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Abel / Totoro MS-7040 *Rev. 120*

Intel (R) Springdale (GMCH) + ICH5 Chipset
Intel Northwood & Prescott mPGA478B Processor

CPU:

Intel Northwood/Prescott - 3.0G & Above

System Chipset:

Intel Springdale - GMCH (North Bridge)
Intel ICH5 (South Bridge)

On Board Chipset:

BIOS -- FWH EEPROM 4M
AC'97 Codec -- STAC9752T
LPC Super I/O -- W83627THF
LAN - Intel 82562EZ (10/100)
1394 -- NEC PD72874
CLOCK -- Cypress CY28405

Main Memory:

DDR * 4 (Max 4GB)

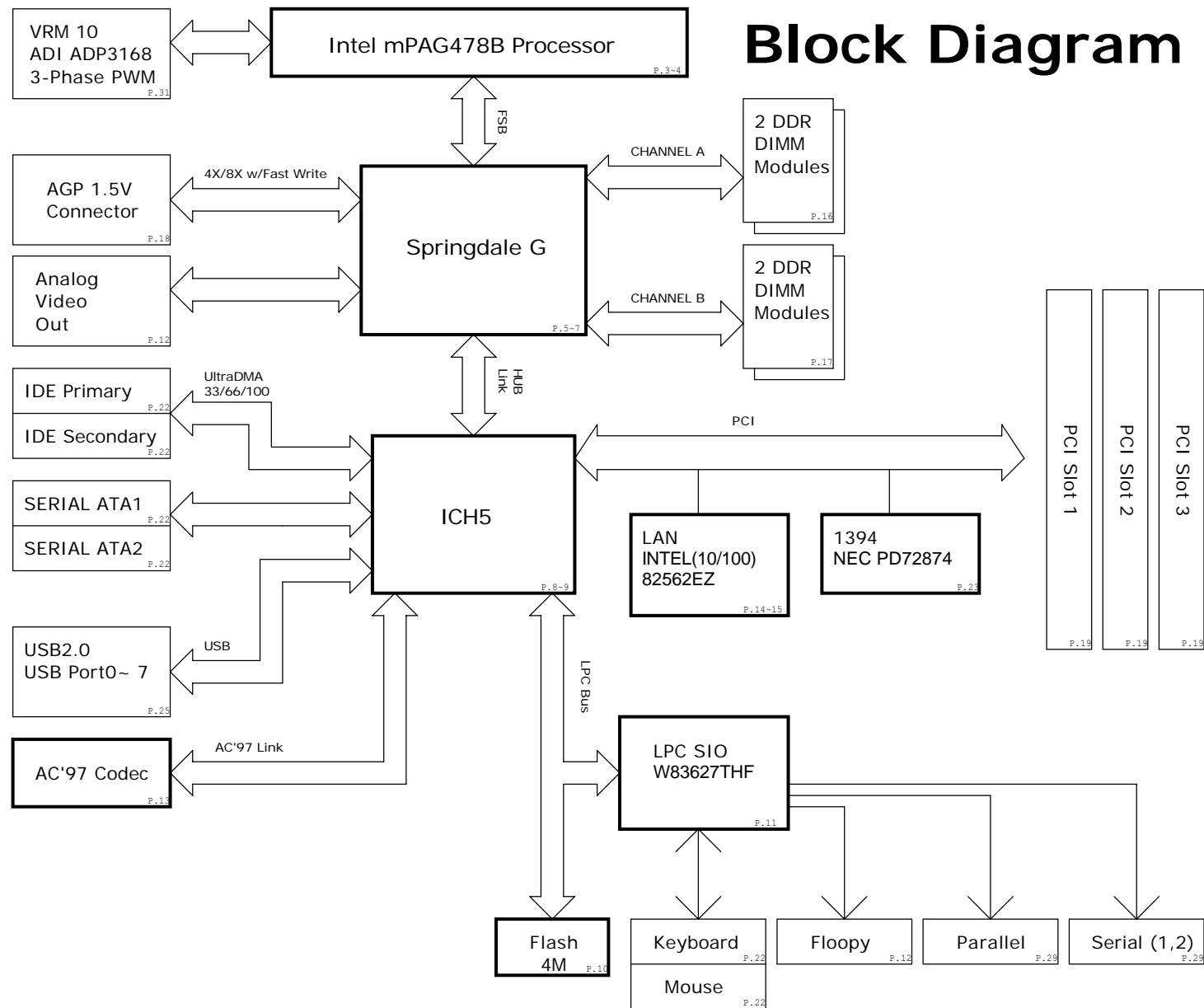
Expansion Slots:

PCI2.3 SLOT * 3
AGP4X/8X SLOT * 1

ADI PWM:

Controller: ADP3168
Driver: ADP3418 * 3

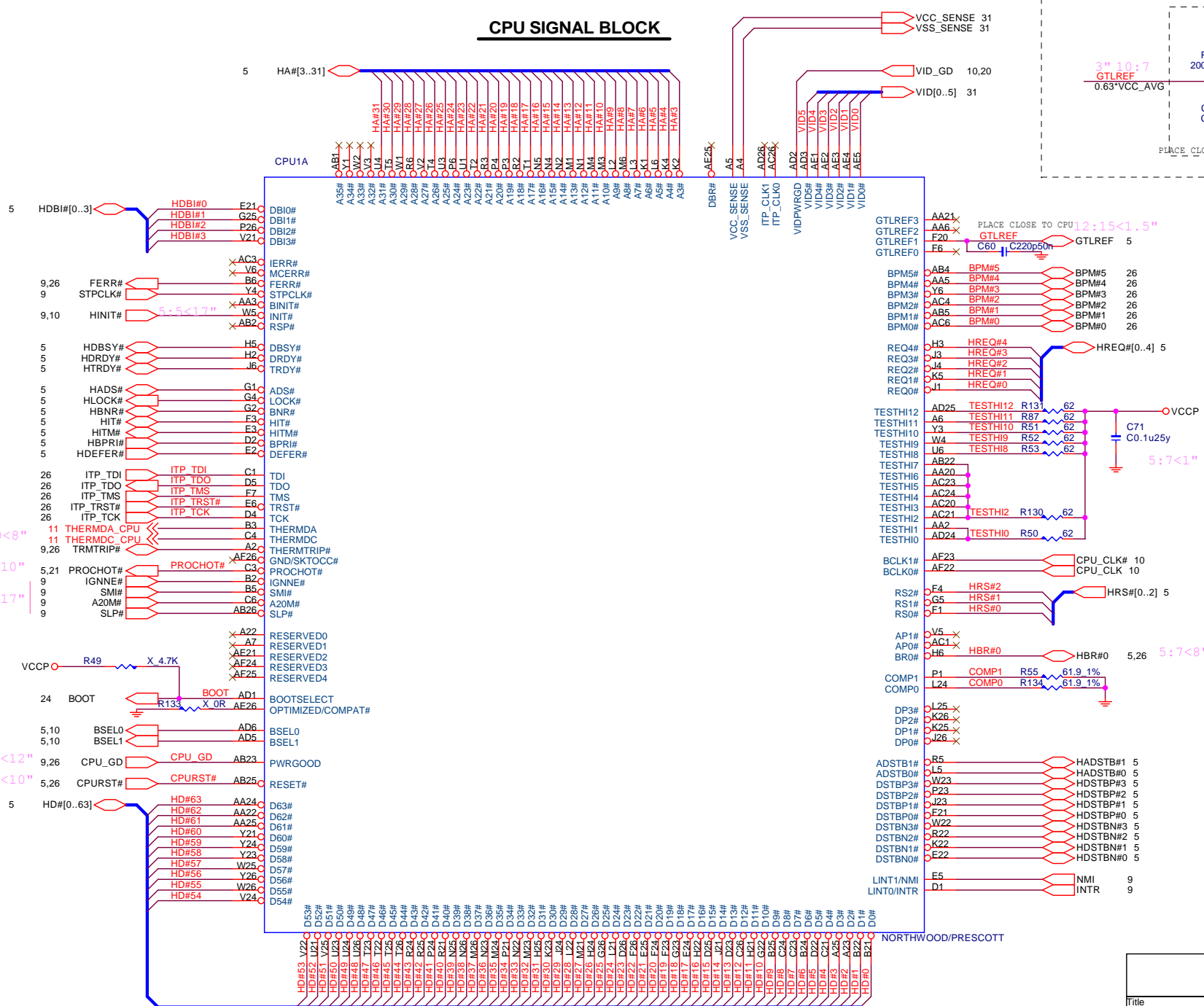
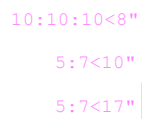
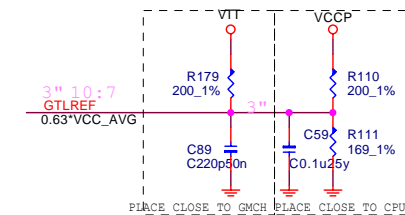
SAMSUNG ELECTRONICS			
Title COVER SHEET			
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SAMSUNG ELECTRONICS

Title			BLOCK DIAGRAM
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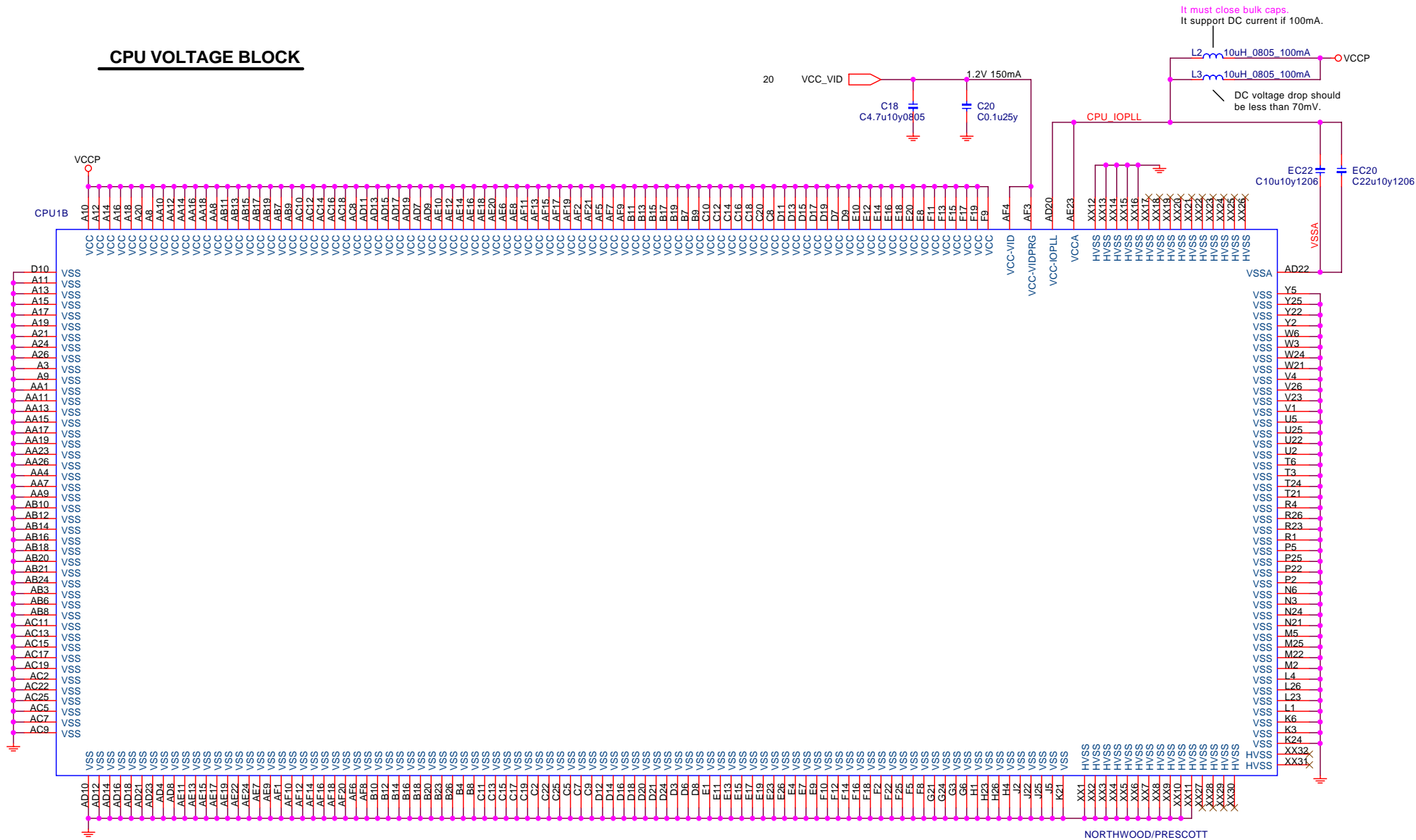
CPU GTL REFERENCE VOLTAGE BLOCK



SAMSUNG ELECTRONICS

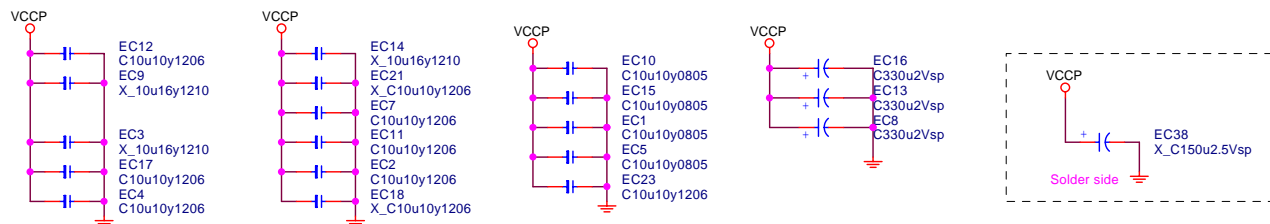
Title			
Intel mPGA478B - Signals			
Size	Document Number		Rev
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CPU VOLTAGE BLOCK

