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# MS-7846

Version : 50

mATX 173mm x 231mm

## Intel Sharkbay plamform H81

**CPU:**

INTEL-Haswell LGA1150

**System Chipset:**

H81

**Memory:**

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

**PWM:**

VRD12 - ISL95812

**OnBoard Chipset:**

HD Audio Codec:ALC887

LAN-realtek8111G

SIO:NUVOTON 5533D

SPI ROM: 64 MB

**Expansion Slots:**

PCI Express (X16) Slot \* 1

PCI Express (X1) Slot \* 2

**Other:**

DVI or HDMI\*1  
VGA\*1

SATA3\*2  
SATA6\*2

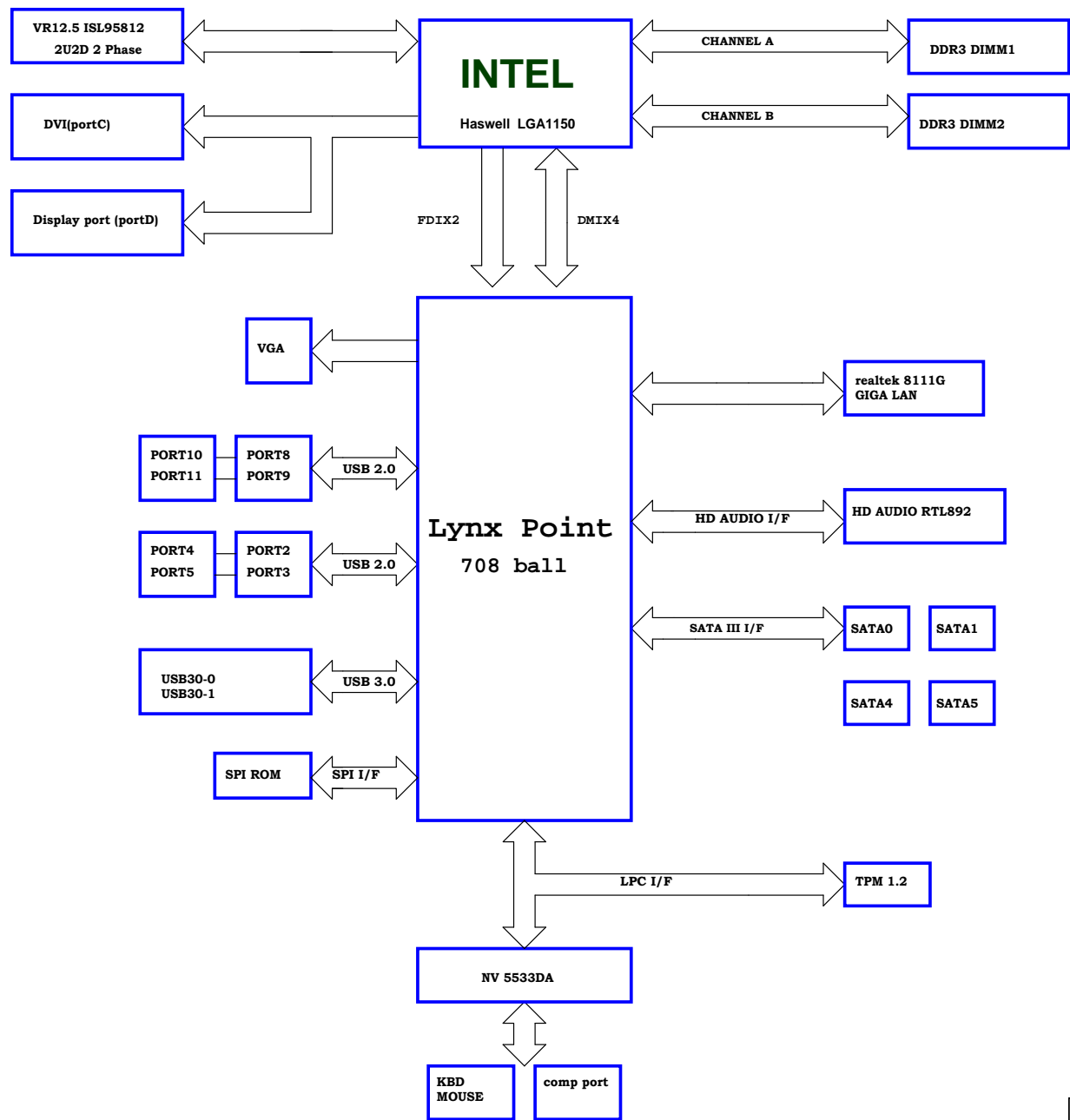
FRONT USB2.0 \*4  
FRONT USB3.0 \*2

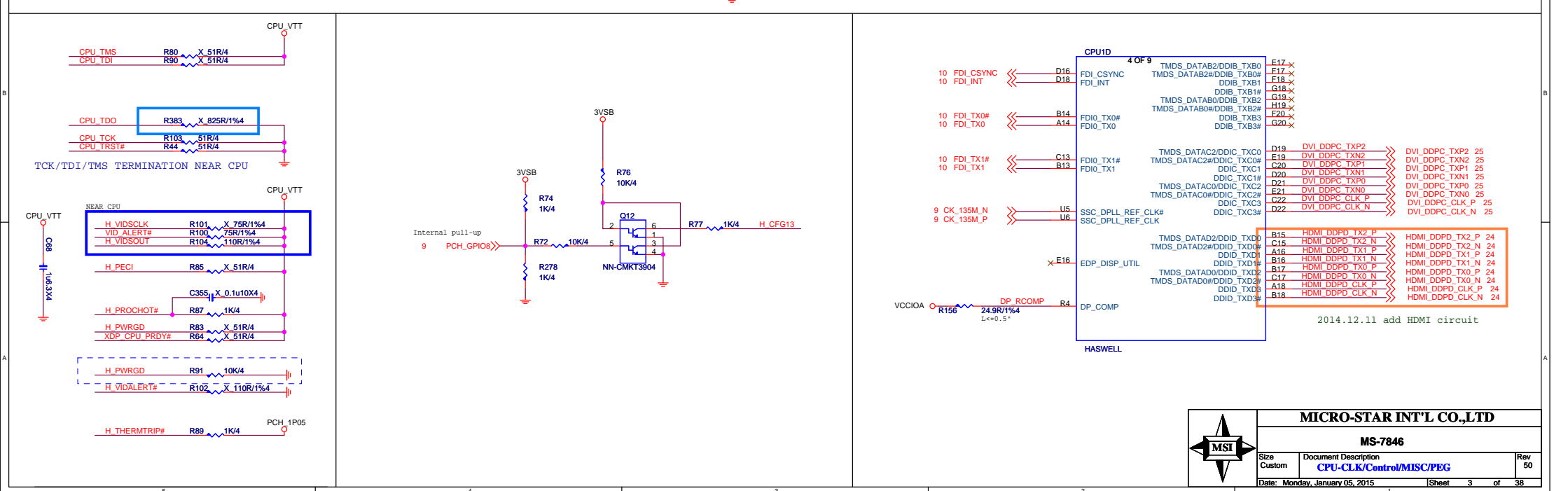
REAL USB2.0 \*4  
REAL USB3.0 \*2

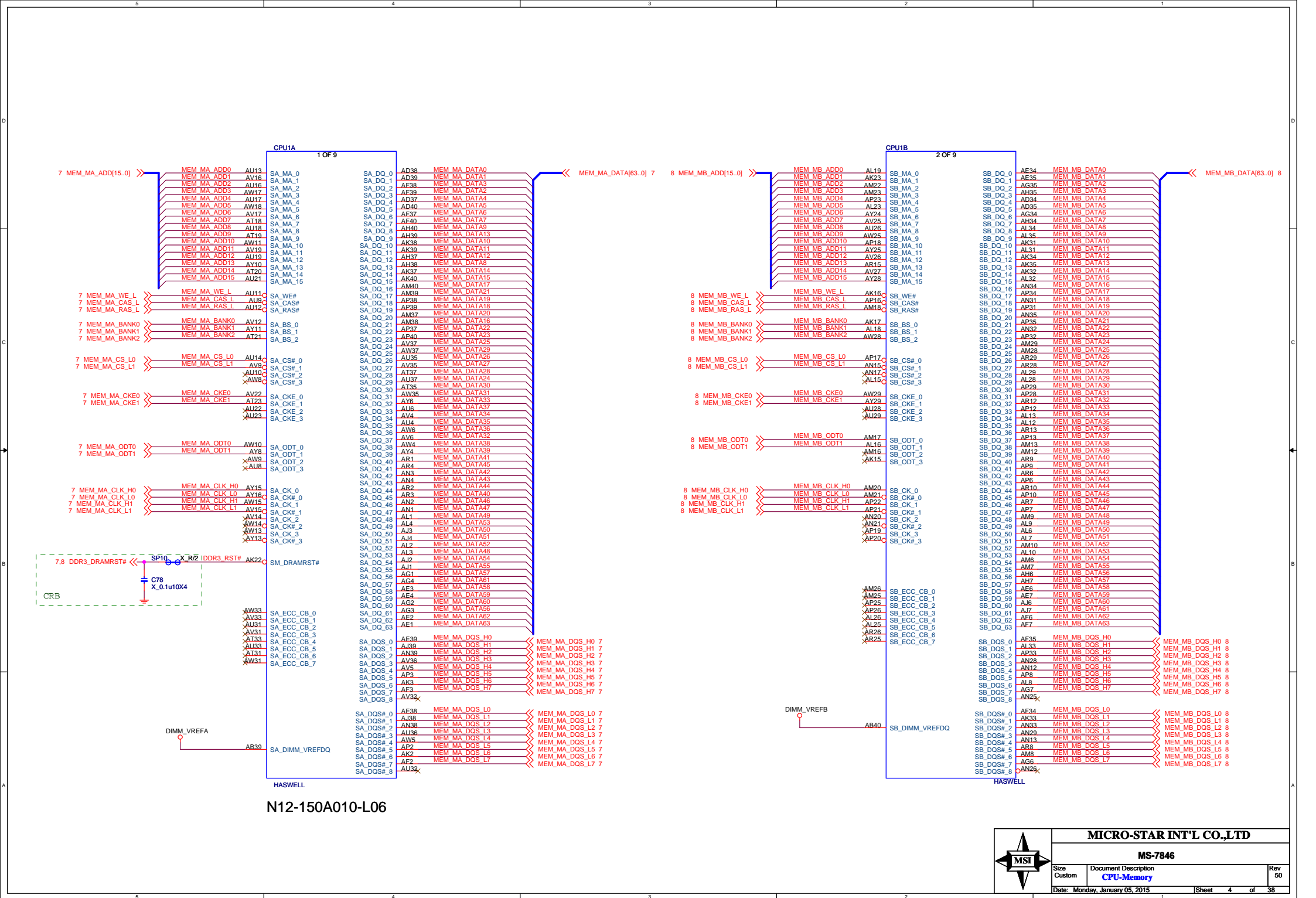


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MS-7846		
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MS-7846 Block Diagram








