P727-A01: G96, GB1-128, GDDR3, DL-DVI, DL-DVI/VGA, SD/HDTV

PAGE SUMMARY:

SKU	VARIANT	NVPN	ASSEMBLY
B	BASE	600-10727-base-sch	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
1	SKU0000	600-10727-0000-100	G96-400, 625/800MHz 256MB 16Mx32 GDDR3, DVI DVI HDTV-Out
2	SKU0001	600-10727-0001-100	G96-300, 550/800MHz 256MB 16Mx32 GDDR3, DVI DVI HDTV-Out
3	SKU0002	600-10727-0002-100	G96-300, 550/800Mhz 256MB 16Mx32 GDDR3, DVI DVI
4	<UNDEFINED>	<UNDEFINED>	<UNDEFINED>
5	<UNDEFINED>	<UNDEFINED>	<UNDEFINED>
6	<UNDEFINED>	<UNDEFINED>	<UNDEFINED>
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8	<UNDEFINED>	<UNDEFINED>	<UNDEFINED>
9	<UNDEFINED>	<UNDEFINED>	<UNDEFINED>
10	<UNDEFINED>	<UNDEFINED>	<UNDEFINED>
11	<UNDEFINED>	<UNDEFINED>	<UNDEFINED>
12	<UNDEFINED>	<UNDEFINED>	<UNDEFINED>
13	<UNDEFINED>	<UNDEFINED>	<UNDEFINED>
14	<UNDEFINED>	<UNDEFINED>	<UNDEFINED>
15	<UNDEFINED>	<UNDEFINED>	<UNDEFINED>

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	TABLE OF CONTENTS

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16X PEX INTERFACE

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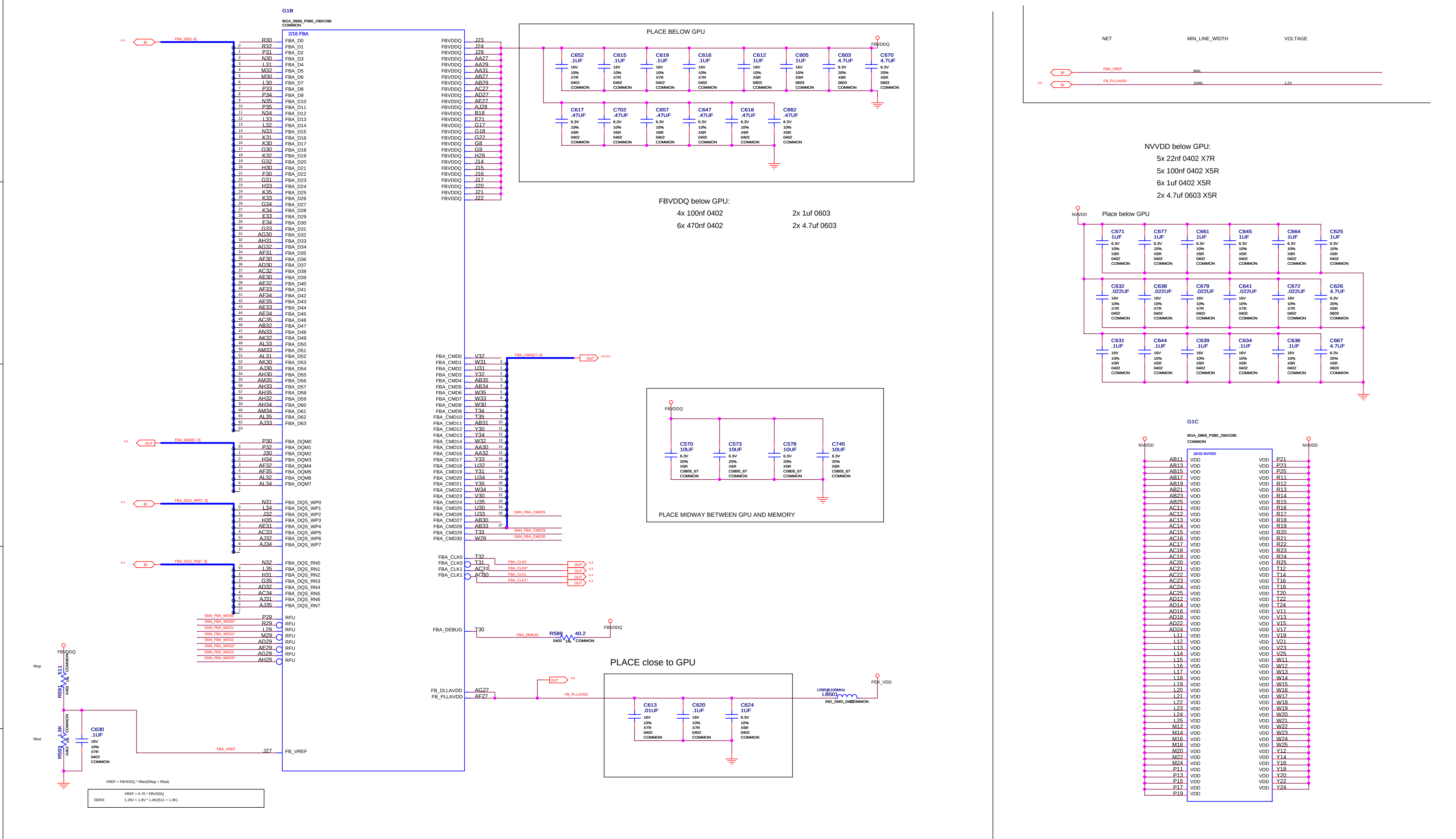

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	FBA MEMORY INTERFACE, GPU NVVDD & FBVDDQ DECOUPLING CAPS

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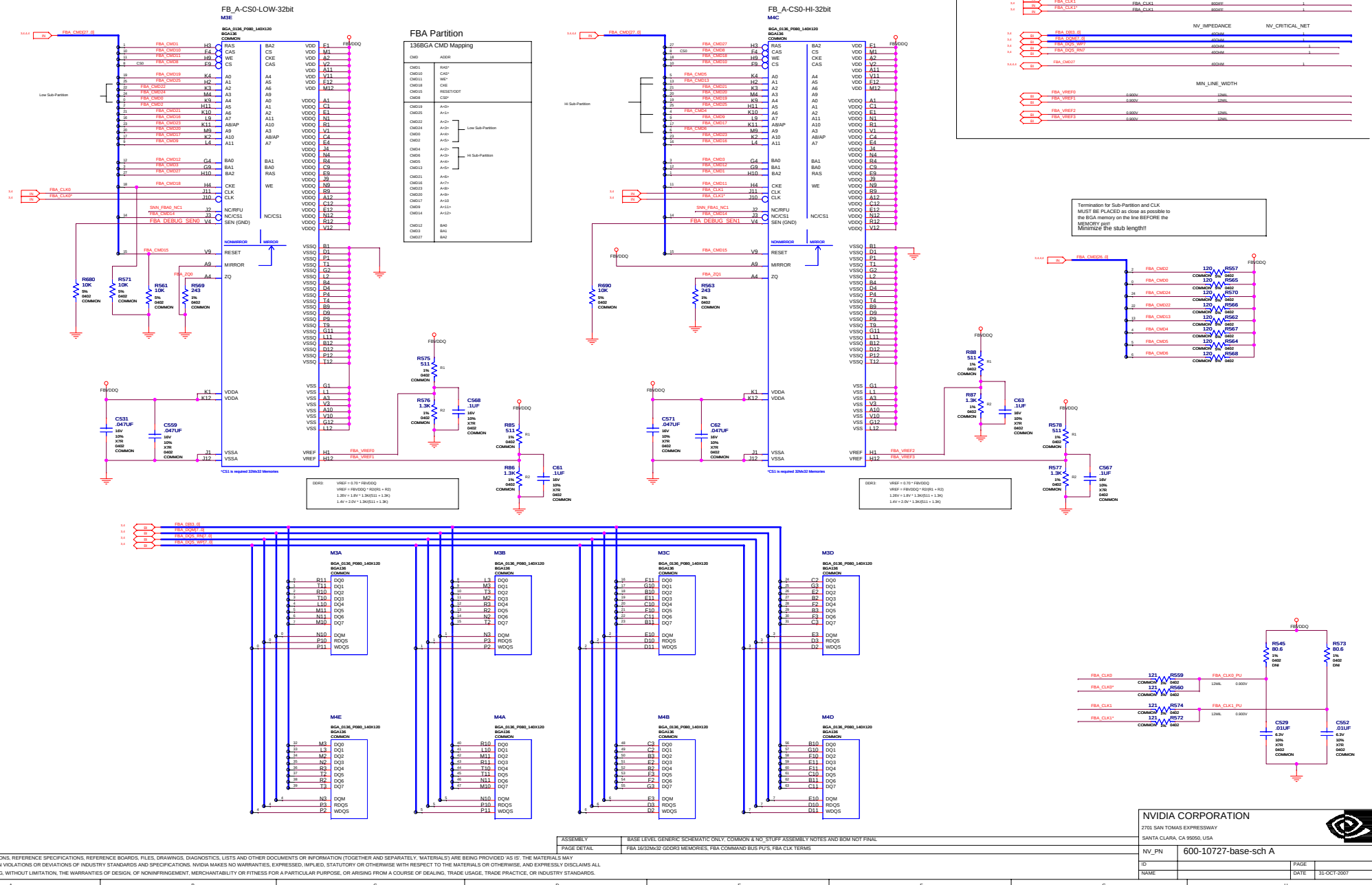
FrameBuffer: Partition A 16/32Mx32 BGA136 GDDR3



NET	DIFFPAIR	NV_IMPEDANCE	NV_CRITICAL_NET
FBA_CLK0	FBA_CLK0	80OHM	1
FBA_CLK0*	FBA_CLK0	80OHM	1
FBA_CLK1	FBA_CLK1	80OHM	1
FBA_CLK1*	FBA_CLK1	80OHM	1

NET	NV_IMPEDANCE	NV_CRITICAL_NET
FBA_DBI1..0	40OHM	1
FBA_DQM7..0	40OHM	1
FBA_DQS_WP7	40OHM	1
FBA_DQS_RN7	40OHM	1
FBA_CMD27	40OHM	1

