

# MS-7037

Version 0.0B  
12/26/2003 Update

Intel (R) Springdale (GMCH) + ICH5 Chipset  
Intel Northwood & Prescott mPGA478B Processor

## CPU:

Intel Northwood/Prescott - 3.6G & Above

## System Chipset:

Intel Springdale - GMCH (North Bridge)  
Intel ICH5 (South Bridge)

## On Board Chipset:

CLOCK -- Cypress CY28405

## On Board Chipset:

BIOS -- FWH EEPROM 4M  
AC'97 Codec -- REALTEK / ALC655  
LPC Super I/O -- W83627THF-AW  
LAN - REALTEK RTL8110S/8100C

## Main Memory:

DDR \* 2 (Max 2GB)

## Expansion Slots:

PCI2.3 SLOT \* 3  
AGP4X/8X SLOT \* 1

## Intersil PWM:

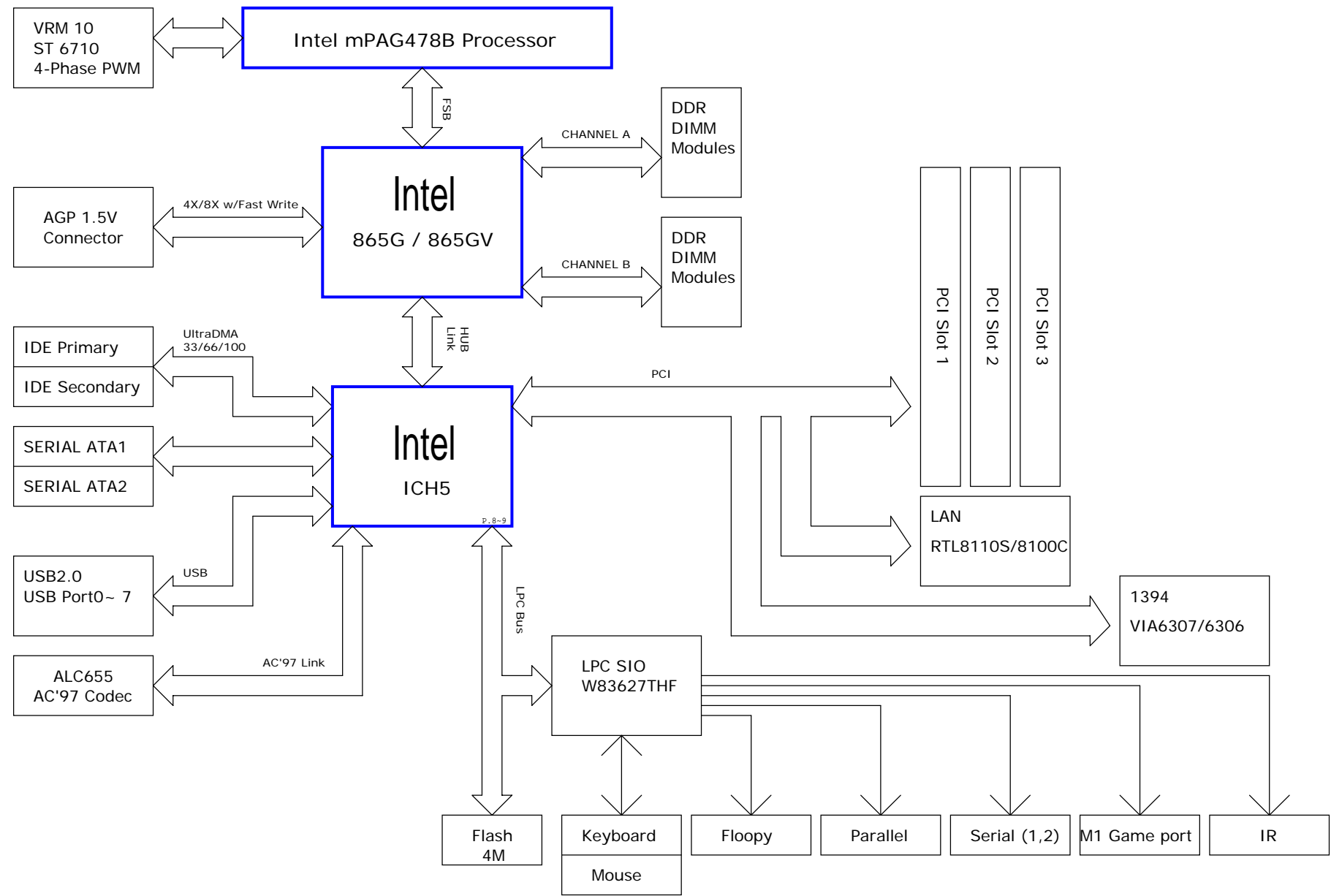
Controller: ST6710

ERP BOM	Function Description	
501/601-7037	Opt : IL	865G-A2+ICH5,W/LAN-8100,W/655,W/1394-6306
01S---		
501/601-7037	Opt : A	865G-A2+ICH5,W/LAN-8100,W/655,W/1394-6307
02S---		W/internal Amplifier SSM2211S
501/601-7037	Opt : VL	865GV+ICH5,W/LAN-8100,W/655,WO/1394-6306
03S---		W/Acer's pin-header



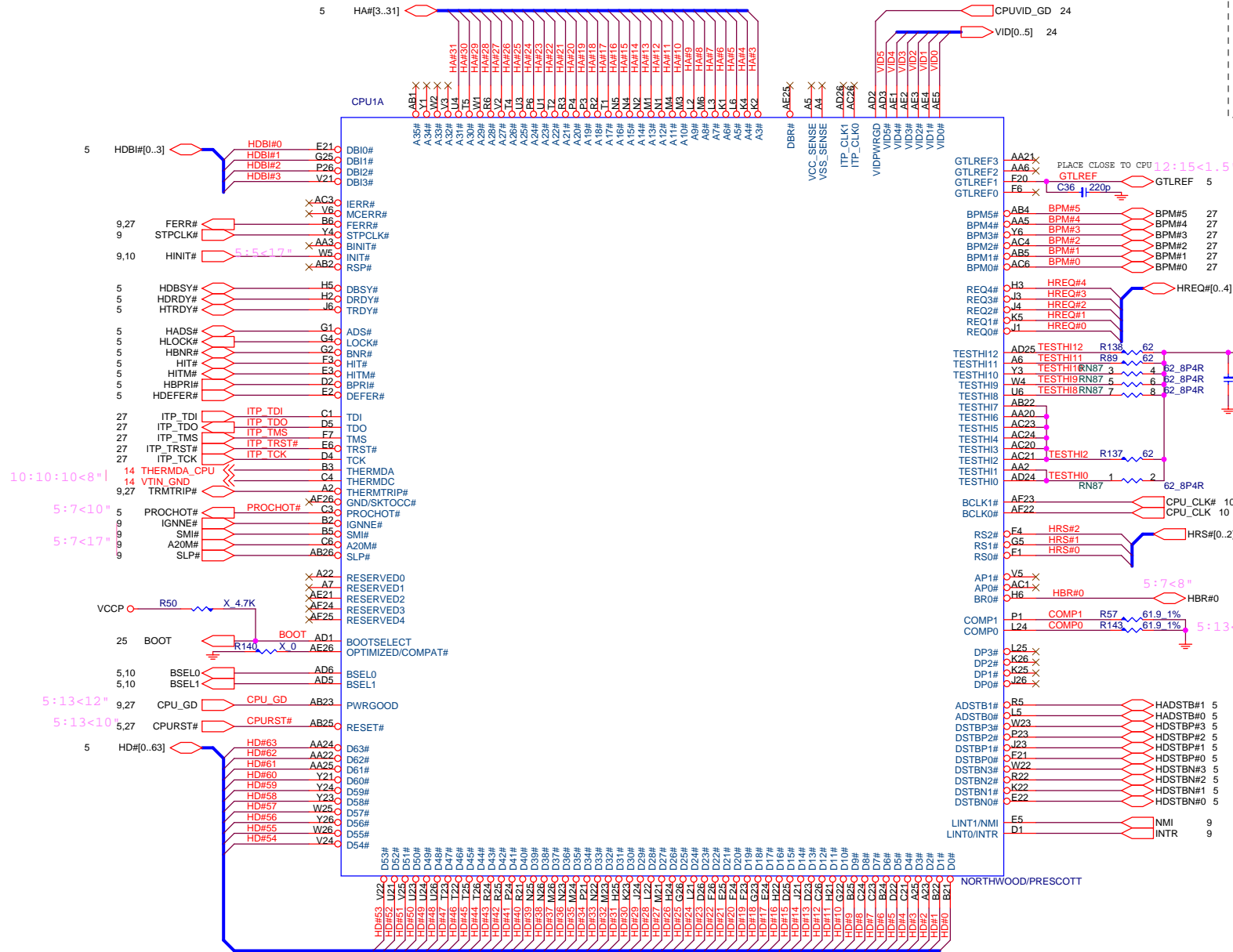
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# Block Diagram

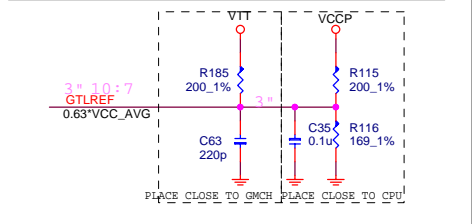


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Document Number <b>BLOCK DIAGRAM</b>		
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# CPU SIGNAL BLOCK

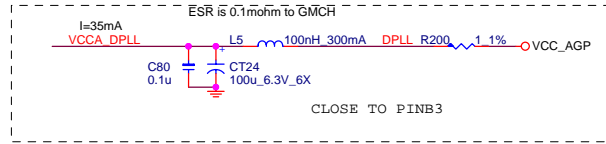
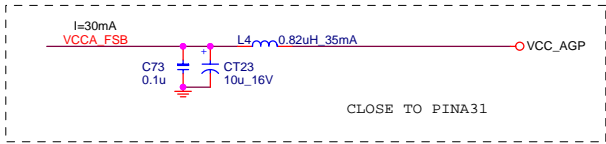
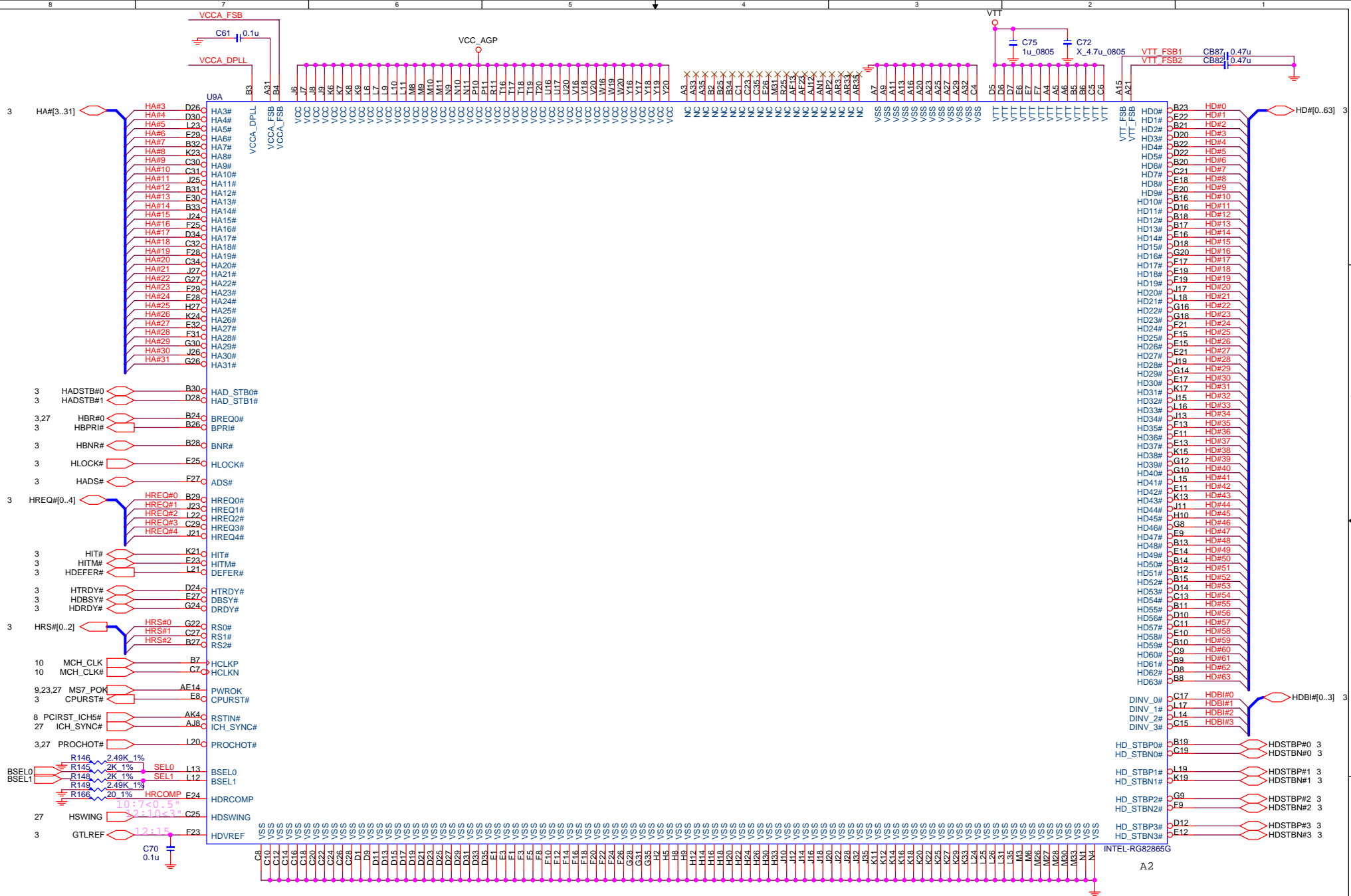


