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7	CPU-GND
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10	PCH-DMI/PCIE/USB/SATA/DDI
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Q470/H470

CPU :

Intel CometLake-S

System Chipset :

Intel CannonLake-H Chipset

On Board Chipset :

IMVP8 -- NCP81266MNTXG+NCP302155MNTWG 6+2Phase

Gigabit LAN -- I219LM/V

HDA Codec -- Realtek ALC623

Super I/O --NCT6686D-L

SPI Flash 32MB

Main Memory :

2 Channel DDR 4 * 4 (Max 128GB)

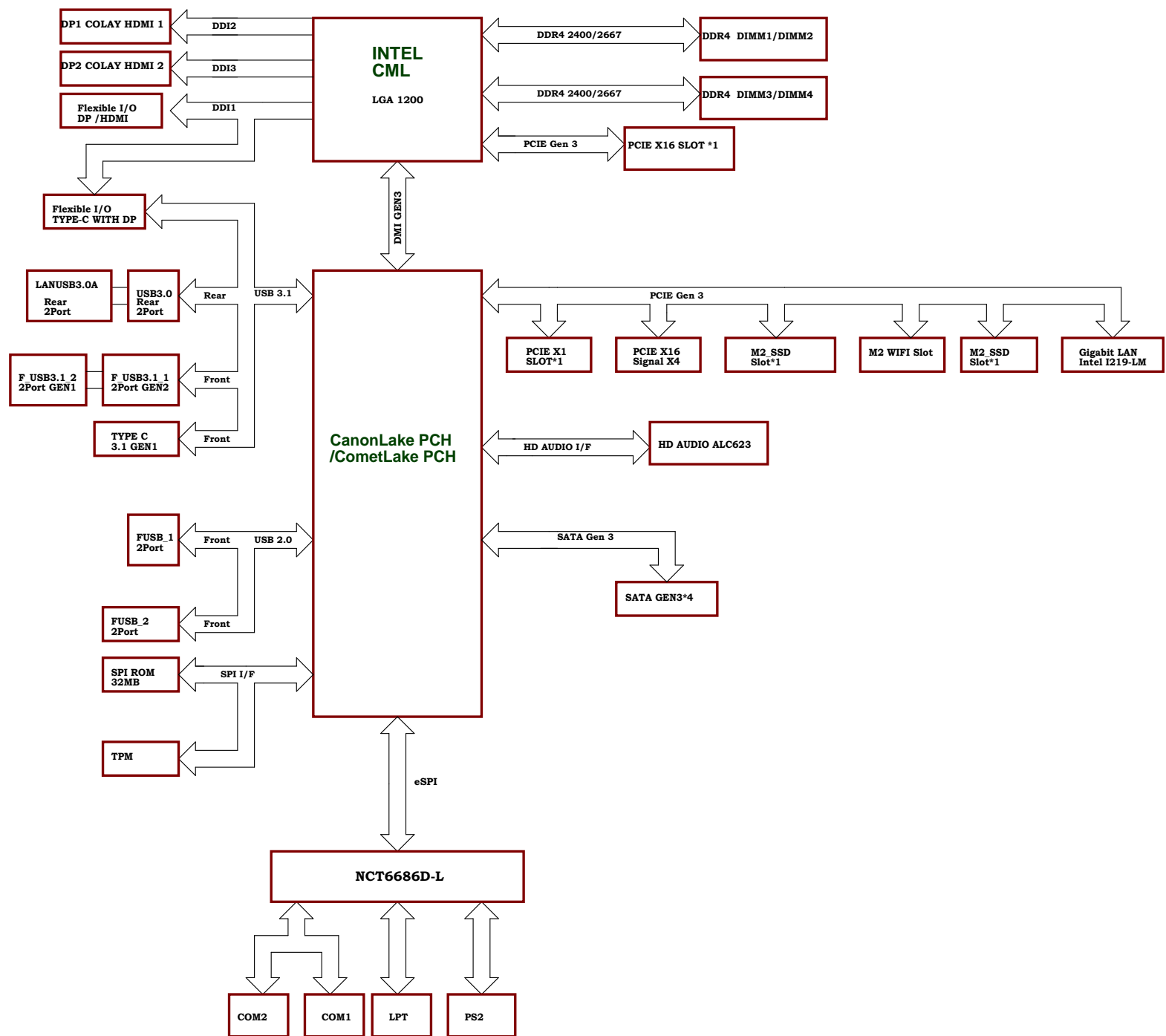
Expansion Slot :

PCI Express x16 Slot * 1

PCI Express x4 Slot * 1

PCI Express x1 Slot * 1



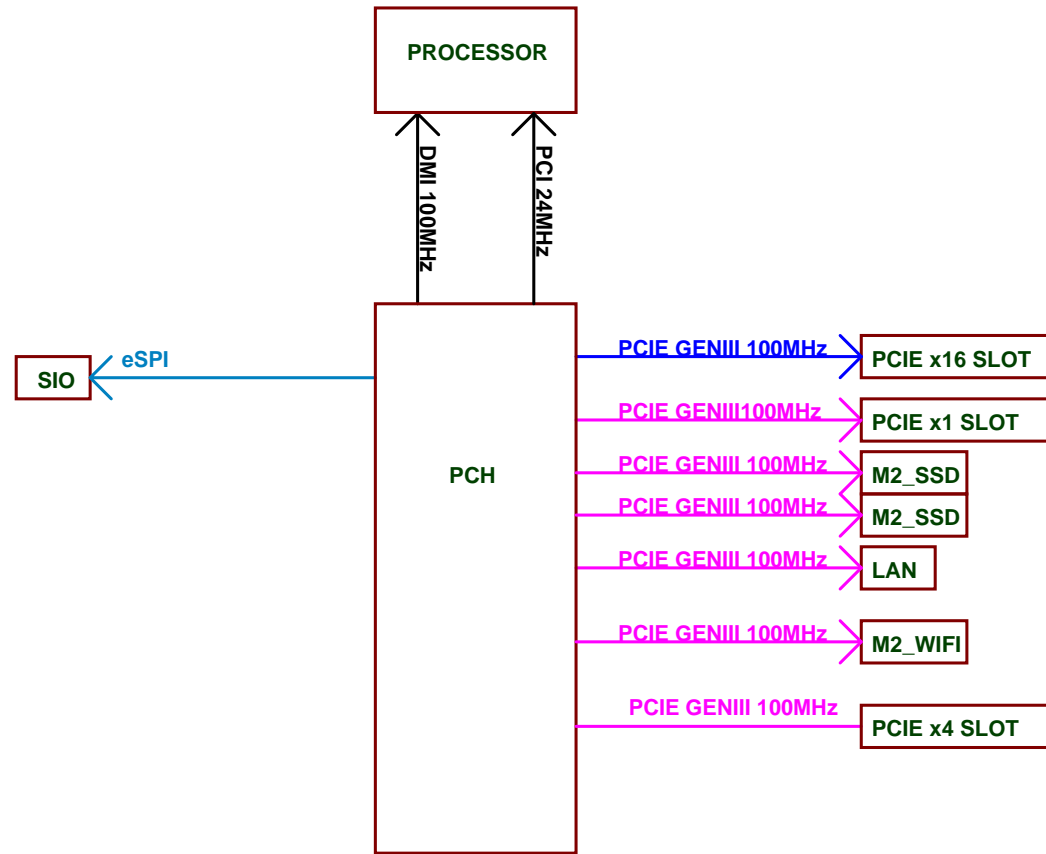


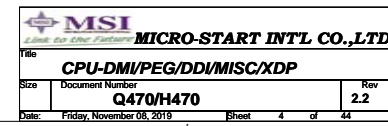
Slot Sequence:

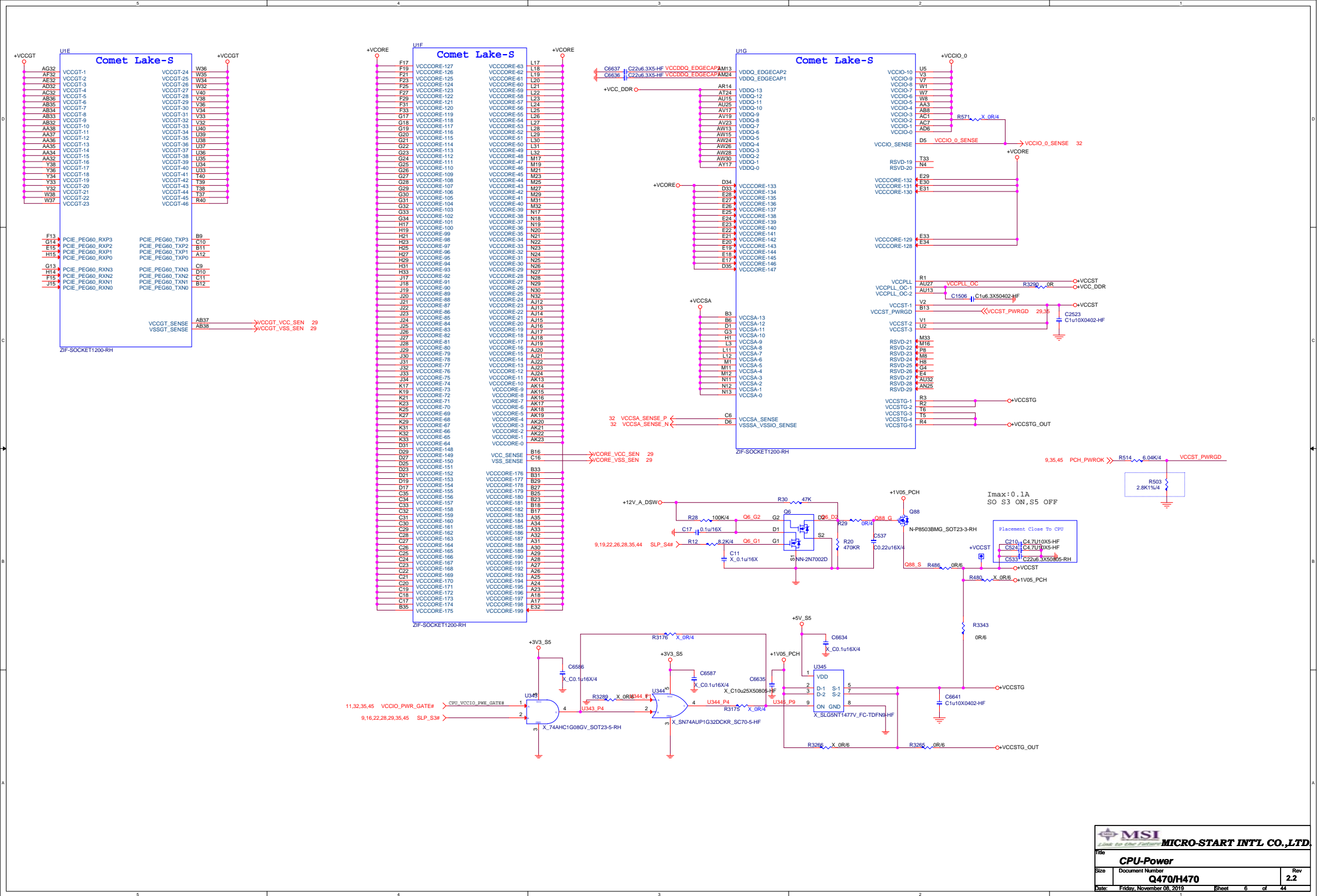
PCIE X16

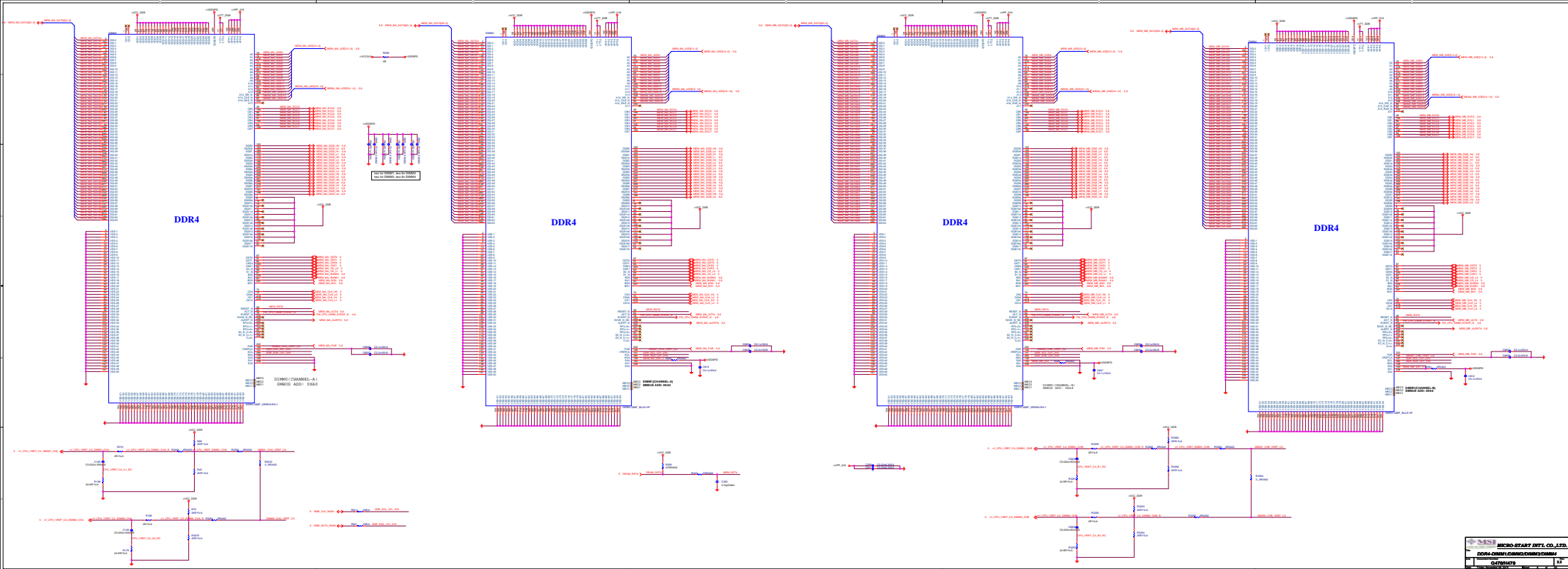
PCIE X1

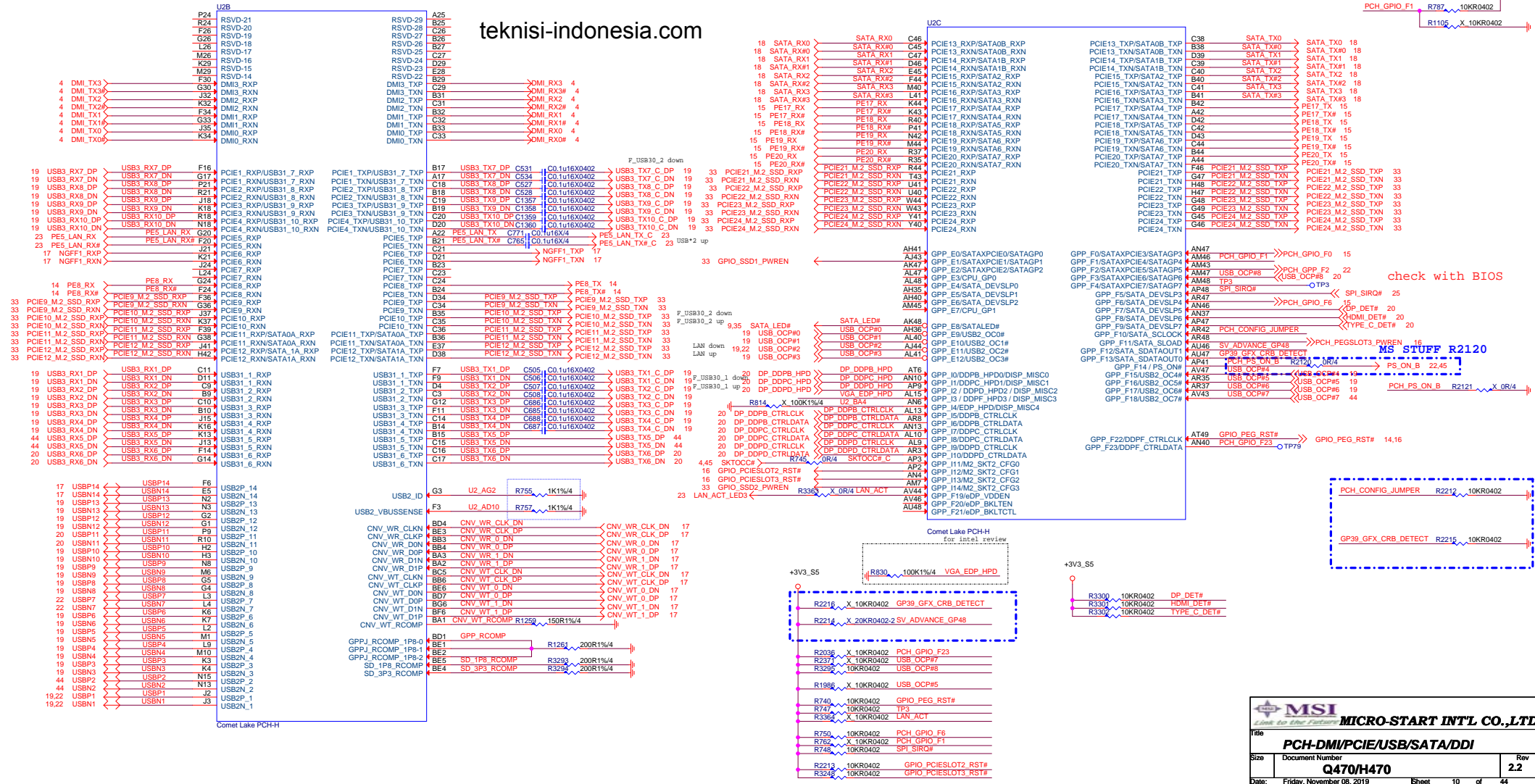
PCIE X16(signal x4)

