P616-A00: G96-GB1-128, MXM-II, 512/256MB GDDR3 (32/16Mx32), LVDS, HDMI, DP, TV_OUT, VGA, HD AUDIO, MXM 2.1a SPECIFICATION COMPLIANT

Table of Contents

SKU	VARIANT	NVPN	ASSEMBLY
B	Base	600-10616-0000-000	BASE LEVEL GENERIC SCHEMATIC ONLY
1	SKU0001	600-10616-0001-000	NB9P-GS G96M 400MHz, 512MB(128bit) GDDR3 32Mx32 84FBGA, LVDS + DP + HDMI + SD/HD(TV_OUT) + VGA
2	SKU0002	600-10616-0002-000	Cancelled 128MB version
3	SKU0003	600-10616-0003-000	NB9P-GE2 G96M 400MHz, 512MB(128bit) GDDR3 32Mx32 84FBGA, LVDS + DP + HDMI + SD/HD(TV_OUT) + VGA
4	SKU9998	600-10616-9998-000	All components
5	<UNDEFINED>	<UNDEFINED?	<UNDEFINED?
6	<UNDEFINED>	<UNDEFINED>	<UNDEFINED>
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9	<UNDEFINED>	<UNDEFINED>	<UNDEFINED>
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11	<UNDEFINED>	<UNDEFINED>	<UNDEFINED>
12	<UNDEFINED>	<UNDEFINED>	<UNDEFINED>
13	<UNDEFINED>	<UNDEFINED>	<UNDEFINED>
14	<UNDEFINED>	<UNDEFINED>	<UNDEFINED>
15	<UNDEFINED>	<UNDEFINED>	<UNDEFINED>

ASSEMBLY	NB9P-GS G96M 400MHz, 512MB(128bit) GDDR3 32Mx32 84FBGA, LVDS + DP + HDMI + SD/HD(TV_OUT) + VGA
PAGE DETAIL	PAGE OVERVIEW

NVIDIA CORPORATION
2701 SAN TOMAS EXPRESSWAY
SANTA CLARA, CA 95050, USA

NV_PN	600-10616-0001-000 A		
ID	p616_a00	PAGE	1 OF 19
NAME	wbrenckle	DATE	07-NOV-2007

PCI EXPRESS

CN1
CON_MXM_X16_EDGE
NONPHY-X16
NONPHY-X16
COMMON

1/2 PCI-Express, Power

3V3_RUN — C5 .1UF 6.3V 10% X7R 0402 COMMON — C6 .1UF 6.3V 10% X7R 0402 COMMON — GND
238 3V3RUN (1.5A)

1V8_RUN — C57 .1UF 6.3V 10% X7R 0402 COMMON — GND
2 1V8RUN (3.5A)

PWR_SRC — C533 .1UF 50V 10% X7R 0603 COMMON — GND
1 PWR_SRC (4A)

2V5_RUN — C12 .1UF 6.3V 10% X7R 0402 COMMON — GND
234 2V5RUN (0.5A)

5V_RUN — C549 .1UF 16V 10% X7R 0402 COMMON — GND
18 5VRUN (0.5A)

17 GND
20 GND
41 GND
44 GND
47 GND
50 GND
53 GND
56 GND
59 GND
62 GND
65 GND
68 GND
71 GND
74 GND
77 GND
80 GND
83 GND
86 GND
89 GND
92 GND
95 GND
98 GND
101 GND
104 GND
107 GND
110 GND
113 GND
116 GND
119 GND
122 GND
125 GND
128 GND
131 GND
138 GND
142 GND
150 GND
154 GND
158 GND
163 GND
164 GND
175 GND
176 GND
181 GND
182 GND
187 GND
188 GND
194 GND
199 GND
205 GND
206 GND
211 GND
212 GND
218 GND
223 GND
229 GND
235 GND
236 GND
241 GND
GND

GND — R58 0 5% 0402 NO STUFF

CLK_REQ	137	PEX_CLKREQ*	R59 0 0402 5% COMMON										
PEX_RST	139												
PEX_REFCLK	135												
PEX_REFCLK	133												
PEX_RX0	129	PEX_TX0_C	PEX_TX0_C	90DIFF	1	C629 .1UF 0402 16V 10% X7R COMMON							
PEX_RX0	127	PEX_TX0_C*	PEX_TX0_C	90DIFF	1	C623 .1UF 0402 16V 10% X7R COMMON							
PEX_TX0	132												
PEX_TX0	130												
PEX_RX1	123	PEX_TX1_C	PEX_TX1_C	90DIFF	1	C620 .1UF 0402 16V 10% X7R COMMON							
PEX_RX1	121	PEX_TX1_C*	PEX_TX1_C	90DIFF	1	C616 .1UF 0402 16V 10% X7R COMMON							
PEX_TX1	126												
PEX_TX1	124												
PEX_RX2	117	PEX_TX2_C	PEX_TX2_C	90DIFF	1	C612 .1UF 0402 16V 10% X7R COMMON							
PEX_RX2	115	PEX_TX2_C*	PEX_TX2_C	90DIFF	1	C607 .1UF 0402 16V 10% X7R COMMON							
PEX_TX2	120												
PEX_TX2	118												
PEX_RX3	111	PEX_TX3_C	PEX_TX3_C	90DIFF	1	C605 .1UF 0402 16V 10% X7R COMMON							
PEX_RX3	109	PEX_TX3_C*	PEX_TX3_C	90DIFF	1	C599 .1UF 0402 16V 10% X7R COMMON							
PEX_TX3	114												
PEX_TX3	112												
PEX_RX4	105	PEX_TX4_C	PEX_TX4_C	90DIFF	1	C593 .1UF 0402 16V 10% X7R COMMON							
PEX_RX4	103	PEX_TX4_C*	PEX_TX4_C	90DIFF	1	C591 .1UF 0402 16V 10% X7R COMMON							
PEX_TX4	108												
PEX_TX4	106												
PEX_RX5	99	PEX_TX5_C	PEX_TX5_C	90DIFF	1	C589 .1UF 0402 16V 10% X7R COMMON							
PEX_RX5	97	PEX_TX5_C*	PEX_TX5_C	90DIFF	1	C584 .1UF 0402 16V 10% X7R COMMON							
PEX_TX5	102												
PEX_TX5	100												
PEX_RX6	93	PEX_TX6_C	PEX_TX6_C	90DIFF	1	C583 .1UF 0402 16V 10% X7R COMMON							
PEX_RX6	91	PEX_TX6_C*	PEX_TX6_C	90DIFF	1	C581 .1UF 0402 16V 10% X7R COMMON							
PEX_TX6	96												
PEX_TX6	94												
PEX_RX7	87	PEX_TX7_C	PEX_TX7_C	90DIFF	1	C575 .1UF 0402 16V 10% X7R COMMON							
PEX_RX7	85	PEX_TX7_C*	PEX_TX7_C	90DIFF	1	C574 .1UF 0402 16V 10% X7R COMMON							
PEX_TX7	90												
PEX_TX7	88												
PEX_RX8	81	PEX_TX8_C	PEX_TX8_C	90DIFF	1	C573 .1UF 0402 16V 10% X7R COMMON							
PEX_RX8	79	PEX_TX8_C*	PEX_TX8_C	90DIFF	1	C572 .1UF 0402 16V 10% X7R COMMON							
PEX_TX8	84												
PEX_TX8	82												
PEX_RX9	75	PEX_TX9_C	PEX_TX9_C	90DIFF	1	C570 .1UF 0402 16V 10% X7R COMMON							
PEX_RX9	73	PEX_TX9_C*	PEX_TX9_C	90DIFF	1	C567 .1UF 0402 16V 10% X7R COMMON							
PEX_TX9	78												
PEX_TX9	76												
PEX_RX10	69	PEX_TX10_C	PEX_TX10_C	90DIFF	1	C566 .1UF 0402 16V 10% X7R COMMON							
PEX_RX10	67	PEX_TX10_C*	PEX_TX10_C	90DIFF	1	C565 .1UF 0402 16V 10% X7R COMMON							
PEX_TX10	72												
PEX_TX10	70												
PEX_RX11	63	PEX_TX11_C	PEX_TX11_C	90DIFF	1	C563 .1UF 0402 16V 10% X7R COMMON							
PEX_RX11	61	PEX_TX11_C*	PEX_TX11_C	90DIFF	1	C559 .1UF 0402 16V 10% X7R COMMON							
PEX_TX11	66												
PEX_TX11	64												
PEX_RX12	57	PEX_TX12_C	PEX_TX12_C	90DIFF	1	C558 .1UF 0402 16V 10% X7R COMMON							
PEX_RX12	55	PEX_TX12_C*	PEX_TX12_C	90DIFF	1	C557 .1UF 0402 16V 10% X7R COMMON							
PEX_TX12	60												
PEX_TX12	58												
PEX_RX13	51	PEX_TX13_C	PEX_TX13_C	90DIFF	1	C556 .1UF 0402 16V 10% X7R COMMON							
PEX_RX13	49	PEX_TX13_C*	PEX_TX13_C	90DIFF	1	C555 .1UF 0402 16V 10% X7R COMMON							
PEX_TX13	54												
PEX_TX13	52												
PEX_RX14	45	PEX_TX14_C	PEX_TX14_C	90DIFF	1	C554 .1UF 0402 16V 10% X7R COMMON							
PEX_RX14	43	PEX_TX14_C*	PEX_TX14_C	90DIFF	1	C553 .1UF 0402 16V 10% X7R COMMON							
PEX_TX14	48												
PEX_TX14	46												
PEX_RX15	39	PEX_TX15_C	PEX_TX15_C	90DIFF	1	C551 .1UF 0402 16V 10% X7R COMMON							
PEX_RX15	37	PEX_TX15_C*	PEX_TX15_C	90DIFF	1	C550 .1UF 0402 16V 10% X7R COMMON							
PEX_TX15	42												
PEX_TX15	40												

PRSNT1 — 134
PEX_LSW — 38 — PEX_PRSNT* — R73 0 0402 5% COMMON — PEX_PRSNT_R* — OUT 19.4A<
GND

PEX_RST — R59 0 0402 5% COMMON — PEX_CLKREQ_R*

NO STUFF FOR PRODUCTION
R547 200 0402 5% NO STUFF

NV_IMPEDANCE	NV_CRITICAL	DIFF_PAIR	NET_NAME	
90DIFF	1	PEX_TCLK	PEX_PLL_CLK_OUT	AJ17 PEX_TSTCLK_OUT
90DIFF	1	PEX_TCLK	PEX_PLL_CLK_OUT*	AJ18 PEX_TSTCLK_OUT
100DIFF	1	PEX_RCLK	PEX_REFCLK	AR16 PEX_REFCLK
100DIFF	1	PEX_RCLK	PEX_REFCLK*	AR17 PEX_REFCLK
90DIFF	1	PEX_TX0	PEX_TX0	AL17 PEX_TX0
90DIFF	1	PEX_TX0	PEX_TX0*	AM17 PEX_TX0
90DIFF	1	PEX_RX0	PEX_RX0	AP17 PEX_RX0
90DIFF	1	PEX_RX0	PEX_RX0*	AN17 PEX_RX0
90DIFF	1	PEX_TX1	PEX_TX1	AM18 PEX_TX1
90DIFF	1	PEX_TX1	PEX_TX1*	AM19 PEX_TX1
90DIFF	1	PEX_RX1	PEX_RX1	AN19 PEX_RX1
90DIFF	1	PEX_RX1	PEX_RX1*	AP19 PEX_RX1
90DIFF	1	PEX_TX2	PEX_TX2	AL19 PEX_TX2
90DIFF	1	PEX_TX2	PEX_TX2*	AK19 PEX_TX2
90DIFF	1	PEX_RX2	PEX_RX2	AR19 PEX_RX2
90DIFF	1	PEX_RX2	PEX_RX2*	AR20 PEX_RX2
90DIFF	1	PEX_TX3	PEX_TX3	AL20 PEX_TX3
90DIFF	1	PEX_TX3	PEX_TX3*	AM20 PEX_TX3
90DIFF	1	PEX_RX3	PEX_RX3	AP20 PEX_RX3
90DIFF	1	PEX_RX3	PEX_RX3*	AN20 PEX_RX3
90DIFF	1	PEX_TX4	PEX_TX4	AM21 PEX_TX4
90DIFF	1	PEX_TX4	PEX_TX4*	AM22 PEX_TX4
90DIFF	1	PEX_RX4	PEX_RX4	AN22 PEX_RX4
90DIFF	1	PEX_RX4	PEX_RX4*	AP22 PEX_RX4
90DIFF	1	PEX_TX5	PEX_TX5	AL22 PEX_TX5
90DIFF	1	PEX_TX5	PEX_TX5*	AK22 PEX_TX5
90DIFF	1	PEX_RX5	PEX_RX5	AR22 PEX_RX5
90DIFF	1	PEX_RX5	PEX_RX5*	AR23 PEX_RX5
90DIFF	1	PEX_TX6	PEX_TX6	AL23 PEX_TX6
90DIFF	1	PEX_TX6	PEX_TX6*	AM23 PEX_TX6
90DIFF	1	PEX_RX6	PEX_RX6	AP23 PEX_RX6
90DIFF	1	PEX_RX6	PEX_RX6*	AN23 PEX_RX6
90DIFF	1	PEX_TX7	PEX_TX7	AM24 PEX_TX7
90DIFF	1	PEX_TX7	PEX_TX7*	AM25 PEX_TX7
90DIFF	1	PEX_RX7	PEX_RX7	AN25 PEX_RX7
90DIFF	1	PEX_RX7	PEX_RX7*	AP25 PEX_RX7
90DIFF	1	PEX_TX8	PEX_TX8	AL25 PEX_TX8
90DIFF	1	PEX_TX8	PEX_TX8*	AK25 PEX_TX8
90DIFF	1	PEX_RX8	PEX_RX8	AR25 PEX_RX8
90DIFF	1	PEX_RX8	PEX_RX8*	AR26 PEX_RX8
90DIFF	1	PEX_TX9	PEX_TX9	AL26 PEX_TX9
90DIFF	1	PEX_TX9	PEX_TX9*	AM26 PEX_TX9
90DIFF	1	PEX_RX9	PEX_RX9	AP26 PEX_RX9
90DIFF	1	PEX_RX9	PEX_RX9*	AN26 PEX_RX9
90DIFF	1	PEX_TX10	PEX_TX10	AM27 PEX_TX10
90DIFF	1	PEX_TX10	PEX_TX10*	AM28 PEX_TX10
90DIFF	1	PEX_RX10	PEX_RX10	AN28 PEX_RX10
90DIFF	1	PEX_RX10	PEX_RX10*	AP28 PEX_RX10
90DIFF	1	PEX_TX11	PEX_TX11	AL28 PEX_TX11
90DIFF	1	PEX_TX11	PEX_TX11*	AK28 PEX_TX11
90DIFF	1	PEX_RX11	PEX_RX11	AR28 PEX_RX11
90DIFF	1	PEX_RX11	PEX_RX11*	AR29 PEX_RX11
90DIFF	1	PEX_TX12	PEX_TX12	AK29 PEX_TX12
90DIFF	1	PEX_TX12	PEX_TX12*	AL29 PEX_TX12
90DIFF	1	PEX_RX12	PEX_RX12	AP29 PEX_RX12
90DIFF	1	PEX_RX12	PEX_RX12*	AN29 PEX_RX12
90DIFF	1	PEX_TX13	PEX_TX13	AM29 PEX_TX13
90DIFF	1	PEX_TX13	PEX_TX13*	AM30 PEX_TX13
90DIFF	1	PEX_RX13	PEX_RX13	AN31 PEX_RX13
90DIFF	1	PEX_RX13	PEX_RX13*	AP31 PEX_RX13
90DIFF	1	PEX_TX14	PEX_TX14	AM31 PEX_TX14
90DIFF	1	PEX_TX14	PEX_TX14*	AM32 PEX_TX14
90DIFF	1	PEX_RX14	PEX_RX14	AR31 PEX_RX14
90DIFF	1	PEX_RX14	PEX_RX14*	AR32 PEX_RX14
90DIFF	1	PEX_TX15	PEX_TX15	AN32 PEX_TX15
90DIFF	1	PEX_TX15	PEX_TX15*	AP32 PEX_TX15
90DIFF	1	PEX_RX15	PEX_RX15	AR34 PEX_RX15
90DIFF	1	PEX_RX15	PEX_RX15*	AP34 PEX_RX15

