HSF Property:ROHS

# ACER

# JM31/SJM31/BAP31 Discrete MAIN BOARD

2009.05.26

| | | |
|---|---|---|
| Tuesday, May 26, 2009 | | A03 |
| DATE | CHANGE NO. | REV |

| | EE | DATE | POWER | DATE |
|---|---|---|---|---|
| DRAWER | | | | |
| DESIGN | | | | |
| CHECK | | | | |
| RESPONSIBLE | | | | |

SIZE= VER:

FILE NAME: XXXX-XXXXXX-XX

P/N XXXXXXXXXXX

INVENTEC

TITLE: BAP31G SFF

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| C | CS | D-CS-1310A2264501-ALG | A03 |

SHEET 1 of 47

# 1. Schematic Page Description :

## Montevina Schematic Ver : A03



INVENTEC

TITLE: BAP31G SFF
Schematic Page

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |

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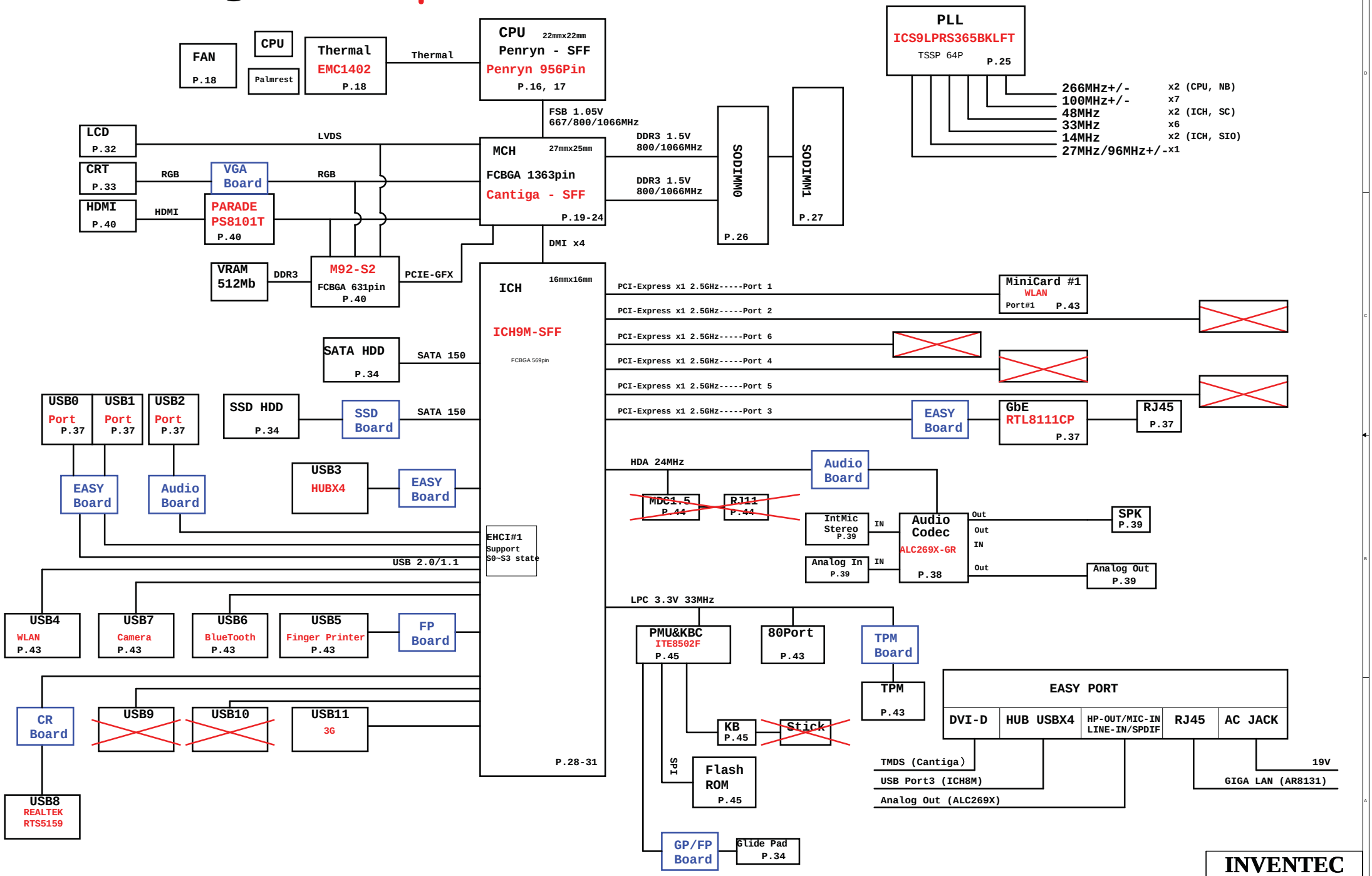
CHANGE by S-H Chung DATE Tuesday, May 26, 2009

# 3. Block Diagram :






INVENTEC

| | | | |
|---|---|---|---|
| TITLE: BAP31G SFF Block Diagram | | | |
| SIZE: Custom | CODE: CS | DOC.NUMBER: D-CS-1310A2264501-ALG | REV: A03 |
| SHEET 3 of 47 | | | |

CHANGE by S-H Chung DATE Tuesday, May 26, 2009

# 4. Net name Description

## Voltage Rails

| | |
|---|---|
| DCIN | Primary DC system power supply |
| +5VLA | 5.0V always on power rail by LATCH or ACIN |
| +5VA | 5.0V always on power rail by ECPWON |
| +3VA | 3.3V always on power rail by ECPWON |
| +5VS | 5.0V switched power rail by SLP_S3#_3R |
| +3VS | 3.3V switched power rail by SLP_S3#_3R |
| +1.8VS | 1.8V switched power rail by SLP_S3#_3R |
| VCC_CORE | Core Voltage for CPU |
| +1.05VS | 1.05V power rail for AGTL+ termination/Core for GMCH by SLP_S3#_3R |
| +1.25VS | 1.25V switched power rail by SLP_S3#_3R |
| +1.5VS | 1.5V power rail for CPU PLL/DMI;PCIE;DDRIII DLLs for GMCH/Core;PCIE for ICH9m by SLP_S3#_3R |
| +1.5V | 1.5V power rail for DDRII by SLP_S5#_3R |
| 0.75VDDT_DDRIII | 0.75V DDRII Termination Voltage by SLP_S3#_3R |

## Part Naming Conventions

| | | |
|---|---|---|
| C | = | Capacitor |
| CN | = | Connector |
| D | = | Diode |
| F | = | Fuse |
| L | = | Inductor |
| Q | = | Transistor |
| R | = | Resistor |
| RP | = | Resistor Pack |
| U | = | Arbitrary Logic Device |
| Y | = | Crystal and Osc |

## Net Name Suffix

| | | |
|---|---|---|
| # | = | Active Low signal |

# 5. Board Stack up Description

## PCB Layers

| | | |
|---|---|---|
| Layer 1 | | Component Side, Microstrip signal Layer |
| Layer 2 | | Ground Plane |
| Layer 3 | | Stripline Layer |
| Layer 4 | | Power Plane |
| Layer 5 | | Stripline Layer |
| Layer 6 | | Stripline Layer |
| Layer 7 | | Ground Plane |
| Layer 8 | | Solder Side,Microstrip signal Layer |

| | Differential Impedance for Microstrip | Differential Impedance for Stripline |
|---|---|---|
| Host Clock | 95 ohm +/- 20% | 95 ohm +/- 20% |
| PCI-E Clock | 95 ohm +/- 20% | 95 ohm +/- 20% |
| DDR3 CLK | 75 ohm +/- 20% | 75 ohm +/- 20% |
| DDR3 Strobe | 90 ohm +/- 20% | 90 ohm +/- 20% |
| DMI Bus | 95 ohm +/- 20% | 95 ohm +/- 20% |
| PCIE Bus | 95 ohm +/- 20% | 95 ohm +/- 20% |
| SDVO | 95 ohm +/- 20% | 95 ohm +/- 20% |
| SATA | 95 ohm +/- 20% | 95 ohm +/- 20% |
| USB | 90 ohm +/- 20% | 90 ohm +/- 20% |
| LVDS | 95 ohm +/- 20% | 95 ohm +/- 20% |
| Lan | 95 ohm +/- 20% | 95 ohm +/- 20% |

| Power Rail | Destination | Voltage | S0 Current | |
|---|---|---|---|---|
| VCC_CORE | Penryn SFF: | 1.3319V~1.4375V~1.4591V | 18A | |
| | LFM: | 0.9221V~0.9625V~0.9739V | | |
| 1.05VS | Penryn SFF : AGTL+ termination | 1V~1.05V~1.10V | 4.5A | |
| | Cantiga GS: Core | 0.997V~1.05V~1.102V | 8.7A | |
| | Cantiga GS: PCIE | 0.9975V~1.05V~1.1025V | 1.78A | |
| | Cantiga GS:Core+IMEL+HSIO | 0.9975V~1.05V~1.1025V | 2.898A | |
| | Cantiga GS:VCC_GMCH | 0.997V~1.05V~1.102V | 10.154A | |
| | Cantiga GS:VCCA_SM_CK and NCTF | 0.997V~1.05V~1.102V | 37.95mA | |
| | Cantiga GS:VCC_DMI | 0.997V~1.05V~1.102V | 456mA | |
| | Cantiga GS:VCCA_SM | 0.997V~1.05V~1.102V | 747.5mA | |
| | Cantiga GS:VTT | 0.997V~1.05V~1.102V | 852mA | |
| | ICH9M:VCC1_05 | 0.997V~1.05V~1.102V | 1.634A | |
| | ICH9M:DMI | 0.997V~1.05V~1.102V | 48mA | |
| | ICH9M:CPU_IO | 0.997V~1.05V~1.102V | 2mA | |
| 1.5VS | Penryn SFF PLL | 1.425V~1.5V~1.575V | 130mA | |
| | Cantiga GS: QDAC | 1.425V~1.5V~1.575V | 0.5mA | |
| | Cantiga GS: LVDS | 1.71V~1.8V~1.89V | 60.31mA | |
| | Cantiga GS: TVDAC | 1.425V~1.5V~1.575V | 35mA | |
| | Cantiga GS: Various PLLS analog supply | 1.425V~1.5V~1.575V | 485mA | |
| | Cantiga GS: VCC_SM_CK | 1.425V~1.5V~1.575V | 149.5mA | |
| | Cantiga GS: VCC_SM | 1.425V~1.5V~1.575V | 3.1625A | |
| | ICH9M:PCIE_ICH | 1.425V~1.5V~1.575V | 646mA | |
| | ICH9M:SATA_ICH | 1.425V~1.5V~1.575V | 1.342A | |
| | ICH9M:VCC_GLAN | 1.425V~1.5V~1.575V | 80mA | |
| | Mini Card: | | | |
| | Express Card: | 1.425V~1.5V~1.575V | 650mA | |
| 1.5V | Cantiga GS: DDRIII System Memory | 1.425V~1.5V~1.575V | 3.1A(800M) 4.1A(1067M) | |
| 0.75VDDT_DDRIII | DDRIII Terminator: | 0.7125V~0.75V~0.7875V | 1.0A | |
| 3VS | Cantiga GS: HV CMOS | 3.135V~3.3V~3.465V | 105.3mA | |
| | Cantiga GS: VCCS_TVDAC | 3.135V~3.3V~3.465V | 78mA | |
| | ICH9M:VCC3_3 | 3.135V~3.3V~3.465V | 308mA | |
| | ICH9M:VCCGLAN3_3 | 3.135V~3.3V~3.465V | 1mA | |
| | Thermal Sensor: | 3.0V~3.3V~3.6V | 5mA | |
| | Mini Card: UMTS | | | |
| | Express Card: | 3.135V~3.3V~3.465V | 1.3A | |
| | CLK Generator: ICS9LPRS365BKLFT | 3.135V~3.3V~3.465V | 500mA | |
| | Mini Card: WirelessLan | | | |
| | Bluetooth: | 3.0V~3.3V~3.6V | | |
| | Super I/O: IT8305E | | | |
| | Azalia Codec: ALC262 | | | |
| | Azalia MDC: | | | |
| 1.8VS | DVI | 3.0V~3.3V~3.6V | 120mA | |
| 3VA | ICH9M: RTC | 2V~3.3V~3.465V | 6uA | |
| | ICH9M:VCCSUS3_3 | 3.135V~3.3V~3.465V | 212mA | |
| | ICH9M:VCCCL3_3 | 3.135V~3.3V~3.465V | 73mA | |
| | ICH9M:VCCLAN3_3 | 3.135V~3.3V~3.465V | 78mA | |
| | LCD: | 3.0V~3.3V~3.6V | 2A | |
| | Lan:AR8131 | 3.0V~3.3V~3.6V | 1A | |
| | Azalia MDC: | | | |
| | Flash ROM: BIOS | 3.0V~3.3V~3.6V | | |
| 5VS | Cardreader: RTS5159 | 3.0V~3.3V~3.6V | | |
| | Azalia Codec: ALC269 | 3.0V~3.3V~3.6V | | |
| | HDD: SATA | 4.75V~5.0V~5.25V | Max: 1.5A ; R/W: 460mA ; STDBY: 70mA | |
| | ~~ODD: SATA~~ | ~~4.75V~5.0V~5.25V~~ | ~~Max: 1.5A ; R/W: 900mA ; STDBY: 45mA~~ | |
| | ~~Audio AMP: G1432~~ | | | |
| | Inverter: | | | |
| | WebCam | 4.75V~5.0V~5.25V | 1A | |
| 5VA | USB: x 2 ports | 5VA | 2A | |
| | USB | 5VA | 1.5A | |
| 5VLA | Control Power | | | |
| 3VLA | EC: ITE8512E | 3.0V~3.3V~3.6V | 300mA | |

INVENTEC

TITLE: BAP31G SFF

ANNOTATIONS

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |

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CHANGE by S-H Chung DATE Tuesday, May 26, 2009

# 6.Schematic modify Item and History

2009.0108

1. ADD USB P3 for Docking, USB P5 for Finger printer,
   Modify CN5 -----P28
2. Modify CN20 to 50pin-------P33
3. Move PWR_SWIN# from CN14 to CN20
4. ADD TPM module------P34

2009.0109

1. ADD DOCK_USB_EN, DOCK_CRT_IN#-----P32,33

2009.0112

1. Change power item: R490,R291,BAT CNN TH PIN

INVENTEC

TITLE: BAP31G SFF

Schematic Modify

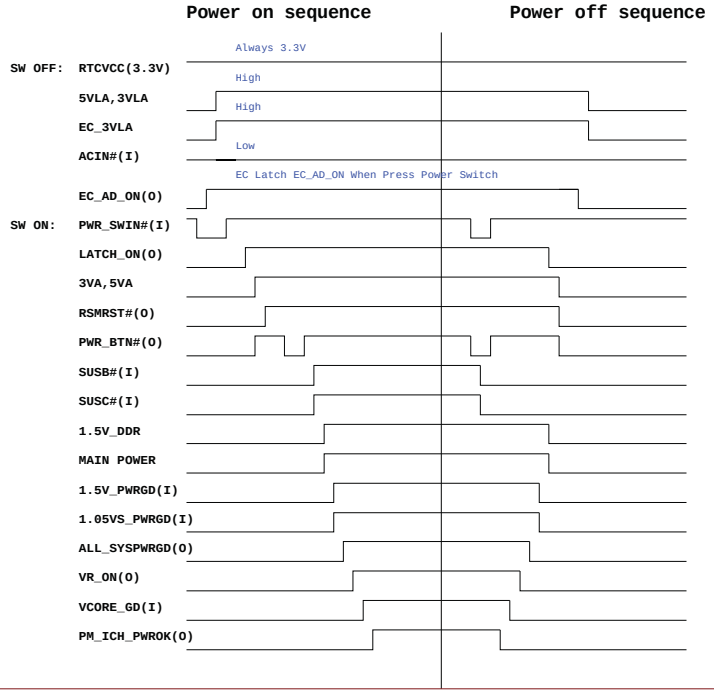
| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |

CHANGE by S-H Chung | DATE Tuesday, May 26, 2009 | SHEET 5 of 47

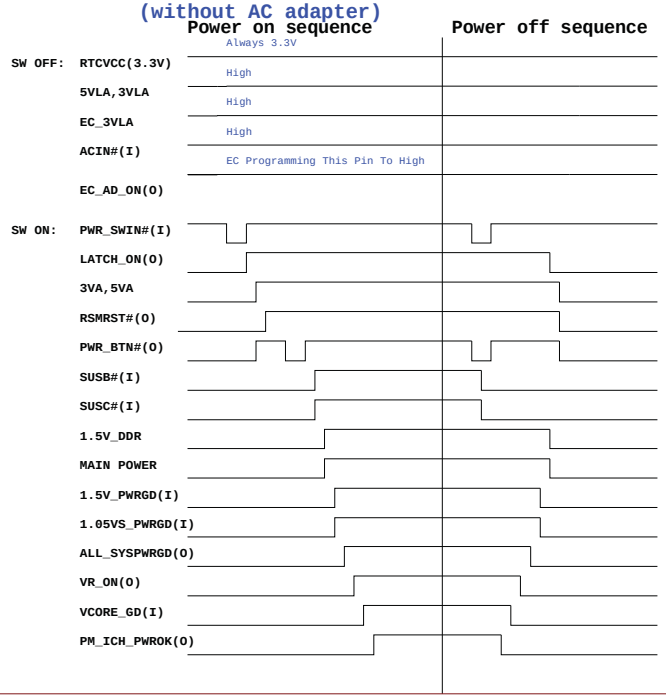
# SYSTEM POWER ON/OFF SEQUENCE

Drawing : Wendy, Huang

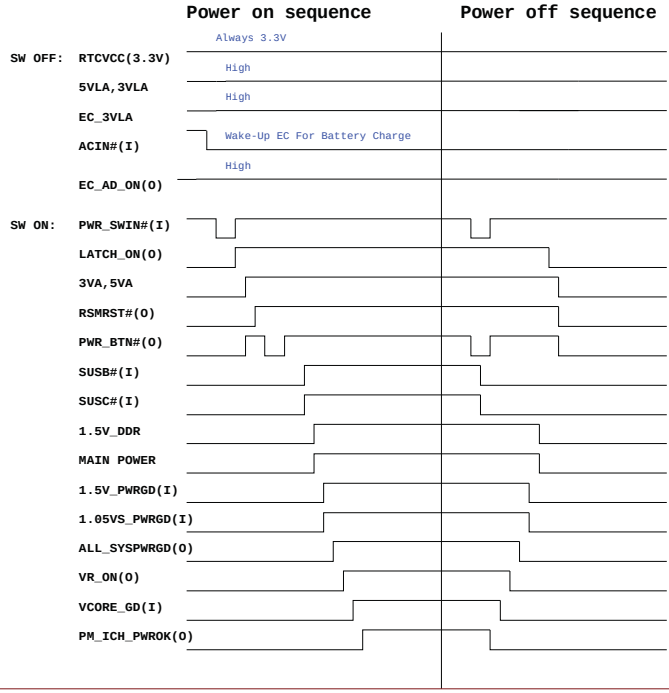
## Power on/off sequence AC insert (without Battery Pack)



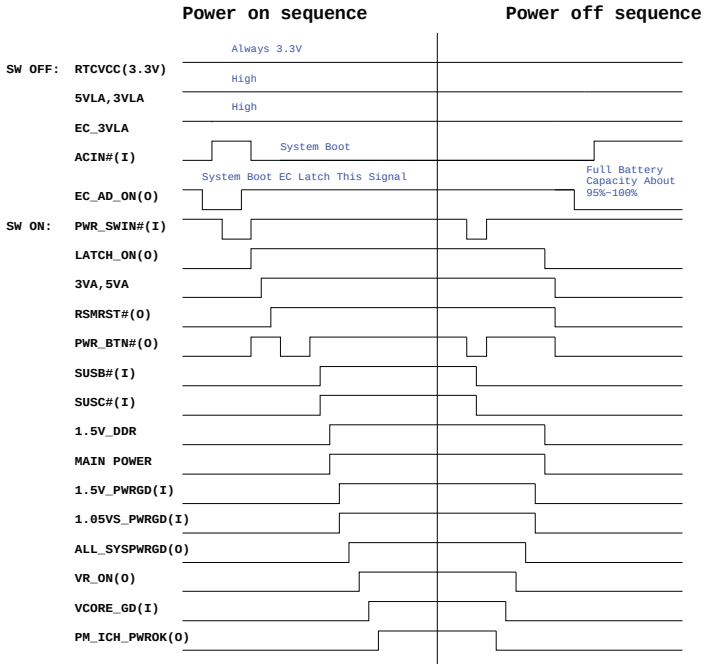

## Power on/off sequence Battery insert (without AC adapter)



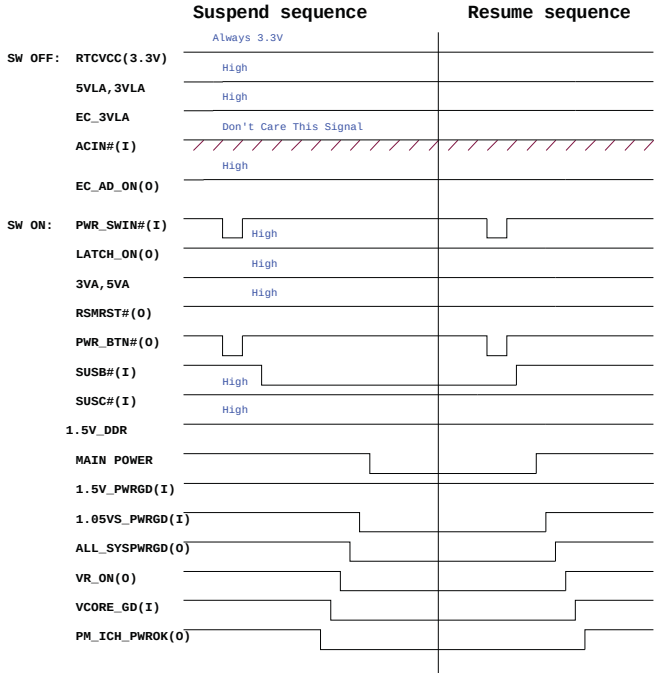

## Power on/off sequence AC insert(with charge over 95%)



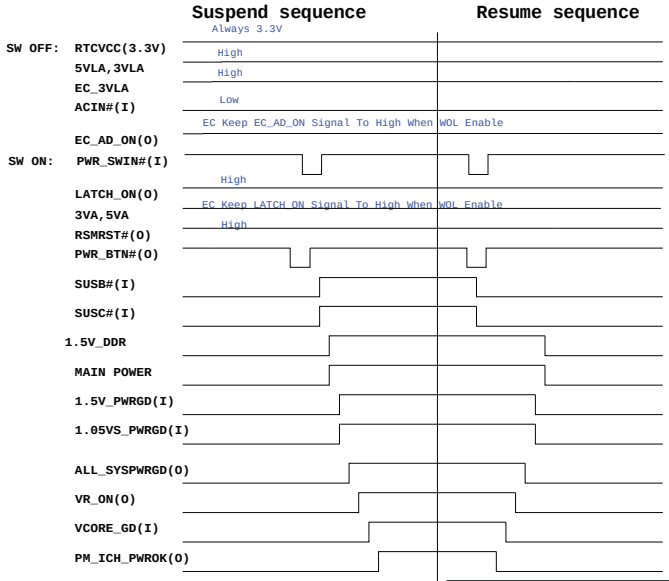

## Power on/off sequence AC insert(without charge over 95%)




## Suspend And Resume Sequence (S3)




## Power on/off sequence after windows shoutdown (WOL enable)




INVENTEC

TITLE: BAP31G SFF
Time Diagram

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2284501-ALG | A03 |

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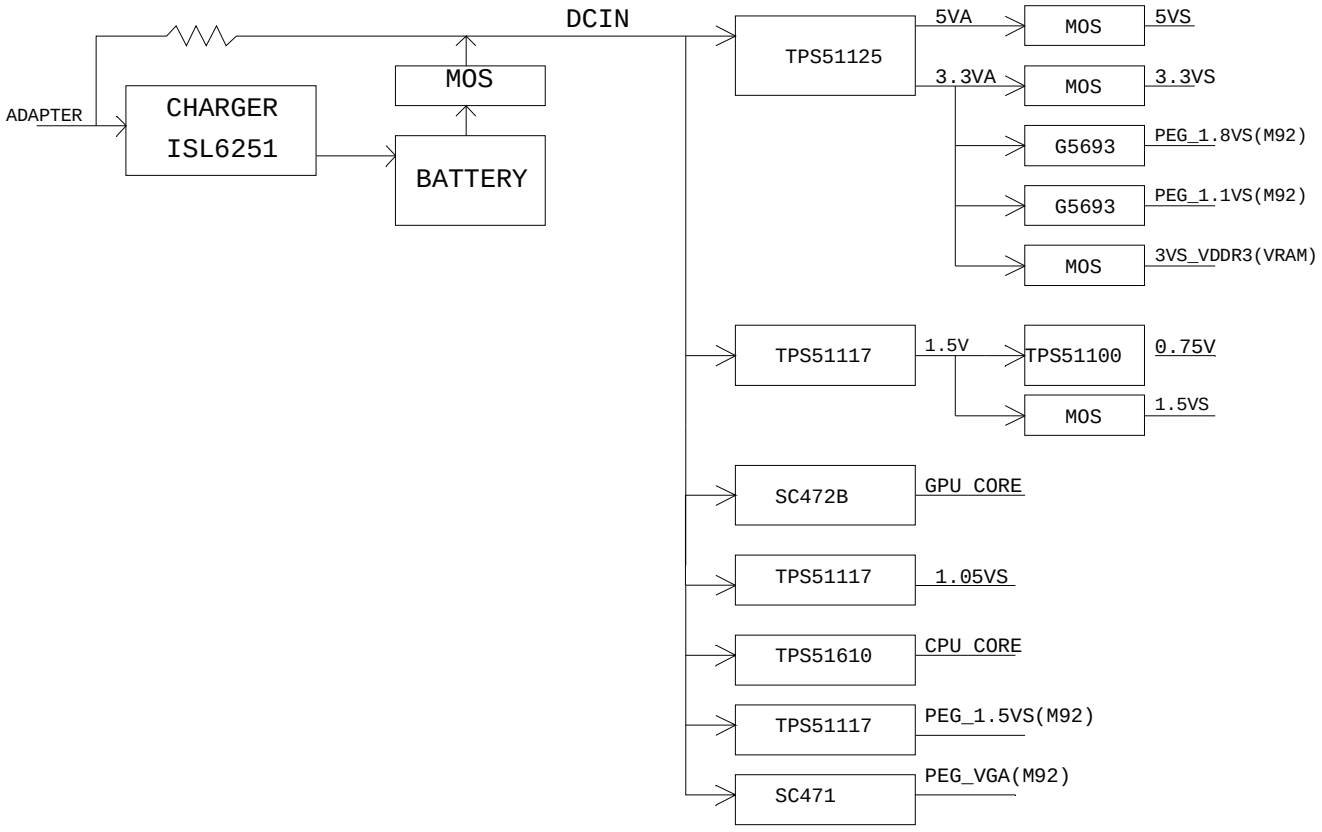
CHANGE by S-H Chung | DATE Tuesday, May 26, 2009

