MS-7817

mATX
Ver: 10

Intel Sharkbay plamform H81

CPU:

INTEL-Haswell LGA1150

System Chipset:

INTEL-LYNX

Memory:

DDRIII (1333/1666MHz) * 2 (Dual Channel)

PWM:

VRD12 - ISL95812

OnBoard Chipset:

HD Audio Codec:RTL892

LAN-realtek8111G

SIO:NUVOTON 5533D

SPI ROM: 64 MB

Other:

DVI*1
VGA*1
SATA2*2
SATA3*2
FRONT USB2.0 *2
REAL USB2.0 *4
REAL USB3.0 *2

Expansion Slots:

PCI Express (X16) Slot * 1
PCI Express (X1) Slot * 1

MICRO-STAR INT'L CO.,LTD

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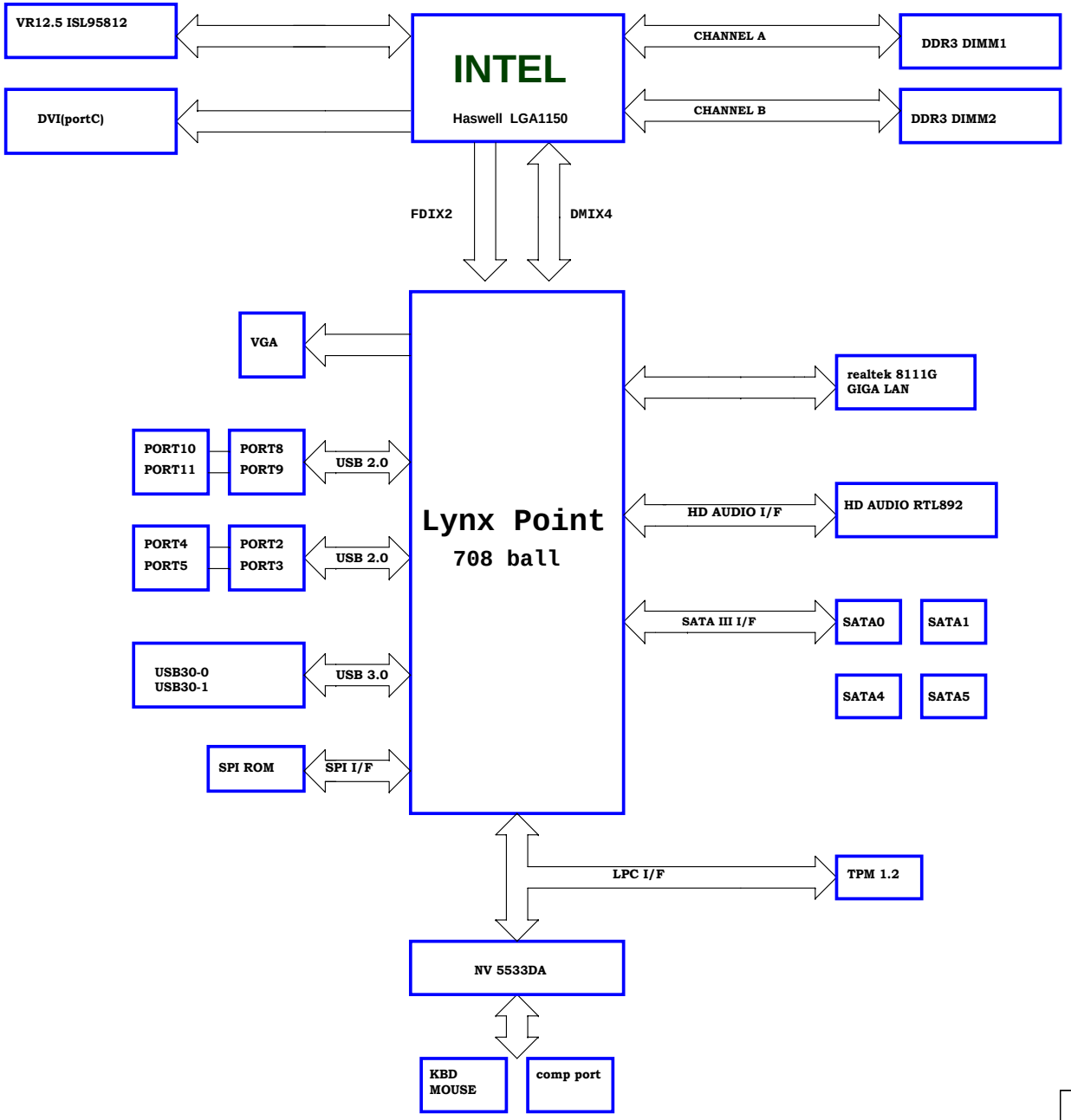
MS-7817 Block Diagram



MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7817	
Size: Custom	Document Description: Block Diagram	Rev: 10
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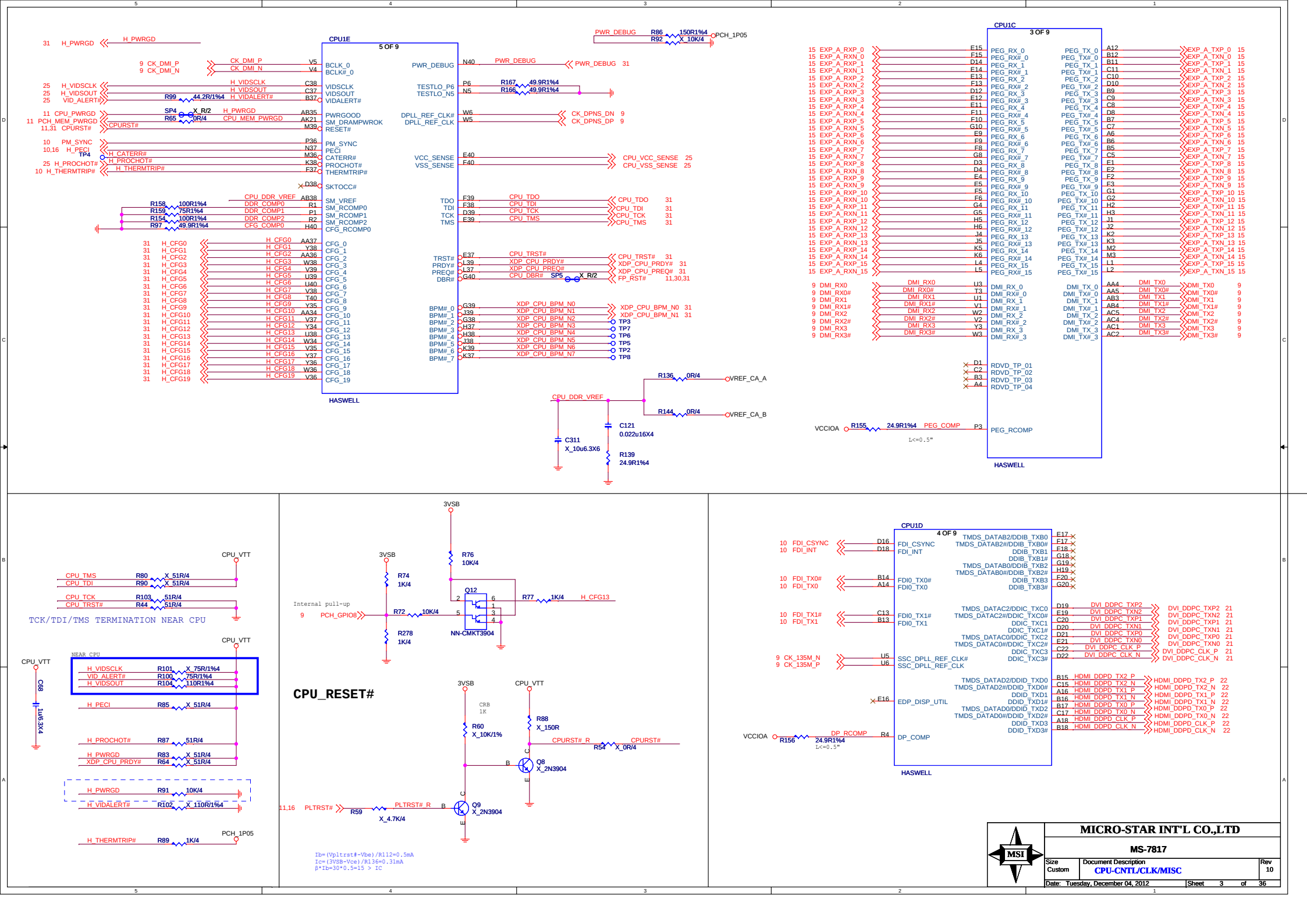
CPU1E
5 OF 9
HASWELL
CPU1C
3 OF 9
HASWELL
CPU1D
4 OF 9
HASWELL
TCK/TDI/TMS TERMINATION NEAR CPU
CPU_RESET#
MICRO-STAR INT'L CO.,LTD
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CPU-CNTL/CLK/MISC
Size
Custom
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10
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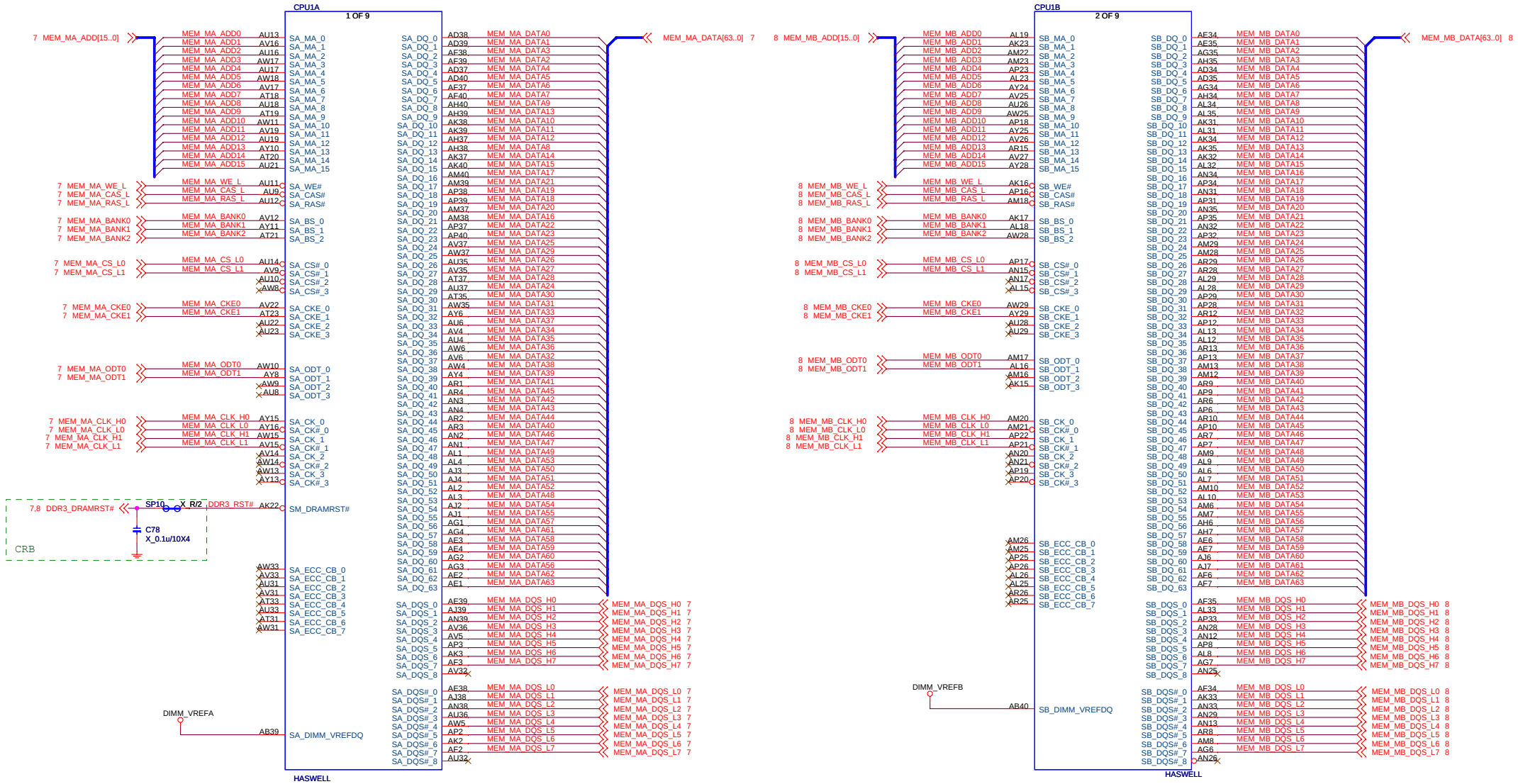

MICRO-STAR INT'L CO.,LTD		
MS-7817		
Size: Custom	Document Description: CPU-Memory	Rev: 10
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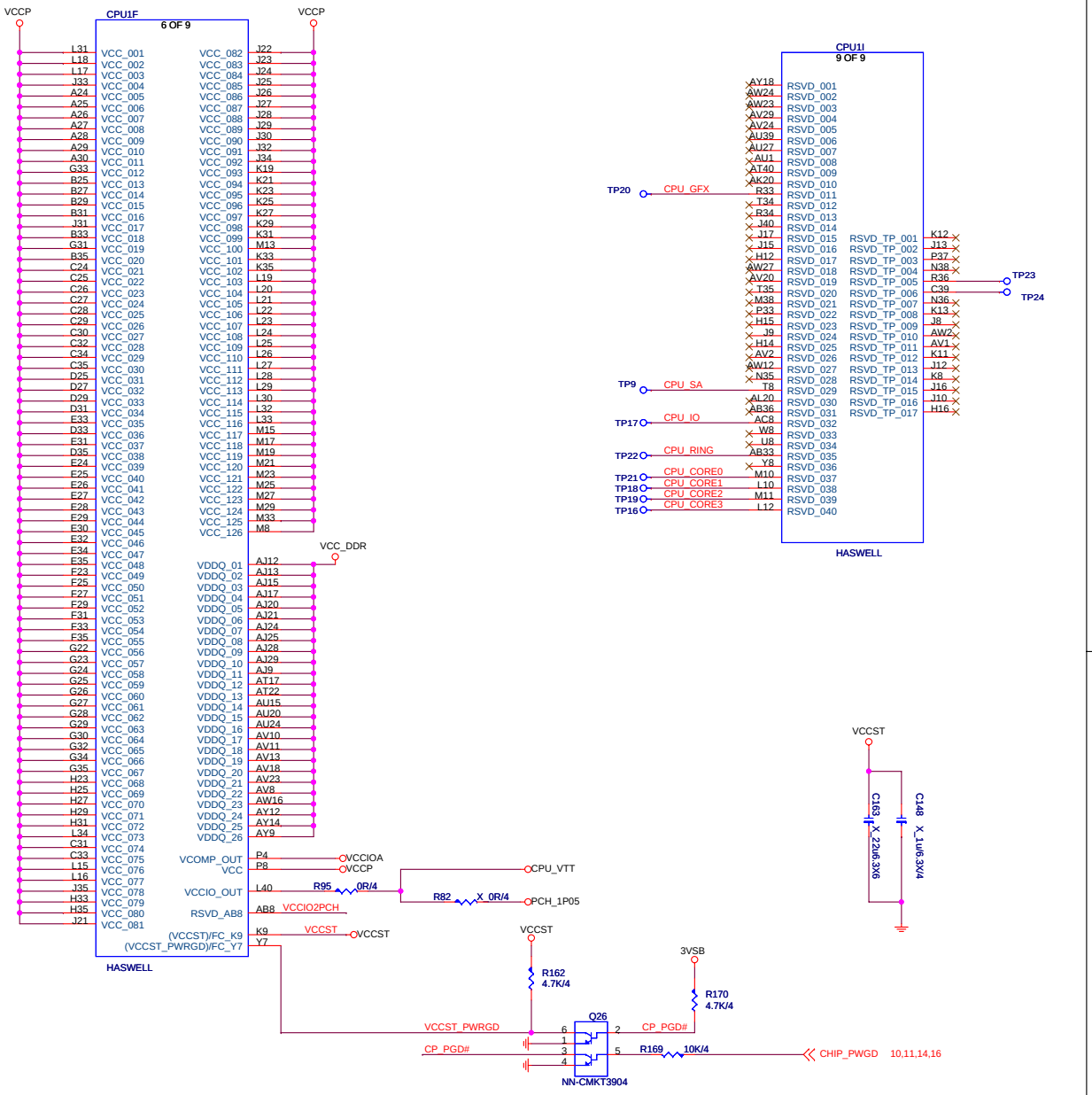
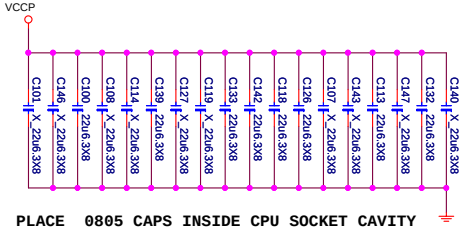
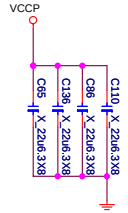