G1
G96
STD
COMMON

1/16 PCI_EXPRESS

PEX_IOVDD	AK16	
PEX_IOVDD	AK17	
PEX_IOVDD	AK21	
PEX_IOVDD	AK24	
PEX_IOVDD	AK27	
PEX_IOVDDQ	AG11	
PEX_IOVDDQ	AG12	
PEX_IOVDDQ	AG13	
PEX_IOVDDQ	AG15	
PEX_IOVDDQ	AG16	
PEX_IOVDDQ	AG17	
PEX_IOVDDQ	AG18	
PEX_IOVDDQ	AG22	
PEX_IOVDDQ	AG23	
PEX_IOVDDQ	AG24	
PEX_IOVDDQ	AG25	
PEX_IOVDDQ	AG26	
PEX_IOVDDQ	AJ14	
PEX_IOVDDQ	AJ15	
PEX_IOVDDQ	AJ19	
PEX_IOVDDQ	AJ21	
PEX_IOVDDQ	AJ22	
PEX_IOVDDQ	AJ24	
PEX_IOVDDQ	AJ25	
PEX_IOVDDQ	AJ27	
PEX_IOVDDQ	AK18	
PEX_IOVDDQ	AK20	
PEX_IOVDDQ	AK23	
PEX_IOVDDQ	AK26	
PEX_IOVDDQ	AL16	

PEX_VDD
C606 .1UF 6.3V 10% X7R 0402 COMMON
C624 .1UF 6.3V 10% X7R 0402 COMMON
C600 1UF 6.3V 10% X5R 0402 COMMON
GND
C576 .1UF 6.3V 10% X7R 0402 COMMON
C611 1UF 6.3V 10% X5R 0402 COMMON
C622 1UF 6.3V 10% X5R 0402 COMMON
C592 4.7UF 6.3V 10% X5R 0603 COMMON
GND

NC_1	A2	SNN_NC<1>
NC_2	AB7	SNN_NC<2>
NC_3	AD6	SNN_NC<3>
NC_4	AF6	SNN_NC<4>
NC_5	AG6	SNN_NC<5>
NC_6	AJ5	SNN_NC<6>
NC_7	AK15	SNN_NC<7>
NC_8	AL7	SNN_NC<8>
NC_9	D32	SNN_NC<9>
NC_10	E35	SNN_NC<10>
NC_11	E7	SNN_NC<11>
NC_12	F7	SNN_NC<12>
NC_13	H32	SNN_NC<13>
NC_14	M7	SNN_NC<14>
NC_15	P6	SNN_NC<15>
NC_16	P7	SNN_NC<16>
NC_17	R7	SNN_NC<17>
NC_18	U7	SNN_NC<18>
NC_19	V6	SNN_NC<19>

3V3_RUN
VDD33_1 J10
VDD33_2 J11
VDD33_3 J12
VDD33_4 J13
VDD33_5 J9
C650 .1UF 10% X7R 0402 COMMON
C637 1UF 10% X5R 0402 COMMON
GND

VDD_SENSE AD20 NVVDD_SENSE — OUT 2.5G<> 17.3G< — TP501
GND_SENSE AD19 NVVDD_GND_SENSE

PEX_VDD
PEX_PLLVDD AG14 PEX_PLLVDD — LB508 10nH 0402 COMMON
C631 .1UF 6.3V 10% X7R 0402 COMMON
C687 2.2UF 6.3V 20% X5R 0402 COMMON
C695 4.7UF 6.3V 10% X5R 0603 COMMON
GND

PEX_VDD 17.3G<
PEX_RFU1 AG19 PEX_CAL_PD_VDDQ — R544 2.49K 0402 1% COMMON
PEX_RFU2 AG20 PEX_CAL_PU_GND — R543 2.49K 0402 1% COMMON
PEX_TERMP AG21 PEX_TERMP — R542 2.49K 0402 1% COMMON
TESTMODE AP35 GPU_TESTMODE — R71 1K 0402 5% COMMON
GND

		MIN_LINE_WIDTH	VOLTAGE
B1	NVVDD_SENSE	10MIL	1.1V
B1	NVVDD_GND_SENSE	10MIL	0V
B1	PEX_PLLVDD	10MIL	1.1V

SOURCE_PWR_NET	VOLTAGE	MAX_CURRENT
PWR_SRC	22V	4.0A
1V8_RUN	1.8V	3.5A
2V5_RUN	2.5V	0.5A
3V3_RUN	3.3V	1.5A
5V_RUN	5V	0.5A

ASSEMBLY	NB9P-GS G96M 400MHz, 512MB(128bit) GDDR3 32Mx32 84FBGA, LVDS + DP + HDMI + SD/HD(TV_OUT) + VGA
PAGE DETAIL	PCI EXPRESS INTERFACE, PEX_VDD DECOUPLING CAPS

NVIDIA CORPORATION
2701 SAN TOMAS EXPRESSWAY
SANTA CLARA, CA 95050, USA

NV_PN	600-10616-0001-000 A		
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NAME	wbrenckle	DATE	07-NOV-2007

GPU MEMORY INTERFACE: PARTITION A

G1
G96
STD
COMMON

2/16 FBA

4.4F< 4.4A<	BI	FBA_D<63..0>	
0	FBA_D<0>	R30	FBA_D0
1	FBA_D<1>	R32	FBA_D1
2	FBA_D<2>	P31	FBA_D2
3	FBA_D<3>	N30	FBA_D3
4	FBA_D<4>	L31	FBA_D4
5	FBA_D<5>	M32	FBA_D5
6	FBA_D<6>	M30	FBA_D6
7	FBA_D<7>	L30	FBA_D7
8	FBA_D<8>	P33	FBA_D8
9	FBA_D<9>	P34	FBA_D9
10	FBA_D<10>	N35	FBA_D10
11	FBA_D<11>	P35	FBA_D11
12	FBA_D<12>	N34	FBA_D12
13	FBA_D<13>	L33	FBA_D13
14	FBA_D<14>	L32	FBA_D14
15	FBA_D<15>	N33	FBA_D15
16	FBA_D<16>	K31	FBA_D16
17	FBA_D<17>	K30	FBA_D17
18	FBA_D<18>	G30	FBA_D18
19	FBA_D<19>	K32	FBA_D19
20	FBA_D<20>	G32	FBA_D20
21	FBA_D<21>	H30	FBA_D21
22	FBA_D<22>	F30	FBA_D22
23	FBA_D<23>	G31	FBA_D23
24	FBA_D<24>	H33	FBA_D24
25	FBA_D<25>	K35	FBA_D25
26	FBA_D<26>	K33	FBA_D26
27	FBA_D<27>	G34	FBA_D27
28	FBA_D<28>	K34	FBA_D28
29	FBA_D<29>	E33	FBA_D29
30	FBA_D<30>	E34	FBA_D30
31	FBA_D<31>	G33	FBA_D31
32	FBA_D<32>	AG30	FBA_D32
33	FBA_D<33>	AH31	FBA_D33
34	FBA_D<34>	AG32	FBA_D34
35	FBA_D<35>	AF31	FBA_D35
36	FBA_D<36>	AF30	FBA_D36
37	FBA_D<37>	AD30	FBA_D37
38	FBA_D<38>	AC32	FBA_D38
39	FBA_D<39>	AE30	FBA_D39
40	FBA_D<40>	AE32	FBA_D40
41	FBA_D<41>	AF33	FBA_D41
42	FBA_D<42>	AF34	FBA_D42
43	FBA_D<43>	AE35	FBA_D43
44	FBA_D<44>	AE33	FBA_D44
45	FBA_D<45>	AE34	FBA_D45
46	FBA_D<46>	AC35	FBA_D46
47	FBA_D<47>	AB32	FBA_D47
48	FBA_D<48>	AN33	FBA_D48
49	FBA_D<49>	AK32	FBA_D49
50	FBA_D<50>	AL33	FBA_D50
51	FBA_D<51>	AM33	FBA_D51
52	FBA_D<52>	AL31	FBA_D52
53	FBA_D<53>	AK30	FBA_D53
54	FBA_D<54>	AJ30	FBA_D54
55	FBA_D<55>	AH30	FBA_D55
56	FBA_D<56>	AM35	FBA_D56
57	FBA_D<57>	AH33	FBA_D57
58	FBA_D<58>	AH35	FBA_D58
59	FBA_D<59>	AH32	FBA_D59
60	FBA_D<60>	AH34	FBA_D60
61	FBA_D<61>	AM34	FBA_D61
62	FBA_D<62>	AL35	FBA_D62
63	FBA_D<63>	AJ33	FBA_D63

4.4F> 4.4A<	BI	FBA_DQM<7..0>	
0	FBA_DQM<0>	P30	FBA_DQM0
1	FBA_DQM<1>	P32	FBA_DQM1
2	FBA_DQM<2>	J30	FBA_DQM2
3	FBA_DQM<3>	H34	FBA_DQM3
4	FBA_DQM<4>	AF32	FBA_DQM4
5	FBA_DQM<5>	AF35	FBA_DQM5
6	FBA_DQM<6>	AL32	FBA_DQM6
7	FBA_DQM<7>	AL34	FBA_DQM7

4.5A< 4.4F>	BI	FBA_DQS_WP<7..0>	
0	FBA_DQS_WP<0>	N31	FBA_DQS_WP0
1	FBA_DQS_WP<1>	L34	FBA_DQS_WP1
2	FBA_DQS_WP<2>	J32	FBA_DQS_WP2
3	FBA_DQS_WP<3>	H35	FBA_DQS_WP3
4	FBA_DQS_WP<4>	AE31	FBA_DQS_WP4
5	FBA_DQS_WP<5>	AC33	FBA_DQS_WP5
6	FBA_DQS_WP<6>	AJ32	FBA_DQS_WP6
7	FBA_DQS_WP<7>	AJ34	FBA_DQS_WP7

4.4F< 4.4A<	IN	FBA_DQS_RN<7..0>	
0	FBA_DQS_RN<0>	N32	FBA_DQS_RN0
1	FBA_DQS_RN<1>	L35	FBA_DQS_RN1
2	FBA_DQS_RN<2>	H31	FBA_DQS_RN2
3	FBA_DQS_RN<3>	G35	FBA_DQS_RN3
4	FBA_DQS_RN<4>	AD32	FBA_DQS_RN4
5	FBA_DQS_RN<5>	AC34	FBA_DQS_RN5
6	FBA_DQS_RN<6>	AJ31	FBA_DQS_RN6
7	FBA_DQS_RN<7>	AJ35	FBA_DQS_RN7

SNN_FBA_WDS0	P29	RFU
SNN_FBA_WDS0*	R29	RFU
SNN_FBA_WDS1	L29	RFU
SNN_FBA_WDS1*	M29	RFU
SNN_FBA_WDS2	AD29	RFU
SNN_FBA_WDS2*	AE29	RFU
SNN_FBA_WDS3	AG29	RFU
SNN_FBA_WDS3*	AH29	RFU