# Power Block Diagram




| | | | |
|---|---|---|---|
| CHANGE by | S-H Chung | DATE | Thursday, June 04, 2009 |

INVENTEC

TITLE: BAP31G SFF
Power Block Diagram

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| C | CS | D-CS-1310A2264501-ALG | A03 |

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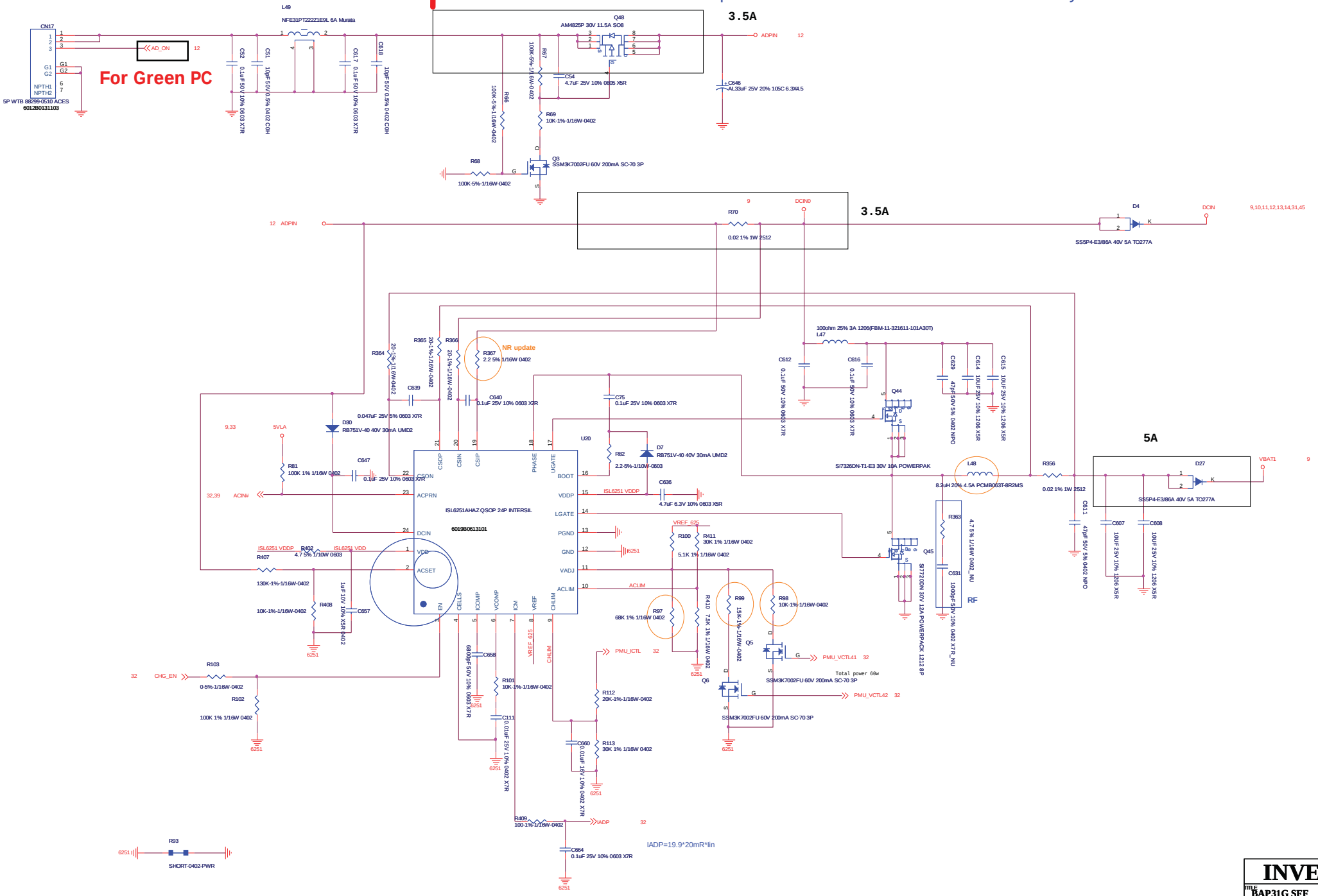
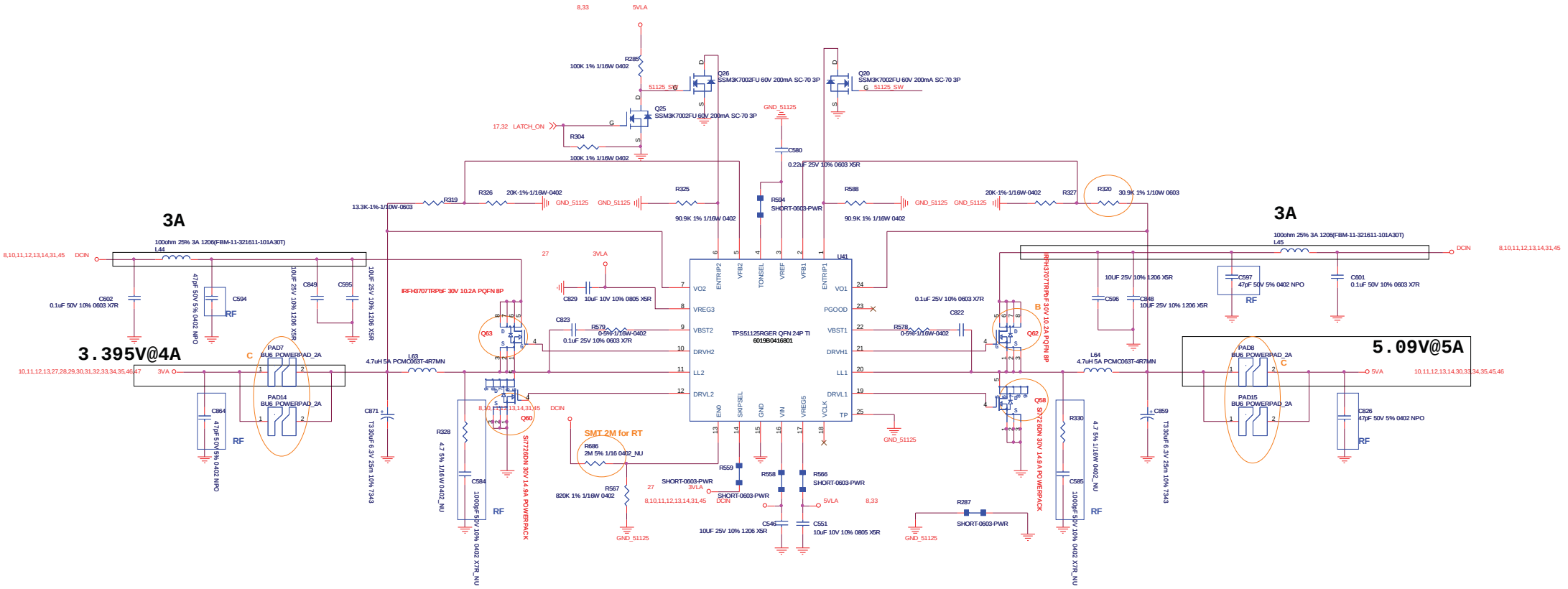
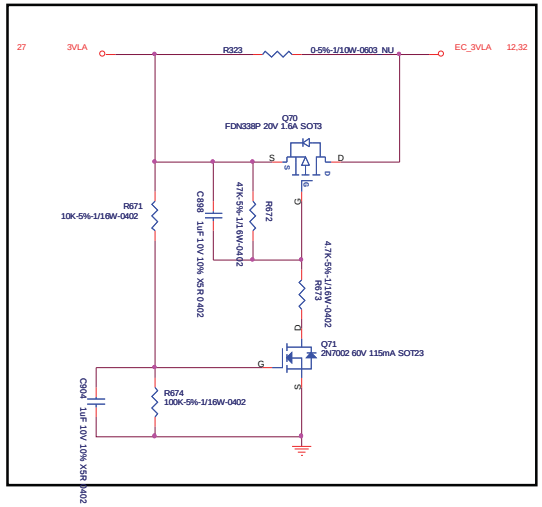
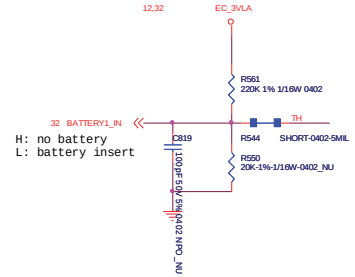


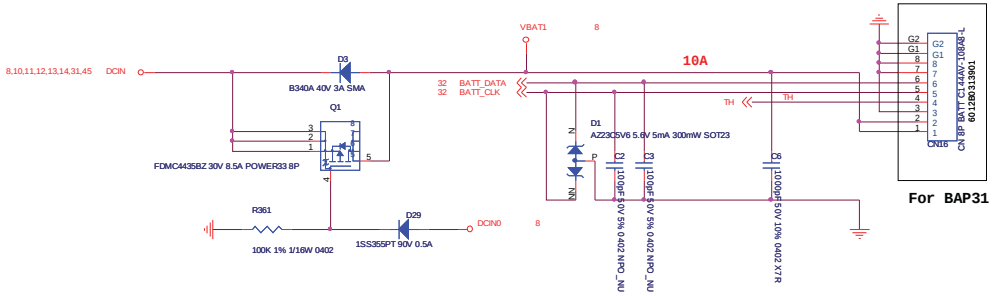



## For Green PC




JM31, SJM31 USE 6012B0311301 H=4.7
BAP31 USE 6012B0313901 H=5.25




| | | | |
|---|---|---|---|
| INVENTEC | | | |
| TITLE: BAP31G SFF | | | |
| 5VLA/5VA/3VLA/3VA | | | |
| SIZE: Custom | CODE: CS | DOC.NUMBER: D-CS-1310A2284501-ALG | REV: A03 |
| CHANGE by: S-H Chung | DATE: Tuesday, May 26, 2009 | SHEET: 9 of 47 | |

2A

1.5V@8A

If voltage divide circuit OK,
U2, C30, R724 can remove
02/17

Intel Item5

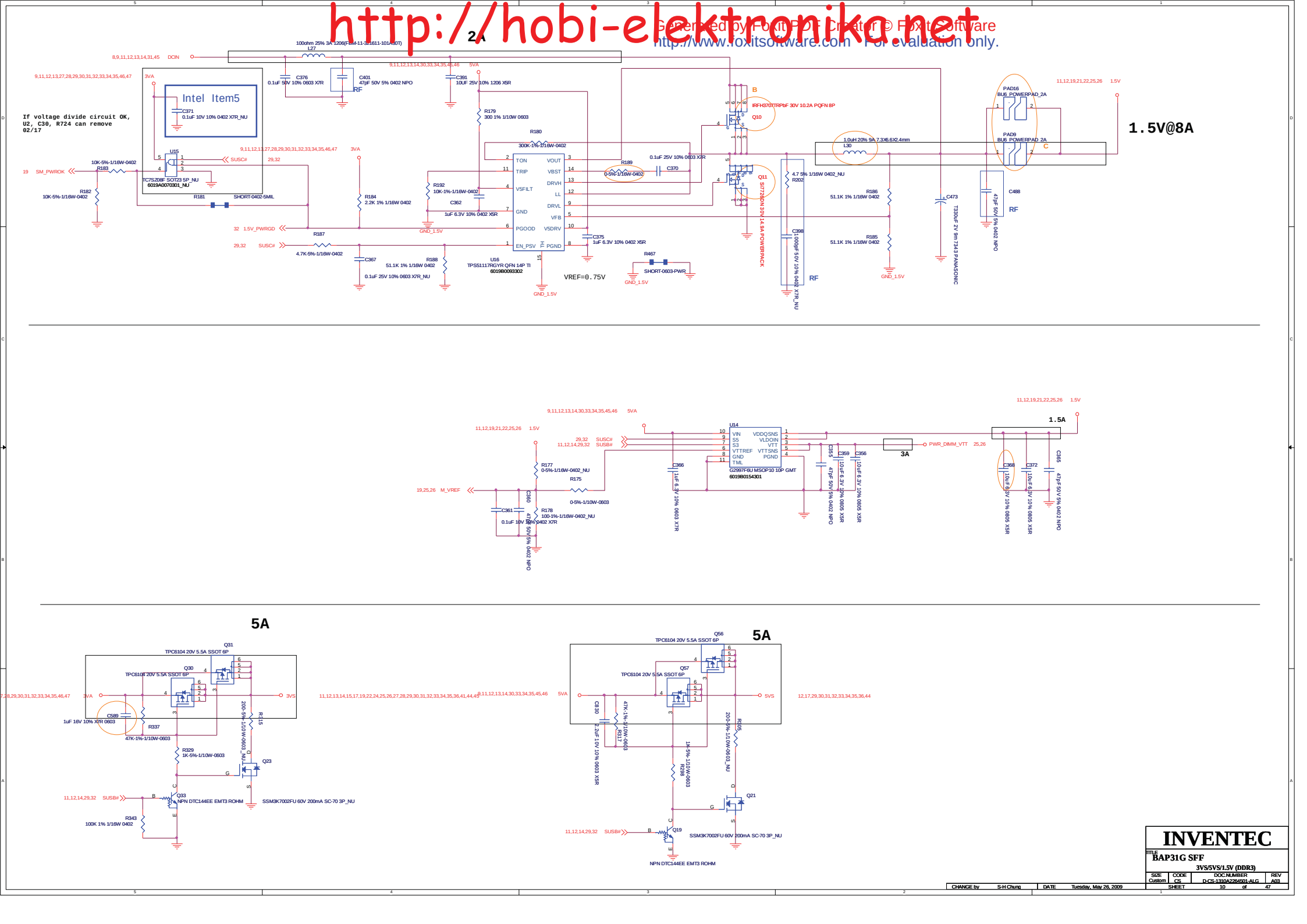
VREF=0.75V

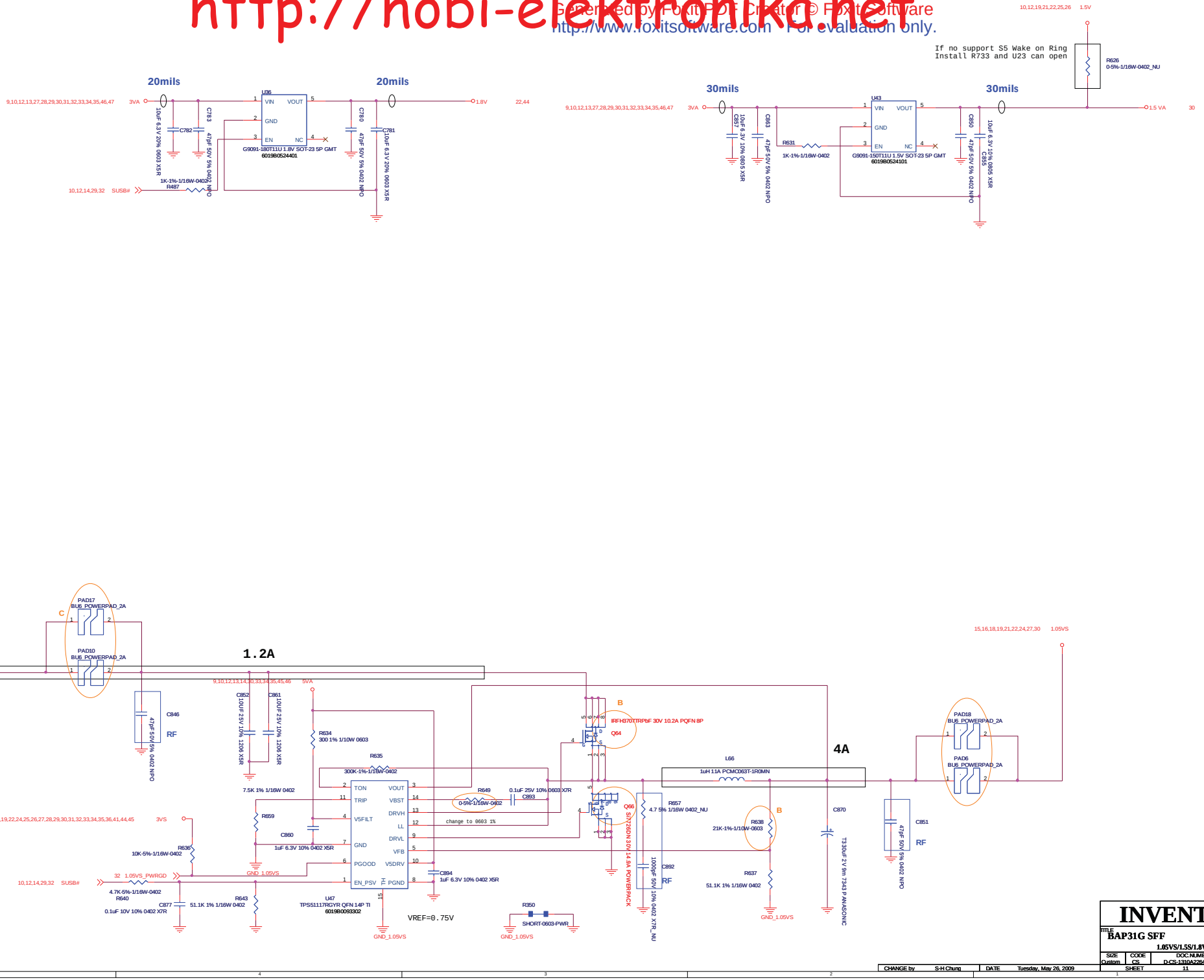
1.5A

3A

5A

5A






| | | | |
|---|---|---|---|
| CHANGE by | S-H Chung | DATE | Tuesday, May 26, 2009 |

**INVENTEC**

TITLE: **BAP31G SFF**

**1.05VS/1.5S/1.8V/1.5VA**

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A284501-ALG | A03 |

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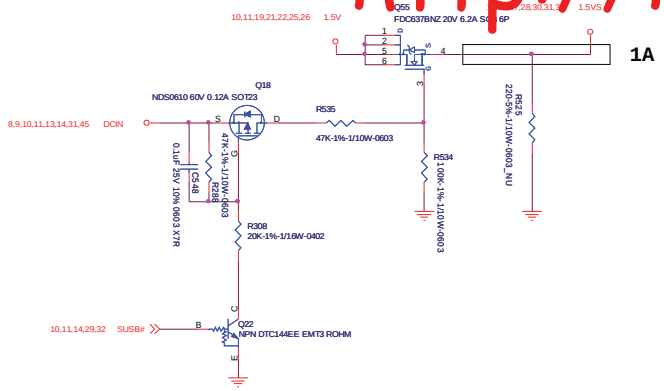
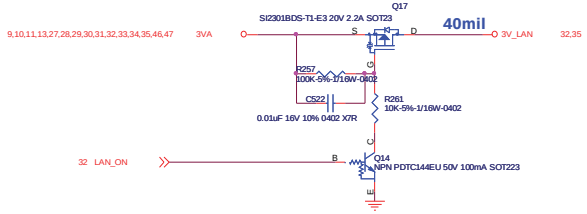
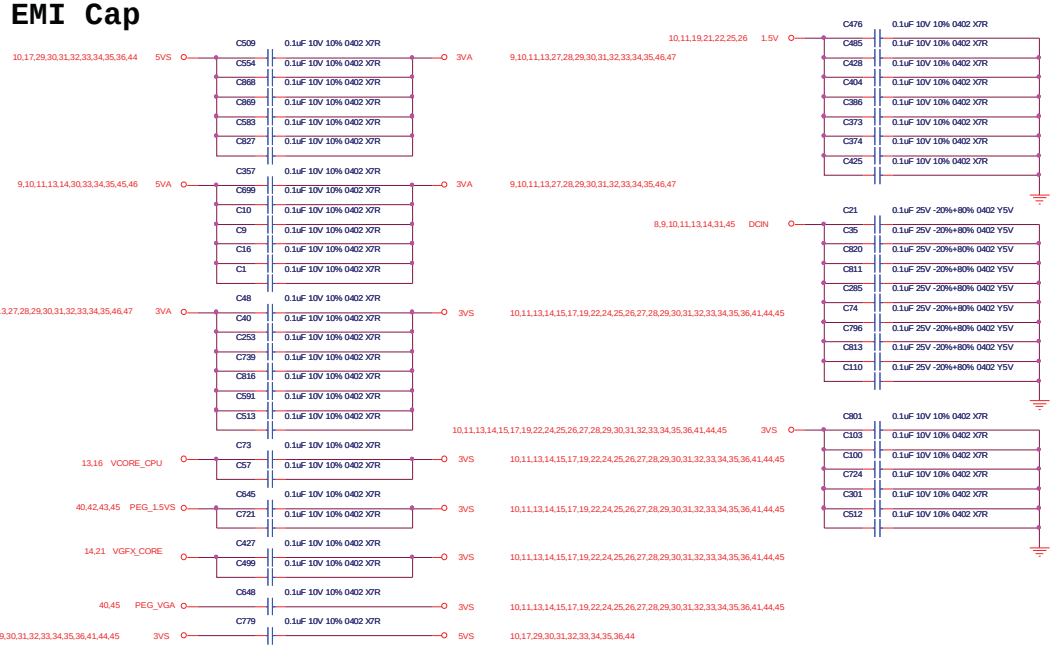
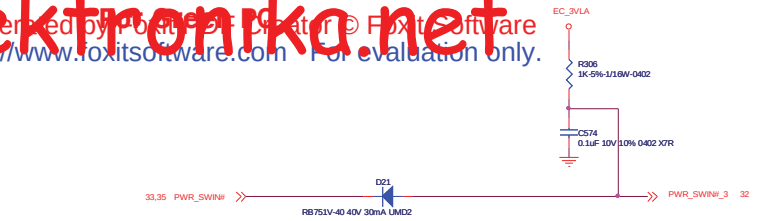
## 1.5VS

