MS-6714

Version : 2.0A

INTEL (R) Brookdale-G GE/PE Chipset

Willamette/Northwood 478pin mPGA-B Processor Schematics

CPU: Willamette/Northwood mPGA-478B Processor

System Brookdale-G / GE / PE Chipset:

INTEL GMCH + ICH4

On Board Chipset:

BIOS -- FWH

LPC Super I/O -- W83627HF-AW

Clock Generator -- CY28349

AC'97 Codec -- RealTek AC650

Onboard Lan Chipset-- RealTek RTL8101L

Expansion Slots:

AGP2.0 SLOT * 1

PCI2.2 SLOT * 3

Platform: Micro ATX

MICRO-STAR

Title: COVER SHEET

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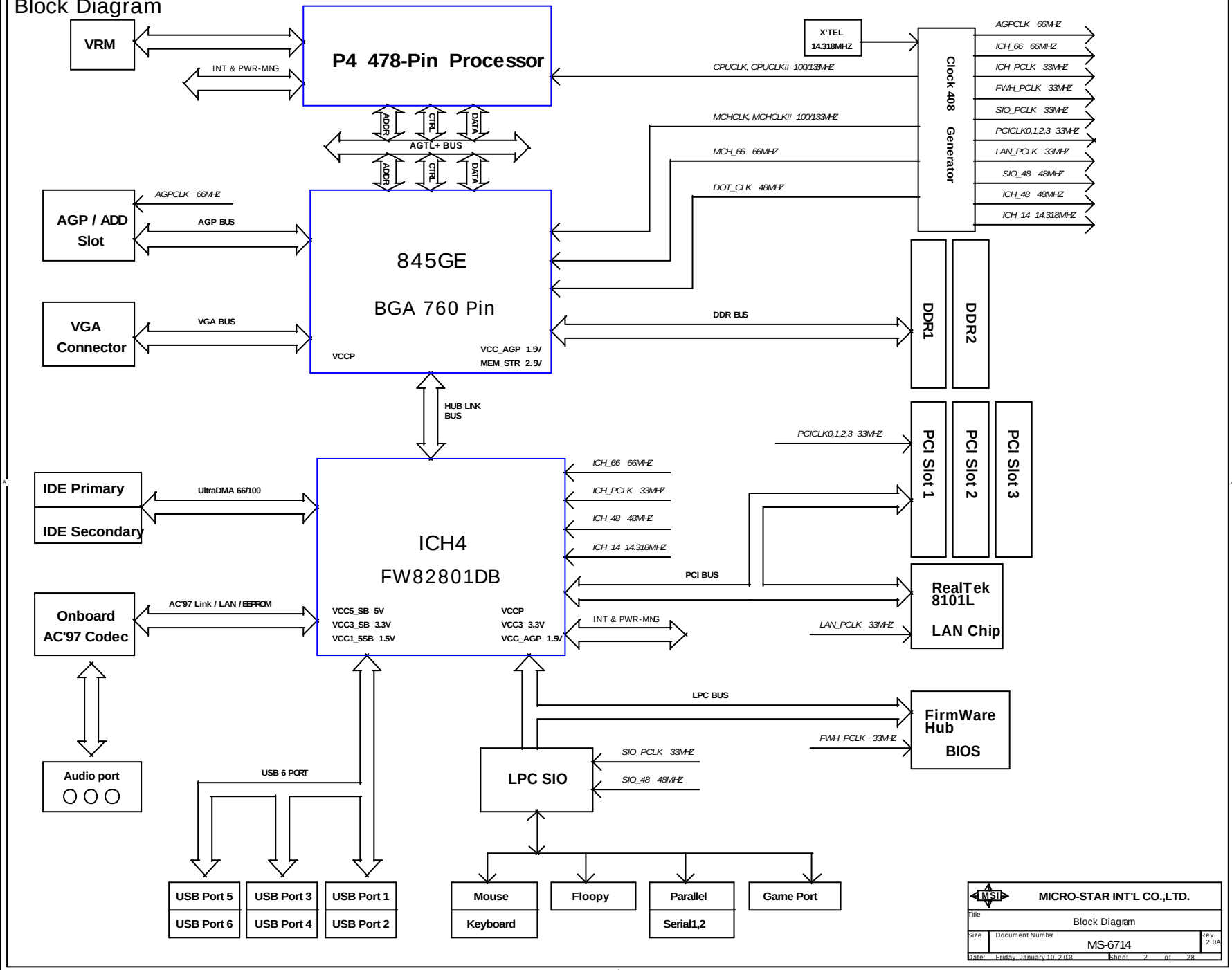
Block Diagram



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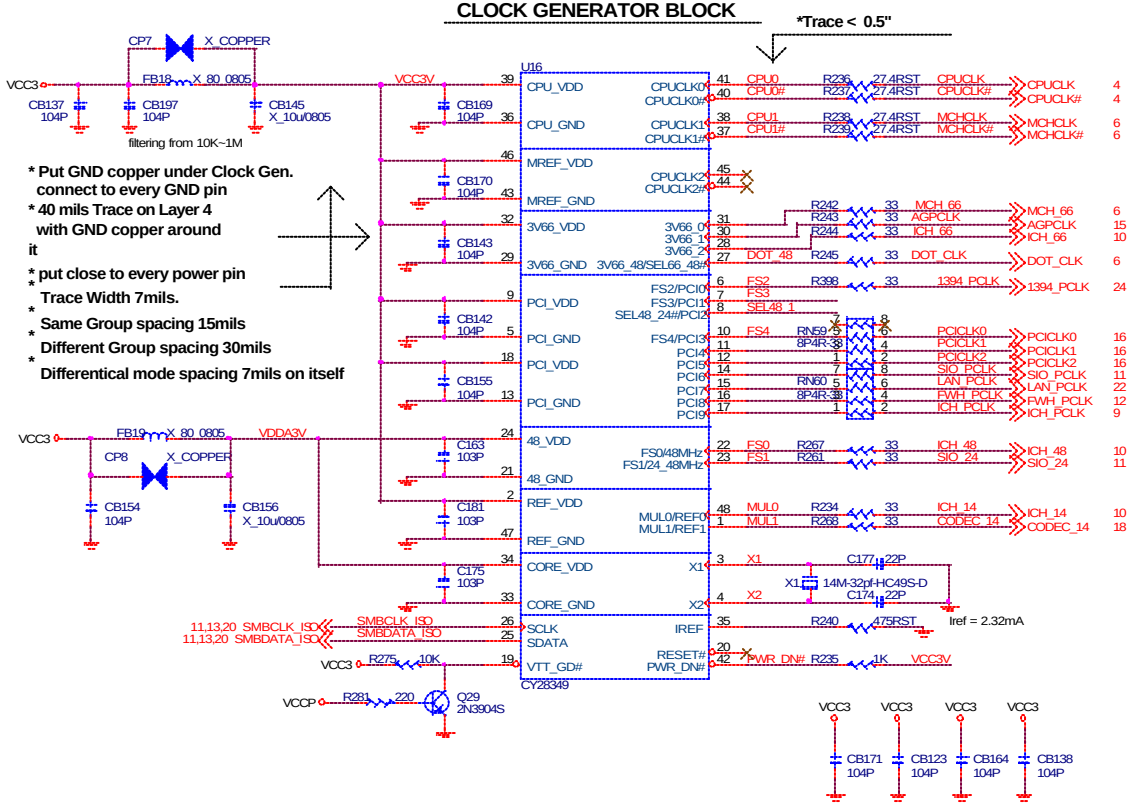
CLOCK GENERATOR BLOCK



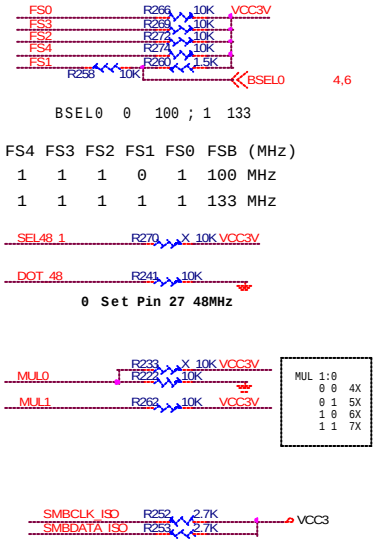
* Put GND copper under Clock Gen. connect to every GND pin
* 40 mils Trace on Layer 4 with GND copper around it
* put close to every power pin
* Trace Width 7mils.
* Same Group spacing 15mils
* Different Group spacing 30mils
* Differentical mode spacing 7mils on itself

Shut Source Termination Resistors

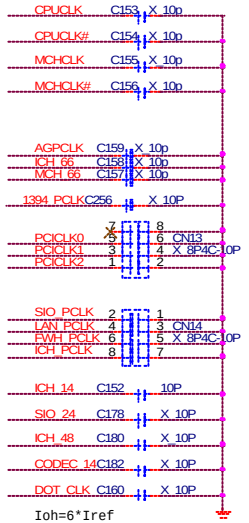
Trace less 0.2"

49.9ohm for 50ohm M/B impedance

CLOCK STRAPPING RESISTORS



Pull-Down Capacitors

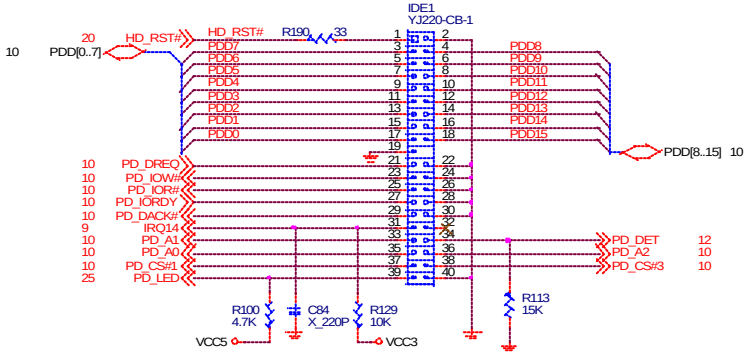


Ioh=6*Iref
Voh=0.71V

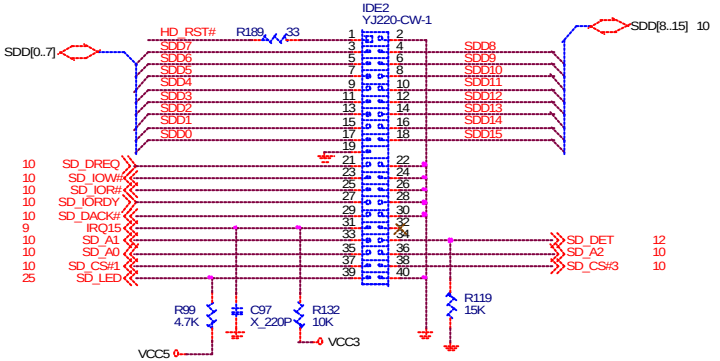
used only for EMI issue

Trace less 0.2"

PRIMARY IDE BLOCK



SECONDARY IDE BLOCK



ATA100 IDE CONNECTORS

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

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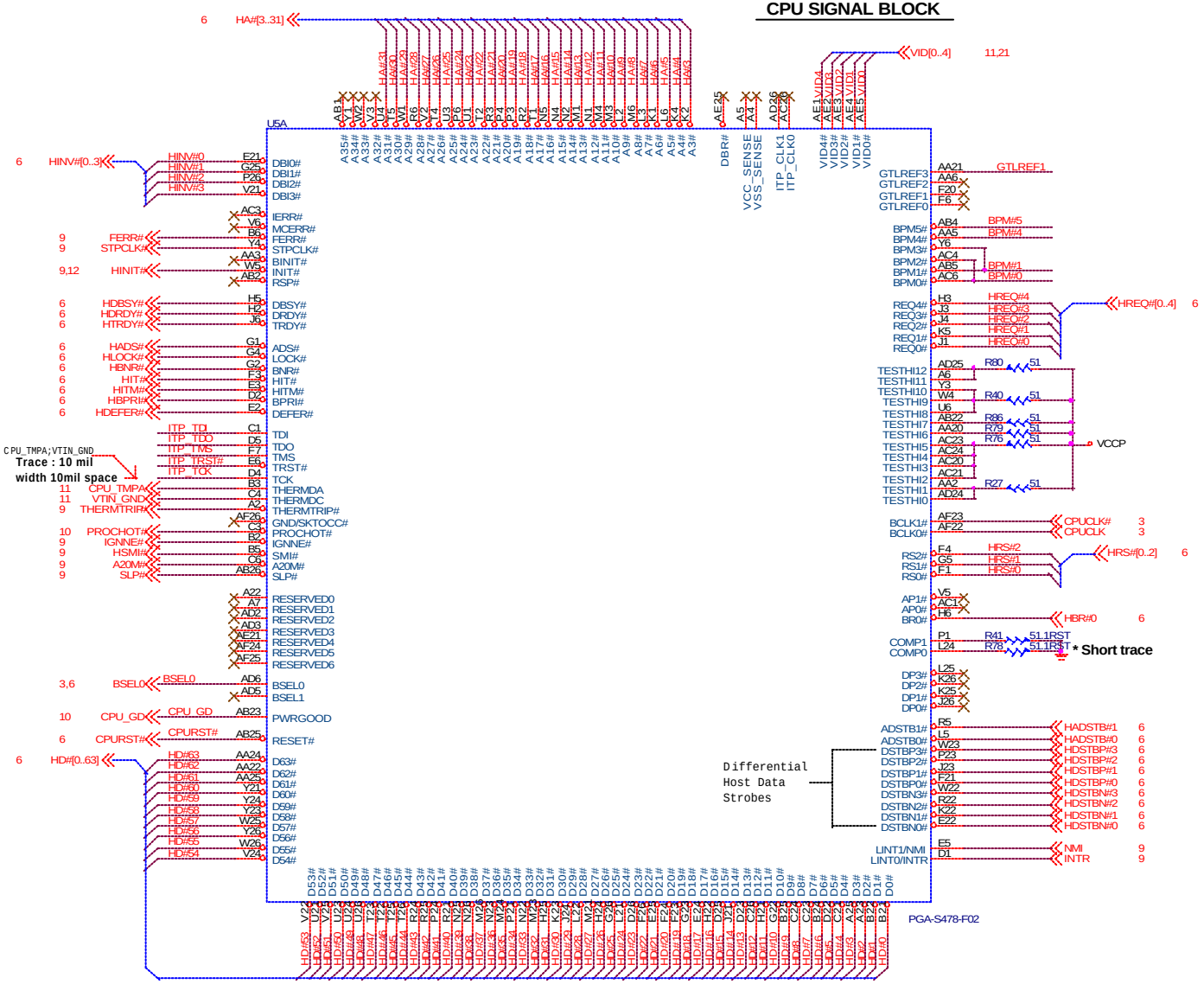
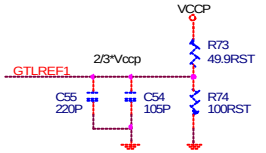
CPU SIGNAL BLOCK

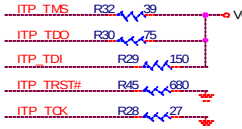


CPU GTL REFERNCE VOLTAGE BLOCK



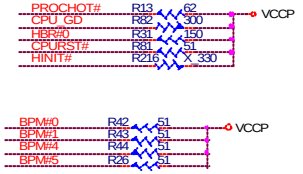
Every pin put one 220pF cap near it.
Trace Width 10mils, Space 15mils.
Keep the voltage dividers within 1.5 inches of the first GTLREF Pin

