

Scala2-R

CPU : Sandy Bridge PGA
Chip Set : Intel Cougar Point
GFX : N12P-GV/N12M-GE
Remarks : Huron River Platform

Model Name : Scala2-R
PBA Name : MAIN
PCB Code : BA41-01XXXA (GCE)
BA41-01XXXA (NY)
BA41-01XXXA (HAN)
BA41-01XXXA (GBM)
Dev. Step : ADV
Revision : 0.1
T.R. Date : 2011.01.20

Design	CHECK	APPROVAL
GU HUI	SJ WU	BC LEE

■ Owner : SRDC PD3

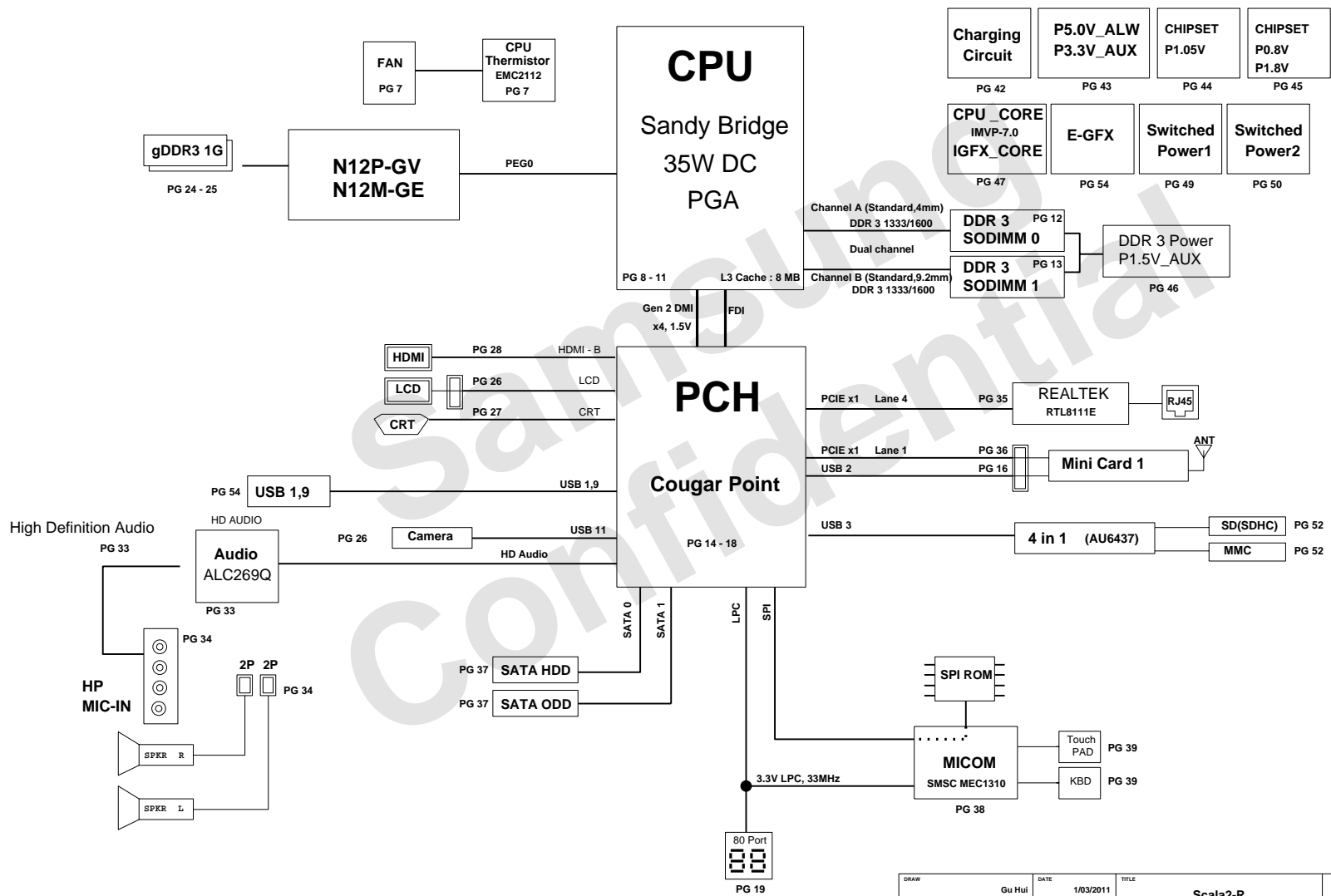
Signature : GUHUI

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DRAW	Gu Hui	DATE	1/03/2011	TITLE	Scala2-R	SAMSUNG ELECTRONICS
CHECK	SJ Wu	DEV. STEP	ADV		MAIN	
APPROVAL	BC LEE	REV	REV. 0.1		COVER	
MODULE CODE		LAST EDIT	January 20, 2011 18:59:20 PM	PAGE	1	OF 48

BLOCK DIAGRAM



DRAW	Gu Hui	DATE	1/03/2011	TITLE	Scala2-R	SAMSUNG ELECTRONICS
CHECK	SJ Wu	DEV. STEP	ADV	MAIN		
APPROVAL	BC LEE	REV	rev. 0.1	BLOCK DIAGRAM	PART NO.	
MODULE CODE	undefined	LAST EDIT	January 20, 2011 18:59:20 PM	PAGE	2 OF 48	

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BOARD INFORMATION

SCHEMATIC ANNOTATIONS AND BOARD INFORMATION

Voltage Rails	Active in	
VDC P3.3V_MICOM P5.0V_STB P5.0V_ALW P3.3V_ALW P12.0V_ALW	Primary DC system power supply (7 to 21V) 3.3V always power rail (for Micom) 5.0V always power rail 5.0V always power rail 3.3V always power rail 12.0V always power rail	S4 - S5
P5.0V_AUX P3.3V_AUX P1.5V_AUX	5.0V switched on power rail (off in S4-S5) 3.3V switched on power rail (off in S4-S5) 1.5V power rail for DDR3 (off in S4-S5)	S3
P5.0V P3.3V P1.8V P1.5V P0.75V P0.8V	5.0V switched power rail (off in S3-S5) 3.3V switched power rail (off in S3-S5) 1.8V switched power rail (off in S3-S5) 1.5V switched power rail (off in S3-S5) 0.75V power rail for DDR3 (off in S3-S5) 0.8V switched power rail (off in S3-S5)	S0
VCC_CORE EGFX_CORE P1.05V (VCCP)	Core Voltage for CPU Core Voltage for GPU VCC for COUGARPOINT	S0
P3.3V_D P1.5V_D P1.05V_D	3.3V discrete power rail for N12X 1.5V discrete power rail for N12X 1.05V discrete power rail for N12X	

USB PORT Assign	PCI Express Assign
PORT # ASSIGNED TO	PORT # ASSIGNED TO
0 NC	1 Mini Card 1 (WLAN)
1 SYSTEM PORT 0	2 NC
2 Mini PCI Express	3 NC
3 Multi Memory Card Controller	4 LAN CONTROLLER
4 NC	5 USB 3.0
5 NC	6 NC
6 NC (N/A WITH HM55)	7 NC
7 NC (N/A WITH HM55)	8 NC
8 Camera	
9 SYSTEM PORT 1	
10 NC	
11 Camera(LCD Cable)	
12 NC	
13 NC	

SATA PORT Assign
PORT # ASSIGNED TO
0 HDD
1 ODD
2 (N/A WITH HM65)
3 (N/A WITH HM65)
4
5

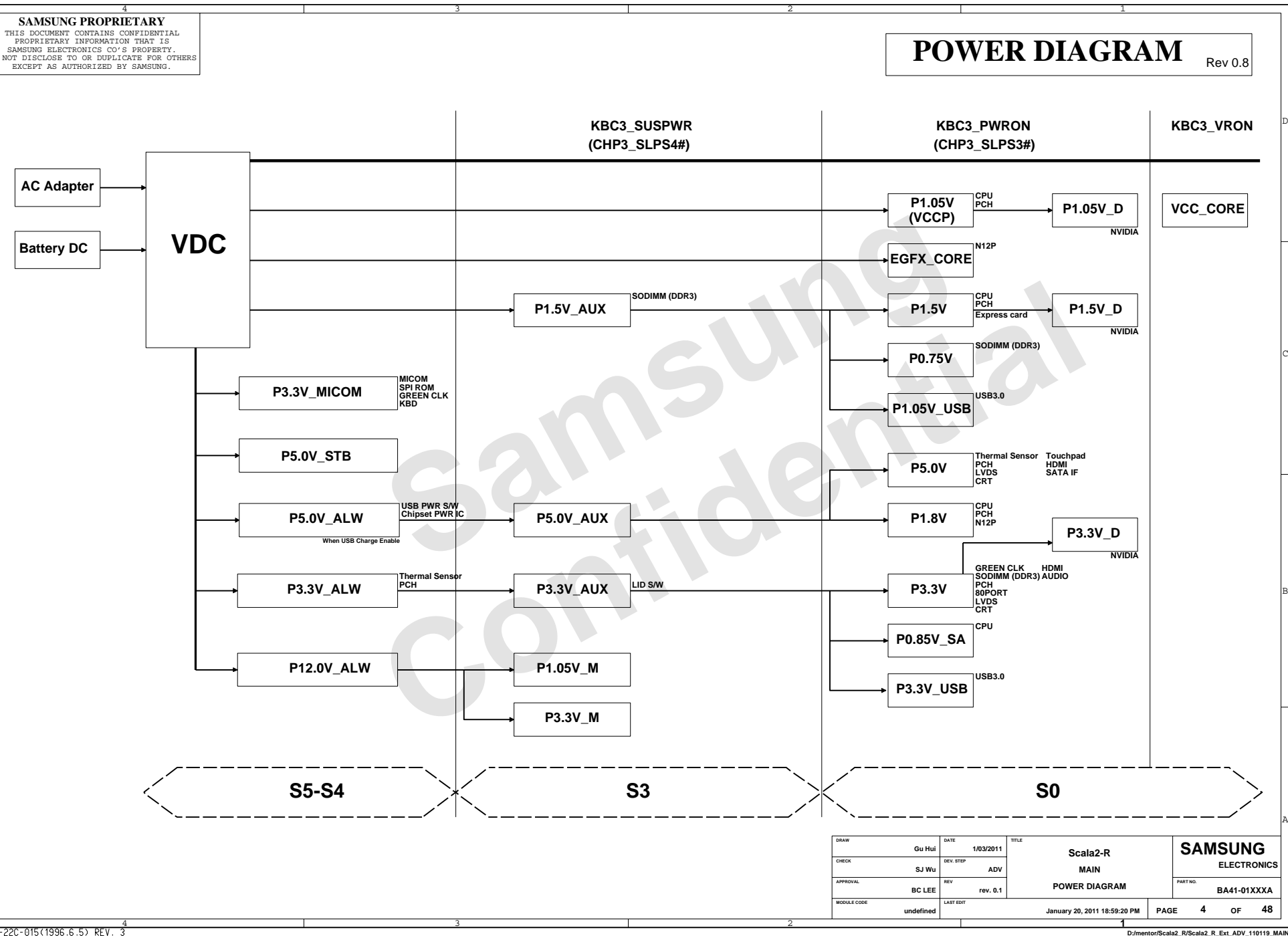
Crystal / Oscillator
TYPE FREQUENCY DEVICE USAGE
Crystal 32.768KHz HM65 Real Time Clock
Crystal 25MHz LAN Intel LAN
Crystal 24MHz USB 3.0
Crystal 25MHz HM65 INTEL
Crystal 27MHz N12P-LP NVIDIA

LCD Pannel Detect (TBD)
Devices Resolution PANNEL_DETECT_0

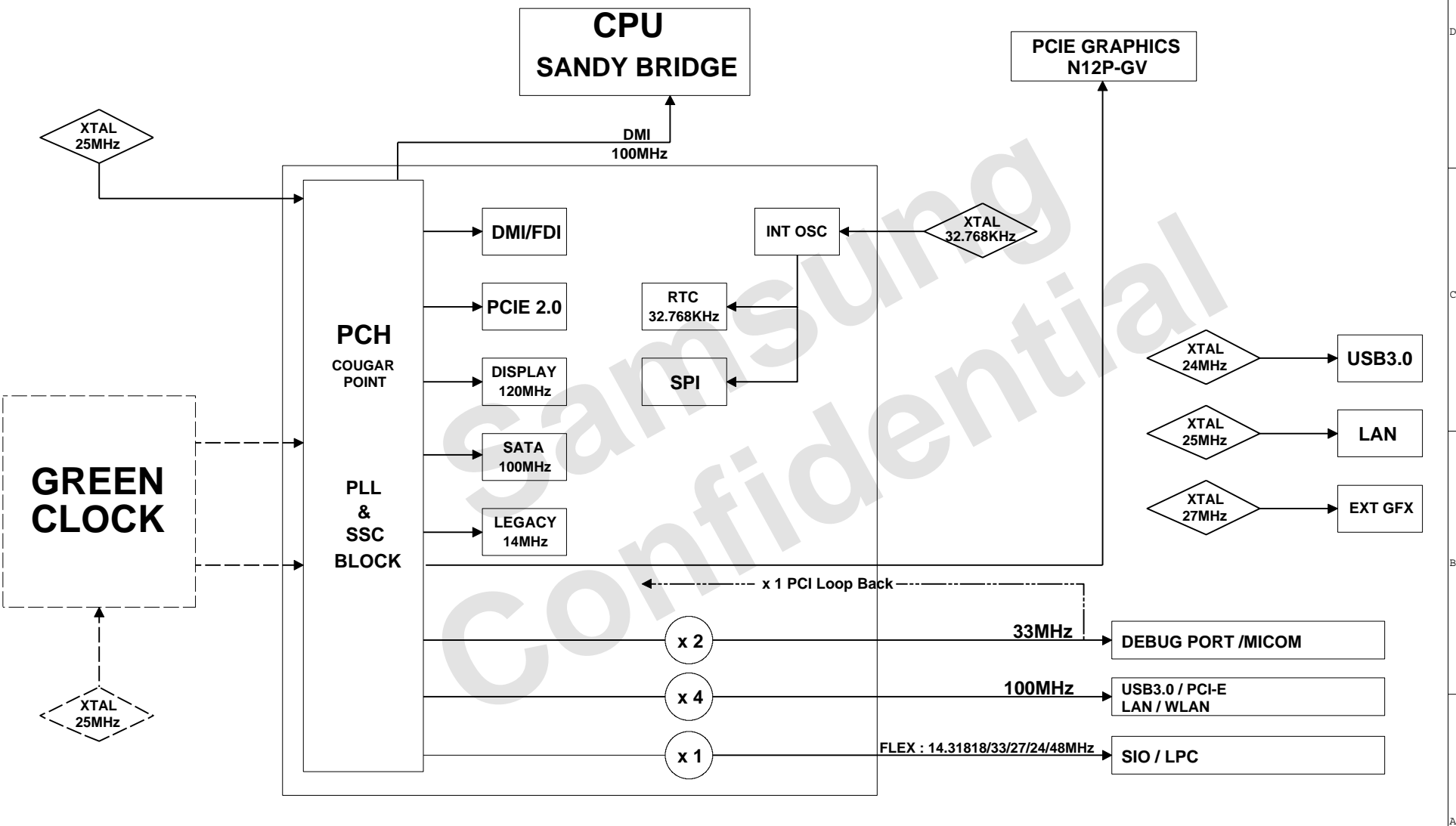
I ² C / SMB Address
Devices Address Hex Bus
HM65 Master - SMBUS Master
CPU Thermal Sensor 0111 101x 7Ah Thermal Sensor
SODIMM0 1010 000x A0h -
SODIMM1 1010 010x A4h -
Thermal Sensor on SODIMM0 0011 000x 30h -
Thermal Sensor on SODIMM1 0011 010x 34h -
Thermal Sensor on board 1101 100x 98h
Power thermal management TS 1101 011x 96h

DRAW	Gu Hui	DATE	1/03/2011	TITLE	Scala2-R MAIN BOARD INFO	SAMSUNG ELECTRONICS
CHECK	SJ Wu	DEV. STEP	ADV			
APPROVAL	BC LEE	REV	rev. 0.1			
MODULE CODE	undefined	LAST EDIT	January 20, 2011 18:59:20 PM			
				PAGE	3	OF 48

22C-015(1996.6.5) REV. 3 D:/mentor/Scala2_R/Scala2_R_Ext_ADV_110119.MAIN



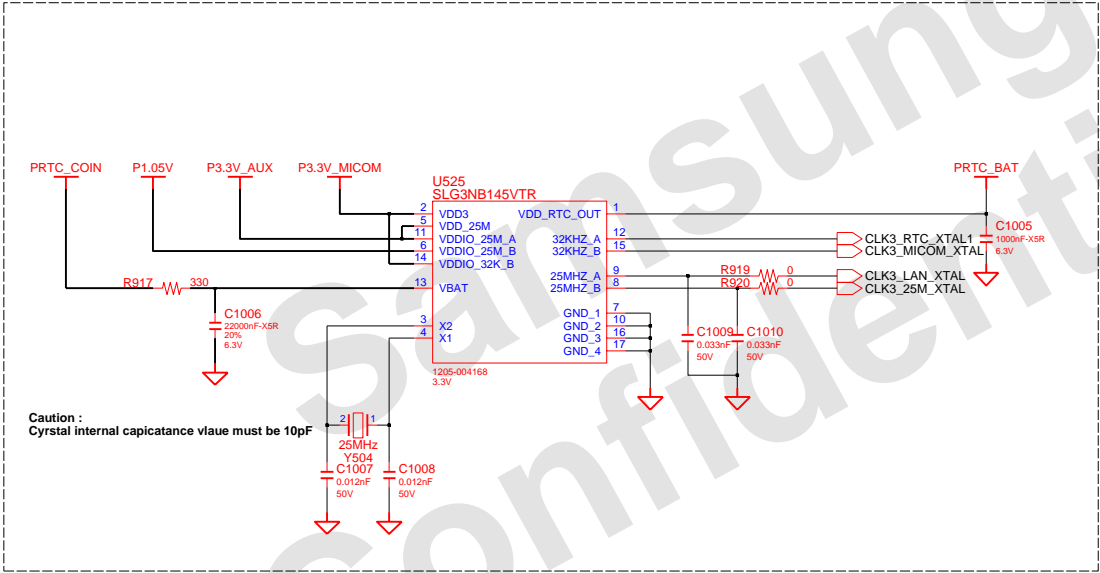
CLOCK DISTRIBUTION Rev. 0.8



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CHECK	SJ Wu	DEV. STEP	ADV	MAIN		
APPROVAL	BC LEE	REV	rev. 0.1	CLOCK DIAGRAM	PART NO. BA41-01XXXA	
MODULE CODE	undefined	LAST EDIT	January 20, 2011 18:59:20 PM	PAGE	5	OF 48

