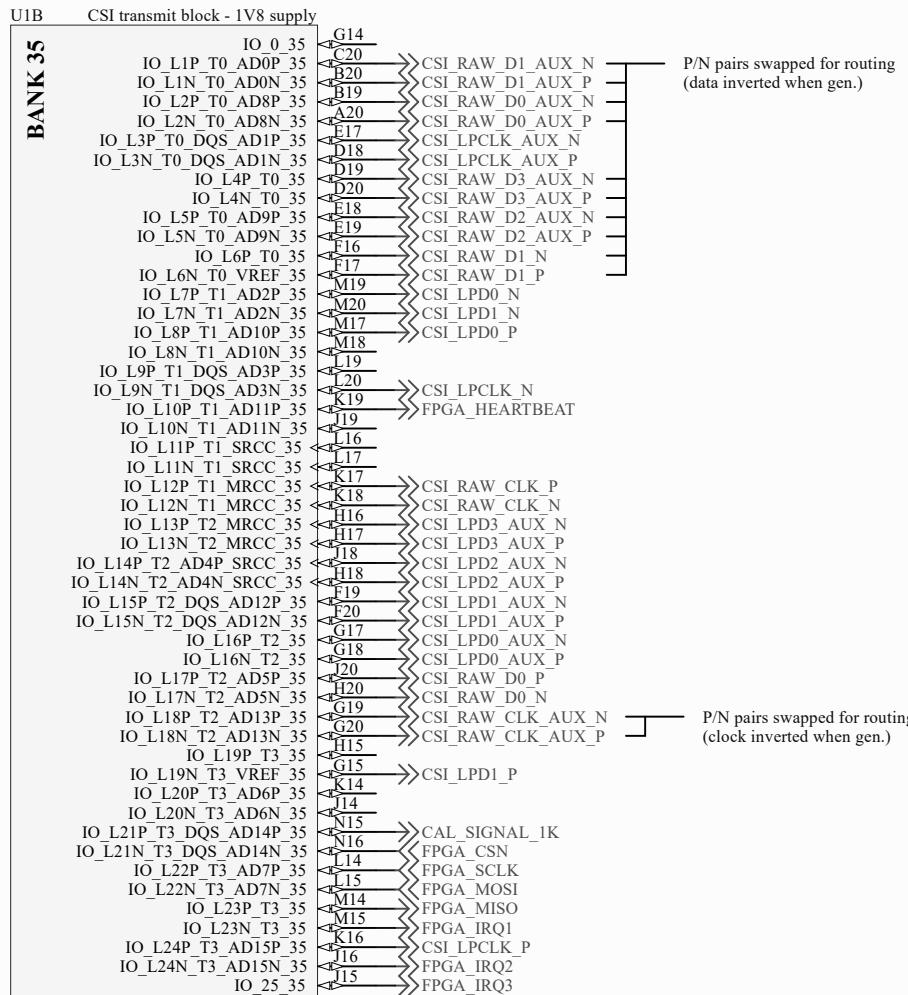
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D

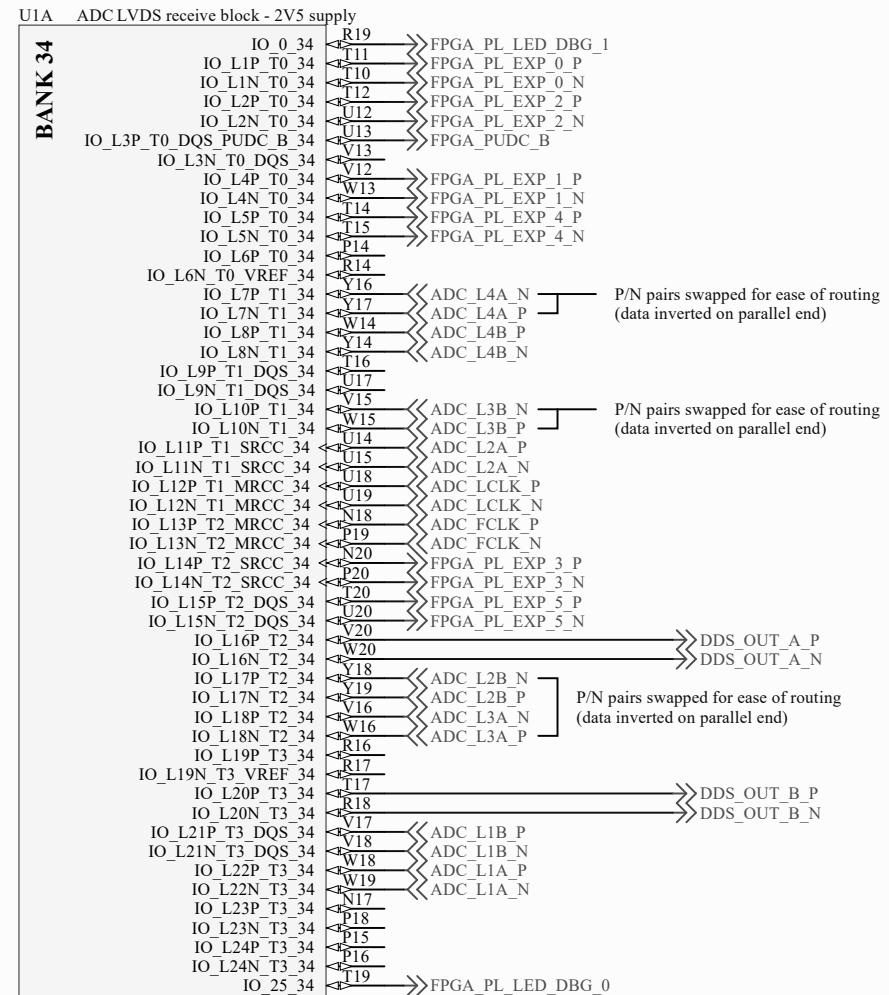
Scopy Minimum Viable Prototype

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 Tomato Engineering Ltd.
 12 Greenfield Avenue
 Leeds, West Yorkshire
 LS27 7AH
 United Kingdom

