

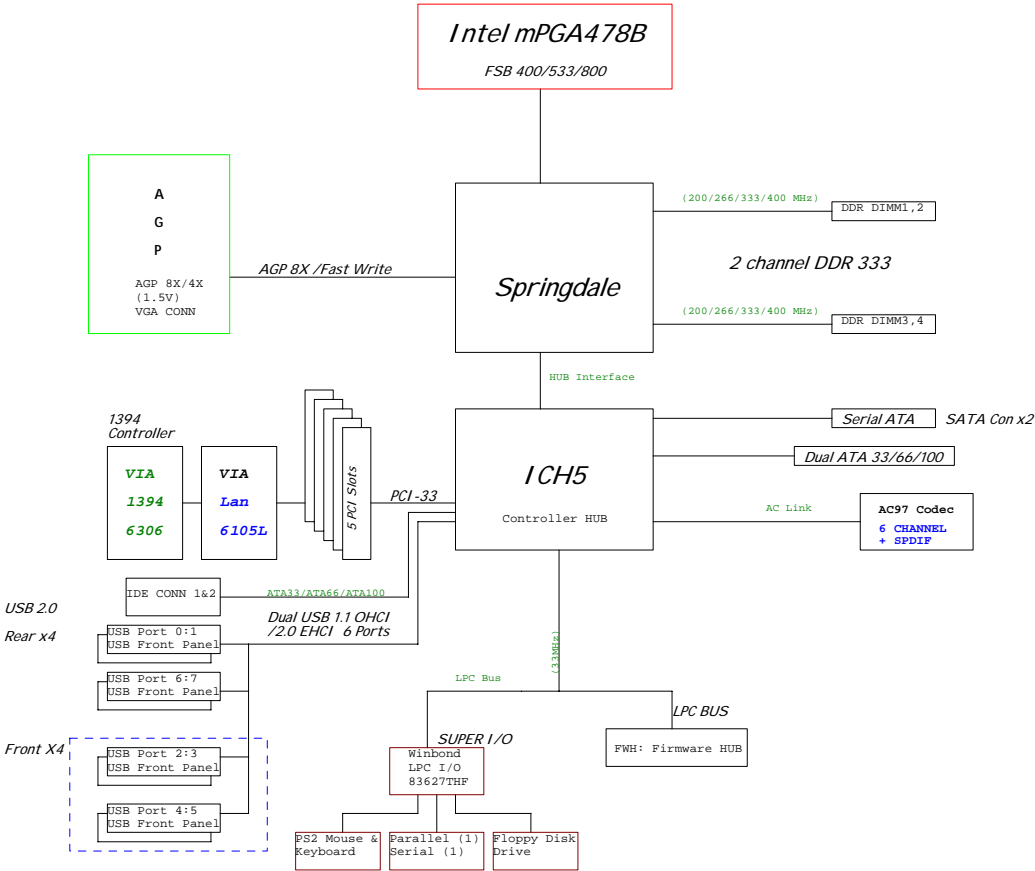
MS-7041 uATX

- *INTEL mPGA 478B Processor
- *INTEL Springdale GMCH / ICH5 Chipset
(DDR 400 / AGP 8X) / (integrated serial ATA)
- *VIA/6105L
- *VIA/6306,IEEE1394 3port
- *Winbond 83627HF LPC I/O
- *Audio codec 6 channel support
- *USB 2.0 support x6 (integrated into ICH5)

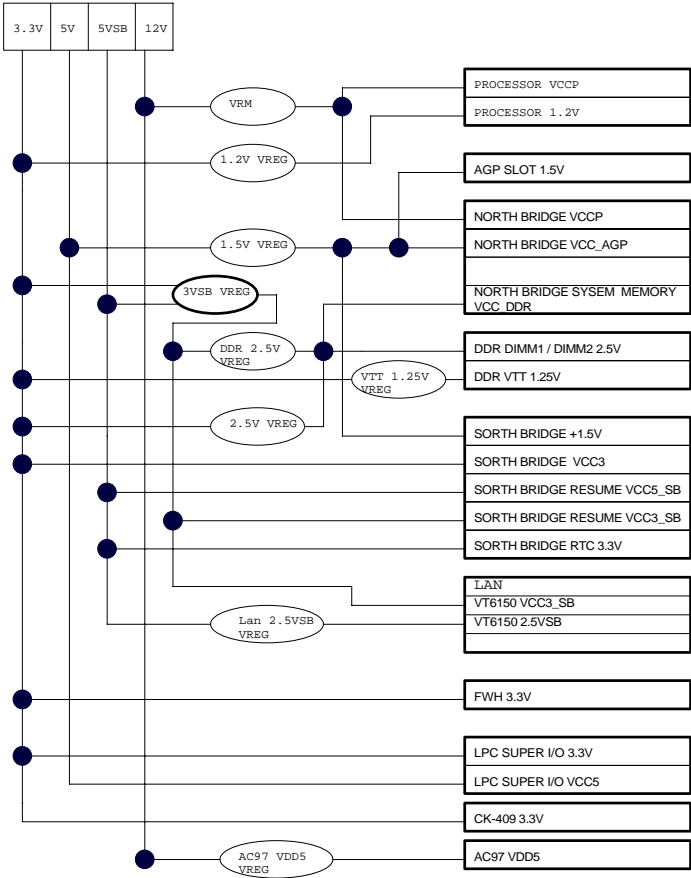
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Block Diagram

+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_5VSB
+12V for 1394 bus power : CPWR



POWER DELIVERY MAP



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

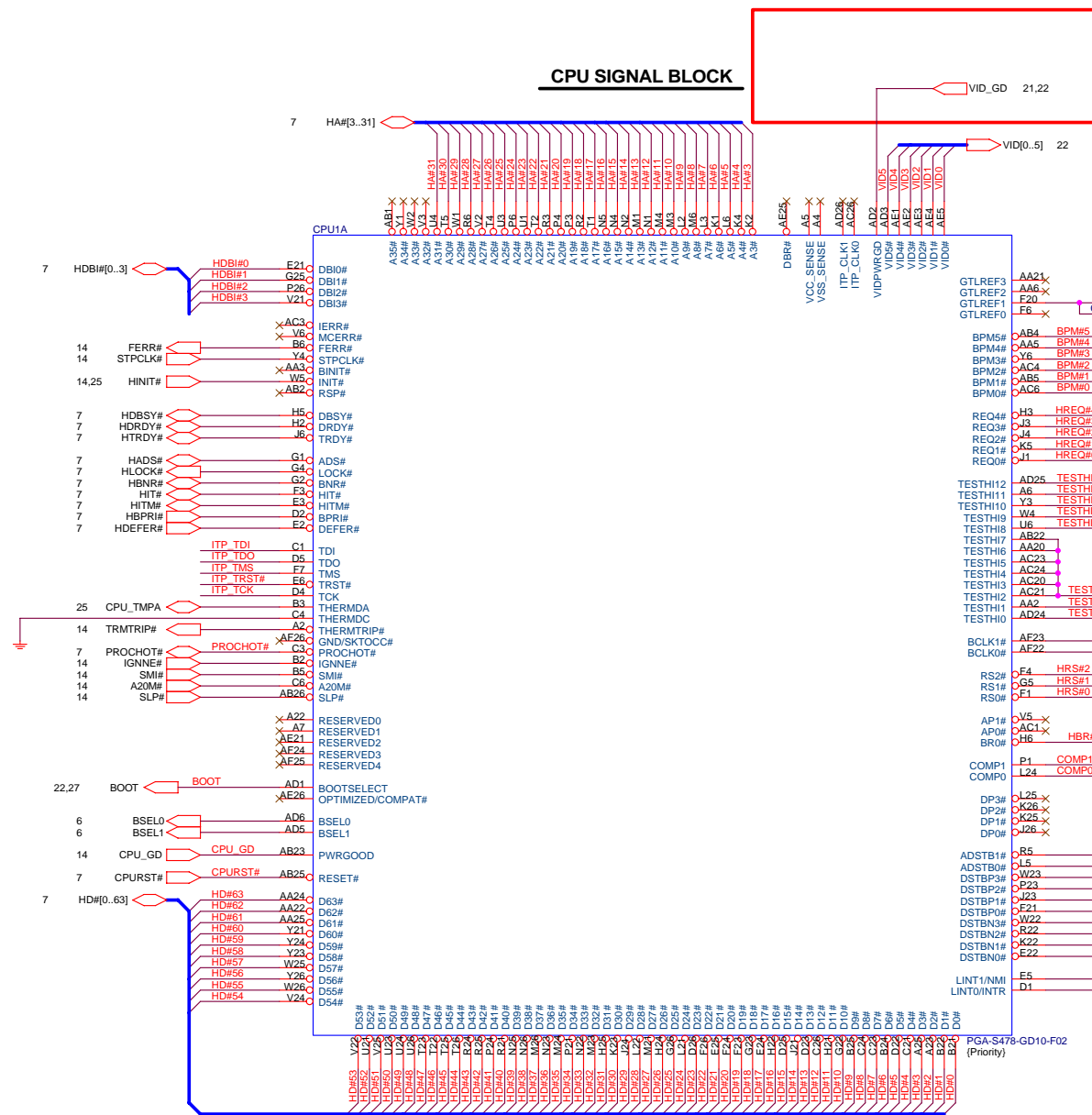
Signals	Target
PCIRST#_ICH5	AGP,FWH,MS-5
PCIRST#1	Springdale,LAN, Super I/O,1394,MS-1
PCIRST#2	PCI slot 1-3 & Mini PCI
HD_RST#	Primary, Scoundary IDE

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 100
Document Number	MS-7041	
MICRO-STAR INT'L No. 66, Ly De St, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw		Last Revision Date: Thursday, December 04, 2003 Sheet 3 of 29

CPU SIGNAL BLOCK

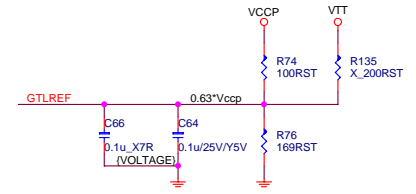


VIDPWRGD DC Specifications

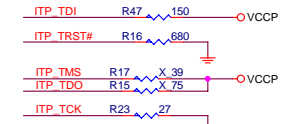
	Min	Typ	Max
VIL			
VIH	0.9		0.3

It must route to the enable pin of PWM and CK-409.
VIDGD to Vccp delay time is from 1ms to 10ms.
VIDGD rising time is 150ns.

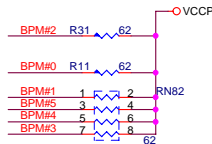
CPU GTL REFERENCE VOLTAGE BLOCK



CPU ITP BLOCK



CPU STRAPPING RESISTORS



ALL COMPONENTS CLOSE TO CPU



Micro Star Restricted Secret

Title Intel mPGA478B - Signals

Document Number MS-7041

MICRO-STAR INT'L
No. 62, Hsiao-Hsin Rd., Jung-He City,
Taipei Hsien, Taiwan
http://www.msi.com.tw

Last Revision Date:
Tuesday, December 09, 2003
Sheet 4 of 29

The diagram illustrates the pinout of the AD9232, showing connections for VCC, CPUIB, and VCC-VIDPRG pins. The pins are organized into three main groups: VCC (top), CPUIB (middle), and VCC-VIDPRG (bottom). The VCC pins are connected to various internal blocks, including VSS, VDD, and VDDQ. The CPUIB pins are connected to various internal blocks, including VSS, VDD, and VDDQ. The VCC-VIDPRG pins are connected to various internal blocks, including VSS, VDD, and VDDQ.

Pin	Signal	Internal Block
10	VSS	VSS
11	VSS	VSS
13	VSS	VSS
15	VSS	VSS
17	VSS	VSS
19	VSS	VSS
21	VSS	VSS
23	VSS	VSS
25	VSS	VSS
27	VSS	VSS
29	VSS	VSS
31	VSS	VSS
33	VSS	VSS
35	VSS	VSS
37	VSS	VSS
39	VSS	VSS
41	VSS	VSS
43	VSS	VSS
45	VSS	VSS
47	VSS	VSS
49	VSS	VSS
51	VSS	VSS
53	VSS	VSS
55	VSS	VSS
57	VSS	VSS
59	VSS	VSS
61	VSS	VSS
63	VSS	VSS
65	VSS	VSS
67	VSS	VSS
69	VSS	VSS
71	VSS	VSS
73	VSS	VSS
75	VSS	VSS
77	VSS	VSS
79	VSS	VSS
81	VSS	VSS
83	VSS	VSS
85	VSS	VSS
87	VSS	VSS
89	VSS	VSS
91	VSS	VSS
93	VSS	VSS
95	VSS	VSS
97	VSS	VSS
99	VSS	VSS
101	VSS	VSS
103	VSS	VSS
105	VSS	VSS
107	VSS	VSS
109	VSS	VSS
111	VSS	VSS
113	VSS	VSS
115	VSS	VSS
117	VSS	VSS
119	VSS	VSS
121	VSS	VSS
123	VSS	VSS
125	VSS	VSS
127	VSS	VSS
129	VSS	VSS
131	VSS	VSS
133	VSS	VSS
135	VSS	VSS
137	VSS	VSS
139	VSS	VSS
141	VSS	VSS
143	VSS	VSS
145	VSS	VSS
147	VSS	VSS
149	VSS	VSS
151	VSS	VSS
153	VSS	VSS
155	VSS	VSS
157	VSS	VSS
159	VSS	VSS
161	VSS	VSS
163	VSS	VSS
165	VSS	VSS
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207	VSS	VSS
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211	VSS	VSS
213	VSS	VSS
215	VSS	VSS
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221	VSS	VSS
223	VSS	VSS
225	VSS	VSS
227	VSS	VSS
229	VSS	VSS
231	VSS	VSS
233	VSS	VSS
235	VSS	VSS
237	VSS	VSS
239	VSS	VSS
241	VSS	VSS
243	VSS	VSS
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317	VSS	VSS
319	VSS	

