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# MS-7392

Version: 1.1

## CPU:

Intel Core2 Duo, Wolfdale, Kentsfield  
and Yorkfield processors in LGA775 Package.

## System Chipset:

Intel - MCH (North Bridge) P31/G31  
Intel ICH7 (South Bridge)

## On Board Chipset:

BIOS -- SPI EEPROM  
HD Codec -- ALC888  
LPC Super I/O -- F81182  
LAN-- REALTEK RTL8111C  
CLOCK -- ICS9LPRS906CGLF

## Main Memory:

DDR II \* 4 (Max 4GB)

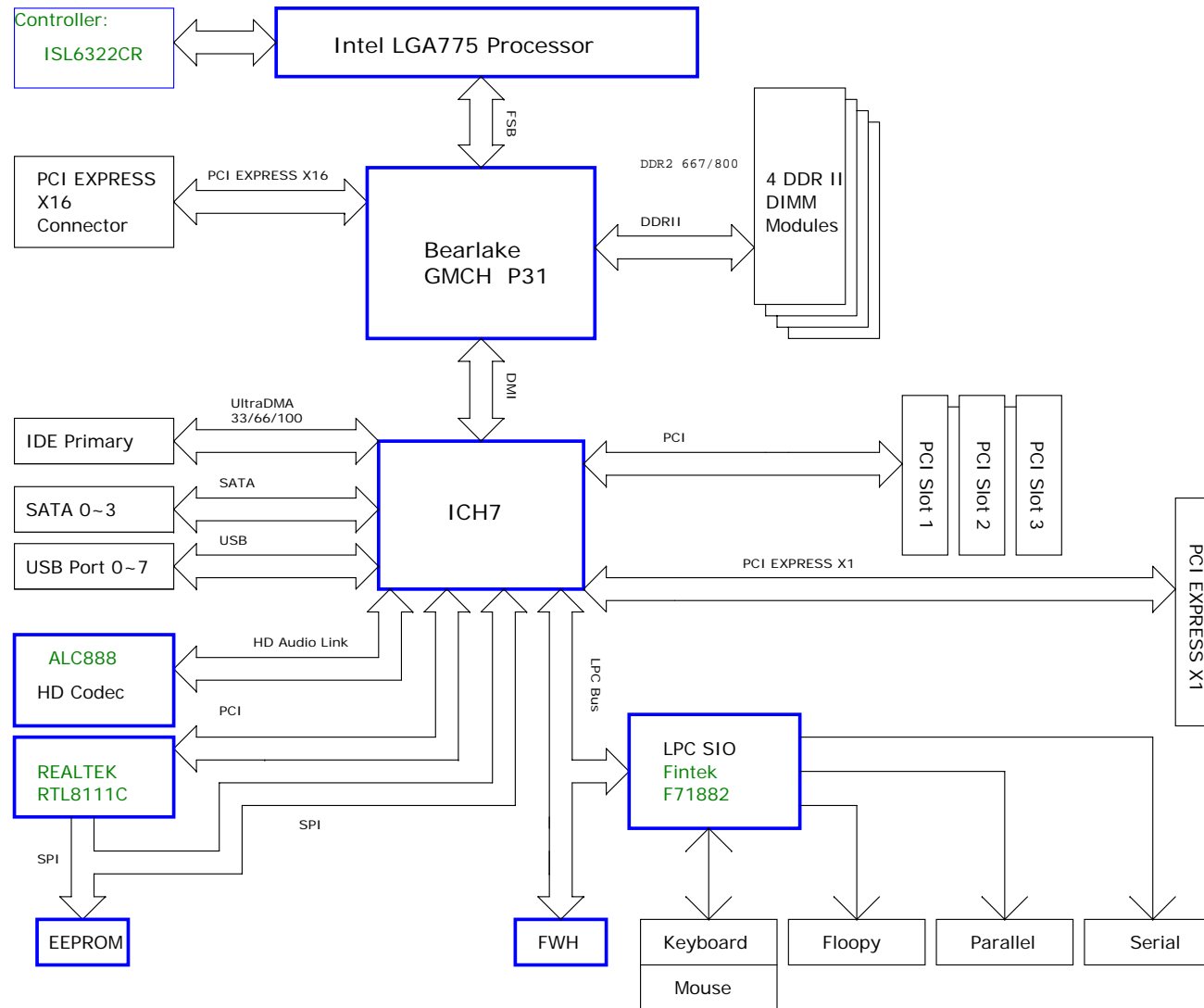
## Expansion Slots:

PCI2.3 SLOT \* 3  
PCI EXPRESS X1 SLOT  
PCI EXPRESS X16 SLOT

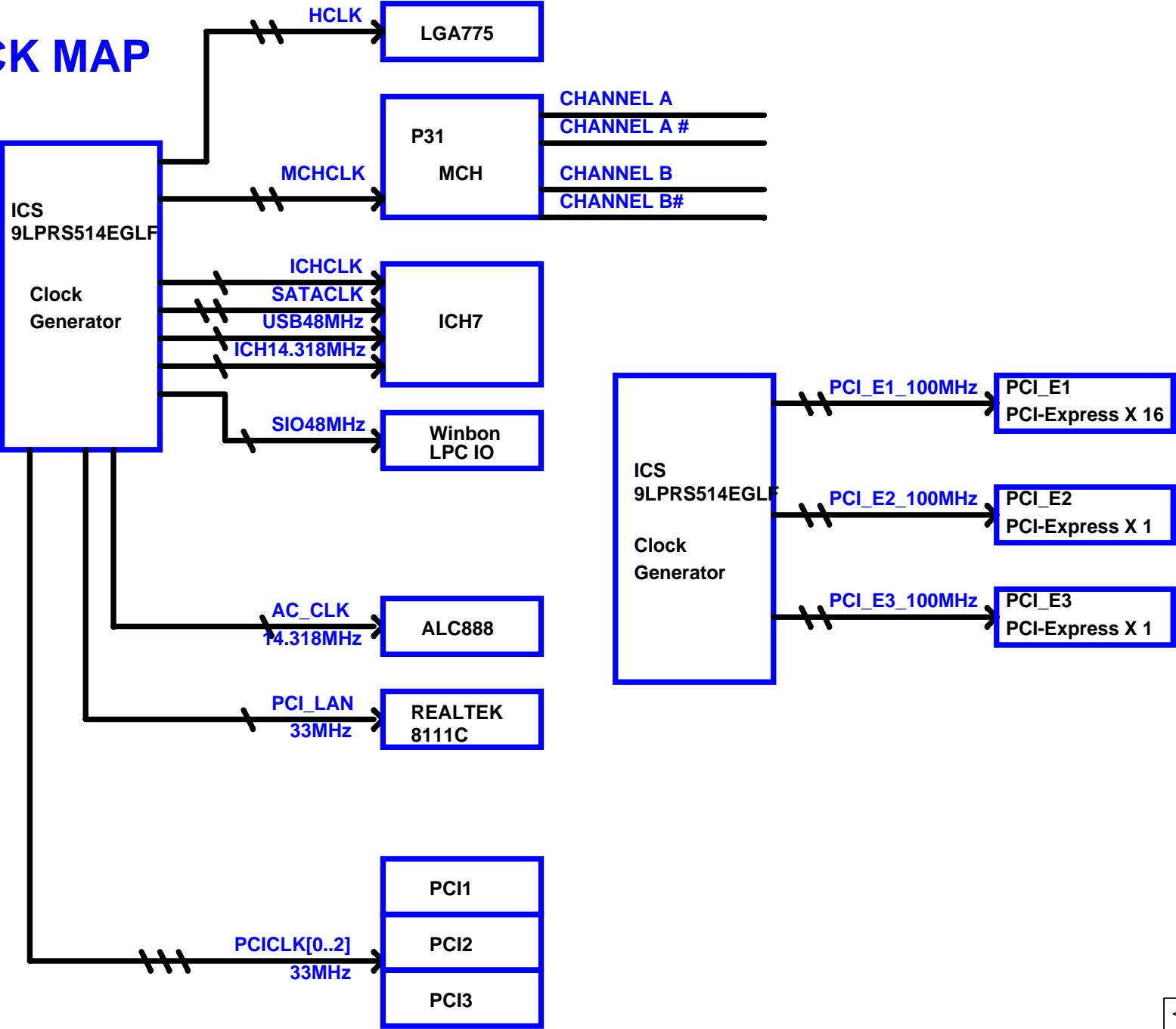
## INTELSIL PWM:

