

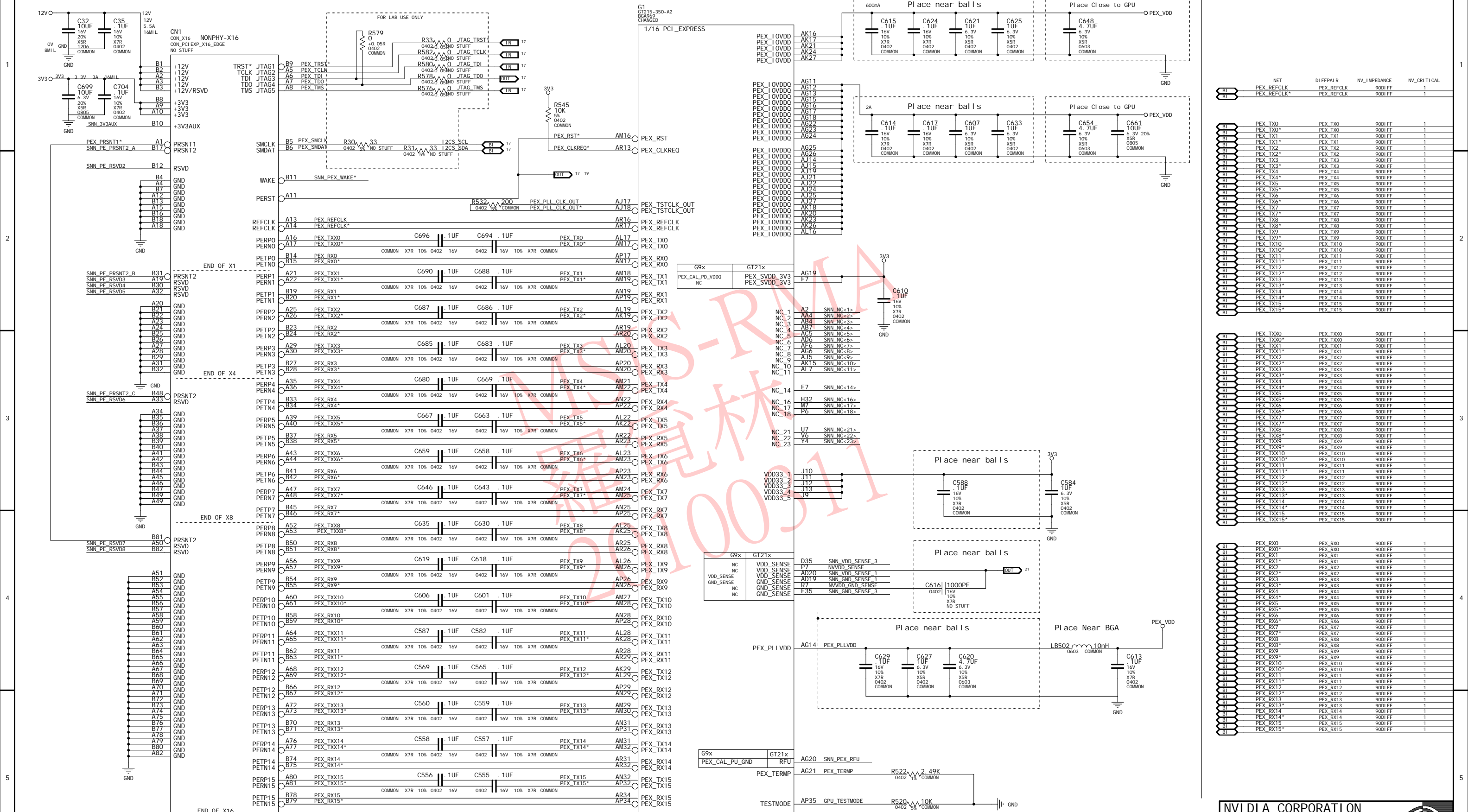
P684-A01 GT216/GT215 DESKTOP Low Profile
PCI-EXPRESSx16 DVI-I HDMI VGA DDR3

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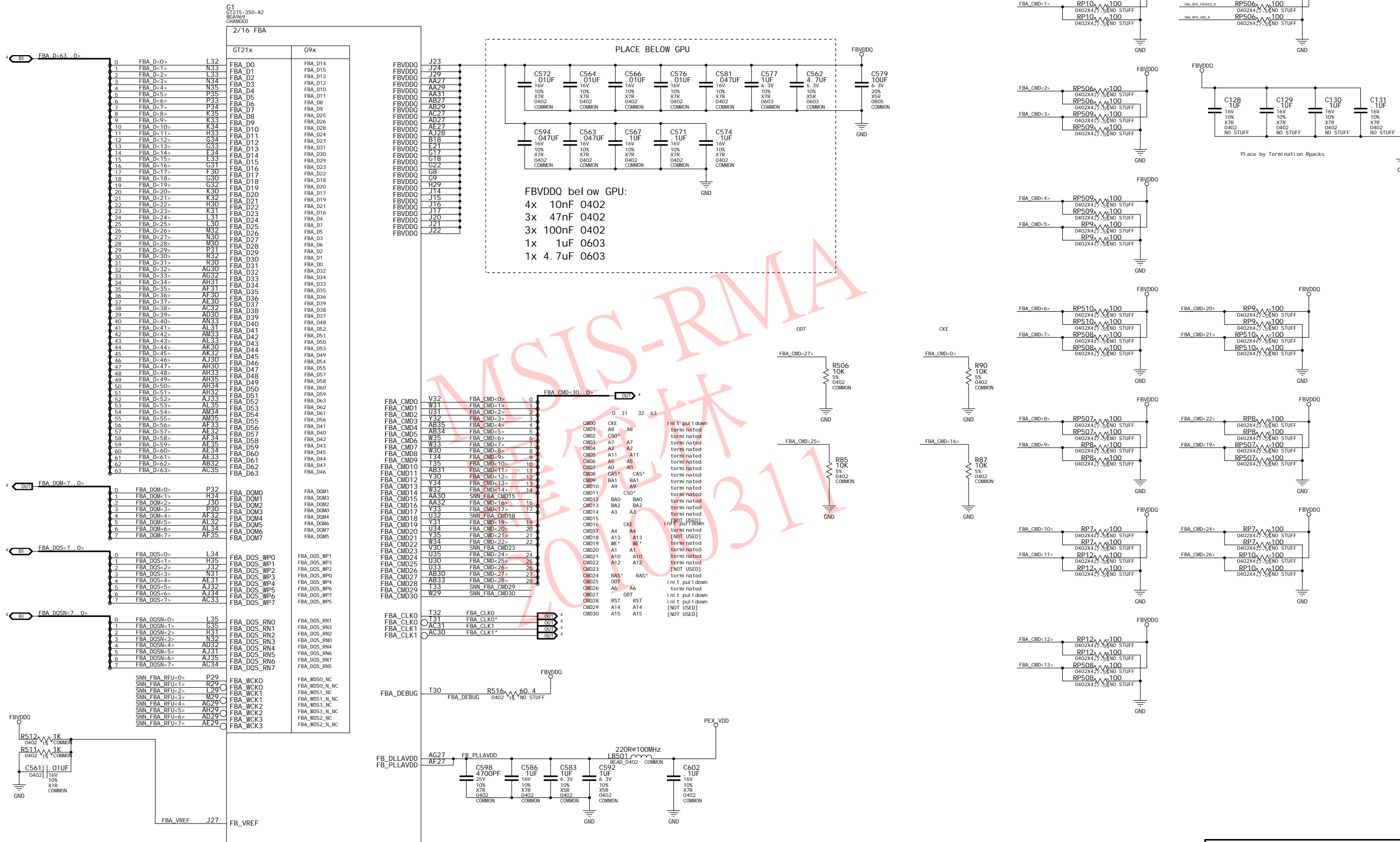
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20100311

| SKU | VARIANT | NVPN | ASSEMBLY |
|-----|-------------|--------------------|---|
| B | BASE | 600-10684-base-100 | BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO STUFF ASSEMBLY NOTES AND BOM NOT FINAL |
| 1 | SKU0000 | 600-10684-0000-100 | GT216-350 615/1335MHz 1024MB 64Mx16 BGA100 790MHz DDR3 DVI-I/HDMI/VGA |
| 2 | SKU0011 | 600-10684-0011-100 | GT215-350 540/1302MHz 1024MB 64Mx16 BGA100 790MHz DDR3 DVI-I/HDMI/VGA |
| 3 | SKU0012 | 600-10684-0012-100 | GT215-250 540/1302MHz 1024MB 64Mx16 BGA100 790MHz DDR3 DVI-I/HDMI/VGA |
| 4 | SKU0013 | 600-10684-0013-100 | GT215-250 NVS 540/1302MHz 1024MB 64Mx16 BGA100 790MHz DDR3 DVI-I/HDMI/VGA |
| 5 | SKU0014 | 600-10684-0014-100 | GT215-350 NVS 540/1302MHz 1024MB 64Mx16 BGA100 790MHz DDR3 DVI-I/HDMI/VGA |
| 6 | SKU0005 | 600-10684-0005-100 | GT216-205 475/1100MHz 1024MB 64Mx16 BGA100 790MHz DDR3 DVI-I/HDMI/VGA |
| 7 | SKU0015 | 600-10684-0015-100 | GT215-255 540/1302MHz 1024MB 64Mx16 BGA100 790MHz DDR3 DVI-I/HDMI/VGA |
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PCI -EXPRESS INTERFACE



PARTITION A FRAME BUFFER INTERFACE



PARTITION A MEMORY



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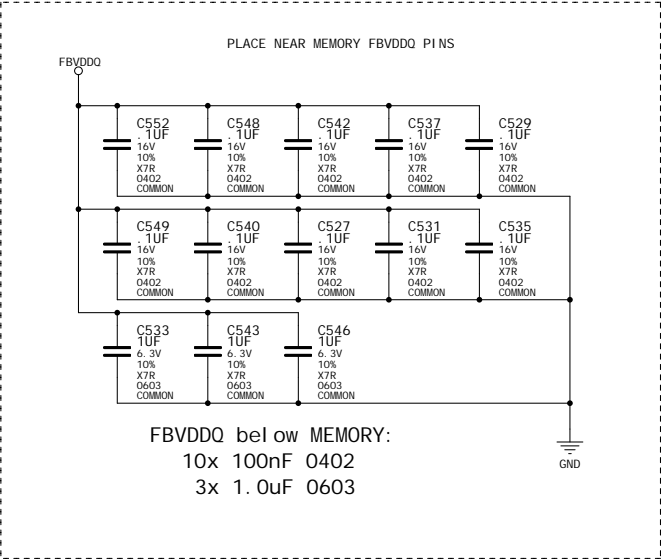
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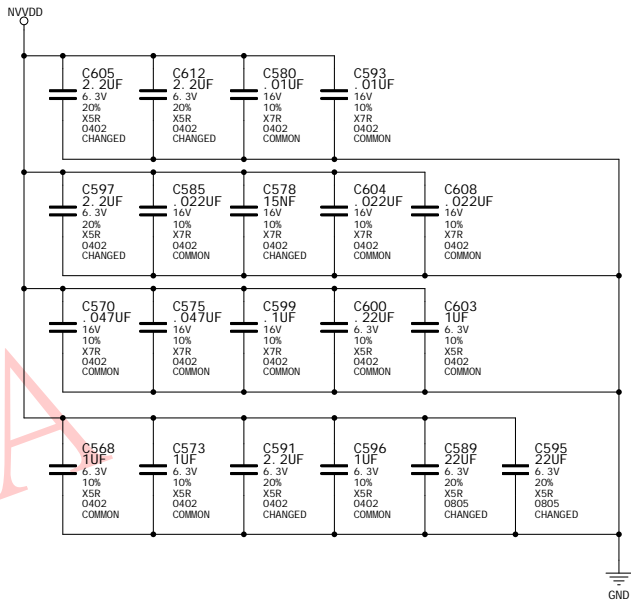
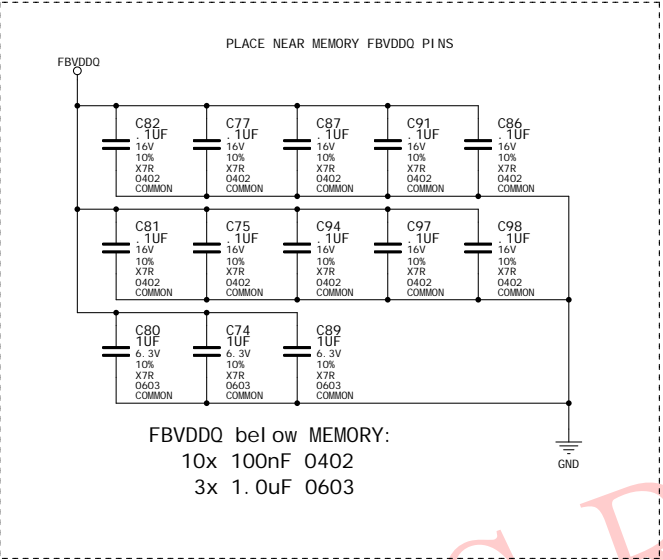
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| NAME | Garrett Hall | DATE | 30-OCT-2009 |