CPU ITP BLOCK



ALL COMPONENTS CLOSE TO CPU

CPU STRAPPING RESISTORS



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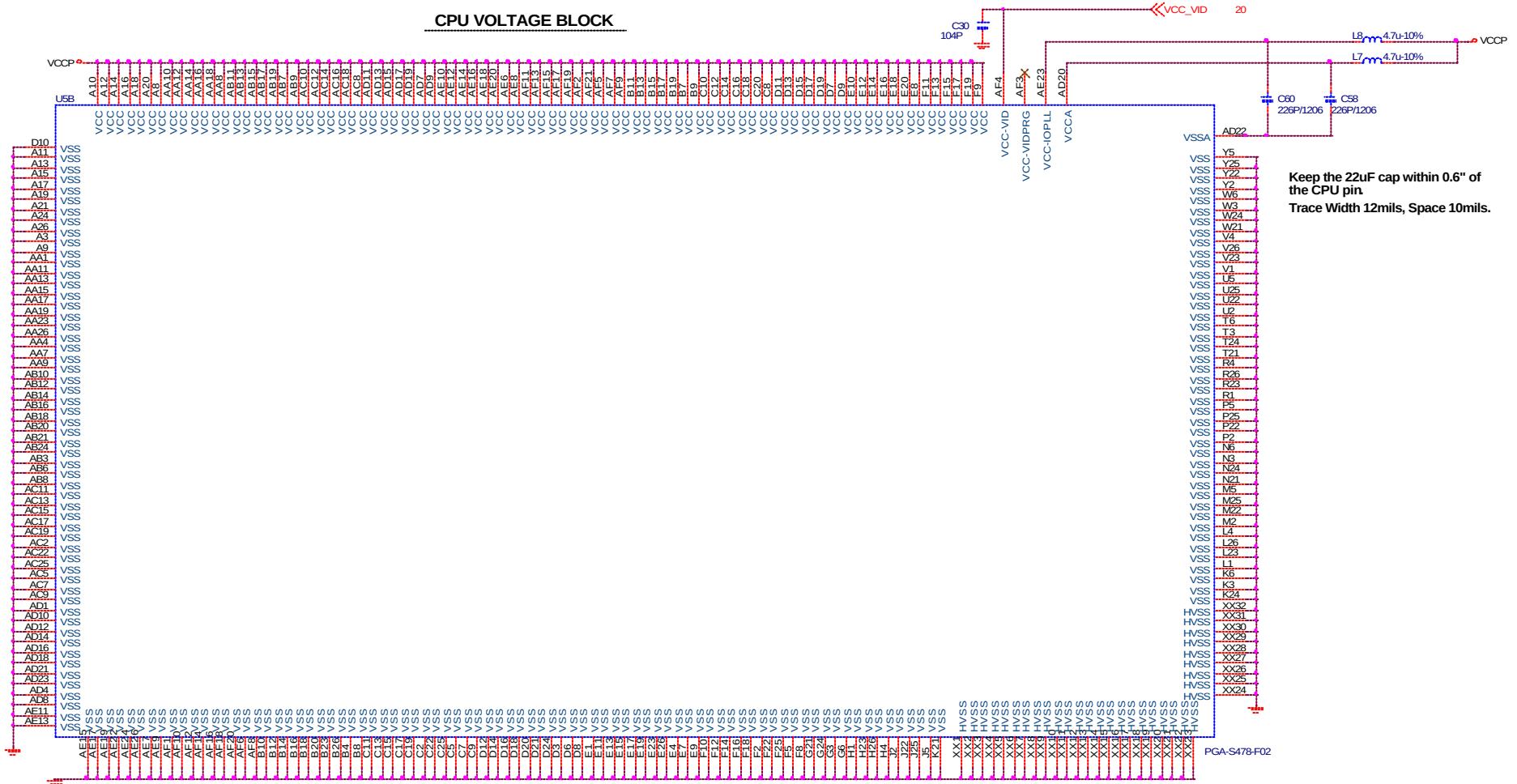
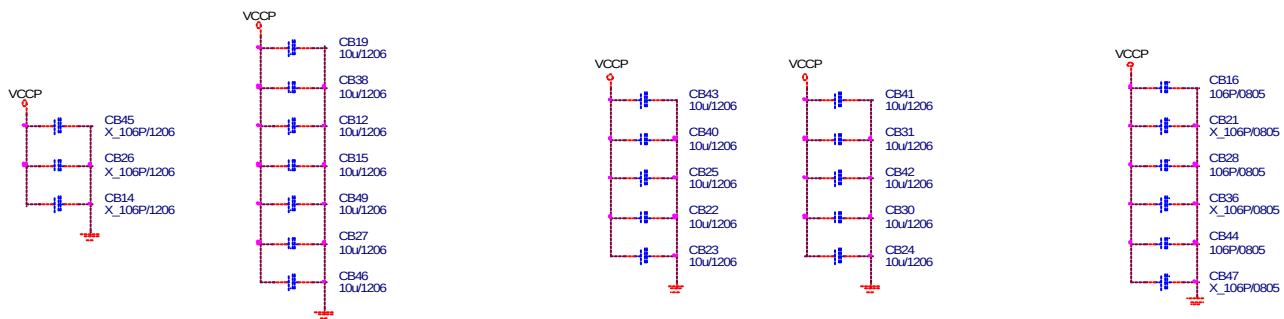
CPU VOLTAGE BLOCK



CPU DECOUPLING CAPACITORS



MICRO-STAR		
Title	INTEL mPGA478-B CPU2	
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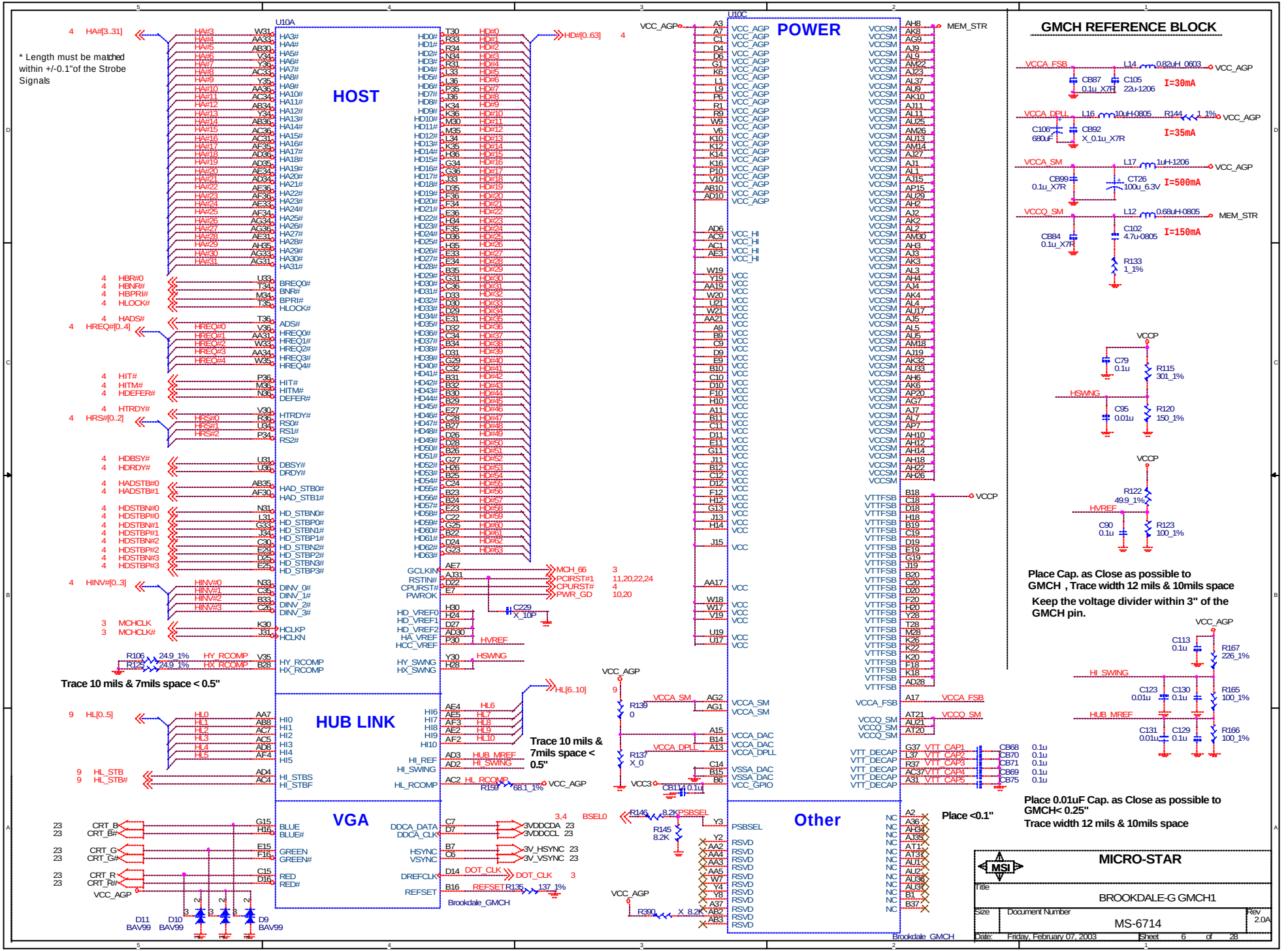
U10A
HOST
* Length must be matched within +/-0.1"of the Strobe Signals
Trace 10 mils & 7mils space < 0.5"
HUB LINK
Trace 10 mils & 7mils space < 0.5"
VGA
Brookdale_GMCH
U10C
POWER
Other
Brookdale_GMCH
GMCH REFERENCE BLOCK
VCCA_FSB
L14 0.82uH_0603
VCC_AGP
CB87 0.1u_X7R
C105 22u-1206
I=30mA
VCCA_DPLL
L16 10uH-0805
R144 1_1%
C106 680uF
CB92 X_0.1u_X7R
I=35mA
VCCA_SM
L17 1uH-1206
CB99 0.1u_X7R
CT26 100u_6.3V
I=500mA
VCCQ_SM
L12 0.68uH-0805
MEM_STR
C102 4.7u-0805
CB84 0.1u_X7R
I=150mA
R133 1_1%
VCCP
C79 0.1u
R115 301_1%
HSWNG
C95 0.01u
R120 150_1%
R122 49.9_1%
HVREF
C90 0.1u
R123 100_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.
HI_SWING
HUB_MREF
C113 0.1u
R167 226_1%
C123 0.01u
C130 0.1u
R165 100_1%
C131 0.01u
C129 0.1u
R166 100_1%
Place 0.01uF Cap. as Close as possible to GMCH< 0.25"
Trace width 12 mils & 10mils space
Place <0.1"
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BROOKDALE-G GMCH1
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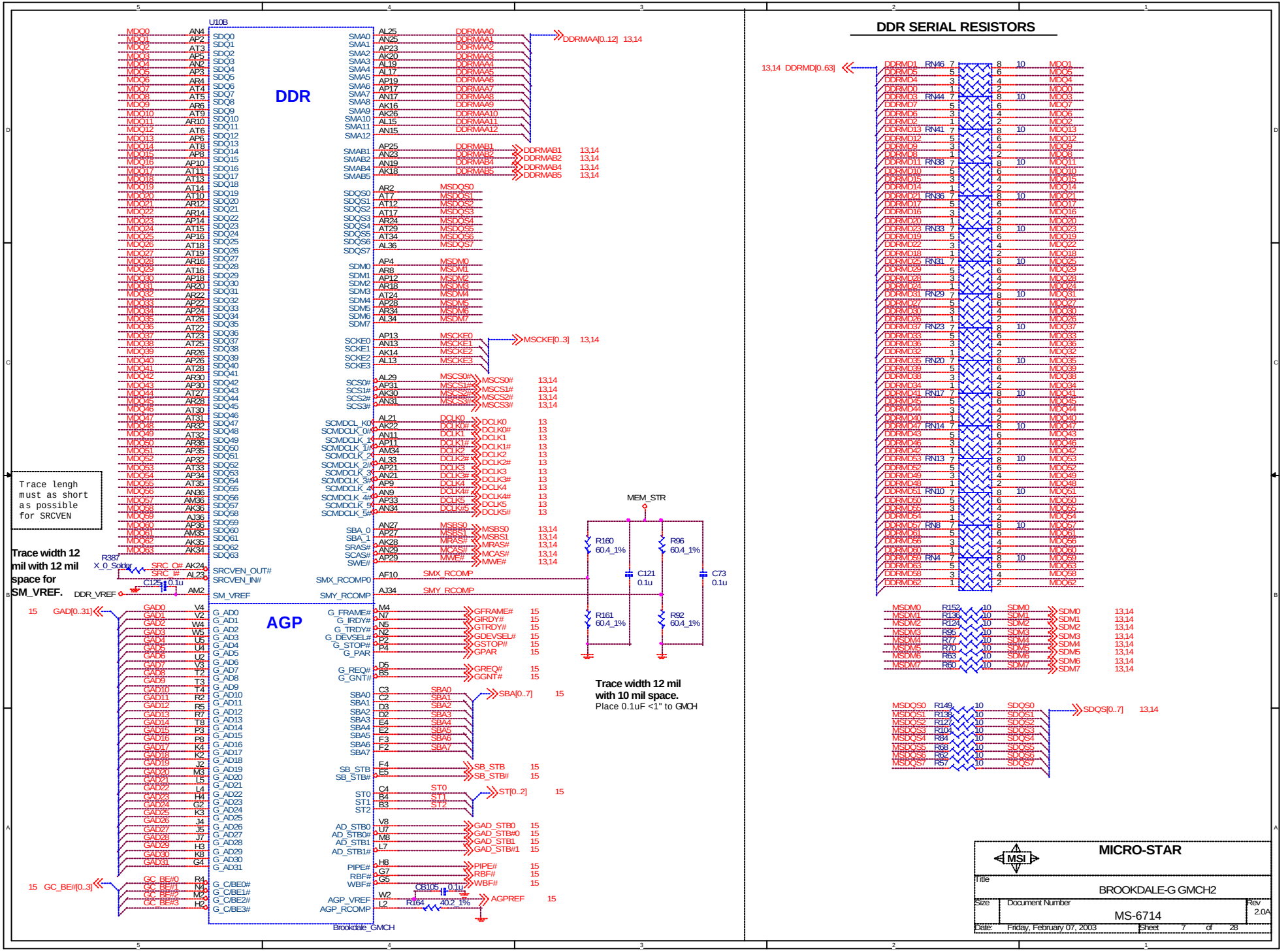
DDR
AGP
U10B
Brookdale_GMCH
DDR SERIAL RESISTORS
Trace lengh must as short as possible for SRCVEN
Trace width 12 mil with 12 mil space for SM_VREF.
Trace width 12 mil with 10 mil space.
Place 0.1uF <1" to GMCH
MEM_STR
MICRO-STAR
BROOKDALE-G GMCH2
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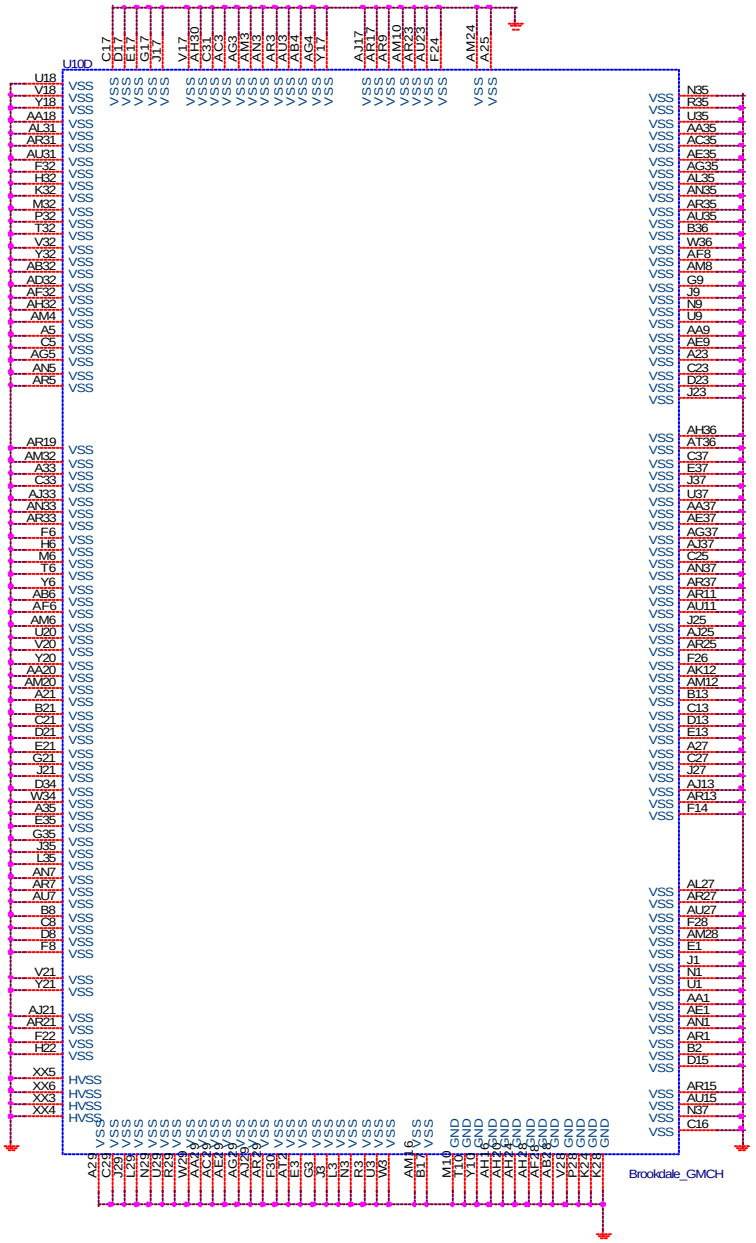
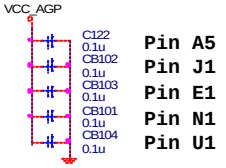
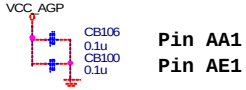