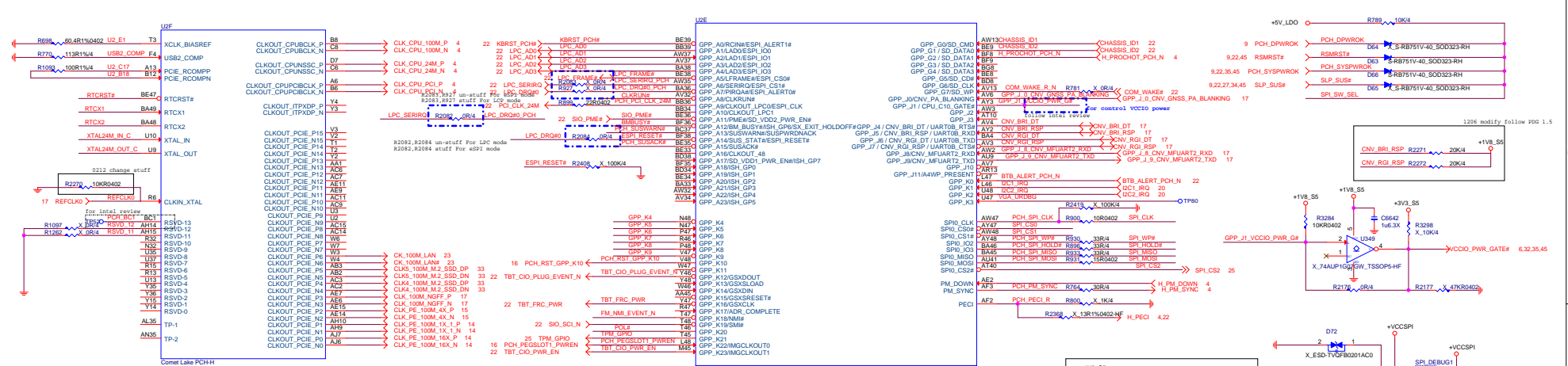




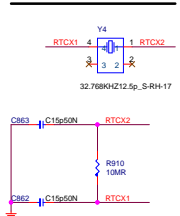




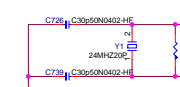




RTC Block (close to PCH)



24MHz Clock



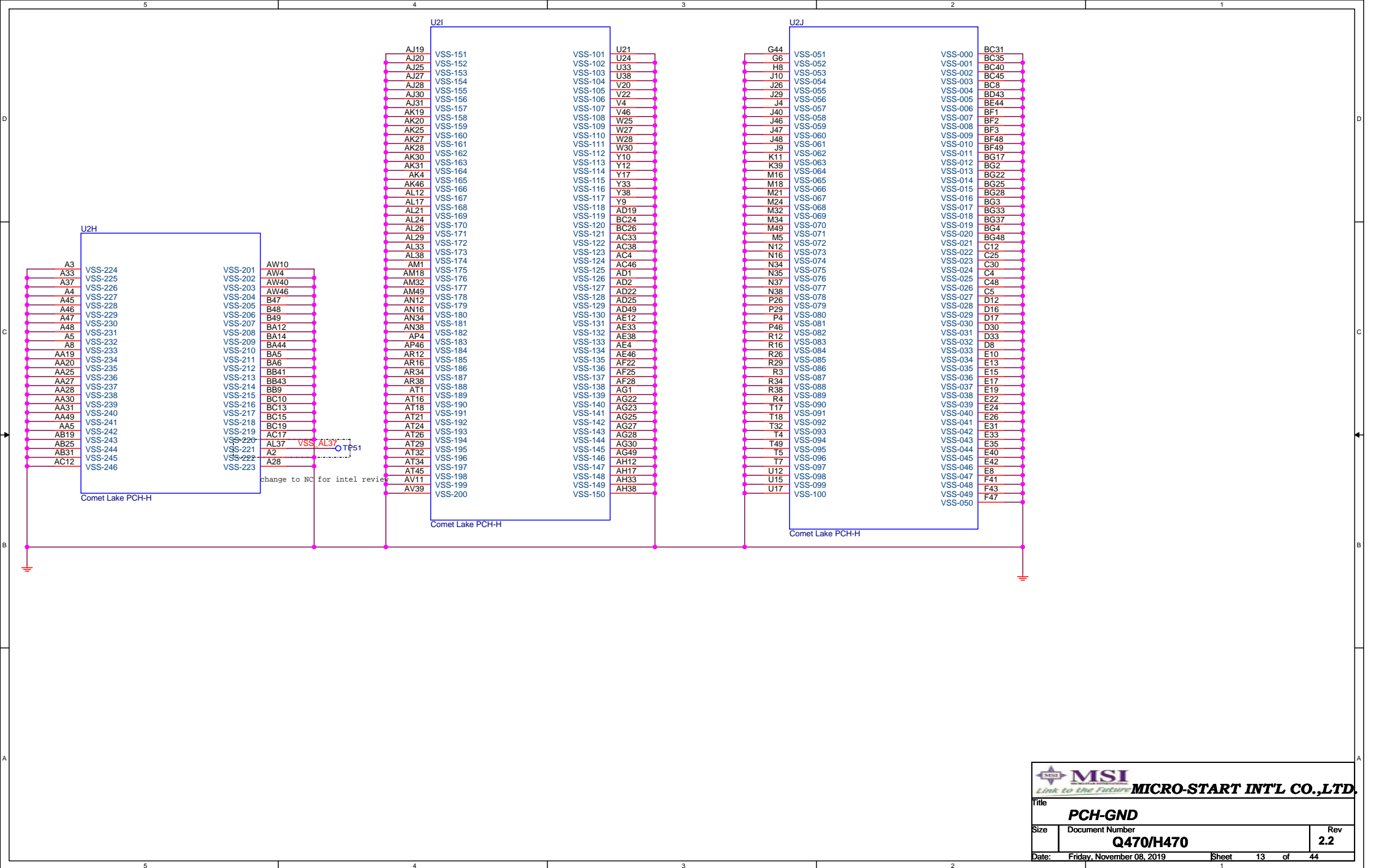
Bom Option



Bom Option Configuration

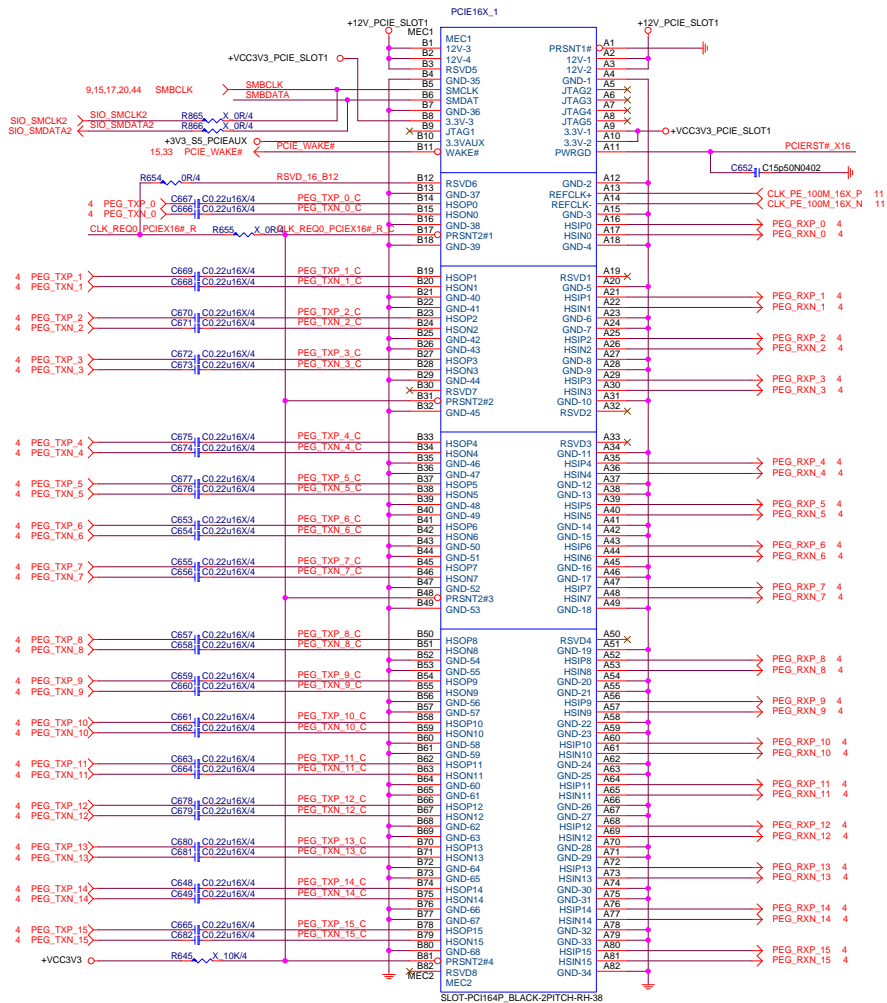
GPP_K9	GPP_K8	GPP_K7	GPP_K6	GPP_K5	GPP_K4	Project	BOM Opt
0	0	0	0	0	0	TCM ROW M90t / M90s	
0	0	0	0	0	1	M90t/s PRC Q470TCM PRC M90t/M90s	
0	0	0	0	1	0	ThinkStation P340t/P340s	
0	0	0	0	1	1	NEC workstation Rigel	
1	0	0	0	0	0	YT As	

Project	BIOS ID	Chipset	Board ID	Planar SSID	ME FW	Premium/Mainstream	Audio
TCM ROW M90t / M90s	M2T	Q470	000000	315F	Corporate	Premium	1
TCM PRC M90t/M90s	M2T	Q470	000001	3160	Corporate	Premium	1
ThinkStation P340t/P340s	S08	W480	000010	1048	Corporate	Premium	1
NEC workstation Rigel	S08	W480	000011	1049	Corporate	Premium	1
TCM ROW M80t	M2T	Q470	000100	3162	Corporate	Mainstream	1
TCM ROW M80s	M2T	Q470	000101	3164	Corporate	Mainstream	1
NEC Rigel-ME	M2T	Q470	000110	3165	Corporate	Mainstream	1
TCM PRC M80t / M80s / QT M630t	M2T	Q470	000111	3163	Corporate	Mainstream	3
YT As	M2T	H470	100000	3161	Consumer	Premium	1
TCM ROW M70t/M70s	M2T	H470	100100	3168	Consumer	Mainstream	1
NEC Rigel-MB/LV	M2T	H470	100101	3166	Consumer	Mainstream	1
NEC Rigel-ML	M2T	H470	100110	317D	Consumer	Mainstream	1
QT M437	M2T	H470	100111	3167	Consumer	Mainstream	3

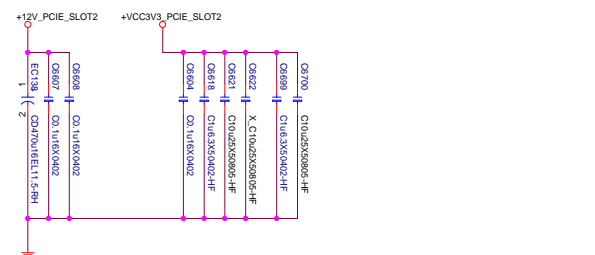
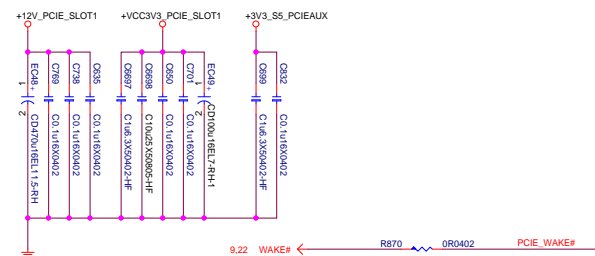
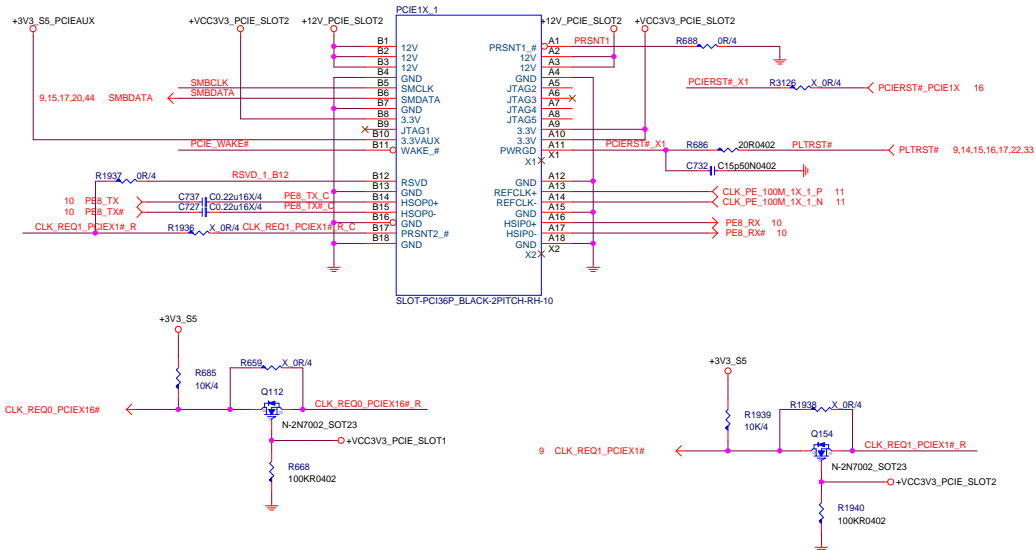