+CPU_VCCP-Decoupling

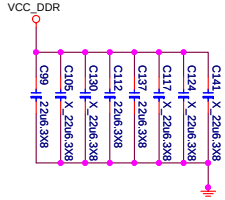


PLACE 0805 CAPS INSIDE CPU SOCKET CAVITY

PLACE 0805 CAPS Near CPU SOCKET edge



+1.5V_DDR3-Decoupling



CPU SOCKET CAVITY CAPS

MICRO-STAR INT'L CO.,LTD		
MS-7817		
Size: Custom	Document Description: CPU-Power	Rev: 10
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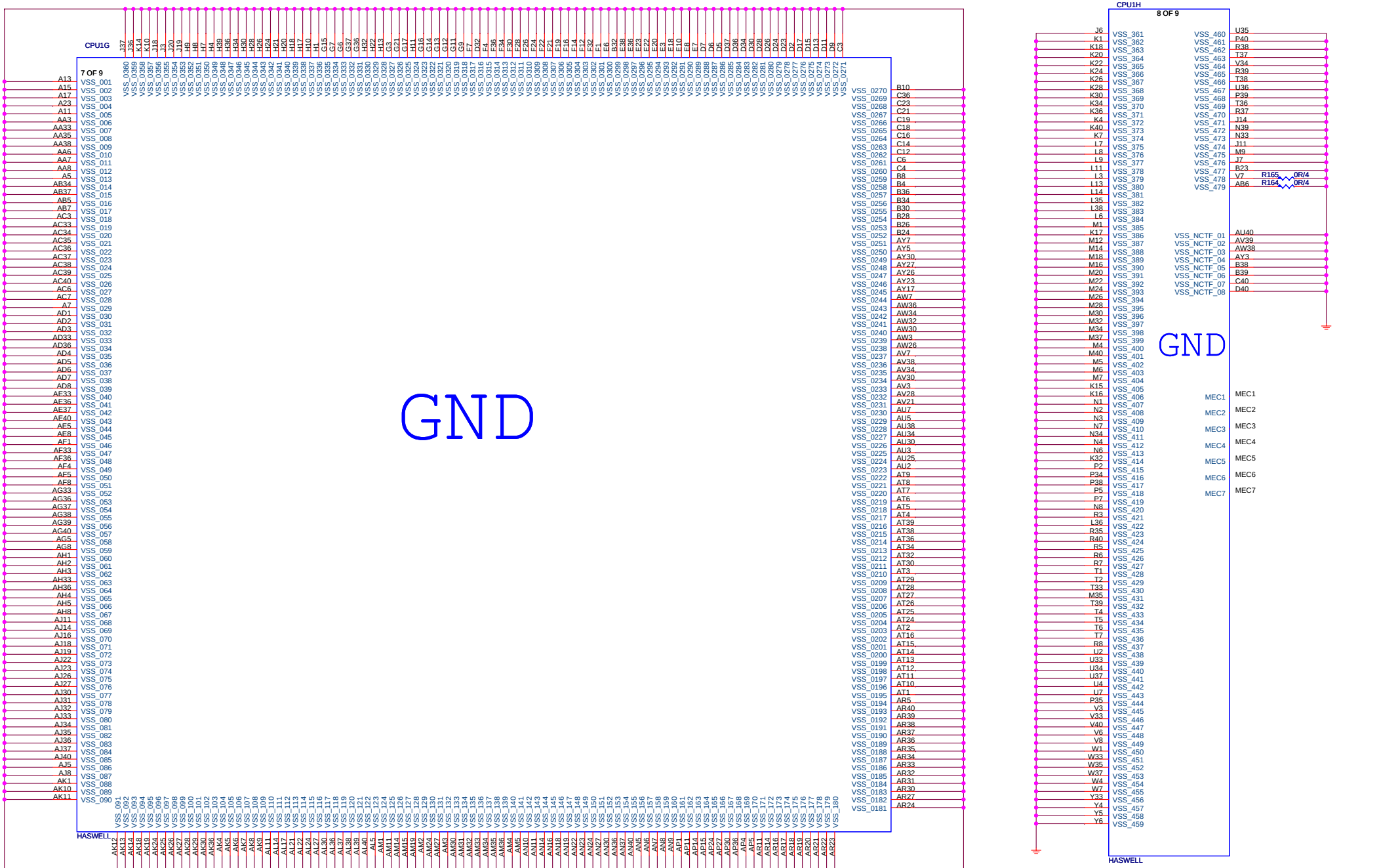

MICRO-STAR INT'L CO.,LTD		
MS-7817		
Size: Custom	Document Description: CPU-GND	Rev: 10
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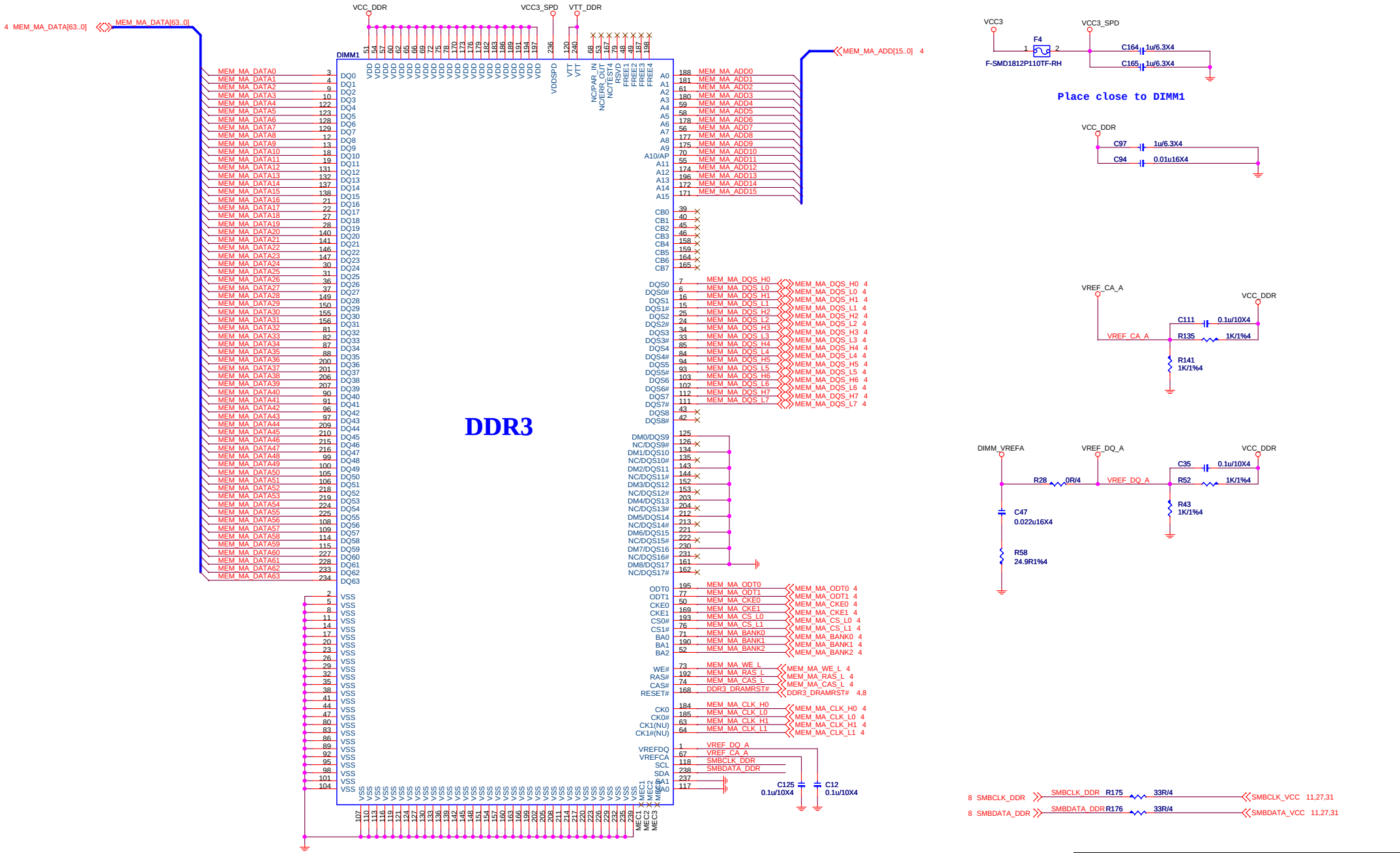

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Size: Custom	Document Description: DDR3 Chanel-A DIMM1/2
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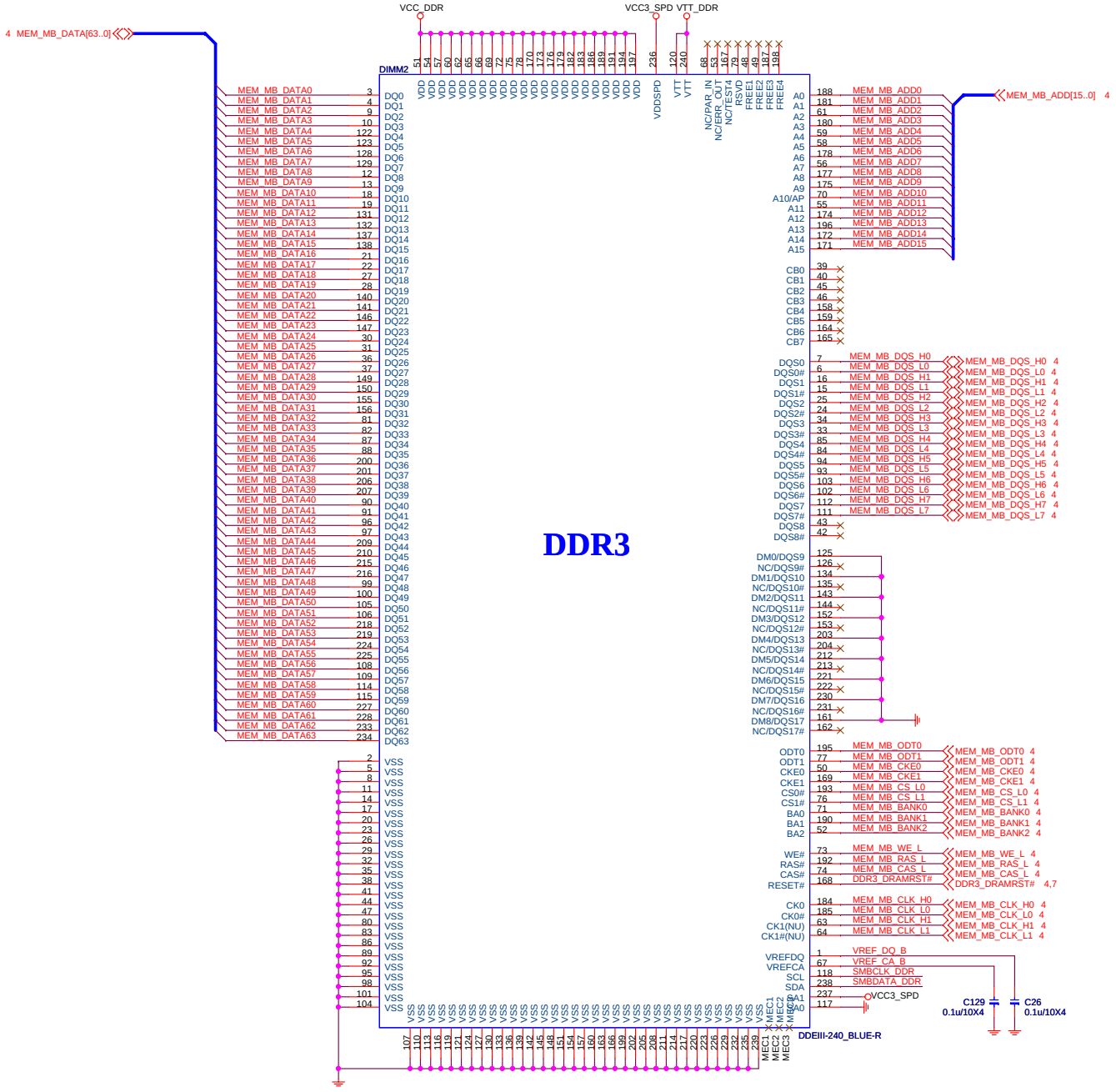
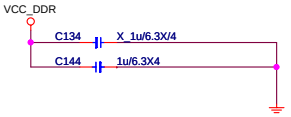
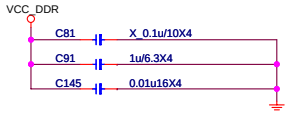
DDRIII DIMM_B0

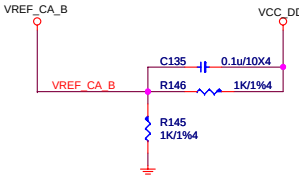


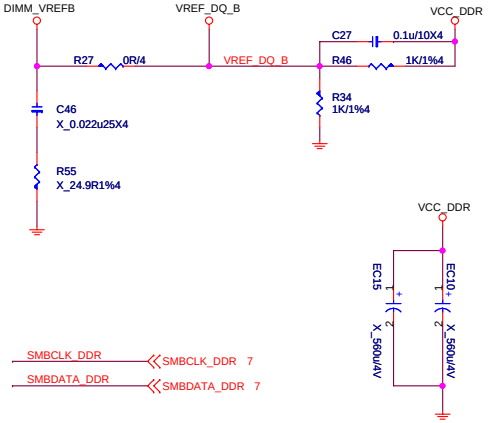
Place close to DIMM2



Place close to DIMM2







MICRO-STAR INT'L CO.,LTD	
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Size: Custom	Document Description: DDR3 Chanel-B DIMM3/4
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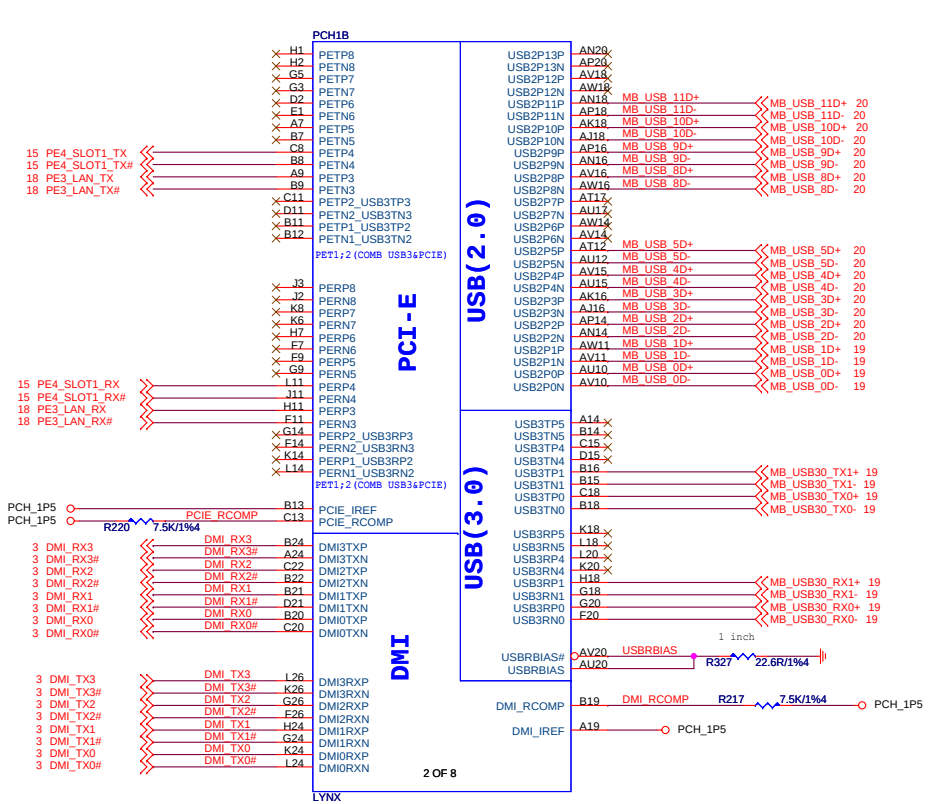
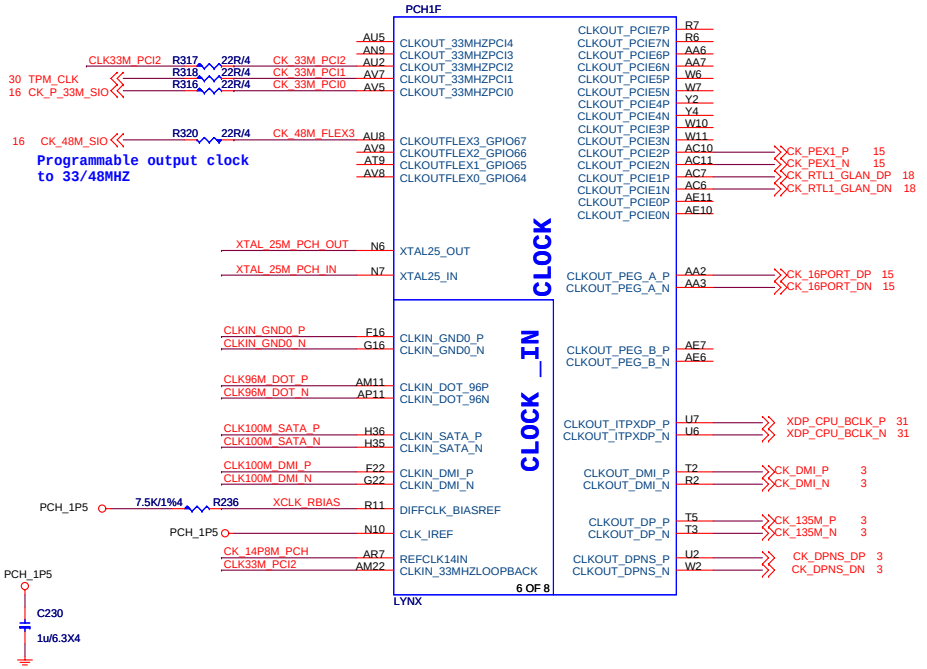
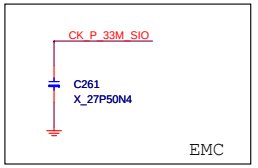
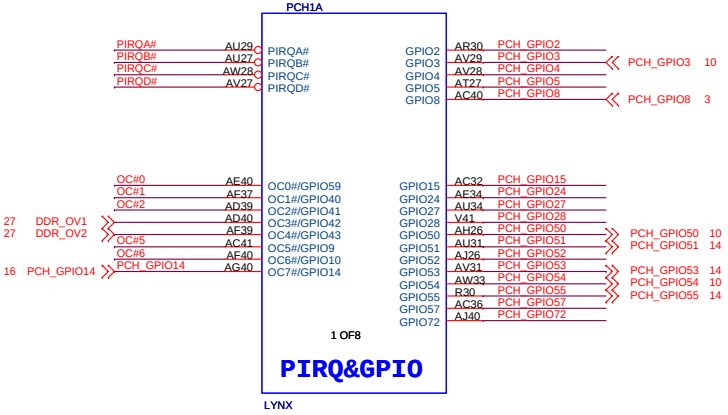
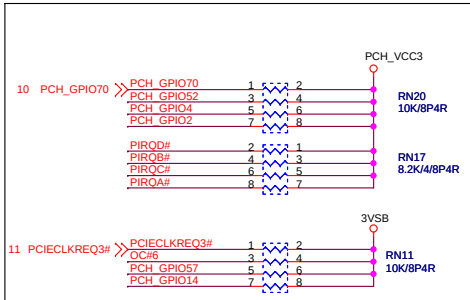
USB 2.0 ports 6,7,12 and 13 are disabled on 10 port SKUs.
Only USB 3.0 ports 1 and 2 are enabled.
pcie port7,8 NA

