
msi
B85M PRO-VD
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MS-7A01 *Ver.1.1* *174mm x 231mm*

Intel Sharkbay-B85 mATX plamform

CPU:

INTEL-Haswell LGA1150

System Chipset:

B85

Memory:

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

PWM:

VRD12 - ISL95812

OnBoard Chipset:

HD Audio Codec:ALC887

LAN-realtek8111G

SIO:NUVOTON 5533D

SPI ROM: 128 MB

Expansion Slots:

*PCI Express (X16) Slot * 1*

*PCI Express (X1) Slot * 2*

Other:

*DVI*1 (Co-layout with HDMI*1)*

*VGA*1*

*SATA3*4 SATA2*2*

*FRONT USB2.0 *4 REAL USB2.0 *2*

*FRONT USB3.0 *2 REAL USB3.0 *2*

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MS-7A01

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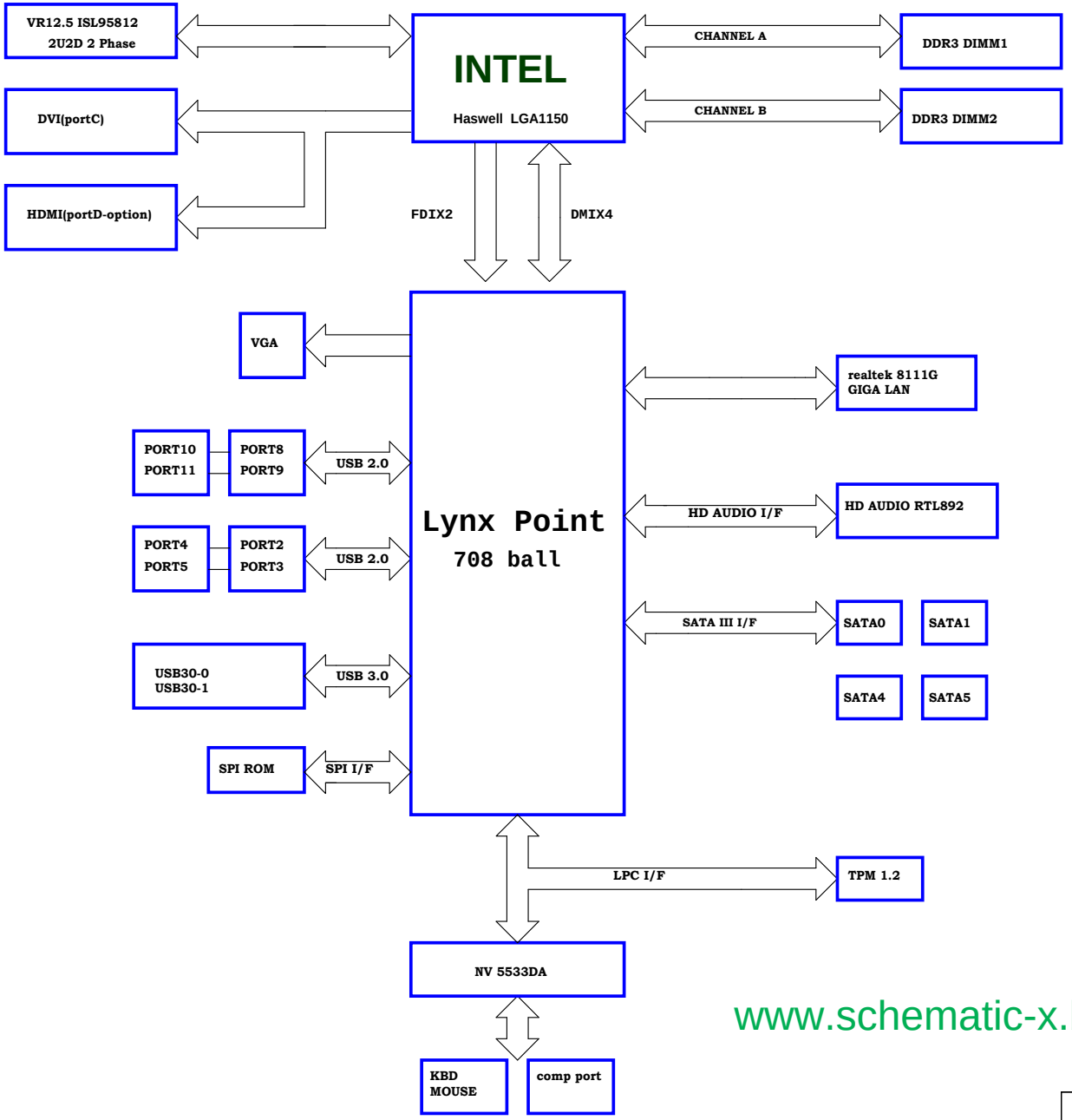
MS-7A01 Block Diagram



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	MS-7A01	
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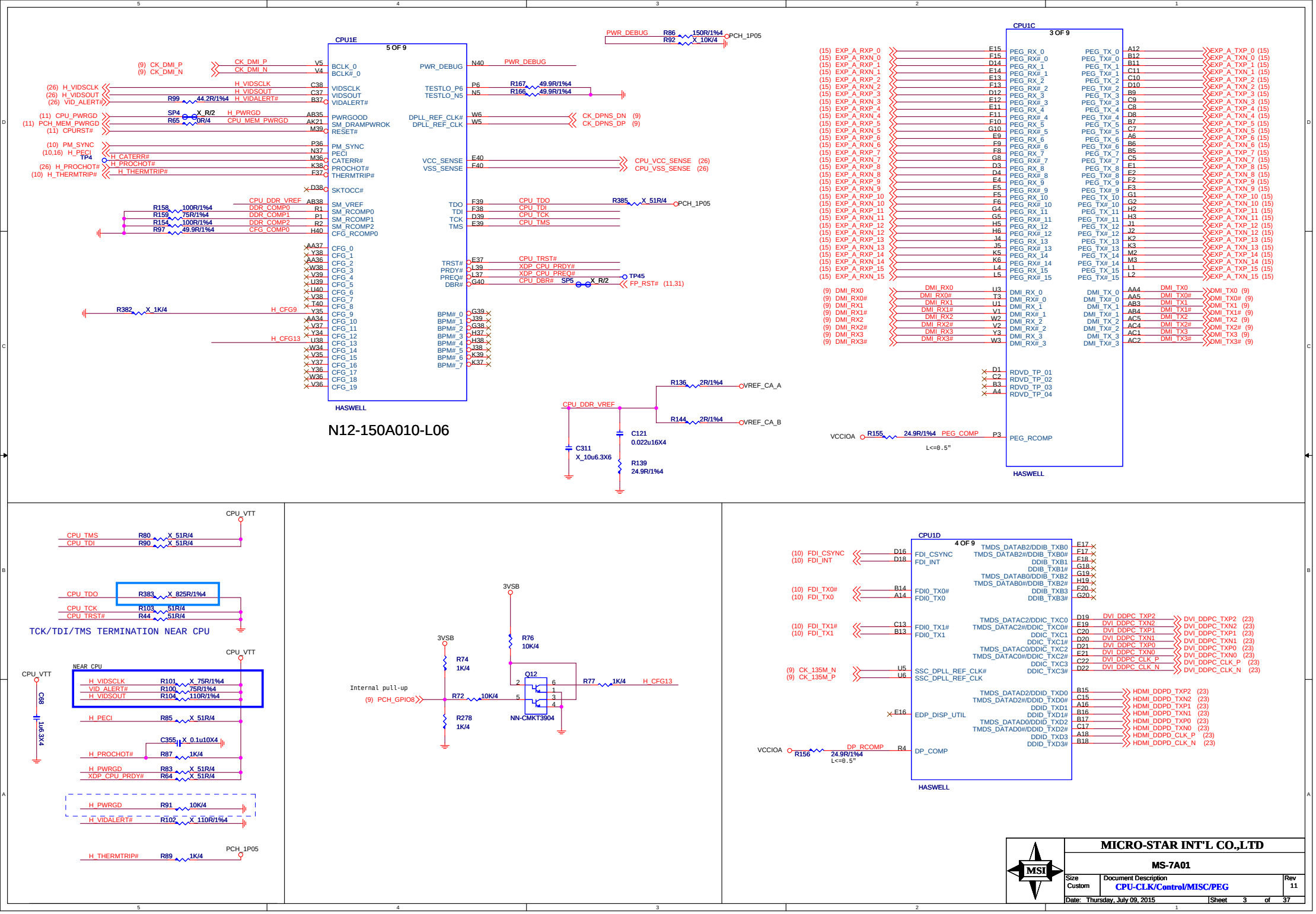
CPU1E
5 OF 9
HASWELL
CPU1C
3 OF 9
HASWELL
CPU1D
4 OF 9
HASWELL
N12-150A010-L06
TCK/TDI/TMS TERMINATION NEAR CPU
MICRO-STAR INT'L CO.,LTD
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CPU-CLK/Control/MISC/PEG
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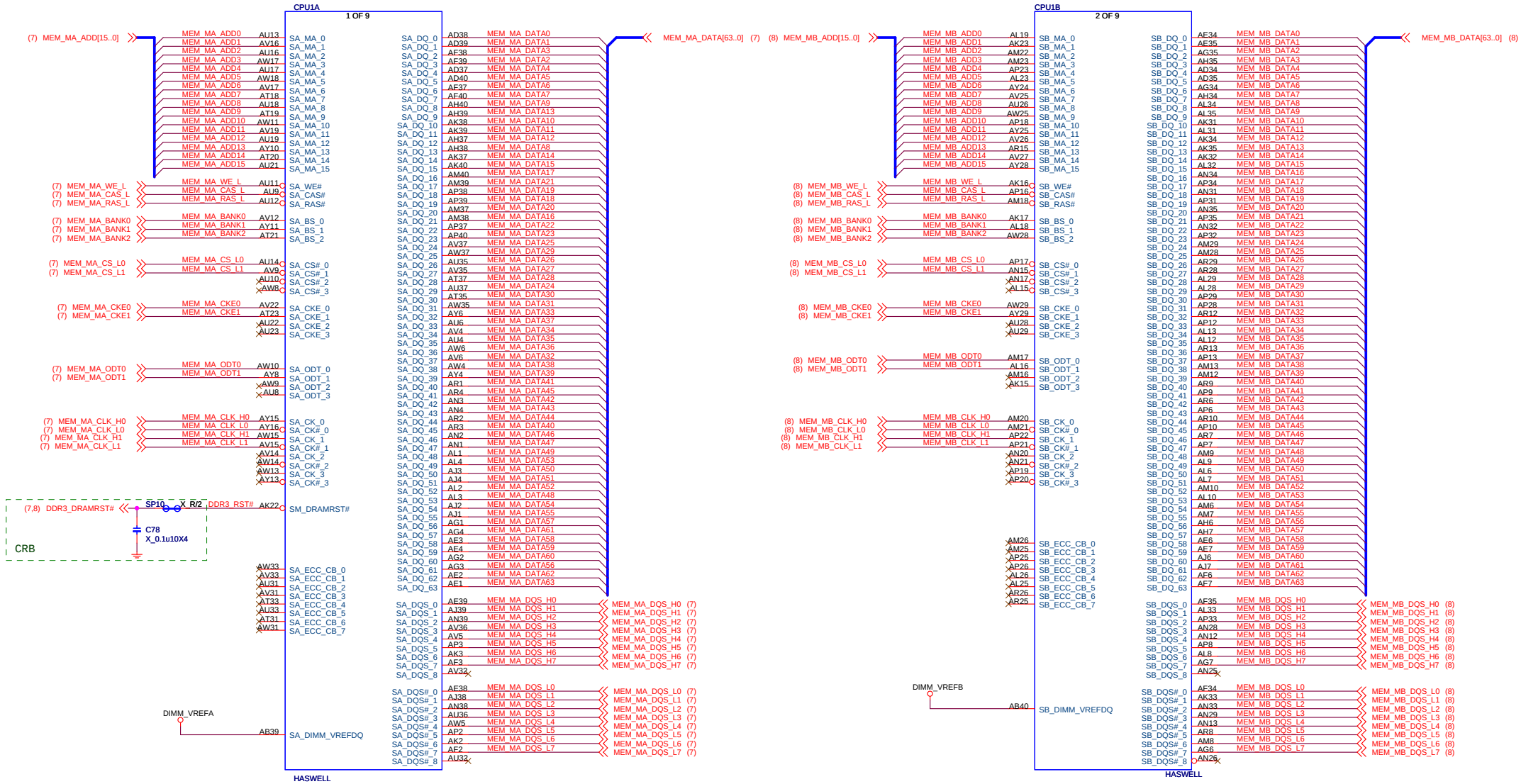

N12-150A010-L06

MICRO-STAR INT'L CO.,LTD			
MS-7A01			
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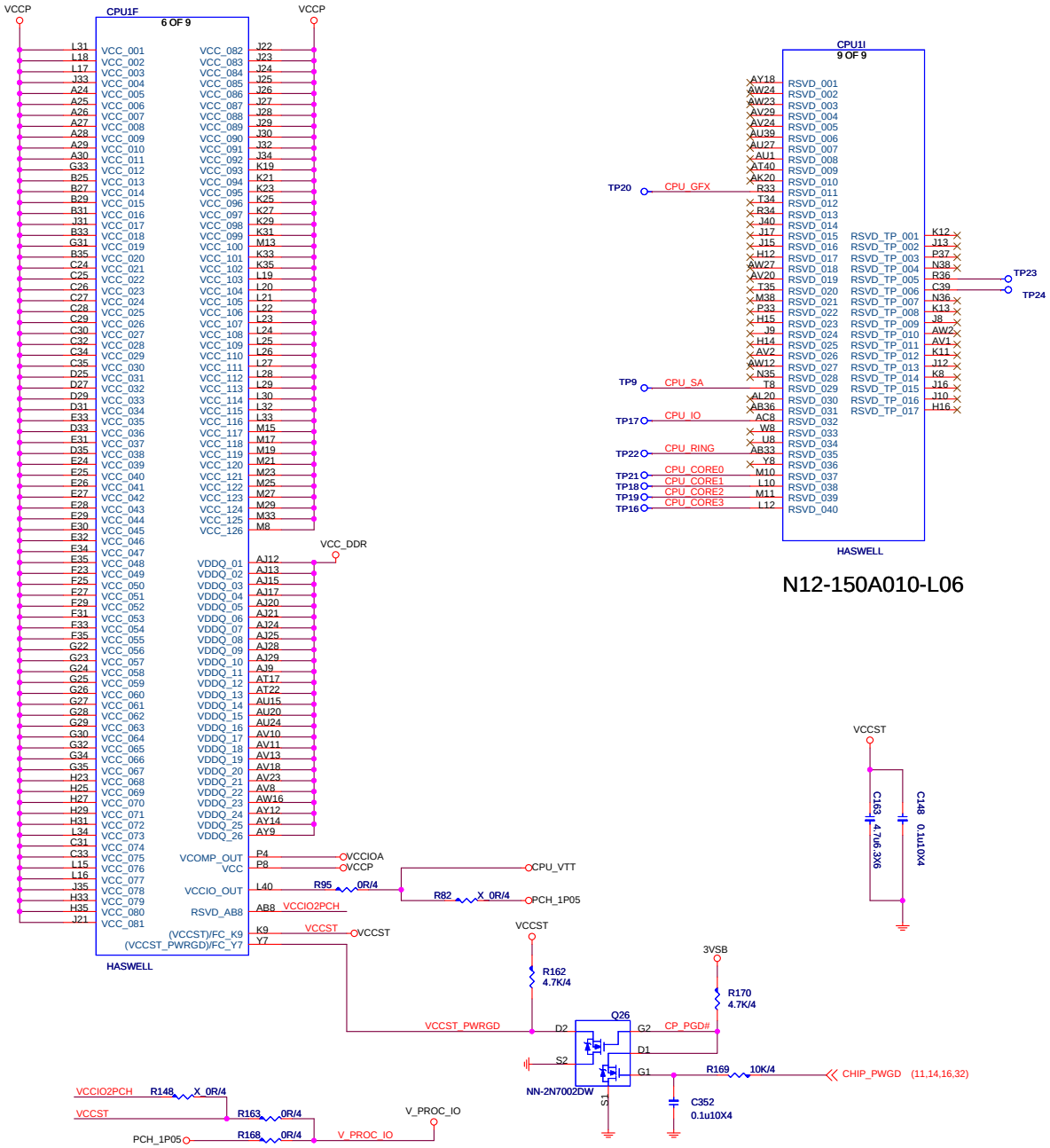
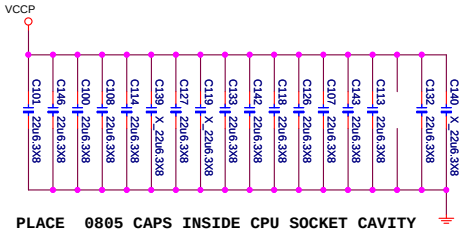