N12-150A010-L06



GND

GND

N12-150A010-L06



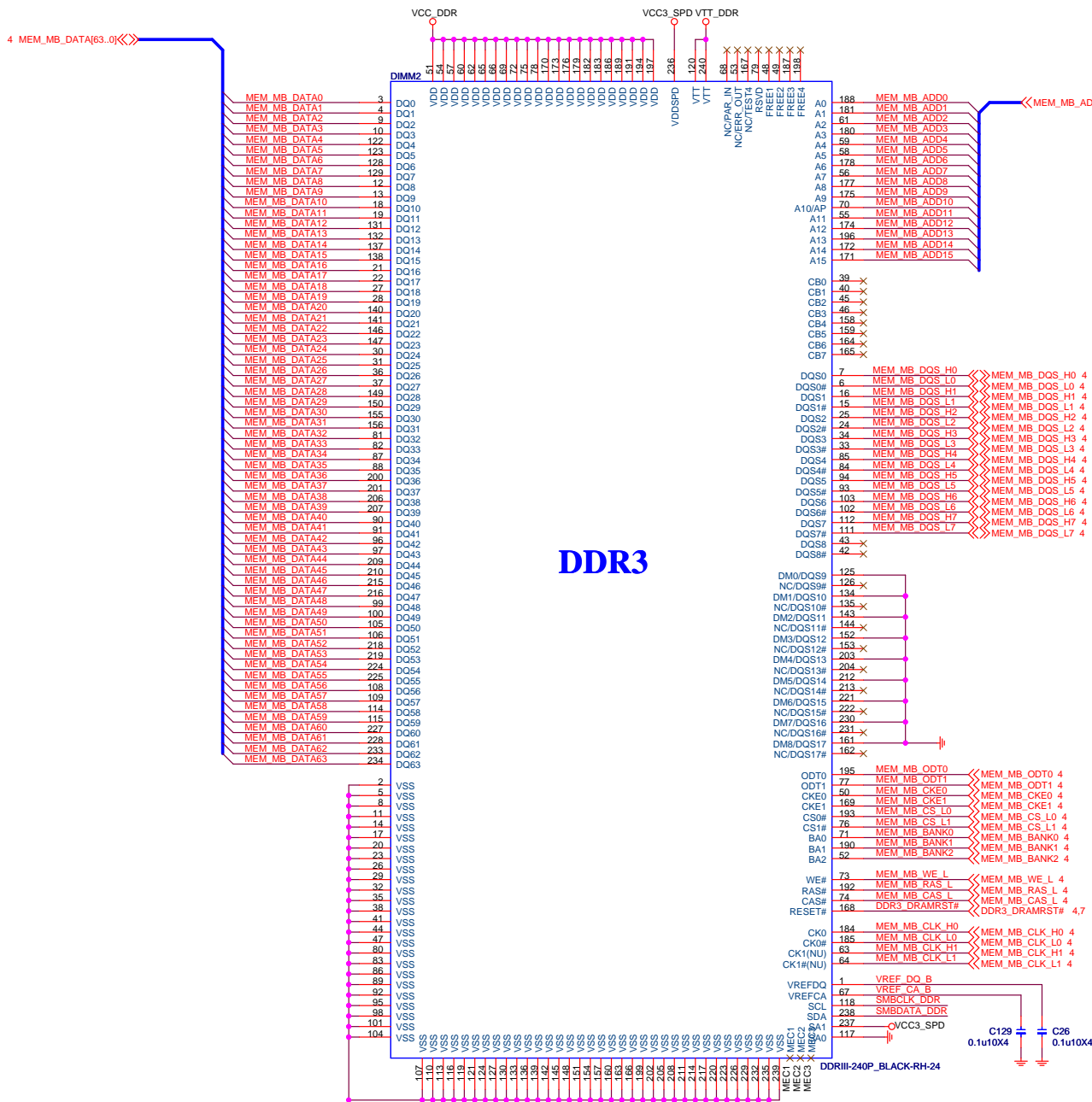
MICRO-STAR INT'L CO.,LTD

MS-7846

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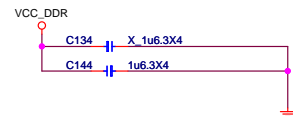


# DDR3 DIMM\_B0

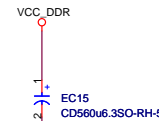
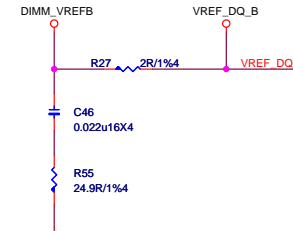
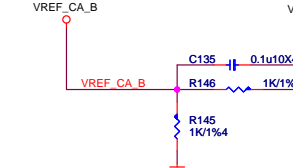
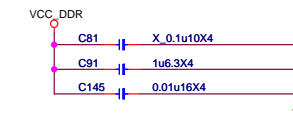


N13-2401471-L06

Place close to DIMM2

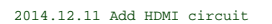


Place close to DIMM2

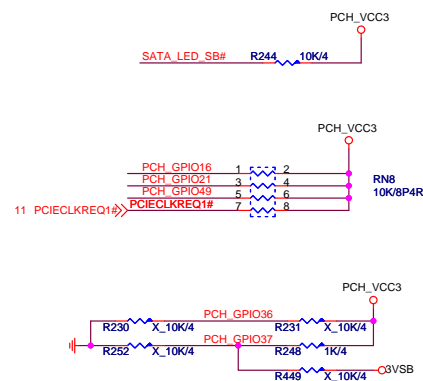




SATA 6 Gb/s support on ports 0 and 1 only.



N91-01F0151-L06



RGB DDC DATA	R408	2.2K/4
RGB DDC CLK	R409	2.2K/4
DVI DDPC CTRLCLK	R300	2.2K/4
DVI DDPC CTRLDATA	R306	2.2K/4
HDMI DDPC CTRLCLK	R367	2.2K/4
HDMI DDPC CTRLDATA	R331	2.2K/4

**Close to PCH within 250mils.**

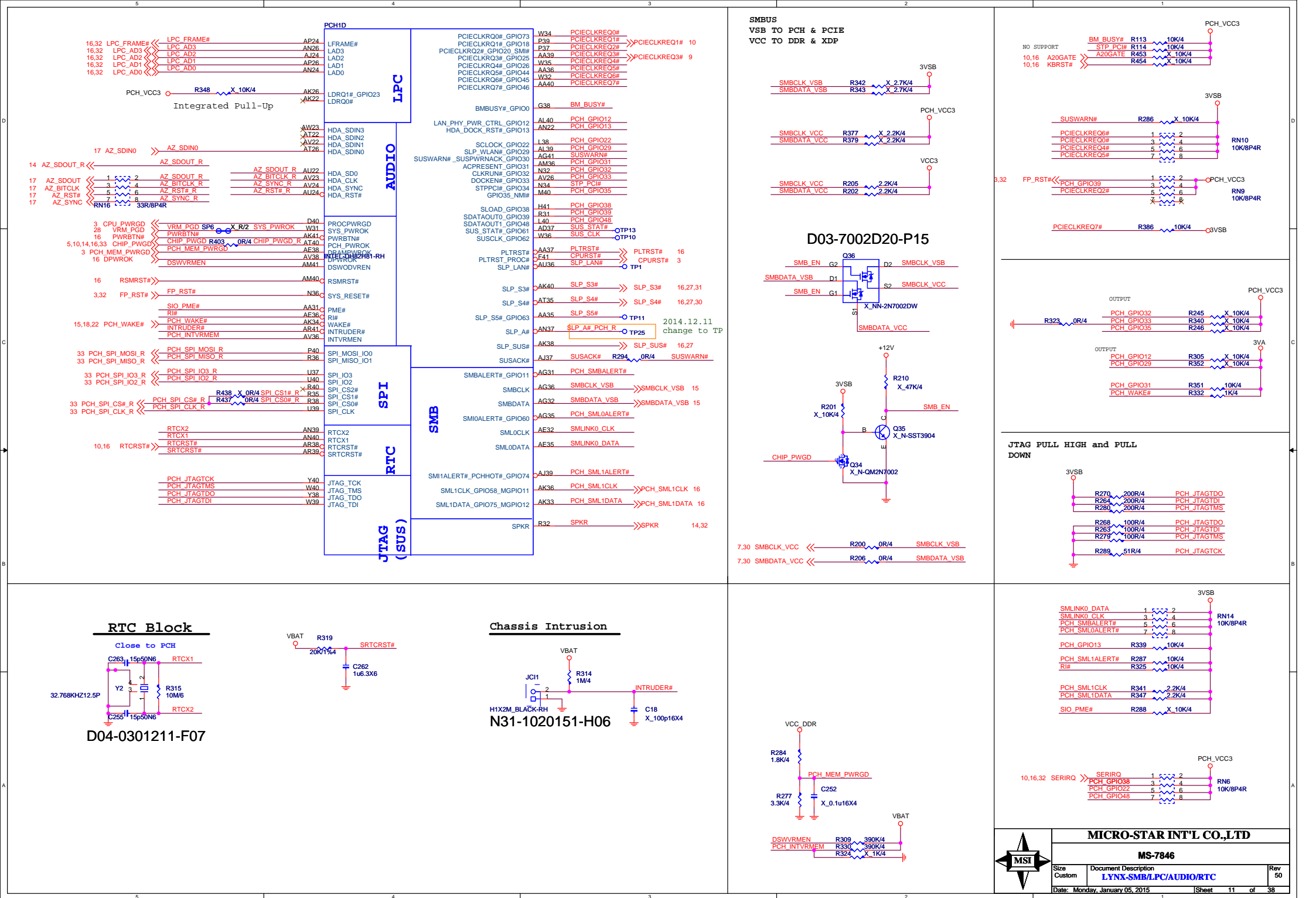
VGA R	R273	150R/1%4
VGA G	R281	150R/1%4
VGA B	R265	150R/1%4

**Close to PCH within 250mils.**

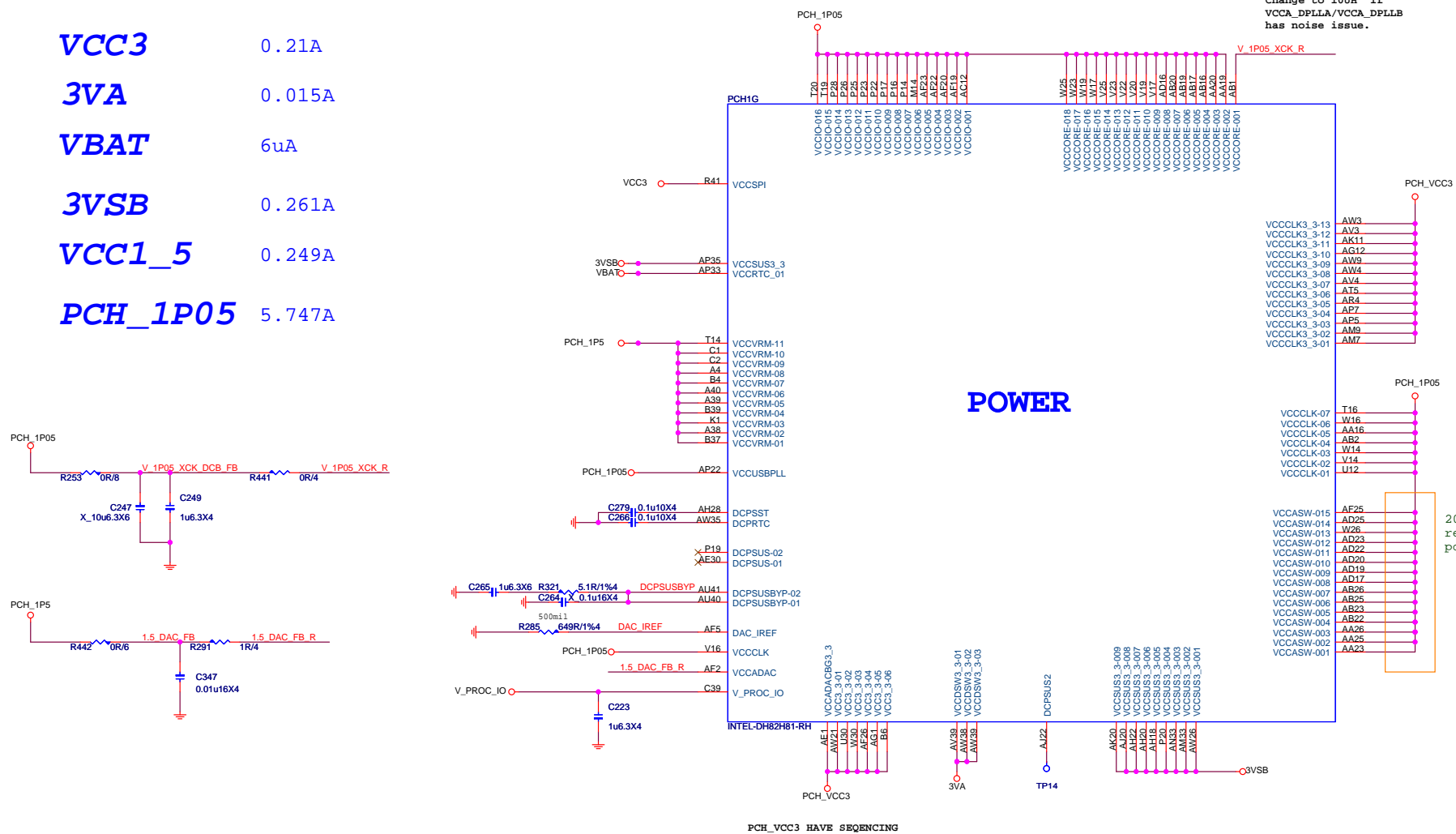


MS-7846

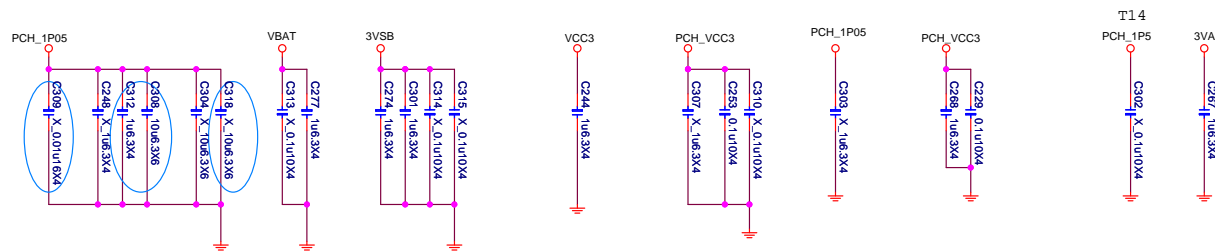
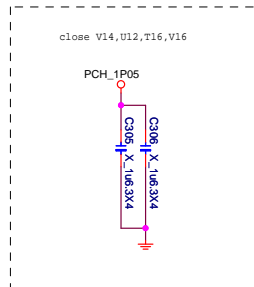
Size Custom	Document Description <b>LYNX-SATA/HOST/GPIO/VGA</b>	Rev 50
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<b>VCC3</b>	0.21A
<b>3VA</b>	0.015A
<b>VBAT</b>	6uA
<b>3VSB</b>	0.261A
<b>VCC1_5</b>	0.249A
<b>PCH_1P05</b>	5.747A



