

Cover Sheet, Block diagram	1-2
Intel PGA478B CPU - Signals	3
Intel PGA478B CPU - Power	4
Intel Springdale - Host Signals	5
Intel Springdale - Memory Signals	6
Intel Springdale - AGP & LDT Signals	7
Intel ICH5 - PCI & IDE & AC97 Signals	8
Intel ICH5 - Other Signals	9
Clock - Cypress CY28405 & FWH	10
LPC I/O - W83627THF	11
Floppy & VGA Connector	12
AC97 Audio - STAC9752T	13
LAN - Intel 82562EZ (10/100)	14-15
DDR System Memory 1 , 2 , 3 & 4	16-17
AGP 4X/8X Slot & Fan Conn.	18
PCI Slots 1 & 2 & 3	19
ACPI & Power Controller (MS-5)	20
ATX & Front Panel & Buzzer	21
PS2, IDE & SATA	22
1394 - NEC PD72874	23
GMCH VTT Power Module	24
USB CONNECTORS	25
Pull-up/down Resistors & Clear CMOS	26
GPIO & JUMPER SETTING	27
Manual Parts & Power Delivery	28
COM, LPT, Ring Wake-up	29
AGP & DDR POWER	30
VRM10 - ADI ADP3168	31
History	32

Abel / Totoro MS-7040 *Rev. 130*

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)

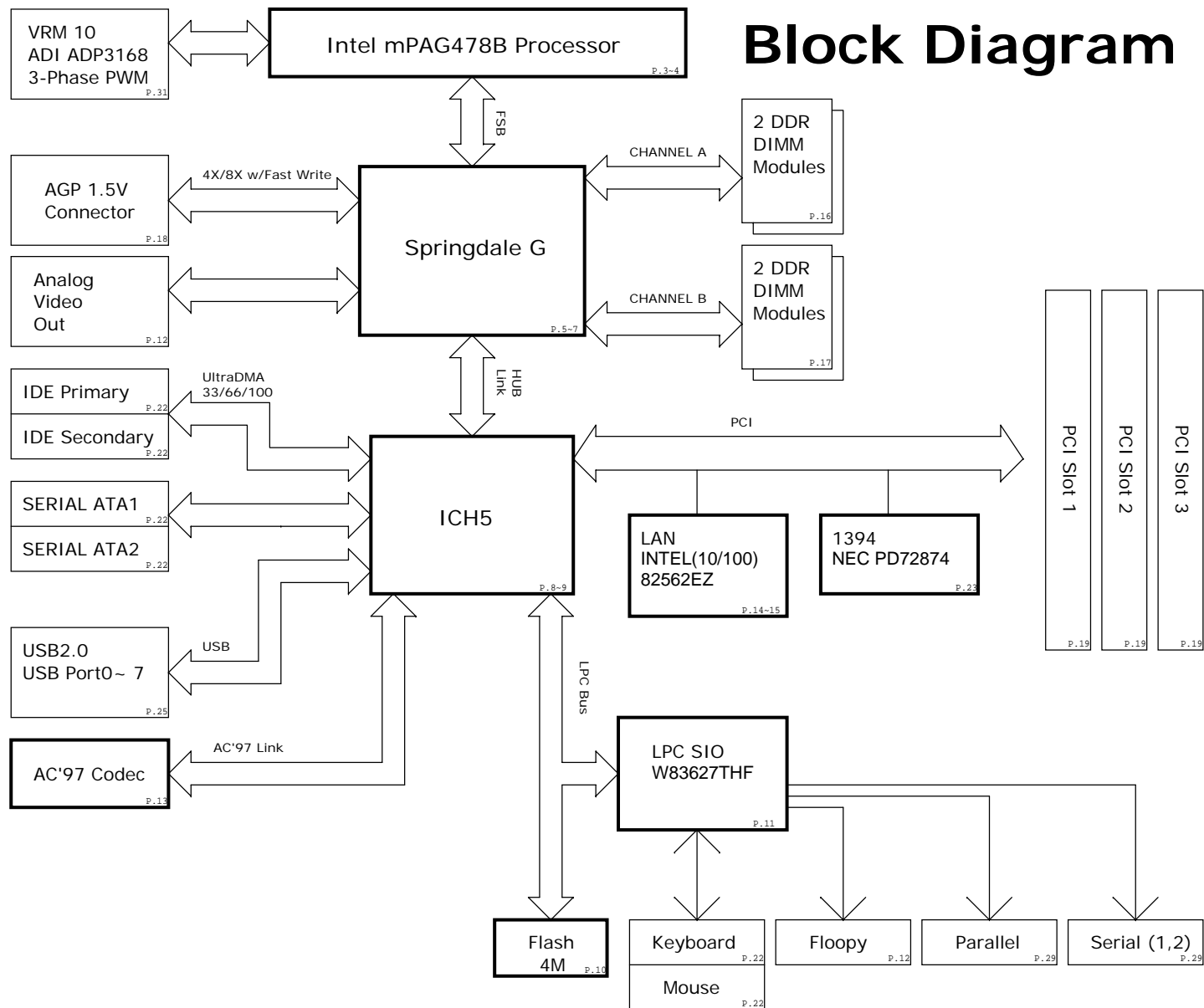
Expansion Slots:

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

ADI PWM:

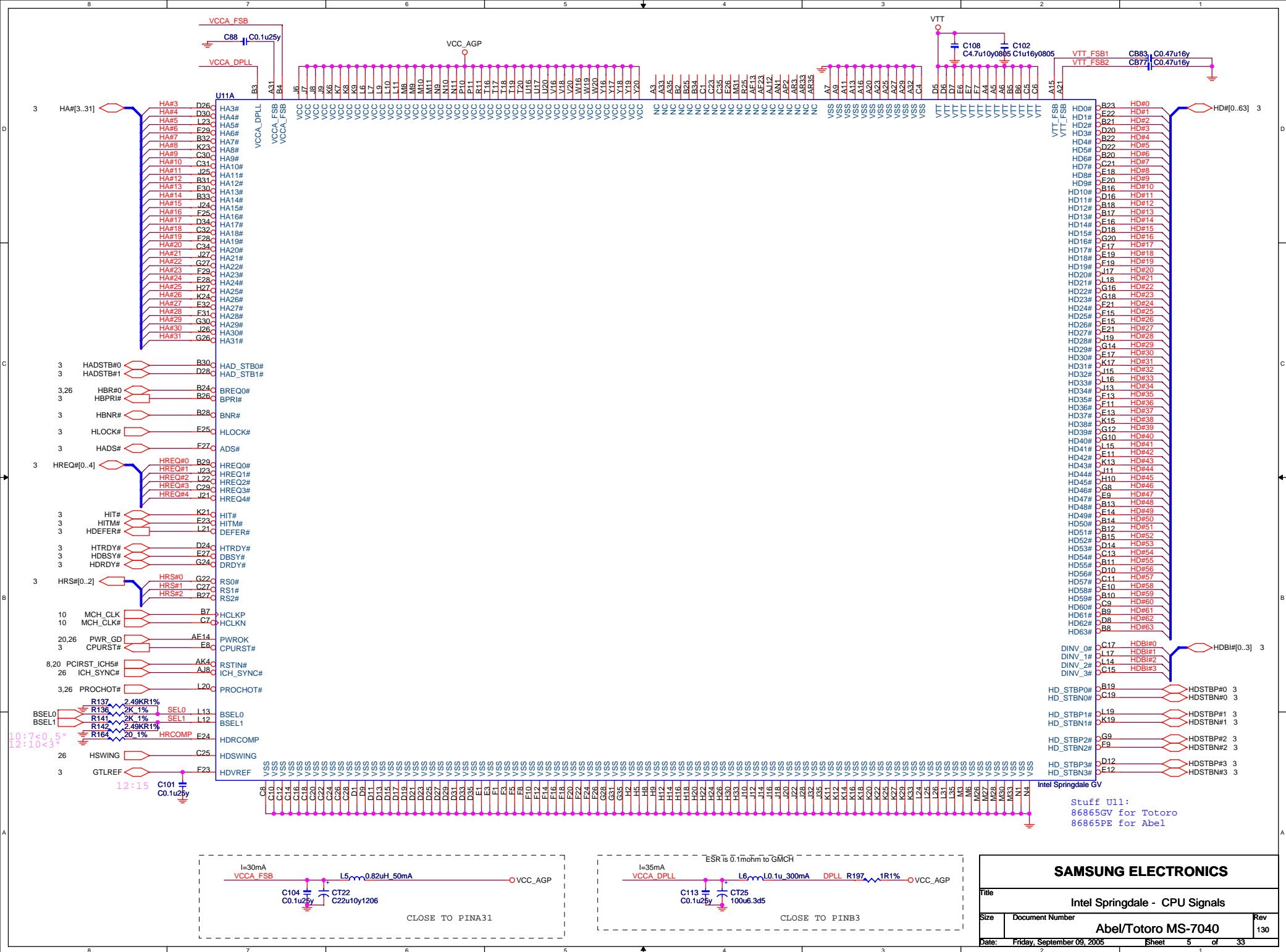
Controller: ADP3168
Driver: ADP3418 * 3

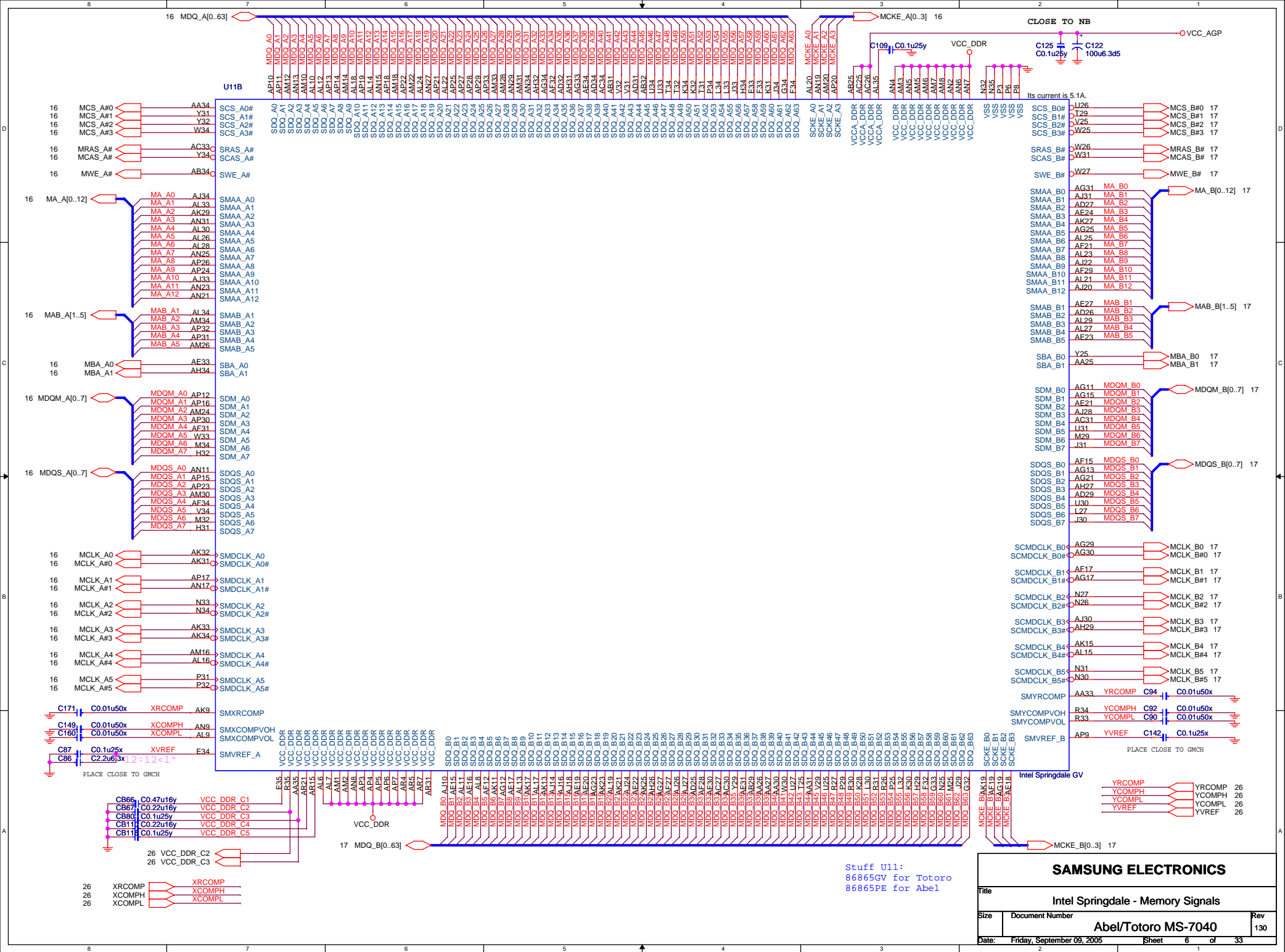
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Size	Document Number	Abel/Totoro MS-7040	Rev 130
Date: Friday, September 09, 2005	Sheet	1	of 33