## CPU GTL REFERENCE VOLTAGE BLOCK

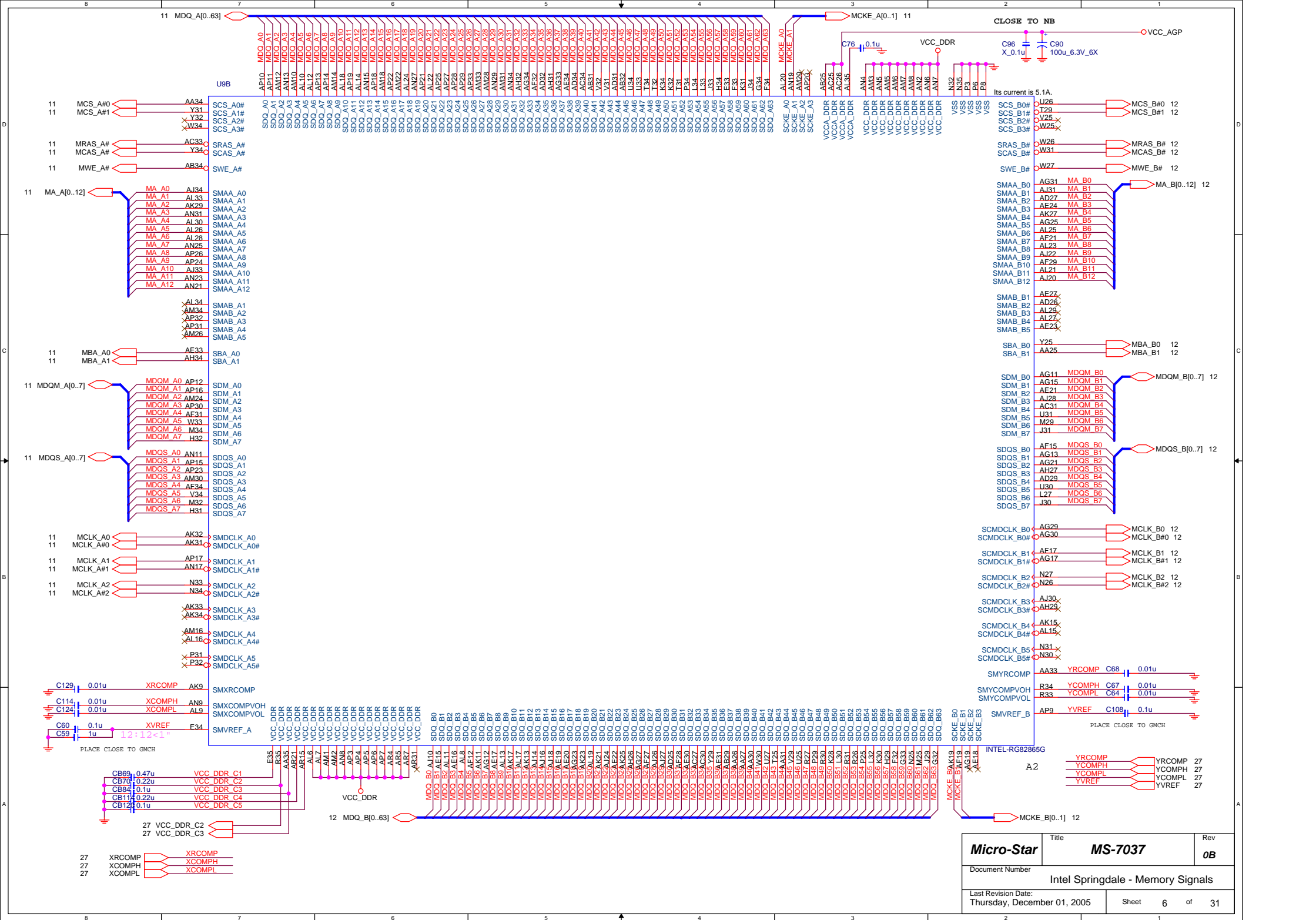


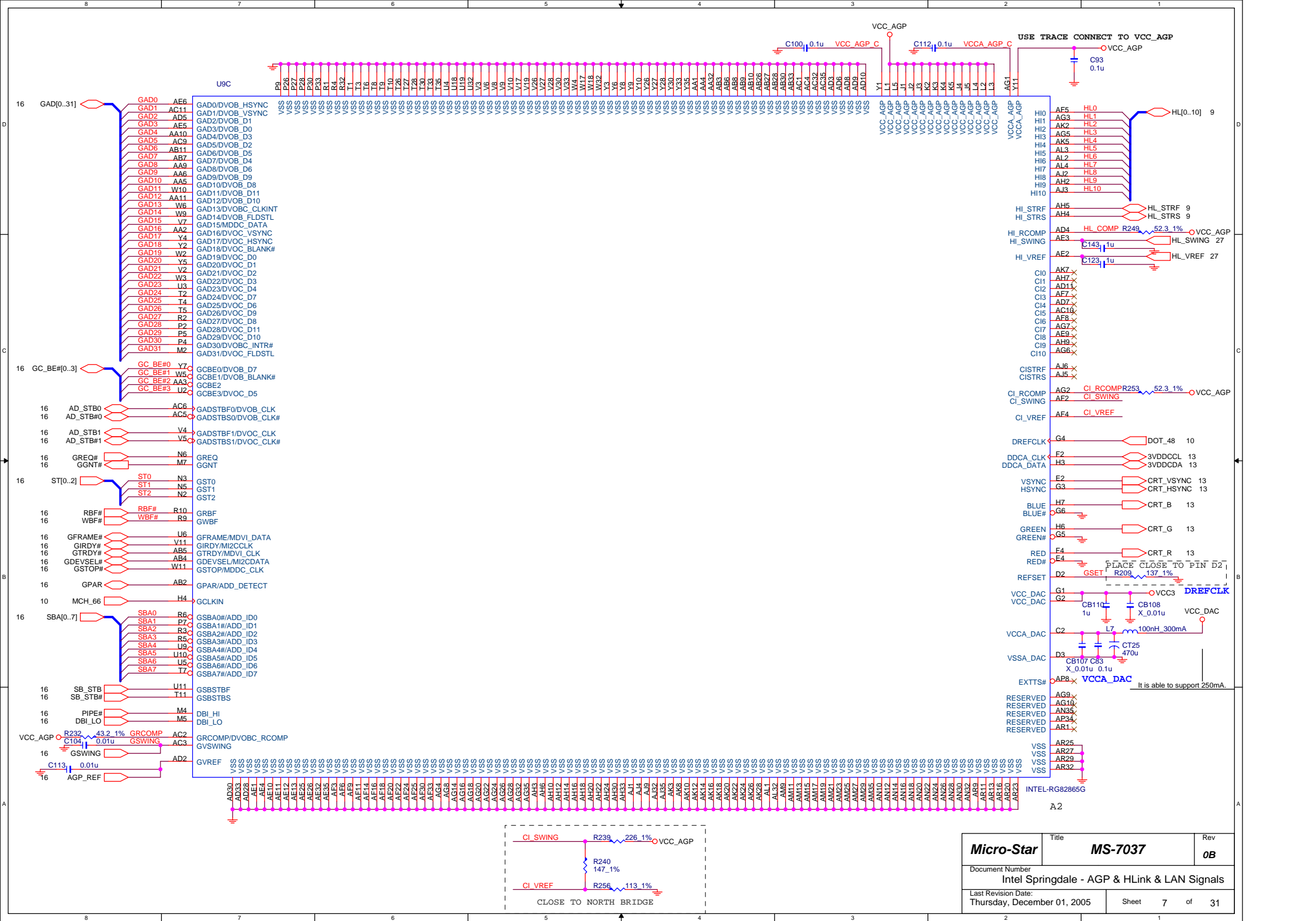
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Intel Springdale - CPU Signals				
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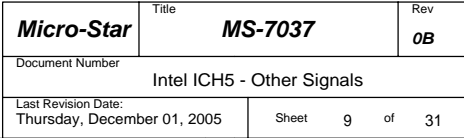


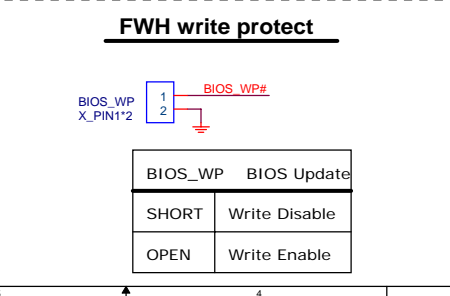
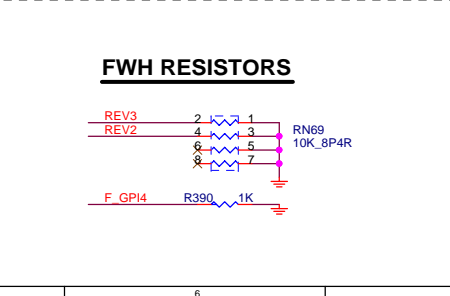
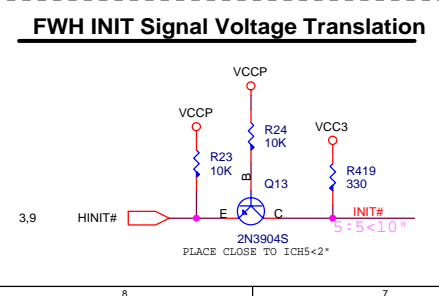
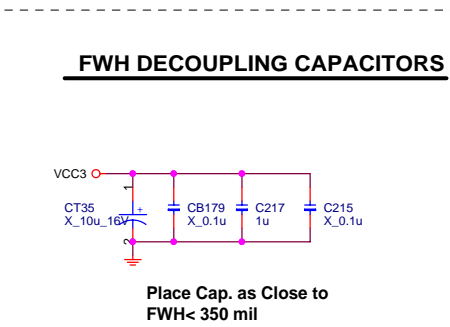
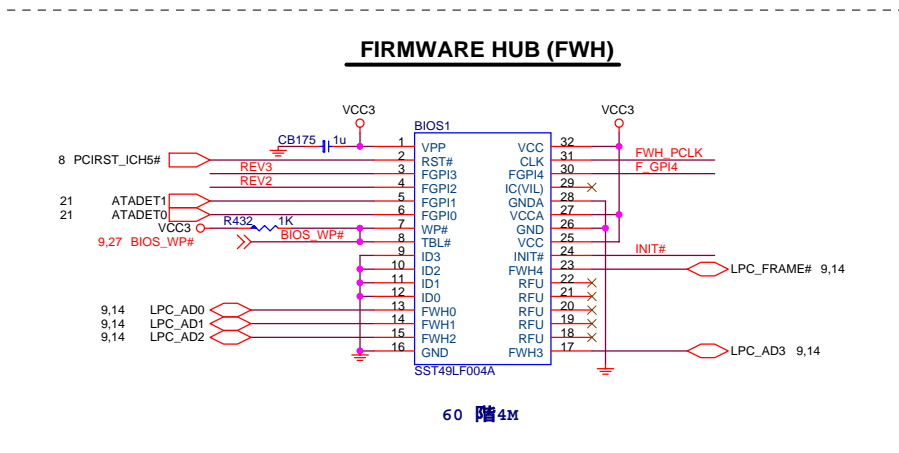
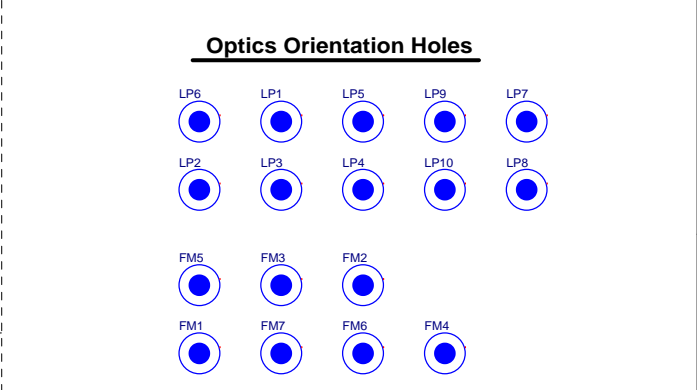
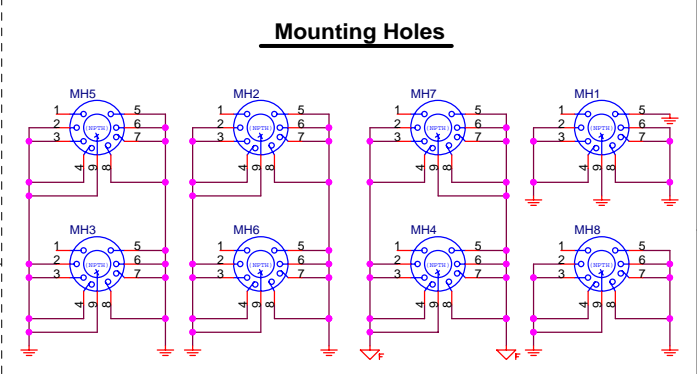
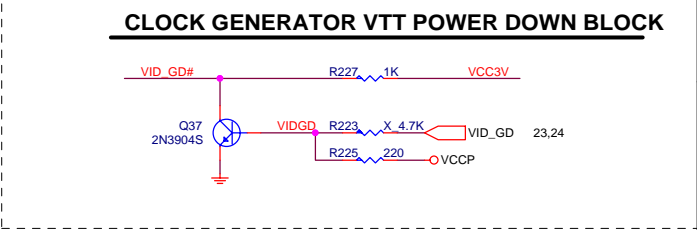
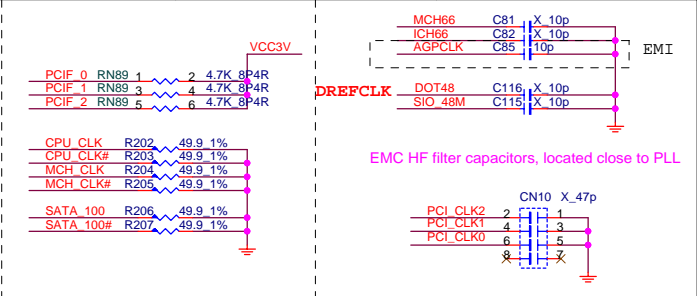
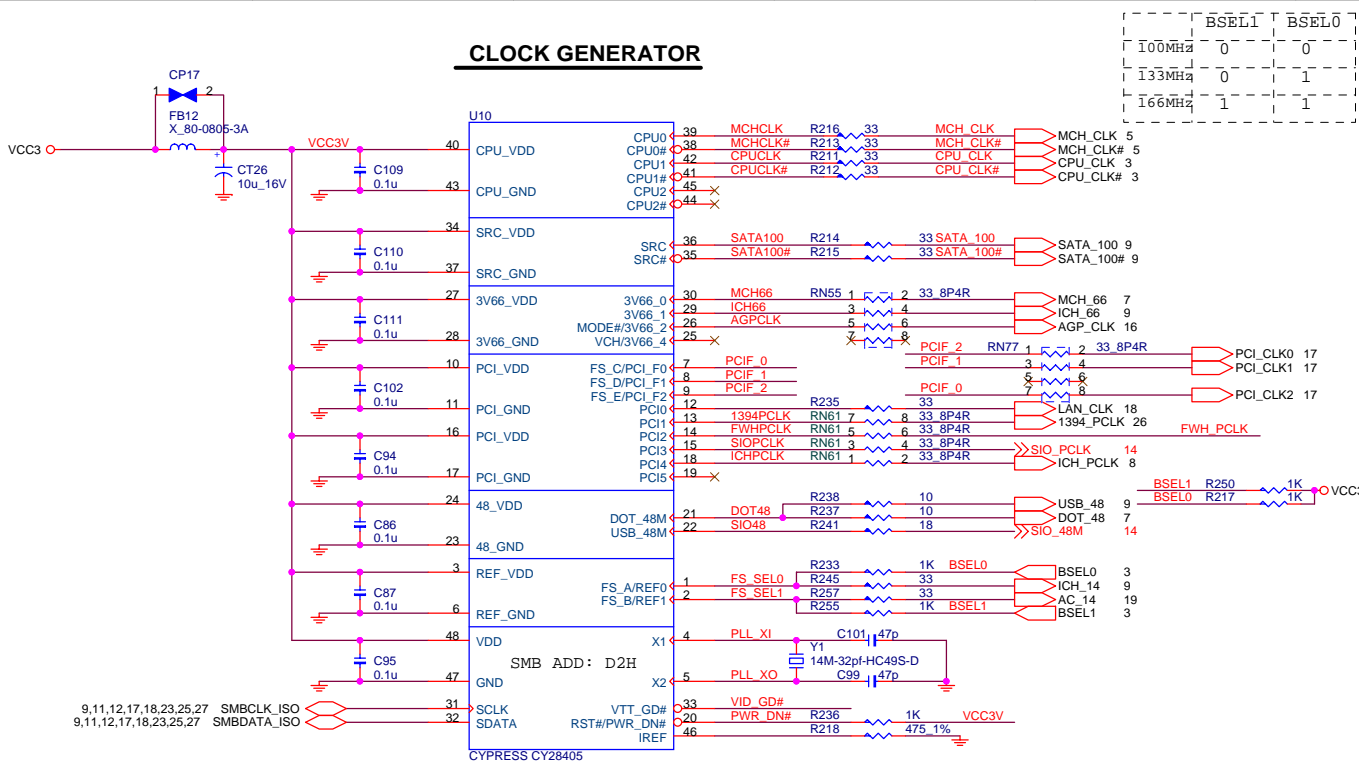












### Simulation

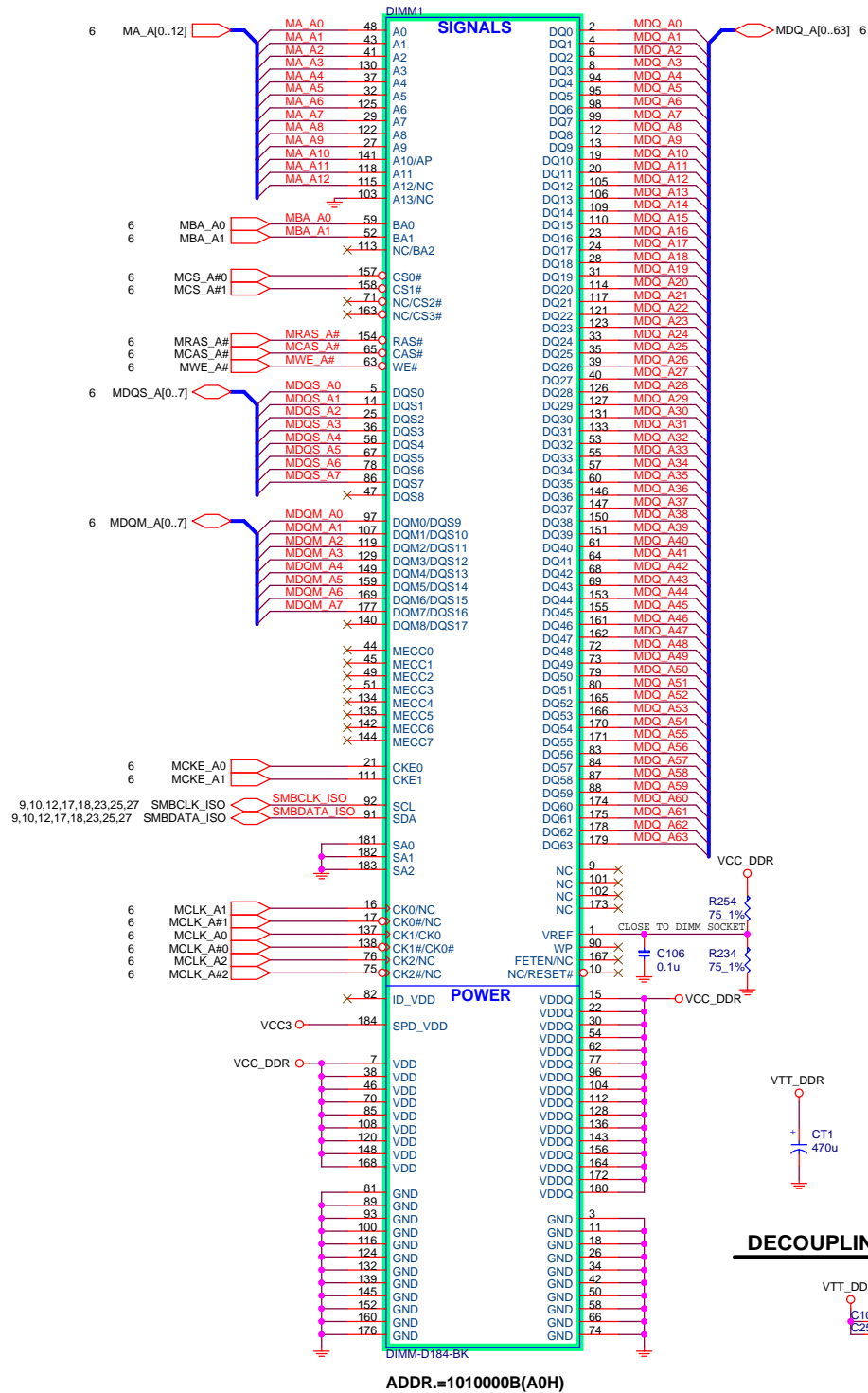
Micro-Star	Title	Rev
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Document Number: Clock - Cypress CY28405 & BIOS

