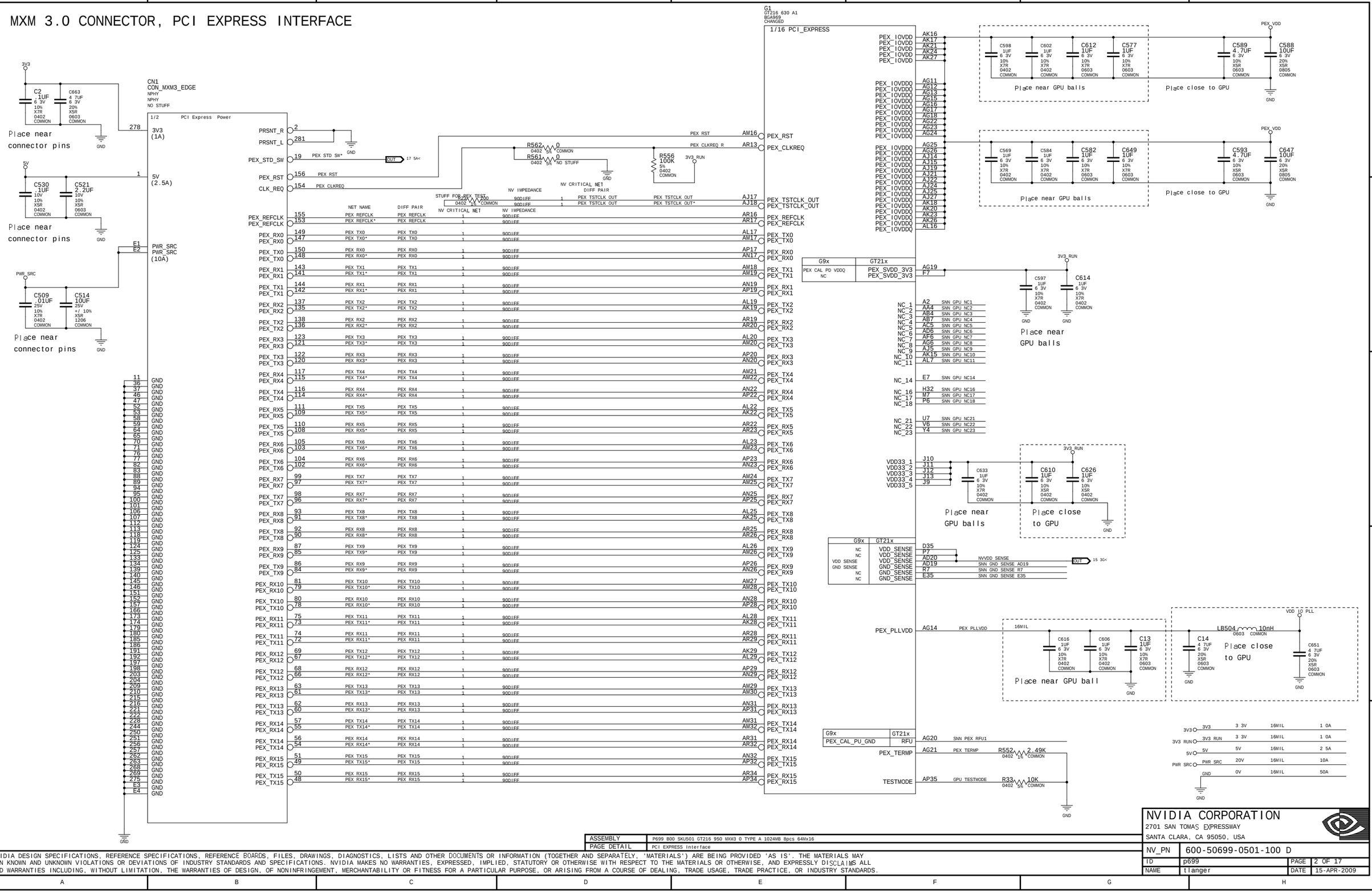
2. MXM 3.0 CONNECTOR, PCI EXPRESS INTERFACE



ASSEMBLY	P699 B00 SKU501 GT216 950 MXM3 0 TYPE A 1024MB 8pcs 64Mx16
PAGE DETAIL	PCI EXPRESS Interface

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

NV_PN	600-50699-0501-100 D		
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3. GPU MEMORY INTERFACE