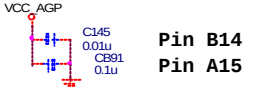
GMCH DECOUPLING CAPACITOR



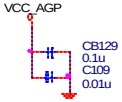
Place decoupling cap close to GMCH AGP Interface < 0.1"



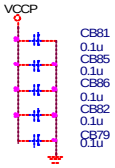
Place decoupling cap close to GMCH Hub-Link Interface< 0.1"



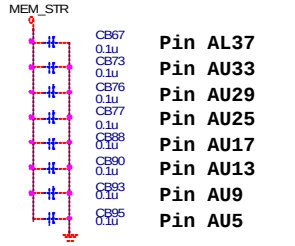
Place decoupling cap close to GMCH DAC Interface< 0.1"



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

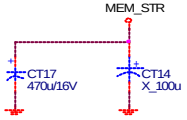


Place decoupling cap close to GMCH CPU Interface < 250mil in the Vtt corridor



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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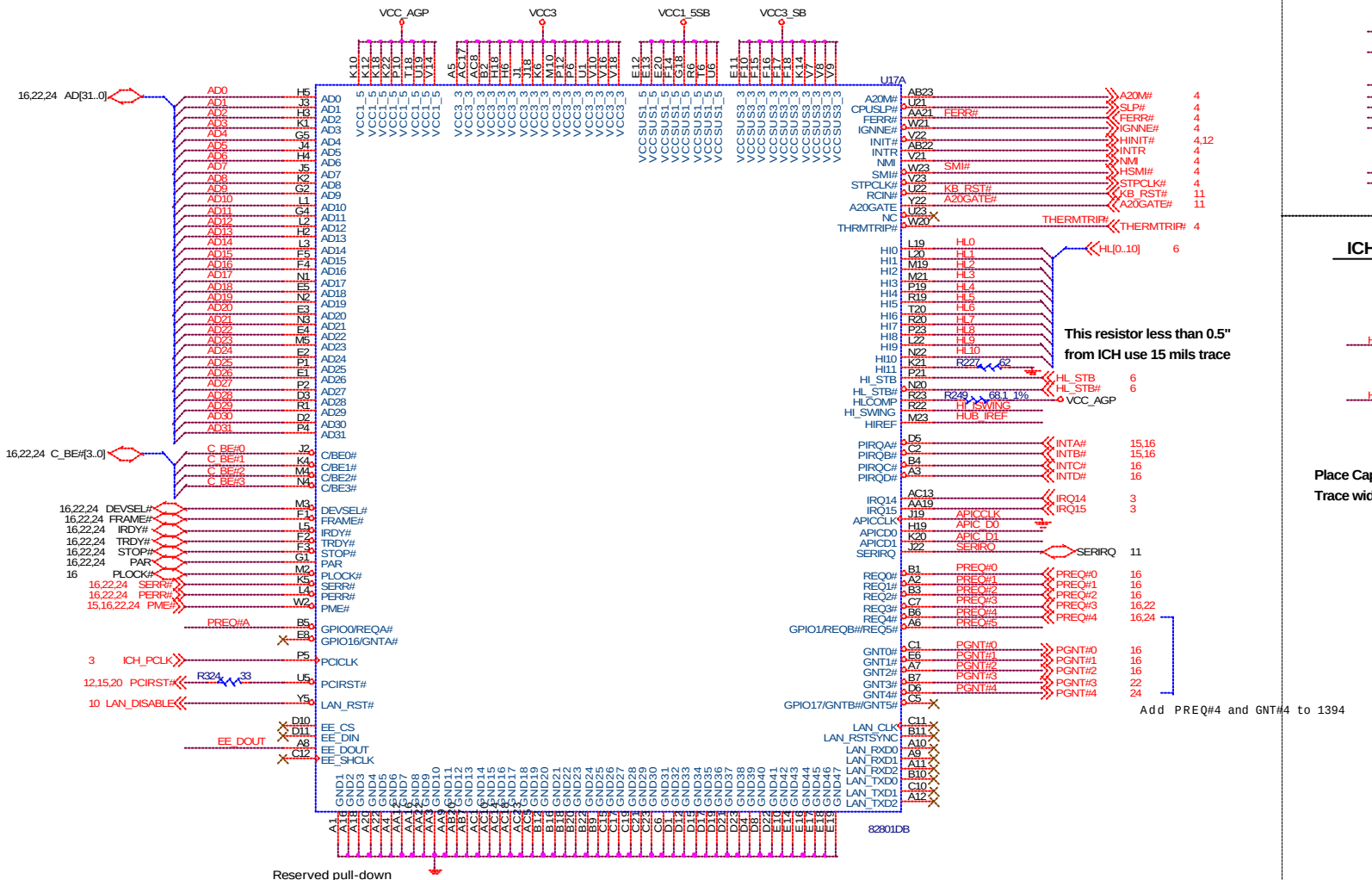
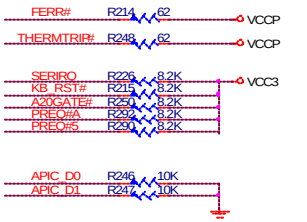
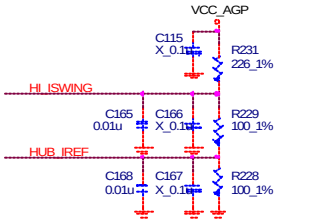
ICH4 PCI / HUB LINK / CPU / LAN / INTERRUPT SIGNALS



ICH4 PULL-UP/DOWN RESISTORS



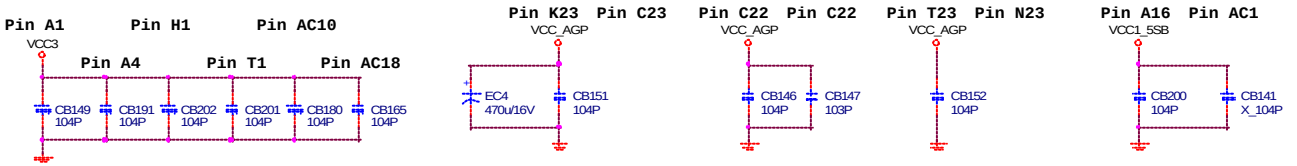
ICH4 REFERENCE VOLTAGE



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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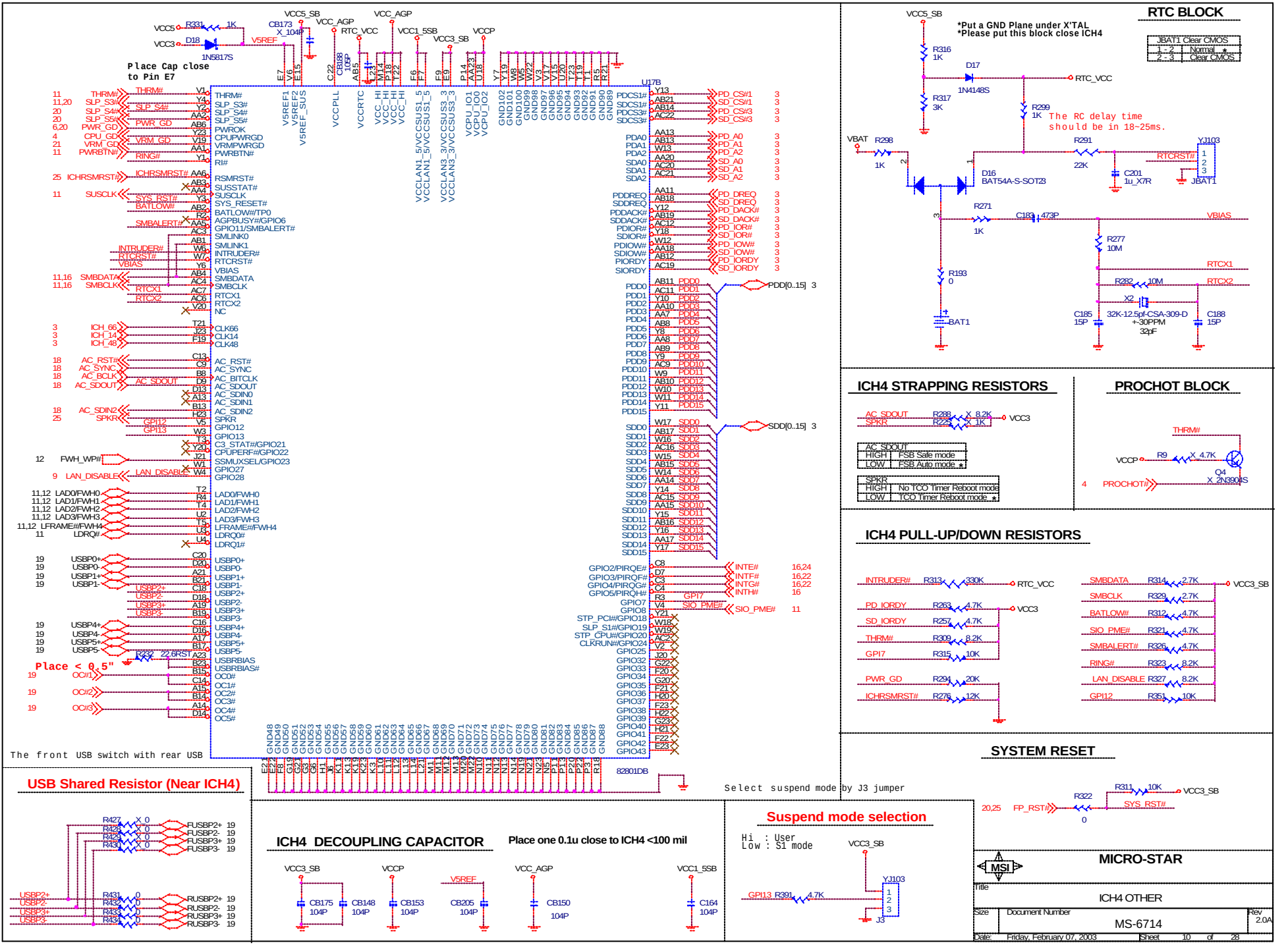
RTC BLOCK
*Put a GND Plane under X'TAL
*Please put this block close ICH4
JBAT1 Clear CMOS
1 - 2 Normal *
2 - 3 Clear CMOS
The RC delay time should be in 18~25ms.
D16 BAT54A-S-SOT23
1N4148S
BAT1
32K-12.5pf-CSA-309-D +-30PPM 32pF
ICH4 STRAPPING RESISTORS
AC_SDOUT
HIGH FSB Safe mode
LOW FSB Auto mode *
SPKR
HIGH No TCO Timer Reboot mode
LOW TCO Timer Reboot mode *
PROCHOT BLOCK
ICH4 PULL-UP/DOWN RESISTORS
SYSTEM RESET
Place Cap close to Pin E7
Place < 0.5"
The front USB switch with rear USB
Select suspend mode by J3 jumper
USB Shared Resistor (Near ICH4)
ICH4 DECOUPLING CAPACITOR
Place one 0.1u close to ICH4 <100 mil
Suspend mode selection
Hi : User
Low : S1 mode
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ICH4 OTHER
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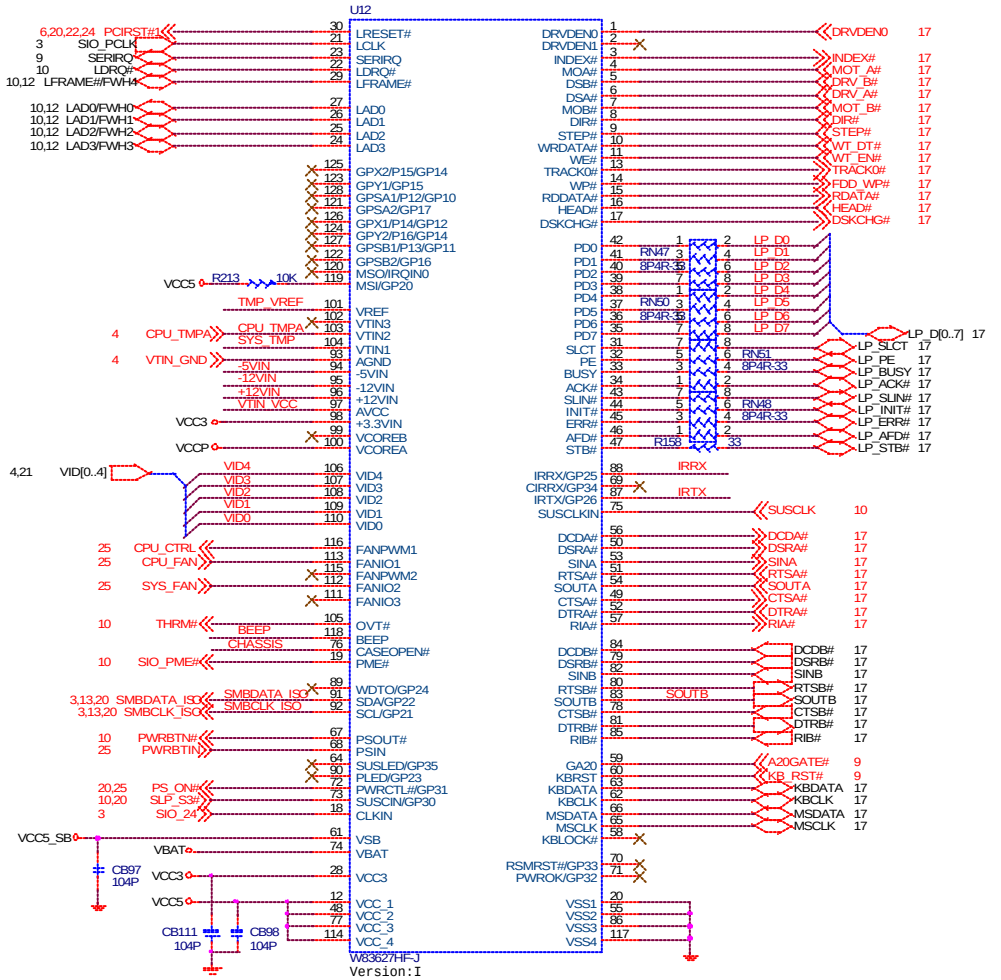
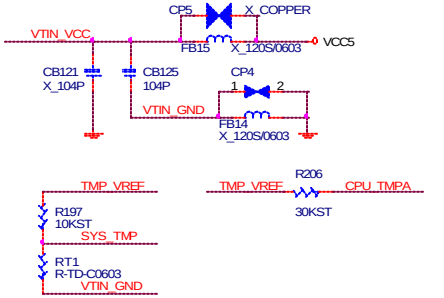
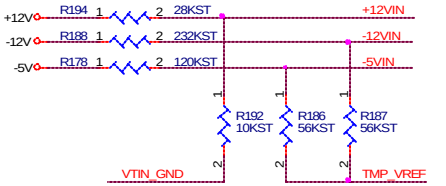
LPC SUPER I/O W83627HF