FBVDDQ	J23	
FBVDDQ	J24	
FBVDDQ	J29	
FBVDDQ	AA27	
FBVDDQ	AA29	
FBVDDQ	AA31	
FBVDDQ	AB27	
FBVDDQ	AB29	
FBVDDQ	AC27	
FBVDDQ	AD27	
FBVDDQ	AE27	
FBVDDQ	AJ28	
FBVDDQ	B18	
FBVDDQ	E21	
FBVDDQ	G17	
FBVDDQ	G18	
FBVDDQ	G22	
FBVDDQ	G8	
FBVDDQ	G9	
FBVDDQ	H29	
FBVDDQ	J14	
FBVDDQ	J15	
FBVDDQ	J16	
FBVDDQ	J17	
FBVDDQ	J20	
FBVDDQ	J21	
FBVDDQ	J22	

FBVDDQ

C578 1UF 6.3V 10% X7R 0402 COMMON
C627 1UF 6.3V 10% X7R 0402 COMMON
C596 1UF 6.3V 10% X7R 0402 COMMON
C505 1UF 6.3V 10% X7R 0603 COMMON
C525 1UF 6.3V 10% X7R 0603 COMMON
C538 4.7UF 6.3V 20% X5R 0603 COMMON
C621 1UF 6.3V 10% X7R 0402 COMMON
C577 1UF 6.3V 10% X7R 0402 COMMON
C580 1UF 6.3V 10% X7R 0402 COMMON
C542 1UF 6.3V 10% X7R 0603 COMMON
C546 1UF 6.3V 10% X7R 0603 COMMON
C527 4.7UF 6.3V 20% X5R 0603 COMMON

GND

FBA_CMD<25..0> → OUT 4.1A< 4.4F<

FBA_CMD0	V32	FBA_CMD<0>	0
FBA_CMD1	W31	FBA_CMD<1>	1
FBA_CMD2	U31	FBA_CMD<2>	2
FBA_CMD3	Y32	FBA_CMD<3>	3
FBA_CMD4	AB35	FBA_CMD<4>	4
FBA_CMD5	AB34	FBA_CMD<5>	5
FBA_CMD6	W35	FBA_CMD<6>	6
FBA_CMD7	W33	FBA_CMD<7>	7
FBA_CMD8	W30	FBA_CMD<8>	8
FBA_CMD9	T34	FBA_CMD<9>	9
FBA_CMD10	T35	FBA_CMD<10>	10
FBA_CMD11	AB31	FBA_CMD<11>	11
FBA_CMD12	Y30	FBA_CMD<12>	12
FBA_CMD13	Y34	FBA_CMD<13>	13
FBA_CMD14	W32	FBA_CMD<14>	14
FBA_CMD15	AA30	FBA_CMD<15>	15
FBA_CMD16	AA32	FBA_CMD<16>	16
FBA_CMD17	Y33	FBA_CMD<17>	17
FBA_CMD18	U32	FBA_CMD<18>	18
FBA_CMD19	Y31	FBA_CMD<19>	19
FBA_CMD20	U34	FBA_CMD<20>	20
FBA_CMD21	Y35	FBA_CMD<21>	21
FBA_CMD22	W34	FBA_CMD<22>	22
FBA_CMD23	V30	FBA_CMD<23>	23
FBA_CMD24	U35	FBA_CMD<24>	24
FBA_CMD25	U30	FBA_CMD<25>	25
FBA_CMD26	U33	SNN_FBA_CMD26	
FBA_CMD27	AB30	SNN_FBA_CMD27	
FBA_CMD28	AB33	SNN_FBA_CMD28	
FBA_CMD29	T33	SNN_FBA_CMD29	
FBA_CMD30	W29	SNN_FBA_CMD30	

FBA_CLK0	T32	FBA_CLK0	OUT	4.2A< 4.4F<
FBA_CLK0	T31	FBA_CLK0*	OUT	4.2A< 4.4F<
FBA_CLK1	AC31	FBA_CLK1	OUT	4.2D< 4.4F<
FBA_CLK1	AC30	FBA_CLK1*	OUT	4.2D< 4.4F<

FBVDDQ

FBA_DEBUG — T30 — FBA_DEBUG — R533 40.2 0402 1% COMMON

FB_DLLAVDD	AG27		
FB_PLLAVDD	AF27	FB_PLLAVDD	OUT 3.5G<> 6.5G<

LOW PERF: VREF = 0.40 * FBVDDQ

HIGH PERF: VREF = 0.70 * FBVDDQ

VREF = FBVDDQ * Rbot/(Rtop + Rbot)

VREF	RTop	RBot	FBVDDQ	PERF MODE	GPIO10
0.62V	511	1k3	1.55V	Low	High
0.72V	511	1k3	1.8V	Low	High
1.09V	511	1k3 || 464	1.55V	High	Low
1.26V	511	1k3 || 464	1.8V	High	Low

FBVDDQ

R537 511 1% 0402 COMMON Rtop

4.5F<> BI FB_VREF1 — J27 — FB_VREF

R536 464 1% 0402 COMMON Rbot1

R538 1.3K 1% 0402 COMMON Rbot

C579 .1UF 6.3V 10% X7R 0402 COMMON

FBAC_VREF_CTL

1G1D1S

Q507 RHU002N06 SOT323_1G1D1S COMMON

MAX_VOLTAGE=60V
CONT'INUOUS_CURRENT=200mA
V_GS_TH=1.5V
MAX_CURRENT=800mA
MAX_WATTAGE=200mW
V_BE_SS=+/-20V

14.3G> 7.1H< 4.1H< IN GPIO10_FB_VREF_SW

GND

NET	MIN_LINE_WIDTH	VOLTAGE
3.4F> 6.5G< BI FB_PLLAVDD	10MIL	1.2V

ASSEMBLY	NB9P-GS G96M 400MHz, 512MB(128bit) GDDR3 32Mx32 84FBGA, LVDS + DP + HDMI + SD/HD(TV_OUT) + VGA
PAGE DETAIL	FBA MEMORY INTERFACE & FBVDDQ DECOUPLING CAPS

NVIDIA CORPORATION
2701 SAN TOMAS EXPRESSWAY
SANTA CLARA, CA 95050, USA

NV_PN	600-10616-0001-000 A		
ID	p616_a00	PAGE	3 OF 19
NAME	wbrenckle	DATE	07-NOV-2007

FRAME BUFFER PARTITION A

ROUTE CMD BRANCH 56 OHM
(FROM TRUNK TO MEMORY)

NONMIRRORED

MIRRORED

MUST BE PLACED as close as possible to the BGA memory on the line BEFORE the MEMORY pin!!
Minimize the stub length!!

GDDR3: ZQ = 6x desired output impedence of DQ drivers
Impedence = 240 / 6 = 40 ohm

For Infineon ICT test

Low Power VREF Switch

LOW PERF: VREF = 0.40 * FBVDDQ

HIGH PERF: VREF = 0.70 * FBVDDQ

VREF = FBVDDQ * Rbot/(Rtop + Rbot)

VREF	RTop	RBot	FBVDDQ	PERF MODE	GPIO10
0.62V	511	1k3	1.55V	Low	High
0.72V	511	1k3	1.8V	Low	High
1.09V	511	1k3 || 464	1.55V	High	Low
1.26V	511	1k3 || 464	1.8V	High	Low

NET RULES for FrameBuffer A

NET	NV_CRITICAL	NV_IMPEDANCE	DIFFPAIR
FBA_CLK0	1	80DIFF	FBA_CLK0
FBA_CLK0*	1	80DIFF	FBA_CLK0
FBA_CLK1	1	80DIFF	FBA_CLK1
FBA_CLK1*	1	80DIFF	FBA_CLK1
FBA_DQS_WP<7..0>	1	50OHM	
FBA_DQS_RN<7..0>	1	50OHM	
FBA_DQM<7..0>	1	50OHM	
FBA_D<63..0>	1	50OHM	
FBA_CMD<25..0>	1	50OHM	

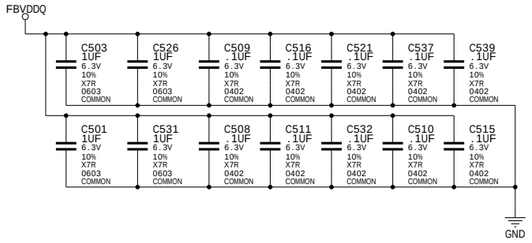
NET	VOLTAGE	MAX_CURRENT	MIN_WIDTH
FBA_VREF0	1.47V	0.02A	12MIL
FBA_VREF1	1.47V	0.02A	12MIL
FBA_VREF2	1.47V	0.02A	12MIL
FBA_VREF3	1.47V	0.02A	12MIL
FBA_ZQ0	1.47V	0.02A	12MIL
FBA_ZQ1	1.47V	0.02A	12MIL
FB_VREF1	1.47V	0.02A	12MIL

ASSEMBLY	NB9P-GS G96M 400MHz, 512MB(128bit) GDDR3 32Mx32 84FBGA, LVDS + DP + HDMI + SD/HD(TV_OUT) + VGA
PAGE DETAIL	FRAME BUFFER A MEMORIES

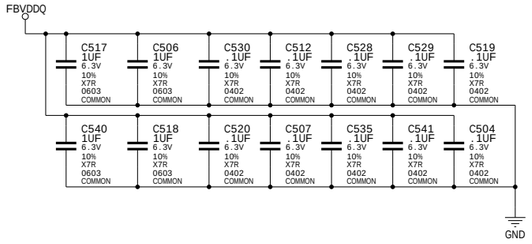
NVIDIA CORPORATION
2701 SAN TOMAS EXPRESSWAY
SANTA CLARA, CA 95050, USA

NV_PN	600-10616-0001-000 A		
ID	p616_a00	PAGE	4 OF 19
NAME	wbrenckle	DATE	07-NOV-2007

FRAME BUFFER: PARTITION A DECOUPLING

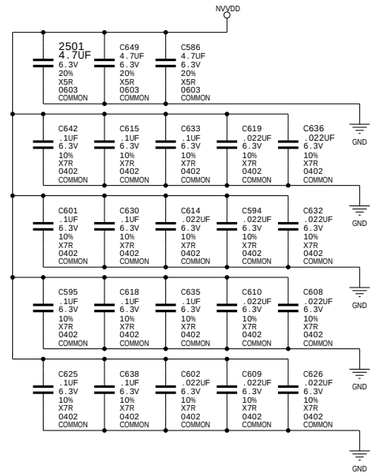


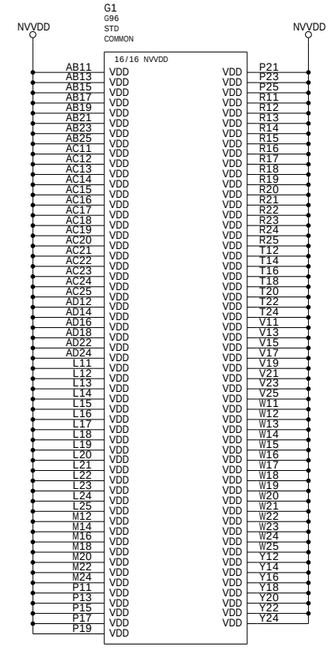
Decoupling for FBA North Side Memory Device.



Decoupling for FBA South Side Memory Device.

NVVDD POWER AND DECOUPLING





ASSEMBLY	NB9P-GS G96M 400MHz, 512MB(128bit) GDDR3 32Mx32 84FBGA, LVDS + DP + HDMI + SD/HD(TV_OUT) + VGA
PAGE DETAIL	FBA & NVVDD DECOUPLING CAPS

NVIDIA CORPORATION
2701 SAN TOMAS EXPRESSWAY
SANTA CLARA, CA 95050, USA

NV_PN	600-10616-0001-000 A		
ID	p616_a00	PAGE	5 OF 19
NAME	wbrenckle	DATE	07-NOV-2007

GPU MEMORY INTERFACE: PARTITION C

NET	MIN_LINE_WIDTH
FB_CAL_PD_VDDQ	10MIL
FB_CAL_PU_GND	10MIL
FB_CAL_TERM_GND	10MIL

7.4F<> 7.4A<> B1 FBC_D<63..0>

G1
G96
STD
COMMON

3/16 FBC

0	FBC_D<0>	D11	FBC_D0
1	FBC_D<1>	E11	FBC_D1
2	FBC_D<2>	F10	FBC_D2
3	FBC_D<3>	D8	FBC_D3
4	FBC_D<4>	F8	FBC_D4
5	FBC_D<5>	F9	FBC_D5
6	FBC_D<6>	E8	FBC_D6
7	FBC_D<7>	F12	FBC_D7
8	FBC_D<8>	B11	FBC_D8
9	FBC_D<9>	C13	FBC_D9
10	FBC_D<10>	A11	FBC_D10
11	FBC_D<11>	B8	FBC_D11
12	FBC_D<12>	A8	FBC_D12
13	FBC_D<13>	C8	FBC_D13
14	FBC_D<14>	C11	FBC_D14
15	FBC_D<15>	C10	FBC_D15
16	FBC_D<16>	D12	FBC_D16
17	FBC_D<17>	E13	FBC_D17
18	FBC_D<18>	F17	FBC_D18
19	FBC_D<19>	F15	FBC_D19
20	FBC_D<20>	F16	FBC_D20
21	FBC_D<21>	E16	FBC_D21
22	FBC_D<22>	F14	FBC_D22
23	FBC_D<23>	F13	FBC_D23
24	FBC_D<24>	D13	FBC_D24
25	FBC_D<25>	A13	FBC_D25
26	FBC_D<26>	B13	FBC_D26
27	FBC_D<27>	A14	FBC_D27
28	FBC_D<28>	C16	FBC_D28
29	FBC_D<29>	A17	FBC_D29
30	FBC_D<30>	B16	FBC_D30
31	FBC_D<31>	D16	FBC_D31
32	FBC_D<32>	D24	FBC_D32
33	FBC_D<33>	D26	FBC_D33
34	FBC_D<34>	E25	FBC_D34
35	FBC_D<35>	F25	FBC_D35
36	FBC_D<36>	F27	FBC_D36
37	FBC_D<37>	E28	FBC_D37
38	FBC_D<38>	F28	FBC_D38
39	FBC_D<39>	D29	FBC_D39
40	FBC_D<40>	A25	FBC_D40
41	FBC_D<41>	B25	FBC_D41
42	FBC_D<42>	D25	FBC_D42
43	FBC_D<43>	C26	FBC_D43
44	FBC_D<44>	C28	FBC_D44
45	FBC_D<45>	B28	FBC_D45
46	FBC_D<46>	A28	FBC_D46
47	FBC_D<47>	A29	FBC_D47
48	FBC_D<48>	E29	FBC_D48
49	FBC_D<49>	F29	FBC_D49
50	FBC_D<50>	D30	FBC_D50
51	FBC_D<51>	E31	FBC_D51
52	FBC_D<52>	C33	FBC_D52
53	FBC_D<53>	D33	FBC_D53
54	FBC_D<54>	F32	FBC_D54
55	FBC_D<55>	E32	FBC_D55
56	FBC_D<56>	B29	FBC_D56
57	FBC_D<57>	C29	FBC_D57
58	FBC_D<58>	B31	FBC_D58
59	FBC_D<59>	C31	FBC_D59
60	FBC_D<60>	B32	FBC_D60
61	FBC_D<61>	C32	FBC_D61
62	FBC_D<62>	B34	FBC_D62
63	FBC_D<63>	B35	FBC_D63