Controller: INTELSIL - ISL6322CR

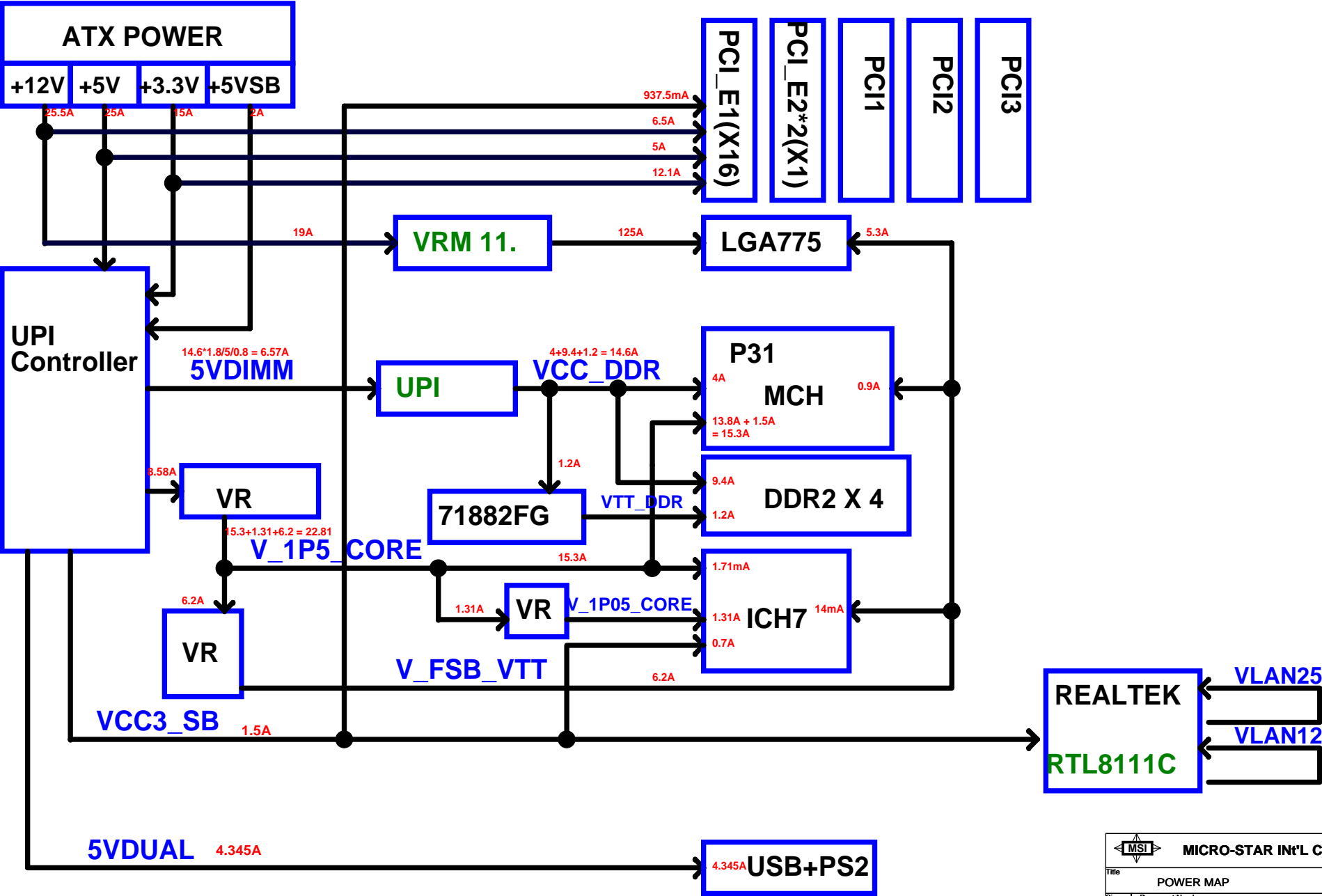
# Block Diagram



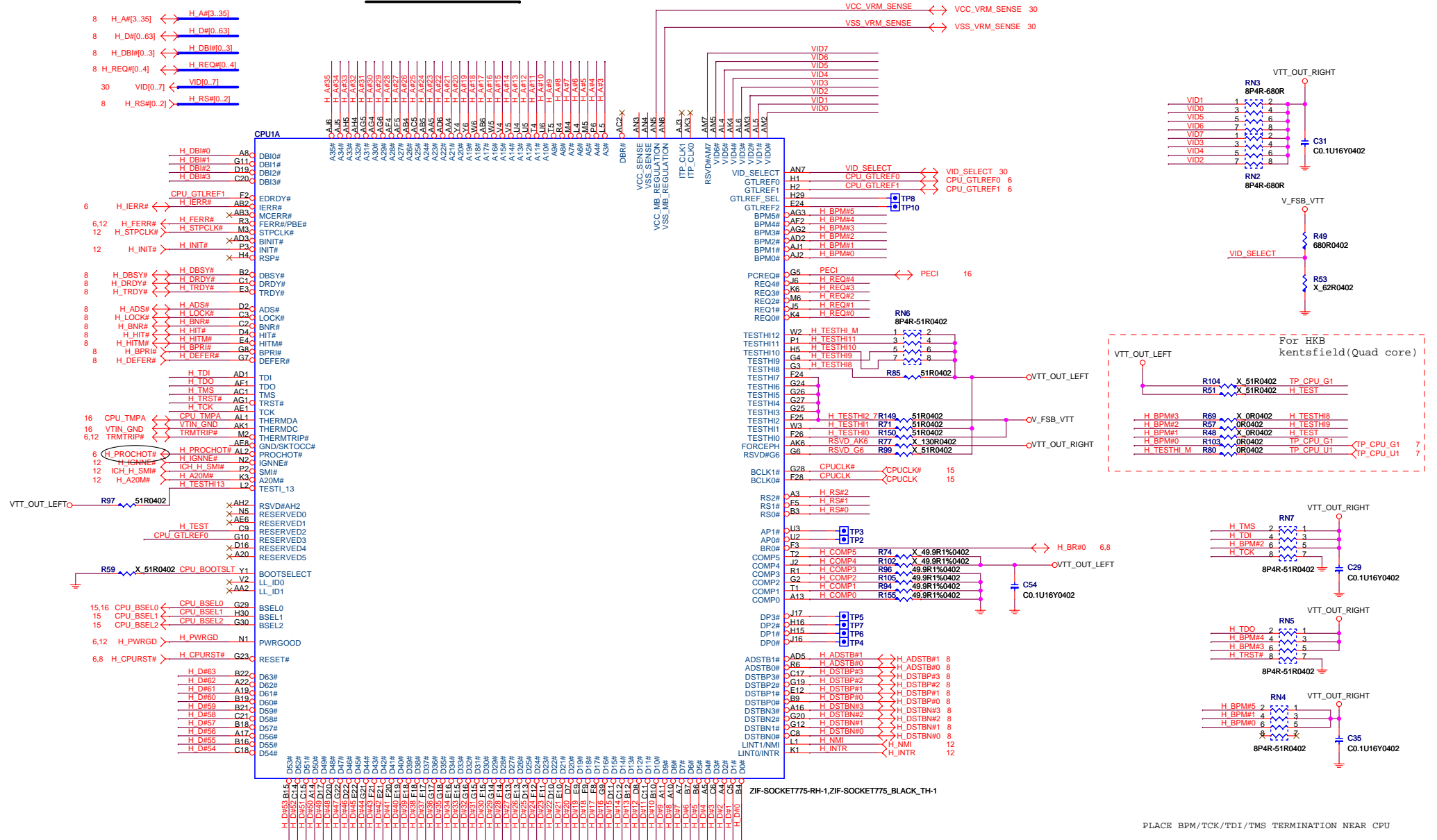
# CLOCK MAP



# POWER MAP



### CPU SIGNAL BLOCK



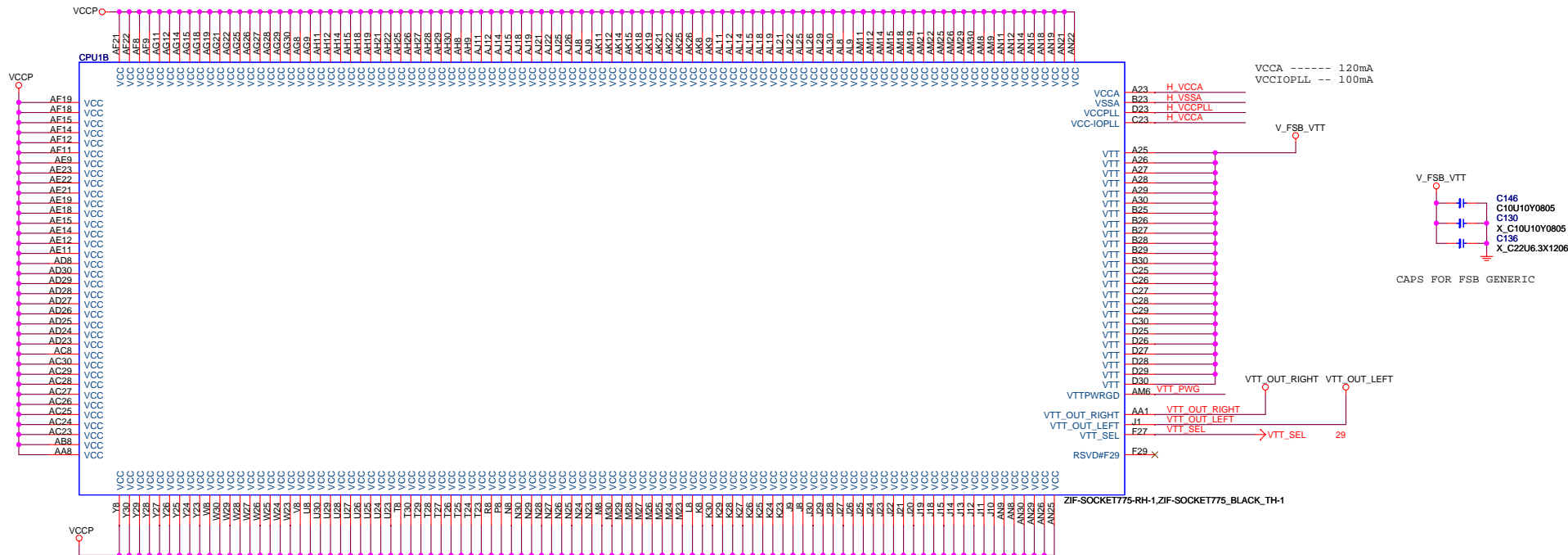
PLACE BPM/TCK/TDI/TMS TERMINATION NEAR CPU  
PLACE TDO TERMINATION NEAR CONNECTOR



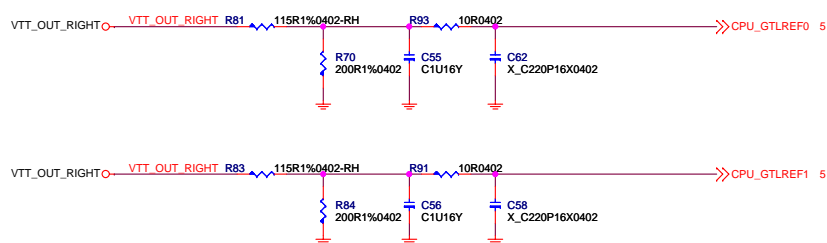
**MICRO-STAR INT'L CO., LTD.**

Title	Intel LGA775 CPU - Signals
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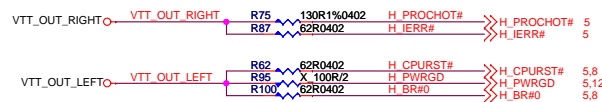
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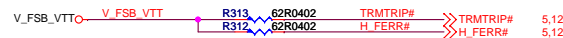
GTLPREF VOLTAGE SHOULD BE  $0.635 \times V_{TT}$   
57.6ohm and 100ohm divider



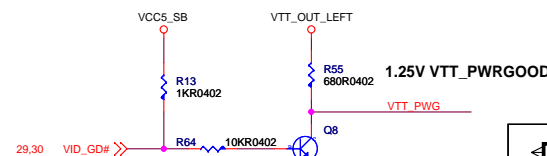
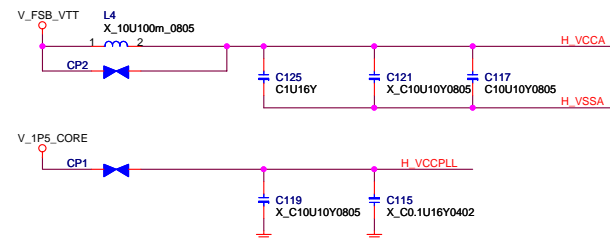
PLACE AT CPU END OF ROUTE



PLACE AT ICH END OF ROUTE




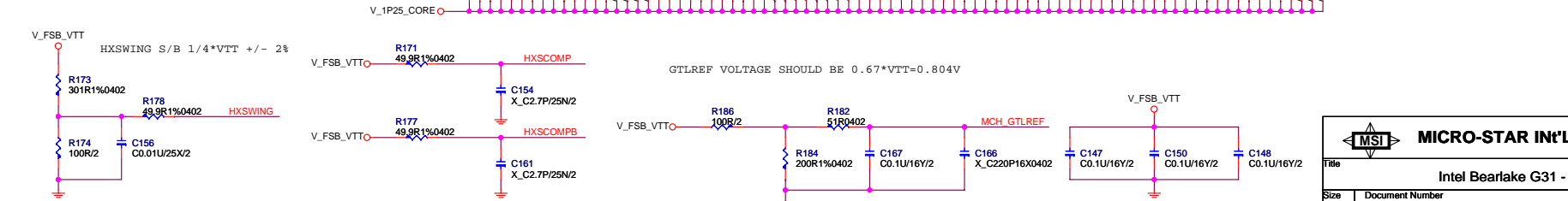
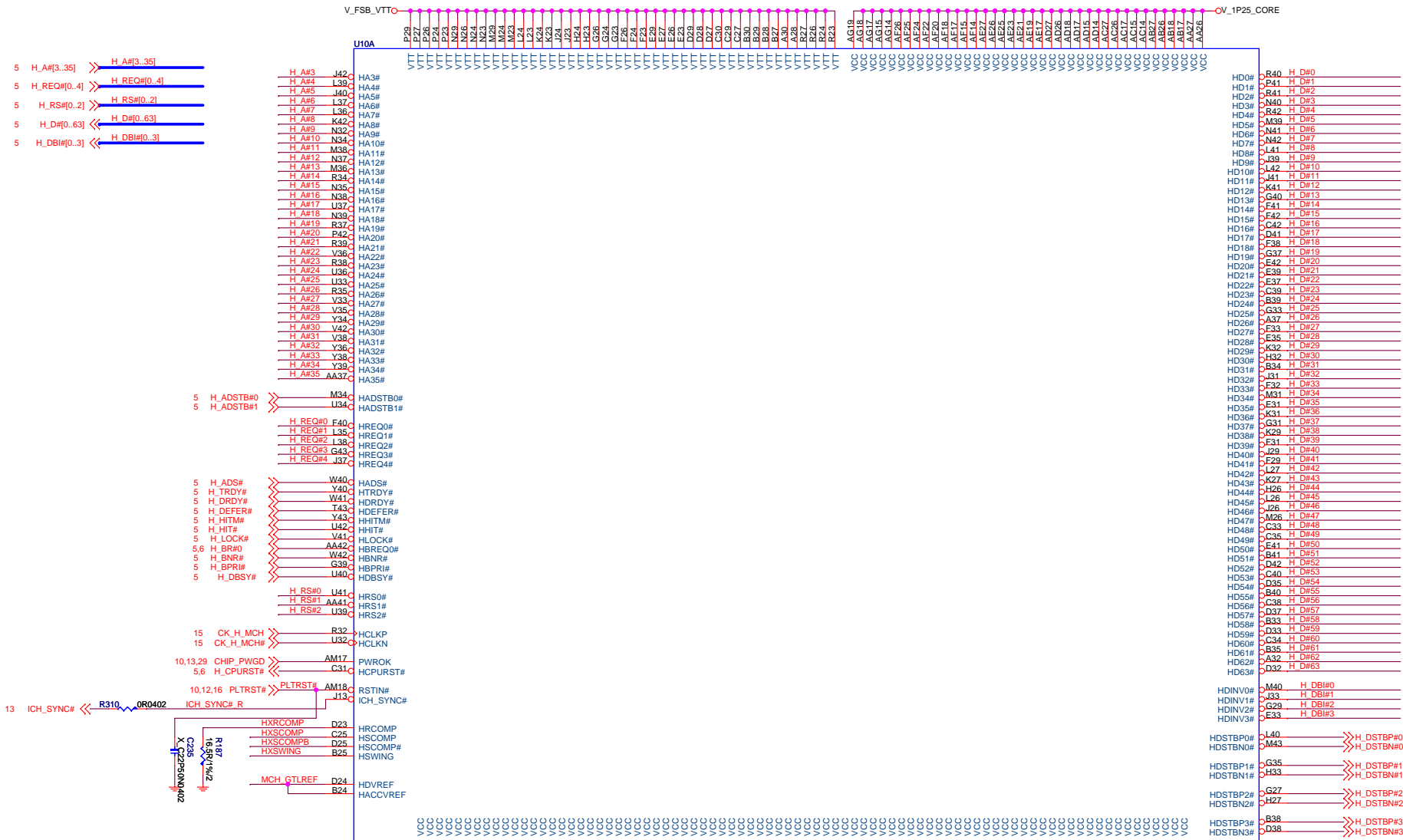
PLACE COMPONENTS AS CLOSE AS POSSIBLE TO PROCESSOR SOCKET  
TRACE WIDTH TO CAPS MUST BE NO SMALLER THAN 12MILS