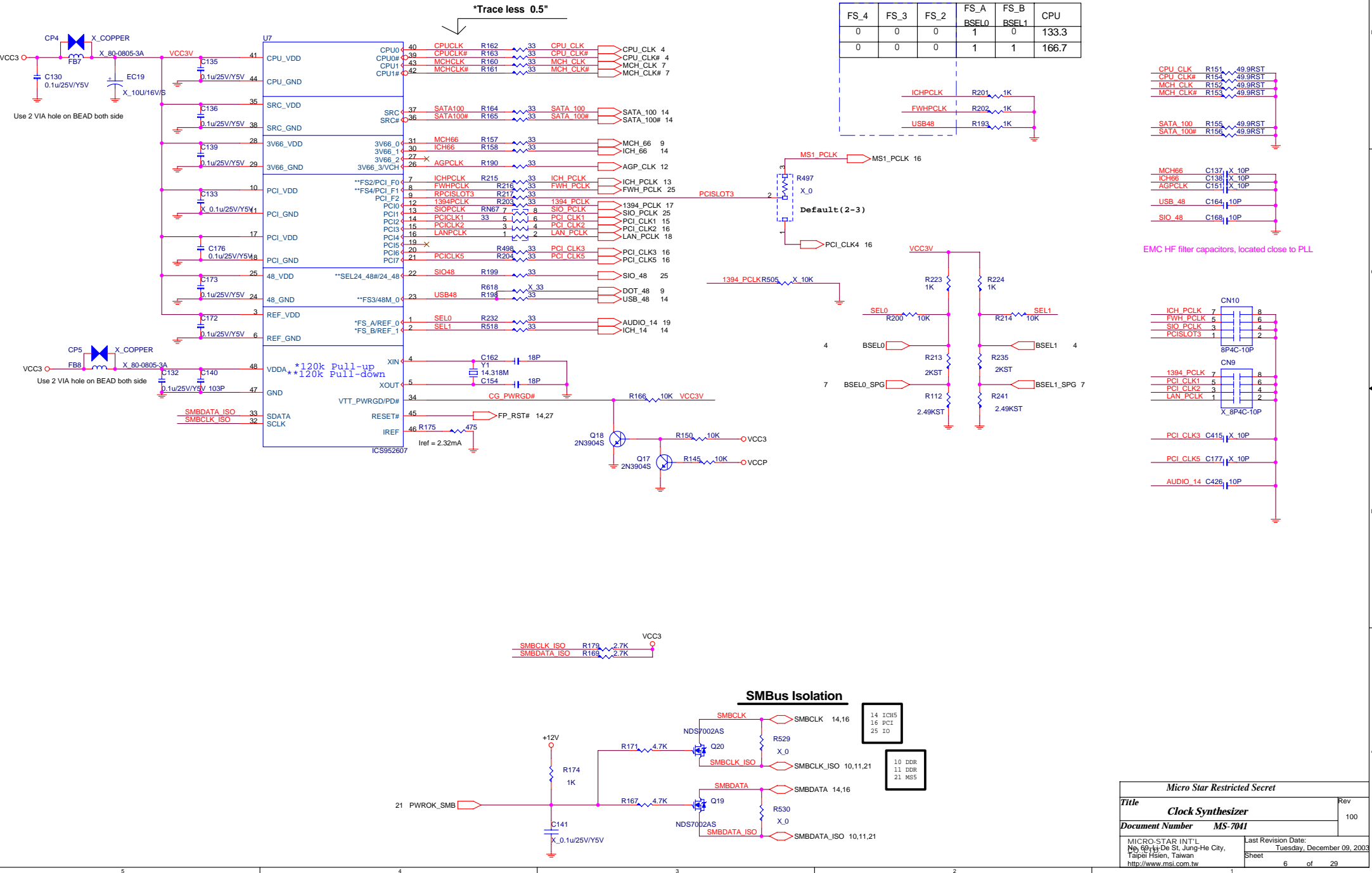
It support DC current if 100mA.

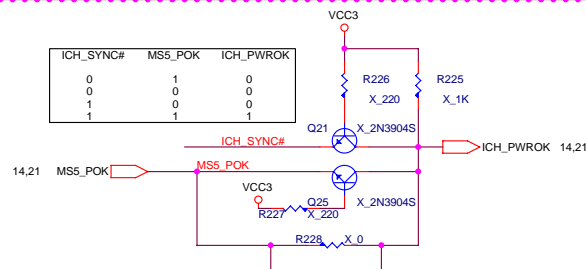
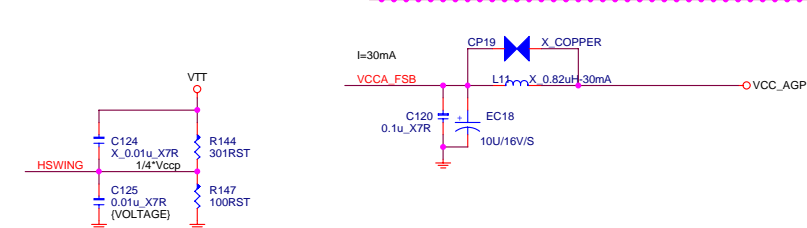
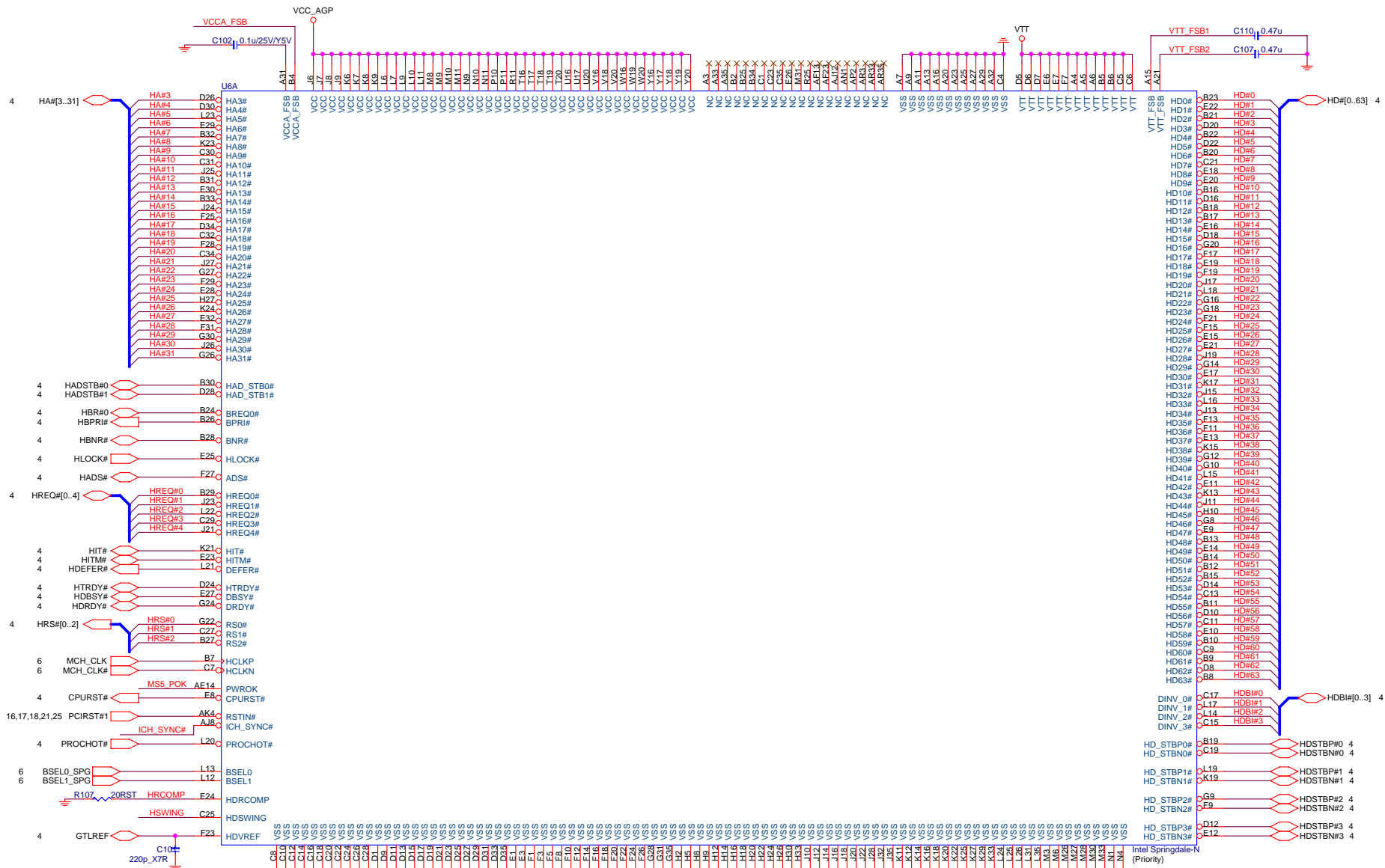
The ESL is less than 5nH, and the ESR is less than 0.3ohm.

Place these caps within north side of processor

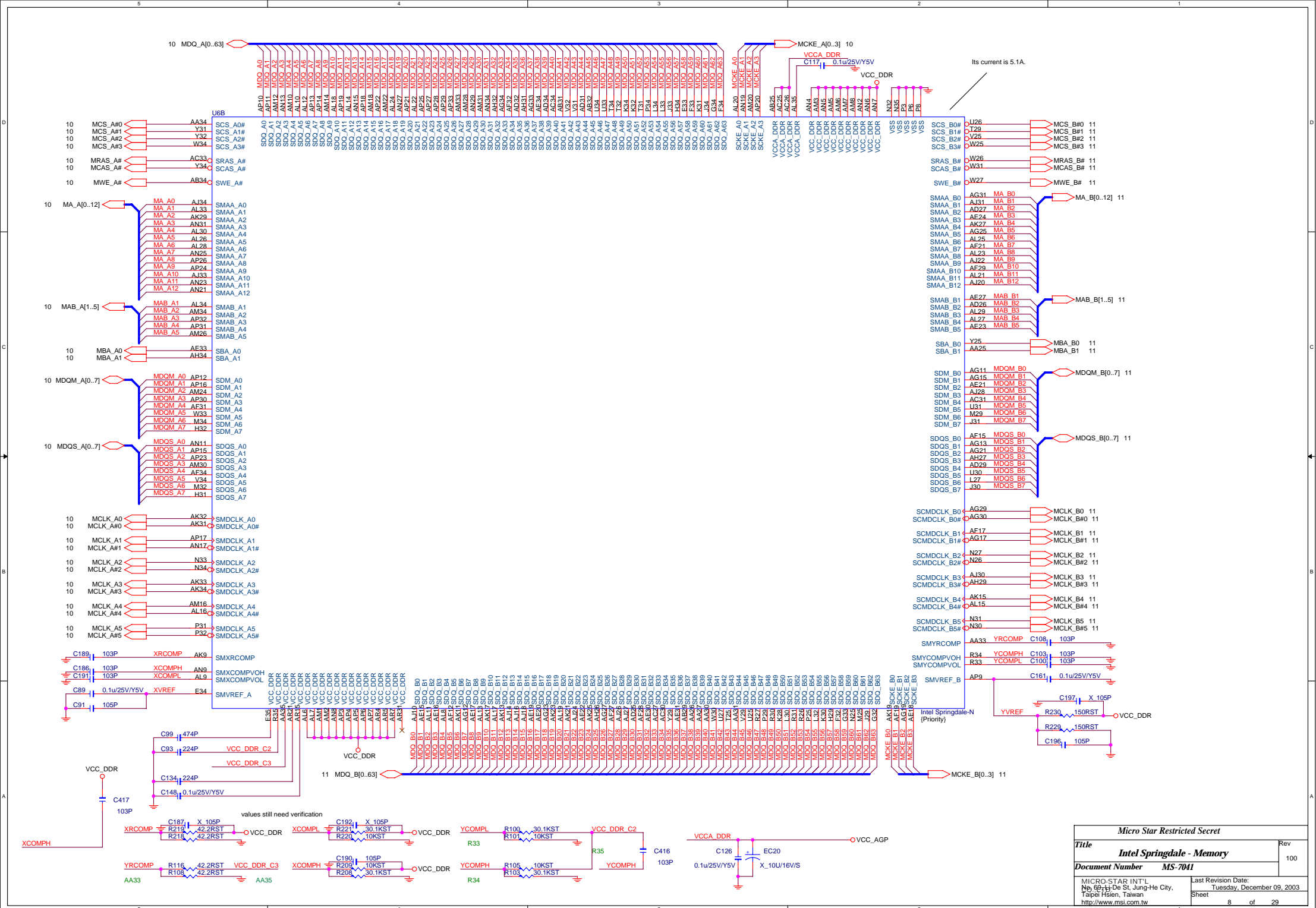
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Title	Intel mPGA478B - Power	Rev
Document Number	MS-7041	100
MICRO-STAR INT'L No. 60-Hsiao De Star, Jing-He City, Taipei Hsien, Taiwan http://www.msi.com.tw		Last Revision Date: Tuesday, December 09, 2003 Sheet 5 of 29