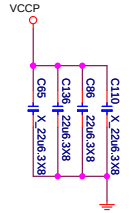
N12-150A010-L06

+CPU_VCCP-Decoupling

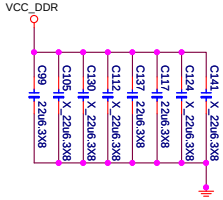


PLACE 0805 CAPS INSIDE CPU SOCKET CAVITY

PLACE 0805 CAPS Near CPU SOCKET edge



+1.5V_DDR3-Decoupling



CPU SOCKET CAVITY CAPS

MICRO-STAR INT'L CO.,LTD		
MS-7A01		
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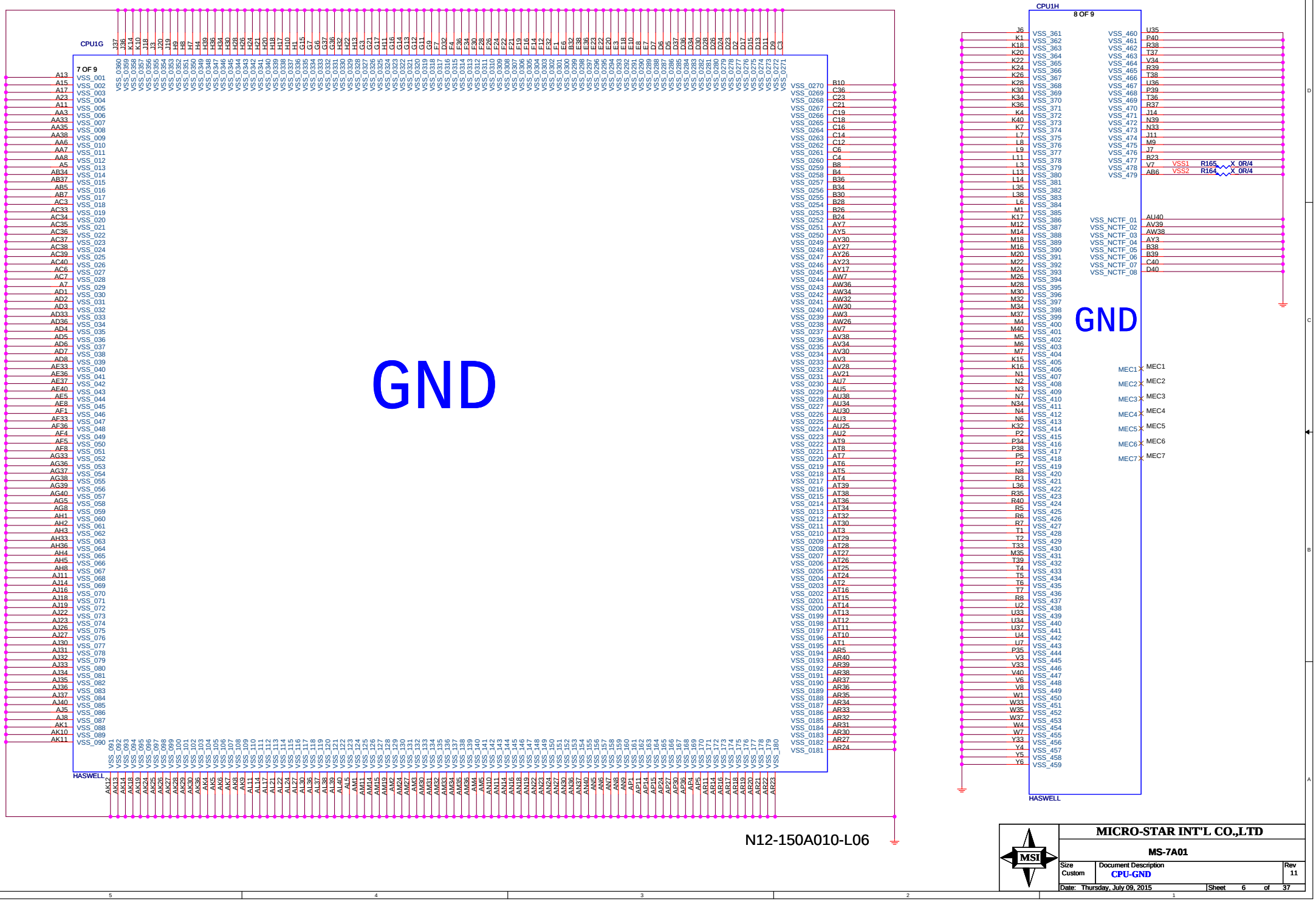

MICRO-STAR INT'L CO.,LTD	
MS-7A01	
Size: Custom	Document Description: CPU-GND
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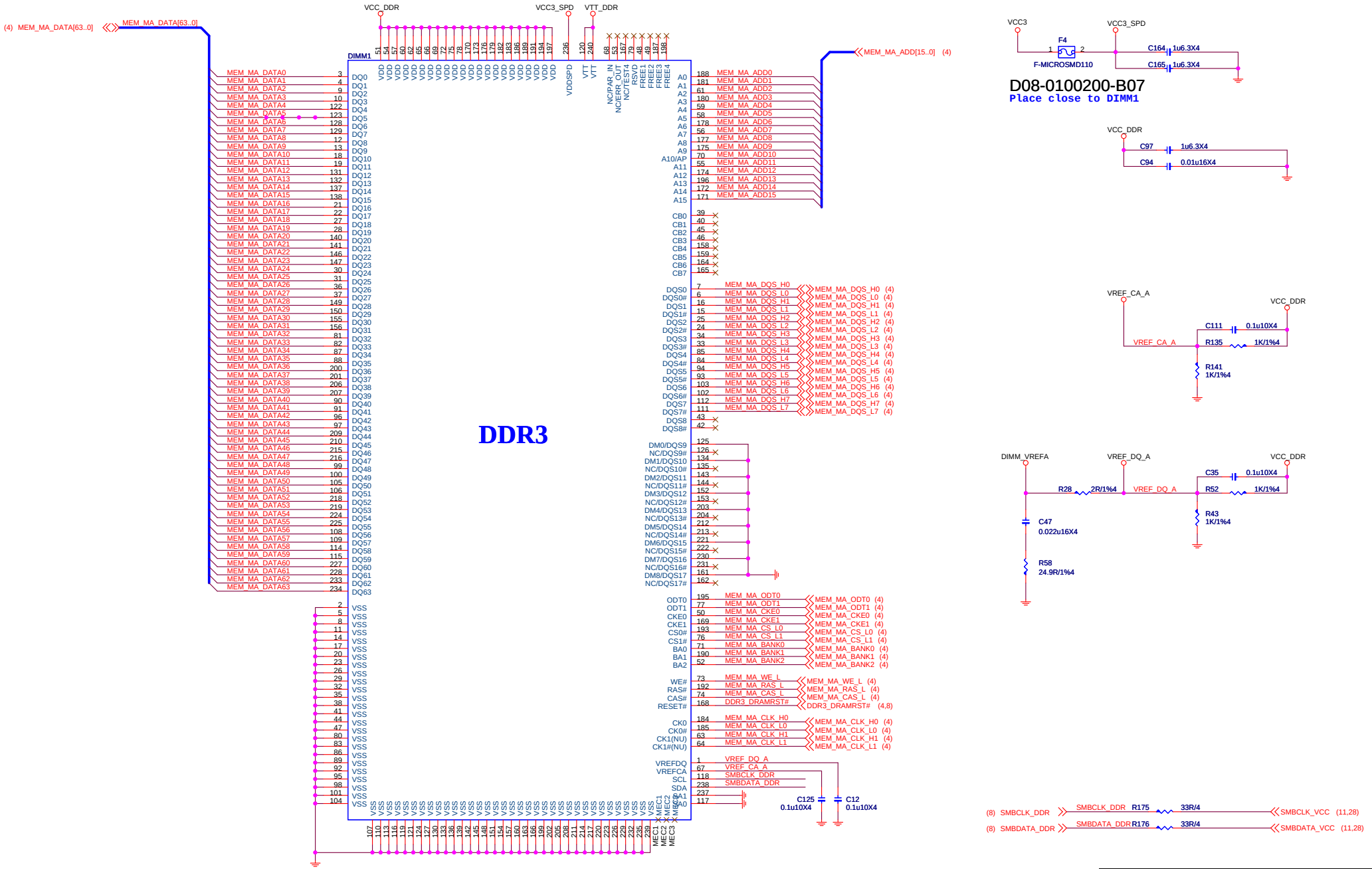

MICRO-STAR INT'L CO.,LTD	
MS-7A01	
Size: Custom	Document Description: DDR3 Chanel-A DIMM1
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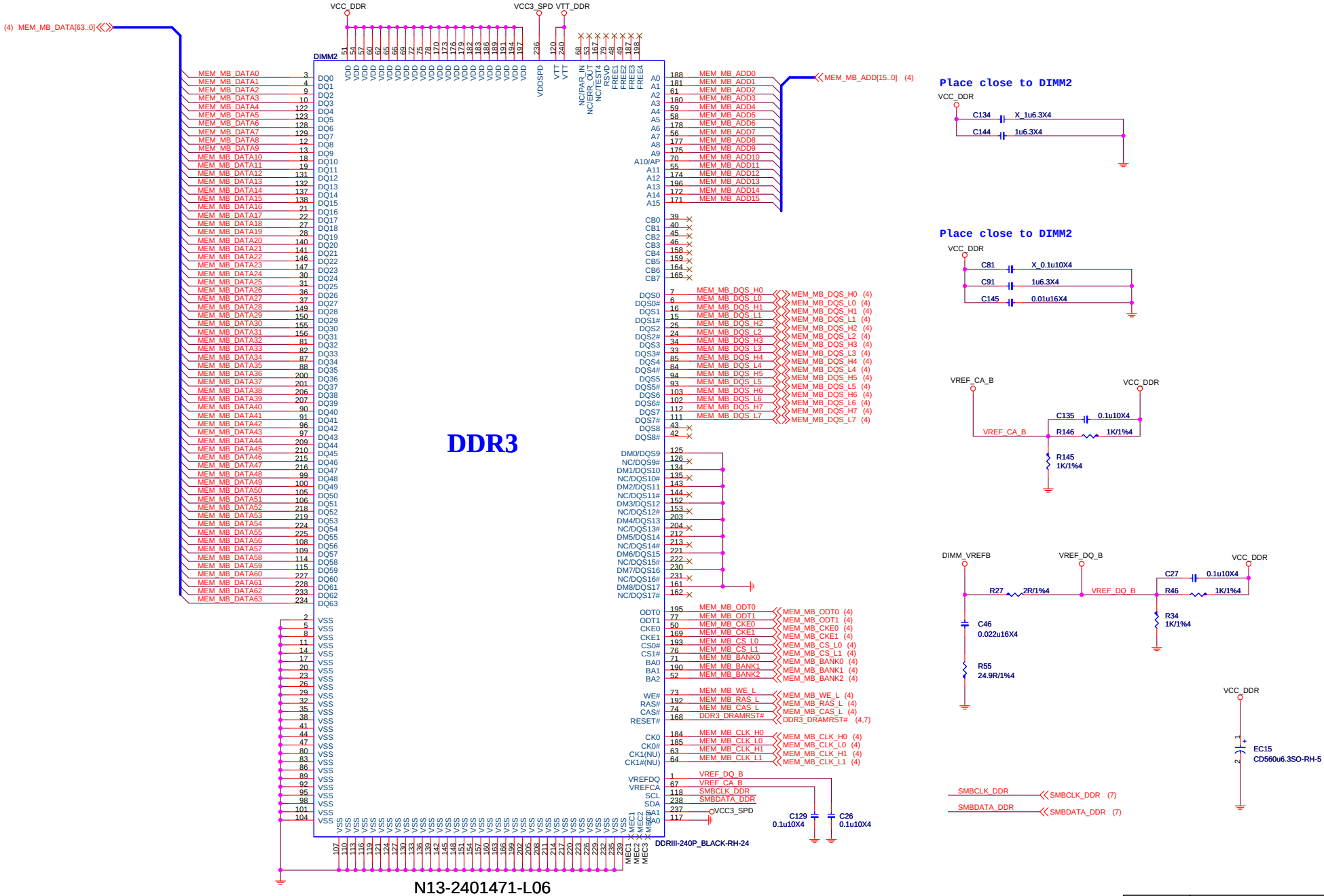
DDRIII DIMM_B0



N13-2401471-L06

Place close to DIMM2

Place close to DIMM2

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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

H81 disabled

H81 disabled

H81 disabled

H81 disabled

PCH1B

PCI-E

USB(2.0)

USB(3.0)

DMI

2 OF 8

LYNX

PCH1F

CLOCK

CLOCK_IN

EMC

Programmable output clock to 33/48MHZ

6 OF 8

LYNX

B01-82B8545-I06

PCH1A

PIRQ&GPIO

1 OF8

LYNX

OC 0-3 for usb 0-7
OC 7-4 for usb 8-13

default:OUTPUT

no clock gen pull down

OPT BOM:FOR BIOS USE

CRYSTAL:25MHZ

D04-1000201-F07

GPIO10	Sus	Native	Yes	No	No	Multiplexed with OC6#. When configured as GPIO, default direction is Input (GPI).

MICRO-STAR INT'L CO.,LTD

MS-7A01

Size: Custom | Document Description: LYNX PCIE/DMI/USB/CLK | Rev: 11

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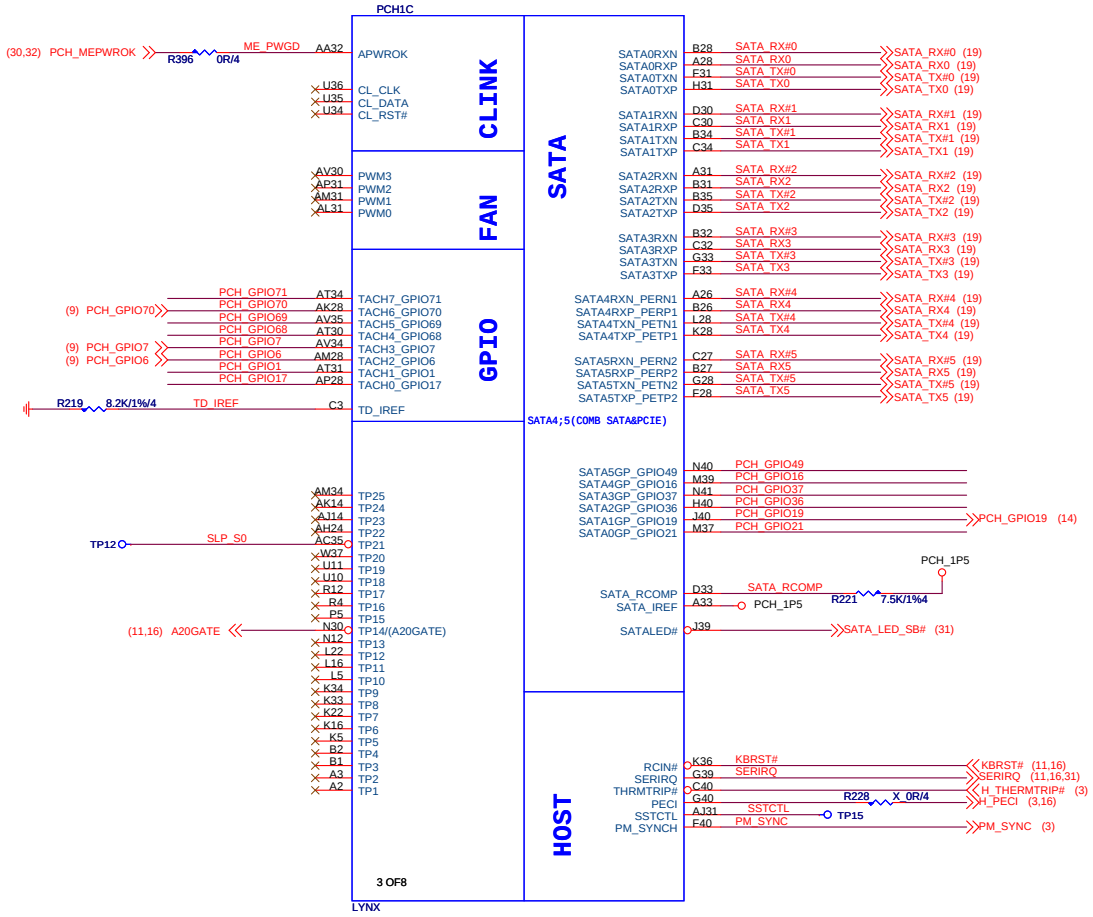
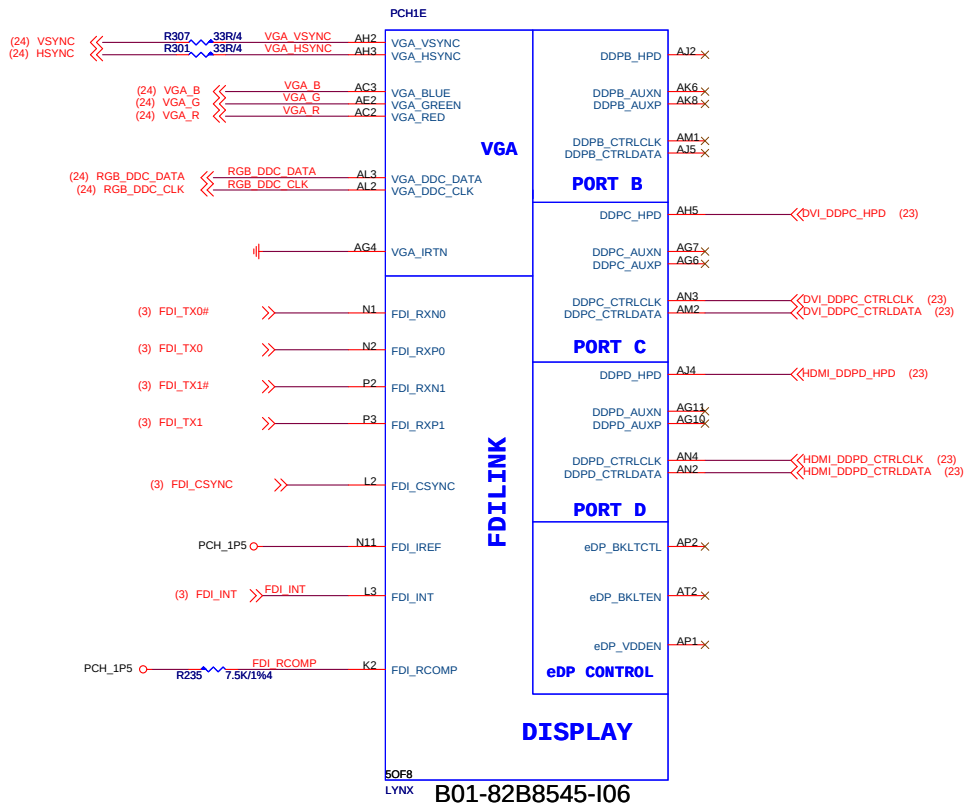
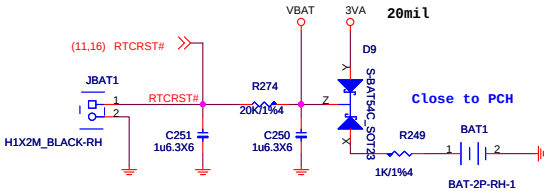
SATA ports 2 and 3 are disabled on 4 port SKUs.
SATA 6 Gb/s support on ports 0 and 1 only.





