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# MS-7358 uATX Version: 1.1

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

## System Chipset:

Intel Bearlake - Q35/G33 North Bridge  
Intel ICH9 (DO/DH South Bridge)

## On Board Device:

CLOCK Gen ICS 9LPRS906  
LPC Super I/O -- Fintek F71882F  
LPC TPM -- SLB9635  
LAN -- INTEL NINEVEH/EKRON  
HD Audio Codec -- ALC888  
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

| STD | Bearlake-Q33/ICH9DO | cfg-7358-STD |  |
|-----|---------------------|--------------|--|
|     |                     |              |  |
|     |                     |              |  |
|     |                     |              |  |

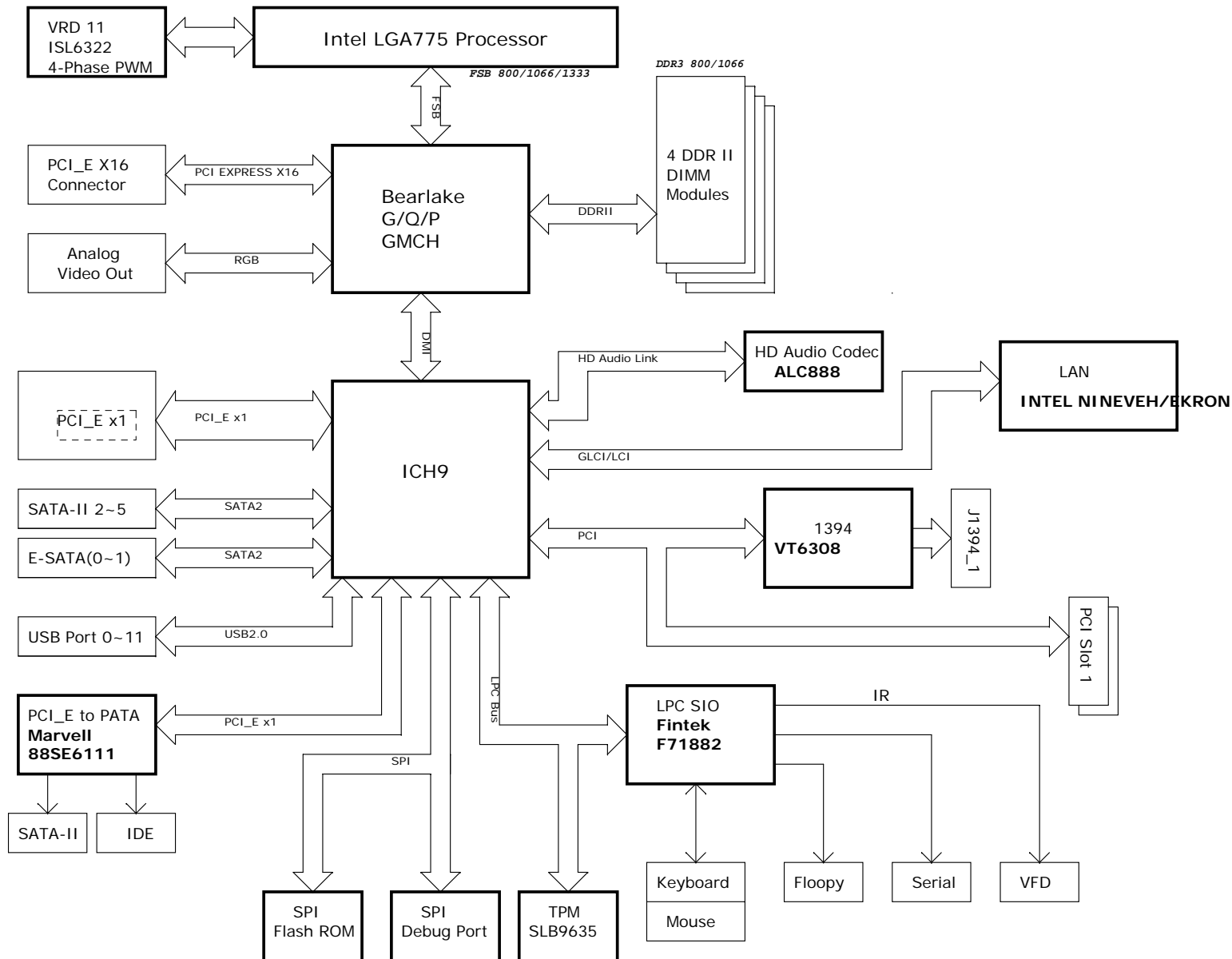


**MICRO-STAR INT'L CO.,LTD**

**MS-7358**

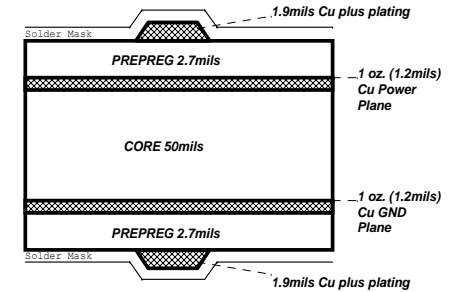
|                             |  |           |
|-----------------------------|--|-----------|
| Size<br>Custom              | Document Description<br><b>COVER SHEET</b> | Rev<br>0A |
| Date: Tuesday, May 08, 2007 | Sheet 1 of 34                              |           |

# Block Diagram



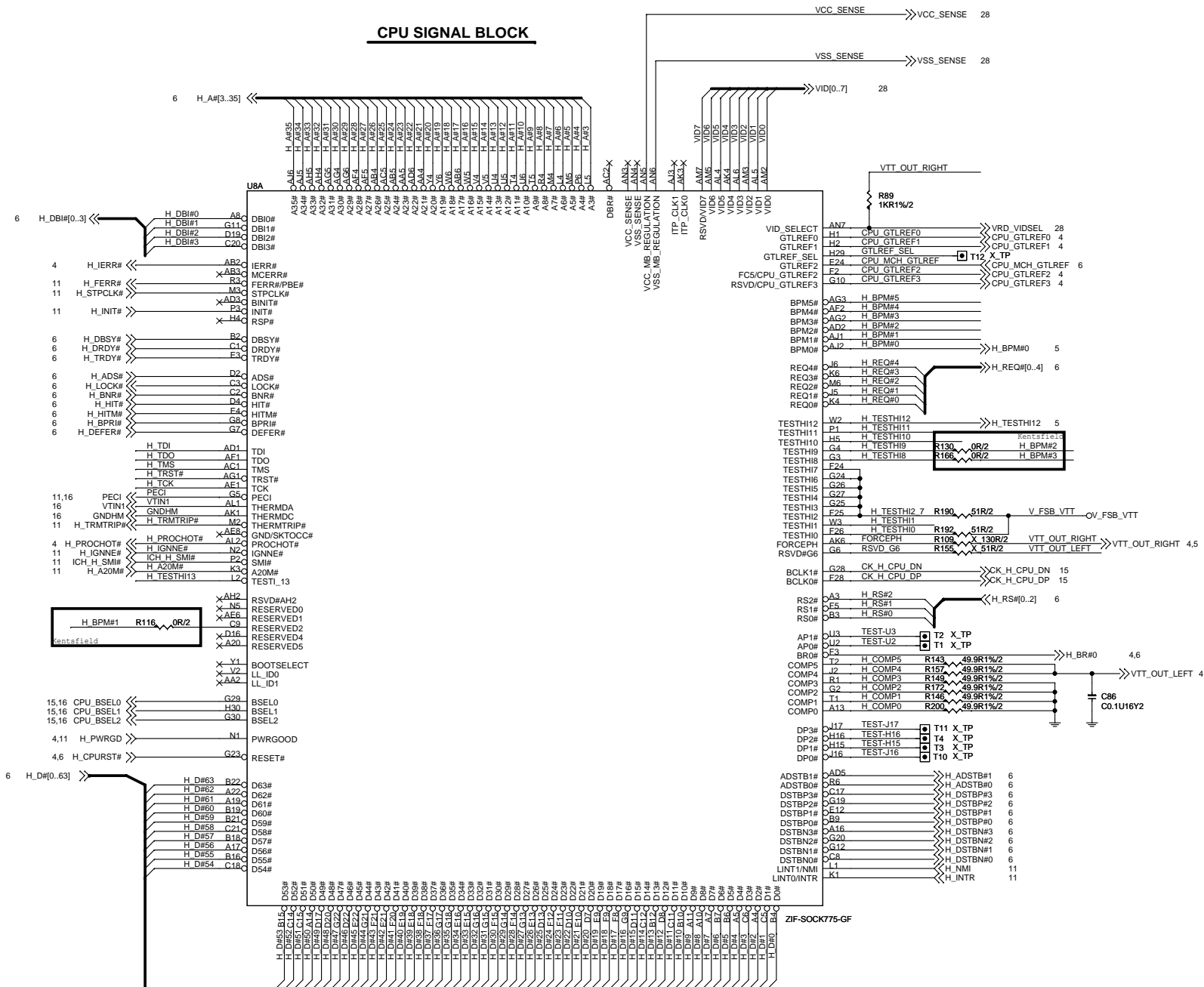
## Board Stack-up

(1080 Prepreg Considerations)

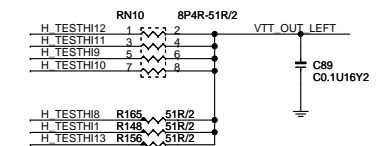
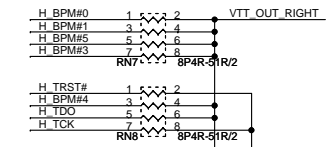
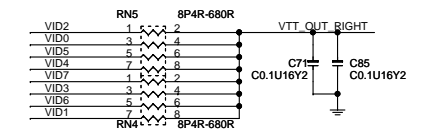


Single End 50ohm Top/Bottom : 4mils  
 USB2.0 - 90ohm : 15/4.5/7.5/4.5/15  
 SATA - 95ohm : 15/4/8/4/15  
 LAN - 100ohm : 15/4/8/4/15  
 PCIE - 95ohm : 15/4/8/4/15  
 IEEE1394 - 110ohm : 15/4/9/4/15  
 IDE : 15/4/8/4/15

