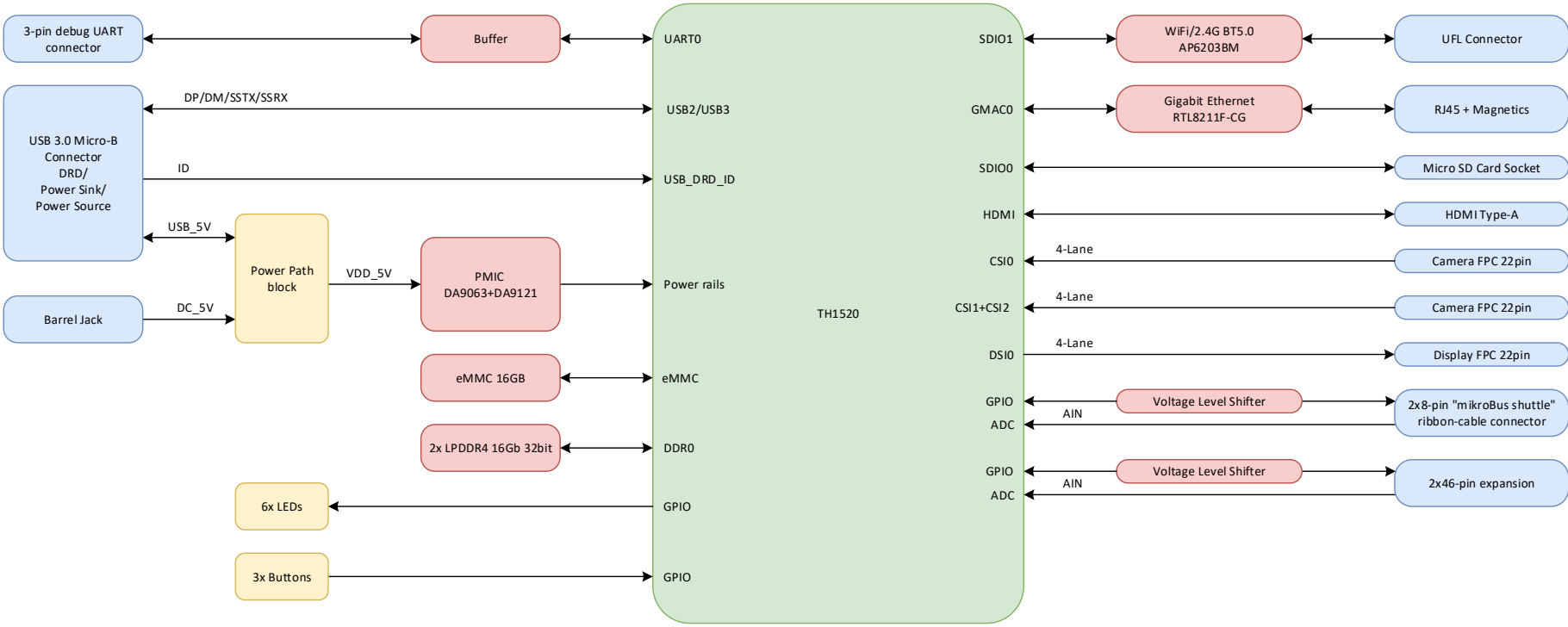
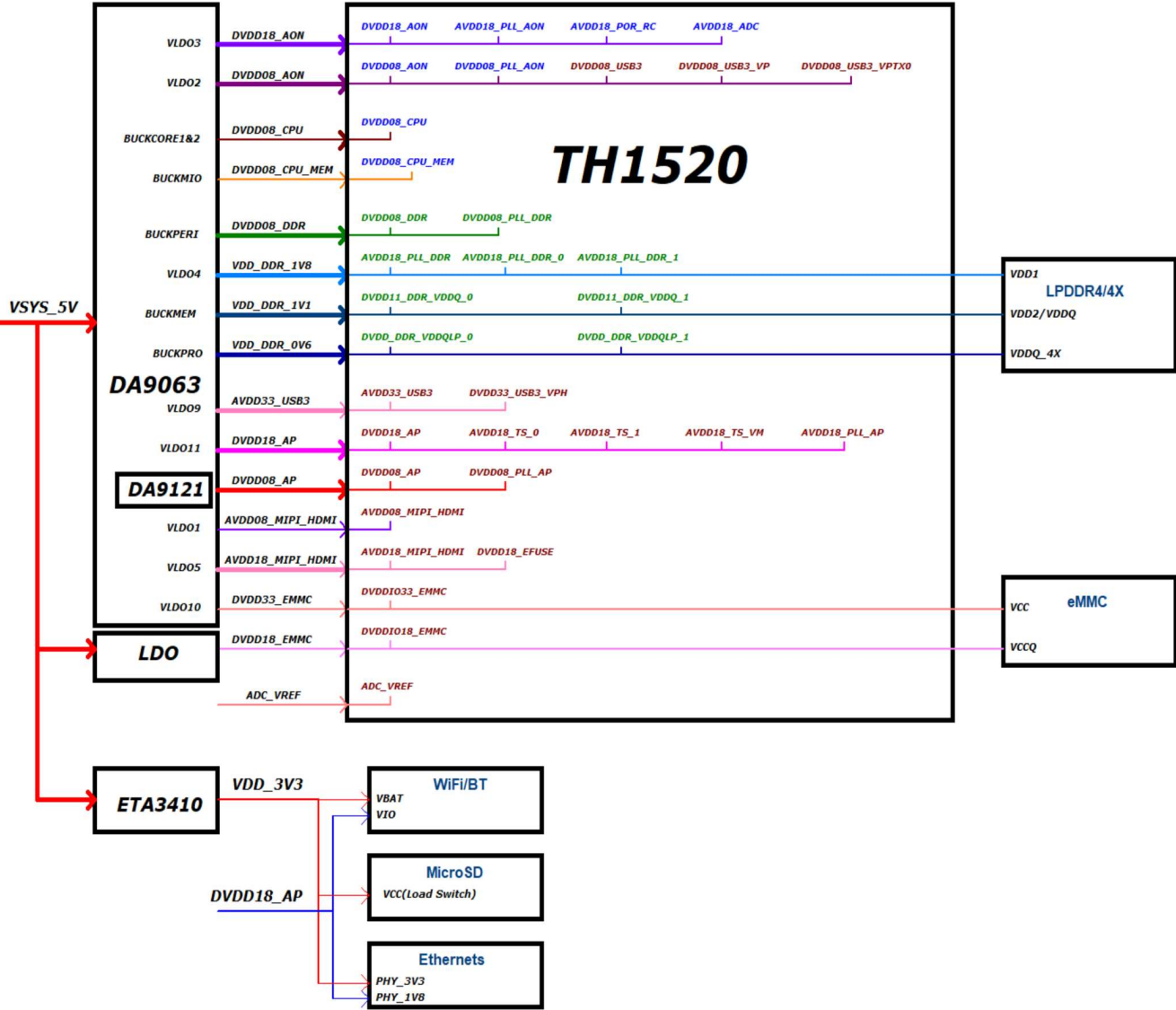


VER #	DATE	DESCRIPTION OF CHANGES	AUTHOR	REVIEWED BY
1.0	April 20, 2023	Production release.	qxn	

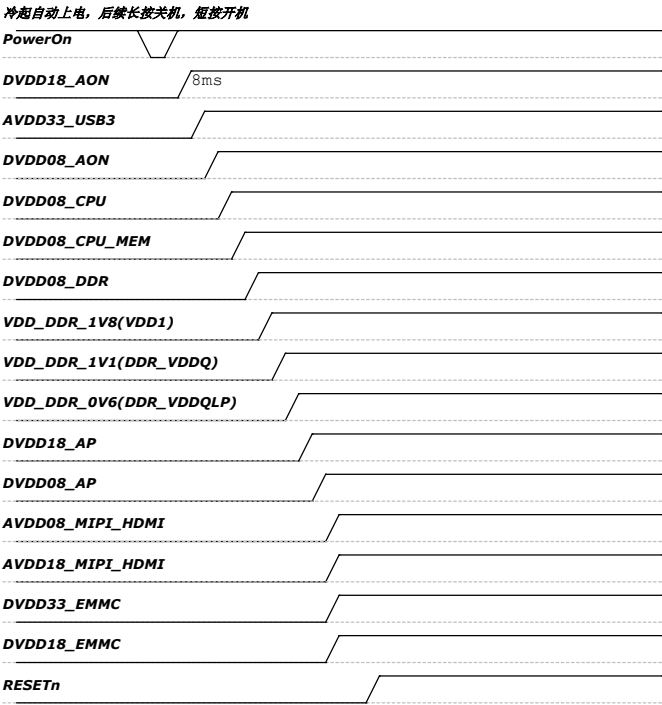
Block Diagram



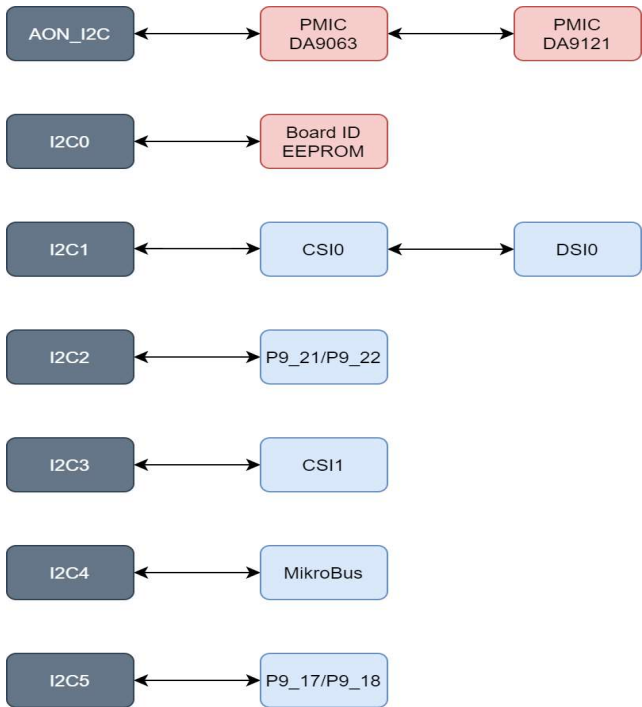
Power tree



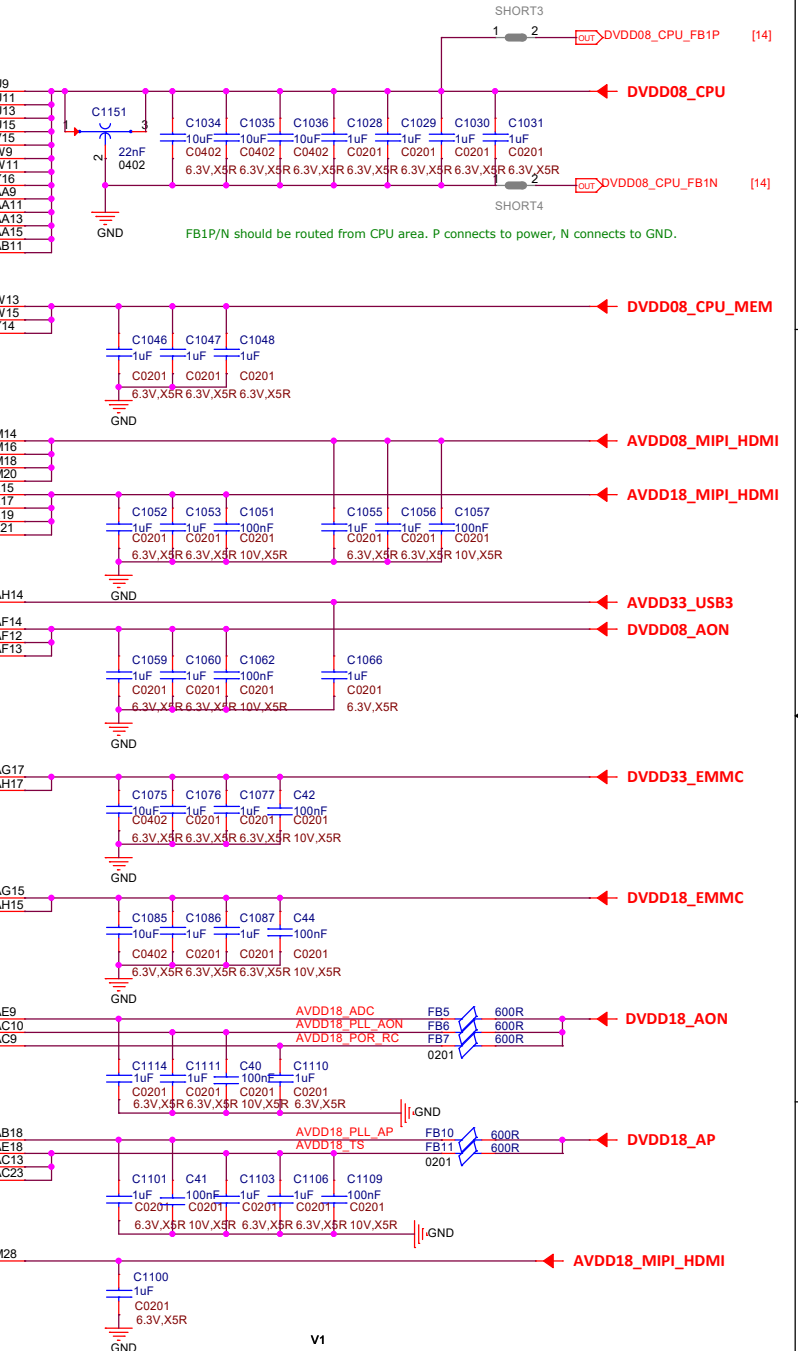
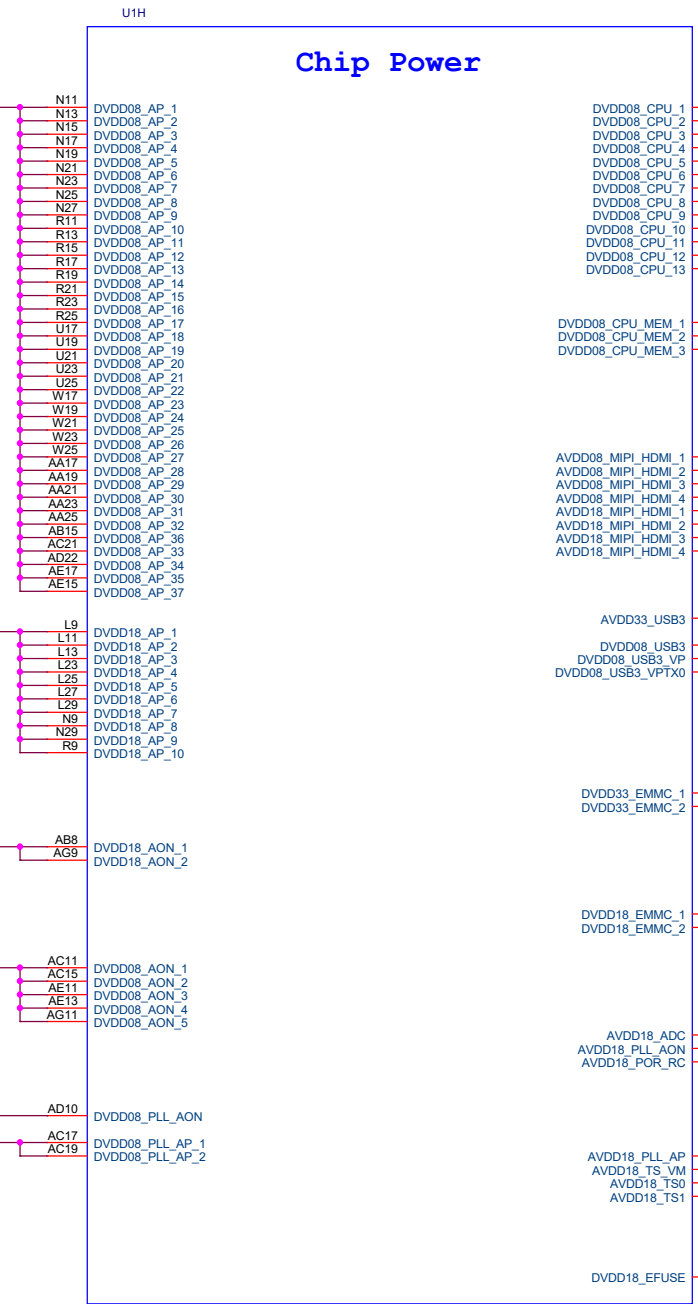
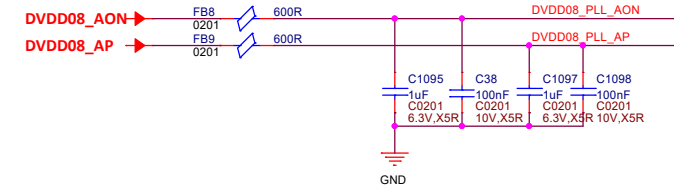
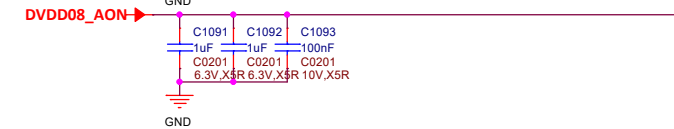
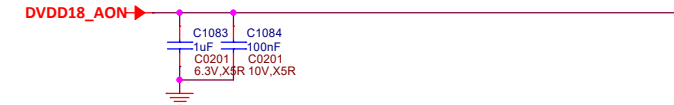
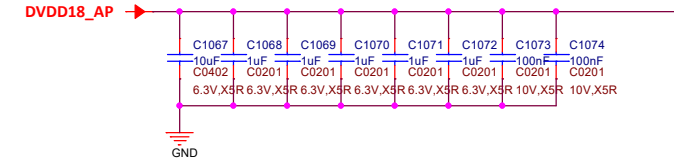
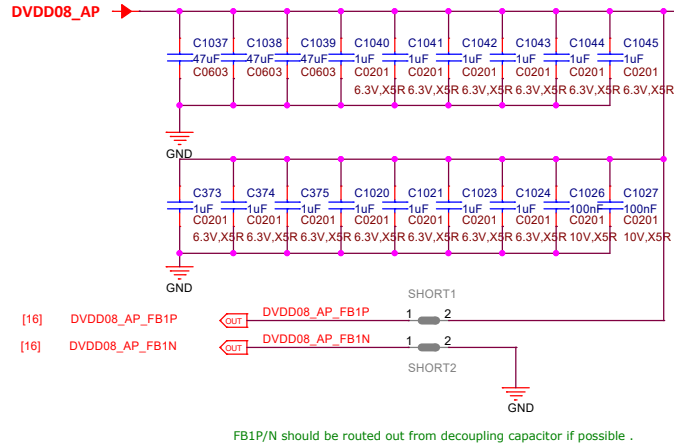
CPU Power Sequence