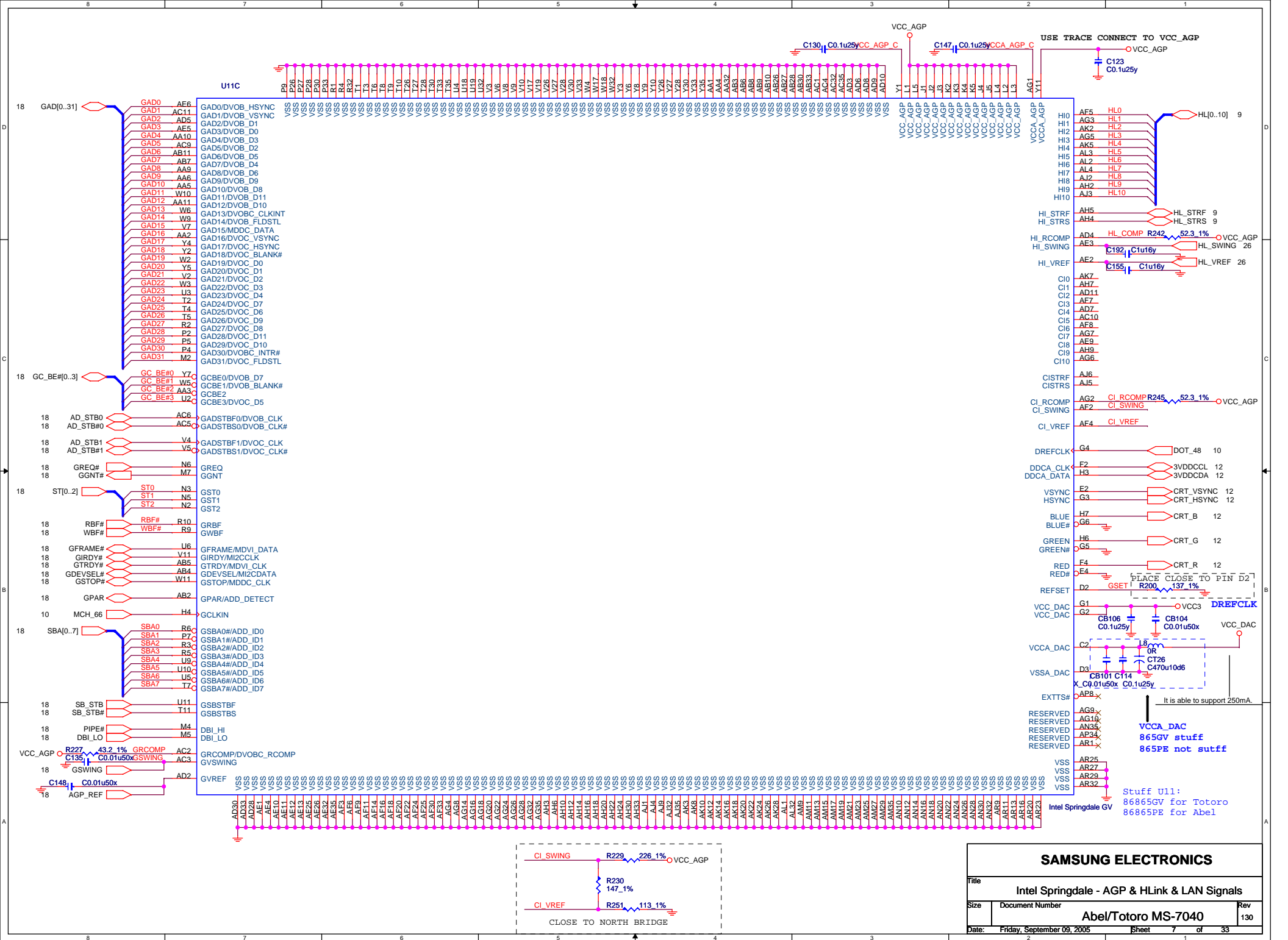


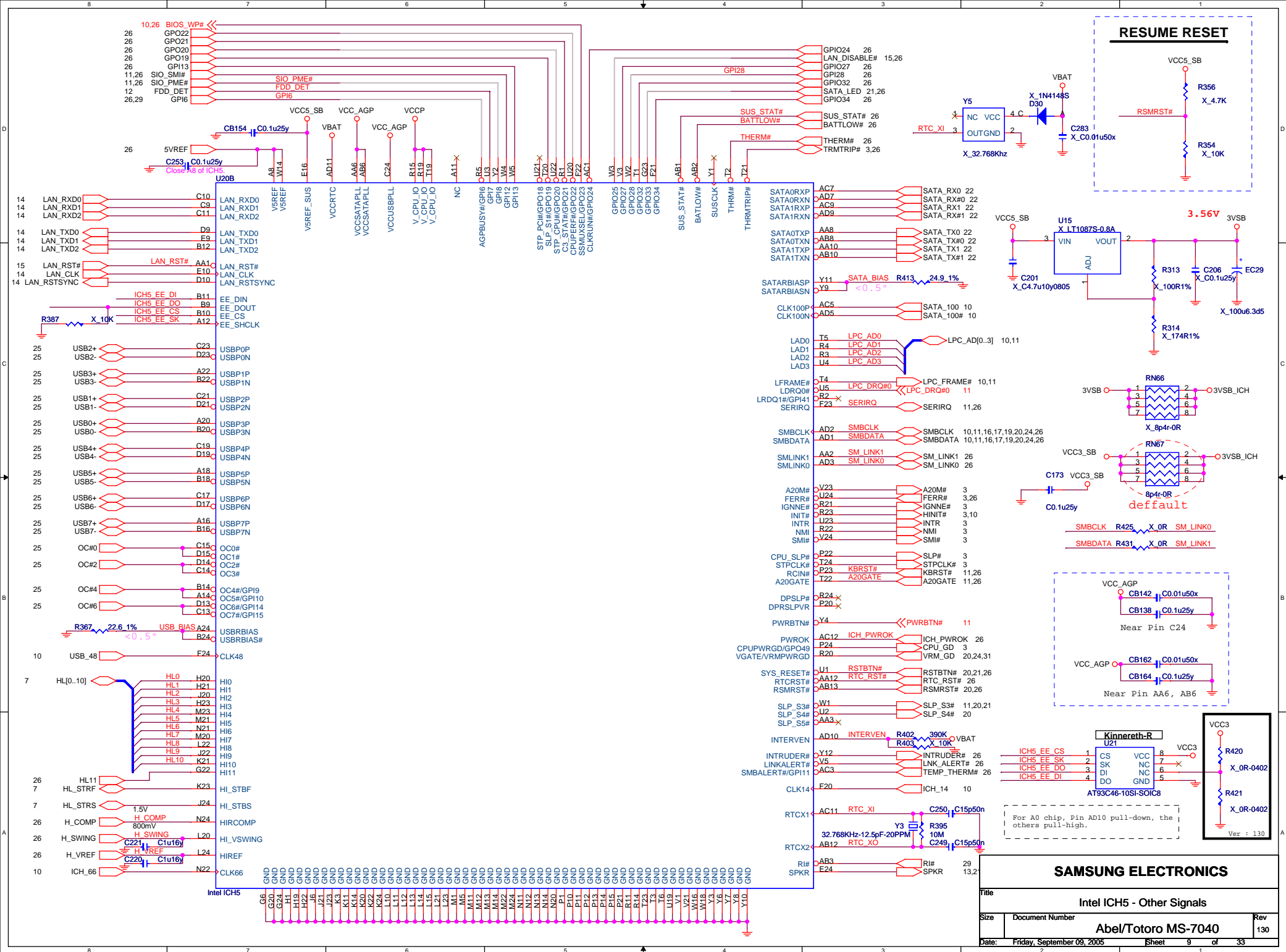
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Size	Document Number		Rev
	Abel/Totoro MS-7040		130
Date:	Friday, September 09, 2005		Sheet 2 of 33



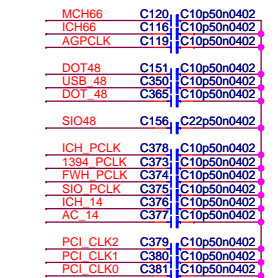






CLOCK GENERATOR

VCC3
L80-0805-3A
VCC3V
C118
C0.1u16y0402
C153
C10u10y1206
C133
C0.1u16y0402
C144
C0.1u16y0402
C143
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C



CLOCK GENERATOR

VCC3

FB12 L80-0805-3A

VCC3V

C118 C0.1u16y0402

C153 C0.1u16y0402

CT27 C10u10y1206

C133 C0.1u16y0402

C144 C0.1u16y0402

C143 C0.1u16y0402

C117 C0.1u16y0402

C145 C0.1u16y0402

C124 C0.1u16y0402

C121 C0.1u16y0402

9,11,16,17,19,20,24,26 SMBCLK_ISO

9,11,16,17,19,20,24,26 SMBDATA_ISO

VCC5

C369 C0.1u16y0402

C370 C0.1u16y0402

for EMI

U12

CPU0_VDD

CPU0_GND

SRC_VDD

SRC_GND

3V66_VDD

3V66_GND

PCI_VDD

PCI_GND

PCI_VDD

PCI_GND

48_VDD

48_GND

REF_VDD

REF_GND

VDD

GND

SMB ADD: D2H

SCLK

SDATA

VTT_GD#

RST#/PWR_DN#

IREF

CYPRESS CY28405

MCHCLK#

MCHCLK#

CPUCLK#

CPUCLK#

CPUCLK#

CPUCLK#

MCH_CLK

MCH_CLK#

CPU_CLK

CPU_CLK#

SATA_100

SATA_100#

SATA_100

SATA_100#

MCH66

ICH66

AGPCLK

MCH_66

ICH_66

AGP_CLK

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PCI0_F1

PCI0_F2

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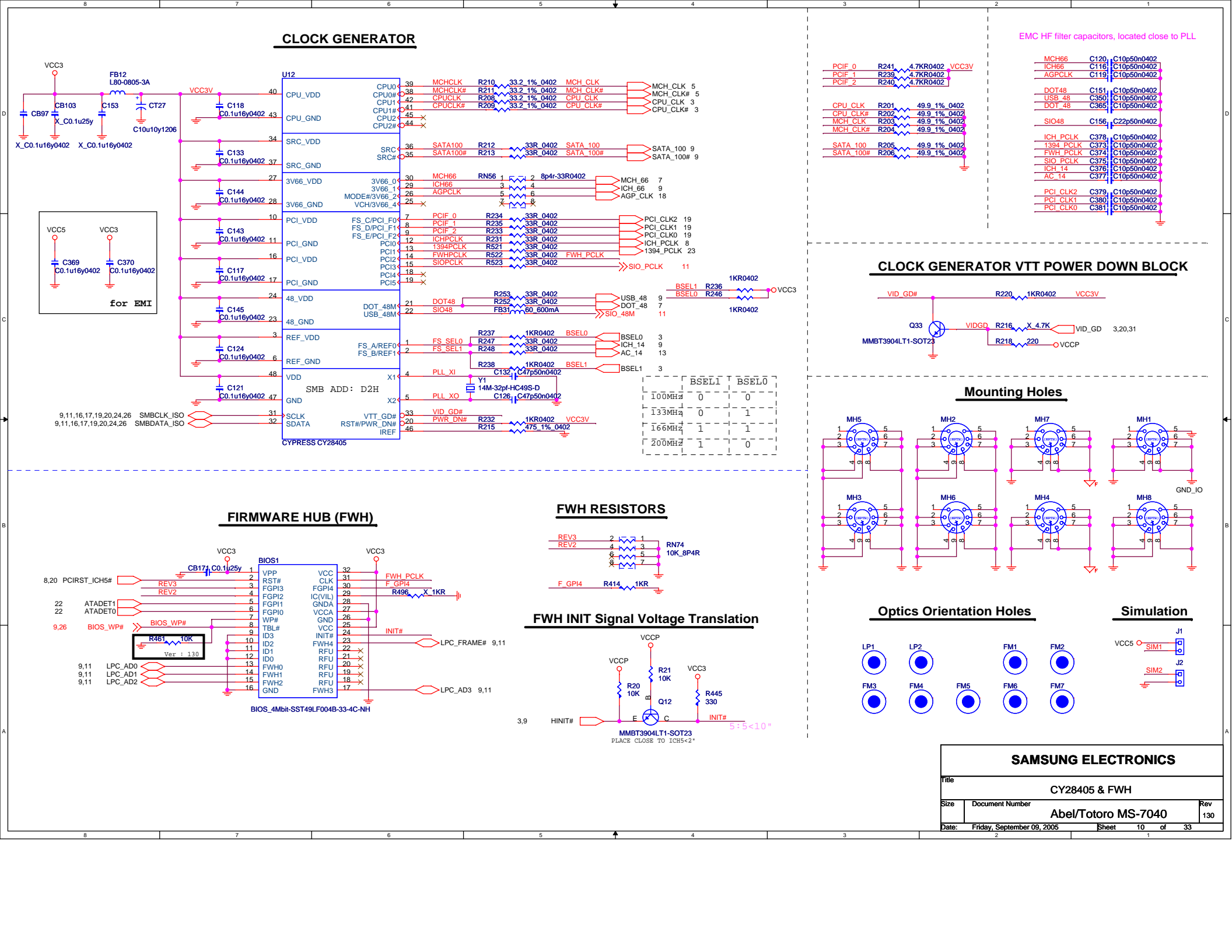
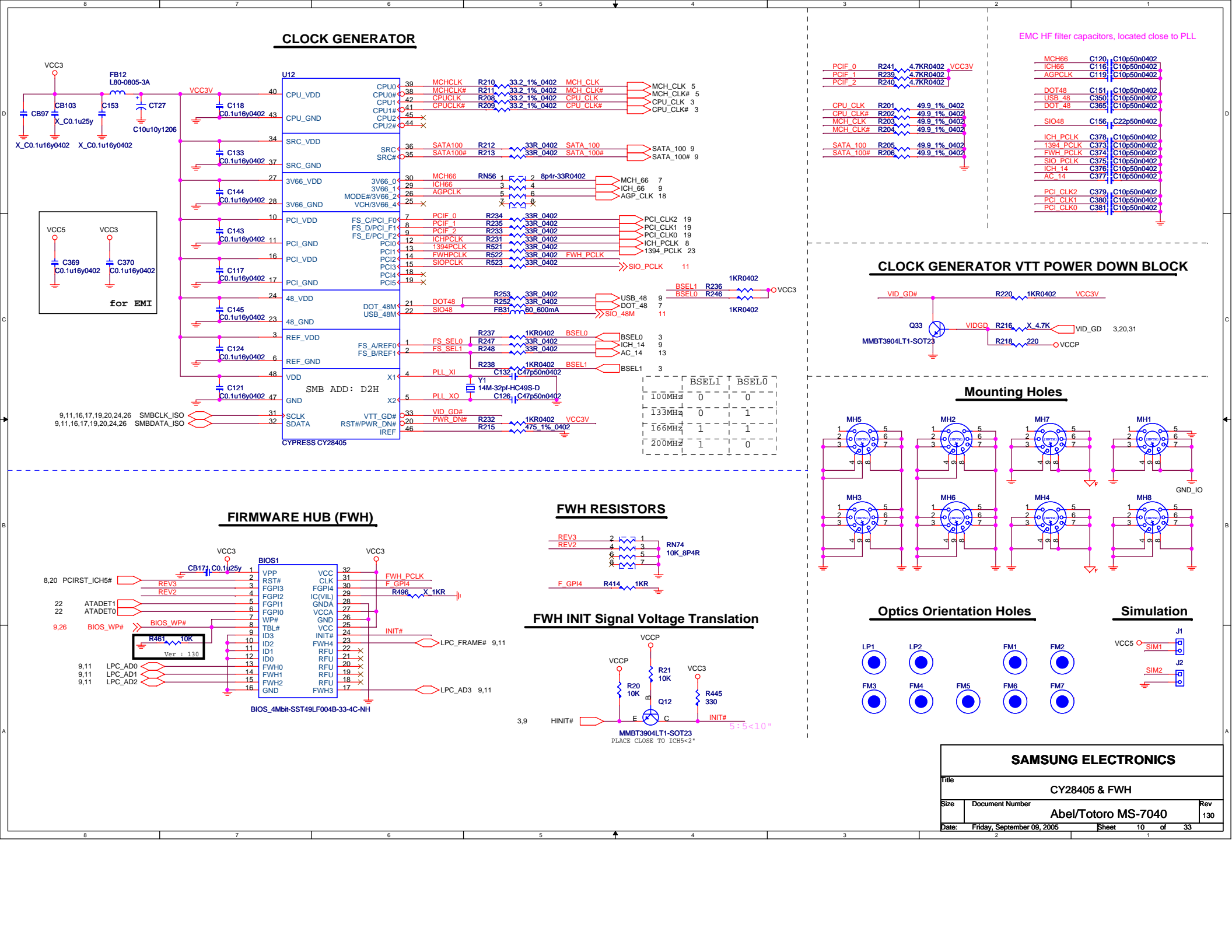
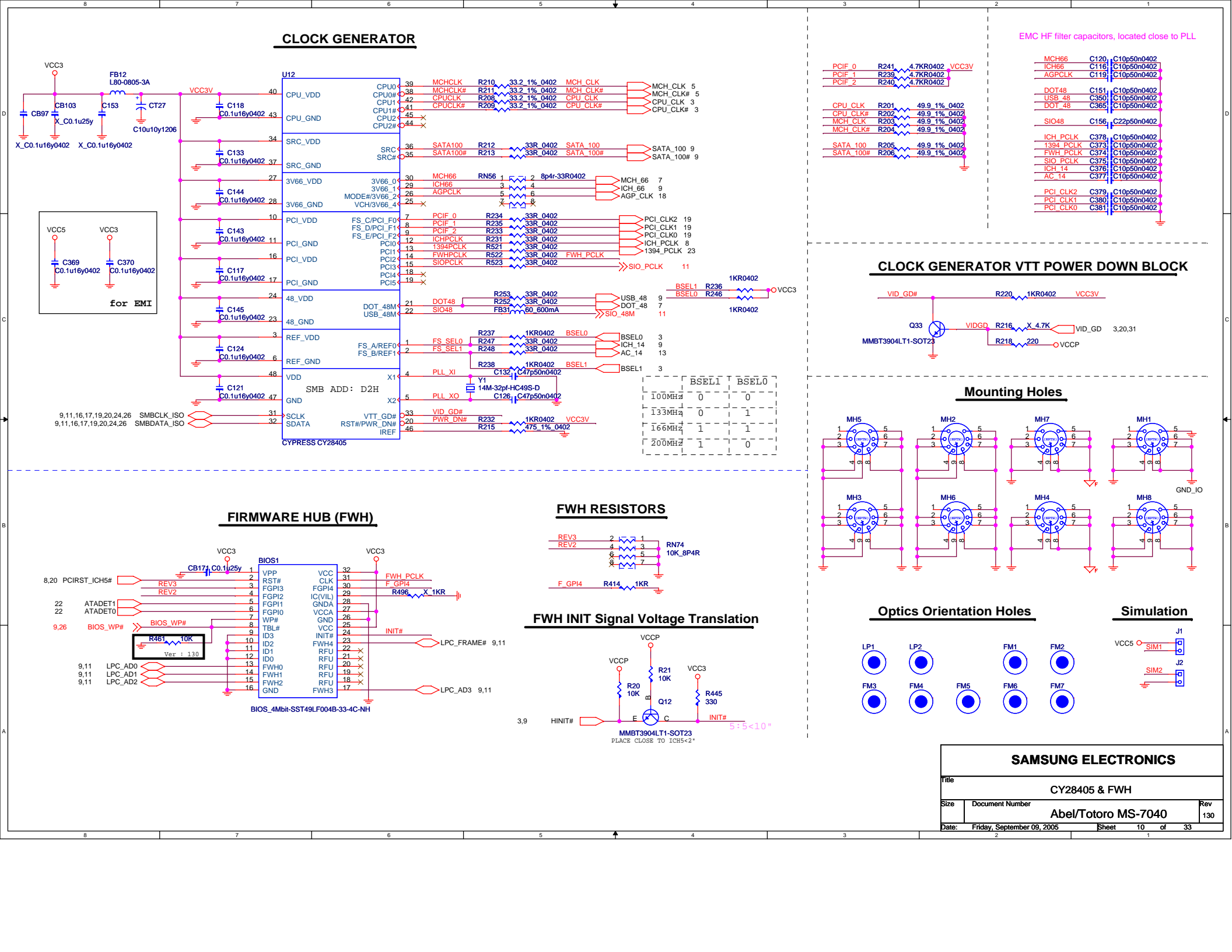
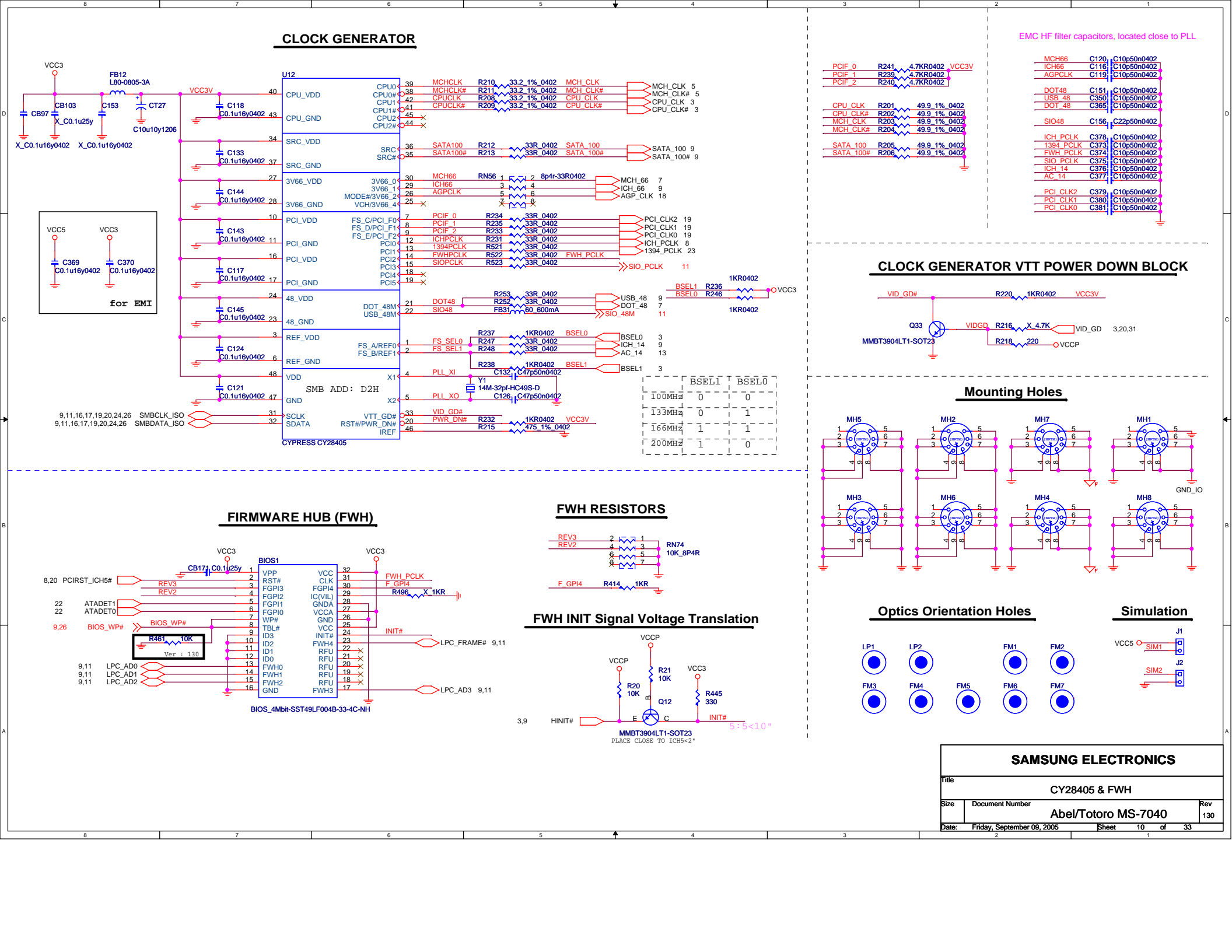
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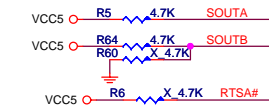
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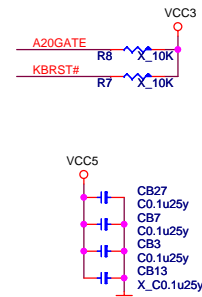
PCI



