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# MS-7502 uATX Version: 0A

**CPU:** Intel Pentium 4, Pentium D, Core2 Duo, Wolfdale, Kentsfield and Yorkfield processors in LGA775 Package.

## System Chipset:

Intel Bearlake - P35 North Bridge  
Intel ICH9R South Bridge

## On Board Device:

CLOCK Gen ICS 9LPRS906  
LPC Super I/O -- Fintek F71882F  
Realtek RTL8111B / 8101E  
Audio Codec -- ALC888S  
1394 Controller -- VT6308 (2-port)  
PCIE to PATA Bridge -- Marvel 88SE6111

## Main Memory:

Dual-channel DDR-II \* 4

## Expansion Slots:

PCI EXPRESS X16 SLOT \*1  
PCI EXPRESS X1 SLOT \*1  
PCI SLOT \* 2

## PWM:

Intersil ISL6322 (4 Phases) w/ ISL6612 driver

Configuration and BOM match up

Option	Function	Orcad Configure	BOM
STD	Bearlake-P35/ICH9R	cfg-7502	

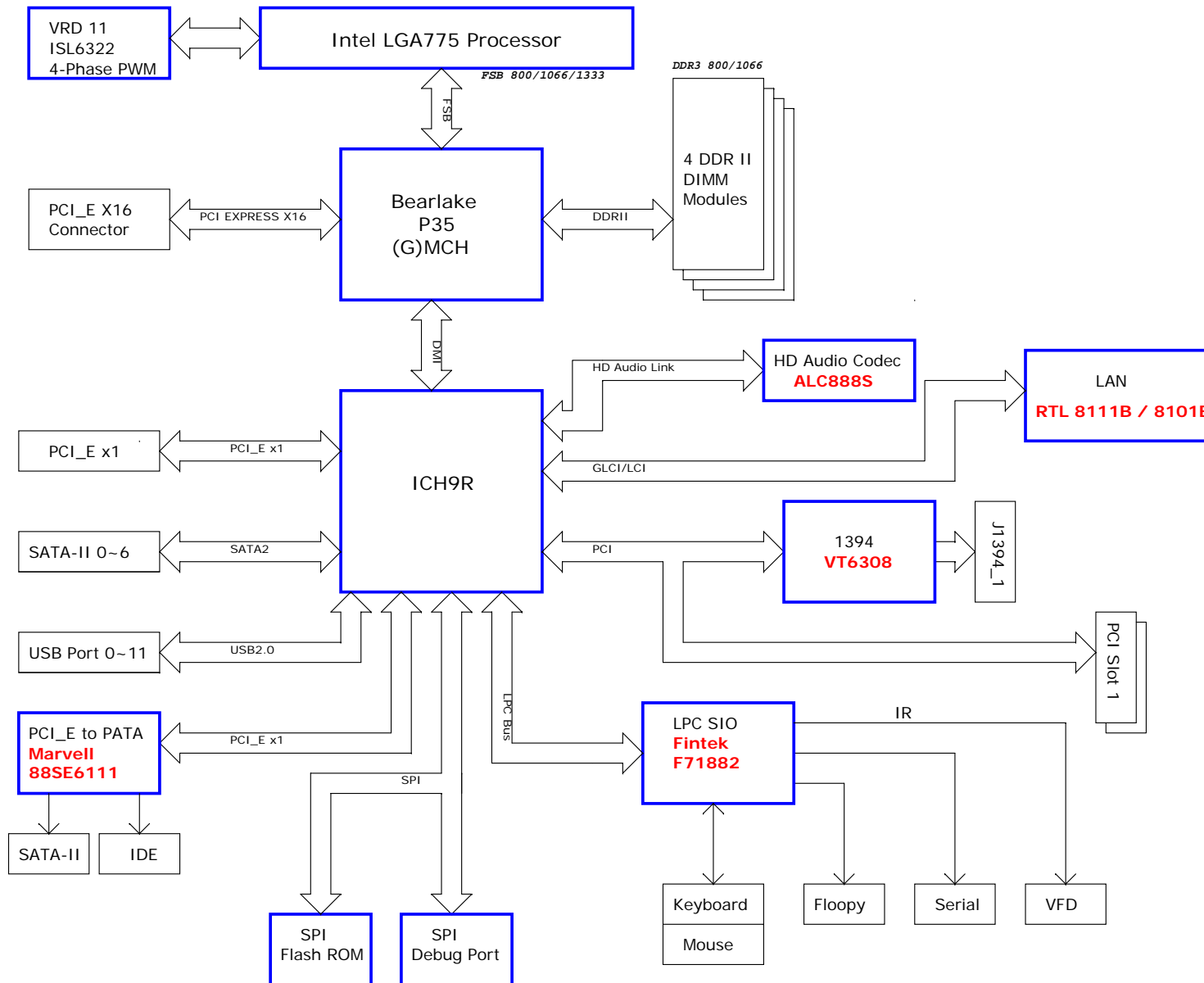


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**MS-7502**

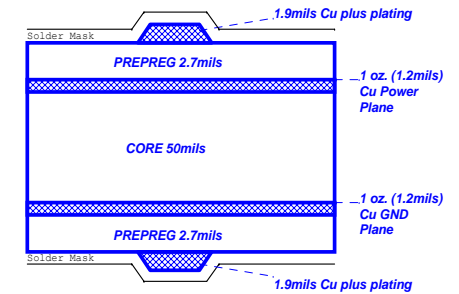
Size Custom	Document Description <b>COVER SHEET</b>	Rev <b>0A</b>
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# Block Diagram



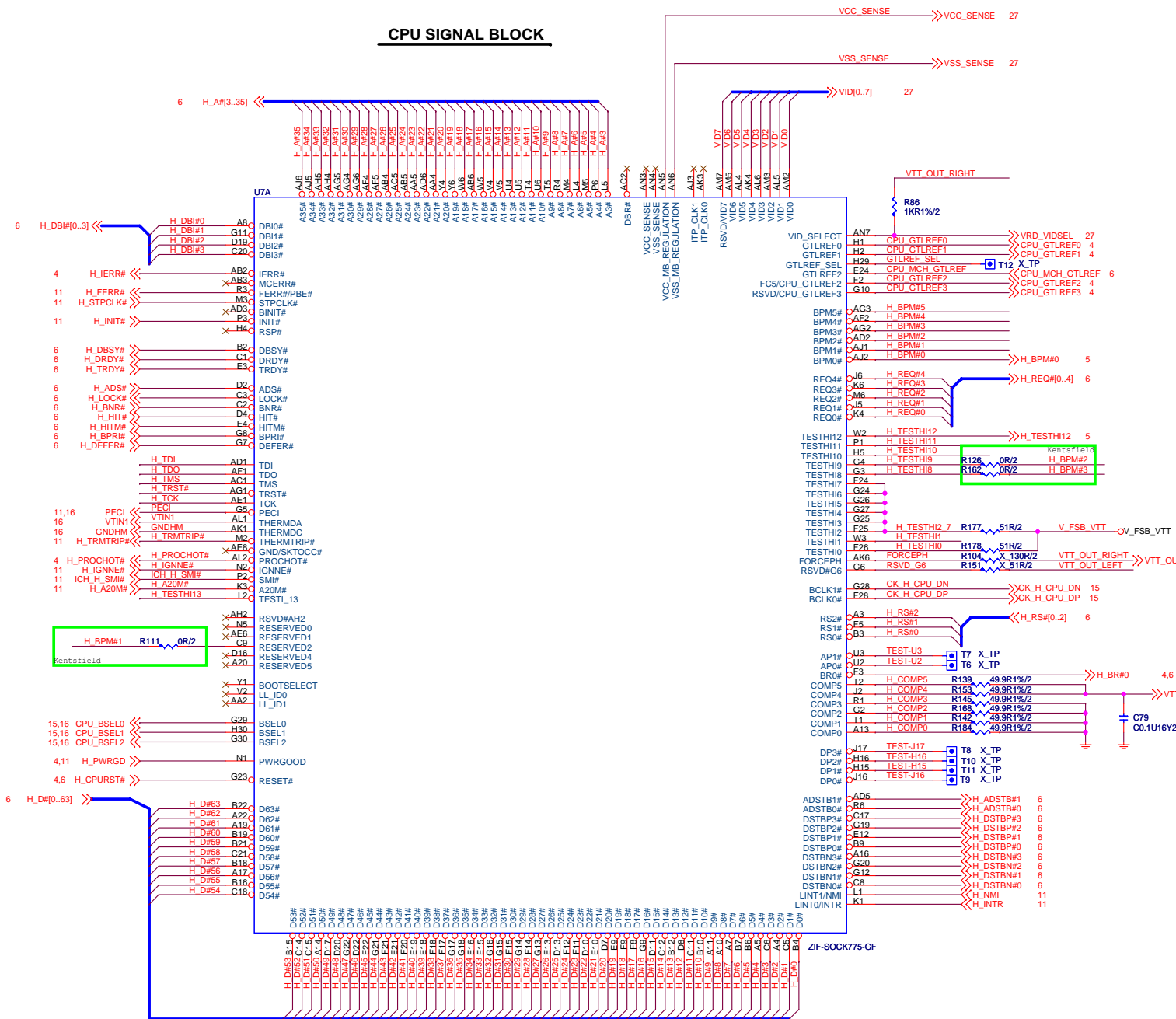
## Board Stack-up

(1080 Prepreg Considerations)

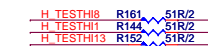
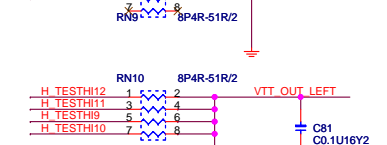
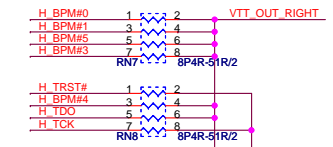
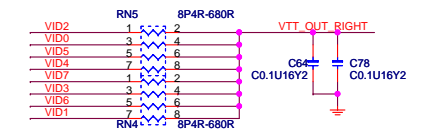


Single End 50ohm Top/Bottom : 4mils  
 USB2.0 - 90ohm : 15/4.5/7.5/4.5/15  
 SATA - 95ohm : 15/4/8/4/15  
 LAN - 100ohm : 15/4/8/4/15  
 PCIE - 95ohm : 15/4/8/4/15  
 IEEE1394 - 110ohm : 15/4/9/4/15  
 IDE : 15/4/8/4/15

