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# MS-7820 ATX Ver: 2.1

Intel -ShakeBay plamform

**CPU:**

INTEL-Haswell LGA1150

**CPU DISPLAY**

VGA

**System Chipset:**

INTEL-LYNX

**OnBoard Chipset:**

HD Audio Codec:ALC887

LAN-RTL8111G Co-lay 8106G

SIO:Nuvoton NCT6779

**Main Memory:**

DDRIII (1066/1333/1600MHz) \* 2 (Dual Channel)

**Expansion Slots:**

PCI Express (X16) Slot \* 1

PCI Slot \* 5

**PWM:**

VRD12 - ISL95812

**Other:**

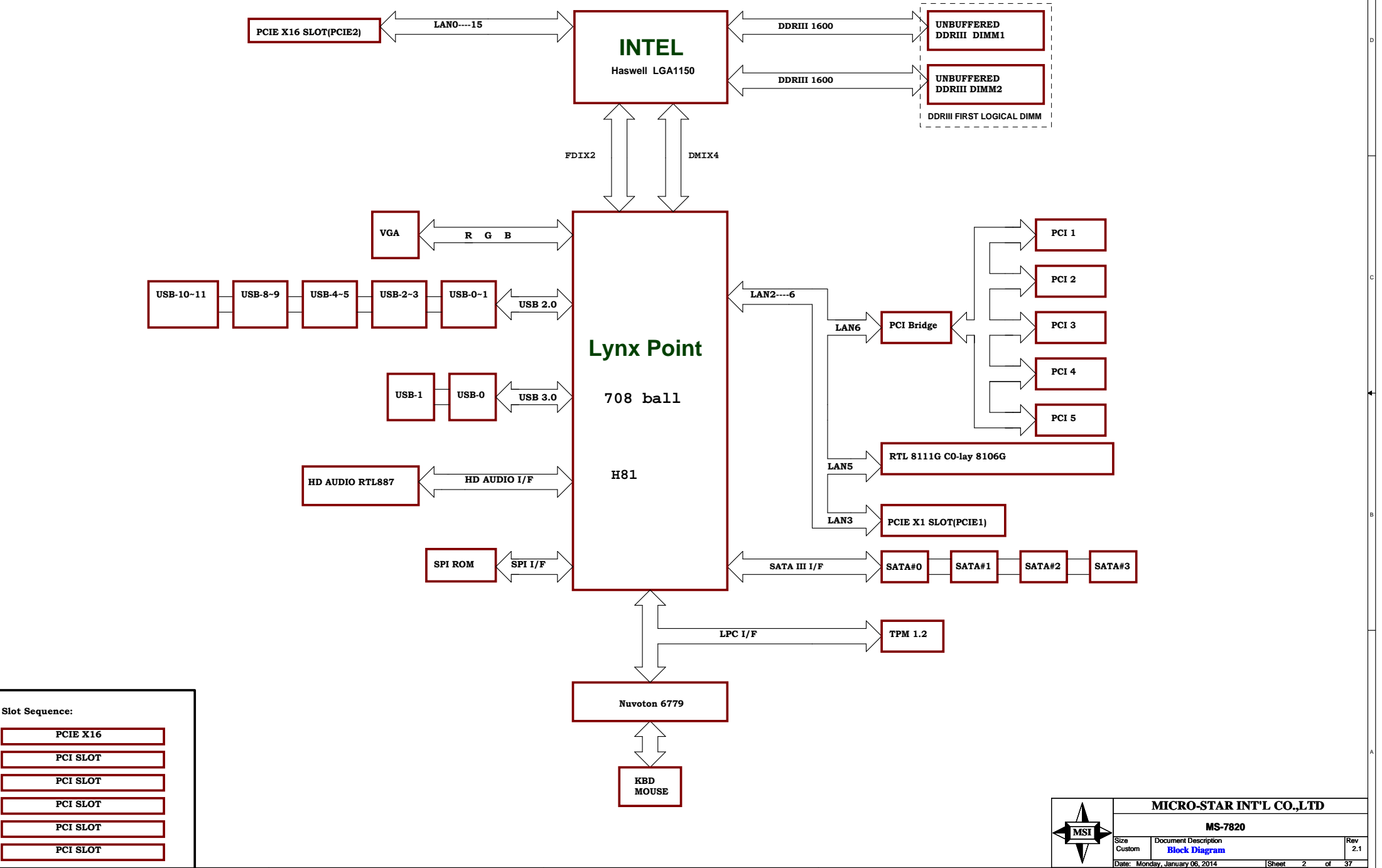
SATA(SATA2-300MB/s) \*2 (SATA1,SATA2)

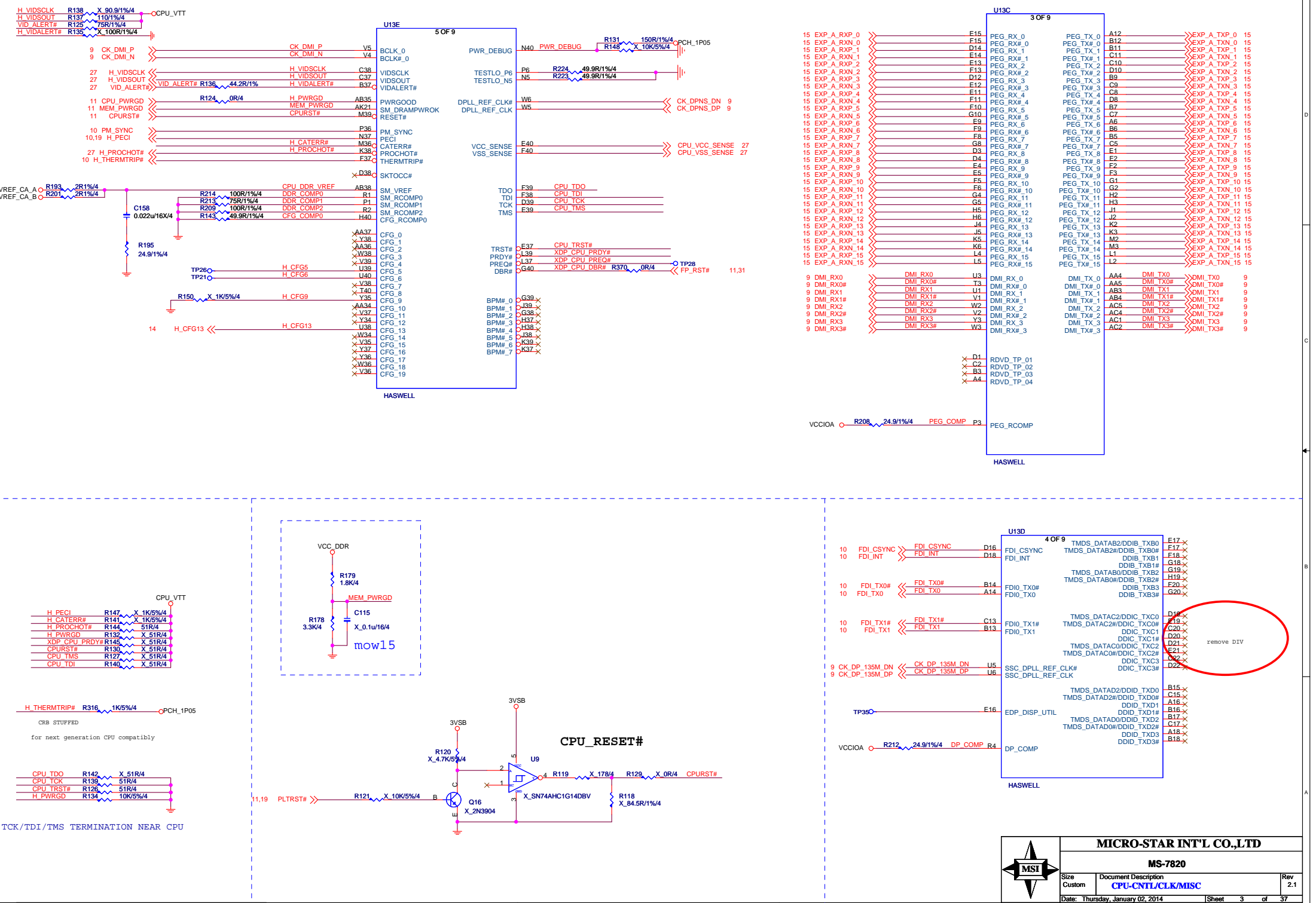
SATA(SATA3-500MB/s) \*2 (SATA3,SATA4)