G1
GT216 630 A1
BGA969
CHANGED

2/16 FBA

GT21x	G9x
FBA_D0	FBA D14
FBA_D1	FBA D15
FBA_D2	FBA D13
FBA_D3	FBA D12
FBA_D4	FBA D10
FBA_D5	FBA D11
FBA_D6	FBA D8
FBA_D7	FBA D9
FBA_D8	FBA D25
FBA_D9	FBA D26
FBA_D10	FBA D28
FBA_D11	FBA D24
FBA_D12	FBA D27
FBA_D13	FBA D31
FBA_D14	FBA D30
FBA_D15	FBA D29
FBA_D16	FBA D23
FBA_D17	FBA D22
FBA_D18	FBA D18
FBA_D19	FBA D20
FBA_D20	FBA D17
FBA_D21	FBA D19
FBA_D22	FBA D21
FBA_D23	FBA D16
FBA_D24	FBA D4
FBA_D25	FBA D7
FBA_D26	FBA D5
FBA_D27	FBA D3
FBA_D28	FBA D6
FBA_D29	FBA D2
FBA_D30	FBA D1
FBA_D31	FBA D0
FBA_D32	FBA D32
FBA_D33	FBA D34
FBA_D34	FBA D33
FBA_D35	FBA D35
FBA_D36	FBA D36
FBA_D37	FBA D39
FBA_D38	FBA D38
FBA_D39	FBA D37
FBA_D40	FBA D48
FBA_D41	FBA D52
FBA_D42	FBA D51
FBA_D43	FBA D50
FBA_D44	FBA D53
FBA_D45	FBA D49
FBA_D46	FBA D54
FBA_D47	FBA D55
FBA_D48	FBA D57
FBA_D49	FBA D58
FBA_D50	FBA D60
FBA_D51	FBA D59
FBA_D52	FBA D63
FBA_D53	FBA D62
FBA_D54	FBA D61
FBA_D55	FBA D56
FBA_D56	FBA D41
FBA_D57	FBA D40
FBA_D58	FBA D42
FBA_D59	FBA D43
FBA_D60	FBA D45
FBA_D61	FBA D44
FBA_D62	FBA D47
FBA_D63	FBA D46
FBA_DQM0	FBA DQM1
FBA_DQM1	FBA DQM3
FBA_DQM2	FBA DQM2
FBA_DQM3	FBA DQM0
FBA_DQM4	FBA DQM4
FBA_DQM5	FBA DQM6
FBA_DQM6	FBA DQM7
FBA_DQM7	FBA DQM5
FBA_DQS_WP0	FBA DQS WP1
FBA_DQS_WP1	FBA DQS WP3
FBA_DQS_WP2	FBA DQS WP2
FBA_DQS_WP3	FBA DQS WP0
FBA_DQS_WP4	FBA DQS WP4
FBA_DQS_WP5	FBA DQS WP6
FBA_DQS_WP6	FBA DQS WP7
FBA_DQS_WP7	FBA DQS WP5
FBA_DQS_RN0	FBA DQS RN1
FBA_DQS_RN1	FBA DQS RN3
FBA_DQS_RN2	FBA DQS RN2
FBA_DQS_RN3	FBA DQS RN0
FBA_DQS_RN4	FBA DQS RN4
FBA_DQS_RN5	FBA DQS RN6
FBA_DQS_RN6	FBA DQS RN7
FBA_DQS_RN7	FBA DQS RN5
FBA_WCK0	FBA DQS NC
FBA_WCK0	FBA DQS0 N NC
FBA_WCK1	FBA WDS1 NC
FBA_WCK1	FBA WDS1 N NC
FBA_WCK2	FBA WDS3 NC
FBA_WCK2	FBA WDS3 N NC
FBA_WCK3	FBA WDS2 NC
FBA_WCK3	FBA WDS2 N NC

FBA_DATA<63_0>
FBA_DQM<7_0>
FBA_CMD<30_0>
FBA_DEBUG
FBA_CLK0
FBA_CLK0
FBA_CLK1
FBA_CLK1
FB_VREF
FB_DLLAVDD
FB_PLLAVDD

FBVDDQ
Place under GPU WEST SIDE (FBA) near FBVDDQ balls
Place under GPU NE corner
GND

C565 1UF 6 3V 10% X7R 0402 COMMON
C567 1UF 6 3V 10% X7R 0402 COMMON
C564 1UF 6 3V 10% X7R 0402 COMMON
C575 1UF 6 3V 10% X7R 0402 COMMON
C562 1UF 6 3V 10% X7R 0402 COMMON
C566 1UF 6 3V 10% X7R 0603 COMMON

R544 10K 0402 5% COMMON

R547 1.1K 1% 0402 NO STUFF
R549 1.1K 1% 0402 NO STUFF
C590 .01UF 6 3V 10% X7R 0402 NO STUFF
Place close to GPU
FB_VREF 12MIL

FBA_PLLAVDD GPU 16MIL 1 1V
C576 1UF 6 3V 10% X7R 0402 COMMON
C572 1UF 6 3V 10% X7R 0402 COMMON
Place near GPU balls

VDD 1.0 PLL
LB501 240R@100MHz BEAD 0402 COMMON
C563 4.7UF 6 3V 10% X5R 0603 COMMON
C571 4.7UF 6 3V 10% X5R 0603 COMMON
Place close to GPU

G1
GT216 630 A1
BGA969
CHANGED

3/16 FBC

GT21x	G9x
FBC_D0	FBC D26
FBC_D1	FBC D24
FBC_D2	FBC D25
FBC_D3	FBC D27
FBC_D4	FBC D28
FBC_D5	FBC D30
FBC_D6	FBC D29
FBC_D7	FBC D31
FBC_D8	FBC D9
FBC_D9	FBC D8
FBC_D10	FBC D14
FBC_D11	FBC D10
FBC_D12	FBC D15
FBC_D13	FBC D13
FBC_D14	FBC D11
FBC_D15	FBC D12
FBC_D16	FBC D6
FBC_D17	FBC D4
FBC_D18	FBC D2
FBC_D19	FBC D5
FBC_D20	FBC D7
FBC_D21	FBC D3
FBC_D22	FBC D0
FBC_D23	FBC D1
FBC_D24	FBC D16
FBC_D25	FBC D17
FBC_D26	FBC D23
FBC_D27	FBC D22
FBC_D28	FBC D19
FBC_D29	FBC D21
FBC_D30	FBC D20
FBC_D31	FBC D18
FBC_D32	FBC D39
FBC_D33	FBC D36
FBC_D34	FBC D38
FBC_D35	FBC D37
FBC_D36	FBC D33
FBC_D37	FBC D35
FBC_D38	FBC D32
FBC_D39	FBC D34
FBC_D40	FBC D55
FBC_D41	FBC D54
FBC_D42	FBC D53
FBC_D43	FBC D51
FBC_D44	FBC D52
FBC_D45	FBC D49
FBC_D46	FBC D50
FBC_D47	FBC D48
FBC_D48	FBC D56
FBC_D49	FBC D59
FBC_D50	FBC D57
FBC_D51	FBC D58
FBC_D52	FBC D61
FBC_D53	FBC D60
FBC_D54	FBC D63
FBC_D55	FBC D62
FBC_D56	FBC D47
FBC_D57	FBC D45
FBC_D58	FBC D46
FBC_D59	FBC D44
FBC_D60	FBC D43
FBC_D61	FBC D42
FBC_D62	FBC D41
FBC_D63	FBC D40
FBC_DQM0	FBC DQM3
FBC_DQM1	FBC DQM1
FBC_DQM2	FBC DQM0
FBC_DQM3	FBC DQM2
FBC_DQM4	FBC DQM4
FBC_DQM5	FBC DQM6
FBC_DQM6	FBC DQM7
FBC_DQM7	FBC DQM5
FBC_DQS_WP0	FBC DQS WP3
FBC_DQS_WP1	FBC DQS WP1
FBC_DQS_WP2	FBC DQS WP0
FBC_DQS_WP3	FBC DQS WP2
FBC_DQS_WP4	FBC DQS WP4
FBC_DQS_WP5	FBC DQS WP6
FBC_DQS_WP6	FBC DQS WP7
FBC_DQS_WP7	FBC DQS WP5
FBC_DQS_RN0	FBC DQS RN3
FBC_DQS_RN1	FBC DQS RN1
FBC_DQS_RN2	FBC DQS RN0
FBC_DQS_RN3	FBC DQS RN2
FBC_DQS_RN4	FBC DQS RN4
FBC_DQS_RN5	FBC DQS RN6
FBC_DQS_RN6	FBC DQS RN7
FBC_DQS_RN7	FBC DQS RN5
FBC_WCK0	FBC WDS1 NC
FBC_WCK0	FBC WDS1 N NC
FBC_WCK1	FBC WDS0 NC
FBC_WCK1	FBC WDS0 N NC
FBC_WCK2	FBC WDS3 NC
FBC_WCK2	FBC WDS3 N NC
FBC_WCK3	FBC WDS2 NC
FBC_WCK3	FBC WDS2 N NC