MIN_LINE_WIDTH			
FBA_VREF0	0.900V	12MIL	
FBA_VREF1	0.900V	12MIL	
FBA_VREF2	0.900V	12MIL	
FBA_VREF3	0.900V	12MIL	

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	FBA 16/32Mx32 GDDR3 MEMORIES, FBA COMMAND BUS PU'S, FBA CLK TERMS

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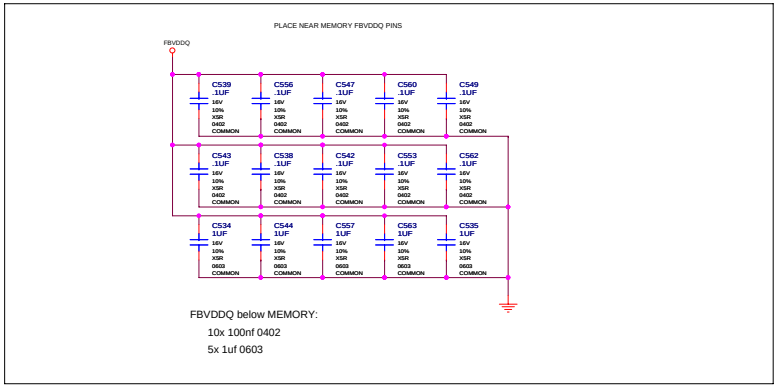
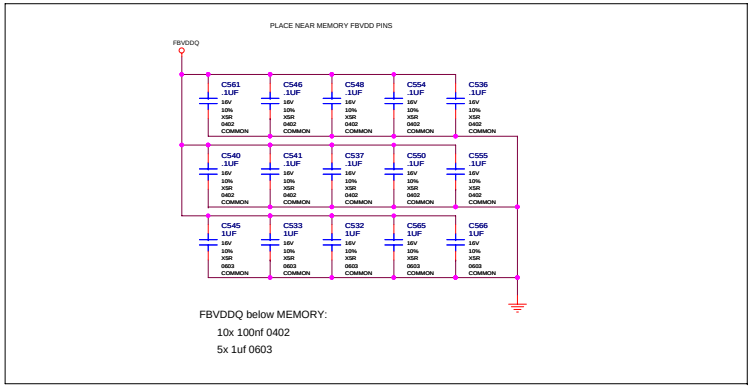
FRAME BUFFER: PARTITION A DECOUPLING

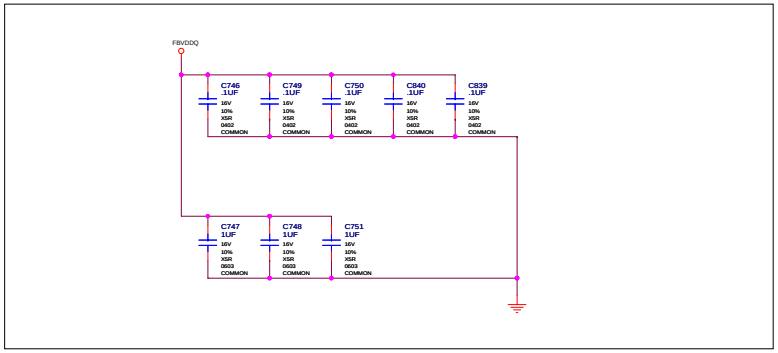
Decoupling for FBA 0..31



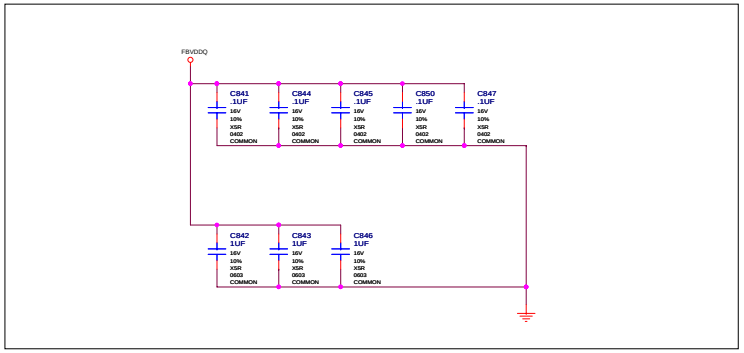
Decoupling for FBA 32..63



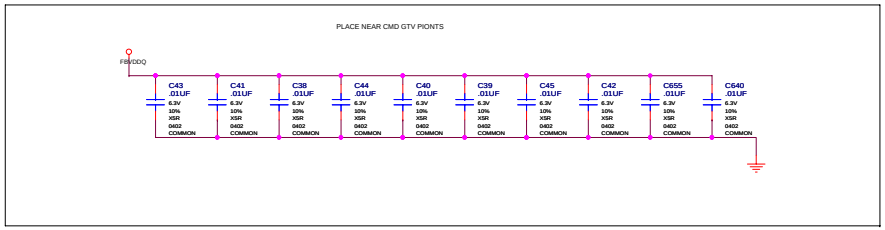
Decoupling for FBA A1 0..31



Decoupling for FBA A1 0..31



Return path coupling GND/FBVDDQ for FBA



ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	FBA MEMORY FBVDDQ DECOUPLING CAPS

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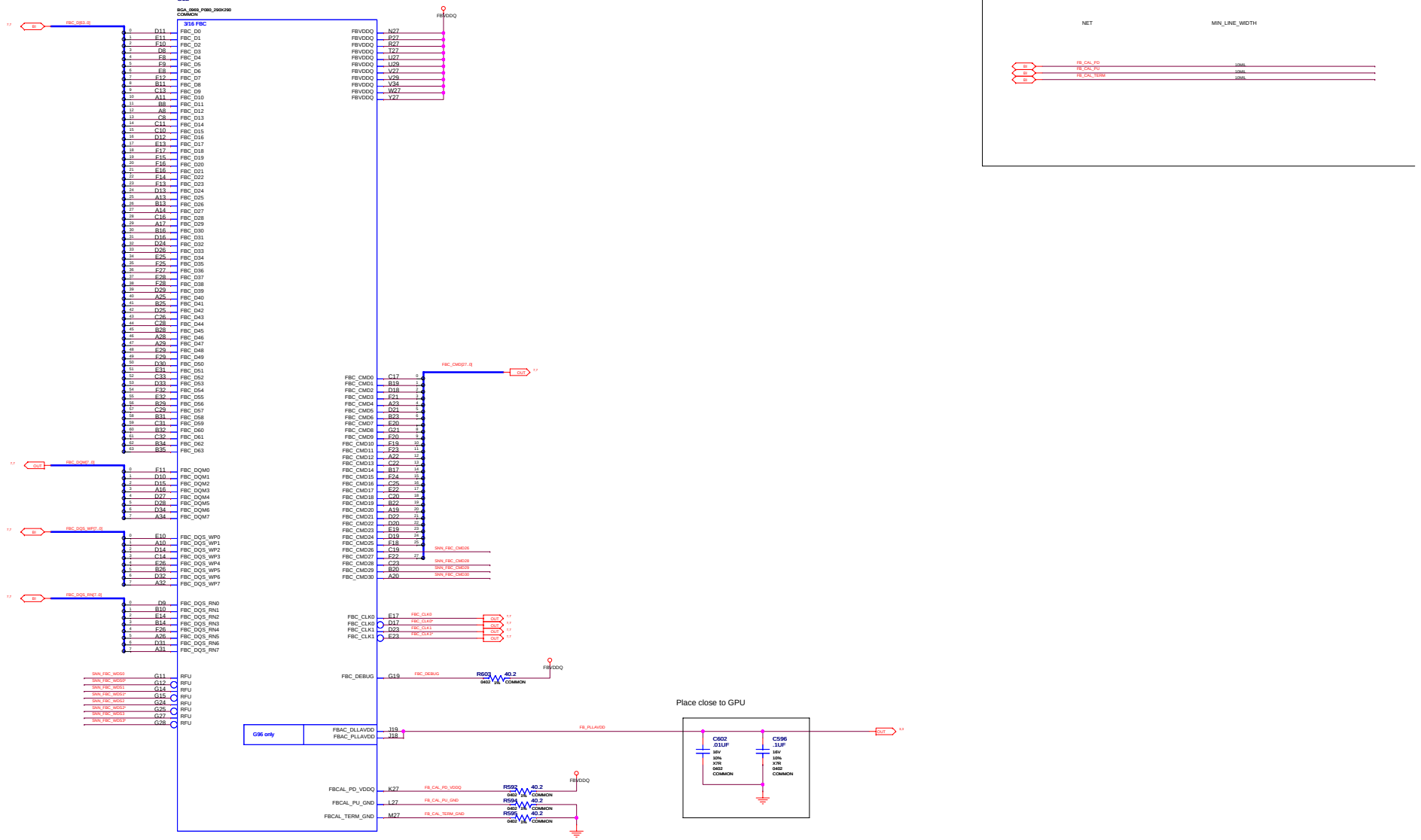

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	FBC MEMORY INTERFACE

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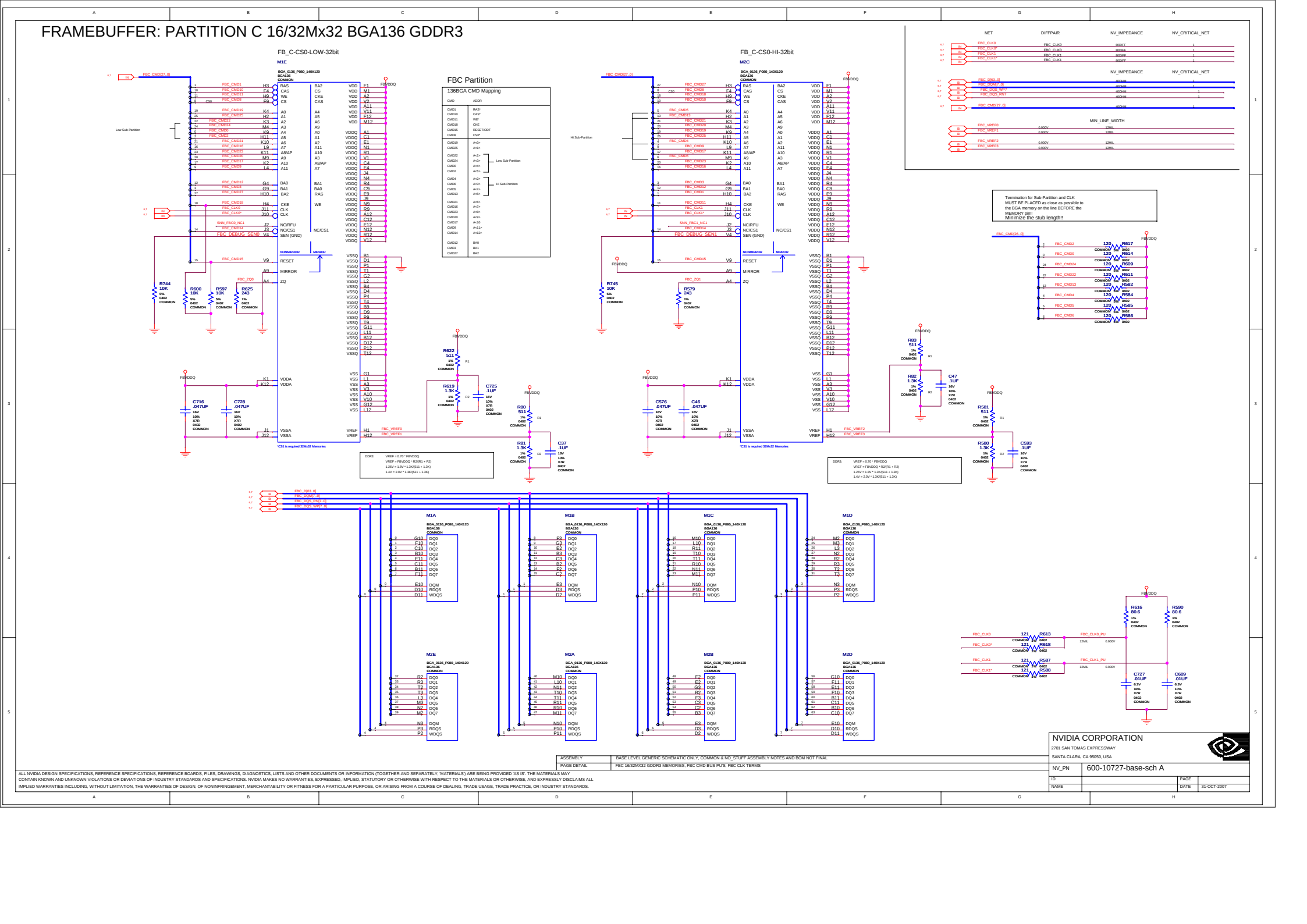
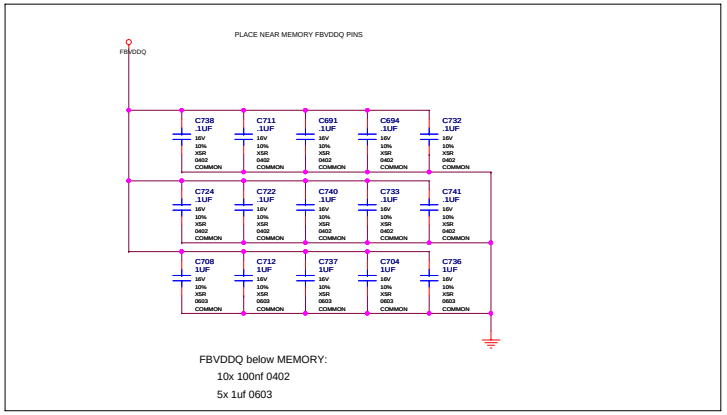
FRAMEBUFFER: PARTITION C 16/32Mx32 BGA136 GDDR3

