

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 : BA41-01609A (GCE)
BA41-01608A (NY)
BA41-01610A (HAN)
BA41-01XXXXA (GBM)
Dev. Step : ADV
Revision : 0.1
T.R. Date : 2011.01.20

| Design | CHECK | APPROVAL |
|--------|-------|----------|
| GU HUI | SJ WU | BC LEE |
| | | |

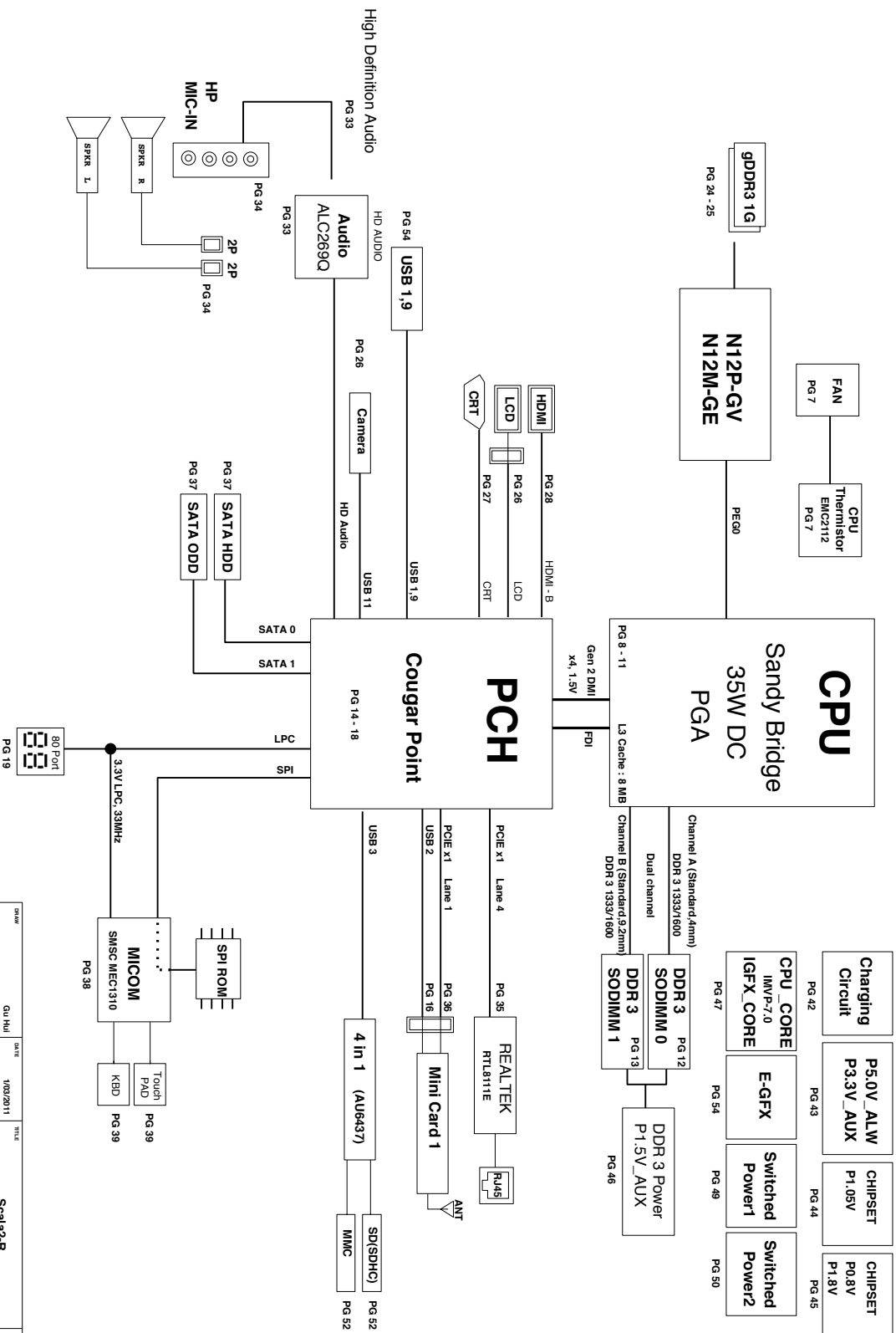
Owner : SRDC PD3

Signature : GUHUI

| | |
|------------------------------|--|
| sheet01 : Cover | sheet25 : LVDS/CAMERA |
| sheet02 : BLOCK DIAGRAM | sheet26 : CRT |
| sheet03 : BOARD INFORMATION | sheet27 : HDMI |
| sheet04 : POWER DIAGRAM | sheet28 : Audio - AL C269 |
| sheet05 : CLOCK DISTRIBUTION | sheet29 : Audio - HP/MIC |
| sheet06 : Thermal Sensor | sheet30 : LAN (Realtek RTL8111E) |
| sheet07 : CPU | sheet31 : WLAN |
| sheet08 : CPU | sheet32 : SATA interface |
| sheet09 : CPU | sheet33 : MICOM / BIOS |
| sheet10 : CPU | sheet34 : MICOM Glue Logic (KBD / TP) |
| sheet11 : DDR3 SODIMM #0 | sheet35 : USB connector |
| sheet12 : DDR3 SODIMM #1 | sheet36 : Power - charger |
| sheet13 : PCH-CougarPoint | sheet37 : Power - P3.3V_AUX / P5.0V_AUX |
| sheet14 : PCH-CougarPoint | sheet38 : Power - P1.05V (Chipset Power) |
| sheet15 : PCH-CougarPoint | sheet39 : Power - P0.8V (Chipset Power) |
| sheet16 : PCH-CougarPoint | sheet40 : Power - DDR3 |
| sheet17 : PCH-CougarPoint | sheet41 : Power - CPU VRM |
| sheet18 : 80 port | sheet42 : Power - EGFX_CORE |
| sheet19 : N12P-GV | sheet43 : Power - Switched Power 1 |
| sheet20 : N12P-GV | sheet44 : Power - Switched Power 2 |
| sheet21 : N12P-GV | sheet45 : Power - Power Discharge |
| sheet22 : N12P-GV | sheet46 : 3-in-1 card (AU6437) |
| sheet23 : GFX memory | sheet47 : Touchpad & LED |
| sheet24 : GFX memory | sheet48 : Mount Hole |

| | | | |
|-------------|-----------|------------------------------|--------------|
| DATE | DATE | TITLE | |
| GU HUI | 1/02/2011 | Scala2-R | SAMSUNG |
| GU HUI | REV STEP | MAIN | ELECTRONICS |
| SJ WU | ADV | | |
| APPROVAL | REV | COVER | |
| BC LEE | REV 0.1 | | |
| MODULE CODE | LAST EDIT | January 20, 2011 10:59:20 PM | PAGE 1 OF 48 |

BLOCK DIAGRAM



| | | | | | | |
|-------------|-----------|-----------|-----------|------------------------------|----------|-------------|
| BIOS | GUI HUI | DATE | 1/10/2011 | TITLE | Scala2-R | SAMSUNG |
| CHICK | SA WU | REV STEP | ADV | MAIN | MAIN | ELECTRONICS |
| APPROVAL | BC LEE | REV | REV 0.1 | BLOCK DIAGRAM | | BA41-01XXXX |
| MODULE CODE | undefined | LATE EDIT | | January 20, 2011 18:59:20 PM | PAGE | 2 OF 48 |

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 | S4 - S5 |
| P5.0V_AUX P3.3V_AUX P1.5V_AUX | |
| P5.0V P3.3V P1.8V P1.5V P0.75V | |
| P0.8V | |
| VCC_CORE EGFX_CORE P1.05V(VCCP) P3.3V_D P1.5V_D P1.05V_D | |
| P5.0V P3.3V P1.8V P1.5V P0.75V | S0 |
| P0.8V | |
| VCC_CORE EGFX_CORE P1.05V(VCCP) P3.3V_D P1.5V_D P1.05V_D | |
| P5.0V P3.3V P1.8V P1.5V P0.75V | |
| P0.8V | |

| USB Port Assign | PCI Express Assign |
|---|--|
| PORT # | PORT # |
| 0 NC 1 SYSTEM PORT 0 2 Mini PCI Express 3 Multi Memory Card Controller 4 NC 5 NC 6 NC (N/A WITH HM65) 7 NC (N/A WITH HM65) 8 Camera 9 SYSTEM PORT 1 10 NC 11 Camera(LCD Cable) 12 NC 13 NC | 1 Mini Card 1 (M.LAN) 2 NC 3 NC 4 LAN CONTROLLER 5 USB 3.0 6 NC 7 NC 8 NC |

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

| Crystal / Oscillator |
|--|
| TYPE |
| FREQUENCY |
| DEVIDE |
| USAGE |
| Crystal 32.768KHz HM65 LAN Real Time Clock Crystal 29MHz LAN Intel LAN Crystal 29MHz HM65 USB 3.0 Crystal 27MHz N12P-UP HM65 INTEL Crystal N12P-UP HM65 NVIDIA |

