MS-6526 *Version 300*

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

CPU:

Willamette/Northwood mPGA-478B Processor

System Brookdale-G Chipset:

INTEL GMCH (North Bridge) +
INTEL ICH4 (South Bridge)

On Board Chipset:

BIOS -- FWH
AC'97 Codec -- ALC201A
LPC Super I/O -- W83627HF-AW
Clock Generation -- ICS950218AF
LAN -- Intel 562ET

Expansion Slots:

PCI2.2 SLOT * 3

MODEL Config.	ORCAD Config.	Function	ERP Number
MS6526 STD	cfg6526-STD	STD	601-6526-08S
MS6526 Option:L	cfg6526-LAN	STD+Intel LAN	601-6526-09S
MS6526M1 STD	cfg6526M1-STD	STD+M1	
MS6526M1 Option:L	cfg6526M1-LAN	STD+M1+Intel LAN	

Title **Page**

MSI **MICRO-STAR INT'L CO.,LTD.**

Title: Cover Sheet

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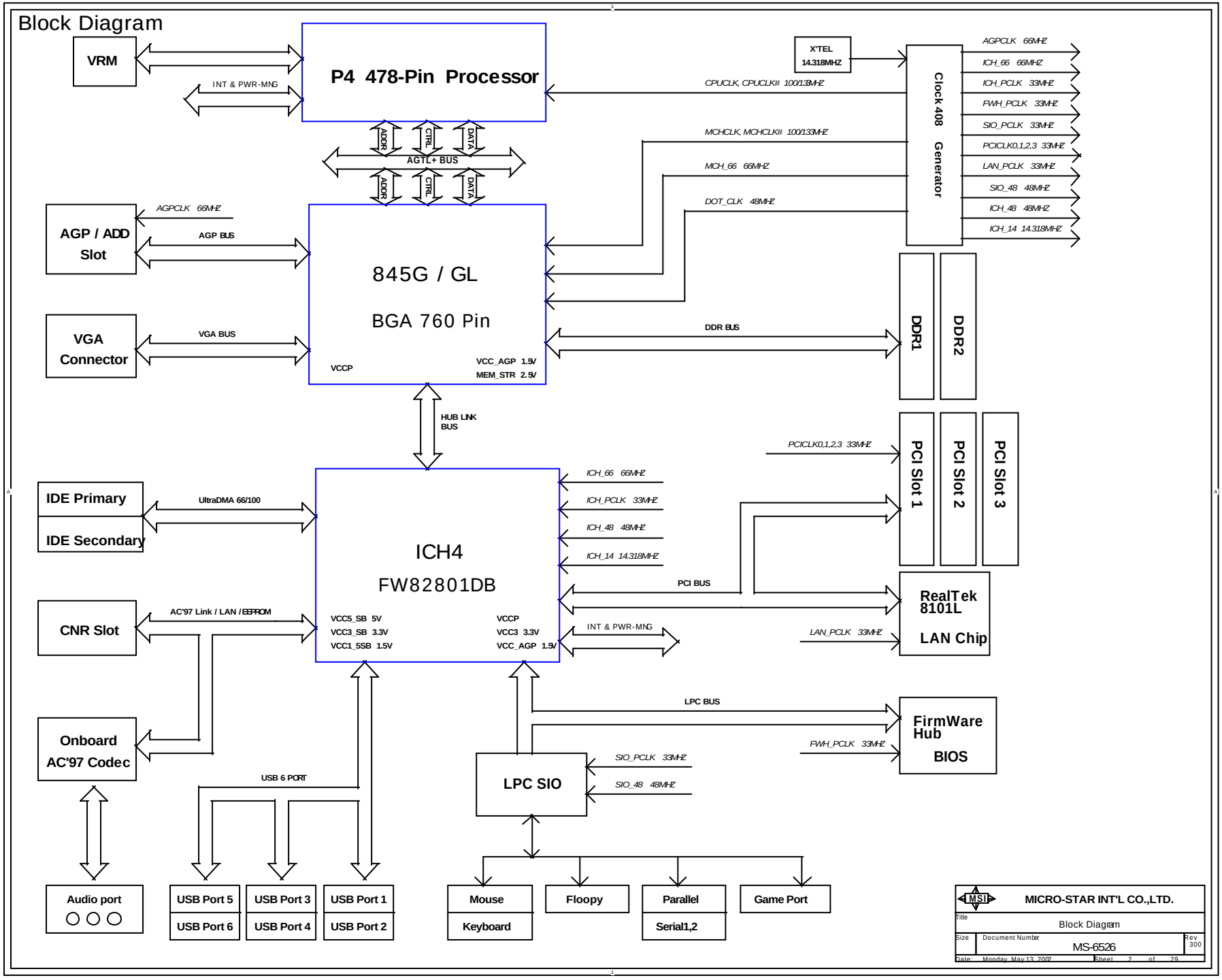
Block Diagram



MSI	MICRO-STAR INT'L CO.,LTD.
Title	Block Diagram
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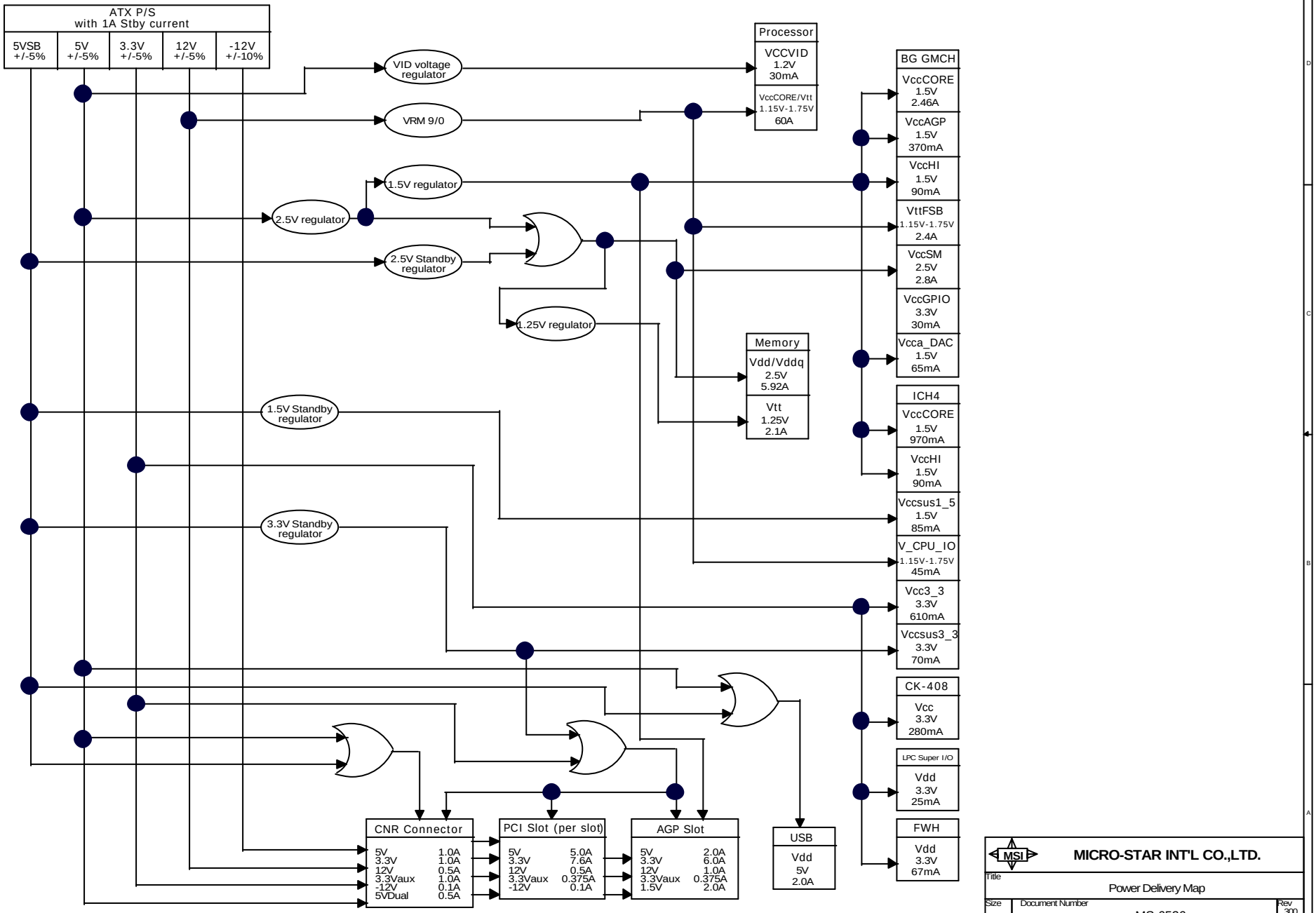
Power Delivery Map



MSI **MICRO-STAR INT'L CO.,LTD.**

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General SPEC

ICH4

GPIO Pin	Type	Function
GPIO 0	I	REQ#A (multifunction pin)
GPIO 1	I	REQ#B (multifunction pin)
GPIO 2	I	Pull up through 8.2K ohms (PIRQE#)
GPIO 3	I	Pull up through 8.2K ohms (PIRQF#)
GPIO 4	I	Pull up through 8.2K ohms (PIRQG#)
GPIO 5	I	Pull up through 8.2K ohms (PIRQH#)
GPIO 6	I	Pull down through 10K ohms (unused)
GPIO 7	I	Pull down through 10K ohms (unused)
GPIO 8	I	Pull Up to 3.3VSBY through 4.7K ohms (SIO_PME)
GPIO 9	I	Not Implemented
GPIO 10	I	Not Implemented
GPIO 11	I	SMB_ALERT (multifuntion pin)
GPIO 12	I	EXTSMI# with Pull up 10K ohms to VCC3_SB
GPIO 13	I	Pull down through 10K ohms (unused)
GPIO 14~15	I	Not Implemented
GPIO 16	O	GNT#A (multifunction pin)
GPIO 17	O	GNT#B (multifuntion pin)
GPIO 18*	O	No Connected
GPIO 19	O	No Connected
GPIO 20	O	No Connected
GPIO 21	O	No Connected
GPIO 22	OD	No Connected
GPIO 23	O	Pull Up to 3.3V through 8.2K ohms (BIOS protect)
GPIO 24	I/O	No Connected
GPIO 25	I/O	No Connected
GPIO 26	I/O	Not Implemented
GPIO 27	I/O	No Connected
GPIO 28	I/O	No Connected
GPIO 29~31	O	Not Implemented
GPIO 32	I/O	No Connected
GPIO 33	I/O	No Connected
GPIO 34	I/O	Primary IDE ATA66/100 detection (PD_DET)
GPIO 35	I/O	Secondary IDE ATA66/100 detection (SD_DET)
GPIO 36	I/O	No Connected
GPIO 37	I/O	No Connected
GPIO 38	I/O	No Connected
GPIO 39	I/O	No Connected
GPIO 40	I/O	No Connected
GPIO 41	I/O	No Connected
GPIO 42	I/O	No Connected
GPIO 43	I/O	No Connected
GPIO 44~47	I/O	Not Implemented

** GPIO18 will toggle at 1Hz frequency.*

FWH

GPIO Pin	Type	Function
GPI 0	I	Pull down through 8.2K ohms (unused)
GPI 1	I	Pull down through 8.2K ohms (unused)
GPI 2	I	P1 customer defined
GPI 3	I	P1 customer defined
GPI 4	I	Pull down through 8.2K ohms (unused)

PCI Config.

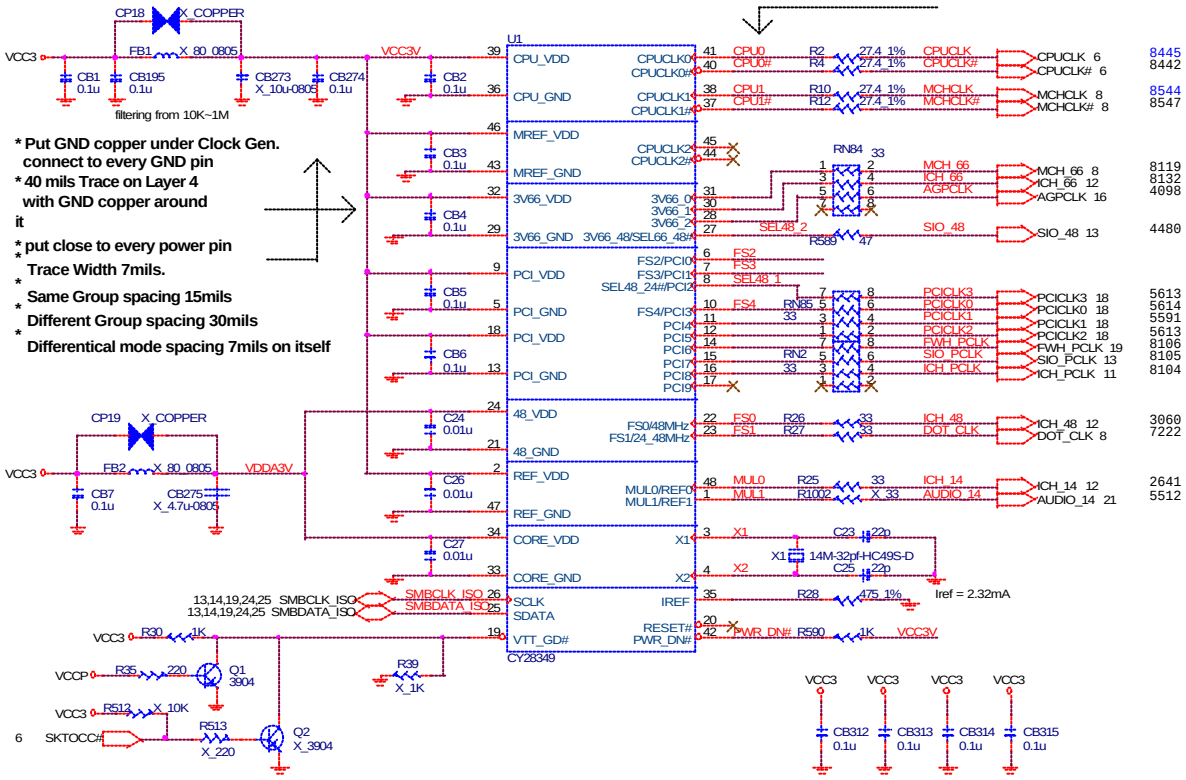
DEVICE	ICH INT Pin	IDSEL	CLOCK	CLK GEN PIN OUT
PCI Slot 1	INTA# INTB# INTC# INTD#	AD16	PCICLK0	10 (PCI3/FS4)
PCI Slot 2	INTB# INTC# INTD# INTA#	AD17	PCICLK1	11 (PCI4)
PCI Slot 3	INTC# INTD# INTA# INTB#	AD18	PCICLK2	12 (PCI5)
PCI LAN	INTG# INTF#	AD29	LAN_PCLK	17 (PCI9)

**ICH4 reserved PCI address line AD22 for the PCI-to-ISA Bridge's IDSEL input.*

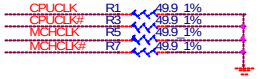
DIMM Config.

