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Lotus-13

CPU : Sandy Bridge ULV
Chip Set : Intel Cougar Point
GFX : INTEL HD 3000
Remarks : Huron River

Model Name : Lotus-13

PBA Name : MAIN

PCB Code : BA41-01091A (GCE)
BA41-01092A (NY)

Dev. Step : PR

Revision : 0.9

T.R. Date : 2011.11.24

Design	CHECK	APPROVAL
SY KIM	SE LEE	MK KIM

Owner : SEC Mobile R & D Signature : X

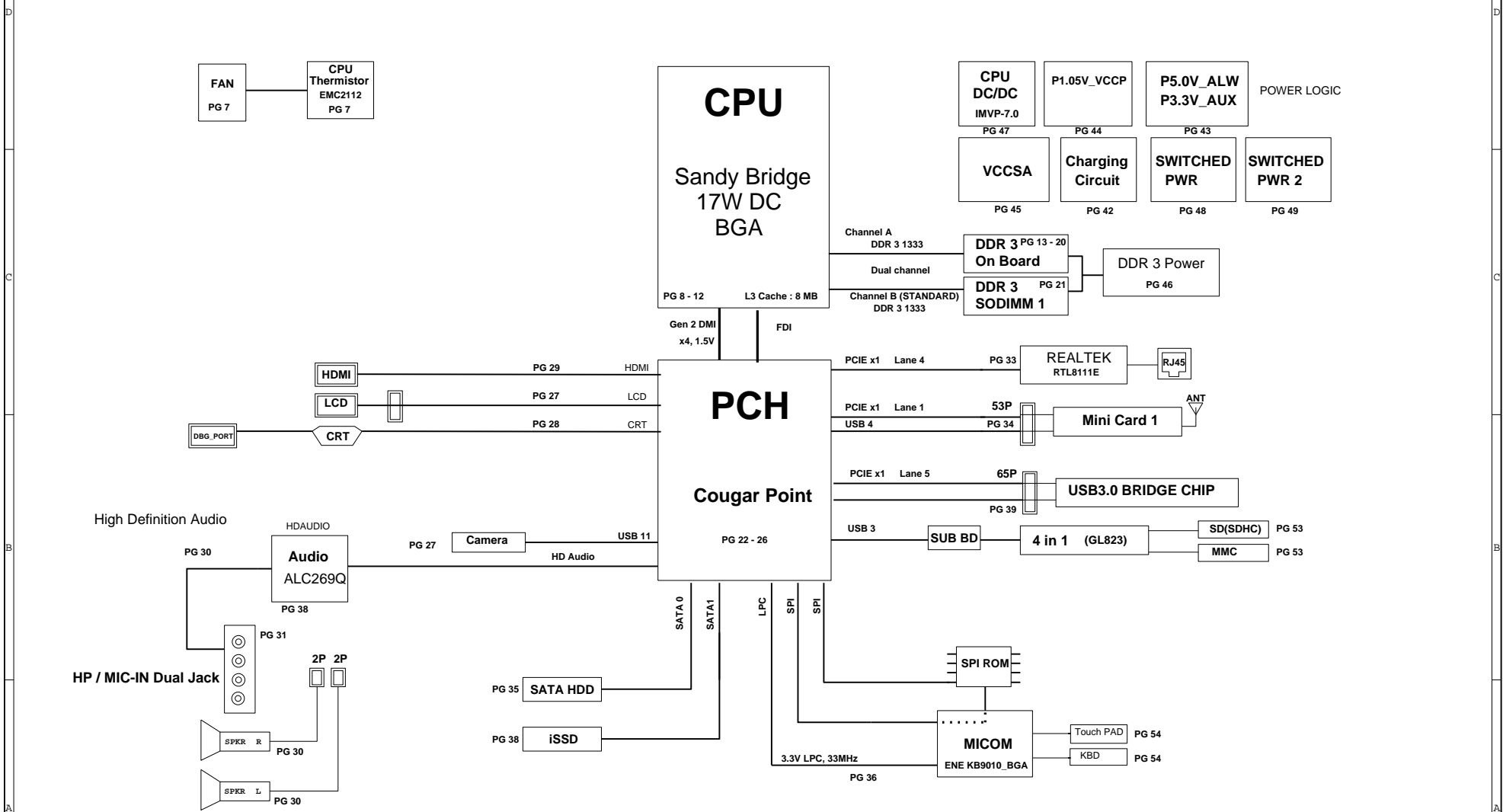
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sheet40 : USB connector
sheet41 : MAIN TO SUB CONNECTOR
sheet42 : Power - charger
sheet43 : Power - P3.3V_AUX / P5.0V_AUX
sheet44 : Power - P1.05V (Chipset Power)
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DRAW	SY KIM	DATE	7/14/2010	TITLE	Lotus-13	SAMSUNG ELECTRONICS
CHECK	SE LEE	DEV. STEP	PV	MAIN		
APPROVAL	MK KIM	REV	REV 0.9	COVER	PART NO. BA41-01091A	
MODULE CODE		LAST EDIT	November 25, 2011 15:12:10 PM			PAGE 1 OF 53

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BLOCK DIAGRAM



DRAW	SY KIM	DATE	7/14/2010	TITLE	Lotus-13 MAIN BLOCK DIAGRAM	SAMSUNG ELECTRONICS
CHECK	SE LEE	DEV. STEP	PV			PART NO. BA41-01091A
APPROVAL	MK KIM	REV	REV 0.9			
MODULE CODE	undefined	LAST EDIT	November 25, 2011 15:12:10 PM	PAGE	2	OF 53

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BOARD INFORMATION

SCHEMATIC ANNOTATIONS AND BOARD INFORMATION

Voltage Rails

VDC	Primary DC system power supply (7 to 21V)	S4 - S5
P3.3V_MICOM	3.3V always power rail (for Micom)	
P5.0V_ALW	5.0V always power rail	
P5.0V_STB	5.0V always power rail	
P5.0V_AUX	5.0V switched on power rail (off in S4-S5)	S3
P3.3V_AUX	3.3V switched on power rail (off in S4-S5)	
P1.5V_AUX	1.5V power rail for DDR3 (off in S4-S5)	
P5.0V	5.0V switched power rail (off in S3-S5)	S0
P3.3V	3.3V switched power rail (off in S3-S5)	
P1.8V	1.8V switched power rail (off in S3-S5)	
P1.5V	1.5V switched power rail (off in S3-S5)	
P0.75V	0.75V power rail for DDR3 (off in S3-S5)	
P0.85V	0.85V switched power rail (off in S3-S5)	
VCC_CORE	Core Voltage for CPU	S0
EGFX_CORE	Core Voltage for GPU	
P1.05V (VCCP)	VCC for COUGARPOINT	

USB PORT Assign

USB PORT Assign		PCI Express Assign	
PORT #	ASSIGNED TO	PORT #	ASSIGNED TO
0	SYSTEM PORT 0	1	Mini Card 1 (WLAN)
1	SYSTEM PORT 1	2	NC
2	Mini PCI Express (WLAN)	3	NC
3	Multi Memory Card Controller	4	LAN CONTROLLER
4	NC	5	USB3.0 BRIDGE
5	NC	6	NC
6	NC (N/A WITH HM65)	7	NC
7	NC (N/A WITH HM65)	8	NC
8	Mini PCI Express (HSPA)		
9	SYSTEM PORT 2		
10	NC		
11	Camera		
12	USIM		
13	NC		

SATA PORT Assign

PORT #	ASSIGNED TO
0	HDD
1	SSD
2	ODD
3	
4	
5	

Crystal / Oscillator

TYPE	FREQUENCY	DEVICE	USAGE
Crystal	32.768KHz	COUGAR POINT	Real Time Clock
Crystal	25MHz	LAN	REALTEK
Crystal	25MHz	COUGAR POINT	
Crystal	27MHz	N12P	
Crystal	24MHz	USB3.0 CHIP	

LCD Pannel Detect (TBD)

Devices	Resolution	PANNEL_DETECT_0

I²C / SMB Address

Devices	Address	Hex	Bus
COUGARPOINT	Master	-	SMBUS Master
CPU Thermal Sensor	0011 000X	30h	
SODIMM0	1010 000x	A0h	Thermal Sensor
SODIMM1	1010 010x	A4h	-
Thermal Sensor on SODIMM0	0011 000x	30h	-
Thermal Sensor on SODIMM1	0011 010x	34h	-
on board DDR3 thermal Sensor	1001 100x	98h	
Platform thermal management TS	1001 011x	96h	

DRAW

SY KIM

DATE

7/14/2010

TITLE

Lotus-13

MAIN

BOARD INFO

SAMSUNG

ELECTRONICS

PART NO.

BA41-01091A

CHECK

SE LEE

DEV. STEP

PV

APPROVAL

MK KIM

REV

REV 0.9

MODULE CODE

undefined

LAST EDIT

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PAGE

3

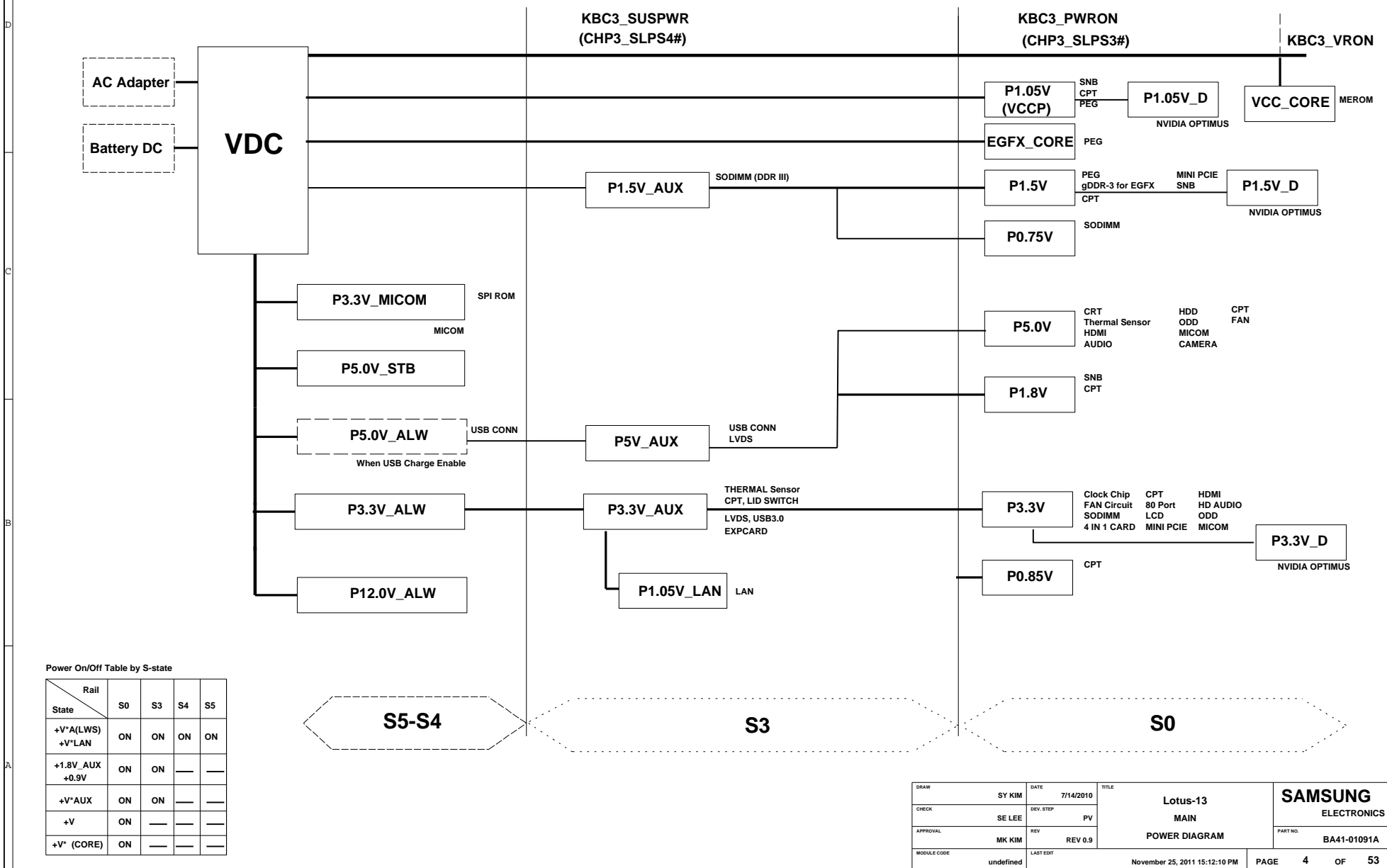
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COM-22C-015(1996.6.5) REV. 3

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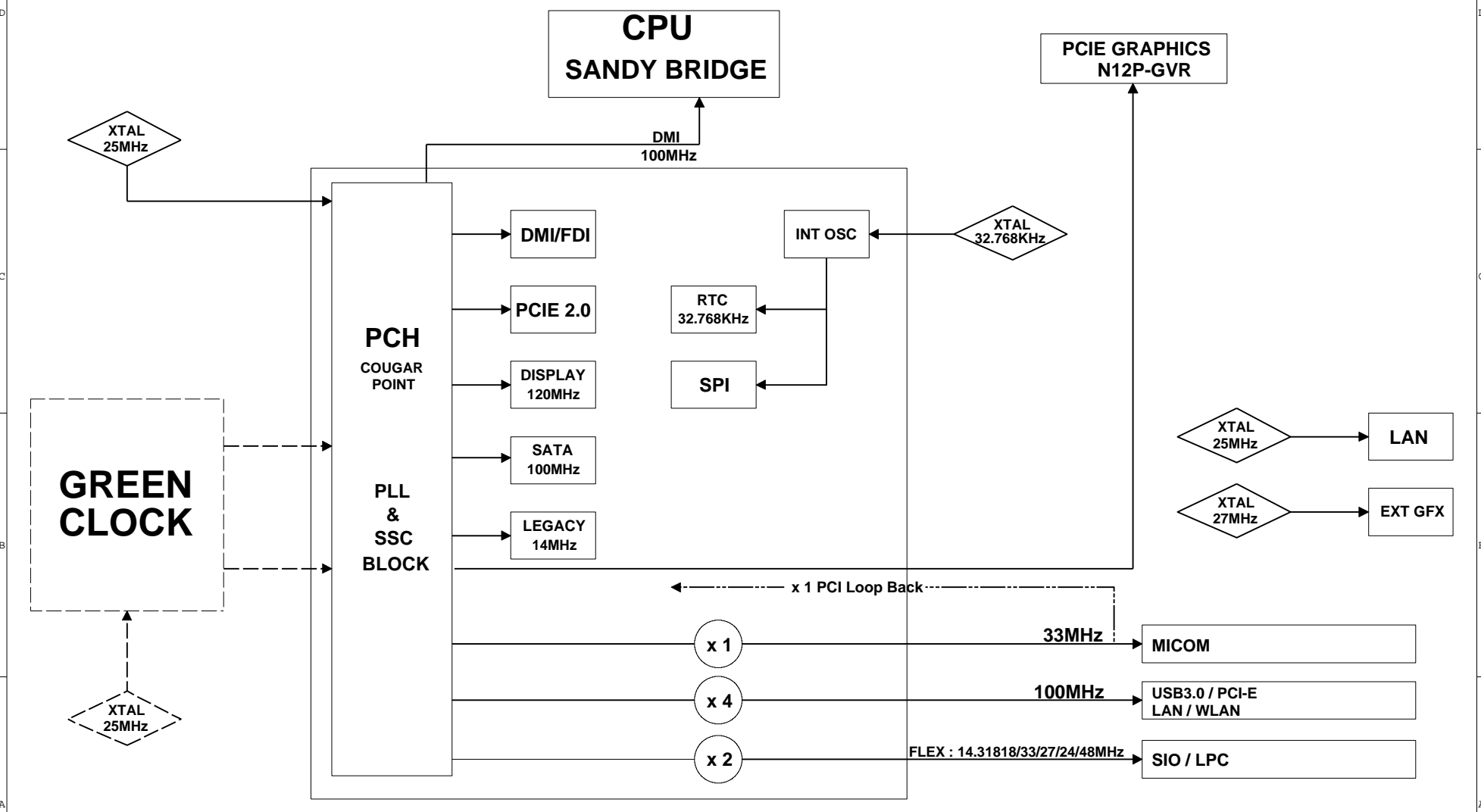
Rev 0.7



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CLOCK DISTRIBUTION

Rev. 0.8



DRAW	SY KIM	DATE	7/14/2010	TITLE	Lotus-13 MAIN CLOCK DIAGRAM	SAMSUNG ELECTRONICS
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APPROVAL	MK KIM	REV	REV 0.9			
MODULE CODE	undefined	LAST EDIT	November 25, 2011 15:12:10 PM	PAGE	5	OF 53

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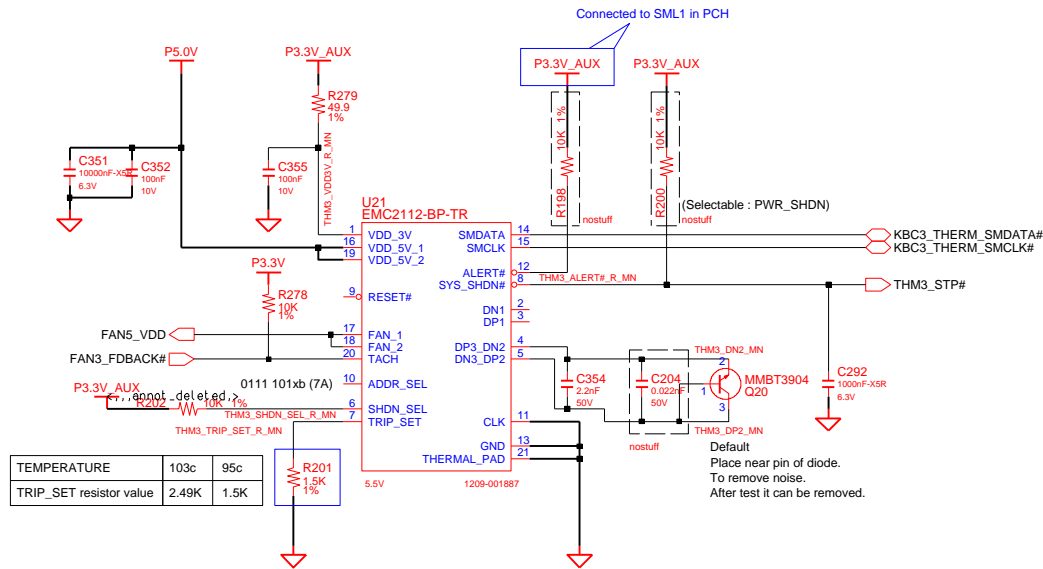
GREENCLK