Size: A4	Engineer: Tom Oldbury	Revision: A
Date: 28/11/2020	Time: 21:14:13	
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CMP-8842584-4



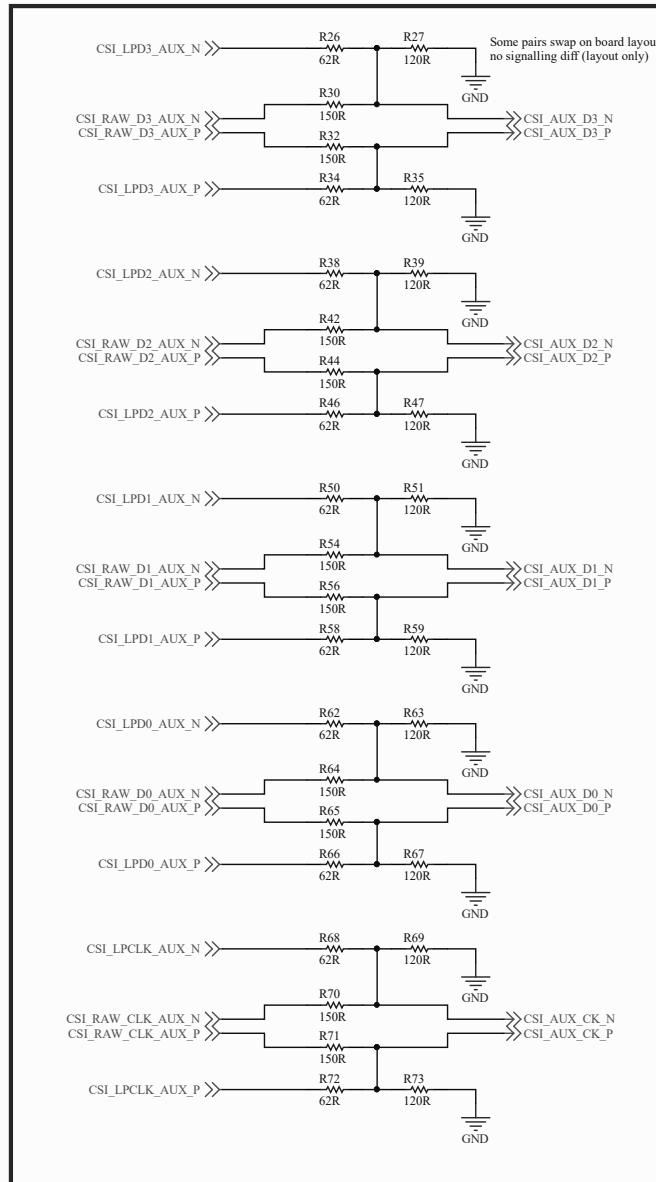
CMP-8842584-4

Scopy Minimum Viable Prototype