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CLOCK DISTIBUTOR



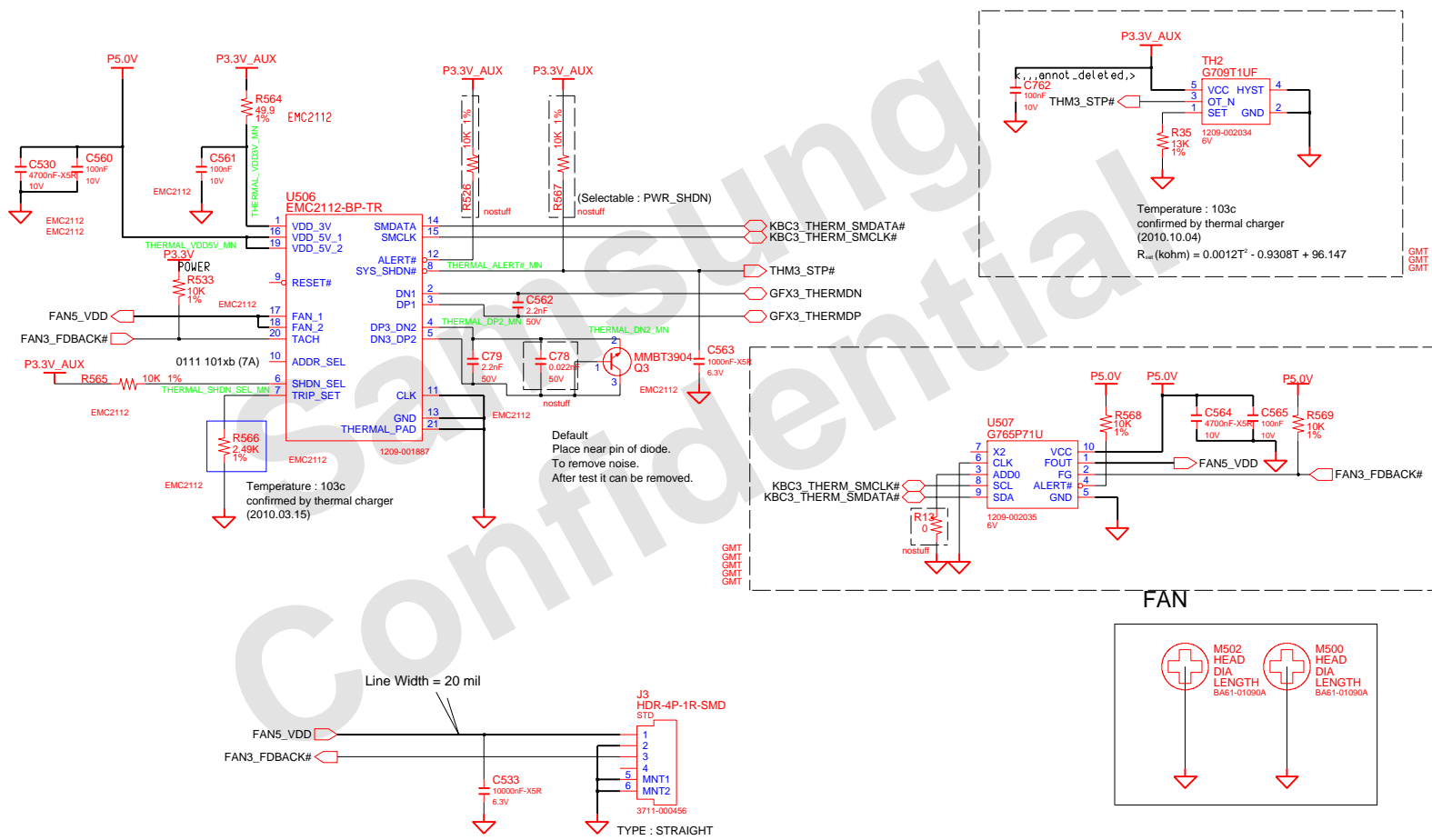
GREENCLK
GREENCLK
GREENCLK
GREENCLK
GREENCLK
GREENCLK
GREENCLK
GREENCLK
GREENCLK
GREENCLK

ENGINEER	DATE	TITLE	SAMSUNG ELECTRONICS PART NO. BA41-XXXXXX
DESIGNED BY	short_date	SCALAZ-R_PV_MAIN	
CHANGED BY	DEV. STEP	Module Name	
FIG. CHK	REV	1.0	
LAST EDIT		last_edit	PAGE 6 OF XX

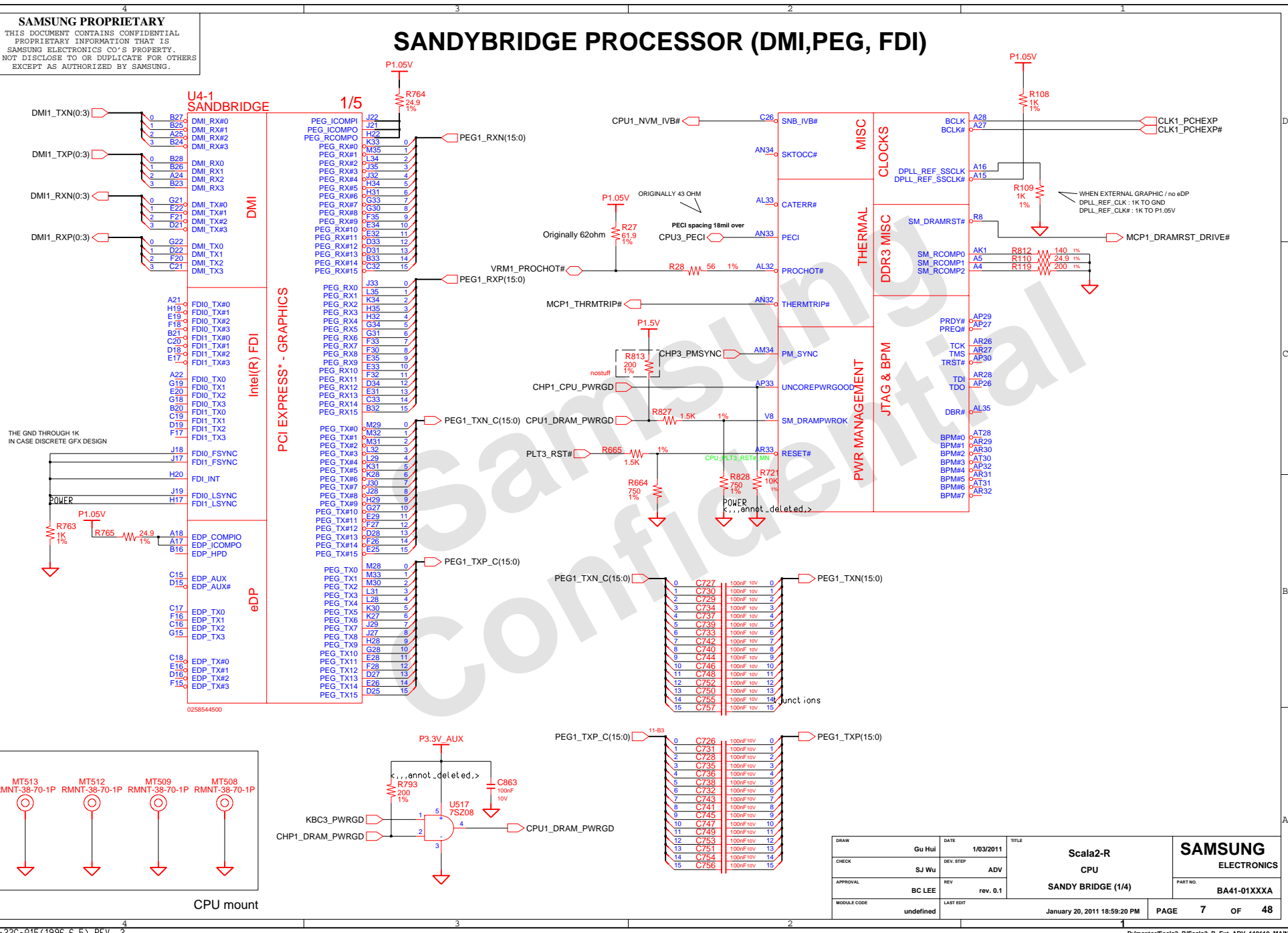
THERMAL SENSOR & FAN CONTROL

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



DESIGN	Gu Hui	DATE	1/03/2011	TITLE	Scala2-R	SAMSUNG ELECTRONICS
CHECK	SJ Wu	DEV. STEP	ADV		THERMAL SENSOR	
APPROVAL	BC LEE	REV	rev. 0.1		THERMAL SENSOR EMC2112	
MODULE CODE		LAST EDIT				
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D:/mentor/Scala2 R/Scala2 R Ext ADV 110119 MAIN

CPU CORE U4-3

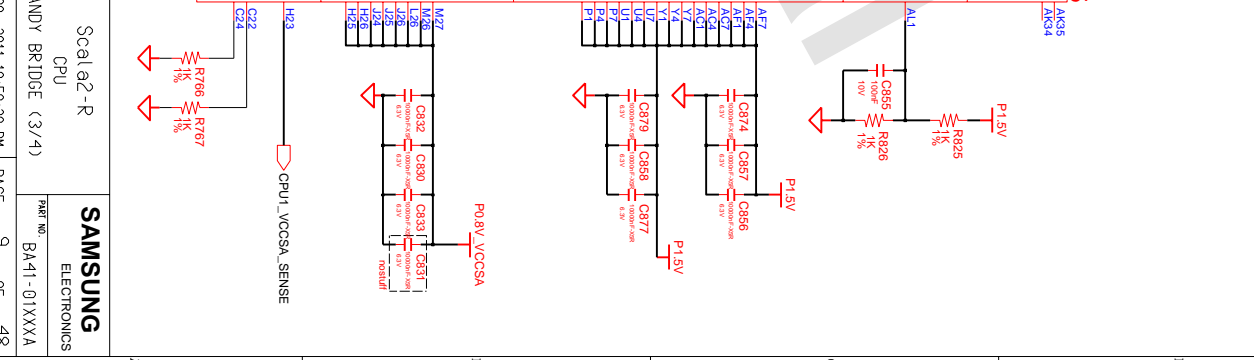
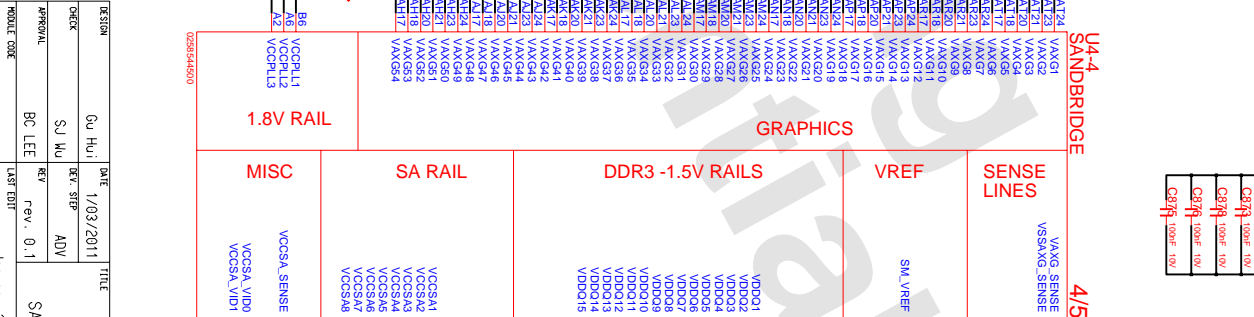
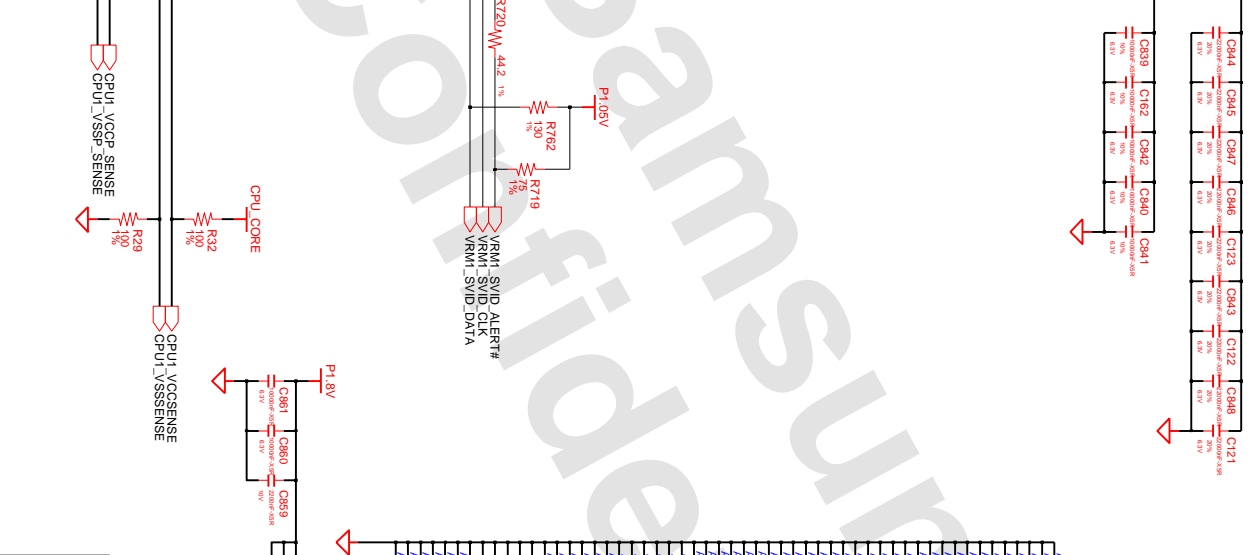
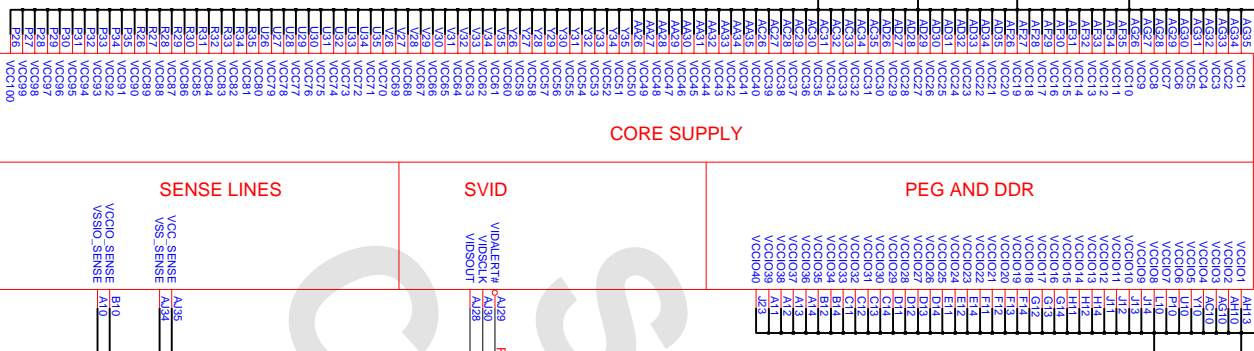
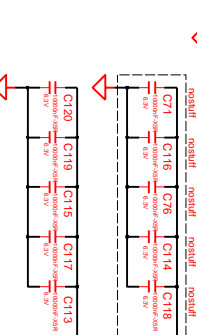
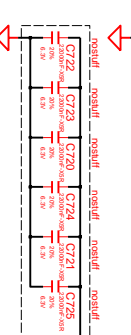
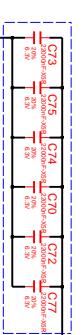
SANDBRIDGE

3/5

P1.05V

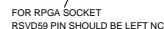
Undecore : Stiff

Undecore : Stiff



DESIGN	DATE	TITLE	SAMSUNG
Scal2-R	1/03/2011	CPU	ELECTRONICS
DESIGN	BY: HUI	REV: STP	
CHECK	SJ MU	ADV	
APPROVAL	BC LEE	REV. 0.1	
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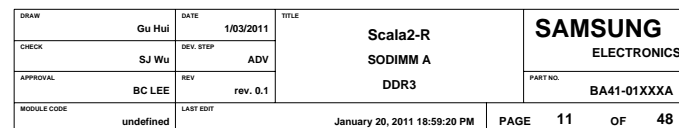


PEG STATIC LANE REVERSAL - CFG2 IS FOR THE 16X	
CFG2	1 : (DEFAULT) NORMAL OPERATION 0 : LANE REVERSED
PCIE PORT BIFURCATION STRAPS	
CFG6[5]	11 : (DEFAULT) X16 - DEVICE 1 FUNCTIONS 1 AND 2 DISABLED 10 : X8 - X8 - DEVICE 1 FUNCTION 1 ENABLED - FUNCTION 2 DISABLED 01 : RESERVED - DEVICE 1 FUNCTION 1 DISABLED ; FUNCTION 2 ENABLED 00 : X8 - X4 - DEVICE 1 FUNCTIONS 1 AND 2 ENABLED
Display Port Presence	
CFG4	1 : Disabled - No DP device is connected to eDP 0 : Enabled - (DP device is connected to eDP
PEG DEFER TRAINING	
CFG7	1 : (DEFAULT) PEG TRAIN IMMEDIATELY FOLLOWING XRESETB DEASSERTION 0 : WAIT FOR BIOS FOR TRAINING

D:/mentor/Scala2_R/Scala2_R_Ext_ADV_110119_MAIN

DDR SO-DIMM #0

P/N : 3709-001656 (Foxconn)