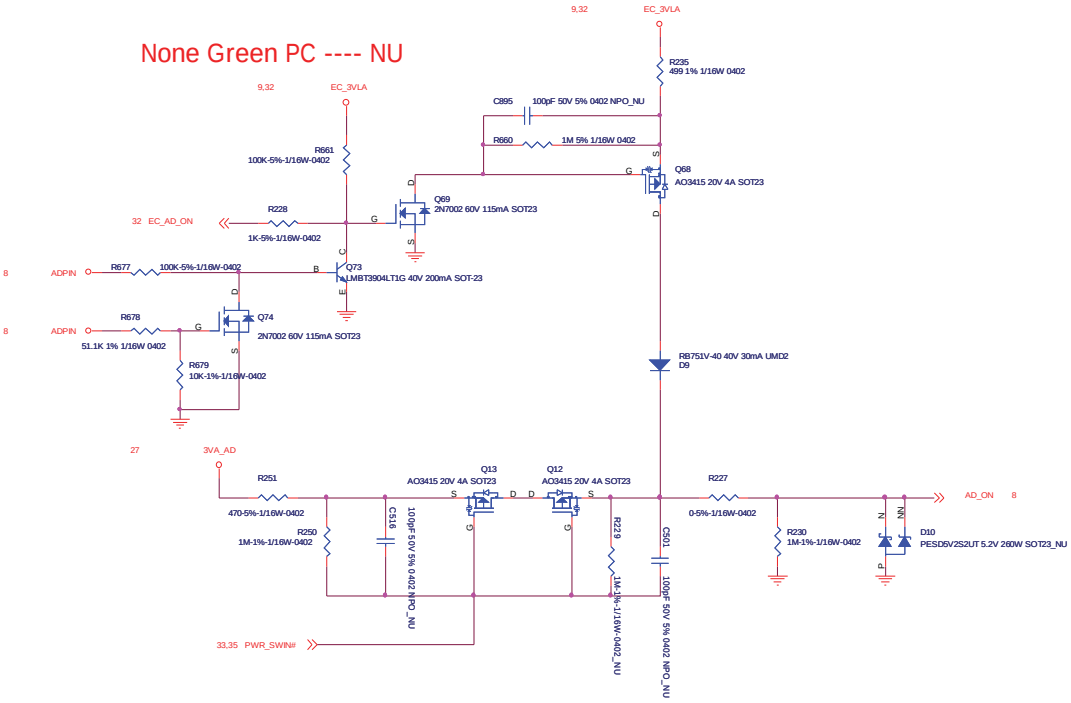


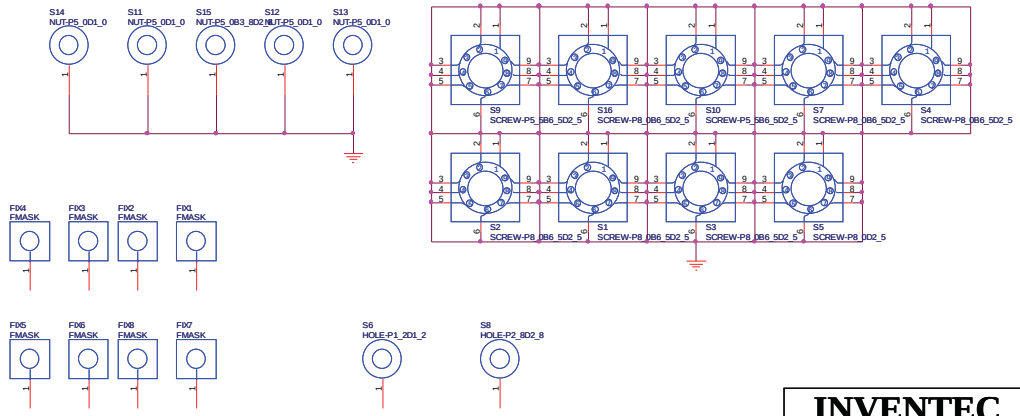




## EMI Cap




**INVENTEC**

TITLE: BAP31G SFF
Power on latch

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A284501-ALG | A03 |

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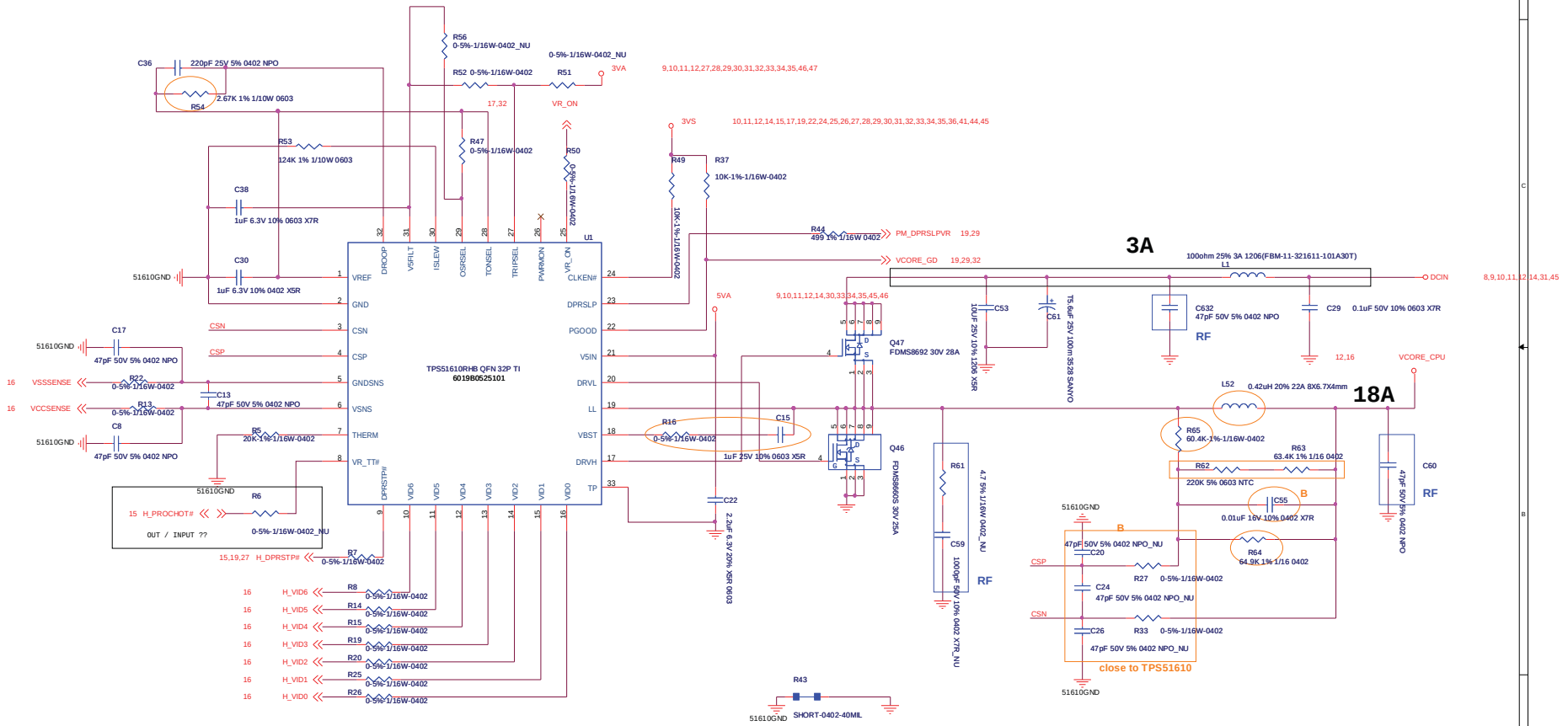
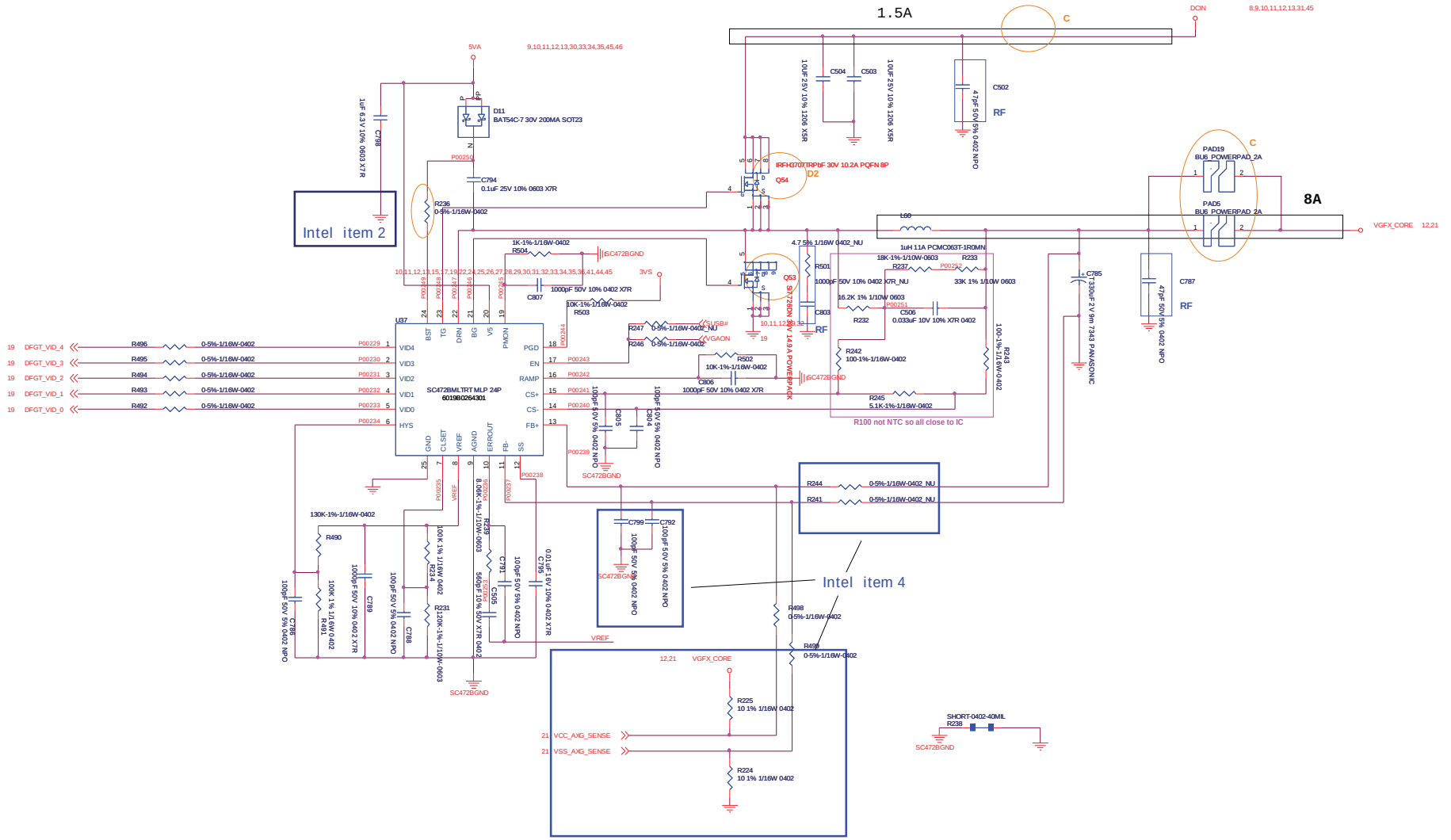
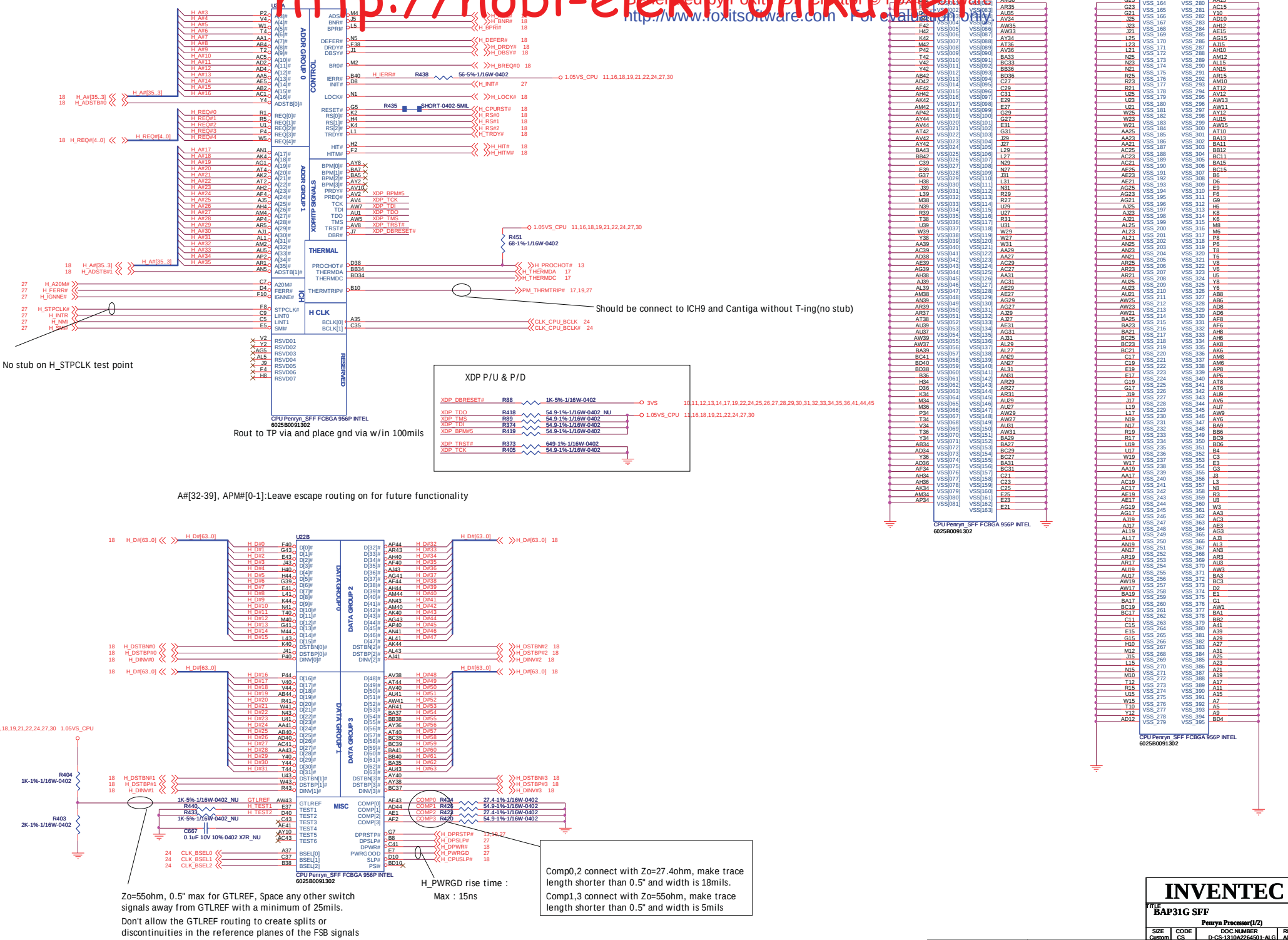



| | | | |
|---|---|---|---|
| INVENTEC | | | |
| TITLE: BAP31G SFF<br>CPU Core Power | | | |
| SIZE: C | CODE: CS | DOC NUMBER: D-CS-1310A2264501-ALG | REV: A03 |
| CHANGE by: S-H Chung | DATE: Tuesday, May 26, 2009 | SHEET: 13 of 47 | |




| | | | |
|---|---|---|---|
| INVENTEC | | | |
| TITLE: BAP31G SFF | | | |
| GPU CORE | | | |
| SIZE: Custom | CODE: CS | DOC NUMBER: D-CS-1310A284501-ALG | REV: A03 |
| CHANGE by: S-H Chung | DATE: Tuesday, May 26, 2009 | SHEET: 14 of 47 | |




| | | | |
|---|---|---|---|
| CHANGE by | S-H Chung | DATE | Tuesday, May 26, 2009 |

**INVENTEC**

TITLE: **BAP31G SFF**

**Penryn Processor(1/2)**

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |

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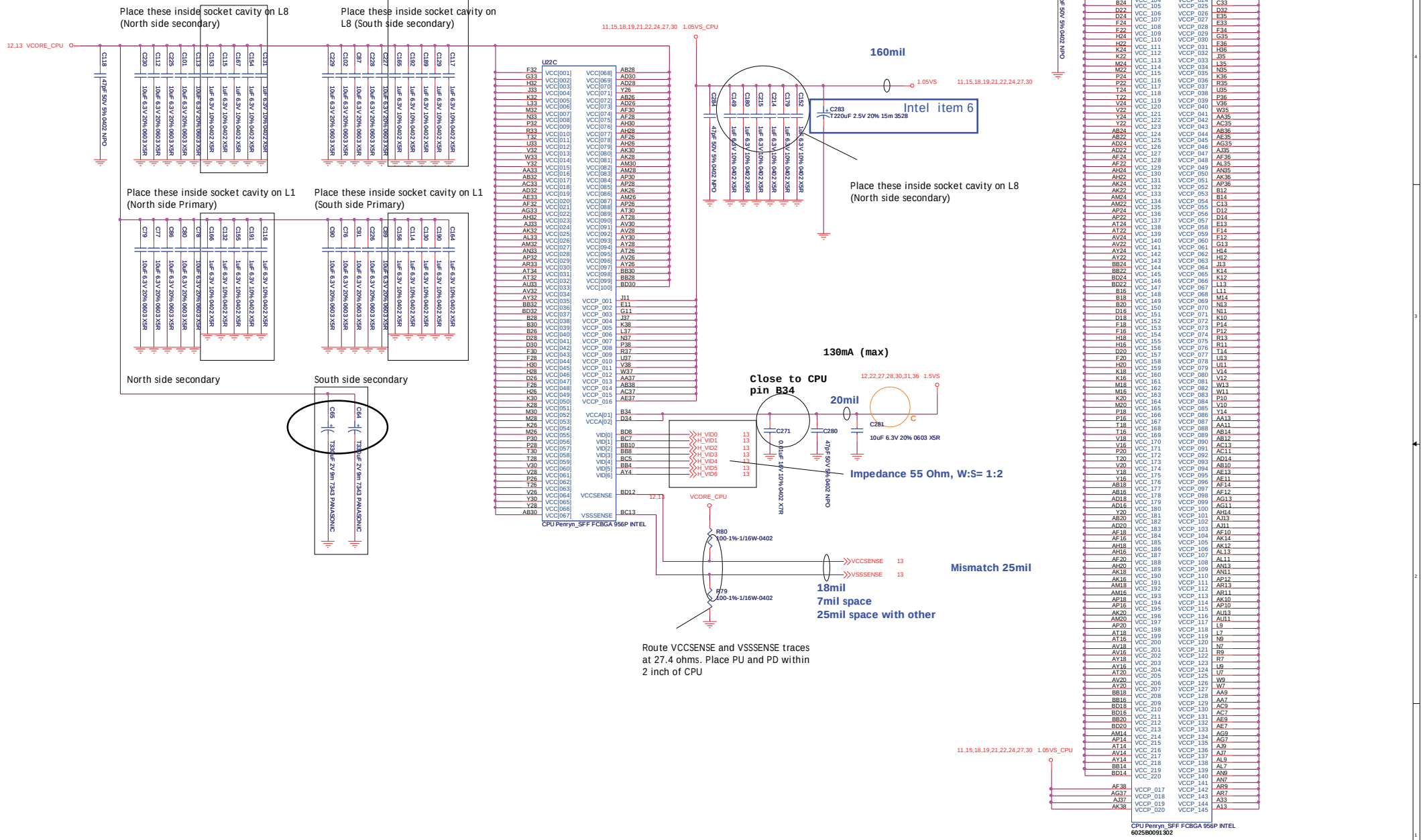
ULV Dual-Core : 18A(max)
ULV Single-Core : 9A(max)

Power-up peak current : 5A (max)
Steady-state current : 2.5A (max)




| | | | |
|---|---|---|---|
| CHANGE by | S-H Chung | DATE | Tuesday, May 26, 2009 |

INVENTEC

TITLE: BAP31G SFF
Penryn Processor(2/2)

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |

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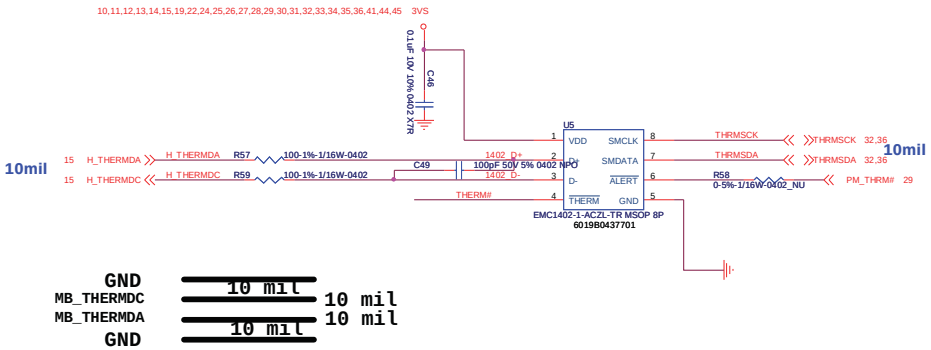
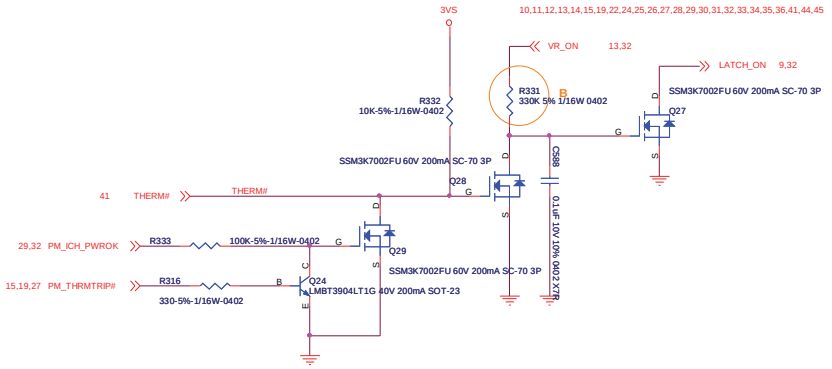
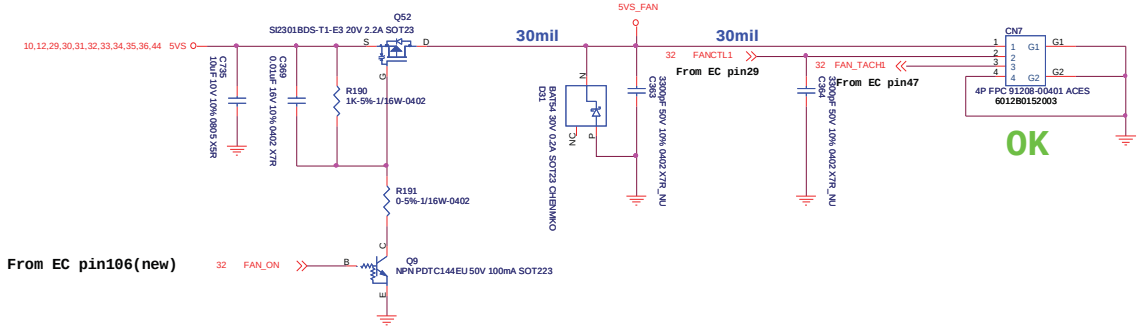
# THERMAL SENSOR




# Fan control




| | | | |
|---|---|---|---|
| CHANGE by | S-H Chung | DATE | Tuesday, May 26, 2009 |

**INVENTEC**

TITLE: BAP31G SFF
CPU Thermal

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |

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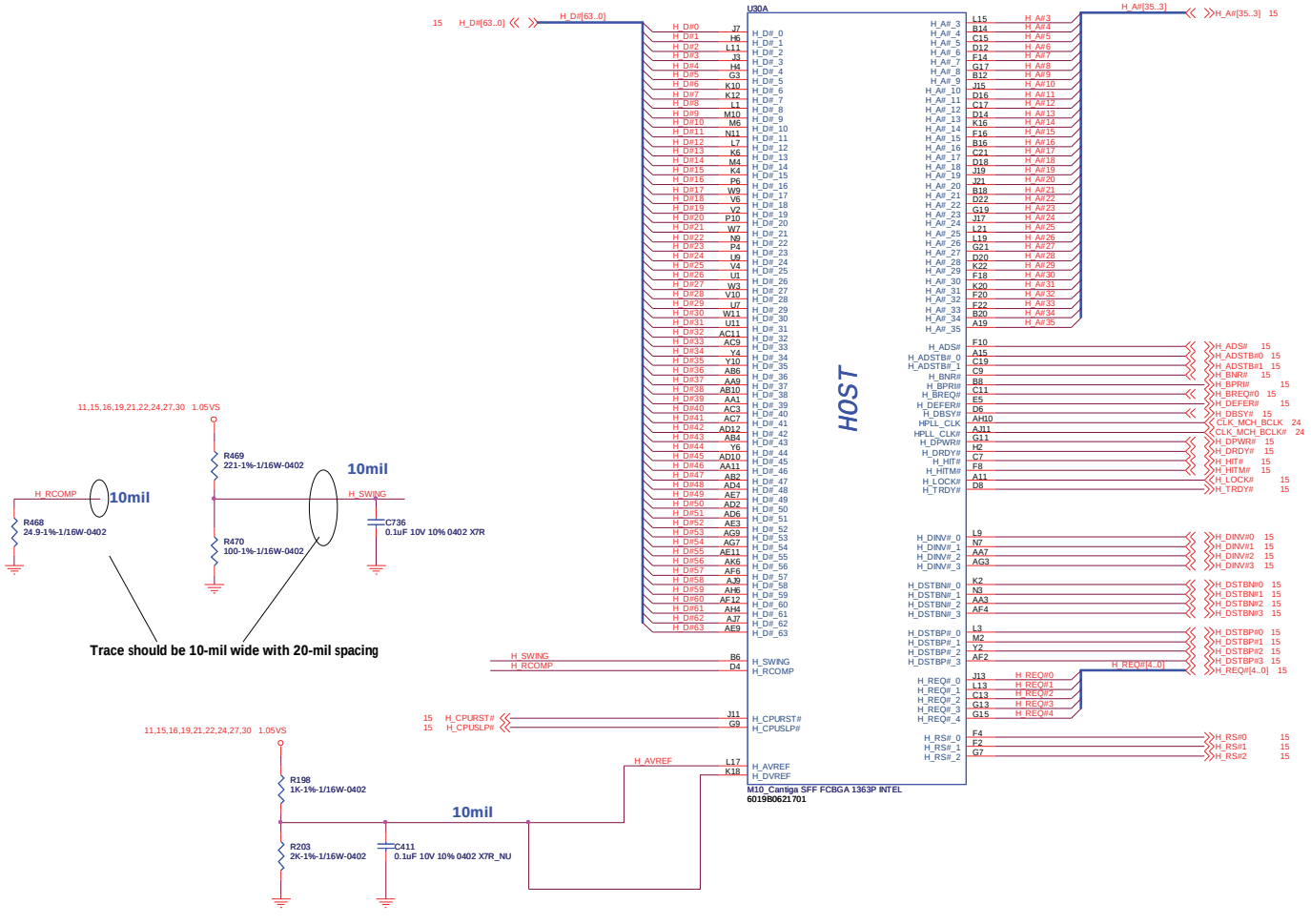
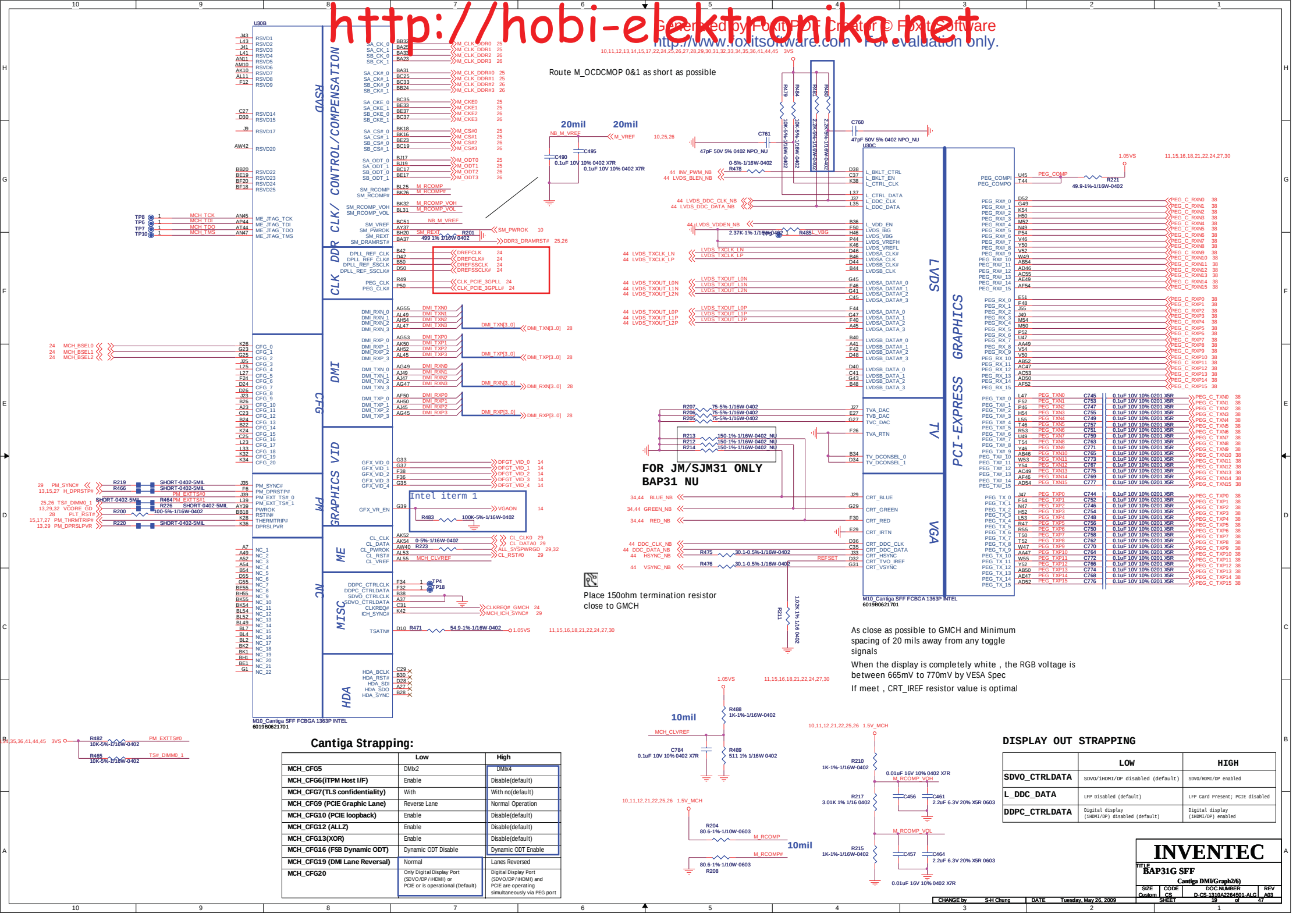



| | | | | | |
|---|---|---|---|---|---|
| CHANGE by | S-H Chung | DATE | Tuesday, May 26, 2009 | | |

