

MS-7037

Version 10A
05/27/2004 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

ST PWM:

Controller: ST6710

ERP BOM	Function Description	
501/601-7037	Opt : GLS	865G-A2+ICH5,W/LAN-8100,W/655,WO/1394-6307
01S---010	IL-->GLS	WO/Game port
501/601-7037	Opt : A	865G-A2+ICH5,W/LAN-8100,W/655,W/1394-6307
		W/internal Amplifier SSM2211S
501/601-7037	Opt : VLS	865GV+ICH5,W/LAN-8100,W/655,WO/1394
02S---020	VL-->VLS	WO/Game port
501/601-7037	Opt : PILS	865PE-A2+ICH5,W/LAN-8100,W/655,W/1394-6307
03S---040	PIL-->PILS	WO/Game port, WO/VGA port
501/601-7037	Opt : GFIS	865G-A2+ICH5,W/LAN-8110S,W/655,W/1394-6307
04S---030	GF-->GFIS	WO/Game port
501/601-7037	Opt : VFIS	865GV+ICH5,W/LAN-8110S,W/655,W/1394-6307
06S		WO/Game port

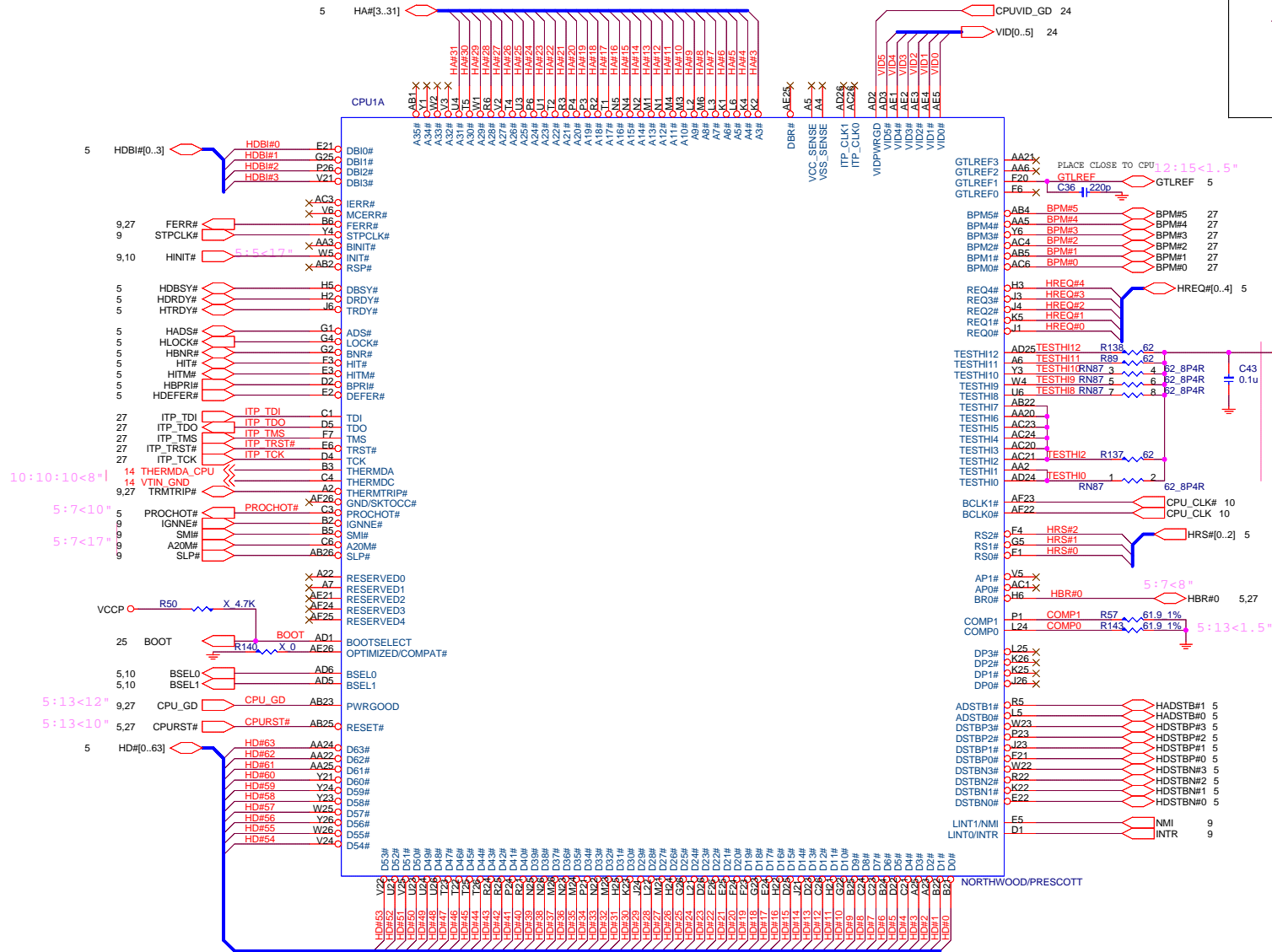
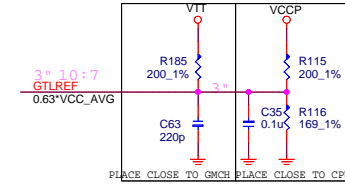
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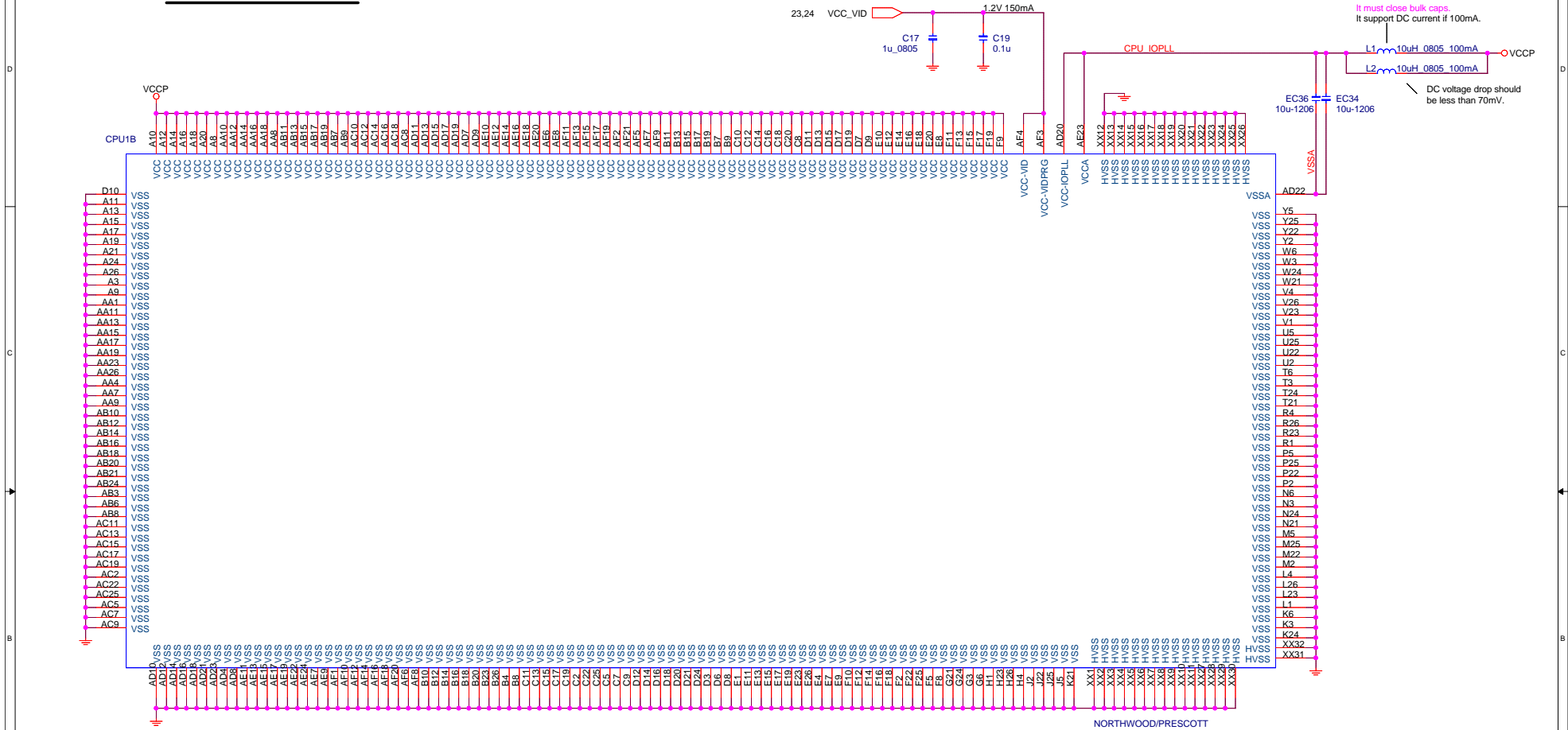
CPU SIGNAL BLOCK

CPU GTL REFERENCE VOLTAGE BLOCK

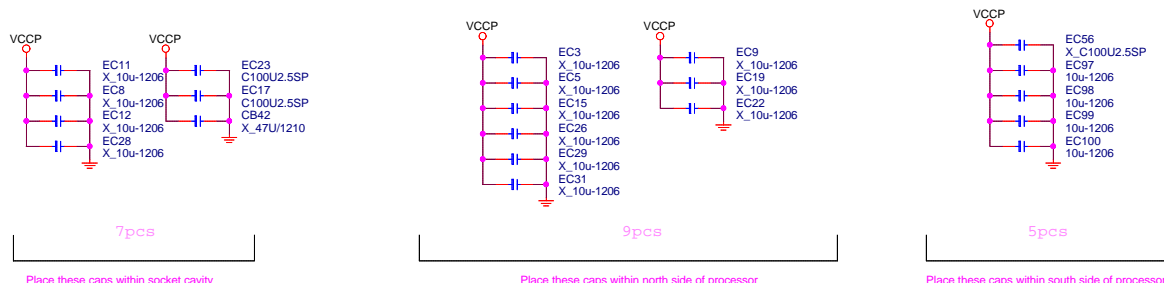


Micro-Star	Title MS-7037	Rev 10A
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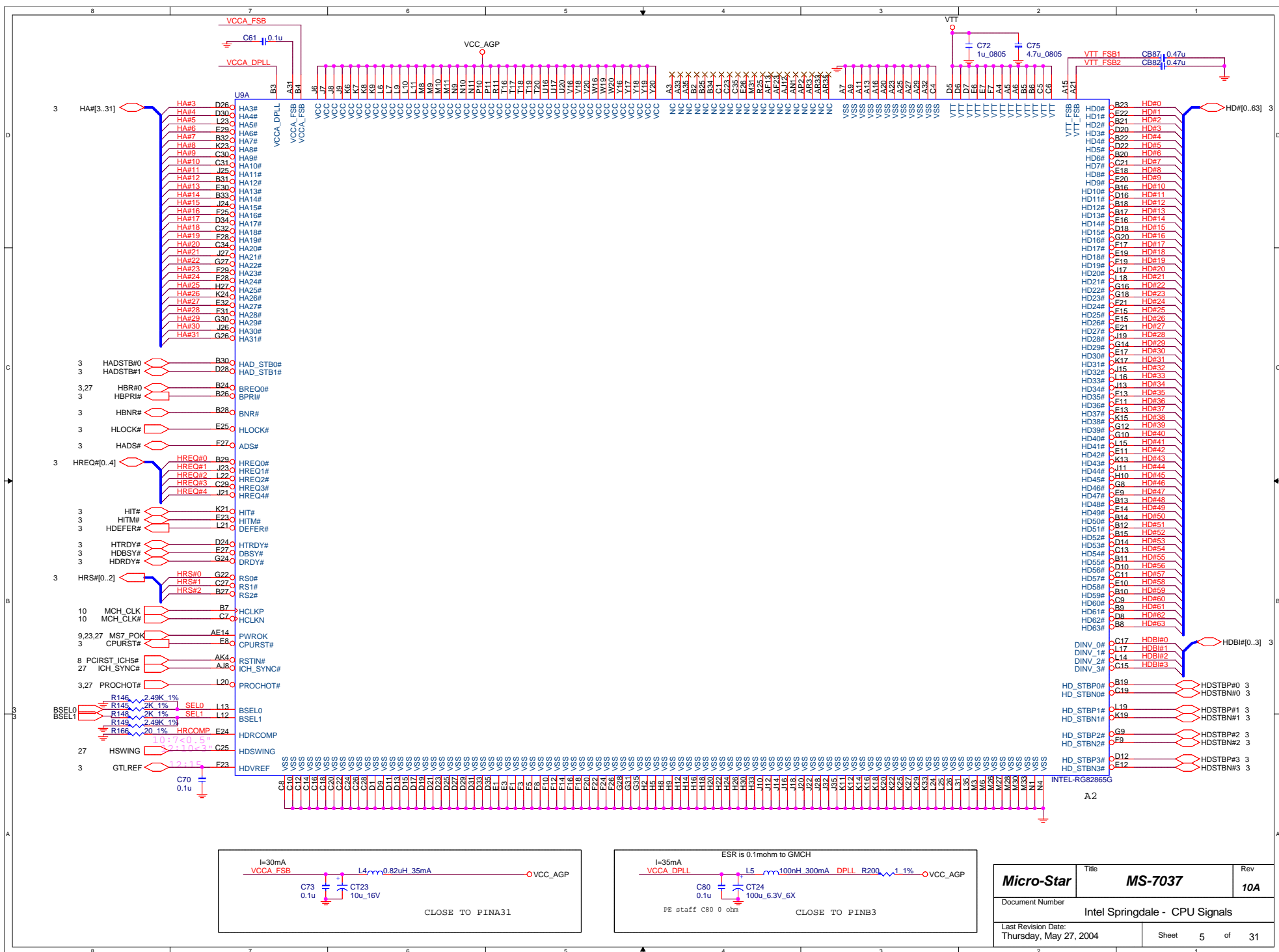
CPU VOLTAGE BLOCK

