Version 1.0B

MS-6532 *(LEGEND)*

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)

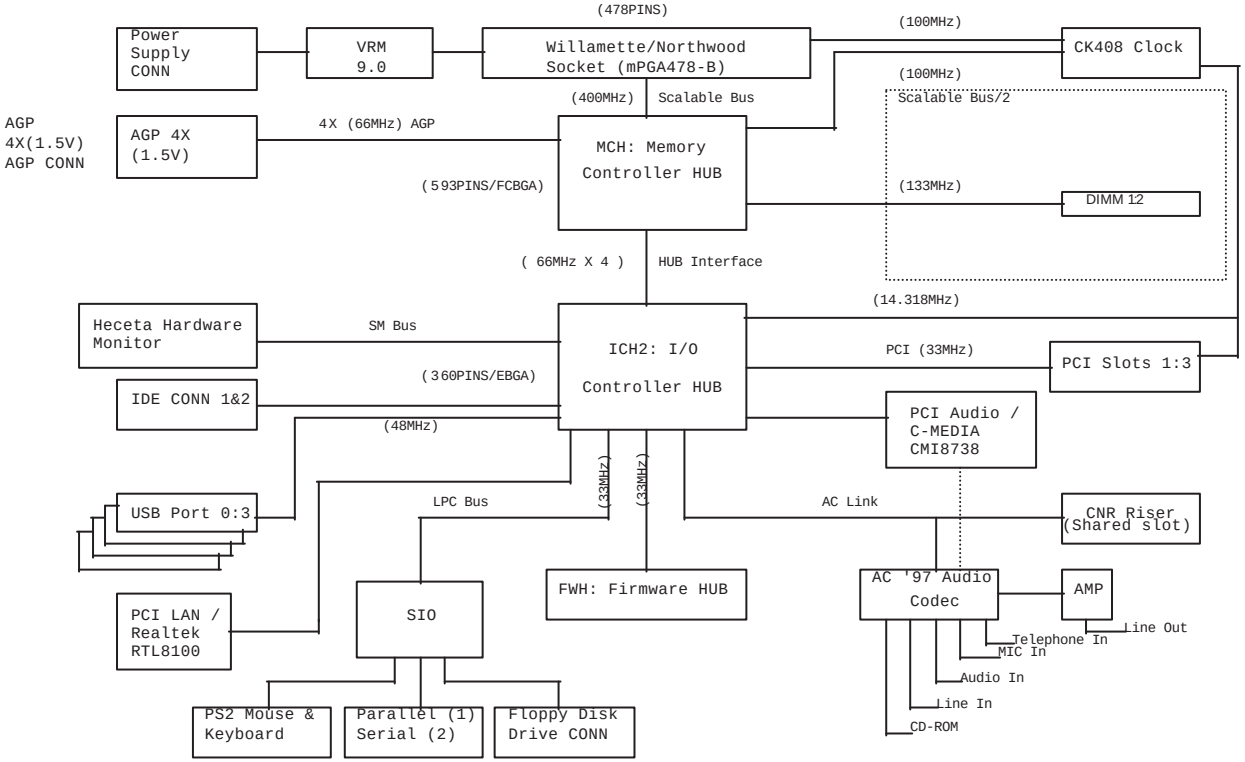
On Board Chipset:

BIOS -- FWH
LPC Super I/O -- W83627HF
Clock Generation -- ICS94208
PCI SOUND -- C-MEDIA CMI8738

Expansion Slots:

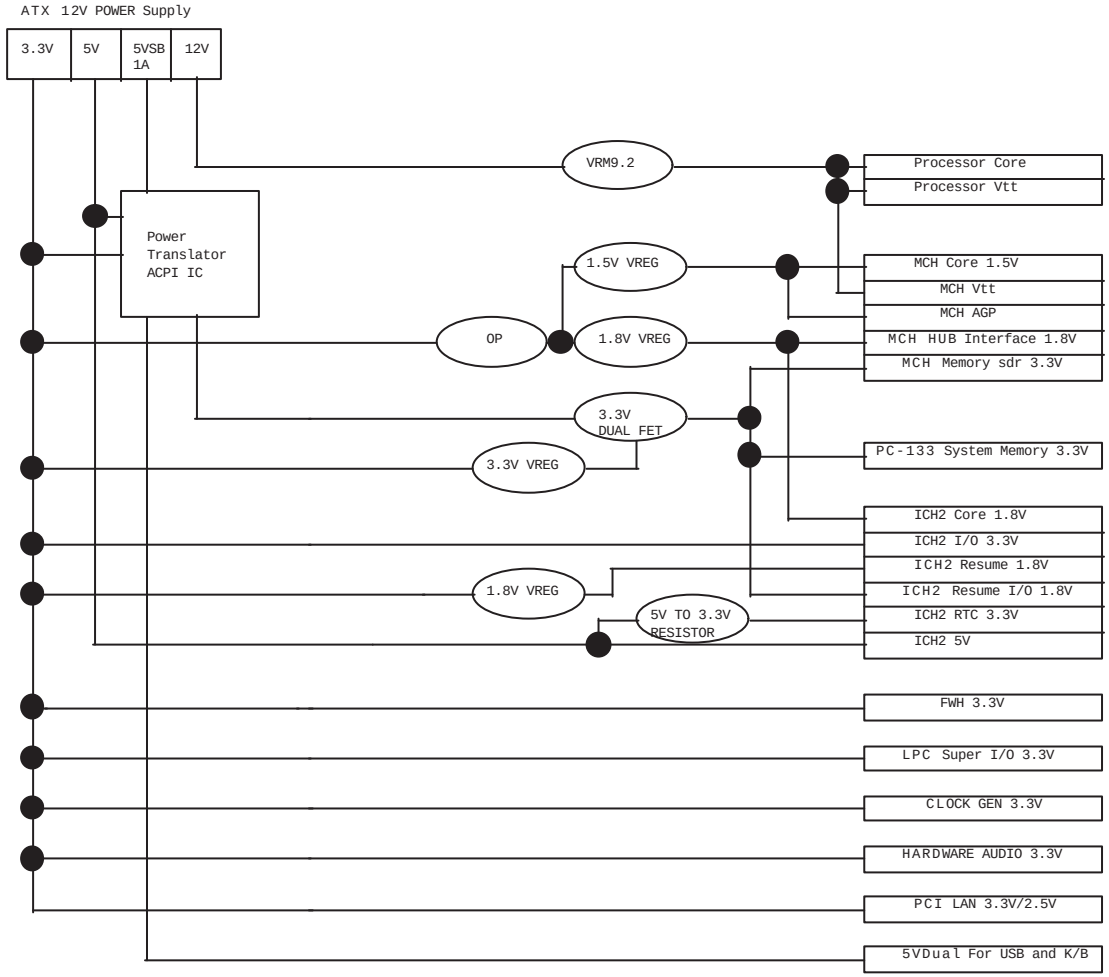
AGP2.0 SLOT * 1
PCI2.2 SLOT * 3
CNR SLOT * 1

Micro-Star	Title: *MS-6532*	Rev: *1.0B*
Document Number: Cover Sheet		
Last Revision Date: Wednesday, July 25, 2001	Sheet 1 of 32	



Micro-Star	Title: MS-6532	Rev: 1.0B
Document Number: Block Diagram		
Last Revision Date: Wednesday, July 25, 2001	Sheet 2 of 32	

Power Delivery Map



Micro-Star	Title: MS-6532	Rev: 1.0B
Document Number: Power Delivery Map		
Last Revision Date: Wednesday, July 25, 2001	Sheet 3 of 32	

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	AC97 Enabled/Disabled
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	Non
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

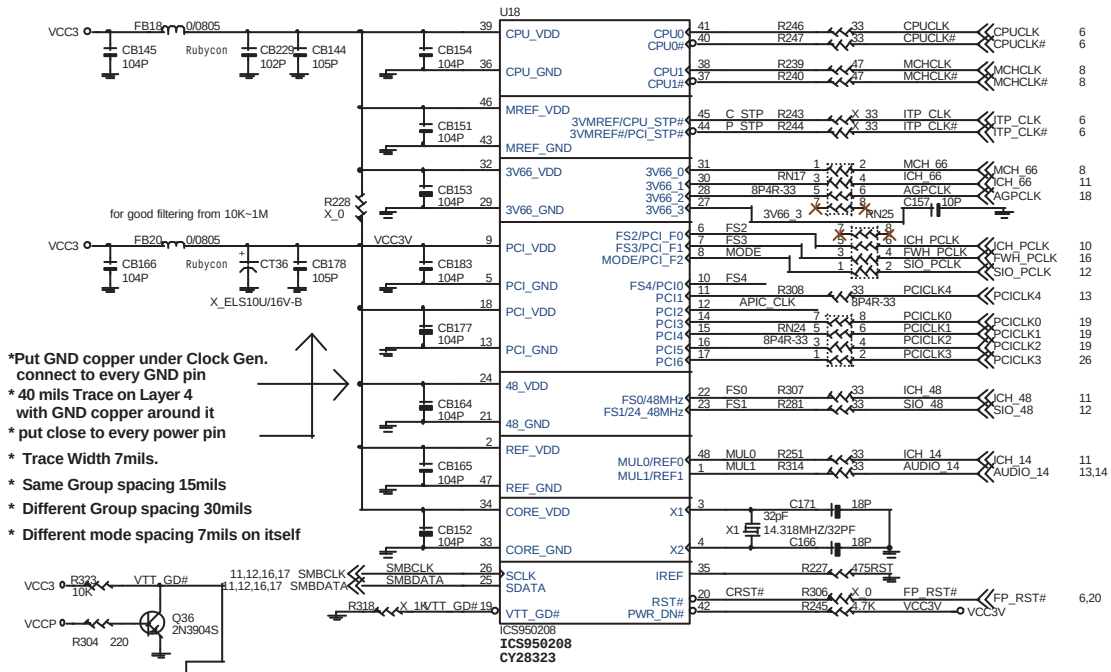
GPIO Pin	Type	Function
GPI 0	I	ATA IDE 1 Detect
GPI 1	I	ATA IDE 2 Detect
GPI 2	I	Reserved
GPI 3	I	Reserved

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
PCI Audio	INTD#/INTE# INTA# INTB# INTC#	AD23
PCI Lan	INTC#/INTF# INTD# INTA# INTB#	AD22

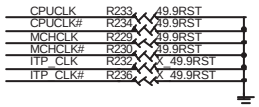
for good filtering from 10K~1M

*Trace less 0.5"

CLOCK GENERATOR BLOCK



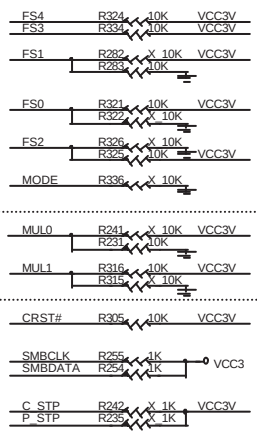
Shut Source Termination Resistors



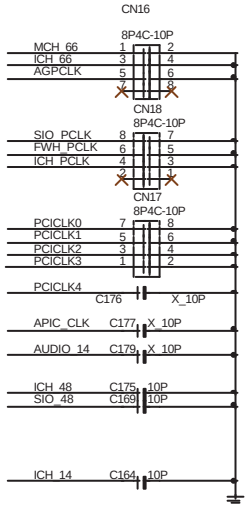
Trace less 0.2"

49.9ohm for 50ohm M/B impedance

CLOCK STRAPPING RESISTORS



Pull-Down Capacitors

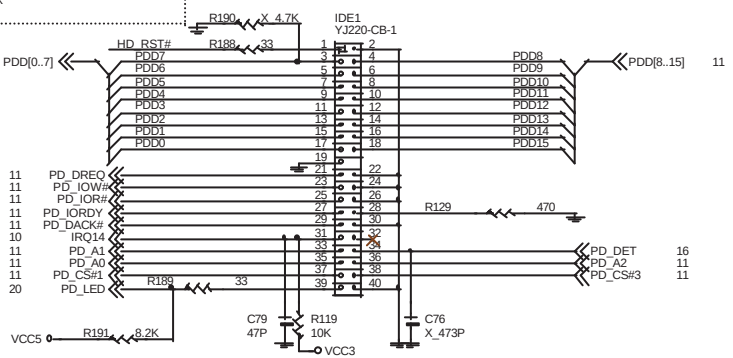


used only for EMI issue

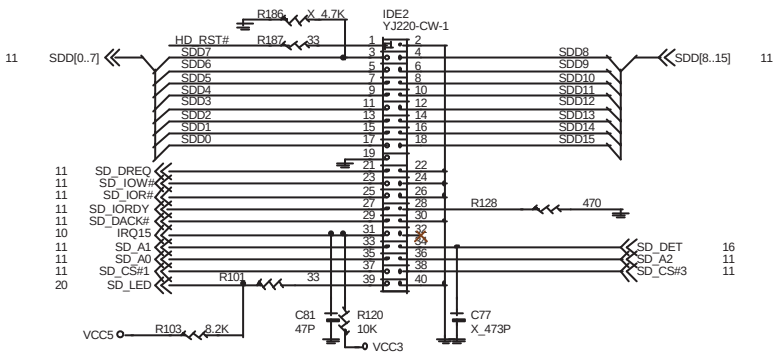
Trace less 0.2"

ATA100 IDE CONNECTORS

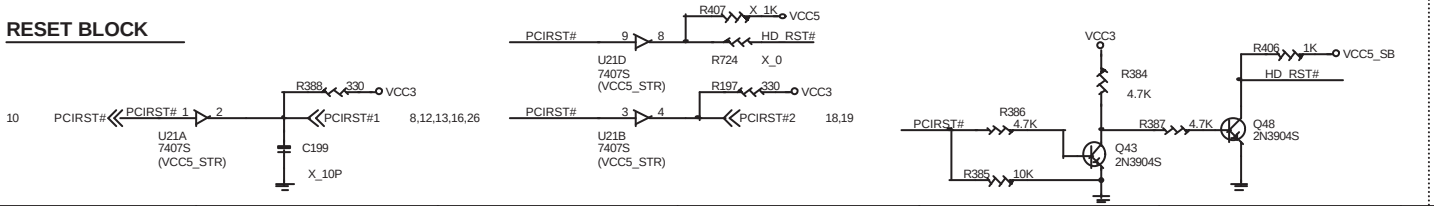
PRIMARY IDE BLOCK



SECONDARY IDE BLOCK

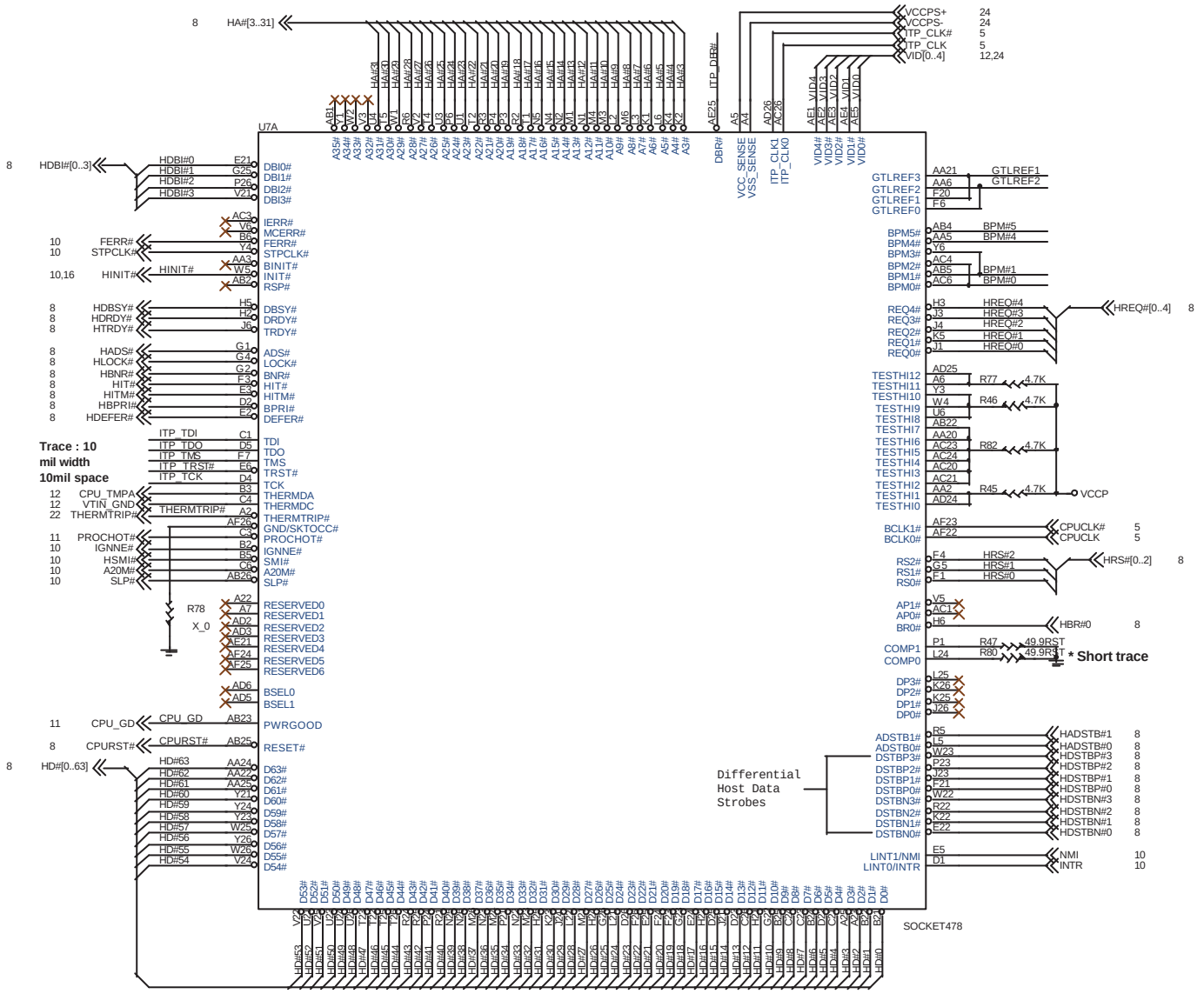


RESET BLOCK

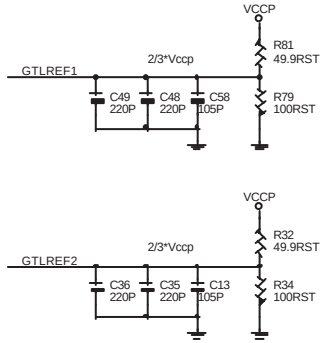


Micro-Star	Title: MS-6532	Rev: 1.0B
	Document Number: Clock CY28323/4 & ATA100 IDE	
	Last Revision Date: Wednesday, July 25, 2001	Sheet 5 of 32