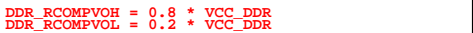
VTT\_PWG SPEC :  
High > 0.9V  
Low < 0.3V  
Trise < 150ns

<b>MICRO-STAR INT'L CO., LTD.</b>		
Title: Intel LGA775 CPU - Power		
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Title	
Intel LGA775 CPU - GND	
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V\_1P25\_CORE

Close to MCH A.S.A.P

V\_1P25\_CORE

U10C

12 DMI\_MCH\_IT\_MR\_0\_DP  
12 DMI\_MCH\_IT\_MR\_0\_DN  
12 DMI\_MCH\_IT\_MR\_1\_DP  
12 DMI\_MCH\_IT\_MR\_1\_DN  
12 DMI\_MCH\_IT\_MR\_2\_DP  
12 DMI\_MCH\_IT\_MR\_2\_DN  
12 DMI\_MCH\_IT\_MR\_3\_DP  
12 DMI\_MCH\_IT\_MR\_3\_DN

W2 DMI\_RXP0  
V2 DMI\_RXN0  
Y2 DMI\_RXP1  
Y9 DMI\_RXN1  
AA7 DMI\_RXP2  
AA6 DMI\_RXN2  
AA4 DMI\_RXP3  
AA4 DMI\_RXN3

15 CK\_PE\_100M\_MCH  
15 CK\_PE\_100M\_MCH#

B12 GCLKP  
B13 GCLKN

22 SDVO\_CTRL\_DATA  
22 SDVO\_CTRL\_CLK

G17 SDVO\_CTRL\_DATA  
E17 SDVO\_CTRL\_CLK

15,16 H\_BSL0  
15,16 H\_BSL1  
15,16 H\_BSL2

G20 BSEL0  
J20 BSEL1  
J18 BSEL2

EXP\_SLR: PCI Express  
Static Lane Reversal  
0: BTX 1: ATX

V\_1P25\_CORE  
22 EXP\_PRSNT\_N

R193 1K0402 EXP\_SLR  
R191 0R0402 EXP\_EN

Stuff 0-ohm for P31

V\_1P25\_CORE

R482 X 0R0402

CP33

VCC3

B17

VCC3\_3

VSS

VCC3

VCC3\_3

VCC3

VCC3\_3

VCC3

VCC3\_3

VCC3

VCC3\_3

VCC3

VCC3\_3

VCC3

VCC3\_3

VCC3

VCC3\_3

VCC3

VCC3\_3

VCC3

VCC3\_3

VCC3

VCC3\_3

VCC3

VCC3\_3

F15 EXP\_RXP0

G15 EXP\_RXN0

K15 EXP\_RXP1

F15 EXP\_RXN1

E12 EXP\_RXP2

E12 EXP\_RXN2

J12 EXP\_RXP3

H12 EXP\_RXN3

H11 EXP\_RXP4

H11 EXP\_RXN4

F7 EXP\_RXP5

F7 EXP\_RXN5

E8 EXP\_RXP6

E8 EXP\_RXN6

C2 EXP\_RXP7

C2 EXP\_RXN7

D2 EXP\_RXP8

D2 EXP\_RXN8

G8 EXP\_RXP9

G8 EXP\_RXN9

L8 EXP\_RXP10

L8 EXP\_RXN10

M4 EXP\_RXP11

M4 EXP\_RXN11

L4 EXP\_RXP12

L4 EXP\_RXN12

R9 EXP\_RXP13

R9 EXP\_RXN13

R10 EXP\_RXP14

R10 EXP\_RXN14

T4 EXP\_RXP15

T4 EXP\_RXN15

R4 EXP\_RXP15

R4 EXP\_RXN15

R7 EXP\_RXP15

R7 EXP\_RXN15

R7 EXP\_RXP15

R7 EXP\_RXN15

R7 EXP\_RXP15

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R7 EXP\_RXP15

R7 EXP\_RXN15

R7 EXP\_RXP15

R7 EXP\_RXN15

F15 EXP\_RXP0

G15 EXP\_RXN0

K15 EXP\_RXP1

F15 EXP\_RXN1

E12 EXP\_RXP2

E12 EXP\_RXN2

J12 EXP\_RXP3

H12 EXP\_RXN3

H11 EXP\_RXP4

H11 EXP\_RXN4

F7 EXP\_RXP5

F7 EXP\_RXN5

E8 EXP\_RXP6

E8 EXP\_RXN6

C2 EXP\_RXP7

C2 EXP\_RXN7

D2 EXP\_RXP8

D2 EXP\_RXN8

G8 EXP\_RXP9

G8 EXP\_RXN9

L8 EXP\_RXP10

L8 EXP\_RXN10

M4 EXP\_RXP11

M4 EXP\_RXN11

L4 EXP\_RXP12

L4 EXP\_RXN12

R9 EXP\_RXP13

R9 EXP\_RXN13

R10 EXP\_RXP14

R10 EXP\_RXN14

T4 EXP\_RXP15

T4 EXP\_RXN15

R4 EXP\_RXP15

R4 EXP\_RXN15

R7 EXP\_RXP15

R7 EXP\_RXN15

R7 EXP\_RXP15

R7 EXP\_RXN15

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R7 EXP\_RXN15

R7 EXP\_RXP15

R7 EXP\_RXN15

R7 EXP\_RXP15

R7 EXP\_RXN15

F15 EXP\_RXP0

G15 EXP\_RXN0

K15 EXP\_RXP1

F15 EXP\_RXN1

E12 EXP\_RXP2

E12 EXP\_RXN2

J12 EXP\_RXP3

H12 EXP\_RXN3

H11 EXP\_RXP4

H11 EXP\_RXN4

F7 EXP\_RXP5

F7 EXP\_RXN5

E8 EXP\_RXP6

E8 EXP\_RXN6

C2 EXP\_RXP7

C2 EXP\_RXN7

D2 EXP\_RXP8

D2 EXP\_RXN8

G8 EXP\_RXP9

G8 EXP\_RXN9

L8 EXP\_RXP10

L8 EXP\_RXN10

M4 EXP\_RXP11

M4 EXP\_RXN11

L4 EXP\_RXP12

L4 EXP\_RXN12

R9 EXP\_RXP13

R9 EXP\_RXN13

R10 EXP\_RXP14

R10 EXP\_RXN14

T4 EXP\_RXP15

T4 EXP\_RXN15

R4 EXP\_RXP15

R4 EXP\_RXN15

R7 EXP\_RXP15

R7 EXP\_RXN15

R7 EXP\_RXP15

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R7 EXP\_RXN15

R7 EXP\_RXP15

R7 EXP\_RXN15

F15 EXP\_RXP0

G15 EXP\_RXN0

K15 EXP\_RXP1

F15 EXP\_RXN1

E12 EXP\_RXP2

E12 EXP\_RXN2

J12 EXP\_RXP3

H12 EXP\_RXN3

H11 EXP\_RXP4

H11 EXP\_RXN4

F7 EXP\_RXP5

F7 EXP\_RXN5

E8 EXP\_RXP6

E8 EXP\_RXN6

C2 EXP\_RXP7

C2 EXP\_RXN7

D2 EXP\_RXP8

D2 EXP\_RXN8

G8 EXP\_RXP9

G8 EXP\_RXN9

L8 EXP\_RXP10

L8 EXP\_RXN10

M4 EXP\_RXP11

M4 EXP\_RXN11

L4 EXP\_RXP12

L4 EXP\_RXN12

R9 EXP\_RXP13

R9 EXP\_RXN13

R10 EXP\_RXP14

R10 EXP\_RXN14

T4 EXP\_RXP15

T4 EXP\_RXN15

R4 EXP\_RXP15

R4 EXP\_RXN15

R7 EXP\_RXP15

R7 EXP\_RXN15

R7 EXP\_RXP15

R7 EXP\_RXN15

R7 EXP\_RXP15

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R7 EXP\_RXP15

R7 EXP\_RXN15

R7 EXP\_RXP15

R7 EXP\_RXN15

R7 EXP\_RXP15

R7 EXP\_RXN15

F15 EXP\_RXP0

G15 EXP\_RXN0

K15 EXP\_RXP1

F15 EXP\_RXN1

E12 EXP\_RXP2

E12 EXP\_RXN2

J12 EXP\_RXP3

H12 EXP\_RXN3

H11 EXP\_RXP4

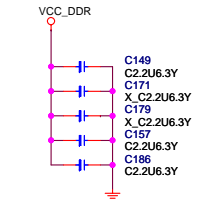
H11 EXP\_RXN4

F7 EXP\_RXP5

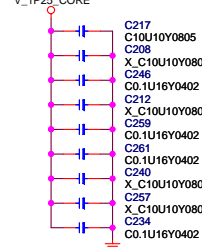
F7 EXP\_RXN5



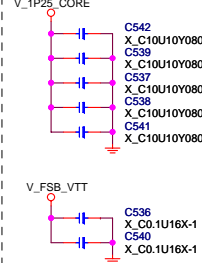
Place close to GMCH




MCH CORE DECOUPLING



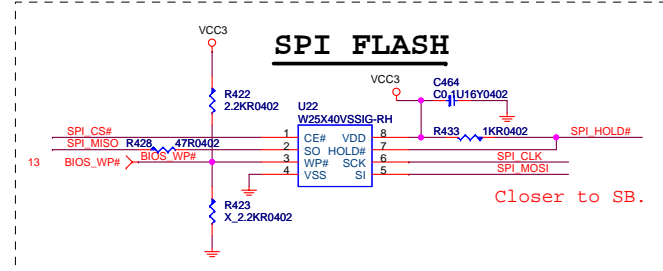
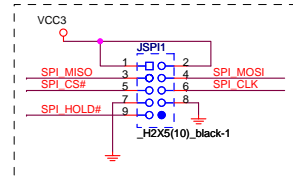
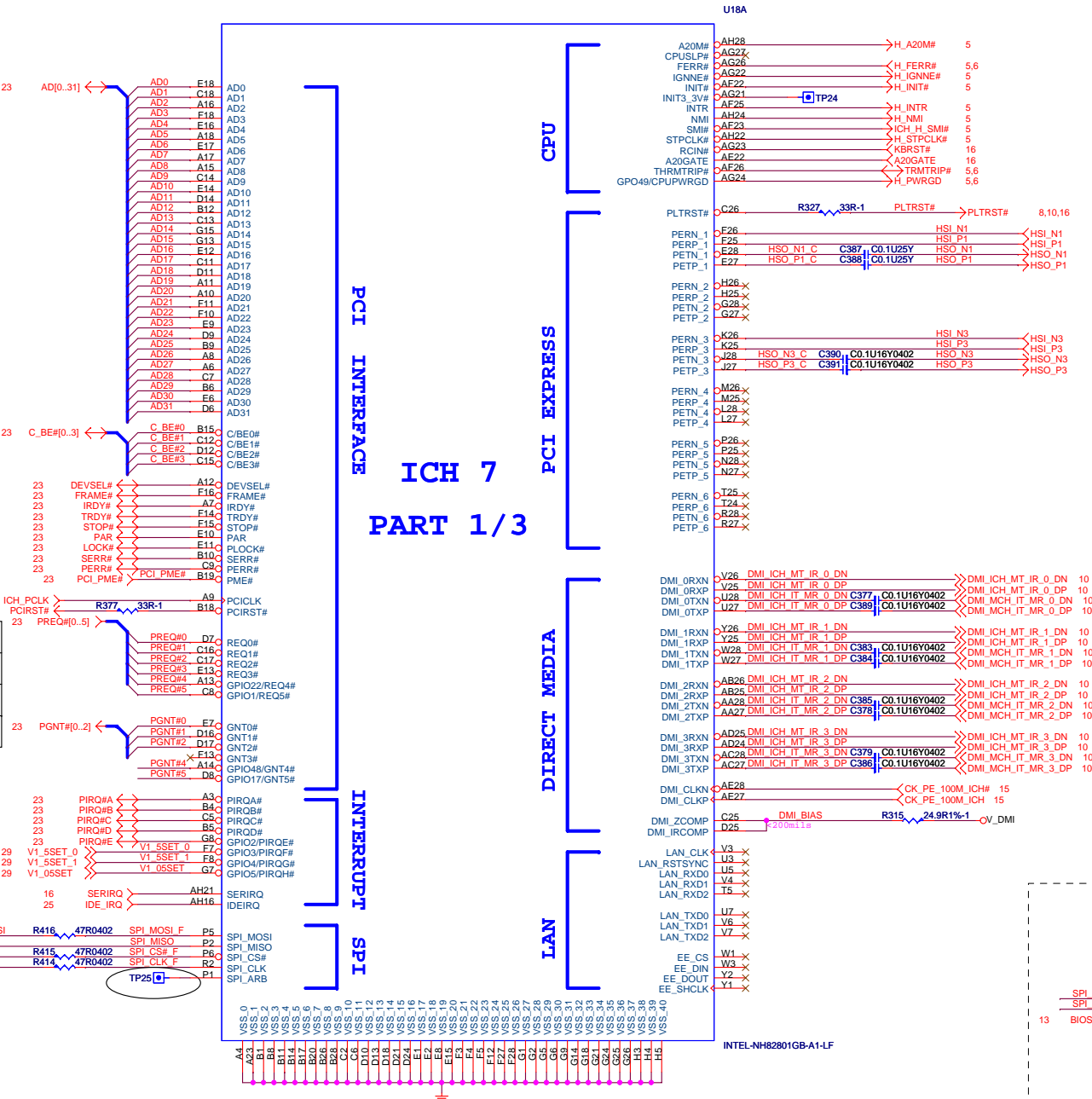
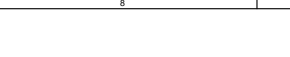
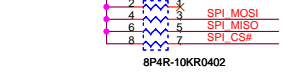
5020 Parts