SUPER I/O STRAPPING RESISTOR



SPEAKER BLOCK



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Title	Author	Date	Page
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Title	Author	Date	Page
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LPC SUPER I/O

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Abel/Totoro MS-7040

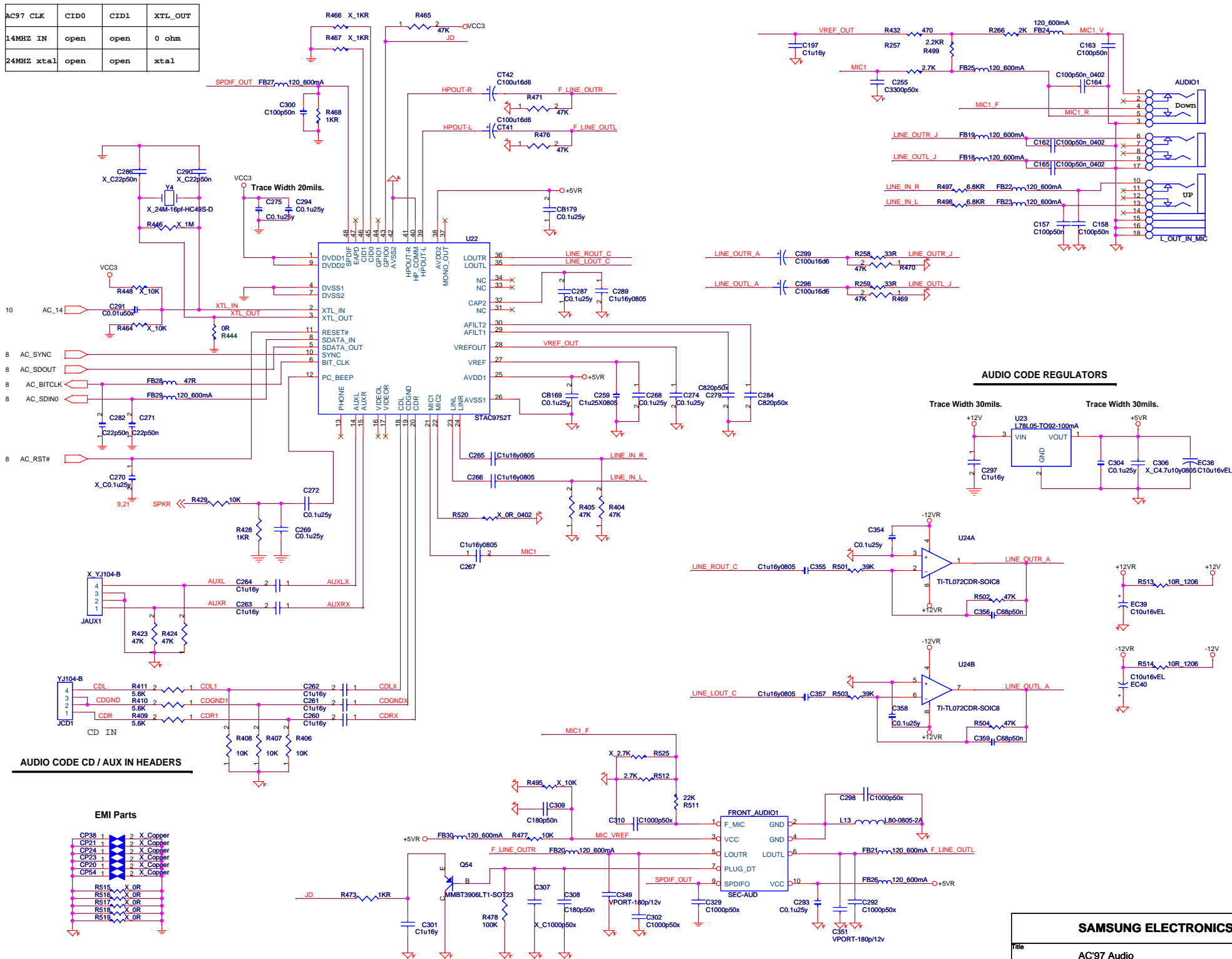
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Date: Friday, September 09, 2005

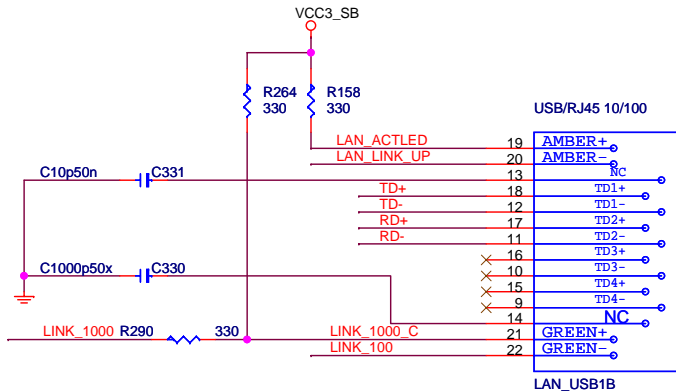
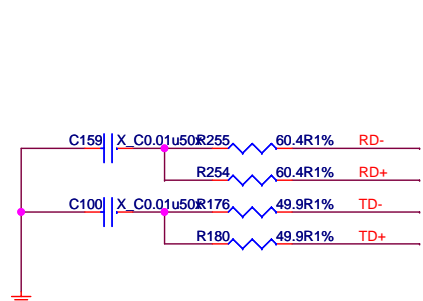
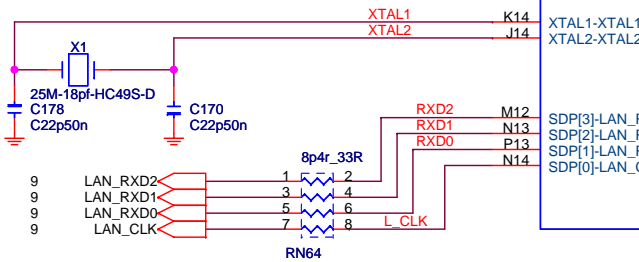
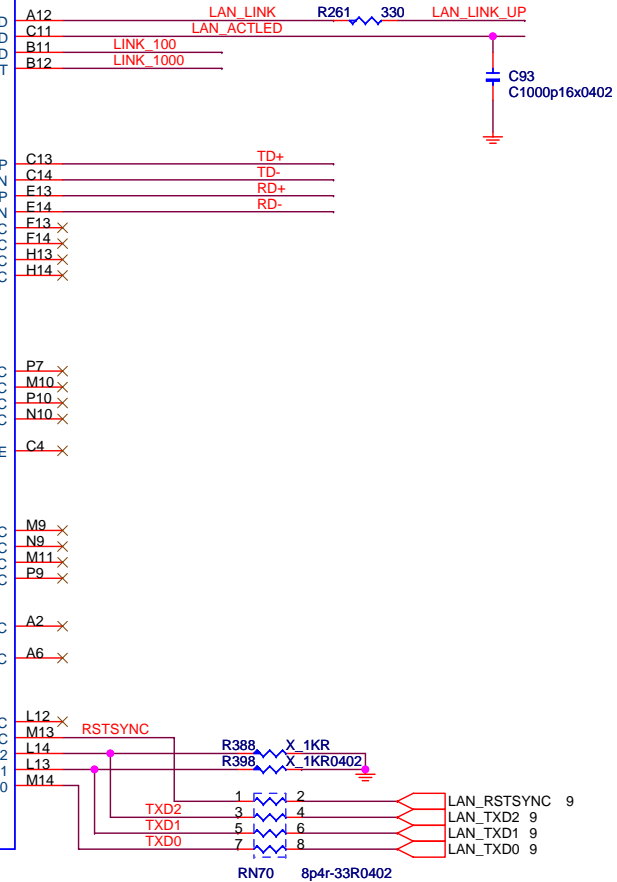
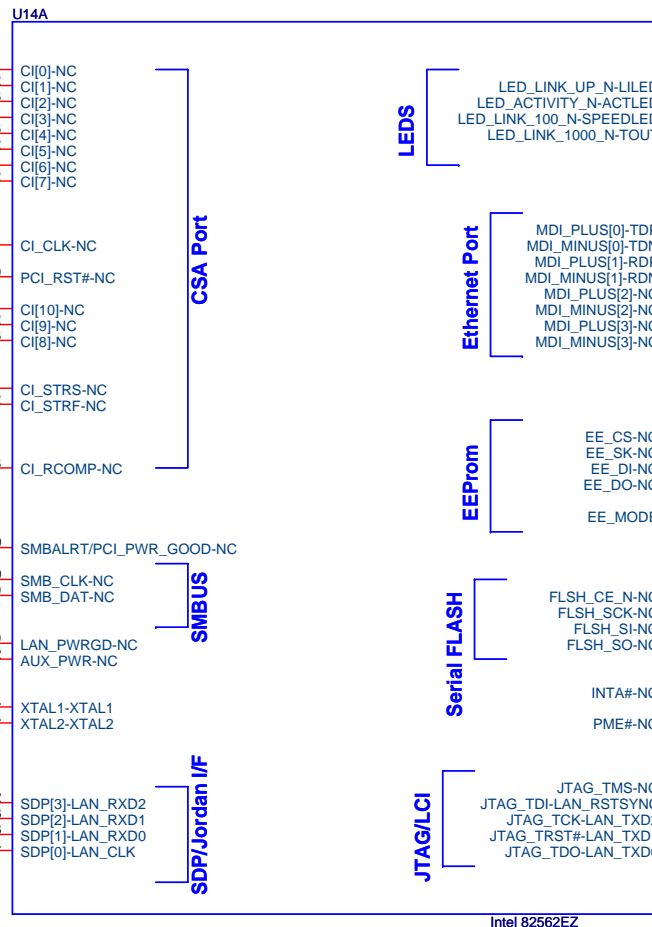
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1 of 33