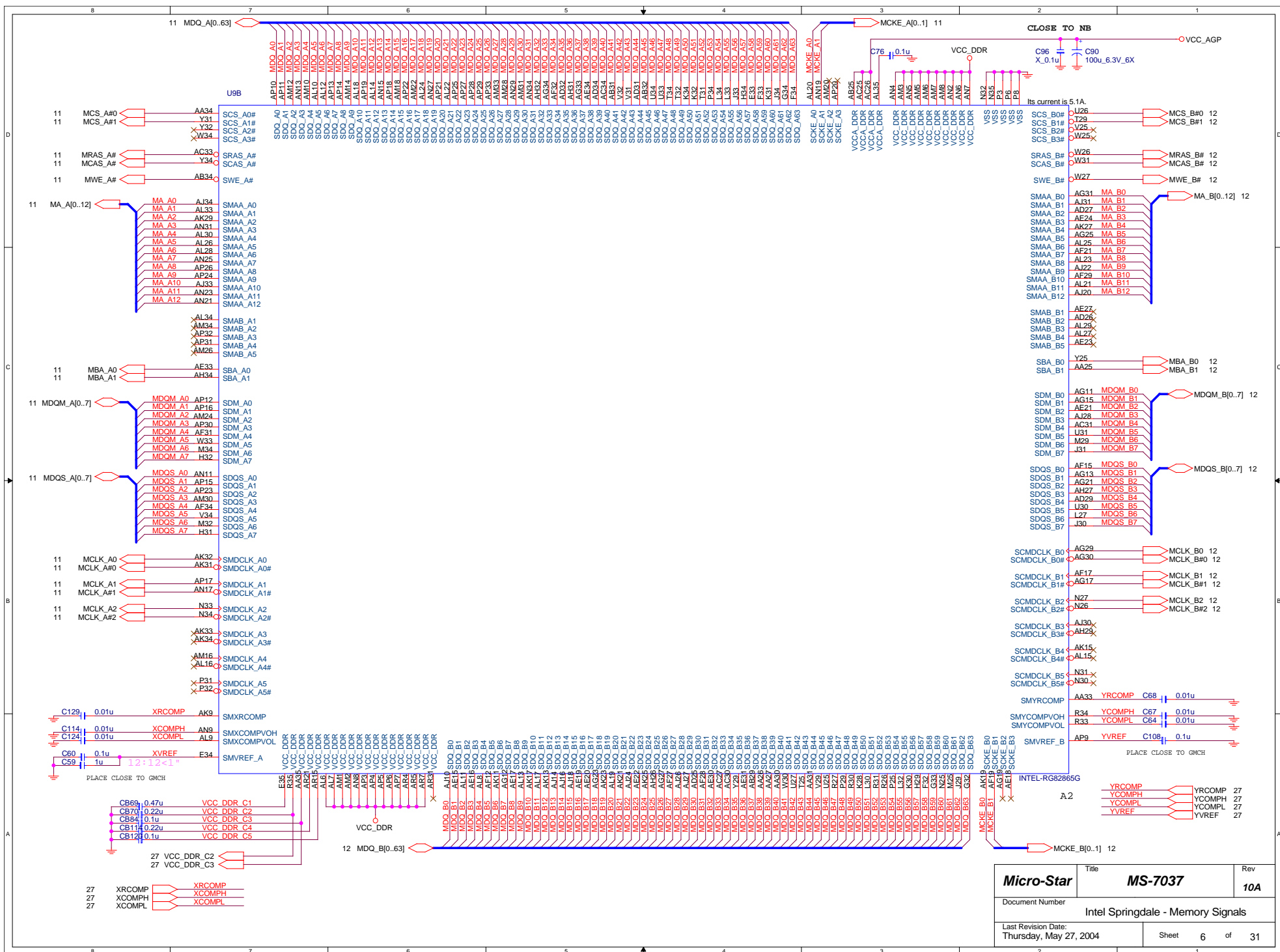


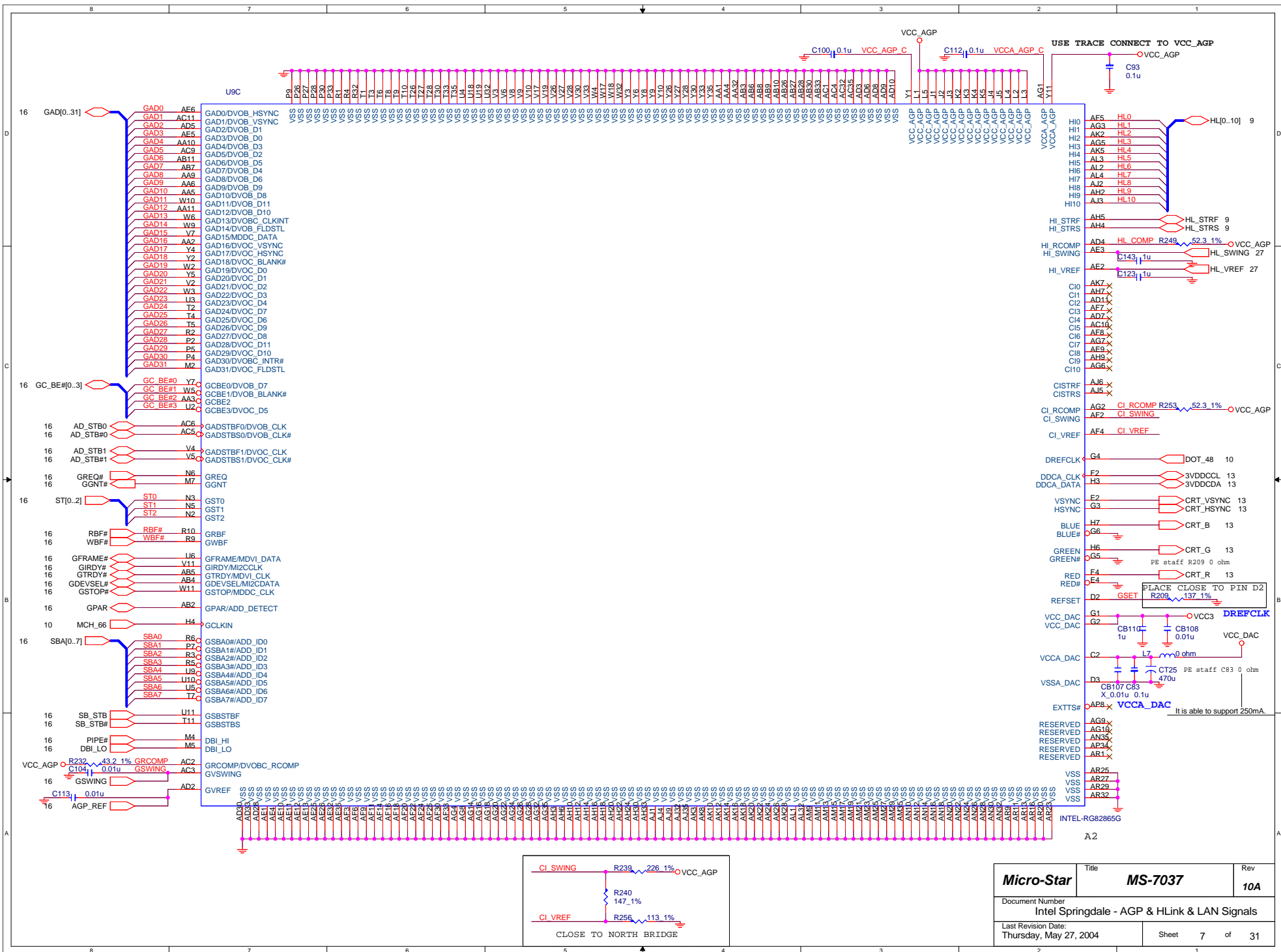
CPU DECOUPLING CAPACITORS



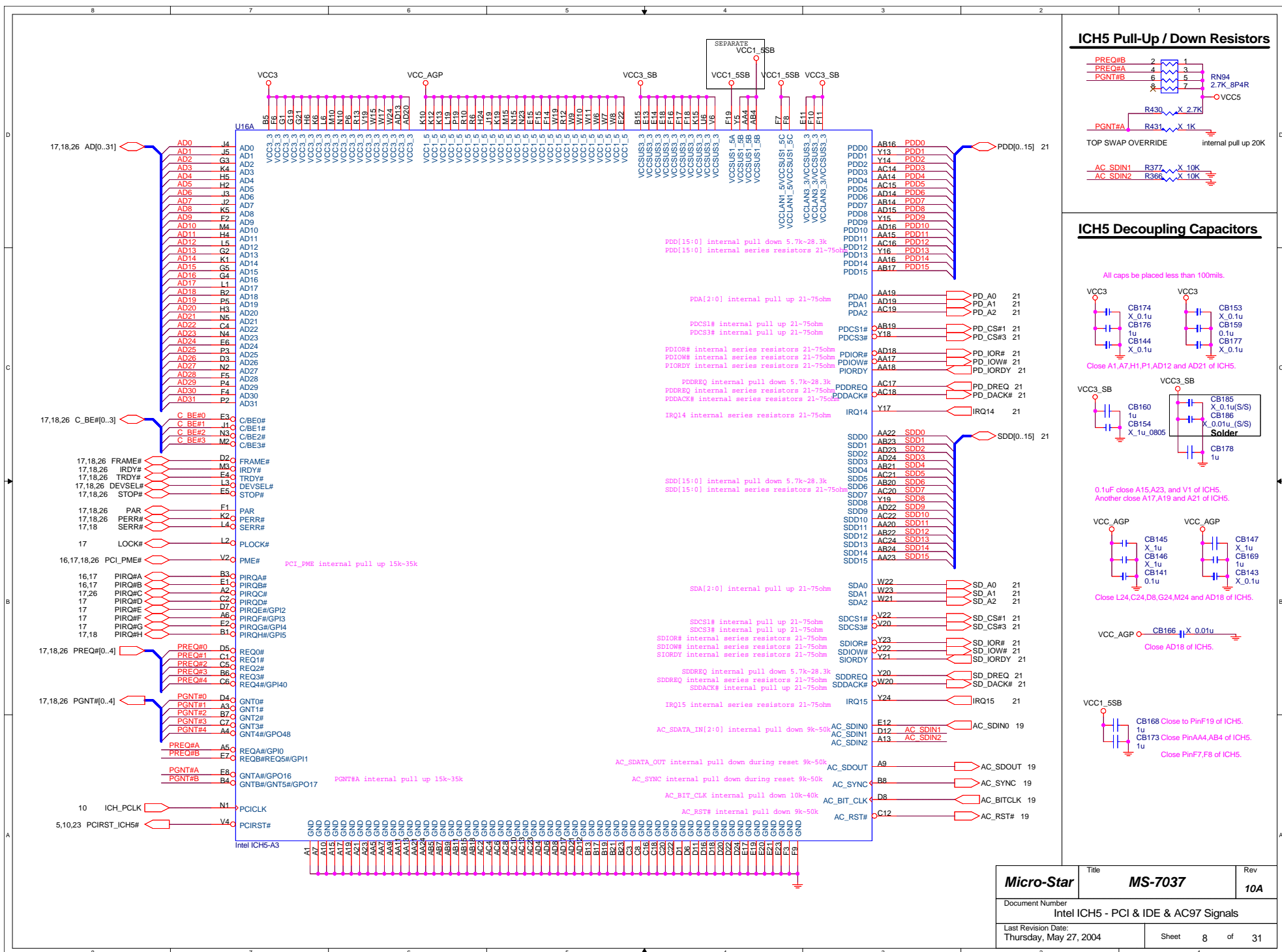
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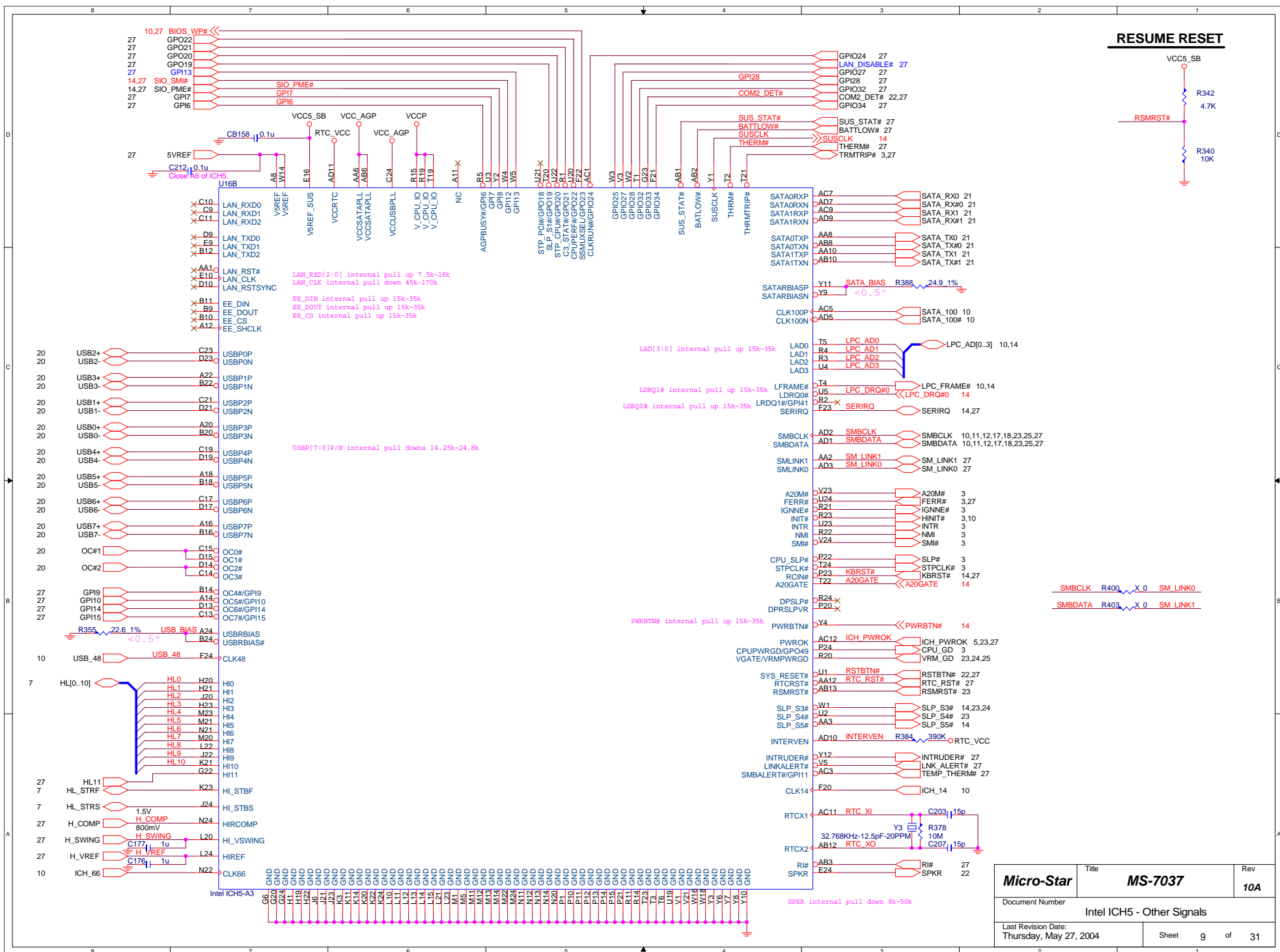






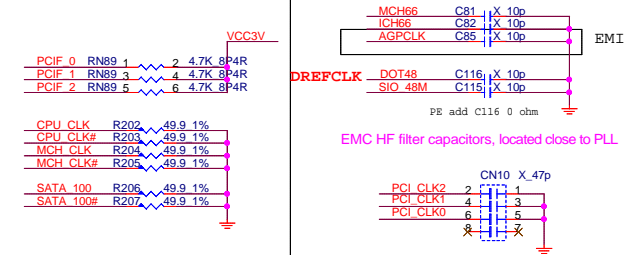
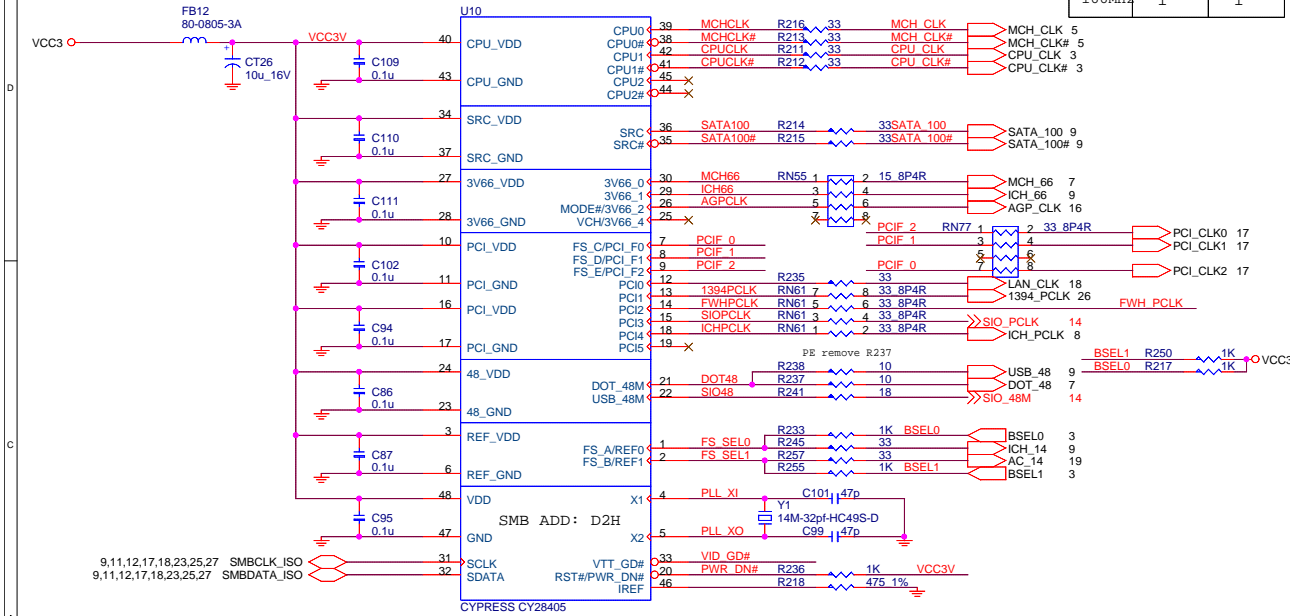
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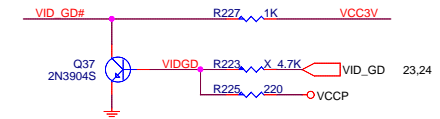