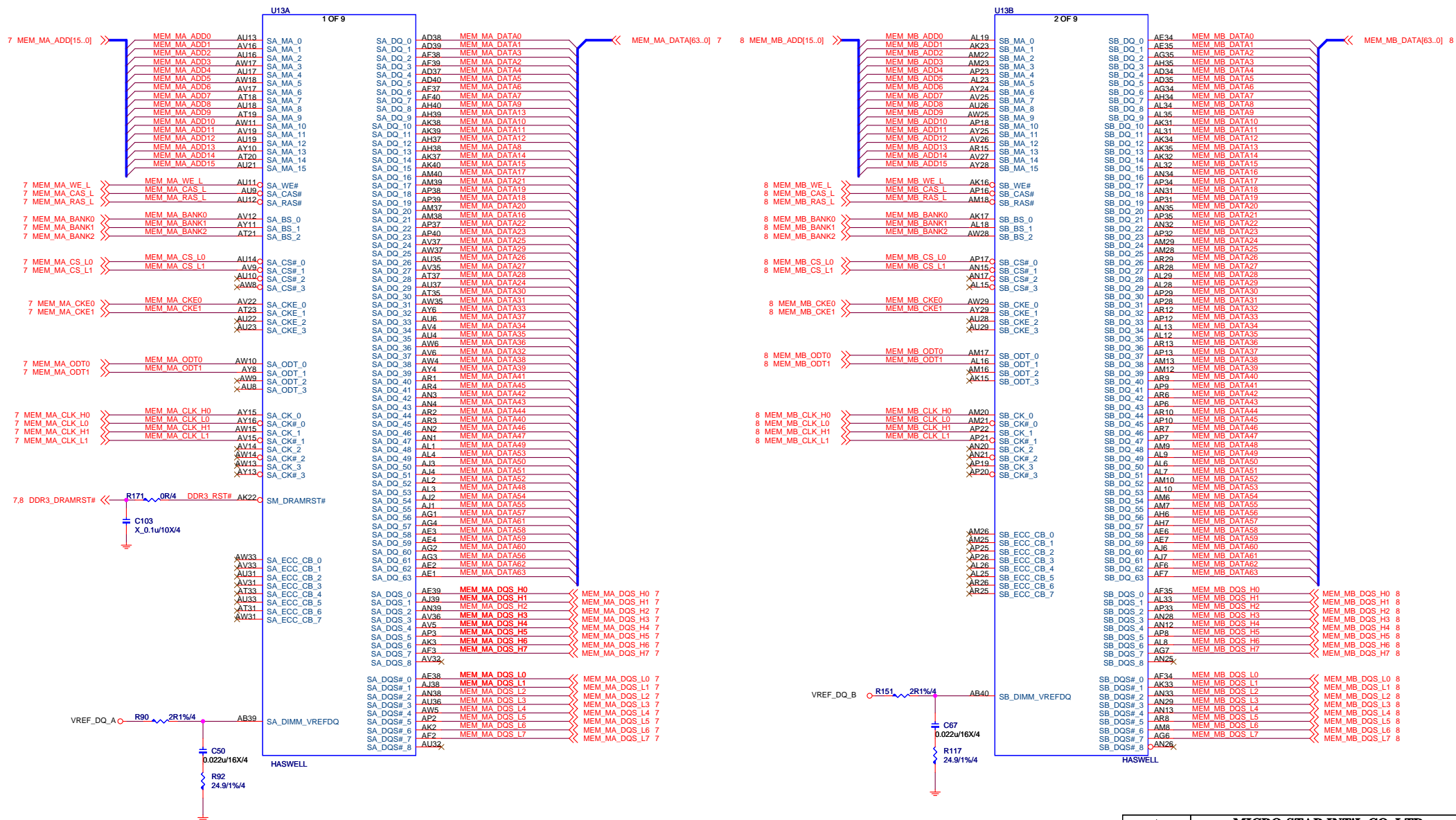
REAL USB2.0 \*2

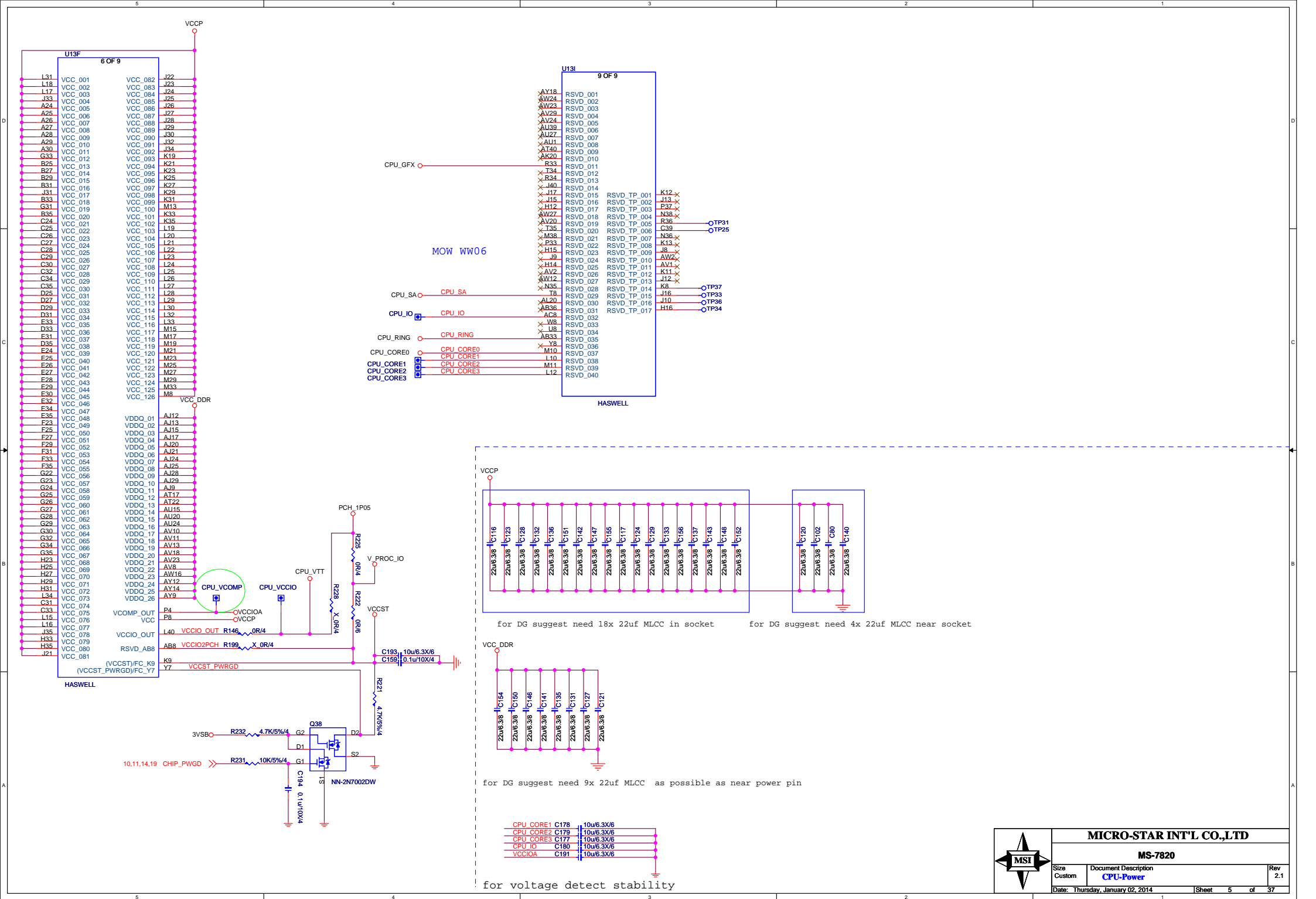
FRONT USB2.0 \*6

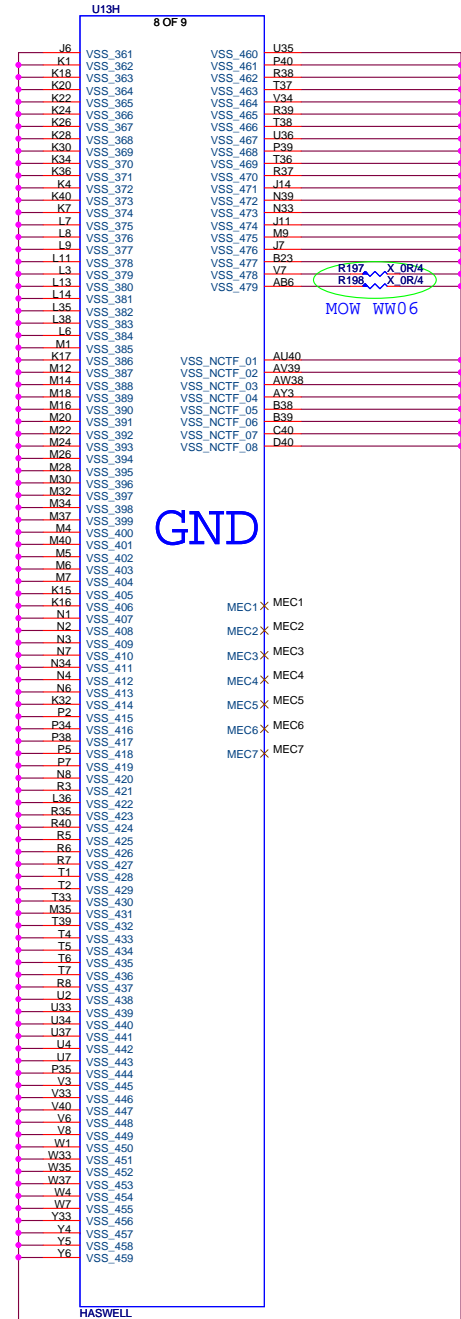
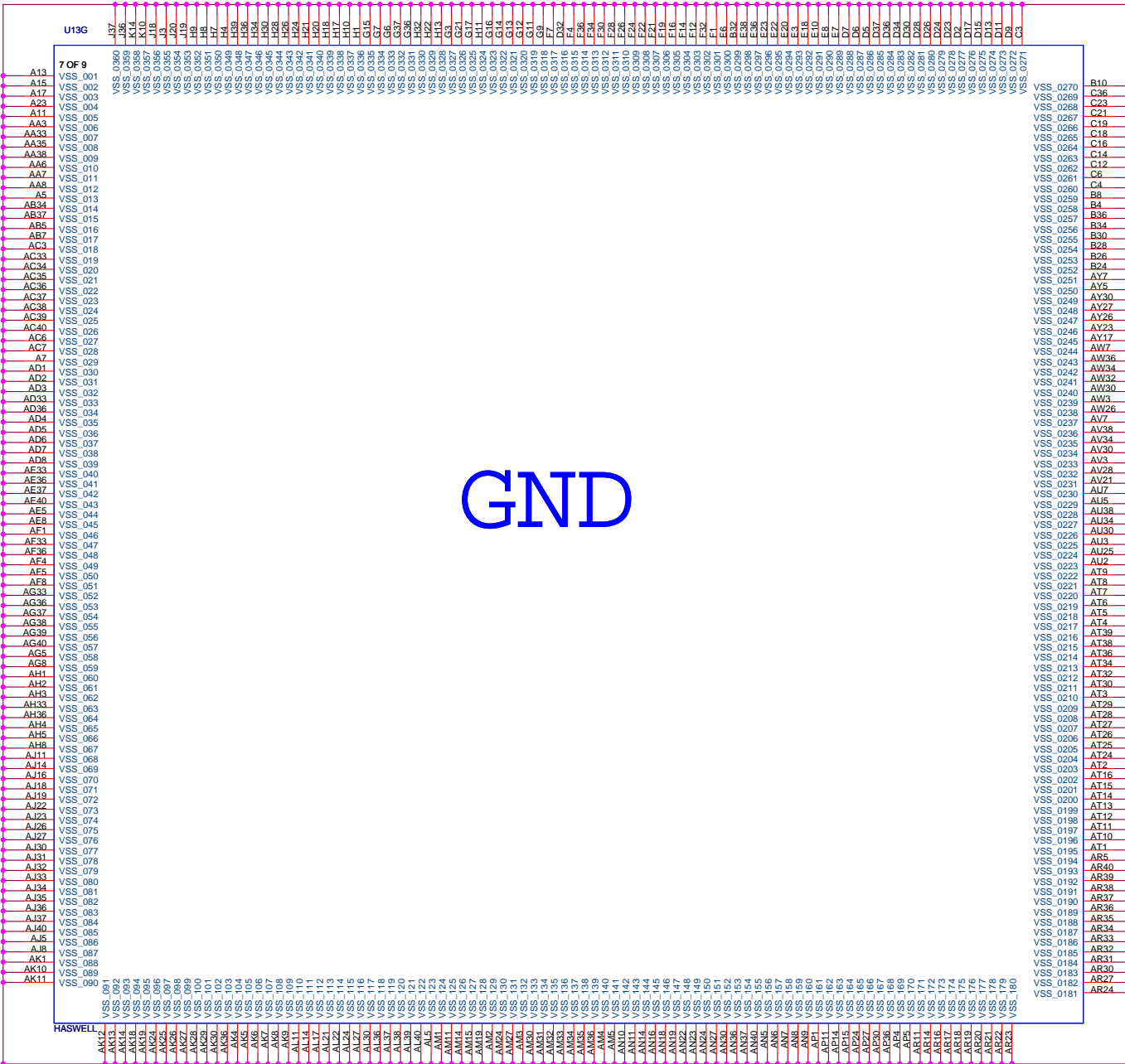
MS-7820-2.1 Block Diagram