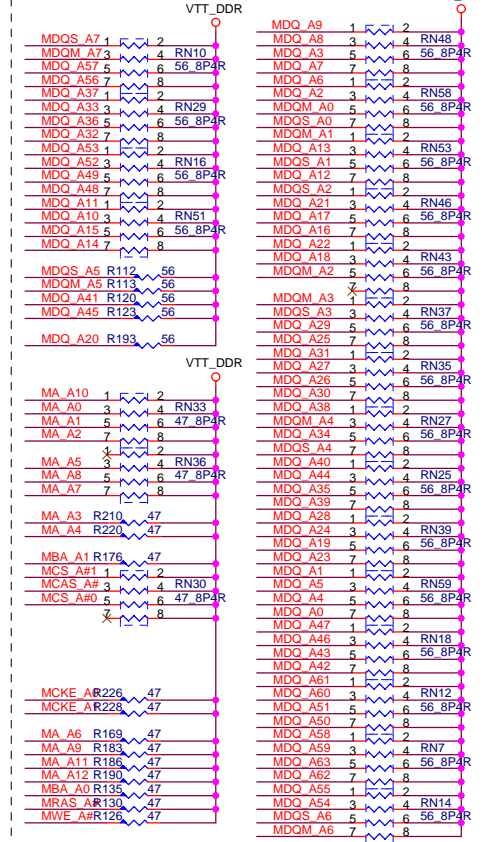
Last Revision Date: Thursday, December 01, 2005

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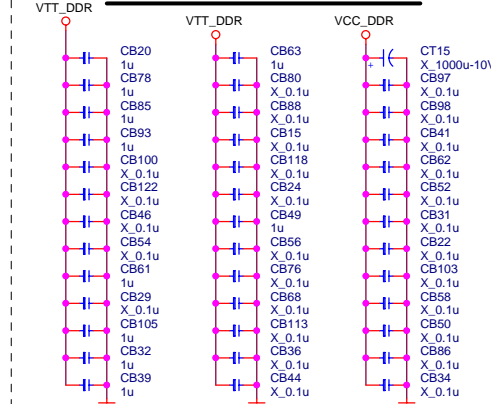
## DDR DIMM1



## DDR Terminational Resistors



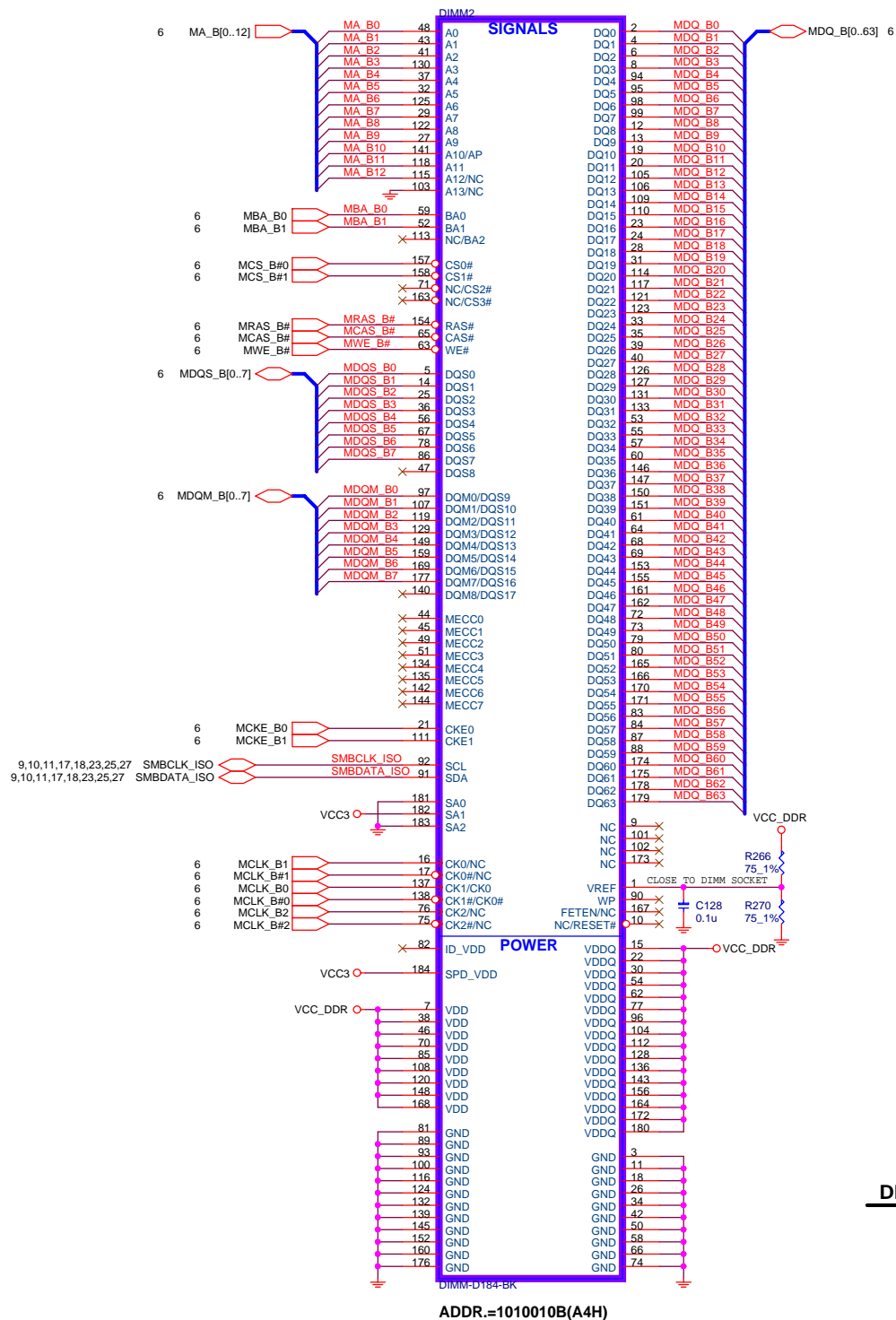
## DECOUPLING CAPACITORS



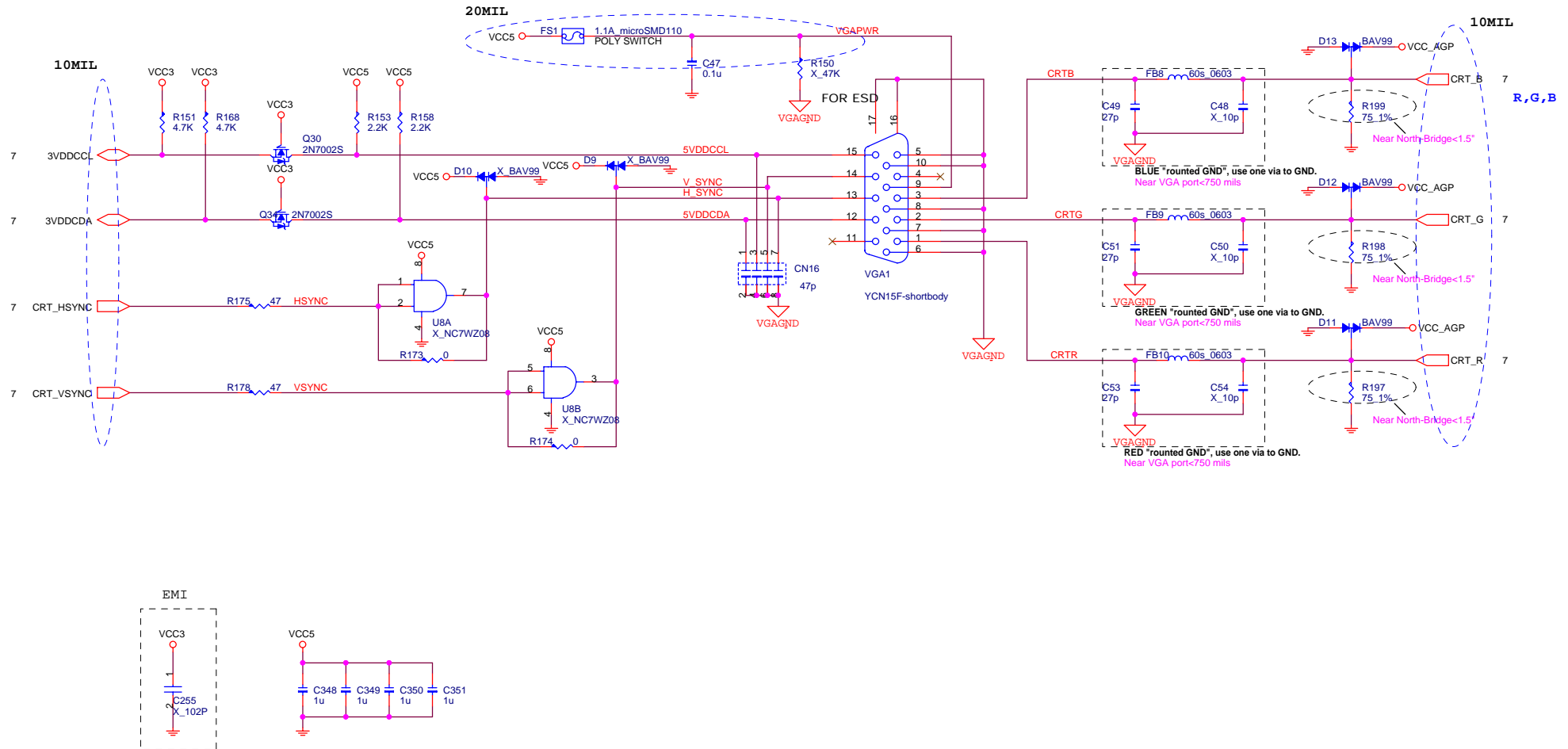
Place these decoupling capacitors close to VTT\_DDR termination resistors.  
One decoupling capacitor for each R-pack.

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DDR DIMM 1				
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## DDR DIMM2

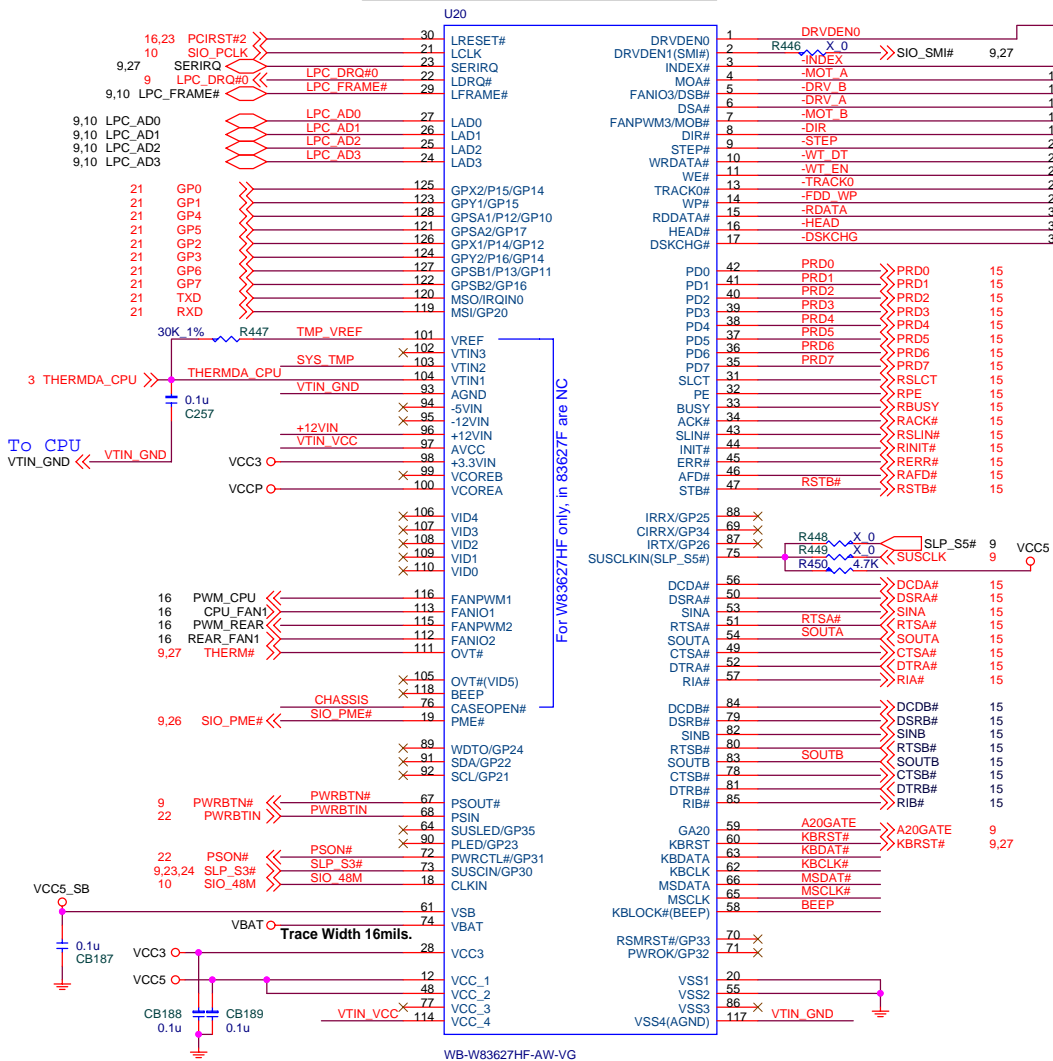


## VGA CONNECTOR



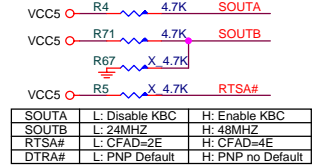
Micro-Star	Title <b>MS-7037</b>	Rev <b>0B</b>
Document Number <b>VGA CONNECTOR</b>		
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# LPC SUPER I/O W83627THF

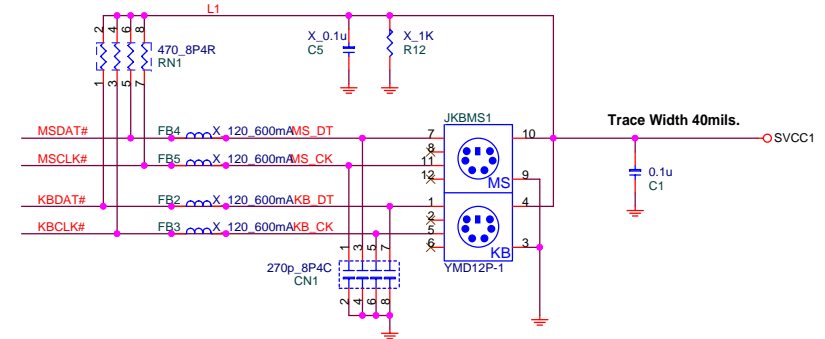


## FLOPPY CONNECTOR

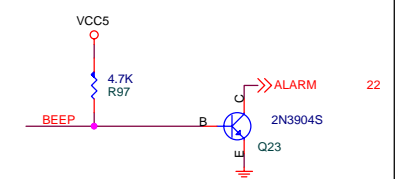
## SUPER I/O STRAPPING RESISTOR



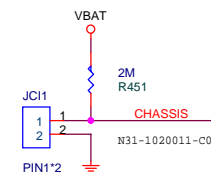
## PS2 KEYBOARD & MOUSE CONNECTOR



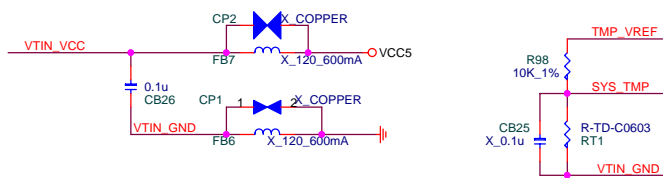
## SPEAKER BLOCK



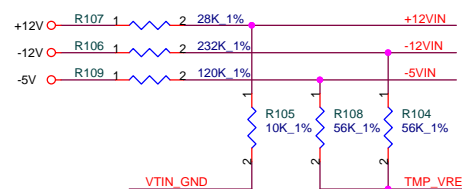
## Chassis Intrusion



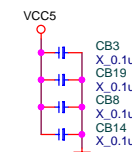
## THERMAL RESISTOR BLOCK



NOTE: LOCATE CLOSE STATUS PANEL



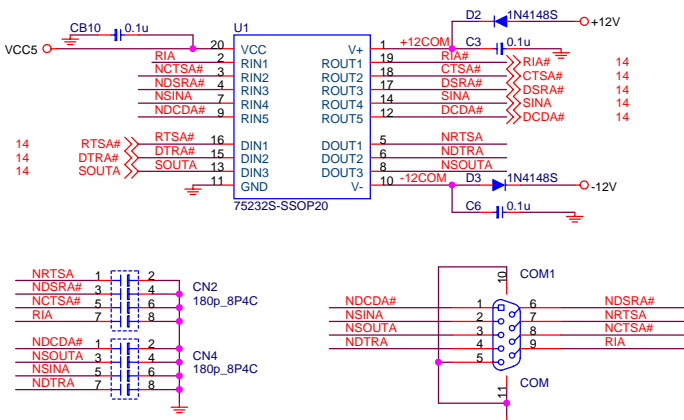
## LPC I/O DECOUPLING CAPACITORS



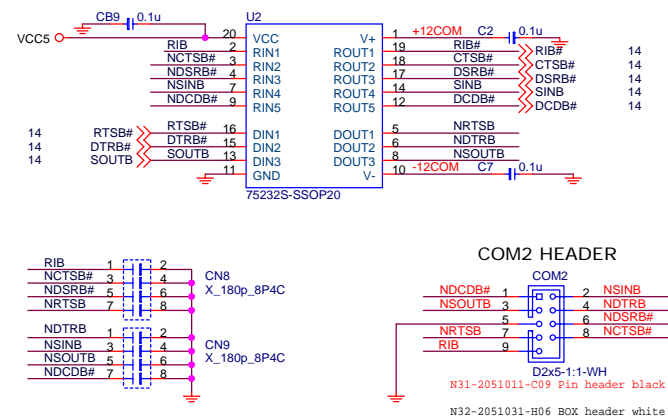
Micro-Star	Title	MS-7037	Rev	0B
Document Number	SIO-W83627HF & KB/MS & FDD			
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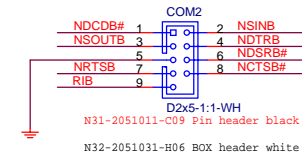
## SERIAL PORT 1