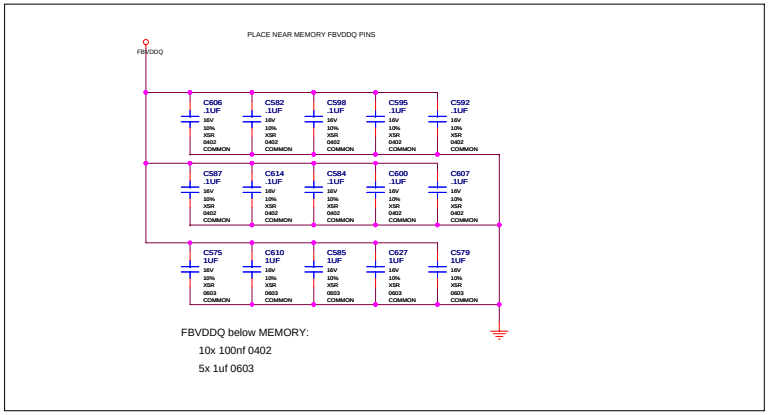


FRAMEBUFFER: PARTITION C DECOUPLING

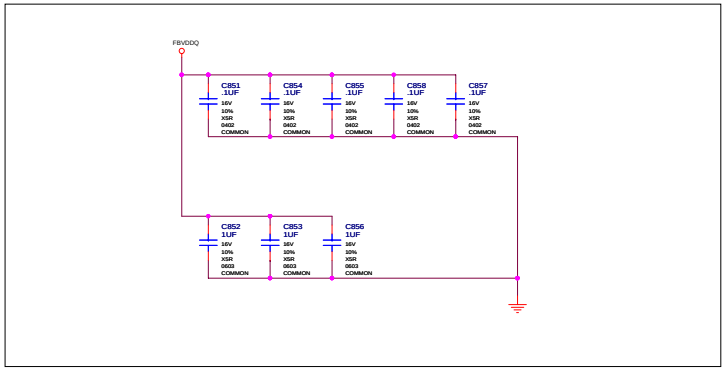
Decoupling for FBC 0..31



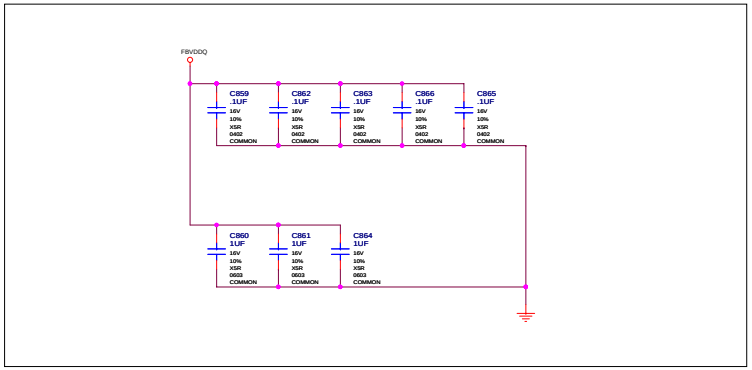
Decoupling for FBC 32..63



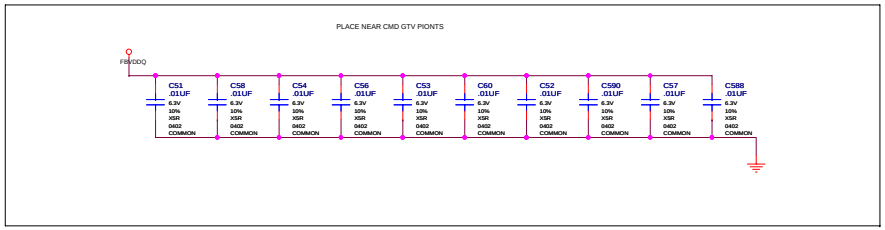
Decoupling for FBC C1 0..31

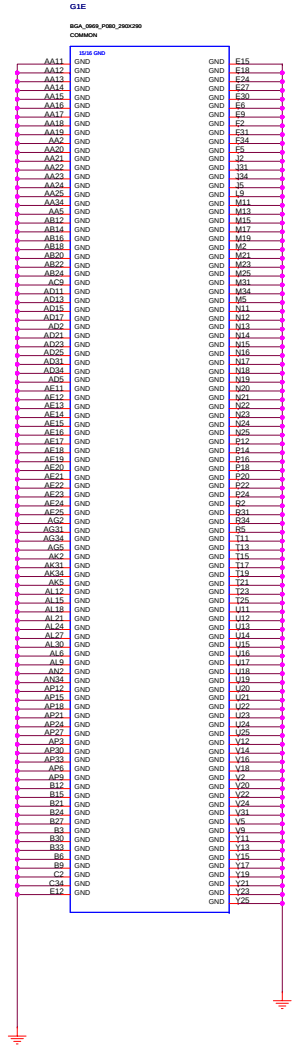


Decoupling for FBC C1 32..63



Return path coupling GND/FBVDDQ for FBC





ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	FBC MEMORY FBVDDQ DECOUPLING CAPS, GPU GND CONNECTIONS

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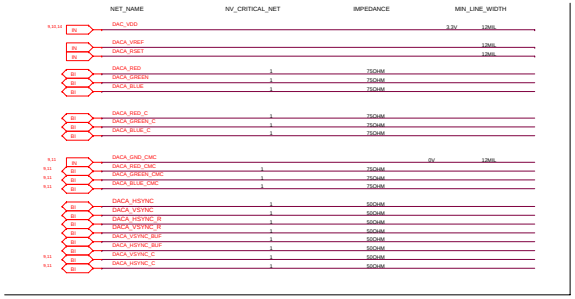
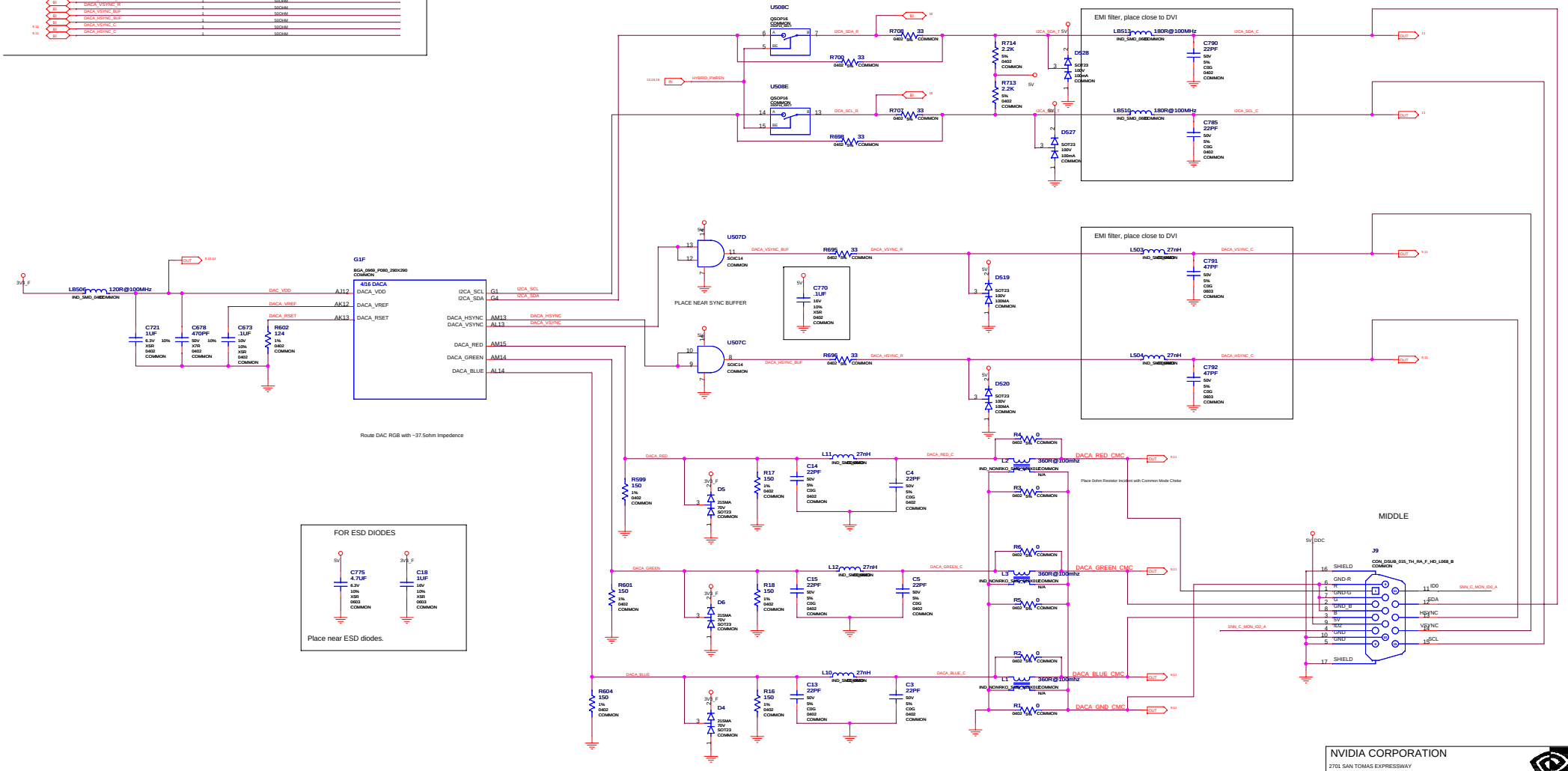
Primary Display (DACA), DVI-I

DACA RGB-FILTER





ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	DACA FILTERS, DACA SYNC BUFFERS & DB15 SOUTH

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Secondary Display (DACC), Slim DB15

DACC RGB-FILTER

NET_NAME	NV_CRITICAL_NET	IMPEDANCE	MIN_LINE_WIDTH
DACC_VREF			12MIL
DACC_RSET			12MIL
DACC_RED	1	75OHM	
DACC_GREEN	1	75OHM	
DACC_BLUE	1	75OHM	
DACC_RED_C	1	75OHM	
DACC_GREEN_C	1	75OHM	
DACC_BLUE_C	1	75OHM	
DACC_GND_CMC	0		12MIL
DACC_RED_CMC	1	75OHM	
DACC_GREEN_CMC	1	75OHM	
DACC_BLUE_CMC	1	75OHM	
DACC_HSYNC	1	50OHM	
DACC_VSYNC	1	50OHM	
DACC_VSYNC_R	1	50OHM	
DACC_HSYNC_R	1	50OHM	
DACC_VSYNC_BUF	1	50OHM	
DACC_HSYNC_BUF	1	50OHM	
DACC_VSYNC_C	1	50OHM	
DACC_HSYNC_C	1	50OHM	

FOR ESD DIODES

C771 1UF 16V 10% X5R 0603 COMMON

C19 1UF 16V 10% X5R 0603 COMMON

Place near ESD diodes.