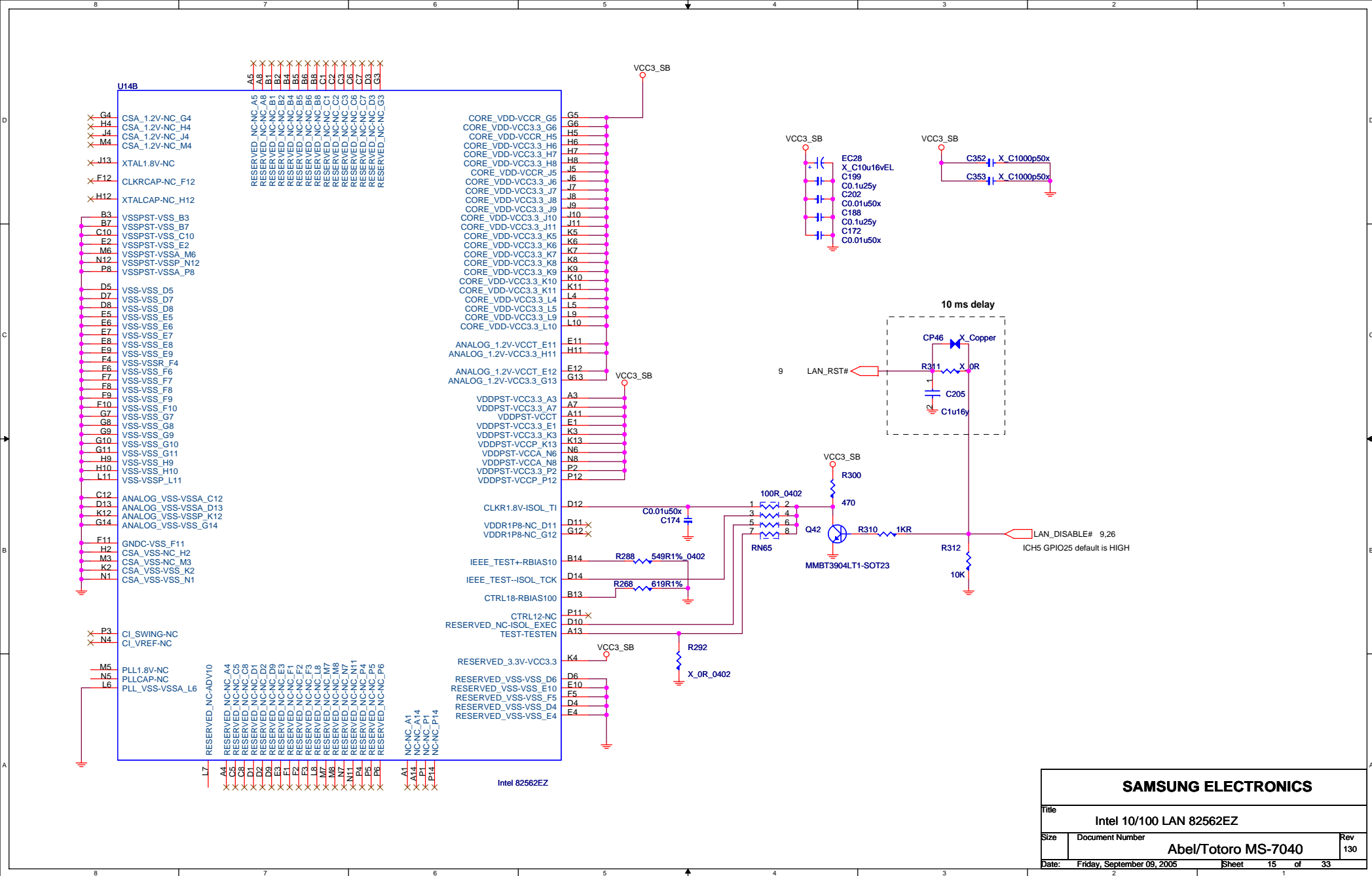
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24MHZ xtal	open	open	xtal



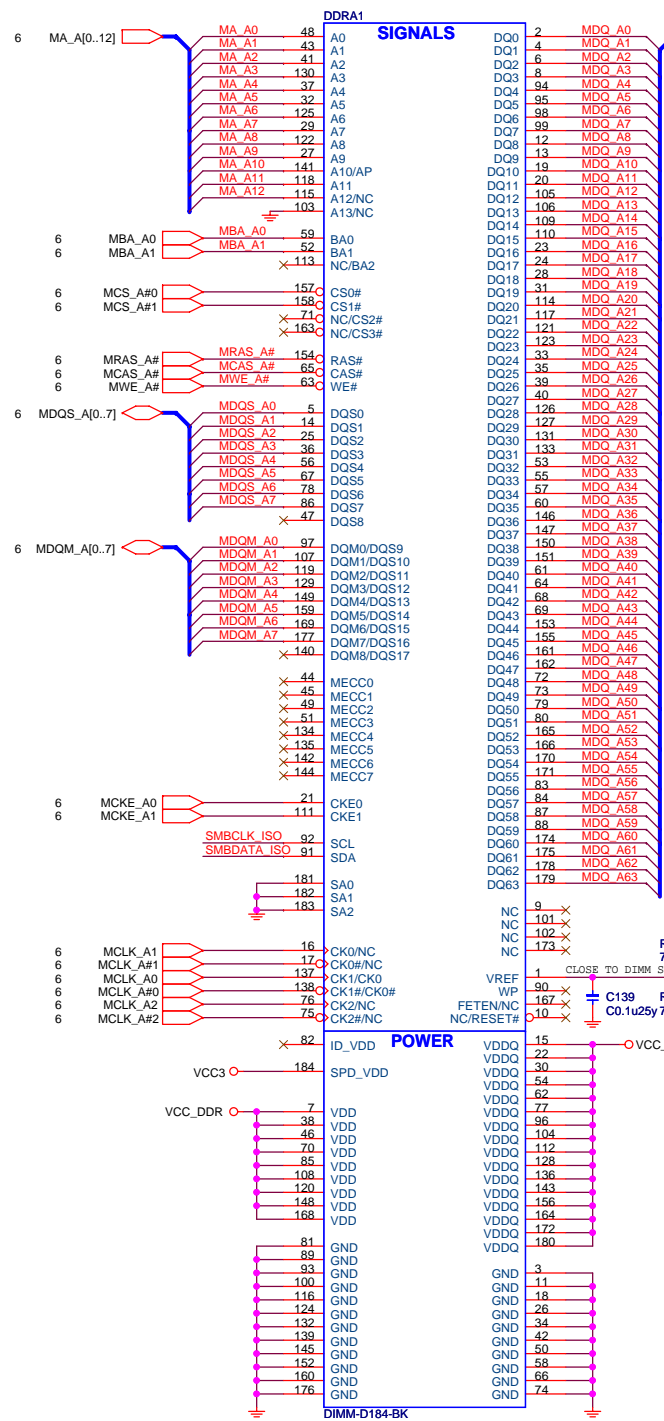
Intel 10/100 LAN 82562EZ



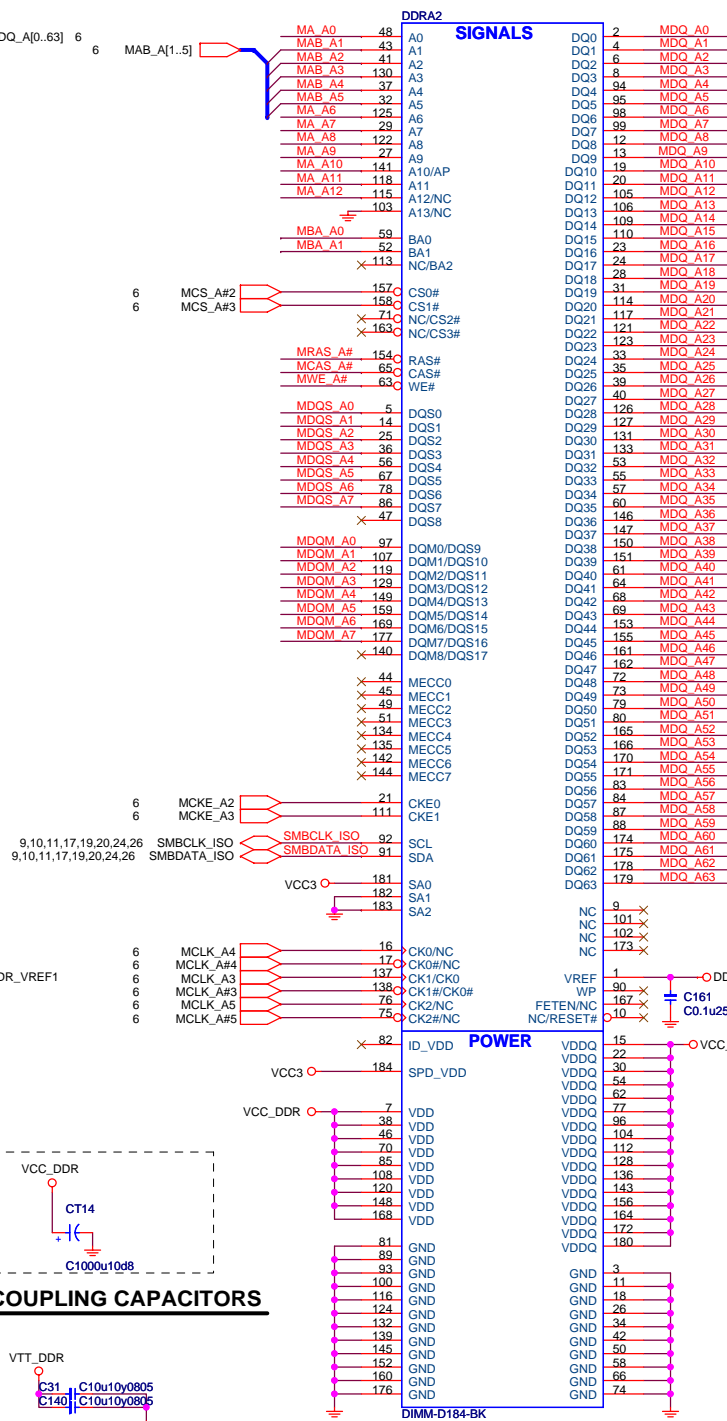
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Size	Document Number		Rev
	Abel/Totoro MS-7040		130
Date:	Friday, September 09, 2005		Sheet 14 of 33



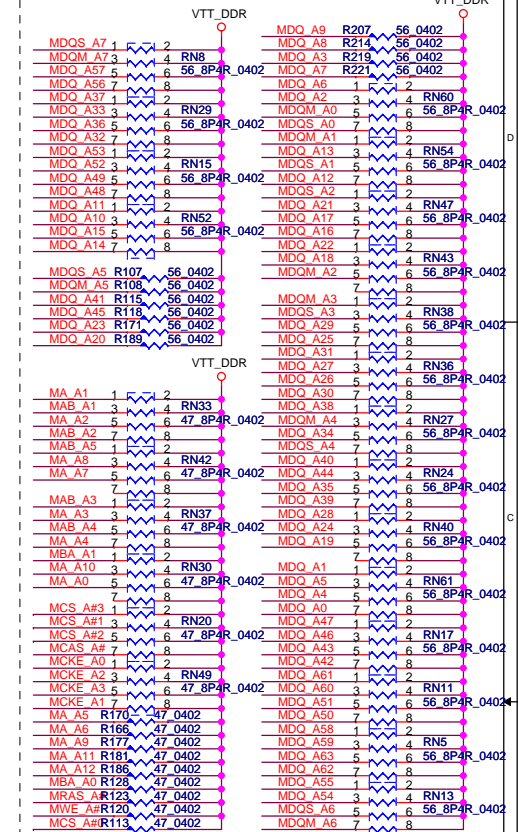
DDR DIMM1



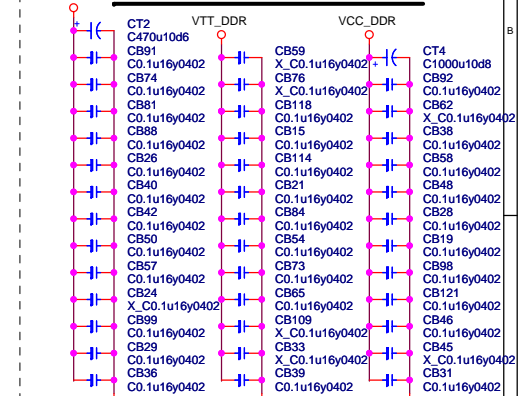
DDR DIMM2



DDR Terminational Resisitors



DECOUPLING CAPACITORS

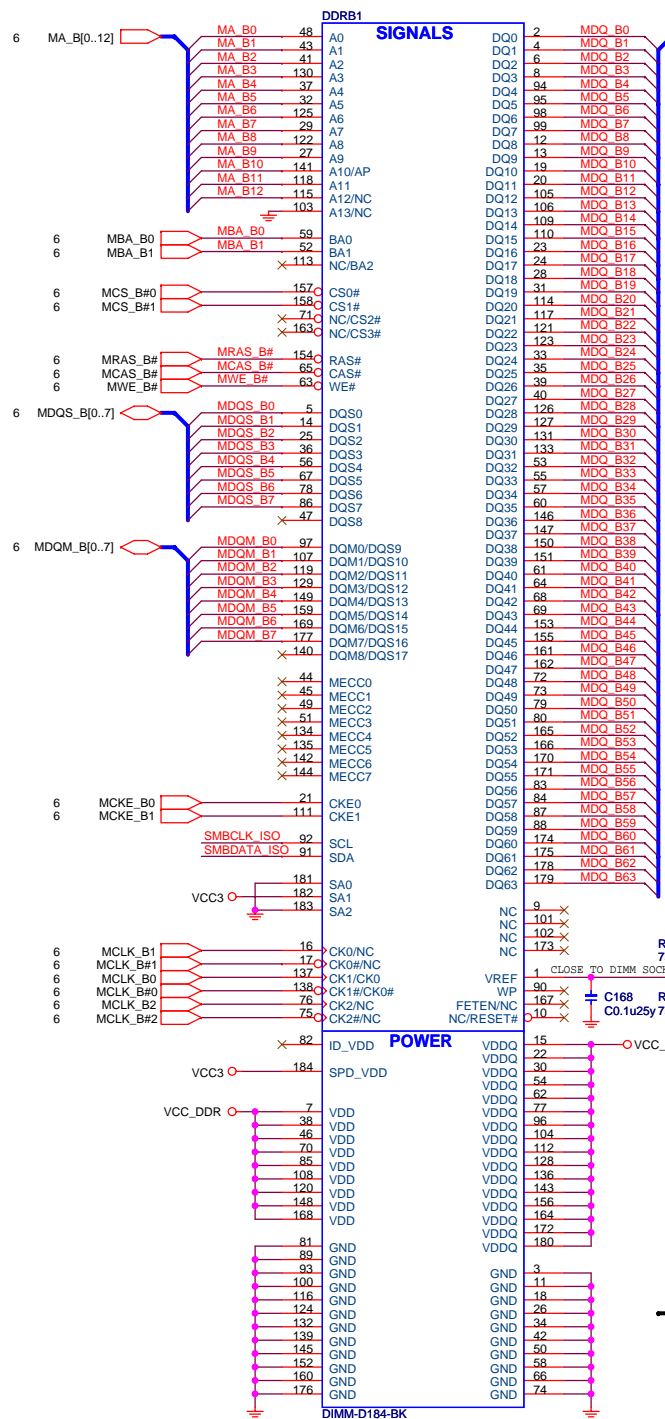


Place these decoupling capacitors close to VTT_DDR termination resistors.
One decoupling capacitor for each R-pack.

