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MS-7360

ATX Version: 0A

CPU: Intel Pentium 4, Pentium D, Core2 Duo, Wolfdale, Kentsfield and Yorkfield processors in LGA775 Package.

System Chipset:

Intel Bearlake - Q/G/P (G33, P35, Q35/33North Bridge)
Intel ICH9 (South Bridge)

On Board Device:

CLOCK Gen -- ICS 9LPRS900
LPC Super I/O -- Fintek F71882F
LAN -- Realtek 8111 (PCIE)
HD Audio Codec -- ALC888
1394 Controller -- VT6307 / VT6308 (2-port)
PCIE to PATA/SATA Bridge -- Marvel 88SE6111

Main Memory:

Dual-channel DDR-II * 4

Expansion Slots:

PCI EXPRESS X16 SLOT * 3
PCI SLOT * 2

PWM: Intersil ISL6322 (3 Phases) w/ ISL6612 driver

Configuration and BOM match up

Option	Function	Order Configure	BOM
STD	Bearlake-G/ICH9/ICH-Fan/Non-PCIEx4	cfg-STD	601-72345-A10



MICRO-STAR INT'L CO., LTD

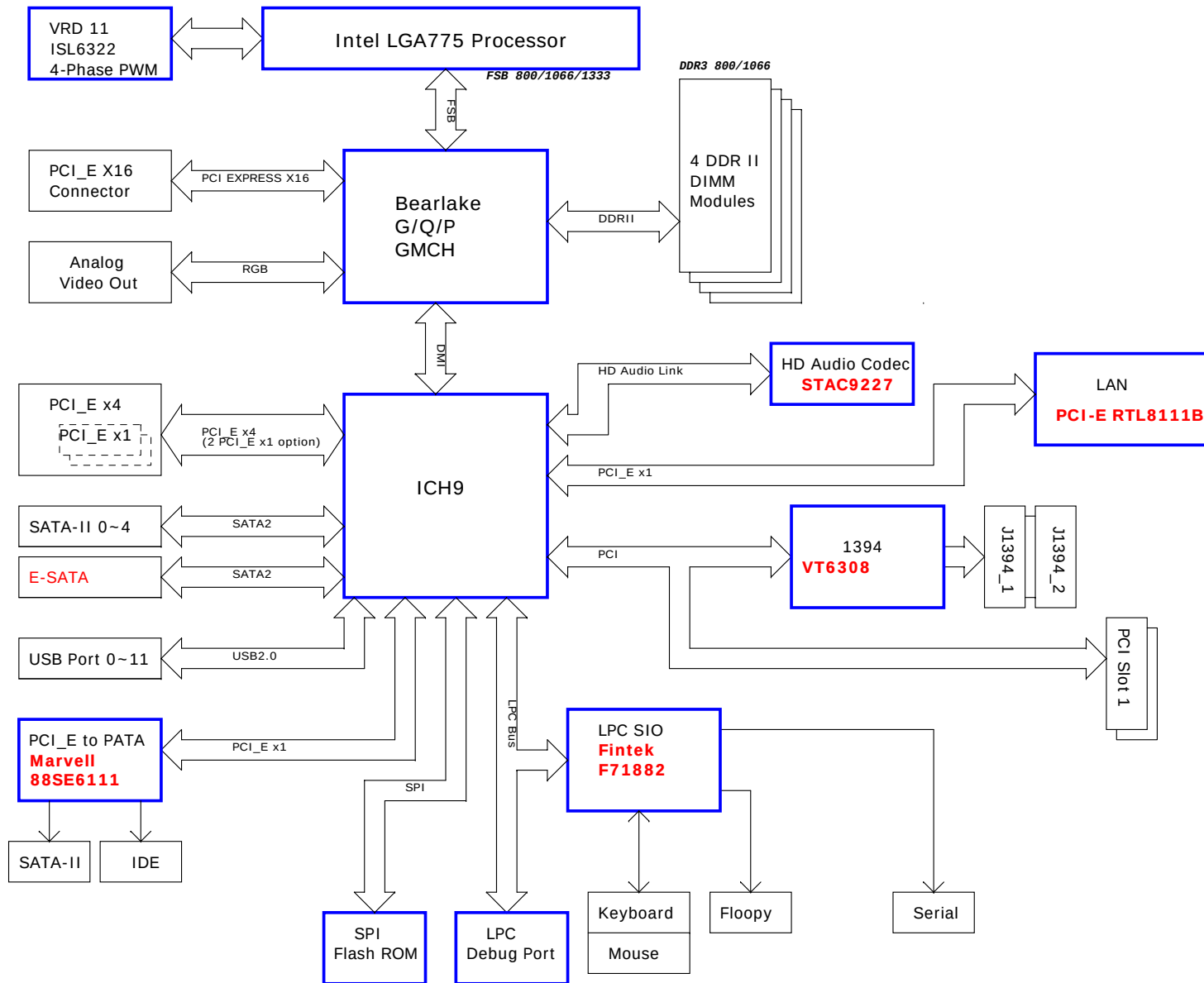
MS-7360

Docu-Name
COVER SHEET

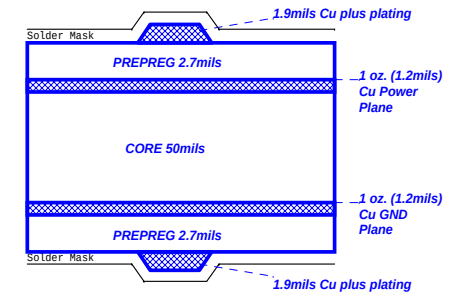
Docu-Description

Rev
1.0

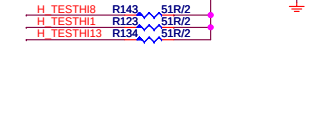
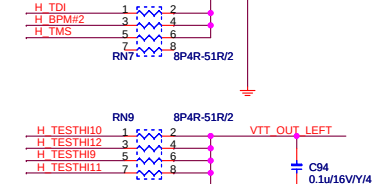
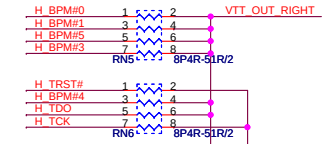
Block Diagram



Board Stack-up (1080 Prepreg Considerations)

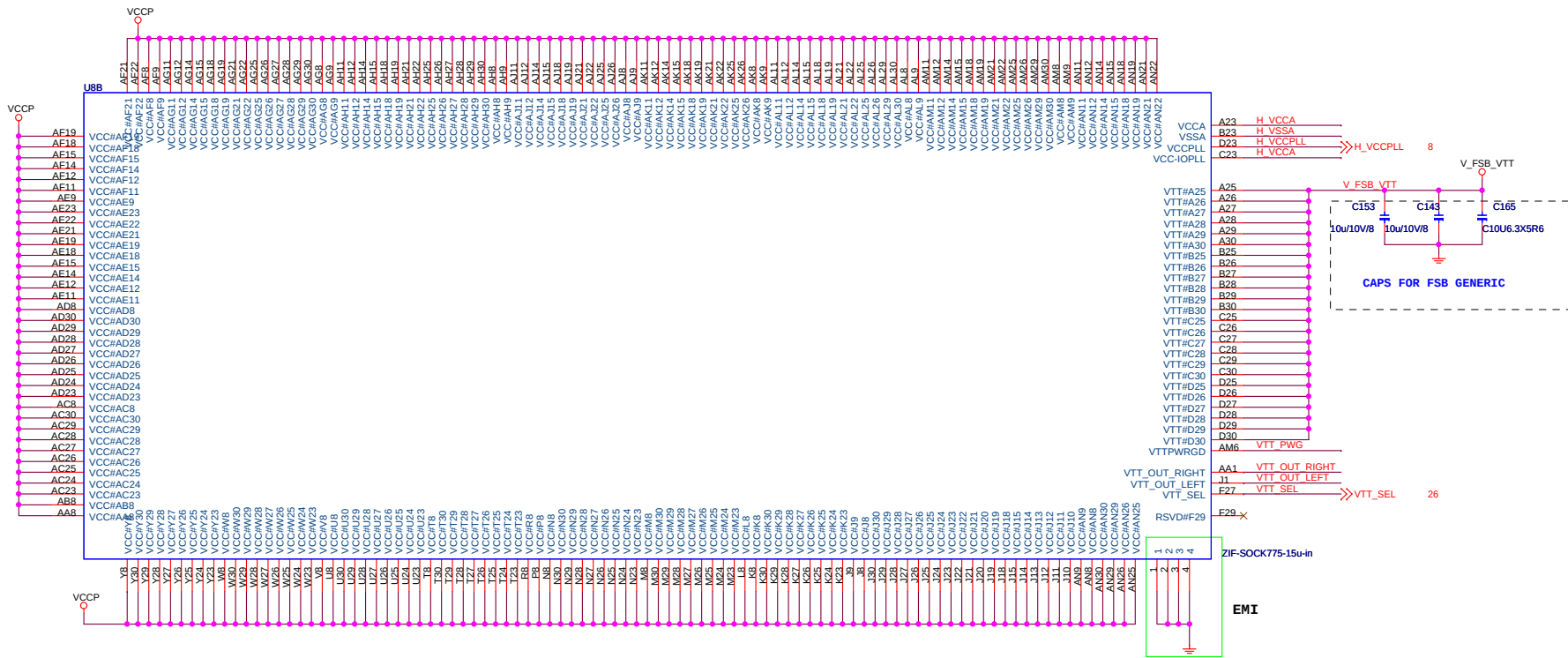


Single End 50ohm Top/Bottom : 4mils
 USB2.0 - 90ohm : 15/4.5/7.5/4.5/15
 SATA - 95ohm : 15/4/8/4/15
 LAN - 100ohm : 15/4/8/4/15
 PCIE - 95ohm : 15/4/8/4/15
 IEEE1394 - 110ohm : 15/4/9/4/15
 IDE : 15/4/8/4/15

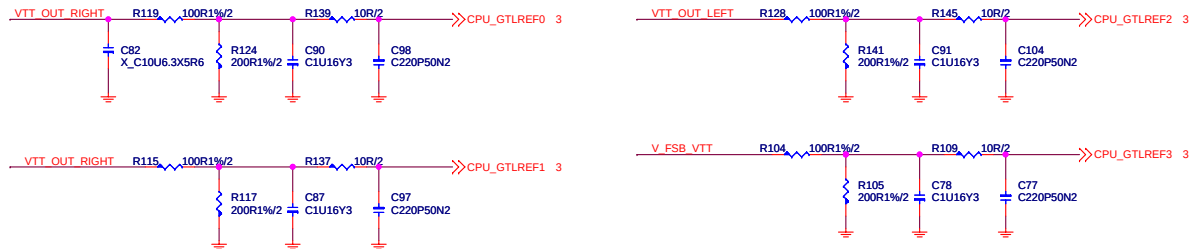
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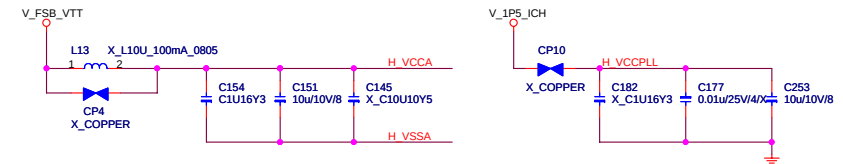
Size Custom	Document Description LGA775 - Signal	Rev 1.0
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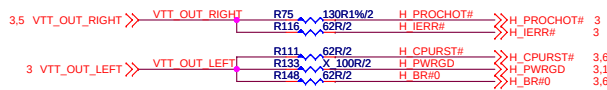
*GTLREF VOLTAGE SHOULD BE
0.67 * VTT = 0.8V (At VTT=1.2V)



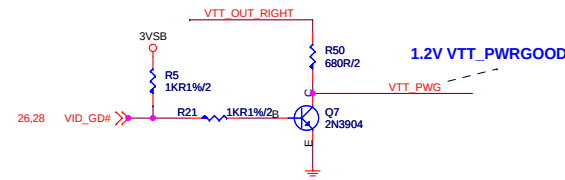
*PLACE COMPONENTS AS CLOSE AS POSSIBLE TO PROCESSOR SOCKET
*TRACE WIDTH TO CAPS MUST BE NO SMALLER THAN 12MILS



PLACE AT CPU END OF ROUTE

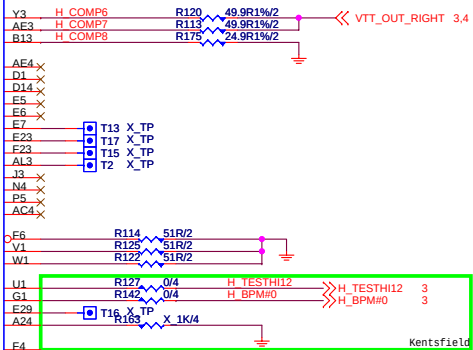
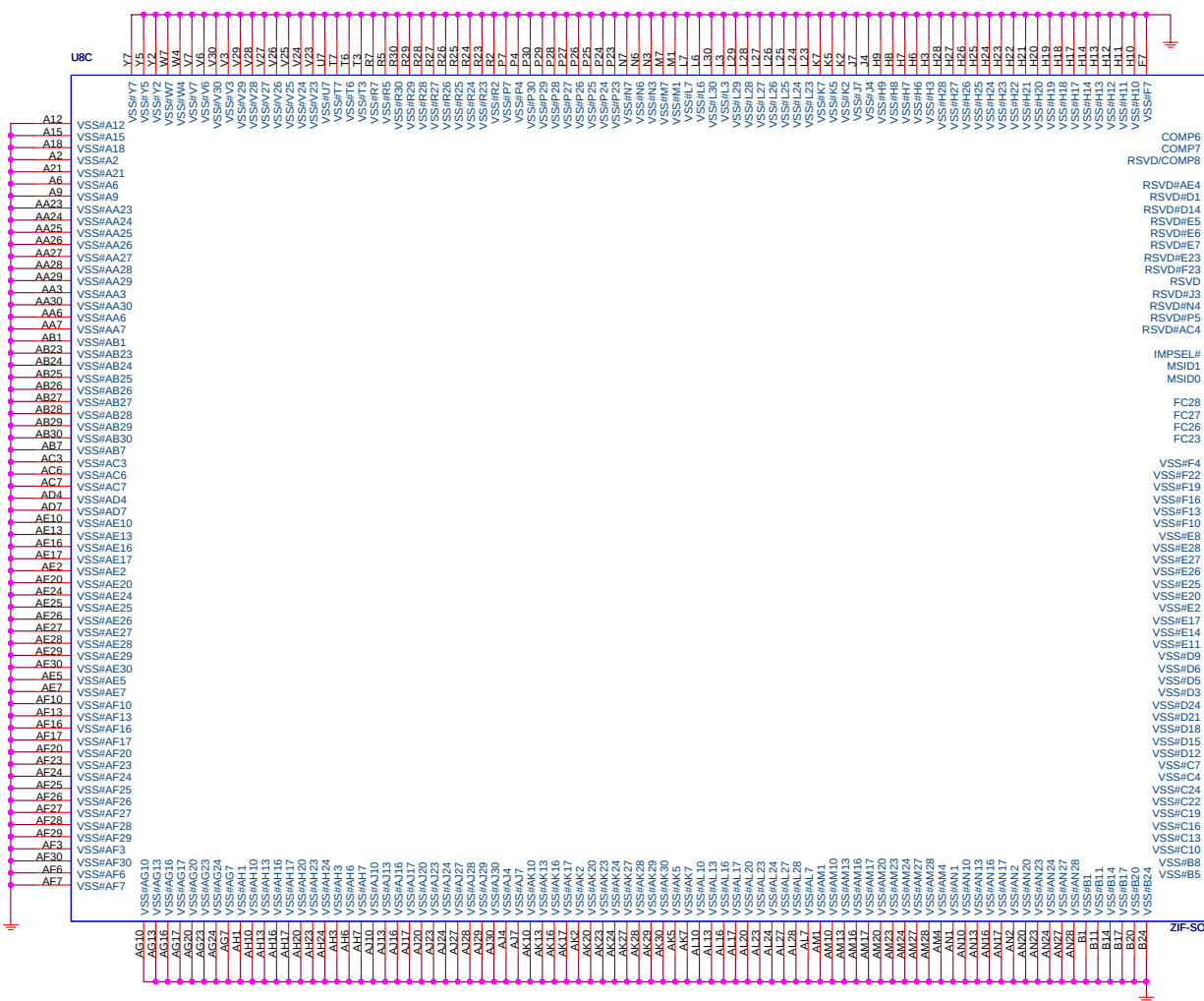