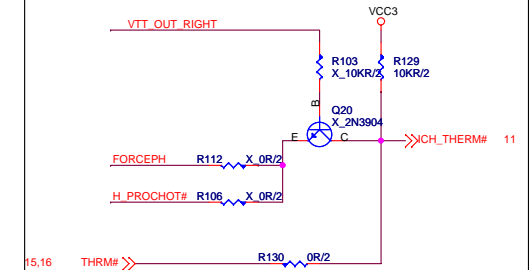
### CPU SIGNAL BLOCK



**PULL HIGHT PULL DOWN**



### Thermal TRIP



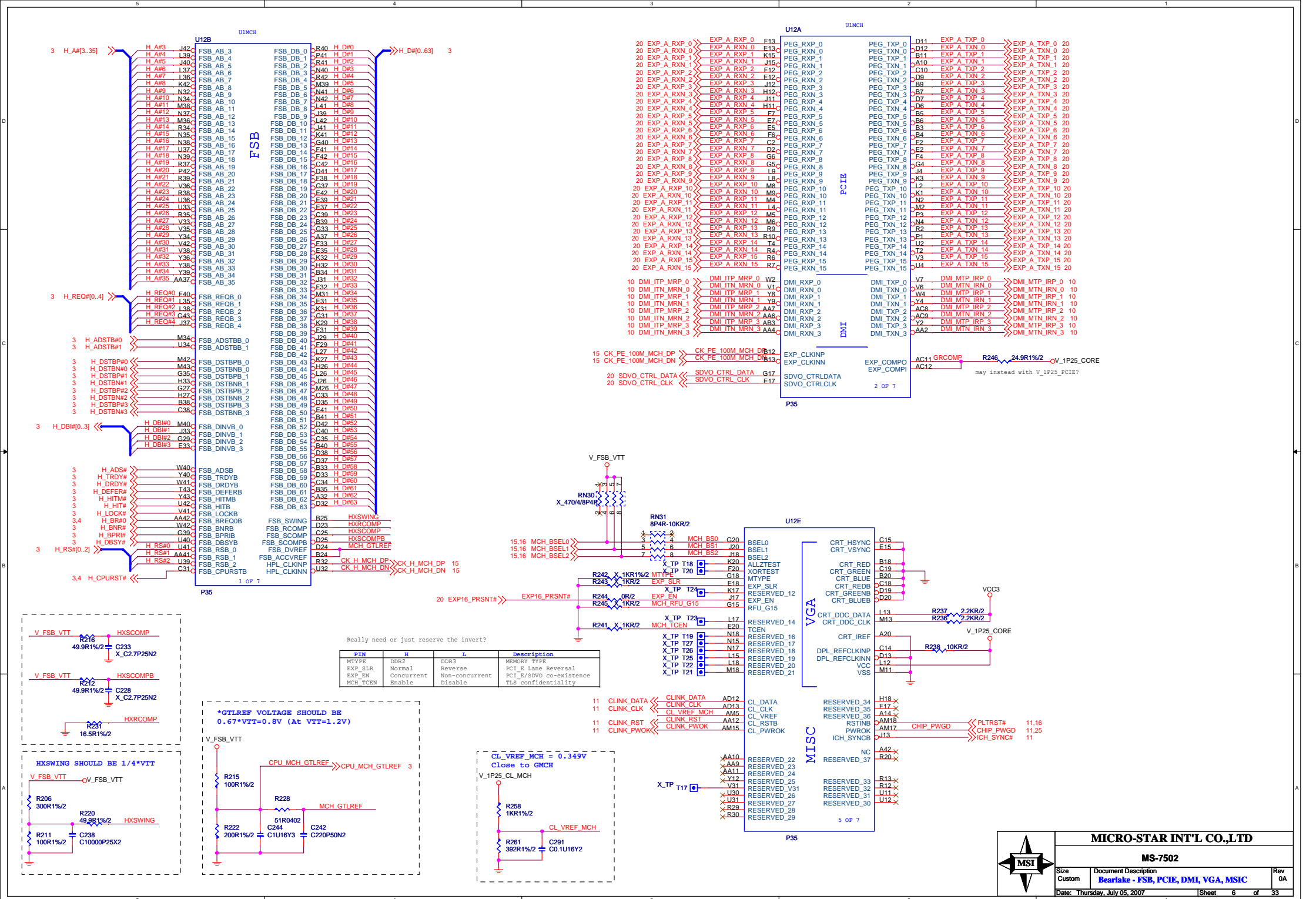
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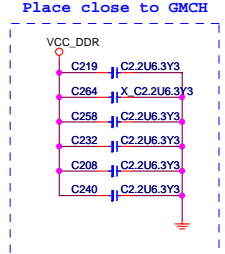
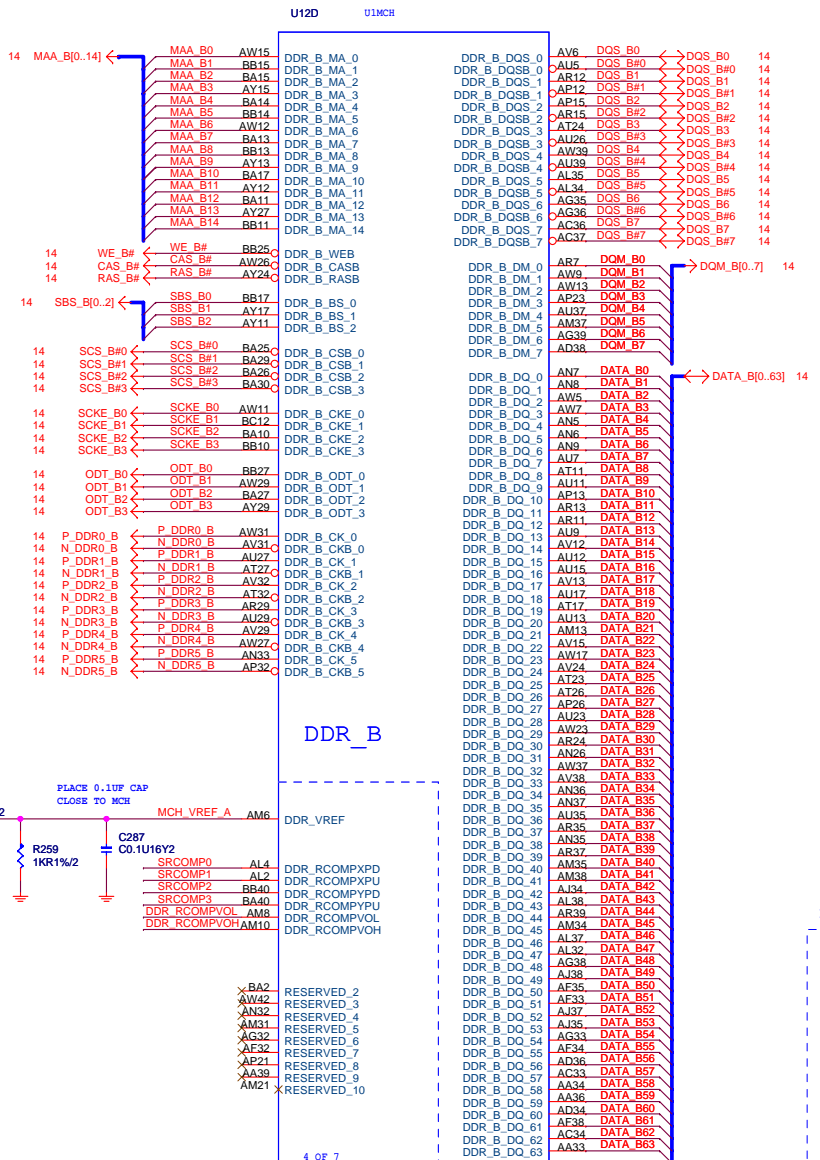
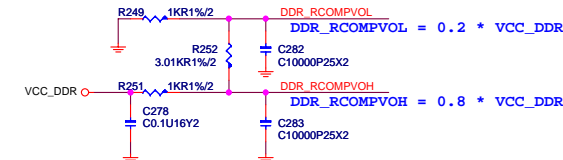
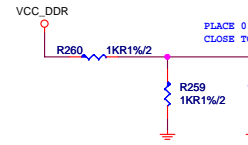
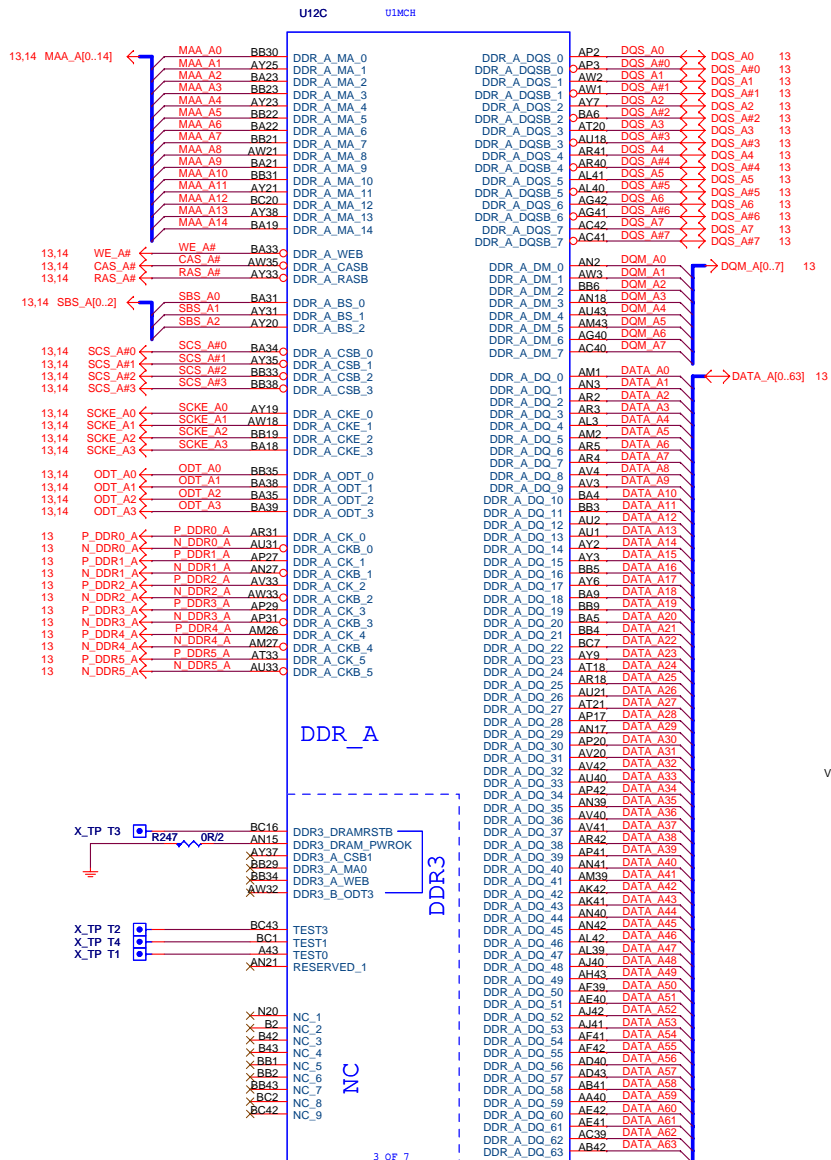
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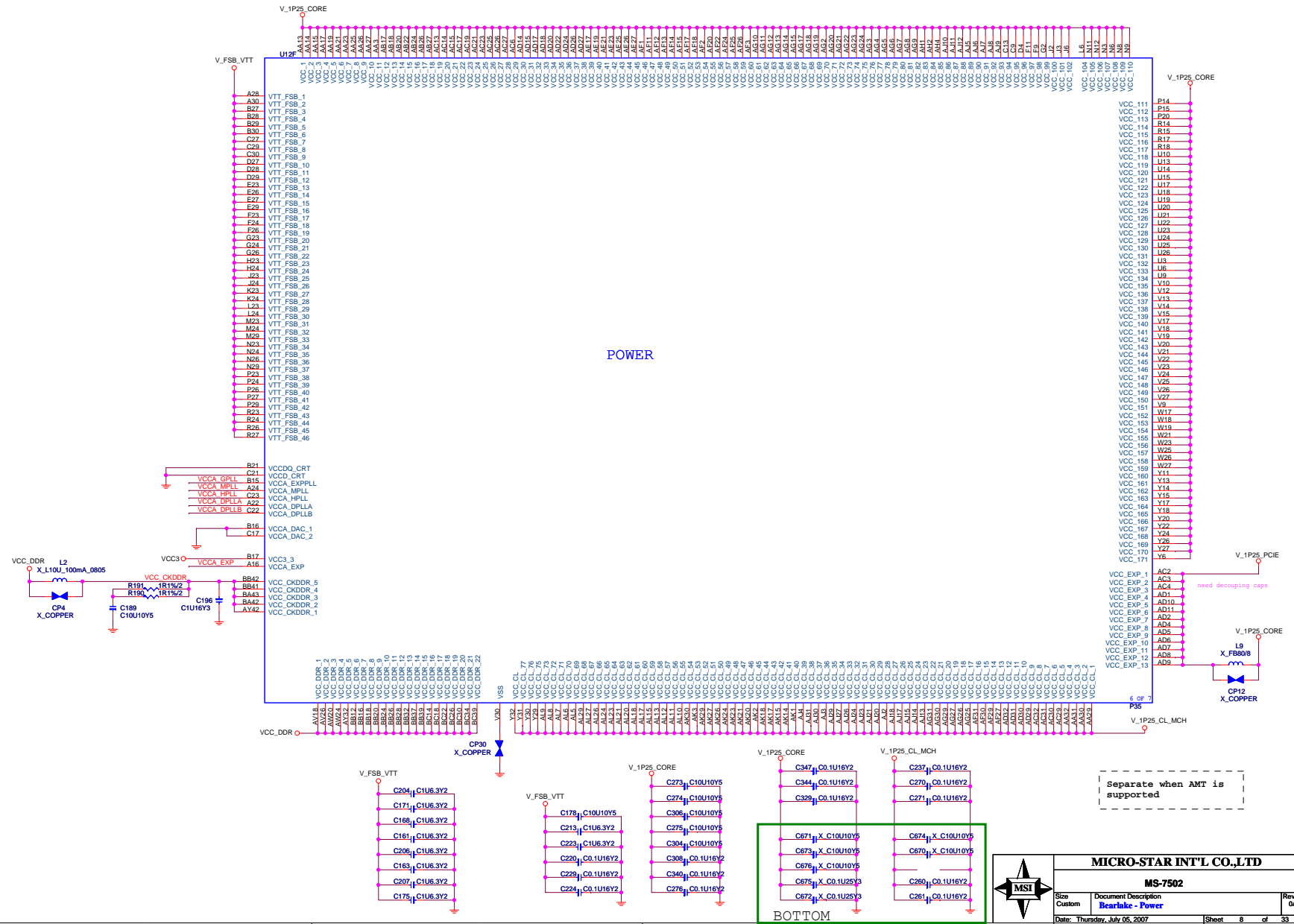
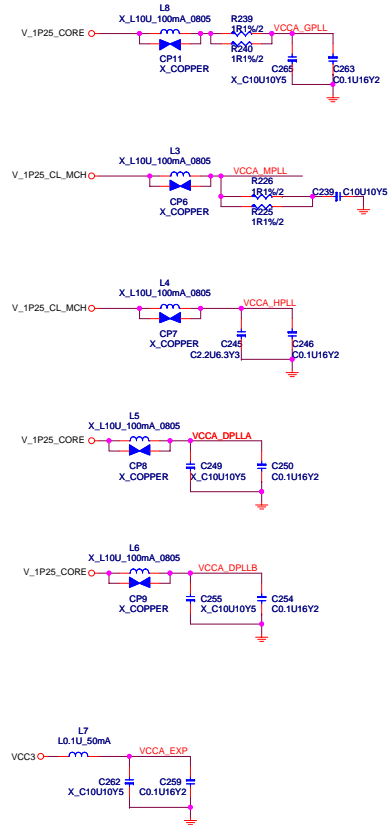