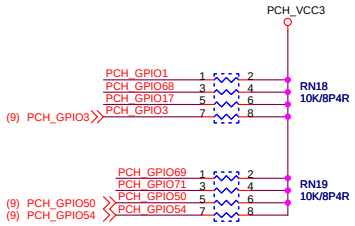
B01-82B8545-I06

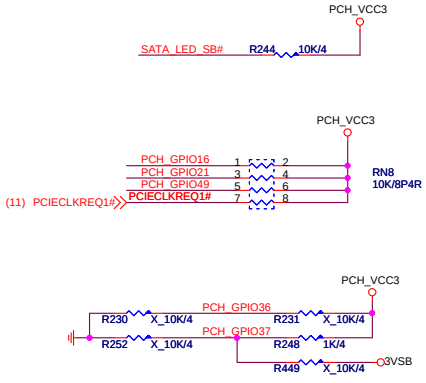
RTC and CLR_CMOS



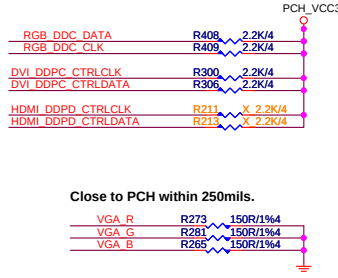
N31-1020151-H06

N91-01F0151-L06





Enable VGA(CTRLCLK/DATA Pull High)



MICRO-STAR INT'L CO.,LTD	
MS-7A01	
Size: Custom	Document Description: LYNX-SATA/HOST/GPIO/VGA
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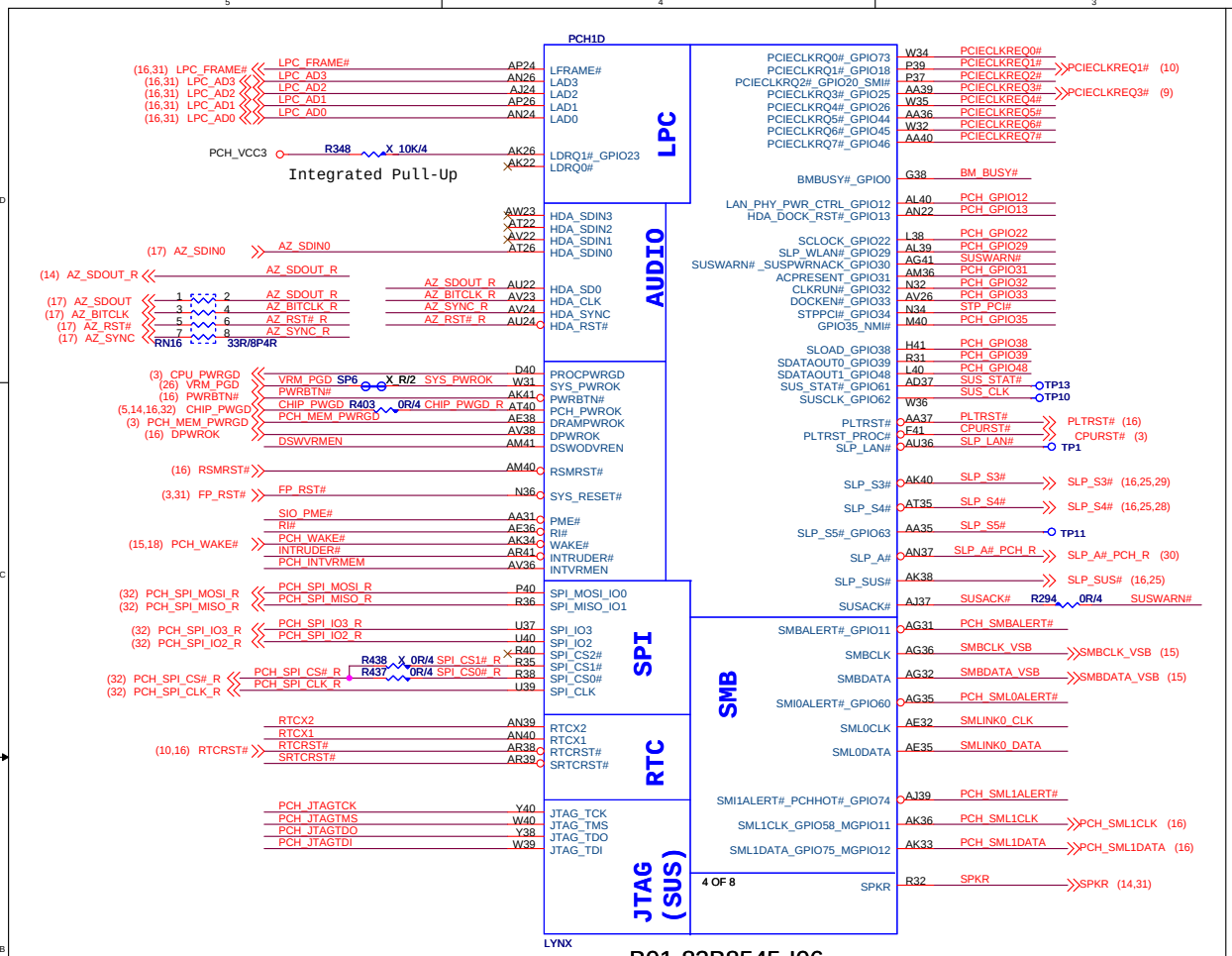
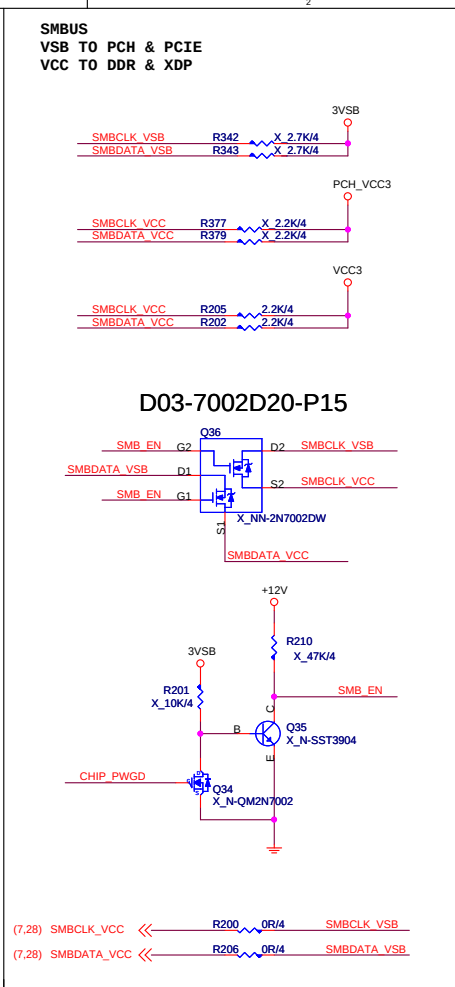
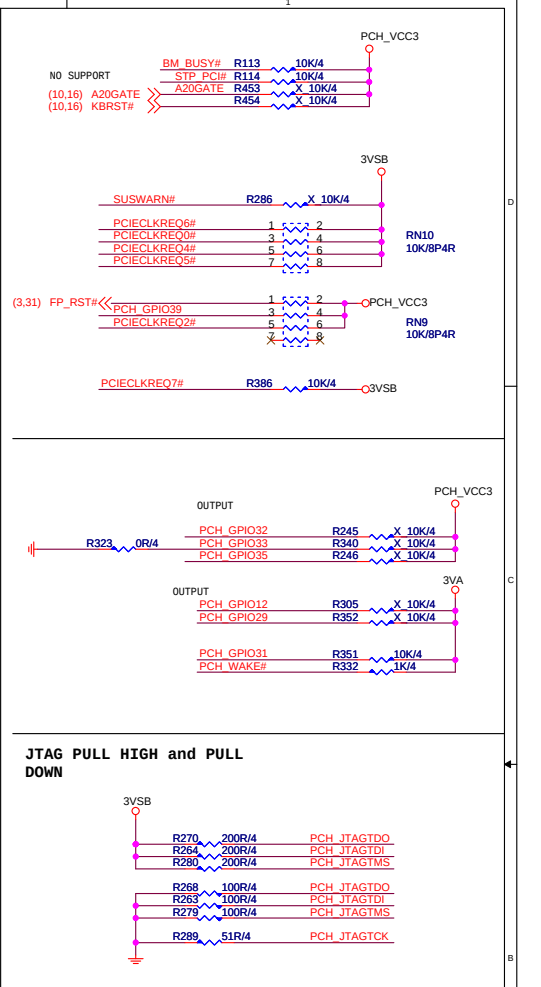


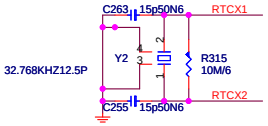
B01-82B8545-I06



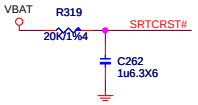


RTC Block

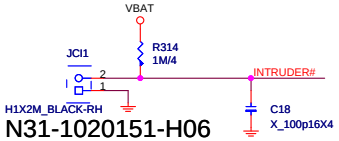
Close to PCH



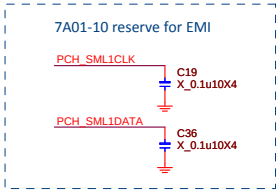
D04-0301211-F07

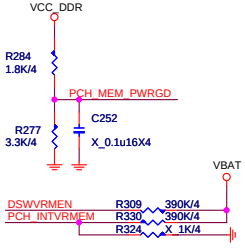


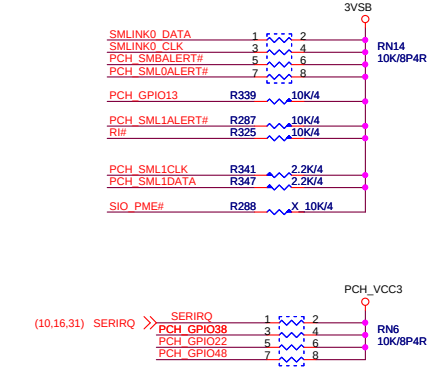
Chassis Intrusion



N31-1020151-H06







MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7A01	
Size: Custom	Document Description: LYNX-SMB/LPC/AUDIO/RTC	Rev: 11
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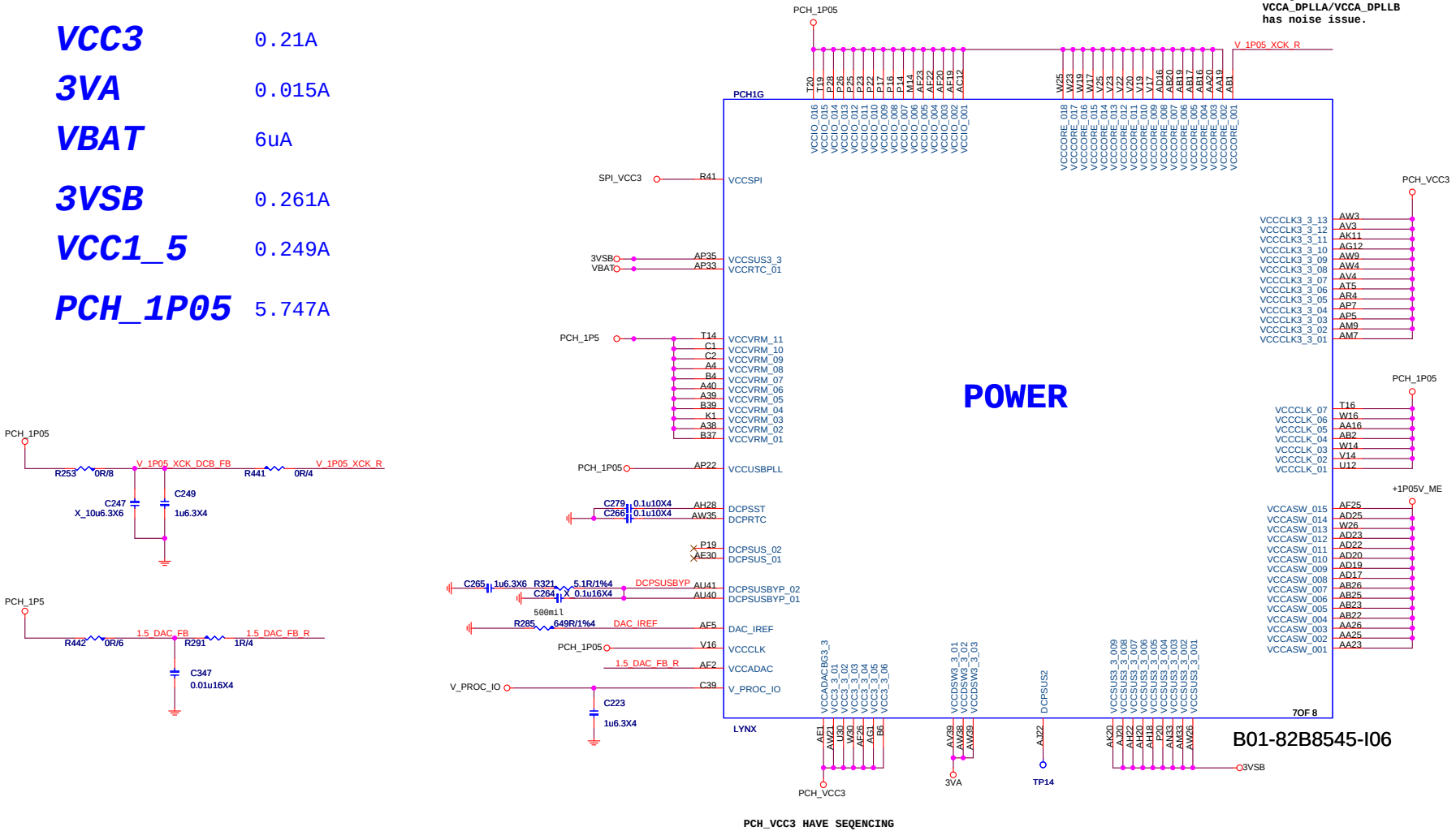
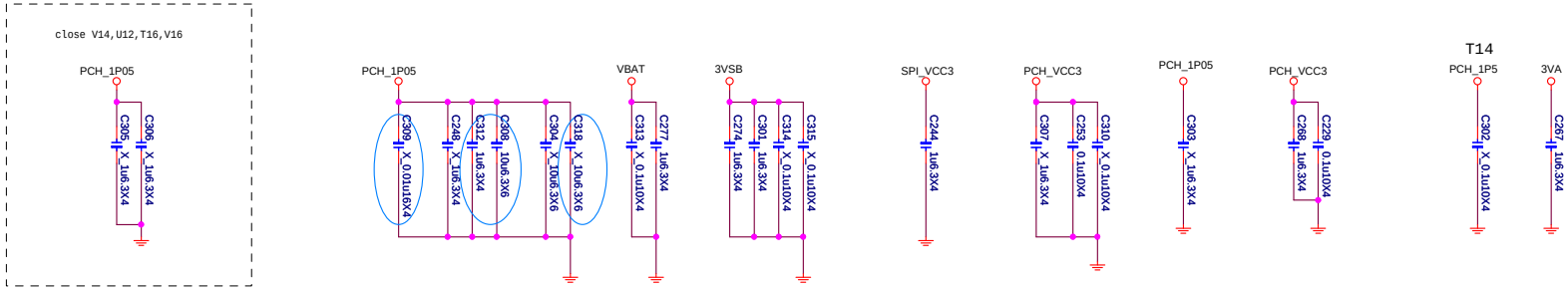
VCC3	0.21A
3VA	0.015A
VBAT	6uA
3VSB	0.261A
VCC1_5	0.249A
PCH_1P05	5.747A