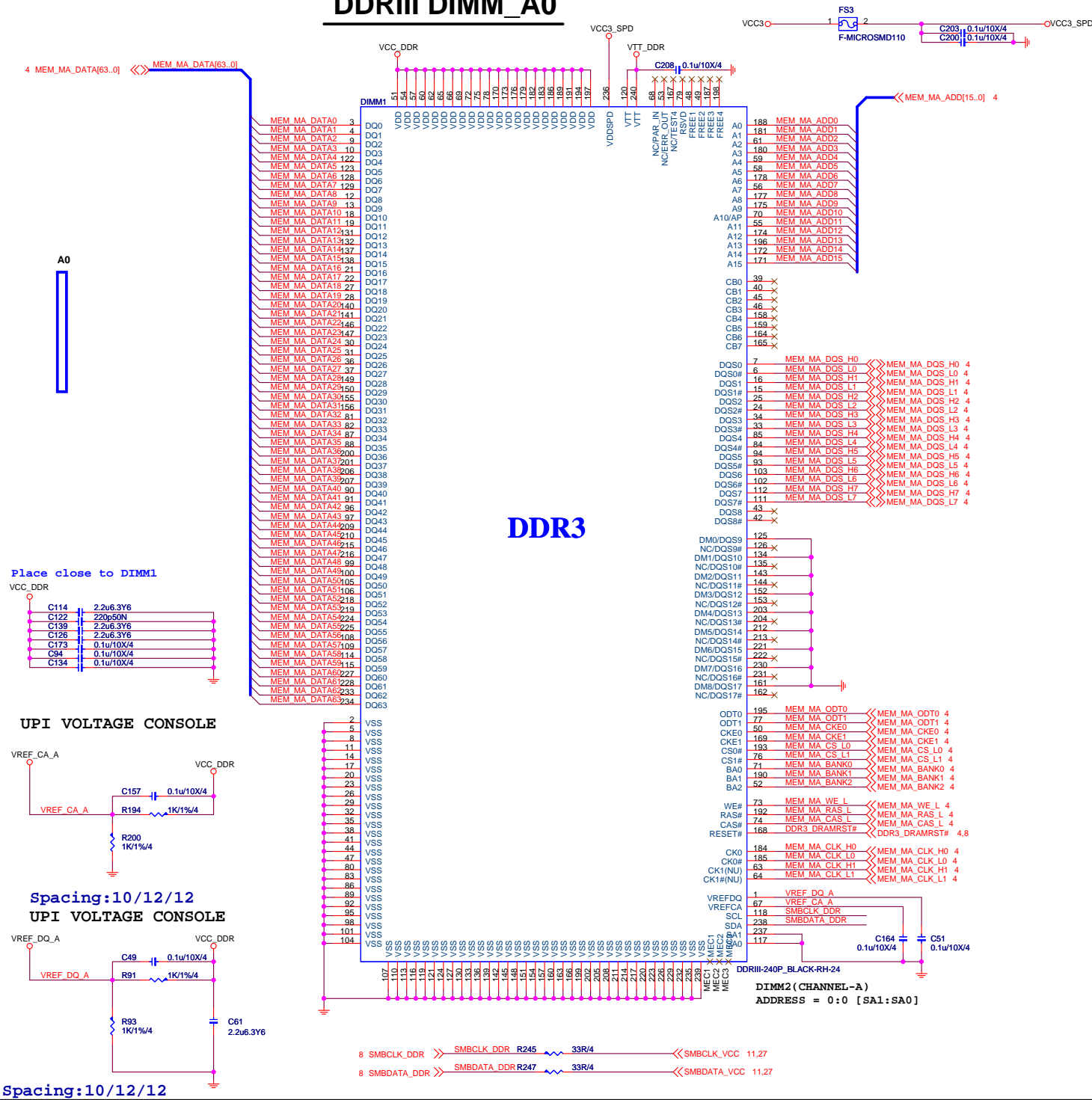


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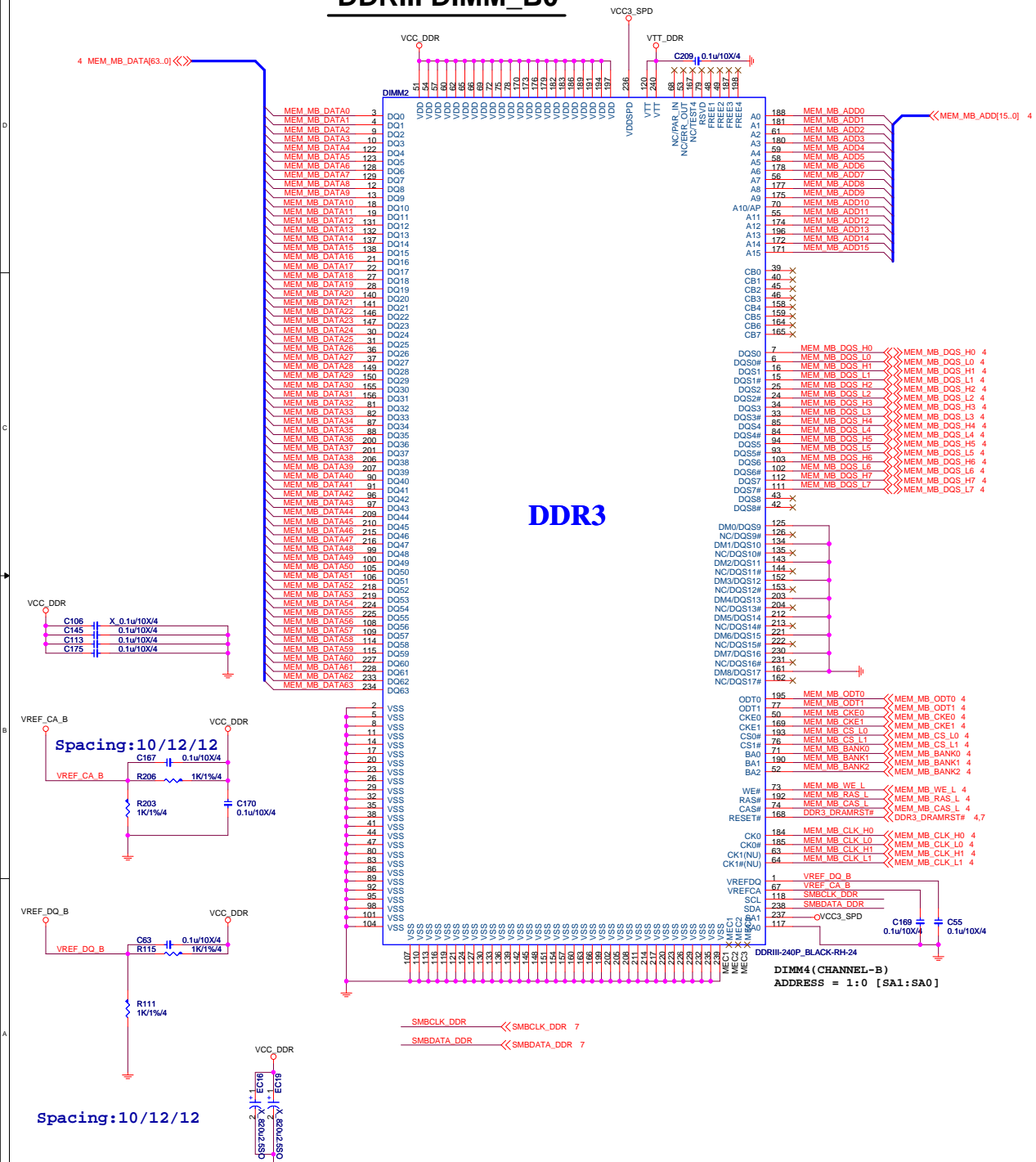
Size	Document Description	Rev
Custom	CPU-GND	2.1
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# DDRIII DIMM\_A0





## DDRIII DIMM\_B0



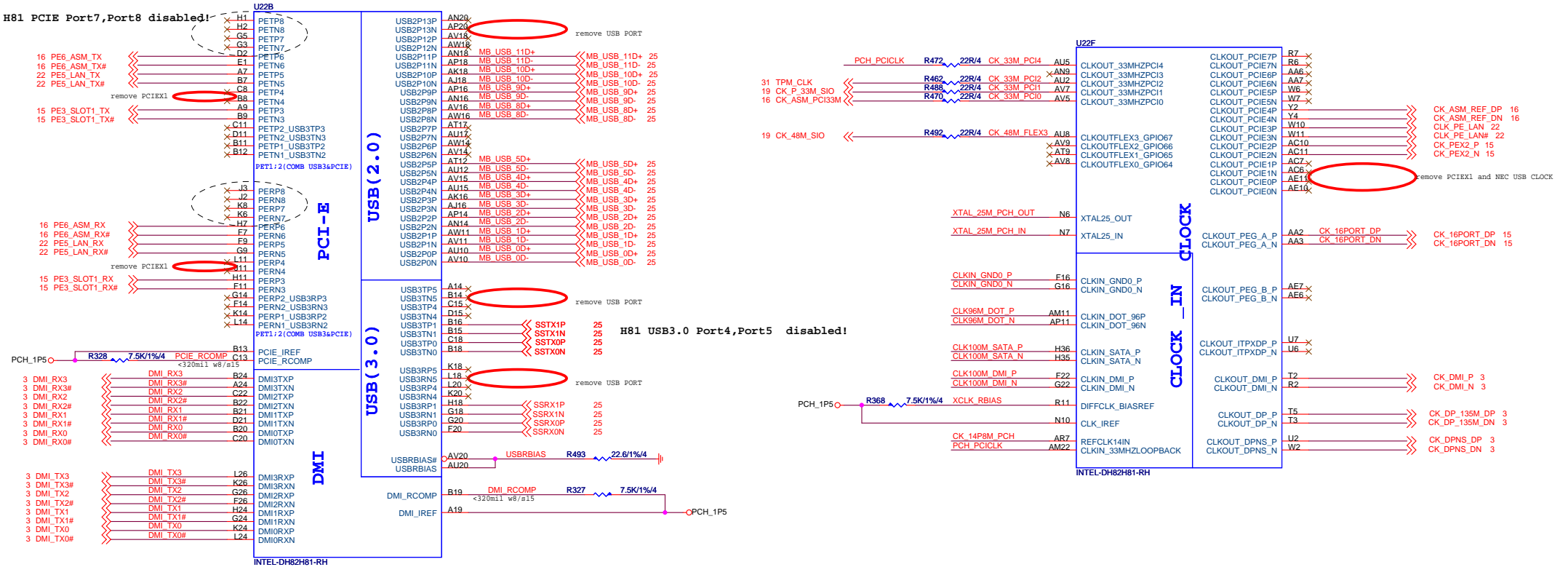
**MICRO-STAR INT'L CO.,LTD**

MS-7820

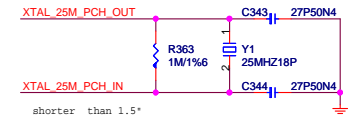
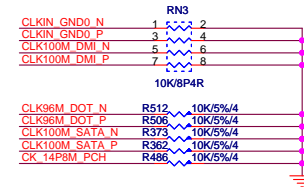
Size Custom	Document Description <b>DDR III 8 DIMM 1</b>	Rev 2.1
Date: Thursday, January 02, 2014		Sheet 8 of 37



USB 2.0 ports 6 and 7 are disabled on 12 port SKUs.(B85)  
USB 2.0 ports 6,7,12 and 13 are disabled on 10 port SKUs.(H81)



