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MS-7C89

CML Platform

ATX
Ver: 1.0

CPU:

Comet lake S 65W

Onboard Chip:

HD Audio Codec : ALC892

LAN : INTEL I219

SIO : NTC5887

Flash ROM: SPI 128 MB X1

Main Memory:

*DDRIV (2666MHz) * 2*

PWM:

IMVP8 -RT3607BC

ACPI:

LDO

Expansion Slots:

*PCI Express (X16) Slot * 1*

*PCI Express (X1) Slot * 1*

*M.2 Slot * 1*

*Intel WIFI * 1*

System Chipset:

H410 PCH_V

VGA Output:

HDMI Port

DVI Port

VGA Port

Other:

*SATA3.0 *4*

*PS2 * 1*

*REAL USB3.1 *2*

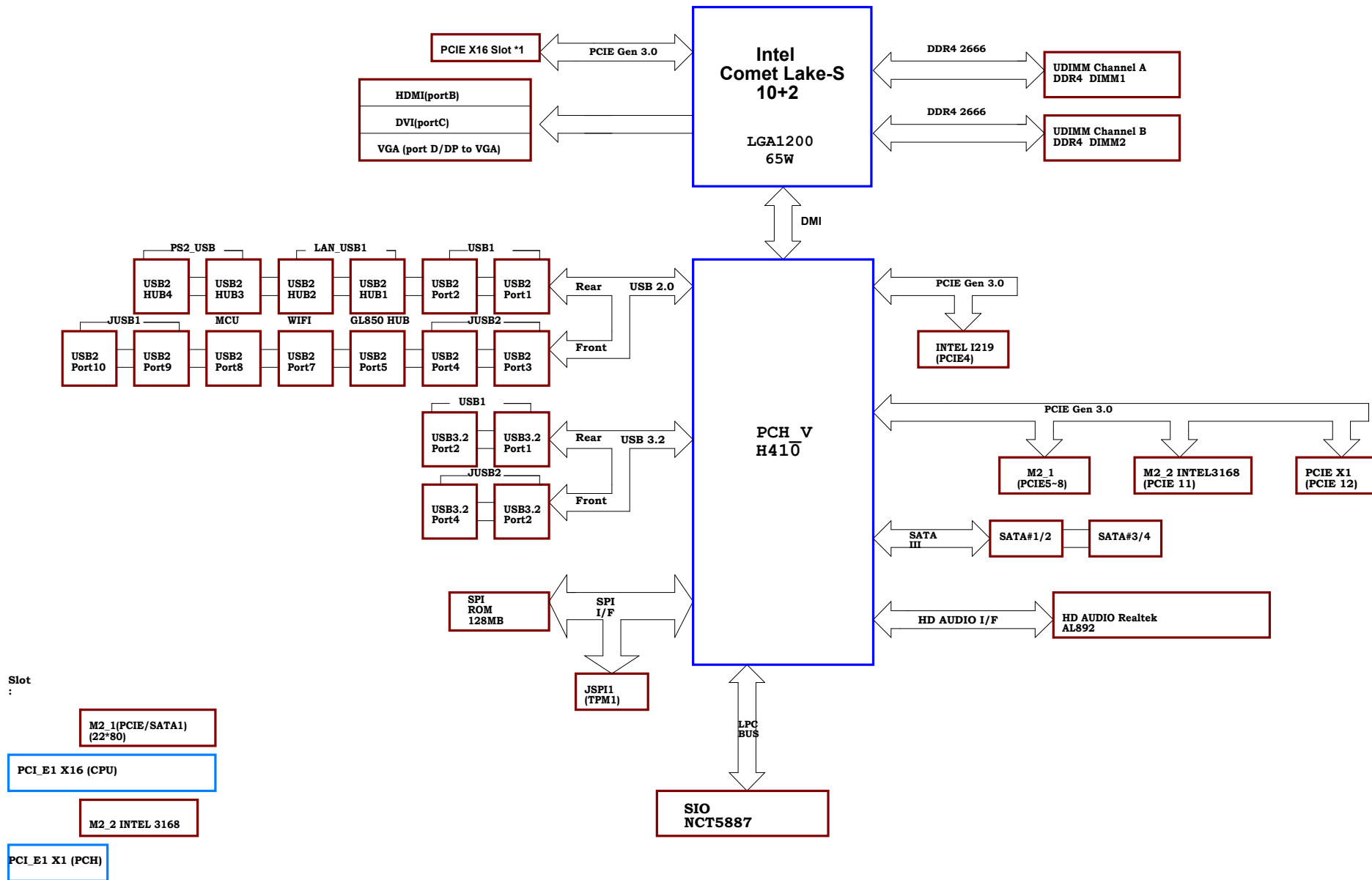
REAL USB2.0 LAN_USB

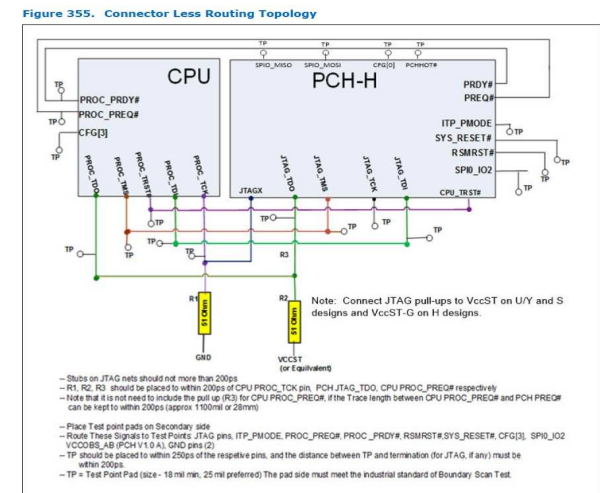
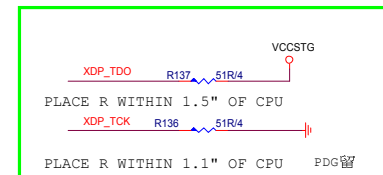
*FRONT USB3.1 *2*

*FRONT USB2.0 *4*

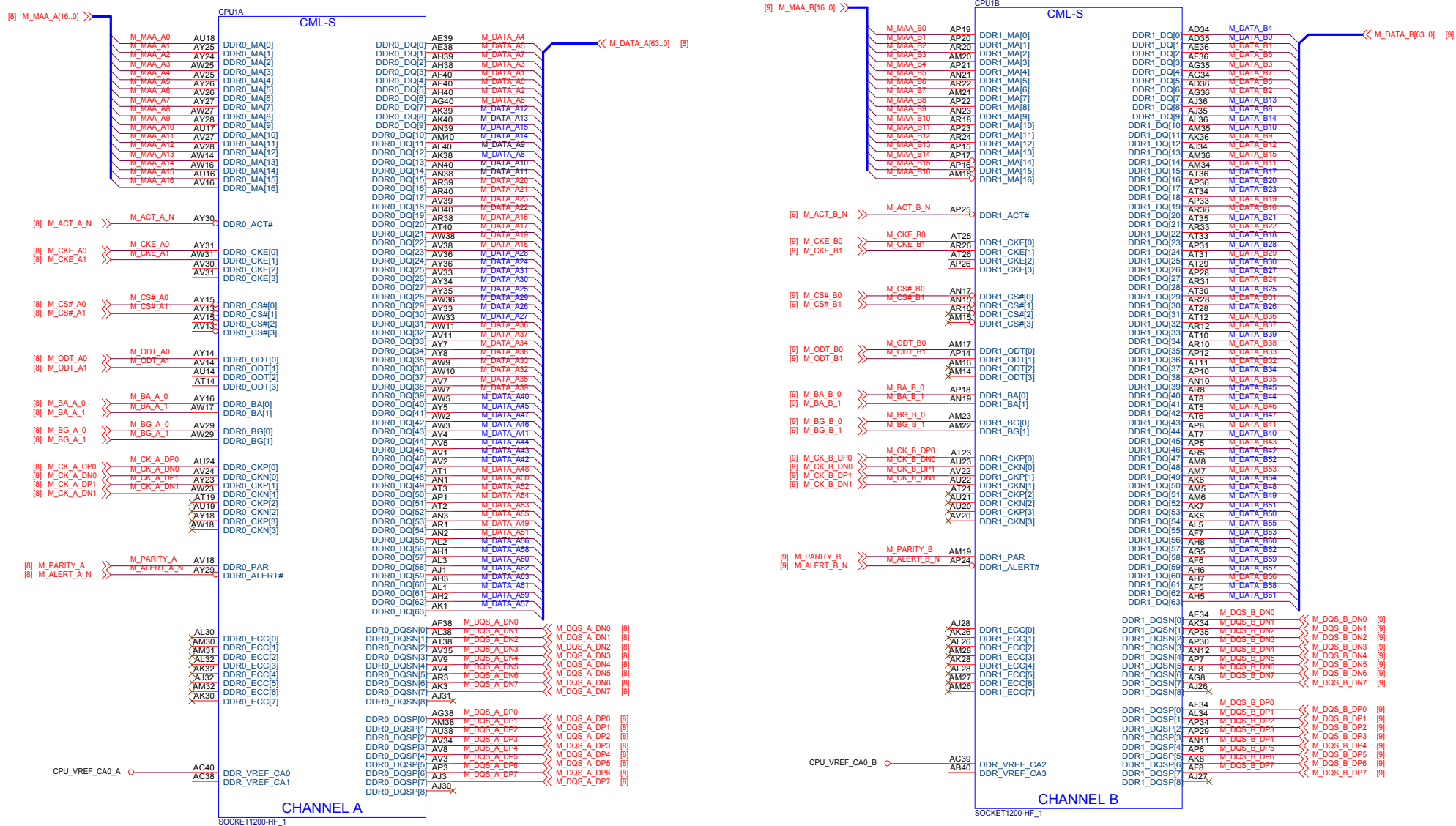
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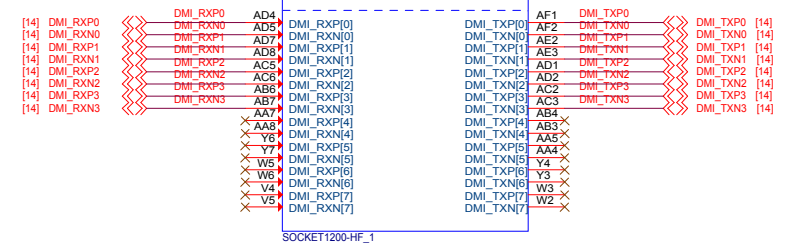
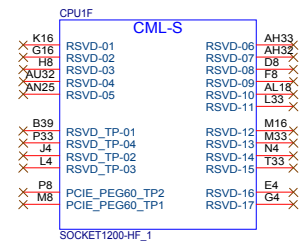
MS-7C86 Block Diagram



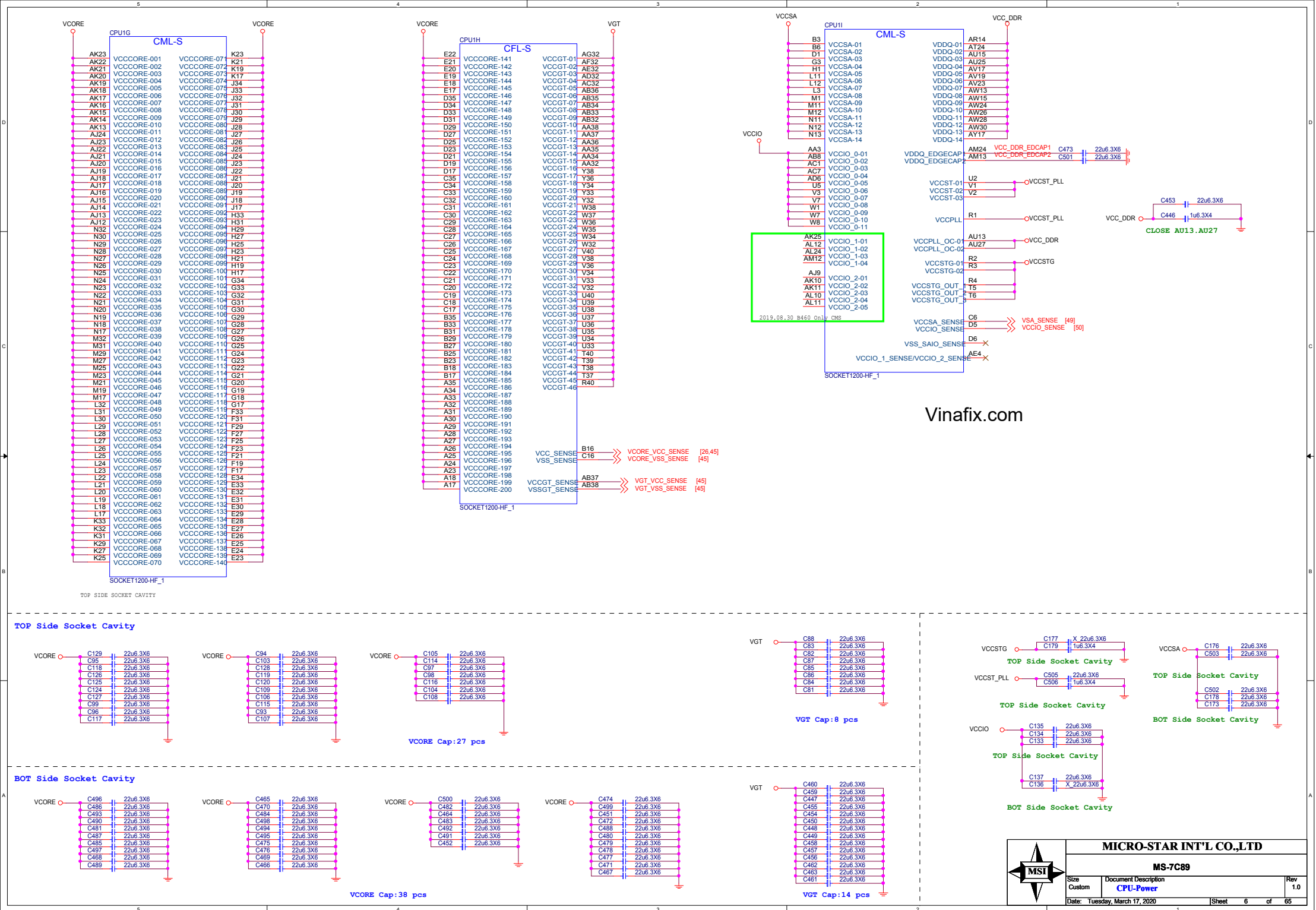


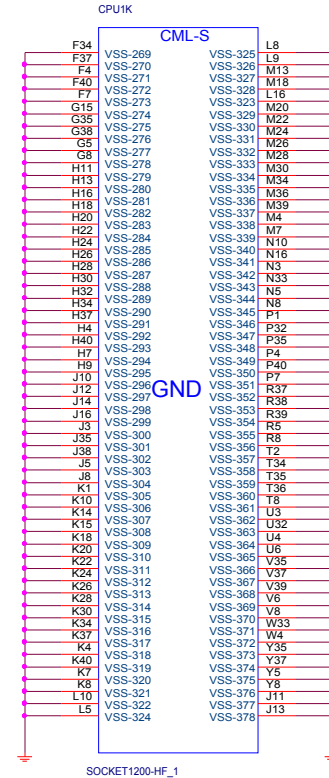
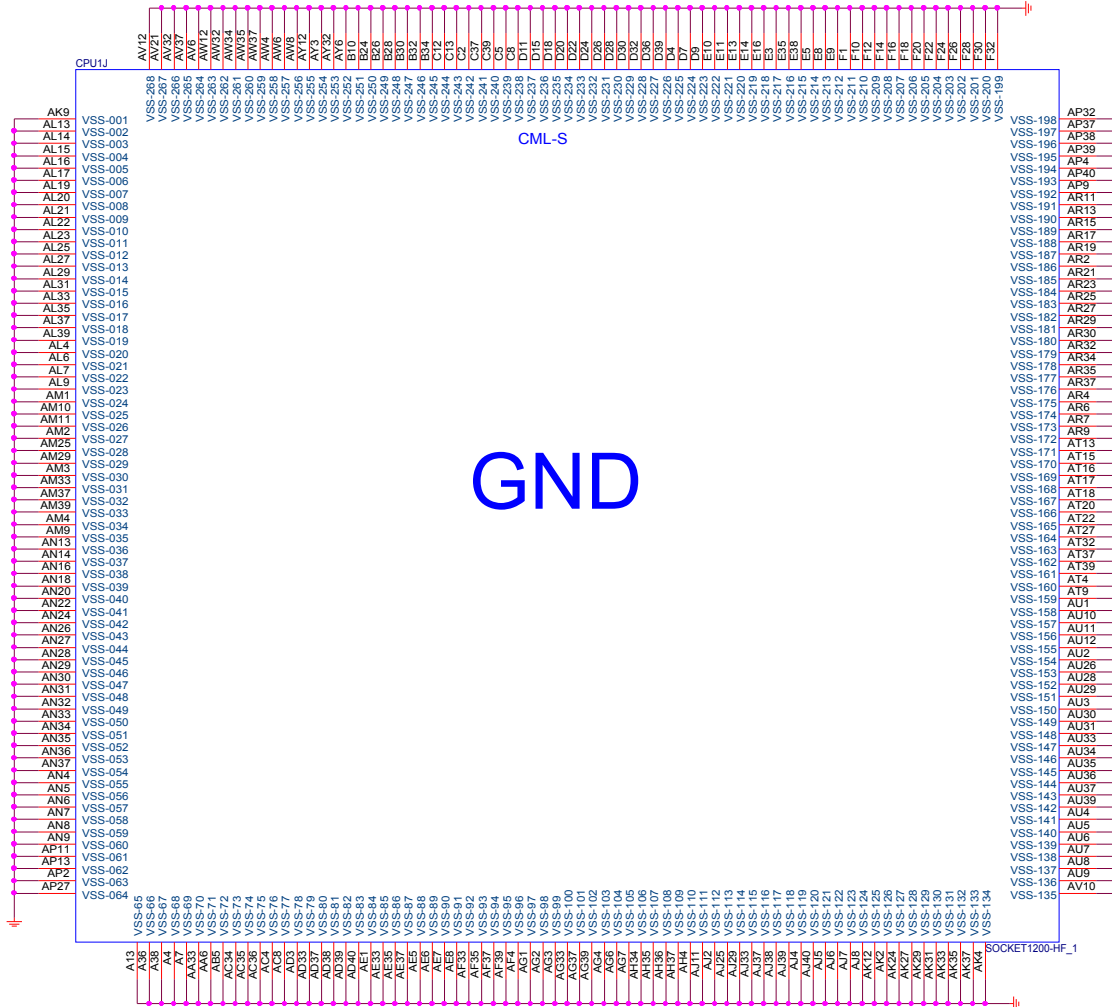
ENABLE#		SLOT	SLOT	SLOT
X8	X4			
0	0	X8	X4	X4
0	1	X8	X8	X0
1	0	RSVD	RSVD	RSVD
1	1	X16	X0	X0

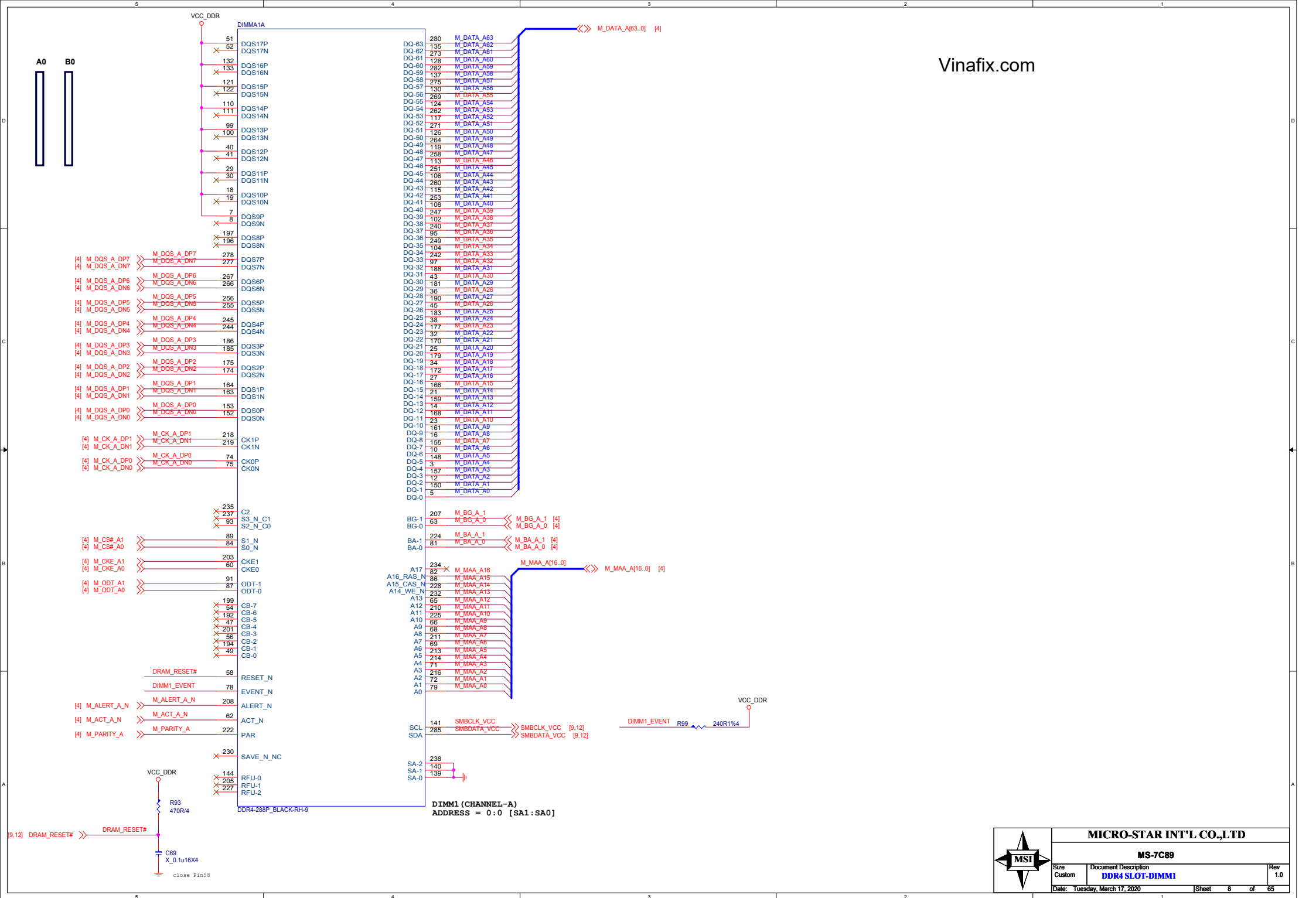


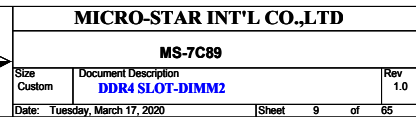
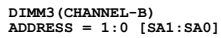