VTT PWRGOOD



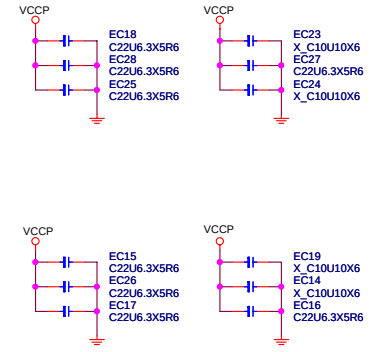
VTT_PWG SPEC :
High > 0.9V
Low < 0.3V
Trise < 150ns

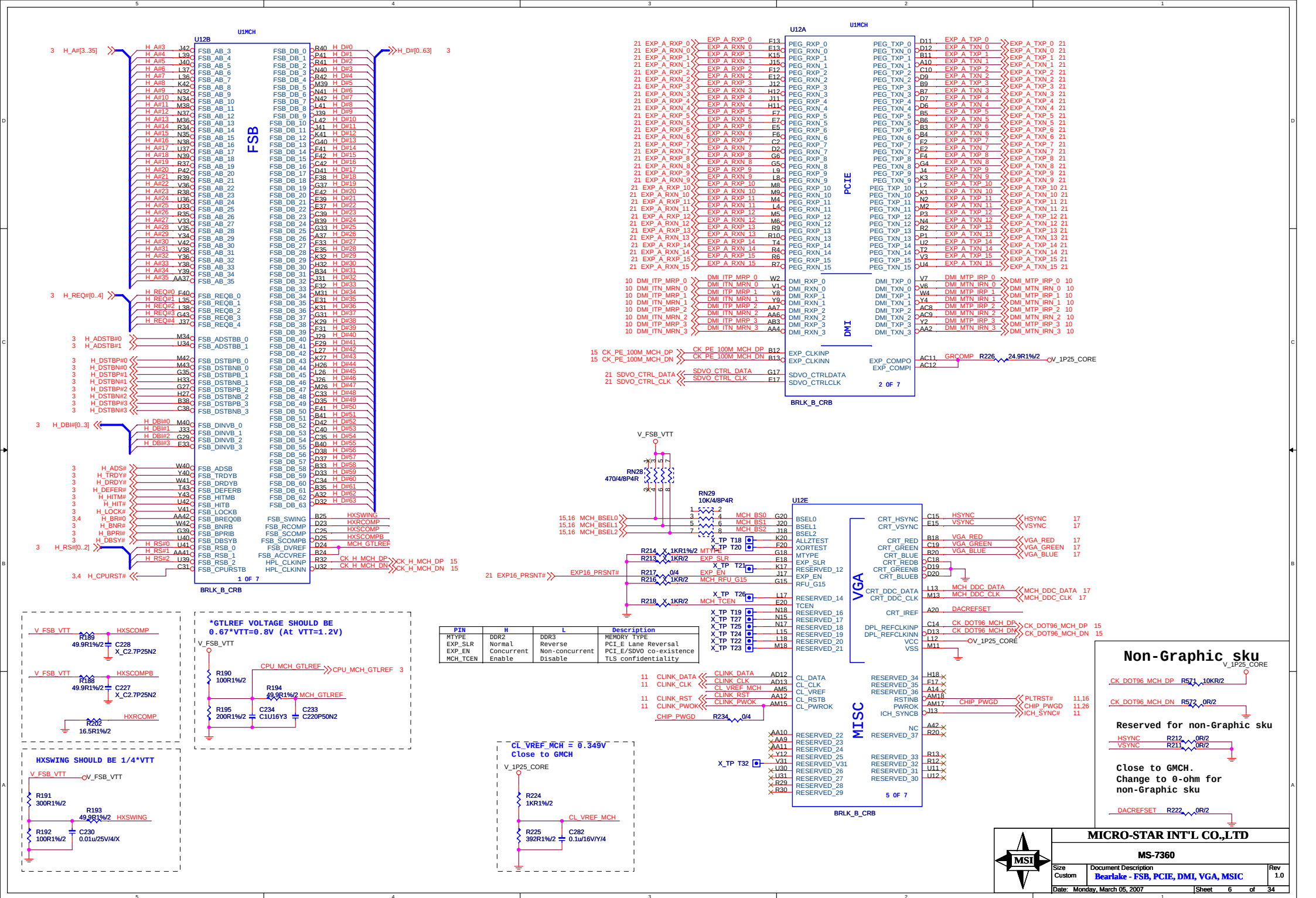
MICRO-STAR INT'L CO.,LTD			
MS-7360			
Size	Document Description	Rev	
Custom	LGA775 - Power	1.0	
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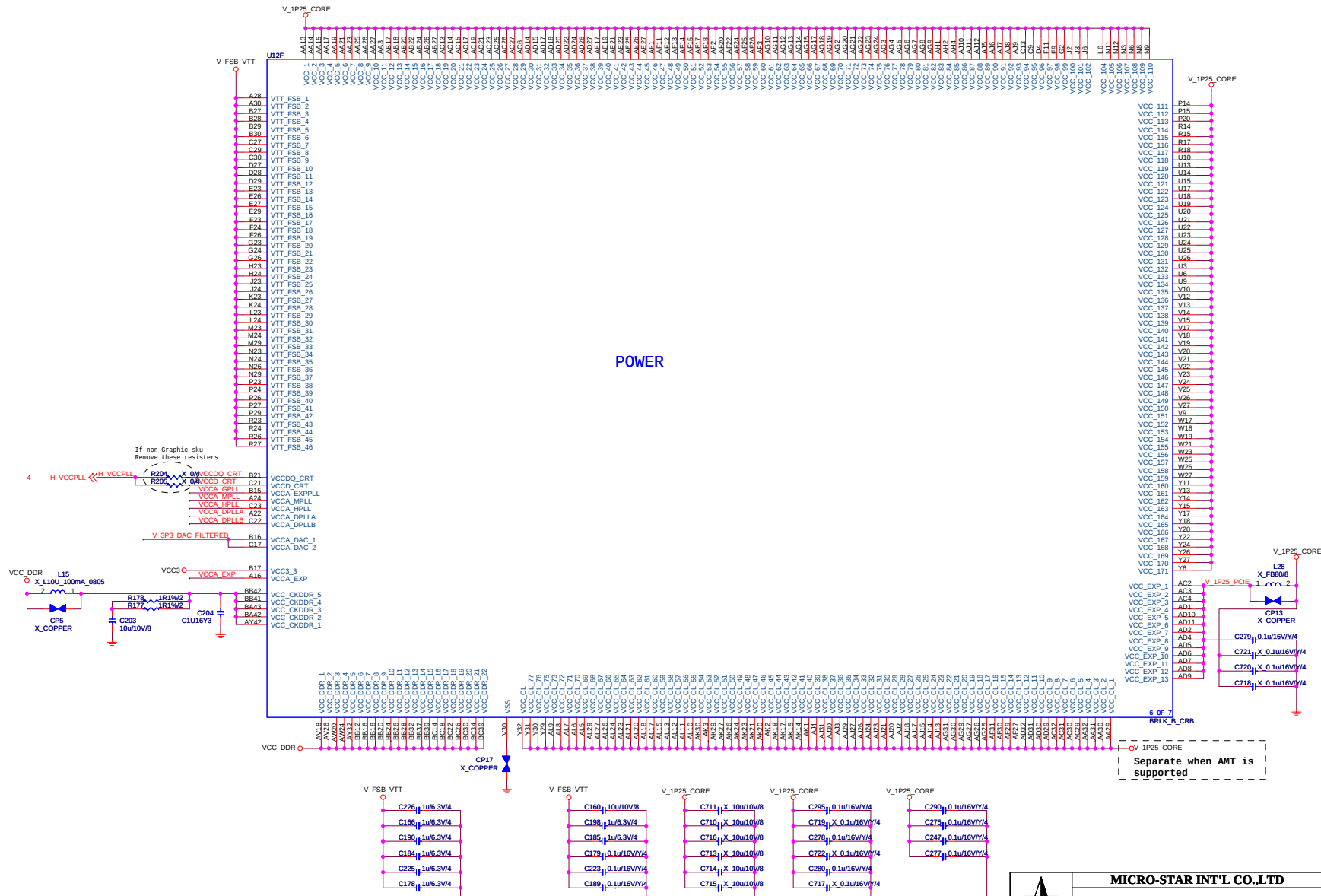
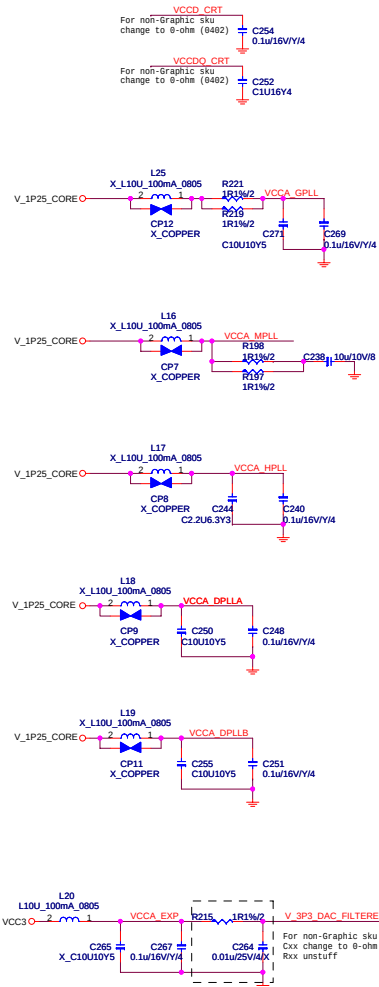
CPU DECOUPLING CAPACITORS

Place these caps within socket cavity



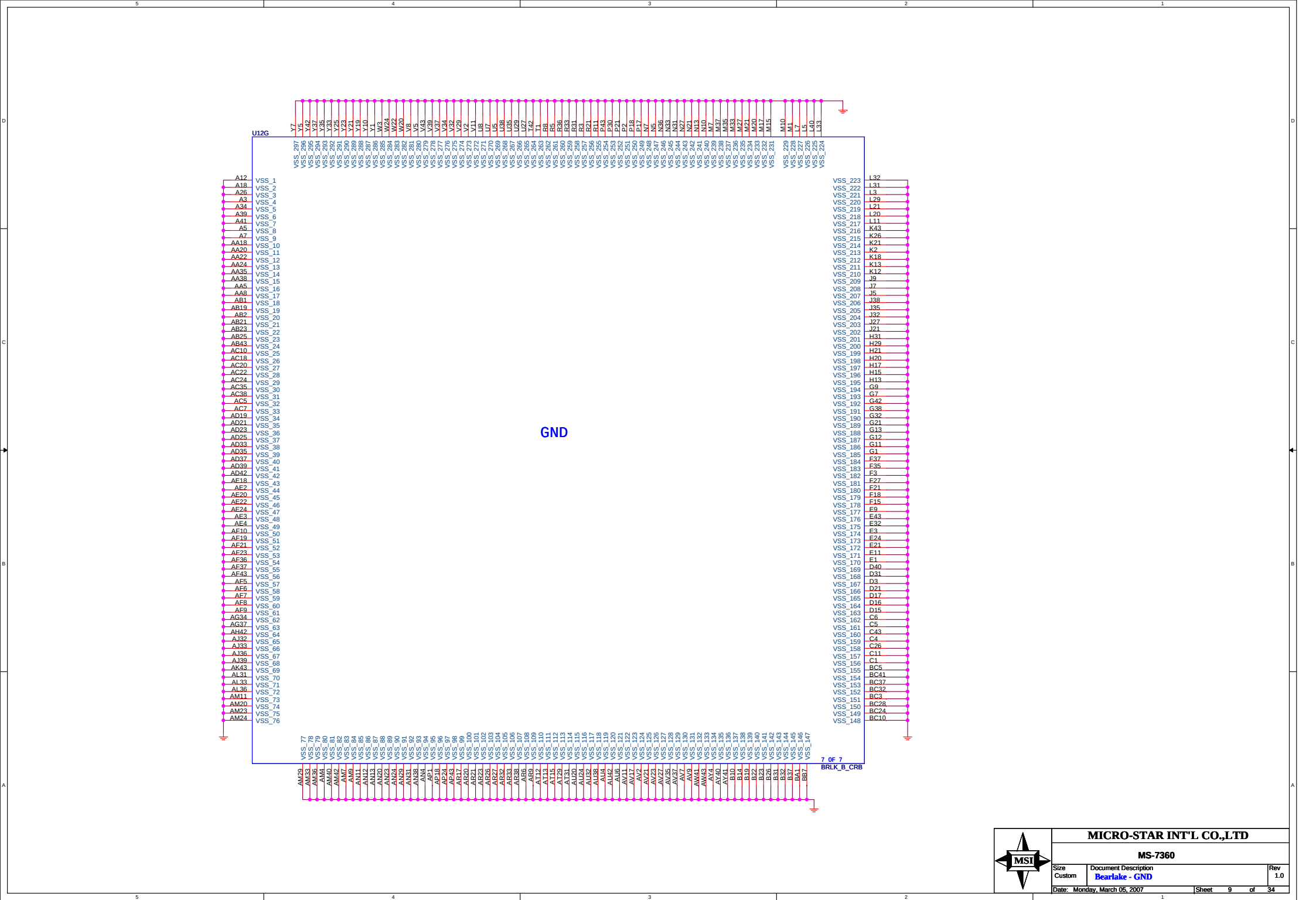


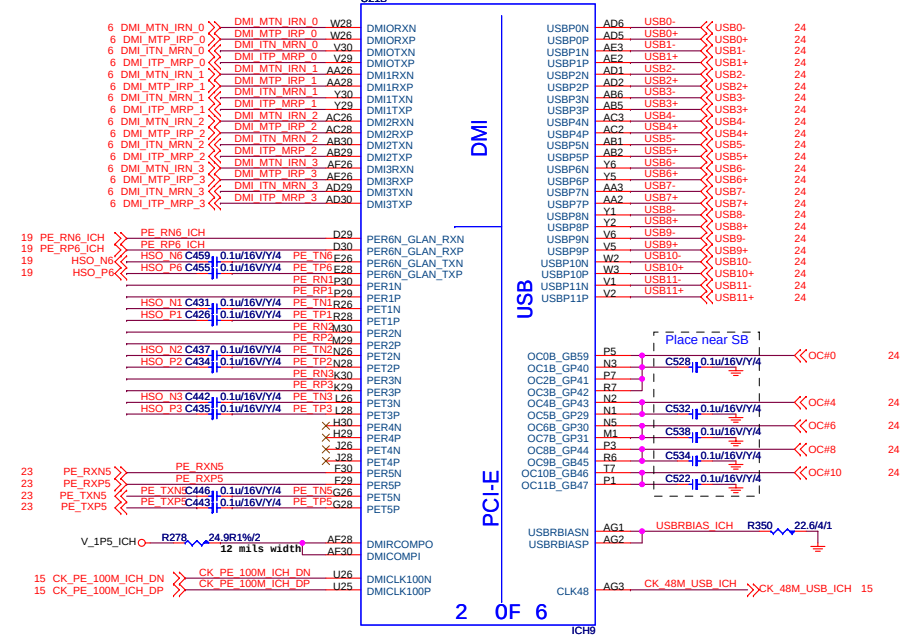
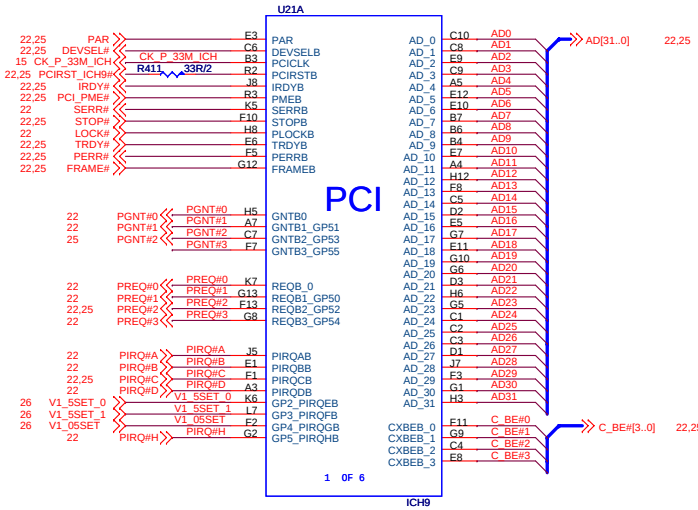
NB POWER