Micro-Star	Title MS-7037	Rev 10A
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Intel ICH5 - Other Signals		
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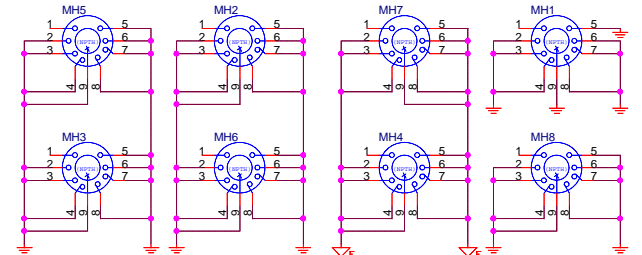
CLOCK GENERATOR



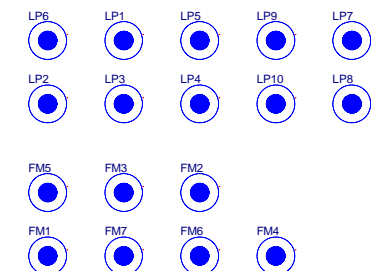
CLOCK GENERATOR VTT POWER DOWN BLOCK



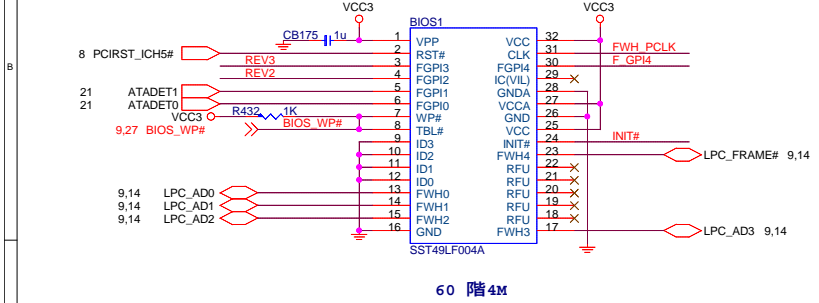
Mounting Holes



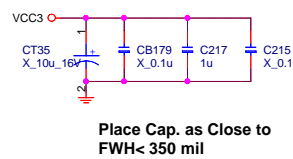
Optics Orientation Holes



FIRMWARE HUB (FWH)

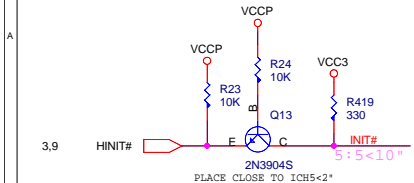


FWH DECOUPLING CAPACITORS

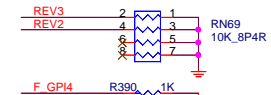


Place Cap. as Close to FWH< 350 mil

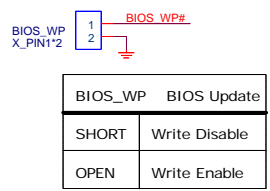
FWH INIT Signal Voltage Translation



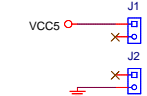
FWH RESISTORS



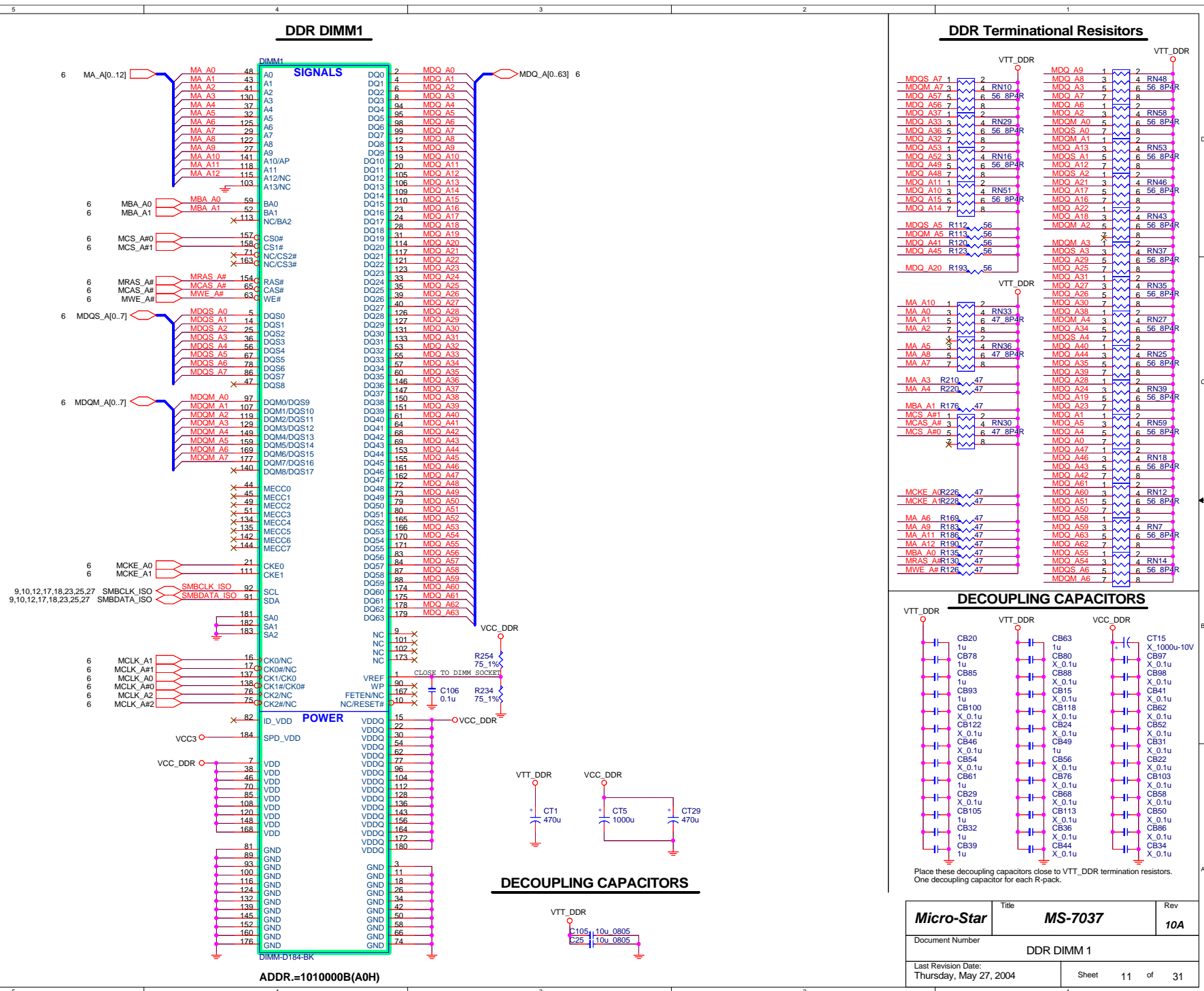
FWH write protect



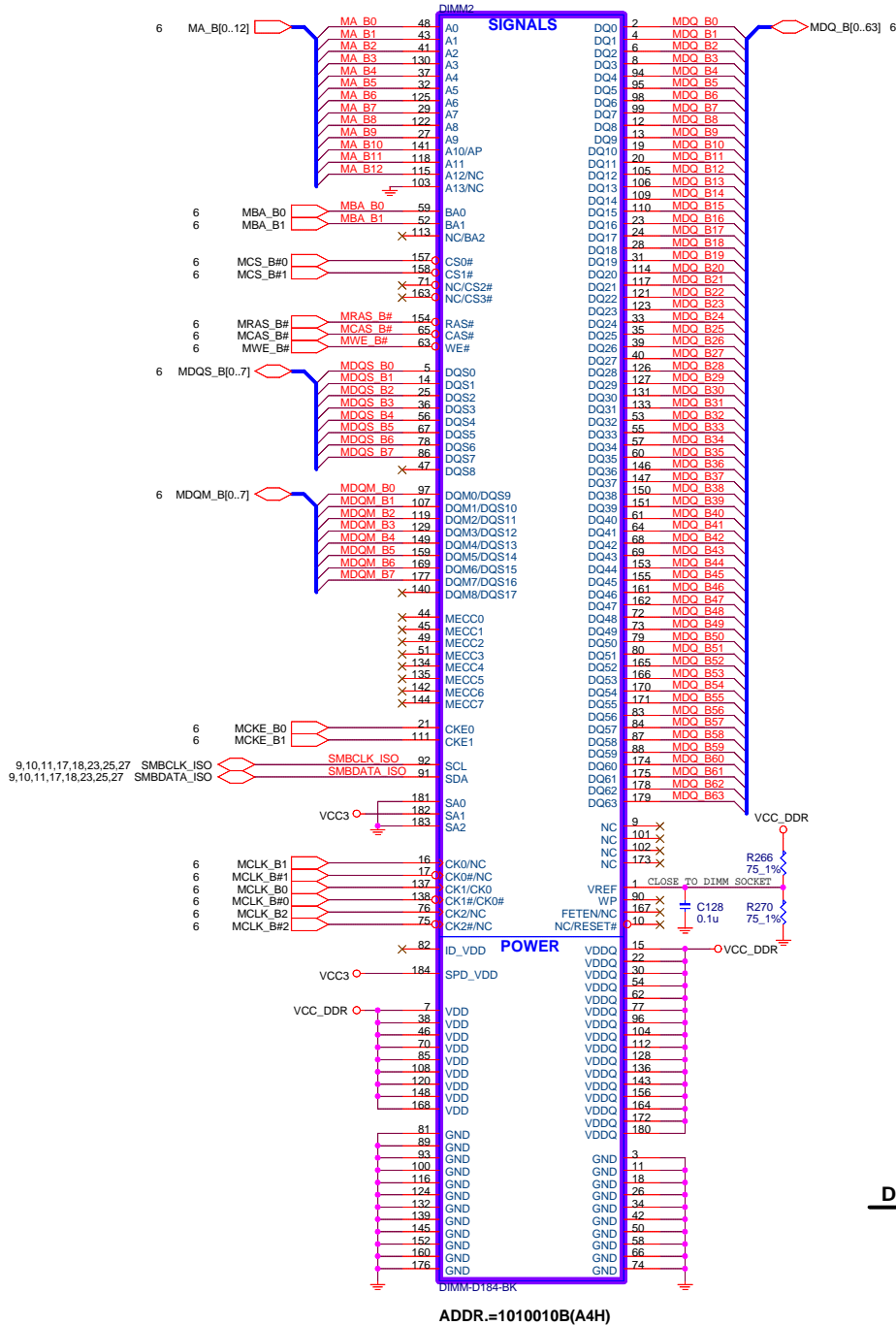
Simulation



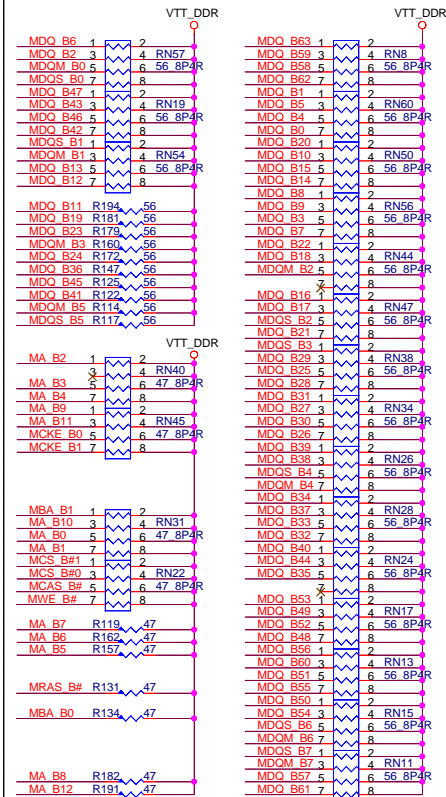
Micro-Star	Title	MS-7037	Rev	10A
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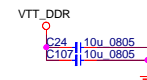
DDR DIMM2



DDR Terminational Resistors

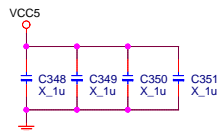
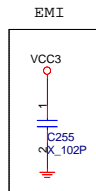
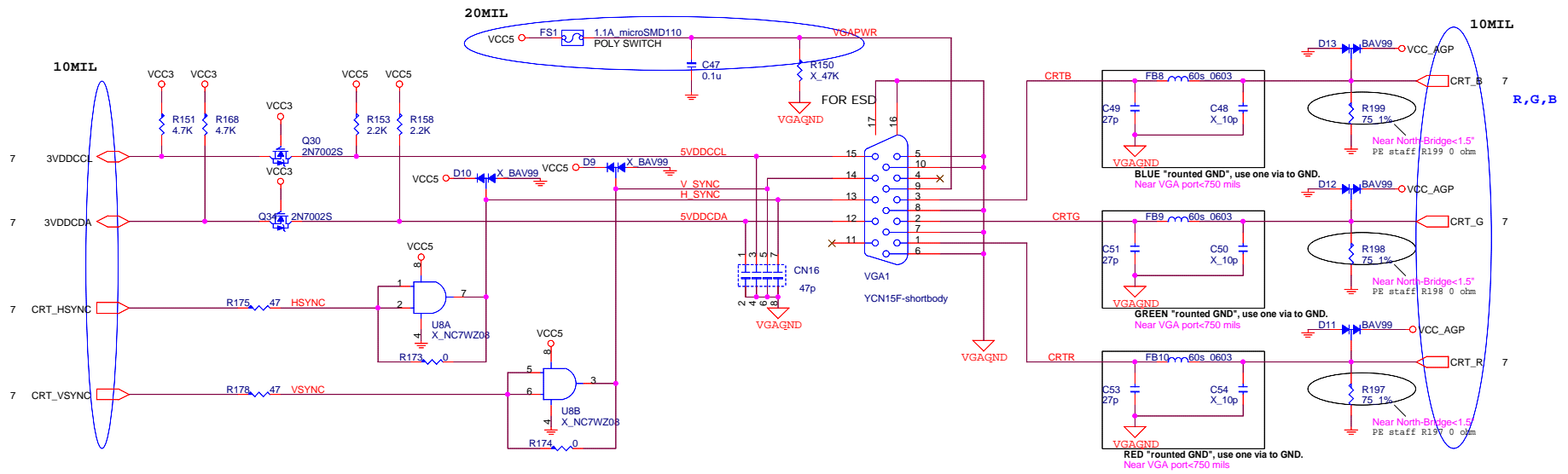