U508D QSOP16 COMMON

U508B QSOP16 COMMON

R712 33 0402 5% COMMON

R701 33 0402 5% COMMON

R699 33 0402 5% COMMON

R697 33 0402 5% COMMON

R711 2.2K 5% 0402 COMMON

R706 2.2K 5% 0402 COMMON

D525 SOT23 100V 100mA COMMON

D526 SOT23 100V 100mA COMMON

EMI filter, place close to DVI

LB512 180R@100MHz IND_SMD_0603 COMMON

LB511 180R@100MHz IND_SMD_0603 COMMON

C787 22PF 50V 5% C0G 0402 COMMON

C786 22PF 50V 5% C0G 0402 COMMON

U507B SOIC14 COMMON

U507A SOIC14 COMMON

R685 33 0402 5% COMMON

R693 33 0402 5% COMMON

D513 SOT23 100V 100mA COMMON

D514 SOT23 100V 100mA COMMON

L501 27nH IND_SMD_0603 COMMON

L502 27nH IND_SMD_0603 COMMON

C788 47PF 50V 5% C0G 0603 COMMON

C789 47PF 50V 5% C0G 0603 COMMON

EMI filter, place close to DVI

MIDDLE

Place 0ohm Resistor Incident with Common Mode Choke

G1G BGA_096B_P080_290X290 COMMON

6/16 DACC

DACC_VDD AG7

DACC_VREF AK6

DACC_RSET AH7

I2CB_SCL G3

I2CB_SDA G2

DACC_HSYNC AM1

DACC_VSYNC AM2

DACC_RED AK4

DACC_GREEN AL4

DACC_BLUE AJ4

C710 470PF 50V 10% X7R 0402 COMMON

C726 4700PF 25V 10% X7R 0402 COMMON

C709 1UF 16V 10% X5R 0402 COMMON

R615 124 1% 0402 COMMON

R76 150 1% 0402 COMMON

R77 150 1% 0402 COMMON

R75 150 1% 0402 COMMON

D2 215MA 75V SOT23 COMMON

D3 215MA 75V SOT23 COMMON

D1 215MA 75V SOT23 COMMON

R14 150 1% 0402 COMMON

R15 150 1% 0402 COMMON

R13 150 1% 0402 COMMON

C11 22PF 50V 5% C0G 0402 COMMON

C12 22PF 50V 5% C0G 0402 COMMON

C10 22PF 50V 5% C0G 0402 COMMON

L8 27nH IND_SMD_0603 COMMON

L9 27nH IND_SMD_0603 COMMON

L7 27nH IND_SMD_0603 COMMON

C7 22PF 50V 5% C0G 0402 COMMON

C8 22PF 50V 5% C0G 0402 COMMON

C6 22PF 50V 5% C0G 0402 COMMON

R10 0 0402 5% COMMON

R9 0 0402 5% COMMON

R12 0 0402 5% COMMON

R11 0 0402 5% COMMON

R8 0 0402 5% COMMON

R7 0 0402 5% COMMON

L5 360R@100mhz IND_NONRKO_SMD_0603 COMMON N/A

L6 360R@100mhz IND_NONRKO_SMD_0603 COMMON N/A

L4 360R@100mhz IND_NONRKO_SMD_0603 COMMON N/A

J1 CON_DSUB_015_TH_RA_F_HD_LOBE_B COMMON

5V_DDC

SHIELD GND-R R GND-G G GND_B B 5V ID2 GND GND SHIELD

ID0 SDA HSYNC VSYNC SCL

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	DACC FILTERS, DACC SYNC BUFFERS & DB15 MID

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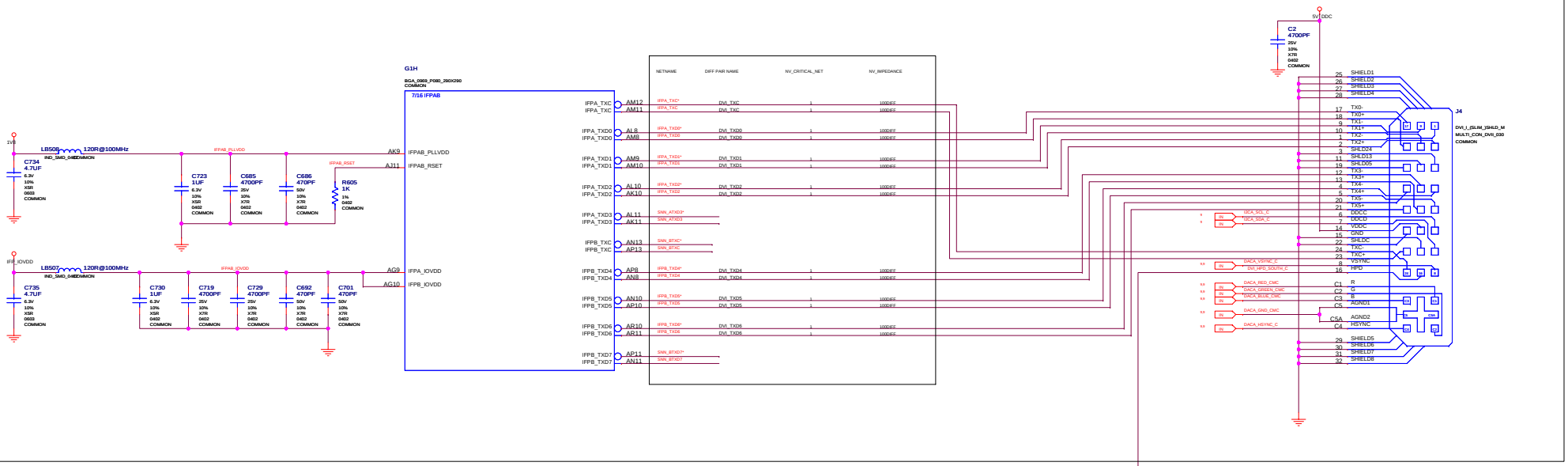
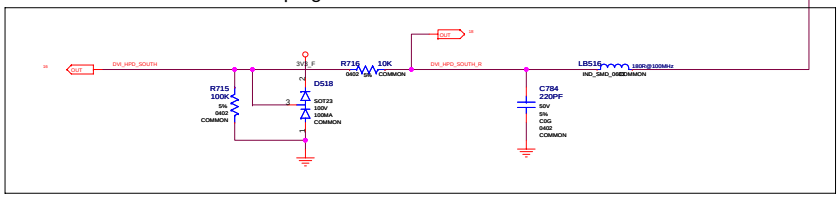
TMDS LINK: A & B



Hotplug Detection



NETNAME	MIN_LINE_WIDTH	VOLTAGE
IFPAB_PLLVDD	12MIL	1.8V
IFPAB_IOVDD	12MIL	3.3V
IFPABRSET	12MIL	

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	TMDS LINK A/B, DVI CONNECTOR SOUTH

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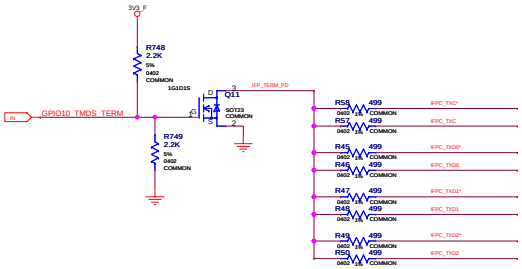
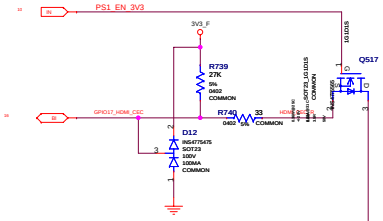
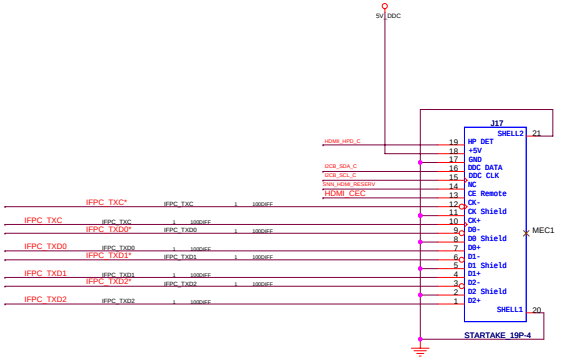
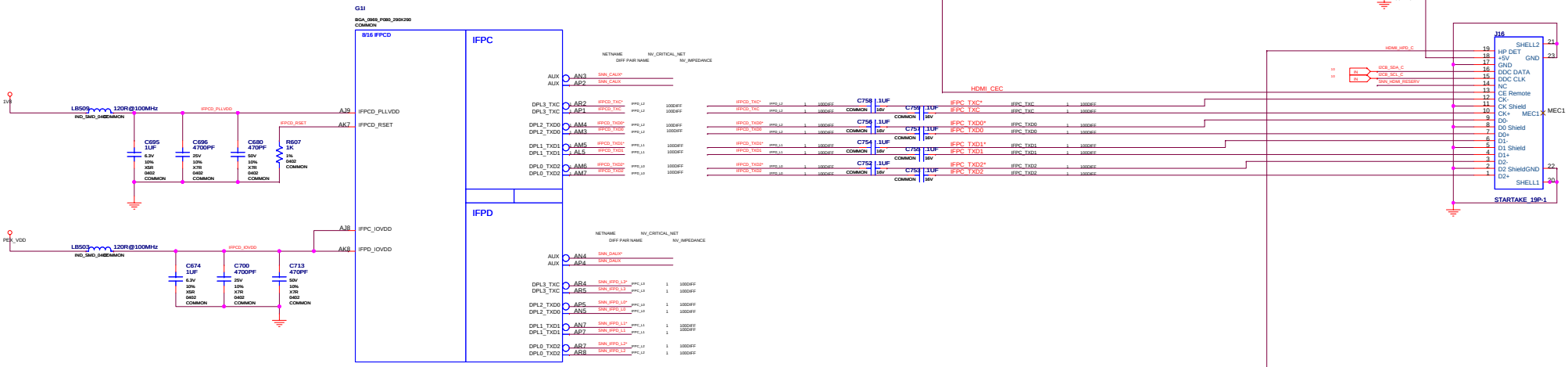
TMDS LINK: C & D