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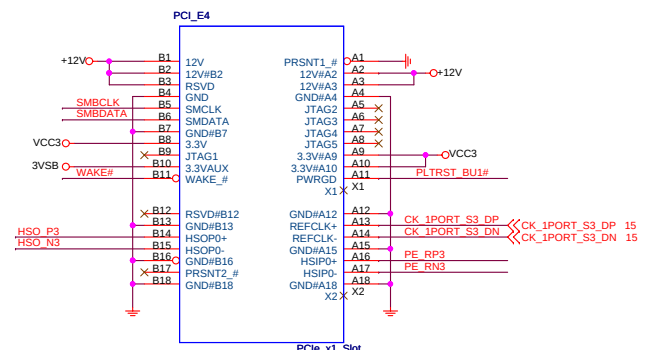
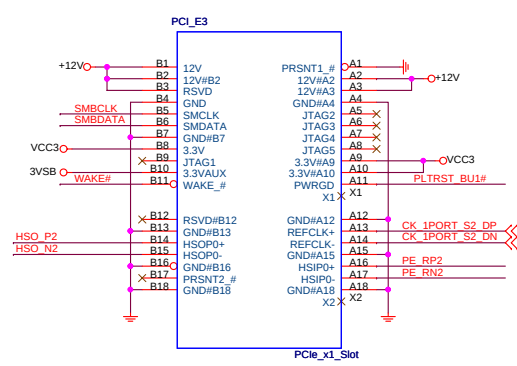
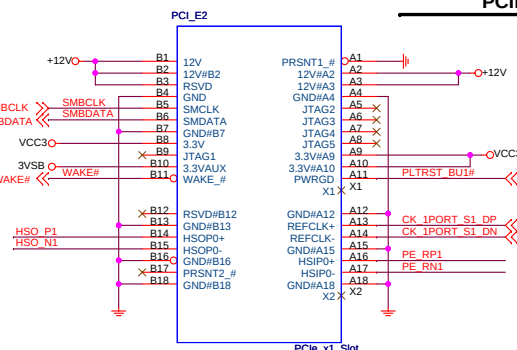
SB STRAPPING RESISTOR

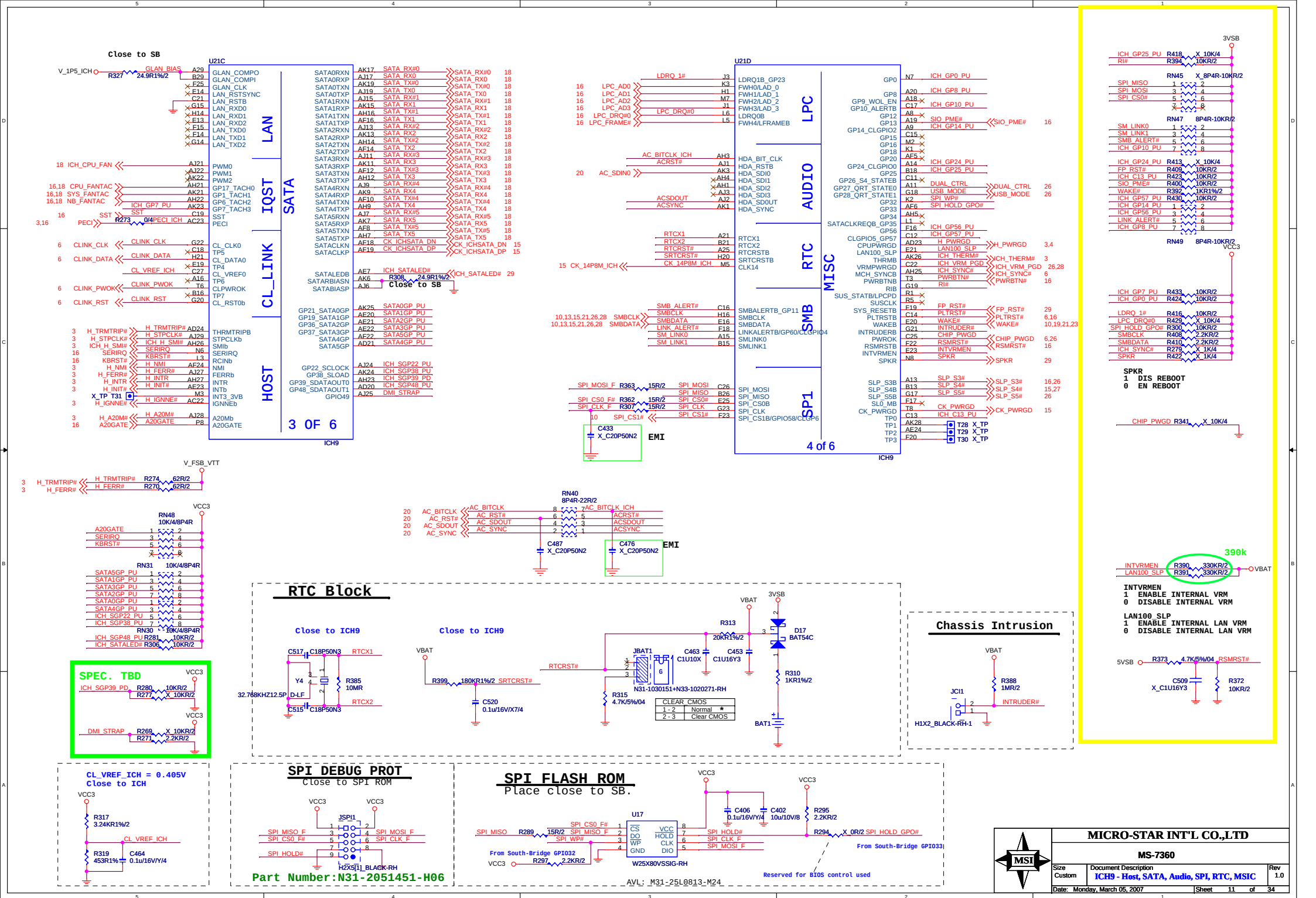
BOOT SELECT STRAPS			
BOOT DEVICE	GNT#0	SPI CS1#	
FwH	1	1	
SPI	0	1	
PCI	1	0	



SIGNAL	H	L	DES.
GNT3	DIS	EN	A16 OVERRIDE
GNT2	N/A	SET BIT	PCI PORT CONFIG 2 BIT 0 (5-6)

PCI-E X1 SLOT 1,2,3





SB POWER

V_{1P5_ICH} → L27 → CP25 → VCCUSBPPLL → C486 → GND

V_{1P5_ICH} → L26 → CP22C395 → VCCSATAPLL → C399 → GND

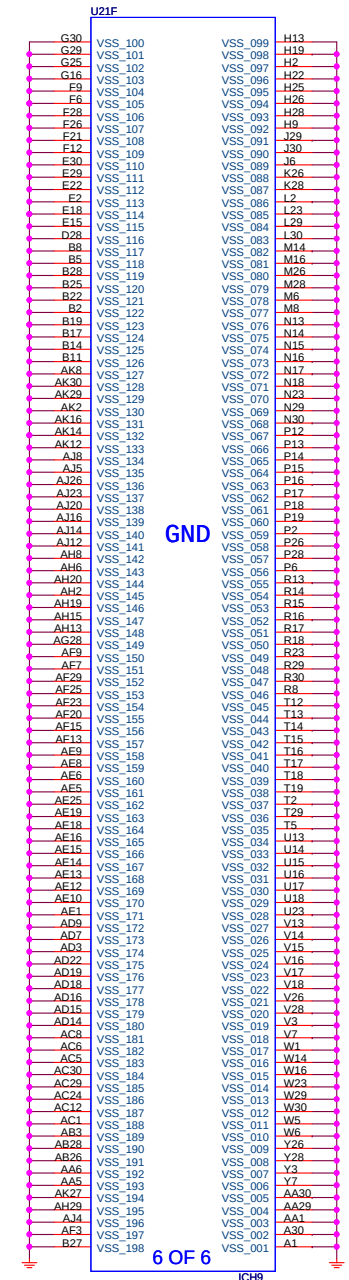
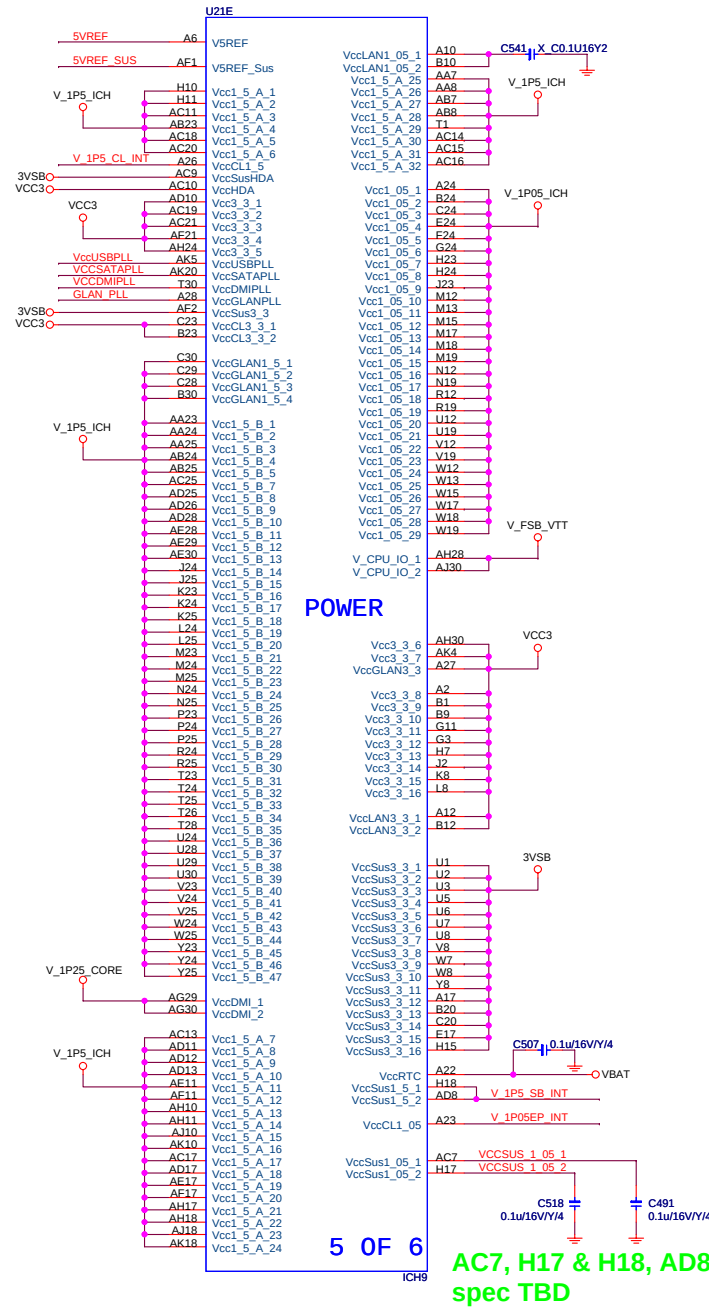
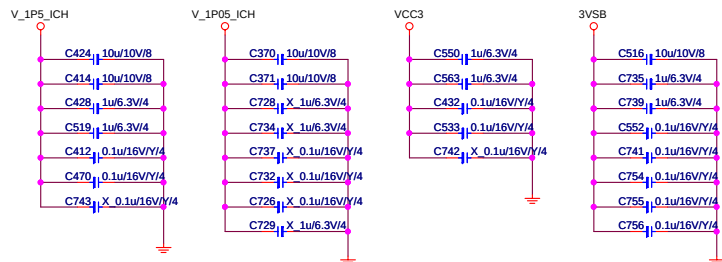
V_{1P5_ICH} → L36 → CP407 → VCCDMIPLL → C413 → GND

V_{1P5_ICH} → CP24 → C466 → GLAN_PLL → C472 → GND

V_{1P05EP_INT} ← C477 ← C478

V_{1P05_SB_INT} ← C505 ← C503

V_{1P5_CL_INT} ← C473 ← C475



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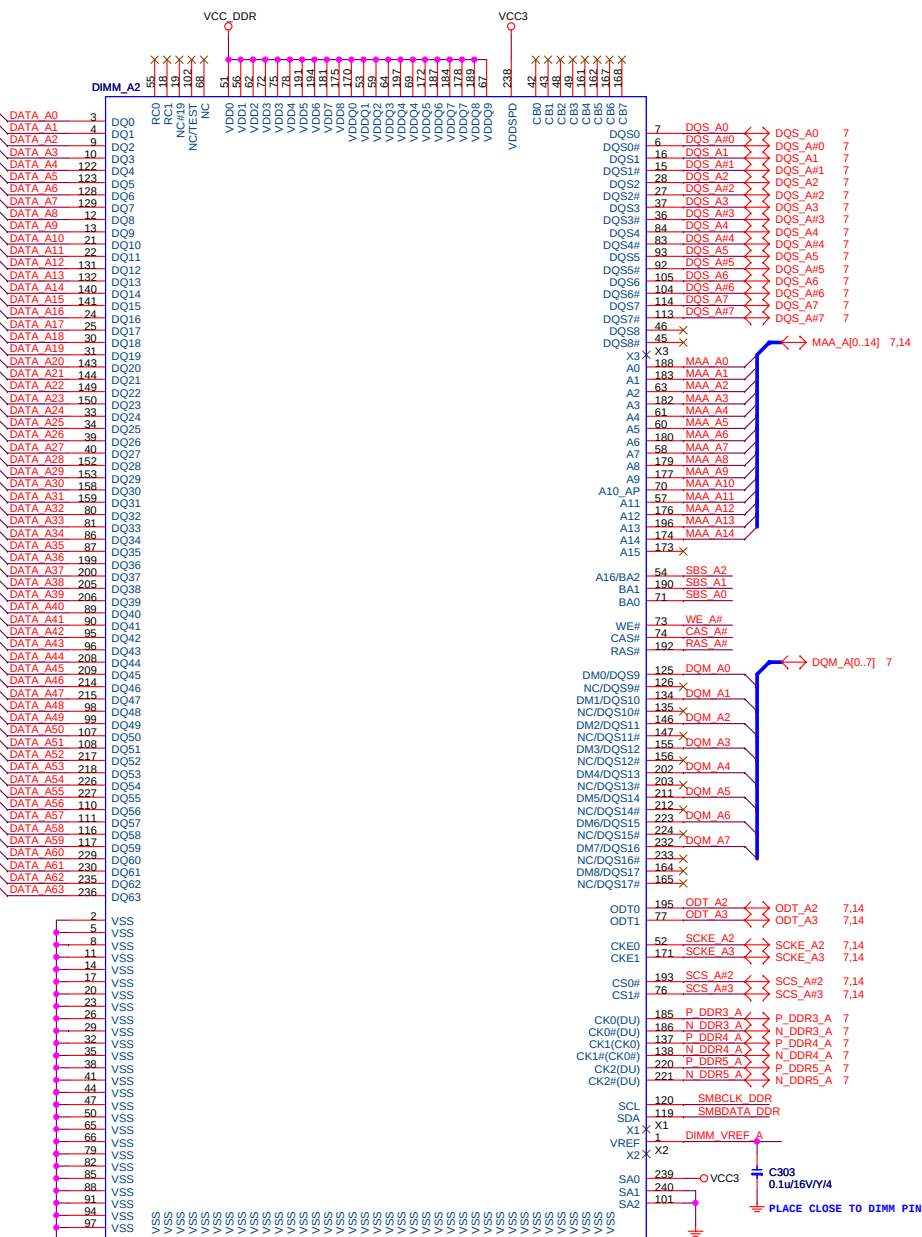