**INVENTEC**

TITLE: BAP31G SFF
Cantiga Host(1/6)

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |
| SHEET | 18 | of | 47 |




## Cantiga Strapping:

| | Low | High |
|---|---|---|
| **MCH_CFG5** | DMIx2 | DMIx4 |
| **MCH_CFG6(iTPM Host I/F)** | Enable | Disable(default) |
| **MCH_CFG7(TLS confidentiality)** | With | With no(default) |
| **MCH_CFG9 (PCIE Graphic Lane)** | Reverse Lane | Normal Operation |
| **MCH_CFG10 (PCIE loopback)** | Enable | Disable(default) |
| **MCH_CFG12 (ALLZ)** | Enable | Disable(default) |
| **MCH_CFG13(XOR)** | Enable | Disable(default) |
| **MCH_CFG16 (FSB Dynamic ODT)** | Dynamic ODT Disable | Dynamic ODT Enable |
| **MCH_CFG19 (DMI Lane Reversal)** | Normal | Lanes Reversed |
| **MCH_CFG20** | Only Digital Display Port (SDVO/DP /HDMI) or PCIE or is operational (Default) | Digital Display Port (SDVO/DP /HDMI) and PCIE are operating simultaneously via PEG port |

## DISPLAY OUT STRAPPING

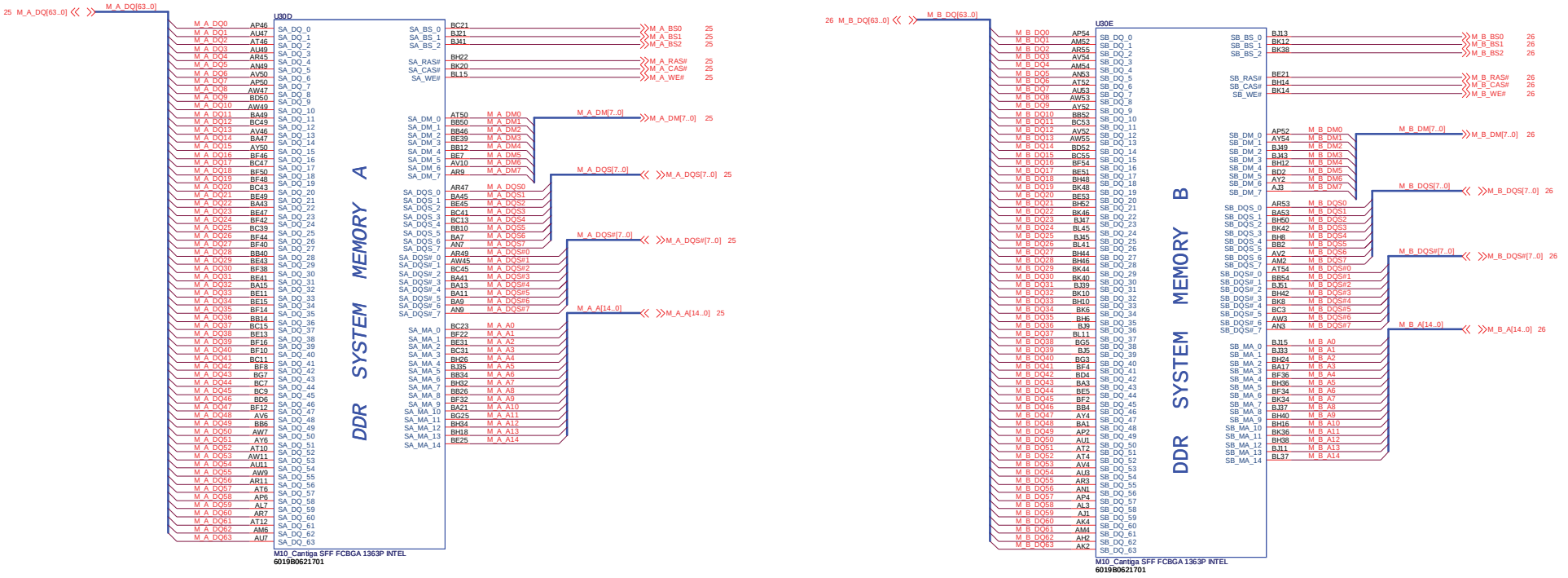
| | LOW | HIGH |
|---|---|---|
| **SDVO_CTRLDATA** | SDVO/iHDMI/DP disabled (default) | SDVO/HDMI/DP enabled |
| **L_DDC_DATA** | LFP Disabled (default) | LFP Card Present; PCIE disabled |
| **DDPC_CTRLDATA** | Digital display (iHDMI/DP) disabled (default) | Digital display (iHDMI/DP) enabled |

INVENTEC

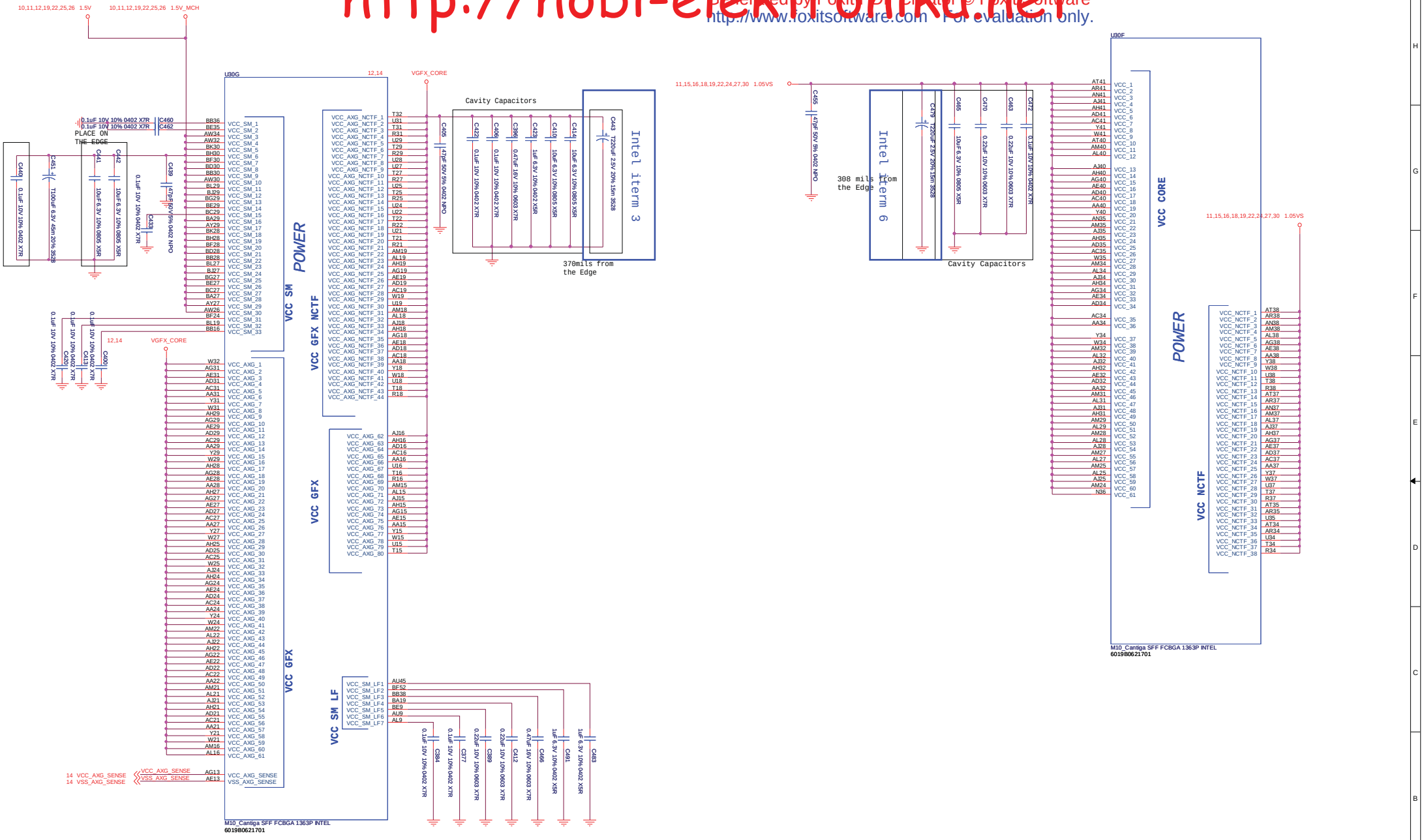
TITLE: BAP31G SFF
Cantiga DMI/Graph2/6)

| SIZE | CODE | DOC NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |

CHANGE by S-H Chung | DATE Tuesday, May 26, 2009 | SHEET 19 of 47




| | | | |
|---|---|---|---|
| INVENTEC | | | |
| TITLE: BAP31G SFF | | | |
| Cantiga DDR3(3/6) | | | |
| SIZE: Custom | CODE: CS | DOC.NUMBER: D-CS-1310A2264501-ALG | REV: A03 |
| CHANGE by: S-H Chung | DATE: Tuesday, May 26, 2009 | SHEET: 20 of 47 | |




| | | | | |
|---|---|---|---|---|
| CHANGE by | S-H Chung | DATE | Tuesday, May 26, 2009 | |

**INVENTEC**

TITLE: **BAP31G SFF**

**Cantiga Power(4/6)**

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |

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0.1uf caps in 1.5VDDM_xPLL need to be located as edge caps within 200mils

11,15,16,18,19,21,24,27,30 1.05VS

30mil

L33 100ohm 25% 2A 0.1ohm 0603 — (64.8mA) 10mil — 1.05VS_DPLLA
C484 10uF 6.3V 10% 0805 X5R; C481 0.1uF 10V 10% 0402 X7R

L35 100ohm 25% 2A 0.1ohm 0603 — (64.8mA) 10mil — 1.05VS_DPLLB
C497 10uF 6.3V 10% 0805 X5R; C494 0.1uF 10V 10% 0402 X7R

L26 100ohm 25% 2A 0.1ohm 0603 — (24mA) 10mil — 1.05VS_HPLL
C383 4.7uF 6.3V 10% 0603 X5R; C385 0.1uF 10V 10% 0402 X7R

L58 100ohm 25% 2A 0.1ohm 0603 — (139.2mA) 10mil — 1.05VS_MPLL
C728 10uF 6.3V 10% 0805 X5R; C732 0.1uF 10V 10% 0402 X7R

L34 100ohm 25% 2A 0.1ohm 0603 — 10mil — 1.05VS_PEGPLL
C489 10uF 6.3V 10% 0805 X5R; C478 0.1uF 10V 10% 0402 X7R

12,16,27,28,30,31,36 1.5VS

0-5%-1/10W-0603 R209 — (35mA) 10mil — 1.5VS_TVDAC
C435 0.1uF 10V 10% 0402 X7R; C444 0.01uF 16V 10% 0402 X7R

L29 180ohm 25% 1.5A 0603(FBM-11-160808-181A15T) — (0.5mA) 10mil — 1.5VS_QDAC
C458 0.1uF 10V 10% 0402 X7R; C448 0.01uF 16V 10% 0402 X7R

Caps used in 1.5VDDM_TVDAC and 1.5VDDM_QTVDAC should be within 250mils of edge

3VS 10,11,12,13,14,15,17,19,24,25,26,27,28,29,30,31,32,33,34,35,36,41,44,45

0-5%-1/10W-0603 R218 — (120mA) 10mil — VCCS_TVDACA
C459 0.1uF 10V 10% 0402 X7R; C454 0.01uF 16V 10% 0402 X7R

3VDDM_TVDAC should be within 250mils of edge

Vout
R1 Vout=Vref(1+R2/R1)+Iadj*R2
R2=R1(Vout/Vref-1)
FB 1117 Vref=1.250V,Iadj=55uA
R2
GND

180ohm 25% 1.5A 0603(FBM-11-160808-181A15T) L31
10,11,12,13,14,15,17,19,24,25,26,27,28,29,30,31,32,33,34,35,36,41,44,45 3VS

(73mA) 20mil — C437 0.01uF 16V 10% 0402 X7R; C453 0.1uF 10V 10% 0402 X7R — J31 VCCA_CRT_DAC
(5mA) 20mil — C452 0.01uF 16V 10% 0402 X7R; C436 0.1uF 10V 10% 0402 X7R — L31 M33 VCCA_DAC_BG VSSA_DAC_BG

CRT

1.05VS_DPLLA J45 VCCA_DPLLA
1.05VS_DPLLB L49 VCCA_DPLLB
1.05VS_HPLL AF10 VCCA_HPLL
1.05VS_MPLL AE1 VCCA_MPLL

PLL

(10mA) — 1.8V_TXLVDS — C468 1000pF 50V 10% 0402 X7R — U43 U41 VCCA_LVDS1 VCCA_LVDS2; V44 VSSA_LVDS

A LVDS

(0.414mA) — 12,16,27,28,30,31,36 1.5VS — C475 0.1uF 10V 10% 0402 X7R — AJ43 VCCA_PEG_BG
(50mA) — 1.05VS_PEGPLL — AG43 VCCA_PEG_PLL

A PEG

(747.5mA) — 11,15,16,18,19,21,24,27,30 1.05VS
C392 10uF 6.3V 10% 0805 X5R; C394 4.7uF 6.3V 10% 0603 X5R; C418 10uF 6.3V 10% 0805 X5R; C401 1uF 6.3V 10% 0402 X5R
AW24 AU24 AW22 AU22 AU21 AW20 AU19 AW18 AU18 AW16 AU16 AT16 AR16 AU15 AT15 AR15 AW14 — VCCA_SM_1 … VCCA_SM_17

POWER

A SM

AT24 AR24 AT22 AR22 AT21 AR21 AT19 AR19 AT18 AR18 — VCCA_SM_NCTF_1 … VCCA_SM_NCTF_10

(37.95mA) — 11,15,16,18,19,21,24,27,30 1.05VS
C447 10uF 6.3V 10% 0805 X5R; C429 4.7uF 6.3V 10% 0603 X5R; C432 0.1uF 10V 10% 0402 X7R
AU27 AU28 AU29 AU31 AT31 AR31 AT29 AR29 AT28 AR28 AT27 AR27 — VCCA_SM_CK_4 … VCCA_SM_CK_NCTF_8

SM CK

(157.2mA) — 11,15,16,18,19,21,24,27,30 1.05VS — C393 0.1uF 10V 10% 0402 X7R — AH12 VCCD_HPLL
(50mA) — 1.05VS_PEGPLL — C474 0.1uF 10V 10% 0402 X7R — AE43 VCCD_PEG_PLL; M46 L45 VCCD_LVDS_1 VCCD_LVDS_2

VCCD

(30mA) — 11,44 1.8V — C480 1uF 6.3V 10% 0402 X5R

M10_Cantiga SFF FCBGA 1363P INTEL
6019B0621701

(852mA) — 11,15,16,18,19,21,24,27,30 1.05VS
C726 4.7uF 6.3V 10% 0603 X5R; C727 4.7uF 6.3V 10% 0603 X5R; C731 2.2uF 6.3V 20% X5R 0603; C733; C730 T100uF 6.3V 45m 20% 3528 -NU
PLACE ON THE EDGE

VTT

R13 T12 R11 T10 R9 T8 R7 T6 R5 T4 R3 T2 R1 — VTT_1 … VTT_13

(79mA) 10mil — K30 VCCA_TV_DAC — VCCS_TVDACA

TV

(50mA) — A31 VCC_HDA

HDA

IF use iHDMI, VCC_HDA need connnect to 1.5VS

N34 VCCD_QDAC — 1.5VS_QDAC
N32 VCCD_TVDAC — 1.5VS_TVDAC

TV/CRT

30mil (440mA) — 1uF 6.3V 10% 0402 X5R — 1.05VS — 11,15,16,18,19,21,24,27,30
C419 C424 10uF 6.3V 10% 0805 X5R_NU

30mil (149.5mA) — 0.1uF 10V 10% 0402 X7R — L28 100ohm 25% 2A 0.1ohm 0603 — 1.5V_MCH — 10,11,12,19,21,25,26
C421 C417 10uF 6.3V 10% 0805 X5R

M25 N24 M23 — VCC_AXF_1 … VCC_AXF_3

AXF

BK24 BL23 BJ23 BK22 — VCC_SM_CK_1 … VCC_SM_CK_4

(80mA) — 1.8V_TXLVDS — 10mil — 1000pF 50V 10% 0402 X7R — L32 — 1.8V — 11,44
C469 C471 120ohm 25% 200mA 0603(BLM11A121S); 22uF 6.3V 20% 0805 X5R_NU

T41 — VCC_TX_LVDS
C33 A33 — VCC_HV_1 VCC_HV_2 — 3VS_HV

HV

(1782mA) — 10uF 6.3V 10% 0805 X5R — 1.05VS — 11,15,16,18,19,21,24,27,30
C482 C492 T100uF 6.3V 45m 20% 3528

AB44 Y44 AC43 AA43 — VCC_PEG_1 … VCC_PEG_4

PEG

(456mA) 20mil — GM OPEN

AM44 AN43 AL43 — VCC_DMI_1 … VCC_DMI_3

DMI

C493 C477 0.1uF 10V 10% 0402 X7R

K14 Y12 P2 — VTTLF1 VTTLF2 VTTLF3 — VTTLF_CAP1 VTTLF_CAP2 VTTLF_CAP3

VTTLF

C734 0.47uF 16V 10% 0603 X7R; C395 0.47uF 16V 10% 0603 X7R; C409 0.47uF 16V 10% 0603 X7R; 10uF 6.3V 10% 0805 X5R

3VS 10,11,12,13,14,15,17,19,24,25,26,27,28,29,30,31,32,33,34,35,36,41,44,45

R216 10-5%-1/10W-0603 — D8 1SS355PT 90V 0.5A — 1.05VS — 11,15,16,18,19,21,24,27,30

20mil (105.3mA) — R477 SHORT-0402-15MIL — 3VS_HV — C742 0.1uF 10V 10% 0402 X7R

INVENTEC

TITLE BAP31G SFF
Cantiga Power(5/6)

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |

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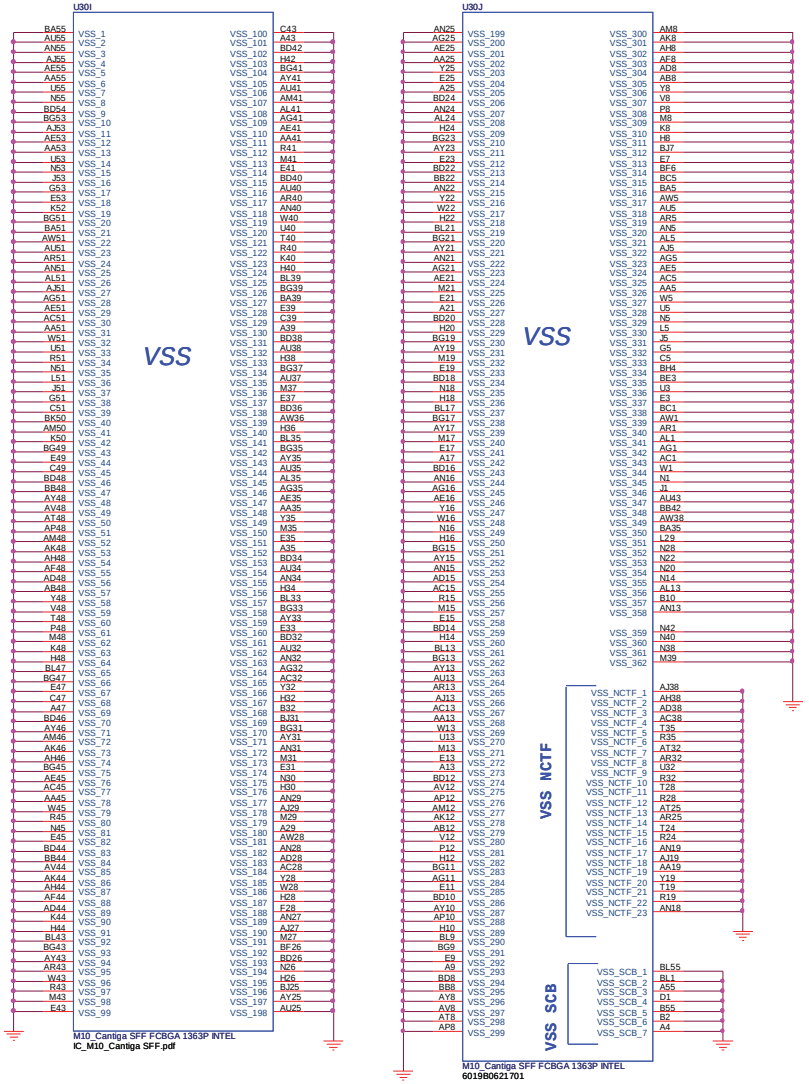
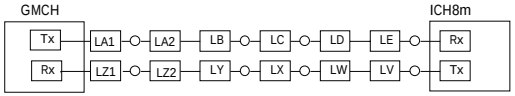
CHANGE by S-H Chung DATE Tuesday, May 26, 2009



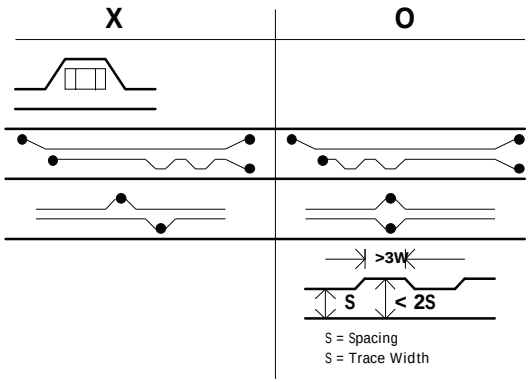

# DMI Routing Guideline



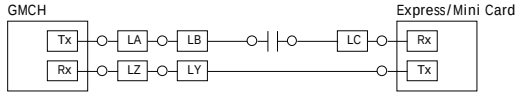

| Breakout/in LA/LZ | Main Route LB/LY | | Breakout/in LE/LV |
|---|---|---|---|
| Microstrip | Same Routing layer as LA/LZ | Same Routing layer as LE/LV | Microstrip |
| Microstrip | Same Routing layer as LA/LZ | Same Routing layer as LE/LV | Stripline |
| Microstrip | Same Routing layer as LA/LZ | Same Routing layer as LE/LV | Microstrip |
| Microstrip | Same Routing layer as LA/LZ | Same Routing layer as LE/LV | Stripline |
| Stripline | Same Routing layer as LA/LZ | Same Routing layer as LE/LV | Stripline |
| Stripline | Same Routing layer as LA/LZ | Same Routing layer as LE/LV | Microstrip |
| Stripline | Same Routing layer as LA/LZ | Same Routing layer as LE/LV | Stripline |
| Stripline | Same Routing layer as LA/LZ | Same Routing layer as LE/LV | Microstrip |

| Parameter | Main Route Guideline | Breakout Guideline |
|---|---|---|
| Uncoupled Single End Impedance | 55 +/- 15% | 55 +/- 15% |
| Nominal Trace Width | Inner Layer : 4 mils<br>Outer Layer : 5 mils | |
| Nominal Didderential Pair-Pitch | Inner Layer : 7 mils<br>Outer Layer : 7 mils | Inner Layer : 4 mils<br>Outer Layer : 5 mils |
| Pair-to-Pair Pitch | Inner Layer : 37 mils<br>Outer Layer : 37 mils | Inner Layer : 27 mils<br>Outer Layer : 27 mils |
| Bus-to-Bus Pitch | Inner Layer : 22 mils<br>Outer Layer : 20 mils | Inner Layer : 15 mils<br>Outer Layer : 12 mils |
| Reference Plane | Ground | Ground |
| Splits/Voids | No routing over plane splits<br>No routing over voids | |
| Trace Length-LA (GMCH Breakout) | Max = 250 mils | |
| Trace Length-LB (GMCH Breakout to Via2) | Max = 3600 mils | |
| Trace Length-LC (Via2 to Via3) | Max = 5900 mils | |
| Trace Length-LD (Via3 to ICH7m Breakout) | Max = 3600 mils | |
| Trace Length-LE (ICH7m Breakout) | Max = 400 mils | |
| Trace Length-L1 (LA+LB+LC+LD+LE) | Max = 8000 mils | |
| Trace Length-LV ( ICH7m Breakout) | Max = 400 mils | |
| Trace Length-LW (ICH7m Breakout to Via2) | Max = 3600 mils | |
| Trace Length-LX (Via2 to Via3) | Max = 5900 mils | |
| Trace Length-LY (Via3 to GMCH Breakout) | Max = 3600 mils | |
| Trace Length-LZ (GMCH Breakout) | Max = 400 mils | |
| Trace Length-L2 (LV+LW+LX+LY+LZ) | Max = 8000 mils | |

*** When routing near the edge of their reference plane , trace should maintain at least 40 mils space to the edge of the plane
*** Match the trace lengths of the complementary signals within each differential pair to +/- 5 mils



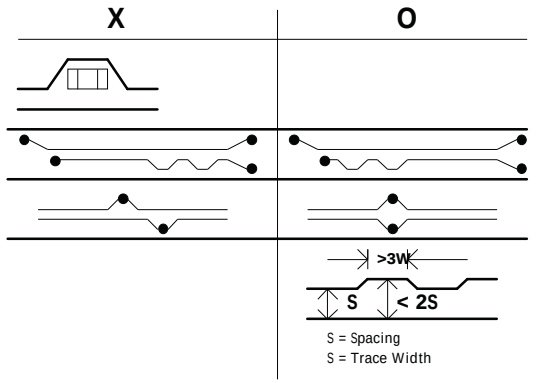

# PCIE Routing Guideline




| Breakout/in LA/LZ | Main Route LB/LC/LY | Main Route LD/LW | Breakout/in LE/LV |
|---|---|---|---|
| Stripline | Microstrip | Same Routing layer as LE/LV | Microstrip |

| Parameter | Main Route Guideline | Breakout Guideline |
|---|---|---|
| Uncoupled Single End Impedance | 55 +/- 15% | 55 +/- 15% |
| Nominal Trace Width | Inner Layer : 4 mils<br>Outer Layer : 5 mils | |
| Nominal Differential Trace Space | Inner Layer : 7 mils<br>Outer Layer : 7 mils | Inner Layer : 4 mils<br>Outer Layer : 5 mils |
| Pair-to-Pair Pitch | Inner Layer : 37 mils<br>Outer Layer : 37 mils | Inner Layer : 27 mils<br>Outer Layer : 27 mils |
| Bus-to-Bus Pitch | Inner Layer : 20 mils<br>Outer Layer : 20 mils | Inner Layer : 15 mils<br>Outer Layer : 12 mils |
| Reference Plane | Ground | Ground |
| Splits/Voids | No routing over plane splits<br>No routing over voids | |
| Trace Length-LA (ICH7m Breakout) | Max = 400 mils | |
| Trace Length-LB (ICH7m Breakout to AC cap) | Max = 10750 mils | |
| Trace Length-LC (AC cap to PCIe CN) | Max = 10750 mils | |
| Trace Length-L1 (LA+LB+LC) | Max = 12000 mils | |
| Trace Length-LY (PCIe CN to ICH7m Breakout) | Max = 11950 mils | |
| Trace Length-LZ (ICH7m Breakout) | Max = 400 mils | |
| Trace Length-L2 (LY+LZ) | Max = 12000 mils | |