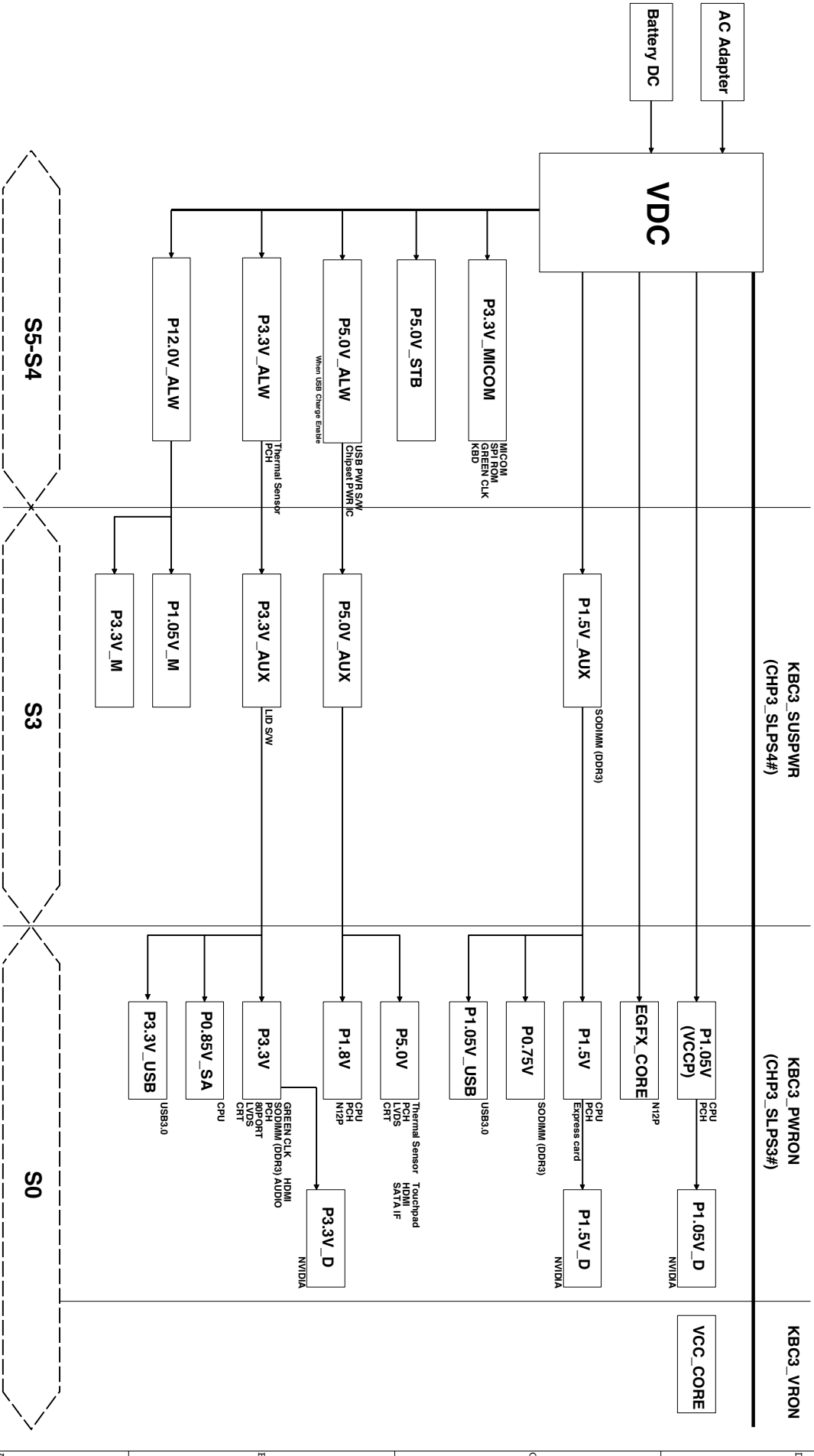
| LCD Pannel Detect (TBD) |
|-------------------------|
| Devices |
| Resolution |
| PANNEL_DETECT_0 |

| I ² C / SMB Address |
|---|
| Devices |
| Address |
| Hex |
| Bus |
| HM65 Master SMBUS Master CPU Thermal Sensor 0111 101X Thermal Sensor SODIMM0 1101 000X SODIMM1 1010 010X Thermal Sensor on SODIMM0 0011 000X Thermal Sensor on SODIMM1 0011 010X Thermal Sensor on board 1101 100X Power Thermal management TS 1101 011X |

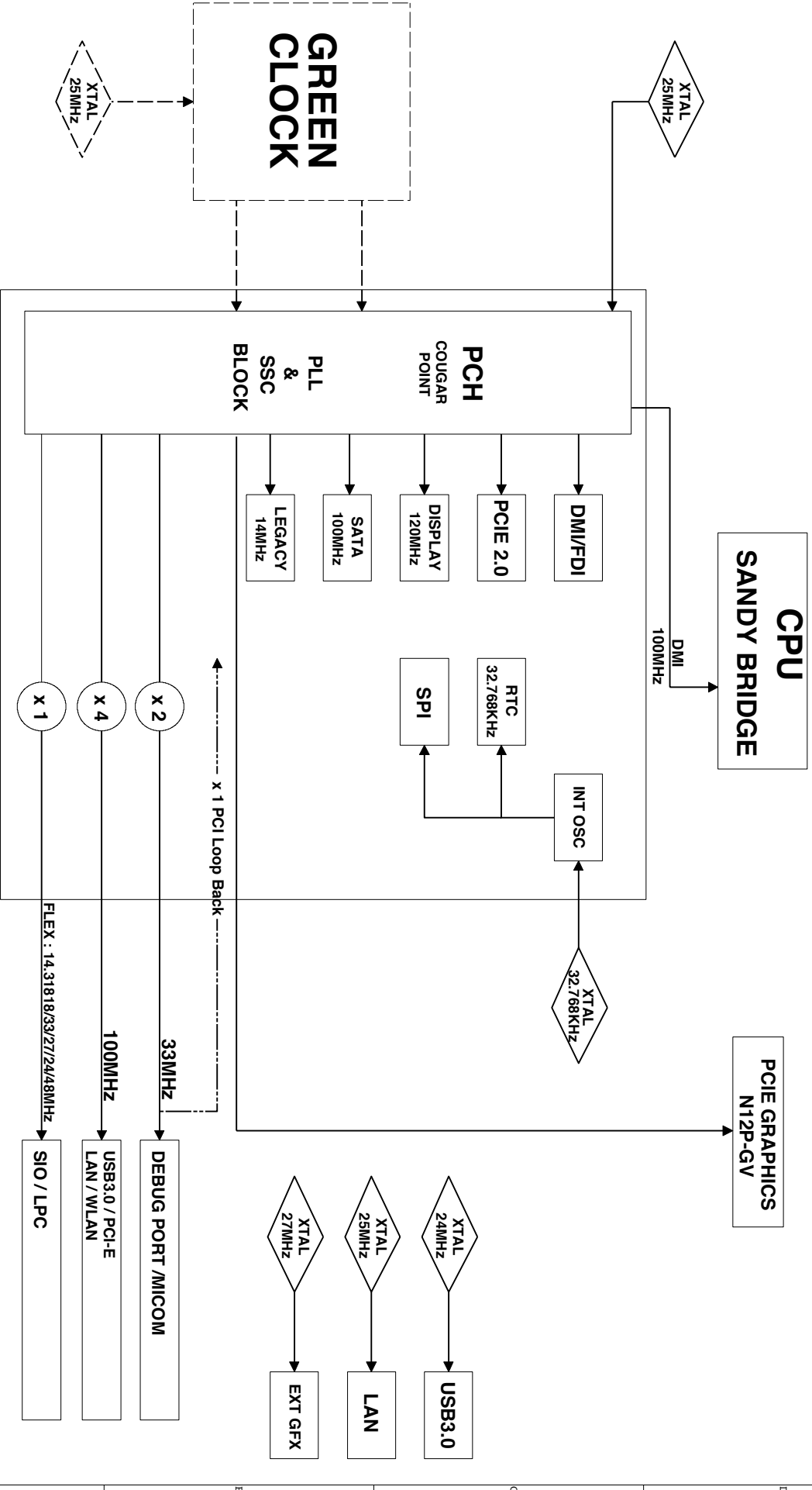
| | | | |
|-------------|-----------|------------|--------------|
| DATE | 1/02/2011 | SCALE2-R | SAMSUNG |
| CHKD | SJ WU | MAIN | ELECTRONICS |
| APPROVAL | BC LEE | BOARD INFO | BA41-01XXXX |
| MODULE CODE | undefined | LAST EDIT | PAGE 3 OF 48 |

POWER DIAGRAM

Rev 0.8

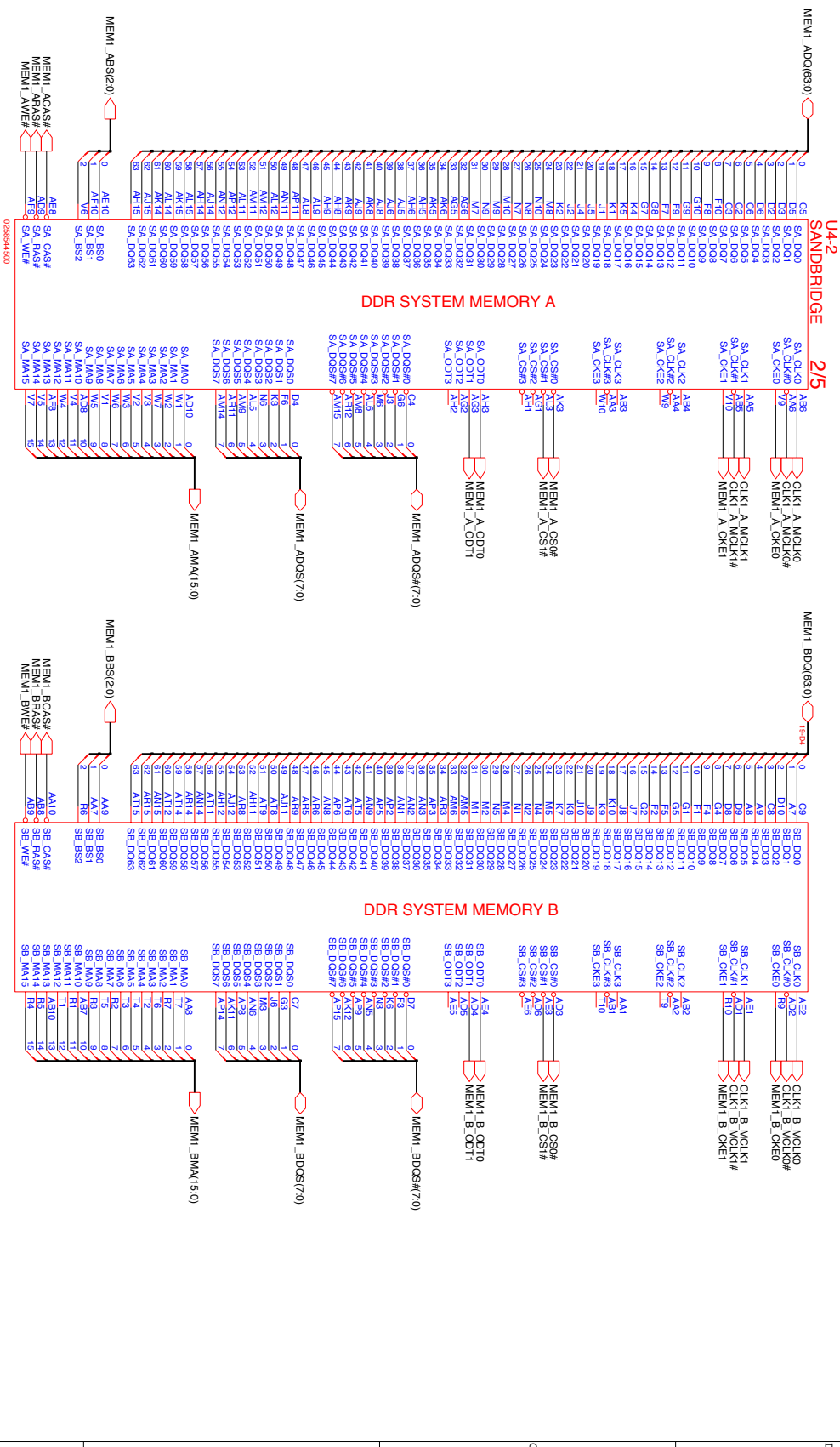


| | | | | |
|-------------|-----------|-----------|------------------------------|----------------------|
| DATE | 1/10/2011 | TITLE | Scalix2-R MAIN POWER DIAGRAM | SAMSUNG ELECTRONICS |
| CHK | SJ WU | REV | ADV | PART NO. BA41-01XXXX |
| APPROVAL | BC LEE | REV | REV 0.1 | |
| MODULE CODE | undefined | LAST EDIT | January 20, 2011 18:59:20 PM | PAGE 4 OF 48 |

