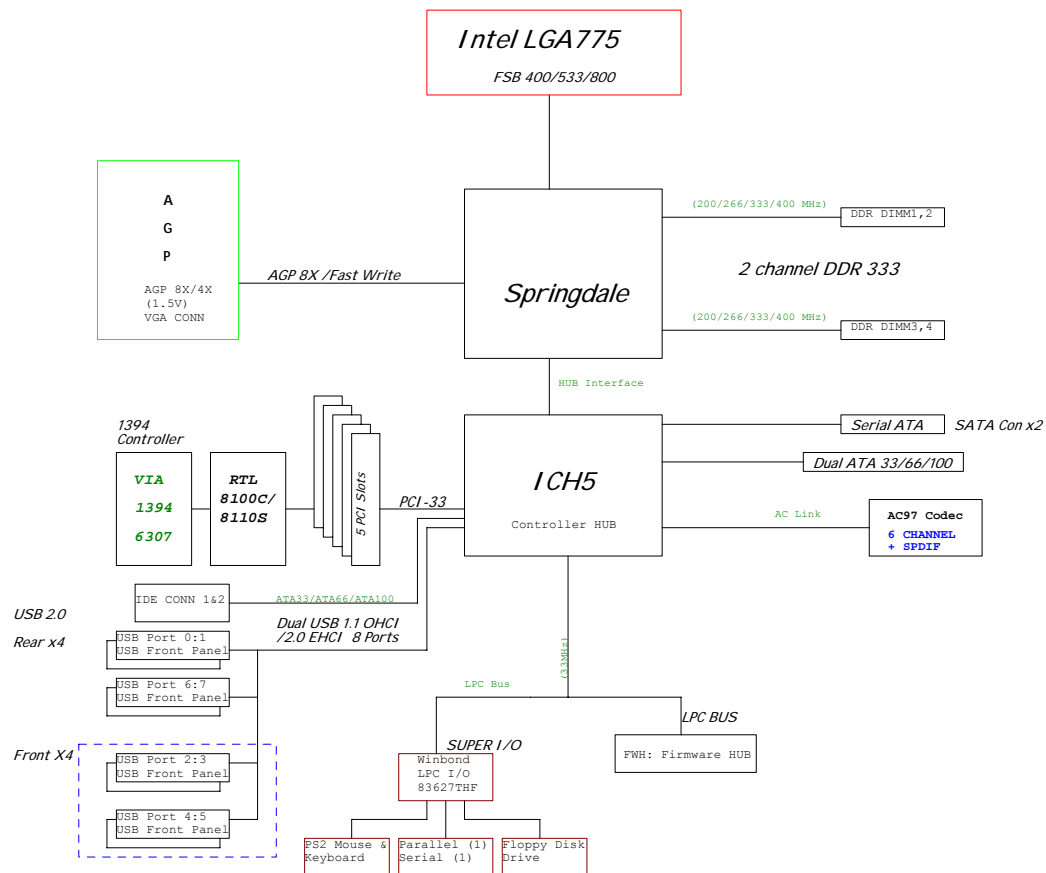


# MS-7088 uATX

- \*Intel LGA775
- \*INTEL Springdale GMCH / ICH5 Chipset  
(DDR 400 / AGP 8X) / (integrated serial ATA)
- \*CLOCK -- ICS952642
- \*LAN - REALTEK RTL8110S/8100C
- \*VIA/6307,IEEE1394 2port
- \*Winbond 83627THF LPC I/O
- \*ALC655 Audio codec 6 channel support
- \*USB 2.0 support x8

Title	Page
Cover Sheet	1
Block Diagram	2
GPIO SPEC	3
Intel LGA775	4,5,6
Clock Synthesizer	7
Intel Springdale	8,9,10
System Memory / DDR Terminations	11,12
AGP SLOT	13
ICH5	14,15
PCI Slot	16
LAN RTL8110S / 8100C	17
VIA 1394(6307)	18
Intel IDE connector	19
MS-7 ACPI Controller	20
Audio Codec / 6 Channel connector	21
VRM 10.1	22
VGA CONNECTOR	23
USB CONNECTOR	24
W627THF LPC I/O / FWH	25
FAN	26
KB/MS/LPT/COM Port/FAN	27
ATX connector / Front Panel	28
Manual Part	29
HISTORY	30

```
+5V : VCC5
+3.3V : VCC3
+12V : +12V
5VSB : VCC5_SB
-12V : -12V
+2.55V for DDR : VCC_DDR
1.275V for DDR VTT : VTT_DDR
Dual 3.3V : 3VDUAL
1.2V for CPU VID : VCC_VID
1.5V for AGP VI/O : VCC_AGP
Dual 5V : 5VDUAL
CPU Vcore : VCCP
+5V for analog CODEC : AVDD5
2.5V for LAN : 2_VSB
+12V for 1394 bus power : CPWR
```



The diagram illustrates the power distribution for the AC97 module. It shows the connection of power rails (3.3V, 5V, 5VSB, 12V) to various components. The components are grouped into three columns: Processor and North Bridge, Memory and DIMM, and South Bridge and I/O. The diagram includes voltage regulators (VRM, VREG, VTT, VSB, Lan, AC97 VDD5) and their connections to the respective components.

Power Rail	Component
3.3V	PROCESSOR VCCP
3.3V	PROCESSOR 1.2V
3.3V	AGP SLOT 1.5V
3.3V	NORTH BRIDGE VCCP
3.3V	NORTH BRIDGE VCC_AGP
3.3V	NORTH BRIDGE SYSEM MEMORY VCC_DDR
3.3V	DDR DIMM1 / DIMM2 2.5V
3.3V	DDR VTT 1.25V
3.3V	SORTH BRIDGE +1.5V
3.3V	SORTH BRIDGE VCC3
3.3V	SORTH BRIDGE RESUME VCC5_SB
3.3V	SORTH BRIDGE RESUME VCC3_SB
3.3V	SORTH BRIDGE RTC 3.3V
3.3V	LAN VT6150 VCC3_SB
3.3V	LAN VT6150 2.5VSB
3.3V	FWH 3.3V
3.3V	LPC SUPER I/O 3.3V
3.3V	LPC SUPER I/O VCC5
3.3V	CK-409 3.3V
3.3V	AC97 VDD5
5V	VRM
5V	1.2V VREG
5V	1.5V VREG
5V	3VSB VREG
5V	DDR 2.5V VREG
5V	2.5V VREG
5V	VTT 1.25V VREG
5V	Lan 2.5VSB VREG
5V	AC97 VDD5 VREG
5VSB	3VSB VREG
12V	VRM

GPIO FUNCTION

ICH5

GPIO Pin	Type	Function	Power well
GPIO 0	I	PREQ#B	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	GPI8	RESUME
GPIO 9	I	OC4#	RESUME
GPIO 10	I	OC5#	RESUME
GPIO 11	I	SIO_SMI#	RESUME
GPIO 12	I	EXTSMI#	RESUME
GPIO 13	I	SIO_PME#	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	BIOS_WP#	MAIN
GPIO 20	O	GPO20	MAIN
GPIO 21	O	GPO21	MAIN
GPIO 22	OD	GPO22	MAIN
GPIO 23	O	GPO23	MAIN
GPIO 24	I/O	GPIO24	RESUME
GPIO 25	I/O	GPIO25	RESUME
GPIO 27	I/O	GPIO27	RESUME
GPIO 28	I/O	GPIO28	RESUME
GPIO 32	I/O	GPIO32	MAIN
GPIO 33	I/O	GPIO33	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	CPUPWRGD	MAIN

default output  
default output  
default output  
default output  
default output

FWH

GPIO Pin	Type	Function
GPI 0	I	PD_DET
GPI 1	I	SD_DET
GPI 2	I	BOM strapping for Bit 0
GPI 3	I	Pull down through 1K ohms (unused)
GPI 4	I	BOM strapping for Bit 1

DDR DIMM Config.

DEVICE	ADDRESS	CLOCK
DIMM 1	1010000B	MCLK_A0/MCLK_A0# MCLK_A1/MCLK_A1# MCLK_A2/MCLK_A2#
DIMM 2	1010001B	MCLK_A3/MCLK_A3# MCLK_A4/MCLK_A4# MCLK_A5/MCLK_A5#

DDR DIMM Config.

DEVICE	ADDRESS	CLOCK
DIMM 3	1010010B	MCLK_B0/MCLK_B0# MCLK_B1/MCLK_B1# MCLK_B2/MCLK_B2#
DIMM 4	1010011B	MCLK_B3/MCLK_B3# MCLK_B4/MCLK_B4# MCLK_B5/MCLK_B5#

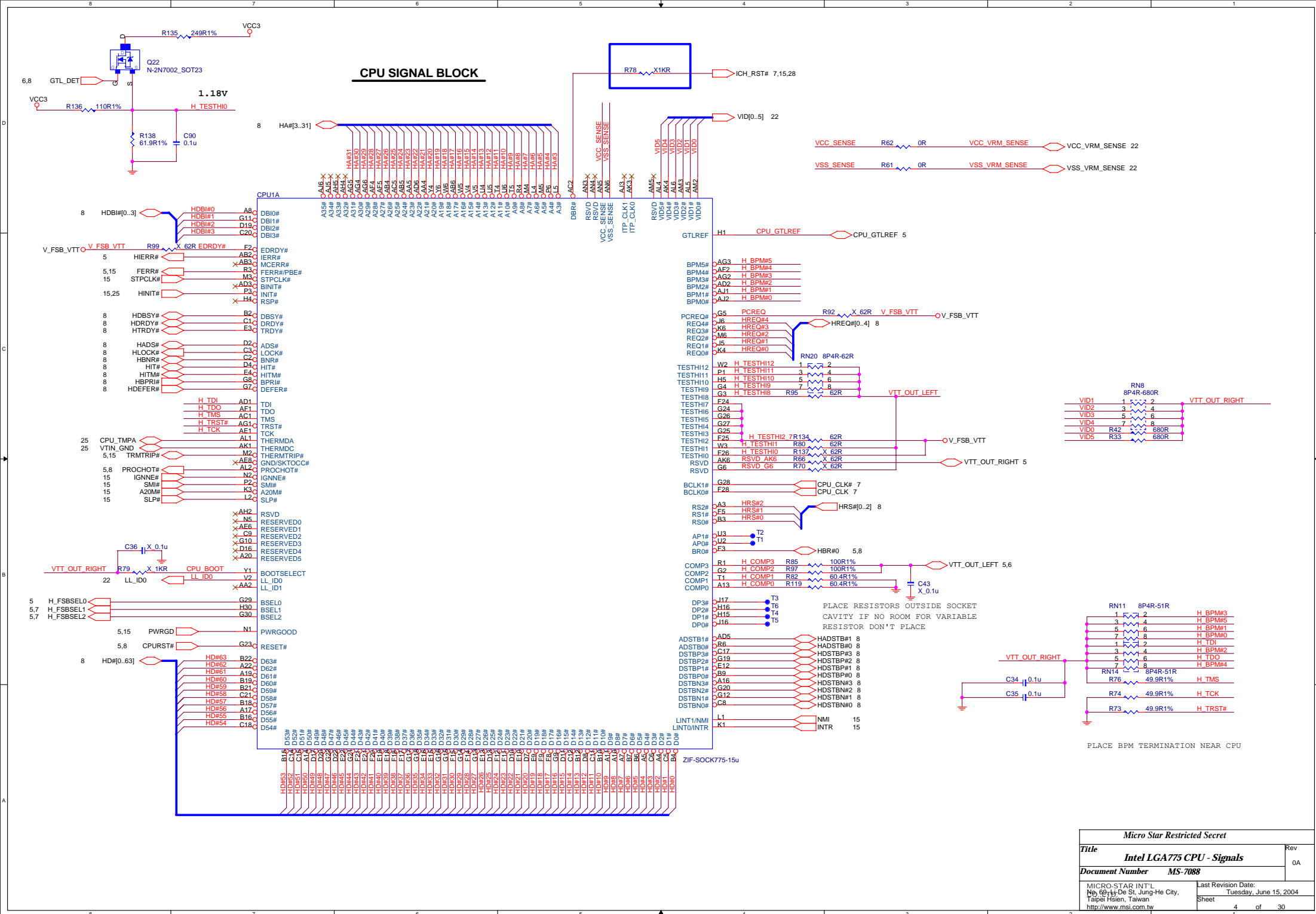
PCI RESET DEVICE

Signals	Target
PCIRST#_ICH5	AGP,FWH,MS-5
PCIRST#1	Springdale,LAN, Super I/O,1394,MS-1
PCIRST#2	PCI slot 1-3 & Mini PCI
HD_RST#	Primary, Scoundary IDE

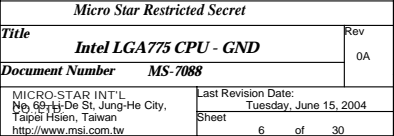
PCI clock NC pin : PCI 33MHz(Pin 19 ,20) , 66MHz(Pin 27)

DEVICES	INT#	IDSEL	REQ#/GNT#	CLOCK
Mini PCI 1	INT#A INT#B	AD16	PREQ#1 PGNT#1	PCICLK1-Pin-14
PCI SLOT 1	INT#B INT#C INT#D INT#A	AD17	PCI1PREQ#1 PCI1PGNT#1	PCICLK2-Pin-15
PCI SLOT 2	INT#C INT#D INT#A INT#B	AD18	PREQ#3 PGNT#3	PCICLK3-Pin-20
PCI SLOT 3	INT#D INT#A INT#B INT#C	AD19	PCI3PREQ#3 PCI3PGNT#3	MS1 (MS1PCLK-Pin-8)
PCI SLOT 4	INT#G	AD20	PREQ#5 PGNT#5	PCICLK5-Pin-21
Lan 6105L	INT#E	AD25	PREQ#4 PGNT#4	Lan_PCLK-Pin-16
1394	INT#F	AD26	PREQ#2 PGNT#2	1394_PCLK-Pin-12
MS-1			PREQ#0 PGNT#0	MS1PCLK-Pin-8