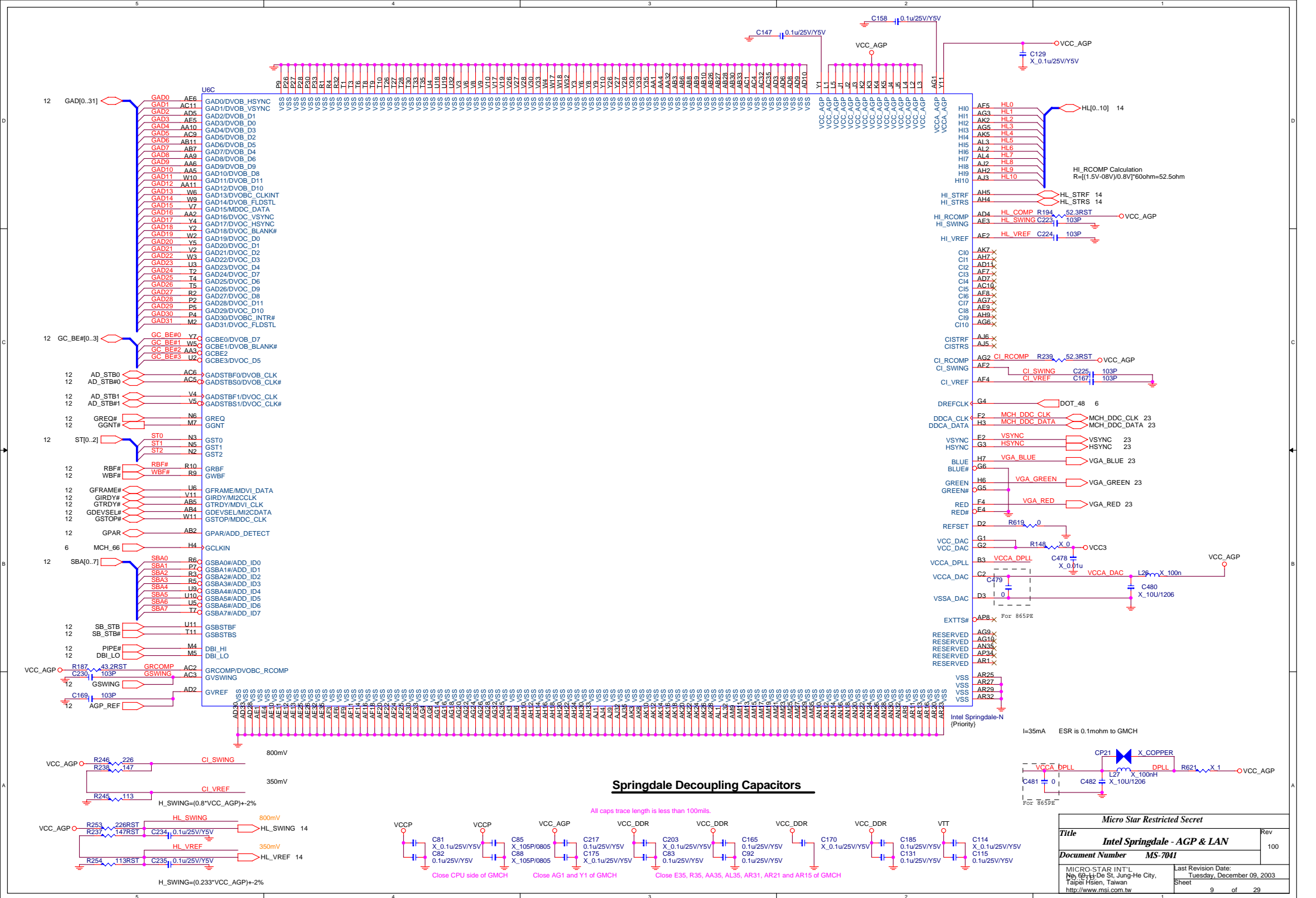
Clock Synthesizer



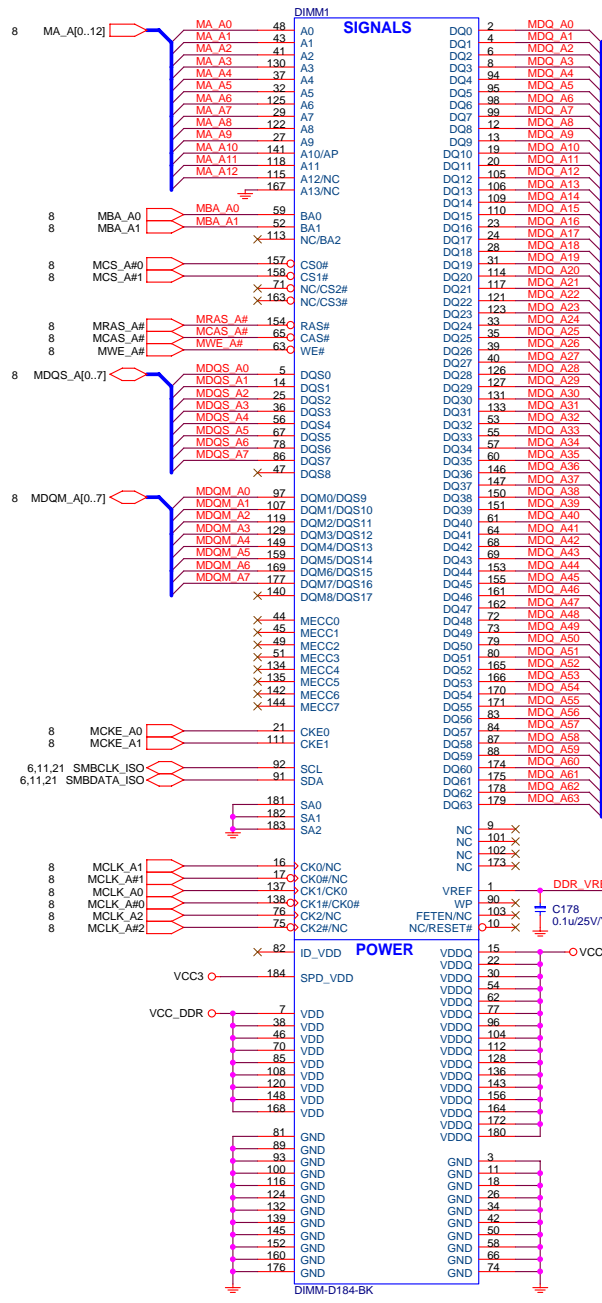


Intel Springdale-N
(Priority)

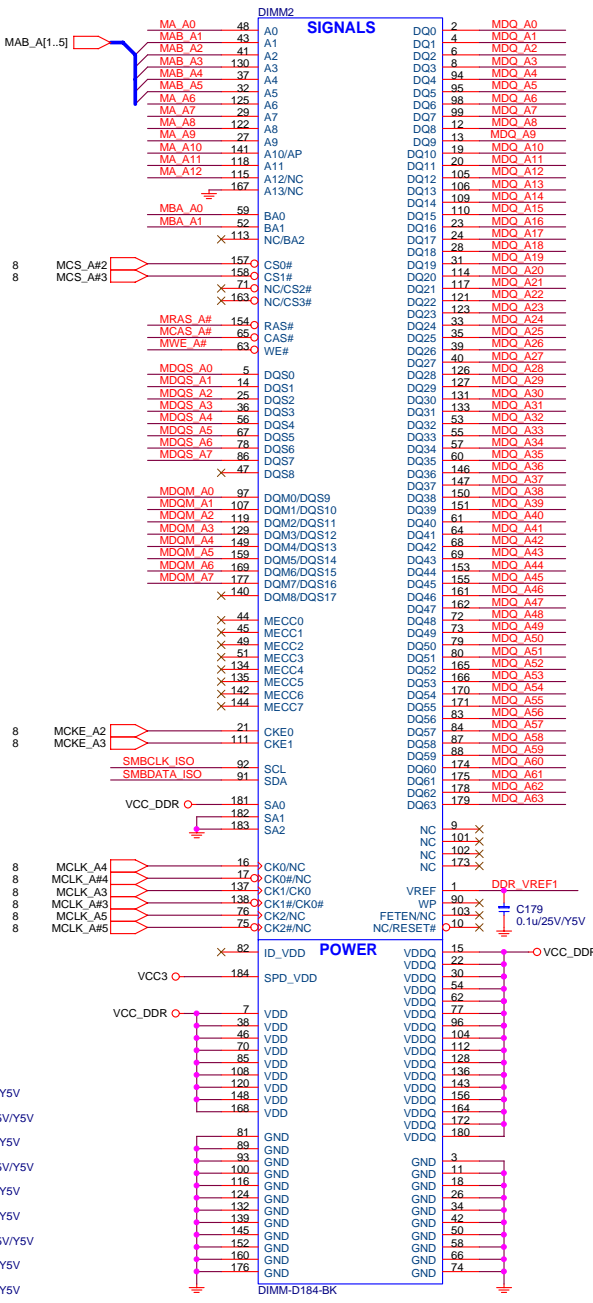




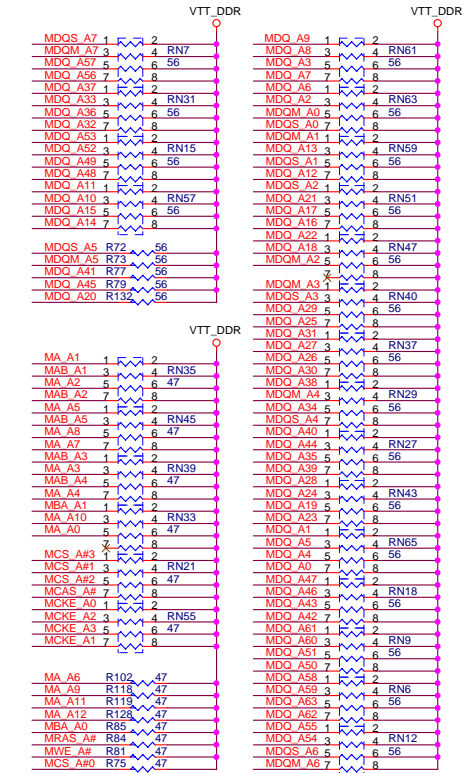
DDR DIMM1



DDR DIMM2



DDR Termination Resistors

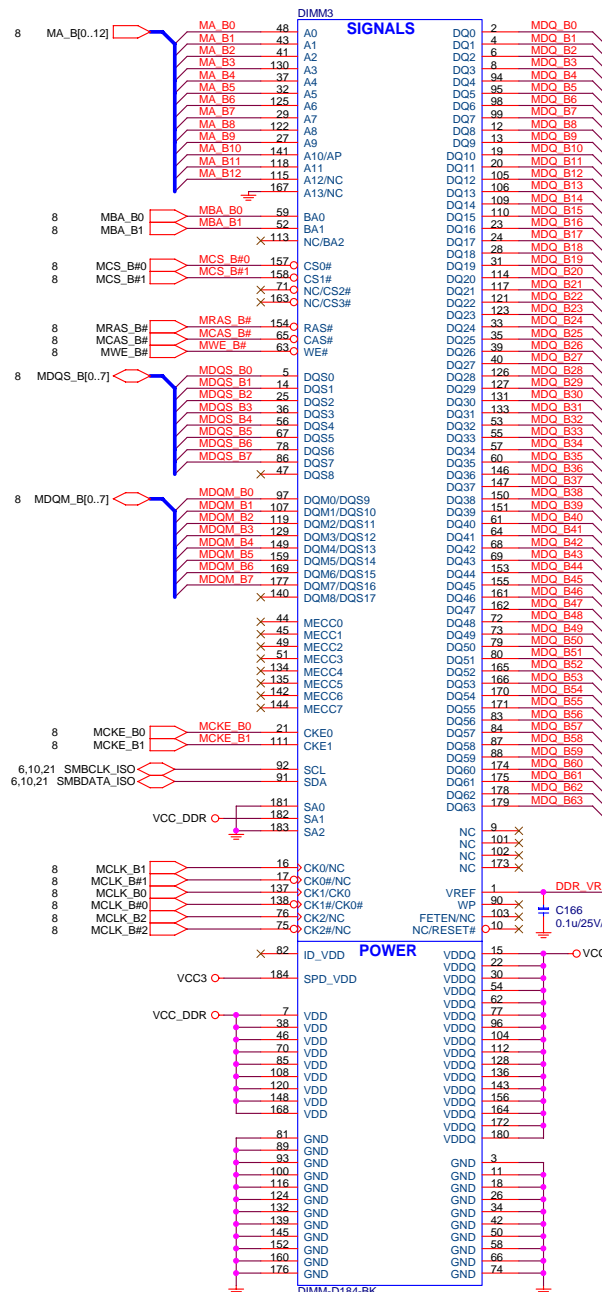


Micro Star Restricted Secret

Title		Rev
DDR DIMM1,2		100
Document Number	MS-7041	
MICRO-STAR INT'L No. 66, Hsiao-De St., Jung-He City, Taipei Hsien, Taiwan		Last Revision Date: Tuesday, December 09, 2003
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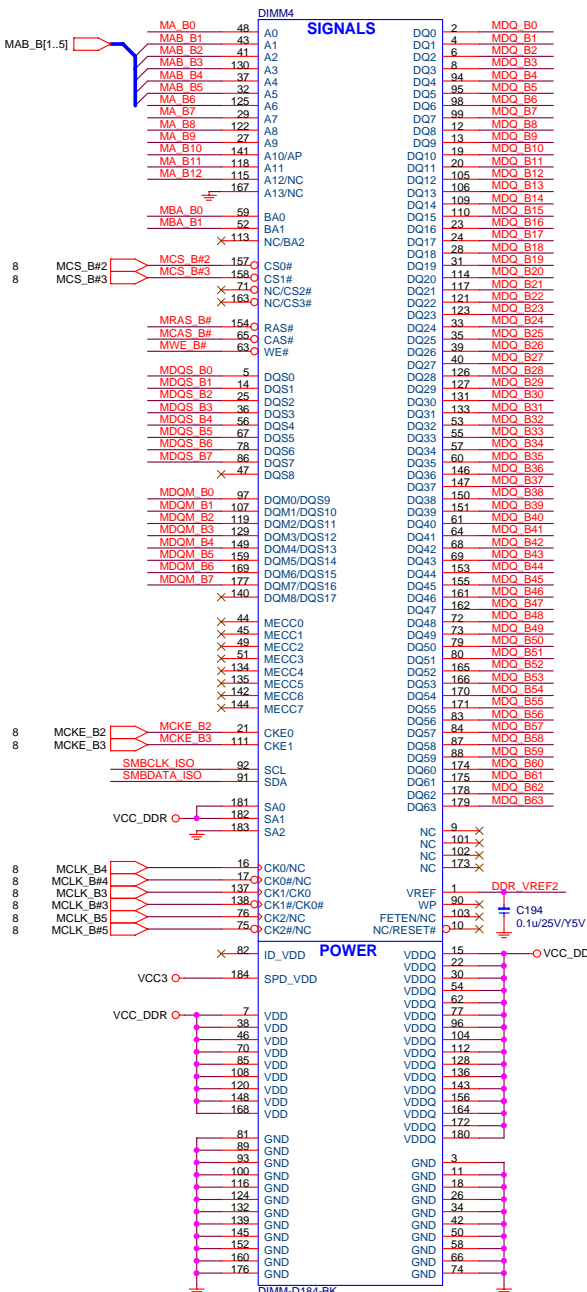
SYSTEM MEMORY