SCROMP1,3 CLOSED TO VCC_DDR		
VCC_DDR	R254 19.1R1%/2	SRCOMP0
	R192 19.1R1%/2	SRCOMP2
	R193 19.1R1%/2	SRCOMP3
C197 C0.1U16Y2		
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MS-7502		
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**NB POWER**

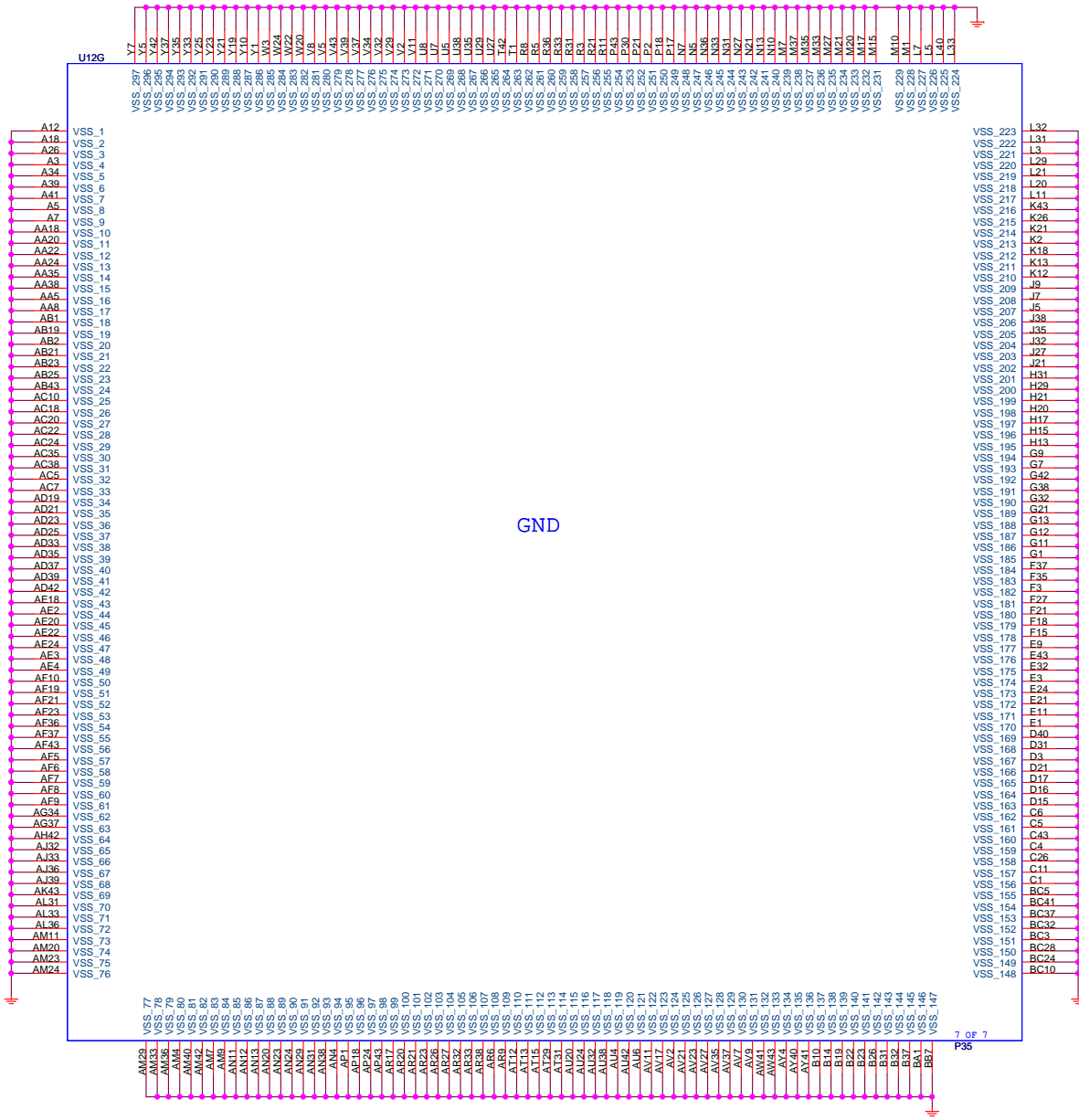


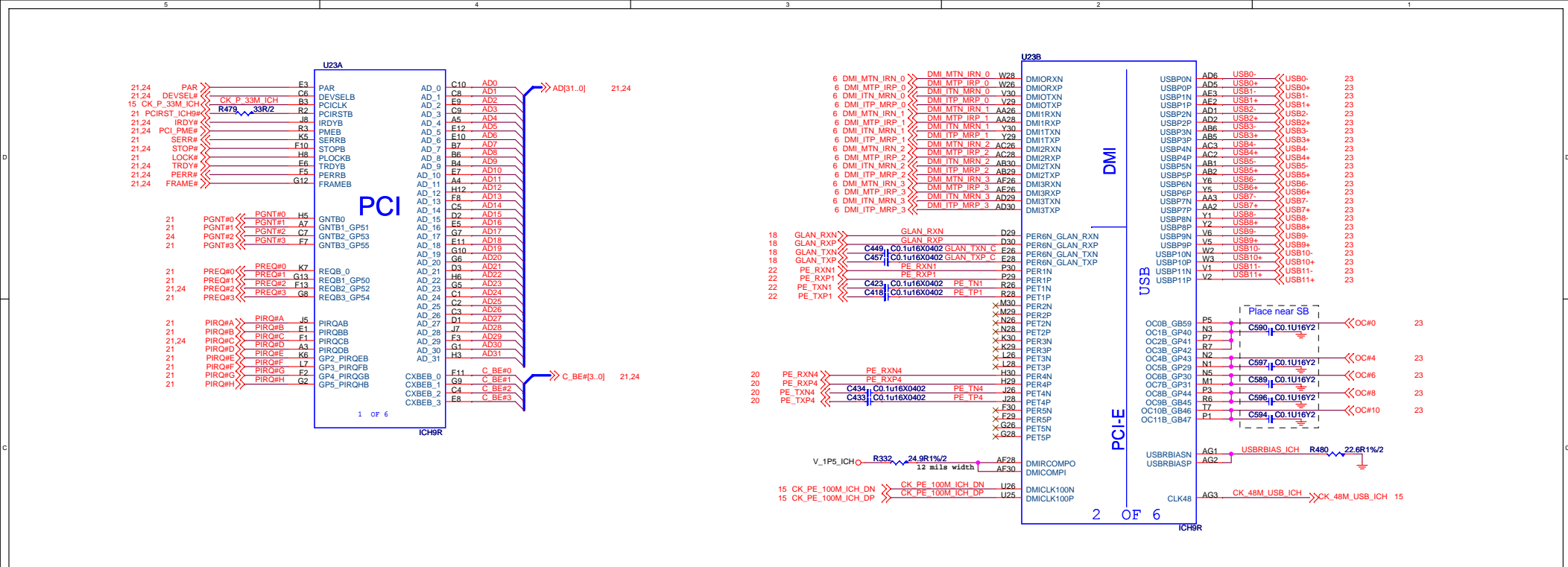
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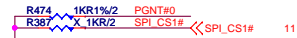
Size Custom	Document Description <b>Bearlake - Power</b>	Rev 0A
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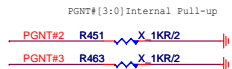




## SB STRAPPING RESISTOR



BOOT SELECT STRAPS		
BOOT DEVICE	GNT#0	SPI_CS1#
FWH	1	1
SPI	0	1
PCI	1	0



SIGNAL	H	L	DES.
GNT3	DIS	EN	A16 OVERRIDE
GNT2	N/A	SET BIT	PCI-E PORT CONFIG 2 BIT 0 (5-6)

HDA\_SDOUT/HDA\_SYNC strap PCI\_E port configuration bit[1:0]. Internal weak pull down.  
00:1X/1X/1X 11:0X/0X/4X



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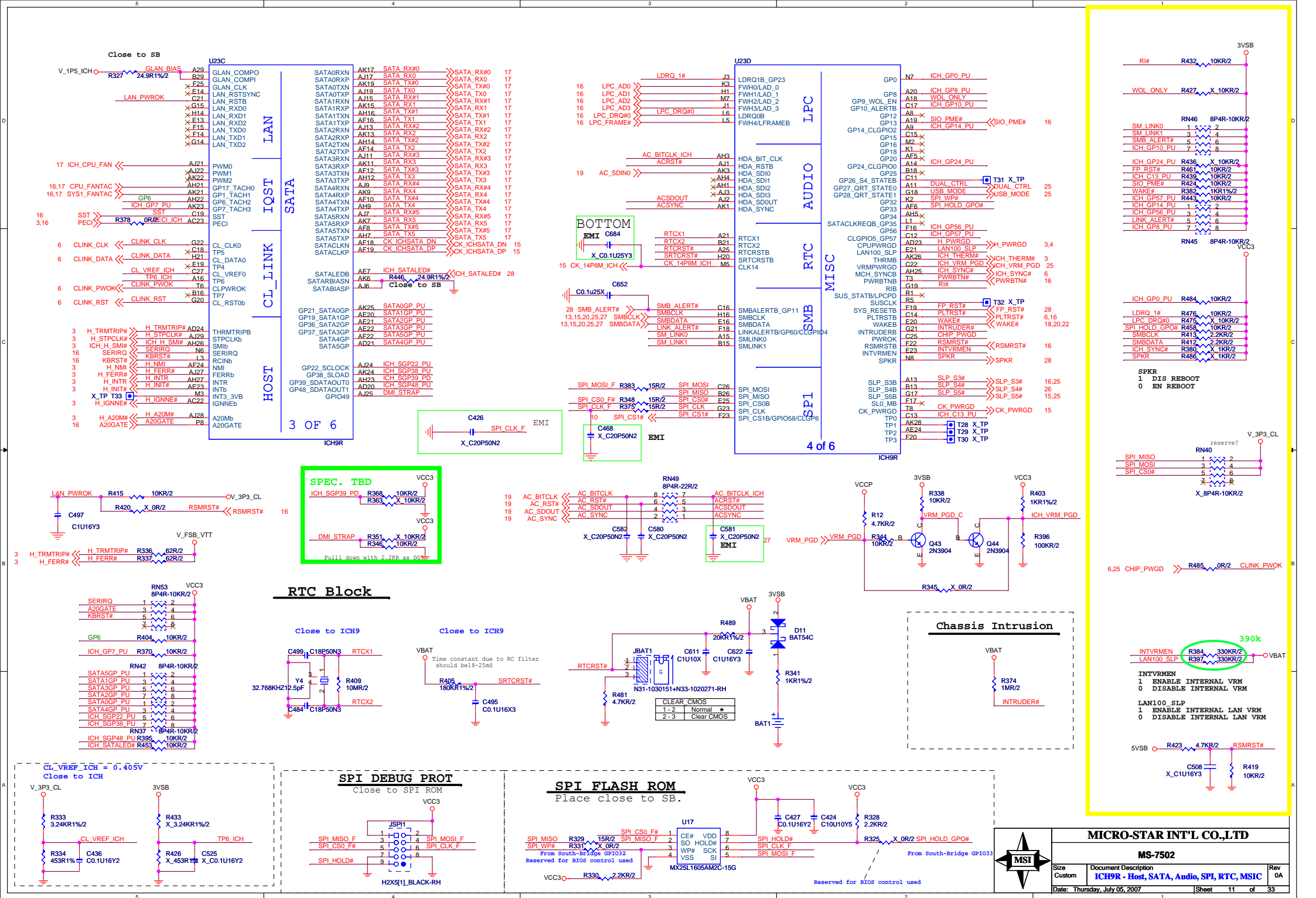
Size Custom