CPU SIGNAL BLOCK

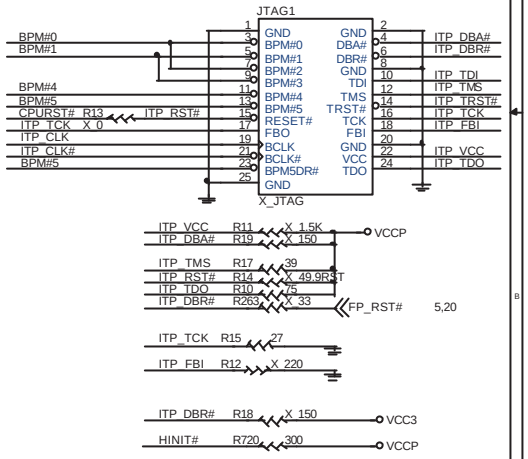


CPU GTL REFERNCE VOLTAGE BLOCK



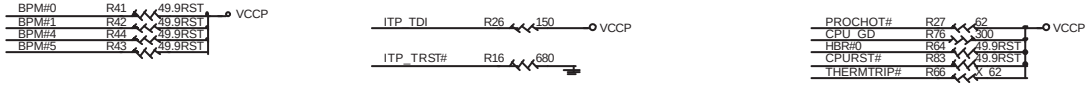
Every pin put one 220pF cap near it.
Trace Width 15mils, Space 15mils.
Keep the voltage dividers within 1.5 inches of the first GTLREF Pin

CPU ITP BLOCK




```
NO USE ITP COMPORENTS LIST:
1.JTAG1 NC
2.R13 NC
3.R11 NC
4.R14 NC
5.R263 NC
6.R18 NC
```

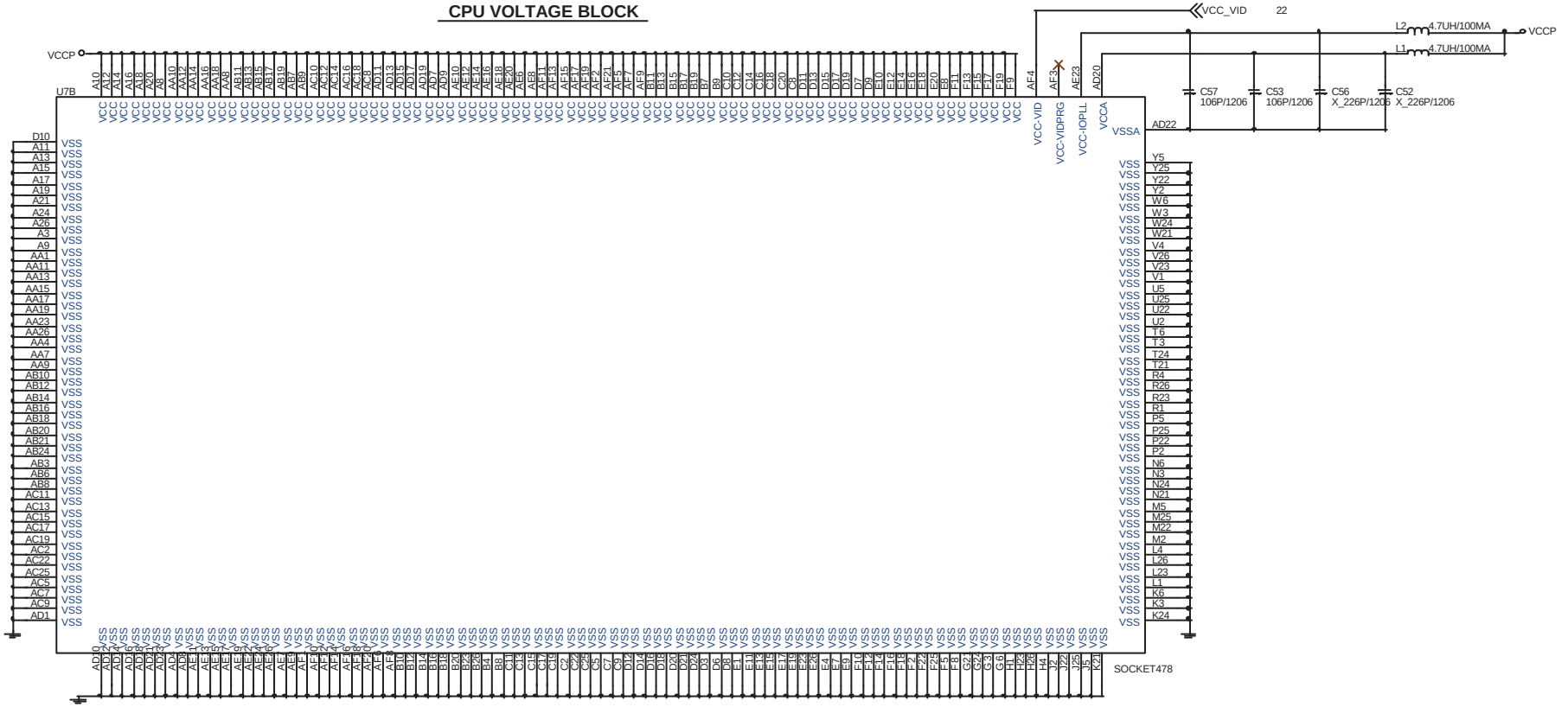
CPU STRAPPING RESISTORS



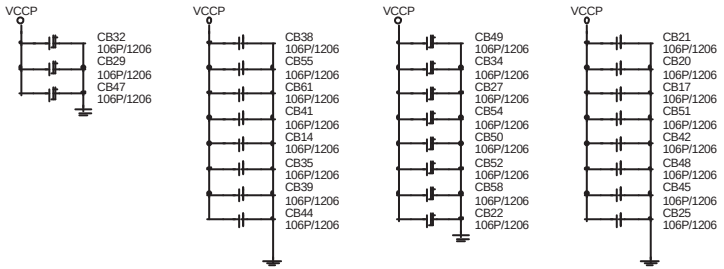
ALL COMPONENTS CLOSE TO CPU

Micro-Star	Title: MS-6532		Rev: 1.0B
Document Number: INTEL mPGA478-B CPU1			
Last Revision Date: Wednesday, July 25,2001		Sheet 6 of 32	

CPU VOLTAGE BLOCK

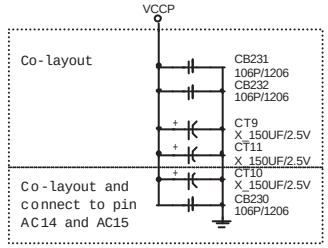


CPU DECOUPLING CAPACITORS



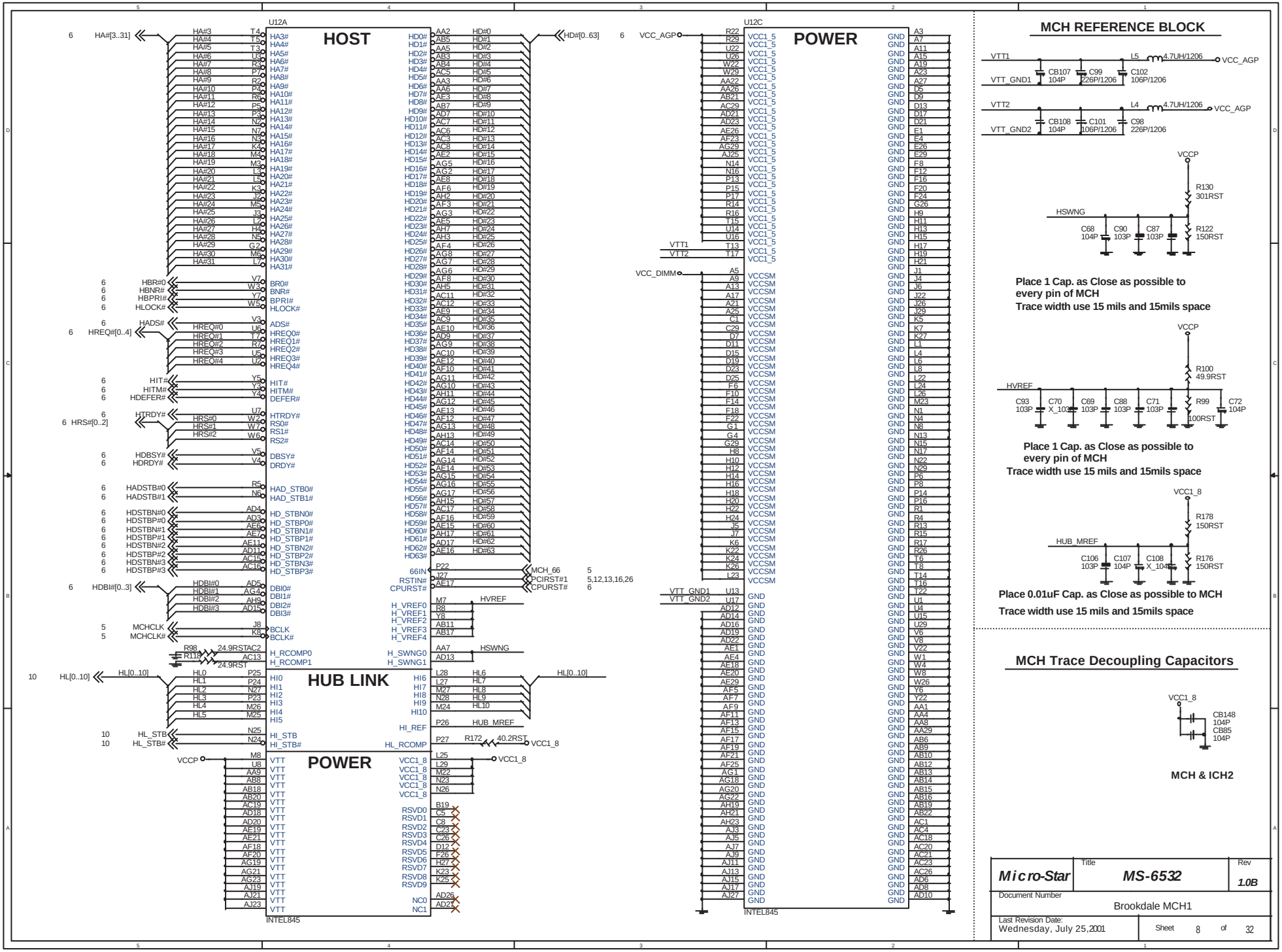
PLACE CAPS WITHIN CPU CAVITY

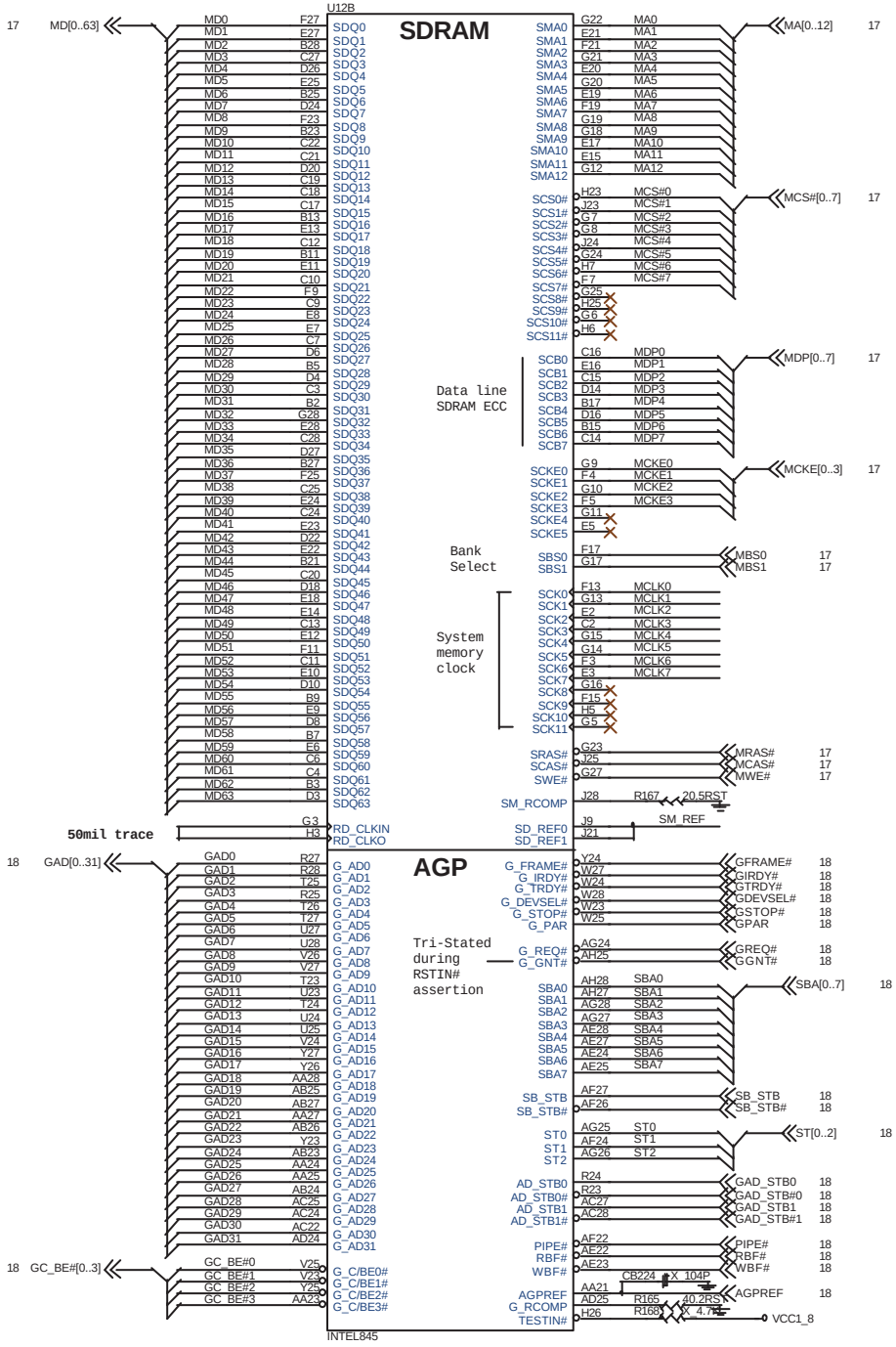
CPU DECOUPLING CAPACITORS



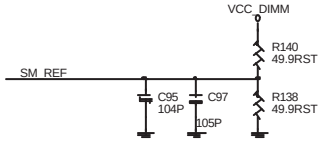
PLACE CAPS WITHIN CPU CAVITY SOLDER

Micro-Star	Title: MS-6532	Rev: 1.0B
Document Number: INTEL mPGA478-B CPU2		
Last Revision Date: Wednesday, July 25, 2001	Sheet 7 of 32	

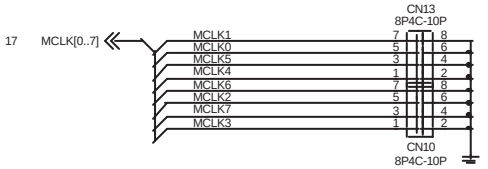

U12A
HOST
HA#[3..31]
HD#[0..63]
HBR#0
HBNR#
HBPRI#
HLOCK#
HADS#
HREQ#[0..4]
HIT#
HITM#
HDEFER#
HTRDY#
HRS#[0..2]
HDBSY#
HDRDY#
HADSTB#0
HADSTB#1
HDSTBN#0
HDSTBP#0
HDSTBN#1
HDSTBP#1
HDSTBN#2
HDSTBP#2
HDSTBN#3
HDSTBP#3
HDBI#[0..3]
MCHCLK
MCHCLK#
R98 24.9RSTAC2
R119 24.9RST
HL[0..10]
HL_STB
HL_STB#
VCCP
HUB LINK
POWER
INTEL845
U12C
POWER
VCC_AGP
VCC_DIMM
VTT1
VTT2
VTT_GND1
VTT_GND2
INTEL845
MCH REFERENCE BLOCK
VTT1
VTT_GND1
CB107 104P
C99 226P/1206
C102 106P/1206
L5 4.7UH/1206
VCC_AGP
VTT2
VTT_GND2
CB108 104P
C101 106P/1206
C98 226P/1206
L4 4.7UH/1206
VCC_AGP
VCCP
R130 301RST
HSWNG
C68 104P
C90 103P
C87 103P
R122 150RST
Place 1 Cap. as Close as possible to every pin of MCH
Trace width use 15 mils and 15mils space
VCCP
R100 49.9RST
HVREF
C93 103P
C70 X_103P
C69 103P
C88 103P
C71 103P
R99 100RST
C72 104P
Place 1 Cap. as Close as possible to every pin of MCH
Trace width use 15 mils and 15mils space
VCC1_8
R178 150RST
HUB_MREF
C106 103P
C107 104P
C108 X_104P
R176 150RST
Place 0.01uF Cap. as Close as possible to MCH
Trace width use 15 mils and 15mils space
MCH Trace Decoupling Capacitors
VCC1_8
CB148 104P
CB85 104P
MCH & ICH2
Micro-Star
Title
MS-6532
Rev
1.0B
Document Number
Brookdale MCH1
Last Revision Date:
Wednesday, July 25,2001
Sheet 8 of 32