SAMSUNG ELECTRONICS

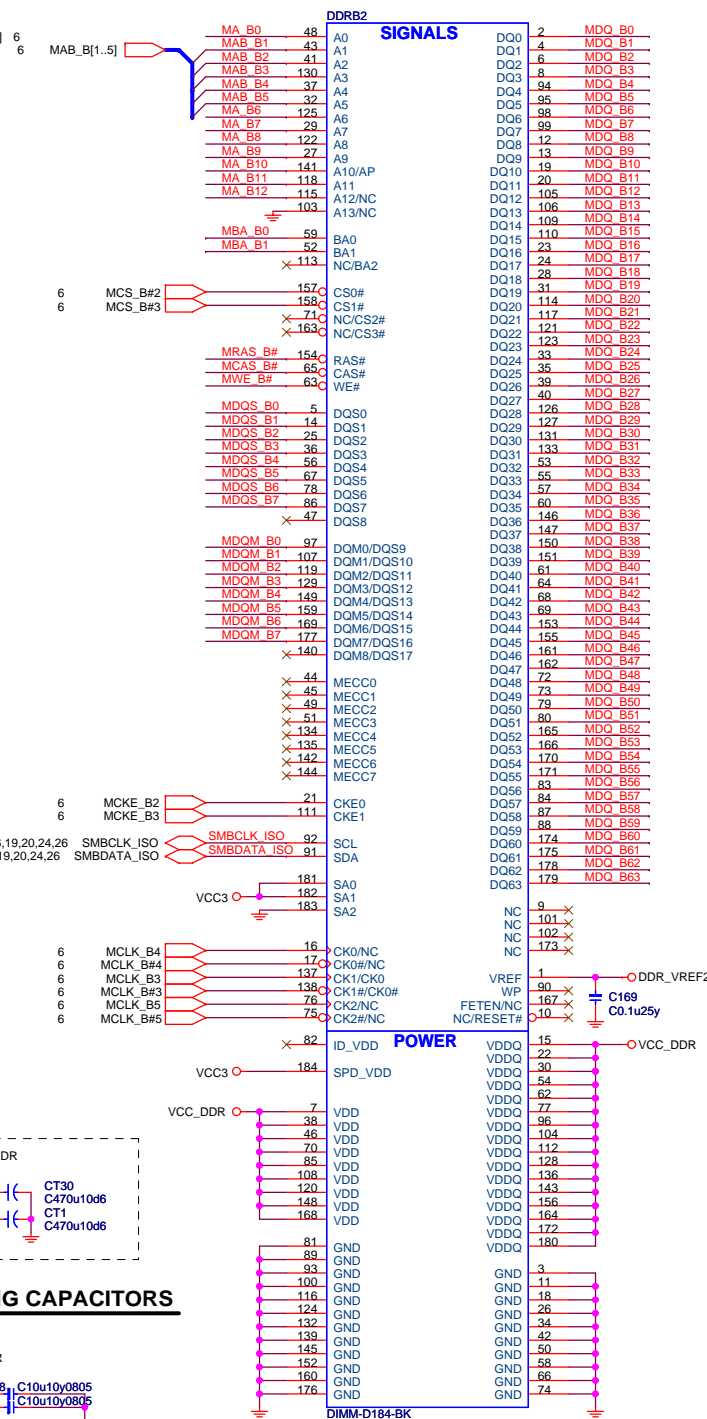
Title			
DDR DIMM 1 & 2			
Size	Document Number	Rev	
	Abel/Totoro MS-7040	130	
Date:	Friday, September 09, 2005	Sheet	16 of 33

DDR DIMM3



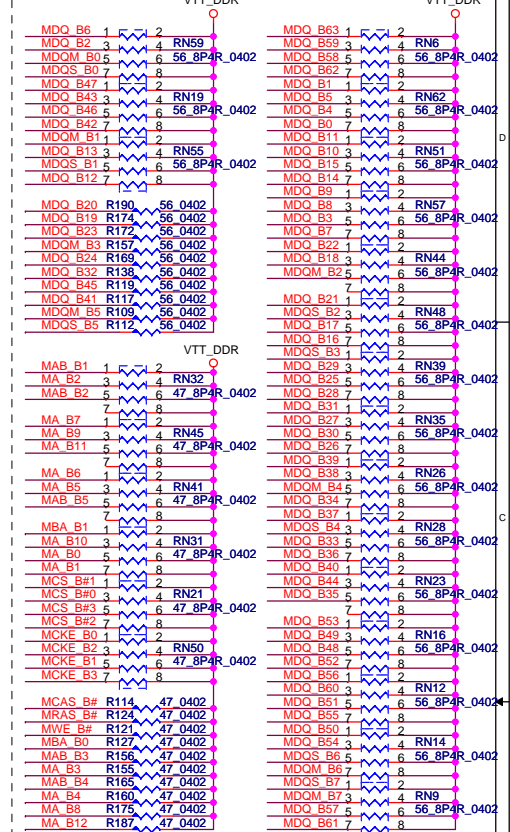
ADDR.=1010010B(A4H)

DDR DIMM4

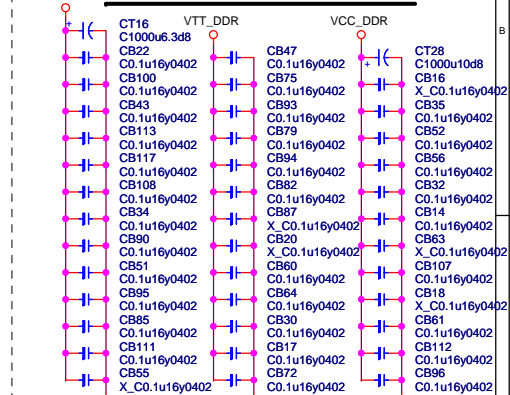


ADDR.=1010011B(A6H)

DDR Terminational Resisitors



DECOUPLING CAPACITORS



Place these decoupling capacitors close to VTT_DDR termination resistors. One decoupling capacitor for each R-pack.

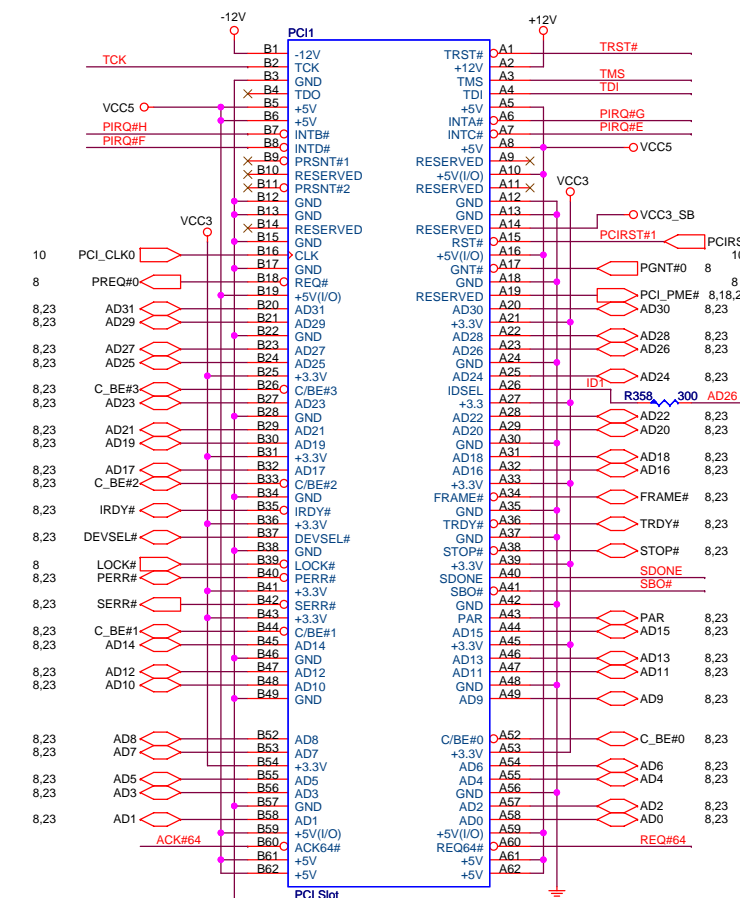
SAMSUNG ELECTRONICS

Title			
DDR DIMM 3 & 4			
Size	Document Number		Rev
	Abel/Totoro MS-7040		130
Date:	Friday, September 09, 2005	Sheet	17 of 33

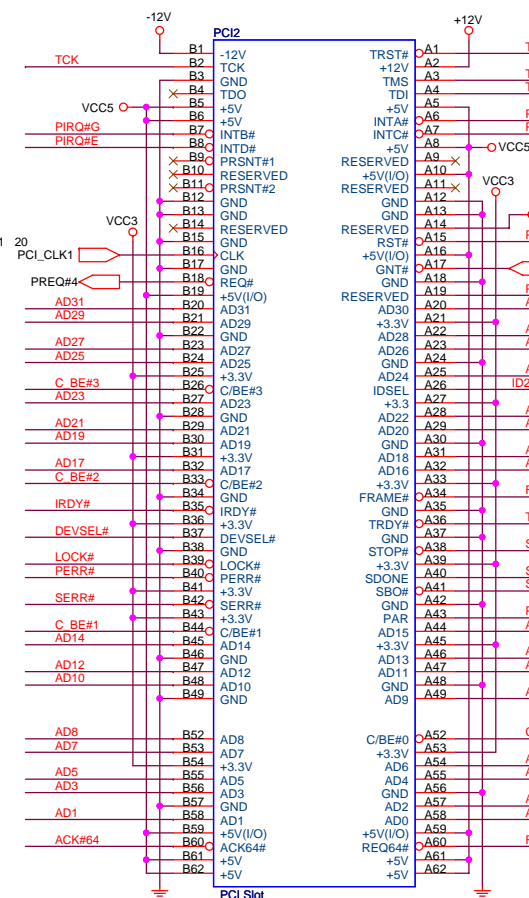
PCI SLOT 1 (PCI VER: 2.2 COMPLY)

PCI SLOT 2 (PCI VER: 2.2 COMPLY)

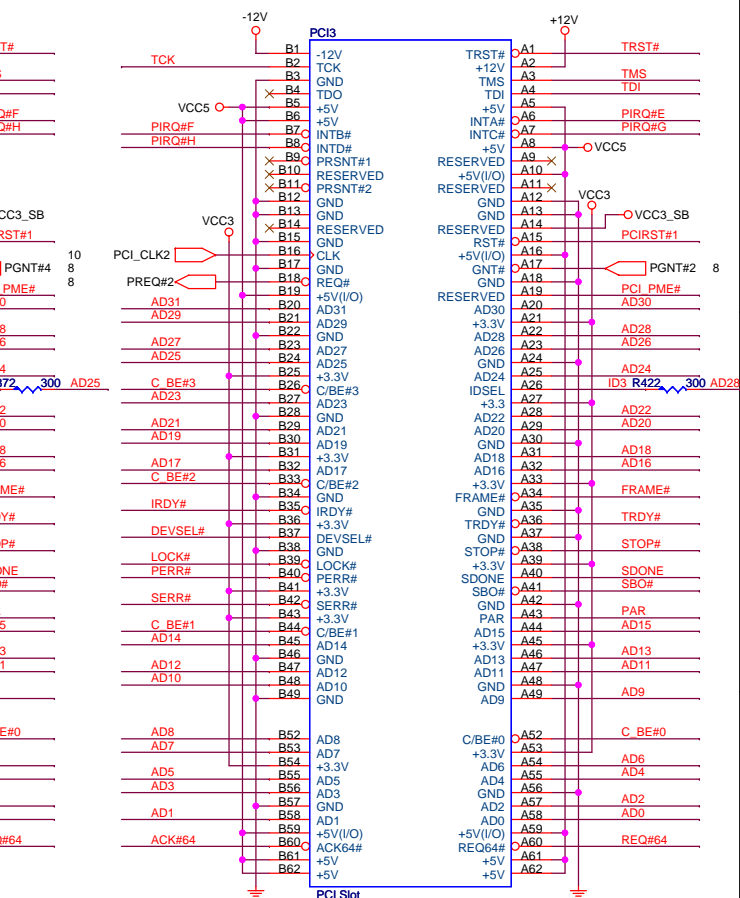
PCI SLOT 3 (PCI VER: 2.2 COMPLY)



IDSEL = AD26
MASTER = PREQ#0
PIRQ#G

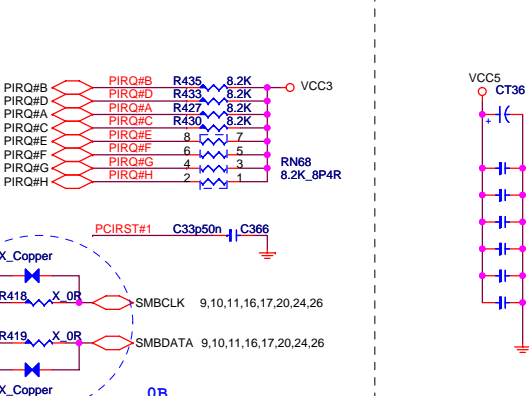
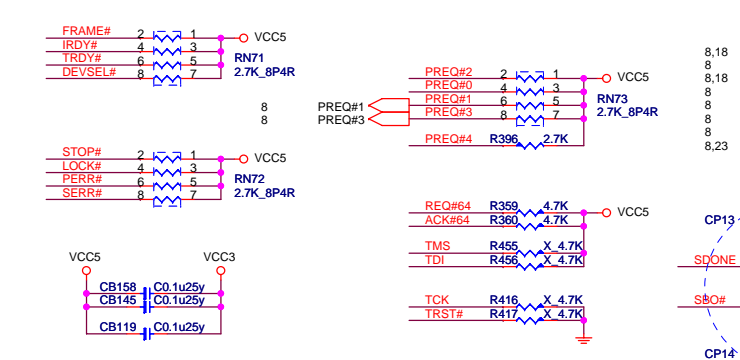


IDSEL = AD25
MASTER = PREQ#4
PIRQ#F

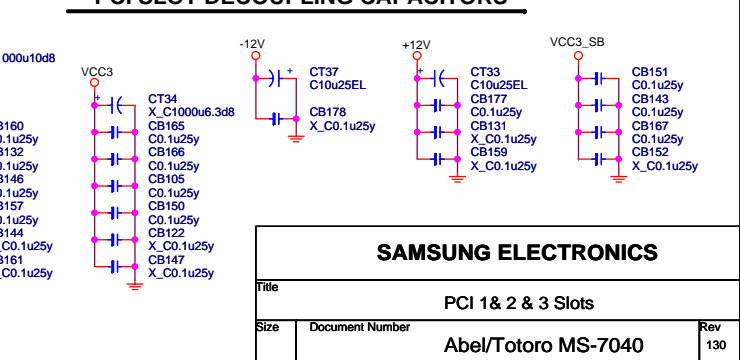


IDSEL = AD28
MASTER = PREQ#2
PIRQ#E

PCI PULL-UP / DOWN RESISTORS



PCI SLOT DECOUPLING CAPACITORS



SAMSUNG ELECTRONICS

Title			PCI 1 & 2 & 3 Slots		
Size	Document Number		Abel/Totoro MS-7040		Rev 130
Date:	Friday, September 09, 2005		Sheet	19 of 33	

SEL0	5VUSB
H	2 MOSFET
L	1 MOSFET

DDR VTT Power

DDR VTT Power

5V DUAL Power

CLOSE REAR CONNECTOR

GMCH VCC_DAC Voltage Supplier

**Place MOSFET
near CPU**

THIS PIN IS OPEN DRAIN OUTPUT

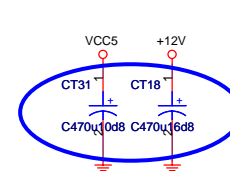
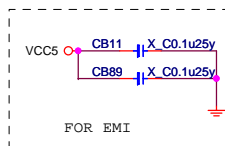
SEL1	VRAM	VRAM_2.5
H	3.3VDUAL	2.5V
TRI-STATE	3.3VSB	2.5V
L	3.3VSTR	1.25V

FOR 3VSB OR 3VSTR
SETTING BY SEL1

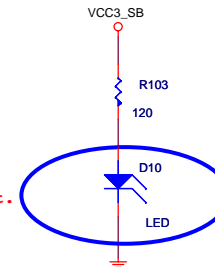
```
** SETTING 3VSTR THEN VRAM_2.5
BECOME TO 1.25 VREF
```

SAMSUNG ELECTRONICS			
Title ACPI (MS-5)			
Size	Document Number		Rev
	Abel/Totoro MS-7040		130
Date:	Friday, September 09, 2005	Sheet	20 of 33

ATX CONNECTOR



*Placement close to ATX connect.