Document Description  
ICH9R - PCI, DMI, USB, PCIE & Slots

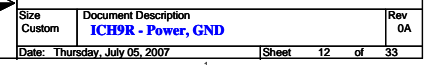
Rev 0A

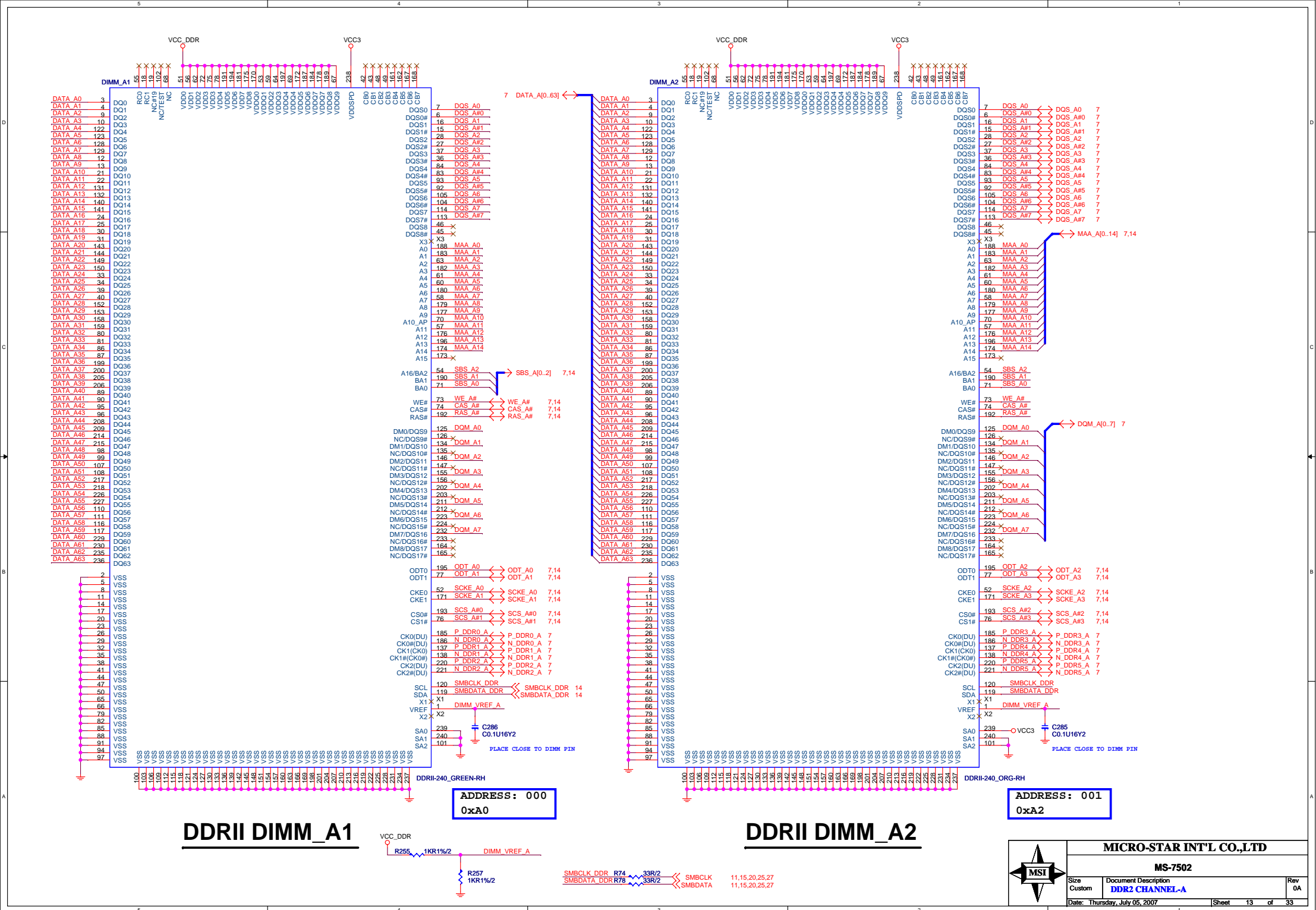
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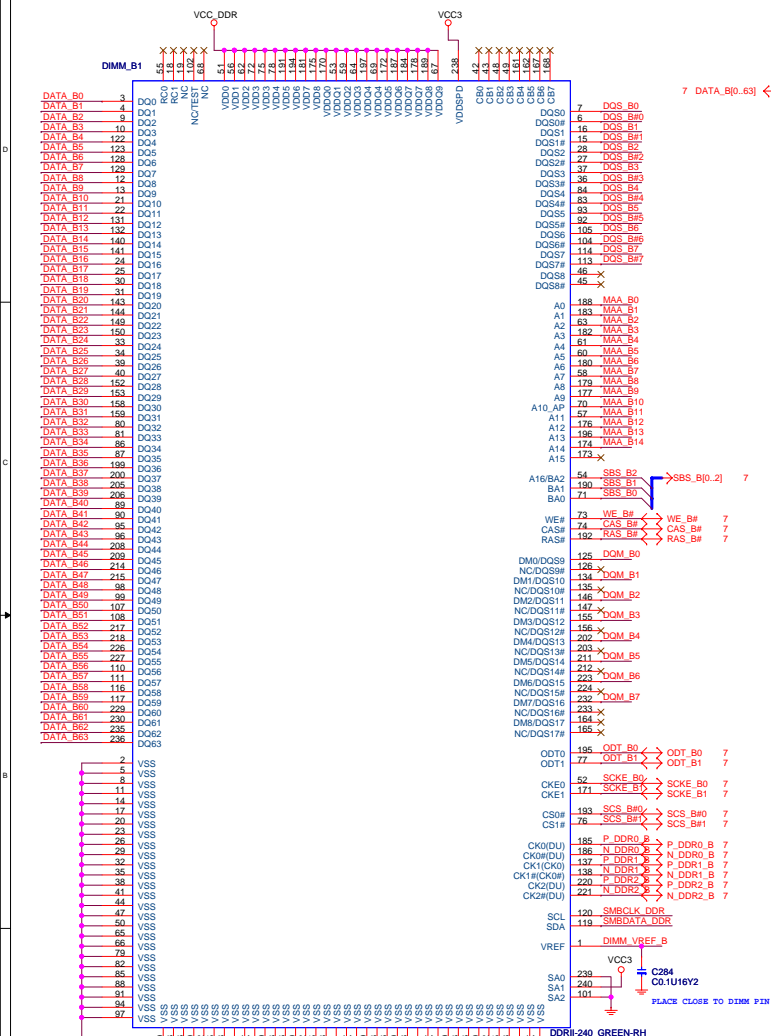


V5REF must be powered up before VCC3 or after VCC3 within 0.7V.  
Also, V5REF must power down after VCC3 or before VCC3 within 0.7V.  
This rule is also applies to V5REF\_SUS and 3VSB.  
However, the 3VSB is derived from the 5VSB on the power supply  
thru a voltage regulator and therefore, they can satisfy the requirement.

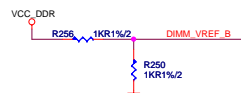




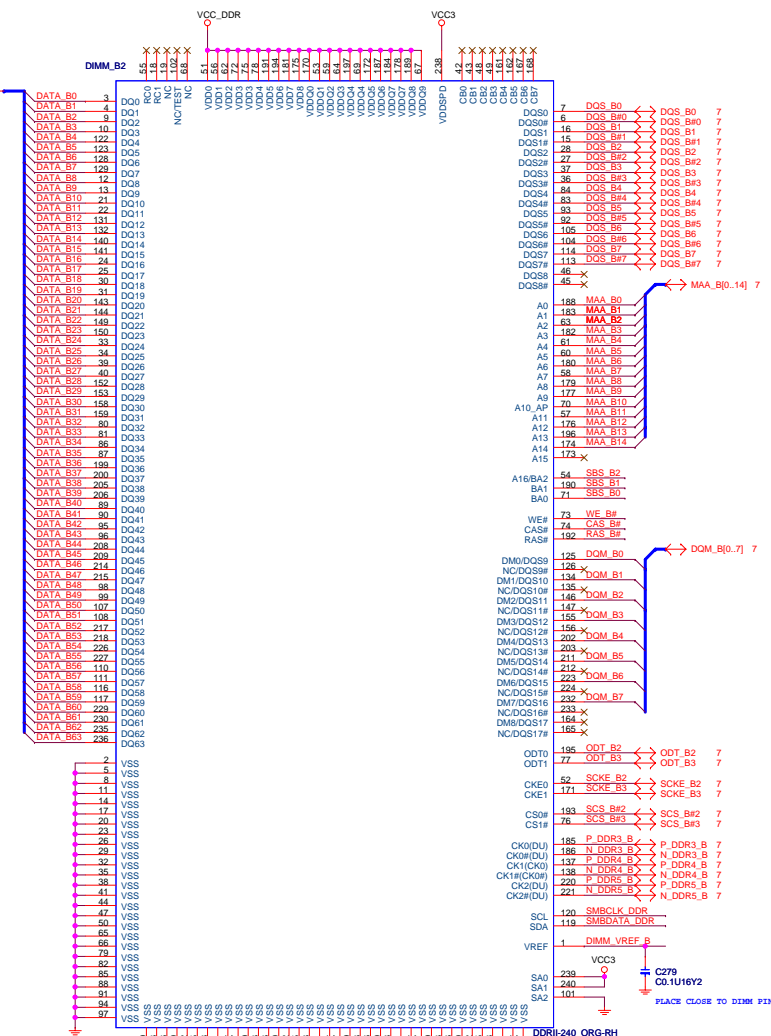
## DDR II Termination



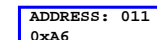
## DDRII DIMM\_B1



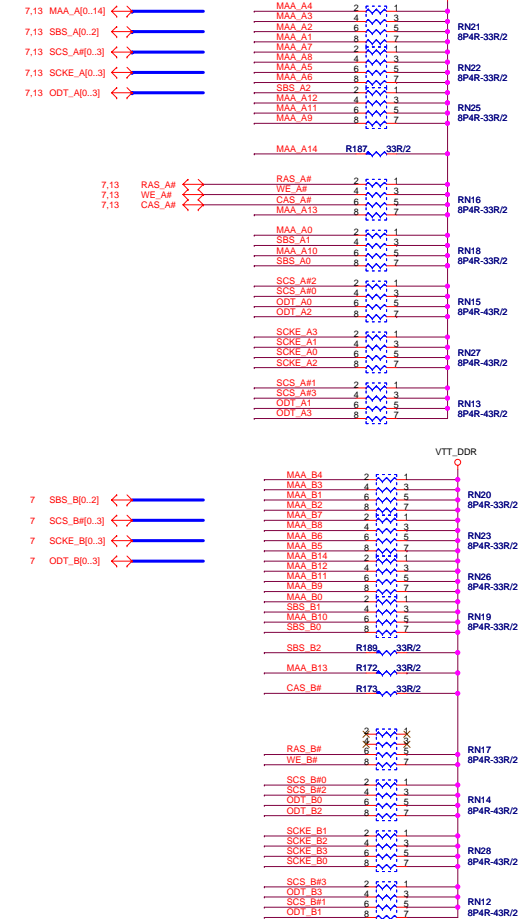
ADDRESS: 010



## DDRII DIMM\_B2



ADDRESS: 011  
0xA6



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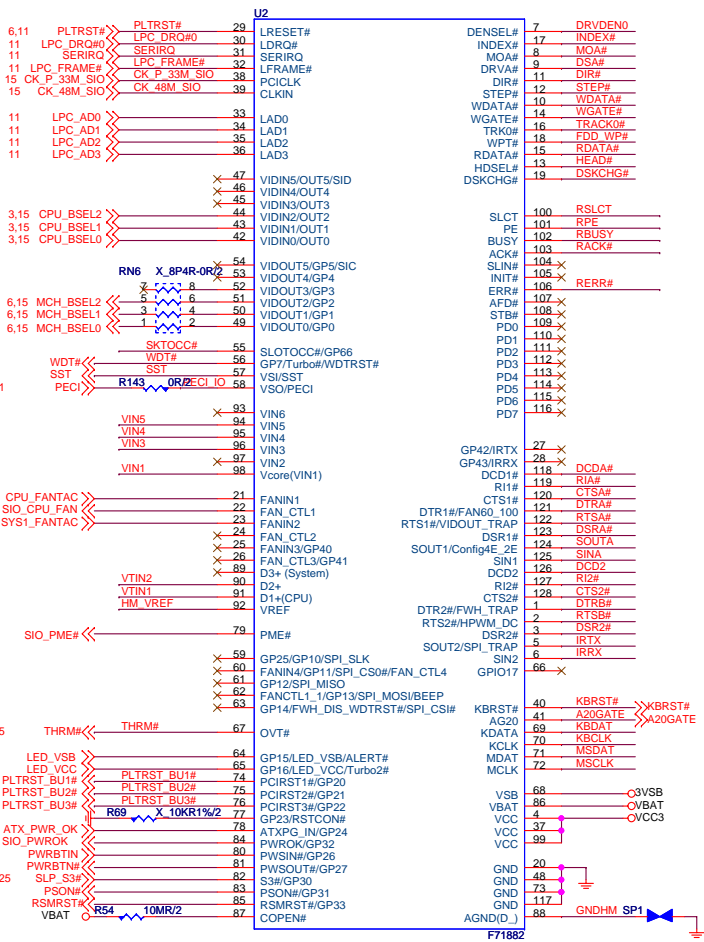
MS-7502

Size Custom	Document Description <b>DDR2 CHANNEL-B/DDR II Termination</b>
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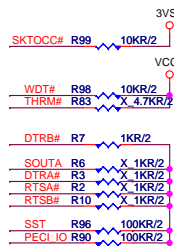






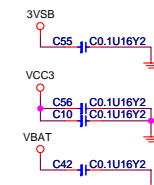


## LPC I/O STRAPPING RESISTOR

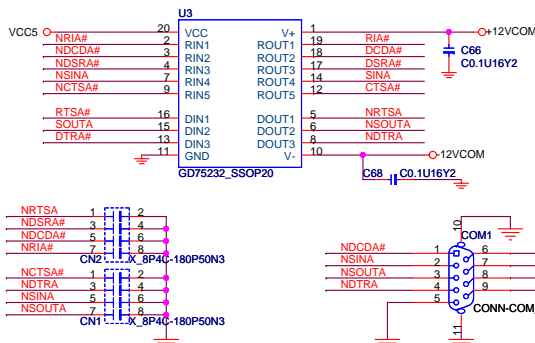


S I/O STRAP

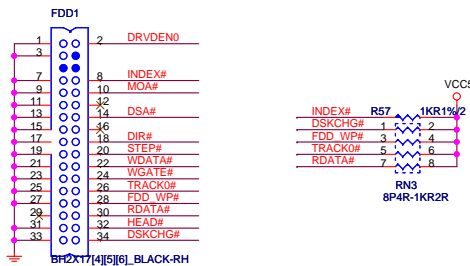
SPI 1:BACKUP\* 0:PRIMARY  
SPI 1:DIS 0:EN  
IO ADD 1:4Eh\* 0:2Eh  
FAN 1:60% 0:100%  
VID 1:VIDO/VIDI\* 0:GPIO/VIDIO  
FAN 1:PWM FAN 0:LNFR FAN\*