PCH decoupling cap



MICRO-STAR INT'L CO.,LTD			
MS-7A01			
Size: Custom	Document Description: LYNX -POWER PIN		Rev: 11
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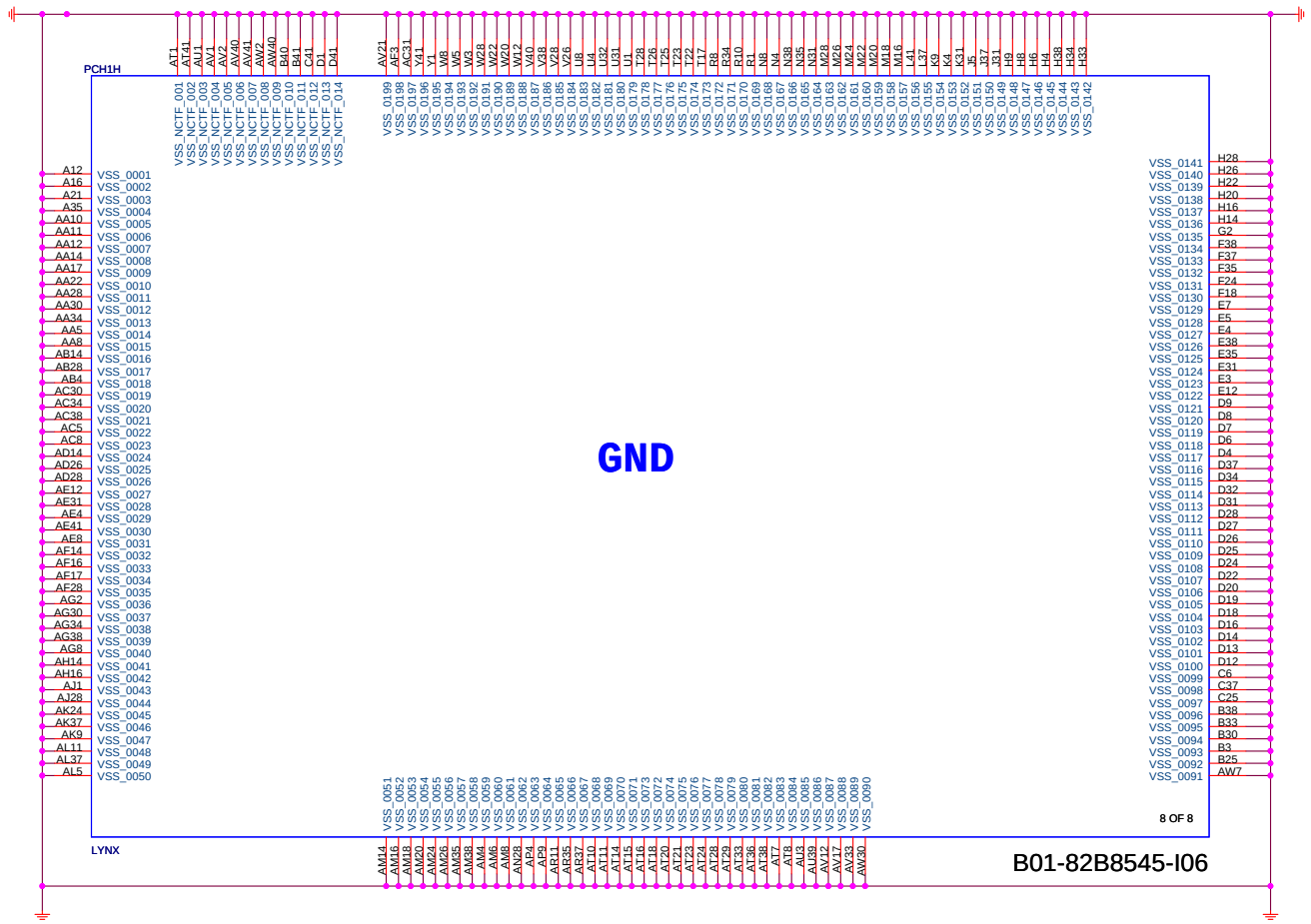

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MS-7A01	
Size: Custom	Document Description: LYNX-GND
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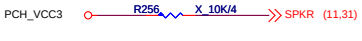
PCH Straps



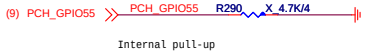
SPKR

Default Mode:

Internal weak Pull-down.

No Reboot Mode with TCO Disabled:

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



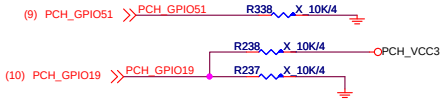
GPIO55

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:

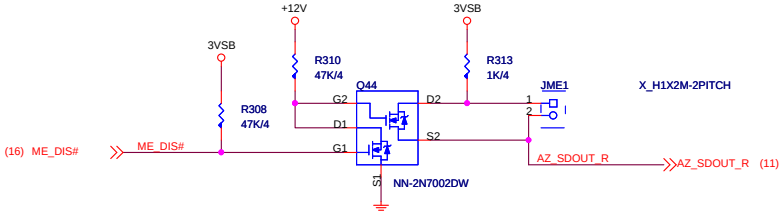
Connect SATA1GP/GPIO19 to ground with 1k Ohm pull-down resistor.
Leave GPIO51 Floating.

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

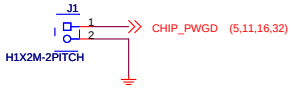
Enable TLS:

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		
MS-7A01		
Size: Custom	Document Description: LYNX STRAPS	Rev: 11
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PCI-E x16:N11-1640961-L06/N11-1640961-F02
PCI-E x1:N11-0360211-F02/N11-0360381-L06

(11) SMBCLK_VSB
(11) SMBDATA_VSB
SMBCLK_VSB R450 0R/4 SMBCLK_VSB_R
SMBDATA_VSB R451 0R/4 SMBDATA_VSB_R

C351 0.1u10X4
D17
SMBDATA_VSB_R
SMBCLK_VSB_R
ESD-AOZ8902

D0G-0200529-A68

PCI_E1 MEC1

SMBCLK_VSB_R
SMBDATA_VSB_R
VCC3
3VSB
(11,18) PCH_WAKE#
+12V
PE_S_RESET_SLOT
PE_S_RESET_SLOT (16)

(3) EXP_A_TXP_0	C185	0.22u6.3X4	EXP_A_TXP_0_C	EXP_A_RXP_0	EXP_A_RXP_0 (3)
(3) EXP_A_TXN_0	C184	0.22u6.3X4	EXP_A_TXN_0_C	EXP_A_RXN_0	EXP_A_RXN_0 (3)
(3) EXP_A_TXP_1	C187	0.22u6.3X4	EXP_A_TXP_1_C	EXP_A_RXP_1	EXP_A_RXP_1 (3)
(3) EXP_A_TXN_1	C186	0.22u6.3X4	EXP_A_TXN_1_C	EXP_A_RXN_1	EXP_A_RXN_1 (3)
(3) EXP_A_TXP_2	C183	0.22u6.3X4	EXP_A_TXP_2_C	EXP_A_RXP_2	EXP_A_RXP_2 (3)
(3) EXP_A_TXN_2	C182	0.22u6.3X4	EXP_A_TXN_2_C	EXP_A_RXN_2	EXP_A_RXN_2 (3)
(3) EXP_A_TXP_3	C189	0.22u6.3X4	EXP_A_TXP_3_C	EXP_A_RXP_3	EXP_A_RXP_3 (3)
(3) EXP_A_TXN_3	C188	0.22u6.3X4	EXP_A_TXN_3_C	EXP_A_RXN_3	EXP_A_RXN_3 (3)
(3) EXP_A_TXP_4	C191	0.22u6.3X4	EXP_A_TXP_4_C	EXP_A_RXP_4	EXP_A_RXP_4 (3)
(3) EXP_A_TXN_4	C190	0.22u6.3X4	EXP_A_TXN_4_C	EXP_A_RXN_4	EXP_A_RXN_4 (3)
(3) EXP_A_TXP_5	C192	0.22u6.3X4	EXP_A_TXP_5_C	EXP_A_RXP_5	EXP_A_RXP_5 (3)
(3) EXP_A_TXN_5	C193	0.22u6.3X4	EXP_A_TXN_5_C	EXP_A_RXN_5	EXP_A_RXN_5 (3)
(3) EXP_A_TXP_6	C194	0.22u6.3X4	EXP_A_TXP_6_C	EXP_A_RXP_6	EXP_A_RXP_6 (3)
(3) EXP_A_TXN_6	C195	0.22u6.3X4	EXP_A_TXN_6_C	EXP_A_RXN_6	EXP_A_RXN_6 (3)
(3) EXP_A_TXP_7	C196	0.22u6.3X4	EXP_A_TXP_7_C	EXP_A_RXP_7	EXP_A_RXP_7 (3)
(3) EXP_A_TXN_7	C197	0.22u6.3X4	EXP_A_TXN_7_C	EXP_A_RXN_7	EXP_A_RXN_7 (3)
(3) EXP_A_TXP_8	C198	0.22u6.3X4	EXP_A_TXP_8_C	EXP_A_RXP_8	EXP_A_RXP_8 (3)
(3) EXP_A_TXN_8	C199	0.22u6.3X4	EXP_A_TXN_8_C	EXP_A_RXN_8	EXP_A_RXN_8 (3)
(3) EXP_A_TXP_9	C200	0.22u6.3X4	EXP_A_TXP_9_C	EXP_A_RXP_9	EXP_A_RXP_9 (3)
(3) EXP_A_TXN_9	C201	0.22u6.3X4	EXP_A_TXN_9_C	EXP_A_RXN_9	EXP_A_RXN_9 (3)
(3) EXP_A_TXP_10	C203	0.22u6.3X4	EXP_A_TXP_10_C	EXP_A_RXP_10	EXP_A_RXP_10 (3)
(3) EXP_A_TXN_10	C202	0.22u6.3X4	EXP_A_TXN_10_C	EXP_A_RXN_10	EXP_A_RXN_10 (3)
(3) EXP_A_TXP_11	C205	0.22u6.3X4	EXP_A_TXP_11_C	EXP_A_RXP_11	EXP_A_RXP_11 (3)
(3) EXP_A_TXN_11	C204	0.22u6.3X4	EXP_A_TXN_11_C	EXP_A_RXN_11	EXP_A_RXN_11 (3)
(3) EXP_A_TXP_12	C206	0.22u6.3X4	EXP_A_TXP_12_C	EXP_A_RXP_12	EXP_A_RXP_12 (3)
(3) EXP_A_TXN_12	C207	0.22u6.3X4	EXP_A_TXN_12_C	EXP_A_RXN_12	EXP_A_RXN_12 (3)
(3) EXP_A_TXP_13	C213	0.22u6.3X4	EXP_A_TXP_13_C	EXP_A_RXP_13	EXP_A_RXP_13 (3)
(3) EXP_A_TXN_13	C208	0.22u6.3X4	EXP_A_TXN_13_C	EXP_A_RXN_13	EXP_A_RXN_13 (3)
(3) EXP_A_TXP_14	C209	0.22u6.3X4	EXP_A_TXP_14_C	EXP_A_RXP_14	EXP_A_RXP_14 (3)
(3) EXP_A_TXN_14	C210	0.22u6.3X4	EXP_A_TXN_14_C	EXP_A_RXN_14	EXP_A_RXN_14 (3)
(3) EXP_A_TXP_15	C212	0.22u6.3X4	EXP_A_TXP_15_C	EXP_A_RXP_15	EXP_A_RXP_15 (3)
(3) EXP_A_TXN_15	C211	0.22u6.3X4	EXP_A_TXN_15_C	EXP_A_RXN_15	EXP_A_RXN_15 (3)

CK_16PORT_DP (9)
CK_16PORT_DN (9)

SLOT-PCI164P_BLACK-2PITCH-RH-51

PCI_E2

(9) PE4_SLOT1_TX
(9) PE4_SLOT1_TX#
C258 0.1u10X4 PE4_SLOT1_TX_C
C257 0.1u10X4 PE4_SLOT1_TX#_C
CK_PEX1_P (9)
CK_PEX1_N (9)
PE4_SLOT1_RX (9)
PE4_SLOT1_RX# (9)

SLOT-PCIEx1_BLACK-R

N11-0360381-L06

PCI_E3

(9) PE5_SLOT2_TX
(9) PE5_SLOT2_TX#
C325 0.1u10X4 PE5_SLOT2_TX_C
C326 0.1u10X4 PE5_SLOT2_TX#_C
CK_PEX2_P (9)
CK_PEX2_N (9)
PE5_SLOT2_RX (9)
PE5_SLOT2_RX# (9)

SLOT-PCIEx1_BLACK-R

N11-0360381-L06

EC21 CD270u16SO-RH-6
C259 1u16X4
C214 1u16X4
C275 X_0.1u10X4
C224 X_0.1u10X4

EC26 CD560u6.3SO-RH-5
C217 1u6.3X4
C260 1u6.3X4
C215 0.01u16X4

MICRO-STAR INT'L CO.,LTD

MS-7A01

Size: Custom
Document Description: PCIE(X1) & PCIE(X16) Slots
Rev: 11
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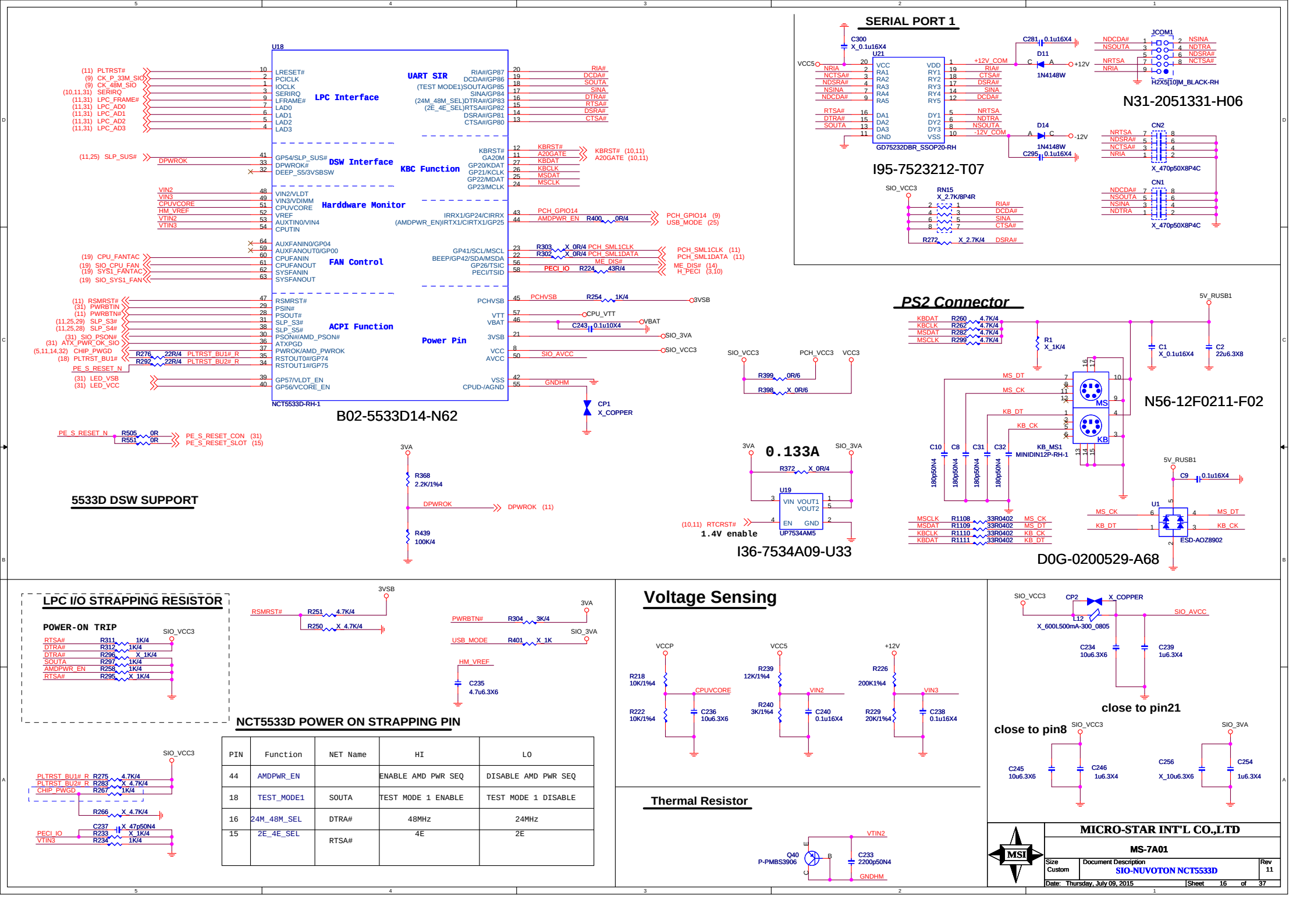

PIN	Function	NET Name	HI	LO
44	AMDPWR_EN		ENABLE AMD PWR SEQ	DISABLE AMD PWR SEQ
18	TEST_MODE1	SOUTA	TEST MODE 1 ENABLE	TEST MODE 1 DISABLE
16	24M_48M_SEL	DTRA#	48MHz	24MHz
15	2E_4E_SEL	RTSA#	4E	2E

Type C:
ALC887-VD
VT1708S CE

11mA
Closed Codec

CA4 closed PIN25
CA3 closed PIN38

UA1 — ALC887-VD2-CG-HF

B05-LC88714-R09

45.8mA

LIN_OUT — AUDIO1B — JACK-AUDIOX3F

LIN_IN — AUDIO1A — JACK-AUDIOX3F

MIC1 — AUDIO1C — JACK-AUDIOX3F

N54-13F0441-L06

DA2 — S-BAT54A_SOT23
DA1 — S-BAT54A_SOT23

RNA1 4.7K/8P4R

RNA2 75R/8P4R

JAUD1 — H2X5[8]M_BLACK-RH

N31-2051411-H06

D LIN_IN
E LIN_OUT
F MIC1

N54-13F0271-K06

100pF Cap can change to TVS by PM request.