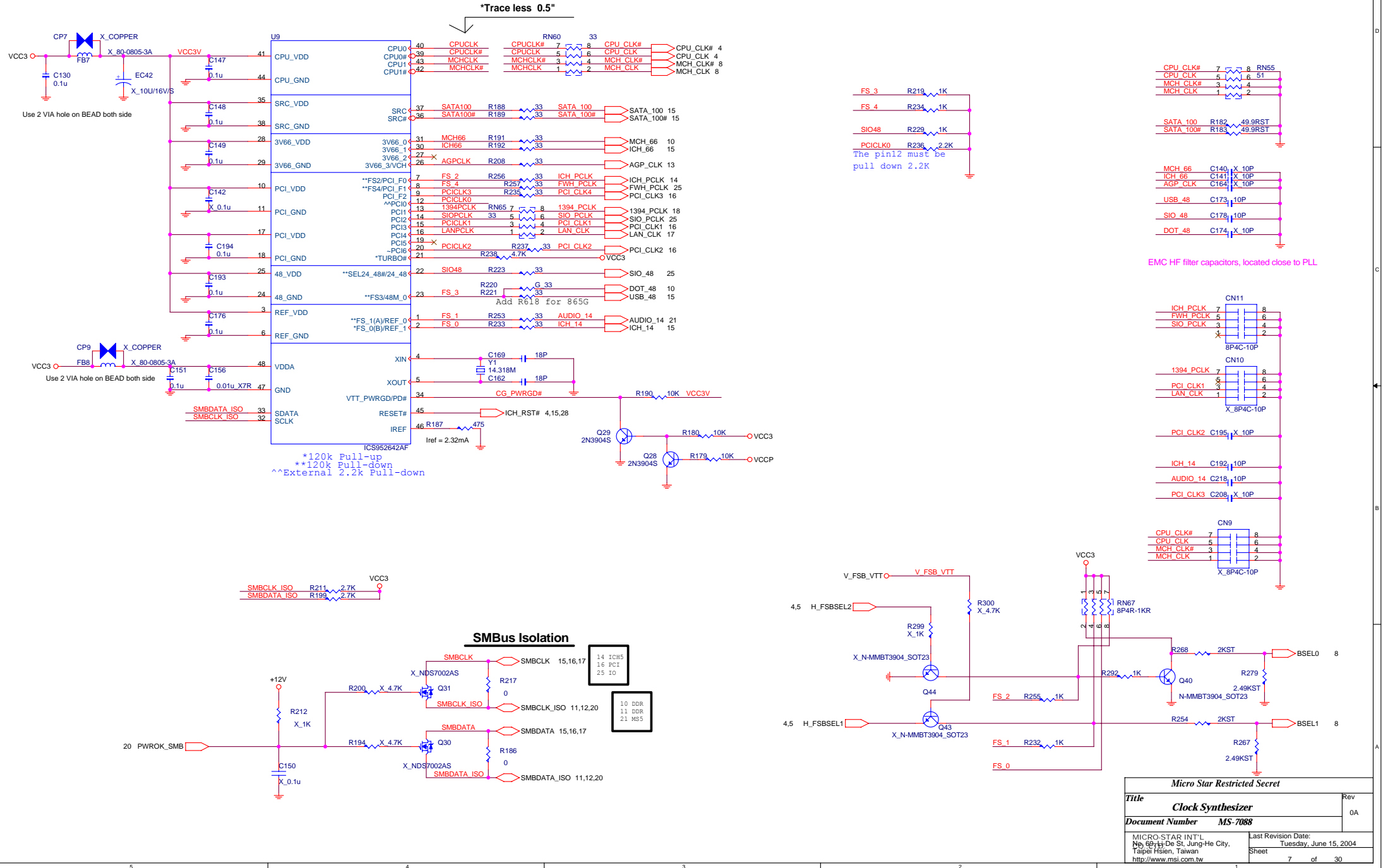
Micro Star Restricted Secret			
Title	GPIO Spec.		Rev 0A
Document Number	MS-7088		
MICRO-STAR INT'L No. 66, Ly-De St, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw		Last Revision Date: Tuesday, June 15, 2004 Sheet 3 of 30	