no clock gen pull down

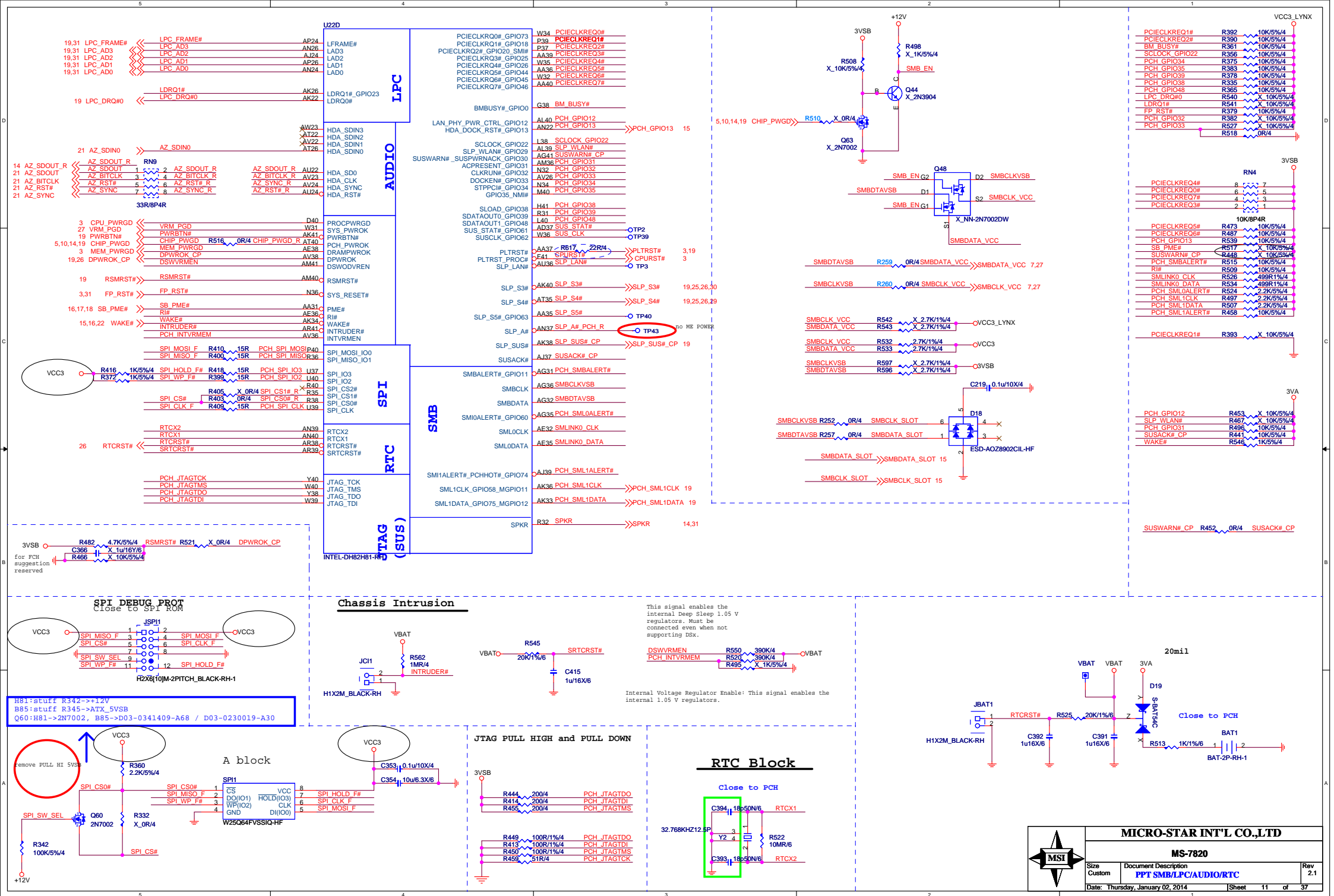


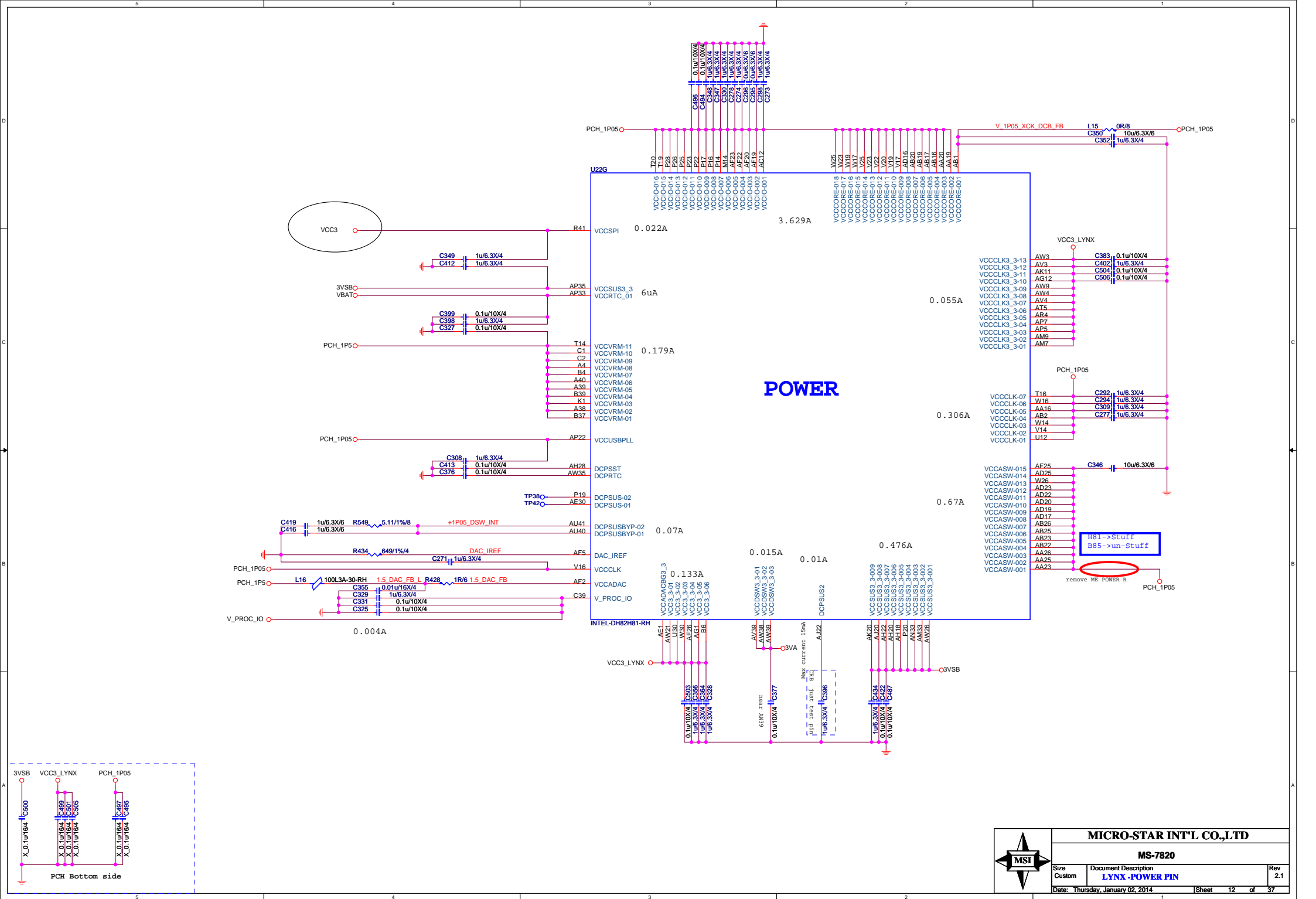
**MICRO-STAR INT'L CO.,LTD**

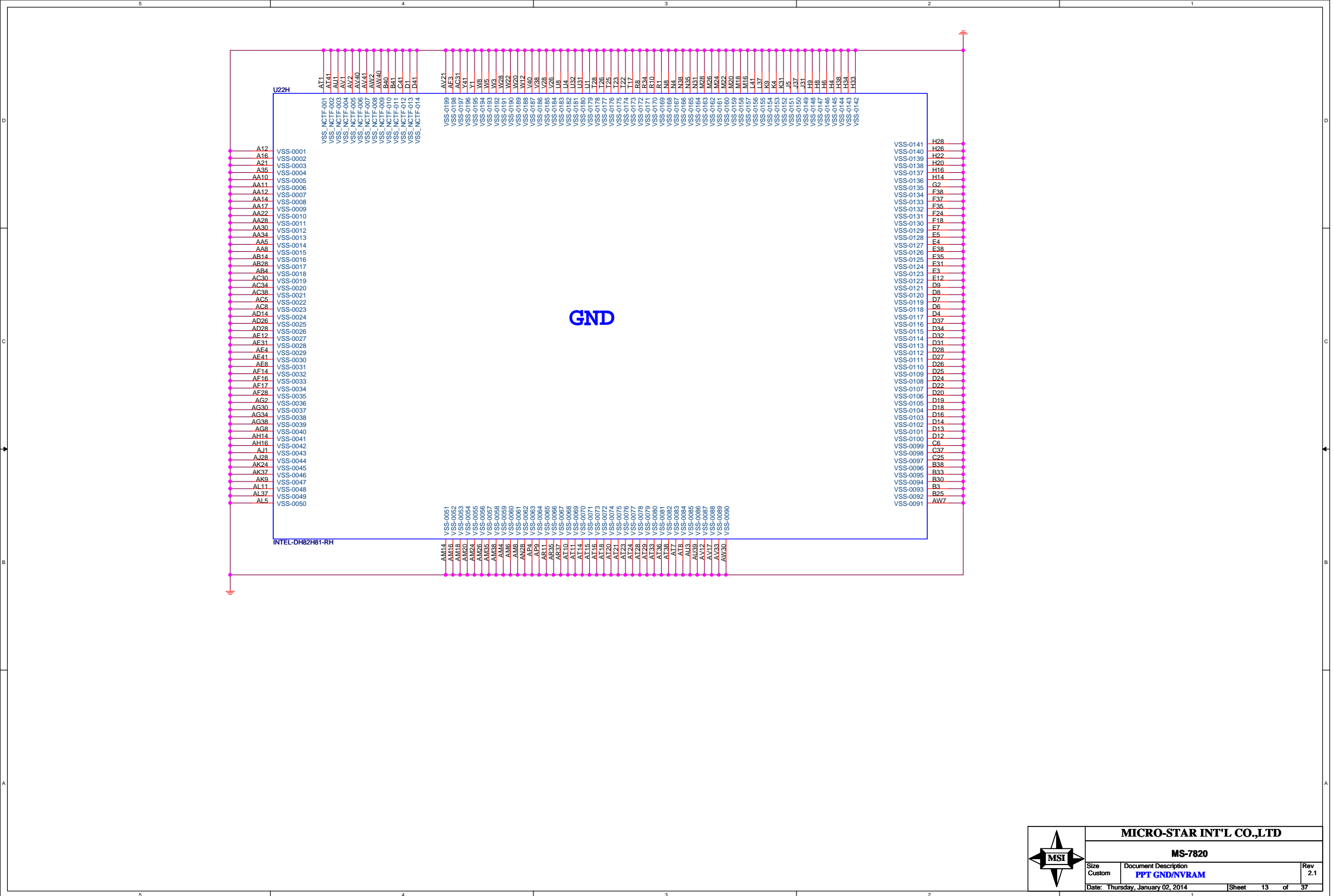
**MS-7820**

Size	Document Description	Rev
Custom	PBT PCIe/DMI/USB/CLK	2.1
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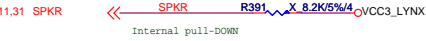




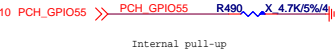




Internal weak pull down  
Pull high to enable "No Reboot" mode

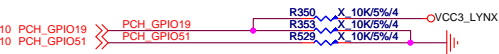


Internal weak pull up  
Pull low to enable "Top-Block Swap" mode



BOOT DEVICE	GPIOS1	GPIOS19
LPC	0	0
SPI	1	1

Default



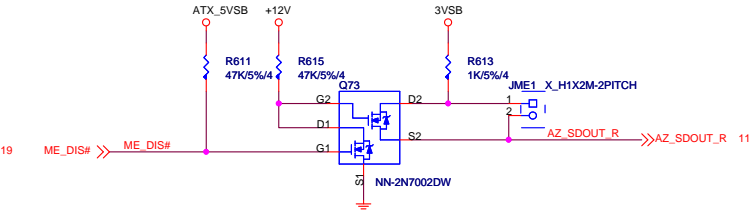
Do not pull low.  
Connect to ground with 1k Ohm pull-down resistor.



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



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



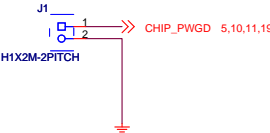
Internal weak pull down (function reserved)  
Signal should not be pulled high when strap is sampled



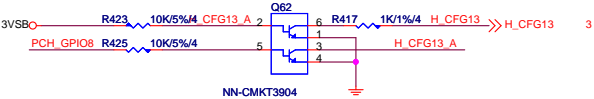
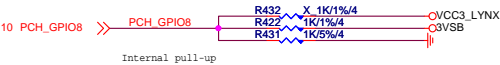
PCIE1 and SATA4 flexible IO function select  
High: SATA Low: PCIE



For test cpu voltage



Follow CRG 1.0









```

IDSEL = AD16
MASTER = PREQ#0
PIRQ#A

```

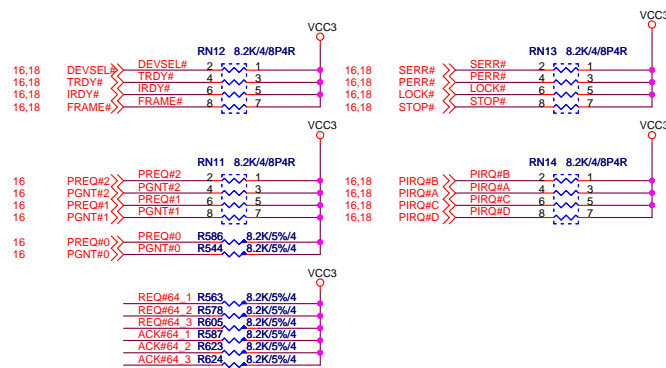
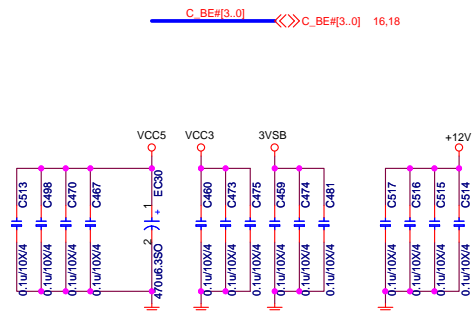
```

IDSEL = AD17
MASTER = PREQ#1
PIRQ#B