DDR DIMM3



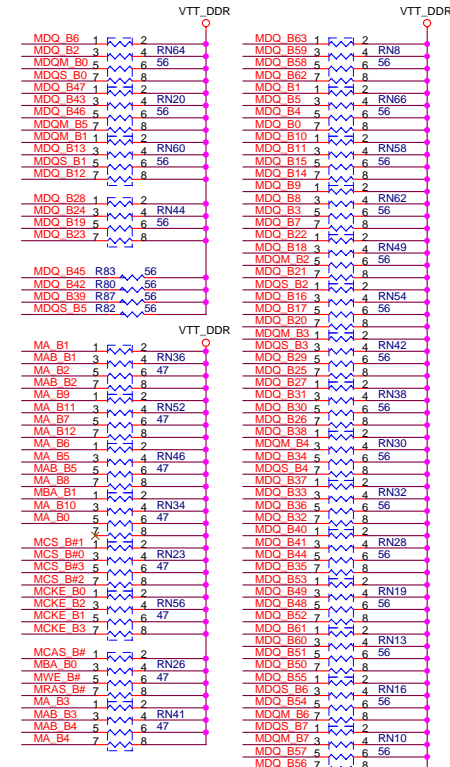
ADDR.=1010010B

DDR DIMM4

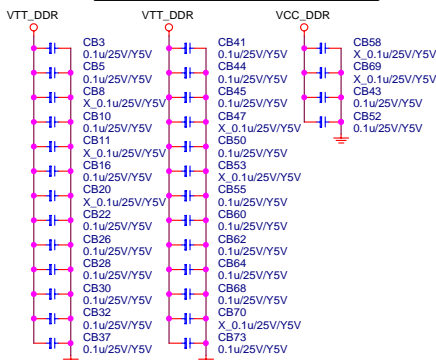


ADDR.=1010011B

DDR Terminational Resisitors



DECOUPLING CAPACITORS



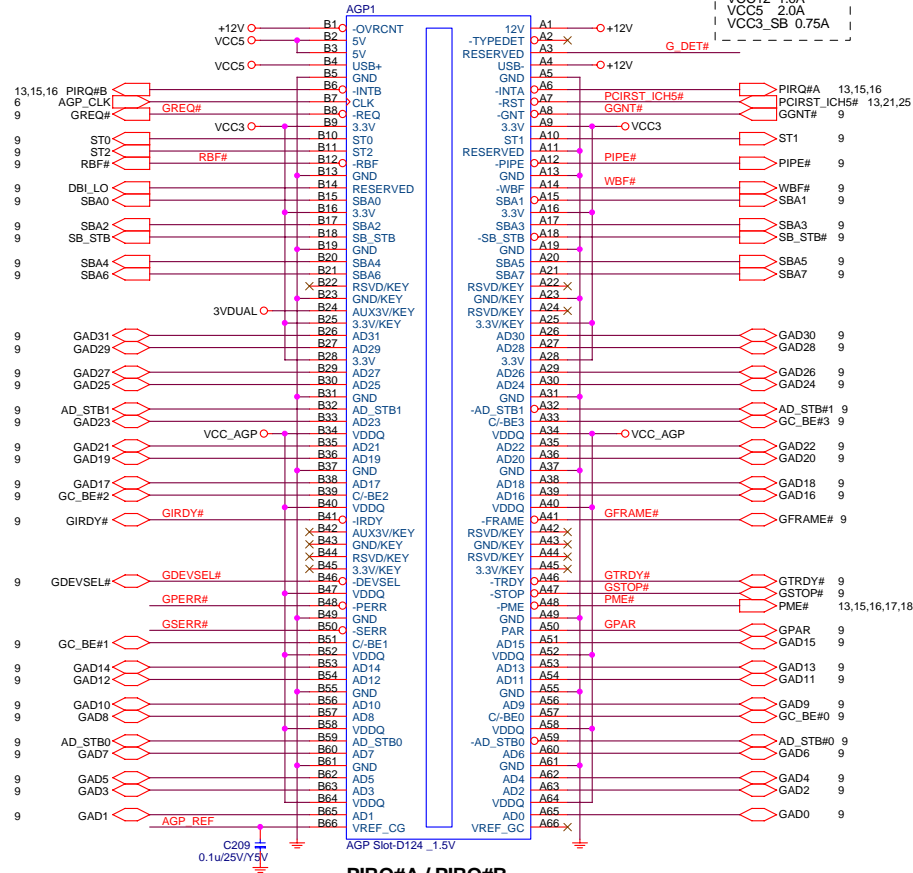
Place these decoupling capacitors close to VTT_DDR termination resistors.
One decoupling capacitor for each R-pack.

Micro Star Restricted Secret		
Title	DDR DIMM 34	Rev
Document Number	MS-7041	100
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B1 == 12V
A4 == 12V
B4 == 5V

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

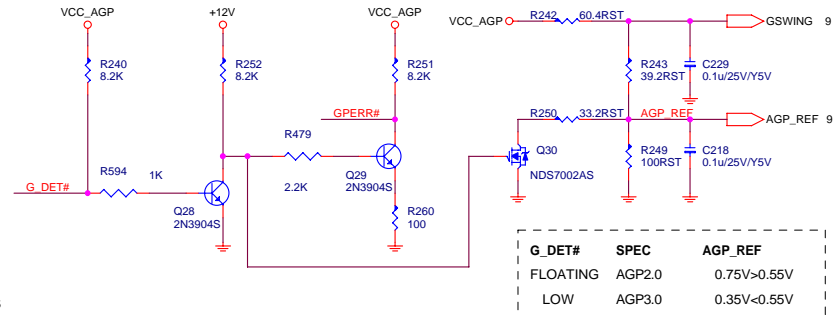
VCC5 = 60mils trace / 15 mils space



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

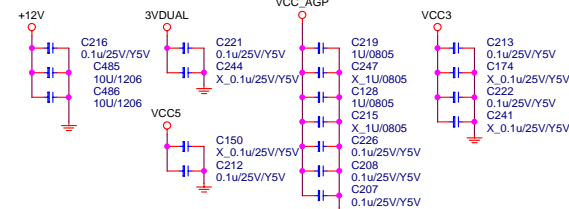


G_DET#	SPEC	AGP_REF
FLOATING	AGP2.0	0.75V>0.55V
LOW	AGP3.0	0.35V<0.55V

AGP TERMINATION RESISTORS

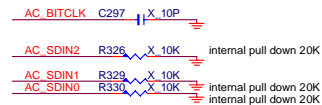


AGP SLOT DECOUPLING CAPACITORS

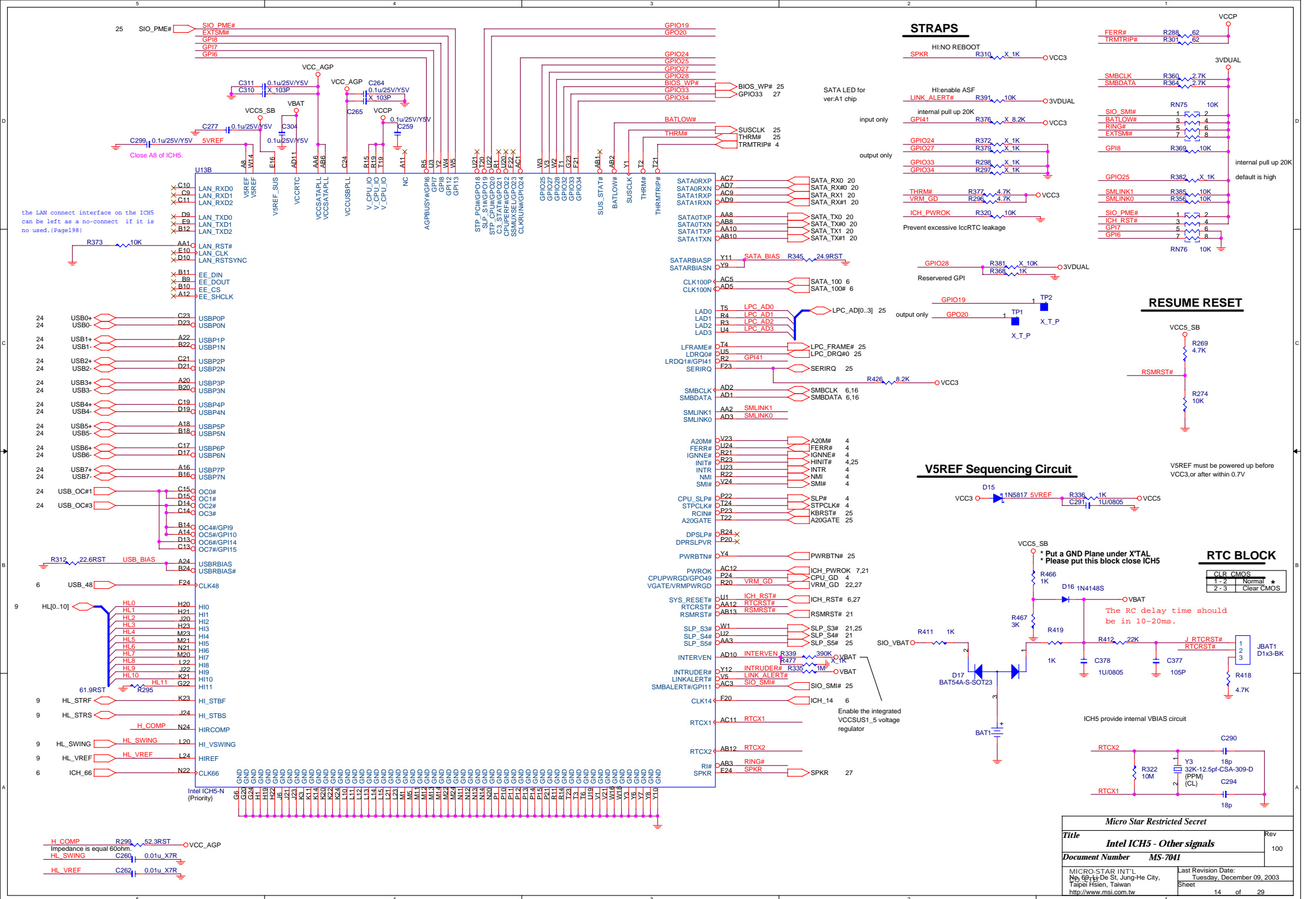


Micro Star Restricted Secret

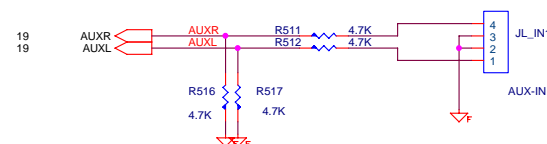
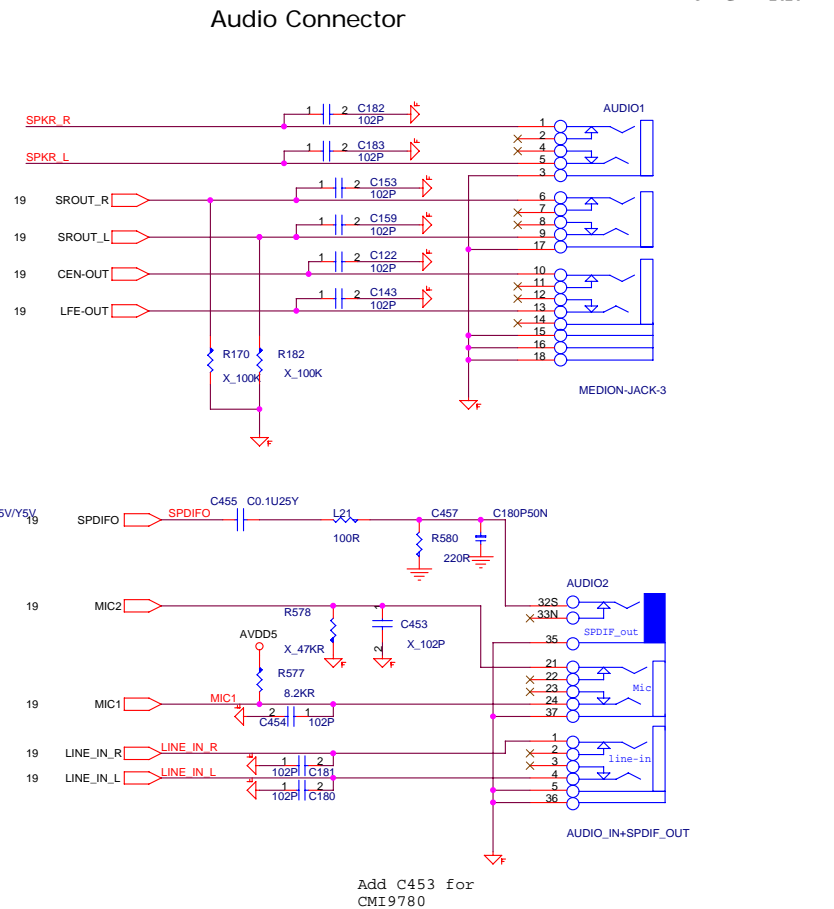
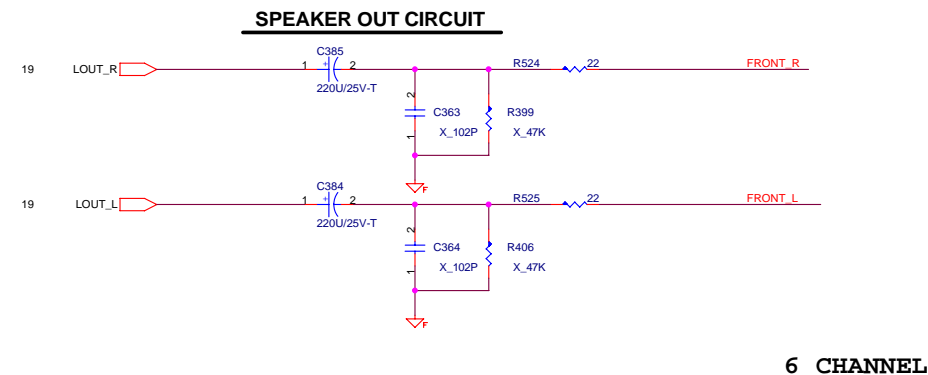
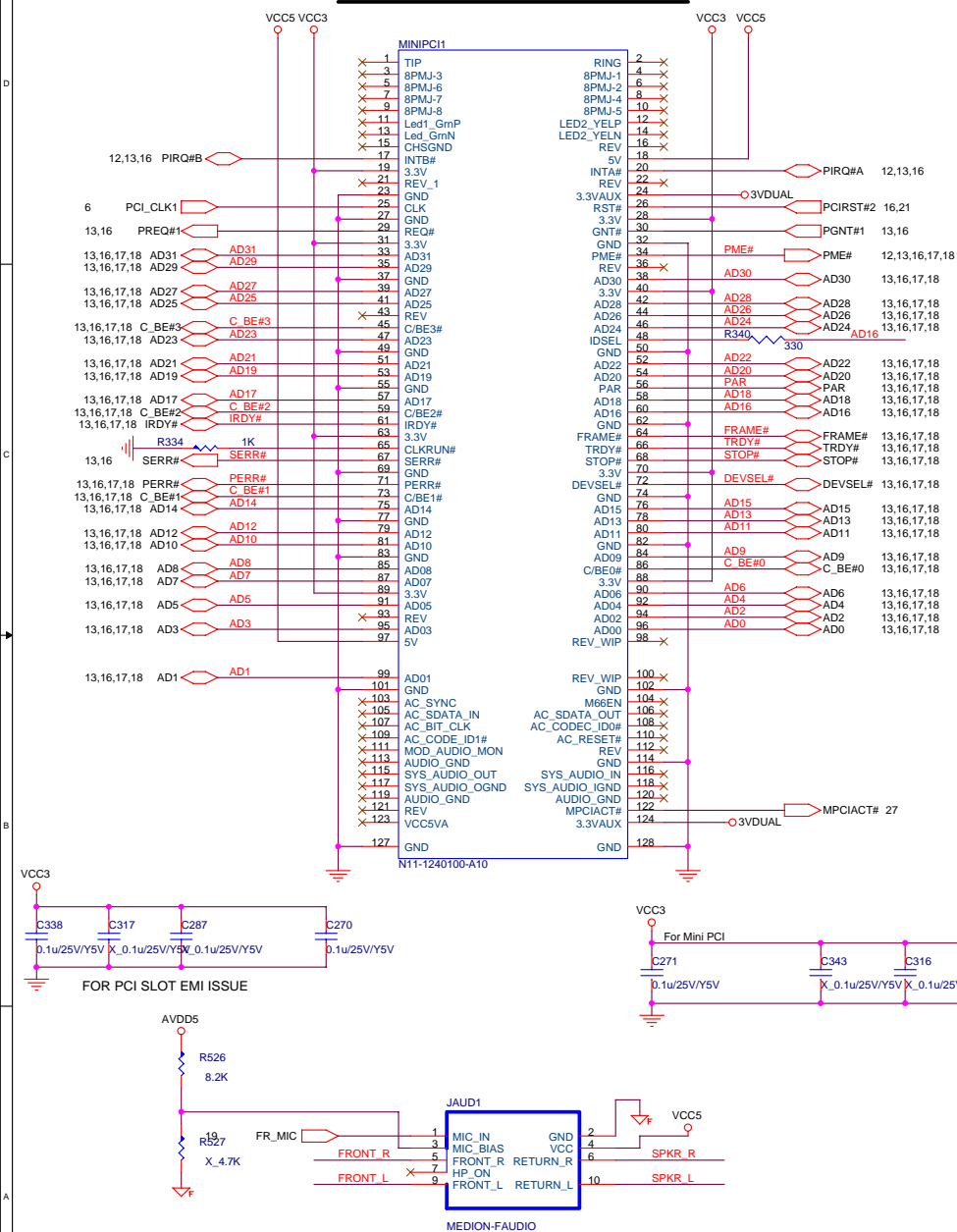
Title		Rev
AGP SLOT		100
Document Number		MS-7041
MICRO-STAR INT'L No. 62, Hsiao-De St., Jung-He City, Taipai Hsien, Taiwan http://www.msi.com.tw		Last Revision Date: Tuesday, December 09, 2003 Sheet 12 of 29