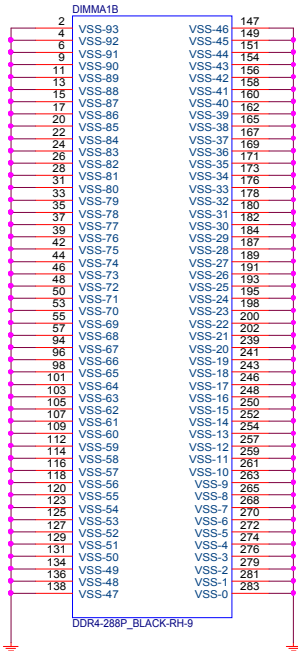
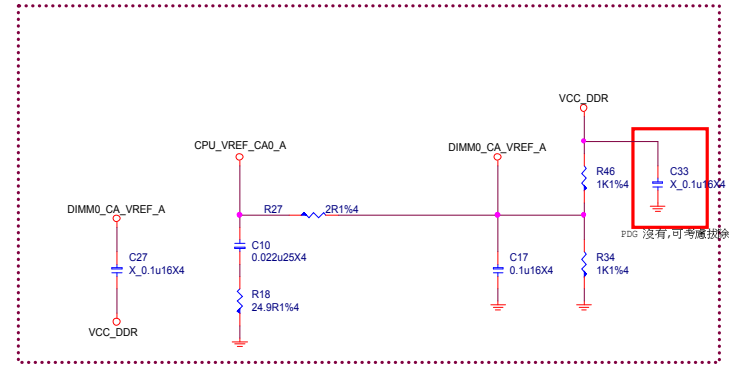
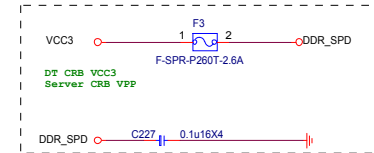
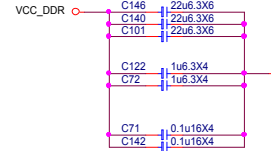
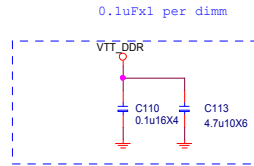
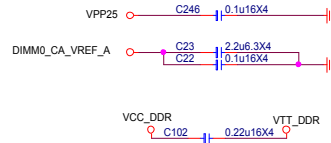
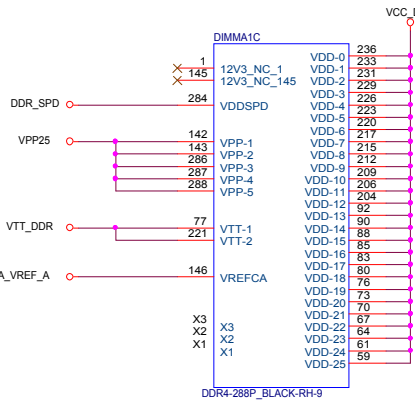
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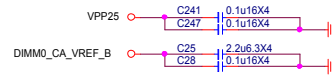
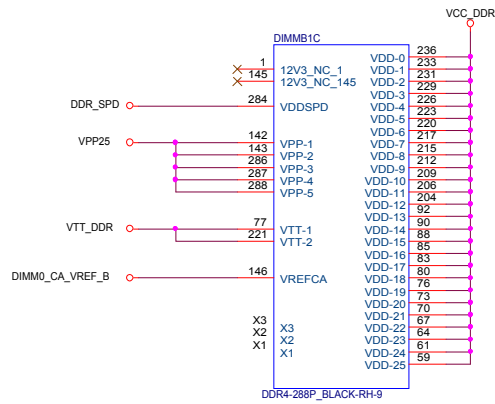




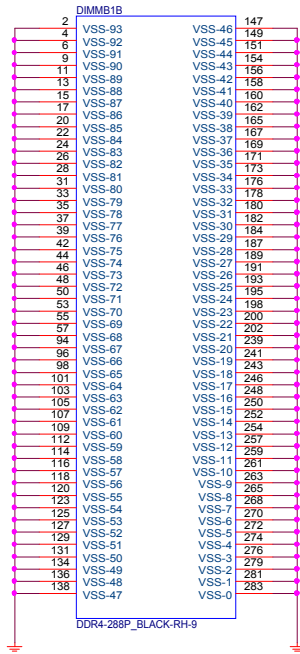
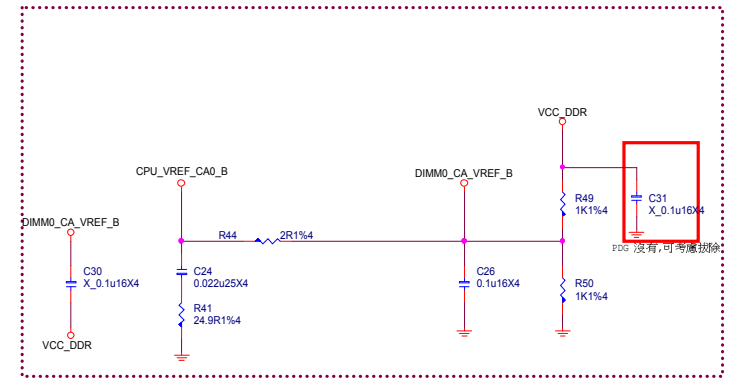
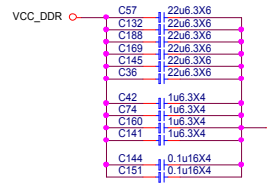
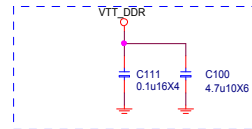








0.1uFxl per dimm

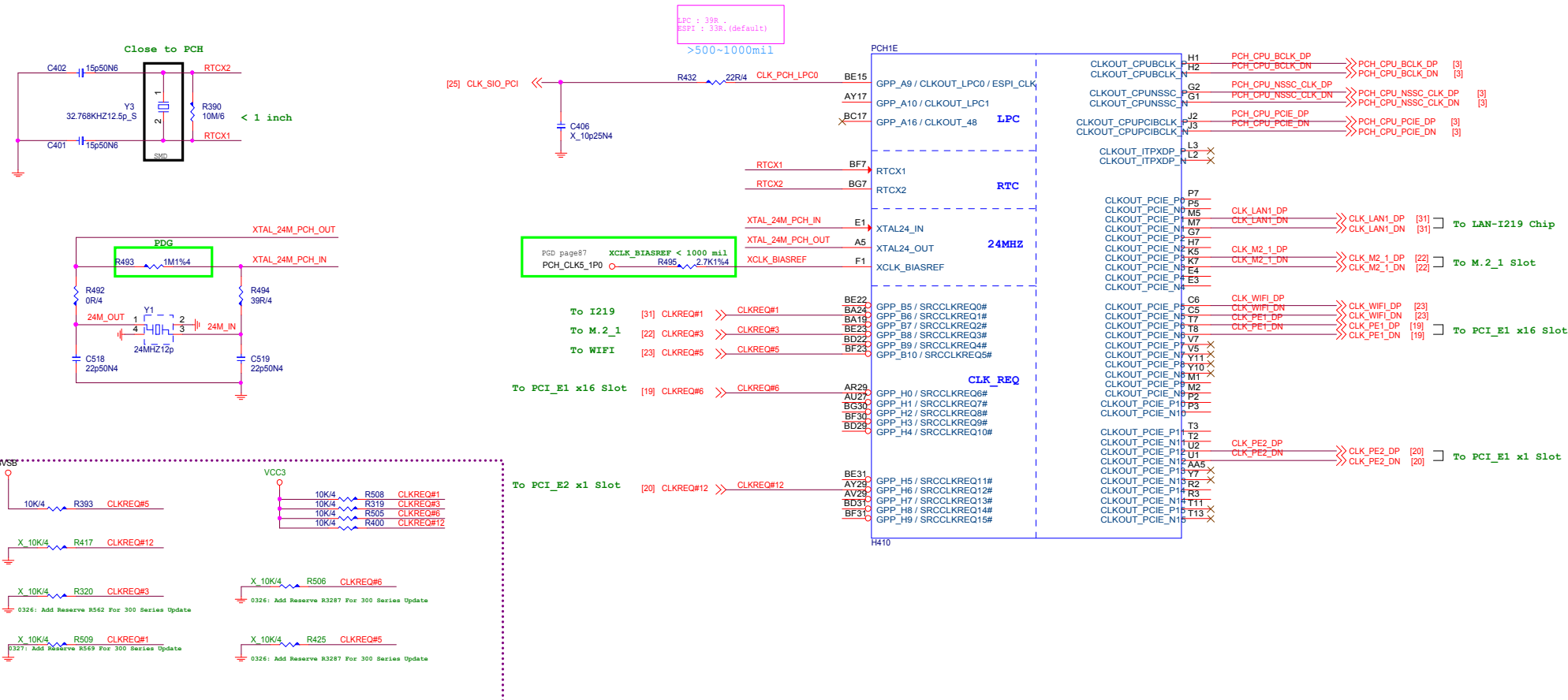


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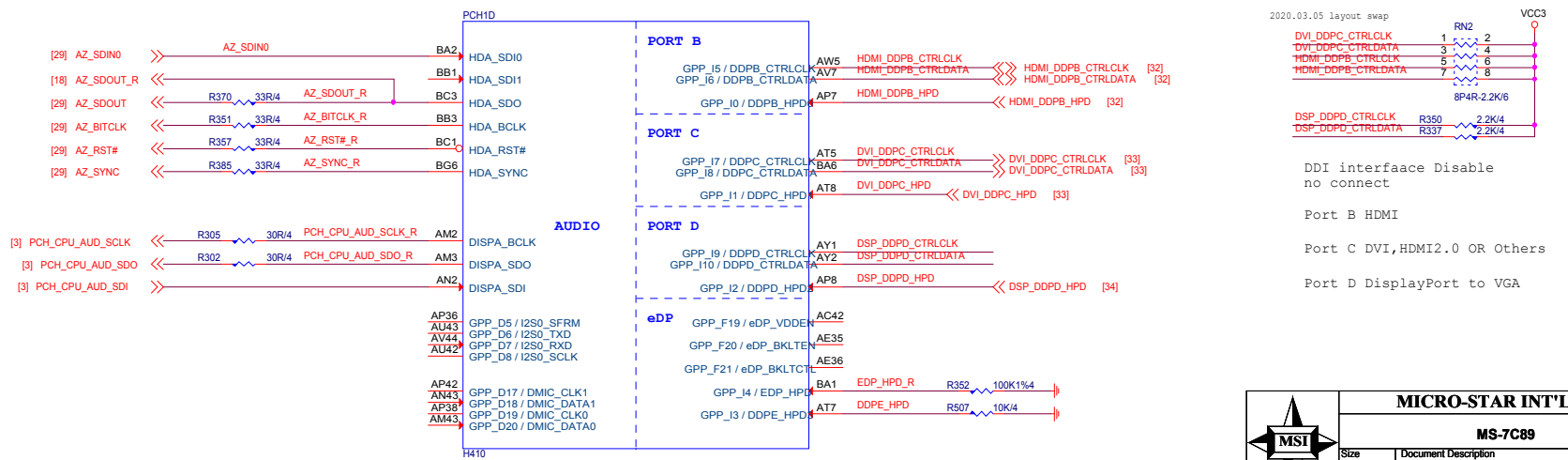
MS-7C89

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PCH_CLK



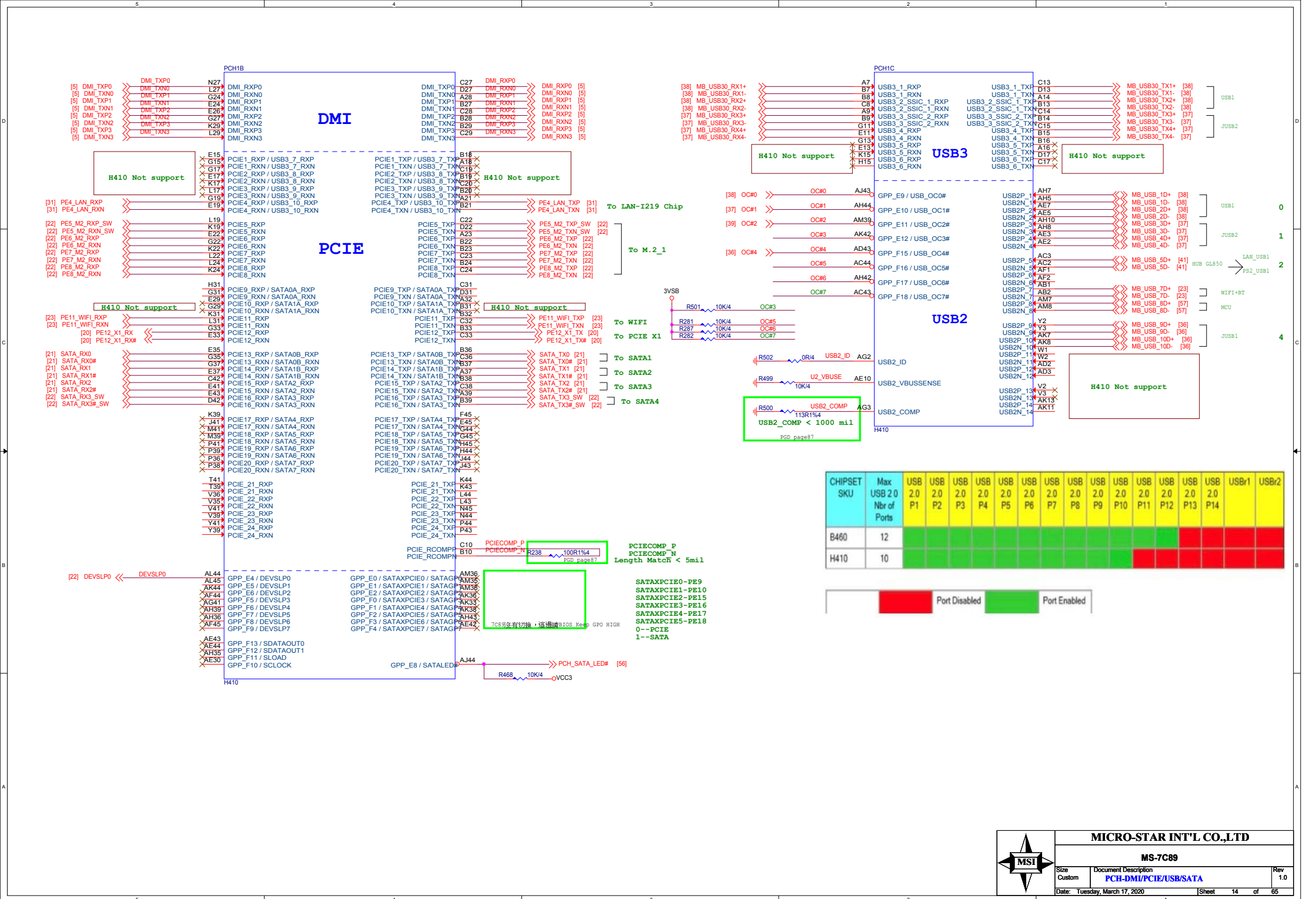
PCH_AUDIO

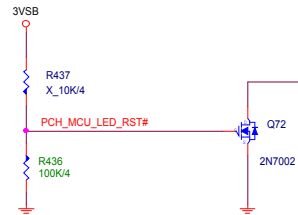
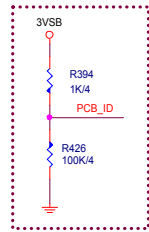


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Custom	PCH-Clock/Audio	1.0
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[23] WIFI_BTDIS# << WIFI_BTDIS#

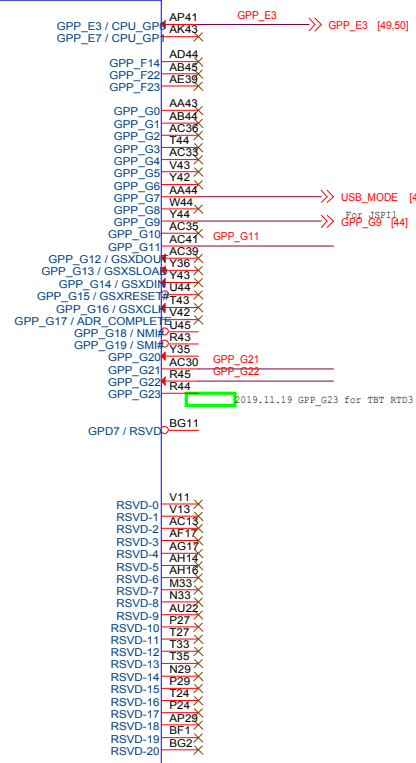
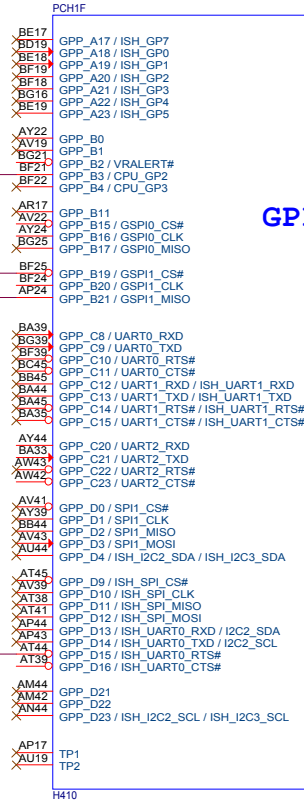
PCB_ID
PCH_MCU_LED_RST#

2020/02/26 Remove GPP_B20 ,7C89 no use for p-code disable function

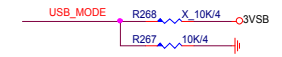
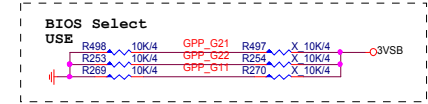
[22] PLN_EN <<

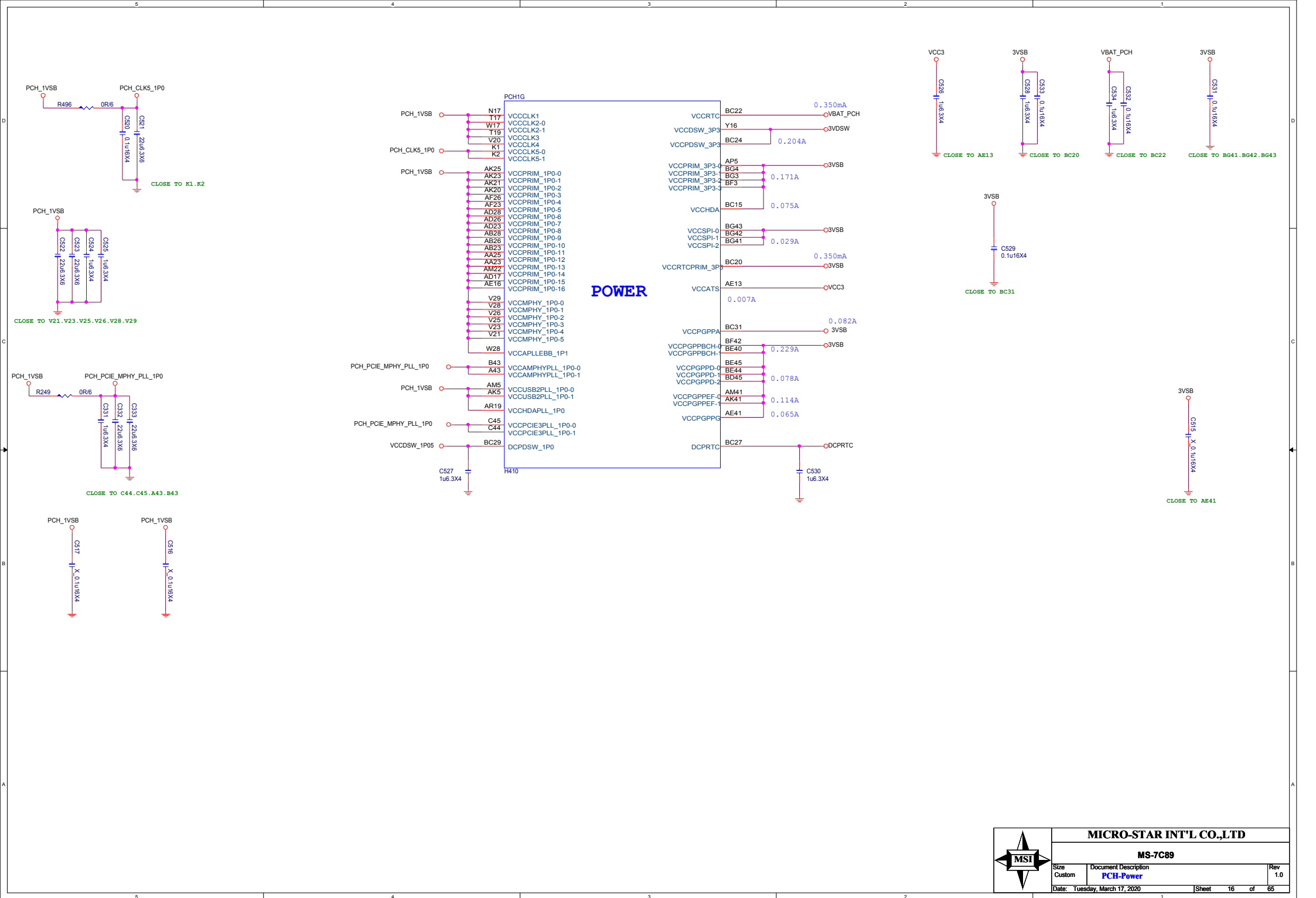
LED_RST# >> LED_RST# [57]

GPIO



	GPP_G21	GPP_G22	GPP_G11
H410M PRO	0	0	0
H410M-A PRO	0	0	1





VSS

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TOP Swap

GPP_B14

2020/02/26 Follow 7C82 remove

0 : DISABLE (Default)
1 : ENABLE

Internal Pull-down is disabled after PCH_PWROK is high.

No Reboot

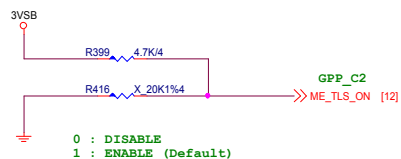
GPP_B18

2020/02/26 Follow 7C82 remove

0 : DISABLE (Default)
1 : ENABLE

Internal Pull-down is disabled after PCH_PWROK is high.

TLS confidentiality



Internal Pull-down is disabled after RSMRST# de-assert.

Boot BIOS

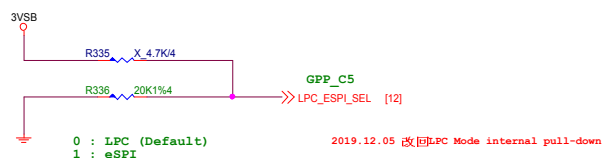
GPP_B22

2020/02/26 Follow 7C82 remove

0 : SPI (Default)
1 : LPC

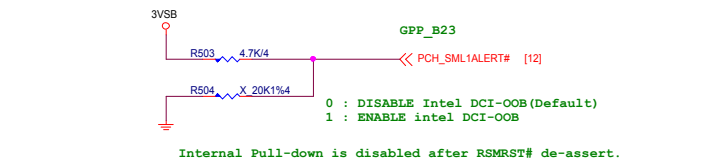
Internal Pull-down is disabled after PCH_PWROK is high.

LPC eSPI Mode

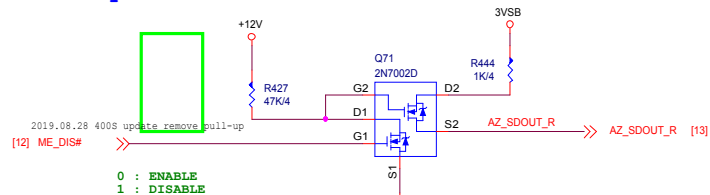


Internal Pull-down is disabled after RSMRST# de-assert.