G9x	GT21x
FBAC_DLLAVDD1	RFU
FBAC_PLLAVDD1	RFU

FBC_DATA<63_0>
FBC_DQM<7_0>
FBC_CMD<30_0>
FBC_CLK0
FBC_CLK0
FBC_CLK1
FBC_CLK1
FBC_DEBUG
FBCAL_PD_VDDQ
FBCAL_PU_GND
FBCAL_TERM_GND

FBVDDQ
C580 1UF 6 3V 10% X7R 0402 COMMON
C625 1UF 6 3V 10% X7R 0402 COMMON
C568 1UF 6 3V 10% X7R 0402 COMMON
C600 1UF 6 3V 10% X7R 0402 COMMON
C599 1UF 6 3V 10% X7R 0402 COMMON
Place under GPU NORTH SIDE (FBC) near FBVDDQ balls
GND

R551 10K 0402 5% COMMON

R545 40.2 0402 1% CHANGED
R548 40.2 0402 1% CHANGED
R546 40.2 0402 1% COMMON

ASSEMBLY	P699 B00 SKU501 GT216 950 MXM3 0 TYPE A 1024MB 8pcs 64Mx16
PAGE DETAIL	Frame Buffer GPU Interface

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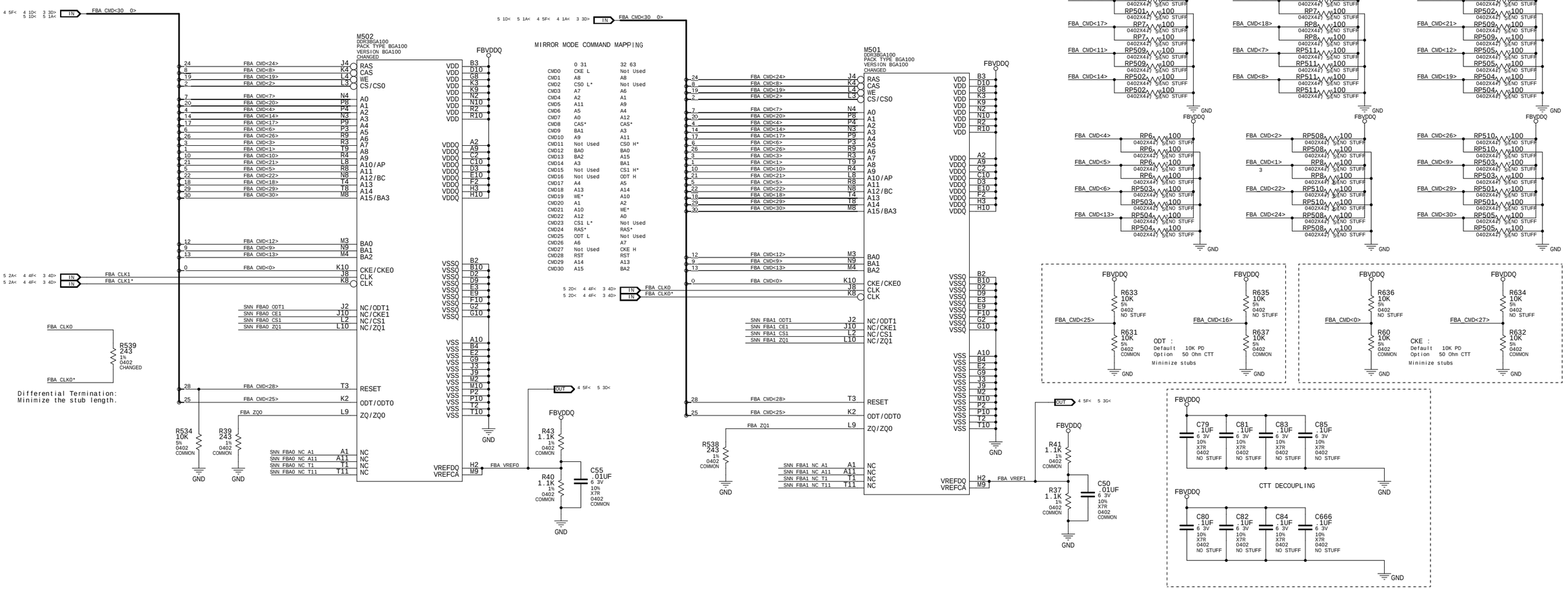
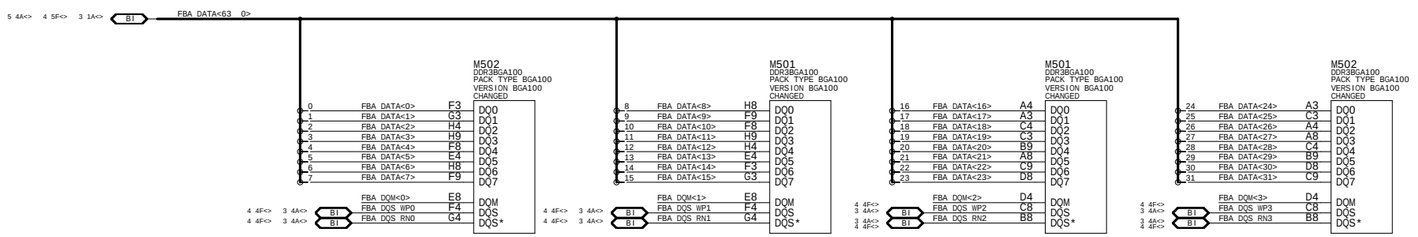
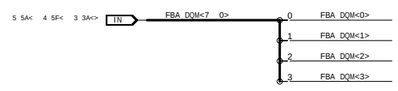
4. MEMORY PARTITION A LOWER 32 BITS







