Cover Sheet	1
Block Diagram	2
GPIO Spec.	3
Clock CY28324 & ATA100 IDE CONNECTORS	4
mPGA478-B INTEL CPU Sockets	5 - 6
INTEL Brookdale MCH -- North Bridge	7 - 8
INTEL ICH2 -- South Bridge	9 - 10
LPC I/O W83627HF	11
PCI AUDIO-CMI8738	12
AC'97 Codec	13
Audio Amp TL072 & GAME	14
FWH -- BIOS & CNR RISER	15
SDR DIMM-168PIN DIMM1,2	16
AGP 4X SLOT (1.5V)	17
PCI SLOT 1 & 2 & 3	18
Front Panel & Connectors	19
USB & FAN Connectors	20
RESERVED	21
Votlage Regulator	22
HIP6301V CPU Power (PWM)-VRM9.2	23
IO Connectors	24
Realtek RTL8100(L) LAN	25
DDR Damping	26
DDR Termination	27
DDR Termination Power	28
Jumper setting	29
Power Delivery Map	30

MS-6513

Version 0A
06/21/2001 Update

INTEL (R) Brookdale Chipset
Willamette/Northwood 478pin mPGA-B Processor Schematics

CPU:

Willamette/Northwood mPGA-478B Processor

System Brookdale Chipset:

INTEL MCH (North Bridge) +
INTEL ICH2 (South Bridge)

On Board Chipset:

BIOS -- FWH

LPC Super I/O -- W83627HF

Clock Generation -- CY28324

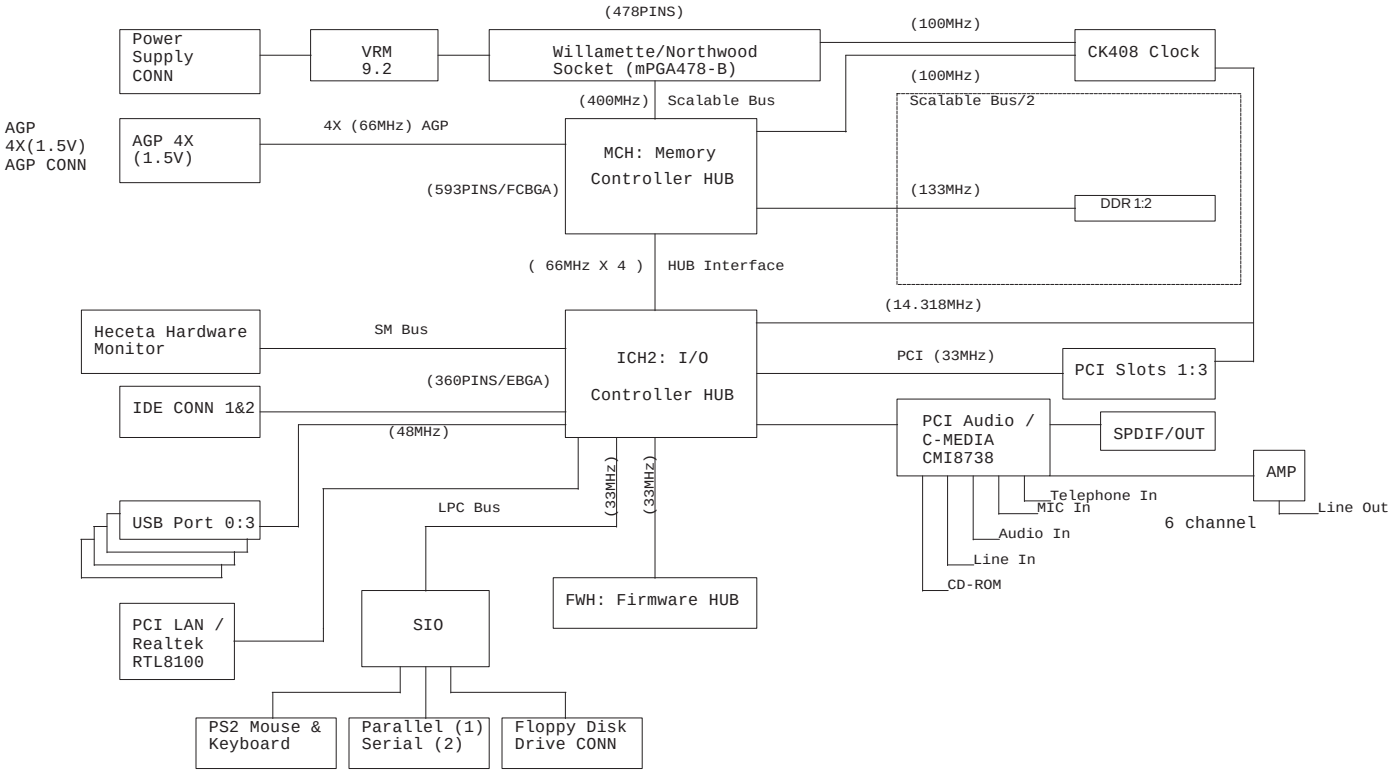
PCI SOUND -- C-MEDIA CMI8738

Expansion Slots:

AGP2.0 SLOT * 1
PCI2.2 SLOT * 3

PCI3 with two masters

Micro-Star	Title: ***MS-6513***	Rev: ***0A***
Document Number: Cover Sheet		
Last Revision Date: Thursday, June 21, 2001	Sheet 1 of 35	



Micro-Star	Title: MS-6513	Rev: 0A
Document Number: Block Diagram		
Last Revision Date: Thursday, June 21, 2001	Sheet 2 of 35	

General Purpose I/O Spec.

ICH2

GPIO Pin	Type	Function
GPIO 0	I	Non Connect
GPIO 1	I	Non Connect
GPIO 2~4	I	Not Implemented
GPIO 5	I	Non Connect
GPIO 6	I	Non Connect
GPIO 7	I	None
GPIO 8	I	LAN Wake Up
GPIO 9	I	AC'97 Serial Data In
GPIO 10	I	Non Connect
GPIO 11	I	Non Connect
GPIO 12	I	External SMI
GPIO 13	I	LPC PME
GPIO 14~15	I	Not Implemented
GPIO 16	O	Non Connect
GPIO 17	O	Non Connect
GPIO 18	O	Not Implemented
GPIO 19	O	Not Implemented
GPIO 20	O	Not Implemented
GPIO 21	O	Not Implemented
GPIO 22	O	Non
GPIO 23	OD	BIOS Locked/Unlocked
GPIO 24	O	Non
GPIO 25	O	Non
GPIO 26	O	Non
GPIO 27	I/O	Non
GPIO 28	I/O	non
GPIO 29~31	I/O	Not Implemented

FWH

GPIO Pin	Type	Function
GPI 0	I	ATA IDE 1 Detect
GPI 1	I	ATA IDE 2 Detect
GPI 2	I	Reserved
GPI 3	I	Reserved

DLED-Super I/O

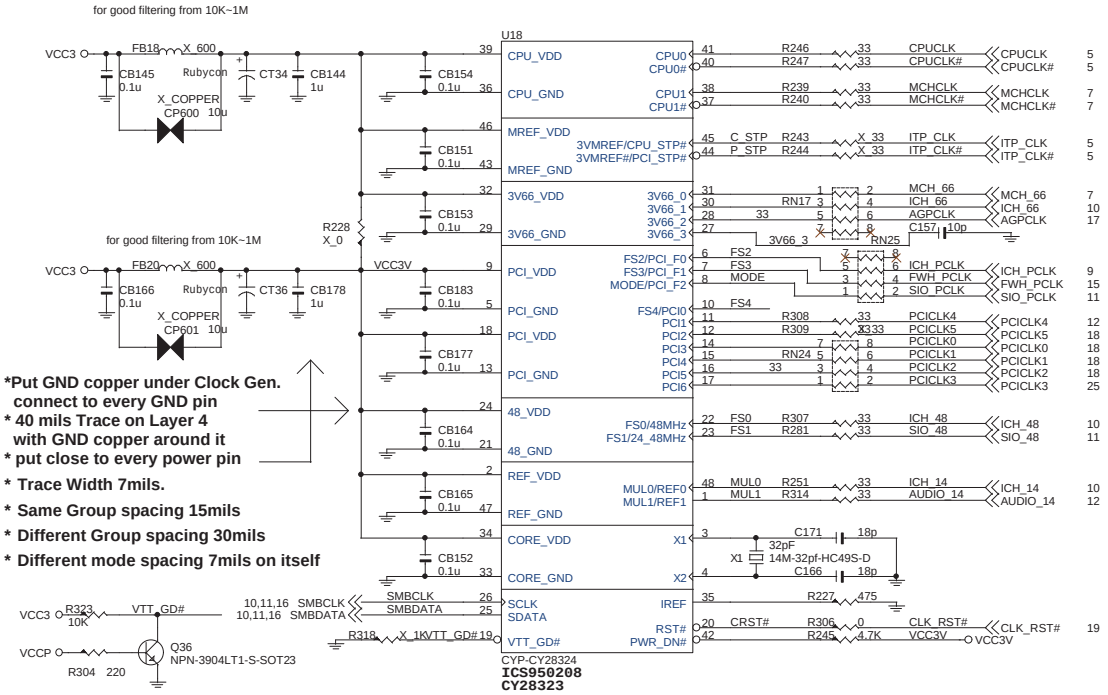
GPIO Pin	Type	Function
GP32	I/OD	Not Implemented
GP24	I/OD	Not Implemented
GP34	I/OD	Not Implemented
GP33	I/OD	Not Implemented

DEVICE	ICH INT Pin	IDSEL
PCI Slot 1	INTA# INTB# INTC# INTD#	AD16
PCI Slot 2	INTB# INTC# INTD# INTA#	AD17
PCI Slot 3	INTC# INTD# INTA# INTB#	AD18 AD19
PCI Audio	INTD#/INTE# INTA# INTB# INTC#	AD23
PCI Lan	INTC#/INTF# INTD# INTA# INTB#	AD22

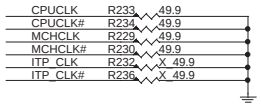
Micro-Star	Title: MS-6513	Rev: 0A
Document Number: GPIO Spec.		
Last Revision Date: Thursday, June 21, 2001	Sheet 3 of 35	

CLOCK GENERATOR BLOCK

*Trace less 0.5"



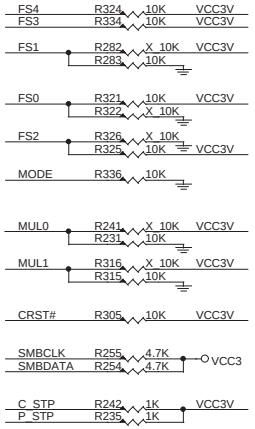
Shut Source Termination Resistors



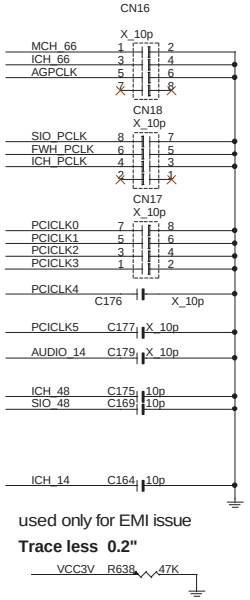
Trace less 0.2"

49.9ohm for 50ohm M/B impedance

CLOCK STRAPPING RESISTORS



Pull-Down Capacitors



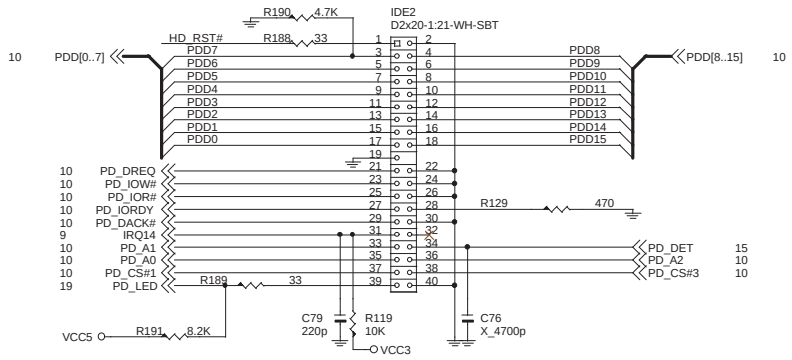
used only for EMI issue

Trace less 0.2"

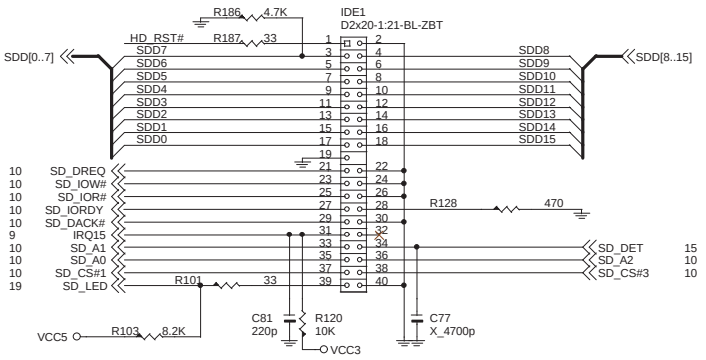
VCC3V R638 47K

ATA100 IDE CONNECTORS

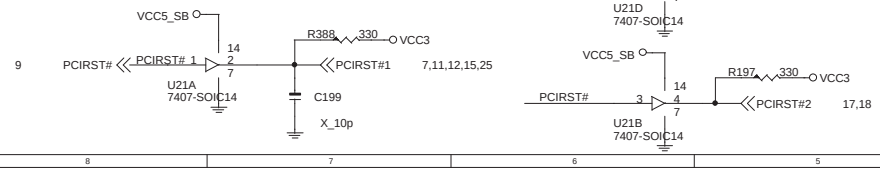
PRIMARY IDE BLOCK



SECONDARY IDE BLOCK

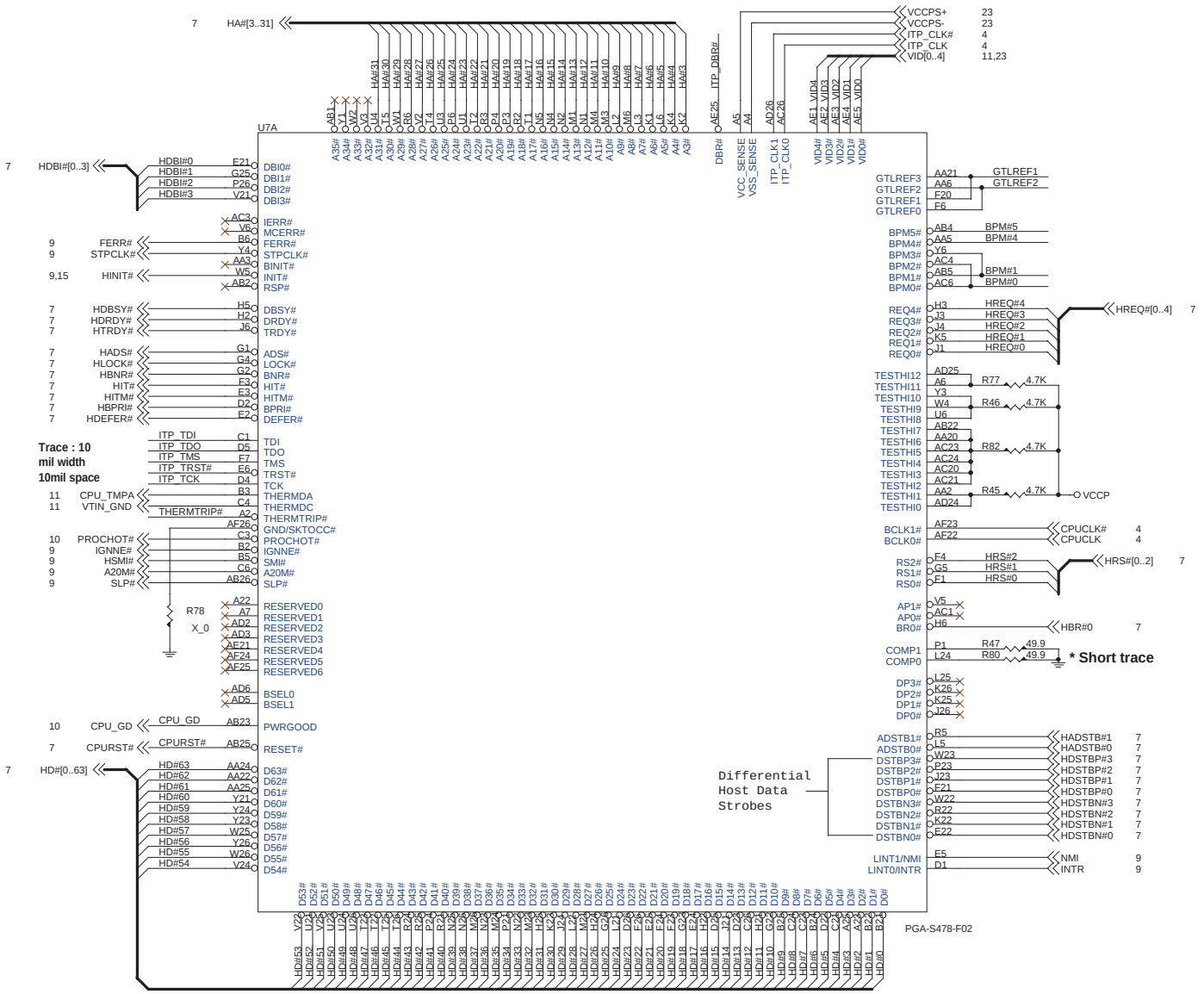


RESET BLOCK

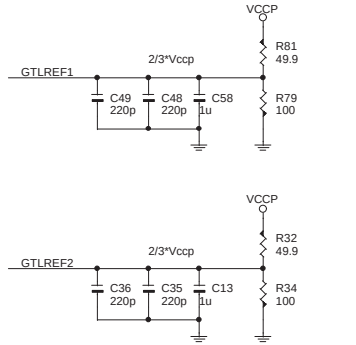


Micro-Star	Title: MS-6513	Rev: 0A
Document Number: Clock CY28323/4 & ATA100 IDE		
Last Revision Date: Friday, June 15, 2001	Sheet 4 of 35	

CPU SIGNAL BLOCK

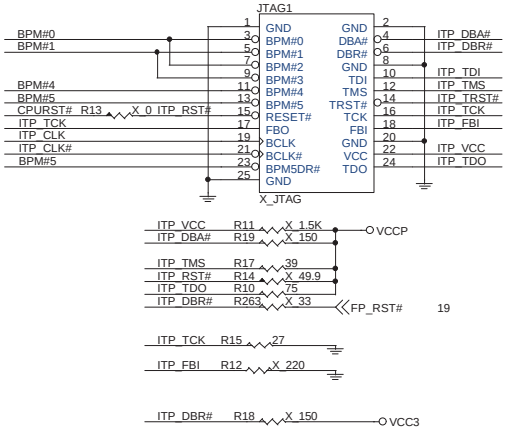


CPU GTL REFERNCE VOLTAGE BLOCK

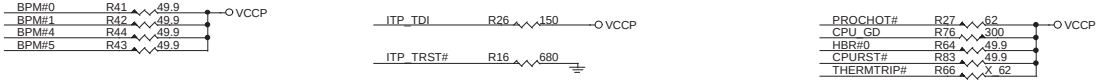


Every pin put one 220pF cap near it.
Trace Width 15mils, Space 15mils.
Keep the voltage dividers within 1.5 inches of the first GTLREF Pin