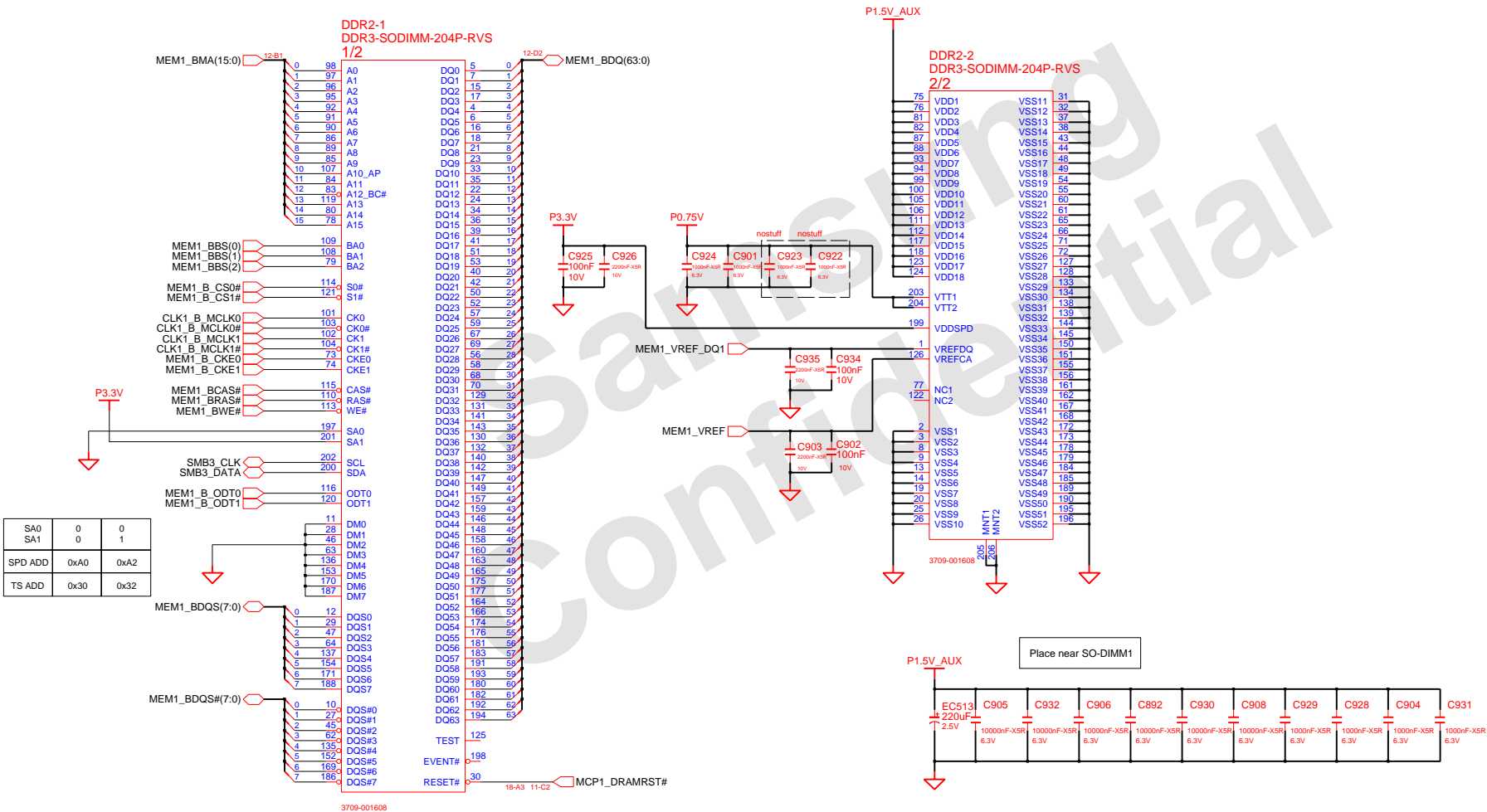
SO-DIMM#1 : 1st SO-DIMM

DDR SO-DIMM #1

Height : 4 mm (REVERSE)

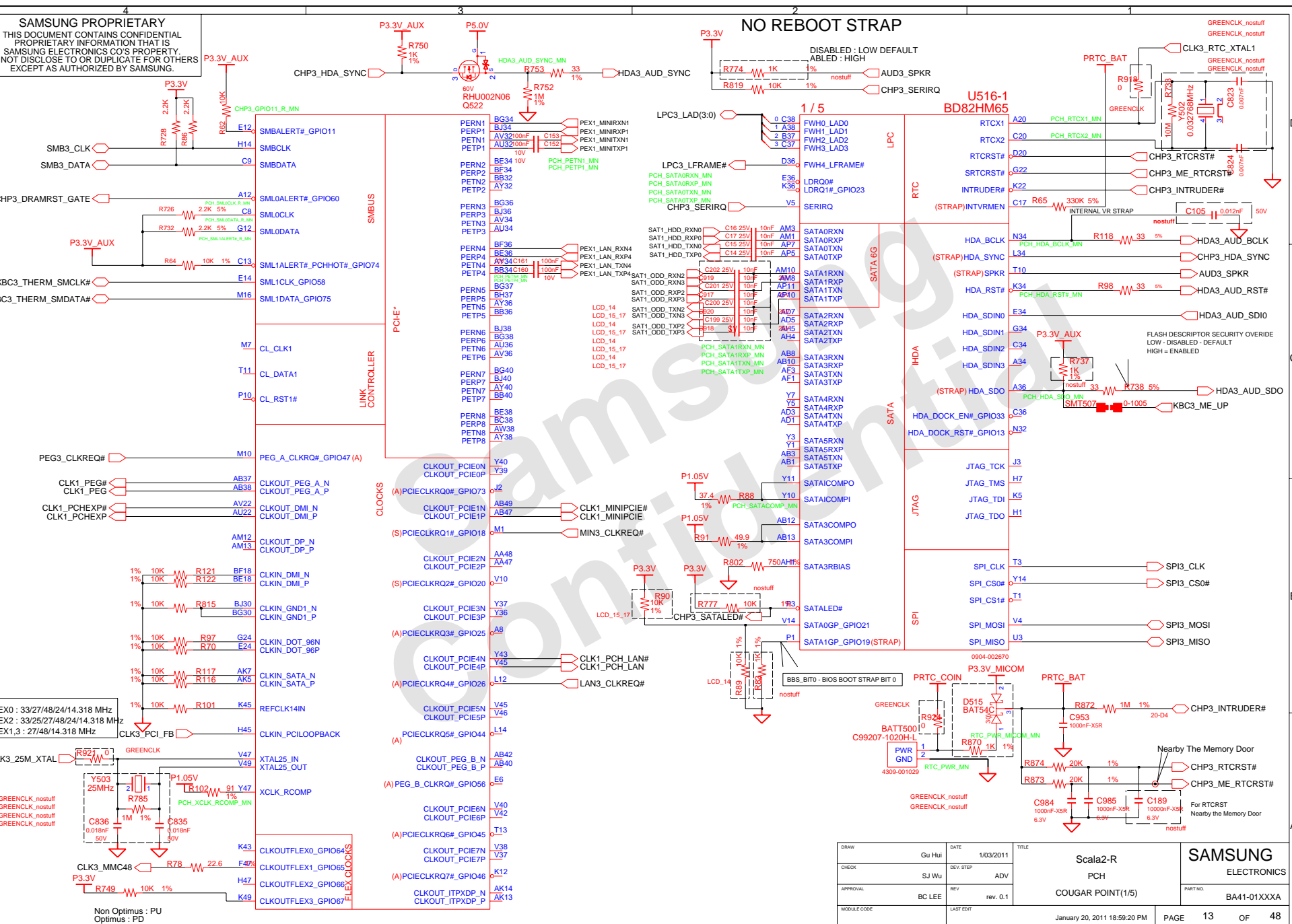
P/N : 3709-001608 (CONCRAFT)

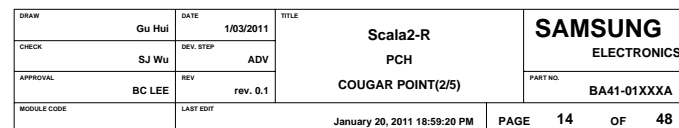
P/N : 3709-001654 (Foxconn)



DRAW	Gu Hui	DATE	1/03/2011	TITLE	Scala2-R	SAMSUNG
CHECK	SJ Wu	DEV. STEP	ADV		SODIMM B	ELECTRONICS
APPROVAL	BC LEE	REV	REV. 0.1		DDR3	PART NO.
MODULE CODE		LAST EDIT				BA41-01XXA
				January 20, 2011 18:59:20 PM	PAGE	12 OF 48

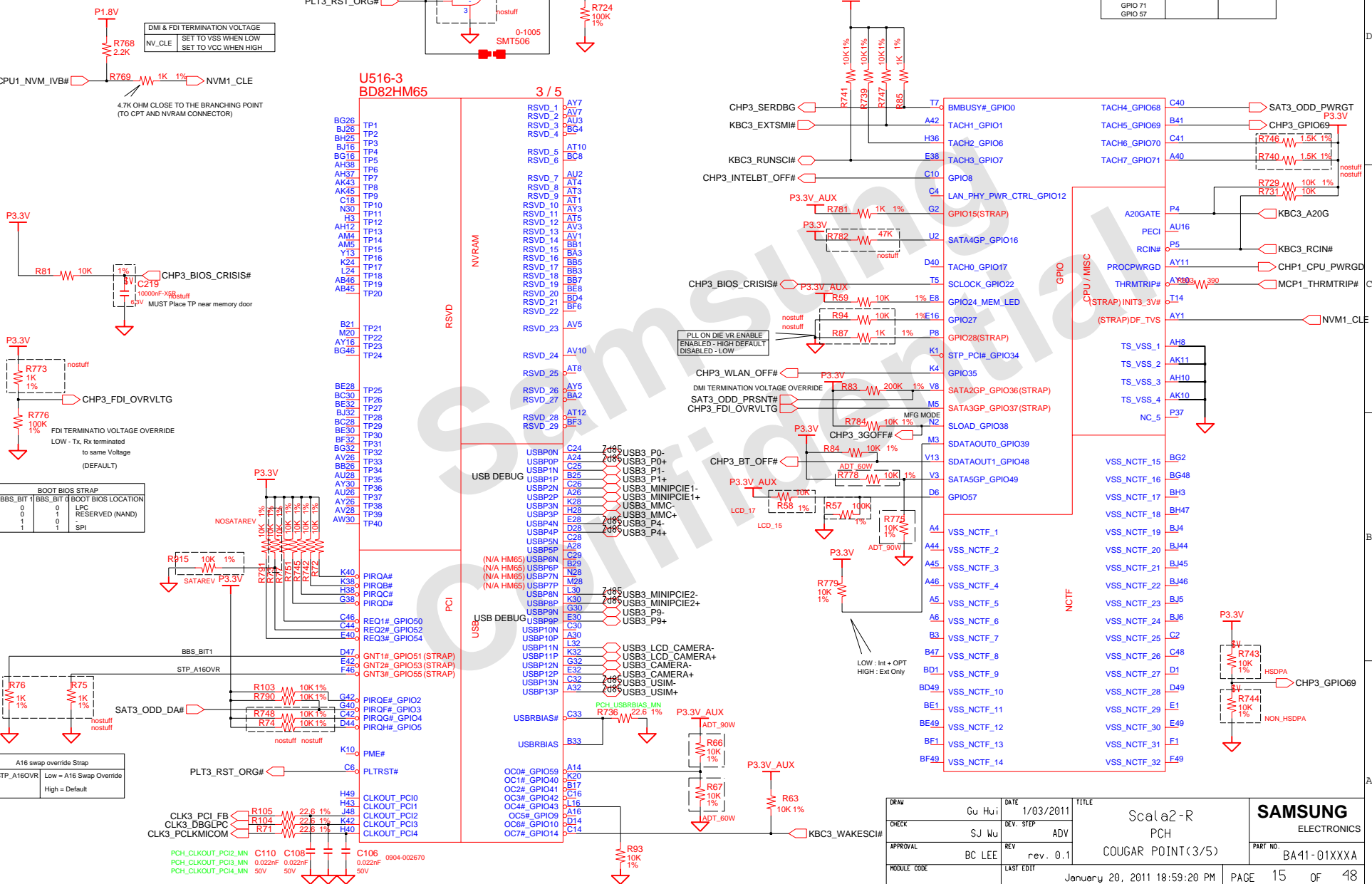
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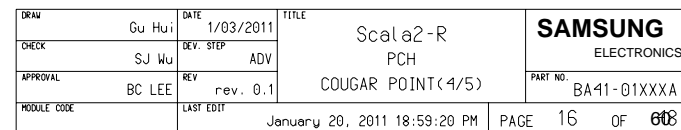


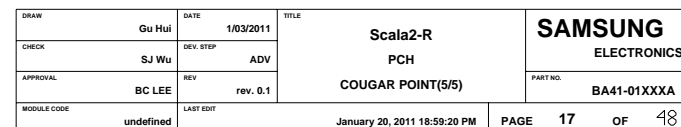
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	PU	PD
GPIO 39	EXT ONLY	INT + OPT
GPIO 69	HSDPA	NON HSDPA
GPIO 70		
GPIO 71		
GPIO 57		



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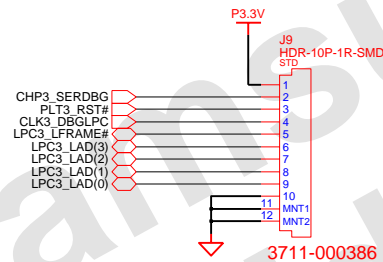


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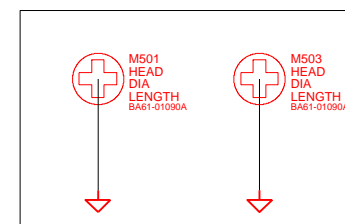
2

1

80H PORT DEBUG

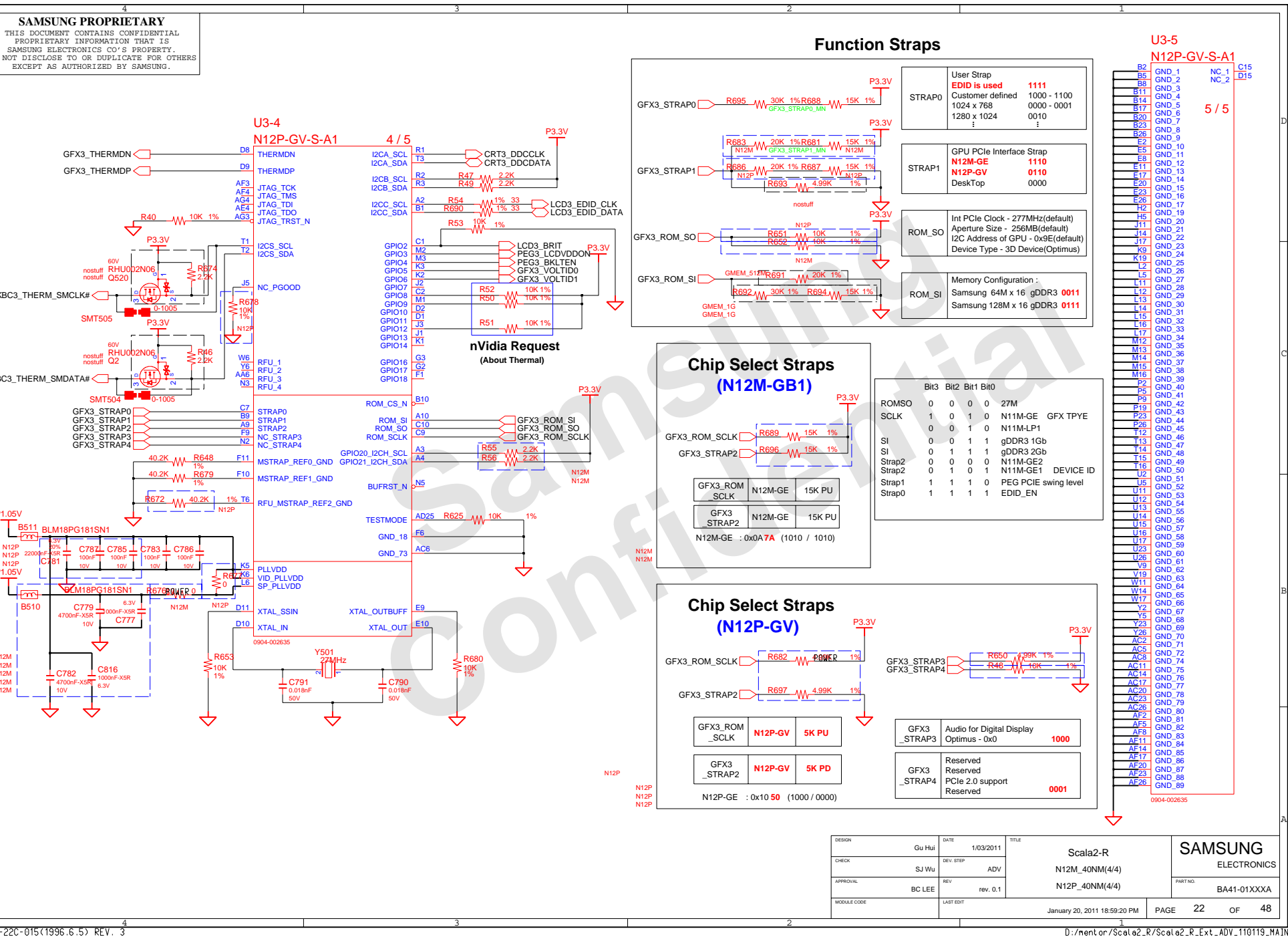


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APPROVAL	BC LEE	REV	rev. 0.1			
MODULE CODE		LAST EDIT	January 20, 2011 18:59:20 PM	PAGE	18	OF 48