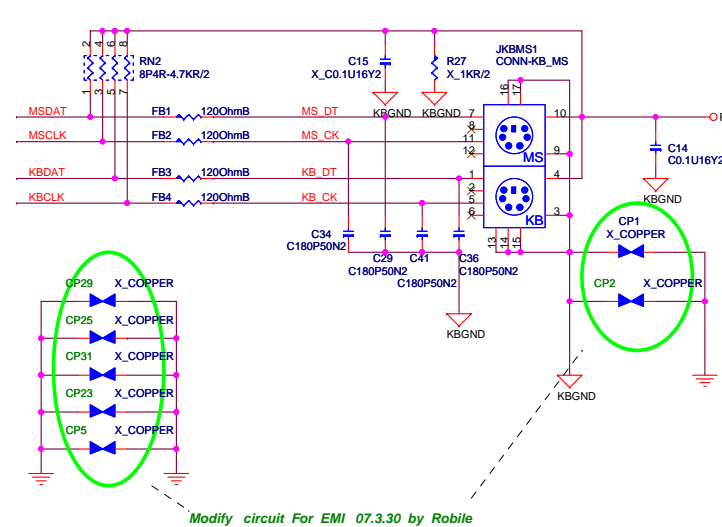
## SERIAL PORT 1



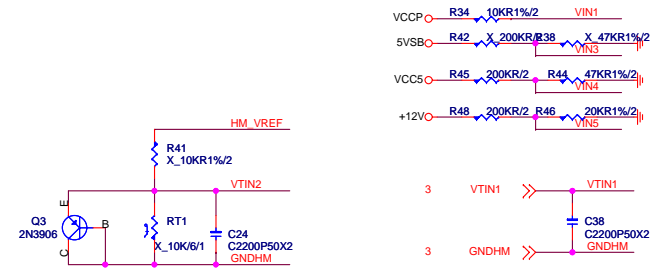
## FLOPPY CONNECTOR



## PS2 KEYBOARD & MOUSE CONNECTOR



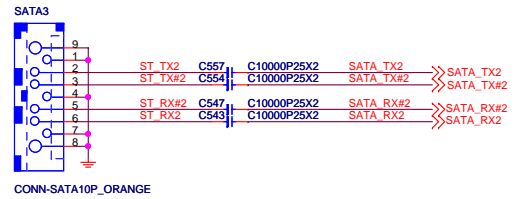
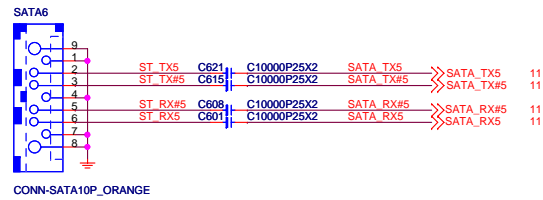
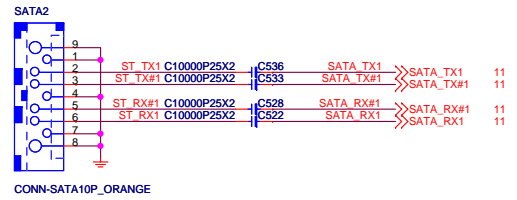
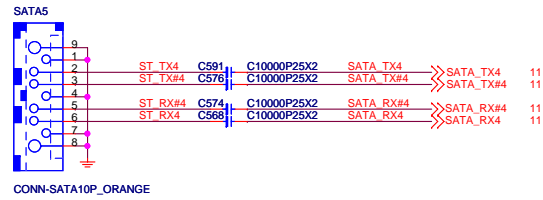
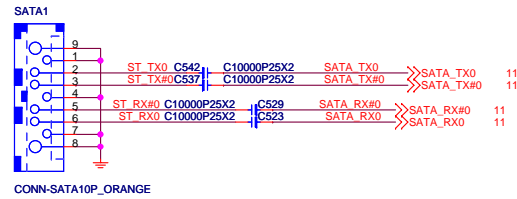
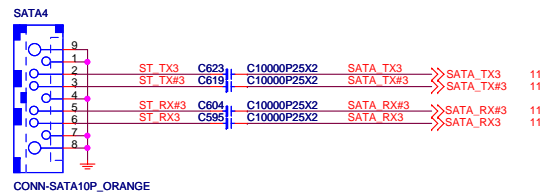
## Thermal Resistor



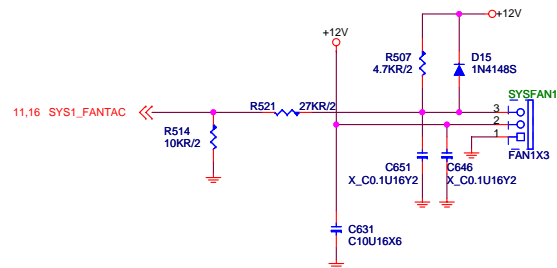
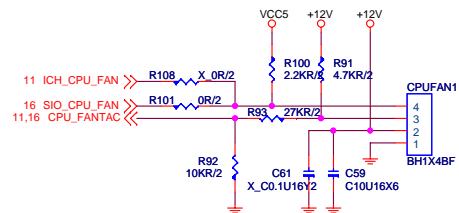
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## FAN-COUNTROL CIRCUIT



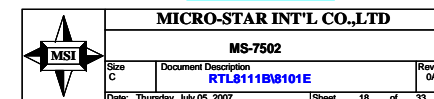
Modify System FAN circuit & Remove PWR\_FAN  
for spec need 3pin DC Smart FAN 07.3.30 by Robile



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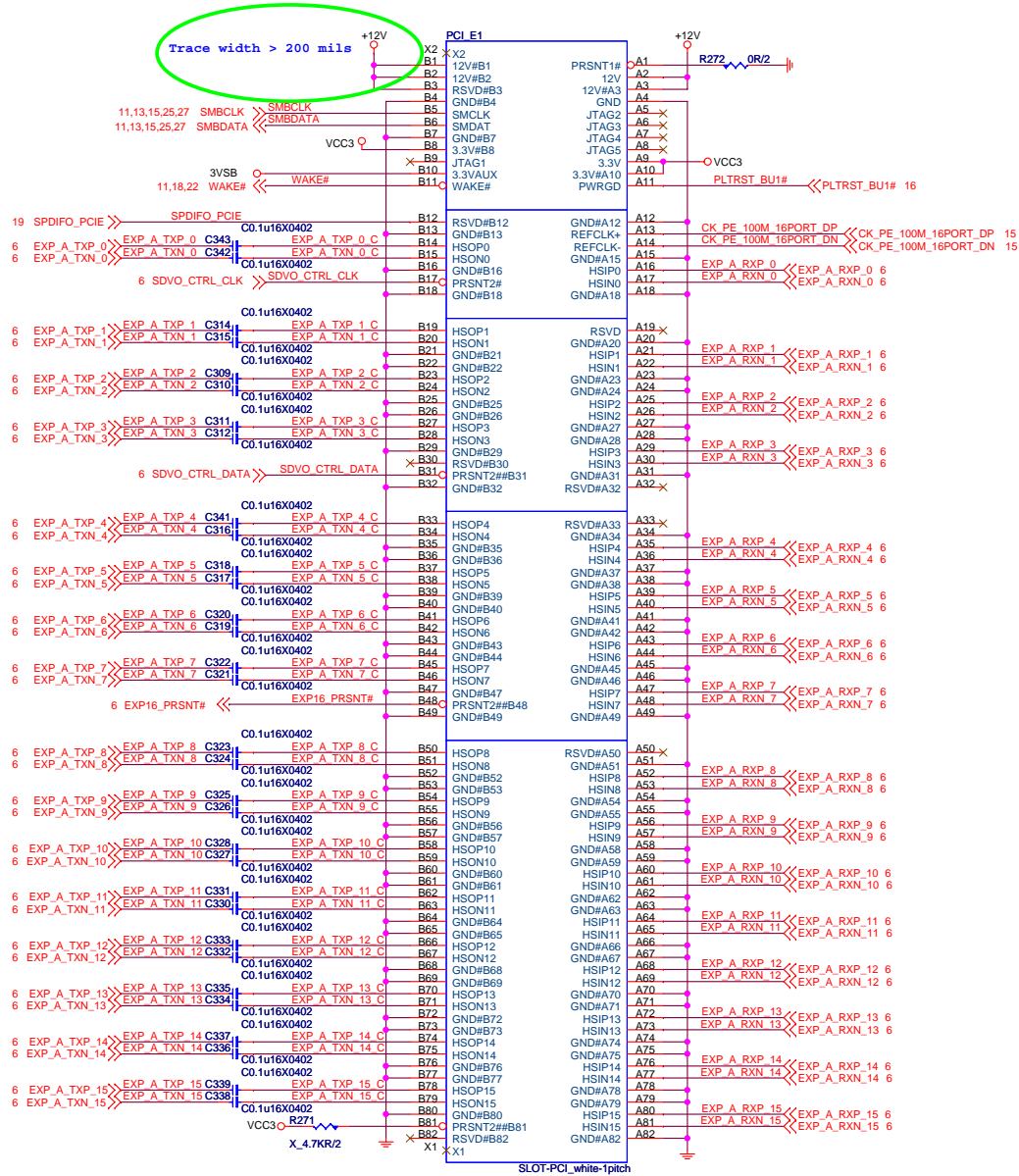
MS-7502

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Custom	SATA & e-SATA Ports and Fan Control	0A
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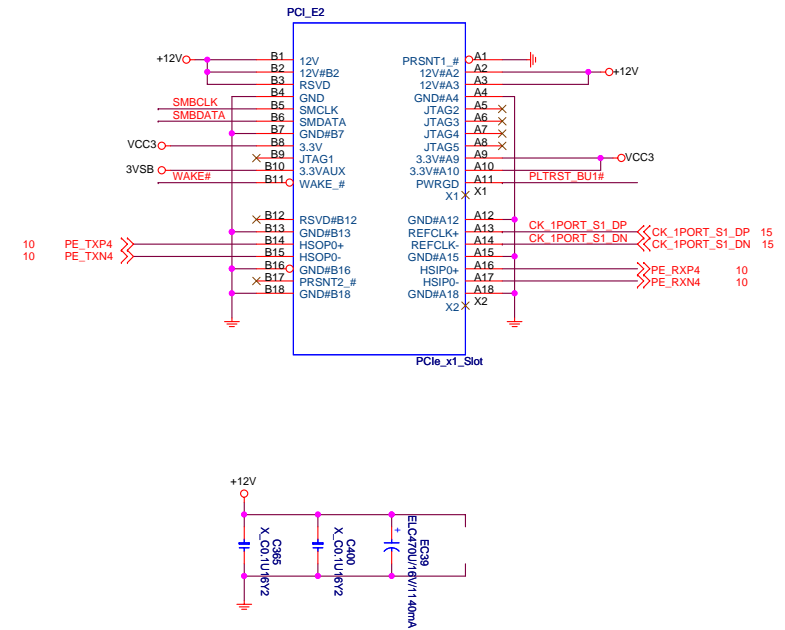




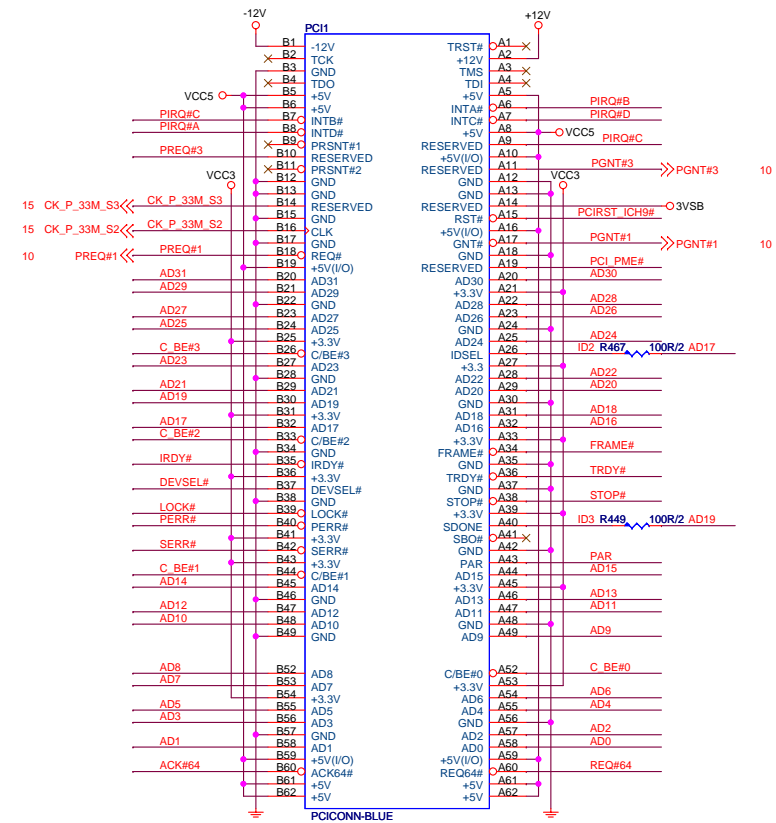
# PCI\_Express X16 Slot



# PCI\_Express X4 Slot (Share with PCI\_E x1 Slots)



PCI SLOT 1 (PCI VER: 2.2 COMPLY)