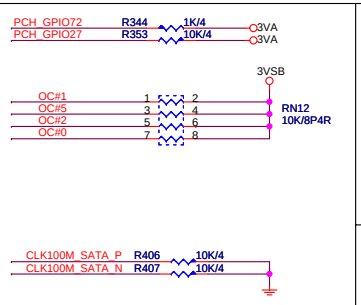


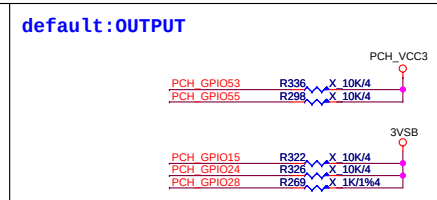


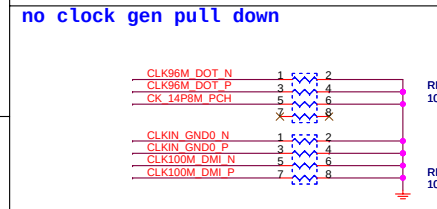


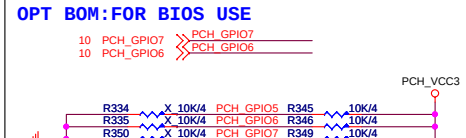


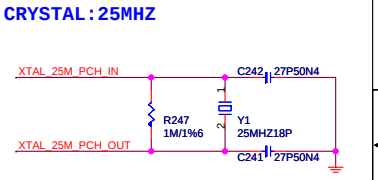












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Custom	PPT PCIE/DMI/USB/CLK	10

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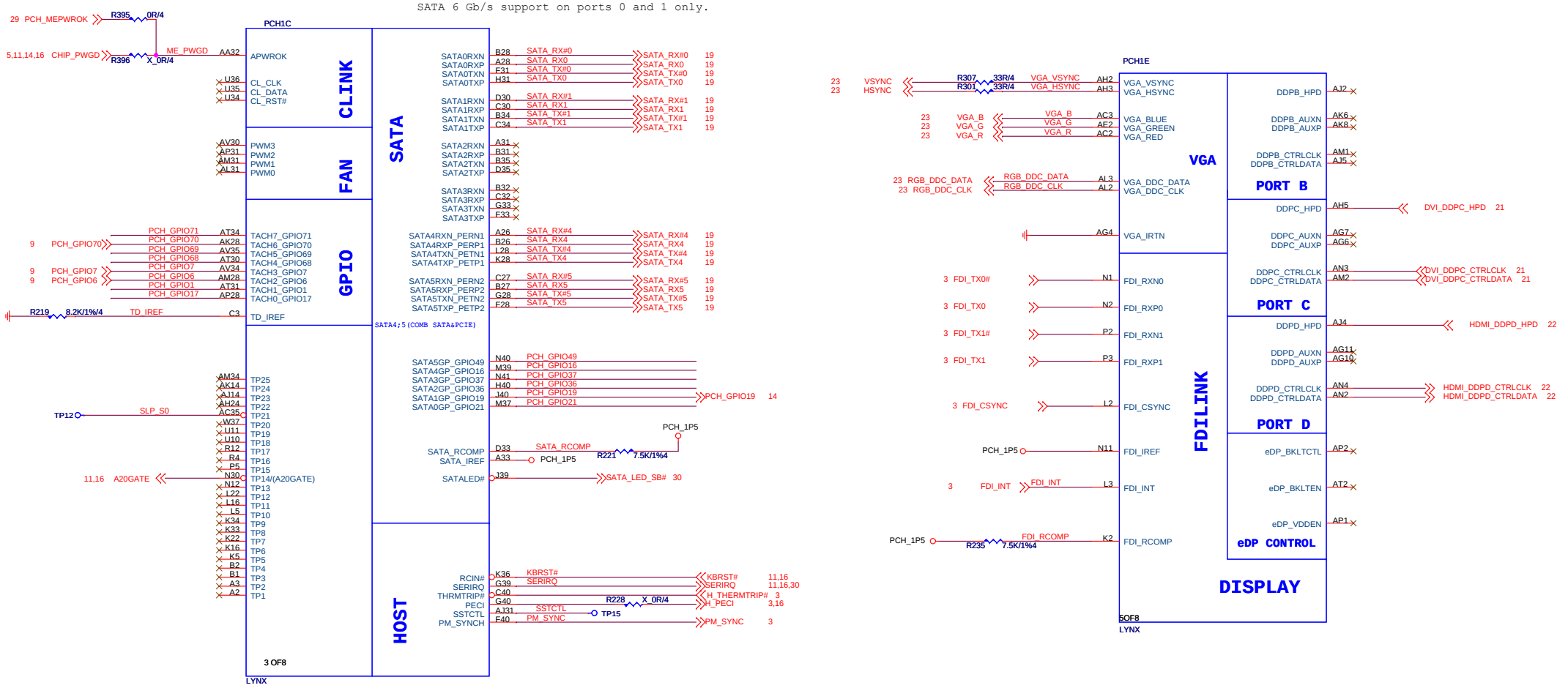
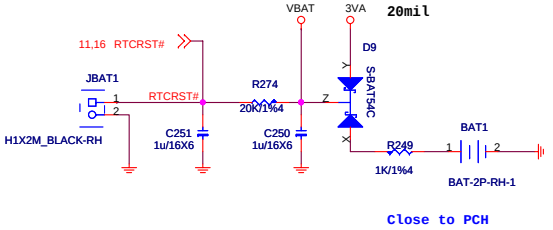
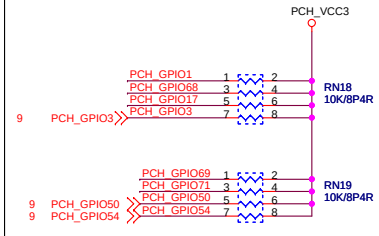
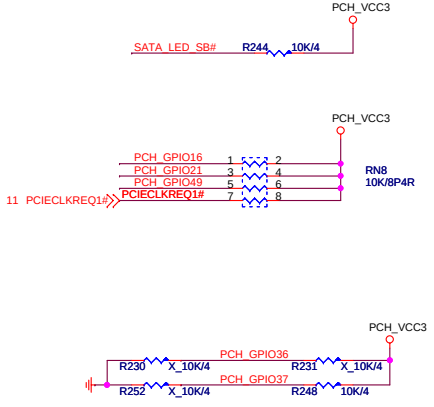
SATA ports 2 and 3 are disabled on 4 port SKUs.
SATA 6 Gb/s support on ports 0 and 1 only.



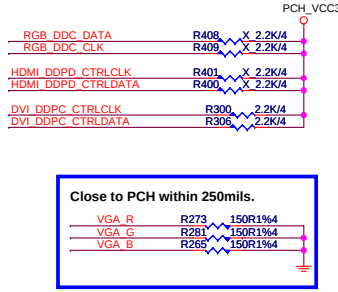
RTC and CLR_CMOS







Enable VGA(CTRLCLK/DATA Pull High)



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MS-7817	
Size: Custom	Document Description: PPT SATA/HOST/FAN/GPIO/VGA
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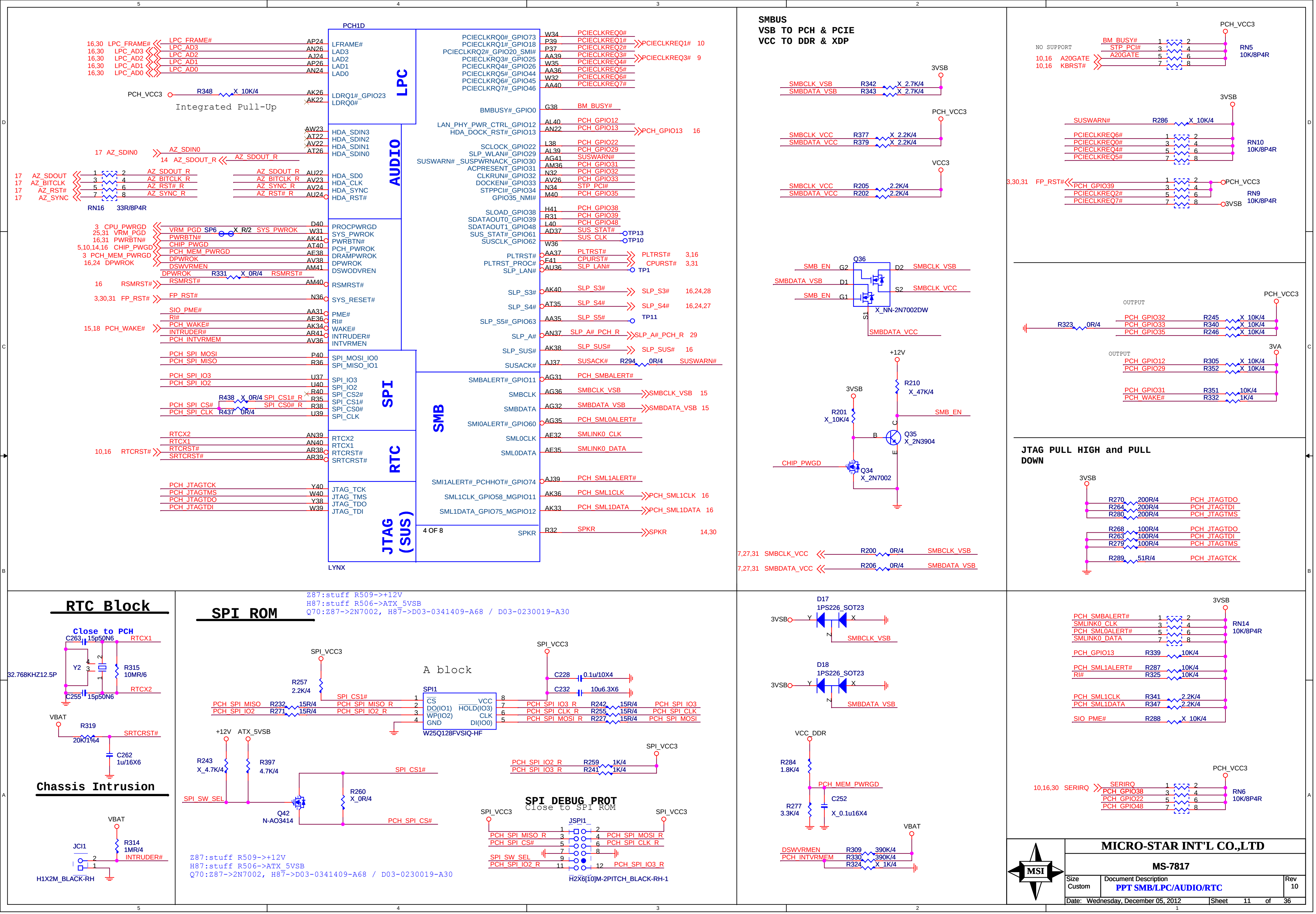
PCH1D
LPC
AUDIO
SPI
RTC
JTAG (SUS)
SMB
4 OF 8
LYNX
Integrated Pull-Up
SMBUS
VSB TO PCH & PCIE
VCC TO DDR & XDP
NO SUPPORT
OUTPUT
JTAG PULL HIGH and PULL DOWN
RTC Block
Close to PCH
32.768KHZ12.5P
Chassis Intrusion
SPI ROM
Z87:stuff R509->+12V
H87:stuff R506->ATX_5VSB
Q70:Z87->2N7002, H87->D03-0341409-A68 / D03-0230019-A30
A block
W25Q128FVSIQ-HF
SPI DEBUG PROT
Close to SPI ROM
H2X6[10]M-2PITCH_BLACK-RH-1
H1X2M_BLACK-RH
MICRO-STAR INT'L CO.,LTD
MS-7817
Size: Custom
Document Description: PPT SMB/LPC/AUDIO/RTC
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VCC3	0.21A
3VA	0.015A
VBAT	6uA
3VSB	0.261A
VCC1_5	0.249A
PCH_1P05	5.747A

Change to 10UH if VCCA_DPLLA/VCCA_DPLLB has noise issue.

POWER

PCH1G

PCH_1P05 → V_1P05_XCK_R

VCCIO_016 VCCIO_015 VCCIO_014 VCCIO_013 VCCIO_012 VCCIO_011 VCCIO_010 VCCIO_009 VCCIO_008 VCCIO_007 VCCIO_006 VCCIO_005 VCCIO_004 VCCIO_003 VCCIO_002 VCCIO_001

VCCORE_018 VCCORE_017 VCCORE_016 VCCORE_015 VCCORE_014 VCCORE_013 VCCORE_012 VCCORE_011 VCCORE_010 VCCORE_009 VCCORE_008 VCCORE_007 VCCORE_006 VCCORE_005 VCCORE_004 VCCORE_003 VCCORE_002 VCCORE_001

SPI_VCC3 — R41 — VCCSPI

3VSB — AP35 — VCCSUS3_3

VBAT — AP33 — VCCRTC_01

PCH_1P5 — T14 — VCCVRM_11
C1 VCCVRM_10
C2 VCCVRM_09
A4 VCCVRM_08
B4 VCCVRM_07
A40 VCCVRM_06
A39 VCCVRM_05
B39 VCCVRM_04
K1 VCCVRM_03
A38 VCCVRM_02
B37 VCCVRM_01

PCH_1P05 — AP22 — VCCUSBPLL

C279 0.1u/10X4 — C266 0.1u/10X4 — AH28 DCPSST / AW35 DCPRTC

P19 DCPSUS_02
AE30 DCPSUS_01

C265 1u/16X6 — R321 5.1R1%4 — C264 0.1u16X4 — DCPSUSBYP — AU41 DCPSUSBYP_02 / AU40 DCPSUSBYP_01

500mil
R285 649R1%4 — DAC_IREF — AF5 DAC_IREF

PCH_1P05 — V16 VCCCLK

1.5_DAC_FB_R — AF2 VCCADAC

V_PROC_IO — C39 V_PROC_IO

C223 X_1uF/6.3V/X/4

VCCADACBG3_3 VCC3_3_01 VCC3_3_02 VCC3_3_03 VCC3_3_04 VCC3_3_05 VCC3_3_06

VCCDSW3_3_01 VCCDSW3_3_02 VCCDSW3_3_03

DCPSUS2

VCCSUS3_3_009 VCCSUS3_3_008 VCCSUS3_3_007 VCCSUS3_3_006 VCCSUS3_3_005 VCCSUS3_3_004 VCCSUS3_3_003 VCCSUS3_3_002 VCCSUS3_3_001

7OF 8

LYNX

AE1 AW21 V30 V29 AE28 AG1 B6 → PCH_VCC3

AV39 AW38 AW39 → 3VA

AJ22 → TP14

AK20 AJ20 AH22 AH20 AH18 P20 AN33 AM32 AW28 → 3VSB

PCH_VCC3

VCCCLK3_3_13 AW3
VCCCLK3_3_12 AV3
VCCCLK3_3_11 AK11
VCCCLK3_3_10 AG12
VCCCLK3_3_09 AW9
VCCCLK3_3_08 AW4
VCCCLK3_3_07 AV4
VCCCLK3_3_06 AT5
VCCCLK3_3_05 AR4
VCCCLK3_3_04 AP7
VCCCLK3_3_03 AP5
VCCCLK3_3_02 AM9
VCCCLK3_3_01 AM7

PCH_1P05

VCCCLK_07 T16
VCCCLK_06 W16
VCCCLK_05 AA16
VCCCLK_04 AB2
VCCCLK_03 W14
VCCCLK_02 V14
VCCCLK_01 U12

+1P05V_ME

VCCASW_015 AF25
VCCASW_014 AD25
VCCASW_013 W26
VCCASW_012 AD23
VCCASW_011 AD22
VCCASW_010 AD20
VCCASW_009 AD19
VCCASW_008 AD17
VCCASW_007 AB26
VCCASW_006 AB25
VCCASW_005 AB23
VCCASW_004 AB22
VCCASW_003 AA26
VCCASW_002 AA25
VCCASW_001 AA23

H81->Stuff
H87->un-Stuff

+1P05V_ME — R416 X_0R/8 — R417 X_0R/8 — PCH_1P05

PCH_VCC3 HAVE SEQENCING

PCH_1P05 — V_1P05_XCK_DCB_FB — R253 0R/8 — V_1P05_XCK_R — R441 0R/4
C247 X_10u6.3X6
C249 1u/6.3X4

PCH_1P5 — 1.5_DAC_FB — R442 0R/6 — 1.5_DAC_FB_R — R291 1R/4
C347 0.01u16X4

PCH decoupling cap

close V14,U12,T16,V16

PCH_1P05 — C305 X_1u/6.3X/4 — C306 X_1u/6.3X/4

PCH_1P05 — C312 0.01u16X4 — C248 X_1u/6.3X4 — C309 1u/6.3X4 — C308 X_10u6.3X6 — C304 X_10u6.3X6 — C318 10u6.3X6