*** When routing near the edge of their reference plane , trace should maintain at least 40 mils space to the edge of the plane
*** Match the trace lengths of the complementary signals within each differential pair to +/- 5 mils

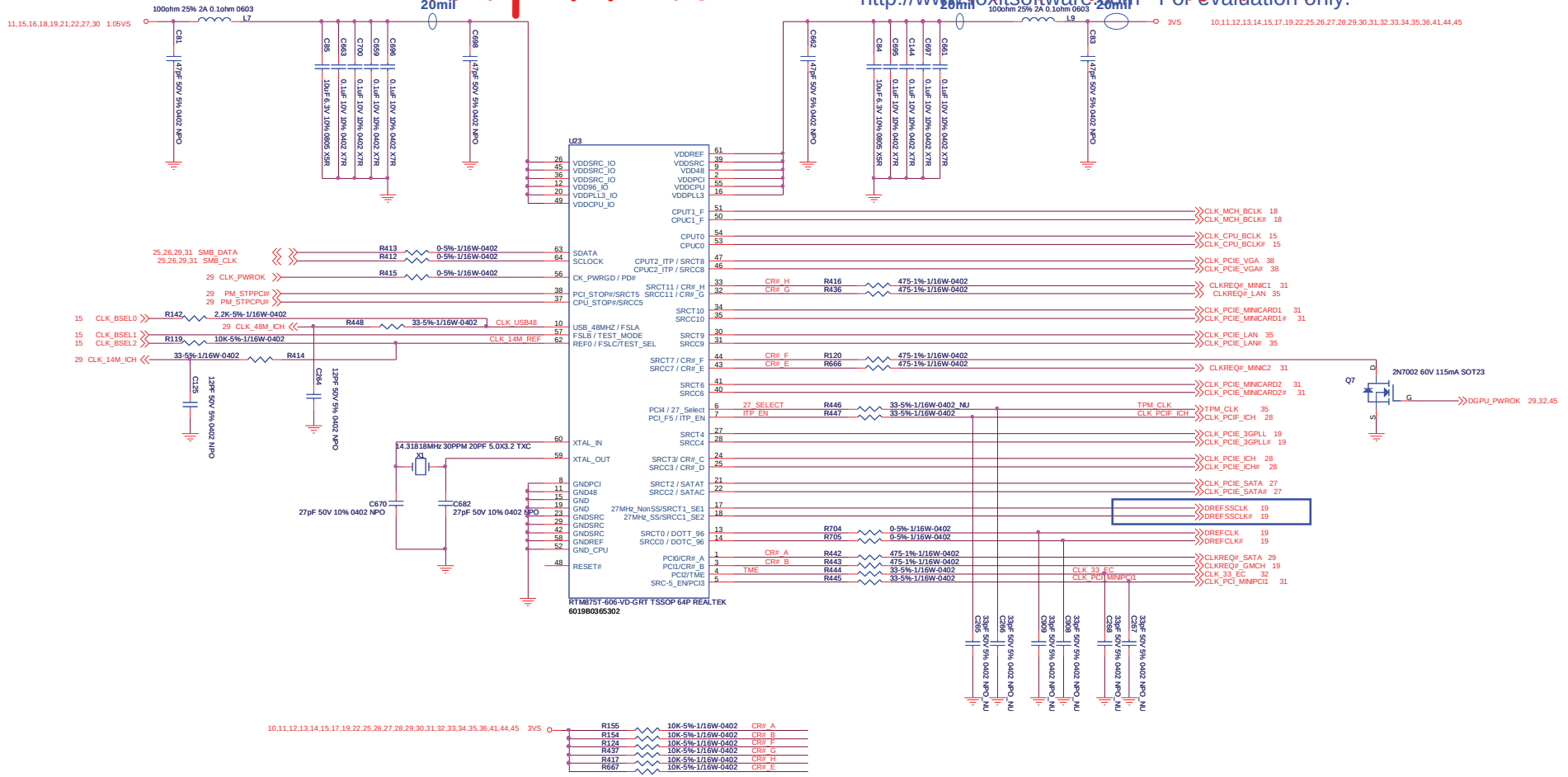



INVENTEC

TITLE: BAP31G SFF
Cantiga Ground(6/6)

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |

CHANGE by S-H Chung | DATE Tuesday, May 26, 2009 | SHEET 23 of 47




| CR#_A: | Byte 5 bit 6=0--->SRC0<br>bit 6=1--->SRC2 | BIT 7=1 (Enable) |
|---|---|---|
| CR#_C: | Byte 5 bit 2=0--->SRC0<br>bit 2=1--->SRC2 | BIT 3=1 (Enable) |
| CR#_B: | Byte 5 bit 4=0--->SRC1<br>bit 4=1--->SRC4 | BIT 5=1 (Enable) |
| CR#_D: | Byte 5 bit 0=0--->SRC1<br>bit 0=1--->SRC4 | BIT 1=1 (Enable) |
| CR#_E: | SRC6 (Byte 6) | BIT 7=1 (Enable) |
| CR#_F: | SRC8 (Byte 6) | BIT 6=1 (Enable) |
| CR#_G: | SRC9 (Byte 6) | BIT 5=1 (Enable) |
| CR#_H: | SRC10 (Byte 6) | BIT 4=1 (Enable) |

| FSA | FSB | FSC | FSB CLOCK FREQUENCY | HOST CLOCK FREQUENCY | |
|---|---|---|---|---|---|
| 1 | 1 | 0 | 667 | 166 | |
| 0 | 1 | 0 | 800 | 200 | |
| 0 | 0 | 0 | 1067 | 266 | * |

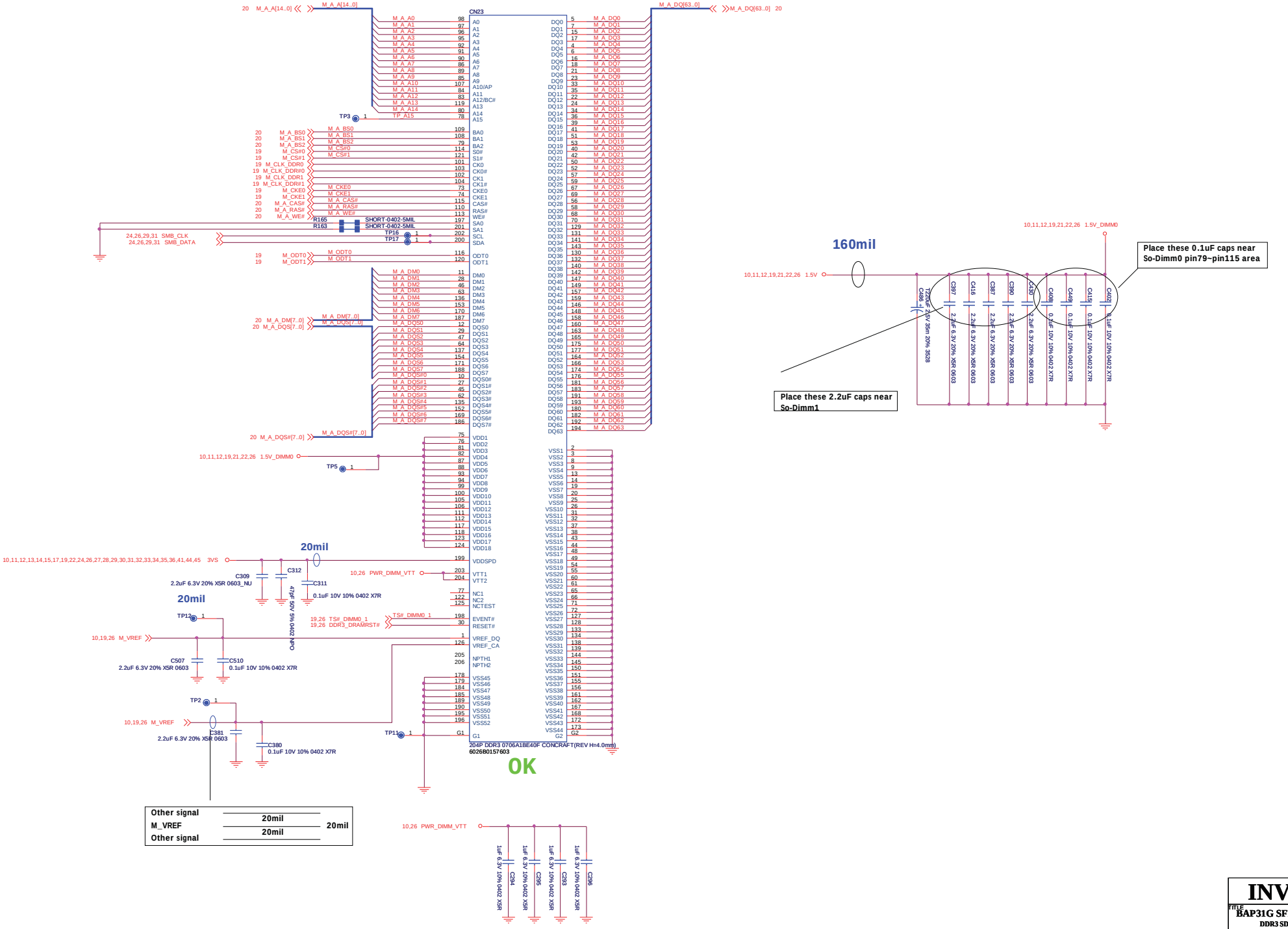
ITP_EN =0
SRC8/SRC8#
ITP_EN =1
ITP/ITP#

27_SELECT =0
Dot96/ LCD_SS /SE
27_SELECT =1
SRC8/ 27MHz

By Tony

| | |
|---|---|
| INVENTEC | |
| TITLE | BAP31G SFF |
| | Clock Generator |
| SIZE: Custom | CODE: CS |
| DOC.NUMBER | D-CS-1310A2264501-ALG |
| REV | A03 |
| CHANGE by | S-H Chung |
| DATE | Tuesday, May 26, 2009 |
| SHEET | 24 of 47 |

# SO-DIMM0




| | | | |
|---|---|---|---|
| CHANGE by | S-H Chung | DATE | Tuesday, May 26, 2009 |

**INVENTEC**

TITLE
**BAP31G SFF**
**DDR3 SDRAM SO-DIMM0**

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |

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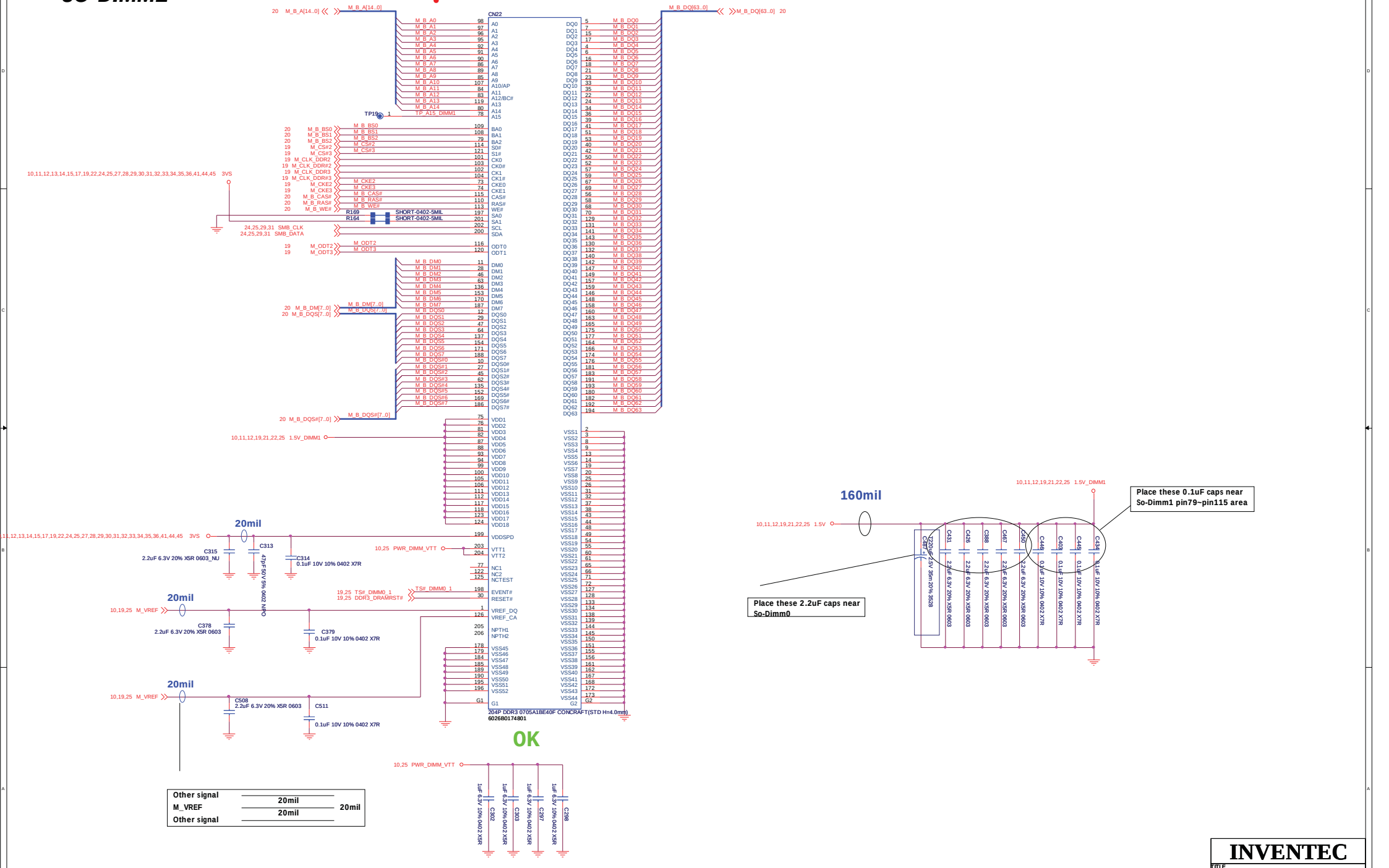
# SO-DIMM1




| | | |
|---|---|---|
| Other signal | 20mil | 20mil |
| M_VREF | 20mil | |
| Other signal | | |

**INVENTEC**

TITLE: BAP31G SFF
DDR3 SDRAM SO-DIMM1

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |

CHANGE by S-H Chung | DATE Tuesday, May 26, 2009 | SHEET 26 of 47

# RTC Circuit

1. RC delay time should be in the range of 18~25ms
2. It is recommended that this larger capacitor and small resistor value in order to reduce the likelihood of glitching of RTCRST#

1. The ICHm requires a length less than 1 inch on each branch ( from crystal's terminal to RTCXn ball)
2. Routing the RTC circuit should be kept simple to simplify the trace length measurement and increase accuracy on calculating trace capacitances
3. On FR-4, a 5-mils trace has approximately 2pF per inch
4. Trace signal coupling must limited as much as possible by avoiding the routing of adjacent PCI signals close to RTCX1 and RTCX2
5. Ground guard plane is highly recommended

For JM31,SJM31 For BAP31

For Green PC

BATT1

123

CABLE,ROUND,3POS,75mm,I,RTC_NU

6027B0066801

**RTC Battery Life :**

220mAh(220000uAh) / 6uA = 4.2 year

Place all series resistors 0.6 to 2.6 inches from the ICH9

Needs to be placed within 2" of ICH9m

Must be placed within 2" of 24.9 ohm w/o stub

Distance between the ICH9-M and cap on the "P" signal should be identical distance between the ICH9-M and cap on the "N" signal for same pair.

Placed within 500mils of ICH9m ball

ICH8m internal VR enable strap

| | Enable | Disable |
|---|---|---|
| INTVRMEN | 1(Default) | 0 |

Internal VRM enabled for VccSus1_05, VccSus1_5, VccCL1_5, VccLAN1_05 and VccCL1_05

Short pins AG1 and AG2 at the package

ACZ_SDATAOUT strap functionality base on RSVD9 strap

XOR chain entrance (RSVD9 pulled low)

PCIE port config bit 1(RSVD9 not pulled low)

Stuff for XOR chain testing

| XOR Chain Entrance Strap - to be updated | | |
|---|---|---|
| ICH_TP3 | HDA_SDOUT | Description |
| 0 | 0 | RSVD |
| 0 | 1 | Enter XOR Chain |
| 1 | 0 | Normal Operation (Default) |
| 1 | 1 | Set PCIE port config bit 1 |

By Tony

INVENTEC

TITLE: BAP31G SFF

ICH9M CPU/IDE/SATA(1/4)

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |

CHANGE by S-H Chung DATE Tuesday, May 26, 2009 SHEET 27 of 47

PCIE AC coupling caps need to be within 250mils of the driver

WLAN
3G
LAN

C518 C519 C896 C897 C515 C514 0.1uF 10V 10% 0402 X7R

PCIE_RXN1 PCIE_RXP1 PCIE_TXN1 PCIE_TXP1
PCIE_RXN2 PCIE_RXP2 PCIE_TXN2 PCIE_TXP2
PCIE_RXN3 PCIE_RXP3 PCIE_TXN3 PCIE_TXP3

U40D

PCI-Express

Direct Media Interface

DMI0RXN DMI0RXP DMI0TXN DMI0TXP
DMI1RXN DMI1RXP DMI1TXN DMI1TXP
DMI2RXN DMI2RXP DMI2TXN DMI2TXP
DMI3RXN DMI3RXP DMI3TXN DMI3TXP
DMI_CLKN DMI_CLKP
DMI_ZCOMP DMI_IRCOMP

DMI_RXN0 DMI_RXP0 DMI_TXN0 DMI_TXP0
DMI_RXN1 DMI_RXP1 DMI_TXN1 DMI_TXP1
DMI_RXN2 DMI_RXP2 DMI_TXN2 DMI_TXP2
DMI_RXN3 DMI_RXP3 DMI_TXN3 DMI_TXP3
CLK_PCIE_ICH# CLK_PCIE_ICH

DMI_IRCOMP_R

12,16,22,27,30,31,36 1.5VS
R263 24.9-1%-1/16W-0402
10mil

Place within 500mils of ICH

PERN1 PERP1 PETN1 PETP1
PERN2 PERP2 PETN2 PETP2
PERN3 PERP3 PETN3 PETP3
PERN4 PERP4 PETN4 PETP4
PERN5 PERP5 PETN5 PETP5
PERN6/GLAN_RXN PERP6/GLAN_RXP PETN6/GLAN_TXN PETP6/GLAN_TXP

SPI_CLK SPI_CS0# SPI_CS1#/GPIO58/CLGPIO6 SPI_MOSI SPI_MISO

SPI

USB

USBP0N USBP0P USBP1N USBP1P USBP2N USBP2P USBP3N USBP3P USBP4N USBP4P USBP5N USBP5P USBP6N USBP6P USBP7N USBP7P USBP8N USBP8P USBP9N USBP9P USBP10N USBP10P USBP11N USBP11P

USB_RBIAS_PN
USBRBIAS USBRBIAS#
R591 22.6-1%-1/16W-0402

9,10,11,12,13,27,29,30,31,32,33,34,35,46,47 3VA
R619 10K-5%-1/16W-0402

OC0#/GPIO59 OC1#/GPIO40 OC2#/GPIO41 OC3#/GPIO42 OC4#/GPIO43 OC5#/GPIO29 OC6#/GPIO30 OC7#/GPIO31 OC8#/GPIO44 OC9#/GPIO45 OC10#/GPIO46 OC11#/GPIO47

USB port
USB port
USB port
EASY PORT
WLAN
Finger printer
Bluetooth
Camera
Card Reader
3G

M10_ICH9M_SFF FCBGA 569P INTEL
6019B0621801

Place within 500mils of ICH
5/5 mils spacing on microstrip

U40B

PCI

AD0 AD1 AD2 AD3 AD4 AD5 AD6 AD7 AD8 AD9 AD10 AD11 AD12 AD13 AD14 AD15 AD16 AD17 AD18 AD19 AD20 AD21 AD22 AD23 AD24 AD25 AD26 AD27 AD28 AD29 AD30 AD31

REQ0# GNT0# REQ1#/GPIO50 GNT1#/GPIO51 REQ2#/GPIO52 GNT2#/GPIO53 REQ3#/GPIO54 GNT3#/GPIO55

C/BE0# C/BE1# C/BE2# C/BE3#

IRDY# PAR PCIRST# DEVSEL# PERR# PLOCK# SERR# STOP# TRDY# FRAME#

PLTRST# PCICLK PME#

PCI_REQ#0 PCI_GNT#0 PCI_REQ#1 DGPU_SELECT# 34,44 PCI_GNT#2 PCI_REQ#3 PCI_GNT#3 PCI_IRDY# PCI_DEVSEL# PCI_PERR# PCI_LOCK# PCI_SERR# PCI_STOP# PCI_TRDY# PCI_FRAME# PLT_RST# CLK_PCIF_ICH

Interrupt I/F

PIRQA# PIRQB# PIRQC# PIRQD#
PIRQE#/GPIO2 PIRQF#/GPIO3 PIRQG#/GPIO4 PIRQH#/GPIO5

PCI_IRQA# PCI_IRQB# PCI_IRQC# PCI_IRQD#
PCI_IRQE# PCI_IRQF# PCI_IRQG# PCI_IRQH#

M10_ICH9M_SFF FCBGA 569P INTEL
6019B0621801

## PCI Pull up

10,11,12,13,14,15,17,19,22,24,25,26,27,29,30,31,32,33,34,35,36,41,44,45 3VS

| | | |
|---|---|---|
| PCI_DEVSEL# | R582 | 8.2K-5%-1/16W-0402 |
| PCI_SERR# | R318 | 8.2K-5%-1/16W-0402 |
| PCI_PERR# | R590 | 8.2K-5%-1/16W-0402 |
| PCI_IRDY# | R599 | 8.2K-5%-1/16W-0402 |
| PCI_LOCK# | R589 | 8.2K-5%-1/16W-0402 |
| PCI_FRAME# | R576 | 8.2K-5%-1/16W-0402 |
| PCI_STOP# | R586 | 8.2K-5%-1/16W-0402 |
| PCI_TRDY# | R598 | 8.2K-5%-1/16W-0402 |
| PCI_REQ#0 | R602 | 8.2K-5%-1/16W-0402 |
| PCI_REQ#1 | R574 | 8.2K-5%-1/16W-0402 |
| DGPU_SELECT# | R569 | 8.2K-5%-1/16W-0402 |
| PCI_REQ#3 | R583 | 8.2K-5%-1/16W-0402 |
| PCI_IRQA# | R609 | 8.2K-5%-1/16W-0402 |
| PCI_IRQB# | R601 | 8.2K-5%-1/16W-0402 |
| PCI_IRQC# | R608 | 8.2K-5%-1/16W-0402 |
| PCI_IRQD# | R577 | 8.2K-5%-1/16W-0402 |
| PCI_IRQE# | R610 | 8.2K-5%-1/16W-0402 |
| PCI_IRQF# | R611 | 8.2K-5%-1/16W-0402 |
| PCI_IRQG# | R603 | 8.2K-5%-1/16W-0402 |
| PCI_IRQH# | R322 | 8.2K-5%-1/16W-0402 |

9,10,11,12,13,27,29,30,31,32,33,34,35,46,47 3VA
C812 0.1uF 10V 10% 0402 X7R
U38
PLT_RST#
TC7SZ08F SOT23 5P
6019A0070301
TP20
BUF_PLT_RST# 29,31,32,35,38
Buffer to reduce loading on PLT_RST#
R518 100K-5%-1/16W-0402
R514 0-5%-1/16W-0402_NU

PCI_GNT#2 R573 1K-5%-1/16W-0402_NU
PCI_GNT#3 R587 1K-5%-1/16W-0402_NU
PCI_GNT#0 R604 1K-5%-1/16W-0402_NU

| PCI_GNT#3 | No stuff : by default<br>Stuff : For A16 swap override |
|---|---|

| PCI_GNT#0 | SPI_CS1# | |
|---|---|---|
| 1 | 1 | LPC |
| 1 | 0 | PCI |
| 0 | 1 | SPI |

## Check BIOS type

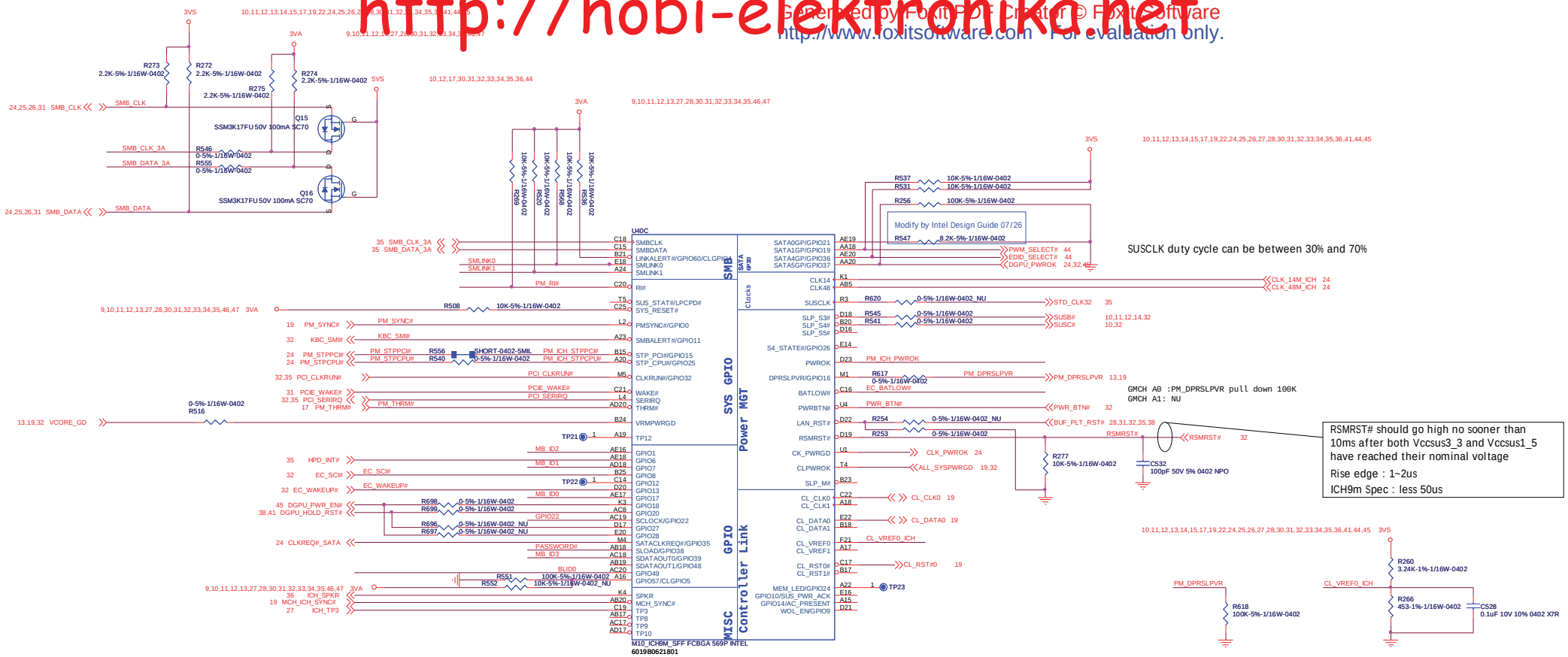
INVENTEC

TITLE: BAP31G SFF
ICH9M PCI/PCIE/DMI/USB(2/4)