PCI EXPRESS X16 SLOT

PCIERST#_X16 R3123 0R/4 PCIERST#_PCIE16X 16

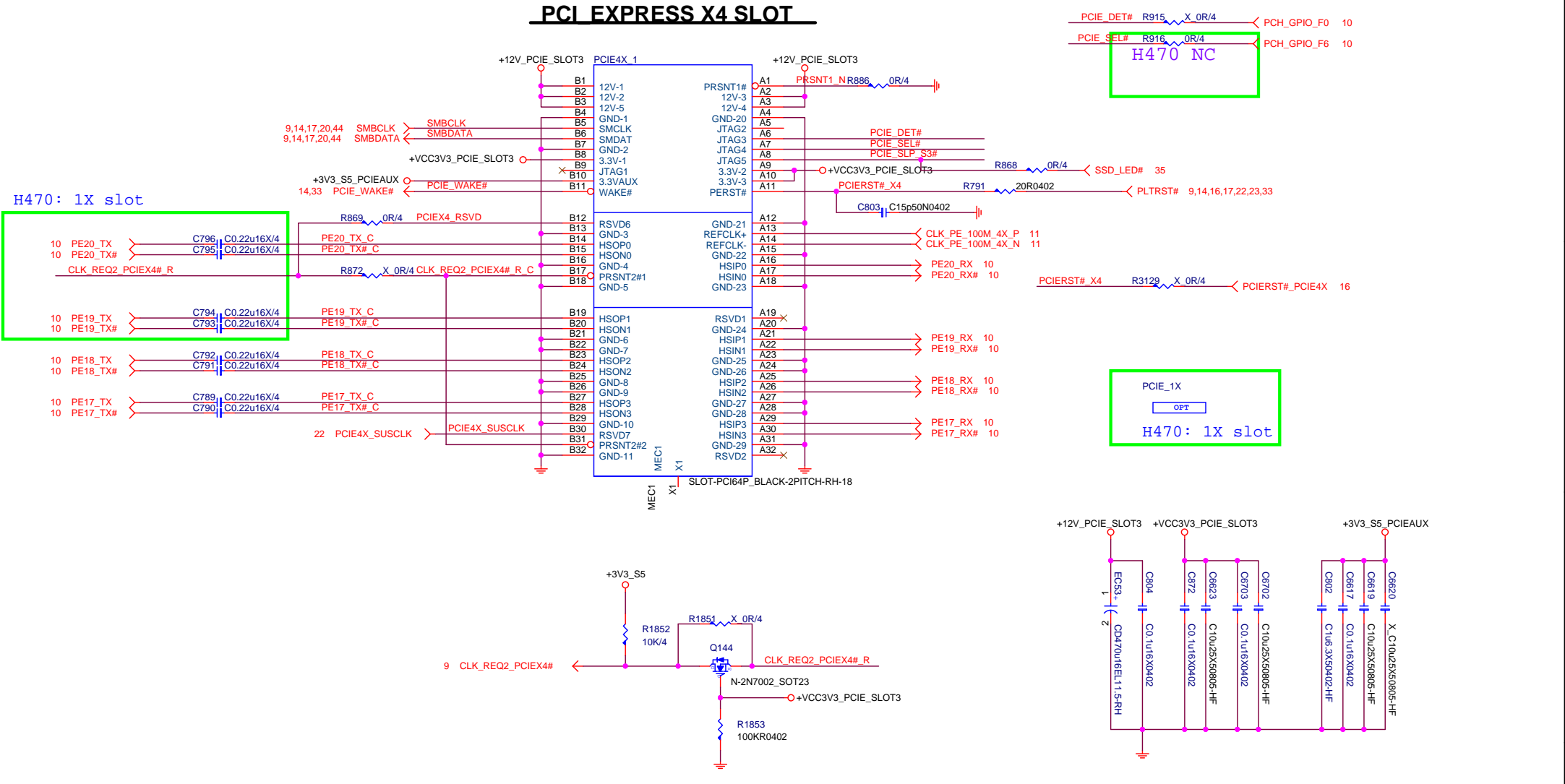


PCI EXPRESS x1-PORT

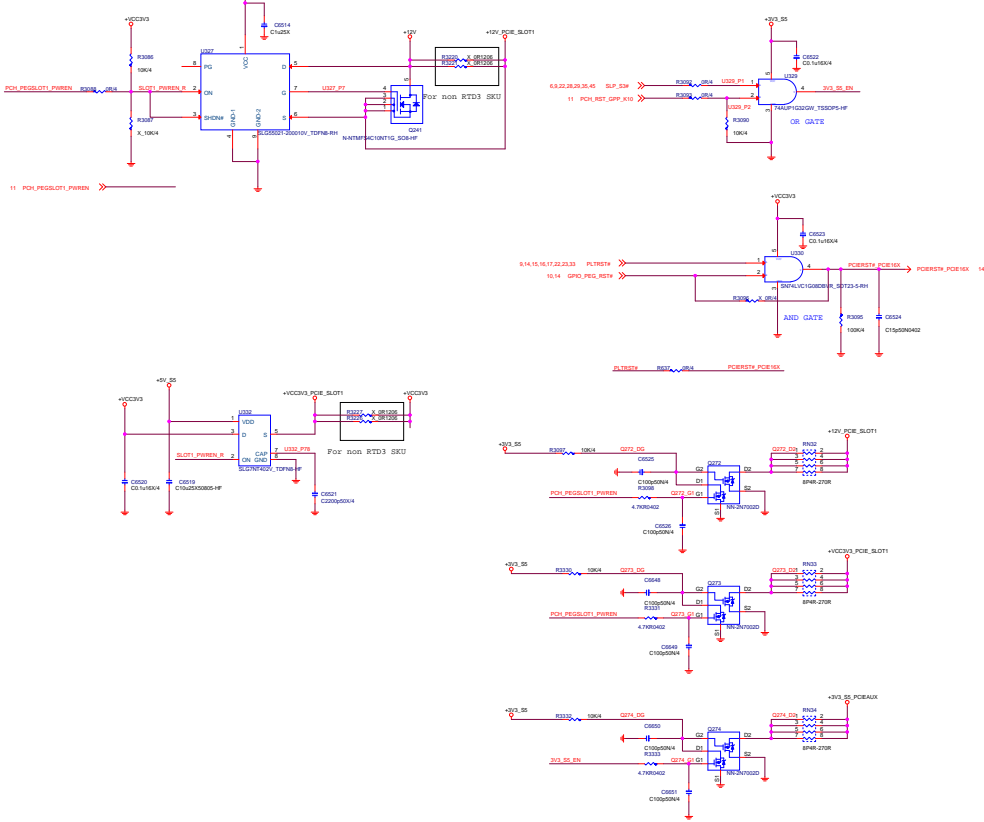


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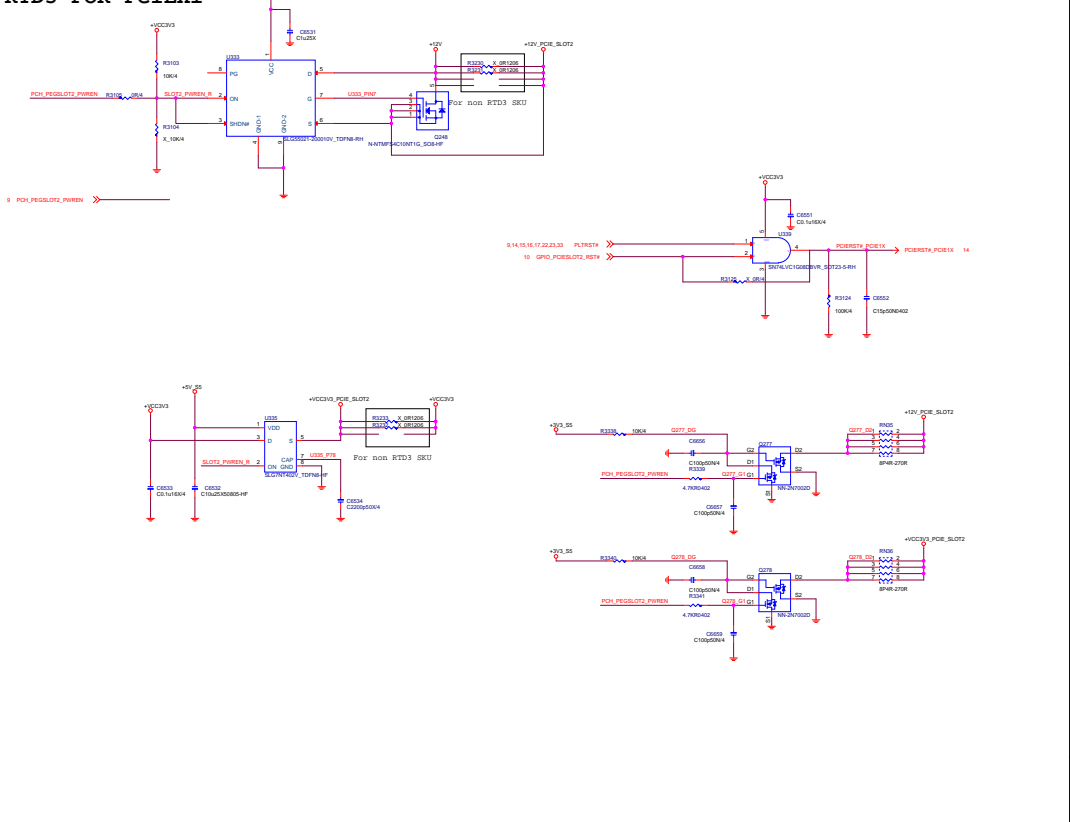
PCI EXPRESS X4 SLOT



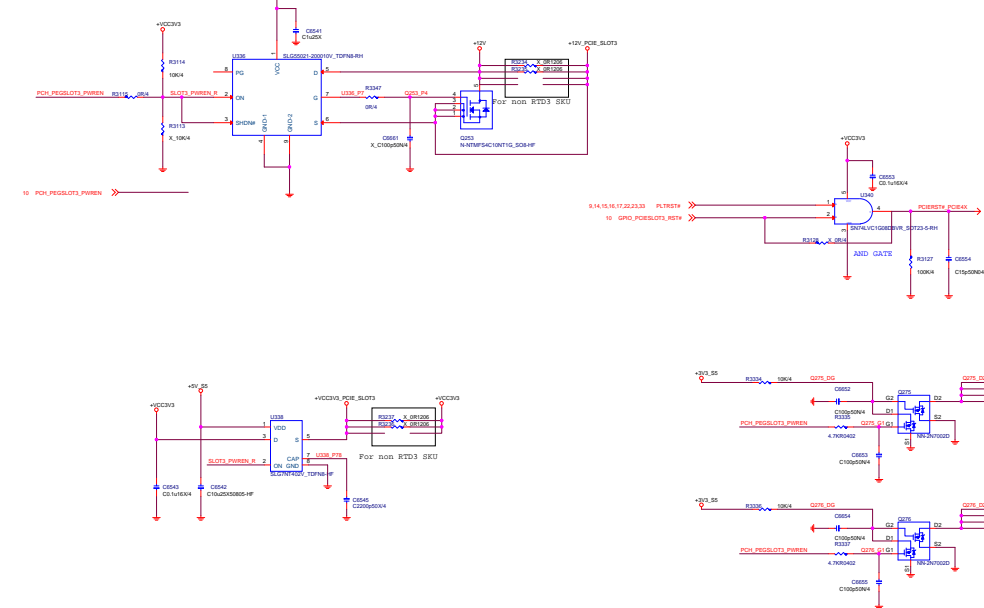
RTD3 FOR PCIEX16



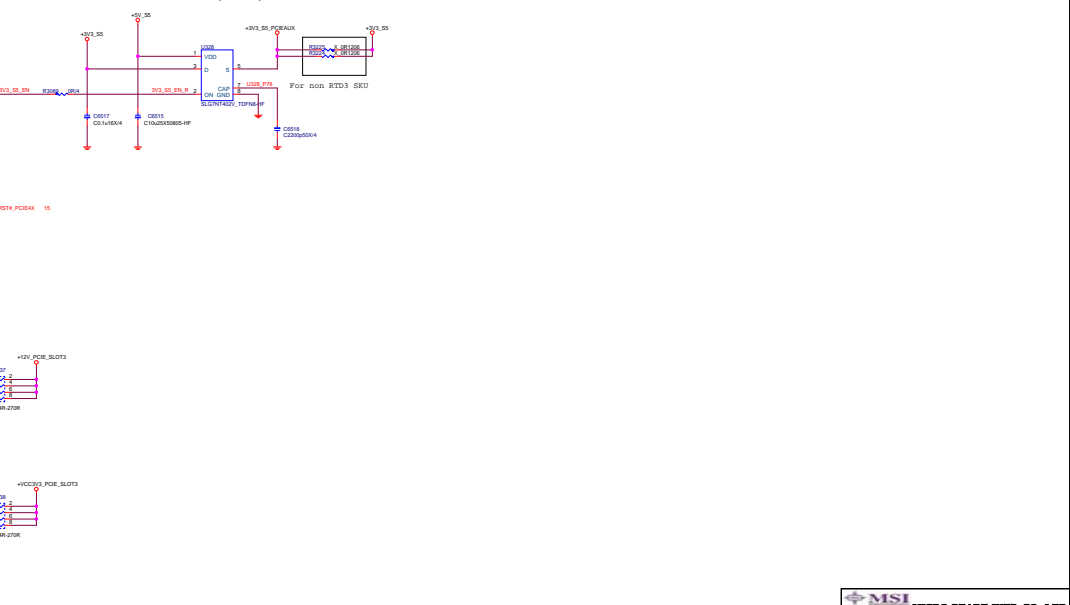
RTD3 FOR PCTEX1



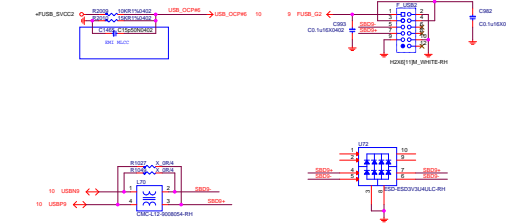
RTD3 FOR PCIEX4



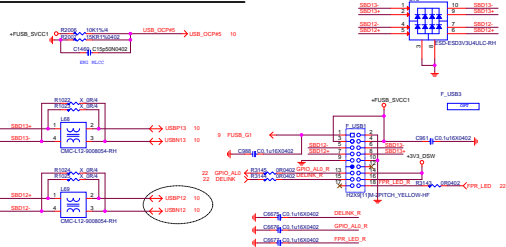
RTD3 FOR PCIEx16/x4/x1



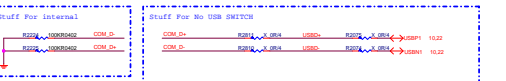
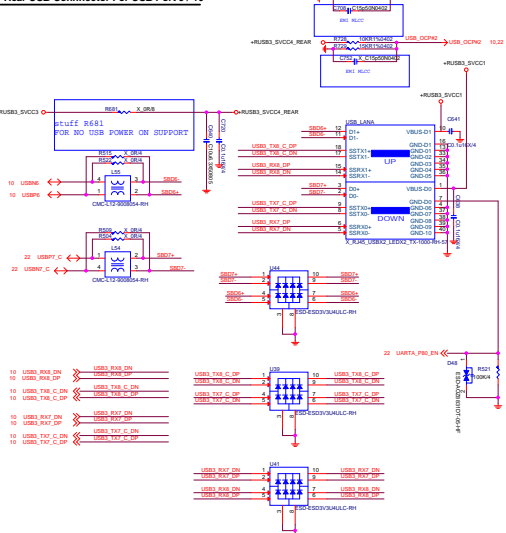
Front Panel USB Connector For USB Port 3 / 4



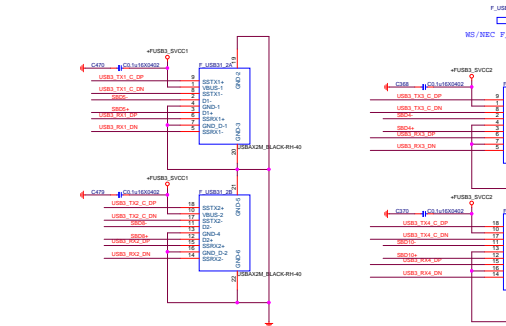
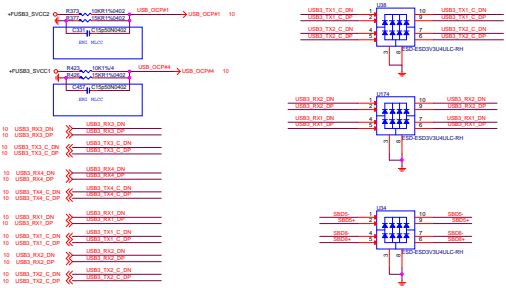
Front Panel USB Connector For USB Port 1/2



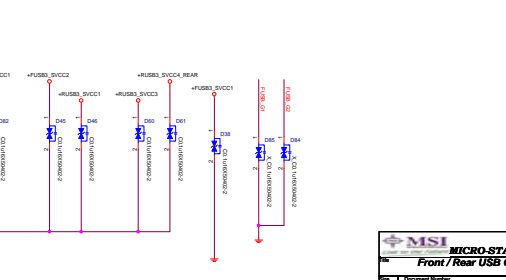
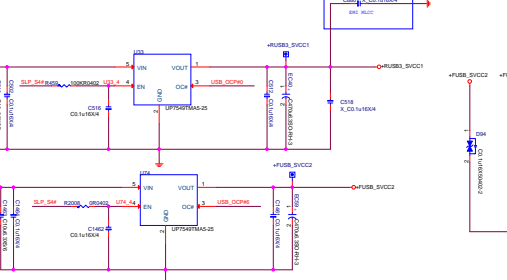
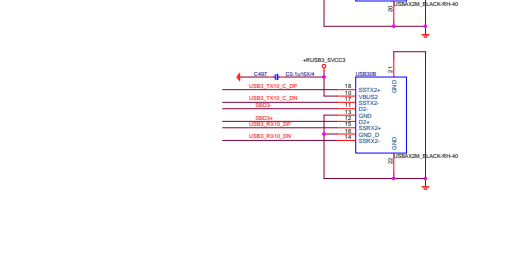
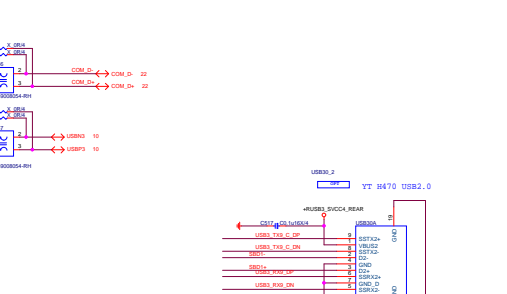
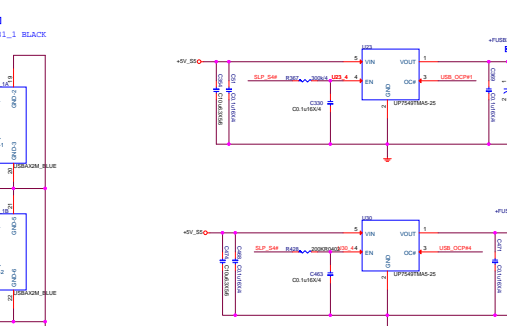
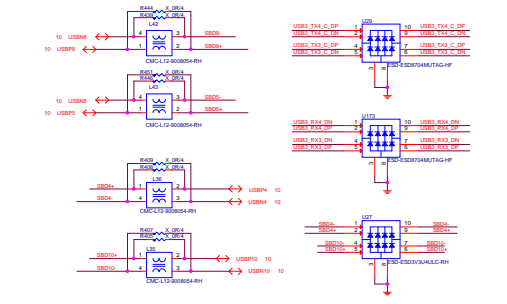
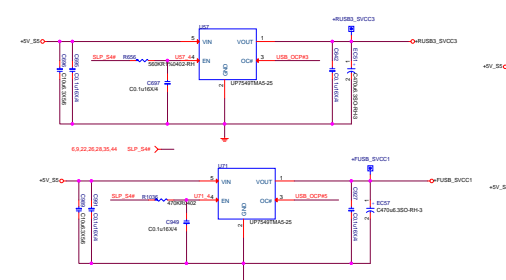
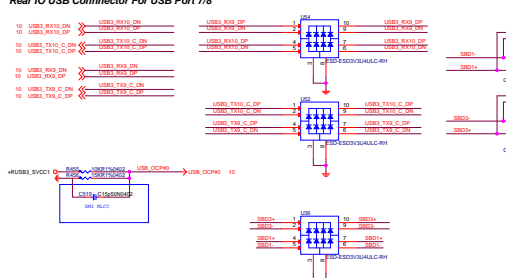
Rear USB Connector For USB Port 9 / 10