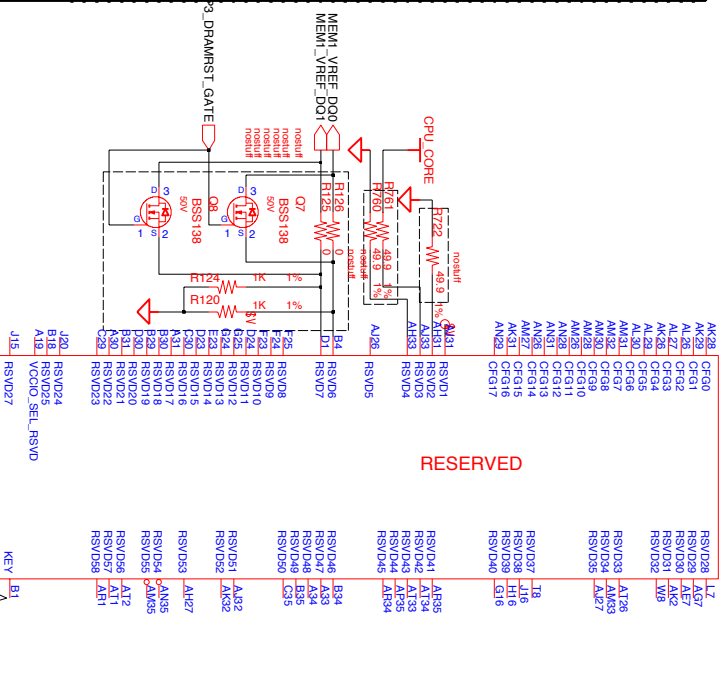
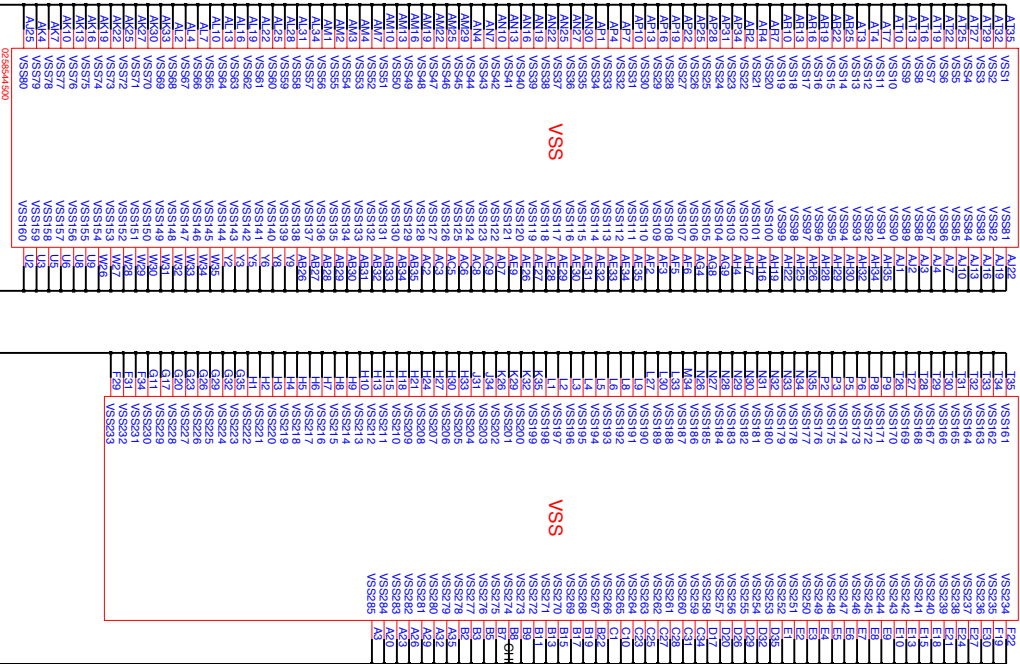


| | | | | |
|-------------|-----------|-----------|------------------------------|-------------|
| DATE | 10/2/2011 | TITLE | Scal2-R | SAMSUNG |
| CHICK | SJ WU | REV STEP | MAIN | ELECTRONICS |
| APPROVAL | BC LEE | REV | ADV | |
| MODULE CODE | undefined | REV | REV 0.1 | |
| | | LAST EDIT | January 20, 2011 18:59:20 PM | |
| | | PAGE | 5 | OF 48 |





| | | | |
|-------------|-----------|----------|------------------------------|
| DATE | 1/10/2011 | FILE | Scale2R |
| DESIGNER | SJ.WU | ADV | CPU |
| APPROVAL | BC.LEE | REV. 0.1 | SANDY BRIDGE (2/4) |
| MODULE CODE | undefined | LMT EDIT | January 20, 2011 16:59:20 PM |
| PAGE | 8 | OF | 48 |



CFG Straps for Processor

| |
|---|
| PEG STATIC LANE REVERSAL - CPG2 IS ON FOR THE 10X |
| CPG2 0 - LANE REVERSED |

| |
|--|
| PEG PORT HYBRIDATION STRAPS |
| CPG(6)5 11 - DEFAULT: YX-1A - DEVICE 1 - FUNCTION 1 AND 2 DISABLED 0 - YX-2A - DEVICE 1 - FUNCTION 1 - DISABLED - FUNCTION 2 - DISABLED 01 - RESERVED - DEVICE 1 - FUNCTION 1 - DISABLED - FUNCTION 2 - DISABLED 00 - X8, X4, X4 - DEVICE 1 - FUNCTIONS 1 AND 2 - ENABLED |

| |
|---|
| Display Port Presence |
| 1 - Disabled - No DP device is connected to aIDP |
| CPG(4) 0 - Enabled - IDP device is connected to aIDP |

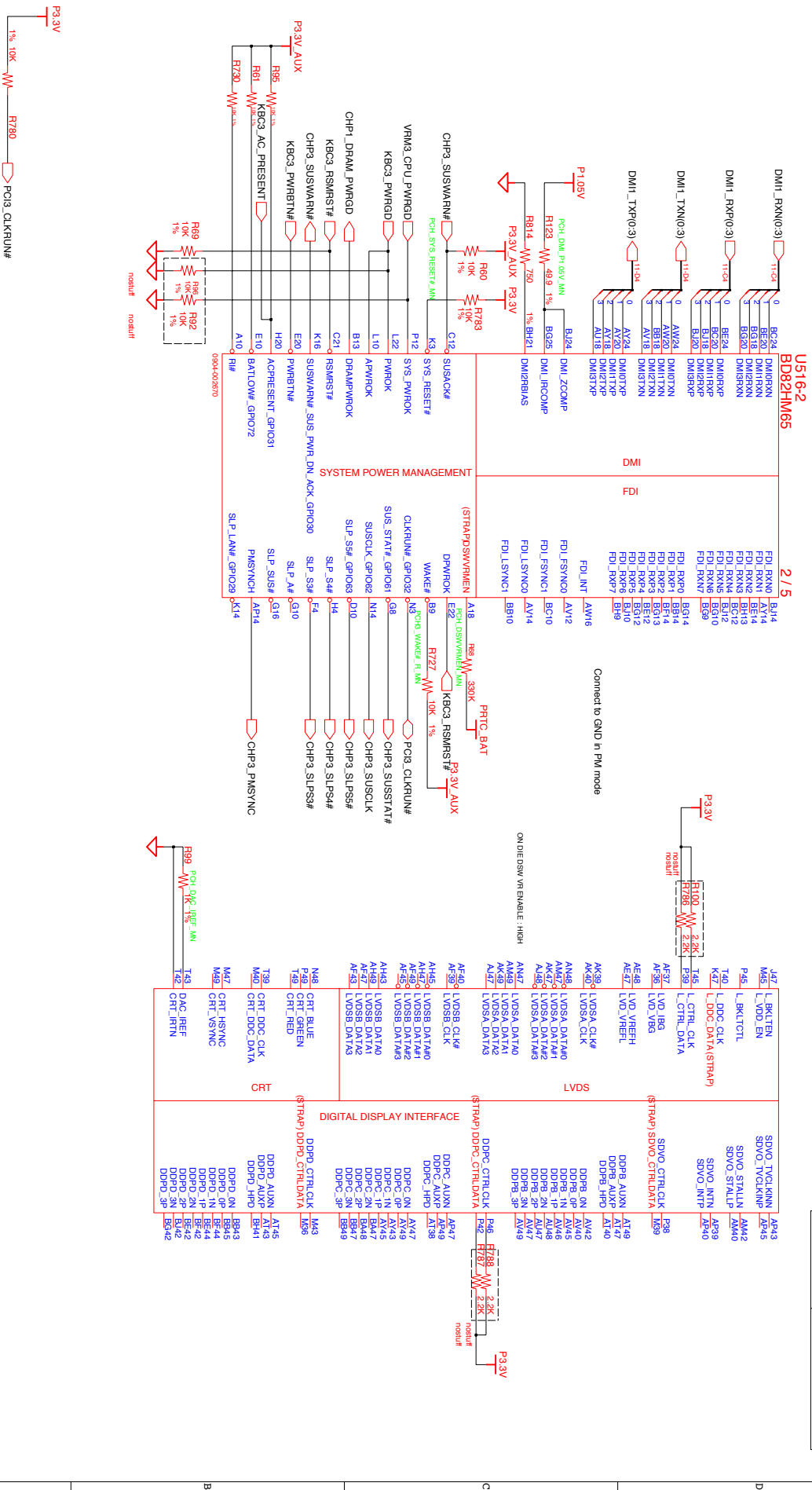
| |
|--|
| PEG DEEP TRAINING |
| CPG(7) 0 - DEFAULT: DEEP TRAINING IMMEDIATELY FOLLOWING XNTEST DEASSERTION 0 - PEG MAIN HUBS FOR TRAINING |