DEVICE	ADDRESS	CLOCK
DIMM 1	1010000B	DCLK0/DCLK0# DCLK1/DCLK1# DCLK2/DCLK2#
DIMM 2	1010001B	DCLK3/DCLK3# DCLK4/DCLK4# DCLK5/DCLK5#

CLOCK GENERATOR BLOCK



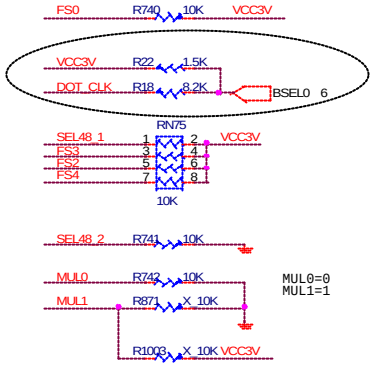
Shut Source Termination Resistors



Trace less 0.2"

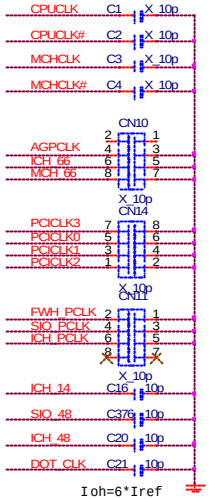
49.9ohm for 50ohm M/B impedance

CLOCK STRAPPING RESISTORS



FS4	FS3	FS2	FS1	FS0	FSB (MHz)
1	1	1	0	1	100 MHz
1	1	1	1	1	133 MHz

Pull-Down Capacitors



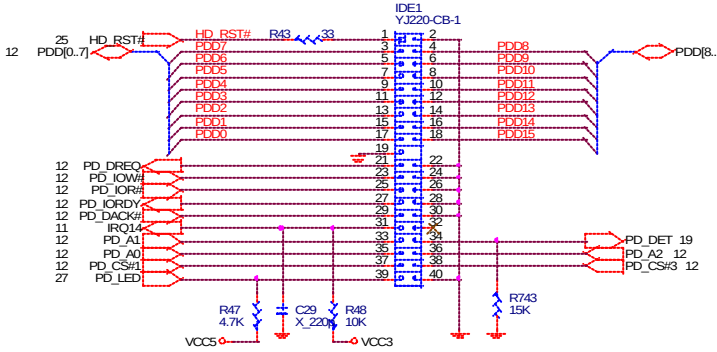
Ioh=6*Iref
Voh=0.71V

used only for EMI issue

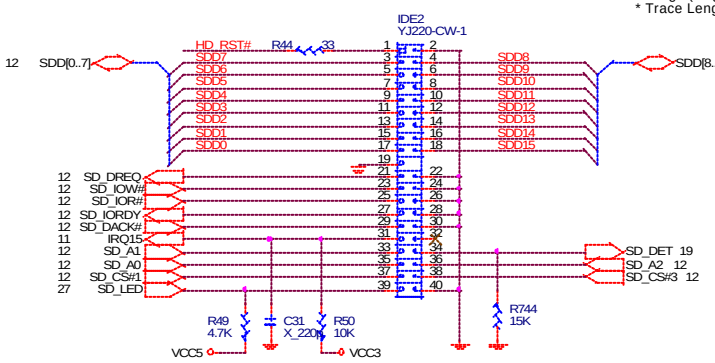
Trace less 0.2"

ATA100 IDE CONNECTORS

PRIMARY IDE BLOCK



SECONDARY IDE BLOCK



* Trace Width : 5mils
* Trace Spacing : 7mils
* Length(longest)-Length(shortest)<0.5"
* Trace Length less than5"

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Title	Clock Gen & ATA100 IDE Connectors	
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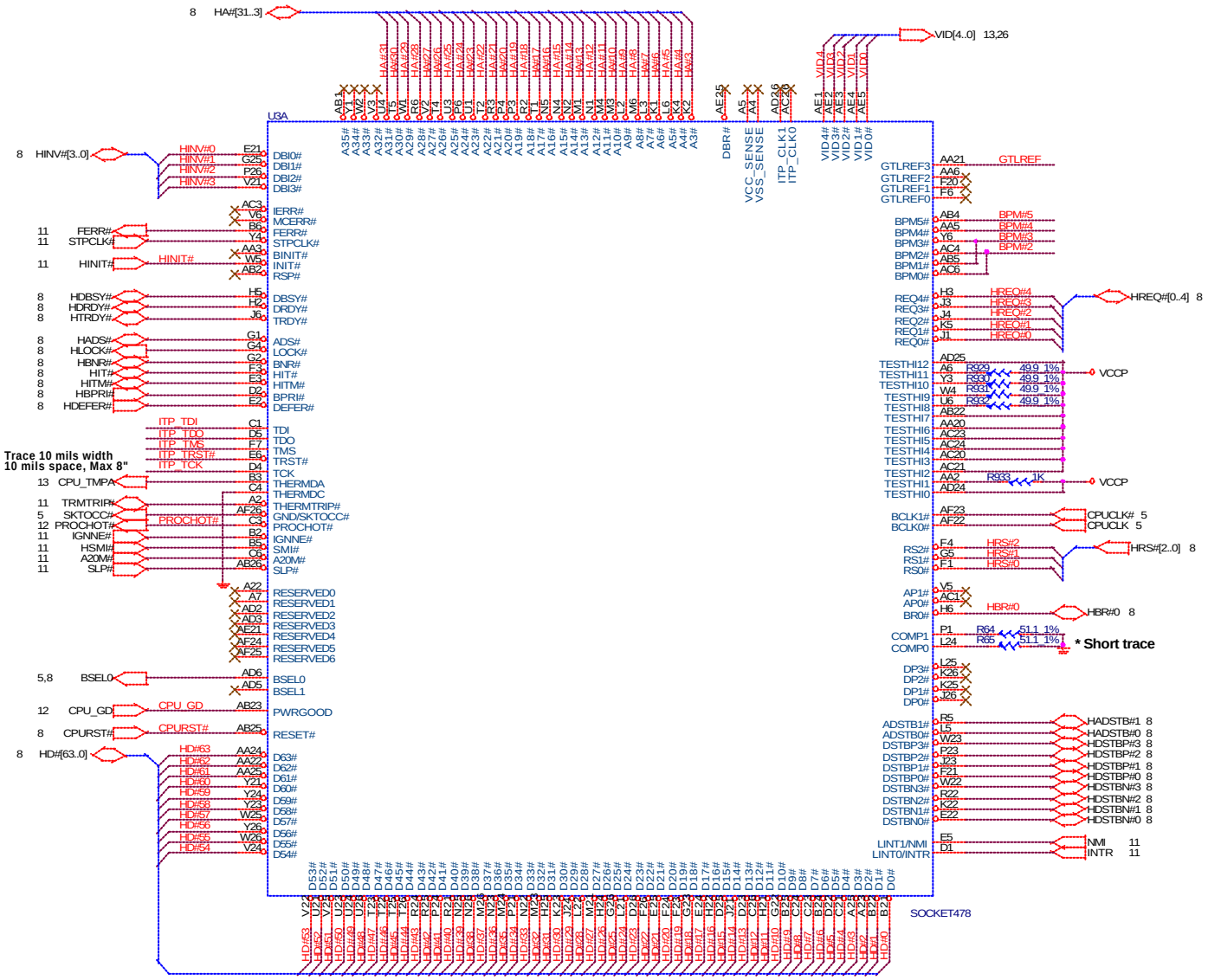
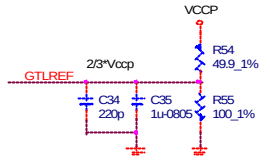
CPU SIGNAL BLOCK



CPU GTL REFERNCE VOLTAGE BLOCK

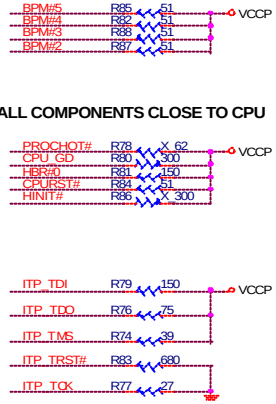


Every pin put one 220pF cap near it.

Trace Width 7mils, Space 10mils.

Keep the voltage divider within 1.5" of the GETREF pin.

CPU STRAPPING RESISTORS



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Title	mPGA478-B INTEL CPU SOCKET Part1		
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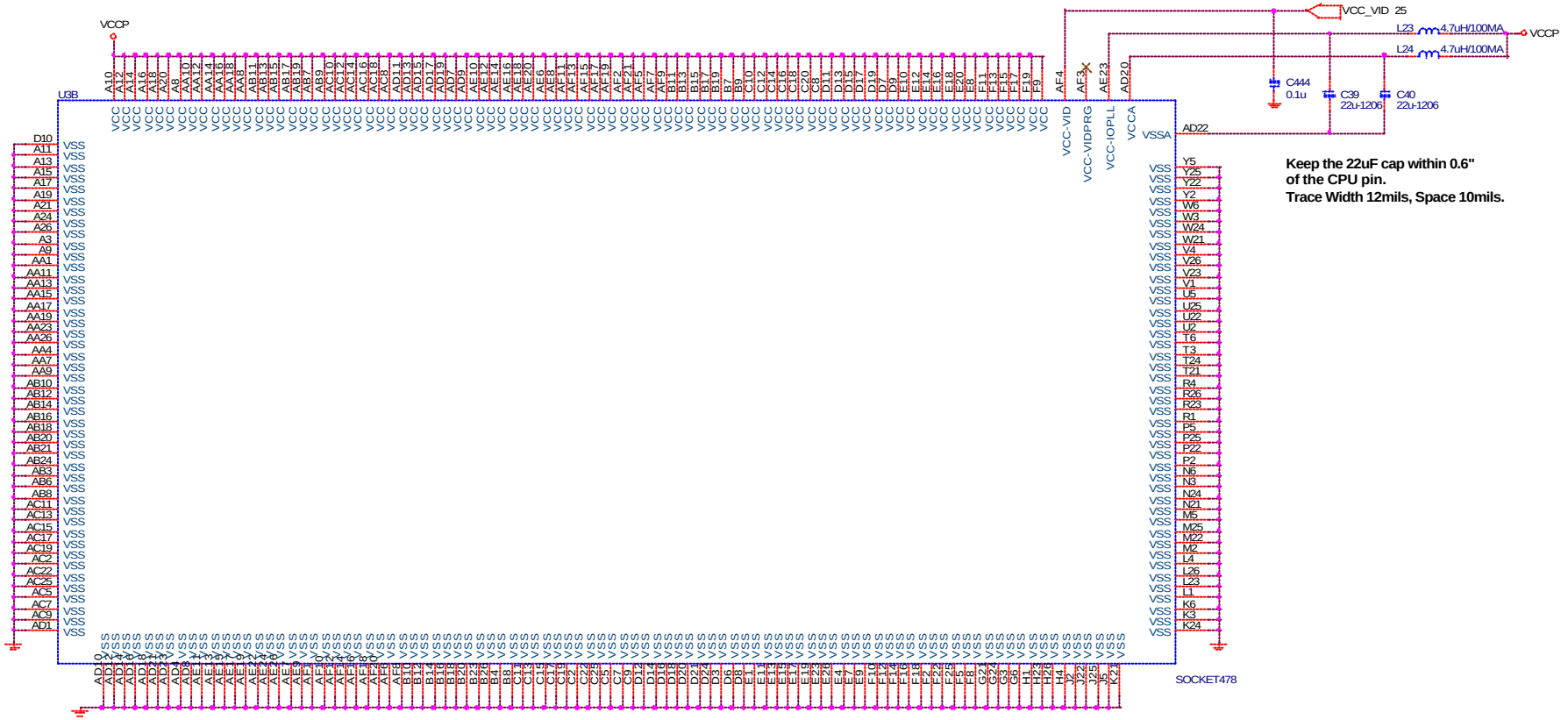
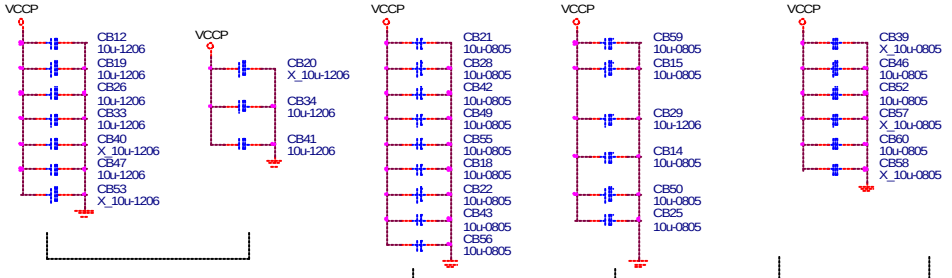
CPU VOLTAGE BLOCK



Keep the 22uF cap within 0.6" of the CPU pin.
Trace Width 12mils, Space 10mils.

CPU DECOUPLING CAPACITORS



Place 14 pcs 1206 size cap north side of processor

PLACE CAPS WITHIN CPU CAVITY

Place these caps on south side of processor

Within CPU Cavity Solder Side

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Title	mPGA478-B INTEL CPU Part2	
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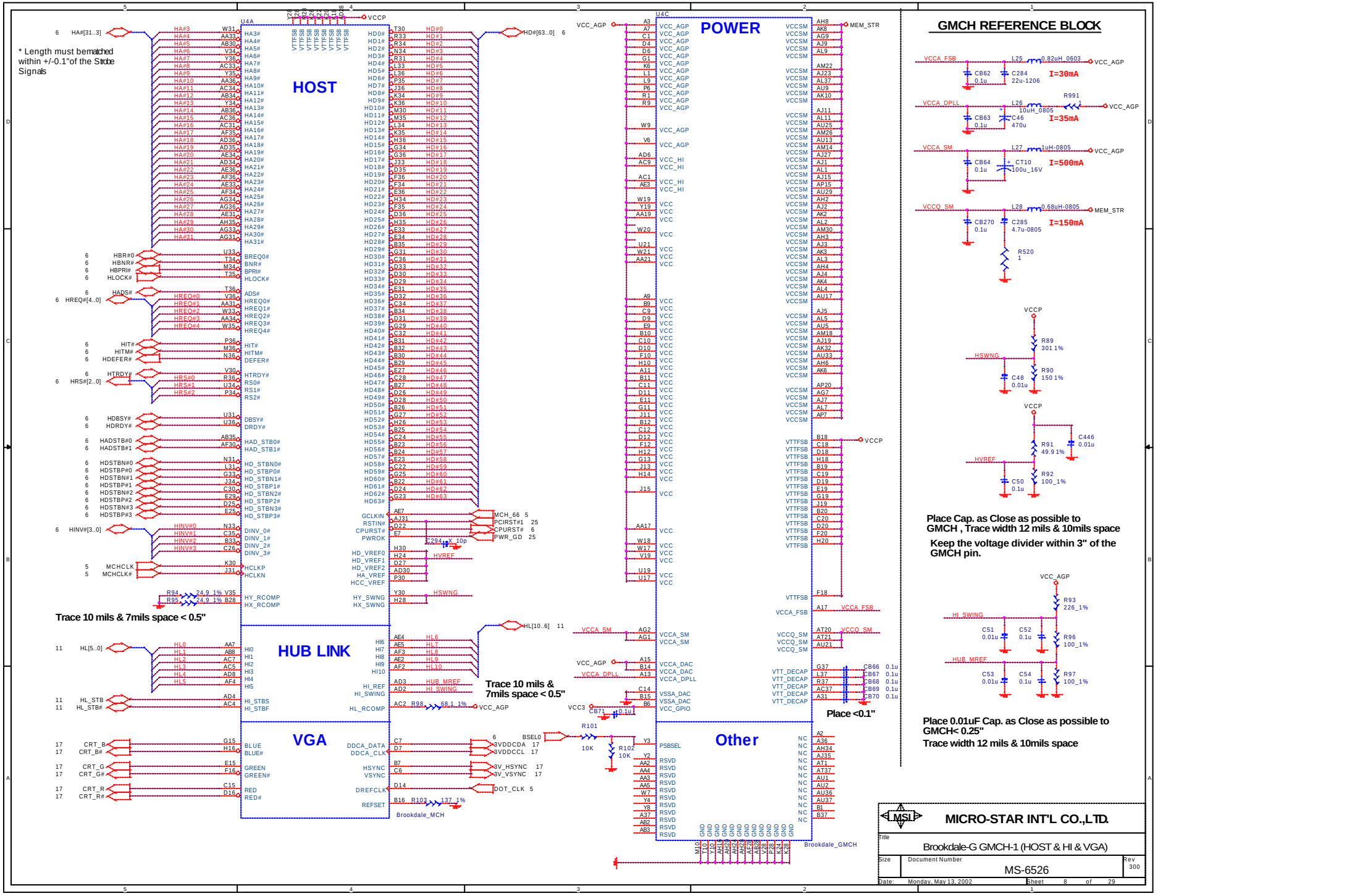
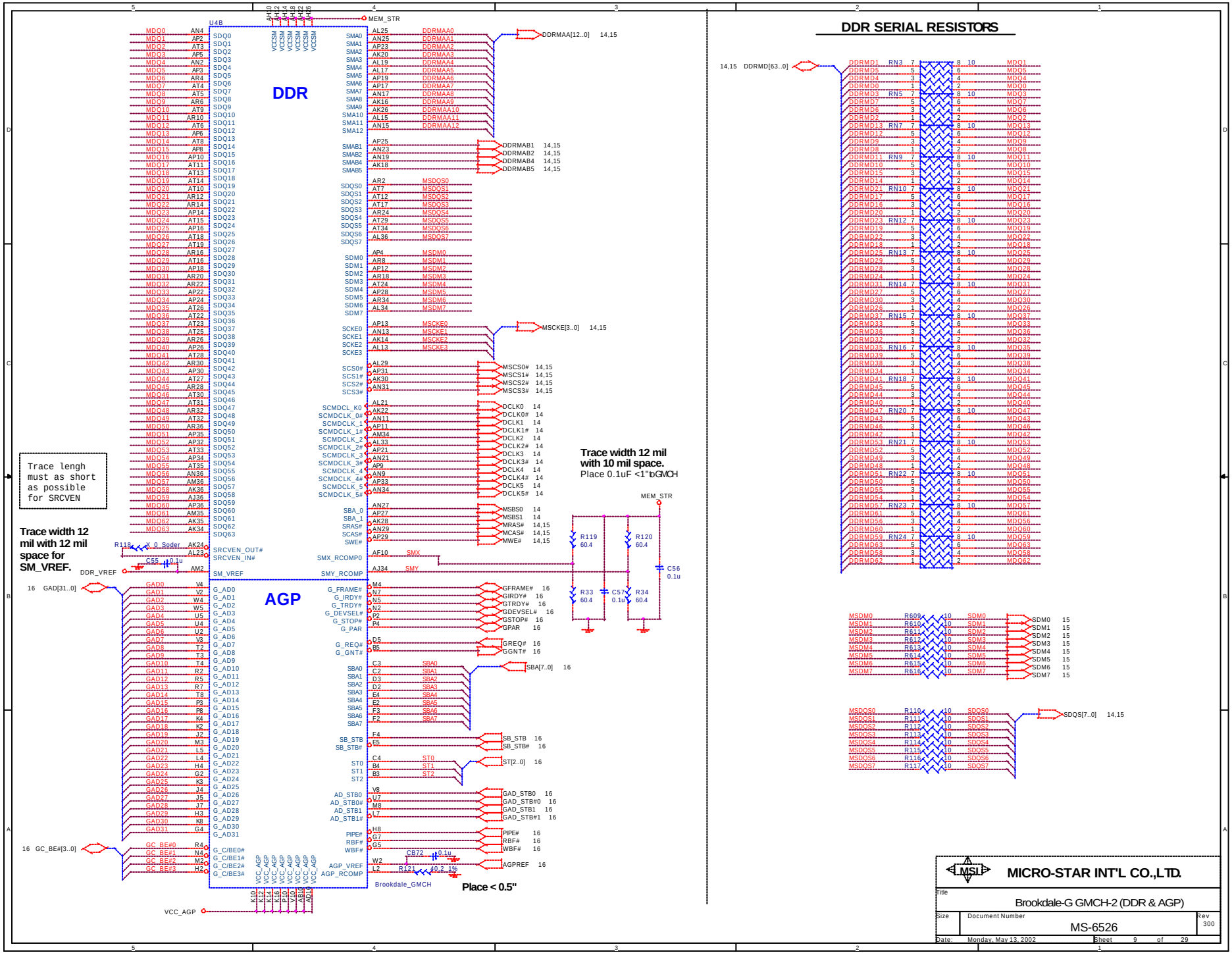