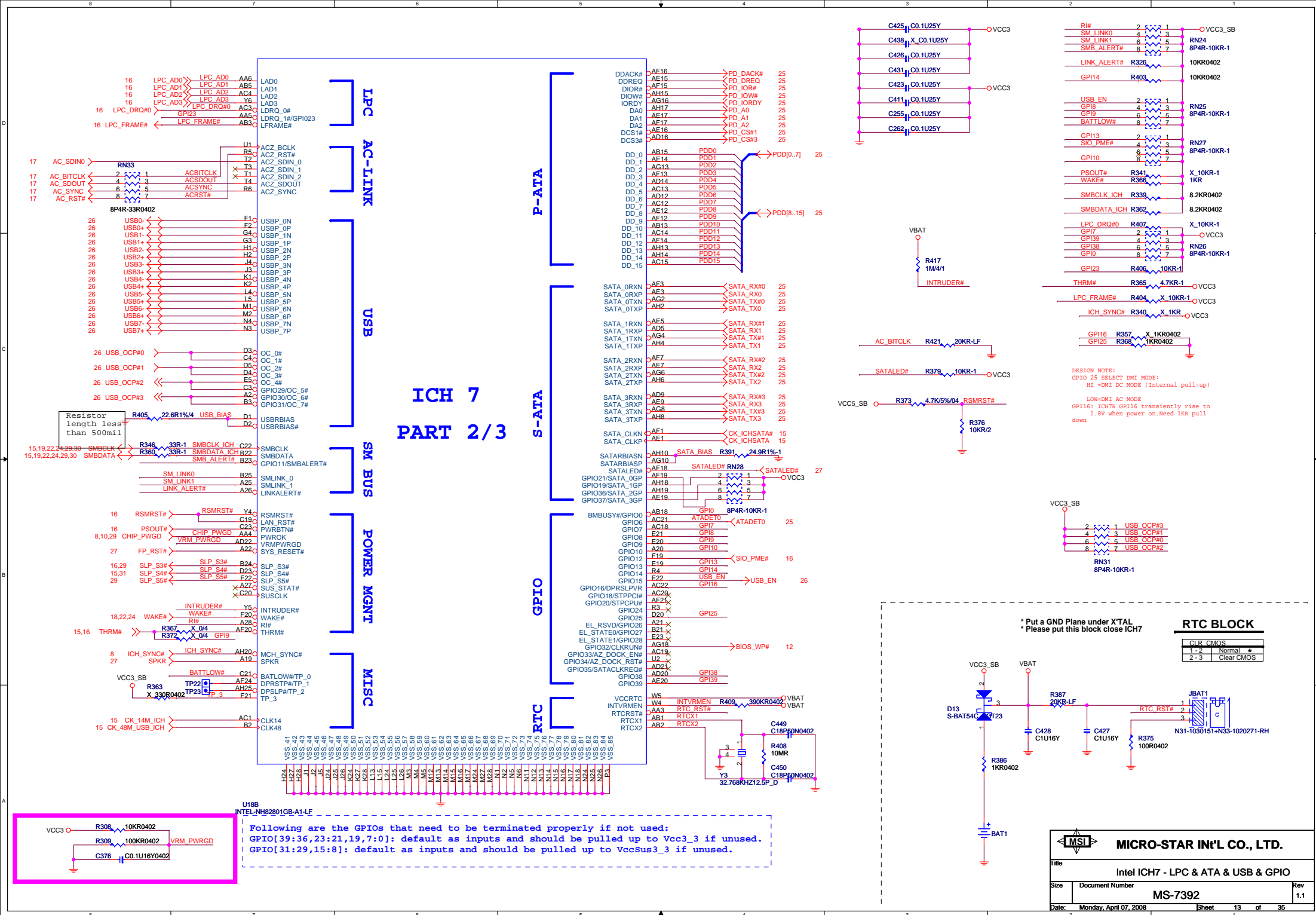


INTEL-NR88BOBVBVA[G31]-A1-RH

 <b>MICRO-STAR INT'L CO., LTD.</b>			
Title Intel Bearlake G31 - CPU Signals			
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GNT5#	GNT4#	ROUTING
0	1	Flash Cycles Routed to SPI
1	0	Flash Cycles Routed to PCI
1	1	Flash Cycles Routed to LPC

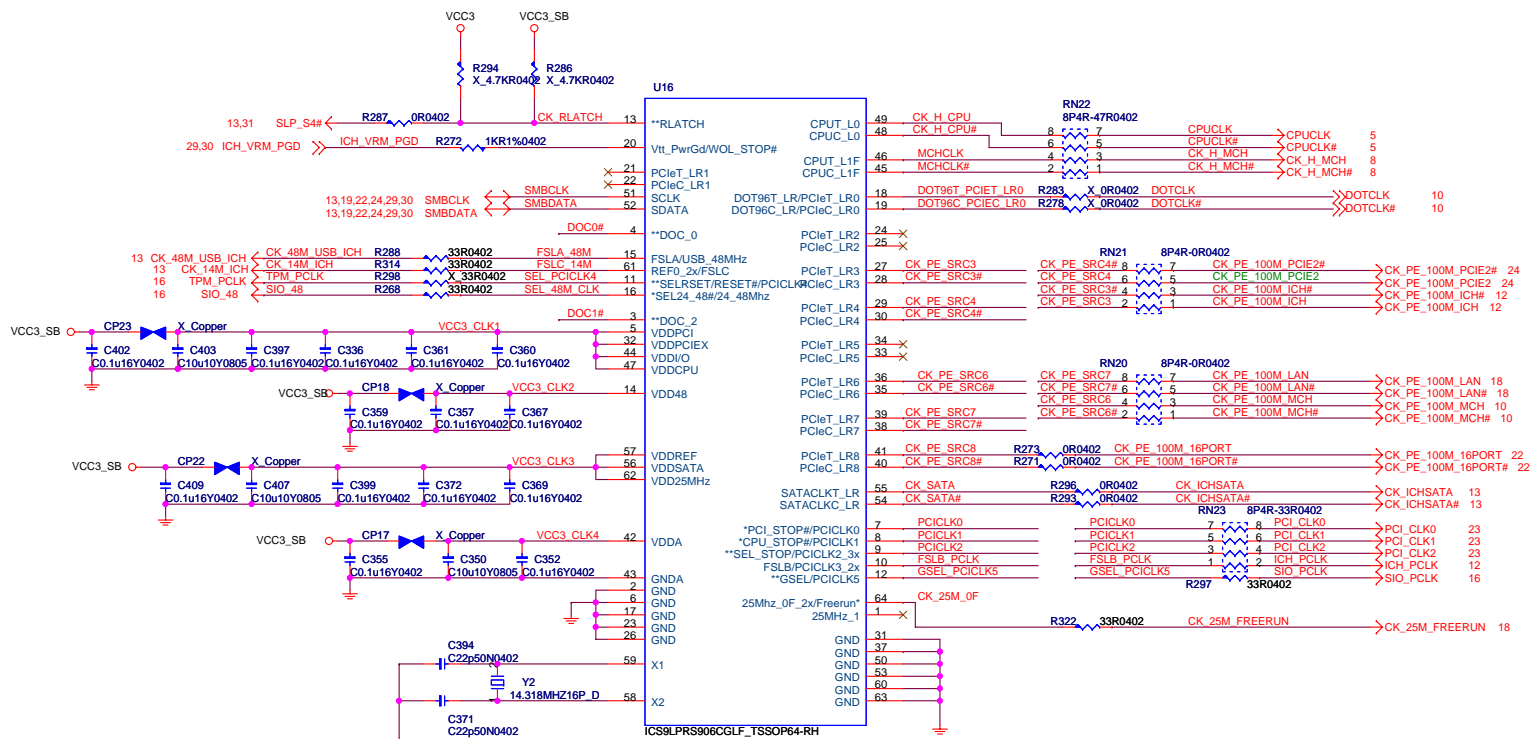




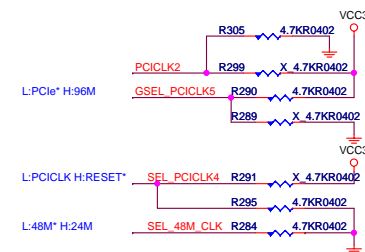




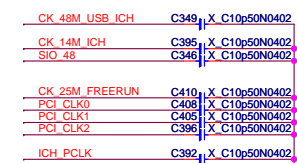
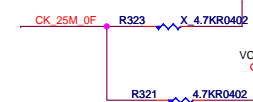
## Clock Generator - ICS9LPRS906CGLF



## CLOCK GEN STRAPING



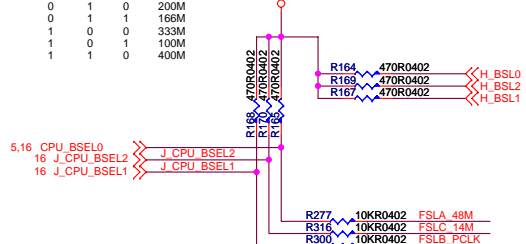
25MHz freerun function



### CPU Frequency Selection

FS_C	FS_B	FS_A	CPU
0	0	0	266M
0	0	1	133M
0	1	0	200M
0	1	1	166M
1	0	0	333M
1	0	1	100M
1	1	0	400M

V\_FSB\_VTT



JFSR1

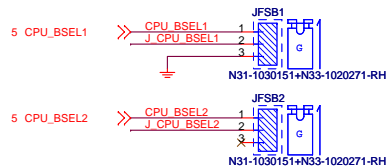
```
Plug 1--2
200MHZ-->200MHZ
Plug 2--3
200MHZ-->266MHZ
```

JFSR2

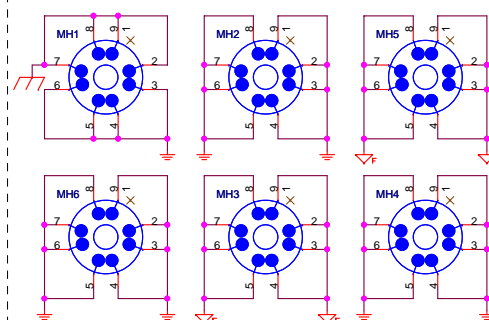
```
Plug 1--2
266MHZ-->266MHZ
Plug 2--3
266MHZ-->333MHZ
```