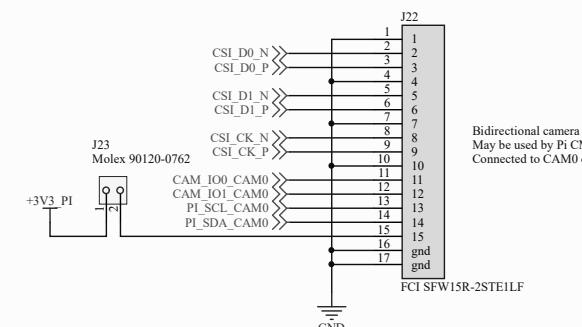
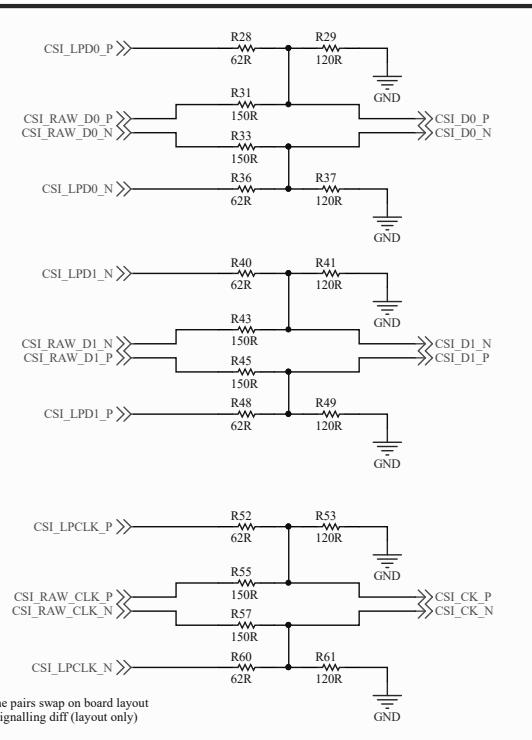
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LS27 7AH
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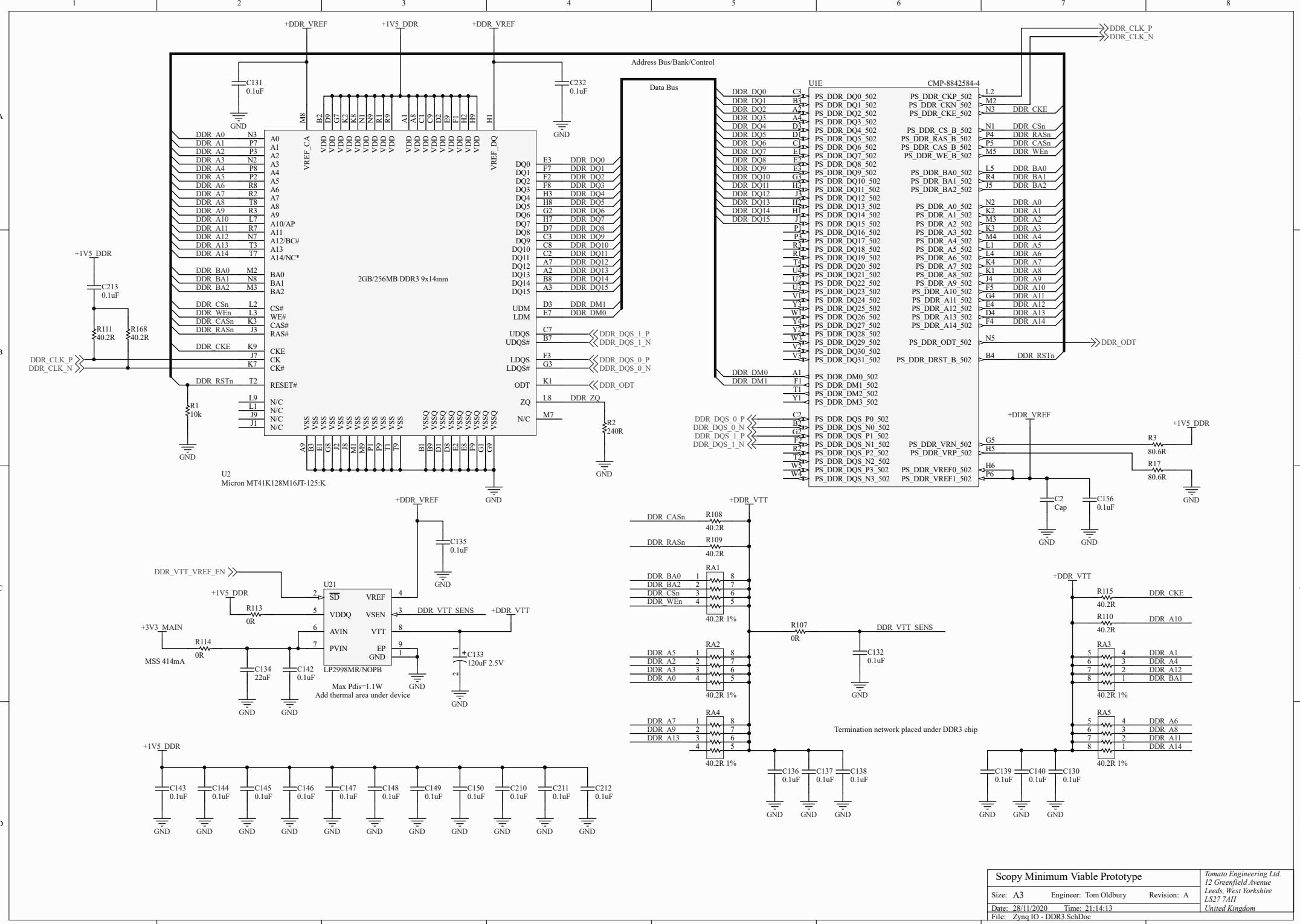