7.4F> 7.4A<> B1 FBC_DQM<7..0>

0	FBC_DQM<0>	F11	FBC_DQM0
1	FBC_DQM<1>	D10	FBC_DQM1
2	FBC_DQM<2>	D15	FBC_DQM2
3	FBC_DQM<3>	A16	FBC_DQM3
4	FBC_DQM<4>	D27	FBC_DQM4
5	FBC_DQM<5>	D28	FBC_DQM5
6	FBC_DQM<6>	D34	FBC_DQM6
7	FBC_DQM<7>	A34	FBC_DQM7

7.5A<> 7.4F> B1 FBC_DQS_WP<7..0>

0	FBC_DQS_WP<0>	E10	FBC_DQS_WP0
1	FBC_DQS_WP<1>	A10	FBC_DQS_WP1
2	FBC_DQS_WP<2>	D14	FBC_DQS_WP2
3	FBC_DQS_WP<3>	C14	FBC_DQS_WP3
4	FBC_DQS_WP<4>	E26	FBC_DQS_WP4
5	FBC_DQS_WP<5>	B26	FBC_DQS_WP5
6	FBC_DQS_WP<6>	D32	FBC_DQS_WP6
7	FBC_DQS_WP<7>	A32	FBC_DQS_WP7

7.4F< 7.4A<> B1 FBC_DQS_RN<7..0>

0	FBC_DQS_RN<0>	D9	FBC_DQS_RN0
1	FBC_DQS_RN<1>	B10	FBC_DQS_RN1
2	FBC_DQS_RN<2>	E14	FBC_DQS_RN2
3	FBC_DQS_RN<3>	B14	FBC_DQS_RN3
4	FBC_DQS_RN<4>	F26	FBC_DQS_RN4
5	FBC_DQS_RN<5>	A26	FBC_DQS_RN5
6	FBC_DQS_RN<6>	D31	FBC_DQS_RN6
7	FBC_DQS_RN<7>	A31	FBC_DQS_RN7

SNN_FBC_WDS0	G11	RFU
SNN_FBC_WDS0*	G12	RFU
SNN_FBC_WDS1	G14	RFU
SNN_FBC_WDS1*	G15	RFU
SNN_FBC_WDS2	G24	RFU
SNN_FBC_WDS2*	G25	RFU
SNN_FBC_WDS3	G27	RFU
SNN_FBC_WDS3*	G28	RFU

FBVDDQ

FBVDDQ	N27	
FBVDDQ	P27	
FBVDDQ	R27	
FBVDDQ	T27	
FBVDDQ	U27	
FBVDDQ	U29	
FBVDDQ	V27	
FBVDDQ	V29	
FBVDDQ	V34	
FBVDDQ	W27	
FBVDDQ	Y27	

FBC_CMD<25..0> OUT 7.1A< 7.4F<

FBC_CMD0	C17	FBC_CMD<0>	0
FBC_CMD1	B19	FBC_CMD<1>	1
FBC_CMD2	D18	FBC_CMD<2>	2
FBC_CMD3	F21	FBC_CMD<3>	3
FBC_CMD4	A23	FBC_CMD<4>	4
FBC_CMD5	D21	FBC_CMD<5>	5
FBC_CMD6	B23	FBC_CMD<6>	6
FBC_CMD7	F20	FBC_CMD<7>	7
FBC_CMD8	G21	FBC_CMD<8>	8
FBC_CMD9	F20	FBC_CMD<9>	9
FBC_CMD10	F19	FBC_CMD<10>	10
FBC_CMD11	F23	FBC_CMD<11>	11
FBC_CMD12	A22	FBC_CMD<12>	12
FBC_CMD13	C22	FBC_CMD<13>	13
FBC_CMD14	B17	FBC_CMD<14>	14
FBC_CMD15	F24	FBC_CMD<15>	15
FBC_CMD16	C25	FBC_CMD<16>	16
FBC_CMD17	E22	FBC_CMD<17>	17
FBC_CMD18	C20	FBC_CMD<18>	18
FBC_CMD19	B22	FBC_CMD<19>	19
FBC_CMD20	A19	FBC_CMD<20>	20
FBC_CMD21	D22	FBC_CMD<21>	21
FBC_CMD22	D20	FBC_CMD<22>	22
FBC_CMD23	E19	FBC_CMD<23>	23
FBC_CMD24	D19	FBC_CMD<24>	24
FBC_CMD25	F18	FBC_CMD<25>	25
FBC_CMD26	C19	SNN_FBC_CMD26	
FBC_CMD27	F22	SNN_FBC_CMD27	
FBC_CMD28	C23	SNN_FBC_CMD28	
FBC_CMD29	B20	SNN_FBC_CMD29	
FBC_CMD30	A20	SNN_FBC_CMD30	

NET_NAME

FBC_CLK0	E17	FBC_CLK0	OUT	7.2A< 7.4F<
FBC_CLK0	D17	FBC_CLK0*	OUT	7.2A< 7.4F<
FBC_CLK1	D23	FBC_CLK1	OUT	7.2D< 7.4F<
FBC_CLK1	E23	FBC_CLK1*	OUT	7.2D< 7.4F<

FBVDDQ

FBC_DEBUG G19 FBC_DEBUG R545 40.2 0402 1% COMMON

G96 only	FBAC_DLLAVDD	J19	
	FBAC_PLLAVDD	J18	

FB_PLLAVDD

IN 3.4F> 3.5G<> 220R@100MHz BEAD_0402 LB501 COMMON

PEX_VDD

C613 1UF 6.3V 10% X7R 0402 COMMON
C582 1UF 6.3V 10% X7R 0402 COMMON
C617 2.2UF 6.3V 20% X5R 0402 COMMON
C585 4.7UF 6.3V 20% X5R 0603 COMMON
GND

FBVDDQ

FBCAL_PD_VDDQ	K27	FB_CAL_PD_VDDQ	R535	45.3 0402 1% COMMON
FBCAL_PU_GND	L27	FB_CAL_PU_GND	R540	24.9 0402 1% COMMON
FBCAL_TERM_GND	M27	FB_CAL_TERM_GND	R541	40.2 0402 1% COMMON

GND

ASSEMBLY	NB9P-GS G96M 400MHz, 512MB(128bit) GDDR3 32Mx32 84FBGA, LVDS + DP + HDMI + SD/HD(TV_OUT) + VGA
PAGE DETAIL	FBC MEMORY INTERFACE

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NV_PN	600-10616-0001-000 A		
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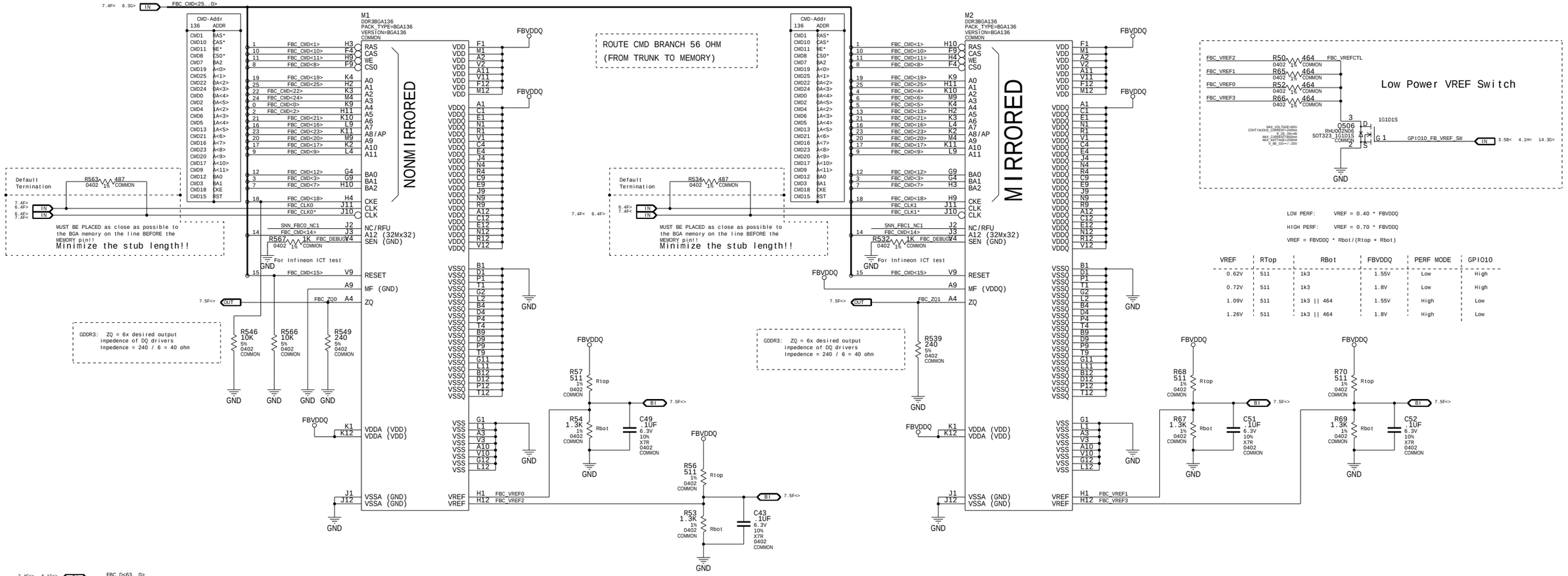
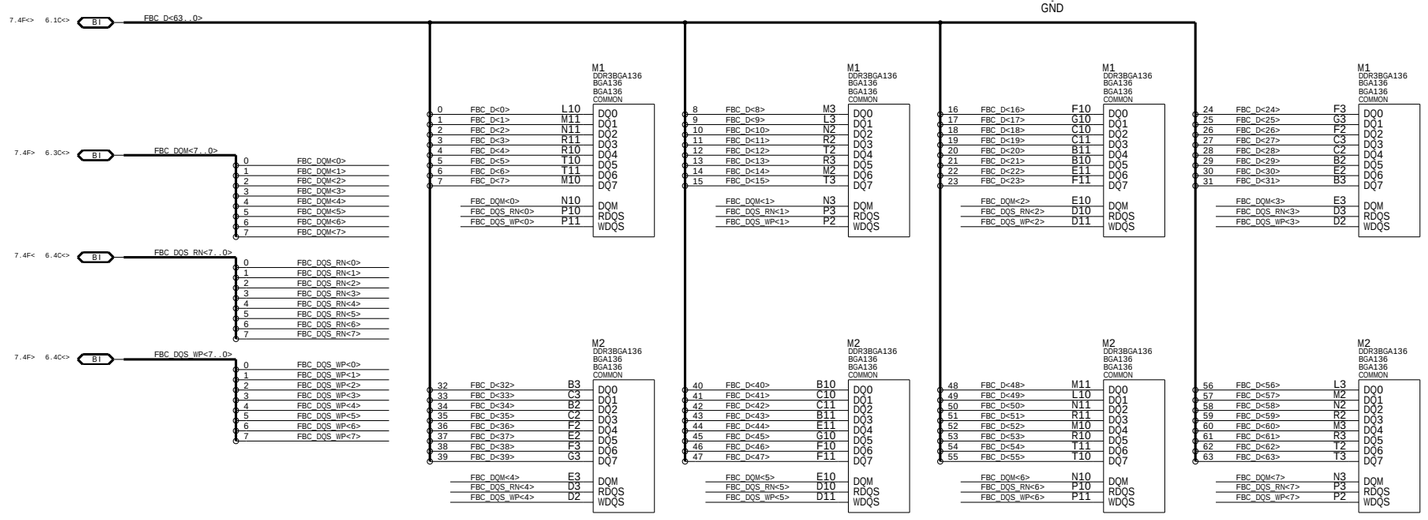
NAME	wbrenckle	DATE	07-NOV-2007

FRAME BUFFER PARTITION C





NET RULES for FrameBuffer C

NET	NV_CRITICAL	NV_IMPEDANCE	DIFFPAIR
FBC_CLK0	1	80DIFF	FBC_CLK0
FBC_CLK0*	1	80DIFF	FBC_CLK0
FBC_CLK1	1	80DIFF	FBC_CLK1
FBC_CLK1*	1	80DIFF	FBC_CLK1
FBC_DQS_WP<7..0>	1	50OHM	
FBC_DQS_RN<7..0>	1	50OHM	
FBC_DQM<7..0>	1	50OHM	
FBC_D<63..0>	1	50OHM	
FBC_CMD<25..0>	1	50OHM	