DESIGN	SY KIM	DATE	1/03/2011	TITLE Lotus-13 CLOCK CLOCK DISTRIBUTION	SAMSUNG ELECTRONICS
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MODULE CODE	LAST EDIT				
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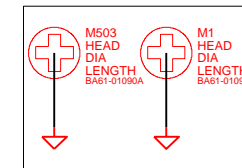
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THERMAL SENSOR & FAN CONTROL

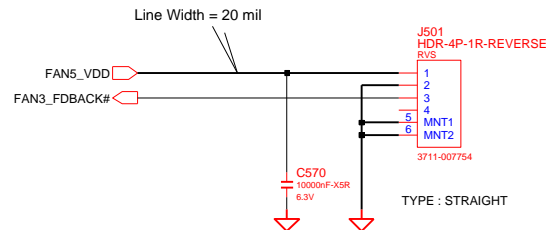


FAN PEM



ADDRESSSEL MODE	
0	0101 111xb
✓ HIGH Z	0111 101xb (7A)
1	0101 110xb

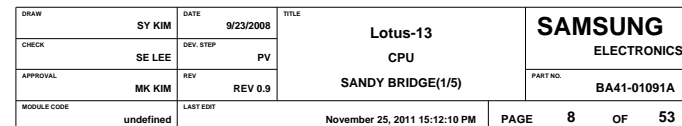
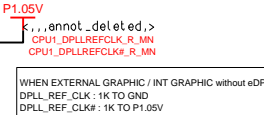
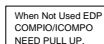
SHDNSEL MODE	
0	INTEL TR MODE
HIGH Z	AMD CPU/DIODE MODE
✓ 1	EXT.DIODE 2 MODE



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CHECK	SE LEE	DEV. STEP	PV		THERMAL SENSOR
APPROVAL	MK KIM	REV	REV 0.9		THERMAL SENSOR EMC2112
MODULE CODE		LAST EDIT	November 25, 2011 15:12:10 PM	PAGE	7 OF 53

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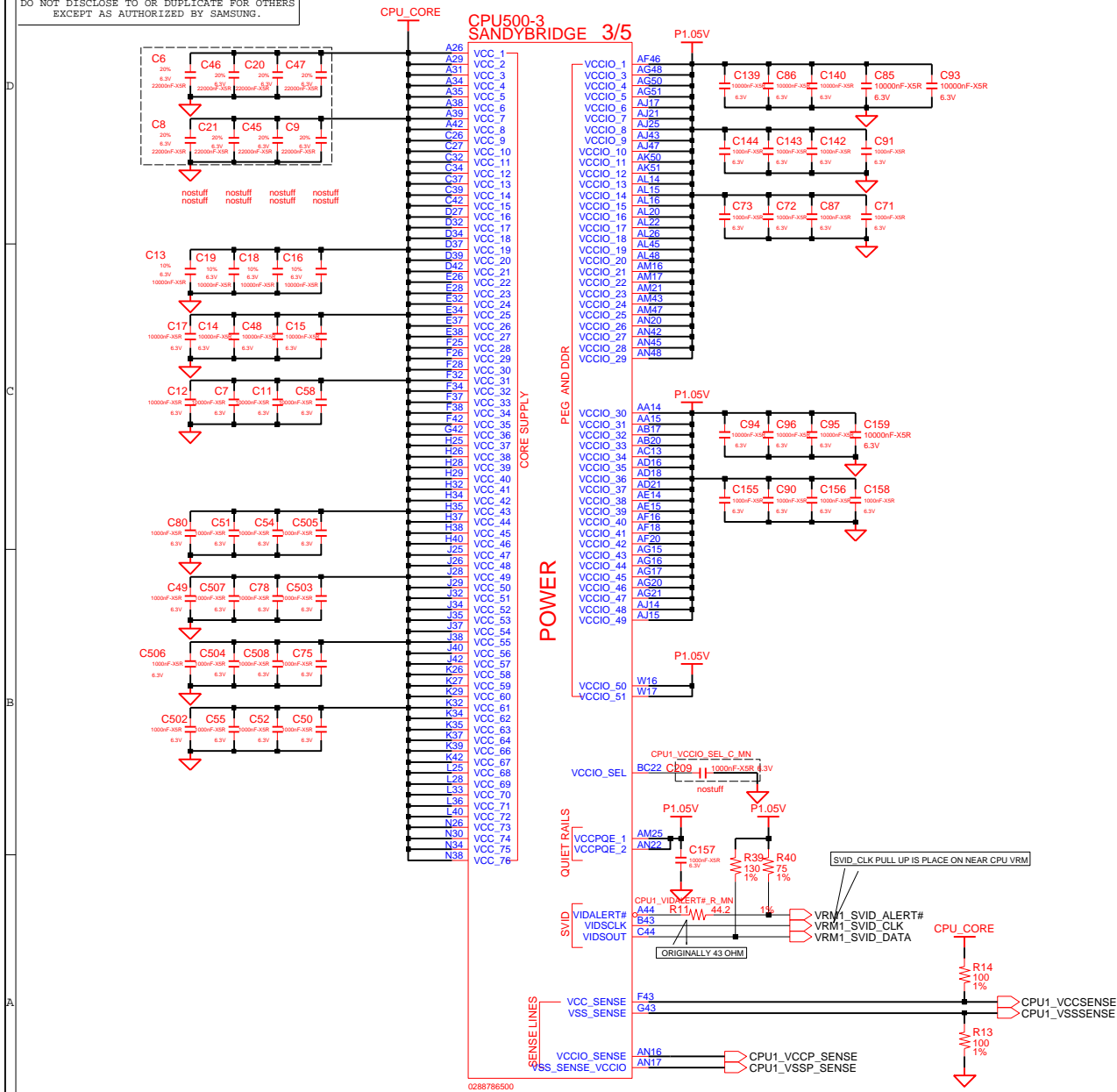
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CPU500-1
SANDYBRIDGE

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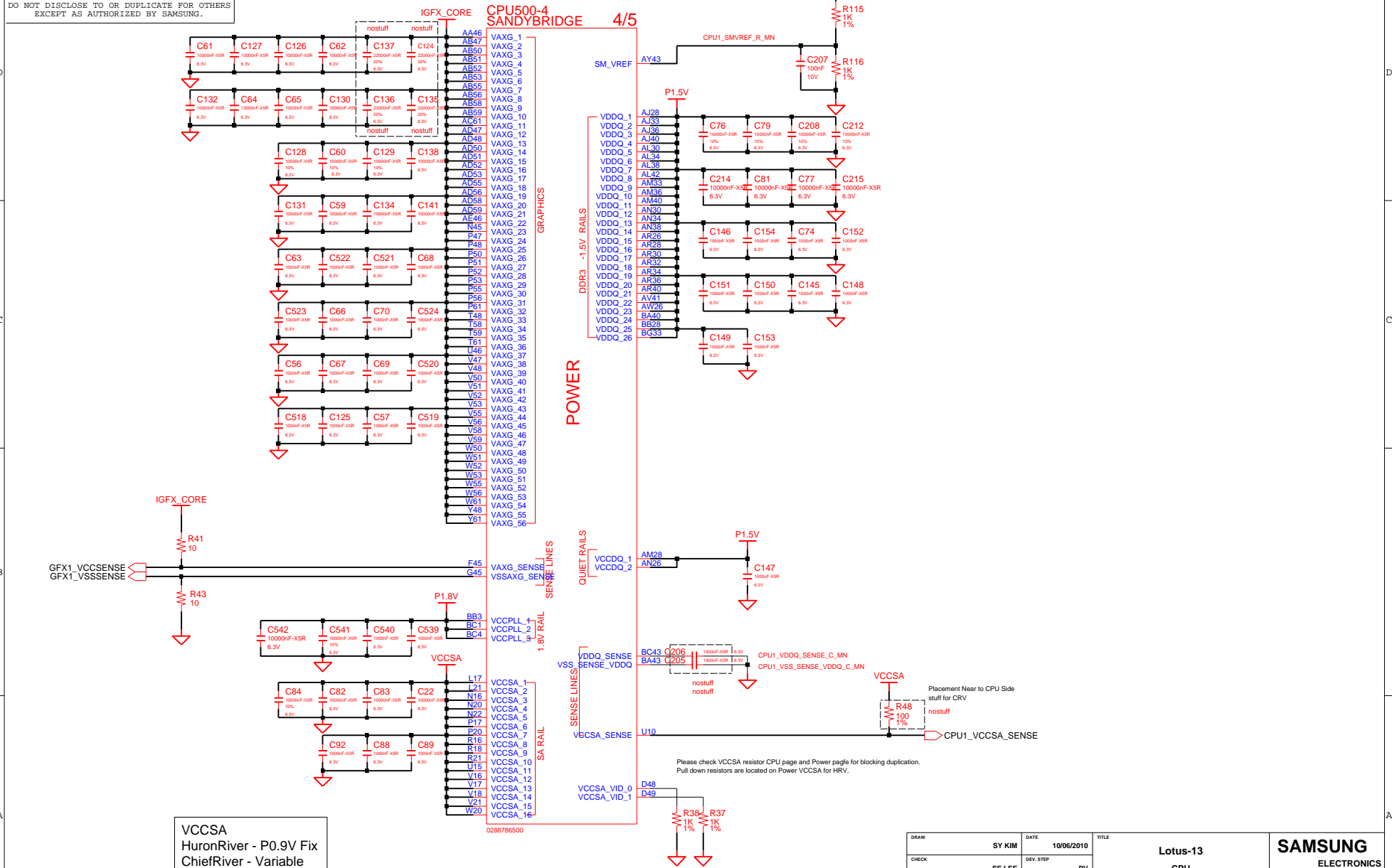
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DESIGN	SY KIM	DATE	6/26/2009	TITLE	Lotus-13 CPU SANDY BRIDGE(3/5)	SAMSUNG ELECTRONICS
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MODULE CODE	LAST EDIT					
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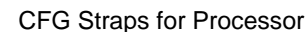
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VCCSA
HuronRiver - P0.9V Fix
ChiefRiver - Variable

DRAW	SY KIM	DATE	10/06/2010	TITLE	Lotus-13 CPU SANDY BRIDGE(4/5)	SAMSUNG ELECTRONICS
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APPROVAL	MK KIM	REV	REV 0.9			
MODULE CODE	undefined	LAST EDIT	November 25, 2011 15:12:10 PM	PAGE	11	OF 53

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PCI Express Static Lane Reversal	
CFG2	1 : Normal operation 0 : Lane Reversed

PCIE PORT BIFURCATION	
CFG[6:5]	1 : Single PEG 0 : Bifunction enabled

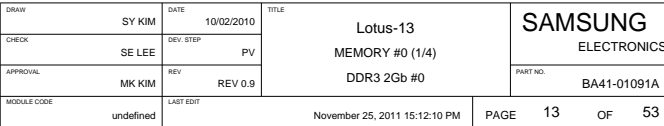
PEG DEFER TRAINING	
CFG7	1 : (DEFAULT) PEG TRAIN IMMEDIATELY FOLLOWING XXRESETB DEASEERTION 0 : PCIE 2.0 PEG WAIT FOR BIOS FOR TRAINING

Display Port Presence	
CFG4	1 : Disabled - No DP device is connected to eDP
	0 : Enabled - (DP device is connected to eDP

DESIGN	SY KIM	DATE	8/19/2009	TITLE Lotus-13 CPU SANDY BRIDGE(5/5)	SAMSUNG ELECTRONICS
CHECK	SE LEE	DEV. STEP	PV		
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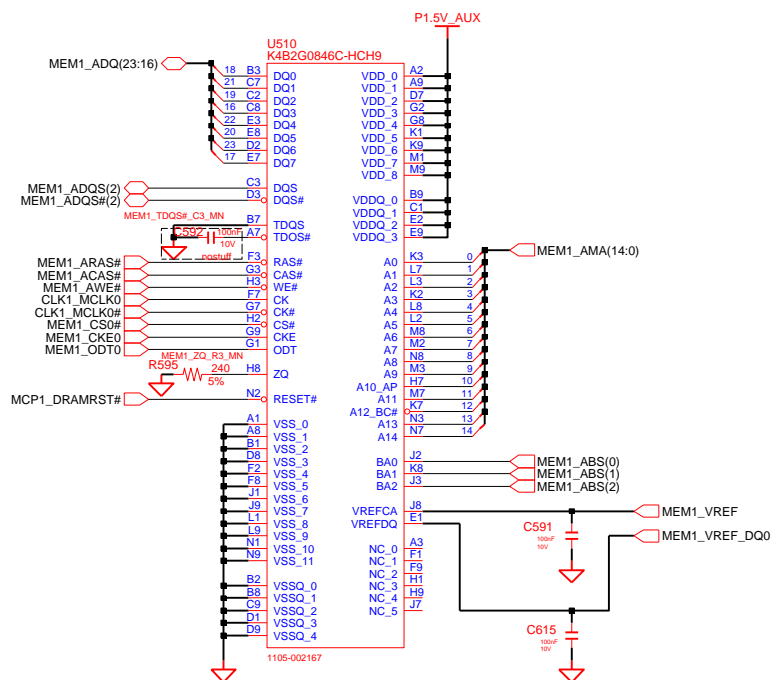
DDR3 on board #0 (1/4)

1 RANK

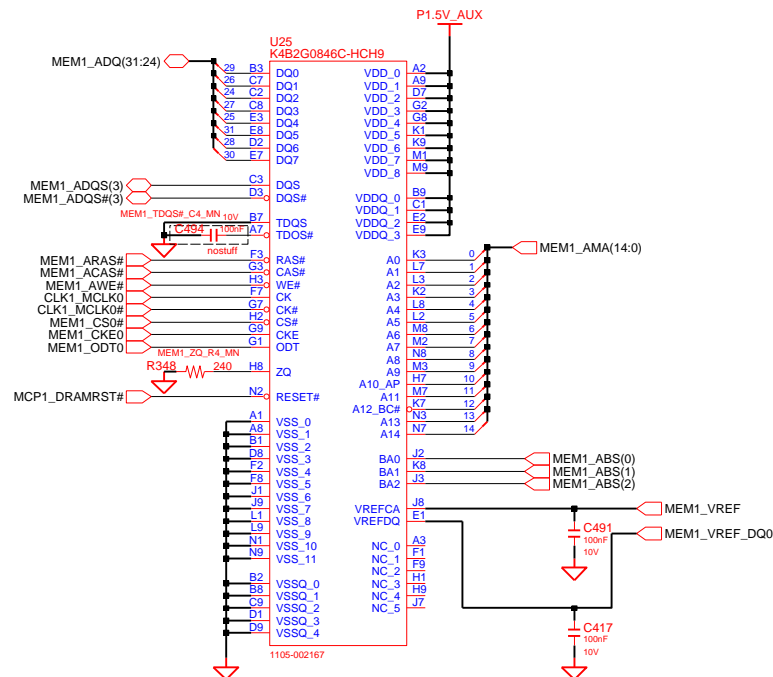


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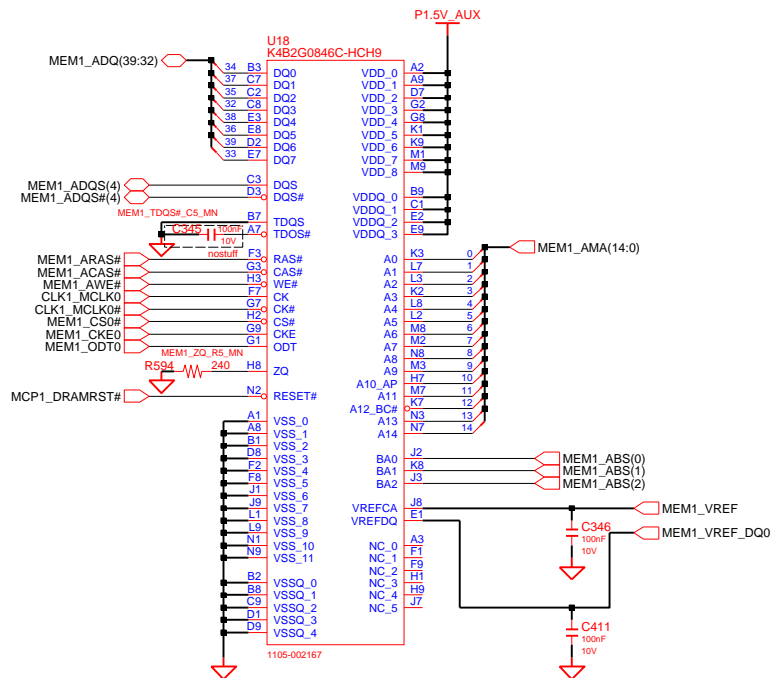
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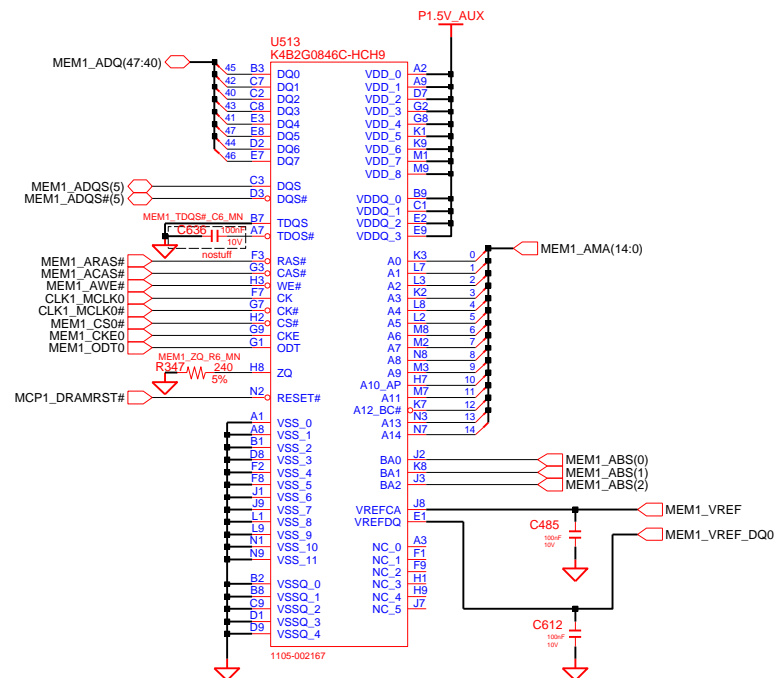
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MODULE CODE	undefined	LAST ENT	November 25, 2011 15:12:10 PM	PAGE	14	OF 53

DDR3 on board #0 (3/4)