CPU ITP BLOCK

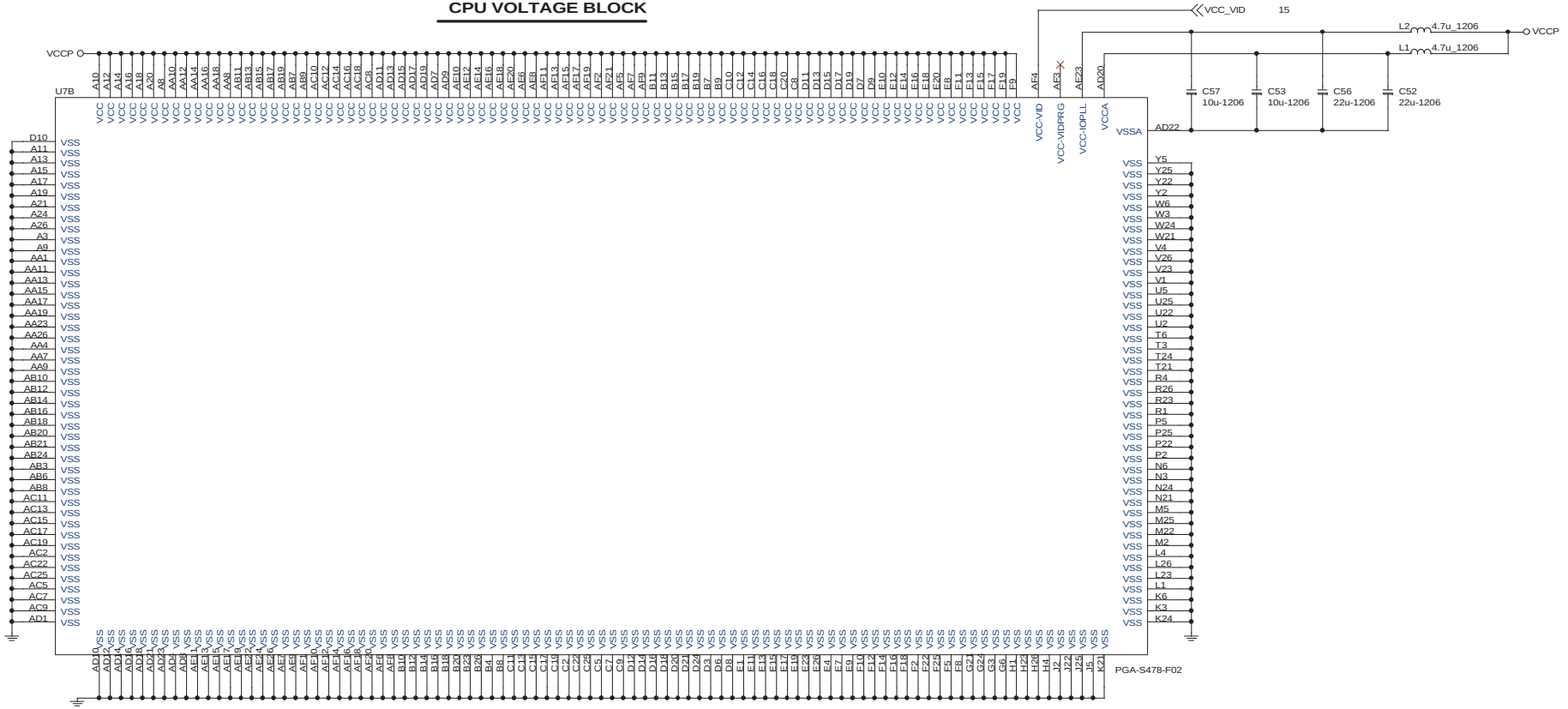


CPU STRAPPING RESISTORS

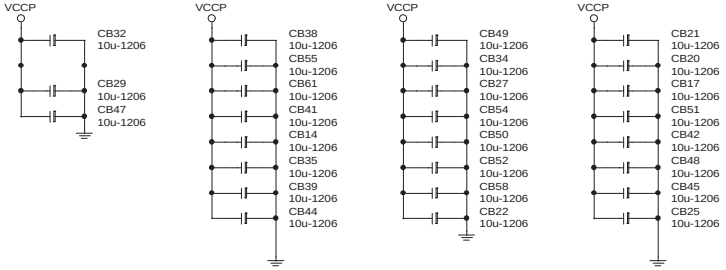


Micro-Star	Title: MS-6513	Rev: 0A
Document Number: INTEL mPGA478-B CPU1		
Last Revision Date: Friday, June 15, 2001	Sheet 5 of 35	

CPU VOLTAGE BLOCK

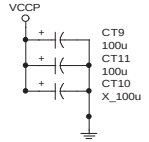


CPU DECOUPLING CAPACITORS



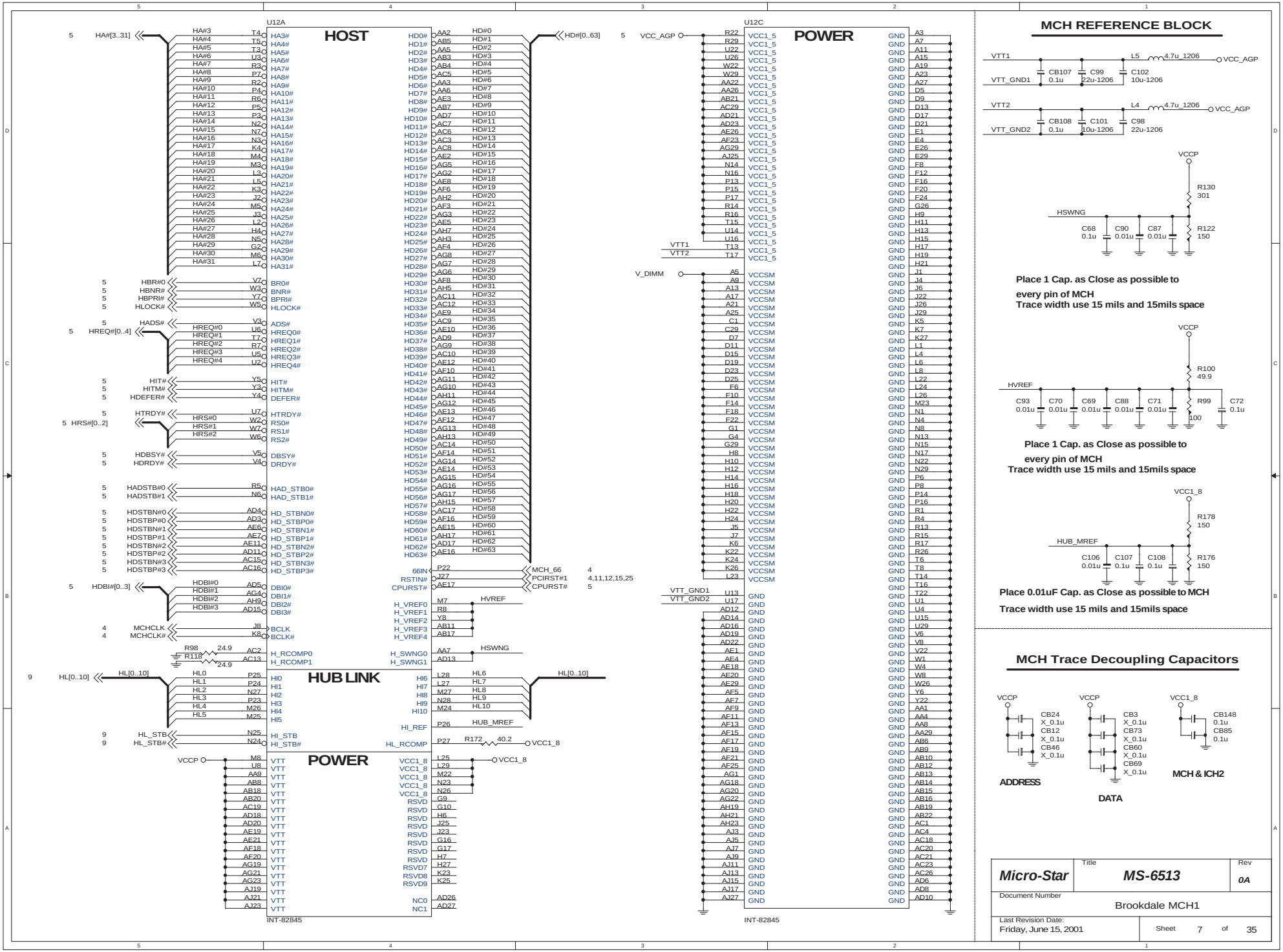
PLACE CAPS WITHIN CPU CAVITY

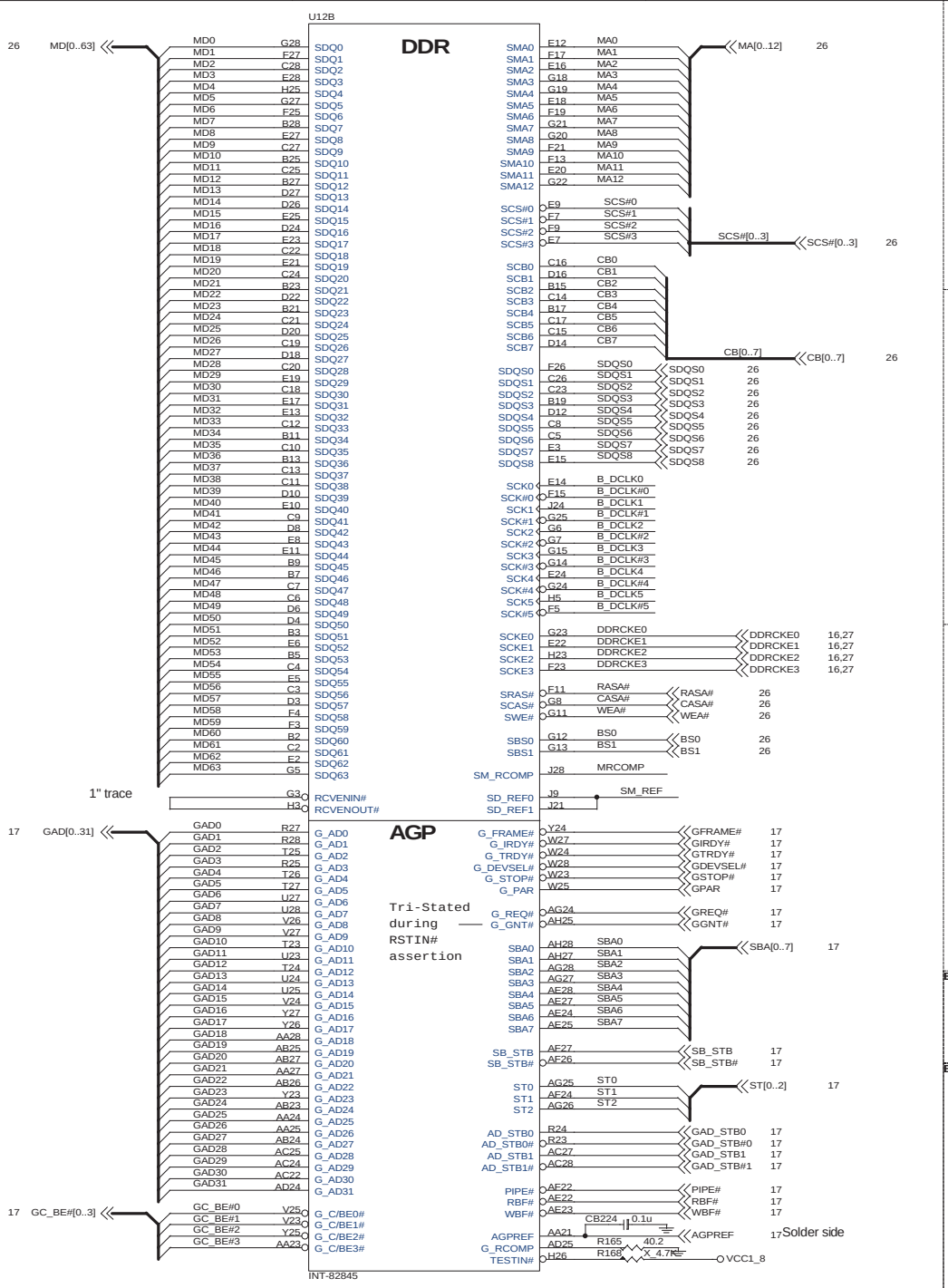
CPU DECOUPLING CAPACITORS



PLACE CAPS WITHIN CPU CAVITY SOLDER

Micro-Star	Title: MS-6513	Rev: 0A
Document Number: INTEL mPGA478-B CPU2		
Last Revision Date: Friday, June 15, 2001	Sheet 6 of 35	


U12A
HOST
HA#[3..31]
HD#[0..63]
HBR#0
HBNR#
HBPRI#
HLOCK#
HADS#
HREQ#[0..4]
HIT#
HITM#
HDEFER#
HTRDY#
HRS#[0..2]
HDBSY#
HDRDY#
HADSTB#0
HADSTB#1
HDSTBN#0
HDSTBP#0
HDSTBN#1
HDSTBP#1
HDSTBN#2
HDSTBP#2
HDSTBN#3
HDSTBP#3
HDBI#[0..3]
MCHCLK
MCHCLK#
R98 24.9
R118 24.9
HL[0..10]
HL_STB
HL_STB#
VCCP
INT-82845
HUB LINK
HL[0..10]
HI_REF
HUB_MREF
R172 40.2
VCC1_8
POWER
VCC1_8
66IN
RSTIN#
CPURST#
MCH_66
PCIRST#1
CPURST#
4,11,12,15,25
5
H_VREF0
H_VREF1
H_VREF2
H_VREF3
H_VREF4
HVREF
H_SWNG0
H_SWNG1
HSWNG
H_RCOMP0
H_RCOMP1
U12C
POWER
VCC_AGP
V_DIMM
VTT1
VTT2
VCC1_5
VCCSM
VTT
RSVD
NC0
NC1
GND
INT-82845
MCH REFERENCE BLOCK
VTT1
VTT_GND1
CB107 0.1u
C99 22u-1206
C102 10u-1206
L5 4.7u_1206
VCC_AGP
VTT2
VTT_GND2
CB108 0.1u
C101 10u-1206
C98 22u-1206
L4 4.7u_1206
VCCP
R130 301
HSWNG
C68 0.1u
C90 0.01u
C87 0.01u
R122 150
Place 1 Cap. as Close as possible to every pin of MCH
Trace width use 15 mils and 15mils space
R100 49.9
HVREF
C93 0.01u
C70 0.01u
C69 0.01u
C88 0.01u
C71 0.01u
R99 100
C72 0.1u
Place 1 Cap. as Close as possible to every pin of MCH
Trace width use 15 mils and 15mils space
VCC1_8
R178 150
HUB_MREF
C106 0.01u
C107 0.1u
C108 0.1u
R176 150
Place 0.01uF Cap. as Close as possible to MCH
Trace width use 15 mils and 15mils space
MCH Trace Decoupling Capacitors
CB24 X_0.1u
CB12 X_0.1u
CB46 X_0.1u
ADDRESS
CB3 X_0.1u
CB73 X_0.1u
CB60 X_0.1u
CB69 X_0.1u
DATA
CB148 0.1u
CB85 0.1u
MCH & ICH2
Micro-Star
Title
MS-6513
Rev
0A
Document Number
Brookdale MCH1
Last Revision Date:
Friday, June 15, 2001
Sheet 7 of 35



close MCH

5/23 update

DDR_VTT

R500 30

MRCOMP

C500 0.1u

MCH REFERENCE VOLTAGE

DIMMREF

SM_REF

Solder side C95 0.1u C97 0.1u

MCH MEMORY CLOCK RC CIRCUITS

RN538

B_DCLK#1	DCLK#1	DCLK#1	16,26
B_DCLK1	DCLK1	DCLK1	16,26
B_DCLK#4	DCLK#4	DCLK#4	16,26
B_DCLK4	DCLK4	DCLK4	16,26

0

RN539

B_DCLK3	DCLK3	DCLK3	16,26
B_DCLK#3	DCLK#3	DCLK#3	16,26
B_DCLK0	DCLK0	DCLK0	16,26
B_DCLK#0	DCLK#0	DCLK#0	16,26

0

RN540

B_DCLK2	DCLK2	DCLK2	16,26
B_DCLK#2	DCLK#2	DCLK#2	16,26
B_DCLK#5	DCLK#5	DCLK#5	16,26
B_DCLK5	DCLK5	DCLK5	16,26

0

MCH DECOUPLING CAPACITOR

VCCP: CB93 1u, CB98 0.1u, CB94 0.1u, CB97 0.1u, CB100 0.01u, CB96 10u-1206, CB90 10u-1206

VCC1_8: CB117 1u, CB116 0.1u

VCC_AGP: CB114 0.1u, CB115 0.1u, CB126 0.1u, CB118 0.1u, CB106 0.1u

V_DIMM: CB89 0.1u, CB76 0.1u, CB101 0.1u, CB86 0.1u, CB78 0.1u, CB84 0.1u, CB81 0.1u