9.13

11 ALARM

SPKR

R458

2.2KR

Q53

MMBT3904LT1-SOT23

Q305

150_8P4R

C305

C0.1u25y

D31

1N4148S

BZ1

BUZZER

VCC5

IDE LED

HDDLED

D34 1N4148S

4.7K R168 VCC5

IDEACTP# 22

D35 1N4148S

4.7K R167 VCC5

IDEACTS# 22

SERIAL ATA LED

D36 1N4148S

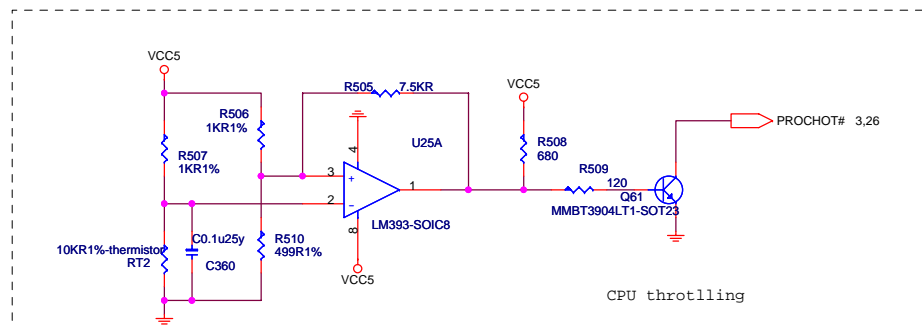
2.2K R106 VCC3

SATA_LED 9,26

SERIAL ATA LED

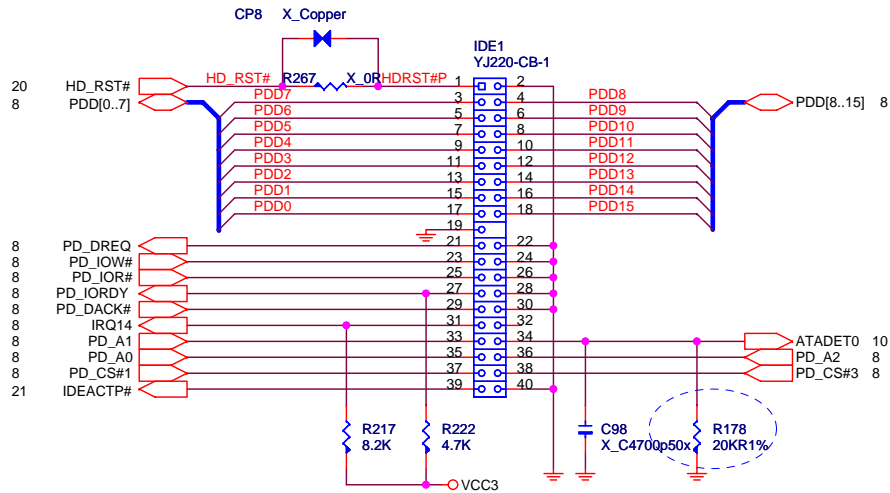
D36 → 1N4148S → 2.2K (R106) → VCC3

SATA_LED 9,26

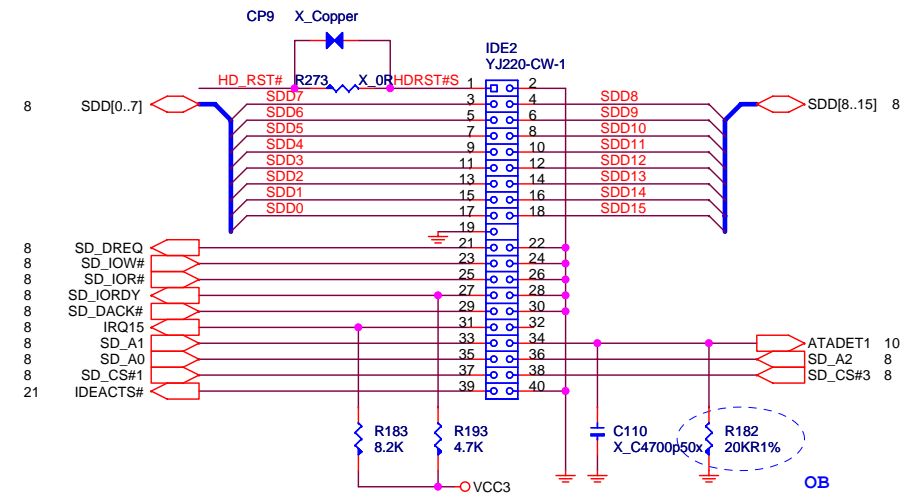


SAMSUNG ELECTRONICS			
Title ATX Connector & Front Panel & Buzzer			
Size	Document Number	Rev	
	Abel/Totoro MS-7040	130	
Date:	Friday, September 09, 2005	Sheet	21 of 33

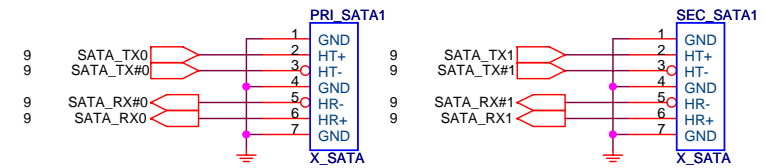
PRIMARY IDE BLOCK



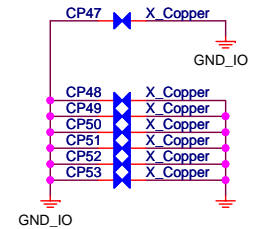
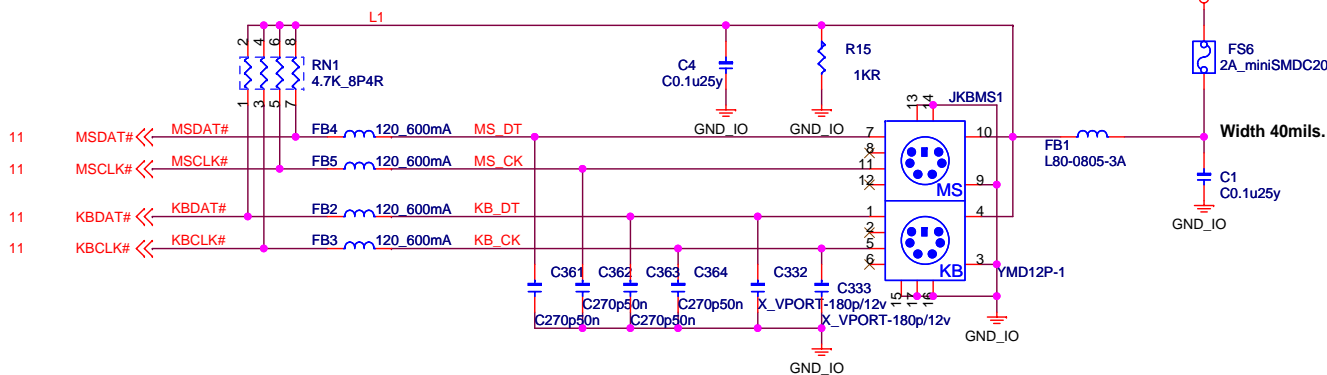
SECONDARY IDE BLOCK



SERIAL ATA CONNECTOR BLOCK



PS2 KEYBOARD & MOUSE CONNECTOR

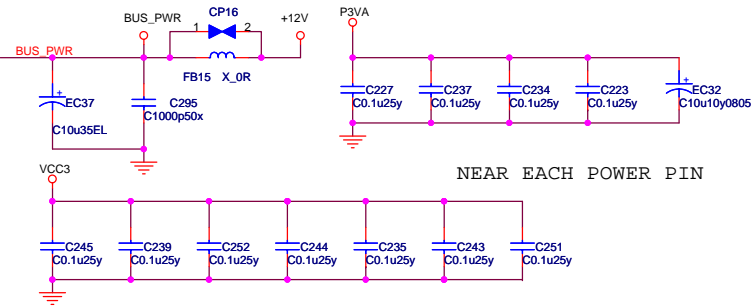


SAMSUNG ELECTRONICS

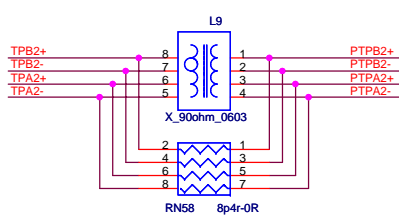
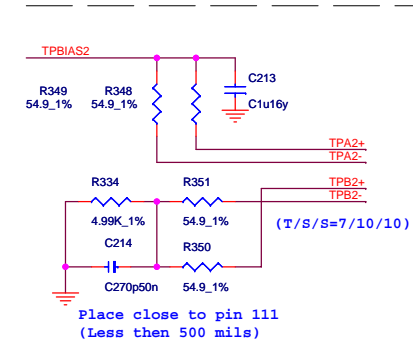
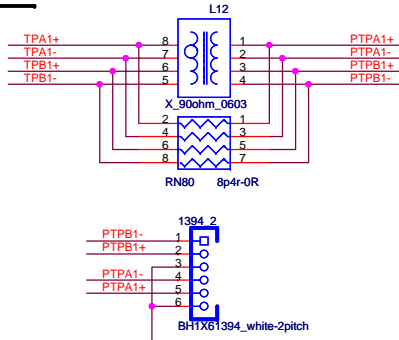
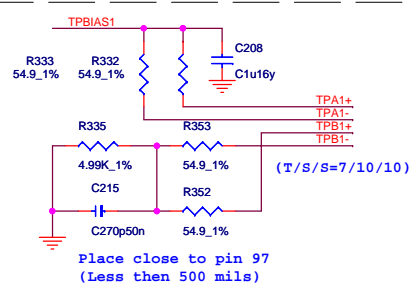
Title			
PS2, IDE, SATA Connectors			
Size	Document Number	Abel/Totoro MS-7040	
Date:	Friday, September 09, 2005	Sheet	22 of 33
		Rev	130

IEEE-1394

support S3 wake-up

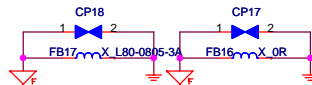
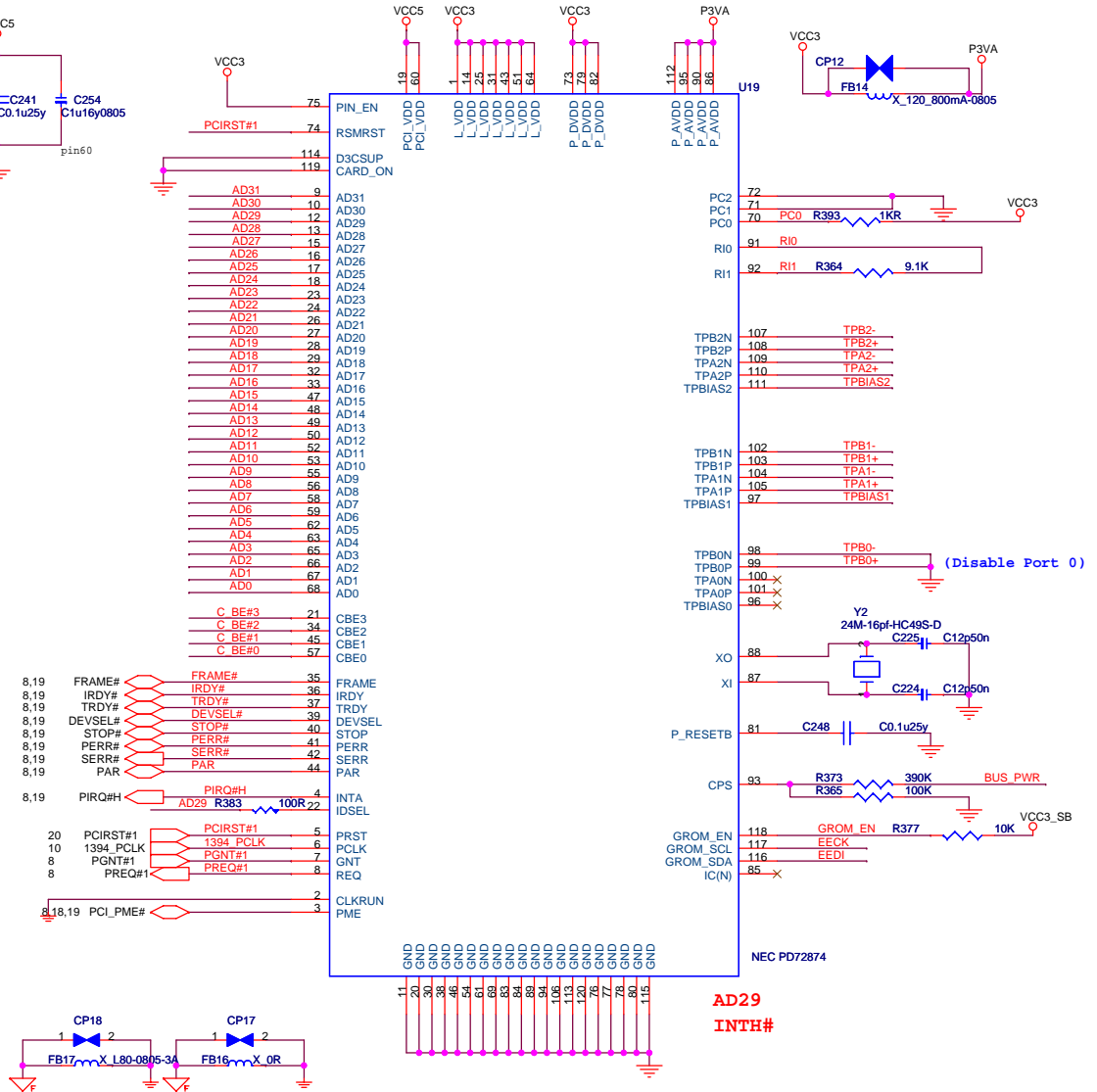
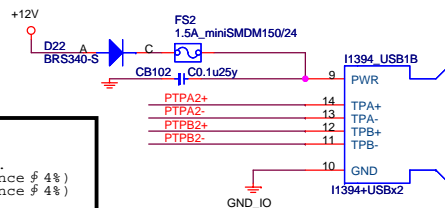


FRONT 1394 PORT 1

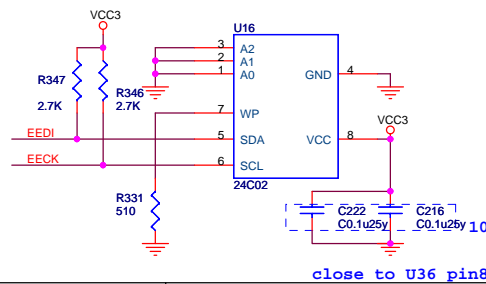


NOTE:

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



1394-EEPROM 24C02

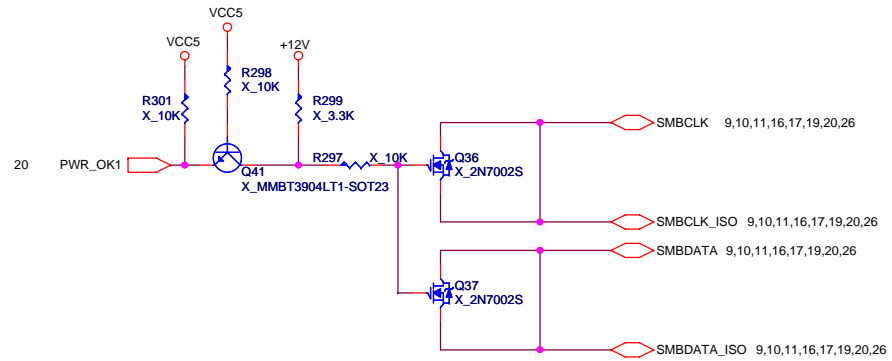
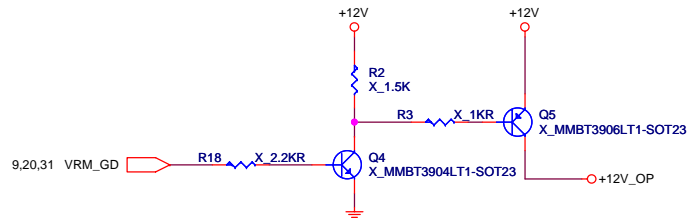


- 8,19 AD[31:0] AD[31:0]
- 8,19 C_BE#[3:0] C_BE#[3:0]

SAMSUNG ELECTRONICS

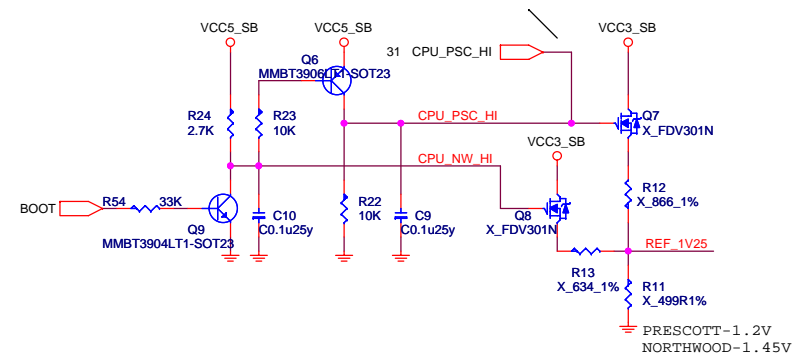
File		NEC 1394	
Size	Document Number	Abel/Totoro MS-7040	
Date	Friday, September 09, 2005	Sheet	23 of 33