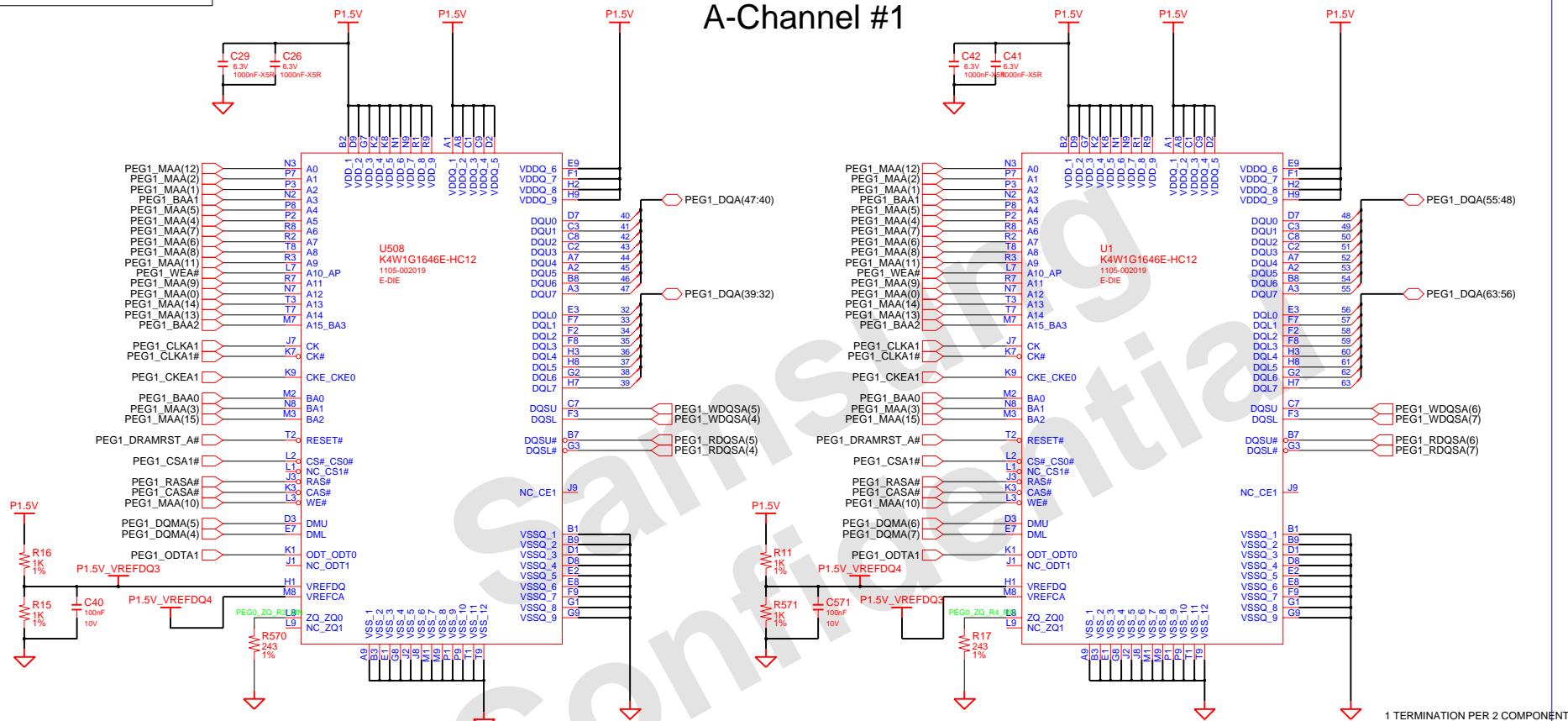
Graphic PEM

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CHECK	SJ Wu	DEV. STEP	ADV			
APPROVAL	BC LEE	REV	rev. 0.1		PART NO.	BA41-01XXXX
MODULE CODE	LAST EDIT				January 20, 2011 18:59:20 PM	PAGE 19 OF 48

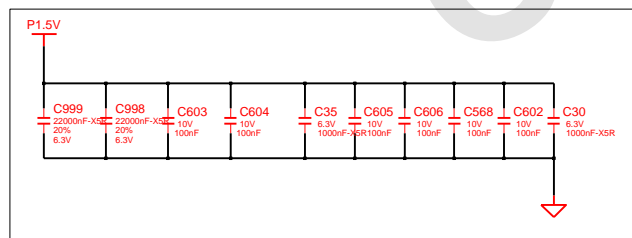


D:/mentor/Scala2_R/Scala2_R_Ext_ADV_110119_MAIN

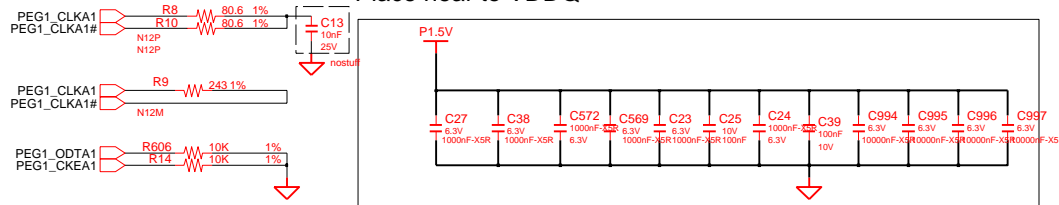
A-Channel #1



Place near to VDDQ



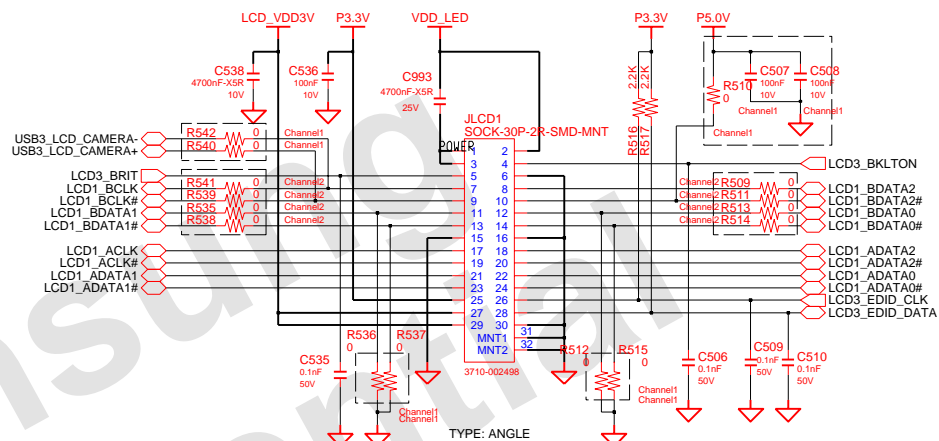
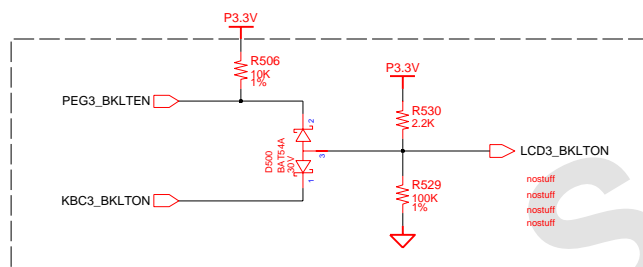
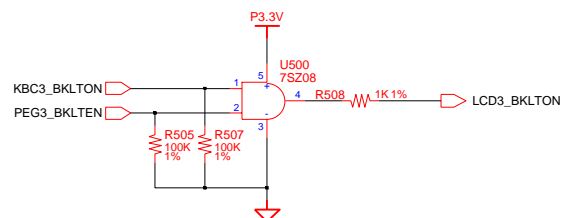
Place near to VDDQ



DESIGN	Gu Hui	DATE	1/03/2011	TITLE	Scala2-R	SAMSUNG ELECTRONICS
CHECK	SJ Wu	DEV. STEP	ADV		GRAPHIC_MEM A#1	
APPROVAL	BC LEE	REV	rev. 0.1		GRAPHIC_MEM A#1	
MODULE CODE		LAST EDIT				
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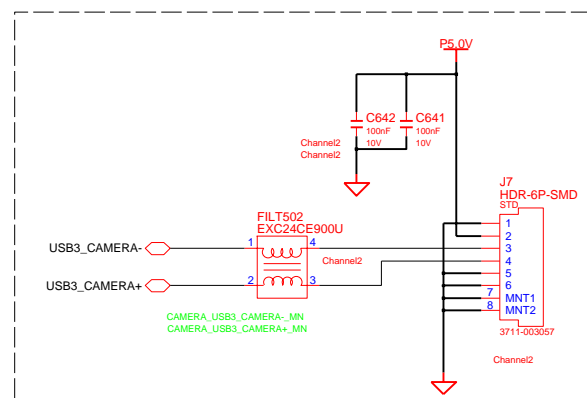
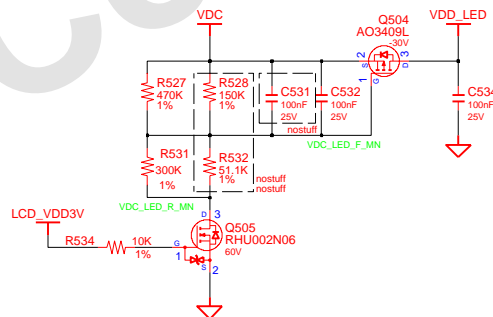
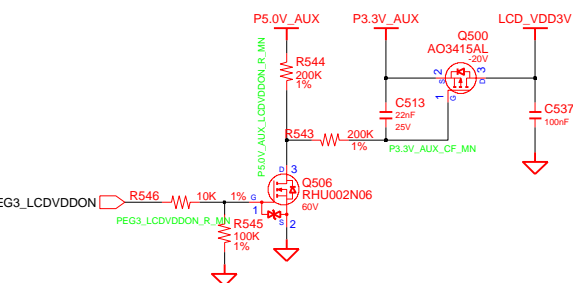
1Ch. LCD Connector + CAMERA

NOTE : Place R20 close to connector to minimize stub



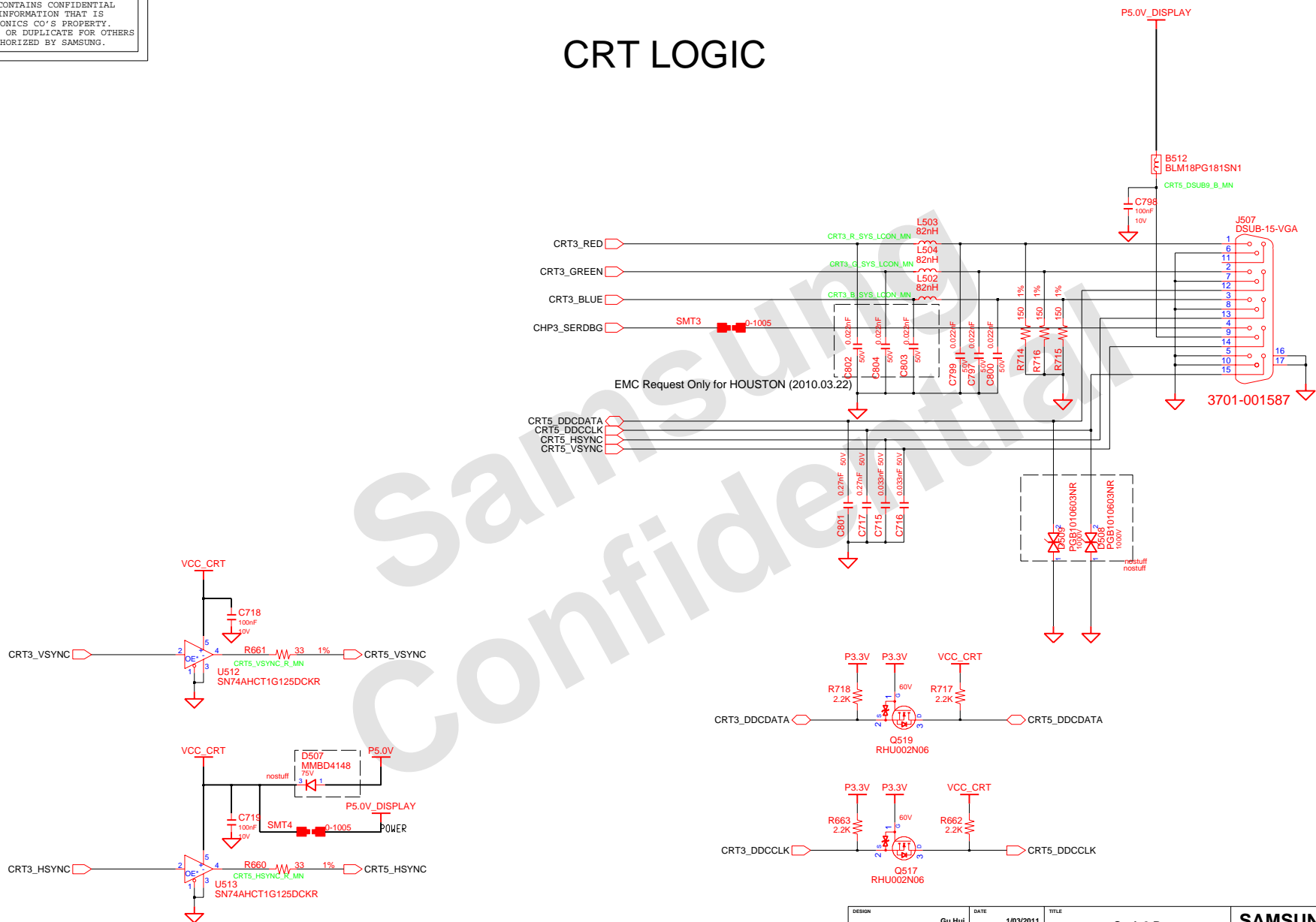
CAMERA CONN FOR 2ch LVDS

LED Power



DESIGN	Gu Hui	DATE	1/03/2011	Scala2-R GRAPHICS_IF LVDS	SAMSUNG ELECTRONICS
CHECK	SJ Wu	DEV. STEP	ADV		
APPROVAL	BC LEE	REV	rev. 0.1		
MODULE CODE	LAST EDIT		January 20, 2011 18:59:20 PM		
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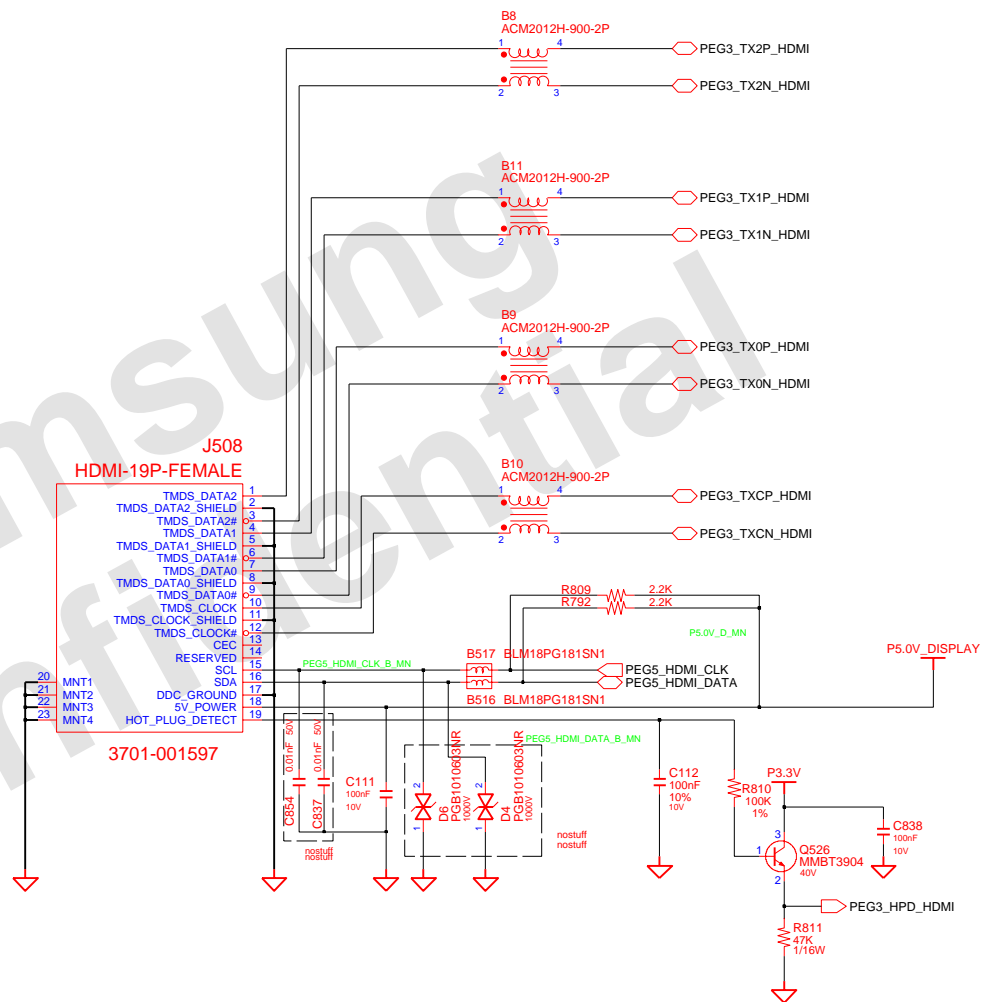
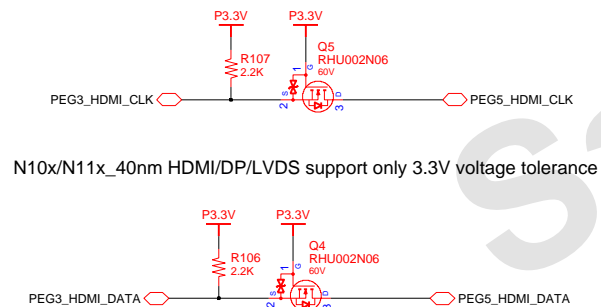
CRT LOGIC



DESIGN	Gu Hui	DATE	1/03/2011	TITLE	Scala2-R	SAMSUNG ELECTRONICS
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APPROVAL	BC LEE	REV	rev. 0.1	CRT		
MODULE CODE		LAST EDIT				
					January 20, 2011 18:59:20 PM	PAGE 26 OF 48