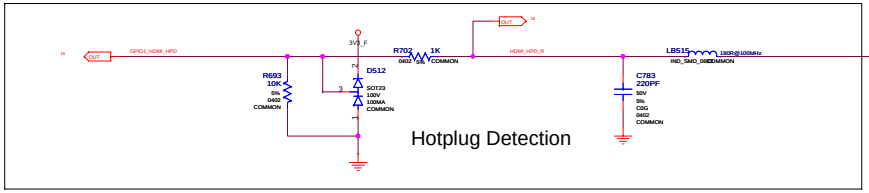






TMDS C : HDMI





NETNAME	MIN_LINE_WIDTH	VOLTAGE
IFPCD_PLLVDD	12MIL	1.8V
IFPCD_IOVDD	12MIL	3.3V
IFP_TERM_PD	20MIL	1.8V

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	TMDS LINK C/D, AC COUPLING, PD's, DVI CONNECTOR MID

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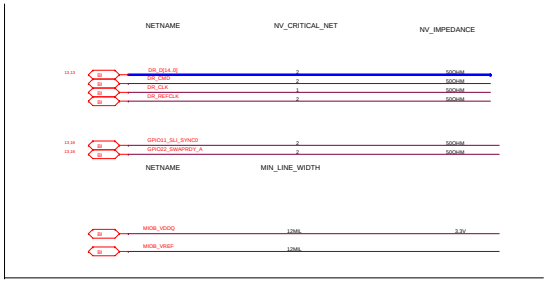
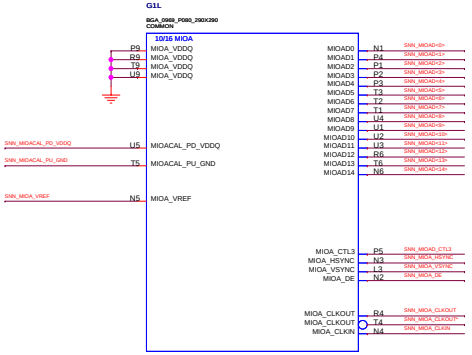
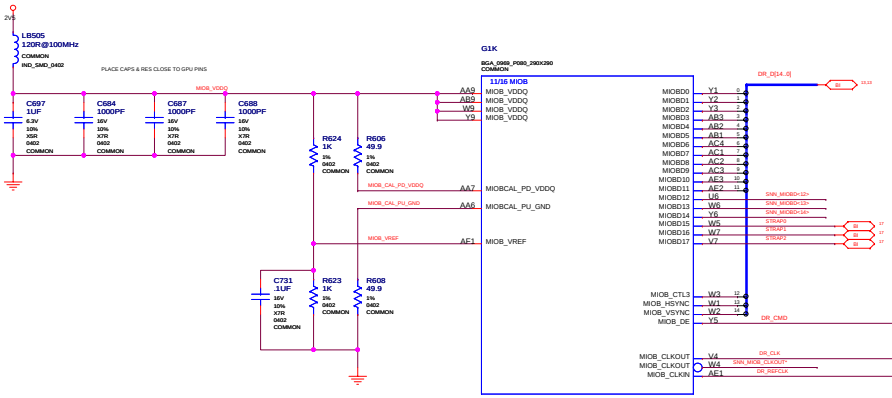
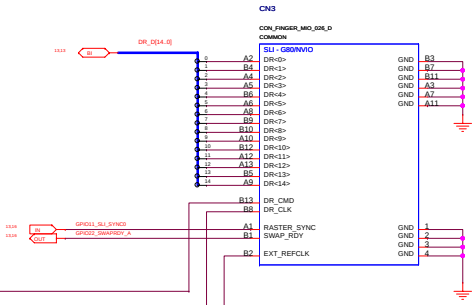
MIOA/B SLI







SLI Connector



ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	MIOA & MIOB, SLI CONNECTOR

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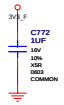
DACB: SD/HD VIDEO OUT CONNECTOR

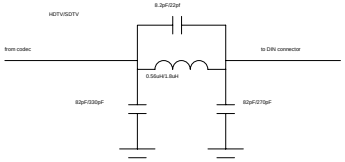
NET_NAME	MIN_LINE_WIDTH	NV_IMPEDANCE	NV_CRITICAL_NET
OUT DACB_C_OUT		75OHM	1
OUT DACB_CVBS_OUT		75OHM	1
OUT DACB_PB_OUT		75OHM	1
BI TV_PBOUT_C		75OHM	1
BI TV_COUT_C		75OHM	1
BI TV_YOUT_C		75OHM	1
IN DACB_VREF	12MIL		
IN DACB_RSET	12MIL		

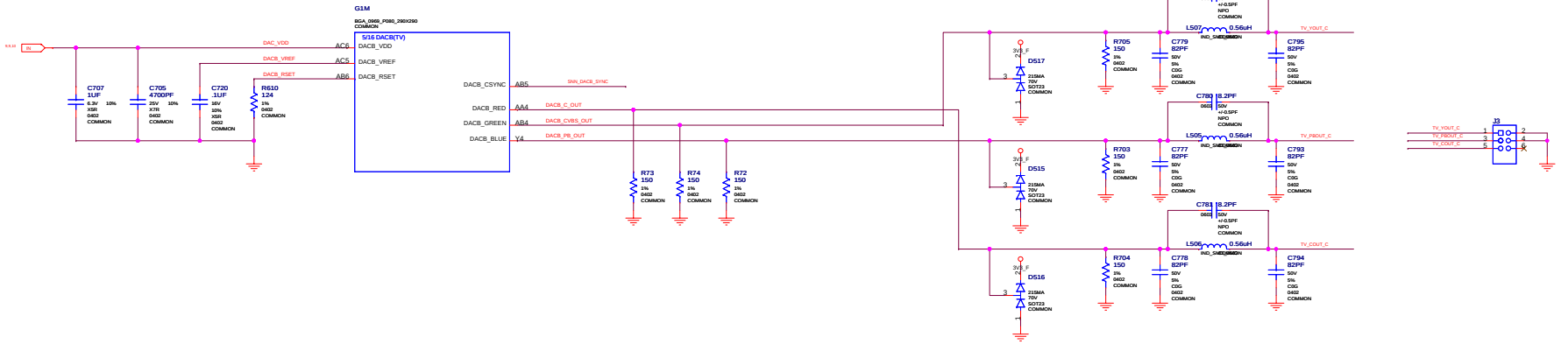
FOR ESD DIODES



Place near ESD diodes.

FILTER CIRCUIT





ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	DACB FILTERS, MINIDIN CONNECTOR NORTH, SD/HD VIDEO OUTPUT CONNECTOR

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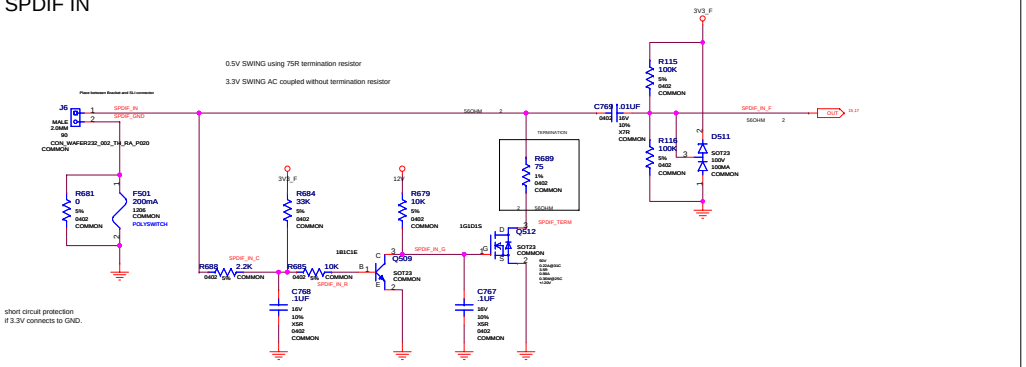
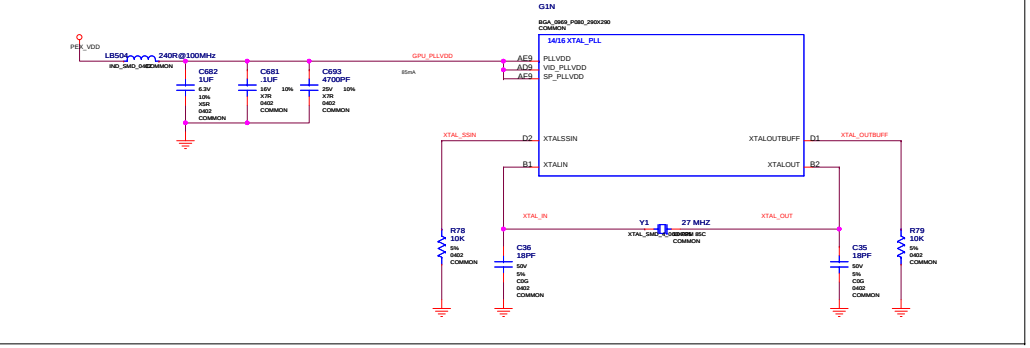
XTAL/PLLVDD/SPDIF IN

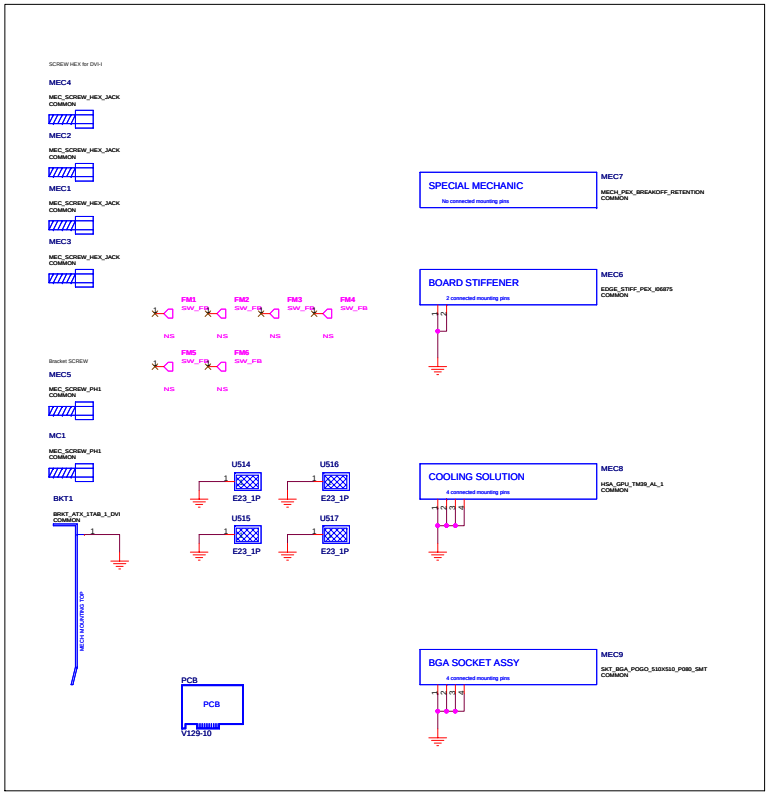
SPDIF IN



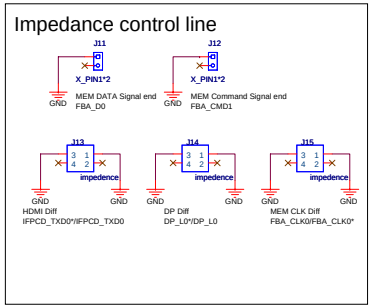
XTAL/GPU_PLLVDD

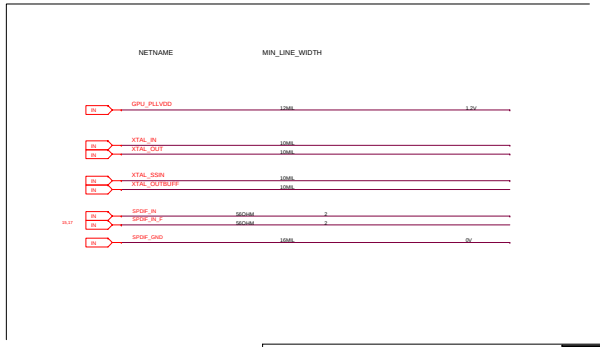


MECHANICALS & THERMALS



Impedance control line





ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	SPDIF-IN, XTAL, MECHANICALS, THERMALS