DDRII DIMM_A1

VCC_DDR R246 1KR1%2 DIMM VREF A

ADDRESS: 000
0xA0

SMBCLK_DDR R121 33R/2 SMBCLK 10.11.15.21.26.28
SMBDATA_DDR R129 33R/2 SMBDATA 10.11.15.21.26.28



DDRII DIMM_A2

VCC_DDR R246 1KR1%2 DIMM VREF A

ADDRESS: 001
0xA2



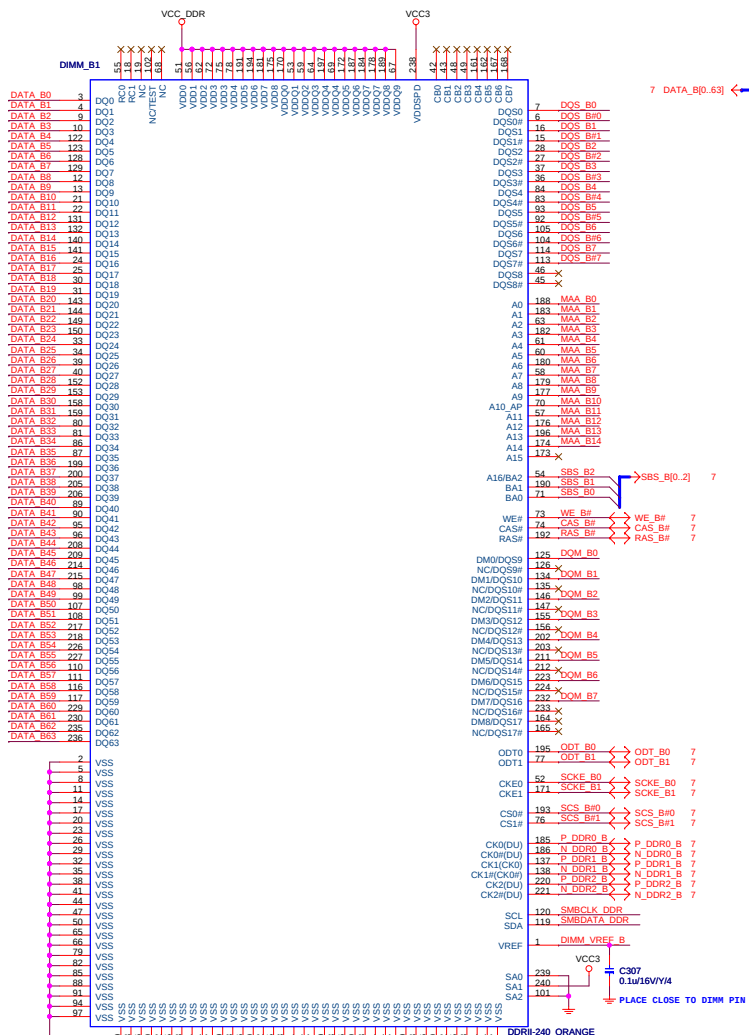
MICRO-STAR INT'L CO.,LTD

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Size Custom Document Description DDR2 CHANNEL-A Rev 1.0

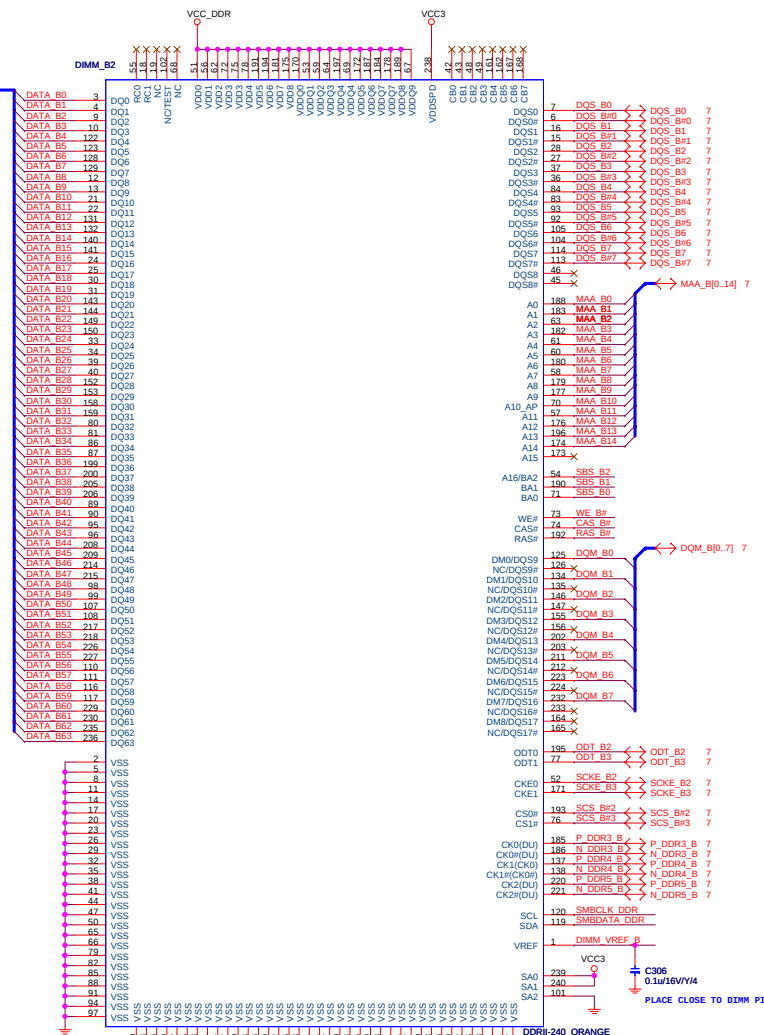
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DDR II Termination



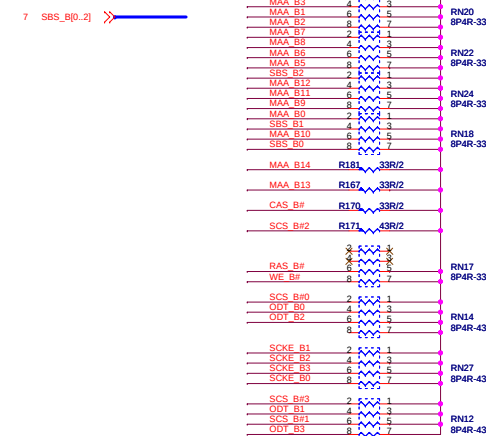
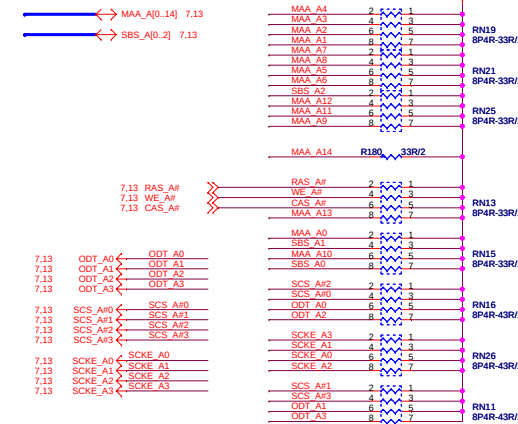
DDR II DIMM B1