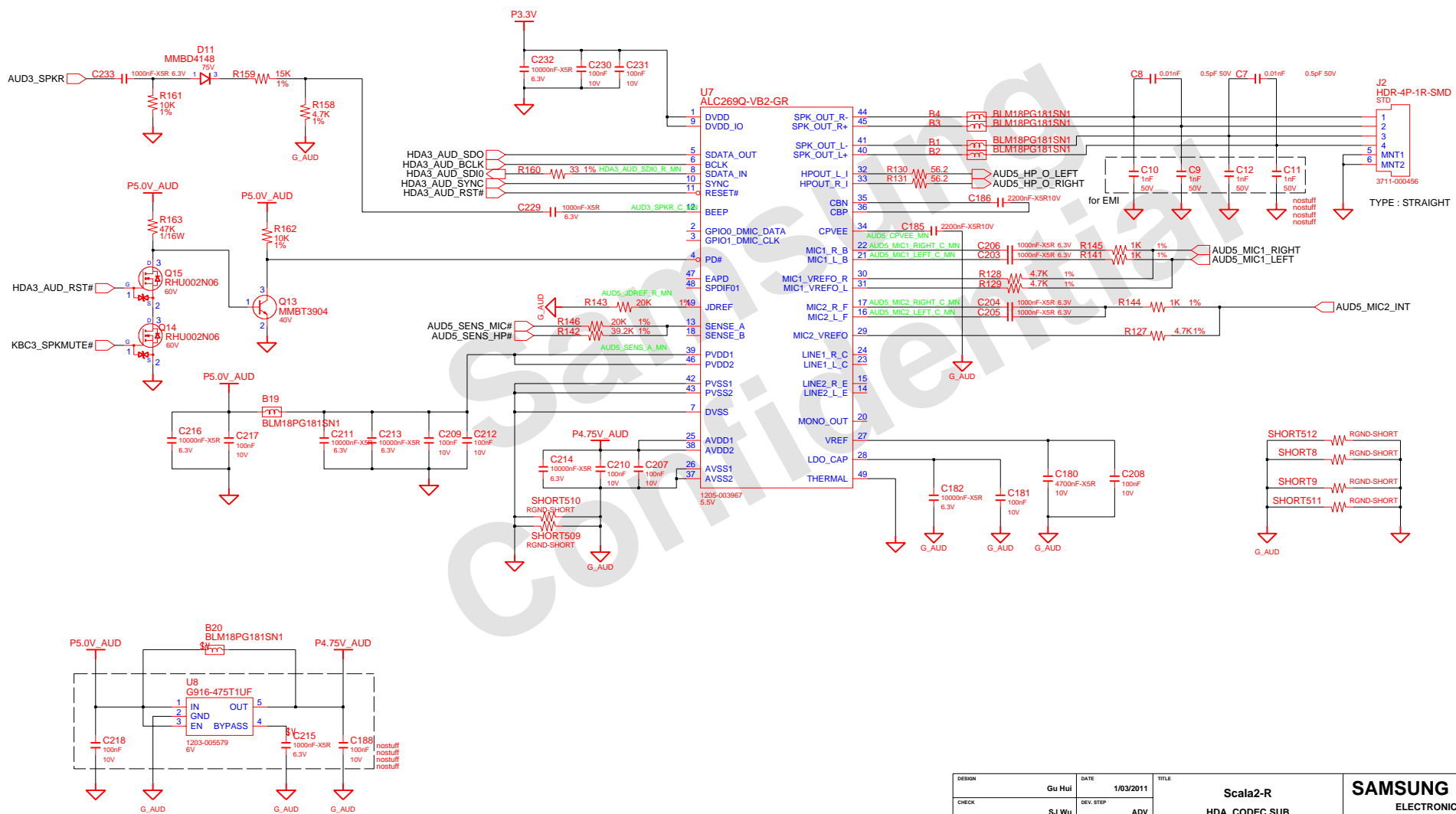
HDMI Graphic

FOR HDMI VERIFICATION TEST



DESIGN	Gu Hui	DATE	1/03/2011	TITLE	Scala2-R	SAMSUNG ELECTRONICS
CHECK	SJ Wu	DEV. STEP	ADV	GRAPHICS_IF		
APPROVAL	BC LEE	REV	rev. 0.1	HDMI		
MODULE CODE		LAST EDIT	January 20, 2011 18:59:20 PM			
PAGE 27 OF 48						BA41-01XXXA

HD AUDIO

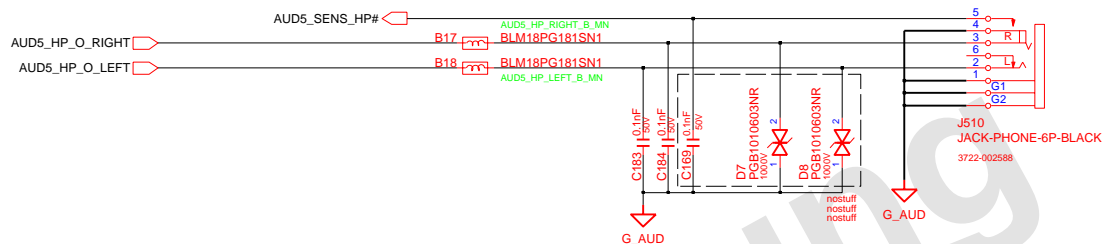


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APPROVAL	BC LEE	REV	rev. 0.1		AUDIO CODEC ALC269 SUB	
MODULE CODE		LAST EDIT				
					January 20, 2011 18:59:20 PM	PAGE 28 OF 48

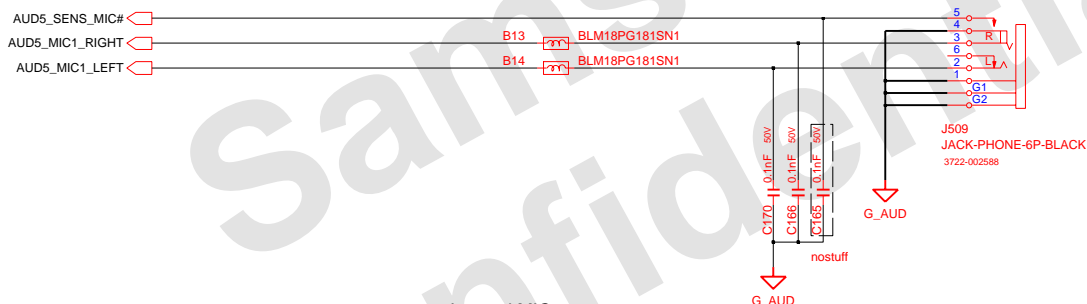
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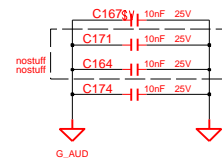
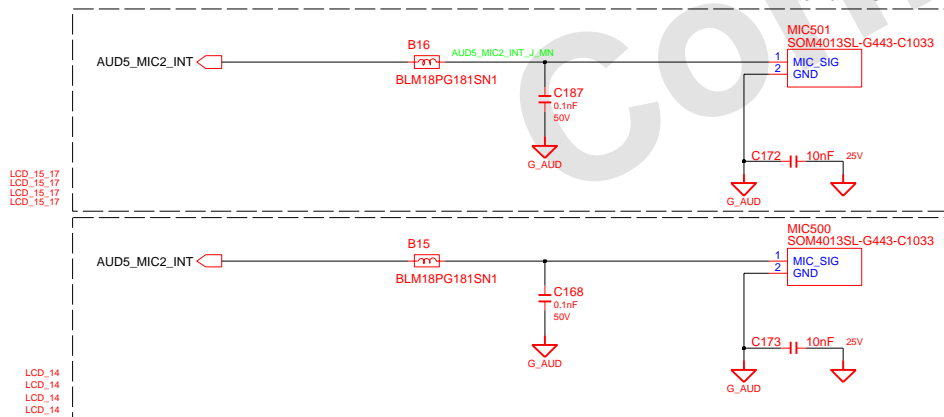
HEADPHONE



MIC JACK

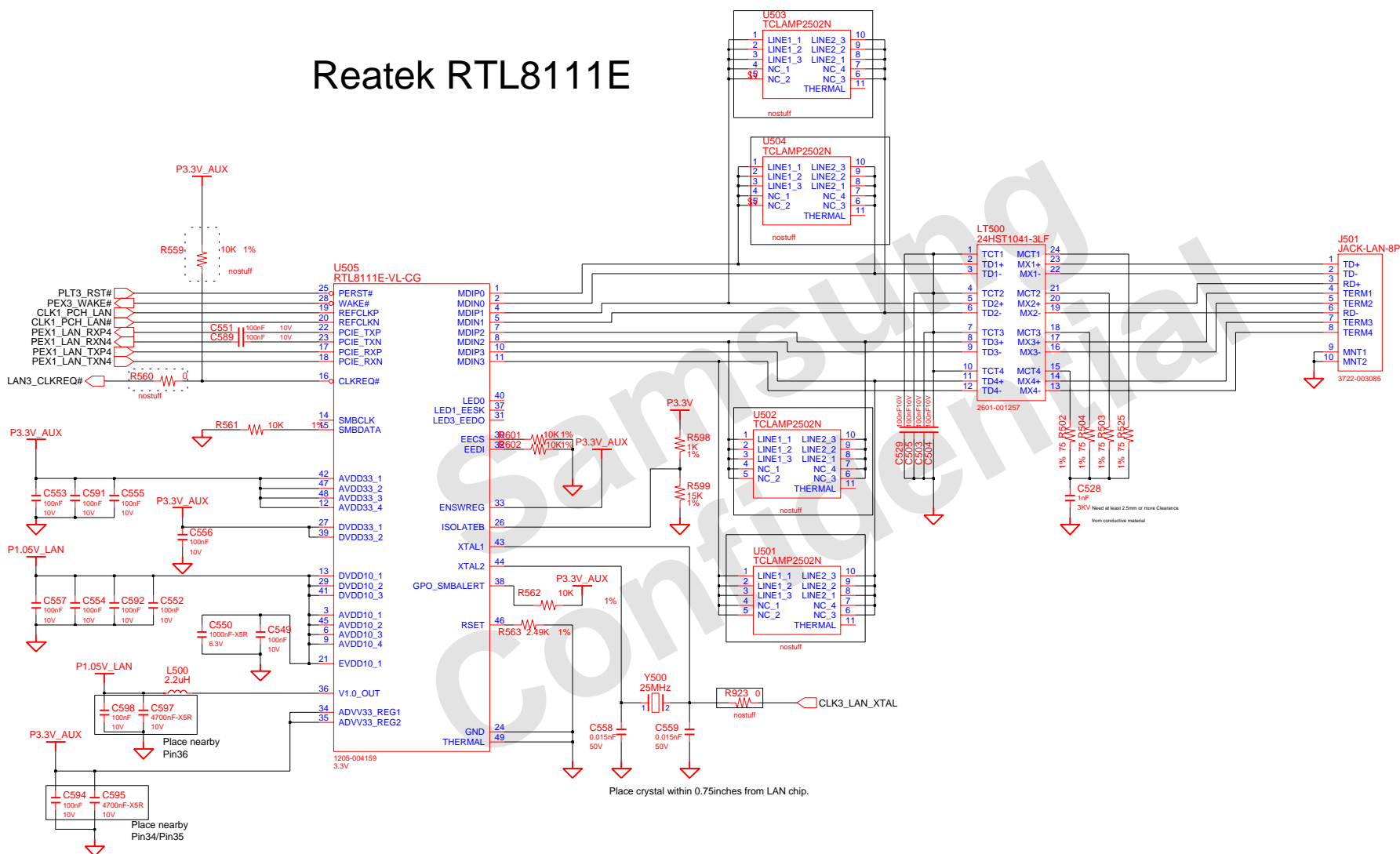



Internal MIC



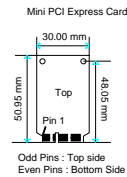
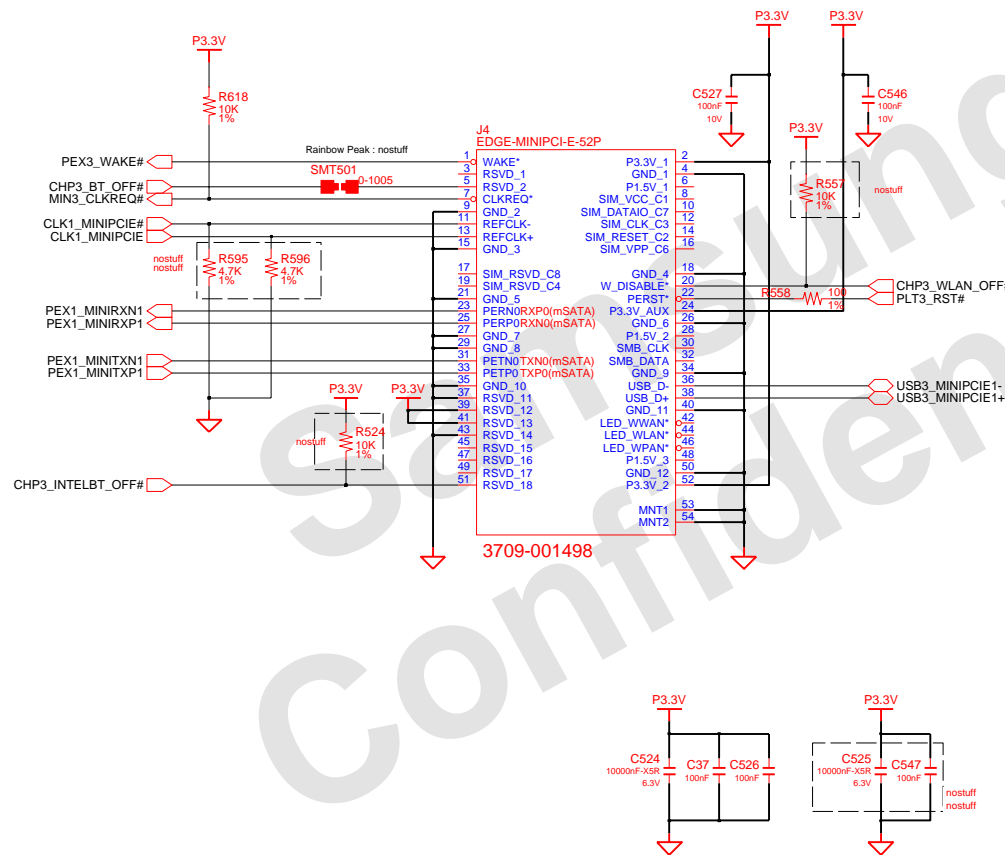
DESIGN	Gu Hui	DATE	1/03/2011	TITLE	Scala2-R	SAMSUNG ELECTRONICS
CHECK	SJ Wu	DEV. STEP	ADV		HDA_CODEC & LED SUB	
APPROVAL	BC LEE	REV	rev. 0.1		AUDIO JACK & LED SUB	
MODULE CODE		LAST EDIT			January 20, 2011 18:59:20 PM	PART NO. BA41-01XXXA
					PAGE 29 OF 48	

Reatek RTL8111E



DESIGN	Gu Hui	DATE	1/03/2011	Scala2-R LAN LAN_Realtek_RTL8111	
CHECK	SJ Wu	DEV. STEP	ADV		
APPROVAL	BC LEE	REV	rev. 0.1		
MODULE CODE	LAST EDIT				
				January 20, 2011 18:59:20 PM	PAGE 30 OF 48

WLAN, 4mm

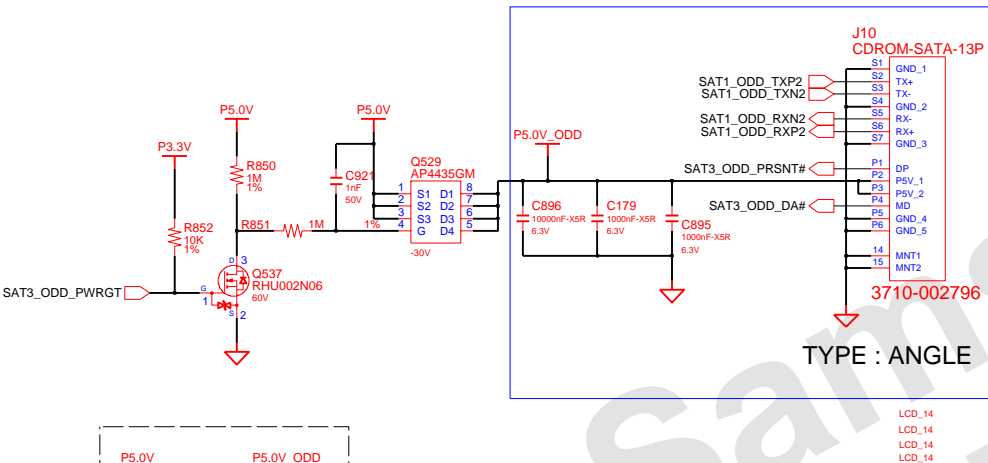


DESIGN	Gu Hui	DATE	1/03/2011	TITLE	Scala2-R	SAMSUNG ELECTRONICS
CHECK	SJ Wu	DEV. STEP	ADV	MINI_PCIE_CONN		
APPROVAL	BC LEE	REV	rev. 0.1	WLAN		
MODULE CODE		LAST EDIT		January 20, 2011 18:59:20 PM	PAGE 31 OF 48	PART NO. BA41-01XXXXA

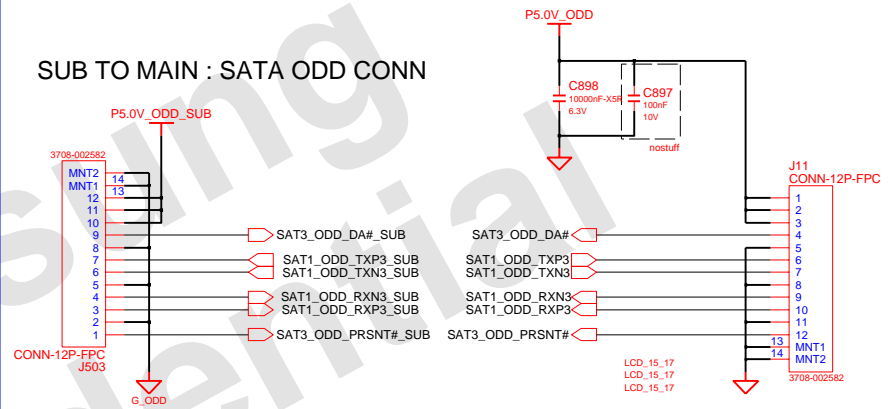
SATA I/F CONN

SATA ODD CONN

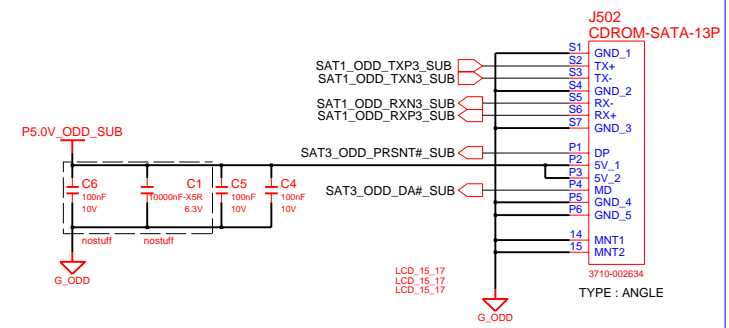
15.6" / 17.3"



MAIN TO SUB : SATA ODD CONN



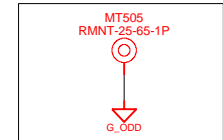
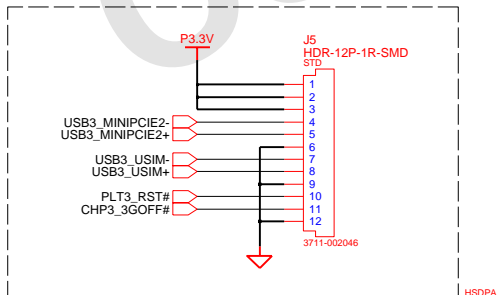
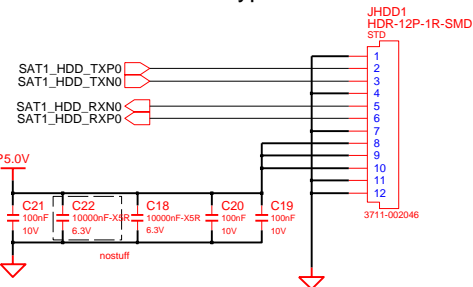
SATA ODD CONN