I2C Usage Diagram



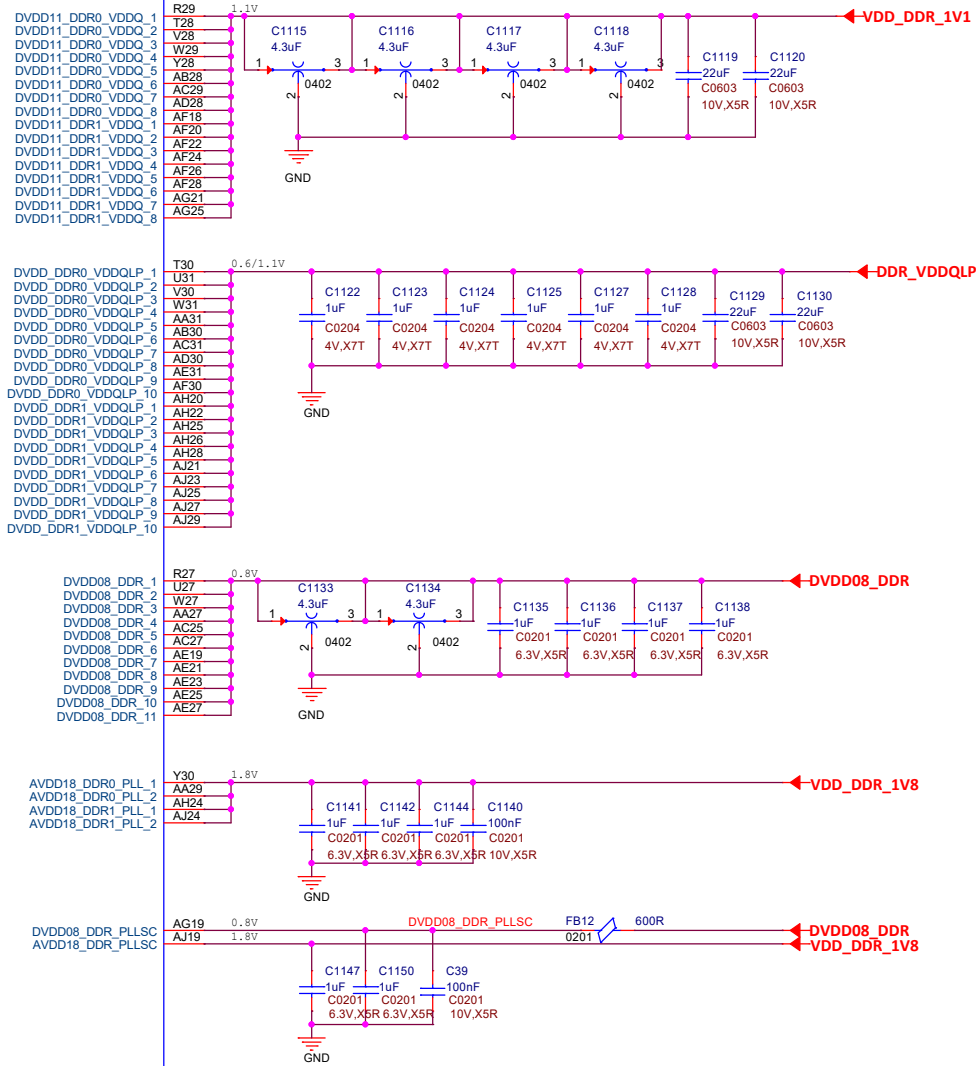
SoC Power



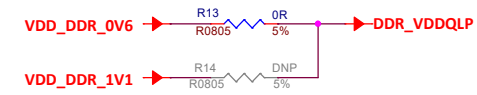
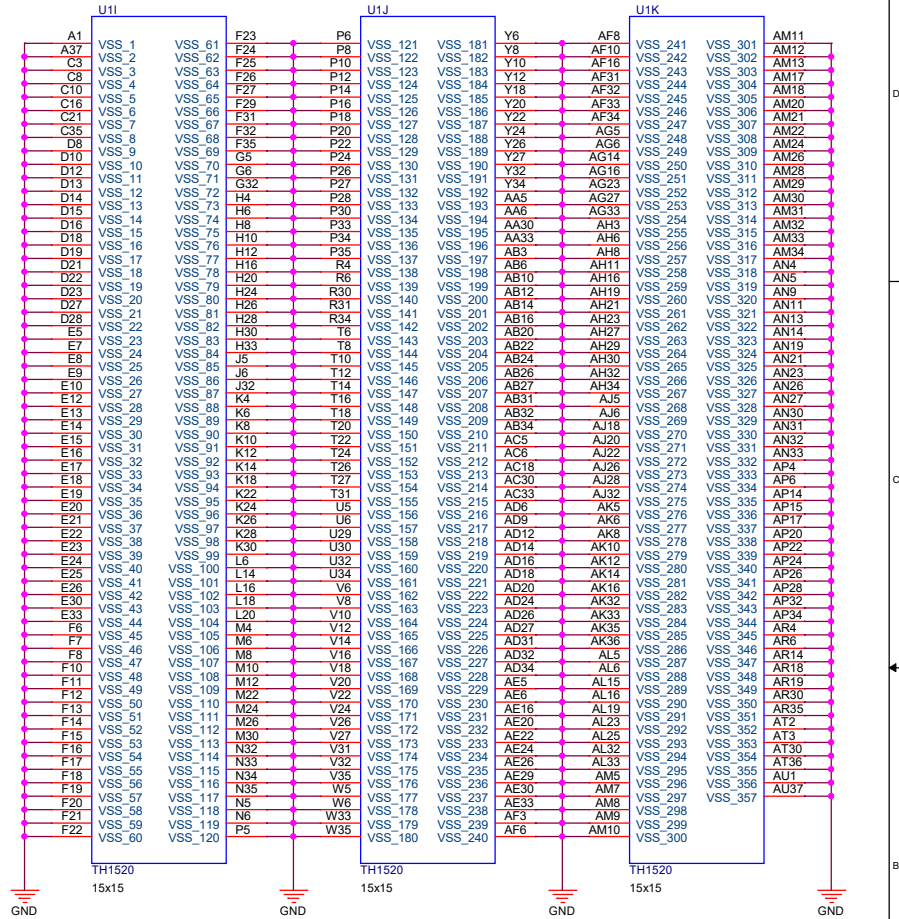
SoC DDR Power

U1G

DDR Power



TH1520
15x15



LPDDR4/4X VDDQ Power Supply:

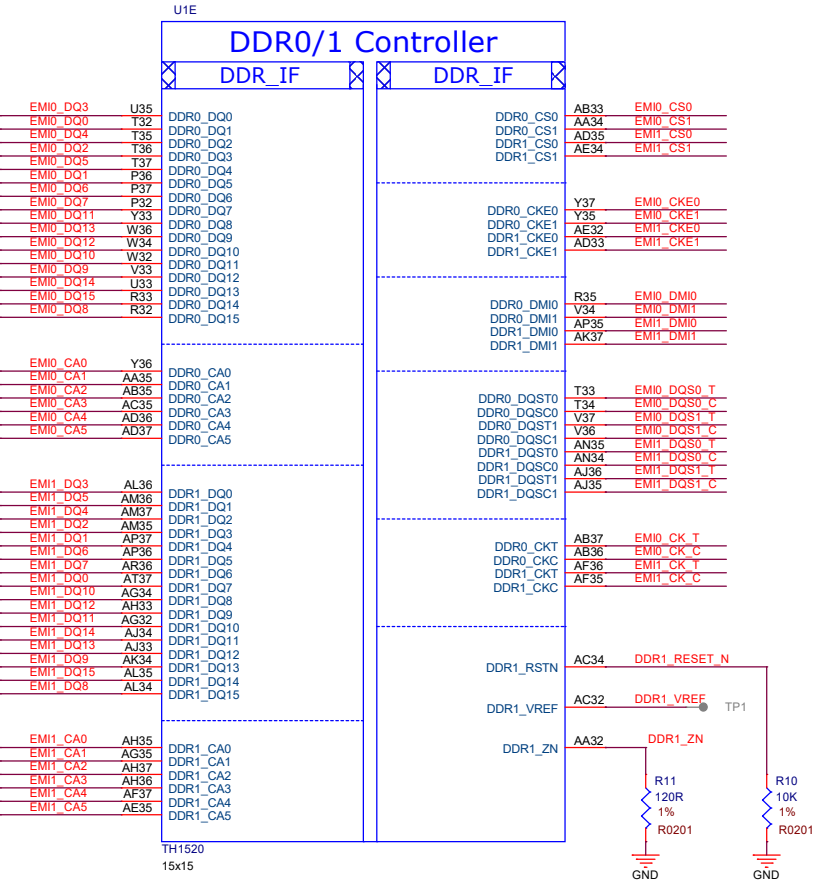
LPDDR4X VDDQ:0.6V, R13 0OHM, R14 DNP Default

LPDDR4 VDDQ:1.1V, R14 0OHM, R13 DNP

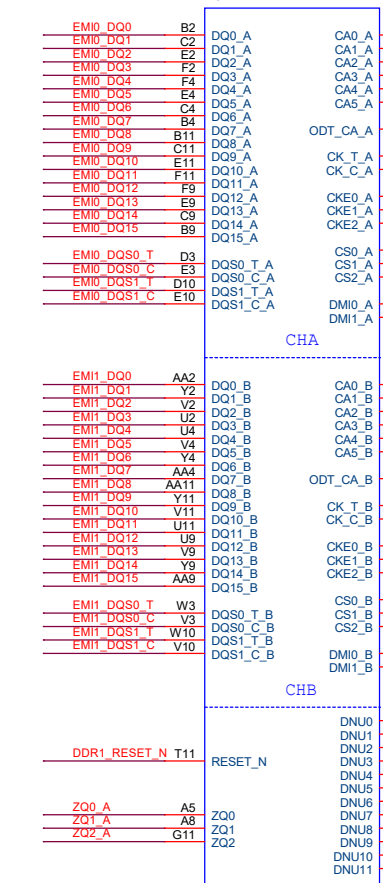
V1

seeed studio		https://www.seeedstudio.com	
Title:		BeagleV-Ahead	
Size: A3	Document Number:	006_SoC DDR Power	Rev: v1.0
Draw By: qm	Date: Friday, April 21, 2023	Sheet: 6 of 26	