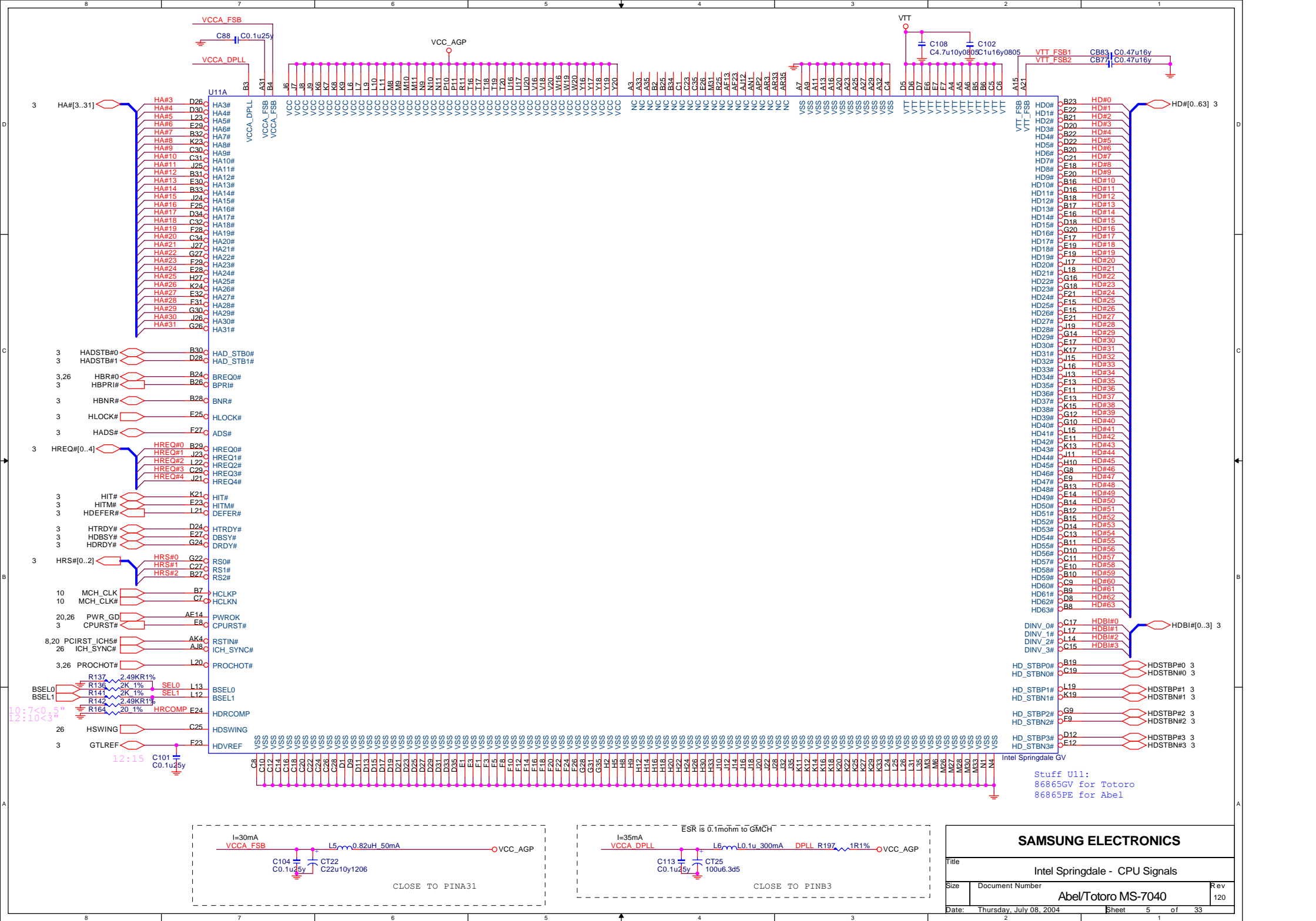


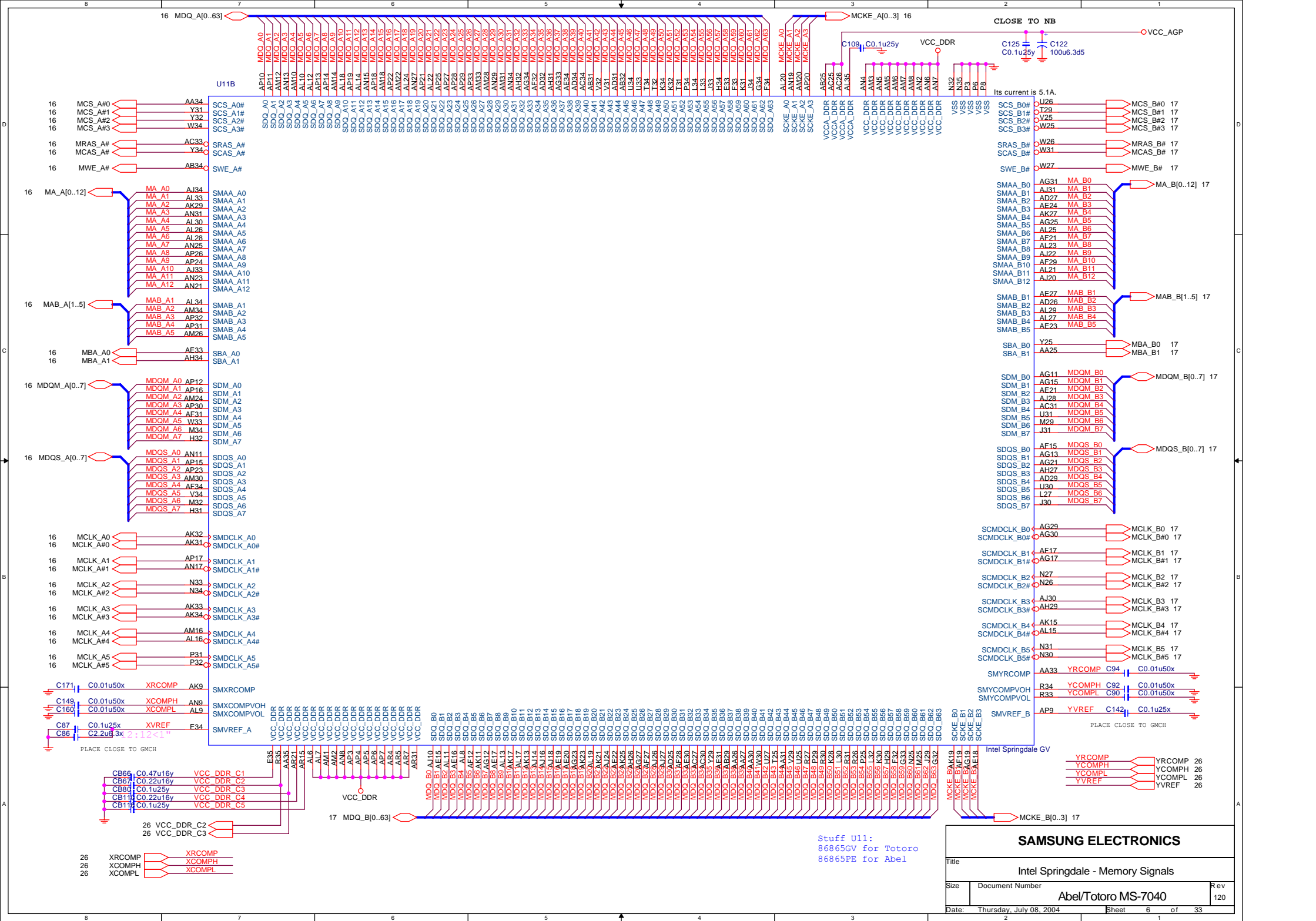
It must close bulk caps.
It support DC current if 100mA.
DC voltage drop should be less than 70mV.

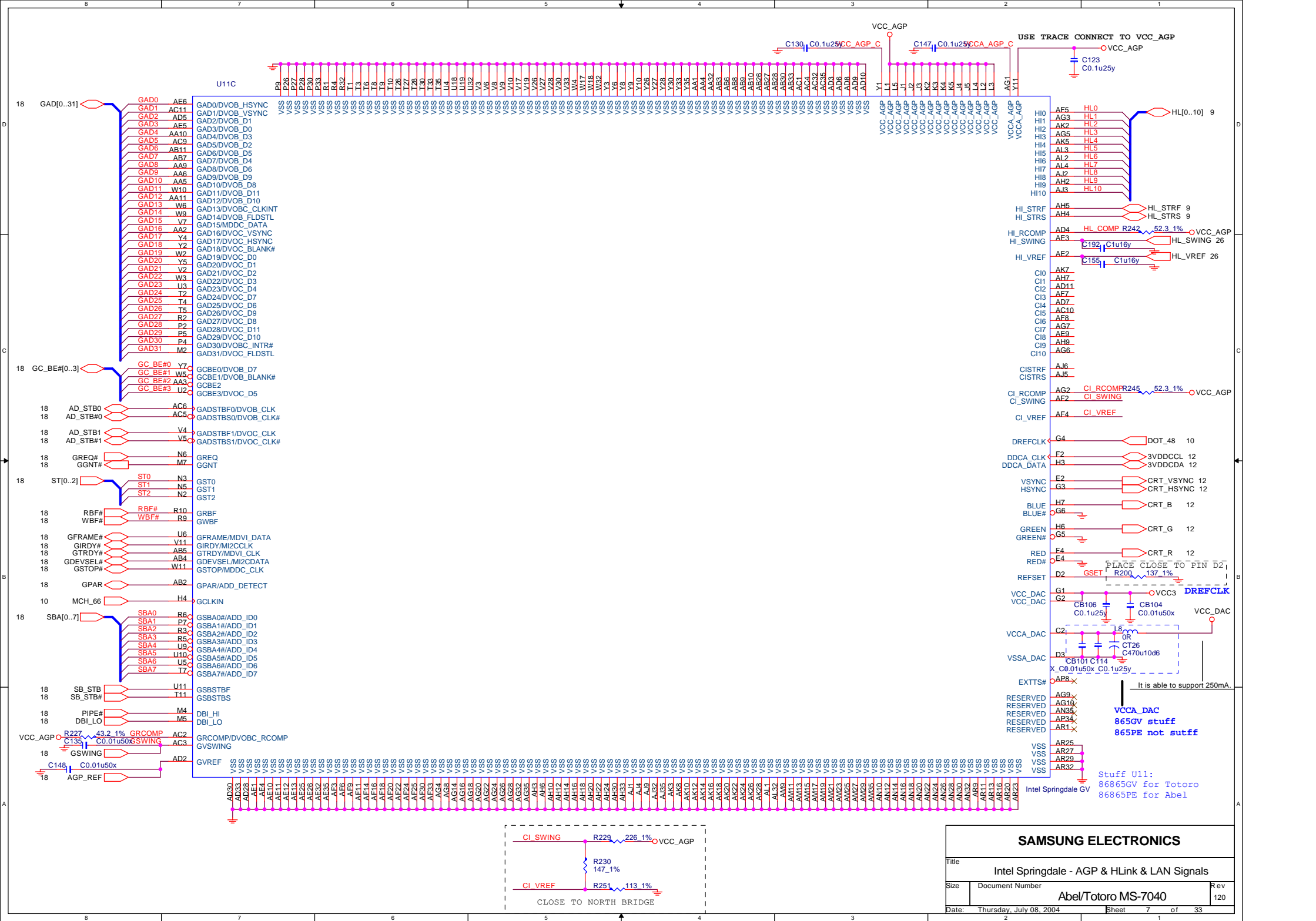
CPU DECOUPLING CAPACITORS

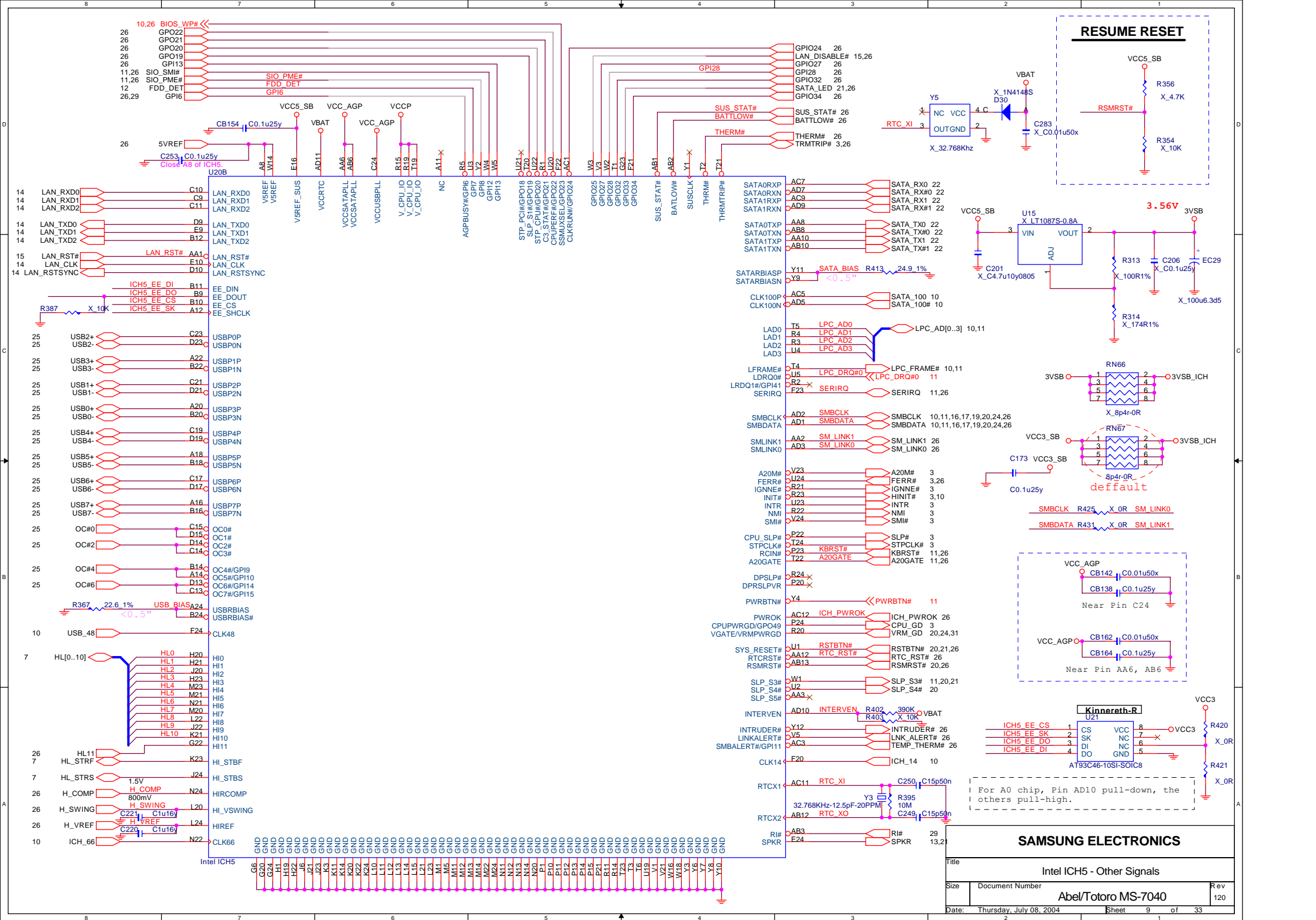


SAMSUNG ELECTRONICS		
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Intel mPGA478B - Power		
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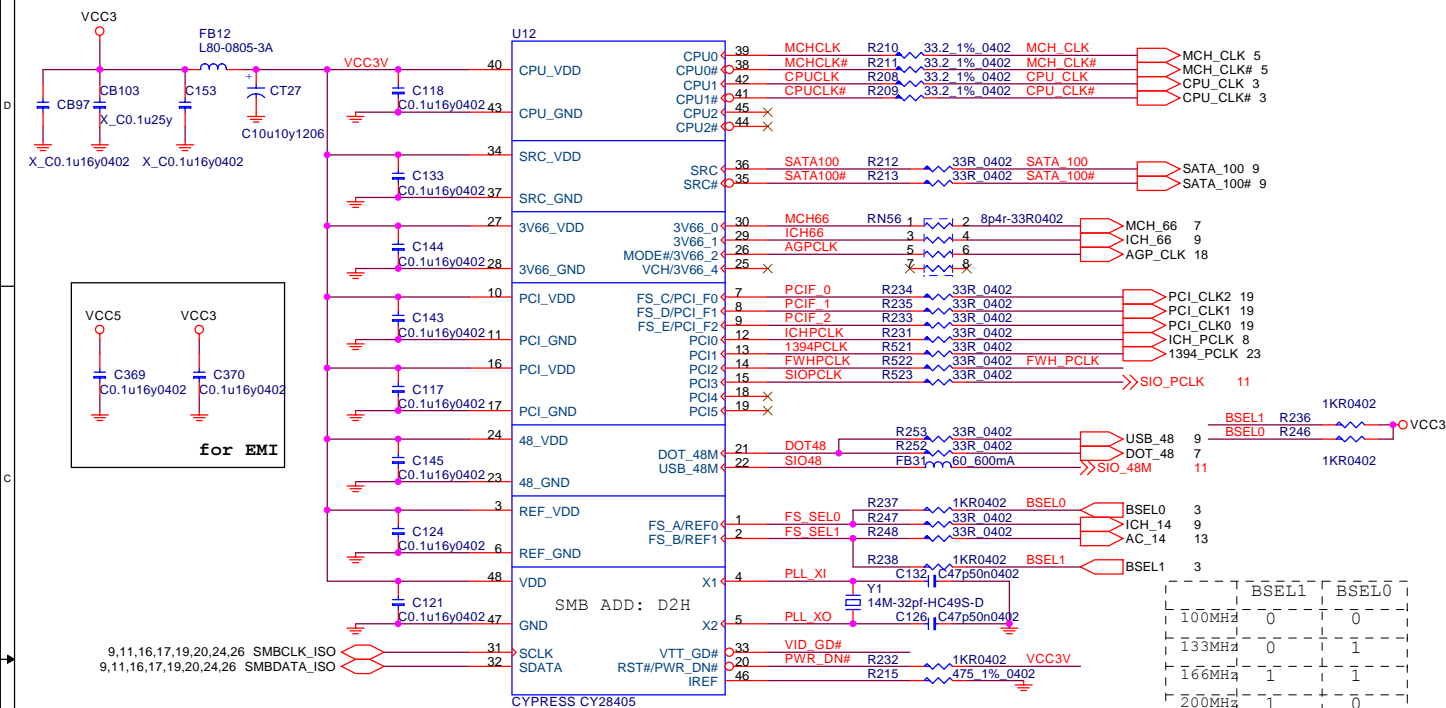




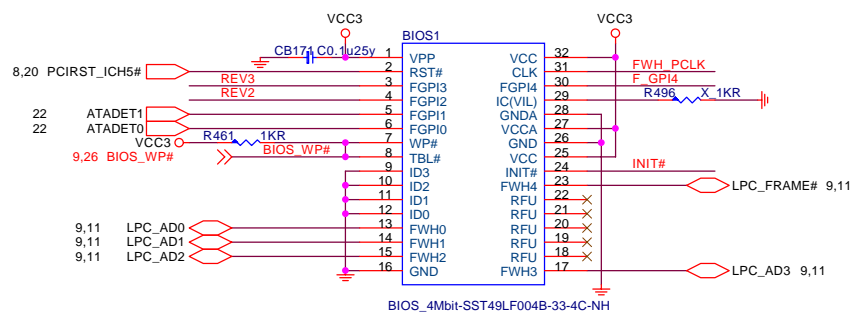




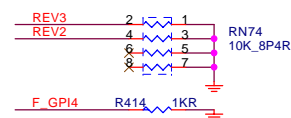
CLOCK GENERATOR



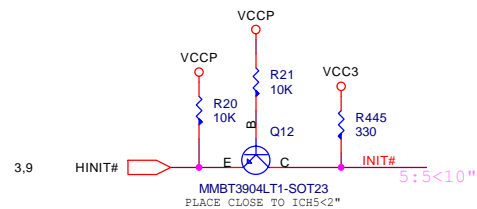
FIRMWARE HUB (FWH)