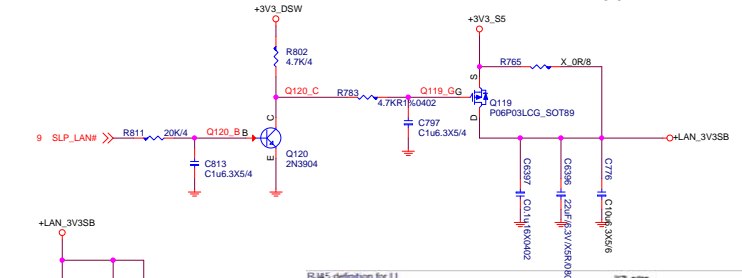
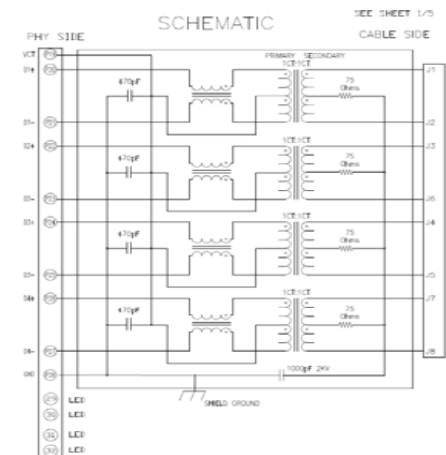
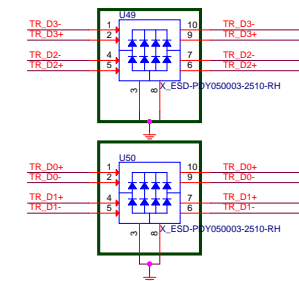
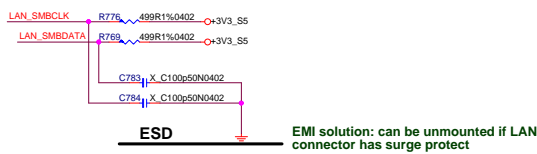
Front IO USB Connector For USB Port 1/2/3/4

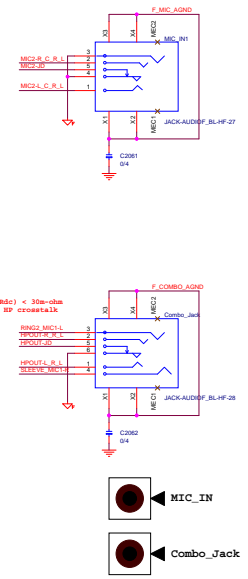
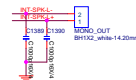


Rear IO USB Connector For USB Port 7/8

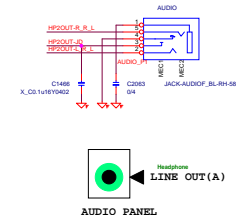
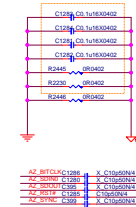


— 3.3V - 1.2A - 4W

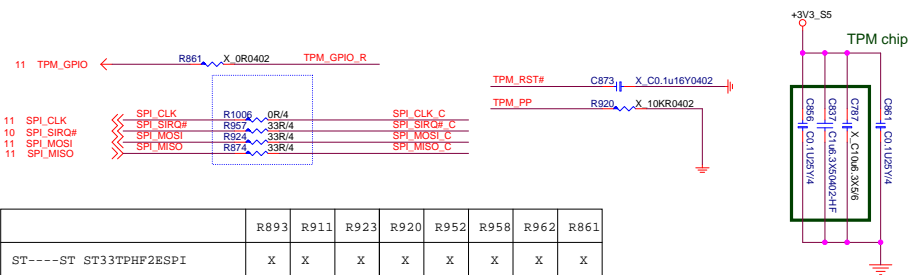
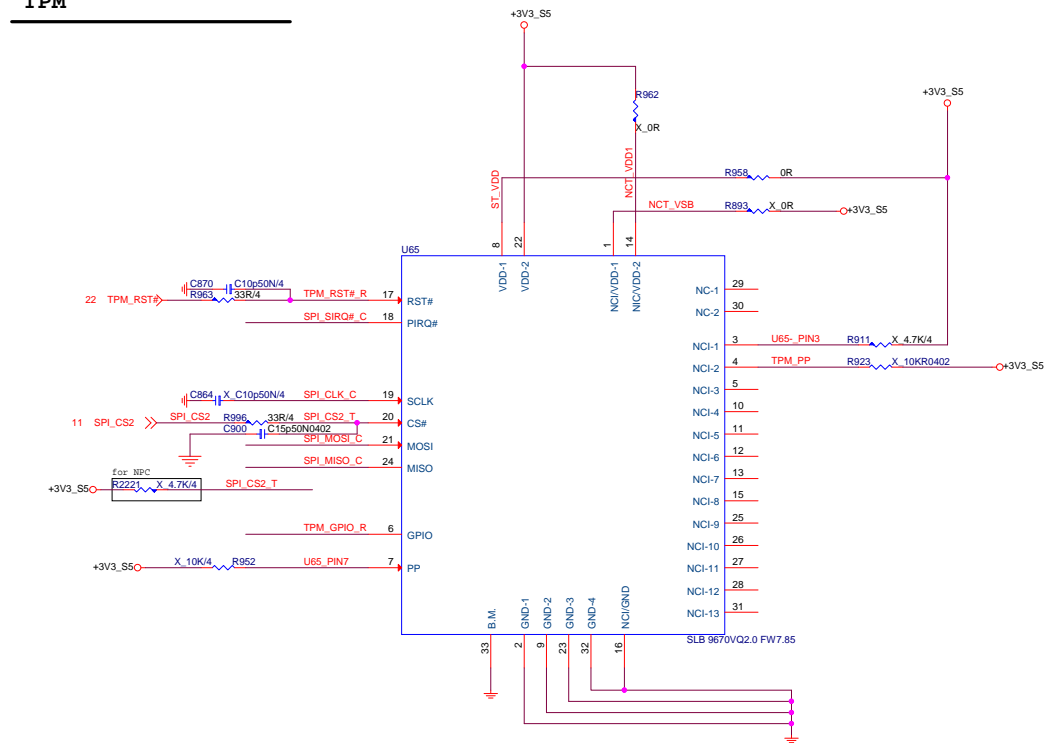
[illegible]



Rear Jack



TPM



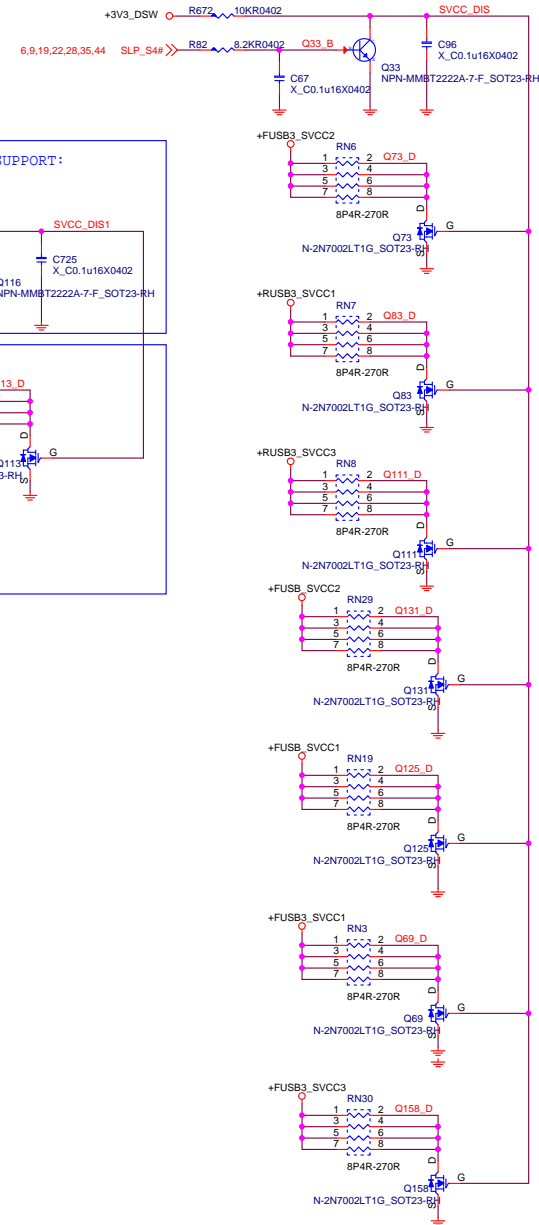
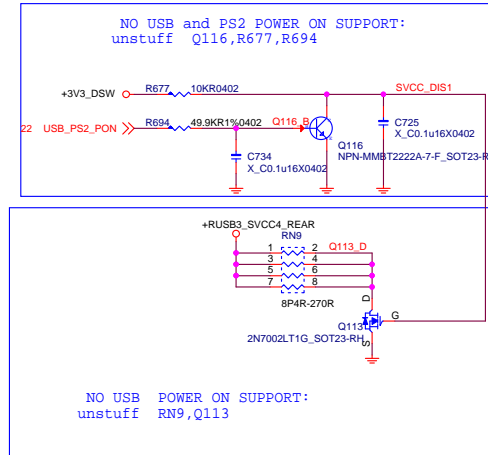
	R893	R911	R923	R920	R952	R958	R962	R861
ST----ST ST33TPHF2ESPI	X	X	X	X	X	X	X	X
Nuvoton----NPCT750LABYX	V	X	X	X	X	V	V	X
Infineon SLB 9670VQ2.0 FW7.85 (SPI)	X	X	X	X	X	V	X	X

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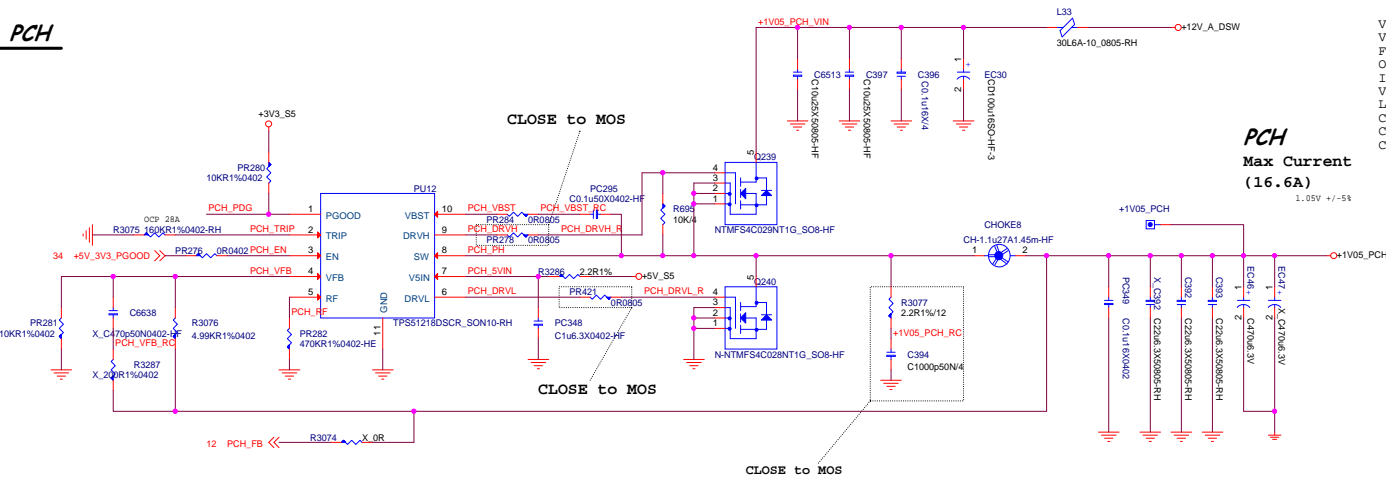
XDP_CPU_PREQ# >>> XDP_CPU_PREQ# 4
 XDP_CPU_PRDY# >>> XDP_CPU_PRDY# 4
 CPU_TCK >>> CPU_TCK 4
 CPU_TDO >>> CPU_TDO 4
 CPU_TDI >>> CPU_TDI 4
 CPU_TMS >>> CPU_TMS 4

CPU_TCK R563 0/4 PCH_JTAGX >>> PCH_JTAGX 9
 CPU_TDI R505 0/4 PCH_JTAGTDI >>> PCH_JTAGTDI 9
 CPU_TMS R506 0/4 PCH_JTAGTMS >>> PCH_JTAGTMS 9
 CPU_TDO R498 0/4 PCH_JTAGTDO >>> PCH_JTAGTDO 9
 XDP_CPU_PRDY# R554 0/4 XDP_PCH_PRDY_N >>> XDP_PCH_PRDY_N 9
 XDP_CPU_PREQ# R553 0/4 XDP_PCH_PREQ_N >>> XDP_PCH_PREQ_N 9

USB power discharge circuit



PCH



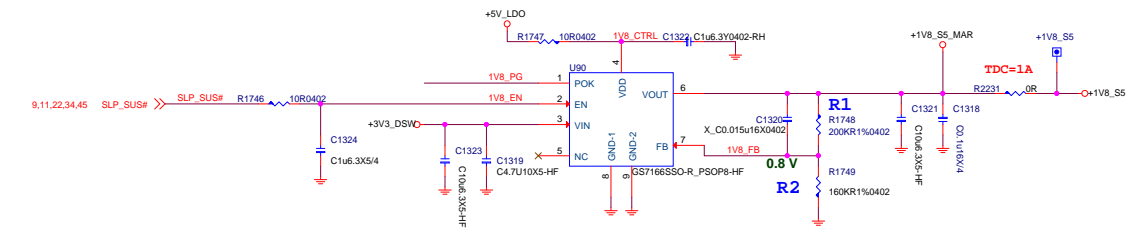
Vo=1.05V
Vin=12V
FS=300KHz
OCP=26.4~35.2A
Iout=17.6A
Vin Irms =4.97A
LIR=16%
Cin CAP=15.61uF
Cout CAP=1729.67uF
Choke=1.1uH/ Isat=27A

PCH
Max Current
(16.6A)

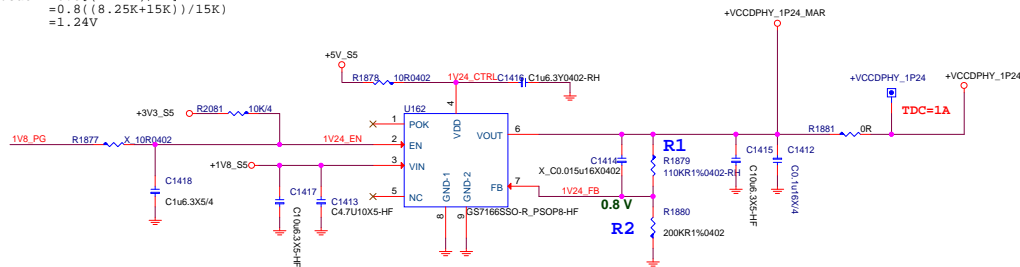
1.05V \pm 5%

+1V8 S5

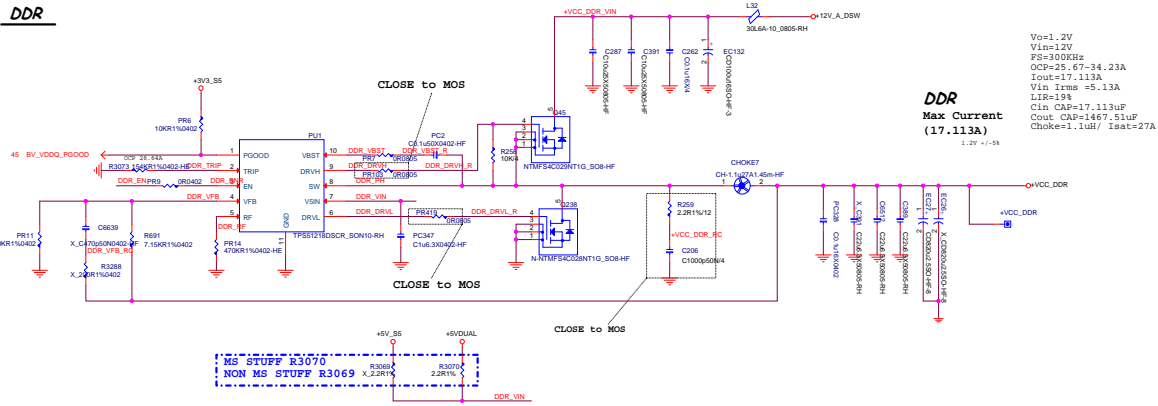
$$\begin{aligned} V_{out} &= 0.8[(R_1+R_2)/R_2] \\ &= 0.8((15K+12K)/12K) \\ &= 1.8V \end{aligned}$$



$$\begin{aligned} V_{out} &= 0.8[(R1+R2)/R2] \\ &= 0.8((8.25K+15K)/15K) \\ &= 1.24V \end{aligned}$$