MEMORY PARTITION A SIGNAL CONSTRAINTS

	NET	DIFFPAIR	CRITICAL	IMPEDANCE
5 2D< 4 2D< 3 4D> IN	FBA_CLK0		1	70DIFF
5 2D< 4 2D< 3 4D> IN	FBA_CLK0*	FBA_CLK0	1	70DIFF
5 2A< 4 2A< 3 4D> IN	FBA_CLK1	FBA_CLK1	1	70DIFF
5 2A< 4 2A< 3 4D> IN	FBA_CLK1*	FBA_CLK1	1	70DIFF
4 4B< 3 4A<> BI	FBA_DQS_WP0		1	80DIFF
4 4B< 3 4A<> BI	FBA_DQS_RN0	FBADQS0	1	80DIFF
4 4C< 3 4A<> BI	FBA_DQS_WP1	FBADQS1	1	80DIFF
4 4C< 3 4A<> BI	FBA_DQS_RN1	FBADQS1	1	80DIFF
4 4C< 3 4A<> BI	FBA_DQS_WP2	FBADQS2	1	80DIFF
4 4C< 3 4A<> BI	FBA_DQS_RN2	FBADQS2	1	80DIFF
4 4D< 3 4A<> BI	FBA_DQS_WP3	FBADQS3	1	80DIFF
4 4D< 3 4A<> BI	FBA_DQS_RN3	FBADQS3	1	80DIFF
5 5B< 3 4A<> BI	FBA_DQS_WP4	FBADQS4	1	80DIFF
5 5B< 3 4A<> BI	FBA_DQS_RN4	FBADQS4	1	80DIFF
5 5C< 3 4A<> BI	FBA_DQS_WP5	FBADQS5	1	80DIFF
5 5C< 3 4A<> BI	FBA_DQS_RN5	FBADQS5	1	80DIFF
5 5D< 3 4A<> BI	FBA_DQS_WP6	FBADQS6	1	80DIFF
5 5D< 3 4A<> BI	FBA_DQS_RN6	FBADQS6	1	80DIFF
5 5E< 3 4A<> BI	FBA_DQS_WP7	FBADQS7	1	80DIFF
5 5E< 3 4A<> BI	FBA_DQS_RN7	FBADQS7	1	80DIFF

	NET	CRITICAL	IMPEDANCE
5 4A<> 4 4A<> 3 1A<> BI	FBA_DATA<63_0>	2	40OHM
5 5A< 4 5A< 3 3A<> IN	FBA_DQM<7_0>	2	40OHM
5 1D< 5 1A< 4 1D< 4 1A< 3 3D> IN	FBA_CMD<30_0>	2	40OHM

	NET	MIN LINE WIDTH	VOLTAGE
IN	FBA_VREF_PD	16MIL	0.9V
5 3D< 4 3D> IN	FBA_VREF0	16MIL	0.9V
5 3G< 4 3G> IN	FBA_VREF1	16MIL	0.9V
BI	FBA_ZQ0	16MIL	1.80V
BI	FBA_ZQ1	16MIL	1.80V
5 3B<> BI	FBA_ZQ2	16MIL	1.80V
5 3E<> BI	FBA_ZQ3	16MIL	1.80V

ASSEMBLY	P699_B00_SKU501_GT216_950_MXM3_0_TYPE_A_1024MB_8pcs_64Mx16
PAGE DETAIL	Frame Buffer Partition A Lower 32 Bits

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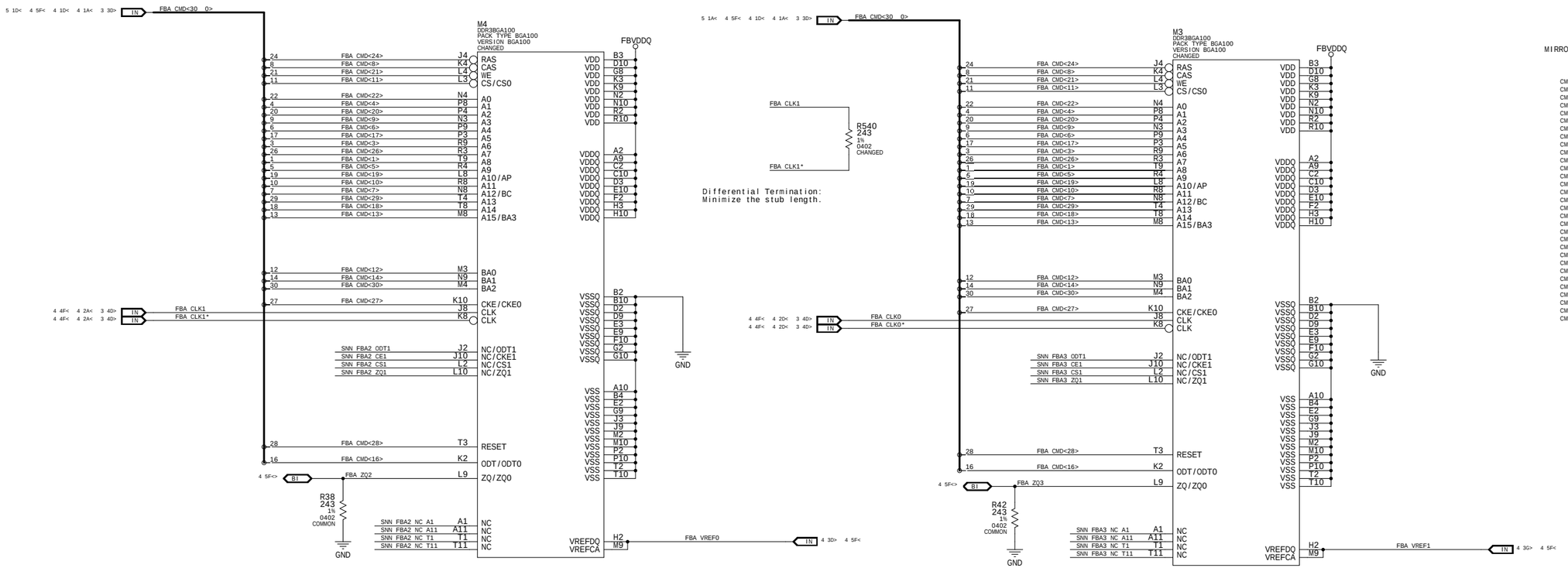
5. MEMORY PARTITION A UPPER 32 BITS