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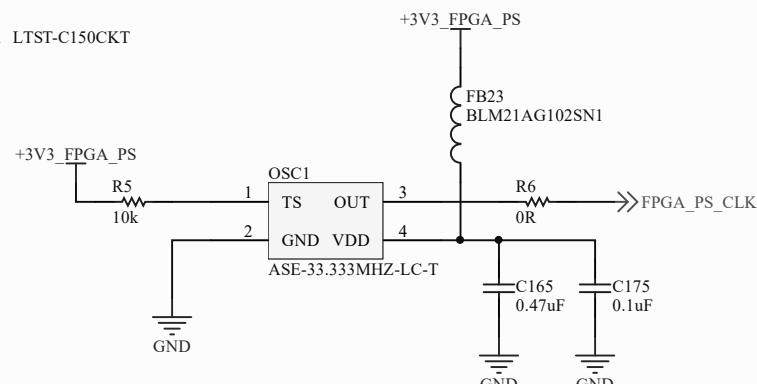
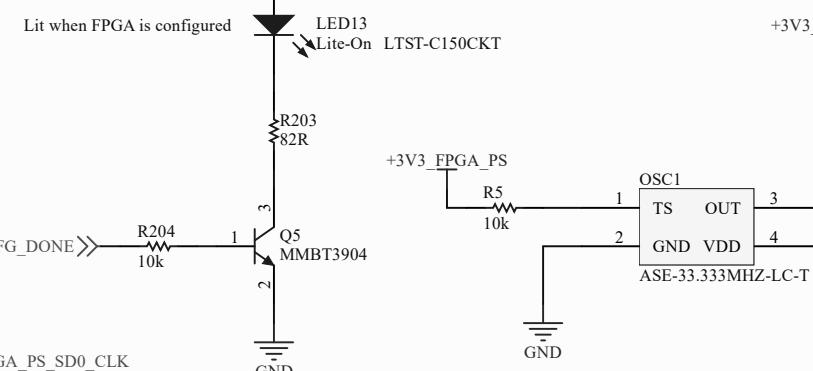
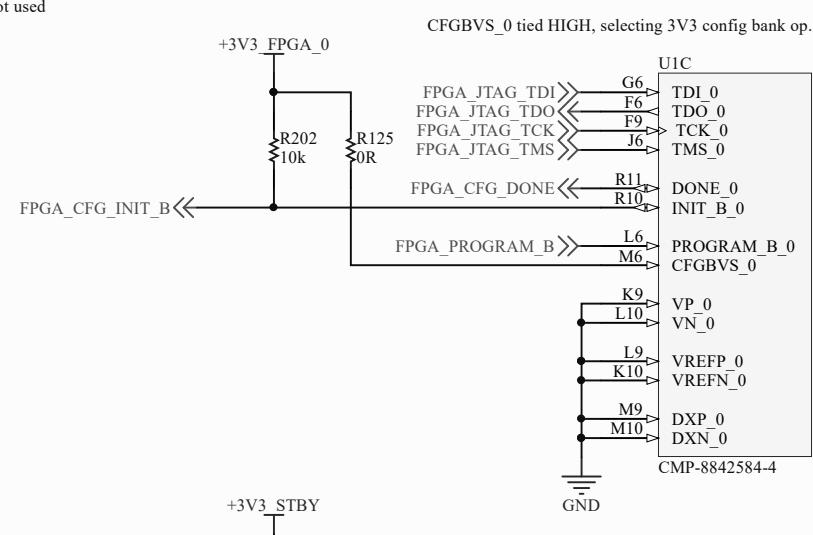
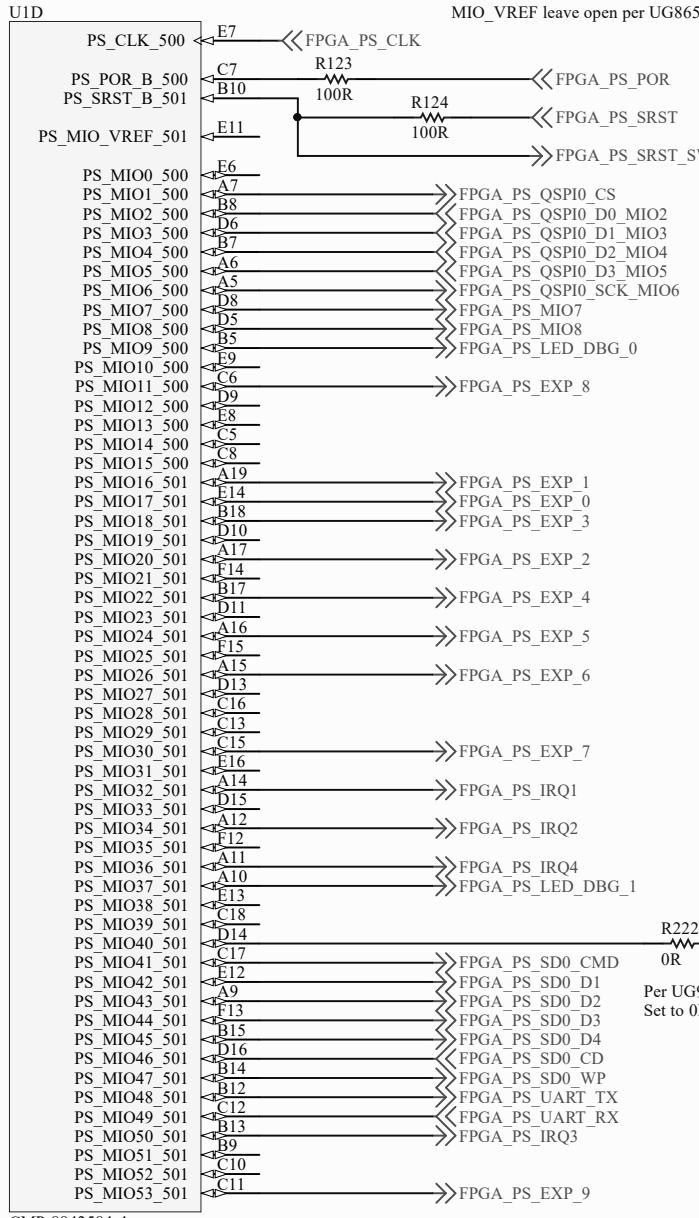
Four Lane CSI (4 Gbit/s)