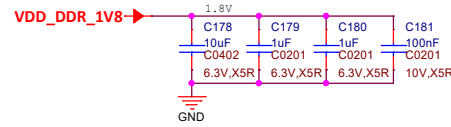
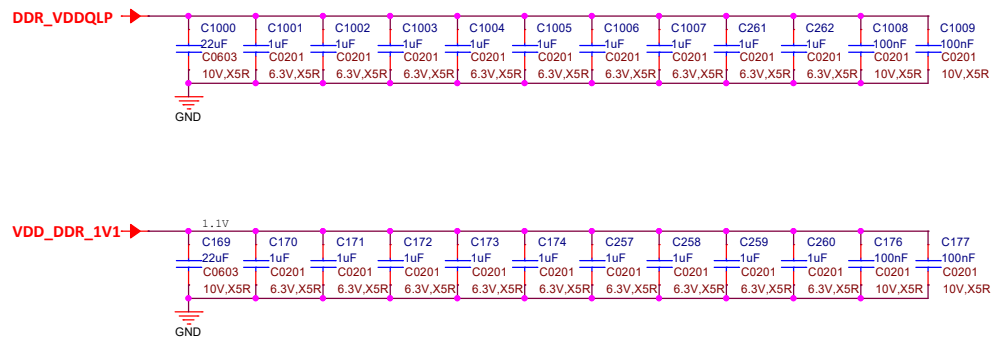
SoC DDR controller



LPDDR4



LPDDR4 DCAPs



DDR Part:

K4UE63S44A-MGCL	Samsung	LPDDR4X	2GB
K4UE3D44A-MGCL	Samsung	LPDDR4X	4GB
K4FBE3D44H-MGCL	Samsung	LPDDR4	4GB
MT53D512M32D2DS-046 WT:D	Micron	LPDDR4/4X	2GB
MT53D1024M32D4DT-046 WT:D	Micron	LPDDR4/4X	4GB

V1

seed studio

https://www.seedstudio.com

Title: BeagleV-Ahead

Size: A3

Document Number: 007_SoC DDR0

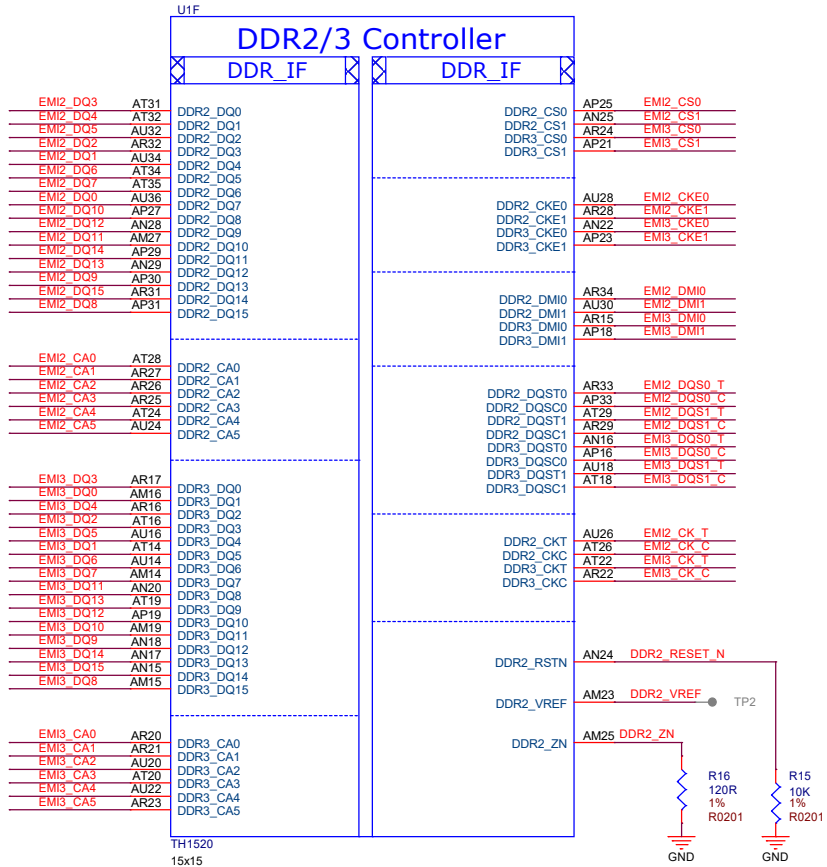
Rev: v1.0

Draw By: qm

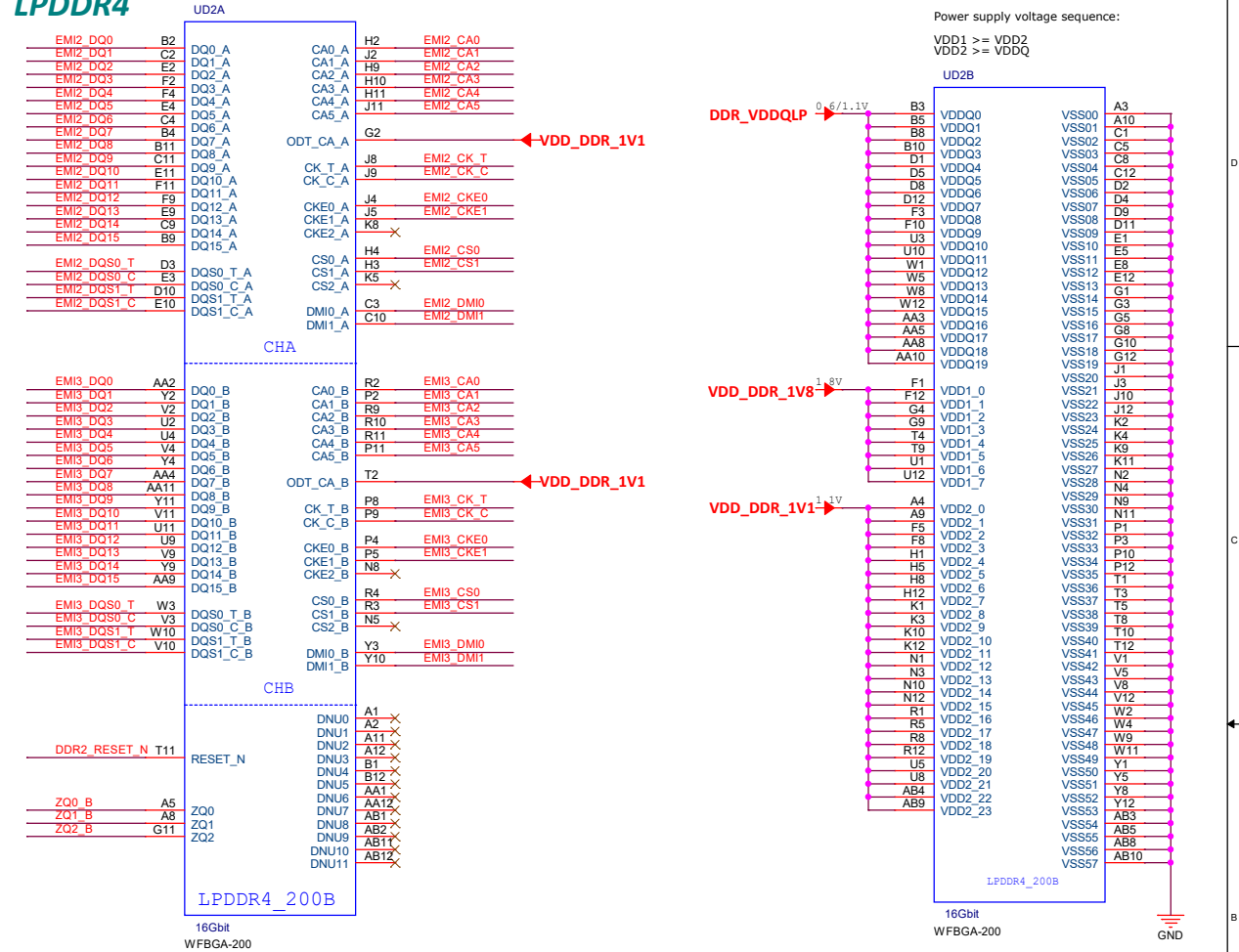
Date: Friday, April 21, 2023

Sheet: 7 of 26

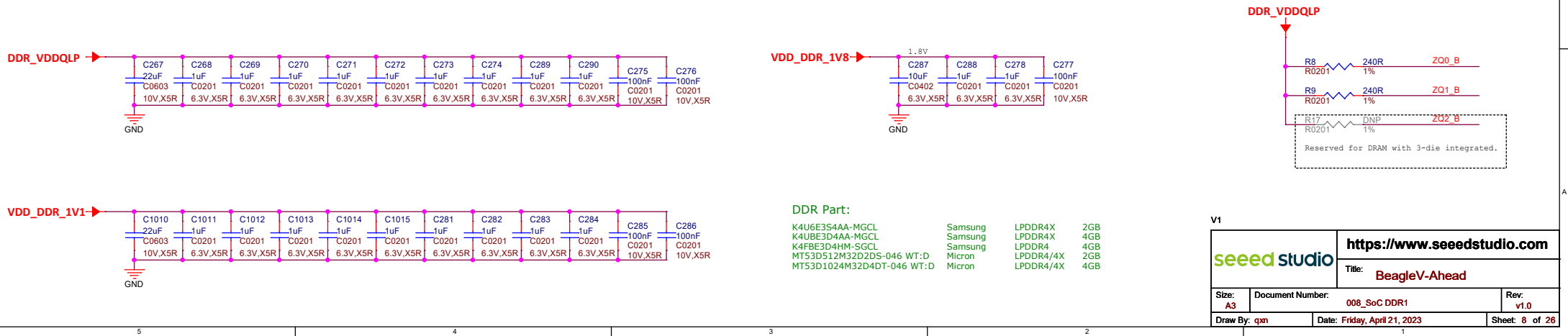
SoC DDR controller



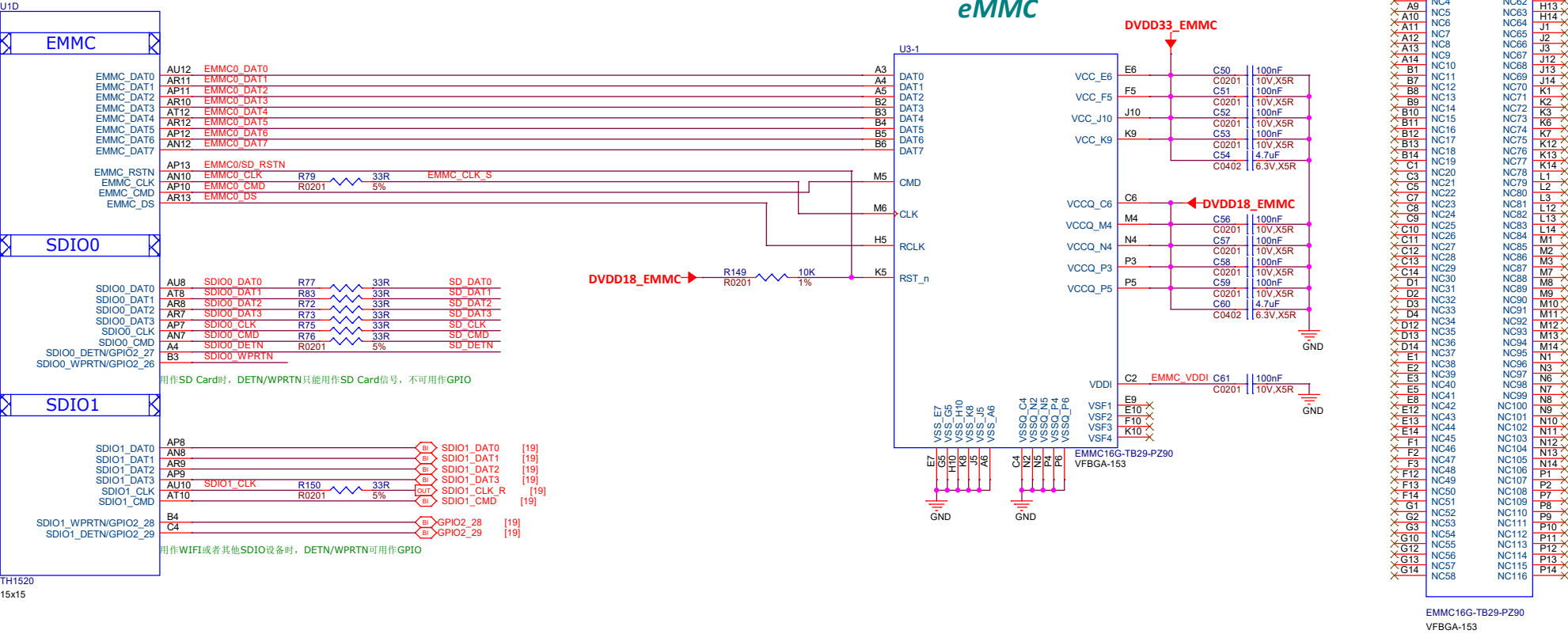
LPDDR4



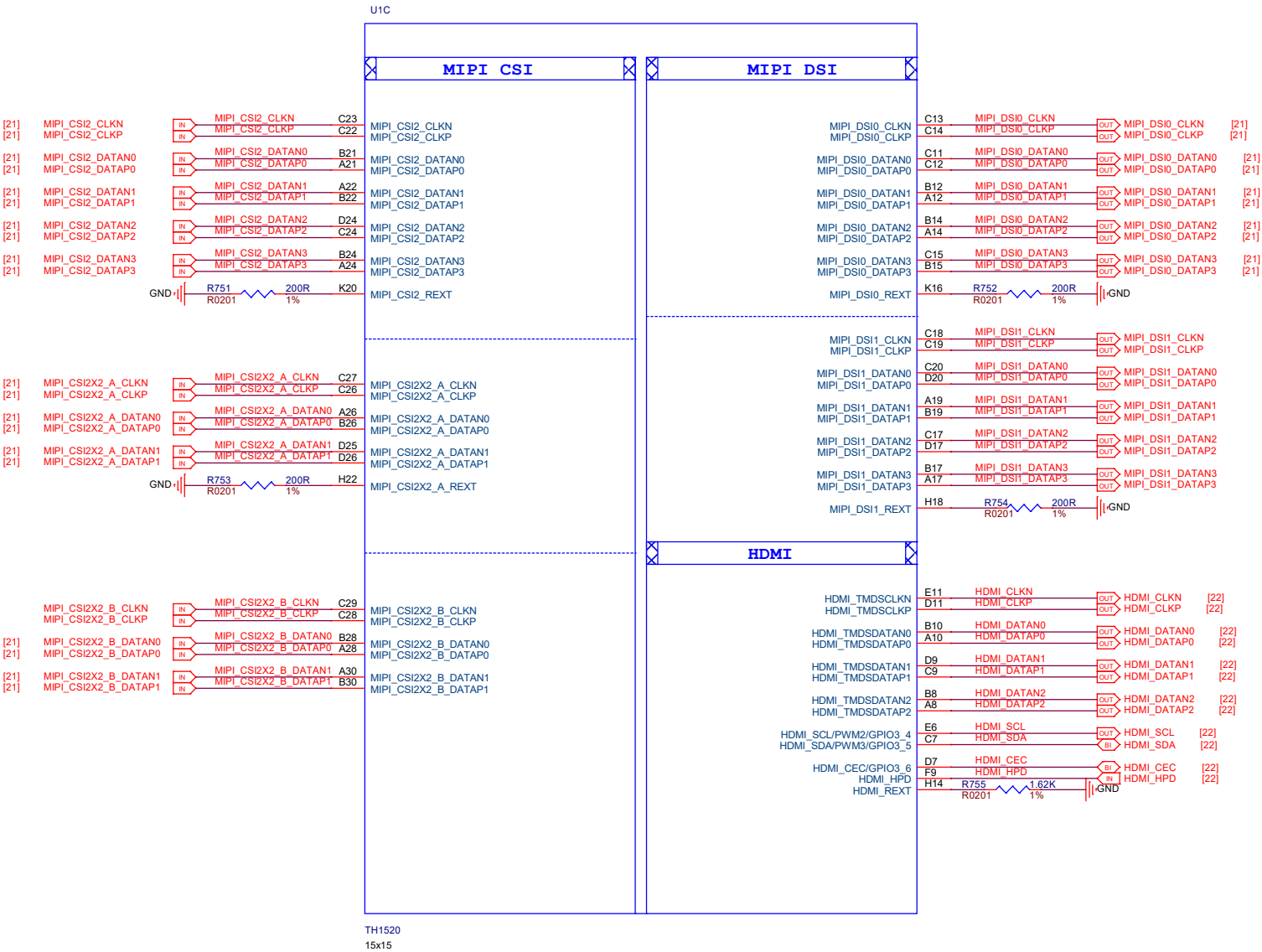
LPDDR4 DCAPs



SoC SDIO & eMMC & SD



SoC MIPI CSI & DSI & HDMI

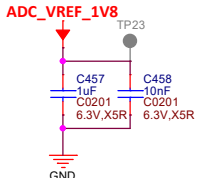


SoC SYS & ADC & Clock ..