DCI Enable



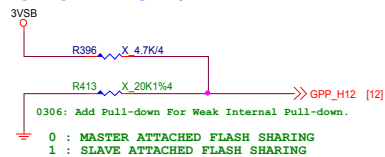
Flash Descriptor Security Override



0 : Enable security measures defined in the Flash Descriptor. (Default)
1 : DISABLE:Flash Descritior Decurity(Override).

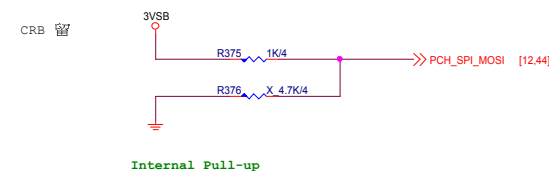
Internal Pull-down is disabled after PCH_PWROK is high.

ESPI FLASH SHARING MODE

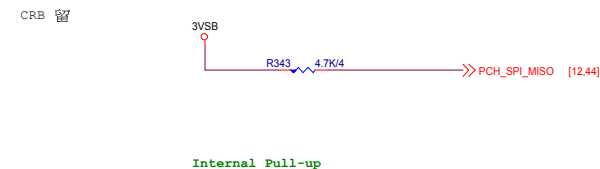


Internal Pull-down is disabled after RSMRST# de-assert.

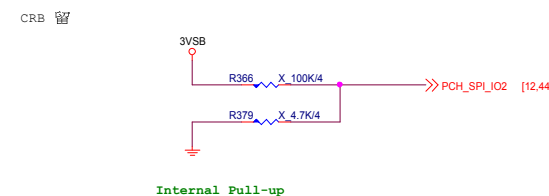
Reserved



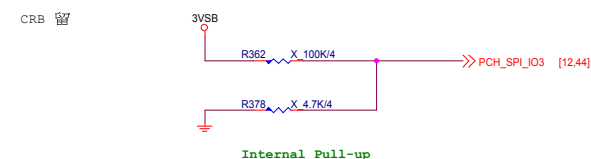
Reserved



Reserved



Reserved



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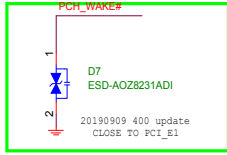
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PCI Express X16 Slot

12V - 5.5A
VCC3 - 3A
3VSB- 375mA

SMBus ESD



[12,19,20,57] SMBCLK_VSB_R
[12,19,20,57] SMBDATA_VSB_R

[12,20,22,55] PCH_WAKE#

[13] CLKREQ#

[5] EXP_A_TXP_0

[5] EXP_A_TXN_0

[5] EXP_A_TXP_1

[5] EXP_A_TXN_1

[5] EXP_A_TXP_2

[5] EXP_A_TXN_2

[5] EXP_A_TXP_3

[5] EXP_A_TXN_3

[5] EXP_A_TXP_4

[5] EXP_A_TXN_4

[5] EXP_A_TXP_5

[5] EXP_A_TXN_5

[5] EXP_A_TXP_6

[5] EXP_A_TXN_6

[5] EXP_A_TXP_7

[5] EXP_A_TXN_7

[5] EXP_A_TXP_8

[5] EXP_A_TXN_8

[5] EXP_A_TXP_9

[5] EXP_A_TXN_9

[5] EXP_A_TXP_10

[5] EXP_A_TXN_10

[5] EXP_A_TXP_11

[5] EXP_A_TXN_11

[5] EXP_A_TXP_12

[5] EXP_A_TXN_12

[5] EXP_A_TXP_13

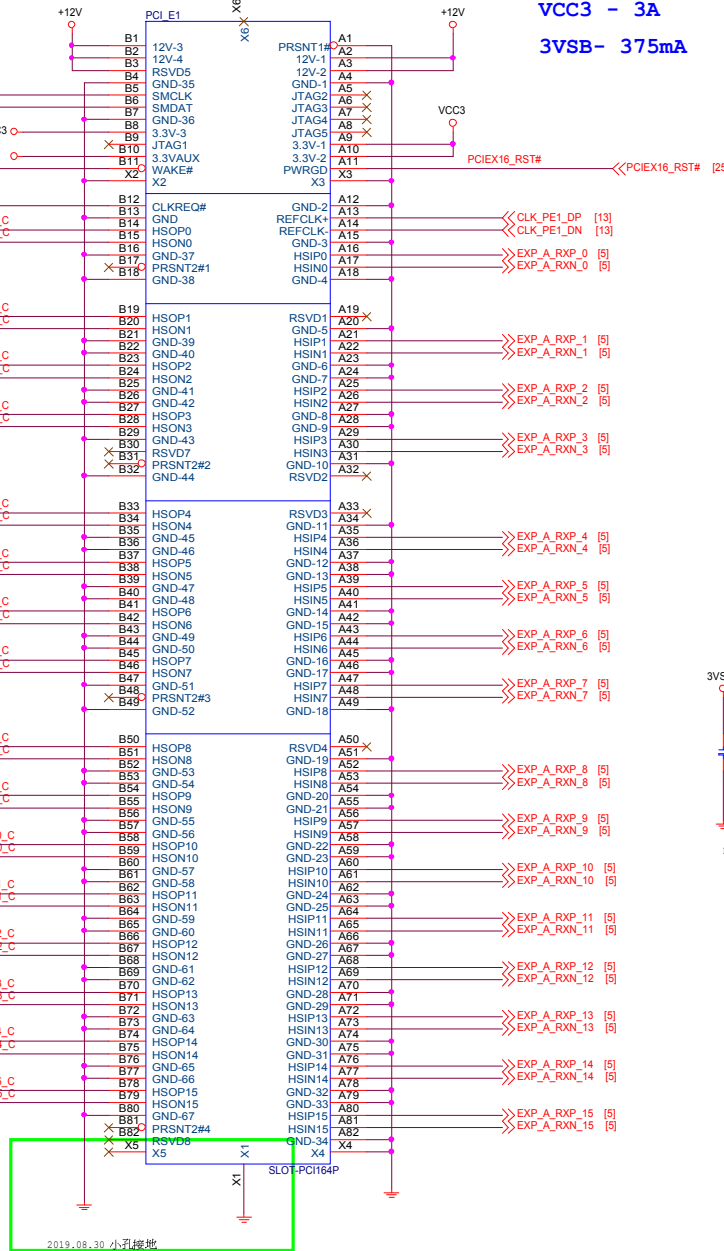
[5] EXP_A_TXN_13

[5] EXP_A_TXP_14

[5] EXP_A_TXN_14

[5] EXP_A_TXP_15

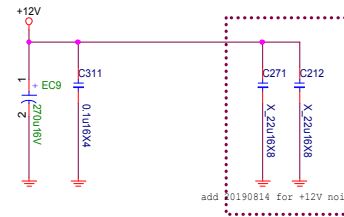
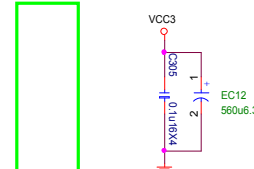
[5] EXP_A_TXN_15



2019.08.30 小孔接地

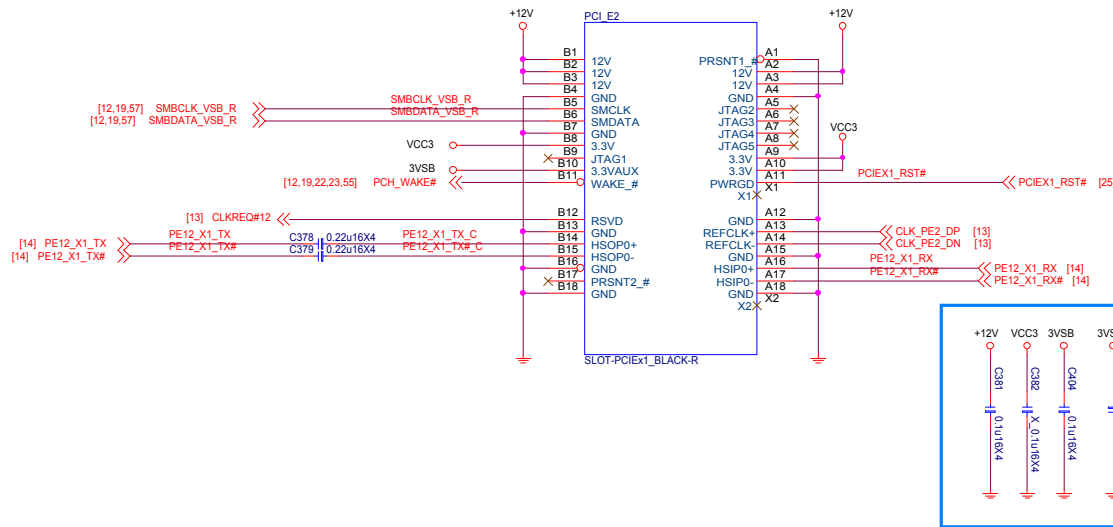
3VSB
C309 0.1u16X4

Remove 3VSB 10uF because dip cap near slot



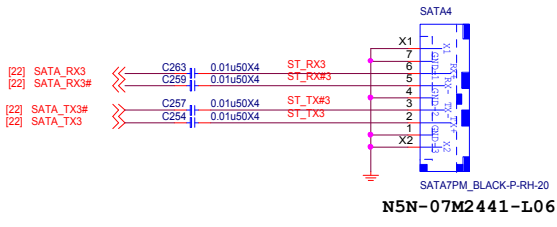
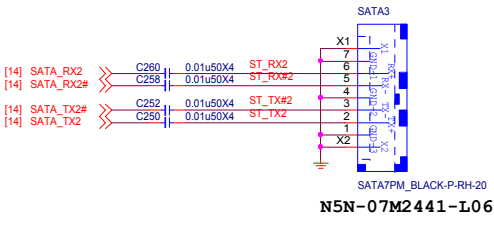
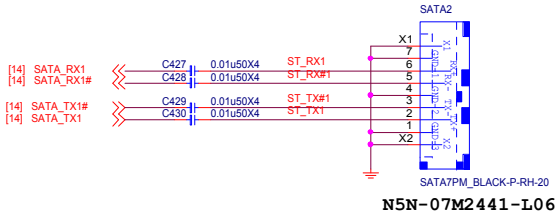
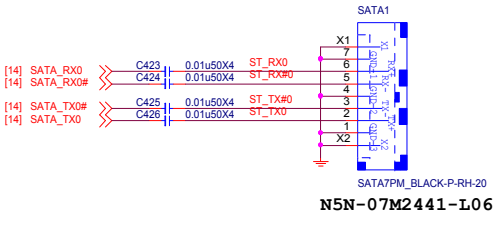
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PCIE X1

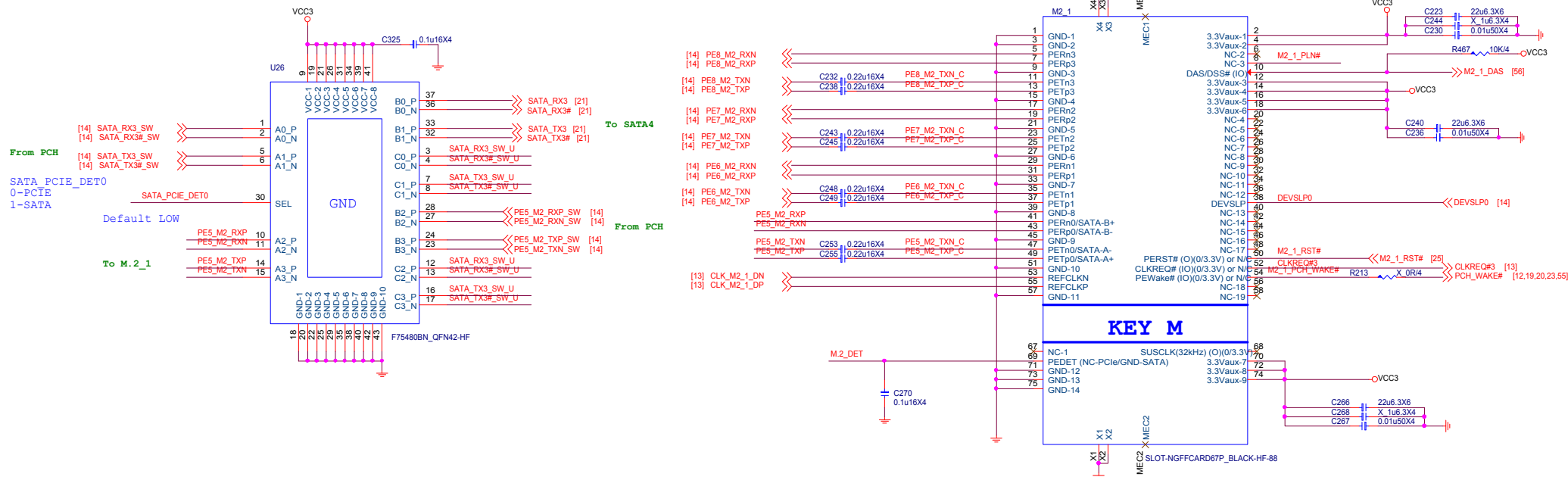


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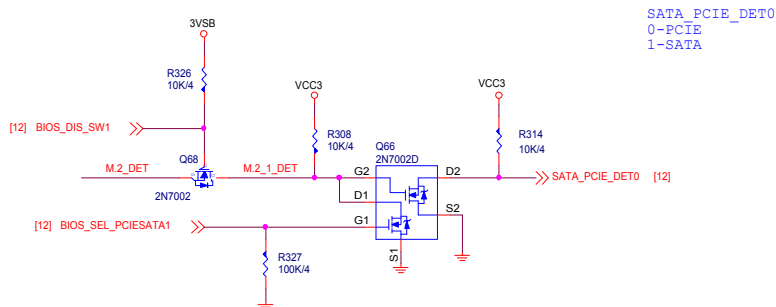
SATA Connector



M2 1

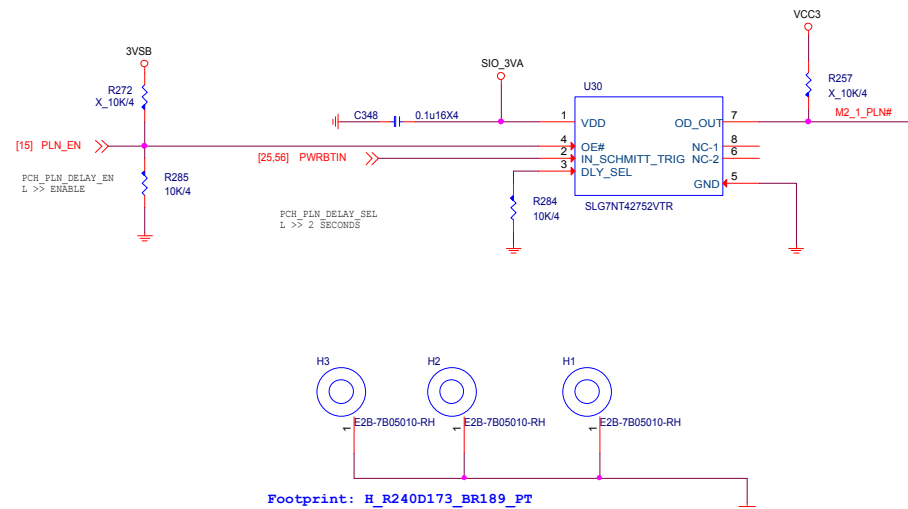


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BIOS_MODE

BIOS_DIS_SW1	BIOS_SEL_PCIESATA1	Mode	SATA_PCIE_DET0
0	1	M2-SATA	1
0	0	M2-PCIE	0
GPI (1)	GPI (0)	AUTO	

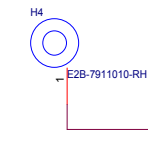
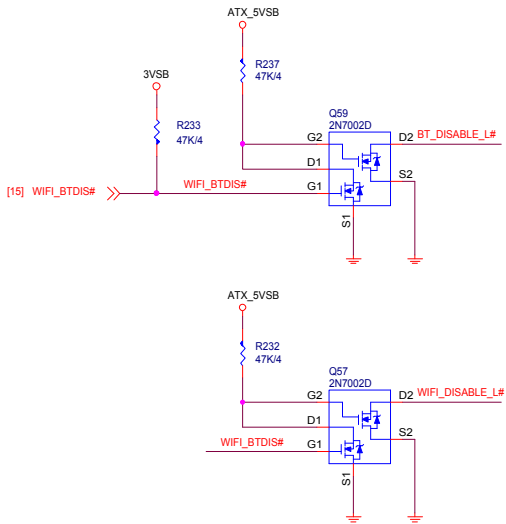
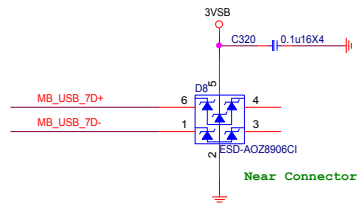


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Custom	M2-SLOT1	1.0

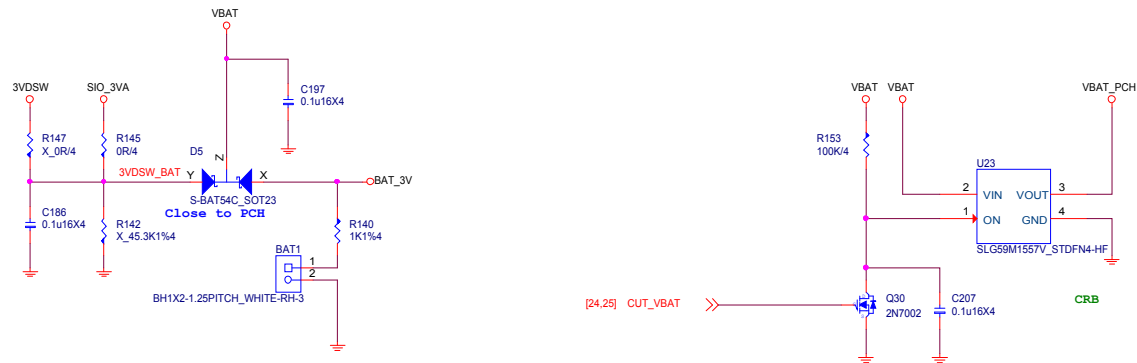
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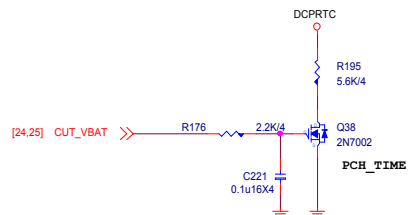
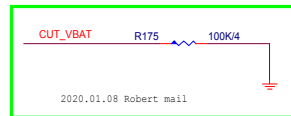
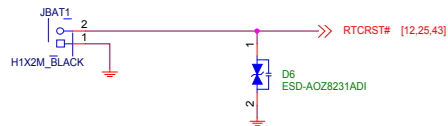
KEY E

950mA peak 2A
3VSB

VBAT



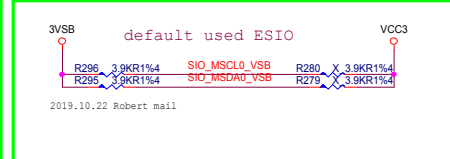
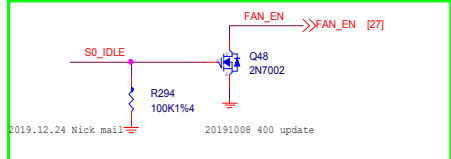
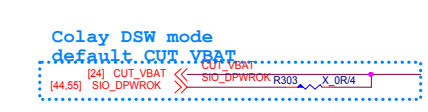
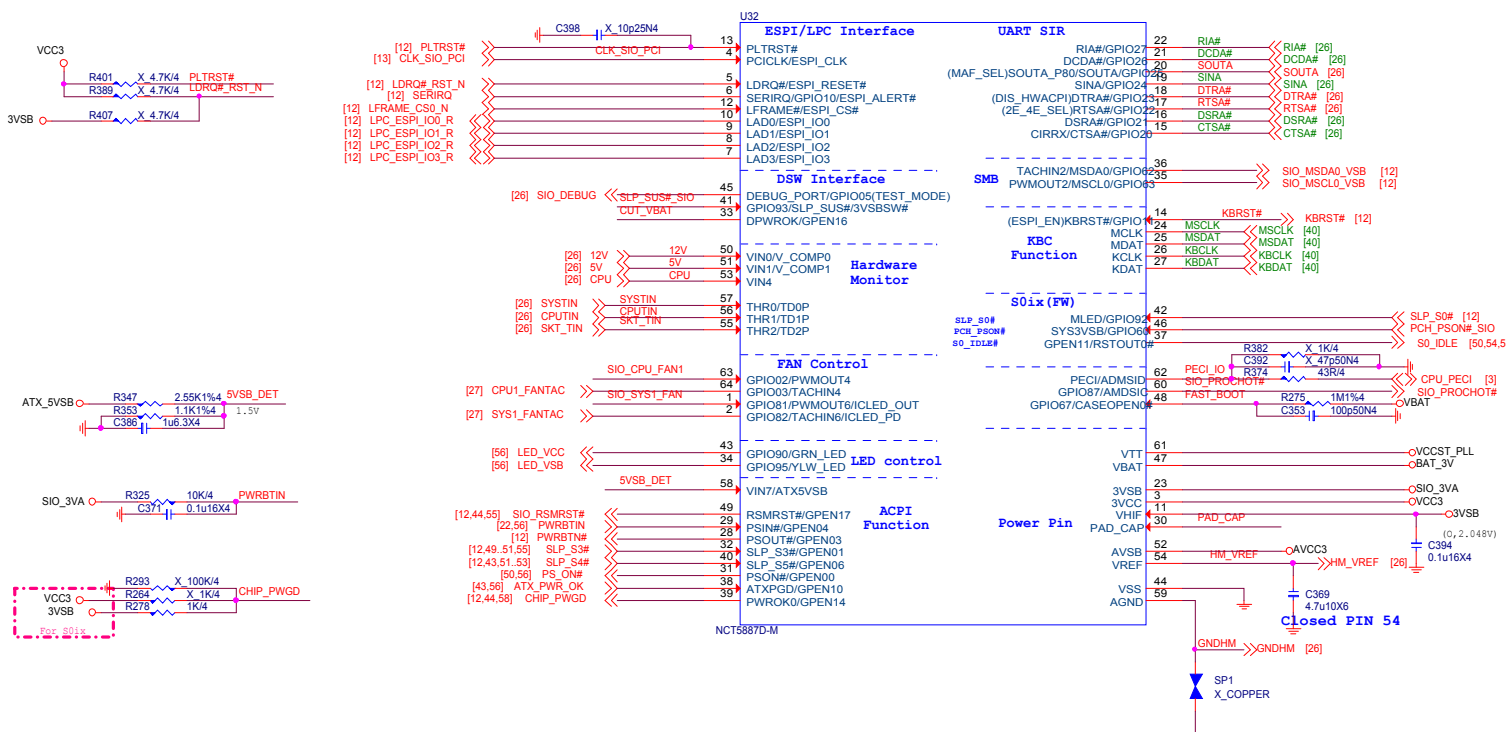
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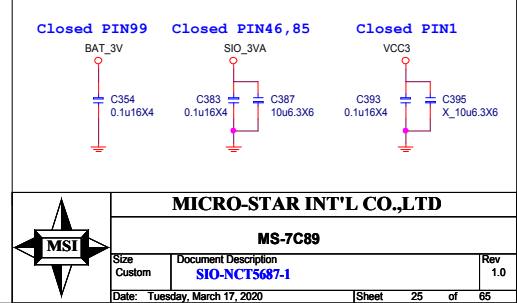
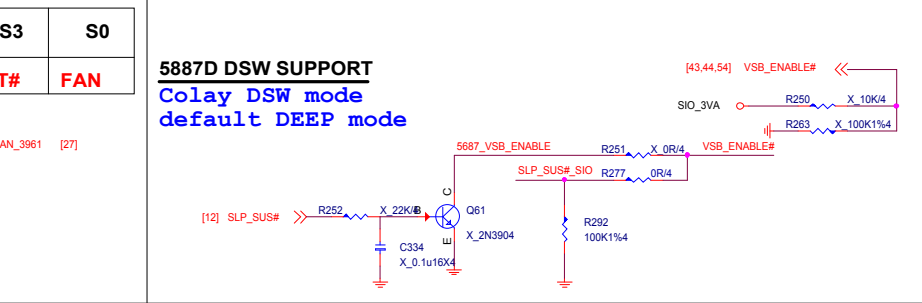
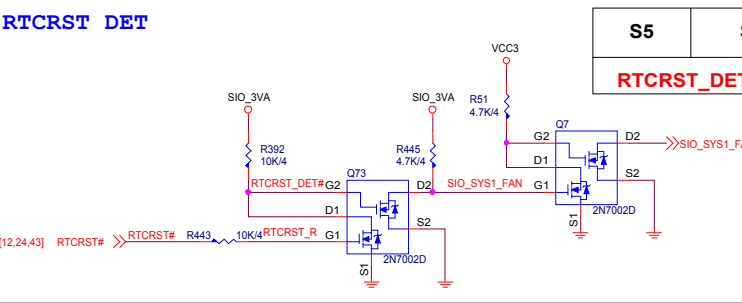
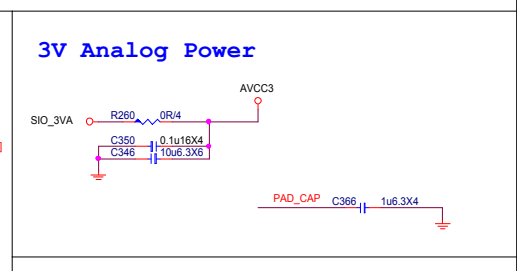
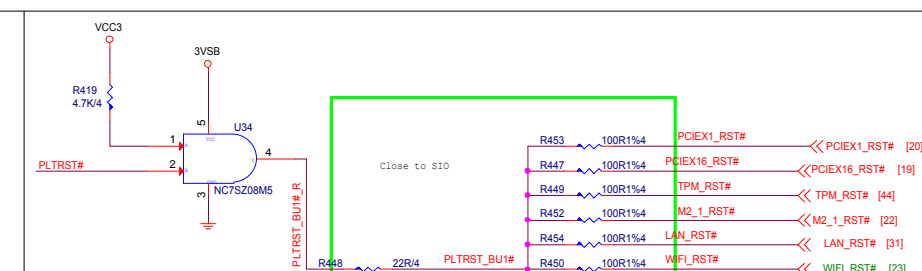
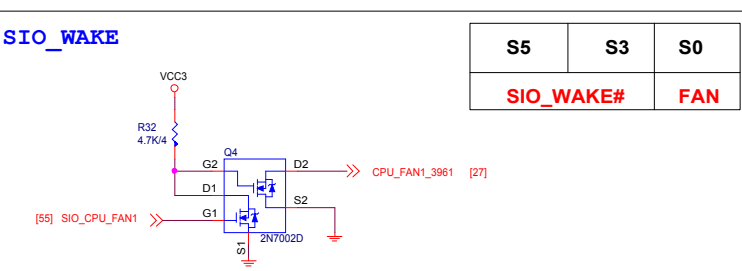
MICRO-STAR INT'L CO.,LTD