MIRROR MODE COMMAND MAPPING

	0 31	32 63
CMD0	CKE L	Not Used
CMD1	A8	A8
CMD2	CS0 L*	Not Used
CMD3	A7	A6
CMD4	A2	A1
CMD5	A11	A9
CMD6	A5	A4
CMD7	A0	A12
CMD8	CAS*	CAS*
CMD9	BA1	A3
CMD10	A9	A11
CMD11	Not Used	CS0 H*
CMD12	BA0	BA0
CMD13	BA2	A15
CMD14	A3	BA1
CMD15	Not Used	CS1 H*
CMD16	Not Used	ODT H
CMD17	A4	A5
CMD18	A13	A14
CMD19	WE*	A10
CMD20	A1	A2
CMD21	A10	WE*
CMD22	A12	A0
CMD23	CS1 L*	Not Used
CMD24	RAS*	RAS*
CMD25	ODT L	Not Used
CMD26	A6	A7
CMD27	Not Used	CKE H
CMD28	RST	RST
CMD29	A14	A13
CMD30	A15	BA2

ASSEMBLY	P699 B00 SKU501 GT216 950 MXM3 0 TYPE A 1024MB 8pcs 64Mx16
PAGE DETAIL	Frame Buffer Partition A Upper 32 Bits

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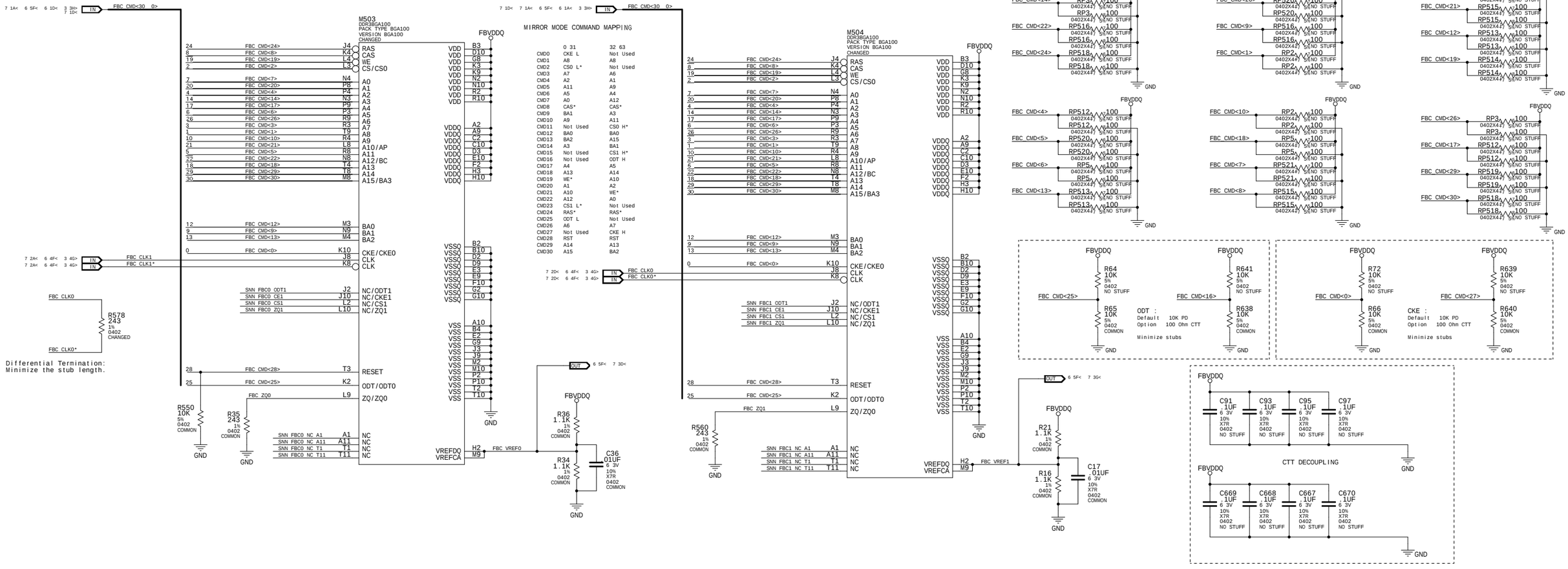
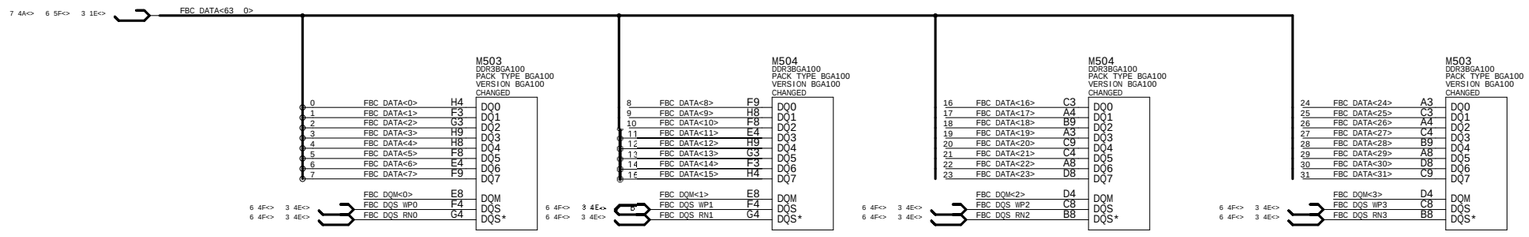
6. MEMORY PARTITION C LOWER 32 BITS