1 RANK



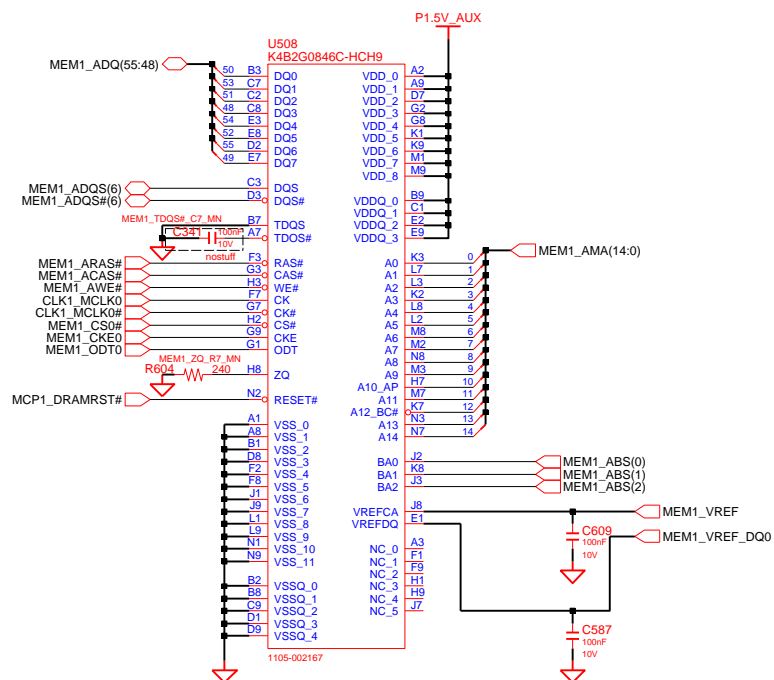
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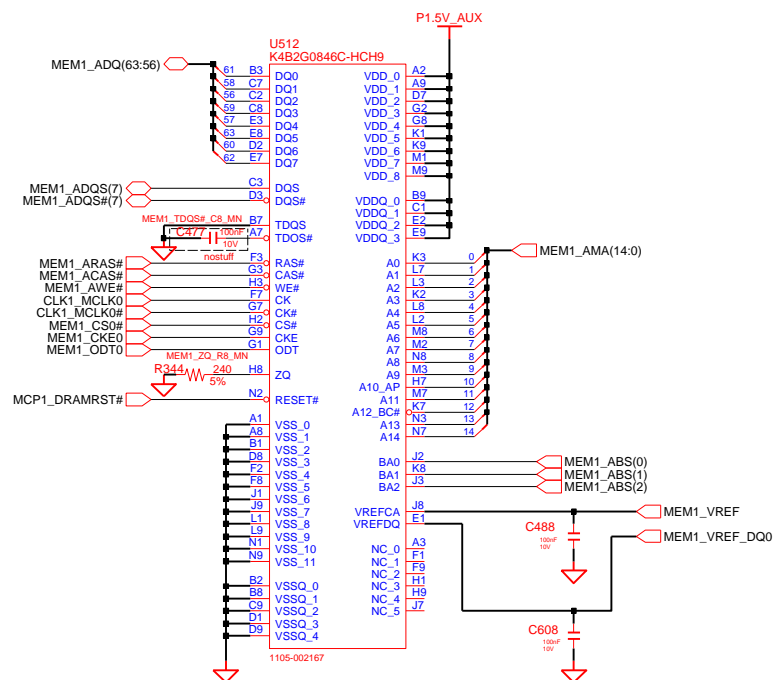
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DDR3 on board #0 (4/4)

1 RANK



1 RANK

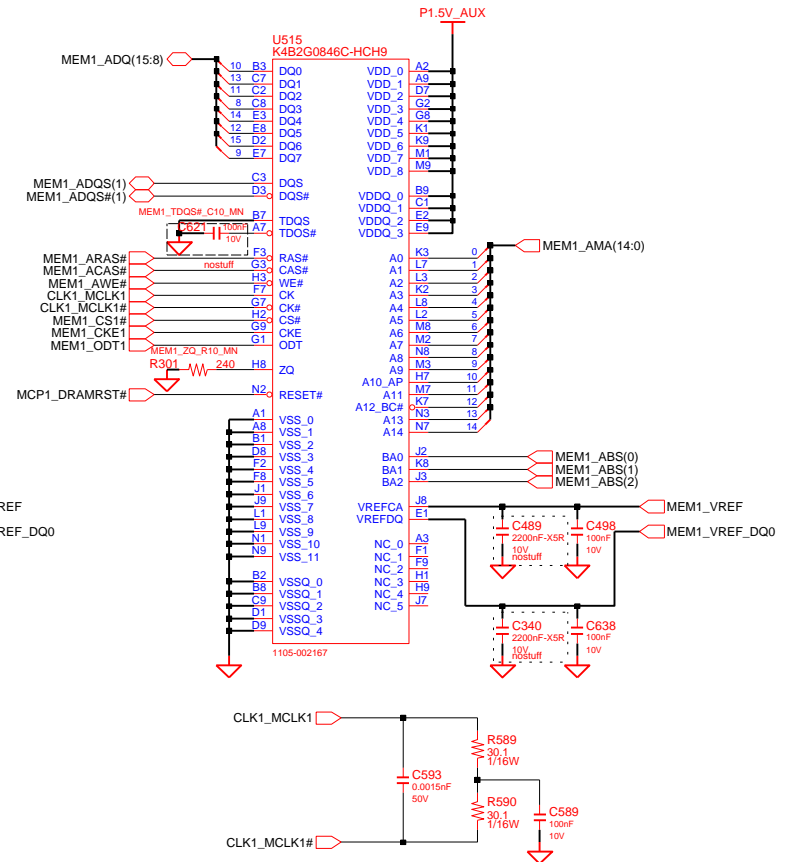
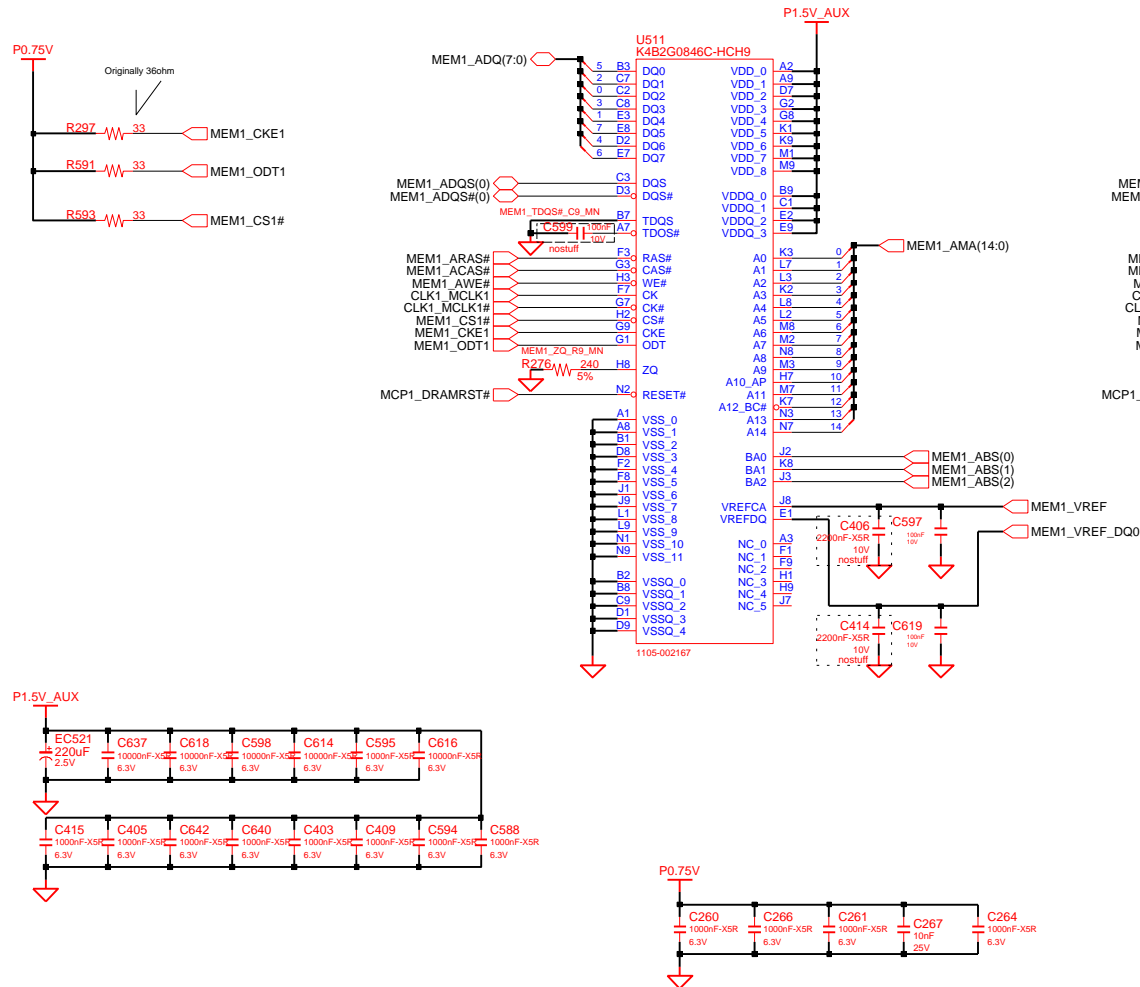


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MODULE CODE	undefined	LAST ENT				BA41-01091A
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DDR3 on board #0 (1/4)

2 RANK

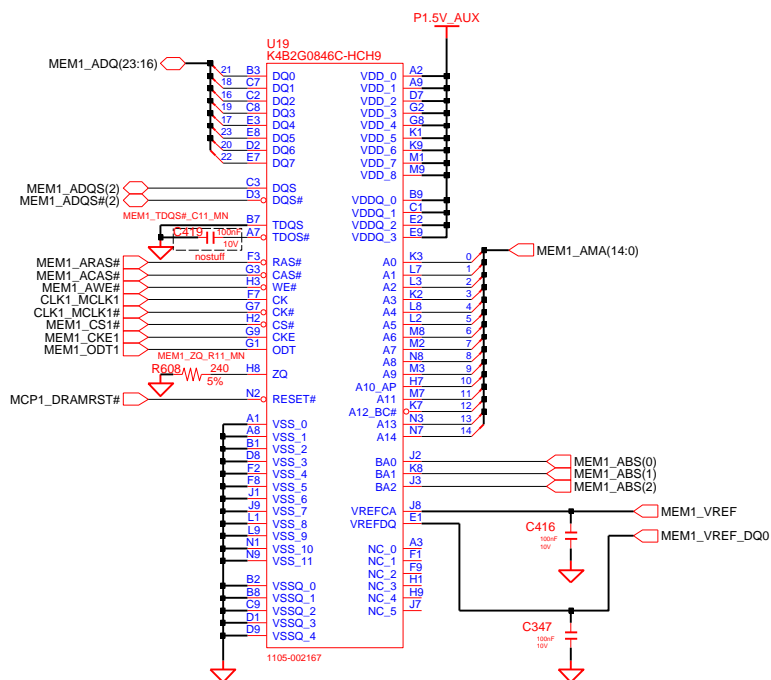
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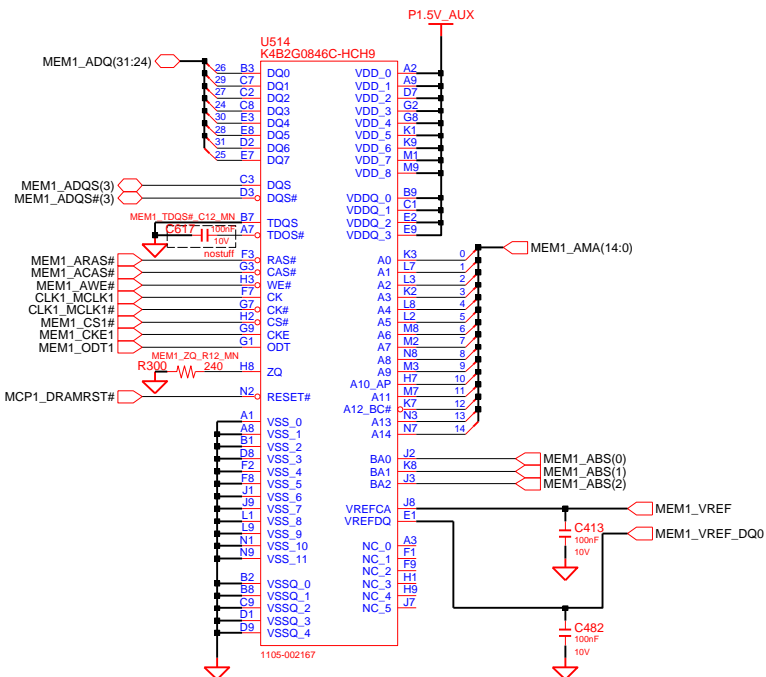
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DDR3 on board #0 (2/4)

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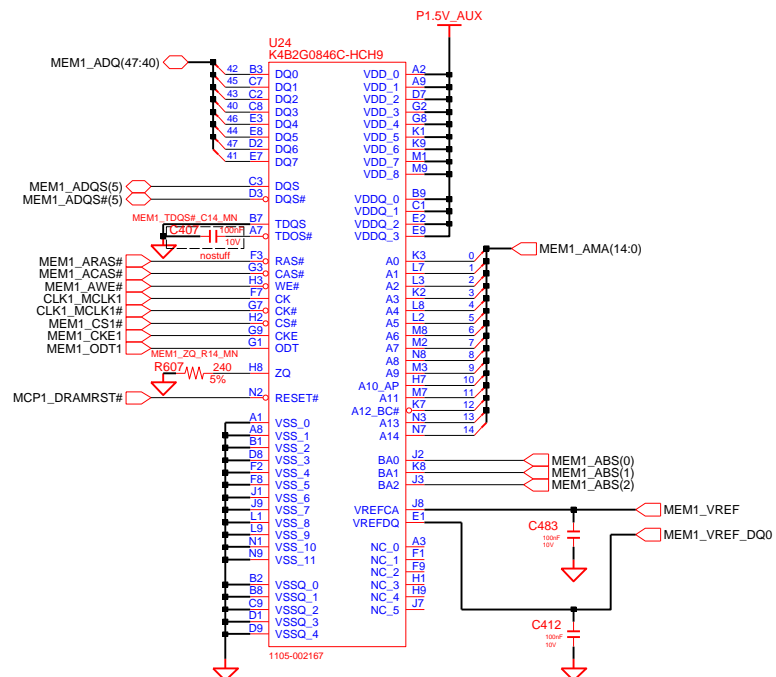


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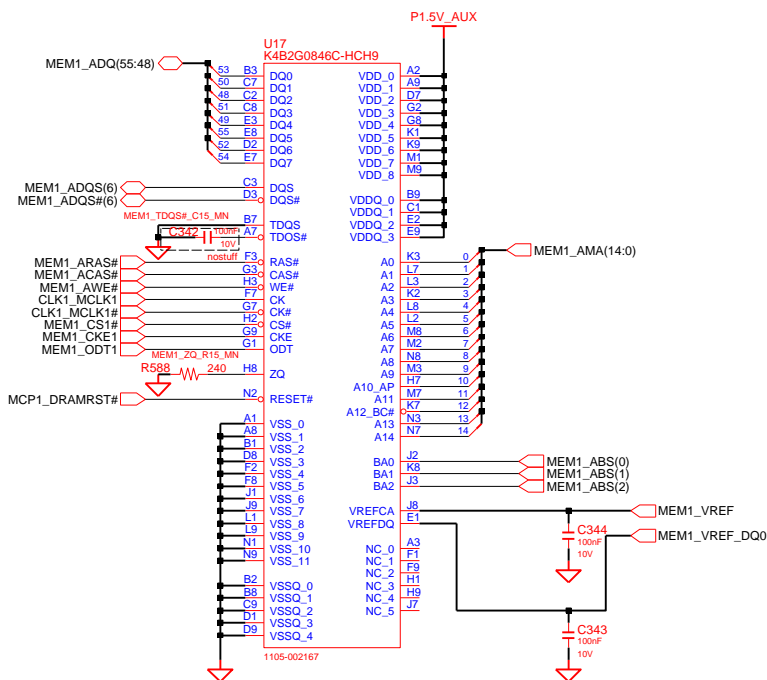
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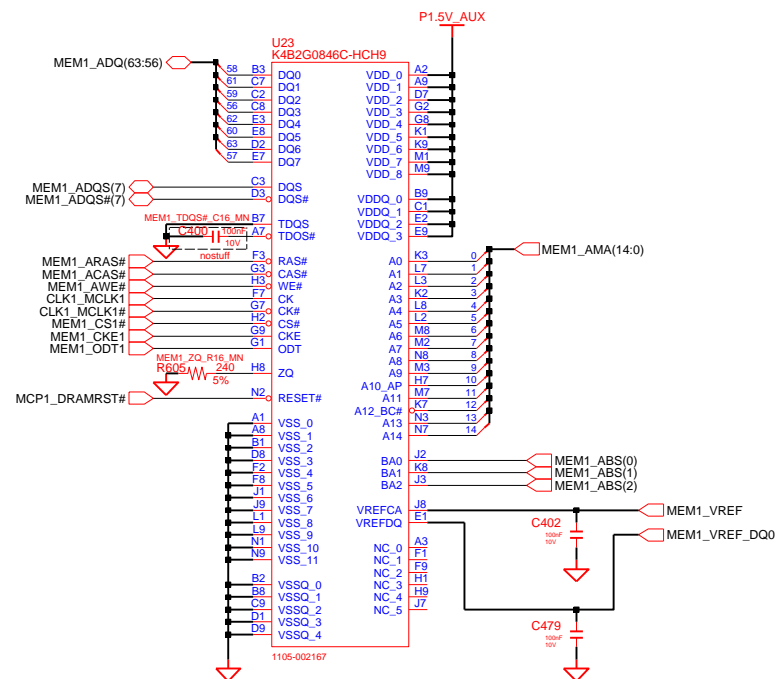
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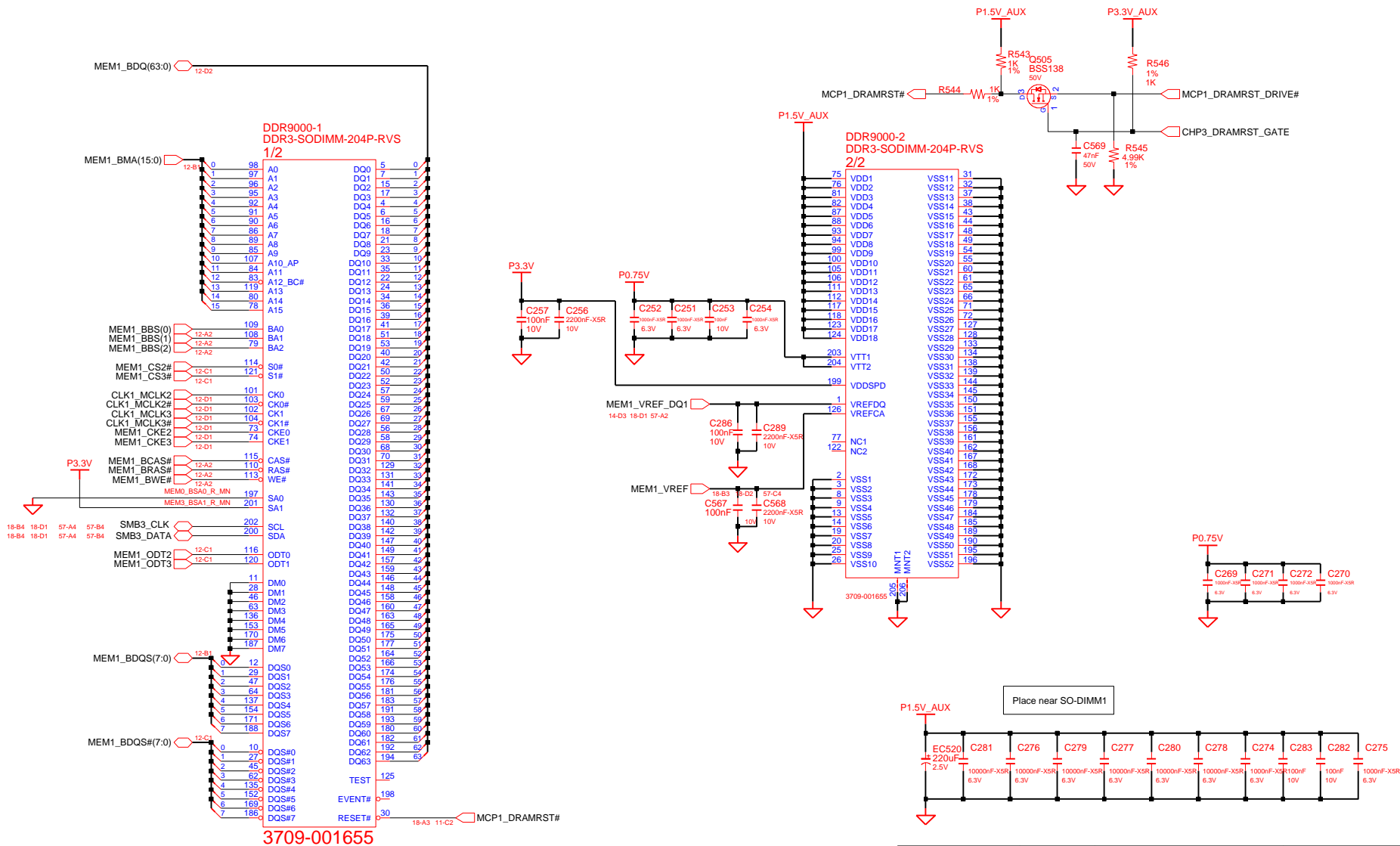