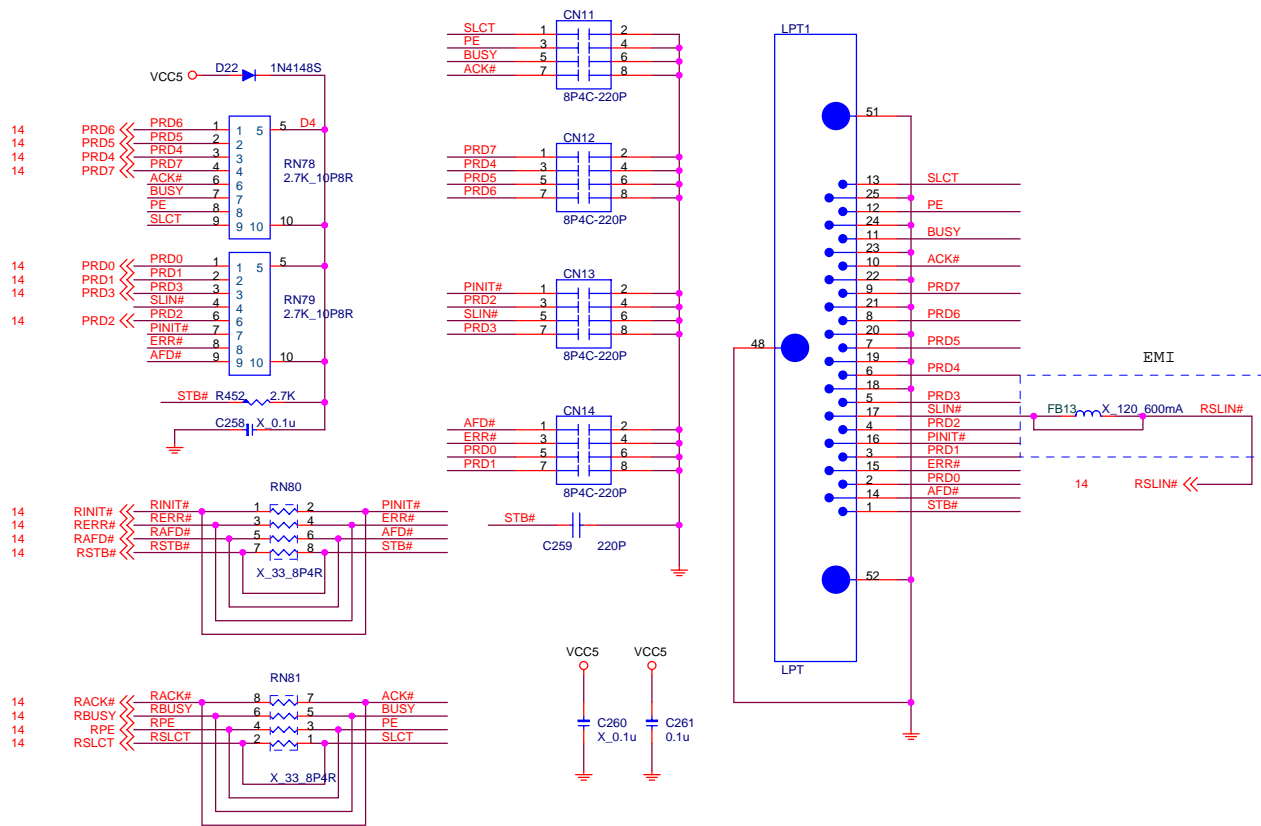
## SERIAL PORT 2



### COM2 HEADER



## PARALLAL PORT



Micro-Star	Title	MS-7037	Rev	0B
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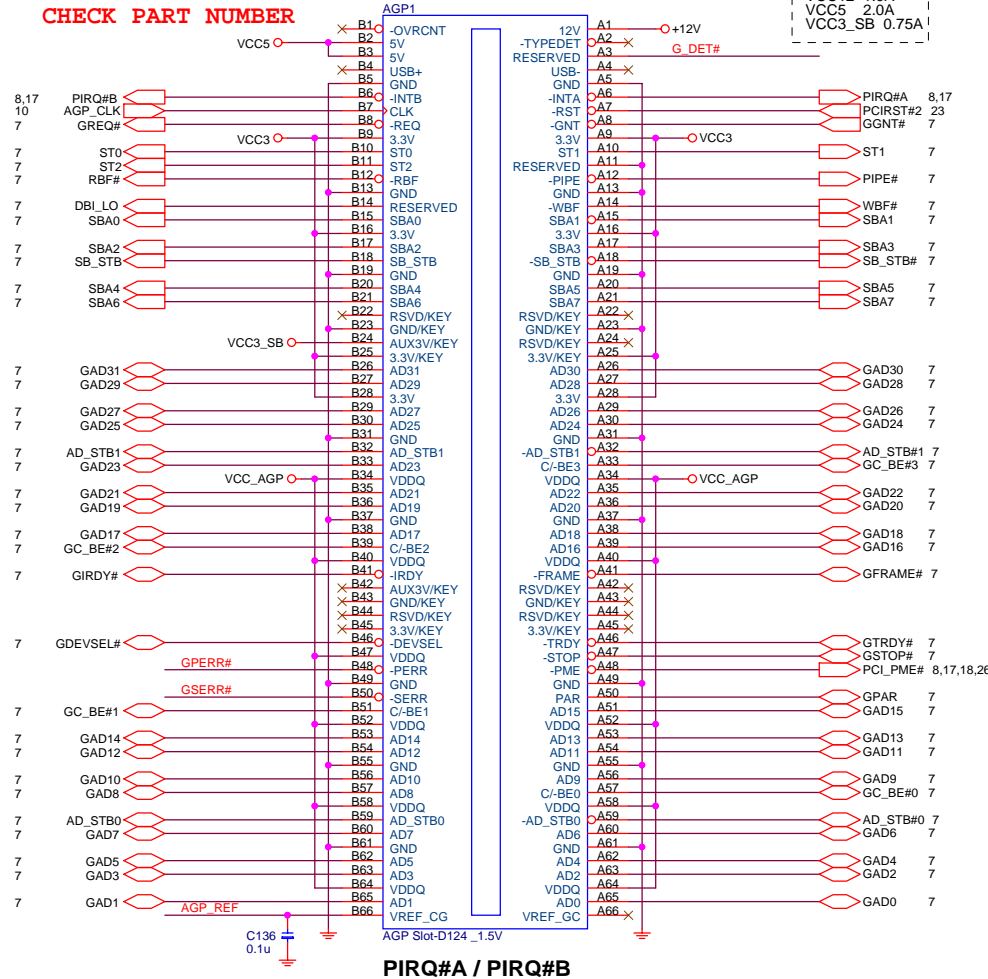


## AGP 1.5V 1X/2X/4X/8X SLOT(AGP VER:3.0)

VCC5 = 60mils trace / 15 mils space

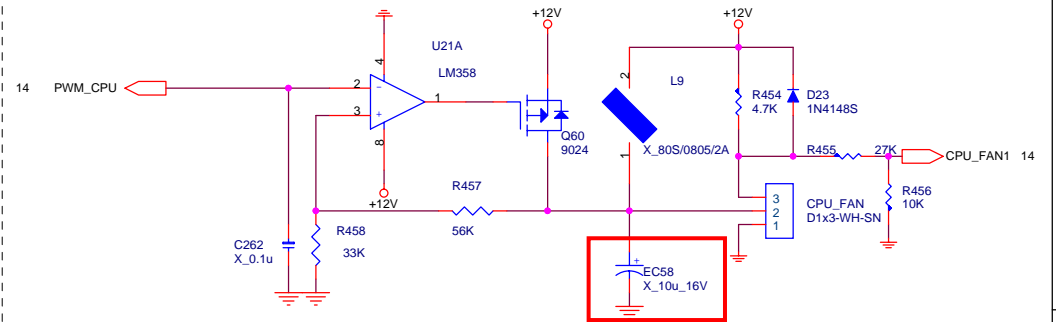
AGP Slot I<sub>max</sub>  
VCCq 8.0A  
VCC3 6.0A  
VCC12 1.0A  
VCC5 2.0A  
VCC3\_SB 0.75A

### CHECK PART NUMBER

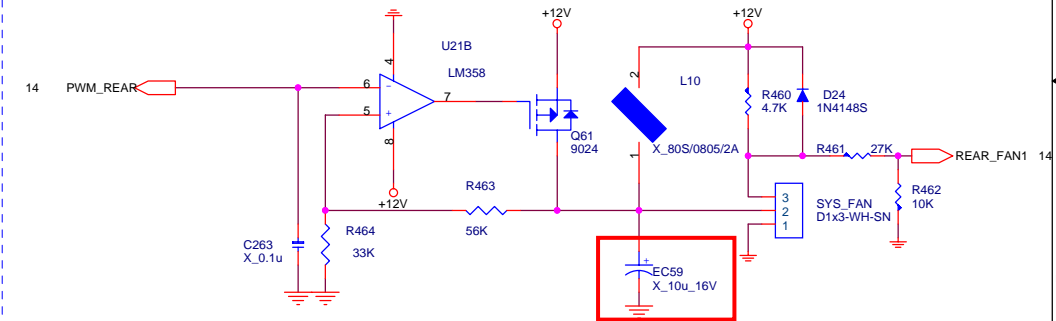


PIRQ#A / PIRQ#B

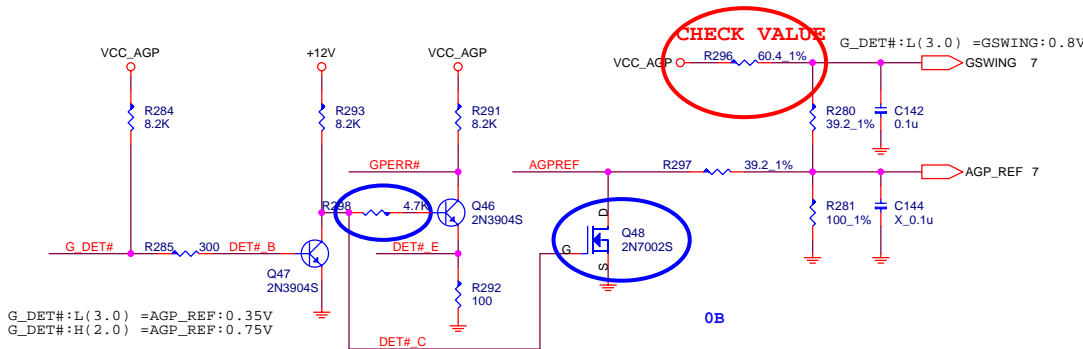
## CPU FAN



## SYSTEM FAN



## Springdale Reference & Swing Voltage Circuit

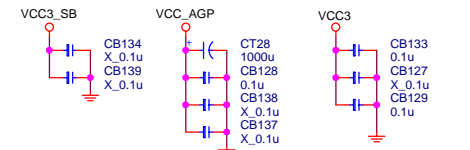


## AGP TERMINATION RESISTORS



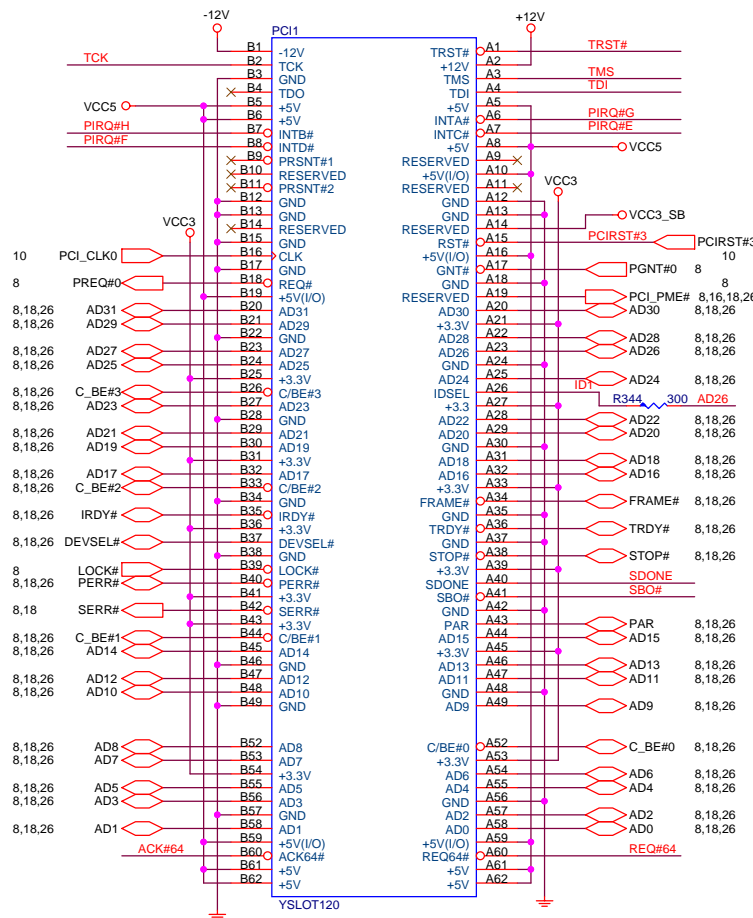
LESS 10MILS STUB TRACE LENGTH MUST BE FOLLOWING.  
Place these resistors between PCI and AGP slot

## AGP SLOT DECOUPLING CAPACITORS



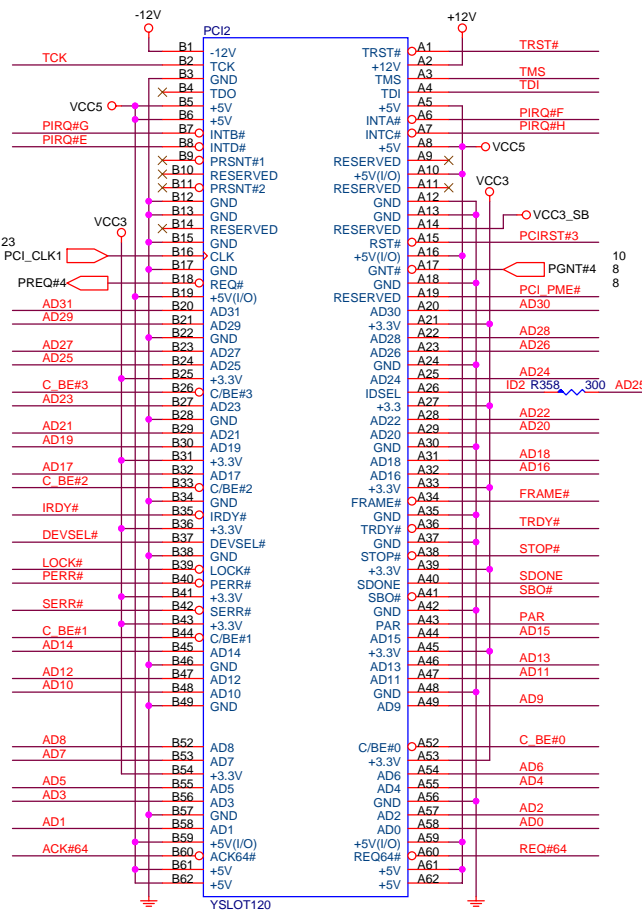
Micro-Star	Title	MS-7037	Rev	0B
Document Number	AGP SLOT & FAN CONTROL			
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## PCI SLOT 1 (PCI VER: 2.2 COMPLY)