FBA DECOUPLING CAPS & NVVDD DECOUPLING CAPS

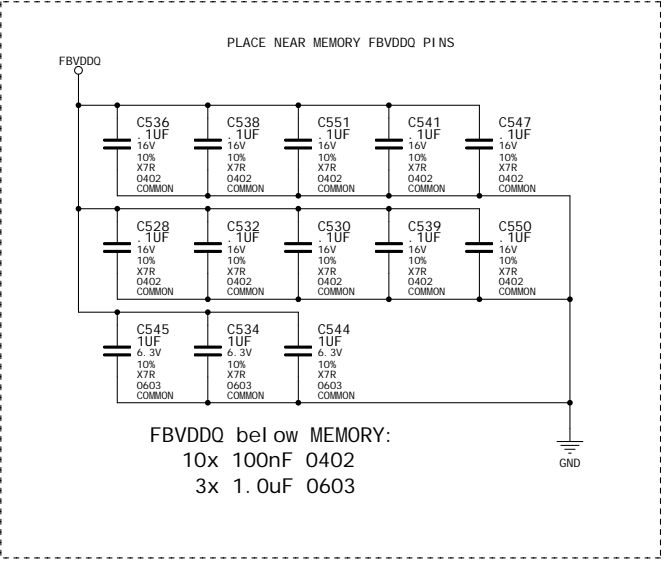
Decoupling for FBA 0..15



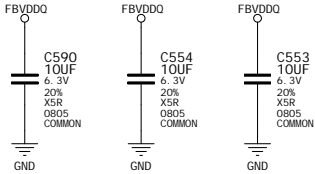
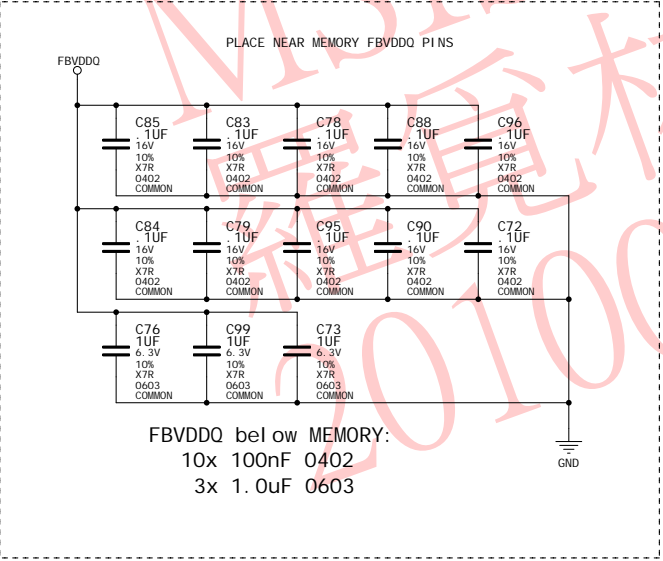
Decoupling for FBA 16..31



Decoupling for FBA 32..47



Decoupling for FBA 48..63



| | | | |
|---|-----|-------------|-----|
| G1 GT215-250-A2 BGA969 CHANGED | | 16/16 NVVDQ | |
| AB11 | VDD | P21 | VDD |
| AB13 | VDD | P23 | VDD |
| AB15 | VDD | P25 | VDD |
| AB17 | VDD | R11 | VDD |
| AB19 | VDD | R12 | VDD |
| AB21 | VDD | R13 | VDD |
| AB23 | VDD | R14 | VDD |
| AB25 | VDD | R15 | VDD |
| AC11 | VDD | R16 | VDD |
| AC12 | VDD | R17 | VDD |
| AC13 | VDD | R18 | VDD |
| AC14 | VDD | R19 | VDD |
| AC15 | VDD | R20 | VDD |
| AC16 | VDD | R21 | VDD |
| AC17 | VDD | R22 | VDD |
| AC18 | VDD | R23 | VDD |
| AC19 | VDD | R24 | VDD |
| AC20 | VDD | R25 | VDD |
| AC21 | VDD | T12 | VDD |
| AC22 | VDD | T14 | VDD |
| AC23 | VDD | T16 | VDD |
| AC24 | VDD | T18 | VDD |
| AC25 | VDD | T20 | VDD |
| AD12 | VDD | T22 | VDD |
| AD14 | VDD | T24 | VDD |
| AD16 | VDD | V11 | VDD |
| AD18 | VDD | V13 | VDD |
| AD22 | VDD | V15 | VDD |
| AD24 | VDD | V17 | VDD |
| L11 | VDD | V21 | VDD |
| L12 | VDD | V23 | VDD |
| L13 | VDD | V25 | VDD |
| L14 | VDD | W11 | VDD |
| L15 | VDD | W12 | VDD |
| L16 | VDD | W13 | VDD |
| L17 | VDD | W14 | VDD |
| L18 | VDD | W15 | VDD |
| L19 | VDD | W16 | VDD |
| L20 | VDD | W17 | VDD |
| L21 | VDD | W18 | VDD |
| L22 | VDD | W19 | VDD |
| L23 | VDD | W20 | VDD |
| L24 | VDD | W21 | VDD |
| L25 | VDD | W22 | VDD |
| M12 | VDD | W23 | VDD |
| M14 | VDD | W24 | VDD |
| M16 | VDD | Y11 | VDD |
| M18 | VDD | Y12 | VDD |
| M20 | VDD | Y14 | VDD |
| M22 | VDD | Y16 | VDD |
| M24 | VDD | Y18 | VDD |
| P11 | VDD | Y20 | VDD |
| P13 | VDD | Y22 | VDD |
| P15 | VDD | Y24 | VDD |
| P17 | VDD | | |
| P19 | VDD | | |

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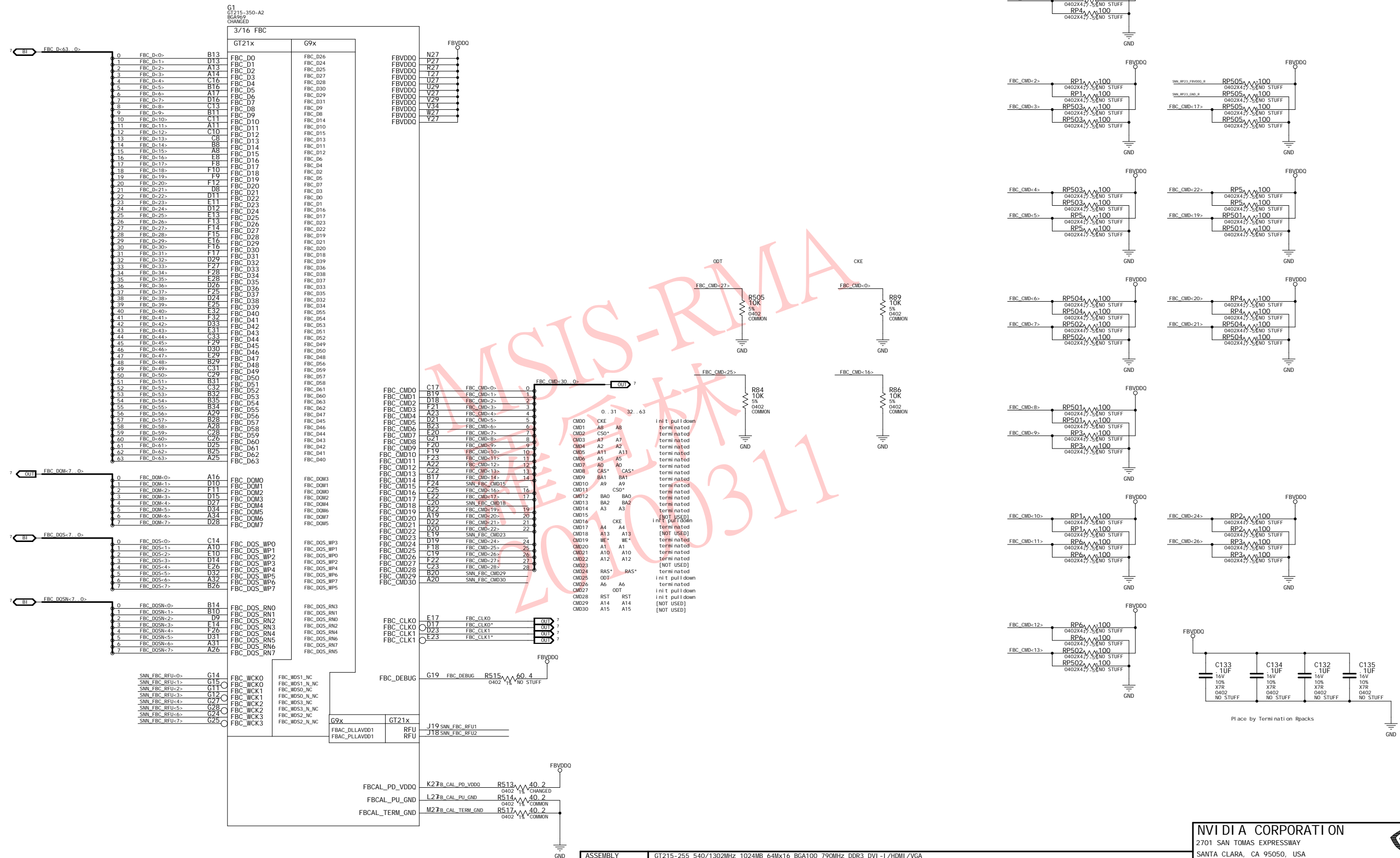


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| ASSEMBLY | GT215-255 540/1302MHz 1024MB 64Mx16 BGA100 790MHz DDR3 DVI-I/HDMI/VGA |
| PAGE DETAIL | FBA DECOUPLING CAPS & NVVDD DECOUPLING CAPS |