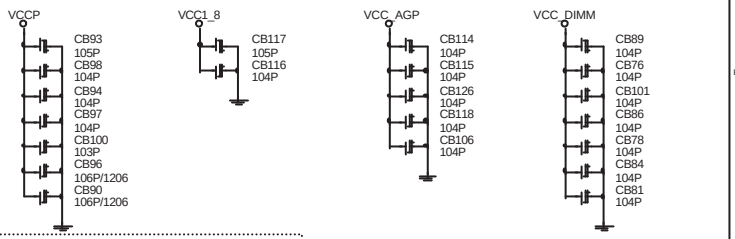
MCH REFERENCE VOLTAGE



MCH MEMORY CLOCK RC CIRCUITS

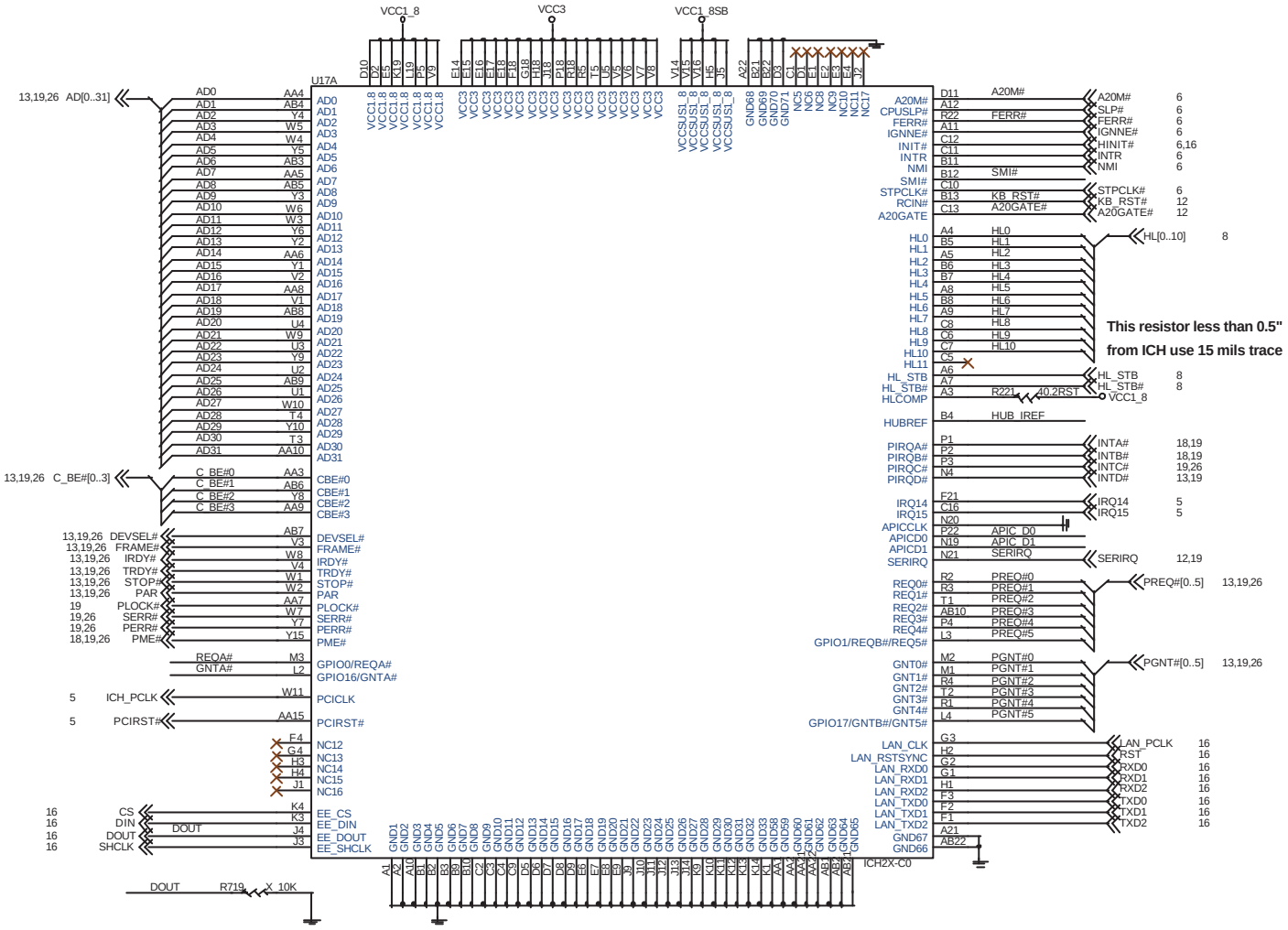


MCH DECOUPLING CAPACITOR

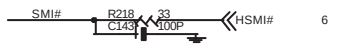


Micro-Star	Title: MS-6532		Rev: 1.0B
Document Number: Brookdale MCH 2			
Last Revision Date: Wednesday, July 25, 2001		Sheet 9 of 32	

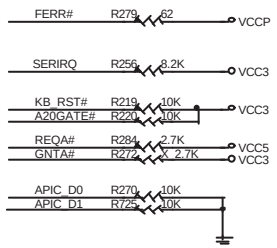
ICH2 PCI / HUB LINK / CPU / LAN / INTERRUPT SIGNALS



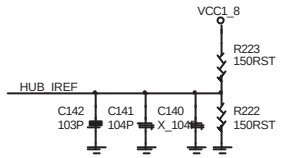
ICH2 SMI# SIGNAL



ICH2 STRAPPING RESISTORS

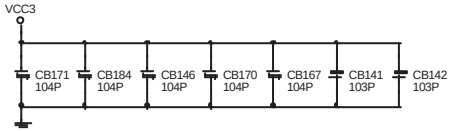


ICH2 REFERENCE VOLTAGE

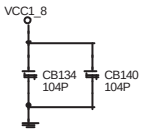


Place Cap. as Close as possible to ICH2
Trace width use 15 mils and 15mils space

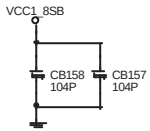
ICH2 DECOUPLING CAPACITORS



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



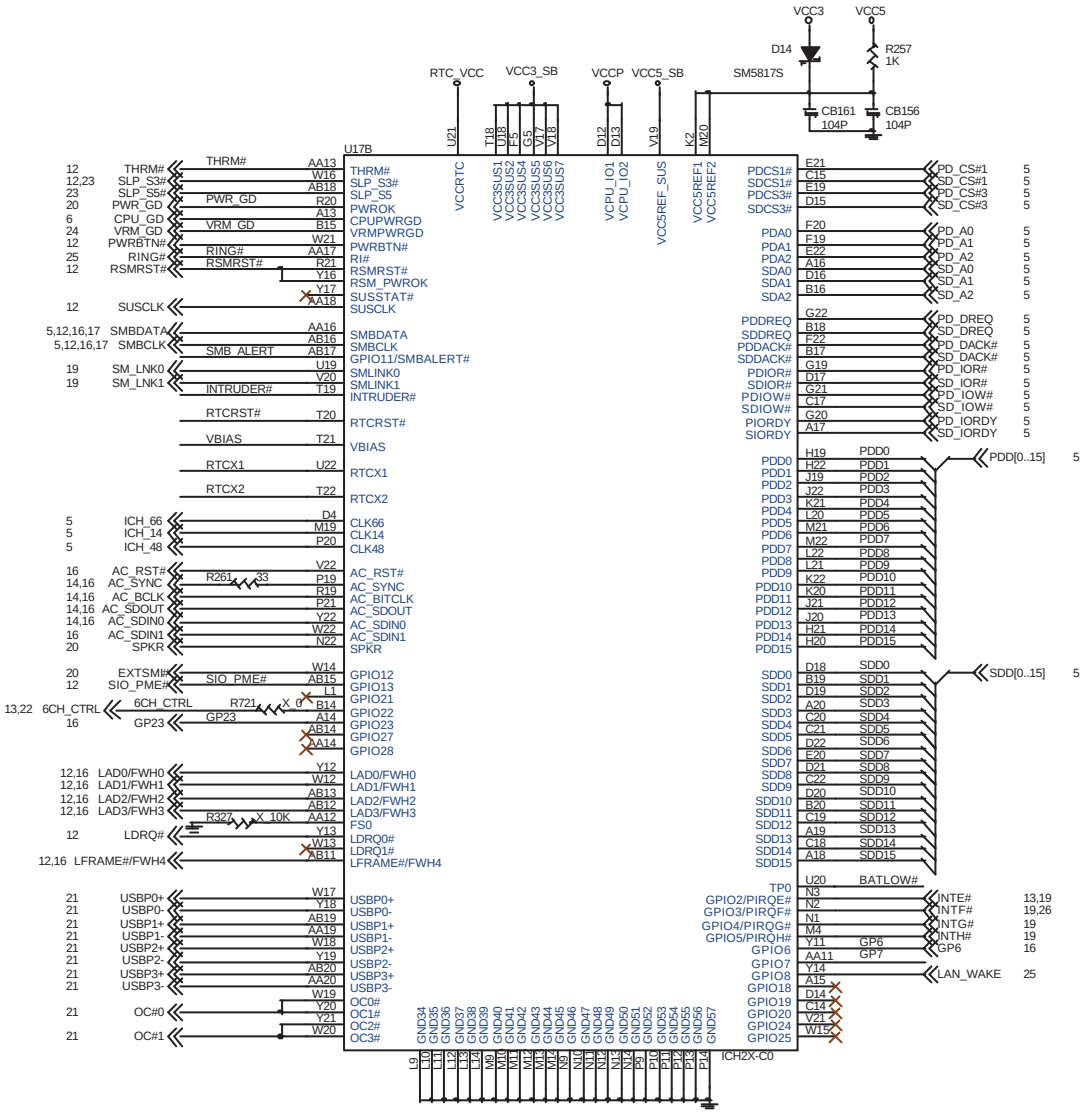
Distribute near the 1.8V
power pin of the ICH2



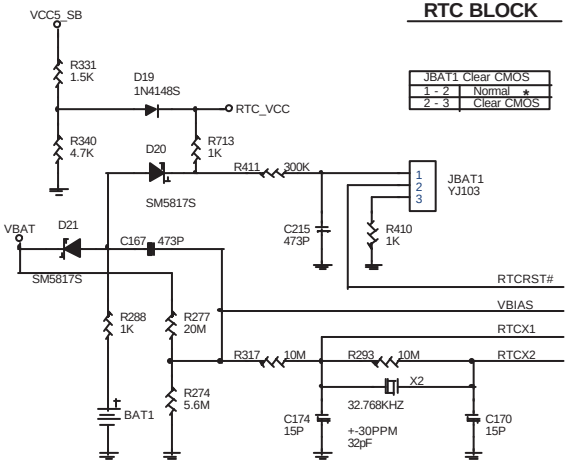
Distribute near the VCC1_8SB
Power pin of the ICH2

Micro-Star	Title: MS-6532	Rev: 1.0B
Document Number: Brookdale ICH2 PCI		
Last Revision Date: Wednesday, July 25, 2001	Sheet 10 of 32	

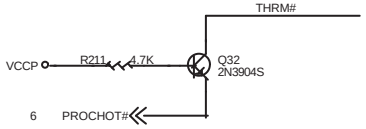
ICH2 ASIC / RTC / AC'97 / GPIO / LPC / USB / IDE SIGNALS



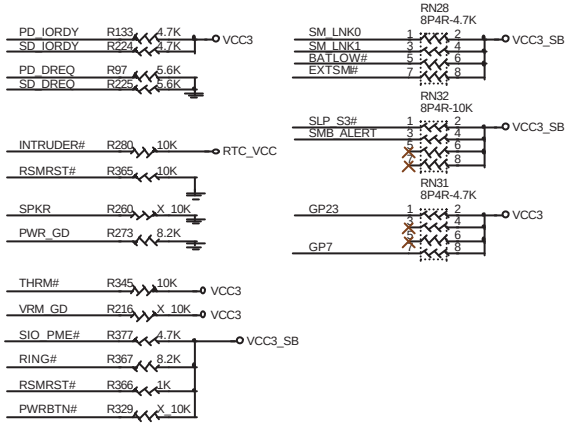
RTC BLOCK



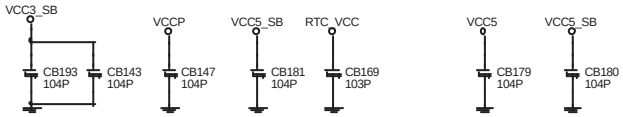
PROCHOT BLOCK



ICH2 STRAPPING RESISTORS



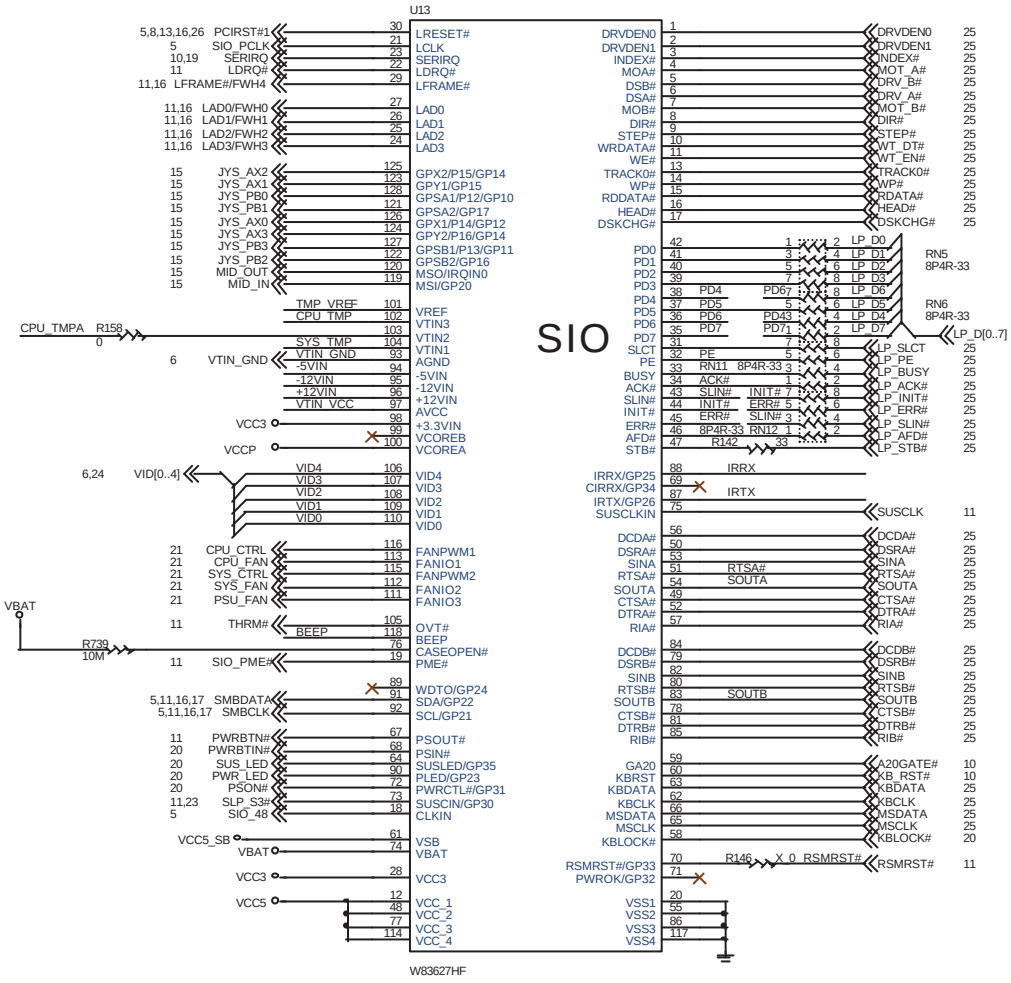
ICH2 DECOUPLING CAPACITOR



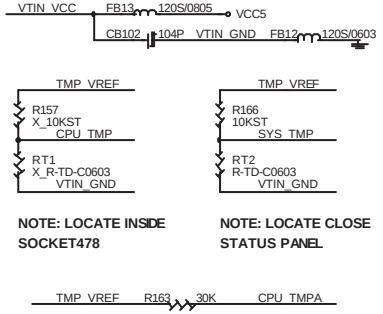
Distribute near the VCC3_SB power pin of the ICH

Micro-Star	Title: MS-6532	Rev: 1.0B
	Document Number: Brookdale ICH2 Other	
Last Revision Date: Wednesday, July 25, 2001	Sheet 11 of 32	

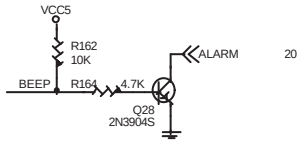
LPC SUPER I/O W83627HF



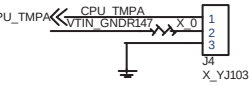
THERMAL RESISTOR BLOCK



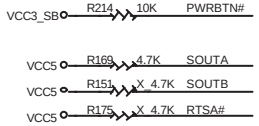
SPEAKER BLOCK



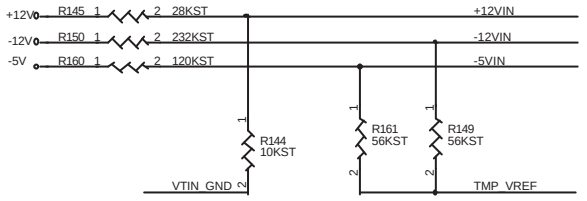
CPU Temperature Read



SUPER I/O STRAPPING RESISTOR

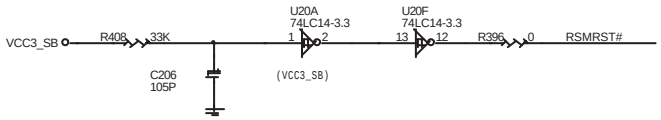


SOUTA	L: Disable KBC	H: Enable KBC
SOUTB	L: 24MHZ	H: 48MHZ
RTSA#	L: CFAD=2E	H: CFAD=4E
DTRA#	L: PNP Default	H: PNP no Default