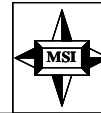
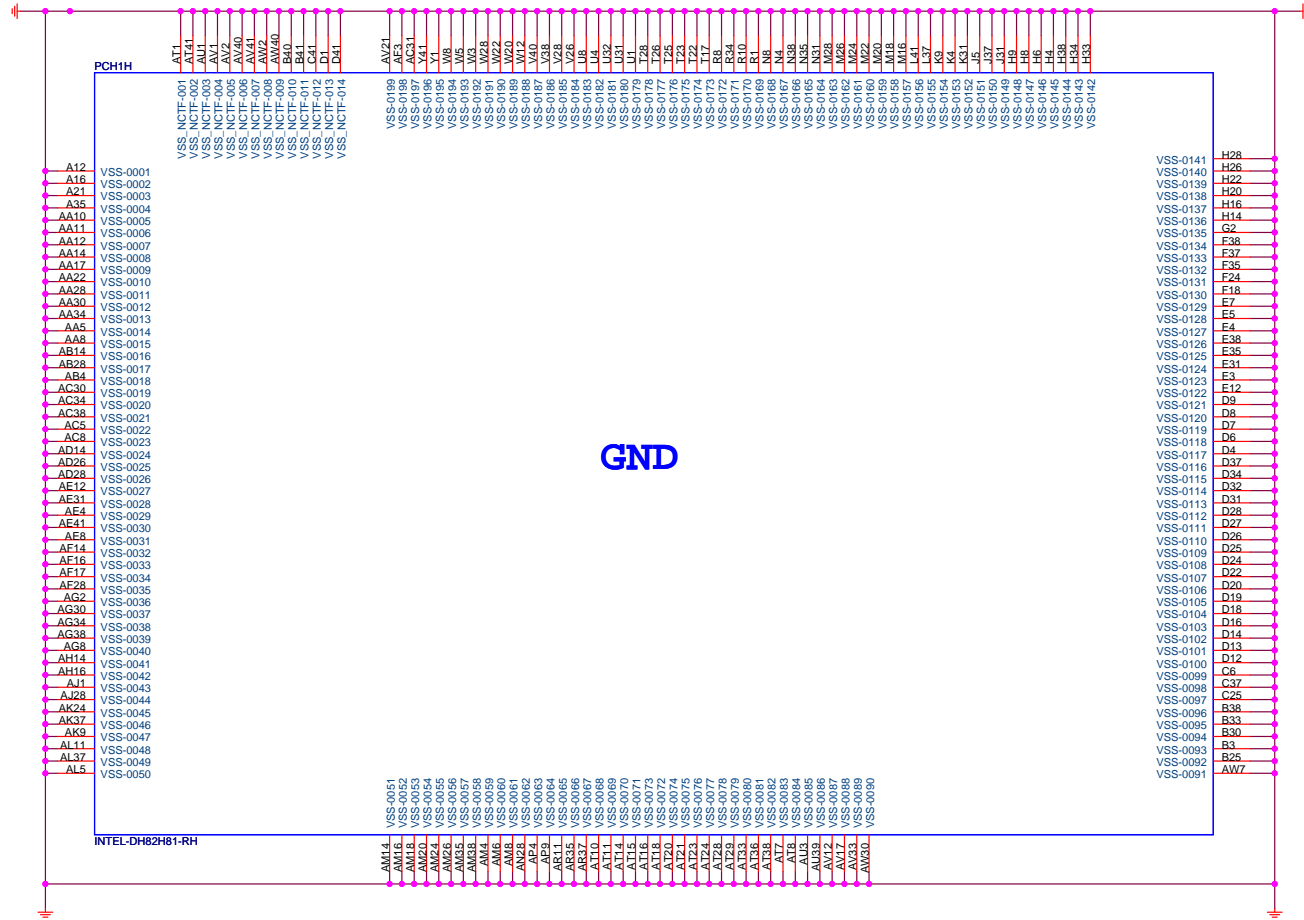
PCH decoupling cap



**MICRO-STAR INT'L CO.,LTD**

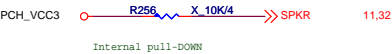
MS-7846

Size Custom	Document Description <b>LYNX -POWER PIN</b>	Rev 50
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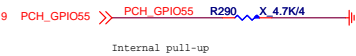
MICRO-STAR INT'L CO.,LTD		
MS-7846		
Size	Document Description	Rev
Custom	LYNX-GND	50
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PCH Straps



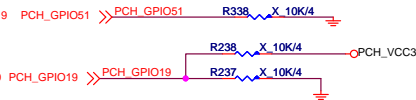
SPKR

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.



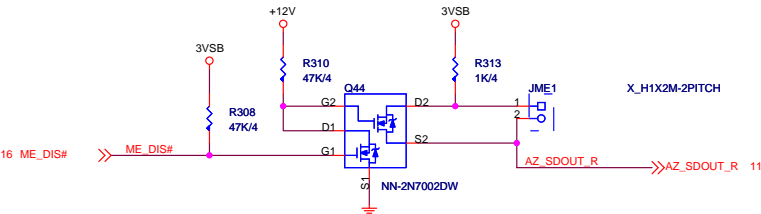
SATA1GF/GPIO19, GPIO51

Default (SPI):  
Left both SATA1GF/GPIO19 and GPIO51 floating.  
No pull up required.  
Boot from PCI:  
Connect SATA1GF/GPIO19 to ground with 1k Ohm pull-down resistor.  
Leave GPIO51 Floating.  
Boot from LPC:  
Connect both SATA1GF/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.



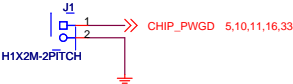
HDA\_SDO

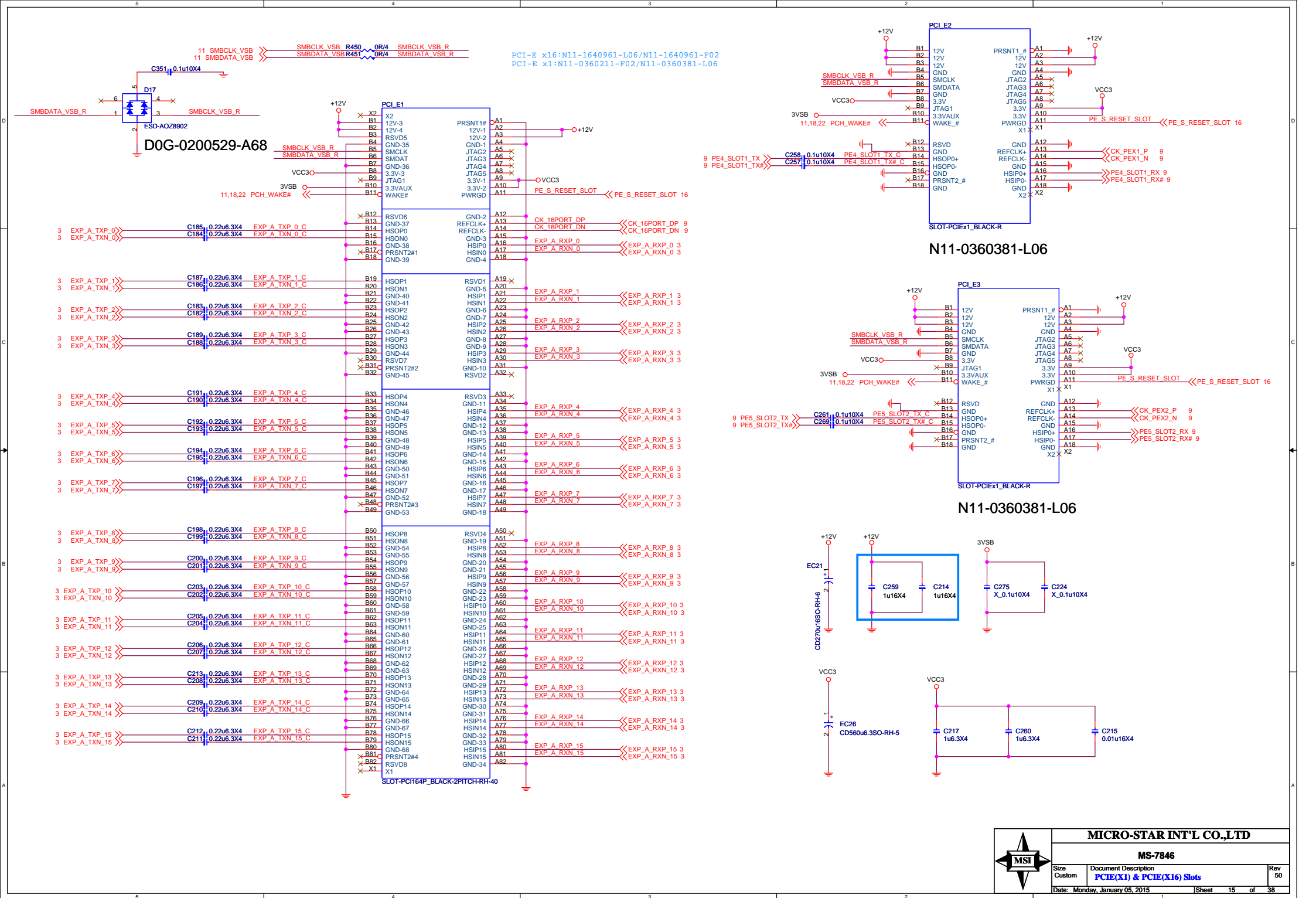
Default:  
Do not pull high.  
Disable ME in Manufacturing Mode:  
Connect to VccSusHDA with 1k Ohm pull-up resistor through a jumper.

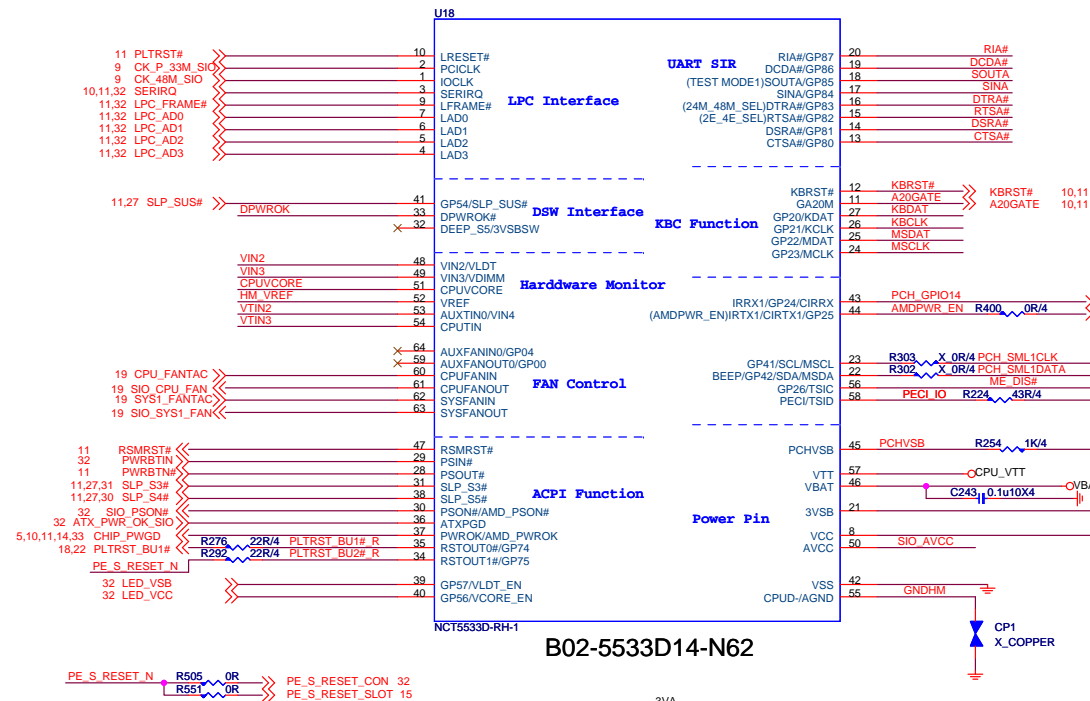
GPIO37

Enable TLS:  
Pull up with 1k Ohm to VccSus3.3.  
Default (Disable TLS):  
Leave NC. Internal pull down.