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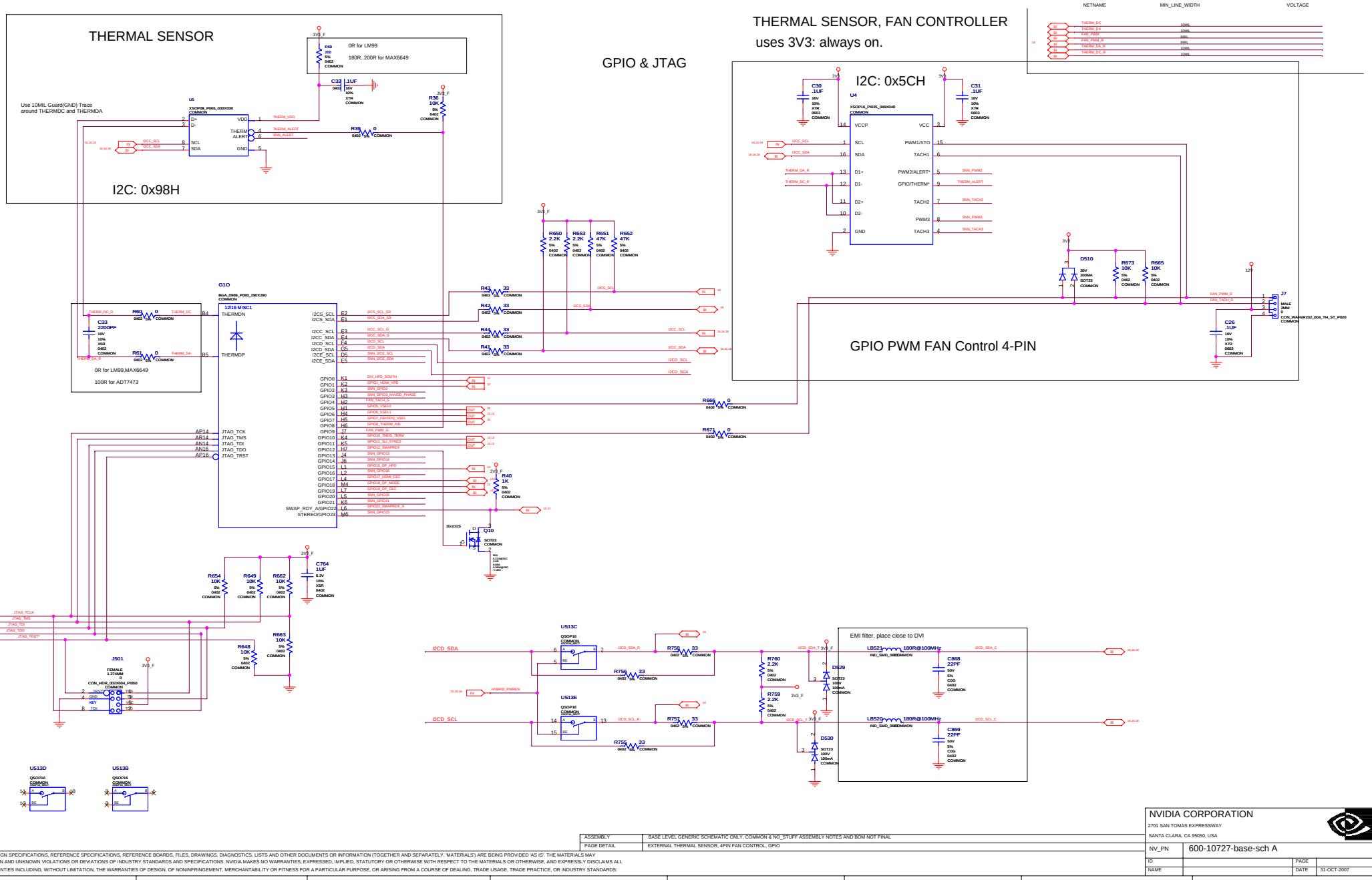

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	EXTERNAL THERMAL SENSOR, 4PIN FAN CONTROL, GPIO

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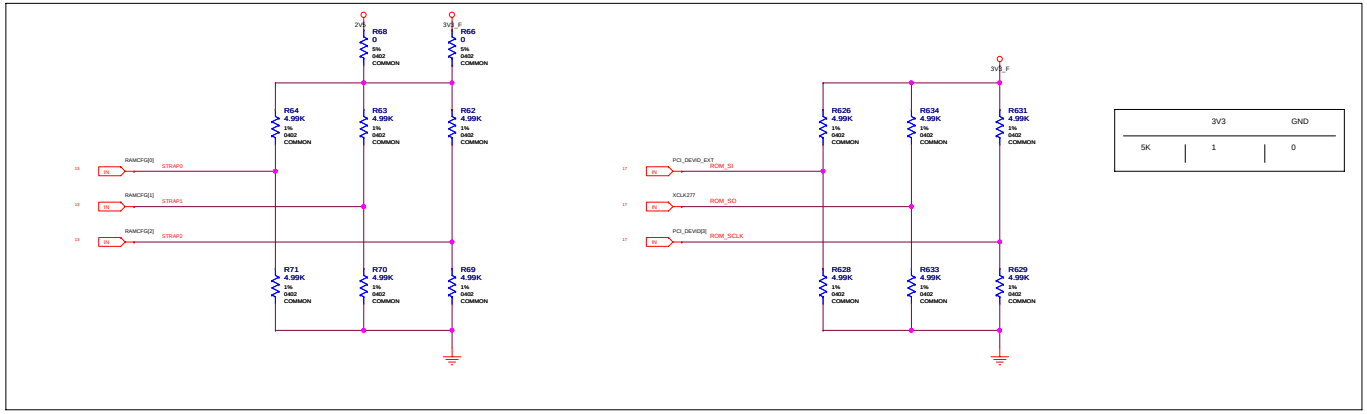
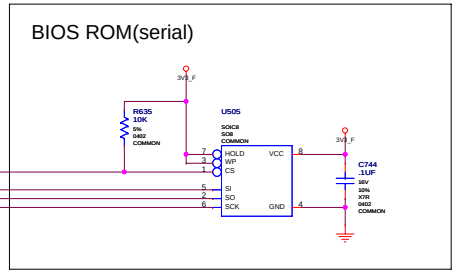
STRAPPING OPTIONS

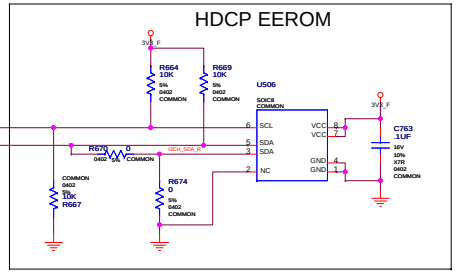
Assembly: BIOS

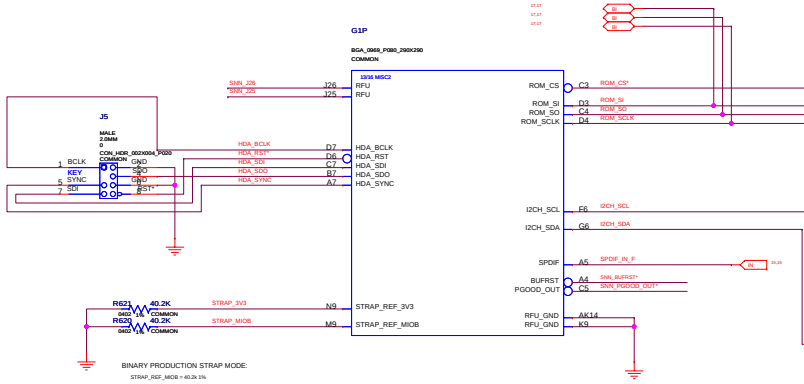


BIOS ROM(serial)



HDCP EEROM





NET_NAME	MIN_LINE_WIDTH	NV_IMPEDANCE	NV_CRITICAL_NET
HDA_BCLK		50OHM	2
HDA_RST*		50OHM	2
HDA_SDI		50OHM	2
HDA_SDO		50OHM	2
HDA_SYNC		50OHM	2

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	BIOS ROM, HDCP ROM, STRAPPING OPTIONS

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HYBRID POWER

Per Datasheet:

Vf = 400mV at 10mA
* expected current < 2mA

Stuff only to bypass the micro-controller

SMBus to GPU

SMBus to PEG connector

Weak pull-ups needed for I2CS:

* if SMBus is isolated from the GPU
* if MB does not support SMBus
* if MB does not support 3V3AUX

I2C to DACA connector

I2C to DACC connector

U3 PIC16F690

3V3_F ENABLE gated from PEX 3V3, PEX 12V and HYBRID enable

Vcc section of I2C bus switch
See DACA /DACC sheets for switch sections

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	HYBRID POWER CIRCUIT

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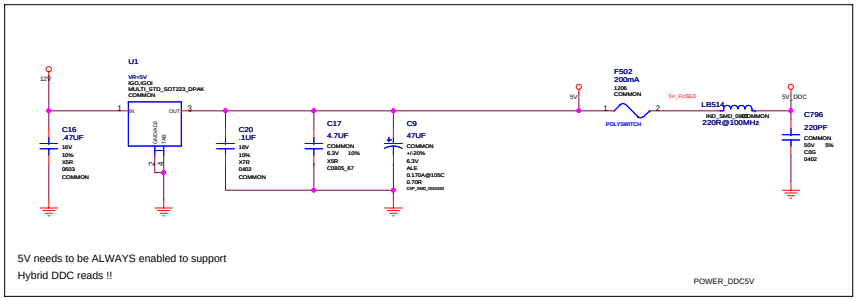
Power Supply: 5V, 5V_DDC, TMDS, MIOA_VDDQ

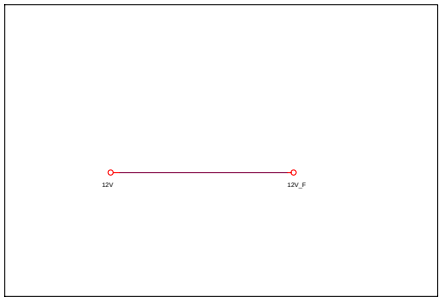
NETNAME	MAX_CURRENT	MIN_LINE_WIDTH	VOLTAGE
5V_FUSED	0.1A	12MIL	5V
5V_DDC	0.1A	12MIL	5V
5V	0.15A	12MIL	5V
PS_1V8_ADJ		10MIL	1.8V
1V8	0.12A	12MIL	1.8V
2V5	0.3A	12MIL	2.5V
GND		16MIL	0V
3V3_F	3.5A	16MIL	3.3V
12V_F	6A	20MIL	12V