GMCH_VTT ON/OFF CIRCUIT

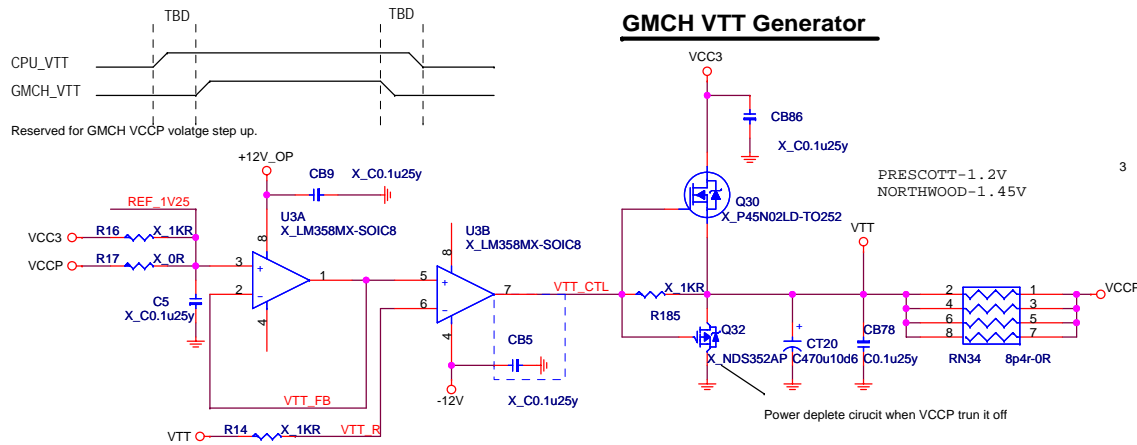


Intel reference GMCH VTT power circuit

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



GMCH VTT Generator



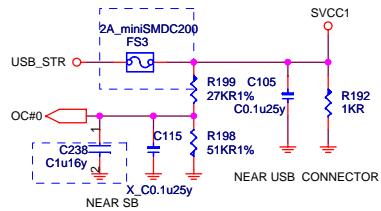
Power deplete circuit when VCCP turn it off

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

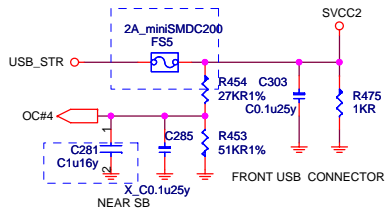
SAMSUNG ELECTRONICS

Title			
GMCH VTT Power Module			
Size	Document Number	Rev	
	Abel/Totoro MS-7040	130	
Date:	Friday, September 09, 2005	Sheet	24 of 33

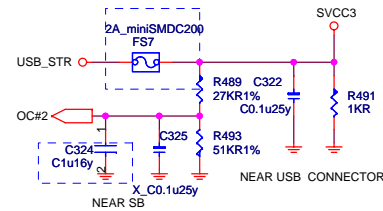
POWER CIRCUIT FOR USB PORT 0,1



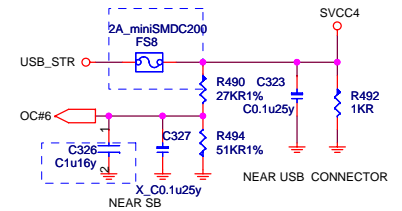
POWER CIRCUIT FOR USB PORT 4,5



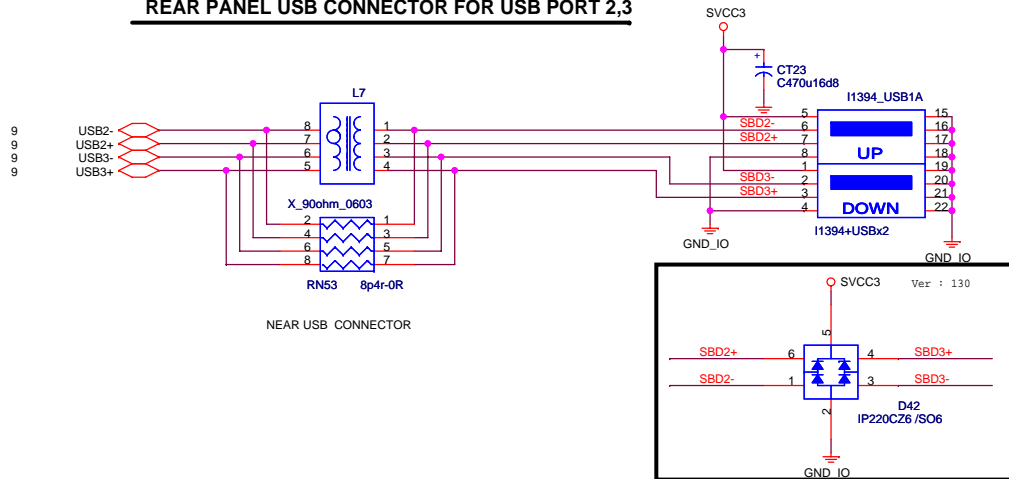
POWER CIRCUIT FOR USB PORT 2,3



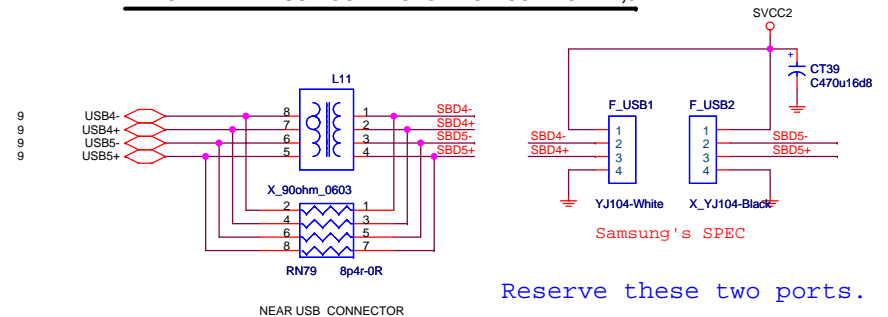
POWER CIRCUIT FOR USB PORT 6,7



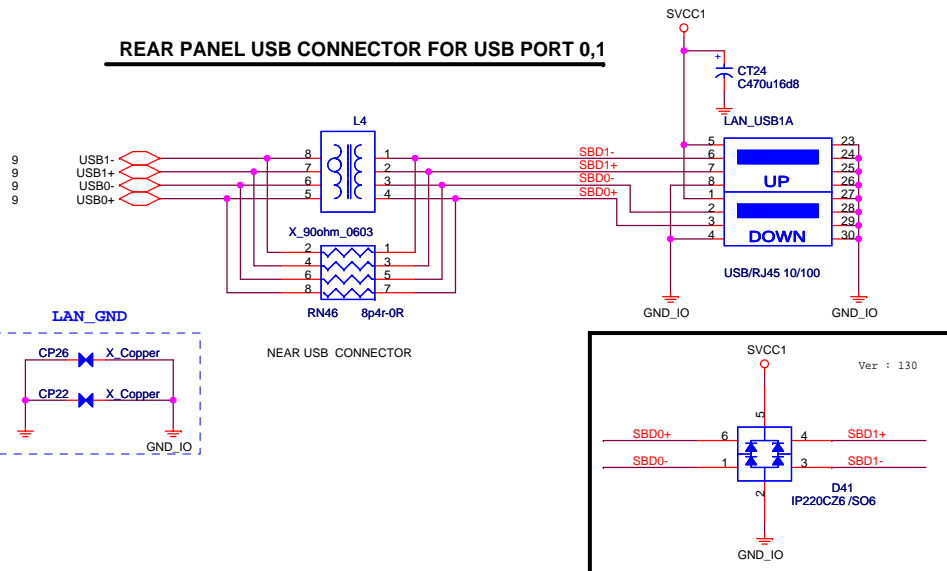
REAR PANEL USB CONNECTOR FOR USB PORT 2,3



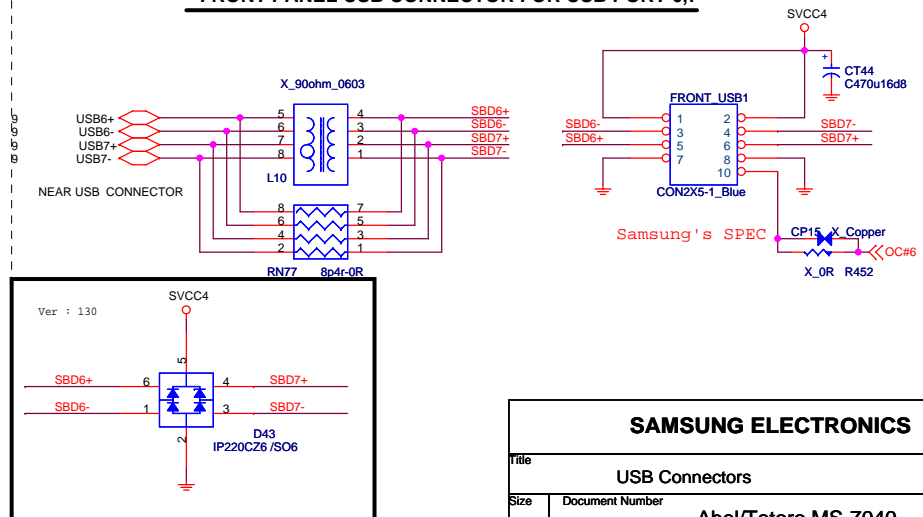
FRONT PANEL USB CONNECTOR FOR USB PORT 4,5



REAR PANEL USB CONNECTOR FOR USB PORT 0,1



FRONT PANEL USB CONNECTOR FOR USB PORT 6,7



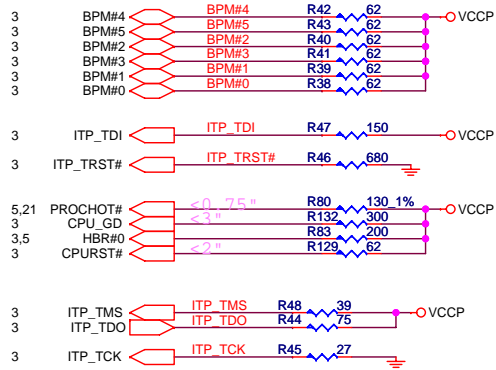
SAMSUNG ELECTRONICS

USB Connectors

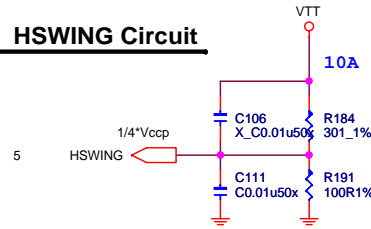
File			
Size	Document Number	Abel/Totoro MS-7040	
Date:	Friday, September 09, 2005	Sheet	25 of 33
		Rev	130

CPU STRAPPING RESISTORS

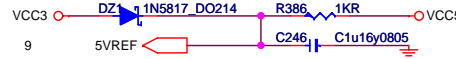
ALL COMPONENTS CLOSE TO CPU



HSWING Circuit



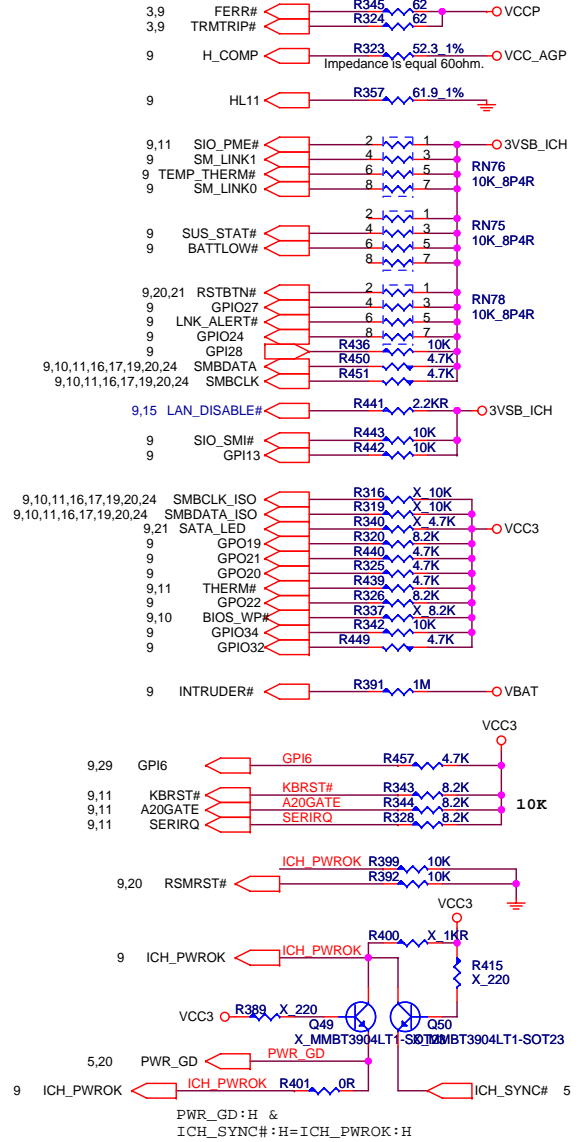
5VREF Sequencing Circuit



ICH5 STRAPPING RESISTORS

ALL COMPONENTS CLOSE TO ICH5

Trace length is less than 3inches to ICH5.



SAMSUNG ELECTRONICS

CPU & GMCH & ICH5 PULL UP / DOWN RESISTORS			
Title	Abel/Totoro MS-7040		
Size	Document Number	Rev	130
Date:	Friday, September 09, 2005	Sheet	26 of 33

12:12<1"



12:10<1"GMCH



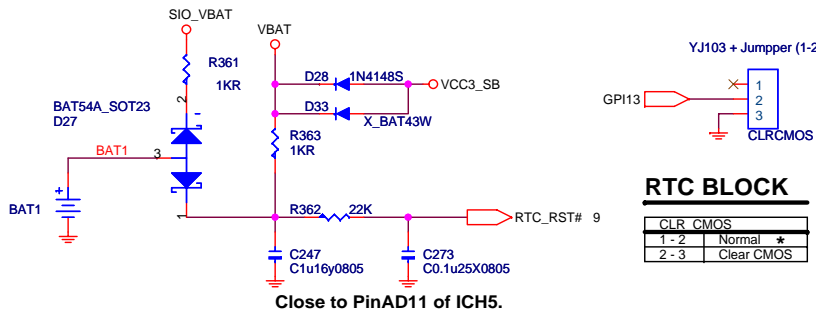
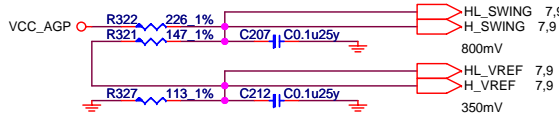
12:10<1"GMCH



12:10<1"GMCH



12:10<1"GMCH



RTC BLOCK

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

Close to PinAD11 of ICH5.