DECOUPLING CAPACITORS

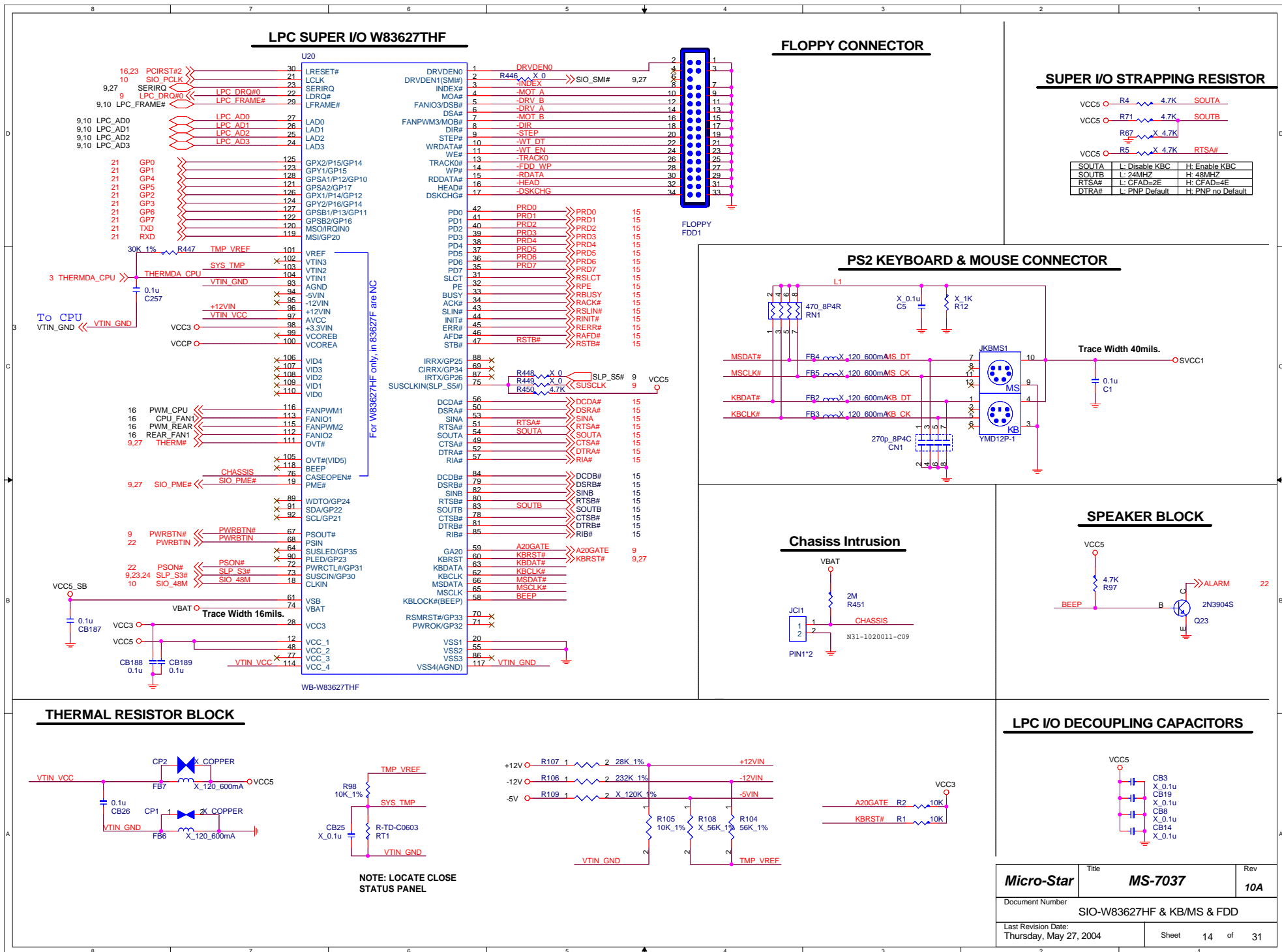


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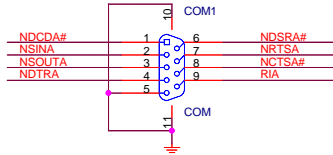
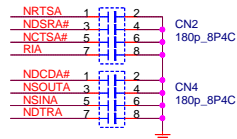
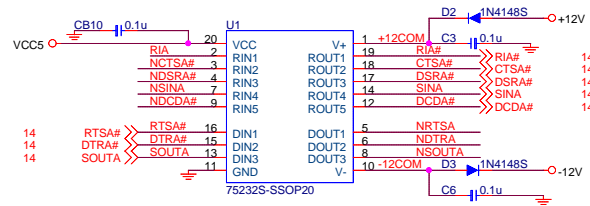
VGA CONNECTOR



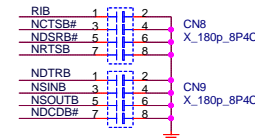
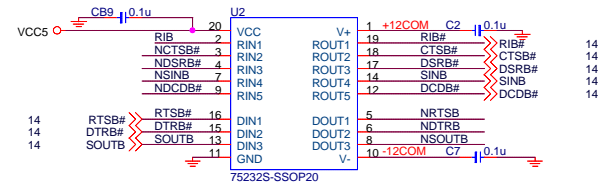
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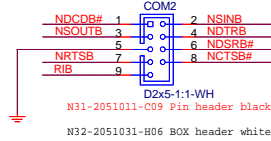
SERIAL PORT 1



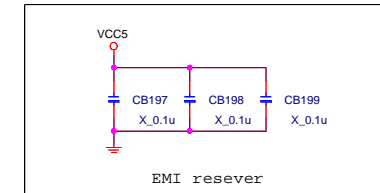
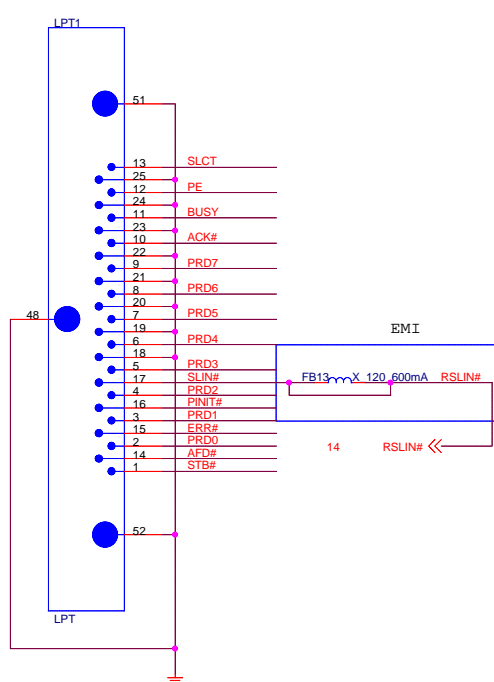
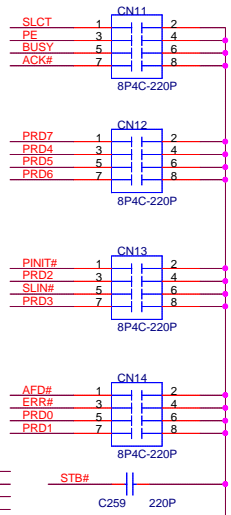
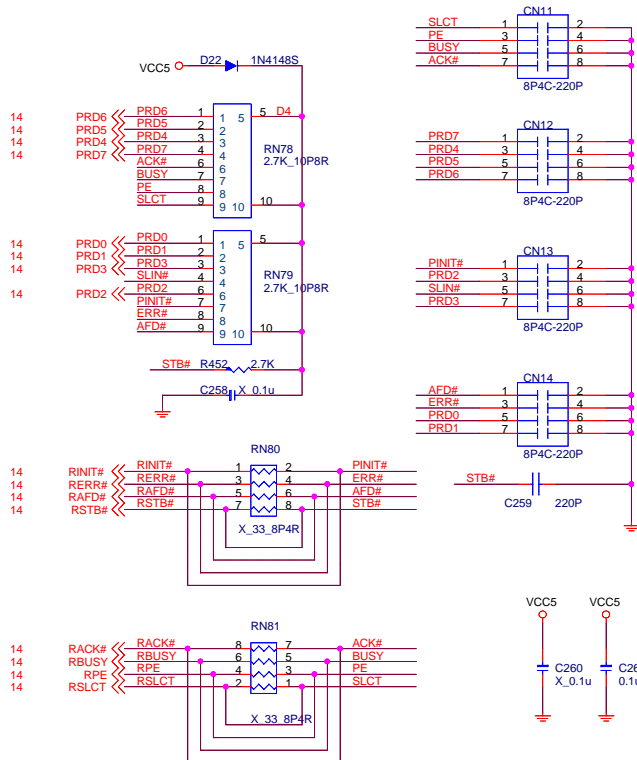
SERIAL PORT 2



COM2 HEADER



PARALLAL PORT



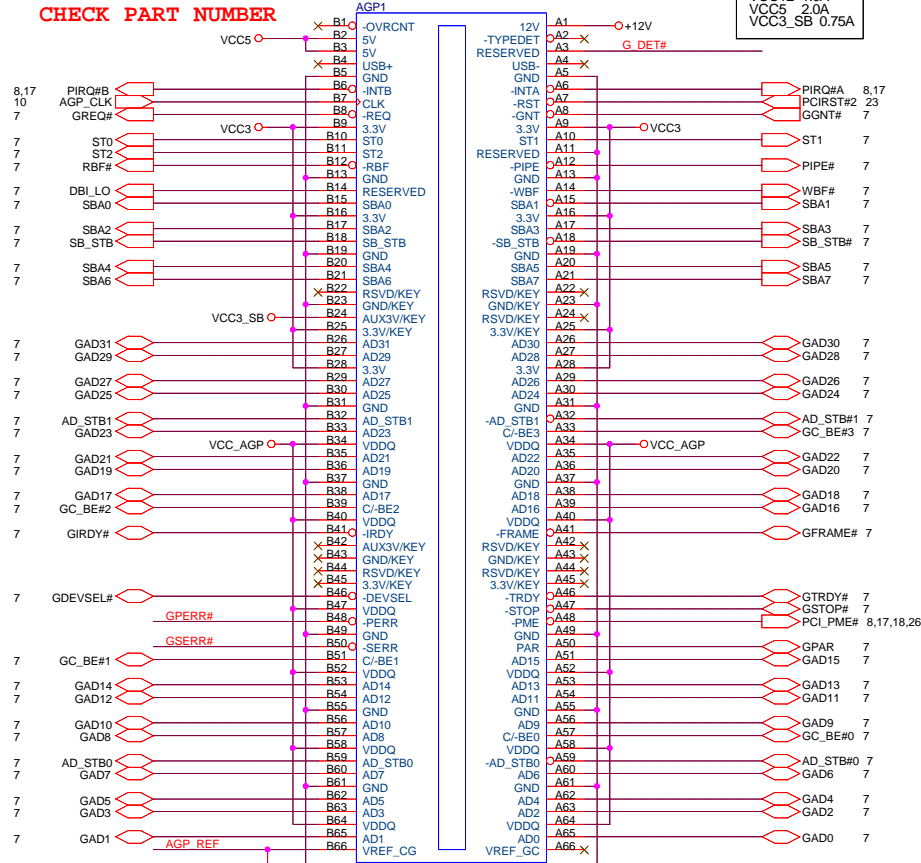
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AGP 1.5V 1X/2X/4X/8X SLOT(AGP VER:3.0)

VCC5 = 60mils trace / 15 mils space

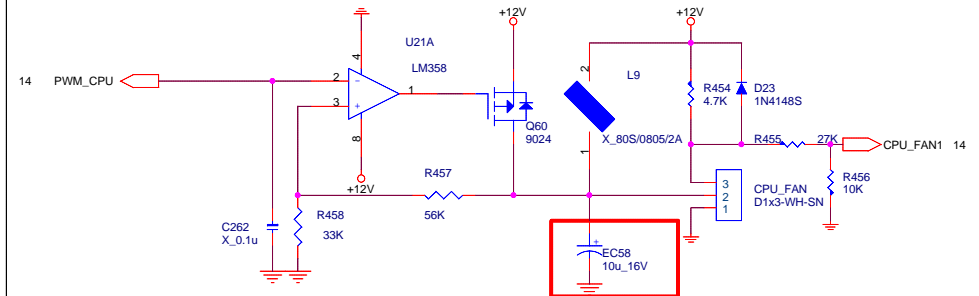
CHECK PART NUMBER

AGP Slot Imax
VCCg 8.0A
VCC3 6.0A
VCC12 1.0A
VCC5 2.0A
VCC3_SB 0.75A

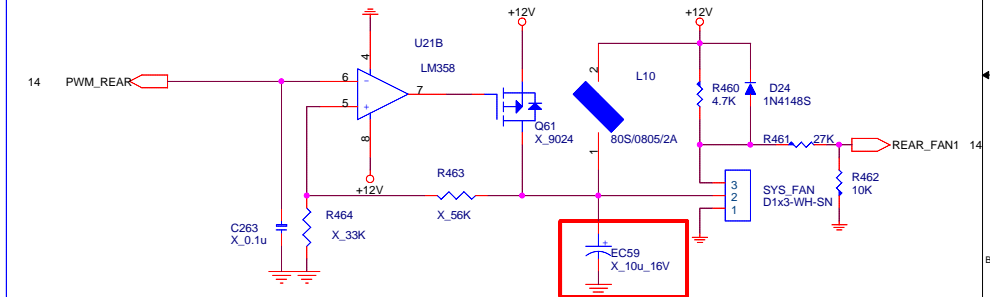


PIRQ#A / PIRQ#B

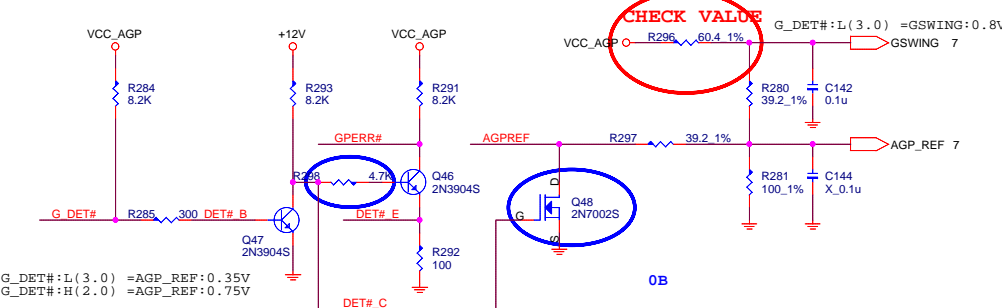
CPU FAN



SYSTEM FAN



Springdale Reference & Swing Voltage Circuit

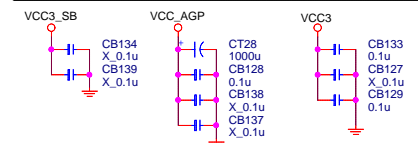


AGP TERMINATION RESISTORS

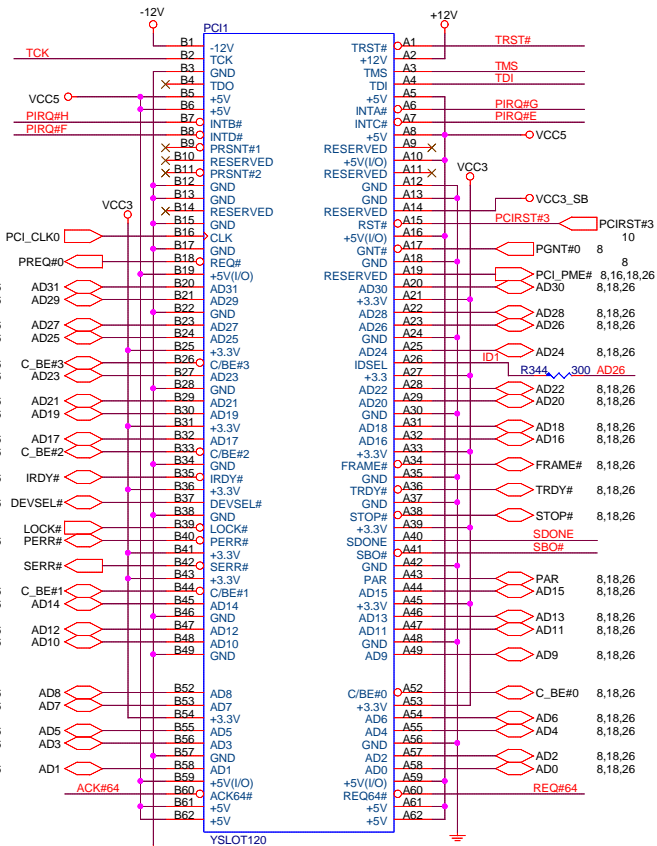
GSERR# R279 8.2K VCC_AGP

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

AGP SLOT DECOUPLING CAPACITORS



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Pin-to-pin comparison diagram for the AD9080 and AD9080-000. The diagram shows two columns of pins, one for the AD9080 (left) and one for the AD9080-000 (right), with their functions and pin numbers. A central column shows the pin numbers for the AD9080-000. The diagram is color-coded: blue for pins that are identical in function and pin number, red for pins that are different, and green for pins that are not present in the AD9080-000. The diagram is divided into two main sections: the top section for pins 1-10 and the bottom section for pins 11-20. The top section shows pins 1-10, and the bottom section shows pins 11-20. The diagram is a detailed comparison of the two devices, showing the mapping of pins and functions between them.