MEMORY PARTITION C SIGNAL CONSTRAINTS

NET	DIFFPAIR	CRITICAL	IMPEDANCE
FB_CLK	FBC_CLK0	1	70DIFF
FB_CLK_*	FBC_CLK0	1	70DIFF
FB_CLK	FBC_CLK1	1	70DIFF
FB_CLK1_*	FBC_CLK1	1	70DIFF
FBC_DQS WP0	FBCDQS0	1	80DIFF
FB_DQS RN0	FBCDQS0	1	80DIFF
FB_DQS WP1	FBCDQS1	1	80DIFF
FB_DQS RN1	FBCDQS1	1	80DIFF
FB_DQS WP2	FBCDQS2	1	80DIFF
FB_DQS RN2	FBCDQS2	1	80DIFF
FB_DQS WP3	FBCDQS3	1	80DIFF
FB_DQS RN3	FBCDQS3	1	80DIFF
FB_DQS WP4	FBCDQS4	1	80DIFF
FB_DQS RN4	FBCDQS4	1	80DIFF
FB_DQS WP5	FBCDQS5	1	80DIFF
FB_DQS RN5	FBCDQS5	1	80DIFF
FB_DQS WP6	FBCDQS6	1	80DIFF
FB_DQS RN6	FBCDQS6	1	80DIFF
FB_DQS WP7	FBCDQS7	1	80DIFF
FB_DQS RN7	FBCDQS7	1	80DIFF

NET		
FBC_DATA<63 0>	2	40OHM
FBC_DQM<7 0>	2	40OHM
FBC_CMD<27 0>	2	40OHM

NET	MIN LINE WIDTH	VOLTAGE
FBC_VREF PD	16MIL	0.9V
FBC_VREF0	16MIL	0.9V
FBC_VREF1	16MIL	0.9V
FBC_ZQ0	16MIL	1.80V
FBC_ZQ1	16MIL	1.80V
FBC_ZQ2	16MIL	1.80V
FBC_ZQ3	16MIL	1.80V

ASSEMBLY	P699-B00 SKU501 GT216-950 MXM3.0 TYPE-A 1024MB 8pcs 64Mx16
PAGE DETAIL	Frame Buffer Partition C Lower 32 Bits

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SANTA CLARA, CA 95050, USA

NV_PN	600-50699-0501-100 D		
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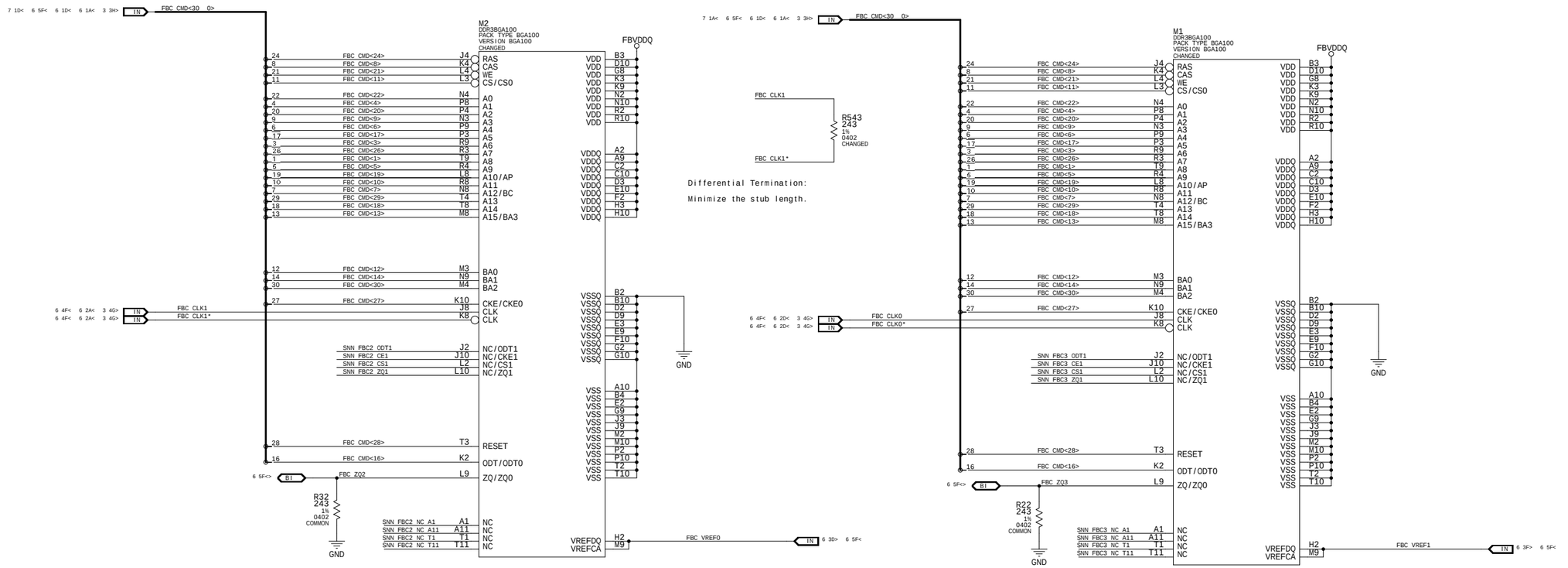
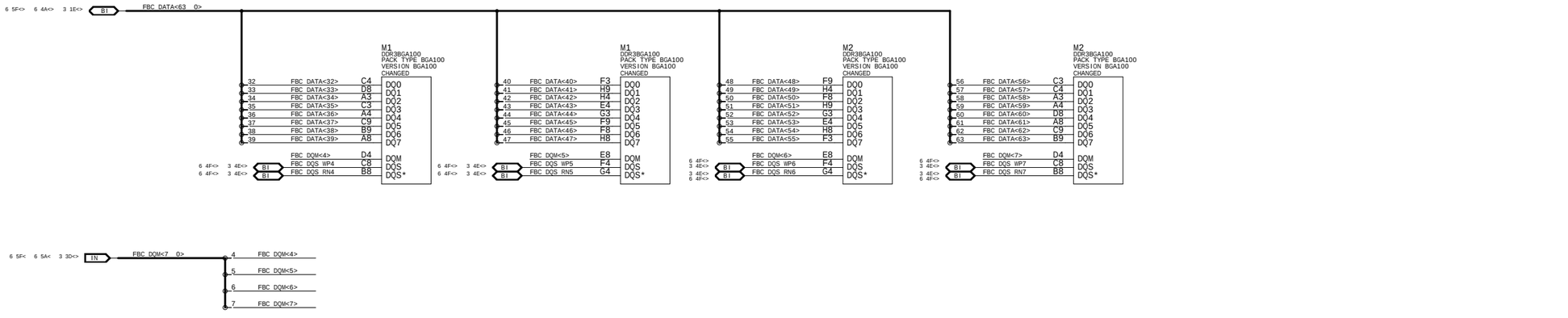
NAME	tlanger	DATE	15-APR-2009