```

```
IDSEL = AD18
MASTER = PREQ#2
PIRQ#C
```

## PCI PULL-UP / DOWN RESISTORS



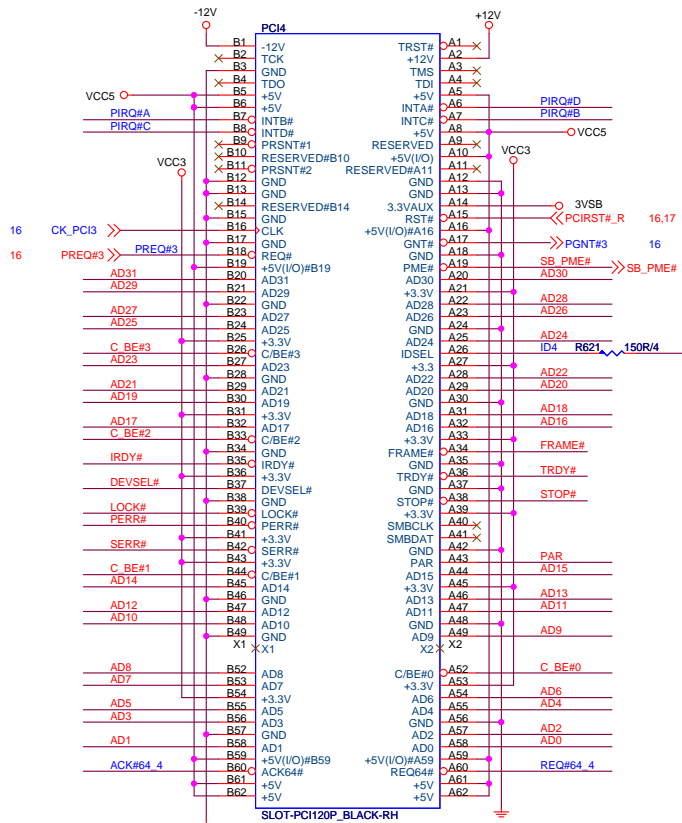
**MICRO-STAR INT'L CO.,LTD**

MS-7820

Size	Document Description
Custom	<b>PCIx3 Slots</b>

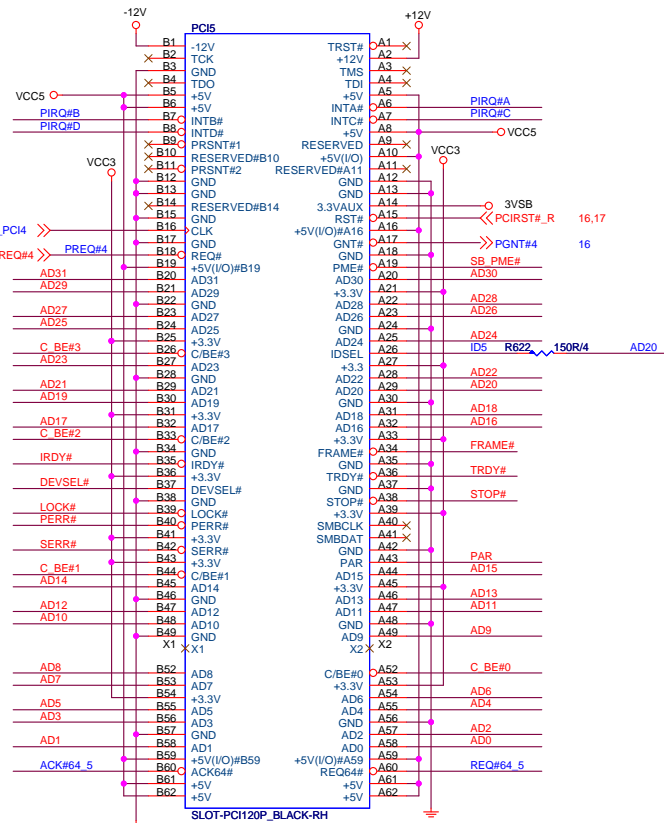
Rev  
2.1

Date: Thursday, January 02, 2014 Sheet 17 of 37

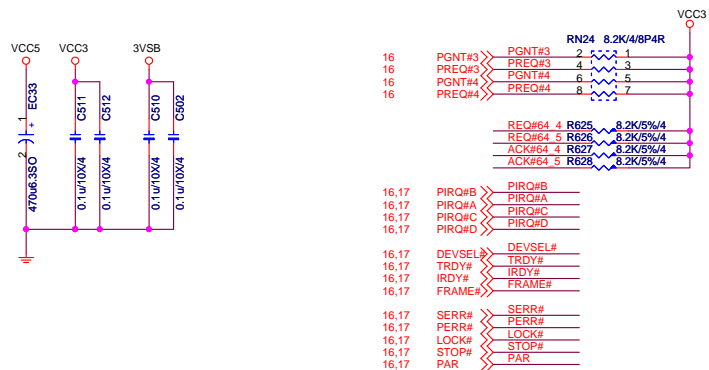


IDSEL = AD19  
MASTER = PREQ#3  
PIRQ#D

AD[31..0] <<> AD[31..0] 16,17  
C\_BE#[3..0] <<> C\_BE#[3..0] 16,17



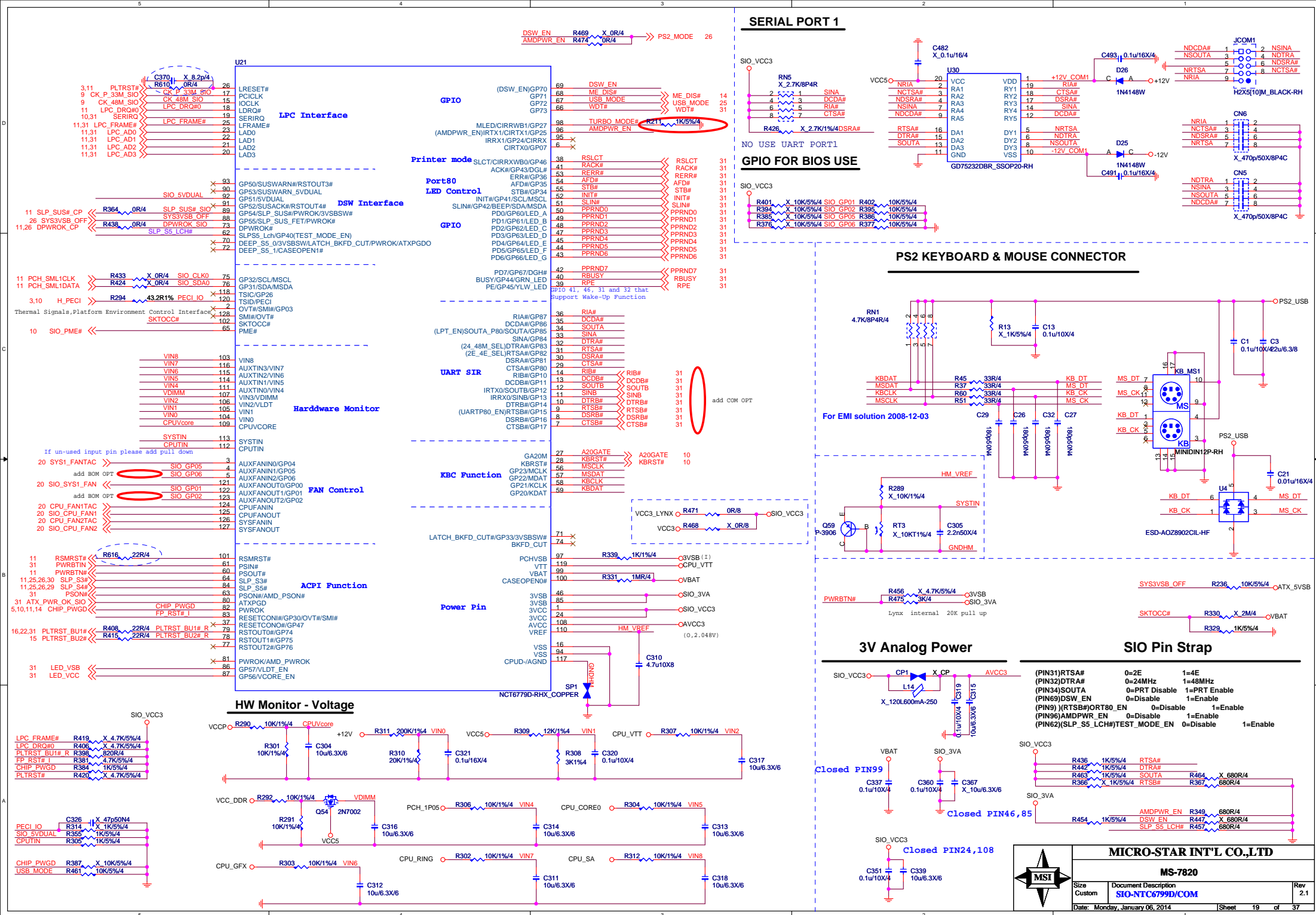
IDSEL = AD20  
MASTER = PREQ#4  
PIRQ#A



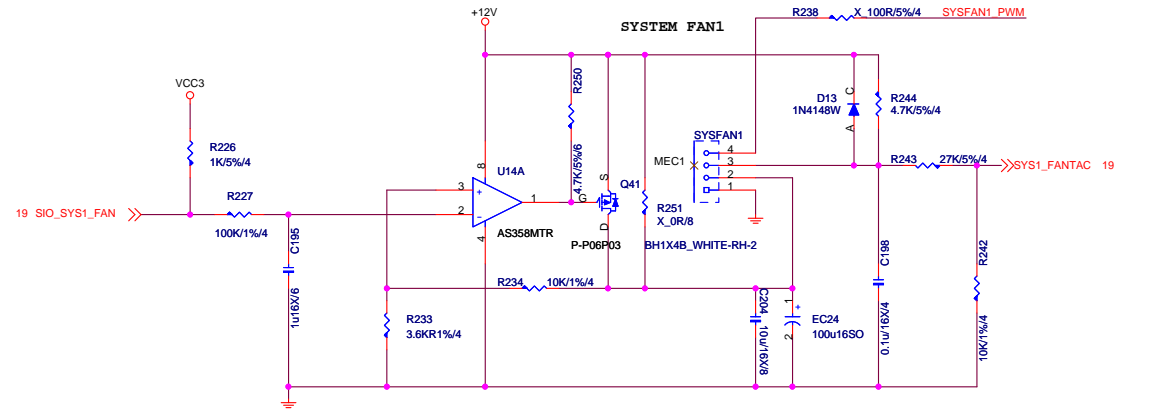
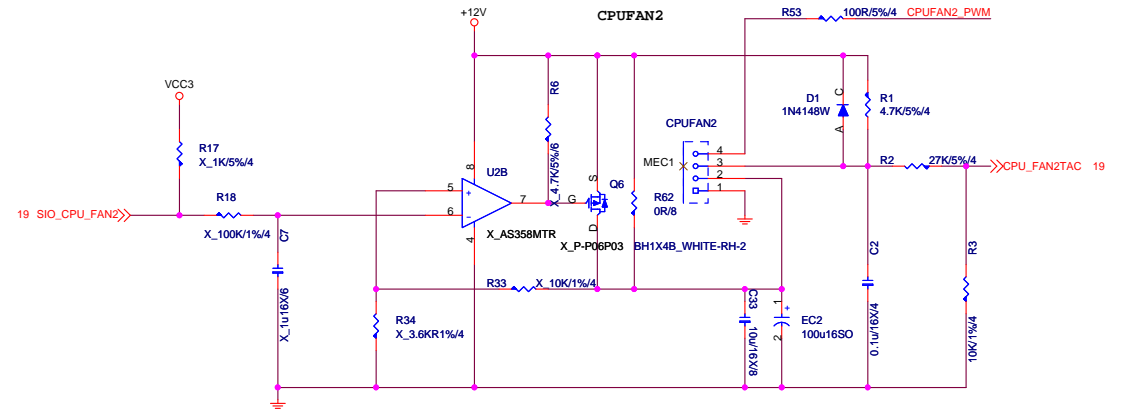
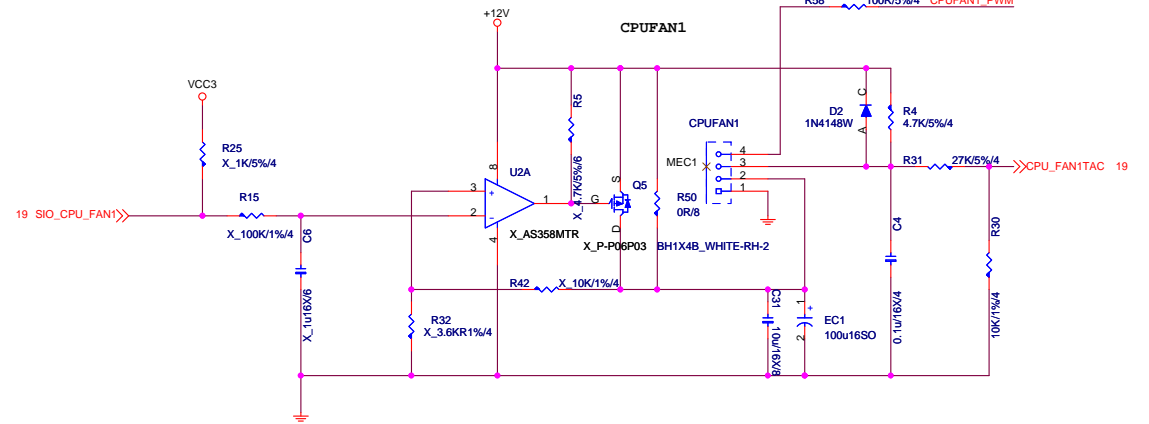
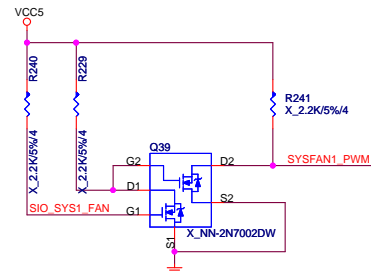
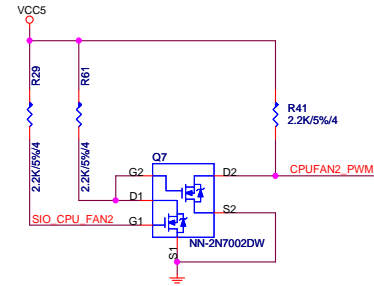
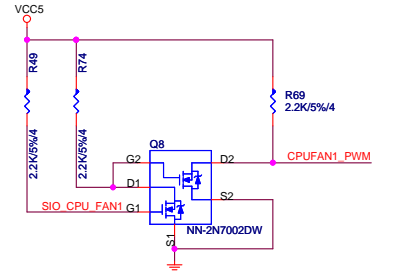
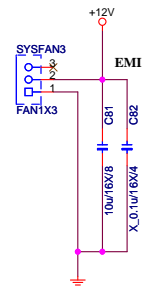
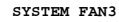
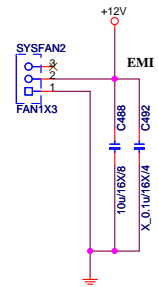
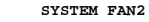
MICRO-STAR INT'L CO.,LTD

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Size	Document Description	Rev
Custom	PCIx2 Slots	2.1
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## FAN-COUNTROL CIRCUIT