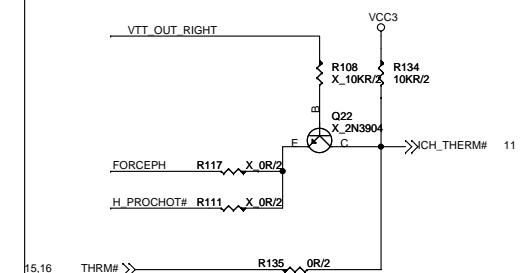
### CPU SIGNAL BLOCK



**PULL HIGHT PULL DOWN**



### Thermal TRIP

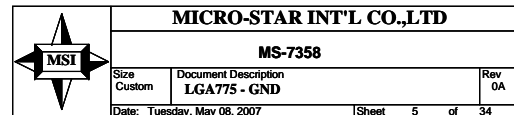


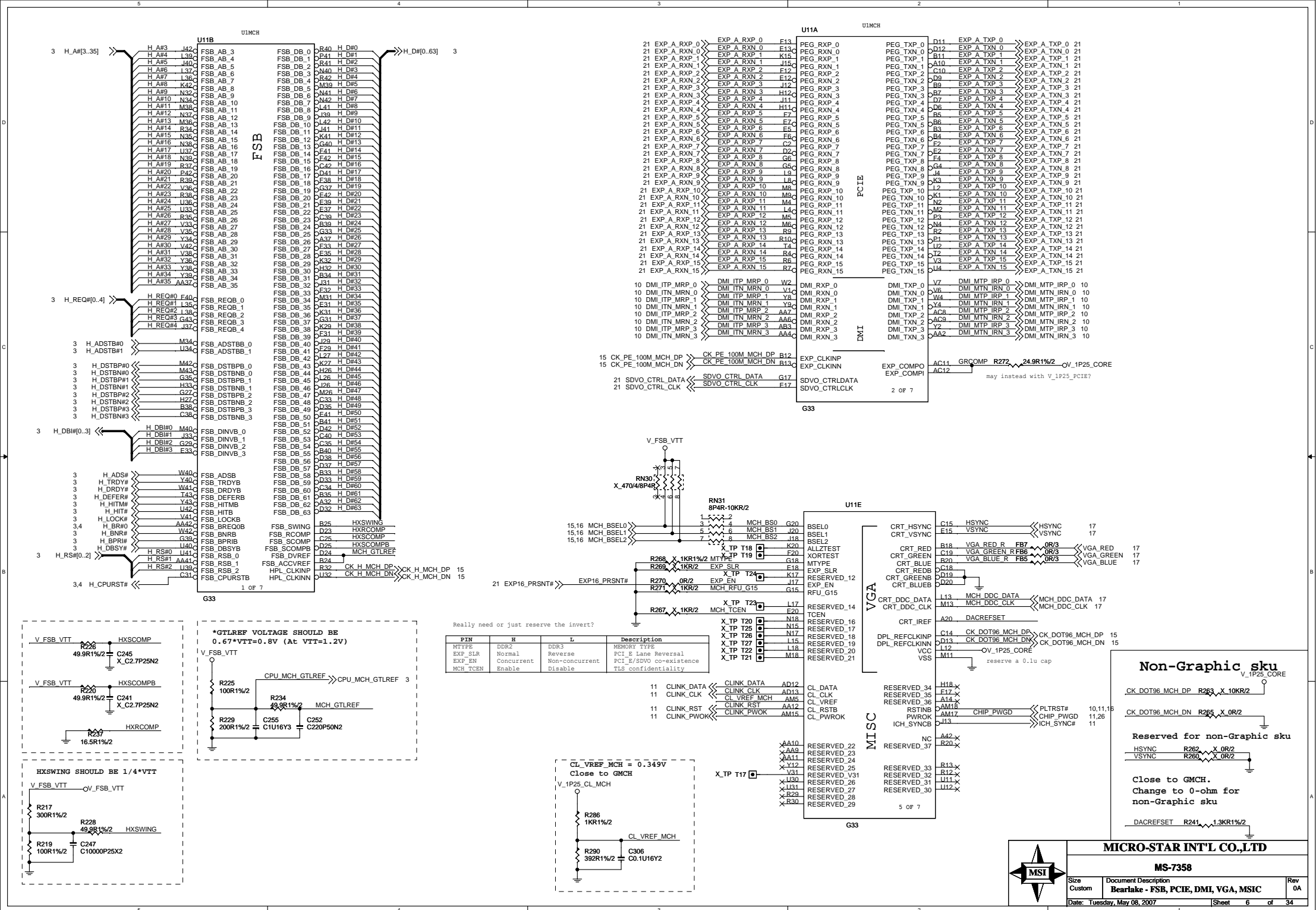
**MICRO-STAR INT'L CO.,LTD**

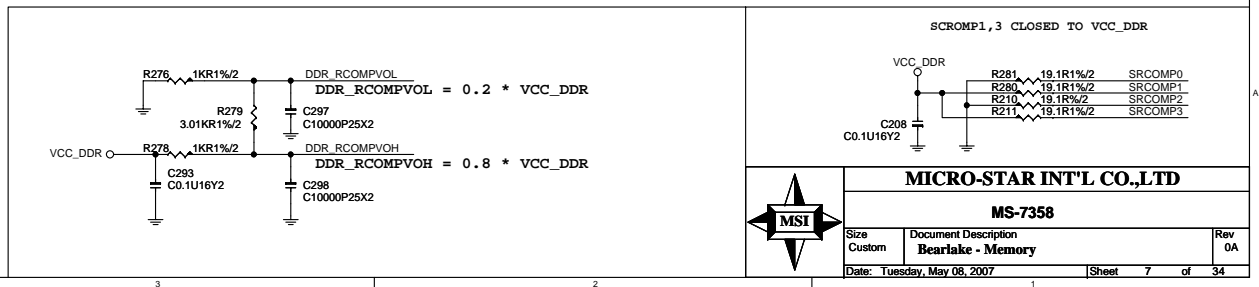
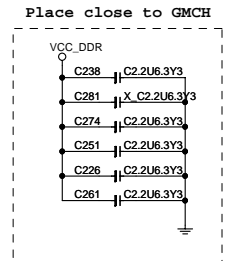
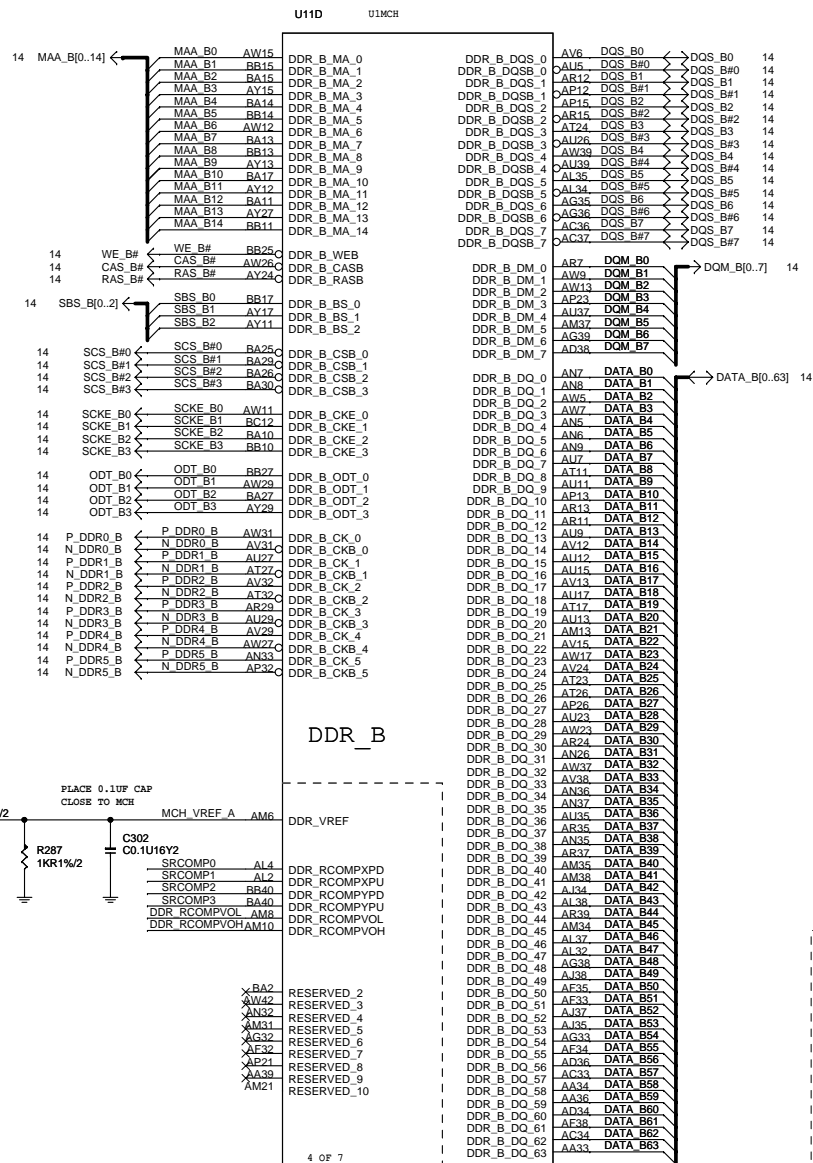
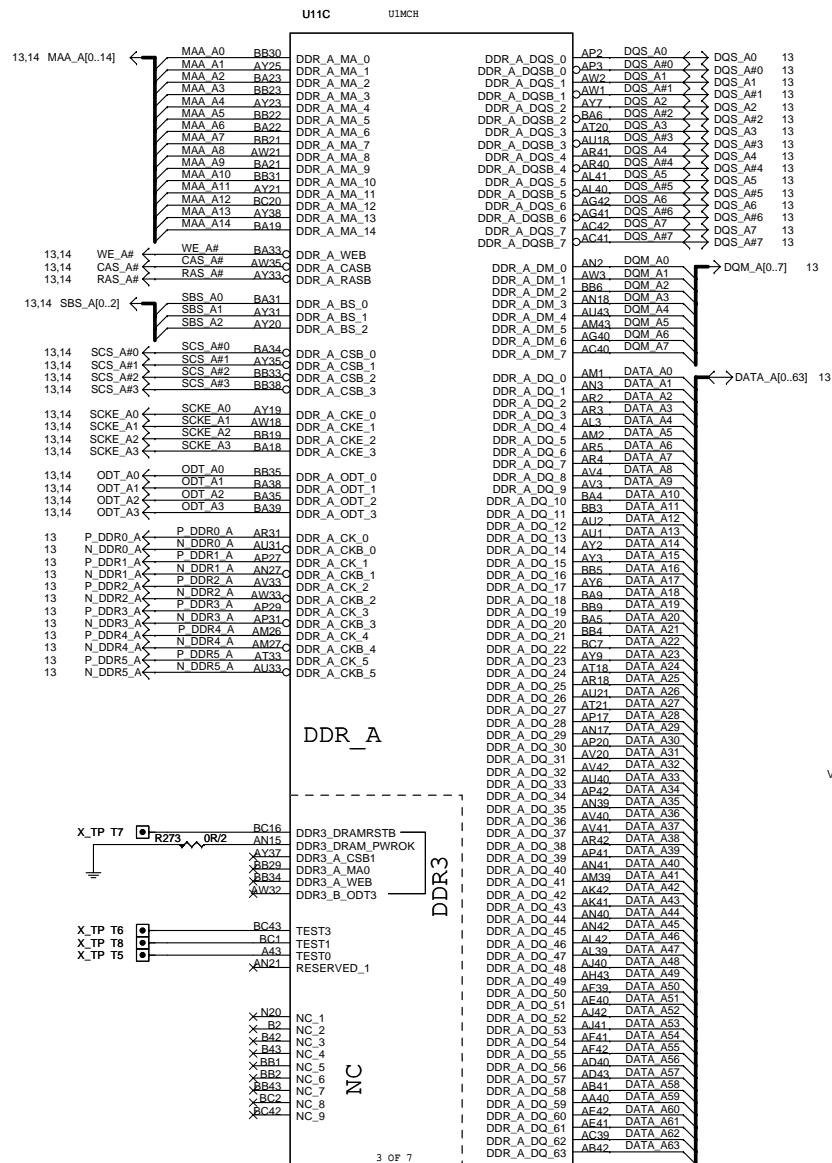
MS-7358

|                             |  |               |
|-----------------------------|--|---------------|
| Size<br>Custom              | Document Description<br><b>LGA775 - Signal</b> | Rev<br>0A     |
| Date: Tuesday, May 08, 2007 |  | Sheet 3 of 34 |