HOST
POWER
HUB LINK
VGA
Other
GMCH REFERENCE BLOCK
* Length must bematched within +/-0.1"of the Strobe Signals
Trace 10 mils & 7mils space < 0.5"
Trace 10 mils & 7mils space < 0.5"
Place <0.1"
Place Cap. as Close as possible to GMCH , Trace width 12 mils & 10mils space
Keep the voltage divider within 3" of the GMCH pin.
Place 0.01uF Cap. as Close as possible to GMCH< 0.25"
Trace width 12 mils & 10mils space
I=30mA
I=35mA
I=500mA
I=150mA
Brookdale_MCH
Brookdale_GMCH
MICRO-STAR INT'L CO.,LTD.
Brookdale-G GMCH-1 (HOST & HI & VGA)
MS-6526
Monday, May 13, 2002


DDR
AGP
DDR SERIAL RESISTORS
MEM_STR
Trace lengh must as short as possible for SRCVEN
Trace width 12 mil with 12 mil space for SM_VREF.
Trace width 12 mil with 10 mil space.
Place 0.1uF <1"bGMCH
Place < 0.5"
Brookdale_GMCH
MICRO-STAR INT'L CO.,LTD.
Brookdale-G GMCH-2 (DDR & AGP)
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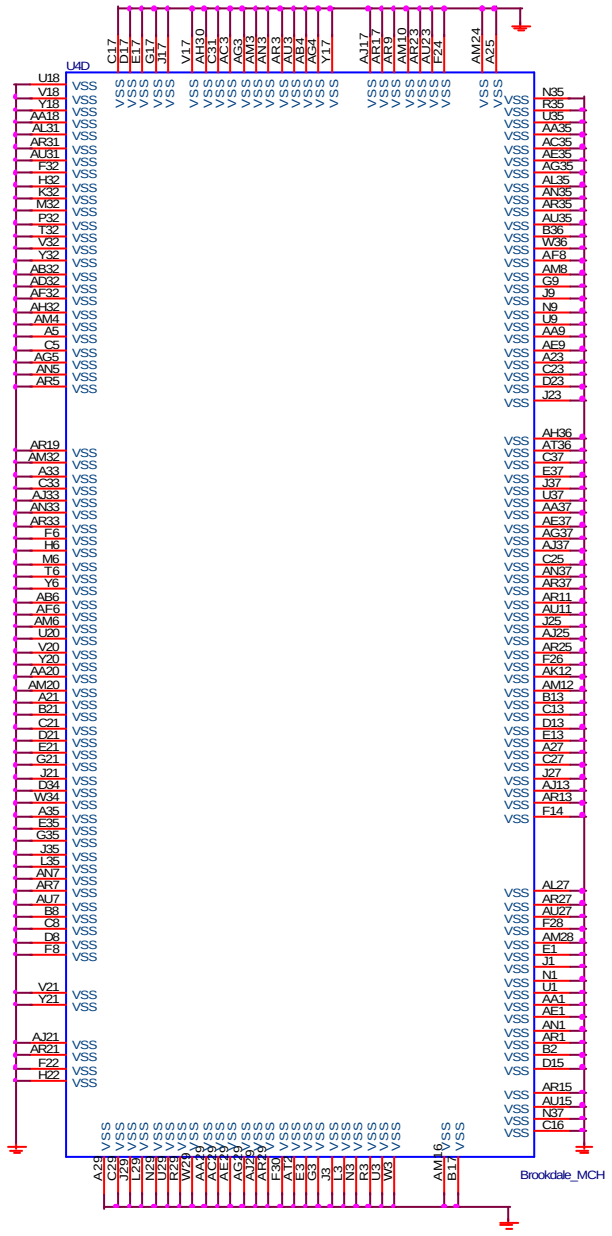
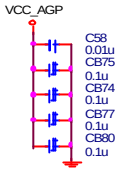
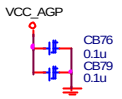


GMCH DECOUPLING CAPACITOR



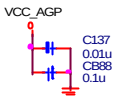
Pin A5
Pin E1
Pin J1
Pin N1
Pin U1

Place decoupling cap close to GMCH AGP Interface < 0.1"



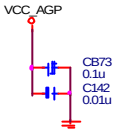
Pin AA1
Pin AE1

Place decoupling cap close to GMCH Hub-Link Interface< 0.1"

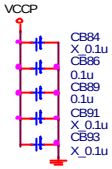


Pin B14
Pin A15

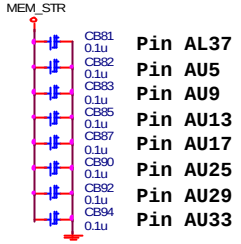
Place decoupling cap close to GMCH DAC Interface< 0.1"



Place decoupling cap close to GMCH Core Logic Interface < 0.1"

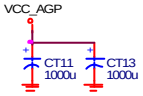


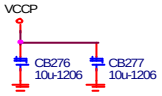
Place decoupling cap close to GMCH CPU Interface < 250mil in the Vtt corridor



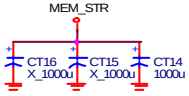
Pin AL37
Pin AU5
Pin AU9
Pin AU13
Pin AU17
Pin AU25
Pin AU29
Pin AU33

Place decoupling cap close to GMCH Memory Interface < 0.1", with 18 mil trach width





Place Bulk cap for Core Logic, AGP & Hub Link Interface



Place Bulk cap between GMCH & DIMM slot

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Title	Broodale GMCH(VSS)	
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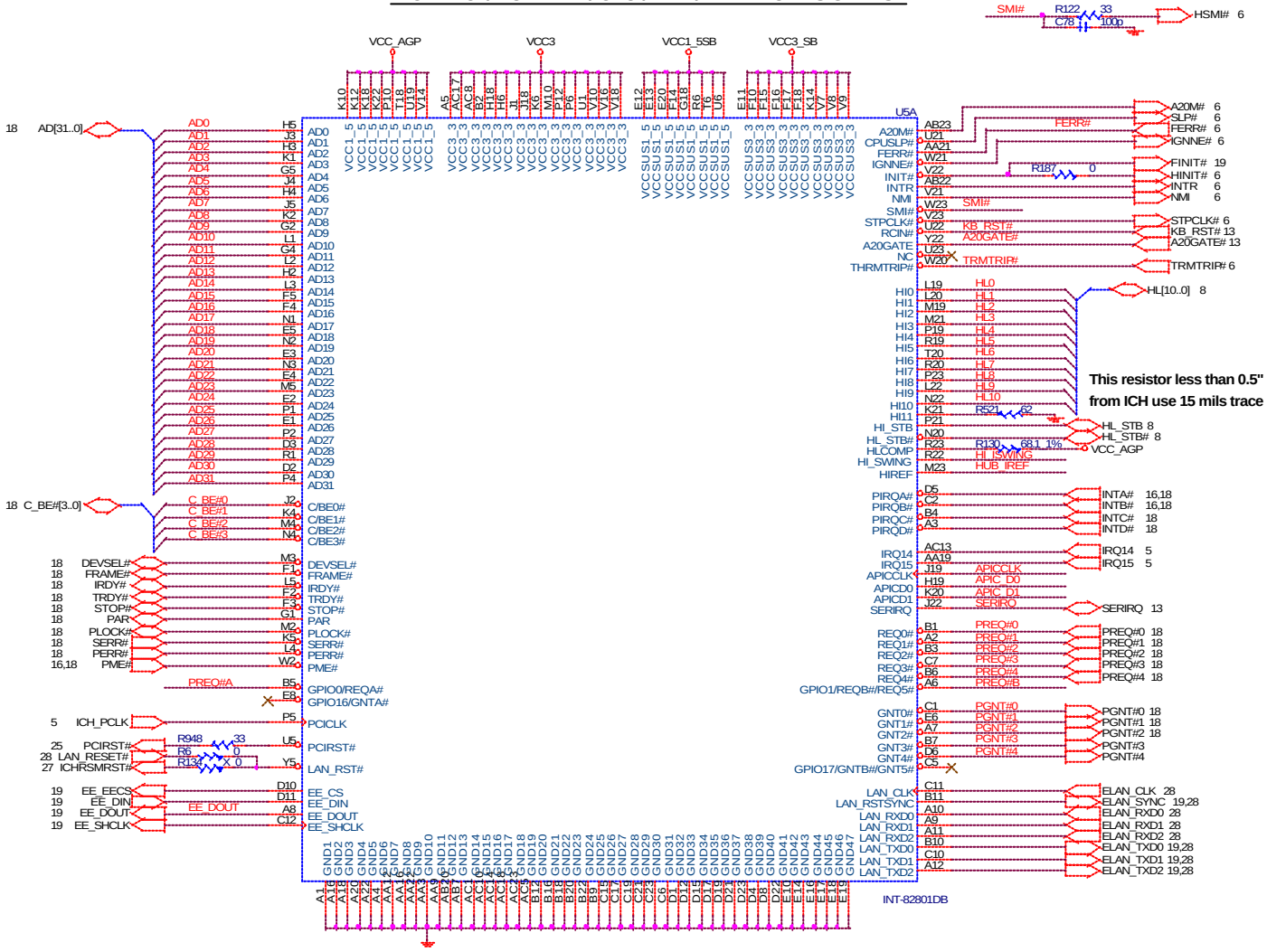
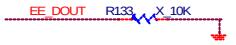
ICH4 PCI / HUB LINK / CPU / LAN / INTERRUPT SIGNALS



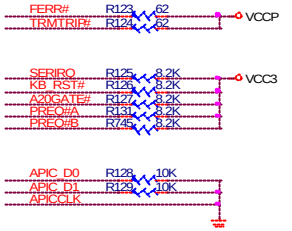
This resistor less than 0.5" from ICH use 15 mils trace

ICH4 STRAPPING RESISTORS

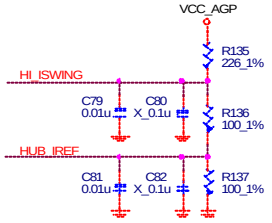


Reserved pull-down resistor for ICH4 reserved function straps.

ICH4 PULL-UP/DOWN RESISTORS



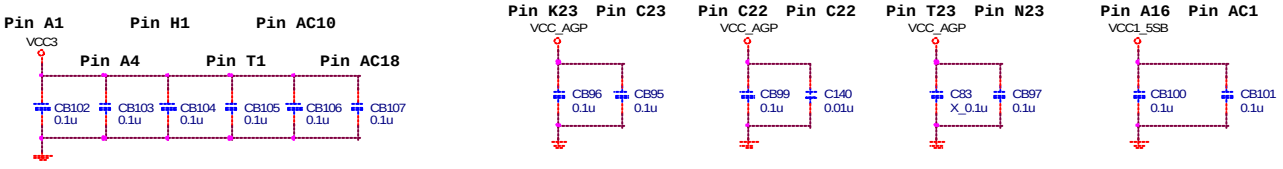
ICH4 REFERENCE VOLTAGE



Place Cap. as Close as possible to ICH4 < 0.25"
Trace width use 12 mils and 10mils space

ICH4 DECOUPLING CAPACITORS

Place one 0.1u close to ICH4 <100 mil



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Title: ICH4 PCI & HI & LAN

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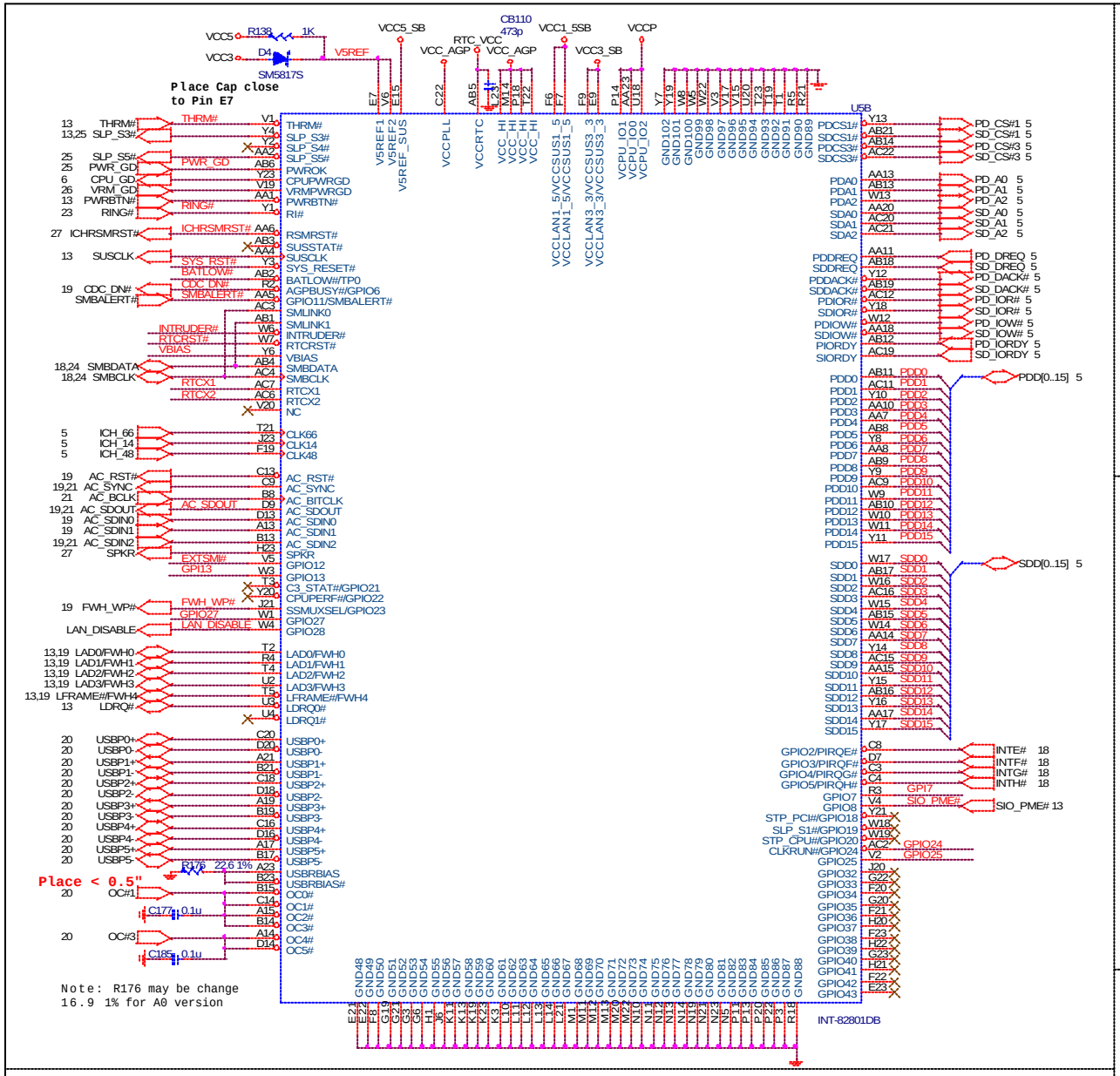