Two Lane CSI (2 Gbit/s)







CMP-8842584-4

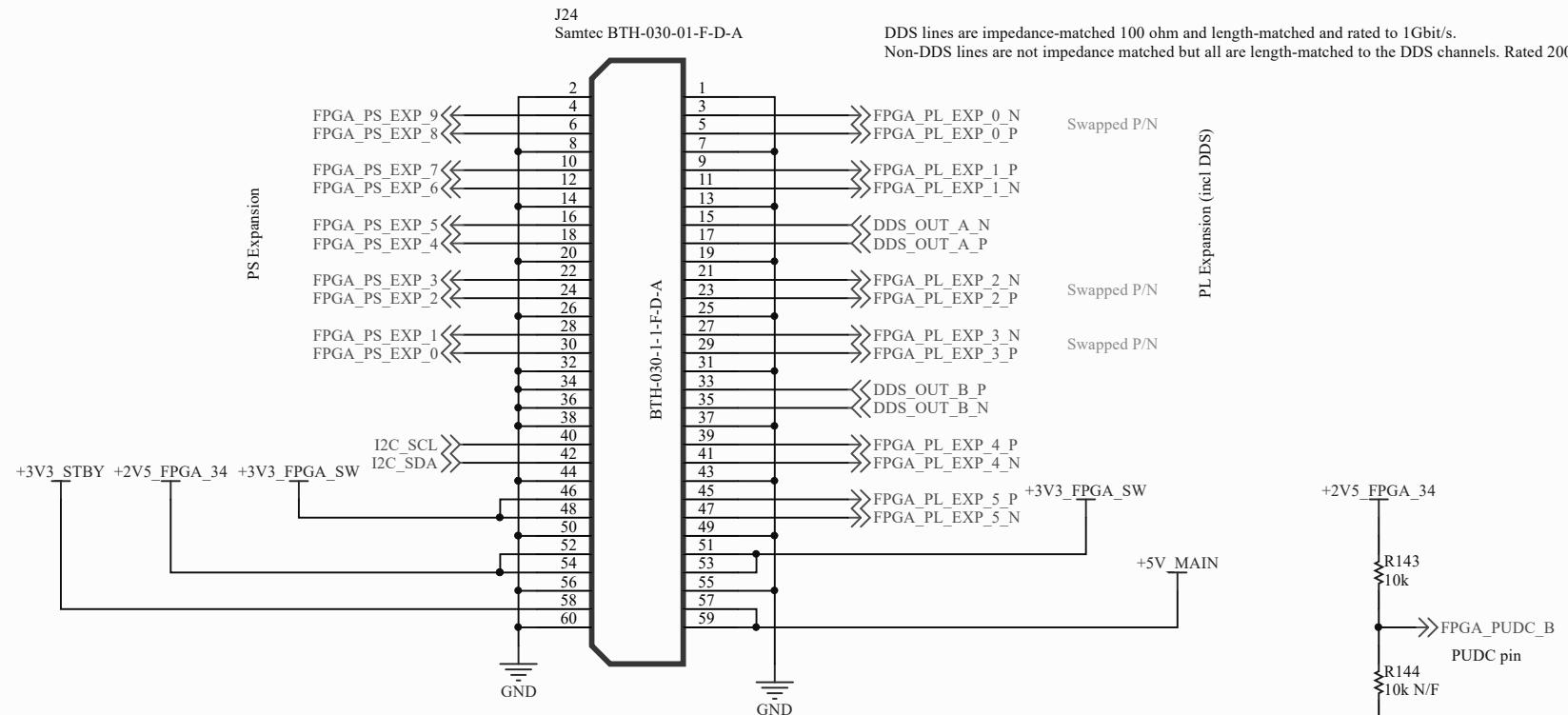
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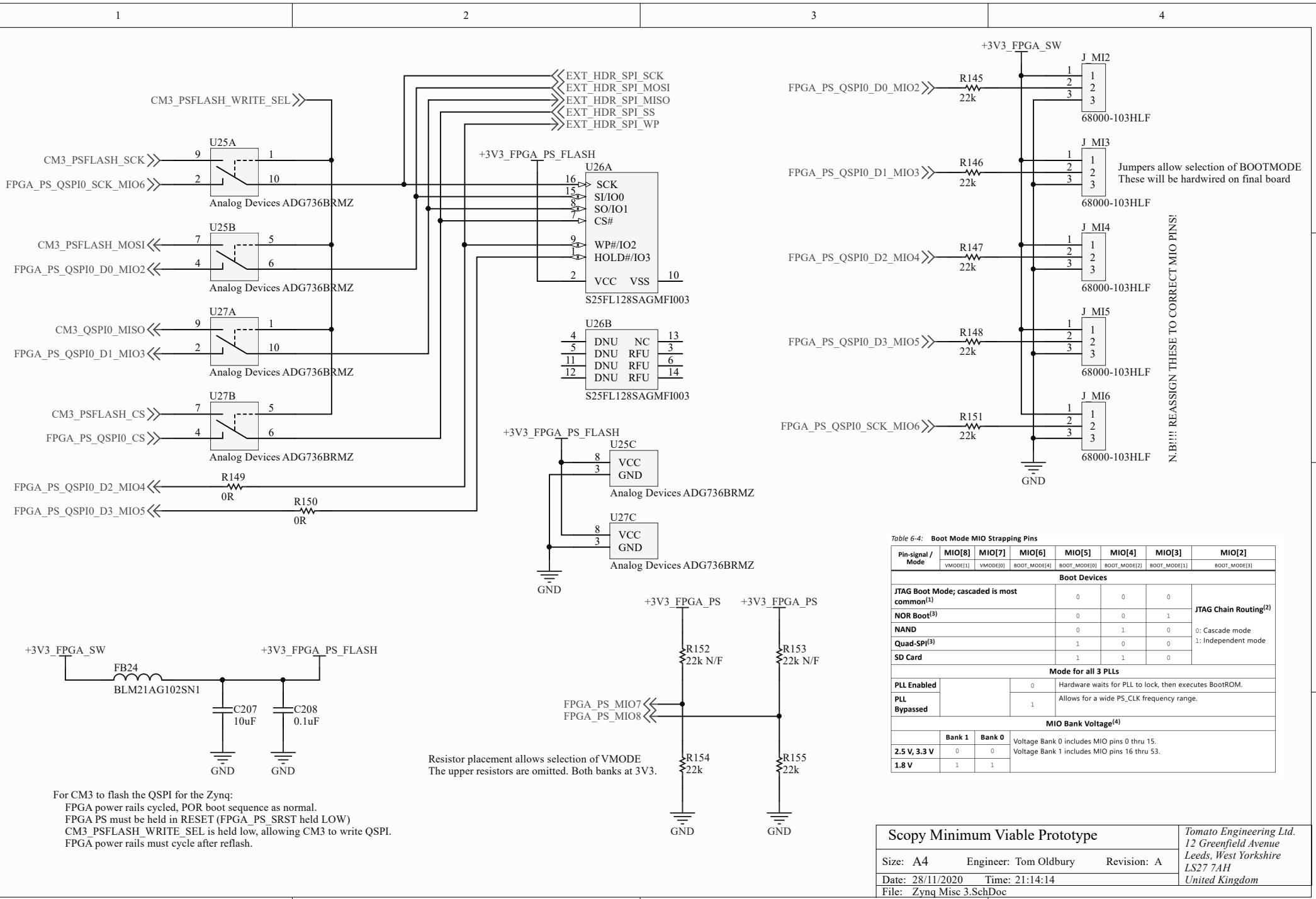