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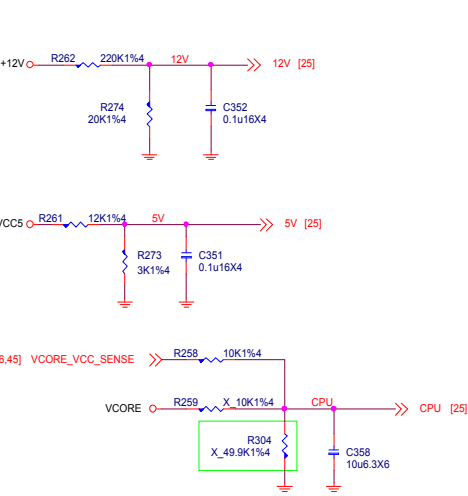
POWER ON STRAPPING PIN FOR NCT5887					
PIN	NAME	Circuit NAME	0	1	Strap Point
17	2E_4E_SEL	RTSA#	I/O ADDRESS 2E	I/O ADDRESS 4E	VCC3
18	DIS_HWACPI	DTRA#	HW ACPI enable	HW ACPI disable	3VA
20	MAF_SEL	SOUTA	MAF enable	MAF disable	3VA
45	Test mode	SIO_DEBUG	Pull down 100K	-	NA
PIN	NAME	Circuit NAME	VCC3	3VA	Strap Point
14	ESPI_EN	KBRST#	LPC(VCC3)	ESPI(3VA)	VCC3 3VA
FW SEL	DSW_EN default disable				



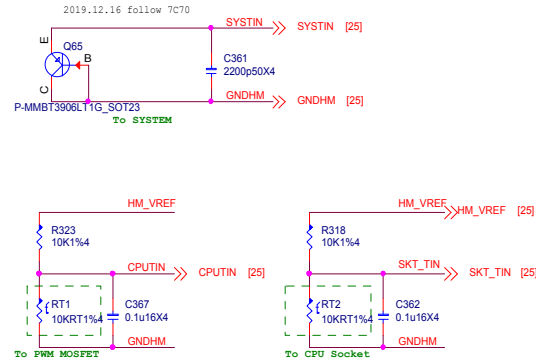
MICRO-STAR INT'L CO.,LTD			
MS-7C89			
Size Custom	Document Description	Rev 1.0	
SIO-NCT5887-1		Date: Tuesday, March 17, 2020	
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HW Monitor - Voltage

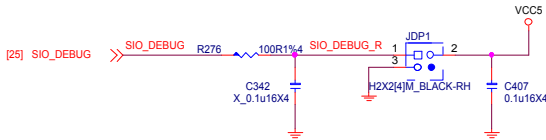
SIO HM Voltage Over 2V will Not Detect



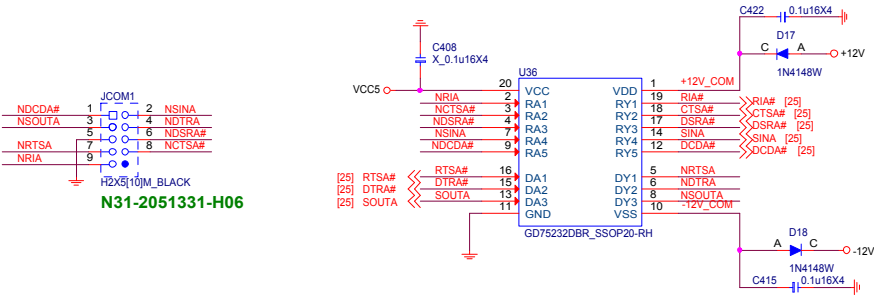
Thermal



DEBUG PORT



COM Port



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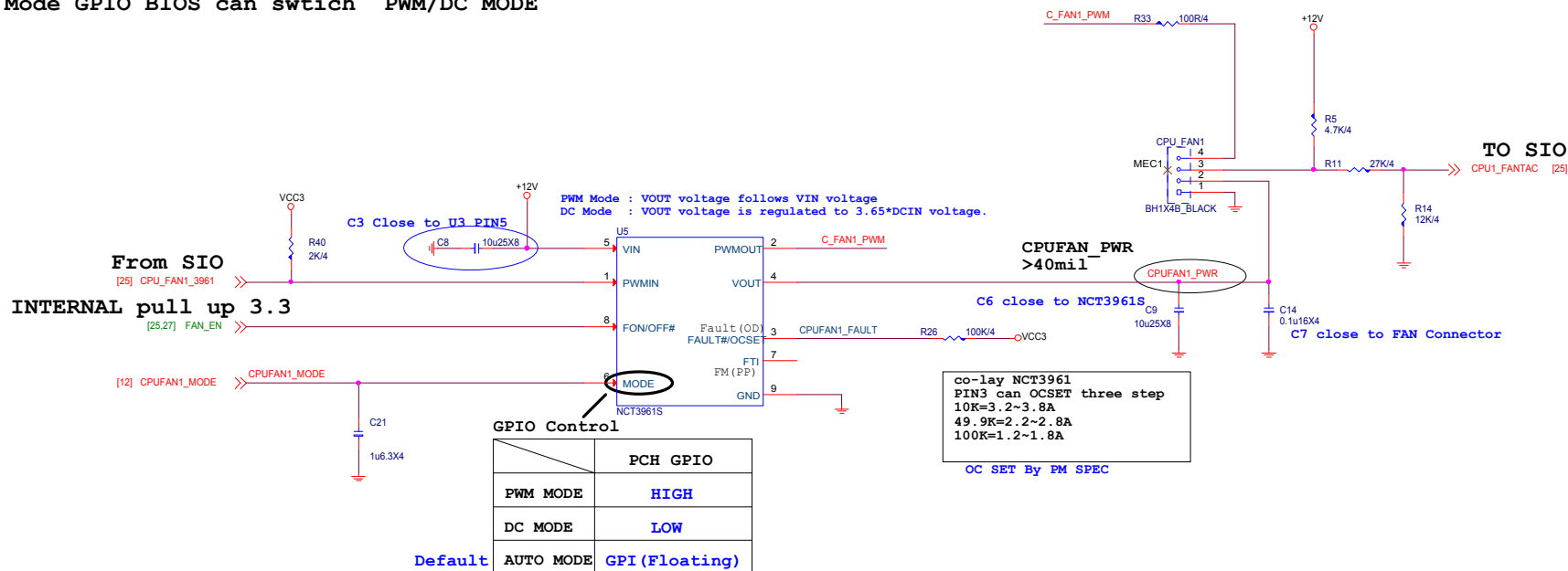
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Custom	SIO-NCT5687-2	1.0
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TYPE M : 4 PIN CPU FAN USE NCT3961S USE PCH GPIO CONTROL FAN MODE

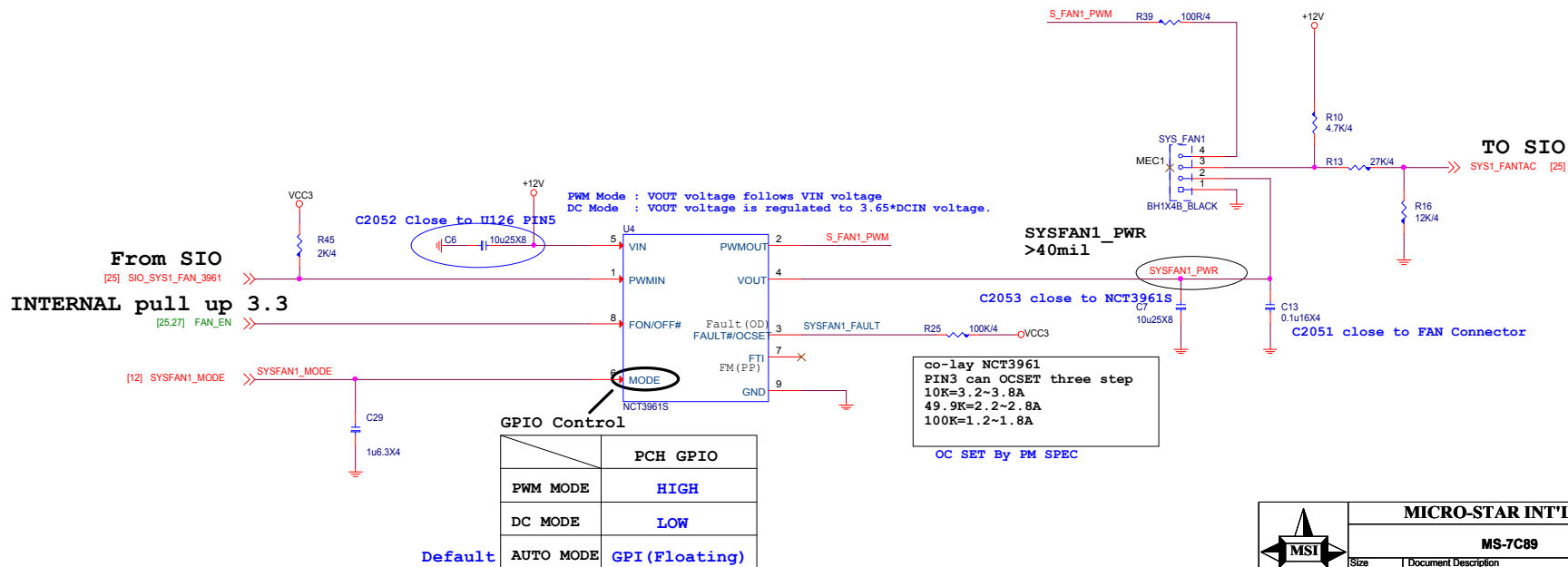
1.Mode GPIO BIOS can swtich PWM/DC MODE

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TYPE M : 4 PIN CPU FAN USE NCT3961S USE PCH GPIO CONTROL FAN MODE

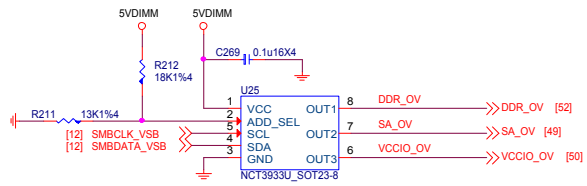
1.Mode GPIO BIOS can swtich PWM/DC MODE



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Custom	CPU and PUMP FAN	1.0
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VOLTAGE CONSOLE

0x26: RH=18K, RL=13K



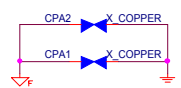
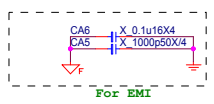
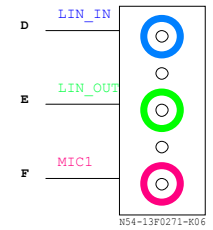
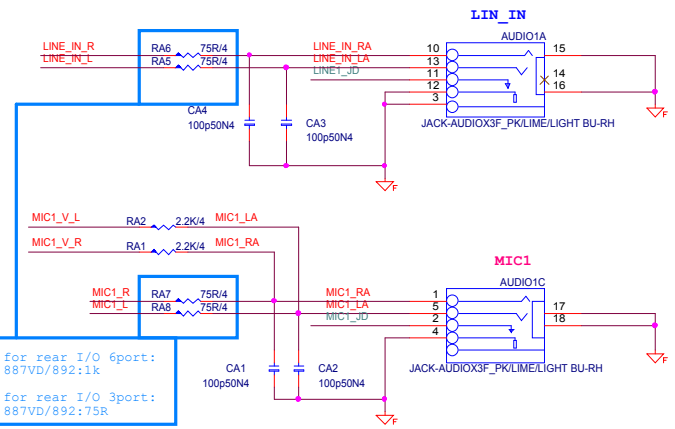
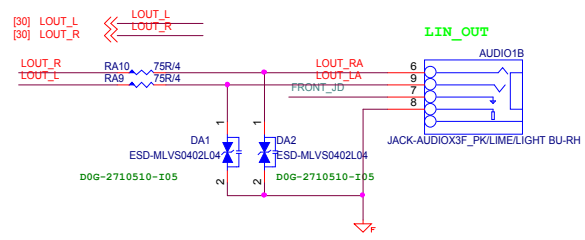
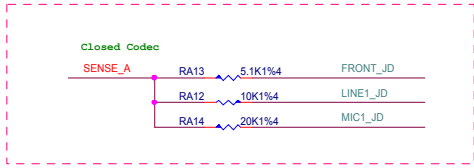
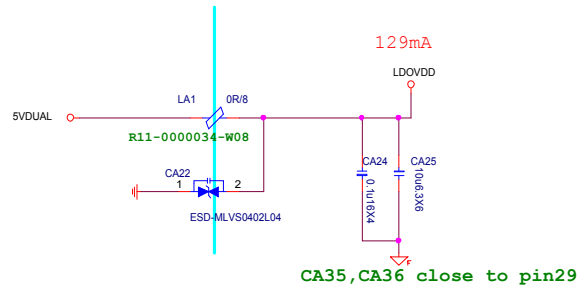
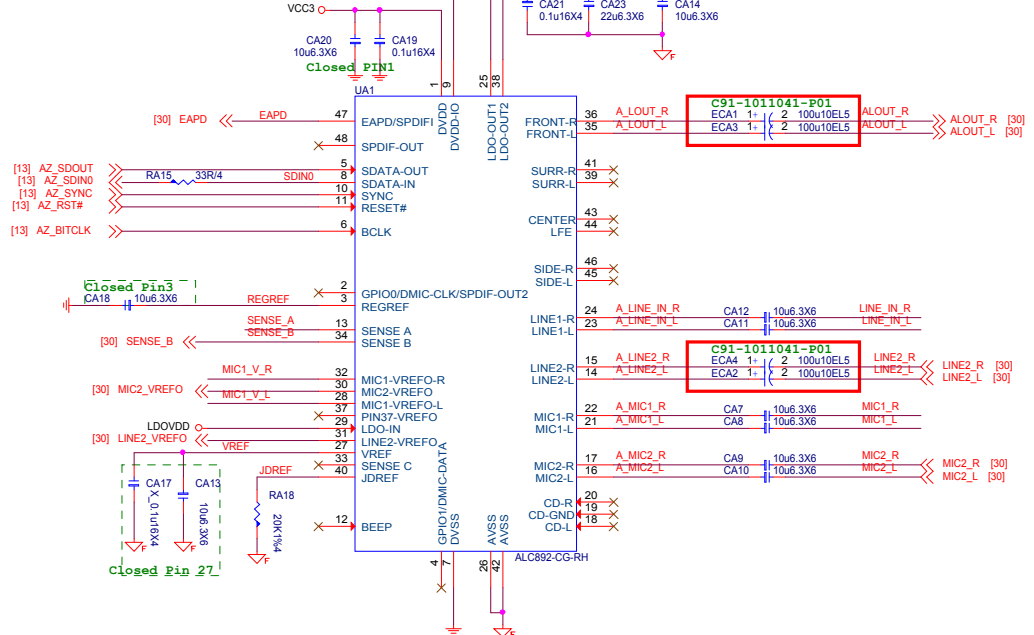
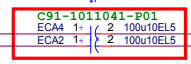
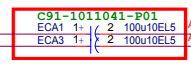
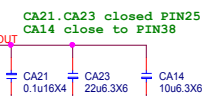
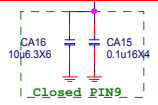
MICRO-STAR INT'L CO.,LTD

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ALC892

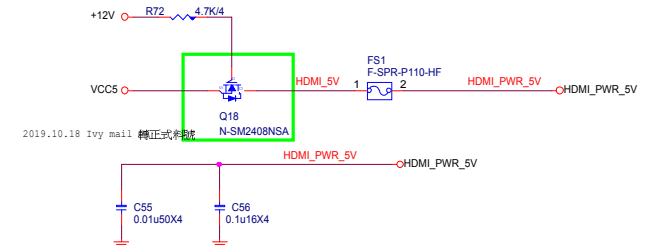
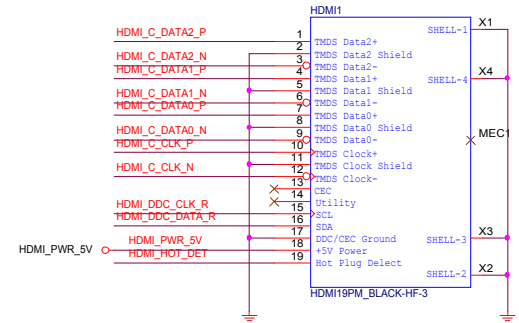
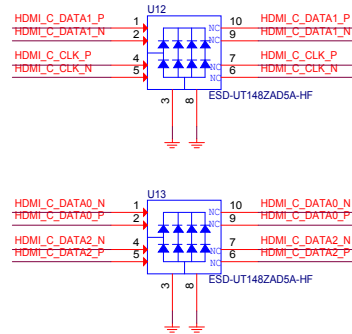
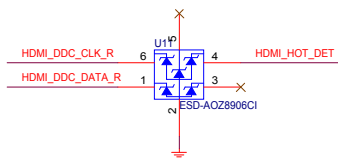
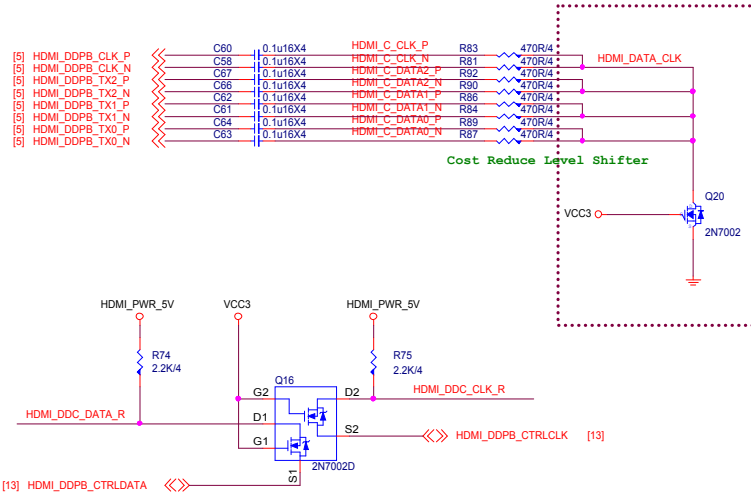
Follow PCH power well



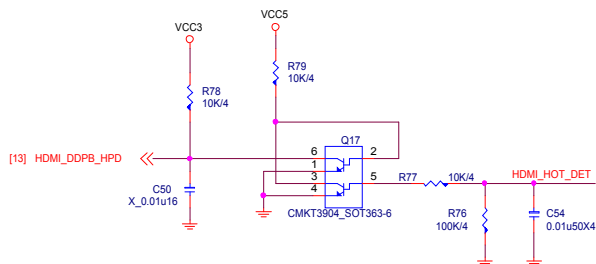
MICRO-STAR INT'L CO.,LTD			
MS-7C89			
Size	Document Description	Rev	
Custom	AUDIO-ALC1200-1	1.0	
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HDMI 1.4b

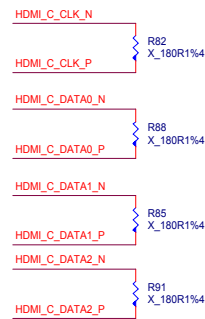
HDMI, DVI : 1920x1200 at 60 Hz (16:10 WUXGA)