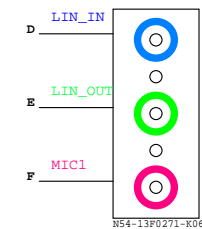
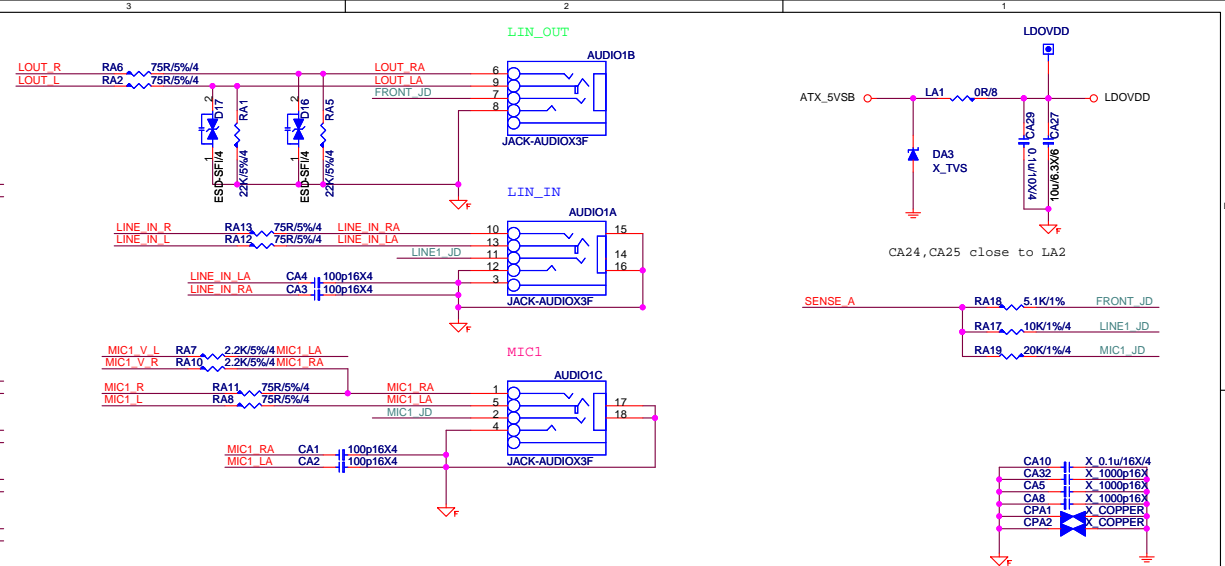
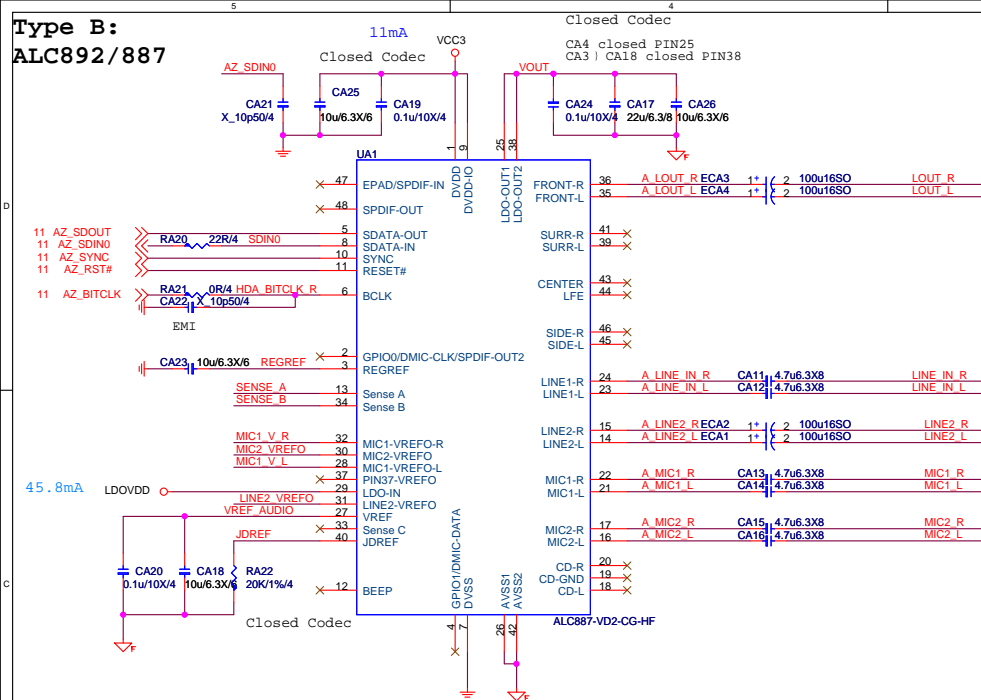


**MICRO-STAR INT'L CO.,LTD**

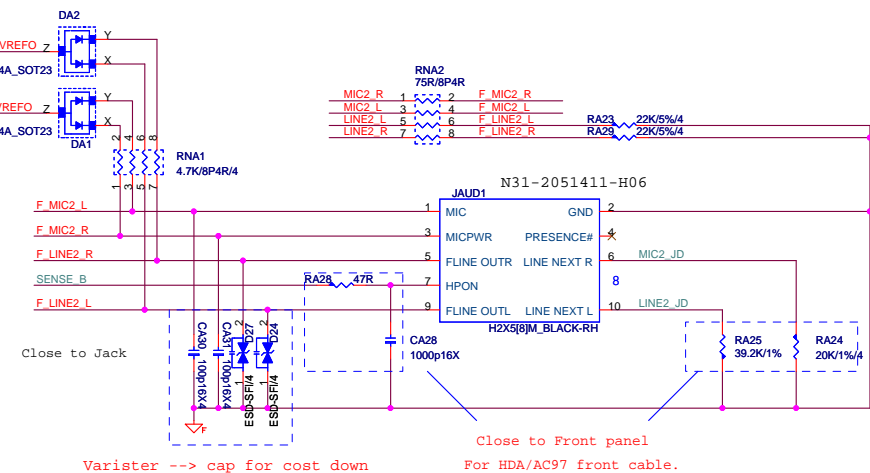
MS-7820

Size Custom	Document Description <b>FAN Control</b>	Rev 2.1
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Type B:  
ALC892/887



Rear Line OUT De-POP circuit  
(add de-pop circuit by PM spec or customer request)

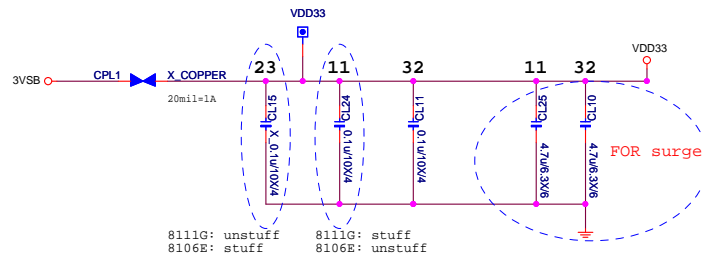
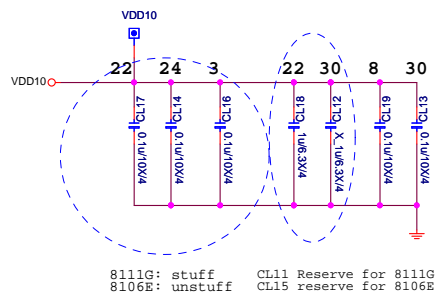
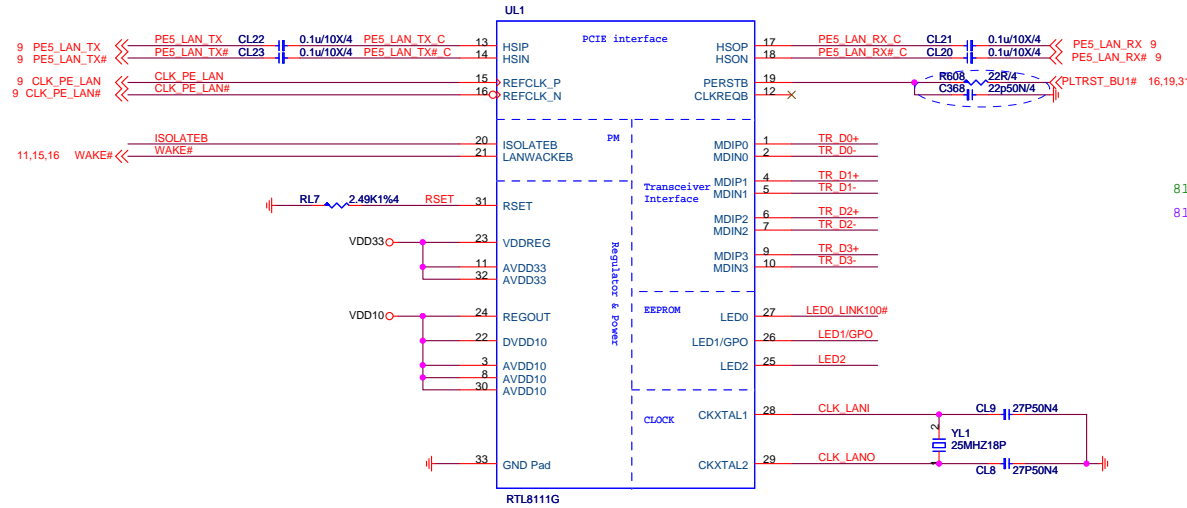


<b>MICRO-STAR INT'L CO.,LTD</b>			
<b>MS-7820</b>			
Size Custom	Document Description <b>Audio Codec ALC887</b>		Rev 2.1
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# RTL8111G Giga LAN

## RTL8106E 10/100M LAN

### LAN Connector



### 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
80 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



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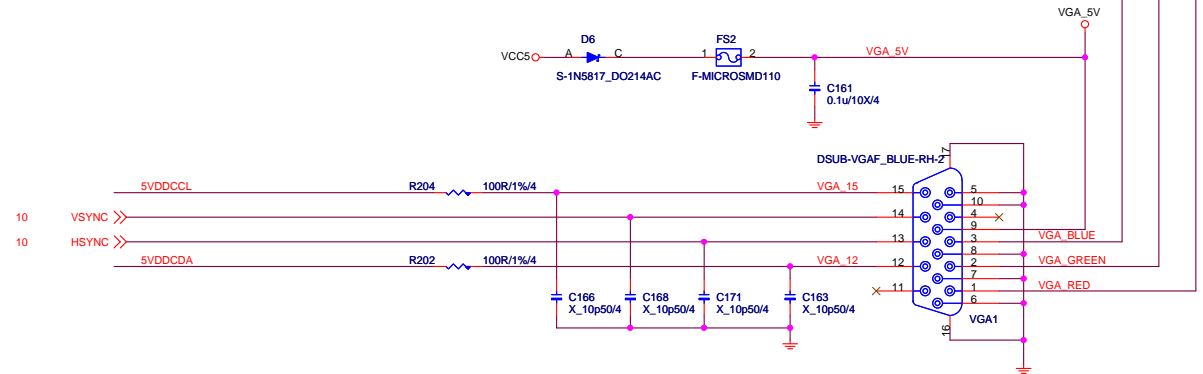
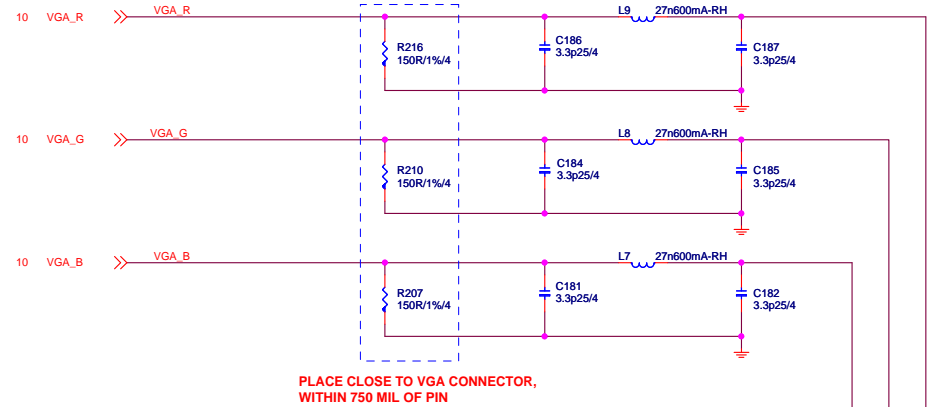
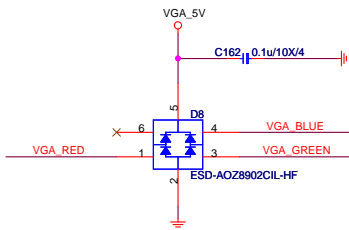
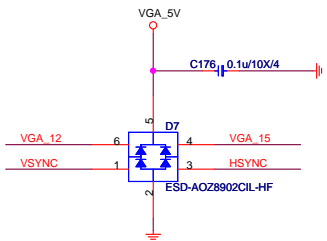
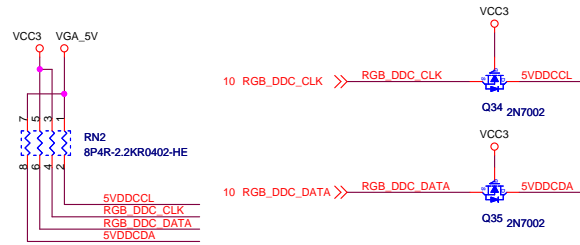
Size	Document Description	Rev
Custom	RTL8111G/8106G	2.1
Date: Thursday, January 02, 2014	Sheet 22 of 37	



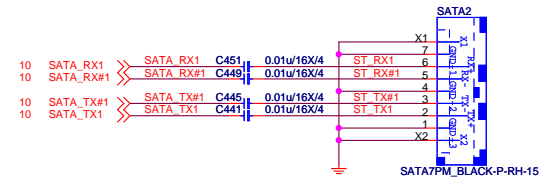
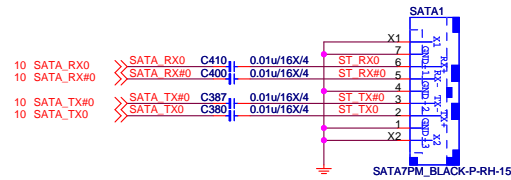
D-Sub