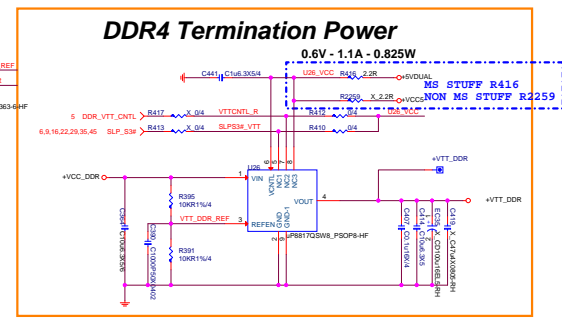
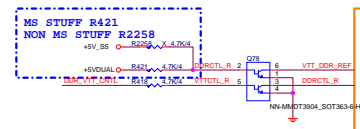


VPP_2.5V

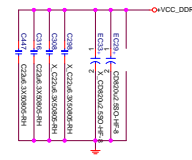


DDR
Max Current
(17.113A)
1.2V +/-5%

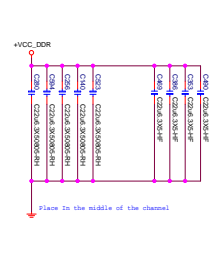
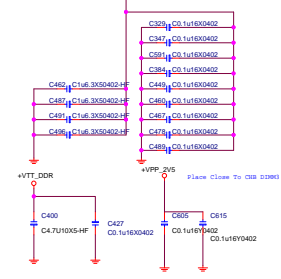
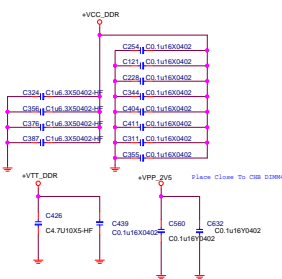
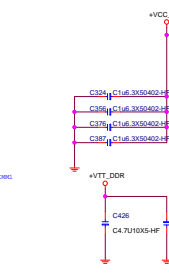
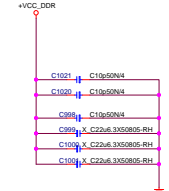
Vo=1.2V
Vin=12V
FS=300KHz
OCP=25.67-34.23A
Iout=17.113A
Vin Irms =5.13A
LIR=19%
Cin CAP=17.113uF
Cout CAP=1467.51uF
Choke=1.1uH/ Isat=27A



DDRIII I/O power decoupling caps.

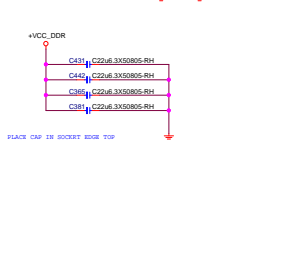
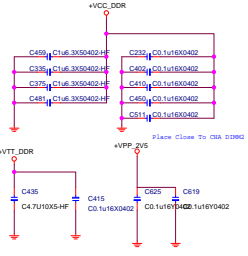
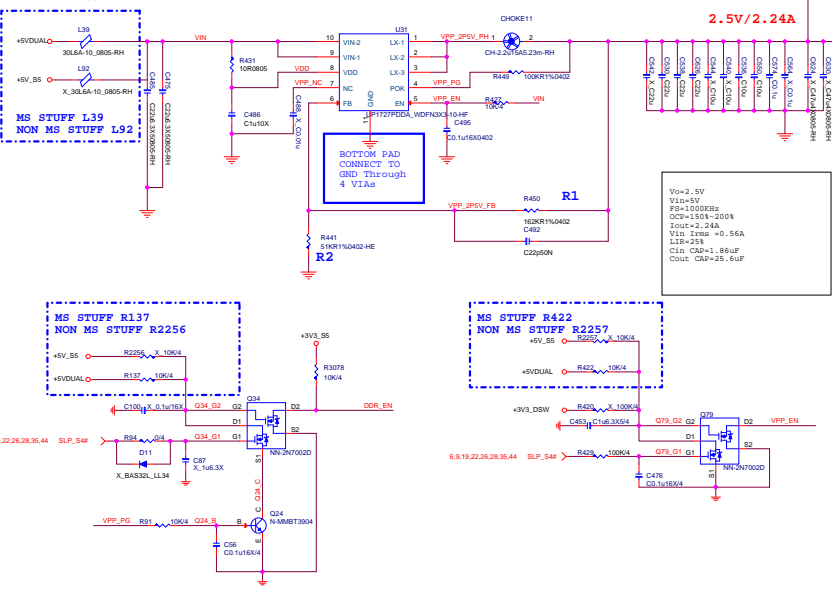


Vo=2.5V
Vin=5V
FS=1000KHz
OCP=4-7A
Iout=2.24A
Vin Irms =1.12A
LIR=25%
Cin CAP=1.867uF
Cout CAP=25.6uF
Choke=2.2uH/ Isat=27A



VPP_2.5V

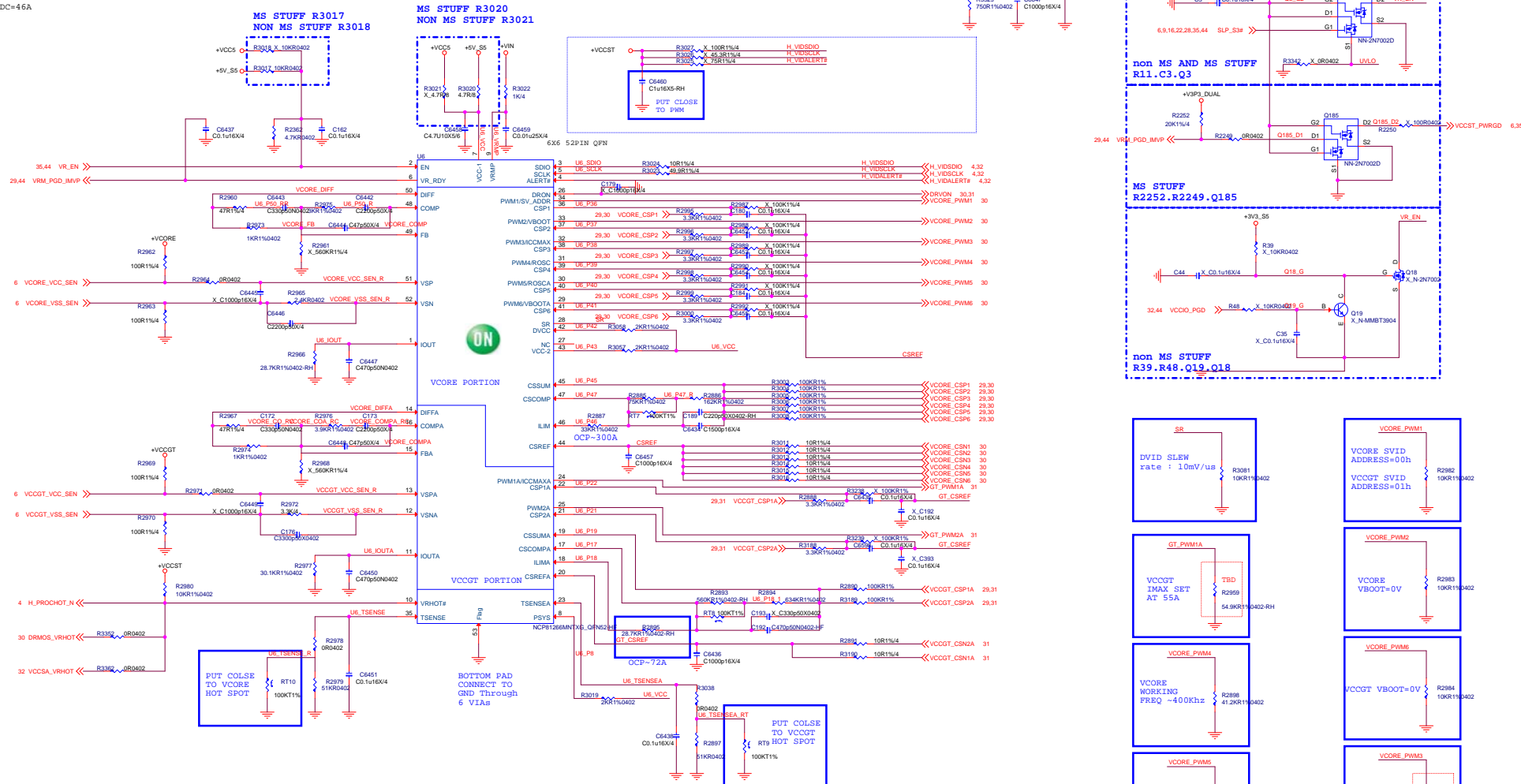
$$\begin{aligned} V_{out} &= 0.6[(R_1+R_2)/R_2] \\ &= 0.6((162K+51K))/51K \\ &= 2.5V \end{aligned}$$



RKL-S CPU power spec
VCORE Iccmax=245A, TDC=185A
Loadline=1.1mohm
VCCGT Iccmax=55A, TDC=46A
Loadline=4mohm

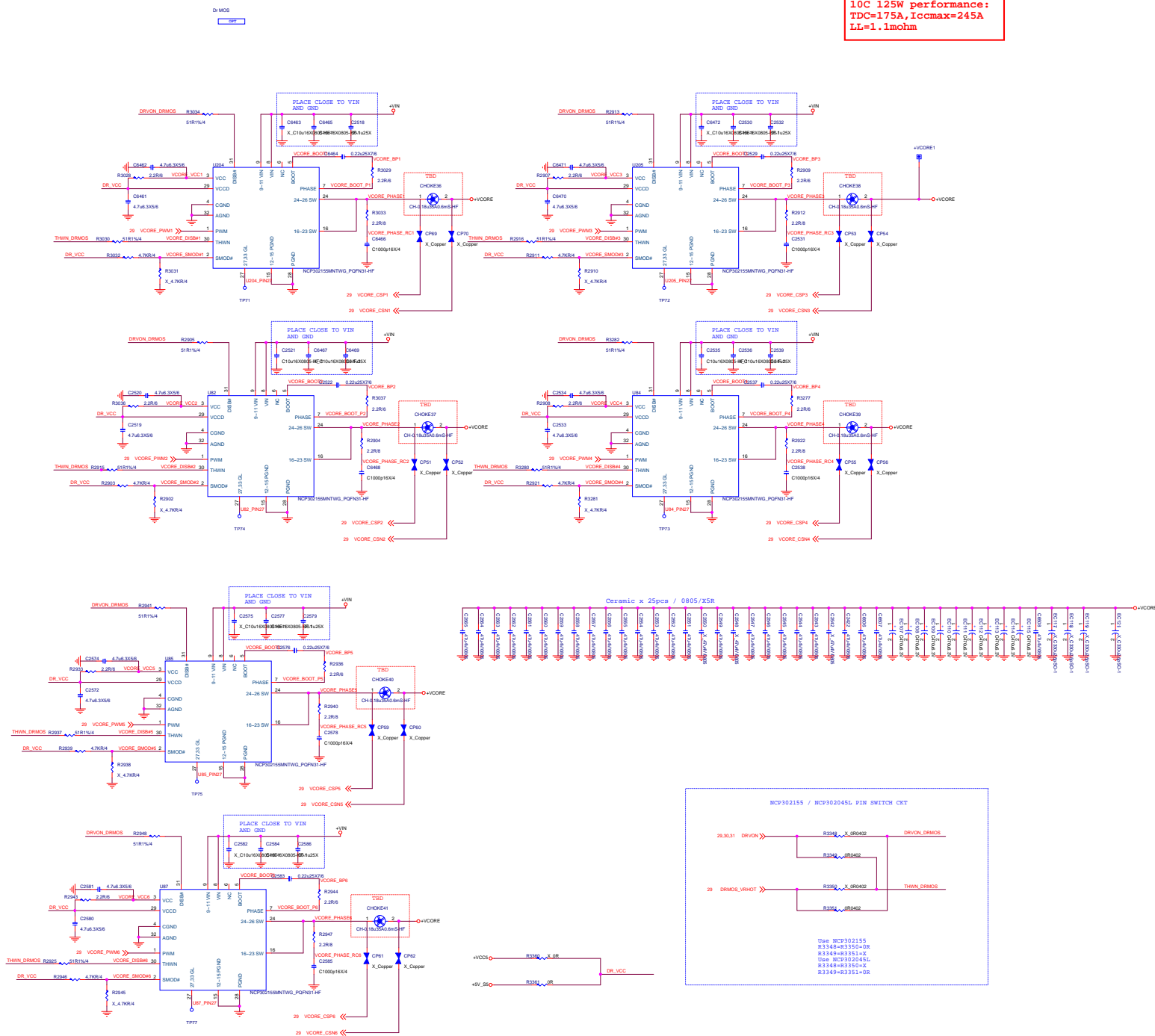
+VIN <10V , PULL LOW VR EN

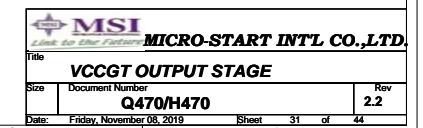
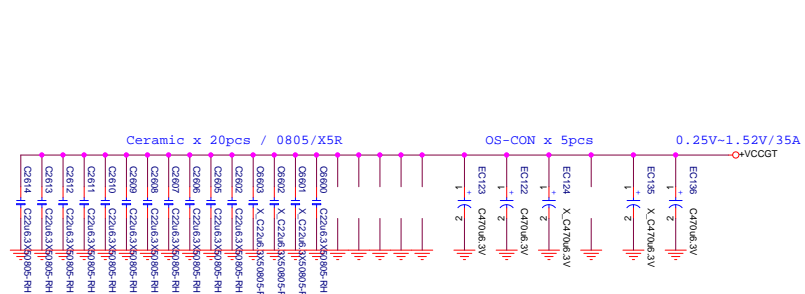
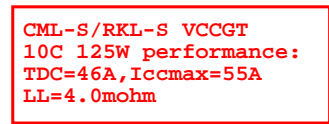
Power Sequence



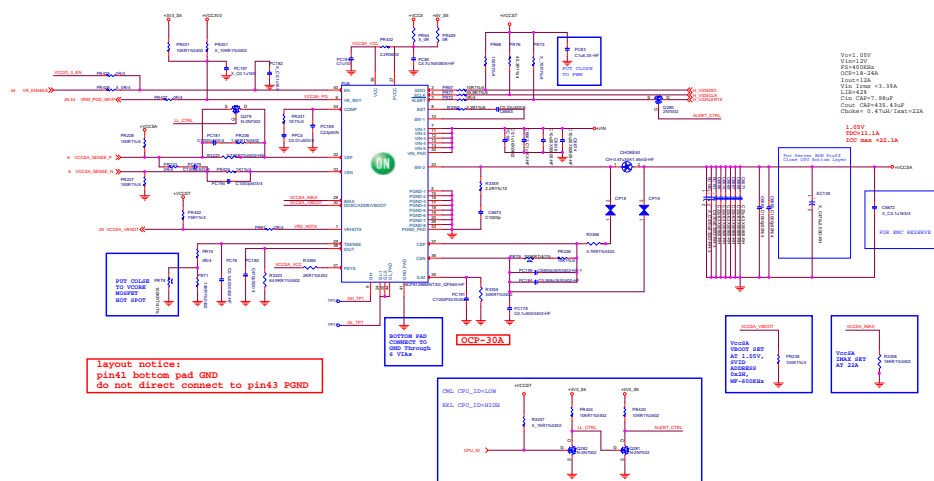
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CML-S VCORE
10C 125W performance:
TDC=175A, Iccmax=245A
LL=1.1mohm