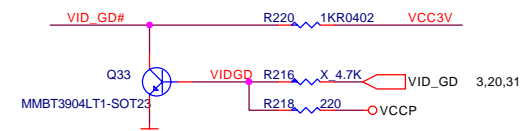
FWH RESISTORS



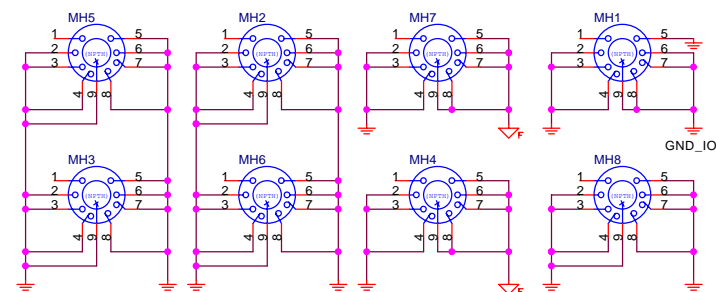
FWH INIT Signal Voltage Translation



CLOCK GENERATOR VTT POWER DOWN BLOCK



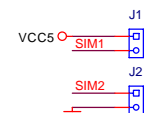
Mounting Holes



Optics Orientation Holes



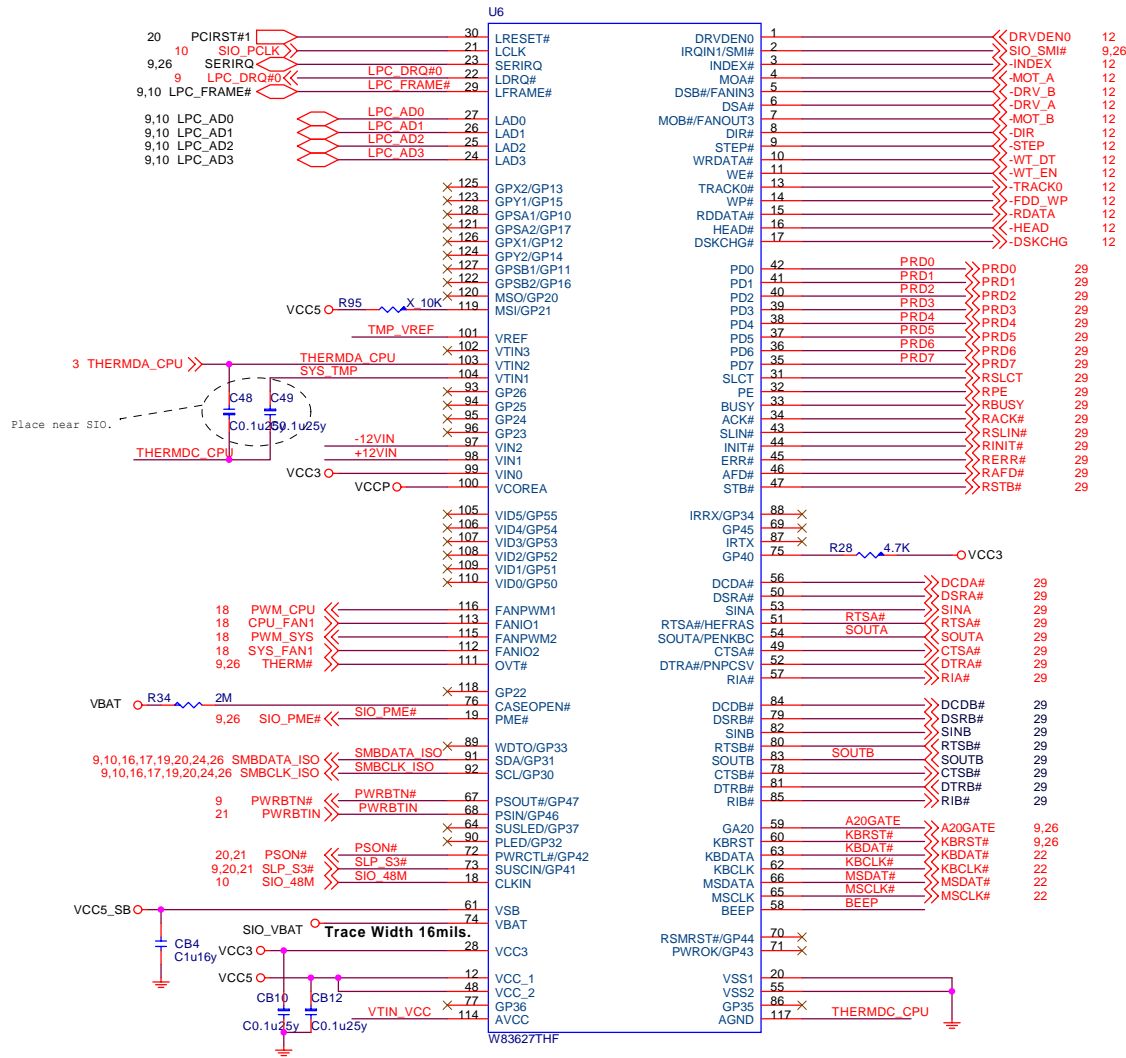
Simulation



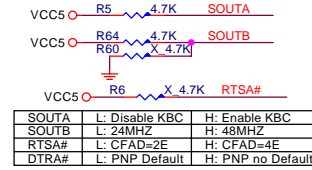
SAMSUNG ELECTRONICS

Title				CY28405 & FWH			
Size	Document Number						Rev
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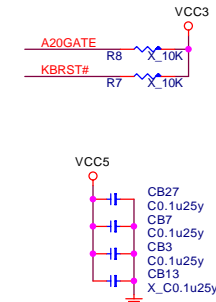
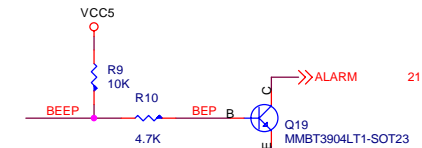
LPC SUPER I/O W83627HF



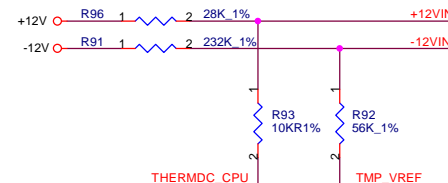
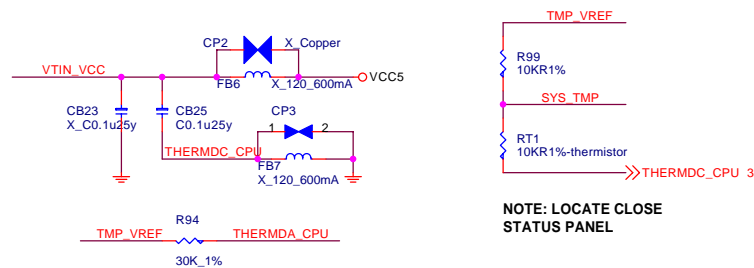
SUPER I/O STRAPPING RESISTOR



SPEAKER BLOCK



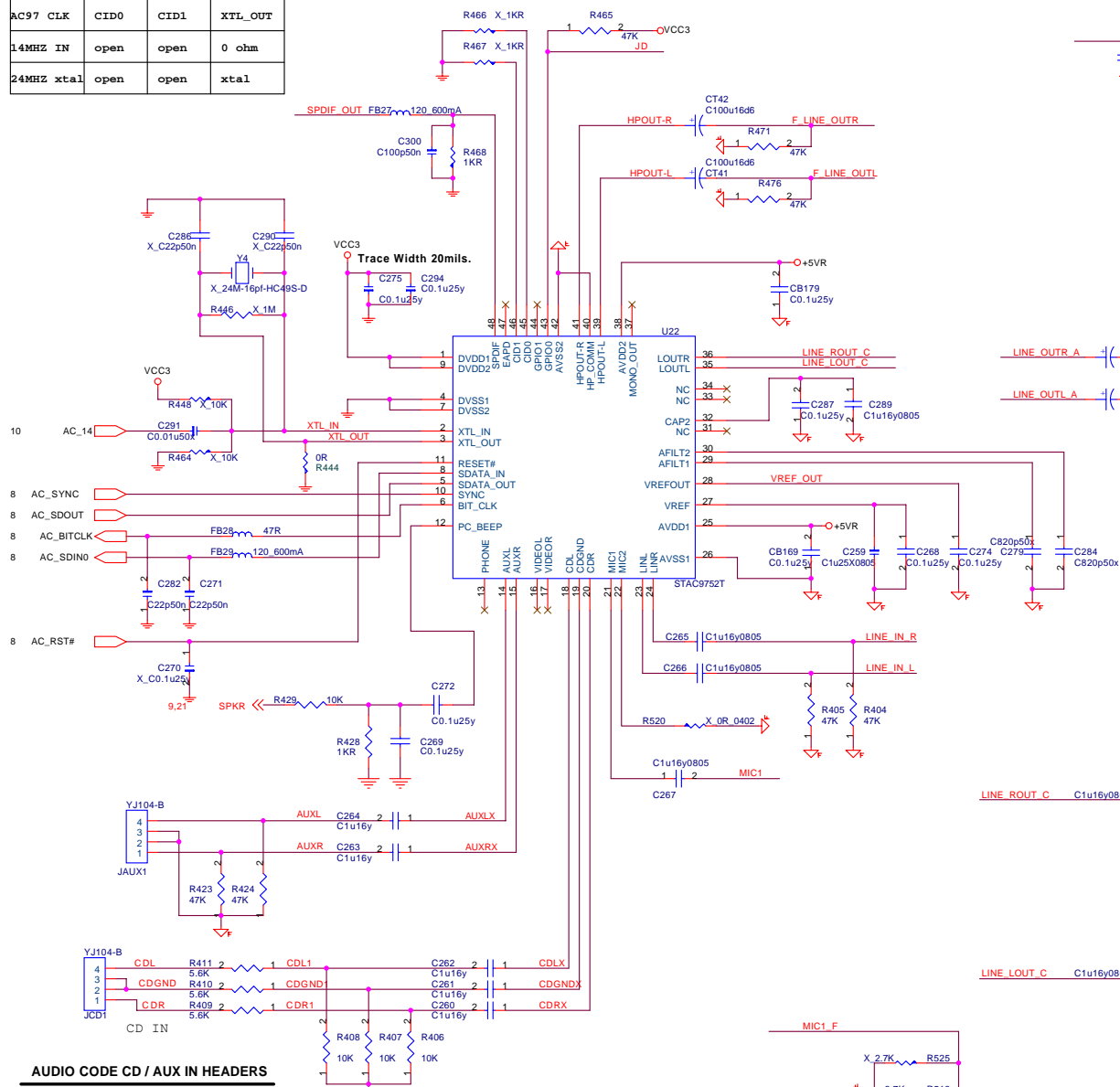
THERMAL RESISTOR BLOCK



SAMSUNG ELECTRONICS

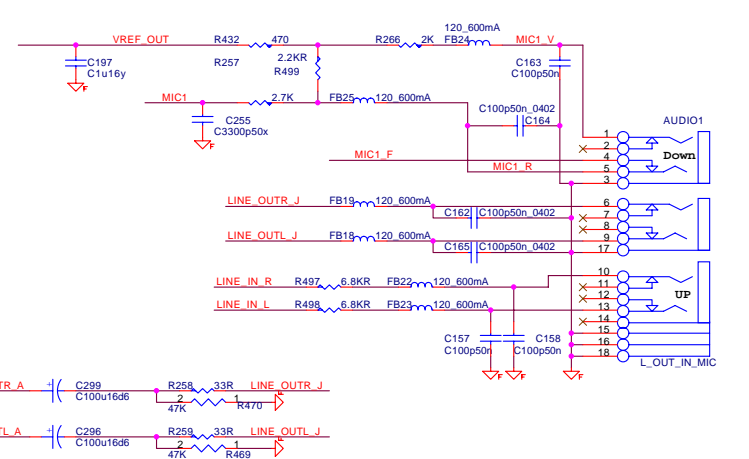
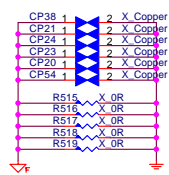
Title			LPC SUPER I/O
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AC97 CLK	CID0	CID1	XTL_OUT
14MHZ IN	open	open	0 ohm
24MHZ xtal	open	open	xtal

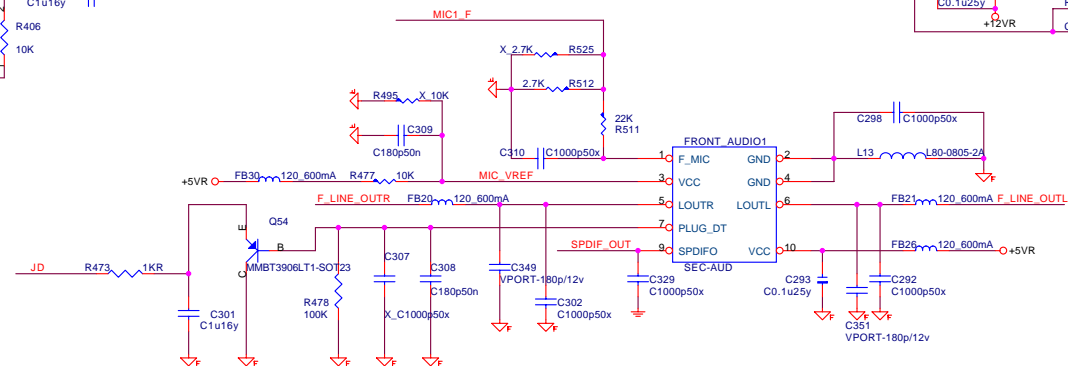
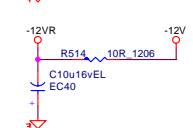
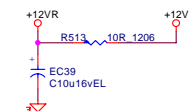
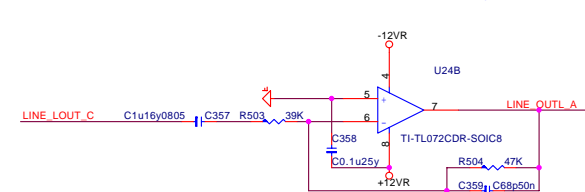
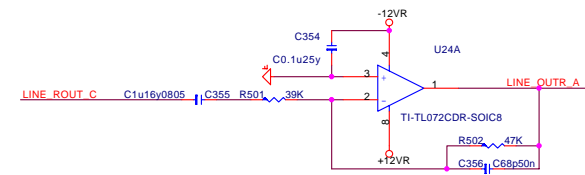
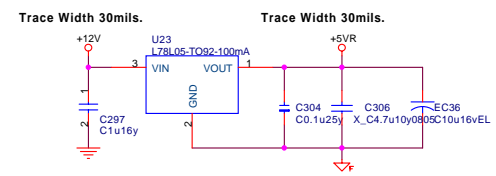


AUDIO CODE CD / AUX IN HEADERS

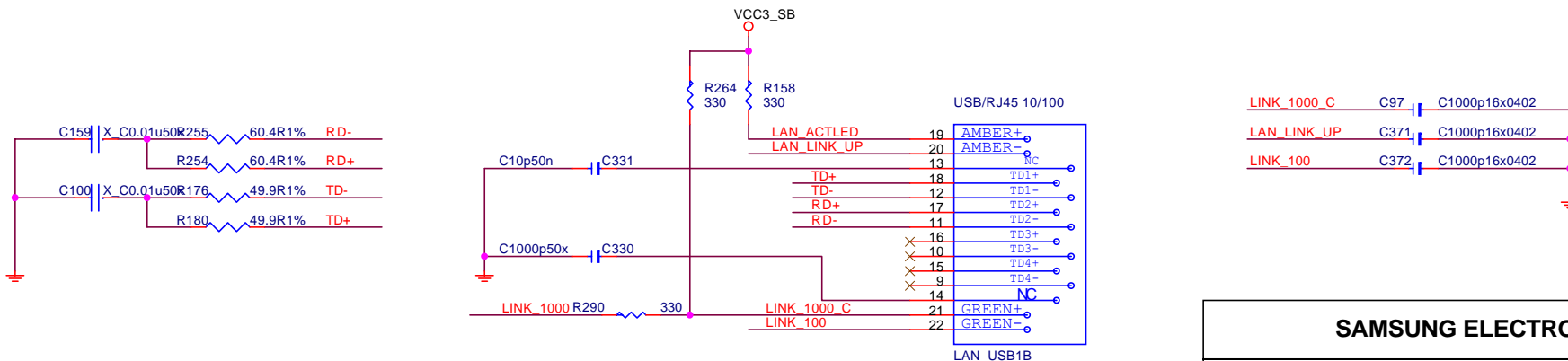
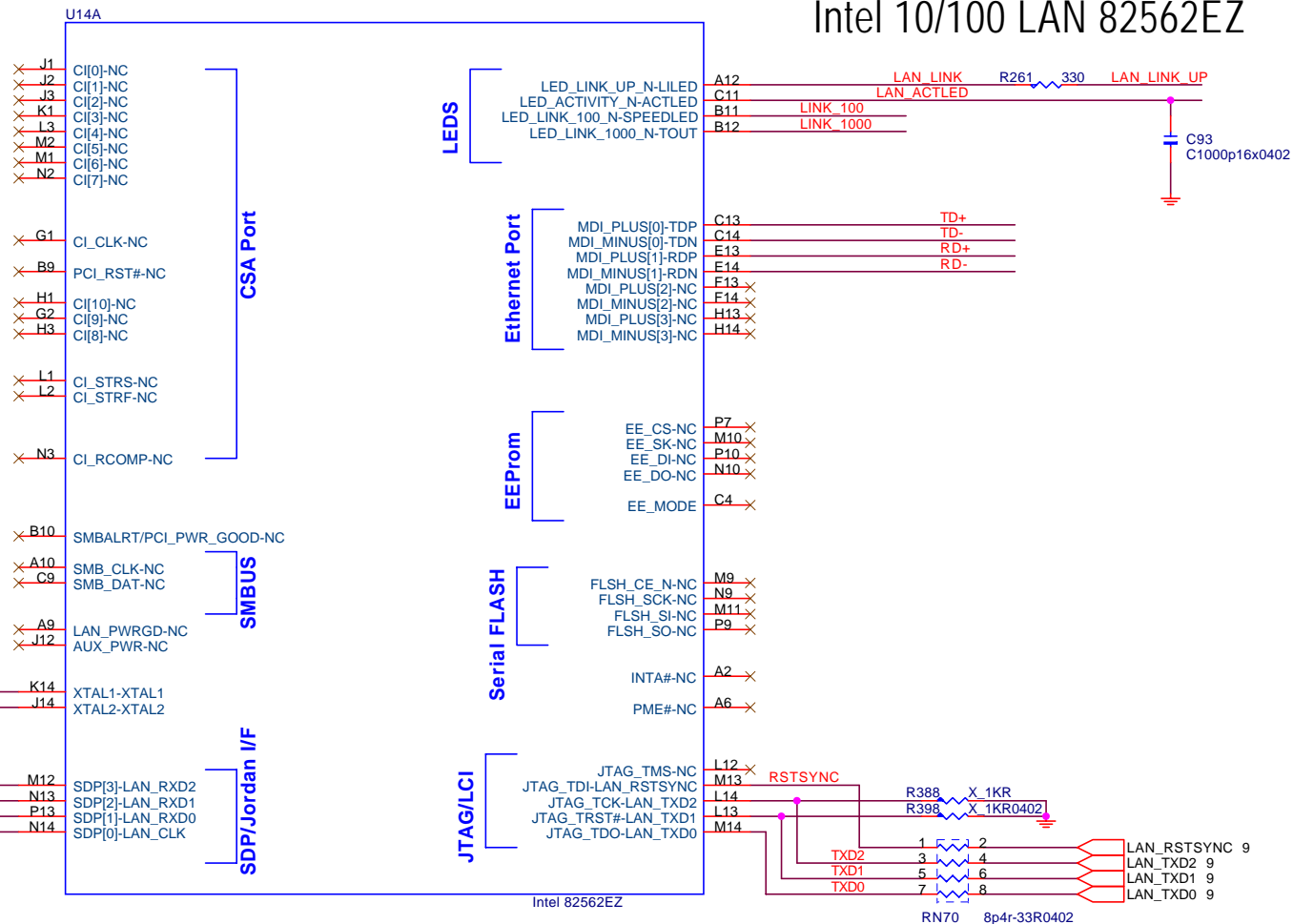
EMI Parts