SATA HDD CONN

MAIN to HSDPA SUB

Cable Connector Type

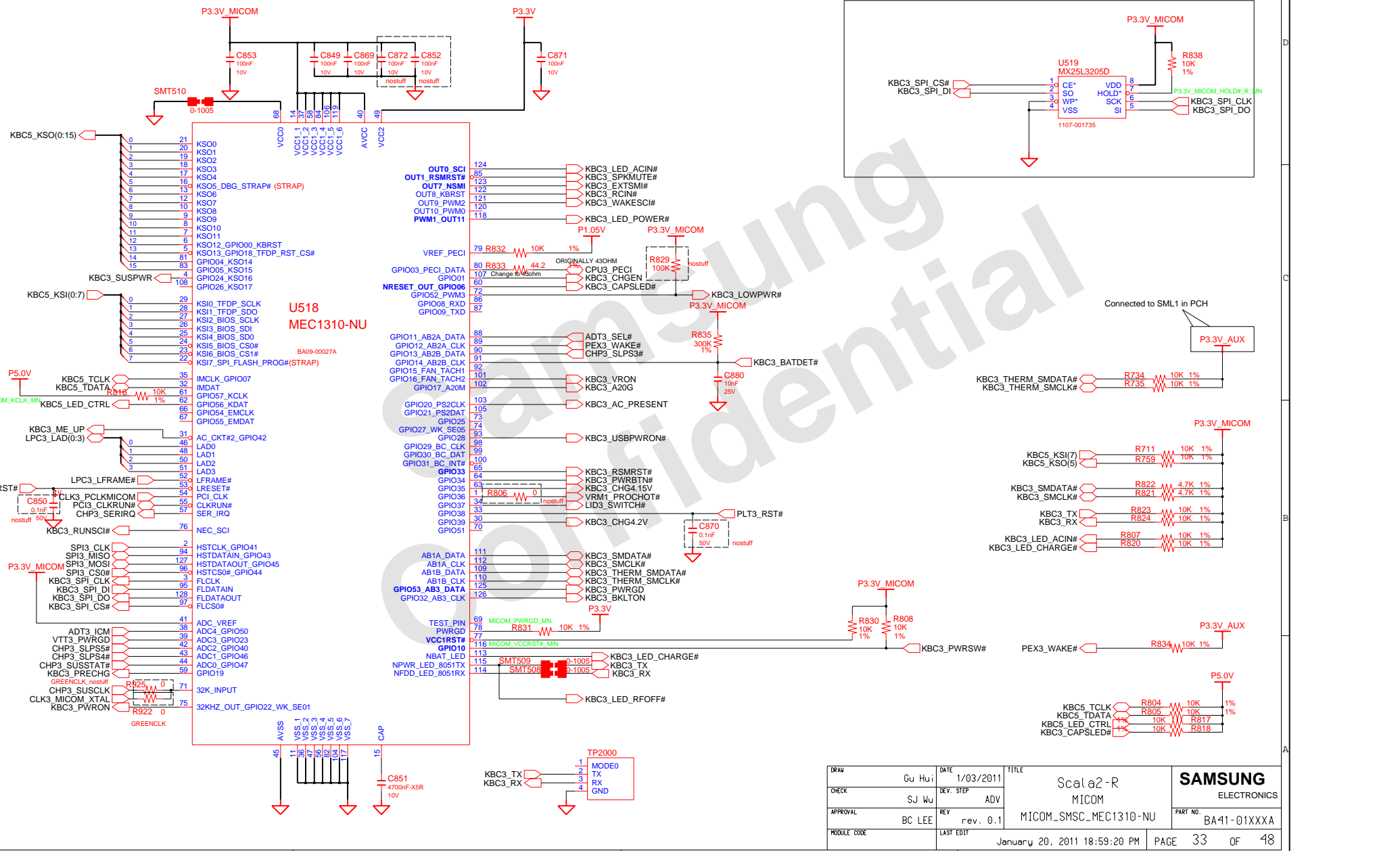


ODD sub board mount hole

DESIGN	Gu Hui	DATE	1/03/2011	TITLE	Scala2-R	SAMSUNG ELECTRONICS
CHECK	SJ Wu	DEV. STEP	ADV	SATA DEVICES		
APPROVAL	BC LEE	REV	rev. 0.1	SATA I/F Conn		
MODULE CODE		LAST EDIT				
				January 20, 2011 18:59:20 PM	PAGE 32 OF 48	BA41-01XXXA

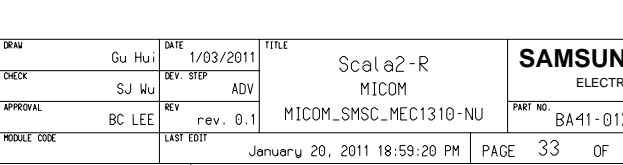
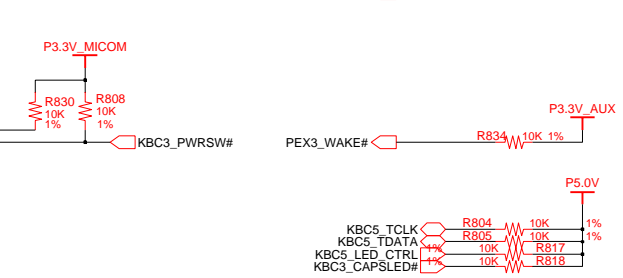
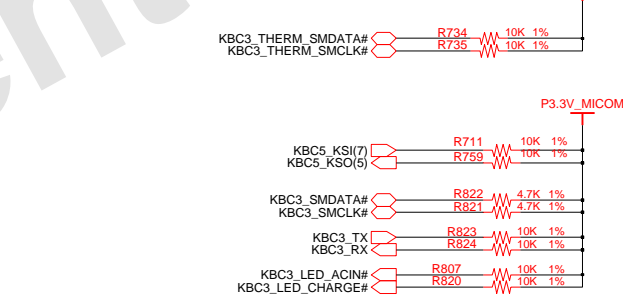
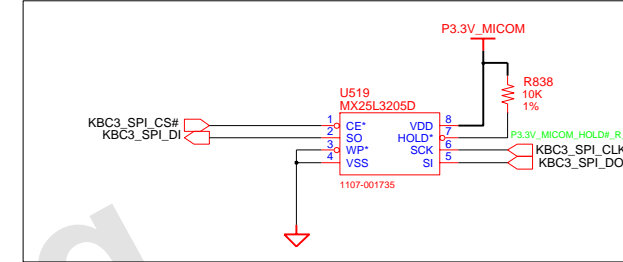
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MAIN BOARD (MICOM)



BE CAUTION SPI ROM SIZE!!

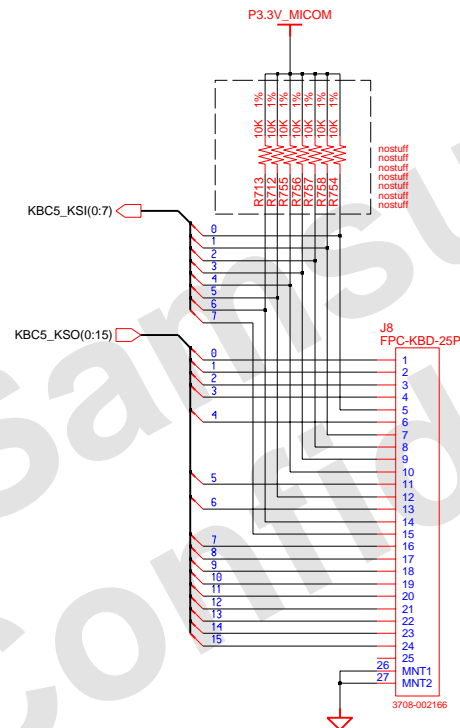
SPI_ROM_SOCKET



DRAW	Gu Hu	DATE	1/03/2011	TITLE	Scala2-R MICOM	SAMSUNG ELECTRONICS
CHECK	SJ Wu	DEV. STEP	ADV			
APPROVAL	BC LEE	REV	rev. 0.1		MICOM_SMSC_MEC1310-NU	PART NO.
MODULE CODE		LAST EDIT	January 20, 2011 18:59:20 PM	PAGE	33	OF 48

Micom Glue Logic

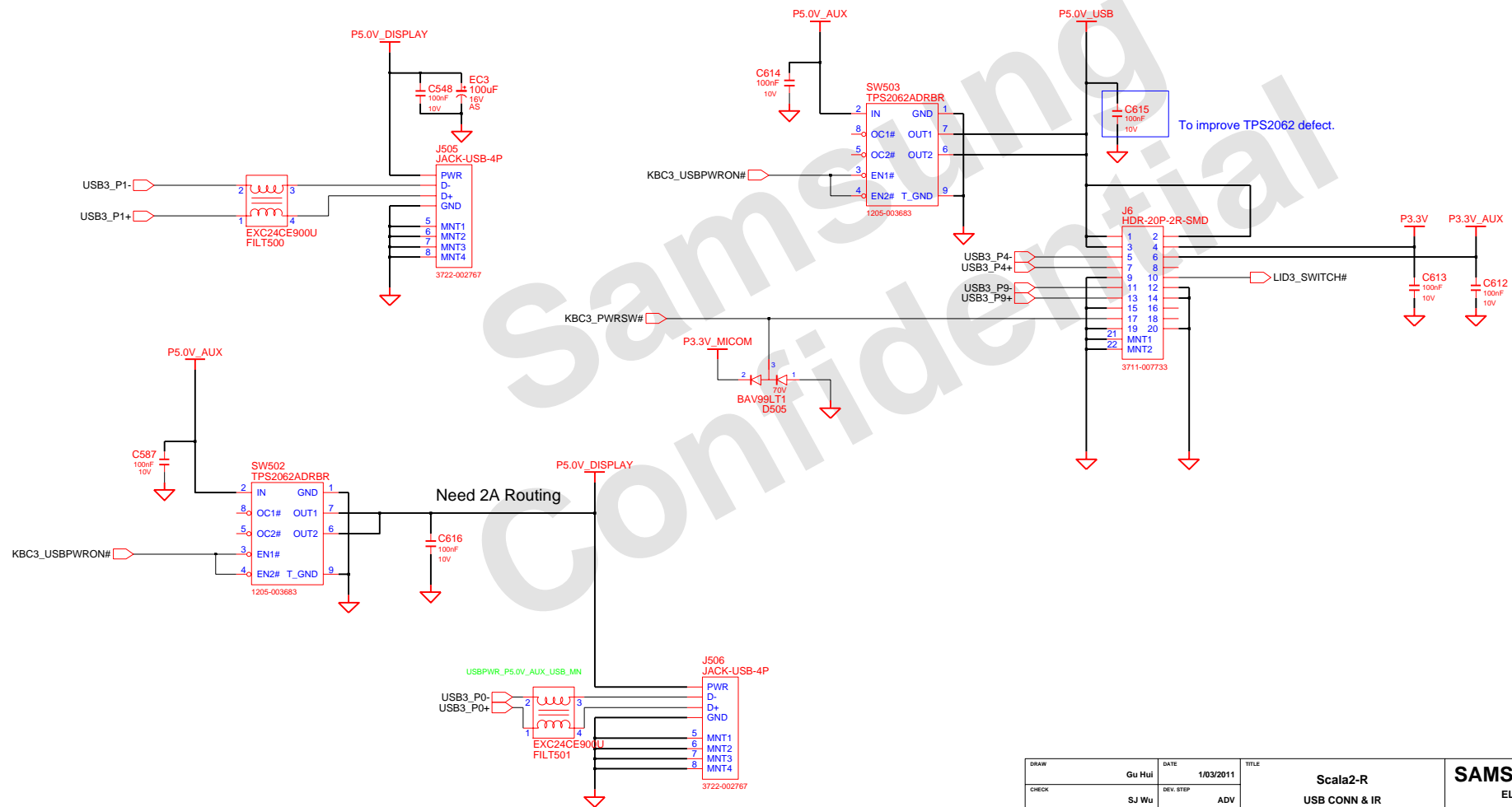
KEYBOARD



DRAW	Gu Hui	DATE	1/03/2011	TITLE	Scala2-R	SAMSUNG
CHECK	SJ Wu	DEV. STEP	ADV	MICOM GLUE LOGIC	MICOM GLUE LOGIC	ELECTRONICS
APPROVAL	BC LEE	REV	rev. 0.1	MICOM GLUE LOGIC	PART NO.	BA41-01XXA
MODULE CODE	LAST EDIT		January 20, 2011 18:59:20 PM		PAGE	34 OF 48

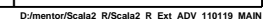
POWER S/W SUB B'D CONNECTOR

MAIN to SUB

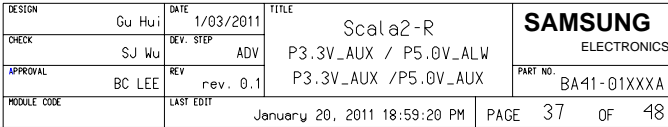


DRAW	Gu Hui	DATE	1/03/2011	TITLE	Scala2-R	SAMSUNG ELECTRONICS
CHECK	SJ Wu	DEV. STEP	ADV	USB CONN & IR		
APPROVAL	BC LEE	REV	rev. 0.1	USB & IR		
MODULE CODE		LAST EDIT				PART NO. BA41-01XXXXA
				January 20, 2011 18:59:20 PM	PAGE 35 OF 48	