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MODULE CODE	undefined	LAST ENT	November 25, 2011 15:12:10 PM	PAGE	20	OF 53

DDR3 SO-DIMM #1

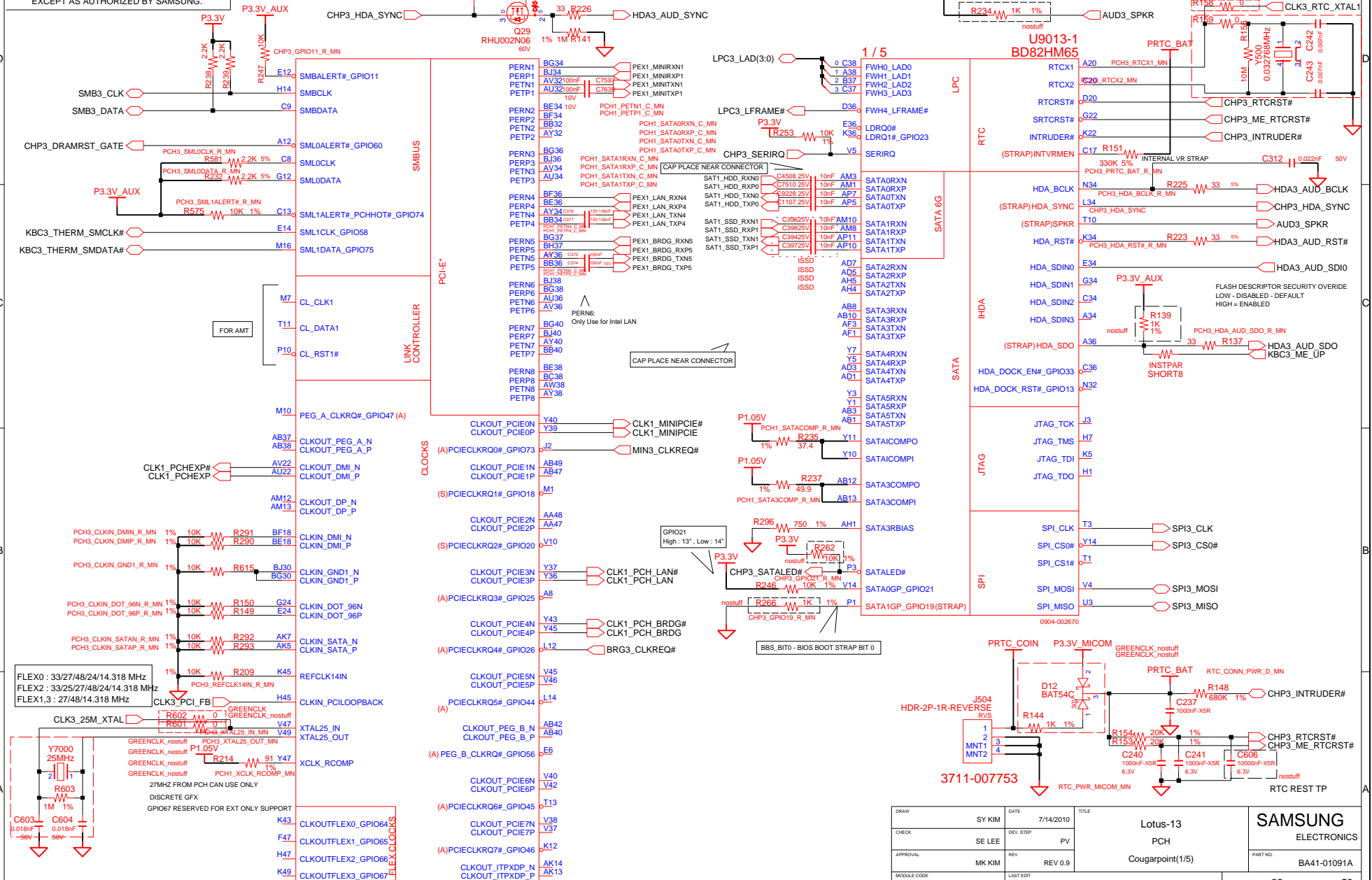


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ELECTRONICS		

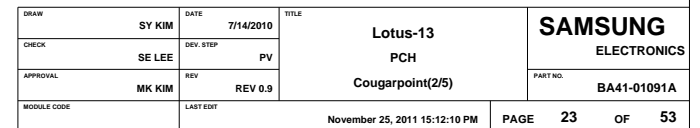
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NO REBOOT STRAP

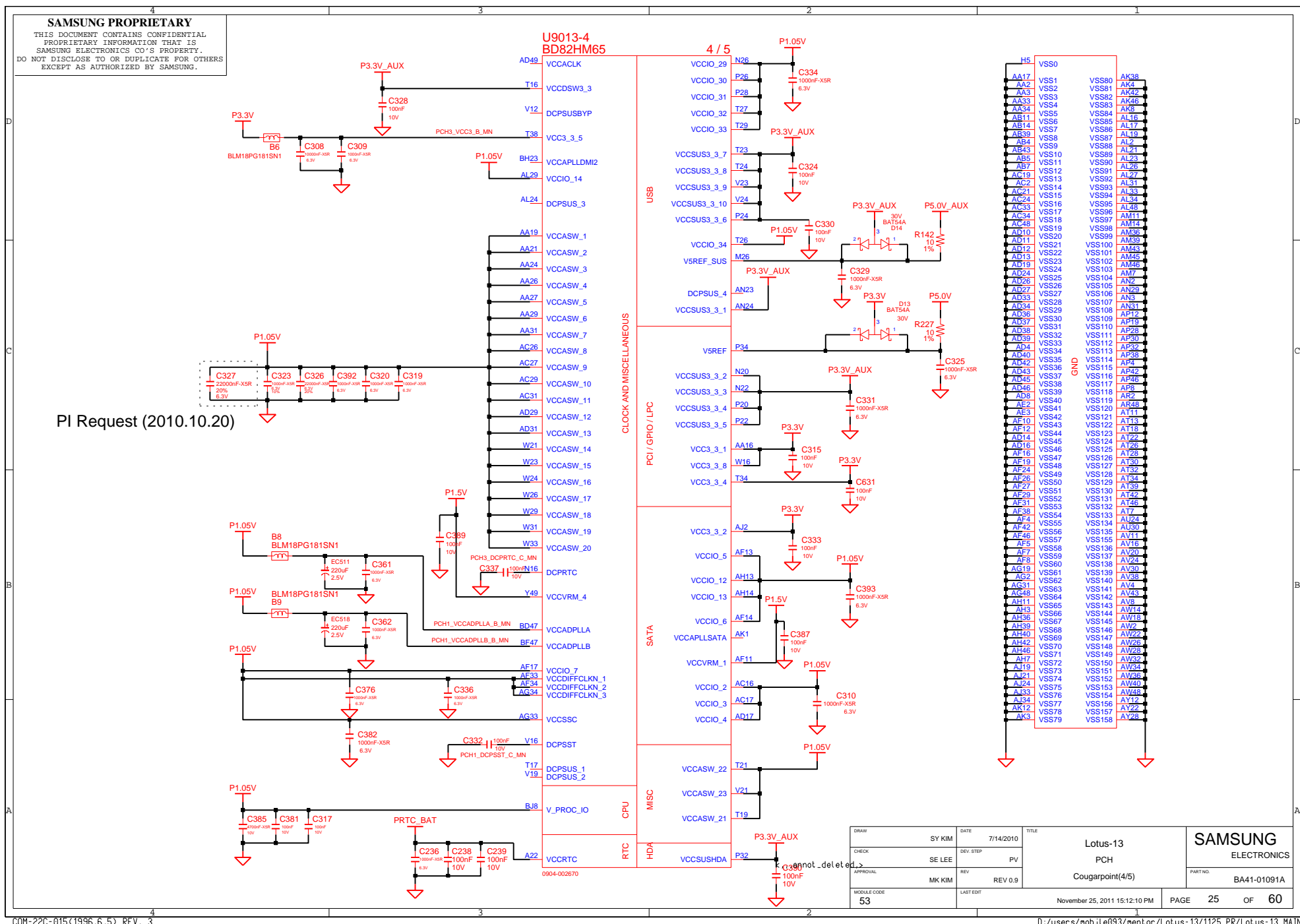


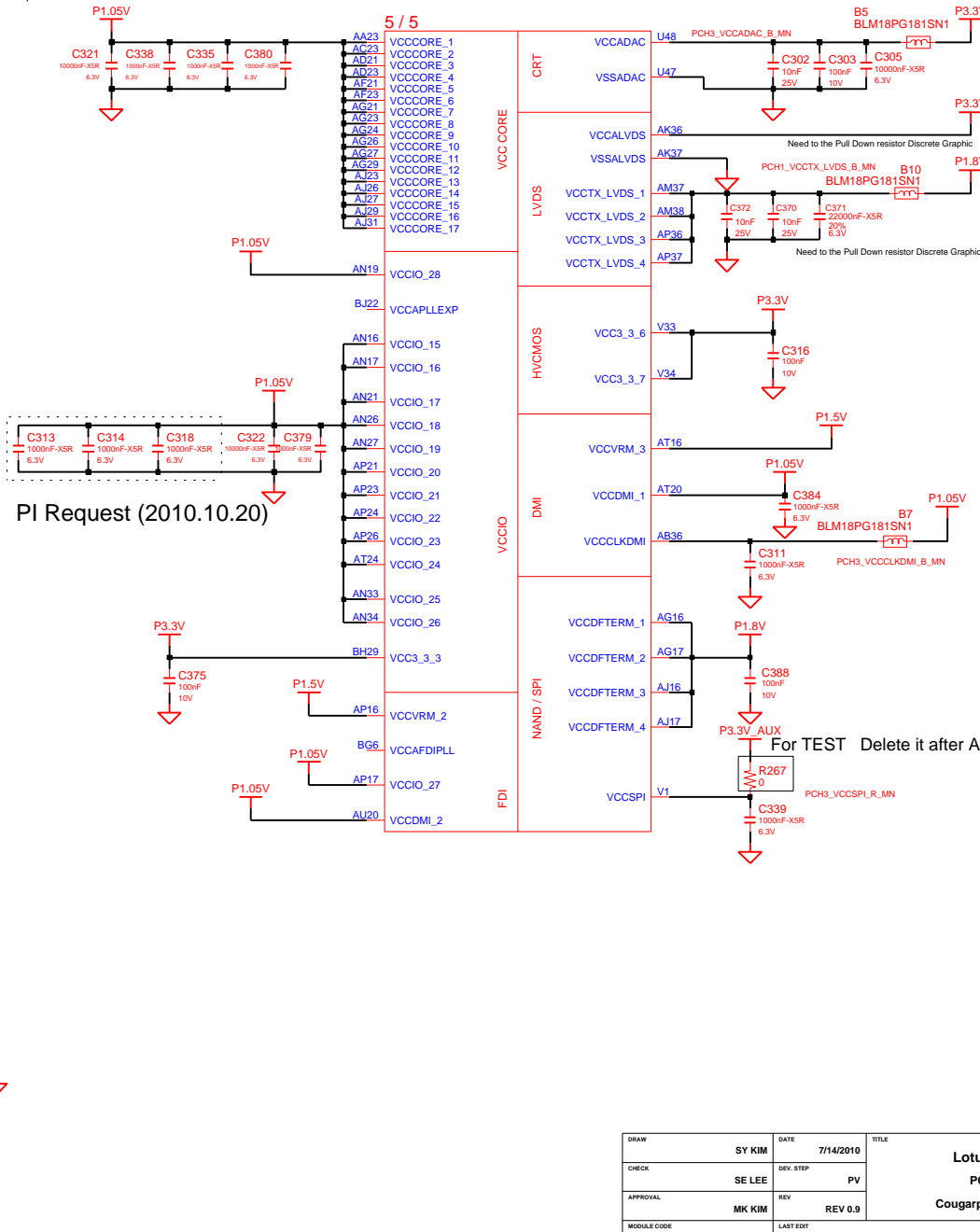
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MODULE CODE		LAST ENT			
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PART NO. BA41-01091A



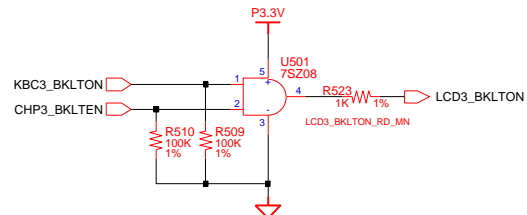
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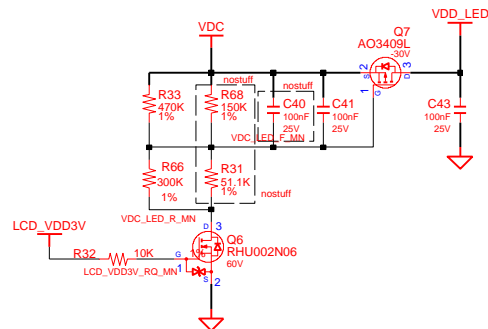


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				PAGE	26	OF	53

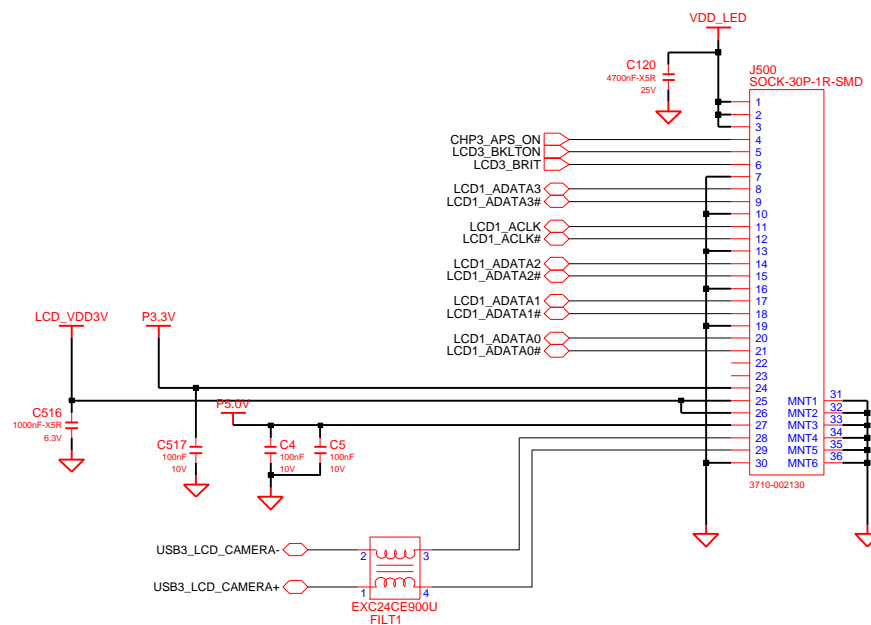
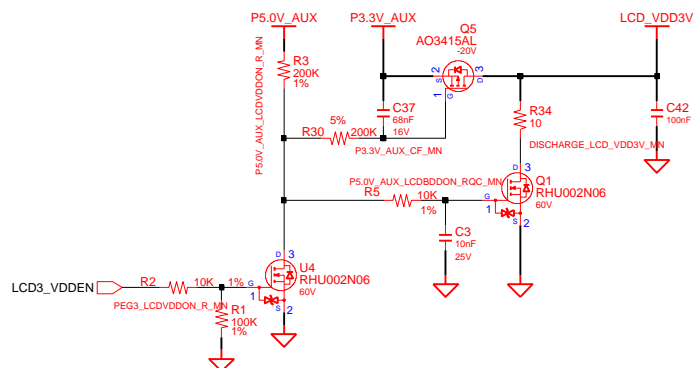
Backlight On