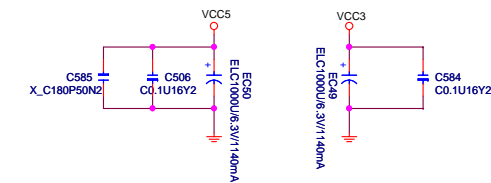


IDSEL = AD19

**MASTER = PREQ#3**

PIRQ#C

## PCI SLOT DECOUPLING CAPACITORS



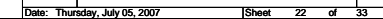
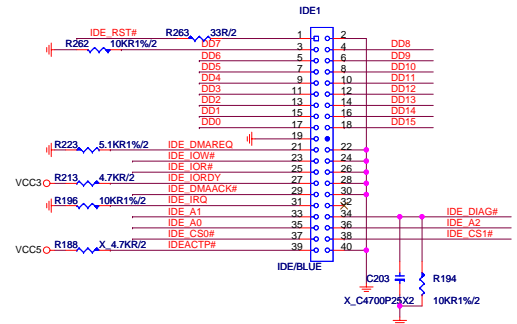
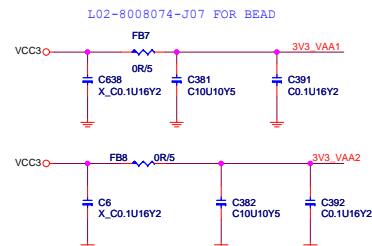
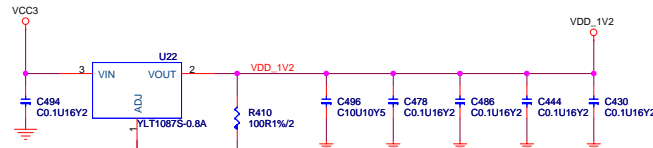
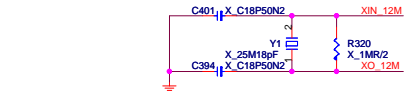
Size	Document Description
Custom	<b>PCI Slot 1 &amp; 2</b>

Rev  
0A

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[Date: March 20, 2008]

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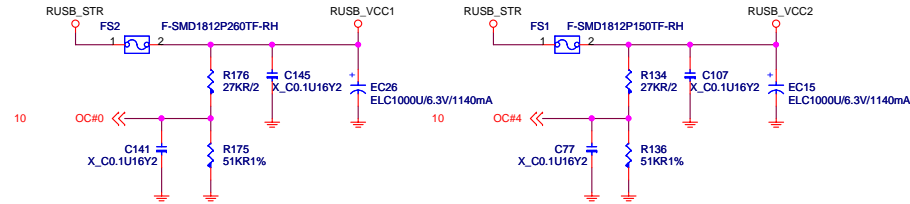
## Rear USB Connector

### USB POWER FOR PORT 0,1,2,3

NEAR CONNECTOR

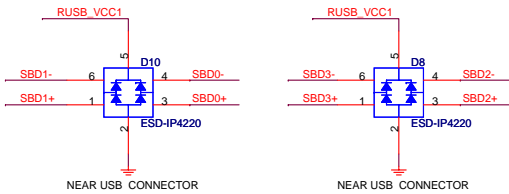
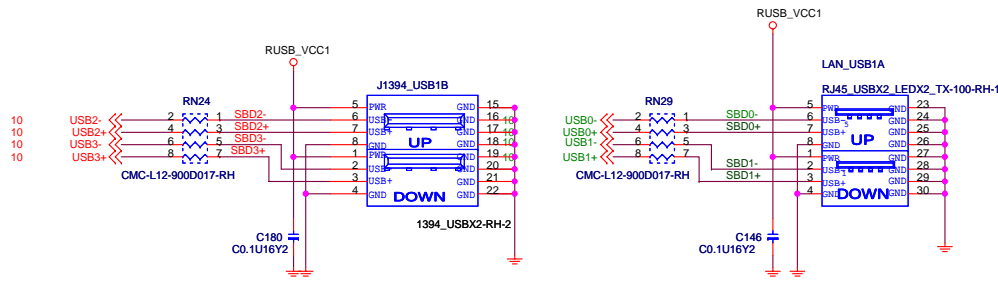
### USB POWER FOR PORT 4,5

NEAR CONNECTOR

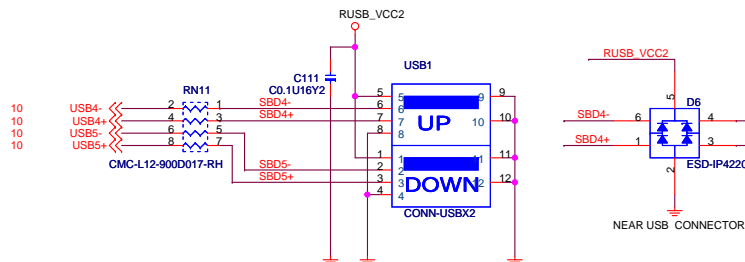


### REAR USB PORT 2,3(With 1394)

### REAR USB PORT 0,1 (With LAN)



### REAR USB PORT 4,5



## Front USB Connector

### USB POWER FOR PORT 6,7

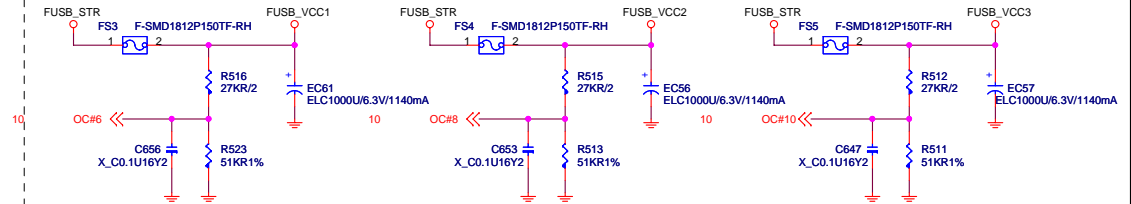
NEAR CONNECTOR

### USB POWER FOR PORT 8,9

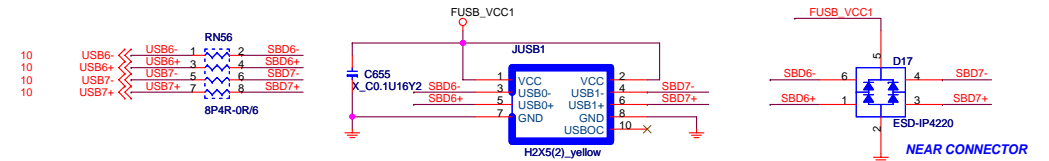
NEAR CONNECTOR

### USB POWER FOR PORT 10,11

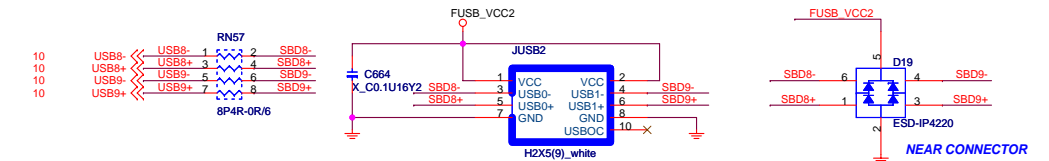
NEAR CONNECTOR



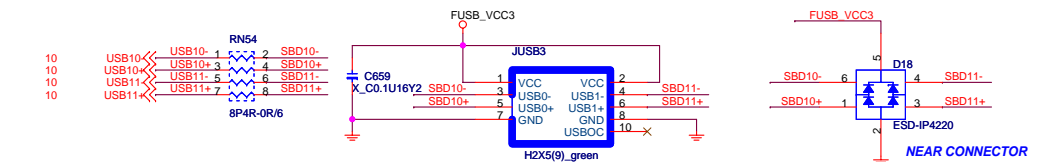
### FRONT USB PORT 6,7



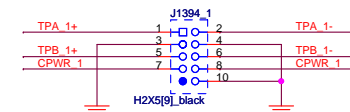
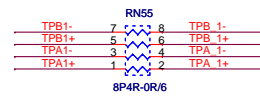
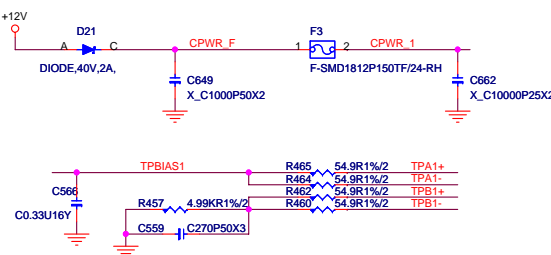
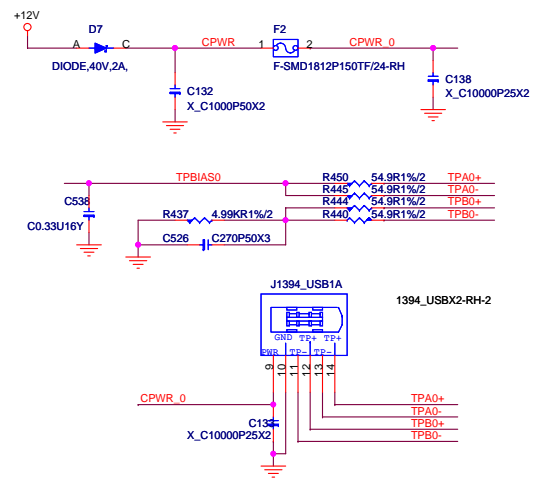
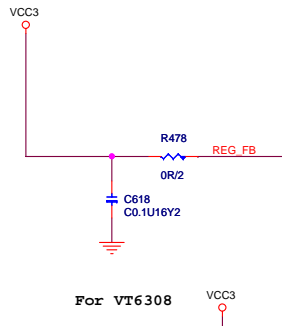
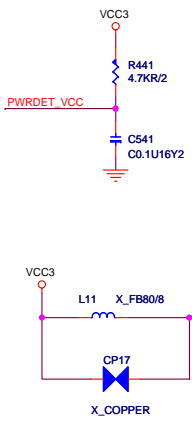
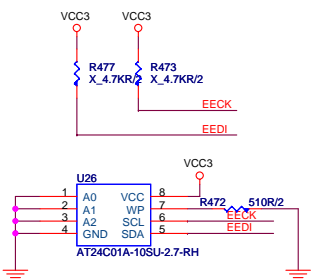
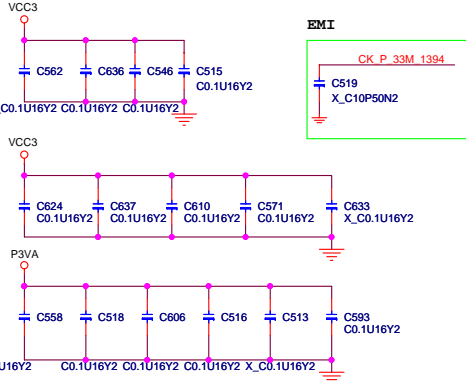
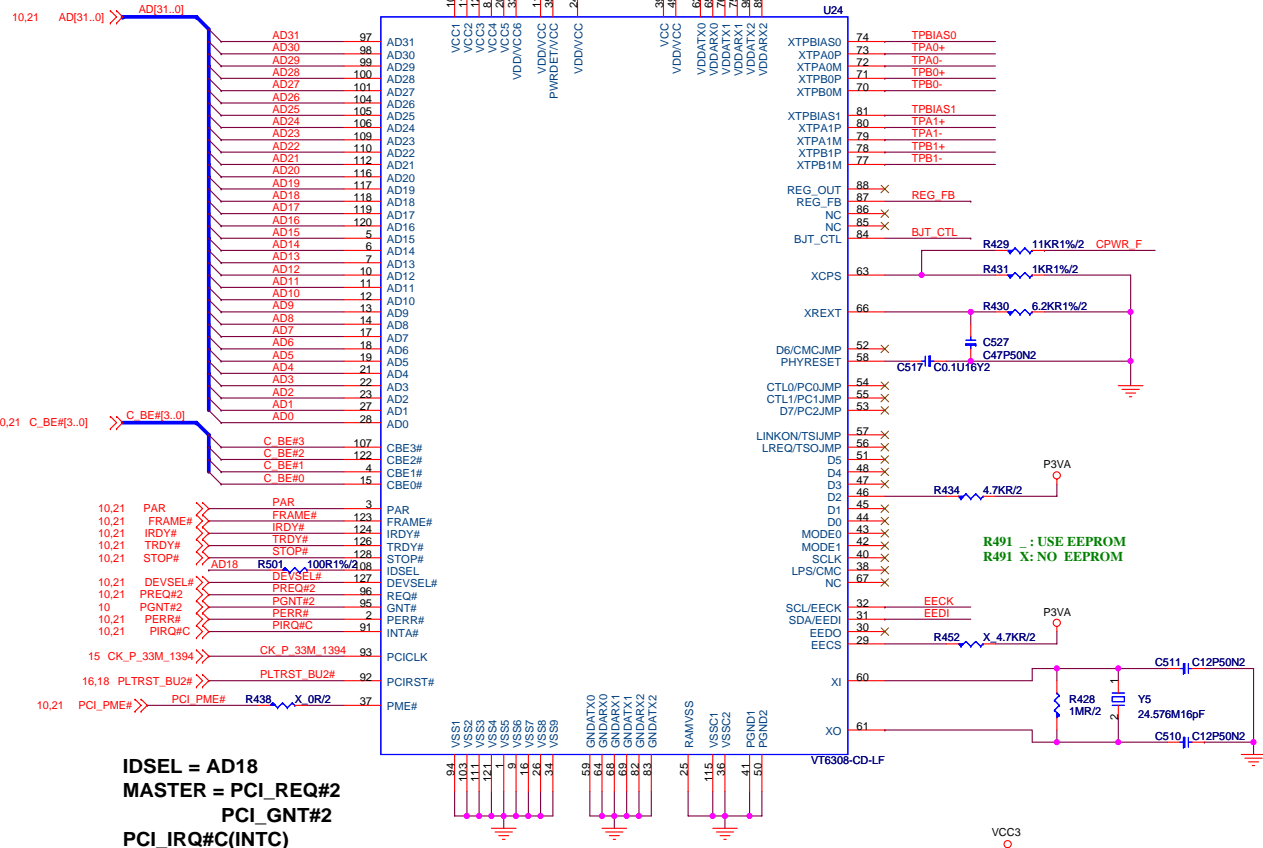
### FRONT USB PORT 8,9