Hot Plug



For EMI



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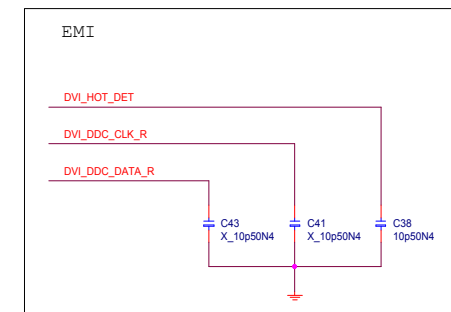
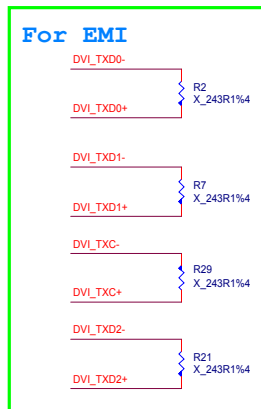
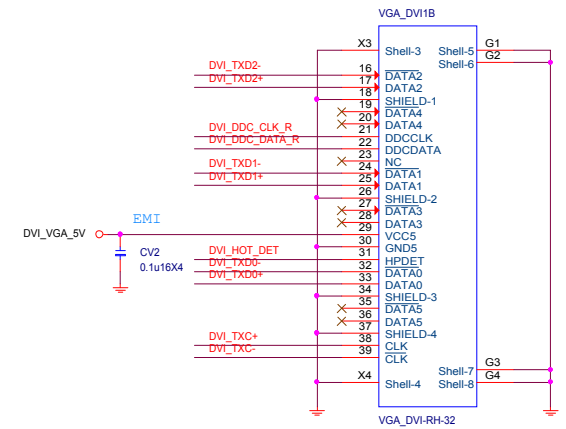
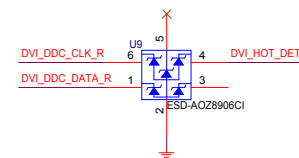
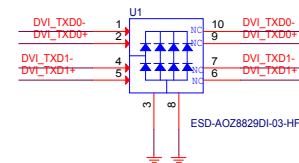
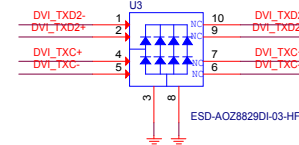
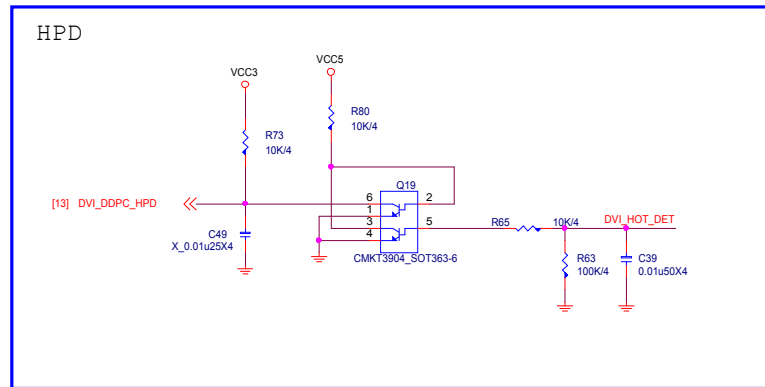
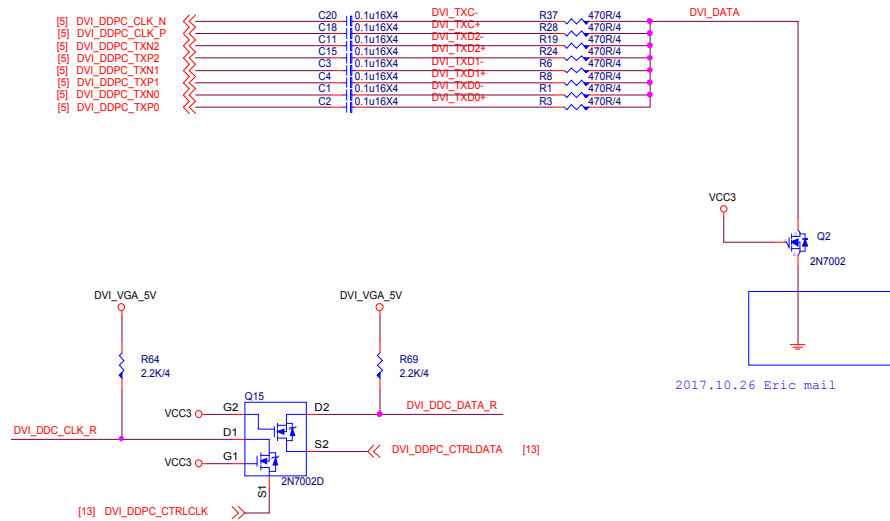


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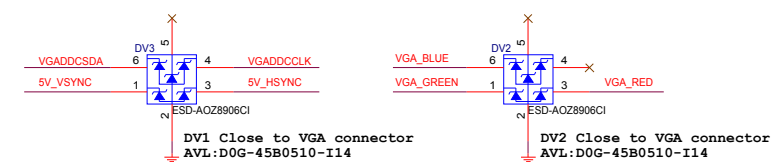
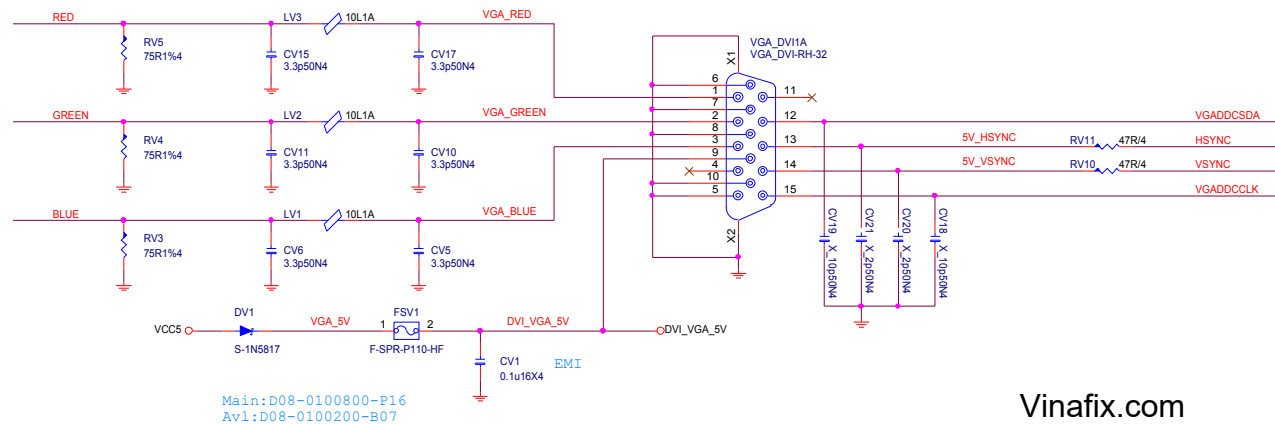
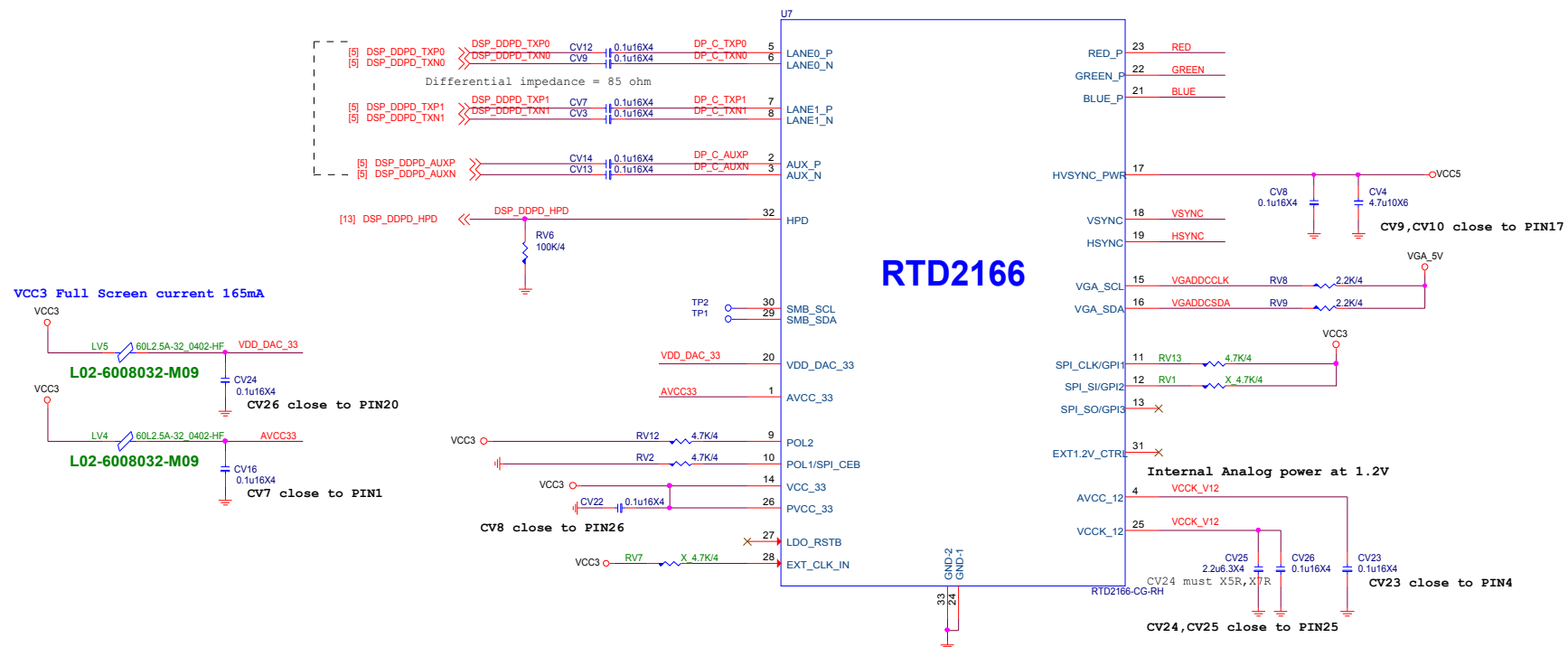
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DVI



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Note: If connect to eDP port,must confirm whether it support hot plug detection HPD and re-auxtraining



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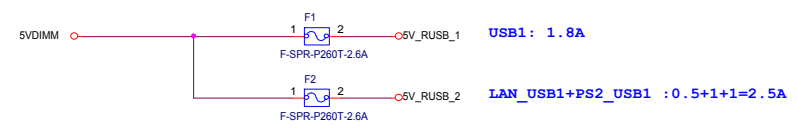
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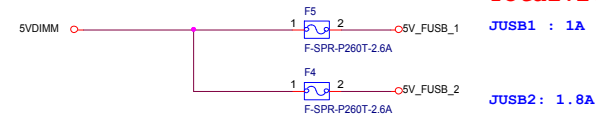
USB Port Power

Total:7.1A

Total:4.3A



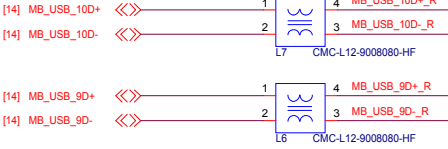
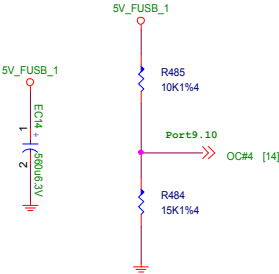
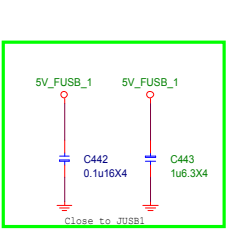
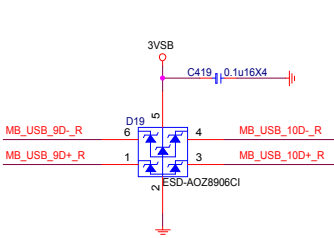
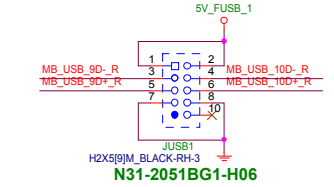
Total:2.8A



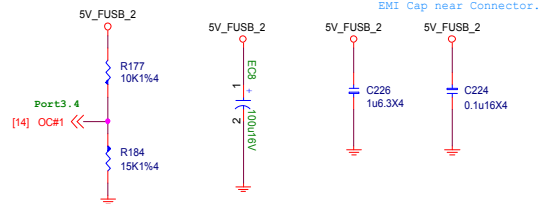
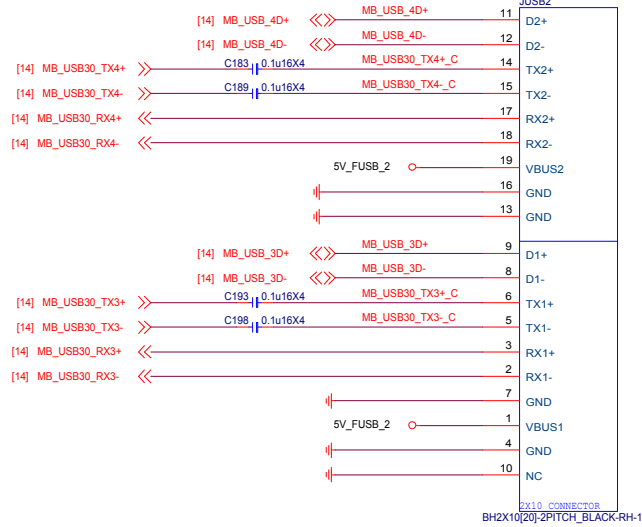
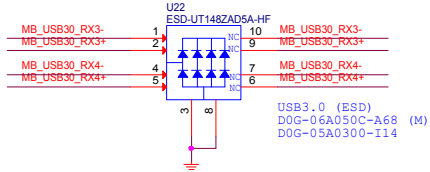
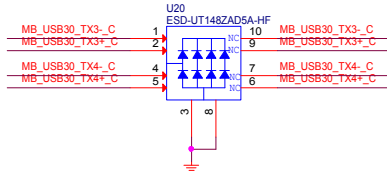
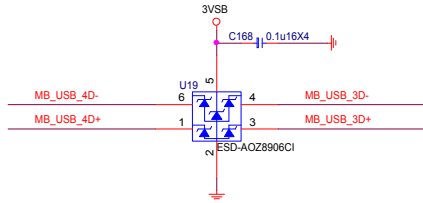
Front USB2.0

USB2.0 Port9.10

2A



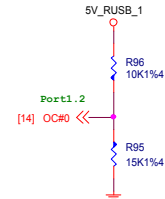
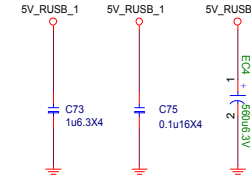
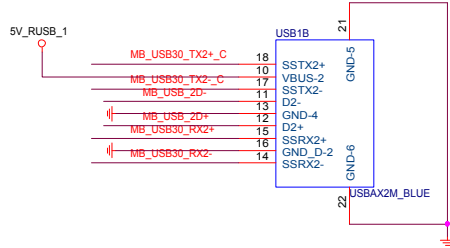
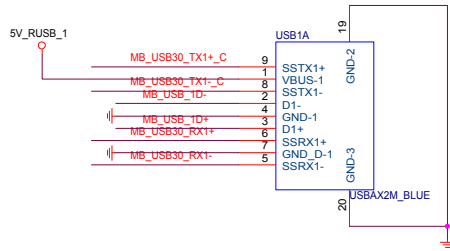
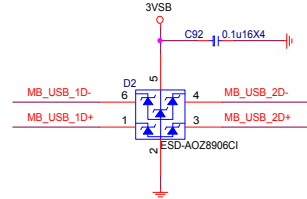
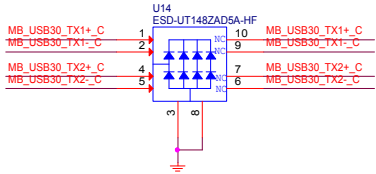
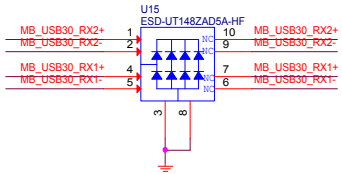
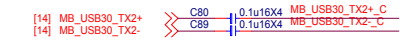
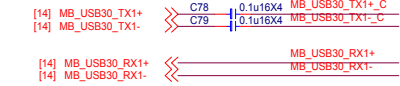
Front USB3.1 Gen1



Rear USB3.0

USB3.0 Port1.2
USB2.0 Port1.2

1.8A



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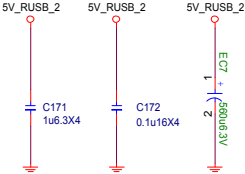
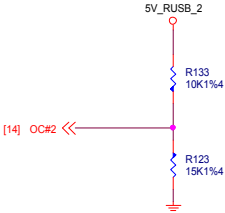
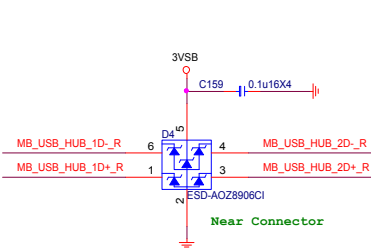
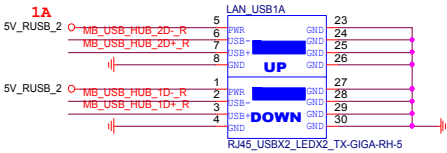
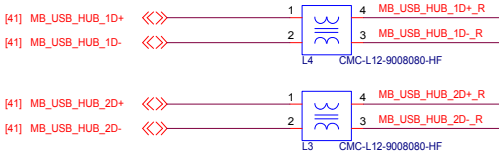
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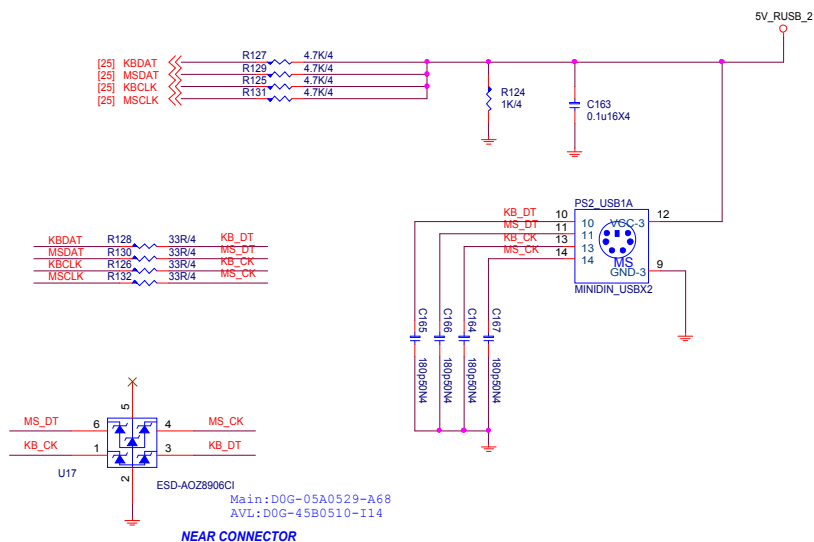
Rear LAN USB2.0

1A

JUSB1 HUB 1 . 2

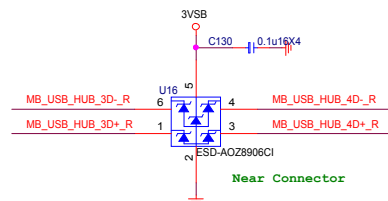
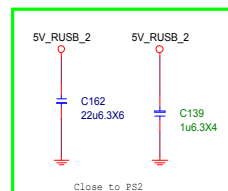
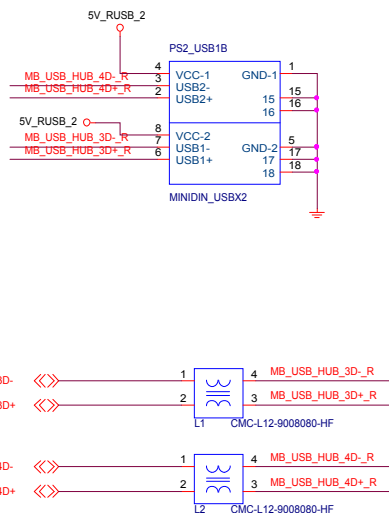


PS2 Connector



PS2 USB Connector

JUSB2 HUB 3.4



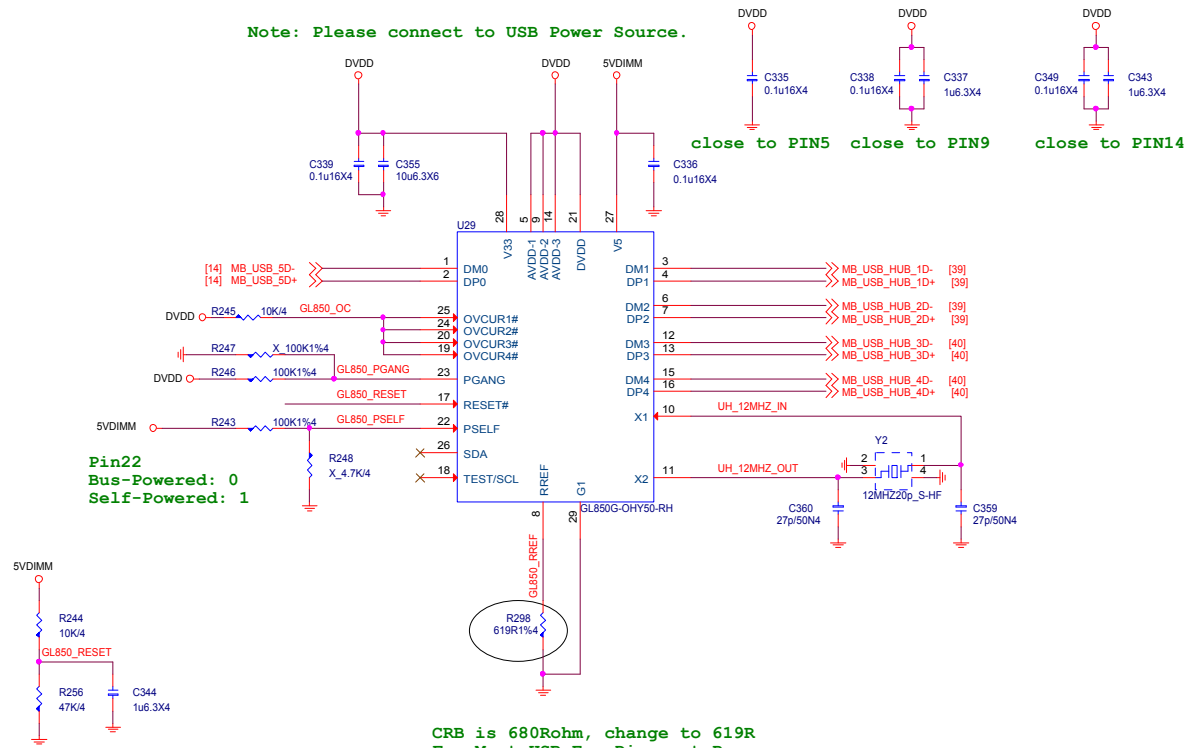
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Rear USB2.0 HUB

Note: Please connect to USB Power Source.