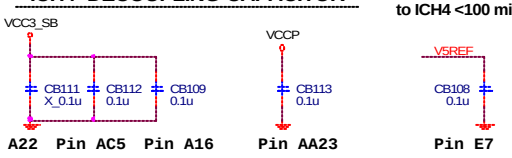

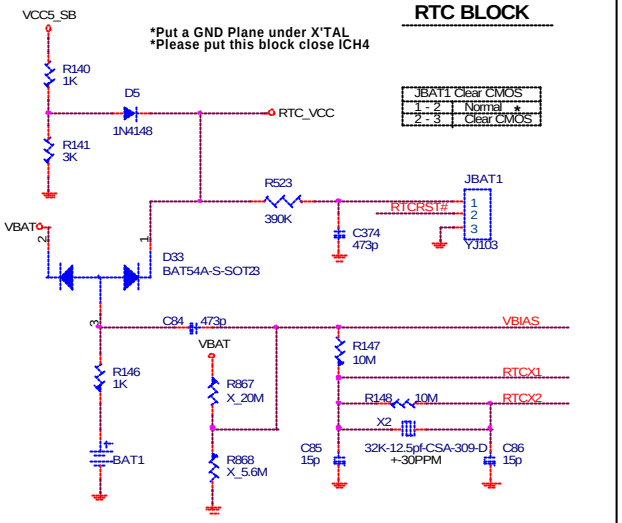

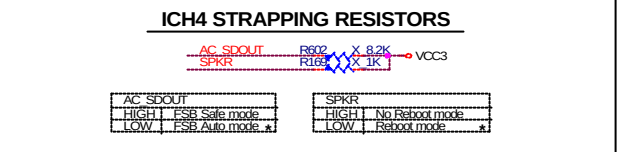

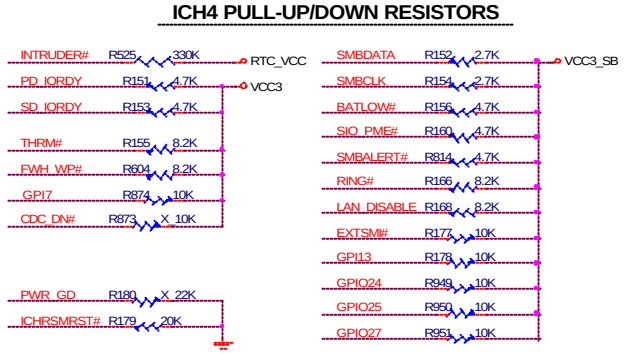

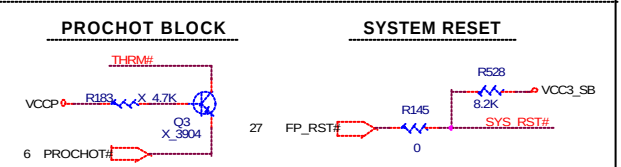

MSI MICRO-STAR INT'L CO.,LTD.

Title: ICH4 ASIC/RTC/AC'97/GPIO/LPC/USB/IDE

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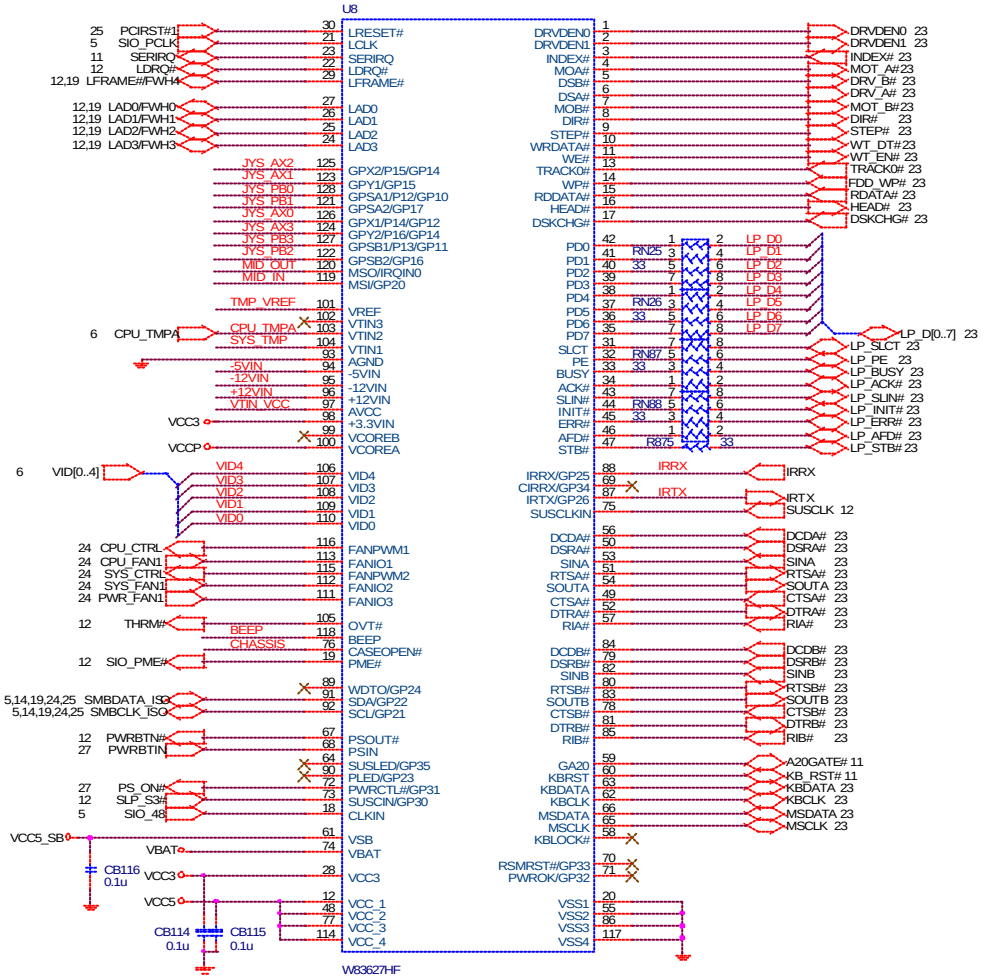
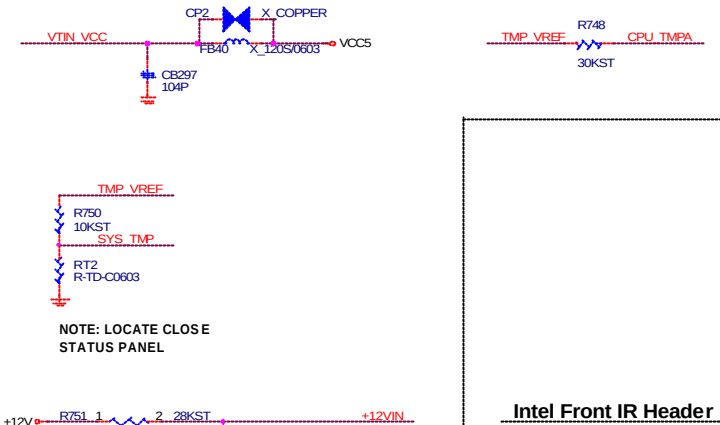
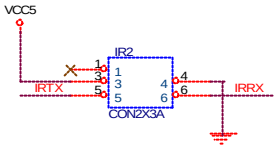
LPC SUPER I/O W83627HF



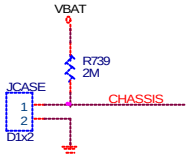
THERMAL RESISTOR BLOCK



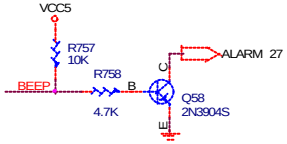
Intel Front IR Header



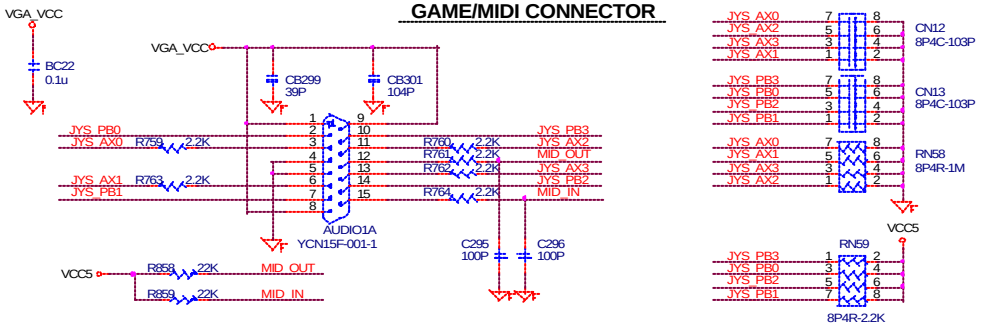
Chasiss Intrusion Header



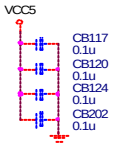
SPEAKER BLOCK



GAME/MIDI CONNECTOR



LPC I/O DECOUPLING CAPACITORS



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

MSI MICRO-STAR INT'L CO.,LTD.

Title: LPC IO & GAME PORT

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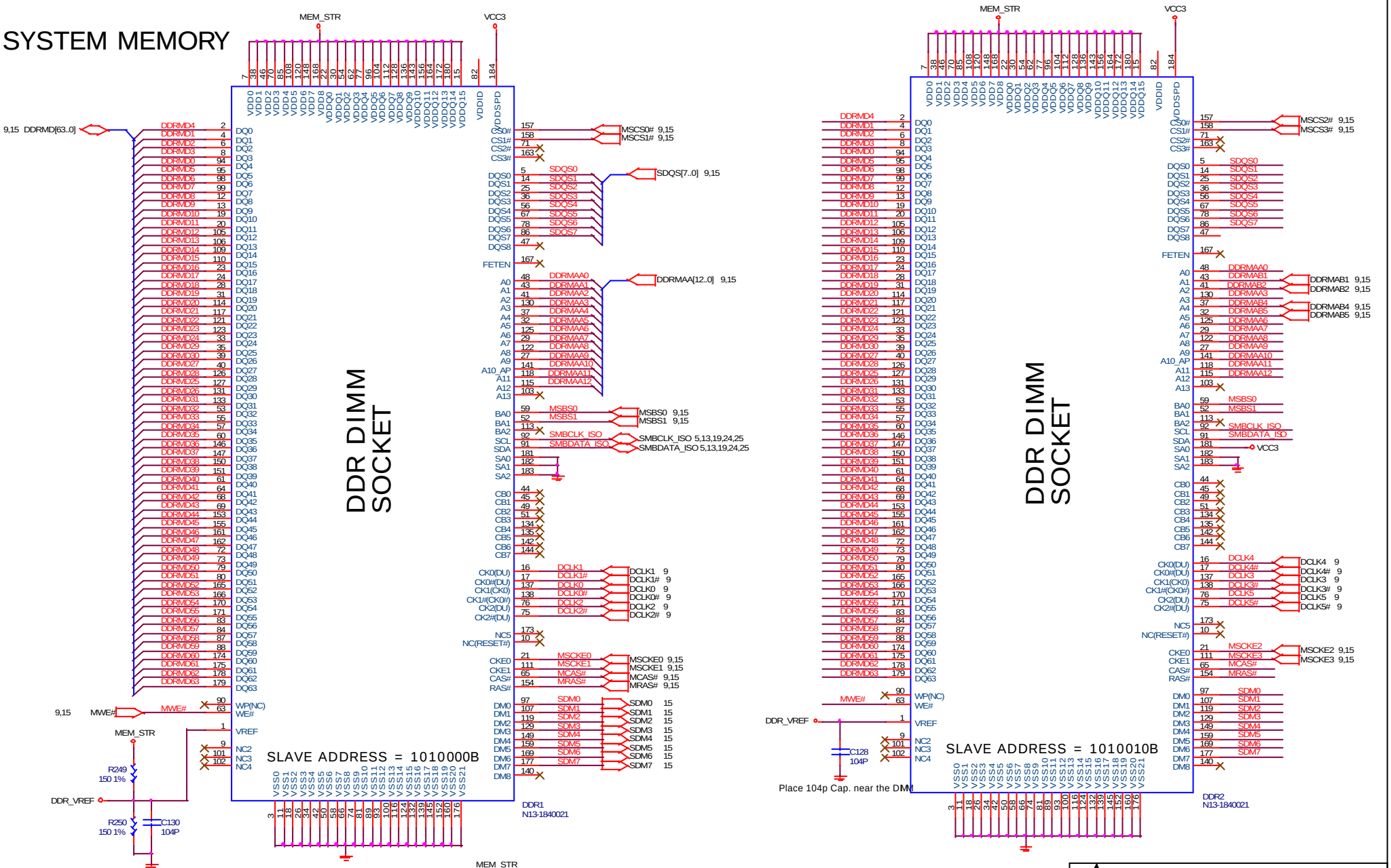
SYSTEM MEMORY



Keep the voltage divider within 1" of DIMM1.
Trace width 12 mil with 12 mil space.
Place 104p Cap. near the DIMM

MICRO-STAR INT'L CO.,LTD.