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PARTITION C FRAME BUFFER INTERFACE



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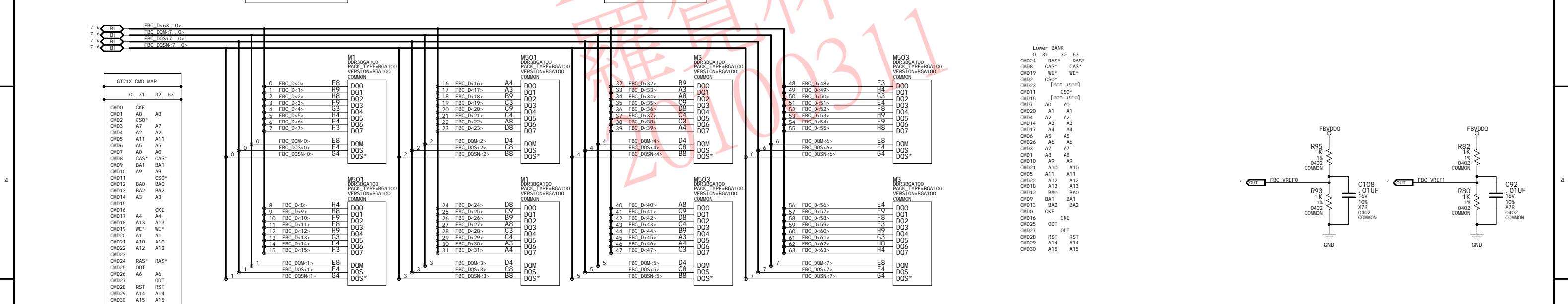
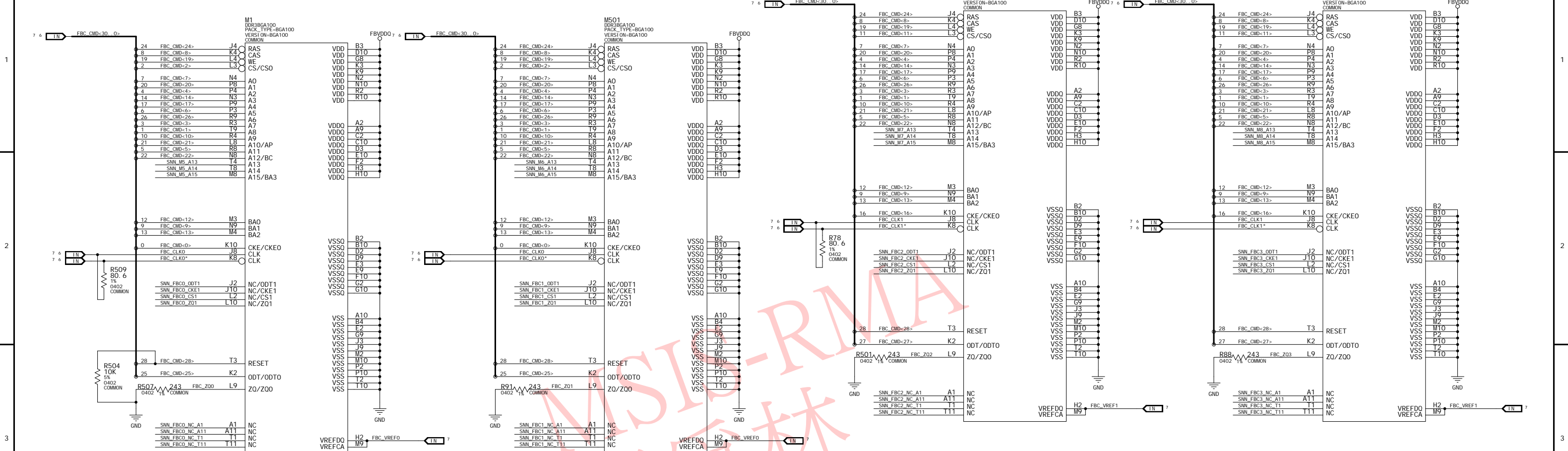
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PARTITION C MEMORY

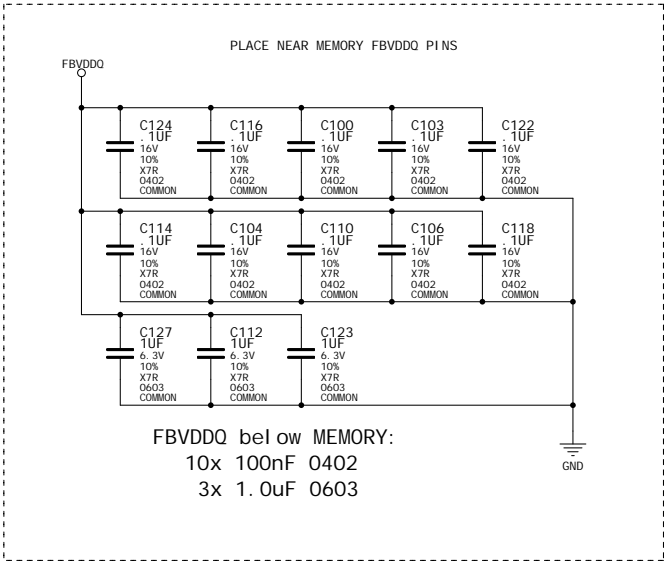


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|--------------|------------|---------------|-------------------|
| 0 FBC_DQS<0> | FBC_DQS<0> | 800LFF | 1 |
| 1 FBC_DQS<1> | FBC_DQS<1> | 800LFF | 1 |
| 2 FBC_DQS<2> | FBC_DQS<2> | 800LFF | 1 |
| 3 FBC_DQS<3> | FBC_DQS<3> | 800LFF | 1 |
| 4 FBC_DQS<4> | FBC_DQS<4> | 800LFF | 1 |
| 5 FBC_DQS<5> | FBC_DQS<5> | 800LFF | 1 |
| 6 FBC_DQS<6> | FBC_DQS<6> | 800LFF | 1 |
| 7 FBC_DQS<7> | FBC_DQS<7> | 800LFF | 1 |

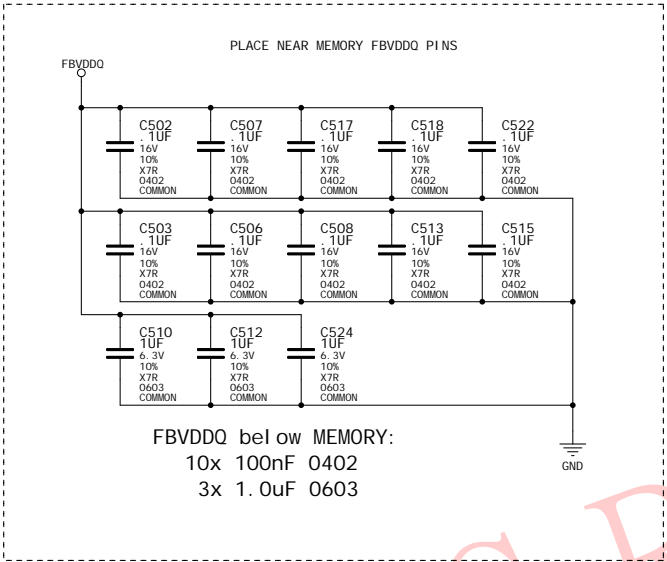
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| 0 FBC_DQS<0> | FBC_DQS<0> | 800LFF | 1 |
| 1 FBC_DQS<1> | FBC_DQS<1> | 800LFF | 1 |
| 2 FBC_DQS<2> | FBC_DQS<2> | 800LFF | 1 |
| 3 FBC_DQS<3> | FBC_DQS<3> | 800LFF | 1 |
| 4 FBC_DQS<4> | FBC_DQS<4> | 800LFF | 1 |
| 5 FBC_DQS<5> | FBC_DQS<5> | 800LFF | 1 |
| 6 FBC_DQS<6> | FBC_DQS<6> | 800LFF | 1 |
| 7 FBC_DQS<7> | FBC_DQS<7> | 800LFF | 1 |

FBC DECOUPLING CAPS & NVVDD DECOUPLING CAPS

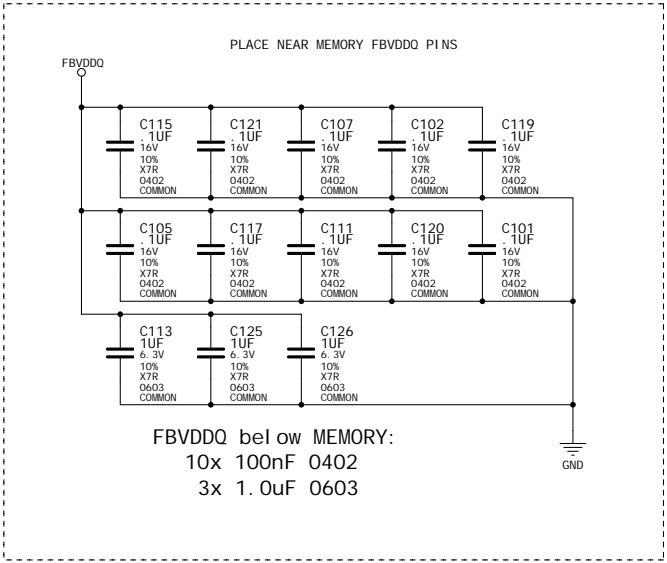
Decoupling for FBC 0..15



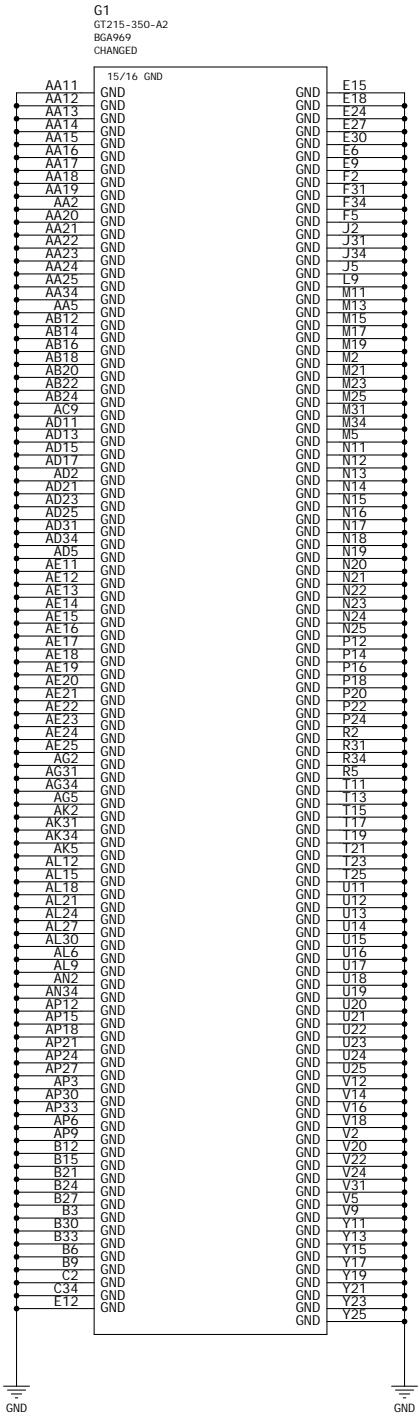
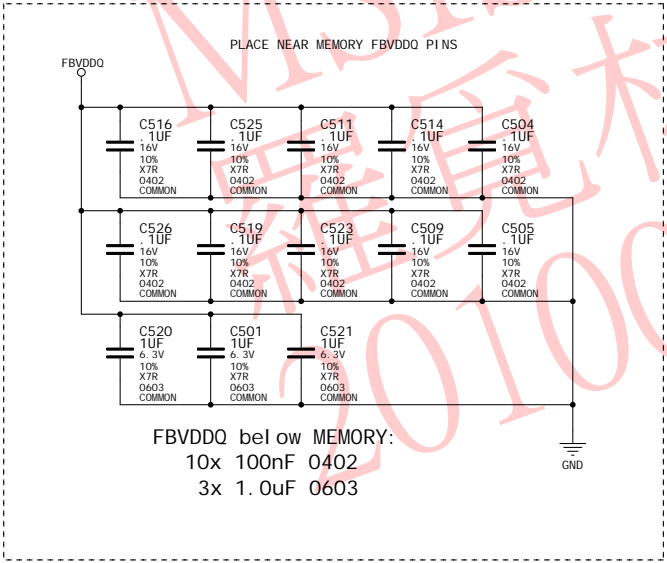
Decoupling for FBC 16..31