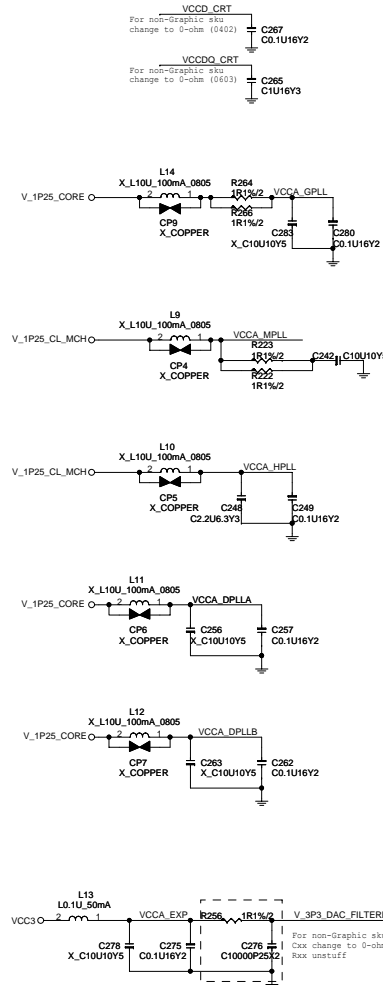




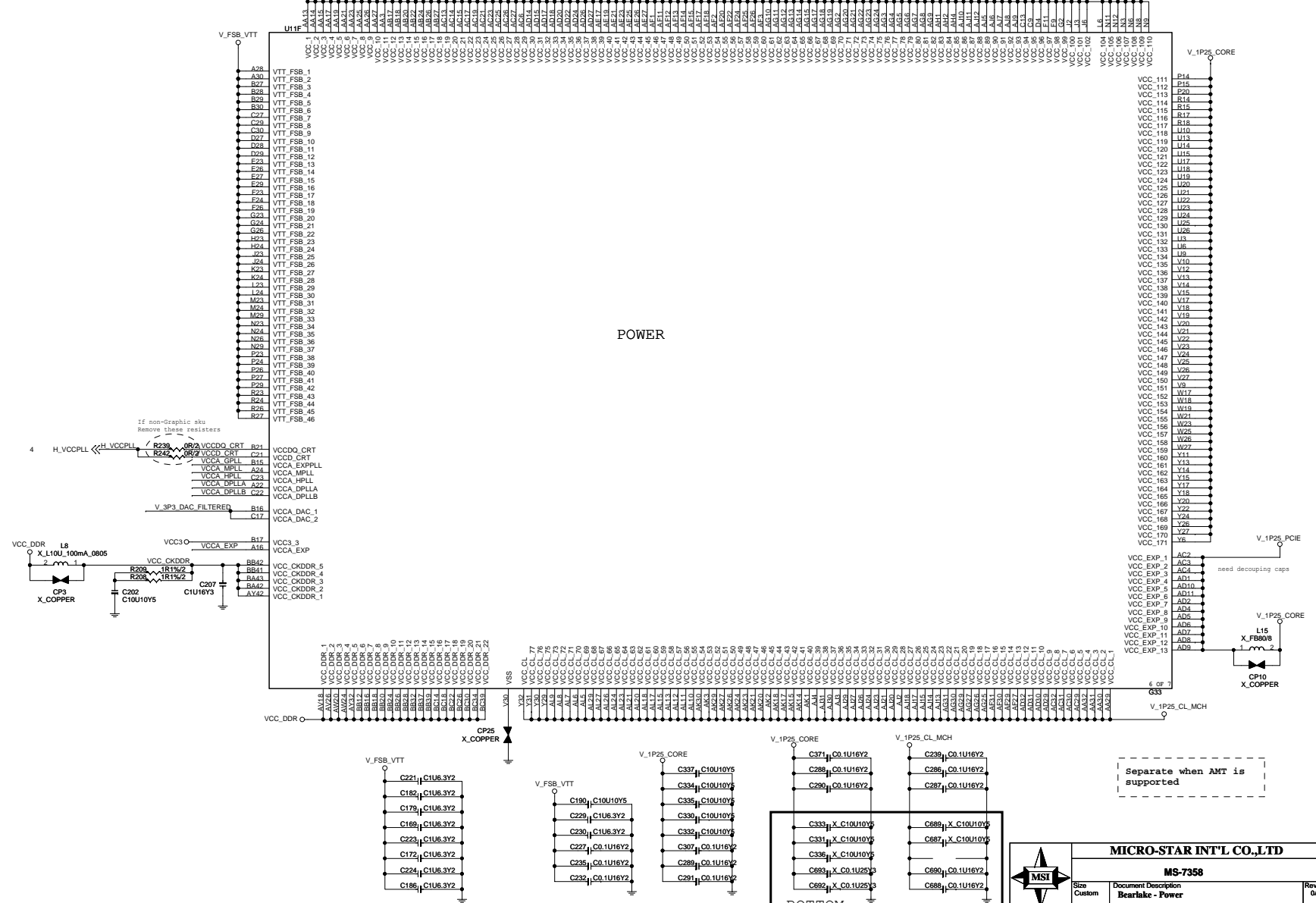




# NB POWER



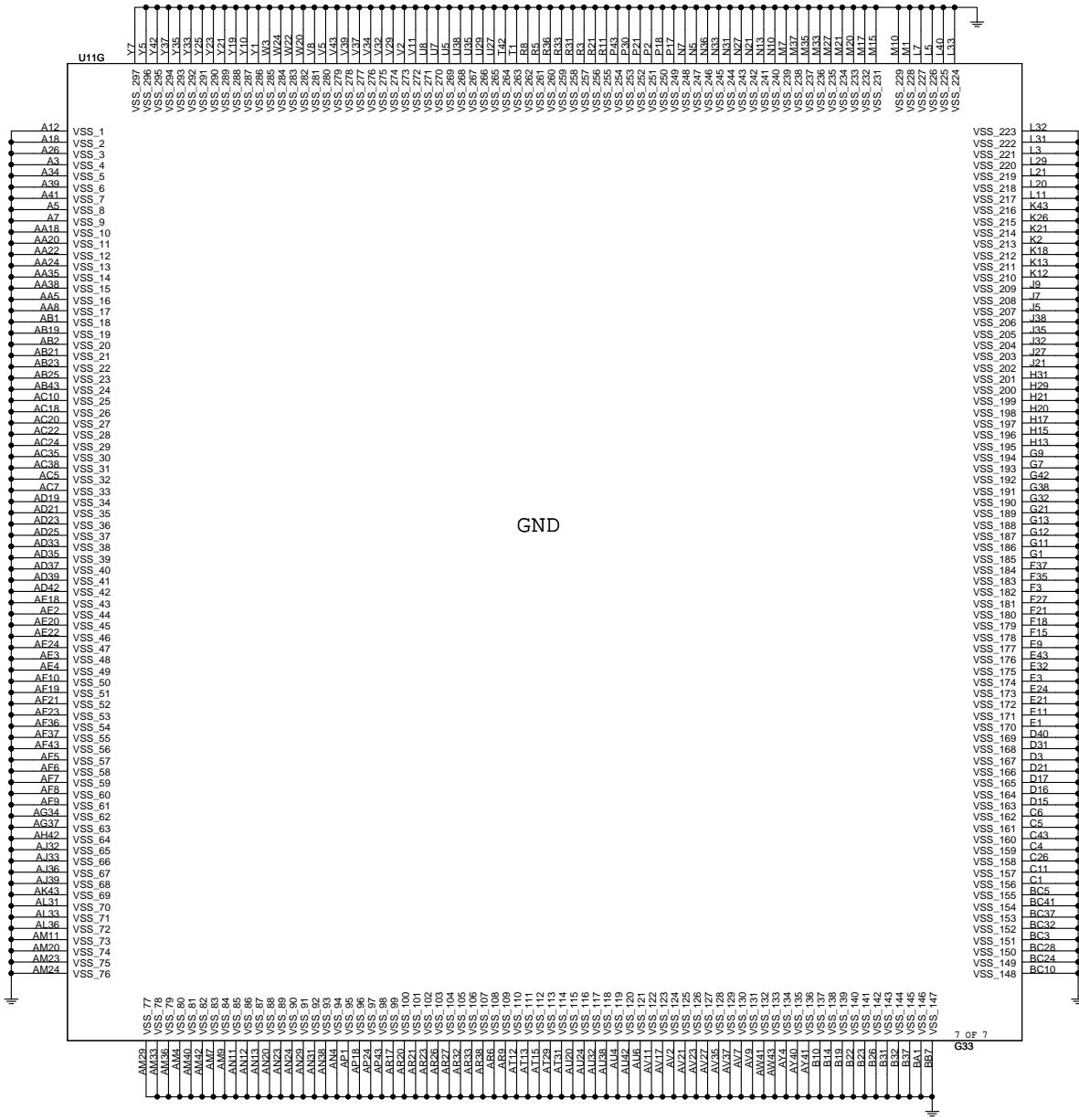
## V\_1P25 CORE

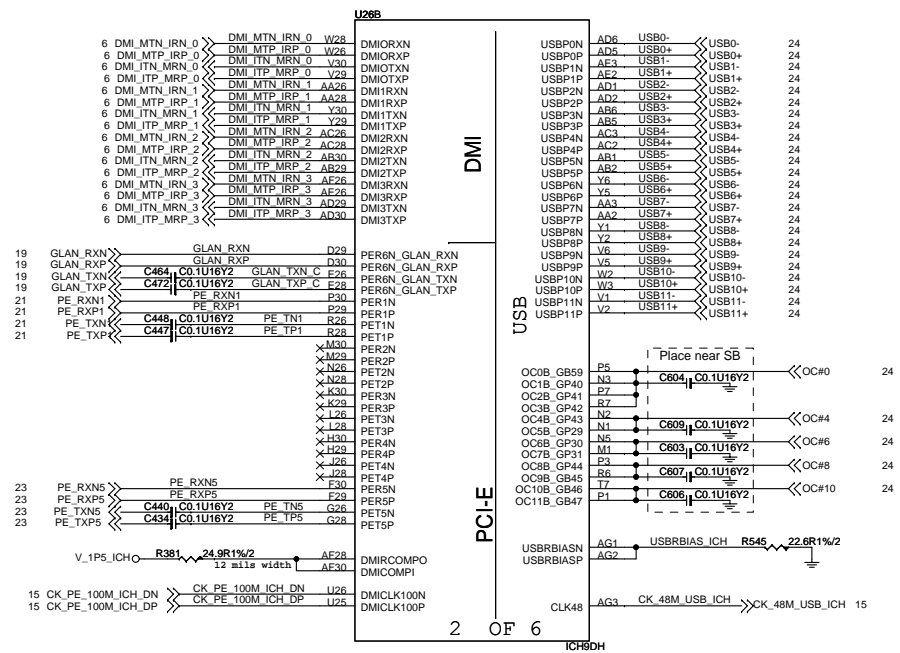


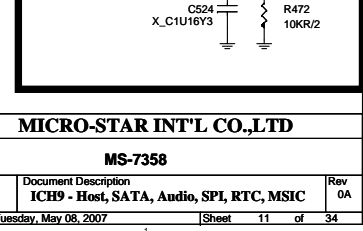
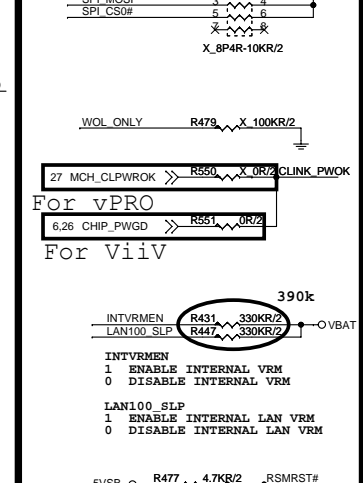
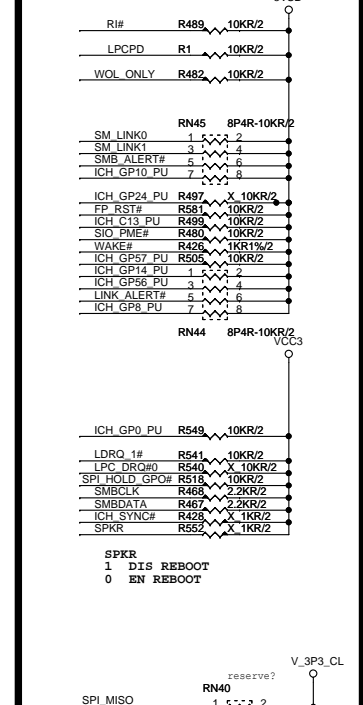
## POWER

|                                 |                      |     |
|---------------------------------|----------------------|-----|
|                                 |                      |     |
| <b>MICRO-STAR INT'L CO.,LTD</b> |                      |     |
| Size                            | Document Description | Rev |
| Custom                          | Bearlake - Power     | 0A  |
| Date: Tuesday, May 08, 2007     |                      |     |
| Sheet 8 of 34                   |                      |     |

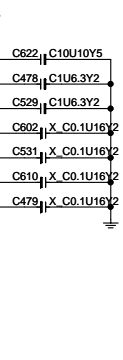
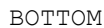






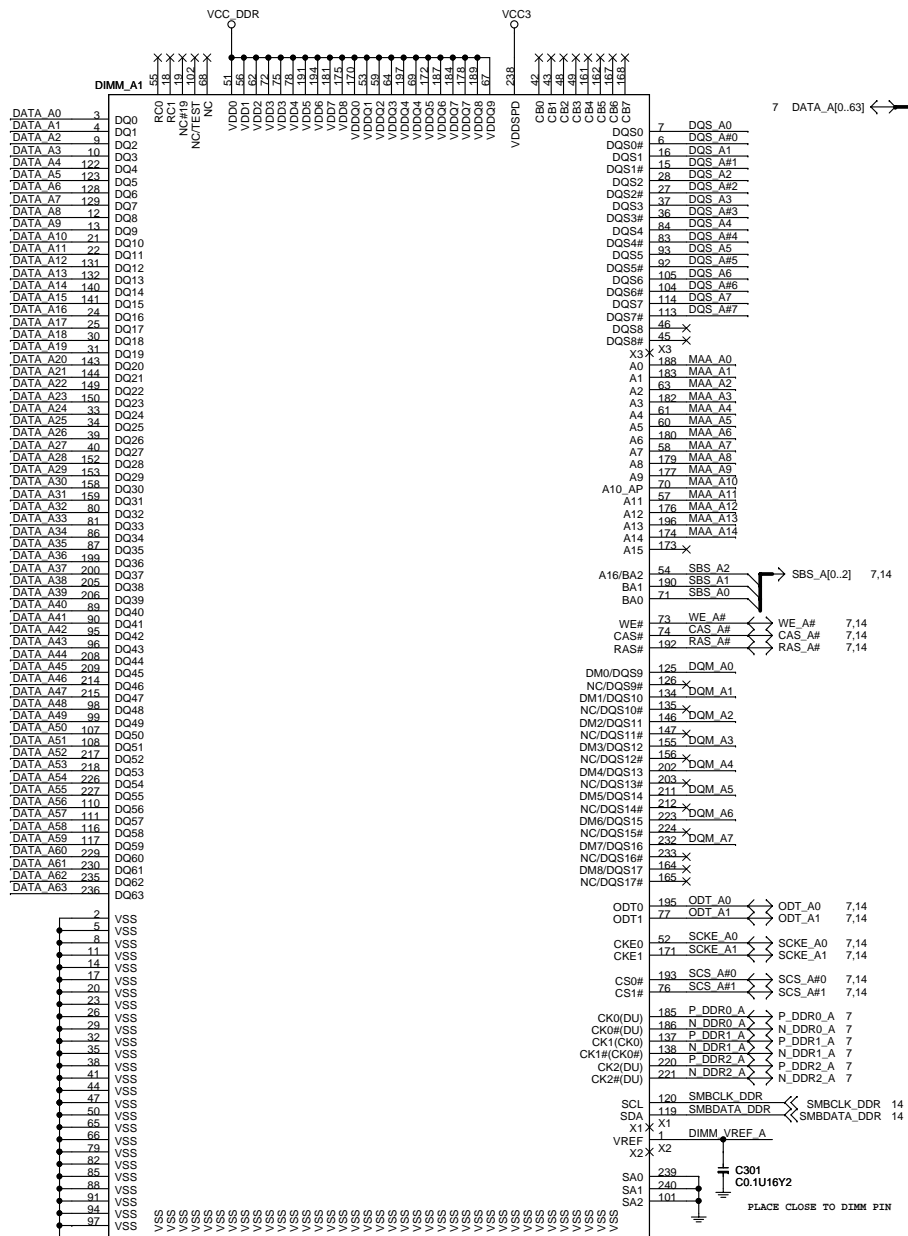


V5REF must be powered up before VCC3 or after VCC3 within 0.7V. Also, V5REF must power down after VCC3 or before VCC3 within 0.7V. This rule is also applies to V5REF\_SUS and 3VSB. However, the 3VSB is derived from the 5VSB on the power supply thru a voltage regulator and therefore, they can satisfy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

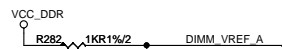


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|                             |  |           |
|-----------------------------|--|-----------|
| Size<br>Custom              | Document Description<br><b>ICH9 - Power, GND</b> | Rev<br>0A |
| Date: Tuesday, May 08, 2007 | Sheet 12 of 34                                   |           |



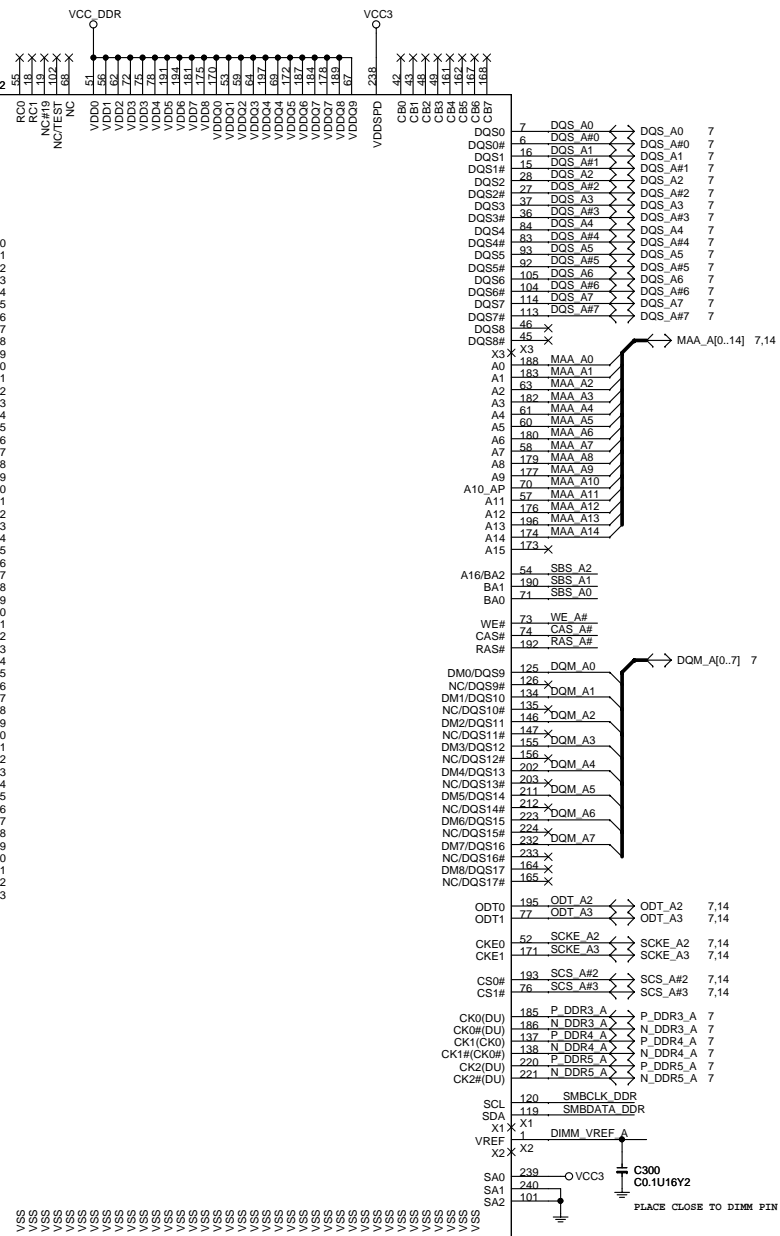
## DDRII DIMM\_A1



ADDRESS: 000  
0xA0

SMBCLK\_DDR R76 33R/2  
SMBDATA\_DDR R80 33R/2

## DDRII DIMM\_A2



ADDRESS: 001  
0xA2



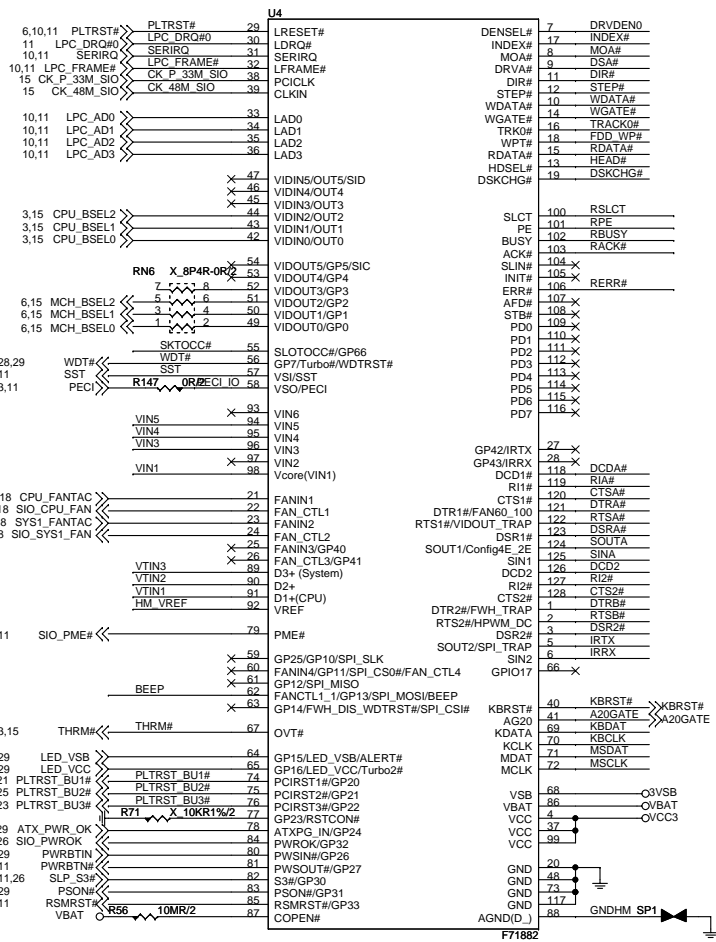
MICRO-STAR INT'L CO.,LTD

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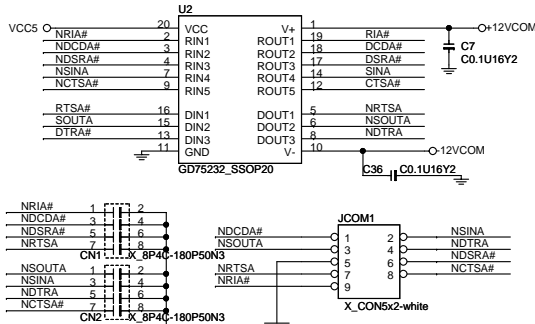
| Size   | Document Description  | Rev            |
|--------|-----------------------|----------------|
| Custom | DDR2 CHANNEL-A        | 0A             |
| Date:  | Tuesday, May 08, 2007 | Sheet 13 of 34 |





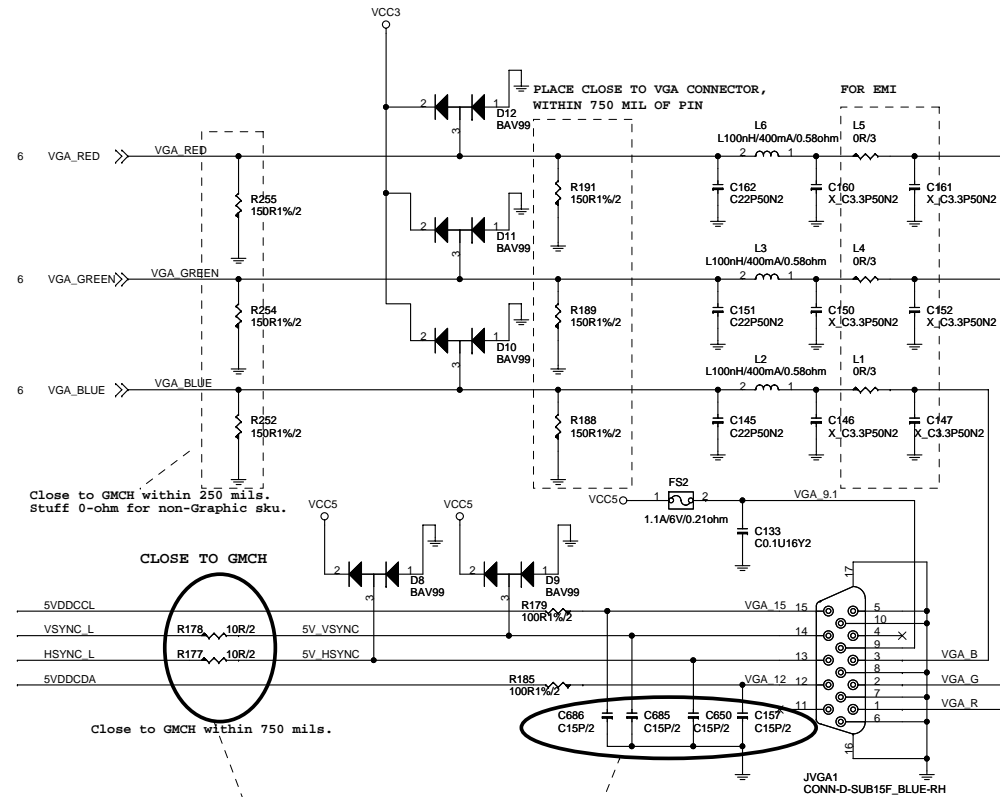
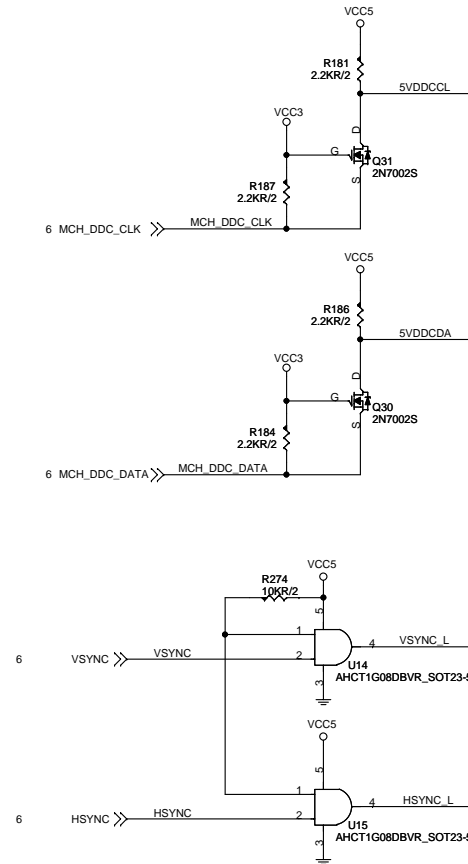