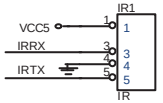


RESUME RESET CIRCUIT BLOCK

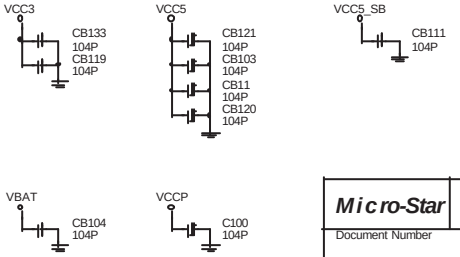
Stuff all for D Version bug



IR HEADER

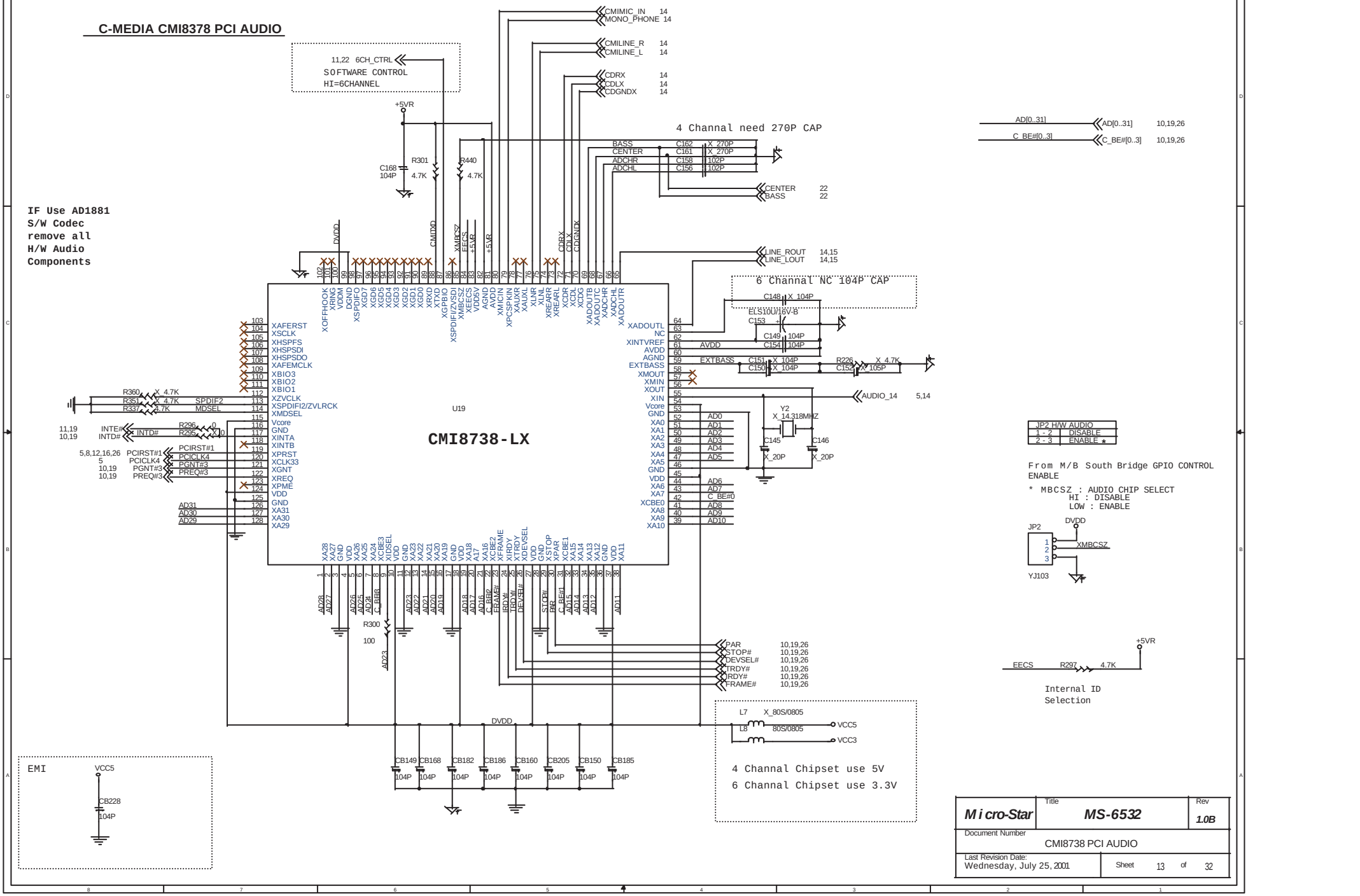


DECOUPLING CAPACITOR



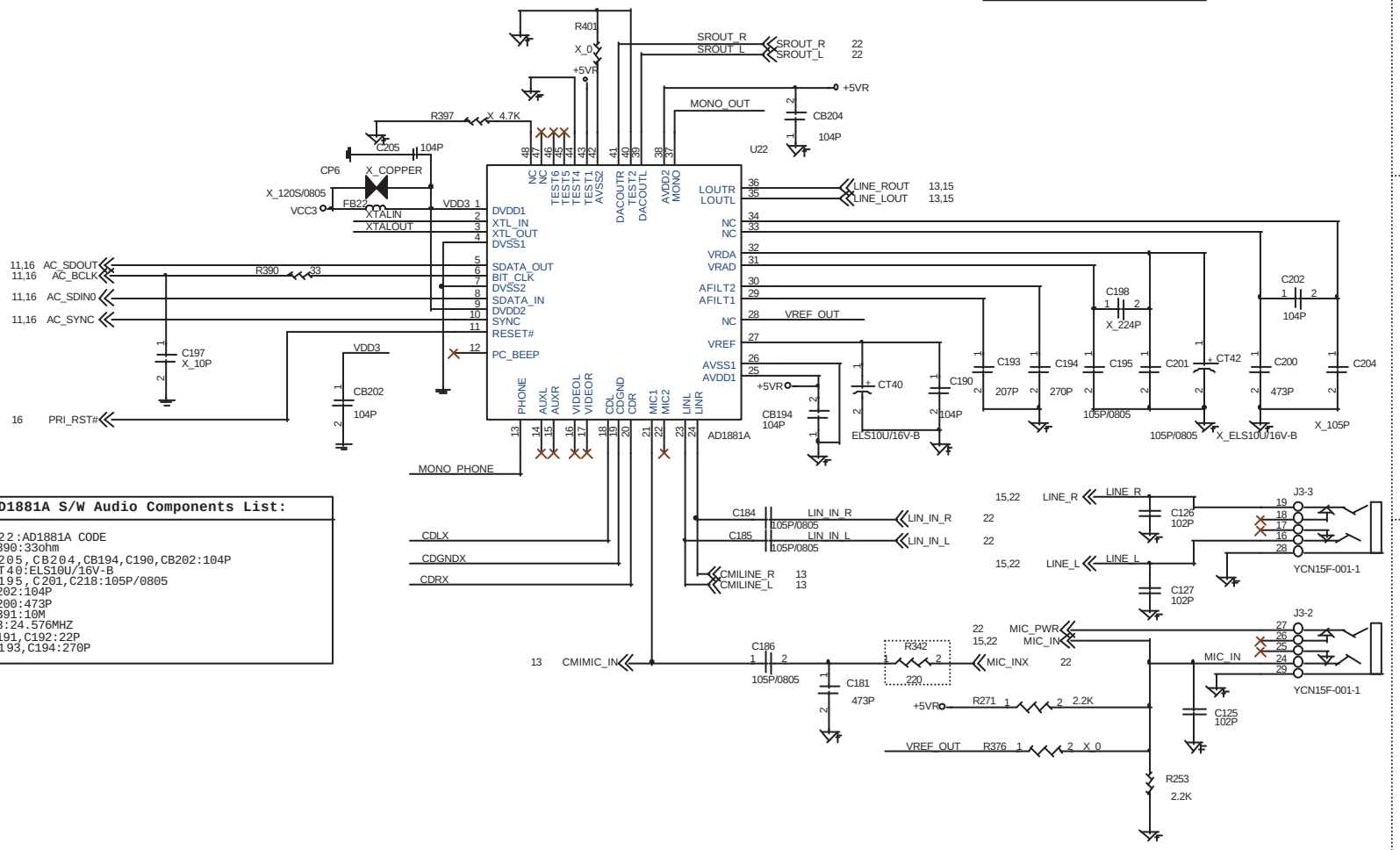
Micro-Star	Title: MS-6532		Rev: 1.0B
Document Number: LPC I/O W83627HF			
Last Revision Date: Wednesday, July 25, 2001	Sheet 12 of 32		

C-MEDIA CMI8378 PCI AUDIO



Micro-Star	Title: MS-6532		Rev: 1.0B
Document Number: CMI8738 PCI AUDIO			
Last Revision Date: Wednesday, July 25, 2001		Sheet 13 of 32	

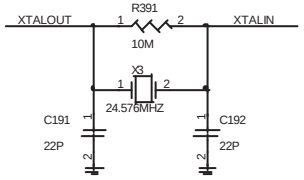
AD1881A AC97 CODEC



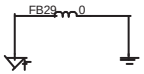
AD1881A S/W Audio Components List:

U22:AD1881A CODE
R390:33ohm
C205,CB204,CB194,C190,CB202:104P
CT40:ELS10U/16V-B
C195,C201,C218:105P/0805
C202:104P
C200:473P
R391:10M
X3:24.576MHZ
C191,C192:22P
C193,C194:270P

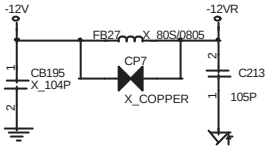
AUDIO CODE CRYSTAL CIRCUIT



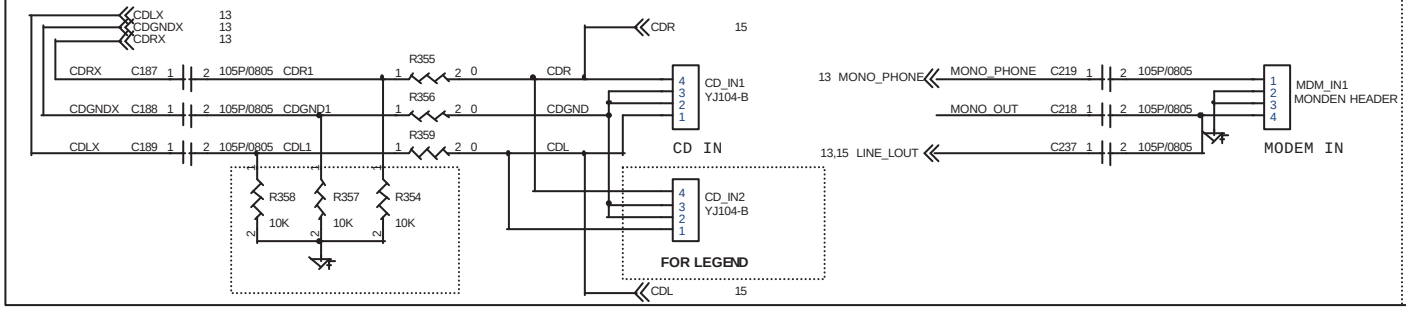
DECOUPLING CAPACITOR

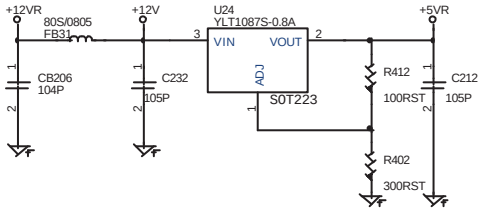


AUDIO CODE REGULATORS



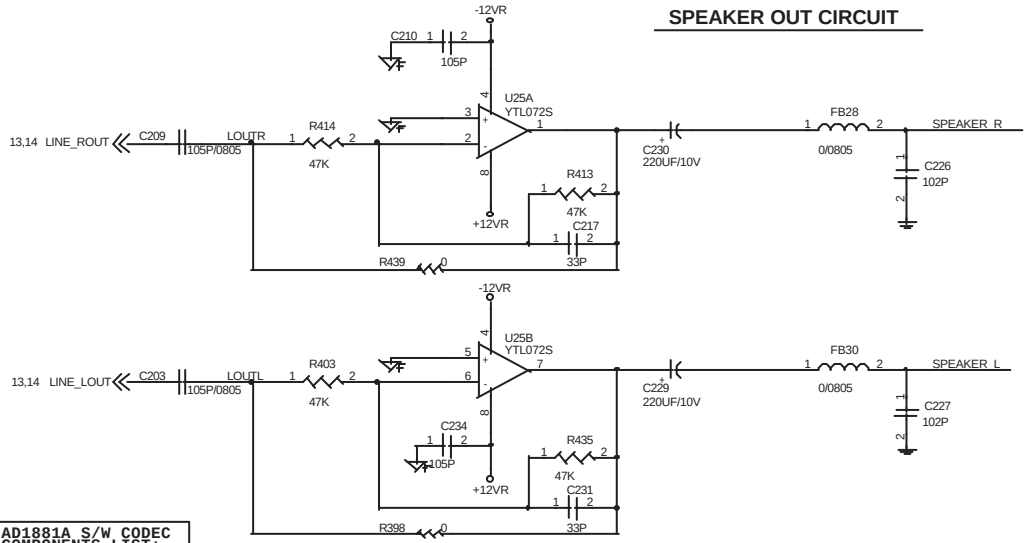
AUDIO CODE CD / AUX / MODEM IN HEADERS



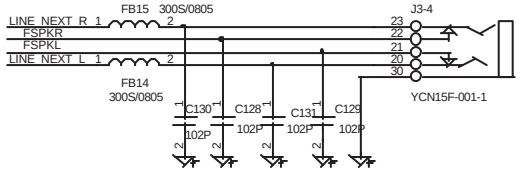


Micro-Star	Title: MS-6532	Rev: 1.0B
Document Number: AC97 CODEC AD1885		
Last Revision Date: Wednesday, July 25, 2001	Sheet 14 of 32	

SPEAKER OUT CIRCUIT



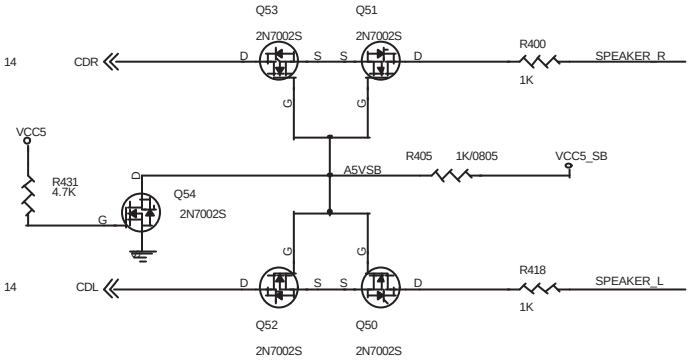
SPEAKER OUT JACK



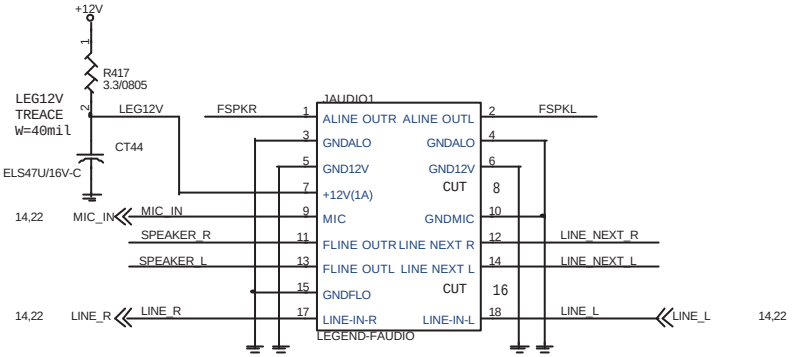
AD1881A S/W CODEC COMPONENTS LIST:

C210,C234:105P
R414,R435,R413,R403:47K
C217,C231:33P
R439,R398:NC

CD PANEL PLAY WITHOUT PC POWER_ON

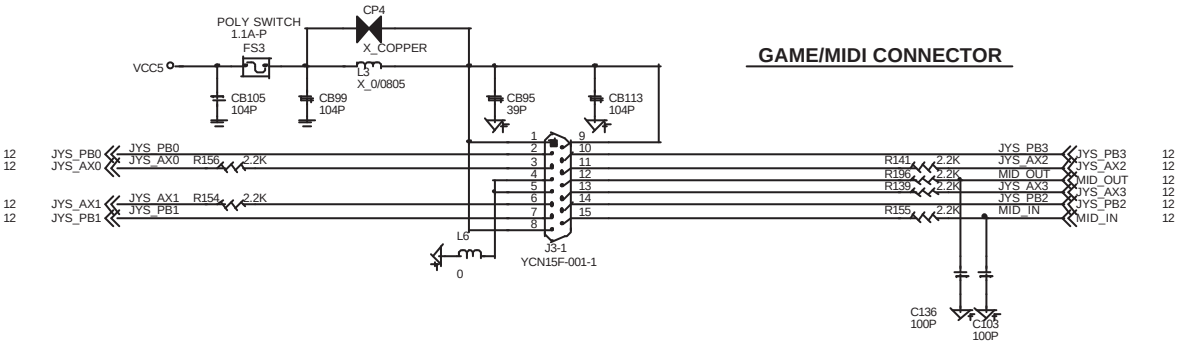


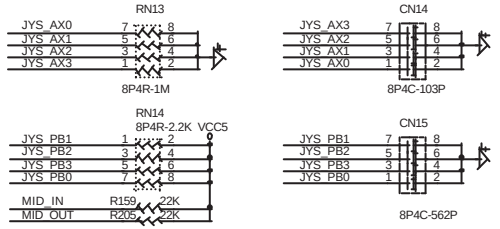
FOR MSI INTERNAL HEADER



FOR LEGEND

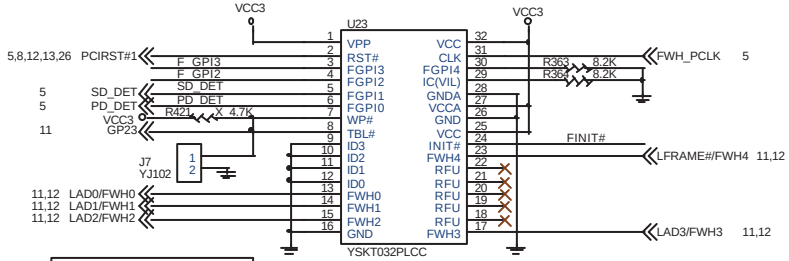
GAME/MIDI CONNECTOR





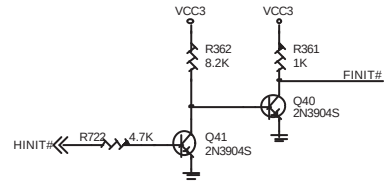
Micro-Star	Title: MS-6532	Rev: 1.0B
Document Number: Audio Amp TL072 & GAME		
Last Revision Date: Wednesday, July 25,2001	Sheet 15 of 32	