Pin23
Gang input:1
Individual input:0

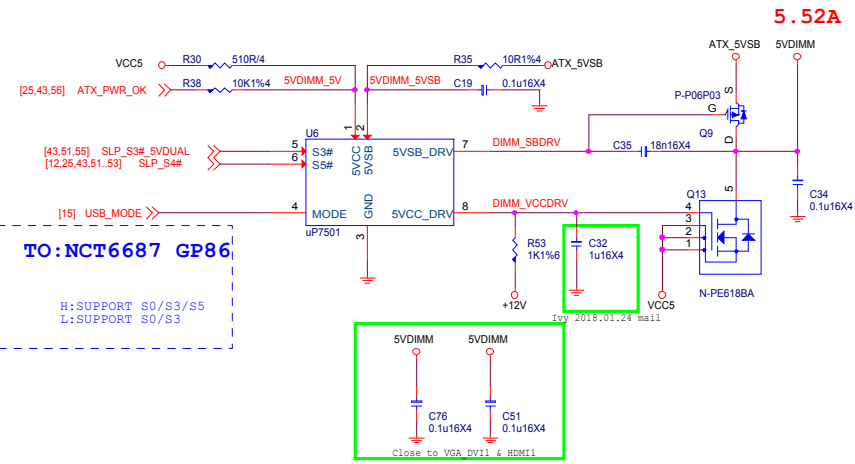


MICRO-STAR INT'L CO.,LTD

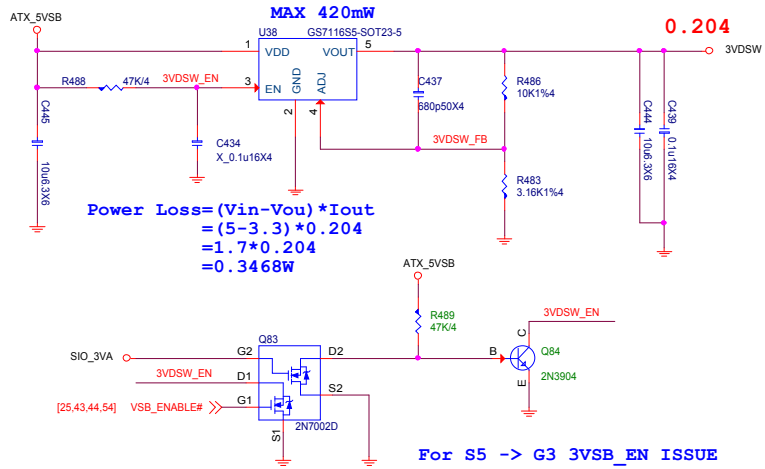
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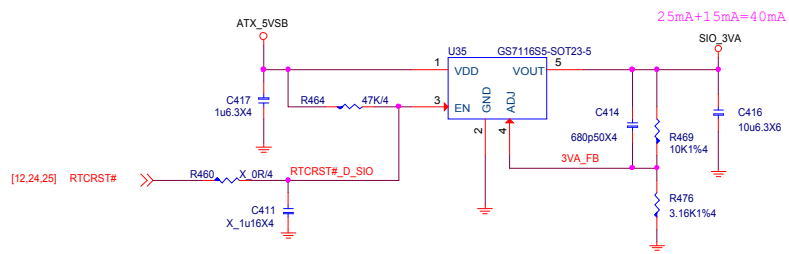
5VDIMM FOR DDR



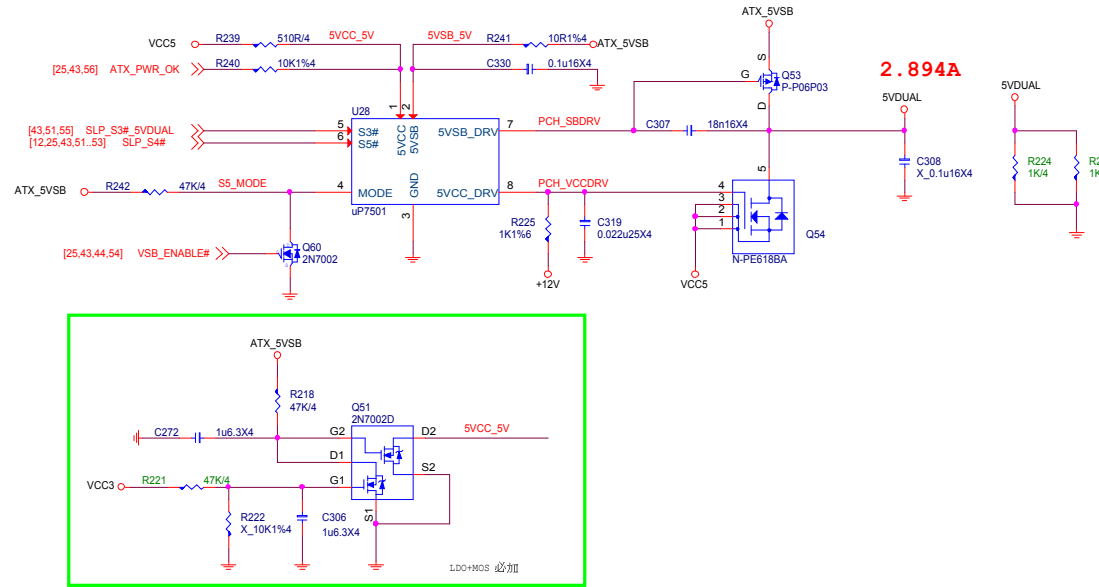
3VDSW



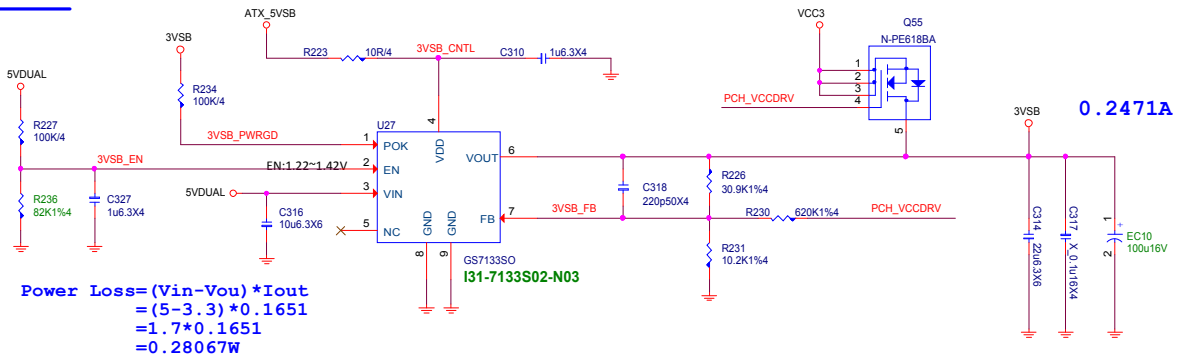
SIO 3VA



5VDUAL



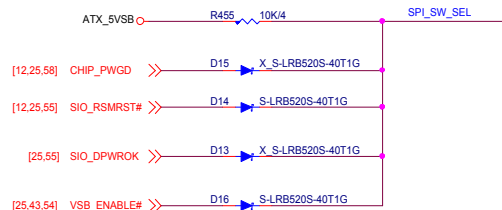
3VSB



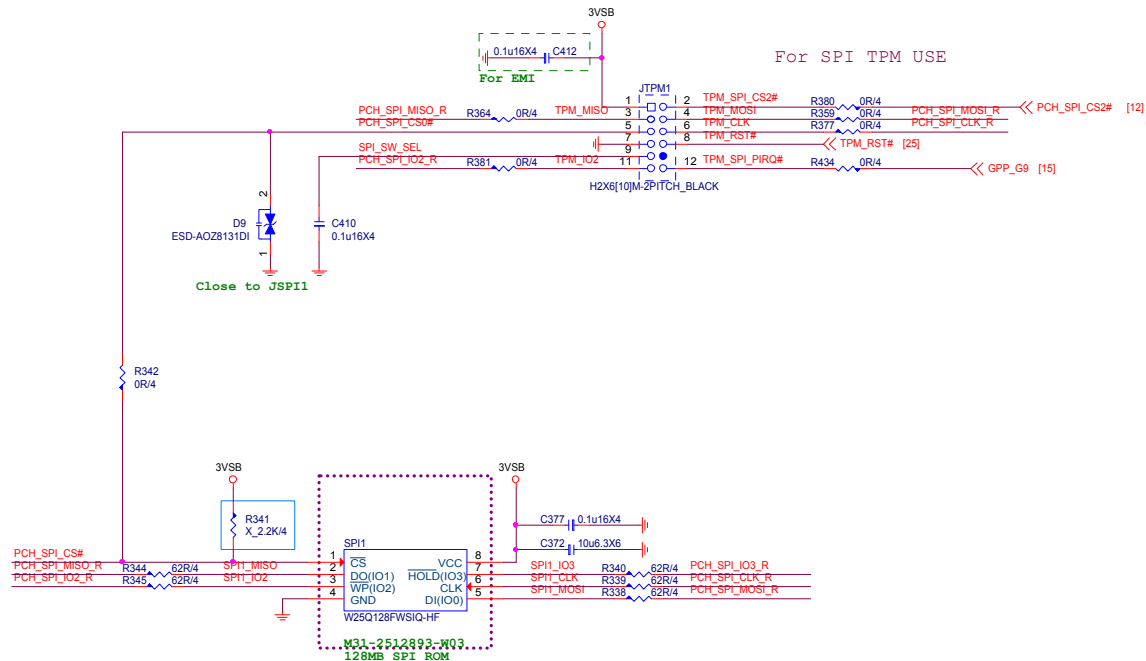
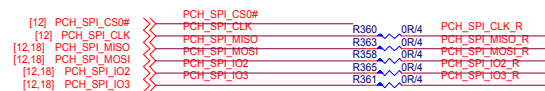
For S5 -> G3 3VSB_EN ISSUE

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Module Stuff CHIP_FWGD,
But PCH_FWROK may ramp up before CHIP_FWGD.

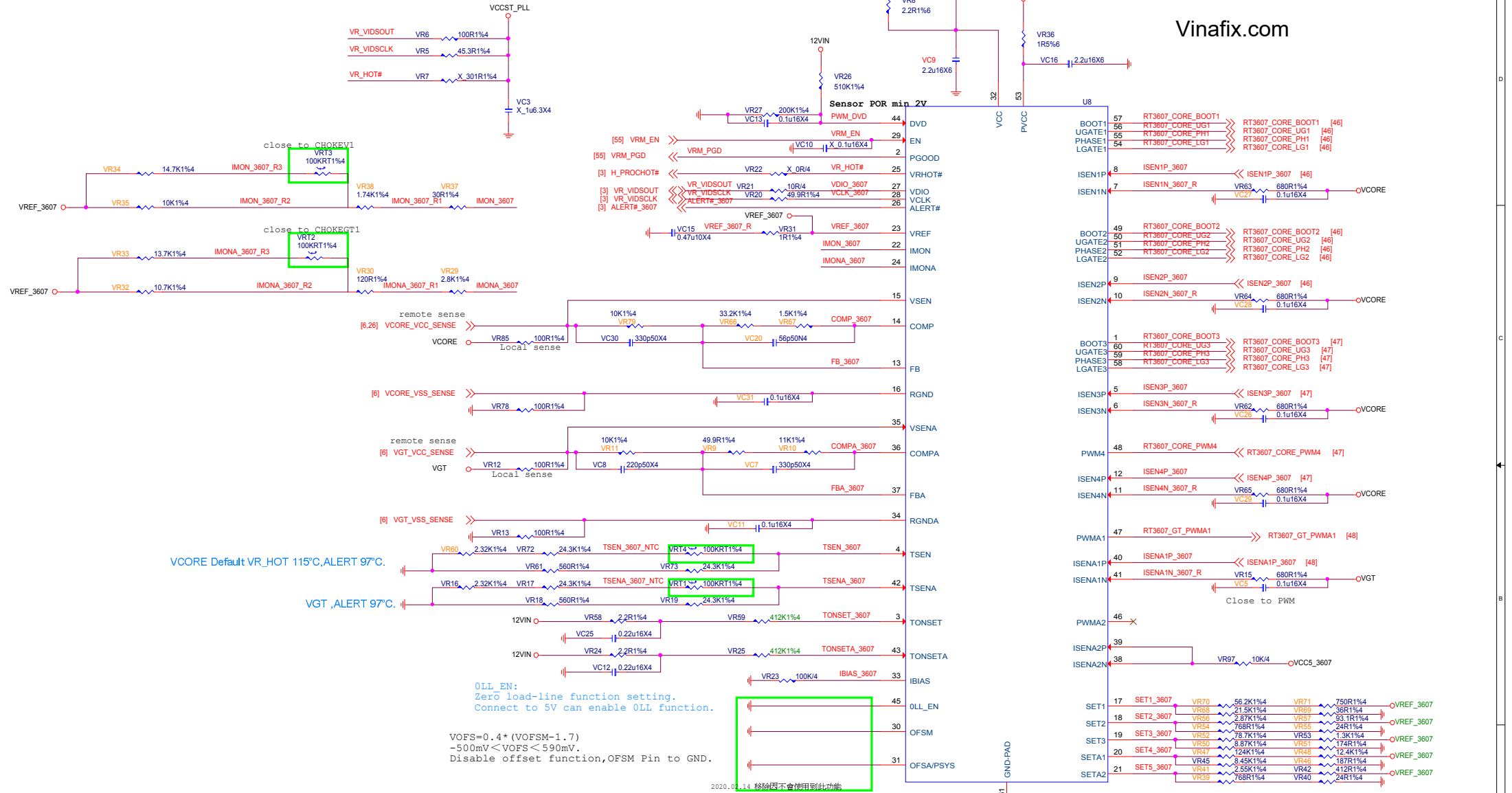


For TL624-1.
DEEP Mode : Stuff D48/R2517
DSW Mode : Stuff D48/D49/R2517

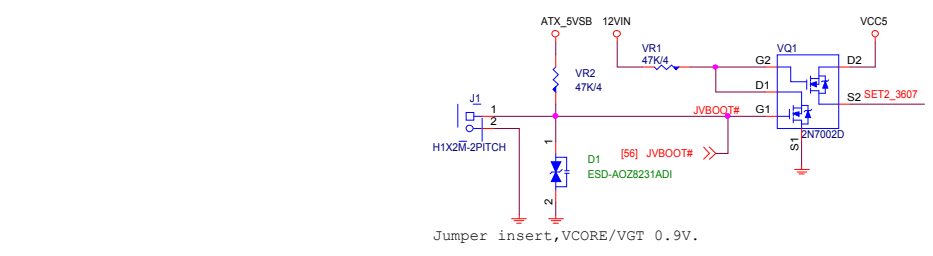


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VCORE Iccmax 140A,TDC 132A, OCP182A.
VGT Iccmax 30A,TDC 28A, OCP39A.



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SET1:Iccmax:140A,OCP:130%*Iccmax,DVID mV
SET5:Iccmax:30A,OCP:130%*Iccmax,DVID mV

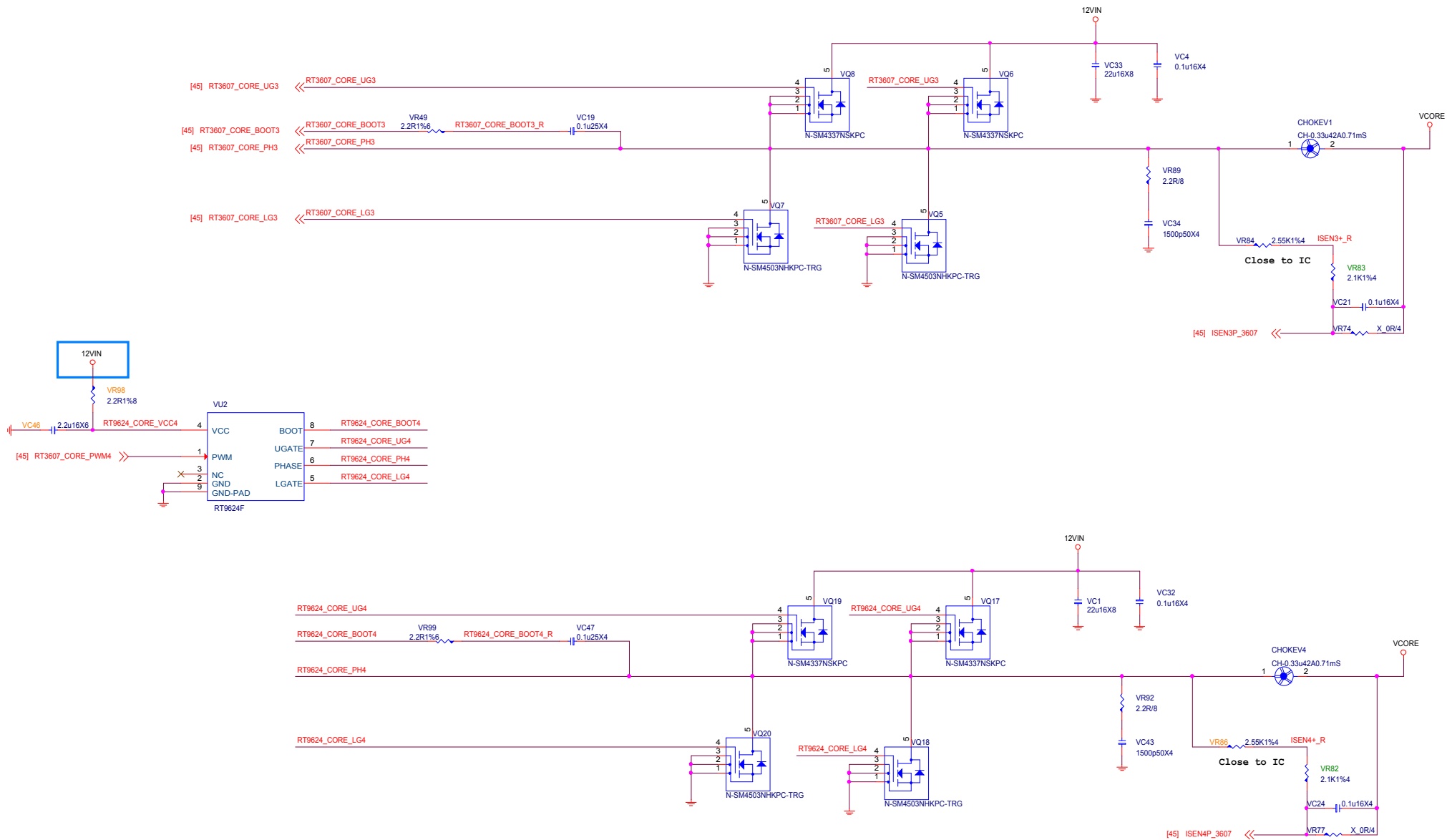
SET1 V
SET2 V
SET3 V
SET4 V
SET5 V

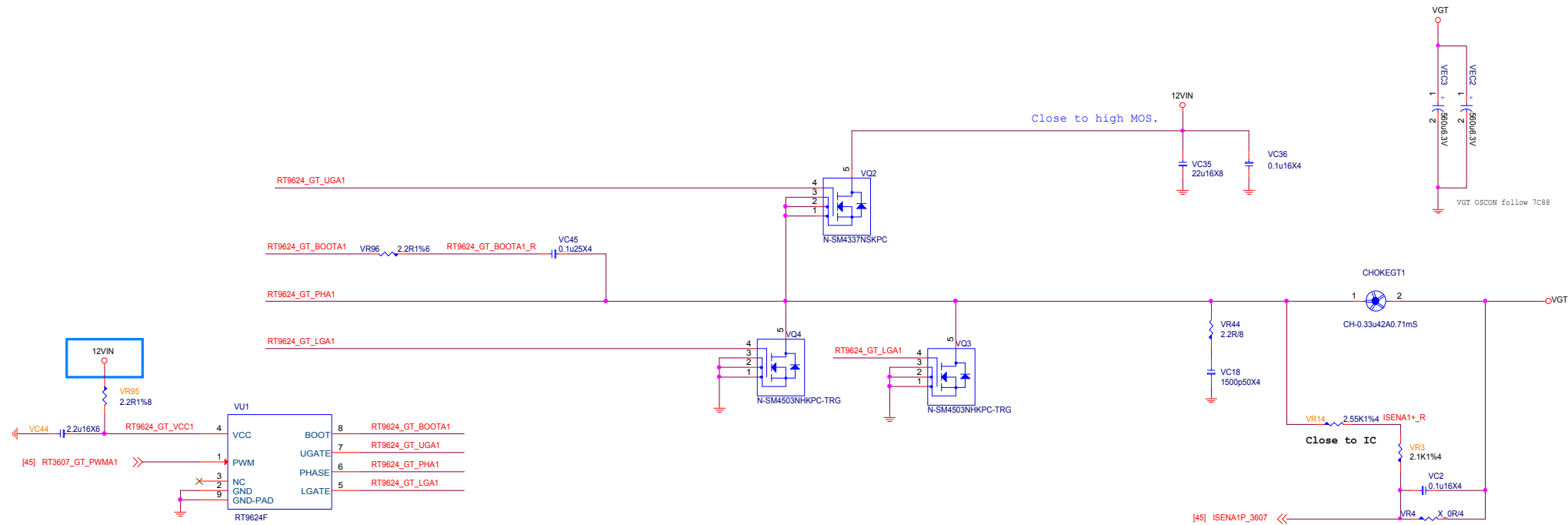
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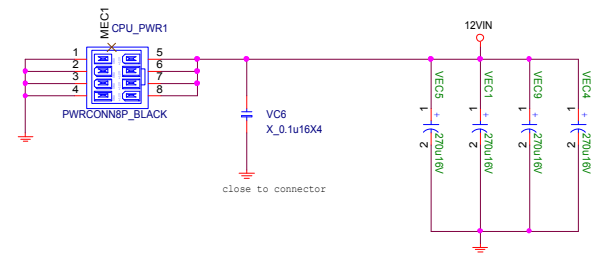
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12VIN CONNECTOR



SA Power:1.05V,11.1A

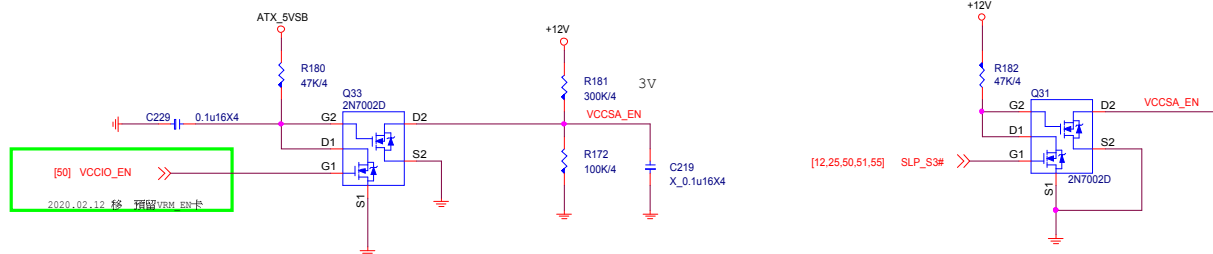
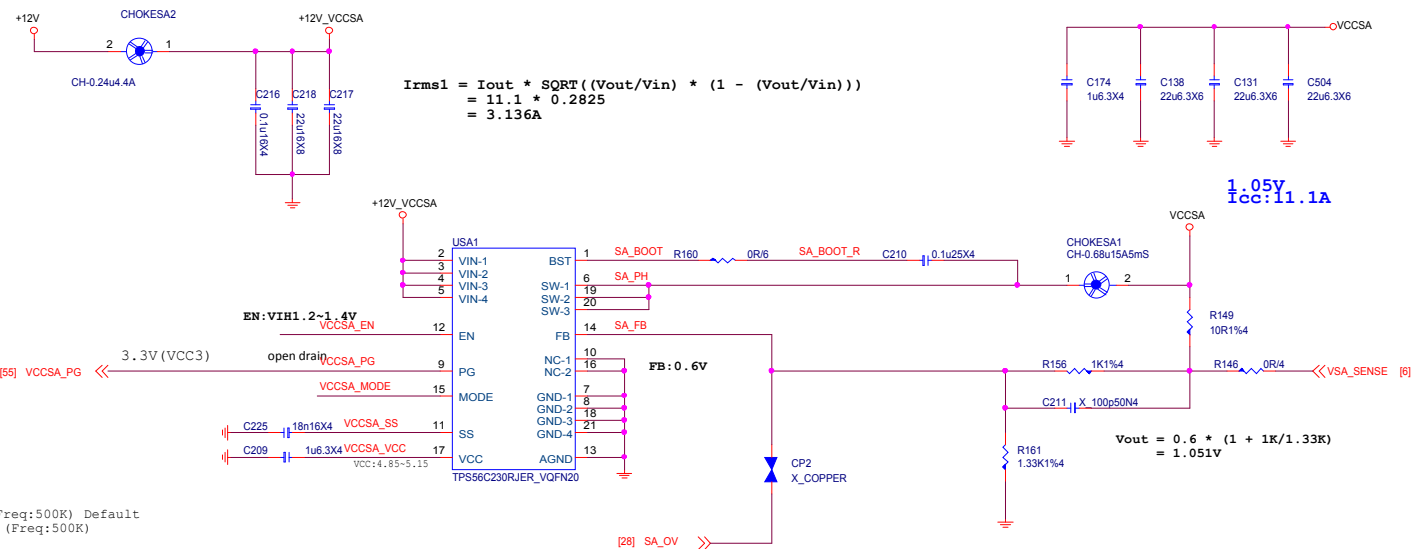
Current limit: 13A~18A, TYP=15A

D

C

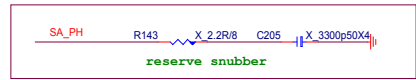
B

A



SLP_S3# assertion to VCC, VCCGT, VCCIO and VCCSA rails completely off.