Title	DDR DIMM1&2	
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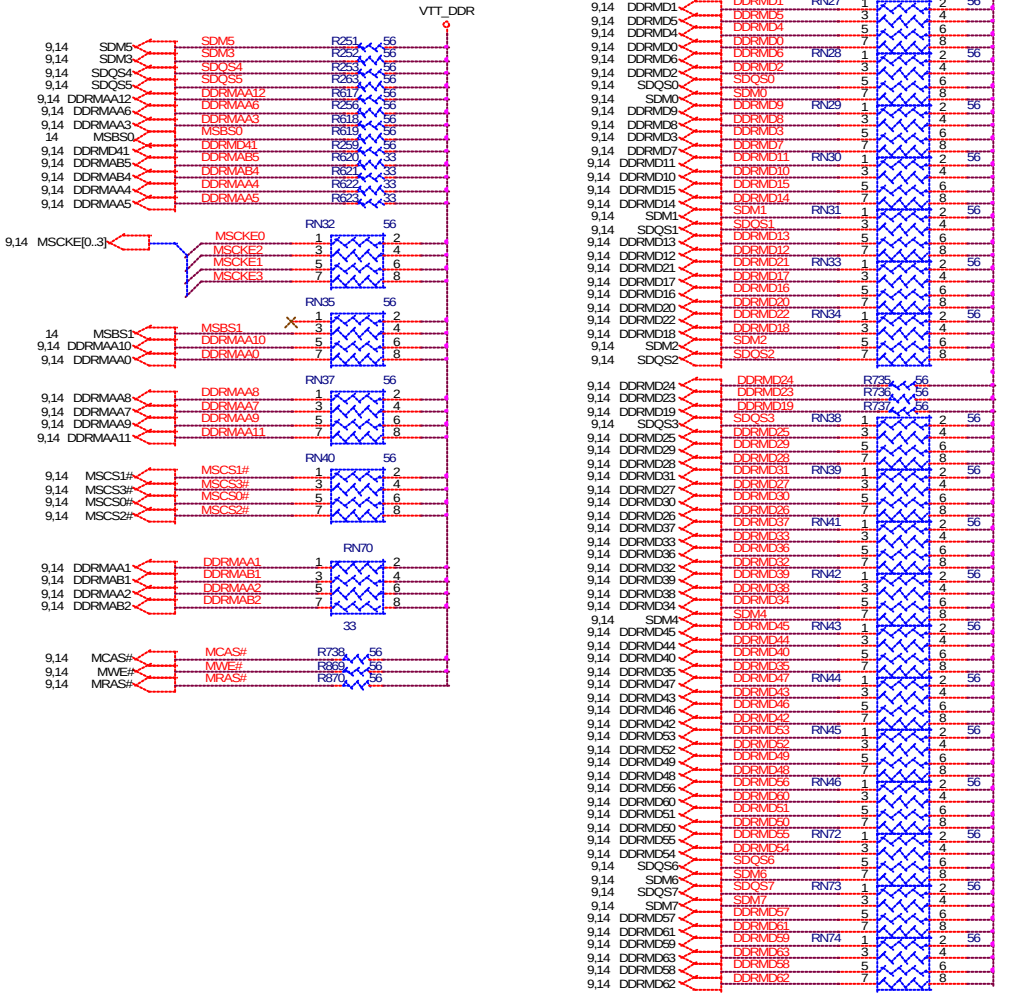
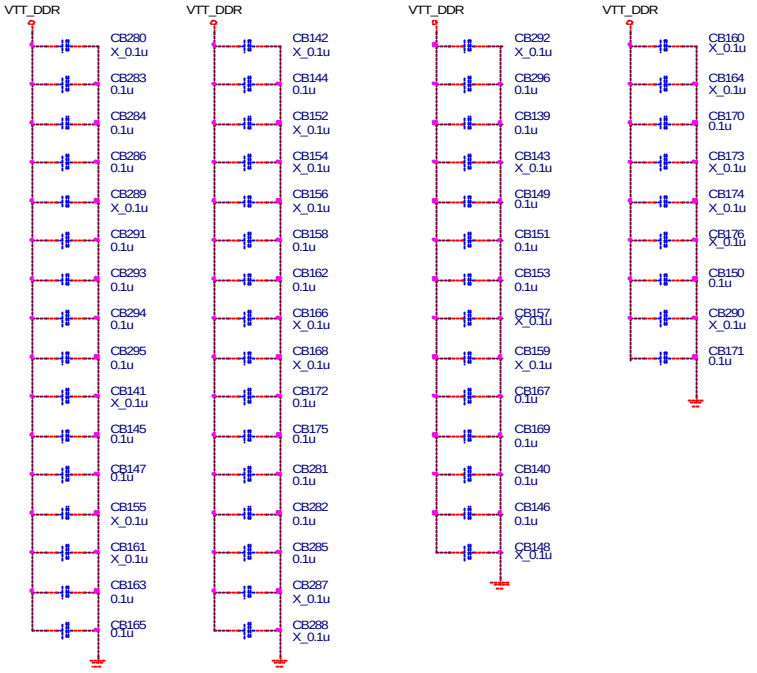
DDR TERMINATORS

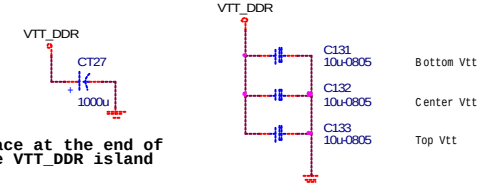


DDR Decouping Caps



Total 110 signal, need 55 pcs decoupling.

Place for VTT_DDR island



Place at the end of the VTT_DDR island

MSI **MICRO-STAR INT'L CO.,LTD.**

Title	DDR Terminator Resistor	
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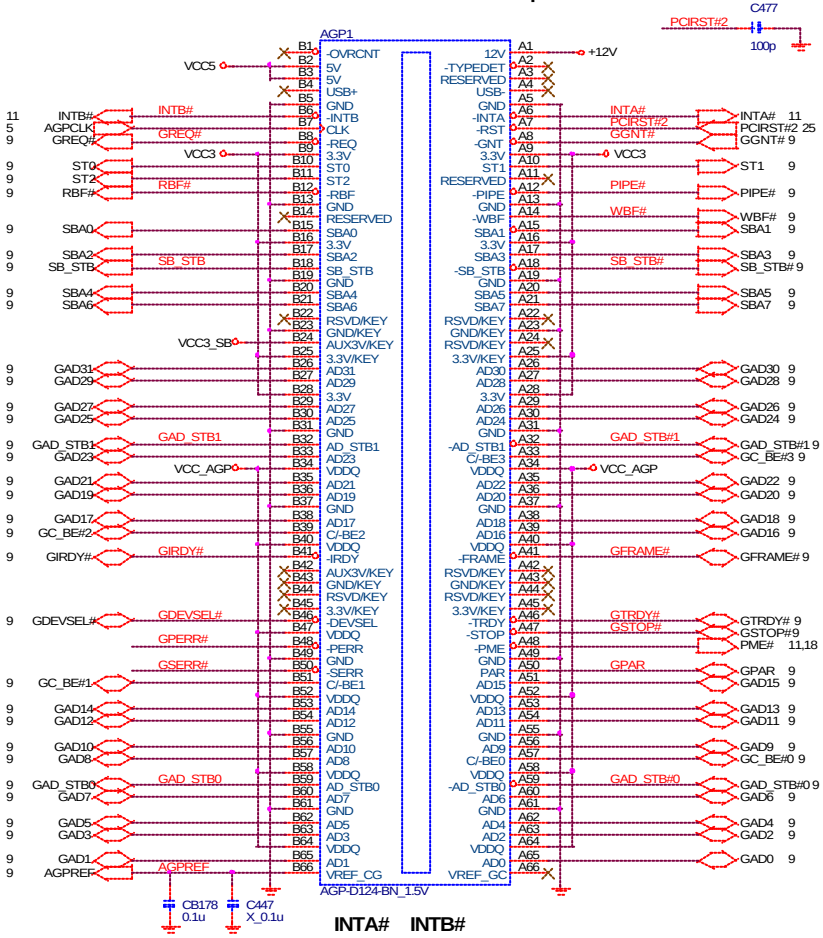
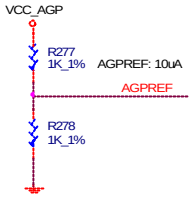
Date: Monday, May 13, 2002	Sheet 15 of 29	

AGP 1.5V 2X/4X SLOT(AGP VER:2.0 COMPLY)

VCC5 = 60mils trace / 15 mils space

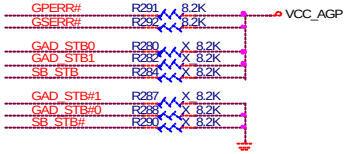


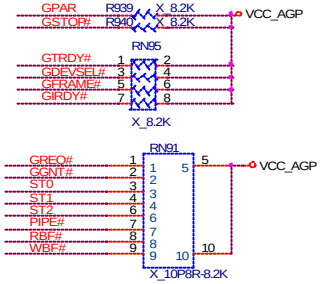
AGP SIGNAL REFERENCE CIRCUIT



NEAR AGP SLOT

AGP TERMINATION RESISTORS

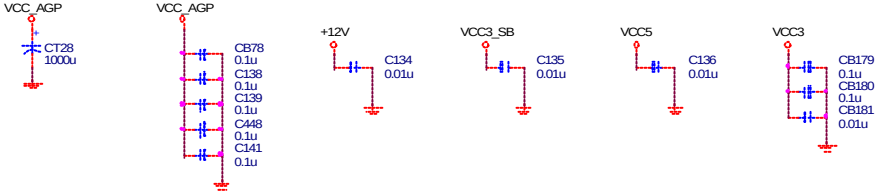




LESS 100MILS STUB TRACE LENGTH FOR 2/4X
LESS 500MIL FOR 1X MUST BE FOLLOW ING.

Place these resistors between AGP slot & GMCH

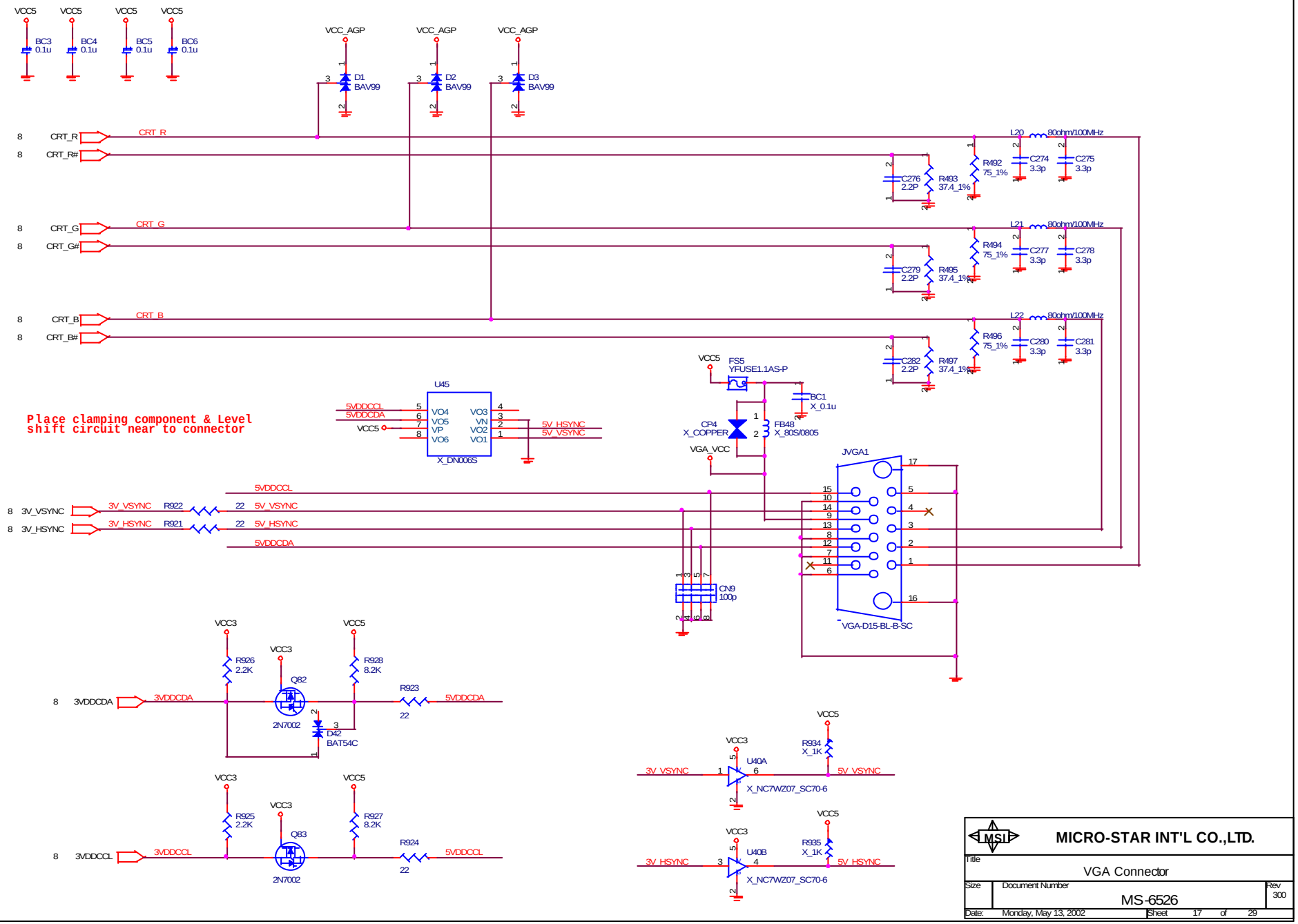
AGP SLOT DECOUPLING CAPACITORS



MICRO-STAR INT'L CO.,LTD.

Title	AGP SLOT	
Size	Document Number MS-6526	Rev 300
Date: Monday, May 13, 2002	Sheet 16 of 29	

Video Connector



MSI	MICRO-STAR INT'L CO.,LTD.	
Title	VGA Connector	
Size	Document Number: MS-6526	Rev: 300
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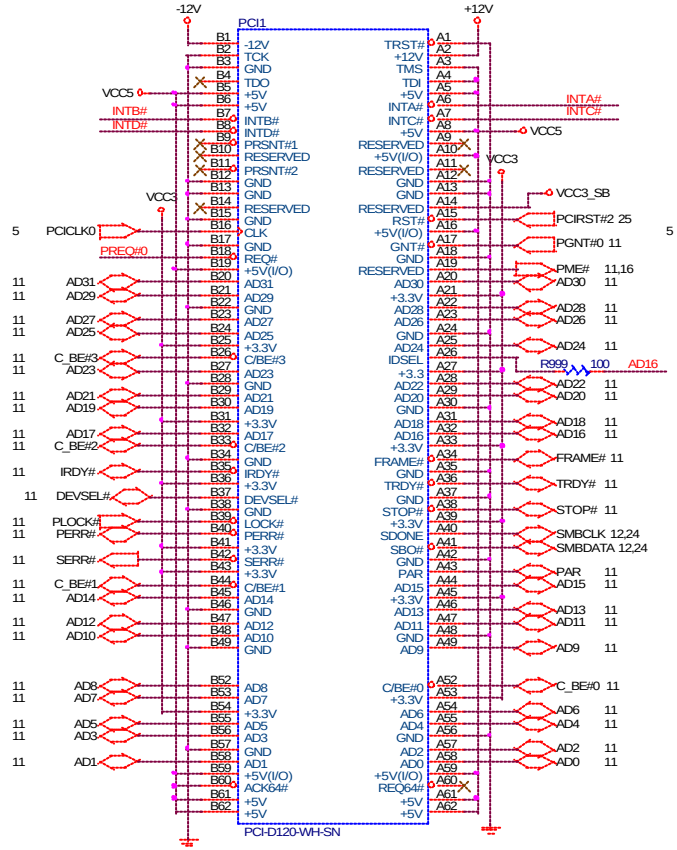
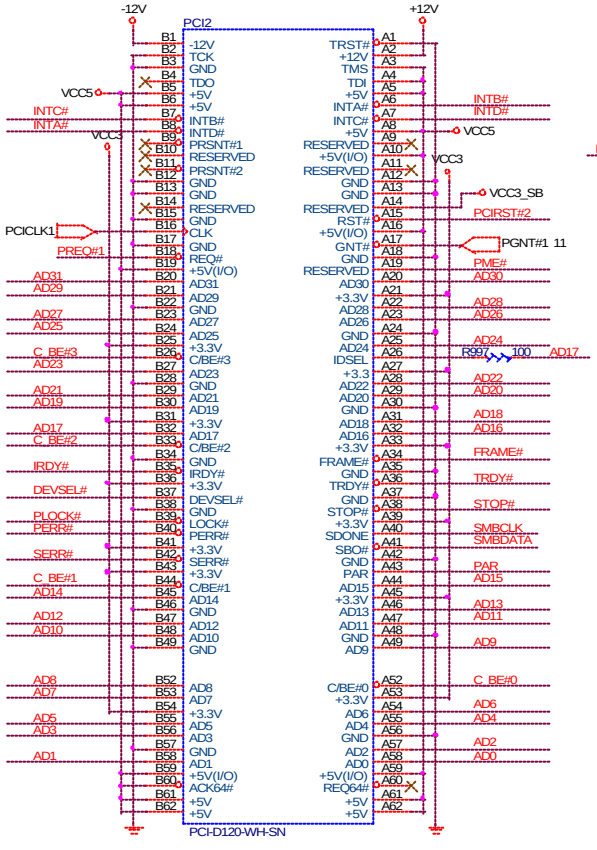
PCI SLOT 1 (PCI VER: 2.2 COMPLY)