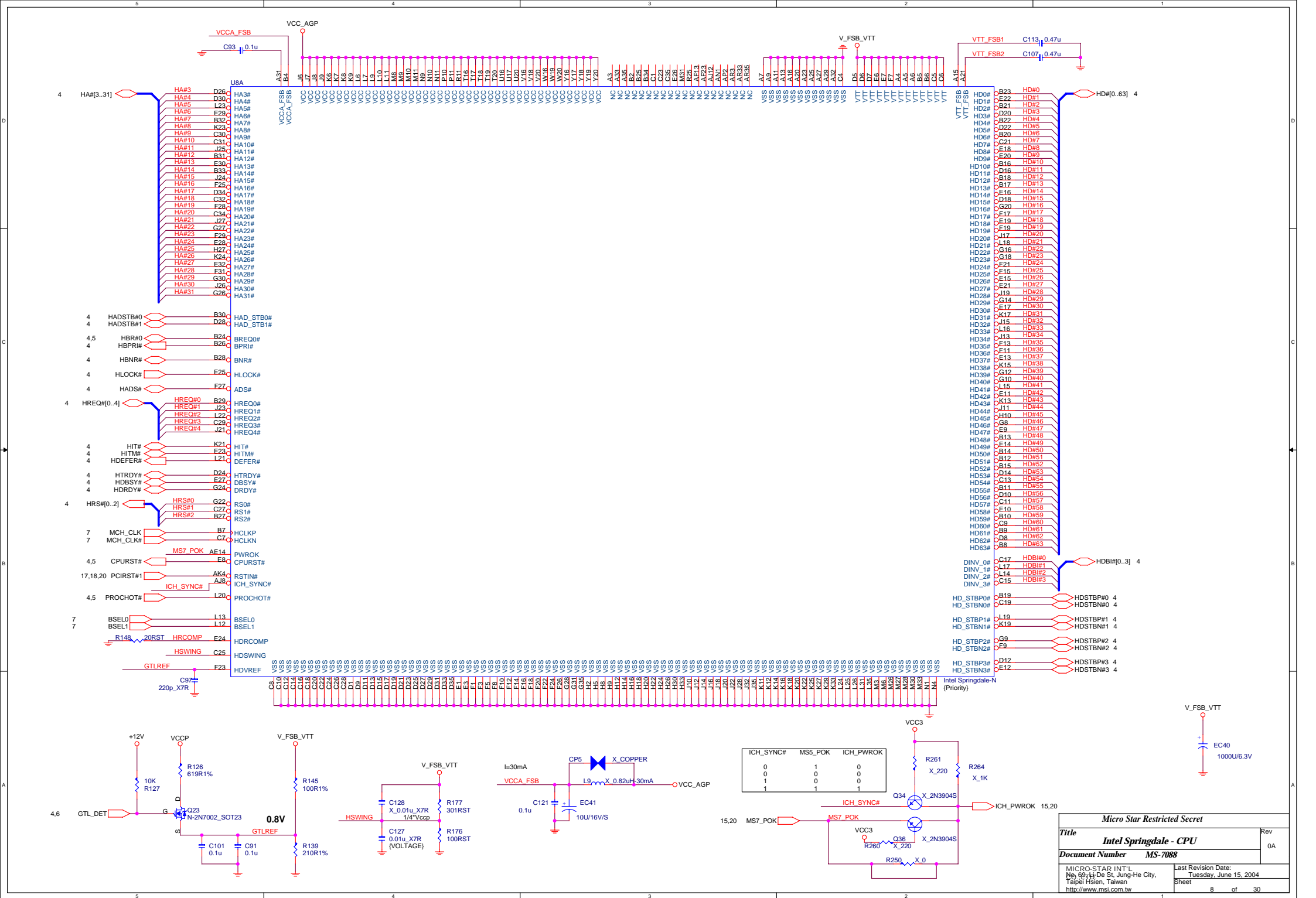




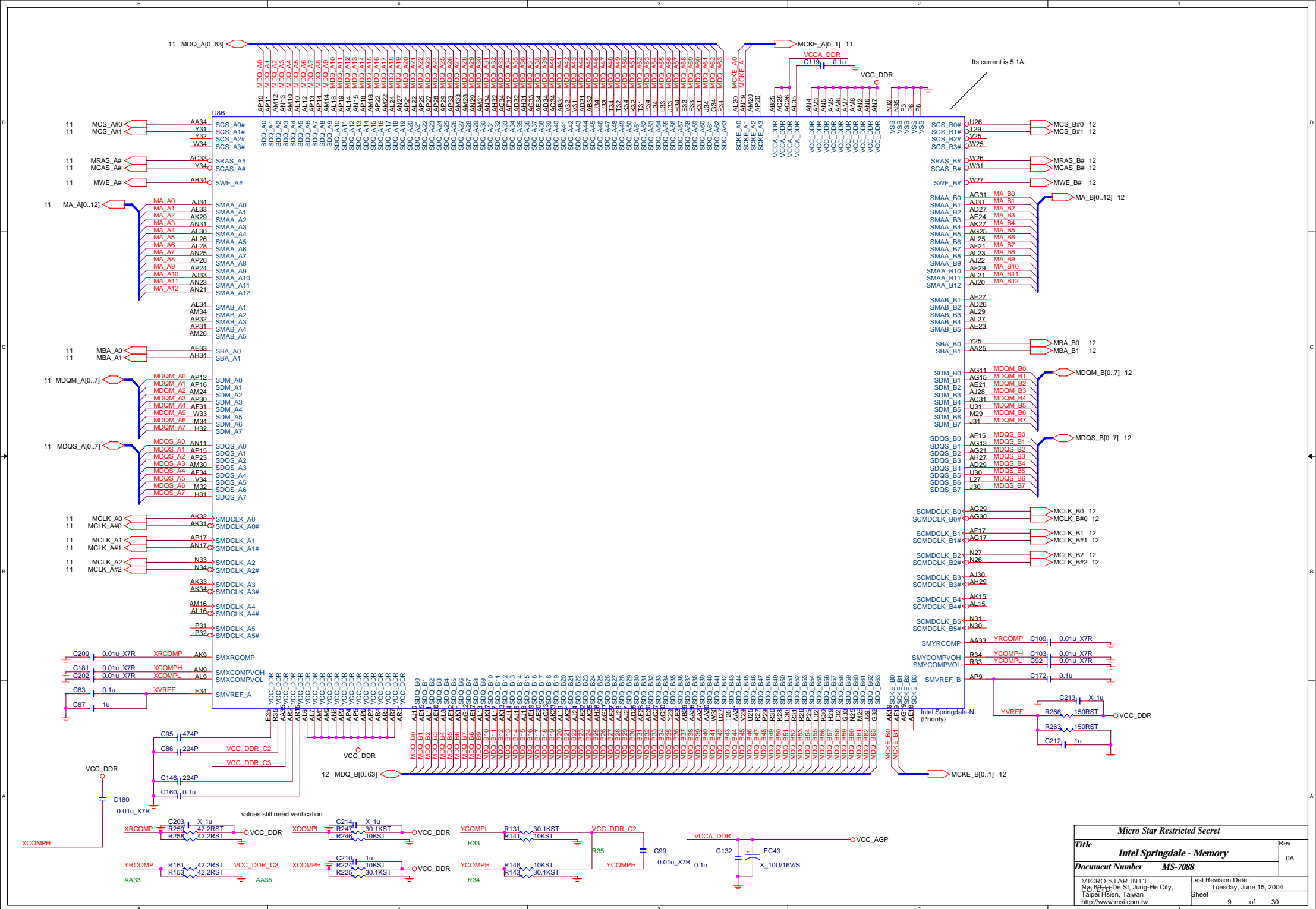


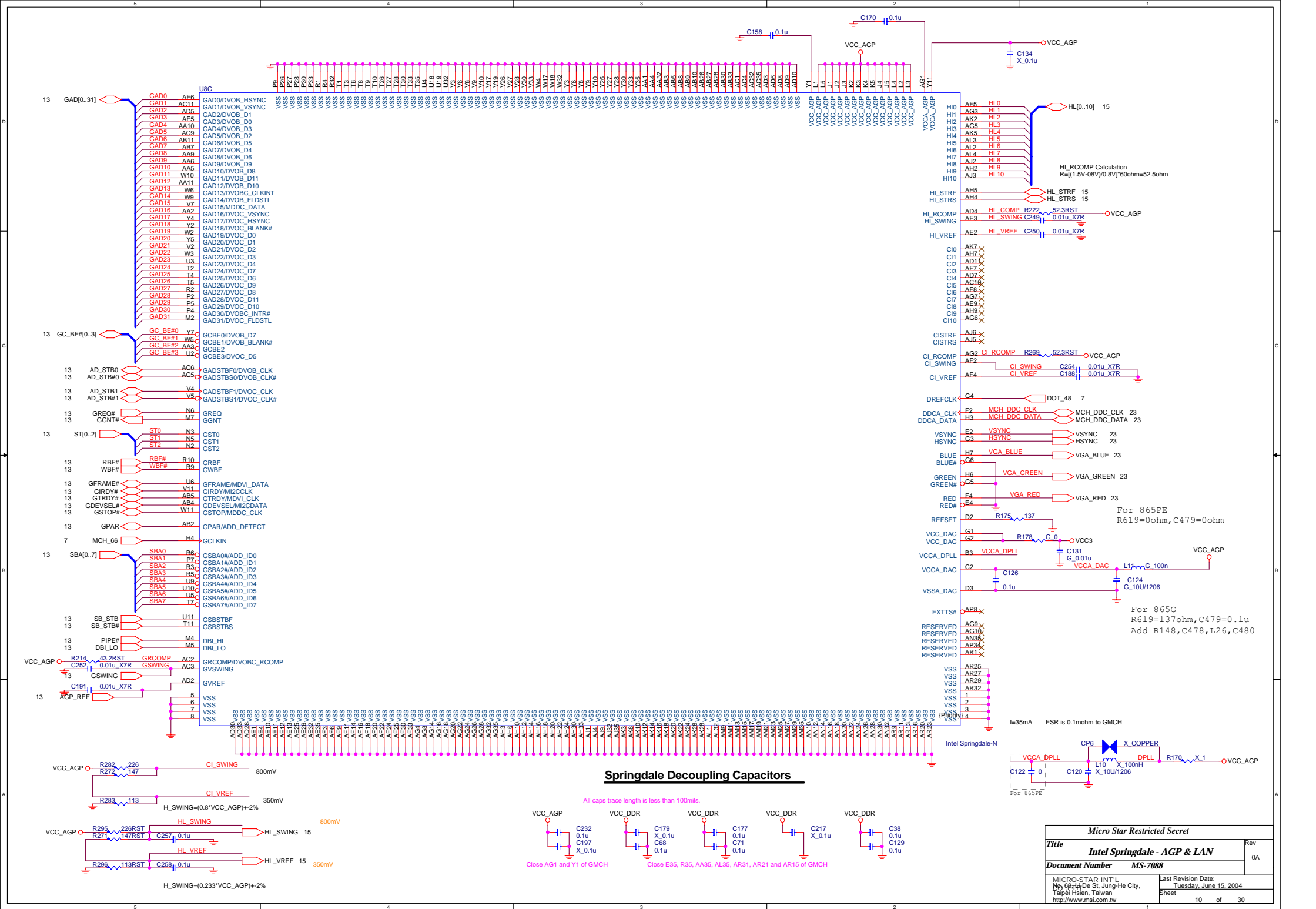
## Clock Synthesizer



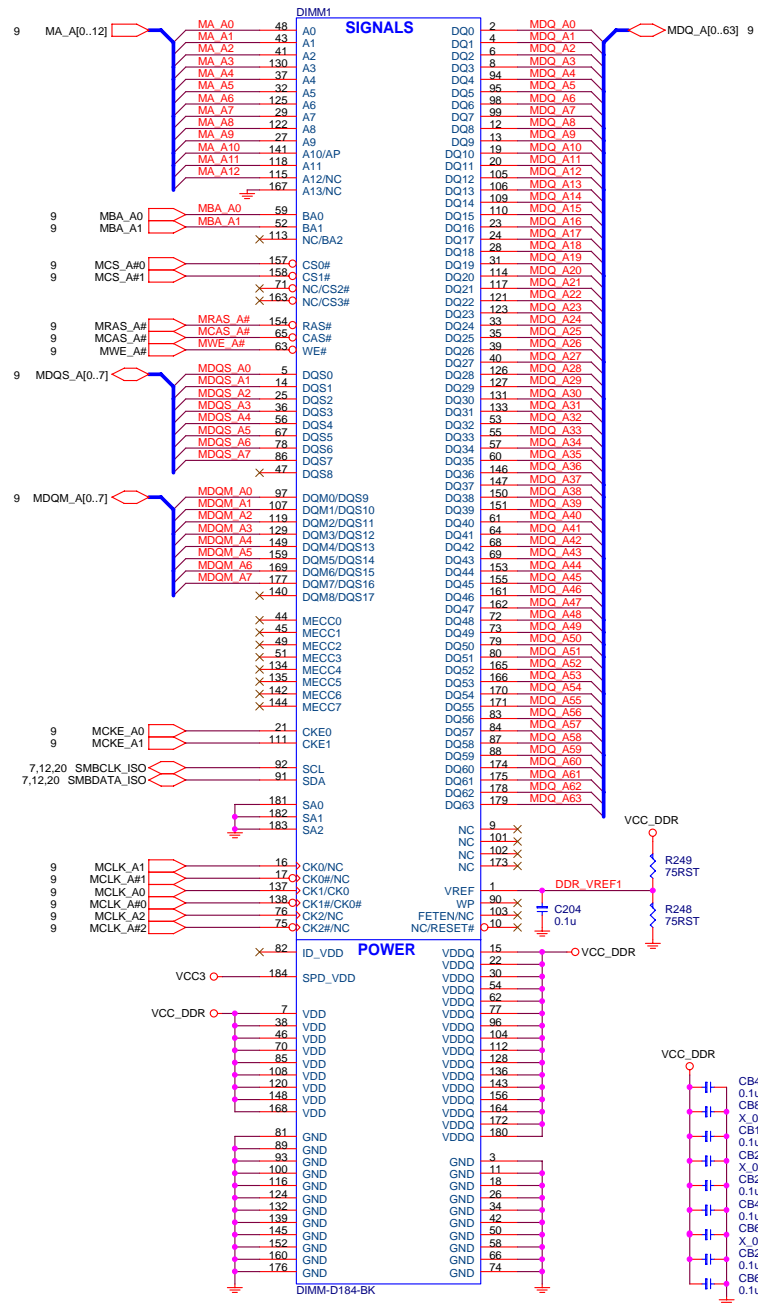






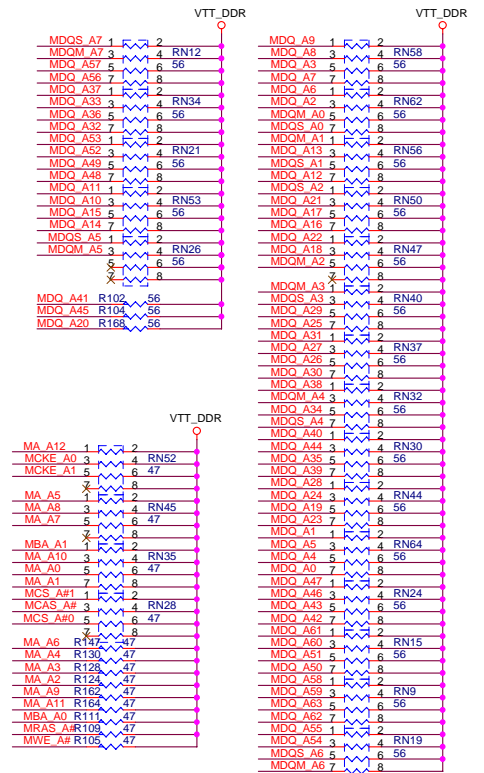


## DDR DIMM1

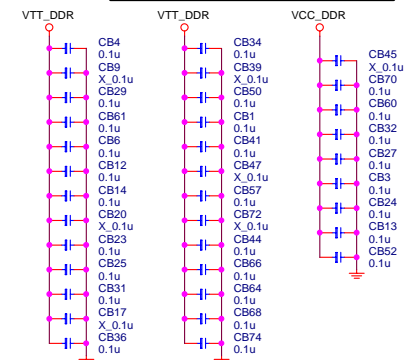


**ADDR.=1010000B**

### DDR Terminational Resisitors



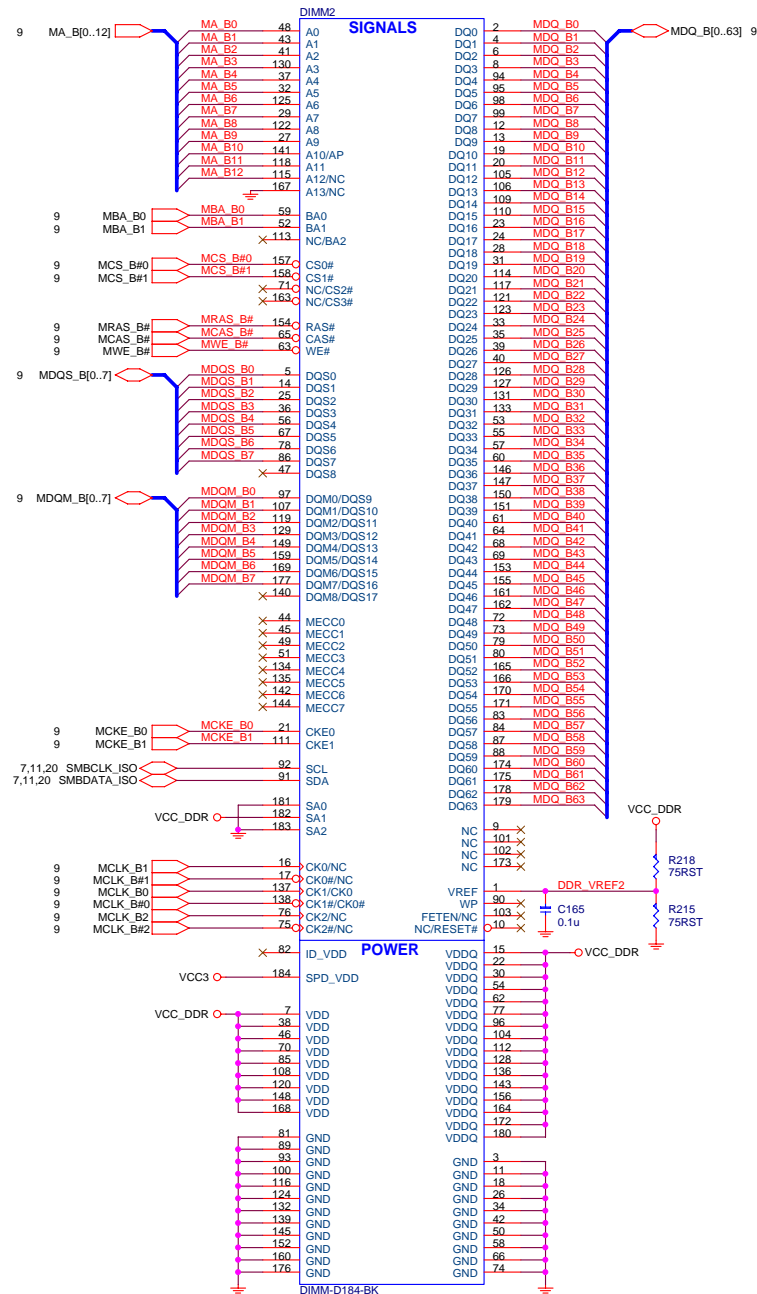
## DECOUPLING CAPACITORS



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

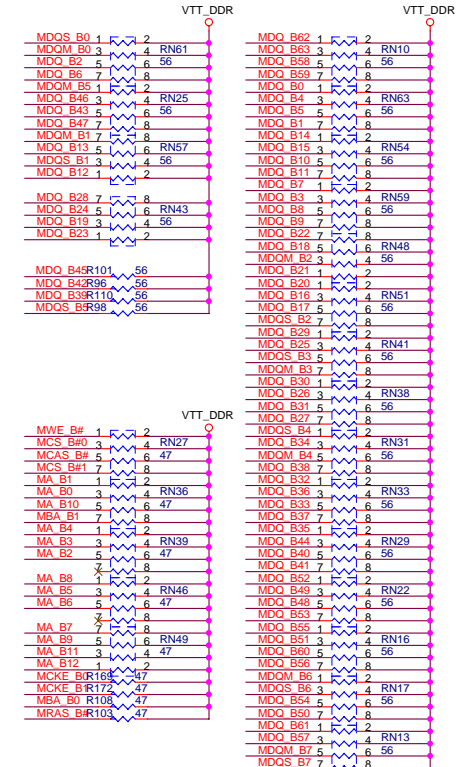
## SYSTEM MEMORY

## DDR DIMM2

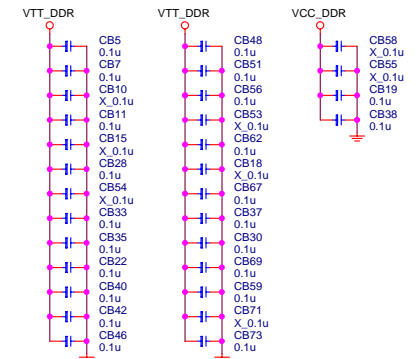


**ADDR.=1010010B**

### DDR Terminational Resisitors



## DECOUPLING CAPACITORS



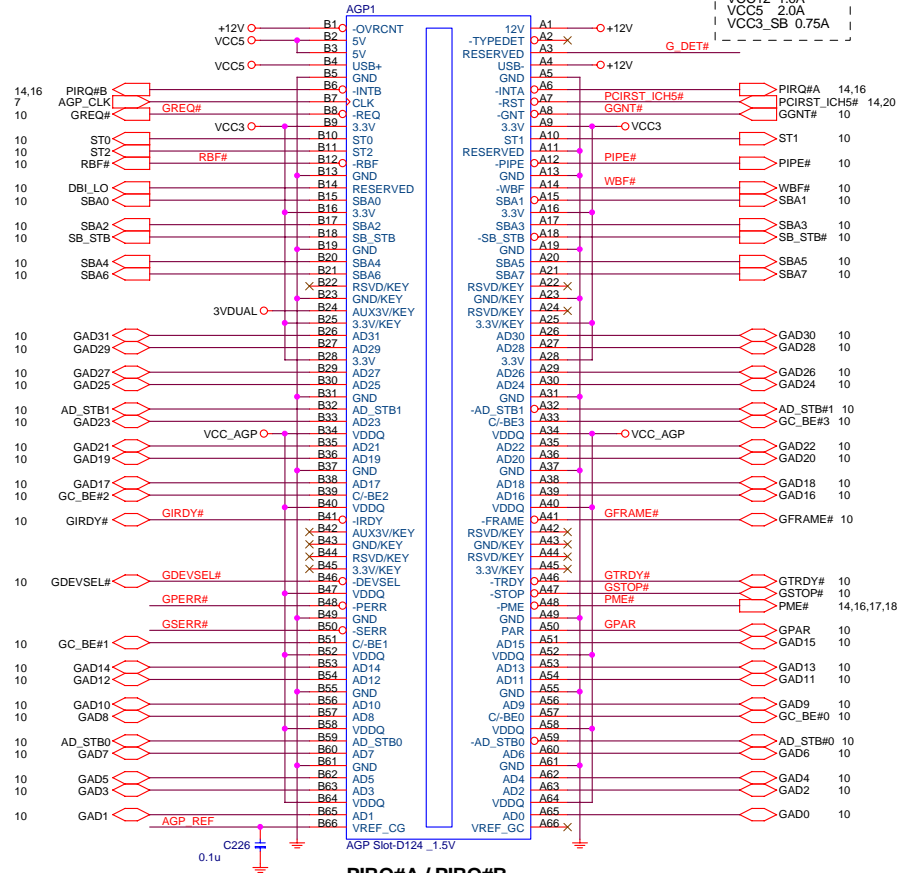
Place these decoupling capacitors close to VTT\_DDR termination resistors.  
One decoupling capacitor for each R-pack.

<i>Micro Star Restricted Secret</i>		
<b>Title</b>	<b>DDR DIMM 34</b>	Rev 0A
<b>Document Number</b>	<b>MS-7088</b>	
MICRO-STAR INT'L No. 664-De St. Jung-He City, Taipai Hsien, Taiwan <a href="http://www.msi.com.tw">http://www.msi.com.tw</a>		Last Revision Date: Tuesday, June 15, 2004 Sheet 12 of 30