JFSB1

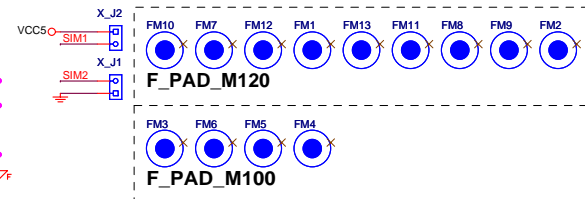
Open  
JFSB2  
or 2--3 or Open  
HZ-->400MHZ



## Mounting Holes



### Optics Orientation Holes



## For 400MHz CPU Support

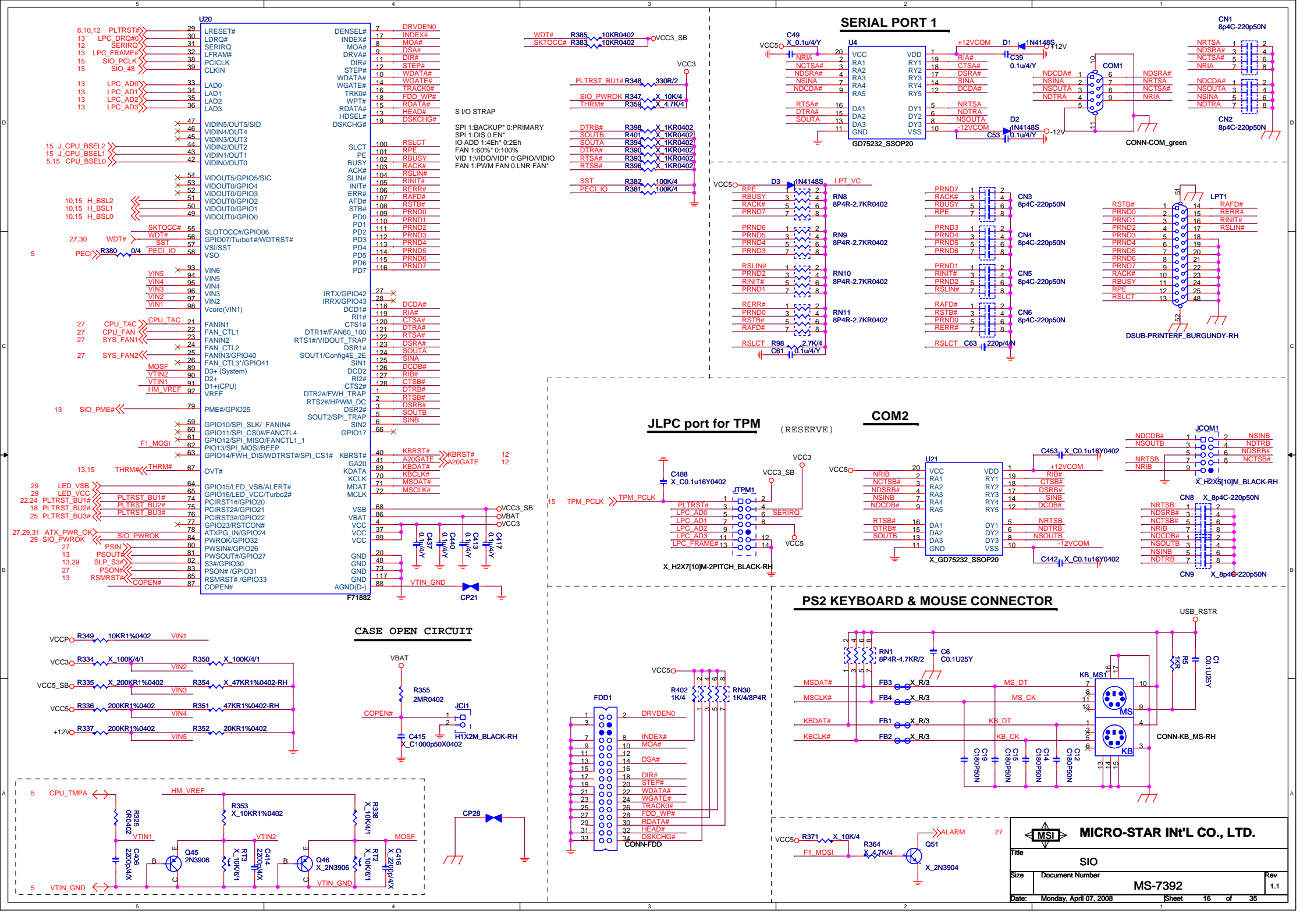

**MICRO-STAR INT'L CO., LTD.**

Title	Clock - ICS91PRS514EGLF
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Size	Document Number
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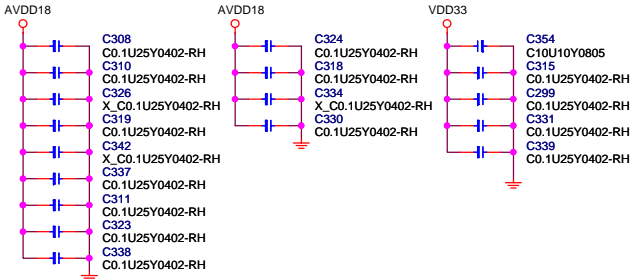
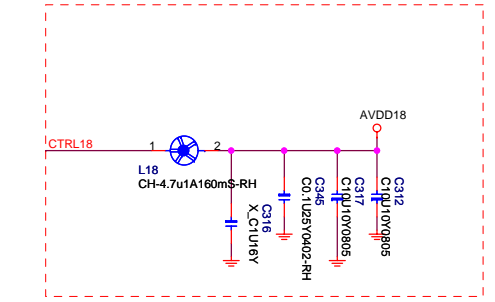
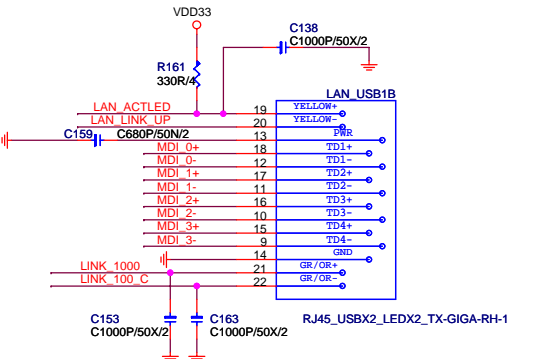
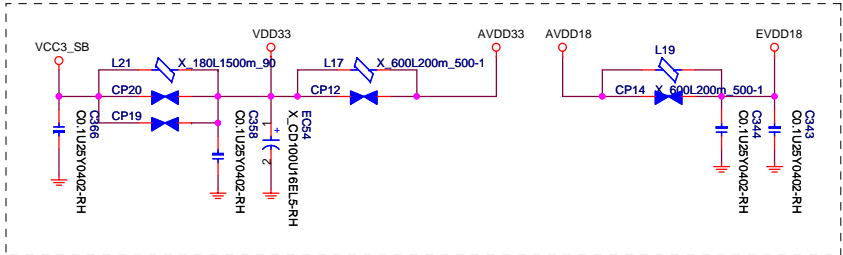
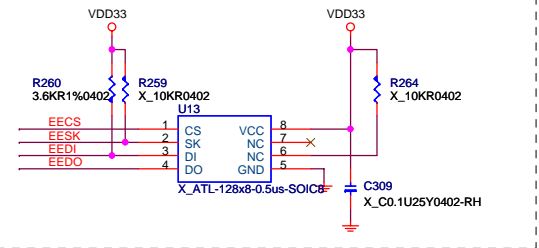
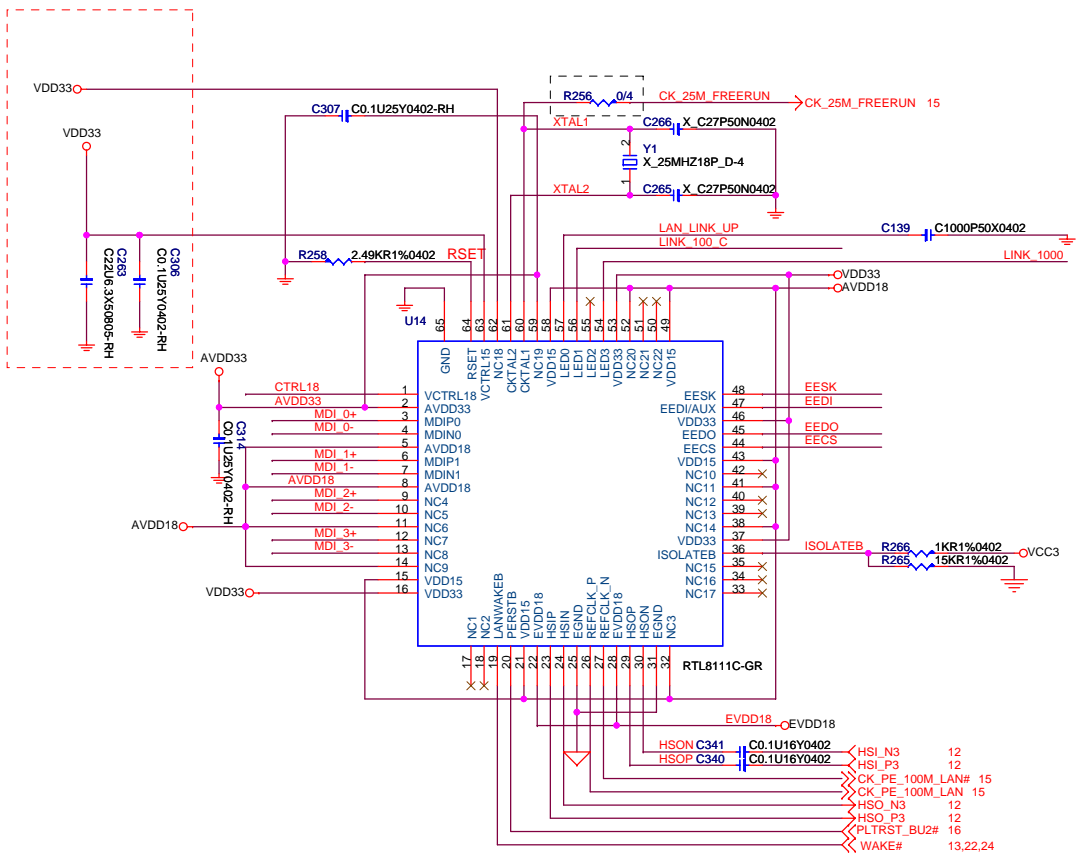
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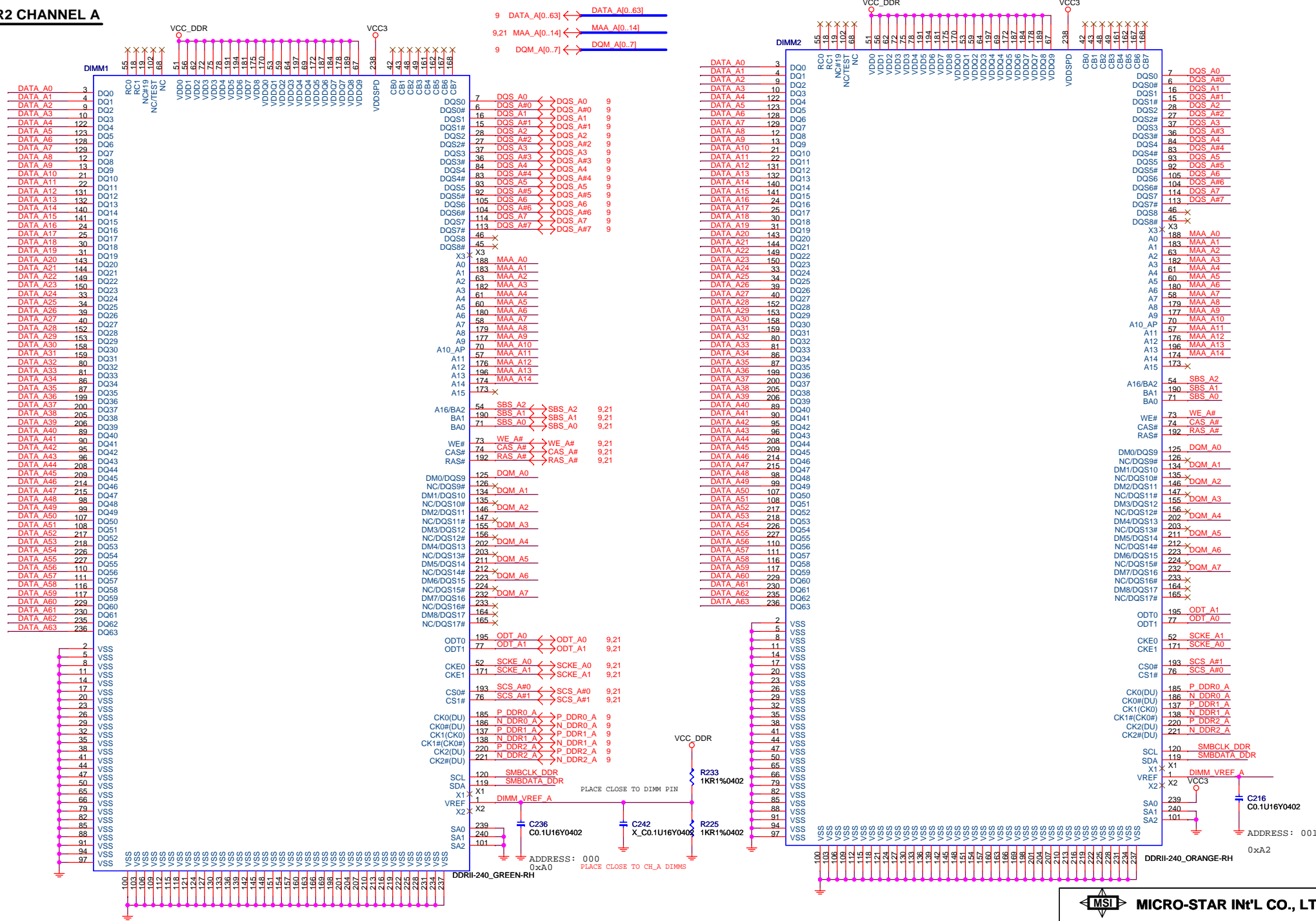