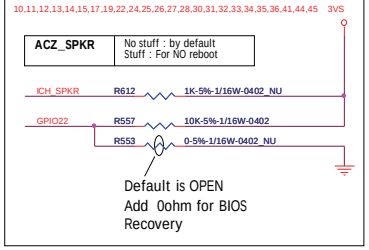
| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |

SHEET 28 of 47

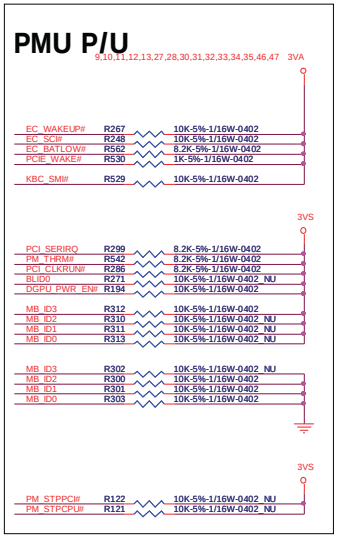
CHANGE by S-H Chung DATE Tuesday, May 26, 2009




## ICH9m strap



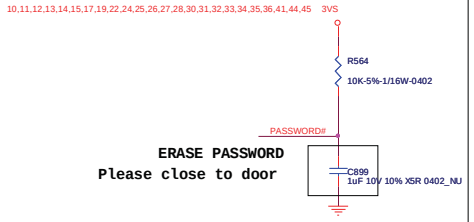

## PMU P/U

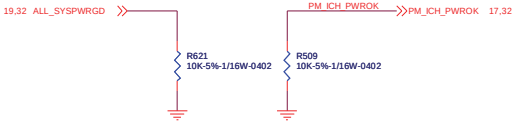



### BIOS ID setting

| Project | MB_ID3 | MB_ID2 | MB_ID1 | MB_ID0 |
|---|---|---|---|---|
| JM31 (UMA) | 1 | 1 | 1 | 1 |
| SJM31 (UMA) | 1 | 1 | 1 | 0 |
| BAP31 (UMA) | 1 | 1 | 0 | 1 |
| BAP41 (UMA) | 1 | 1 | 0 | 0 |
| BAP51 (UMA) | 1 | 0 | 1 | 1 |
| JM31 (dGPU) | 1 | 0 | 1 | 0 |
| SJM31 (dGPU) | 1 | 0 | 0 | 1 |
| BAP31 (dGPU) | 1 | 0 | 0 | 0 |
| BAP41 (dGPU) | 0 | 1 | 1 | 1 |
| BAP51 (dGPU) | 0 | 1 | 1 | 0 |
| | 0 | 1 | 0 | 1 |
| | 0 | 1 | 0 | 0 |
| | 0 | 0 | 1 | 1 |
| | 0 | 0 | 1 | 0 |
| | 0 | 0 | 0 | 1 |
| | 0 | 0 | 0 | 0 |

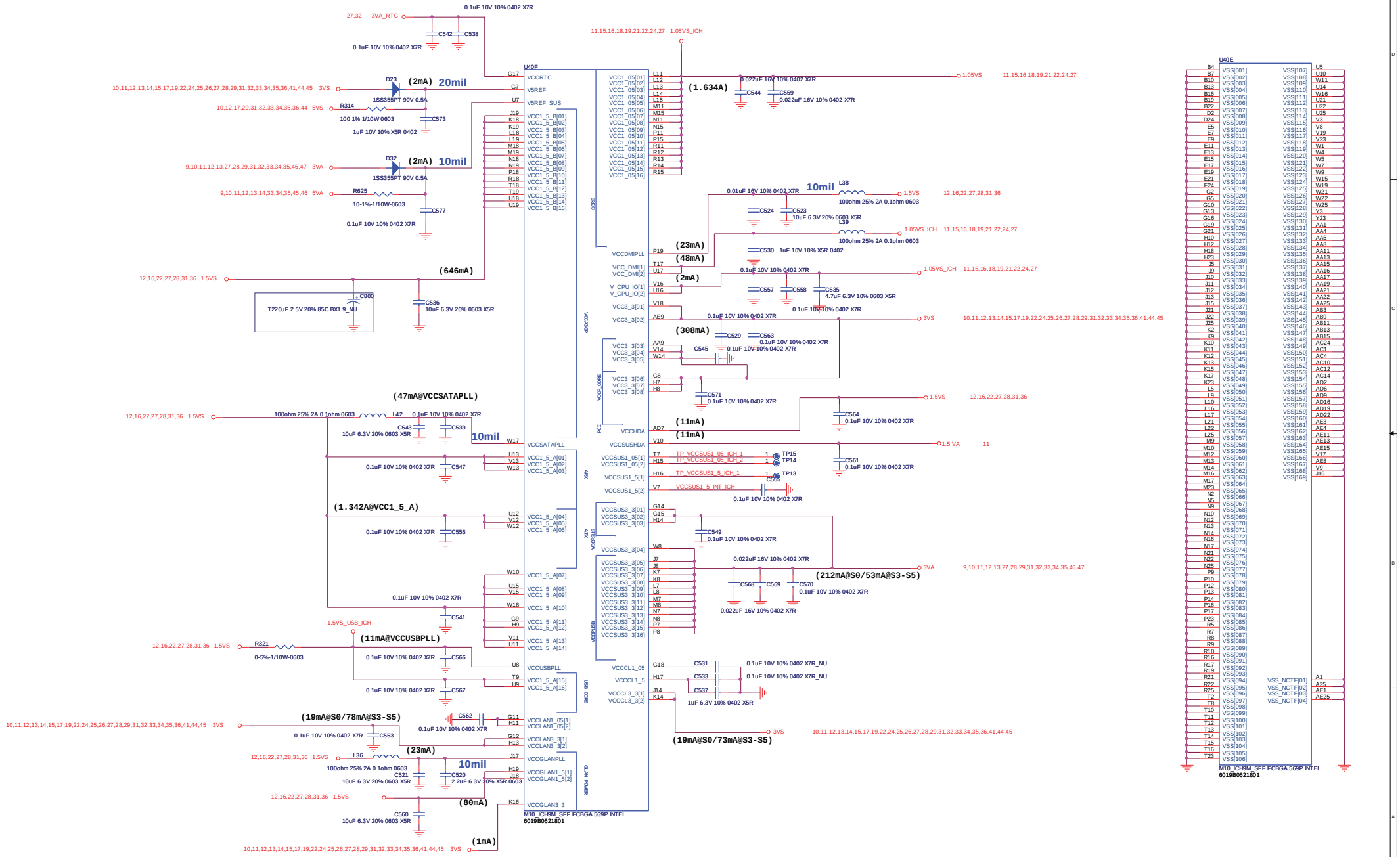
## PASSWORD CLEAR




| | | | | |
|---|---|---|---|---|
| CHANGE by | S-H Chung | DATE | Tuesday, May 26, 2009 | |
| SIZE | CODE | DOC.NUMBER | | REV |
| Custom | CS | D-CS-1310A2264501-ALG | | A03 |
| | | SHEET | 29 of 47 | |

INVENTEC
TITLE
BAP31G SFF
ICH9M GPIO(3/4)



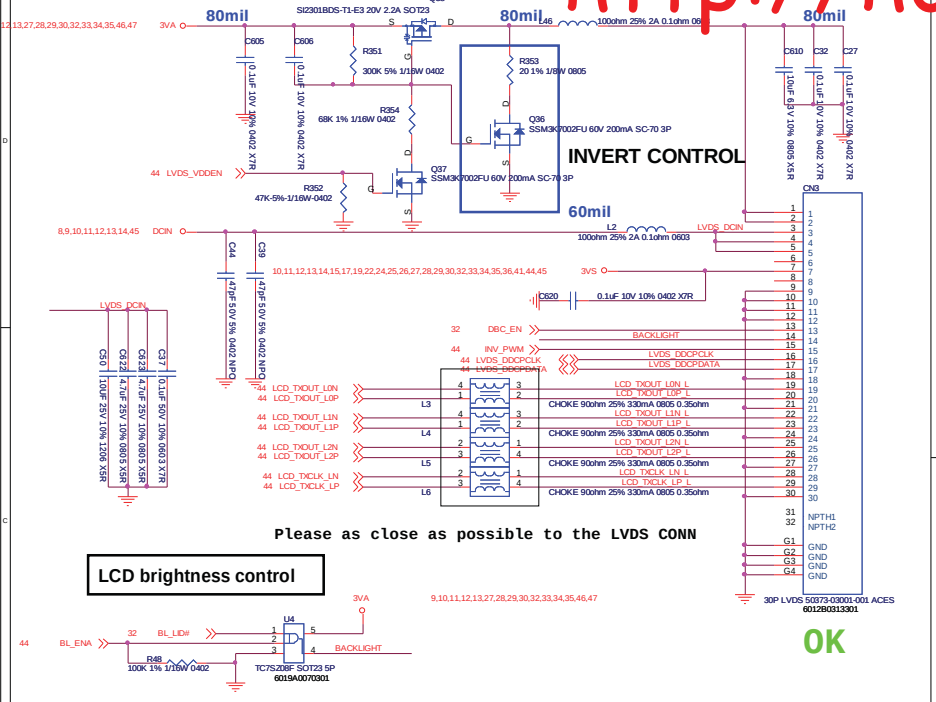

| | | | | |
|---|---|---|---|---|
| CHANGE by | S-H Chung | DATE | Tuesday, May 26, 2009 | |

**INVENTEC**

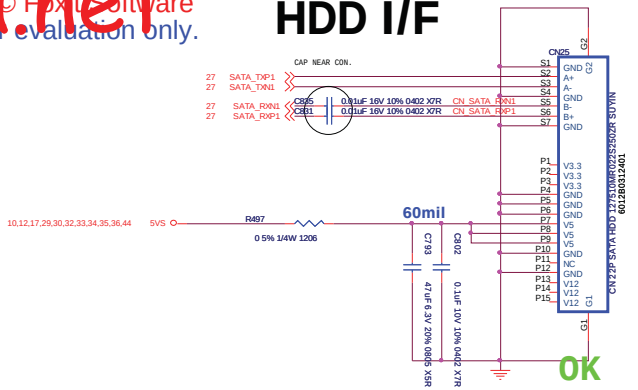
TITLE
**BAP31G SFF**
**ICH9M Power/GND(4/4)**

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |
| | SHEET | 30 of 47 | |

## LVDS Interface

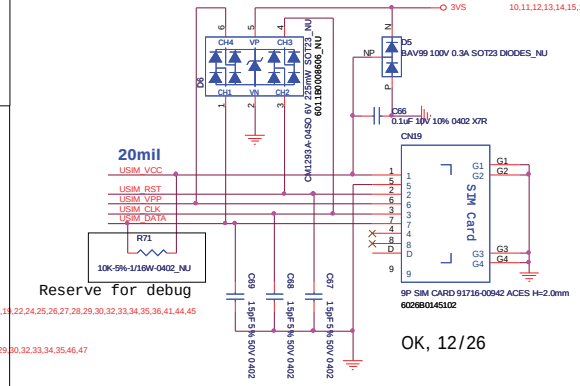



## HDD I/F

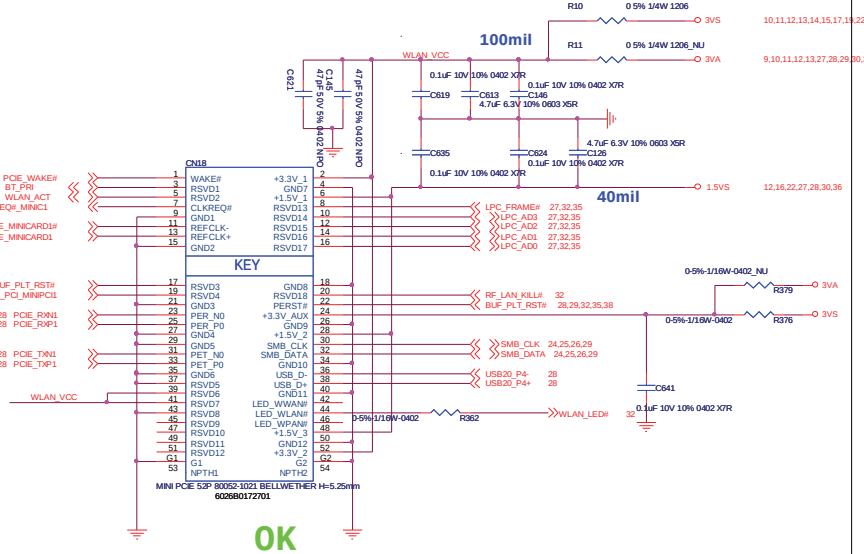



## SIM CARD slot

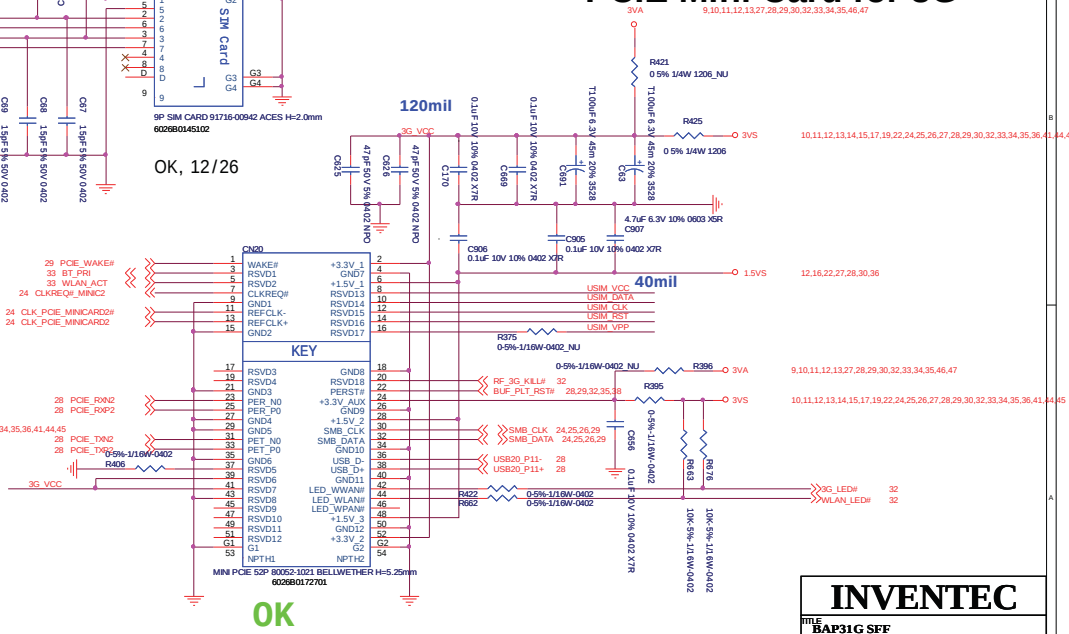
On Chip 5V to 3.3V regulator. No external regulator required
On-Chip power MOSFETs for supplying flash media card power.




## PCIE Mini Card(WLAN)




## PCIE Mini Card for 3G




**INVENTEC**

TITLE: BAP31G SFF
LCD CNN & WLAN & 3G

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A284501-ALG | A03 |

CHANGE by: S-H Chung | DATE: Tuesday, May 26, 2009 | SHEET 31 of 47

# IT8502E-L

IT8502E-L LQFP 128P ITE
6019B0617001

## SPI FLASH

W25X16AVSSIG 1.8M SOIC 8P
6019B0307303

Don't place any pull-up resistor on GPG0 and GPG6

Pull down is for SPI flash

GPIO groud I are only input mode
Group I and J are not 5V tolerant
GPIO groud J are only output mode

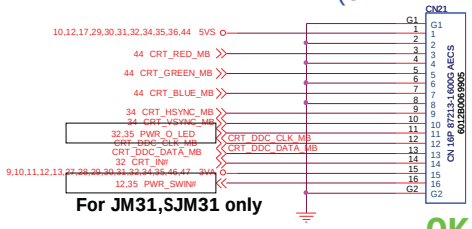
| | R549 | C818 |
|---|---|---|
| For IT8502IX | 0 Ohm | NU |
| For IT8502JX | NU | 0.1uF |

| | |
|---|---|
| TITLE | INVENTEC<br>BAP31G SFF<br>KBC ITE8512F |
| SIZE / CODE / DOC.NUMBER / REV | Custom / CS / D-CS-1310A284501-ALG / A03 |
| CHANGE by | S-H Chung |
| DATE | Tuesday, May 26, 2009 |
| SHEET | 32 of 47 |

For All Model

## VGA Board CN

(CRT+ PWR SW)

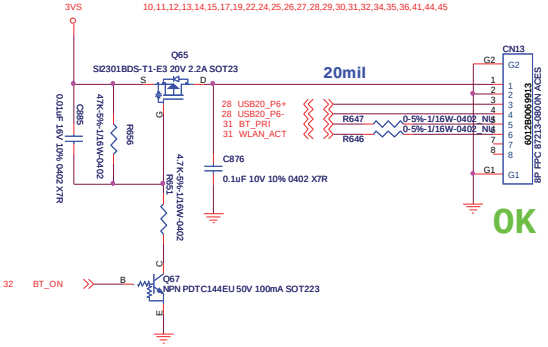



For JM31,SJM31 only

OK

For All Model

## Bluetooth CON.

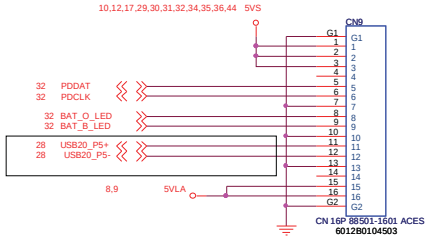



OK

For All Model

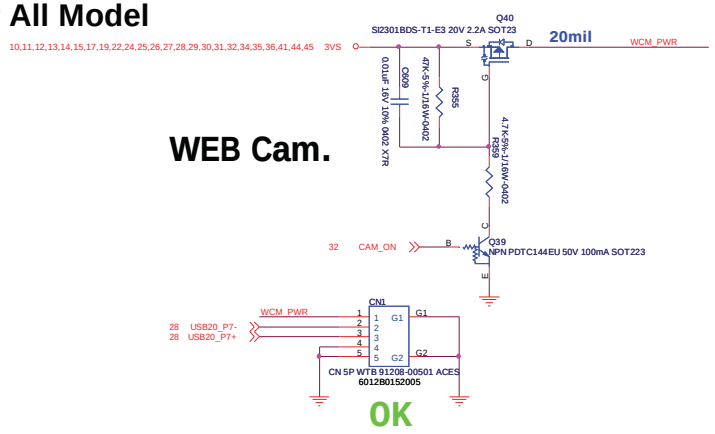
## GLIDE PAD Board

For BAP31 only




For All Model

## WEB Cam.




OK

For All Model

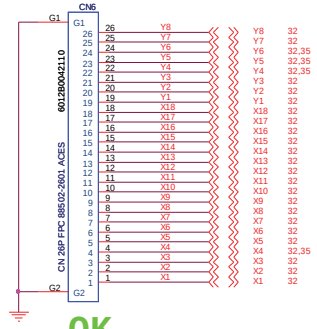
## AUDIO Board CN

(Audio JACK+1USB)


OK

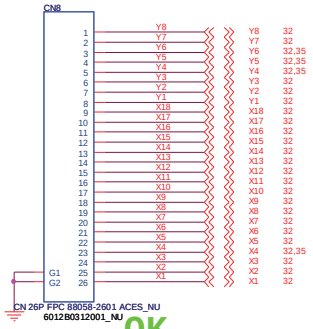
| | | | |
|---|---|---|---|
| INVENTEC | | | |
| TITLE: BAP31G SFF Daughter Connector | | | |
| SIZE: Custom | CODE: CS_E | DOC NUMBER: D-CS-1310A2264501-ALG | REV: A03 |
| CHANGE by: S-H Chung | DATE: Tuesday, May 26, 2009 | SHEET: 33 of 47 | |

## To K/B(For All Model)

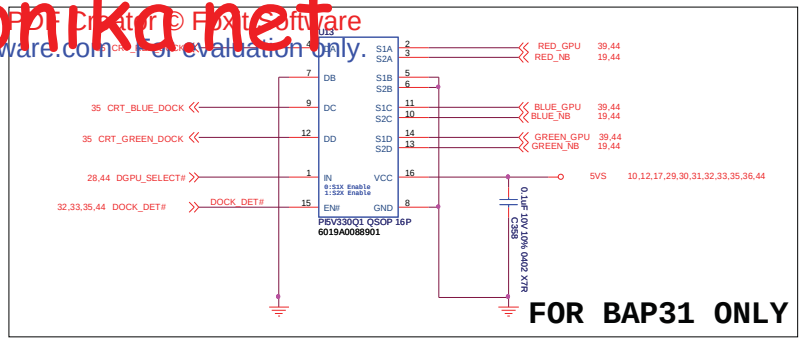


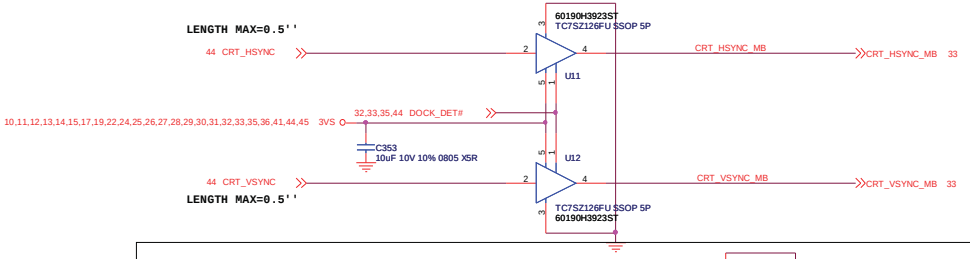

OK

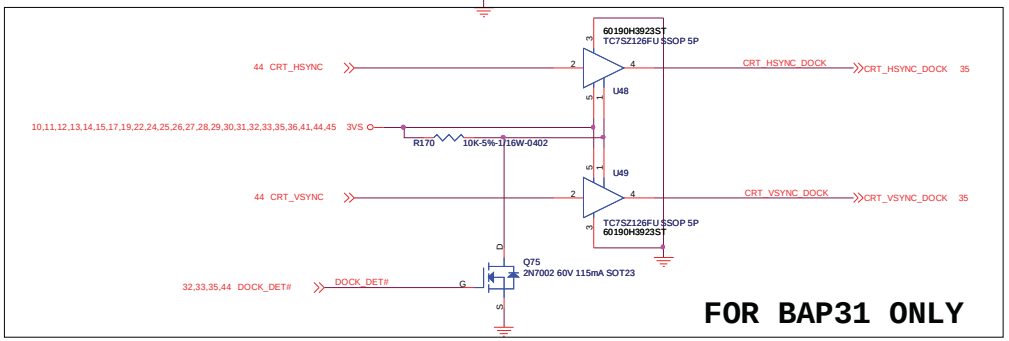
## To K/B(No Use)



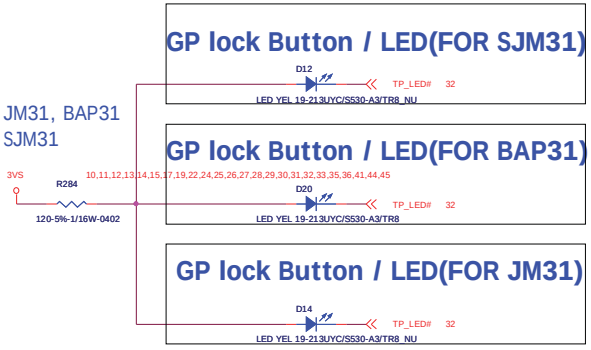

OK



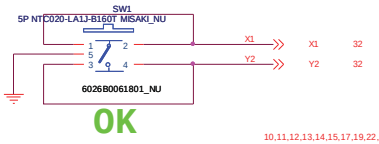




R284
120 ohm for JM31, BAP31
470 ohm for SJM31

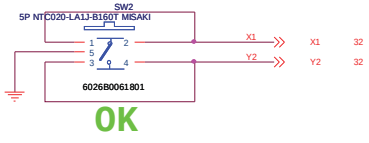



## SW (No Use)



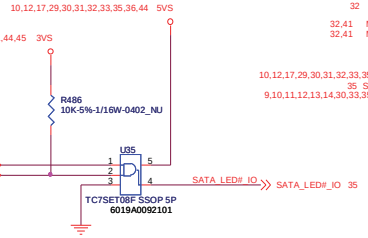

OK

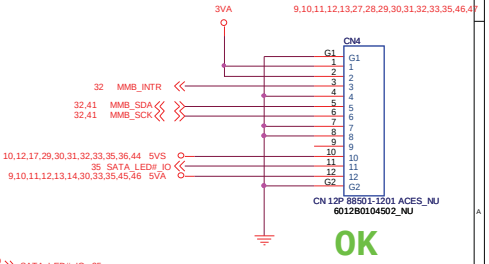
## SW (FOR All Model)




OK

## SW Sensor BOARD(For JM31,SJM31)



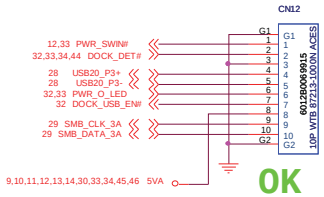




OK

| | | | | | |
|---|---|---|---|---|---|
| CHANGE by | S-H Chung | DATE | Tuesday, May 26, 2009 | | |
| INVENTEC | | | | | |
| TITLE | BAP31G SFF | | | | |
| | BDP | | | | |
| SIZE | CODE | DOC NUMBER | | REV | |
| Custom | CS | D-CS-1310A2264501-ALG | | A03 | |
| | | SHEET | 34 of 47 | | |