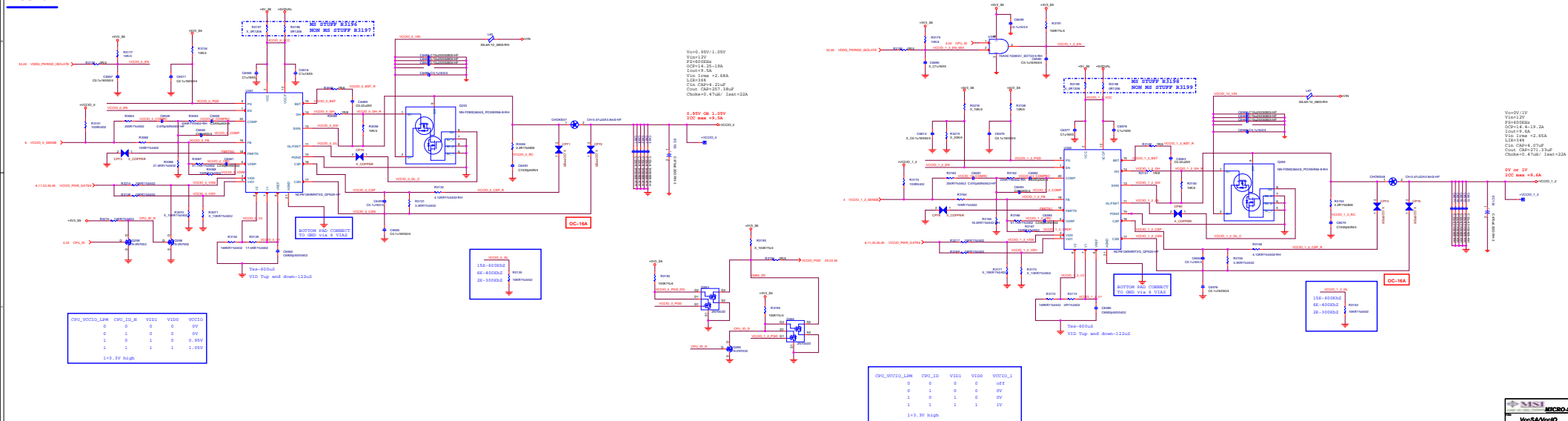


V_{CC}SA POWER CKT

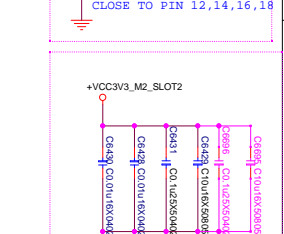
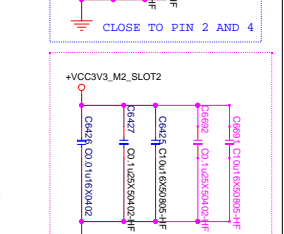
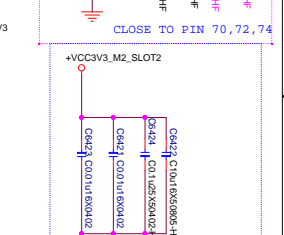
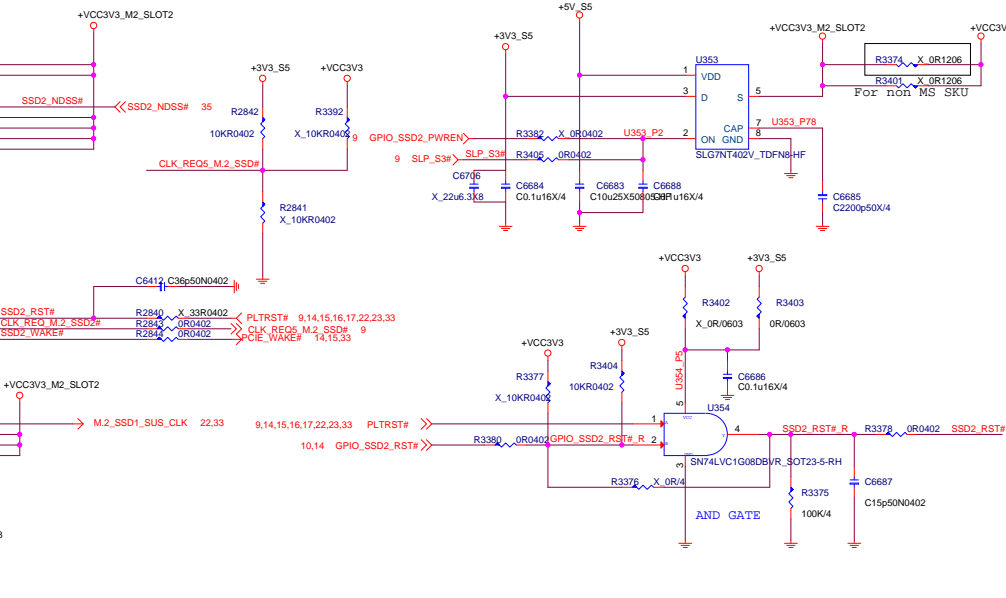
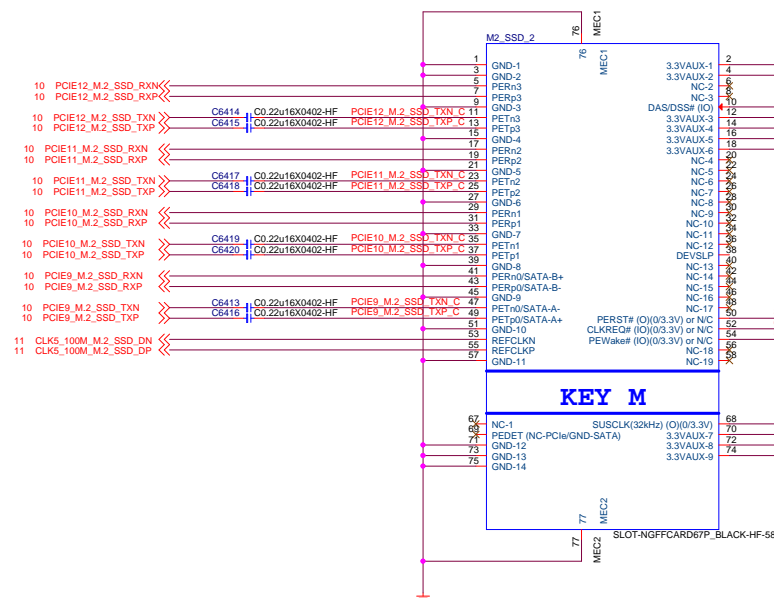
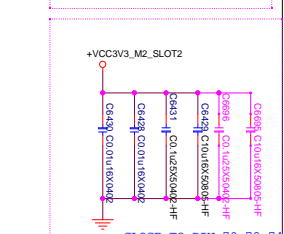
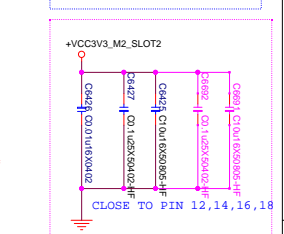
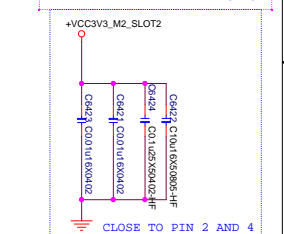
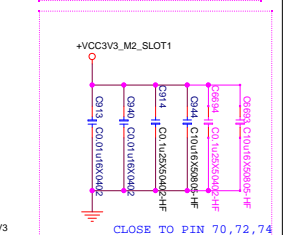
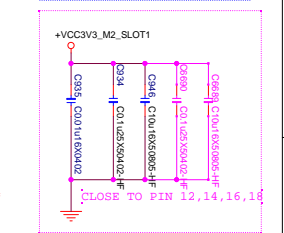
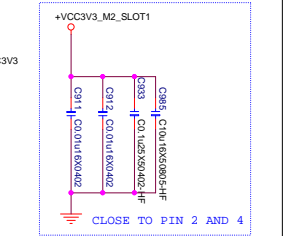
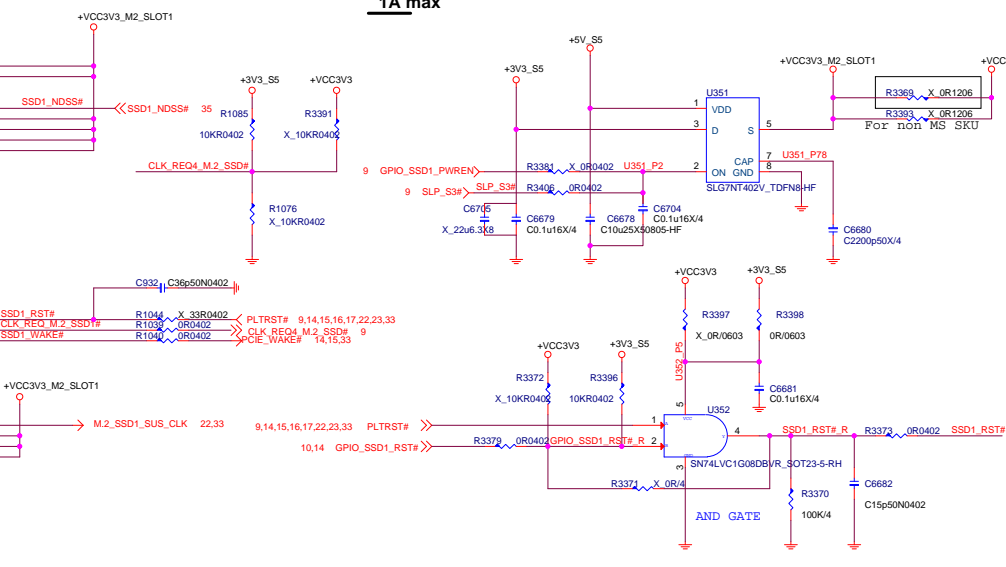
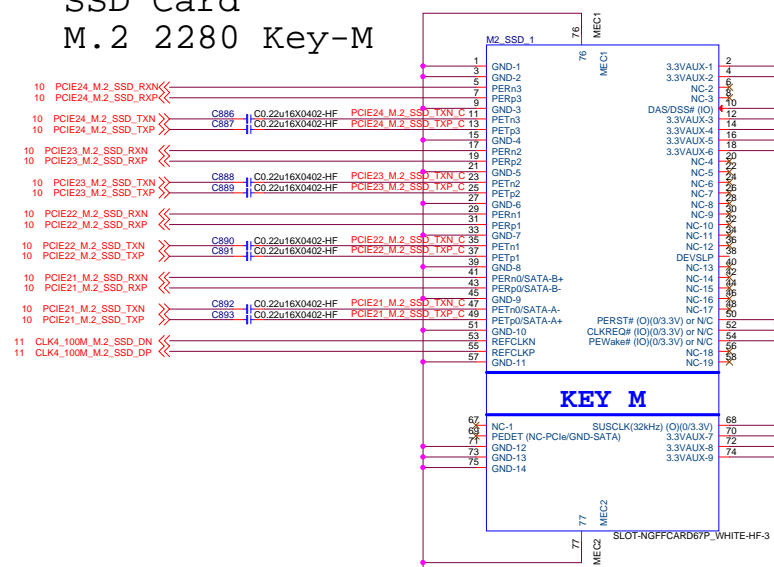


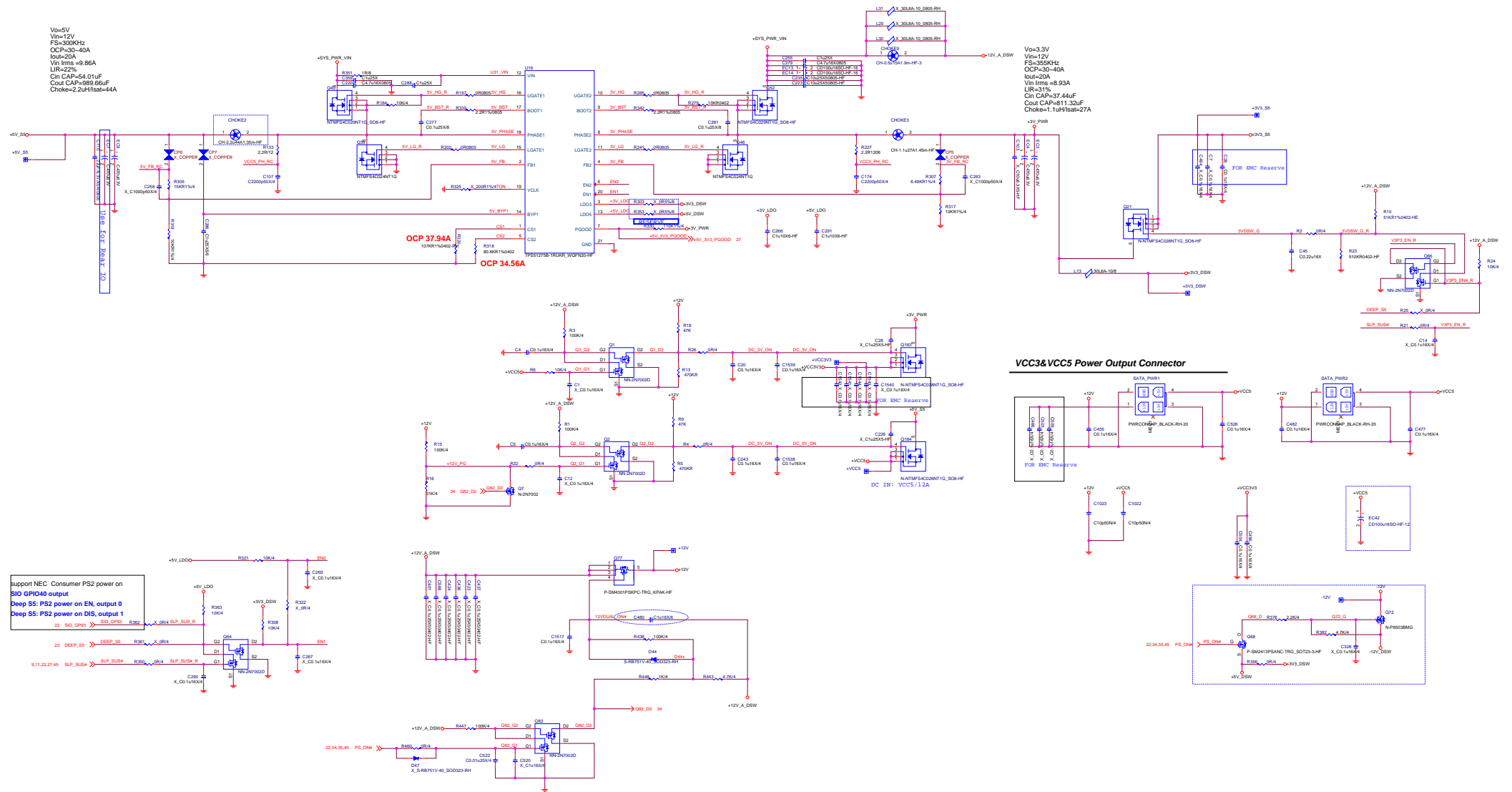
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VCCIO

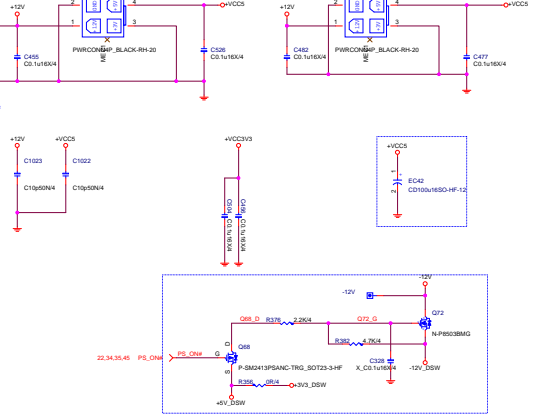


SSD	Card
M.2	2280 Key-M



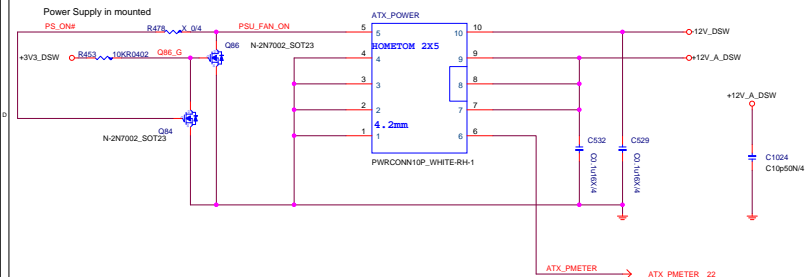


FOR EMC Reserve

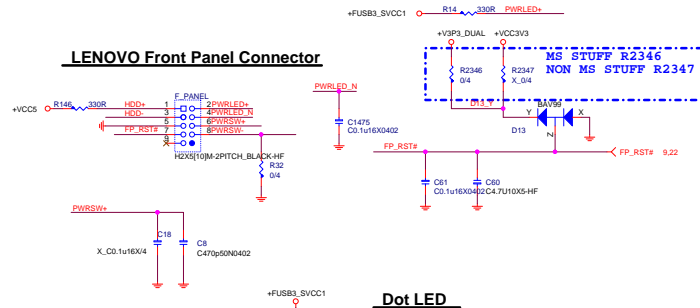


8 Pin ATX Power Connector

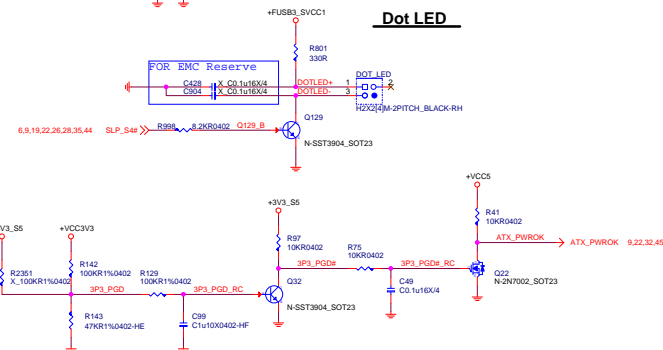
Power Supply in mounted



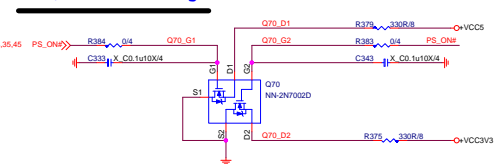
LENOVO Front Panel Connector



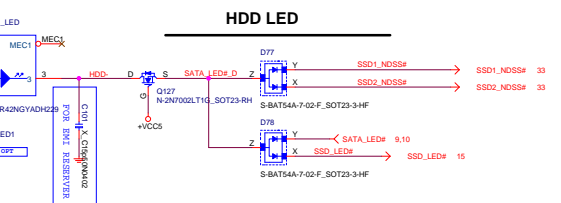
Dot LED



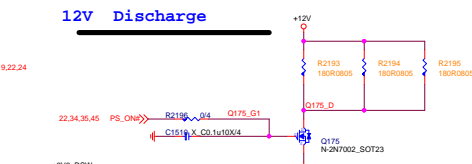
VCC3/VCC5 Discharge



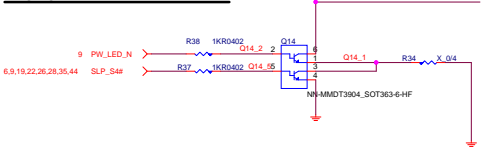
HDD LED



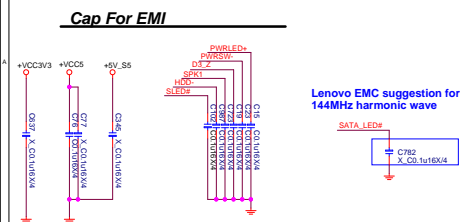
12V Discharge



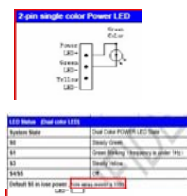
Power LED



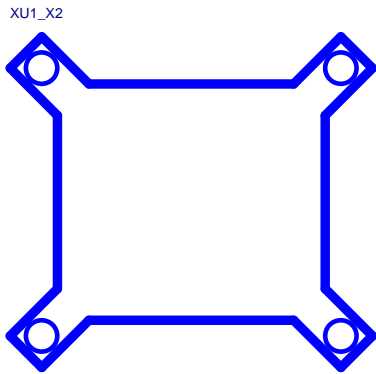
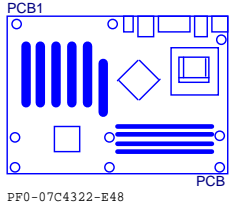
Cap For EMI