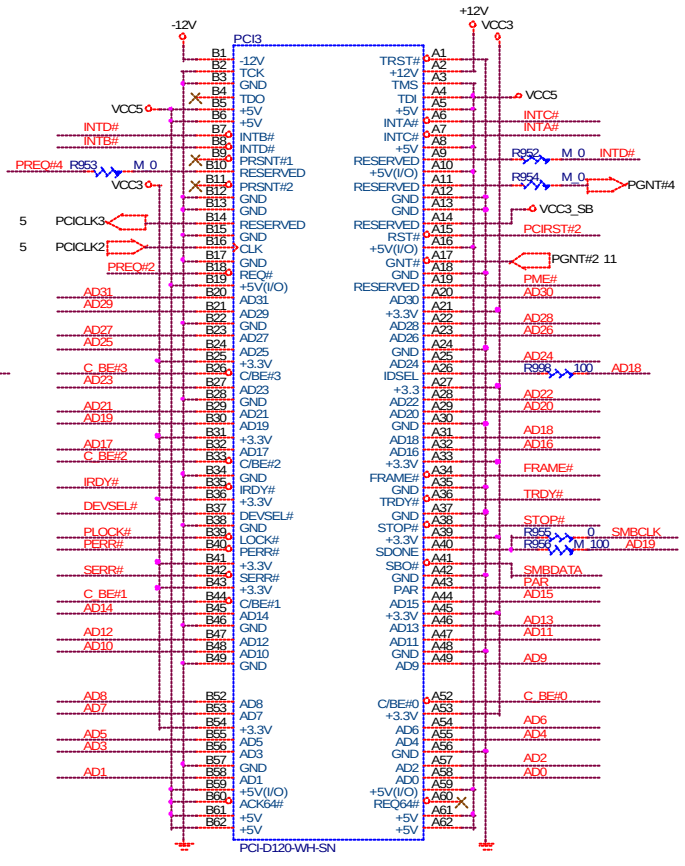
IDSEL = AD16
MASTER = PREQ0
INTA#

PCI SLOT 2 (PCI VER: 2.2 COMPLY)



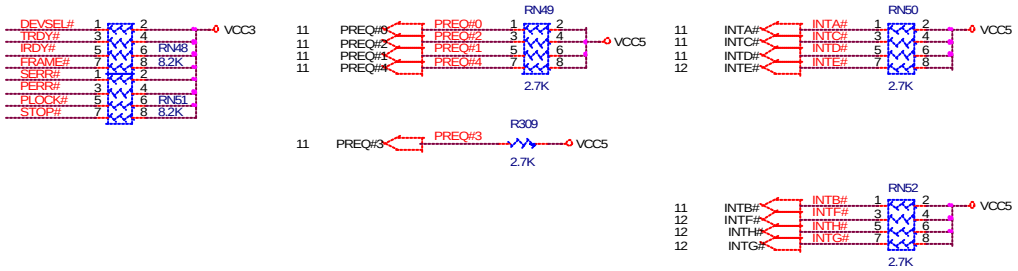
IDSEL = AD17
MASTER = PREQ1
INTB#

PCI SLOT 3 (PCI VER: 2.2 COMPLY)

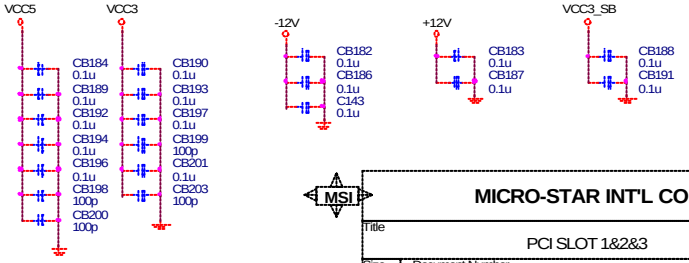


IDSEL = AD18
MASTER = PREQ2
INTC#

PCI PULL-UP / DOWN RESISTORS



PCI SLOT DECOUPLING CAPACITORS



MSI

MICRO-STAR INT'L CO.,LTD.

Title: PCI SLOT 1&2&3

Size | Document Number: MS-6526 | Rev: 300

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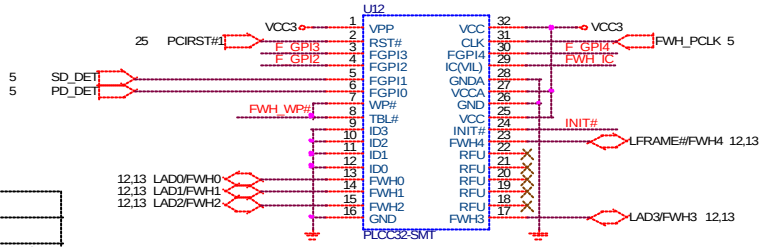
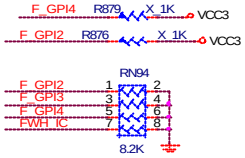
Firware Hub (FWH)



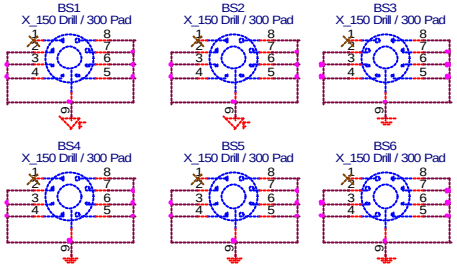
J6 Config.	
1 - 2	Normal *
2 - 3	Configuration Mode
OPEN	Recovery

* Default

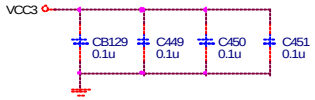
FWH RESISTORS



PCB Mounting Holes

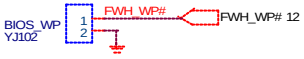


FWH DECOUPLING CAPACITORS



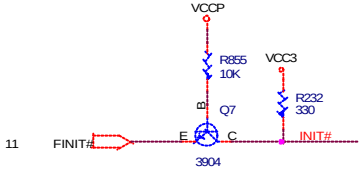
Place Cap. as Close to FWH< 350 mil

FWH write protect

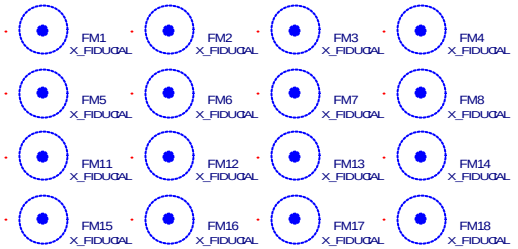


BIOS_WP	BIOS Update
SHORT	Locked
OPEN	Unlocked *

FWH INIT Signal Voltage Translation Block



PCB Fiducials



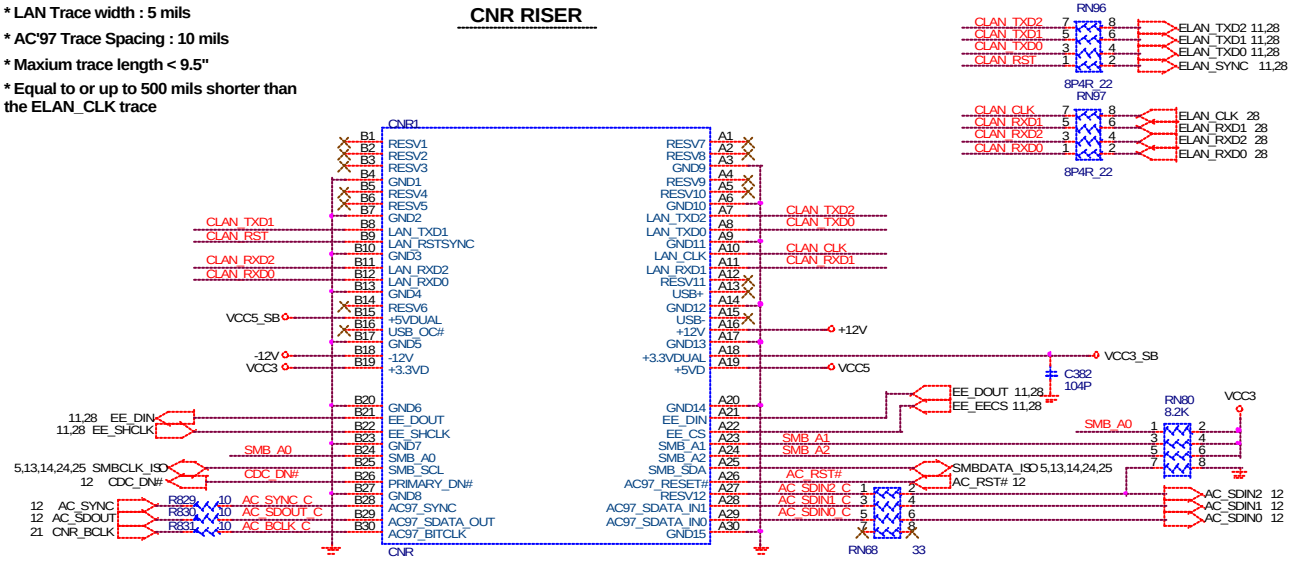
*** LAN Trace width : 5 mils**

*** AC'97 Trace Spacing : 10 mils**

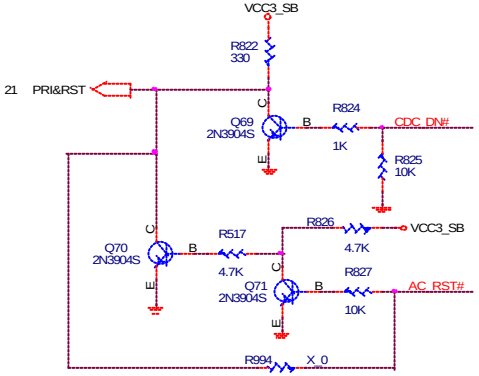
*** Maxium trace length < 9.5"**

*** Equal to or up to 500 mils shorter than the ELAN_CLK trace**

CNR RISER



SIMULATION TRACE



MSI	MICRO-STAR INT'L CO.,LTD.	
Title	FWH & CNR	
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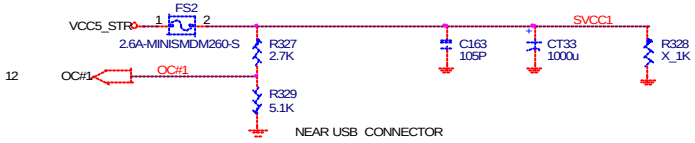
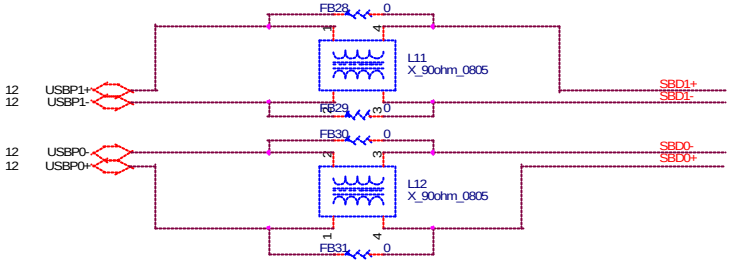
POWER CIRCUIT FOR USB PORT 0,1,2,3



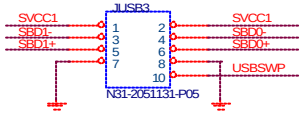
FRONT PANEL USB CONNECTOR FOR USB PORT 0,1

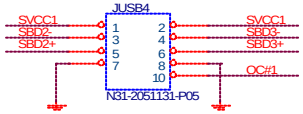


NEAR USB CONNECTOR

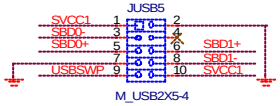
For ESD Protection

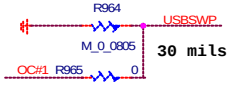
Intel Front USB Header



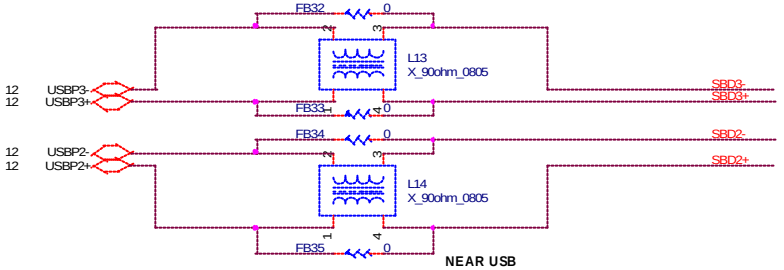


MSI Front USB Header





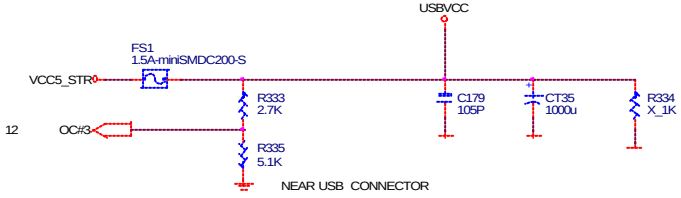
FRONT PANEL USB CONNECTOR FOR USB PORT 2,3



NEAR USB CONNECTOR

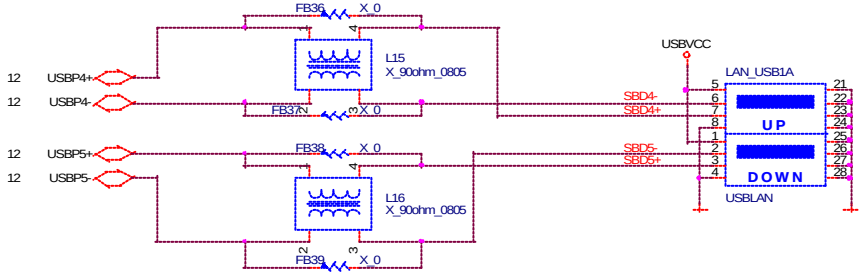
For ESD Protection

POWER CIRCUIT FOR USB PORT 4,5



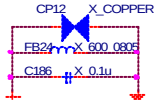
* USB Trace width : 9 mils
* USB Trace Spacing : 25 mils
* Differential USB Signlas Trace, Spacing : 18 mils
* USB Power Trace must be 40mils width

REAR PANEL USB CONNECTOR FOR USB PORT 4,5



NEAR USB CONNECTOR

For ESD Protection



MICRO-STAR INT'L CO.,LTD.

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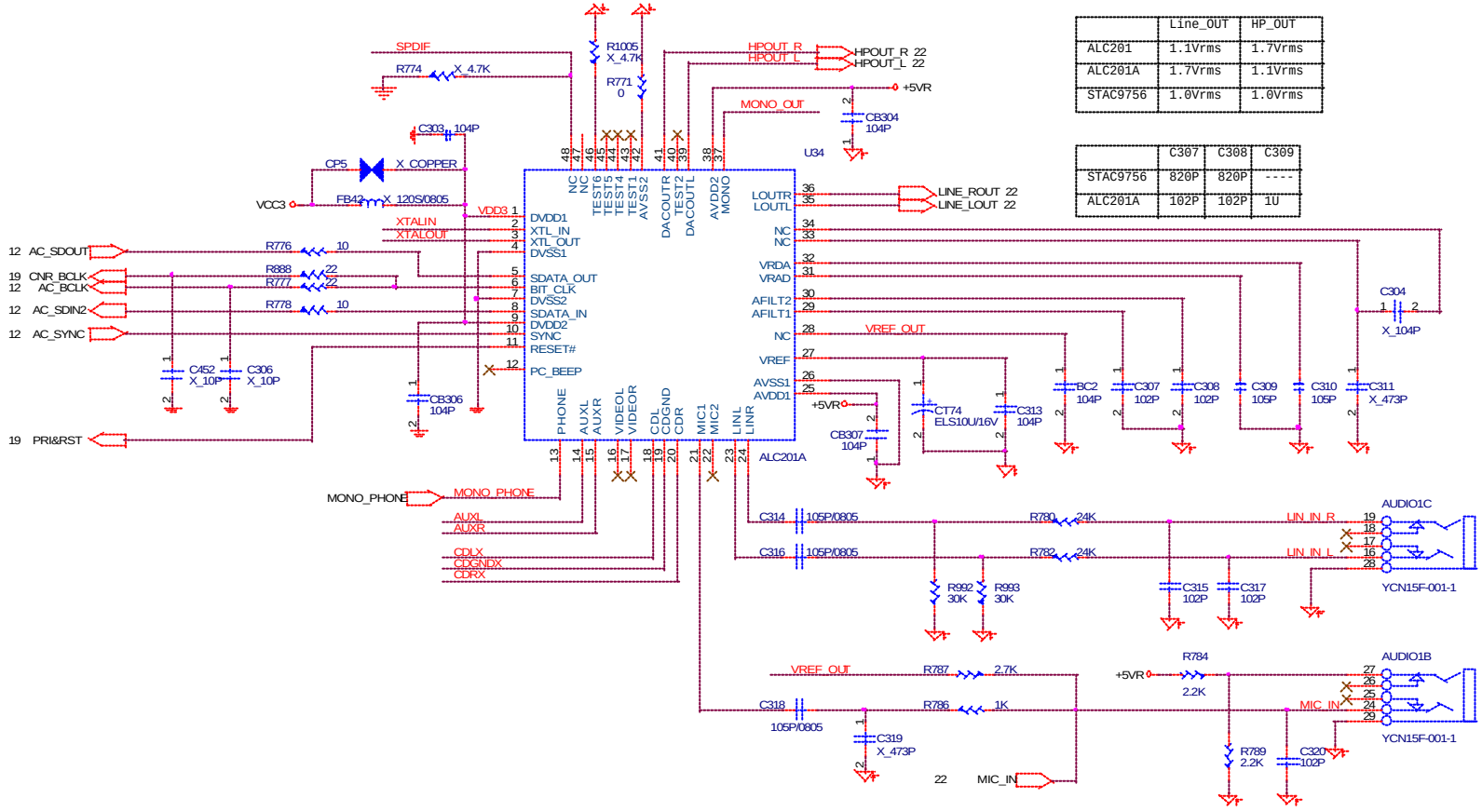
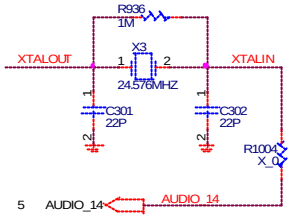
ALC201A AC97 CODEC