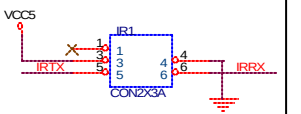
THERMAL RESISTOR BLOCK



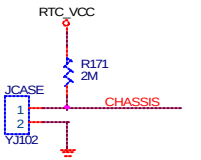
NOTE: LOCATE CLOSE STATUS PANEL



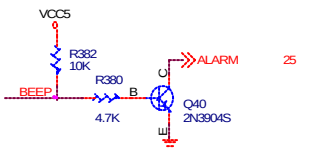
Intel Front IR Header



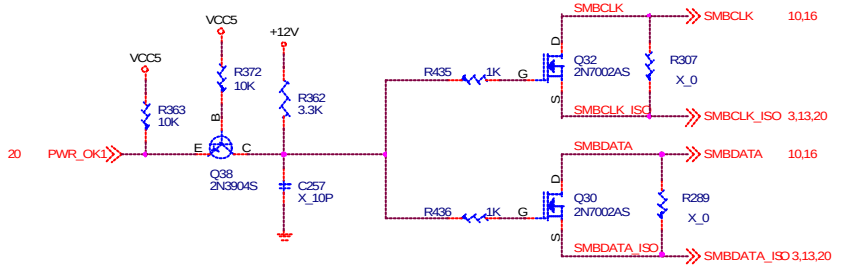
Chasiss Intrusion Header



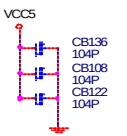
SPEAKER BLOCK



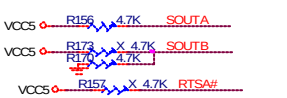
SMBus Isolation



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

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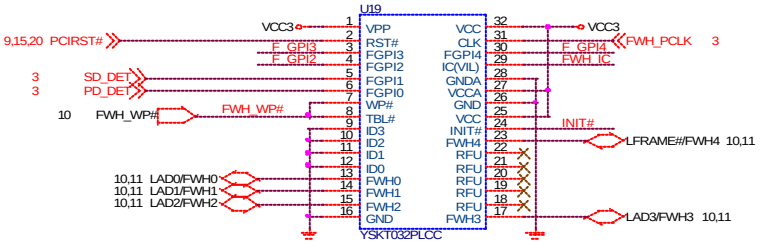
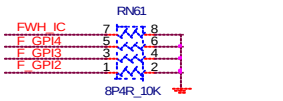
Firware Hub (FWH)

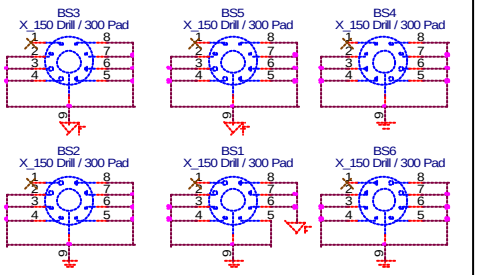


FWH RESISTORS

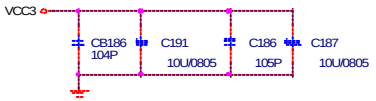


FWH write protect through GPIO23

PCB Mounting Holes

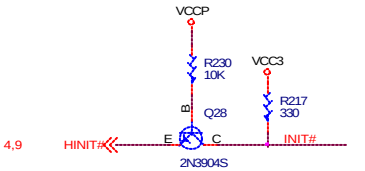


FWH DECOUPLING CAPACITORS

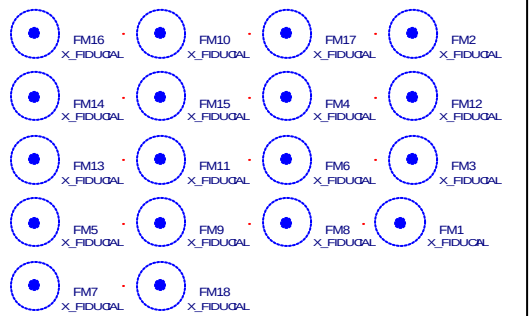


Place Cap. as Close to FWH< 350 mil

FWH INIT Signal Voltage Translation Block



PCB Fiducials



SIMULATION TRACE

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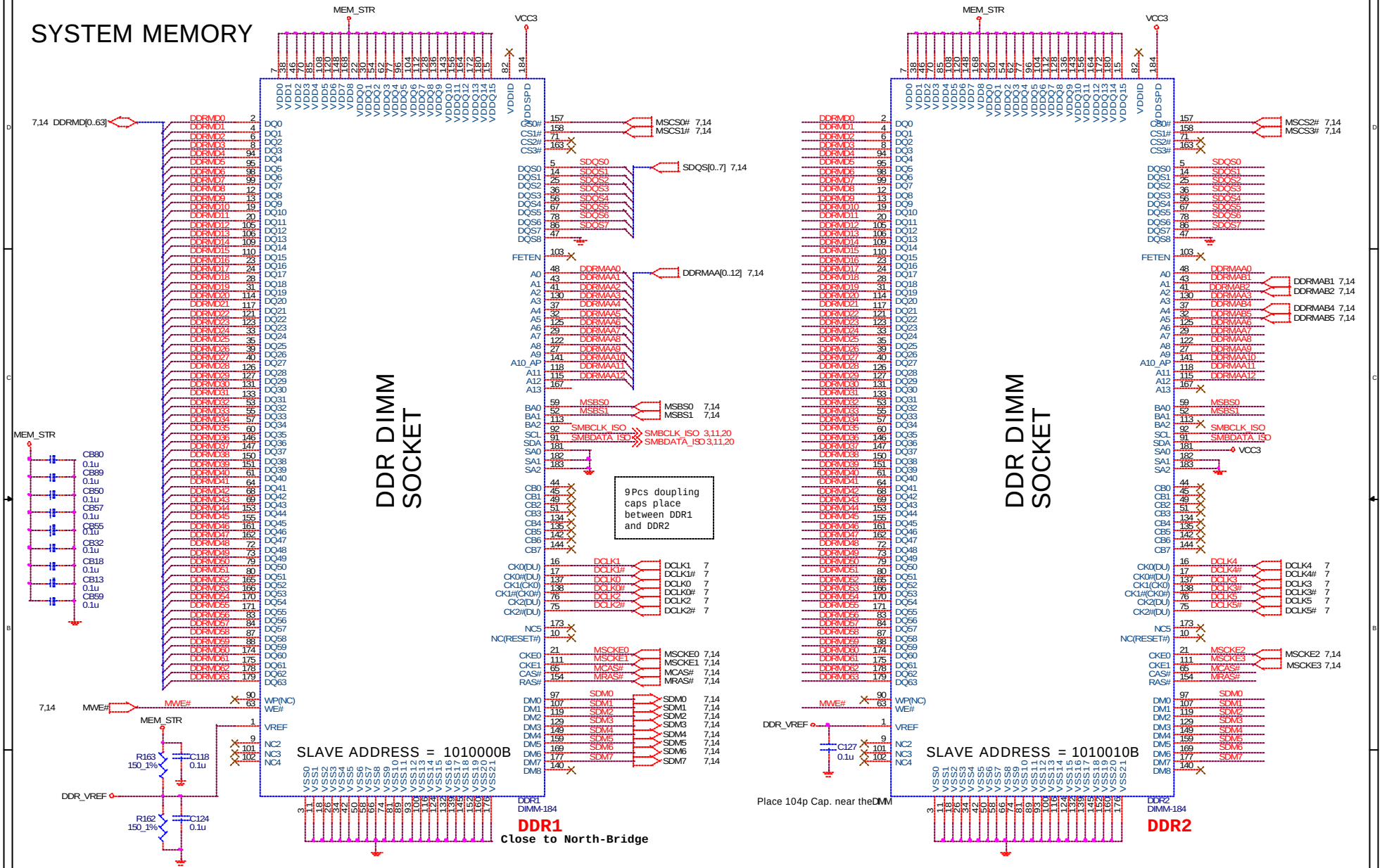
SYSTEM MEMORY



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

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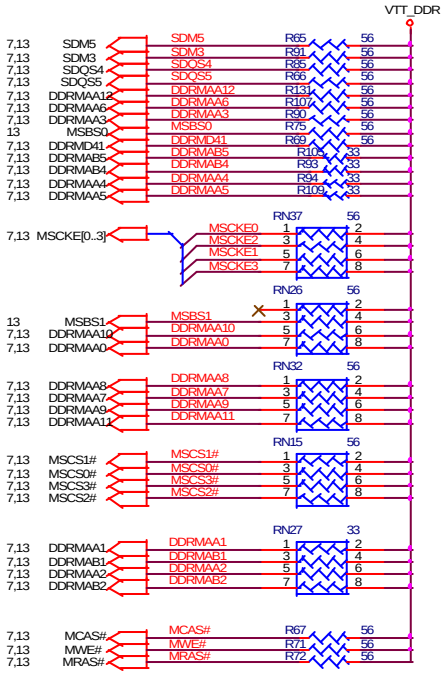
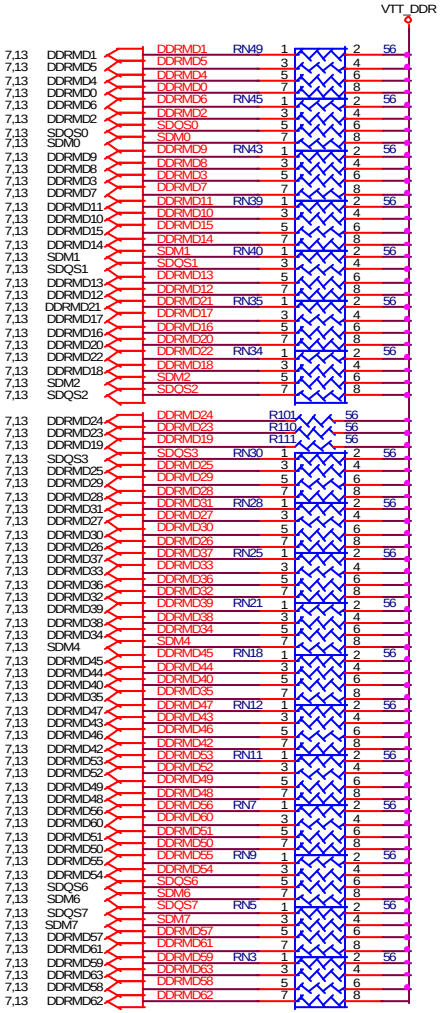
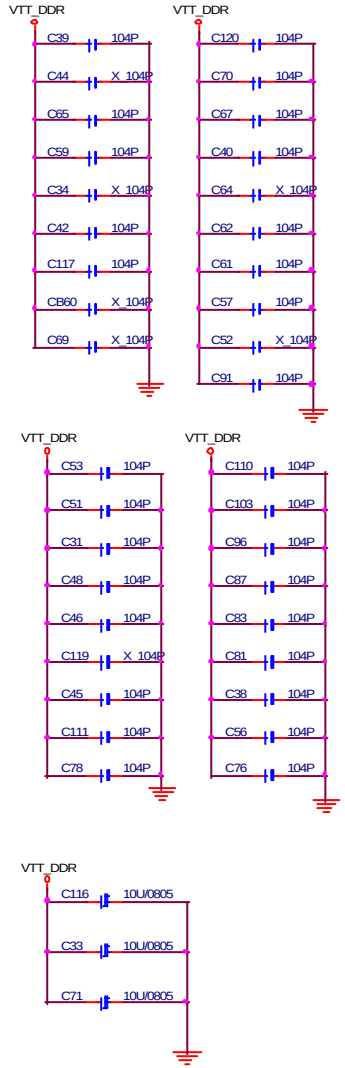
DDR TERMINATORS





TERMINATION DECOUPLING



MSI MICRO-STAR

Title: DDR DAMPING

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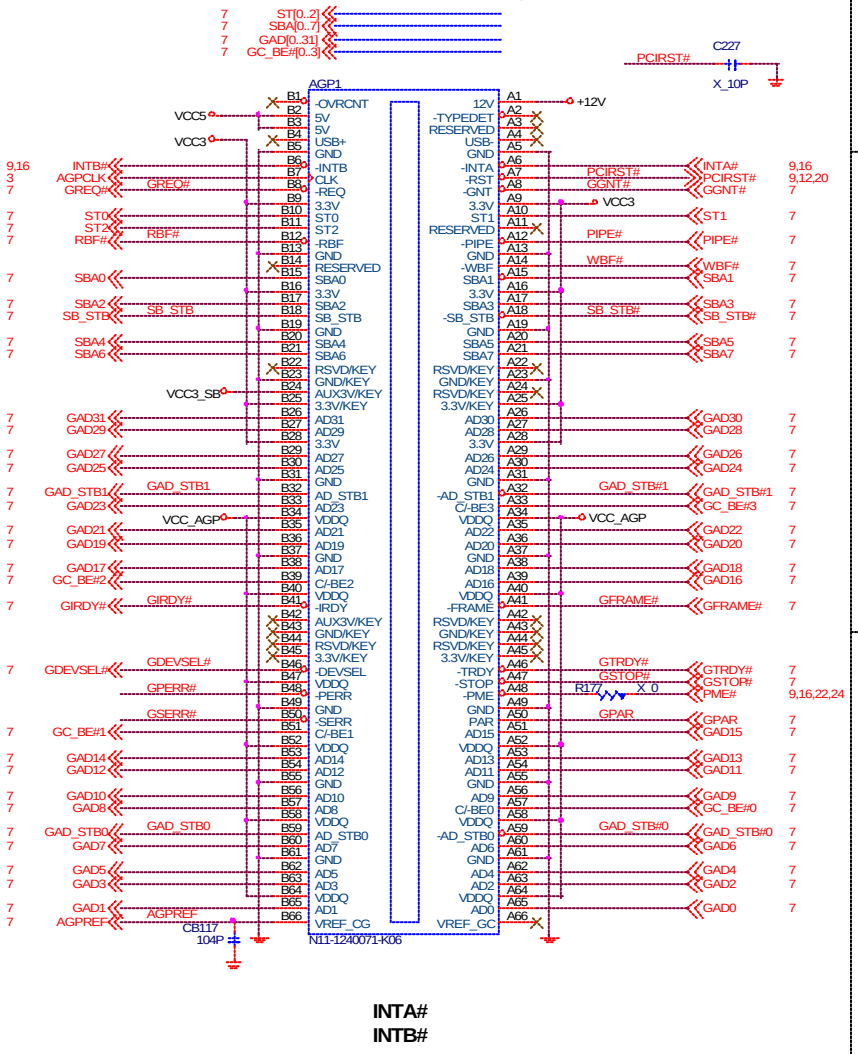
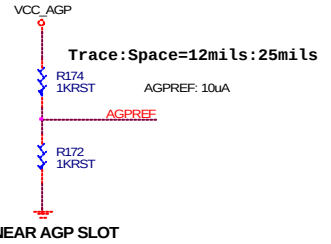
AGP UNIVERSAL 2X/4X SLOT(AGP VER:2.0 COMPLY)

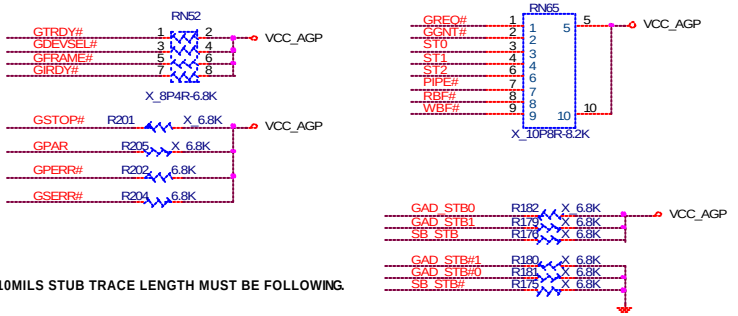
VCC5 = 60mils trace / 15 mils space



AGP SIGNAL REFERENCE CIRCUIT

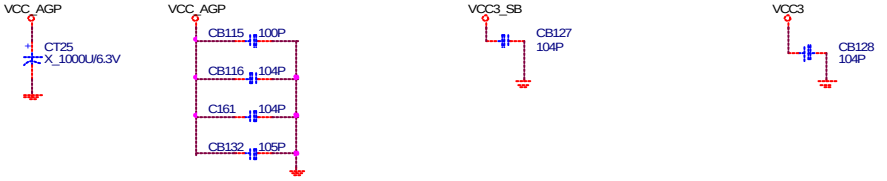


AGP TERMINATION RESISTORS



LESS 10MILS STUB TRACE LENGTH MUST BE FOLLOWING.