AUDIO CODE REGULATORS

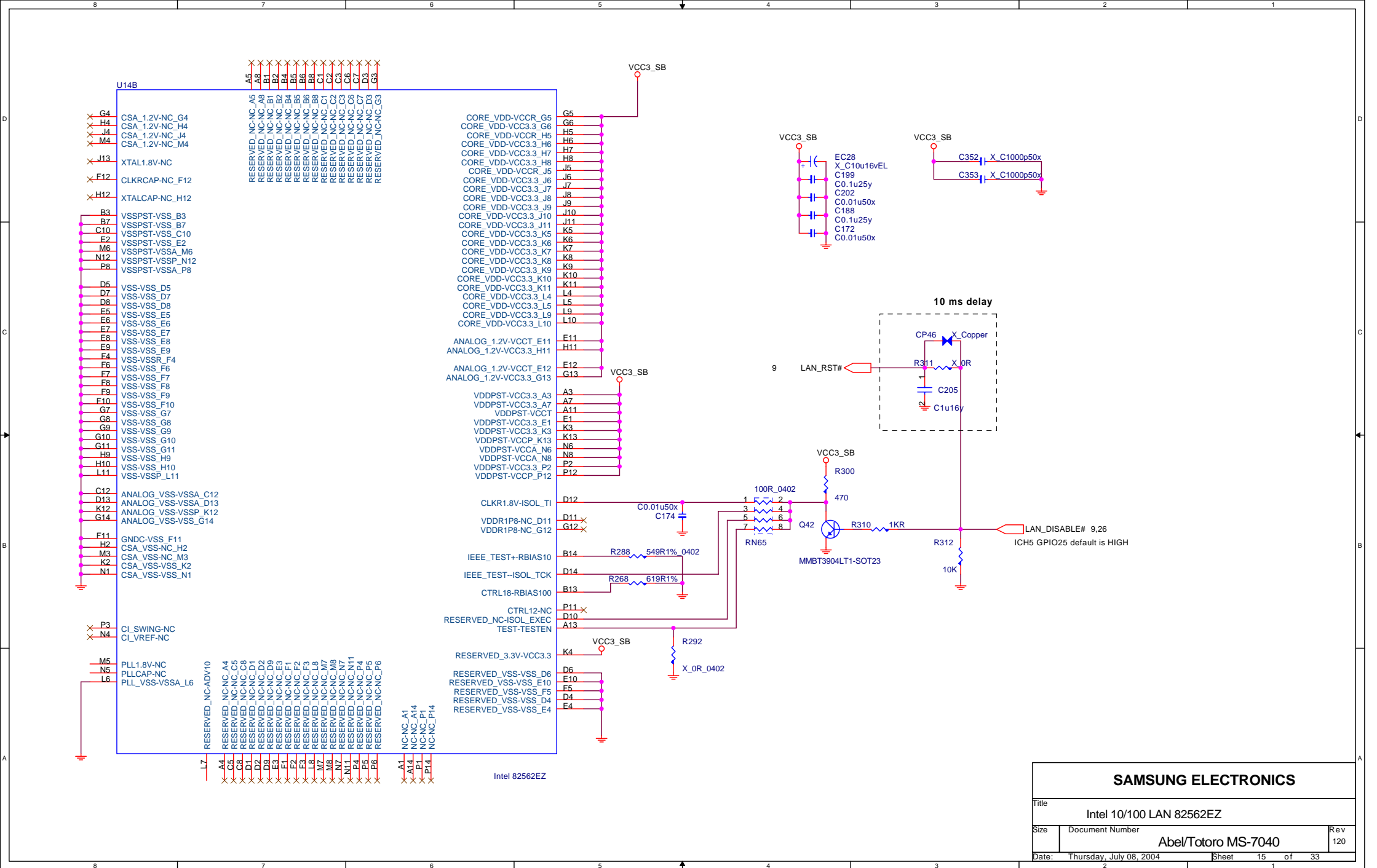


Intel 10/100 LAN 82562EZ

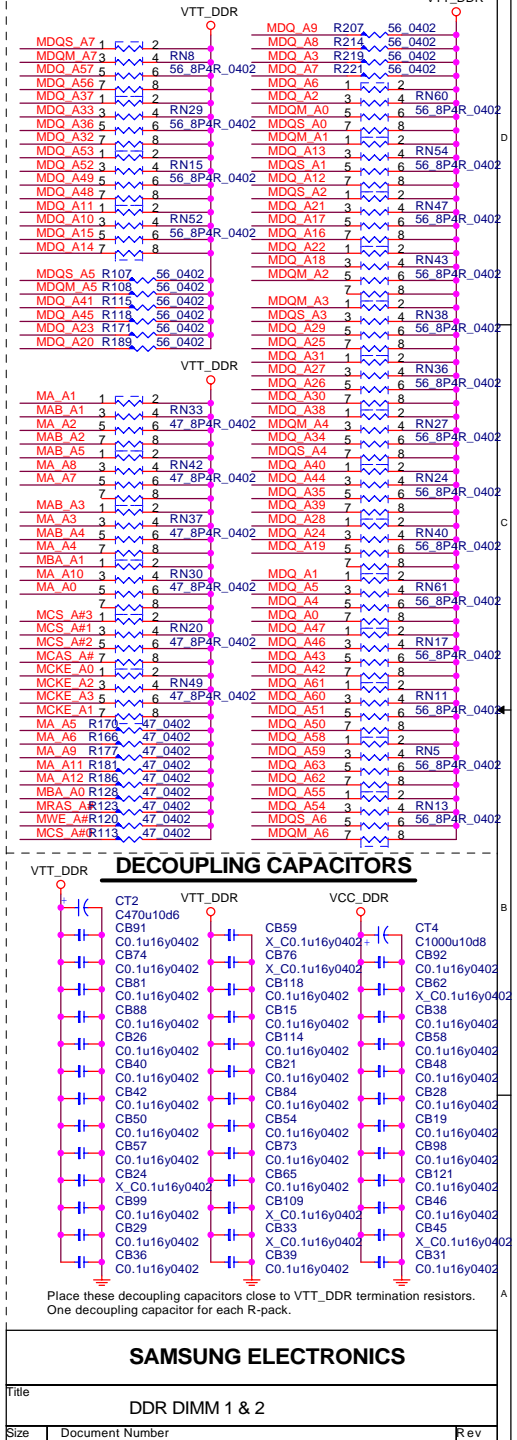


SAMSUNG ELECTRONICS

Title			Intel 10/100 LAN 82562EZ		
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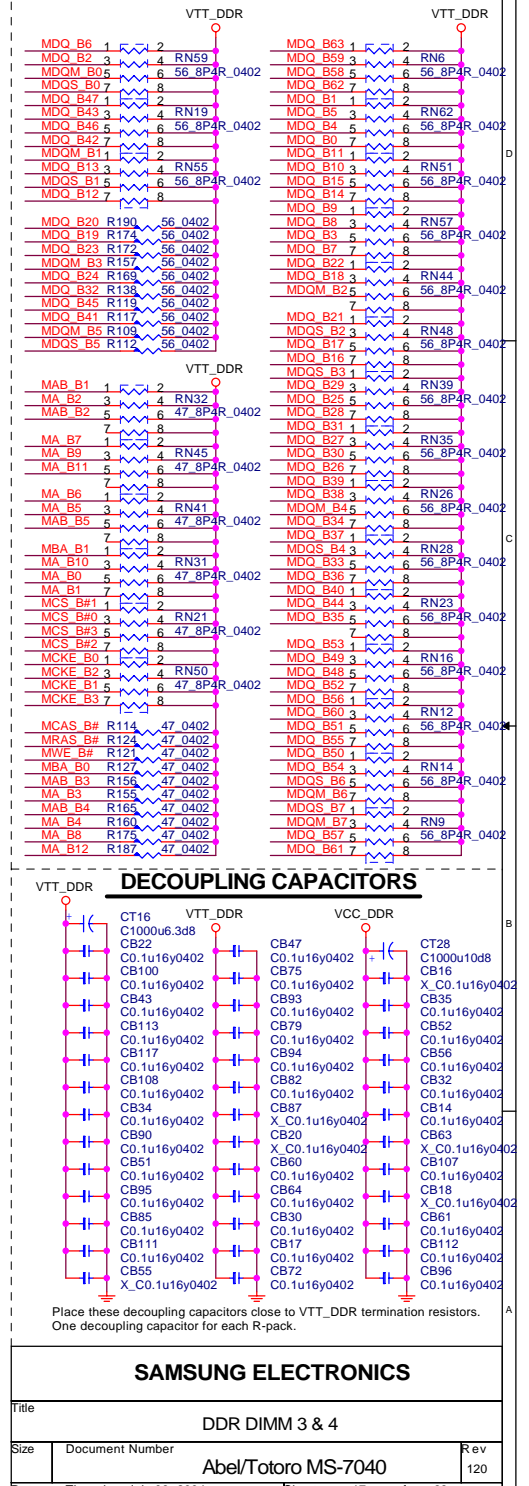
DDR Terminational Resisitors



ADDR.=1010001B(A2H)

Title			
DDR DIMM 1 & 2			
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DDR Terminational Resisitors

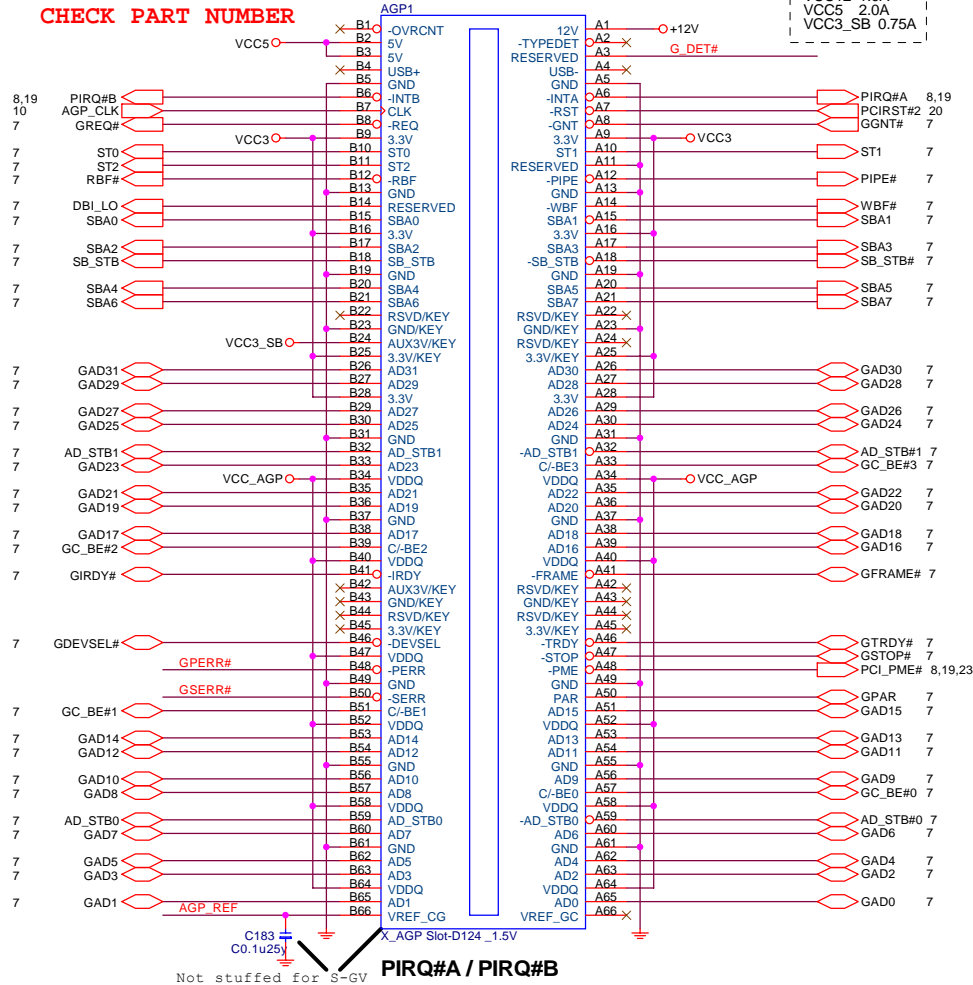


AGP 1.5V 1X/2X/4X/8X SLOT(AGP VER:3.0)

VCC5 = 60mils trace / 15 mils space

AGP Slot Imax
VCCq 8.0A
VCC3 6.0A
VCC12 1.0A
VCC5 2.0A
VCC3_SB 0.75A

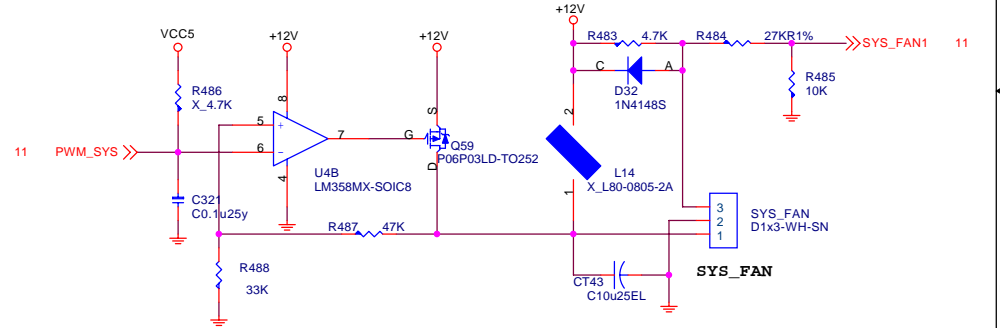
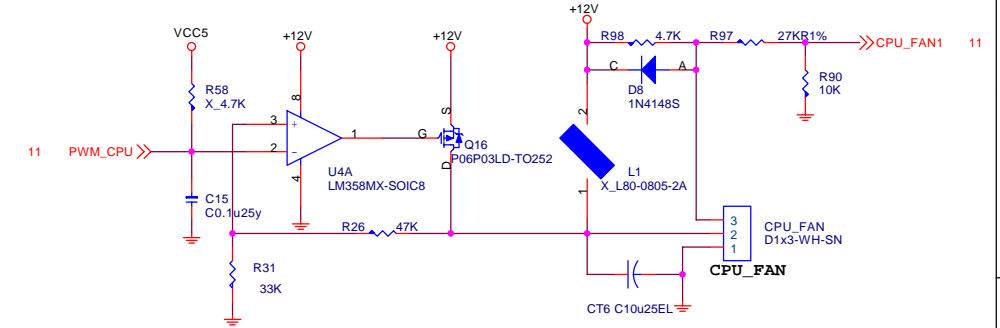
CHECK PART NUMBER



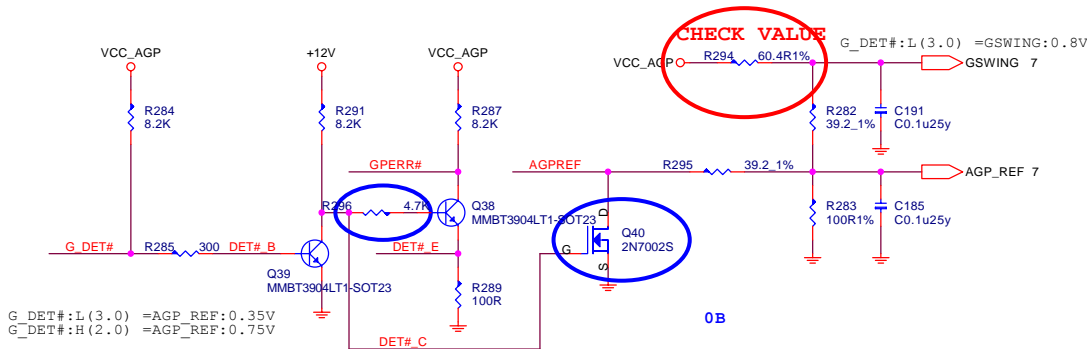
Not stuffed for S-GV

PIRQ#A / PIRQ#B

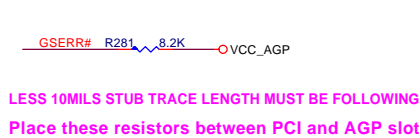
CPU FAN



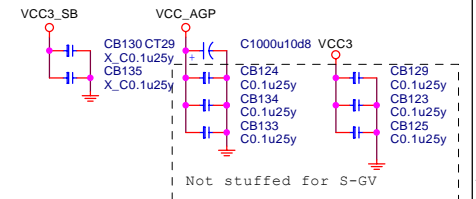
Springdale Reference & Swing Voltage Circuit