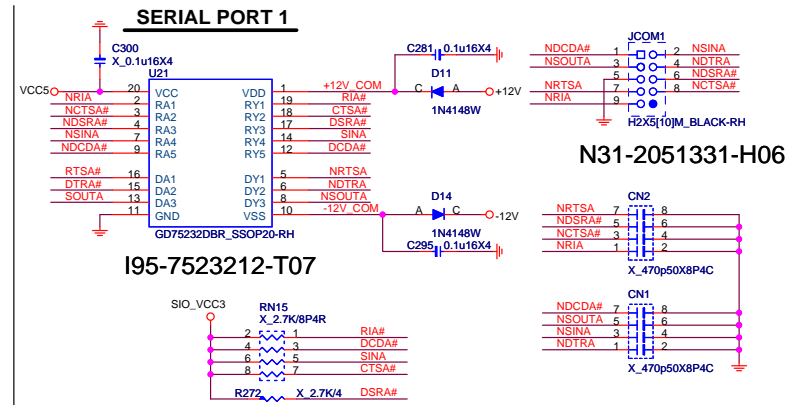
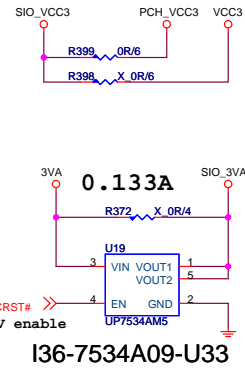
For test cpu voltage







B02-5533D14-N62

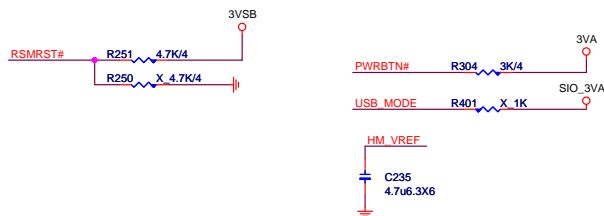
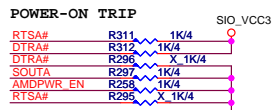


I95-7523212-T07

N56-12F0211-F02

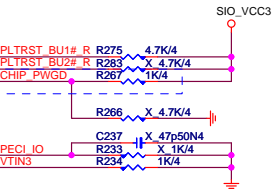
D0G-0200529-A68

## LPC I/O STRAPPING RESISTOR

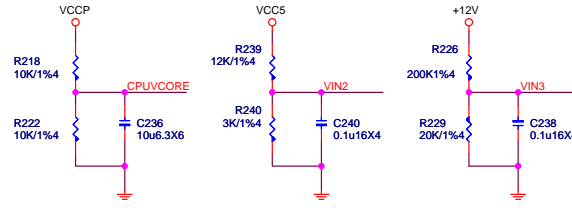


## NCT5533D POWER ON STRAPPING PIN

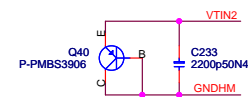
PIN	Function	NET Name	HI	I/O
44	AMDPWR_EN		ENABLE AMD PWR SEQ	DISABLE AMD PWR SEQ
18	TEST_MODEL1	SOUTA	TEST MODE 1 ENABLE	TEST MODE 1 DISABLE
16	24M_48M_SEL	DTRA#	48MHz	24MHz
15	2E_4E_SEL	RTSA#	4E	2E



## Voltage Sensing



## Thermal Resistor



## MICRO-STAR INT'L CO.,LTD

### MS-7846

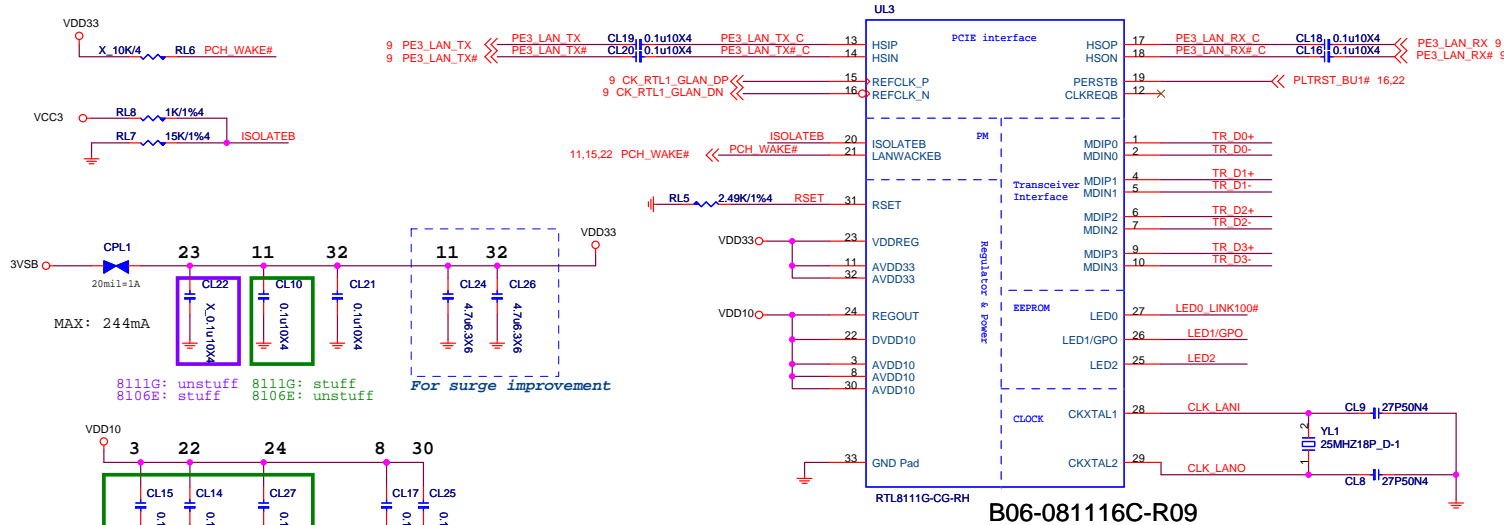
Size	Document Description	Rev
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# RTL8111G Giga LAN

## RTL8106E 10/100M LAN

### LAN Connector



B06-081116C-R09

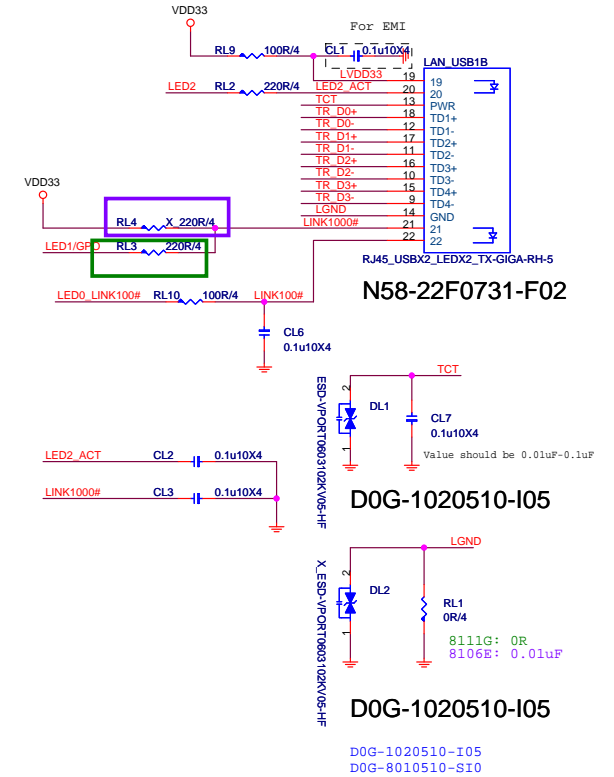
Pin33: 4 via from top layer to GND layer and make the via at the center of IC.

#### 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

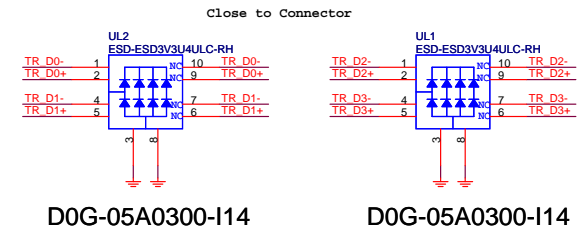
	3.3V @ mA	mW
10 M Idle/TxRx	17.15/116.7	56.6/385.1
100 M Idle/TxRx	71.45/129.5	235.8/427.4
Giga Idle/TxRx	179.1/243.9	591/804.9
ALDPS	6.41	21.15



D0G-1020510-I05

D0G-1020510-I05

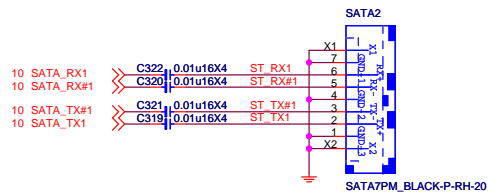
D0G-8010510-S10



D0G-05A0300-I14

D0G-05A0300-I14

**SATA 6G PORT 0,1**

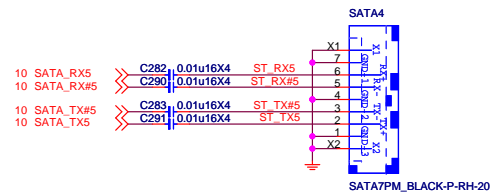


The diagram illustrates the pinout for the SATA7PM\_BLACK-P-RH-20 connector. It shows the following connections:

- SATA3:**
  - Pin 1 (X1) connects to C284 (SATA\_RX#4).
  - Pin 2 (X1) connects to C292 (SATA\_RX#4).
  - Pin 3 (X1) connects to C285 (SATA\_TX#4).
  - Pin 4 (X1) connects to C293 (SATA\_TX4).
  - Pin 5 (X1) connects to C284 (SATA\_RX#4).
  - Pin 6 (X1) connects to C292 (SATA\_RX#4).
  - Pin 7 (X1) connects to C285 (SATA\_TX#4).
  - Pin 8 (X1) connects to C293 (SATA\_TX4).
- SATA7PM\_BLACK-P-RH-20:**
  - Pin 1 (X2) connects to C284 (SATA\_RX#4).
  - Pin 2 (X2) connects to C292 (SATA\_RX#4).
  - Pin 3 (X2) connects to C285 (SATA\_TX#4).
  - Pin 4 (X2) connects to C293 (SATA\_TX4).
  - Pin 5 (X2) connects to C284 (SATA\_RX#4).
  - Pin 6 (X2) connects to C292 (SATA\_RX#4).
  - Pin 7 (X2) connects to C285 (SATA\_TX#4).
  - Pin 8 (X2) connects to C293 (SATA\_TX4).

The diagram also shows the following labels:

- SATA3
- SATA7PM\_BLACK-P-RH-20
- C284
- C292
- C285
- C293
- ST RX#4
- ST RX#4
- ST TX#4
- ST TX4
- X1
- X2
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
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- 98
- 99
- 100