Firware Hub (FWH)

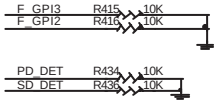


J7 BIOS Update	
SHORT	Locked
OPEN	Unlocked *

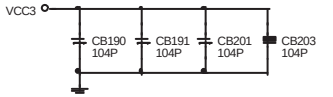
FWH INIT Signal Voltage Translation Block



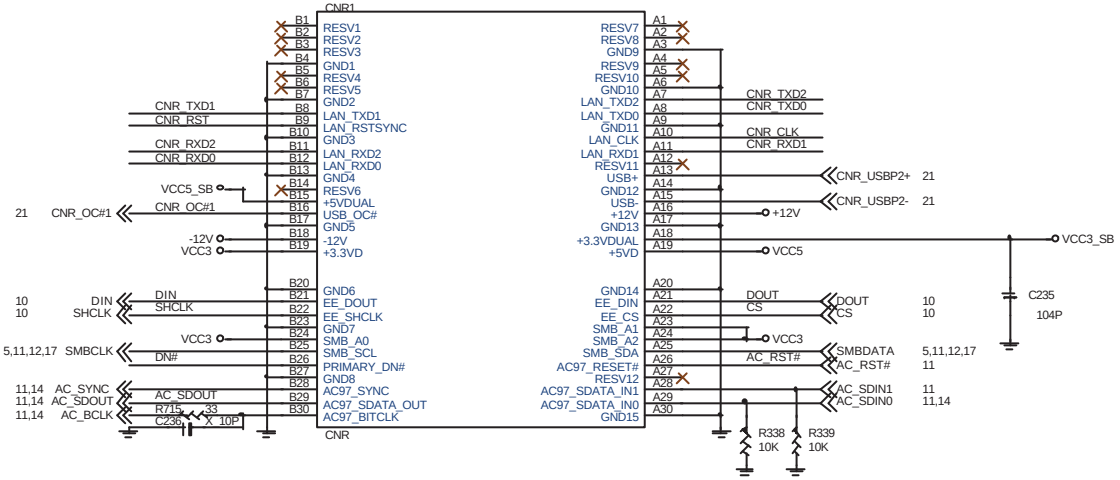
FWH RESISTORS



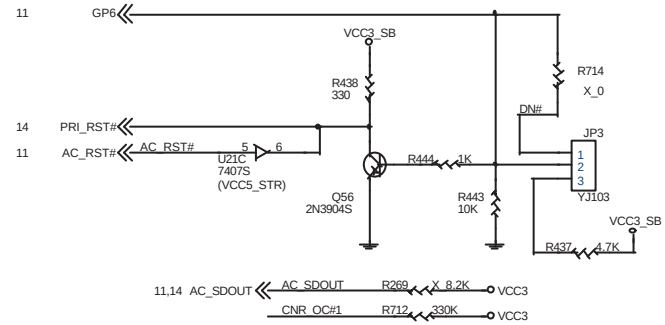
FWH DECOUPLING CAPACITORS



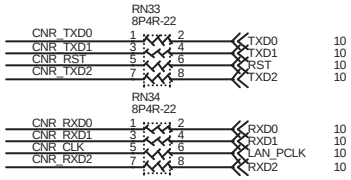
CNR RISER



JP3	AUDIO DOWN
1 - 2	Auto mode
2 - 3	Disabled onboard audio codec



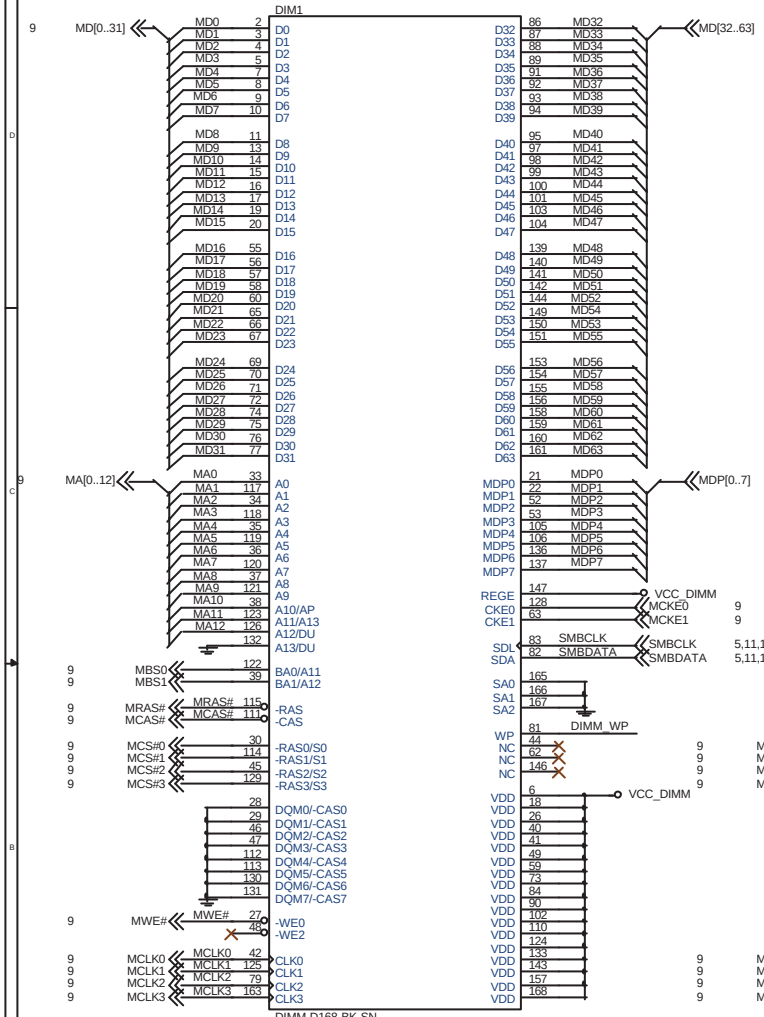
NEAR ICH2



2.5"<L<9"

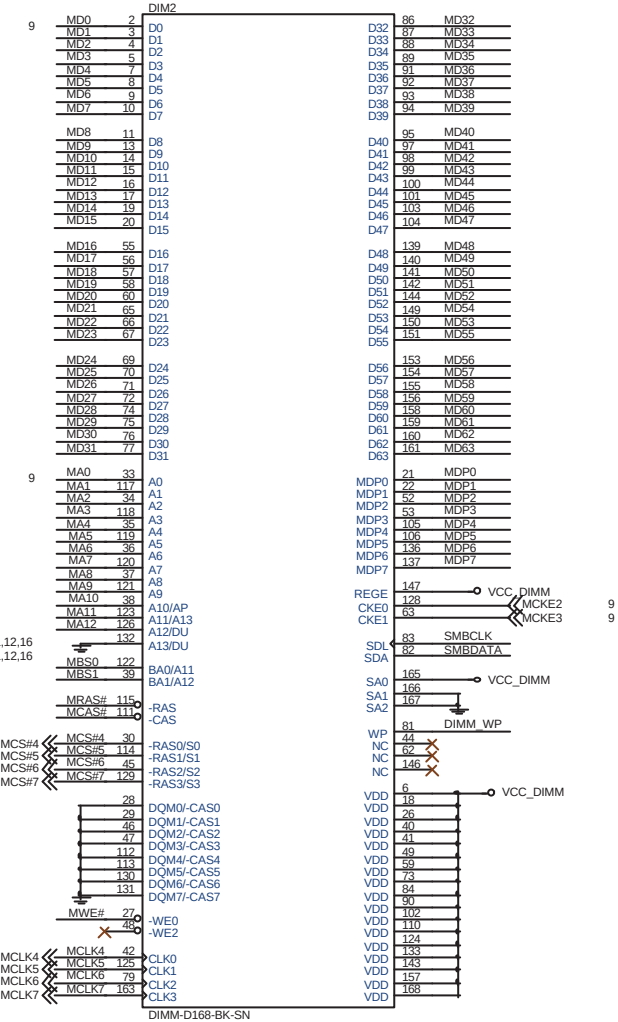
Micro-Star	Title: MS-6532	Rev: 1.0B
Document Number: FWH & CNR		
Last Revision Date: Wednesday, July 25, 2001	Sheet 16 of 32	

DIMM1



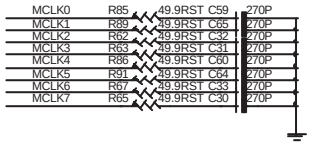
ADDR.=1010000B

DIMM2

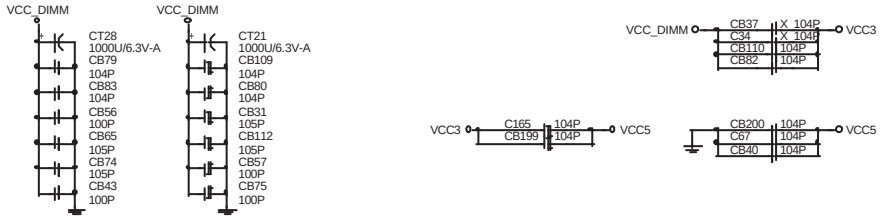


ADDR.=1010001B

DIMM CLOCK



DECOUPLING CAPACITORS

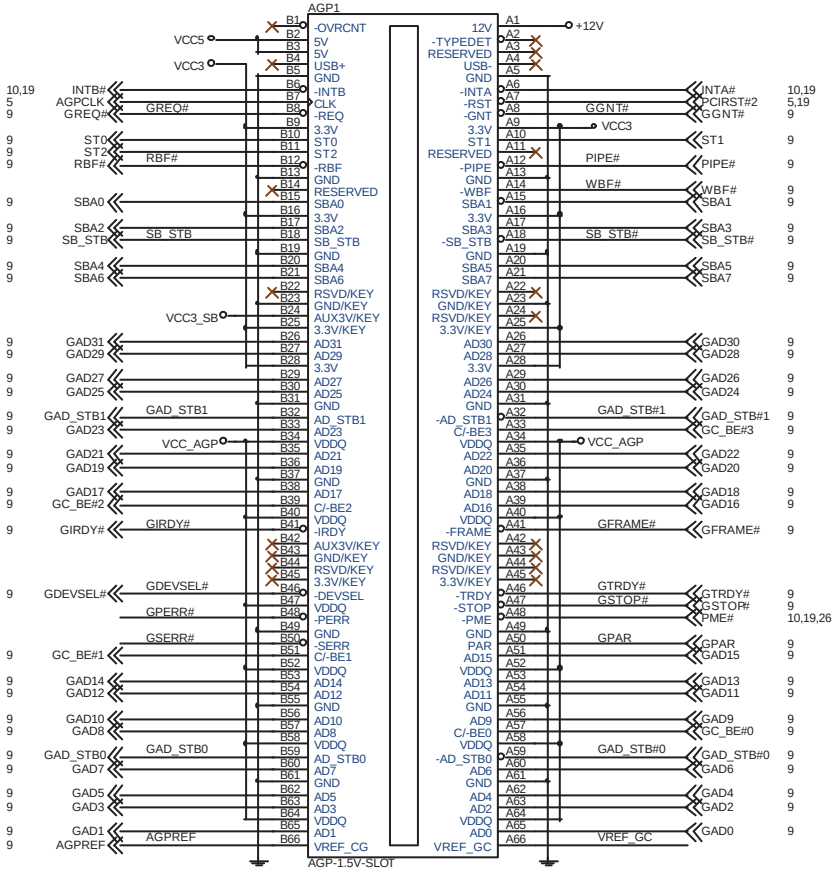


DIMM SPD WE BLOCK

Micro-Star	Title: MS-6532	Rev: 1.0B
Document Number: DIMM 1 & 2		
Last Revision Date: Wednesday, July 25, 2001	Sheet 17 of 32	

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

VCC5 = 60mils trace / 15 mils space

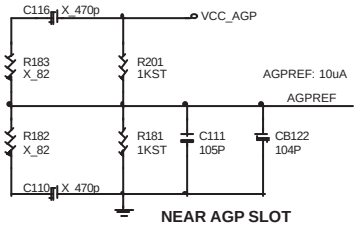


AGP Slot Imax

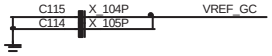
VCC_AGP 8.0A
VCC3 6.0A
VCC12 1.0A
VCC5 2.0A

INTA#
INTB#

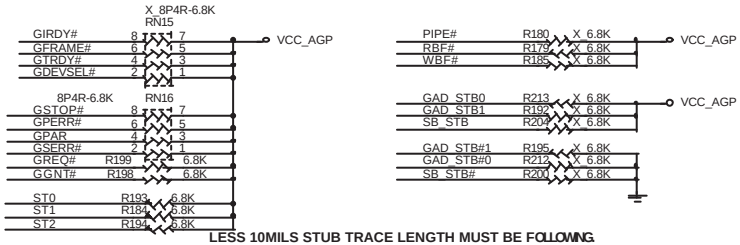
AGP SIGNAL REFERENCE CIRCUIT



NEAR AGP SLOT



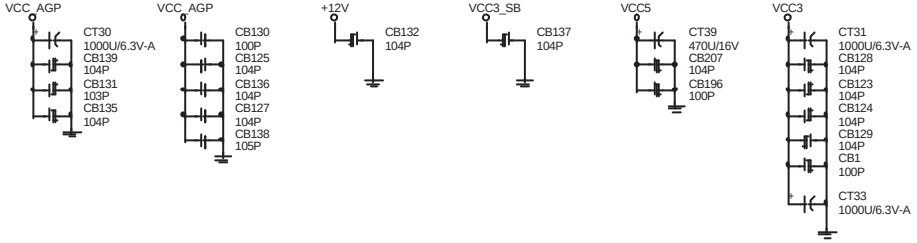
AGP TERMINATION RESISTORS



LESS 10MILS STUB TRACE LENGTH MUST BE FOLLOWING.

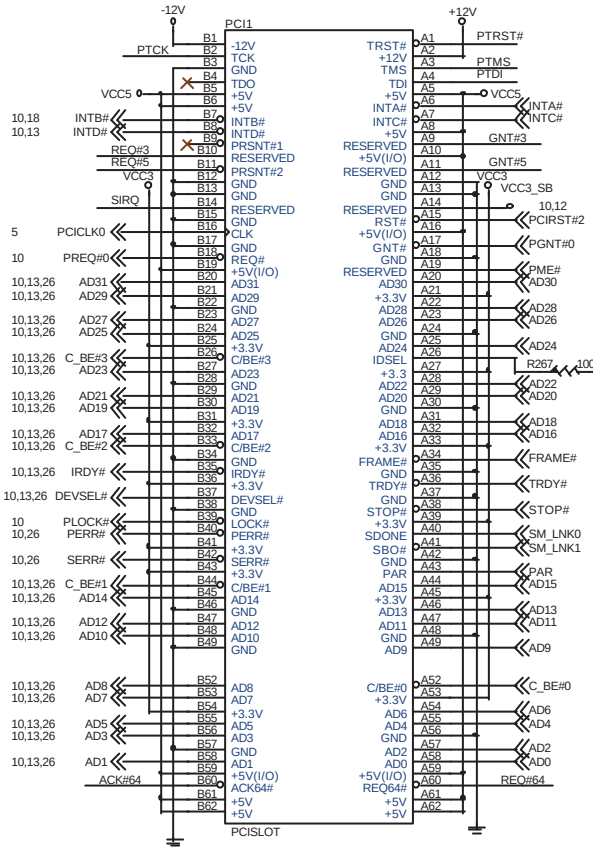
Place these resistors between PCI and AGP slot

AGP SLOT DECOUPLING CAPACITORS



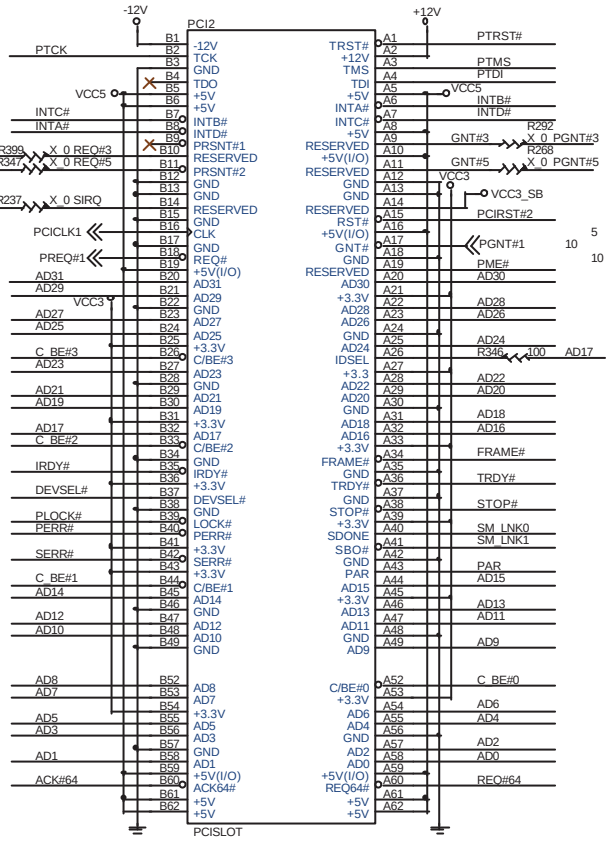
Micro-Star	Title: MS-6532	Rev: 1.0B
Document Number: AGP Slot		
Last Revision Date: Wednesday, July 25, 2001	Sheet 18 of 32	