5V REGULATOR

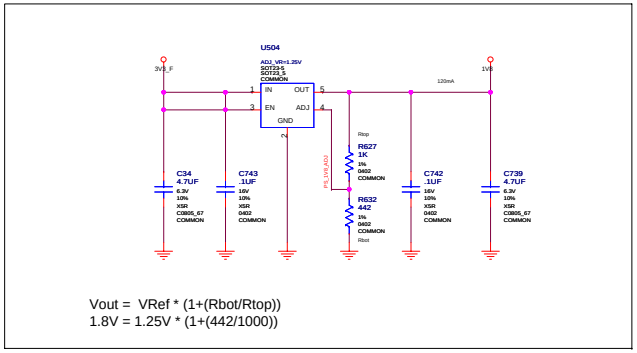
5V DDC



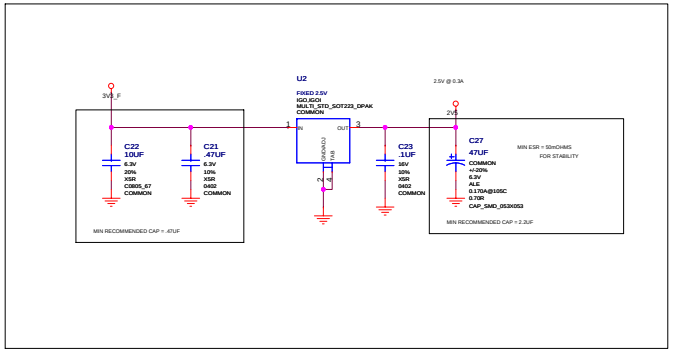
12V filter



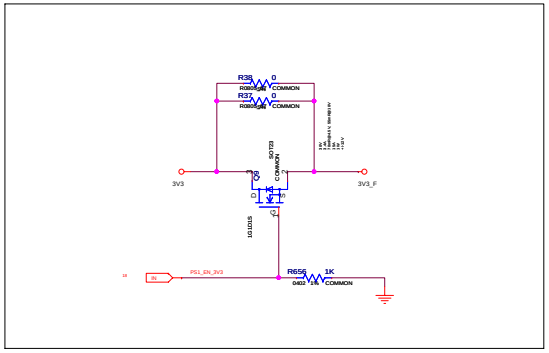
IFP PLL Supply 1.8V



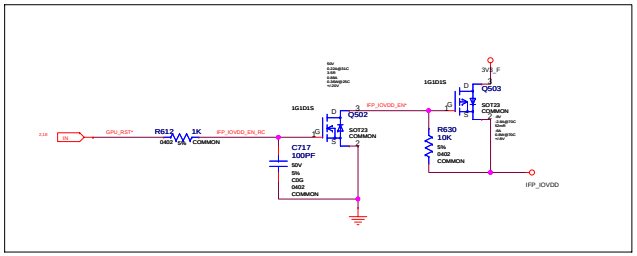
MIO_VDD 2.5V



3V3 switch



IFP_IOVDD BACKDRIVE PREVENTION



ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	POWER SUPPLY LINEARS: 5V, DDC5V, IFP PLLVDD, IFP IOVDD, MIO VDD, 3V3 FILTER, 12V FILTER

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POWER SUPPLY: FBVDD/Q

NET	MIN_LINE_WIDTH	VOLTAGE	NV_NET_MAX_CURRENT
FBVDDQ	20MIL	2V	10A
PS1_FB_BOOT	12MIL		
PS1_FB_BOOT_R	12MIL		
PS1_FB_UGATE	12MIL		
PS1_FB_UGATE_R	12MIL		
PS1_FB_PHASE	20MIL	10A	
PS1_FB_LGATE	12MIL		
PS1_FB_RC	12MIL		
PS1_FB_R1	12MIL		
PS1_FB_SNUB	12MIL		
PS1_FB_FSET	12MIL		
PS1_FB_SVFILT	12MIL		
PS1_FB	12MIL		
PS1_FB_VD	12MIL		
FBVDDQ_FS_DIS	12MIL		
FBVDDQ_EN	12MIL		

FBVDDQ: 1.2mil internal plane
500 mil wide from VRM to MEM
3inch from VRM to farthest MEM

FBVDDQ: 1.8-2.0V @ 9A

FBVDD/Q decap near VRM:
1x 47uF 1206
1x 1500uF ALE/OSCON

PEX_VDD = VREF * (1 + Rtop / Rbot)
1.099V = 0.8V * (1 + 374/1000)

110K for 300KHz
120K for 283KHz

Power Sequence

	GPIO7
FBVDDQ = 1.792V / 1.49V	0
FBVDDQ = 2.098V / 1.81V	1

FBVDDQ = VREF * (1 + (Rtop / Rbot1))
1.792V = 0.8V * (1 + (1.24K/ 1K))
1.49V = 0.8V * (1 + (1.07K/ 1.24K))

FBVDDQ = VREF * (1 + (Rtop / Rbot1/Rbot2))
2.098V = 0.8V * (1 + (1.24K/ (1K//3.24K))
1.81V = 0.8V * (1 + (1.07K/ (1.24K//2.67K))

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	POWER SUPPLY: FBVDDQ SINGLE PHASE SWITCHER

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NVVDD with RT-8805 Two Phase PWM

Net Name	LINE_WIDTH	Current	Voltage
NVVDD	20MIL	15A	1.2V
PEX1V2	24MIL	1.5A	1.20000
NVVDD_SENSE	10MIL	0.5A	1.2V
NVVDD_SENSE_R	10MIL	0.5A	1.2V

Irms = 4.2A @ 0.9V/15A/1Ph

Irms = 5.5A @ 1.2V/35A/2Ph

L7004 Chock 1.2u

Irms=6.0A Isat=8A

Ripple Current 6.1A

Ripple Current 6.1A

CAP for EMI

Place around GPU

NVVDD near GPU:

- 5x 10uf 0805 X5R
- 2x 47uf 1206 X5R
- 3x 470uf ALE/OSCON

ON Semiconductor/NTD4809NT4G

ON Semiconductor/NTD4809NT4G

ON Semiconductor/NTD4806NT4G

ON Semiconductor/NTD4806NT4G

U6 RT8805

NVVDD Power Supply

NVVDD = 0.9-1.2V @ 30-35A

NVVDD: 1.2mil internal PLANE

2inch plane width from VRM to GPU

3inch length from VRM to GPU

Power Sequence

	GPIO6	GPIO5
NVVDD = 1.00V R7403 1.54K R7329 6.19K	0	0
NVVDD = 1.05V R7403 1.54K R7329 6.19K R661 24.3K	0	1
NVVDD = 1.10V R7403 1.54K R7329 6.19K R676 12.1K	1	0
NVVDD = 1.15V (Undefine) R7403 1.54K R7329 6.19K R661 24.3K R676 12.1K	1	1

	GPIO5
NVVDD = 0.95V R7403 1.00K R7329 5.36K	1
NVVDD = 1.00V R7403 1.00K R7329 5.36K R661 16.2K	0

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	POWER SUPPLY: NVVDD DUAL PHASE SWITCHER

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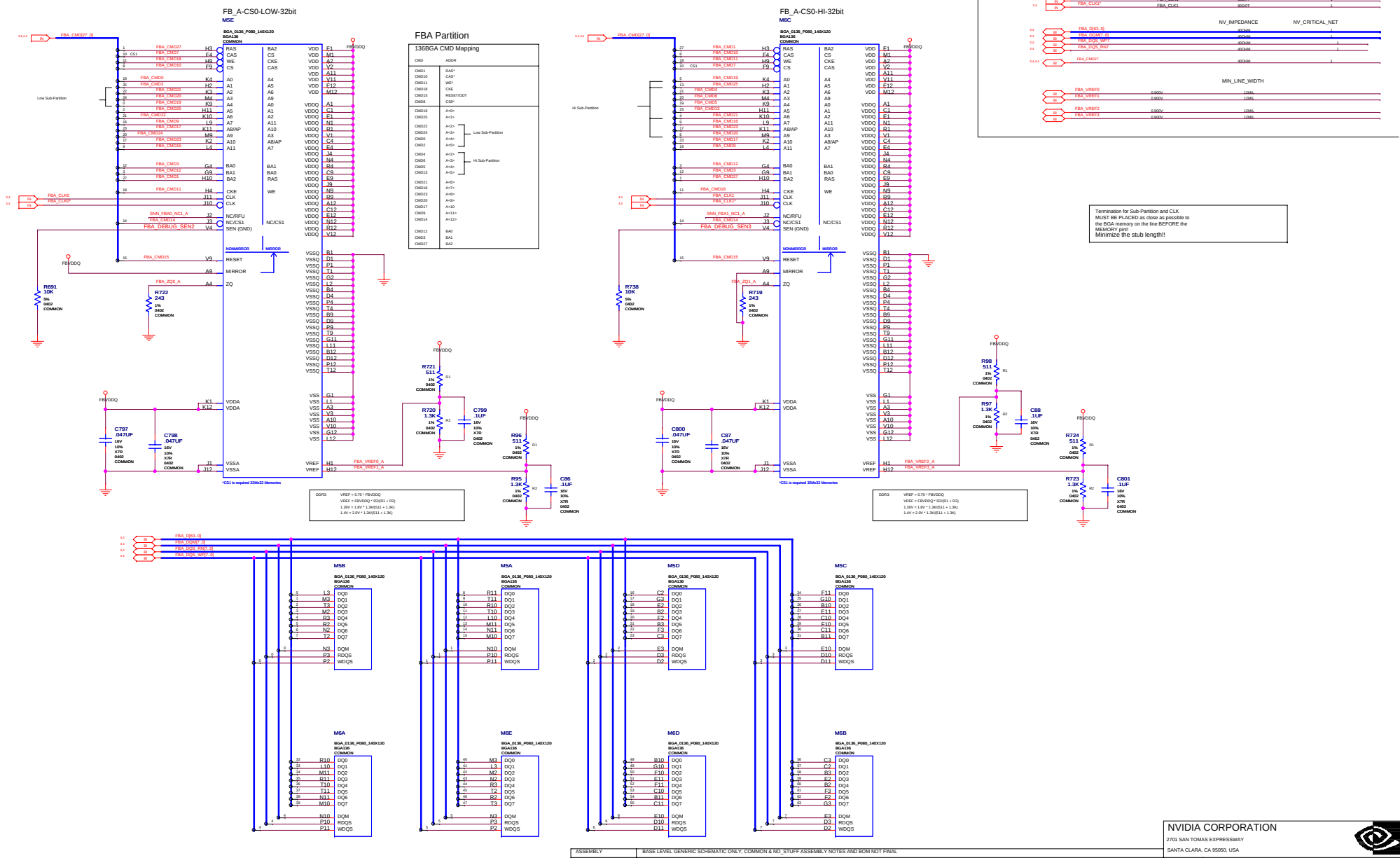
FrameBuffer: Partition A 16/32Mx32 BGA136 GDDR3



ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	FBA 16/32Mx32 GDDR3 MEMORIES, FBA COMMAND BUS PU'S, FBA CLK TERMS

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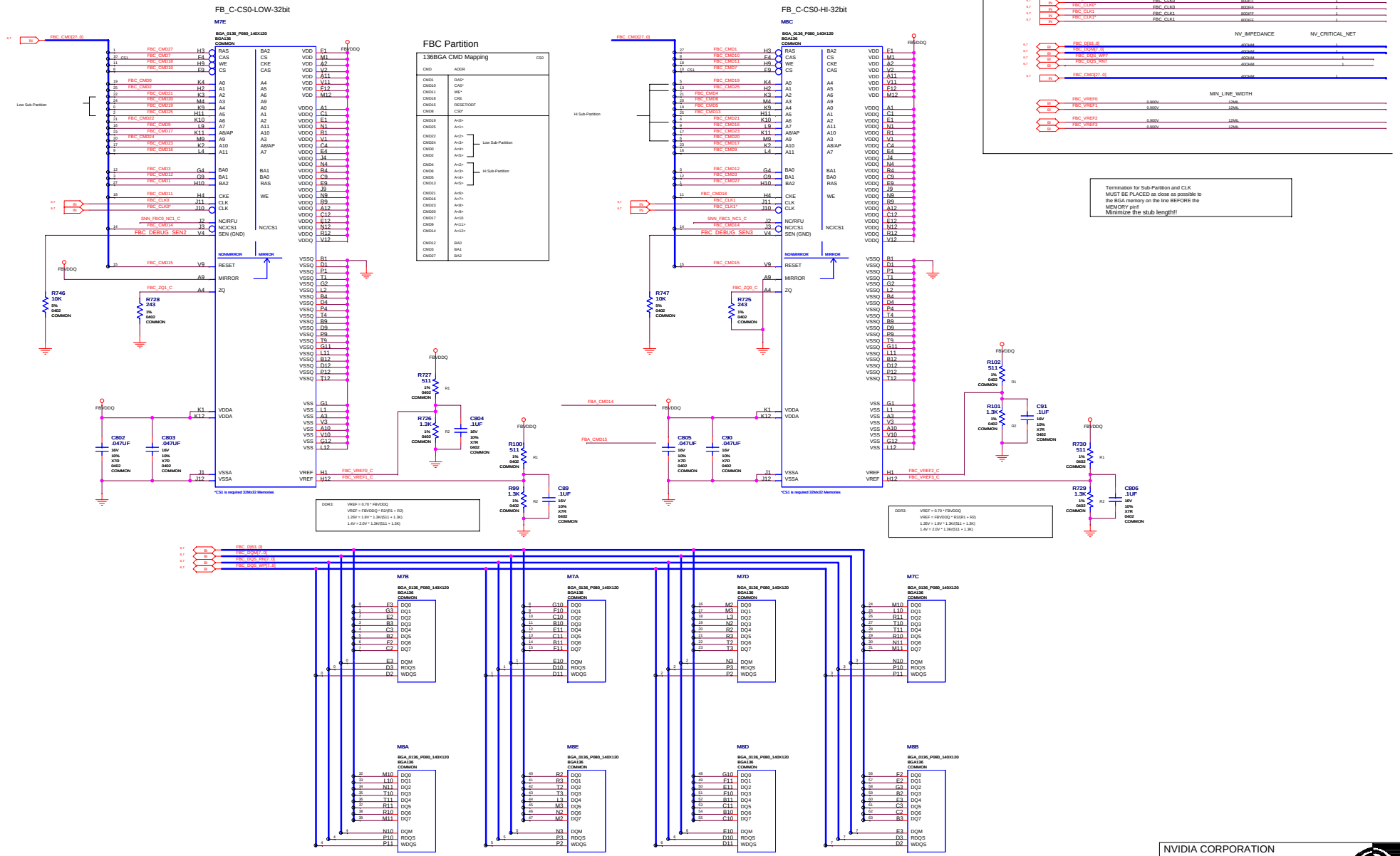
FRAMEBUFFER: PARTITION C 16/32Mx32 BGA136 GDDR3



ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	FBC 16/32MX32 GDDR3 MEMORIES, FBC CMD BUS PU'S, FBC CLK TERMS

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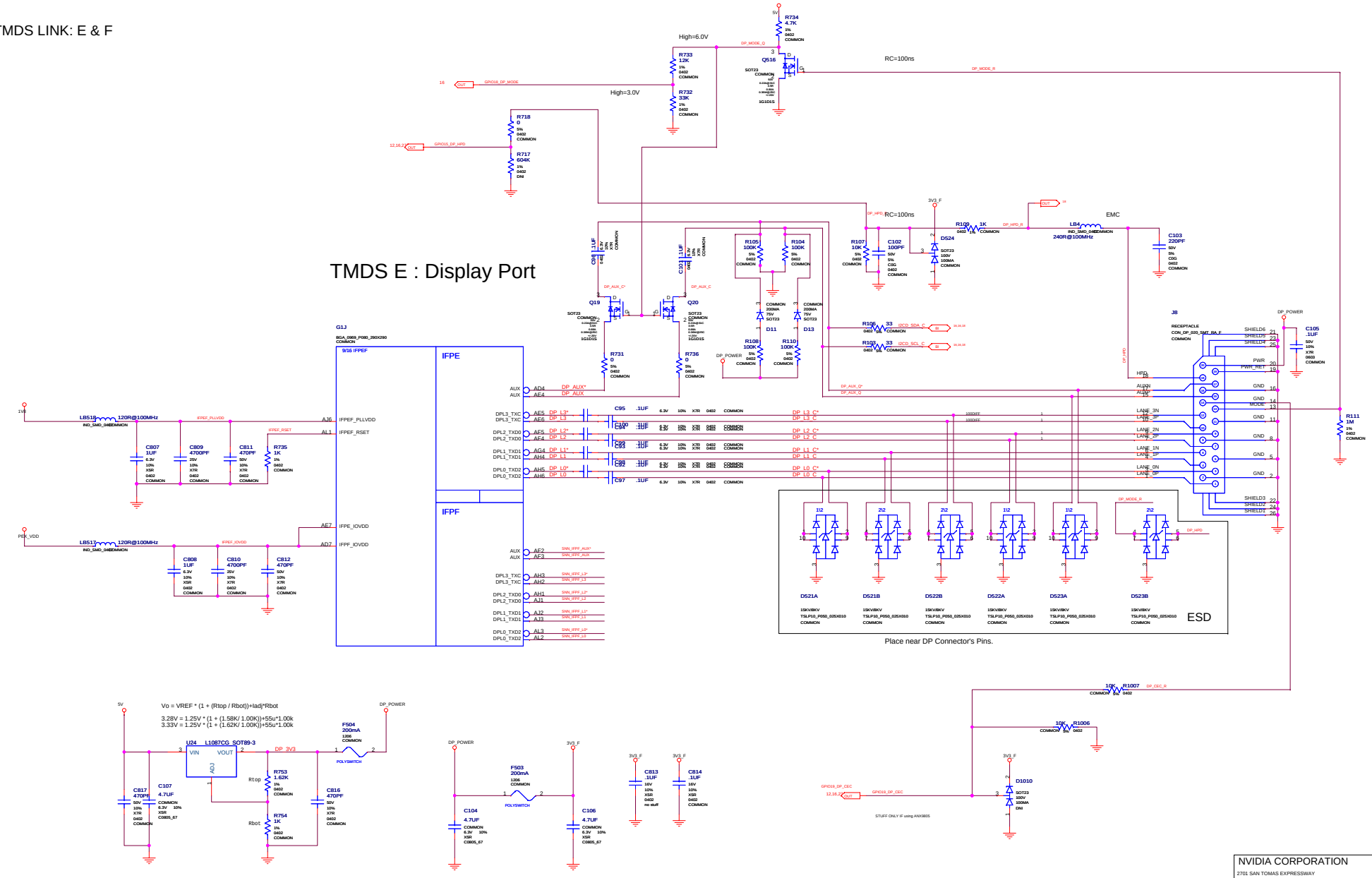
TMDS LINK: E & F

TMDS E : Display Port



ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	TMDS LINK C/D, AC COUPLING, PD's, DVI CONNECTOR MID

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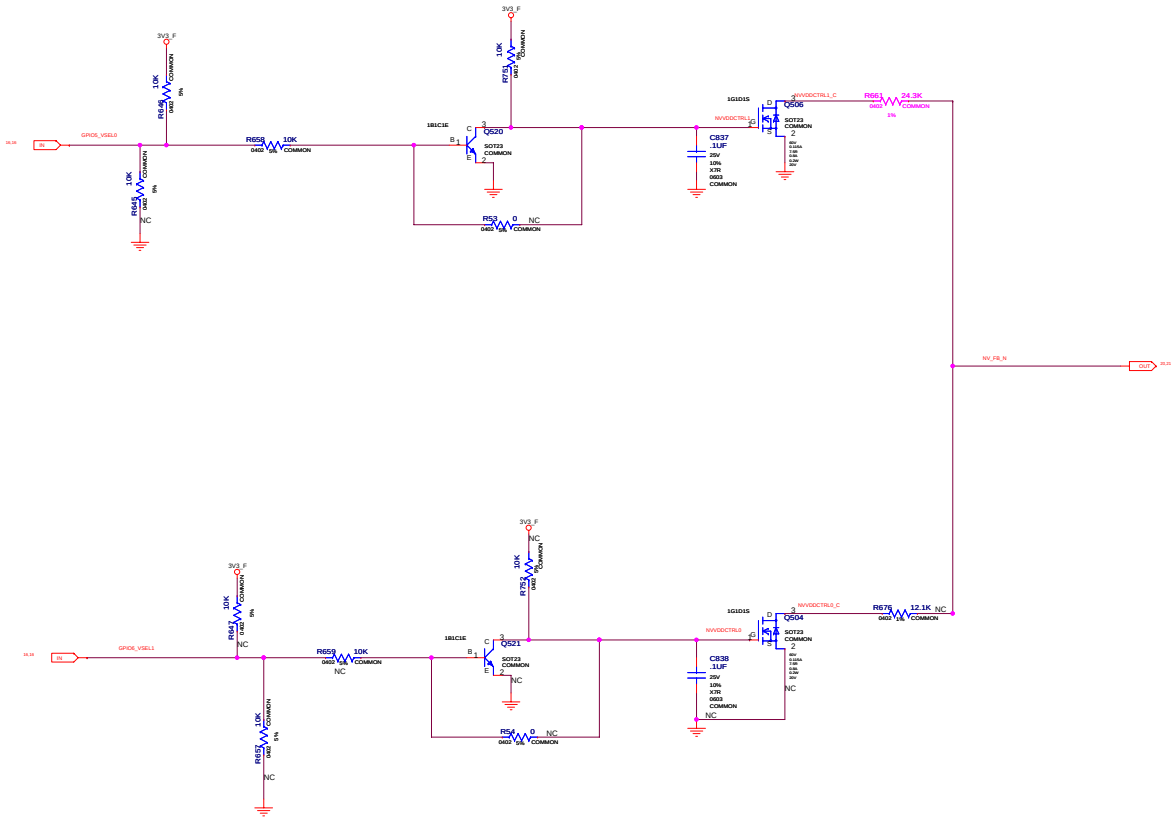
DYNAMIC NVVDD



Dynamic NVVDD

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	POWER SUPPLY: NVVDD DUAL PHASE SWITCHER

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