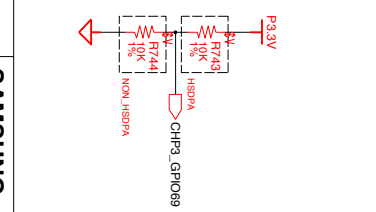
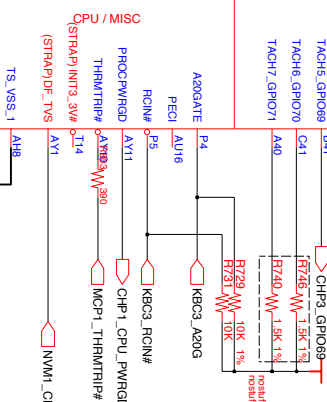
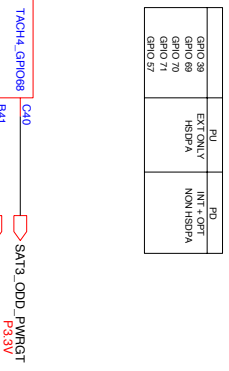
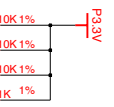
| | | | | | |
|------------|-----------|------------------------------|--------------------|---------------|-------|
| DESIGN | | TITLE | SAMSUNG | | |
| CHECK | Gu Hui | Scale a2-R | ELECTRONIC | | |
| APPROVAL | SJ.Wu | REV. STEP ADV | PART NO. | BA-41-01XXXXA | |
| MODEL CODE | BC LEE | REV. 0.1 | SANDY BRIDGE (4/4) | | |
| | LAST EDIT | January 20, 2011 18:59:20 PM | PAGE | 10 | OF 48 |

P1.5V_AUX
T

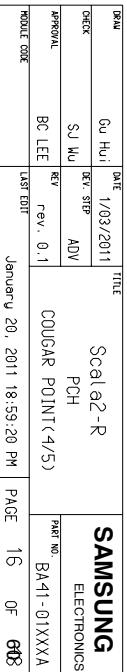


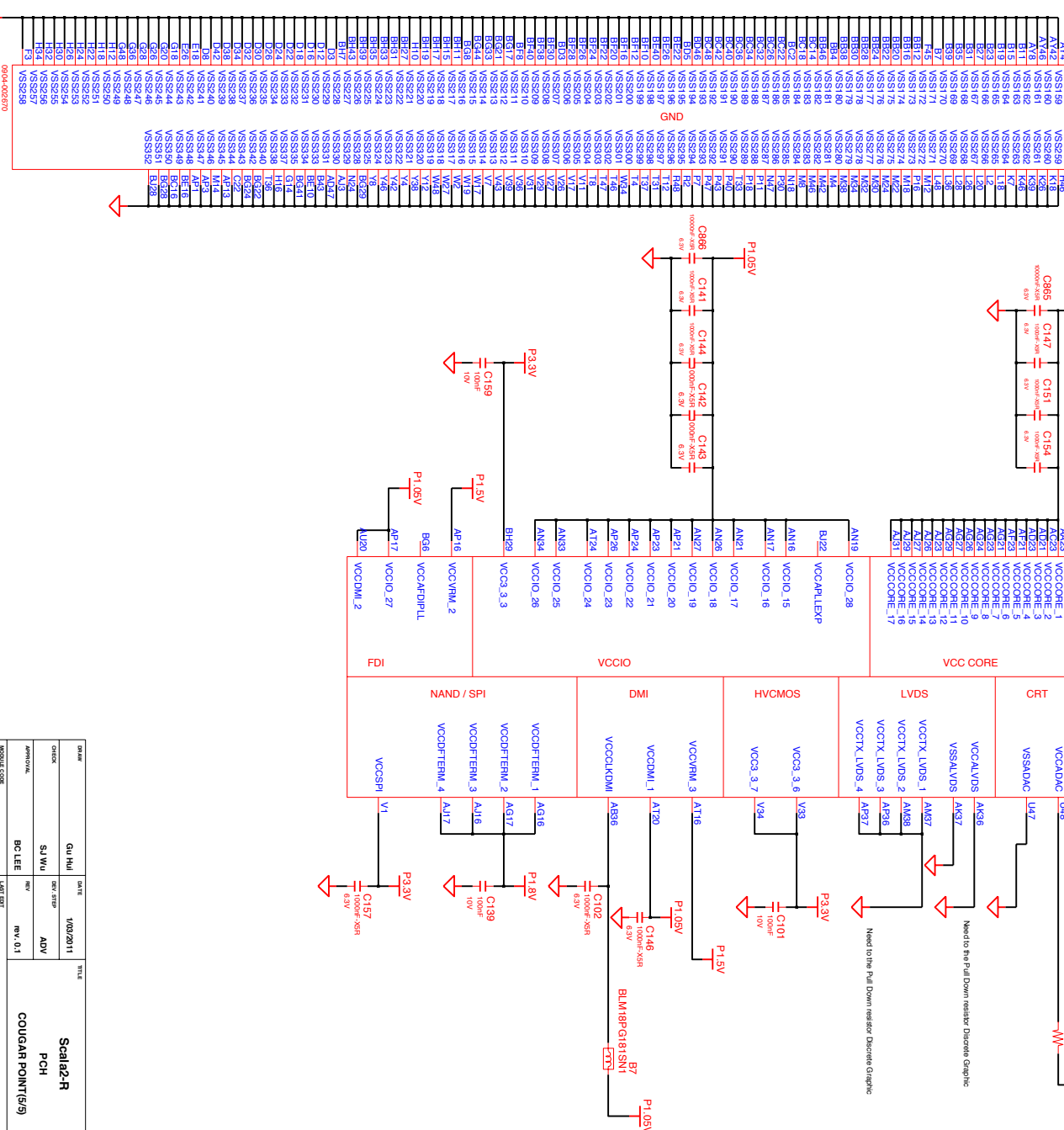






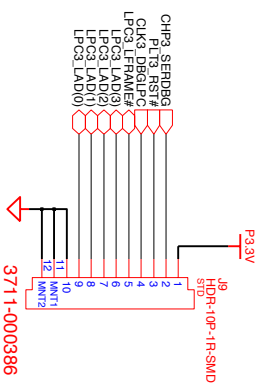
| | |
|---|---|
| Scal a2-R PCH COUGAR POINT(3/5) | SAMSUNG ELECTRONICS PART NO. BA41-01XXXX |
| U 20, 2011 18:59:20 PM PAGE 15 OF 48 | |





| | | | | |
|-------------|-----------|------------------------------|-------------|-------|
| Draw | DATE | TITLE | SAMSUNG | |
| CHIEF | 1/03/2011 | Scale2-R PCH | ELECTRONICS | |
| APPROVAL | REV. STEP | ADV | | |
| MODULE CODE | REV. 0.1 | COUGAR POINT(S/5) | PART NO. | |
| undrafted | LAST REV | January 20, 2011 10:55:20 PM | PAGE 17 | OF 48 |

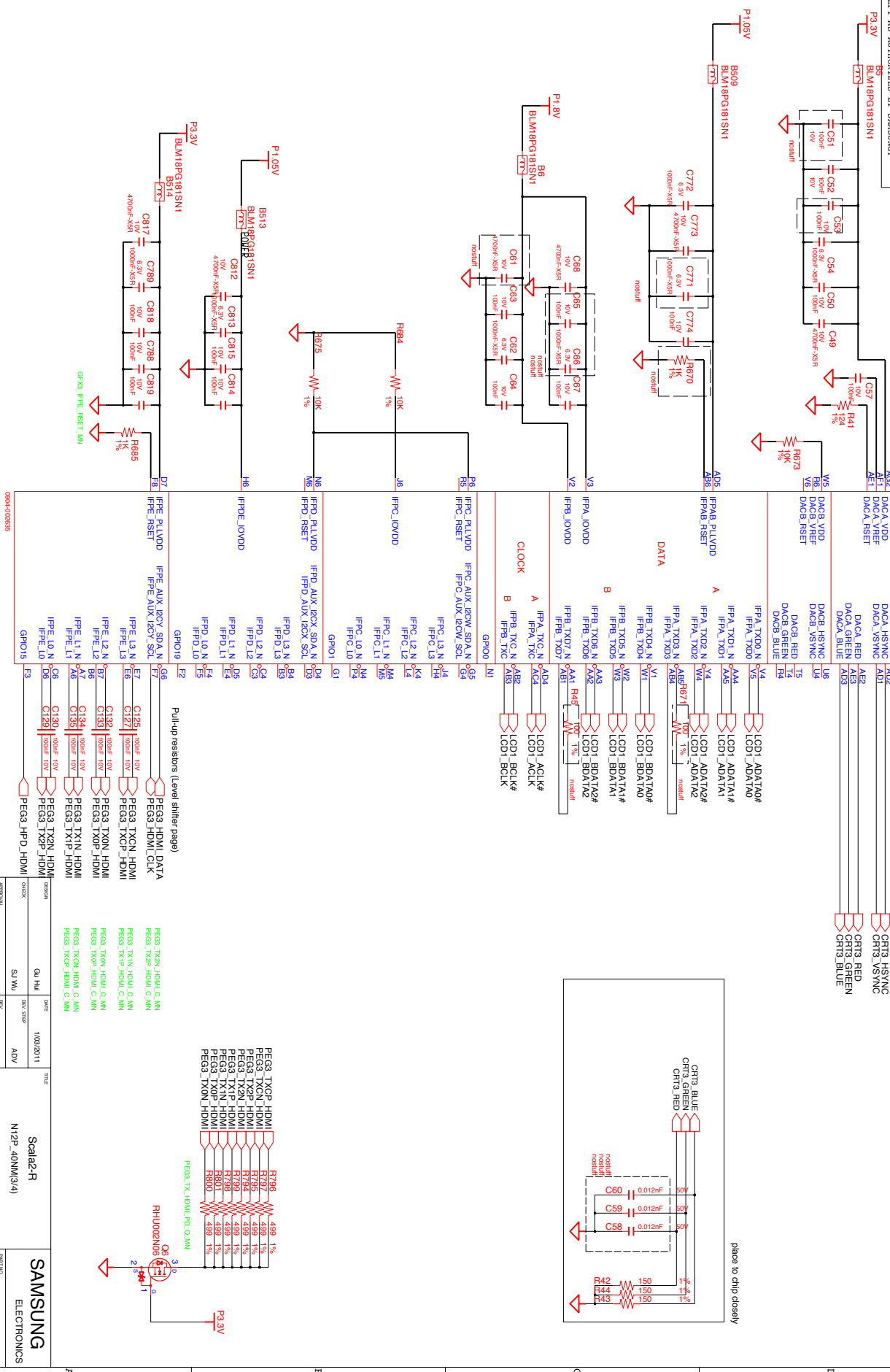
80H PORT DEBUG



| | | | | | | | |
|-------------|--------|-----------|------------------------------|-------|------------------------|--------------|--|
| DESIGN | Gu Hu. | DATE | 1/03/2011 | TITLE | SAMSUNG ELECTRONICS | | |
| CHECK | SJ WU | EXT. STP | ADV | | PART NO. | BA-01-1XXXXA | |
| APPROVAL | BC LEE | REV | rev. 0.1 | | | | |
| MODULE CODE | | LAST EDIT | January 20, 2011 18:59:20 PM | PAGE | 18 | OF 48 | |