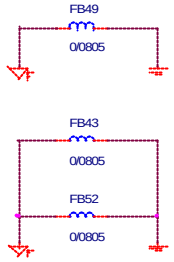


	Line_OUT	HP_OUT
ALC201	1.1Vrms	1.7Vrms
ALC201A	1.7Vrms	1.1Vrms
STAC9756	1.0Vrms	1.0Vrms

	C307	C308	C309
STAC9756	820P	820P	----
ALC201A	102P	102P	1U

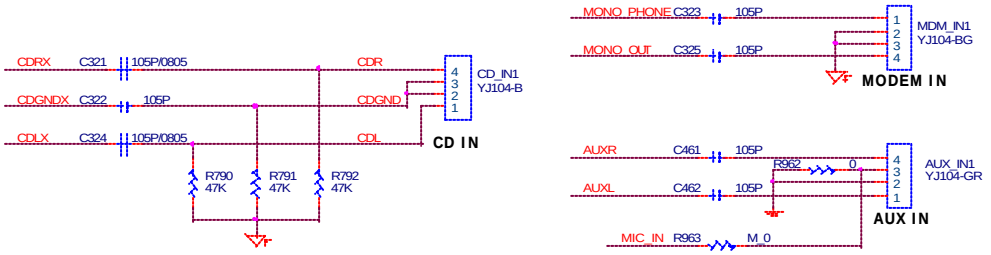
AUDIO CODE CRYSTAL CIRCUIT



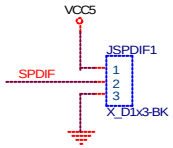


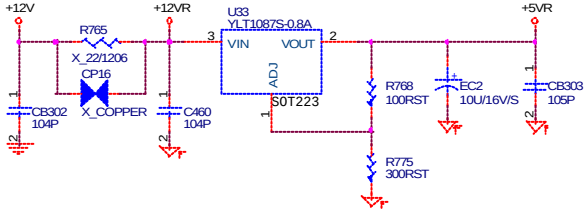
AUDIO CODE REGULATORS

AUDIO CODE CD / AUX / MODEM IN HEADERS



SPDIF HEADERS





MSI MICRO-STAR INT'L CO.,LTD.

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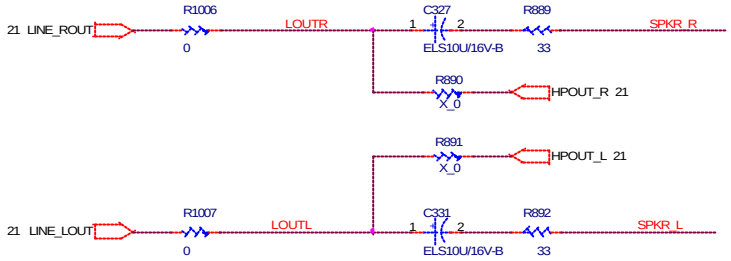
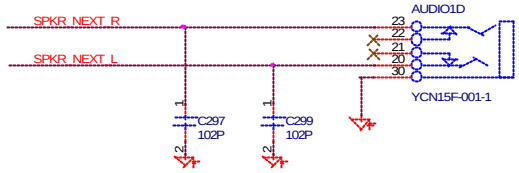
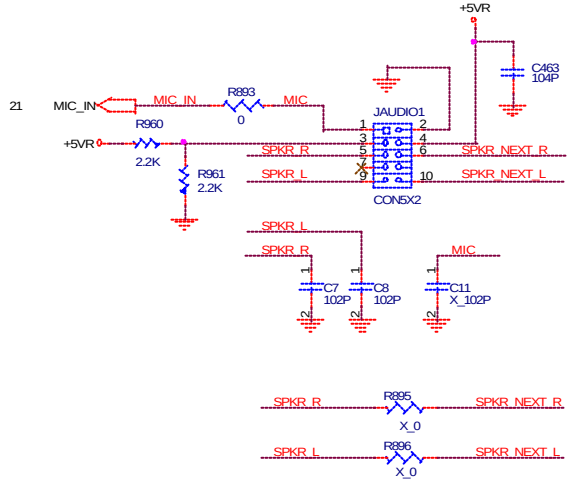
SPEAKER OUT CIRCUIT



SPEAKER OUT JACK



FOR Intel INTERNAL HEADER



MSI MICRO-STAR INT'L CO.,LTD.

Title	AUDIO AMPLIFIER	
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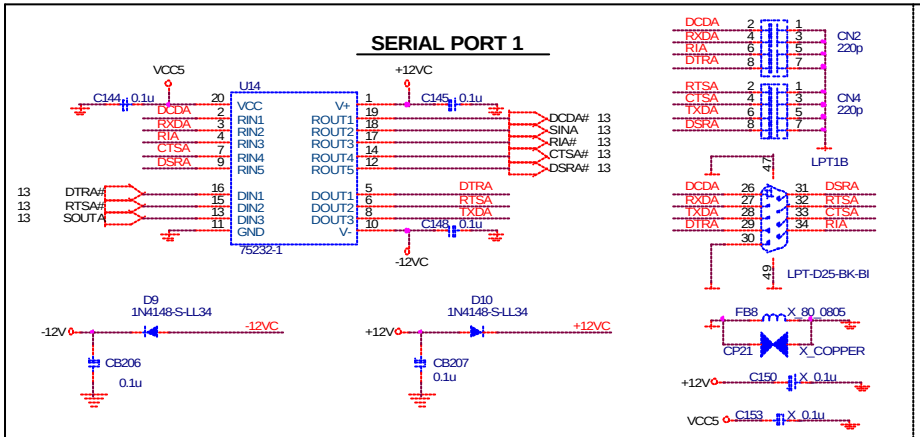
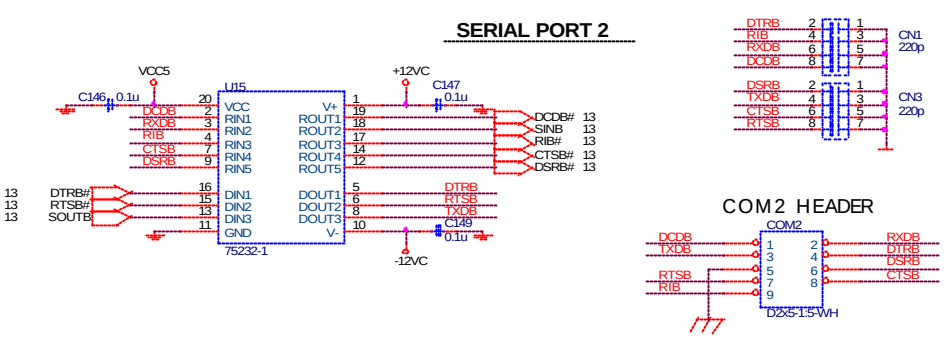
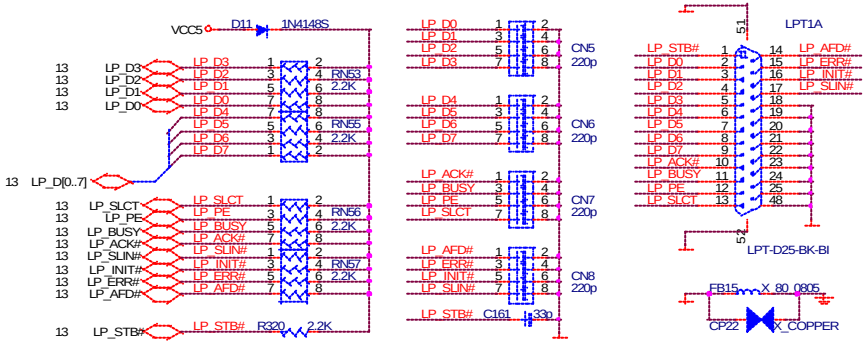
SERIAL PORT 1



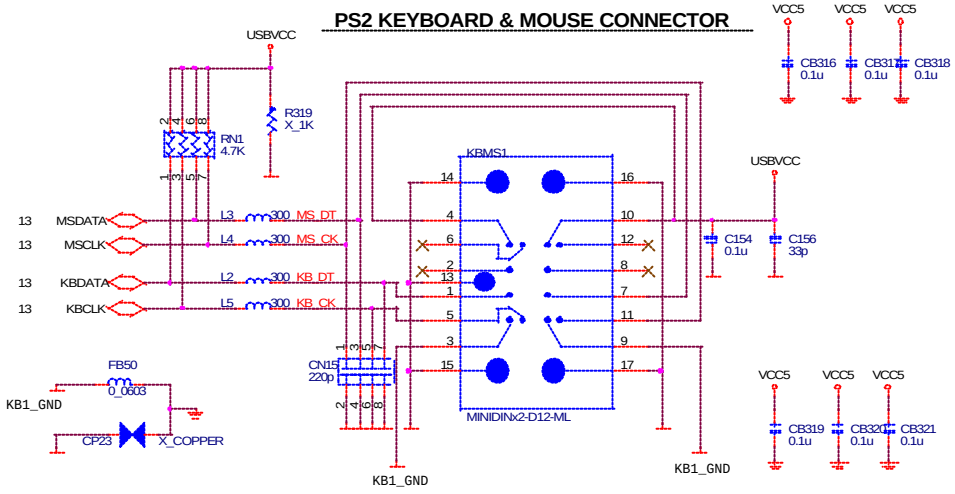
SERIAL PORT 2



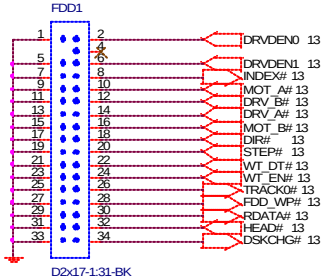
PARALLAL PORT

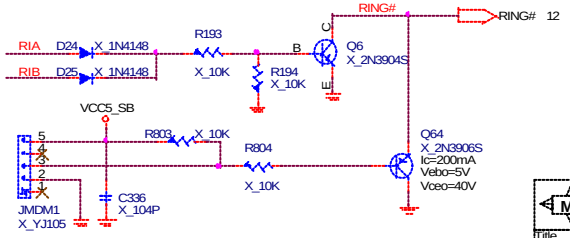


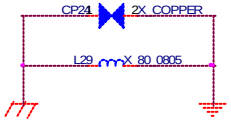
PS2 KEYBOARD & MOUSE CONNECTOR



FLOPPY CONNECTOR







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Title: I/O CONNECTORS

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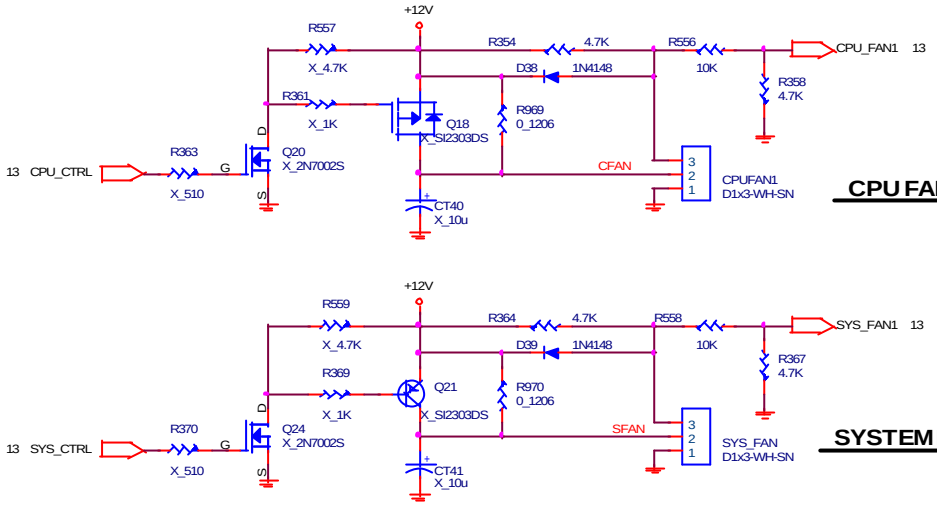