Micro Star Restricted Secret		
Title	Intel ICH5 - PCI & IDE & AC97	Rev
Document Number	MS-7041	100
MICRO-STAR INT'L No. 62, Jyng-He City, Tapei Hsien, Taiwan http://www.msi.com.tw		Last Revision Date: Tuesday, December 09, 2003 Sheet 13 of 29



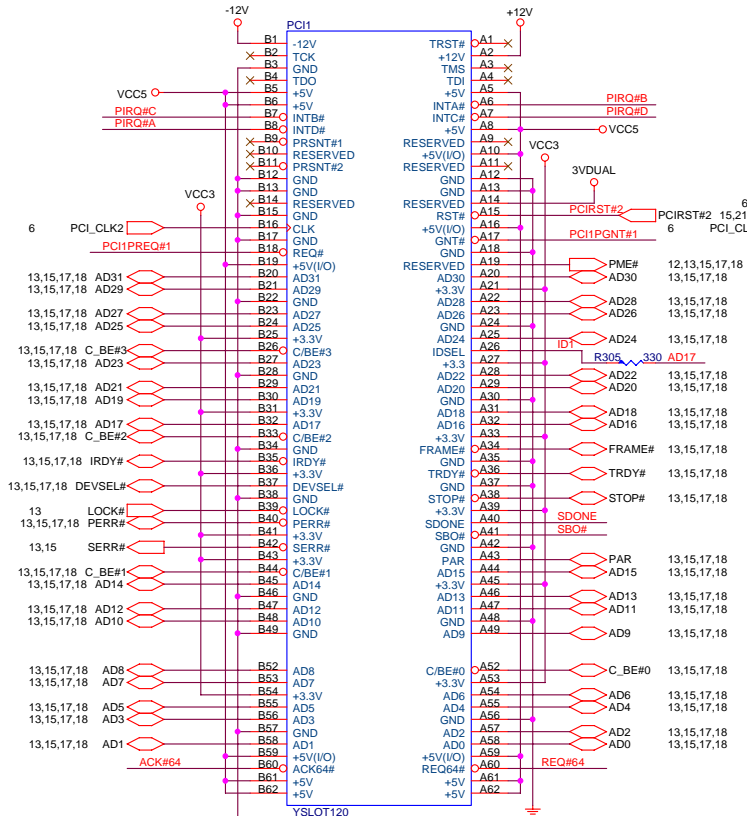
IDSEL = AD16
MASTER = PREQ#1/PGNT#1
PIRQ#A CLK-gen-Pin14



<i>Micro Star Restricted Secret</i>		
<i>Title</i>	<i>Mini PCI & Audio conn.</i>	Rev 100
<i>Document Number</i>	<i>MS-7041</i>	
MICRO-STAR INT'L No. 88, Sec. 2, Jung-Ho City, Taipei Hsien, Taiwan http://www.msi.com.tw		Last Revision Date: Tuesday, December 09, 2003 Sheet 15 of 29

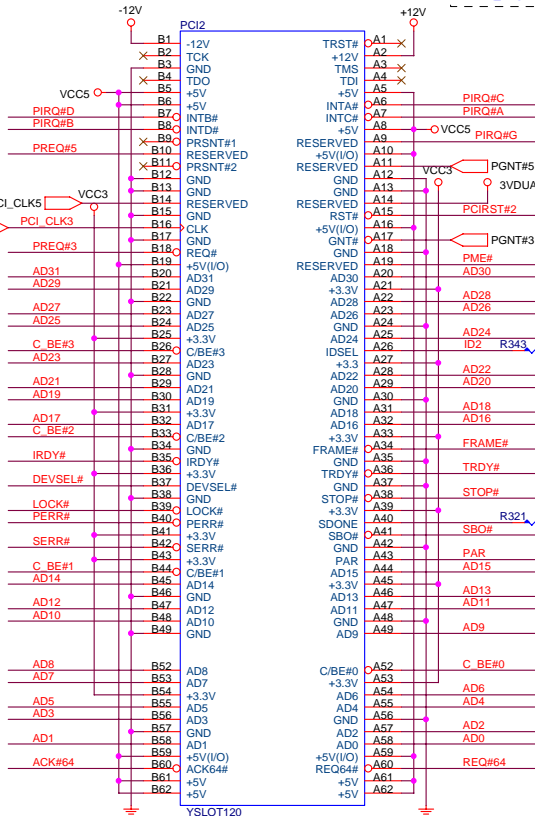
IDSEL = AD17
MASTER = MS1 or PREQ#0
PIRQ#B

PCI SLOT 1 (PCI VER: 2.2 COMPLY)



IDSEL = AD18
MASTER = PREQ#3
PIRQ#C

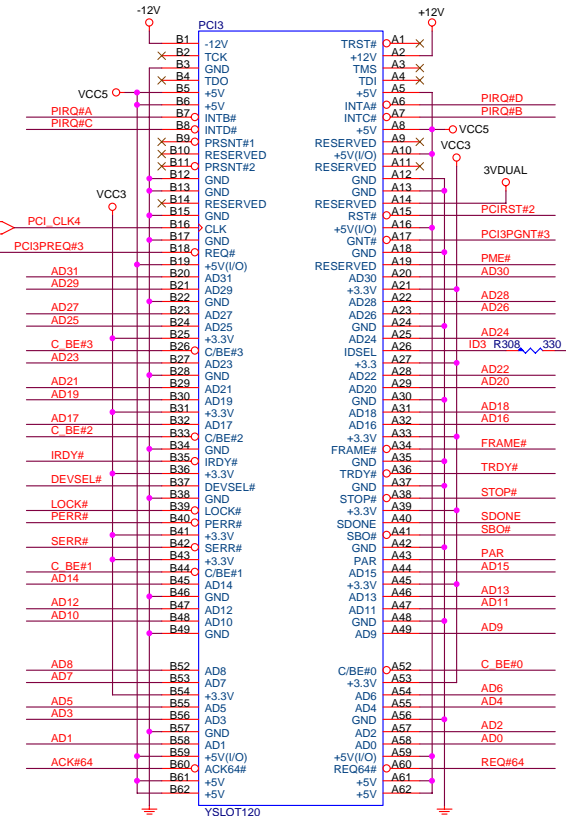
PCI SLOT 2 (PCI VER: 2.2 COMPLY)



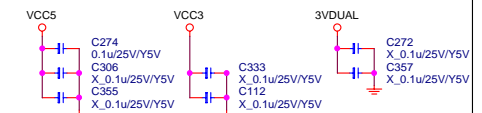
MEDION SPEC
PCI 4: IDSEL = AD20
MASTER = PREQ#5
PIRQ#G

IDSEL = AD19
MASTER = MS1 or PREQ#1
PIRQ#D

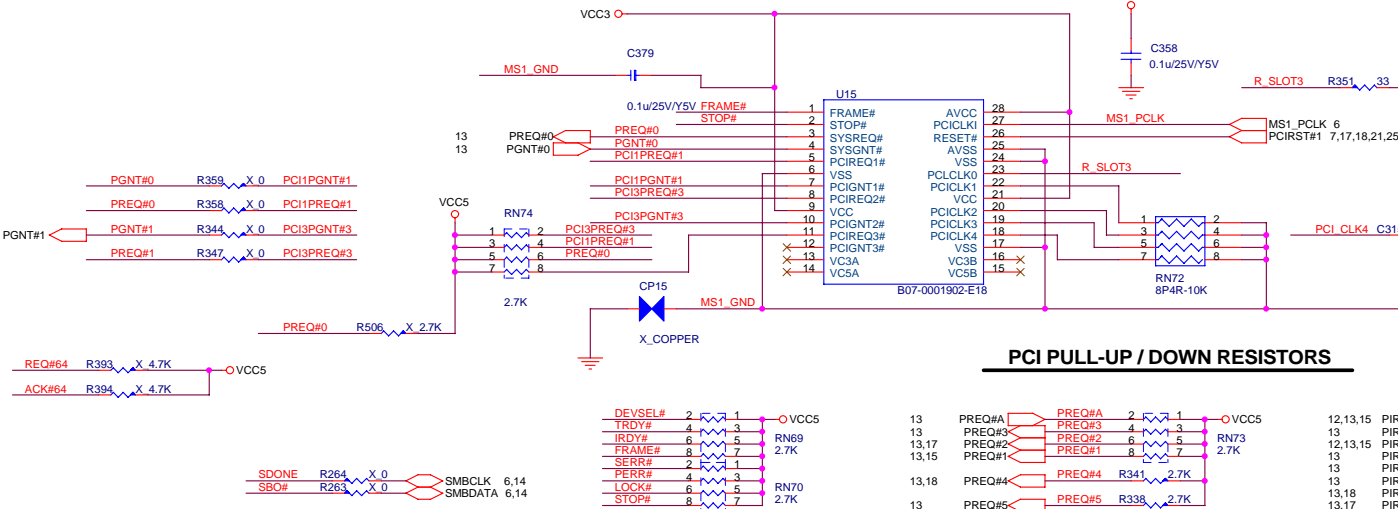
PCI SLOT 3 (PCI VER: 2.2 COMPLY)