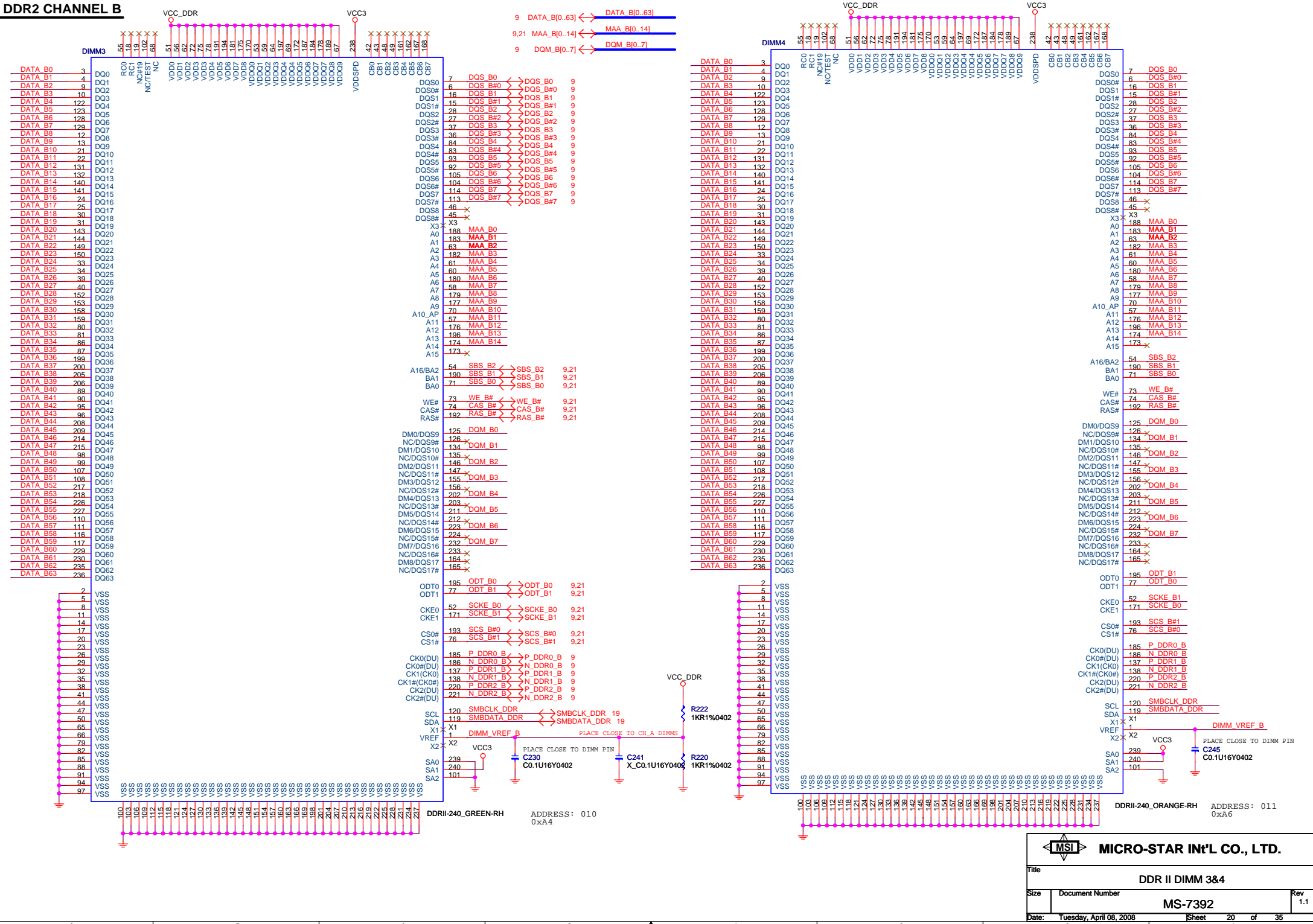


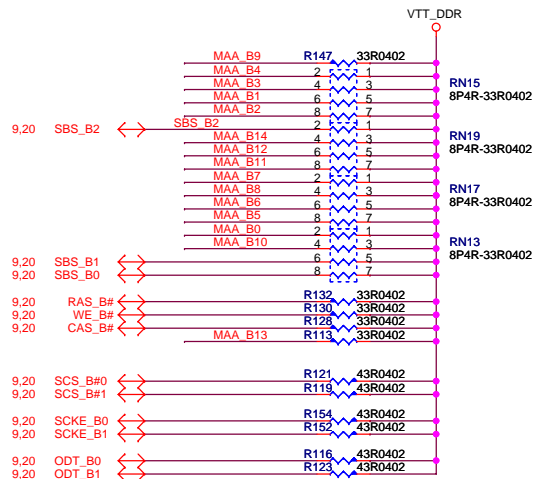
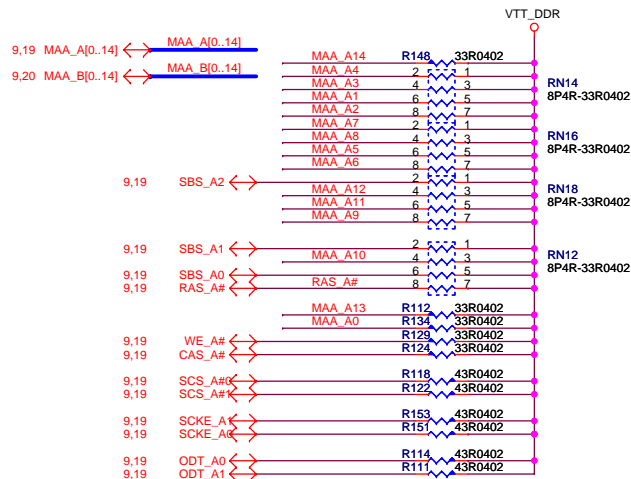
Giga-Lan		10/100-Lan	
N58-22F0181-S42		N58-22F0201-S42	
Link	Yellow	Link	Yellow
Active	Blinking	Active	Blinking
1000	Orange	100	Green
100	Green	10	None
10	None		
19		19	
20	Yellow	20	Yellow
21	Orange	21	
22	Green	22	Green

## DDR2 CHANNEL A

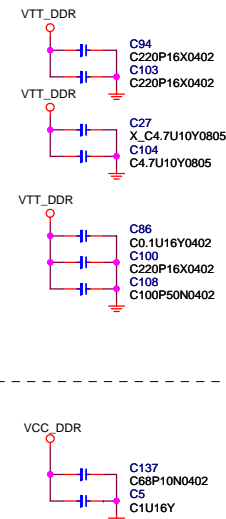


DDR2 CHANNEL B

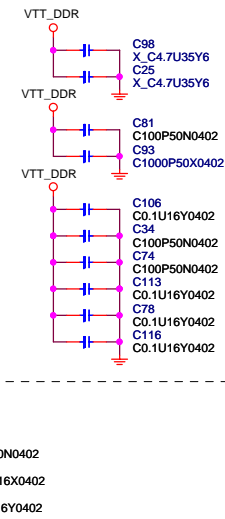




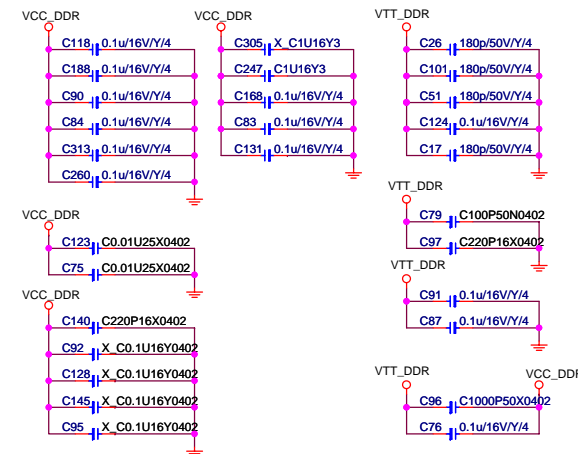
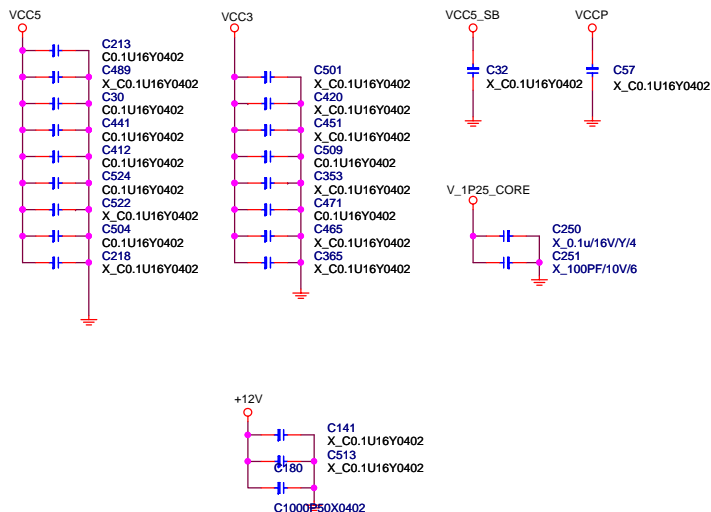
CHANNEL A V\_SM\_VTT DECOUPLING CAPS



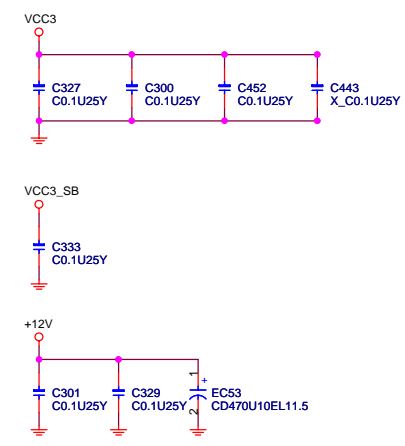
CHANNEL B V\_SM\_VTT DECOUPLING CAPS



**FOR EMI RESERVED**

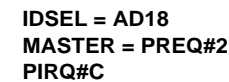


**FOR EMI RESERVED**

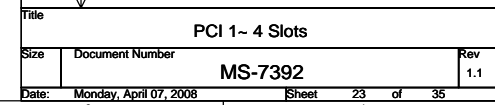
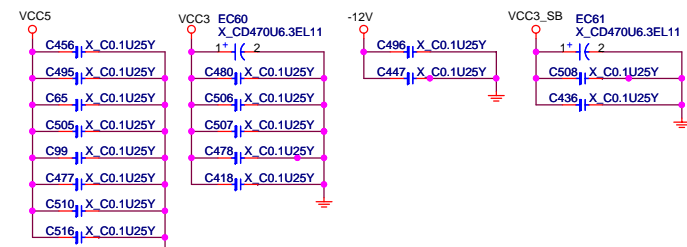