B1 == 12V  
A4 == 12V  
B4 == 5V

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

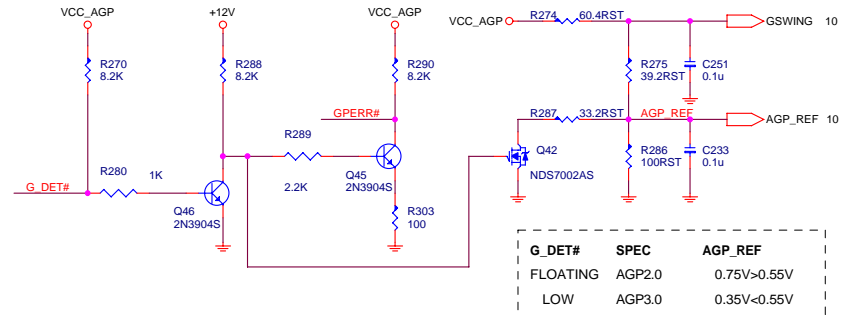
VCC5 = 60mils trace / 15 mils space



PIRQ#A / PIRQ#B

AGP Slot Imax  
VCC3 2.0A  
VCC5 6.0A  
VCC12 1.0A  
VCC5 2.0A  
VCC3\_SB 0.75A

### Springdale Reference & Swing Voltage Circuit

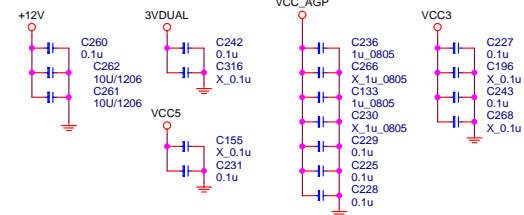


G_DET#	SPEC	AGP_REF
FLOATING	AGP2.0	0.75V>0.55V
LOW	AGP3.0	0.35V<0.55V

### AGP TERMINATION RESISTORS

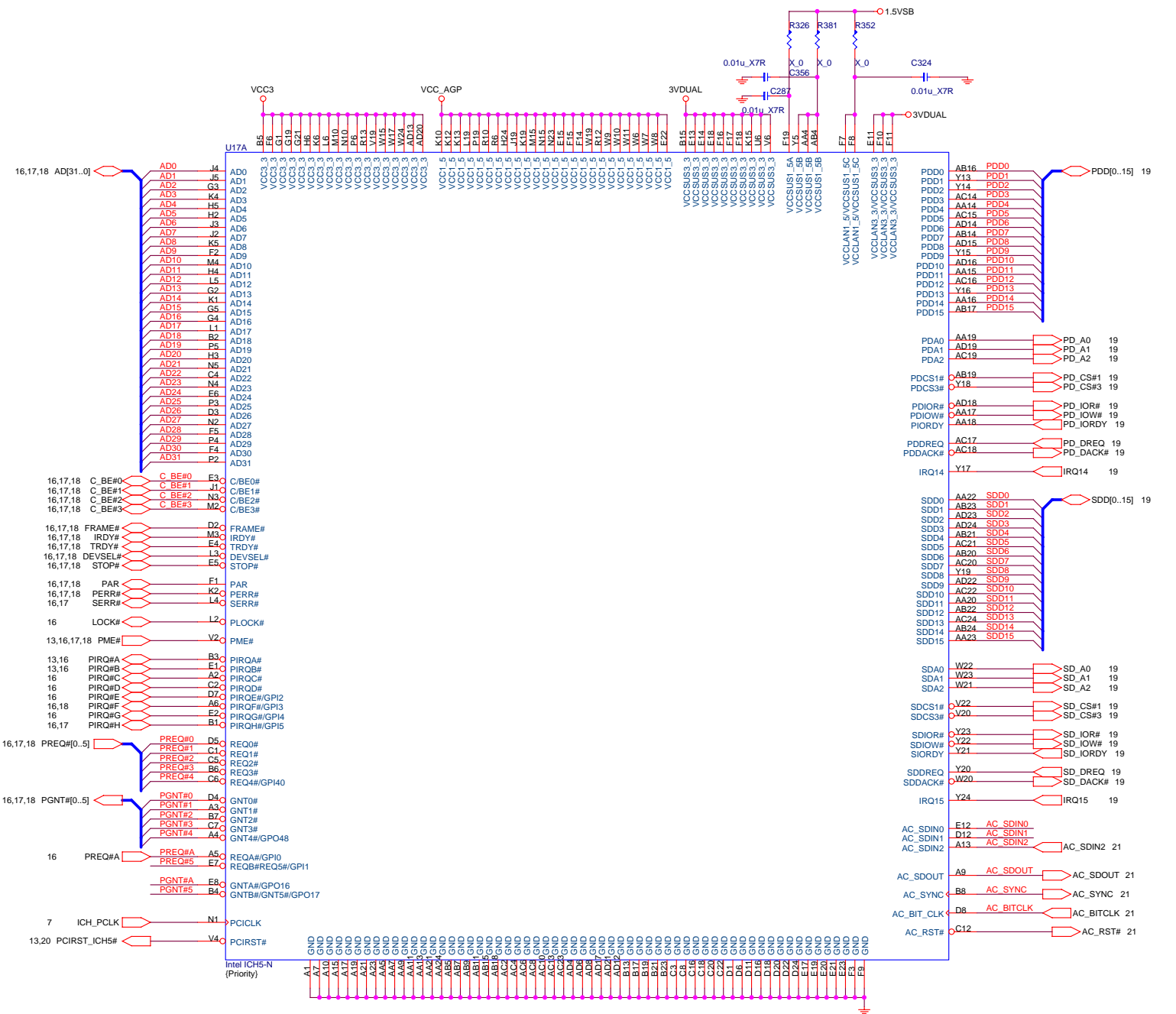


### AGP SLOT DECOUPLING CAPACITORS

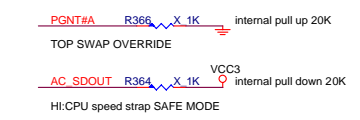


Micro Star Restricted Secret

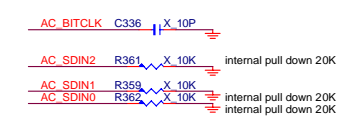
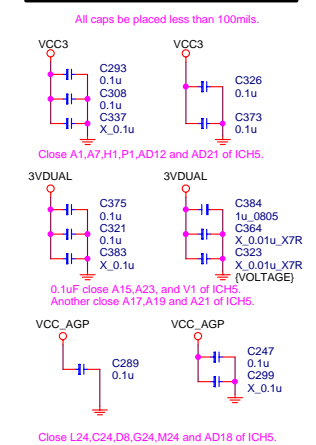
Title		Rev
AGP SLOT		0A
Document Number		MS-7088
MICRO-STAR INT'L No. 66, Hsiao-De St., Jung-He City, Taipei Hsien, Taiwan		Last Revision Date: Tuesday, June 15, 2004 Sheet 13 of 30



### ICH5 Pull-Up / Down Resistors

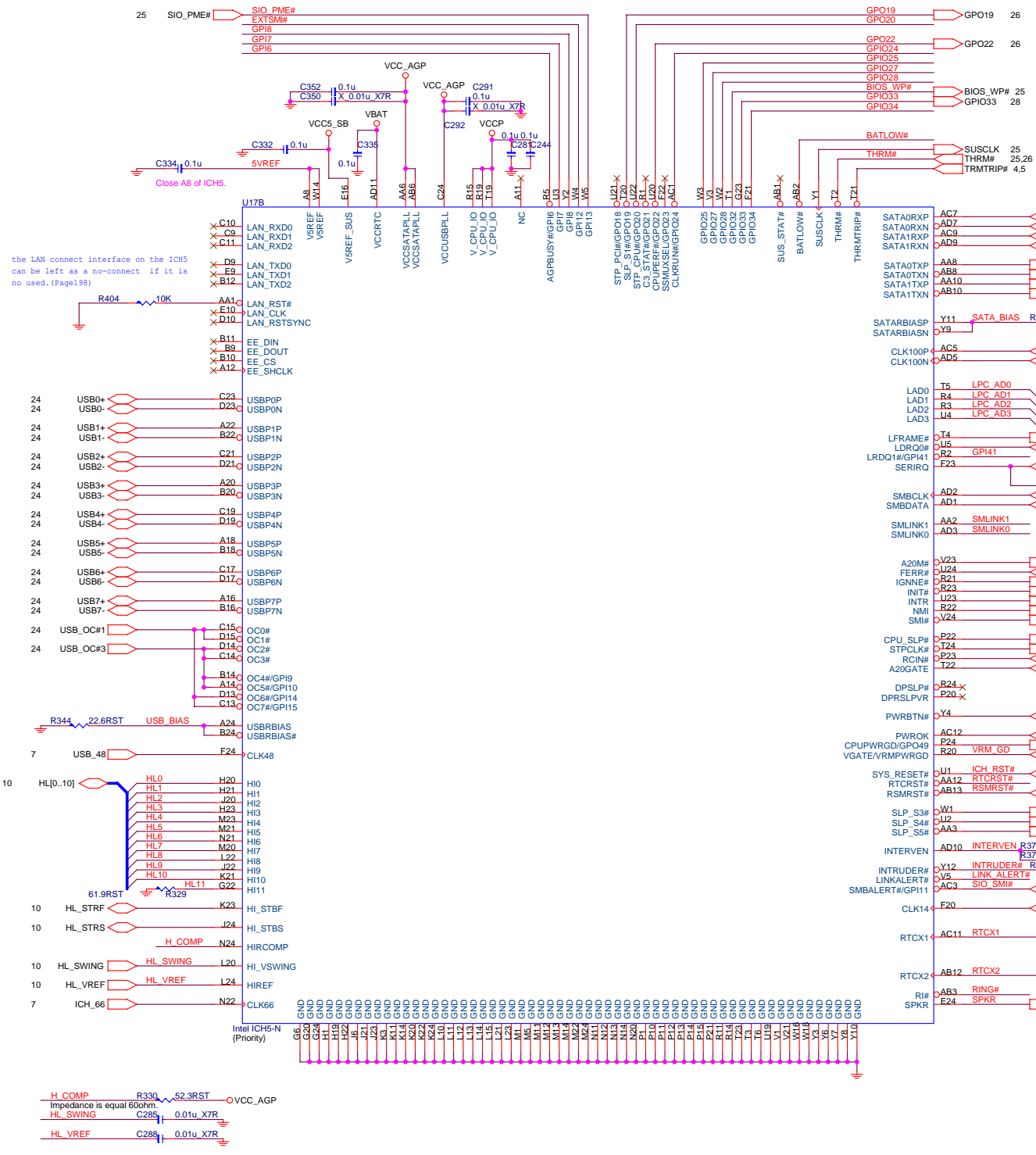


### ICH5 Decoupling Capacitors

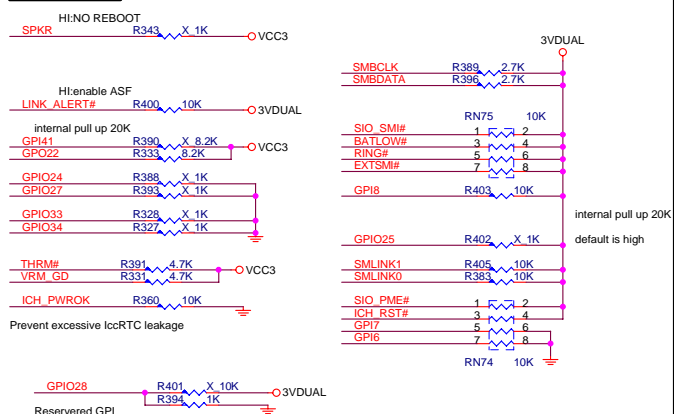


Micro Star Restricted Secret		
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Document Number	MS-7088	
MICRO-STAR INT'L No. 667-De St. Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw		Last Revision Date: Tuesday, June 15, 2004 Sheet 14 of 30

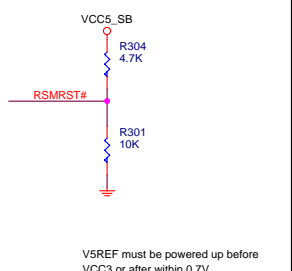




### STRAPS



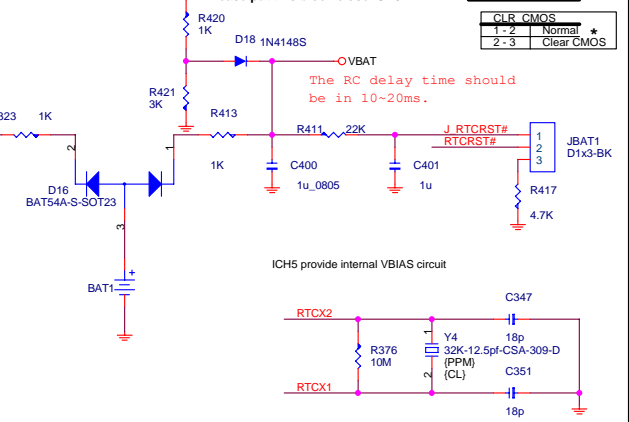
### RESUME RESET



### V5REF Sequencing Circuit



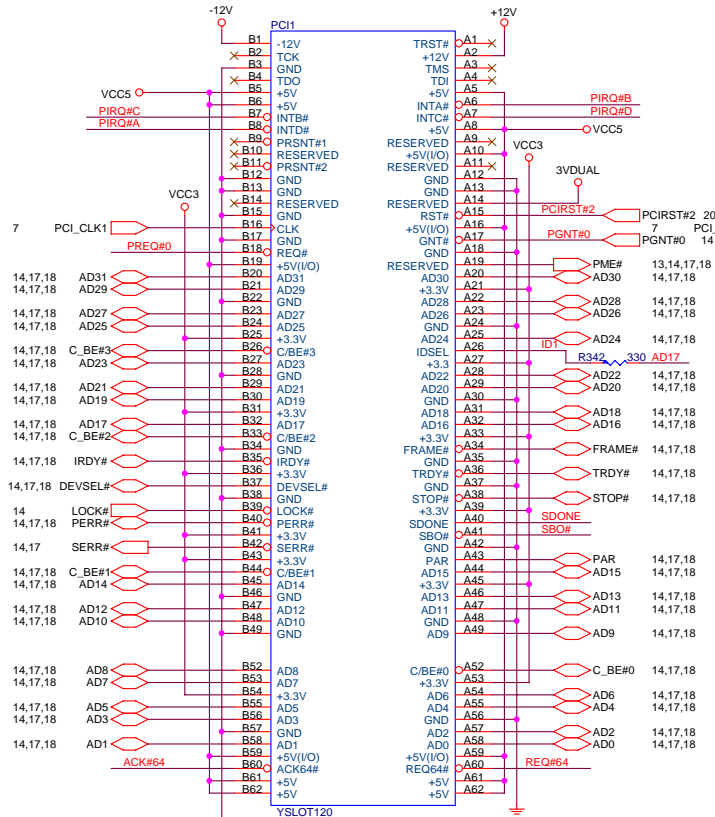
### RTC BLOCK



Micro Star Restricted Secret		
Title	Intel ICH5 - Other signals	Rev
Document Number	MS-7088	0A
MICRO-STAR INT'L No. 62, Hsiao De St., Jung-He City, Taipai Hsien, Taiwan		
Last Revision Date:		Tuesday, June 15, 2004
Sheet	15	of 30

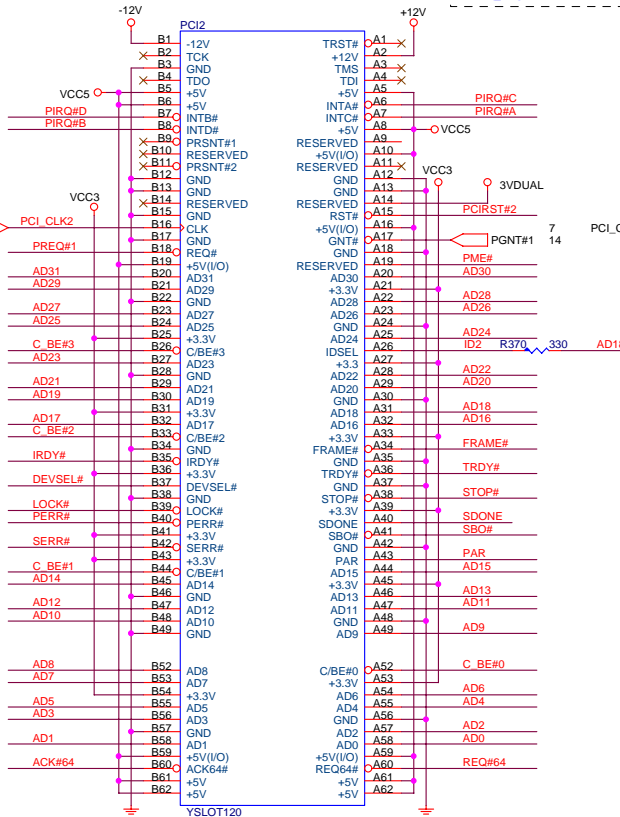
IDSEL = AD17  
MASTER = PREQ#0  
PIRQ#B

PCI SLOT 1 (PCI VER: 2.2 COMPLY)