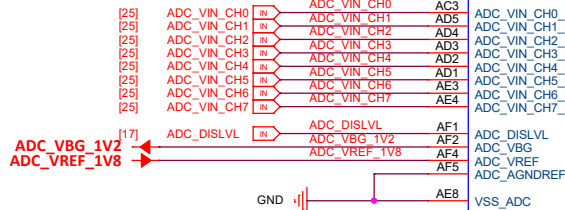
AON

Caution:

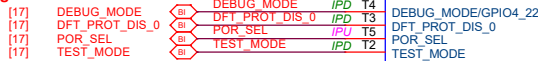
使用ADC_VREF外部参考源时，ADC_VREF输入为 1.8V，ADC信号输入电压范围为0~1.8V，推荐



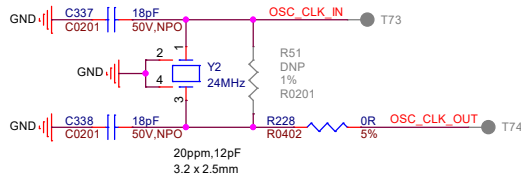
Put the decoupling capacitors to ADC_VBG, ADC_VREF pin as short as possible;
Capacitors on ADC_VBG can be DNP when ADC_VREF is used as the reference voltage;
ADC_AGND_REF and VSS_ADC are connected to GND directly.



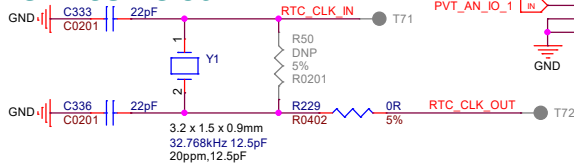
ADC Reference



24M Clock



32.768K Clock



U1A

JTAG/AOGPIO

GPIO0

ADC

GPIO1

Reset

Config

Clock

GPIO2

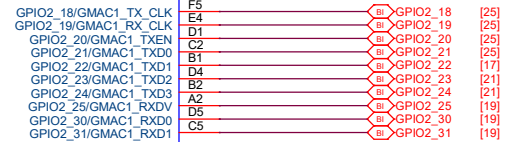
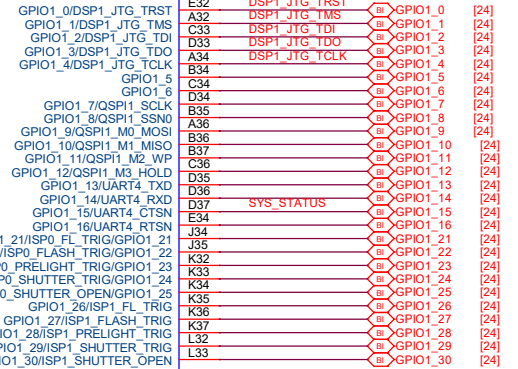
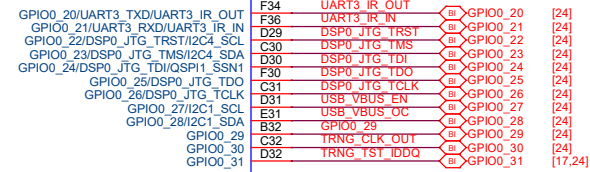
PVT

GPIO3

TH1520
15x15

IRDA

IO PAD	DSP0 JTAG	CHIP Debug
GPIO0_22	DSP0_JTAG_TRST	CHIP_DBG_SEL
GPIO0_23	DSP0_JTAG_TMS	CHIP_DBG_SCLK
GPIO0_24	DSP0_JTAG_TDI	CHIP_DBG_CSN
GPIO0_25	DSP0_JTAG_TDO	CHIP_DBG_MOSI
GPIO0_26	DSP0_JTAG_TCLK	CHIP_DBG_MISO

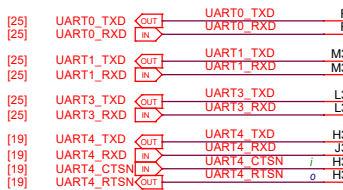
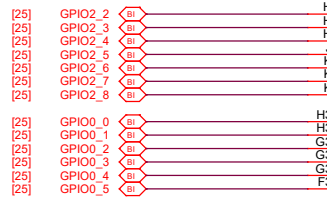
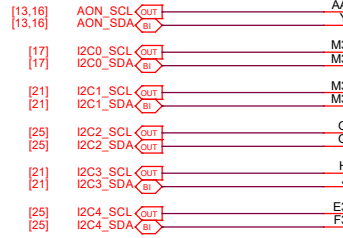


V1

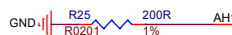
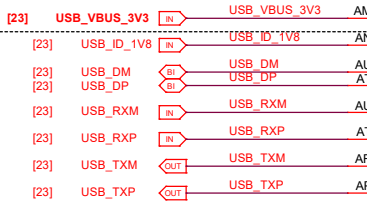
seeed studio		https://www.seeedstudio.com	
Title: BeagleV-Ahead		Rev: v1.0	
Size: A3	Document Number: 011_SoC SYS & ADC & Clock ..	Rev: v1.0	
Draw By: qm	Date: Friday, April 21, 2023	Sheet: 11 of 26	

SoC USB & GMAC & Audio ..

AON

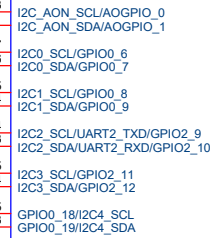


USB3_DRD_VBUS Voltage Range:0~3.3V, must be isolated by 30K serial resistor from 5V VBUS connector, or 3.3V comparator output.

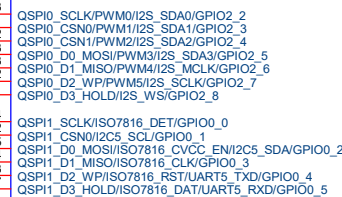


U1B

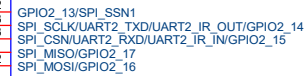
I2C



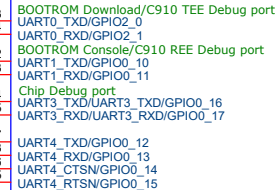
QSPI



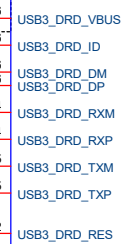
SPI



UART



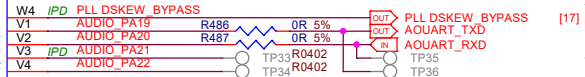
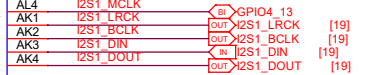
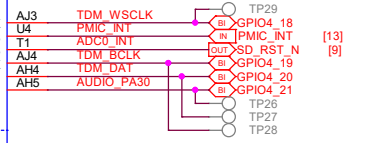
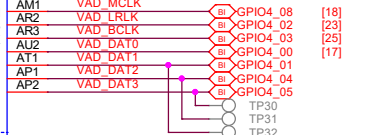
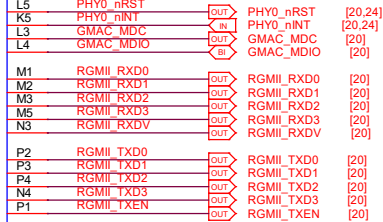
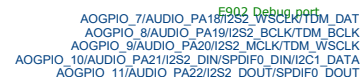
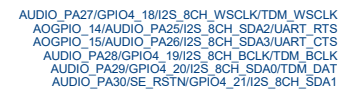
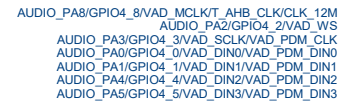
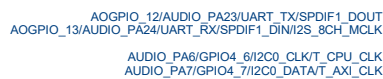
USB



GMAC0



Audio



TH1520

15x15



V1

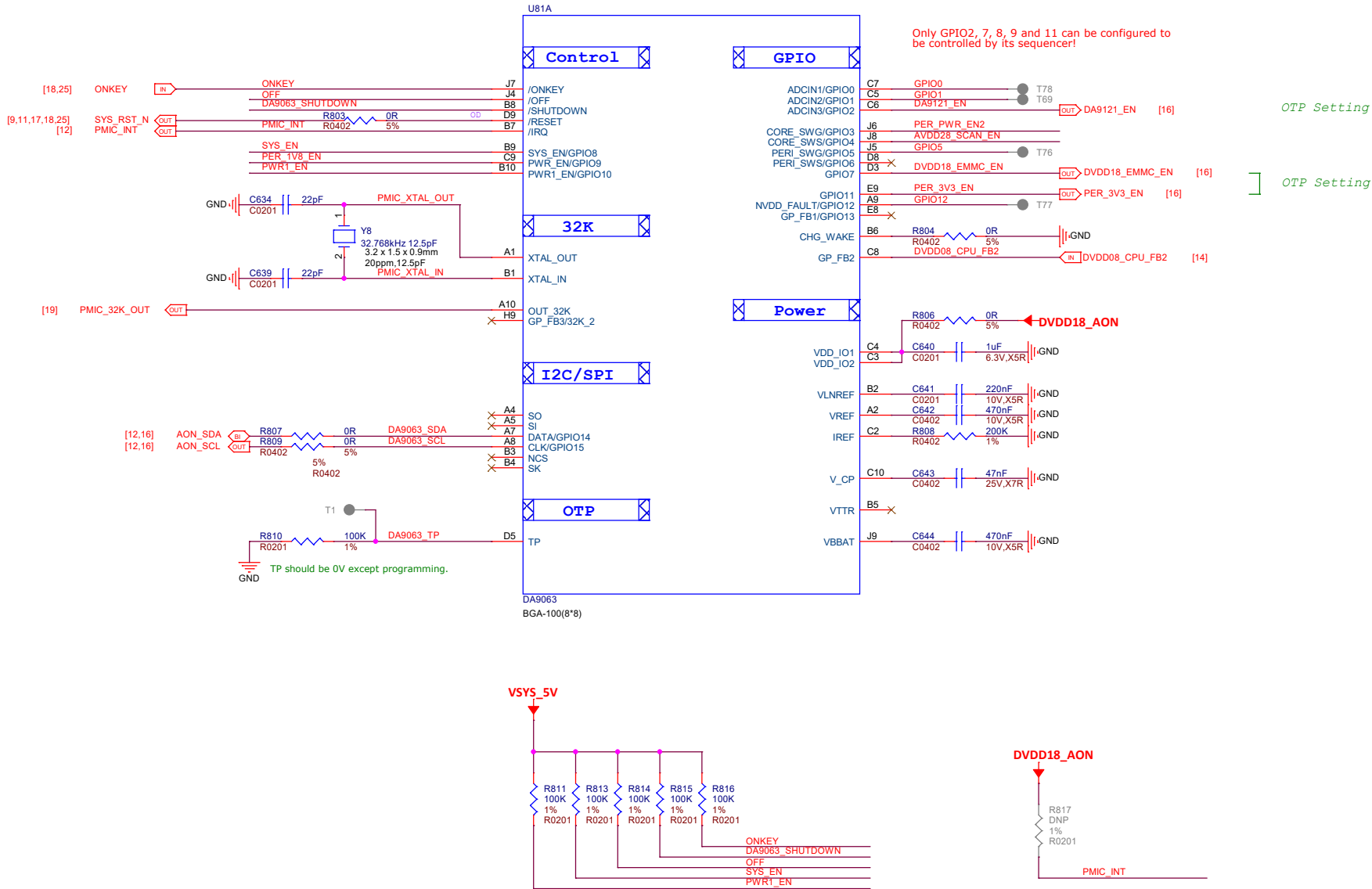
seeed studio		https://www.seeedstudio.com	
Title: BeagleV-Ahead		Rev: v1.0	
Size: A3	Document Number: 012_SoC USB & GMAC & Audio ..	Draw By: qm	
Date: Friday, April 21, 2023		Sheet: 12 of 26	