LED Power



LCD Power

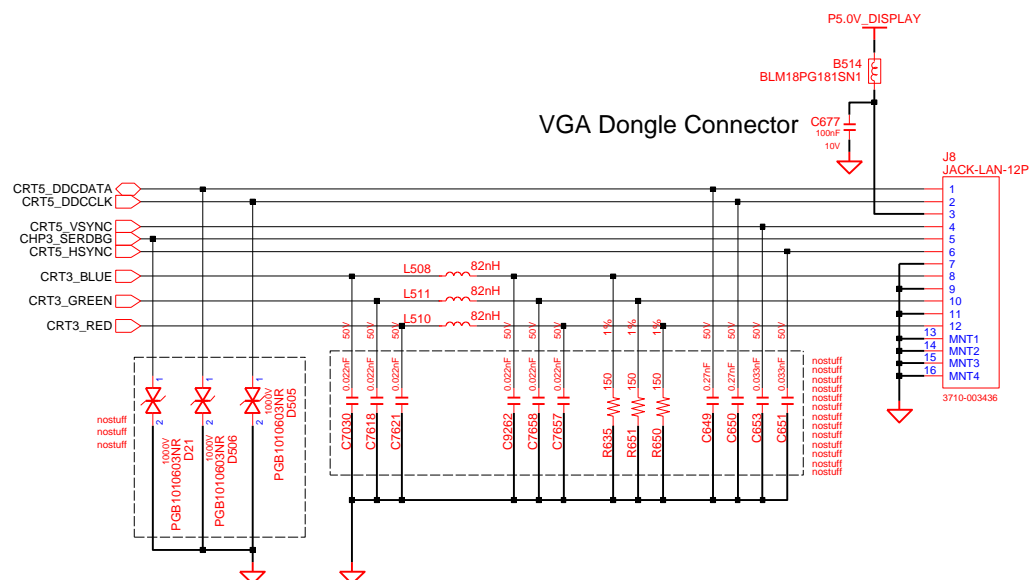
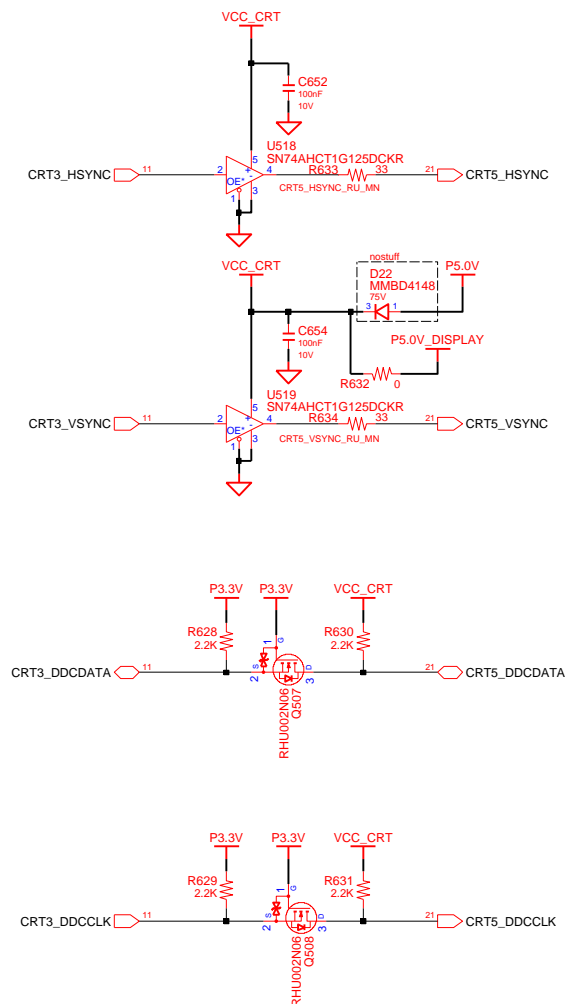


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CHECK	SE LEE	DEV. STEP	PV		
APPROVAL	MK KIM	REV	REV 0.9		
MODULE CODE		LAST EDIT			
November 25, 2011 15:12:10 PM					PAGE 27 OF 53

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VGA Dongle



DESIGN	SY KIM	DATE	01/08/2009	TITLE	Lotus-13 GRAPHIC_IF CRT	SAMSUNG ELECTRONICS
CHECK	SE LEE	DEV. STEP	PV			PART NO. BA41-01091A
APPROVAL	MK KIM	REV	REV 0.9			
MODULE CODE		LAST EDIT	November 25, 2011 15:12:10 PM	PAGE	28	OF 53

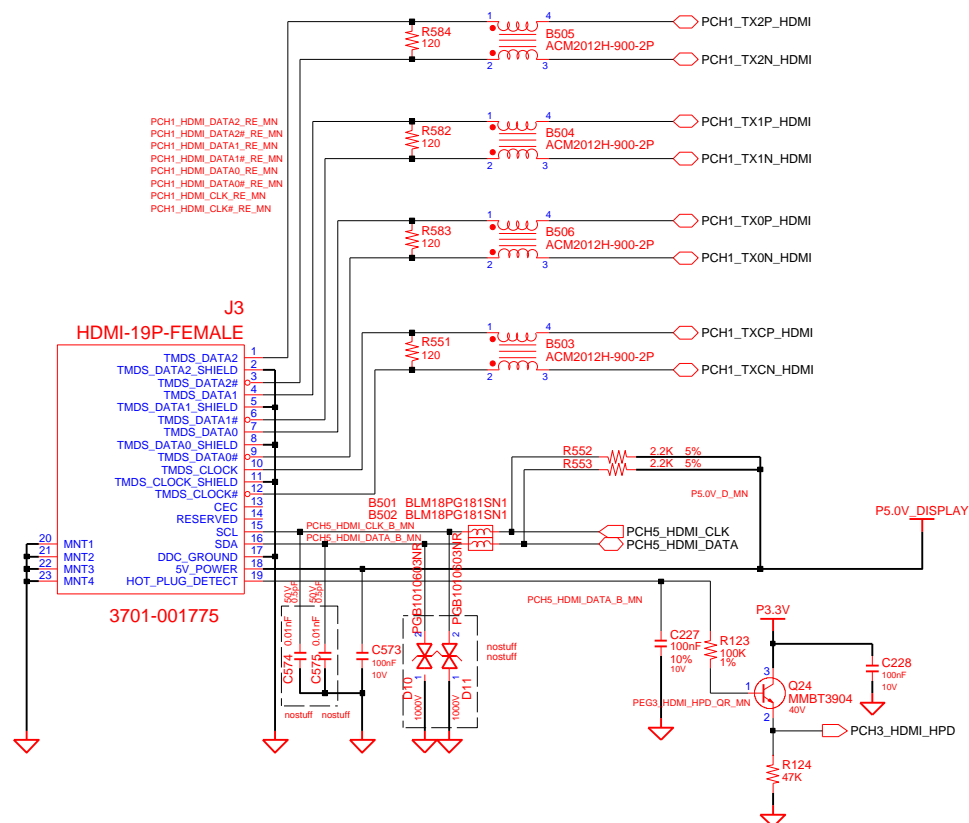
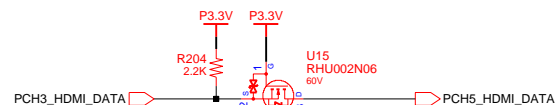
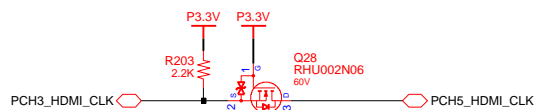
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HDMI Graphic

After checking, Houston need to use CMC for each signal.
(EMC request at 2010.04.15)

FOR HDMI VERIFICATION TEST



N10x/N11x_40nm HDMI/DP/LVDS support only 3.3V voltage tolerance

DESIGN	SY KIM	DATE	7/14/2010	TITLE	Lotus-13	SAMSUNG ELECTRONICS
CHECK	SE LEE	DEV. STEP	PV	GRAPHICS_IF		
APPROVAL	MK KIM	REV	REV 0.9	HDMI	PART NO. BA41-01091A	
MODULE CODE		LAST EDIT			November 25, 2011 15:12:10 PM	PAGE 29 OF 53

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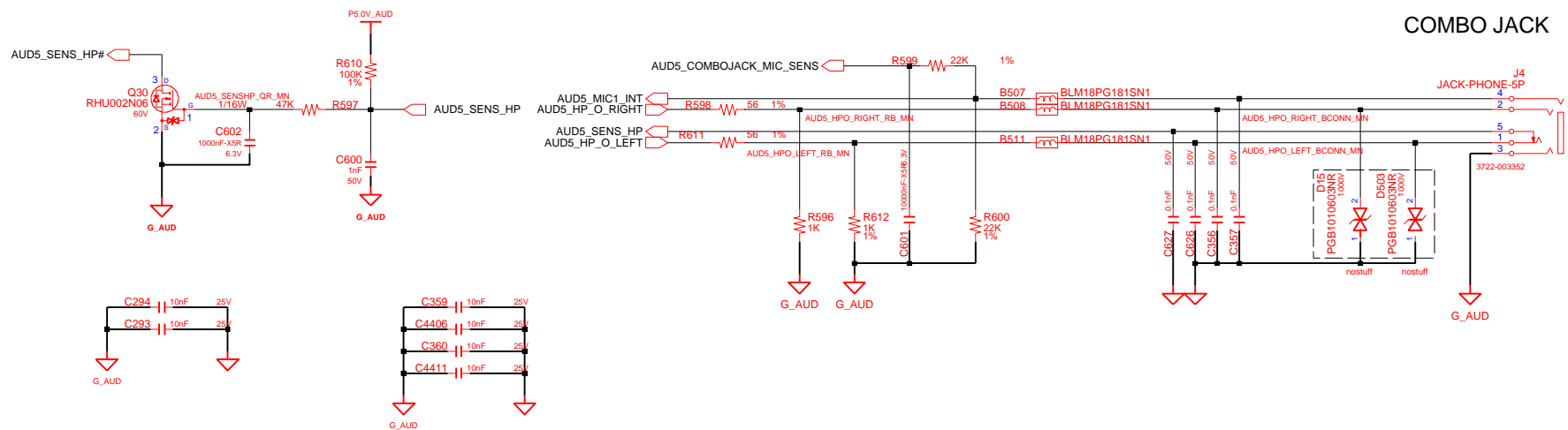
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CHECK	SE LEE	REV. STEP	PV			
APPROVAL	MK KIM	REV	REV 0.9		PART NO.	BA41-01091A
MODULE CODE	LAST EDIT				November 25, 2011 15:12:10 PM	PAGE 30 OF 53

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HD AUDIO



DESIGN	SY KIM	DATE	7/14/2010	TITLE	Lotus-13	SAMSUNG ELECTRONICS
CHECK	SE LEE	DEV. STEP	PV		HDA_CODEC	
APPROVAL	MK KIM	REV	REV 0.9		AUDIO CODEC ALC269	
MODULE CODE		LAST EDIT		November 25, 2011 15:12:10 PM	PAGE 31 OF 53	PART NO. BA41-01091A

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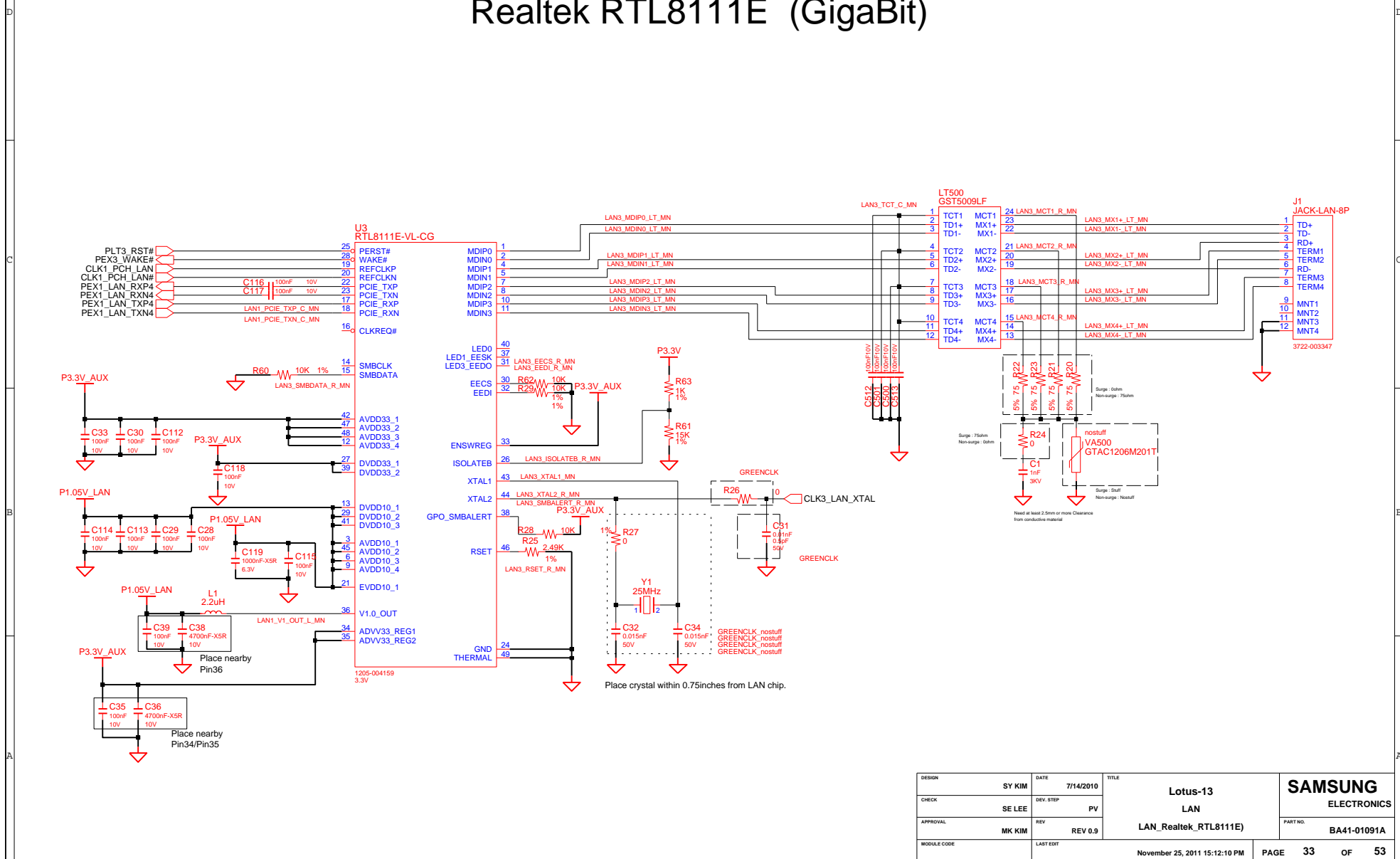
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APPROVAL	MK KIM	REV	REV 0.9			
MODULE CODE	LAST EDIT				November 25, 2011 15:12:10 PM	
				PAGE	32	OF 53

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Realtek RTL8111E (GigaBit)



DESIGN	SY KIM	DATE	7/14/2010	TITLE	Lotus-13
CHECK	SE LEE	DEV. STEP	PV		LAN
APPROVAL	MK KIM	REV	REV 0.9		LAN_Realtek_RTL8111E)
MODULE CODE		LAST EDIT			
				November 25, 2011 15:12:10 PM	PAGE 33 OF 53

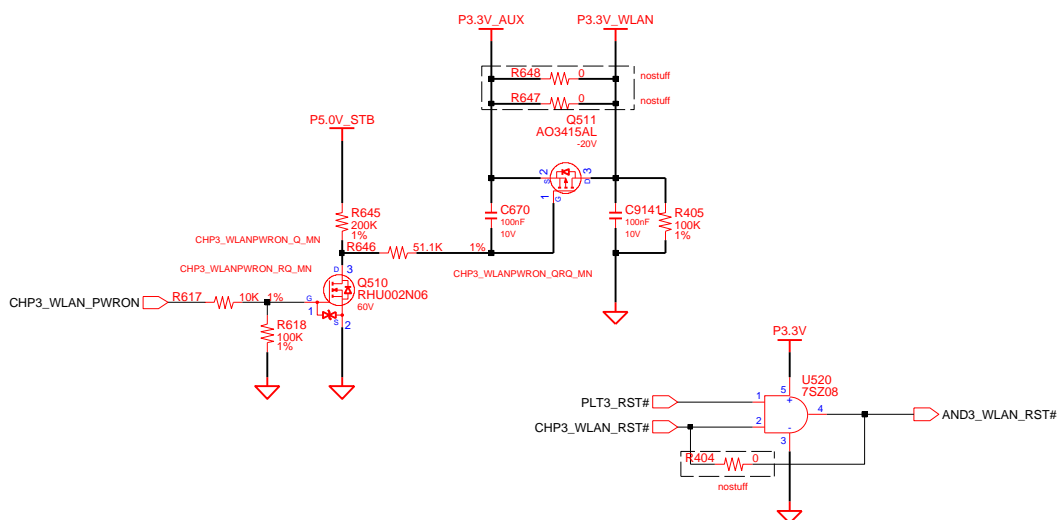
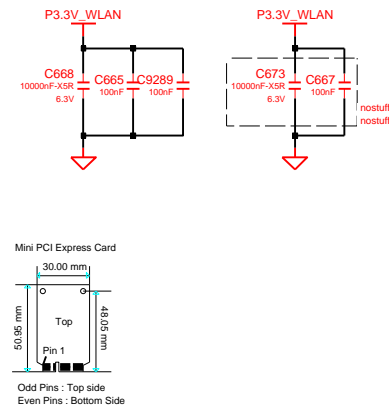
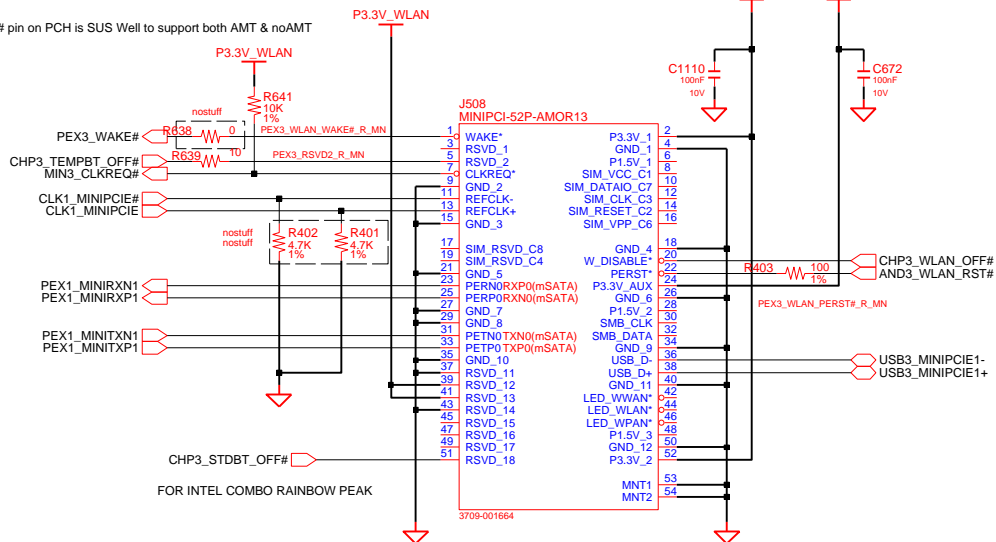
SAMSUNG	BA41-01091A
ELECTRONICS	