AGP SLOT DECOUPLING CAPACITORS



MICRO-STAR

Title: AGP SLOT

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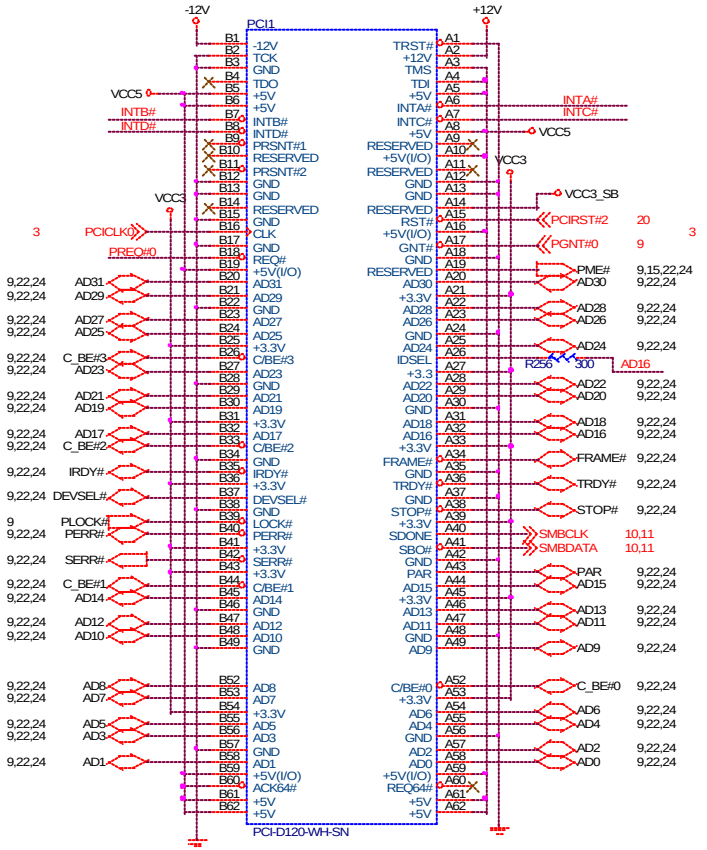
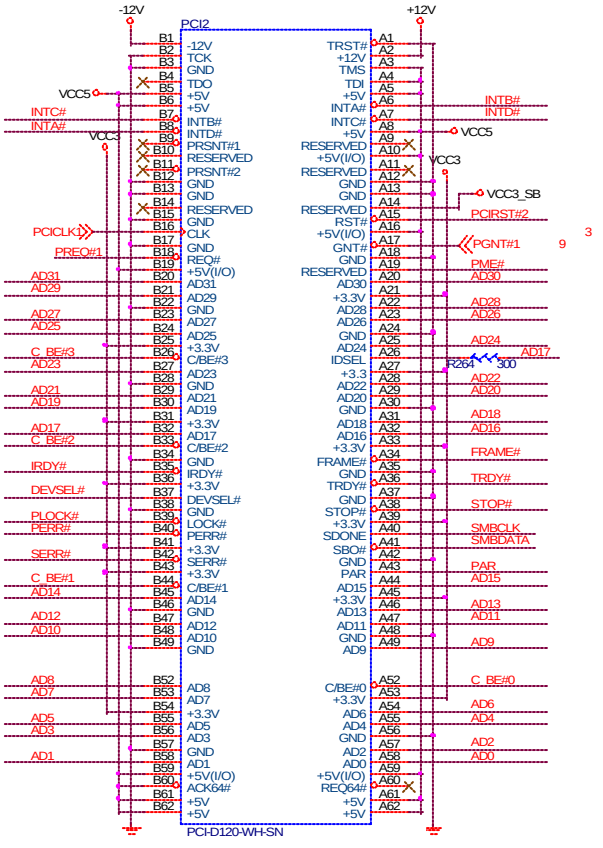
PCI SLOT 1 (PCI VER: 2.2 COMPLY)



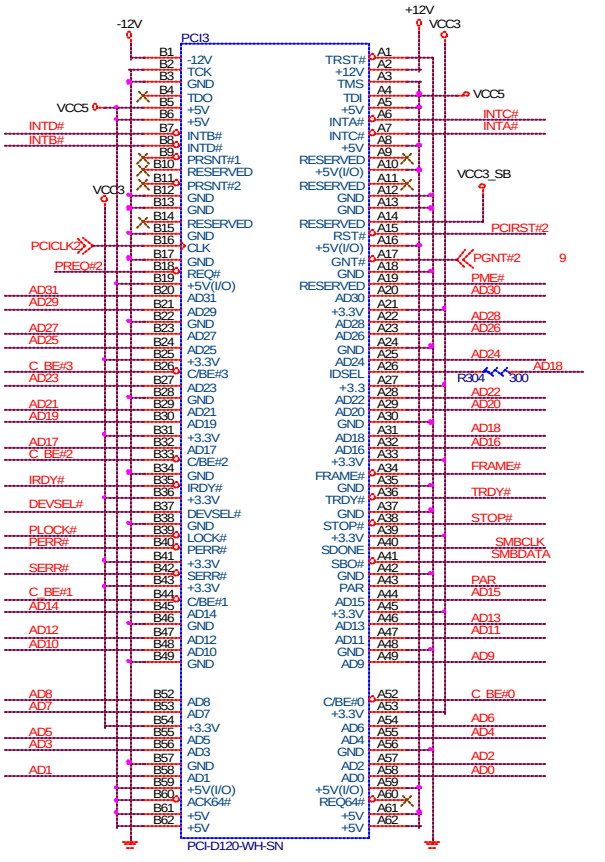
IDSEL = AD16
MASTER = PREQ#0
INT# = ABCD

PCI SLOT 2 (PCI VER: 2.2 COMPLY)



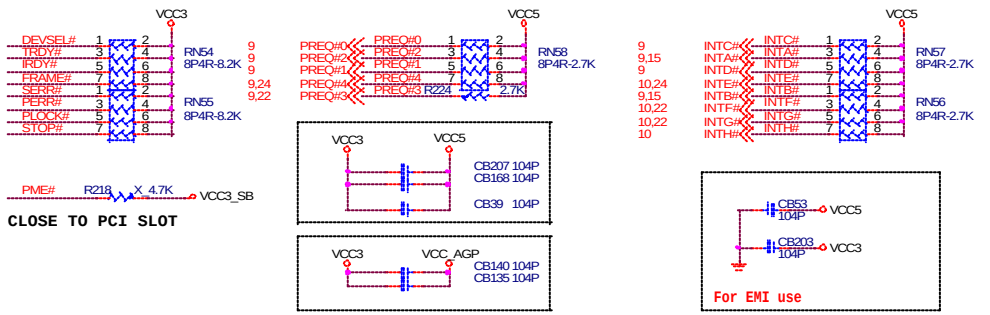
IDSEL = AD17
MASTER = PREQ#1
INT# = BCDA

PCI SLOT 3 (PCI VER: 2.2 COMPLY)

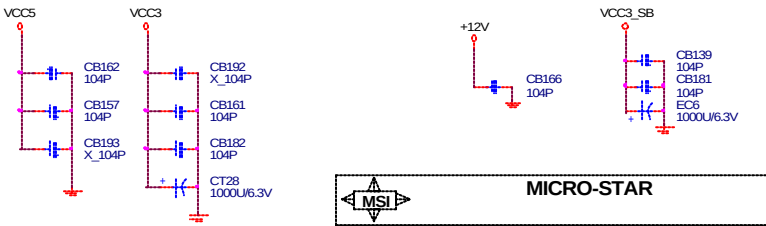


IDSEL = AD18
MASTER = PREQ#2
INT# = CDBA

PCI PULL-UP / DOWN RESISTORS



PCI SLOT DECOUPLING CAPACITORS



MSI **MICRO-STAR**

Title: PCI SLOT 1,2,3

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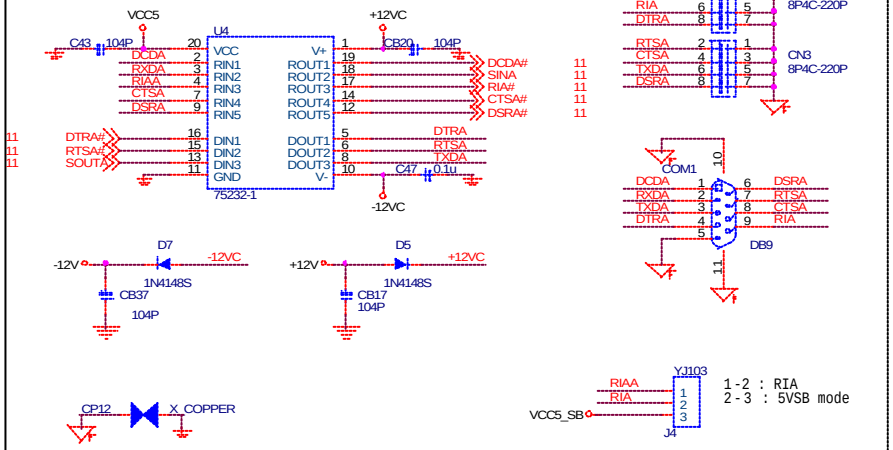
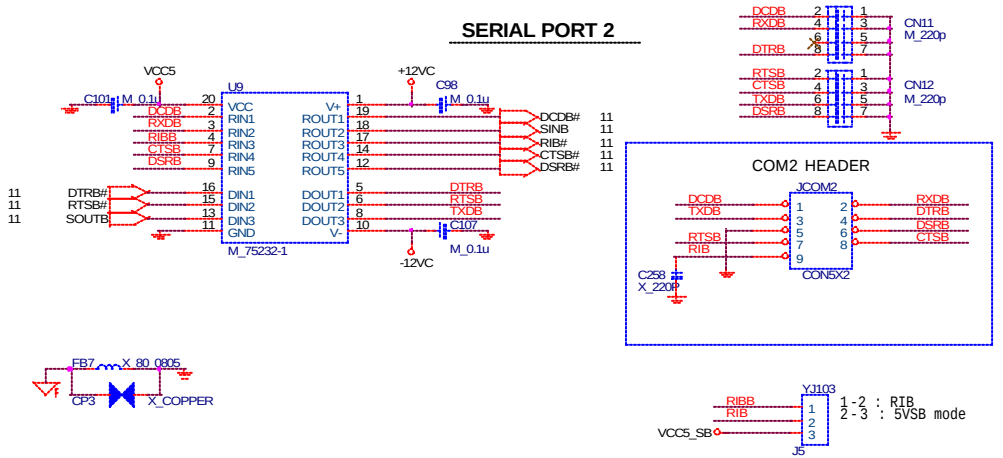
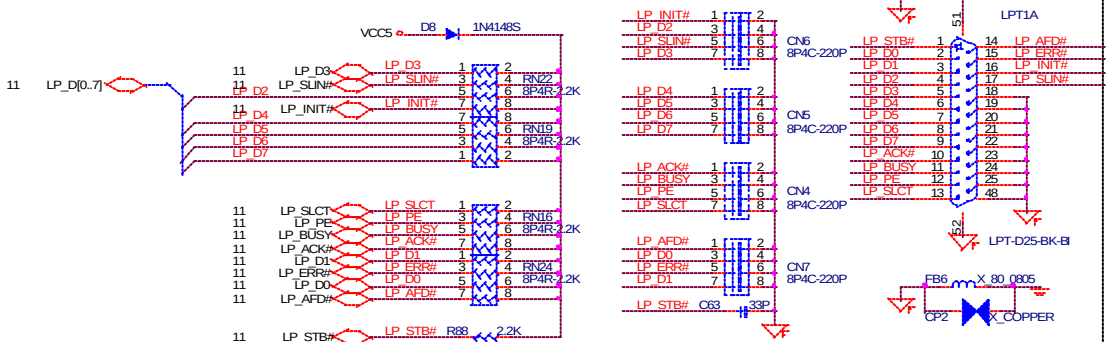
SERIAL PORT 1