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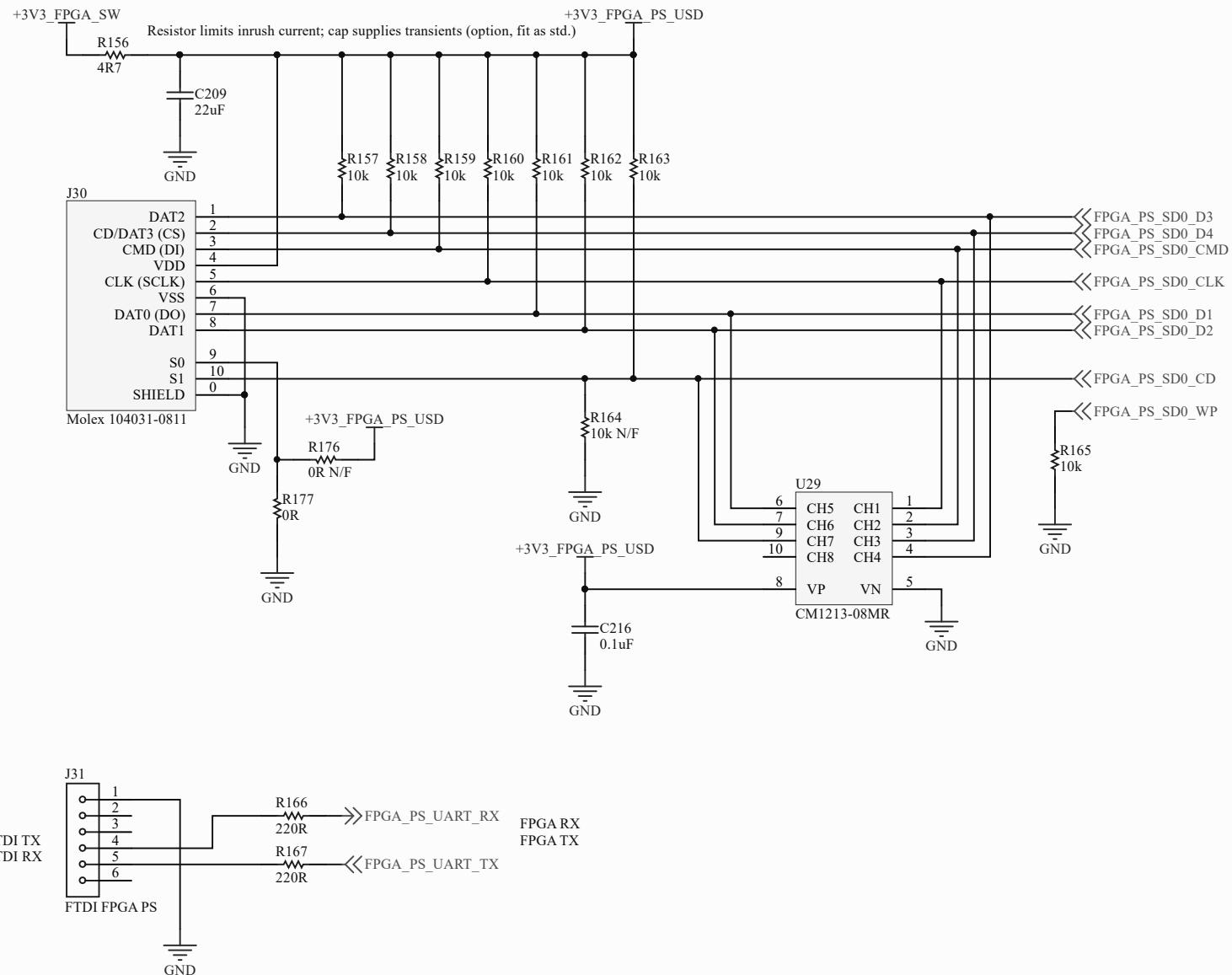
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V8	NC
V10	NC
V11	NC
W6	W8
W9	W10
W11	Y6
Y7	Y8
Y9	Y11
Y12	Y13