Close to Front panel
For HDA/AC97 front cable.

Closed Codec

CA17 Reserve for 1708

887: Remove
1708:Stuff

EMI

CPA1 X_COPPER
CPA2 X_COPPER

Closed Codec

0R for cost down
R11-0000034-W08

CA33,CA34 close to LA1

Rear Line OUT De-POP circuit

(reserve de-pop circuit for Rear Line out & Front Headphone out)

Digital

Analog

QA4 — NN-HBN2515S6R
QA5 — NN-HBN2515S6R

MICRO-STAR INT'L CO.,LTD	
MS-7A01	
Size: Custom	Document Description: ALC887/VT1708S CE-Type C — Rev: 11
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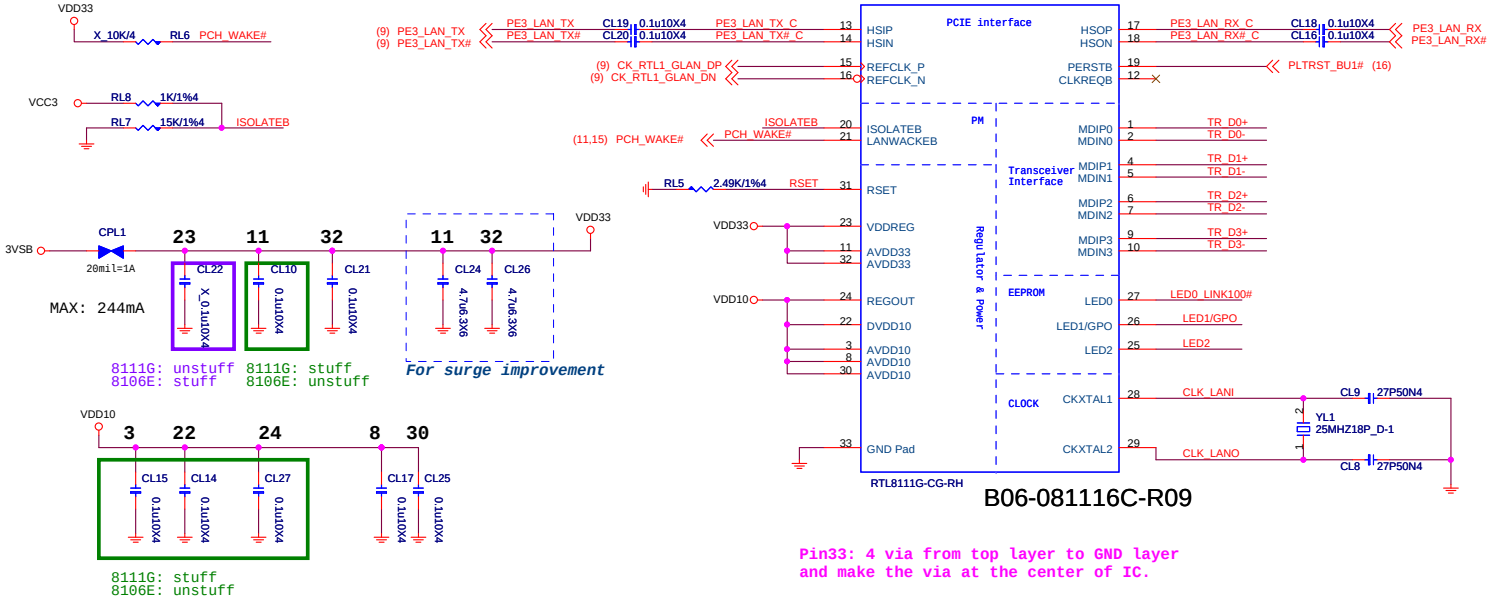
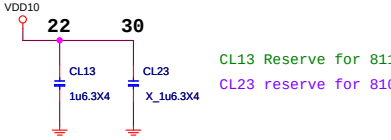
RTL8111G Giga LAN
RTL8106E 10/100M LAN



B06-081116C-R09

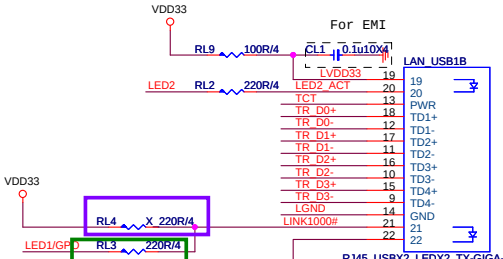
Pin33: 4 via from top layer to GND layer and make the via at the center of IC.



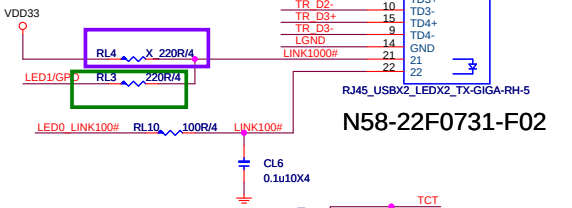
8111G: stuff
8106E: unstuff

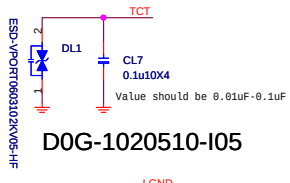
CL13 Reserve for 8111G
CL23 reserve for 8106E

LAN Connector

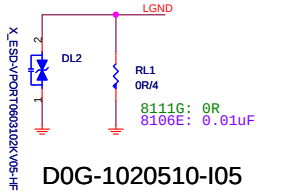


N58-22F0731-F02





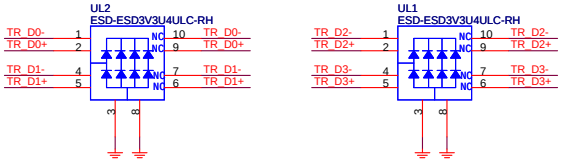
D0G-1020510-I05



D0G-1020510-I05

D0G-1020510-I05
D0G-8010510-SI0

Close to Connector



D0G-05A0300-I14 D0G-05A0300-I14

8106E POWER Consumption

	3.3V @ mA	mW
10 M Idle/TxRx	15/94	49.5/310.2
100 M Idle/TxRx	52/105	171.6/346.5
S0 ALDPS	4	13.2

8111G POWER Consumption

	3.3V @ mA	mW
10 M Idle/TxRx	17.15/116.7	56.6/385.1
100 M Idle/TxRx	71.45/129.5	235.8/427.4
Giga Idle/TxRx	179.1/243.9	591/804.9
ALDPS	6.41	21.15

MICRO-STAR INT'L CO.,LTD

MS-7A01

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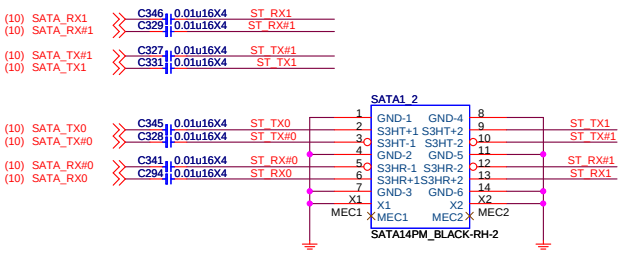
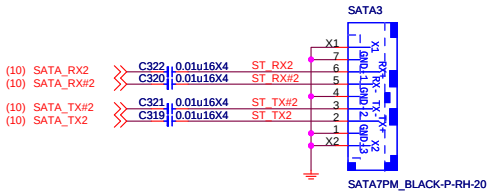
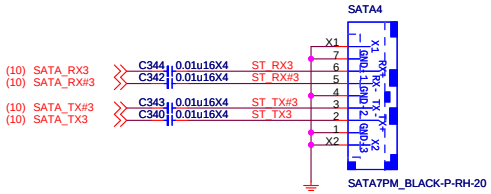
SATA CONNECTOR

SATA 6G PORT 0,1,2,3

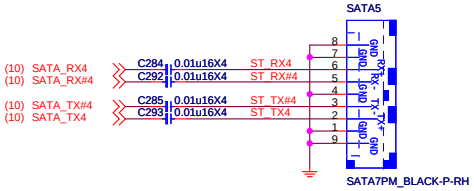


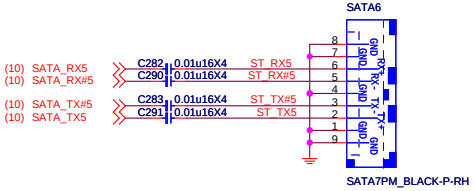
N5N-14M0201-H06





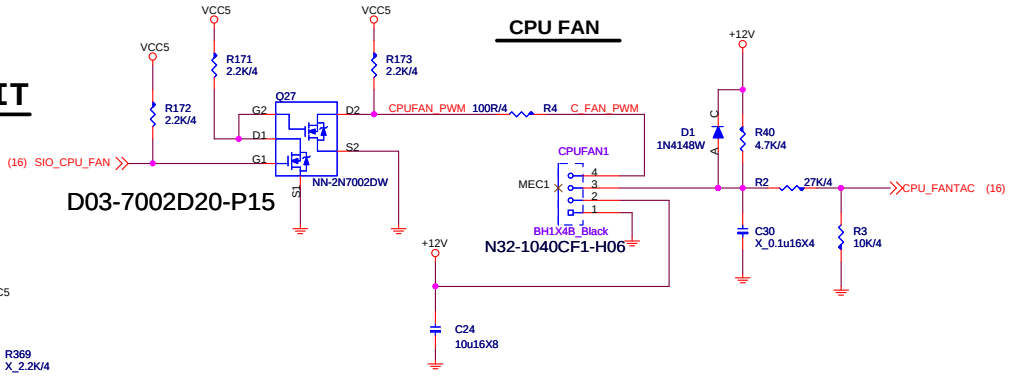
SATA 3G PORT 4,5





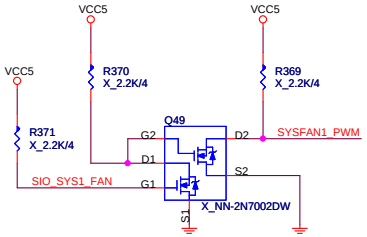
FAN-COUNTROL CIRCUIT

CPU FAN



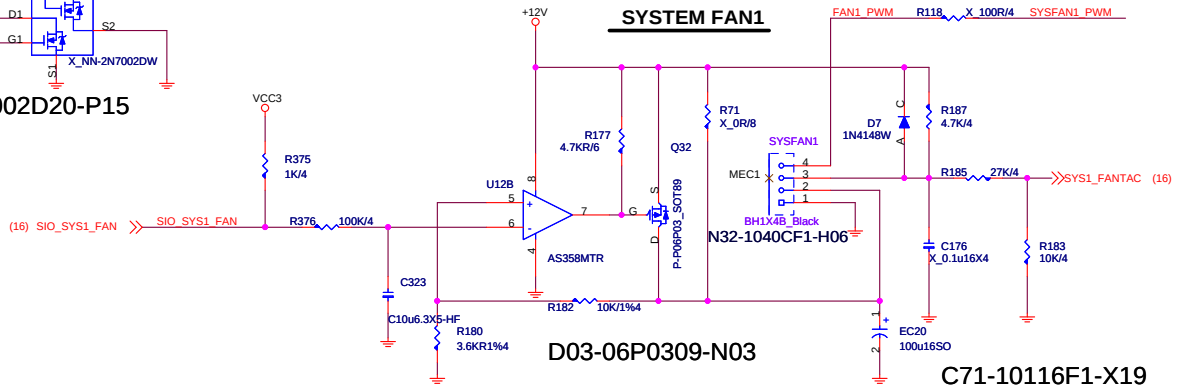
D03-7002D20-P15

N32-1040CF1-H06



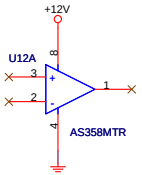
D03-7002D20-P15

SYSTEM FAN1



D03-06P0309-N03

C71-10116F1-X19



MICRO-STAR INT'L CO.,LTD		
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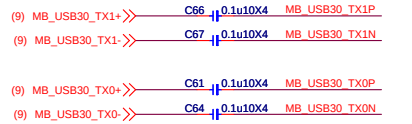
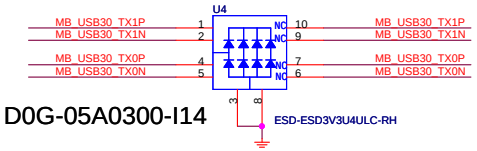
Front USB3.0 Connector





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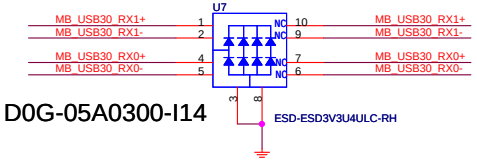

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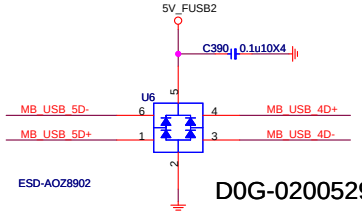
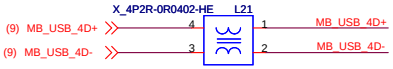
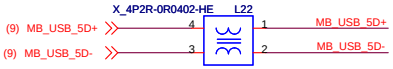


D0G-0200529-A68



R3C-0000012-W08



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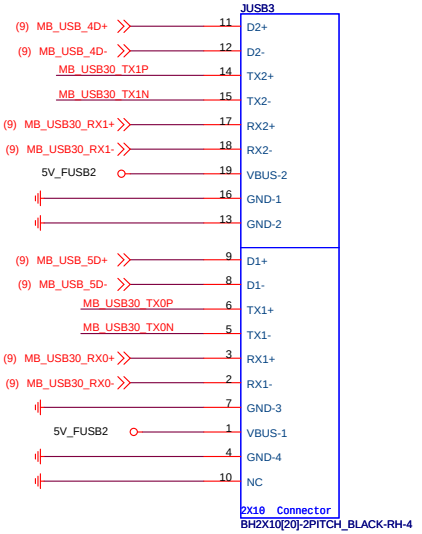

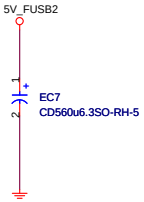

MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7A01	
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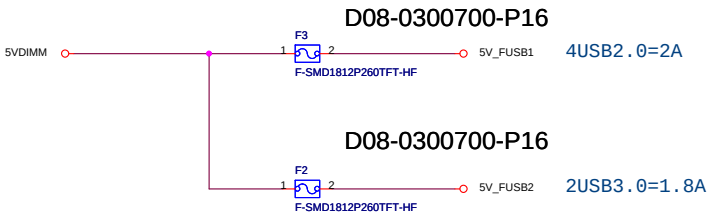
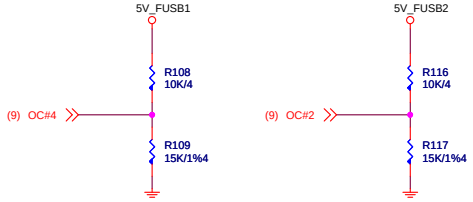
over current protect