VBAT — C313 X_0.1u/10X4 — C277 1u/6.3X4

3VSB — C274 1u/6.3X4 — C301 1u/6.3X4 — C314 X_0.1u/10X4 — C315 X_0.1u/10X4

SPI_VCC3 — C244 1u/6.3X4

PCH_VCC3 — C307 X_1u/6.3X/4 — C253 0.1u/10X4 — C310 X_0.1u/10X4

+1P05V_ME — C303 X_1u/6.3X/4

PCH_VCC3 — C288 1u/6.3X4 — C229 0.1u/10X4

T14
PCH_1P5 — C302 X_0.1u/10X4

3VA — C267 1u/6.3X4

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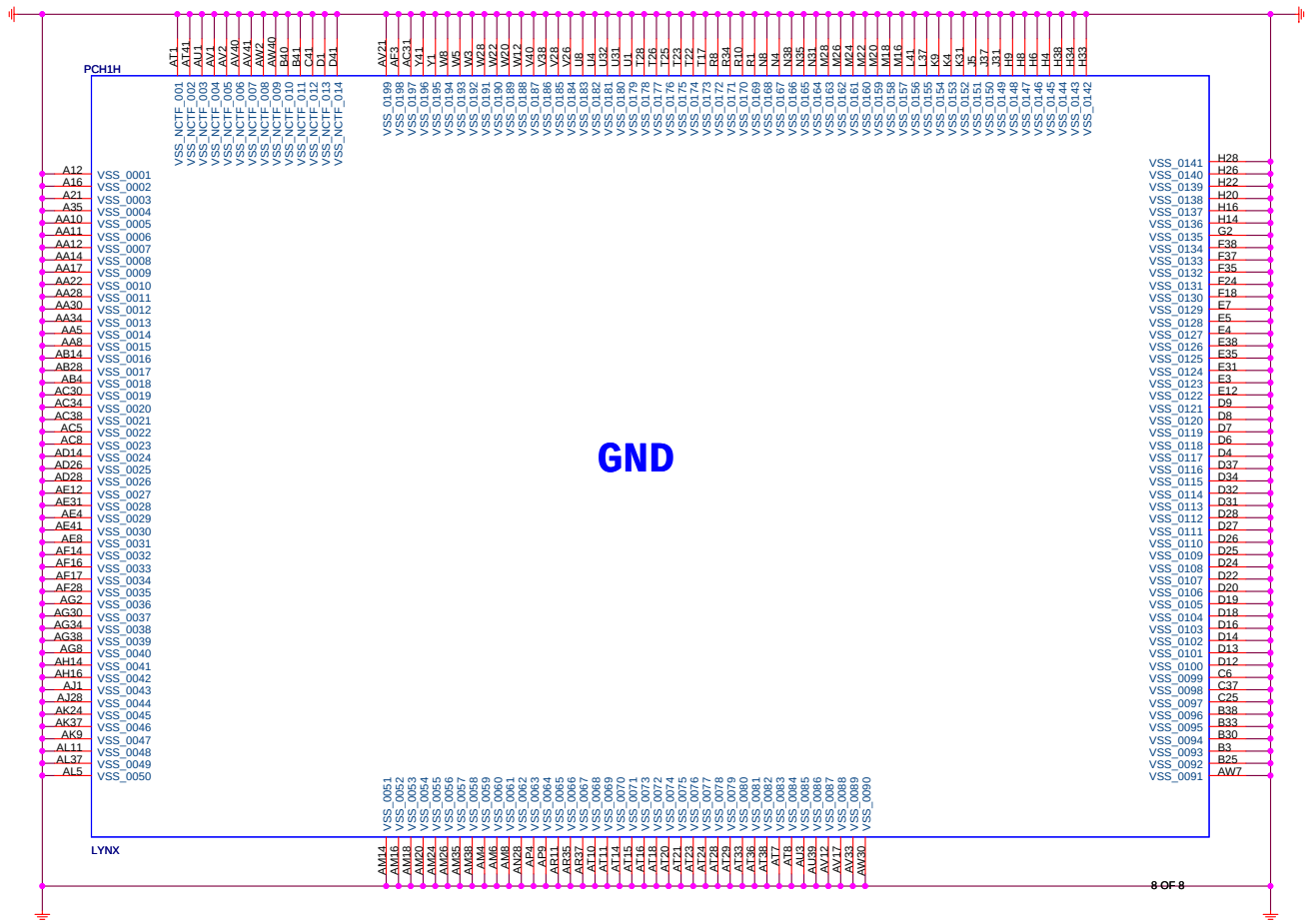

MICRO-STAR INT'L CO.,LTD		
MS-7817		
Size: Custom	Document Description: PPT GND/NVRAM	Rev: 10
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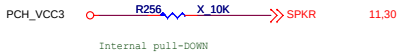
PCH Straps



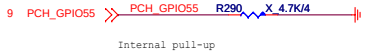
SPKR

Default Mode:

Internal weak Pull-down.

No Reboot Mode with TCO Disabled:

Connect to Vcc3_3 with 8.2k-10k Ohm weak pullup resistor.



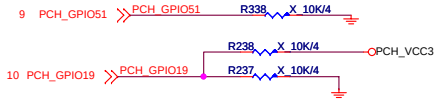
GPIO55

Default Mode:

Internal pull-up.

Top Block Swap Mode:

Connect to ground with 4.7k Ohm weak pulldown resistor.



SATA1GP/GPIO19, GPIO51

Default (SPI):

Left both SATA1GP/GPIO19 and GPIO51 floating.
No pull up required.

Boot from PCI:

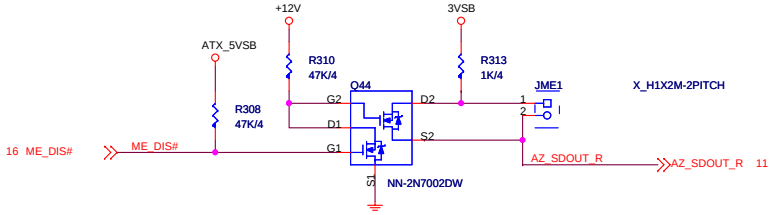
Connect SATA1GP/GPIO19 to ground with 1k Ohm pull-down resistor.
Leave GPIO51 Floating.

Boot from LPC:

Connect both SATA1GP/GPIO19 and GPIO51 to ground with 1k Ohm pull-down resistor.

GPIO53

Do not pull low.
Connect to ground with 1k Ohm pull-down resistor.



HDA_SDO

Default:
Do not pull high.

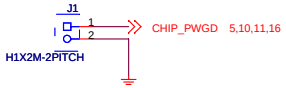
Disable ME in Manufacturing Mode:
Connect to VccSusHDA with 1k Ohm pull-up resistor through a jumper.

GPIO37

Enable TLS:
Pull up with 1k Ohm to VccSus3.3.

Default (Disable TLS):
Leave NC. Internal pull down.

For test cpu voltage



MICRO-STAR INT'L CO.,LTD		
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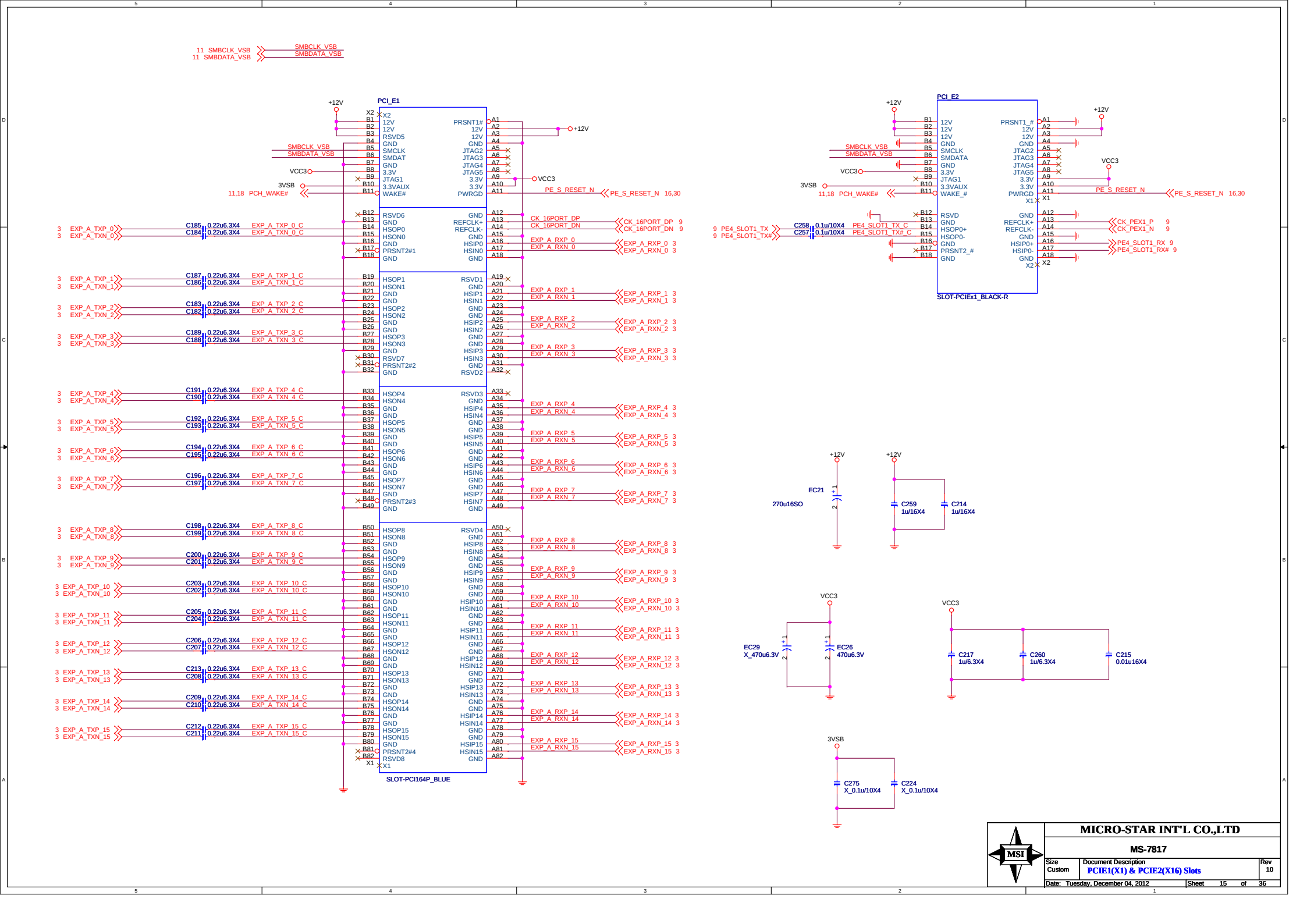
11 SMBCLK_VSB
11 SMBDATA_VSB
SMBCLK_VSB
SMBDATA_VSB
PCI_E1
SLOT-PCI164P_BLUE
PCI_E2
SLOT-PCIEx1_BLACK-R
+12V
3VSB
VCC3
11,18 PCH_WAKE#
PE_S_RESET_N
PE_S_RESET_N 16,30
EXP_A_TXP_0 C185 0.22u6.3X4 EXP_A_TXP_0_C
EXP_A_TXN_0 C184 0.22u6.3X4 EXP_A_TXN_0_C
EXP_A_RXP_0 EXP_A_RXP_0 3
EXP_A_RXN_0 EXP_A_RXN_0 3
EXP_A_TXP_1 C187 0.22u6.3X4 EXP_A_TXP_1_C
EXP_A_TXN_1 C186 0.22u6.3X4 EXP_A_TXN_1_C
EXP_A_RXP_1 EXP_A_RXP_1 3
EXP_A_RXN_1 EXP_A_RXN_1 3
EXP_A_TXP_2 C183 0.22u6.3X4 EXP_A_TXP_2_C
EXP_A_TXN_2 C182 0.22u6.3X4 EXP_A_TXN_2_C
EXP_A_RXP_2 EXP_A_RXP_2 3
EXP_A_RXN_2 EXP_A_RXN_2 3
EXP_A_TXP_3 C189 0.22u6.3X4 EXP_A_TXP_3_C
EXP_A_TXN_3 C188 0.22u6.3X4 EXP_A_TXN_3_C
EXP_A_RXP_3 EXP_A_RXP_3 3
EXP_A_RXN_3 EXP_A_RXN_3 3
EXP_A_TXP_4 C191 0.22u6.3X4 EXP_A_TXP_4_C
EXP_A_TXN_4 C190 0.22u6.3X4 EXP_A_TXN_4_C
EXP_A_RXP_4 EXP_A_RXP_4 3
EXP_A_RXN_4 EXP_A_RXN_4 3
EXP_A_TXP_5 C192 0.22u6.3X4 EXP_A_TXP_5_C
EXP_A_TXN_5 C193 0.22u6.3X4 EXP_A_TXN_5_C
EXP_A_RXP_5 EXP_A_RXP_5 3
EXP_A_RXN_5 EXP_A_RXN_5 3
EXP_A_TXP_6 C194 0.22u6.3X4 EXP_A_TXP_6_C
EXP_A_TXN_6 C195 0.22u6.3X4 EXP_A_TXN_6_C
EXP_A_RXP_6 EXP_A_RXP_6 3
EXP_A_RXN_6 EXP_A_RXN_6 3
EXP_A_TXP_7 C196 0.22u6.3X4 EXP_A_TXP_7_C
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EXP_A_RXN_7 EXP_A_RXN_7 3
EXP_A_TXP_8 C198 0.22u6.3X4 EXP_A_TXP_8_C
EXP_A_TXN_8 C199 0.22u6.3X4 EXP_A_TXN_8_C
EXP_A_RXP_8 EXP_A_RXP_8 3
EXP_A_RXN_8 EXP_A_RXN_8 3
EXP_A_TXP_9 C200 0.22u6.3X4 EXP_A_TXP_9_C
EXP_A_TXN_9 C201 0.22u6.3X4 EXP_A_TXN_9_C
EXP_A_RXP_9 EXP_A_RXP_9 3
EXP_A_RXN_9 EXP_A_RXN_9 3
EXP_A_TXP_10 C203 0.22u6.3X4 EXP_A_TXP_10_C
EXP_A_TXN_10 C202 0.22u6.3X4 EXP_A_TXN_10_C
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EXP_A_RXN_10 EXP_A_RXN_10 3
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EXP_A_TXN_11 C204 0.22u6.3X4 EXP_A_TXN_11_C
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EXP_A_RXN_11 EXP_A_RXN_11 3
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EXP_A_RXN_13 EXP_A_RXN_13 3
EXP_A_TXP_14 C209 0.22u6.3X4 EXP_A_TXP_14_C
EXP_A_TXN_14 C210 0.22u6.3X4 EXP_A_TXN_14_C
EXP_A_RXP_14 EXP_A_RXP_14 3
EXP_A_RXN_14 EXP_A_RXN_14 3
EXP_A_TXP_15 C212 0.22u6.3X4 EXP_A_TXP_15_C
EXP_A_TXN_15 C211 0.22u6.3X4 EXP_A_TXN_15_C
EXP_A_RXP_15 EXP_A_RXP_15 3
EXP_A_RXN_15 EXP_A_RXN_15 3
PE4_SLOT1_TX C258 0.1u/10X4 PE4_SLOT1_TX_C
PE4_SLOT1_TX# C257 0.1u/10X4 PE4_SLOT1_TX#_C
CK_16PORT_DP CK_16PORT_DP 9
CK_16PORT_DN CK_16PORT_DN 9
CK_PEX1_P 9
CK_PEX1_N 9
PE4_SLOT1_RX 9
PE4_SLOT1_RX# 9
EC21 270u16SO
C259 1u/16X4
C214 1u/16X4
EC29 X_470u6.3V
EC26 470u6.3V
C217 1u/6.3X4
C260 1u/6.3X4
C215 0.01u16X4
C275 X_0.1u/10X4
C224 X_0.1u/10X4
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Size Custom
Document Description PCIE1(X1) & PCIE2(X16) Slots
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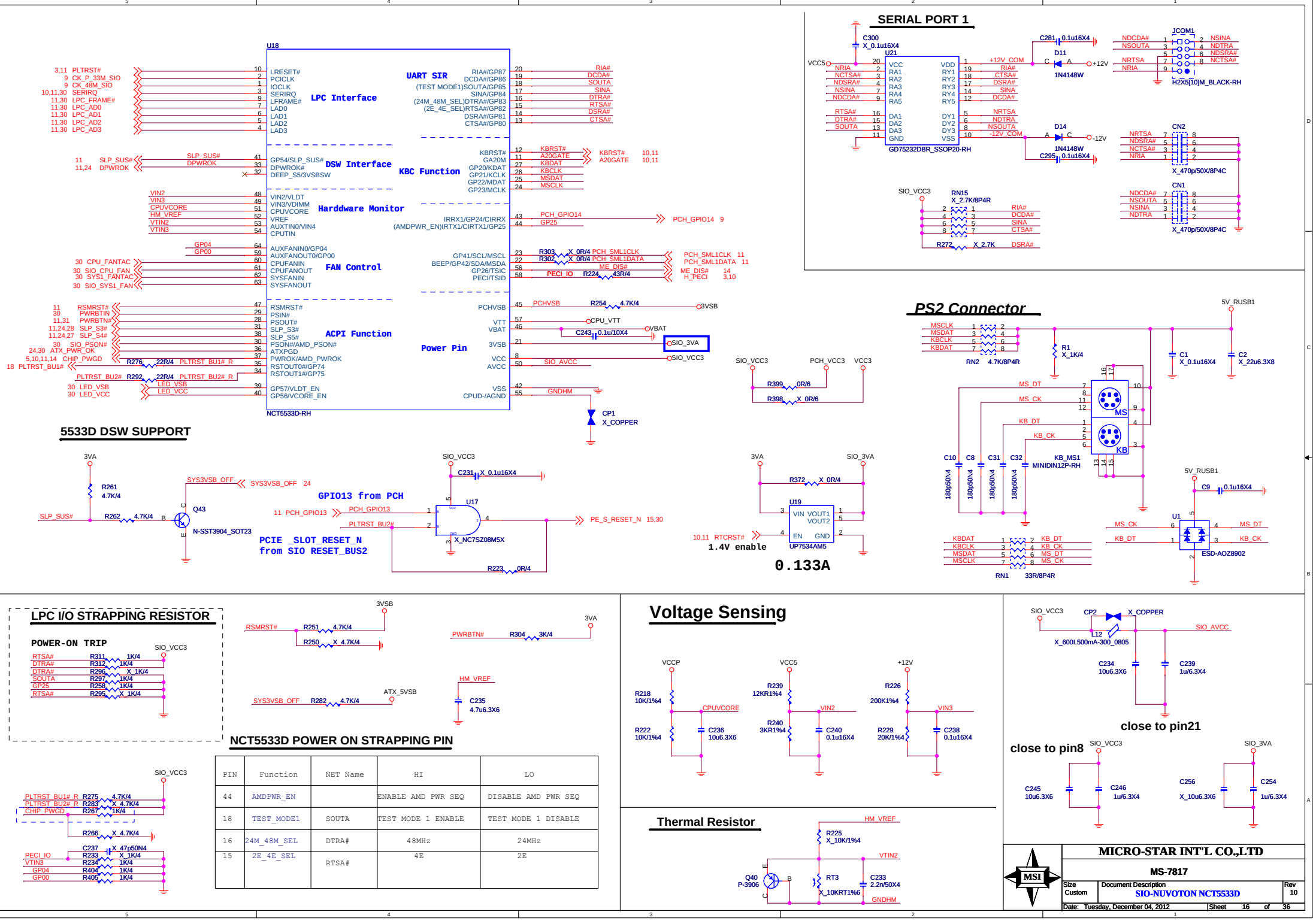
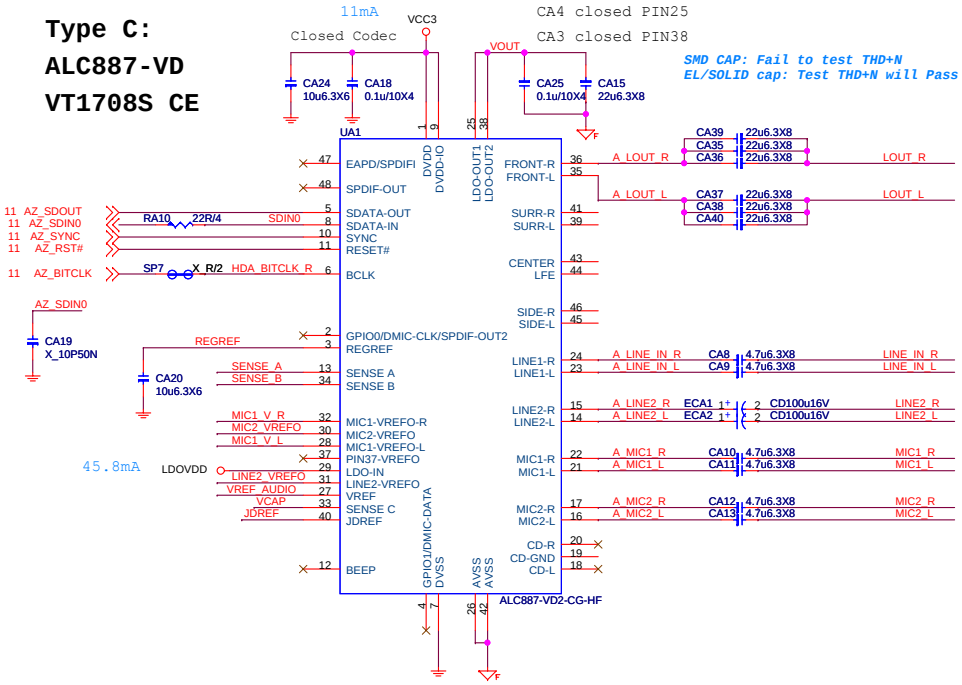
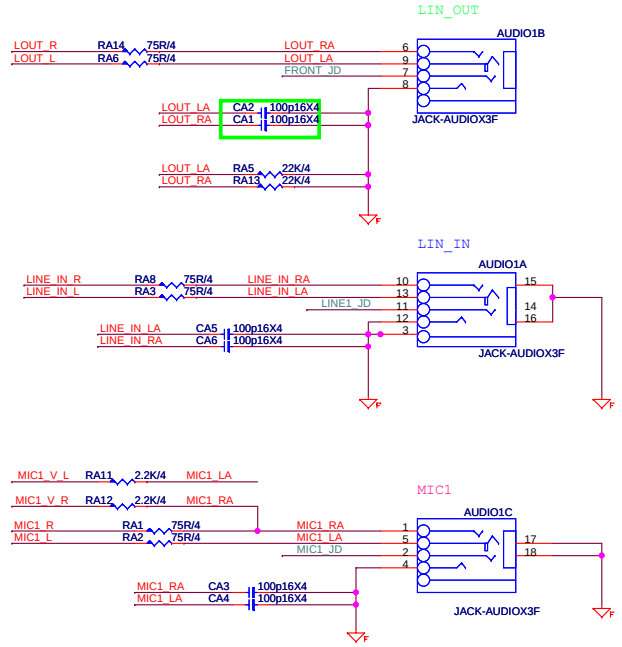
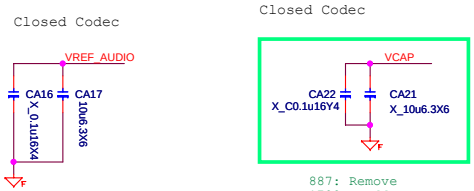