EMI

VCC5: C211 0.1u, C208 0.1u, C8 0.1u

V_DIMM: C21 0.1u

VCC5

C105 0.1u, C104 X_1u — AGPREF

BACK

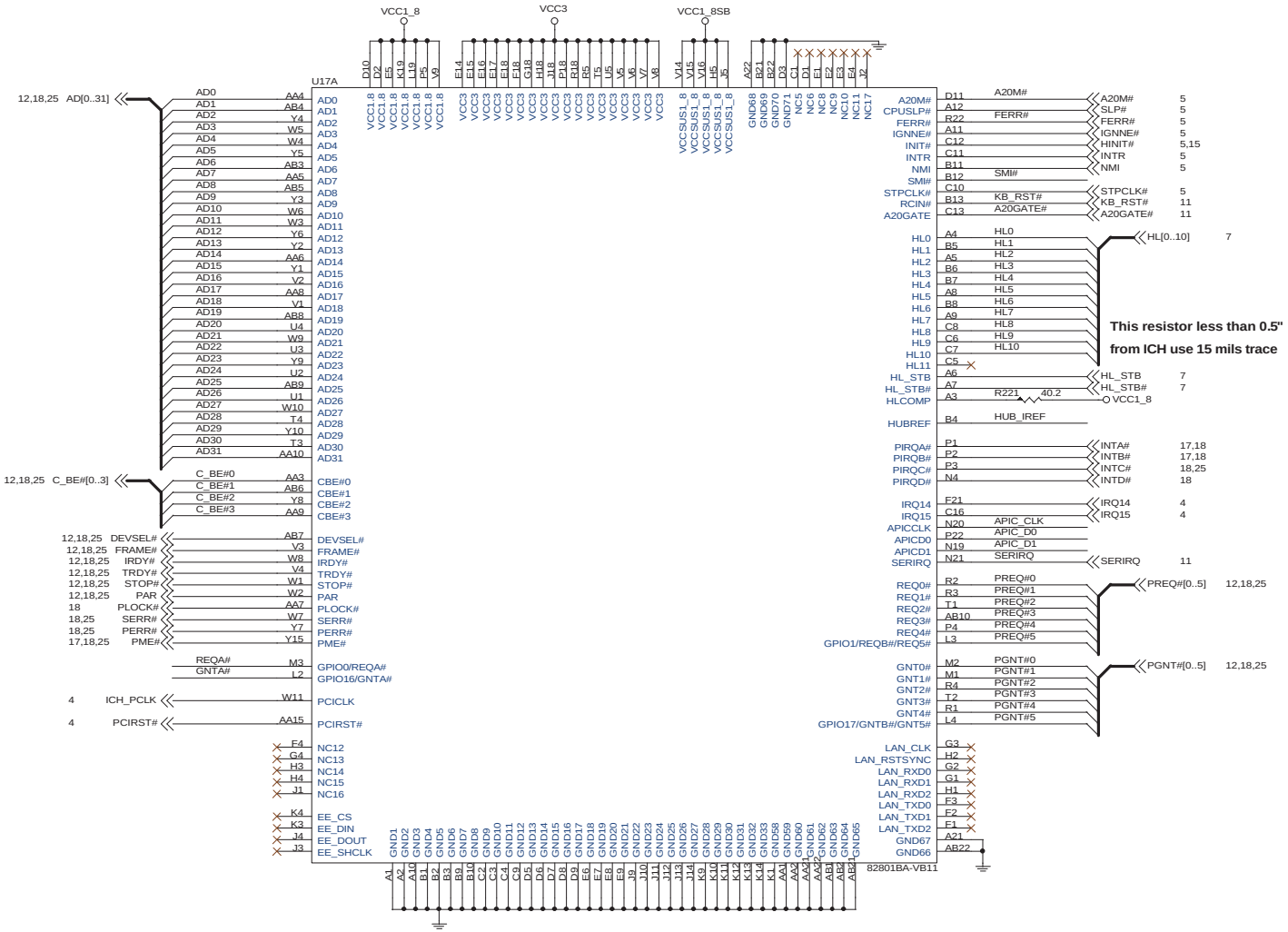
VCCP: CB219 0.1u

V_DIMM: CB225 0.1u, CB221 0.1u

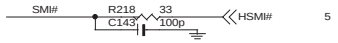
VCC_AGP: CB222 0.1u, CB220 0.1u, CB227 0.1u, CB223 0.1u, CB226 0.1u

Micro-Star	Title: MS-6513	Rev: 0A
Document Number: Brookdale MCH 2		
Last Revision Date: Friday, June 15, 2001	Sheet 8 of 35	

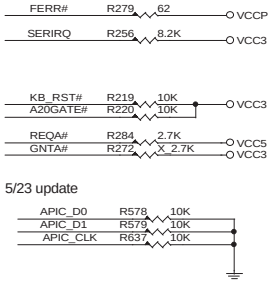
ICH2 PCI / HUB LINK / CPU / LAN / INTERRUPT SIGNALS



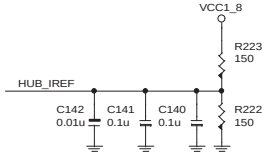
ICH2 SMI# SIGNAL



ICH2 STRAPPING RESISTORS



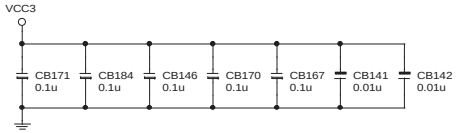
ICH2 REFERENCE VOLTAGE



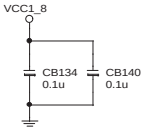
Place Cap. as Close as possible to ICH2

Trace width use 15 mils and 15mils space

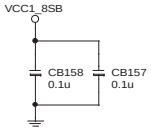
ICH2 DECOUPLING CAPACITORS



Place one 0.1U/0.01U pair in each corner and 2 on opposite sides close to ICH2 if it fit



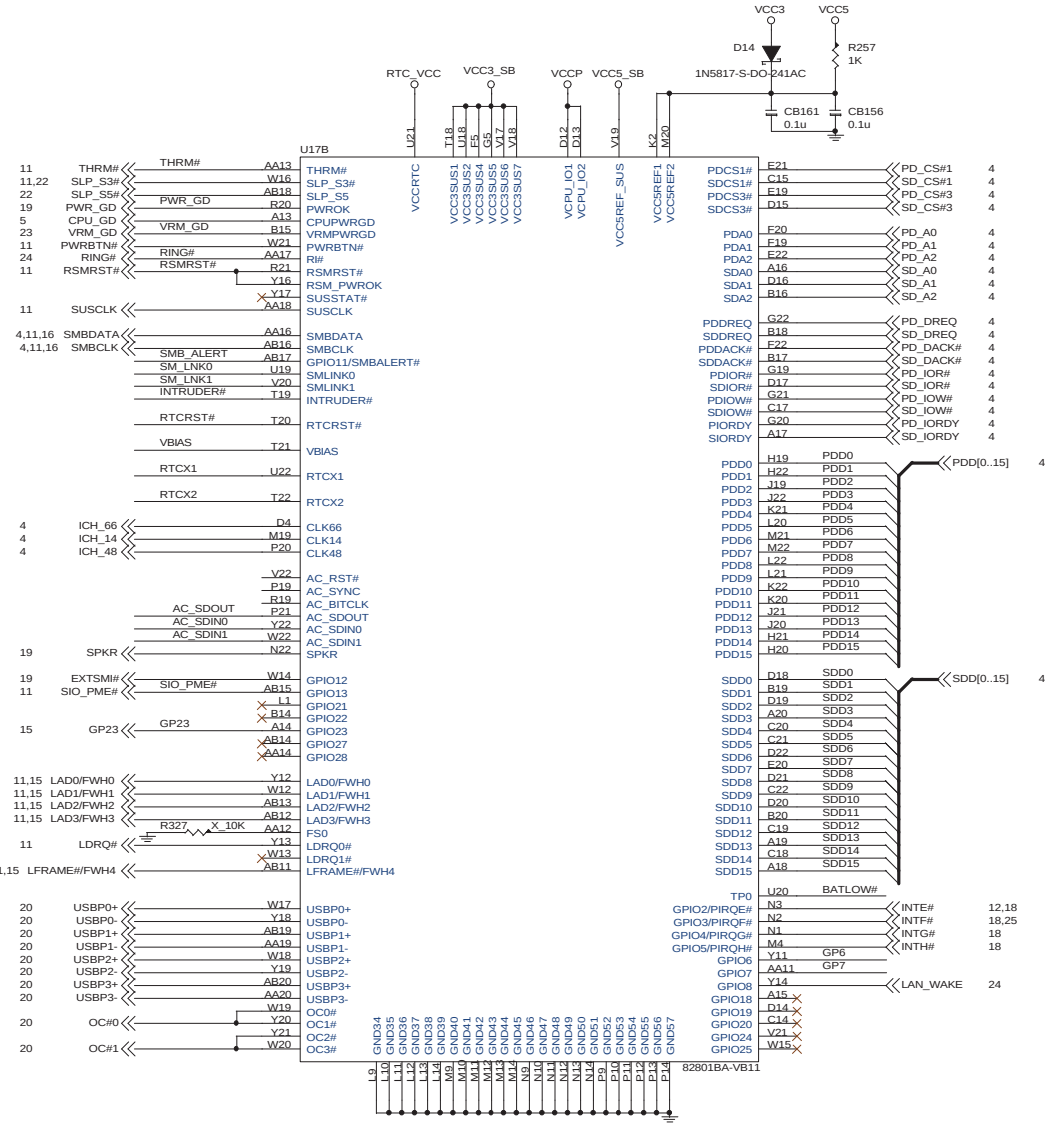
Distribute near the 1.8V power pin of the ICH2



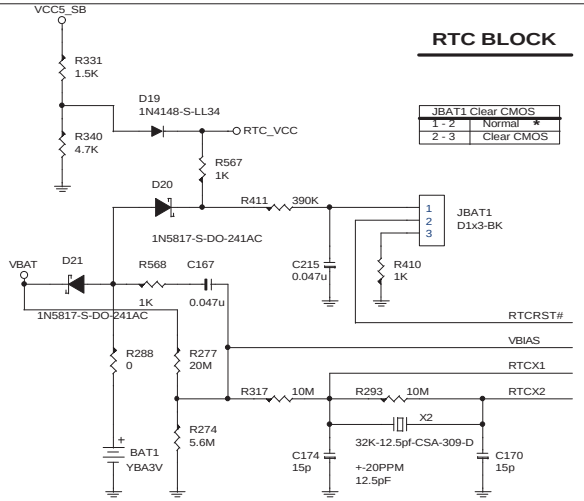
Distribute near the VCC1_8SB Power pin of the ICH2

Micro-Star	Title: **MS-6513**	Rev: **0A**
Document Number:	Brookdale ICH2 PCI	
Last Revision Date: Friday, June 15, 2001	Sheet 9 of 35	

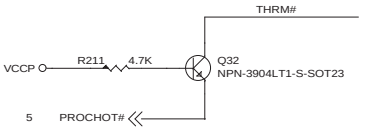
ICH2 ASIC / RTC / AC'97 / GPIO / LPC / USB / IDE SIGNALS



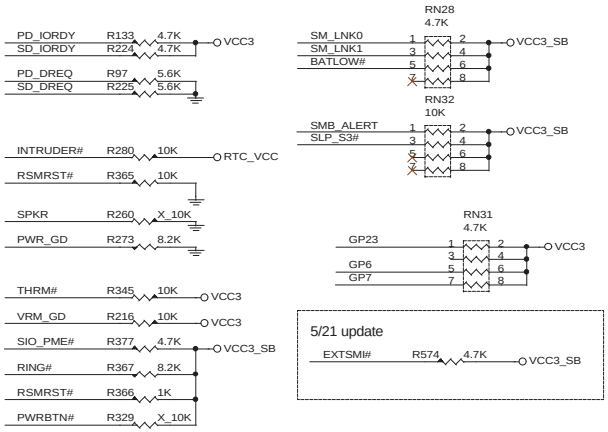
RTC BLOCK



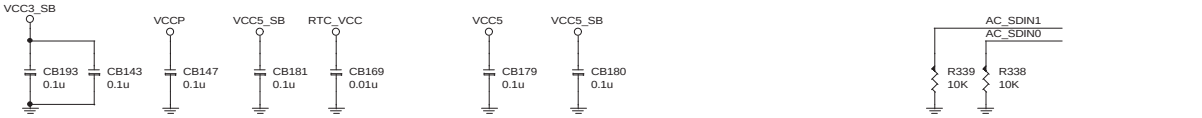
PROCHOT BLOCK



ICH2 STRAPPING RESISTORS



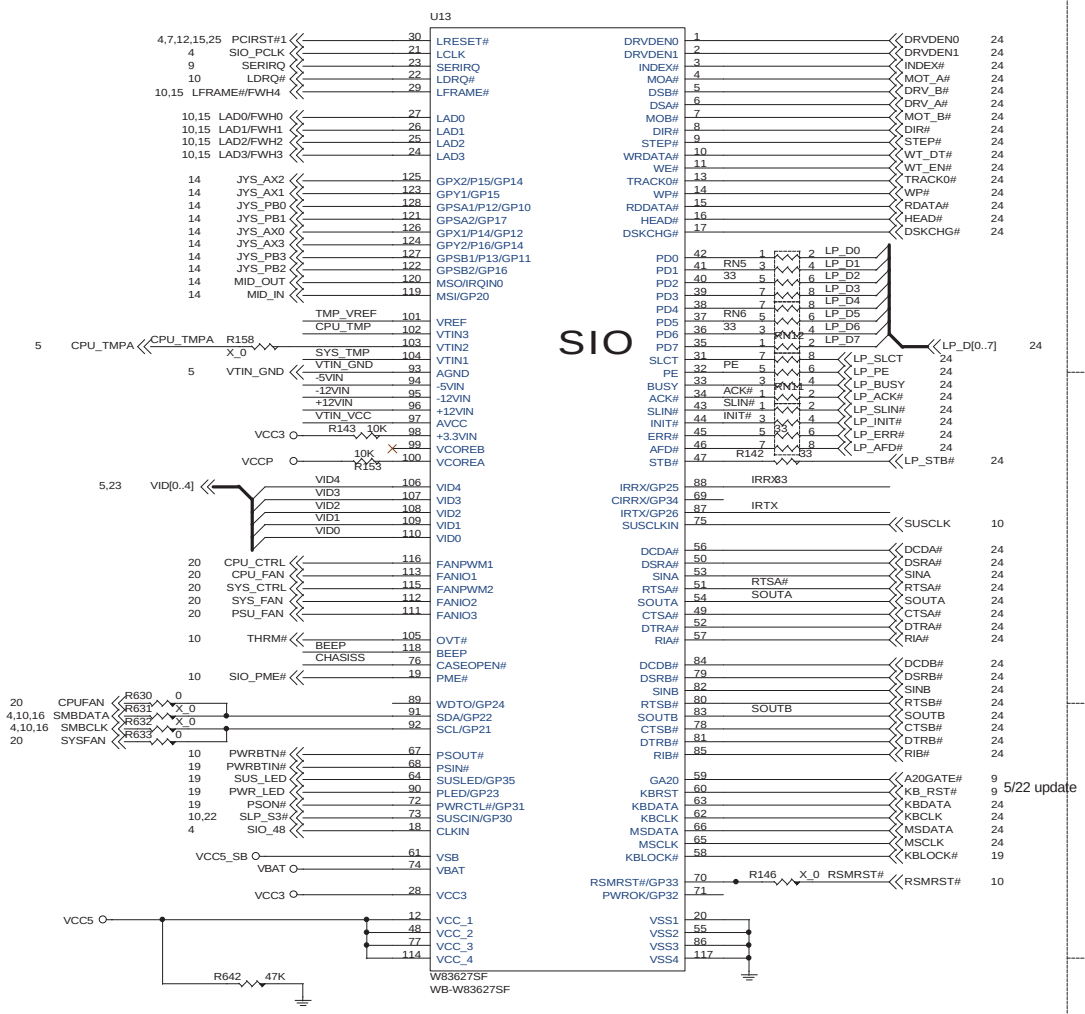
ICH2 DECOUPLING CAPACITOR



Distribute near the VCC3_SB power pin of the ICH

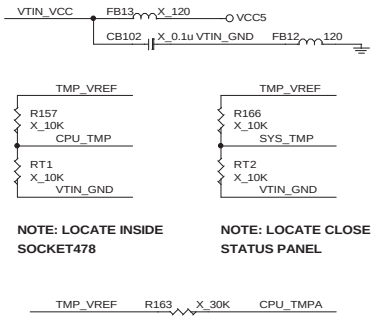
Micro-Star	Title: MS-6513	Rev: 0A
Document Number: Brookdale ICH2 Other		
Last Revision Date: Friday, June 15, 2001	Sheet 10 of 35	

LPC SUPER I/O W83627HF



5/22 update

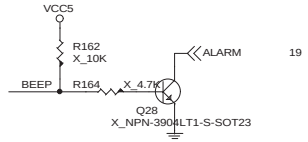
THERMAL RESISTOR BLOCK



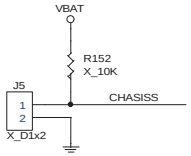
NOTE: LOCATE INSIDE SOCKET478

NOTE: LOCATE CLOSE STATUS PANEL

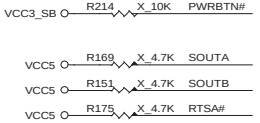
SPEAKER BLOCK



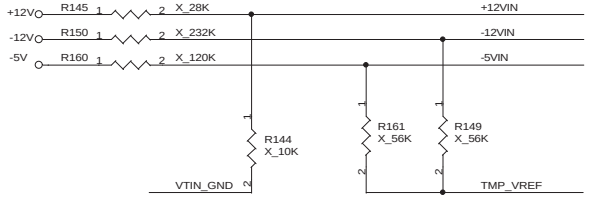
CHASSIS INTRUSION HEADER



SUPER I/O STRAPPING RESISTOR

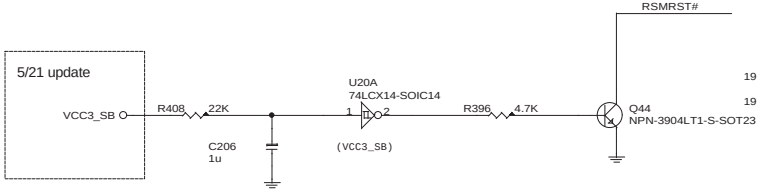


SOUTA	L: Disable KBC	H: Enable KBC
SOUTB	L: 24MHZ	H: 48MHZ
RTSA#	L: CFAD=2E	H: CFAD=4E
DTRA#	L: PNP Default	H: PNP no Default

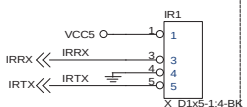


RESUME RESET CIRCUIT BLOCK

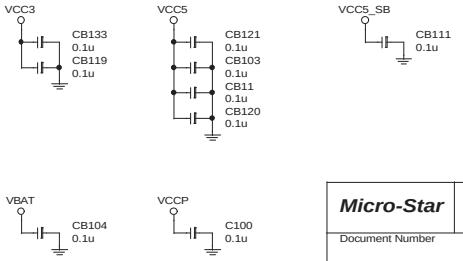
Stuff all for D Version bug



IR HEADER



DECOUPLING CAPACITOR



Micro-Star	Title: MS-6513		Rev: 0A
Document Number: LPC I/O W83627HF			
Last Revision Date: Friday, June 15, 2001		Sheet 11 of 35	