PMIC Control

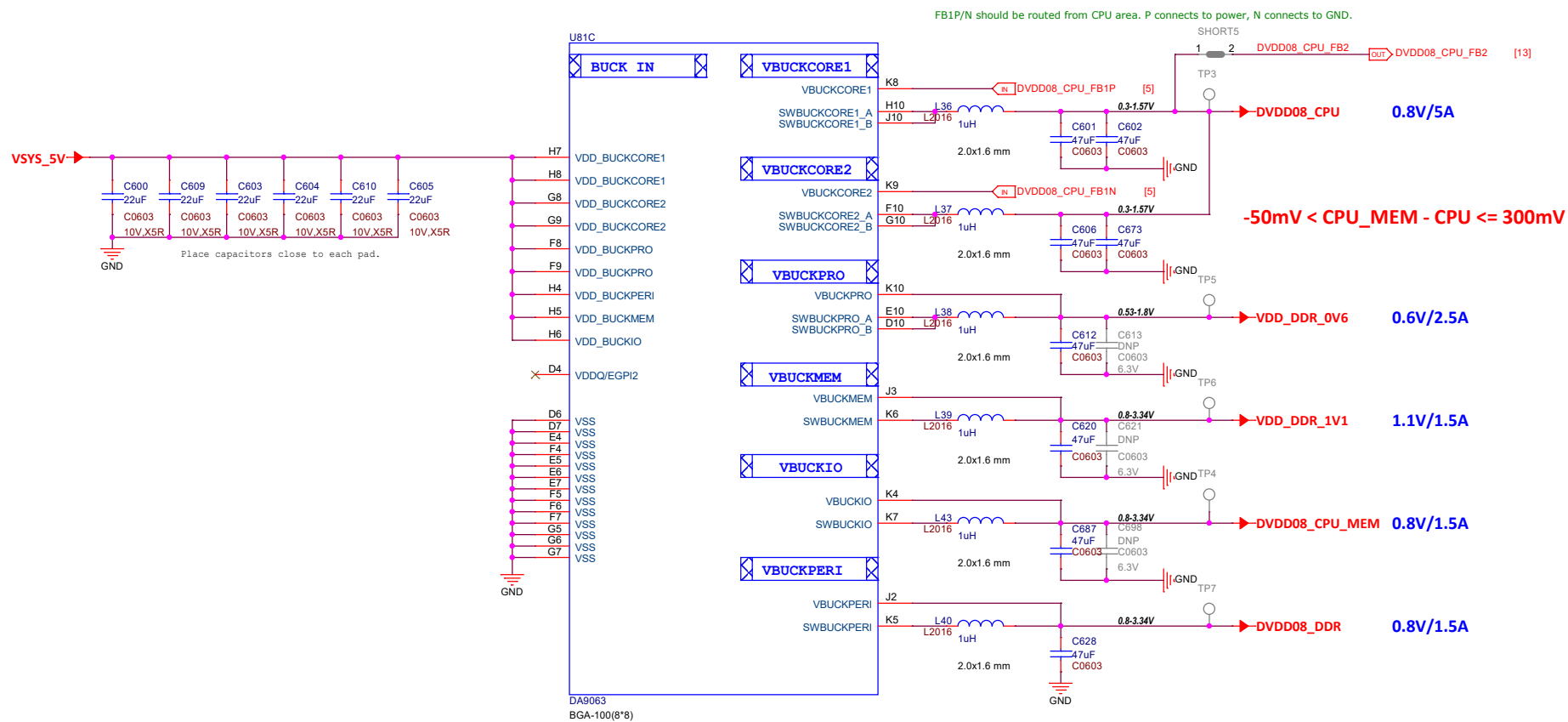
OTP Setting

OTP Setting

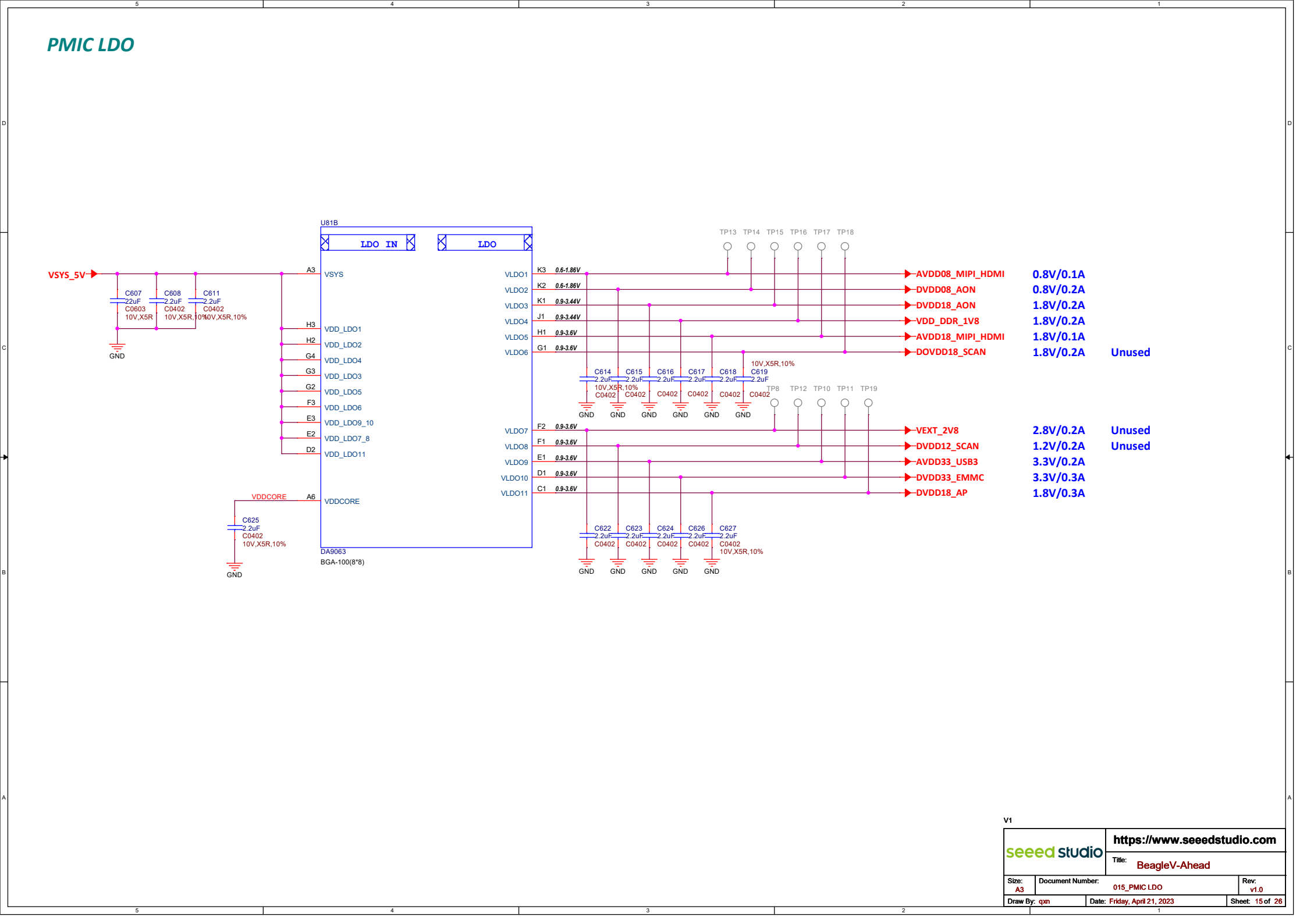
OTP Setting



PMIC Buck



V1

[illegible]

PMIC LDO

VSYS_5V

C607 22uF
C0603 10V,X5R

C608 2.2uF
C0402 10V,X5R

C611 2.2uF
C0402 10V,X5R

GND

U81B

LDO IN

LDO

VSYS

VDD_LDO1

VDD_LDO2

VDD_LDO4

VDD_LDO3

VDD_LDO5

VDD_LDO6

VDD_LDO9_10

VDD_LDO7_8

VDD_LDO11

VDDCORE

DA9063

BGA-100(8*8)

VLDO1

VLDO2

VLDO3

VLDO4

VLDO5

VLDO6

VLDO7

VLDO8

VLDO9

VLDO10

VLDO11

K3 0.6-1.86V

K2 0.6-1.86V

K1 0.9-3.44V

J1 0.9-3.44V

H1 0.9-3.6V

G1 0.9-3.6V

F2 0.9-3.6V

F1 0.9-3.6V

E1 0.9-3.6V

D1 0.9-3.6V

C1 0.9-3.6V

C614 2.2uF
C0402 10V,X5R

C615 2.2uF
C0402 10V,X5R

C616 2.2uF
C0402 10V,X5R

C617 2.2uF
C0402 10V,X5R

C618 2.2uF
C0402 10V,X5R

C619 2.2uF
C0402 10V,X5R

C622 2.2uF
C0402 10V,X5R

C623 2.2uF
C0402 10V,X5R

C624 2.2uF
C0402 10V,X5R

C626 2.2uF
C0402 10V,X5R

C627 2.2uF
C0402 10V,X5R

TP13

TP14

TP15

TP16

TP17

TP18

TP8

TP10

TP11

TP19

AVDD08_MIPI_HDMI

DVDD08_AON

DVDD18_AON

VDD_DDR_1V8

AVDD18_MIPI_HDMI

DOVDD18_SCAN

VEXT_2V8

DVDD12_SCAN

AVDD33_USB3

DVDD33_EMMC

DVDD18_AP

0.8V/0.1A

0.8V/0.2A

1.8V/0.2A

1.8V/0.2A

1.8V/0.1A

1.8V/0.2A

Unused

2.8V/0.2A

Unused

1.2V/0.2A

Unused

3.3V/0.2A

3.3V/0.3A

1.8V/0.3A

V1

seed studio

<https://www.seeedstudio.com>

Title: BeagleV-Ahead

Size: A3

Document Number: 015_PMIC LDO

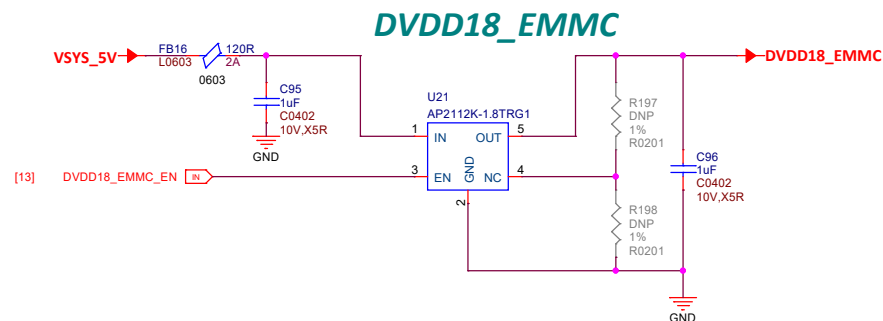
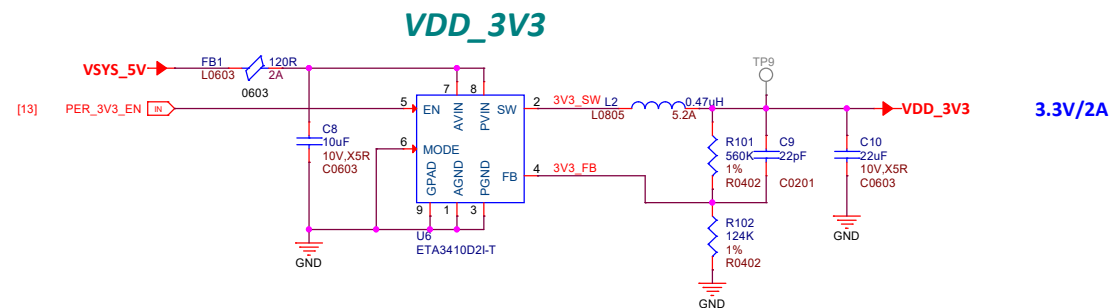
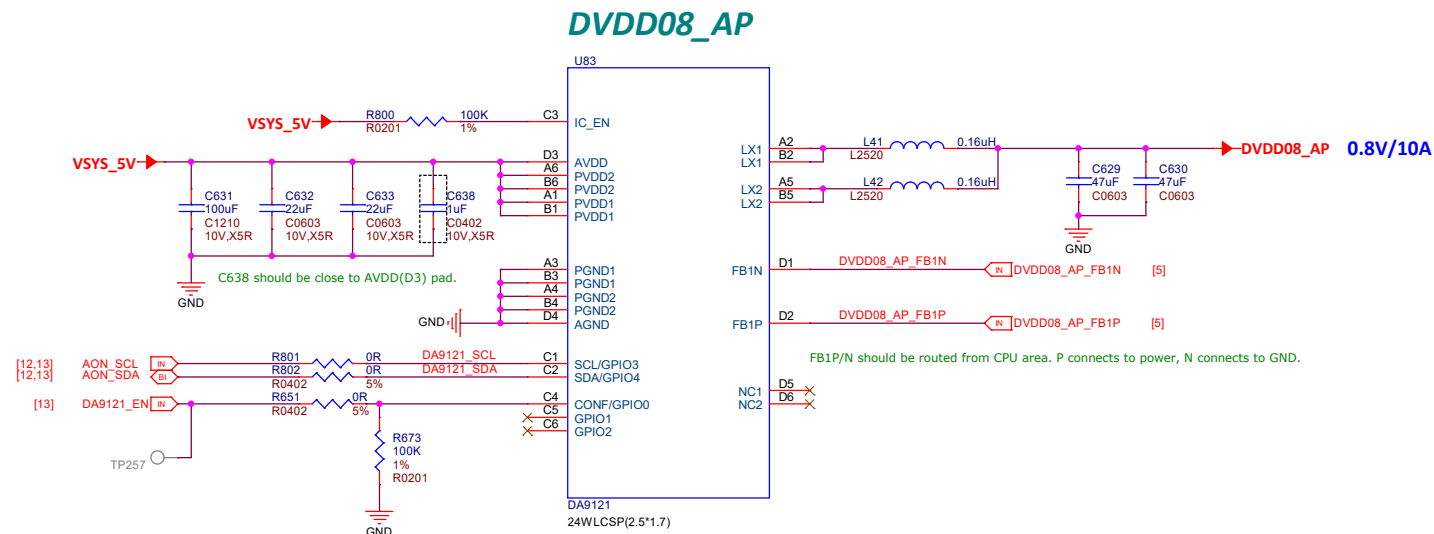
Rev: v1.0