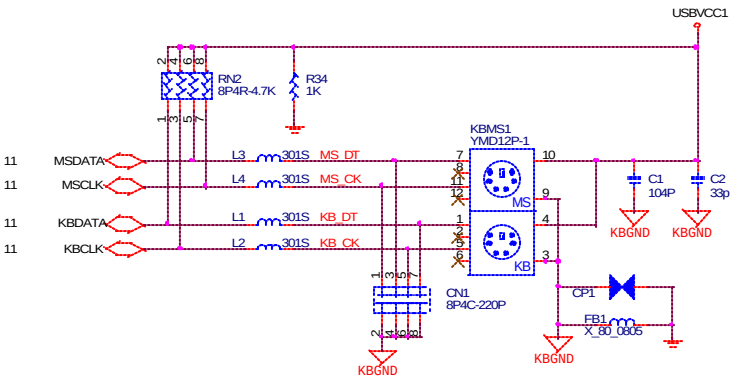
SERIAL PORT 2



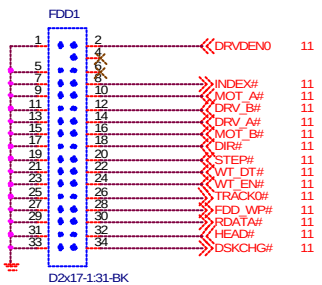
PARALLAL PORT

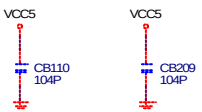


PS2 KEYBOARD & MOUSE CONNECTOR



FLOPPY CONNECTOR





MSI **MICRO-STAR**

Title: I/O CONNECTORS

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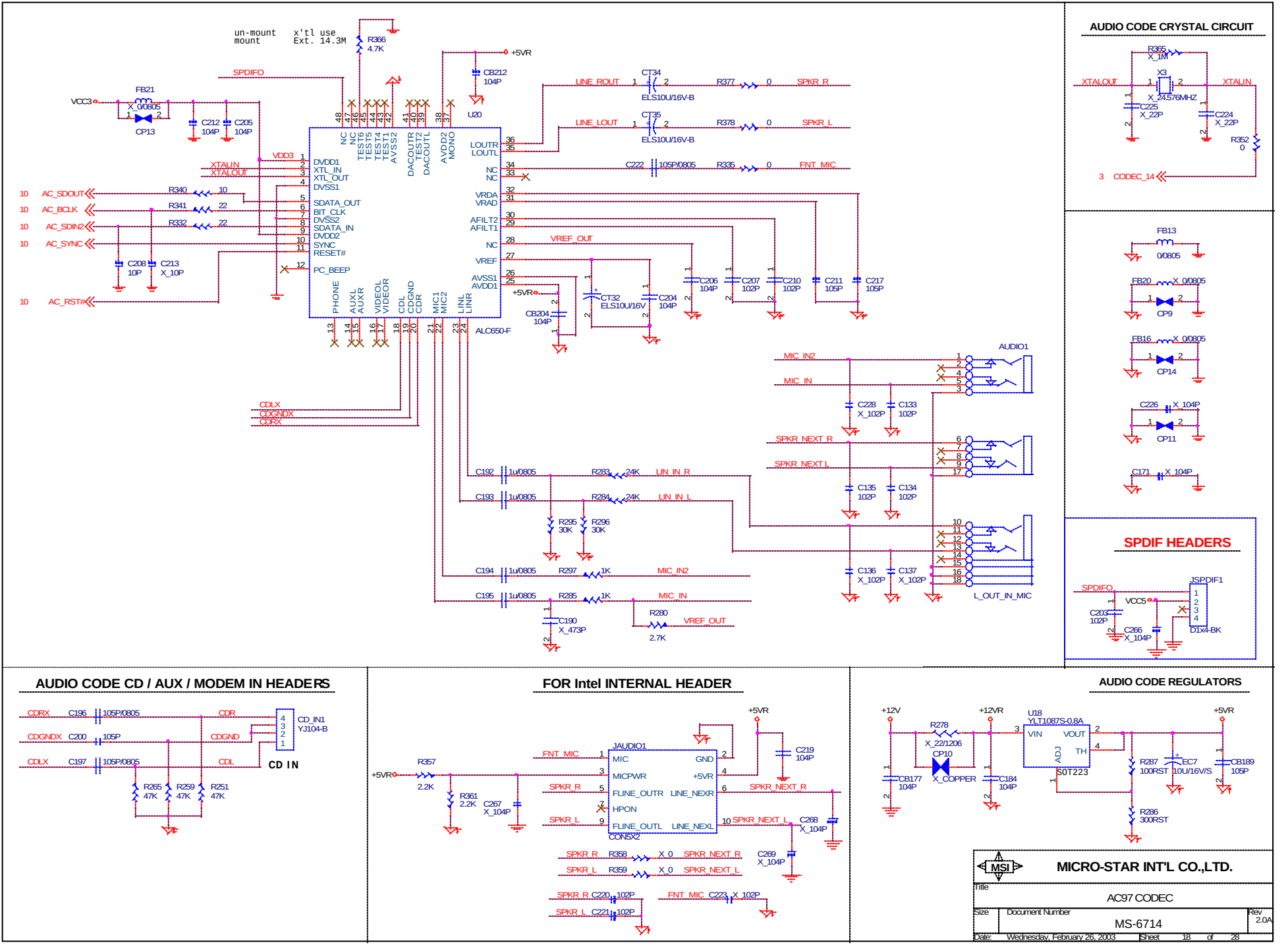
un-mount mount
x'tl use Ext. 14.3M
R366 4.7K
SPDIFO
VCC3
FB21 X_0/0805
CP13
C212 104P
C205 104P
CB212 104P
+5VR
U20
ALC650-F
VDD3
XTALIN
XTALOUT
AC_SDOUT
AC_BCLK
AC_SDIN2
AC_SYNC
AC_RST#
R340 10
R341 22
R332 22
C208 10P
C213 X_10P
PC_BEEP
LINE_ROUT
LINE_LOUT
CT34 ELS10U/16V-B
CT35 ELS10U/16V-B
R377 0
R378 0
SPKR_R
SPKR_L
C222 105P/0805
R335 0
FNT_MIC
VREF_OUT
CT32 ELS10U/16V
CB204 104P
C206 104P
C207 102P
C210 102P
C211 105P
C217 105P
C204 104P
CDLX
CDGNDX
CDRX
C192 1u/0805
C193 1u/0805
R283 24K
R284 24K
LIN_IN_R
LIN_IN_L
R295 30K
R296 30K
C194 1u/0805
C195 1u/0805
R297 1K
R285 1K
MIC_IN2
MIC_IN
C190 X_473P
R280 2.7K
VREF_OUT
AUDIO1
C228 X_102P
C133 102P
C135 102P
C134 102P
C136 X_102P
C137 X_102P
L_OUT_IN_MIC
AUDIO CODE CRYSTAL CIRCUIT
R365 X_1M
X3 X_24.576MHZ
C225 X_22P
C224 X_22P
R352 0
CODEC_14
FB13 0/0805
FB20 X_0/0805
CP9
FB16 X_0/0805
CP14
C226 X_104P
CP11
C171 X_104P
SPDIF HEADERS
JSPDIF1
D1x4-BK
C203 102P
C266 X_104P
AUDIO CODE CD / AUX / MODEM IN HEADERS
CD_IN1 YJ104-B
CD IN
C196 105P/0805
C200 105P
C197 105P/0805
R265 47K
R259 47K
R251 47K
FOR Intel INTERNAL HEADER
JAUDIO1
CON5X2
R357 2.2K
R361 2.2K
C267 X_104P
C219 104P
C268 X_104P
C269 X_104P
R358 X_0
R359 X_0
C220 102P
C221 102P
C223 X_102P
AUDIO CODE REGULATORS
+12V
+12VR
U18 YLT1087S-0.8A
S0T223
R278 X_22/1206
CP10 X_COPPER
CB177 104P
C184 104P
R287 100RST
EC7 10U/16V/S
CB189 105P
R286 300RST
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AC97 CODEC
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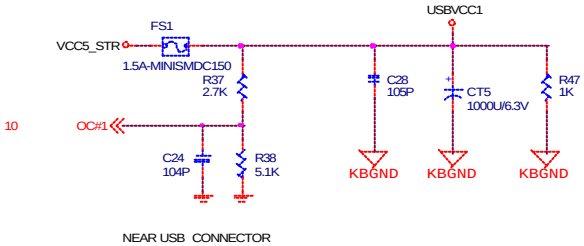
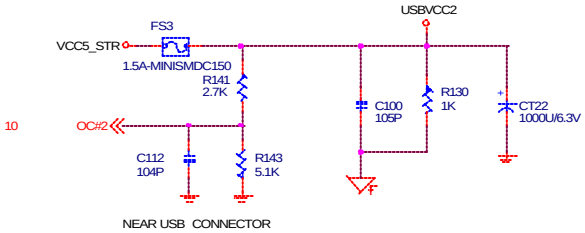
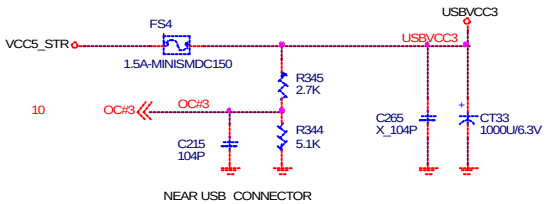
POWER CIRCUIT FOR USB PORT 0,1



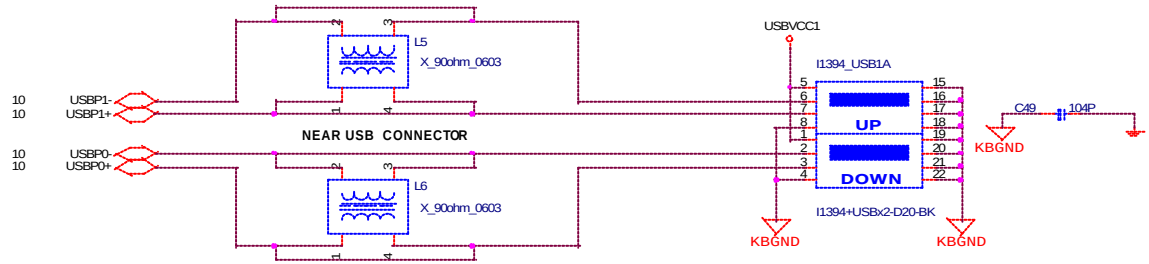
POWER CIRCUIT FOR USB PORT 2,3



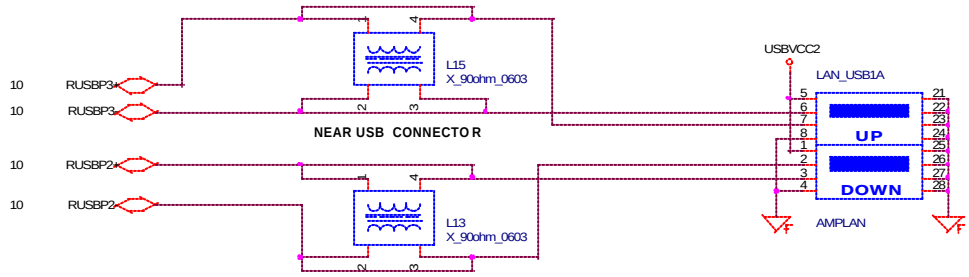
POWER CIRCUIT FOR USB PORT 4,5



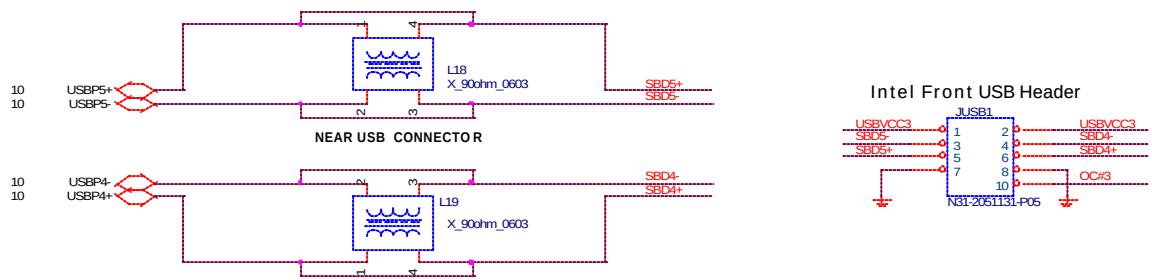
REAR PANEL USB CONNECTOR FOR USB PORT 0,1



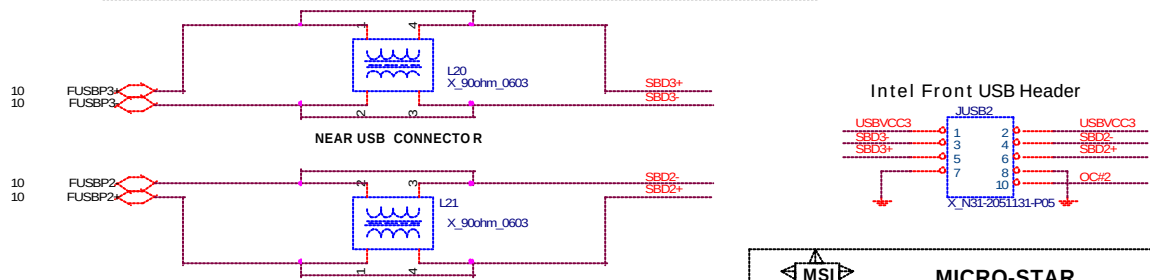
FRONT PANEL USB CONNECTOR FOR USB PORT 2,3 (Shard with Front USB JUSB2)



FRONT PANEL USB CONNECTOR FOR USB PORT 4,5



FRONT PANEL USB CONNECTOR FOR USB PORT 2,3 (Shard with rear USB LAN_USB1)



* USB Trace width : 7.5 mils
* USB Trace Spacing : 20 mils
* Differential USB Signlas Trace, Spacing : 7.5 mils
* USB Power Trace must be 50mils width

MSI MICRO-STAR

Title	USB CONNECTORS	
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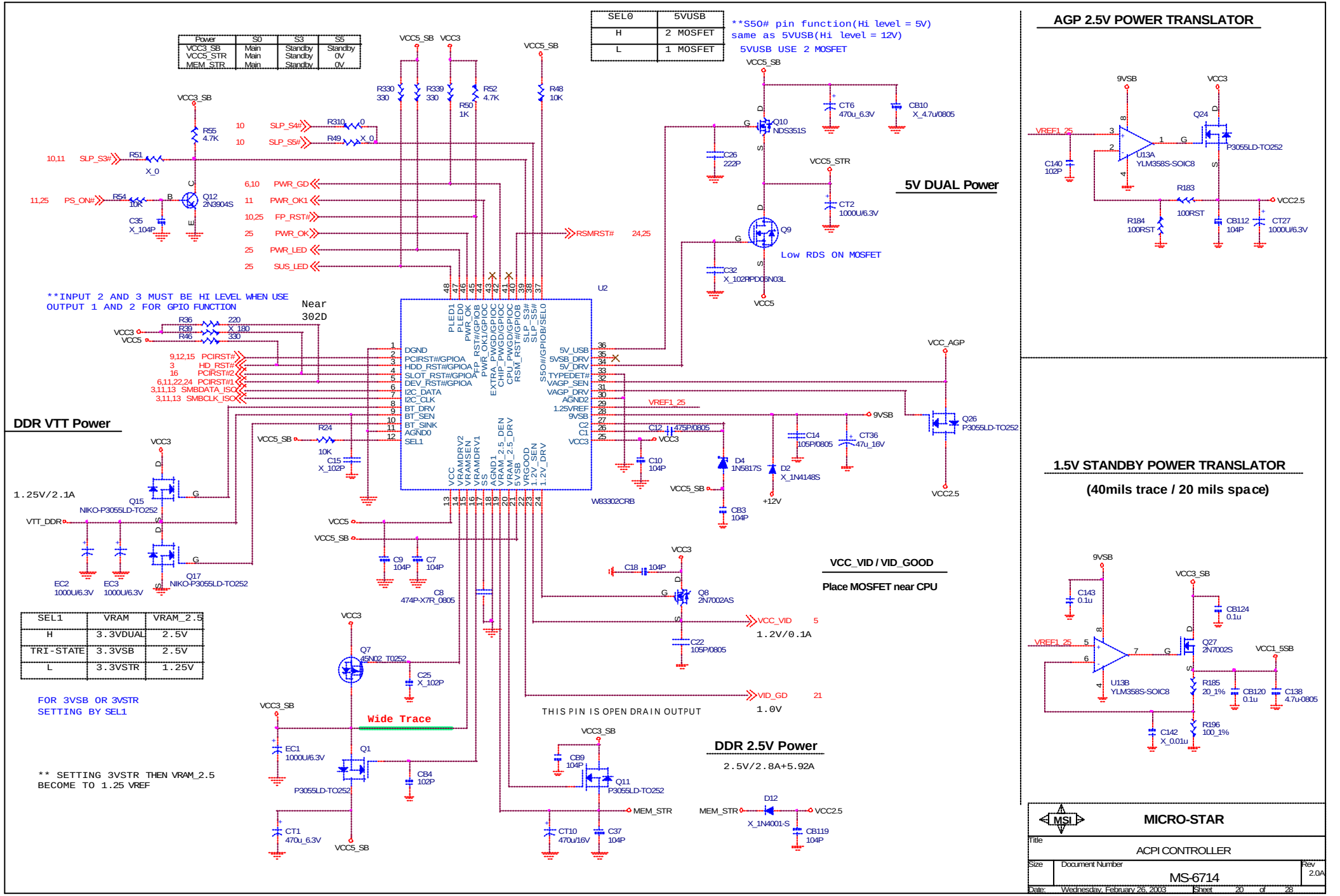
Power | S0 | S3 | S5
VCC3_SB | Main | Standby | Standby
VCC5_STR | Main | Standby | 0V
MEM_STR | Main | Standby | 0V
SEL0 | 5VUSB
H | 2 MOSFET
L | 1 MOSFET
**S5O# pin function(Hi level = 5V)
same as 5VUSB(Hi level = 12V)
5VUSB USE 2 MOSFET
5V DUAL Power
Low RDS ON MOSFET
**INPUT 2 AND 3 MUST BE HI LEVEL WHEN USE
OUTPUT 1 AND 2 FOR GPIO FUNCTION
Near
302D
U2
W83302CRB
DDR VTT Power
1.25V/2.1A
VTT_DDR
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
** SETTING 3VSTR THEN VRAM_2.5
BECOME TO 1.25 VREF
VCC_VID / VID_GOOD
Place MOSFET near CPU
VCC_VID 5
1.2V/0.1A
VID_GD 21
1.0V
THIS PIN IS OPEN DRAIN OUTPUT
Wide Trace
DDR 2.5V Power
2.5V/2.8A+5.92A
AGP 2.5V POWER TRANSLATOR
1.5V STANDBY POWER TRANSLATOR
(40mils trace / 20 mils space)
MICRO-STAR
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ACPI CONTROLLER
Size
Document Number
MS-6714
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2.0A
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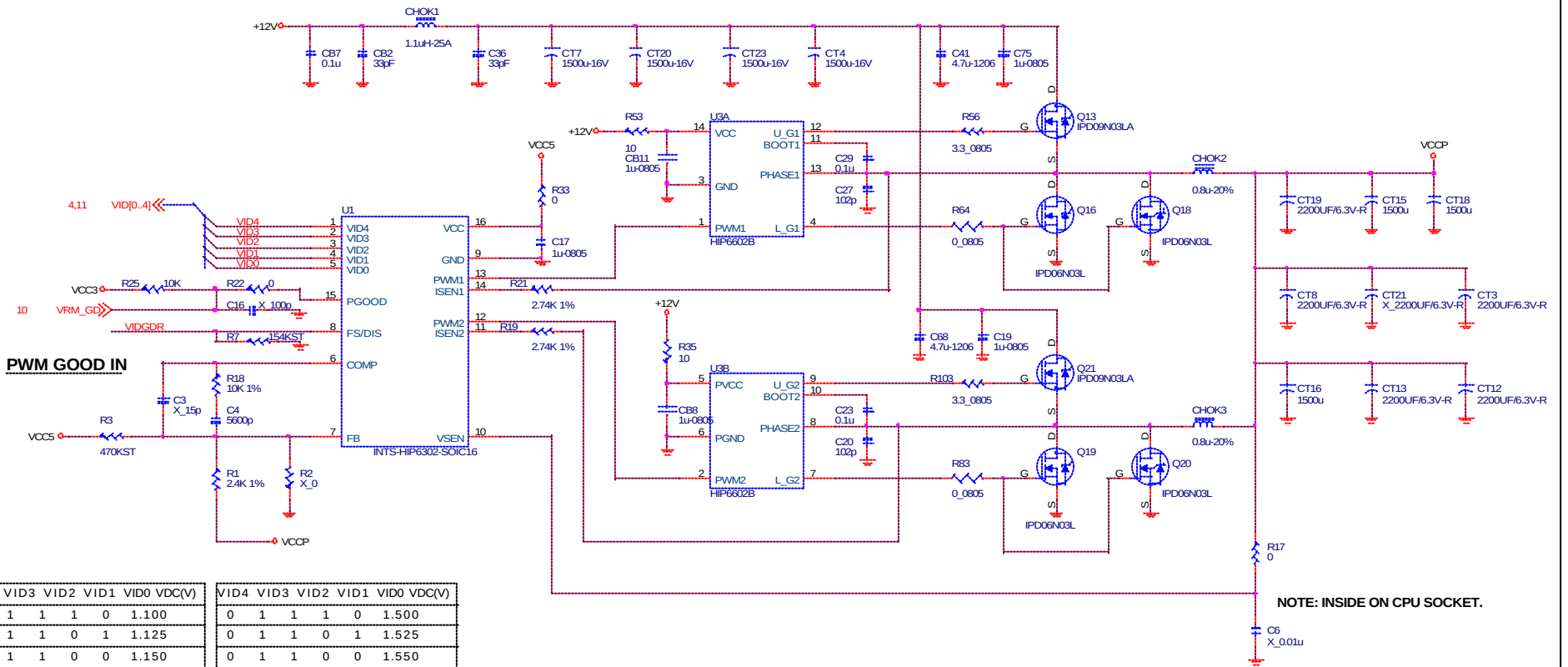
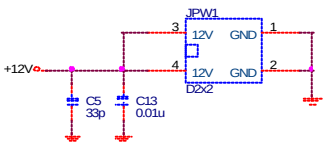