IDSEL = AD18  
MASTER = PREQ#1  
PIRQ#C

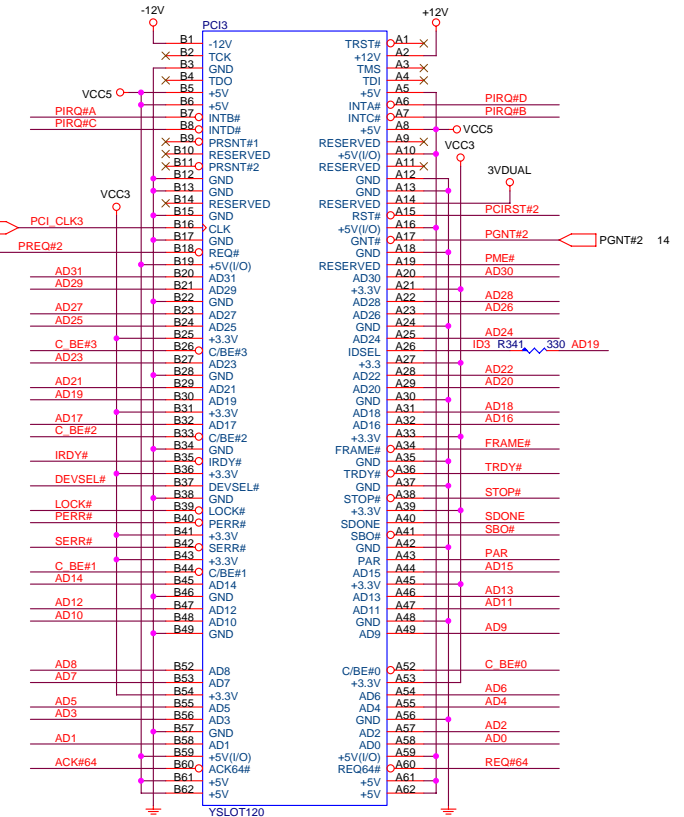
PCI SLOT 2 (PCI VER: 2.2 COMPLY)



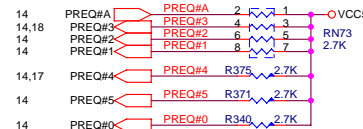
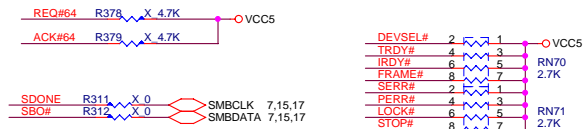
MEDION SPEC  
PCI 4: IDSEL = AD20  
MASTER = PREQ#5  
PIRQ#G

IDSEL = AD19  
MASTER = PREQ#2  
PIRQ#D

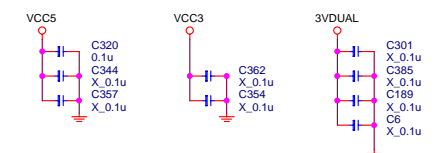
PCI SLOT 3 (PCI VER: 2.2 COMPLY)



PCI PULL-UP / DOWN RESISTORS



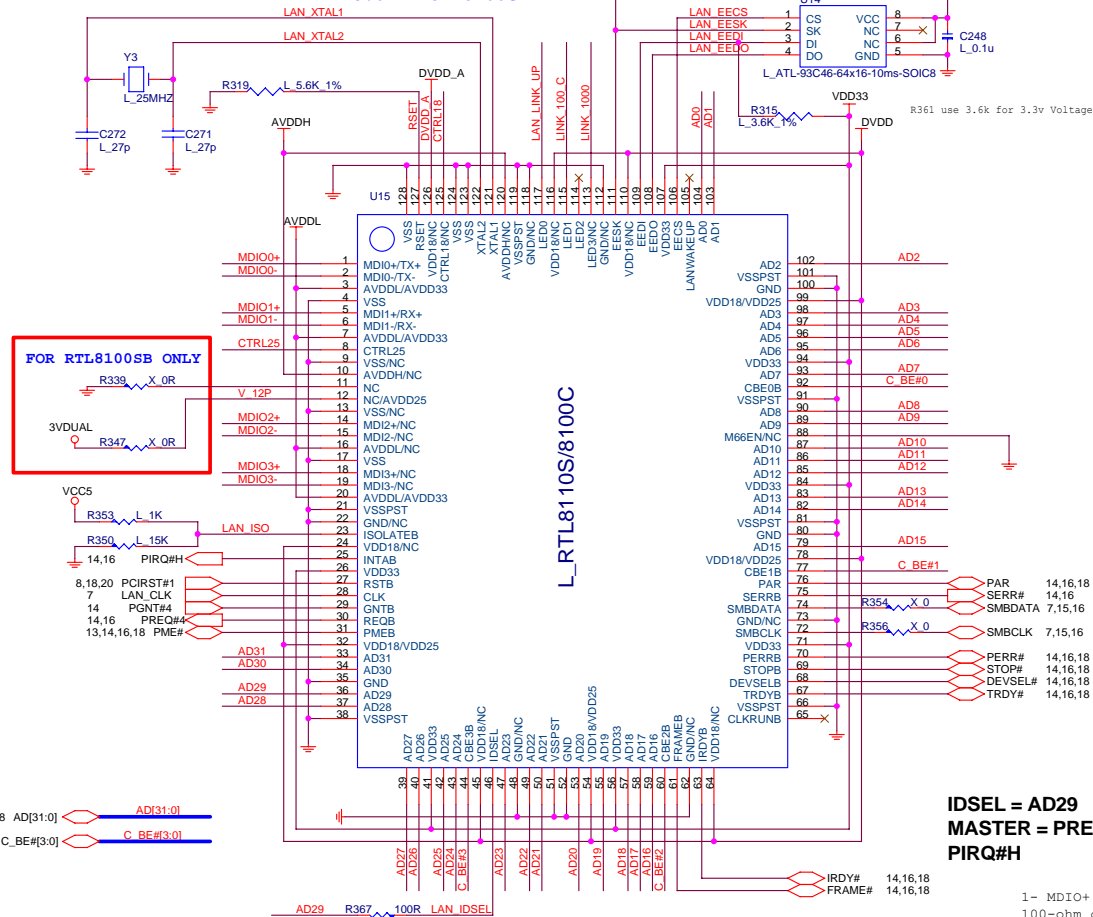
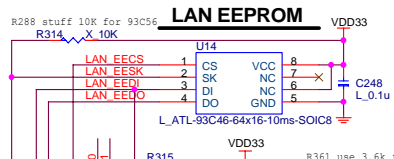
PCI SLOT DECOUPLING CAPACITORS





## PCI LAN RTL8110S/8100C

PIN319[RSET]: 2.49K for 8110S  
5.6K for 8100C

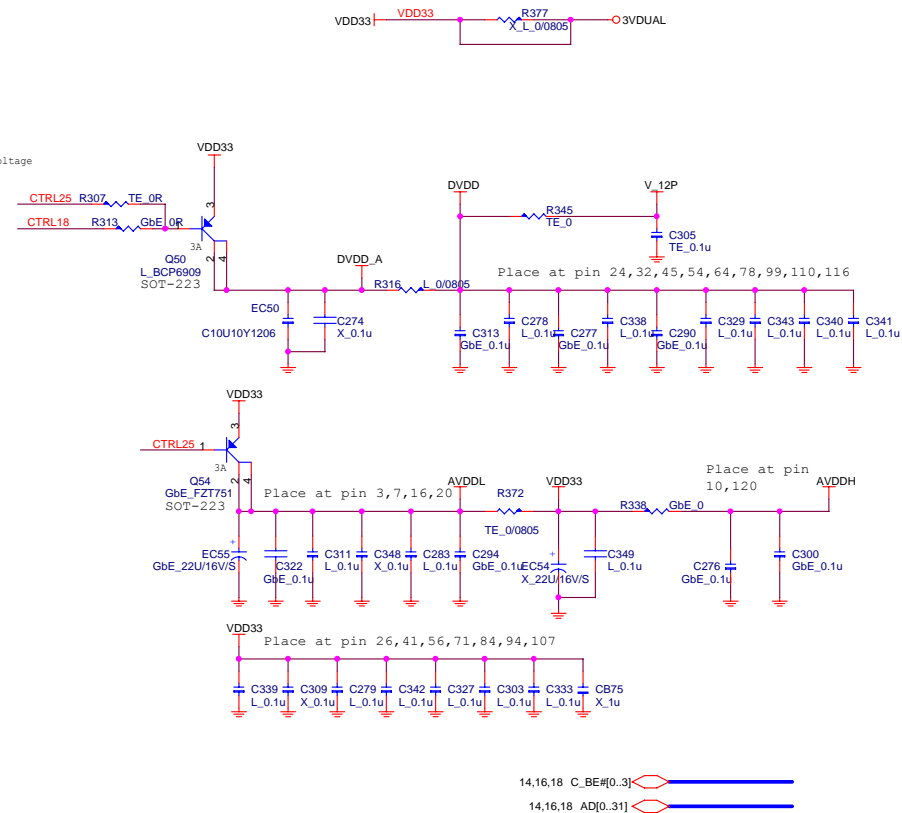


```

IDSEL = AD29
MASTER = PREQ#4
PIRQ#H

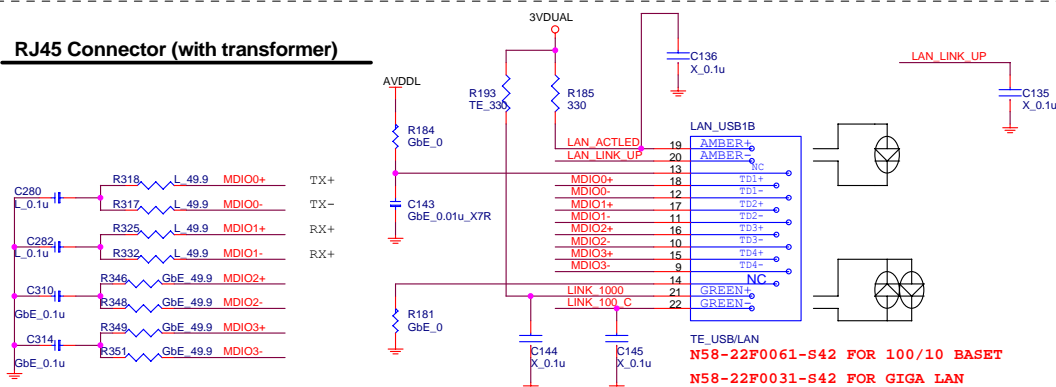
```

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



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

### RJ45 Connector (with transformer)



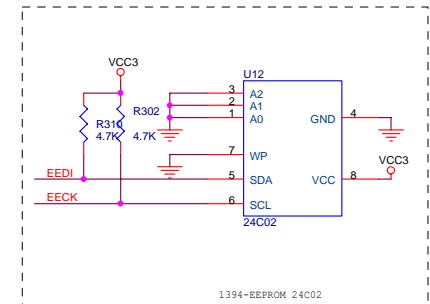
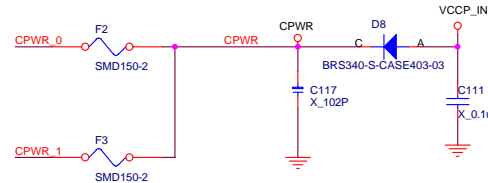
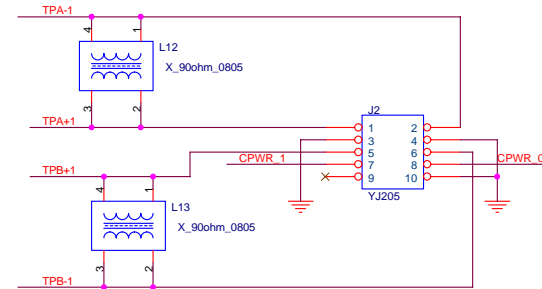
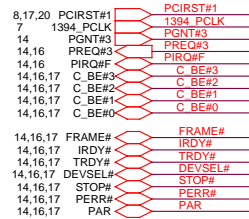
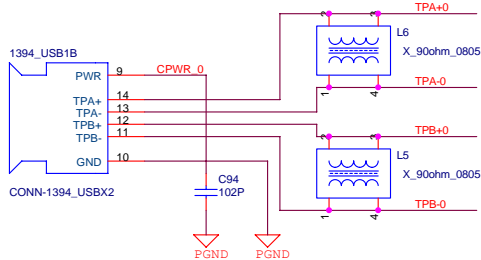
Part Value Selection:

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

*Micro Star Restricted Secret*

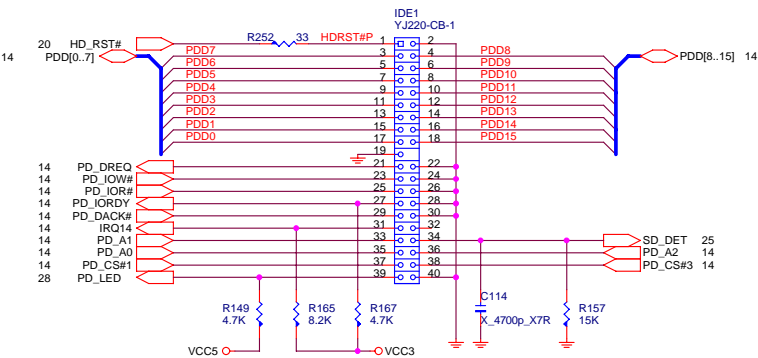
<b>Title</b>		Rev
<b>LAN RTL8110S/8100C</b>		0A
<b>Document Number</b>		
<b>MS-7088</b>		
MICRO-STAR INT'L No. 69, Hsiao St, Jung-He City, Taipei Hsien, Taiwan <a href="http://www.msi.com.tw">http://www.msi.com.tw</a>		Last Revision Date: <b>Tuesday, June 15, 2004</b>
Sheet		17 of 30

```
Did not support S3
wake-up
```

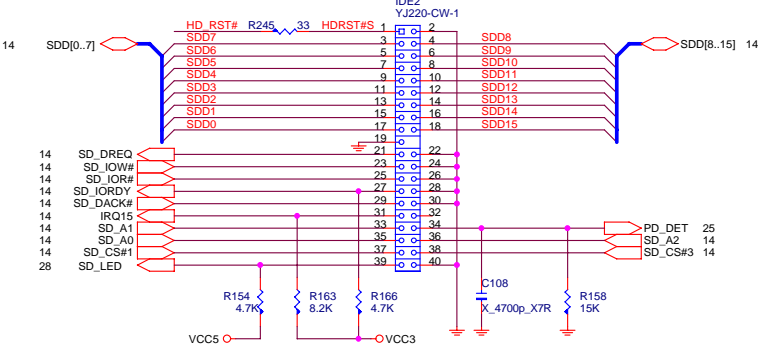


ATA 33/66/100 Connector

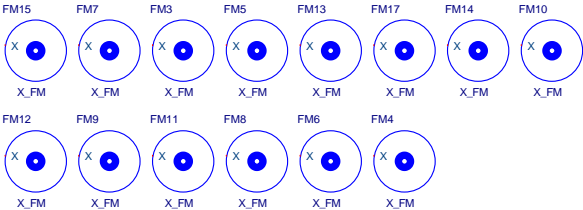
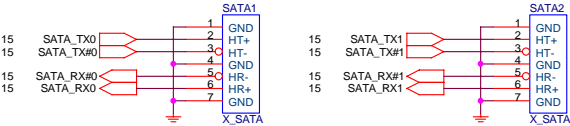
PRIMARY IDE BLOCK