Pin-to-pin connection diagram for the PCI slot. The diagram shows two rows of pins, B1-B49 on the left and A1-A62 on the right. Signals are connected between corresponding pins on both sides. For example, TCK connects to B1 and A1, TRST# to B2 and A2, and VCC5 to B4 and A8. The diagram also shows power connections for -12V, +12V, and VCC3. A note '8' is present near the PGNT# connection.

FRAME# 2 1 VCC5
IRDY# 4 3
TRDY# 6 5 RN66
DEVSEL# 8 7 2.7K_8P4R

8 8.26

STOP# 2 1 VCC5
LOCK# 4 3
PERR# 6 5 RN67
SERR# 8 7 2.7K_8P4R

VCC5 VCC3
CB162 X 0.1u
CB150 X 0.1u

PREQ#2 2 1 VCC5
PREQ#0 4 3
PREQ#1 6 5 RN68
PREQ#3 8 7 2.7K_8P4R

PREQ#4 R379 4.7K

REQ#64 R345 4.7K VCC5
ACK#64 R346 4.7K

TMS R427 X 4.7K
TDI R428 X 4.7K

TCK R391 X 4.7K
TRST# R392 X 4.7K

PIRQ#D 8 7 VCC3
PIRQ#A 6 5
PIRQ#C 4 3 RN70
PIRQ#B 2 1 8.2K_8P4R

PIRQ#E 8 7
PIRQ#F 6 5
PIRQ#G 4 3 RN64
PIRQ#H 2 1 8.2K_8P4R

SDONE SMBCLK 9,10,11,12,18,23,25,27

SBO# SMBDATA 9,10,11,12,18,23,25,27

Component	Value
CT33	X, 1000u
CT170	X, 0.1u
CT171	X, 0.1u
CT109	X, 0.1u
CT155	X, 0.1u
CT152	X, 0.1u
CT31	X, 10u_25V
CT183	X, 0.1u
CT32	X, 10u_25V
CT182	X, 0.1u
CT135	X, 0.1u
CT163	X, 0.1u
CT161	X, 0.1u
CT162	X, 0.1u
CT163	X, 0.1u
CT164	X, 0.1u
CT165	X, 0.1u
CT166	X, 0.1u
CT167	X, 0.1u
CT168	X, 0.1u
CT169	X, 0.1u
CT170	X, 0.1u
CT171	X, 0.1u
CT172	X, 0.1u
CT173	X, 0.1u
CT174	X, 0.1u
CT175	X, 0.1u
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CT178	X, 0.1u
CT179	X, 0.1u
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CT201	X, 0.1u
CT202	X, 0.1u
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CT208	X, 0.1u
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CT210	X, 0.1u
CT211	X, 0.1u
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CT227	X, 0.1u
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CT229	X, 0.1u
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CT257	X, 0.1u
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CT270	X, 0.1u
CT271	X, 0.1u
CT272	X, 0.1u
CT273	X, 0.1u
CT274	X, 0.1u
CT275	X, 0.1u
CT276	X, 0.1u
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CT278	X, 0.1u
CT279	X, 0.1u
CT280	X, 0.1u
CT281	X, 0.1u

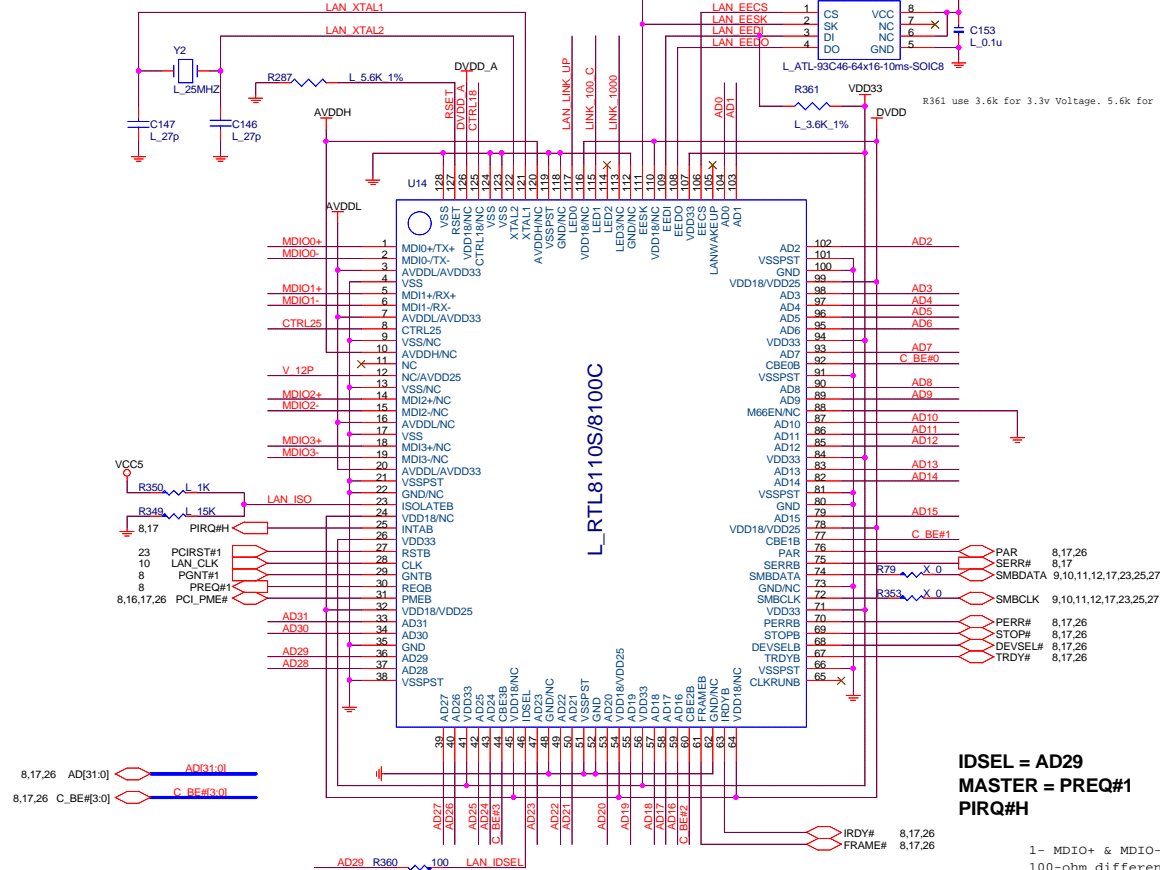
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Document Number PCI 1& 2 & 3 Slots		
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PCI LAN RTL8110S/8100C

R287 2.49K for 8110S; 5.6k for 8100C

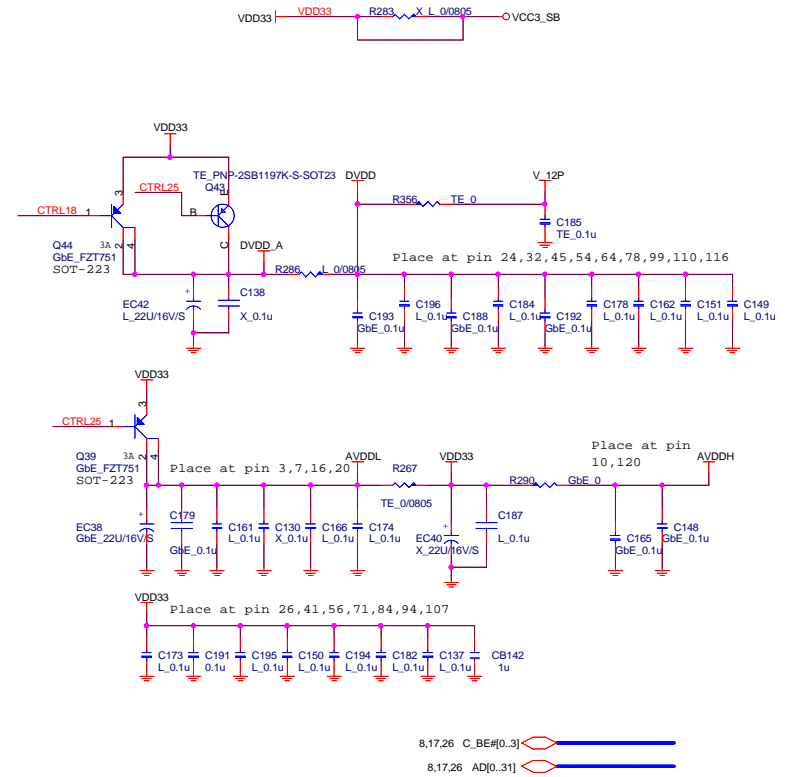
LAN EEPROM

R288 stuff 10K for 93C56
R288 X 10K
U12
LAN EEC5 1 CS
LAN EESK 2 VCC
LAN EEDI 3 NC
LAN EEDO 4 DI
DO 5 GND
L_ATL-93C46-64x16-10ms-SOIC8
R361
VDD33
D_VDD
L 3.6K 1%
R361 use 3.6k for 3.3v Voltage. 5.6k for 5v voltage



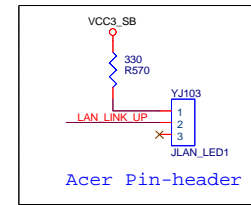
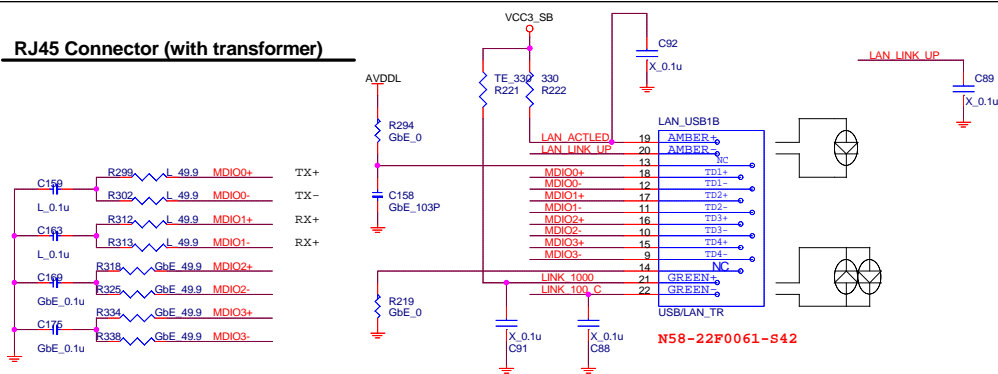
IDSEL = AD29
MASTER = PREQ#1
PIRQ#H

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

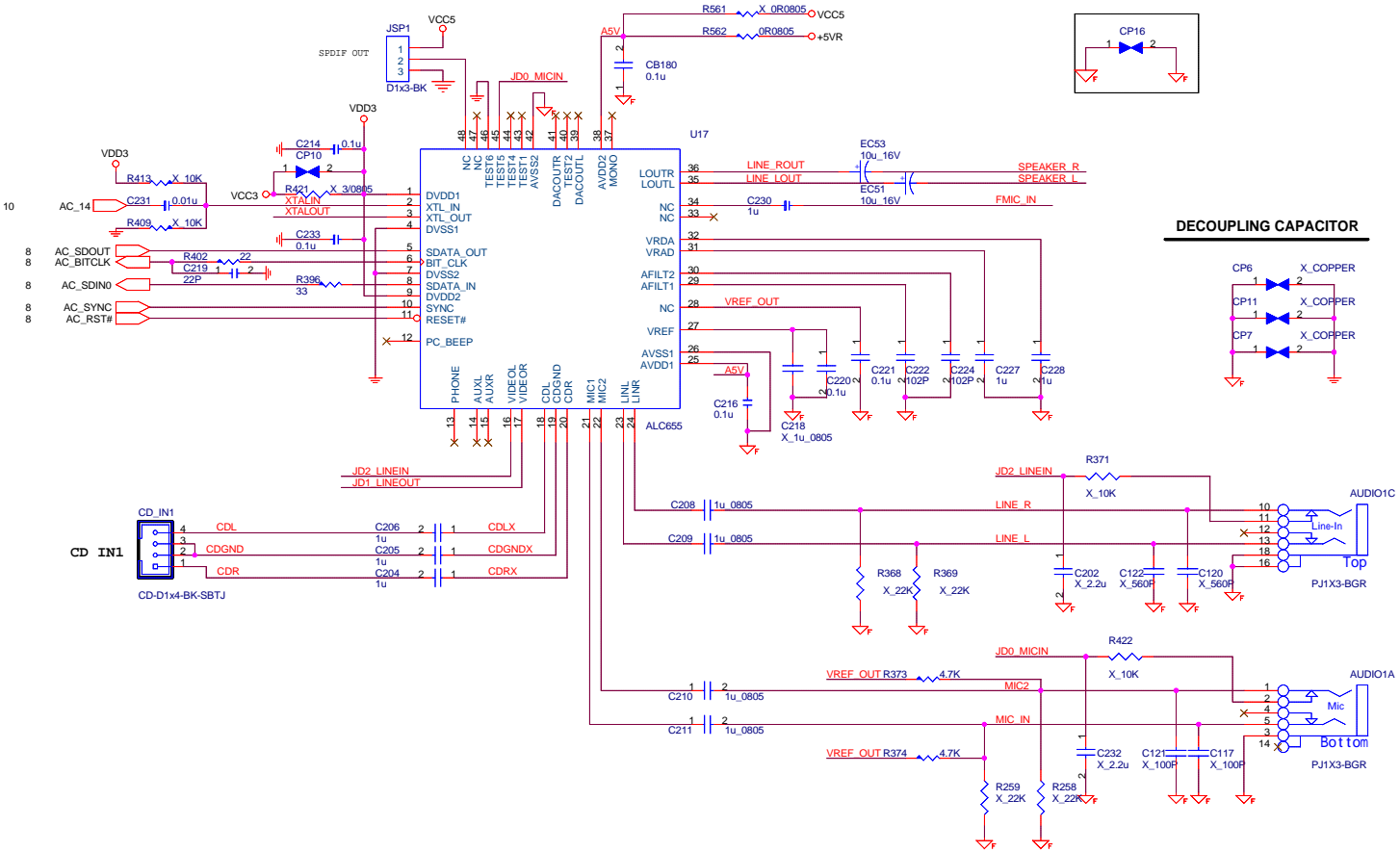
RJ45 Connector (with transformer)



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

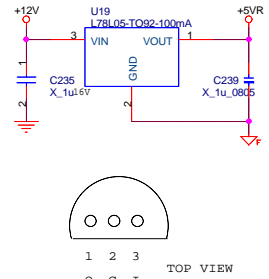
Micro-Star	Title	Rev
	MS-7037	10A
Document Number	LAN RTL8110S/8100C	
Last Revision Date:	Thursday, May 27, 2004	Sheet 18 of 31

ALC655 AC97 CODEC

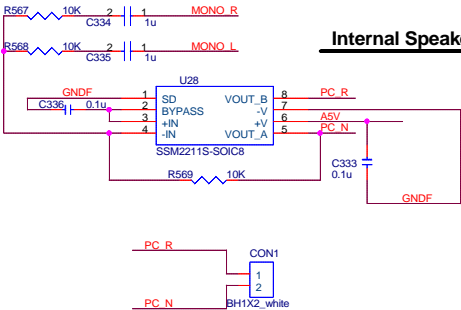


AUDIO CODE REGULATORS

Trace Width 30mils.