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

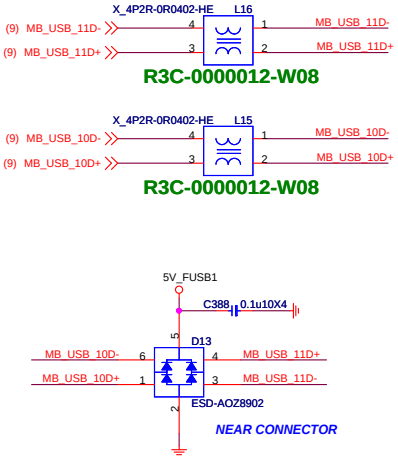
Near Front ==>





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)

FRONT USB PORT 8,9



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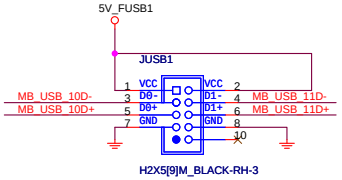
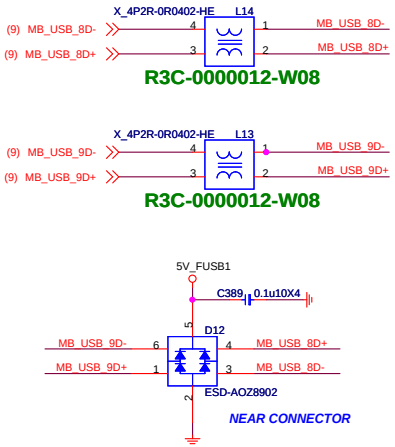
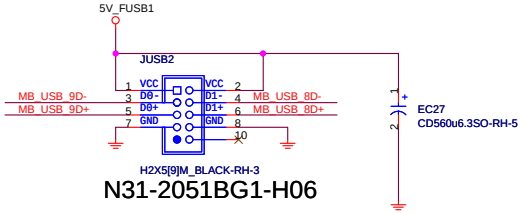


N31-2051BG1-H06

FRONT USB PORT 10.11



D0G-0200529-A68



N31-2051BG1-H06

MICRO-STAR INT'L CO.,LTD		
MS-7A01		
Size: Custom	Document Description: Front USB2.0 Connector	Rev: 11
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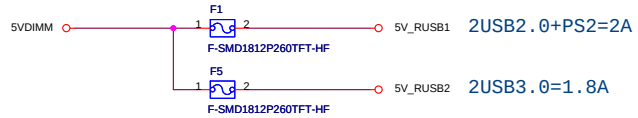
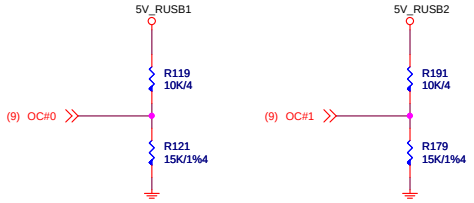
PCH/FCH side: OC# pull high to +3VSB

Near Rear ==>

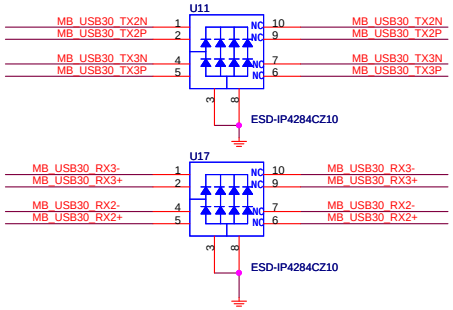


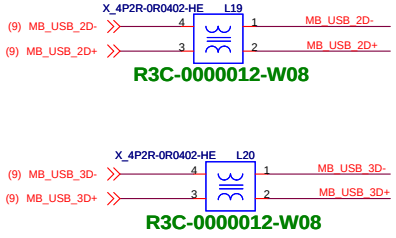
D08-2000300-P16 (Itrip=3.5A; 0.003ohm) support 6 USB ports (3A)
D08-0300700-P16 (Itrip=2.6A; 0.015ohm) support 4 USB ports (2A)
D08-0100110-P16 (Itrip=1.1A; 0.04ohm) support 2 usb 2.0 ports (1A)

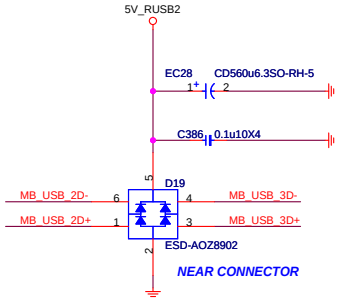
over current protect



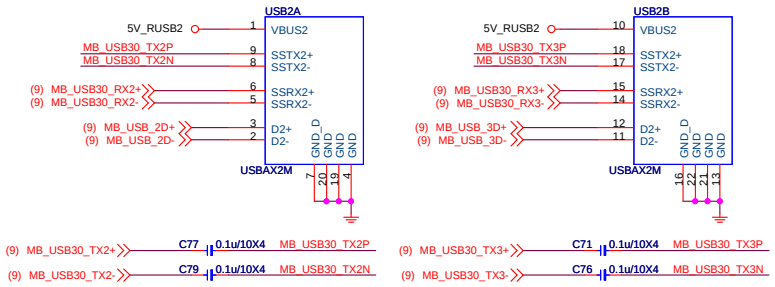
REAR USB3.0 PORT





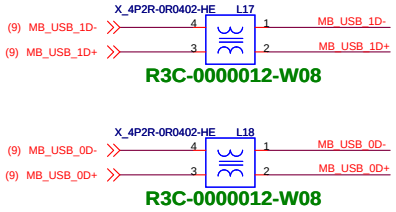


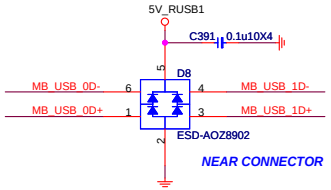
D0G-0200529-A68



N58-22F0731-F02

REAR USB2.0 PORT 4.5





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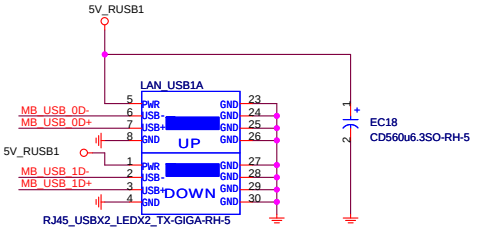

N58-22F0731-F02

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Size: Custom	Document Description: Rear USB2.0 / 3.0 Connector	Rev: 11
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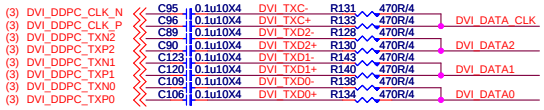
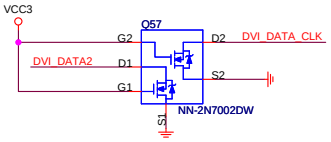
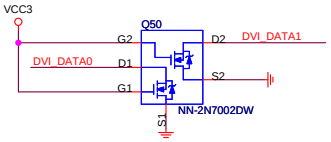
DVI

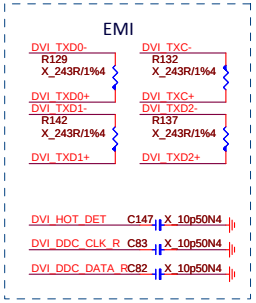
HDMI&DVI:
1920*1200@60Hz (16:10 WUXGA)

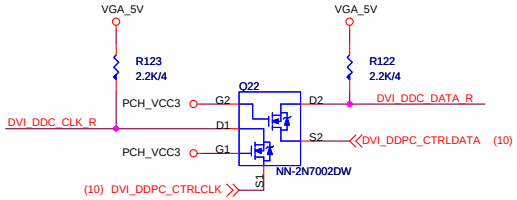


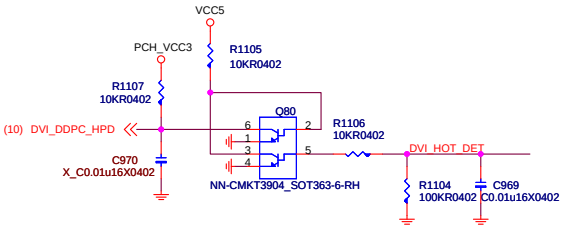


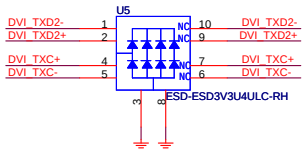
D03-7002D20-P15



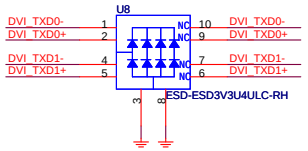


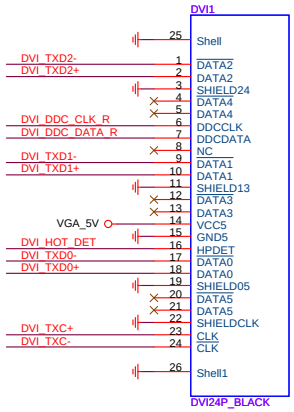






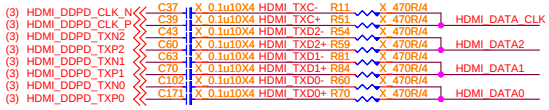
D0G-05A0300-I14

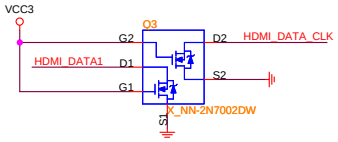




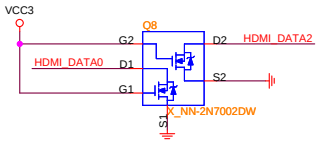
HDMI

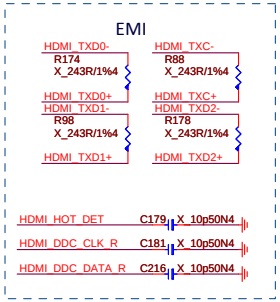
HDMI (Optional) co-layout with DVI
Components of orange color: Stuff for HDMI skew only.

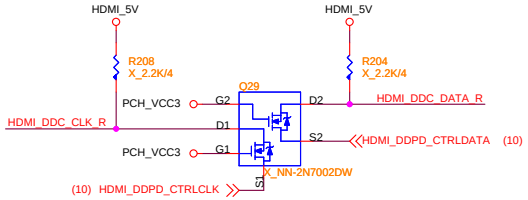


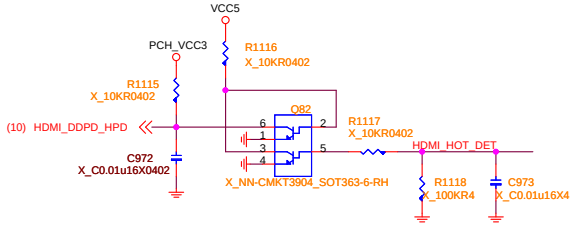


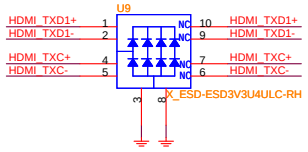
D03-7002D20-P15



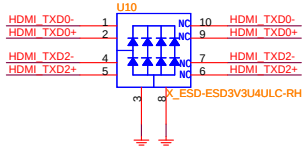


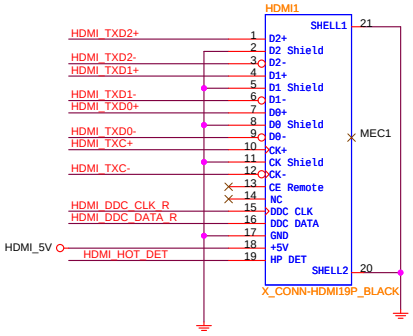


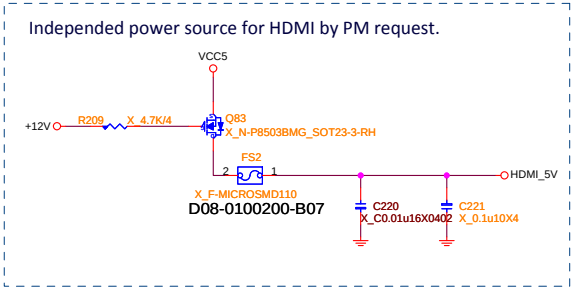




D0G-05A0300-I14







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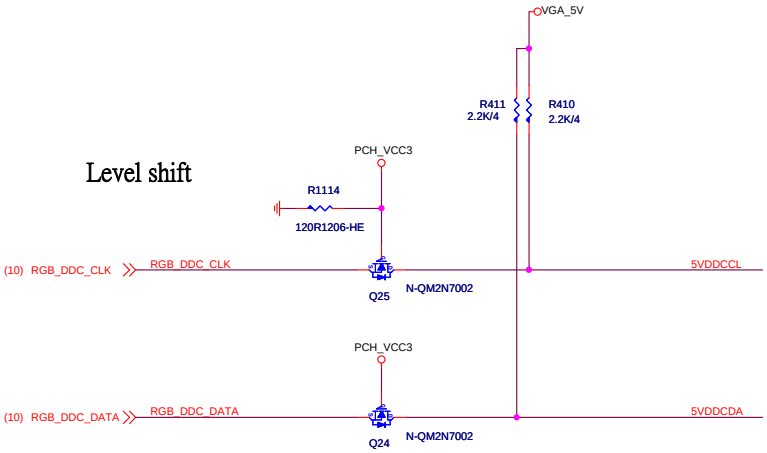
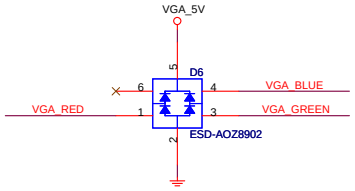
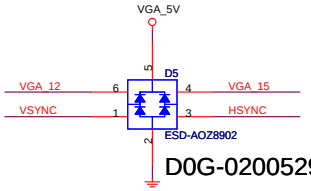
D-Sub

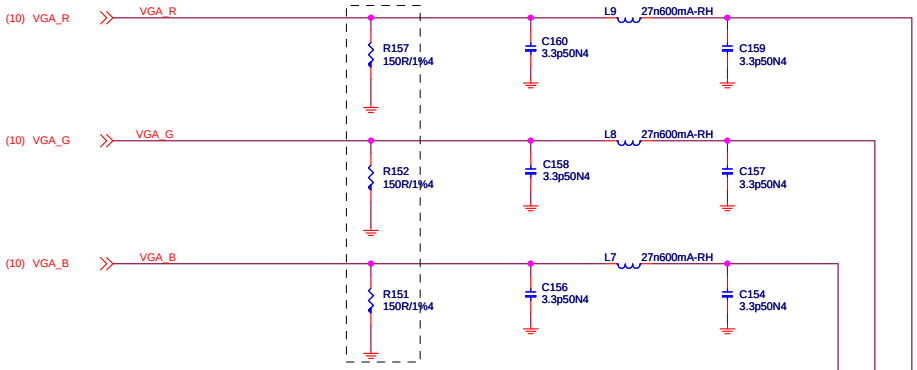
VGA: resolution of 2048x1536 pixels with 32-bit color at 75 Hz (4:3 QXGA)





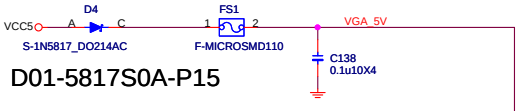


D0G-0200529-A68

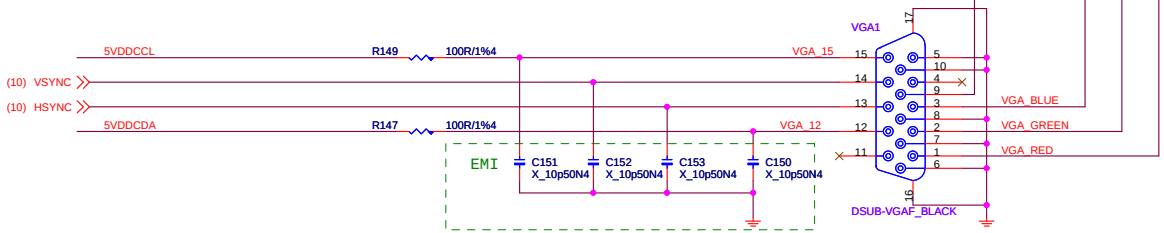


PLACE CLOSE TO VGA CONNECTOR,
WITHIN 750 MIL OF PIN

D08-0100200-B07



D01-5817S0A-P15



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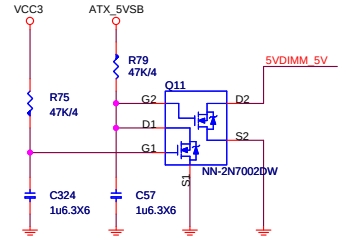
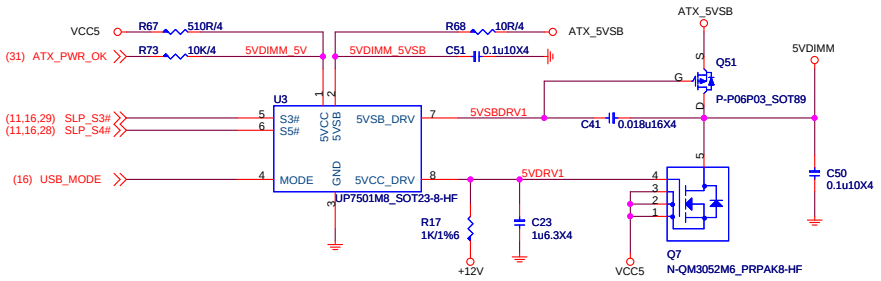
5VDIMM FOR DDR

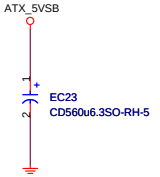


Patch coolermaster 700w power sequence

D03-7002D20-P15



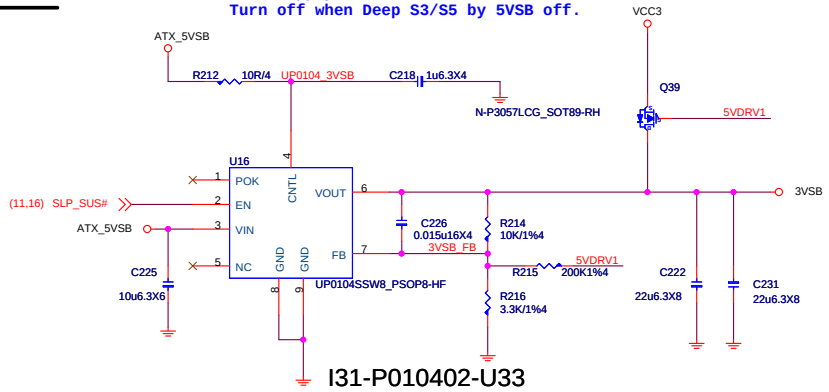
D03-3052M00-U47



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.