### CONTROL CIRCUIT

**CPU FAN**

VCC5

R171 2.2K/4

R172 2.2K/4

Q27 NN-2N7002DW

D1 1N4148W

R40 4.7K/4

R2 27K/4

R3 10K/4

C70 22u16X8

C84 0.1u16X4

2014.12.11 change Fan cap

**SYSTEM FAN1**

VCC3

R375 1K/4

R376 100K/4

U12B AS358MTR

R182 10K/1%4

C10u6.3X5-HF

R180 3.6K/1%4

Q32 P-P06P03\_S07B9

R71 X\_0R/8

D7 1N4148W

R187 4.7K/4

R185 27K/4

R183 10K/4

C176 X\_0.1u16X4

C60 22u16X8

C63 0.1u16X4

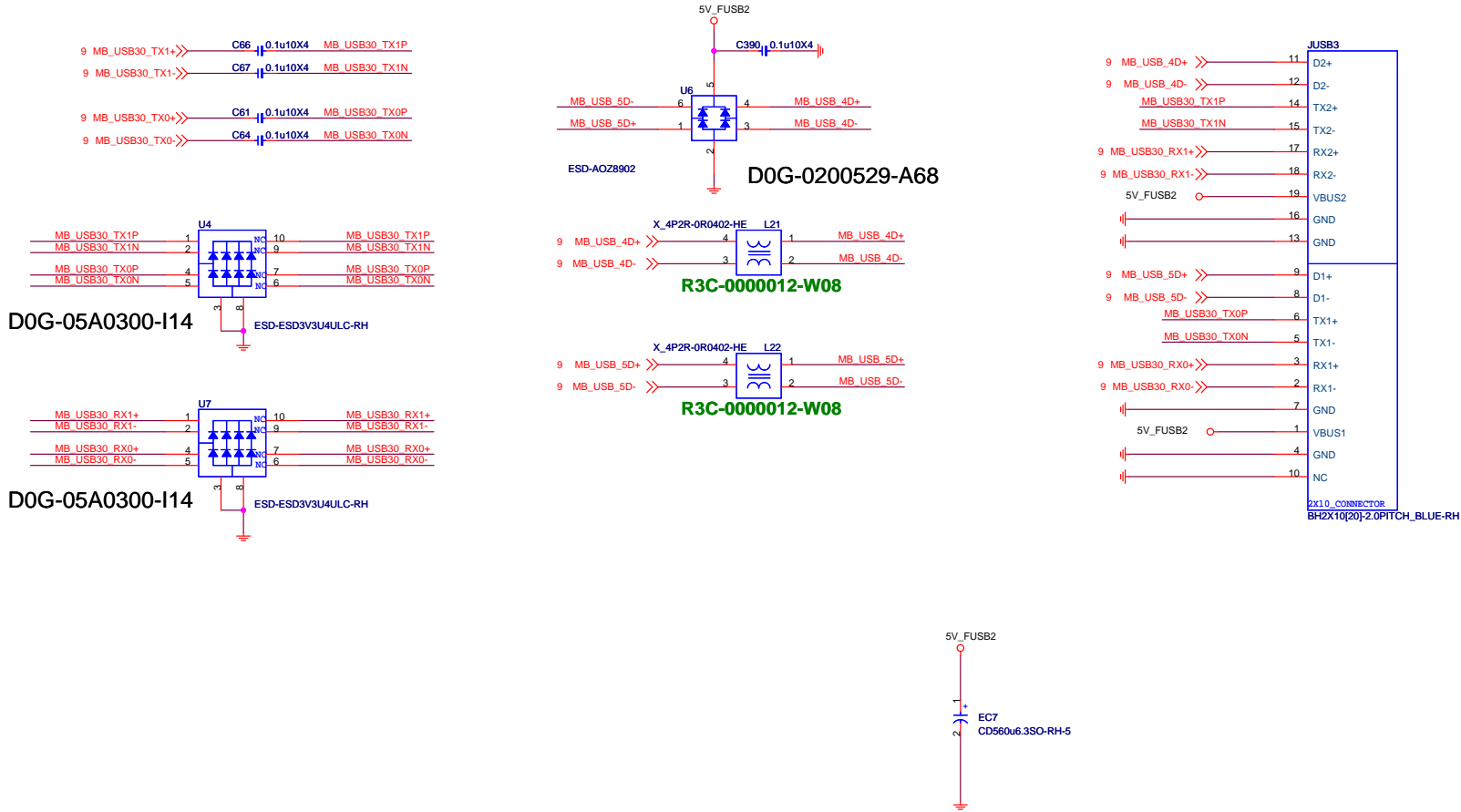
2014.12.11 change Fan cap



MS-7846

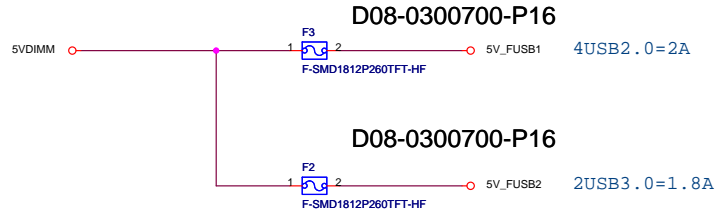
Size Custom	Document Description <b>SATA/FAN</b>	Rev 50
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Front USB3.0 Connector

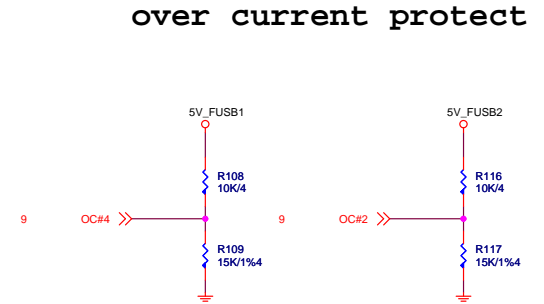


PCH/FCH side: OC# pull high to +3VSB

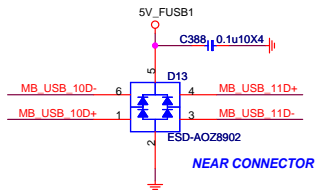
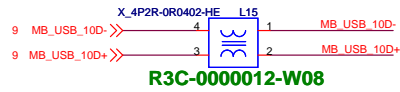
Near Front ==>



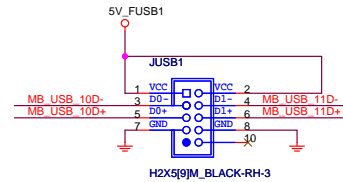
D08-2000300-P16 (Itrip=3.5A; 0.003ohm) support 6 USB ports (3A)  
D08-0300700-P16 (Itrip=2.6A; 0.015ohm) support 4 USB ports (2A)  
D08-0100110-P16 (Itrip=1.1A; 0.04ohm) support 2 usb 2.0 ports (1A)



#### FRONT USB PORT 8,9

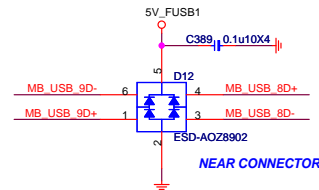
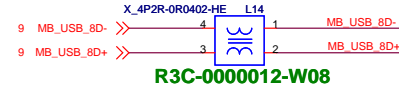


D0G-0200529-A68

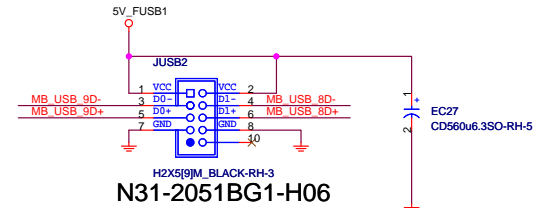


N31-2051BG1-H06

#### FRONT USB PORT 10,11



D0G-0200529-A68



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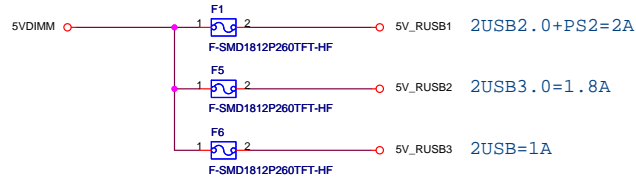
MS-7846

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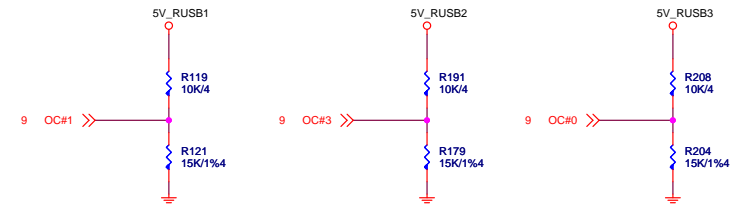
PCH/FCH side: OC# pull high to +3VSB

Near Rear ==>

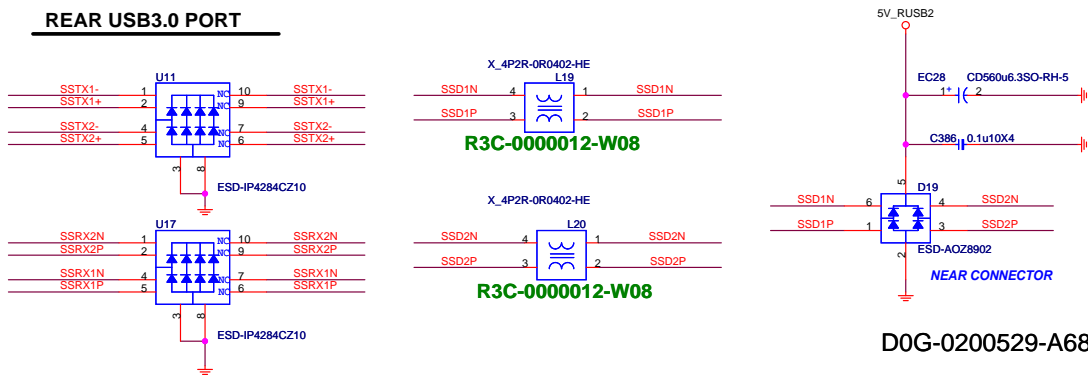


D08-2000300-P16 (Itrip=3.5A; 0.003ohm) support 6 USB ports (3A)  
D08-0300700-P16 (Itrip=2.6A; 0.015ohm) support 4 USB ports (2A)  
D08-0100110-P16 (Itrip=1.1A; 0.04ohm) support 2 usb 2.0 ports (1A)

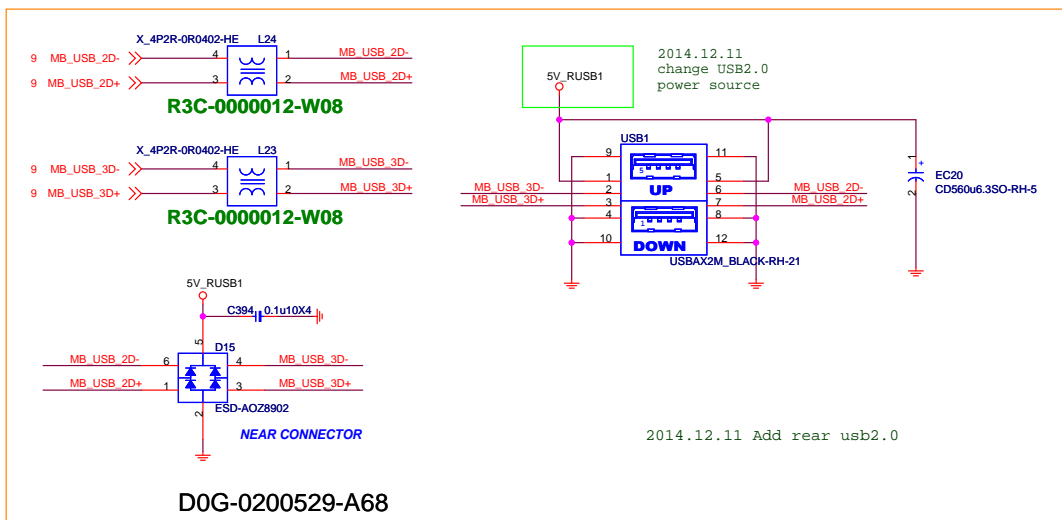
## over current protect



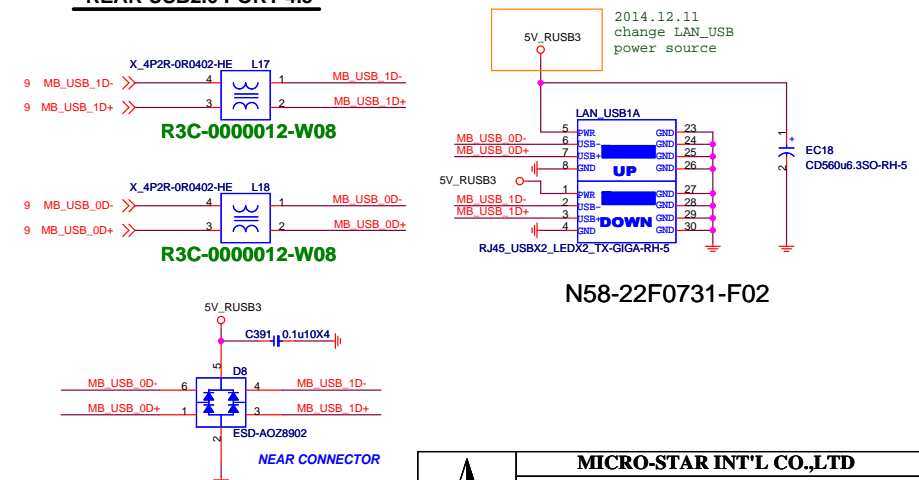
## REAR USB3.0 PORT



## REAR USB2.0 PORT 2.3



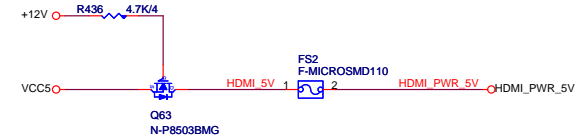
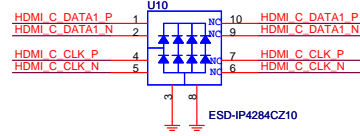
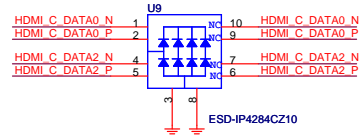
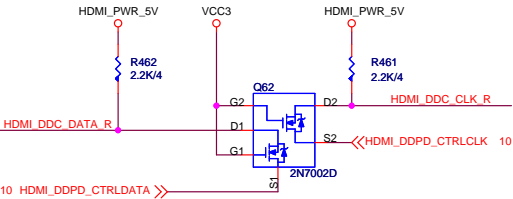
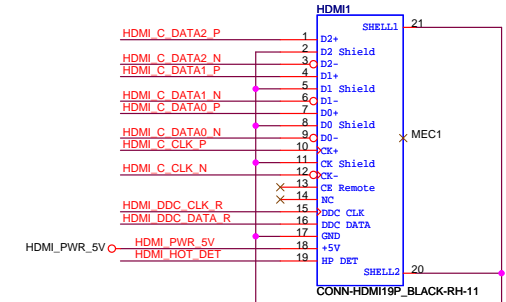
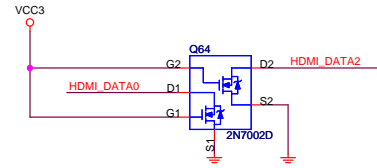
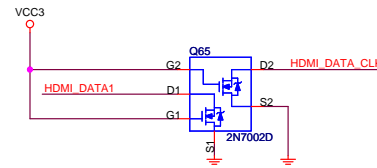
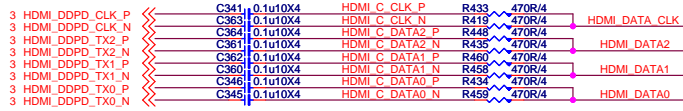
## REAR USB2.0 PORT 4.5