## SERIAL PORT 1





# Video Connector

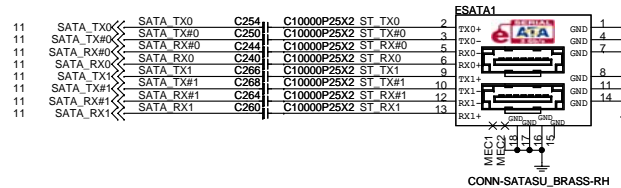
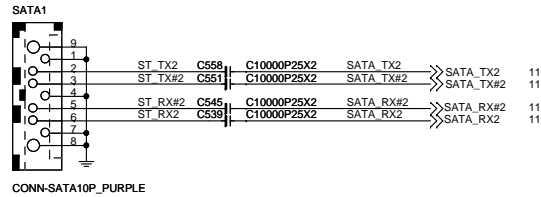
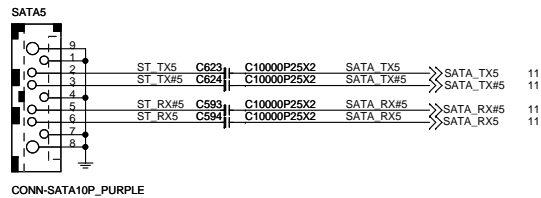
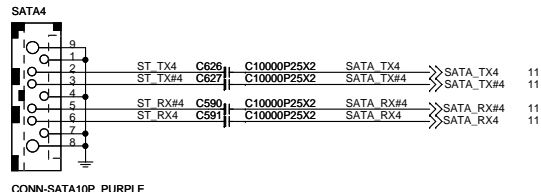
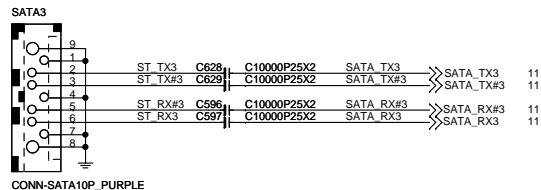


Close to GMCH within 250 mils.  
Stuff 0-ohm for non-Graphic sku.

CLOSE TO GMCH

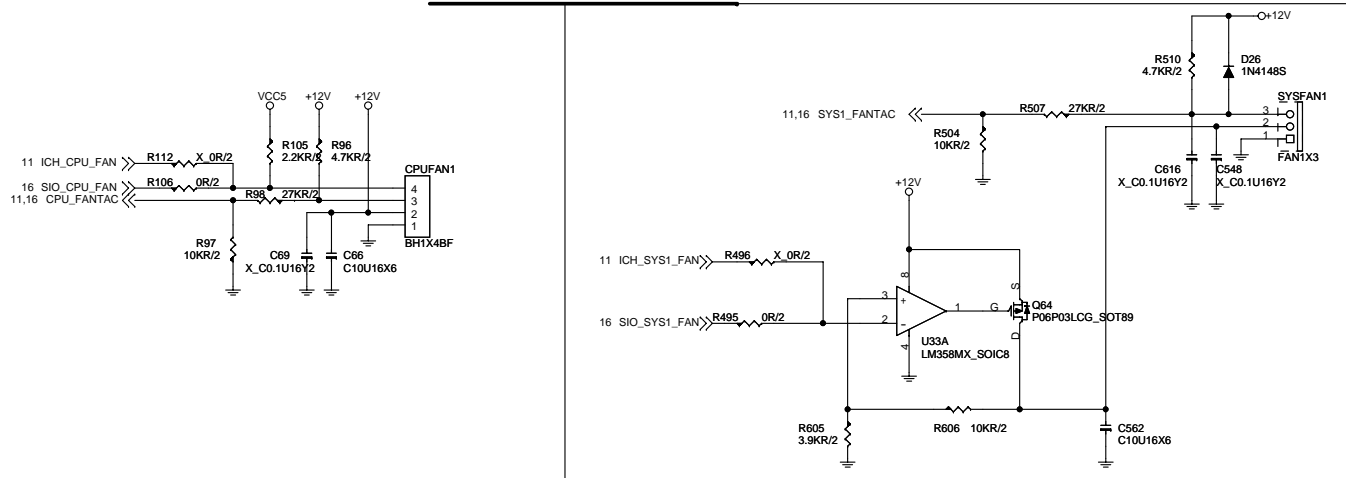
Close to GMCH within 750 mils.

Modify HSYNC/VSYNC Circuit  
1. R178,R177 from 30R to 10R  
2. CN3 from 33p to 15p  
For Rise time edge not clean 07.3.30 by Robile



e-SATA trace length should be less than 10 inch.(Connector to Chip)

### FAN-COUNTROL CIRCUIT

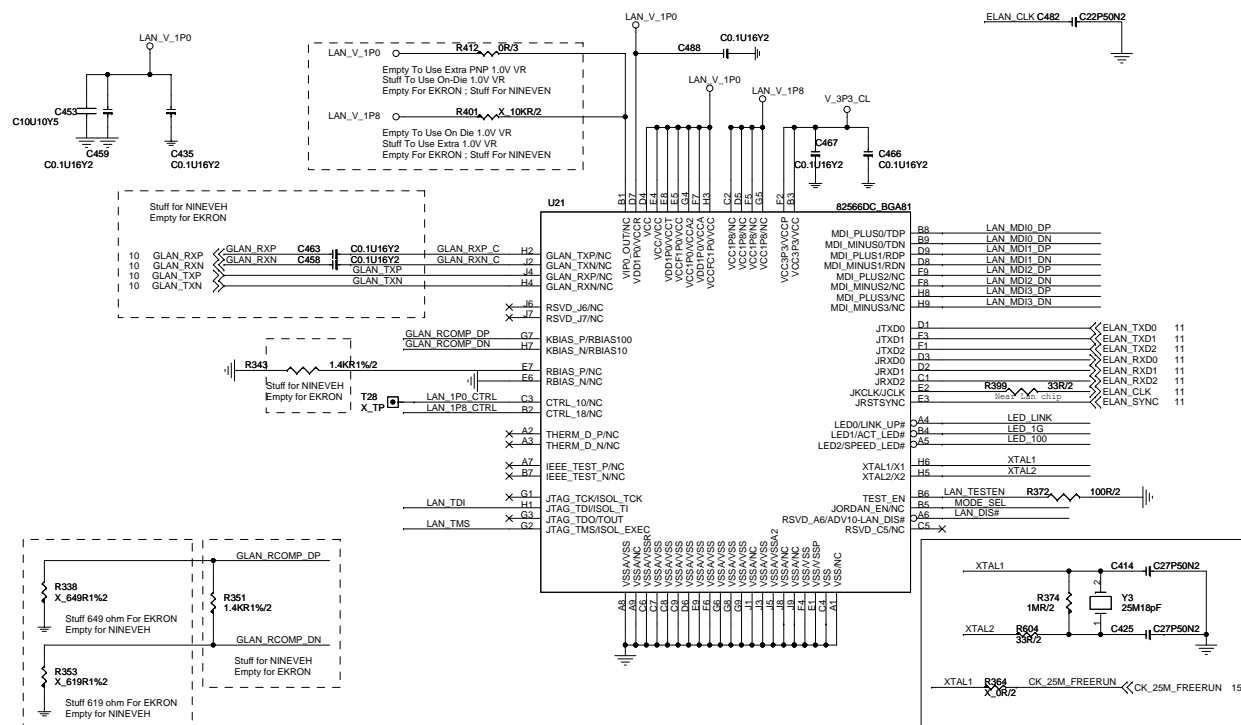


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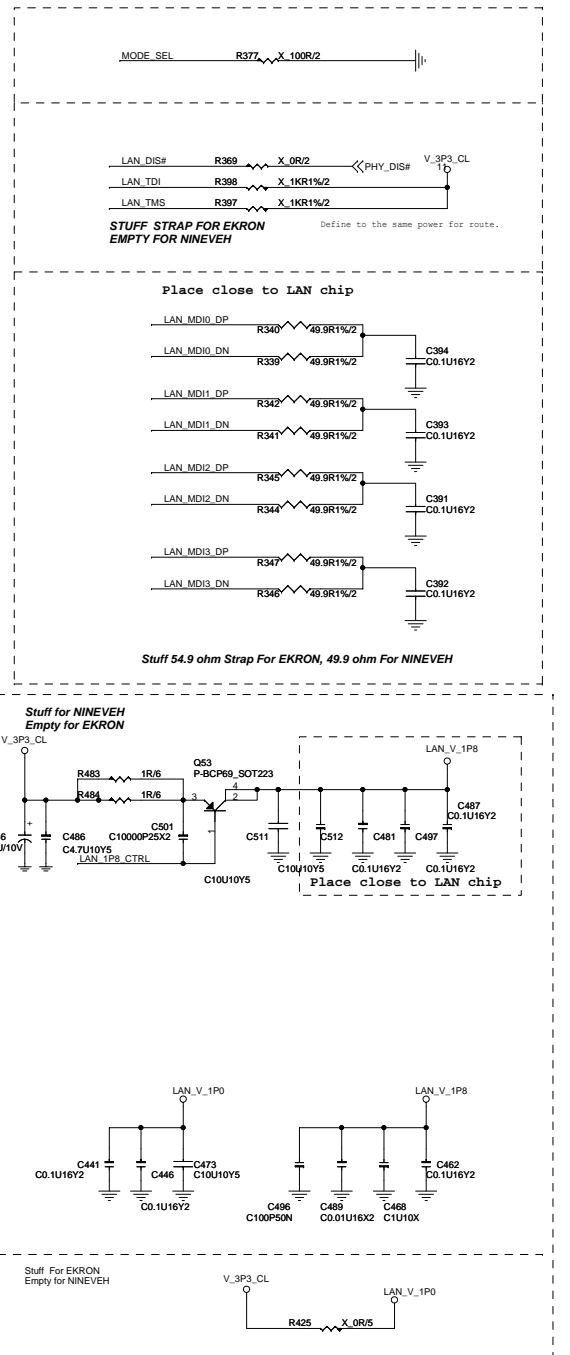
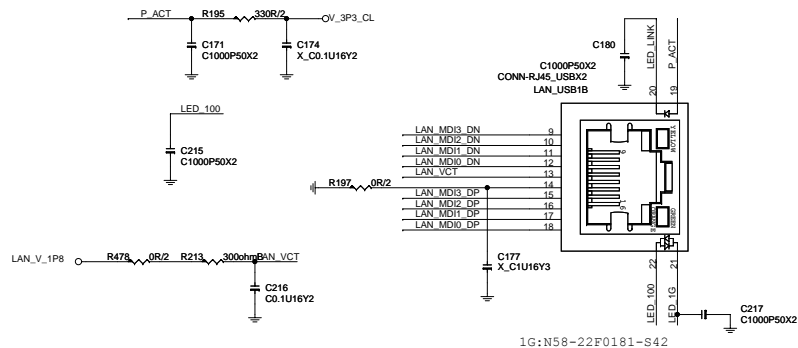
| Size                        | Document Description                | Rev |
|-----------------------------|-------------------------------------|-----|
| Custom                      | SATA & e-SATA Ports and Fan Control | 0A  |
| Date: Tuesday, May 08, 2007 | Sheet 18 of 34                      |     |

LAN - NINEVEH/EKRON






Intel 82566DM  
For business desktop PCs.Support Intel AMT2 or ASF 2.0 alerting.Circuit Breaker,WoL,PXE,Multitport teaming,RSS,Intel Stable Image Platform Program drivers.  
Intel 82566DC  
For consumer desktop PC.Support Digital Home capabilities,WoL,PXE.  
Intel 82562V  
Basic 10/100 Ethernet connection.  
#06-82566D5-1Y6  
\_FOR\_NECF\_CONSIGN,\_CHIP\_LAN,\_INTEL/82566DM,\_BGA-81pin,NINEVEH GIGA LAN CHIP(PHY),RoHS COMPLIANCE  
#06-8256615-406  
\_CHIP\_LAN,\_INTEL/82566DC,\_BGA-81pin,NINEVEH GIGA LAN CHIP(PHY),RoHS COMPLIANCE  
#06-8256205-406  
\_CHIP\_LAN,\_INTEL/82562V,\_BGA-81pin,NINEVEH GIGA LAN CHIP(PHY),RoHS COMPLIANCE

## LAN CONNECTOR



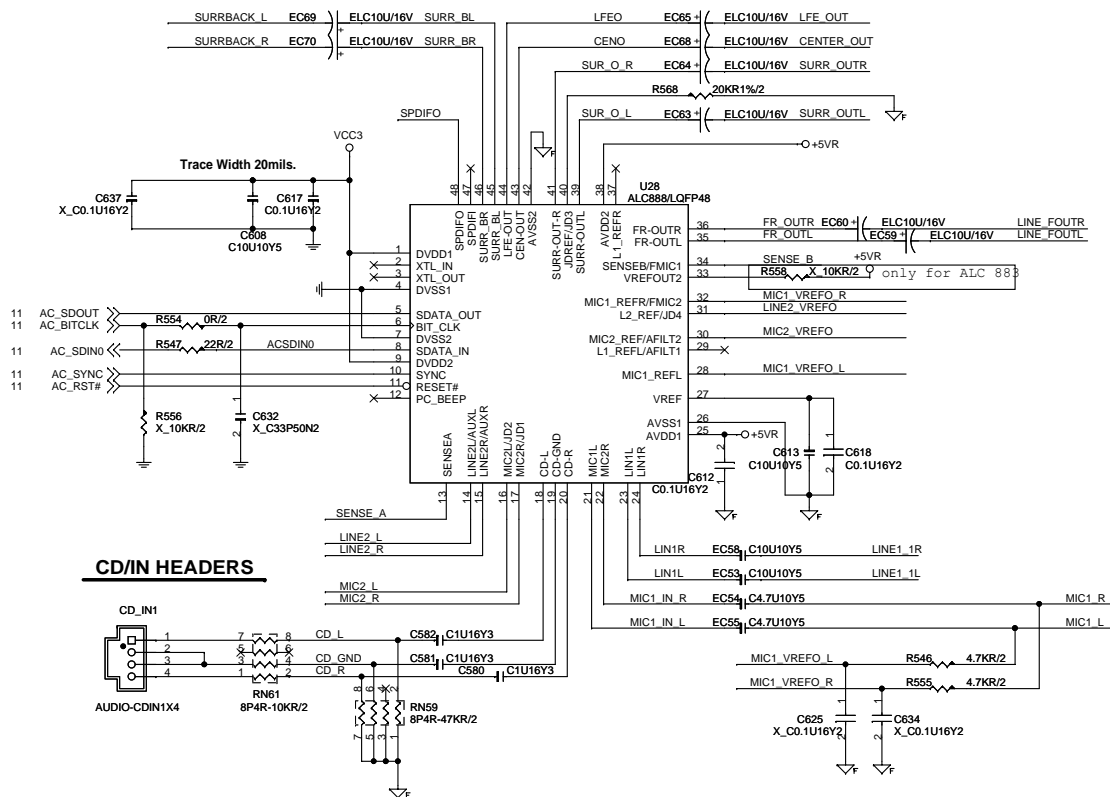
|                   |  |
|-------------------|--|
| ACT_LED           | Link_LED                                 |
| S0: LOW           | S0: LOW                                  |
| S1/S3/S4/S5: HIGH | S5: HIGH                                 |
|                   | S1/S3/S4: WOL EN-->LOW<br>WOL DIS-->HIGH |

| Giga-Lan        |   | 10/100-Lan                         |   |
|-----------------|---|------------------------------------|---|
| N58-22F0181-842 |   | N58-22F0061-842<br>N58-22F0061-F02 |   |
| 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   |