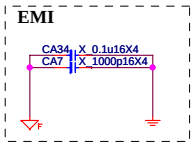
PIN	Function	NET Name	HI	LO
44	AMDPWR_EN		ENABLE AMD PWR SEQ	DISABLE AMD PWR SEQ
18	TEST_MODE1	SOUTA	TEST MODE 1 ENABLE	TEST MODE 1 DISABLE
16	24M_48M_SEL	DTRA#	48MHz	24MHz
15	2E_4E_SEL	RTSA#	4E	2E

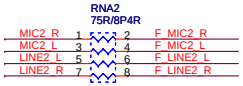
Type C:
ALC887-VD
VT1708S CE

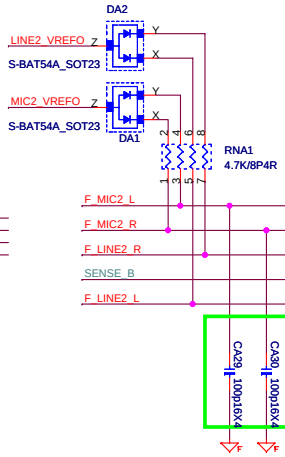


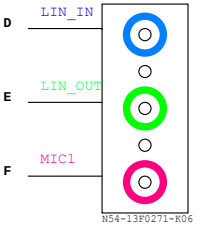


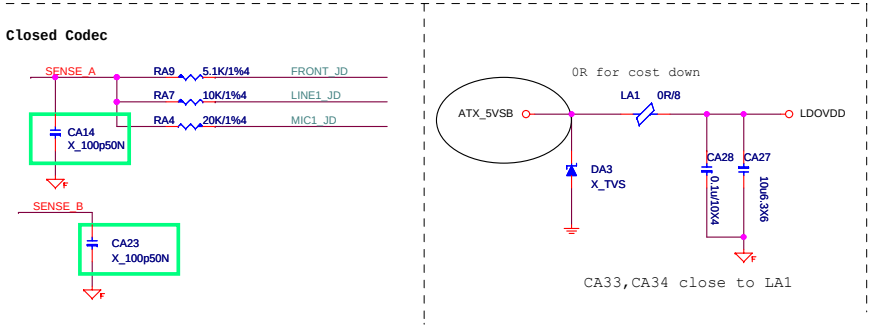












100pF Cap can change to
TVS by PM request.

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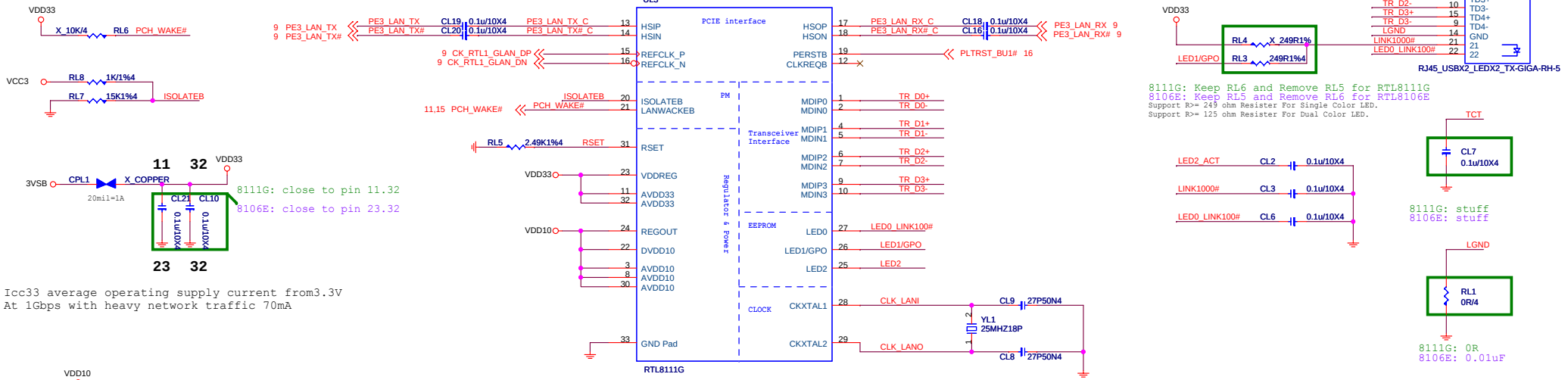
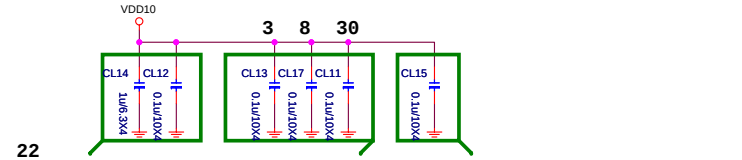
RTL8111G Giga LAN
RTL8106E 10/100M LAN



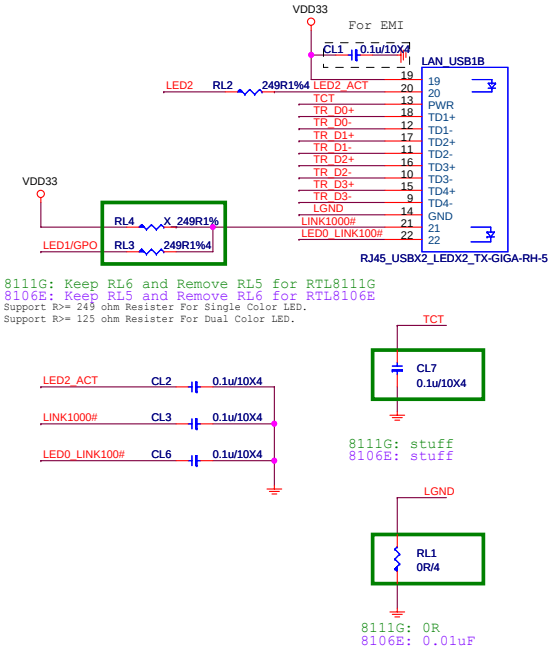
Icc33 average operating supply current from3.3V
At 1Gbps with heavy network traffic 70mA



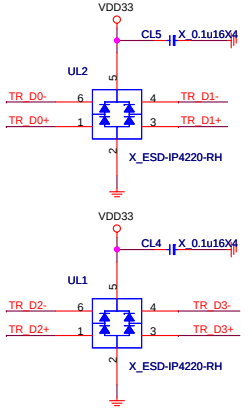
30

Icc10 average operating supply current from1.0V
At 1Gbps with heavy network traffic 300mA

LAN Connector



Reserve ESD Protect



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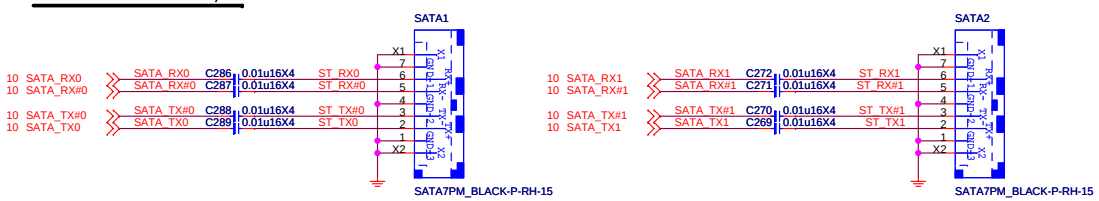
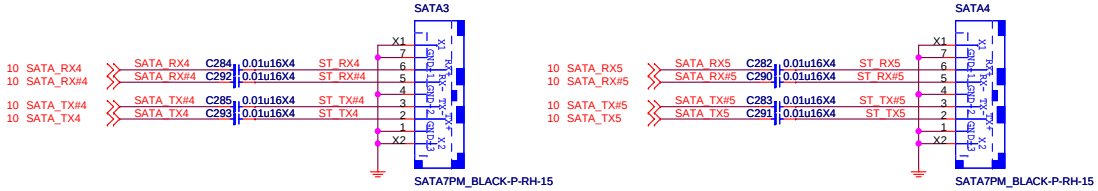
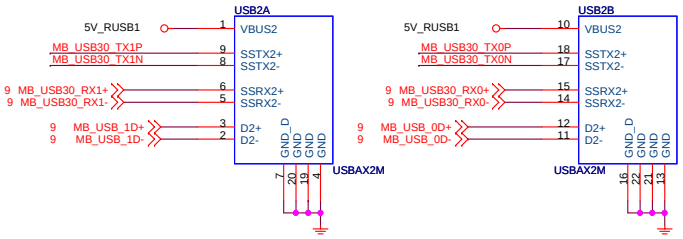
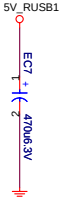
SATA 6G PORT 0,1

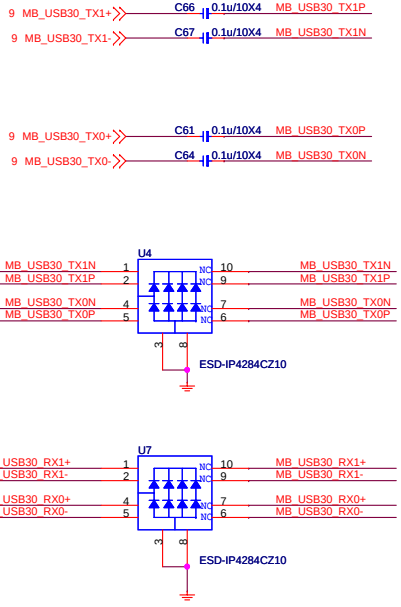


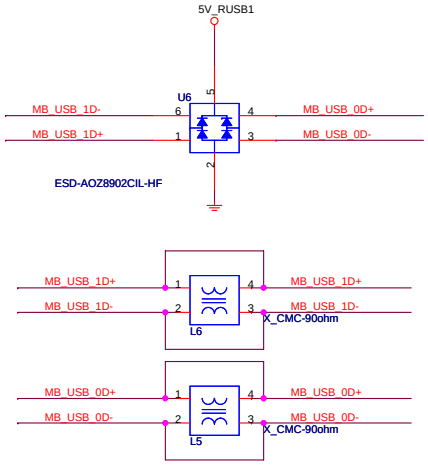
SATA 3G PORT 4,5











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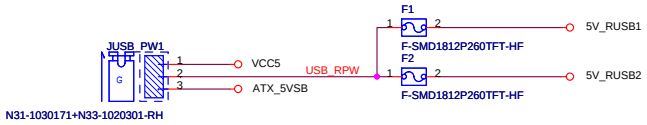
Type C: jumper +Fuse

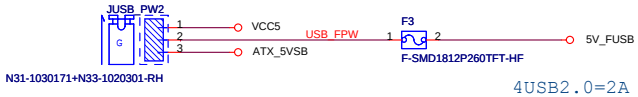
PCH/FCH side: OC# pull high to +3VSB

Near Rear ==>



4USB2.0+2USB3.0+PS2=5A

Near Front ==>



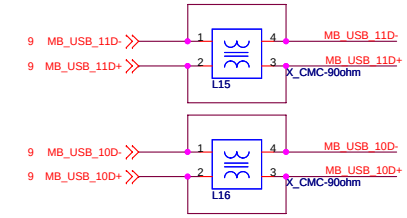
4USB2.0=2A

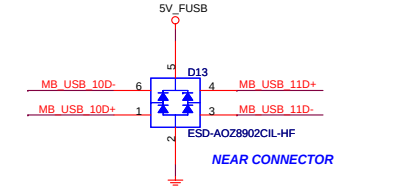
D08-2000300-P16 (Itrip=3.5A; 0.003ohm) support 6 USB ports (3A)
D08-0300700-P16 (Itrip=2.6A; 0.015ohm) support 4 USB ports (2A)
D08-0100110-P16 (Itrip=1.1A; 0.04ohm) support 2 usb 2.0 ports (1A)

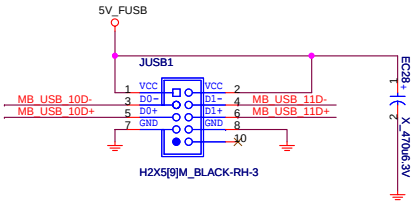
Default VCC5 (PIN1-2)