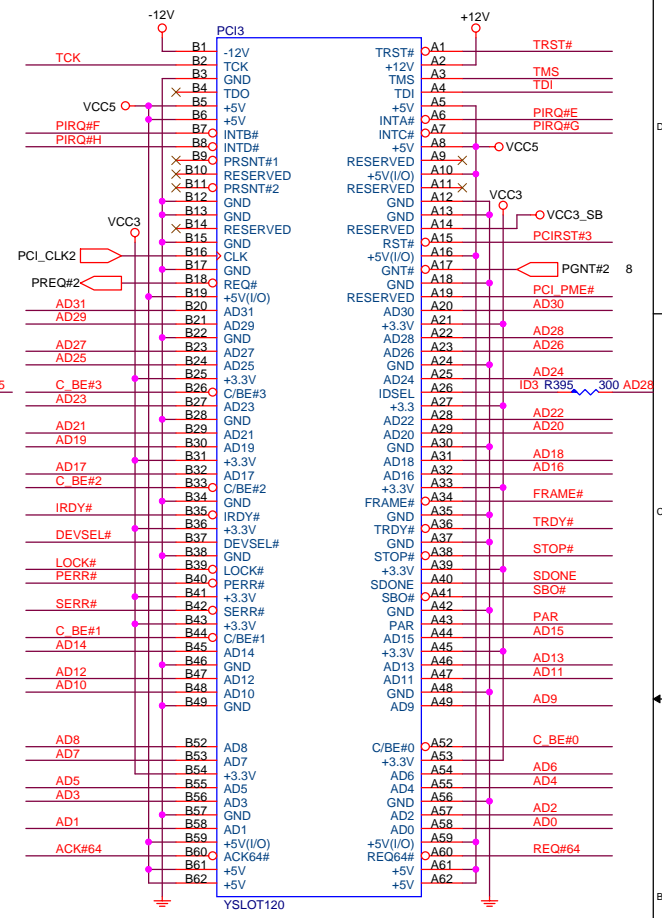
**IDSEL = AD26**  
**MASTER = PREQ#0**  
**PIRQ#G**

## PCI SLOT 2 (PCI VER: 2.2 COMPLY)



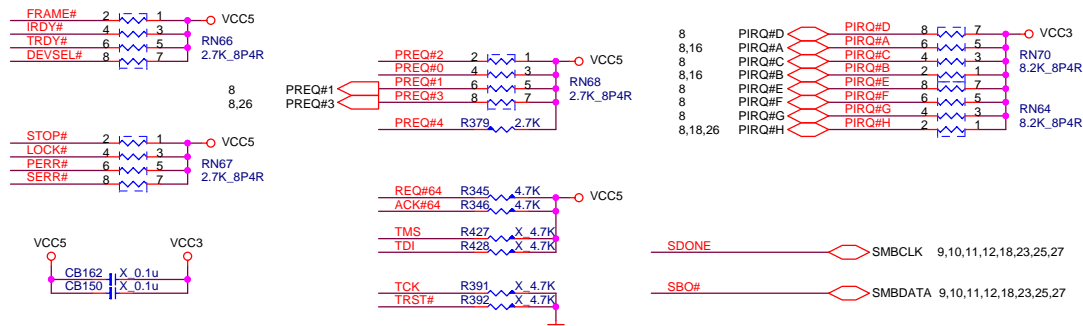
**IDSEL = AD25**  
**MASTER = PREQ#4**  
**PIRQ#F**

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

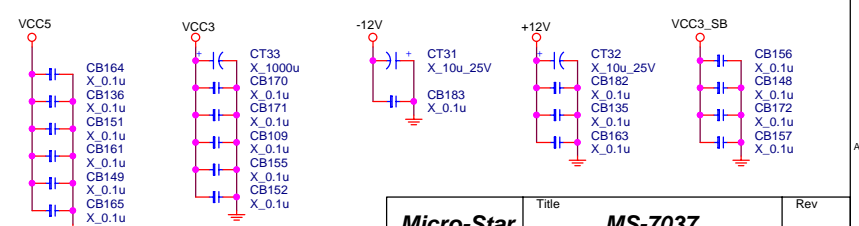


**IDSEL = AD28**  
**MASTER = PREQ#2**  
**PIRQ#E**

## PCI PULL-UP / DOWN RESISTORS

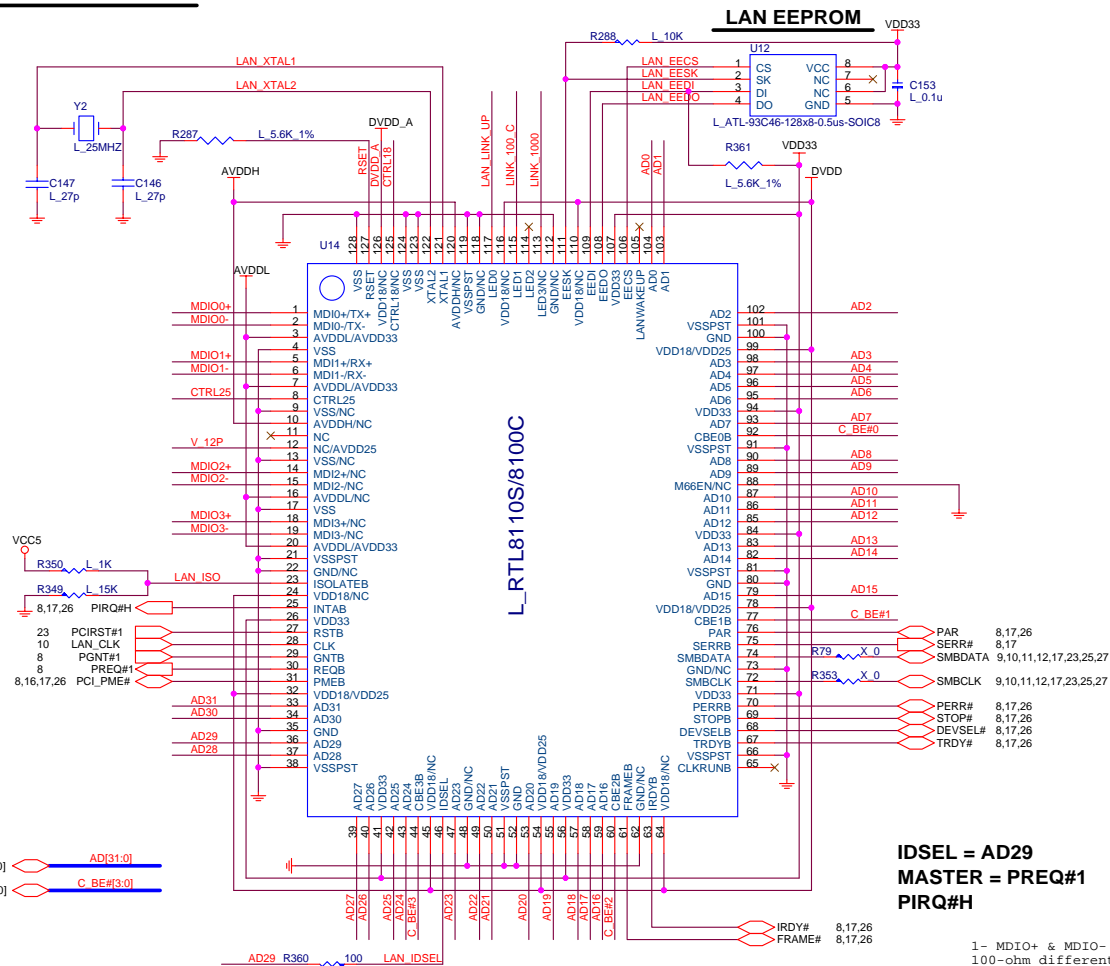


## PCI SLOT DECOUPLING CAPACITORS



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	MS-7037	0B
Document Number		
PCI 1 & 2 & 3 Slots		
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## PCI LAN RTL8110S/8100C

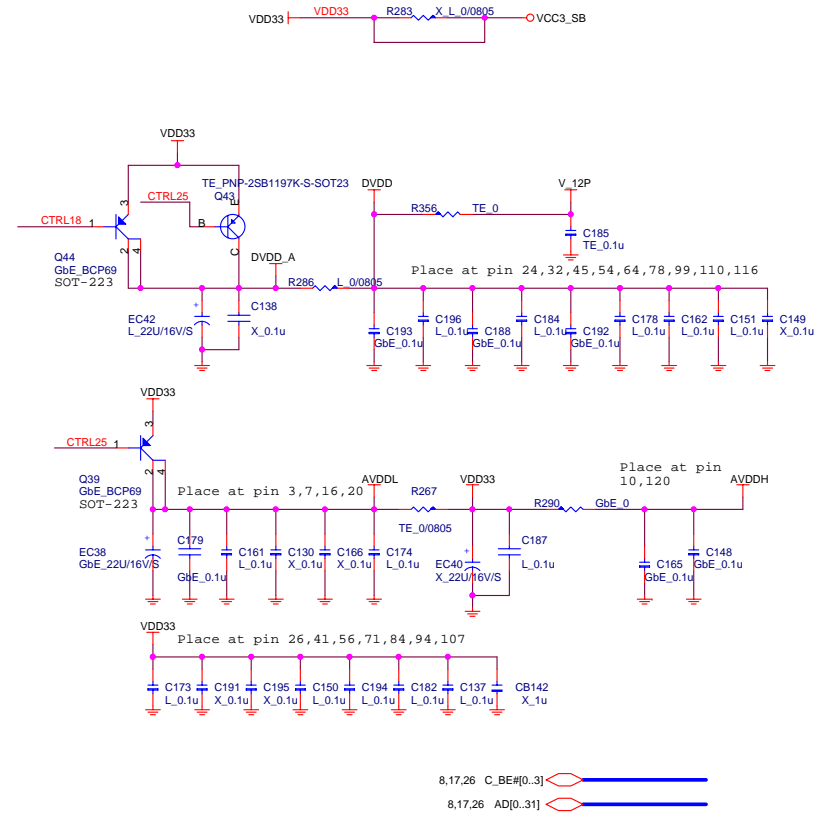


```

IDSEL = AD29
MASTER = PREQ#1
PIRQ#H

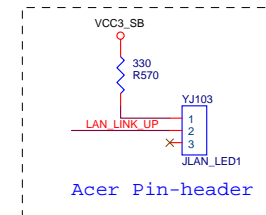
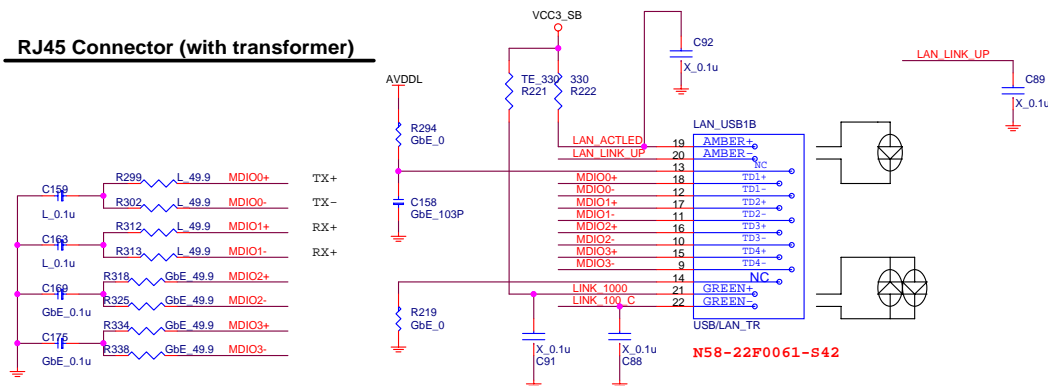
```

1- MDIO+ & MDIO- pairs should be 100-ohm differential impedance. Route equal length and symmetrically. Separate every pairs.



	DVDD	DVDDA	AVDDL	AVDDH	V-12P
8100C	2.5V	2.5V	3.3V	X	2.5V
8110S	1.8V	1.8V	2.5V	3.3V	X

### RJ45 Connector (with transformer)

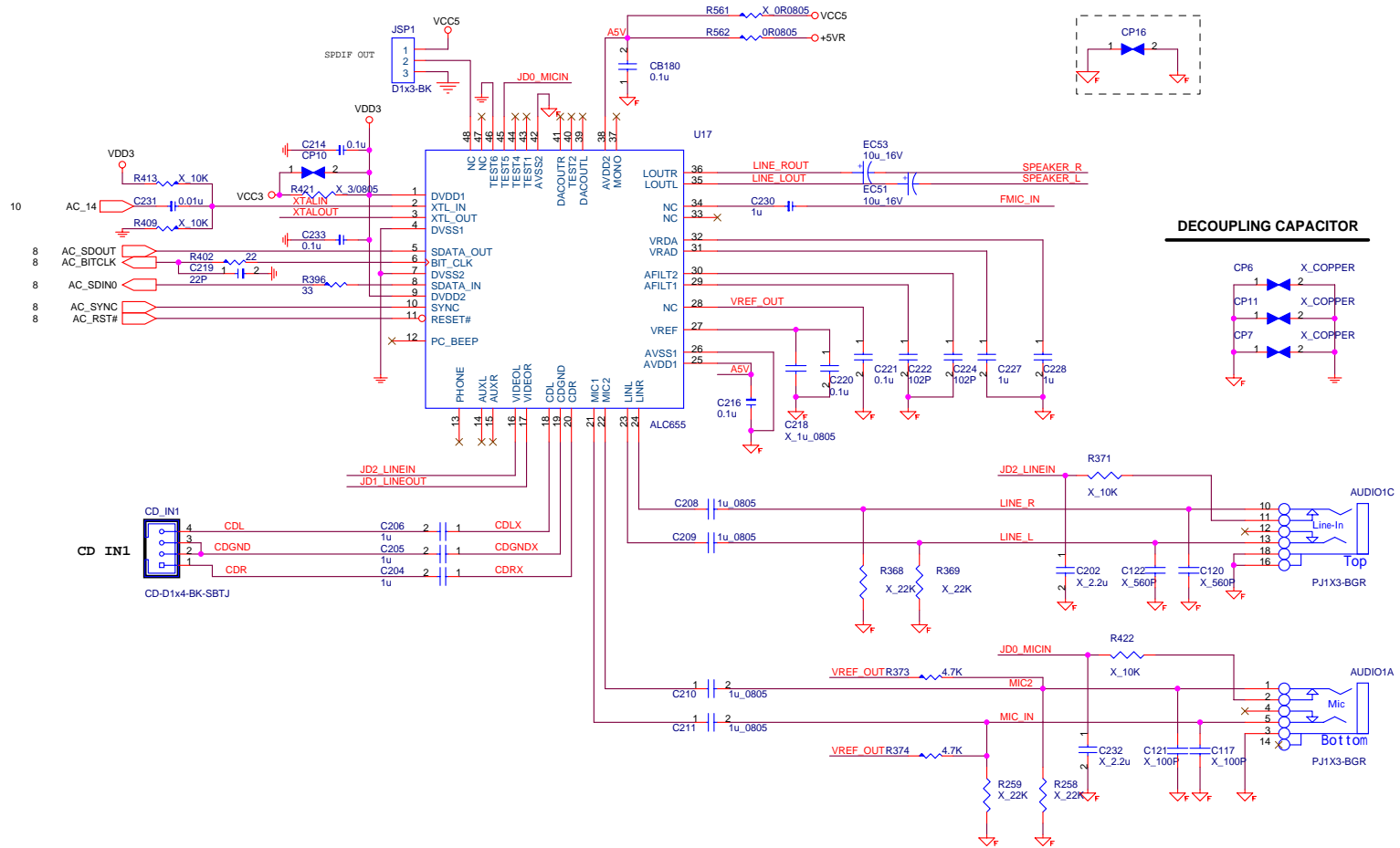


Part Value Selection:

```
GbE: 8110S LAN(1000M)
TE: 8100C LAN(10/100M)
L: With LAN option
X: No Stuff
```

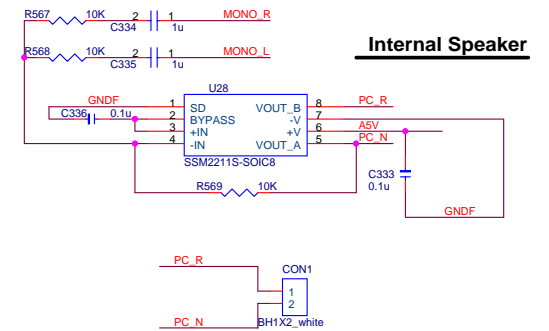
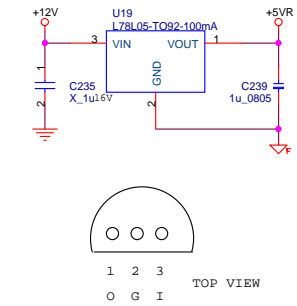
<b>Micro-Star</b>	Title <b>MS-7037</b>	Rev <b>0B</b>
Document Number <b>LAN RTL8110S/8100C</b>		
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## ALC655 AC97 CODEC