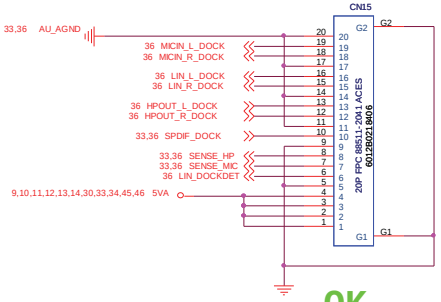
# For BAP31(EASY/B)

## MB(USB) TO EASY/B
For BAP31



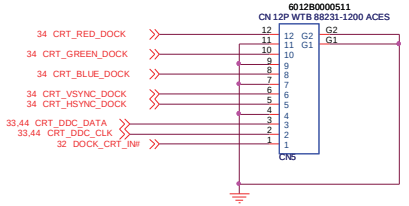

OK

## MB(AUDIO) TO EASY/B
For BAP31

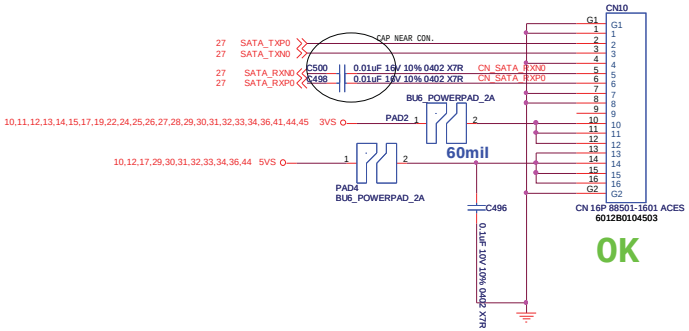



OK

## MB(RGB) TO EASY/B
For BAP31

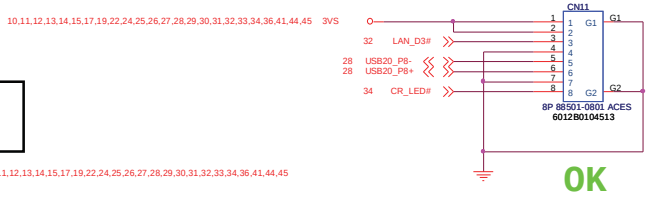



## SSD I/F
For All Model




OK

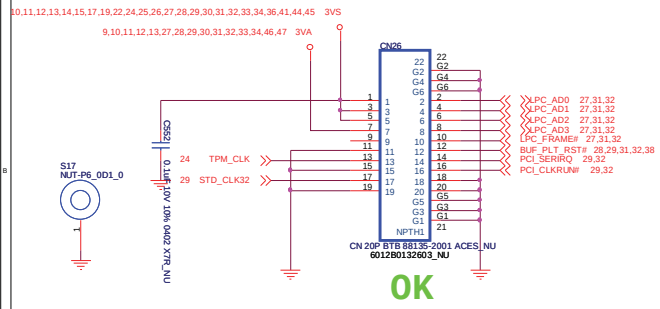
## Card Reader BOARD CN
For All Model




OK

## NO NEED

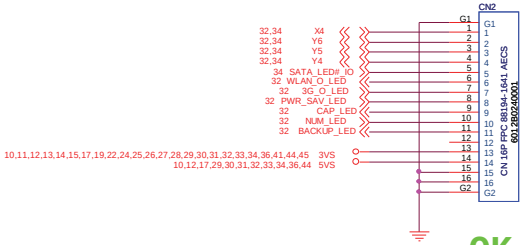
## TPM CN




OK

## For BAP31

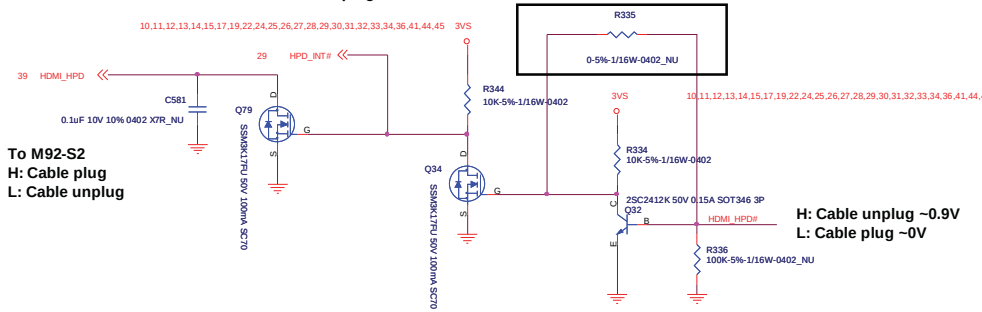
## SW/B CN



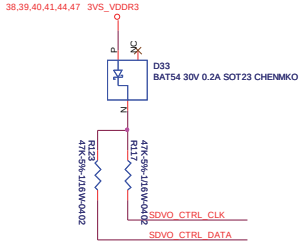

OK

To ICH-9M
H: Cable unplug
L: Cable plug

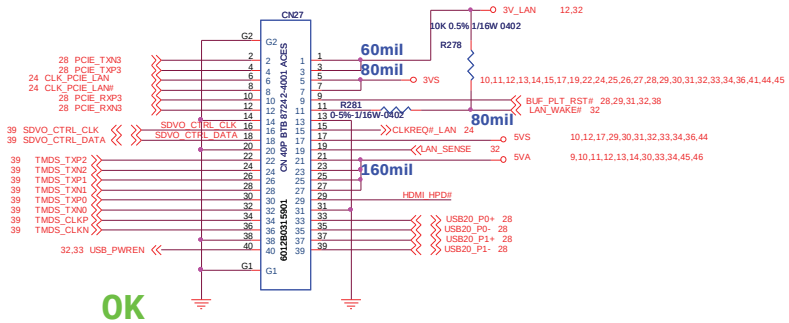
To M92-S2
H: Cable plug
L: Cable unplug




H: Cable unplug ~0.9V
L: Cable plug ~0V




## USB Board CN (LAN+HDMI+2USB)
For All Model



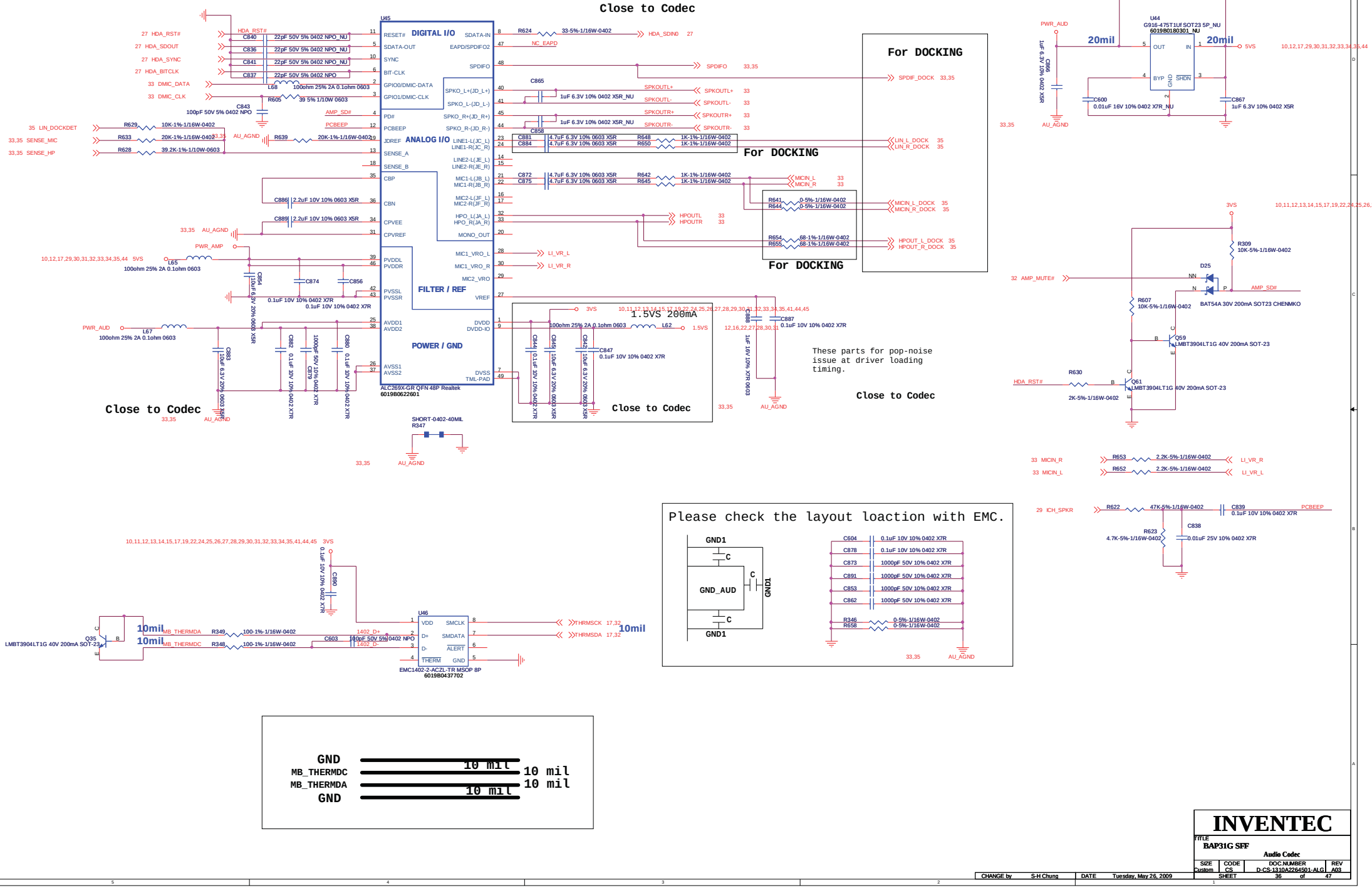

OK

INVENTEC

TITLE: BAP31G SFF
BDP

| SIZE | CODE | DOC NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |

CHANGE by S-H Chung | DATE Tuesday, May 26, 2009 | SHEET 35 of 47



# BLANK

| | | | |
|---|---|---|---|
| CHANGE by | S-H Chung | | |
| DATE | Tuesday, May 26, 2009 | | |

INVENTEC

TITLE
BAP31G SFF
BLANK

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A284501-ALG | A03 |

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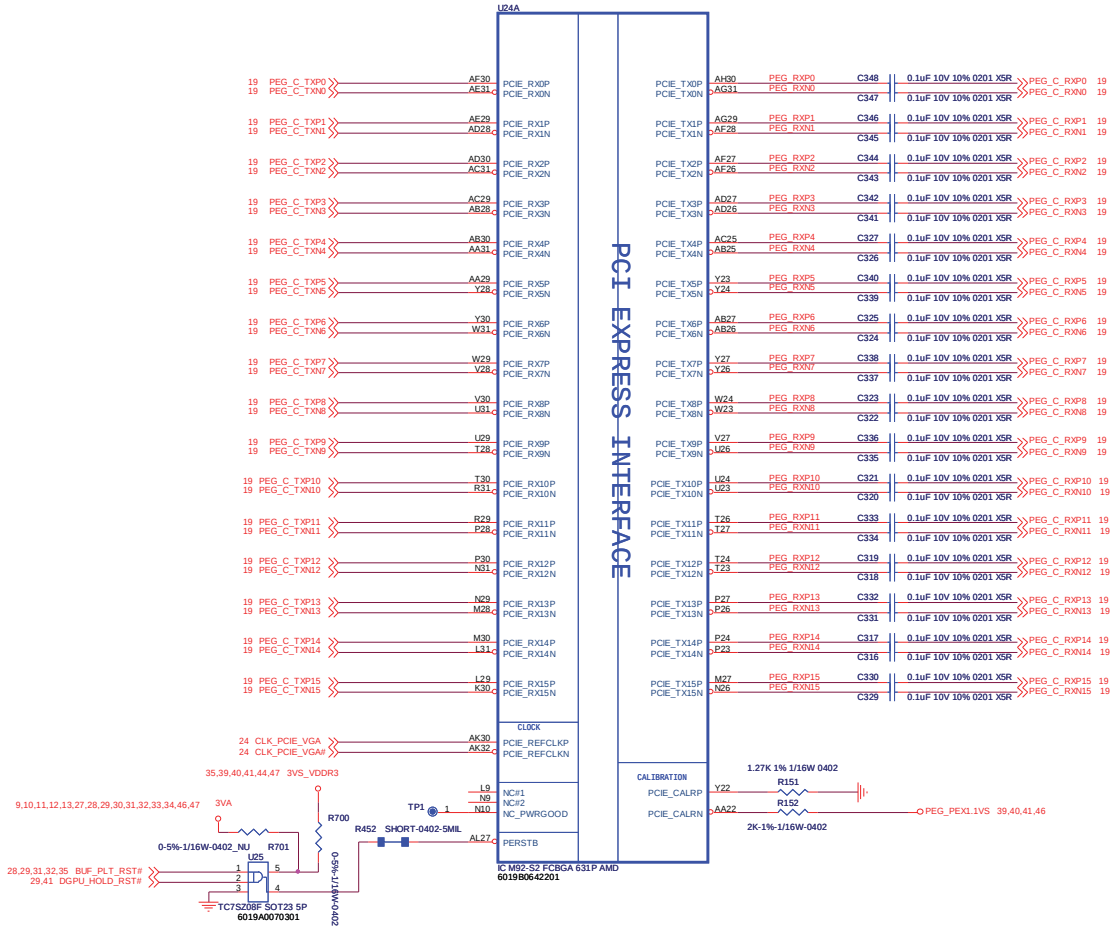


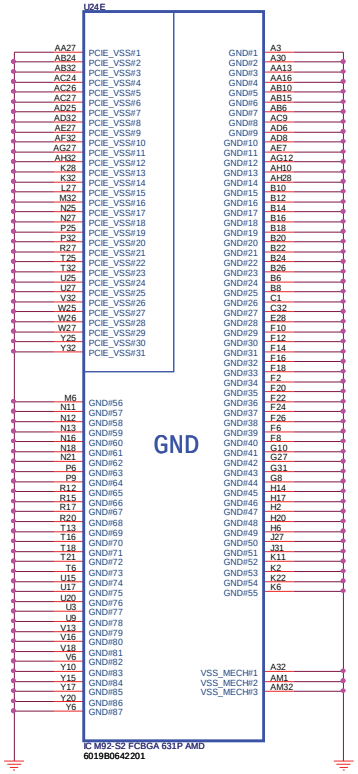


| | | | |
|---|---|---|---|
| CHANGE by | S-H Chung | DATE | Tuesday, May 26, 2009 |

**INVENTEC**

TITLE: BAP31G SFF
M92 [1/5]

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |

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| GPIO_13 | GPIO_12 | GPIO_11 | For DDR3 |
|---|---|---|---|
| 0 | 0 | 0 | 128M |
| 0 | 0 | 1 | 256M(Default) |
| 1 | 1 | 0 | Reserved |

| MEM_ID3 | MEM_ID2 | MEM_ID1 | MEM_ID0 | VENDOR |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | Hynix 64Mx16 |
| 1 | 0 | 0 | 0 | Samsung 64Mx16 |
| | | | | |

| PWRCNTL_1 | PWRCNTL_0 | VDDC |
|---|---|---|
| 1 | 1 | 0.9V |
| 1 | 0 | 0.95V |
| 0 | 1 | 1.05V |
| 0 | 0 | 1.1V |

**FOR JM/SJM31 ONLY**
**BAP31 NU**

H: Cable plug
L: Cable unplug

PLACE VREFG DIVIDER AND CAP CLOSE TO ASIC

(1.8V@120mA DPLL_PVDD)

(1.1V@300mA DPLL_VDDC)

(1.8V@20mA TSVDD)

(1.8V@70mA AVDD)

(1.8V@45mA VDD1DI)

(1.8V@2mA AVDDQ)

(1.8V@40mA VDD2DI)

(3.3V@65mA A2VDD)

**RESERVE SERIAL EEPROM 512K/1M**

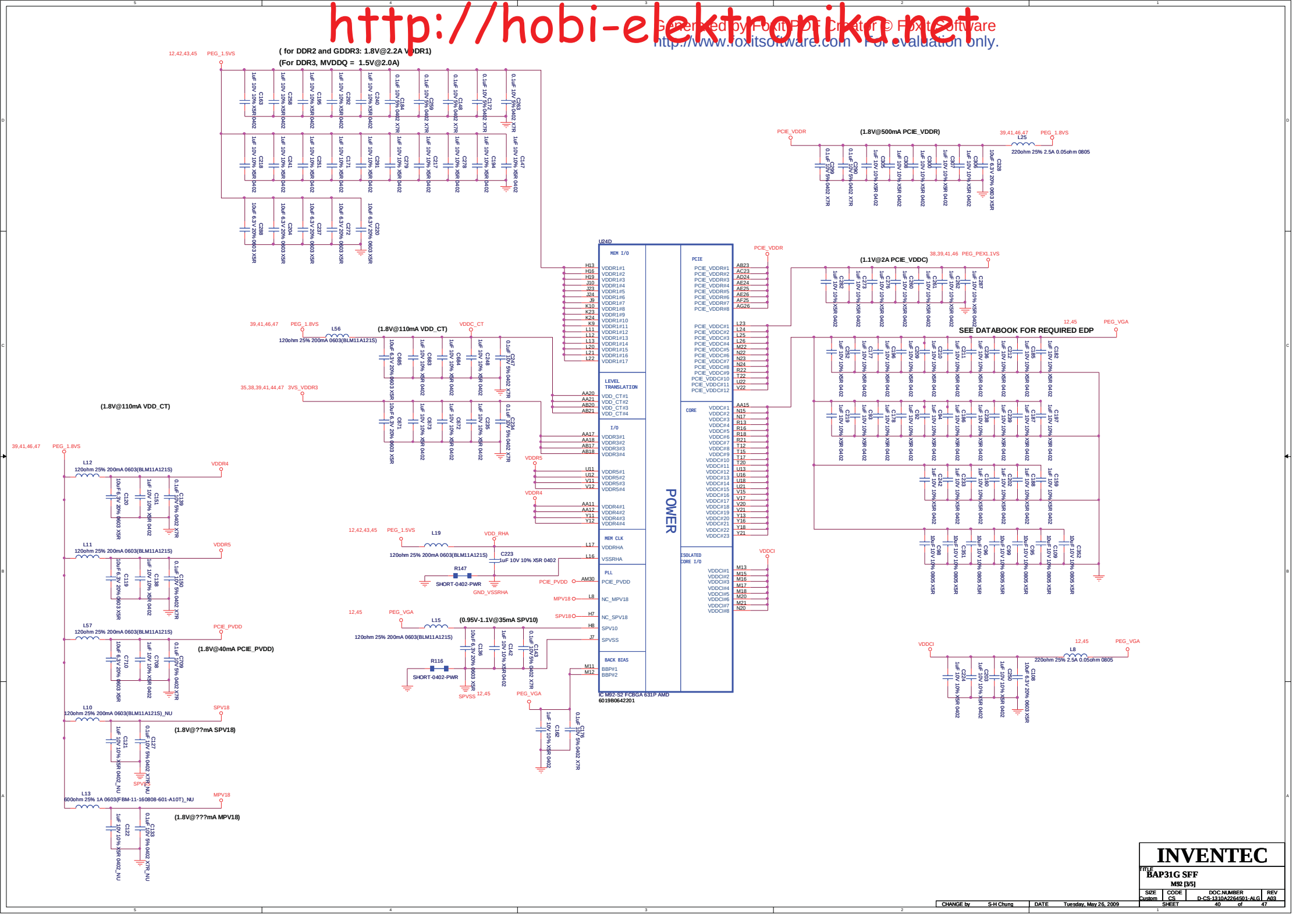
IC M92-S2 FCBGA 631P AMD
6019B0642201

| | | | |
|---|---|---|---|
| CHANGE by | S-H Chung | DATE | Tuesday, May 26, 2009 |

**INVENTEC**

TITLE: BAP31G SFF
M92 [2/5]

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |
| | | SHEET 39 of 47 | |

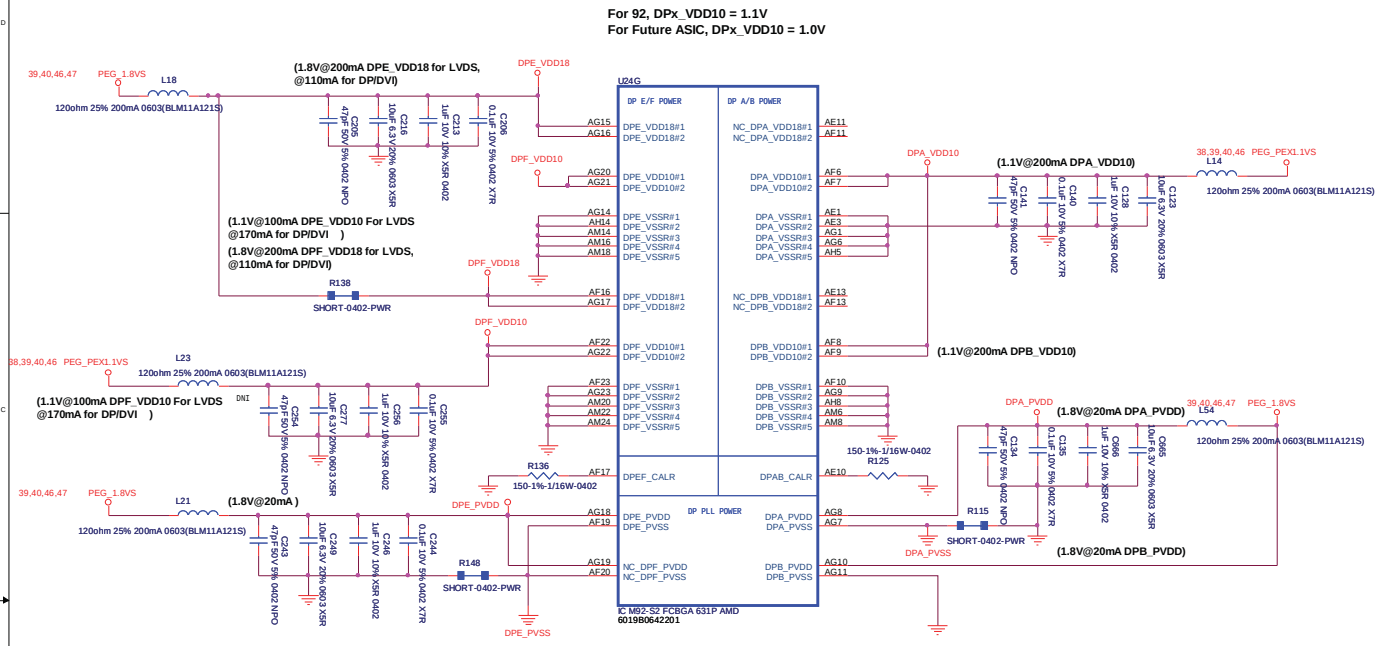


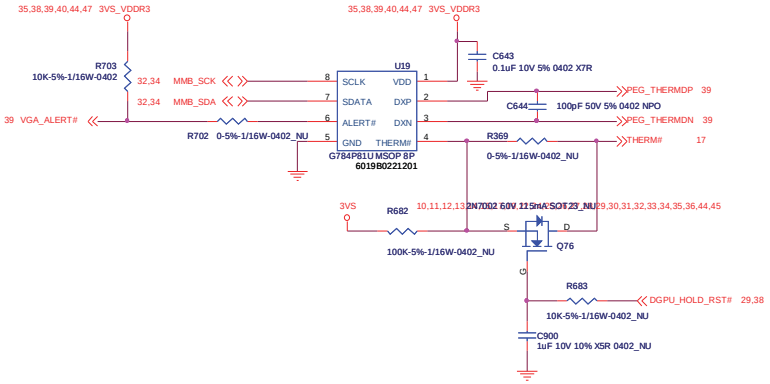

| | | | | | |
|---|---|---|---|---|---|
| CHANGE by | S-H Chung | DATE | Tuesday, May 26, 2009 | | |

**INVENTEC**

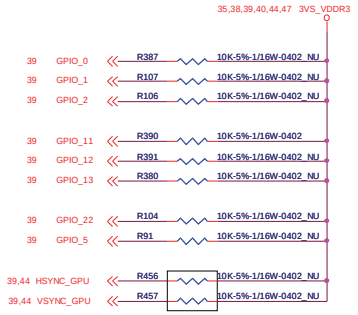
TITLE
**BAP31G SFF**
M92 [3/5]

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |
| | SHEET | 40 of 47 | |




## PIN STRAPS



BAP31 R721, R722 OPEN
DVI no need Audio fuction
JM31/SJM31 R721, R722 install
HDMI need Audio function

### CONFIGURATION STRAPS

**ALLOW FOR PULLUP PADS FOR THESE STRAPS AND IF THESE GPIOS ARE USED, THEY MUST NOT CONFLICT DURING RESET**

RECOMMENDED SETTINGS
0= DO NOT INSTALL RESISTOR
1 = INSTALL 10K RESISTOR
X = DESIGN DEPENDANT
NA = NOT APPLICABLE

| STRAPS | PIN | DESCRIPTION OF DEFAULT SETTINGS | |
|---|---|---|---|
| TX_PWRS_ENB | GPIO0 | PCIE FULL TX OUTPUT SWING | X |
| TX_DEEMPH_EN | GPIO1 | PCIE TRANSMITTER DE-EMPHASIS ENABLED | X |
| BIF_GEN2_EN_A | GPIO2 | PCIE GEN2 ENABLED | X |
| RSVD | GPIO8 | | 0 |
| BIF_VGA_DIS | GPIO9 | VGA ENABLED | 0 |
| RSVD | GPIO21 | | 0 |
| BIOS_ROM_EN | GPIO_22_ROMCSB | ENABLE EXTERNAL BIOS ROM | X |
| ROMIDCFG(2:0) | GPIO[13:11] | SERIAL ROM TYPE OR MEMORY APERTURE SIZE SELECT | X X X |
| VIP_DEVICE_STRAP_ENA | V2SYNC | IGNORE VIP DEVICE STRAPS | X |
| RSVD | GENERICC | | 0 |
| AUD[1] | HSYNC | AUD[1] AUD[0] | 0 |
| AUD[0] | VSYNC | 0 0 No audio function<br>0 1 Audio for DisplayPort and HDMI if dongle is detected<br>1 0 Audio for DisplayPort only<br>1 1 Audio for both DisplayPort and HDMI | X X |