NET	VOLTAGE	MAX_CURRENT	MIN_WIDTH
FBC_VREF0	1.47V	0.02A	12MIL
FBC_VREF1	1.47V	0.02A	12MIL
FBC_VREF2	1.47V	0.02A	12MIL
FBC_VREF3	1.47V	0.02A	12MIL
FBC_ZQ0	1.47V	0.02A	12MIL
FBC_ZQ1	1.47V	0.02A	12MIL

ASSEMBLY	NB9P-GS G96M 400MHz, 512MB(128bit) GDDR3 32Mx32 84FBGA, LVDS + DP + HDMI + SD/HD(TV_OUT) + VGA
PAGE DETAIL	FRAME BUFFER C MEMORIES

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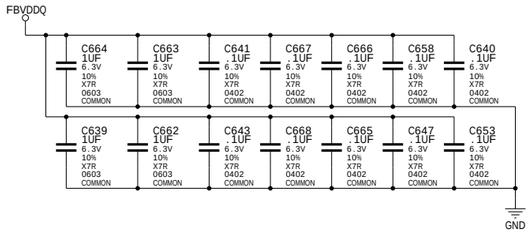
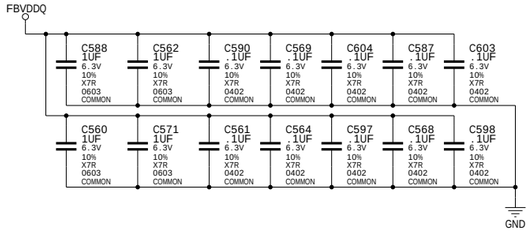
FRAMEBUFFER: PARTITION C DECOUPLING

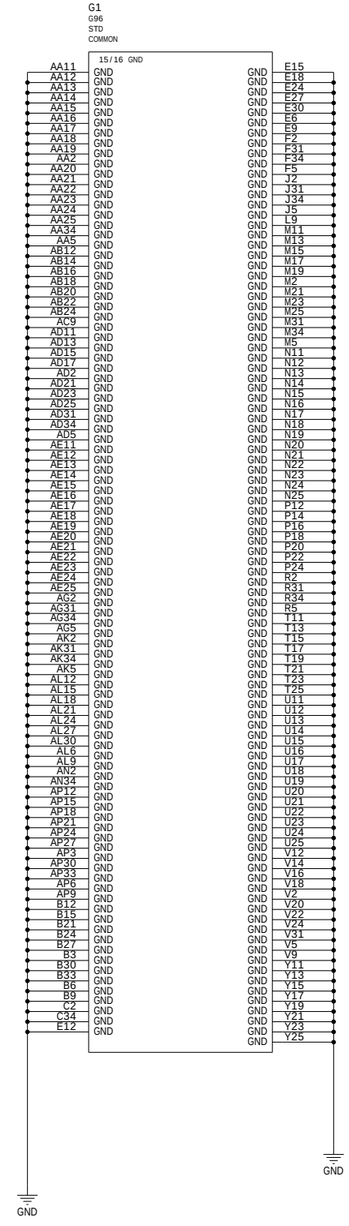


Decoupling for FBC West Side Memory Device.



Decoupling for FBC East Side Memory Device.

NVVDD GROUND



ASSEMBLY	NB9P-GS G96M 400MHz, 512MB(128bit) GDDR3 32Mx32 84FBGA, LVDS + DP + HDMI + SD/HD(TV_OUT) + VGA
PAGE DETAIL	FBC DECOUPLING CAPS, GPU GND CONNECTIONS

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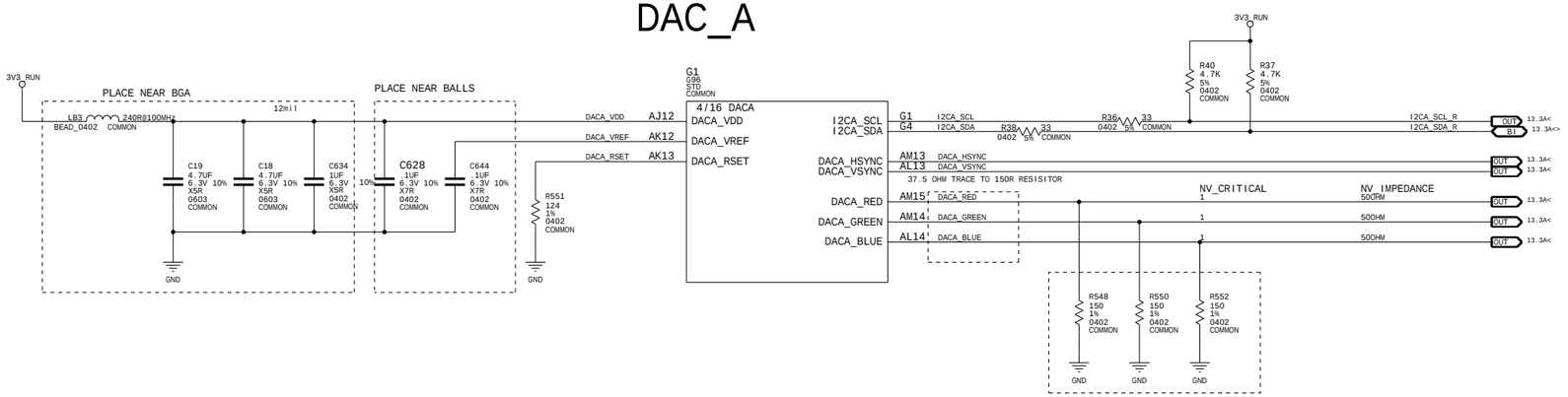
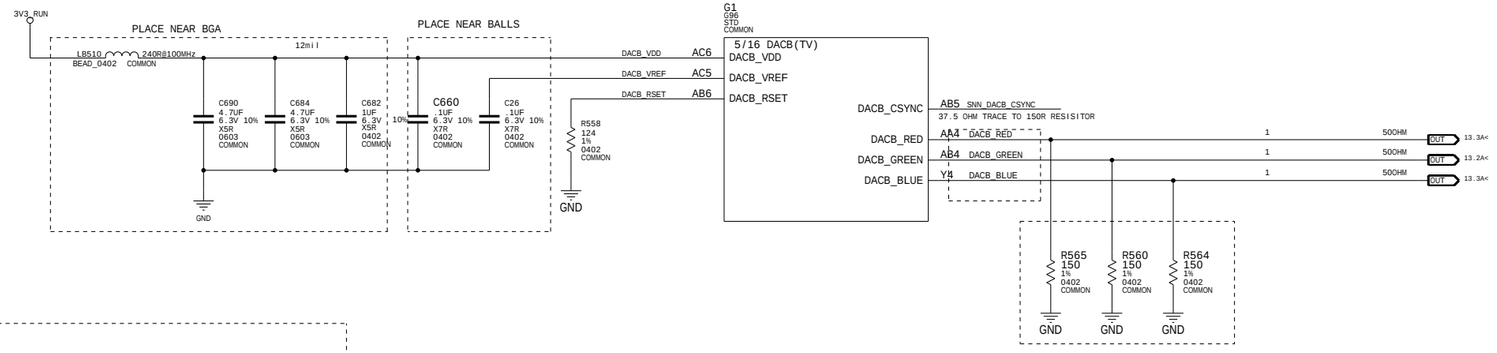
DAC_A

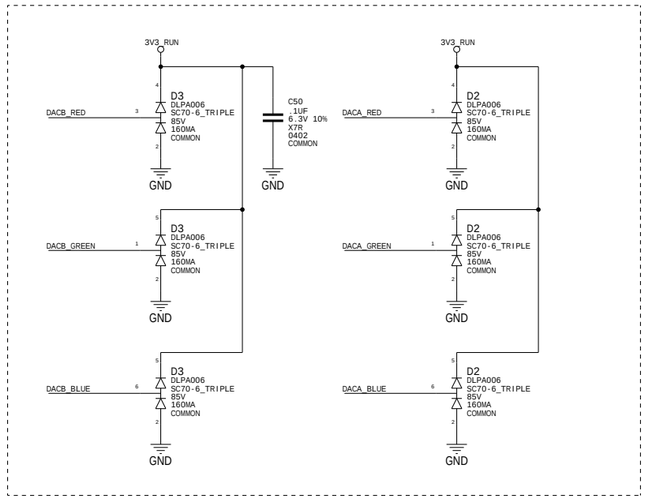


Place close to GPU

DAC_B

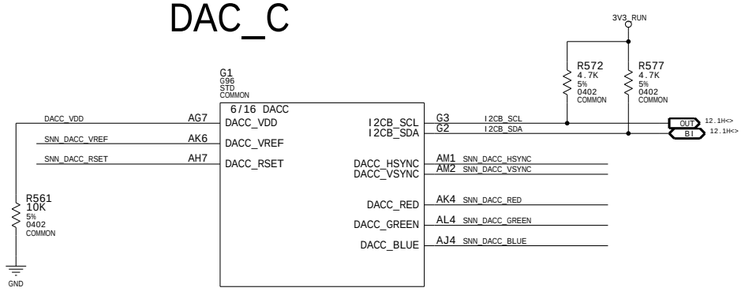


Place close to GPU



TV DAC ESD PROTECTION

DAC_C



ASSEMBLY	
PAGE DETAIL	DAC A/B

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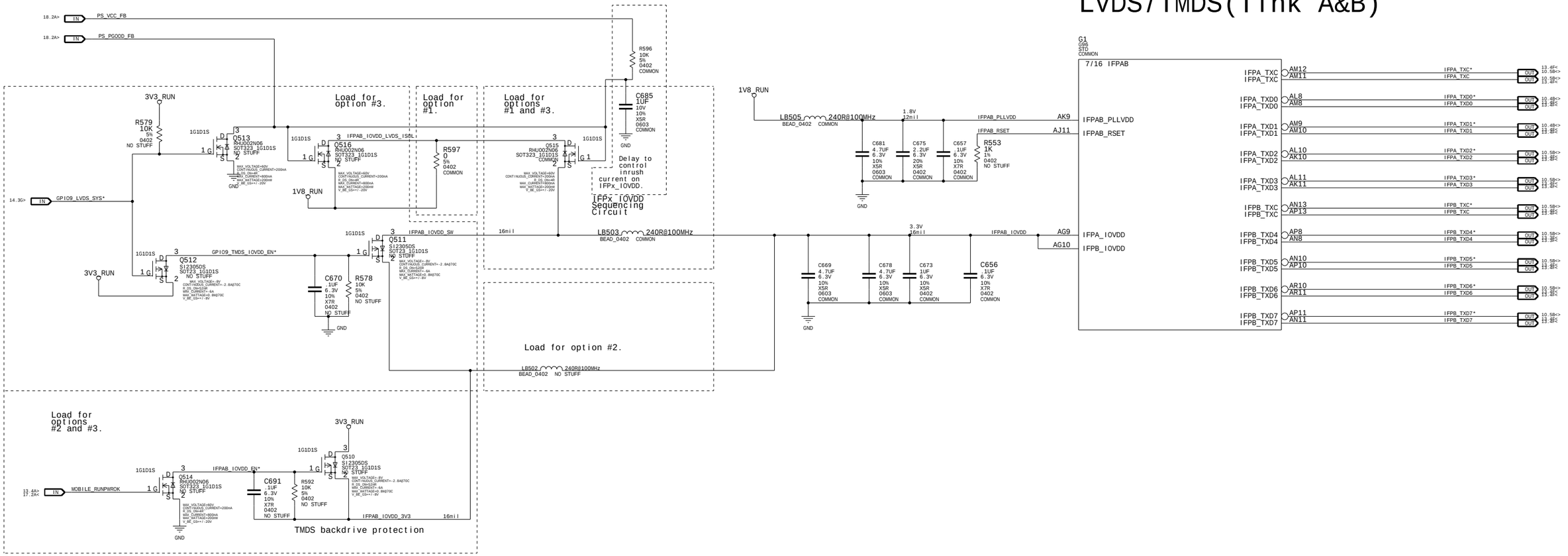
LVDS/TMDS(link A&B)

Loading options for IFPAB outputs

Option #1) IFPAB outputs to LVDS only.
Option #2) IFPAB outputs to DVI-C only.
Option #3) Controlled with GPIO9, IFPAB dynamically outputs to LVDS or DVI-C.