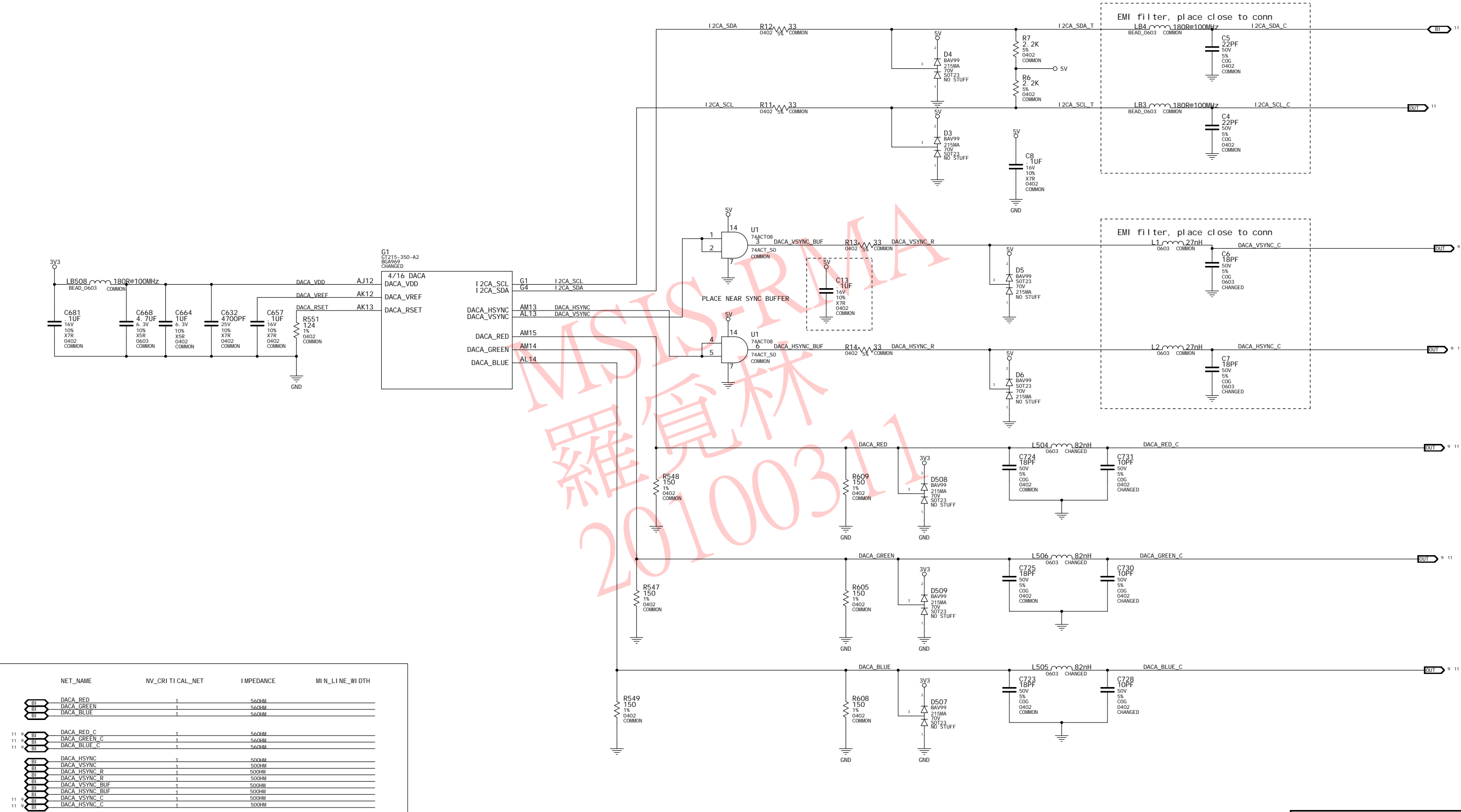
Decoupling for FBC 32..47



Decoupling for FBC 48..63

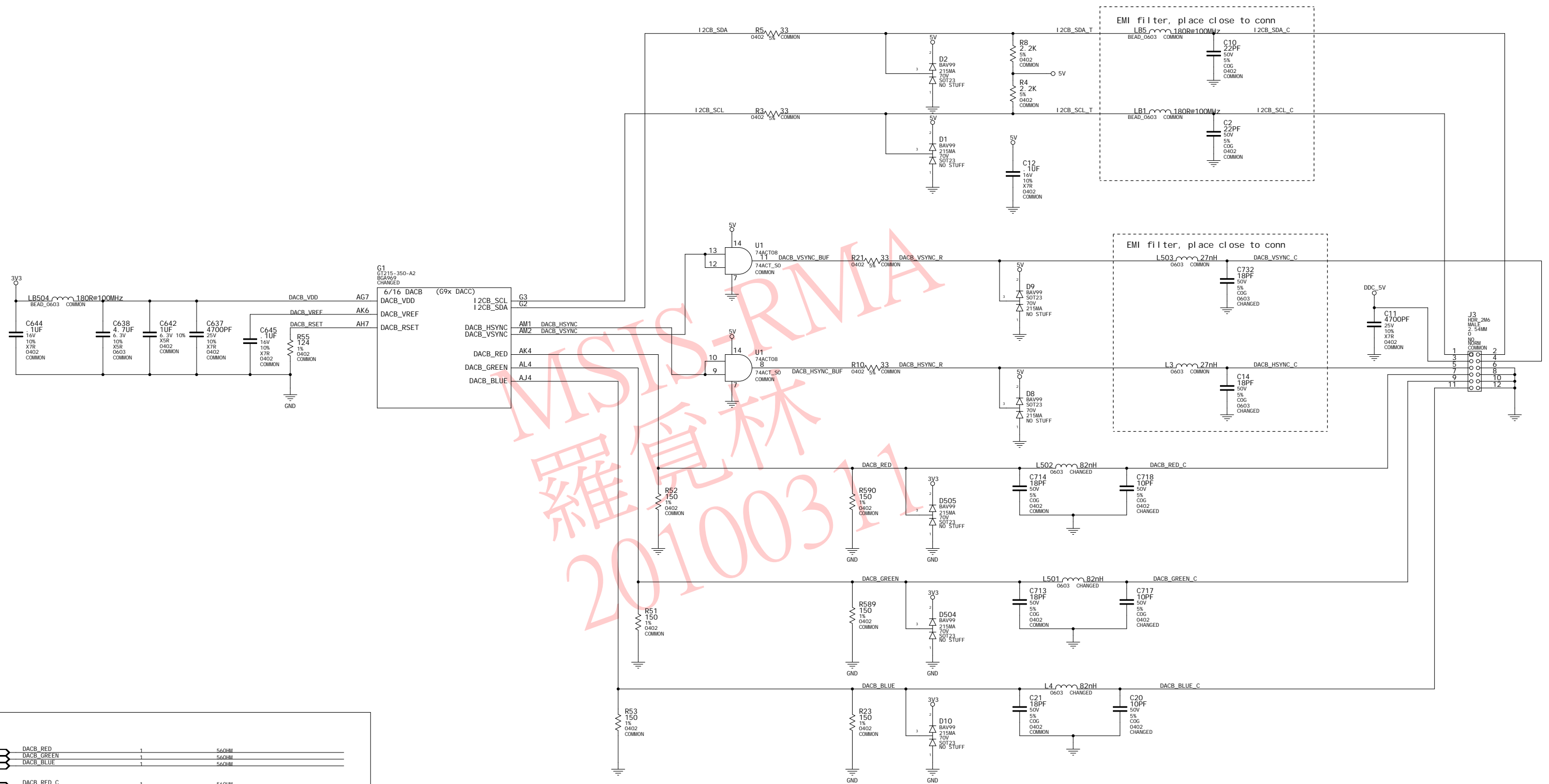


DACA (SOUTH DVI -I)



| NET_NAME | NV_CRI TI CAL_NET | IMPEDANCE | MIN_LENGTH |
|----------------|-------------------|-----------|------------|
| DACA_RED | 1 | 560HM | |
| DACA_GREEN | 1 | 560HM | |
| DACA_BLUE | 1 | 560HM | |
| DACA_RED_C | 1 | 560HM | |
| DACA_GREEN_C | 1 | 560HM | |
| DACA_BLUE_C | 1 | 560HM | |
| DACA_HSYNC | 1 | 500HM | |
| DACA_VSYNC | 1 | 500HM | |
| DACA_HSYNC_R | 1 | 500HM | |
| DACA_VSYNC_R | 1 | 500HM | |
| DACA_HSYNC_BUF | 1 | 500HM | |
| DACA_VSYNC_BUF | 1 | 500HM | |
| DACA_HSYNC_C | 1 | 500HM | |
| DACA_VSYNC_C | 1 | 500HM | |

DACB (cable-up VGA)



| | | | |
|------|----------------|---|-------|
| [BI] | DACB_RED | 1 | 560HM |
| [BI] | DACB_GREEN | 1 | 560HM |
| [BI] | DACB_BLUE | 1 | 560HM |
| [BI] | DACB_RED_C | 1 | 560HM |
| [BI] | DACB_GREEN_C | 1 | 560HM |
| [BI] | DACB_BLUE_C | 1 | 560HM |
| [BI] | DACB_HSYNC | 1 | 500HM |
| [BI] | DACB_VSYNC | 1 | 500HM |
| [BI] | DACB_HSYNC_R | 1 | 500HM |
| [BI] | DACB_VSYNC_R | 1 | 500HM |
| [BI] | DACB_HSYNC_BUF | 1 | 500HM |
| [BI] | DACB_VSYNC_BUF | 1 | 500HM |
| [BI] | DACB_HSYNC_C | 1 | 500HM |
| [BI] | DACB_VSYNC_C | 1 | 500HM |

| | |
|-------------|--|
| ASSEMBLY | GT215-255 540/1302MHz 1024MB 64Mx16 BGA100 790MHz DDR3 DVI -I /HDMI /VGA |
| PAGE DETAIL | DACB (cable up VGA) |