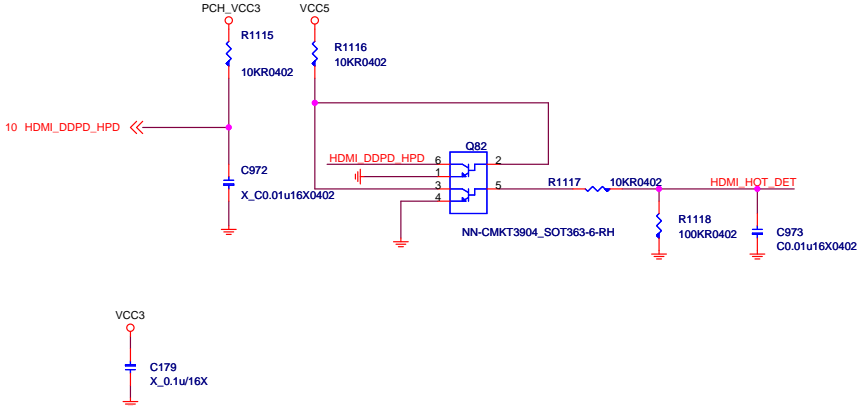
N58-22F0731-F02

MICRO-STAR INT'L CO.,LTD			
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Date: Monday, January 05, 2015	Sheet 23 of 38	Rear USB2.0 / 3.0 Connector	

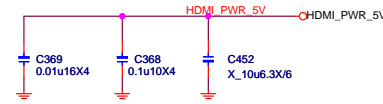
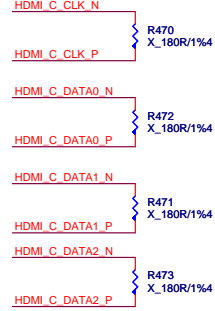
# HDMI, DVI : 1920x1200 at 60 Hz (16:10 WUXGA)



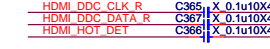
## HPD



## For EMI



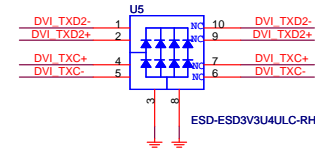
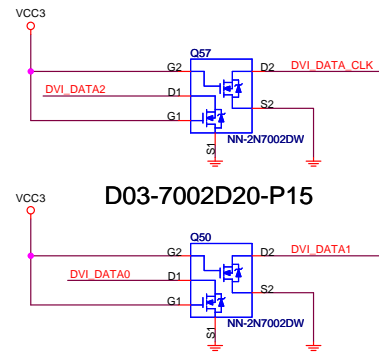
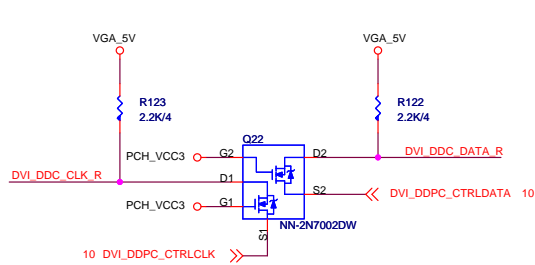
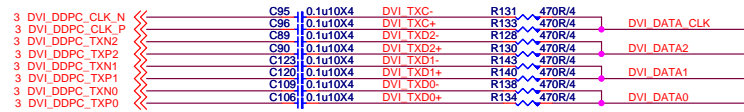
## EMI



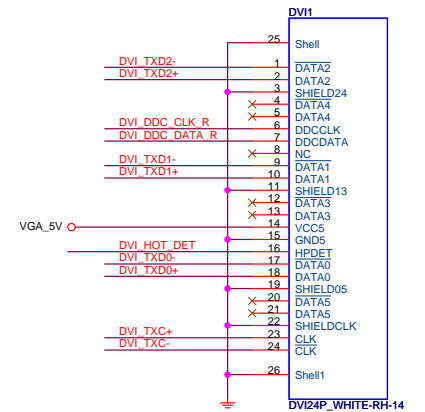
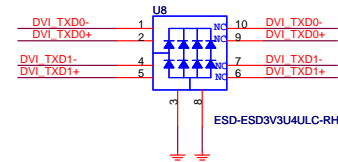
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# DVI

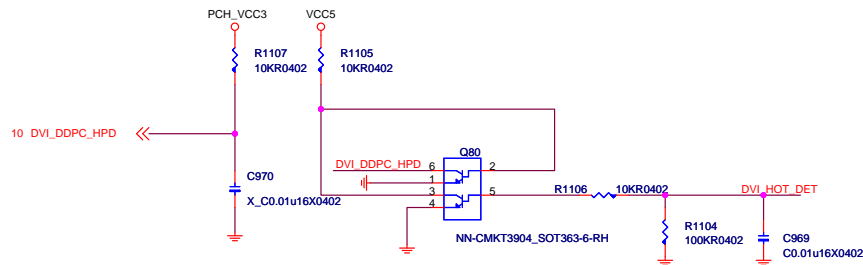
VGA: resolution of 2048x1536 pixels with 32-bit color at 75 Hz (4:3 QXGA)



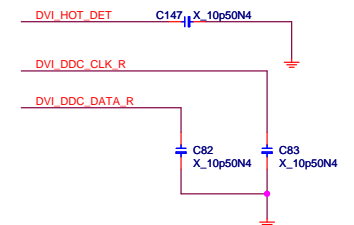
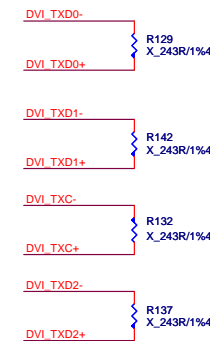
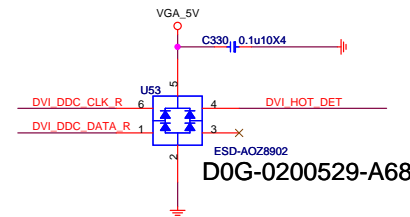
D0G-05A0300-I14



## HPD



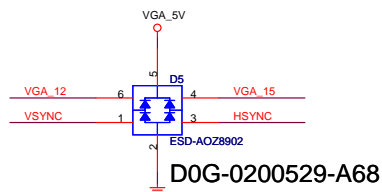
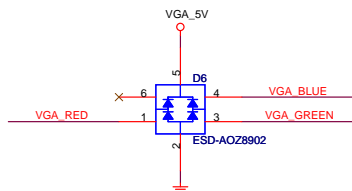
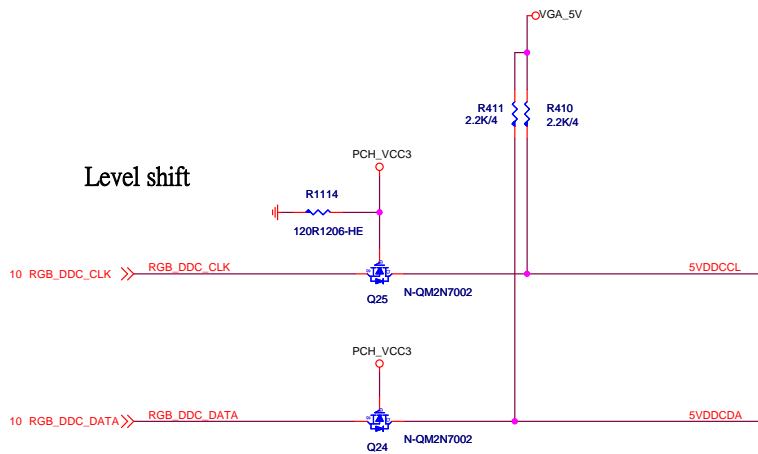
For EMI



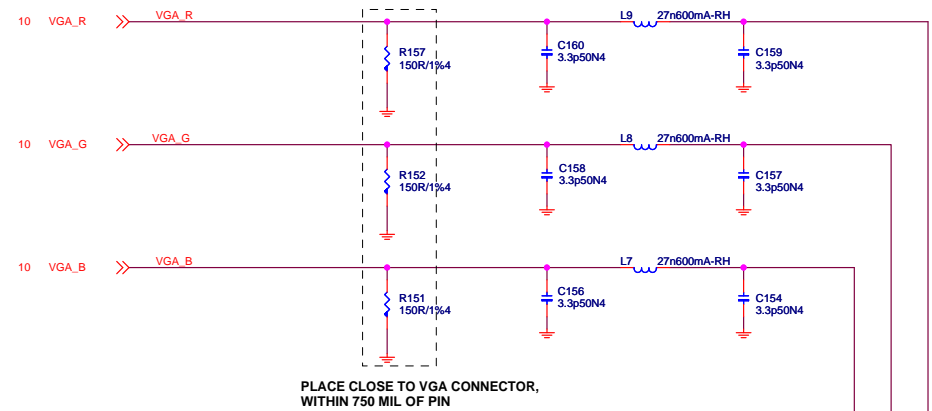
MICRO-STAR INT'L CO.,LTD			
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# D-Sub