### AMD RESERVED CONFIGURATION STRAPS

**ALLOW FOR PULLUP PADS FOR THESE STRAPS AND IF THESE GPIOS ARE USED, THEY MUST NOT CONFLICT DURING RESET**

| | |
|---|---|
| H2SYNC | GENERICC |

**PULLUP PADS ARE NOT REQUIRED FOR THESE STRAPS BUT IF THESE GPIOS ARE USED, THEY MUST NOT CONFLICT DURING RESET**

| |
|---|
| GPIO21_BB_EN |

INVENTEC

TITLE: BAP31G SFF
M92 [4/5]

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |

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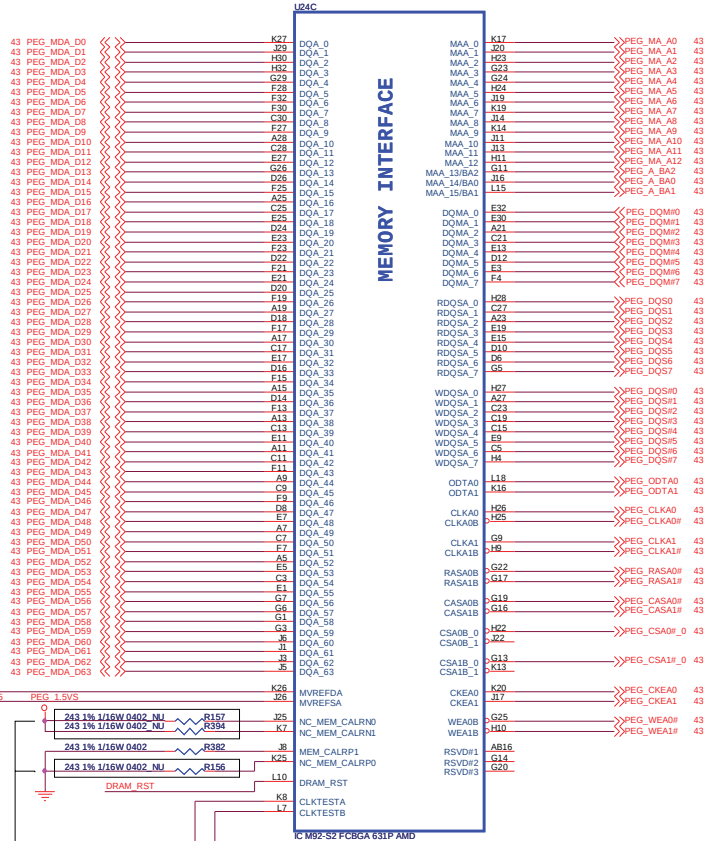
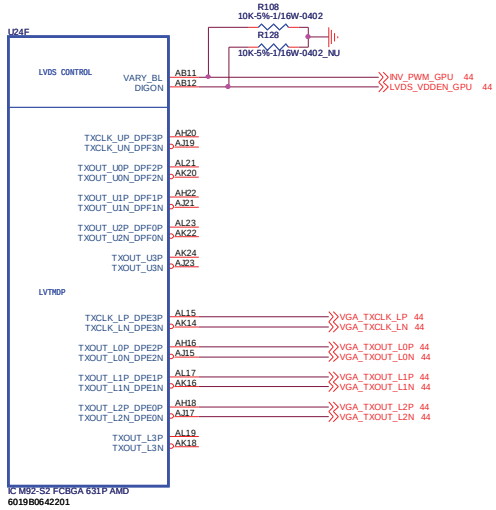
## DDR3 Memory Interface



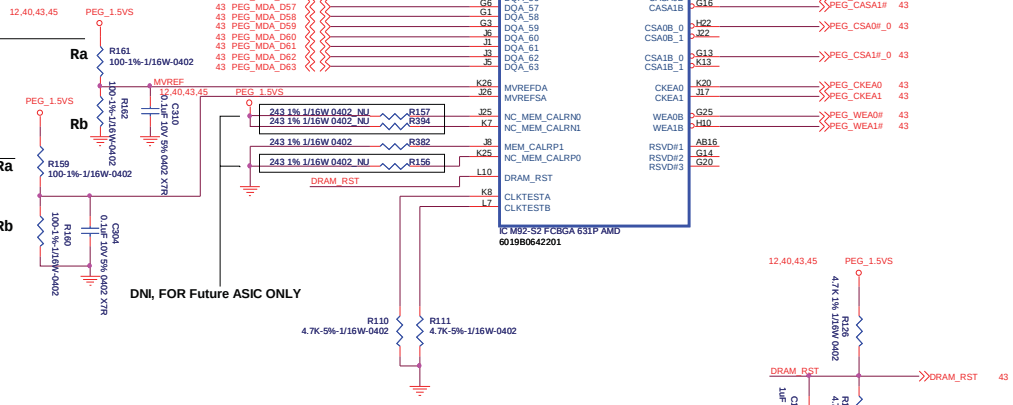

## LVDS Interface




## MVDDQ = 1.5V FOR DDR3 Memory

PLACE MVREF DIVIDERS AND CAPS CLOSE TO ASIC

| DIVIDER RESISTORS | DDR2/DDR3 | GDDR3 |
|---|---|---|
| MVREF TO 1.8V (Ra) | 100R | 40.2R |
| MVREF TO GND (Rb) | 100R | 100R |

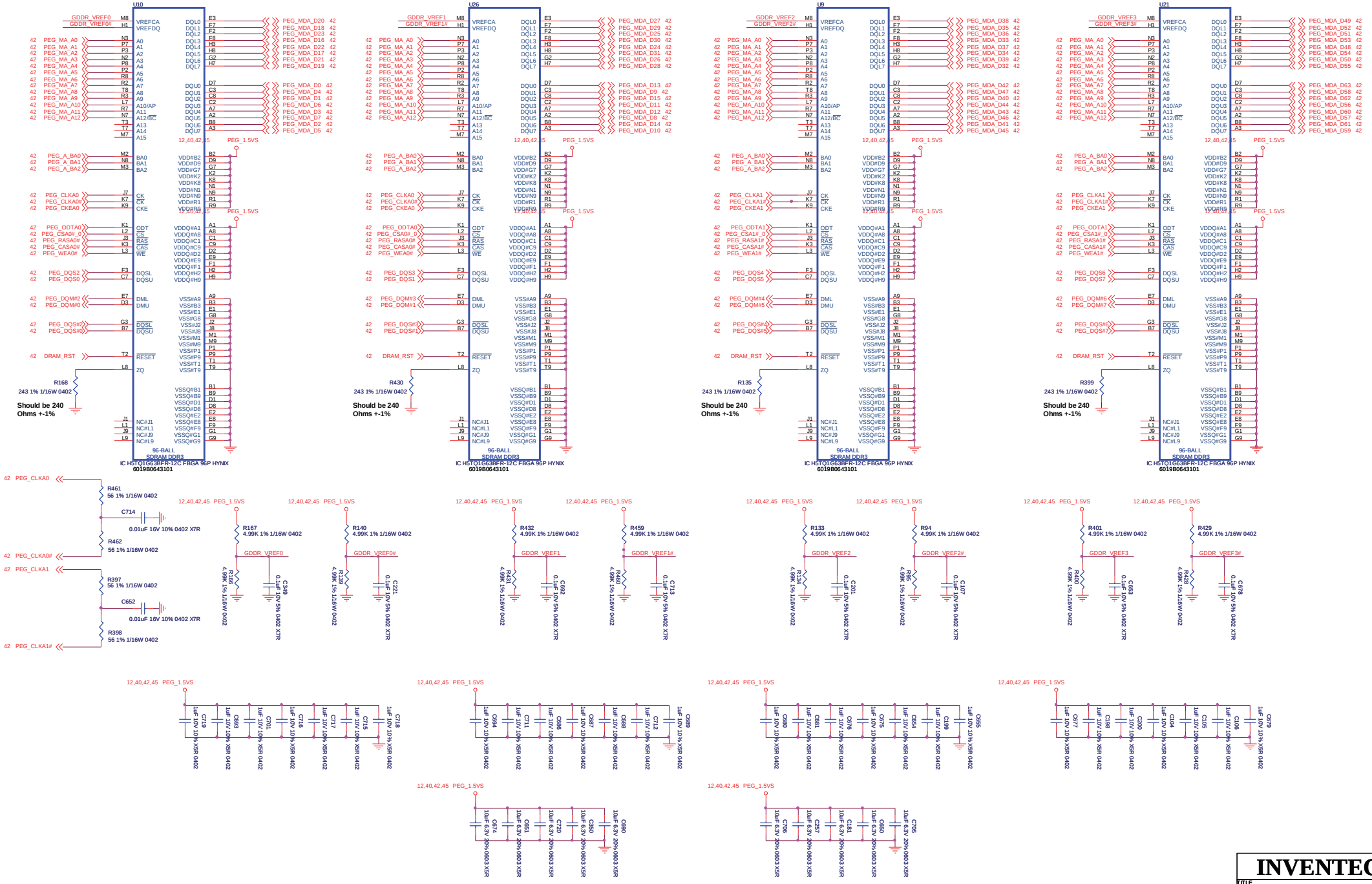



| | | | | |
|---|---|---|---|---|
| CHANGE by | S-H Chung | DATE | Tuesday, May 26, 2009 | |

INVENTEC

TITLE: BAP31G SFF
M92 [5/5]

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |
| | | SHEET 42 of 47 | |




| | | | |
|---|---|---|---|
| CHANGE by | S-H Chung | DATE | Tuesday, May 26, 2009 |

**INVENTEC**

TITLE: **BAP31G SFF**
**VRAM**

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |

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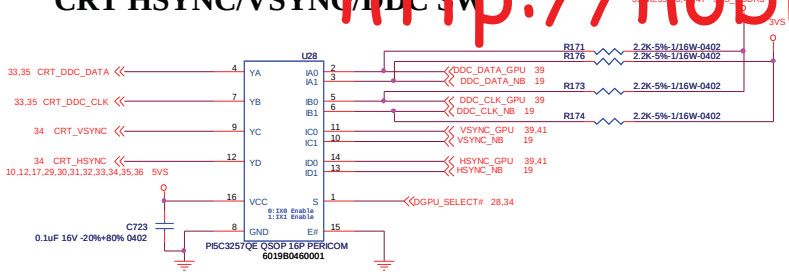
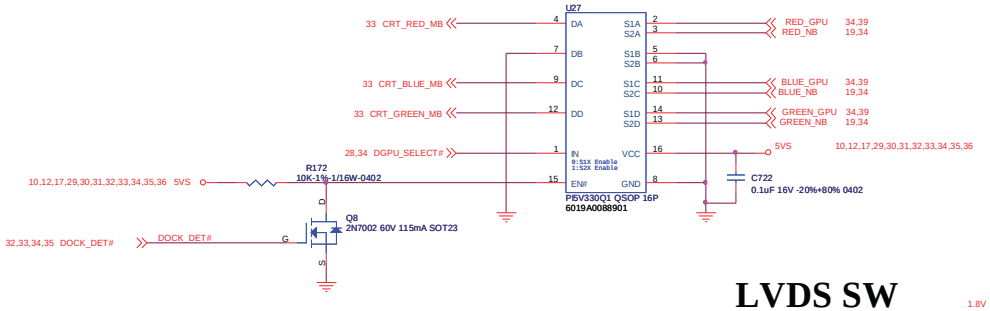
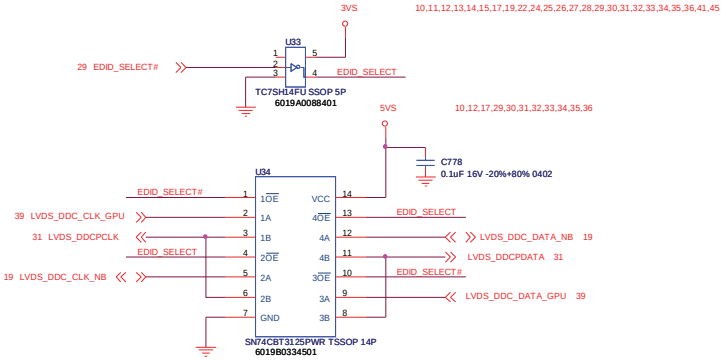
## CRT HSYNC/VSYNC/DDC SW



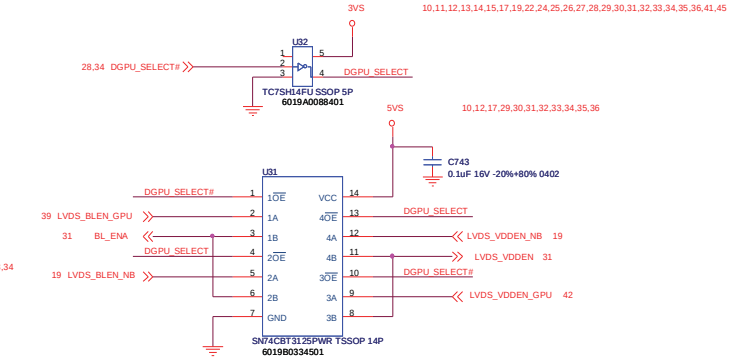

## CRT R/G/B SW



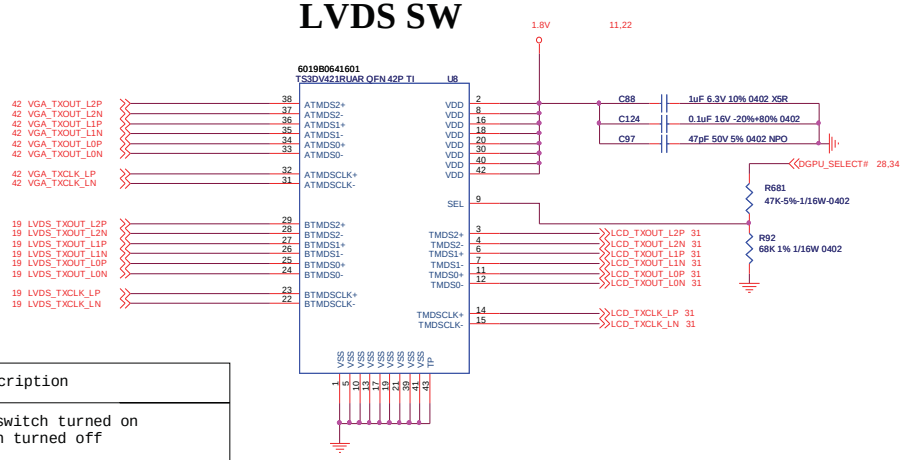

## LCD DDC SW



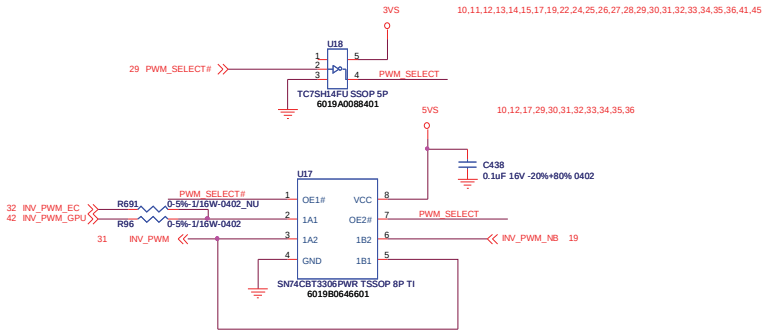

## LVDS BKL and Vcc Enable SW




## LVDS SW




## LCD PWM SW




| Signal | During Reset | After Reset | Description |
|---|---|---|---|
| DGPU_PWR_EN# | High | High | 0 : dGPU power switch turned on<br>1 : power switch turned off |
| DGPU_PWROK | | | 0 : dGPU power is not stable<br>1 : dGPU power is stable |
| DGPU_HOLD_RST# | Low | Low | 0 : Keep dGPU in reset<br>1 : Reset is released |
| DGPU_SELECT# | High | High | 0 : Display switch enabled for dGPU<br>1 : Display switch enabled for iGPU |
| HPD_INT# | | | 0 : DVI insertion<br>1 : No DVI insertion |
| PWM_SELECT# | | High | 0 : PWM switch enabled for dGPU<br>1 : PWM switch enabled for iGPU |
| EDID_SELECT# | | High | 0 : EDID/DDC switch enabled for dGPU<br>1 : EDID/DDC switch enabled for iGPU |

INVENTEC

TITLE: BAP31G SFF
Hybird Switch

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |

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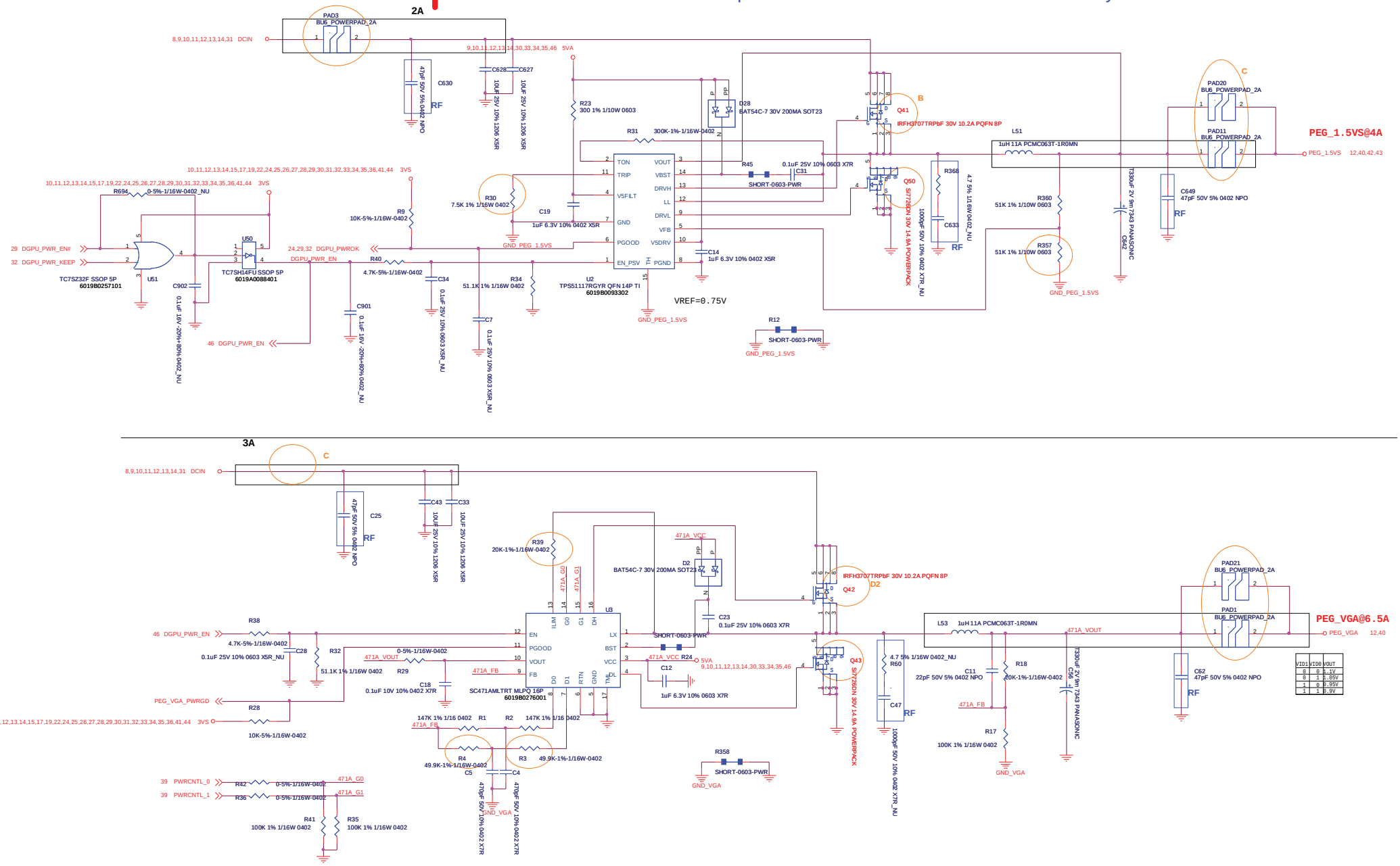


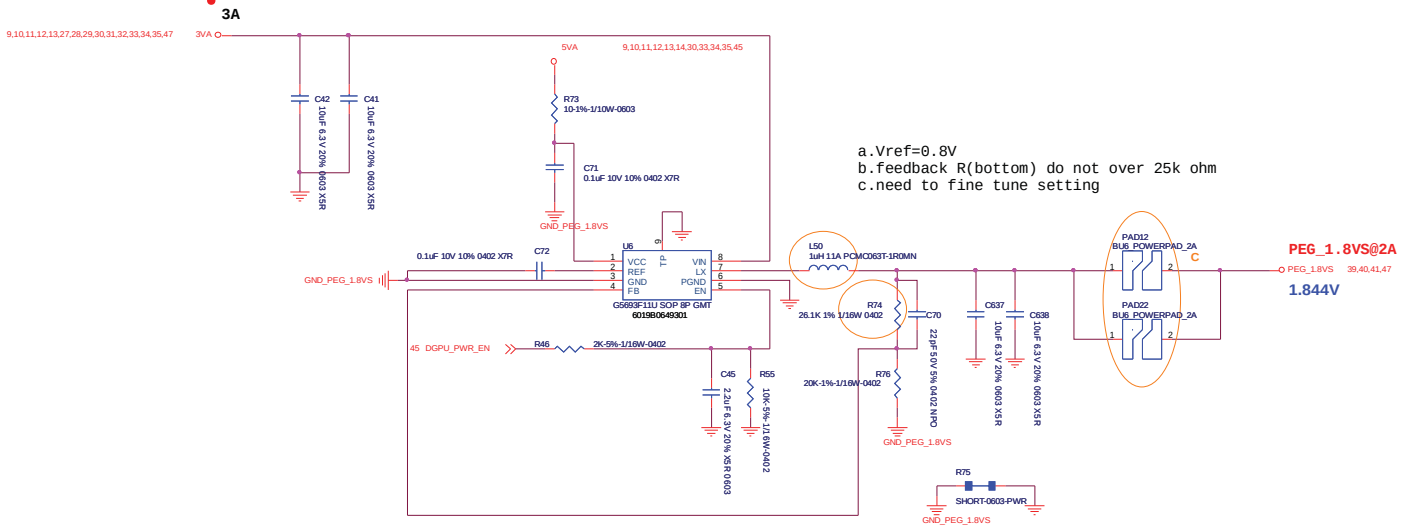

| PWRCNTL_1 | PWRCNTL_0 | VDDC |
|---|---|---|
| 1 | 1 | 0.9V |
| 1 | 0 | 0.95V |
| 0 | 1 | 1.05V |
| 0 | 0 | 1.1V |

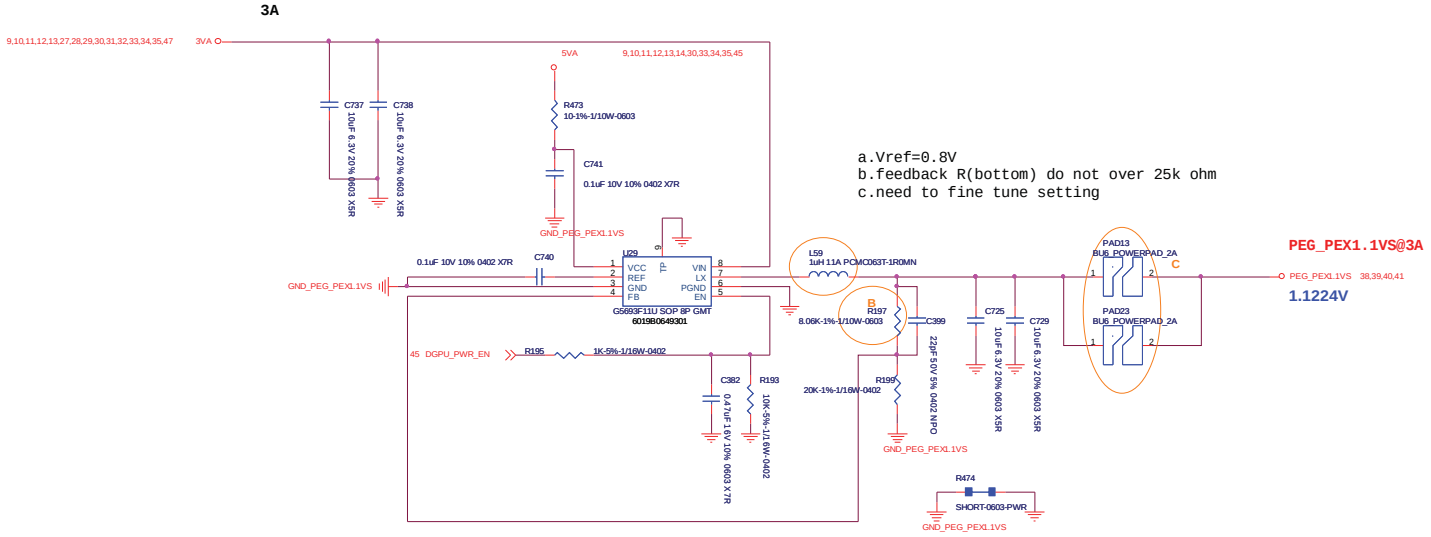
INVENTEC

TITLE: BAP31G SFF
VGA Power[1/3]

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A2264501-ALG | A03 |

CHANGE by S-H Chung | DATE Tuesday, May 26, 2009 | SHEET 45 of 47



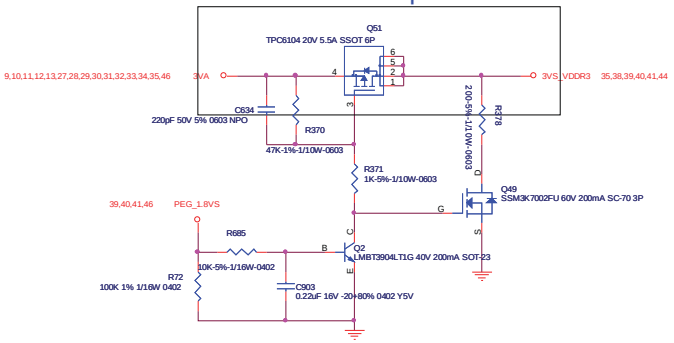




INVENTEC

TITLE: BAP31G SFF
VGA Power[2/3]

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A284501-ALG | A03 |

| CHANGE by | S-H Chung | DATE | Tuesday, May 26, 2009 | SHEET | 46 of 47 |
|---|---|---|---|---|---|




| | | | |
|---|---|---|---|
| CHANGE by | S-H Chung | DATE | Tuesday, May 26, 2009 |

**INVENTEC**

TITLE
**BAP31G SFF**
**VGA Power[3/3]**

| SIZE | CODE | DOC.NUMBER | REV |
|---|---|---|---|
| Custom | CS | D-CS-1310A284501-ALG | A03 |

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