(LVDS CONSTRAINTS)

NET NAME	DIFFPAIR	NV_CRITICAL_NET	NV_IMPEDANCE
IFPA_TXD0*	IFPATXD0	1	100DIFF
IFPA_TXD0	IFPATXD0	1	100DIFF
IFPA_TXD1*	IFPATXD1	1	100DIFF
IFPA_TXD1	IFPATXD1	1	100DIFF
IFPA_TXD2*	IFPATXD2	1	100DIFF
IFPA_TXD2	IFPATXD2	1	100DIFF
IFPA_TXD3*	IFPATXD3	1	100DIFF
IFPA_TXD3	IFPATXD3	1	100DIFF
IFPB_TXD4*	IFPBTXD4	1	100DIFF
IFPB_TXD4	IFPBTXD4	1	100DIFF
IFPB_TXD5*	IFPBTXD5	1	100DIFF
IFPB_TXD5	IFPBTXD5	1	100DIFF
IFPB_TXD6*	IFPBTXD6	1	100DIFF
IFPB_TXD6	IFPBTXD6	1	100DIFF
IFPB_TXD7*	IFPBTXD7	1	100DIFF
IFPB_TXD7	IFPBTXD7	1	100DIFF
IFPA_TXC*	IFPATXC	1	100DIFF
IFPA_TXC	IFPATXC	1	100DIFF
IFPB_TXC*	IFPBTXC	1	100DIFF
IFPB_TXC	IFPBTXC	1	100DIFF

ASSEMBLY	NB9P-GS G96M 400MHz, 512MB(128bit) GDDR3 32Mx32 84FBGA, LVDS + DP + HDMI + SD/HD(TV_OUT) + VGA
PAGE DETAIL	LVDS/TMDS OPTION (LINK A/B)

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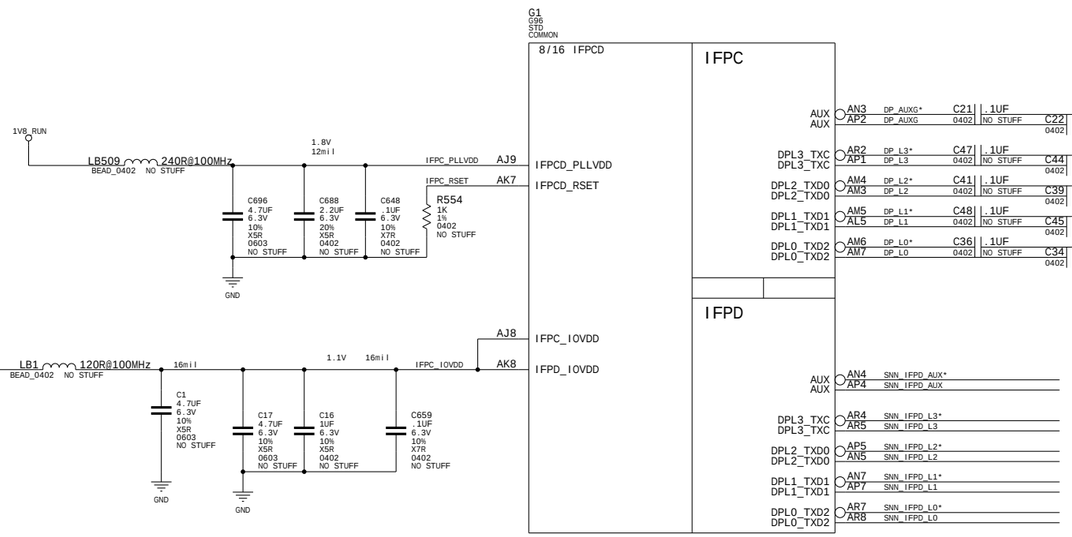
DP(link C)



(DP CONSTRAINTS)

NET NAME	DIFFPAIR	NV_CRITICAL_NET	NV_IMPEDANCE		NET NAME	DIFFPAIR	NV_CRITICAL_NET	NV_IMPEDANCE	
DP_AUX*	DP_AUX	1	100DIFF	BI	DP_AUX_C*	DP_AUX3	1	100DIFF	BI 11.2G>
DP_AUX	DP_AUX	1	100DIFF	BI	DP_AUX_C	DP_AUX3	1	100DIFF	BI 13.3A<> 11.3G> 13.3A<>
IFPCF_AUXG_R*	DP_AUX1	1	100DIFF	BI 11.2F< 12.3F>					
IFPCF_AUXG_R	DP_AUX1	1	100DIFF	BI 11.3F< 12.3F>					
DP_L3*	DP_L3	1	100DIFF	BI	DP_L3_C*	DPL3C	1	100DIFF	BI 13.3F<
DP_L3	DP_L3	1	100DIFF	BI	DP_L3_C	DPL3C	1	100DIFF	BI 11.3E> 13.3F<
DP_L2*	DP_L2	1	100DIFF	BI	DP_L2_C*	DPL2C	1	100DIFF	BI 13.3F<
DP_L2	DP_L2	1	100DIFF	BI	DP_L2_C	DPL2C	1	100DIFF	BI 11.3E> 13.3F<
DP_L1*	DP_L1	1	100DIFF	BI	DP_L1_C*	DPL1C	1	100DIFF	BI 13.3F<
DP_L1	DP_L1	1	100DIFF	BI	DP_L1_C	DPL1C	1	100DIFF	BI 11.3E> 13.3F<
DP_L0*	DP_L0	1	100DIFF	BI	DP_L0_C*	DPL0C	1	100DIFF	BI 11.3E>
DP_L0	DP_L0	1	100DIFF	BI	DP_L0_C	DPL0C	1	100DIFF	BI 13.3F< 11.3E> 13.3F<

ASSEMBLY	NB9P-GS G96M 400MHz, 512MB(128bit) GDDR3 32Mx32 84FBGA, LVDS + DP + HDMI + SD/HD(TV_OUT) + VGA
PAGE DETAIL	DISPLAY PORT (LINK C)

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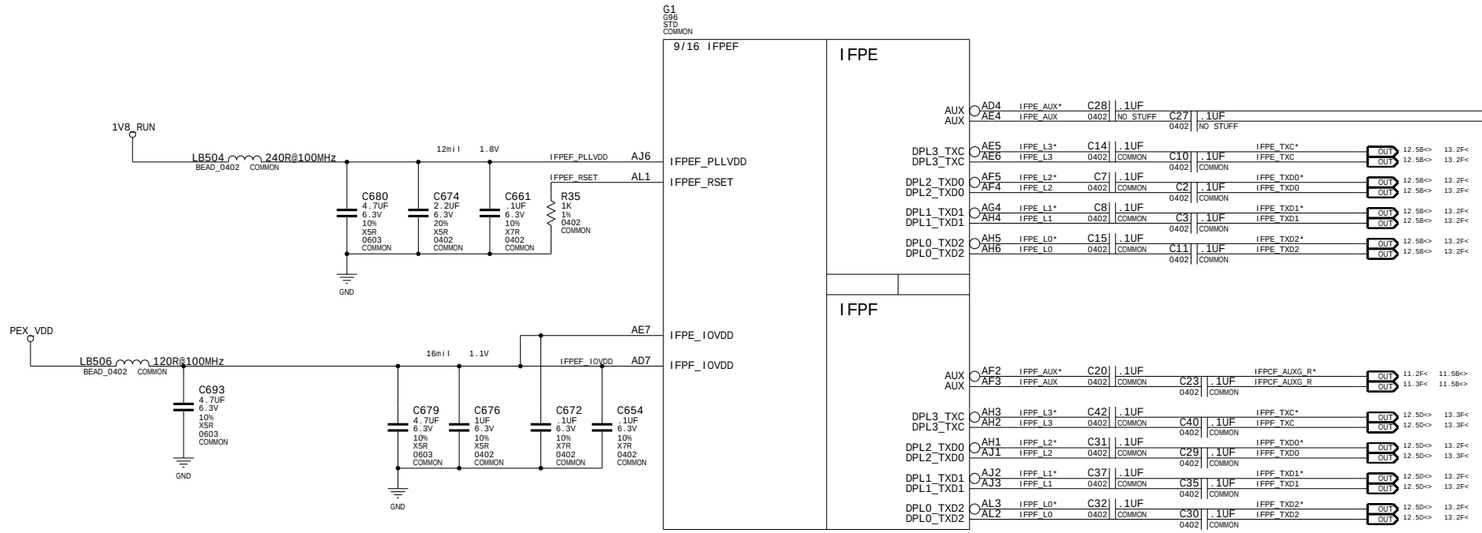
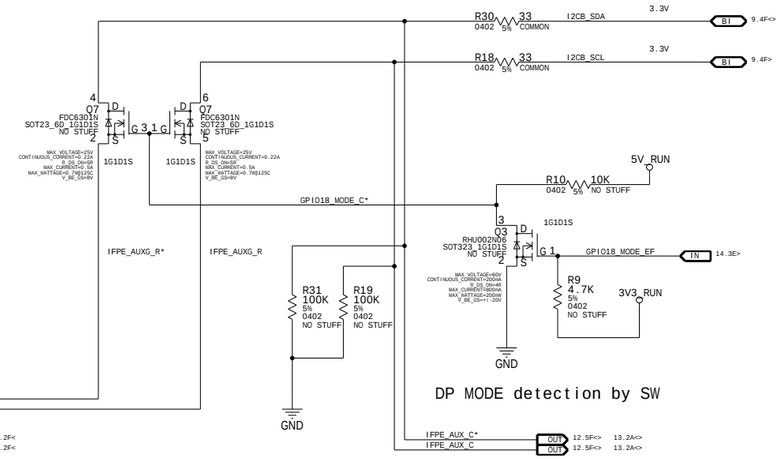
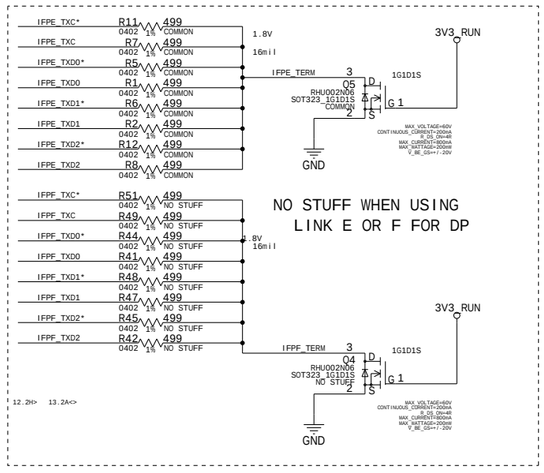
HDMI/DP OPTION (LINK E)





TMDS (LINK F)



LinkE/F BIAS

(TMDS/HDMI/DP OPTION CONSTRAINTS)

NET NAME	DIFFPAIR	NV_CRITICAL_NET	NV_IMPEDANCE
IFPE_L3*	IFPE_L3	1	100DIFF
IFPE_L3	IFPE_L3	1	100DIFF
IFPE_L2*	IFPE_L2	1	100DIFF
IFPE_L2	IFPE_L2	1	100DIFF
IFPE_L1*	IFPE_L1	1	100DIFF
IFPE_L1	IFPE_L1	1	100DIFF
IFPE_L0*	IFPE_L0	1	100DIFF
IFPE_L0	IFPE_L0	1	100DIFF
IFPE_TXC*	IFPETXC	1	100DIFF
IFPE_TXC	IFPETXC	1	100DIFF
IFPE_TXD0*	IFPETXD0	1	100DIFF
IFPE_TXD0	IFPETXD0	1	100DIFF
IFPE_TXD1*	IFPETXD1	1	100DIFF
IFPE_TXD1	IFPETXD1	1	100DIFF
IFPE_TXD2*	IFPETXD2	1	100DIFF
IFPE_TXD2	IFPETXD2	1	100DIFF

NET NAME	DIFFPAIR	NV_CRITICAL_NET	NV_IMPEDANCE
IFPF_L3*	IFPF_L3	1	100DIFF
IFPF_L3	IFPF_L3	1	100DIFF
IFPF_L2*	IFPF_L2	1	100DIFF
IFPF_L2	IFPF_L2	1	100DIFF
IFPF_L1*	IFPF_L1	1	100DIFF
IFPF_L1	IFPF_L1	1	100DIFF
IFPF_L0*	IFPF_L0	1	100DIFF
IFPF_L0	IFPF_L0	1	100DIFF
IFPF_TXC*	IFPFTXC	1	100DIFF
IFPF_TXC	IFPFTXC	1	100DIFF
IFPF_TXD0*	IFPFTXD0	1	100DIFF
IFPF_TXD0	IFPFTXD0	1	100DIFF
IFPF_TXD1*	IFPFTXD1	1	100DIFF
IFPF_TXD1	IFPFTXD1	1	100DIFF
IFPF_TXD2*	IFPFTXD2	1	100DIFF
IFPF_TXD2	IFPFTXD2	1	100DIFF

NET NAME	DIFFPAIR	NV_CRITICAL_NET	NV_IMPEDANCE
IFPE_AUX*	IFPE_AUX	1	100DIFF
IFPE_AUX	IFPE_AUX	1	100DIFF
IFPE_AUXG_R*	IFPE_AUXG_R	1	100DIFF
IFPE_AUXG_R	IFPE_AUXG_R	1	100DIFF
IFPE_AUX_C*	IFPE_AUX_C	1	100DIFF
IFPE_AUX_C	IFPE_AUX_C	1	100DIFF
IFPF_AUX*	IFPF_AUX	1	100DIFF
IFPF_AUX	IFPF_AUX	1	100DIFF

ASSEMBLY	NB9P-GS G96M 400MHz, 512MB(128bit) GDDR3 32Mx32 84FBGA, LVDS + DP + HDMI + SD/HD(TV_OUT) + VGA
PAGE DETAIL	HDMI/DP OPTION (LINK E), TMDS (LINK F)