CMP-8842584-4



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Size: A4	Engineer: Tom Oldbury
Date: 28/11/2020	Revision: A
Time: 21:14:13	
File: Zynq Misc 2.SchDoc	





Scopy Minimum Viable Prototype	Tomato Engineering Ltd. 12 Greenfield Avenue Leeds, West Yorkshire LS27 7AH
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Size: A4	Engineer: Tom Oldbury	Revision: A
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Date: 28/11/2020	Time: 21:14:14
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United Kingdom

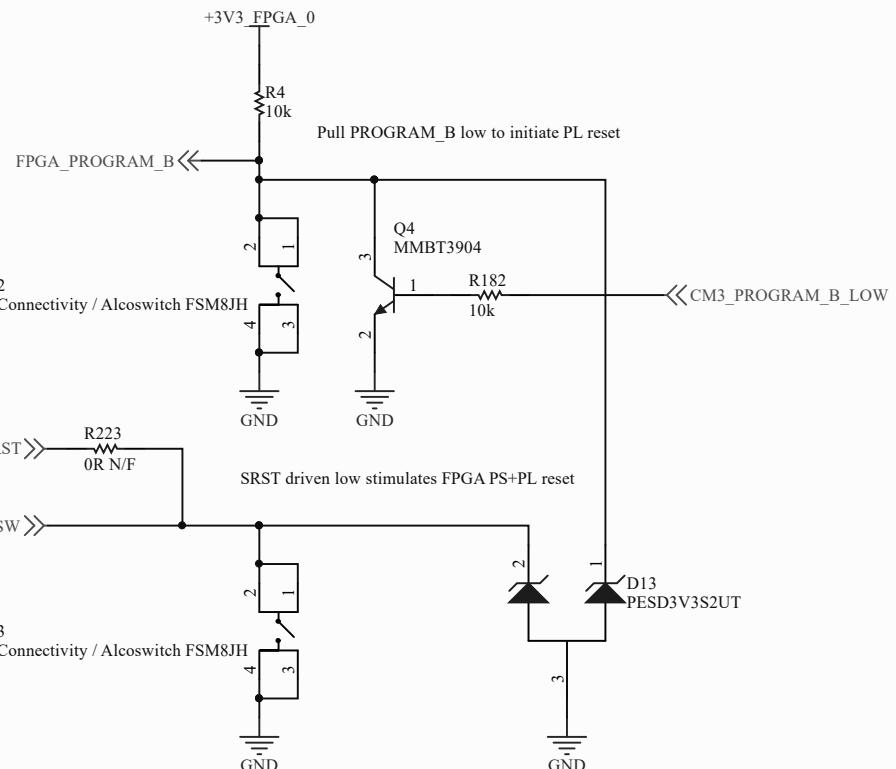
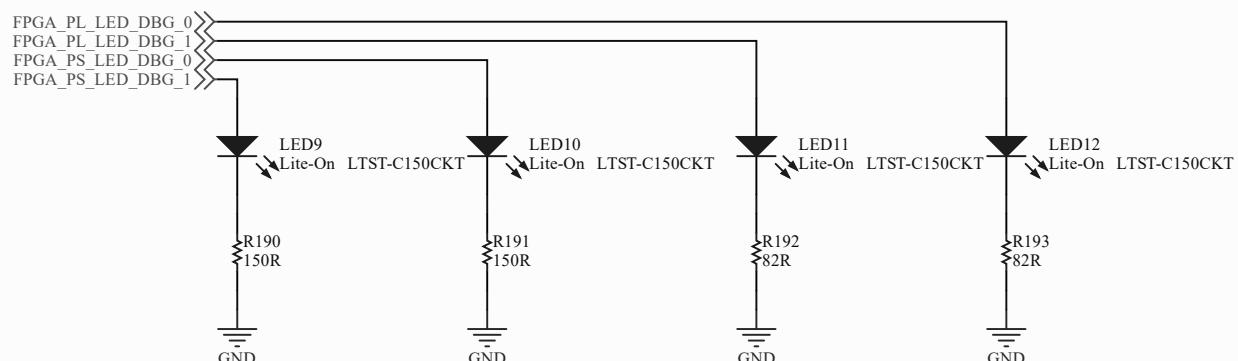
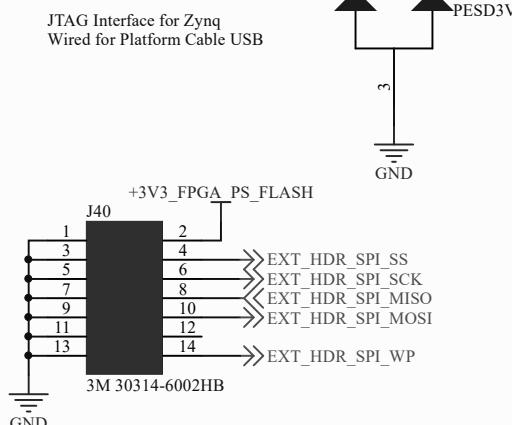
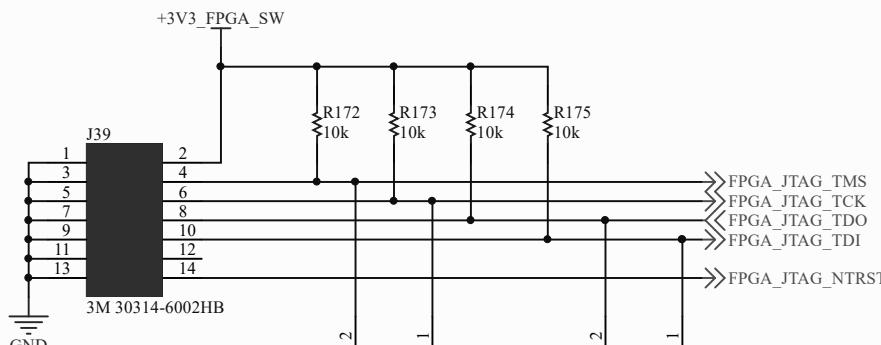
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1