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

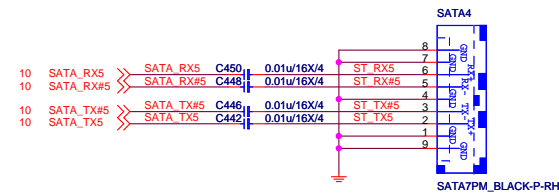
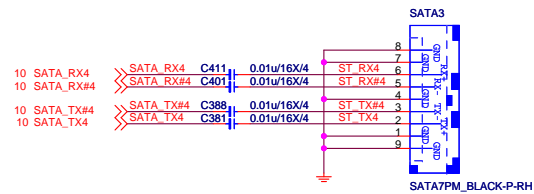
Level shift



### SATA 6G PORT 0,1



### SATA 3G PORT 4.5



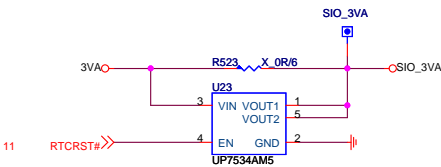
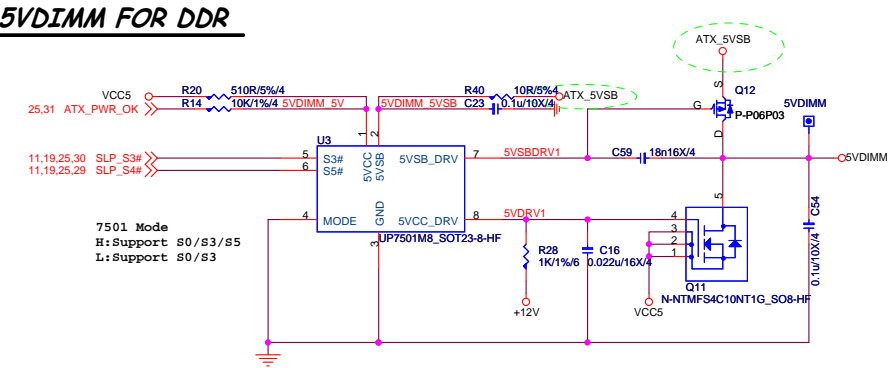
**MICRO-STAR INT'L CO.,LTD**

**MS-7820**

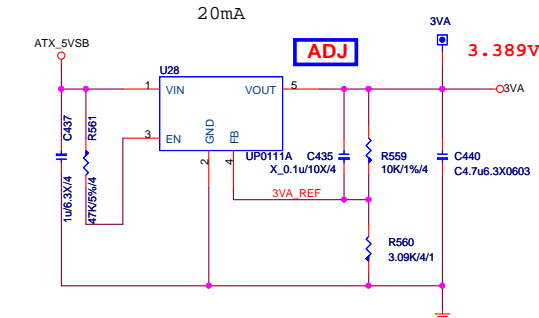
Size	Document Description	Rev
Custom	<b>SATA Connector</b>	2.1
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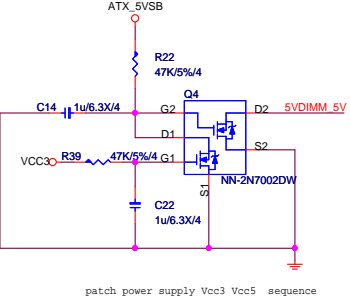
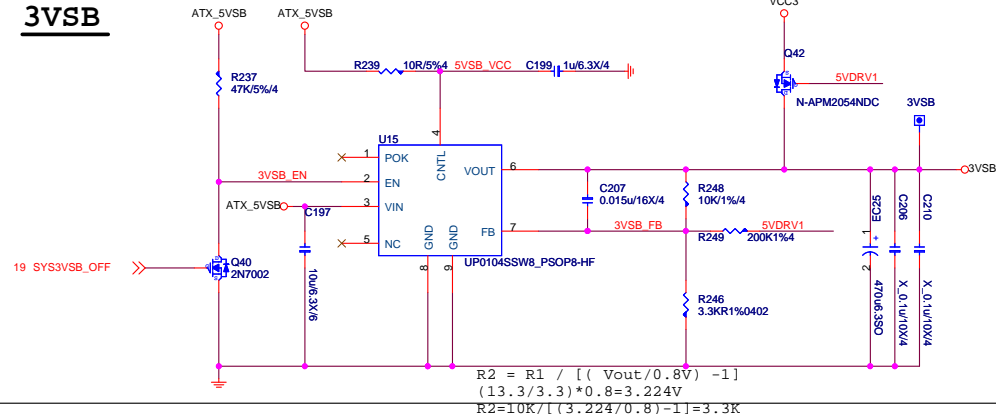
5VDIMM FOR DDR



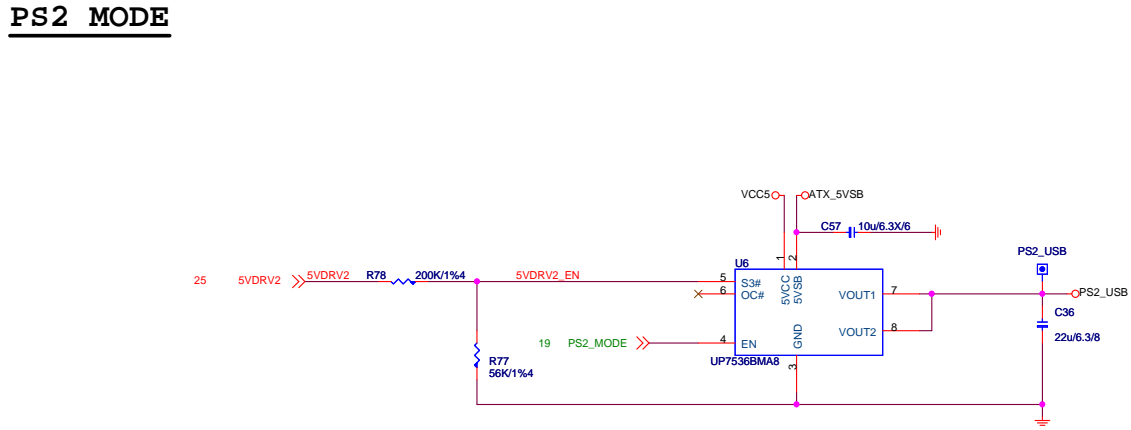
3VA



3VSB



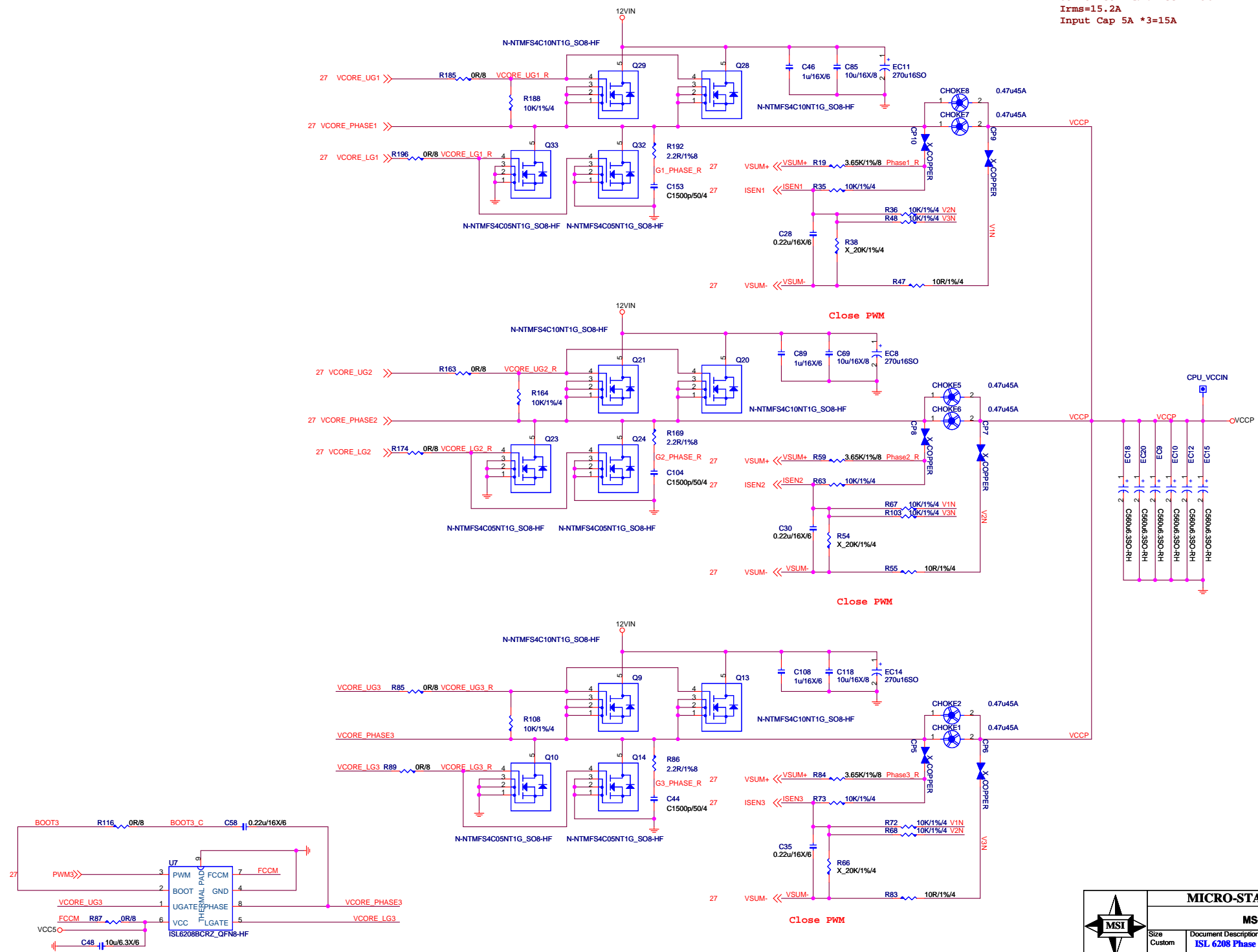
PS2 MODE



FOR DPWROK and 3VA的POWER DOWN的時sequence序(S5-->G3)



OUTPUT CURRENT: ICCMAX 95A  
Irms=15.2A  
Input Cap 5A \*3=15A



# DDR Power:1.5V

DDR3\_1.5V 4.5A+6A+0.4A=15.9A

4.5A FOR CPU

6A FOR 2DIMM

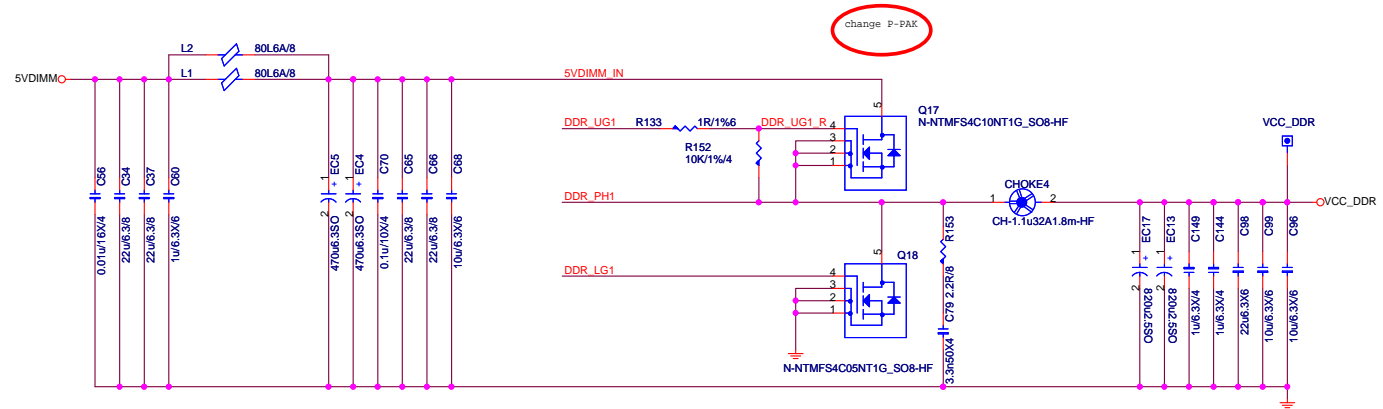
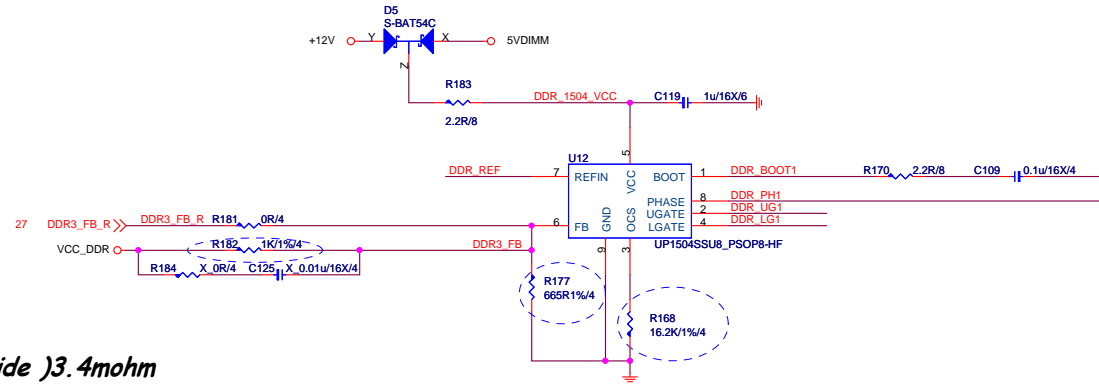
0.4A FOR DDR VTT