PCI SLOT 1 (PCI VER: 2.2 COMPLY)



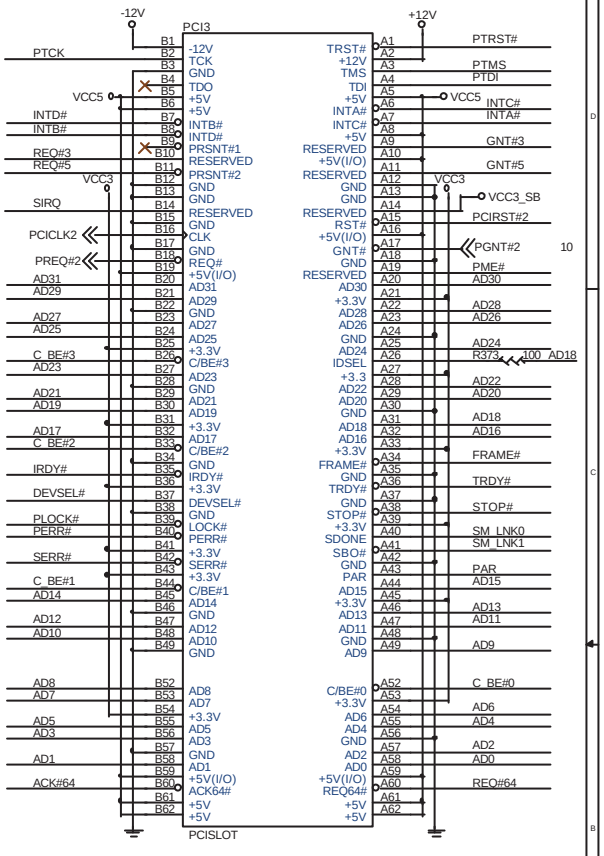
IDSEL = AD16
MASTER = PREQ0
INTA#

PCI SLOT 2 (PCI VER: 2.2 COMPLY)



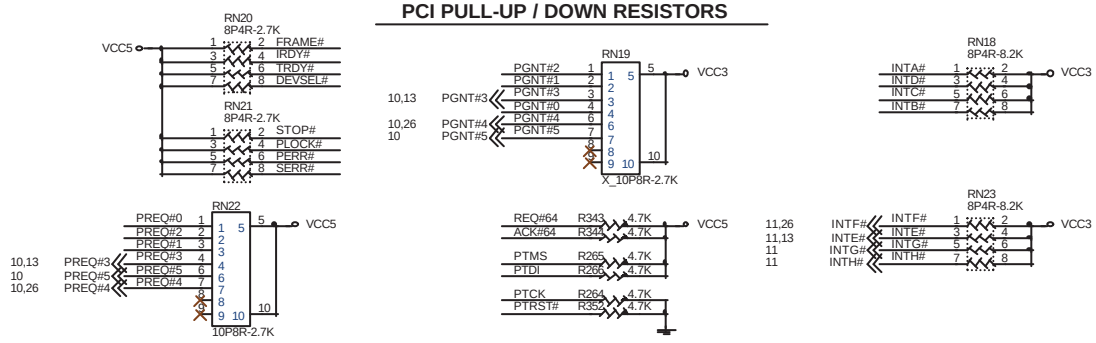
IDSEL = AD17
MASTER = PREQ1
INTB#

PCI SLOT 3 (PCI VER: 2.2 COMPLY)

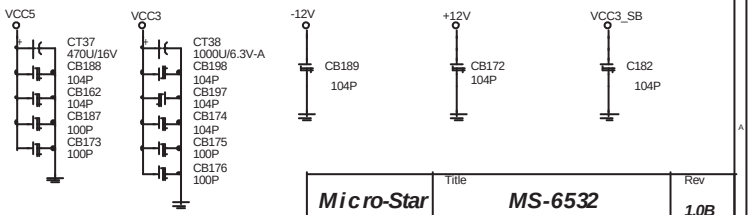


IDSEL = AD18
MASTER = PREQ2
INTC#

PCI PULL-UP / DOWN RESISTORS

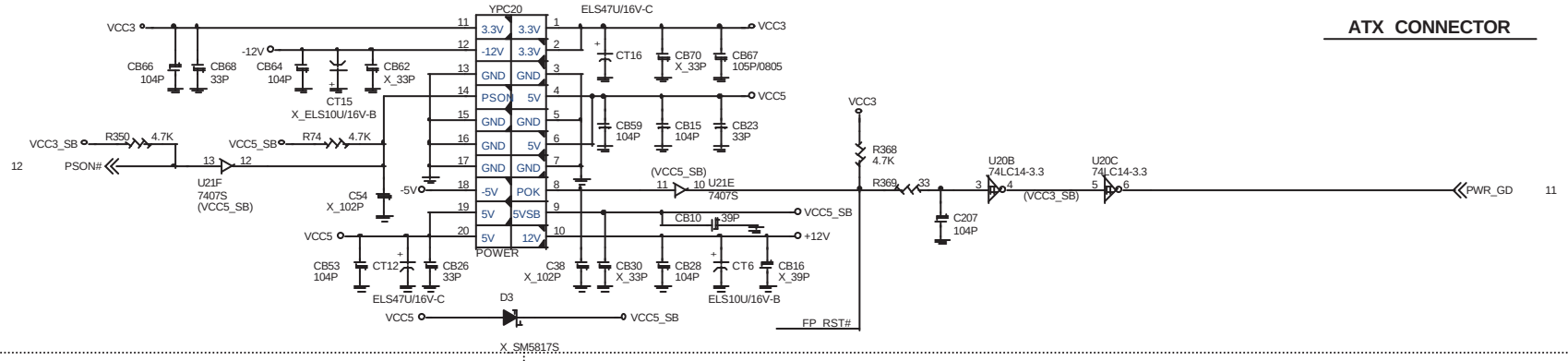


PCI SLOT DECOUPLING CAPACITORS

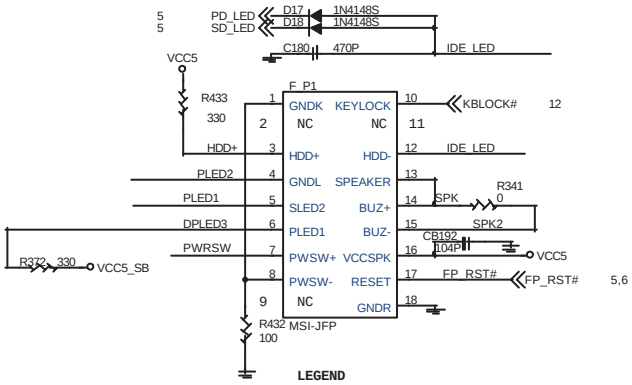


Micro-Star	Title: MS-6532	Rev: 1.0B
Document Number: PCI Slot 1 & 2 & 3		
Last Revision Date: Wednesday, July 25, 2001	Sheet 19 of 32	

ATX CONNECTOR



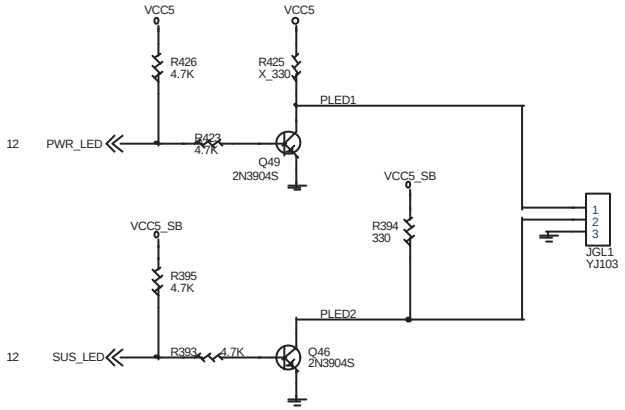
Brookdale FRONT PANEL-M



PIN3:YELLOW S0:GREEN

PIN5:GREEN S1:GREEN BLINKING

PIN6:+ S3:YELLOW



DUAL

\+ ..... GREEN

\- ..... YELLOW

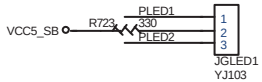
S0:STEADY GREEN

S1:GREEN BLINKING

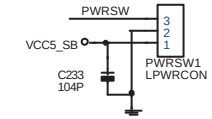
S3:STEADY YELLOW

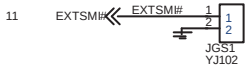
S4/S5:OFF

For Legend overlay with JGL1

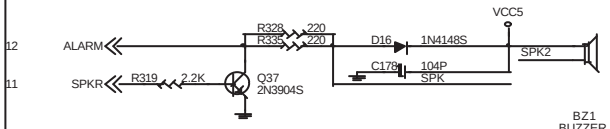


LEGEND POWER

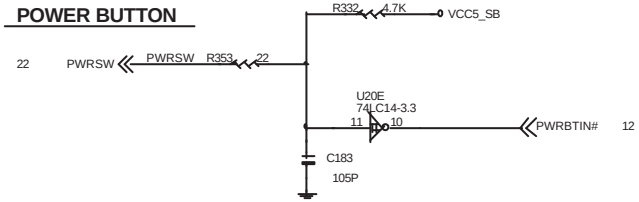




SPEAKER

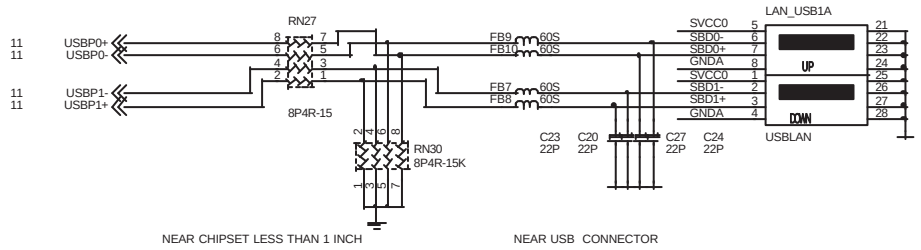


POWER BUTTON

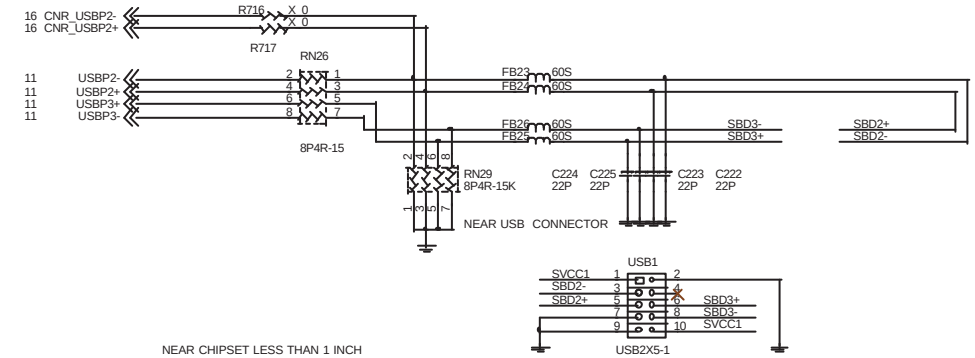


Micro-Star	Title: MS-6532	Rev: 1.0B
Document Number: Front Panel & Connector		
Last Revision Date: Wednesday, July 25, 2001	Sheet 20 of 32	

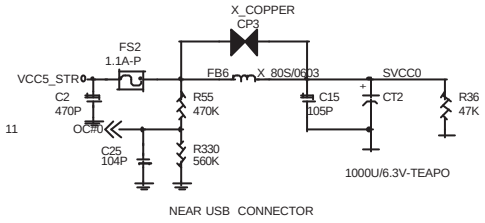
BACK PANEL USB CONNECTOR FOR USB PORT 0,1



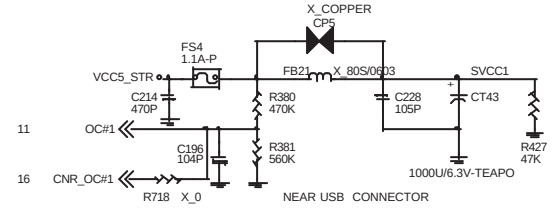
FRONT PANEL USB CONNECTOR FOR USB PORT 2,3



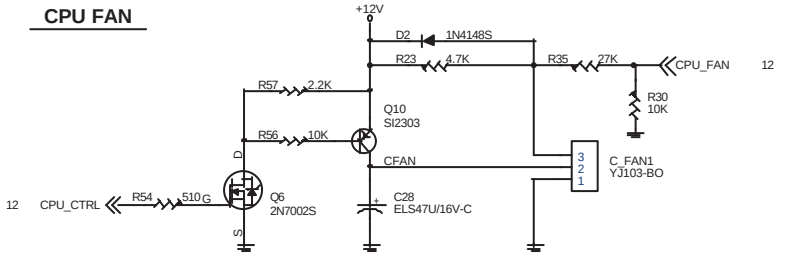
POWER CIRCUIT FOR USB PORT 0,1



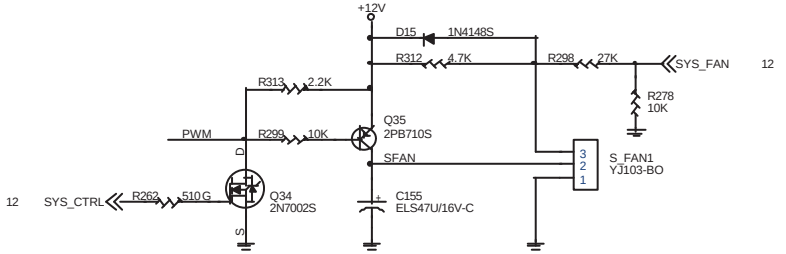
POWER CIRCUIT FOR USB PORT 2, 3



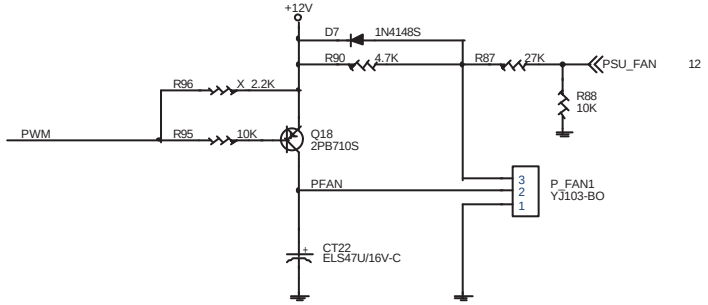
CPU FAN



SYSTEM FAN



ATX PSU FAN ON/OFF CONTROL

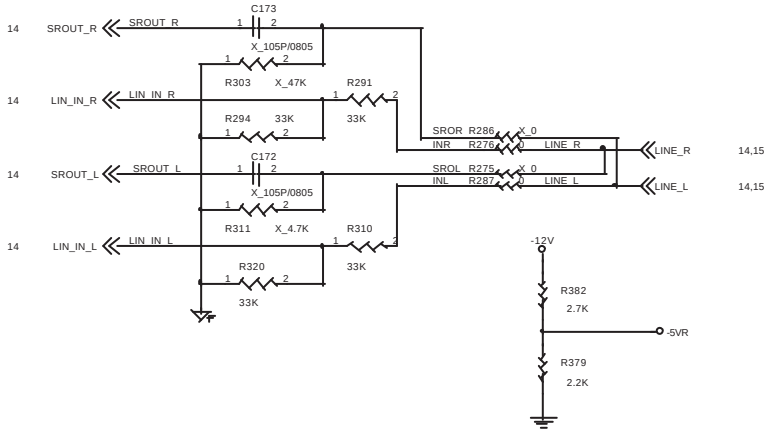


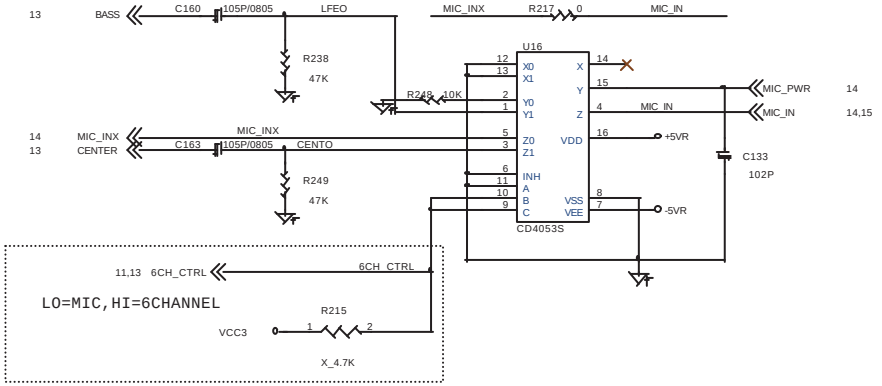
Micro-Star	Title: MS-6532	Rev: 1.0B
Document Number: USB & FAN Connectors		
Last Revision Date: Wednesday, July 25, 2001	Sheet 21 of 32	

6 CHANNEL CONTROLLER

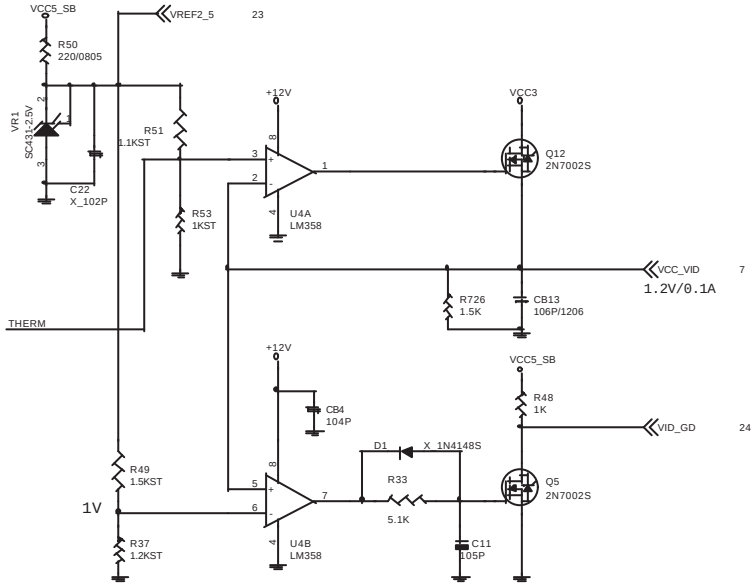
AD1881A S/W CODEC COMPONENTS LIST:

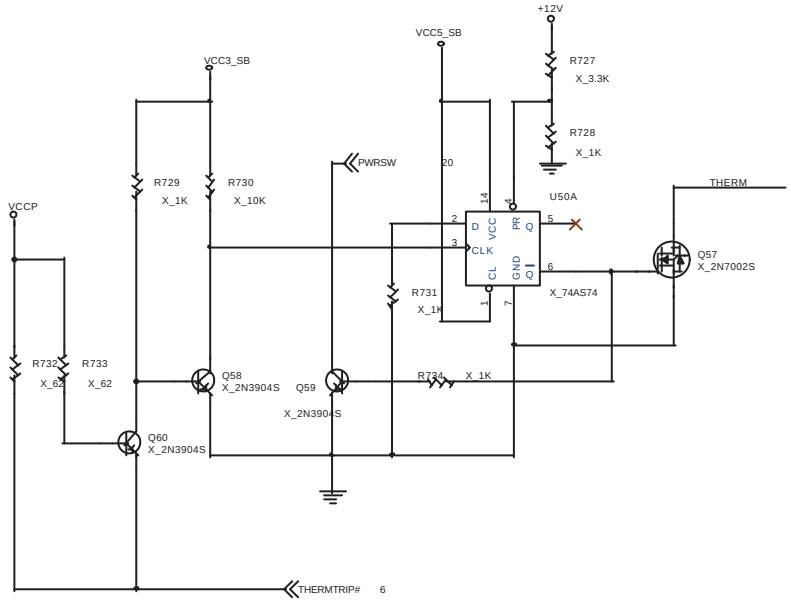
R217:0ohm
C160,R238,C163,R249,U16,C133,R382,R379:X





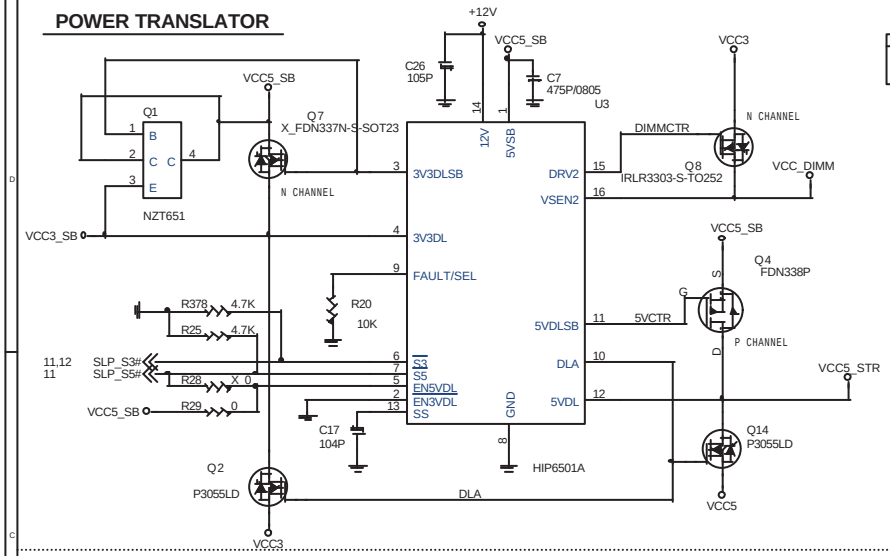
VCC_VID / VID_GOOD





Micro-Star	Title: MS-6532	Rev: 1.0B
Document Number: VID & 6 CHANNEL CONTROL		
Last Revision Date: Wednesday, July 25,2001	Sheet 22 of 32	

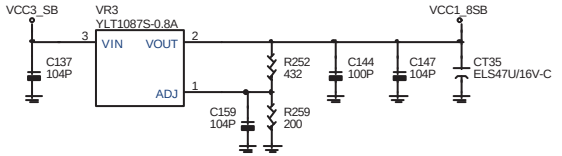
POWER TRANSLATOR



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)

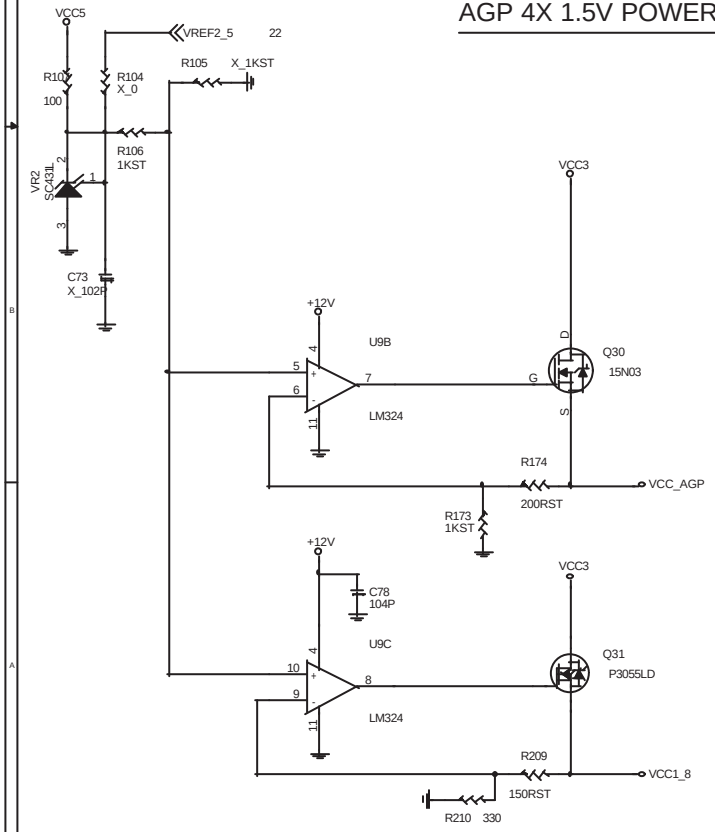
NOTE2 --- DIMM
S0 STATE --- 2.0A * 3 = 6.0A ---> VCC3
S1/S3 STATE --- 200mA * 3 = 600mA ---> VCC3_SB
VCC3_SB --> 600mA*3.3V/5V=396mA --> VCC5_SB

NOTE3 --- ICH2

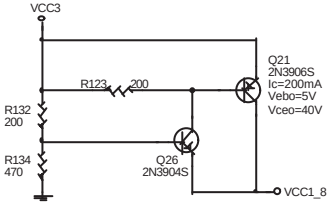
Power	S0	S1	S3/S4/S5
1.8V	300mA	100mA	N/A
1.8V_LAN	36mA	28mA	N/A
VCC1_8SB	45mA	30mA	7mA
VCC3	410mA	5mA	N/A
VCC3+562ET	230mA	210mA	N/A
VCC3_SB	25mA	0.6mA	N/A

VCC3_SB =
VCC1_8SB =
VCC5_SB = VCC3_SB + VCC1_8SB

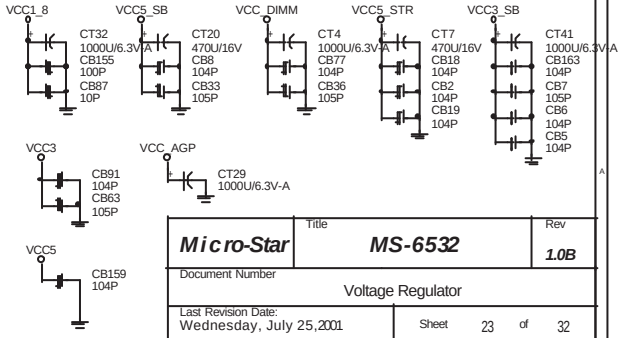
AGP 4X 1.5V POWER TRANSLATOR



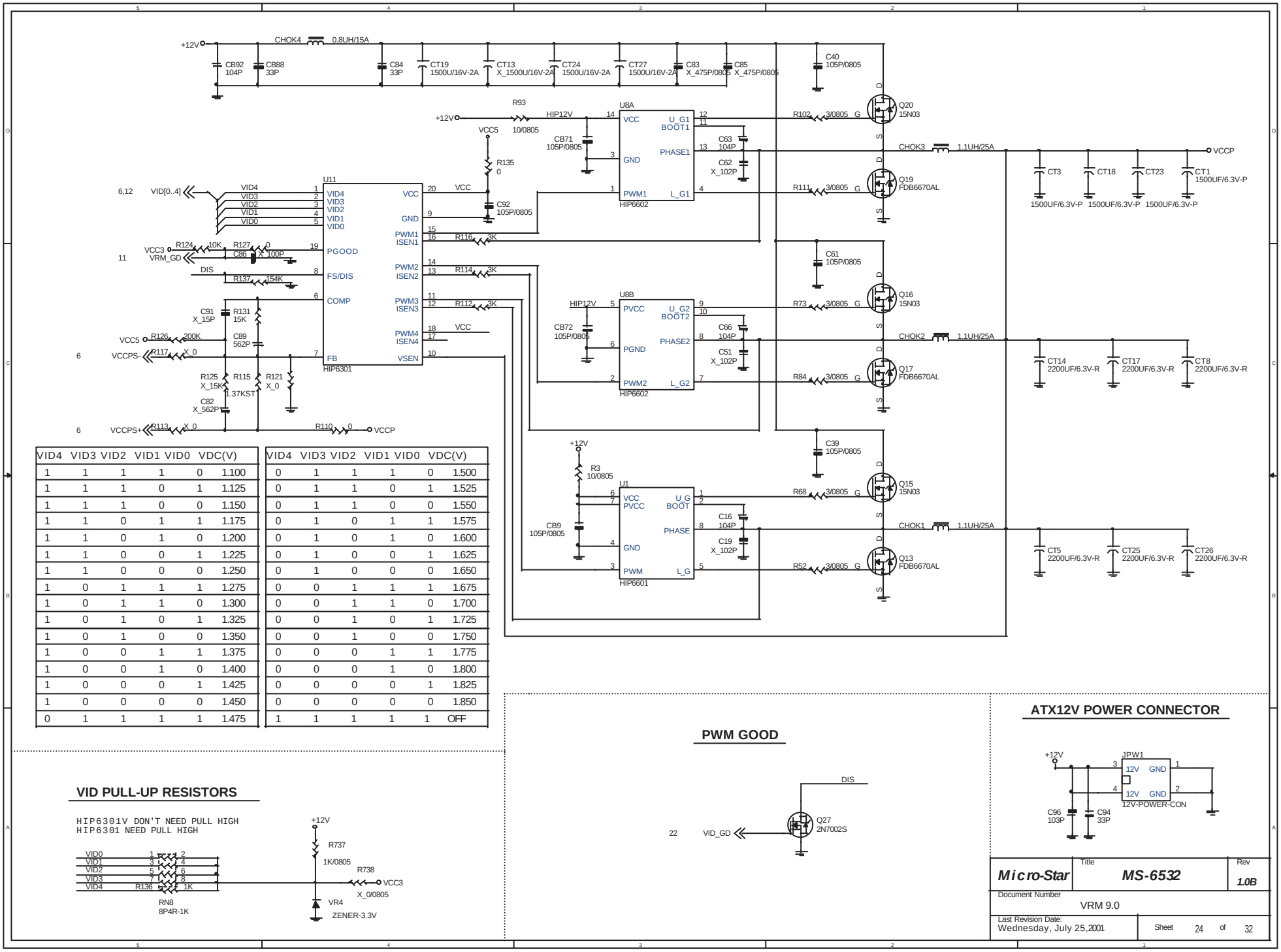
1.8V/3.3V SEQUENCE CIRCUIT



REGULATORS OUTPUT DECOUPLING CAPACITORS



Micro-Star	Title: MS-6532	Rev: 1.0B
Document Number: Voltage Regulator		
Last Revision Date: Wednesday, July 25, 2001	Sheet 23 of 32	



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

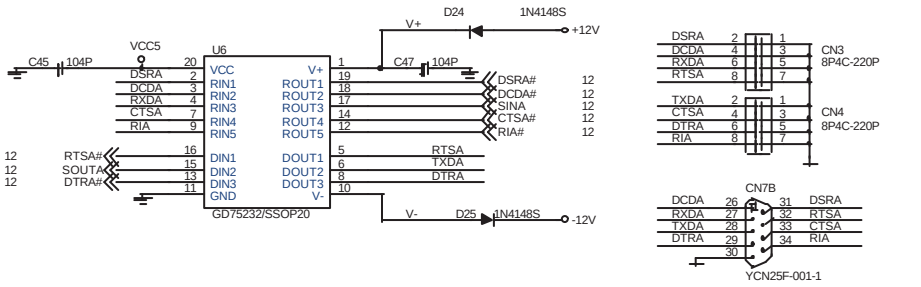
HIP6301V DON'T NEED PULL HIGH
HIP6301 NEED PULL HIGH

PWM GOOD

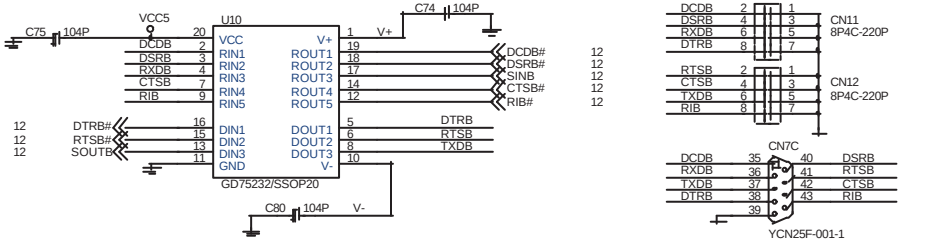
ATX12V POWER CONNECTOR

Micro-Star	Title: MS-6532	Rev: 1.0B
Document Number: VRM 9.0		
Last Revision Date: Wednesday, July 25, 2001	Sheet 24 of 32	