PCI SLOT DECOUPLING CAPACITORS



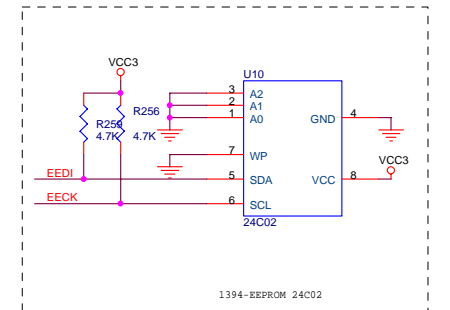
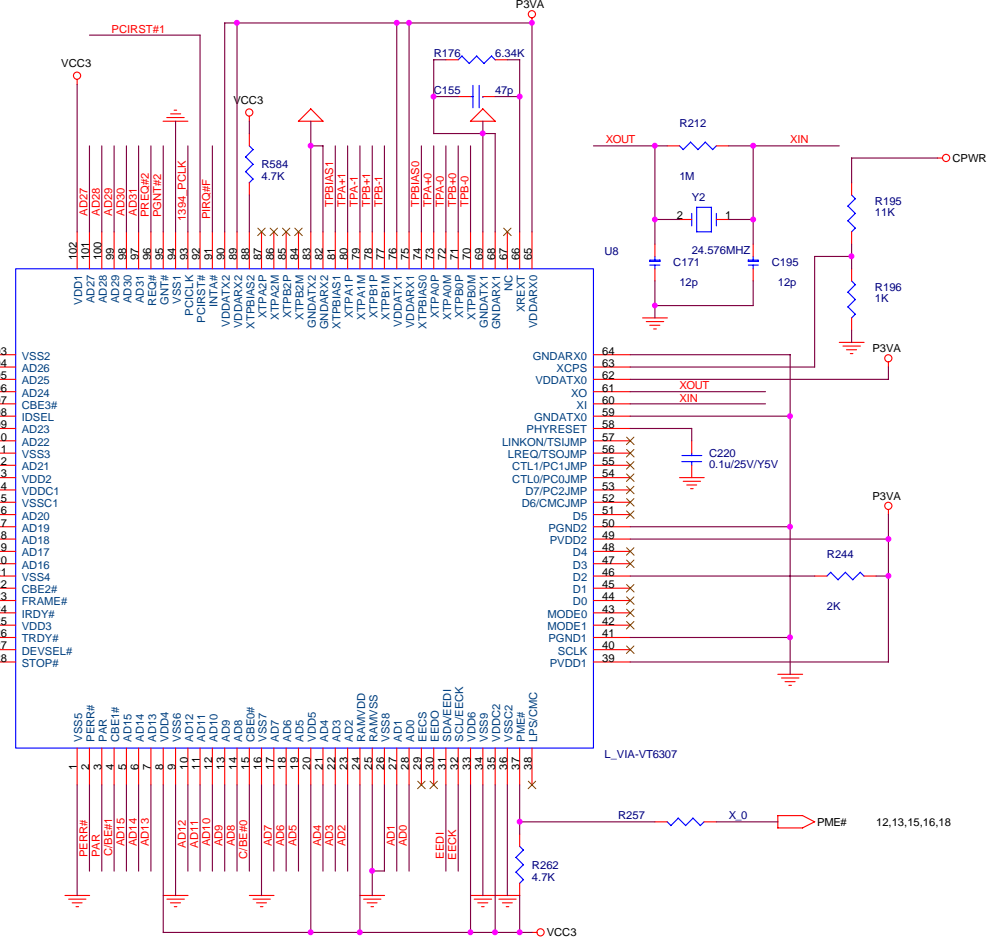
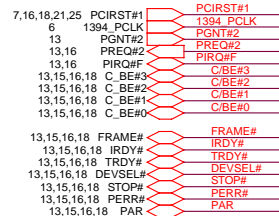
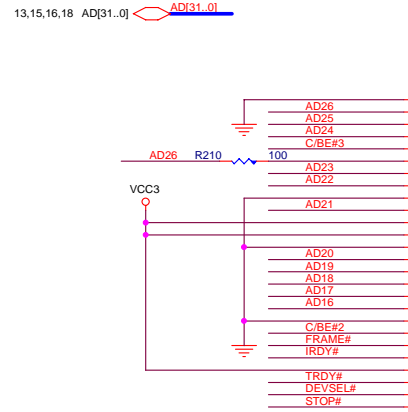
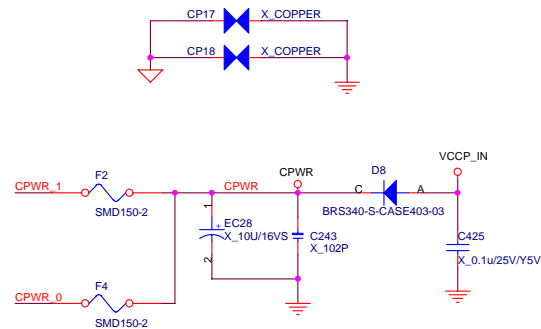
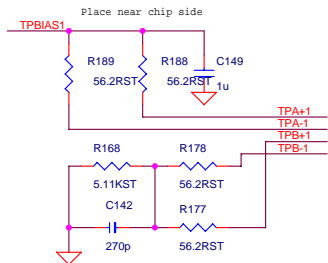
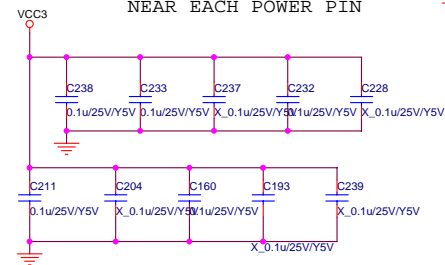
PCI PULL-UP / DOWN RESISTORS



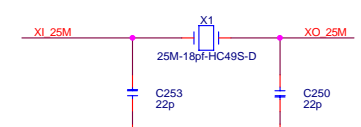
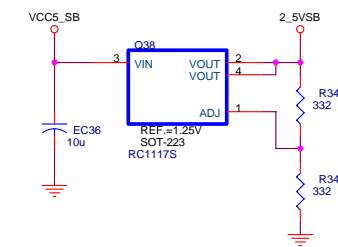
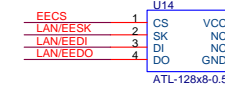
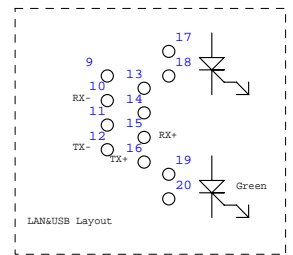
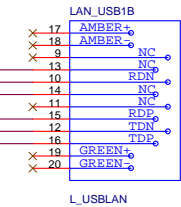
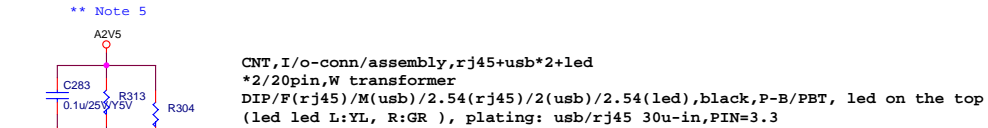
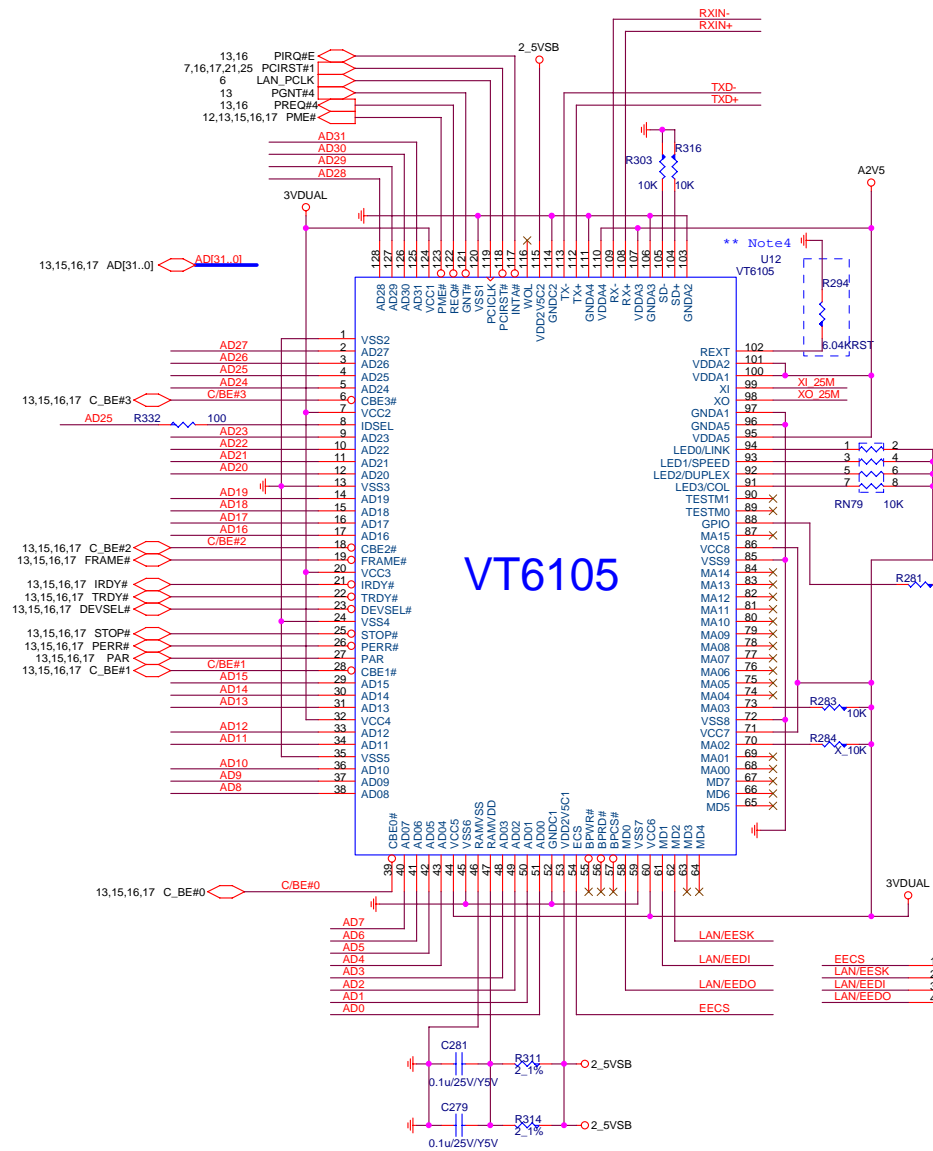
Micro Star Restricted Secret

Title		Rev
PCI Slot 1 & 2 & 3		100
Document Number	MS-7041	
MICRO-STAR INT'L No. 66, Hsien-De St, Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw		Last Revision Date: Tuesday, December 09, 2003 Sheet 16 of 29


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



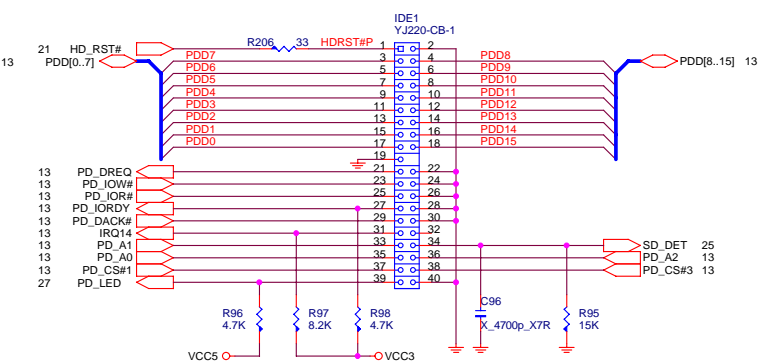
REQ#/GNT#4
INTE# AD25



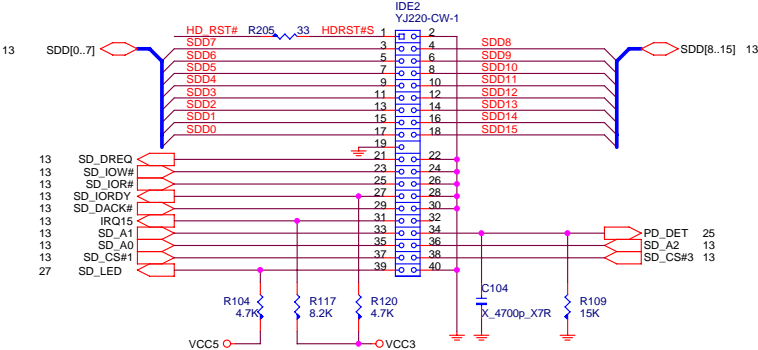
Micro Star Restricted Secret		
Title	Broadcom 4401	Rev
Document Number	MS-7041	100
MICRO STAR INT'L No. 59-1, De St. Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw		Last Revision Date: Tuesday, December 09, 2003 Sheet 18 of 29

ATA 33/66/100 Connector

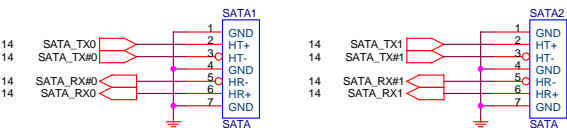
PRIMARY IDE BLOCK



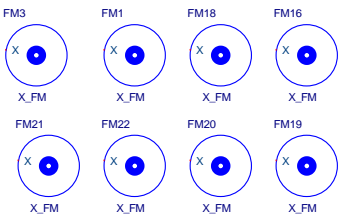
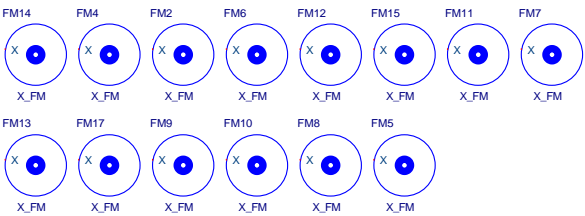
SECONDARY IDE BLOCK



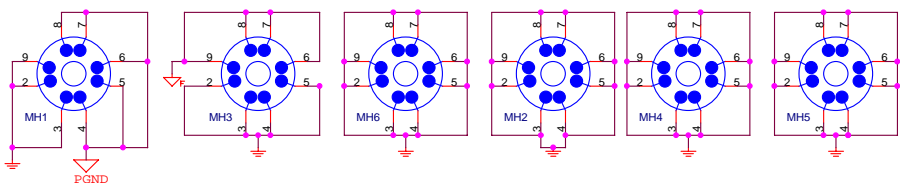
SERIAL ATA CONNECTOR BLOCK



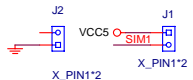
Optics Orientation Holes



Mounting Holes



Simulation



Micro Star Restricted Secret		
Title	ATA 33/66/100 Connector	Rev
Document Number	MS-7041	100
MICRO-STAR INT'L No. 667-Hy-De St., Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw		Last Revision Date: Tuesday, December 09, 2003 Sheet 20 of 29

ACPI Controller

5V DUAL Power

SEL0	5VUSB
H	2 MOSFET
L	1 MOSFET

**S50# pin function(Hi level = 5V)
same as 5VUSB(Hi level = 12V)
5VUSB USE 2 MOSFET

VCC 1.5 Voltage Regulator

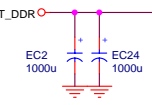
1.7V@250mA

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

**INPUT 2 AND 3 MUST BE HI LEVEL WHEN USE
OUTPUT 1 AND 2 FOR GPIO FUNCTION

DDR VTT Power

1.25V / 2.1A



SEL1	VRAM	VRAM_2.5
H	3.3VDUAL	2.5V
TRI-STATE	3.3VSB	2.5V
L	3.3VSTR	1.25V

FOR 3VSB OR 3VSTR
SETTING BY SEL1

Pin 15,19,22,32 Must
reserve capacitor.