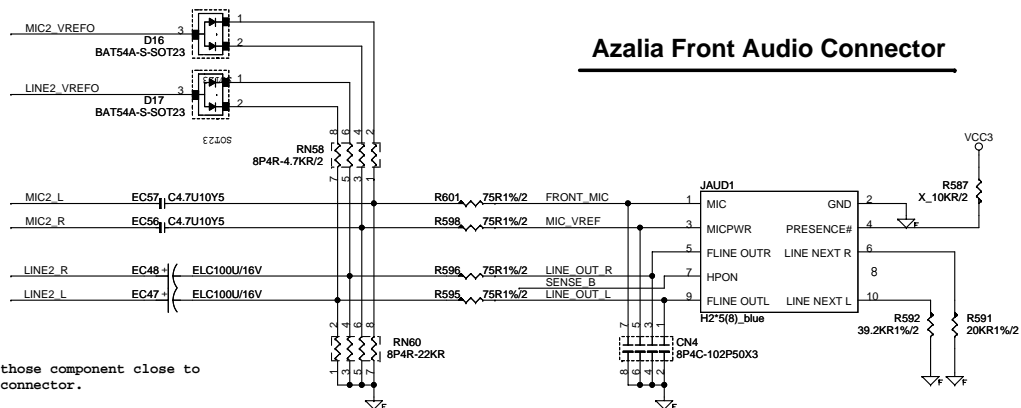


|                                 |  |      |
|---------------------------------|--|------|
| <b>MICRO-STAR INT'L CO.,LTD</b> |  |      |
| <b>MS-7358</b>                  |  |      |
| Size<br>Custom                  | Document Description<br><b>LAN NINEVEH/EKRON</b> |      |
| Date: Tuesday, May 08, 2007     | Sheet 19   | of 3 |

## ALC883 CODEC

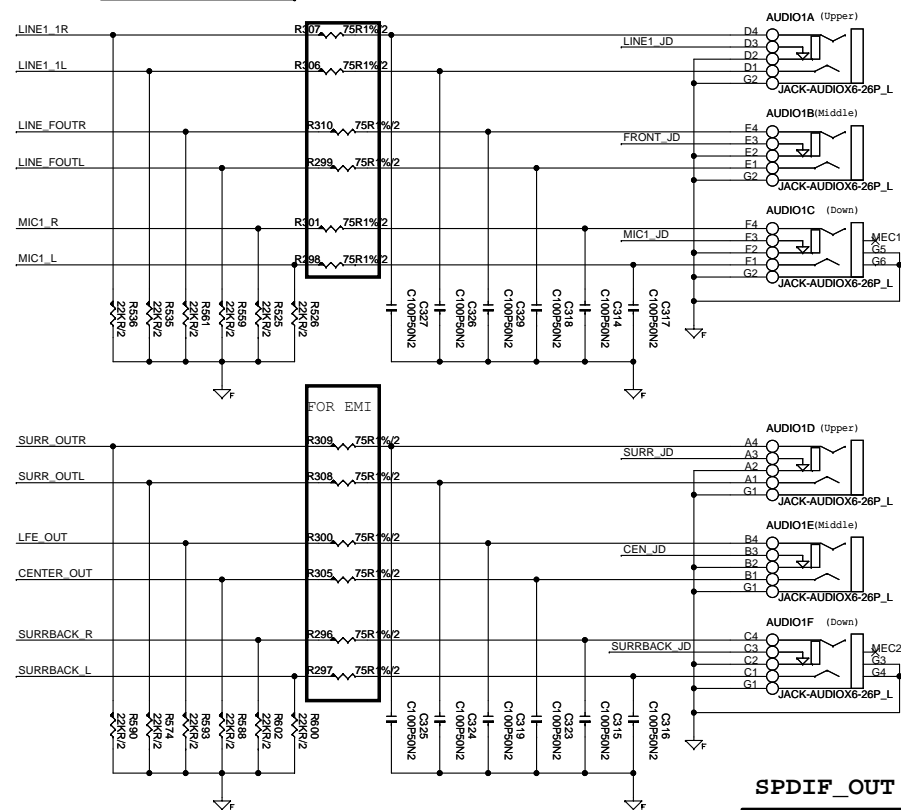


## Azalia Front Audio Connector

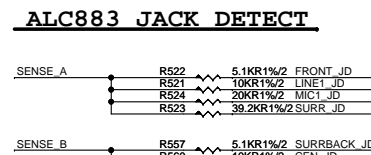


Place those component close to  
audio connector.

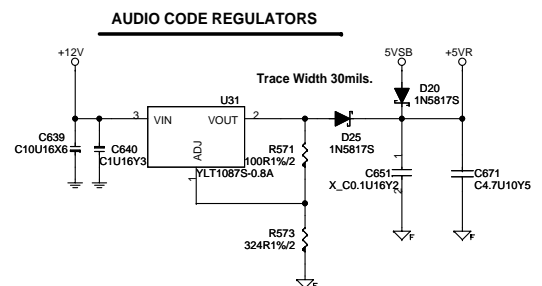
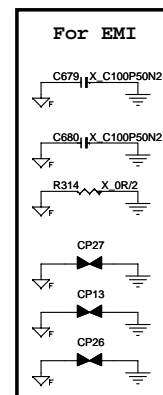
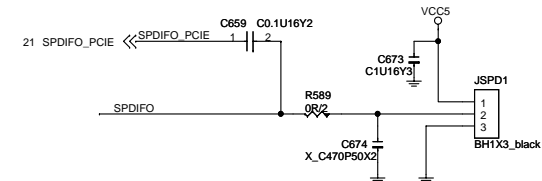
ALC883 JACK



ALC883 JACK DETECT



## AUDIO CODE REGULATORS



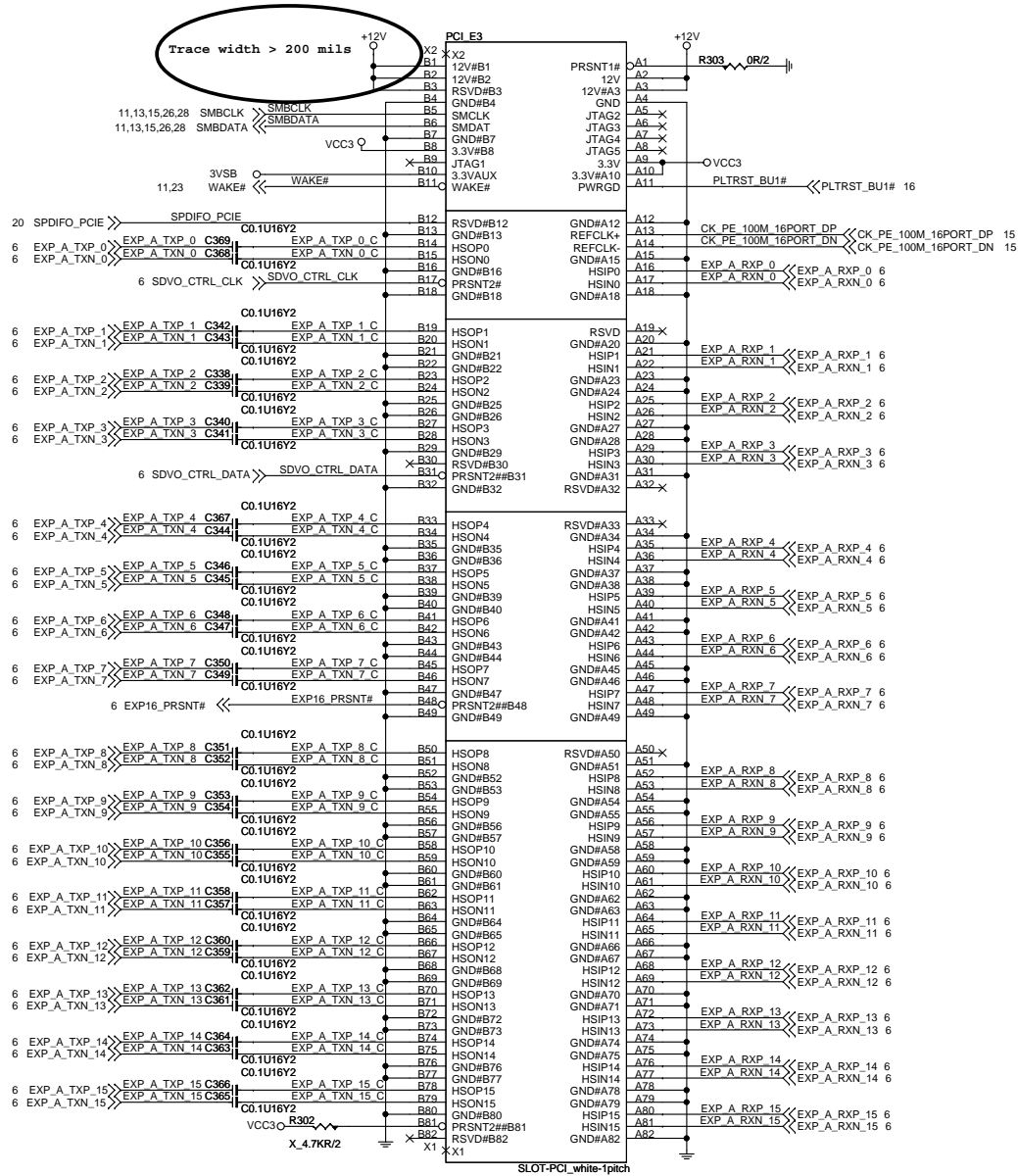
**MICRO-STAR INT'L CO.,LTD**

MS-7358

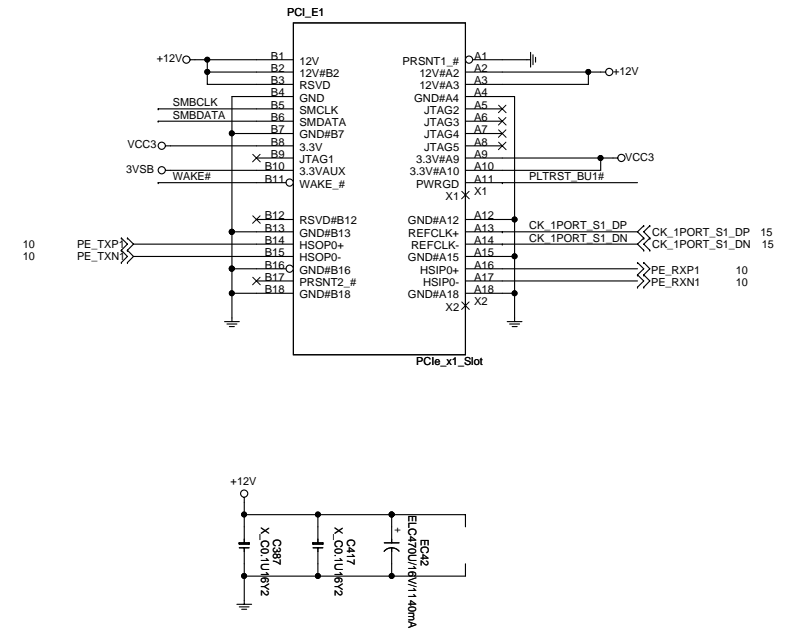
|        |                      |
|--------|----------------------|
| Size   | Document Description |
| Custom | <b>STAC9227</b>      |

|     |   |
|-----|---|
| Rev | 0 |
|-----|---|

# PCI\_Express X16 Slot



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

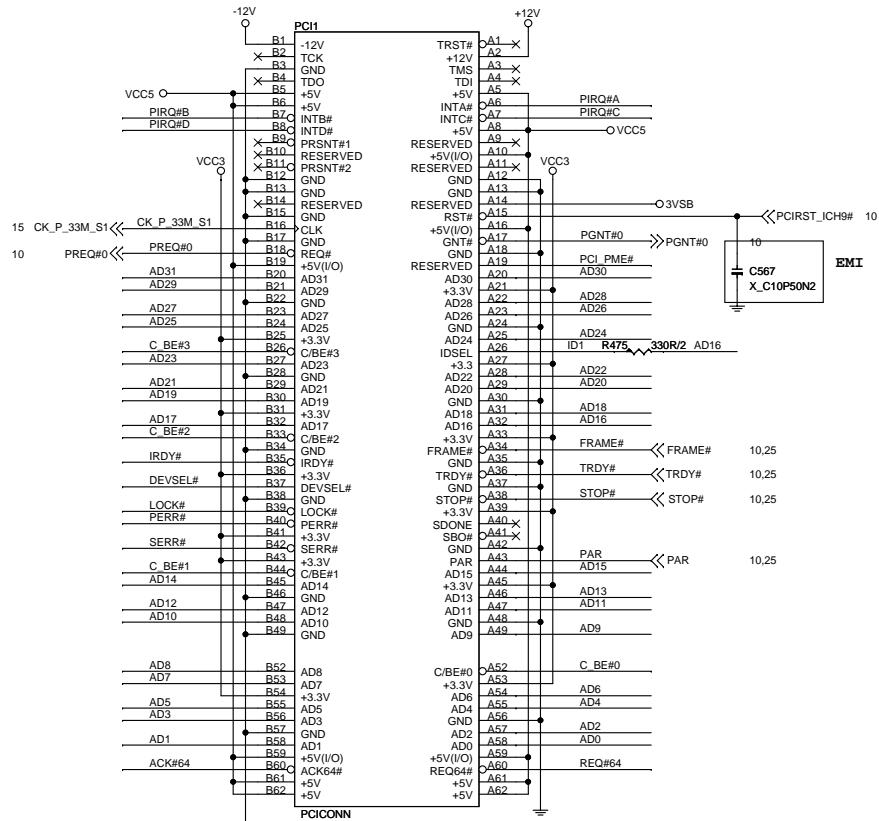


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MS-7358

| Size   | Document Description          | Rev            |
|--------|-------------------------------|----------------|
| Custom | PCIE x16, x4, x1 & Bus Switch | 0A             |
| Date:  | Tuesday, May 08, 2007         | Sheet 21 of 34 |