AGP TERMINATION RESISTORS



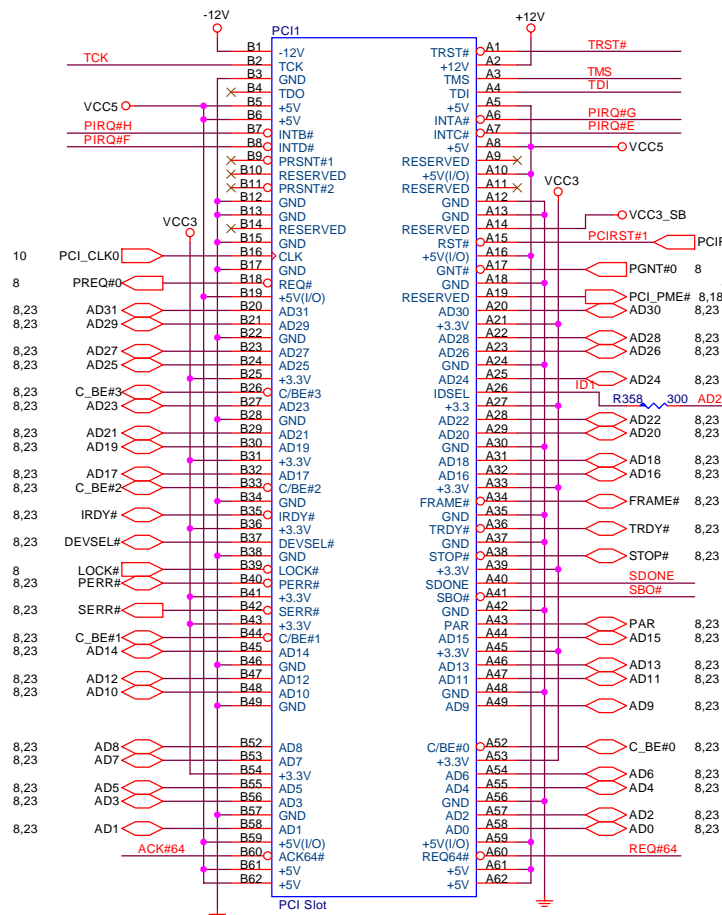
AGP SLOT DECOUPLING CAPACITORS



SAMSUNG ELECTRONICS

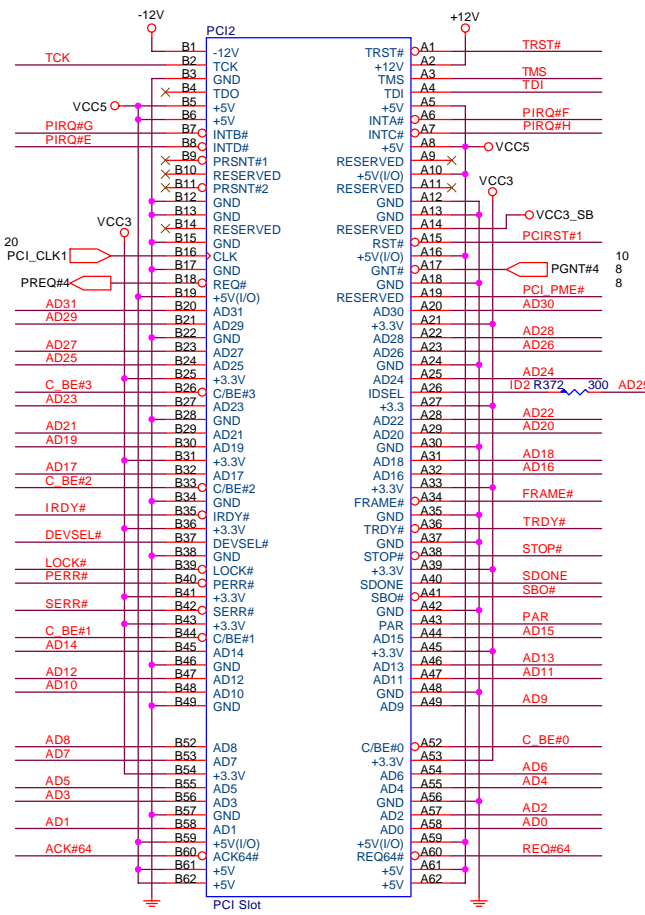
Title			AGP 1.5V SLOT & FAN CONNECTOR		
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PCI SLOT 1 (PCI VER: 2.2 COMPLY)



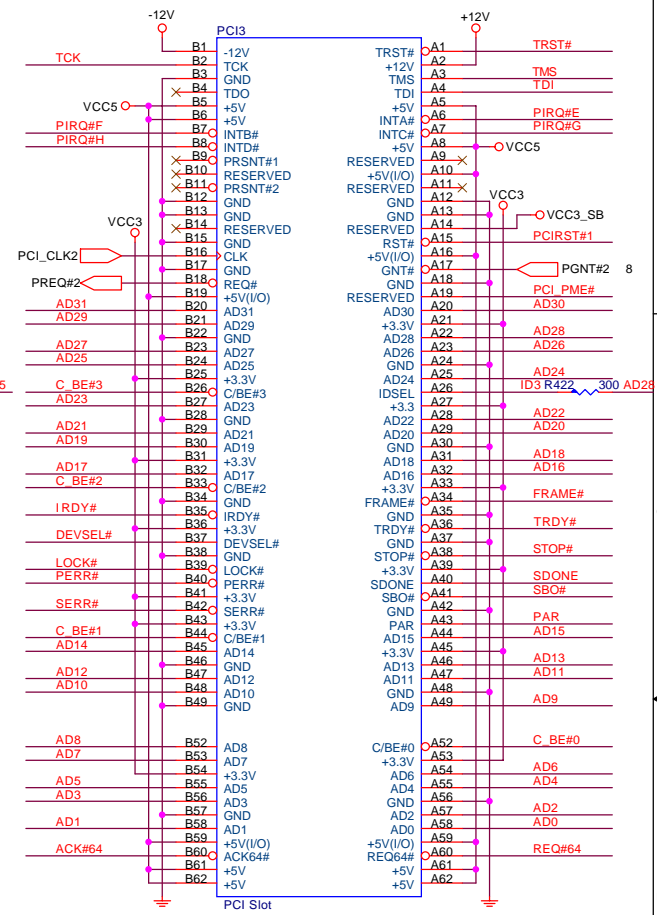
IDSEL = AD26
MASTER = PREQ#0
PIRQ#G

PCI SLOT 2 (PCI VER: 2.2 COMPLY)



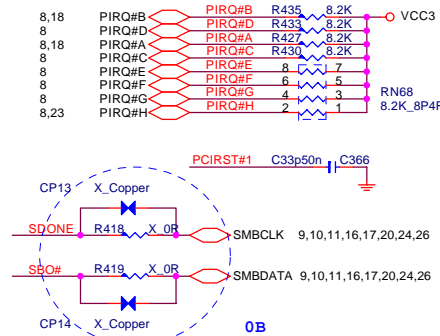
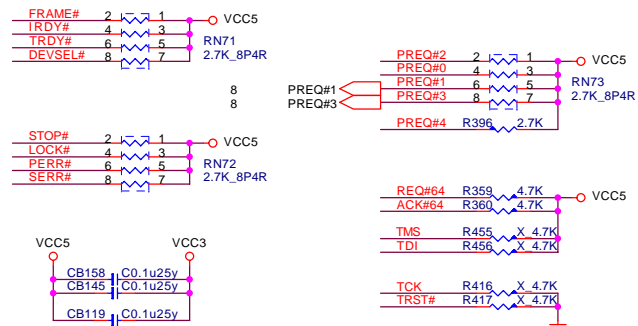
IDSEL = AD25
MASTER = PREQ#4
PIRQ#F

PCI SLOT 3 (PCI VER: 2.2 COMPLY)

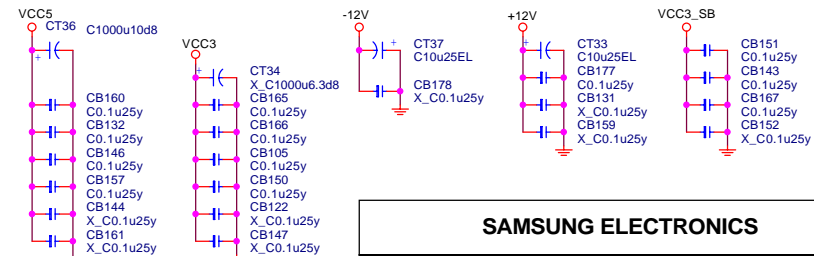


IDSEL = AD28
MASTER = PREQ#2
PIRQ#E

PCI PULL-UP / DOWN RESISTORS



PCI SLOT DECOUPLING CAPACITORS



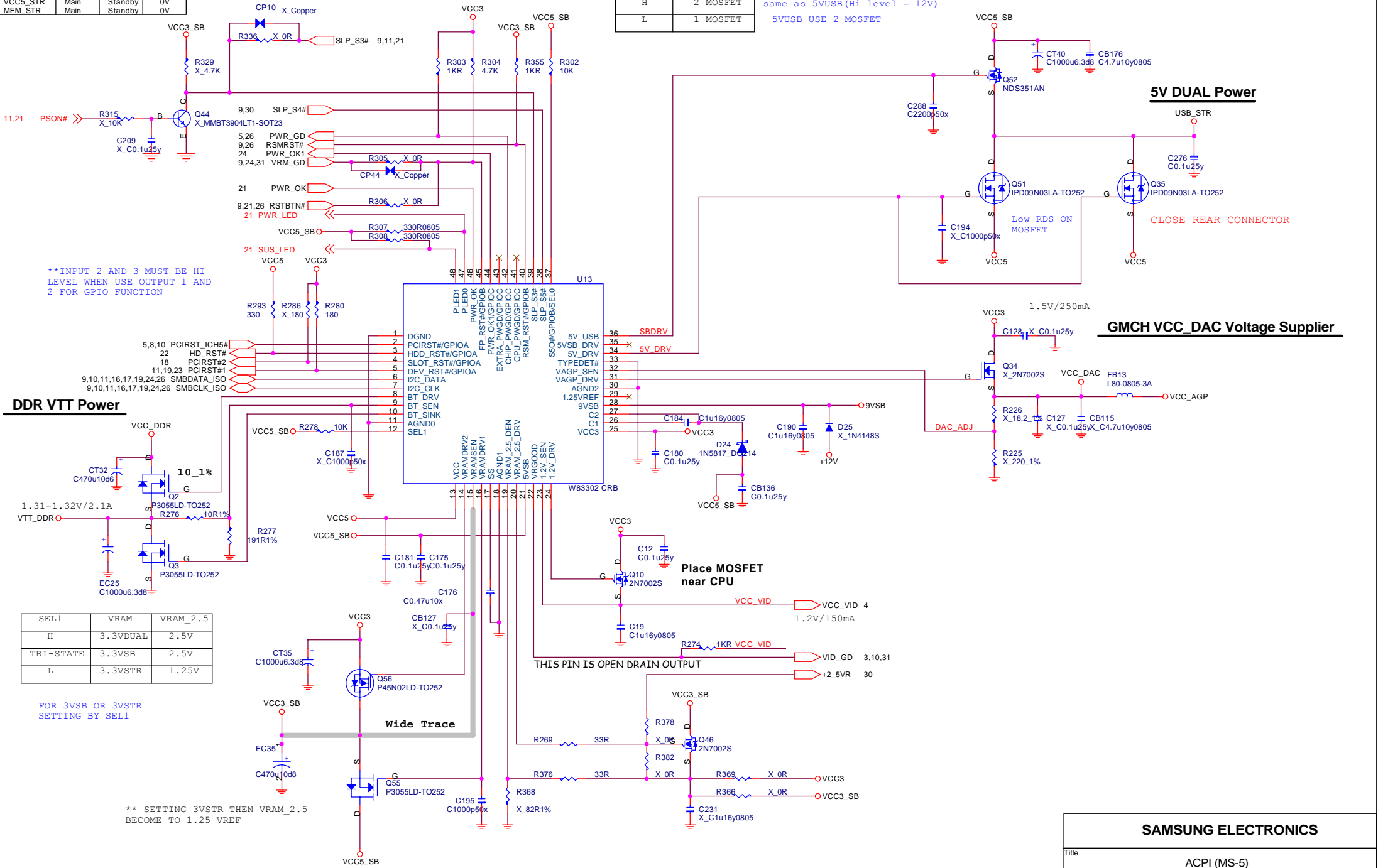
SAMSUNG ELECTRONICS

Title			PCI 1 & 2 & 3 Slots	
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SEL0	5VUSB
H	2 MOSFET
L	1 MOSFET

```
**S50# pin function(Hi level = 5V)
same as 5VUSB(Hi level = 12V)

5VUSB USE 2 MOSFET
```