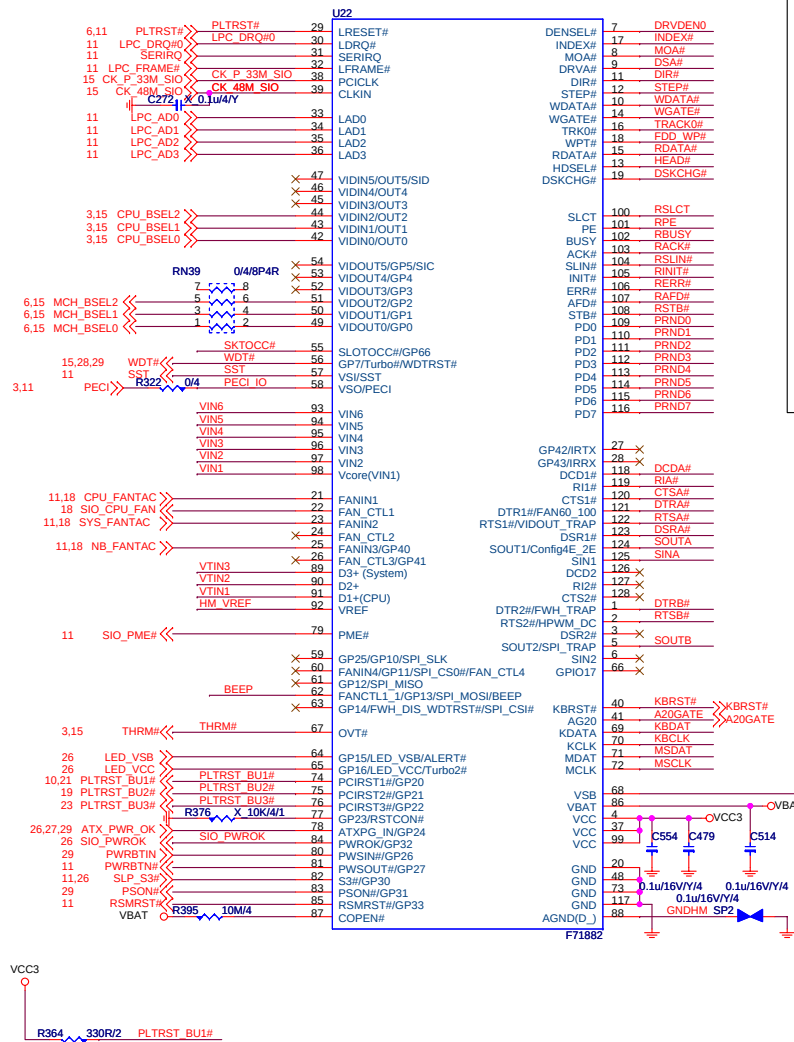
ADDRESS: 010
0xA4



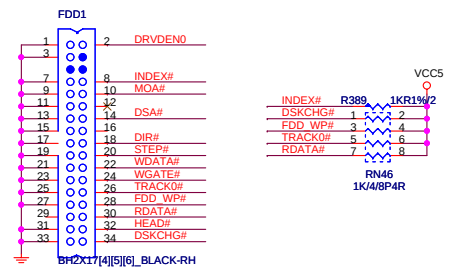
DDR II DIMM B2

ADDRESS: 011
0xA6

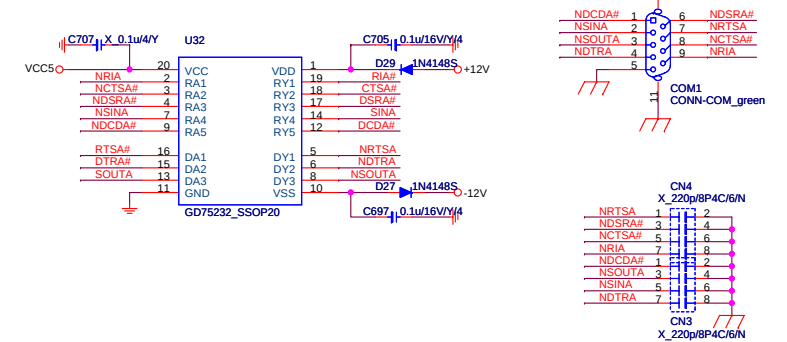




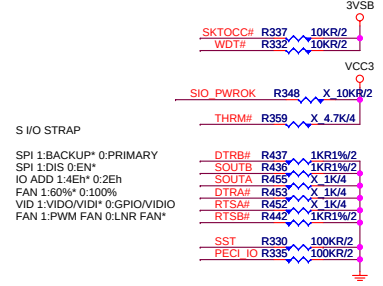
FLOPPY CONNECTOR



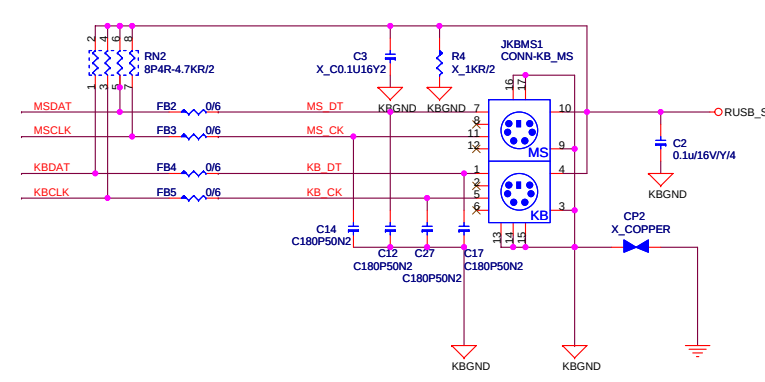
SERIAL PORT 1



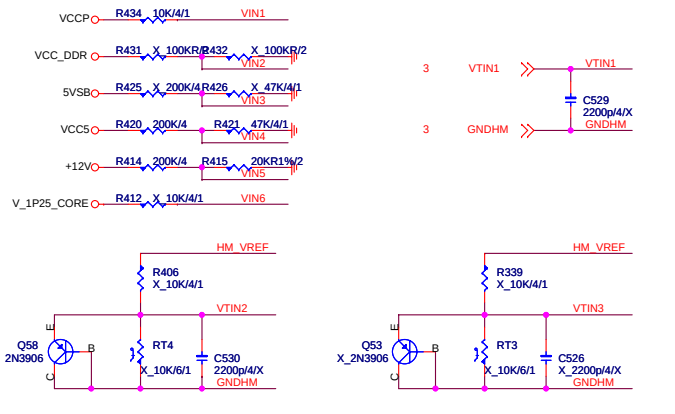
LPC I/O STRAPPING RESISTOR



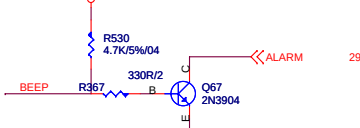
PS2 KEYBOARD & MOUSE CONNECTOR



Thermal Resistor

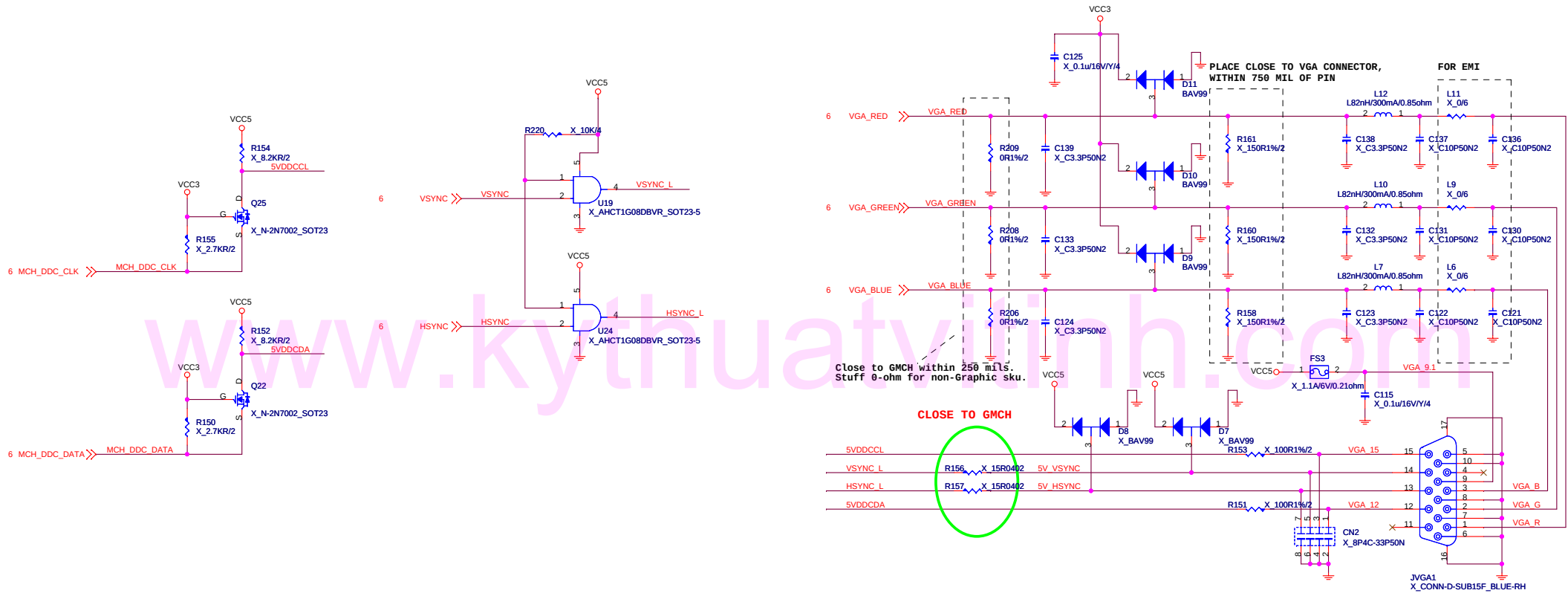


BEEP



MICRO-STAR INT'L CO.,LTD		
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Custom	SIO-Fintek F17882F/COM	1.0
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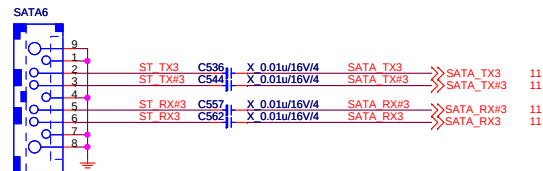
Video Connector



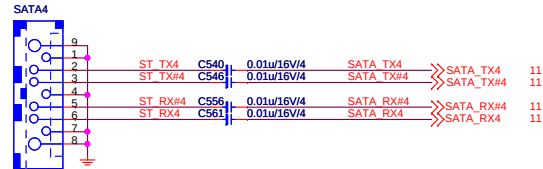
MICRO-STAR INT'L CO.,LTD

MS-7360

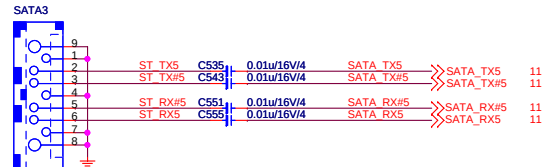
Size Custom	Document Description VGA	Rev 1.0
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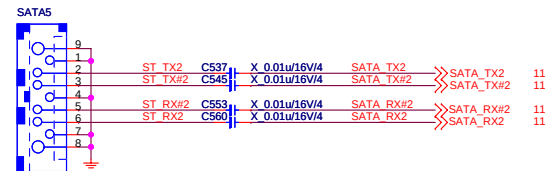
X_CONN-SATA10P_PURPLE



CONN-SATA10P_PURPLE



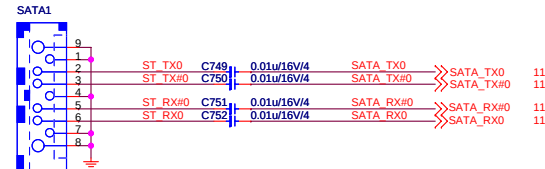
CONN-SATA10P_PURPLE



X_CONN-SATA10P_PURPLE

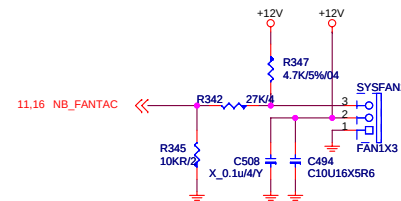
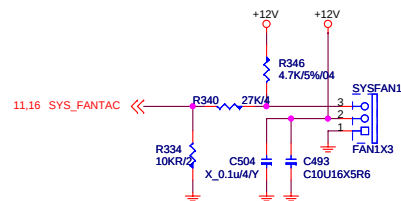
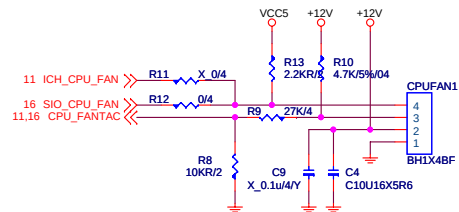


CONN-SATA10P_PURPLE



CONN-SATA10P_PURPLE

FAN-COUNTROL CIRCUIT

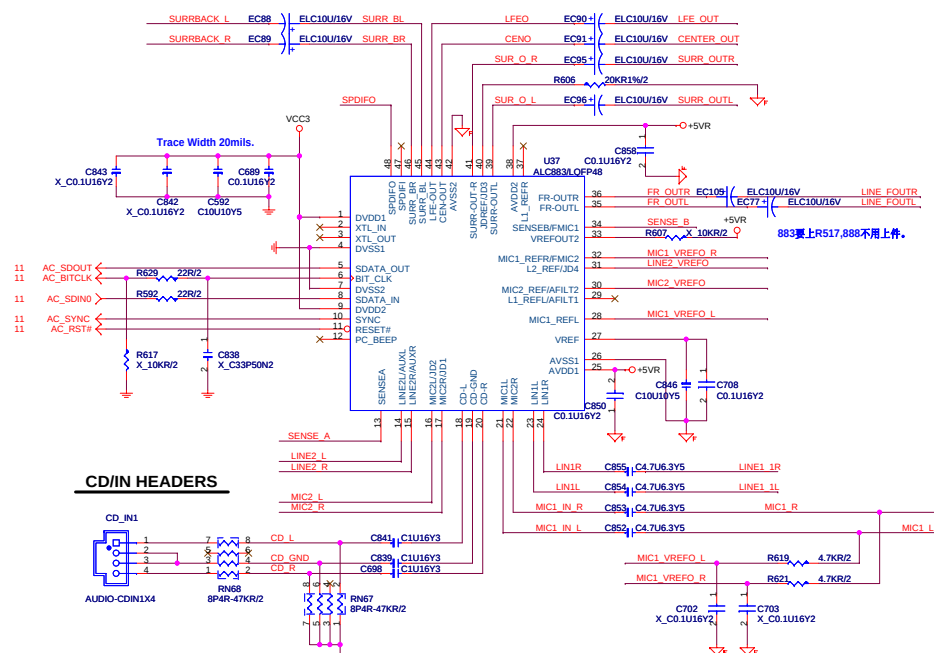


MICRO-STAR INT'L CO.,LTD

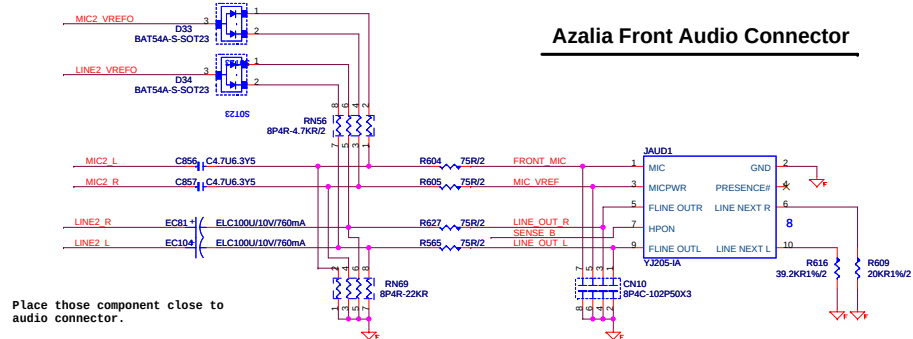
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Custom	SATA & e-SATA Ports and Fan Control	1.0
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ALC888 CODEC

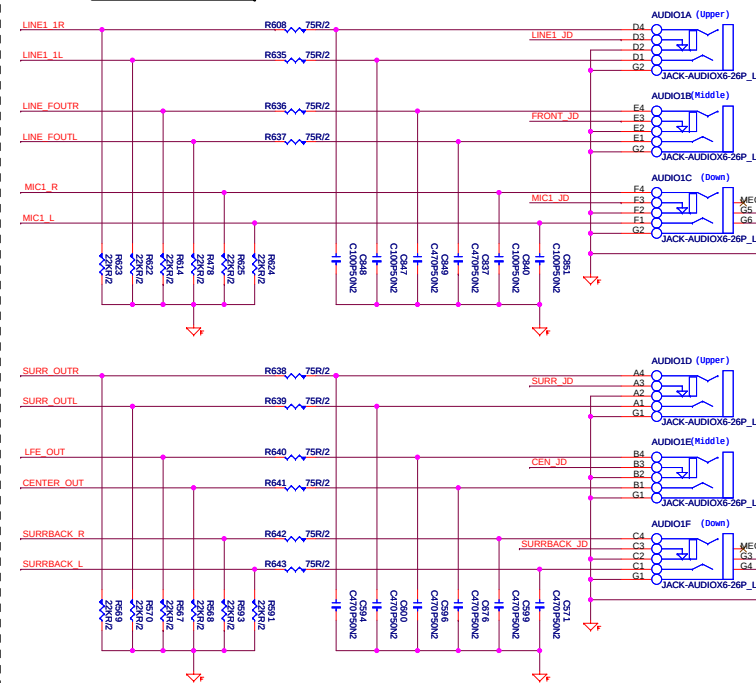


Azalia Front Audio Connector

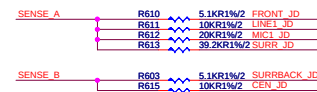


Place those component close to audio connector.

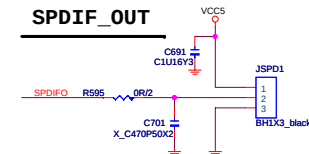
ALC883 JACK



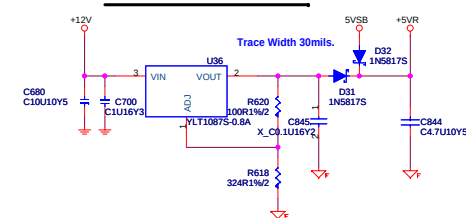
ALC883 JACK DETECT



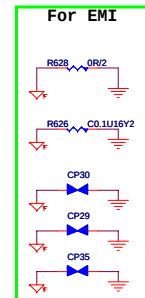
SPDIF_OUT



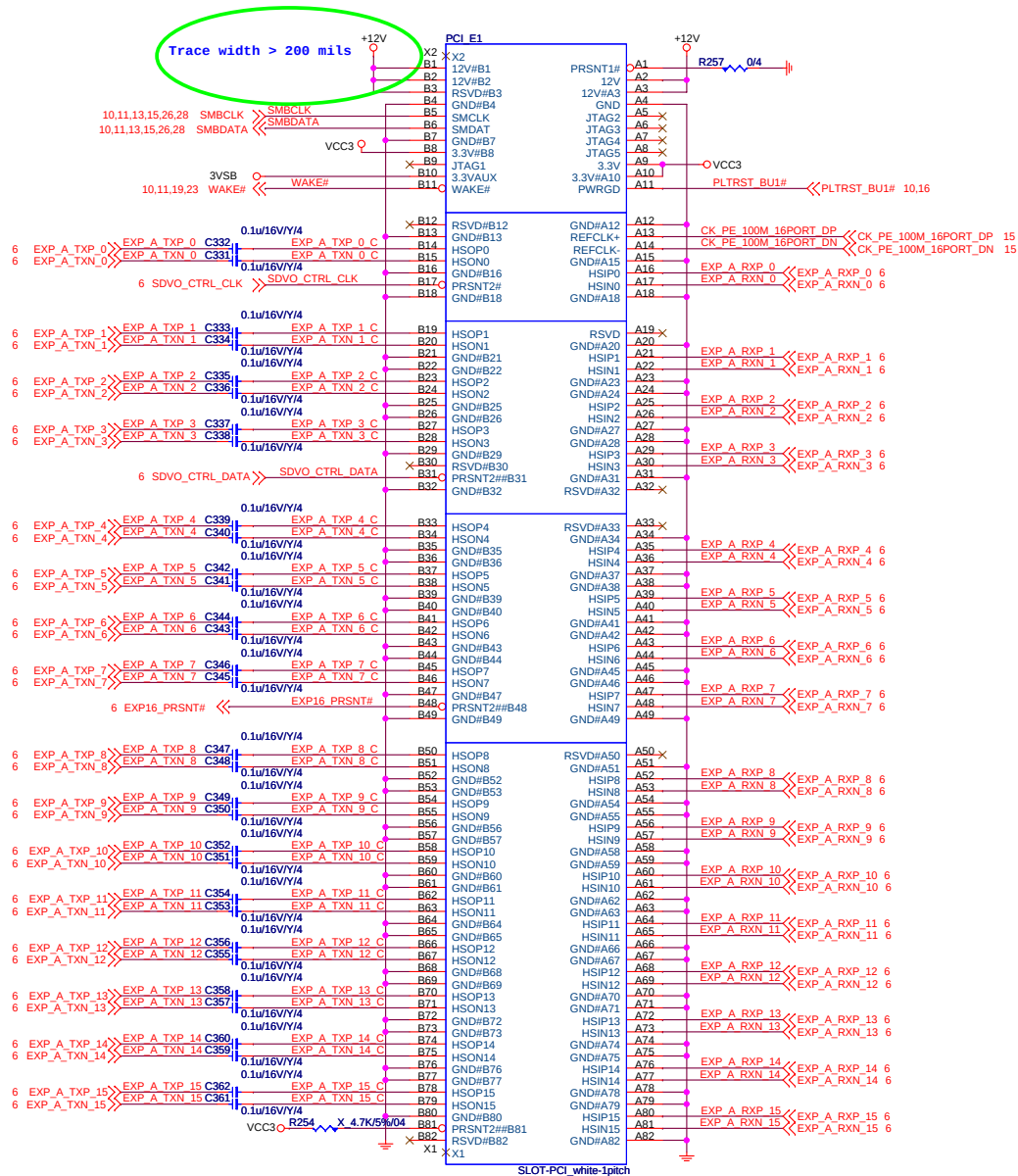
AUDIO CODE REGULATORS



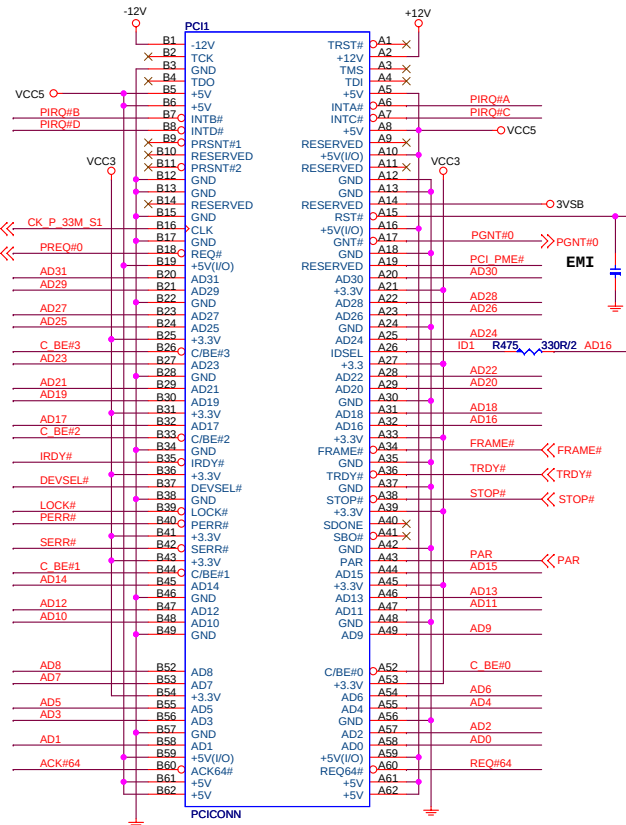
For EMI



PCI_Express X16 Slot



PCI SLOT 1 (PCI VER: 2.2 COMPLY)