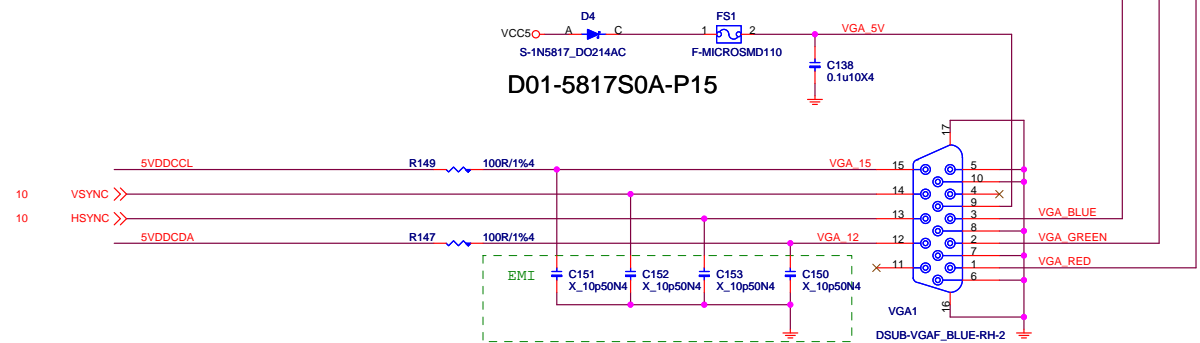
## Level shift



D0G-0200529-A68



D08-0100200-B07



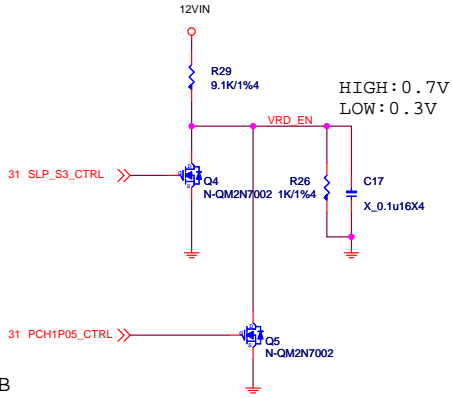
MICRO-STAR INT'L CO.,LTD

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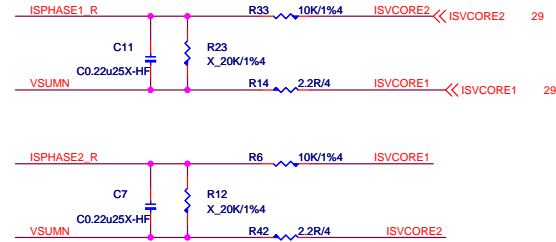
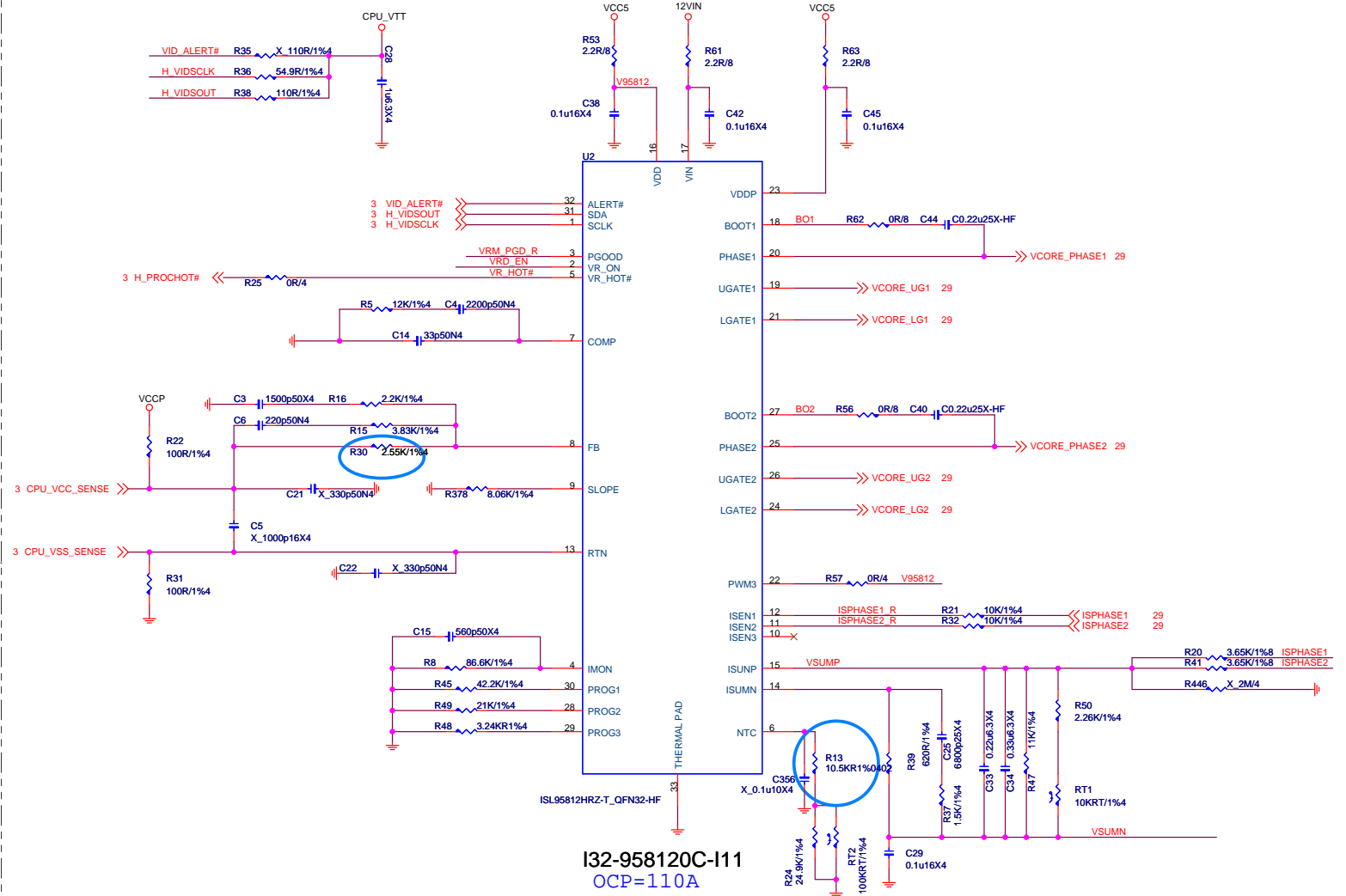
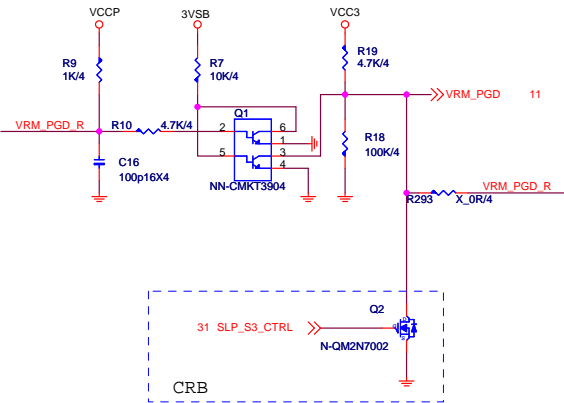
VCORE power on by s3 and 12v



CRB

HIGH:by PCH\_1P05V  
LOW:by S3

## VRMPWRGD LEVEL SHIFT



**MICRO-STAR INT'L CO.,LTD**

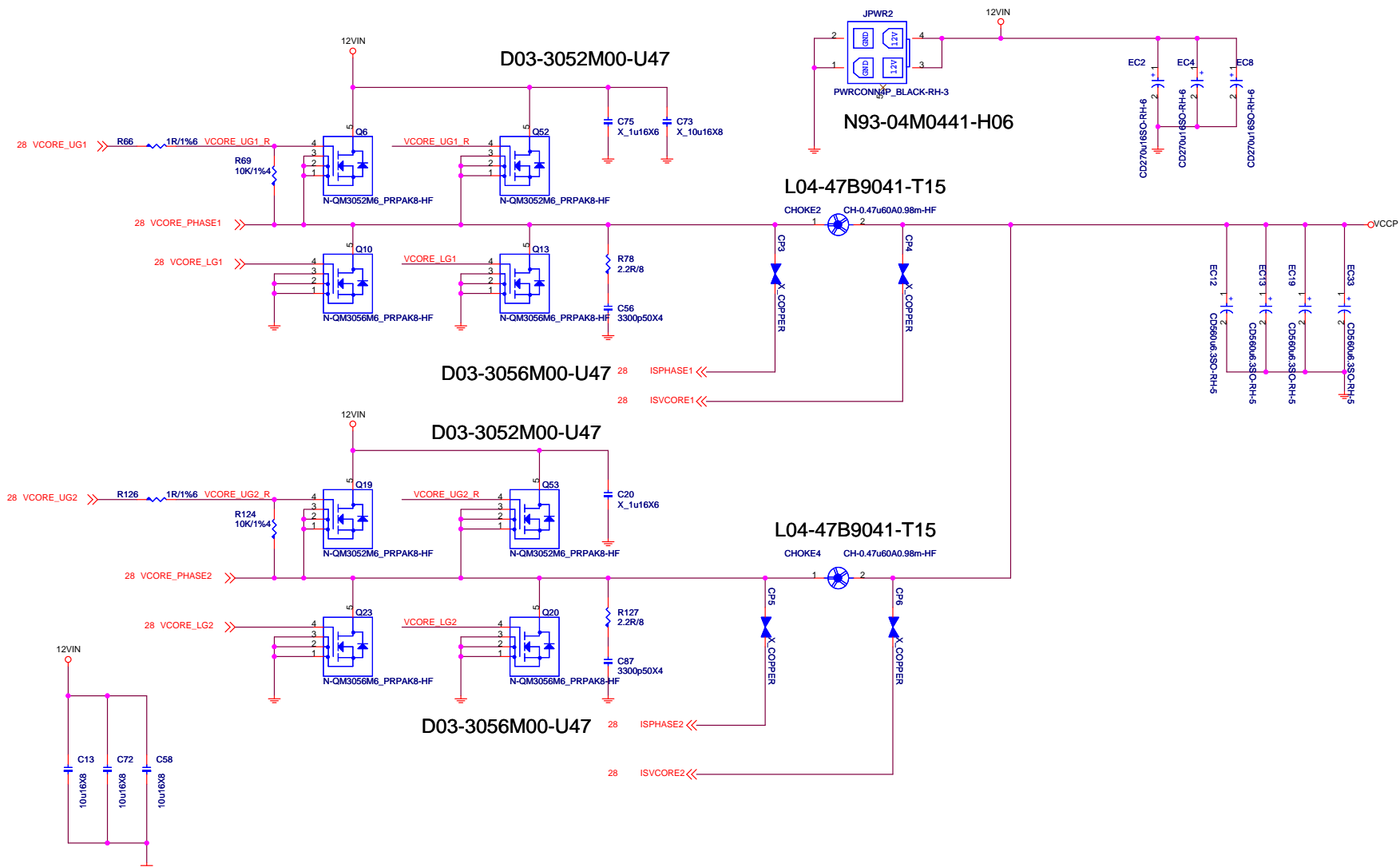
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# VCCP POWER

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

2014.12.11  
remove  
input choke



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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

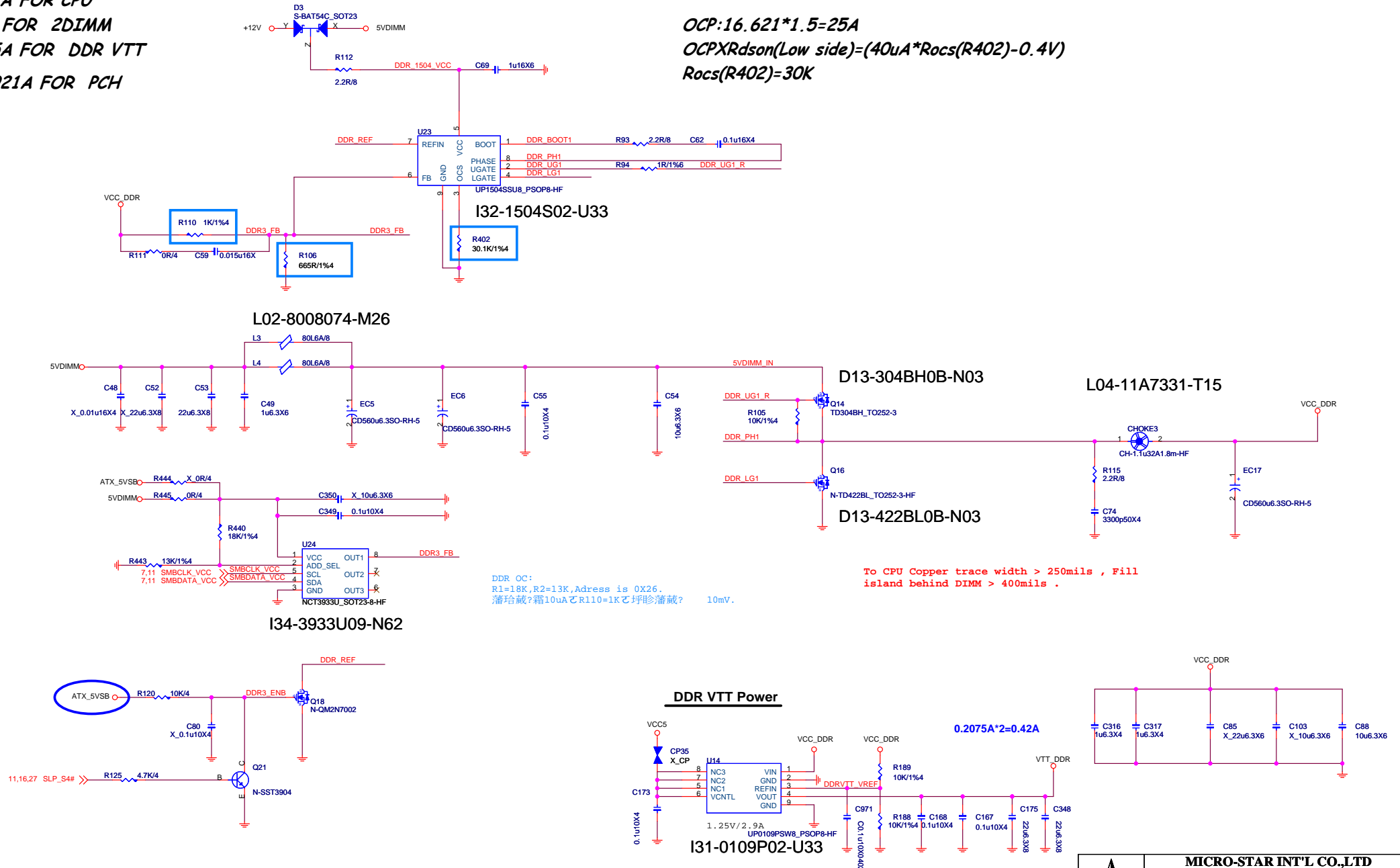
0.5A FOR DDR VTT

5.921A FOR PCH

OCP:16.621\*1.5=25A

OCPXRdson(Low side)=(40uA\*Rocs(R402)-0.4V)

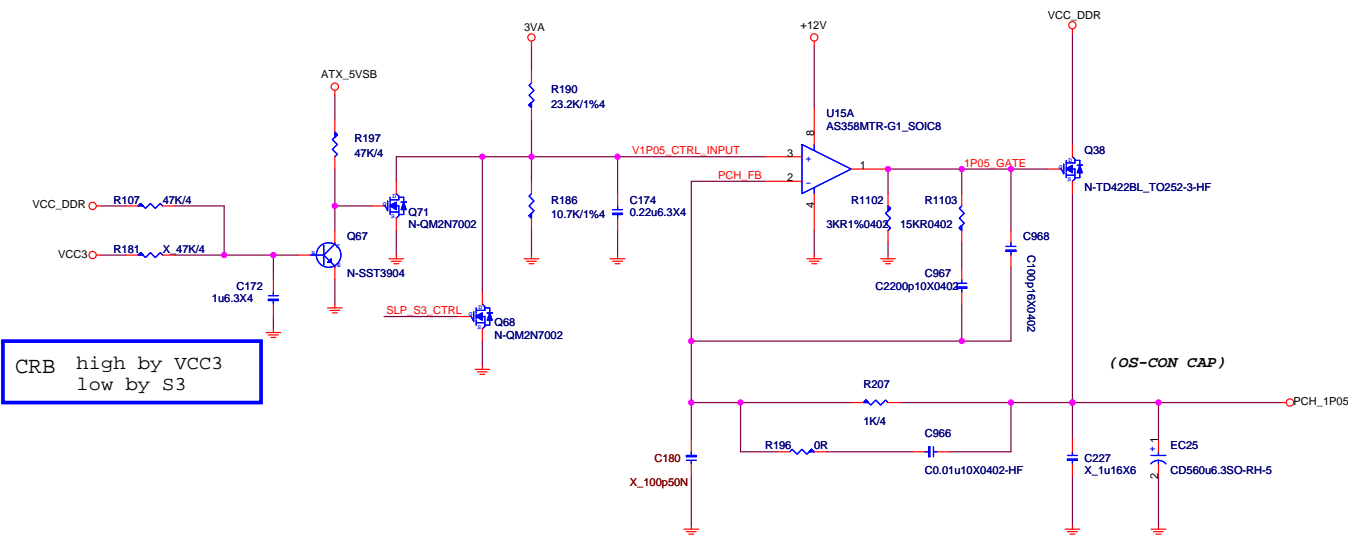
Rocs(R402)=30K



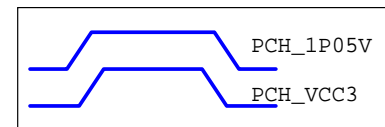
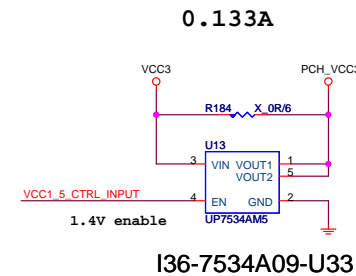
P.S. Only for meet Intel power down sequence.