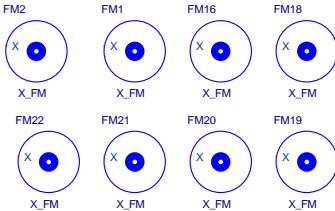
SECONDARY IDE BLOCK



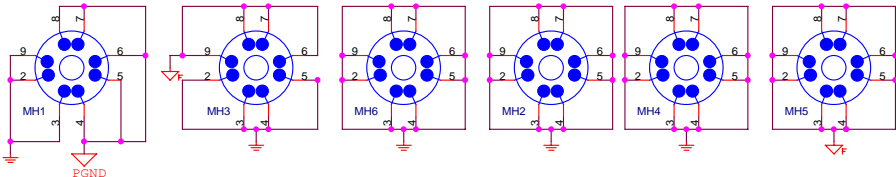
SERIAL ATA CONNECTOR BLOCK



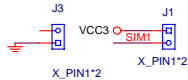
Optics Orientation Holes



Mounting Holes



Simulation



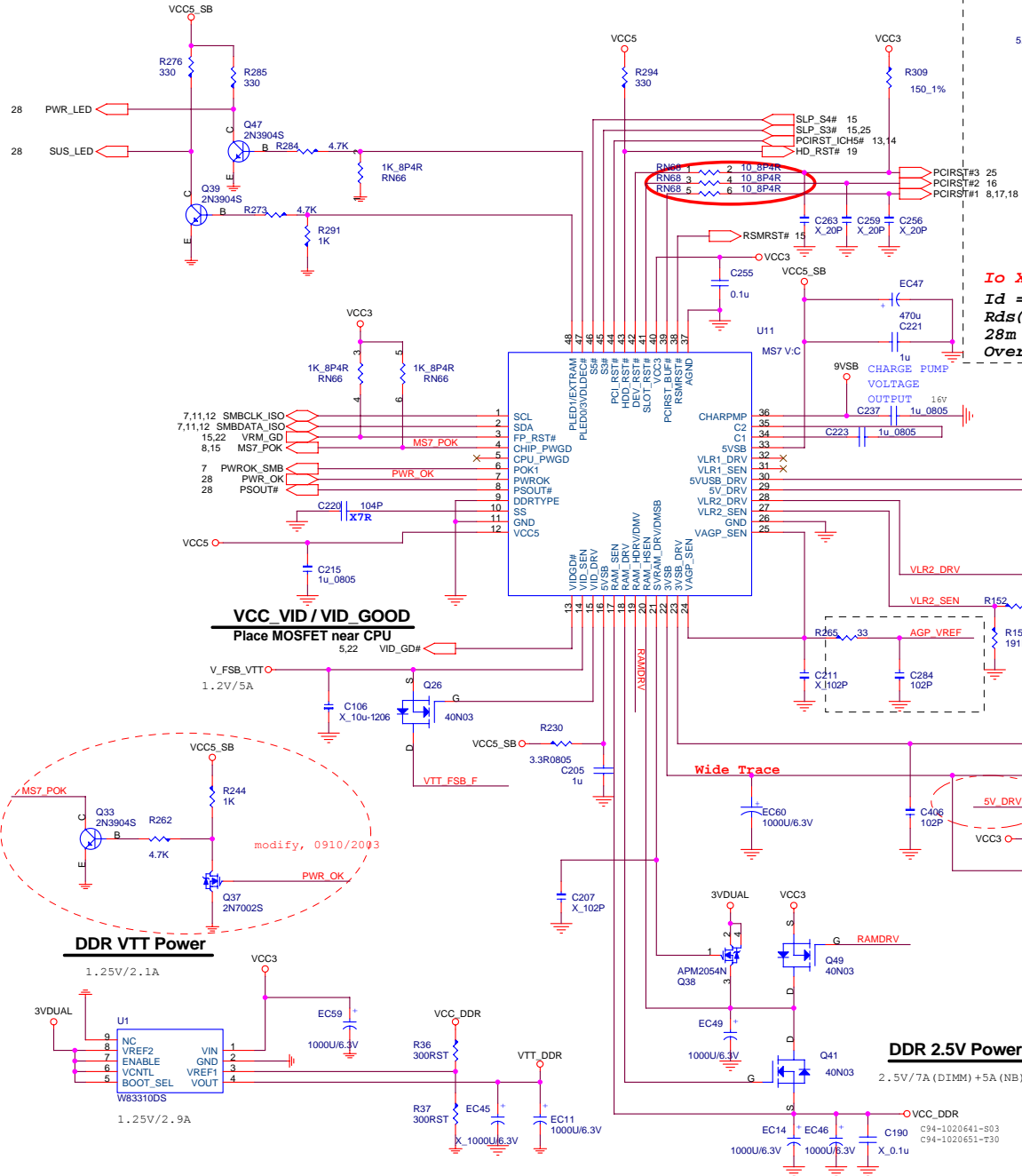
Micro Star Restricted Secret		
Title	ATA 33/66/100 Connector	Rev
Document Number	MS-7088	0A
MICRO-STAR INT'L No. 66, Hsiao-De St., Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw		Last Revision Date: Tuesday, June 15, 2004 Sheet 19 of 30

## ACPI Controller

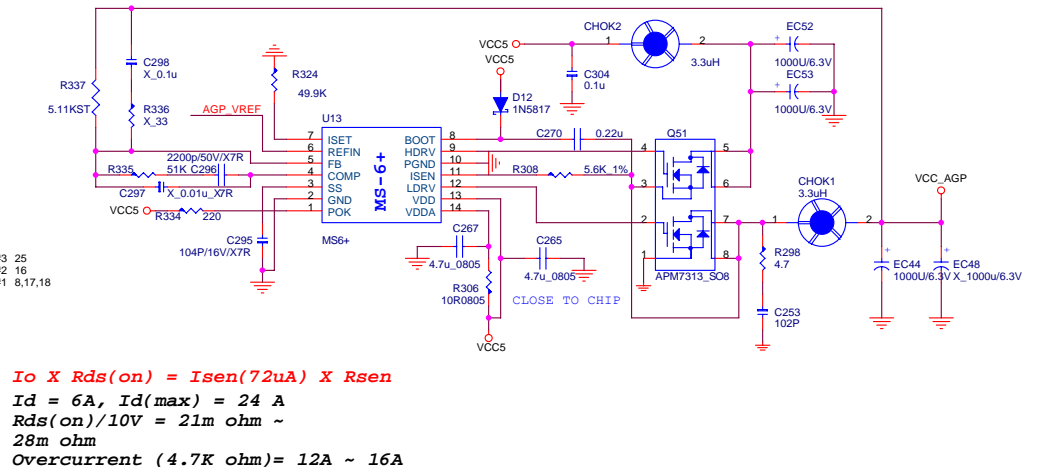
	ICH5 300mA
PCI 375+20+20=	415mA
<hr/>	
VCC3_SB	715mA

**1.7V @250mA**

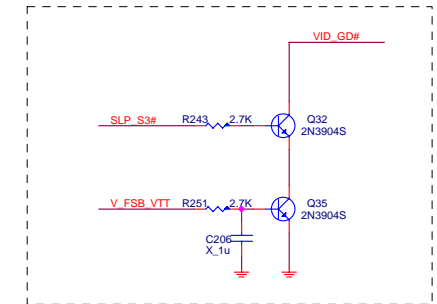
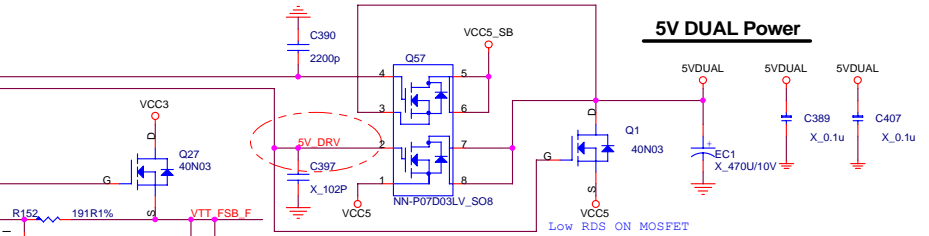
Power	S0	S3	S5
VCC3_SB	Main	Standby	Standby
VCC5_STR	Main	Standby	0V
MEM_STR	Main	Standby	0V



AGP POWER

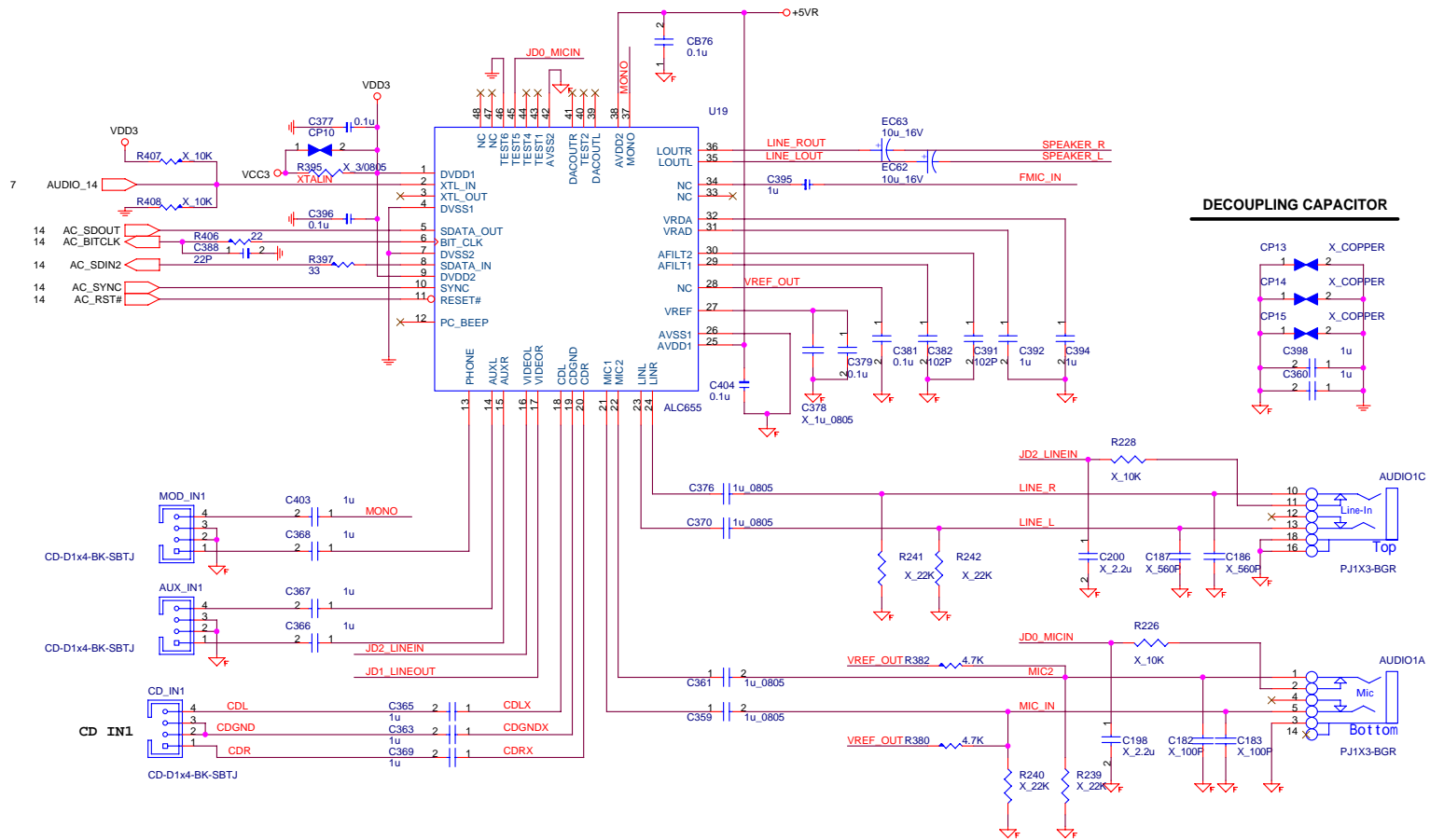


$I_{oX} R_{ds(on)} = I_{sen}(72\mu A) \times R_{sen}$   
 $I_d = 6A, I_d(max) = 24A$   
 $R_{ds(on)}/10V = 21m\ \Omega \sim 28m\ \Omega$   
 $Overcurrent(4.7K\ \Omega) = 12A \sim 16A$



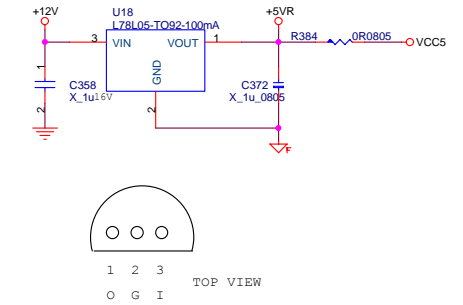
<b><i>Micro Star Restricted Secret</i></b>		
<b><i>Title</i></b>	<b><i>ACPI Controller MS7</i></b>	Rev
<b><i>Document Number</i></b>	<b><i>MS-7088</i></b>	0A
MICRO-STAR INT'L No. 62, Jinhua St., Jung-He City, Taipei Hsien, Taiwan <a href="http://www.msi.com.tw">http://www.msi.com.tw</a>		Last Revision Date: Tuesday, June 15, 2004 Sheet                      20          of          30

## ALC655 AC97 CODEC

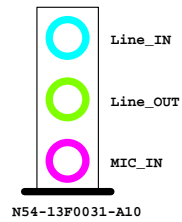
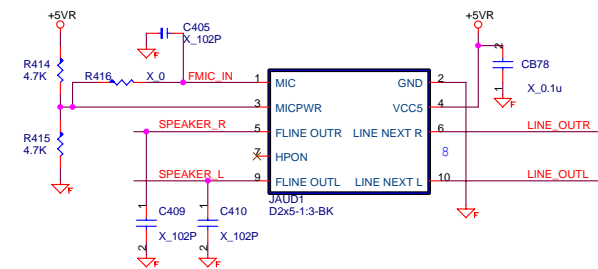