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
```

SAMSUNG ELECTRONICS			
Title ACPI (MS-5)			
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11,20 PSON#

VCC5_SB

R122 1KR

CB8 C0.1u25y

R116 X 47K

Q21

X_MMBT3904LT1-SOT23

9,11,20 SLP_S3#

Default not mount

-5V

CB53 C0.1u25y

VCC5

CB49 C0.1u25y

VCC3

-12V

CB44 C0.1u25y

C64 X C1000p50x

ATX1

1 3.3V

2 3.3V

3 GND

4 5V

5 GND

6 5V

7 GND

8 -5V

9 5V

10 12V

11 3.3V

12 -12V

13 GND

14 GND

15 GND

16 GND

17 GND

18 -5V

19 5V

20 12V

CB37 X_C0.1u25y

CB41 C0.1u25y

CB69 X_C0.1u25y

CB68 C0.1u25y

CB70 C0.1u25y

CB71 C0.1u25y

VCC3

VCC5

VCC5_SB

+12V

R126 1KR

C68 C1000p50x

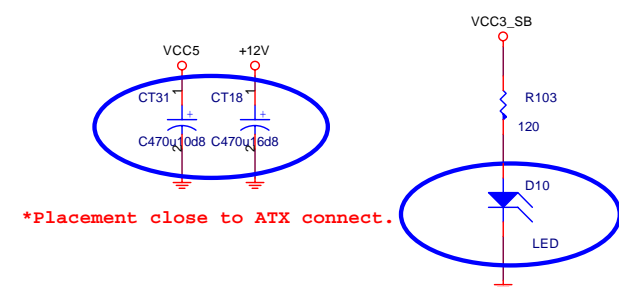
PWR_OK

FOR EMI

CB11 X_C0.1u25y

CB89 X_C0.1u25y

VCC5



Samsung Front Panel

VCC3 ○ R524 X 330R0805

VCC5 ○ R380 330R0805

20 PWR_LED <<

20 SUS_LED <<

R381 100R

VCC5 ○

FRONT_LED1

1 HDD+ 2 HDDLED

3 PLED 4 GND

5 SLED 6 PBTN

7 GND 8 RESET

9 VCC

D2x5-1:1-BK

CB153

C0.1u25v

9,20,26

VCC5_SB

R371 10K

PWRBTIN

PBTN R379 330

R375 10K

Q48 MMBT3904LT1-SOT23

C232 C1u16y

C233 C0.1u25y

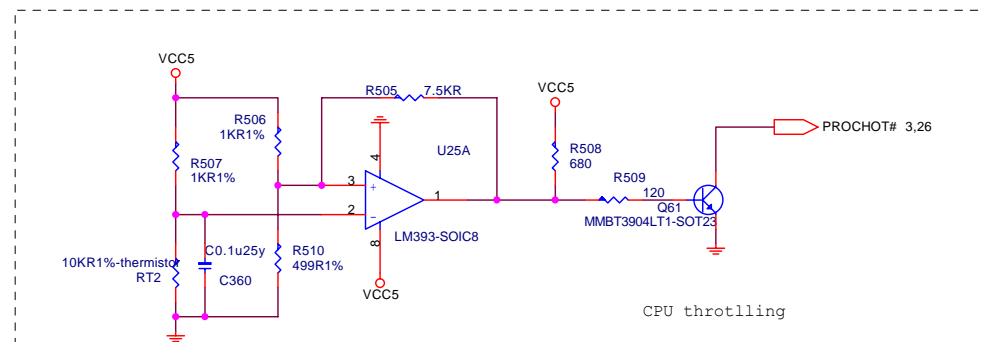
11

SERIAL ATA LED

2.2K R106 VCC3

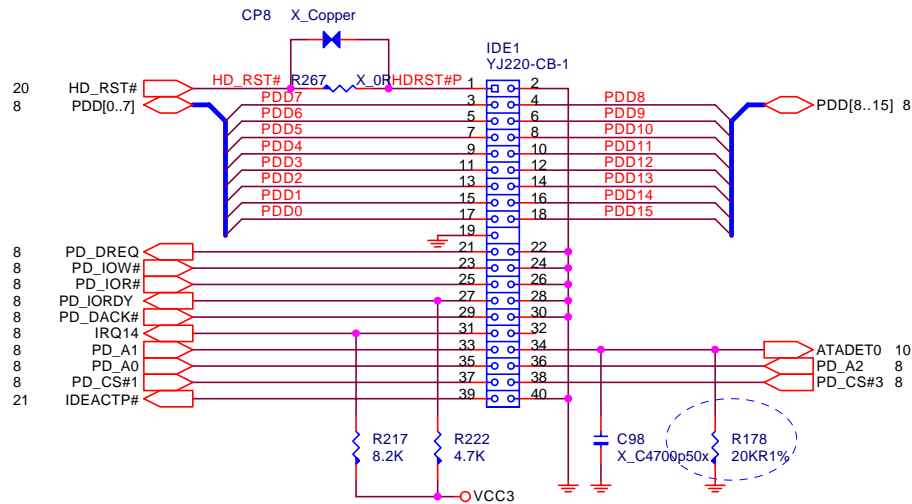
D36 1N4148

SATA LED 9.26

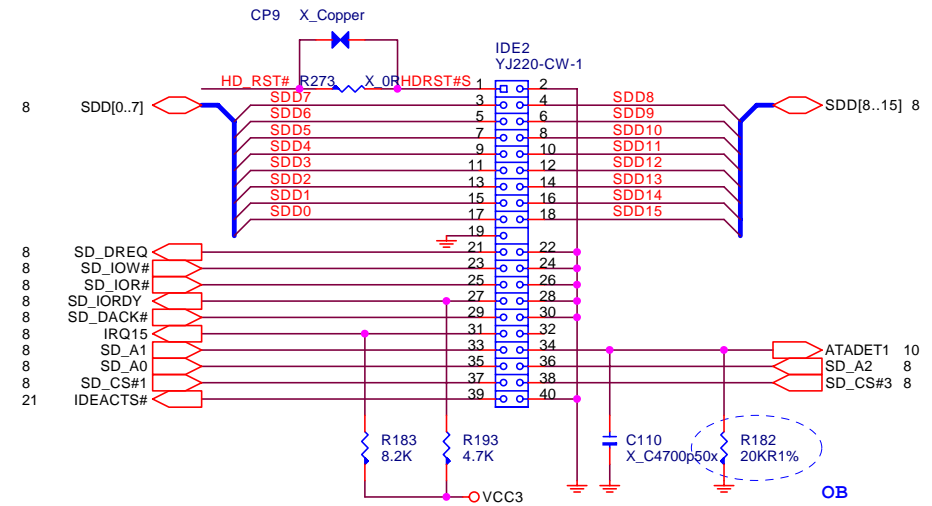


Title			
ATX Connector & Front Panel & Buzzer			
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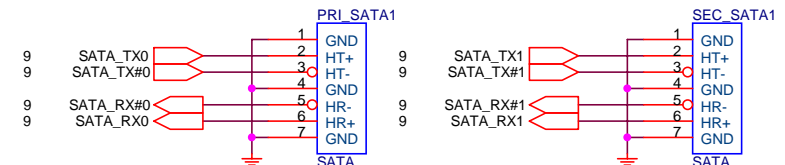
PRIMARY IDE BLOCK



SECONDARY IDE BLOCK

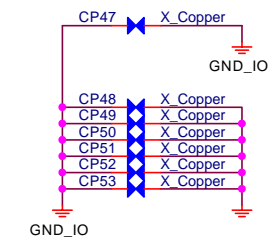
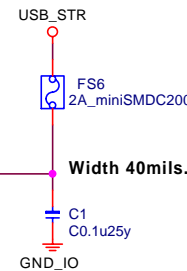
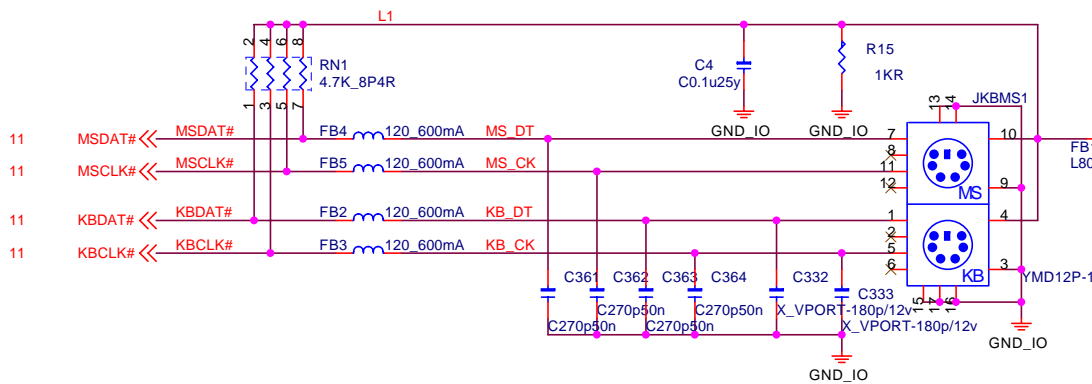


SERIAL ATA CONNECTOR BLOCK



20:5:7:5:20<5"

PS2 KEYBOARD & MOUSE CONNECTOR

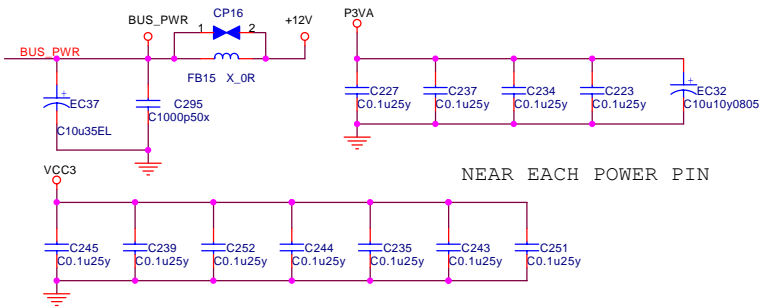


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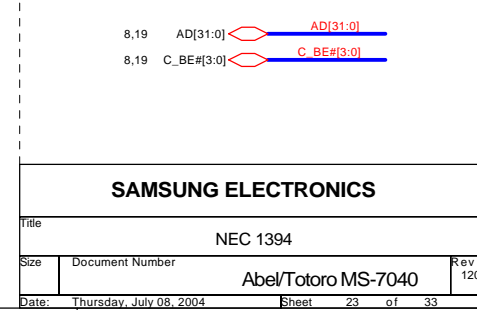
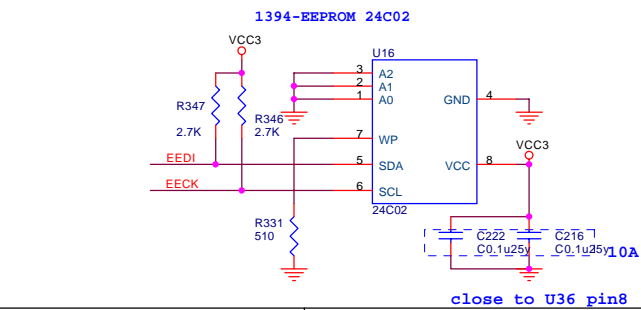
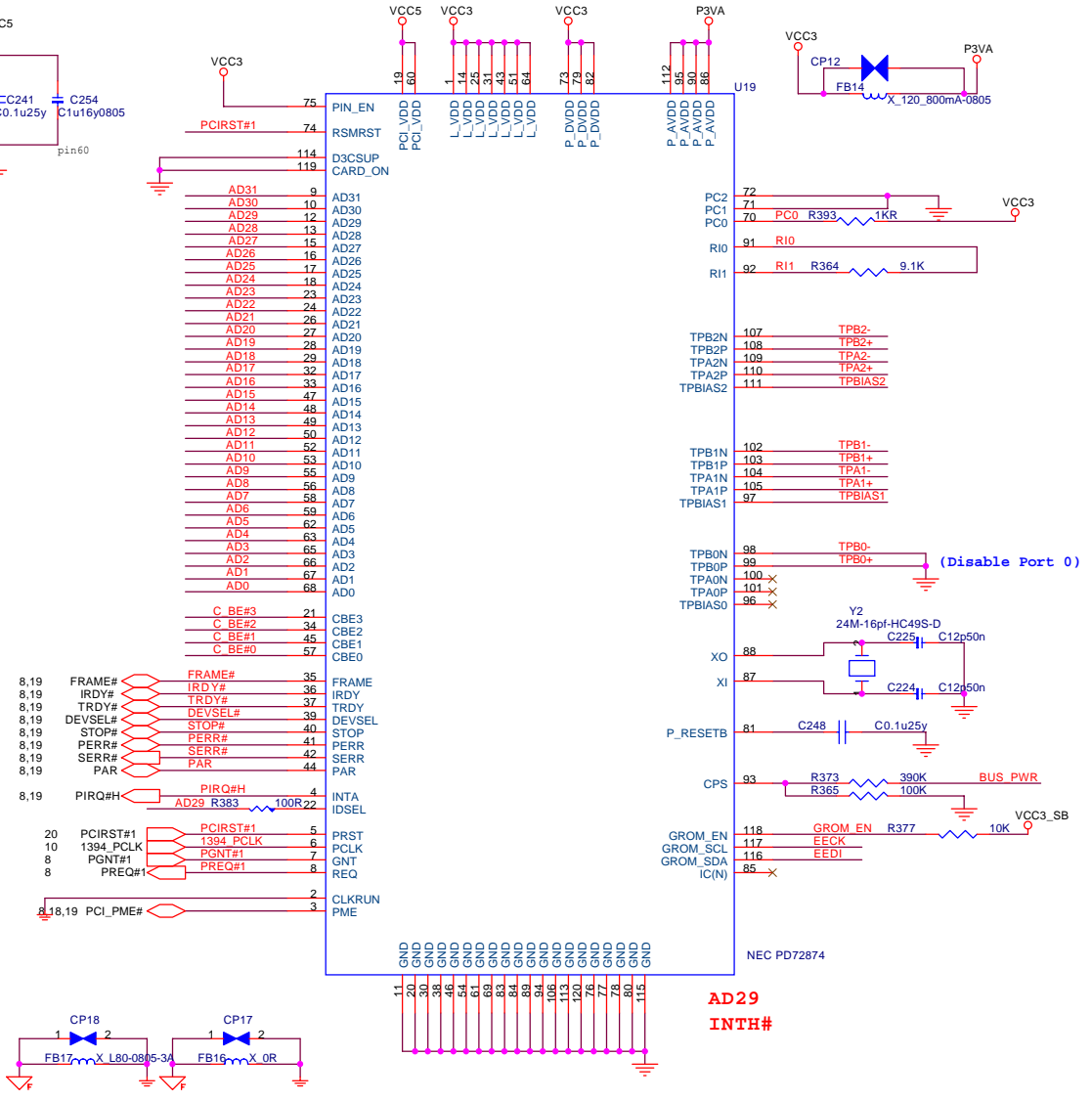
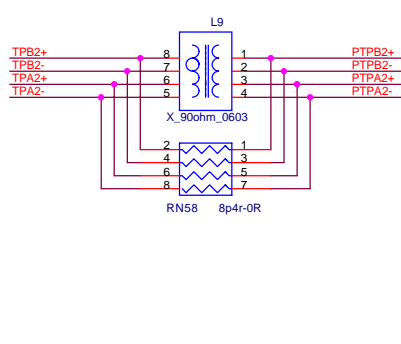
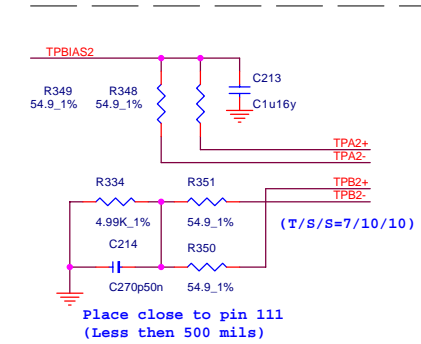
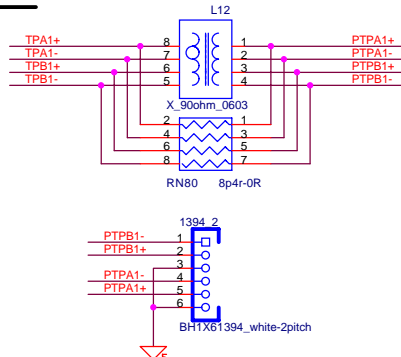
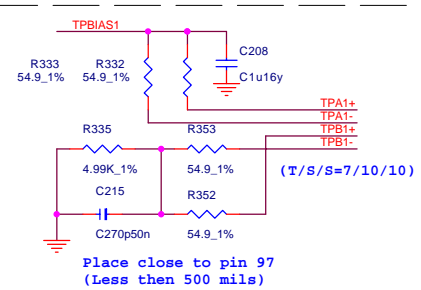
Title		
PS2, IDE, SATA Connectors		
Size	Document Number	Rev
	Abel/Totoro MS-7040	120
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IEEE-1394

support S3 wake-up



FRONT 1394 PORT 1

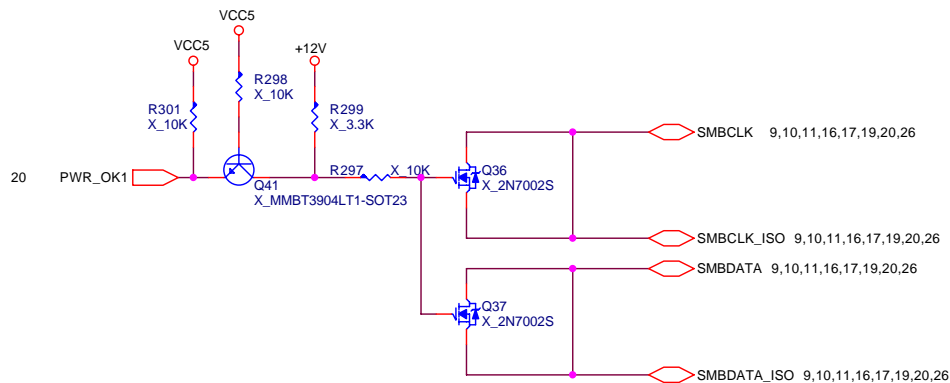
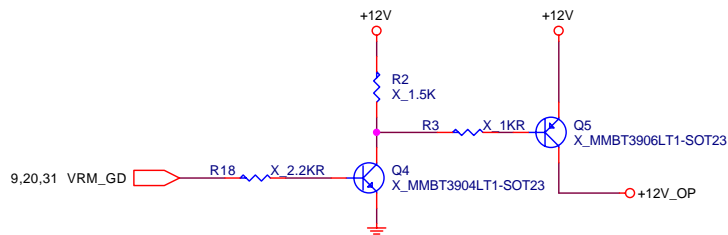


NOTE:

- 1.ASIC TO PHY MAX Length is less than 13.0 mm.
- 2.TPA0+ & TPA0- TWISTED LENGTH IS SAME.(Tolerance±4%)
- 3.TPB0+ & TPB0- TWISTED LENGTH IS SAME.(Tolerance±4%)
- 4.TRACE WIDTH= 7MIL
- 5.TPA0 & TPB0 impedance is 56Ω±1%.
- 6.TRACE SHALL AS SOME LAYER AND BETWEEN CROSS WITH GND.
- 7.TPA0+,TPA0- & TPB0+,TPB0- ,trace must be on surface

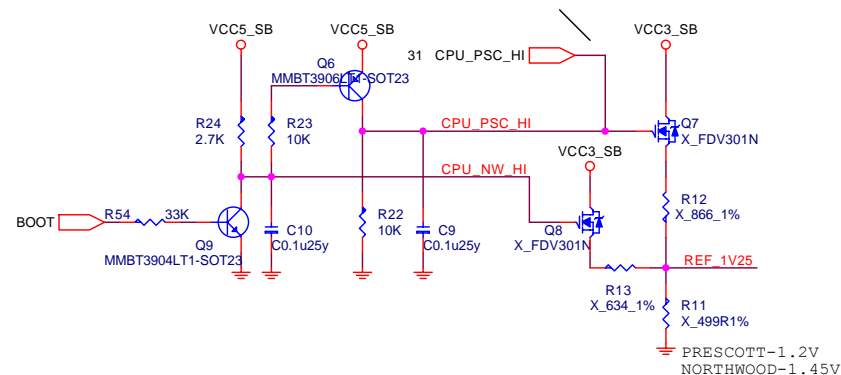
SAMSUNG ELECTRONICS			
Title			
NEC 1394			
Size			
Document Number			
Abel/Totoro MS-7040			
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GMCH_VTT ON/OFF CIRCUIT

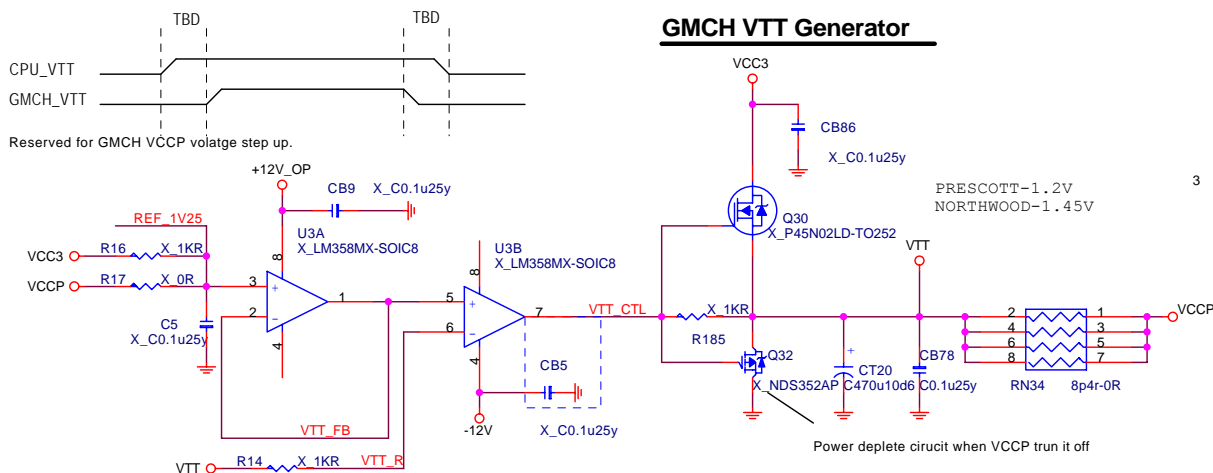


Intel reference GMCH VTT power cirucit

Change R103 connected from Q55 source to drain to eliminate a floating connection when Q55 turn it off.



GMCH VTT Generator



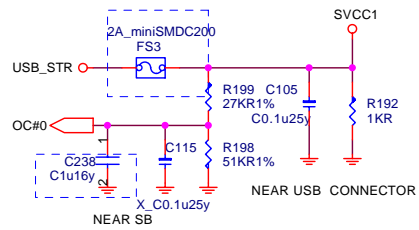
Power deplete cirucit when VCCP trun it off

Bootstrip pin are input rather then output on Intel Prescott processor, either it's internal weak pull-up but still need to identify it can be sufficient driving capability for out side circuit. And the bootstrap pin power by core voltage so the outside circuit need to adjust the turn off voltage.

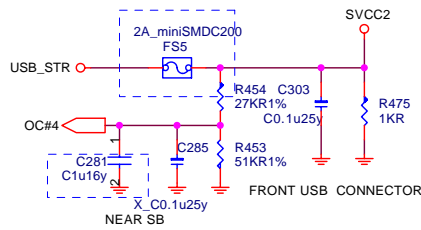
SAMSUNG ELECTRONICS

Title		
GMCH VTT Power Module		
Size	Document Number	Rev
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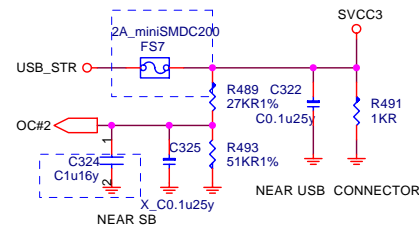
POWER CIRCUIT FOR USB PORT 0,1