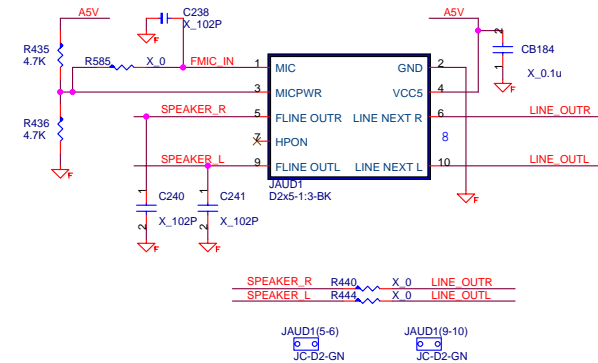
## AUDIO CODE REGULATORS

**Trace Width 30mils.**

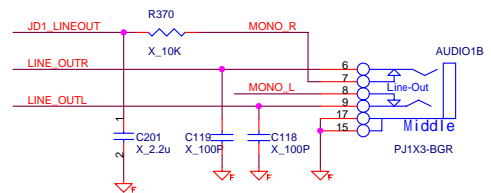


Channel Barebone Internal Speaker amplifier

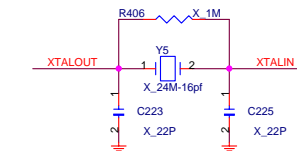
## Intel Front Audio Connector



**SPEAKER OUT JACK**

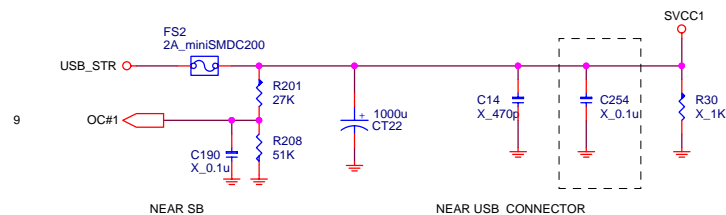


### AUDIO CODE CRYSTAL CIRCUIT

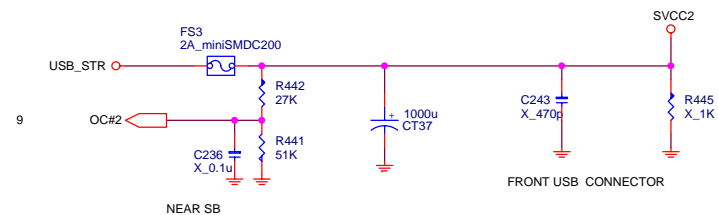


<b>Micro-Star</b>	Title <b>MS-7037</b>	Rev <b>0B</b>
Document Number <b>ALC655 / Connectors</b>		
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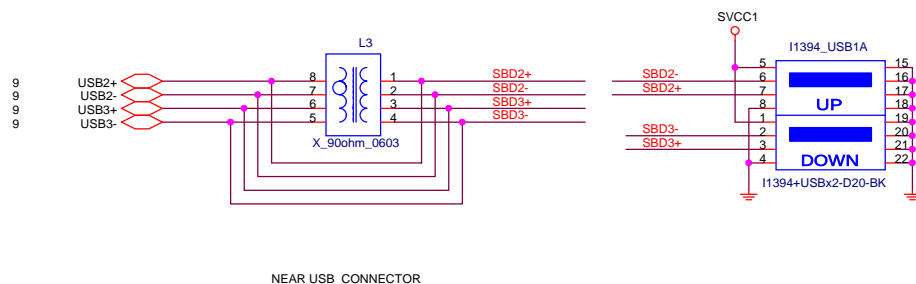
### POWER CIRCUIT FOR USB PORT 0,1,2,3



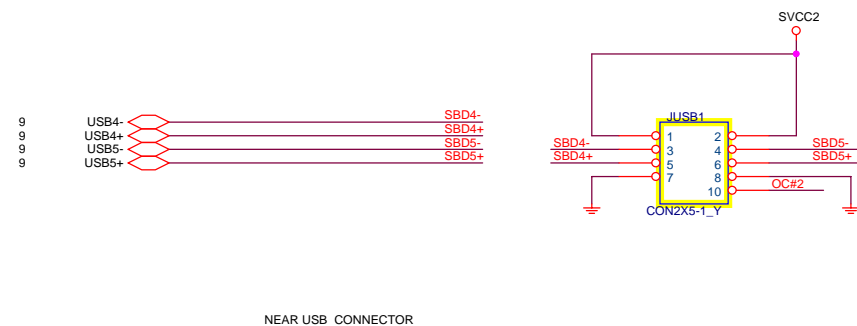
### POWER CIRCUIT FOR USB PORT 4,5,6,7



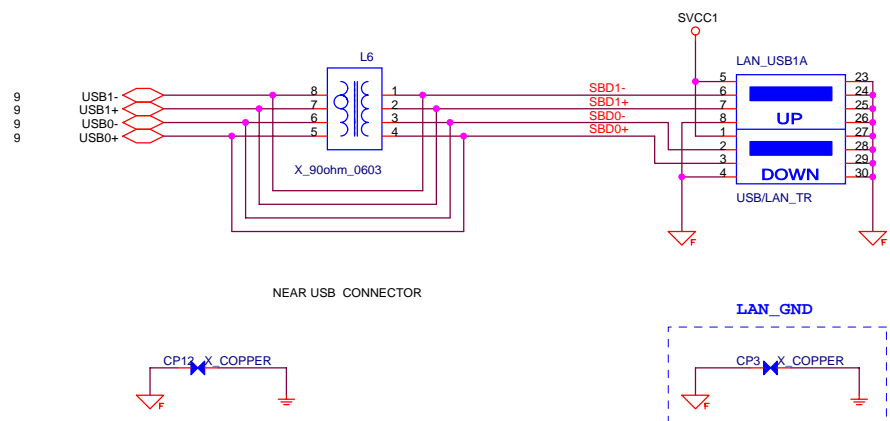
### REAR PANEL USB CONNECTOR FOR USB PORT 0,1



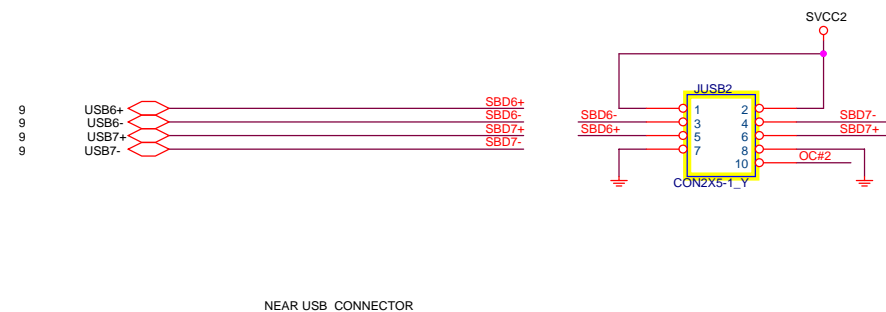
### FRONT PANEL USB CONNECTOR FOR USB PORT 4,5



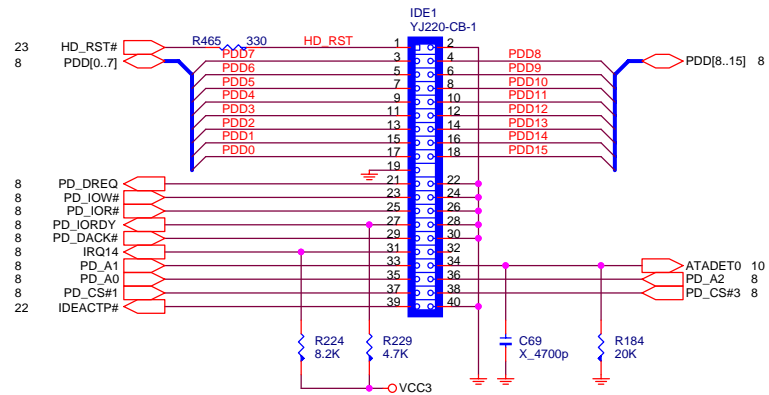
### REAR PANEL USB CONNECTOR FOR USB PORT 2,3



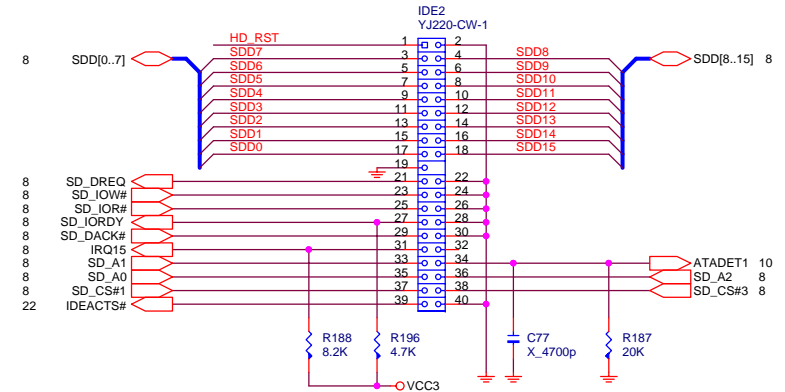
### FRONT PANEL USB CONNECTOR FOR USB PORT 6,7



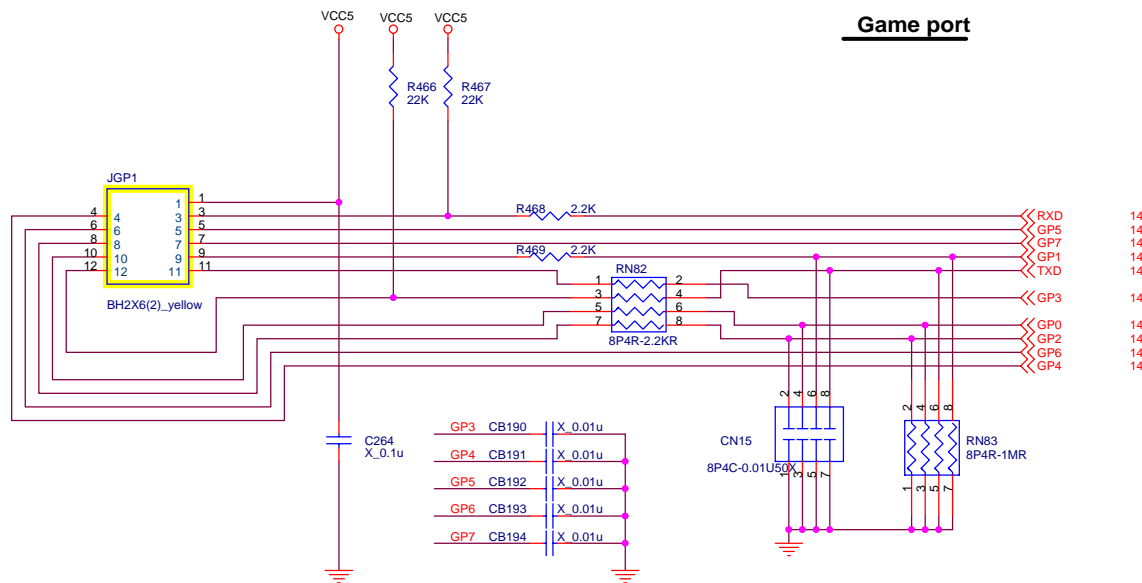
## PRIMARY IDE BLOCK



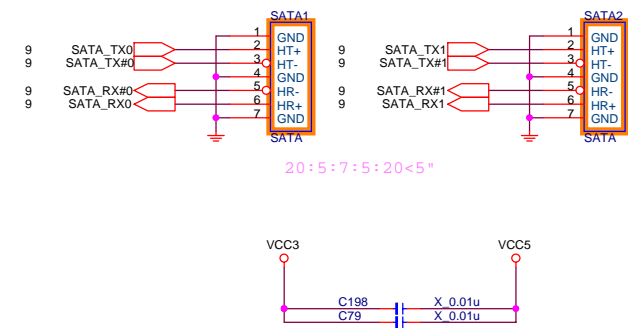
### SECONDARY IDE BLOCK



### Game port

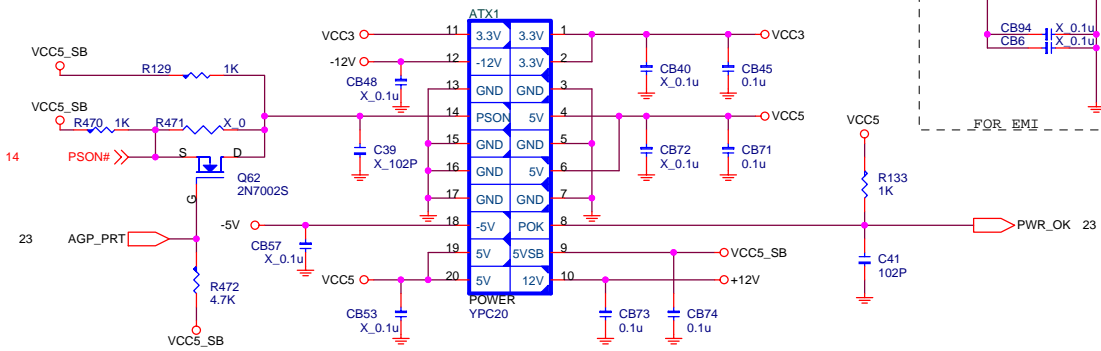


### SERIAL ATA CONNECTOR BLOCK

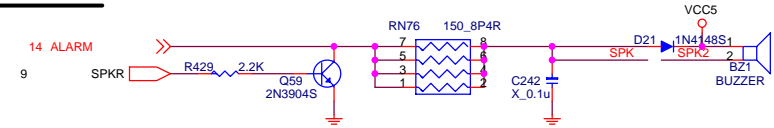


<b>Micro-Star</b>	Title <b>MS-7037</b>	Rev <b>0B</b>
Document Number <b>IDE &amp; SATA &amp; Game port</b>		
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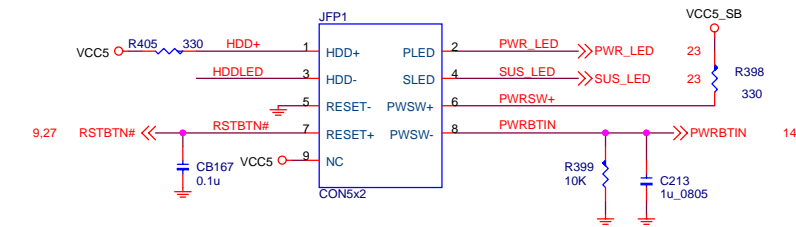
## ATX CONNECTOR



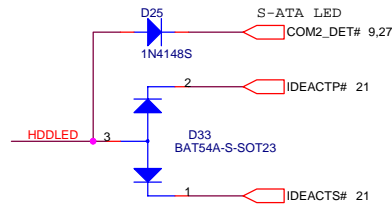
## BUZZER



## Intel Front Panel



## IDE LED



<b>Micro-Star</b>	Title <b>MS-7037</b>	Rev <b>0B</b>
Document Number <b>ATX, FRONT PANEL</b>		
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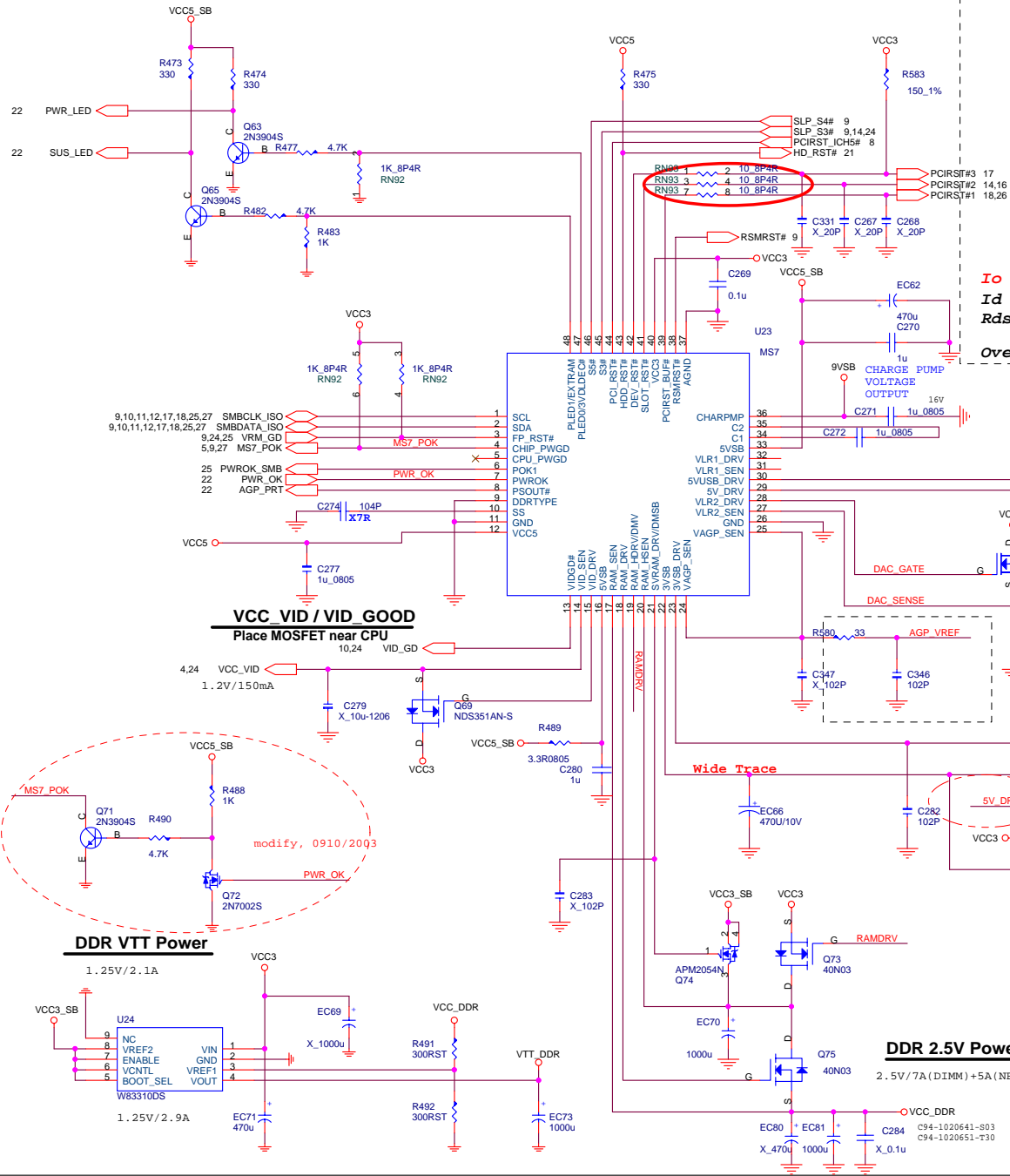