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WLAN

CLKREQ# pin on PCH is SUS Well to support both AMT & noAMT



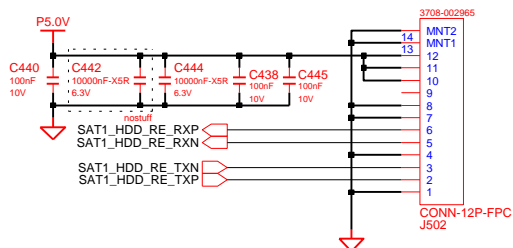
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MODULE CODE		LAST EDIT				PART NO. BA41-01091A
				November 25, 2011 15:12:10 PM	PAGE	34 OF 53

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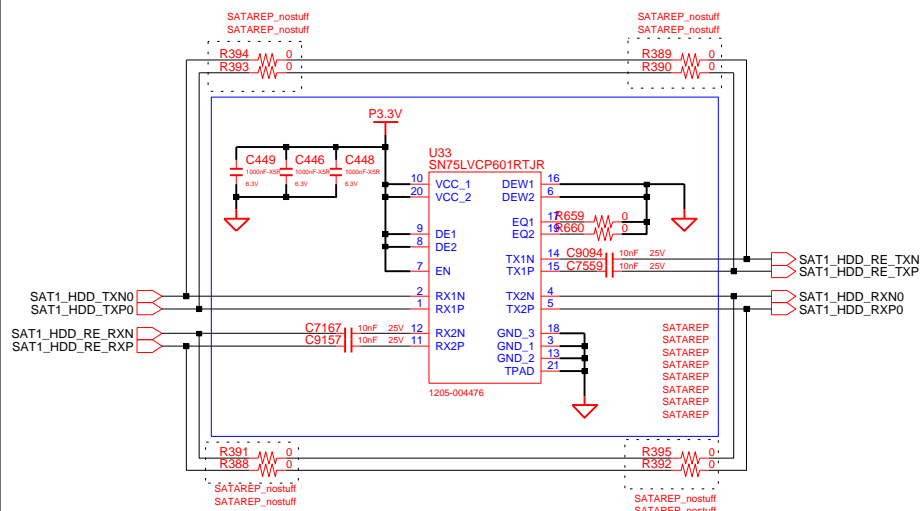
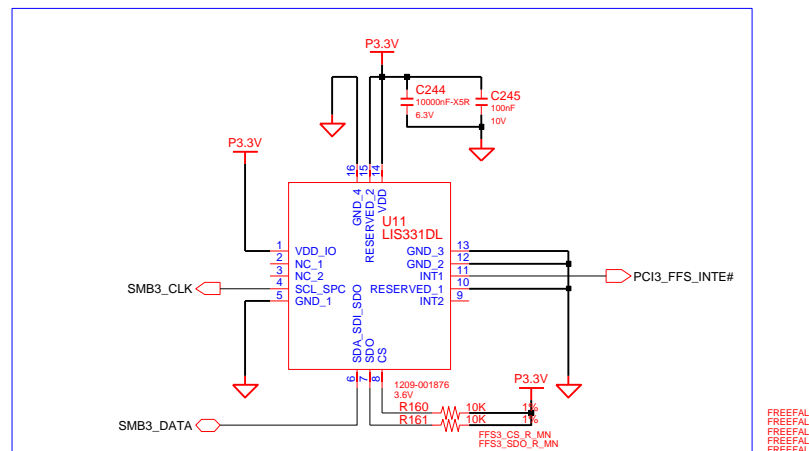
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SATA I/F CONN

SATA HDD CONN



Free Fall Sensor

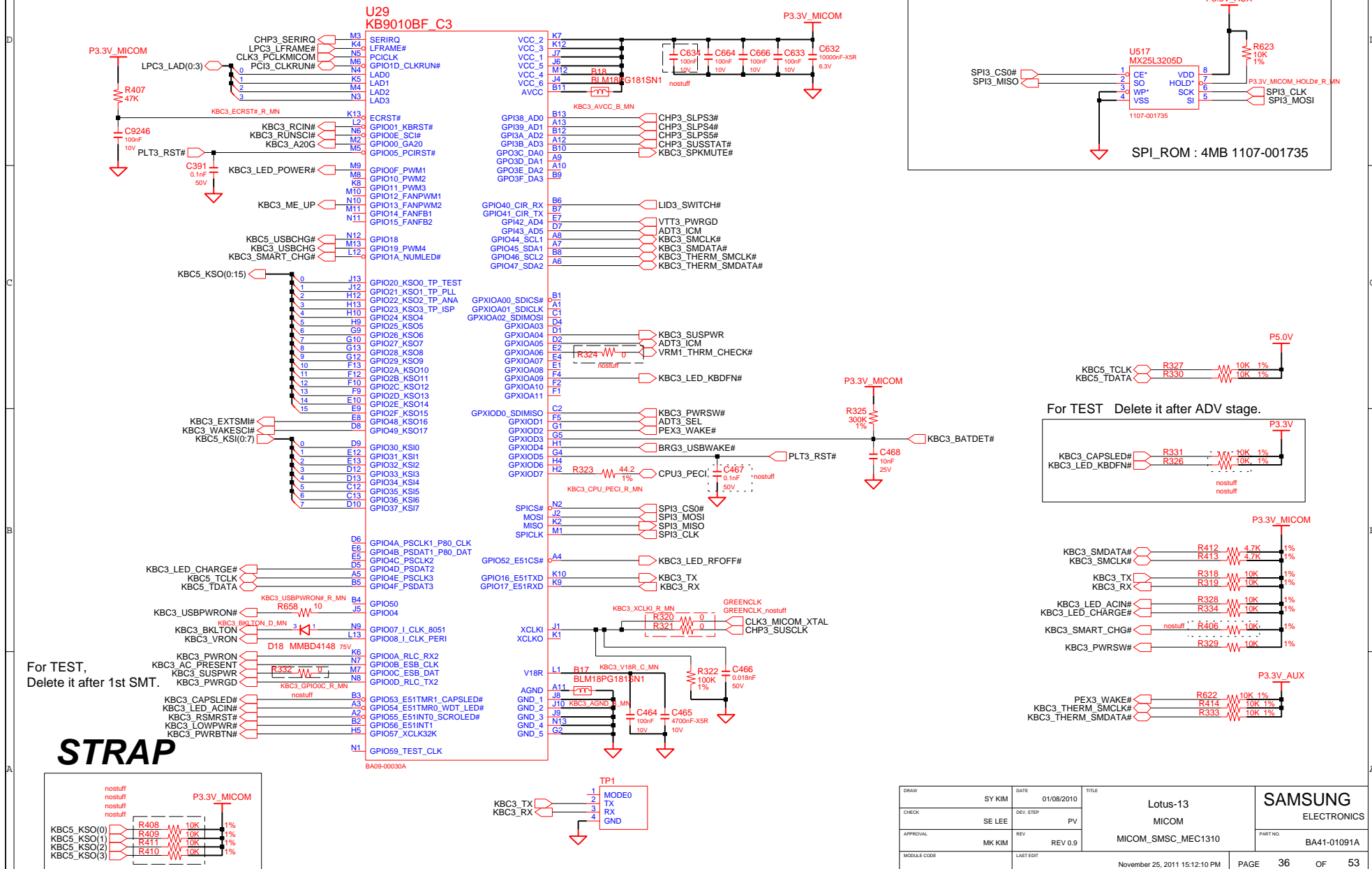


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MODULE CODE		LAST EDIT		November 25, 2011 15:12:10 PM	PAGE 35 OF 53	PART NO. BA41-01091A

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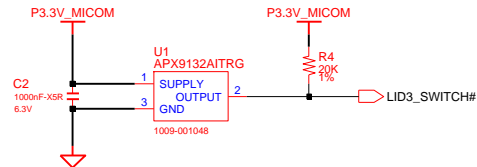
MAIN BOARD (MICOM)



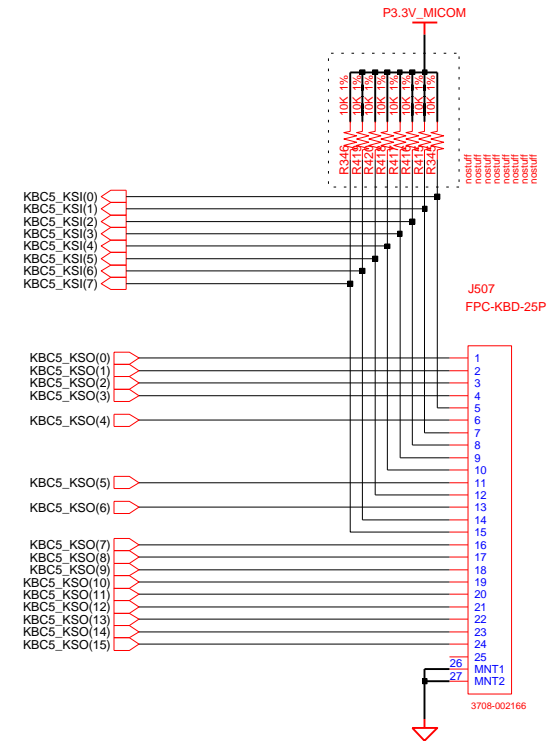
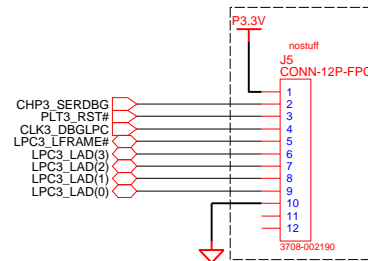
Micom Glue

KEYBOARD

LID3_SWITCH

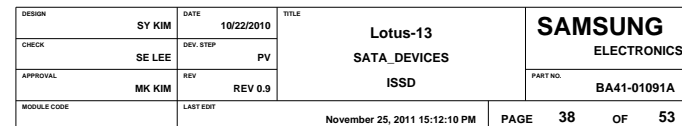


80H PORT DEBUG



DRAW	SY KIM	DATE	7/14/2010	TITLE	Lotus-13 MICOM MICOM GLUE LOGIC	SAMSUNG ELECTRONICS
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APPROVAL	MK KIM	REV	REV 0.9			
MODULE CODE		LAST EDIT	November 25, 2011 15:12:10 PM	PAGE	37	OF 53

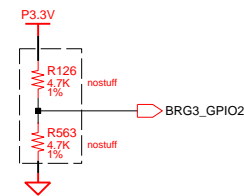
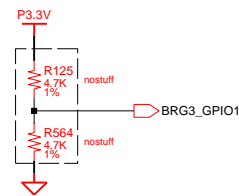
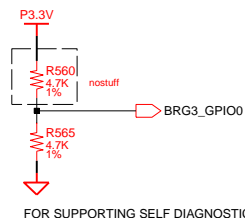
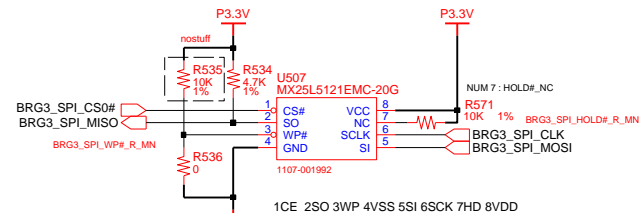
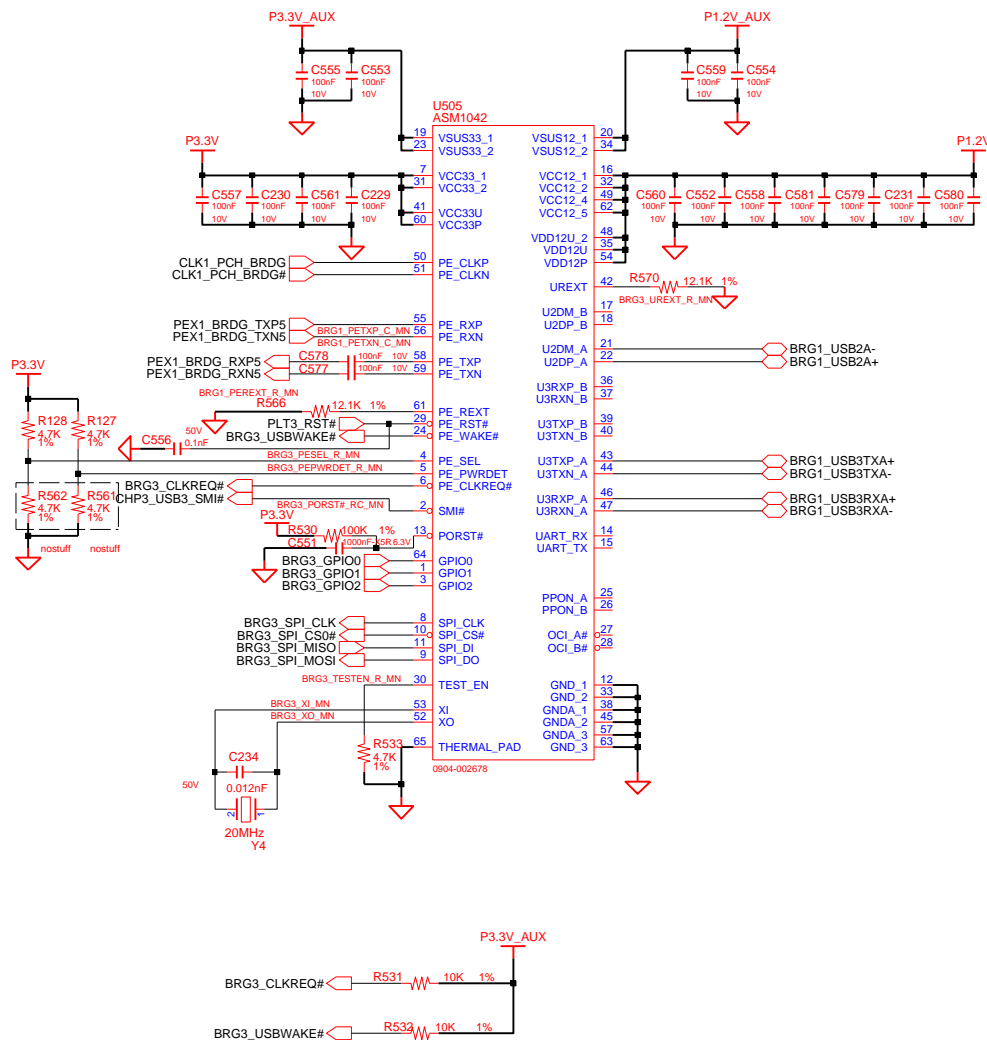
3.3V: For P5 VCCQ=1.8V VDDC=1.2V
GND : For P4 VCCQ=2.0V VDDC=1.0V



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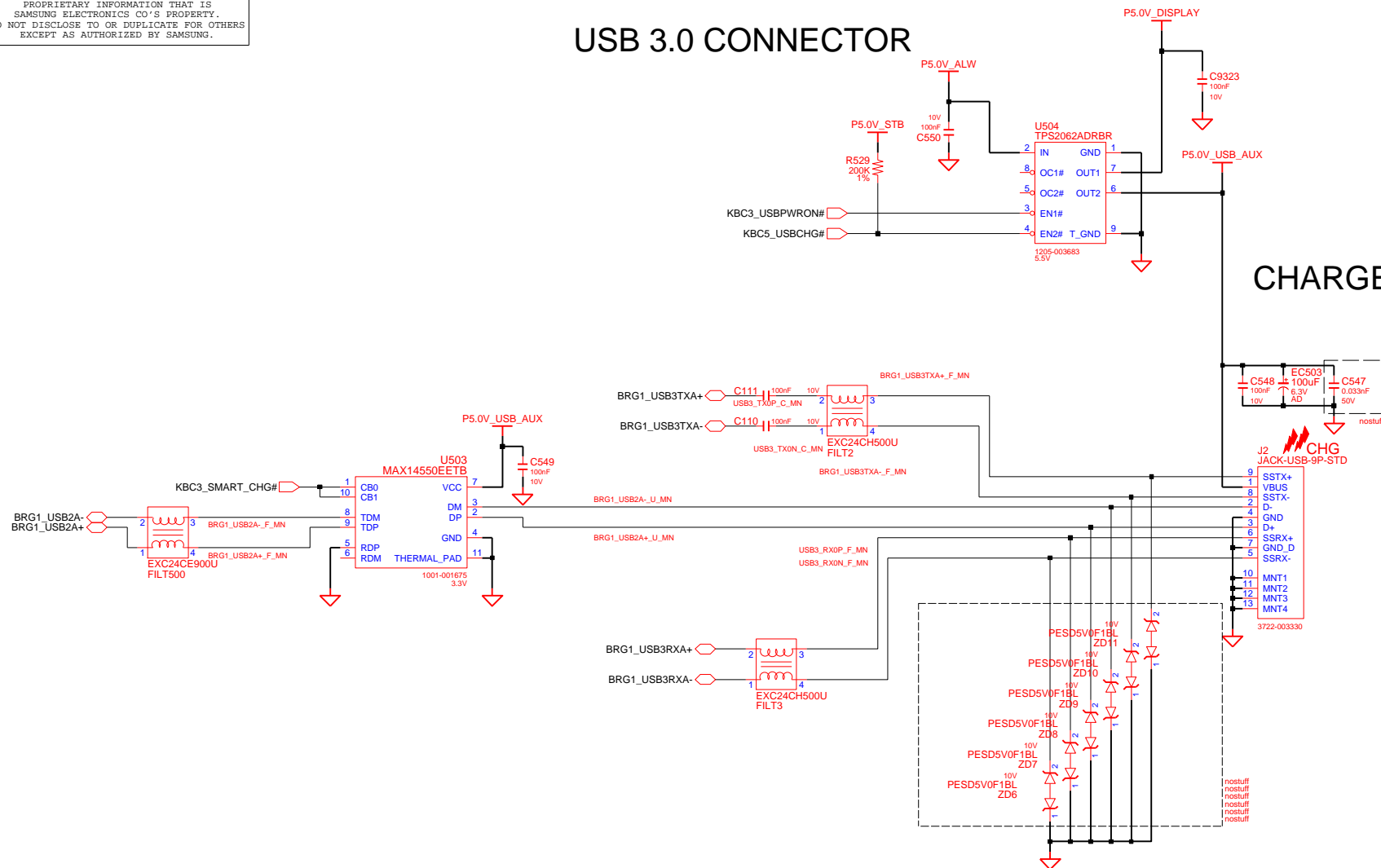
1 USB PORT 3.0



DRAW	SY KIM	DATE	7/14/2010	TITLE	Lotus-13	SAMSUNG
CHECK	SE LEE	DEV. STEP	PV	USB 3.0 BRIDGE	USB 3.0 BRIDGE	ELECTRONICS
APPROVAL	MK KIM	REV	REV 0.9	USB 3.0 BRIDGE	USB 3.0 BRIDGE	PART NO.
MODULE CODE		LAST EDIT				BA41-01091A
				November 25, 2011 15:12:10 PM	PAGE	39 OF 53