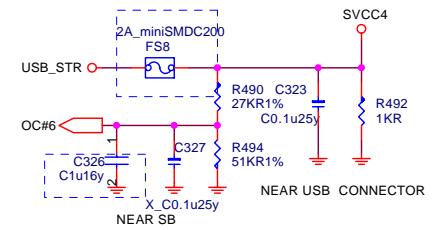
POWER CIRCUIT FOR USB PORT 4,5



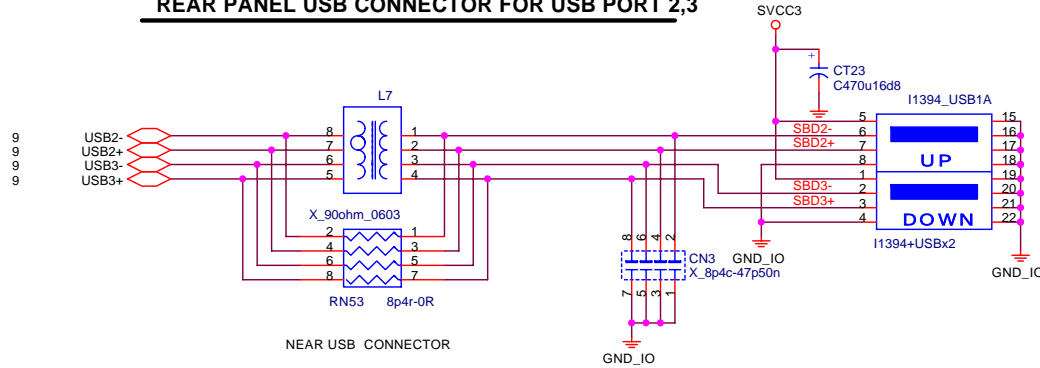
POWER CIRCUIT FOR USB PORT 2,3



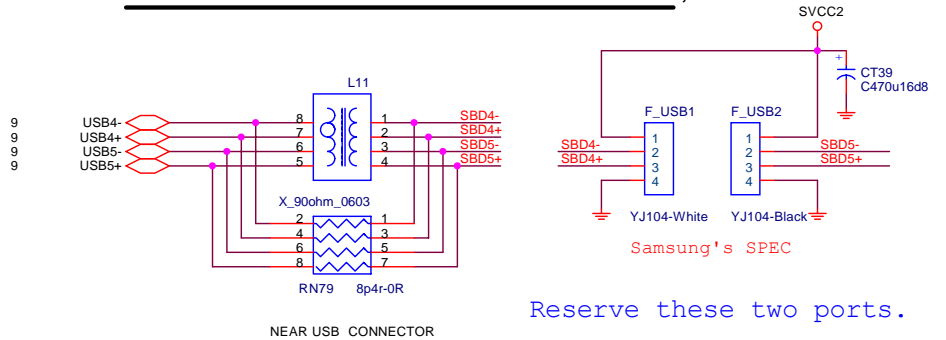
POWER CIRCUIT FOR USB PORT 6,7



REAR PANEL USB CONNECTOR FOR USB PORT 2,3

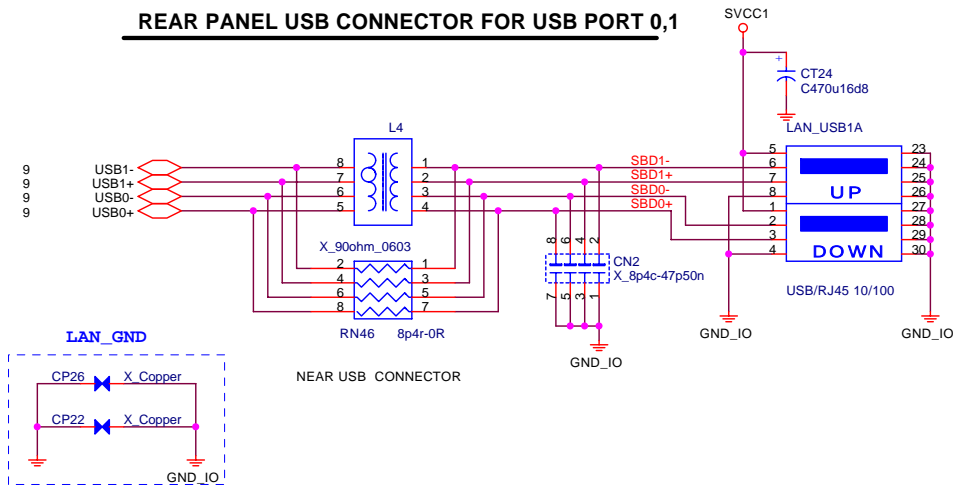


FRONT PANEL USB CONNECTOR FOR USB PORT 4,5

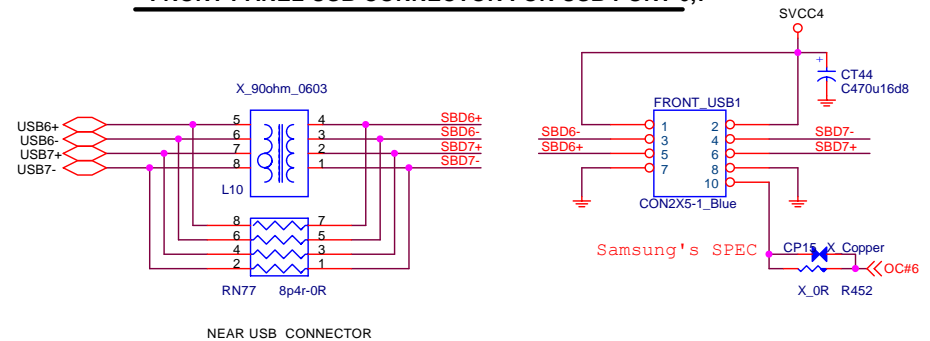


Reserve these two ports.

REAR PANEL USB CONNECTOR FOR USB PORT 0,1



FRONT PANEL USB CONNECTOR FOR USB PORT 6,7

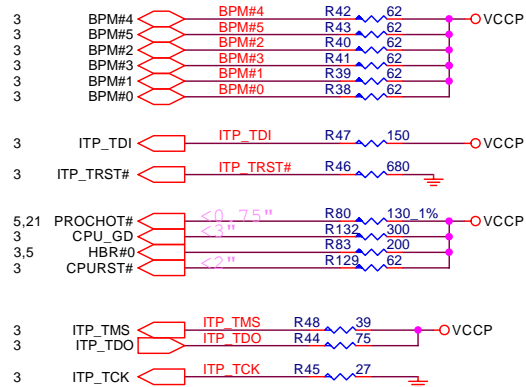


Samsung's SPEC

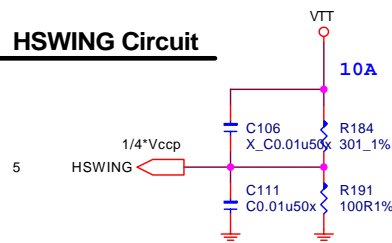
SAMSUNG ELECTRONICS			
Title			
USB Connectors			
Size	Document Number		Rev
	Abel/Totoro MS-7040		120
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CPU STRAPPING RESISTORS

ALL COMPONENTS CLOSE TO CPU



HSWING Circuit



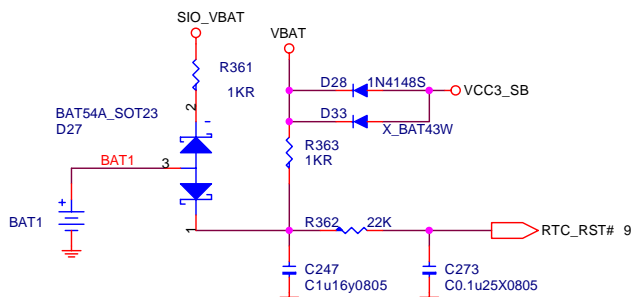
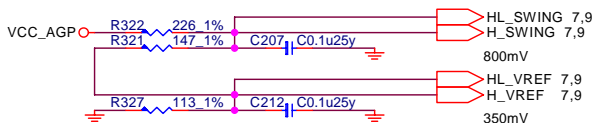
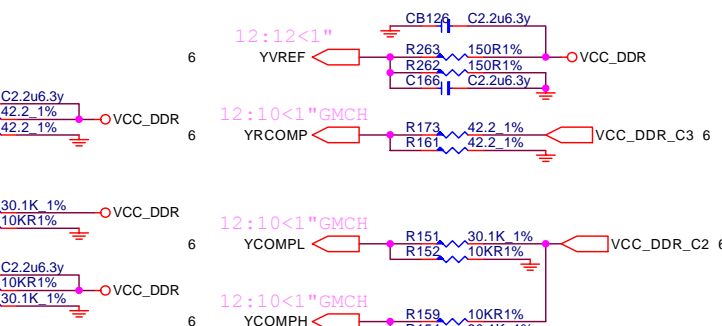
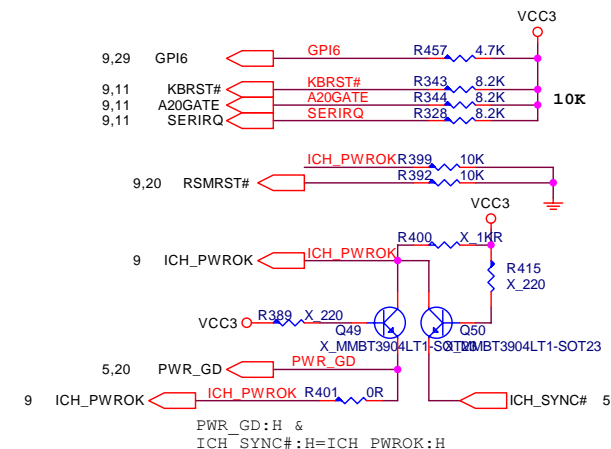
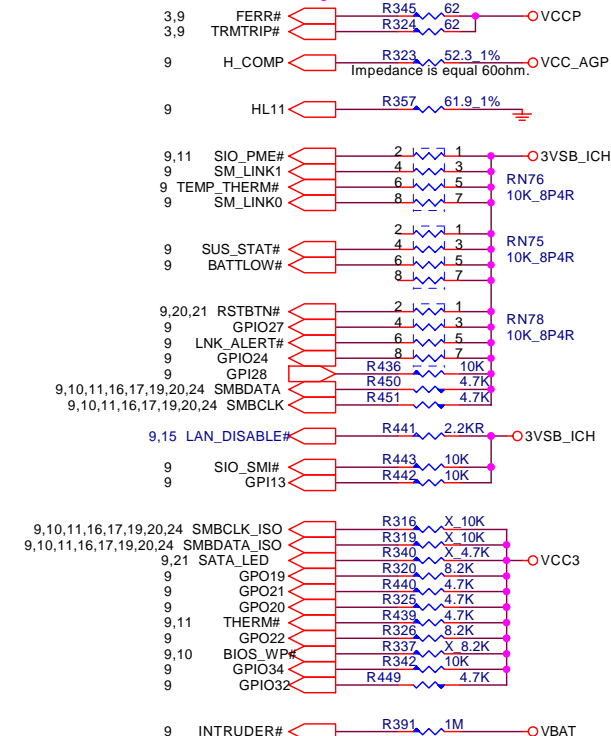
5VREF Sequencing Circuit



ICH5 STRAPPING RESISTORS

ALL COMPONENTS CLOSE TO ICH5

Trace length is less than 3inchs to ICH5.



Close to PinAD11 of ICH5.

RTC BLOCK

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

SAMSUNG ELECTRONICS

Title
 CPU & GMCH & ICH5 PULL UP / DOWN RESISTORS

Size Document Number

Abel/Totoro MS-7040

Rev

120

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ICH5

GPIO Pin	Type	Function
GPIO 0	I	ATADET0 (multifunction pin)
GPIO 1	I	ATADET1 (multifunction pin)
GPIO 2	I	PCI_IRQ#E (multifunction pin)
GPIO 3	I	PCI_IRQ#F (multifunction pin)
GPIO 4	I	PCI_IRQ#G (multifunction pin)
GPIO 5	I	PCI_IRQ#H (multifunction pin)
GPIO 6	I	Unused (multifunction pin)
GPIO 7	I	Unused (multifunction pin)
GPIO 8	I	SIO_PME# (multifunction pin)
GPIO 9	I	Unused (multifunction pin)
GPIO 10	I	Unused (multifunction pin)
GPIO 11	I	Unused (multifunction pin)
GPIO 12	I	SIO_SMI#
GPIO 13	I	Unused (multifunction pin)
GPIO 14	I	Unused (multifunction pin)
GPIO 15	I	Unused (multifunction pin)
GPIO 16	O	Unused (multifunction pin)
GPIO 17	O	Unused (multifunction pin)
GPIO 18	O	Unused (multifunction pin)
GPIO 19	O	Unused (multifunction pin)
GPIO 20	O	Unused (multifunction pin)
GPIO 21	O	Unused (multifunction pin)
GPIO 22	OD	Unused (multifunction pin)
GPIO 23	O	BIOS_WP# (multifunction pin)
GPIO 24	I/O	Unused (multifunction pin)
GPIO 25	I/O	LAN_DISABLE#
GPIO 27	I/O	Unused (multifunction pin)
GPIO 28	I/O	Unused (multifunction pin)
GPIO 32	I/O	Unused (multifunction pin)
GPIO 33	I/O	Unused (multifunction pin)
GPIO 34	I/O	Unused (multifunction pin)
GPIO 40	I	PREQ#4 (multifuntion pin)
GPIO 41	I	Unused (multifunction pin)
GPIO 48	O	PGNT#4 (multifuntion pin)
GPIO 49	OD	CPU_GD (multifunction pin)

PCI Config.

DEVICE	MCP1 INT Pin	REQ#/GNT#	IDSEL	CLOCK
PCI Slot 1	PIRQ#G PIRQ#H PIRQ#E PIRQ#F	PCI_REQ#0 PCI_GNT#0	AD26	PCICLK0
PCI Slot 2	PIRQ#F PIRQ#G PIRQ#H PIRQ#E	PCI_REQ#4 PCI_GNT#4	AD25	PCICLK1
PCI Slot 3	PIRQ#E PIRQ#F PIRQ#G PIRQ#H	PCI_REQ#2 PCI_GNT#2	AD28	PCICLK2
1394	PIRQH	PCI_REQ#1 PCI_GNT#1	AD29	1394_PCLK

DDR DIMM Config.

DEVICE	ADDRESS	CLOCK
DIMM 1	AOH	MCLK_A0/MCLK_A#0 MCLK_A1/MCLK_A#1 MCLK_A2/MCLK_A#2
DIMM 2	A2H	MCLK_A3/MCLK_A#3 MCLK_A4/MCLK_A#4 MCLK_A5/MCLK_A#5
DIMM 3	A4H	MCLK_B0/MCLK_B#0 MCLK_B1/MCLK_B#1 MCLK_B2/MCLK_B#2
DIMM 4	A6H	MCLK_B3/MCLK_B#3 MCLK_B4/MCLK_B#4 MCLK_B5/MCLK_B#5

JUMPER SETTING

CLRCMOS	(1-2) NORMAL	(2-3) CLEAR
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SIO

PIN NAME	USAGE	Input/Output	NOTES
GPIO10	UNUSED	INPUT	
GPIO11	UNUSED	INPUT	
GPIO12	UNUSED	INPUT	
GPIO13	UNUSED	INPUT	
GPIO14	UNUSED	OUTPUT	
GPIO15	VID5	INPUT	Low: VID add 0.0125V , High :by pass
GPIO16	UNUSED	OUTPUT	
GPIO17	UNUSED	OUTPUT	
GPIO20	UNUSED	OUTPUT	
GPIO21	SMBCLK_ISO	INPUT	SMBUS CLOCK