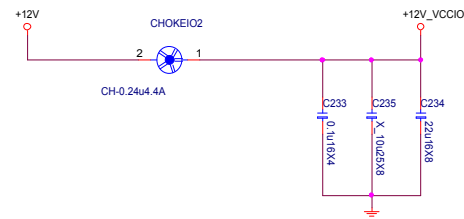
SLP_S3# assertion to VR disabled
max:1us



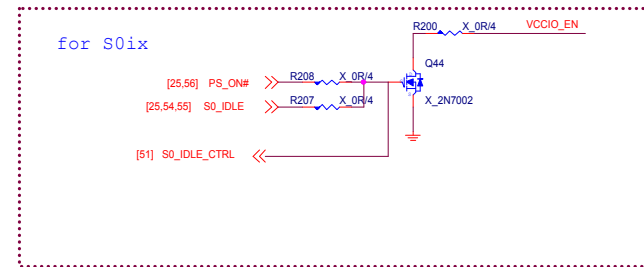
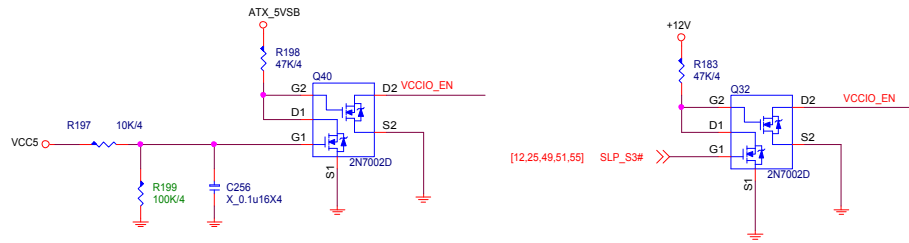
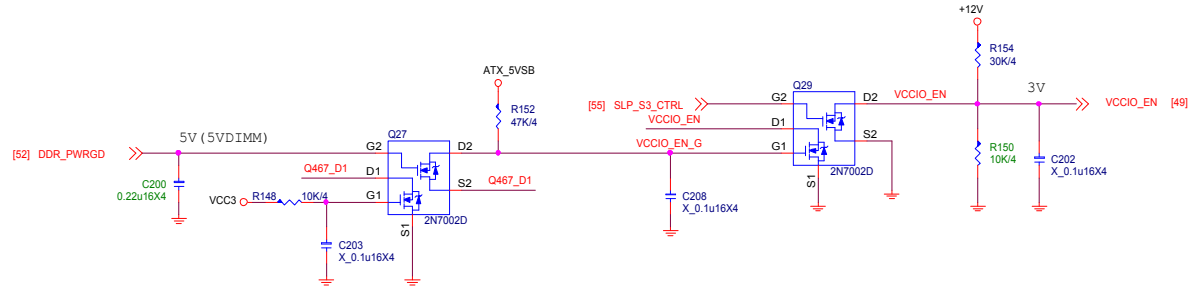
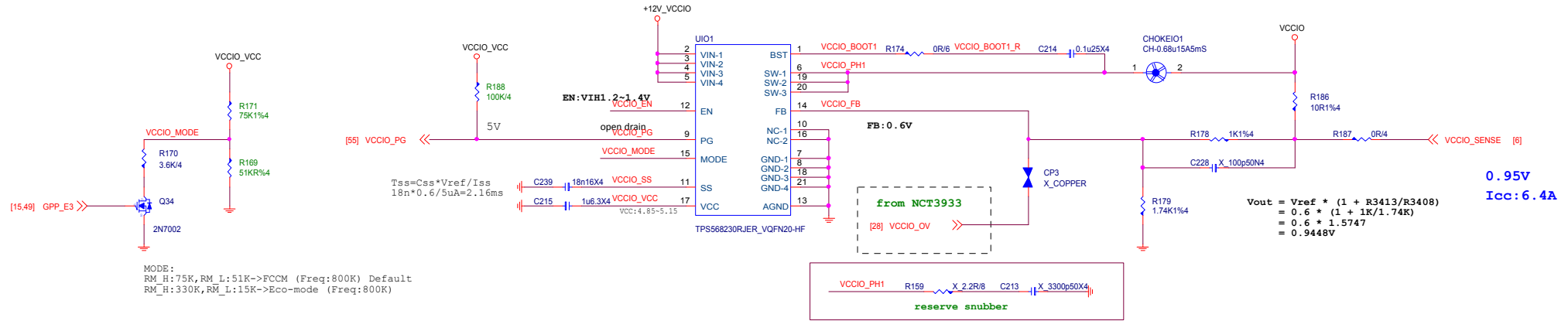
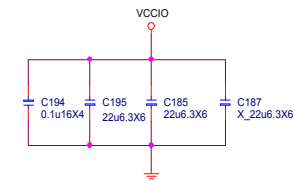
Vinafix.com

VCCIO Power 0.95,6.4A

0.95V Icc:6.4A

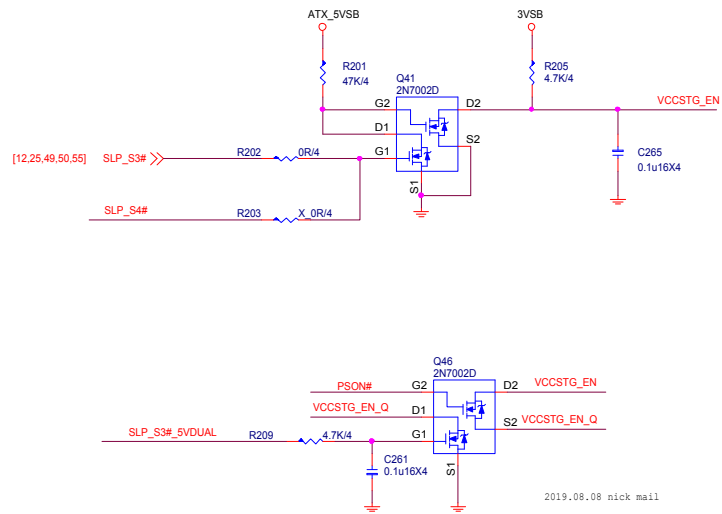
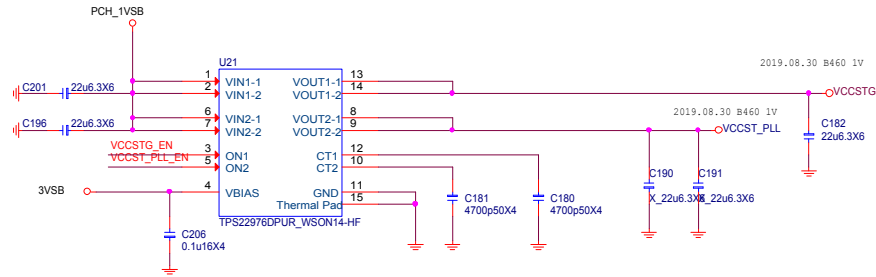


$$\begin{aligned} I_{rms1} &= I_{out} * \sqrt{(V_{out}/V_{in}) * (1 - (V_{out}/V_{in}))} \\ &= 6.4 * 0.27 \\ &= 1.728A \end{aligned}$$

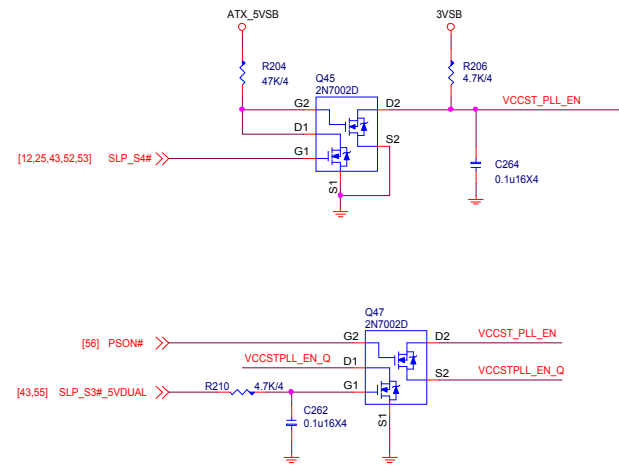


VCCST PLL 1.0V; 0.45A
VCCSTG 1.0V; 0.2A

$$\begin{aligned}\text{Power Loss1} &= (I \cdot I) \cdot R_{ds(on)} \\ &= (0.45 \cdot 0.45) \cdot 0.022 \\ &= 0.2025 \cdot 0.022 \\ &= 4.455 \text{mW} \\ \text{Power Loss2} &= (I \cdot I) \cdot R_{ds(on)} \\ &= (0.2 \cdot 0.2) \cdot 0.022 \\ &= 0.04 \cdot 0.022 \\ &= 0.88 \text{mW}\end{aligned}$$



for S0ix



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DDR4 Power:1.2V,12.15A

3.7A For CPU

7.85A For 2DIMM

0.375A For DDR VTT

OCP = 12.5~16.6A; Choke Isat=32A

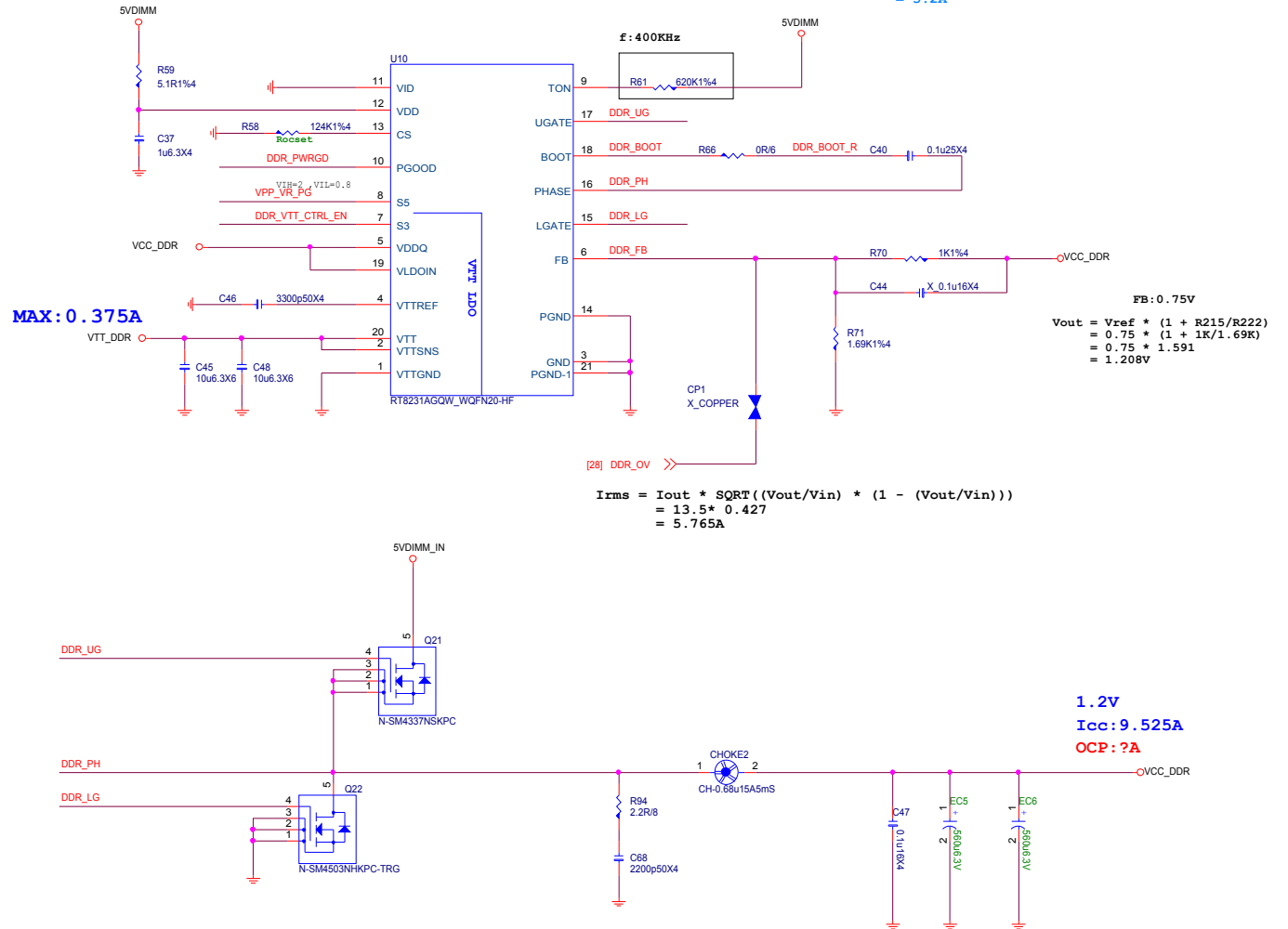
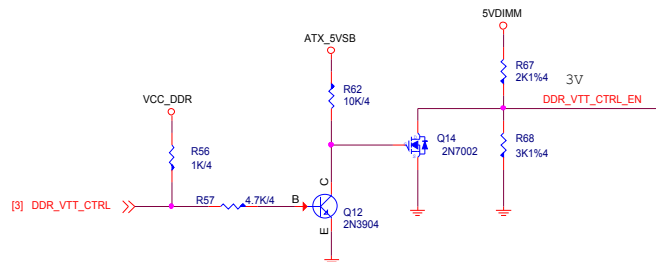
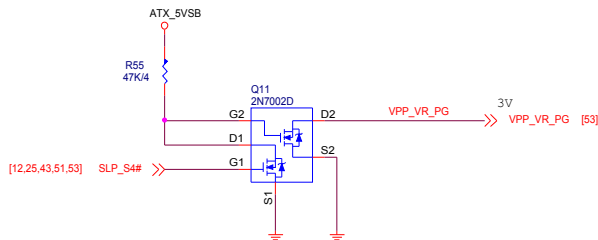
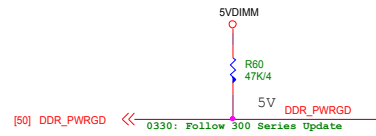
$$R_{limit} = L_{limit} * R_{ds} * 10 / 5uA$$
$$= 15.8 * 3.9 * 10 / 5 = 123.24K$$

$$0.4V \leq R_{limit} * 5uA \leq 3V$$
$$123.24 * 0.005 = 0.6162$$

D03-4503NOC-ST8

Current limit= $124K * 5uA / 10 / 5.1mohm = 12.16A$

Current limit= $124K * 5uA / 10 / 3.9mohm = 15.9A$

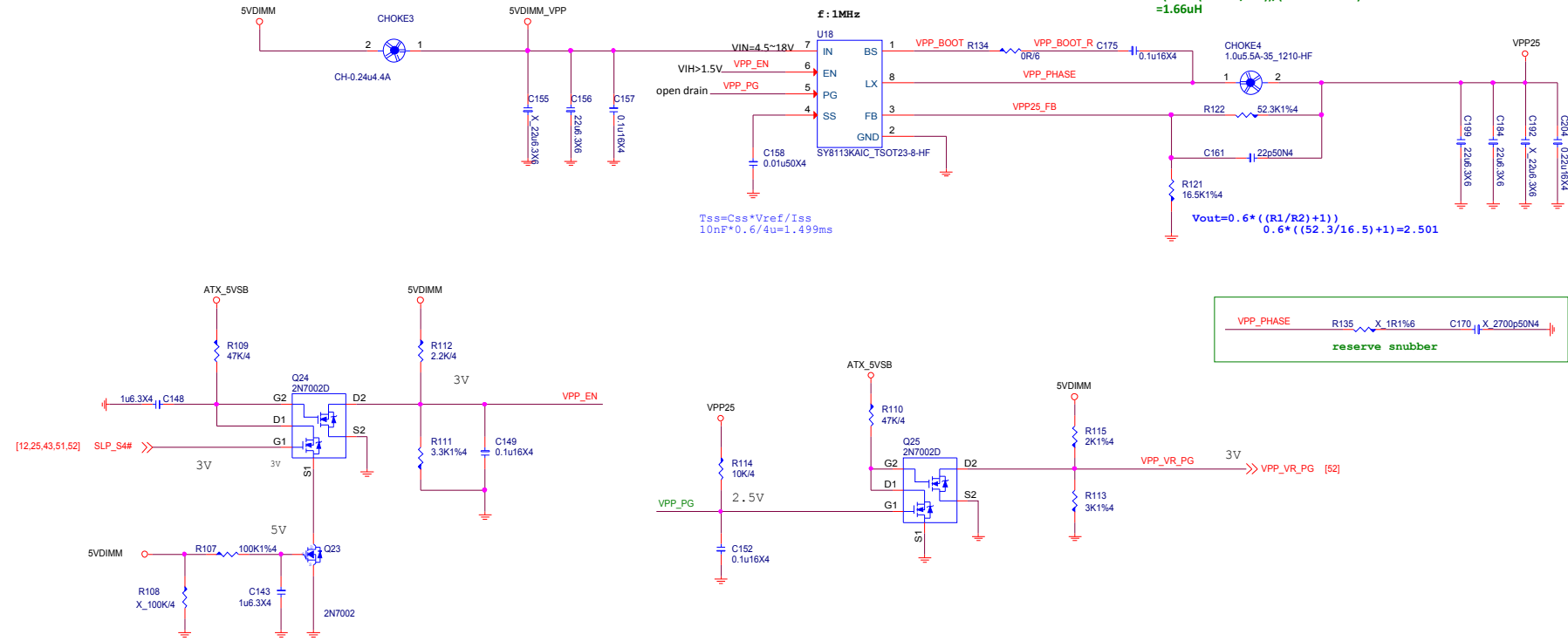


IC OCP:4.6

```
Irms = Iout * SQRT((Vout/Vin) * (1 - (Vout/Vin)))
      = 3 * 0.5
      = 1.5A
```

$$L = (V_{out} - (1 - V_{out}/V_{in})) / (F_{sw} \cdot I_{out} \cdot 0.4) = 1.66 \mu H$$

$$V_{out} = 0.6 * ((R1/R2) + 1) = 0.6 * ((52.3/16.5) + 1) = 2.501$$



PCH_1VSB Power:1V,9.208+0.65=9.858A

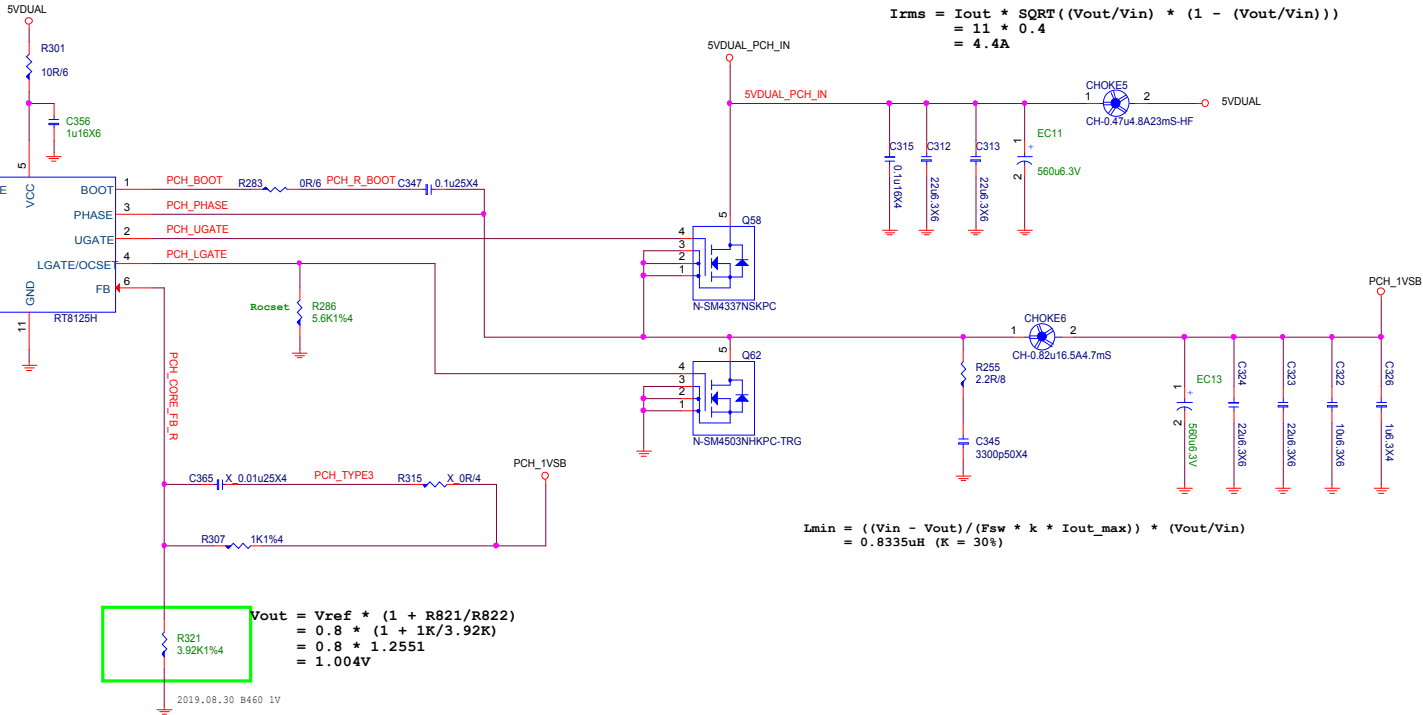
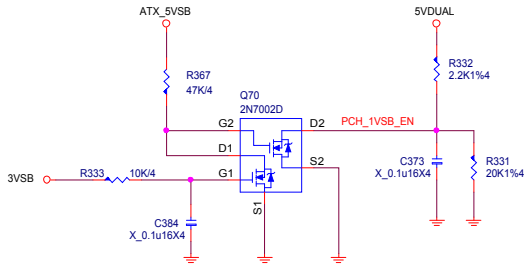
OCP = 11.66~15.55A

$I_{ocp} = R_{ocset} \cdot I_{ocset} / R_{dson(LOW)}$
= 5.6K*10uA/3.9m
= 14.36A
 $I_{ocp} = R_{ocset} \cdot I_{ocset} / R_{dson(MAX)}$
= 5.6K*10uA/5.1m
= 10.98A