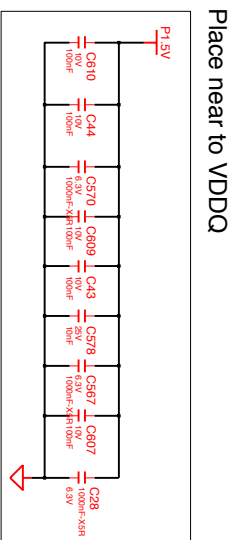


U3-3
N12P-GV-S-A1 3/5

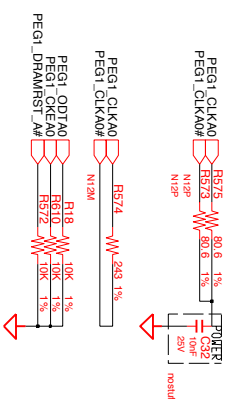


U3-5

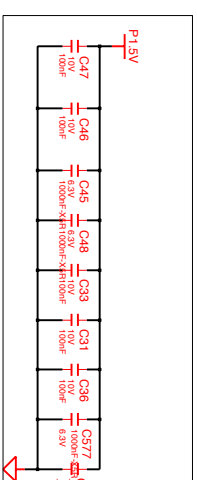




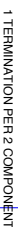
Place near to VDDQ



Place near to VDDQ



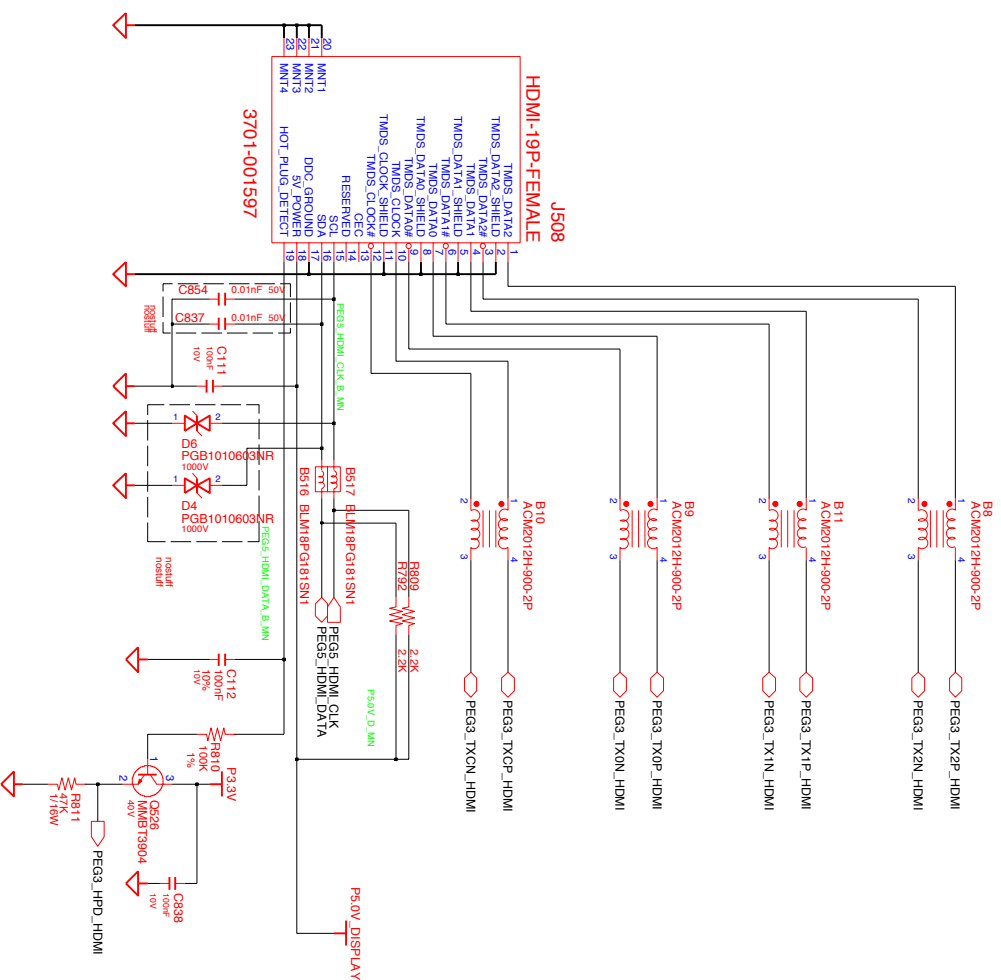
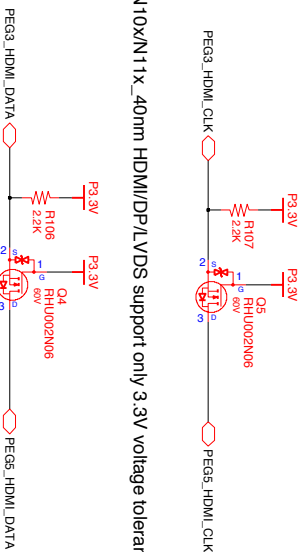
| REGION | DATE | SAMSUNG | |
|------------------------------|---------------|-----------------|-------------|
| Q4 H1 | 1/03/2011 | Scal2-R | |
| CHIPS | REV STEP | GRAPHIC MEM A40 | |
| APPROVAL | REV | PART NO | BA41-01XXXX |
| MOBILE CODE | REV 0.1 | GRAPHIC MEM A40 | |
| DATE EDIT | PAGE 23 OF 48 | | |
| January 20, 2011 10:50:20 PM | | | |



HDMI Graphic

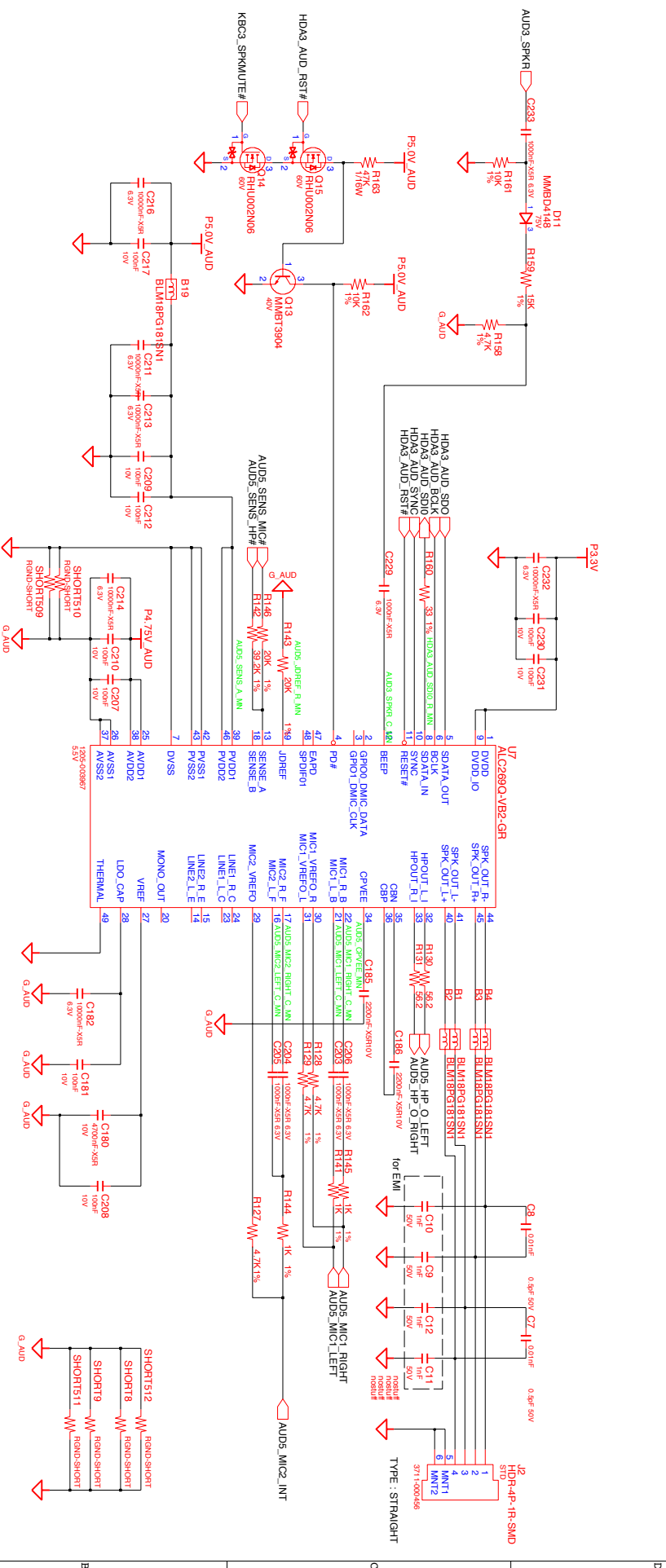
FOR HDMI VERIFICATION TEST

N10xN11x_40nm HDMI/DPLVDS support only 3.3V voltage tolerance



| | | | | | | |
|-------------|--------|-----------|------------------------------|--------------|--------------|-------------|
| DESIGNER | GU HUI | DATE | 1/02/2011 | TITLE | Scala2-R | SAMSUNG |
| CHECK | SJ WU | REV. STEP | ADV | GRAPHICS_I/F | BA41-01XXXXA | ELECTRONICS |
| APPROVAL | BC LEE | REV. | 0.1 | HDMI | | |
| MODULE CODE | | LAYOUT | | | | |
| | | | January 20, 2011 18:58:20 PM | PAGE | 27 | OF 48 |

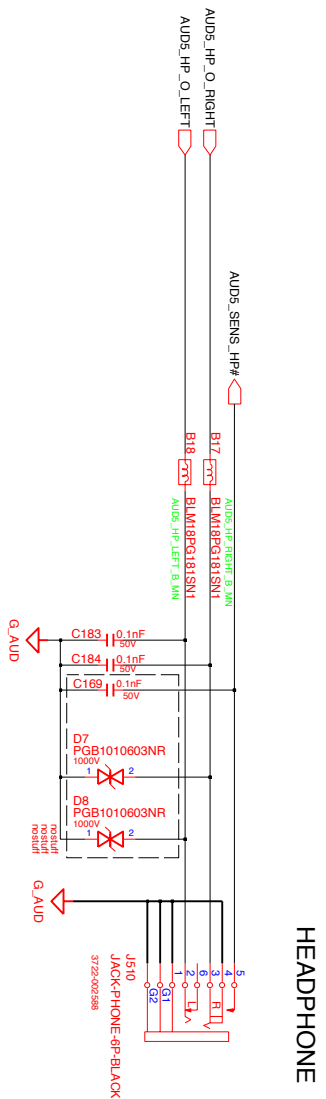
HD AUDIO



| | | | | |
|-------------|------------|-----------|---|-----------|
| REVISION | DATE | TITLE | SAMSUNG ELECTRONICS HDA CODEC SUB AUDIO CODEC ALIC269 SUB | PRINT NO. |
| CHKD | QU HUI | 1/03/2011 | | ENV STEP |
| CHKD | SA WU | ADV | | REV |
| APPROVAL | BC LEE | REV. 0.1 | | |
| MODULE CODE | LABEL EDIT | | | |