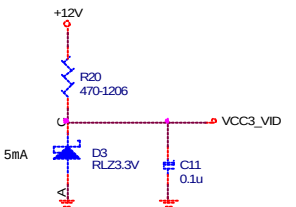
VID4	VID3	VID2	VID1	VID0	VDC(V)
1	1	1	1	0	1.100
1	1	1	0	1	1.125
1	1	1	0	0	1.150
1	1	0	1	1	1.175
1	1	0	1	0	1.200
1	1	0	0	1	1.225
1	1	0	0	0	1.250
1	0	1	1	1	1.275
1	0	1	1	0	1.300
1	0	1	0	1	1.325
1	0	1	0	0	1.350
1	0	0	1	1	1.375
1	0	0	1	0	1.400
1	0	0	0	1	1.425
1	0	0	0	0	1.450
0	1	1	1	1	1.475

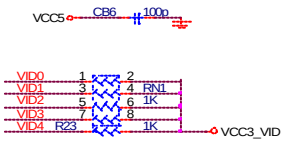
VID4	VID3	VID2	VID1	VID0	VDC(V)
0	1	1	1	0	1.500
0	1	1	0	1	1.525
0	1	1	0	0	1.550
0	1	0	1	1	1.575
0	1	0	1	0	1.600
0	1	0	0	1	1.625
0	1	0	0	0	1.650
0	0	1	1	1	1.675
0	0	1	1	0	1.700
0	0	1	0	1	1.725
0	0	1	0	0	1.750
0	0	0	1	1	1.775
0	0	0	1	0	1.800
0	0	0	0	1	1.825
0	0	0	0	0	1.850
1	1	1	1	1	OFF

ATX12V POWER CONNECTOR



VID PULL-UP RESISTORS





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

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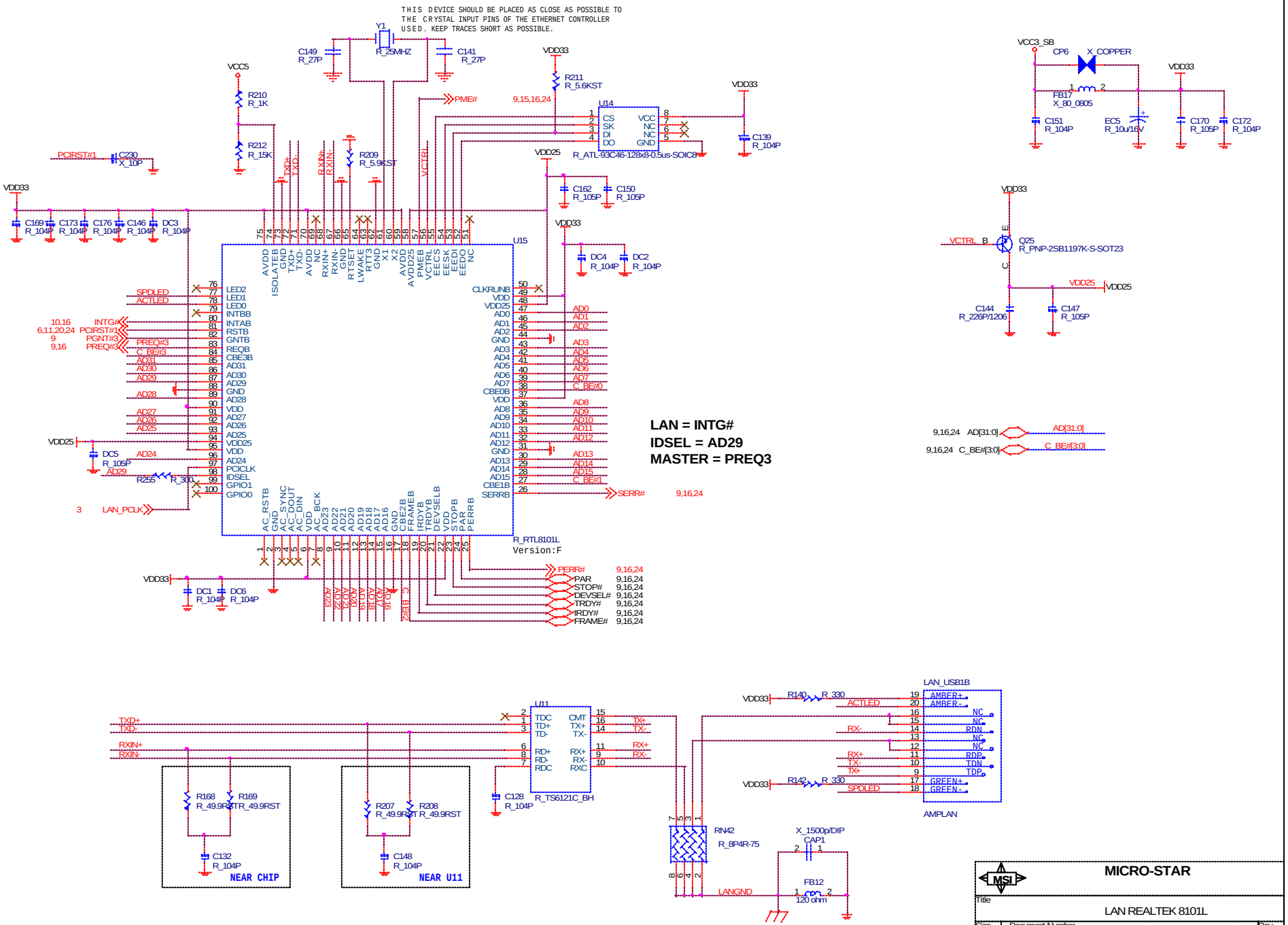

MSI MICRO-STAR

Title: LAN REALTEK 8101L

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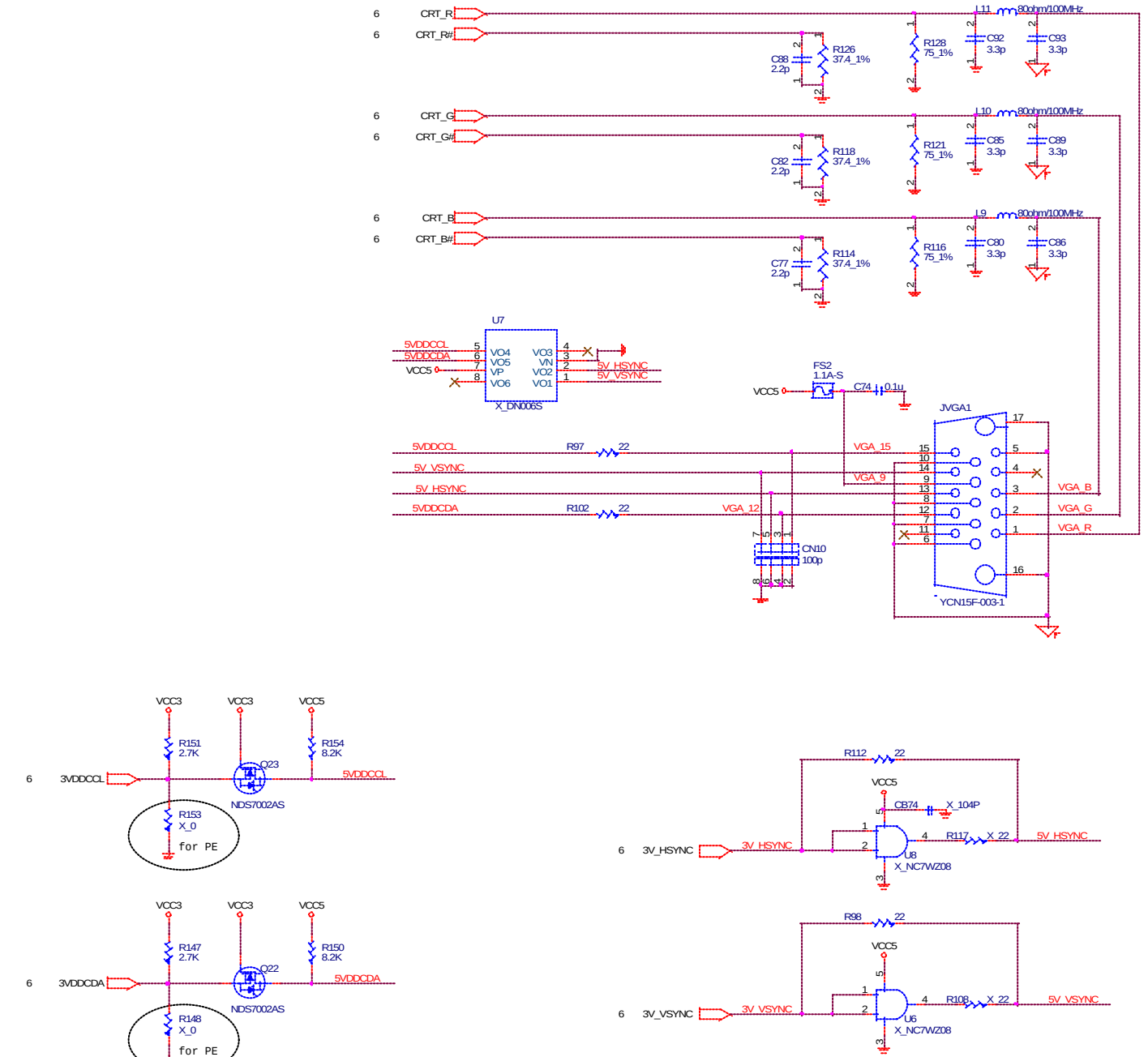
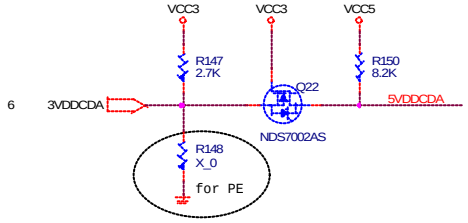
Video Connector





MSI **MICRO-STAR**

Title: VGA CONNECTOR

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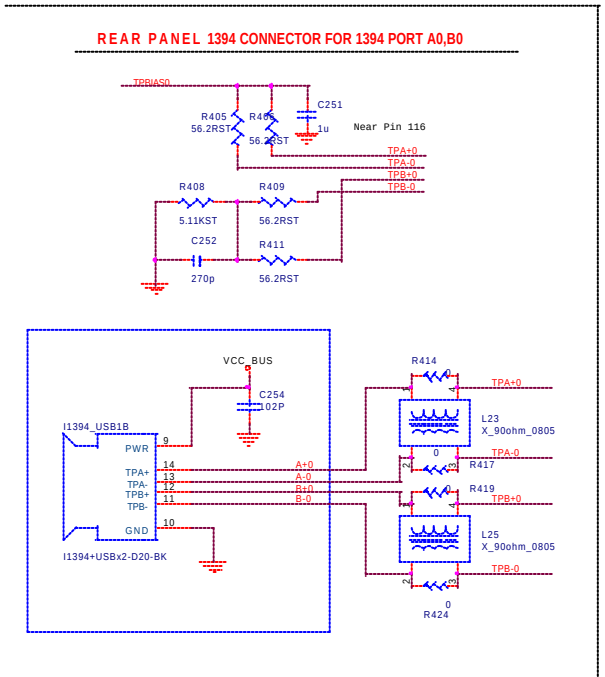
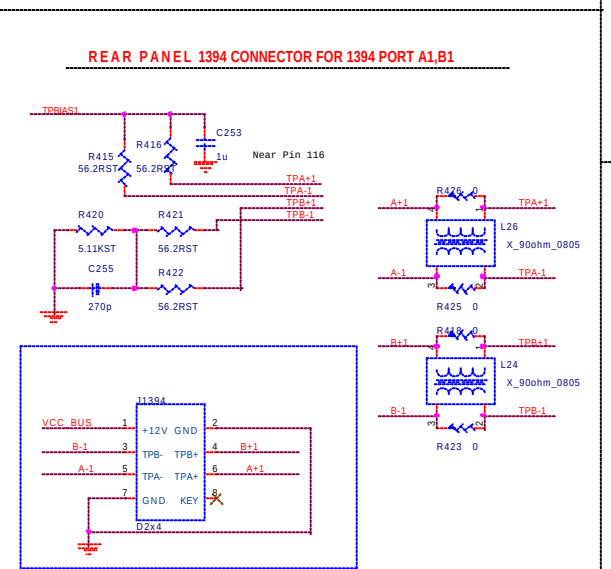
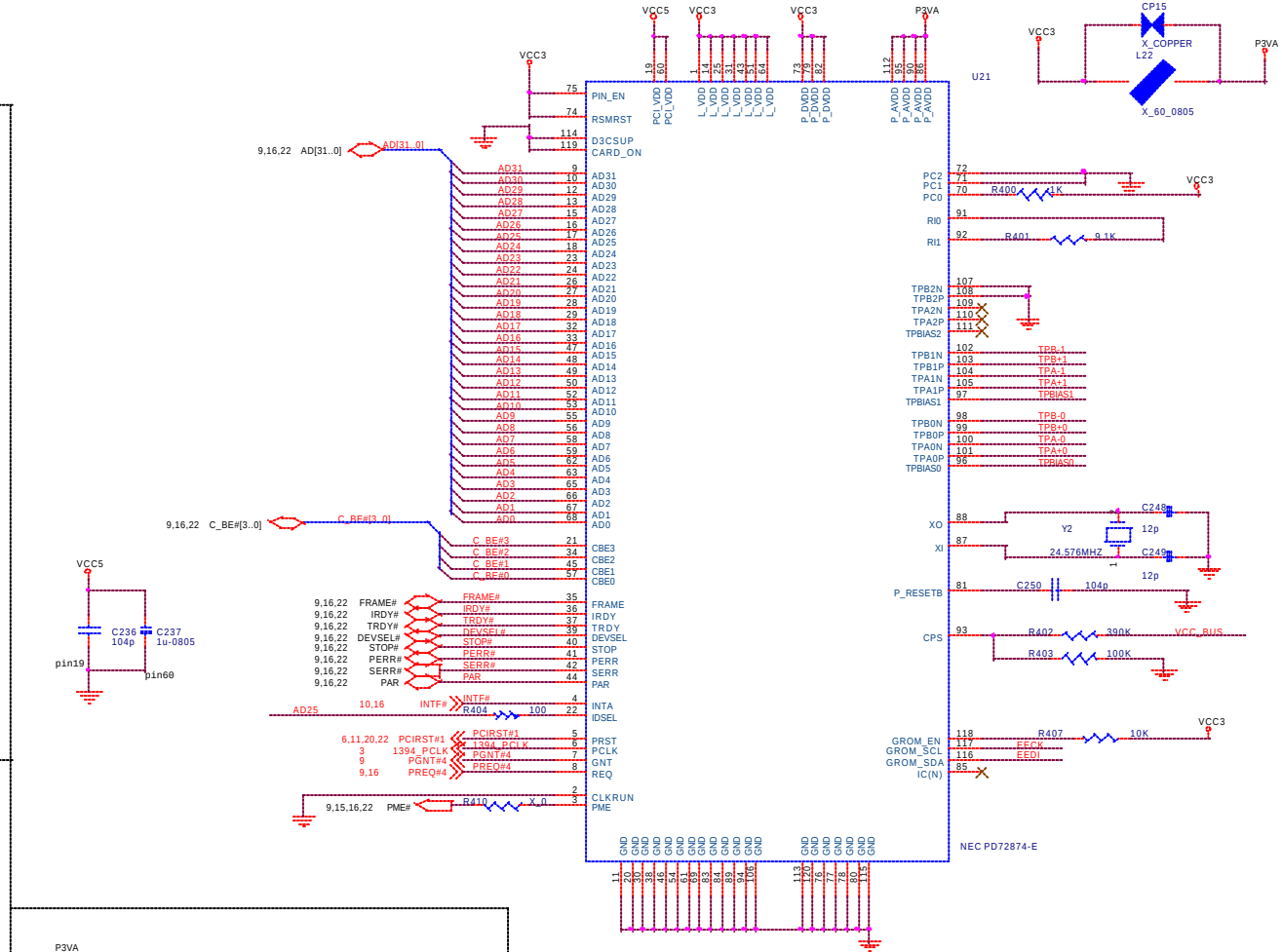
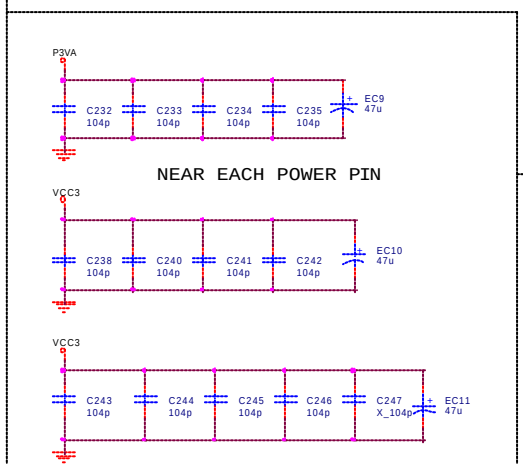
IEEE-1394