7. MEMORY PARTITION C UPPER 32 BITS





ASSEMBLY	P699-B00 SKU501 GT216-950 MXM3.0 TYPE-A 1024MB 8pcs 64Mx16
PAGE DETAIL	Frame Buffer Partition C Upper 32 Bits

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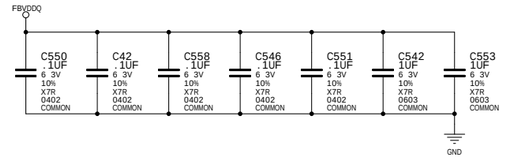
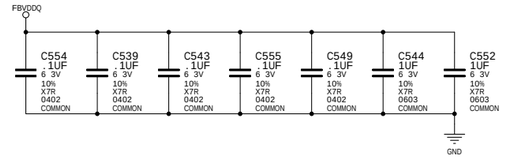
NAME	tlanger	DATE	15-APR-2009

8. MEMORY DECOUPLING CAPS

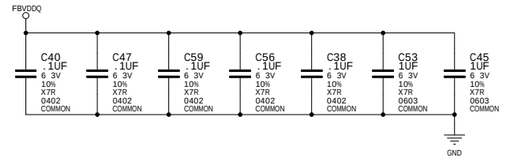
DECOUPLING CAPS FOR ONE MEMORY OF PARTION A LOWER BITS 0-15



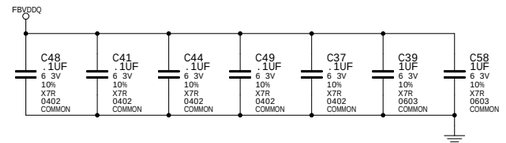
DECOUPLING CAPS FOR ONE MEMORY OF PARTION A LOWER BITS 16-31



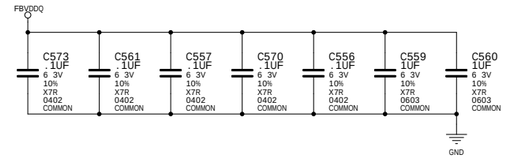
DECOUPLING CAPS FOR ONE MEMORY OF PARTION A UPPER BITS 32-47



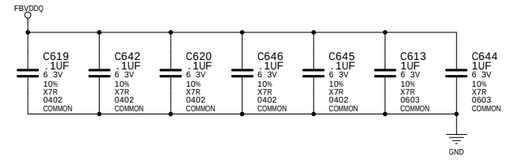
DECOUPLING CAPS FOR ONE MEMORY OF PARTION A UPPER BITS 48-63



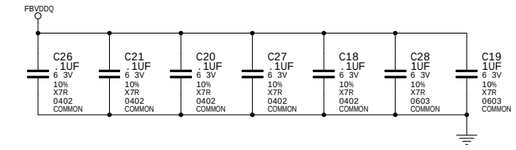
DECOUPLING CAPS FOR ONE MEMORY OF PARTION C LOWER BITS 0-15



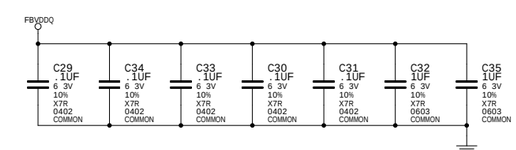
DECOUPLING CAPS FOR ONE MEMORY OF PARTION C LOWER BITS 16-31



DECOUPLING CAPS FOR ONE MEMORY OF PARTION C UPPER BITS 32-47



DECOUPLING CAPS FOR ONE MEMORY OF PARTION C UPPER BITS 48-63



ASSEMBLY	P699 B00 SKU501 GT216 950 MXM3 0 TYPE A 1024MB 8pcs 64Mx16
PAGE DETAIL	Memory Decoupling Caps