IDSEL = AD16

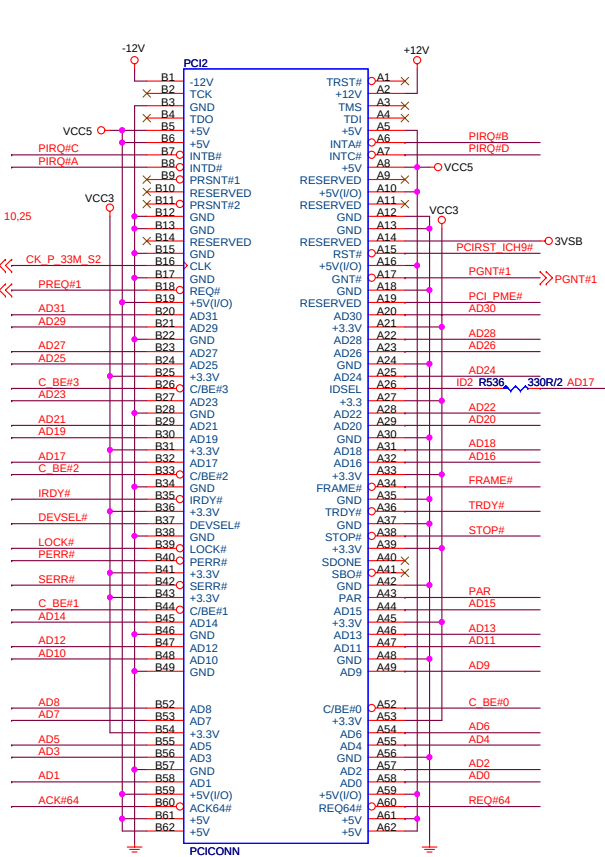
MASTER = PREQ#0

PIRQ#A

10.25 AD[31:0] << AD[31:0]

10.25 C_BE#[3:0] << C_BE#[3:0]

PCI SLOT 2 (PCI VER: 2.2 COMPLY)

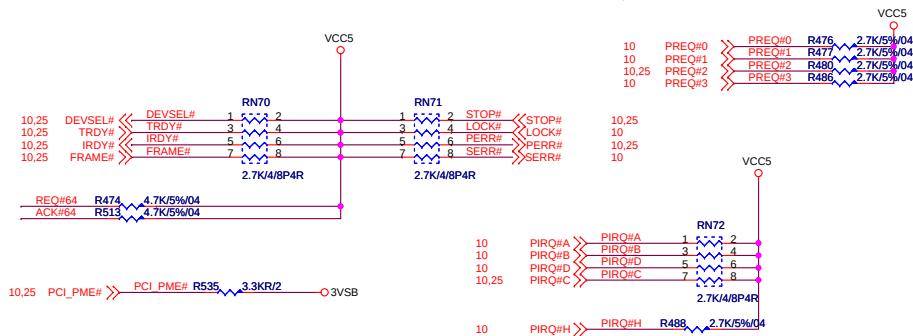


IDSEL = AD17

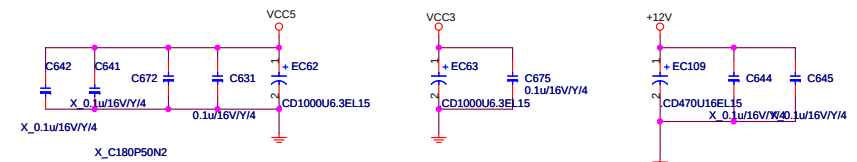
MASTER = PREQ#1

PIRQ#B

PCI PULL-UP / DOWN RESISTORS



PCI SLOT DECOUPLING CAPACITORS

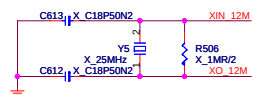
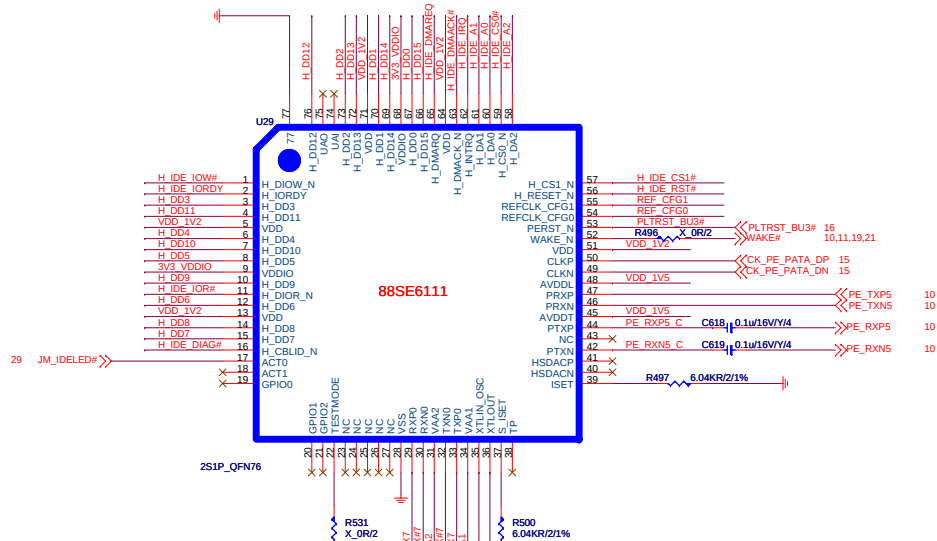


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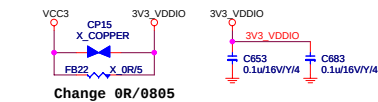
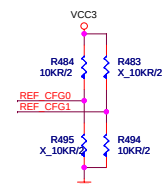
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Hi-Speed PCIE to SATA/PATA Bridge

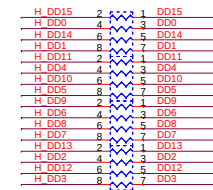
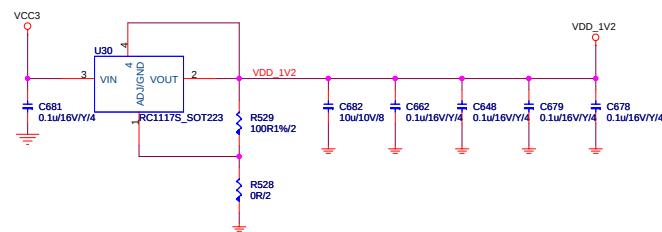
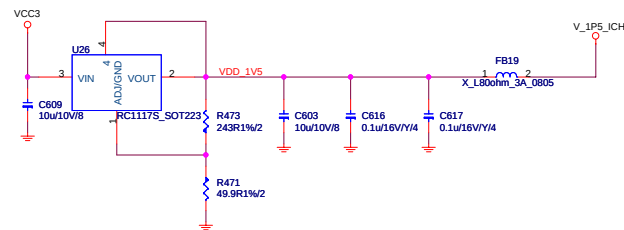
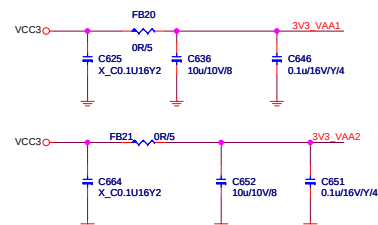


```
REF_CFG[1:0] =  
00:20MHz  
01:25MHz
```

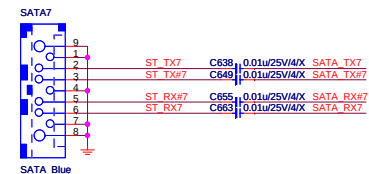
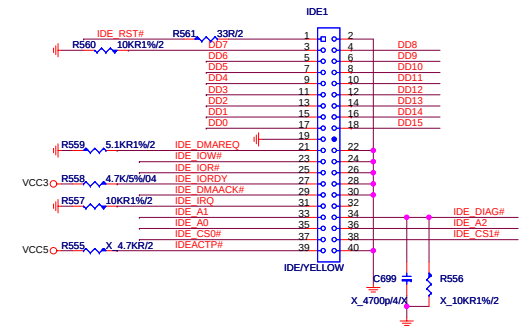


Change 0R/0805

L02-8008074-J07 FOR BEAD



RN60	8P4R-33R/2
RN64	8P4R-33R/2
RN65	8P4R-33R/2
RN62	8P4R-33R/2



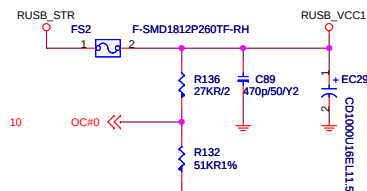
MICRO-STAR INT'L CO.,LTD

MS-7360

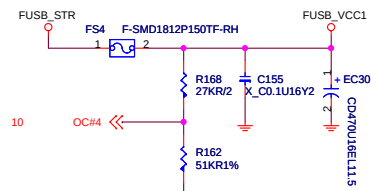
Size Custom	Document Description Marvell 88SE6111 PCIE to PATA/SATA	Rev 1.0
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Rear USB Connector

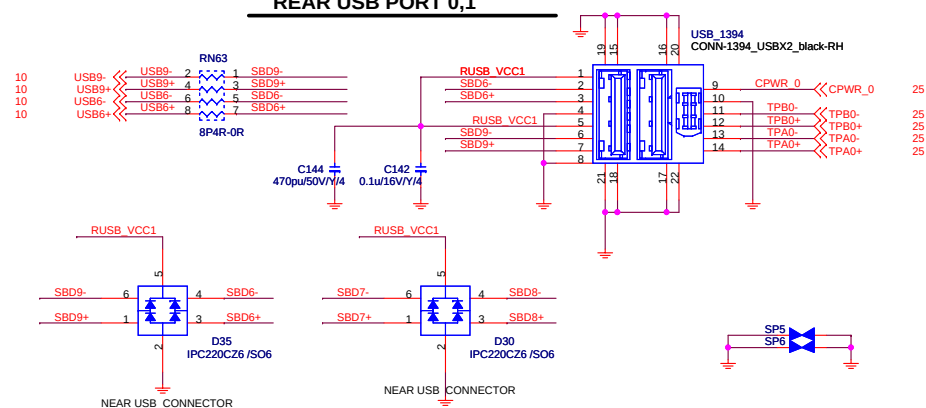
USB POWER FOR PORT 0,1 NEAR CONNECTOR



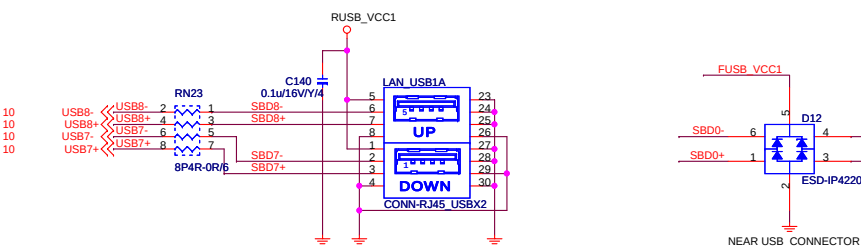
USB POWER FOR PORT 6,7,8,9 NEAR CONNECTOR



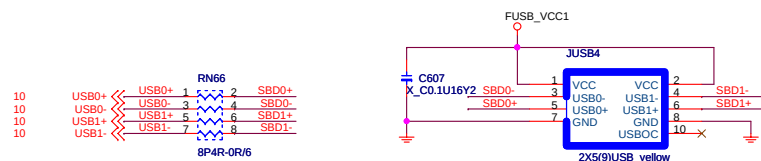
REAR USB PORT 0,1



REAR USB PORT 2,3 (With LAN)