C-MEDIA CMI8378 PCI AUDIO

6/8 update

SPDIF OUT

J600
R600 390 C600 1u-0805
R601 100
JACK+RCA-D3-SB-YL
J601
C601 1u-0805
R604 10K
R602 4.7K
R603 4.7K
JACK+RCA-D3-SB-YL

SPDIF IN

6/8 update

OPTICAL

+12V
JSPDIF1
SPDIFI
SPDIF2
SPDIFO
SPGPIO
X_D2x4-BK

Popular R622 to disable H/W audio

DVDD
R623
X_4.7K
XMBCSZ

+5VR
EECS R297 4.7K

Internal ID Selection

4 Channal need 270P CAP

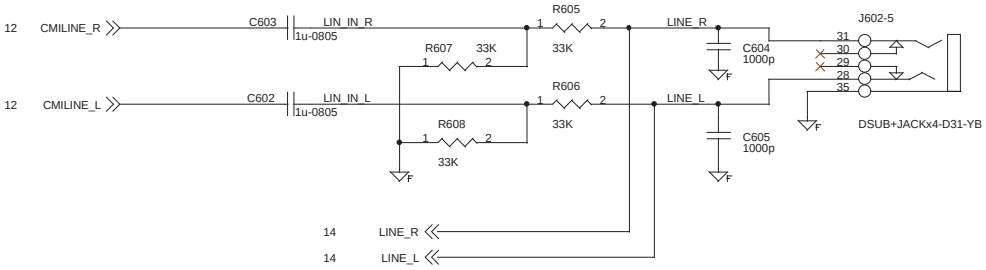
6 Channal NC 104P CAP

6 Channal Chipset use 3.3V

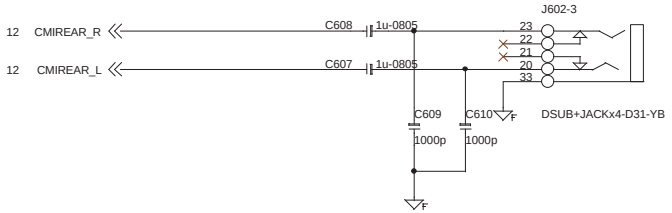
U19
CMI8738

Micro-Star	Title: MS-6513
	Rev: 0A
Document Number	CMI8738 PCI AUDIO
Last Revision Date: Friday, June 15, 2001	Sheet 12 of 35

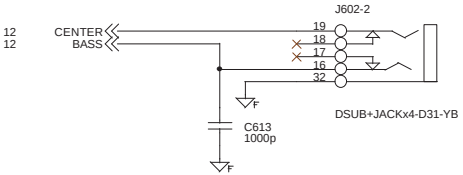
LINE-IN JACK



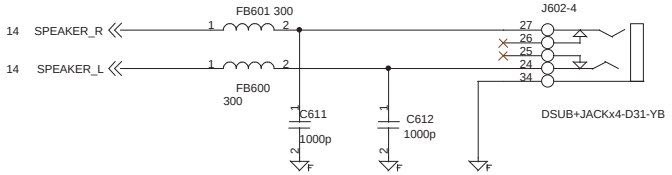
REAL JACK



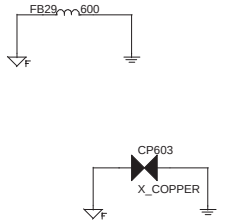
CENTER/BASS JACK



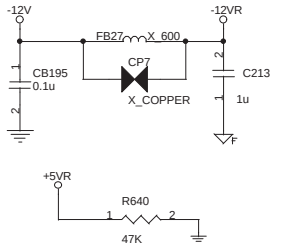
SPEAKER OUT JACK



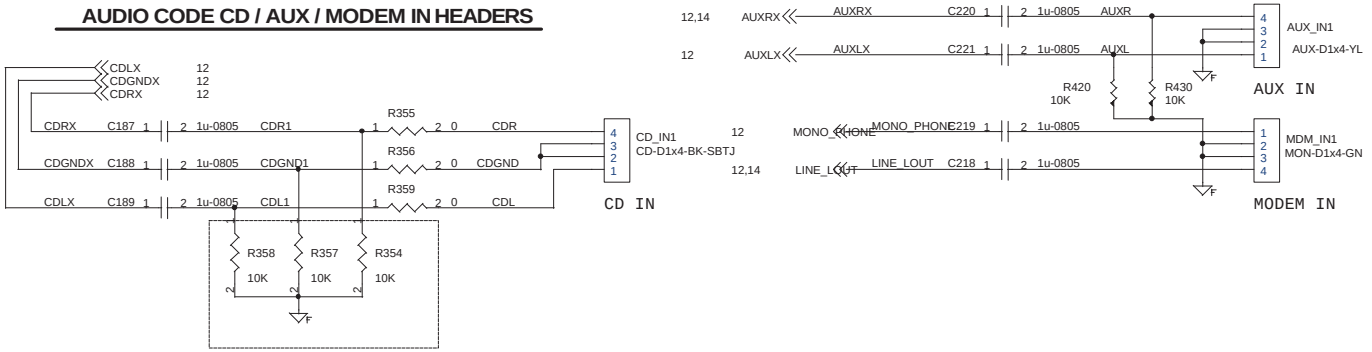
DECOUPLING CAPACITOR

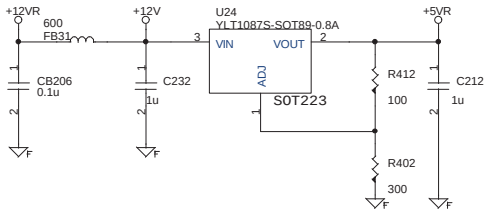


AUDIO CODE REGULATORS



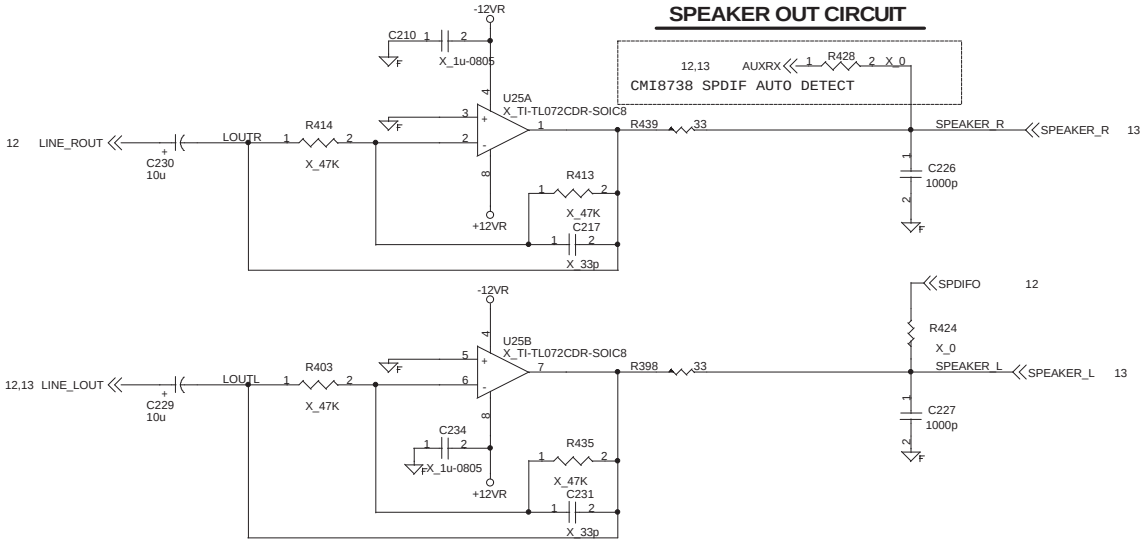
AUDIO CODE CD / AUX / MODEM IN HEADERS



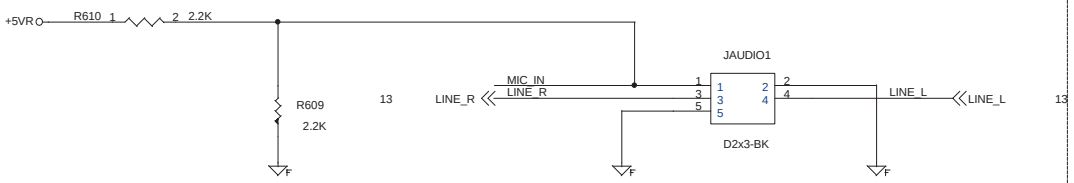


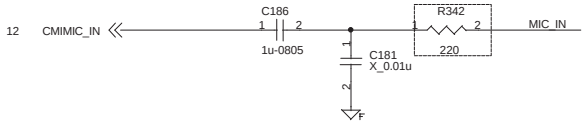
Micro-Star	Title: MS-6513	Rev: 0A
Document Number: AC97 CODEC AD1885		
Last Revision Date: Friday, June 15, 2001	Sheet 13 of 35	

SPEAKER OUT CIRCUIT

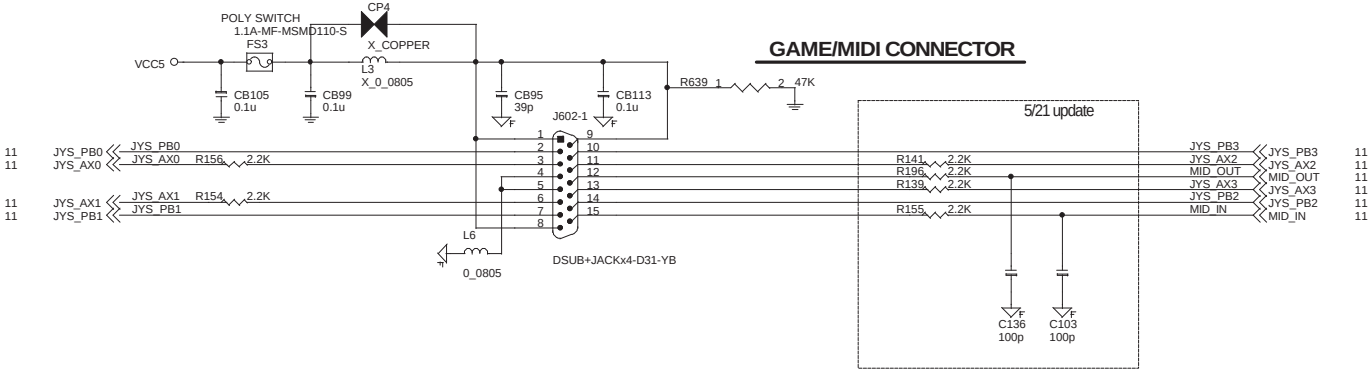


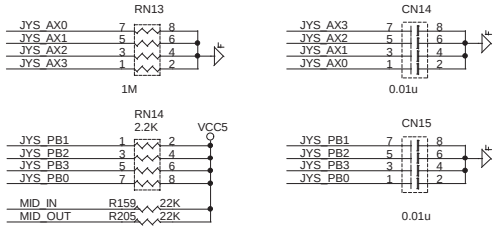
FOR MSI INTERNAL HEADER





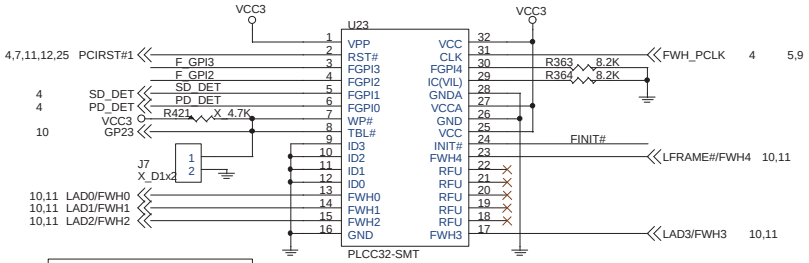
GAME/MIDI CONNECTOR





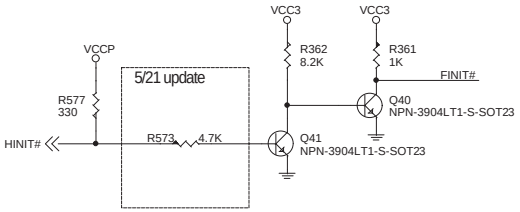
Micro-Star	Title: MS-6513	Rev: 0A
Document Number: Audio Amp TL072 & GAME		
Last Revision Date: Friday, June 15, 2001	Sheet 14 of 35	

Firware Hub (FWH)

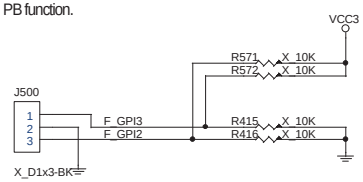


J7 BIOS Update	
SHORT	Locked
OPEN	Unlocked *

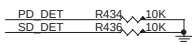
FWH INIT Signal Voltage Translation Block



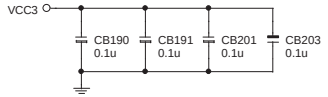
5/16 update
For PB function.



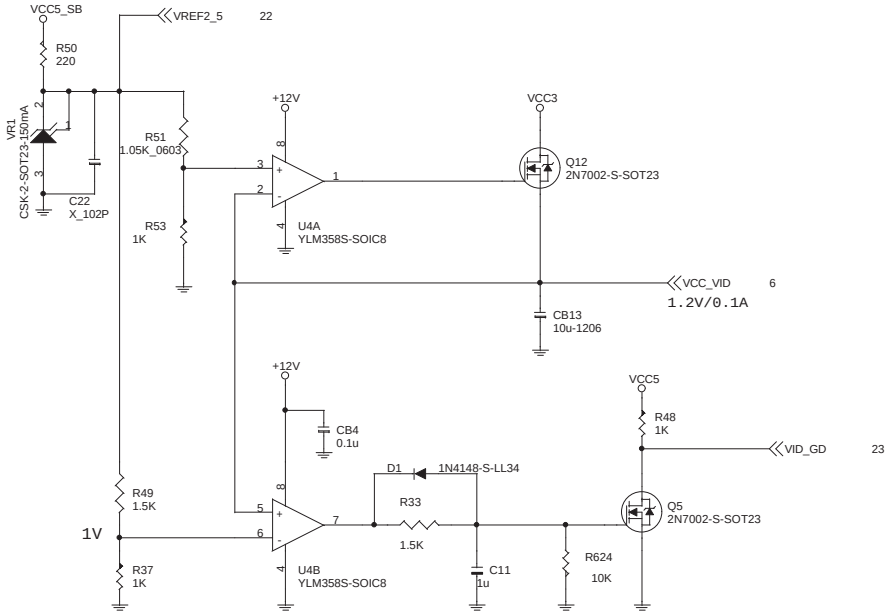
FWH RESISTORS

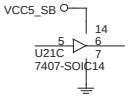


FWH DECOUPLING CAPACITORS

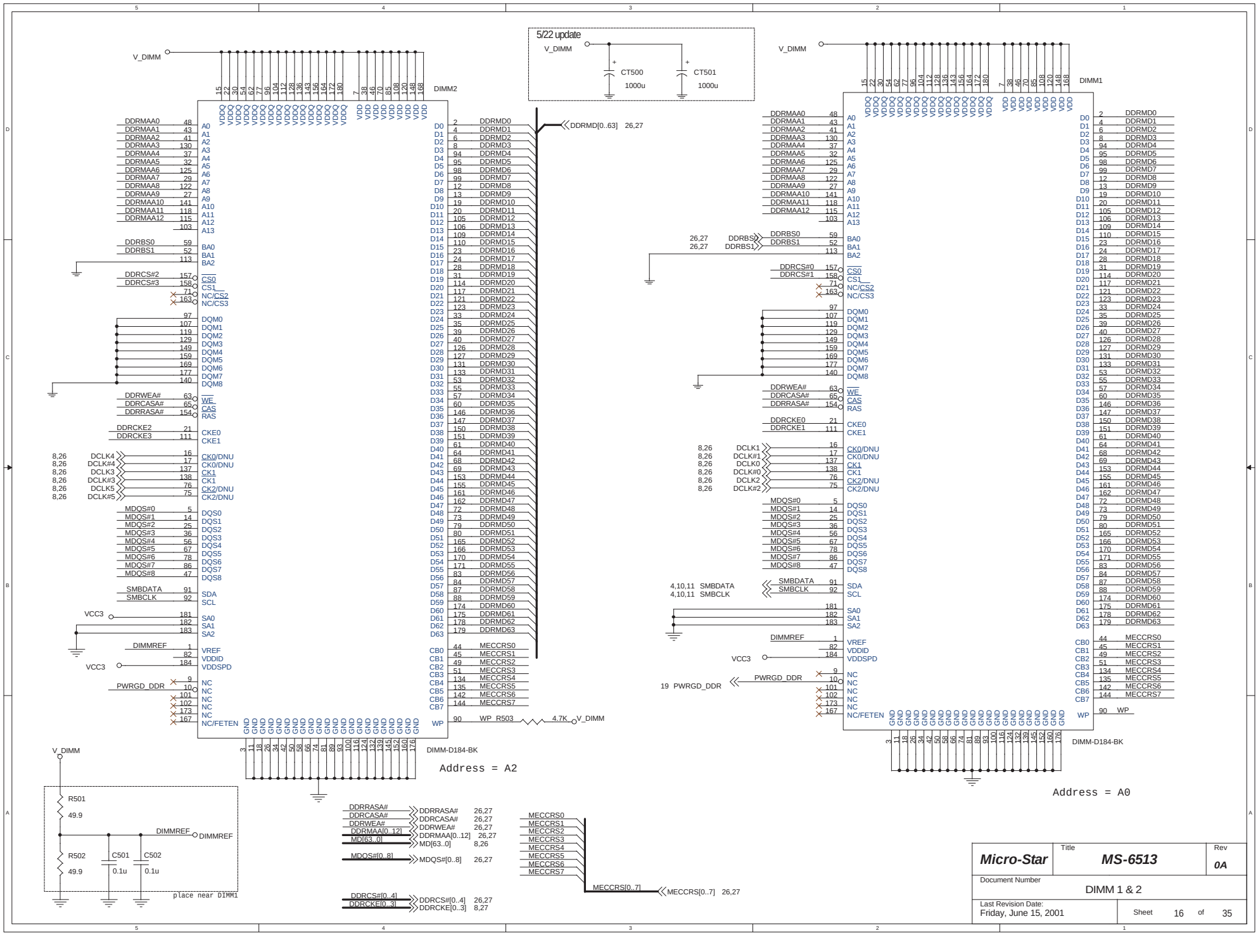


VCC_VID / VID_GOOD





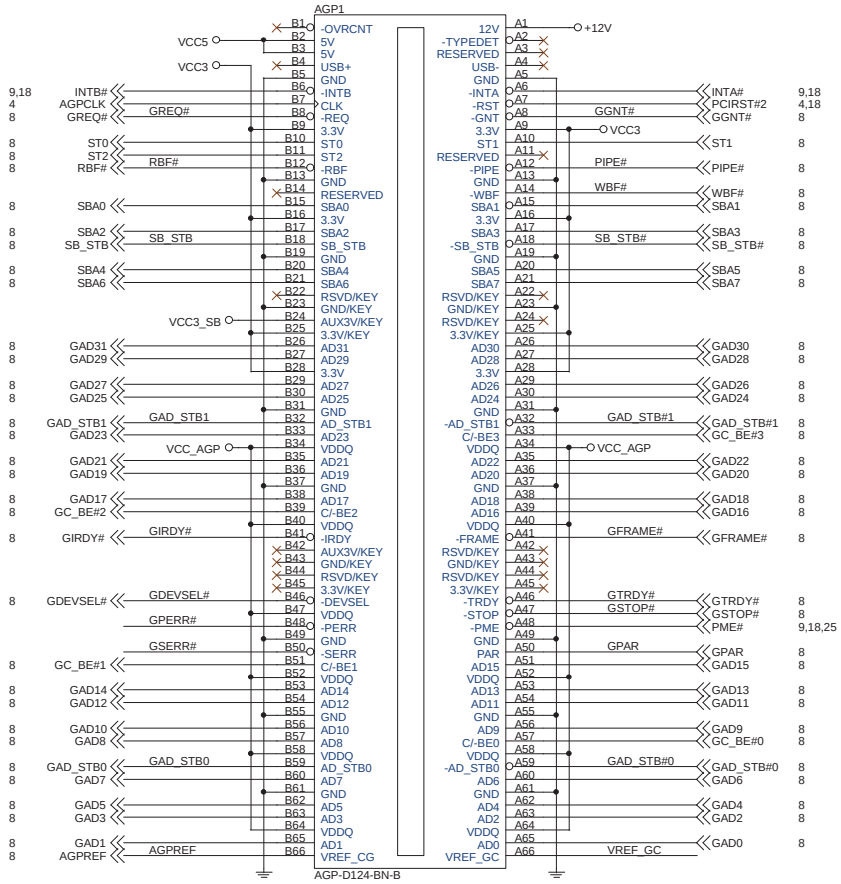
Micro-Star	Title: MS-6513	Rev: 0A
Document Number: FWH & AC'97 Enabled/Disabled control/VID		
Last Revision Date: Friday, June 15, 2001	Sheet 15 of 35	