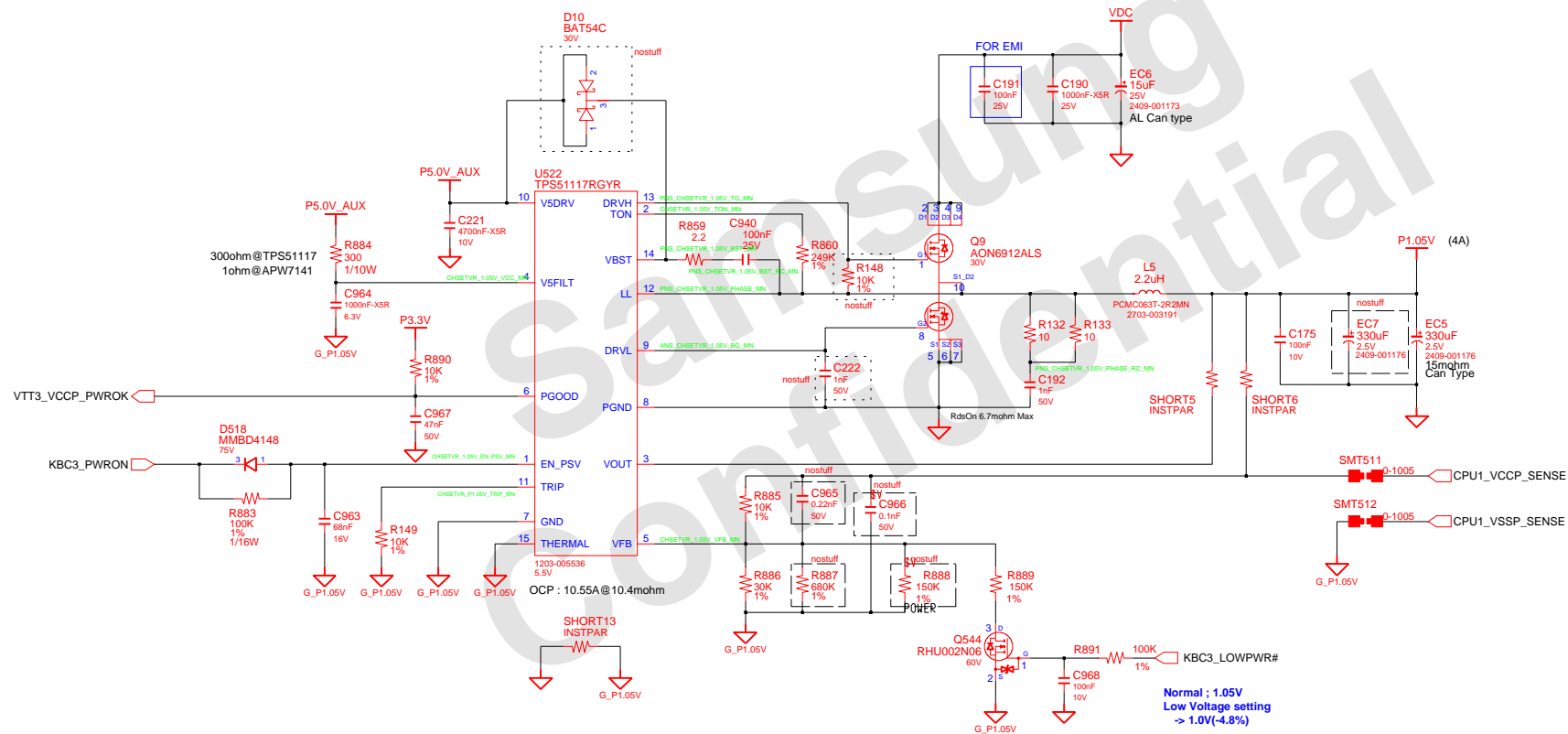
CHARGER & POWER MANAGEMENT



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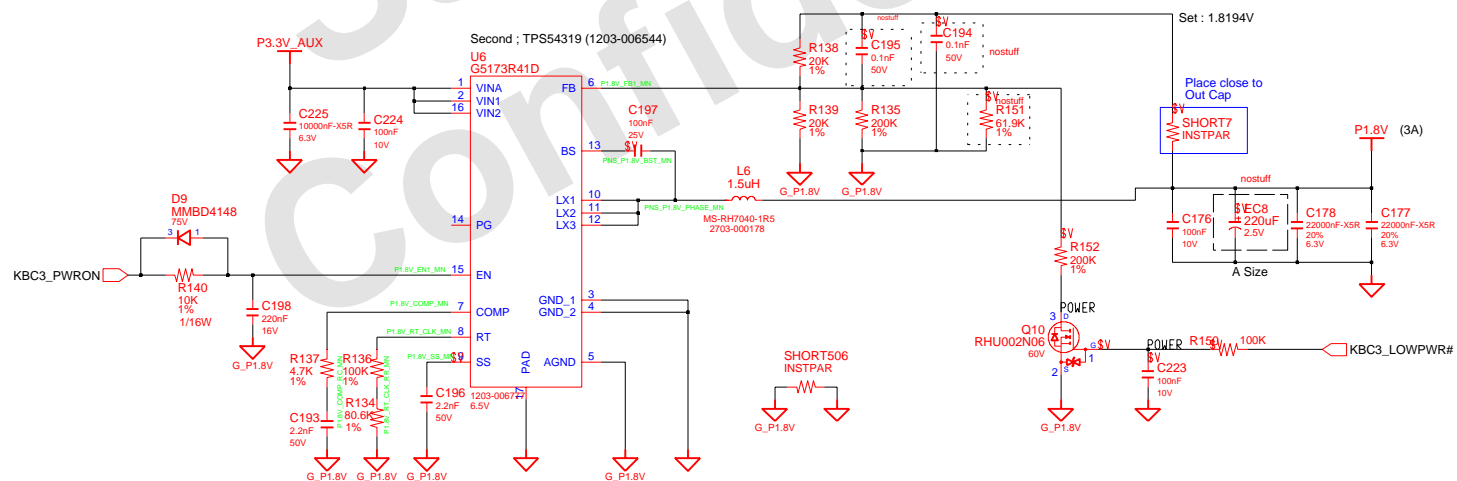
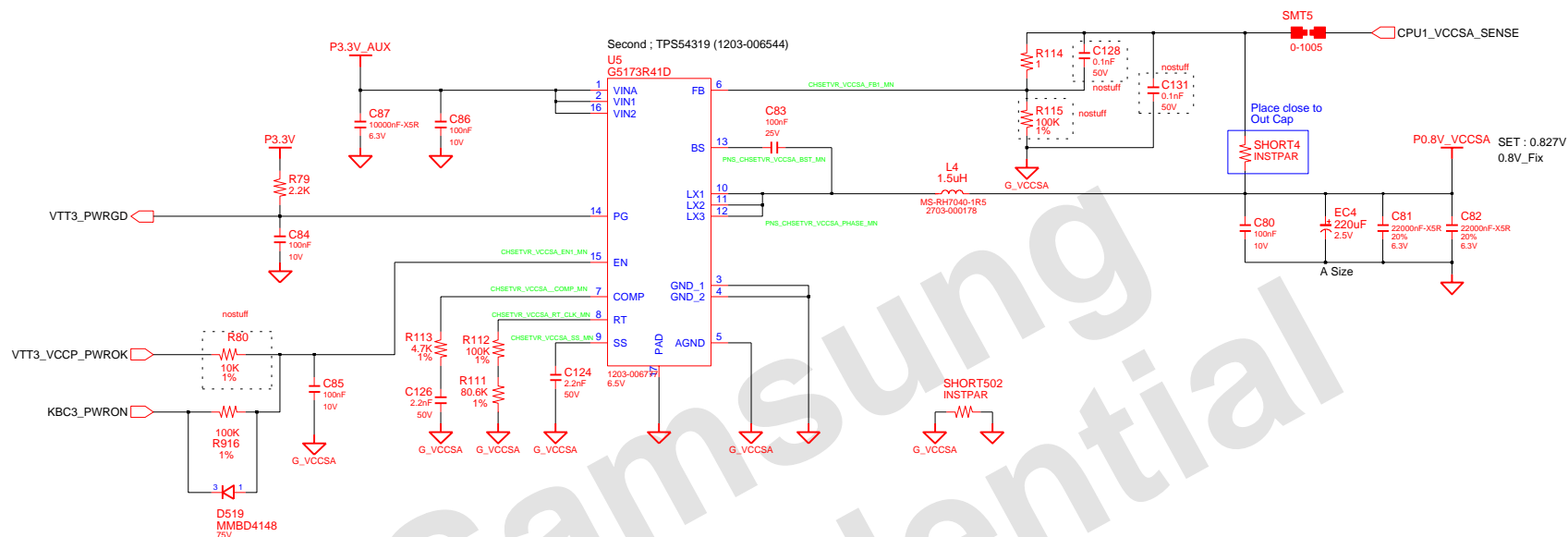



CHIPSET POWER(P1.05V)



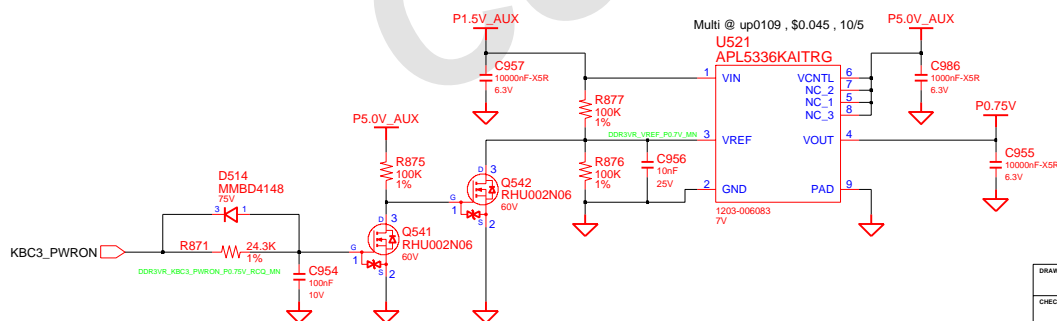
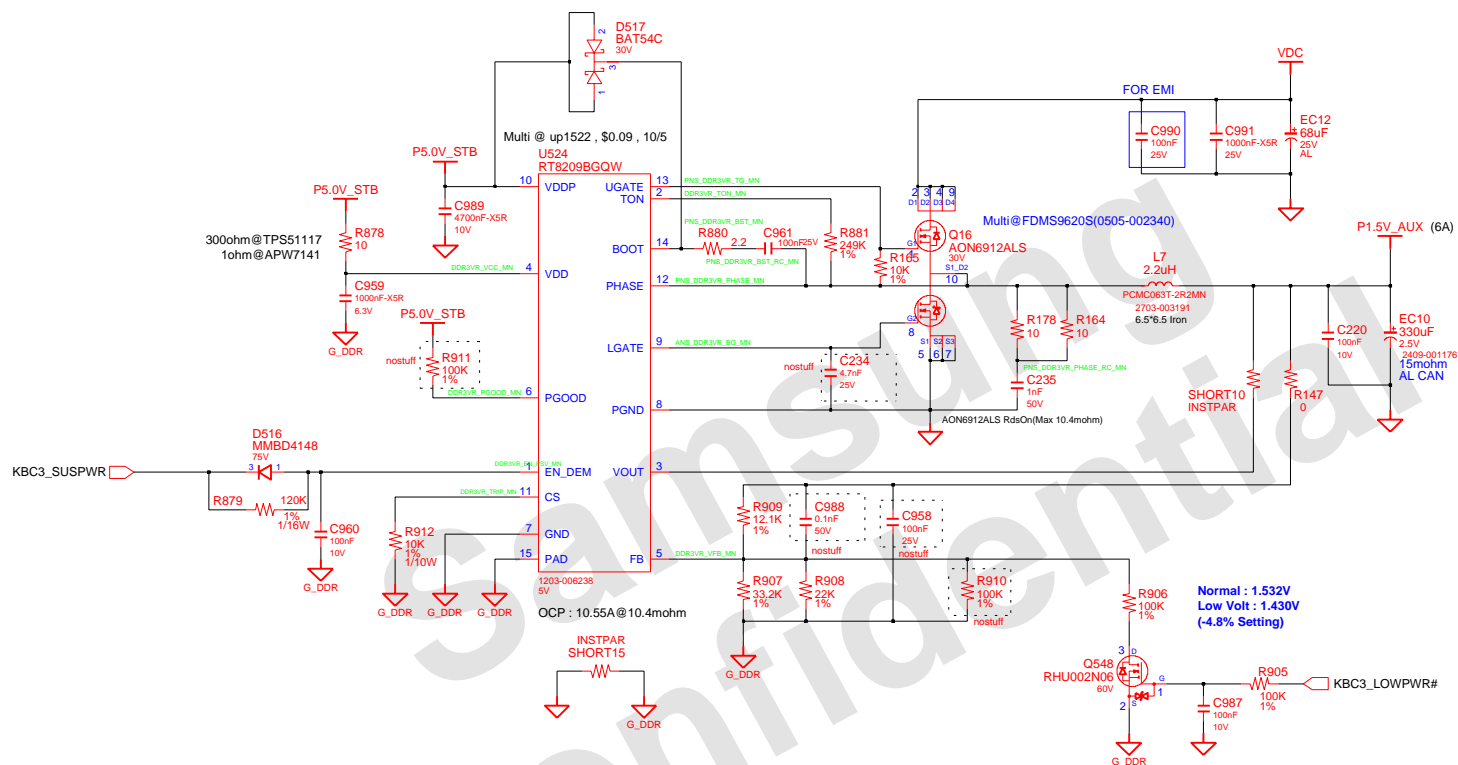
DRAW	Gu Hui	DATE	1/03/2011	TITLE	Scala2-R P1.05V P1.05V(Chipset Power)	SAMSUNG ELECTRONICS
CHECK	SJ Wu	DEV. STEP	ADV			PART NO. BA41-01XXXXA
APPROVAL	BC LEE	REV	rev. 0.1			
MODULE CODE	undefined	LAST EDIT	January 20, 2011 18:59:20 PM	PAGE	38	OF 48

CHIPSET POWER(P1.8V)



DESIGN	Gu Hui	DATE	1/03/2011	TITLE Scala2-R P1.1V_VTT P0.8V(Chipset Power)	
CHECK	SJ Wu	DEV. STEP	ADV		
APPROVAL	BC LEE	REV	rev. 0.1		
MODULE CODE		LAST EDIT	January 20, 2011 18:59:20 PM		PAGE 39 OF 48

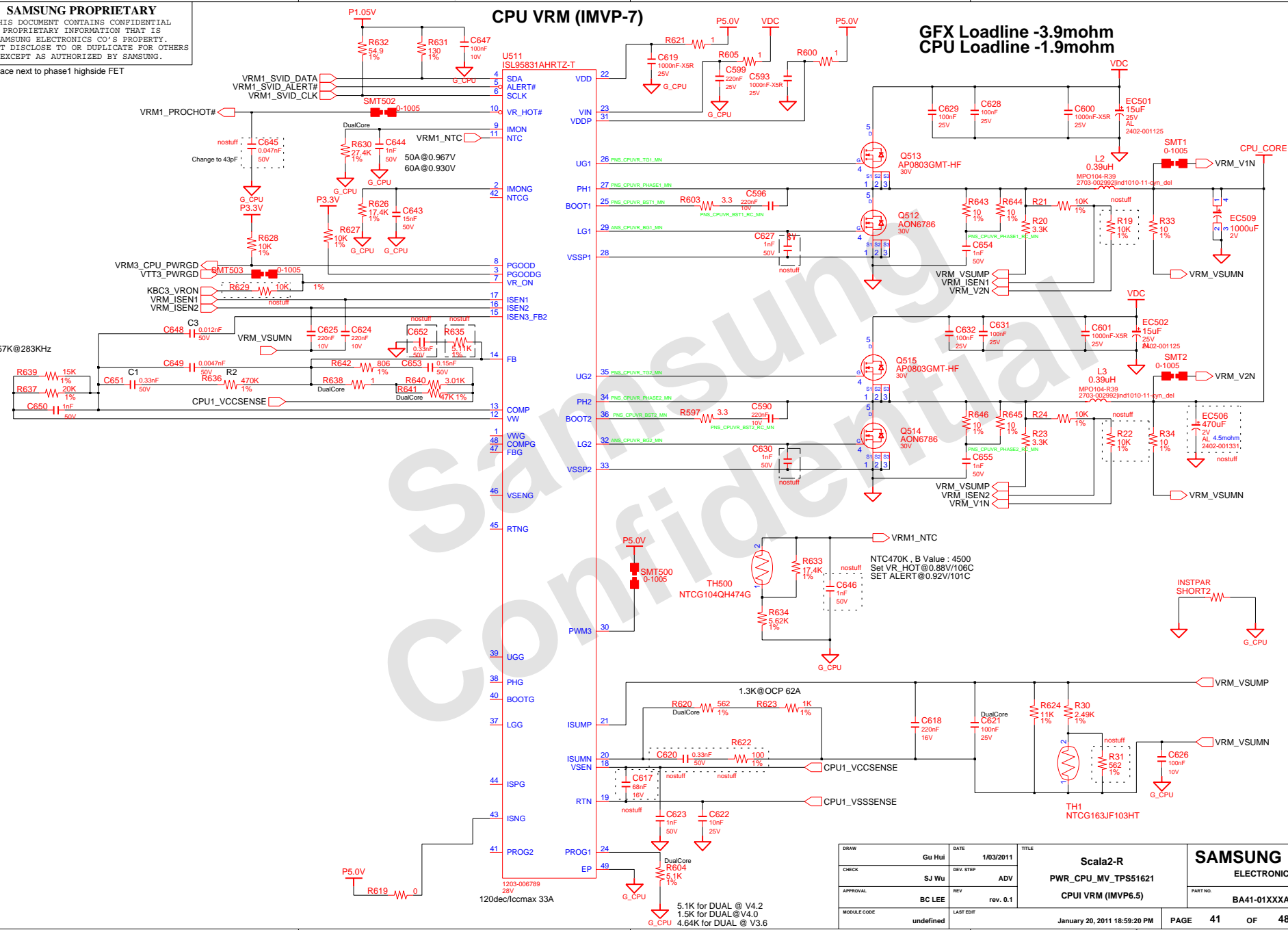
DDR3 VTT(0.75V)



DRAW	Gu Hui	DATE	1/03/2011	Scala2-R PWR_MEMORY DDR3 POWER	SAMSUNG ELECTRONICS		
CHECK	SJ Wu	DEV. STEP	ADV				
APPROVAL	BC LEE	REV	rev. 0.1				
MODULE CODE	undefined	LAST EDIT	January 20, 2011 18:59:20 PM				
				PAGE	40	OF	48

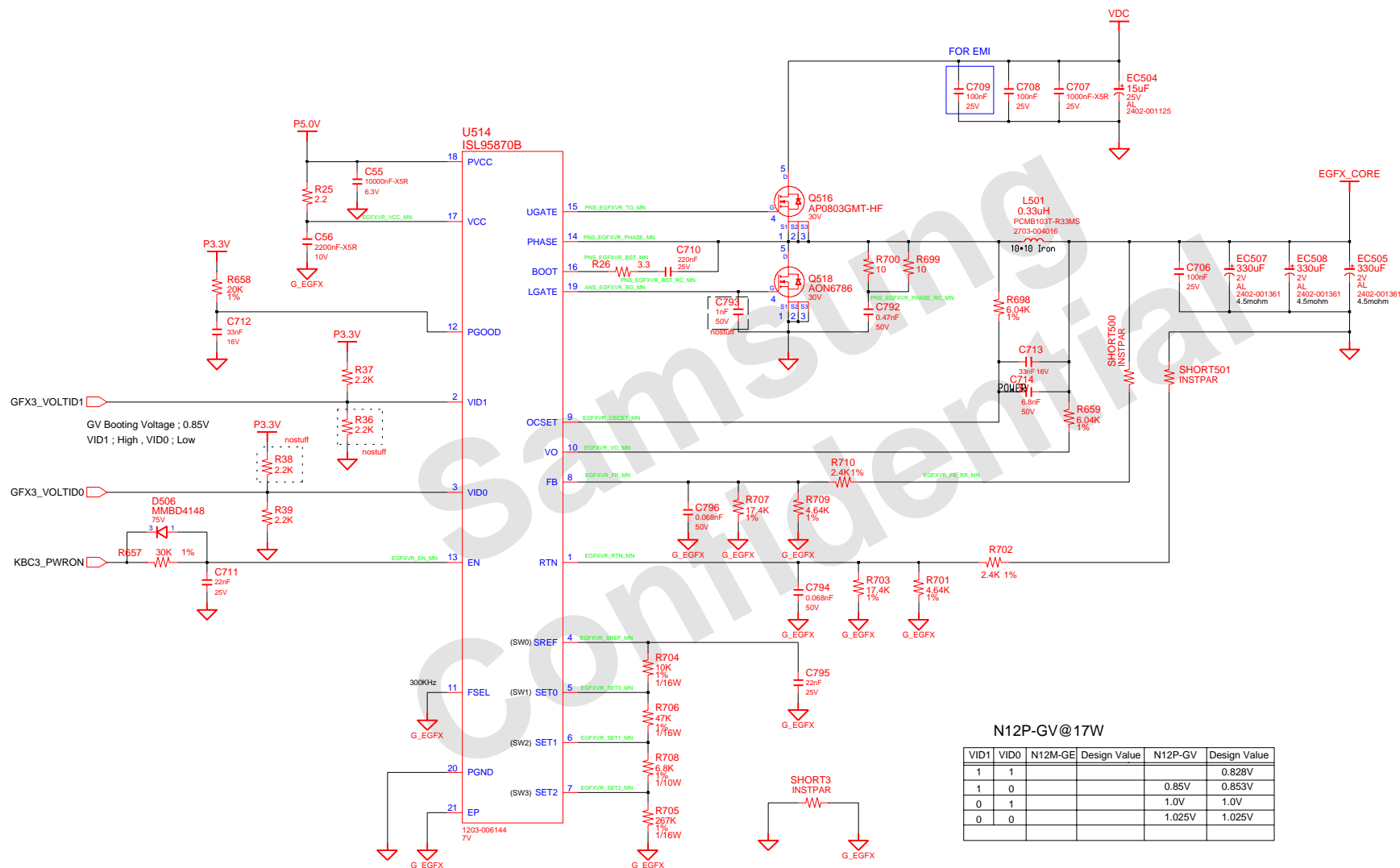
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Place next to phase1 highside FET



DRAW	Gu Hui	DATE	1/03/2011	<div> <div>Scala2-R</div> <div>PWR_CPU_MV_TPS51621</div> <div>CPU1 VRM (IMVP6.5)</div> </div>	<div> <div>SAMSUNG</div> <div>ELECTRONICS</div> </div>	
CHECK	SJ Wu	DEV. STEP	ADV			
APPROVAL	BC LEE	REV	rev. 0.1		PART NO.	BA41-01XXXX
MODULE CODE	undefined	LAST EDIT	January 20, 2011 18:59:20 PM		PAGE	41 OF 48

External GFX Core Power



N12P-GV@17W

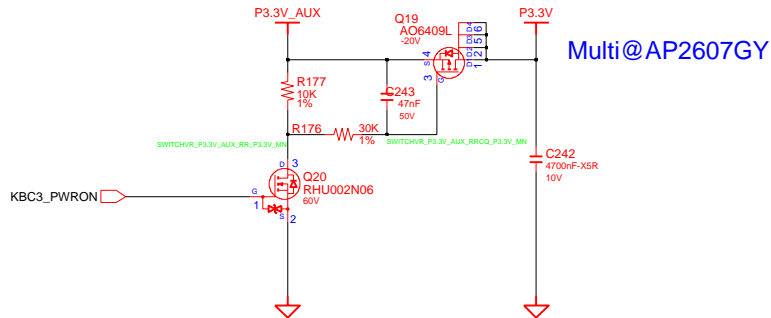
VID1	VID0	N12M-GE	Design Value	N12P-GV	Design Value
1	1				0.828V
1	0			0.85V	0.853V
0	1			1.0V	1.0V
0	0			1.025V	1.025V