### FRONT USB PORT 10,11

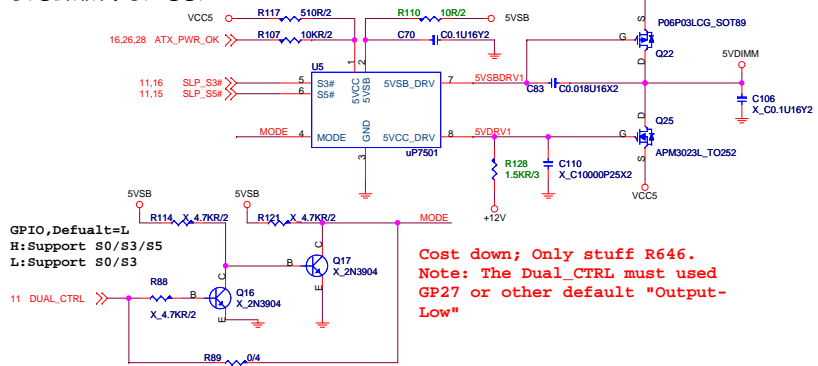


1394a OHCI Link Layer Controller

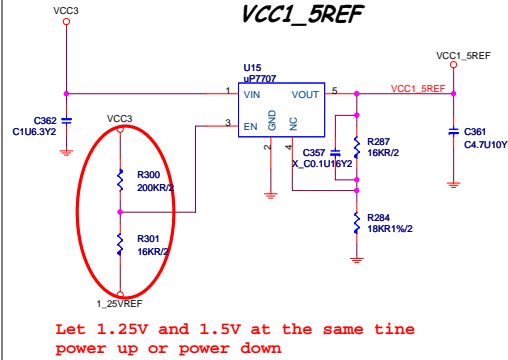


For Intel 1394 pinheader

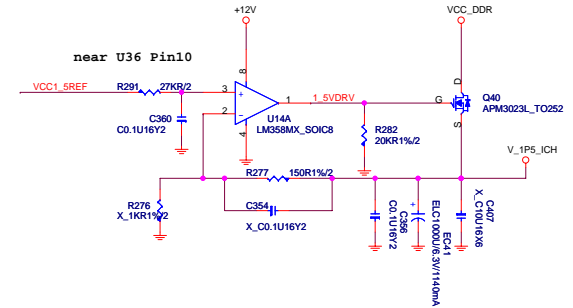
## 5VDIMM FOR DDR



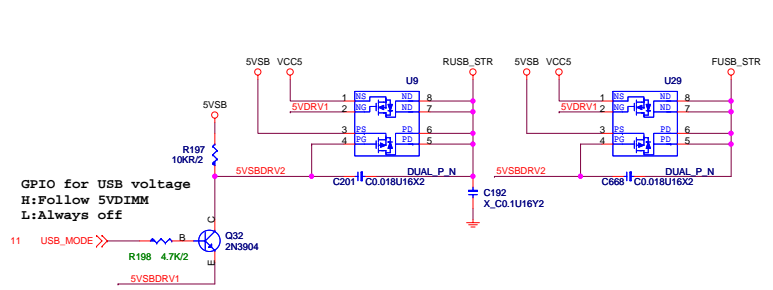
**VCC1\_5REF**



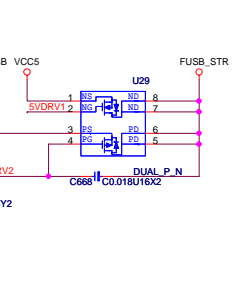
***SB 1.5V 3.543A***



### 5VSB FOR Rear USB



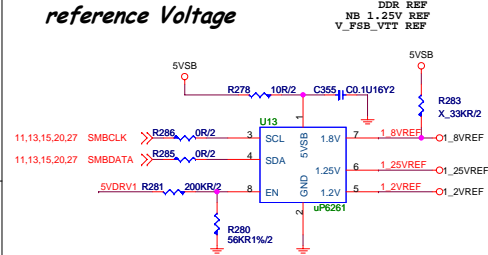
### 5VSB FOR Front USB



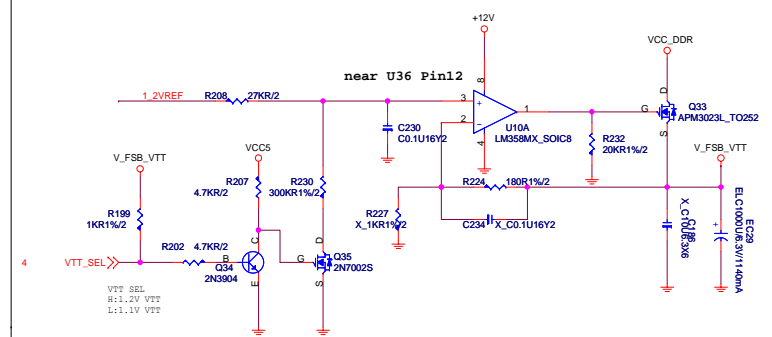
```
*Reference sinking/sourcing 100uA
*Reference ramp-up 5mS
*5VSB > 4.2V POR
*Pin8 > 1.dV Enable
*Pin8 < 0.4V Disable

Stuff R361 to prevent the source current not enough
issue (5.1-1.8)/33K=100uA
```

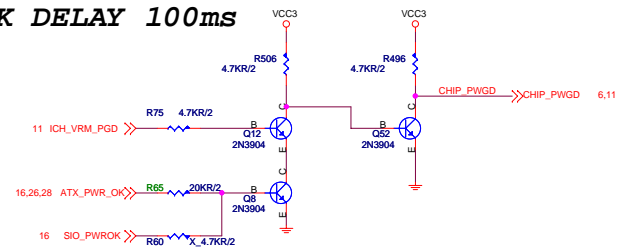
**reference Voltage**



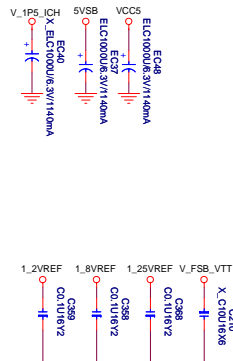
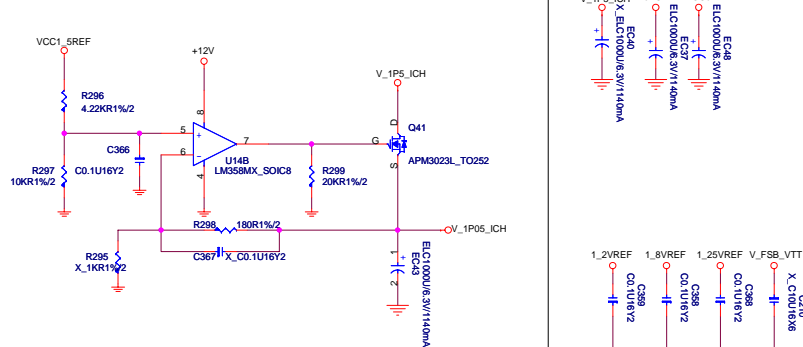
**1.2V 5.802A**



**PWROK DELAY 100ms**

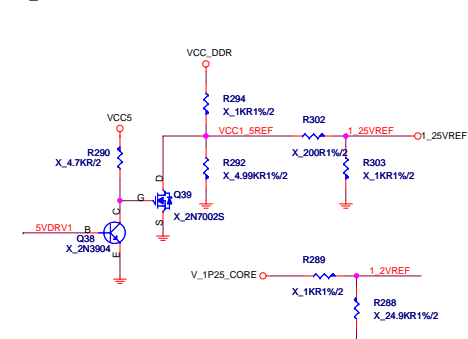


***SB 1.05V 1.16A***

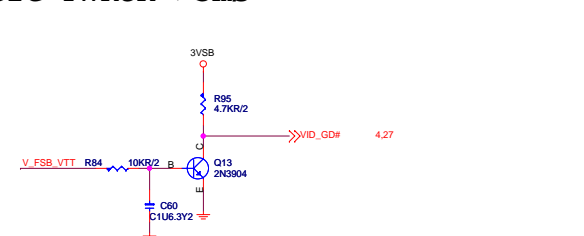


\*Reserve for remove uP6261 and uP7707

```
*1_8REF use uP6103's internal 0.8VREF
```



**VID before PWROK >3ms**



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

MS-7502

Size	Document Description
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Custom	ACPI controller UPI
--------	---------------------

DDR II 1.8V POWER

Irripble=24.127\*0.8\*sqrt(1.8/5)\*sqrt(1-1.8/5)/1=9.264768A  
2.35\*3\*1.7=11.985A>9.264768A

5VDIMM IN

CHOKE1

CH 1.2U18A

5VDIMM

C109 X\_C10000P25X2

EC30

EC29

EC28

EC27

EC26

EC25

EC24

EC23

EC22

EC21

EC20

EC19

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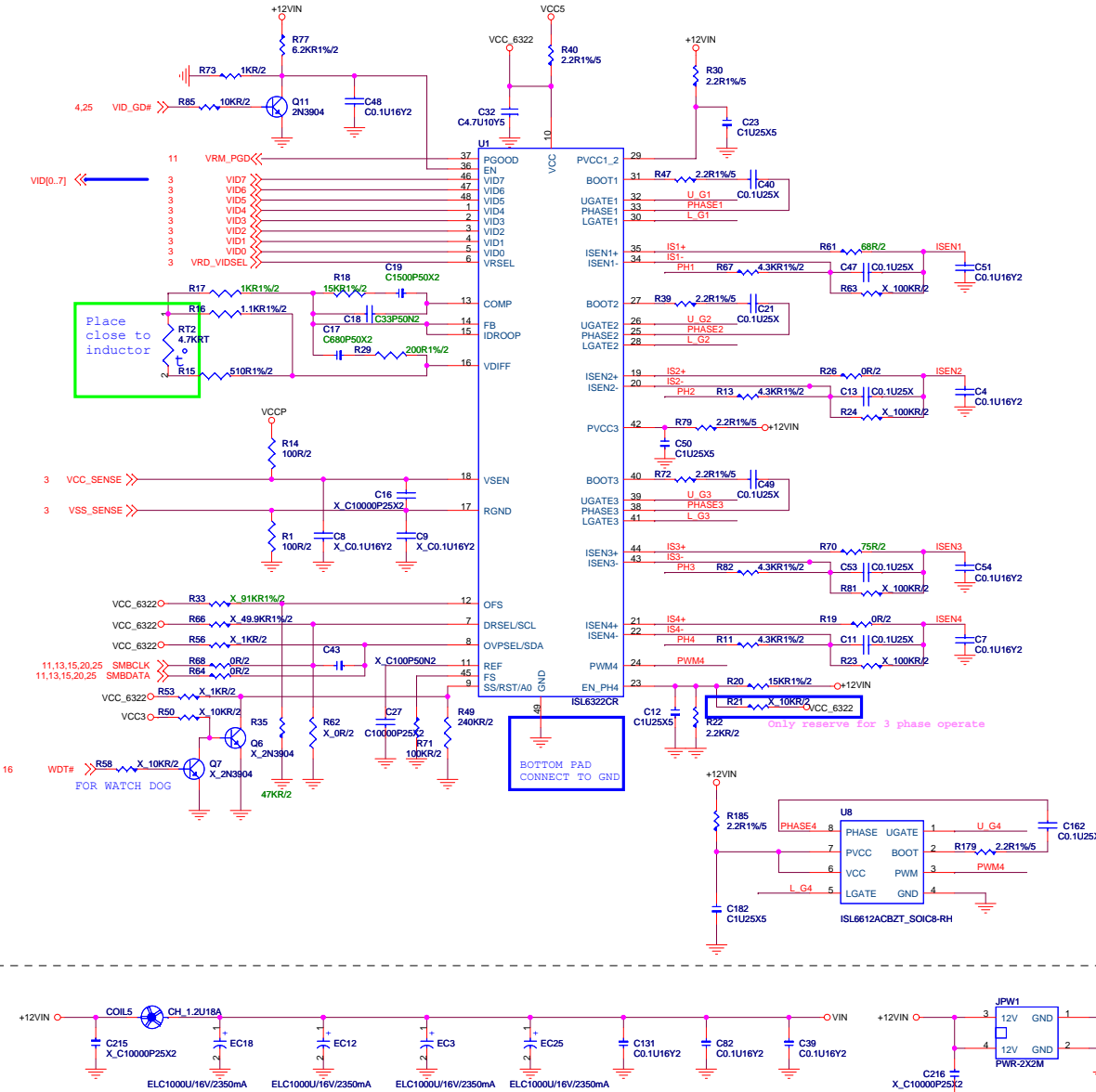
EC0