3VSB

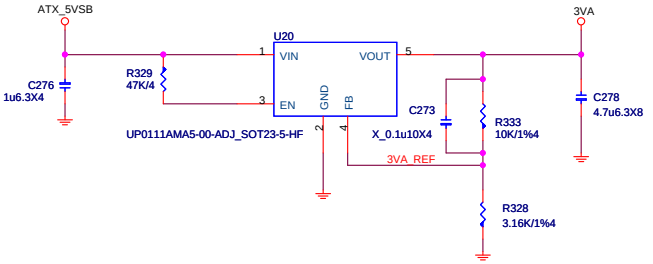
3VSB supply to PCH and other device.
Turn off when Deep S3/S5 by 5VSB off.



I31-P010402-U33

3VA

20mA



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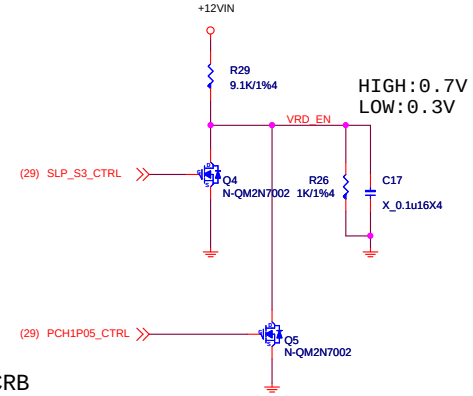
VCORE power on by s3 and 12v

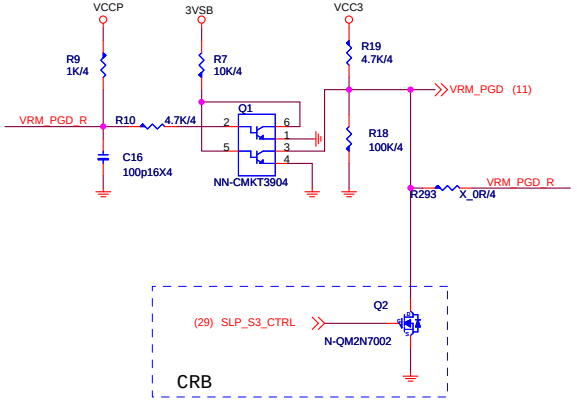


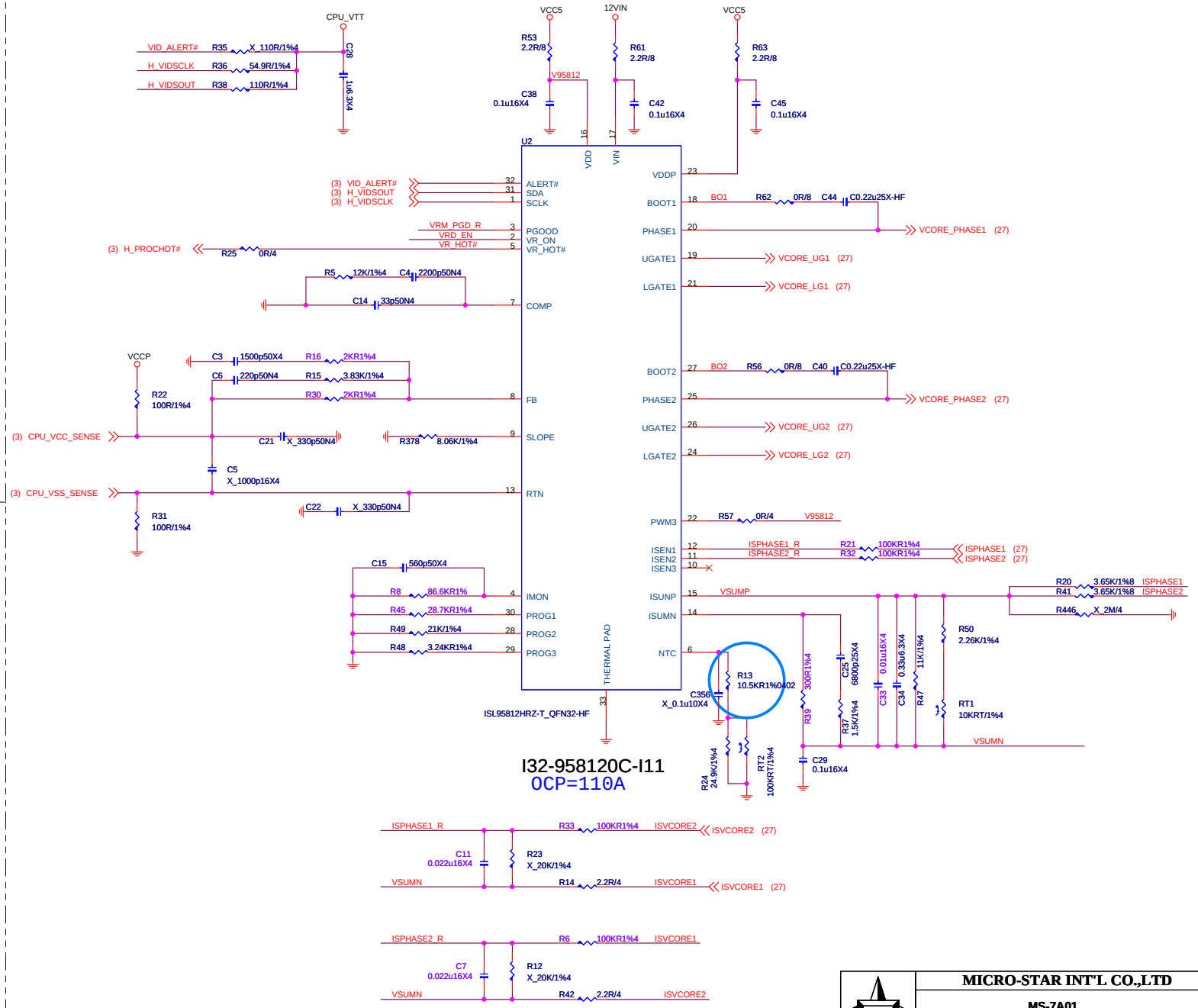
HIGH:0.7V
LOW:0.3V

CRB

HIGH:by PCH_1P05V
LOW:by S3

VRMPWRGD LEVEL SHIFT





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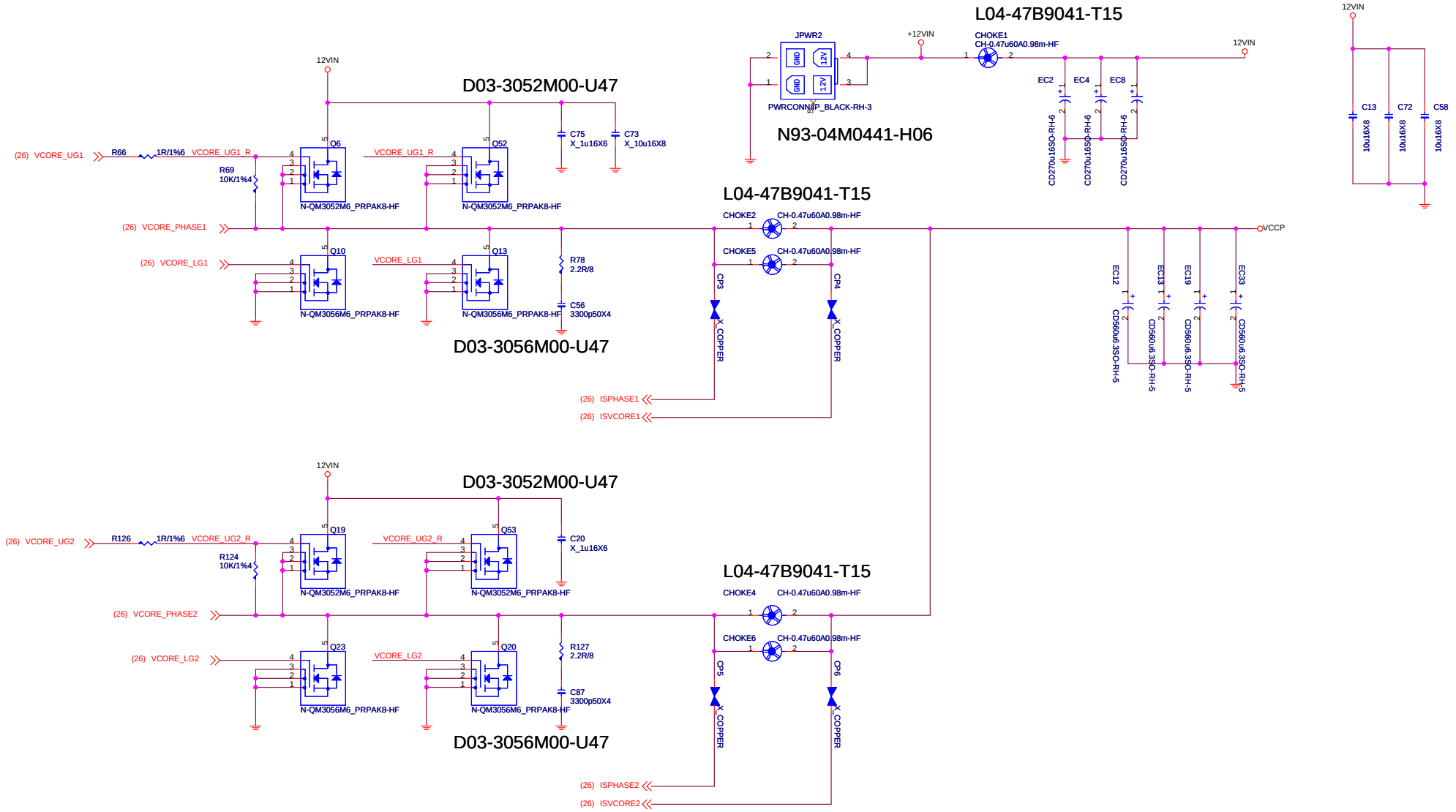
VCCP POWER

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



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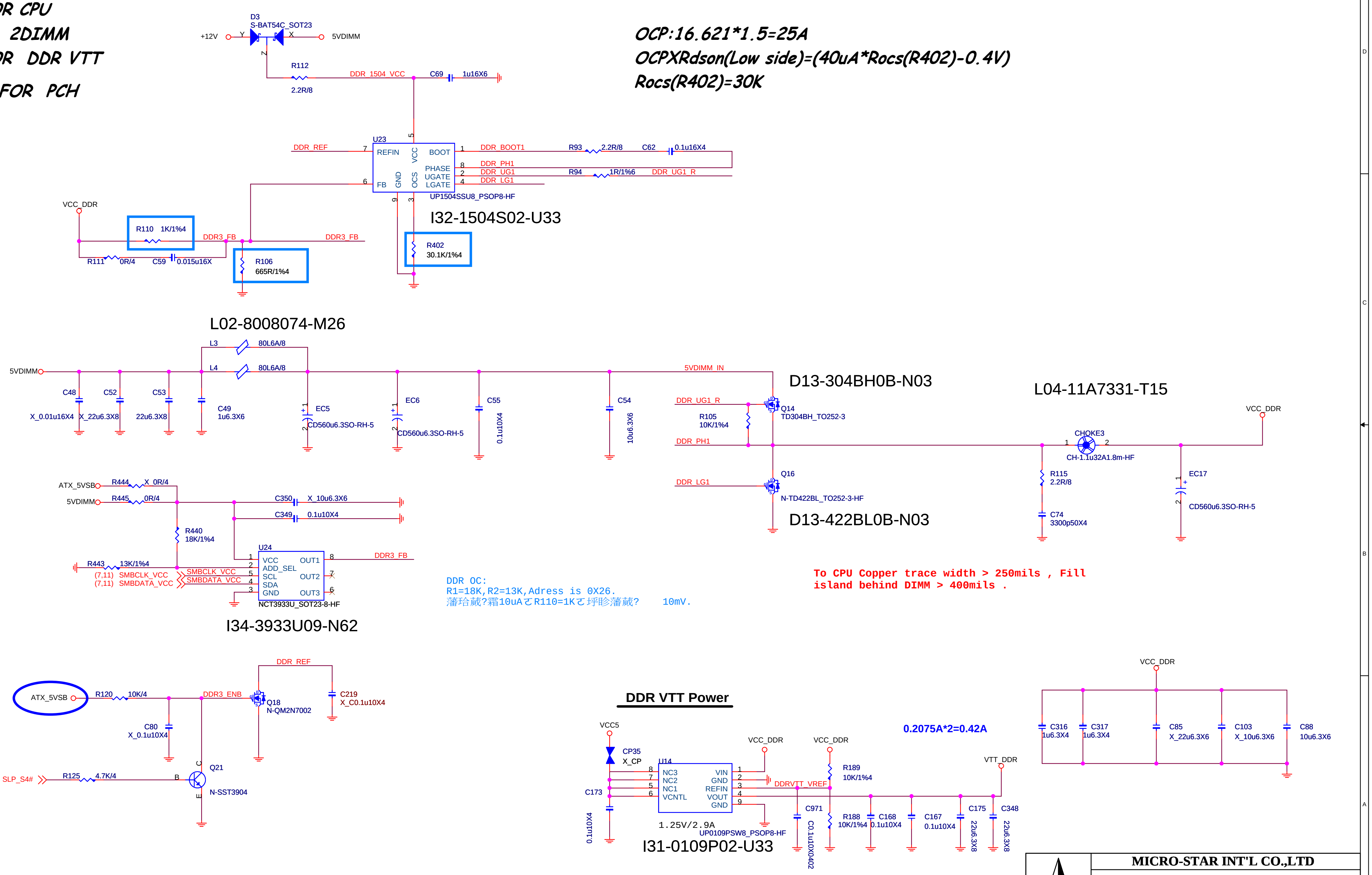
DDR Power:1.5V