# PCI SLOT 1 (PCI VER: 2.2 COMPLY)



IDSEL = AD16

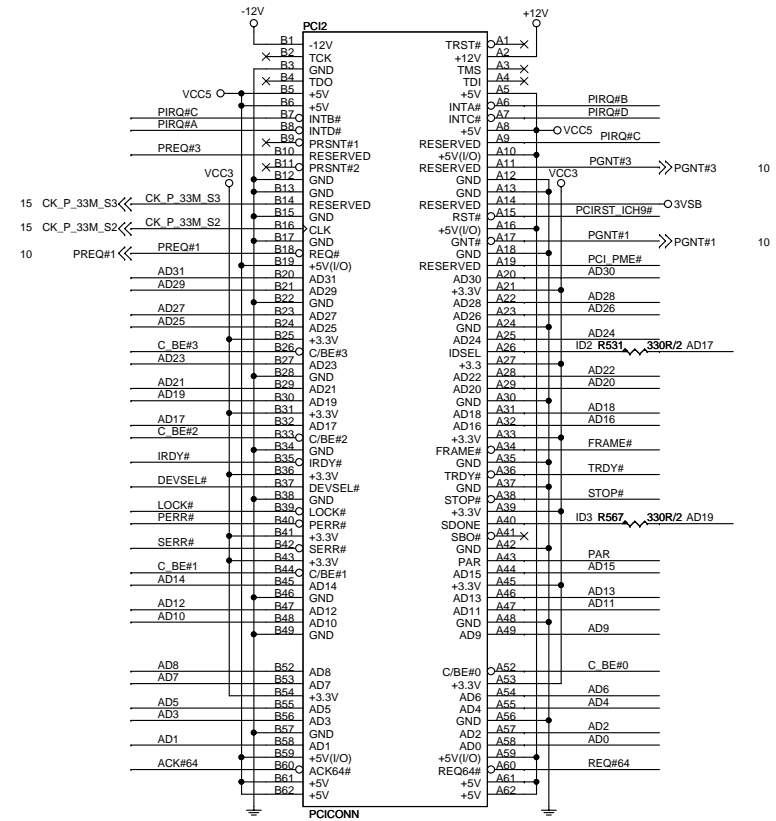
MASTER = PREQ#0

PIRQ#A

10.25 AD[31..0] << AD[31..0]

10.25 C\_BE#[3..0] << C\_BE#[3..0]

# PCI SLOT 2 (PCI VER: 2.2 COMPLY)

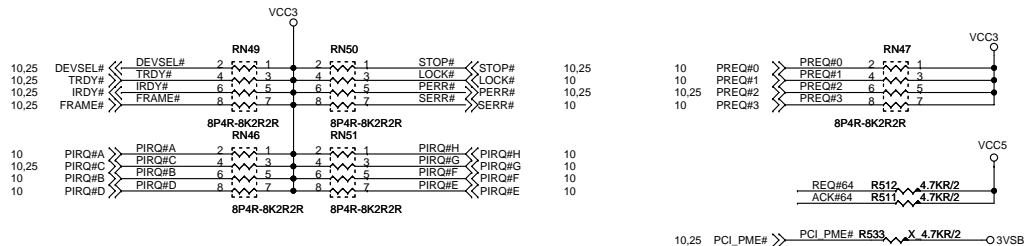


IDSEL = AD17

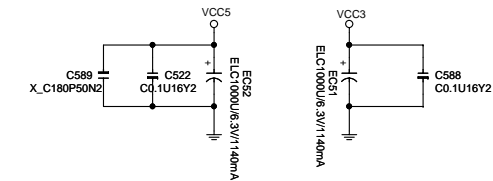
MASTER = PREQ#1

PIRQ#B

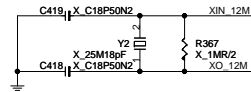
## PCI PULL-UP / DOWN RESISTORS



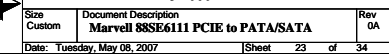
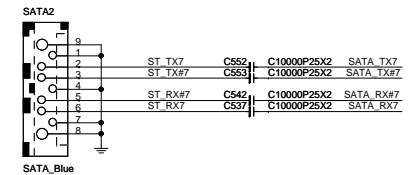
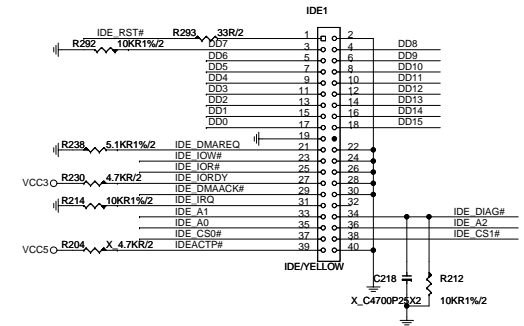
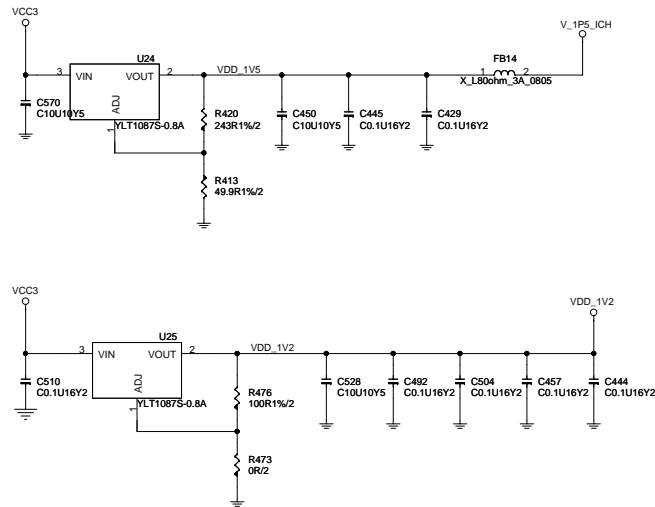
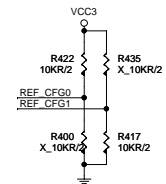
## PCI SLOT DECOUPLING CAPACITORS



```
REF_CFG[1:0] =  
00:20MHz  
01:25MHz
```



```
REF_CFG[1:0] =  
00:20MHz  
01:25MHz
```

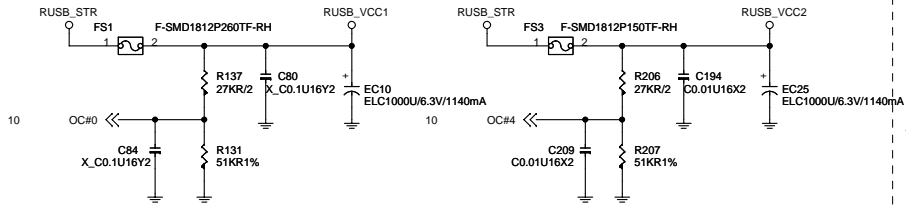


## Rear USB Connector

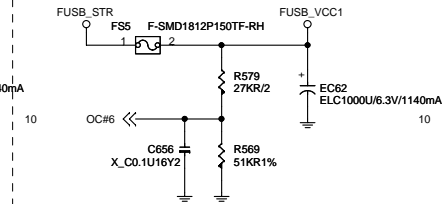
### USB POWER FOR PORT 0,1

---

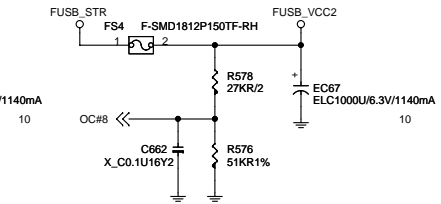
#### NEAR CONNECTOR



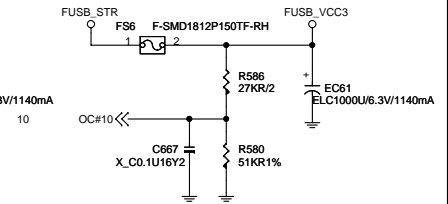
## USB POWER FOR PORT 2,3,4,5



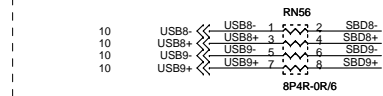
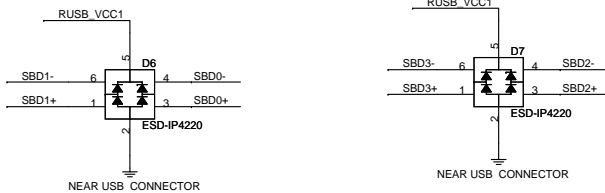
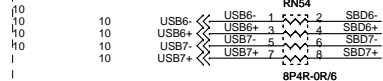
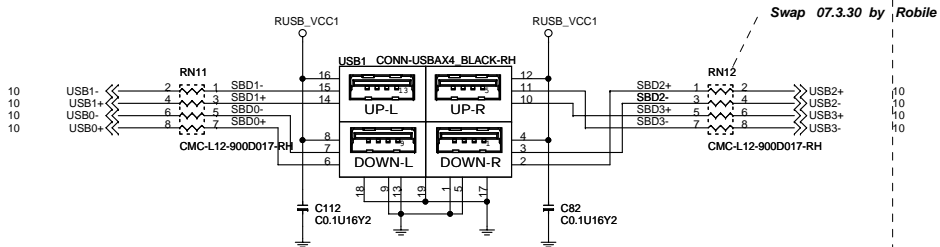
### **USB POWER FOR PORT 6,7**



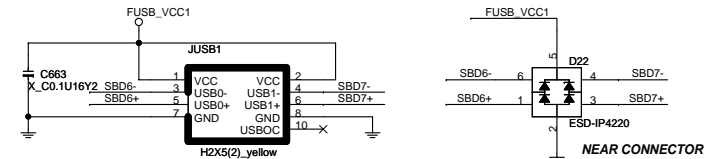
### **USB POWER FOR PORT 6,7**



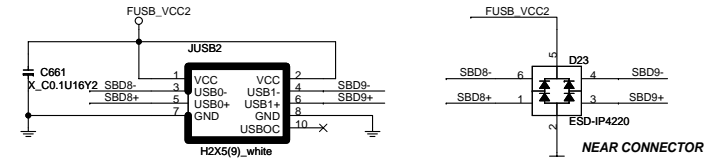
### REAR USB PORT 0~3 (2x2)



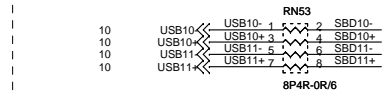
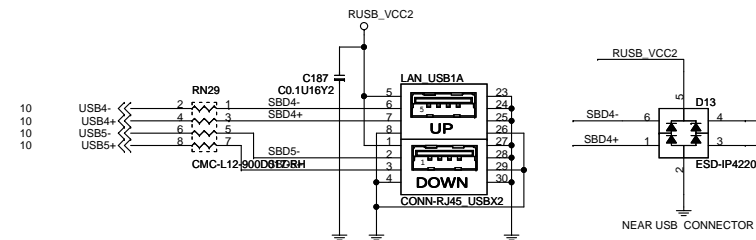
### FRONT USB PORT 6,7



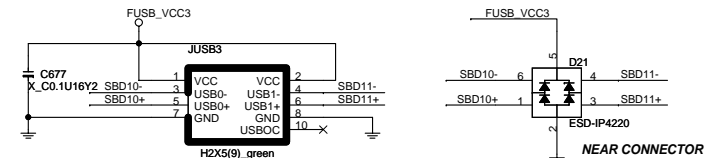
### FRONT USB PORT 8,9



### REAR USB PORT 4,5 (With LAN)



**FRONT USB PORT 10,**



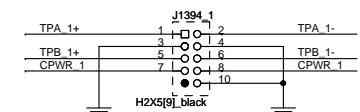
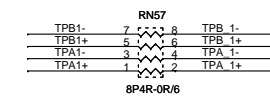
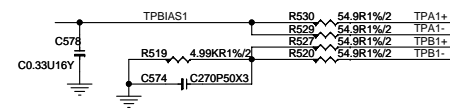
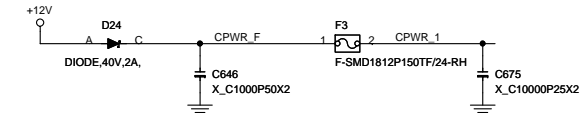
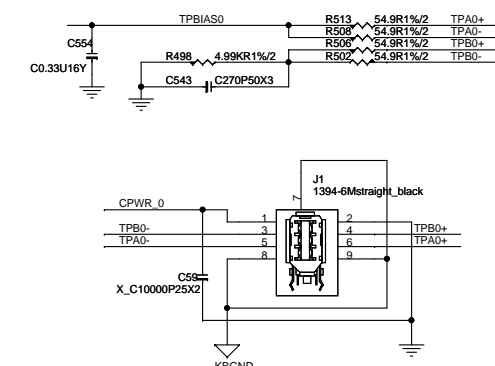
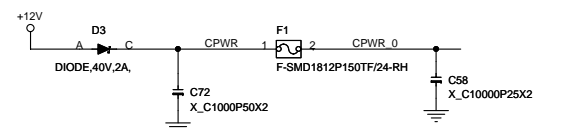
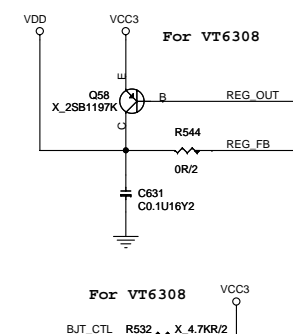
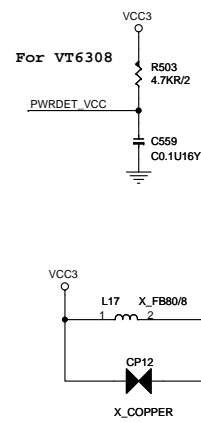
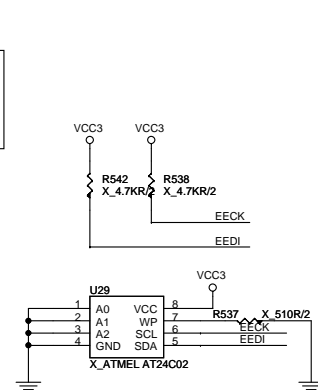
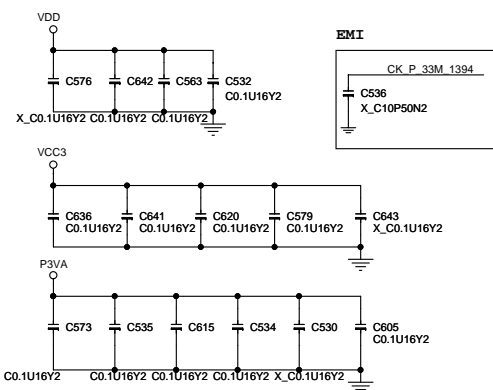
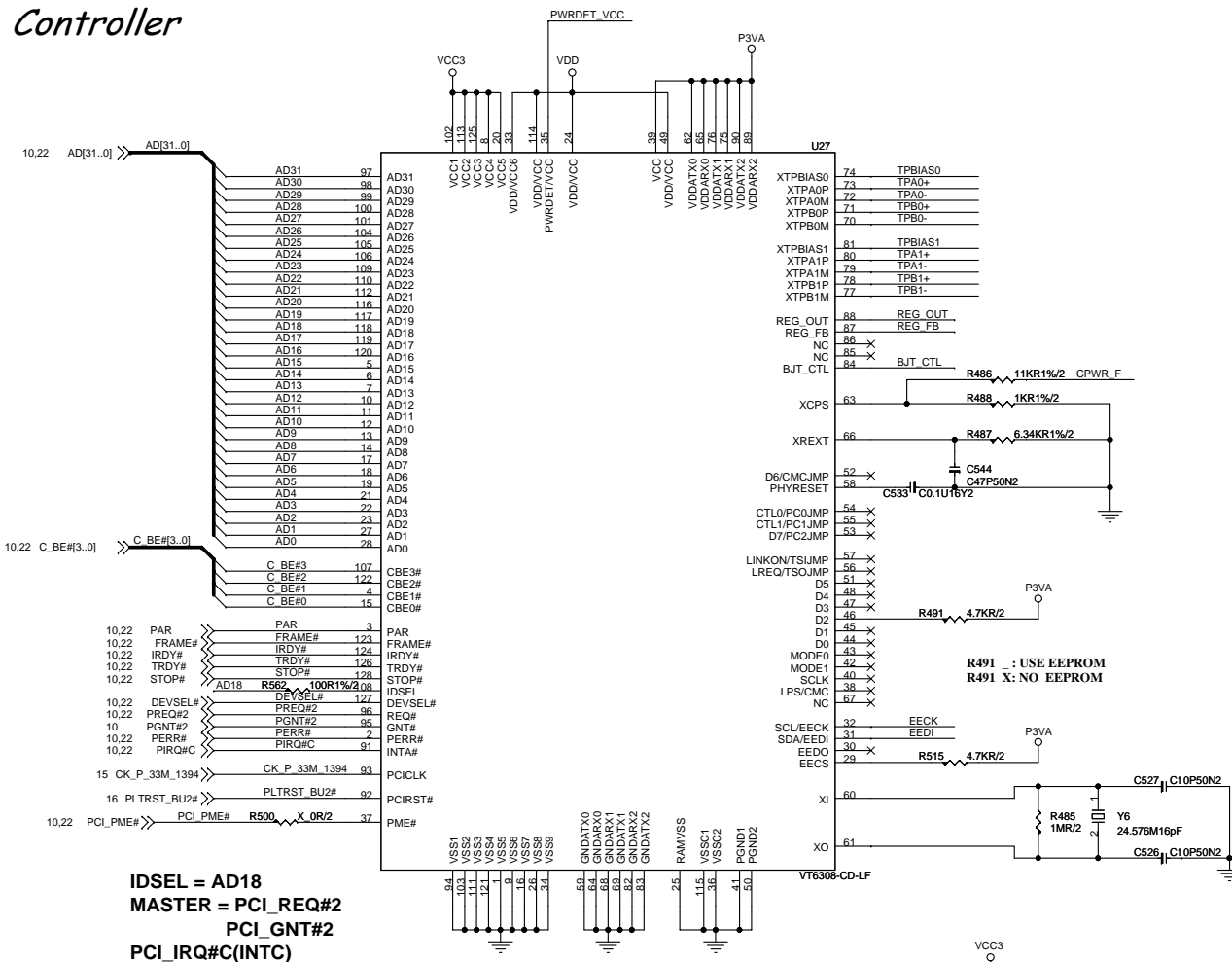
**MICRO-STAR INT'L CO.,LTD**