Micro-Star	Title: MS-6513		Rev: 0A
Document Number: DIMM 1 & 2			
Last Revision Date: Friday, June 15, 2001		Sheet 16 of 35	

AGP UNIVERSAL 2X/4X SLOT(AGP VER:2.0 COMPLY)

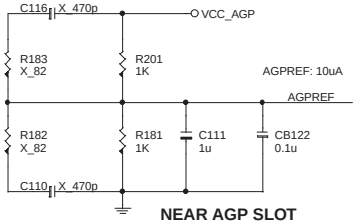
VCC5 = 60mils trace / 15 mils space



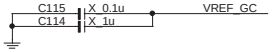
AGP Slot Imax	
VCC_AGP	8.0A
VCC3	6.0A
VCC12	1.0A
VCC5	2.0A

INTA#
INTB#

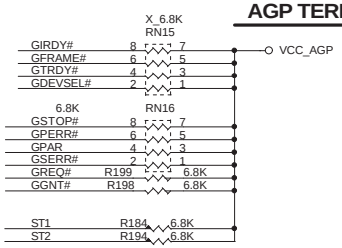
AGP SIGNAL REFERENCE CIRCUIT

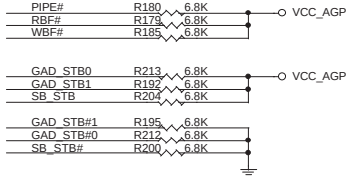


NEAR AGP SLOT

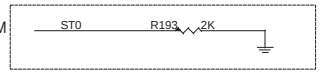


AGP TERMINATION RESISTORS





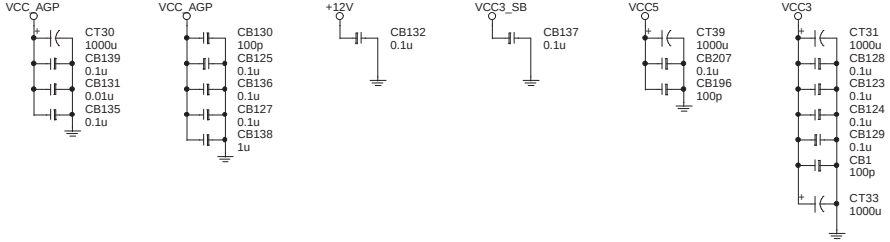
5/23 update
HI: SDRAM
LO:DDR



LESS 10MILS STUB TRACE LENGTH MUST BE FOLLOWING.

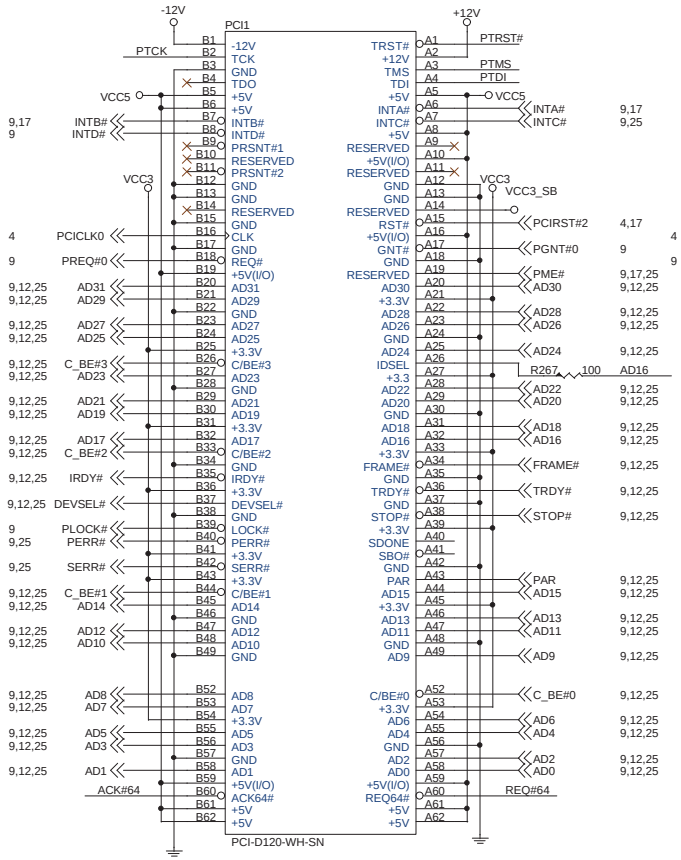
Place these resistors between PCI and AGP slot

AGP SLOT DECOUPLING CAPACITORS



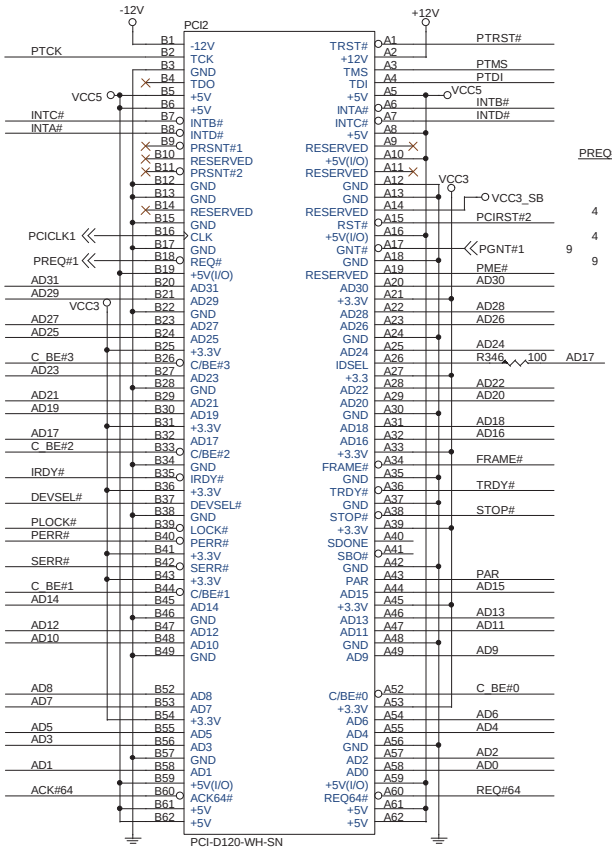
Micro-Star	Title: MS-6513	Rev: 0A
Document Number: AGP Slot		
Last Revision Date: Friday, June 15, 2001	Sheet 17 of 35	

PCI SLOT 1 (PCI VER: 2.2 COMPLY)



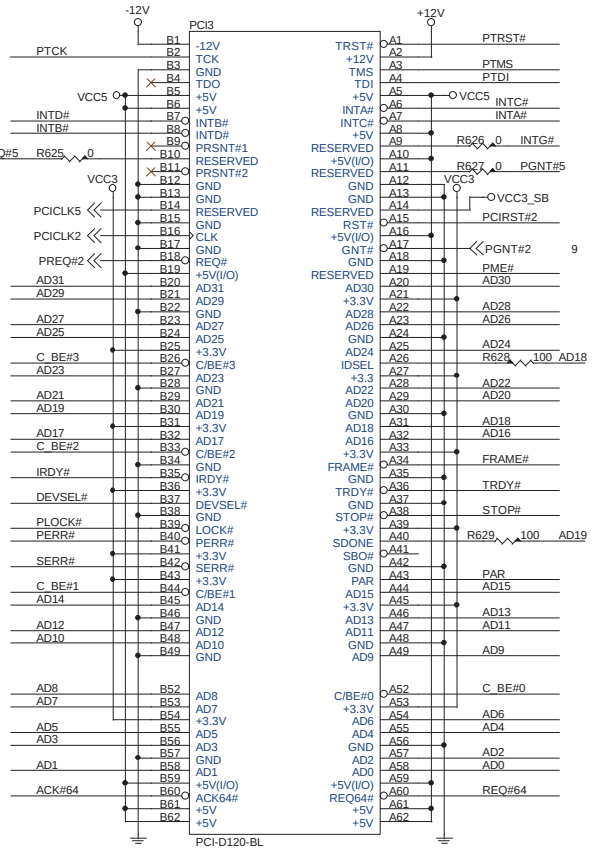
IDSEL = AD16
MASTER = PREQ0
INTA#

PCI SLOT 2 (PCI VER: 2.2 COMPLY)



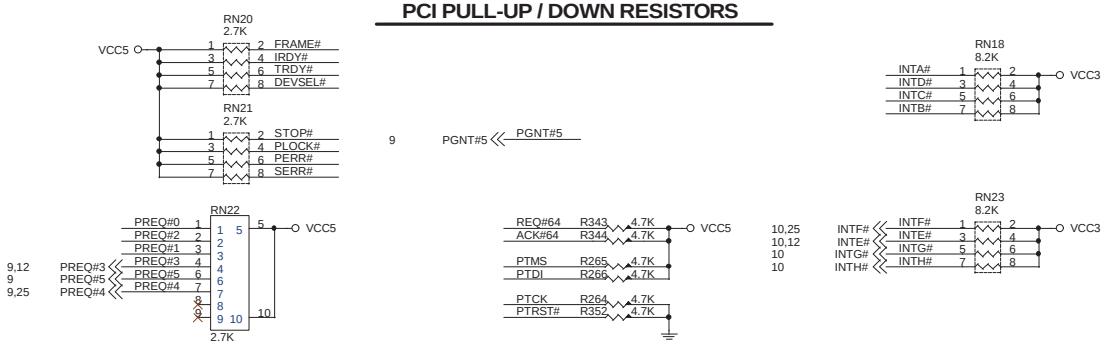
IDSEL = AD17
MASTER = PREQ1
INTB#

PCI SLOT 3 (PCI VER: 2.2 COMPLY)

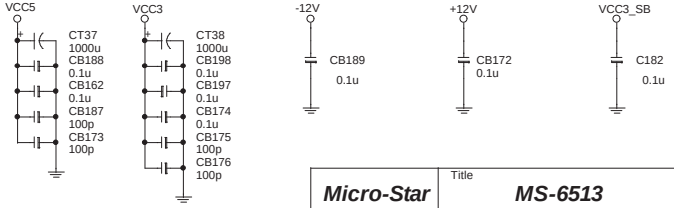


IDSEL = AD18
MASTER = PREQ2
INTC#

PCI PULL-UP / DOWN RESISTORS



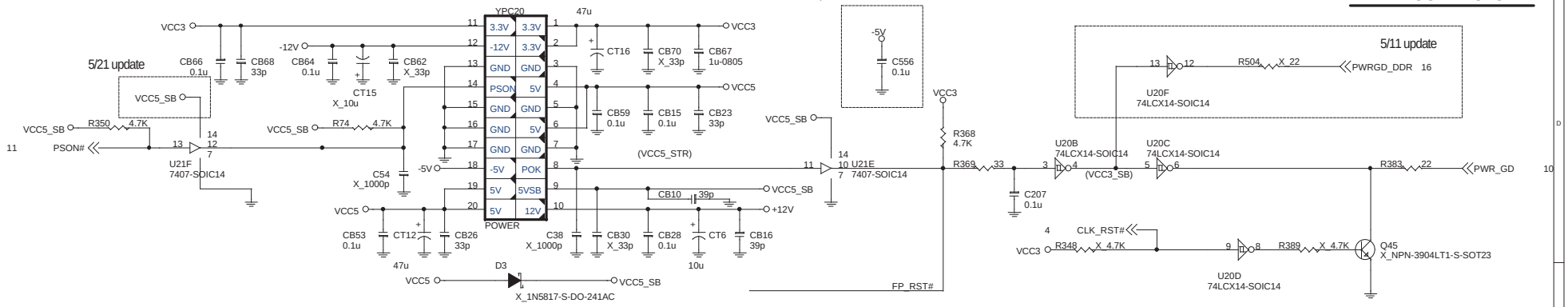
PCI SLOT DECOUPLING CAPACITORS



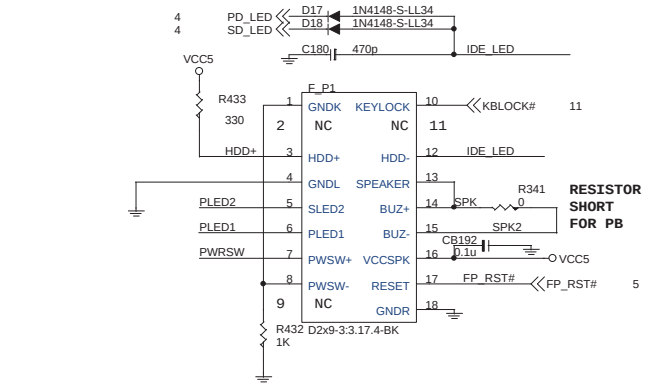
Micro-Star	Title: MS-6513	Rev: 0A
Document Number: PCI Slot 1 & 2 & 3		
Last Revision Date: Friday, June 15, 2001	Sheet 18 of 35	

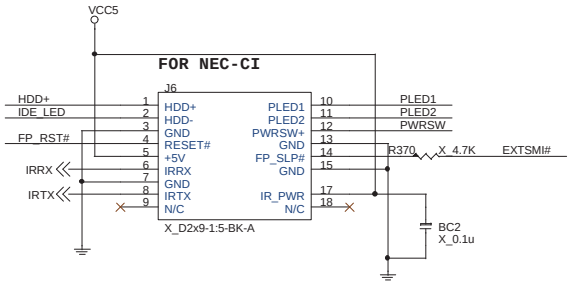
ATX CONNECTOR

5/22 update for EMI use, close ATX connector

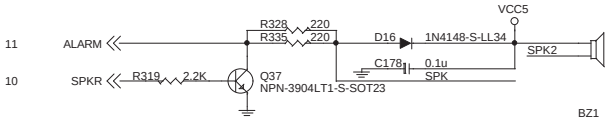


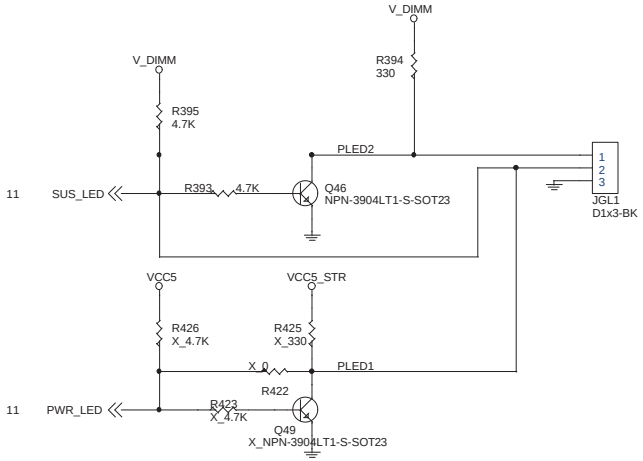
Brookdale FRONT PANEL-M



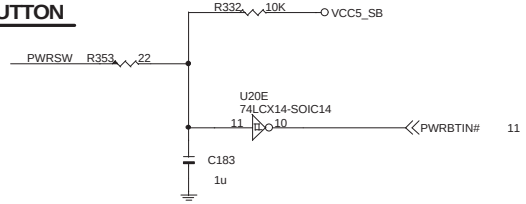


SPEAKER



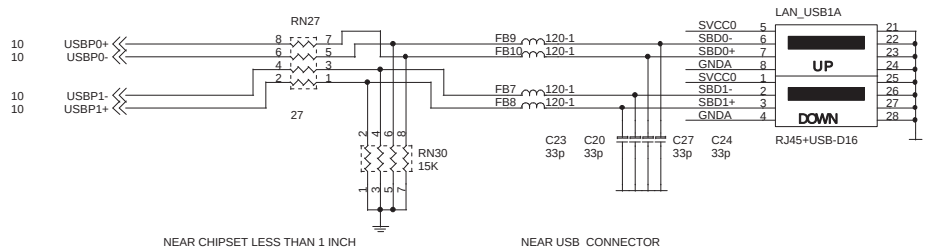


POWER BUTTON

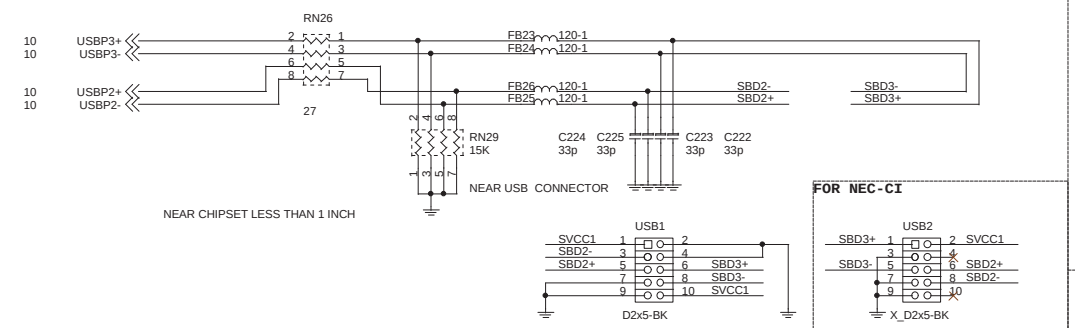


Micro-Star	Title: MS-6513	Rev: 0A
Document Number: Front Panel & Connector		
Last Revision Date: Friday, June 15, 2001	Sheet 19 of 35	

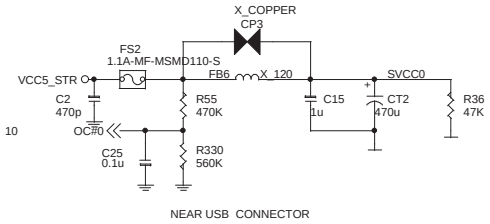
BACK PANEL USB CONNECTOR FOR USB PORT 0,1