January 20, 2011 10:50:20 PM

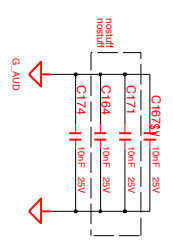
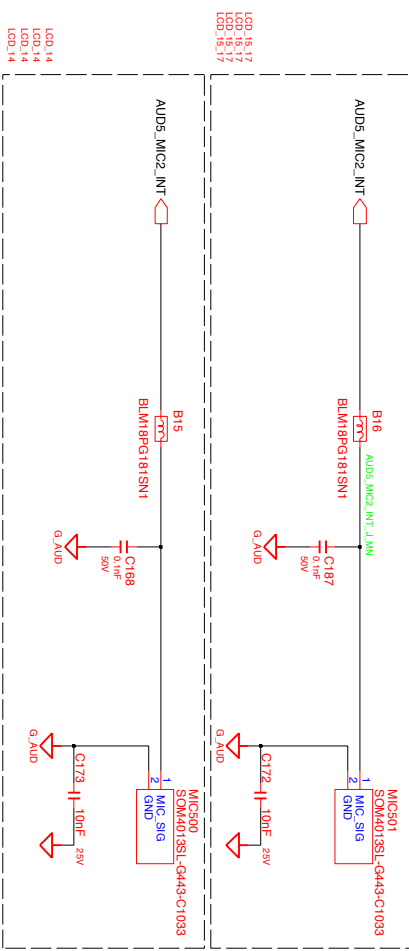
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|-------------|----|----|----|
| PAGE | 28 | OF | 48 |
| BA41-01XXXX | | | |



MIC JACK

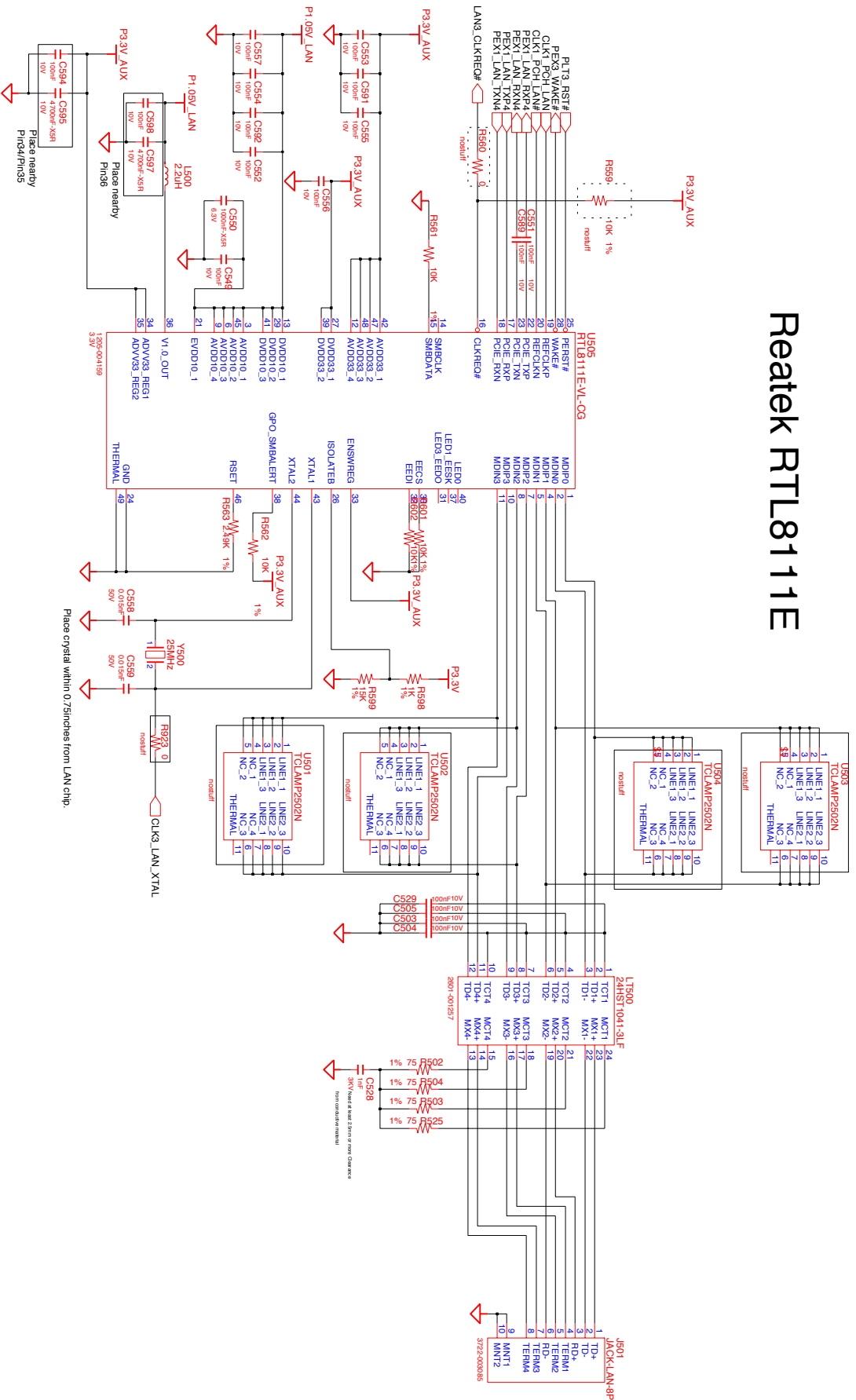


Internal MIC



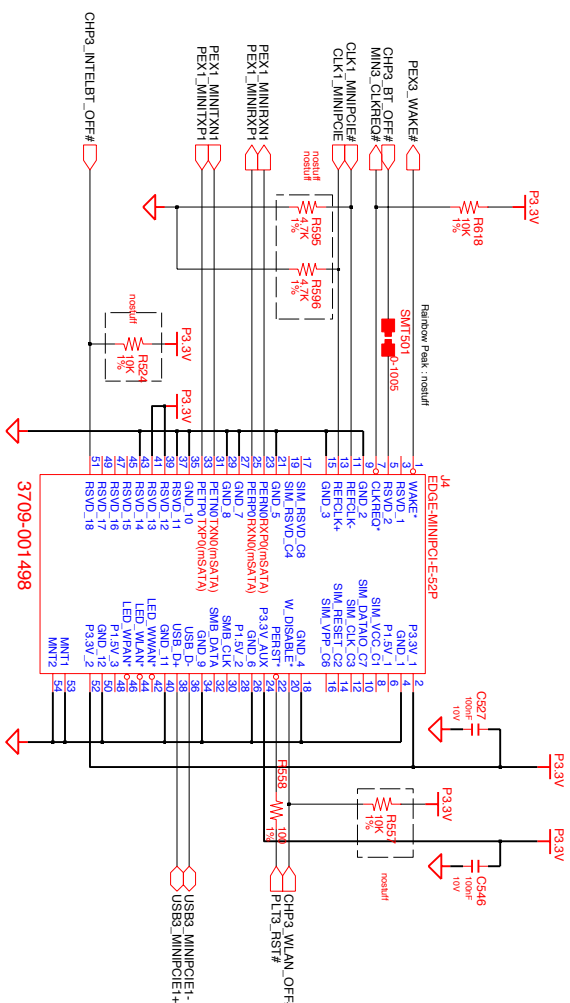
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|-------------|--------|-----------|------------------------------|-------|---------------------------------|
| DESIGN | GU HUI | DATE | 1/02/2011 | TITLE | Scal2R |
| CHECK | SJ WU | REV STEP | ADV | | HDA CODEC & LED SUB |
| APPROVAL | BC LEE | REV | REV 0.1 | | AUDIO JACK & LED SUB |
| MODULE CODE | | LAST EDIT | January 20, 2011 16:59:20 PM | PAGE | 29 OF 48 |
| | | | | | SAMSUNG ELECTRONICS BA41-01XXXX |

Reatek RTL811E

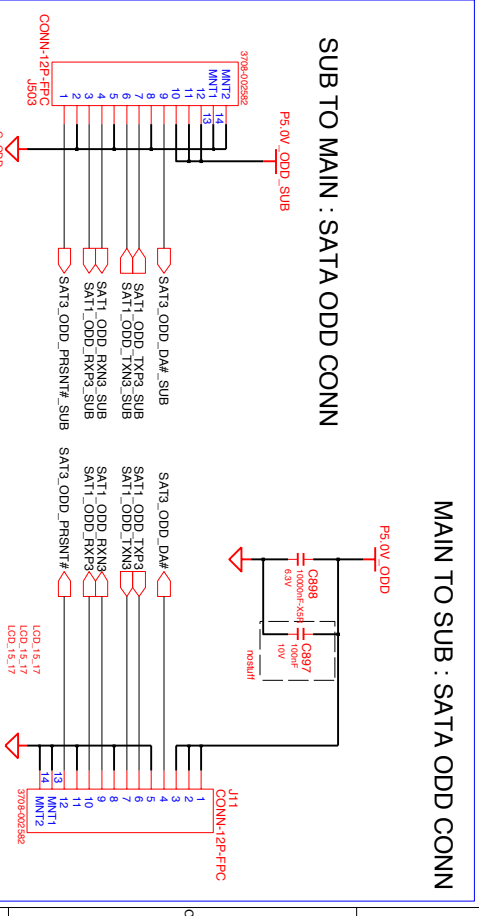


| | | | | | |
|-------------|-----------|------------------------------|-------------------------------|---------------|--|
| DESIGN | TITLE | | SAMSUNG ELECTRONICS | | |
| QU HU | 1/02/2011 | Scalaz-R LAN | | | |
| CHECK | ENV/STEP | ADV | | | |
| APPROVAL | REV | rev. 0.1 | | | |
| MODULE CODE | BC LEE | LAN, Reintek, RTL8111 | | | |
| LAST EDIT | | January 20, 2011 16:50:20 PM | | PAGE 30 OF 48 | |