Draw By: qxm

Date: Friday, April 21, 2023

Sheet: 15 of 26

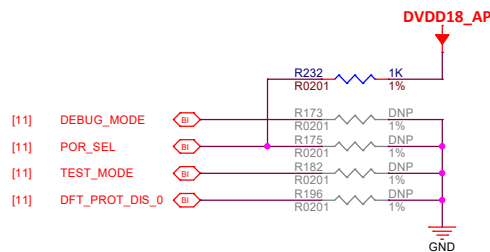
016_EX_DCDC & LDO



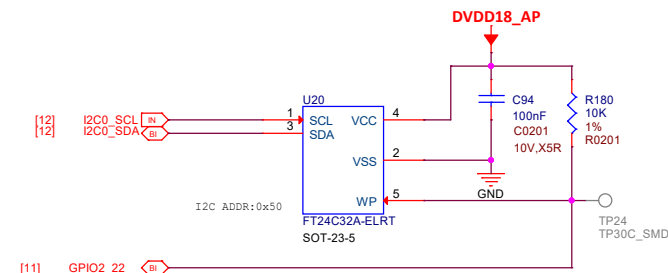
Misc strap pins



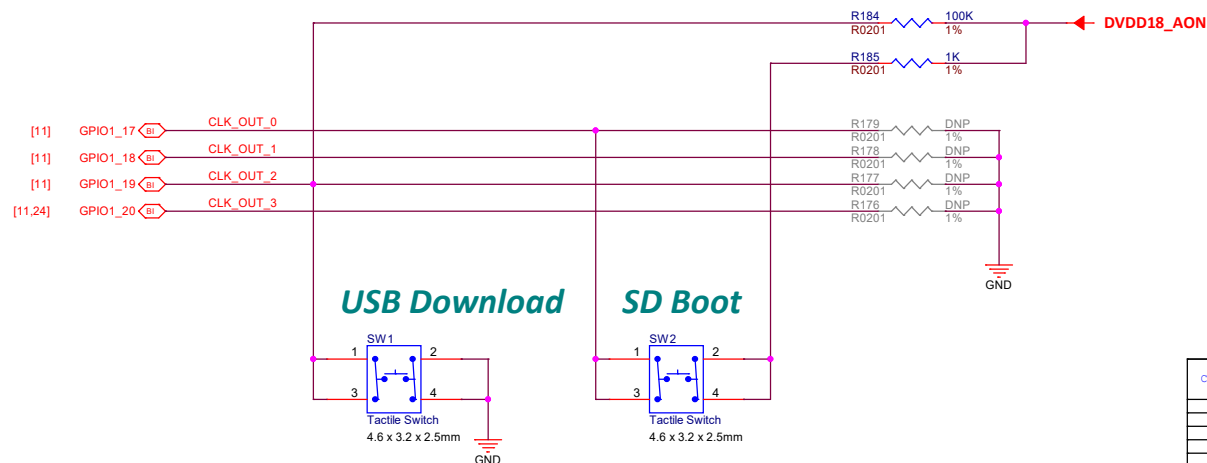
Debug strap pins



EEPROM

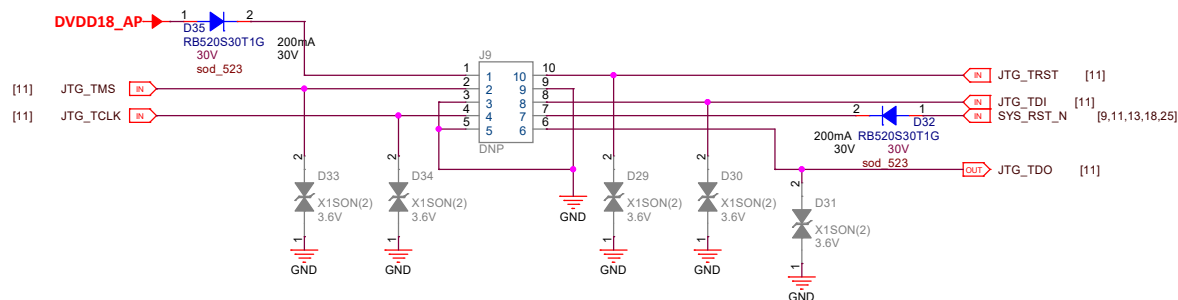


Boot select

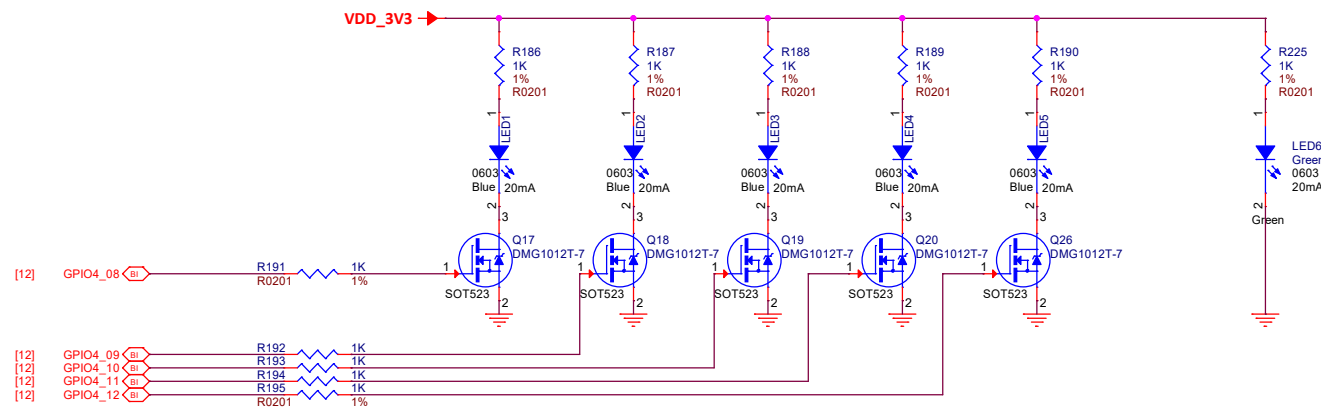


CLK_OUT3	CLK_OUT2	CLK_OUT1	CLK_OUT0	Boot Mode Setting
X	0	X	X	USB Download
X	1	0	0	EMMC Boot
X	1	0	1	SD Boot, SDIO0
X	1	1	0	SPI NAND boot, QSPI0, CS0
X	1	1	1	SPI NOR Boot, QSPI0, CS0

JTAG for Tag-Connect cable

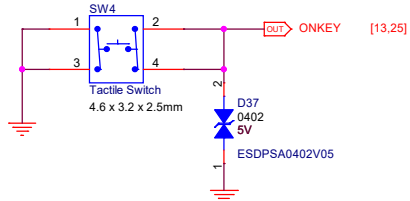


User LED

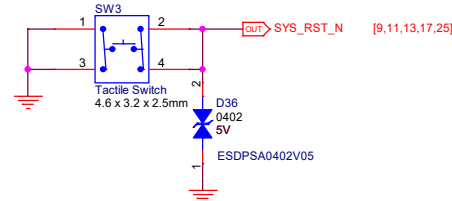


Power Button & Reset Button

Power ON

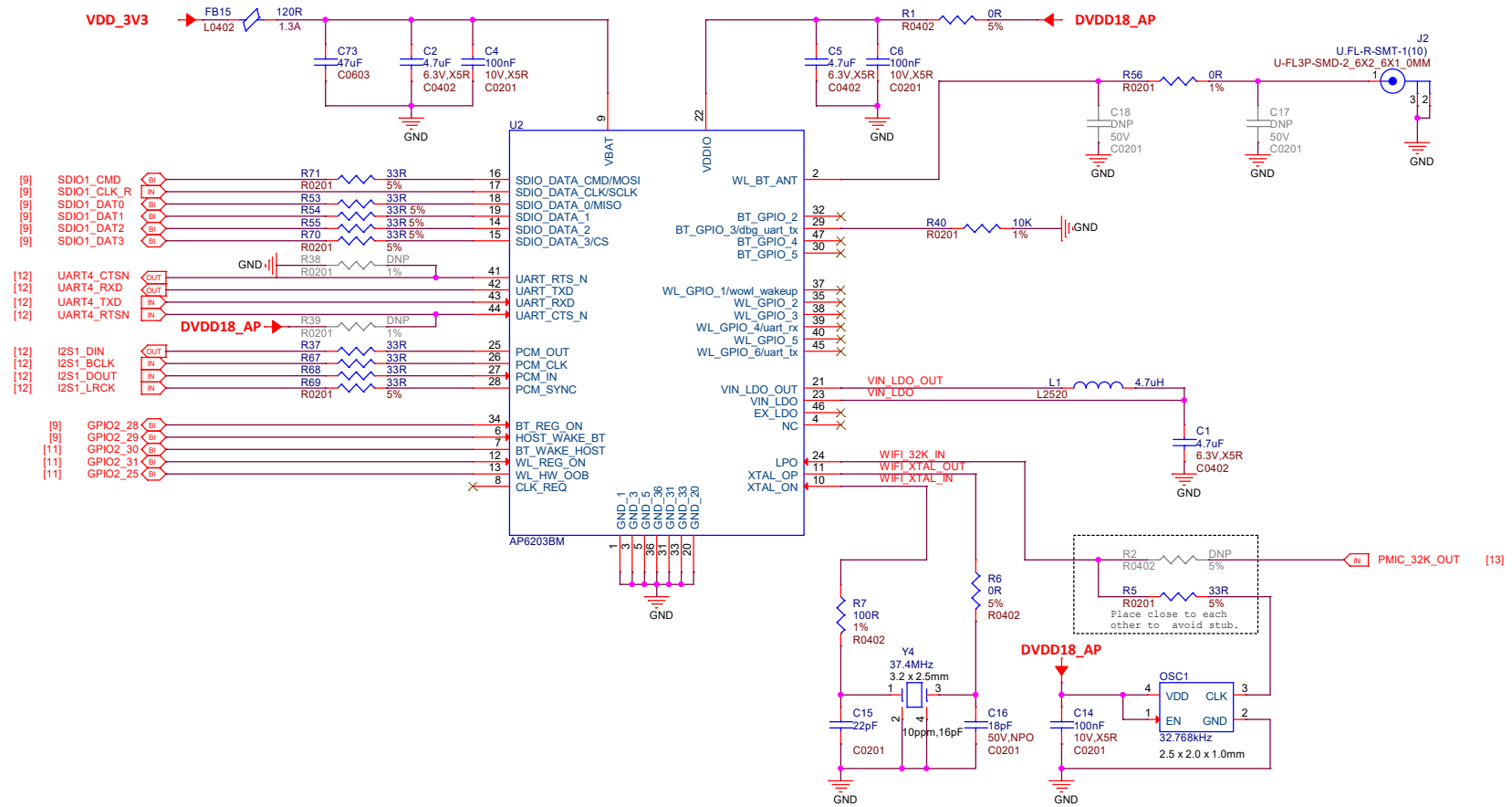


Cold RESET



V1

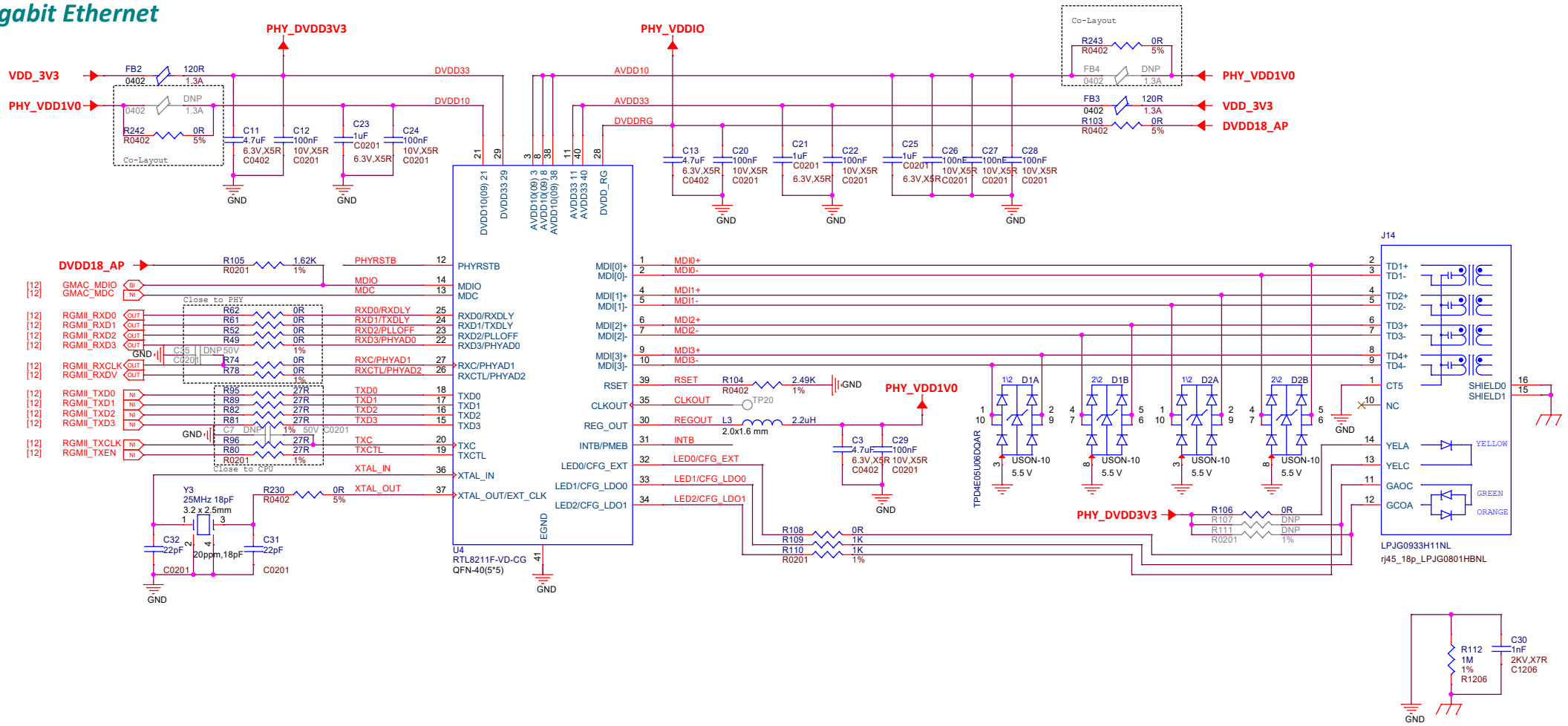
WiFi & Bluetooth



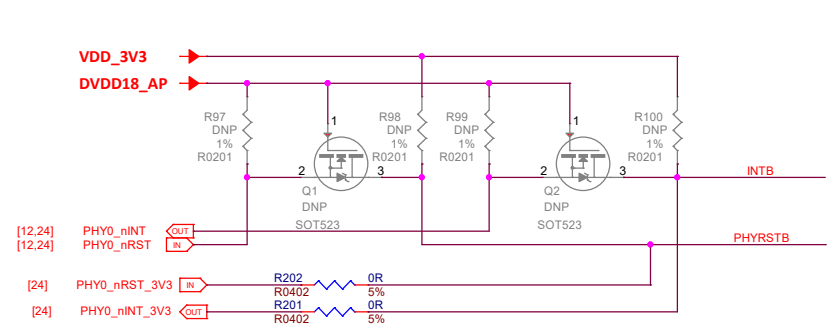
V1

seeed studio		https://www.seeedstudio.com	
Title:		BeagleV-Ahead	
Size: A3	Document Number:	019_WiFi & Bluetooth	Rev: v1.0
Draw By: qxm	Date: Friday, April 21, 2023	Sheet: 19 of 26	