## AUDIO CODE REGULATORS

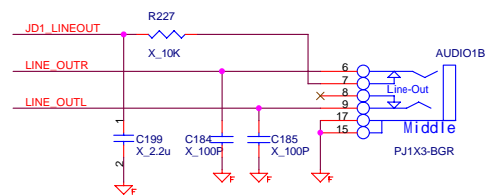
**Trace Width 30mils.**



## Intel Front Audio Connector

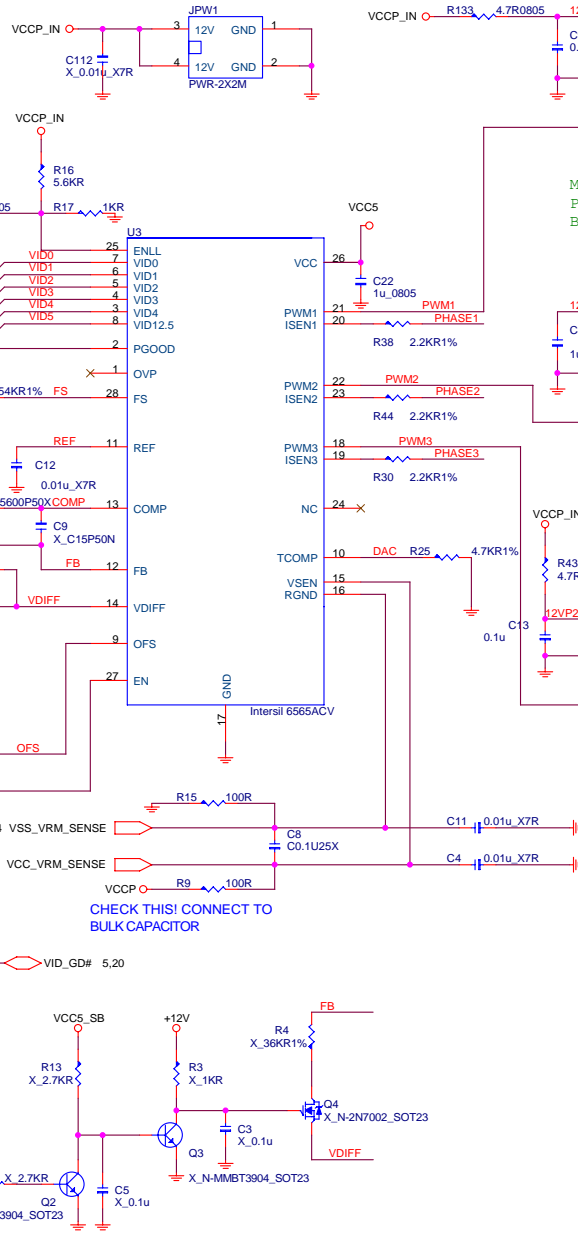


**SPEAKER OUT JACK**



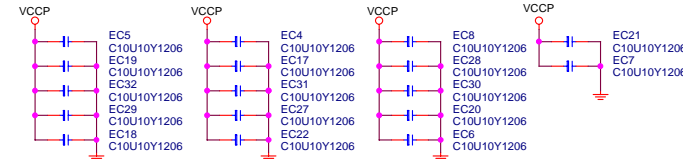
<i>Micro Star Restricted Secret</i>			
<b>Title</b> <i>ALC655</i>			Rev
<b>Document Number</b> <i>MS-7088</i>			0A
MICRO-STAR INT'L No. 60-ii De St. Jung-He City, Taipei Hsien, Taiwan <a href="http://www.msi.com.tw">http://www.msi.com.tw</a>		Last Revision Date: Tuesday, June 15, 2004	
Sheet	21	of	30

# Voltage Regular Module



MOSFET Gate signal : 20 mils  
Phase signal : 20 mils  
Boot signal : 16 mils

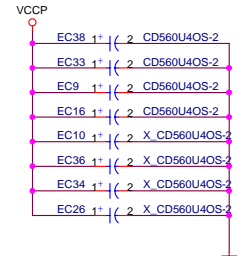
## CPU DECOUPLING CAPACITORS



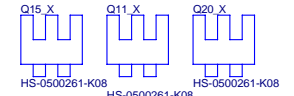
C10U10Y1206 10u/10V/Y5V,1206,80/-20%

Place these caps within socket cavity

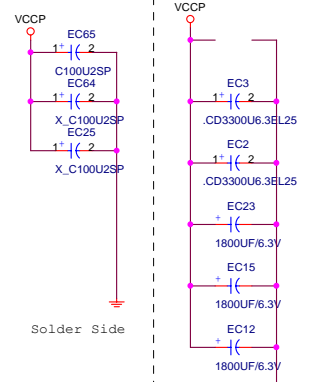
OS-CON  
Capacitors



MOSFET Heatsinks



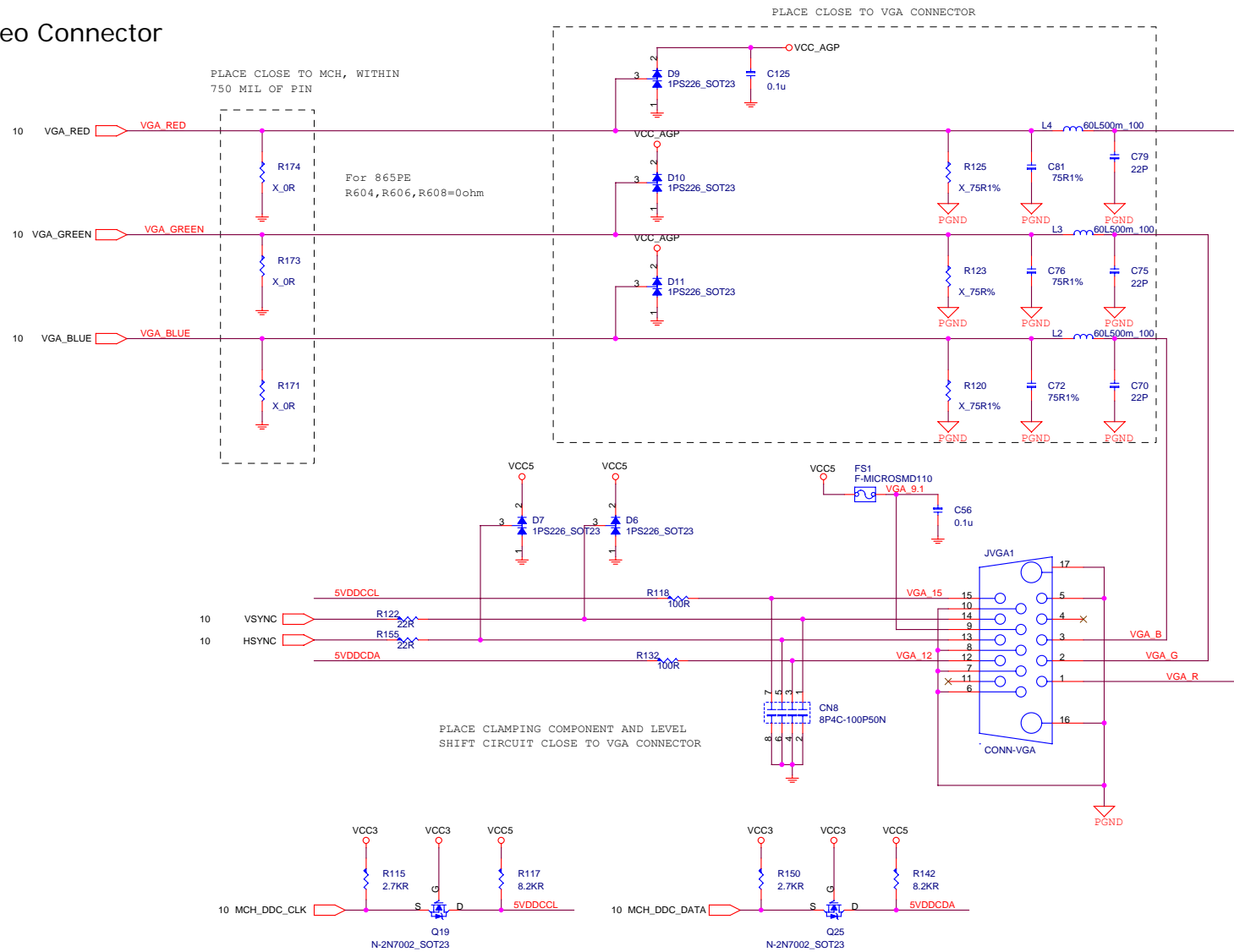
SP Capacitors EL Capacitors



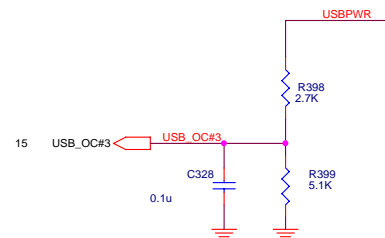
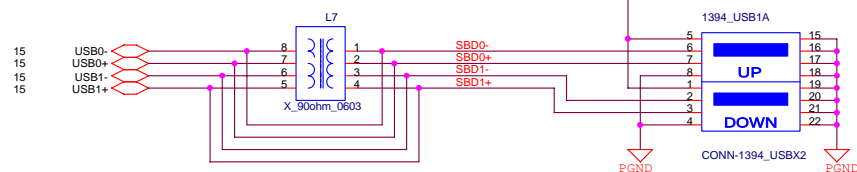
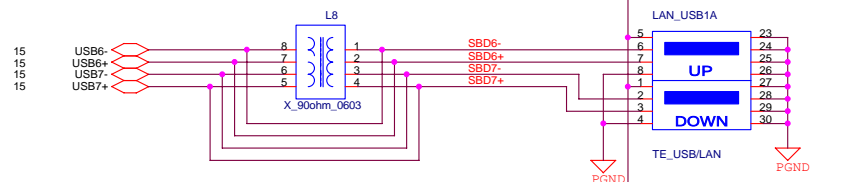
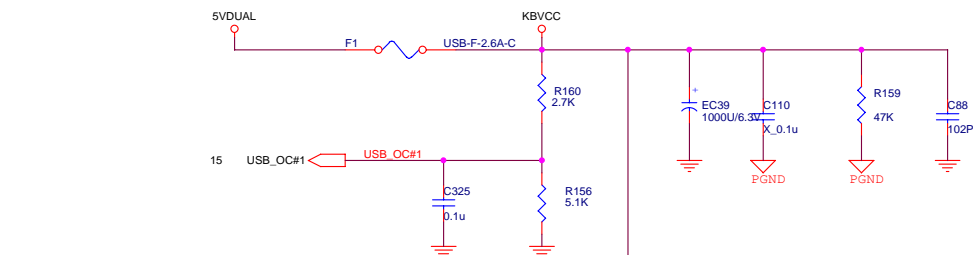
Micro Star Restricted Secret

Title		Rev
VRM 10.1 - Intersil 6565ACV 3 Phase		0A
Document Number		MS-7088
MICRO-STAR INT'L No. 60, Hsiao-De St, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw		Last Revision Date: Tuesday, June 15, 2004 Sheet 22 of 30

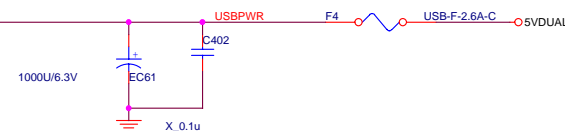
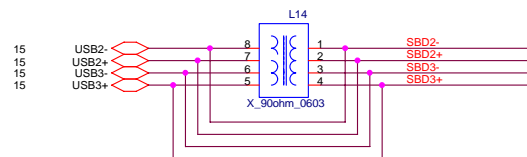
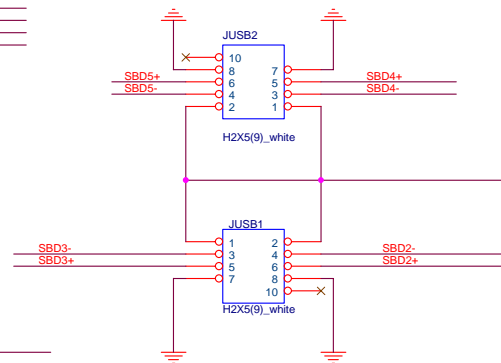
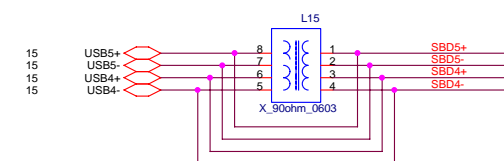
## Video Connector



<i>Micro Star Restricted Secret</i>		
<b>Title</b>	<b>VGA CONNECTOR</b>	Rev
<b>Document Number</b>	<b>MS-7088</b>	0A
MICRO-STAR INT'L No. 66, De St. Jung-He City, Taipei Hsien, Taiwan <a href="http://www.msi.com.tw">http://www.msi.com.tw</a>		Last Revision Date: Tuesday, June 15, 2004 Sheet
		23 of 30



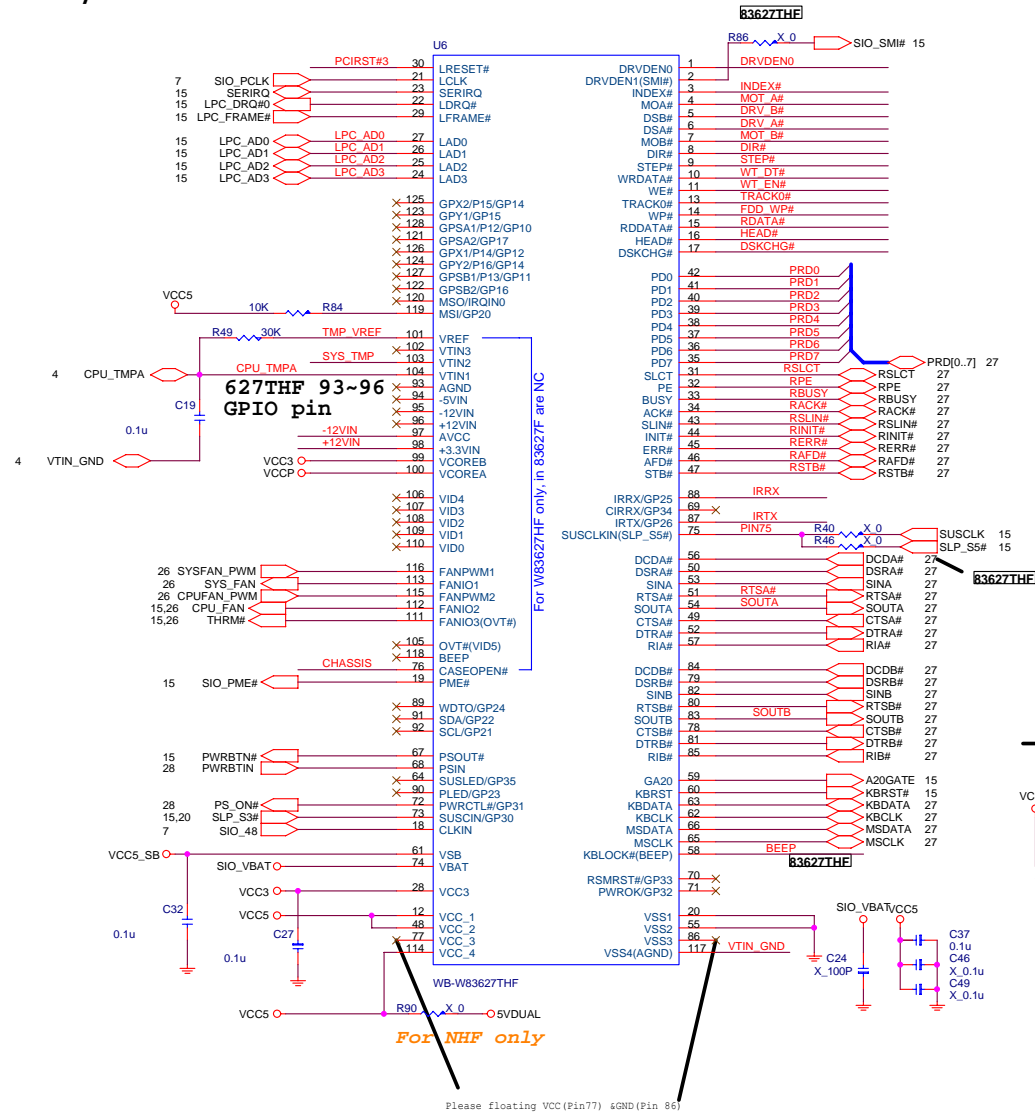
\* USB Trace width : 7.5 mils  
 \* USB Trace Spacing : 20 mils  
 \* Differential USB Signlas Trace, Spacing : 7.5 mils