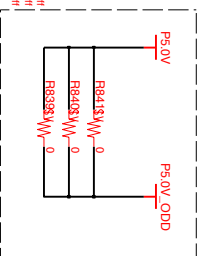
WLAN, 4mm



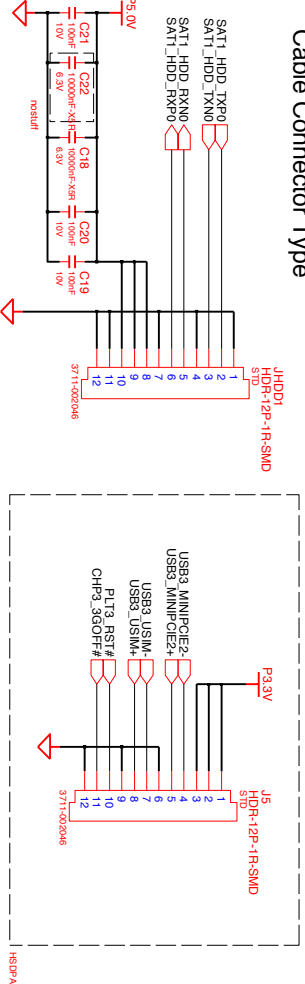
SATA ODD CONN



SATA HDD CONN



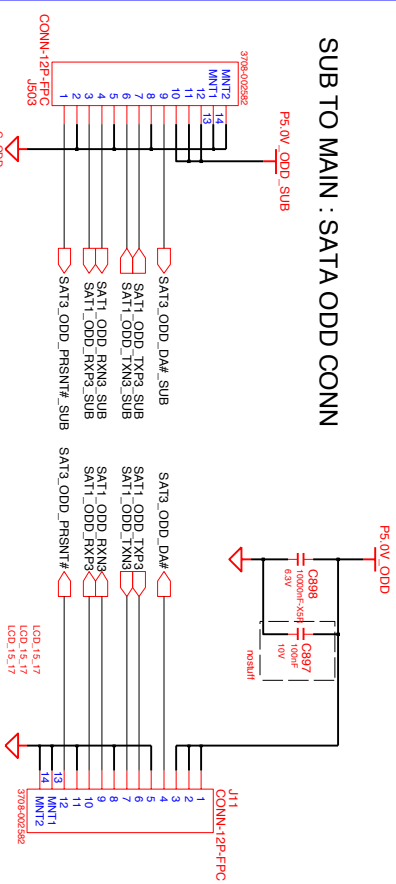
MAIN to HSDPA SUB



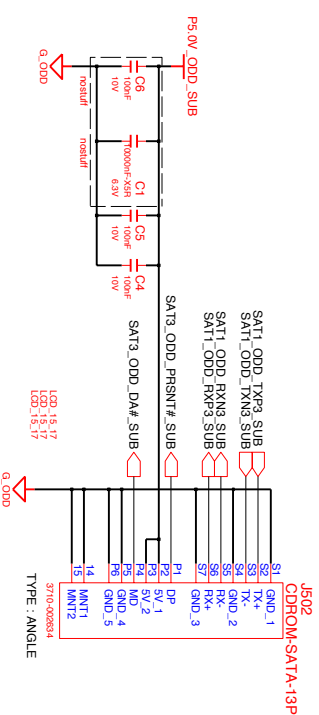
15.6" / 17.3"

MAIN TO SUB : SATA ODD CONN

SUB TO MAIN : SATA ODD CONN



SATA ODD CONN

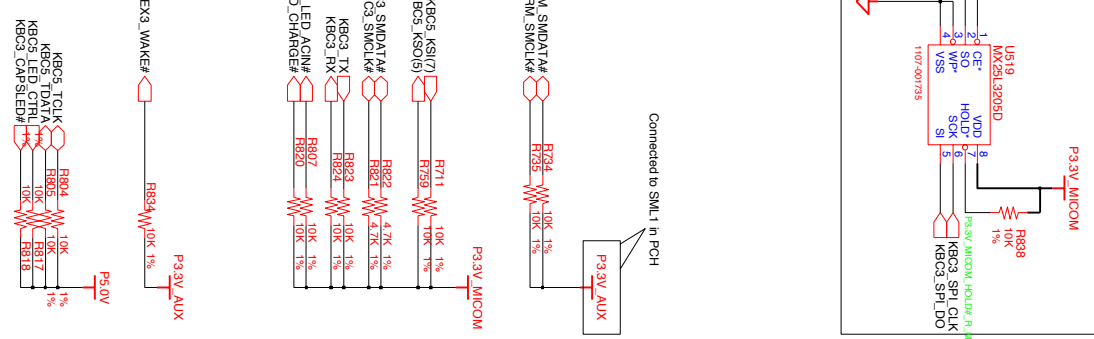


Cable Connector Type

ODD sub board mount hole

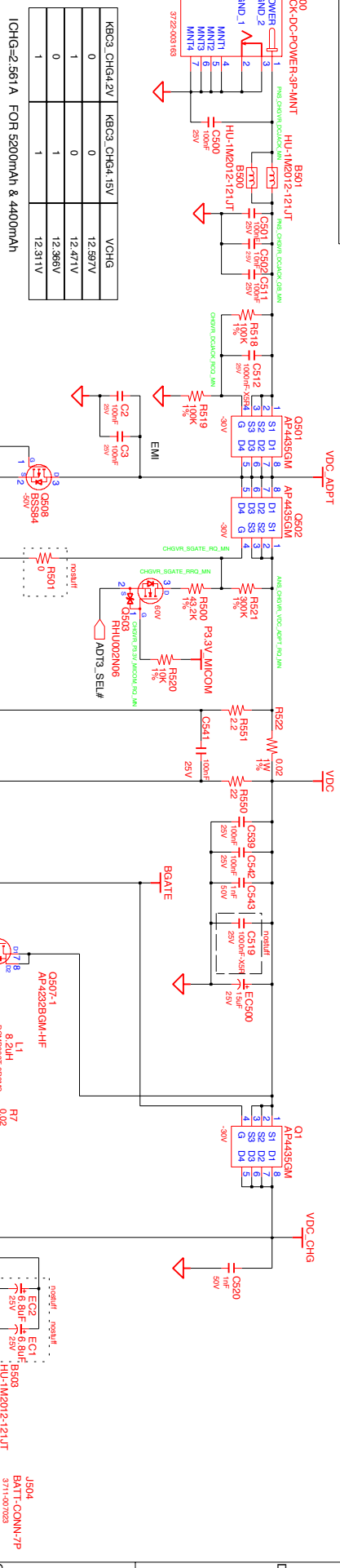
| VERSION | DATE | TITLE | SAMSUNG ELECTRONICS | |
|-------------|------------------------------|---------------|------------------------|----------|
| CHK1 | 1/03/2011 | Scale2-R | PAGE | 32 OF 48 |
| CHK2 | ENV STEP | SATA DEVICES | OF | |
| APPROVAL | ADV | SATA I/F Conn | | |
| BC LEE | REV | SATA I/F Conn | | |
| MODULE CODE | REV: 0.1 | | | |
| | LAST EDIT | | | |
| | January 20, 2011 16:59:20 PM | | | |

SPI ROM SOCKET



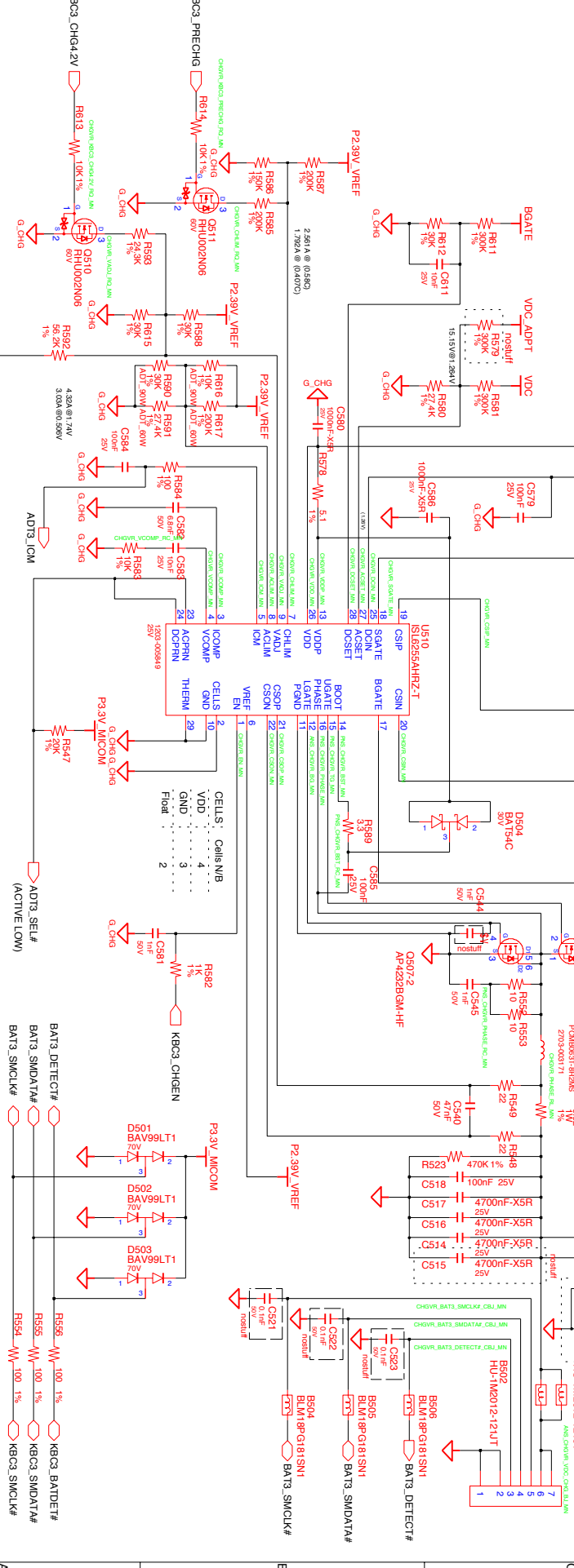
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| DATE | 1/03/2011 | TITLE | SAMSUNG ELECTRONICS | | |
| CHECK | Gu Hui | | SC01a2-R | PART NO. | BA41-01XXXXA |
| | SJ, MU | REV. STEP | MICOM | | |
| APPROVAL | BC LEE | REV. | MIDOM_SMC2-MEC1310-NU | | |
| MODULE CODE | | rev. 0.1 | | | |
| | | LAST EDIT | | PAGE | 33 OF 48 |
| | | | | January 20, 2011 18:59:20 PM | |

CHARGER & POWER MANAGEMENT



IGHG-2-561A FOR 5200mAh & 4400mAh

| KBG3 | CHG4 | 15V | VCHG |
|------|------|---------|------|
| 0 | 0 | 12.597V | |
| 1 | 0 | 12.471V | |
| 0 | 1 | 12.386V | |
| 1 | 1 | 12.311V | |