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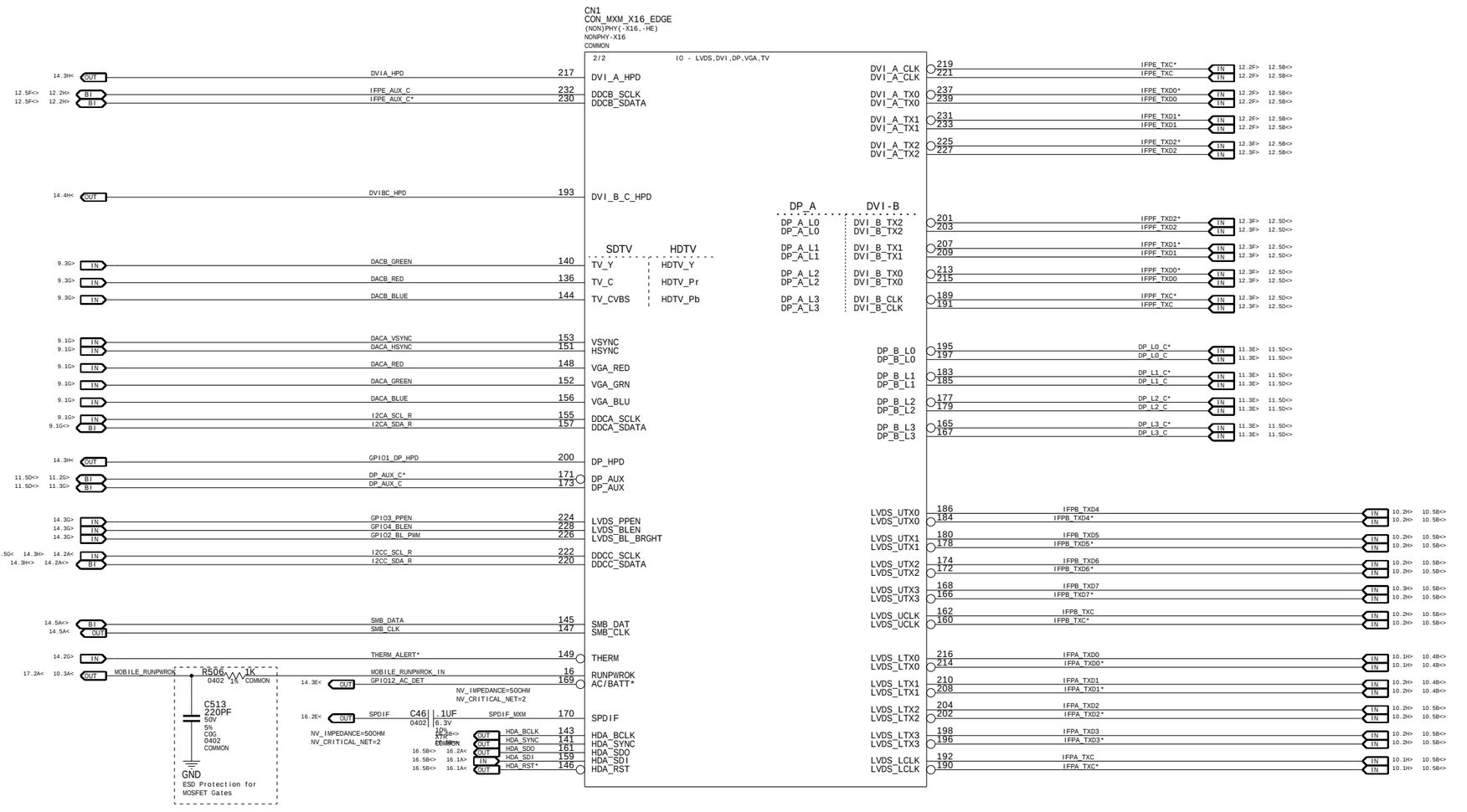
MXM CONNECTOR



ASSEMBLY	NB9P-GS G96M 400MHz, 512MB(128bit) GDDR3 32Mx32 84FBGA, LVDS + DP + HDMI + SD/HD(TV_OUT) + VGA
PAGE DETAIL	MXM CONNECTOR

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GPIO, TEMP SENSOR, JTAG

I2C ADDRESS: 0x98H

NOSTUFF for internal sensor

Stuff for connecting ExtThermalSensor to DDCC

U4 MAX6649MUA SO8_122MIL COMMON

C33 2200PF 0402 X5R COMMON 10V 10%

C671 .1UF 16V 10% X7R 0603 COMMON

R580 200 5% 0402 COMMON

R583 0 0402 5% COMMON

R582 0 0402 5% COMMON

R568 0 0402 5% COMMON

R570 0 0402 5% COMMON

R571 10k 5% 0402 COMMON

R569 2.2K 5% 0402 COMMON

as per HDMI spec
1k5 < R < 2k2

R26 2.2K 5% 0402 COMMON

R25 2.2K 5% 0402 COMMON

R61 180 5% 0402 COMMON

R60 10K 5% 0402 COMMON

R63 10K 5% 0402 COMMON

R62 270 5% 0402 COMMON

R64 10K 5% 0402 COMMON

Place lab TP together

R588 0 0402 5% NO STUFF

R584 0 0402 5% NO STUFF

NOSTUFF, except to connect SMBus to external sensor.

R593 47K 5% 0402 NO STUFF

R585 47K 5% 0402 NO STUFF

R586 0 0402 5% NO STUFF

R598 0 0402 5% NO STUFF

ONLY for IntThermalSensor tied to SMBus

R587 47K 5% 0402 COMMON

R603 47K 5% 0402 COMMON

ONLY FOR IntThermalSensor
NOT connected

R562 0 5% 0402 COMMON

R4 10K 5% 0402 COMMON

R3 10K 5% 0402 COMMON

R14 10K 5% 0402 COMMON

R559 10K 5% 0402 COMMON

R27 33 0402 5% COMMON

R24 33 0402 5% COMMON

R39 100K 5% 0402 NO STUFF

R23 10K 0402 5% COMMON

R29 100K 5% 0402 COMMON

D1 BAT54C 30V 200MA SOT23 COMMON

R43 10K 0402 5% COMMON

R46 100K 5% 0402 COMMON

Use GPIO0 for DVI-B HPD when using link AB for TMDS

ASSEMBLY	NB9P-GS G96M 400MHz, 512MB(128bit) GDDR3 32Mx32 84FBGA, LVDS + DP + HDMI + SD/HD(TV_OUT) + VGA
PAGE DETAIL	GPIO, JTAG, TEMP SENSOR

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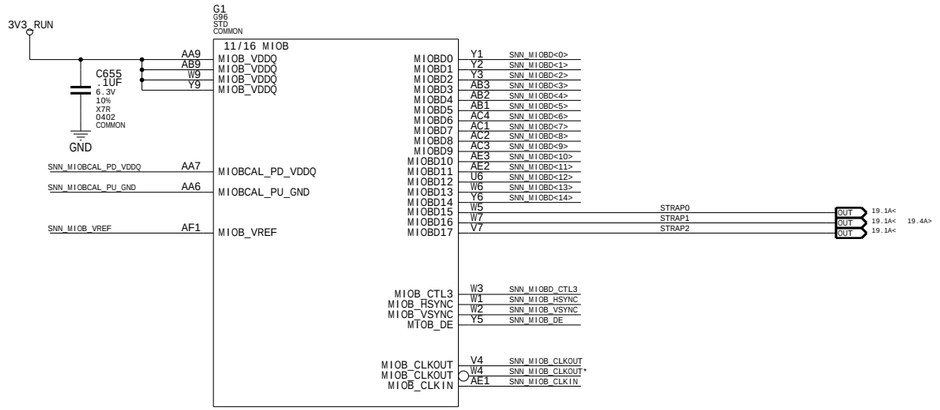
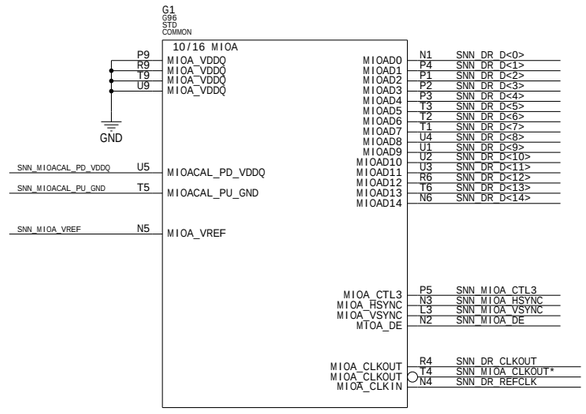
MIOA/B

NETNAME	MIN_LINE_WIDTH	
BI MIOB_VDDQ	12MIL	3.3V

(MIOB CONSTRAINTS)





ASSEMBLY	NB9P-GS G96M 400MHz, 512MB(128bit) GDDR3 32Mx32 84FBGA, LVDS + DP + HDMI + SD/HD(TV_OUT) + VGA
PAGE DETAIL	MIO A/B

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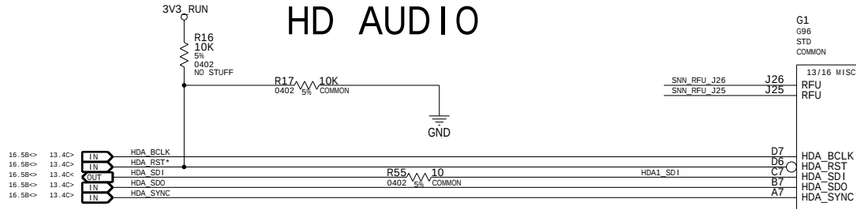
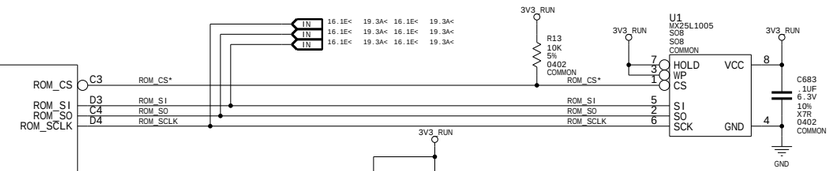
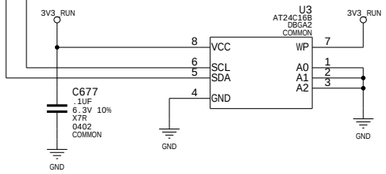
HD AUDIO



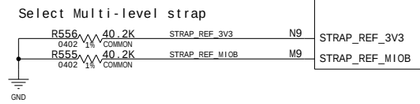
VBIOS ROM



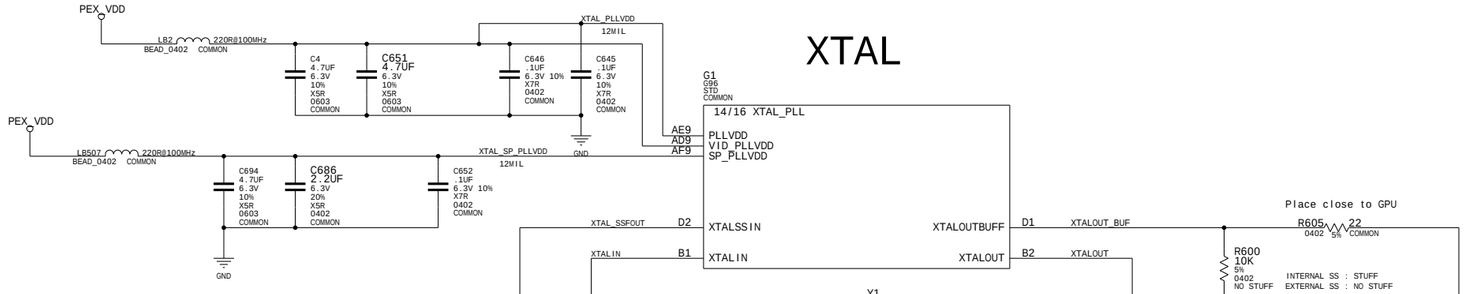
HDCP I2C ROM



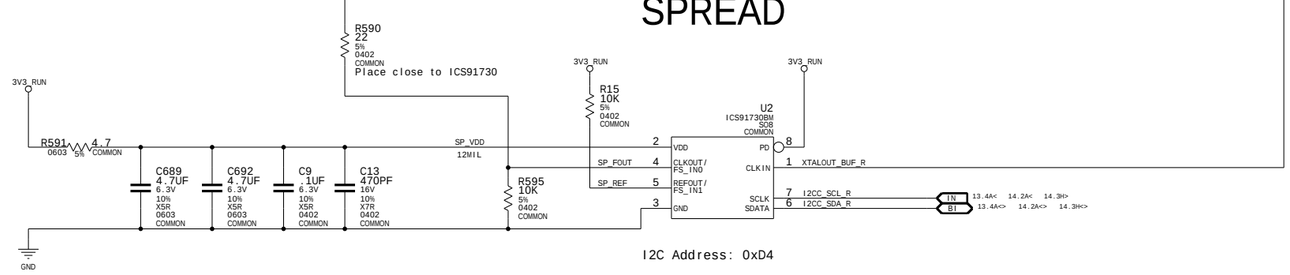
Select Multi-level strap



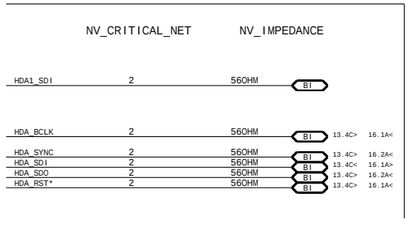
XTAL



SPREAD



(HD AUDIO CONSTRAINTS)



ASSEMBLY	NB9P-GS G96M 400MHz, 512MB(128bit) GDDR3 32Mx32 84FBGA, LVDS + DP + HDMI + SD/HD(TV_OUT) + VGA
PAGE DETAIL	VBIOS, HDCP/I2C ROM, XTAL, SPREAD SPECTRUM, HD AUDIO