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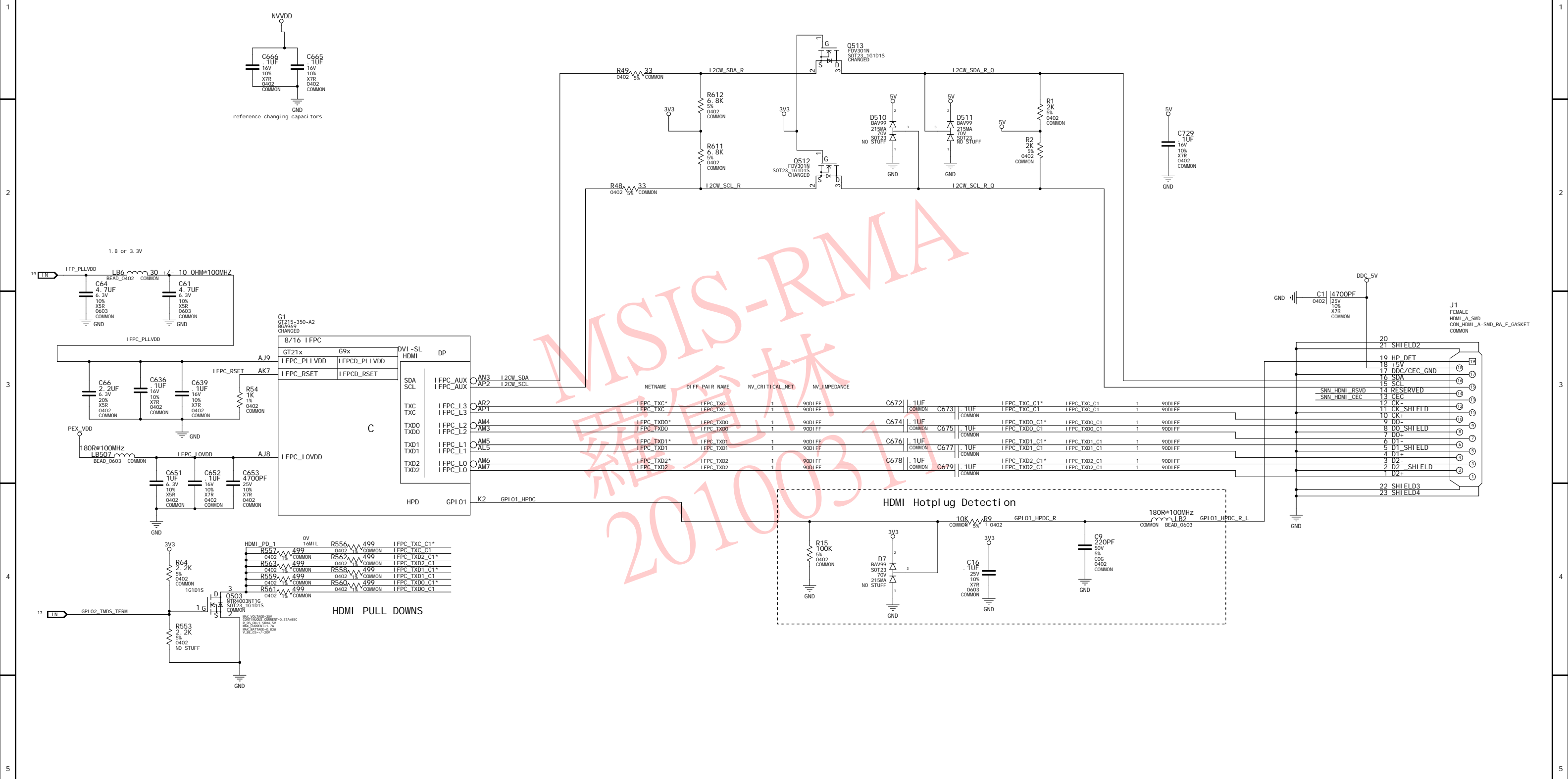
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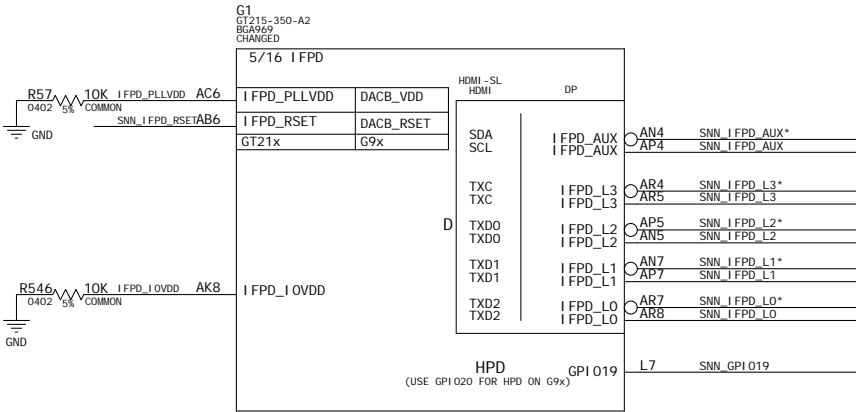
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I FP C (NORTH HDMI)



I F P D (UNUSED)



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| NET | PAIR | NV_CRITICAL | IMPEDANCE |
|---------------------------|-------------------------|-------------|-----------|
| I F P E _ A U X _ B Y P | I F P E _ A U X _ B Y P | 1 | 90DFF |
| I F P E _ A U X _ B Y P * | I F P E _ A U X _ B Y P | 1 | 90DFF |

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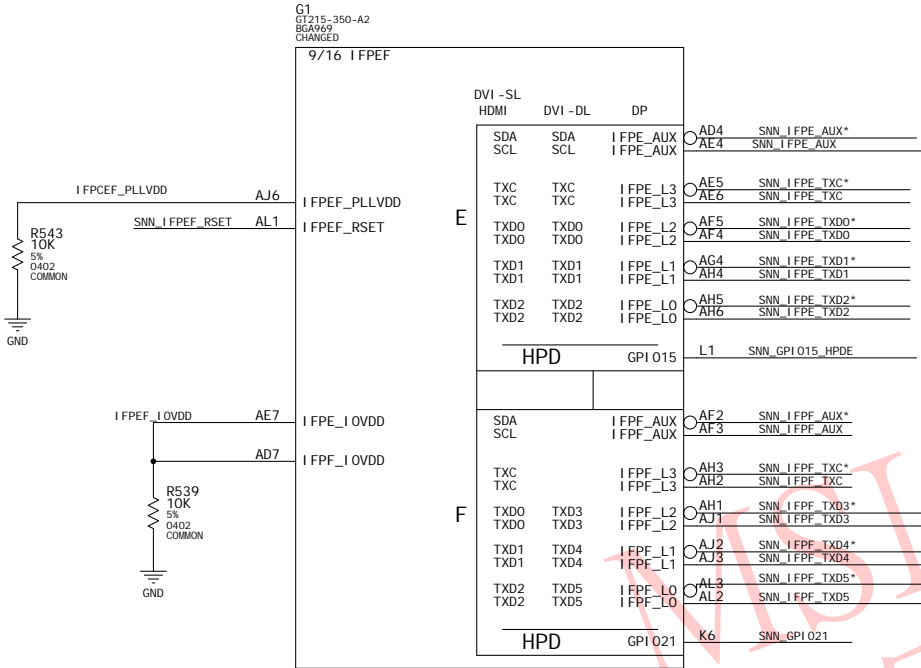
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| NAME | Garrett Hall | DATE | 30-OCT-2009 |

I FP EF (unused)



| NET | PAIR | NV_CRIT ICAL | IMPEDANCE |
|--------------|-------------|--------------|-----------|
| I FPEF_TXC* | I FPEF_TXC | 1 | 90D FF |
| I FPEF_TXC | I FPEF_TXC | 1 | 90D FF |
| I FPE_TXC* | I FPE_TXC | 1 | 90D FF |
| I FPE_TXC | I FPE_TXC | 1 | 90D FF |
| I FPE_TXD0* | I FPE_TXD0 | 1 | 90D FF |
| I FPE_TXD0 | I FPE_TXD0 | 1 | 90D FF |
| I FPE_TXD1* | I FPE_TXD1 | 1 | 90D FF |
| I FPE_TXD1 | I FPE_TXD1 | 1 | 90D FF |
| I FPE_TXD2* | I FPE_TXD2 | 1 | 90D FF |
| I FPE_TXD2 | I FPE_TXD2 | 1 | 90D FF |
| I FPF_TXD3* | I FPF_TXD3 | 1 | 90D FF |
| I FPF_TXD3 | I FPF_TXD3 | 1 | 90D FF |
| I FPF_TXD4* | I FPF_TXD4 | 1 | 90D FF |
| I FPF_TXD4 | I FPF_TXD4 | 1 | 90D FF |
| I FPF_TXD5* | I FPF_TXD5 | 1 | 90D FF |
| I FPF_TXD5 | I FPF_TXD5 | 1 | 90D FF |
| I FPEF_TXD3* | I FPEF_TXD3 | 1 | 90D FF |
| I FPEF_TXD3 | I FPEF_TXD3 | 1 | 90D FF |
| I FPEF_TXD4* | I FPEF_TXD4 | 1 | 90D FF |
| I FPEF_TXD4 | I FPEF_TXD4 | 1 | 90D FF |
| I FPEF_TXD5* | I FPEF_TXD5 | 1 | 90D FF |
| I FPEF_TXD5 | I FPEF_TXD5 | 1 | 90D FF |
| I FPEF_TXD0* | I FPEF_TXD0 | 1 | 90D FF |
| I FPEF_TXD0 | I FPEF_TXD0 | 1 | 90D FF |
| I FPEF_TXD1* | I FPEF_TXD1 | 1 | 90D FF |
| I FPEF_TXD1 | I FPEF_TXD1 | 1 | 90D FF |
| I FPEF_TXD2* | I FPEF_TXD2 | 1 | 90D FF |
| I FPEF_TXD2 | I FPEF_TXD2 | 1 | 90D FF |
| I FPE_AUX* | I FPE_AUX | 1 | 90D FF |
| I FPE_AUX | I FPE_AUX | 1 | 90D FF |