IGHG-2-561A FOR 5200mAh & 4400mAh

| KBG3 | CHG4 | 15V | VCHG |
|------|------|---------|------|
| 0 | 0 | 12.597V | |
| 1 | 0 | 12.471V | |
| 0 | 1 | 12.386V | |
| 1 | 1 | 12.311V | |

| Adapter configuration | | | |
|-----------------------|------------|---------------------|-------------|
| Value | SEC Code | Value | SEC Code |
| 60W / 3.03A / 96% | | 90W / 4.32A / 91.2% | |
| 200k | 2007-00734 | 10k | 2007-007142 |
| R10d | 27.4k | 2007-007274 | 30k |

| DATE | FILE | DATE | FILE |
|-----------|-----------------|-----------|-----------------|
| 1/10/2011 | Scale2R | 1/10/2011 | Scale2R |
| 1/10/2011 | CHARGER | 1/10/2011 | CHARGER |
| 1/10/2011 | Power - Charger | 1/10/2011 | Power - Charger |
| 1/10/2011 | BA41-01XXXXA | 1/10/2011 | BA41-01XXXXA |



| | | | |
|-------------|-----------|------------------------------|--|
| PMW | DATE | TITLE | SAMSUNG ELECTRONICS PART NO. BA41-01XXXXA |
| CHICK | REV. STEP | 1/03/2011 | |
| APPROVAL | SJ.WU | ADV | |
| MODULE CODE | BC LEE | REV. 0.1 | |
| | LAST EDIT | | |
| undifined | | January 20, 2011 18:59:20 PM | PAGE 40 OF 48 |

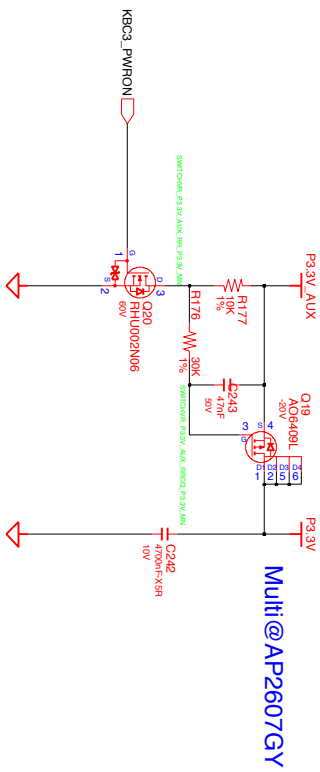
GFX Loadline -3.9mohm
CPU Loadline -1.9mohm



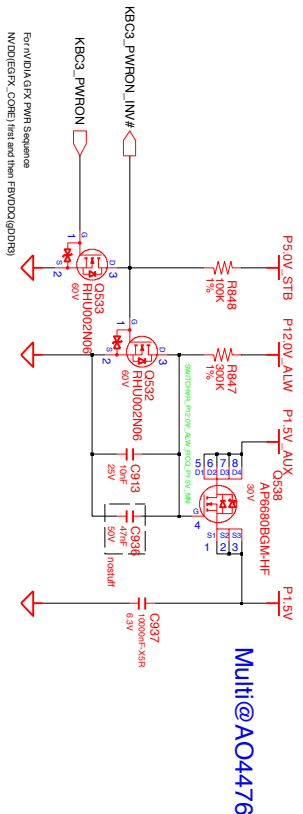
Switched Power

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

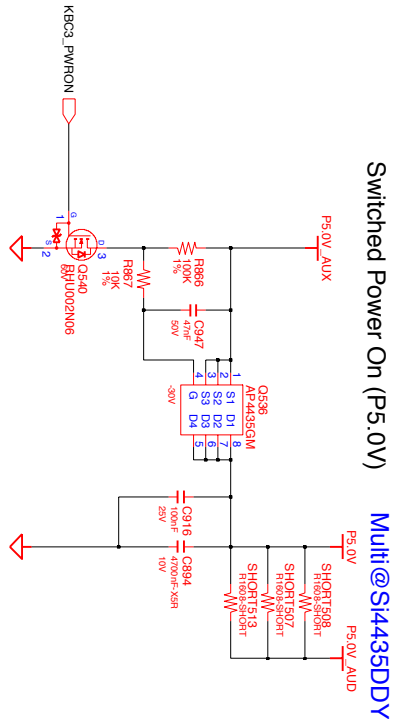
Switched Power On (P3.3V)



Switched Power On (P1.5V)

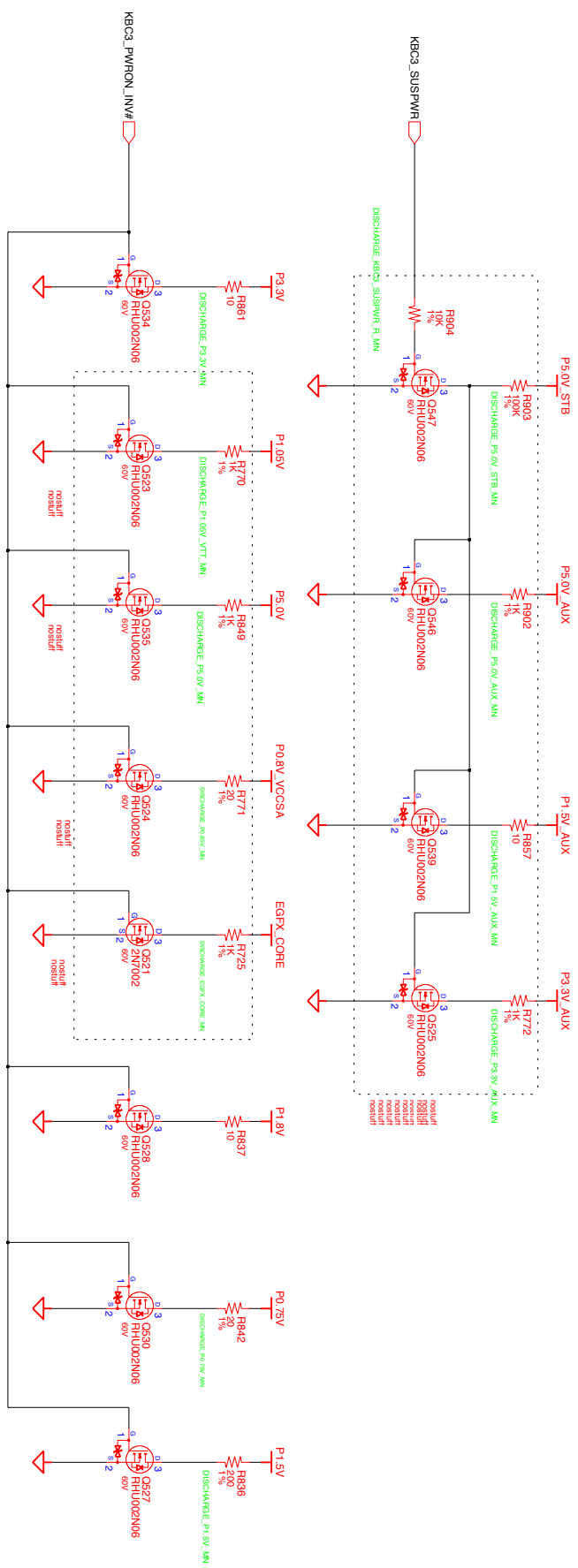


Switched Power On (P5.0V)



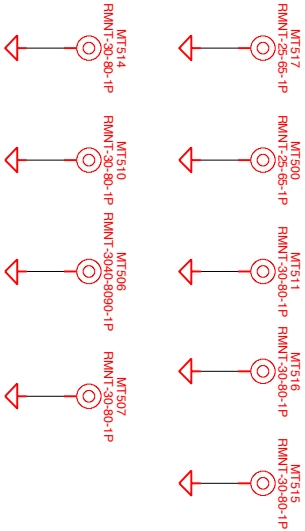
| | | | | |
|-------------|------------|-----------|------------------------------|---------------|
| DATE | 10/02/2011 | FILE | Scal2-R | SAMSUNG |
| CHK | GU HUI | REV | PWR_INV_DISCHARGER | ELECTRONICS |
| CHK | SJ WU | ADV | SWITCHED POWER | BA41-01XXXX |
| APPROVAL | BC LEE | REV | REV. 0.1 | |
| MODULE CODE | undefined | LATE EDIT | January 20, 2011 18:59:20 PM | PAGE 43 OF 48 |

POWER DISCHARGER

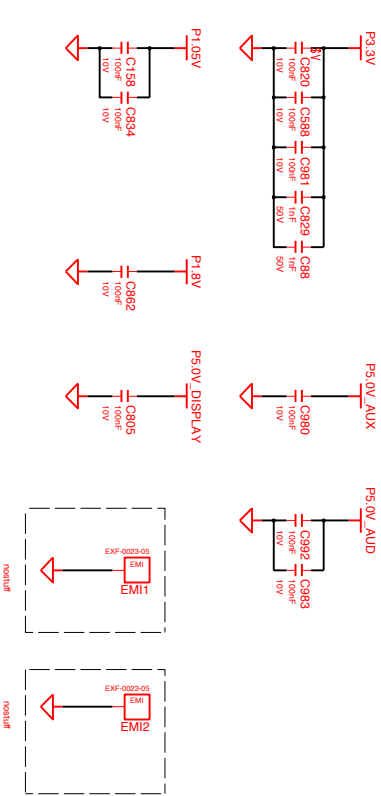
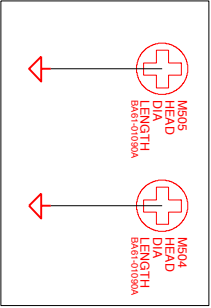


| | | | | | | |
|-------------|--------|-----------|------------------------------|-------|---|------------------------|
| DESIGN | GU HUI | DATE | 1/02/2011 | TITLE | Scala2R SUB BOARD1 Power Discharger | SAMSUNG ELECTRONICS |
| CHECK | SJ WU | REV. STEP | ADV | | | PART NO. |
| APPROVAL | BC LEE | REV. | REV. 0.1 | | | BA41-01XXXA |
| MODULE CODE | | LAST EDIT | January 20, 2011 10:59:20 PM | PAGE | 45 | OF 48 |

Mainboard Mount ((25-65)X2EA, (30-80)X7EA)



PCH Thermal



| | | | | | | |
|-------------|---------|-----------|------------------------------|----------|----------|-------------|
| DESIGNER | MS YANG | DATE | 1/02/2011 | TITLE | Jimbo-R | SAMSUNG |
| CHECK | MKKM | EXP. STEP | ADV | MNT hole | MNT hole | ELECTRONICS |
| APPROVAL | BL LEE | REV | REV. 0.3 | | | BA41-01XXXX |
| MODULE CODE | | LAST EDIT | January 18, 2011 08:10:20 AM | PAGE | 48 | OF 48 |