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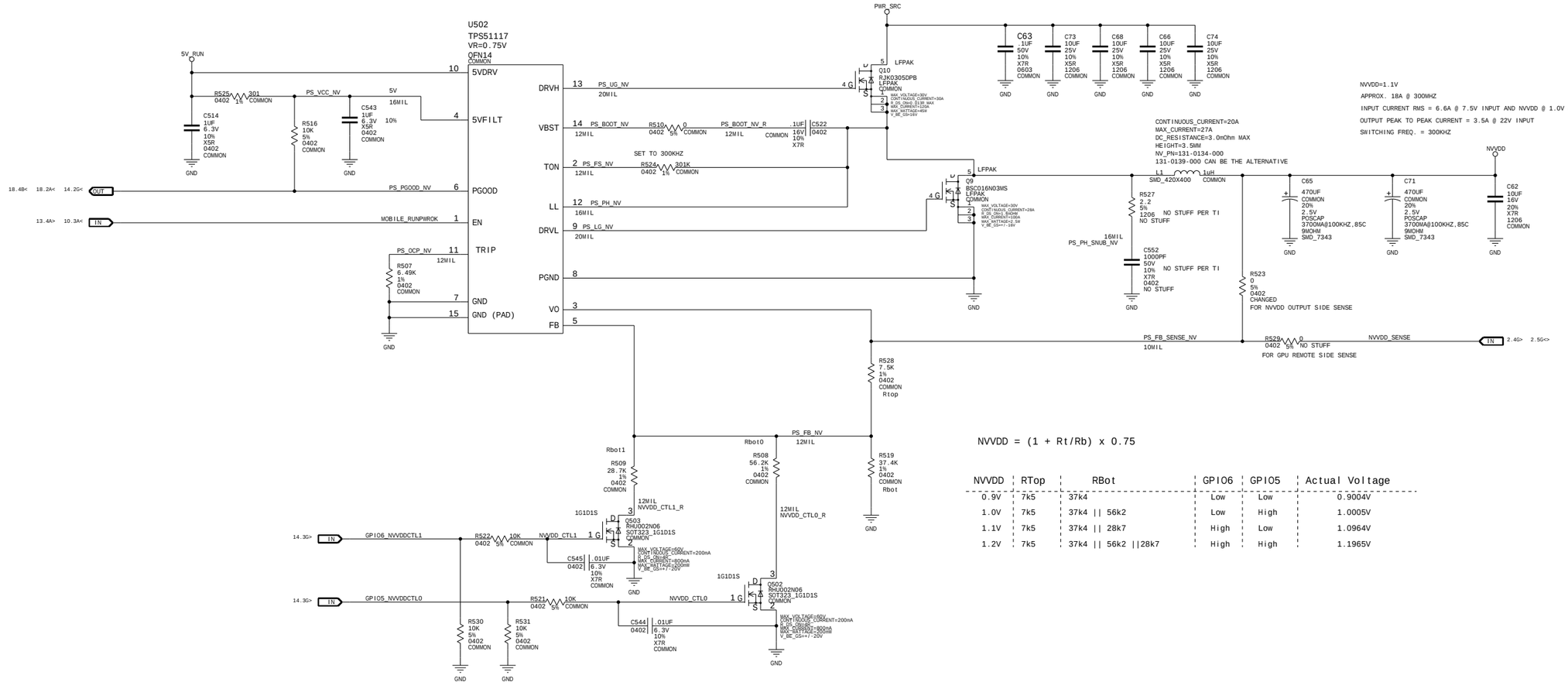
NVVDD POWER SUPPLY

NET	VOLTAGE	MIN_WIDTH_LINE	NV_NET_MAX_CURRENT
NVVDD — NVVDD	1V	12MIL	18A — NVVDD

NVVDD SWITCHER POWER SUPPLY



NVVDD=1.1V
APPROX. 18A @ 300MHZ
INPUT CURRENT RMS = 6.6A @ 7.5V INPUT AND NVVDD @ 1.0V (reduced perf)
OUTPUT PEAK TO PEAK CURRENT = 3.5A @ 22V INPUT
SWITCHING FREQ. = 300KHZ

NVVDD = (1 + Rt/Rb) x 0.75

NVVDD	RTop	RBot	GPIO6	GPIO5	Actual Voltage
0.9V	7k5	37k4	Low	Low	0.9004V
1.0V	7k5	37k4 || 56k2	Low	High	1.0005V
1.1V	7k5	37k4 || 28k7	High	Low	1.0964V
1.2V	7k5	37k4 || 56k2 ||28k7	High	High	1.1965V

ASSEMBLY	NB9P-GS G96M 400MHz, 512MB(128bit) GDDR3 32Mx32 84FBGA, LVDS + DP + HDMI + SD/HD(TV_OUT) + VGA
PAGE DETAIL	NVVDD POWER SUPPLY

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SANTA CLARA, CA 95050, USA

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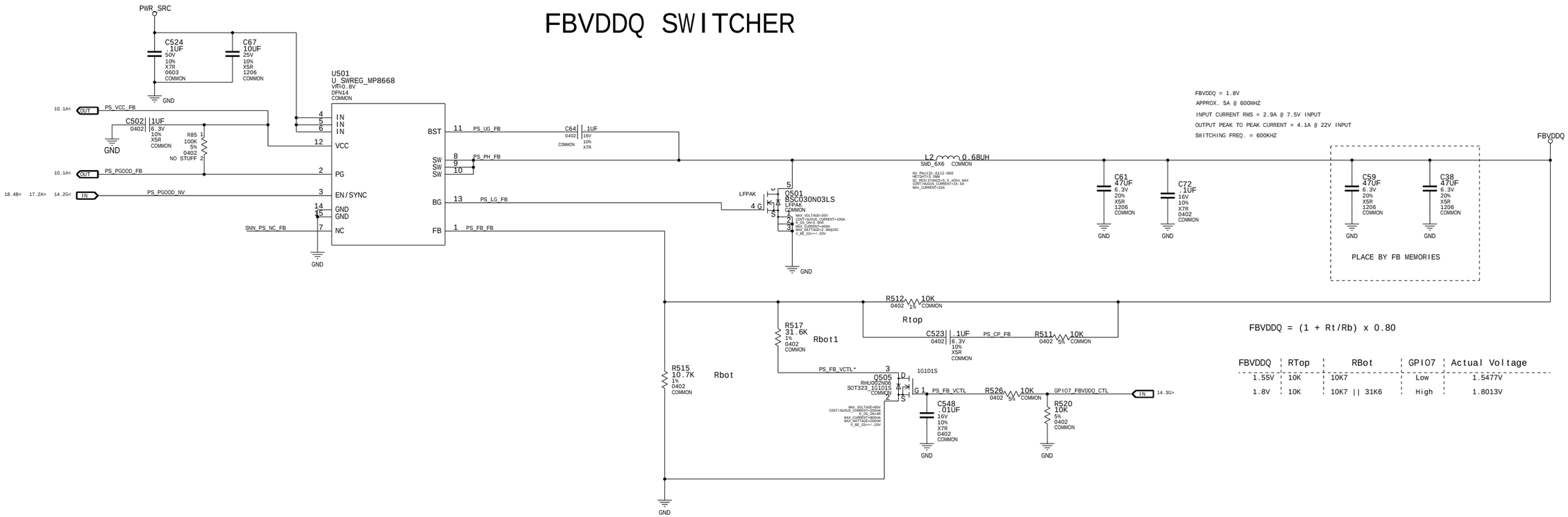
FBVDDQ AND PEX_VDD POWER SUPPLY

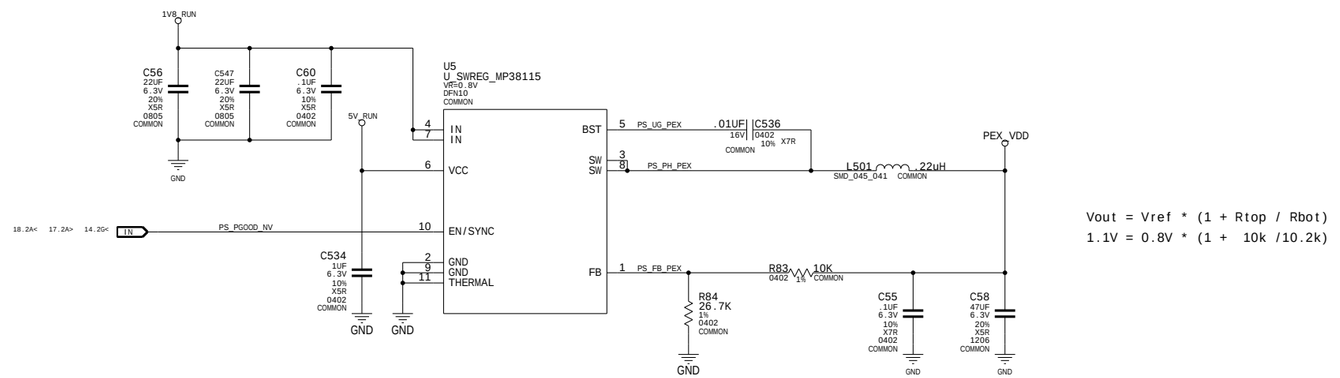
NET	VOLTAGE	NV_NET_MAX_CURRENT
PEX_VDD	1.1V	4A
FBVDDQ	1.8V	5A

FBVDDQ SWITCHER



FBVDDQ	RTop	RBot	GPIO7	Actual Voltage
1.55V	10K	10K7	Low	1.5477V
1.8V	10K	10K7 || 31K6	High	1.8013V

PEX_VDD SWITCHER



ASSEMBLY	NB9P-GS G96M 400MHz, 512MB(128bit) GDDR3 32Mx32 84FBGA, LVDS + DP + HDMI + SD/HD(TV_OUT) + VGA
PAGE DETAIL	FBVDDQ AND PEX_VDD POWER SUPPLY

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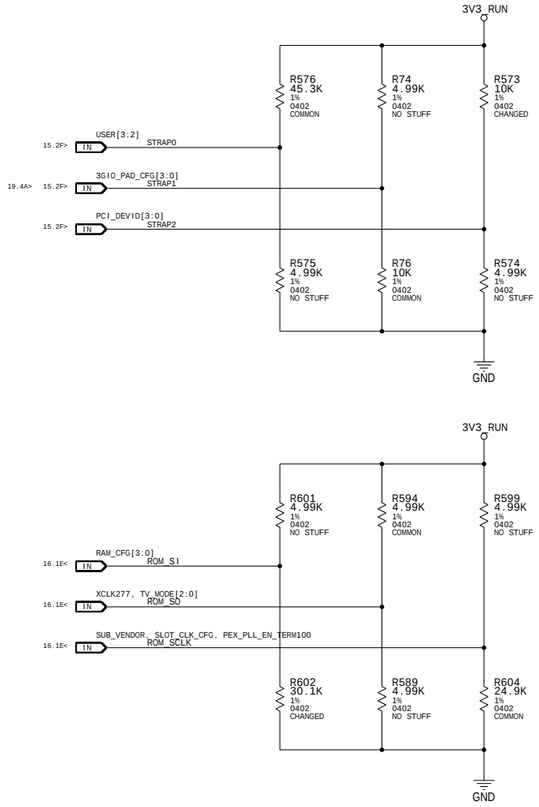
STRAPPING OPTIONS



	3V3	GND
5K	1000	0000
10K	1001	0001
15K	1010	0010
20K	1011	0011
25K	1100	0100
30K	1101	0101
35K	1110	0110
45K	1111	0111

STRAP0

USER_BIT0	0xF: 45K PU (unused)
USER_BIT1	
USER_BIT2	
USER_BIT3	

STRAP1

3GIO_PADCFG_LUT_ADR0	
3GIO_PADCFG_LUT_ADR1	0x0: Desktop default (normal swing) - 5k PD
3GIO_PADCFG_LUT_ADR2	0x1: Mobile default (low swing) - 10k PD
3GIO_PADCFG_LUT_ADR3	acc. to //hw/tesla_g98b/manuals/dev_ext_devices.ref

STRAP2

PCI_DEVID_0	all 4 bits set by HW strapping
PCI_DEVID_1	0x0649: 10K PU (NB9P-GS)
PCI_DEVID_2	0x0648: 5K PU (NB9P-GE2)
PCI_DEVID_3	

ROM_SO

TV_MODE_BIT0	0x0: NTSC-M
TV_MODE_BIT1	5K PU
TV_MODE_BIT2	
XCLK_277	1: PCI-E GEN2

ROM_SI

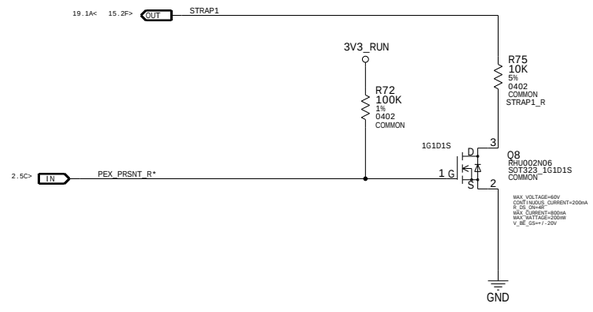
RAM_CFG_0	256 MB (4pcs. 16Mx32) / 512 MB (4pcs. 32Mx32)
RAM_CFG_1	
RAM_CFG_2	
RAM_CFG_3	

RAM_CFG[3:0]	Definitions	RAM_CFG[3:0]	Definitions
0000	Reserved	0100	25k PD Reserved
0001	Qimonda	0101	30k PD Qimonda
0010	Hynix	0110	35k PD Hynix
0011	Samsung	0111	45k PD Samsung

ROM_SCLK

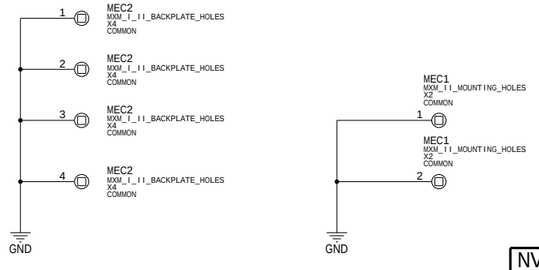
PCI_DEVID_EXT	0:	
SUB_VENDOR	1: SUB_VENDOR BIOS	25K PD
SLOT_CLK_CONFIG	0:	
PEX_PLL_EN_TERM100	0: TERM100 DISABLED	

PEX SWING LEVEL



PEX_PRSNT2_R	R_STRAP1	3_GIO_PADCFG_LUT<3..0>
GND	10k	0x1 MOBILE_DEFAULT
FLOAT	5k (10k || 10k)	0x0 DESKTOP_DEFAULT

MECHANICAL



ASSEMBLY	NB9P-GS G96M 400MHz, 512MB(128bit) GDDR3 32Mx32 84FBGA, LVDS + DP + HDMI + SD/HD(TV_OUT) + VGA
PAGE DETAIL	STRAPS, PEX SWING LEVEL, MECHANICAL

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