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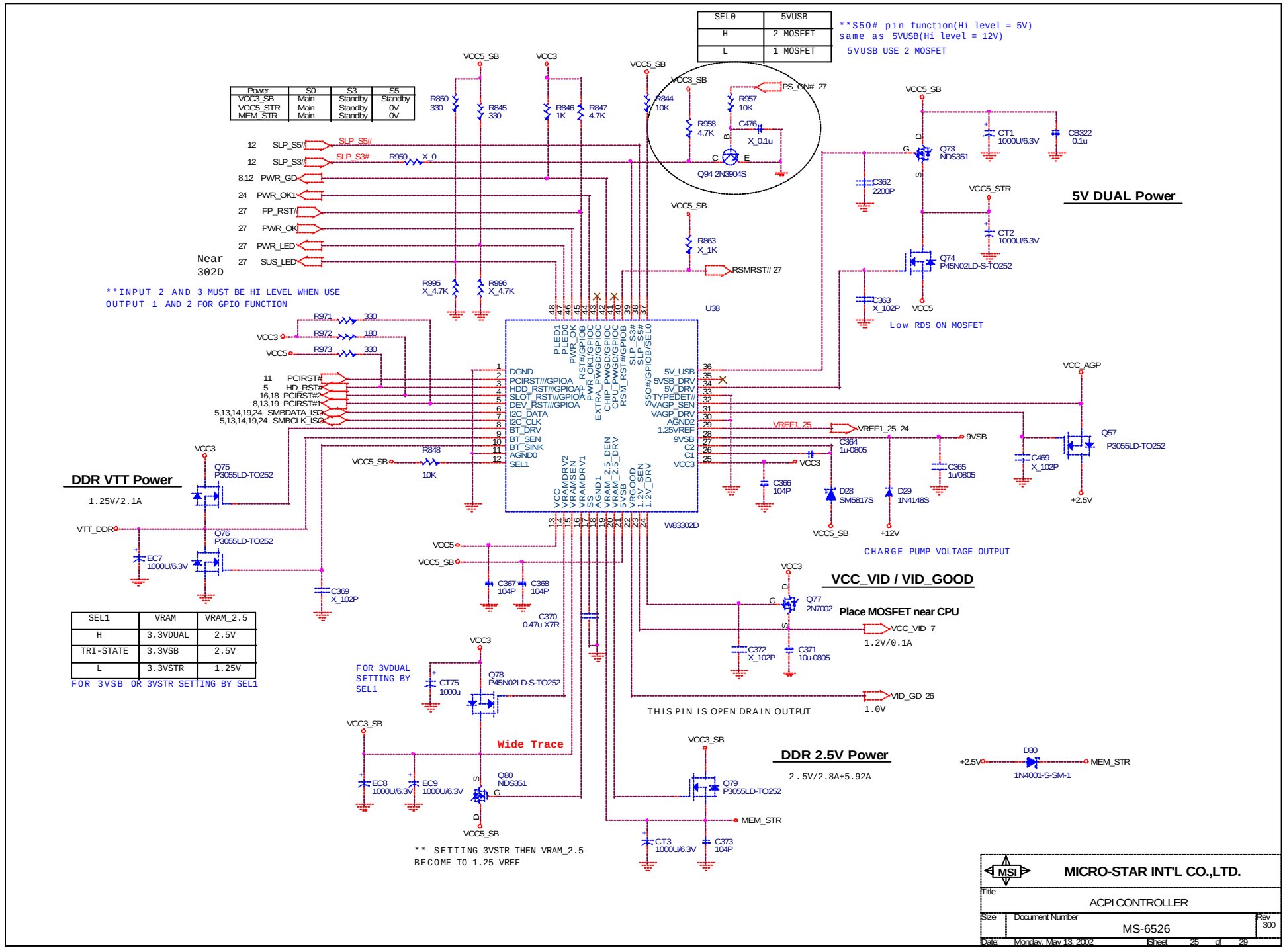
SEL0 | 5VUSB
H | 2 MOSFET
L | 1 MOSFET
**S5O# pin function(Hi level = 5V) same as 5VUSB(Hi level = 12V)
5VUSB USE 2 MOSFET
Power | S0 | S3 | S5
VCC3_SB | Main | Standby | Standby
VCC5_STR | Main | Standby | 0V
MEM_STR | Main | Standby | 0V
Near 302D
**INPUT 2 AND 3 MUST BE HI LEVEL WHEN USE OUTPUT 1 AND 2 FOR GPIO FUNCTION
5V DUAL Power
Low RDS ON MOSFET
DDR VTT Power
1.25V/2.1A
CHARGE PUMP VOLTAGE OUTPUT
VCC_VID / VID_GOOD
Place MOSFET near CPU
1.2V/0.1A
THIS PIN IS OPEN DRAIN OUTPUT
1.0V
DDR 2.5V Power
2.5V/2.8A+5.92A
SEL1 | VRAM | VRAM_2.5
H | 3.3VDUAL | 2.5V
TRI-STATE | 3.3VSB | 2.5V
L | 3.3VSTR | 1.25V
FOR 3VSB OR 3VSTR SETTING BY SEL1
FOR 3VDUAL SETTING BY SEL1
Wide Trace
** SETTING 3VSTR THEN VRAM_2.5 BECOME TO 1.25 VREF
W83302D
MICRO-STAR INT'L CO.,LTD.
ACPI CONTROLLER
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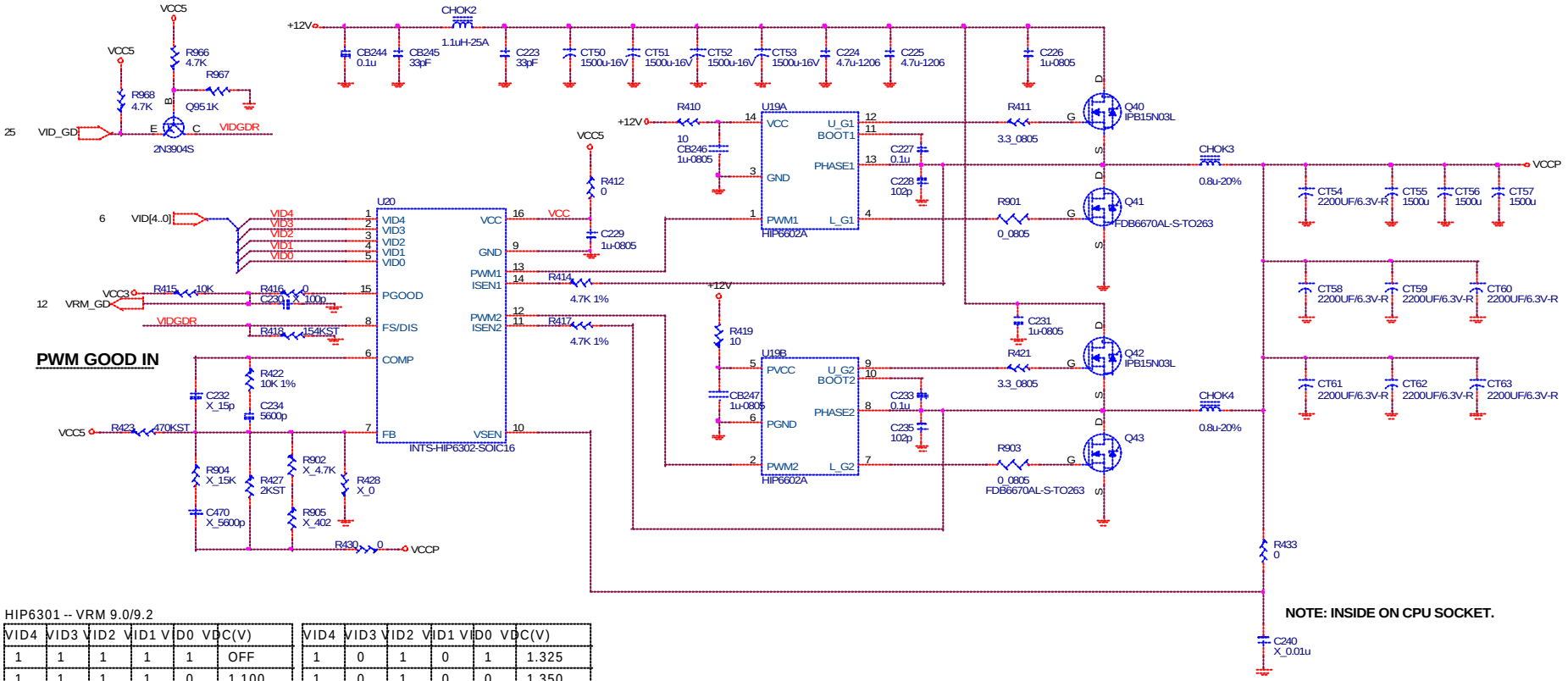
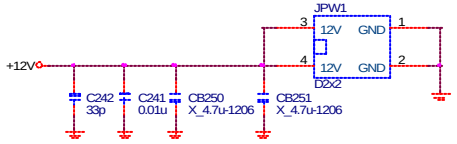


HIP6301 -- VRM 9.0/9.2

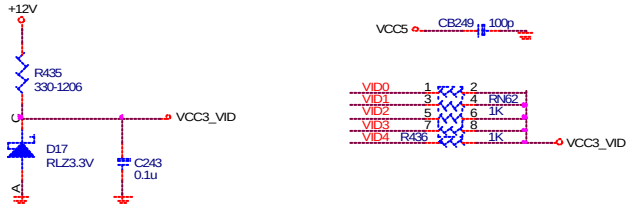
VID4	VID3	VID2	VID1	VID0	VDC(V)
1	1	1	1	1	OFF
1	1	1	1	0	1.100
1	1	1	0	1	1.125
1	1	1	0	0	1.150
1	1	0	1	1	1.175
1	1	0	1	0	1.200
1	1	0	0	1	1.225
1	1	0	0	0	1.250
1	0	1	1	1	1.275
1	0	1	1	0	1.300

VID4	VID3	VID2	VID1	VID0	VDC(V)
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
0	1	1	1	0	1.500
0	1	1	0	1	1.525
0	1	1	0	0	1.550

ATX12V POWER CONNECTOR



VID PULL-UP RESISTORS



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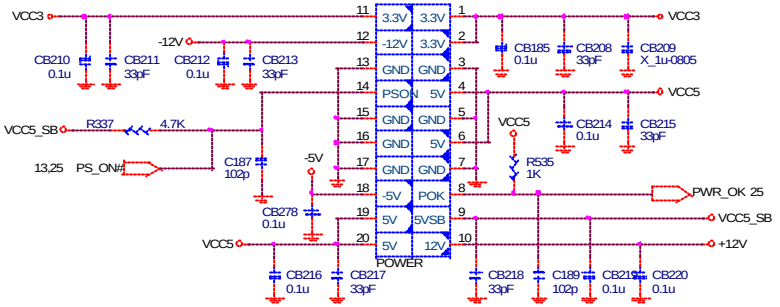
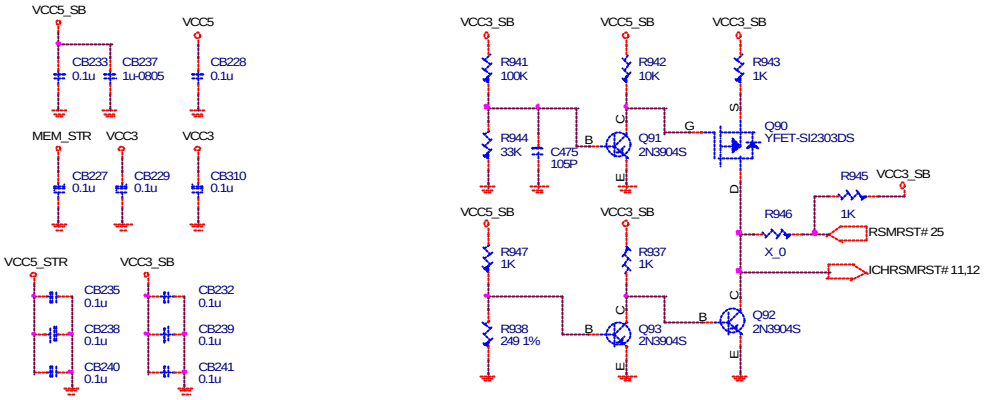
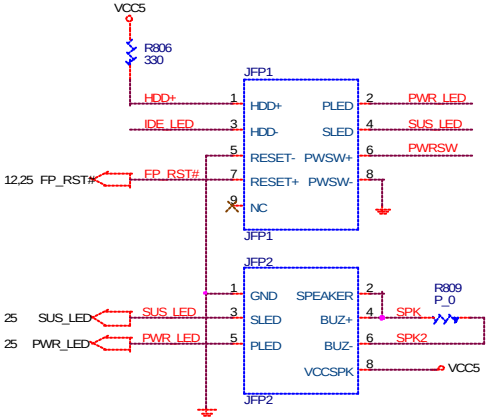
ATX CONNECTOR

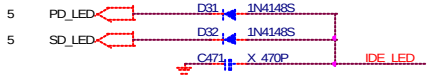


REGULATORS OUTPUT DECOUPLING CAPACITORS

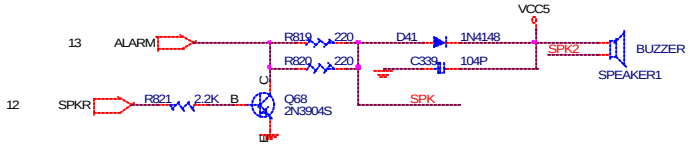


MSI/Intel Front Panel

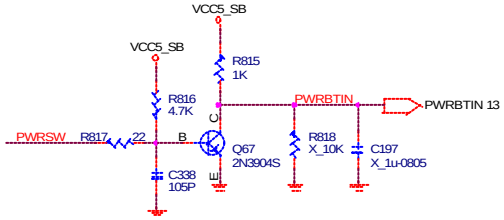




SPEAKER



POWER BUTTON



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Title: Front Panel & ATX Connector & FAN

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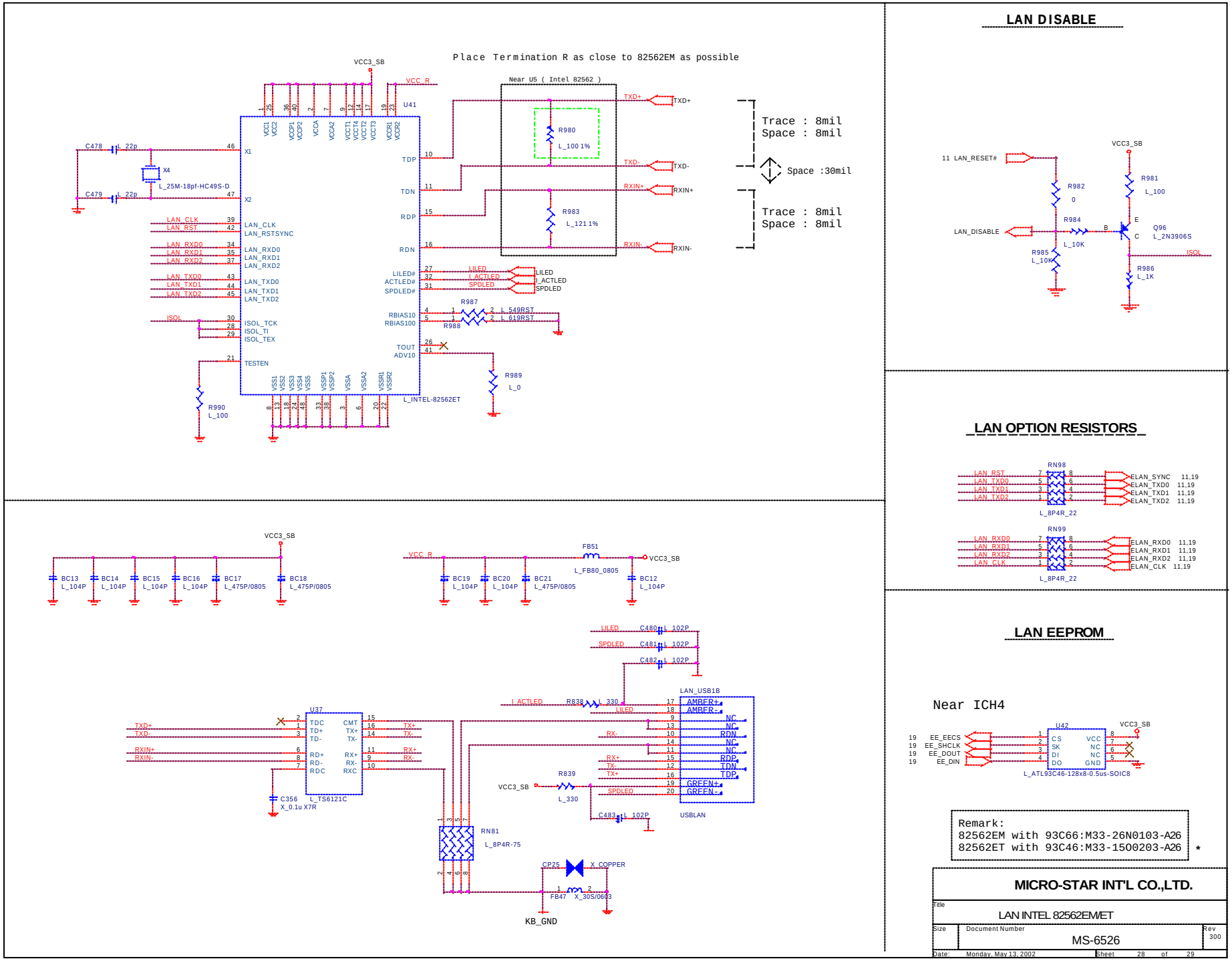

LAN DISABLE

LAN OPTION RESISTORS

LAN EEPROM

Near ICH4

Remark:
82562EM with 93C66:M33-26N0103-A26
82562ET with 93C46:M33-15O0203-A26 *

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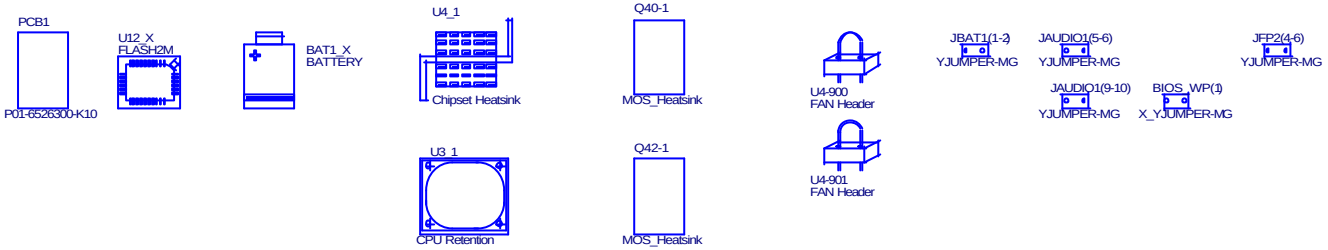
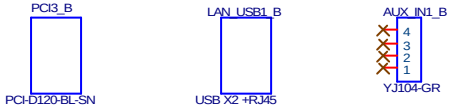


JBAT1 Clear CMOS	
1 - 2	Normal *
2 - 3	Clear CMOS

BIOS_WP	BIOS Update
SHORT	Locked
OPEN	Unlocked *

JLAN1	LAN SELECT
1-2	ENABLED
2-3	DISABLED

Option :M



Option :M

MSI **MICRO-STAR INT'L CO.,LTD.**

Title: MANUAL PARTS

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