DRAW	Gu Hui	DATE	1/03/2011	<div style="text-align: center;"> Scala2-R PWR_MV_SWITCHD Power-EGFX_CORE </div>	<div style="text-align: center;"> SAMSUNG ELECTRONICS </div>
CHECK	SJ Wu	DEV. STEP	ADV		
APPROVAL	BC LEE	REV	rev. 0.1		
<div style="display: flex; justify-content: space-between;"> PART NO. BA41-01XXXX </div>					
MODULE CODE		LAST EDIT		January 20, 2011 18:59:20 PM	<div style="display: flex; justify-content: space-between;"> PAGE 42 OF 48 </div>

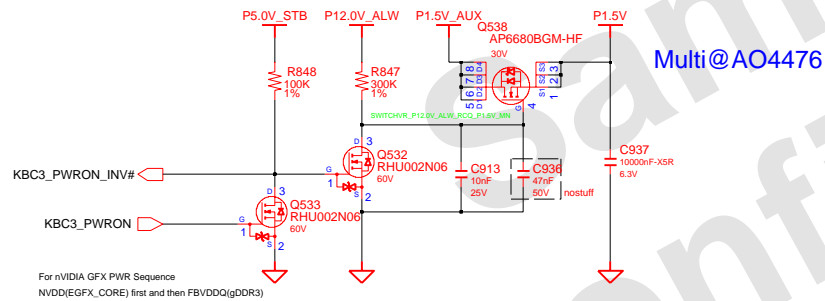
Switched Power

P5.0V -> P3.3V -> EGFX_CORE -> P1.8V -> P1.5V -> P0.75V -> P1.05V -> P0.8V_VCCSA -> CPU_CORE

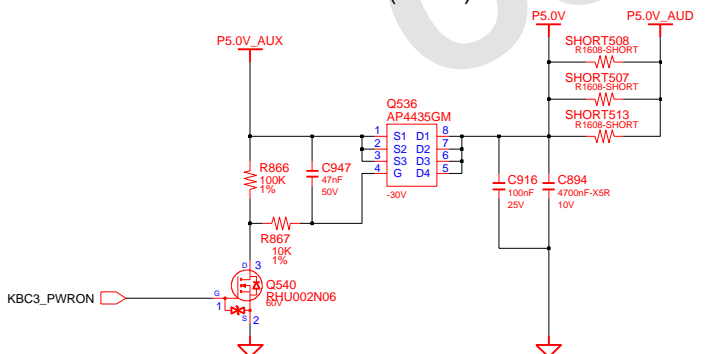
Switched Power On (P3.3V)



Switched Power On (P1.5V)



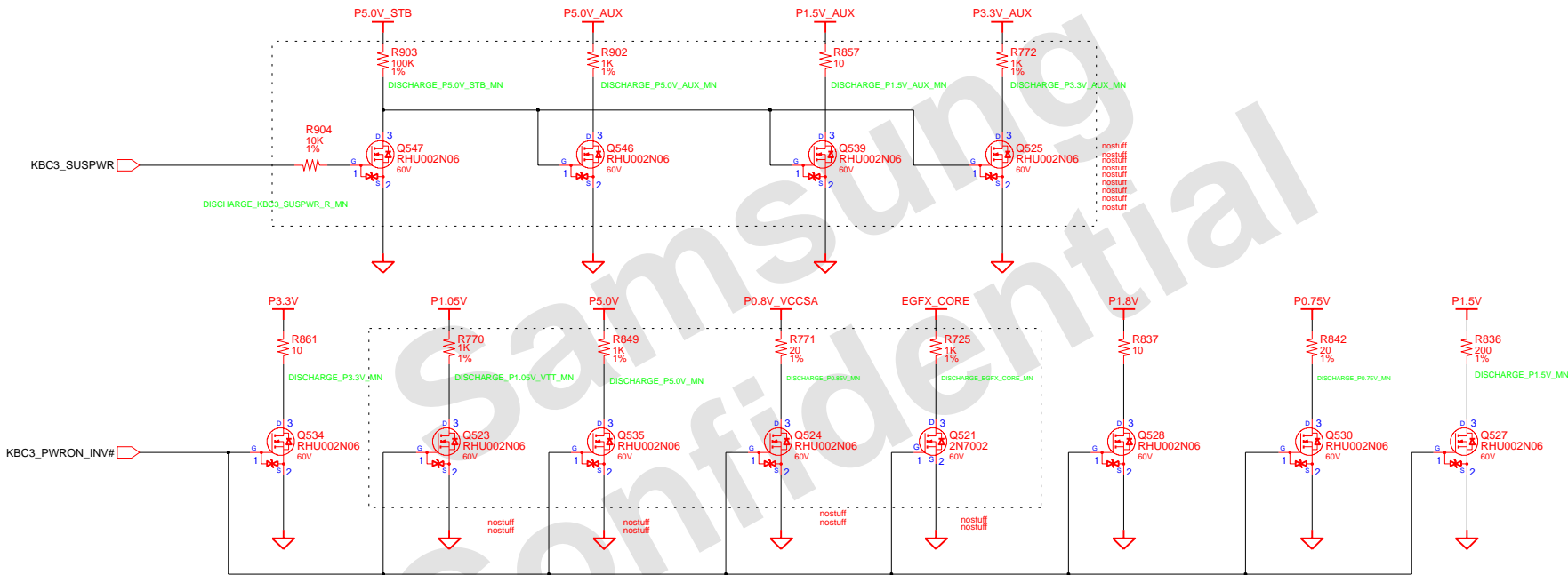
Switched Power On (P5.0V)



DRAW	Gu Hui	DATE	1/03/2011	TITLE	Scala2-R	SAMSUNG ELECTRONICS
CHECK	SJ Wu	DEV. STEP	ADV	PWR_MV_DISCHARGER		
APPROVAL	BC LEE	REV	rev. 0.1	SWITCHED POWER	PART NO.	BA41-01XXXXA
MODULE CODE	undefined	LAST EDIT	January 20, 2011 18:59:20 PM	PAGE	43	OF 48

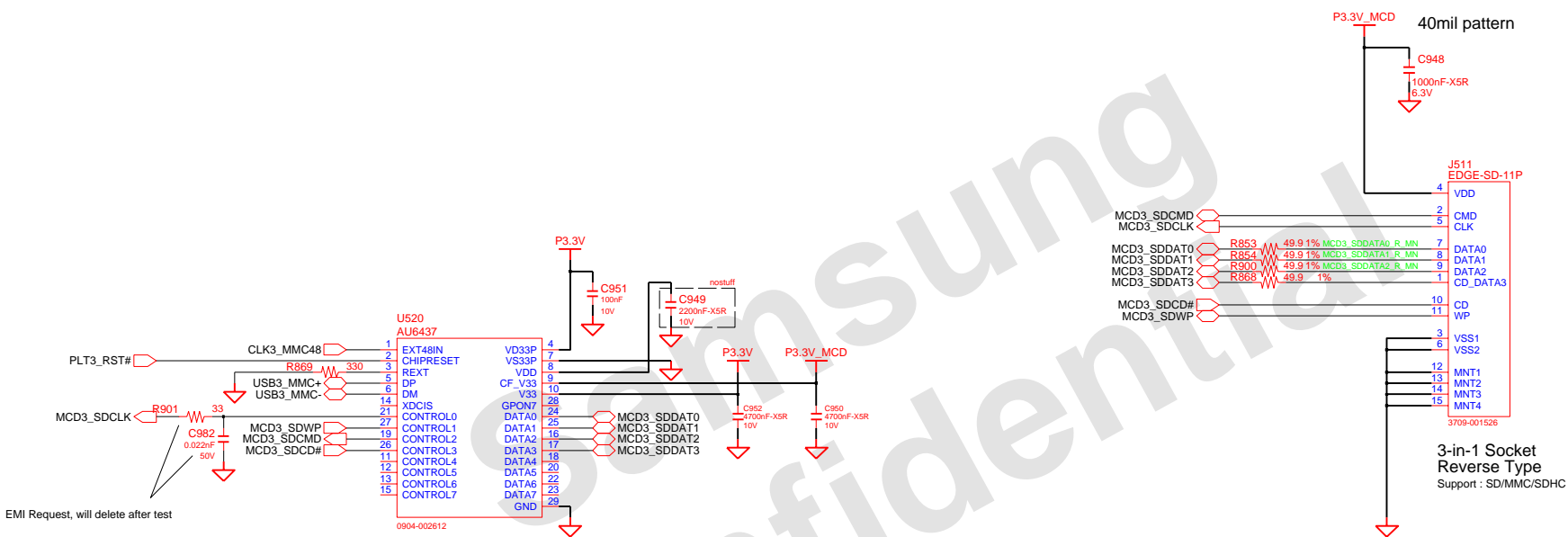
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POWER DISCHARGER



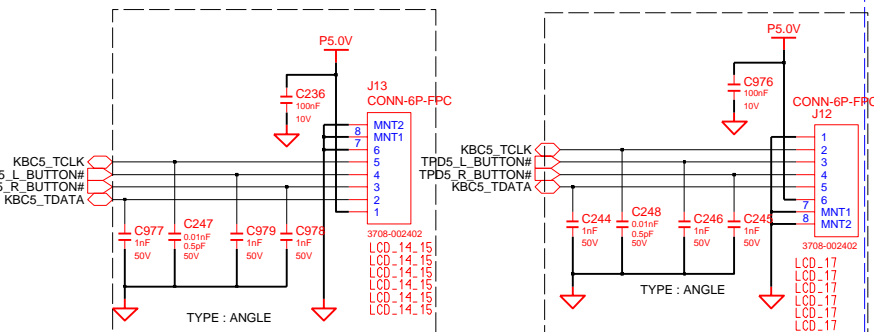
DESIGN	Gu Hui	DATE	1/03/2011	TITLE Scala2-R SUB BOARD1 Power Discharger		SAMSUNG ELECTRONICS		
CHECK	SJ Wu	DEV. STEP	ADV					
APPROVAL	BC LEE	REV	rev. 0.1			PART NO.	BA41-01XXXX	
MODULE CODE	LAST EDIT			January 20, 2011 18:59:20 PM	PAGE	45	OF	48

AU6437 (4-in-1)

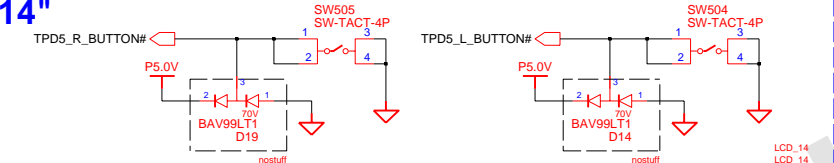


DESIGN	MS YANG	DATE	1/03/2011	TITLE	Jinmao-R	SAMSUNG
CHECK	MK KIM	DEV. STEP	ADV	AU 6437	AU 6437	ELECTRONICS
APPROVAL	BL LEE	REV	rev. 0.3			PART NO.
MODULE CODE		LAST EDIT	January 18, 2011 08:10:20 AM	PAGE	46	BA41-01XXXXA
				OF	48	

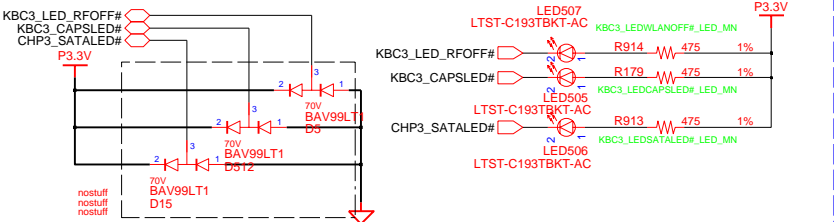
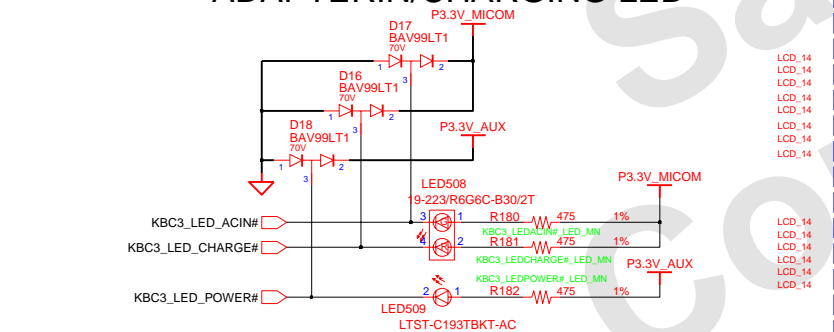
TOUCHPAD



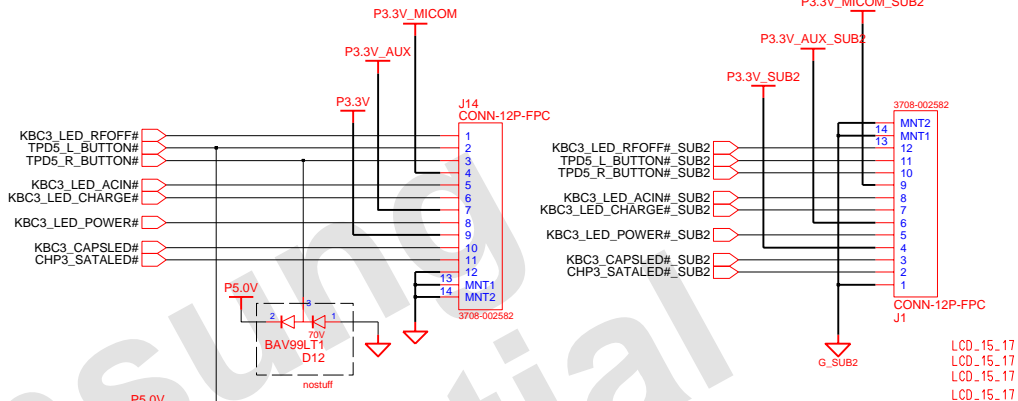
14"



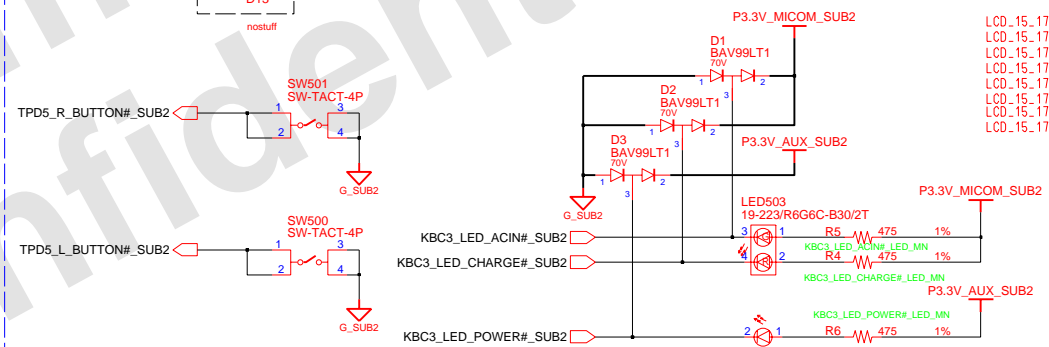
ADAPTERIN/CHARGING LED



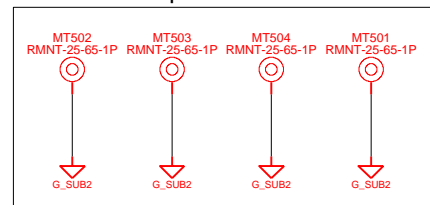
15.6" & 17.3" TOUCHPAD MAIN TO SUB TOUCHPAD SUB TO MAIN



ADAPTERIN/CHARGING LED

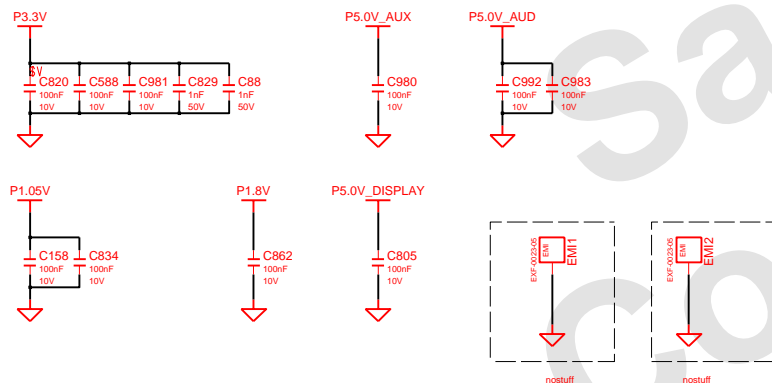
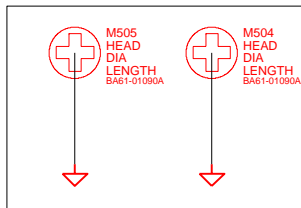
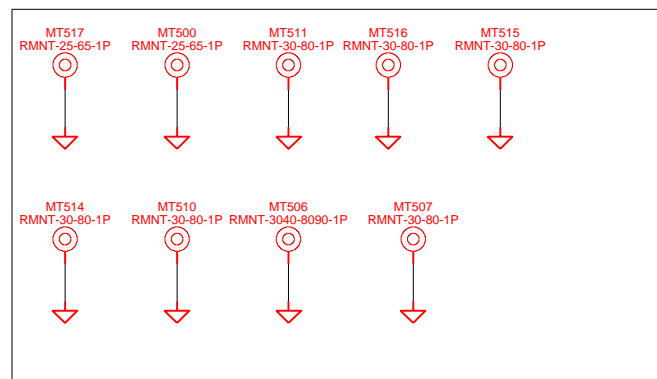


Touchpad Mount Hole



DRAW	MS YANG	DATE	1/3/2011	TITLE	Jinmao-R	SAMSUNG ELECTRONICS
CHECK	MK KIM	DEV. STEP	ADV		Touchpad	
APPROVAL	BL LEE	REV	rev. 0.3		Touchpad	PART NO.
MODULE CODE		LAST EDIT				BA41-01XXXXA
					January 18, 2011 08:10:20 AM	PAGE 47 OF 48

PCH Thermal



DESIGN	MS YANG	DATE	1/03/2011	Jinmao-R MNT hole MNT hole	SAMSUNG ELECTRONICS		
CHECK	MK KIM	DEV. STEP	ADV				
APPROVAL	BL LEE	REV	rev. 0.3				
MODULE CODE	LAST EDIT						
January 18, 2011 08:10:20 AM				PAGE	48	OF	48