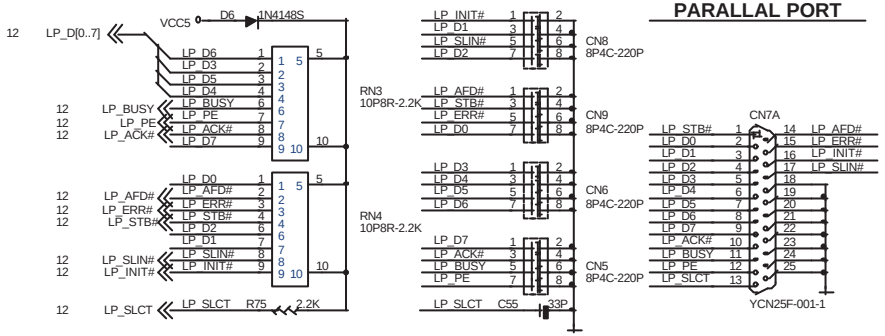
SERIAL PORT 1



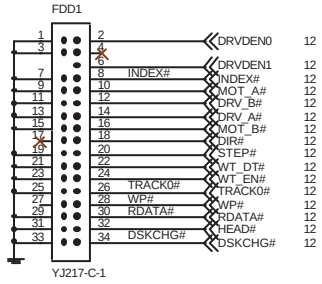
SERIAL PORT 2



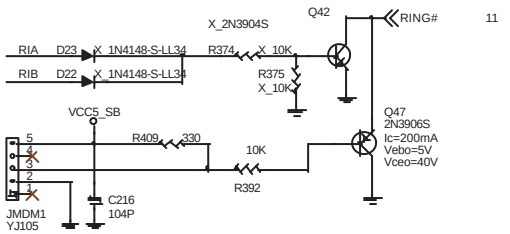
PARALLAL PORT



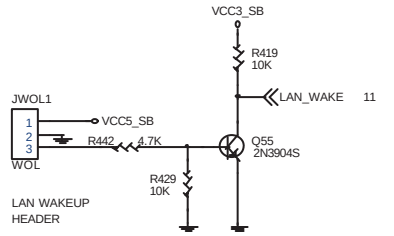
FLOPPY CONNECTOR



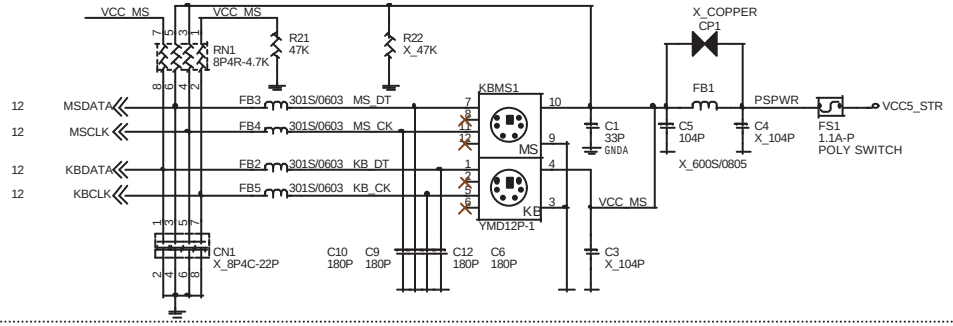
MODEM RING BLOCK



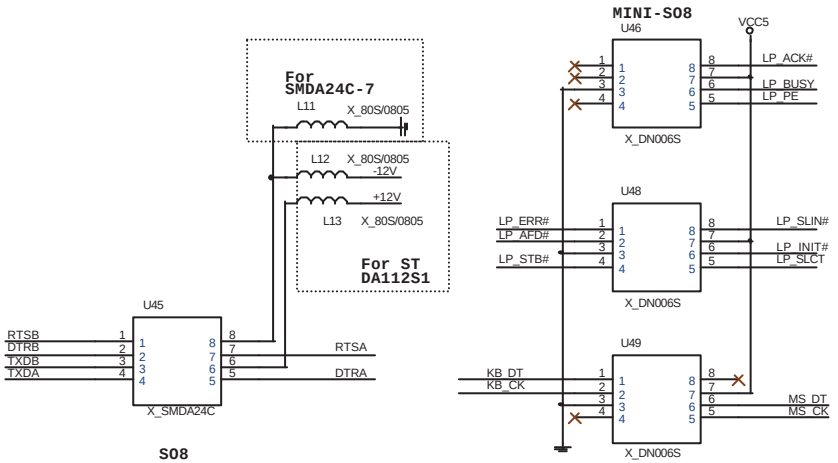
LAN WAKEUP BLOCK



PS2 KEYBOARD & MOUSE CONNECTOR

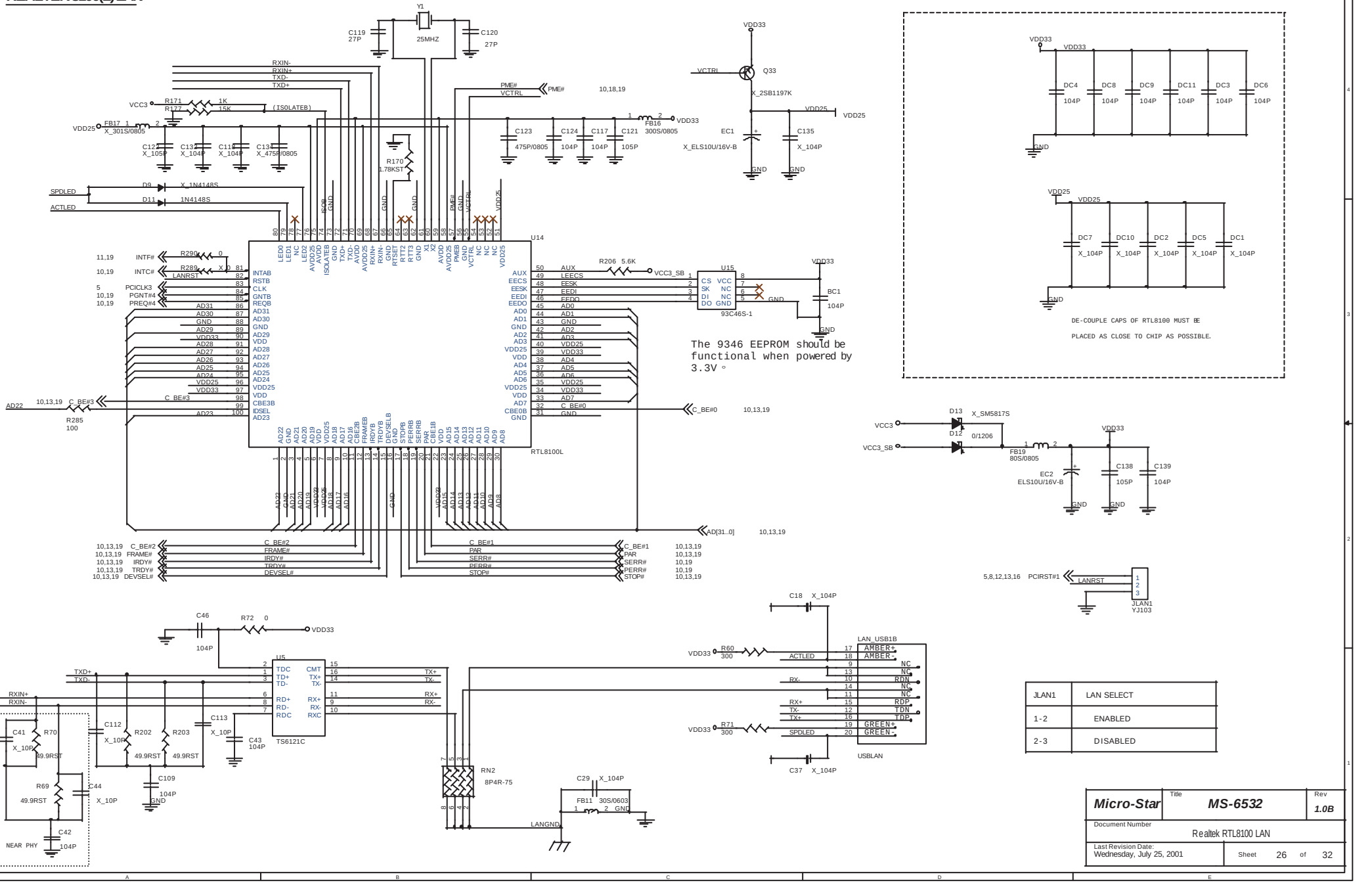


ESD



Micro-Star	Title: MS-6532	Rev: 1.0B
Document Number: IO Connector / ESD		
Last Revision Date: Wednesday, July 25, 2001	Sheet 25 of 32	

REALTEK 8100(L) LAN



JLAN1	LAN SELECT
1-2	ENABLED
2-3	DISABLED

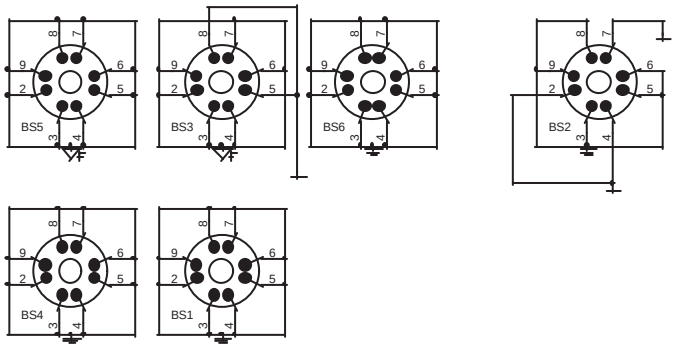
Micro-Star	Title: MS-6532	Rev: 1.0B
Document Number: Realtek RTL8100 LAN		
Last Revision Date: Wednesday, July 25, 2001	Sheet 26 of 32	

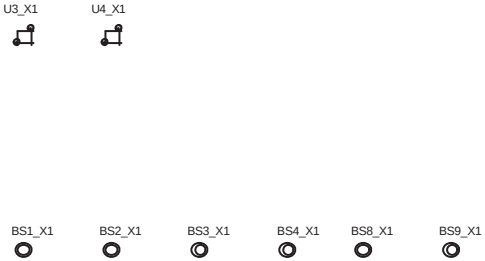
Jumper Setting

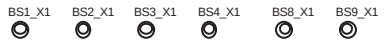
Jumper	Description	
JBAT1	CLEAR CMOS	
1-2	NORMAL	(Default)
2-3	CLEAR CMOS	
IR1	IR HEADER	
CD_IN1	CDROM HEADER (ATAPI)	
MDM_IN1	TELEPHONY HEADER (ATAPI)	
JP1	CNR RISER CODEC SELECT HEADER	
1-2	AUTO MODE	(Default)
2-3	PRIMARY AUDIO CODEC ONBOARD	

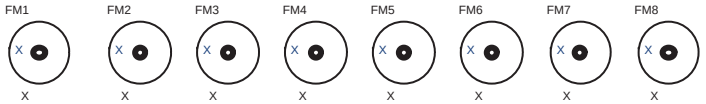
Micro-Star	Title: MS-6532	Rev: 1.0B
Document Number: JUMPER SETTING		
Last Revision Date: Wednesday, July 25, 2001	Sheet 27 of 32	

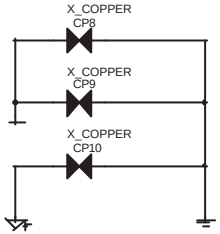
PCB OTHER COMPONENT



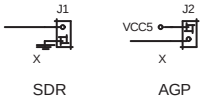








SIMULATION TRACE



Micro-Star	Title: MS-6532	Rev: 1.0B
Document Number: MANUAL		
Last Revision Date: Wednesday, July 25, 2001	Sheet 28 of 32	

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#

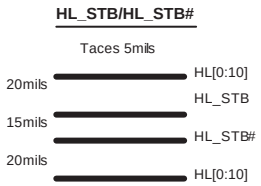
Signals	Length	Inaccuracy
Data	**2.0" to 10.0"**	+/- 100 mil
Address	**2.0" to 10.0"**	+/- 200 mil
Strobe	**2.0" to 10.0"**	+/- 25 mil
Clock	**2.0" to 10.0"**	Don't need

***** 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



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

HL[10..0]

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

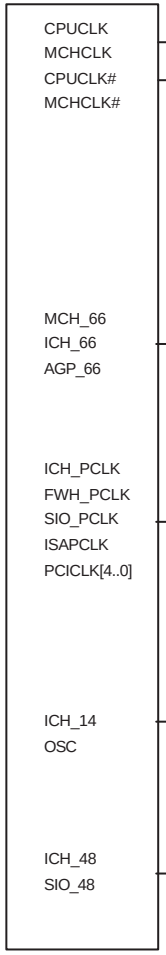
USB

*** 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"

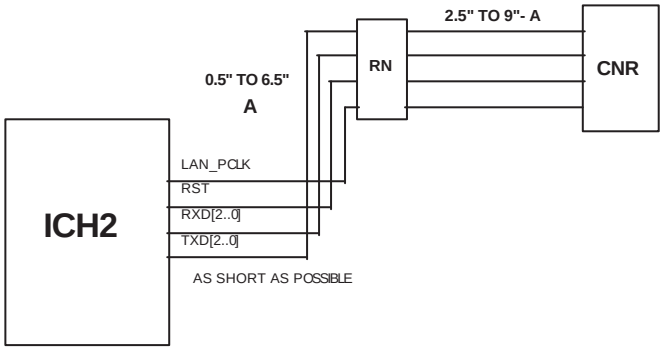
* Line Width : 5.0 mil
* Spacing to other traces : 20 mil
* L1/L2 TRACE SAME AS MCH_66 TRACE LENGTH

DEVICE	L1+L2
ICH	Y
ISA BRIDGE	Y

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

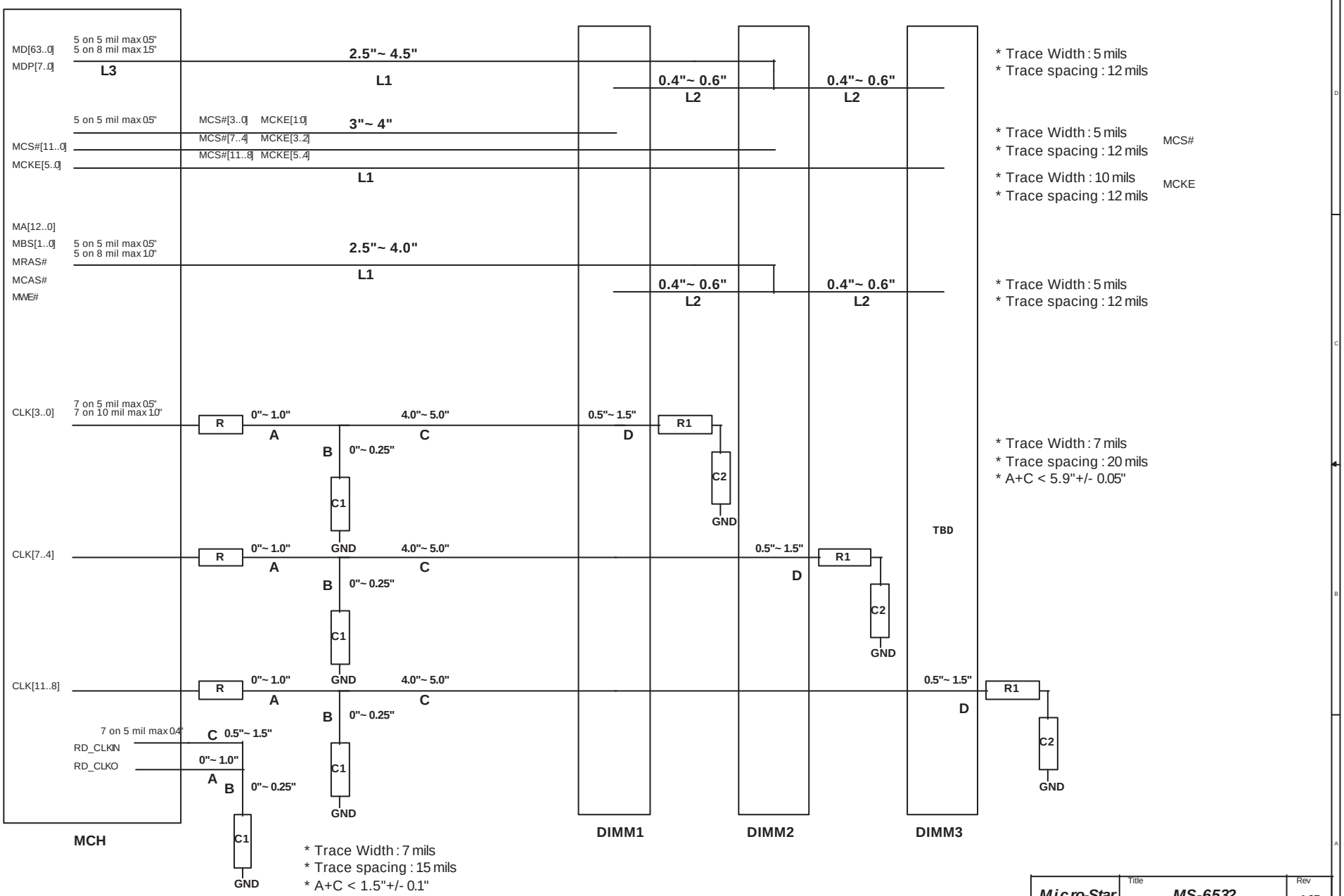
DEVICE	L1+L2
ICH	
SIO	

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



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

Micro-Star	Title: MS-6532	Rev: 1.0B
Document Number: CK-408 and LAN Design Guide		
Last Revision Date: Wednesday, July 25,2001	Sheet 30 of 32	


MD[63..0]
MDP[7..0]
5 on 5 mil max 0.5"
5 on 8 mil max 1.5"
L3
2.5"~ 4.5"
L1
0.4"~ 0.6"
L2
0.4"~ 0.6"
L2
* Trace Width : 5 mils
* Trace spacing : 12 mils
5 on 5 mil max 0.5"
MCS#[3..0] MCKE[1:0]
MCS#[7..4] MCKE[3..2]
MCS#[11..8] MCKE[5..4]
3"~ 4"
MCS#[11..0]
MCKE[5..0]
L1
* Trace Width : 5 mils
* Trace spacing : 12 mils
MCS#
* Trace Width : 10 mils
* Trace spacing : 12 mils
MCKE
MA[12..0]
MBS[1..0]
MRAS#
MCAS#
MWE#
5 on 5 mil max 0.5"
5 on 8 mil max 1.0"
2.5"~ 4.0"
L1
0.4"~ 0.6"
L2
0.4"~ 0.6"
L2
* Trace Width : 5 mils
* Trace spacing : 12 mils
CLK[3..0]
7 on 5 mil max 0.5"
7 on 10 mil max 1.0"
R
0"~ 1.0"
A
4.0"~ 5.0"
C
0.5"~ 1.5"
D
R1
C2
GND
B
0"~ 0.25"
C1
GND
* Trace Width : 7 mils
* Trace spacing : 20 mils
* A+C < 5.9"+/- 0.05"
TBD
CLK[7..4]
CLK[11..8]
7 on 5 mil max 0.4"
C
0.5"~ 1.5"
RD_CLKIN
RD_CLKO
0"~ 1.0"
A
B
0"~ 0.25"
C1
GND
MCH
DIMM1
DIMM2
DIMM3
* Trace Width : 7 mils
* Trace spacing : 15 mils
* A+C < 1.5"+/- 0.1"
Micro-Star
Title
MS-6532
Rev
1.0B
Document Number
PC133 DIMM DG
Last Revision Date:
Wednesday, July 25, 2001
Sheet 31 of 32

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

JBAT1(1-2)
YJUMPER-MG

LEGEND AUDIO

KKK
JC-D2x2-GN

BAT SOCKET

BAT1[A]
YSKTBT

JP2 H/W AUDIO	
1 - 2	DISABLE
2 - 3	ENABLE *

JP2(2-3)
YJUMPER-MG

J7 BIOS Update	
SHORT	Locked
OPEN	Unlocked *

J7(1)
YJUMPER-MG

BIOS

U23[1]

1	VPP	VCC	32
2	RST#	CLK	31
3	FGPI3	FGPI4	30
4	FGPI2	IC(VIL)	29
5	FGPI1	GNDA	28
6	FGPI0	VCCA	27
7	WP#	GND	26
8	TBL#	VCC	25
9	ID3	INIT#	24
10	ID2	FWH4	23
11	ID1	RFU	22
12	ID0	RFU	21
13	FWH0	RFU	20
14	FWH1	RFU	19
15	FWH2	RFU	18
16	GND	FWH3	17

SST49LF002A

FRONT PANNEL BUZZER

F_P114-15
X_YJUMPER-MG

JP3	AUDIO DOWN
1-2	Auto mode
2-3	Disabled onboard audio codec

JP3(1-2)
YJUMPER-MG

JLAN1	LAN SELECT
1-2	ENABLED
2-3	DISABLED

JLAN1(1-2)
YJUMPER-MG

MS6532 PCB

PCB
MS-6532-10B

COM1
YCN9M-1

COM2
YCN9M-1

X_U12-A
845-MCH-PIN

X_U12-B
845-MCH-PIN

X_U12-C
845-MCH-PIN

X_U12-D
845-MCH-PIN

X_U12
845-MCH-H

LAN_USB2
USB2
USB1
YUSB-D1

STD BOM:AD1881A
OPTA BOM:CMI8738-LX
T4 BOM:WITHOUT LAN,WITHOUT H/W AUDIO

Micro-Star	Title: MS-6532	Rev: 1.0B
Document Number: PACKING BOM		
Last Revision Date: Wednesday, July 25, 2001	Sheet 32 of 32	