Did not support S3 wake-up

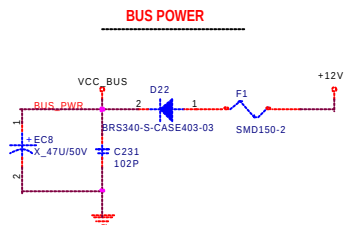


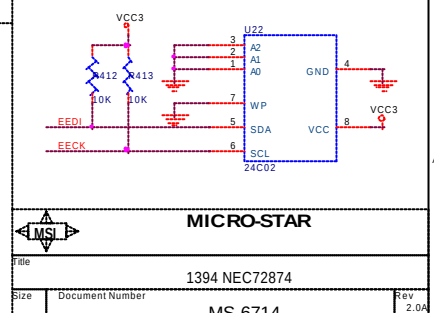




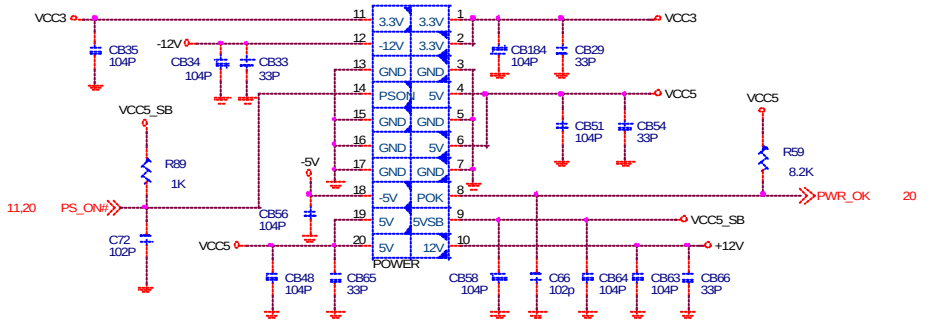


IDSEL = AD25
MASTER = PREQ#4
INT# = F

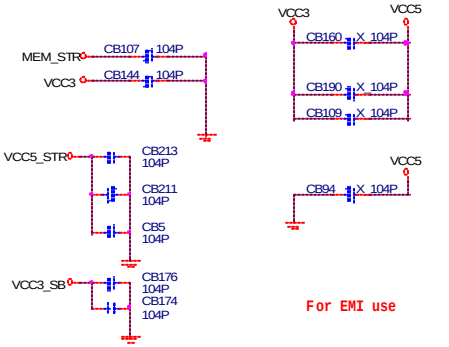




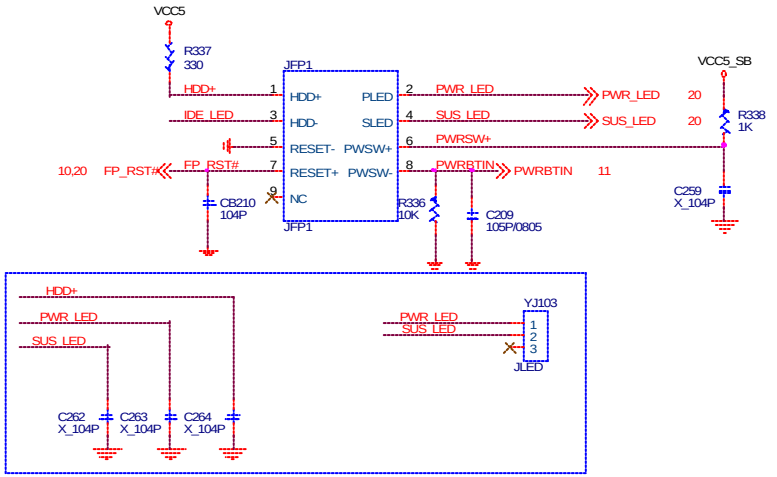
ATX CONNECTOR



REGULATORS OUTPUT DECOUPLING CAPACITORS

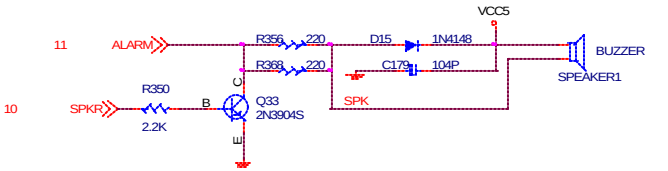


Intel Front Panel

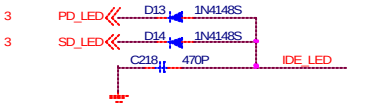


BUZZER

BUZER always enable

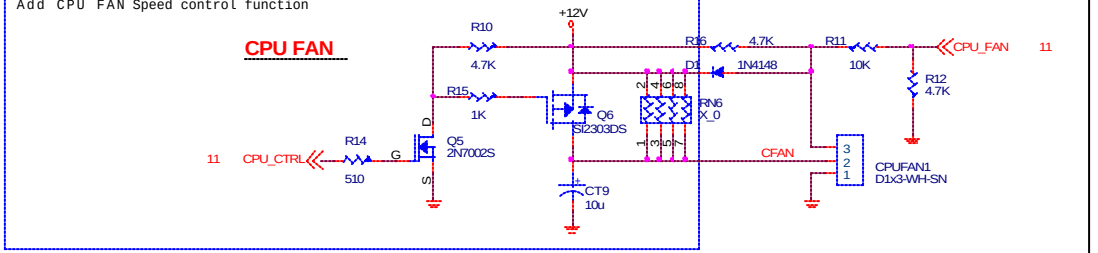


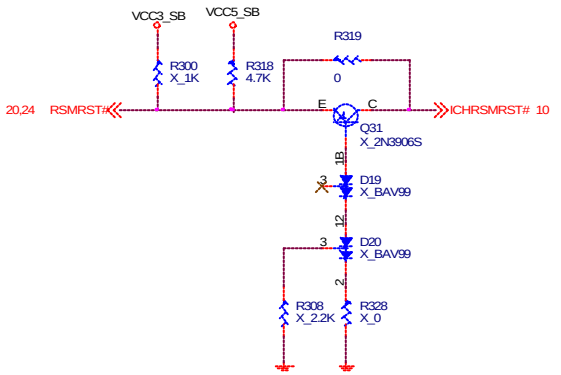
IDE LED



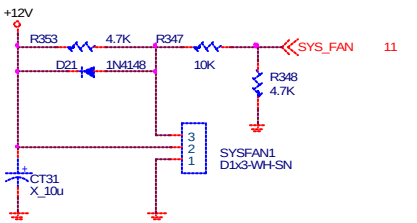
CPU FAN

Add CPU FAN Speed control function





SYSTEM FAN



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Title: Front Panel & ATX Connector & FAN

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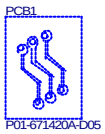
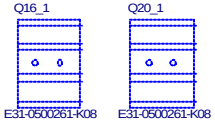
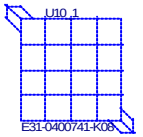
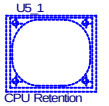
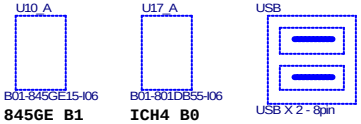
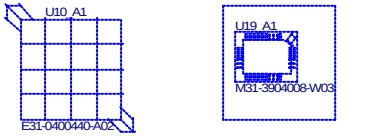
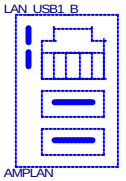
Jumper Setting & Connector Setting

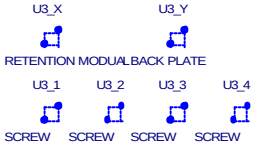


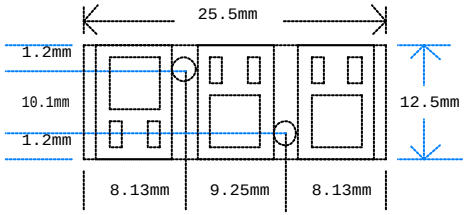


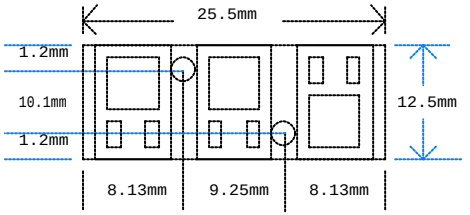




STD		
LAN		







MSI **MICRO-STAR**

Title: JUMPER SETTING & MANUAL PARTS

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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	Suspend mode selection jumper
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	REQ & GNT	CLOCK	CLK GEN PIN OUT	PCIRST#
PCI Slot 1	INTA# INTB# INTC# INTD#	AD16	PREQ#0 PGNT#0	PCICLK0	10 (FS4/PCI3)	PCIRST#2
PCI Slot 2	INTB# INTC# INTD# INTA#	AD17	PREQ#1 PGNT#1	PCICLK1	11 (PCI4)	PCIRST#2
PCI Slot 3	INTC# INTD# INTA# INTB#	AD18	PREQ#2 PGNT#2	PCICLK2	12 (PCI5)	PCIRST#2
1394	INTF#	AD25	PREQ#4 PGNT#4	1394_PCLK	6 (FS2/PCI0)	PCIRST#1
LAN	INTG#	AD29	PREQ#3 PGNT#3	LAN_PCLK	15 (PCI7)	PCIRST#1

**PREQ#5 pull up to VCC3 through 8.2k Ohm*

**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#

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Title: General SPEC

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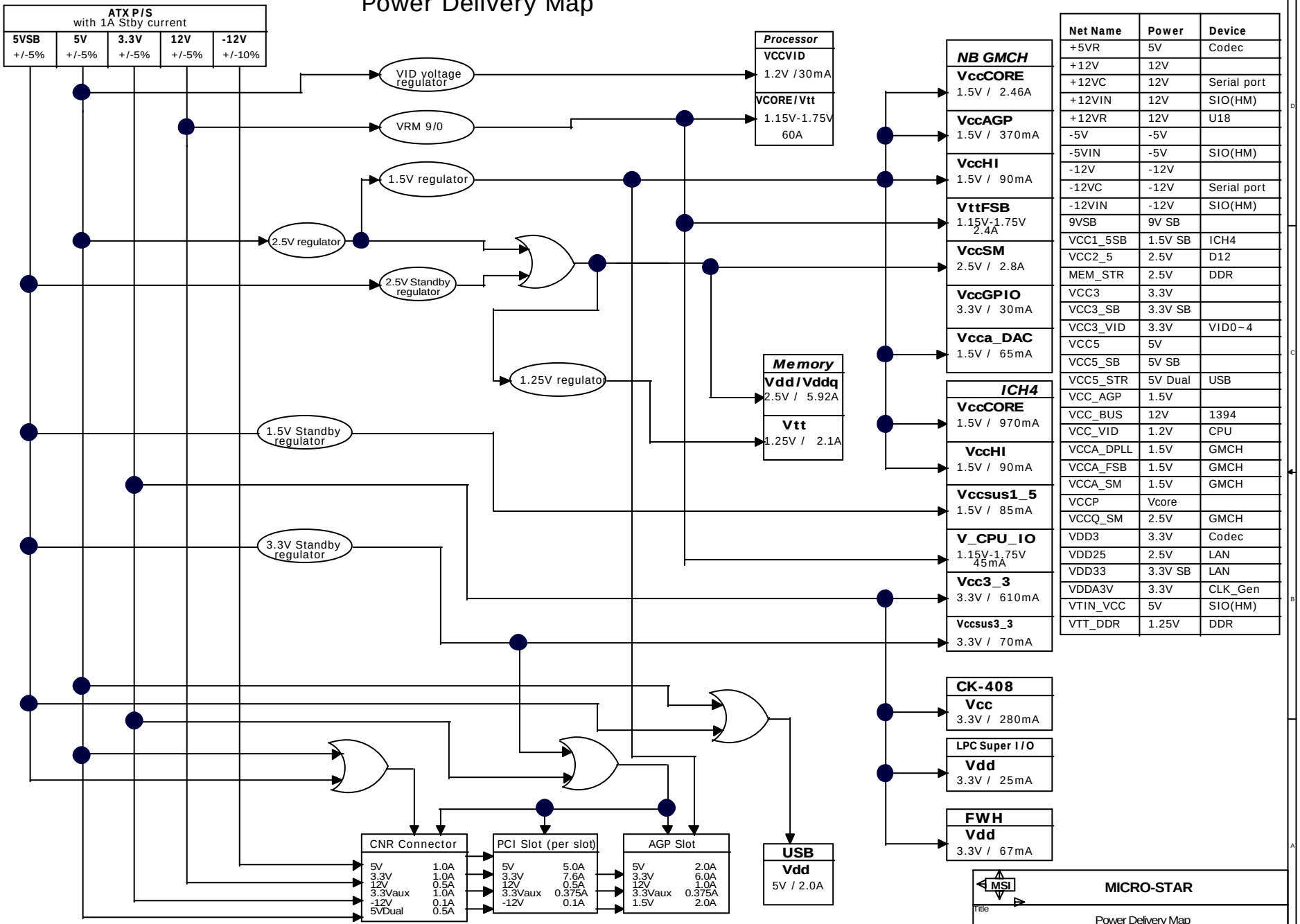
Power Delivery Map



Net Name	Power	Device
+5VR	5V	Codec
+12V	12V	
+12VC	12V	Serial port
+12VIN	12V	SIO(HM)
+12VR	12V	U18
-5V	-5V	
-5VIN	-5V	SIO(HM)
-12V	-12V	
-12VC	-12V	Serial port
-12VIN	-12V	SIO(HM)
9VSB	9V SB	
VCC1_5SB	1.5V SB	ICH4
VCC2_5	2.5V	D12
MEM_STR	2.5V	DDR
VCC3	3.3V	
VCC3_SB	3.3V SB	
VCC3_VID	3.3V	VID0~4
VCC5	5V	
VCC5_SB	5V SB	
VCC5_STR	5V Dual	USB
VCC_AGP	1.5V	
VCC_BUS	12V	1394
VCC_VID	1.2V	CPU
VCCA_DPLL	1.5V	GMCH
VCCA_FSB	1.5V	GMCH
VCCA_SM	1.5V	GMCH
VCCP	Vcore	
VCCQ_SM	2.5V	GMCH
VDD3	3.3V	Codec
VDD25	2.5V	LAN
VDD33	3.3V SB	LAN
VDDA3V	3.3V	CLK_Gen
VTIN_VCC	5V	SIO(HM)
VTT_DDR	1.25V	DDR

MSI MICRO-STAR

Title: Power Delivery Map

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