## ACPI Controller

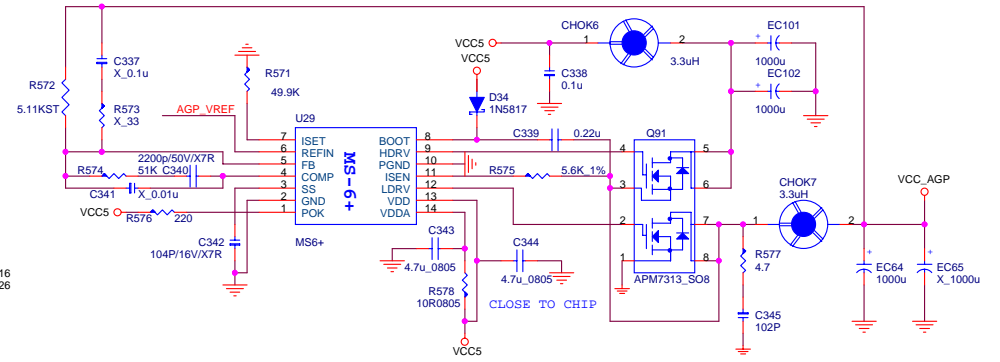
ICH5 300mA  
PCI 375+20+20= 415mA

VCC3\_SB 715mA

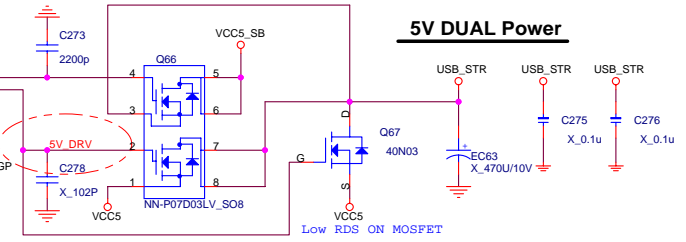
Power	S0	S3	S5
VCC3_SB	Main	Standby	Standby
VCC5_STR	Main	Standby	0V
MEM_STR	Main	Standby	0V



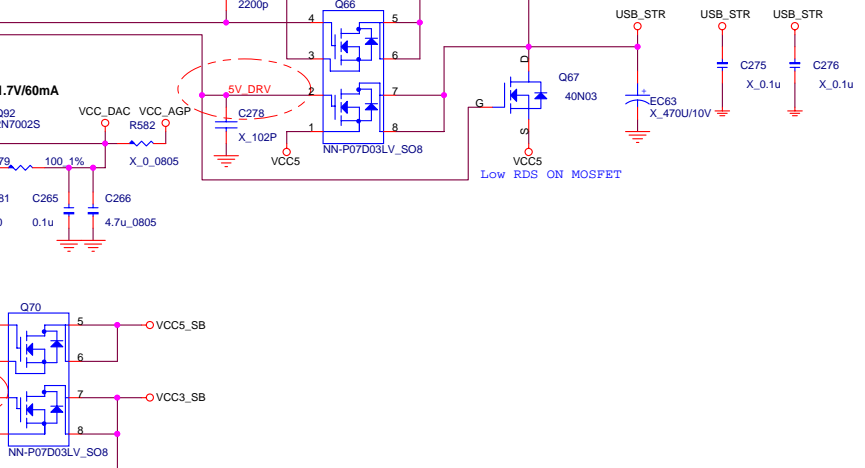
AGP POWER


$$I_o \times R_{ds(on)} = I_{sen}(72\mu A) \times R_{sen}$$
$$I_d = 6A, I_d(max) = 24A$$
$$R_{ds(on)}/10V = 21m\Omega \sim 28m\Omega$$

Overcurrent (4.7K ohm)= 12A ~ 16A

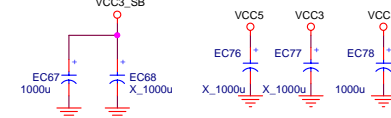


### 5V DUAL Power

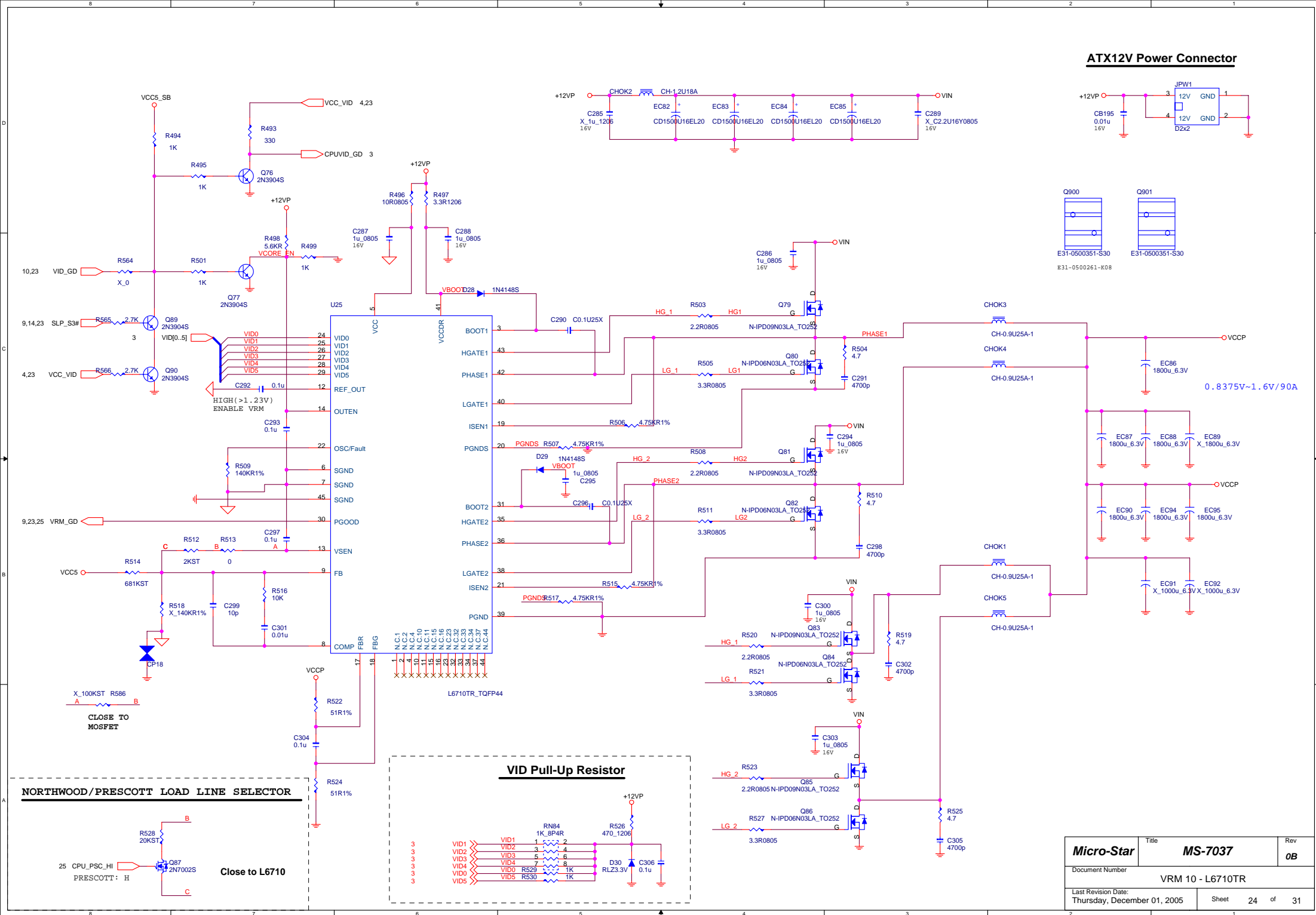


### DDR 2.5V Power

2.5V/7A(DIMM)+5A(NB)

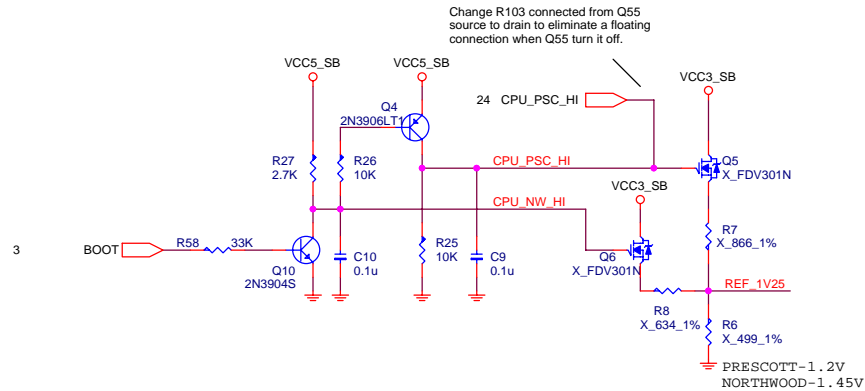


<b>Micro-Star</b>	Title <b>MS-7037</b>	Rev <b>0B</b>
Document Number <b>ACPI Controller MS7</b>		
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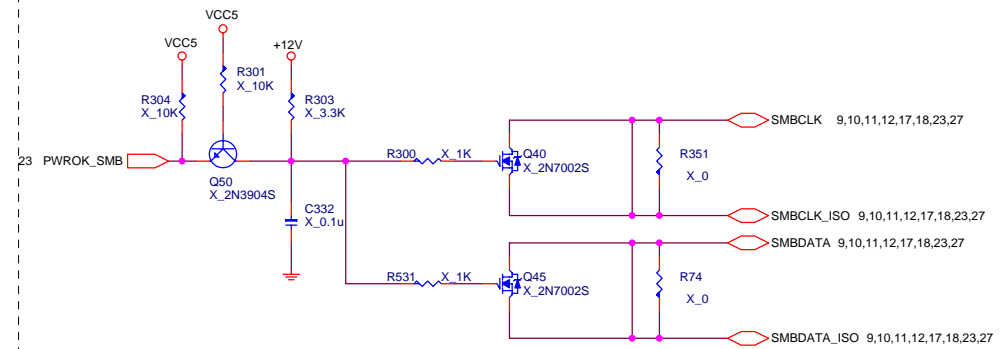
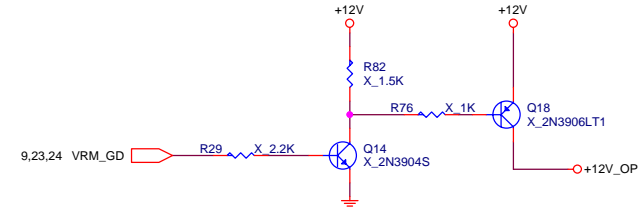


<b>Micro-Star</b>	Title <b>MS-7037</b>	Rev <b>0B</b>
Document Number <b>VRM 10 - L6710TR</b>		
Last Revision Date: <b>Thursday, December 01, 2005</b>		Sheet <b>24</b> of <b>31</b>

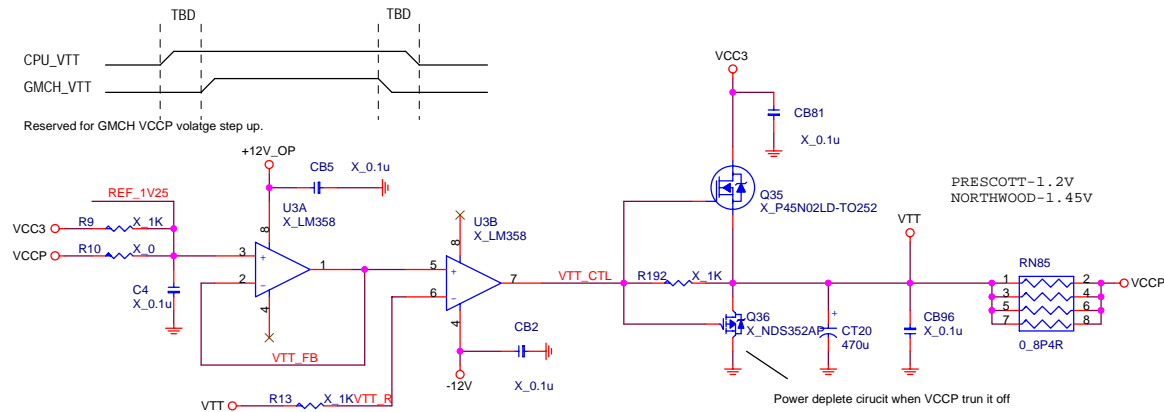
## Intel reference GMCH VTT power circuit



## GMCH\_VTT ON/OFF CIRCUIT



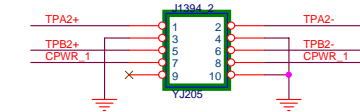
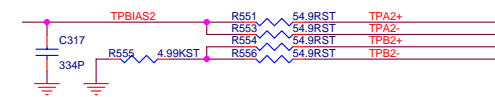
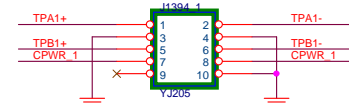
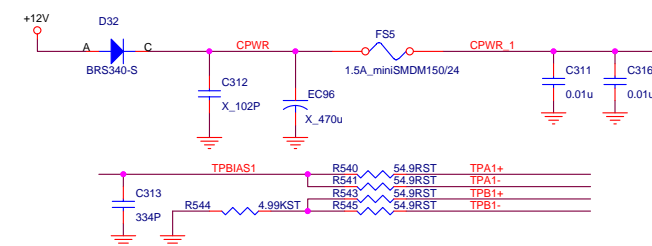
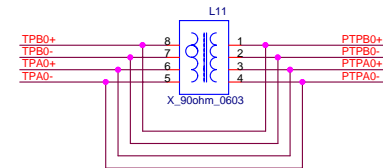
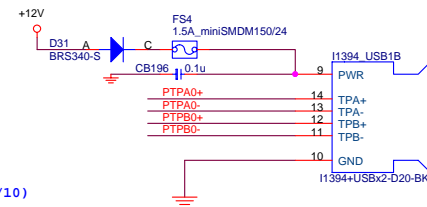
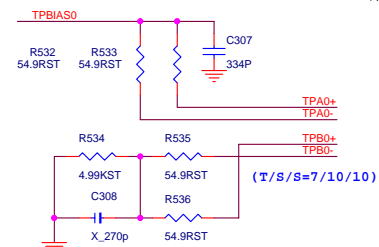
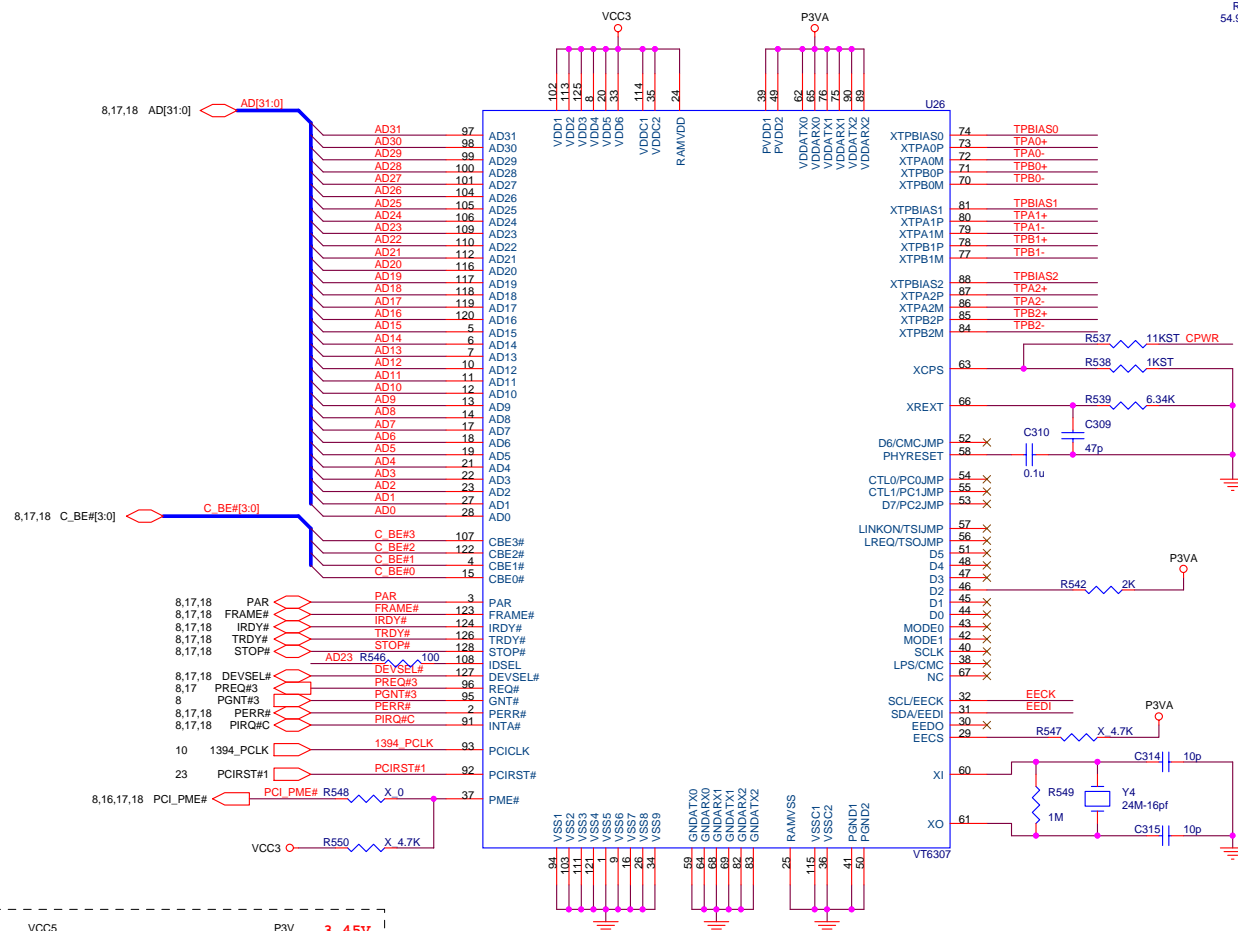
## GMCH VTT Generator



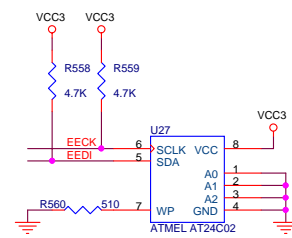
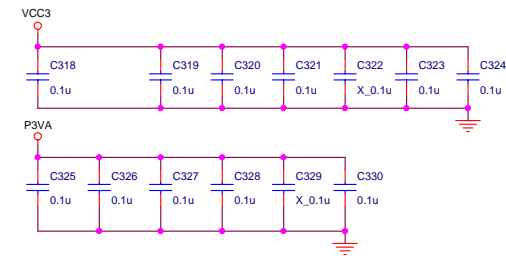
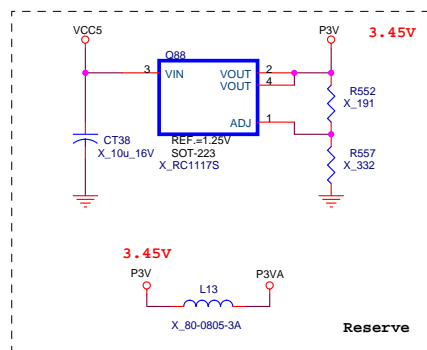
Bootstrip pin are input rather than output on Intel Prescott processor, either it's internal weak pull-up but still need to identify it can be sufficient driving capability for out side circuit. And the bootstrip pin power by core voltage so the outside circuit need to adjust the turn off voltage.