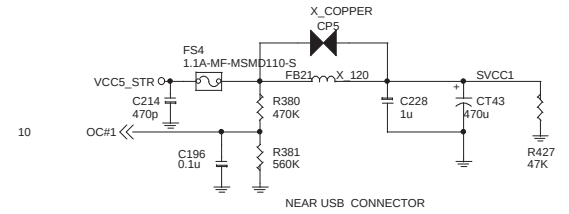
FRONT PANEL USB CONNECTOR FOR USB PORT 2,3



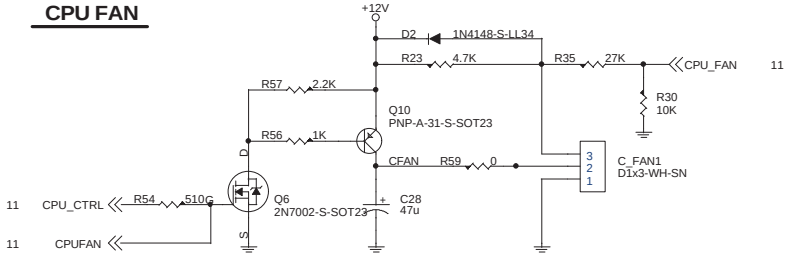
POWER CIRCUIT FOR USB PORT 0,1



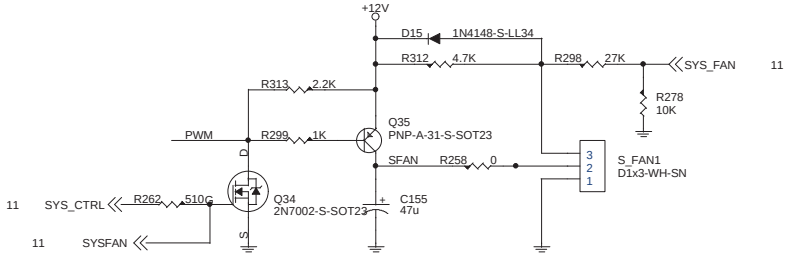
POWER CIRCUIT FOR USB PORT 2, 3



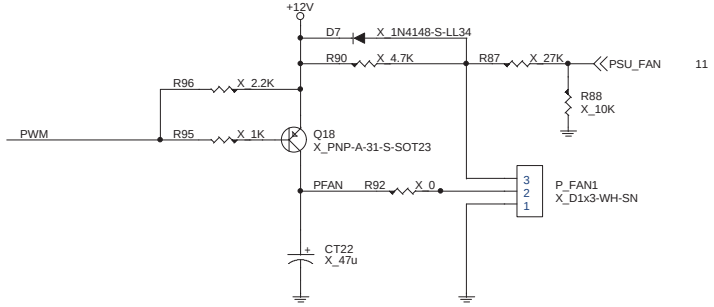
CPU FAN



SYSTEM FAN

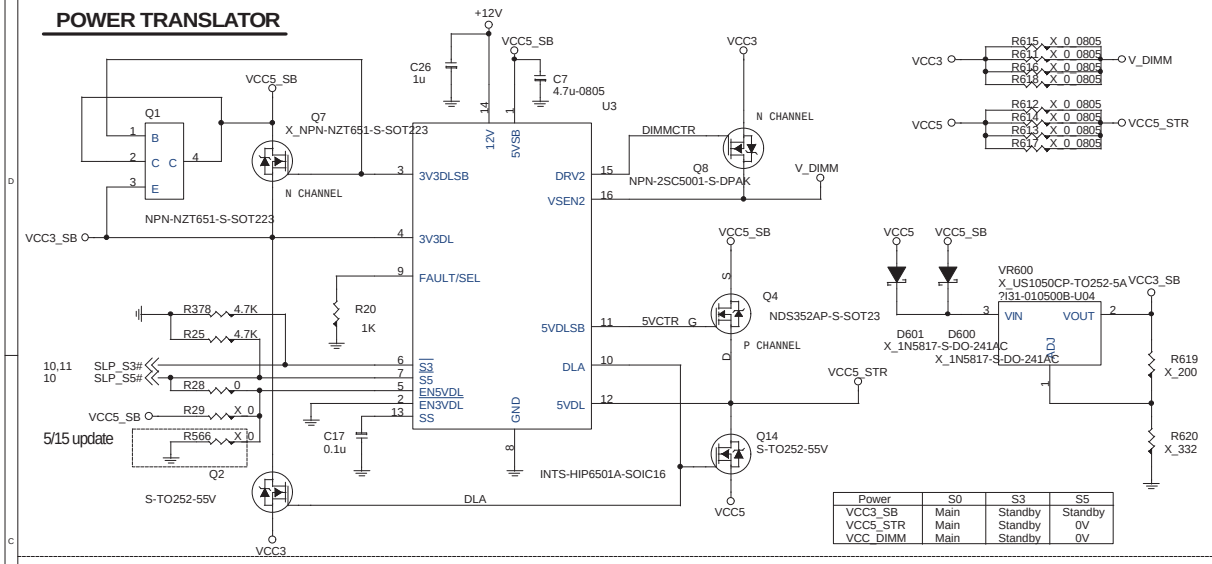


ATX PSU FAN ON/OFF CONTROL



Micro-Star	Title: MS-6513	Rev: 0A
Document Number: USB & FAN Connectors		
Last Revision Date: Thursday, June 21, 2001	Sheet 20 of 35	

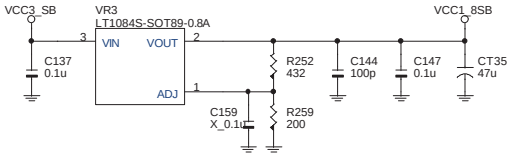
POWER TRANSLATOR



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

1.8V STANDBY POWER TRANSLATOR

(40mils trace / 20 mils space)



POWER CONSUMPTION

	VCCP	VCC_AGP	VCC1_8	VCC3_DIMM	VCC3	VCC5	VCC5_SB	+12V	-12V
CPU	69.0A	0	0	0	0	0	0	NOTE4	0
PMCH	2.4A	NOTE1	0.2A	2.0A	0	0	0	0	0
ICH2	0	0	NOTE3	0	NOTE3	0	NOTE3	0	0
CY28324	0	0	0	0	0	0	0	0	0
AD1885	0	0	0	0	0		0	0	0
FWH -SST	0	0	0	0			0		
W83627HF	0	0	0	0	0		0	0	0
HIP6301		0	0	0	0		0	0	0
HIP6602A		0	0	0			0	0	0
HIP6601A	0	0	0	0	0	0	0	0	0
SC1547	0	0	0	0	0	0			0
DIMM	0	0	0	NOTE2	0		NOTE2	0	0
AGP	0	8.0A	0	0	6.0A	2.0A	?	1.0A	0
PCI	0	0	0	0		0	0	0	0
USB	0		0	0		0			0
USB HUB	0	0	0	0	0	0	0	0	0
FAN	0	0	0	0	0	0	0	0	0
TTL	0	0	0	0	0	0	0	0	0
AMPLIFIER	0	0	0	0			0	0	0
OTHER	0	0	0	0	0		0		

NOTE1 --- MCH
VCC_AGP = VCC1_5 (1.5A) + VCC_AGP (0.37A)

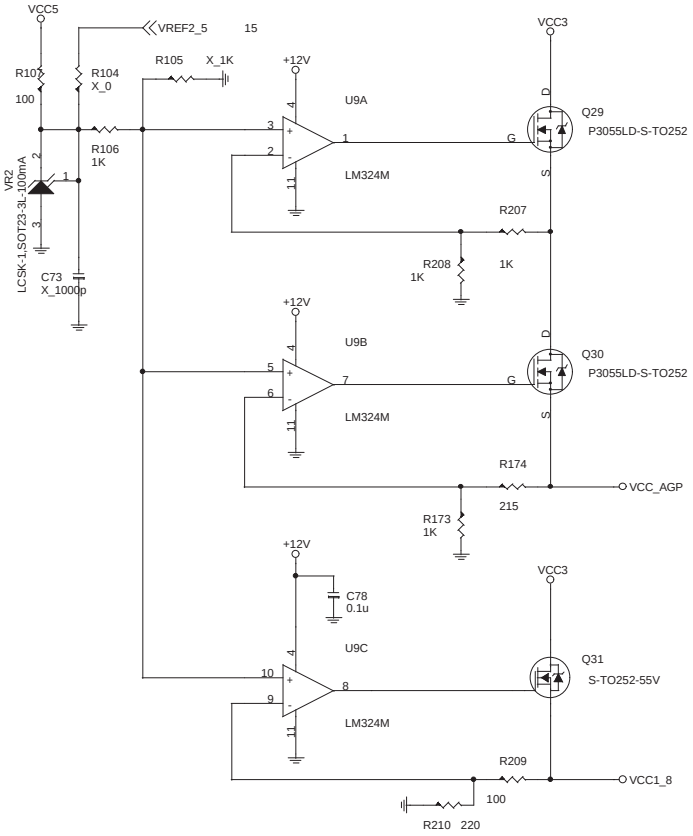
NOTE2 --- DIMM
S0 STATE --- 2.0A * 3 = 6.0A ---> VCC3
S1/S3 STATE --- 200mA * 3 = 600mA ---> VCC3_SB
VCC3_SB --> 600mA*3.3V/5V=396mA --> VCC5_SB

NOTE3 --- ICH2

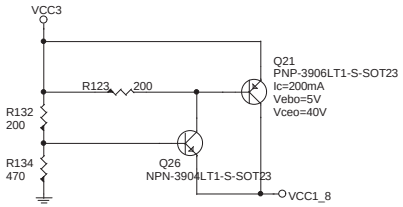
Power	S0	S1	S3/S4/S5
1.8V	300mA	100mA	N/A
1.8V_LAN	36mA	28mA	N/A
VCC1_8SB	45mA	30mA	7mA
VCC3	410mA	5mA	N/A
VCC3+562ET	230mA	210mA	N/A
VCC3_SB	25mA	0.6mA	N/A

VCC3_SB =
VCC1_8SB =
VCC5_SB = VCC3_SB + VCC1_8SB

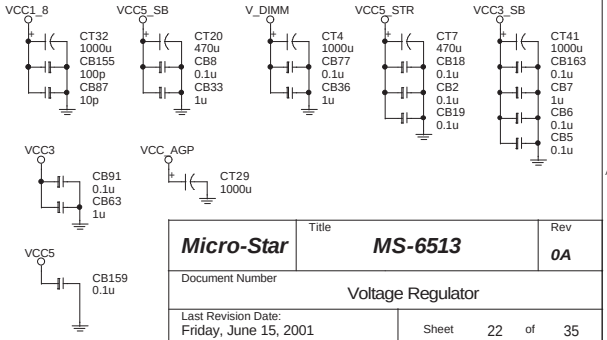
AGP 4X 1.5V POWER TRANSLATOR



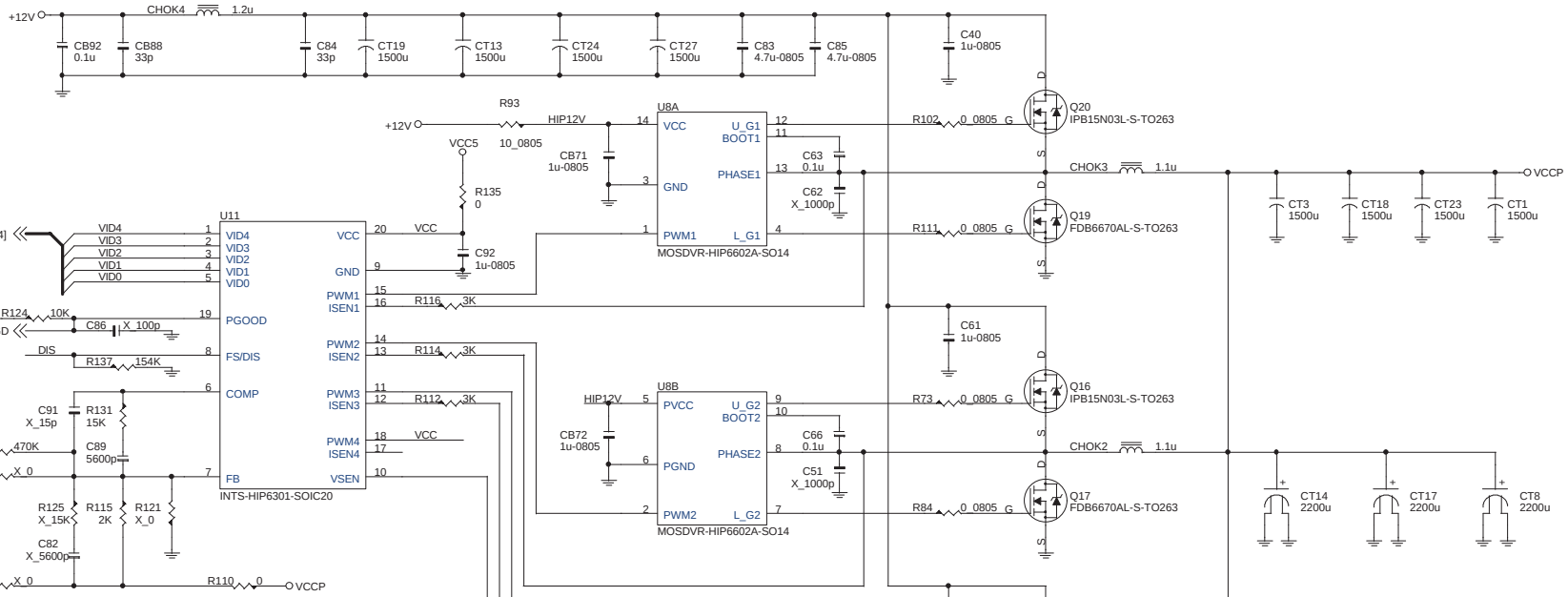
1.8V/3.3V SEQUENCE CIRCUIT



REGULATORS OUTPUT DECOUPLING CAPACITORS



Micro-Star	Title: MS-6513	Rev: 0A
	Document Number: Voltage Regulator	
	Last Revision Date: Friday, June 15, 2001	Sheet 22 of 35

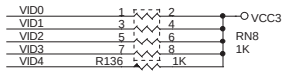


VID4	VID3	VID2	VID1	VID0	VDC(V)
1	1	1	1	0	1.100
1	1	1	0	1	1.125
1	1	1	0	0	1.150
1	1	0	1	1	1.175
1	1	0	1	0	1.200
1	1	0	0	1	1.225
1	1	0	0	0	1.250
1	0	1	1	1	1.275
1	0	1	1	0	1.300
1	0	1	0	1	1.325
1	0	1	0	0	1.350
1	0	0	1	1	1.375
1	0	0	1	0	1.400
1	0	0	0	1	1.425
1	0	0	0	0	1.450
0	1	1	1	1	1.475

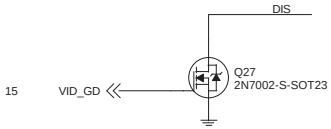
VID4	VID3	VID2	VID1	VID0	VDC(V)
0	1	1	1	0	1.500
0	1	1	0	1	1.525
0	1	1	0	0	1.550
0	1	0	1	1	1.575
0	1	0	1	0	1.600
0	1	0	0	1	1.625
0	1	0	0	0	1.650
0	0	1	1	1	1.675
0	0	1	1	0	1.700
0	0	1	0	1	1.725
0	0	1	0	0	1.750
0	0	0	1	1	1.775
0	0	0	1	0	1.800
0	0	0	0	1	1.825
0	0	0	0	0	1.850
1	1	1	1	1	OFF

VID PULL-UP RESISTORS

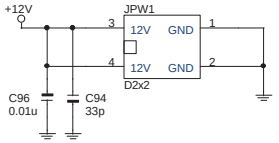
HIP6301V DON'T NEED PULL HIGH
HIP6301 NEED PULL HIGH



PWM GOOD



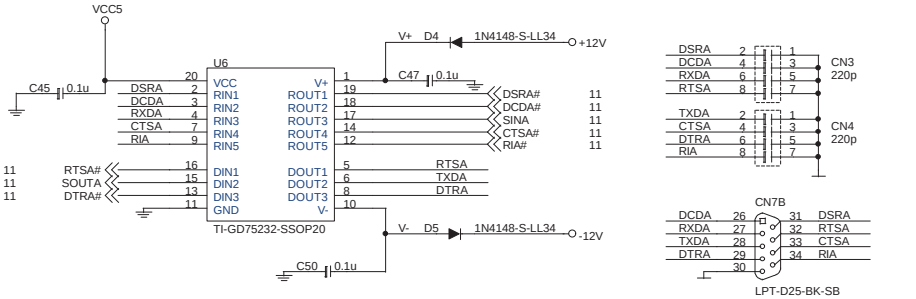
ATX12V POWER CONNECTOR



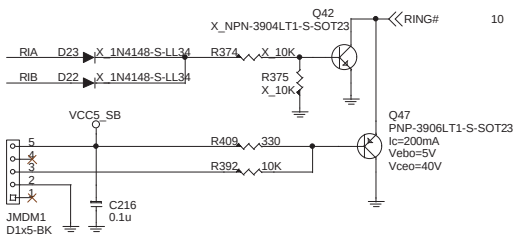
Micro-Star	Title: MS-6513	Rev: 0A
Document Number: VRM 9.2		
Last Revision Date: Friday, June 15, 2001	Sheet 23 of 35	