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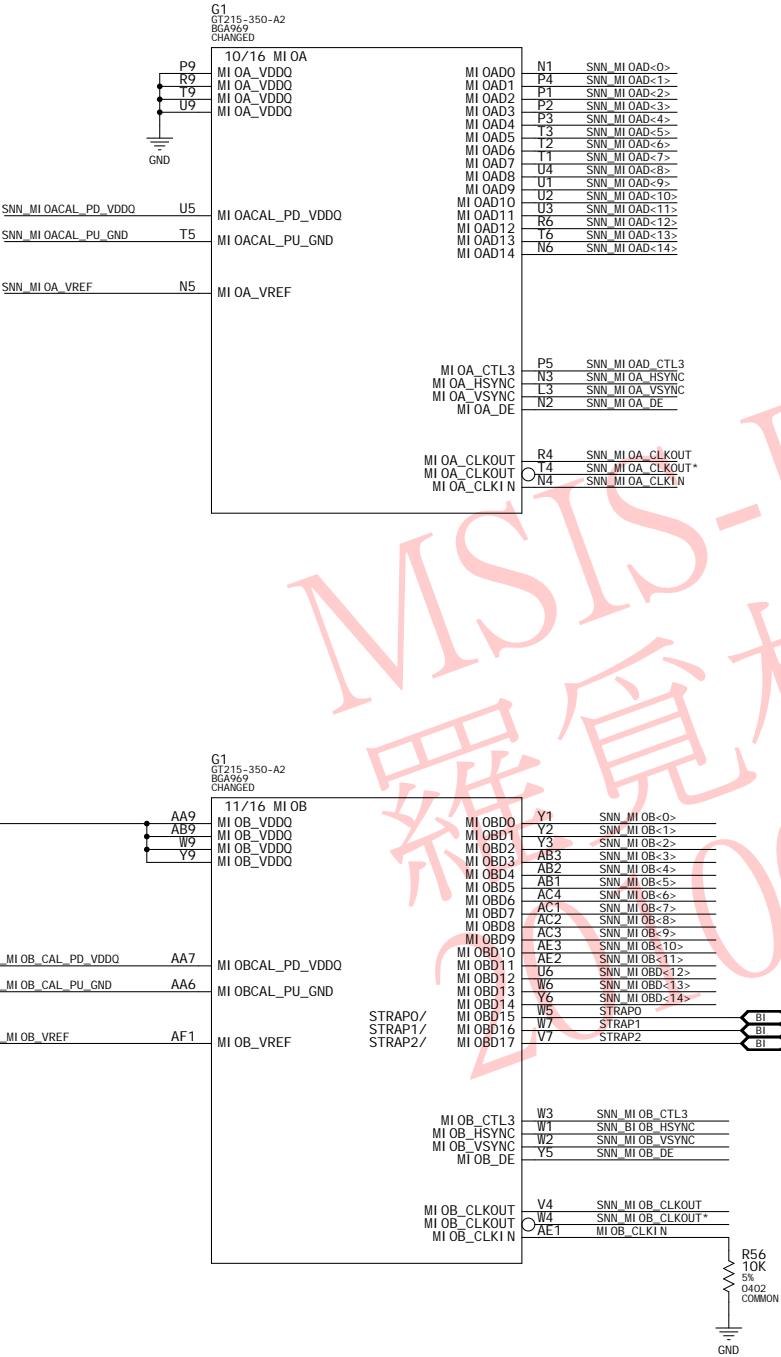


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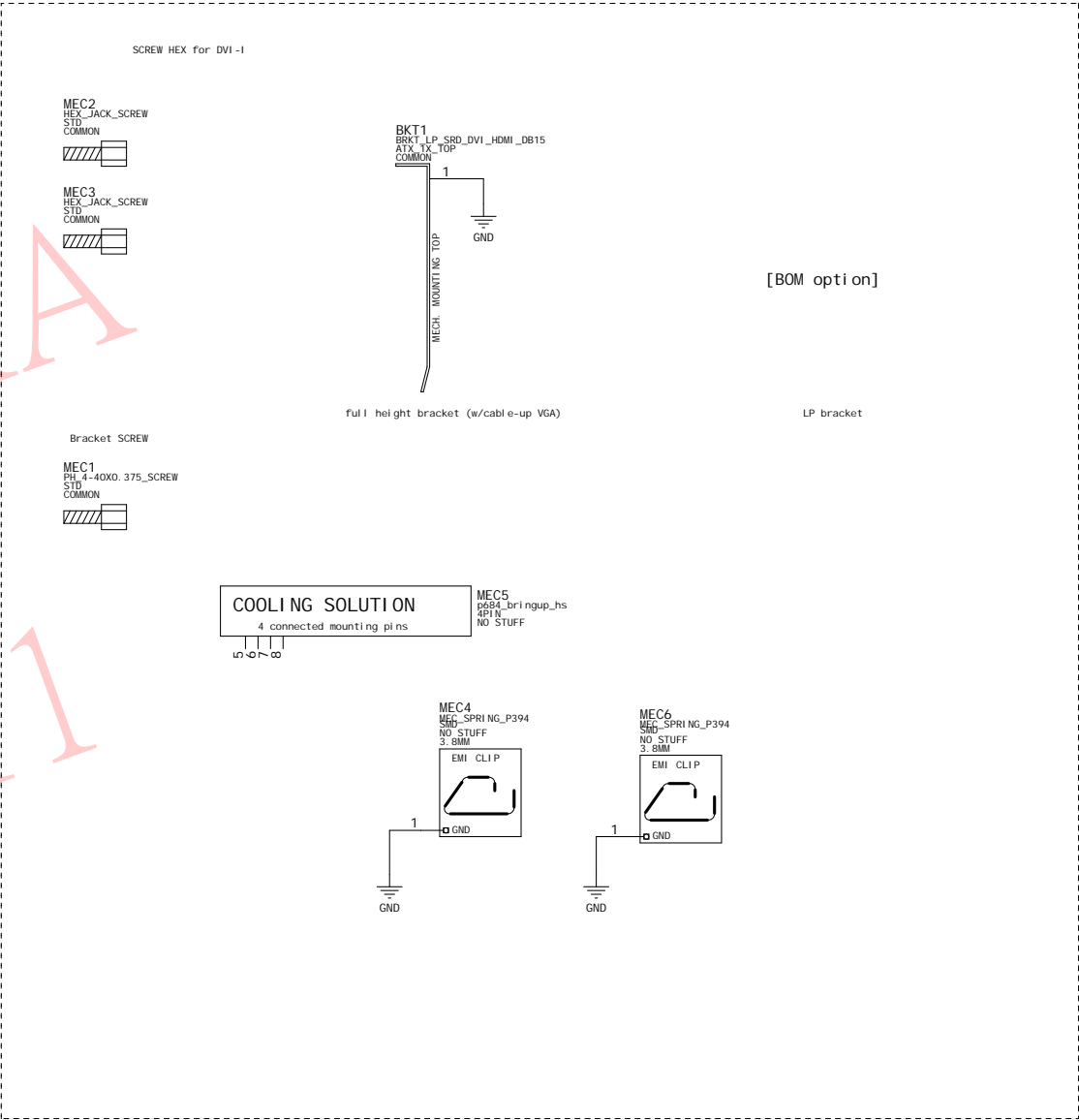
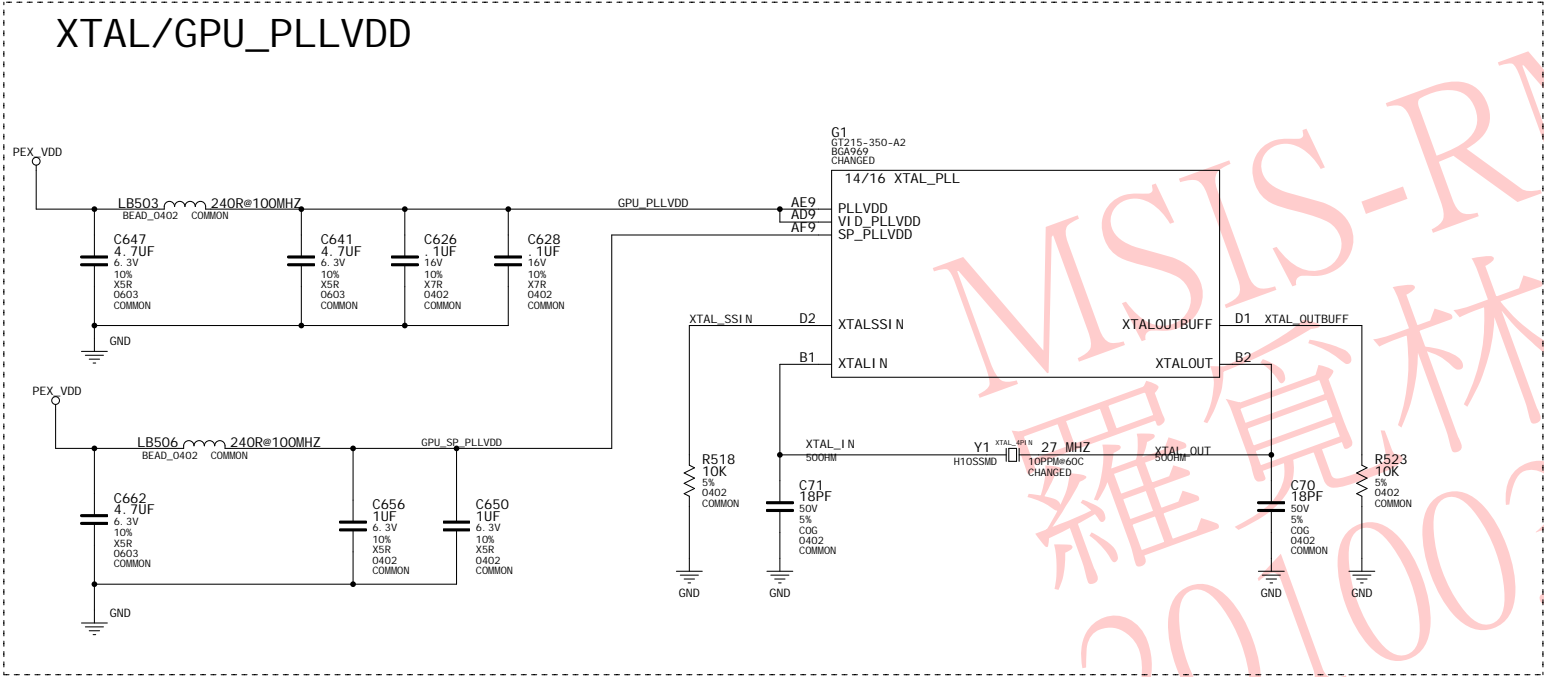
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| NAME | Garrett Hall | DATE | 30-OCT-2009 |

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| ASSEMBLY | GT215-255 540/1302MHz 1024MB 64Mx16 BGA100 790MHz DDR3 DVI-I /HDMI /VGA |
| PAGE DETAIL | I FP EF (unused) |