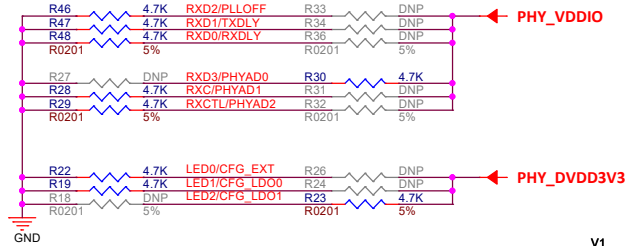
Gigabit Ethernet



Voltage Level Shifter



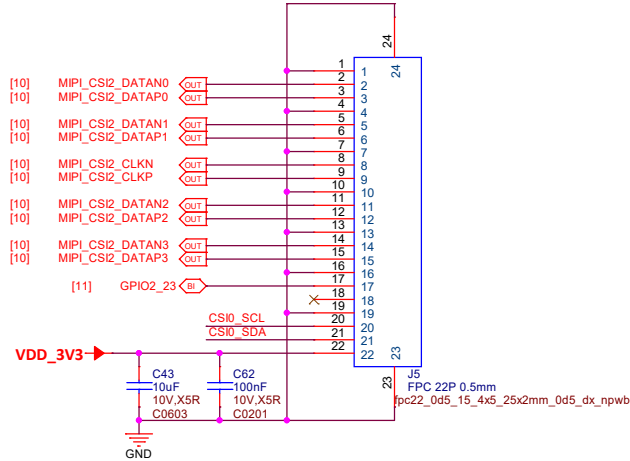
Strap options



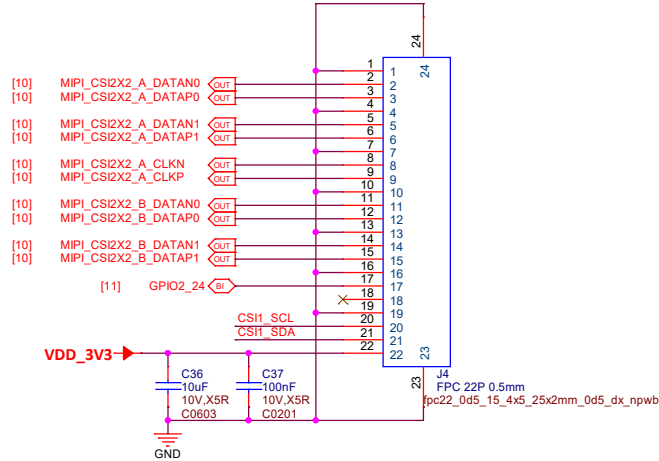
CFG_EXT = 0, CFG_LDO[1:0] = 10 : Internal 1.8V
PHY_AD[2:0] = 001: PHY Addr 001
PHY_PLLOF = 0 : Enable PLL
PHY_TXDLY = 0 :
PHY_RXDLY = 0 :

CSI & DSI Connector

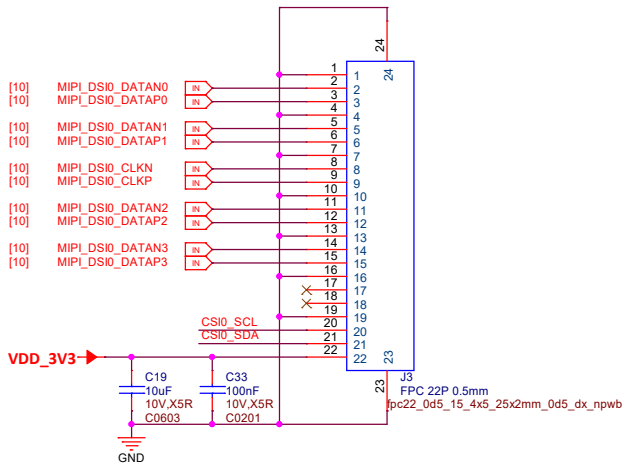
CSI0



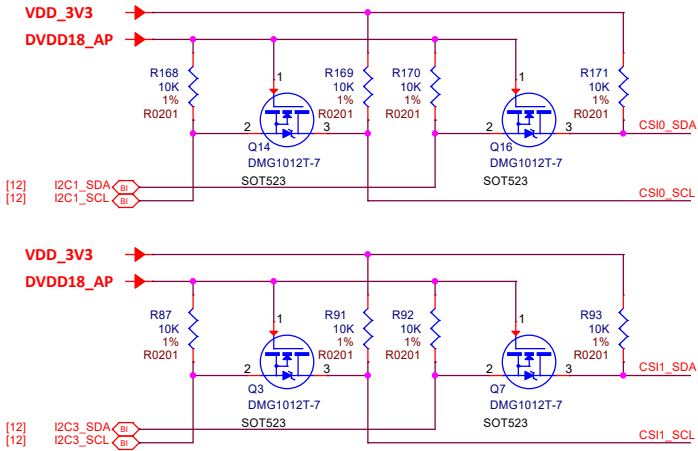
CSI1



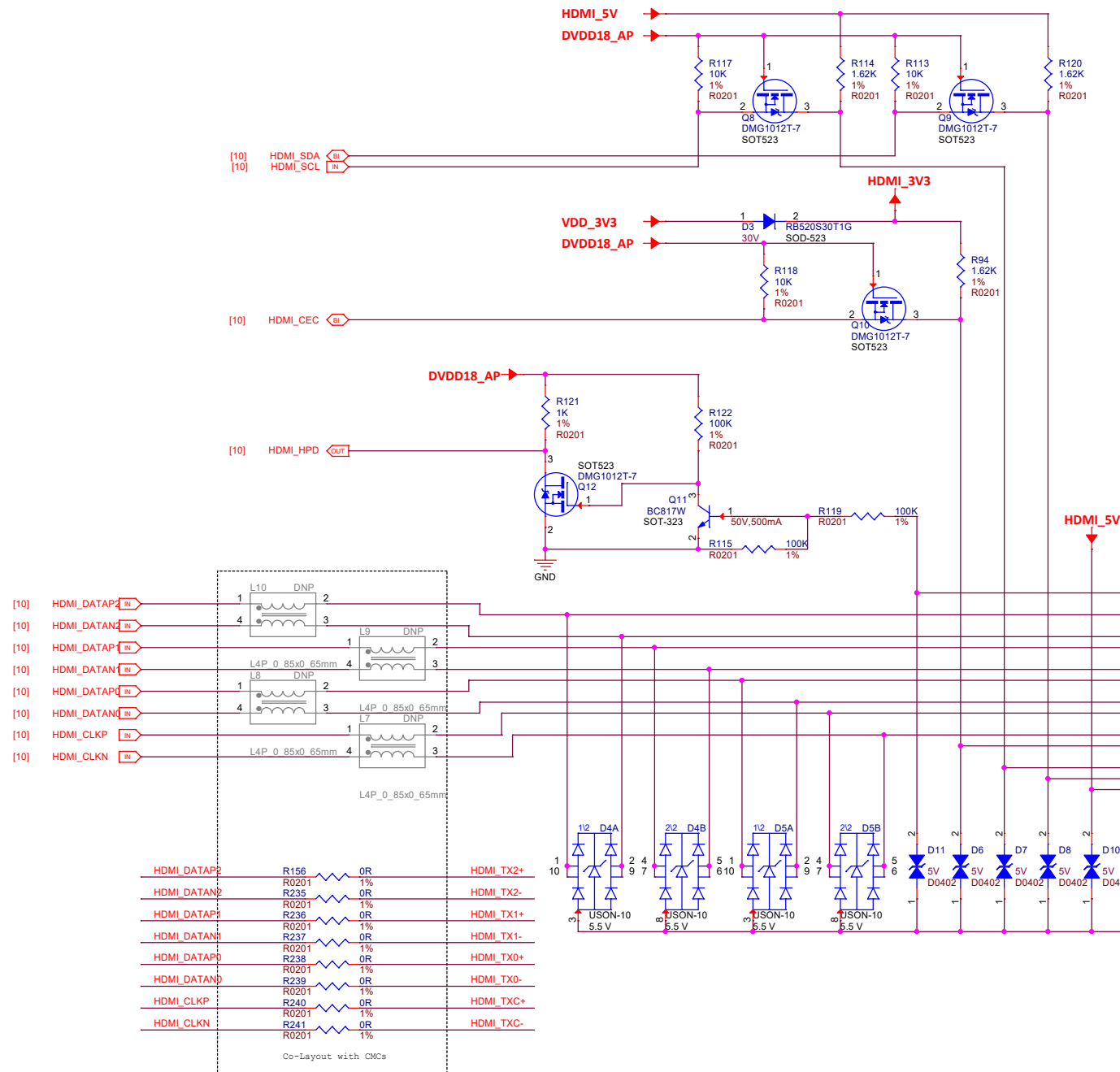
DSI



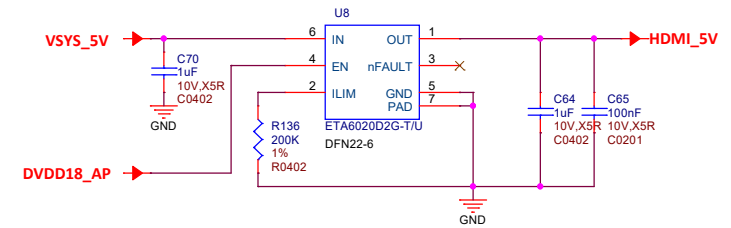
Voltage Level Shifter



HDMI Connector

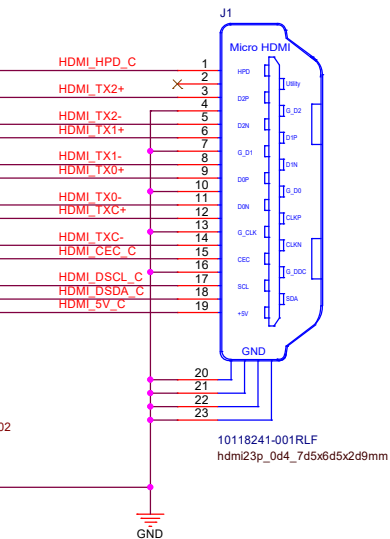


HDMI Power switch

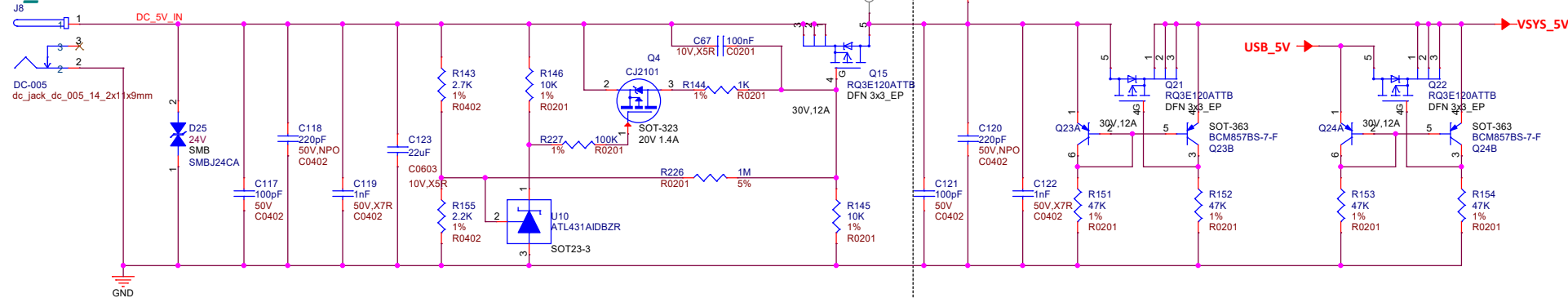


Current is prevented from flowing when the switch is off and the output voltage is higher than the input voltage.