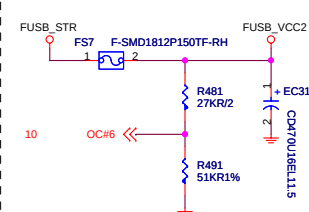


FRONT USB PORT 0,1

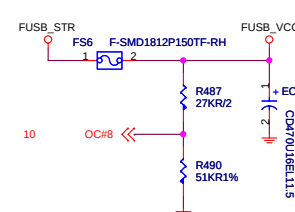


Front USB Connector

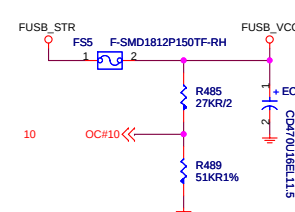
USB POWER FOR PORT 6,7 NEAR CONNECTOR



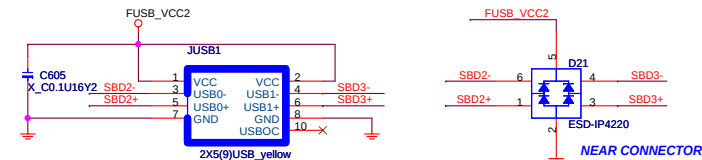
USB POWER FOR PORT 6,7 NEAR CONNECTOR



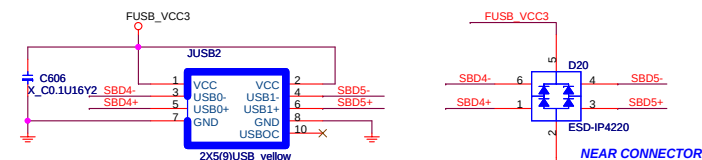
USB POWER FOR PORT 6,7 NEAR CONNECTOR



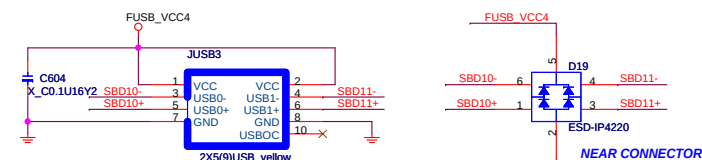
FRONT USB PORT 2,3



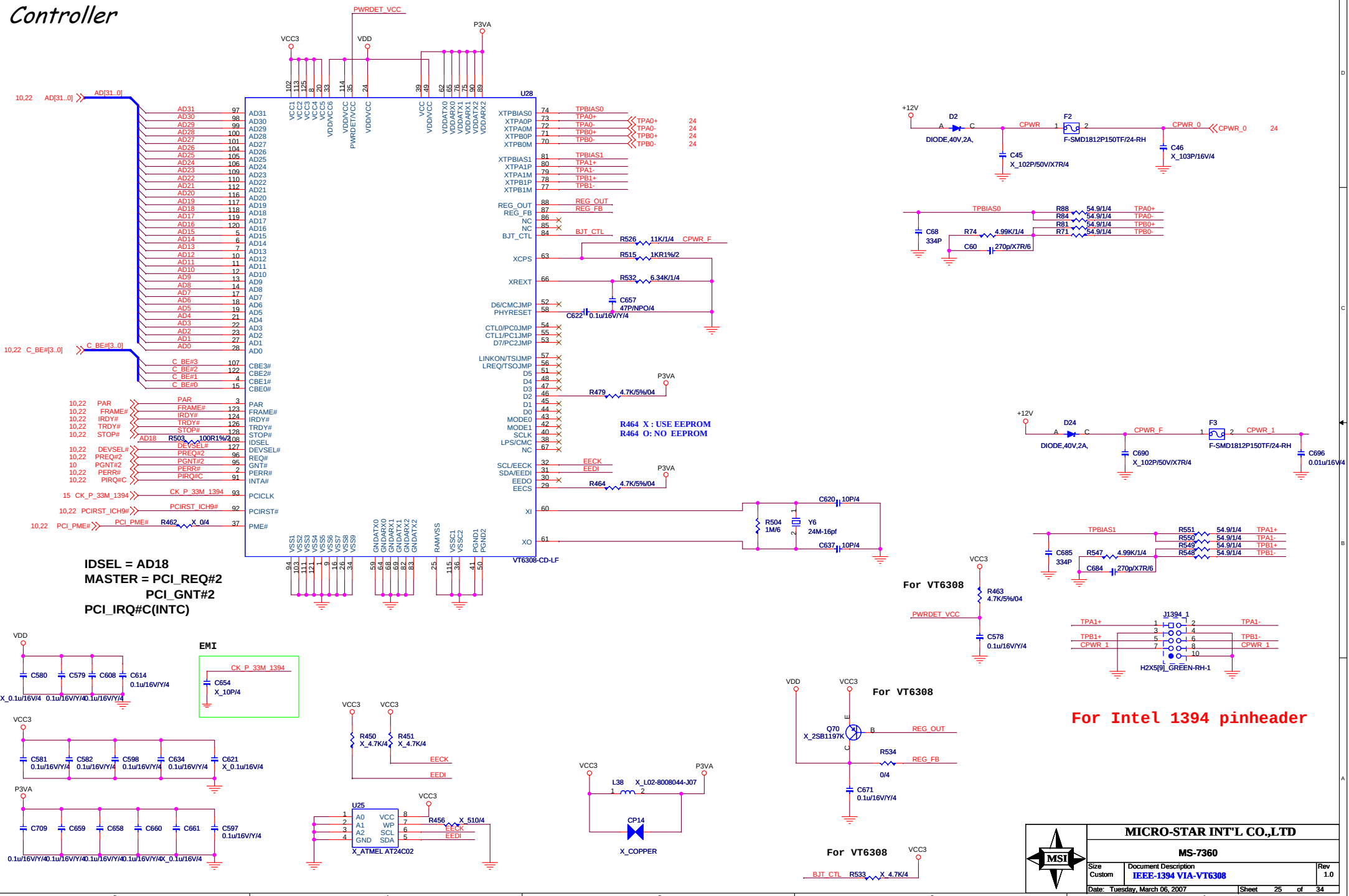
FRONT USB PORT 4,5



FRONT USB PORT 10,11



1394a OHCI Link Layer Controller



DDR II 1.8V POWER

Iripple=21*0.6*0.8/1=10.08A
2.22*3*1.7=11.322A>10.08A

VCC_DDR

To CPU Copper trace width > 250mils , Fill island behind DIMM > 400mils .

DDR VTT Power

VCC_DDR

VTT_DDR

de- VCC_DDR high frequency noise.

CLOSED DDR POWER PIN4

9.4A+4.3A+2.75A+5.8A=22.25A
Irms(MAX) of VCC_DDR=22A

The PCB layout shows decoupling capacitors for Channel B, Channel A, and EMI. The layout includes various capacitor values and footprints connected to power and ground planes.

Channel B V_SM_VTT DECOUPLING CAPS

Channel A V_SM_VTT DECOUPLING CAPS

For EMI

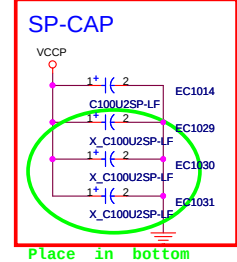
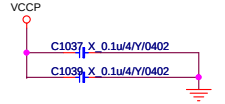
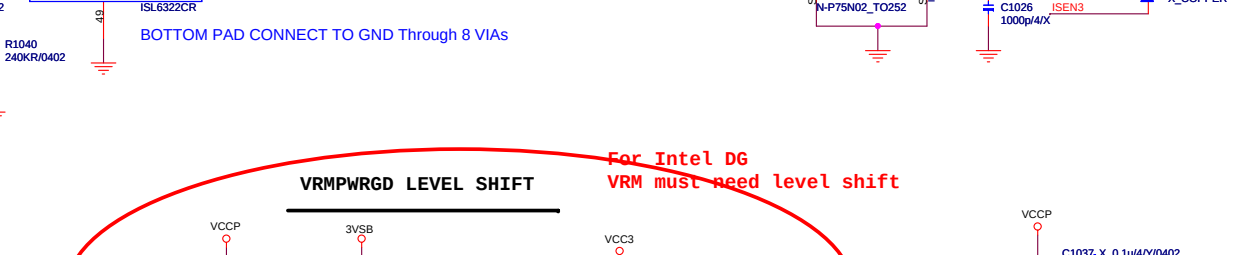
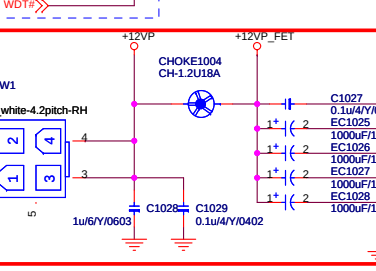
The layout includes various capacitor values and footprints connected to power and ground planes.

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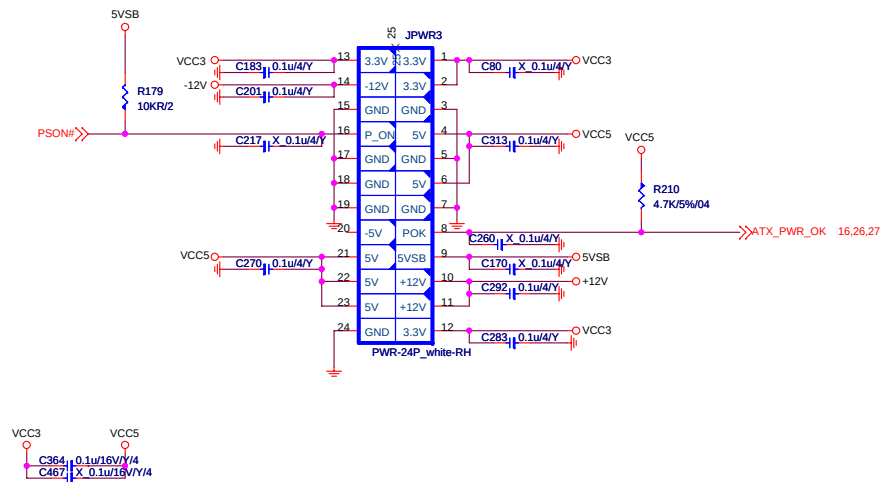
MS-7360

NB Core Power & DDR Power

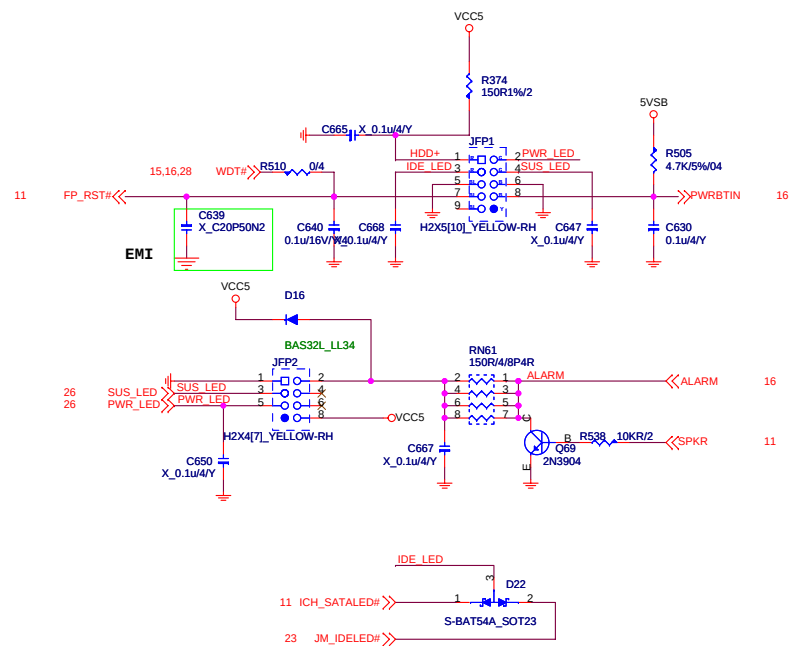
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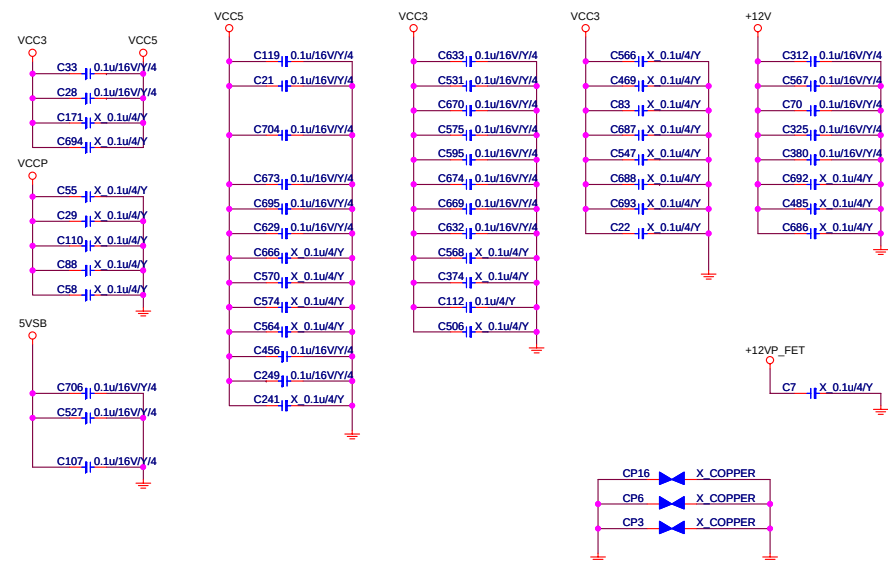
ATX POWER CONNECTOR



FRONT PANNEL



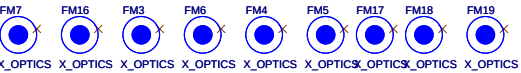
Cap. for EMI & Power



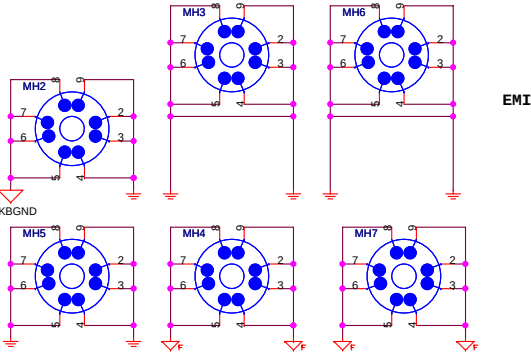
Optical Fiducial Marks-120



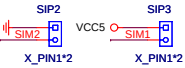
Optical Fiducial Marks-100



Mounting Holes

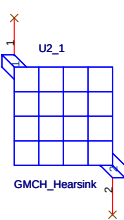


Simulation



7360

P80-073600A-D05, 鐸()鐸 嘲),23, 盤 稜幅紅
P80-0736050A-Y34, 匕璟,23, 盤 稜幅紅



LGA775-CPU		
0.8375V - 1.6000V Core	-	125A
1.2V FSB Vtt	-	4.6A

Bearlake-G (G33)		
1.2V FSB_VTT	-	1.2 A
1.25V Core	-	13.8A
1.25V DMI/PCI Exp.	-	2.47 A
1.5V VCC_DDR	-	3.3A
1.5V VCC_SMCLK	-	350mA
3.3V VCCA_DAC	-	66 mA
3.3V VCC33	-	15.8mA
1.25V Vcc CL	-	4.9A

ICH9		
1.05V Core	-	1.16A
1.25V DMI	-	41 mA
1.2V FSB_VTT	-	2 mA
1.5V_A USB/SATA/PLL	-	1.65A
1.5V_B PCI Exp.	-	0.65A
VCCRTC	-	6 uA
3.3V CL	-	19 mA
1.5V GbE LAN	-	87 mA
3.3V VccSus3_3	-	200mA
3.3V Vcc3_3	-	308mA
3.3V 10/100 LAN	-	19 mA
3.3V GbE LAN	-	1 mA
3.3V HDA	-	32 mA
3.3V SusHDA	-	33 mA

1394 Controller VT6308		
3.3V	-	156mA

HD Audio STAC9227		
3.3V AUDIO	-	32mA
5V AUDIO	-	200mA

CK505		
3.3V VDD_48/PCI/REF	-	250mA
0.3V - 1V CPU/SRC/DOT/PLL	-	80mA

RTL8111B		
3.3V_SB I/O & LED	-	668mA
1.8V EVDD/AVDD	-	198mA
1.5V VDD	-	367mA

ISL6306		
VCCP VRD11/10.x	-	0.8375V-1.6000V
4-Phase Switch	-	

W83310DS		
VTT_DDR	-	0.75V Linear 0.83A

uP6103 SW-Power		
VCC_DDR	-	1.5V PWM 18.64A

uP6103 SW-Power		
V_1P25_CORE	-	1.25V PWM 21.21A

MS12 Controller		
V_1P05_ICH	-	1.05V Linear 1.16A
V_FSB_VTT	-	1.2V Linear 5.8A
V_1P5_ICH (T0263)	-	1.5V Linear 2.31A
VCC3_SB	-	3.3V Linear 2.5A
5VDUAL1	-	5V Switch 6.35A
5VDIMM	-	5V Switch 6.99A

DDRIII x4 & TERMINATOR		
0.9V VTT_DDR	-	0.83A
1.5V VCC_DDR (S0,S1)	-	7.2A

PCI Express x16 slot		
+12V	-	5.5 A
+3.3Vaux (wake)	-	375mA
+3.3Vaux (no wake)	-	20mA
+3.3V	-	3.0A