DDR3_1.5V 4.2A+6A+0.5A+5.921=16.621A

OCP:25A

4.2A FOR CPU
6A FOR 2DIMM
0.5A FOR DDR VTT
5.921A FOR PCH

OCP:16.621*1.5=25A
OCPXRdson(Low side)=(40uA*Rocs(R402)-0.4V)
Rocs(R402)=30K



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

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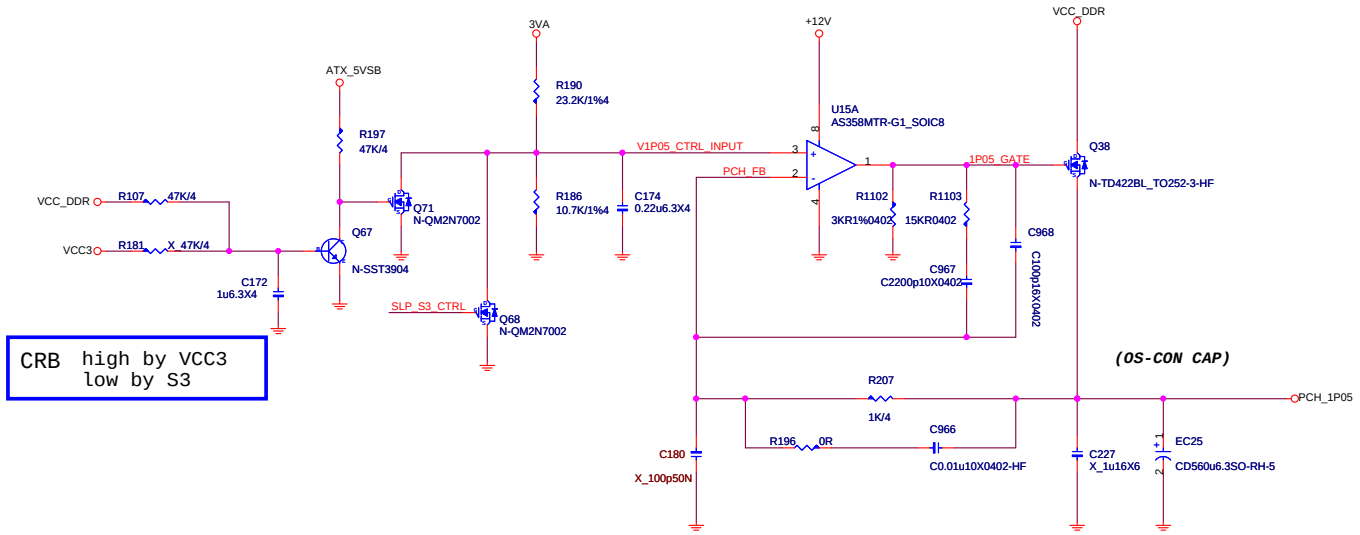
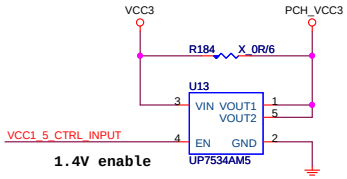
PCH Power:1.05V 5.747A



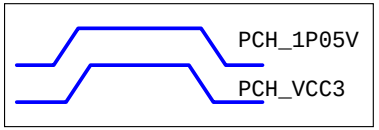
CRB high by VCC3
low by S3

0.133A

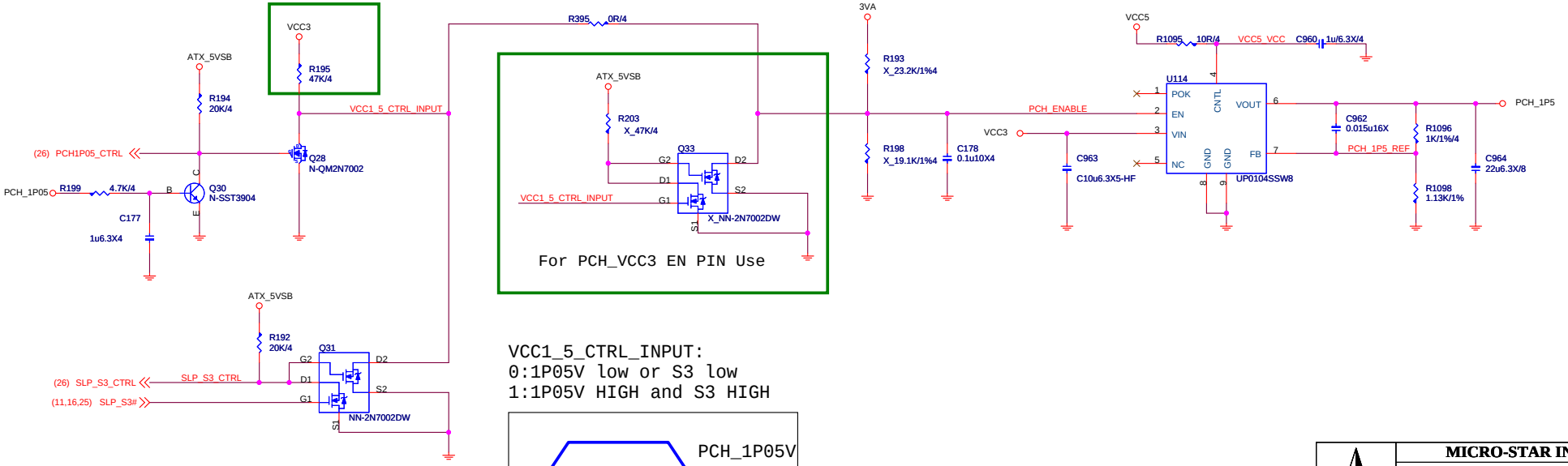


1.4V enable

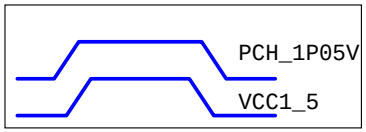
I36-7534A09-U33



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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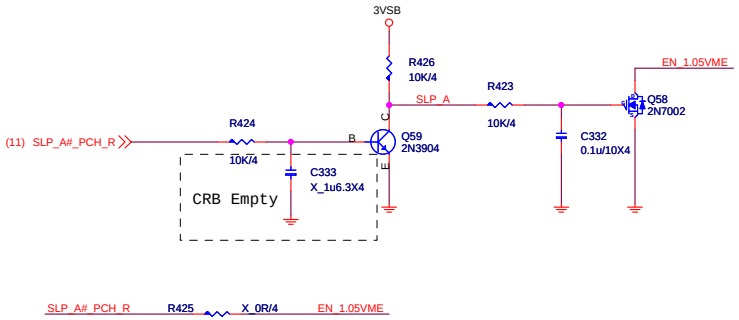
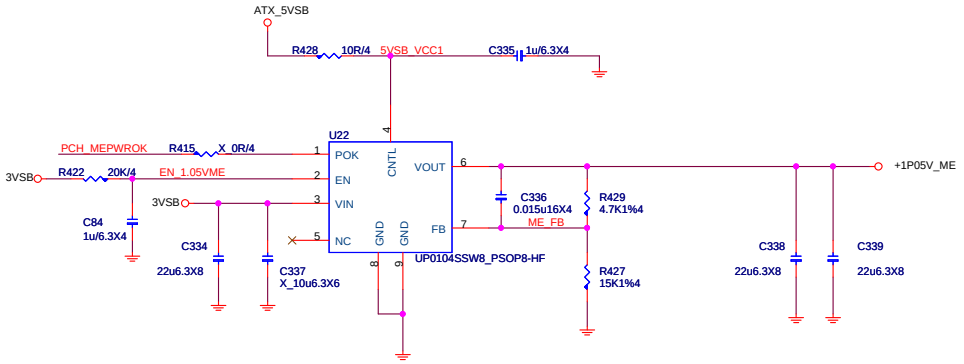
PCH ME Power:1.05V 0.670A

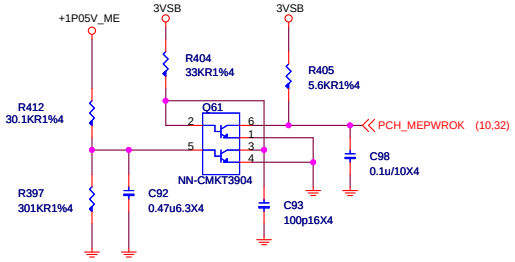
SLP_A

ME Power Control

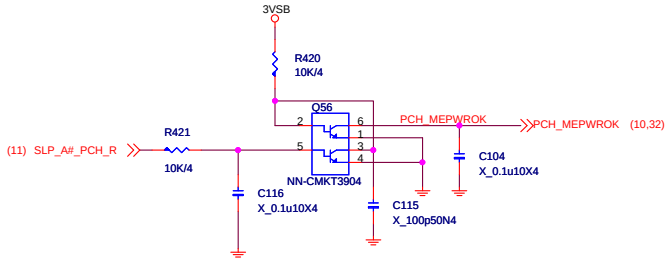




PCH_MEPWROK

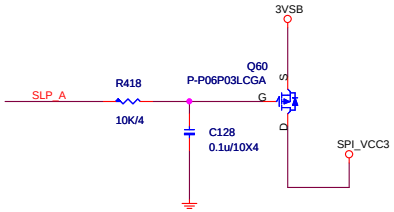


VccASW active to APWROK high 1ms



APWROK falling to VccASW falling 40ns

+3.3V_ME



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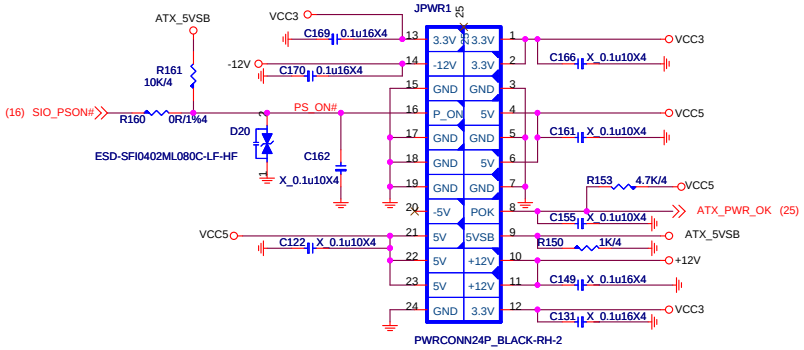
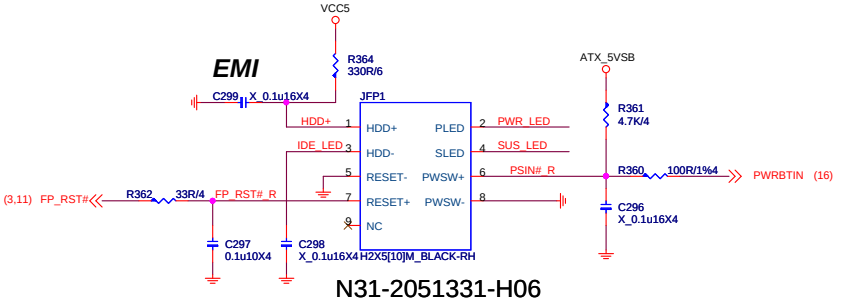
ATX POWER CONNECTOR

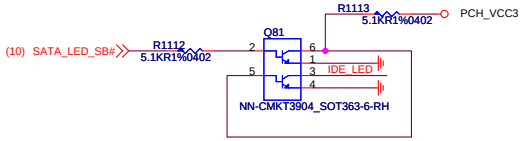


N93-24M0191-H06

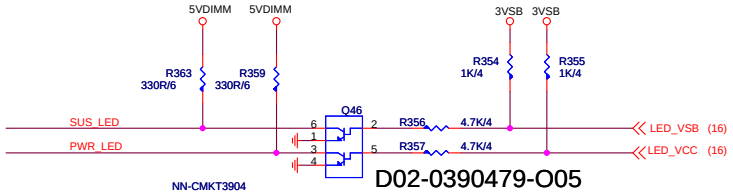
FRONT PANNEL



N31-2051331-H06

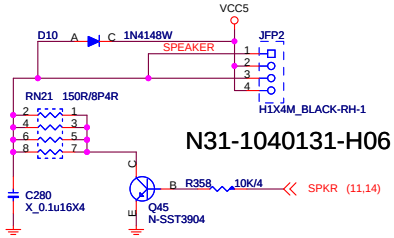


LED (for NV5533)



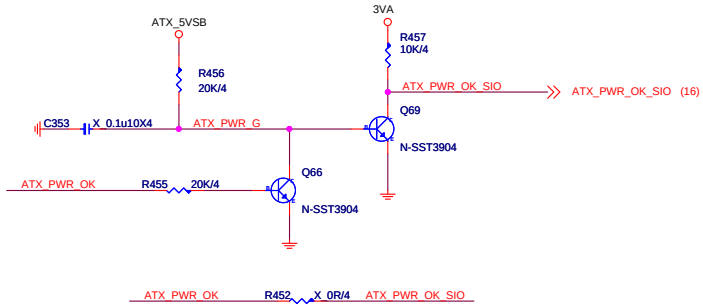
D02-0390479-O05

Speaker Pin Header

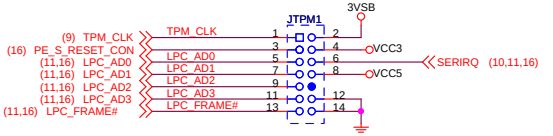


N31-1040131-H06

5VCC leakage from ATXPGD.(NCT6779 PIN80)
(NCT5533 PIN36)



TPM/JLPC



N31-2071101-H06 H2X7[10]M-2PITCH_BLACK-RH

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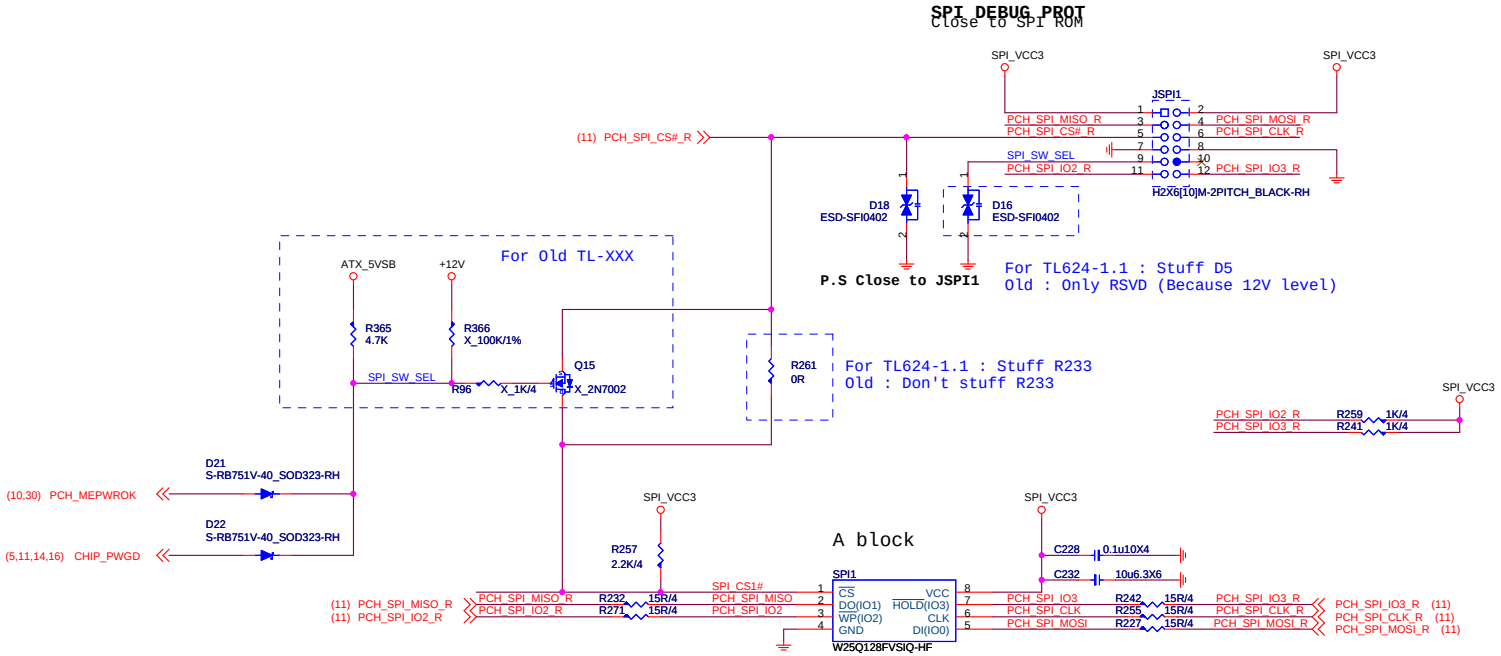
SPI ROM



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LABEL

MARKET Name

LABEL1

LABEL

G51-M1SPG00-Q13

AMI

LABEL3

LABEL

G51-M1SPXXA-A09

Battery

BAT1_X1

BAT-BCR2032P-RH

D06-0100101-P01

PCB1

G023_10

PK0-07A0111-G37

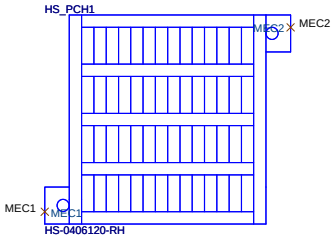
CPU Socket

CPU_H1

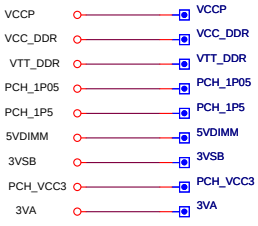
CPU_H1

E21-7869020-F02

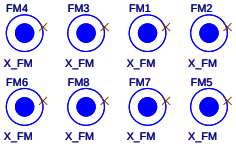
PCH Heatsink



E31-0406121-K08



Optical Fiducial Marks-120



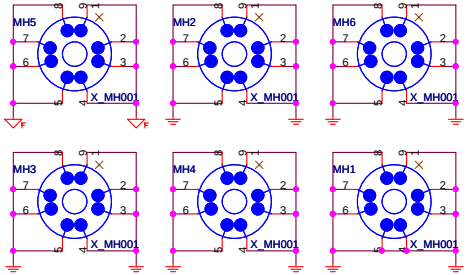
FM002

F_PAD_X

Simulation

SINGLE_SIP2

Mounting Holes



MH001

HOLES_4S

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MS-7A01		
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Date: Thursday, July 09, 2015	Sheet 33 of 37	