GPIO22	SMBDATA_ISO	INPUT / OUTPUT	SMBUS DATA
GPIO23	POWER_LED	OUTPUT	Default used MS-5
GPIO24	UNUSED	OUTPUT	
GPIO25	UNUSED	OUTPUT	RRX
GPIO26	UNUSED	OUTPUT	
GPIO27	UNUSED	OUTPUT	
GPIO30	SLP_S3#	INPUT	S3 state indicator signal
GPIO31	PS_ON#	OUTPUT	Connector to Power Supply to turn on Power.
GPIO32	UNUSED	OUTPUT	
GPIO33	UNUSED	OUTPUT	
GPIO34	UNUSED	OUTPUT	
GPIO35	UNUSED	OUTPUT	

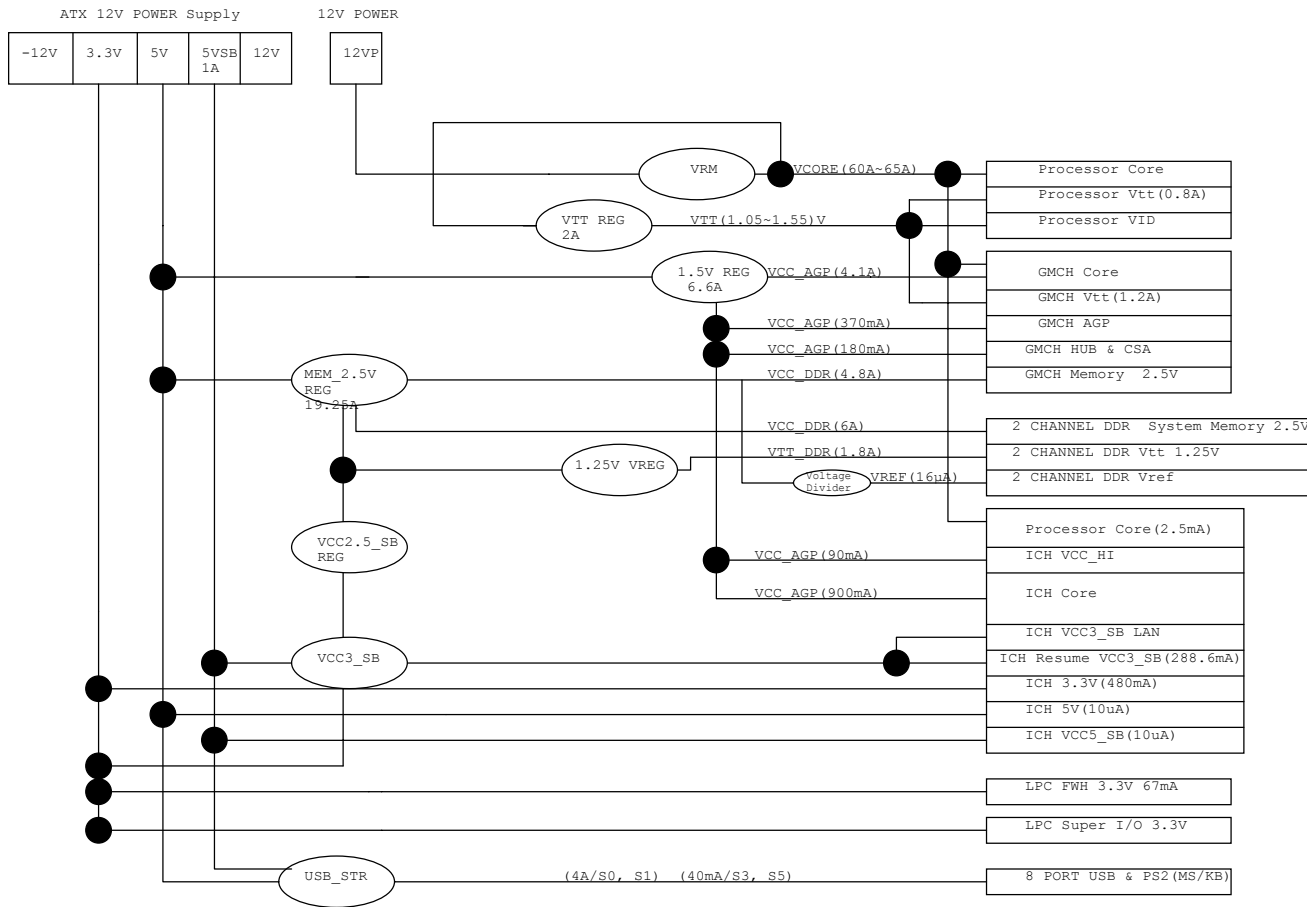
PCI RESET DEVICE

Signals	Target
PCIRST#1	PCI slot 1-3, 1394
PCIRST#2	Super I/O,AGP slot
PCIRST_ICH5#	Northbridge , FWH
HDDRST#	Primary, Scondary IDE

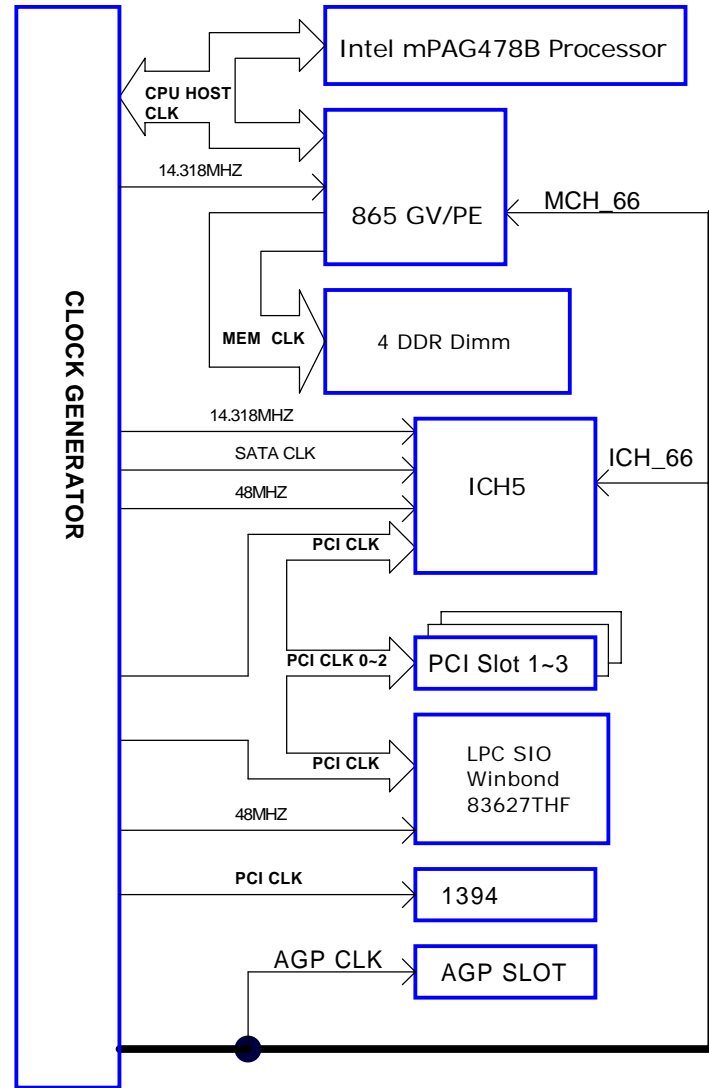
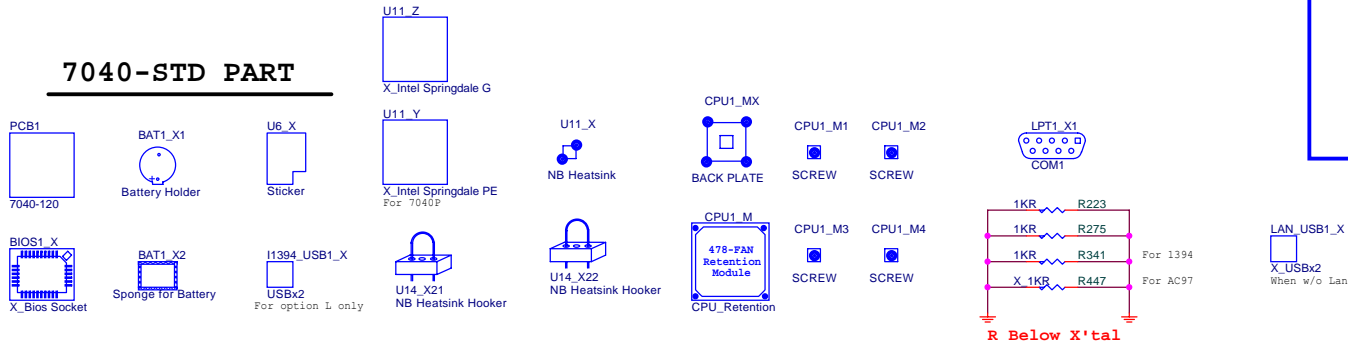
SAMSUNG ELECTRONICS

Title General Purpose Spec & JUMPER SETTING		
Size	Document Number Abel/Totoro MS-7040	Rev 120
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POWER DELIVERY MAP



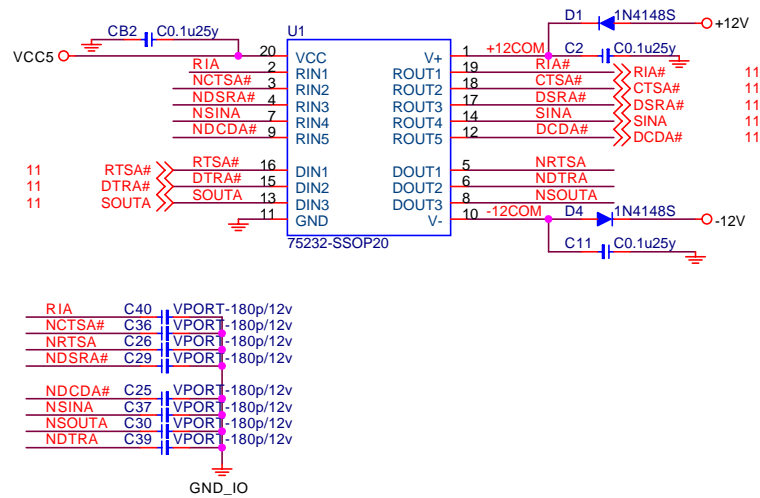
7040-STD PART



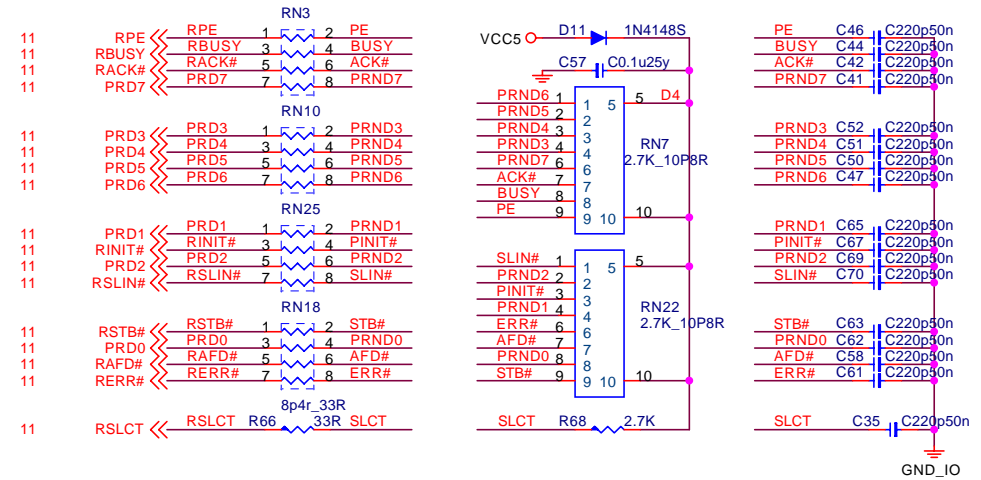
SAMSUNG ELECTRONICS

Title			
POWER DELIVERY MAP & MANUAL PART			
Size	Document Number	Rev	
	Abel/Totoro MS-7040	120	
Date	Thursday, July 08, 2004	Sheet	28 of 33

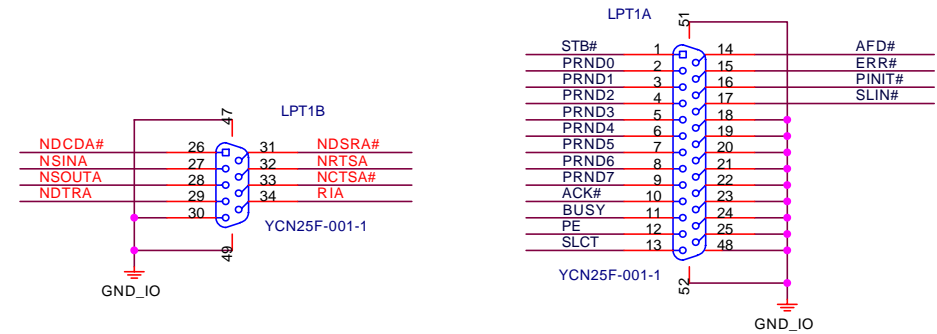
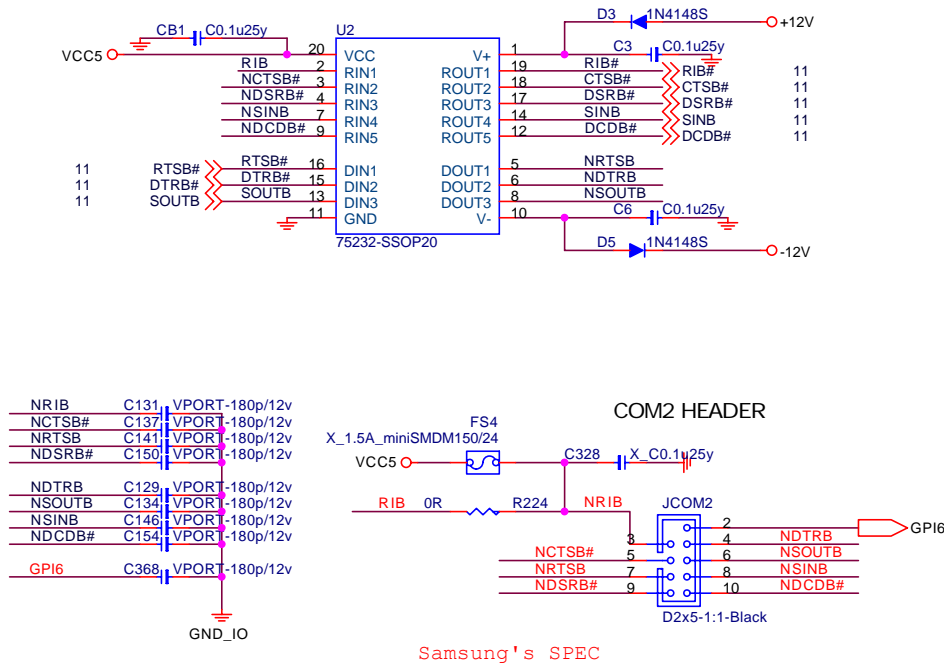
SERIAL PORT 1



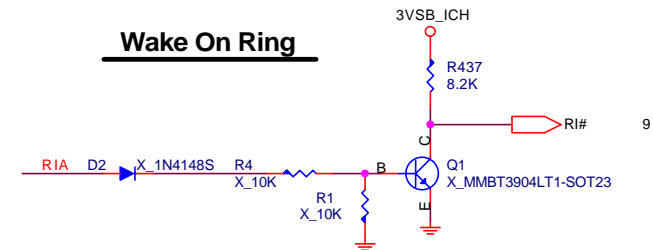
PARALLAL PORT



SERIAL PORT 2

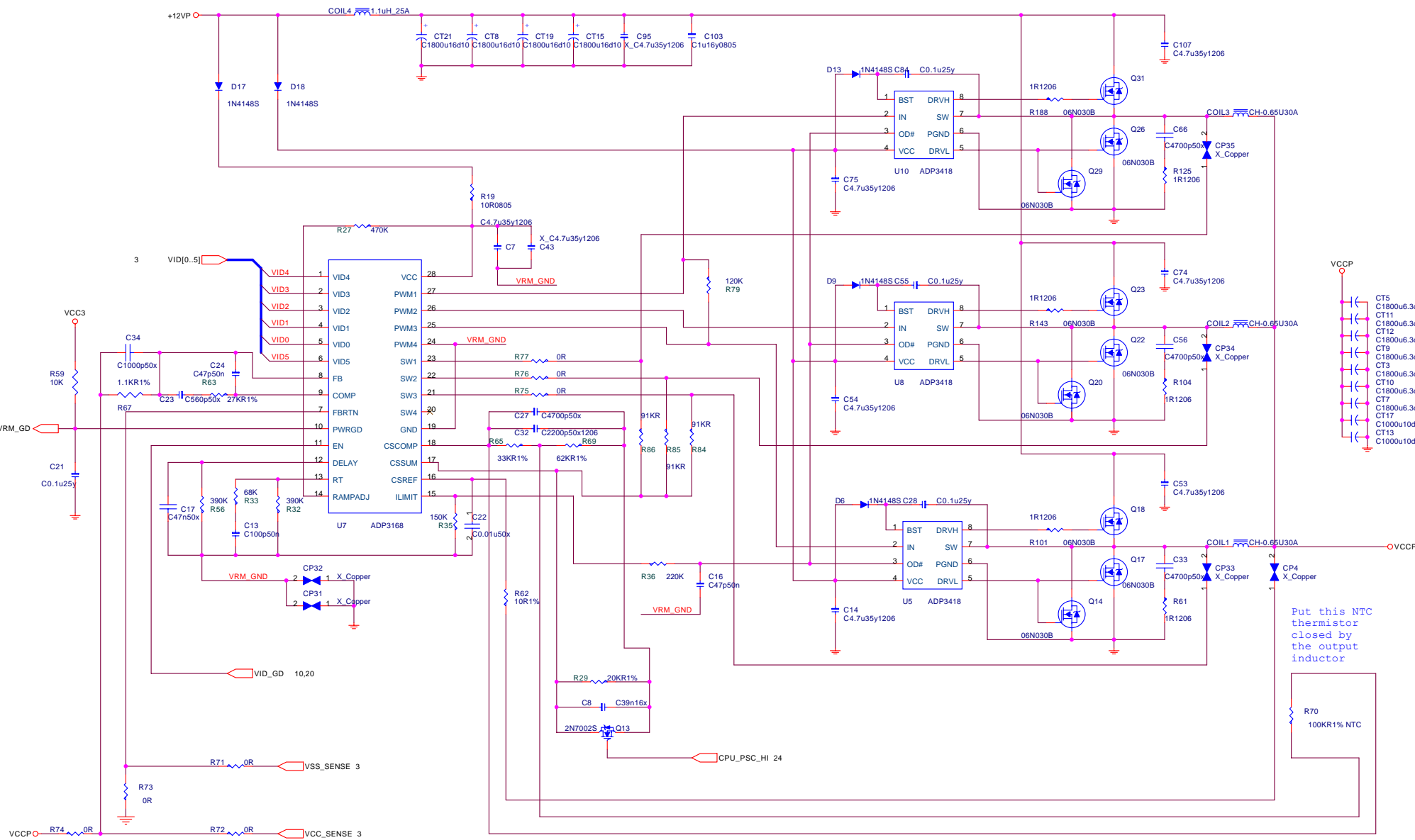


Wake On Ring



SAMSUNG ELECTRONICS

Title			
COM,LPT,RING WEAKER UP			
Size	Document Number		Rev
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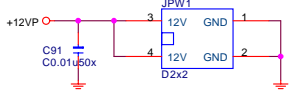
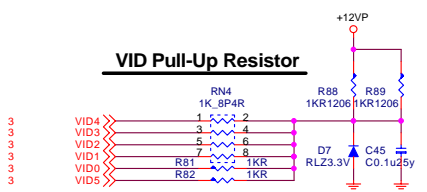


- VCCP
- CT5 C1800u6.3d8
 - CT11 C1800u6.3d8
 - CT12 C1800u6.3d8
 - CT9 C1800u6.3d8
 - CT3 C1800u6.3d8
 - CT10 C1800u6.3d8
 - CT7 C1800u6.3d8
 - CT17 C1000u10d8
 - CT13 C1000u10d8

Put this NTC thermistor closed by the output inductor



VID Pull-Up Resistor



SAMSUNG ELECTRONICS

Title			VRM 10 - ADP3168/3418	
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Jan. 28				Jun. 28			
1. Page 12 : stuff D12, D14, D15, D16 by EMI.				1. Page 6 : change C86 to X5R 10%; C87 C142 to X7R 10%.			
Jan. 30				120			
1. Page 14 : un-stuff C100, C159, C331.				Jul. 2			
2. Page 30 : stuff C152, C182 with 470p 0603, C167, C177 with 470p 0805 by EMI.				1. Page 13 : change C259 to 1u 25V 0805 X7R 10%.			
3. Page 28 : remove Bios socket, Bios1_X.							
4. Page 10 : use SST49LF004B for Bios only.							
Feb. 2							
1. Page 13 : change FB28 from 120 ohm bead to 47 ohm for better timing.							
2. Change the OrgName of titles in all pages to "SAMSUNG ELECTRONICS."							
3. Delete redundant dual-layout footprint information in page 14, 15.							
4. Page 25 : reserve C303, R475, RN79, CT39, F_USB1, F_USB2.							
Feb. 3							
1. Page 31 : change C32 from 4.7u to 2200p; R67 from 820 ohm 1% to 1.1k ohm 1%; add R73, R74, 0 ohm.							
Feb. 10							
1. Page 25 : stuff C303, R475, RN79, CT39, F_USB1, F_USB2.							
11a							
Feb. 20							
1. No schematics change, only modify the distance between PCIs and NPTH holes.							
2. Page 28 : change PCB to ver. 11A							
Feb. 26							
1. Page 12 : change R145, R139 to 10 ohm 1%; change C73, C78 to 10p.							
2. Page 28 : change CPU1_M, CPU retension module, to a special one of AVC's.							
Mar. 18							
1. Page 7 : change L8 to 0 ohm.							
Apr. 15							
1. Create new Bom with 865G (U11) and make the following parts added : page 18 : C183, CB123 -- CB125, CB129, CB133, CB134, AGP1.							
Apr. 19							
1. Page 14 : stuff C331 with 10pF.							
Jun. 17							
1. Page 30 : change COIL1--COIL4, CHOCK3, 4 to non-tubed type.							
Jun. 23							
1. Page 13 : change C259 to X7R Taiyo.							

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Title		History 2	
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