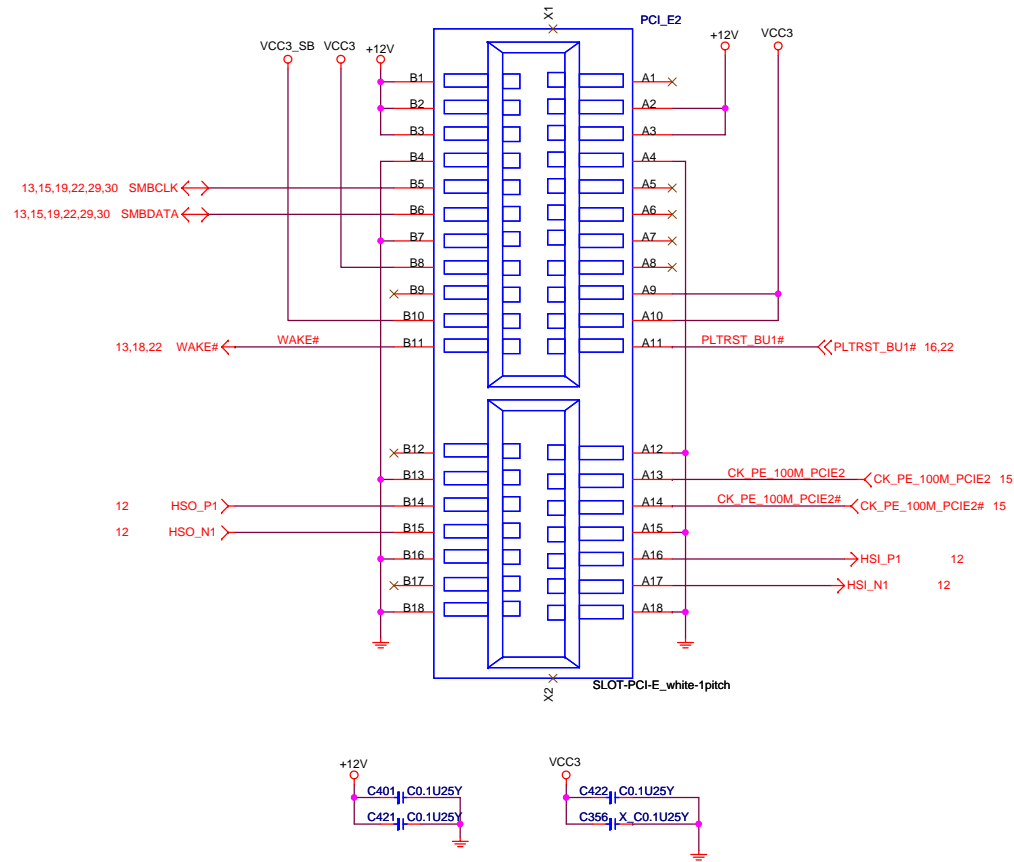
**PCI SLOT 3 (PCI VER: 2.2 COMPLY)**



## PCI SLOT DECOUPLING CAPACITORS

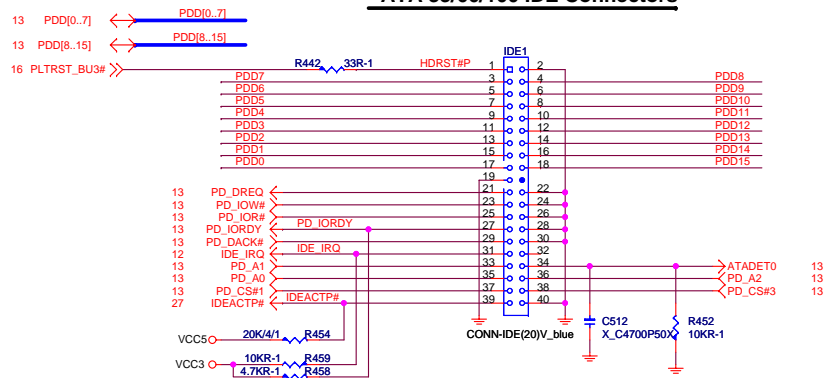


# PCI EXPRESS 1-PORT

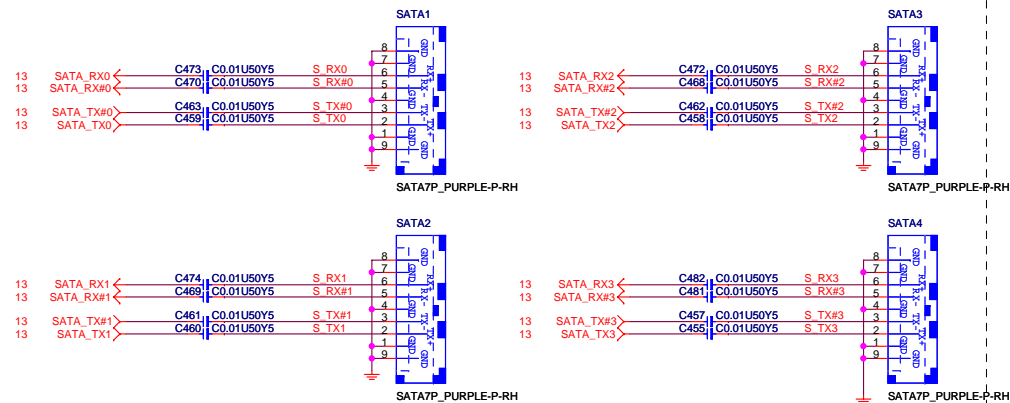




## ATA 33/66/100 IDE Connectors



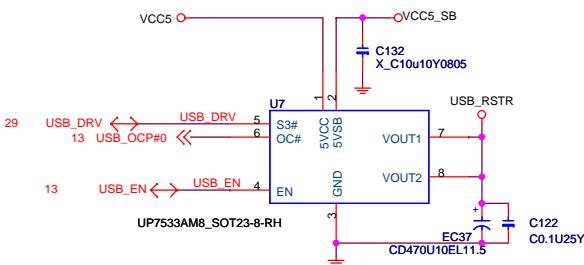
## SERIAL ATA CONNECTOR BLOCK



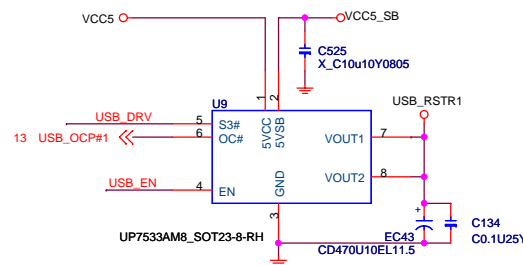
**MICRO-STAR INT'L CO., LTD.**

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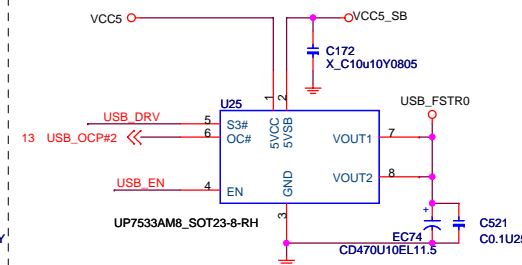
## POWER CIRCUIT FOR USB PORT 0,1



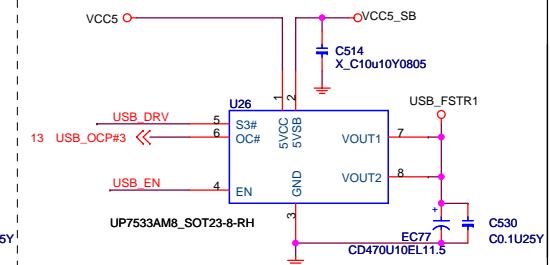
## POWER CIRCUIT FOR USB PORT 2,3



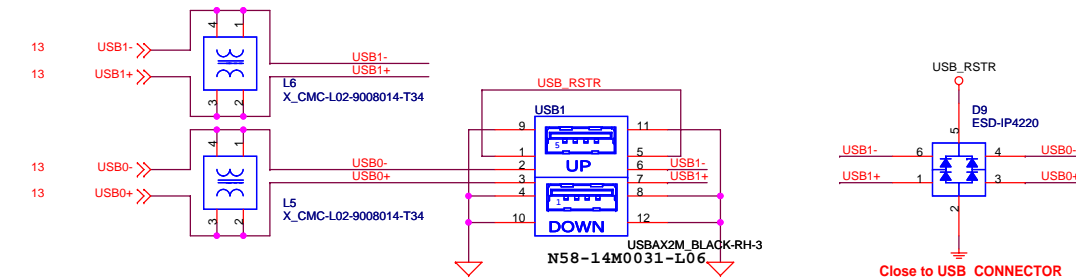
## POWER CIRCUIT FOR USB PORT 4,5



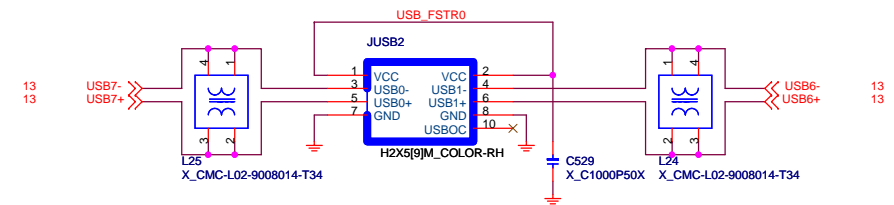
## POWER CIRCUIT FOR USB PORT 6,7



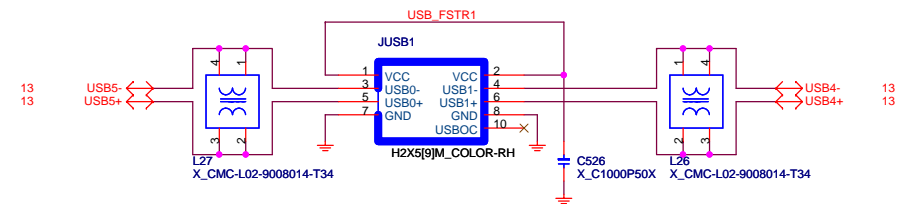
## REAR PANEL USB CONNECTOR FOR USB PORT 0,1



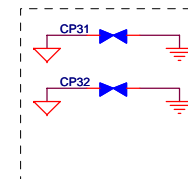
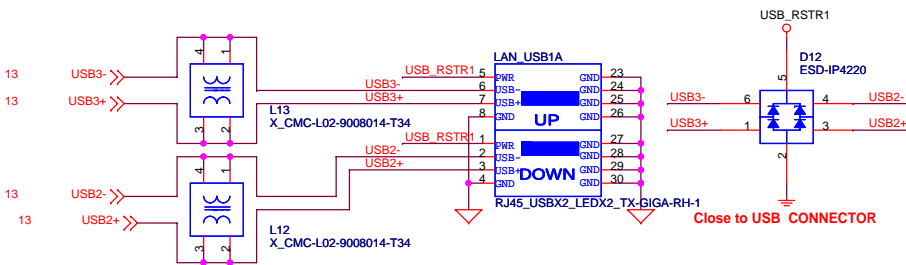
## FRONT PANEL USB CONNECTOR FOR USB PORT 6,7