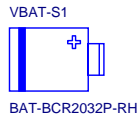
Lenovo EMC suggestion for
144MHz harmonic wave



Manual Parts



X_CPU Backplate



BAT-BCR2032P-RH



USB_LAN



LABEL1



HDMI_LABEL



HDMI_LABEL1



WIN10KEY1



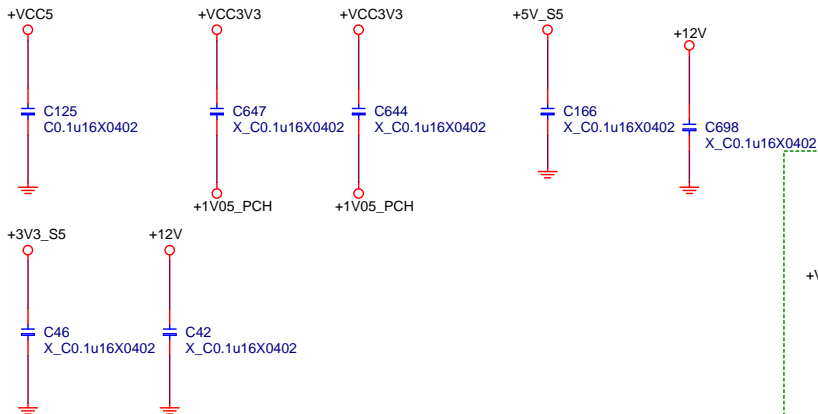
WIN10KEY2



AML_KEY1

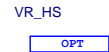
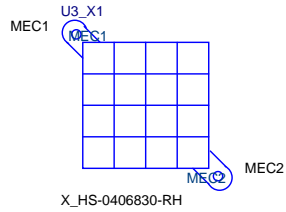
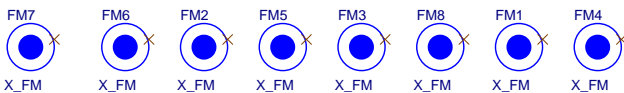
For EMI

For Moat CAP

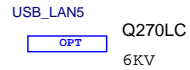


Optics Orientation Holes

Optical Fiducial Marks-120



VR_HS

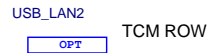


USB_LAN5



Q270LC
6KV

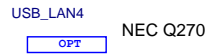
with surge single LED +USB3.0 X2 connector: N58-30F0151-F02



USB_LAN2

TCM ROW

without surge +USB3.0 X2 connector: N58-32F0531-S42



USB_LAN4

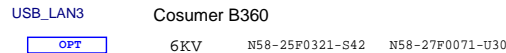
NEC Q270

without surge +USB3.0 X2 connector: N58-32F0221-F02



USB_LAN6

without surge +USB2.0 X2 connector: N58-27F0021-F02

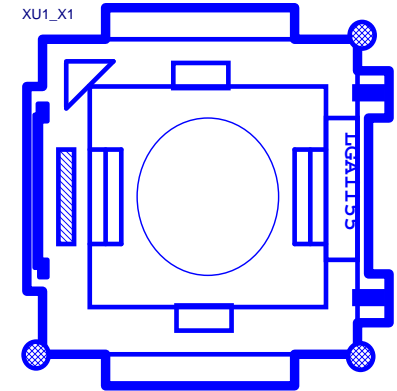
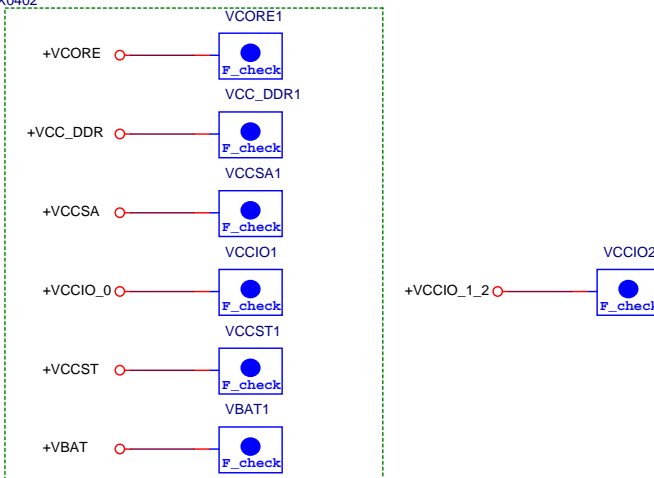


USB_LAN3

Cosumer B360

6KV N58-25F0321-S42 N58-27F0071-U30

with surge single LED +USB2.0 X2 connector: N58-25F0291-F02

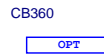


CPU SOCKET

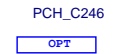
PCH Chipset



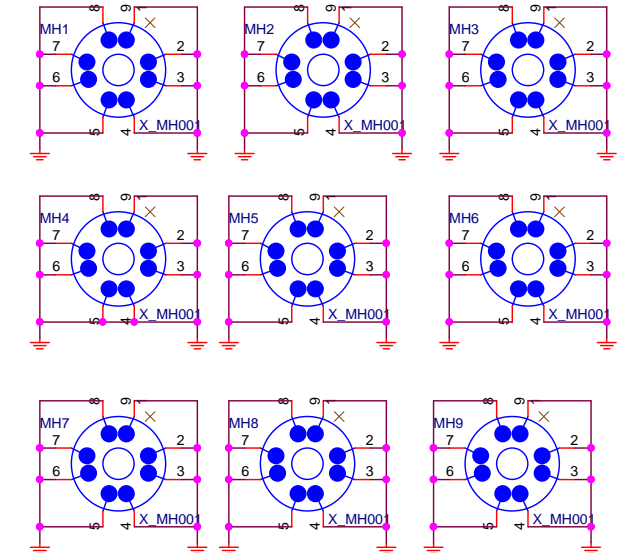
B360TCM




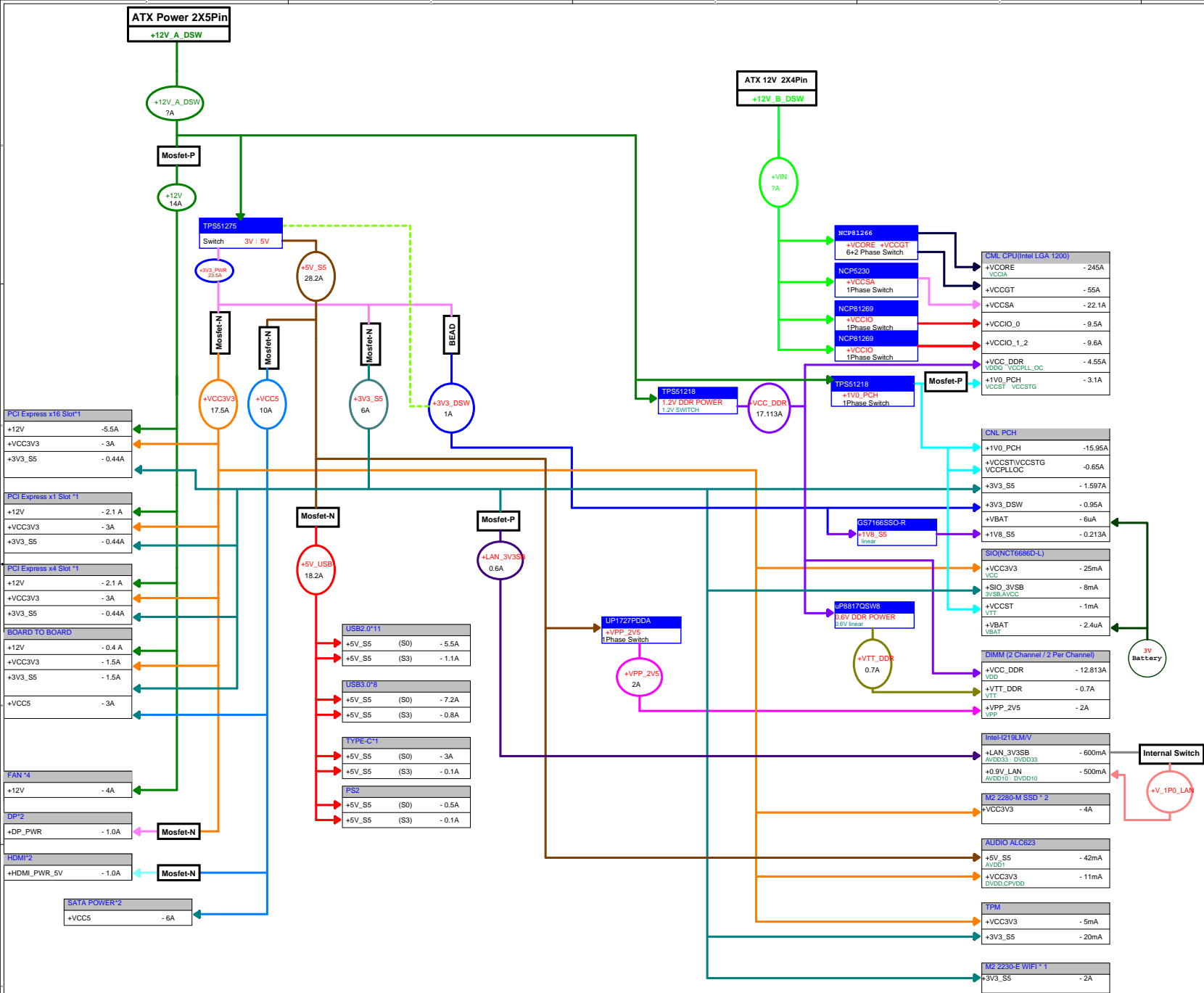
CB360



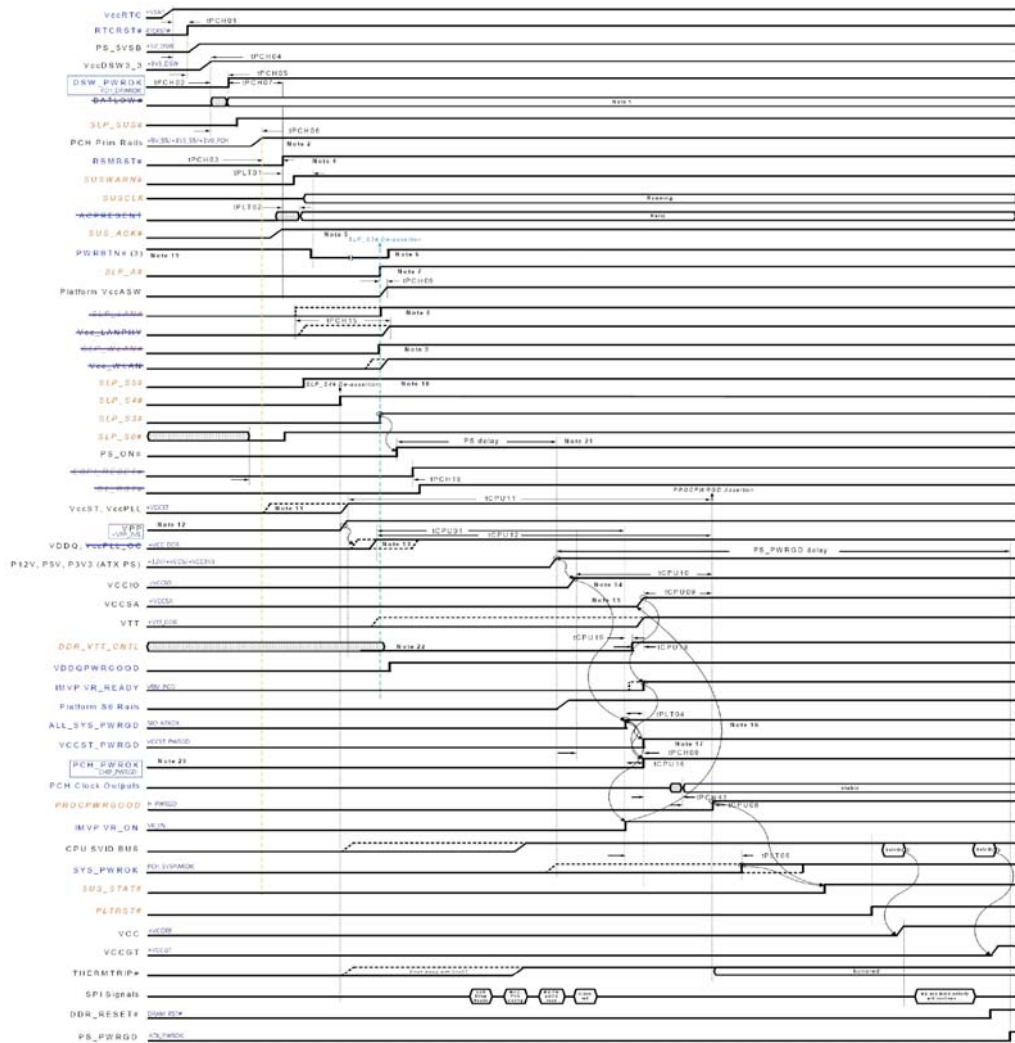
PCH_C246



 MICRO-START INT'L CO.,LTD.		
Title Manual & Option Parts		
Size	Document Number Q470/H470	Rev 2.2
Date:	Friday, November 08, 2019	Sheet 36 of 44