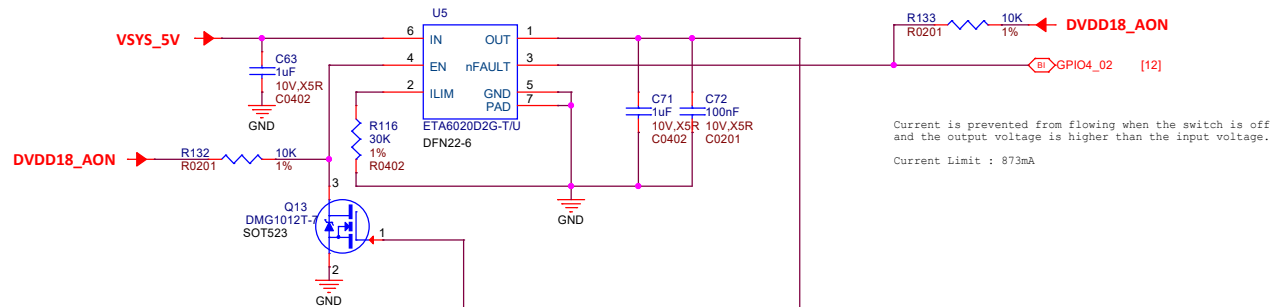
Current Limit : 100mA



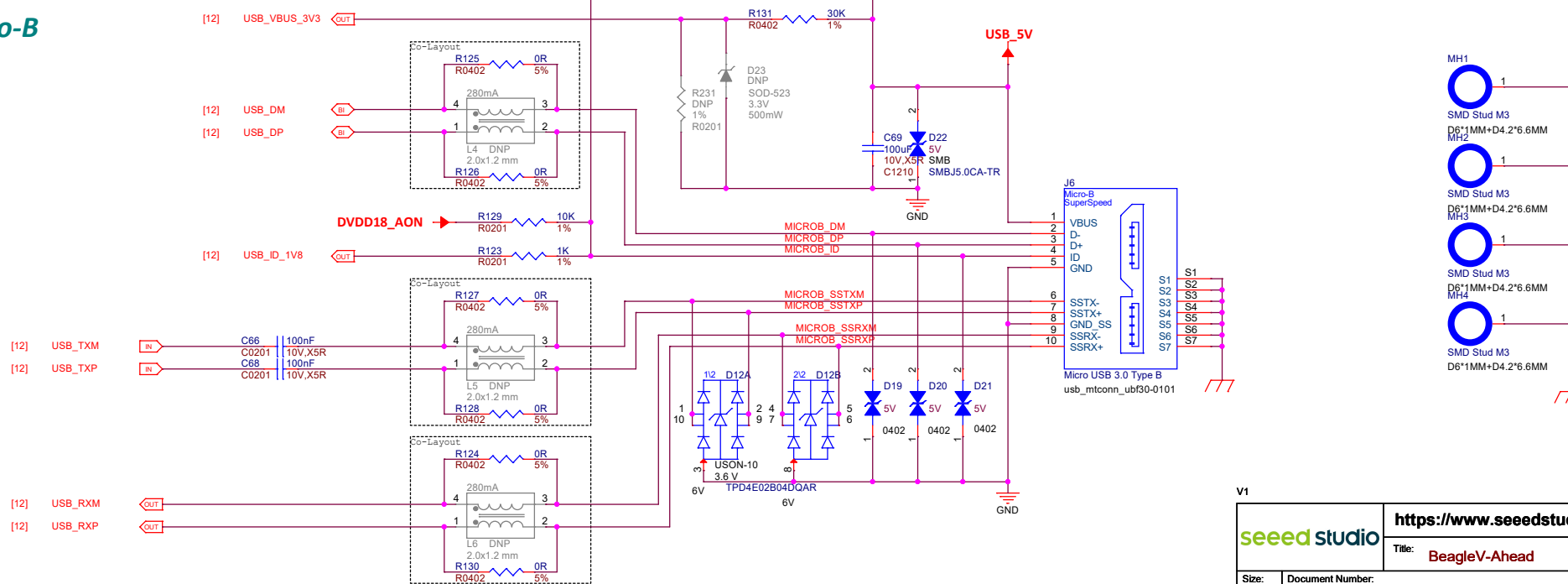
DC_IN & OVP



USB Power Path



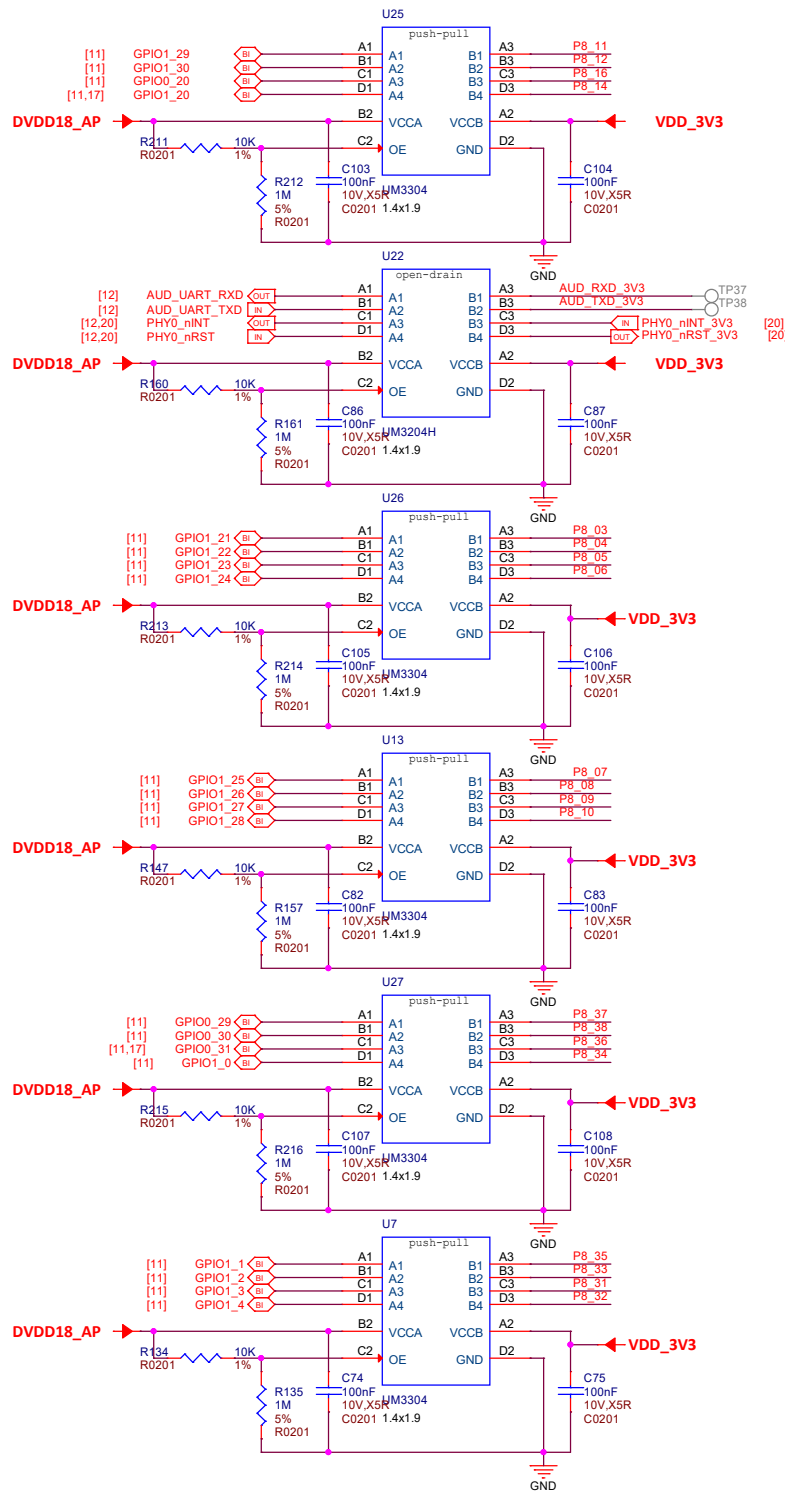
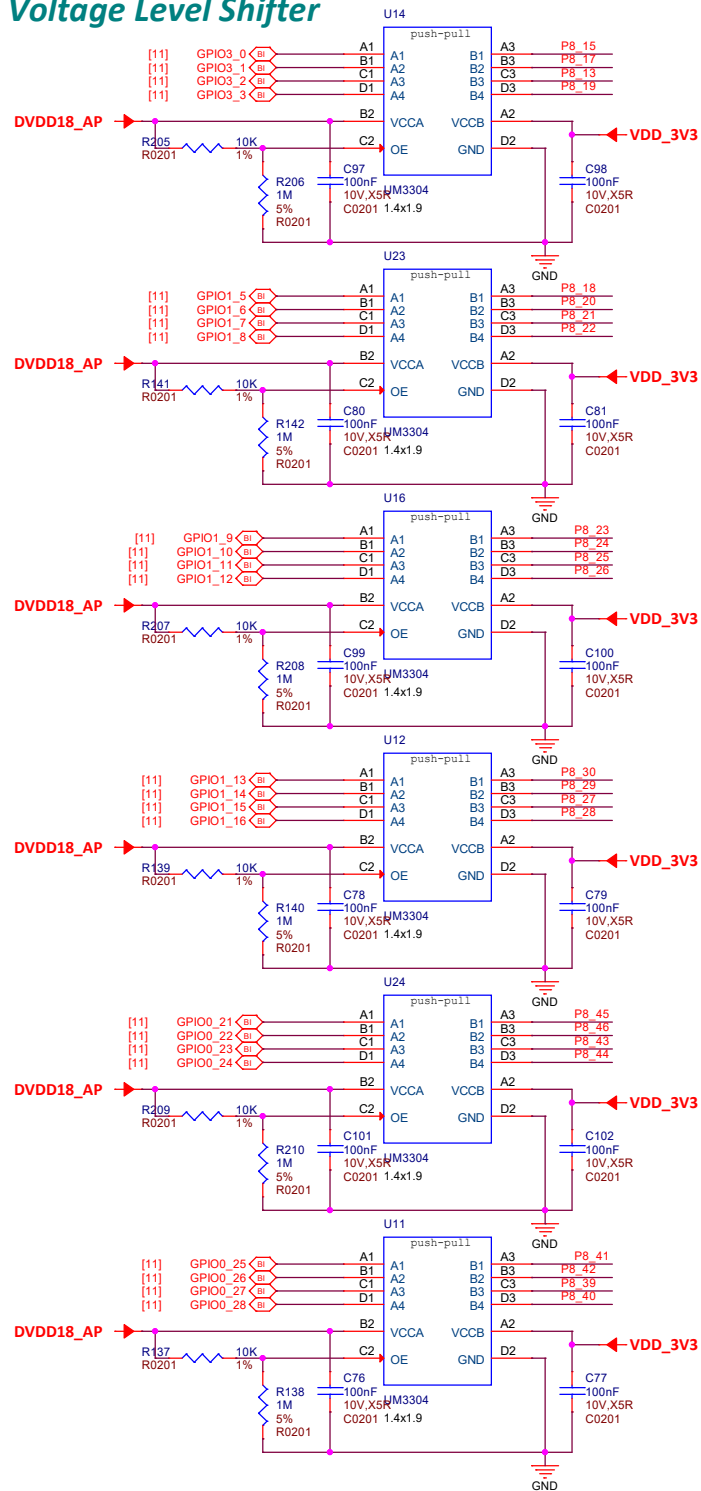
USB 3.0 Micro-B



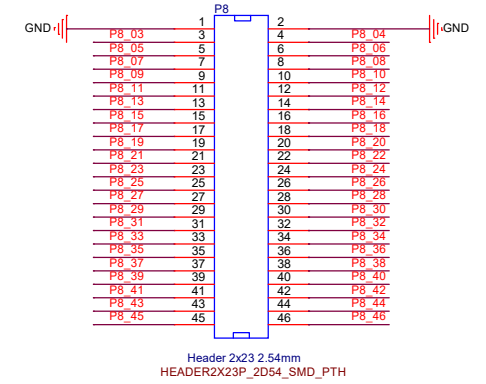
V1

seeed studio		https://www.seeedstudio.com	
Title: BeagleV-Ahead		Rev: v1.0	
Size: A3	Document Number: 023_USB 3.0 Micro B & DC IN	Draw By: qm	
Date: Friday, April 21, 2023		Sheet: 23 of 26	

Voltage Level Shifter



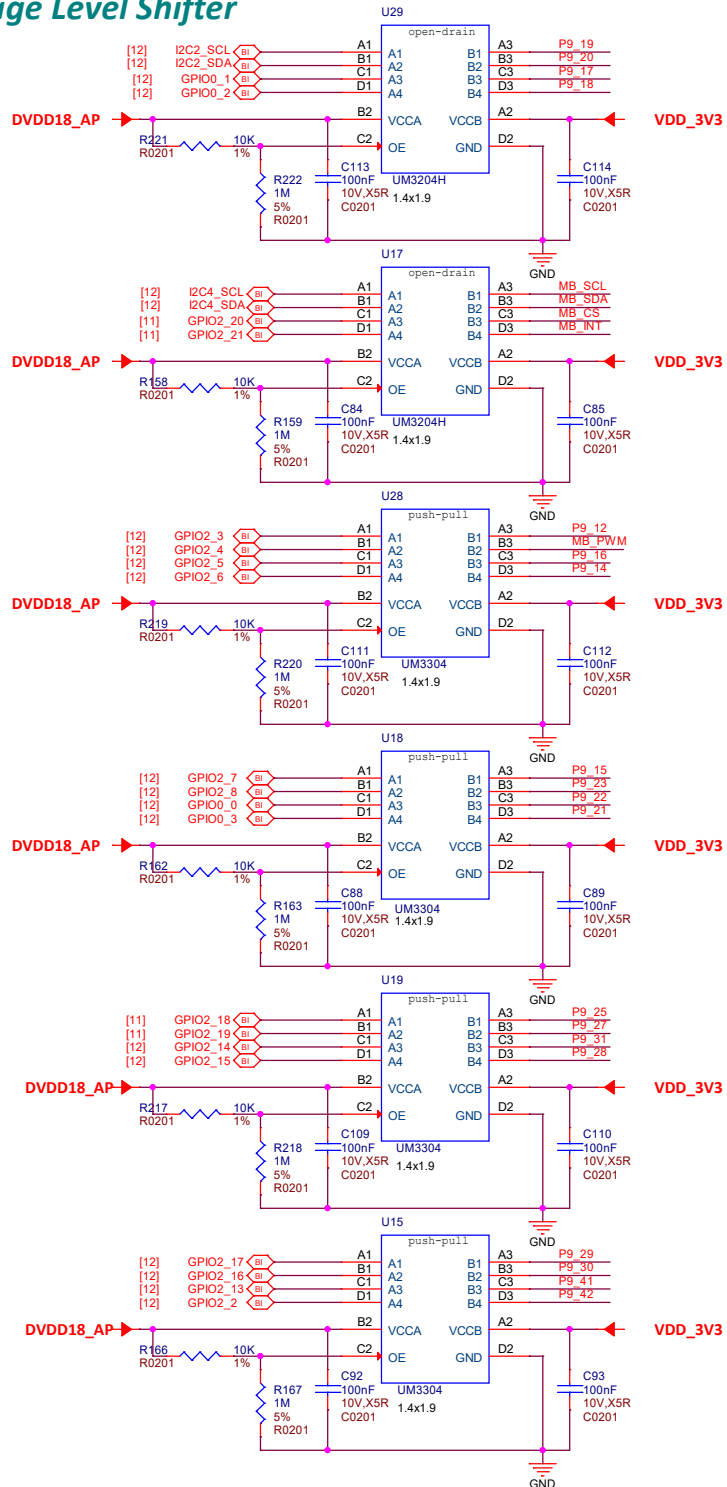
P8 Header



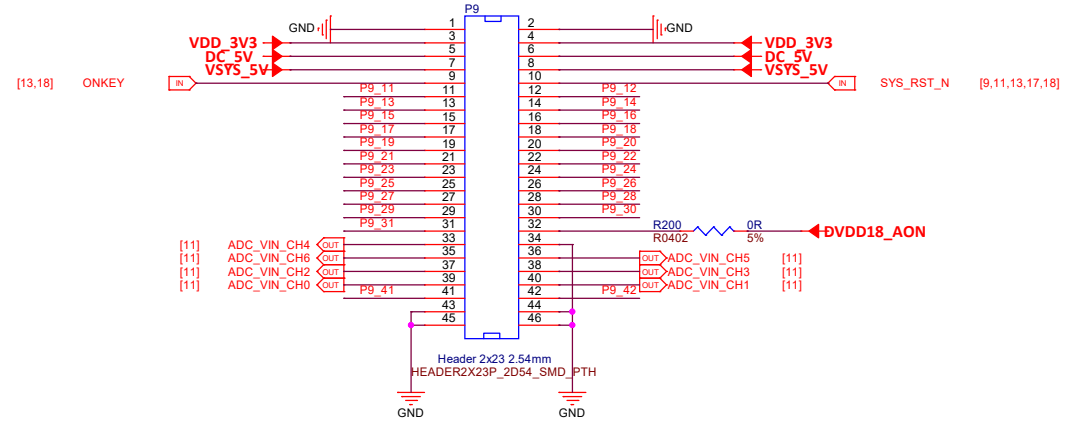
Debug



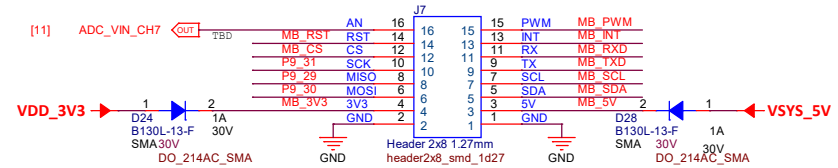
Voltage Level Shifter



P9 Header



MikroBus Shuttle Connector



Voltage Level Shifter