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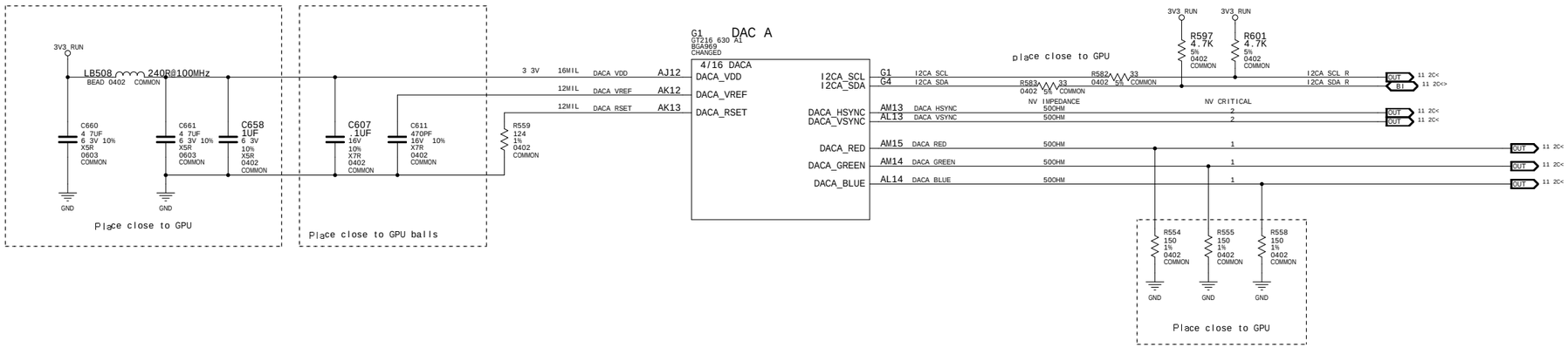
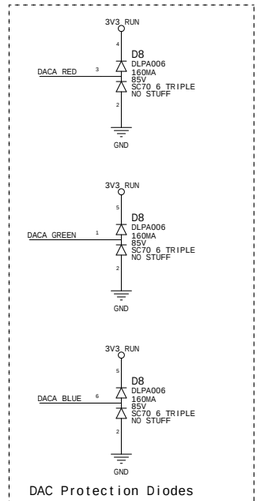
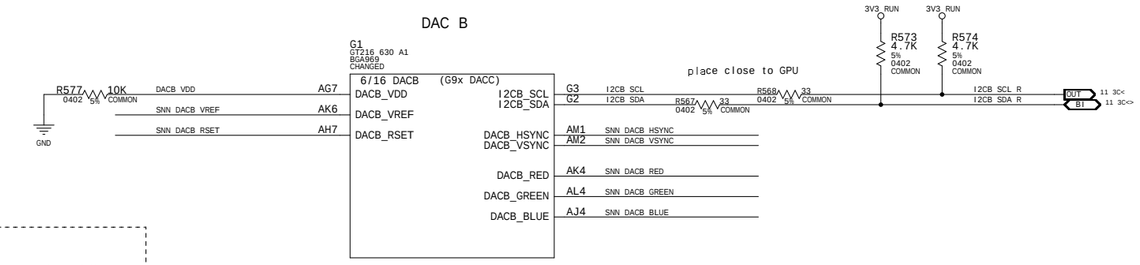
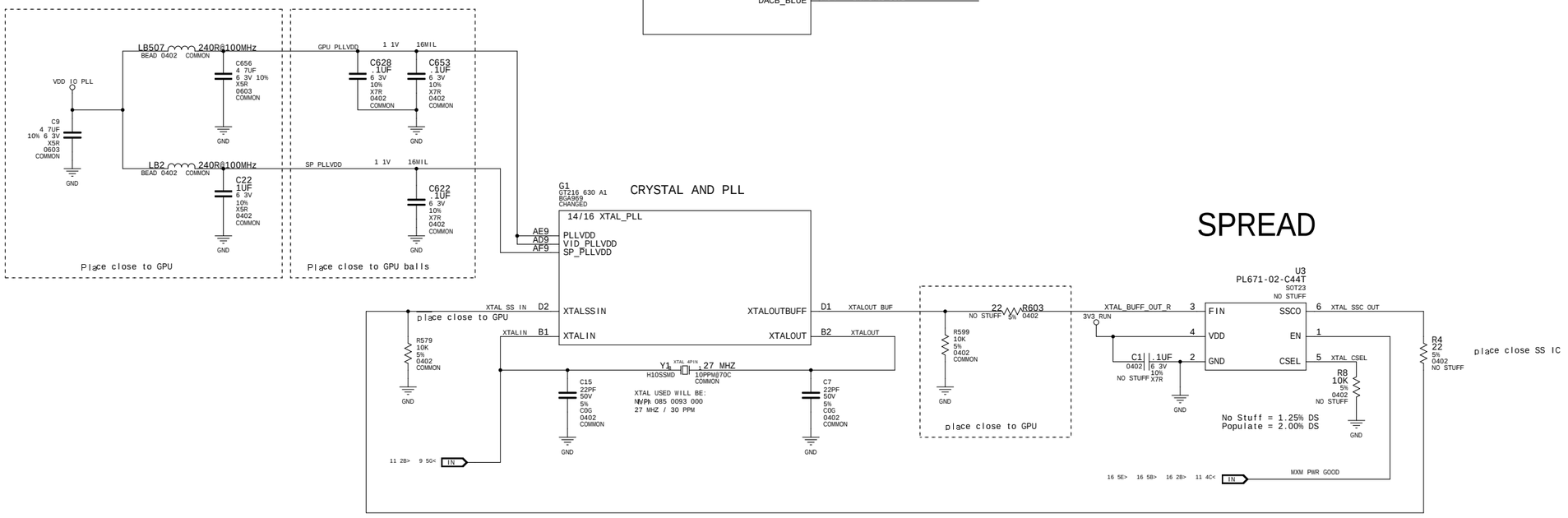
9. DAC_A, DAC_B, SPREAD, PLL, CRYSTAL









NV_NET_NAME	NV_IMPEDANCE	NV_CRITICAL_NET
OUT XTALOUT	50OHM	1
11 2B> 9 5B< IN XTALIN	50OHM	1
OUT XTALOUT_BUF	50OHM	2
IN XTAL_SSC_OUT	50OHM	2

ASSEMBLY	P699 B00 SKU501 GT216 950 MXM3 0 TYPE A 1024MB 8pcs 64Mx16
PAGE DETAIL	DAC A DAC B SPREAD PLL CRYSTAL

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