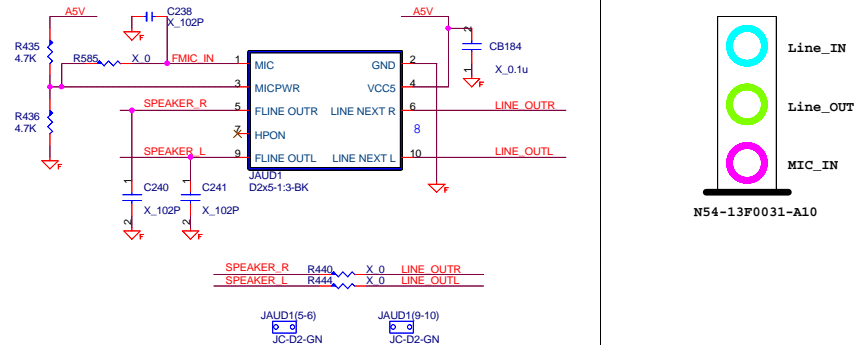


Internal Speaker

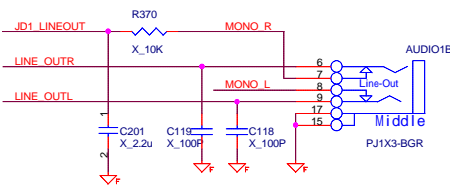


Channel Barebone Internal Speaker amplifier

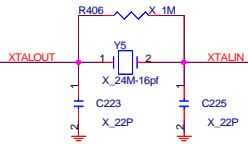
Intel Front Audio Connector



SPEAKER OUT JACK

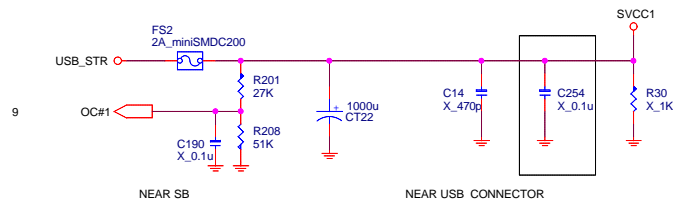


AUDIO CODE CRYSTAL CIRCUIT

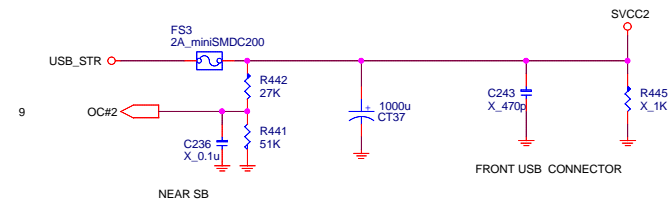


Micro-Star	Title	MS-7037	Rev	10A
Document Number	ALC655			
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Sheet	19	of	31	

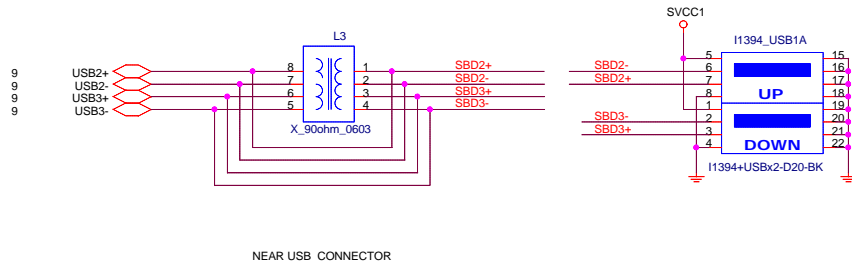
POWER CIRCUIT FOR USB PORT 0,1,2,3



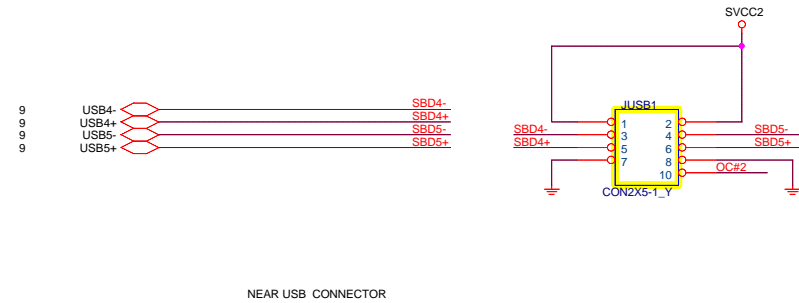
POWER CIRCUIT FOR USB PORT 4,5,6,7



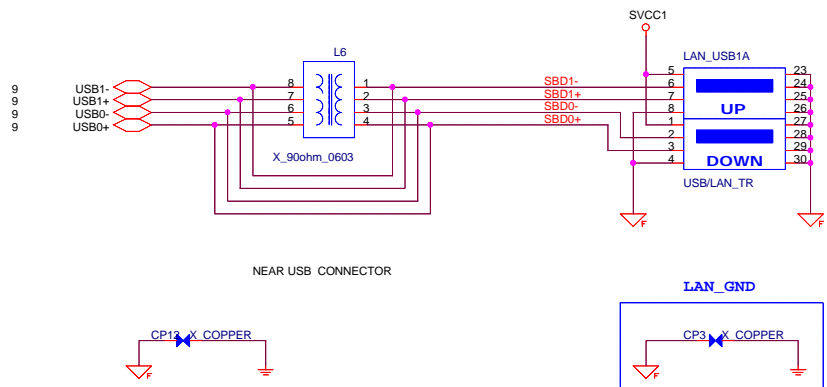
REAR PANEL USB CONNECTOR FOR USB PORT 0,1



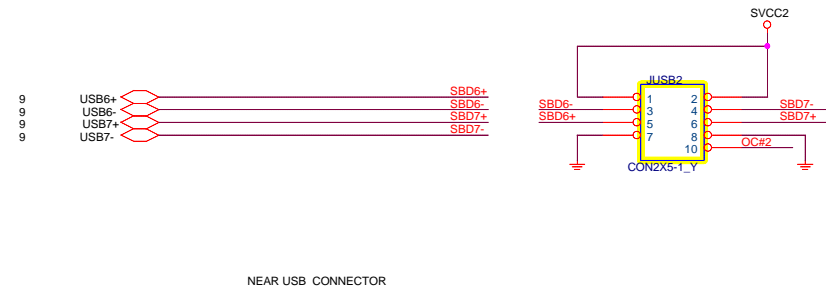
FRONT PANEL USB CONNECTOR FOR USB PORT 4,5



REAR PANEL USB CONNECTOR FOR USB PORT 2,3

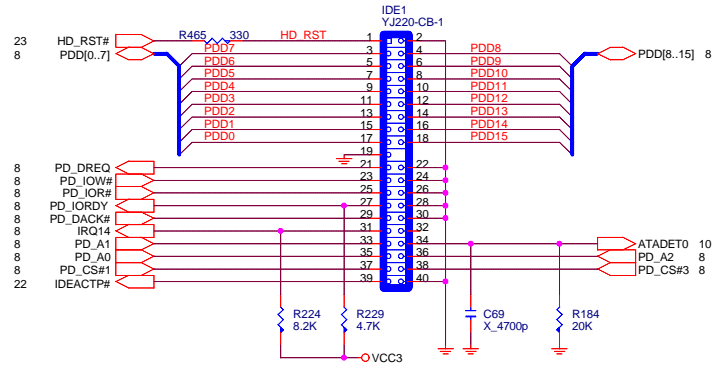


FRONT PANEL USB CONNECTOR FOR USB PORT 6,7

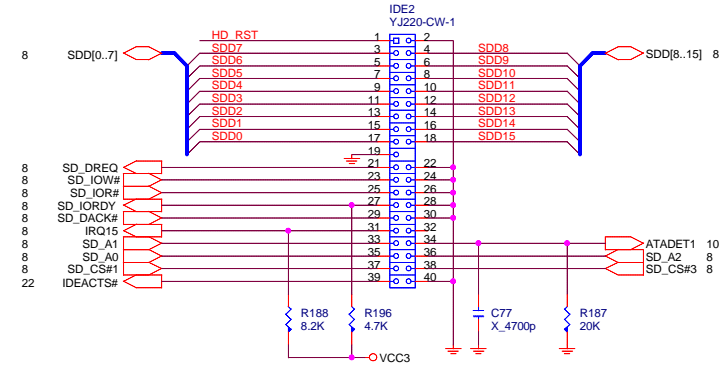


Micro-Star	Title	MS-7037	Rev	10A
	Document Number	USB Connectors		
Last Revision Date:		Thursday, May 27, 2004	Sheet	20 of 31

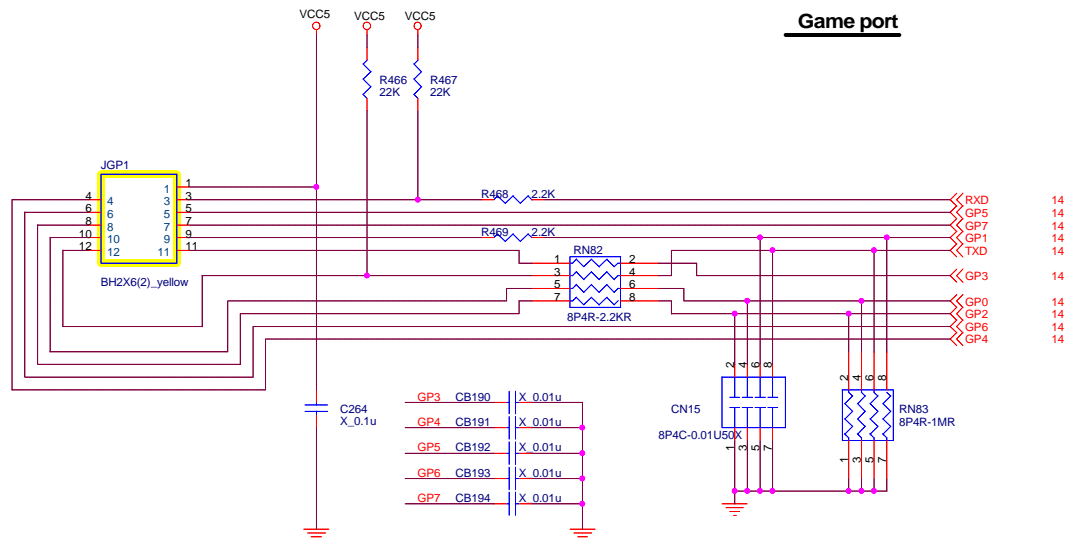
PRIMARY IDE BLOCK



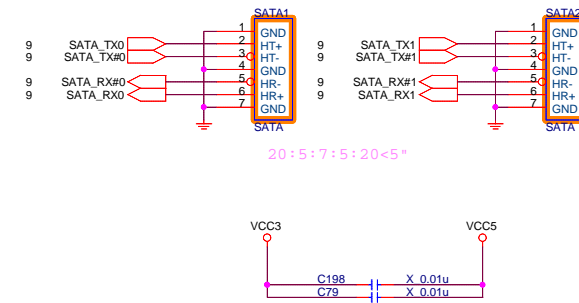
SECONDARY IDE BLOCK



Game port

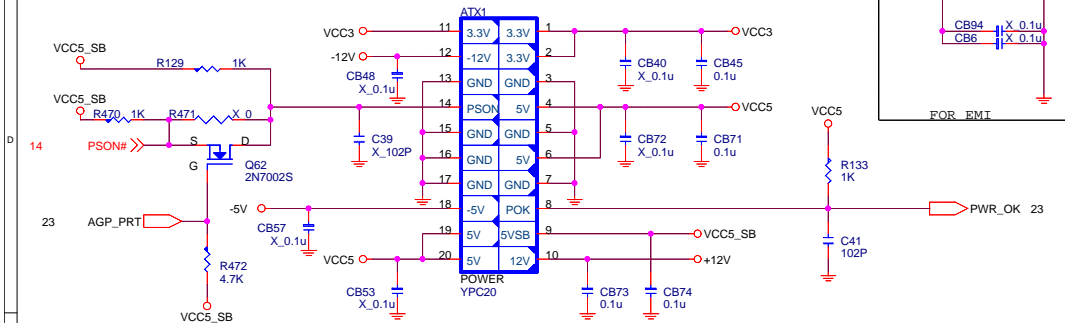


SERIAL ATA CONNECTOR BLOCK

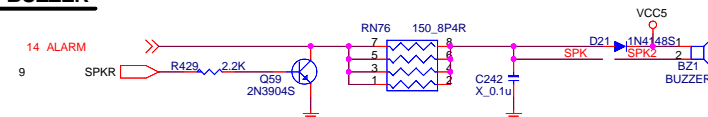


Micro-Star	Title MS-7037	Rev 10A
Document Number	IDE & SATA & Game port	
Last Revision Date: Thursday, May 27, 2004	Sheet 21 of 31	

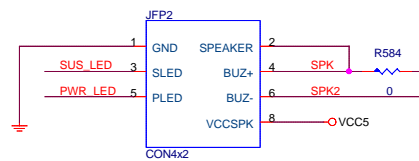
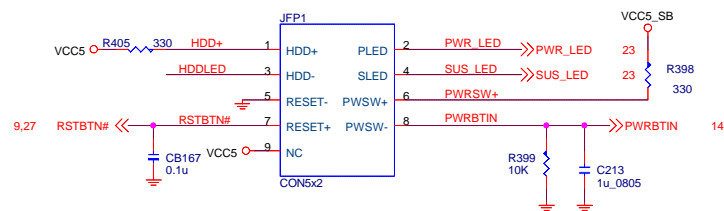
ATX CONNECTOR



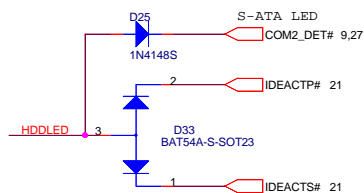
BUZZER



Intel Front Panel



IDE LED

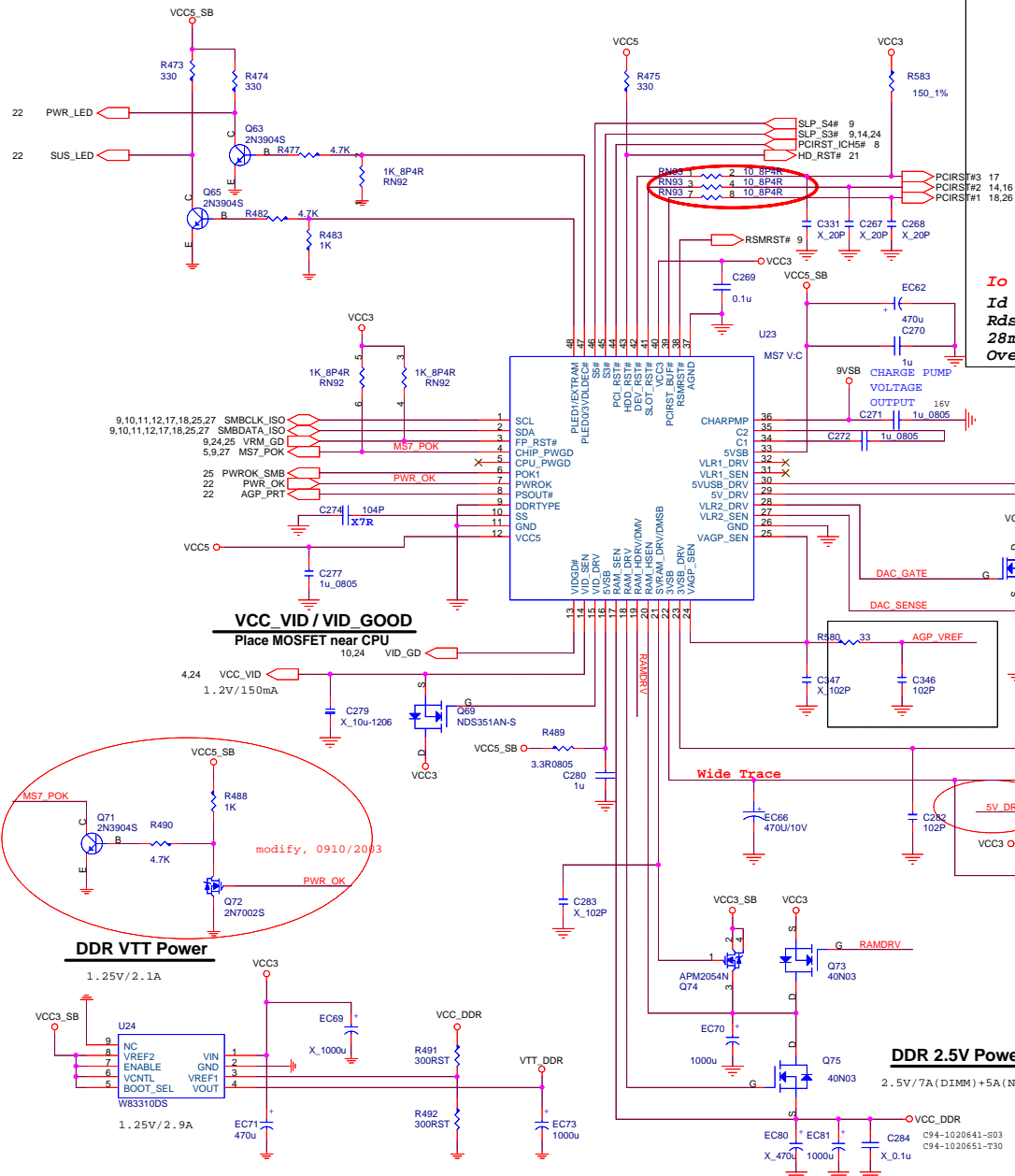


Micro-Star	Title	MS-7037	Rev	10A
	Document Number	ATX, FRONT PANEL		
	Last Revision Date:	Thursday, May 27, 2004	Sheet	22 of 31