2

3

4



Scopy Minimum Viable Prototype

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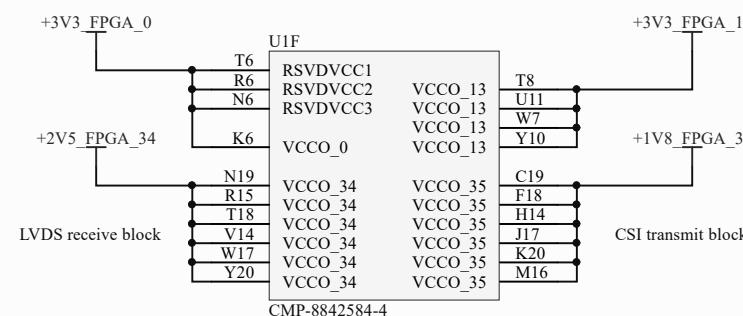
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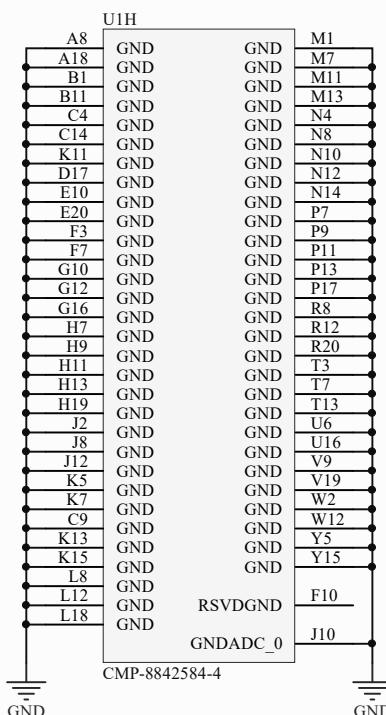
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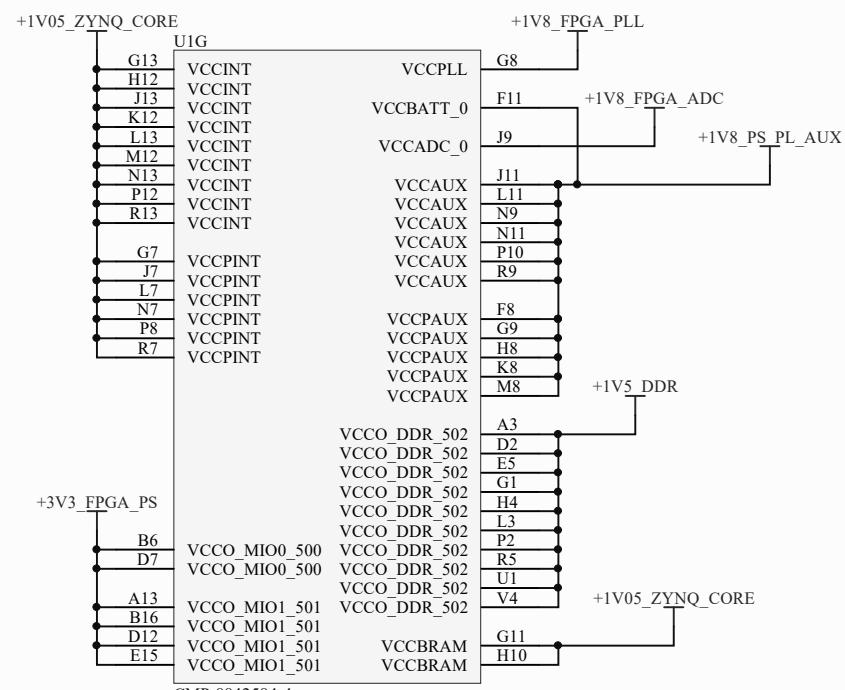
4



Bank 13 not used on 7010 - This may be O/C - To be confirmed



RSVDGND *not* connected per UG865 V1.8



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Size: A4	Engineer: Tom Oldbury	Revision: A	
Date: 28/11/2020	Time: 21:14:14		
File: Zyng Power 1 SchDoc			