5/22 update

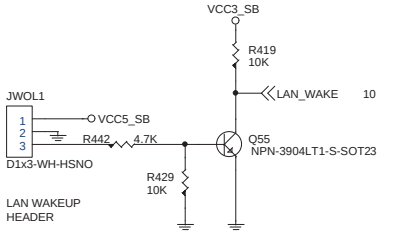
SERIAL PORT 1



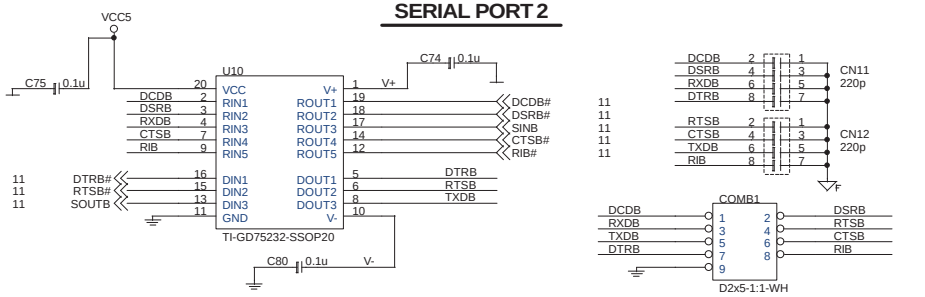
MODEM RING BLOCK



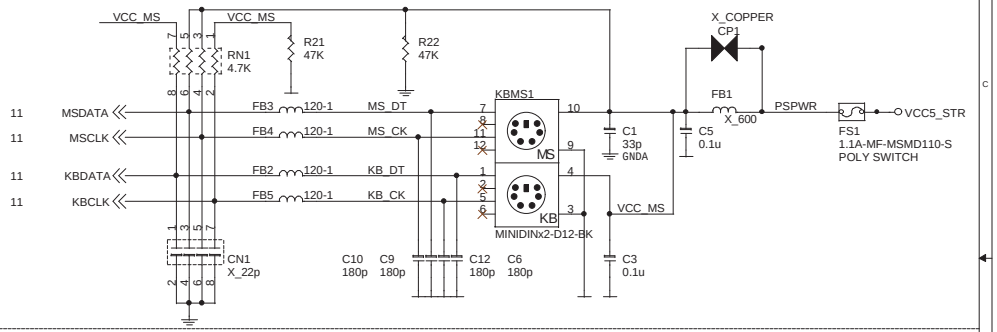
LAN WAKEUP BLOCK



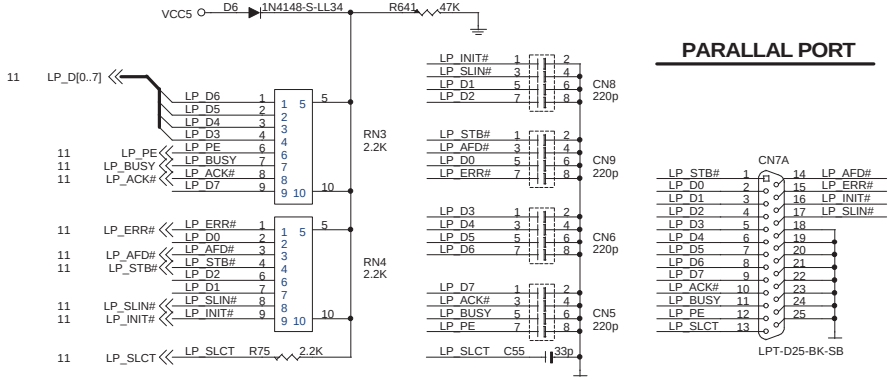
SERIAL PORT 2



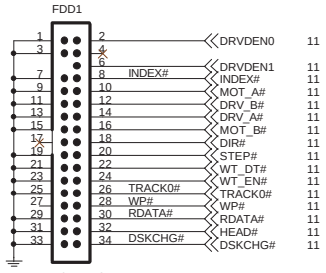
PS2 KEYBOARD & MOUSE CONNECTOR



PARALLAL PORT

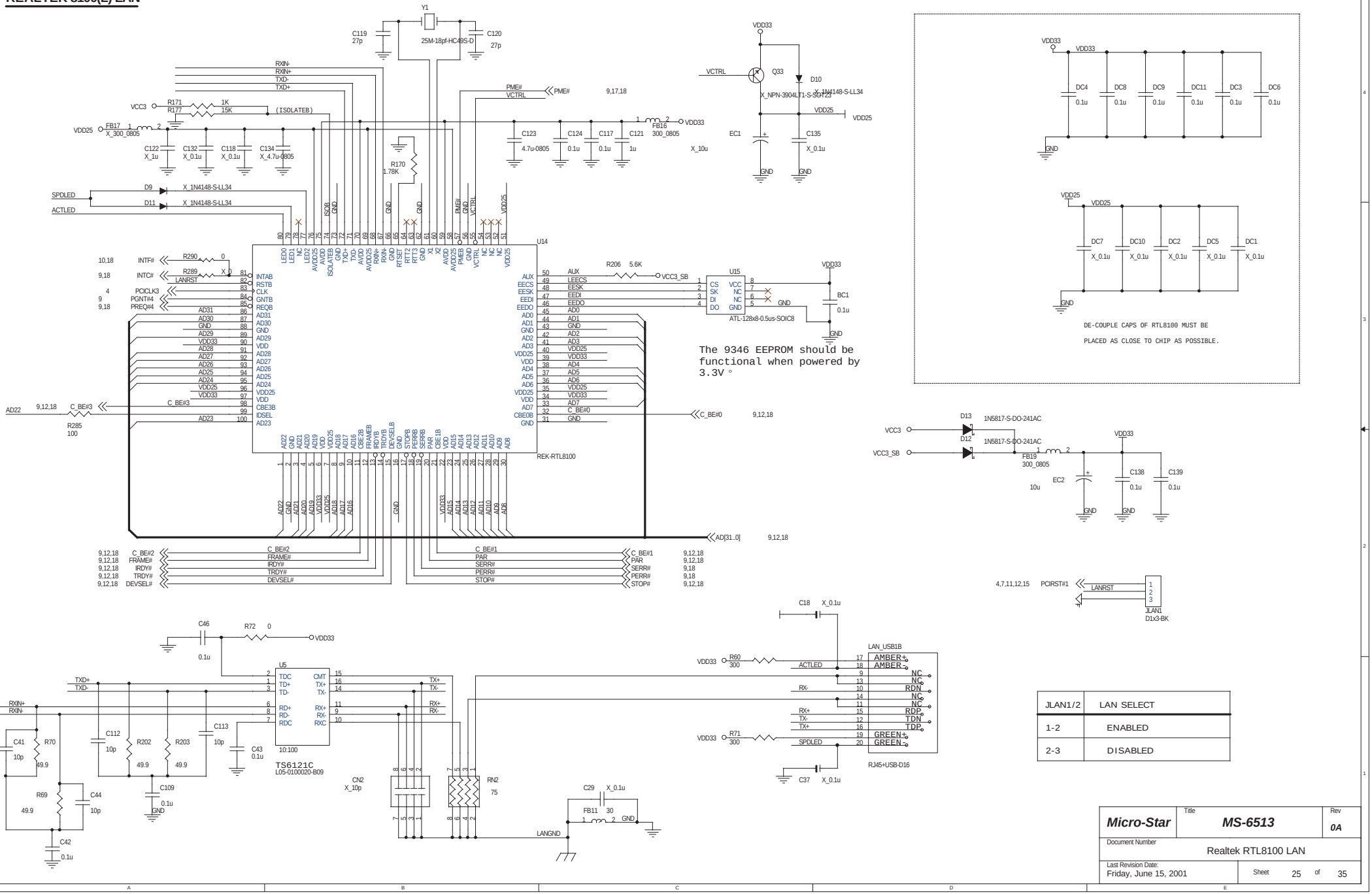


FLOPPY CONNECTOR



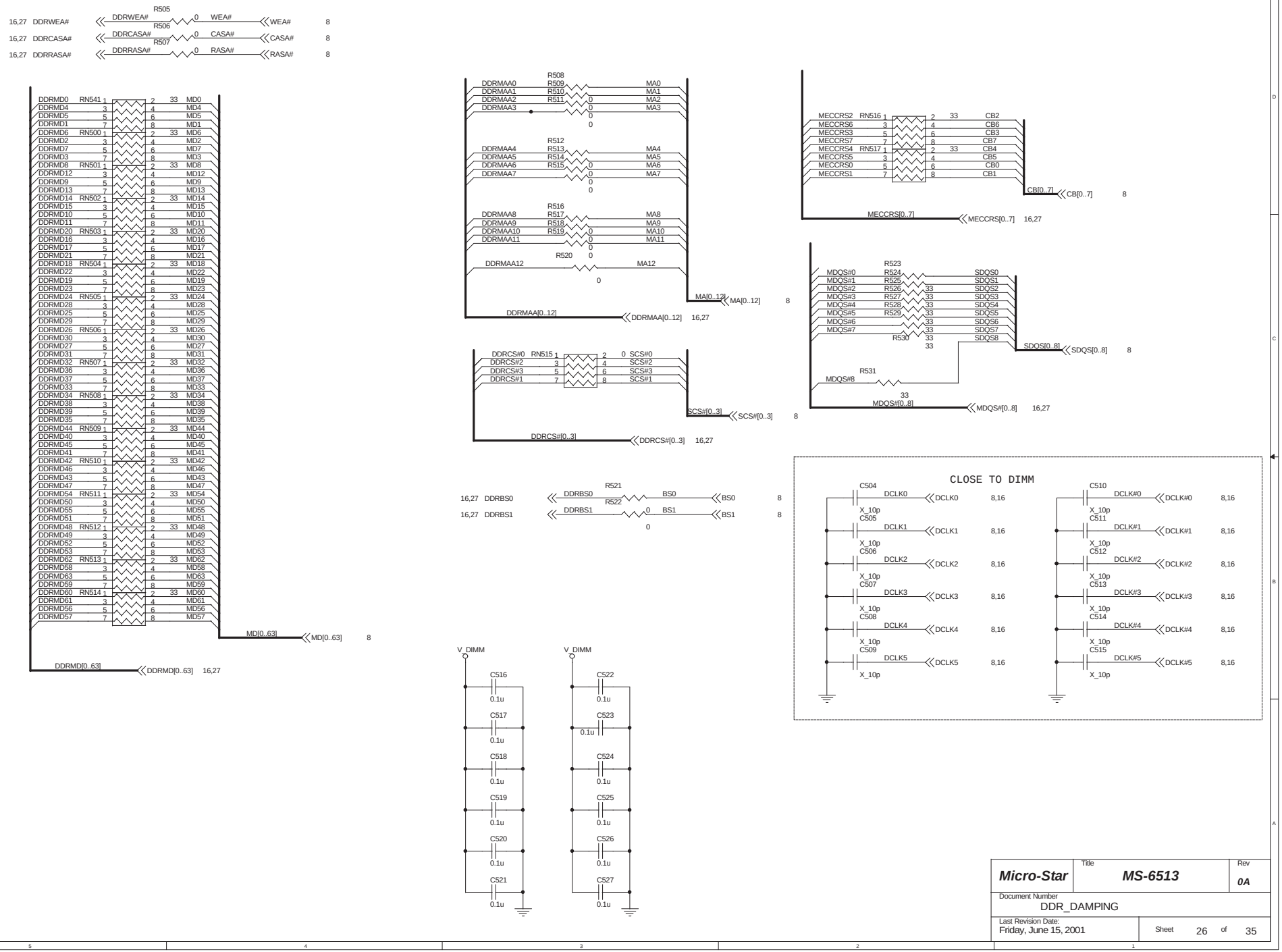
Micro-Star	Title: MS-6513	Rev: 0A
Document Number: IO Connector		
Last Revision Date: Friday, June 15, 2001	Sheet 24 of 35	

REALTEK 8100(L) LAN

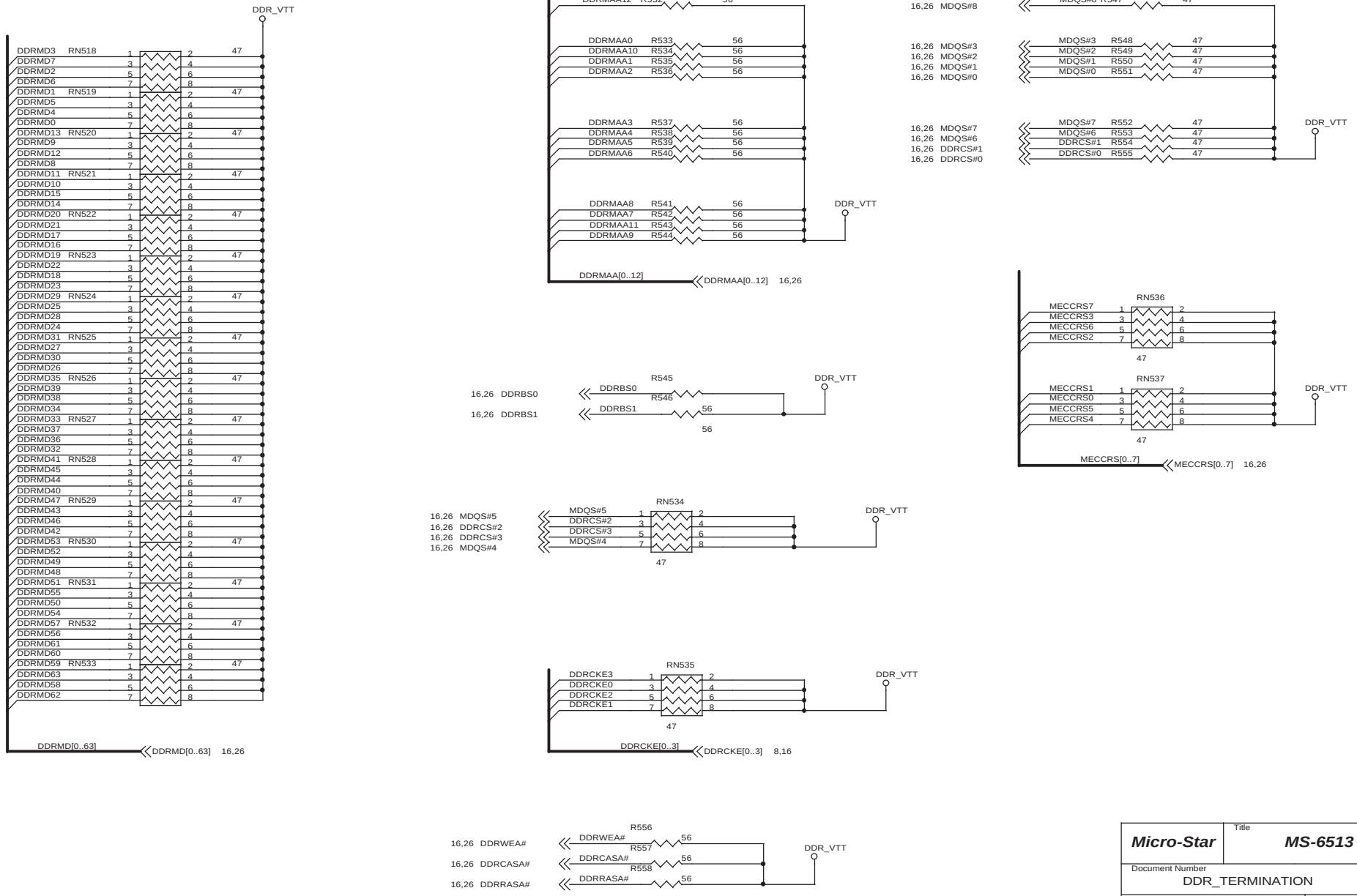


JLAN1/2	LAN SELECT
1-2	ENABLED
2-3	DISABLED

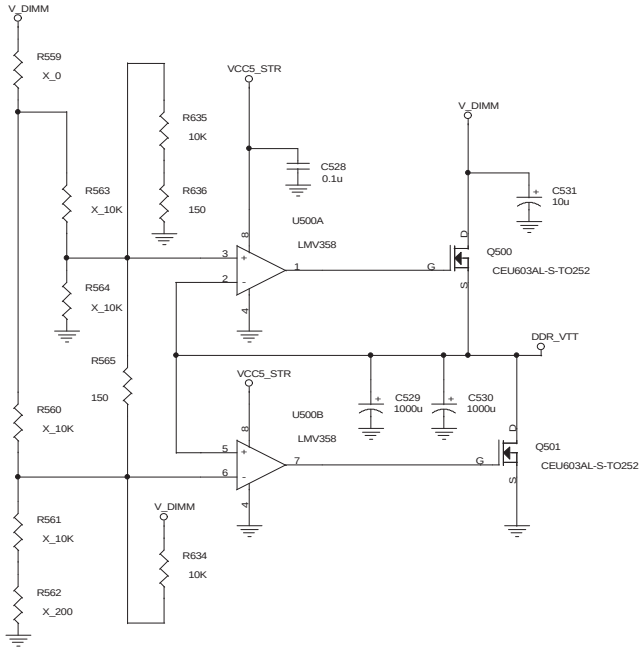
Micro-Star	Title: MS-6513	Rev: 0A
Document Number: Realtek RTL8100 LAN		
Last Revision Date: Friday, June 15, 2001	Sheet 25 of 35	

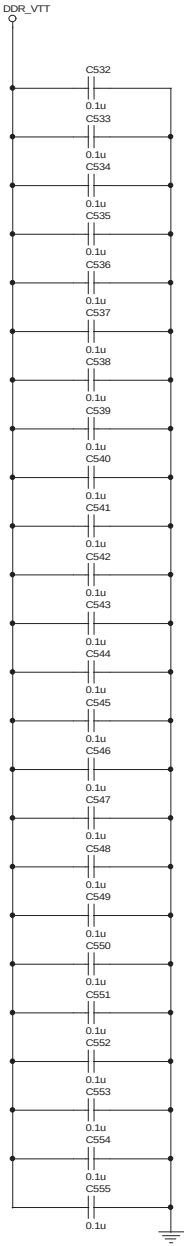


Micro-Star	Title: MS-6513	Rev: 0A
Document Number: DDR_DAMPING		
Last Revision Date: Friday, June 15, 2001	Sheet 26 of 35	



Micro-Star	Title: MS-6513	Rev: 0A
Document Number: DDR_TERMINATION		
Last Revision Date: Friday, June 15, 2001	Sheet 27 of 35	





Micro-Star	Title: MS-6513	Rev: 0A
Document Number: DDR_T_POWER		
Last Revision Date: Friday, June 15, 2001	Sheet 28 of 35	