ICH5 300mA
PCI 375+20+20=415mA
VCC3_SB 715mA

** SETTING 3VSTR THEN VRAM_2.5
BECOME TO 1.25 VREF

VCC_VID / VID GOOD

Place MOSFET near CPU

DDR 2.5V Power

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

Micro Star Restricted Secret

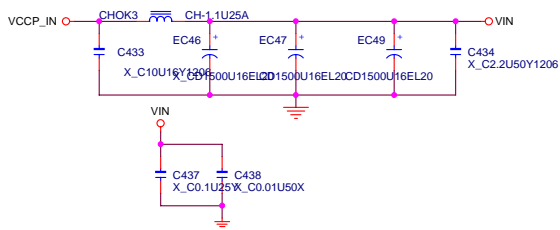
Title MS-5 ACPI Controller

Document Number MS-7041

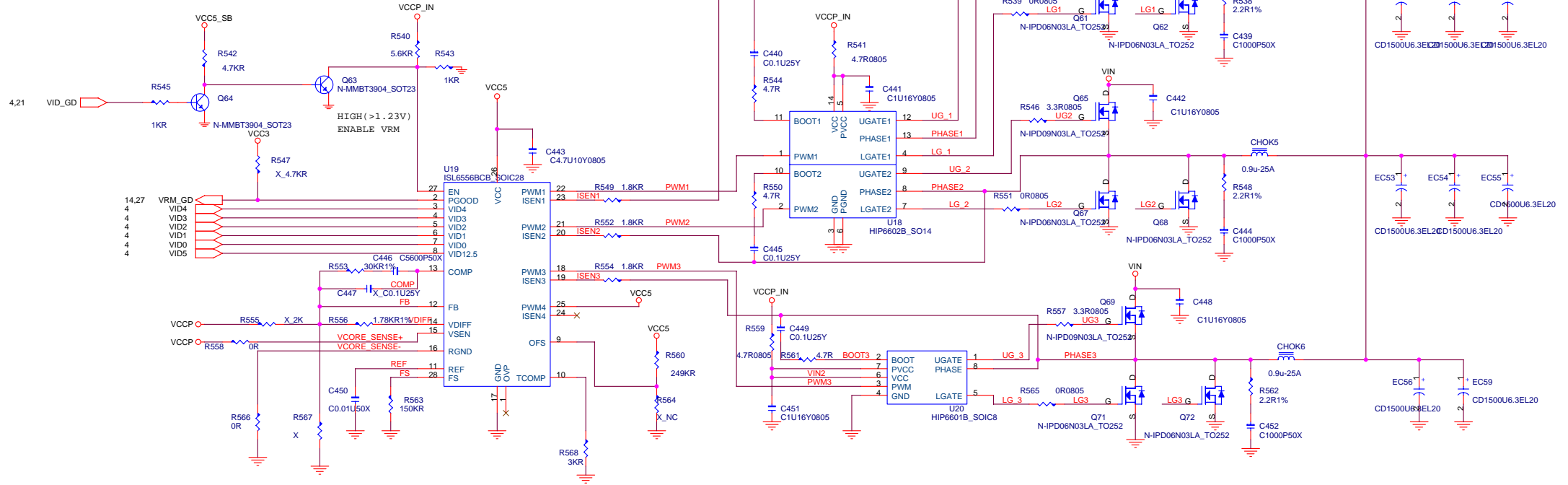
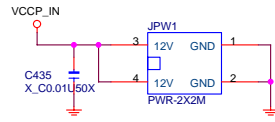
MICRO-STAR INT'L
No. 667-HyDe St., Jung-He City,
Taipei Hsien, Taiwan
http://www.msi.com.tw

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Tuesday, December 09, 2003
Sheet 21 of 29

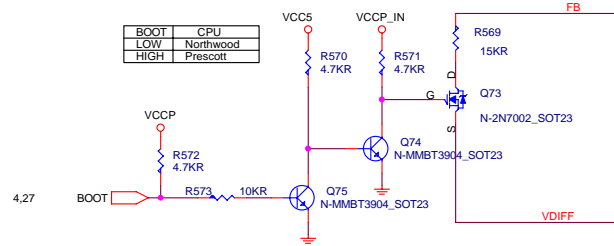
Voltage Regular Module



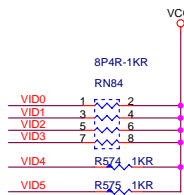
ATX12V Power Connector



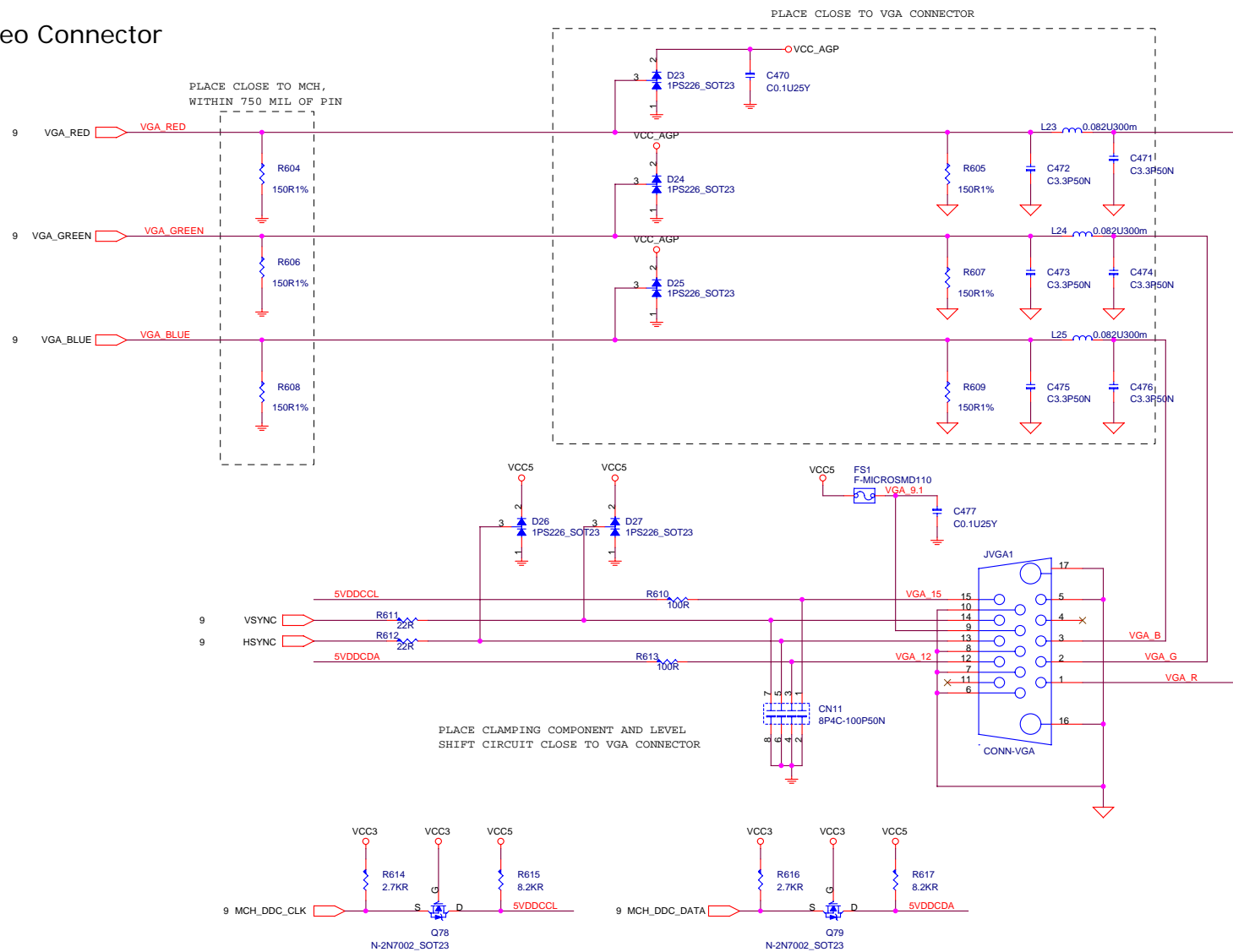
BOOT	CPU
LOW	Northwood
HIGH	Prescott



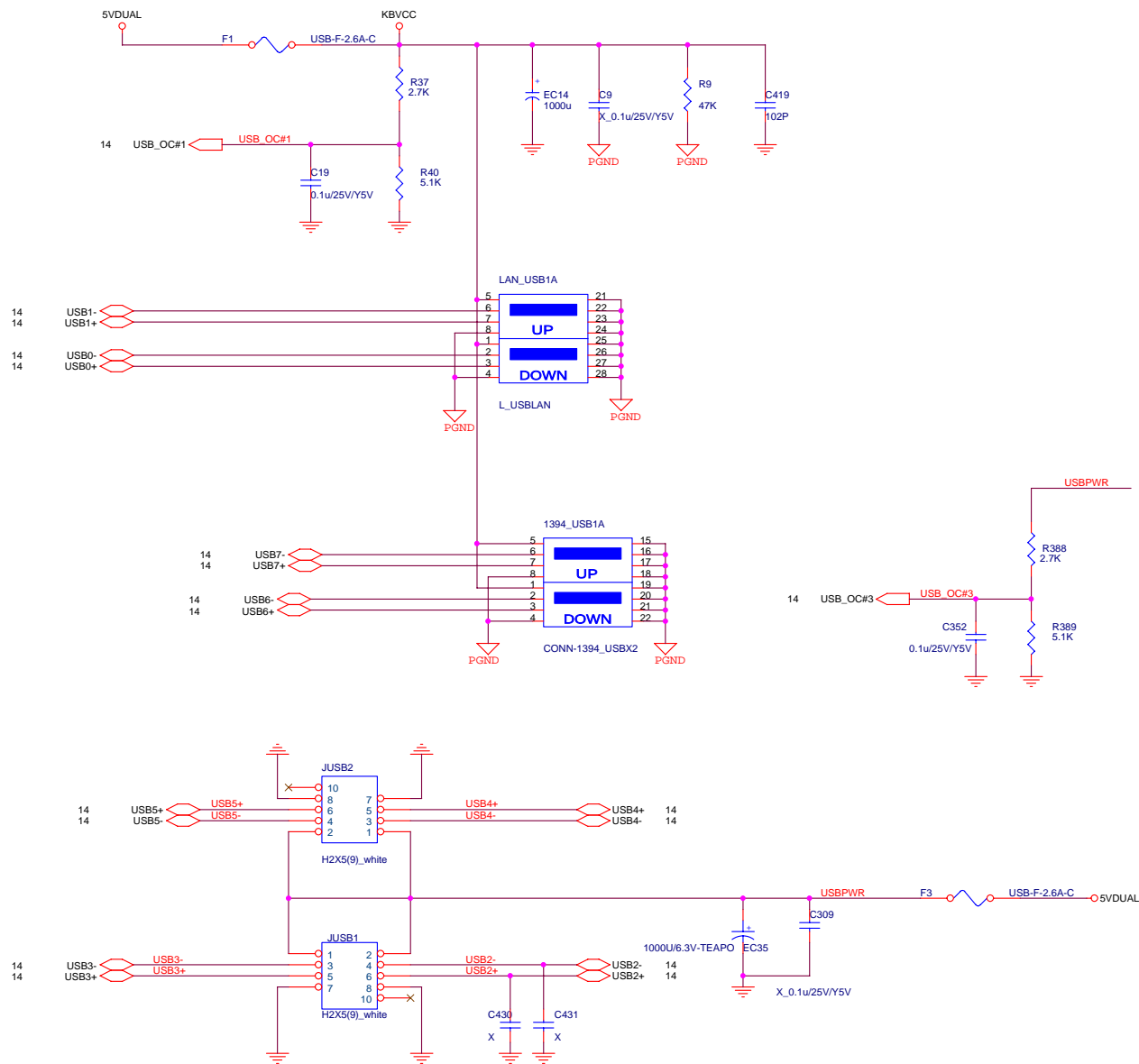
VID Pull-Up Rresistors



Video Connector



<i>Micro Star Restricted Secret</i>		
Title	VGa CONNECTOR	Rev
Document Number	MS-7041	100
MICRO-STAR INT'L No. 66+1, De St. Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw		Last Revision Date: Tuesday, December 09, 2003 Sheet 23 of 29



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

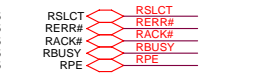
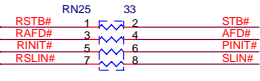
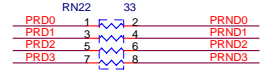
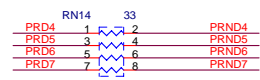
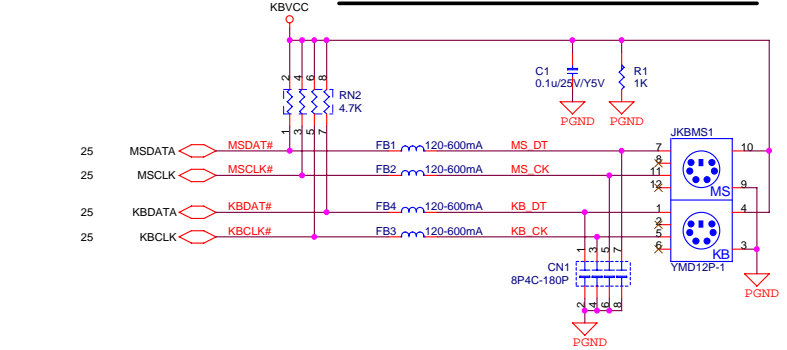
Micro Star Restricted Secret	
Title	Rev
USB Connector	100
Document Number	MS-7041
MICRO-STAR INT'L No. 66, Hsiao De St., Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw	
Last Revision Date: Tuesday, December 09, 2003	
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LPC SUPER I/O W83627F/HF/THF