JUSB_PW	BIOS Menu	Wake up support
1-2	EUP Enable	Not support
	EUP Disable	
2-3	EUP Enable	Not support
	EUP Disable	support

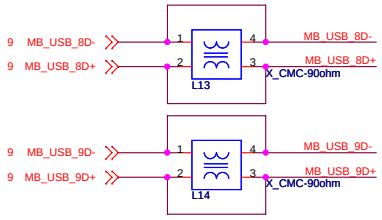
FRONT USB PORT 8,9

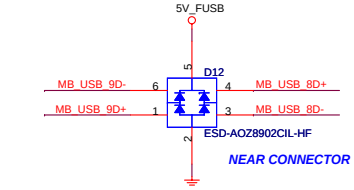


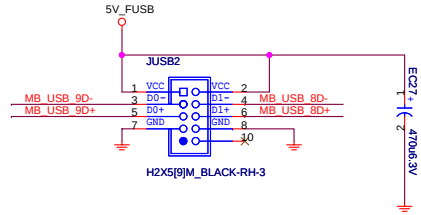




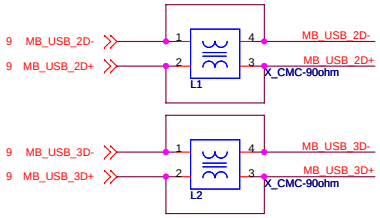
FRONT USB PORT 10.11

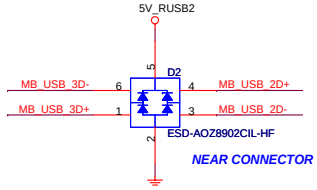


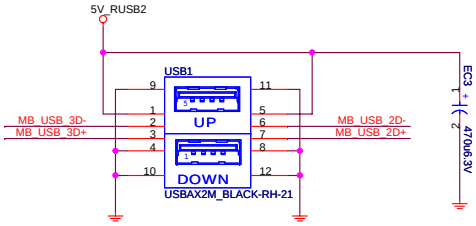




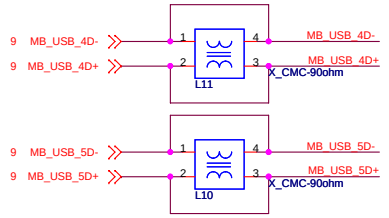
FRONT USB PORT 10.11

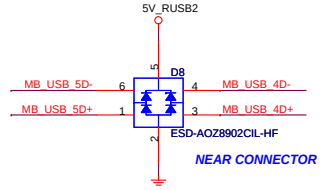


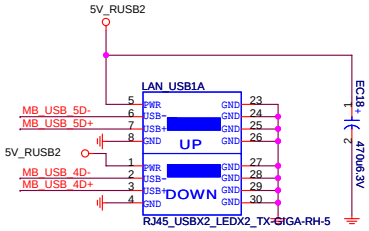




FRONT USB PORT 10.11







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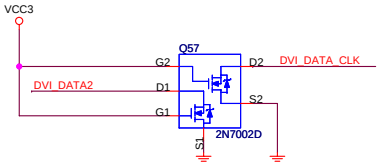
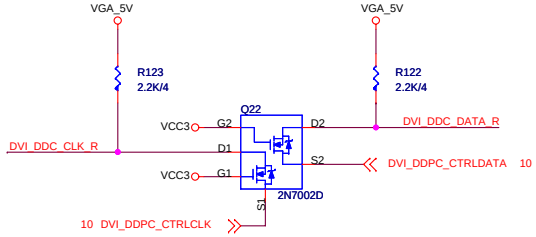
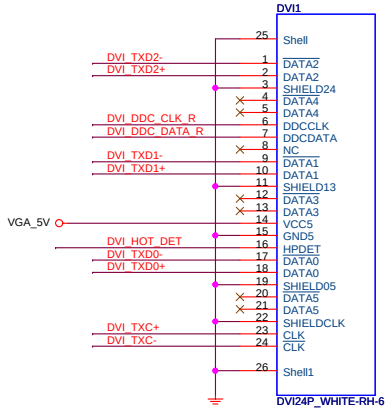
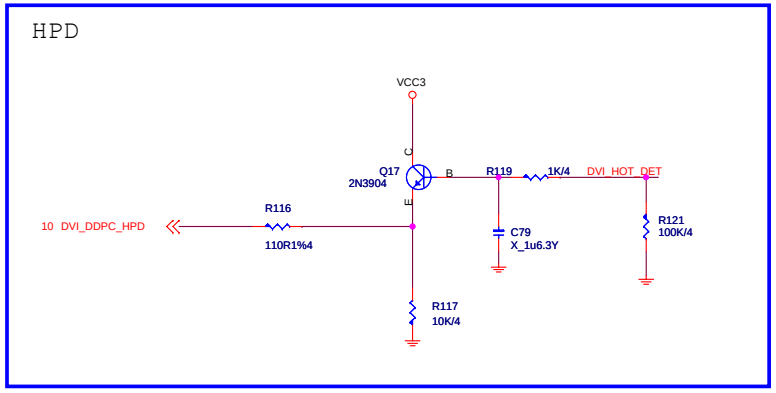
DVI level shifter

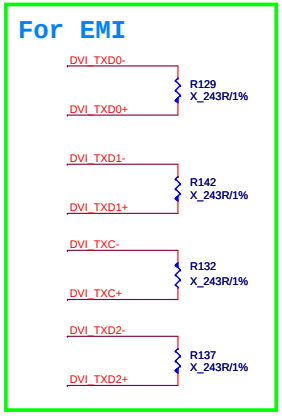
VGA: resolution of 2048x1536 pixels with 32-bit color at 75 Hz (4:3 QXGA)

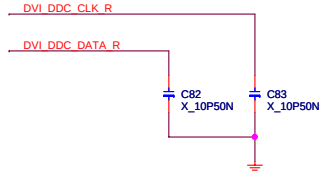












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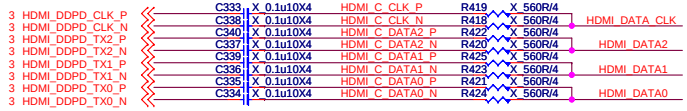
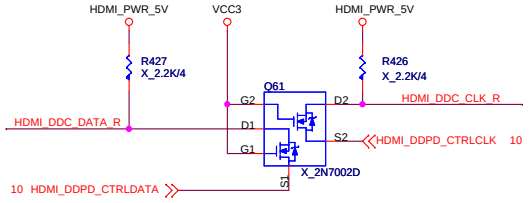
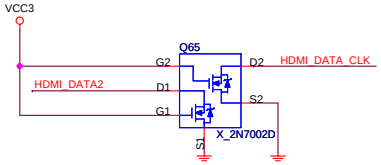
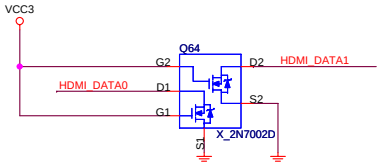
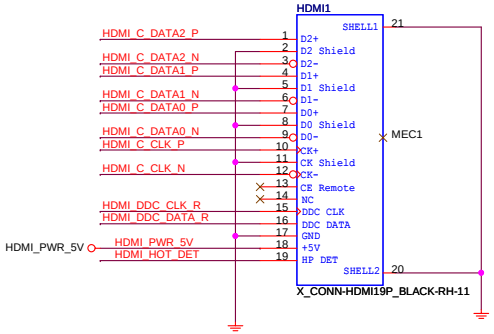
HDMI, DVI : 1920x1200 at 60 Hz (16:10 WUXGA)

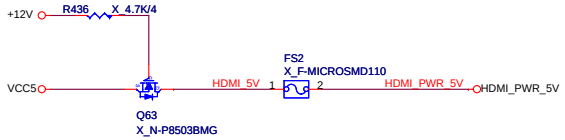


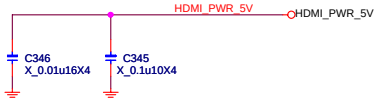




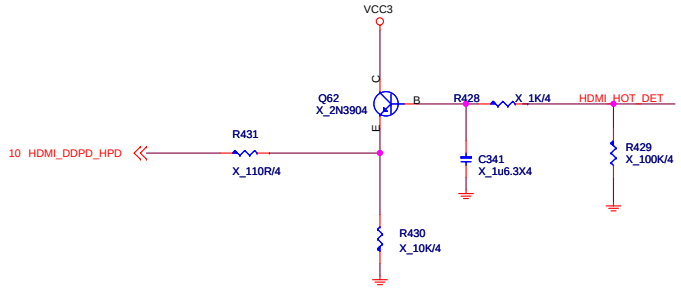




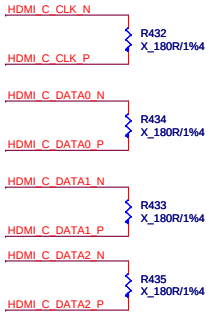




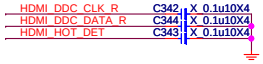
HPD



For EMI



EMI



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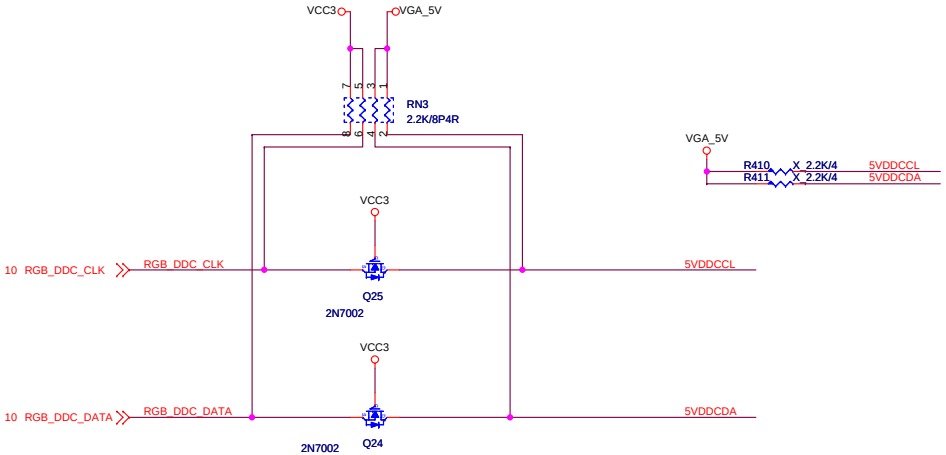
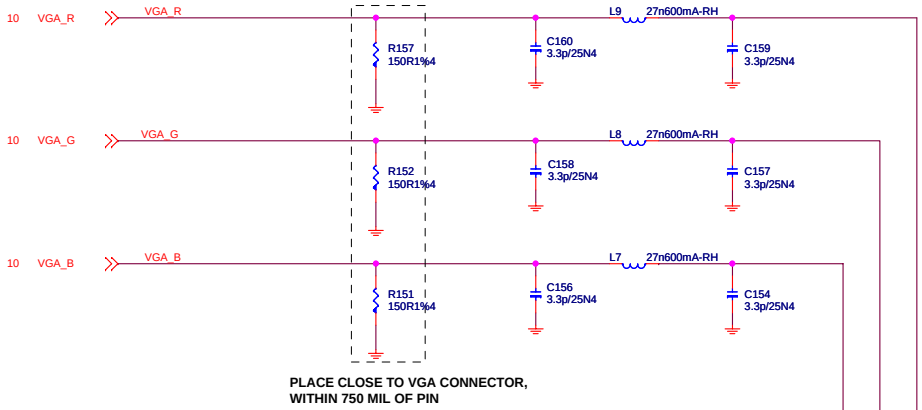
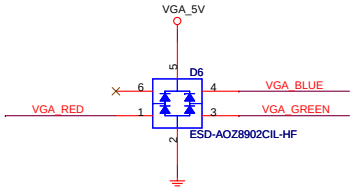
D-Sub

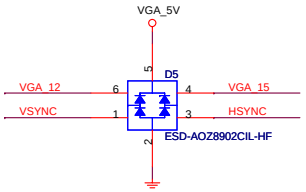
Level shift

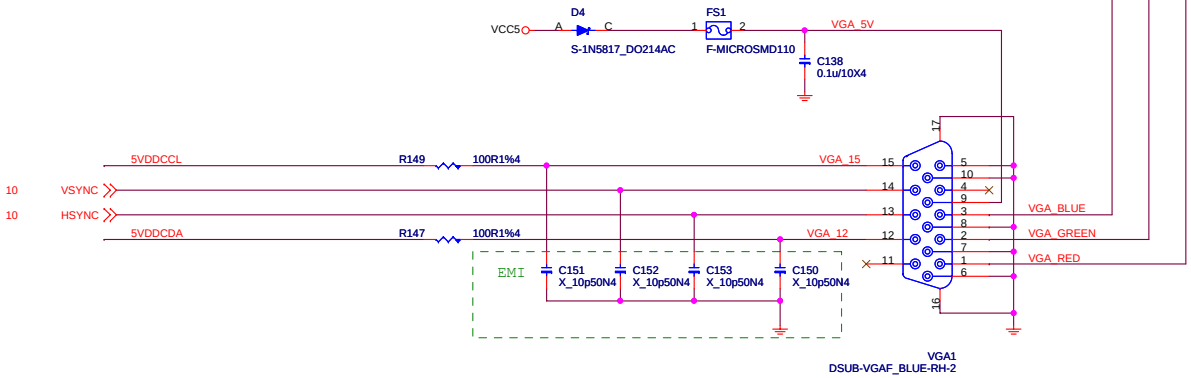




PLACE CLOSE TO VGA CONNECTOR, WITHIN 750 MIL OF PIN







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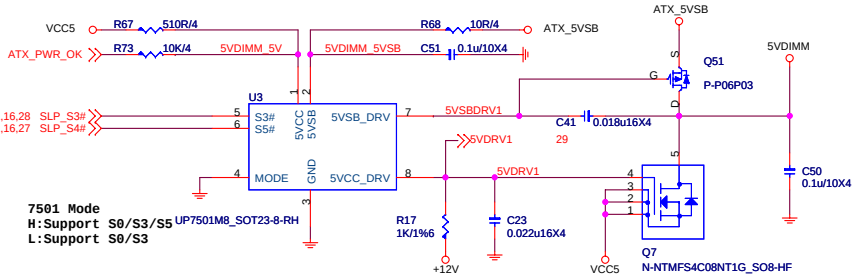
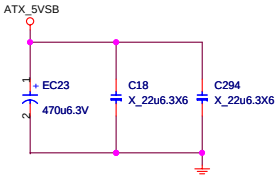
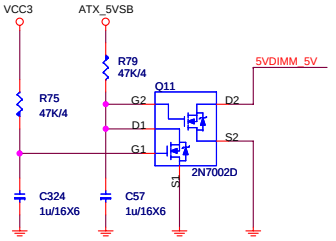
5VDIMM FOR DDR





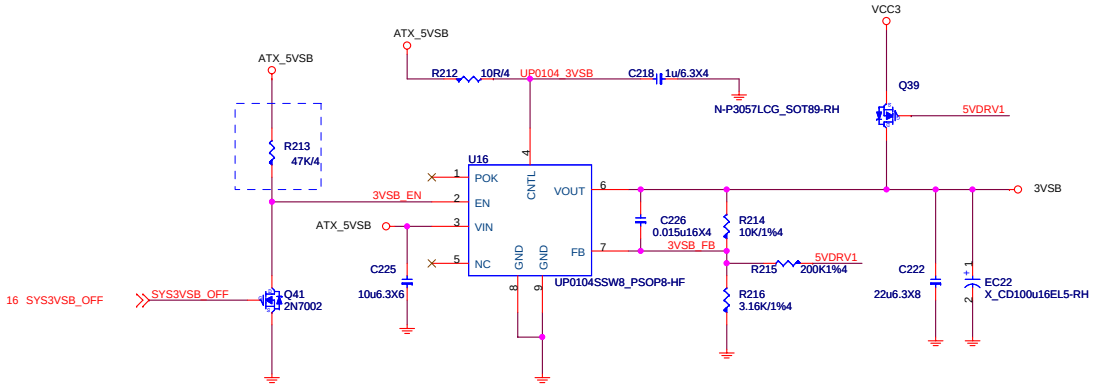
For power 700W solution (only for uP7501+uP7506 for 3VSB solution)
The power supply VCC3 delay 12ms after VCC5 assert.
The chip U7501 5VDRV1 work when the VCC5 ready
(When VCC5 up to 4.2V and the 5VDRV1 delay 6ms assert), but
VCC3 not ready and let the 3VSB sequence fail.



Patch coolermaster 700w power sequence

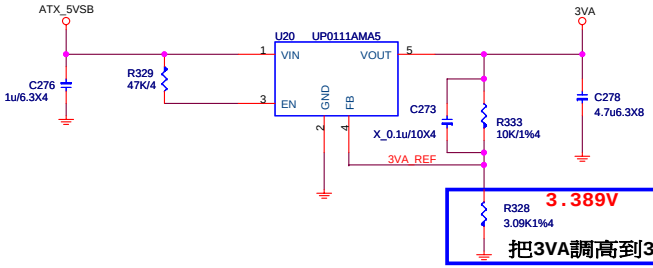
3VSB

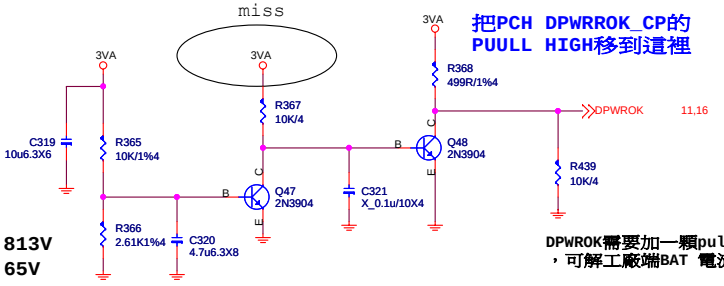
3VSB supply to PCH and other device.
Turn off when Deep S3/S5 by 5VSB off.