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	DDR Power -UP1504 1-Phase		
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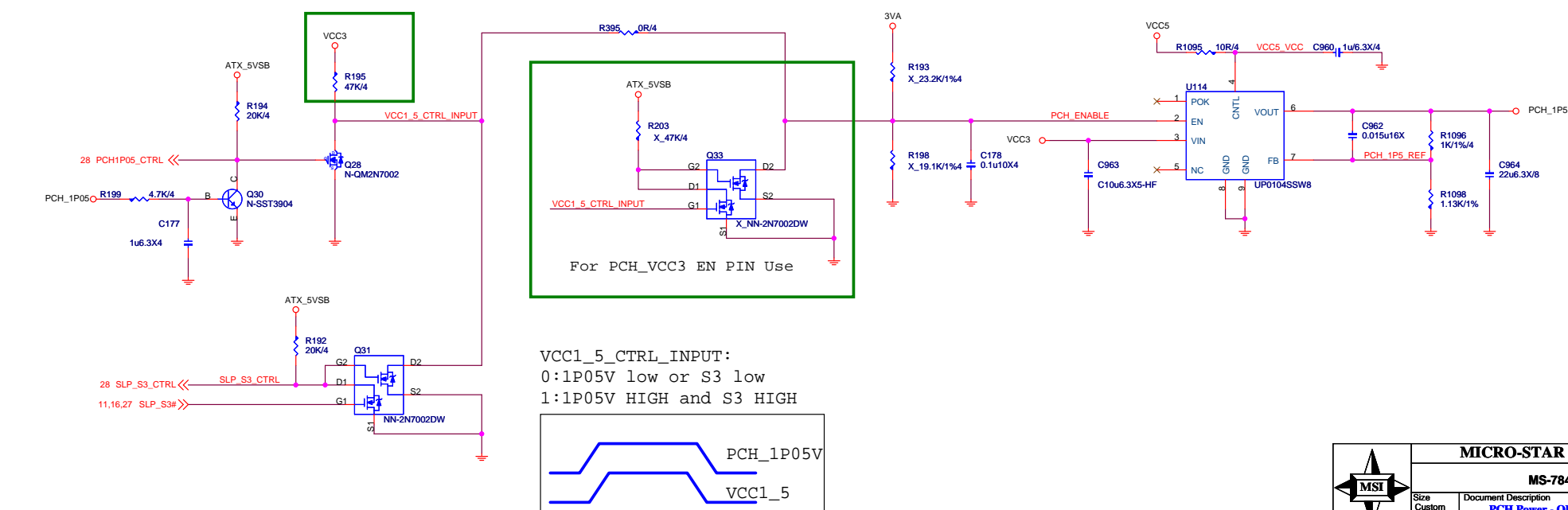
# PCH Power:1.05V 5.747A



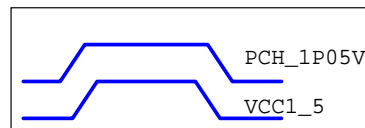
CRB high by VCC3  
low by S3



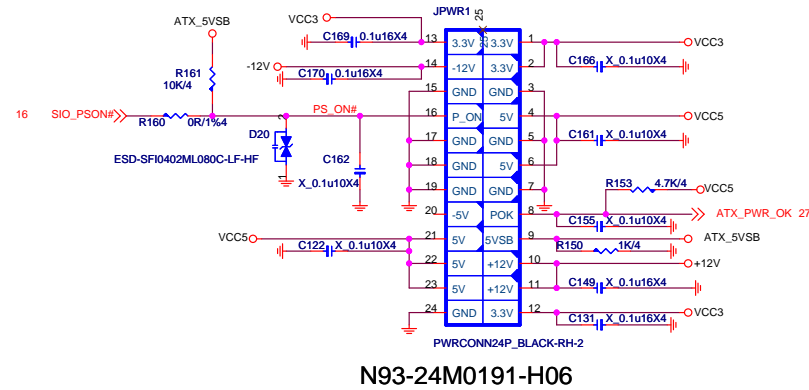
# PCH Power:1.5V 0.183A



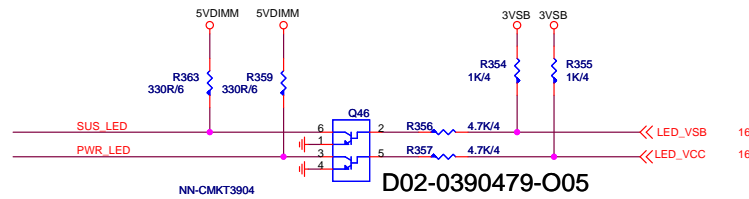
VCC1\_5\_CTRL\_INPUT:  
0:1P05V low or S3 low  
1:1P05V HIGH and S3 HIGH



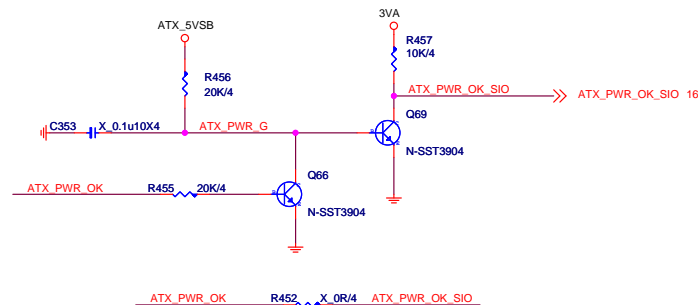
## ATX POWER CONNECTOR



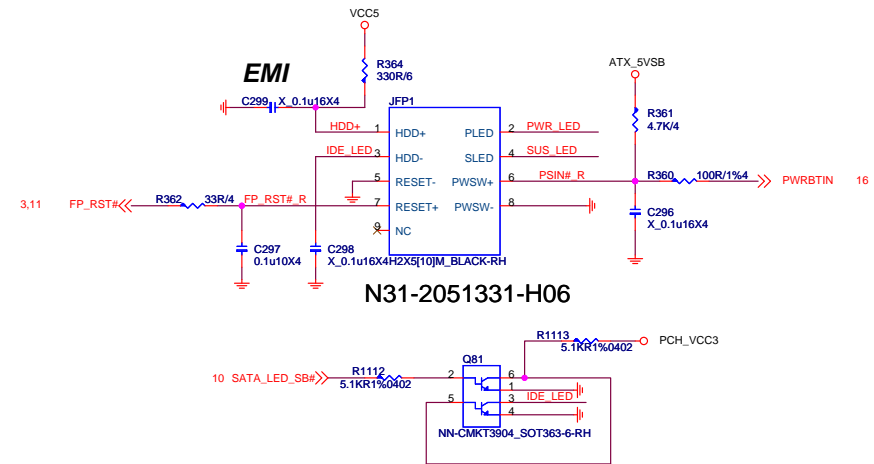
## LED ( for NV5533)



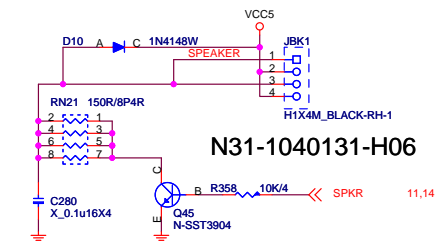
5VCC leakage from ATXPGD.(NCT6779 PIN80)  
(NCT5533 PIN36)



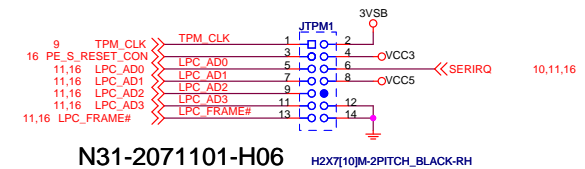
## FRONT PANNEL



## Speaker Pin Header

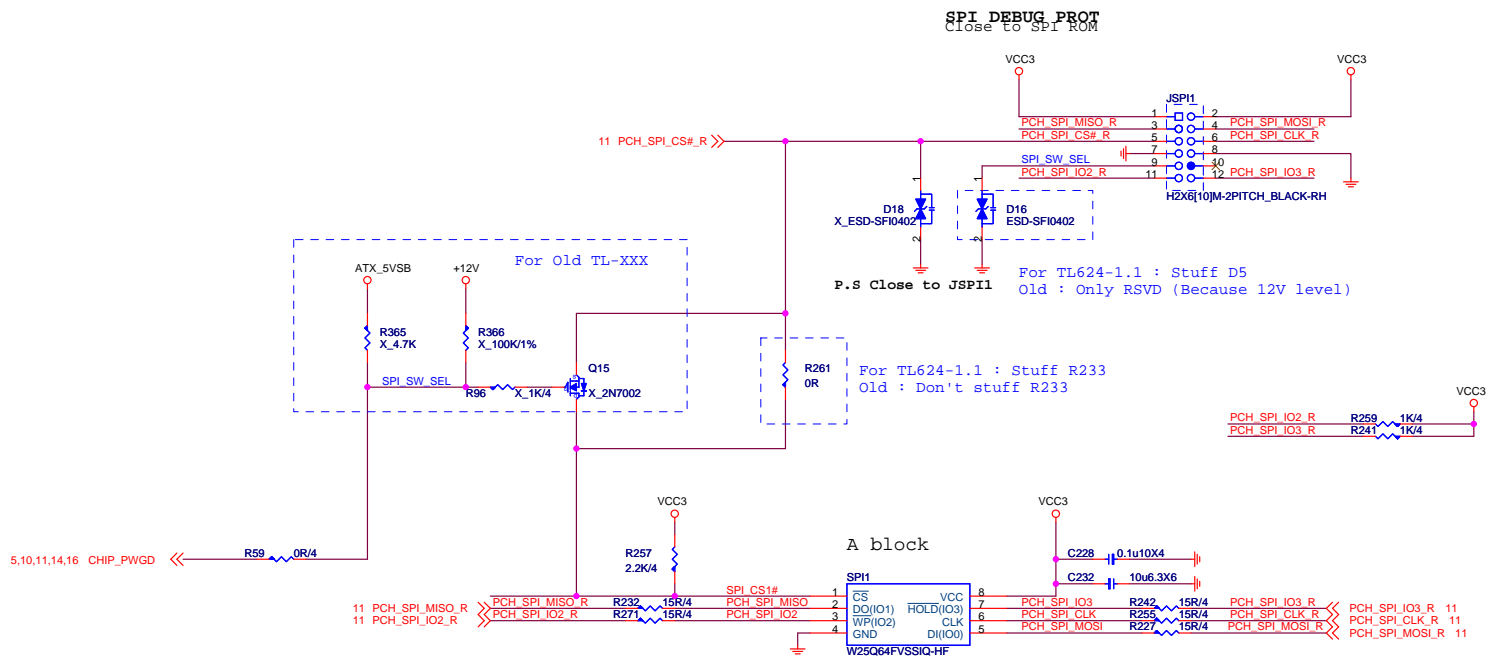


## TPM/JLPC



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## SPI ROM



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LABEL

MARKET Name



G51-M1SPG28-Q13

AMI



G51-M1SPXXA-A09

Battery



D06-0100101-P01



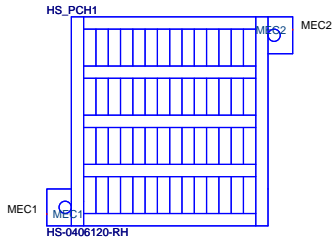
PK0-0784650-E48

CPU Socket

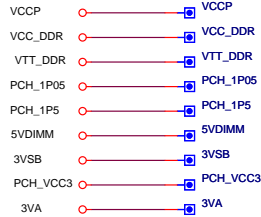


E21-7788020-F02

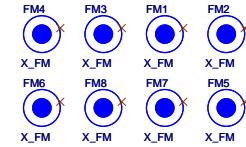
PCH Heatsink



E31-0406120-K08



Optical Fiducial Marks-120



FM002

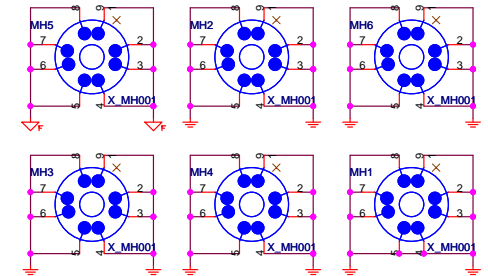
F\_PAD\_X

Simulation



SINGLE\_SIP2

Mounting Holes



MH001

HOLES\_4S



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