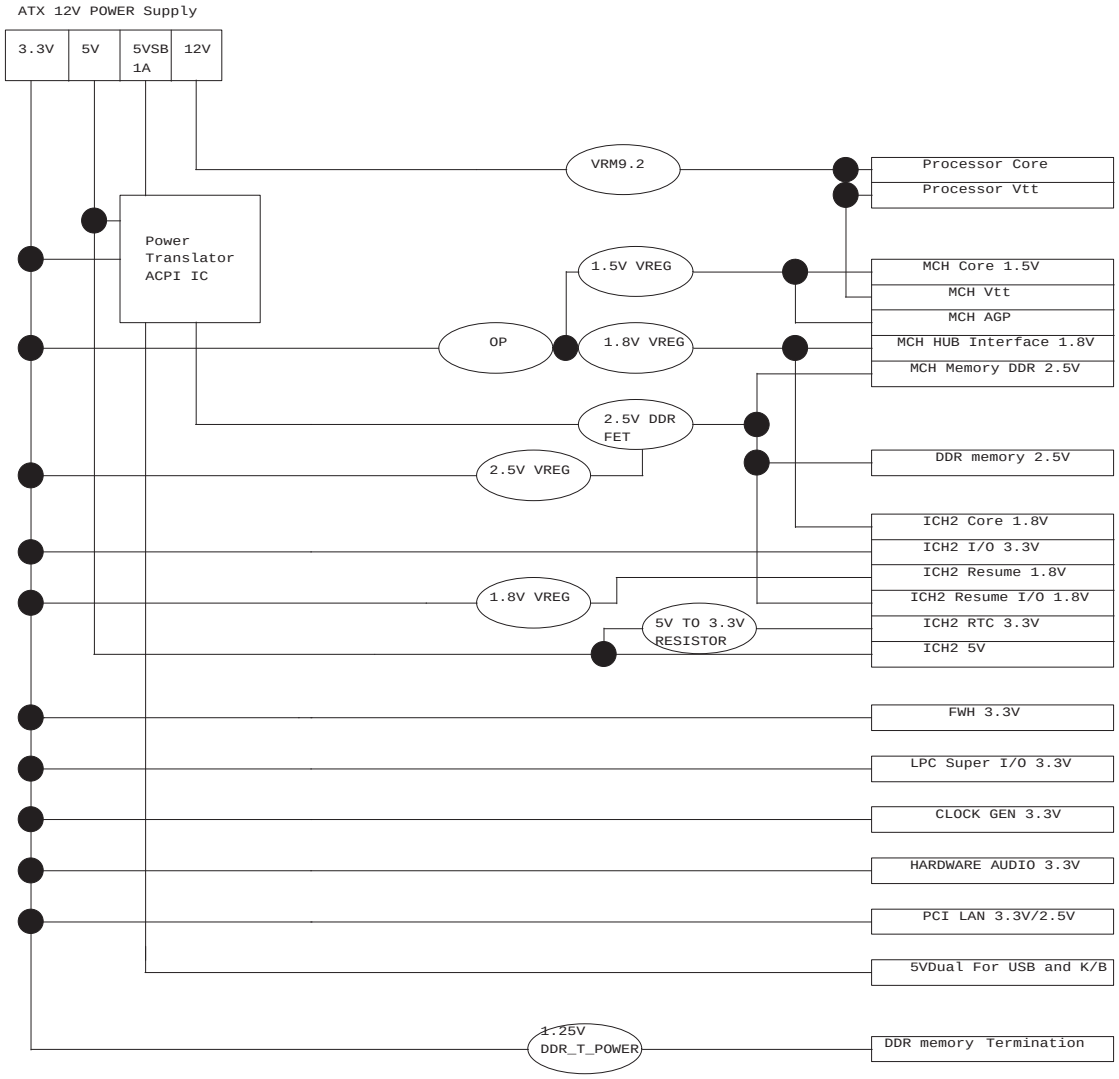
Jumper Setting & Connector Setting

Jumper	Description	
J2	CHASISS INTRUSION HEADER	
J3	AUDIO REAR PHONE JACK (LINE_IN, LINE_OUT, MIC_IN)	
J4	AUDIO AUX HEADER	
J5	AUDIO FRONT PANEL HEADPHONE JACK HEADER	
J6	AUDIO INTERNAL SPEAKER HEADER (ATAPI)	
J7	BIOS function	
1-2	Normal	(Default)
2-3	Configuration Mode	
REMOVED	Recovery	
JBAT1	CLEAR CMOS	
1-2	NORMAL	(Default)
2-3	CLEAR CMOS	
CD_IN1	CDROM HEADER (ATAPI)	
MDM_IN1	TELEPHONY HEADER (ATAPI)	

Connector	Description
U3	INTEL mPGA478-B CPU
IDE1	Primary
IDE2	Secondary
DIM1	SDRAM DIMM1
DIM2	SDRAM DIMM2
AGP1	AGP Slot
PCI1	PCI Slot1
PCI2	PCI Slot2
PCI3	PCI Slot3
COM1	Serial Port
COM2	Serial Port
LPT	Parallel Port
FDD1	Floopy
JMDM1	MODEM RING HEADER
JWOL1	LAN WAKEUP HEADER
KBMS1	PS/2 Keyboard and PS/2 mouse
C_FAN1	CPU FAN HEADER
S_FAN	System FAN HEADER
USB1	USB REAR CONNECTOR
USB2	USB INTERNAL HEADER
POWER	ATX Power
JSMB1	SMBUS HEADER
F_P1	Front Panel
Pin1	Power of Hard LED
Pin2	Power LED
Pin3	Hard LED
Pin4	Suspend LED
Pin5,8,12,13	GND
Pin6	Power Button
Pin7	Reset Button
Pin9	VCC
P_FAN1	ATX FAN HEADER
JPW1	ATX12V Power

Micro-Star	Title: MS-6513	Rev: 0A
Document Number: JUMPER SETTING		
Last Revision Date: Thursday, June 21, 2001	Sheet 29 of 35	

Power Delivery Map



Micro-Star	Title: MS-6513	Rev: 0A
Document Number: Power Delivery Map		
Last Revision Date: Friday, June 15, 2001	Sheet 30 of 35	

Pentium 4 Processor /Northwood mPGA 478

Source Synchronous Signal Group and the Associated Strobes

Signals	Associated Strobe
REQ[4:0],A[16:3]#	ADSTB0#
A[31:17]#	ADSTB1#
D[15:0]#,DBI0#	DSTBP0#,DSTBN0#
D[31:16]#,DBI1#	DSTBP1#,DSTBN1#
D[47:32]#,DBI2#	DSTBP2#,DSTBN2#
D[63:48]#,DBI3#	DSTBP3#,DSTBN3#

ADSTB0#
should be +- 25mils
ADSTB1#

Signals	Length	Inaccuracy
Data	**2.0" to 10.0"**	+/- 100 mil
Address	**2.0" to 10.0"**	+/- 200 mil
Strobe	**2.0" to 10.0"**	+/- 25 mil
Clock	**2.0" to 10.0"**	Don't need

* Delta=(CPU_pkglen.net-CPUpkglen.strobe)+(CS_pkglen.net-CS_pkglen.strobe)
Trace : 7 mil width 13mil space

Miscellaneous Signals

HL_STB/HL_STB#

Taces 5mils

20mils — HL[0:10]
HL_STB
15mils
HL_STB#
20mils — HL[0:10]

* Max Length : 8"
* STB and STB# Length must be equal

HL[10..0]

20mils — Others
15mils — HL[0:10]
HL[0:10]
20mils — Others

* Max Length : 8"
* Length must be matched within +/- 0."
of the Strobe Signals

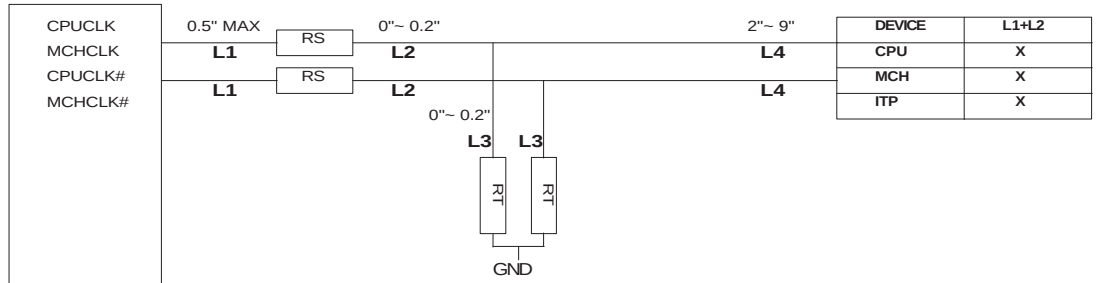
USB

*** USB Trace width : 9 mils**
*** USB Trace Spacing : 25 mils**
*** Differential USB Signlas Trace Spacing : 18 mils**
*** USB Power Trace must be 40mils width**

AGP

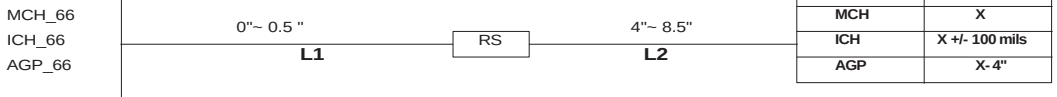
1X Timing group	2X/4X Timing group
AGPCLK PIPE# RBF# WBF# ST[2..0] GFRAME# GIRDY# GTRDY# GSTOP# GDEVSEL# GREQ# GGNT# GPAR	SET#1 GAD[15..0] GC_BE#[1..0] GAD_STB0 GAD_STB0# SET#2 GAD[31..16] GC_BE#[3..2] GAD_STB1 GAD_STB1# SET#3 SBA[7..0] SB_STB SB_STB#

SIGNALS	Maximum Length	Width	Space	Dismatch Length	Relative to
1X Timing group	7.5"	5 mil	5 mil	X	X
2X/4X Timing group SET#1	7.25"	5 mil	20 mil	+/- 0.125"	GAD_STB0 GAD_STB0#
2X/4X Timing group SET#2	7.25"	5 mil	20 mil	+/- 0.125"	GAD_STB1 GAD_STB1#
2X/4X Timing group SET#3	7.25"	5 mil	20 mil	+/- 0.125"	SB_STB SB_STB#
2X/4X Timing group SET#1	6"	5 mil	15 mil	+/- 0.25"	GAD_STB0 GAD_STB0#
2X/4X Timing group SET#2	6"	5 mil	15 mil	+/- 0.25"	GAD_STB1 GAD_STB1#
2X/4X Timing group SET#3	6"	5 mil	15 mil	+/- 0.25"	SB_STB SB_STB#



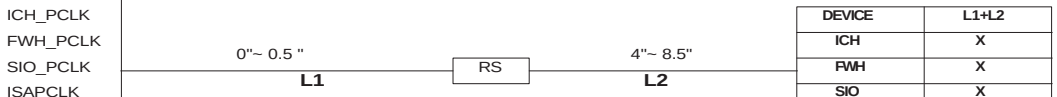
DEVICE	L1+L2
CPU	X
MCH	X
ITP	X

* Line Width : 7.0 mil
* Differential pair spacing : 7.0mil
* Spacing to other traces : 28 mil
* BCLK0/BCLK1 LENGTH MATCH +/- 10 mil



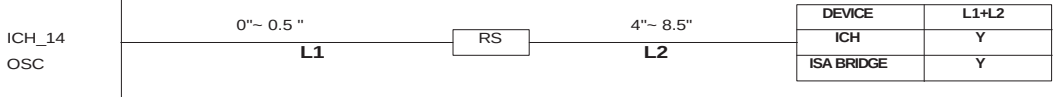
DEVICE	L1+L2
MCH	X
ICH	X +/- 100 mils
AGP	X- 4"

* Line Width : 5.0 mil
* Spacing to other traces : 20 mil



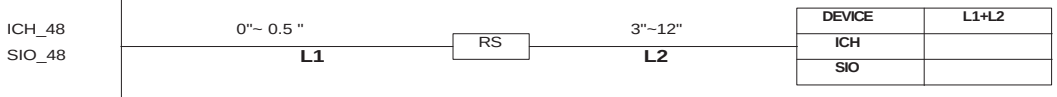
DEVICE	L1+L2
ICH	X
FWH	X
SIO	X
PCI	X-2.5"

* Line Width : 5.0 mil
* Spacing to other traces : 20 mil
* L1/L2 TRACE SAME AS MCH_66 TRACE LENGTH



DEVICE	L1+L2
ICH	Y
ISA BRIDGE	Y

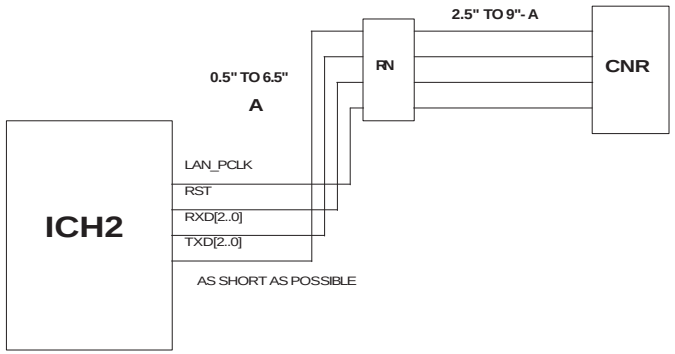
* Line Width : 5.0 mil
* Spacing to other traces : 10 mil



DEVICE	L1+L2
ICH	
SIO	

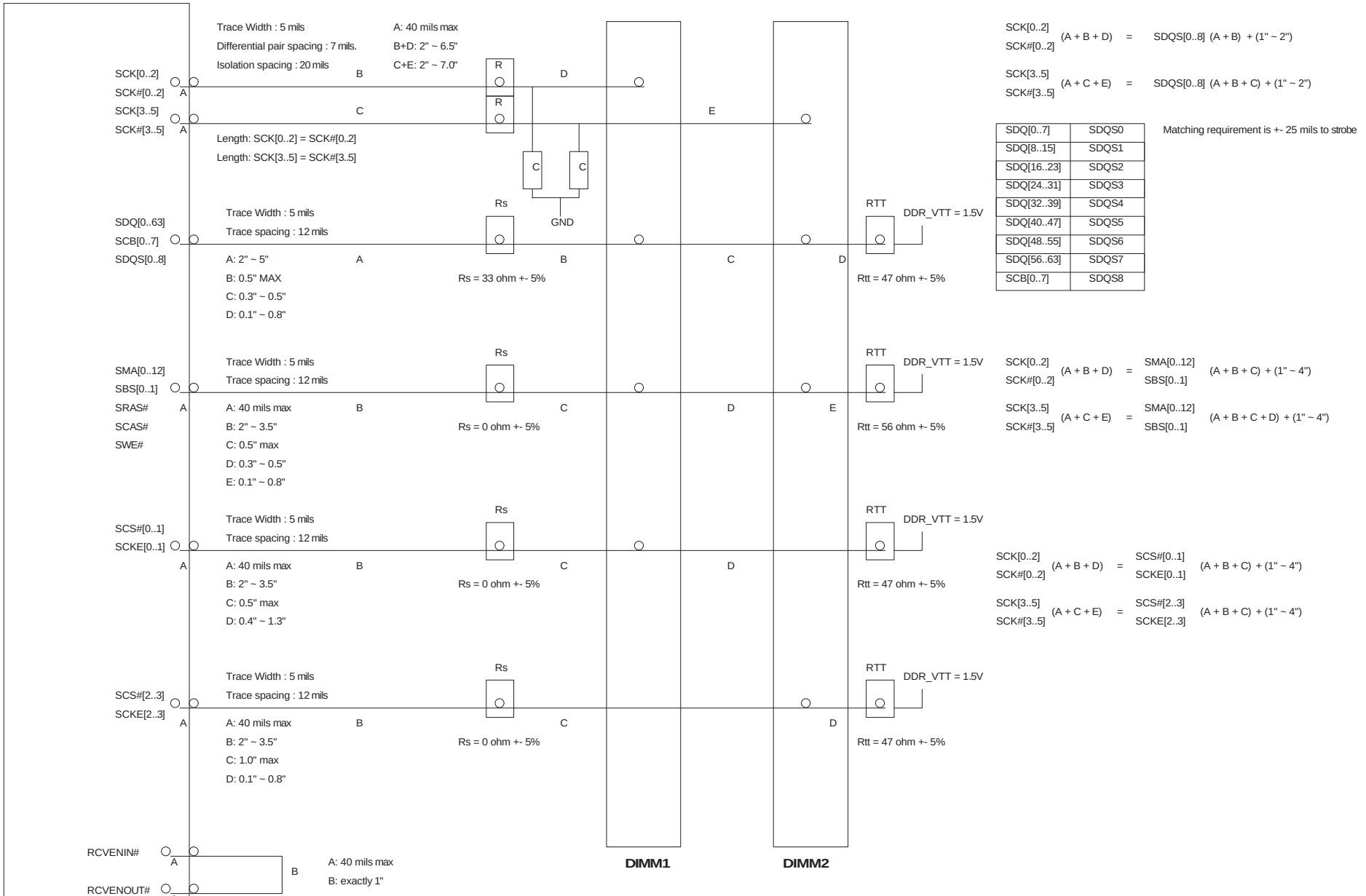
* Line Width : 5.0 mil
* Spacing to other traces : 20 mil

CK 408



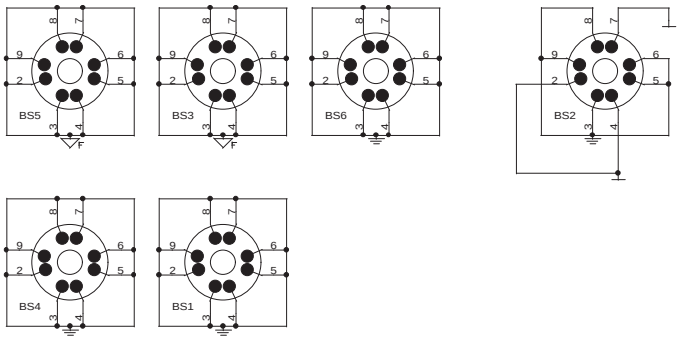
* Line Width : 7.0 mil
* Differential signls space : 14mils
* Differential signls length mismatch +/- 7mil

Micro-Star	Title: MS-6513	Rev: 0A
Document Number: CK-408 and LAN Design Guide		
Last Revision Date: Friday, June 15, 2001	Sheet 32 of 35	



Micro-Star	Title: MS-6513		Rev: 0A
Document Number: DDR DIMM DG			
Last Revision Date: Friday, June 15, 2001		Sheet 33 of 35	

PCB OTHER COMPONENT



U3_X1 U4_X1

BS1_X1 BS2_X1 BS3_X1 BS4_X1

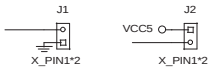
BS6_X1 BS7_X1 BS8_X1 BS9_X1

BS1_X1 BS2_X1 BS3_X1 BS4_X1 BS6_X1 BS7_X1 BS8_X1 BS9_X1

FM1 FM2 FM3 FM4 FM5 FM6 FM7 FM8

X_FM X_FM X_FM X_FM X_FM X_FM X_FM X_FM

SIMULATION TRACE



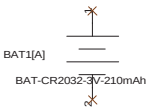
Micro-Star	Title: MS-6513	Rev: 0A
Document Number: MANUAL		
Last Revision Date: Friday, June 15, 2001	Sheet 34 of 35	

JBAT1 Clear CMOS	
1 - 2	Normal *
2 - 3	Clear CMOS

JBAT1(1-2)

JC-D2-GN

BAT SOCKET

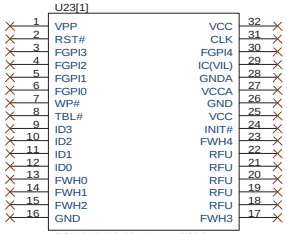


J7 BIOS Update	
SHORT	Locked
OPEN	Unlocked *

J7(1)

X_JC-D2-GN

BIOS



SST-256K*8-33MHz-PLCC32

FRONT PANNEL BUZZER

F_P114-15

X_JC-D2-GN

JLAN1/2	LAN SELECT
1-2	ENABLED
2-3	DISABLED

JLAN1(1-2)

JC-D2-GN

PCB

PCB

_

Heat sink

U12_X

_

Hooker

U12_X1 U12_X2 U12_X3 U12_X4

D1x3-1:2-BK D1x3-1:2-BK D1x3-1:2-BK D1x3-1:2-BK

Micro-Star	Title: MS-6513	Rev: 0A
Document Number: PACKING BOM		
Last Revision Date: Thursday, June 21, 2001	Sheet 35 of 35	