3VA

20mA





把PCH DPWRROK_CP的
PUULL HIGH移到這裡

3.389V分壓=0.813V
2.71V分壓=0.65V

DPWROK需要加一顆pull down 10k電阻
，可解工廠端BAT 電流過大問題

FOR DPWROK跟3VA的POWER
DOWN的時序(S5-->G3)

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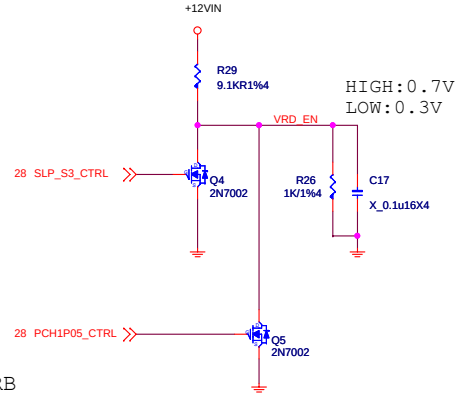
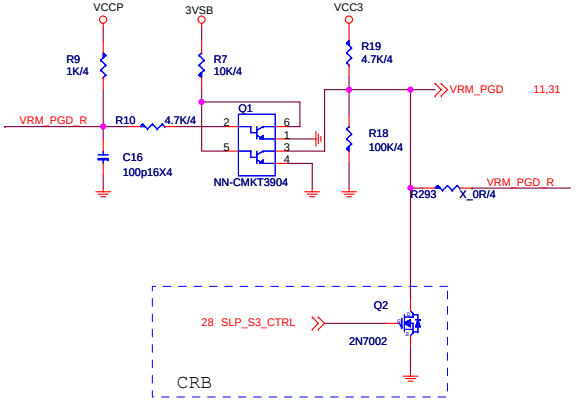
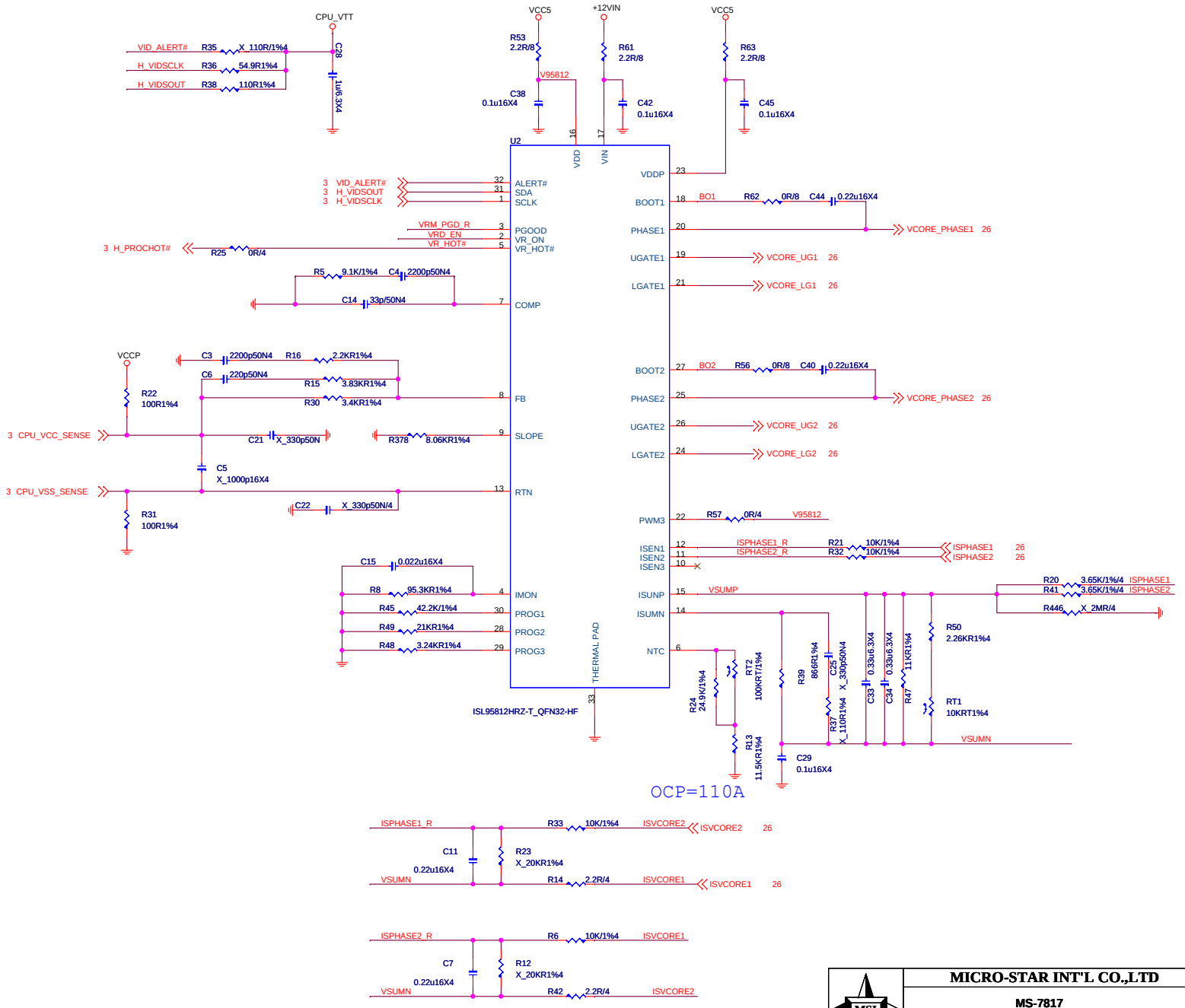
VCORE power on by s3 and 12v



VRMPWRGD LEVEL SHIFT





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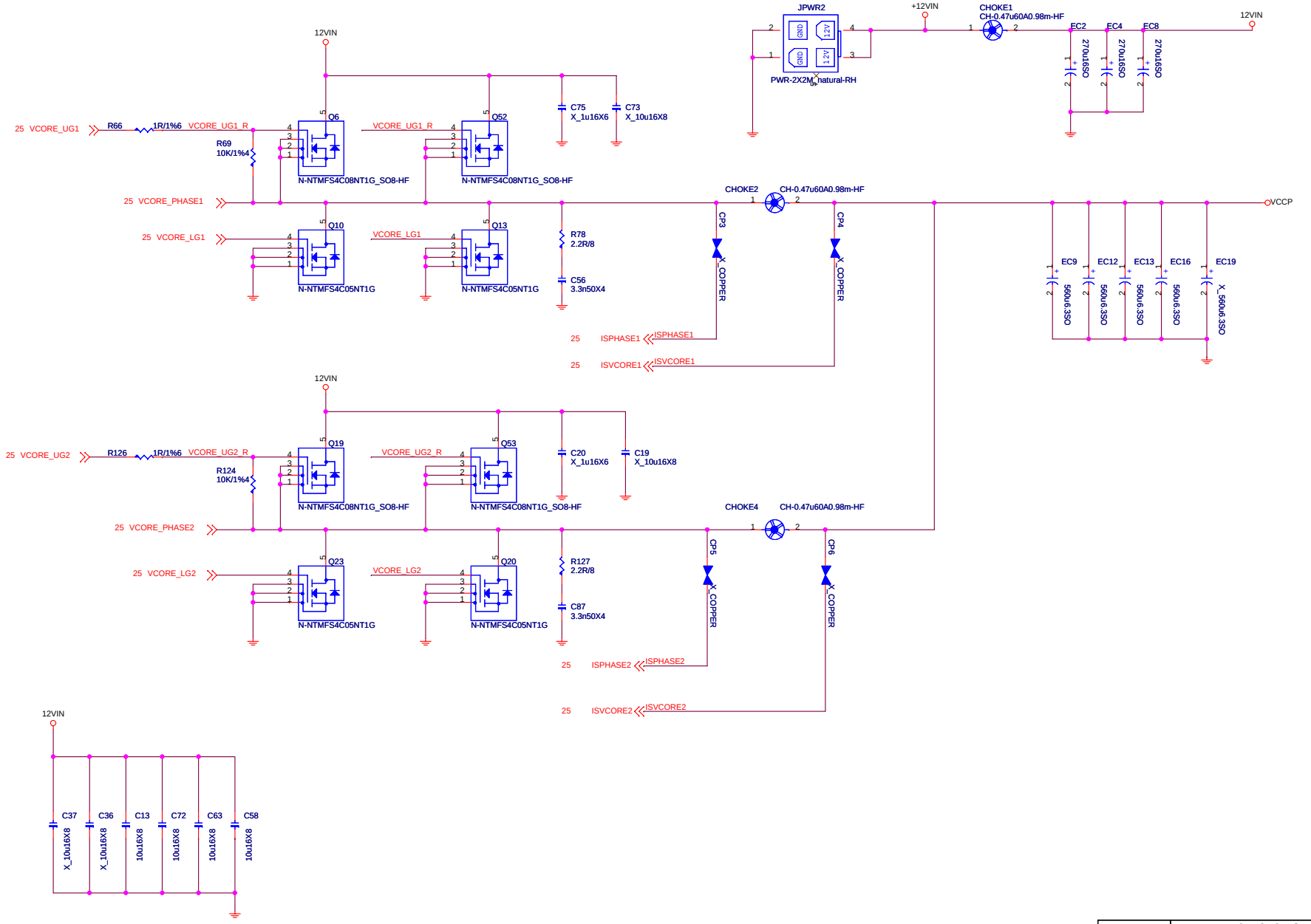
VCCP POWER

VCORE ICC MAX70A ICCTDC:47A 65W
LL:2.5m ohm



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DDR Power:1.5V

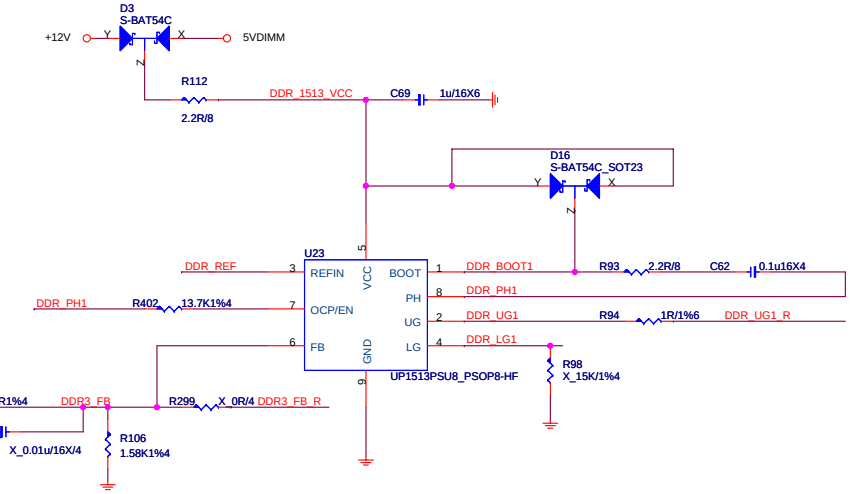
DDR3_1.5V 4.2A+6A+0.5A+7.661=18.361A

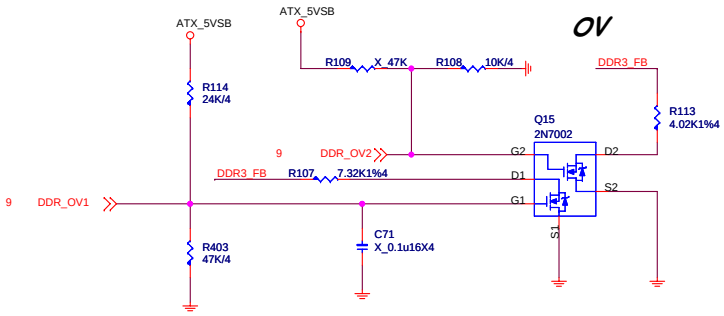
OCP:66.7A

4.2A FOR CPU
6A FOR 2DIMM
0.5A FOR DDR VTT
7.661A FOR PCH

OCP:16.447*1.5=24.6705A
OCPXRdson(Low side)=(40uA*Rocs(R122)-0.4V)
Rocs(R122)=13.75K

2012.03.22 Modify Pull hi (47K)to ATX_5VSB

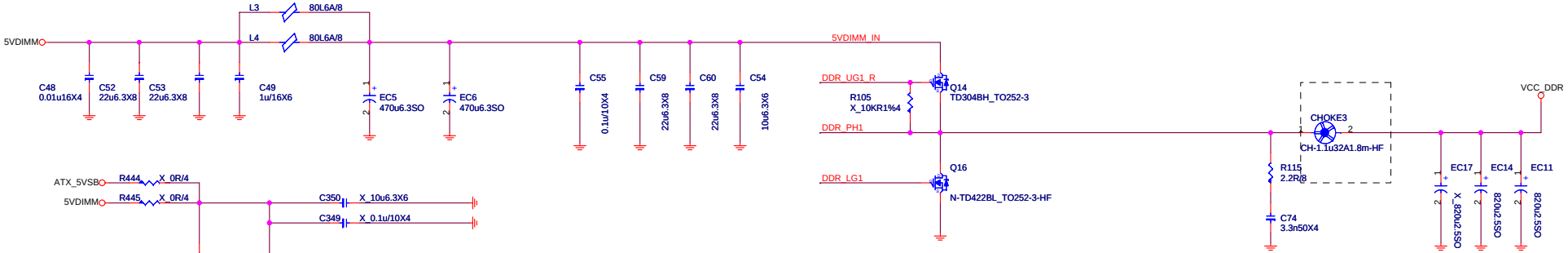


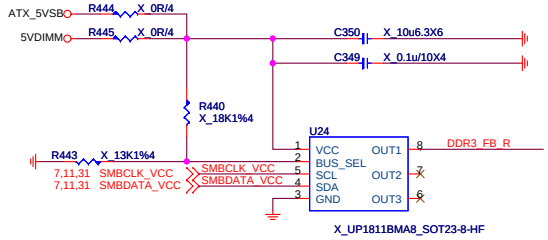


*Default 1.5V

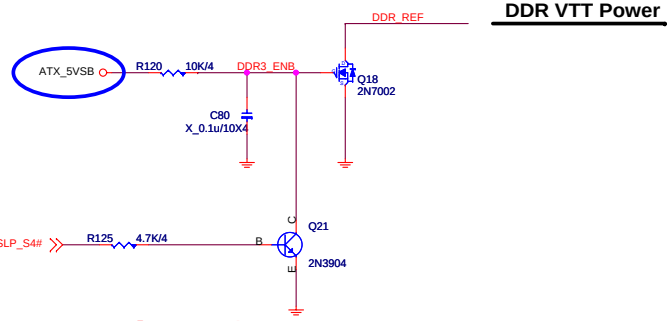
DDR_OV	1.35V	1.5V	1.65V	1.8V
DDR_OV1	Low	High	Low	High
DDR_OV2	Low	Low	High	High

DDR_OV1 = GPIO01(S/IO)
DDR_OV2 = GPIO02(S/IO)



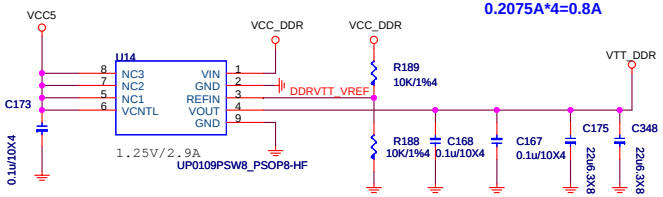


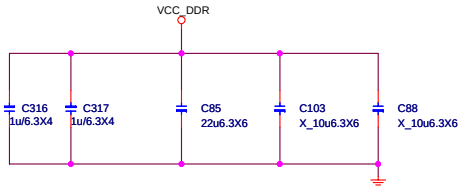
DDR VTT Power



To CPU Copper trace width > 250mils , Fill island behind DIMM > 400mils .

0.2075A*4=0.8A





P.S. Only for meet Intel power down sequence.