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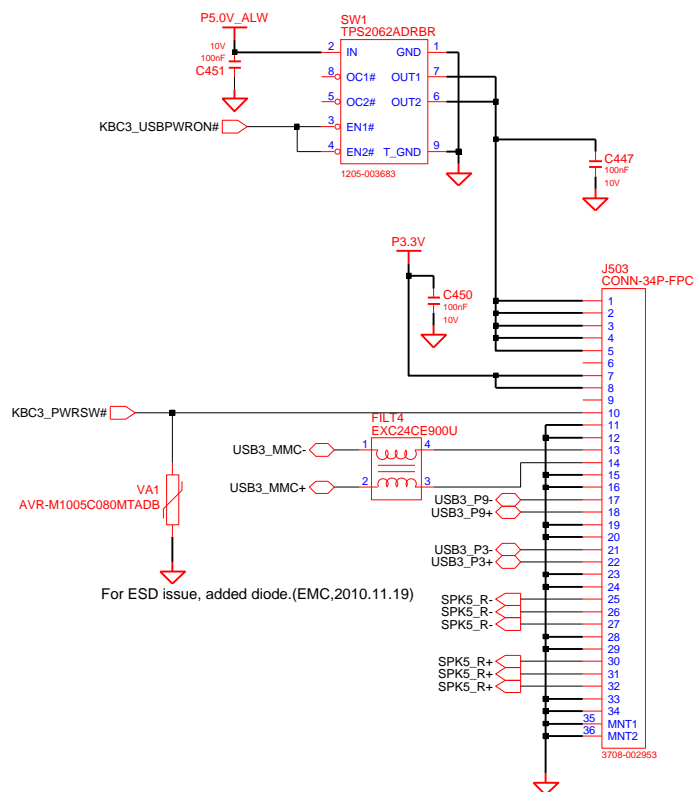
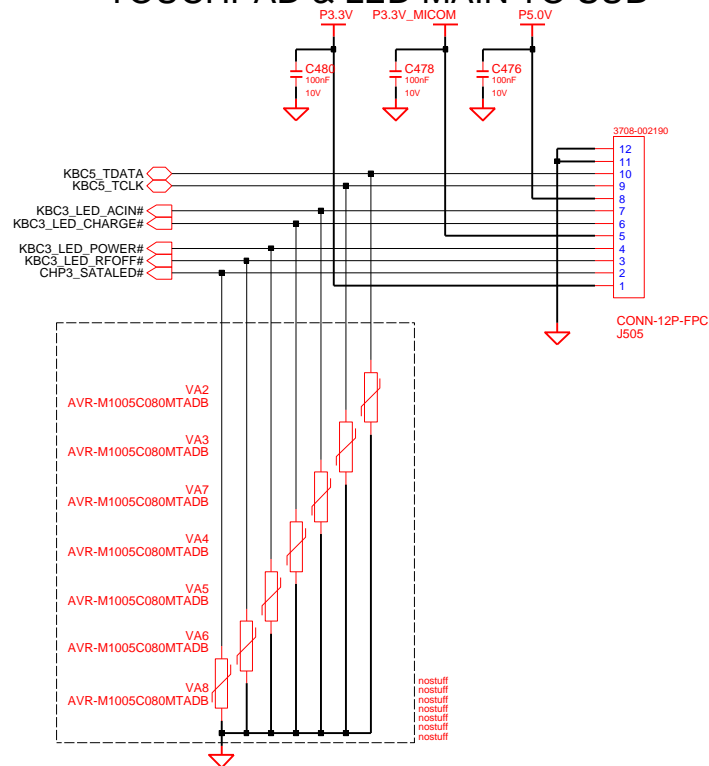
CHARGEABLE USB



DRAW	SY KIM	DATE	7/14/2010	TITLE Lotus-13 USB & BLUETOOTH		SAMSUNG ELECTRONICS		
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APPROVAL	MK KIM	REV	REV 0.9	USB & BLUETOOTH		PART NO.	BA41-01091A	
MODULE CODE		LAST EDIT				November 25, 2011 15:12:10 PM	PAGE	40

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PWR SW & USB SUB Board**MAIN to SUB****TOUCHPAD & LED MAIN TO SUB**

DESIGN	SY KIM	DATE	7/14/2010	TITLE	Lotus-13
CHECK	SE LEE	DEV. STEP	PV	SUB BOARD CONNECTOR	
APPROVAL	MK KIM	REV	REV 0.9	MAIN TO SUB	
MODULE CODE		LAST EDIT	November 25, 2011 15:12:10 PM	PAGE	41 OF 53

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PART NO. BA41-01091A

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U500
HDR-6P-1R-REVERSE B500
HU-1M2012-121JT

VCHG=12.610V@2600Cell and 300Cell / Polymer
ICHG=2.655A FOR 5200mAh / 5900mAh
VCHG=12.610V@2600Cell
VCHG=13.049V@2950Cell
IPRECHG = ICHG * 1/8

VDC

U32
BQ24735GRR

U33
AON7410

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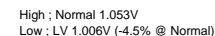
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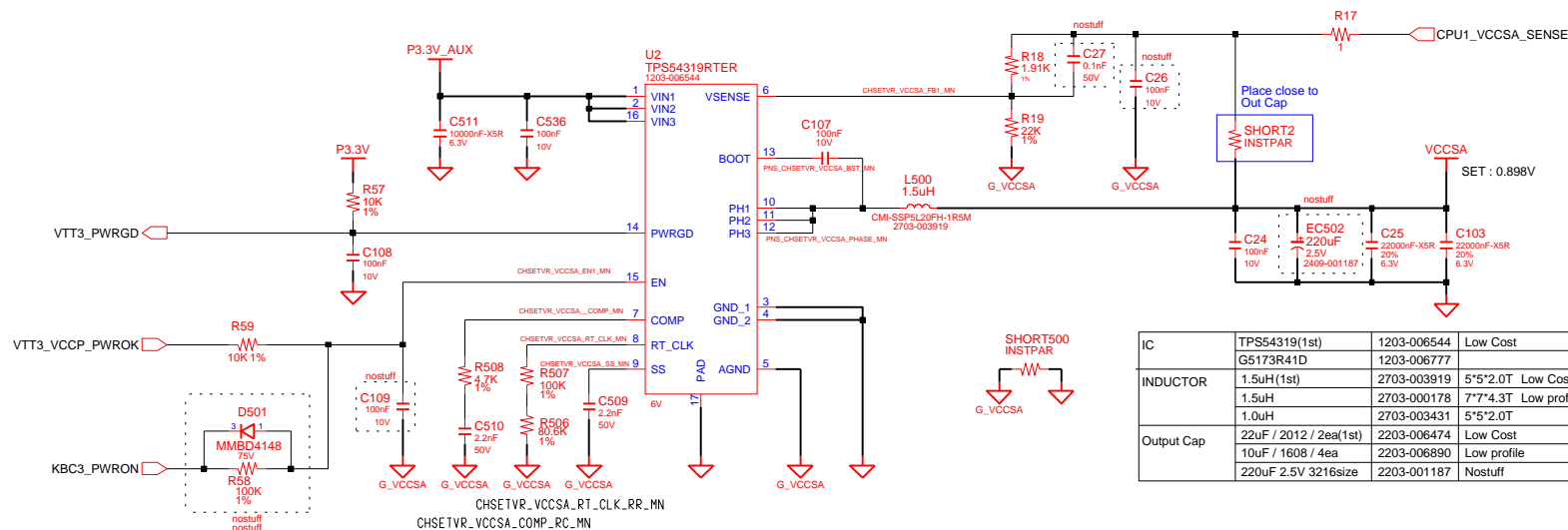


DESIGN	SY KIM	DATE	7/14/2010	Lotus-13 CHIPSET PWR P1.05V		SAMSUNG ELECTRONICS	
CHECK	SE LEE	DEV. STEP	PV			PART NO.	BA41-01091A
APPROVAL	MK KIM	REV	REV 0.9				
MODULE CODE	LAST EDIT			November 25, 2011 15:12:10 PM		PAGE	44 OF 53

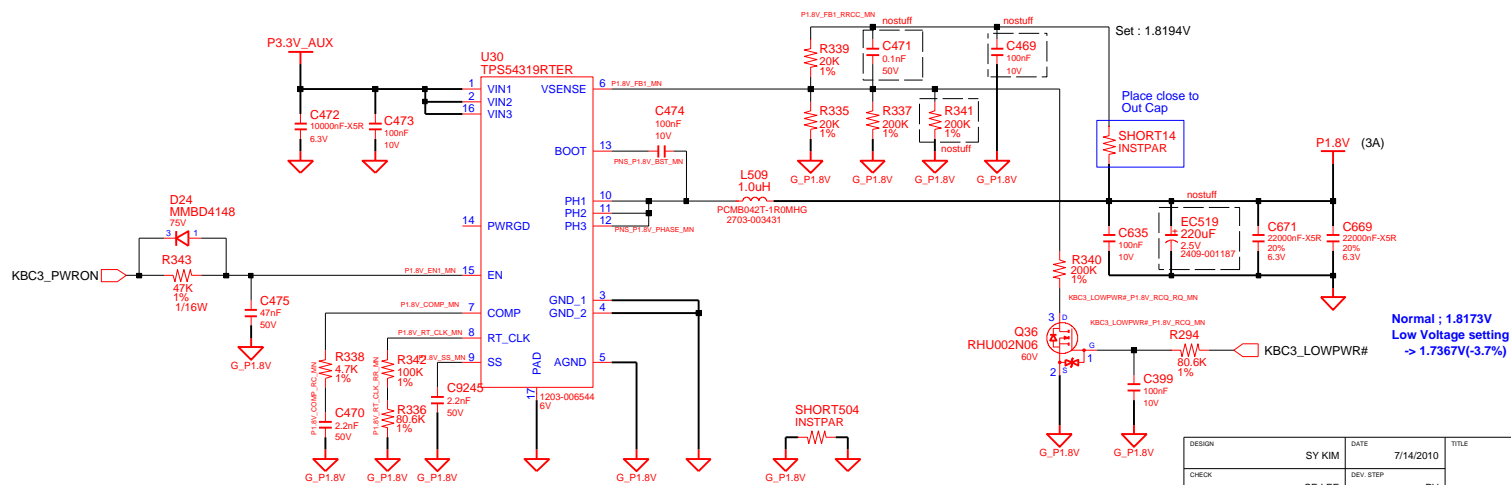
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CHIPSET POWER(VCCSA)



P1.8V (LVDS,PCH Core,LAN , ME IO)

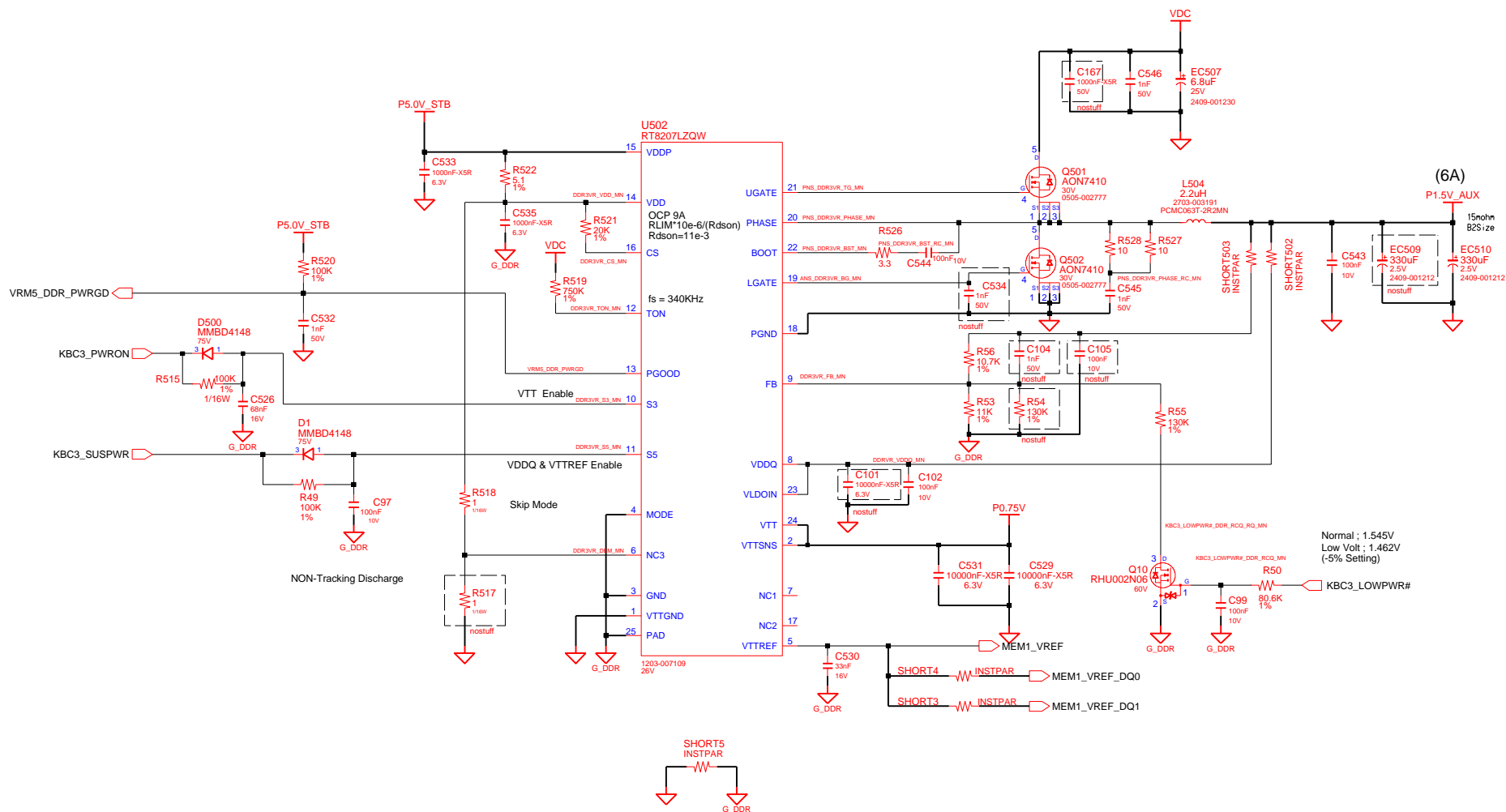


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MODULE CODE		LAST EDIT				BA41-01091A
November 25, 2011 15:12:10 PM						PAGE 45 OF

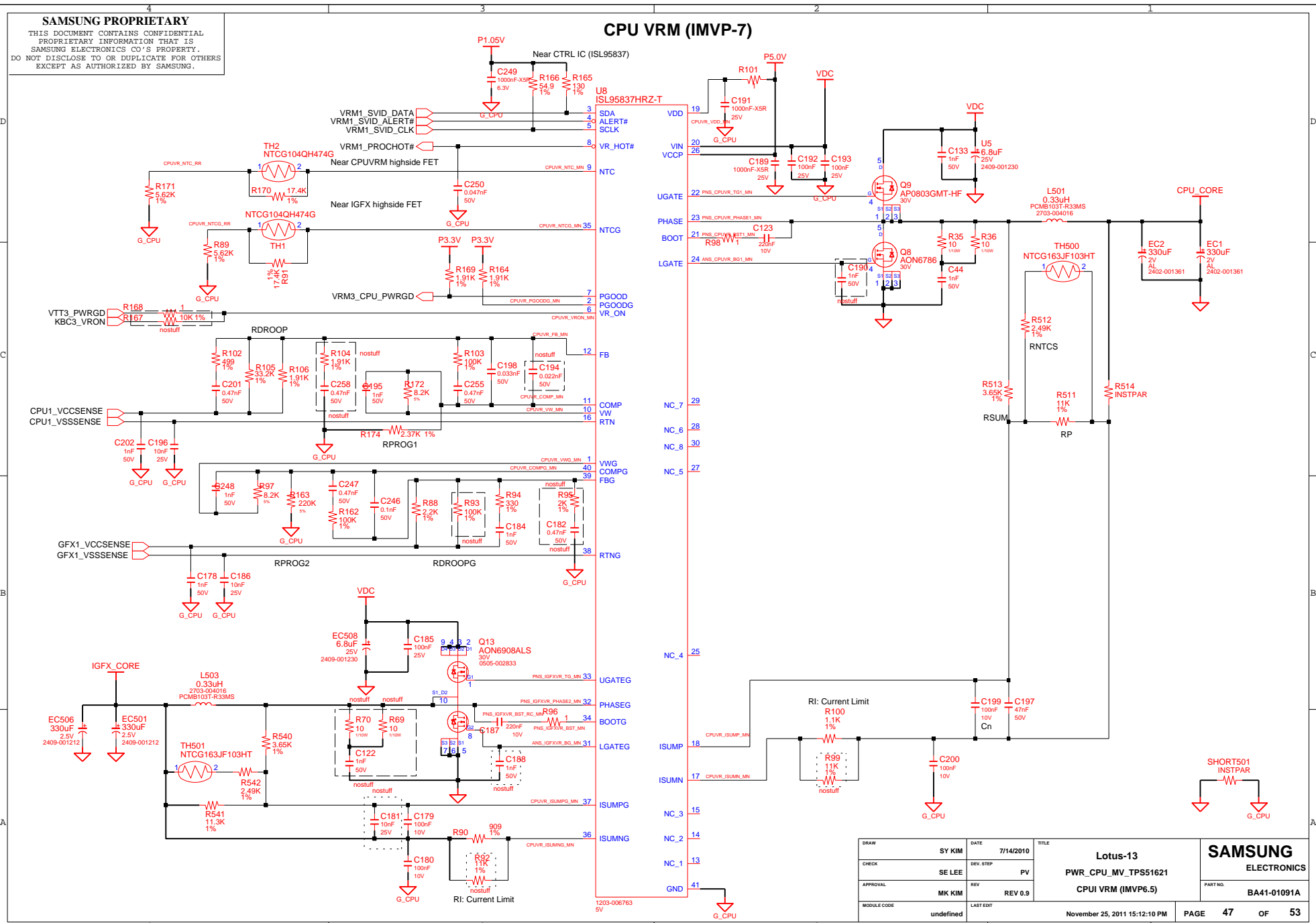
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DDR3 Power



DRAW	SY KIM	DATE	7/14/2010	TITLE	Lotus-13	SAMSUNG
CHECK	SE LEE	DEV. STEP	PV		P1.05V	ELECTRONICS
APPROVAL	MK KIM	REV	REV 0.9		TI TPS51125	PART NO.
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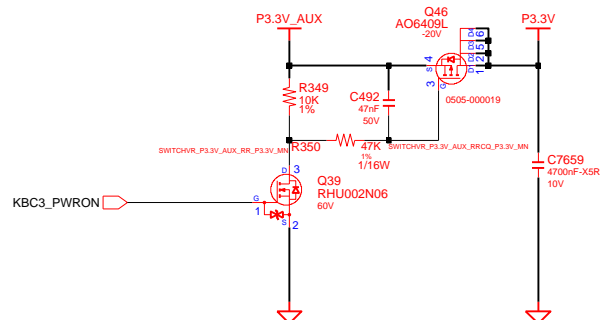