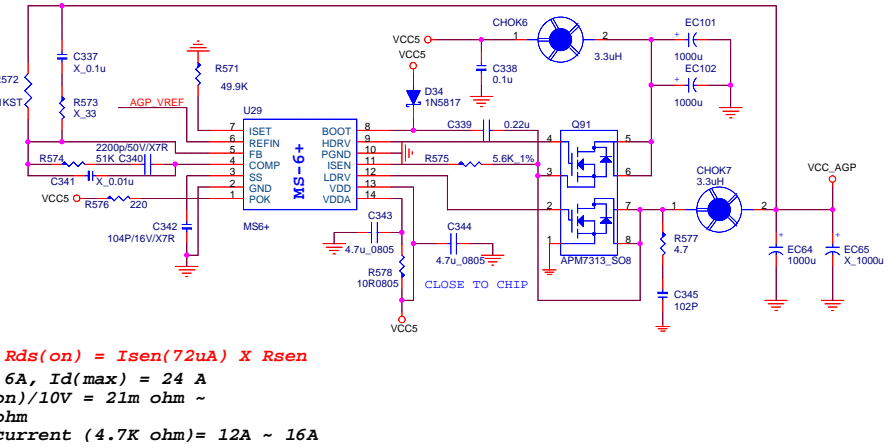
ACPI Controller

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

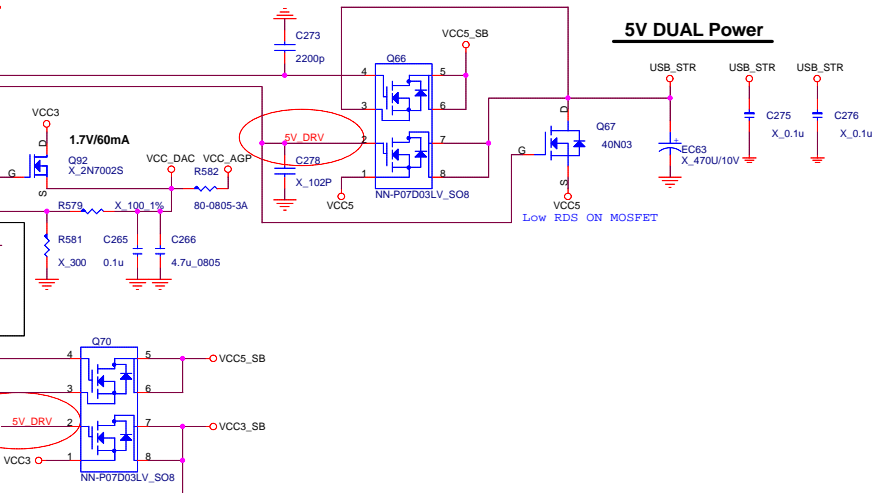
Power	S0	S3	S5
VCC3_SB	Main	Standby	Standby
VCC5_STR	Main	Standby	0V
MEM_STR	Main	Standby	0V



AGP POWER



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



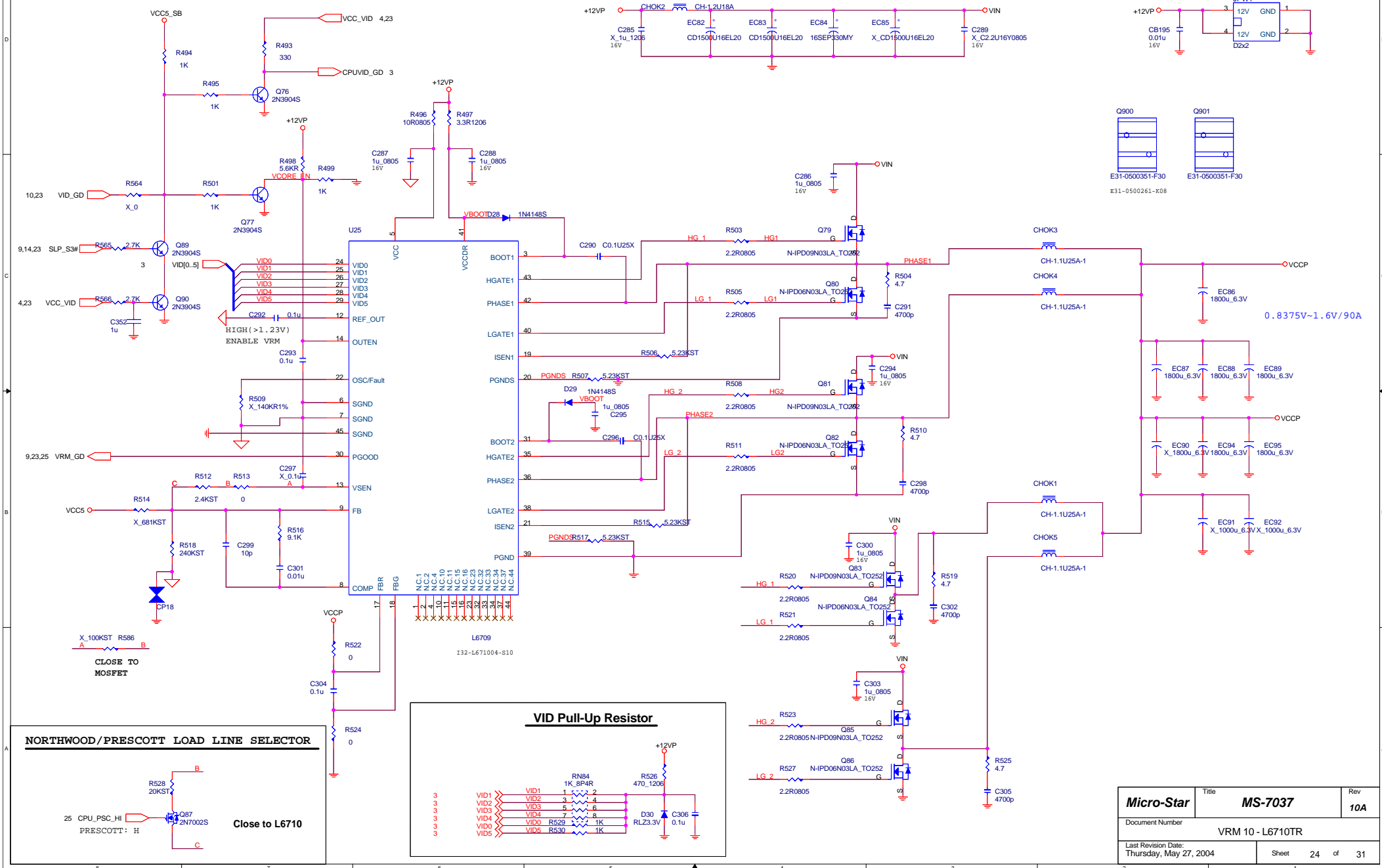
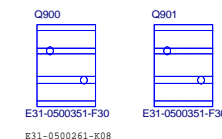
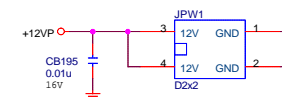
5V DUAL Power

DDR 2.5V Power

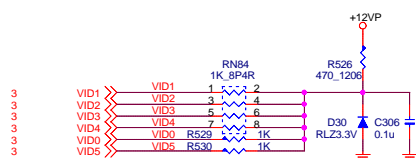
2.5V/7A(DIMM)+5A(NB)

Micro-Star	Title MS-7037	Rev 10A
Document Number ACPI Controller MS7		
Last Revision Date: Thursday, May 27, 2004		Sheet 23 of 31

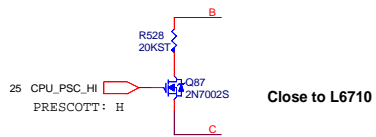
ATX12V Power Connector



VID Pull-Up Resistor

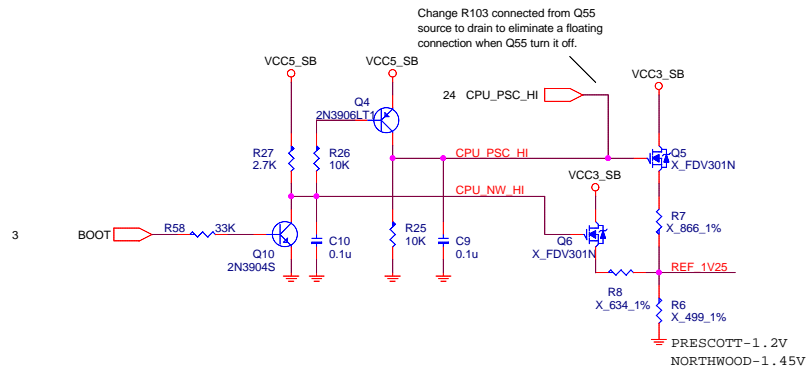


NORTHWOOD/PRESCOTT LOAD LINE SELECTOR

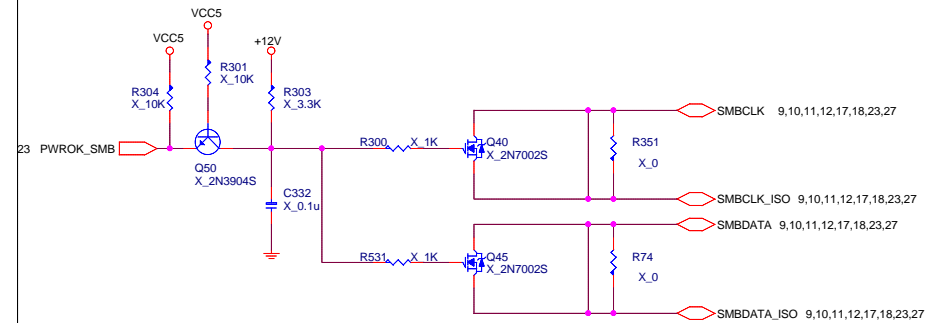
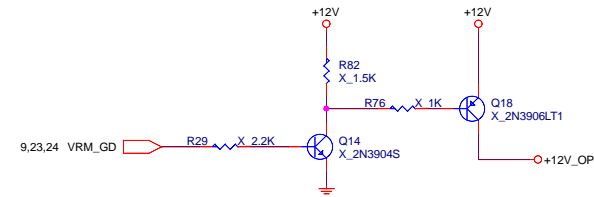


Micro-Star	Title	MS-7037	Rev	10A
Document Number	VRM 10 - L6710TR			
Last Revision Date:	Thursday, May 27, 2004			
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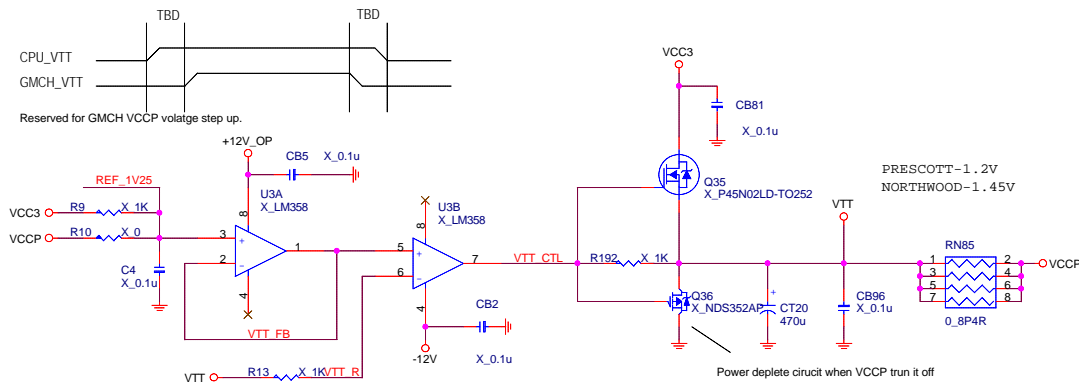
Intel reference GMCH VTT power circuit