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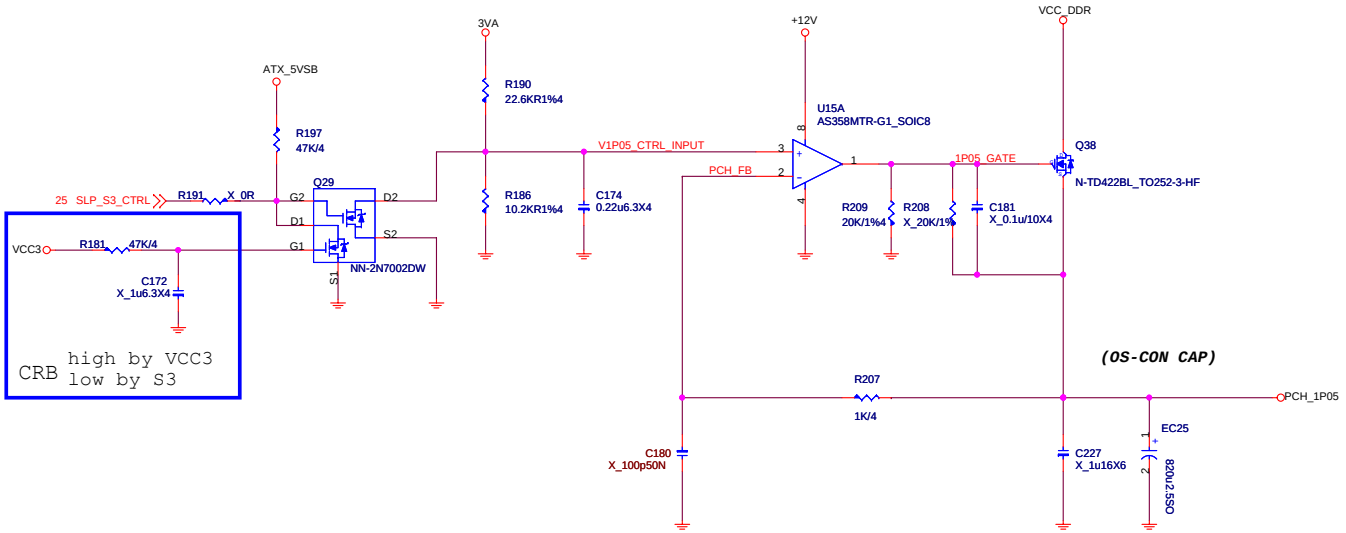
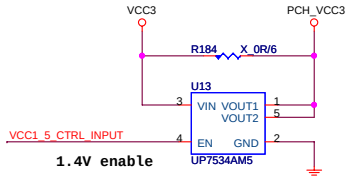
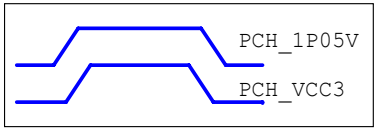
PCH Power:1.05V 5.747A

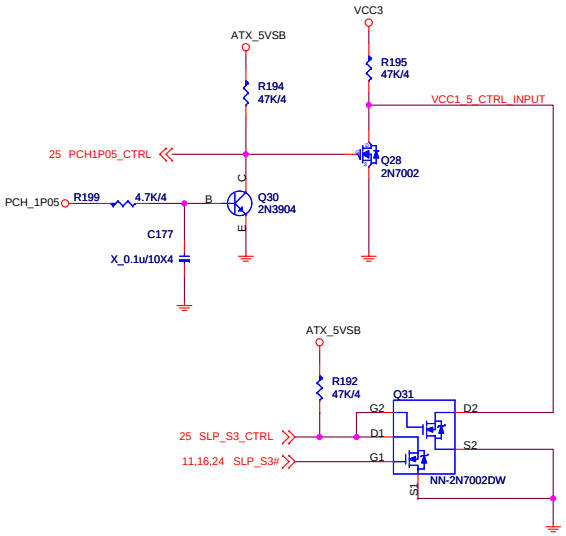


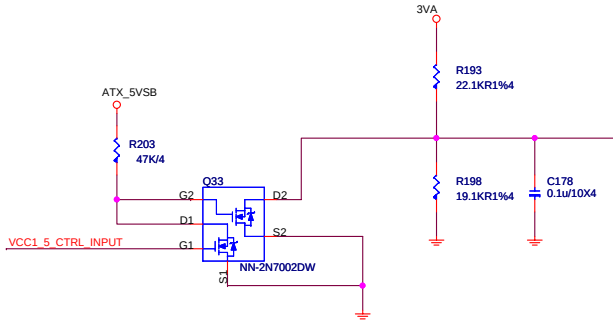
0.133A



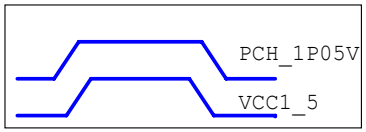


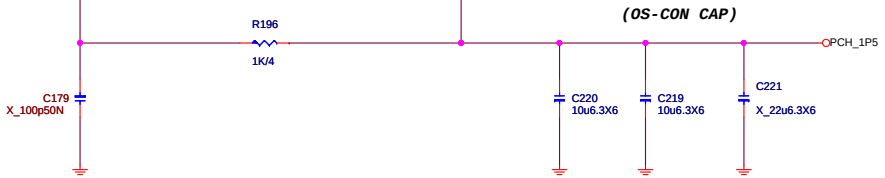
PCH Power:1.5V 0.183A





VCC1_5_CTRL_INPUT:
0:1P05V low or S3 low
1:1P05V HIGH and S3 HIGH





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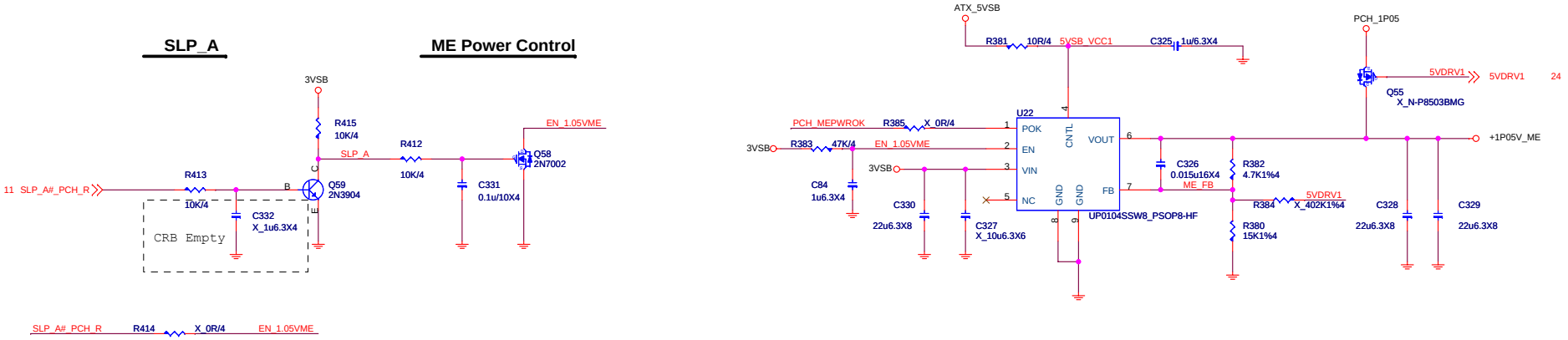
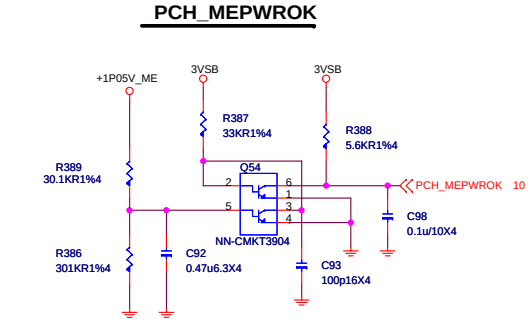
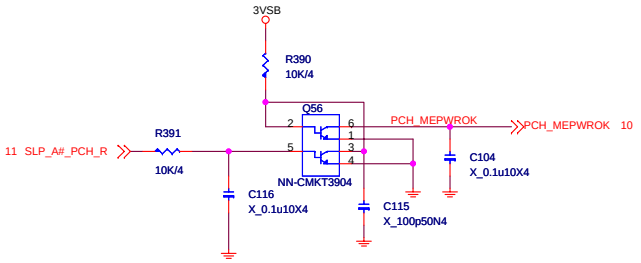
PCH ME Power:1.05V 0.670A

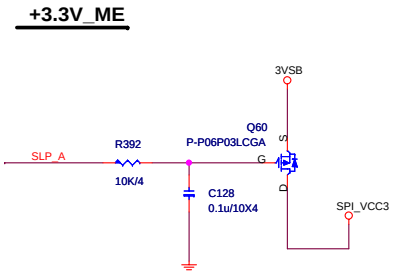




VccASW active to APWROK high 1ms

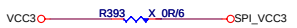


APWROK falling to VccASW falling 40ns



For INTEL ME

Z87->Stuff R366
H87->Stuff R354



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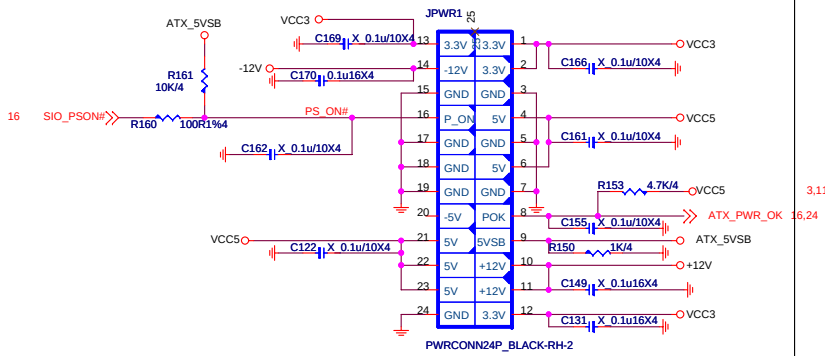
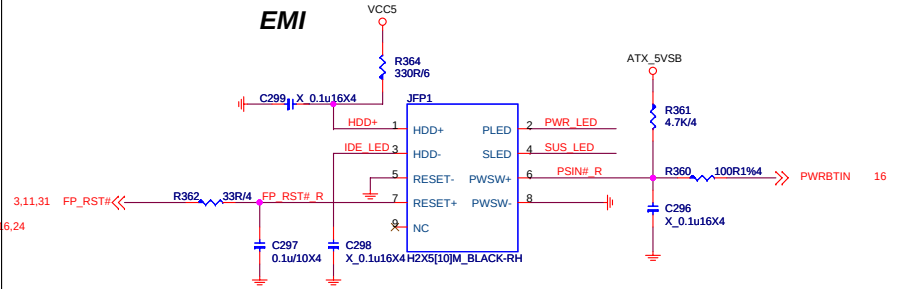
ATX POWER CONNECTOR

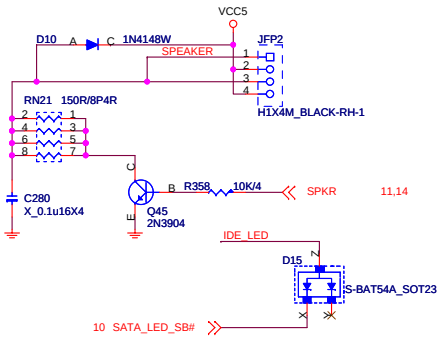


FRONT PANNEL

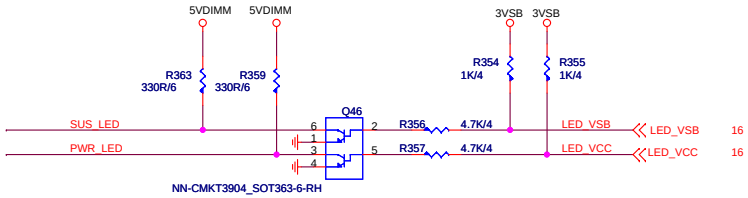
EMI



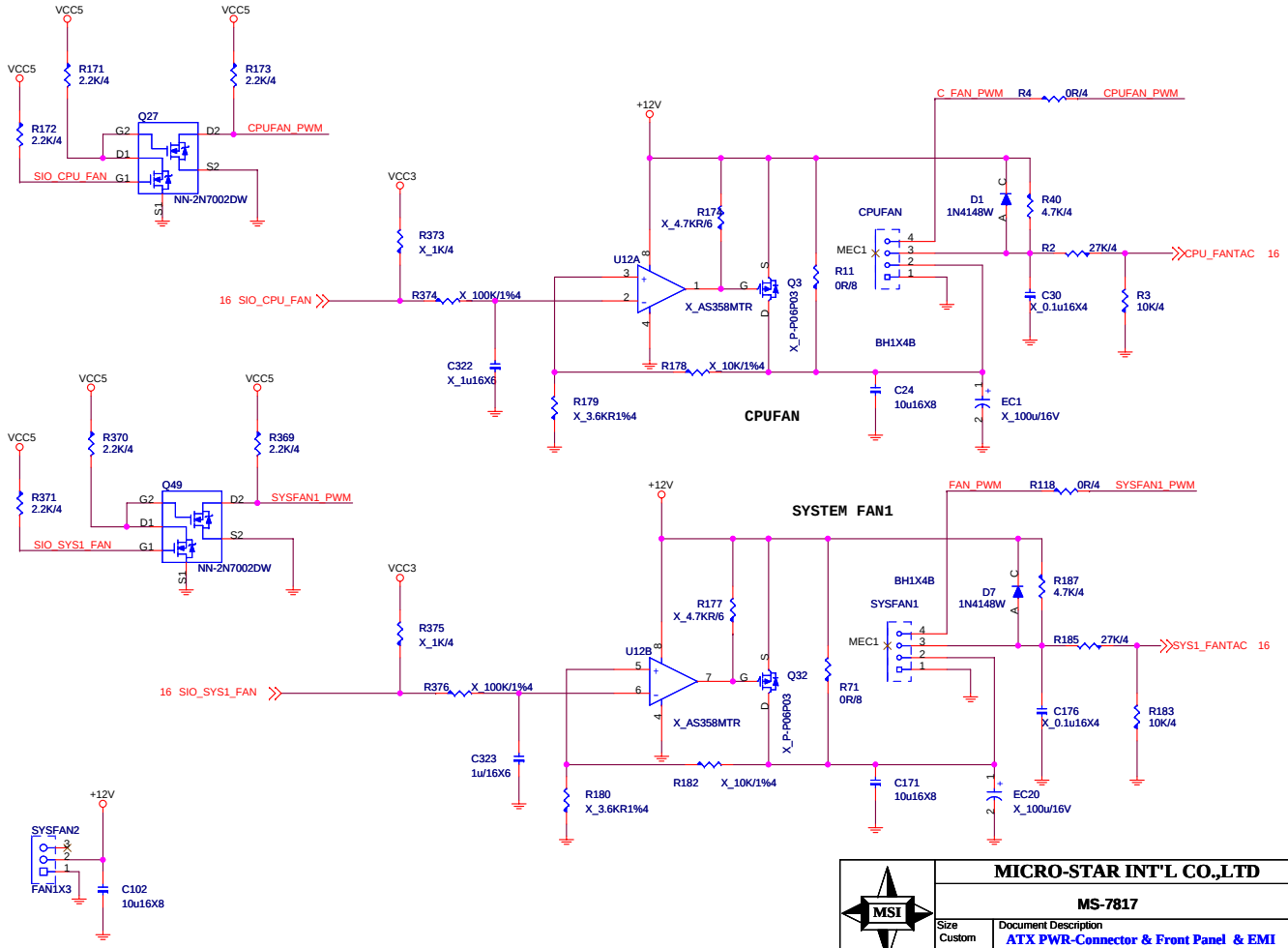
Speaker Pin Header



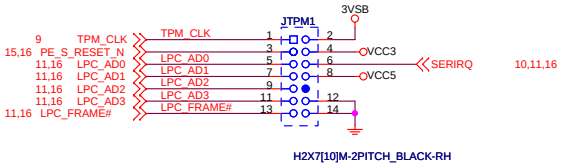
LED (for NV5533)



FAN-COUNTROL CIRCUIT



TPM/JLPC



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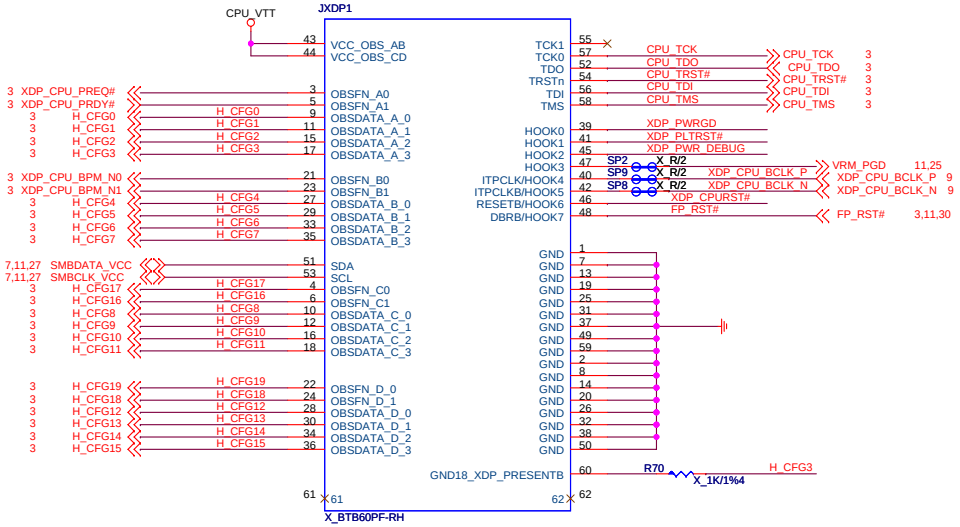
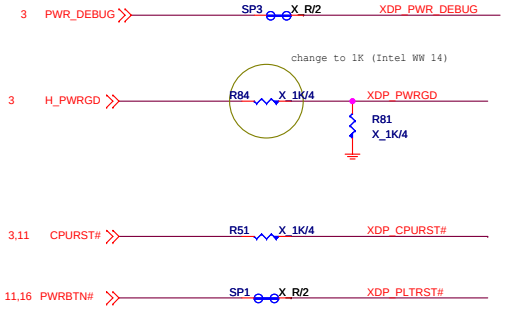
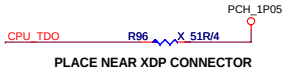
Reserve debug port 5020







PLACE NEAR XDP CONNECTOR

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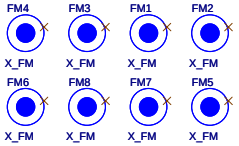
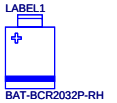
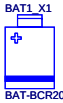
Optical Fiducial Marks-120

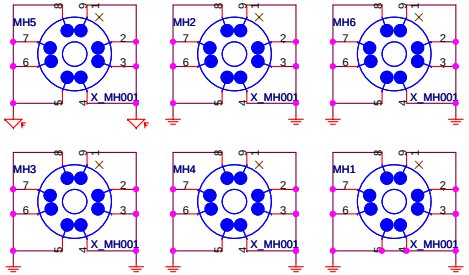




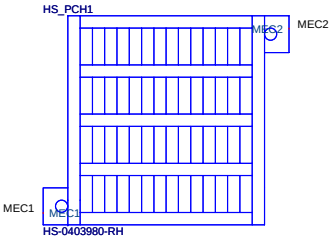


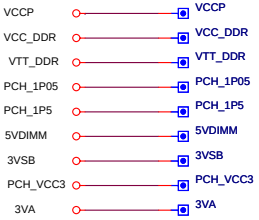
Simulation

Mounting Holes



PCH XDP PWRGD/RESET





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