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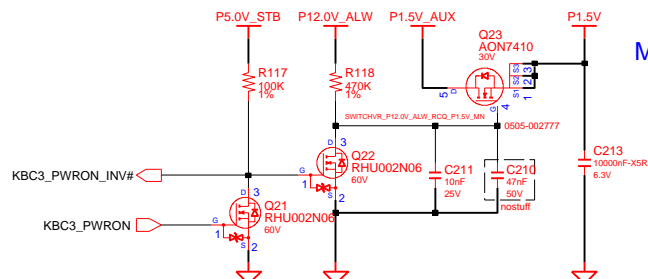
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Switched Power

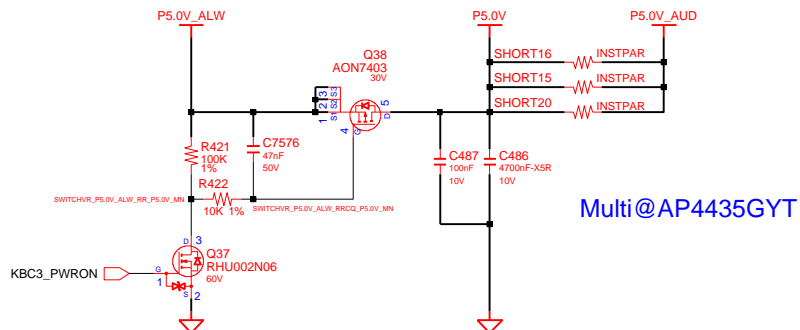
Switched Power On (P3.3V) Multi@AP2607GY



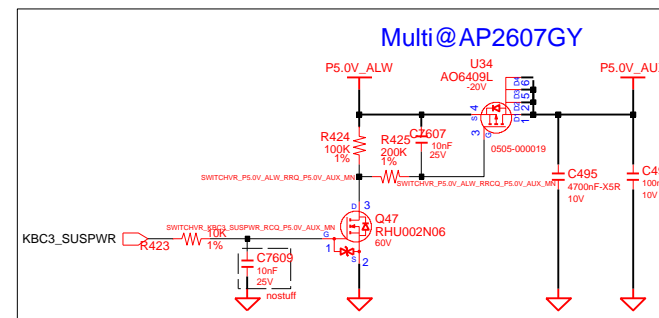
Switched Power On (P1.5V)



Switched Power On (P5.0V)



P5.0V_AUX



Multi@AP9402GYT

Multi@AP4435GYT

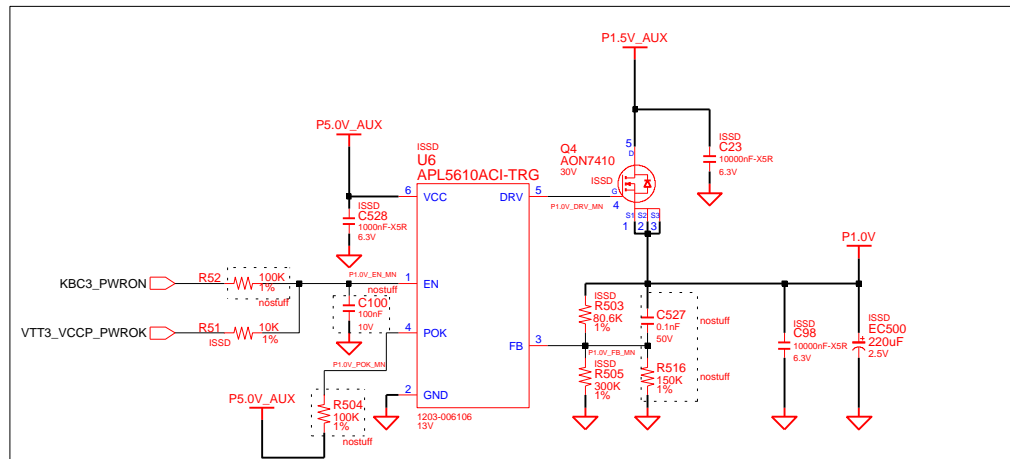
DRAW	SY KIM	DATE	7/14/2010	TITLE	Lotus-13	SAMSUNG
CHECK	SE LEE	DEV. STEP	PV	PWR_MV_SWITCHED	PWR_MV_SWITCHED	ELECTRONICS
APPROVAL	MK KIM	REV	REV 0.9	SWITCHED POWER	SWITCHED POWER	PART NO.
MODULE CODE		LAST EDIT				BA41-01091A
				November 25, 2011 15:12:10 PM	PAGE	48 OF 53

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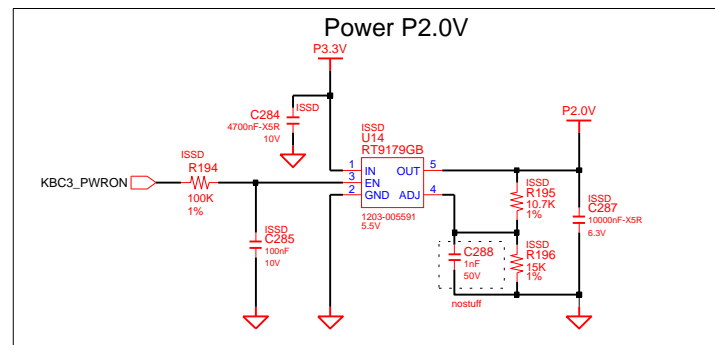
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Switched Power 2 (ISSD & USB3 BRIDGE PWR)

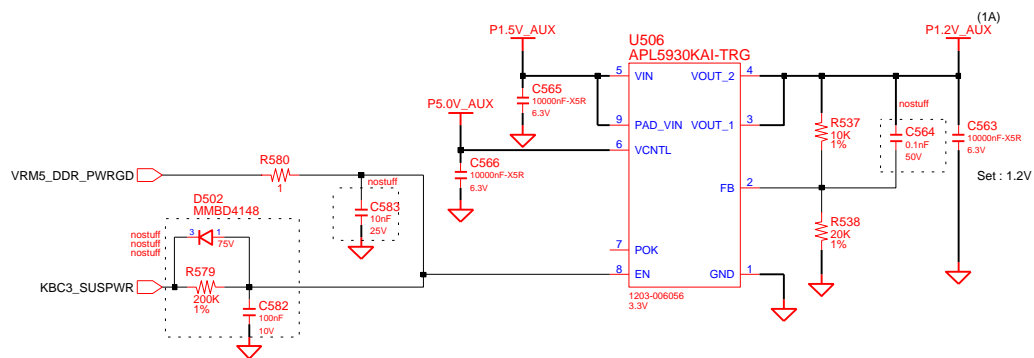
ISSD Power (P1.0V : Max 2.2A)



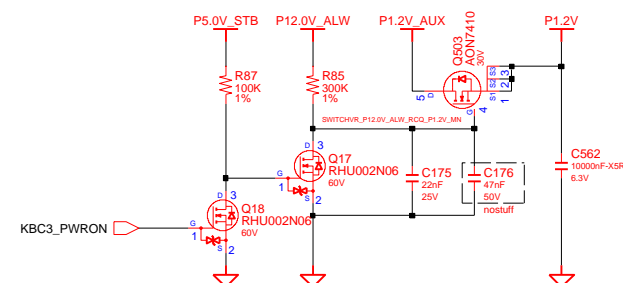
Power P2.0V



USB Power P1.2V_AUX(LDO)



USB Power Switched Power On (P1.2V)

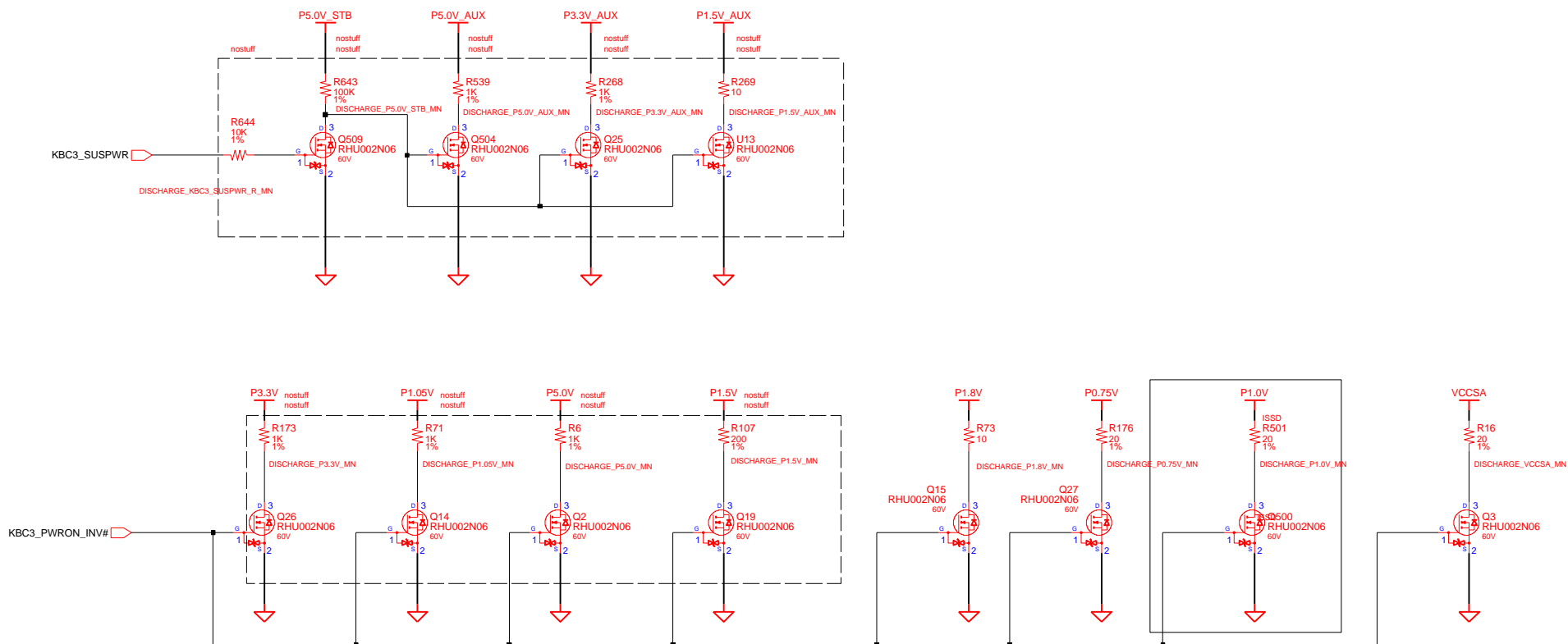


DRAW	SY KIM	DATE	7/14/2010	TITLE	Lotus-13	SAMSUNG
CHECK	SE LEE	DEV. STEP	PV	Switched PWR 2		ELECTRONICS
APPROVAL	MK KIM	REV	REV 0.9	FOT POWER XPRESS & USB3.0 PWR	PART NO.	BA41-01091A
MODULE CODE		LAST EDIT		November 25, 2011 15:12:10 PM	PAGE	49 OF 53

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POWER DISCHARGER



DRAW	SY KIM	DATE	7/14/2010	Lotus-13 PWR_MV_DISCHARGER DISCHARGING LOGIC		SAMSUNG ELECTRONICS	
CHECK	SE LEE	DEV. STEP	PV				
APPROVAL	MK KIM	REV	REV 0.9				
MODULE CODE		undefined		LAST EDIT		November 25, 2011 15:12:10 PM	
				PAGE	50	OF	53

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VDC

C572 100nF 25V

C290 100nF 25V

C525 100nF 25V

C9102 100nF 25V

C571 100nF 25V

C53 100nF 25V

C121 100nF 25V

M505 HEAD DIA LENGTH BA61-01090A

M506 HEAD DIA LENGTH BA61-01090A

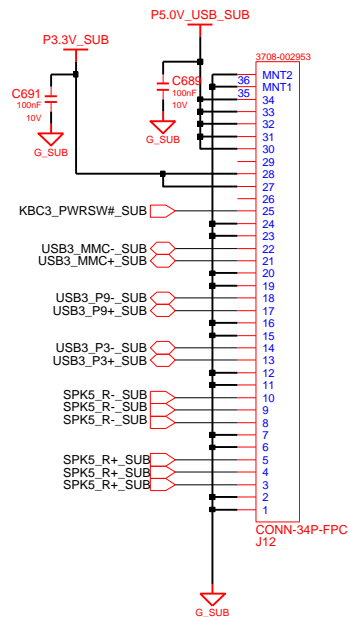
M504 HEAD DIA LENGTH BA61-01090A

MT1 RMNT-25-76-1P

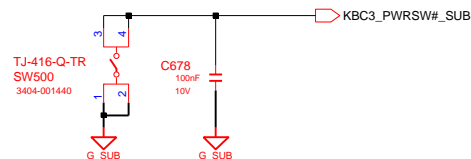
DESIGN	SY KIM	DATE	7/14/2010	Lotus-13 MOUNT HOLE MOUNT HOLE	SAMSUNG ELECTRONICS		
CHECK	SE LEE	DEV. STEP	PV				
APPROVAL	MK KIM	REV	REV 0.9				
MODULE CODE		LAST EDIT					
November 25, 2011 15:12:10 PM				PAGE	51	OF	53

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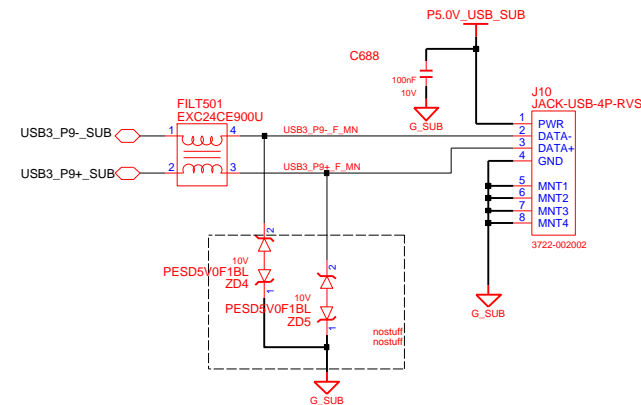
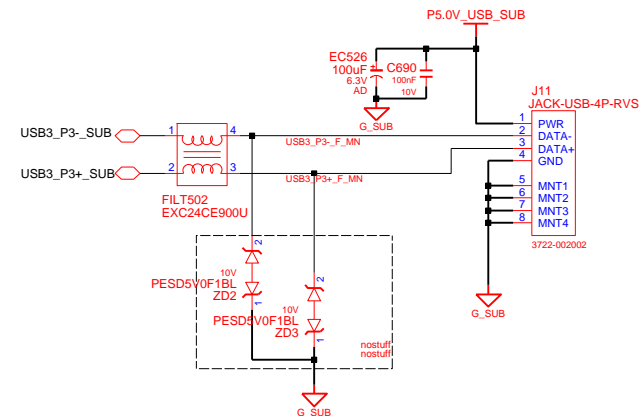
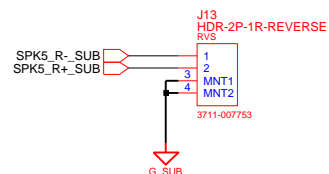
SUB to MAIN



Power Switch Button



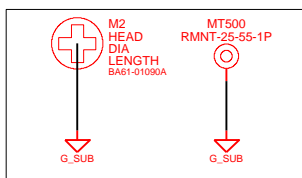
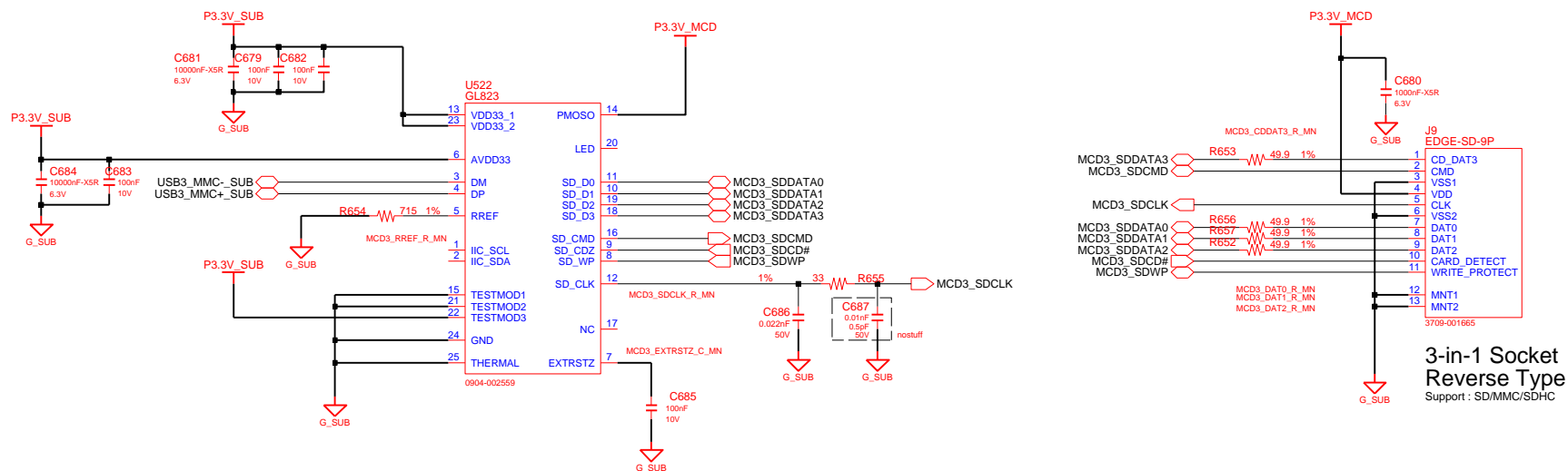
Right Speaker



DESIGN	SY KIM	DATE	7/14/2010	<p align="center">Lotus-13</p> <p align="center">SUB BOARD1</p> <p align="center">POWER SW & USB & SPKR</p>	SAMSUNG	
CHECK	SE LEE	DEV. STEP	PV		ELECTRONICS	
APPROVAL	MK KIM	REV	REV 0.9		PART NO.	BA41-01091A
MODULE CODE	LAST EDIT				November 25, 2011 15:12:10 PM	PAGE 52 OF 53

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PWR SW & USB & 4IN1 SUB Board



DRAW	SY KIM	DATE	7/14/2010	Lotus-13 SUB BOARD1 4IN1	SAMSUNG ELECTRONICS			
CHECK	SE LEE	DEV. STEP	PV					
APPROVAL	MK KIM	REV	REV 0.9					
MODULE CODE	LAST EDIT					PART NO.	BA41-01091A	
November 25, 2011 15:12:10 PM					PAGE	53	OF	53