PCI Express x 1 slot		
+12V	-	0.5 A
+3.3Vaux (wake)	-	375mA
+3.3Vaux (no wake)	-	20mA
+3.3V	-	3.0A

PCI Express x 4 slot		
+12V	-	5.5A
+3.3Vaux (wake)	-	375mA
+3.3Vaux (no wake)	-	20mA
+3.3V	-	3.0A

PCI slot x2		
+3.3Vaux (wake)	-	375mA
+3.3Vaux (no wake)	-	20mA
+3.3V	-	7.6A
+5V	-	5.0A
+12V	-	0.5A

USB x12		
+5V (S0,S1)	-	6.0A
+5V (S3)	-	20mA

PS2		
+5V (S0,S1)	-	345mA
+5V (S3)	-	2.0mA

5VAudio	-	+5VR
	-	500mA

+12V	-	
ATX 2x2	-	

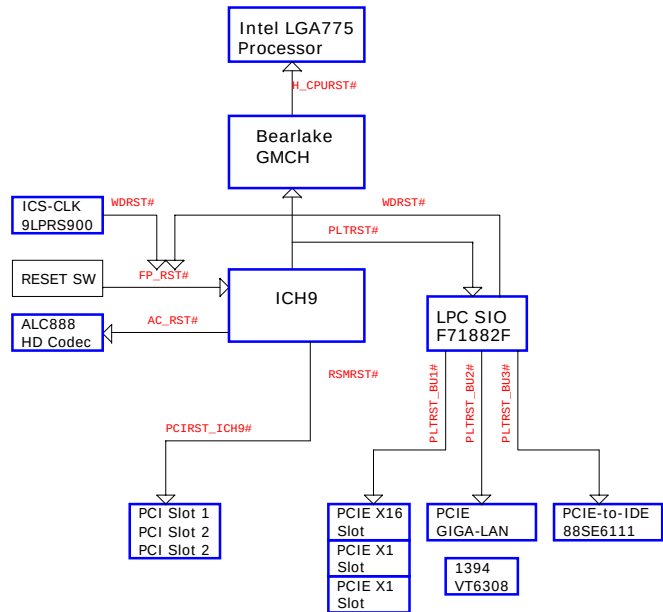
+5V	-	24.97A
+3.3V	-	
+5VSB	-	
+12V	-	
ATX POWER	-	

■ Bead or Inductor
 X-Copper

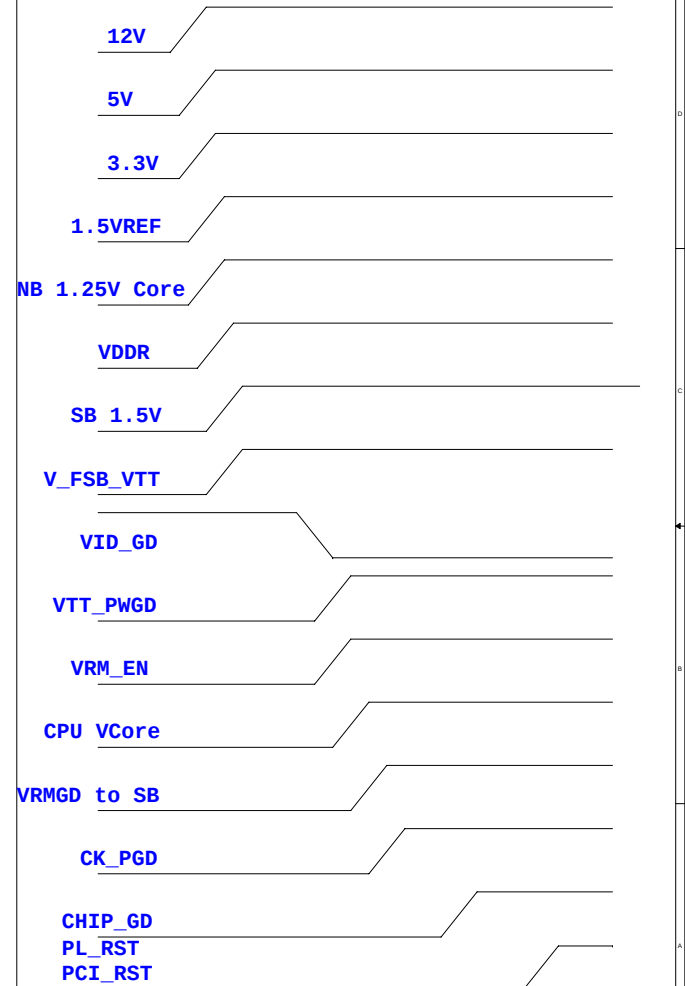
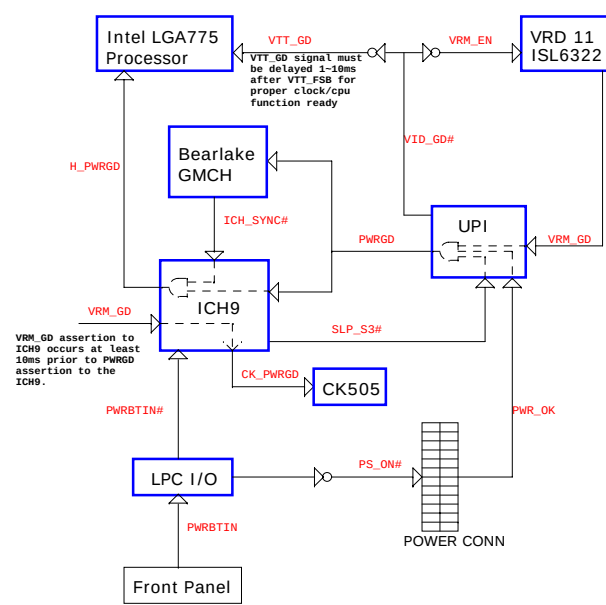


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RESET MAP



PWROK MAP



ICH8

GPIO	Alt Func	I/O/NC	Power	ToI	Default	Signal Name
GPIO[0]	BM_BUSY#	I/O	Core	3.3V	GPI	
GPIO[1]	TACH1	I/O	Core	3.3V	GPI	SYS1_FANTAC
GPIO[5:2]	PIRQ[H:E]#	I/OD	Core	5V	GPI	PIRQ#[H:E]
GPIO[7:6]	TACH[3:2]	I/O	Core	3.3V	GPI	SYS2/3_FANTAC
GPIO[8]	unmuxed	I/O	Resume	3.3V	GPI	
GPIO[9]	WOL_EN	I/O	Resume	3.3V	Native	
GPIO[10]	CLGPIO1	I/O	Resume	3.3V	GPI	
GPIO[11]	SMBALERT#	I/O	Resume	3.3V	Native	
GPIO[12]	unmuxed	I/O	Resume	3.3V	GP0	
GPIO[13]	unmuxed	I/O	Resume	3.3V	GPI	SIO_PME#
GPIO[14]	CLGPIO2	I/O	Resume	3.3V	GPI	
GPIO[15]	unmuxed	I/O	Resume	3.3V	Native	
GPIO[16]	unmuxed	I/O	Core	3.3V	GP0	
GPIO[17]	TACH0	I/O	Core	3.3V	GPI	CPU_FANTAC
GPIO[18]	unmuxed	I/O	Core	3.3V	GP0	
GPIO[19]	SATA1GP	I/O	Core	3.3V	GPI	
GPIO[20]	unmuxed	I/O	Core	3.3V	GP0	
GPIO[21]	SATA0GP	I/O	Core	3.3V	GPI	
GPIO[22]	SCLOCK	I/O	Core	3.3V	GPI	
GPIO[23]	LDRQ1#	I/O	Core	3.3V	Native	
GPIO[24]	CLGPIO0	I/O	Resume	3.3V	GP0	
GPIO[25]	STP_CPU#	I/O	Resume	3.3V	Native	
GPIO[26]	S4_STATE#	I/O	Resume	3.3V	Native	
GPIO[27]	QRT_STATE0	I/O	Resume	3.3V	GP0	
GPIO[28]	QRT_STATE1	I/O	Resume	3.3V	GP0	
GPIO[29]	OC5#	I/O	Resume	3.3V	Native	OC#4
GPIO[30]	OC6#	I/O	Resume	3.3V	Native	OC#6
GPIO[31]	OC7#	I/O	Resume	3.3V	Native	OC#6
GPIO[32]	unmuxed	I/O	Core	3.3V	GP0	SPI_WP#
GPIO[33]	unmuxed	I/O	Core	3.3V	GP0	SPI_HOLD_GP0#
GPIO[34]	unmuxed	I/O	Core	3.3V	GP0	
GPIO[35]	SATACLKREQ#	I/O	Core	3.3V	GP0	
GPIO[36]	SATA2GP	I/O	Core	3.3V	GPI	
GPIO[37]	SATA3GP	I/O	Core	3.3V	GPI	
GPIO[38]	SLOAD	I/O	Core	3.3V	GPI	
GPIO[39]	SDATAOUT0	I/O	Core	3.3V	GPI	
GPIO[43:40]	OC[4:1]#	I/O	Resume	3.3V	Native	OC#0;OC#4
GPIO[47:44]	OC[11:8]#	I/O	Resume	3.3V	Native	OC#8;OC#10
GPIO[48]	SDATAOUT1	I/O	Core	3.3V	GPI	
GPIO[49]	unmuxed	I/O	Core	3.3V	GP0	
GPIO[50]	REQ1#	I/O	Core	5V	Native	PREQ1#
GPIO[51]	GNT1#	I/O	Core	3.3V	Native	PGNT1#
GPIO[52]	REQ2#	I/O	Core	5V	Native	PREQ2#
GPIO[53]	GNT2#	I/O	Core	3.3V	Native	PGNT2#
GPIO[54]	REQ3#	I/O	Core	5V	Native	PREQ3#
GPIO[55]	GNT3#	I/O	Core	3.3V	Native	PGNT3#
GPIO[56]	GLAN_DOCK#	I/O	Resume	3.3V	GPI	
GPIO[57]	CLGPIO5	I/O	Resume	3.3V	GPI	
GPIO[58]	SPI_CS1#	I/O	Resume	3.3V	GPI	SPI_CS1#
GPIO[59]	OC#0	I/O	Resume	3.3V	Native	OC#0
GPIO[60]	LINKALERT#	I/O	Resume	3.3V	Native	

JUMPER SETTING

JBAT1	(1-2)NORMAL	(2-3)CLEAR
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SIO(F71882)

PIN NAME	USAGE	Input/Output	NOTES
GPIO[2:0]	MCH_BSEL2:0]	OUTPUT	PROGRAMED BSEL[2:0] OUTPUT
GPIO3	PCIEX1#	OUTPUT	PROGRAMED X1/X4 OPTION OUTPUT
GPIO4	UNUSED		
GPIO5	UNUSED		
GPIO6	UNUSED		
GPIO7	WDT#	OUTPUT	WATCH DOG TIMER RESET OUTPUT
GPIO10	DLED1	OUTPUT	DEBUG LED OUTPUT 1
GPIO11	UNUSED		
GPIO12	UNUSED		
GPIO13	BEEP	OUTPUT	
GPIO14	UNUSED		
GPIO15	DLED2	OUTPUT	DEBUG LED OUTPUT 2
GPIO16	DLED3	OUTPUT	DEBUG LED OUTPUT 3
GPIO17	UNUSED		
GPIO20	PLTRST_BU#1	OUTPUT	PCI RESTE BUFFER1
GPIO21	PLTRST_BU#2	OUTPUT	PCI RESTE BUFFER2
GPIO22	PLTRST_BU#3	OUTPUT	PCI RESTE BUFFER3
GPIO23	UNUSED		
GPIO24	PWR_OK	INPUT	ATX POWER OK INPUT
GPIO26	PWRBTIN	INPUT	FRONT PANNEL POWER BUTTON
GPIO27	PWRBTN#	OUTPUT	POWER BUTTON BUFFER OUT
GPIO30	SLP_S3#	INPUT	FRONT SOUTBRIDGE S3#
GPIO31	PSON#	OUTPUT	OUTPUT FOR ATX POWER ON
GPIO32	DLED4	OUTPUT	DEBUG LED OUTPUT 4
GPIO33	UNUSED		
GPIO40	SYS2_FANTAC	INPUT	
GPIO41	UNUSED		
GPIO42	IRTX	OUTPUT	
GPIO43	IRRX	INPUT	
VIDIN[2:0]	CPU_BSEL[2:0]	INPUT	CPU BSEL[2:0] INPUT
VIDIN3	UNUSED	INPUT	RESERVED FOR PCIE X4 INDICATION

DDR-III DIMM Config.

DEVICE	ADDRESS	CLOCK
DIMM 1	00	P/N_DDR0_A P/N_DDR2_A
DIMM 2	01	P/N_DDR3_A P/N_DDR5_A
DIMM 3	10	P/N_DDR0_B P/N_DDR2_B
DIMM 4	11	P/N_DDR3_B P/N_DDR4_B

PCI Config.

DEVICE	MCP1 INT Pin	REQ# /GNT#	IDSEL	CLOCK
PCI Slot 1	PIRQ#A PIRQ#B PIRQ#C PIRQ#D	PREQ#0 PGNT#0	AD16	CK_P_33M_S1
PCI Slot 2	PIRQ#B PIRQ#C PIRQ#D PIRQ#A	PREQ#1 PGNT#1	AD17	CK_P_33M_S2
1394	PIRQ#D	PREQ#2 PGNT#2	AD18	CK_P_33M_1394



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- HW Ver.0A Change to Ver.0B List:
- 1.Remove Q54 and R374and short Q54 B,C pin for power sequence.(page26)
 - 2.U24 power change from VCC3 to 3VSB for power sequence.(page26)
 - 3.Change EC42 from 470u to 820u for V_FSB_VTT power noise.(page26)
 - 4.Change EC52 from 470u to 820u for SB1_05 power noise.(page26)
 - 5.Change EC53 from 470u to 820u for SB1_5 power noise.(page26)
 - 5.CPU_GTLREF resistor value R119 , R115, R128, R104 change from 50ohm to 100ohm for pull-up(intel suggestion)(page4)
 - 6.CPU_GTLREF resistor value R124 , R117 , R141 , R105 change from 100ohm to 200ohm for pull-down.(intel suggestion)(page4)
 - 7.MCH_GTLREF resistor value R190 change from 50ohm to 100ohm for pull-pu.(intel suggestion)(page6)
 - 8.MCH_GTLREF resistor value R195 change from 100ohm to 200ohm for pull-down.(intel suggestion)(page6)
 - 9.SRCOMP[3:0] R223 , R227 , R184 , R182 change from 20ohm to 19.1ohm.(intel suggestion)(page7)
 - 10.DDR2 termination RN16 , RN26 , RN11 , RN14 , RN27 , RN12 , R171 change from 39ohm to 43ohm.(intel suggestion)(page14)
 - 11.Add CK_DOT96_MCH_DP pull-high 1.25V and CK_DOT96_MCH_DN pull-down for non-graphic SKU.(intel suggestion)(page6)
 - 12.RIRQ[H:A] pull-up 2.7Kohm to VCC5.(intel suggestion)(page22)
 - 13.USB have two group [5:0] EHCI#1,[6:11EHCI#2 , please one group to real and one group to front.(intel suggestion)(page24)
 - 14.Audio VREFOUT_E and VREFOUT_F swap.(for schematic error)(page20)
 - 15.Audio BASS and CEN_OUT swap.(for schematic error)(page20)



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