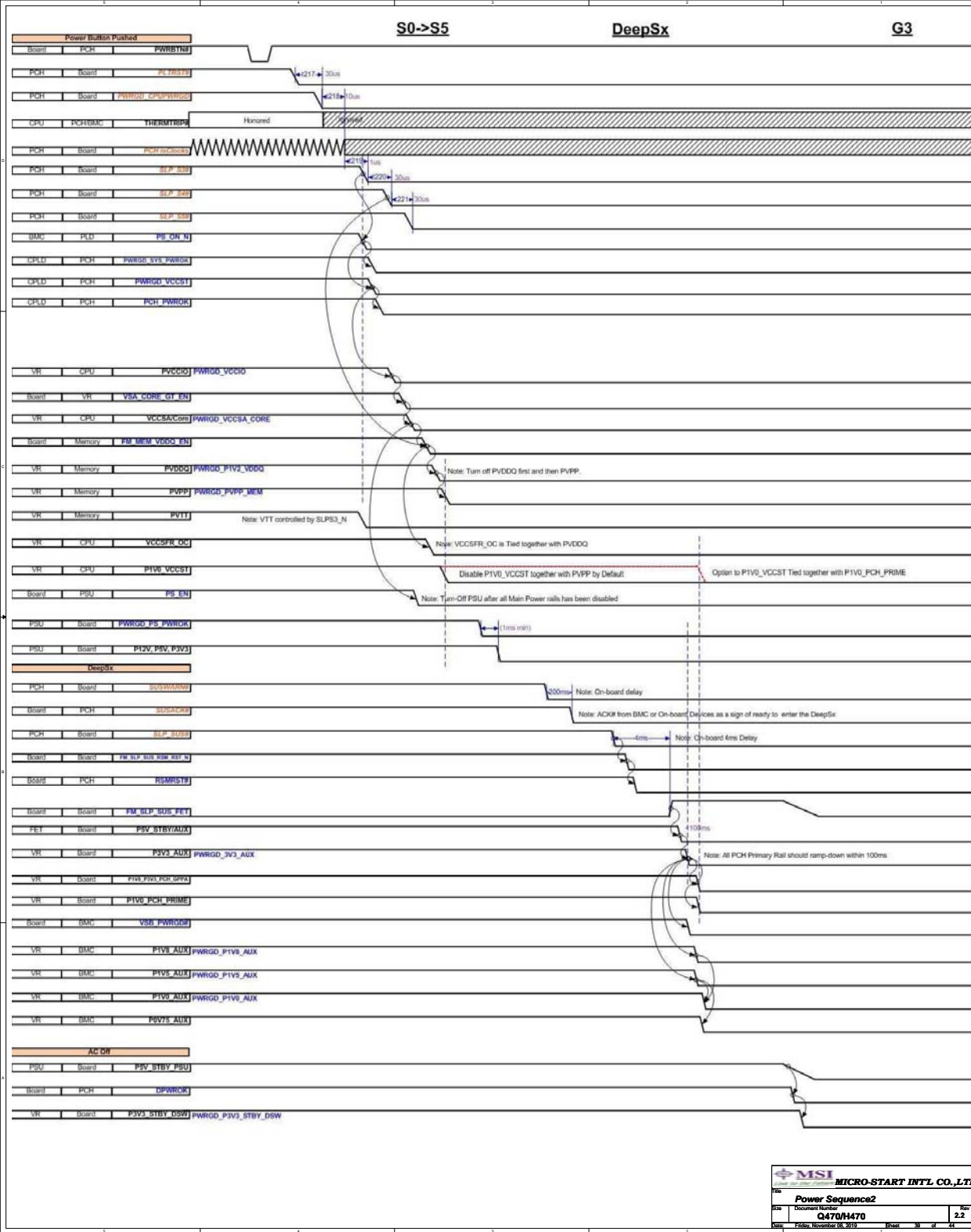


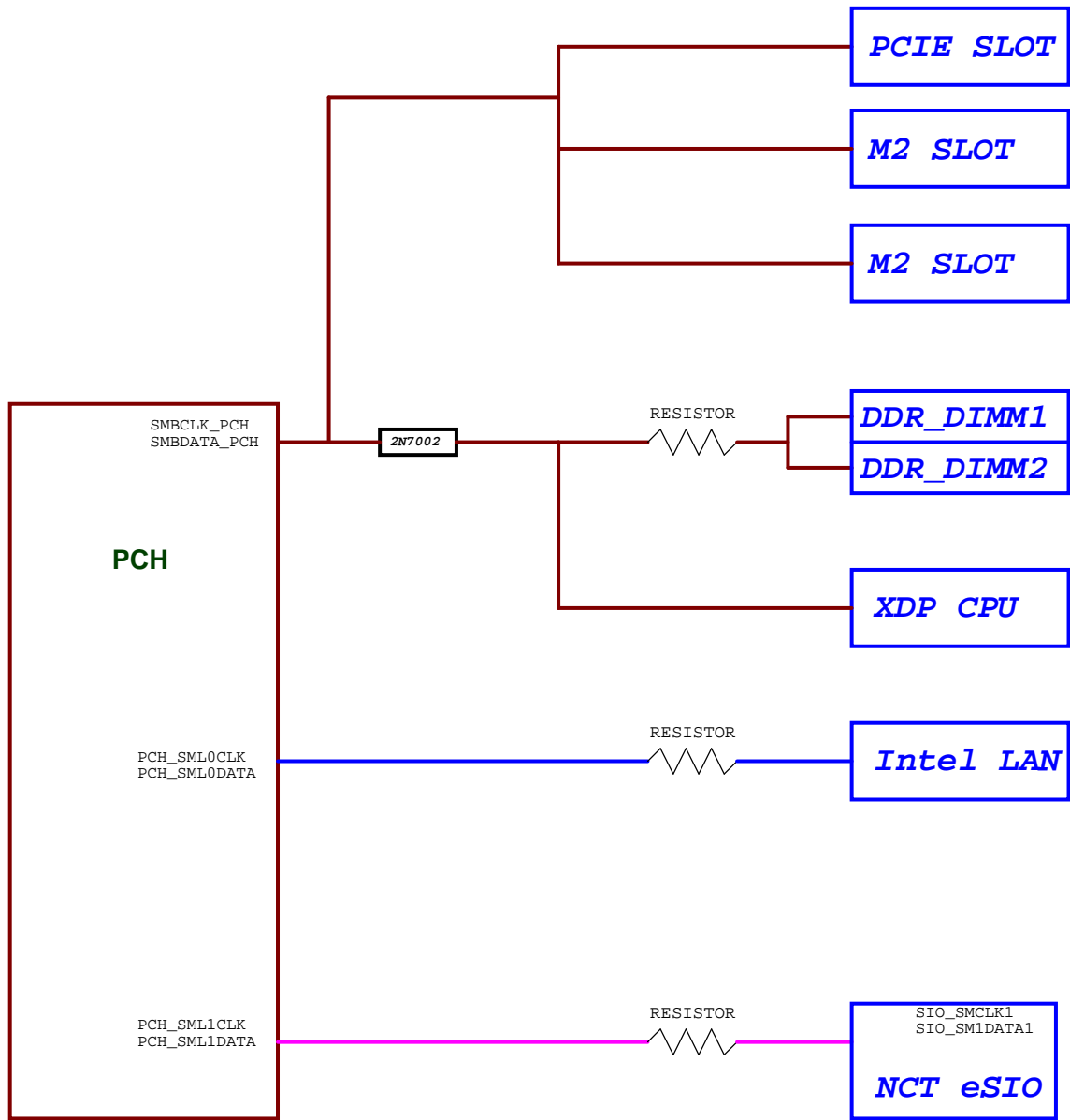
SKL-S Timing Diagram for G3 to S0 [Deep Sx Platform]



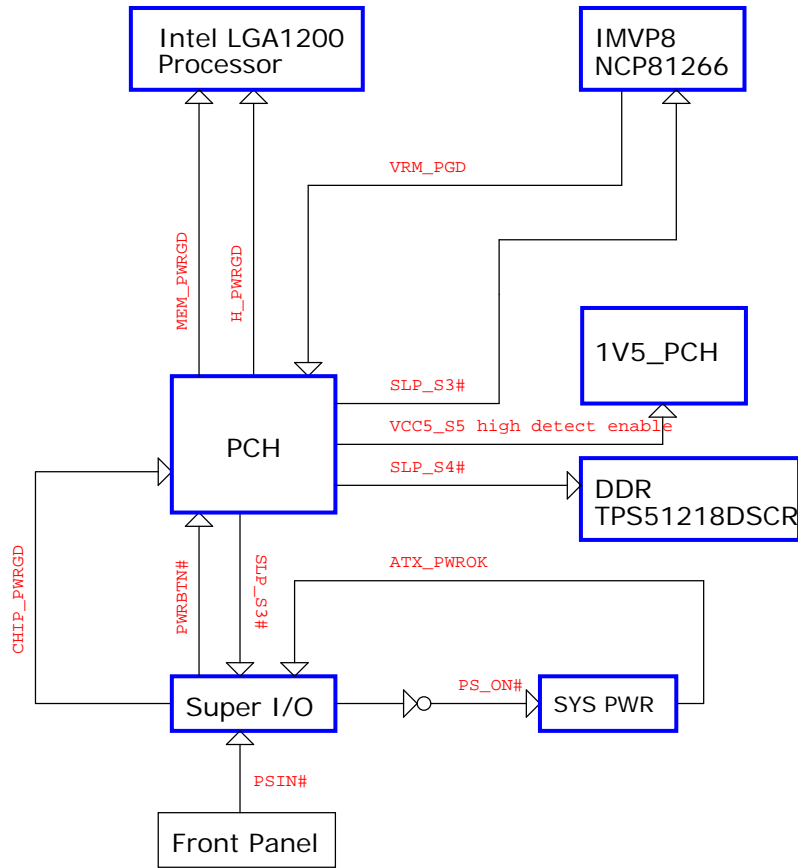
with Deep Sx support

source	destination		G3	DEEP S5	S0
board	PCH	VBAT			
board	PCH	RTCRST#			
PSU	board	+5VSB_DSW			
board	PCH	+3VSB_DSW			
board	PCH	PCH_DPWROK			
PCH	SIO	PCH_SUSWRN#			
SIO	PCH	PCH_SUSACK#			
PCH	SIO	SLP_SUS#			
board	board	+5V_S5			
board	PCH	+3V3_S5			
board	PCH	+1V0_PCH			
SIO	PCH	RSMRST#			

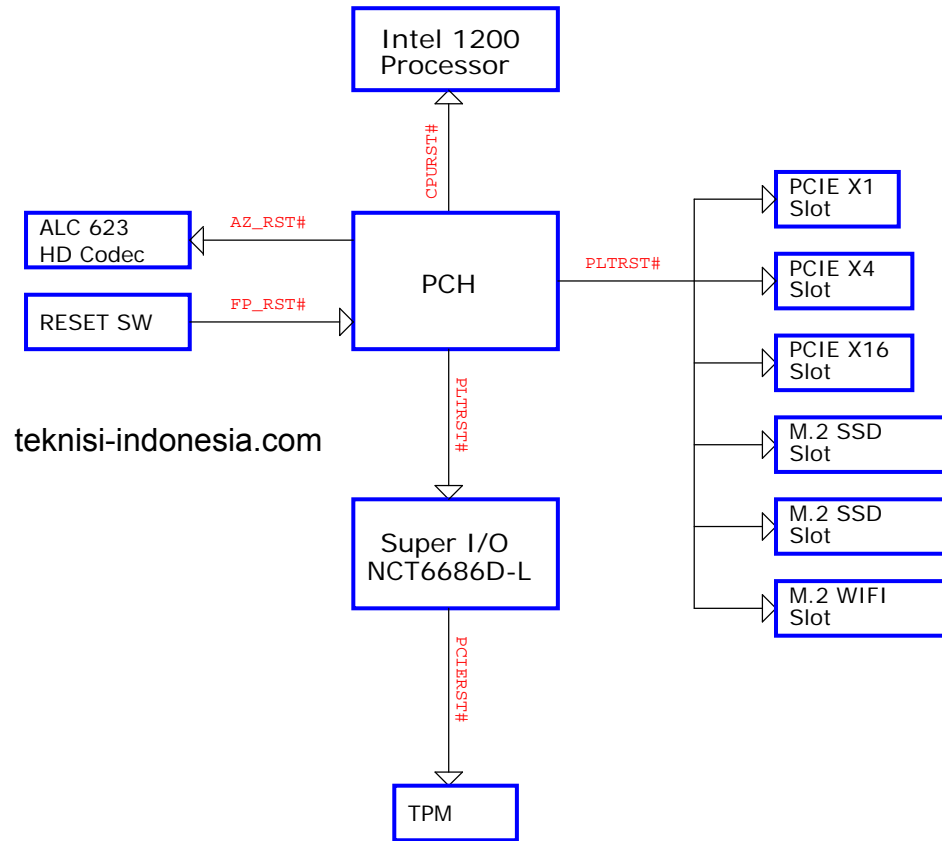




PWROK MAP

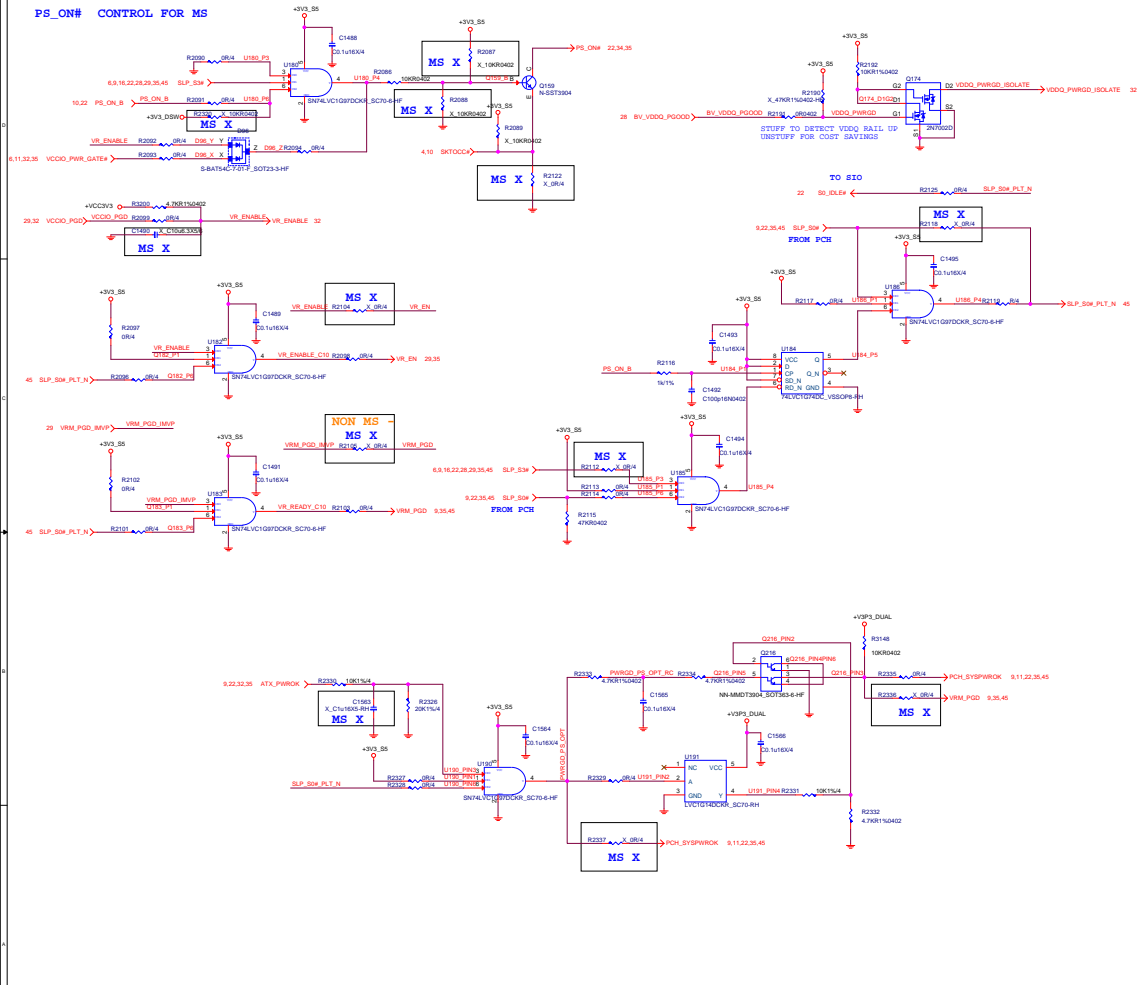


RESET MAP



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PS_ON# CONTROL FOR MS



+3V3_DUAL

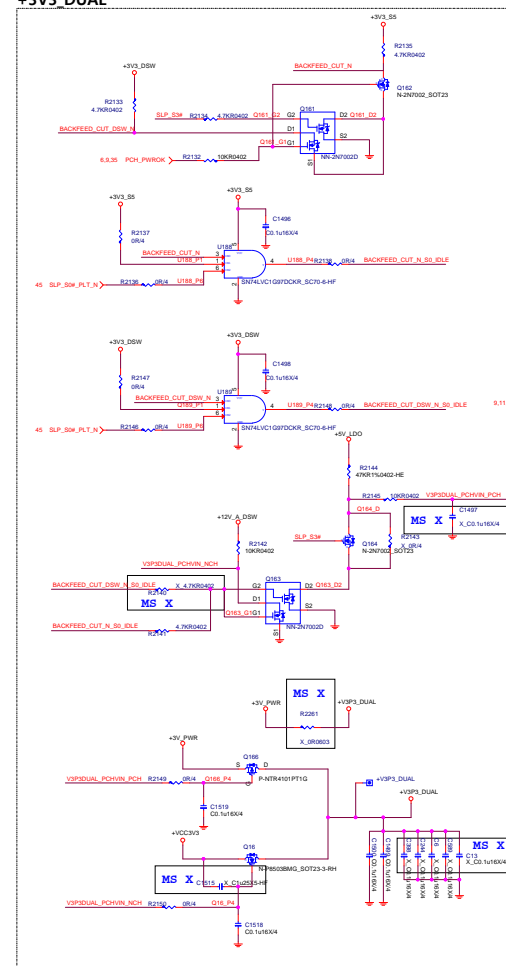
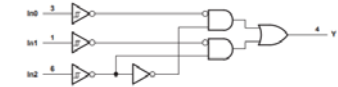


Table 1. FUNCTION TABLE

INPUTS			OUTPUT Y
in2	in1	in0	
L	L	L	L
L	L	H	L
L	H	L	H
L	H	H	H
H	L	L	L
H	L	H	H
H	H	L	L
H	H	H	H

Figure 1. LOGIC DIAGRAM (POSITIVE LOGIC)



+5VDUAL