MI OA & MI OB



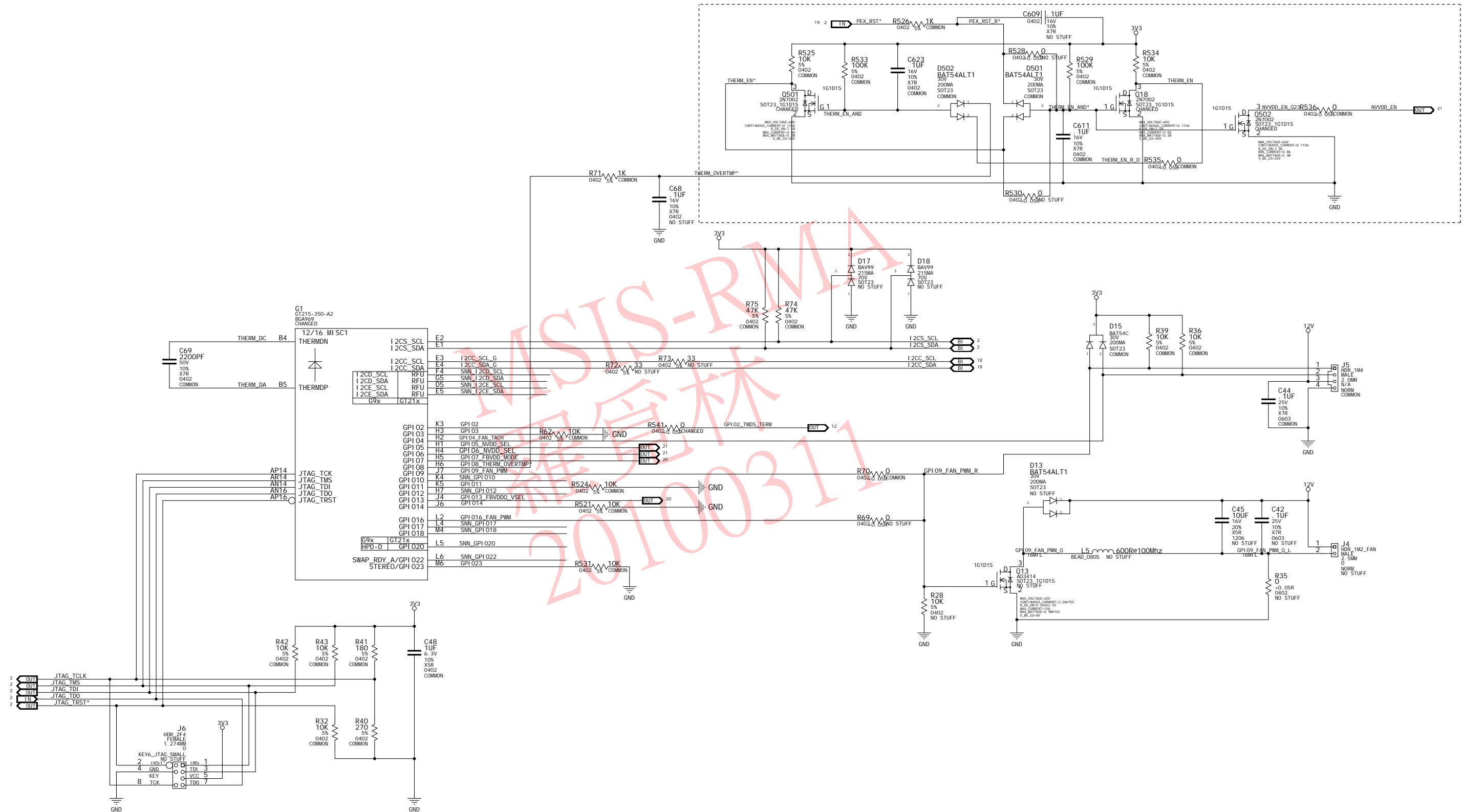
XTAL, MECHANICALS, THERMALS



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FAN CONTROL, GPIO, JTAG

OVERTEMP LATCH



| | |
|-------------|---|
| ASSEMBLY | GT215-255 540/1302MHz 1024MB 64Mx16 BGA100 790MHz DDR3 DVI-I /HDMI /VGA |
| PAGE DETAIL | FAN CONTROL, GPIO, JTAG |

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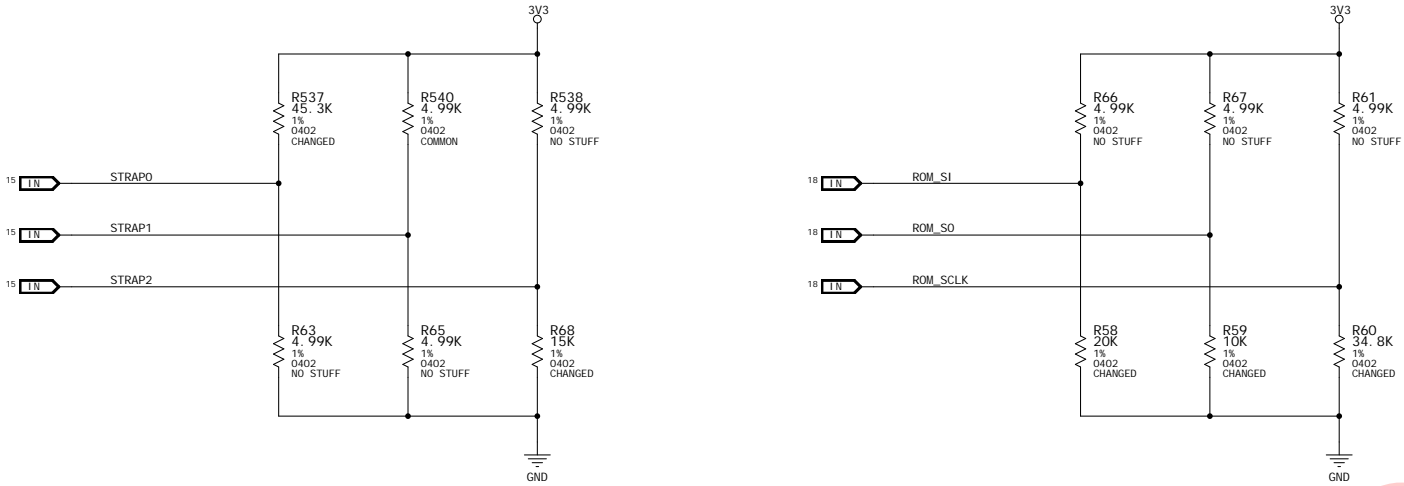


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| NV_PN | 600-10684-0015-100 A |
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|------|--------------|------|-------------|
| ID | p684a01 | PAGE | 17 OF 21 |
| NAME | Garrett Hall | DATE | 30-OCT-2009 |

BIOS ROM, HDCP ROM, STRAPPING OPTIONS

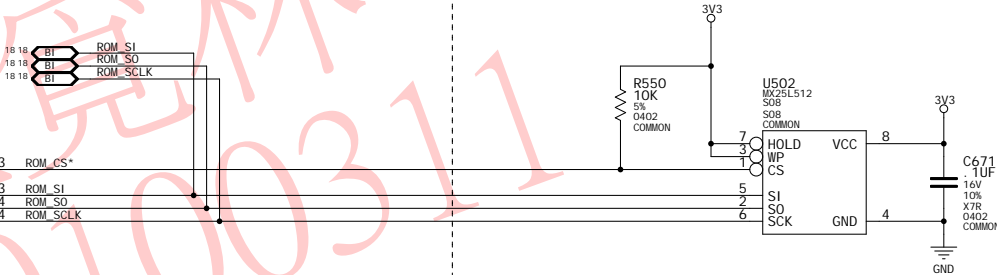
STRAPPING OPTIONS



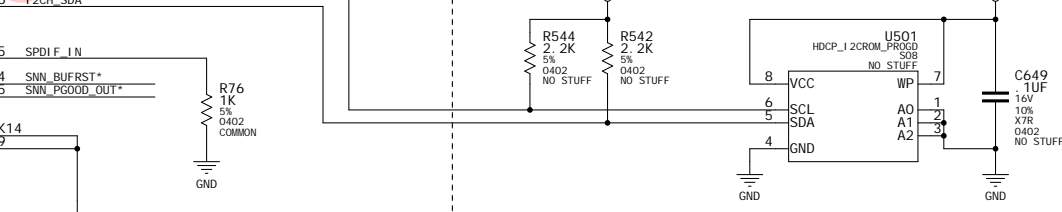
| | | | | | |
|--------|-----------------|-------------------------|---------------|----------|-----------|
| Strap0 | USER[3:0] | EDID: 1111 | 45k pull up | | |
| Strap1 | 3GIOADCFG[3:0] | sku0: 0000 | 5k pull down | 0 5k PD | 8 5k PU |
| | | sku11, 12, 13, 14: 1000 | 5k pull up | 1 10k PD | 9 10k PU |
| | | | | 2 15k PD | 10 15k PU |
| Strap2 | PCI_DEVICE[3:0] | GT216-350: 0A20 | 5k pull down | 3 20k PD | 11 20k PU |
| | | GT215-350: 0CA3 | 20k pull down | 4 25k PD | 12 25k PU |
| | | GT215-250: 0CA2 | 15k pull down | 5 30k PD | 13 30k PU |
| | | GT215-250 NVS: 0CA6 | 35k pull down | 6 35k PD | 14 35k PU |
| | | GT215-350 NVS: 0CA7 | 45k pull down | 7 45k PD | 15 45k PU |
| | | GT216-205: 0A22 | 15k pull down | | |
| | | GT215-255: 0CA2 | 15k pull down | | |

| | | | |
|----------|-----------------------|---------------------------|---------------|
| ROM_SI | RAMCFG[3:0] | 64Mx16 DDR3 Hynix: 0010 | 15k pull down |
| | | 64Mx16 DDR3 Samsung: 0011 | 20k pull down |
| ROM_SO | 3: XCLK_417 | | |
| | 2: FB[0] | | |
| | 1: SMB_ALT_ADDR | 0001 | 10k PD |
| | 0: VGA_DEVICE | | |
| ROM_SCLK | 3: PCI_DEV_EXT | | |
| | 2: SUB_VENDOR | 0110 | 35k PD |
| | 1: SLOT_CLK_CFG | | |
| | 0: PEX_PLL_EN_TERM100 | | |

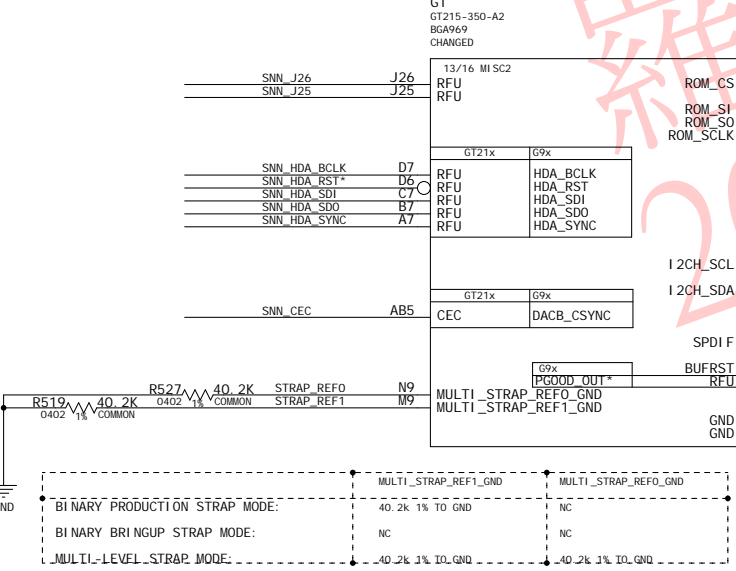
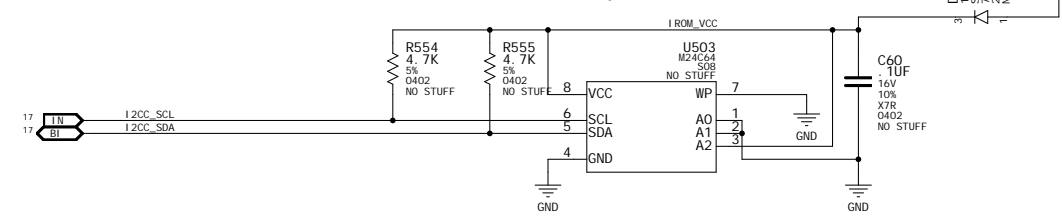
BIOS ROM(serial)



HDCP I2C EEROM



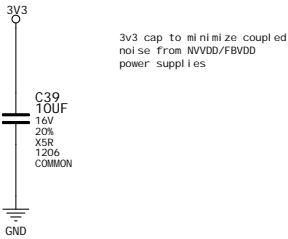
INFOROM



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| NV_PN | 600-10684-0015-100 A | | |
| ID | p684a01 | PAGE | 18 OF 21 |
| NAME | Garrett Hall | DATE | 30-OCT-2009 |