## FRONT PANEL USB CONNECTOR FOR USB PORT 4,5



## REAR PANEL USB CONNECTOR FOR USB PORT 2,3

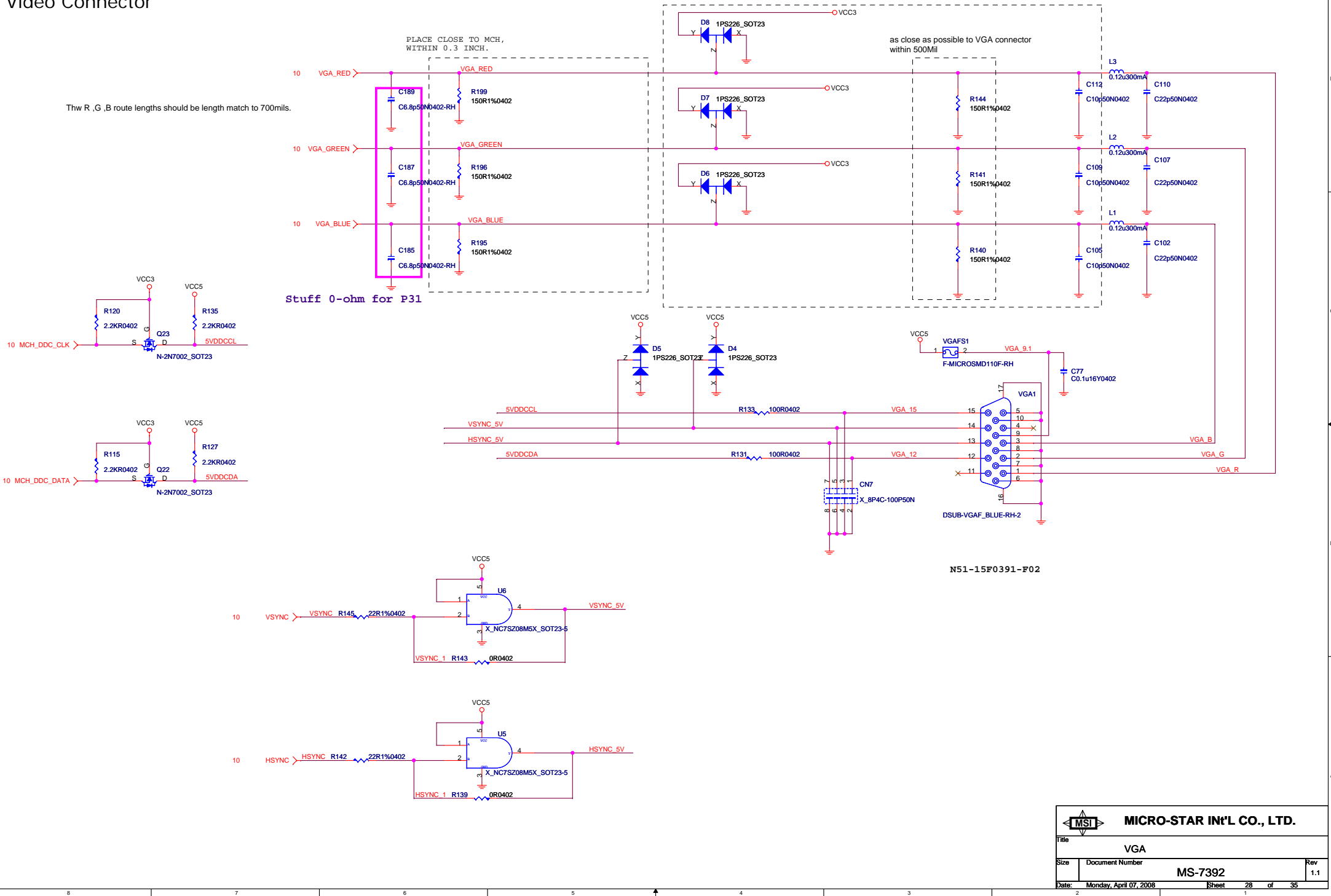


MICRO-STAR INT'L CO., LTD.

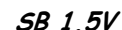
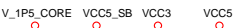
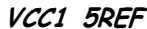
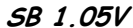
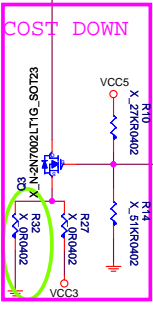
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USB Connectors			
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# Video Connector



## COST DOWN



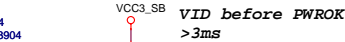
```

V1_5SET_0=0    V1_5SET_1=0
V1_5SET_0=1    V1_5SET_1=0
V1_5SET_0=0    V1_5SET_1=1
V1_5SET_0=1    V1_5SET_1=1

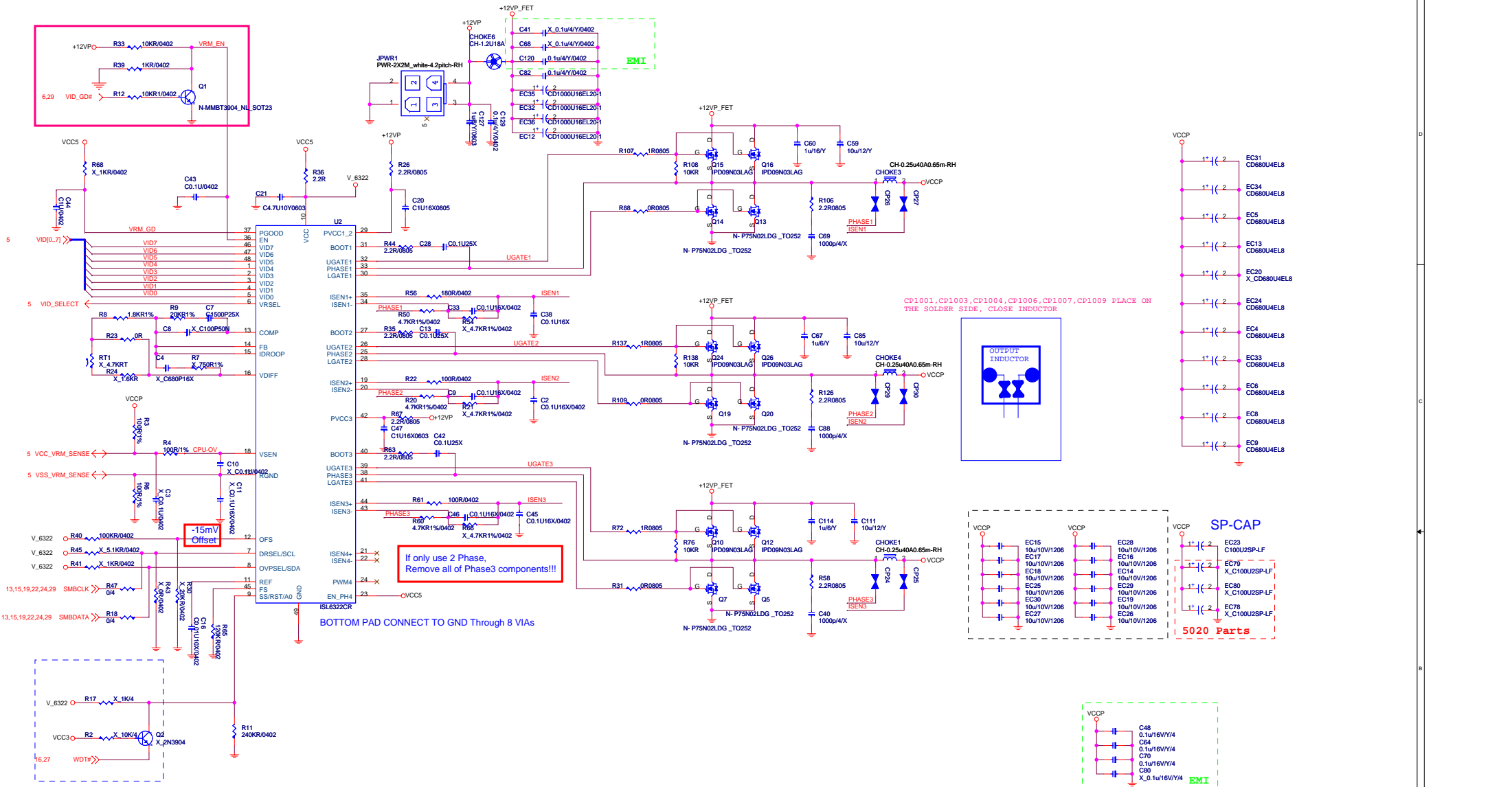
```



**PWROK DELAY 100ms**

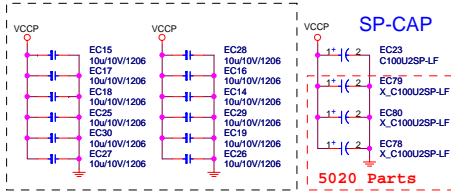
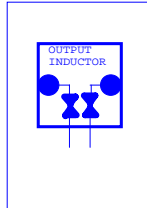


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ACPI CONTROLLER UPI			
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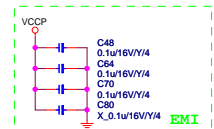
If only use 2 Phase,  
Remove all of Phase3 components!!!

BOTTOM PAD CONNECT TO GND Through 8 VIAs



SP-CAP

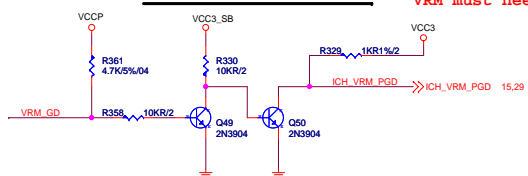
5020 Parts



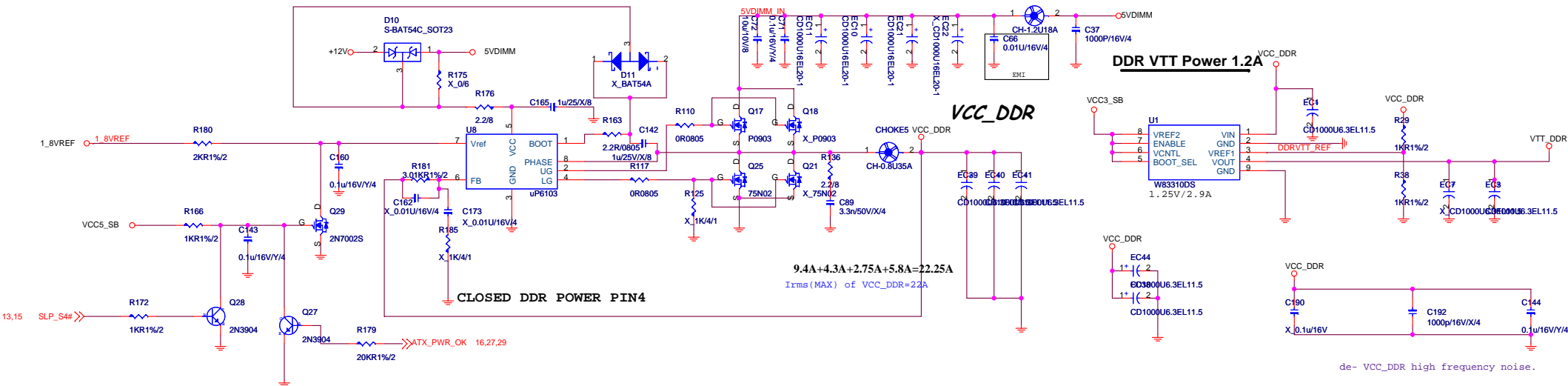
EMI

VRMPWRGD LEVEL SHIFT

For Intel DG  
VRM must need level shift

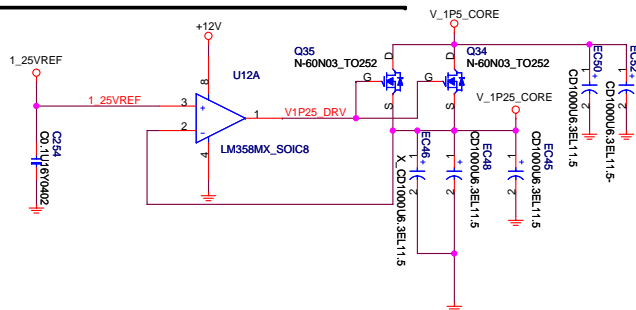


## DDR II 1.8V POWER



## NB 1.25V POWER

**V\_1P25\_CORE 18.1A+2.47A+2.94A**

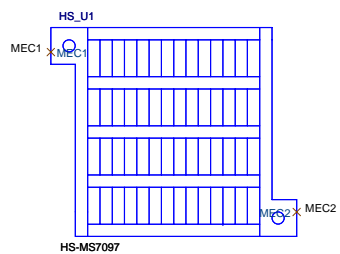


**Auto-BOM Manual Parts**

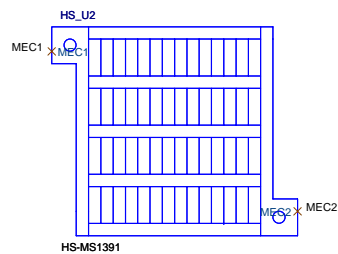
PCB1  
PCB  
PCB-7392

BATTERY1  
BATTERY-CR2032

**P31 HEATSINK**



**ICH7 HEATSINK**



**Auto-BOM Option Parts**

ICH7  
OPT  
X\_ICH7

G31  
OPT  
X\_G31

P31-R1  
OPT  
X\_OR0402

OnVGA1.3  
OPT  
X\_1.3KR1%/2

G31-C1  
OPT  
X\_C0.1U16Y0402



1.0 Change 1.1 list:

- 1. Co-lay G31 add COM2,change LTP to Connect
- 2. change USB power to UPI 7533
- 3. change LAN only to 8111C
- 4. change CLKGEN to 906
- 5. Add OC Jumper
- 6. change clk netname,swapVGA\_ 12/VGA\_ 15 and HSYNC/VSYNC
- 7. remove CP5,CP6,CP21
- 8. Change TestPIN footprint to TPC20B
- 9. Remove SMBus for PCI.
- 10. Rename

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