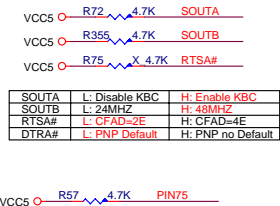
Micro Star Restricted Secret	
Title	Rev
USB Connector	0A
Document Number	MS-7088
MICRO-STAR INT'L No. 66, Sec. 2, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw	
Last Revision Date: Tuesday, June 15, 2004	
Sheet	24 of 30



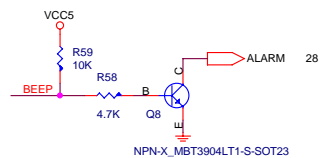
**LPC SUPER I/O W83627F/HF/THF**



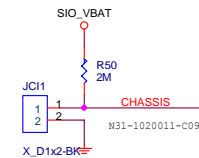
## LPC I/O STRAPPING RESISTOR



**SPEAKER BLOCK**

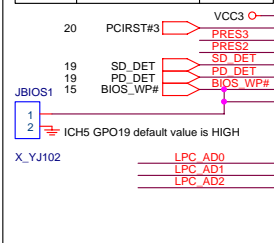


## Chassis Intrusion

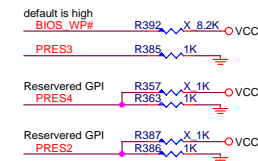


## BIOS PROTECT BLOCK

BIOS Update Config.		
HIGH	Un_protected	
LOW	Protected	Default



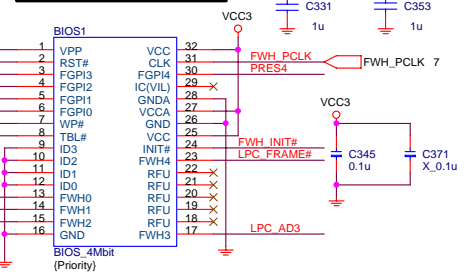
## FWH Resistors



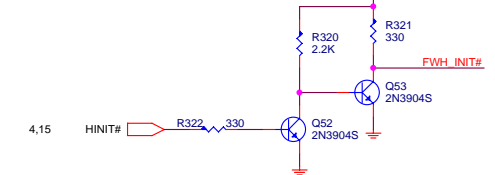
### FWH DECOUPLING CAPACITORS

Place Cap. as Close to FWH< 350 mil

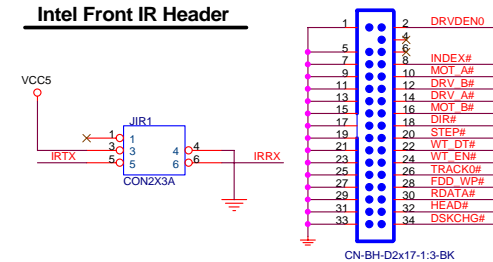
### Firmware Hub (FWH)



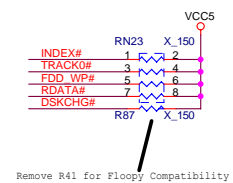
### INIT signal voltage translation



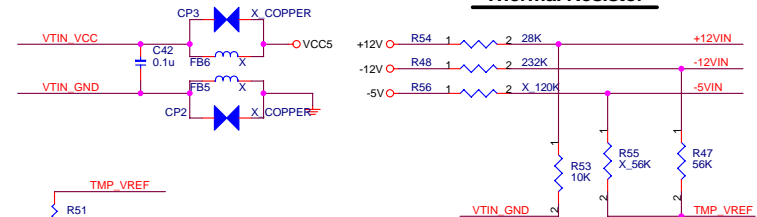
## Intel Front IR Header



### FLOPPY CONNECTOR



### Thermal Resistor



*Micro Star Restricted Secret*

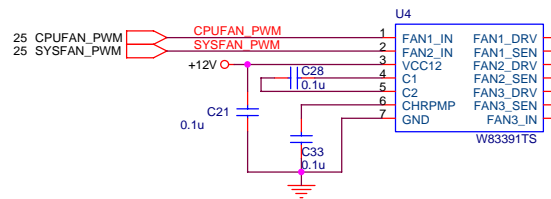
<b>Title</b>	<b>W627THF LPC I/O / FWH</b>
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<b>Document Number</b>	<b>MS-7088</b>
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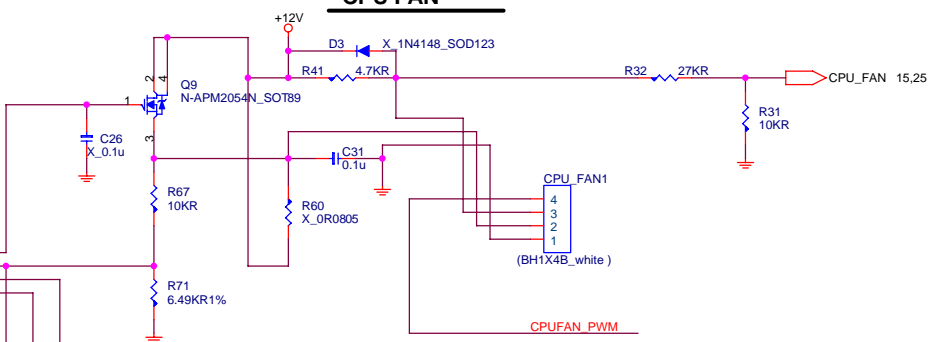
MICRO-STAR INT'L No. 69, Li-De St, Jung-He City, Taipei Hsien, Taiwan <a href="http://www.msi.com.tw">http://www.msi.com.tw</a>	Last Revision Date: Tuesday, June 15, 2004 Sheet 25 of 30
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**NOTE: LOCATE CLOSEST  
STATUS PANEL**

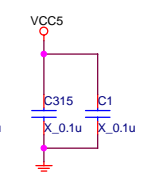
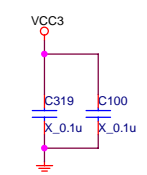
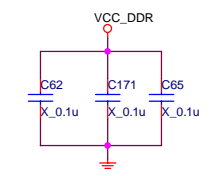
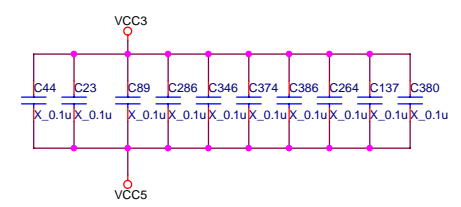
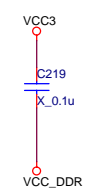
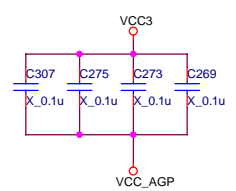
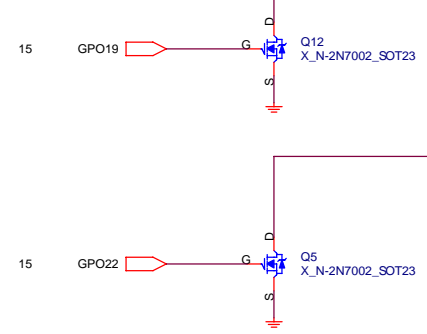
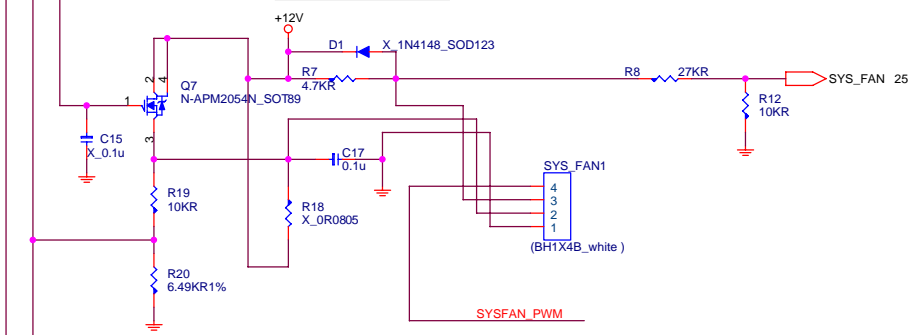
# FAN CONTROL



## CPU FAN

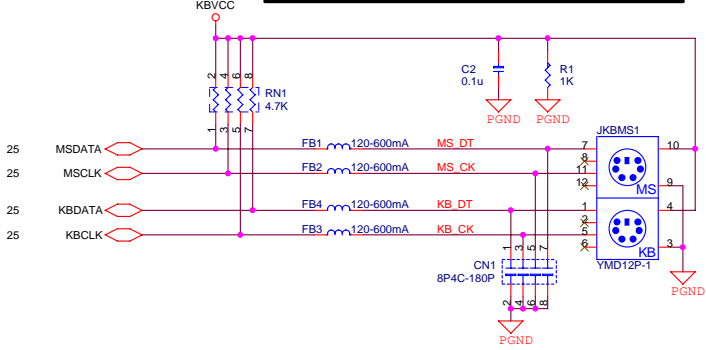


## SYSTEM FAN

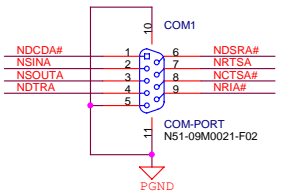
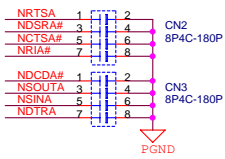
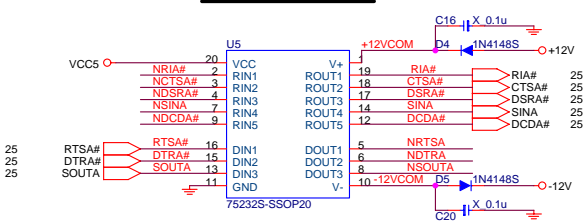


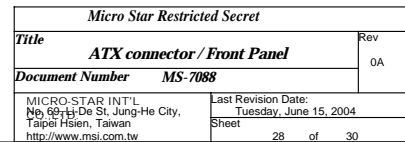
Micro-Star	Title	MS-7067	Rev	0A
Document Number	MEM,VCC_DAC & VTT Controller			
Last Revision Date:	Tuesday, June 15, 2004			Sheet 26 of 30

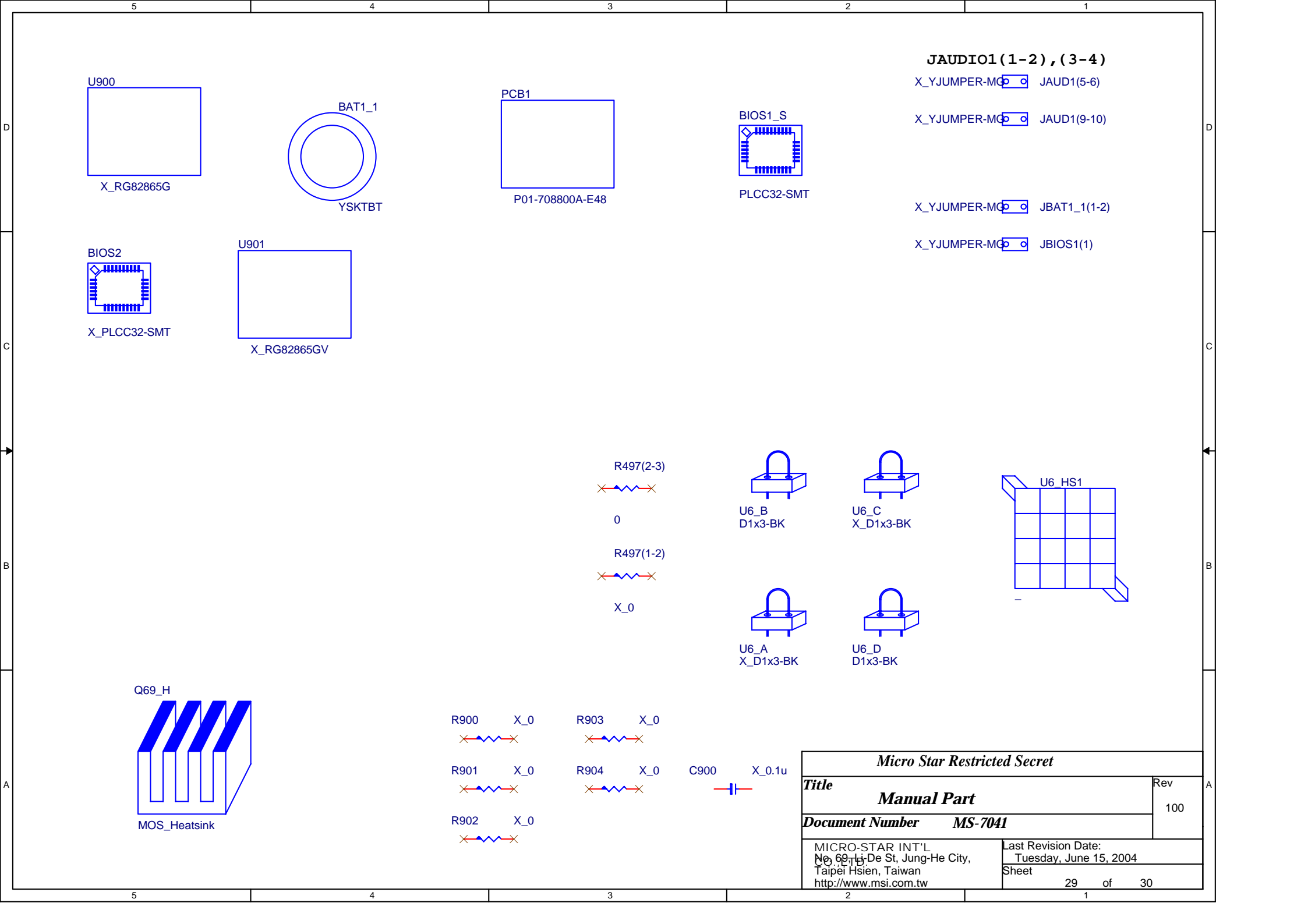
PS2 KEYBOARD & MOUSE CONNECTOR



SERIAL PORT 1



[illegible]



00A to 100 Schematic change list		Page
1	Add R620 (Slove PWM can't work)	21
2	Add VGA circuit	9,23
3		
4		
5		
6		
7		
8		
9		
10		

Micro Star Restricted Secret		
Title History		Rev
Document Number MS-7041		100
MICRO-STAR INT'L No. 66, Hsinyue St., Jung-He City, Taipei Hsien, Taiwan <a href="http://www.msi.com.tw">http://www.msi.com.tw</a>		Last Revision Date: Tuesday, June 15, 2004
		Sheet 30 of 30