MS-7358

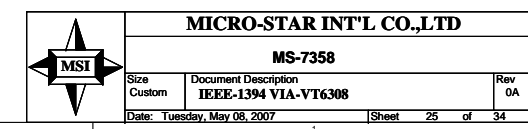
|                             |  |                |
|-----------------------------|--|----------------|
| Size<br>Custom              | Document Description<br><b>USB Connector</b> | Rev<br>0A      |
| Date: Tuesday, May 08, 2007 |  | Sheet 24 of 34 |



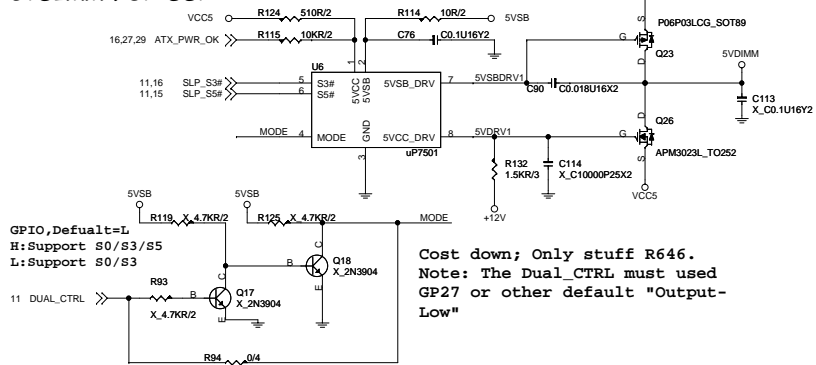
### 1394a OHCI Link Layer Controller



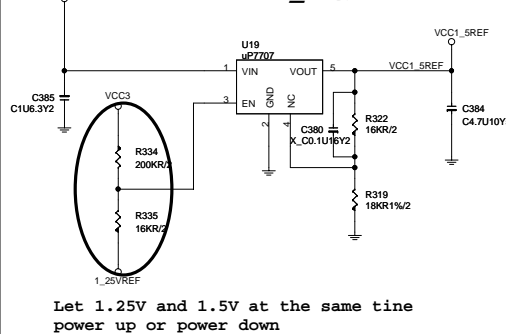
For Intel 1394 pinheader



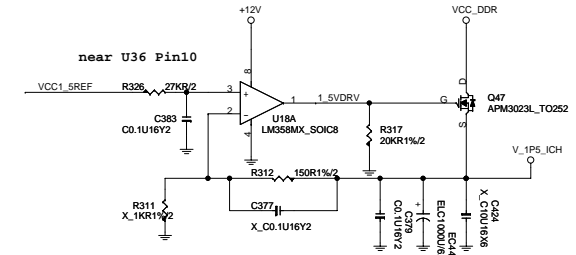
## 5VDIMM FOR DDR



## VCC1\_5REF

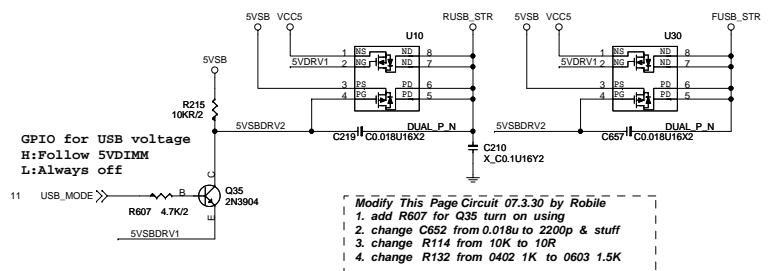


## SB 1.5V 2.75A

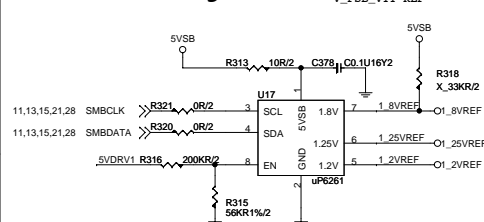


## 5VSB FOR Rear USB

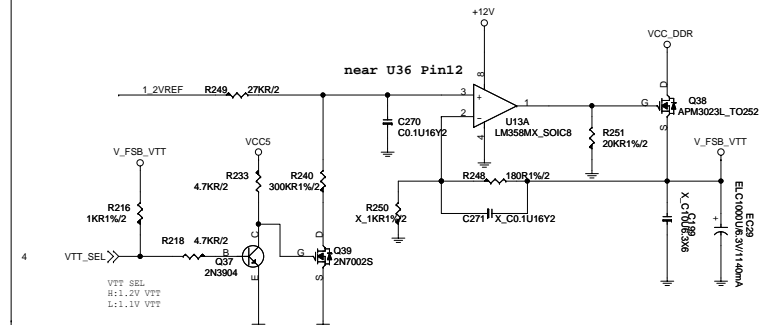
## 5VSB FOR Front USB



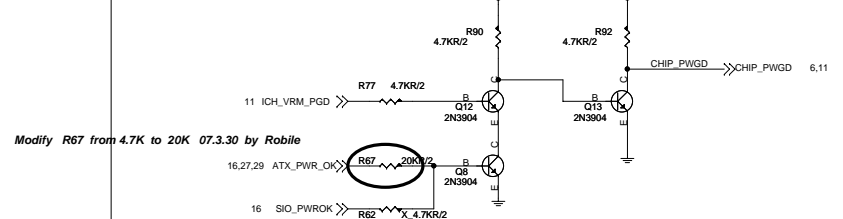
## reference Voltage



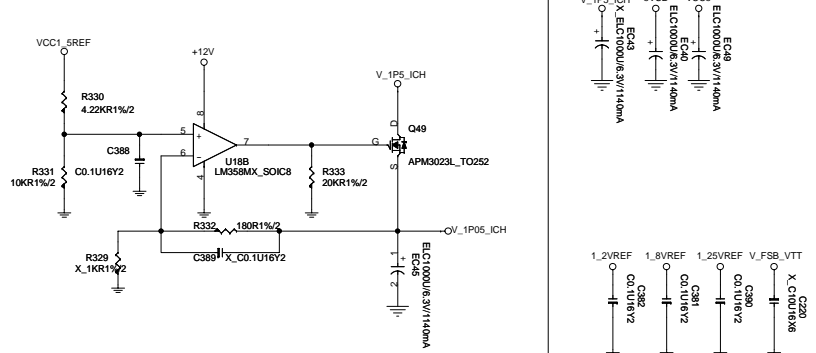
## 1.2V 5.8A



## PWROK DELAY 100ms

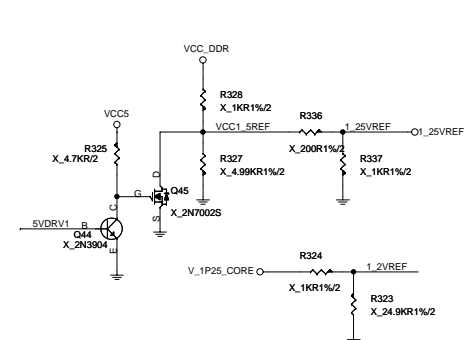


## SB 1.05V 2A

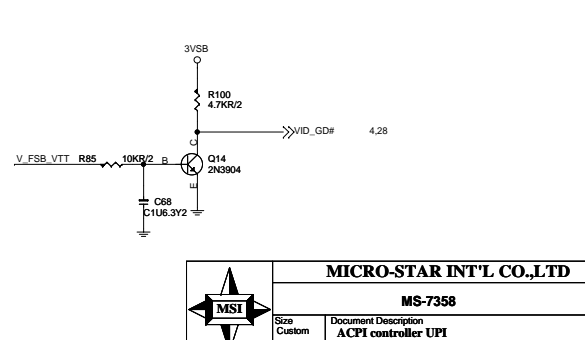


## \*Reserve for remove uP6261 and uP7707

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

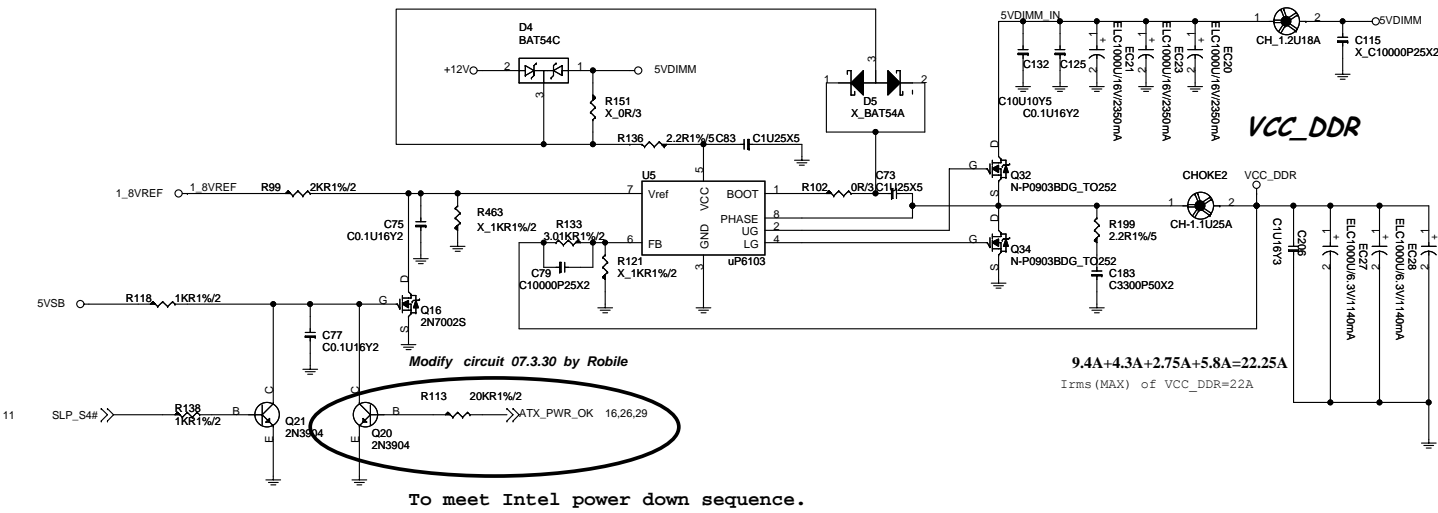


## VID before PWROK >3ms

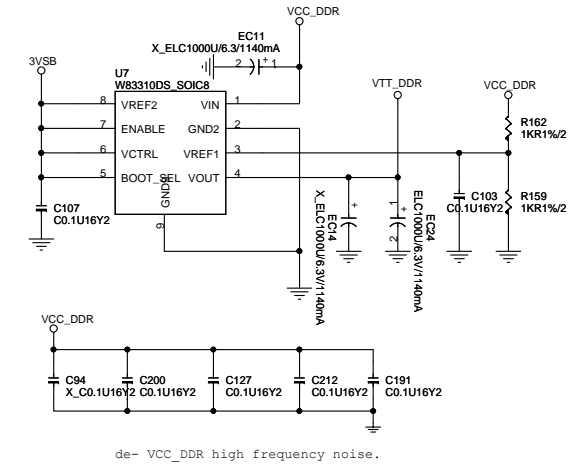


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|-----------------------------|----------------------|-----|-------|
| MS-7358                     |                      |     |       |
| Size                        | Document Description | Rev |       |
| Custom                      | ACPI controller UPI  | 0A  |       |
| Date: Tuesday, May 08, 2007 | Sheet                | 26  | of 34 |

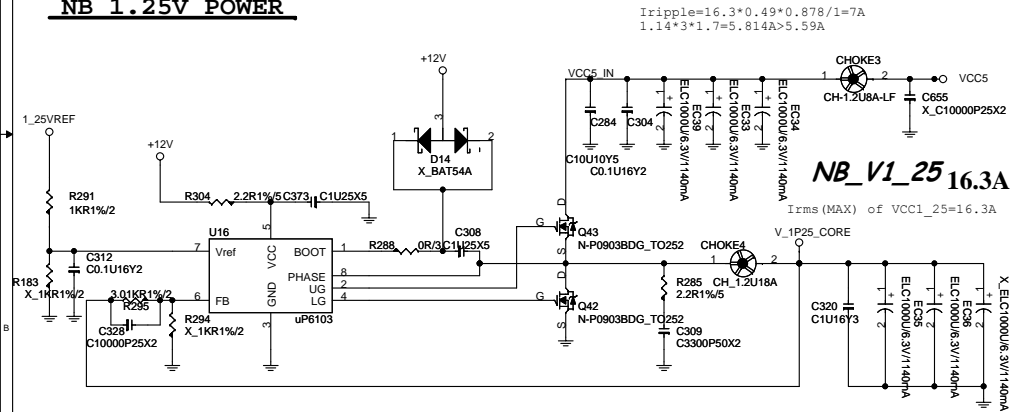
## DDR II 1.8V POWER



## DDR VTT Power

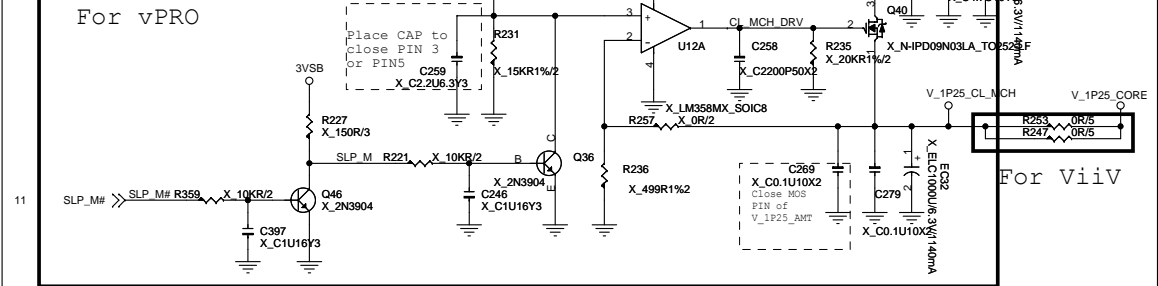


## NB 1.25V POWER

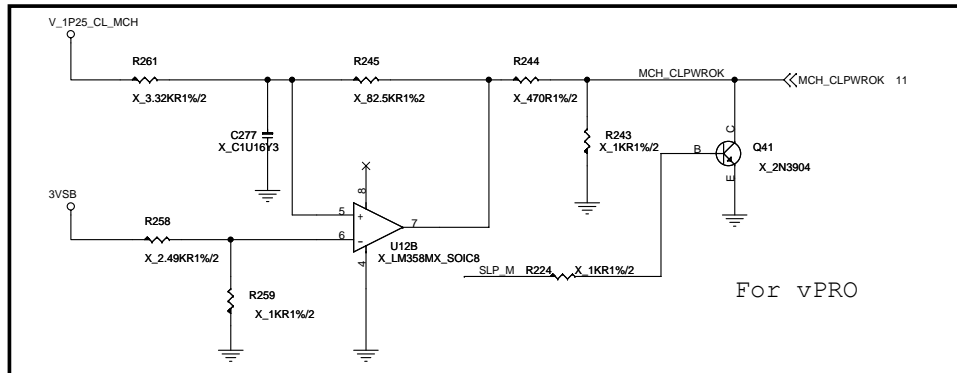


## AMT POWER

### V\_1P25\_CL\_MCH (4.3A)

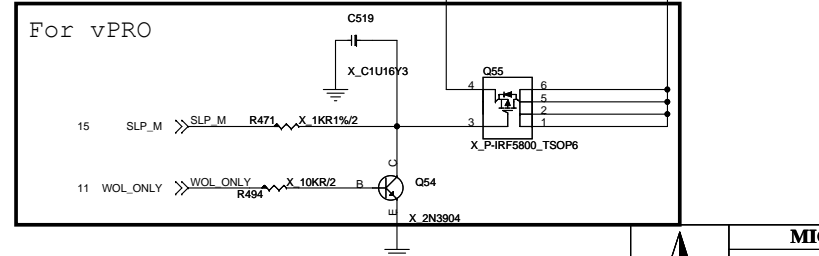


## CLINK PWROK GENERATION



## V\_3P3\_CL

### (711mA)



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| Size                        | Document Description      | Rev |
|-----------------------------|---------------------------|-----|
| Custom                      | NB Core Power & DDR Power | 0A  |
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## Voltage Regular Module