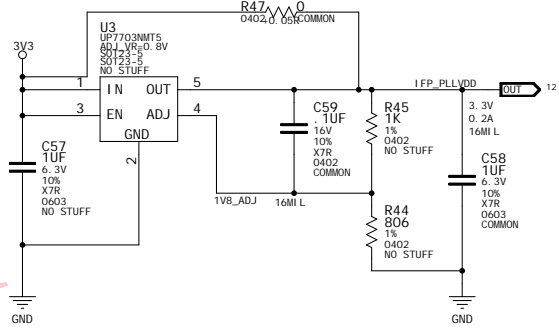
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LINEAR POWER SUPPLIES



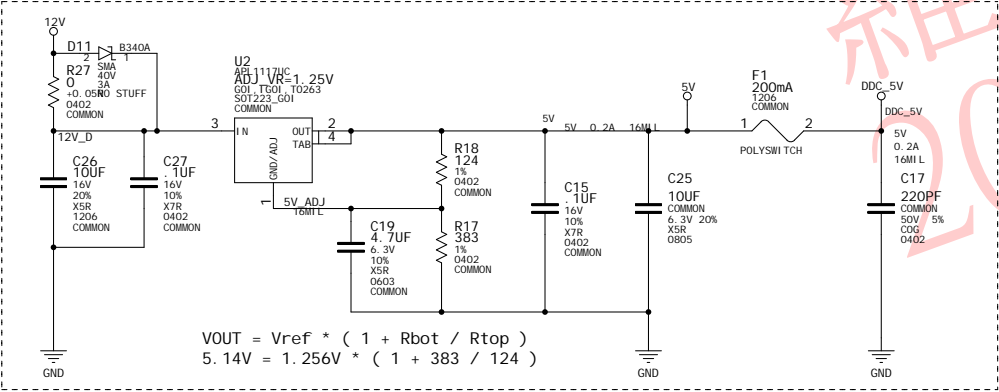
3v3 cap to minimize coupled noise from NVDD/FBVD power supplies

IFP_PLLVDD SUPPLY



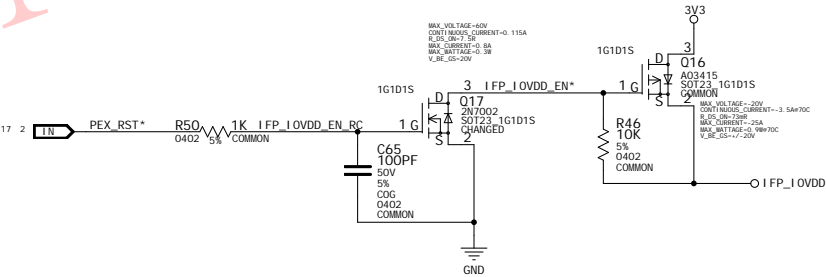
$$V_{OUT} = V_{ref} * (1 + R_{bot} / R_{top})$$
$$1.793V = 0.8V * (1 + 1k / 0.806k)$$

5V & DDC_5V REGULATOR



$$V_{OUT} = V_{ref} * (1 + R_{bot} / R_{top})$$
$$5.14V = 1.256V * (1 + 383 / 124)$$

IFP_IOVDD BACKDRIVE PREVENTION



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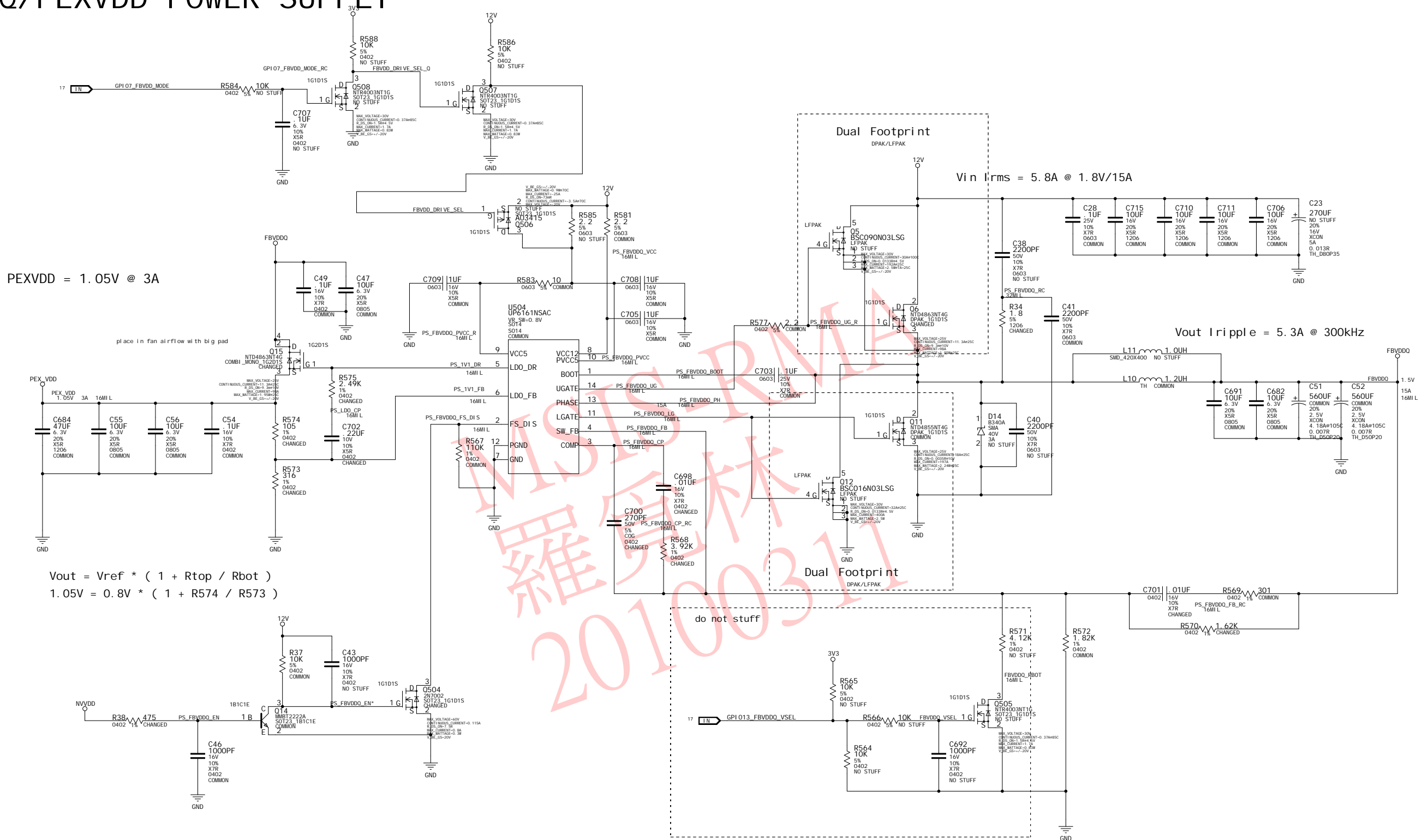
NV_PN 600-10684-0015-100 A

ID p684a01 PAGE 19 OF 21

NAME Garrett Hall DATE 30-OCT-2009

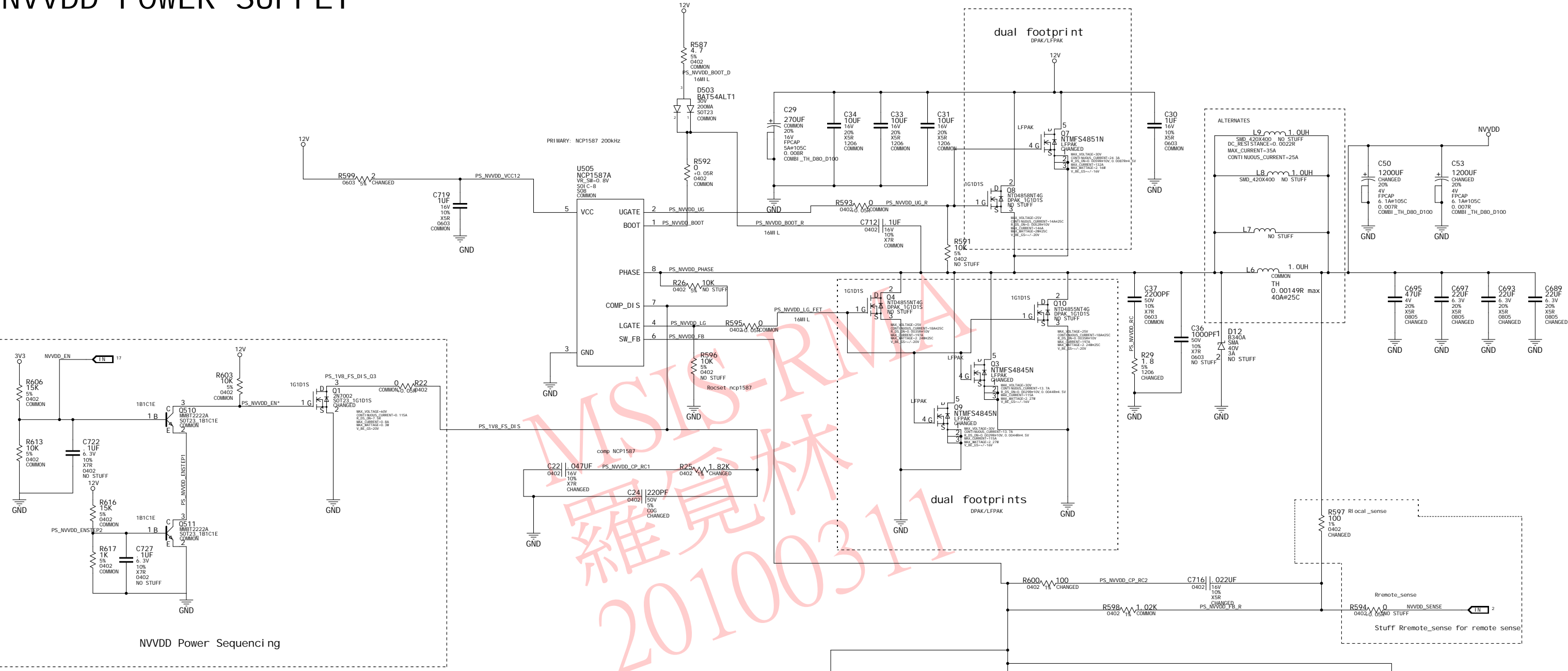
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FBVDDQ/PEXVDD POWER SUPPLY



$$1.50V = 0.8V * (1 + R570 / R572) @ GPI013 = 0 \text{ [DEFAULT]}$$

NVVDD POWER SUPPLY



Net Name MI N LINE WIDTH VOLTAGE NV_NET_MAX_CURRENT

| | | | | |
|-----------------|-------|--------|----|-----|
| NVVDD | NVVDD | 16MI L | 1V | 20A |
| PS_NVVDD_VCC5 | | 16MI L | | |
| PS_NVVDD_VCC12 | | 16MI L | | |
| PS_NVVDD_VVCC5 | | 16MI L | | |
| PS_NVVDD_BOOT | | 16MI L | | |
| PS_NVVDD_UG | | 16MI L | | |
| PS_NVVDD_PHASE | | 16MI L | | |
| PS_NVVDD_LG | | 16MI L | | |
| PS_NVVDD_FB | | 12MI L | | |
| PS_NVVDD_CP | | 12MI L | | |
| PS_NVVDD_UG_R | | 16MI L | | |
| PS_NVVDD_CP_RC1 | | 12MI L | | |
| PS_NVVDD_CP_RC2 | | 12MI L | | |
| PS_NVVDD_FB_R | | 12MI L | | |
| PS_NVVDD_RC | | 12MI L | | |