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MEM,VCC_DAC & VTT Controller				
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### 1394a OHCI Link Layer Controller



**For Intel 1394 pinheader**

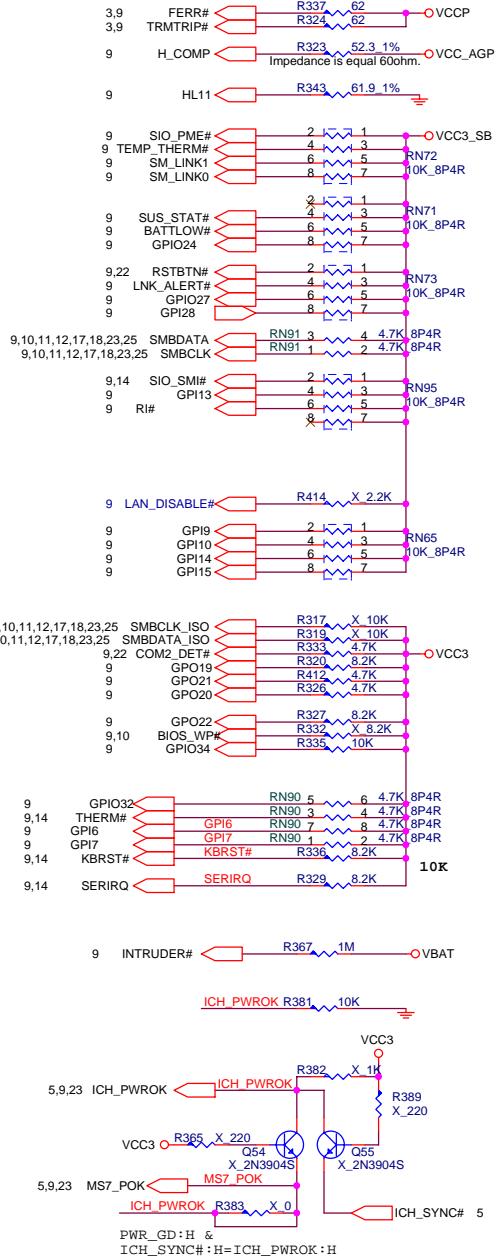


<b>Micro-Star</b>	Title <b>MS-7037</b>	Rev <b>0B</b>
Document Number <b>VIA 6307/6306</b>		
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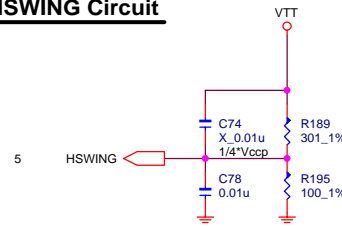
## ICH5 STRAPPING RESISTORS

ALL COMPONENTS CLOSE TO ICH5

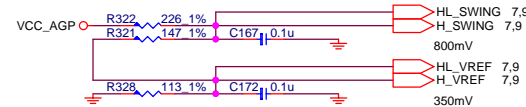
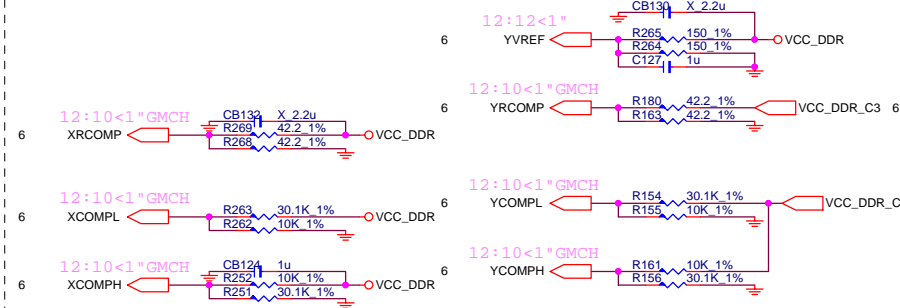
Trace length is less than 3inches to ICH5.



## HSWING Circuit

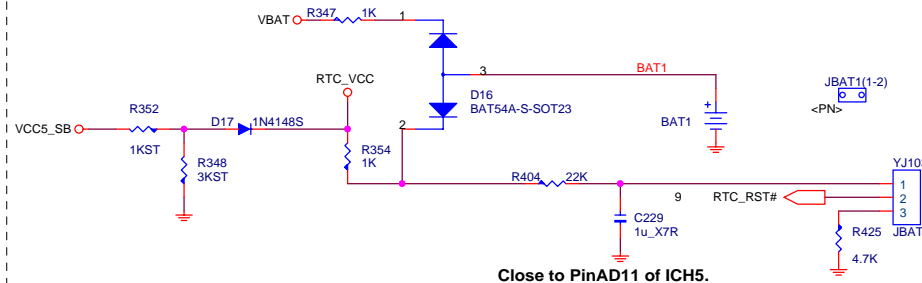


## 5VREF Sequencing Circuit



## RTC BLOCK

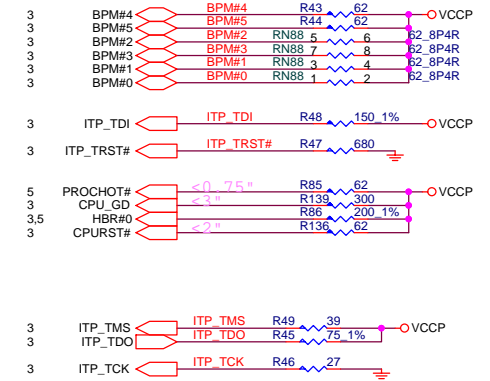
CLR CMOS		
1 - 2	Normal	*
2 - 3	Clear CMOS	



Close to PinAD11 of ICH5.

## CPU STRAPPING RESISTORS

ALL COMPONENTS CLOSE TO CPU



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PULL HIGH RESISTORS & RTC		
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ICH5

GPIO Pin	Type	Function	Power well
GPIO 0	I	PREQ#A	MAIN
GPIO 1	I	PREQ#B	MAIN
GPIO 2	I	PIRQ#E	MAIN
GPIO 3	I	PIRQ#F	MAIN
GPIO 4	I	PIRQ#G	MAIN
GPIO 5	I	PIRQ#H	MAIN
GPIO 6	I	GPI6	MAIN
GPIO 7	I	GPI7	MAIN
GPIO 8	I	SIO_PME#	RESUME
GPIO 9	I	OC4#	RESUME
GPIO 10	I	OC5#	RESUME
GPIO 11	I	TEMP_THERM#	RESUME
GPIO 12	I	SIO_SMI#	RESUME
GPIO 13	I	GPI13	RESUME
GPIO 14	I	OC#6	RESUME
GPIO 15	I	OC#7	RESUME
GPIO 16	O	PGNT#A	MAIN
GPIO 17	O	PGNT#B	MAIN
GPIO 18	O	GPO18	MAIN
GPIO 19	O	GPO19	MAIN
GPIO 20	O	GPO20	MAIN
GPIO 21	O	GPO21	MAIN
GPIO 22	OD	GPO22	MAIN
GPIO 23	O	BIOS_WP#	MAIN
GPIO 24	I/O	GPIO24	RESUME
GPIO 25	I/O	LAN_DISABLE#	RESUME
GPIO 27	I/O	GPIO27	RESUME
GPIO 28	I/O	GPIO28	RESUME
GPIO 32	I/O	GPIO32	MAIN
GPIO 33	I/O	COM2_DET#	MAIN
GPIO 34	I/O	GPIO34	MAIN
GPIO 40	I	PREQ#4	MAIN
GPIO 41	I	GPI41	MAIN
GPIO 48	O	PGNT#4	MAIN
GPIO 49	OD	CPU_GD	MAIN

default output  
default output  
default output  
default output  
default output  
default output  
default output

PCI RESET DEVICE

Signals	Target
PCIRST#1	LAN,1394
PCIRST#2	Super I/O,AGP slot
PCIRST#3	PCI1~3
PCIRST_ICH5#	Northbridge , FWH
HDDRST#	Primary, Scondary IDE

PCI Config.

DEVICE	MCP1 INT Pin	REQ#/GNT#	IDSEL	CLOCK
PCI Slot 1	PIRQ#G PIRQ#H PIRQ#E PIRQ#F	PCI_REQ#0 PCI_GNT#0	AD26	PCICLK0
PCI Slot 2	PIRQ#F PIRQ#G PIRQ#H PIRQ#E	PCI_REQ#4 PCI_GNT#4	AD25	PCICLK1
PCI Slot 3	PIRQ#E PIRQ#F PIRQ#G PIRQ#H	PCI_REQ#2 PCI_GNT#2	AD28	PCICLK2
LAN	PIRQH	PCI_REQ#1 PCI_GNT#1	AD29	LAN_PCLK
1394	PIRQC	PCI_REQ#3 PCI_GNT#3	AD23	1394_PCLK

DDR DIMM Config.

DEVICE	ADDRESS	CLOCK
DIMM 1	AOH	MCLK_A0/MCLK_A#0 MCLK_A1/MCLK_A#1 MCLK_A2/MCLK_A#2
DIMM 2	A4H	MCLK_B0/MCLK_B#0 MCLK_B1/MCLK_B#1 MCLK_B2/MCLK_B#2

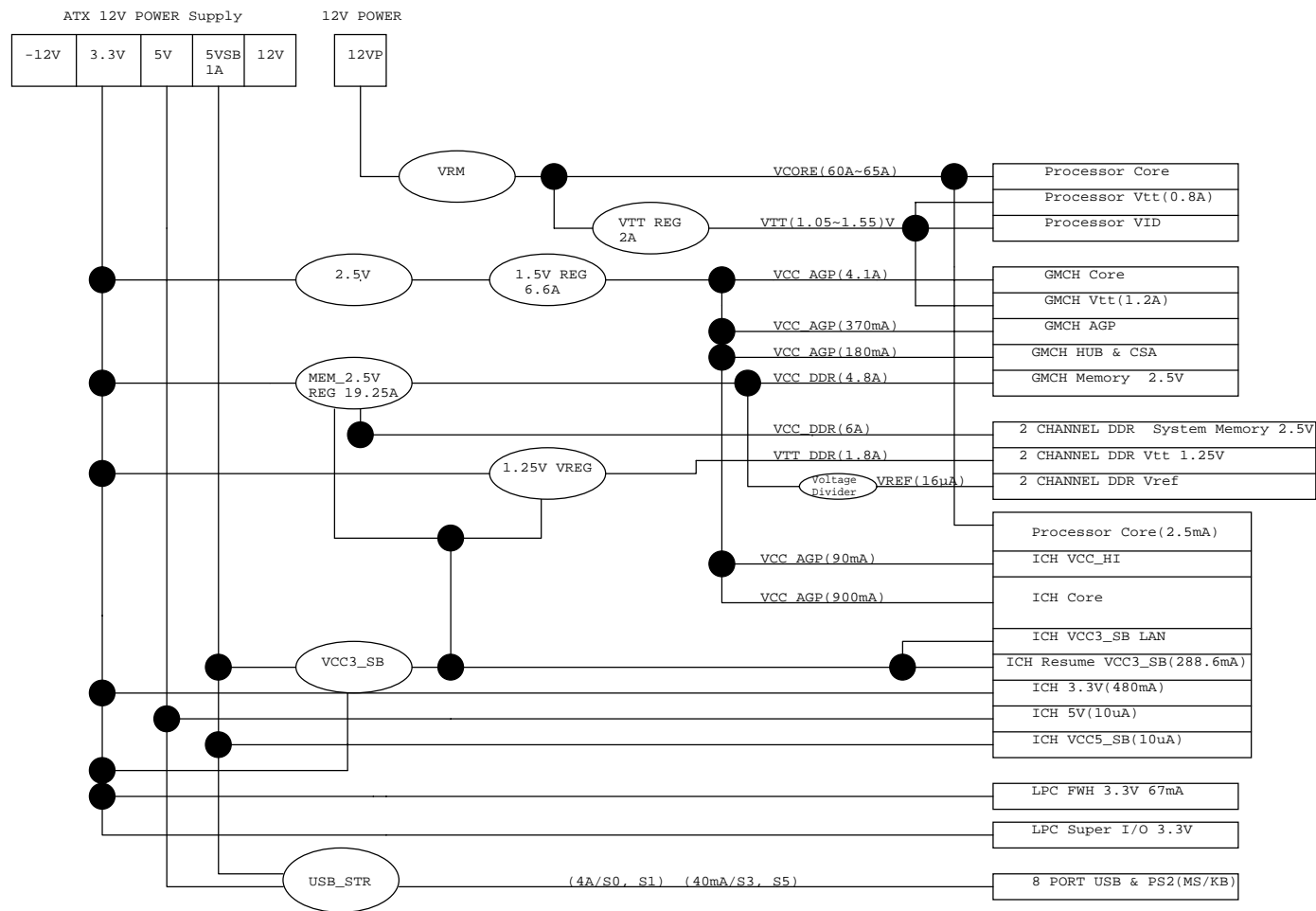
JUMPER SETTING

<b>JBAT1</b>	( 1-2 )NORMAL	( 2-3 )CLEAR
<b>JAUD1</b>	( 5-6 ) W/O FRONT AUDIO ( 9-10 )	WITH FRONT AUDIO

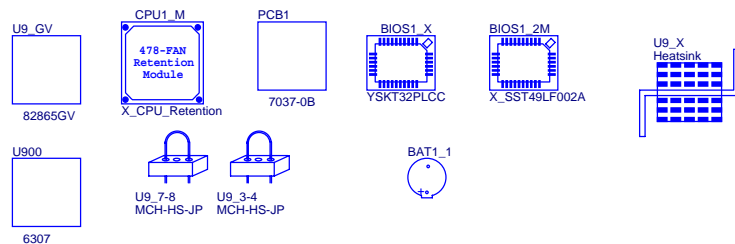
SIO

PIN NAME	USAGE	Input/Output	NOTES
GPIO10	UNUSED	INPUT	
GPIO11	UNUSED	INPUT	
GPIO12	UNUSED	INPUT	
GPIO13	UNUSED	INPUT	
GPIO14	UNUSED	OUTPUT	
GPIO15	VID5	INPUT	Low: VID add 0.0125V , High :by pass
GPIO16	UNUSED	OUTPUT	
GPIO17	UNUSED	OUTPUT	
GPIO20	UNUSED	OUTPUT	
GPIO21	SMBCLK_ISO	INPUT	SMBUS CLOCK
GPIO22	SMBDATA_ISO	INPUT /OUTPUT	SMBUS DATA
GPIO23	POWER_LED	OUTPUT	Default used MS-5
GPIO24	UNUSED	OUTPUT	
GPIO25	UNUSED	OUTPUT	IRRX
GPIO26	UNUSED	OUTPUT	
GPIO27	UNUSED	OUTPUT	
GPIO30	SLP_S3#	INPUT	S3 state indicator signal
GPIO31	PS_ON#	OUTPUT	Connector to Power Supply to turn on Power
GPIO32	UNUSED	OUTPUT	
GPIO33	UNUSED	OUTPUT	
GPIO34	UNUSED	OUTPUT	
GPIO35	UNUSED	OUTPUT	

# POWER DELIVERY MAP



## 7037 PART



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Document Number				
POWER DELIVERY MAP & MANUAL PART				
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Revision History (Changes from Rev 0A)

	Description