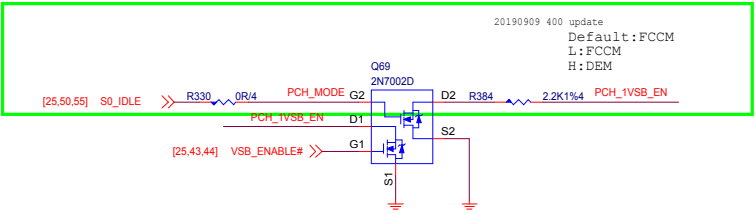
Rdson(Low Side) 5V
D03-4503N0C-ST8:3.9 ~5.1 mohm

Note: Rocset(min)=5K

EN_MODE Pin Voltage	IC Operate Mode
<0.4V	shut down
2.1~2.7V	DEM
4.3~5V	FCCM



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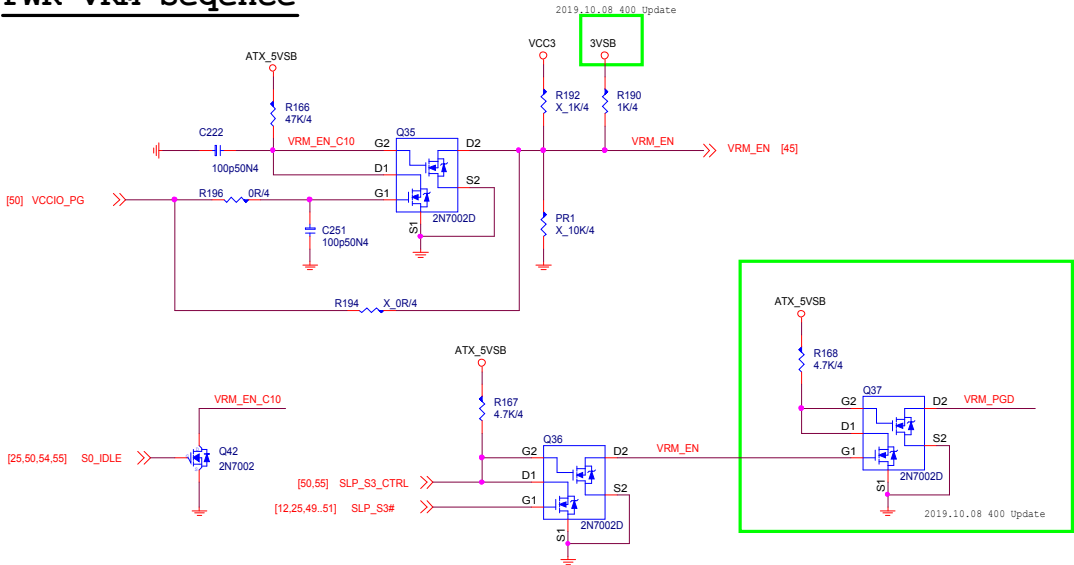


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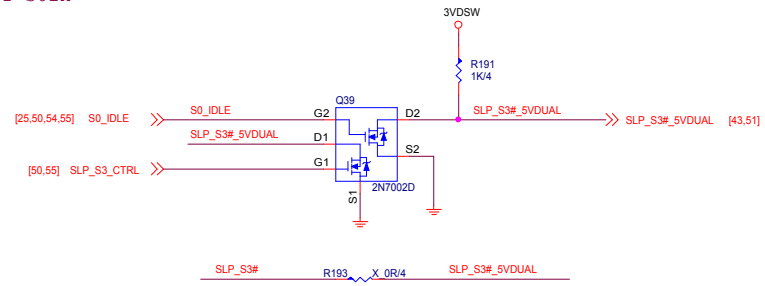
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PWR-VRM-Sequence

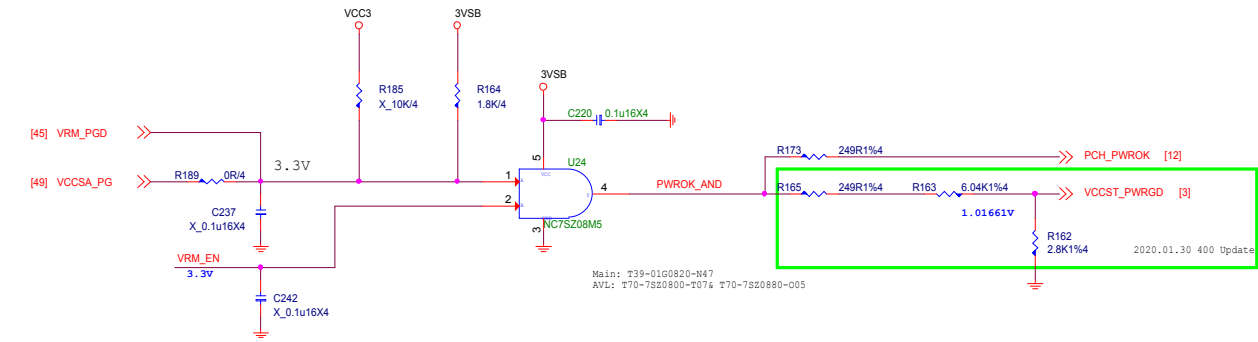
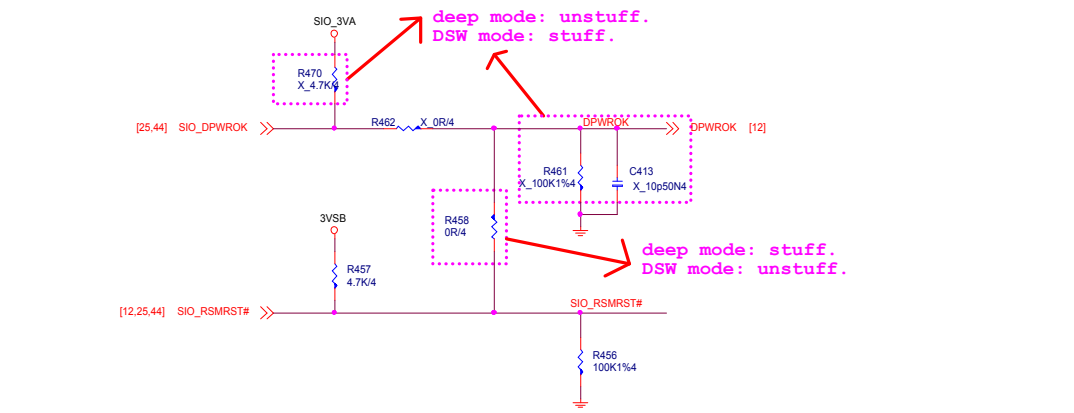
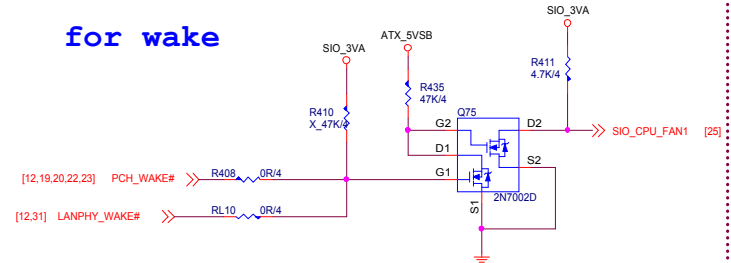


for 5VDIMM and 5VDUAL

for S0ix



for wake

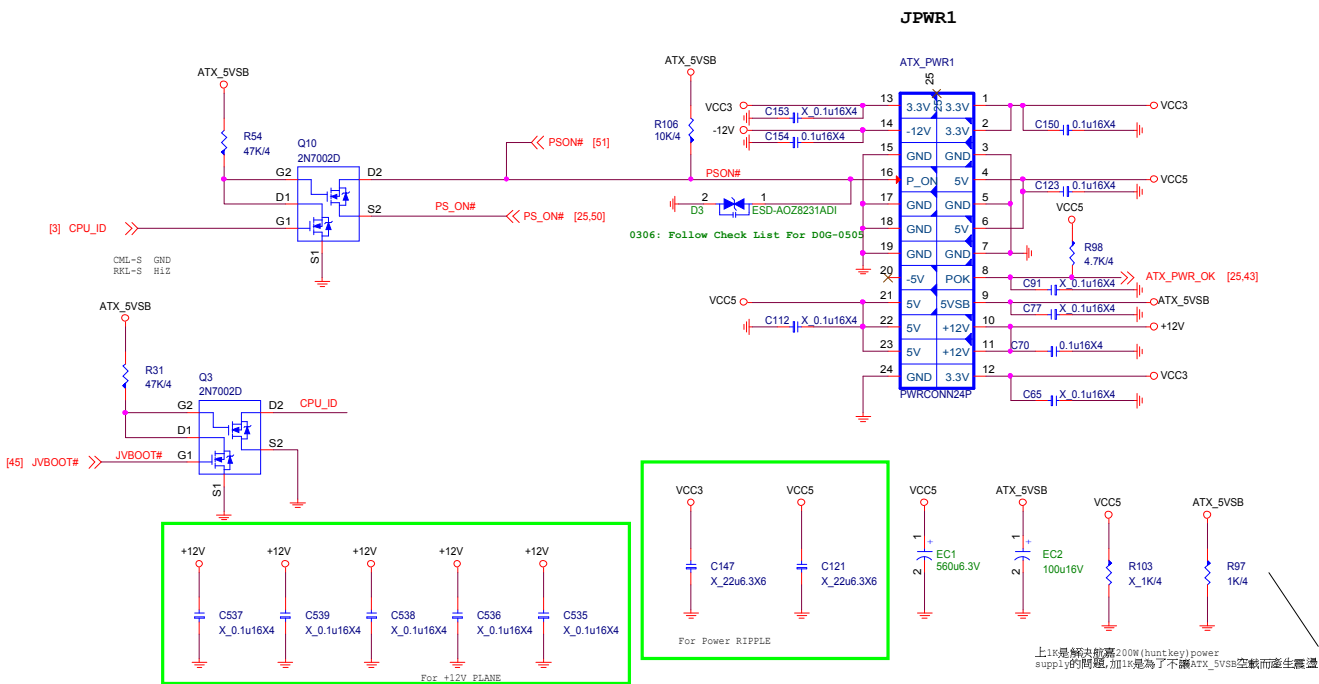


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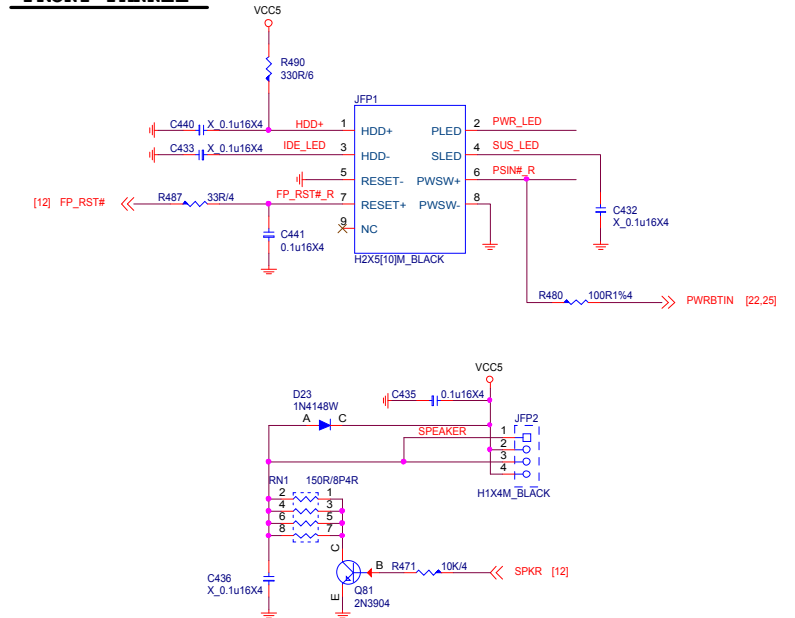
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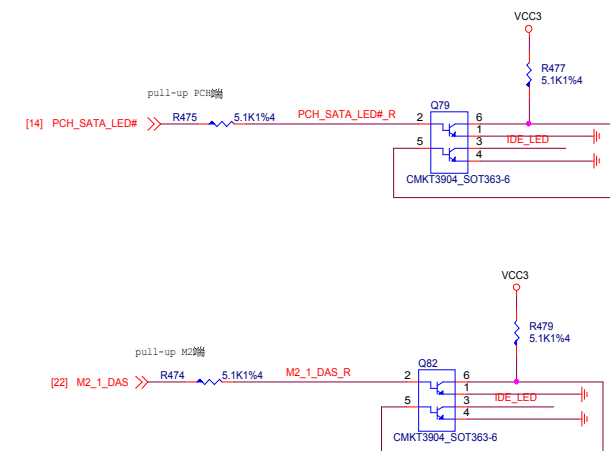
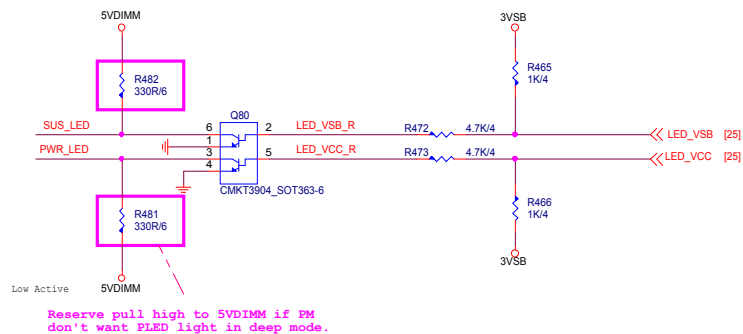
ATX POWER CONNECTOR



FRONT PANNEL



**Front Panel
LED**



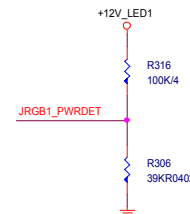
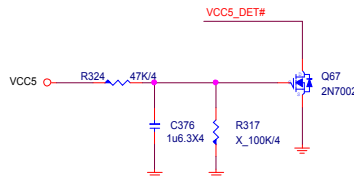
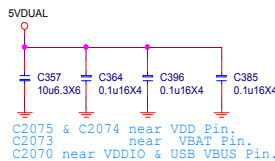
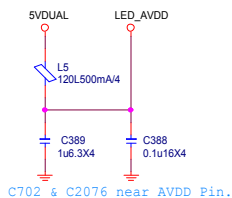
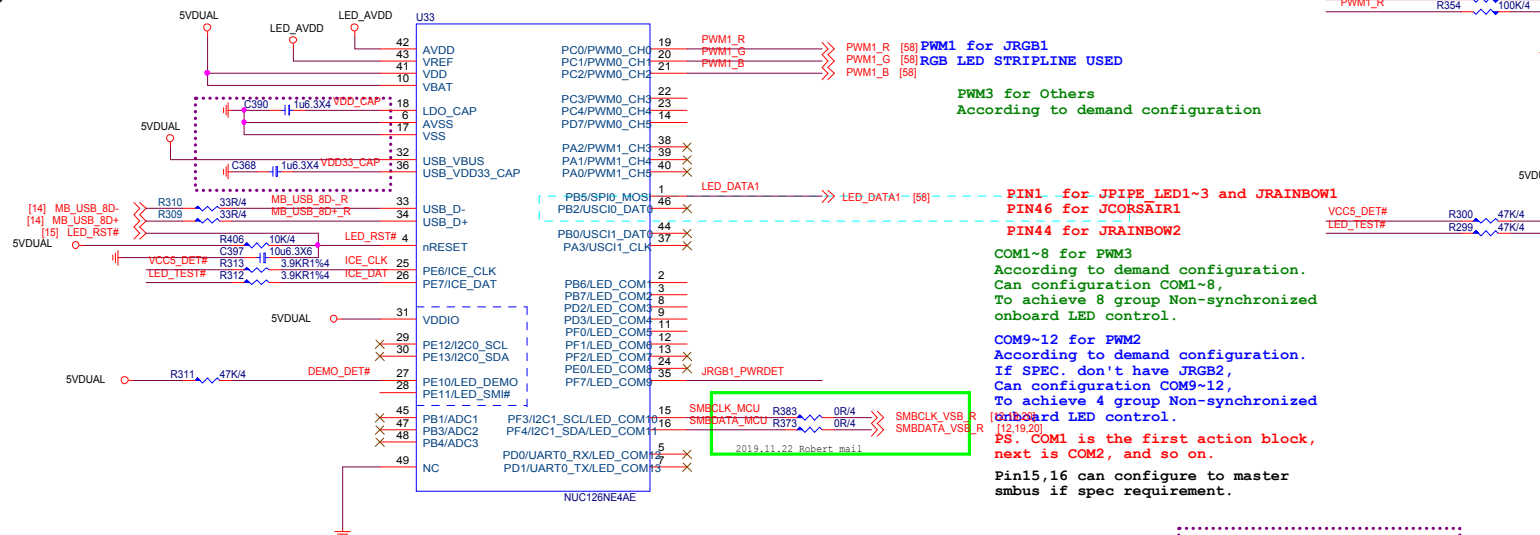
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LED MCU

If you use ADC function, need to separate VREF from AVDD and 4_09VREF stuff for VREF.



IF no JPWRLED1 & JPIPE_LED spec

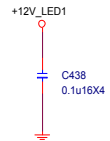
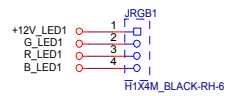
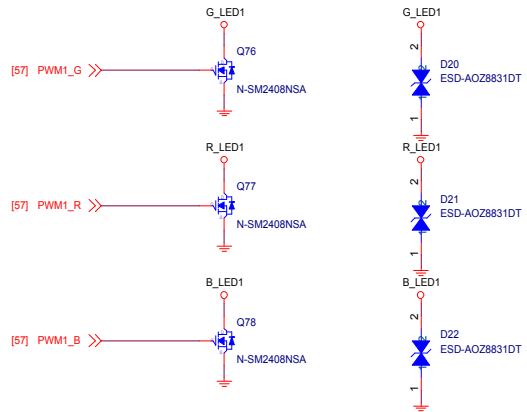
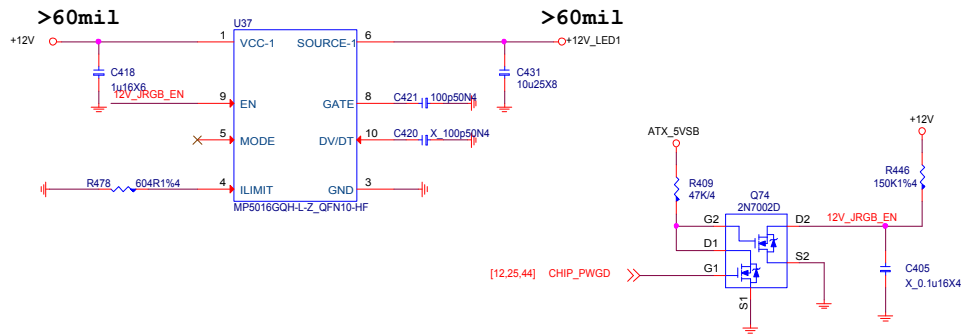
MCU can powered by 5VDUAL directly.
LED_VCC5 replace with 5VDUAL.

JT1 for FW update

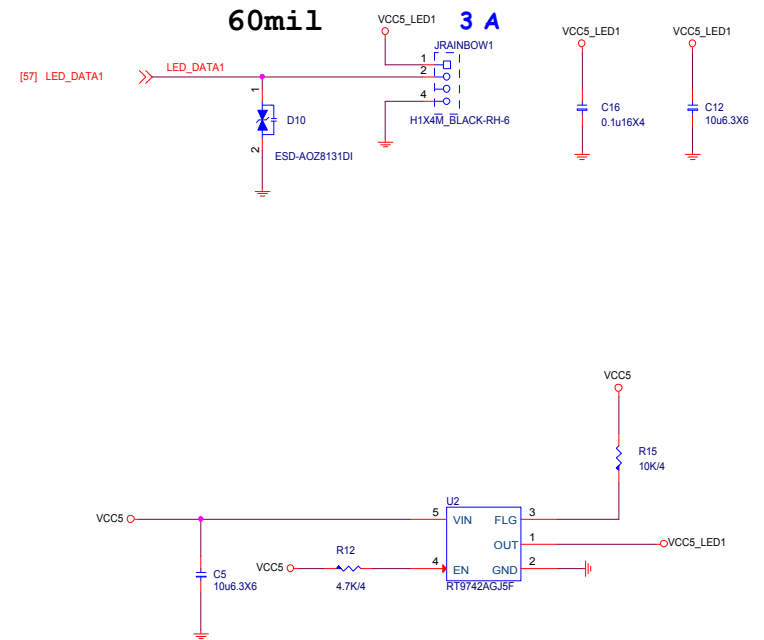


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JRGB1



JRAINBOW1 LED

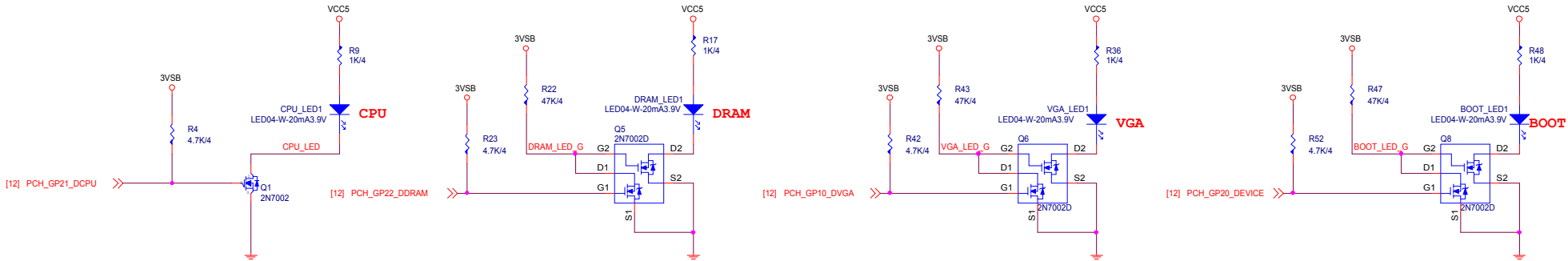


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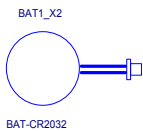
Size Custom	Document Description JRGB and JRAINBOW1 LED	Rev 1.0
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EZ Debug LED

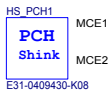




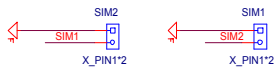
7C89-1.0
PK0-07C8910-G37
PK0-07C8910-E48



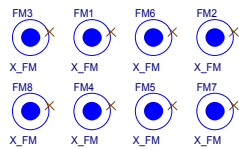
Heat Sink



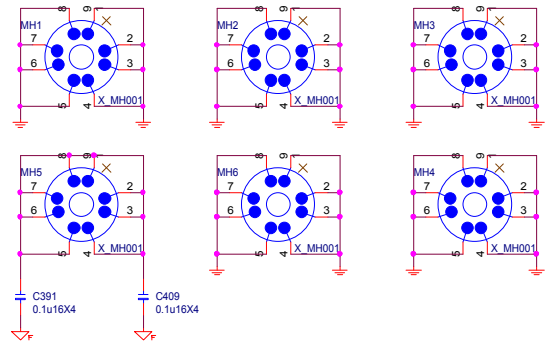
Simulation



Optical Fiducial Marks-120



Mounting Holes



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