GMCH_VTT ON/OFF CIRCUIT



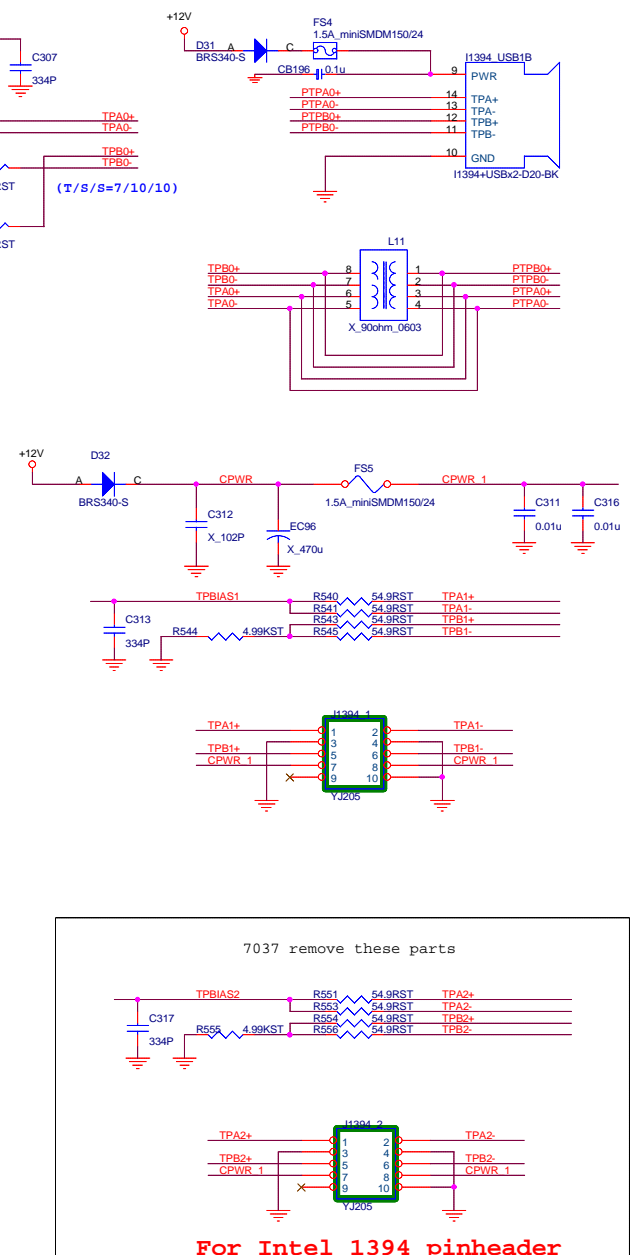
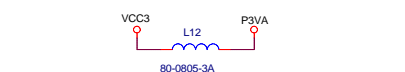
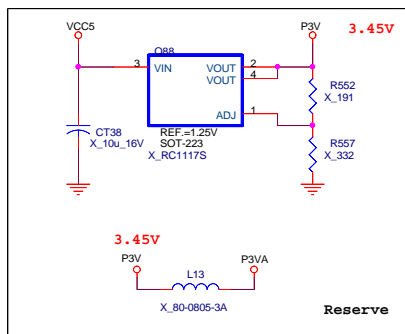
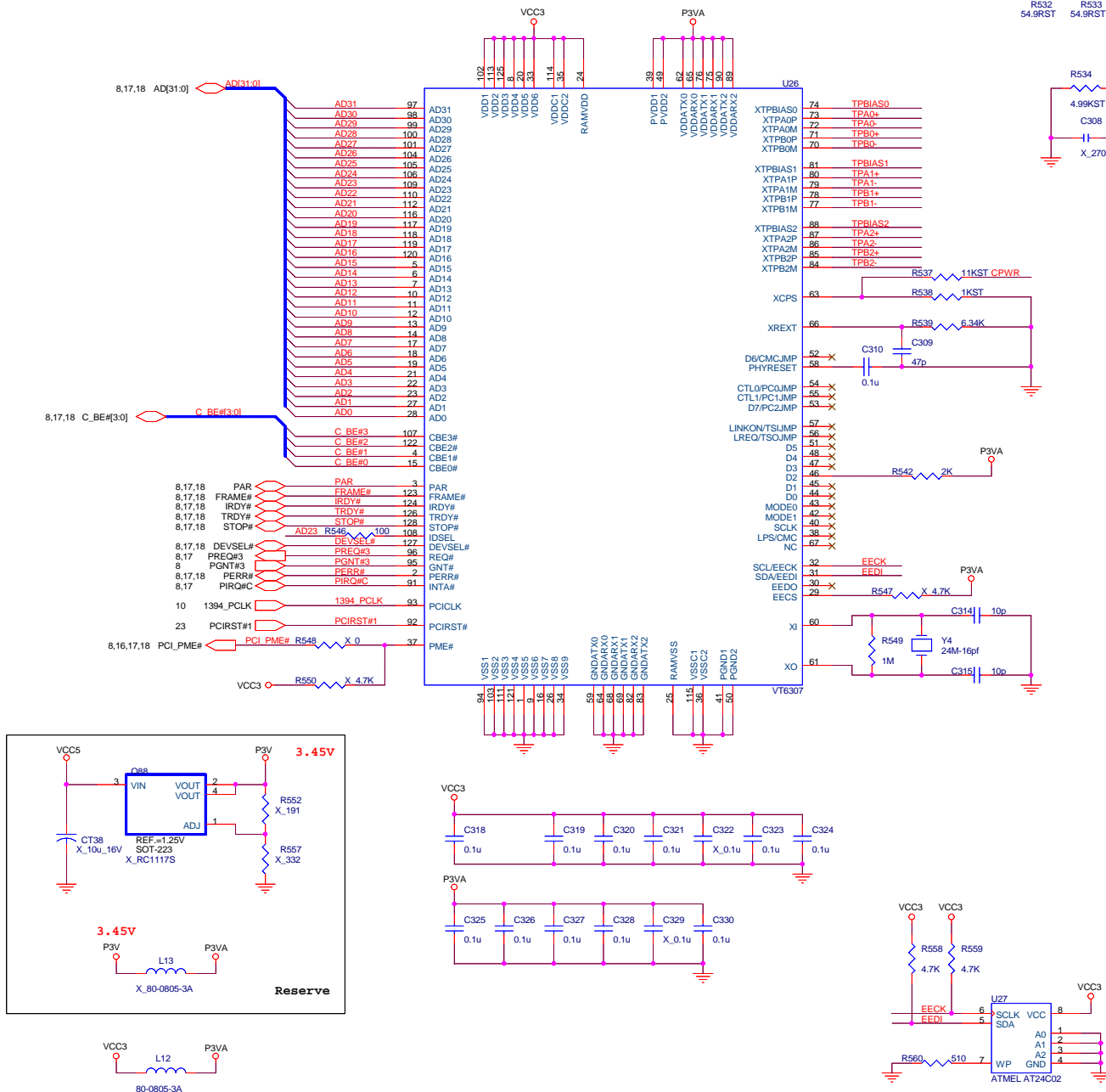
GMCH VTT Generator



Bootstrap pin are input rather then 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 bootstrap pin power by core voltage so the outside circuit need to adjust the turn off voltage.

Micro-Star	Title	MS-7037	Rev	10A
Document Number	MEM,VCC_DAC & VTT Controller			
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1394a OHCI Link Layer Controller

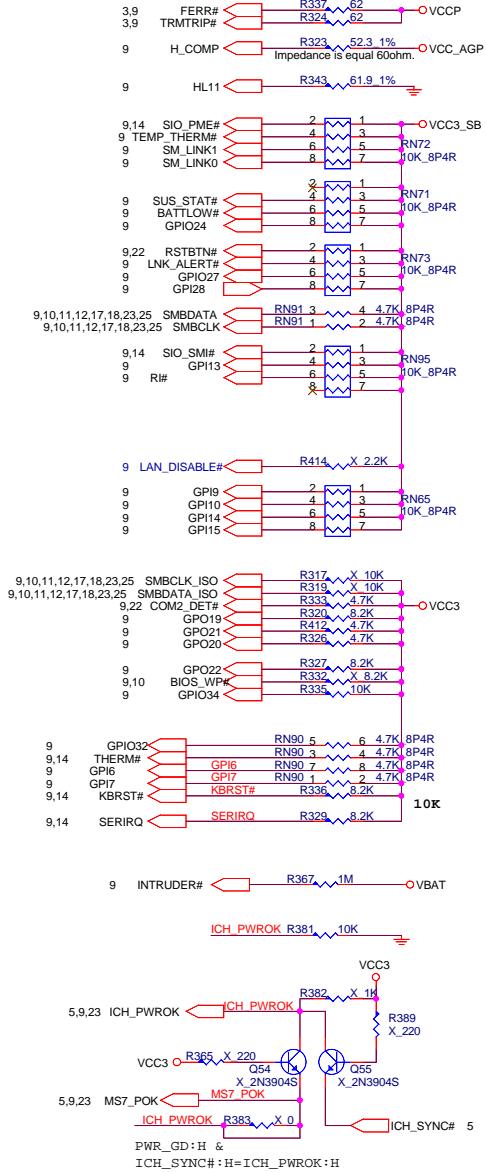


Micro-Star	Title	MS-7037	Rev	10A
Document Number	VIA 6307/6306			
Last Revision Date:	Thursday, May 27, 2004			
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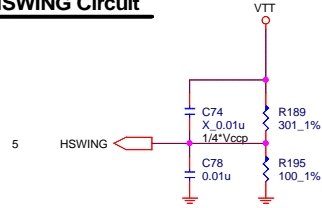
ICH5 STRAPPING RESISTORS

ALL COMPONENTS CLOSE TO ICH5

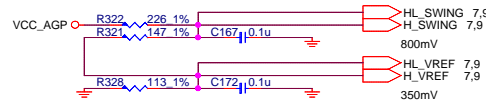
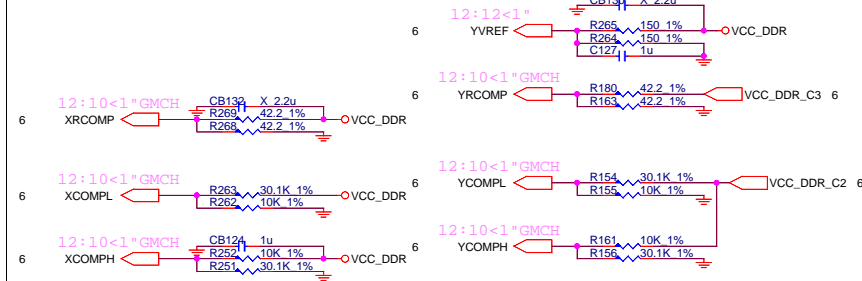
Trace length is less than 3inches to ICH5



HSWING Circuit

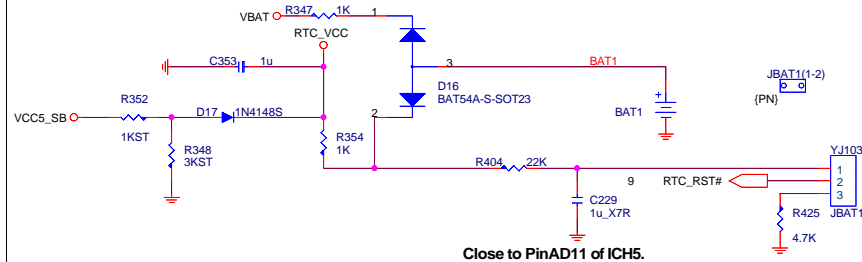


5VREF Sequencing Circuit



RTC BLOCK

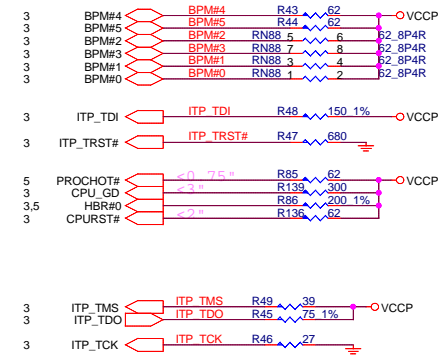
CLR CMOS
1 - 2 Normal *
2 - 3 Clear CMOS



Close to PinAD11 of ICH5.

CPU STRAPPING RESISTORS

ALL COMPONENTS CLOSE TO CPU



Micro-Star	Title MS-7037	Rev 10A
Document Number	PULL HIGH RESISTORS & RTC	
Last Revision Date: Thursday, May 27, 2004	Sheet 27	of 31

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

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

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

SIO

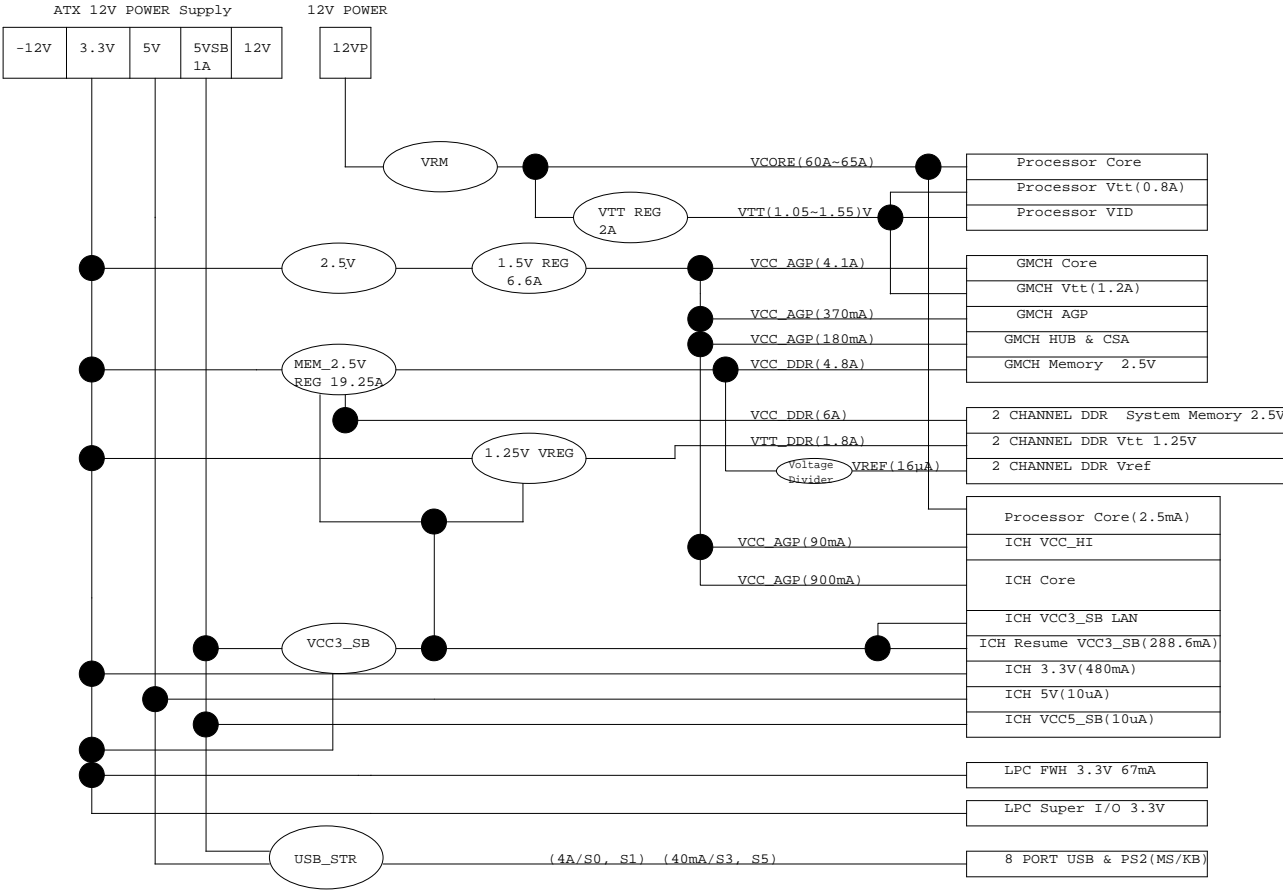
PIN NAME	USAGE	Input/Output	NOTES
GPIO10	UNUSED	INPUT	
GPIO11	UNUSED	INPUT	
GPIO12	UNUSED	INPUT	
GPIO13	UNUSED	INPUT	
GPIO14	UNUSED	OUTPUT	
GPIO15	VID5	INPUT	Low: VID add 0.0125V , High :by pass
GPIO16	UNUSED	OUTPUT	
GPIO17	UNUSED	OUTPUT	
GPIO20	UNUSED	OUTPUT	
GPIO21	SMBCLK_ISO	INPUT	SMBUS CLOCK
GPIO22	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	

PCI RESET DEVICE

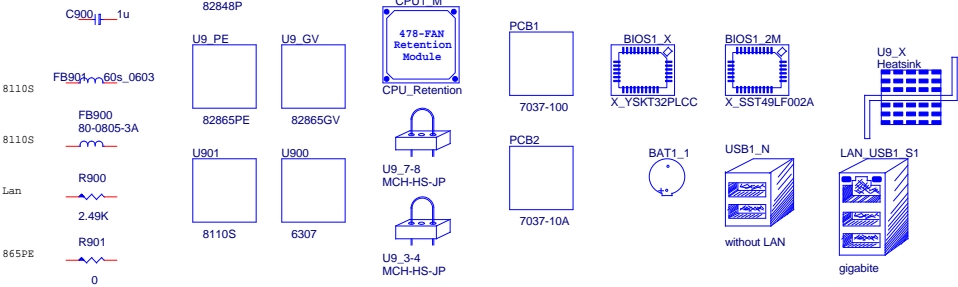
Signals	Target
PCIRST#1	LAN,1394
PCIRST#2	Super I/O,AGP slot
PCIRST#3	PCI1~3
PCIRST_ICH5#	Northbridge , FWH
HDDRST#	Primary, Scondary IDE

Micro-Star	Title MS-7037	Rev 10A
Document Number GPIO & JUMPER SETTING		
Last Revision Date: Thursday, May 27, 2004		Sheet 28 of 31

POWER DELIVERY MAP



7037 PART



TABEL-VLS	865GVM2-LS	02S
865GVM2-LS	TABEL-GFIS	
865GM3-FIS	TABEL-GLS	04S
865GM3-LS	TABEL-PILS	01S
865GM3-LS	TABEL-PILS	03S
865PEM3-ILS		

Micro-Star	Title	MS-7037	Rev	10A
Document Number				
POWER DELIVERY MAP & MANUAL PART				
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Sheet	Description

Micro-Star	Title MS-7037	Rev 10A
Document Number		
REVISION HISTORY		
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