5A FOR DDR PCH

OCP 15.9\*1.5=23.85A

OCP=[20uA\*Rocs(R168)]/4\*Rdson(Low side )3.4mohm

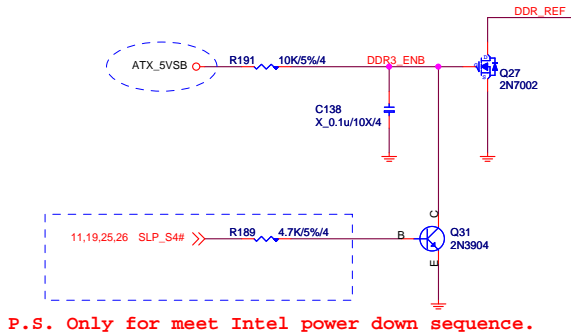
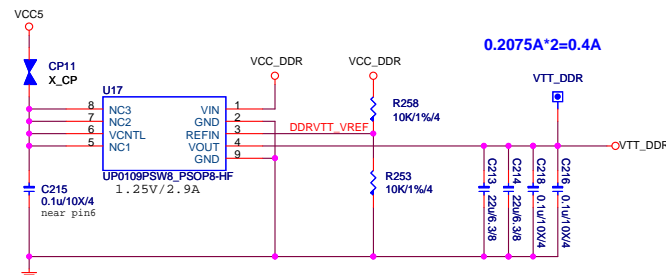
R168=16.2K ohm



## DDR VTT Power

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

0.2075A\*2=0.4A



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



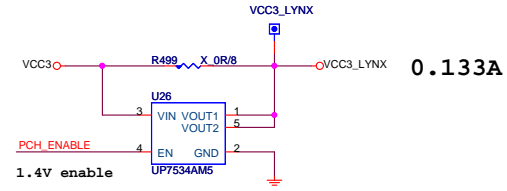
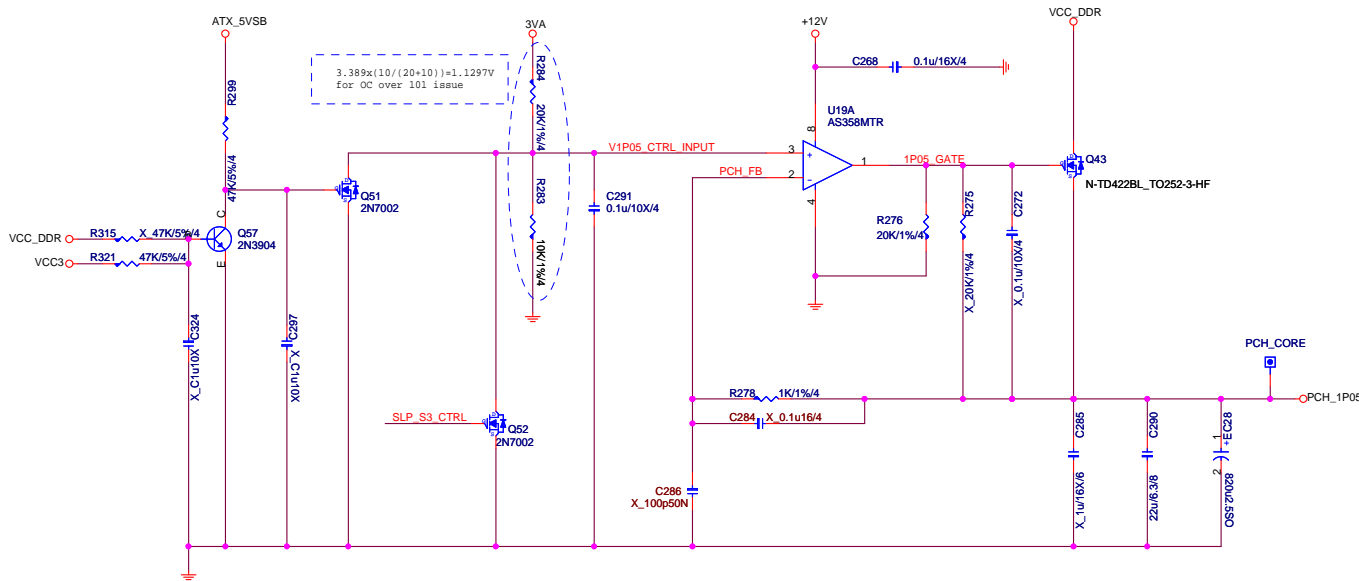
MICRO-STAR INT'L CO.,LTD

MS-7820

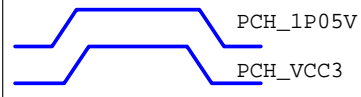
Size	Document Description	Rev
Custom	DDR Power - UP1504S 1-Phase MOS	2.1
Date:	Thursday, January 02, 2014	Sheet 29 of 37



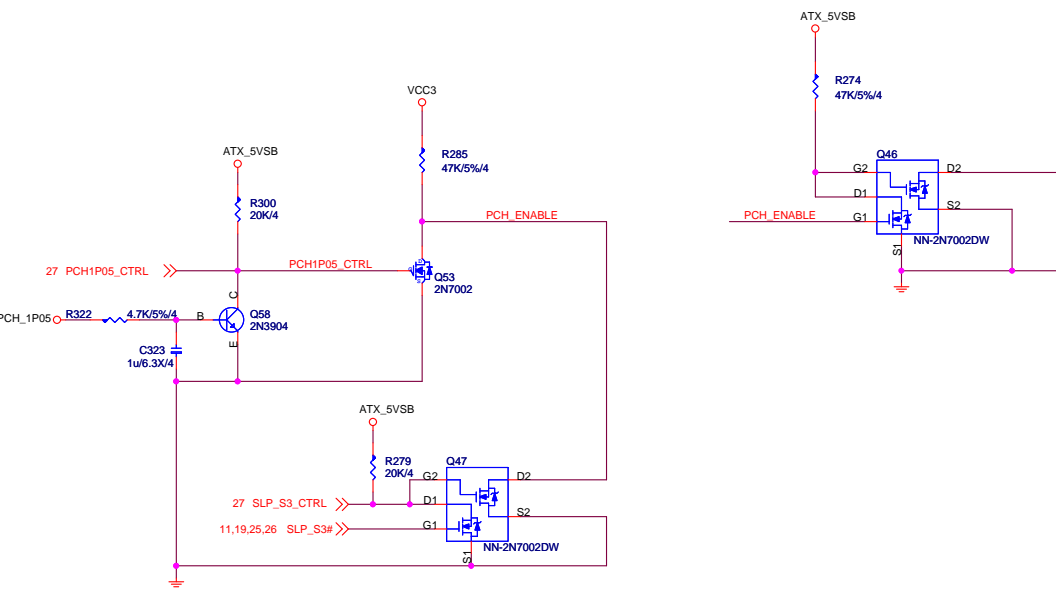
PCH Power:1.05V 5.747A



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

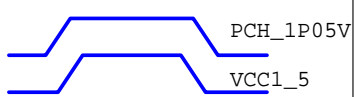


PCH Power:1.5V 0.263A



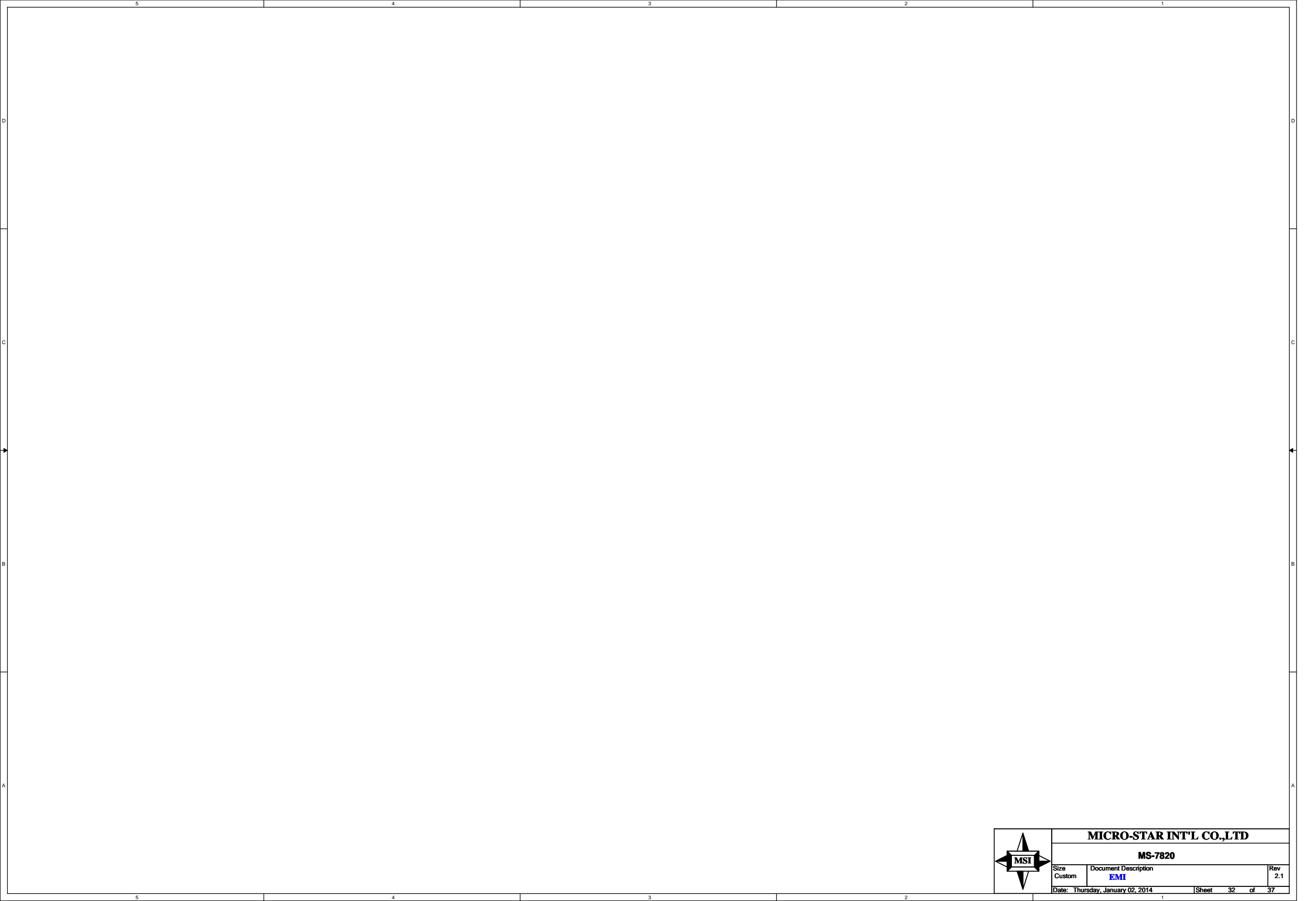
Power Consumption: 0.35A\* (3.3-1.5)V=0.63W  
SOT89 : 0.8W>0.63W

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

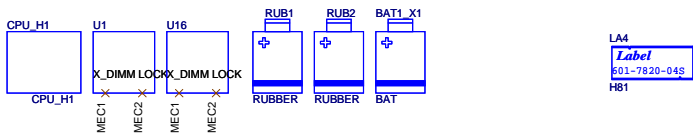
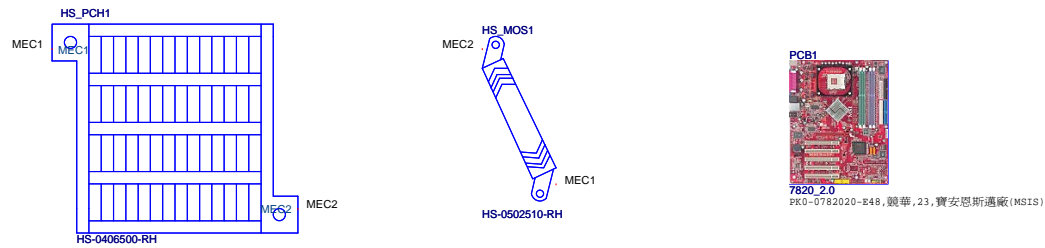


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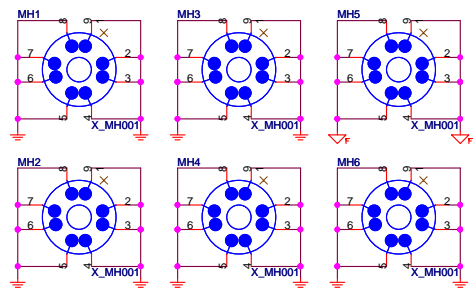




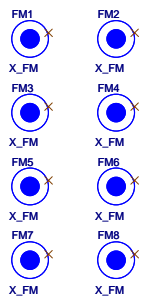
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Mounting Holes



Optical Fiducial Marks-120



Simulation