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 (multifunction pin)
GPIO 41	I	Unused (multifunction pin)
GPIO 48	O	PGNT#4 (multifunction pin)
GPIO 49	OD	CPU_GD (multifunction pin)

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

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

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	IRRX
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	

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

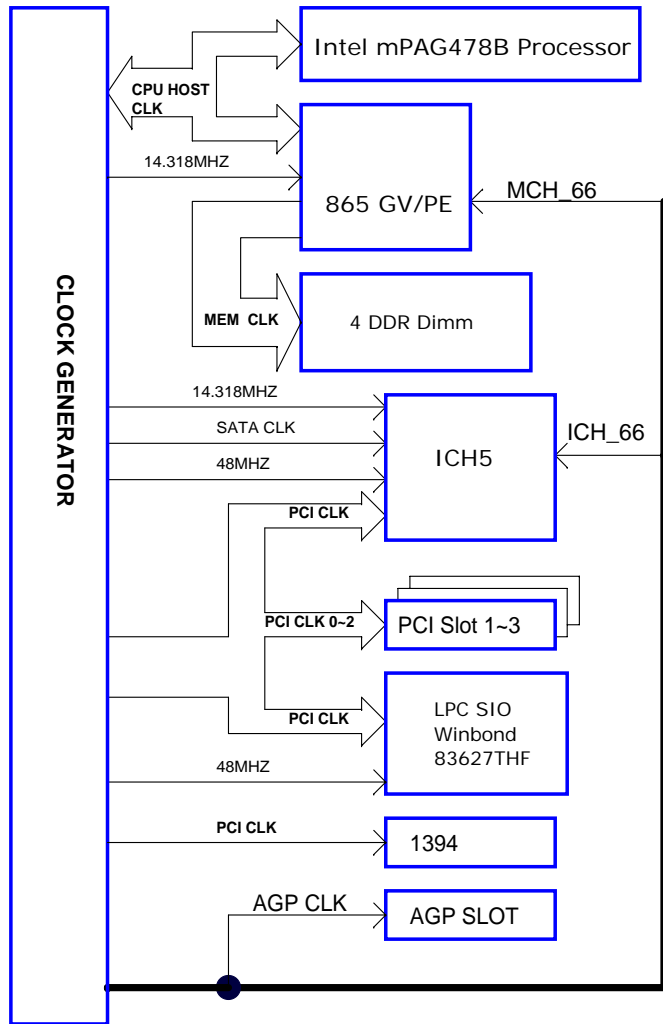
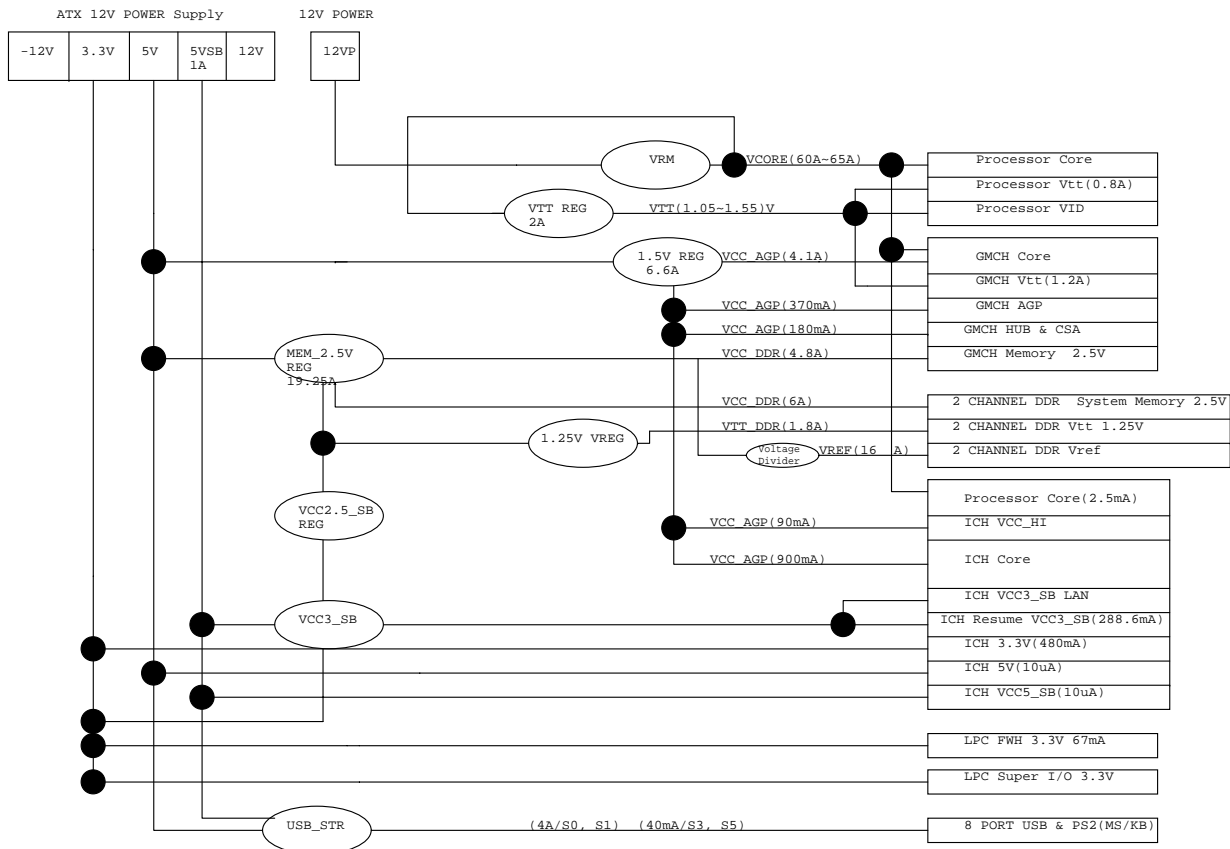
JUMPER SETTING

CLRCMOS	(1-2) NORMAL	(2-3) CLEAR
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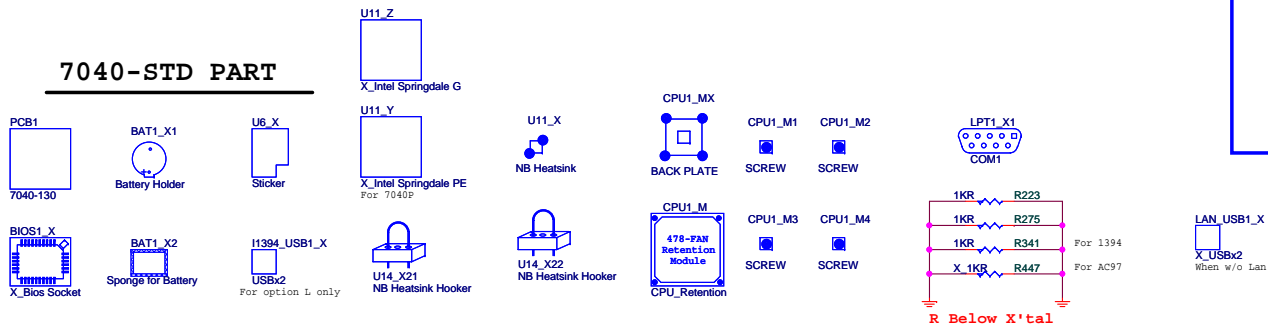
SAMSUNG ELECTRONICS

Title General Purpose Spec & JUMPER SETTING			
Size	Document Number Abel/Totoro MS-7040		Rev 130
Date:	Friday, September 09, 2005	Sheet 27	of 33

POWER DELIVERY MAP

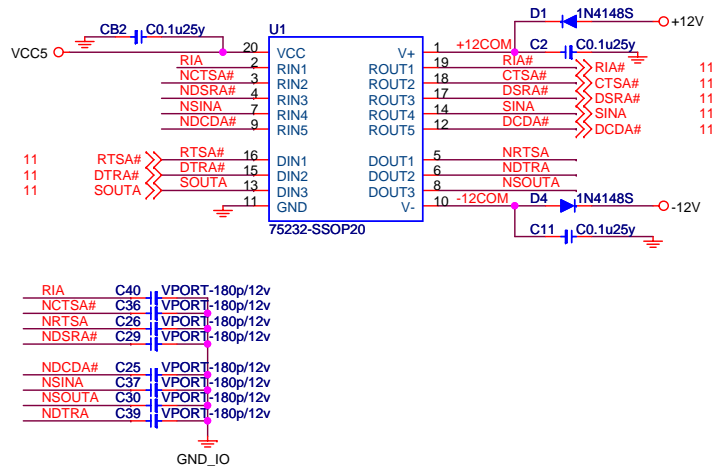


7040-STD PART

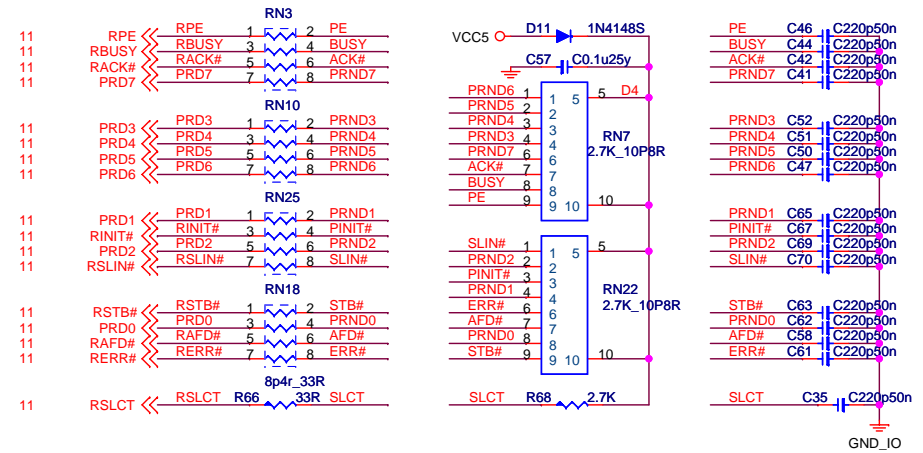


SAMSUNG ELECTRONICS			
Title POWER DELIVERY MAP & MANUAL PART			
Size	Document Number		Rev
	Abel/Totoro MS-7040		130
Date:	Friday, September 09, 2005	Sheet	28 of 33

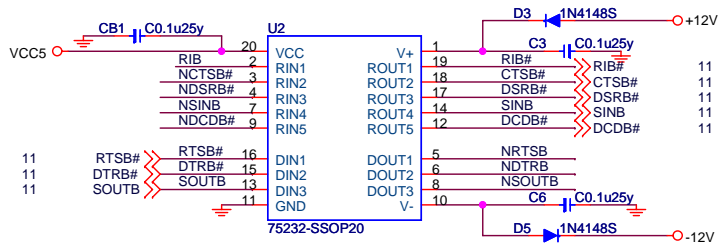
SERIAL PORT 1



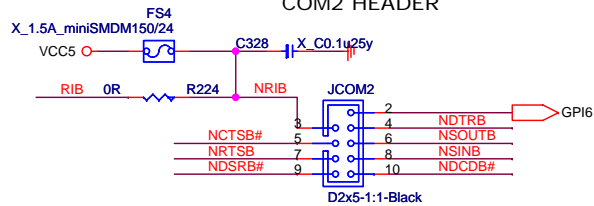
PARALLAL PORT



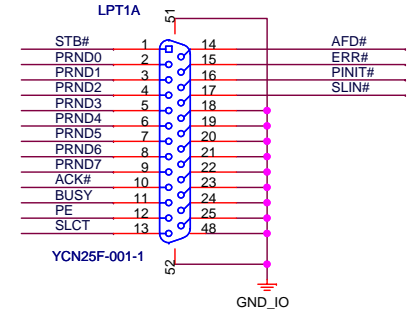
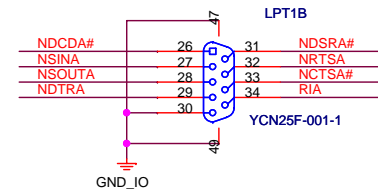
SERIAL PORT 2



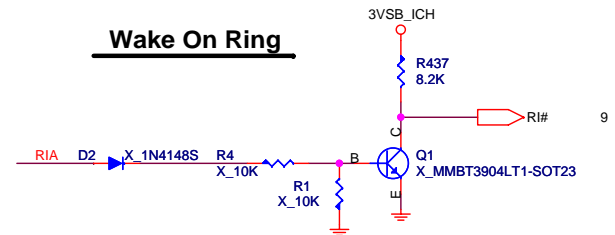
COM2 HEADER



Samsung's SPEC

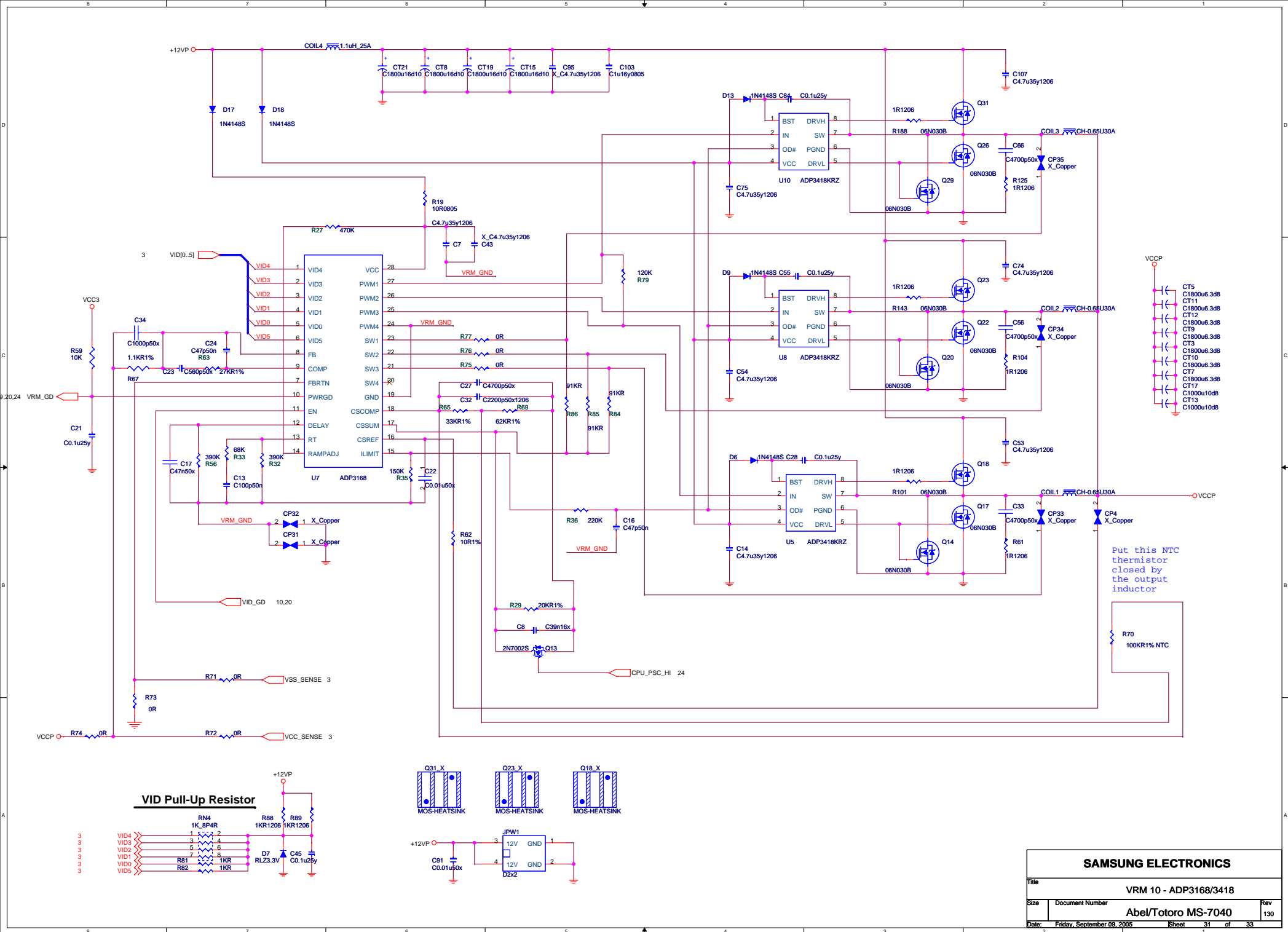


Wake On Ring



SAMSUNG ELECTRONICS

Title		
COM,LPT,RING WEAKER UP		
Size	Document Number	Rev
	Abel/Totoro MS-7040	130
Date:	Friday, September 09, 2005	Sheet 29 of 33



Jan. 28

1. Page 12 : stuff D12, D14, D15, D16 by EMI.

Jan. 30

1. Page 14 : un-stuff C100, C159, C331.
2. Page 30 : stuff C152, C182 with 470p 0603, C167, C177 with 470p 0805 by EMI.
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.

Jun. 28

1. Page 6 : change C86 to X5R 10%; C87 C142 to X7R 10%.

120

Jul. 2

1. Page 13 : change C259 to 1u 25V 0805 X7R 10%.
2. Re-arrange the inner layer where the string " Made in China" is located in audio area.

Sep. 14

1. Page 31 : change U5, U8, U10 from ADP3418JR to ADP3418KRZ.

Oct. 19

1. Page 16, 17 : change DDRA1, DDRB1 to N13-1840051-F02 (AT09211-D7L); change DDRA2, DDRB2 to N13-1840121-A10 (1470069-4) & N13-1840021-F02 (AT09211-D7).
2. Page 3, 4 : remove CPU source N12-4780020-F02 (PZ47807-2748-01).

Nov. 5

1. Page 13 : remove JAUx1 for cost-down.
2. Page 25: remove F_USB2 for cost-down.
3. Page 22 : remove PRI_SATA1 and SEC_SATA1 for cost-down.

Jan. 07, 2005

1. Page 25 : add CN2, CN3 with protection diode, EGA1206V12A.

130

Jan. 27, 2005

1. Page 25 : add IP4220CZ6 for USB port 0, 1, 2, 3, 6, 7.

Jan. 31, 2005

1. Page 10 : change R461 from pull-high(3.3V) to hull-down(GND).
2. Page 9 : change R420, R421 from 0603 to 0402.
3. Page 25: delete CN2, CN3.

Feb. 18

4. Page 10 : change R461 to 10K ohm.

SAMSUNG ELECTRONICS

Title			
History 2			
Size	Document Number		Rev
	Abel/Totoro MS-7040		130
Date:	Friday, September 09, 2005	Sheet	33 of 33