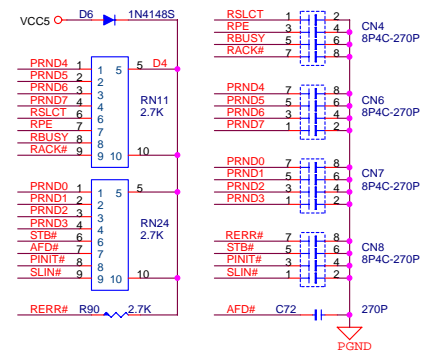


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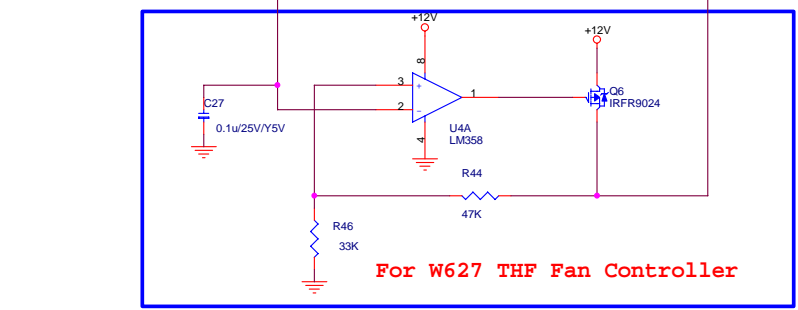
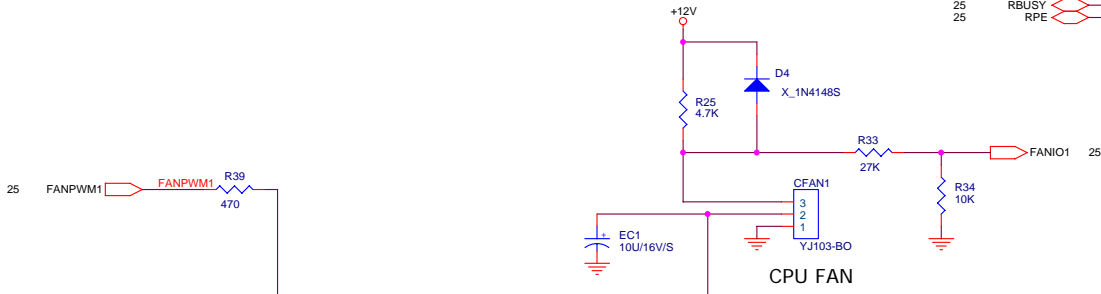
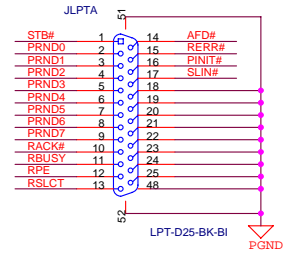
PS2 KEYBOARD & MOUSE CONNECTOR



PRD[0..7] PRD[0..7]

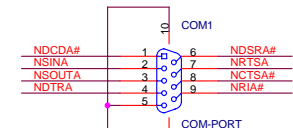
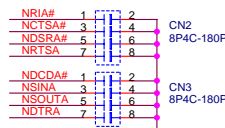
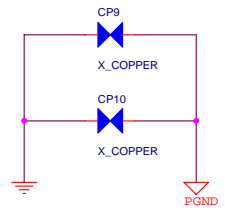


PARALLAL PORT

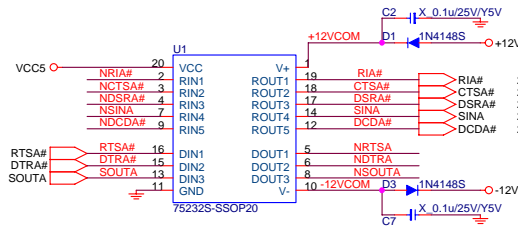


For W627 THF Fan Controller

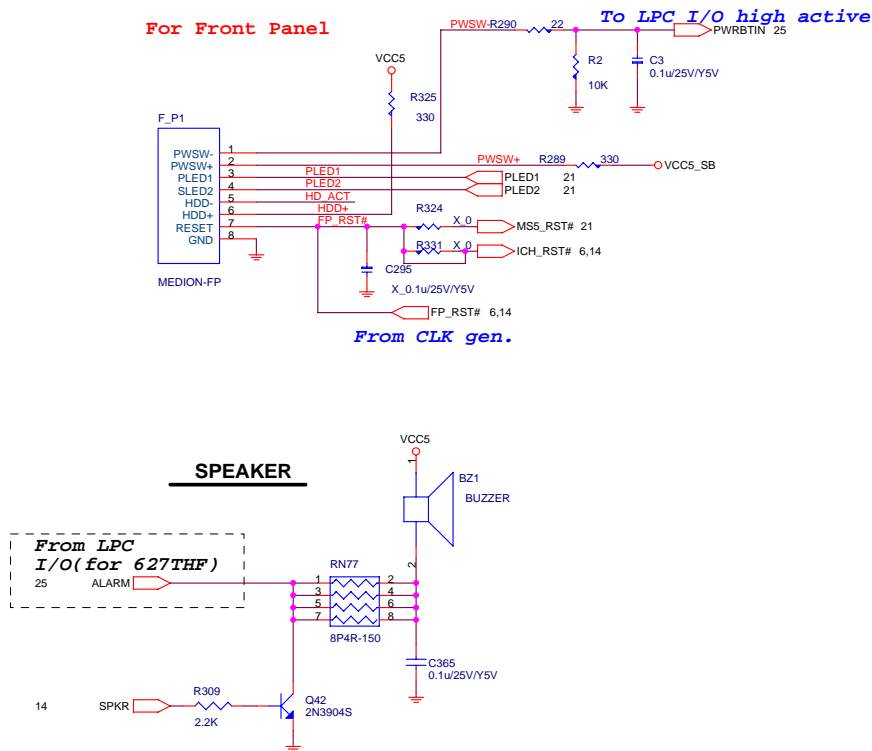
EMI



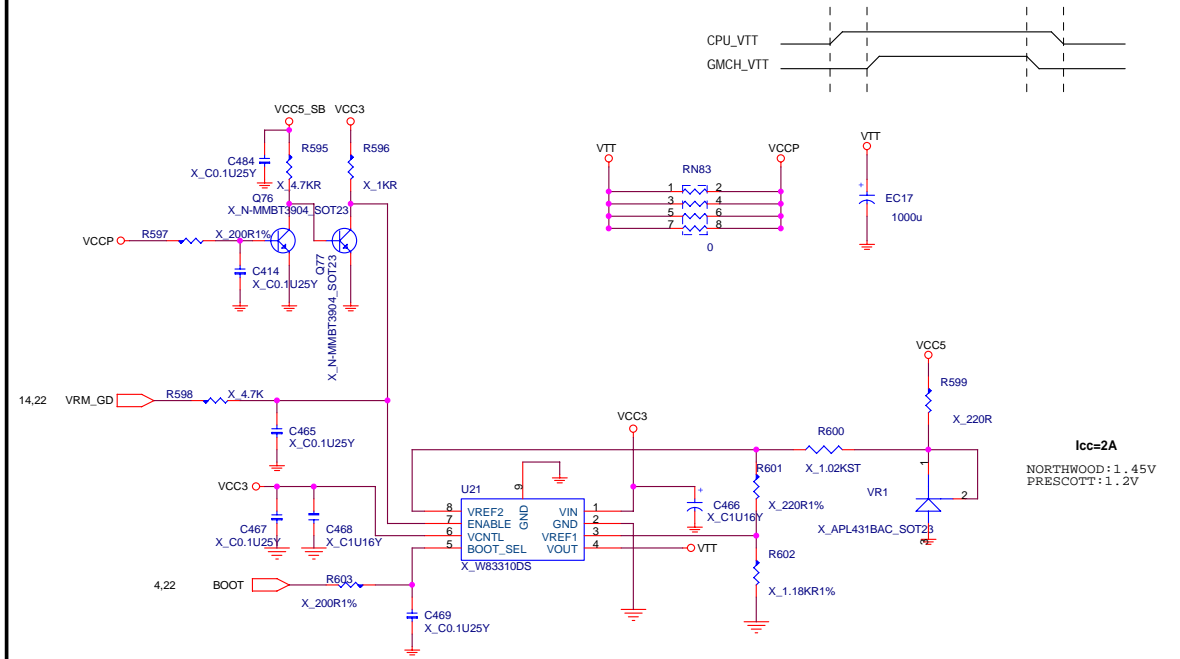
SERIAL PORT 1



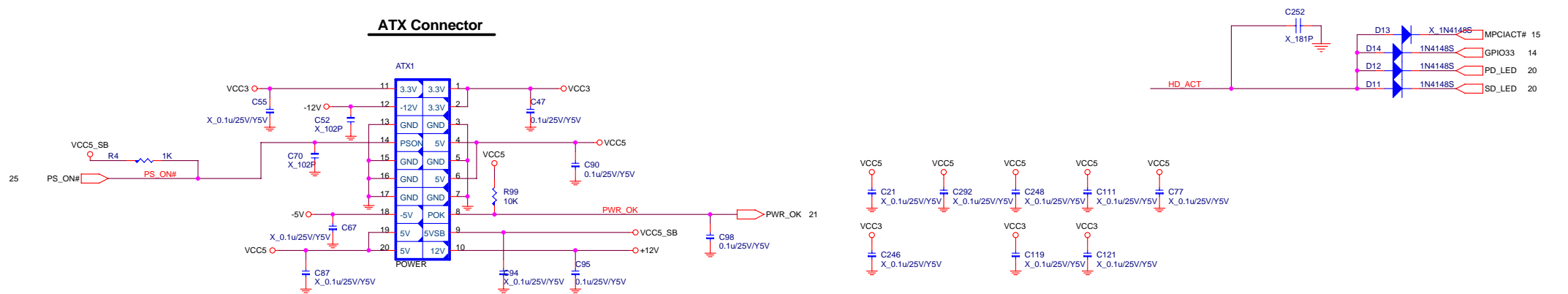
ATX connector / Front Panel



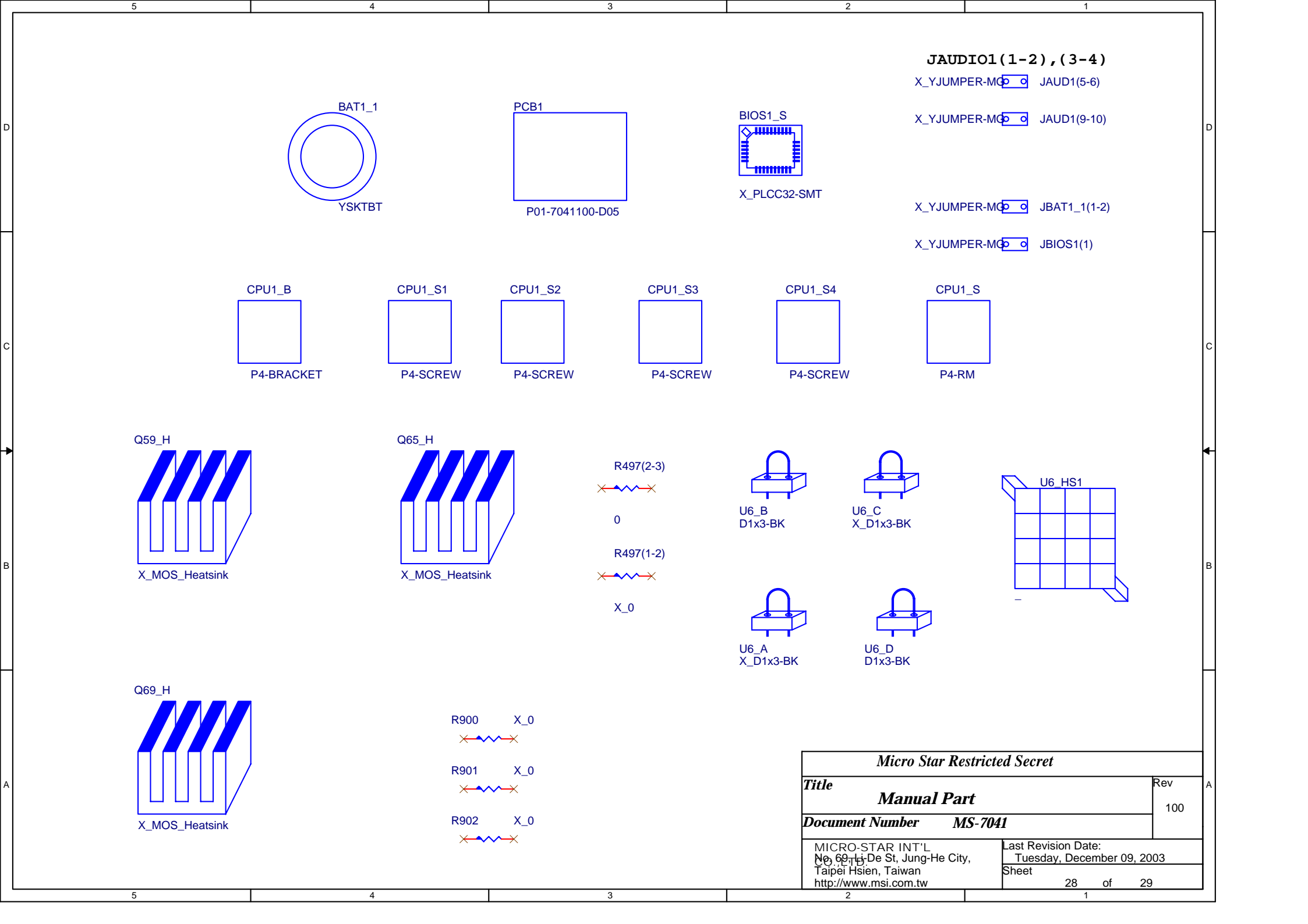
Intel reference GMCH VTT power cirucit



ATX Connector



Micro Star Restricted Secret		
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Document Number	MS-7041	100
MICRO-STAR INT'L No. 66-Hsi-De St., Jung-He City, Taipei Hsien, Taiwan http://www.msi.com.tw		Last Revision Date: Tuesday, December 09, 2003 Sheet 27 of 29



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		