[illegible]

MS-7502

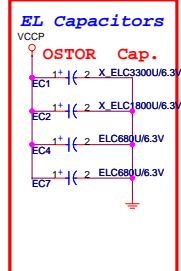
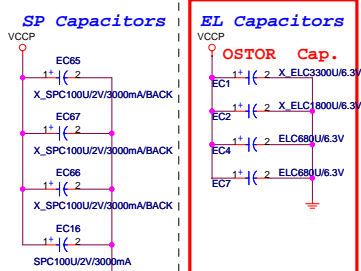
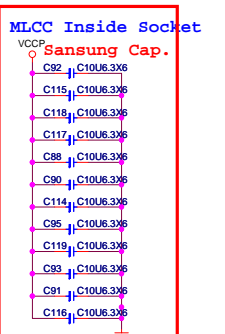
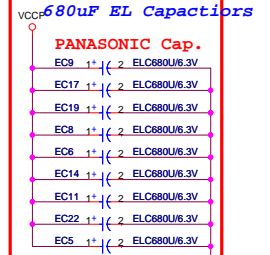
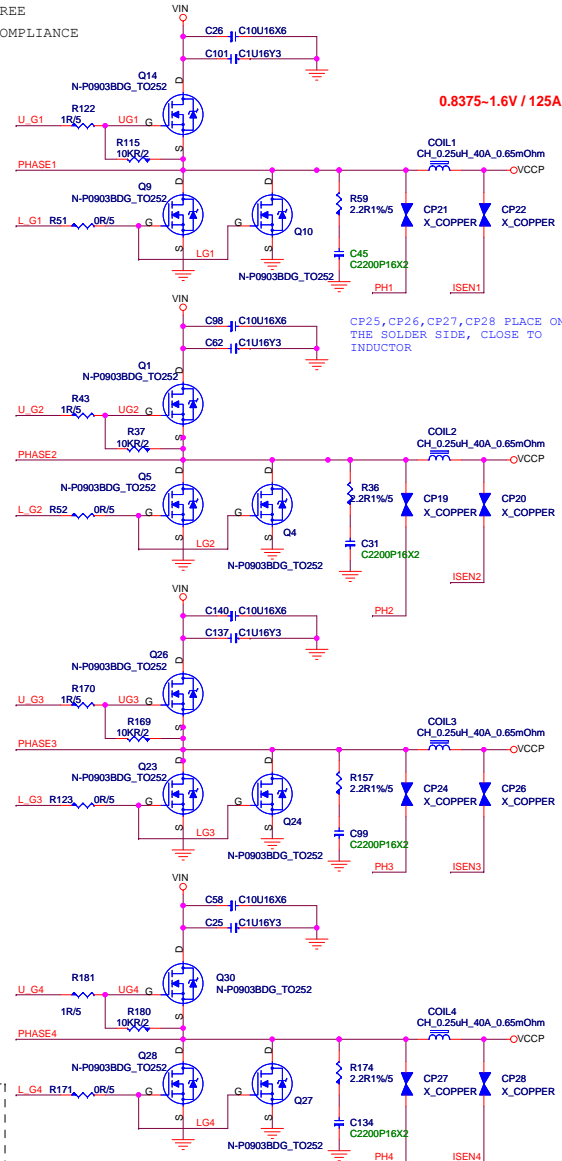
Size Custom	Document Description <b>NB Core Power &amp; DDR Power</b>	Rev 0A
Date: Thursday, July 05, 2007		Sheet 26 of 33

# Voltage Regular Module



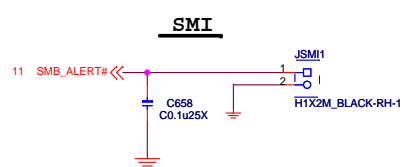
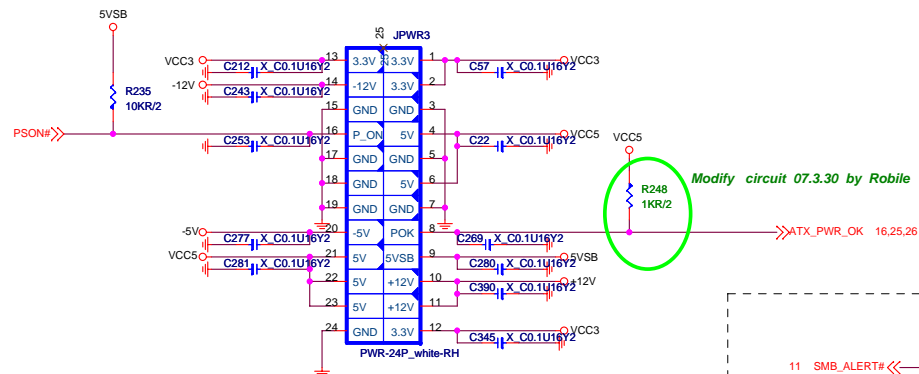
N-P0903BDG\_TO252  
P75N02LDG/TO252  
C100U2SP  
CD560U4OS-2  
1800UF/6.3V  
0.25uH/40A  
CH-1.1u25A-LF  
CD100U16EL20-2

mosfet/n-channel, P0903BDG, SMT/TO252, Rds(on)=9.5mΩ(10V/25A), Vgs(on)=1~3V, Id=50A, Ciss=1800pF, Qg=50nC, Vds=25V, Vgs=±20V, RoHS COMPLIANCE  
mosfet/n-channel, P75N02LDG, SMT/TO252, Rds(on)=7mΩ(10V, 30A), Vgs(on)=1~3V, Id=75A, Ciss=5000pF, Qg=140nC, Vds=25V, Vgs=±20V, RoHS COMPLIANCE  
ESR<13mΩ, Ripple cur.<2.7A, LC<12uA, 105C  
CAP, OS-CON, 560u/4V, Dip-2/8\*9/3.5mm, ESR<7mohm, Ripple cur.=6100mA, LC. <500uA, SPEC series, RoHS compliance  
ESR<12mΩ, Ripple cur.<2350mA, 105C, longlife change from 2000hrs to 3000hrs, KZJ  
SMD CHOKE, 0.25uH, 20%, DIP/8.5mm, 40A, 0.6mOhm, , , PEW, FERRITE, SQUARE, RoHS COMPLIANCE  
IND CHOKE, 1.1uH, 20%, DIP/9mm, 25A, 1.4mOhm, 5.5T, 0.9mmx3, PEW, IRON, , LEAD FREE  
CAP, EL, 1000u, 16V, Dip-8x20/3.5mm, 20%, 12mOhm, 2350mA, 105C, 3000hrs, RoHS COMPLIANCE

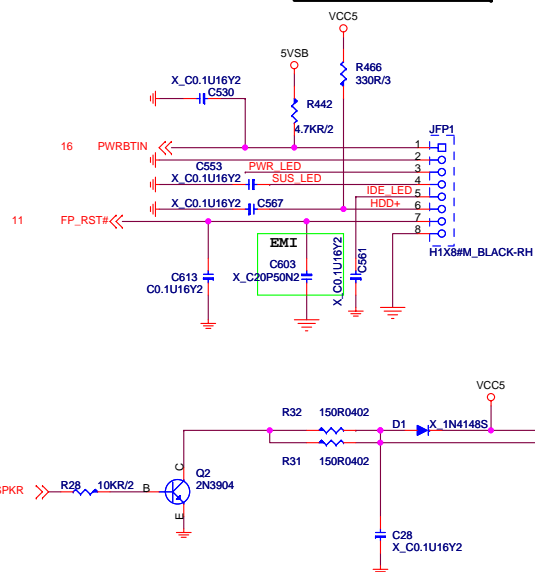


MICRO-STAR INT'L CO.,LTD		
MS-7502		
Size Custom	Document Description VRD11-ISL6322 4-phase	Rev 0A
Date: Thursday, July 05, 2007 Sheet 27 of 33		

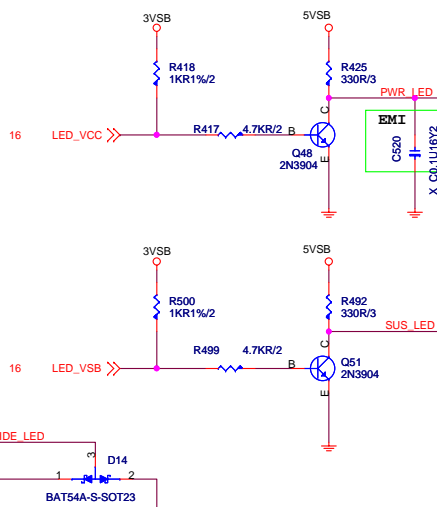
## ATX POWER CONNECTOR



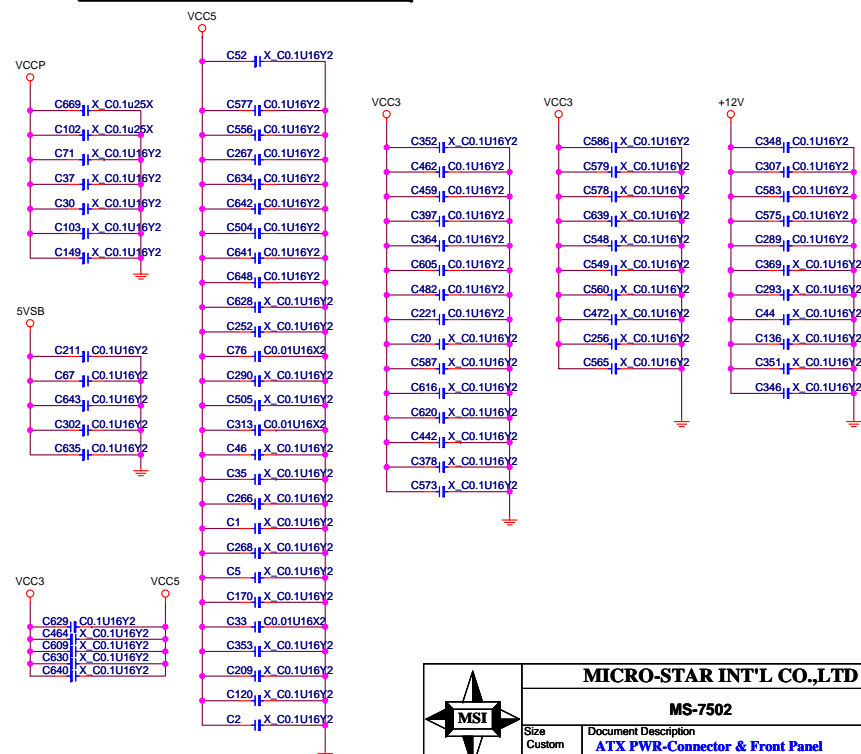
FRONT PANNEL



**LED ( for Fintek 71882)**



## Cap. for EMI &amp; Power



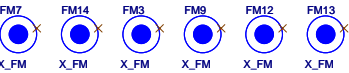
**MICRO-STAR INT'L CO.,LTD**

MS-7502

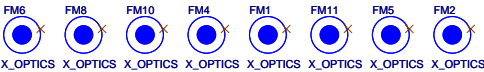
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Rev	0A
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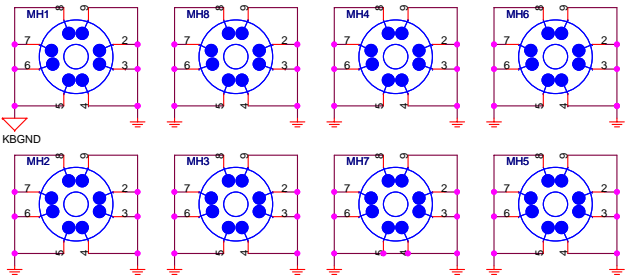
Optical Fiducial Marks-120



Optical Fiducial Marks-100



Mounting Holes



Simulation