N-P0903BDG\_TO252  
P75N02LDG/TO252  
C100U2SP  
CD560U40S-2  
1800UF/6.3V  
0.25uH/40A  
CH-1.1U25A-LF  
CD1000U16EL20-2

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

ESR=13mΩ, Ripplecur.=6100mA, Lc<500uA, SPEC series, RoHS COMPLIANCE

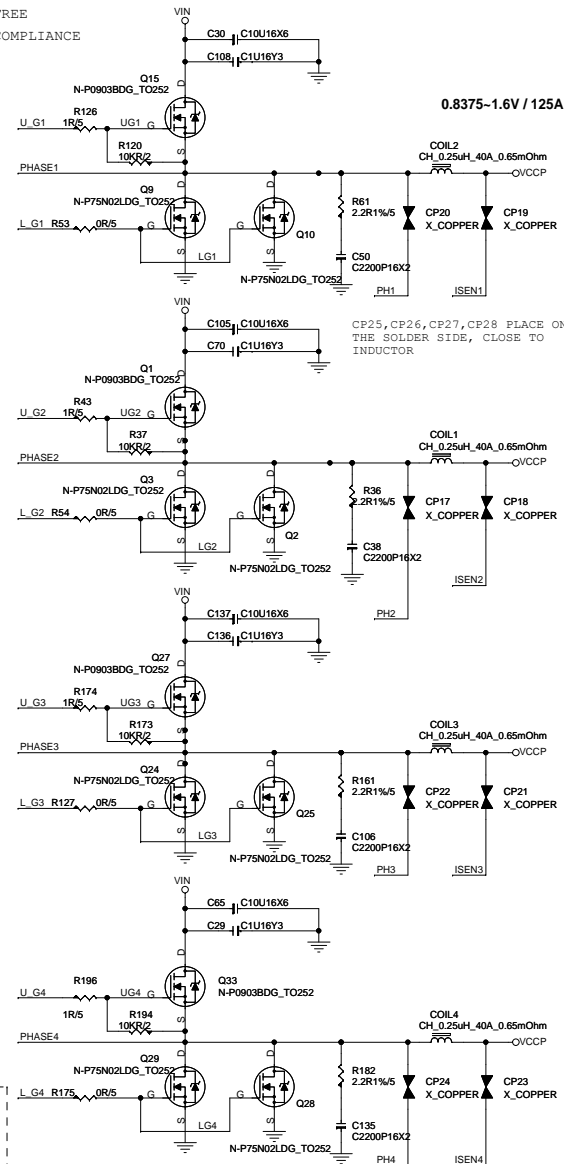
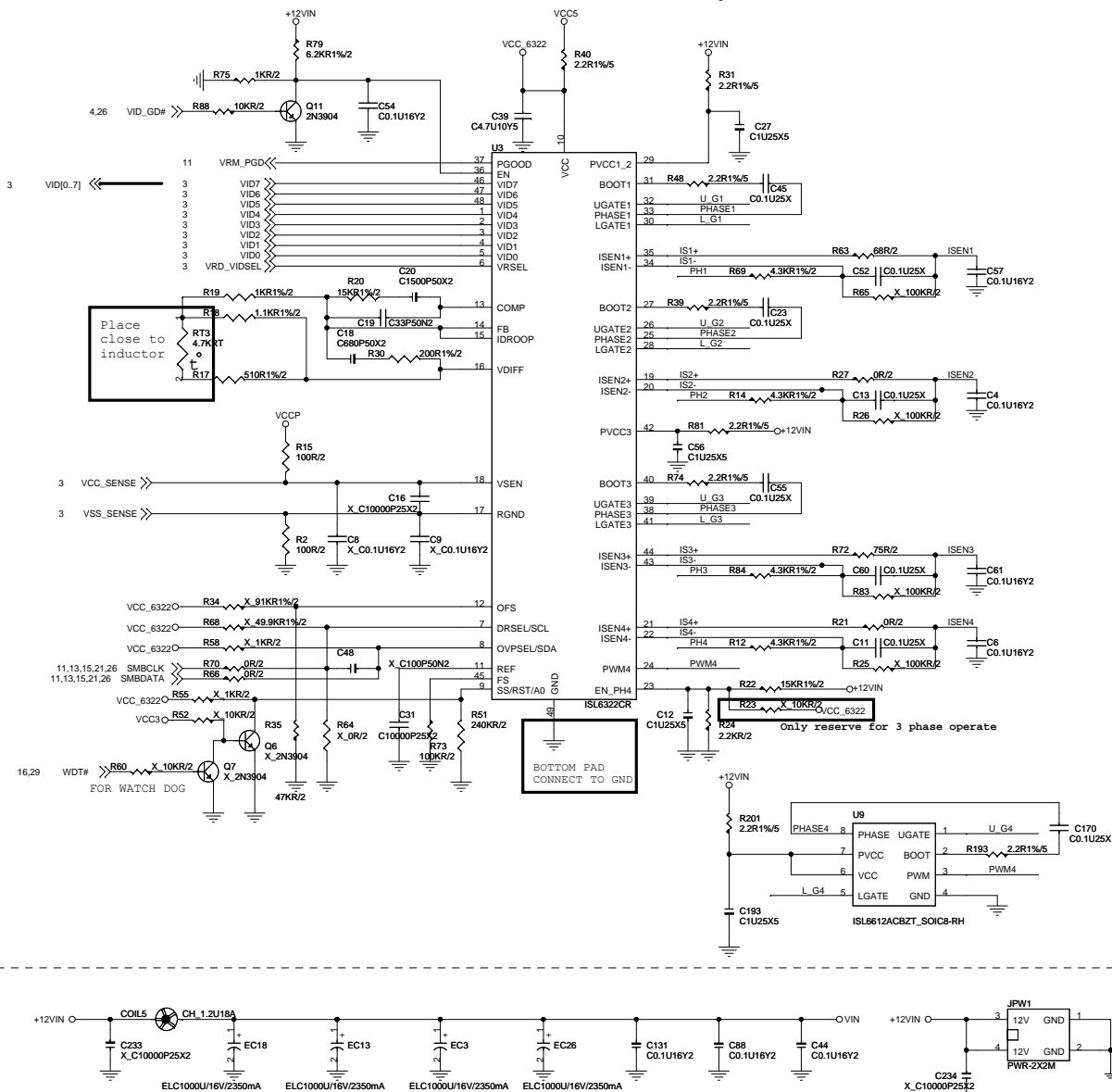
ESR=13mΩ, Ripplecur.<2350mA, 105C, longlife change from 2000hrs to 3000hrs, KXZ series

IND CHOKE, 0.25uH, 20%, DIP/8.5mm, 40A, 0.6mΩhm,, , PEW, FERRITE, SQUARE, RoHS COMPLIANCE

IND CHOKE, 1.1uH, 20%, DIP/9mm, 25A, 1.4mΩhm, 5.5T, 0.9mmx3, PEW, IRON,, LEAD FREE

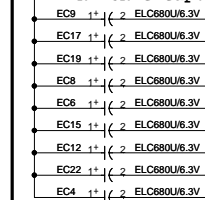
CAP, EL, 1000u, 16V, Dip-8x20/3.5mm, 20%, 12mΩhm, 2350mA, 105C, 3000hrs, RoHS COMPLIANCE

VIN  
C30 C10M16X6



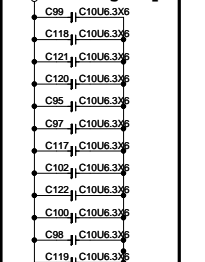
VCCP 680uF EL Capacitors

PANASONIC Cap.

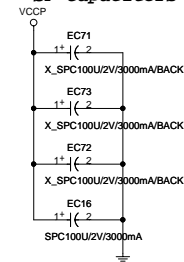


MLCC Inside Socket

CP Samsung Cap.

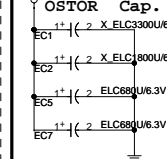


### SP Capacitors



*EL Capacitors*

VCCP



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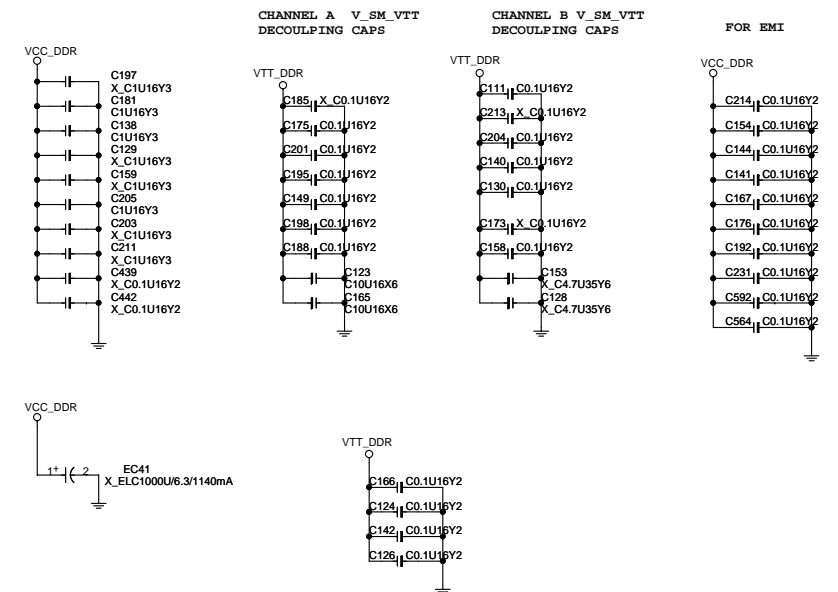
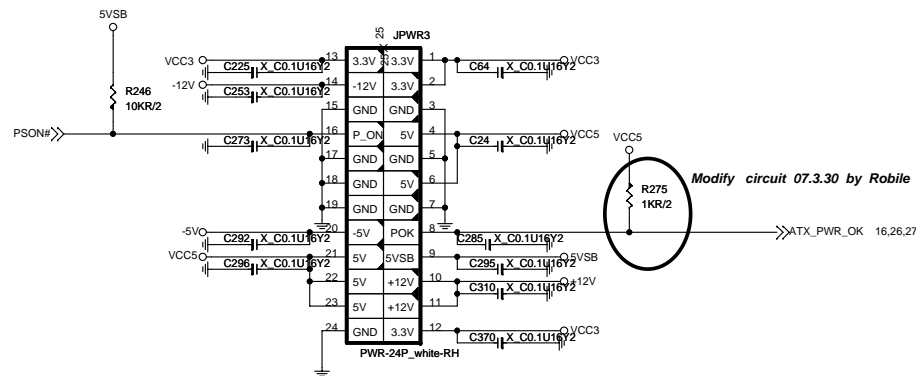
MS-7358

|        |                              |
|--------|------------------------------|
| Size   | Document Description         |
| Custom | <b>VRD11-ISL6322 4-phase</b> |

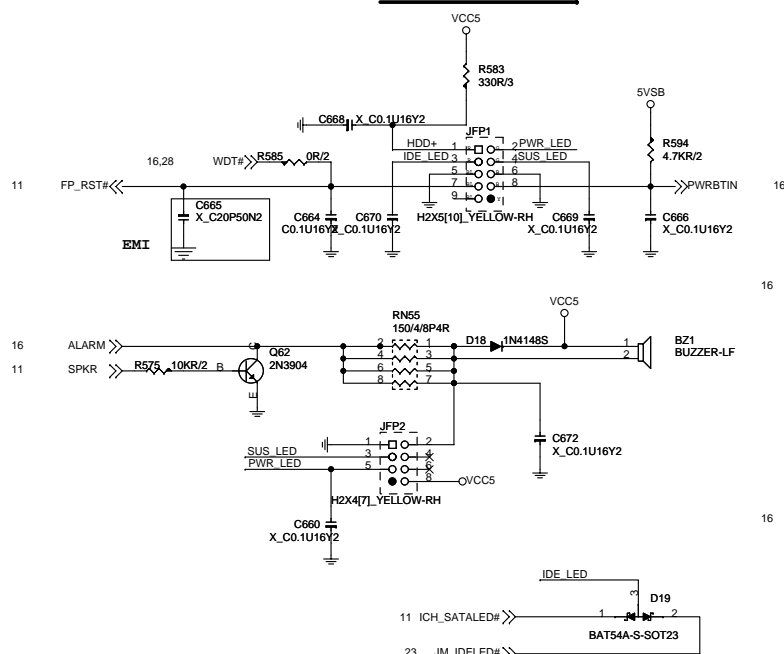
Rev  
0A

|                             |                |
|-----------------------------|----------------|
| Date: Tuesday, May 08, 2007 | Sheet 28 of 34 |
|-----------------------------|----------------|

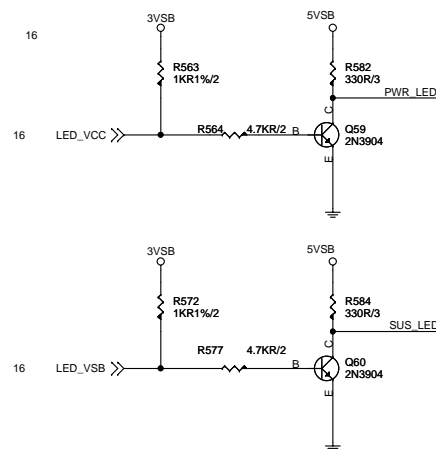
## ATX POWER CONNECTOR



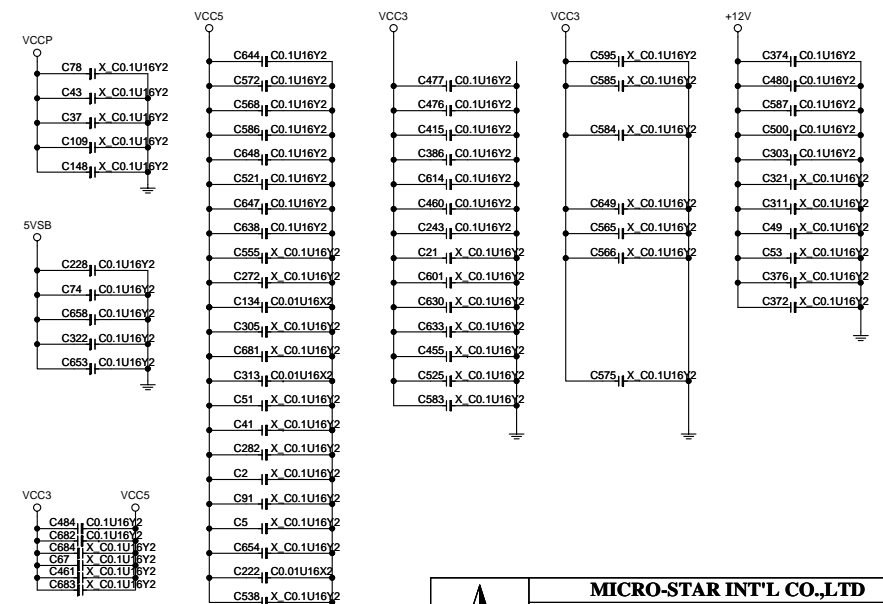
### FRONT PANNEL



**LED ( for Fintek 71882)**



Cap. for EMI & Power

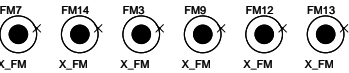


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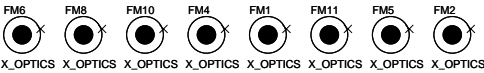
MS-7358

|                             |  |           |
|-----------------------------|--|-----------|
| Size<br>Custom              | Document Description<br><b>ATX PWR-Connector &amp; Front Panel</b> | Rev<br>0A |
| Date: Tuesday, May 08, 2007 | Sheet 29 of 34   |           |

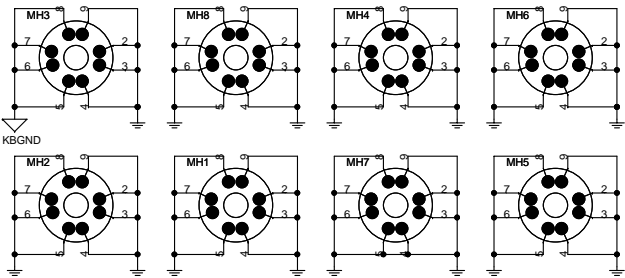
Optical Fiducial Marks-120



Optical Fiducial Marks-100



Mounting Holes



Simulation

