

A	B	C	D	E	F	G	H
---	---	---	---	---	---	---	---

1

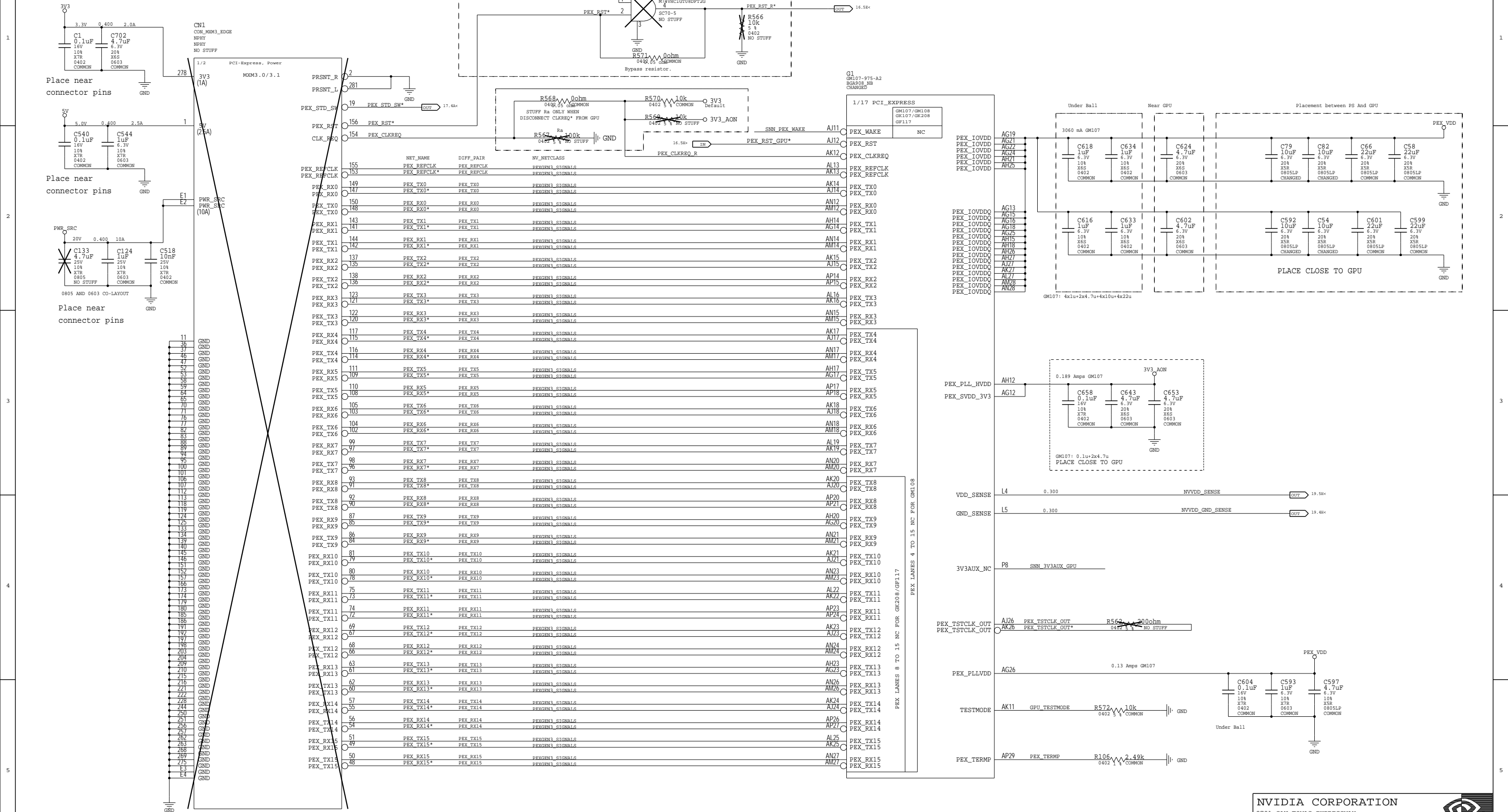
## 1

23

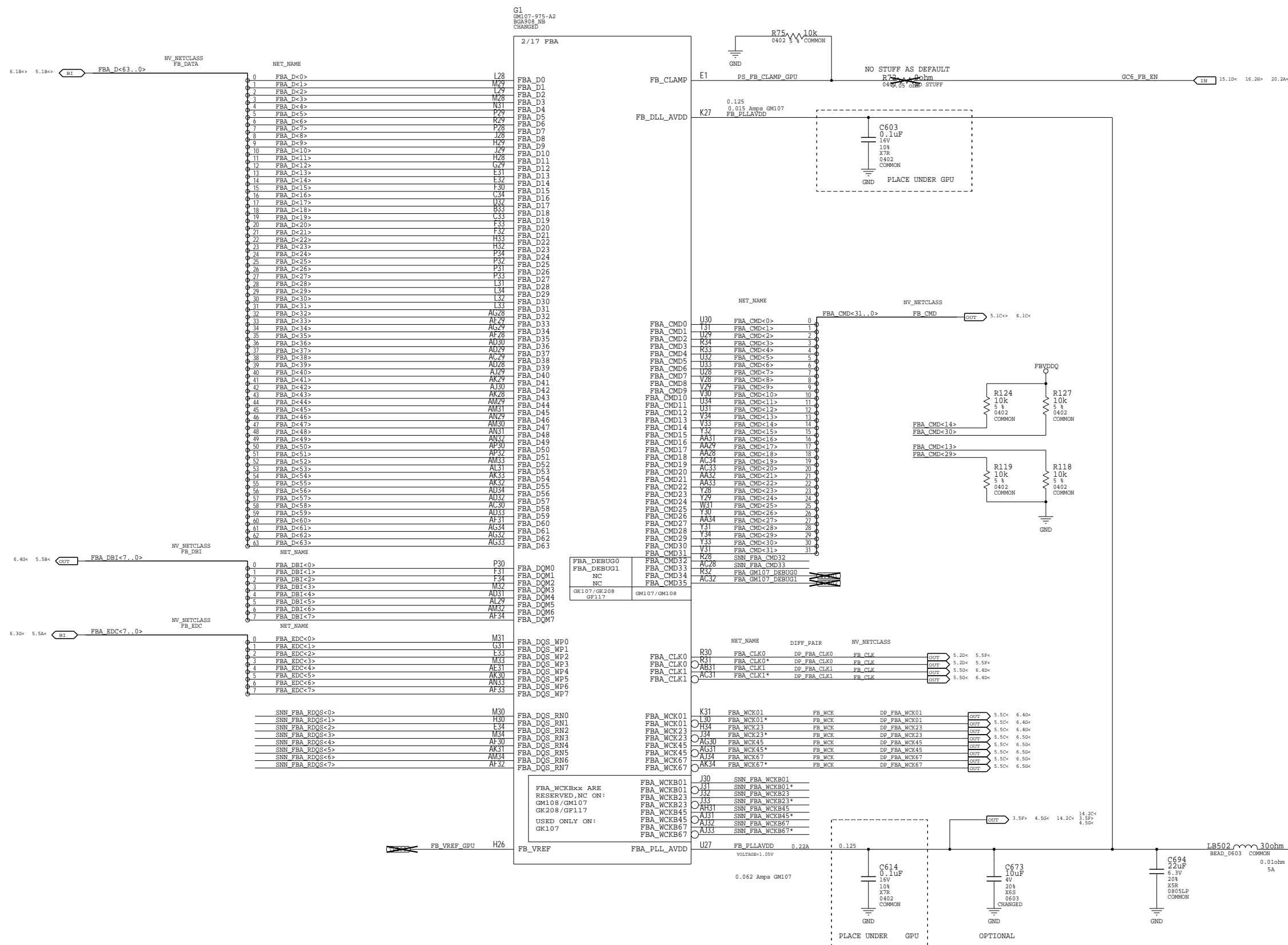
4

5

## PCI EXPRESS INTERFACE



# FRAME BUFFER A GPU INTERFACE




```

GDDR5_BGA170_MIRR COMMAND MAP
-----
CMD0  0_31      32_63
-----
CMD1  CS*
CMD2  A3_BA3
CMD3  A2_BA0
CMD4  A4_BA2
CMD5  A5_BA1
CMD6  WE*
CMD7  A7_A8
CMD8  A6_A11
CMD9  ABI*
CMD9  A12_RFU
CMD10 A0_A10
CMD11 A1_A9
CMD12 RAS*
CMD13 RST*
CMD14 CEK*
CMD15 CAS*
CMD16
CMD17 A3_BA3
CMD18 A2_BA0
CMD19 A4_BA2
CMD20 A5_BA1
CMD21 WE*
CMD22 A7_A8
CMD23 A6_A11
CMD24 ABI*
CMD25 A12_RFU
CMD26 A0_A10
CMD27 A1_A9
CMD28 RAS*
CMD29 RST*
CMD30 CEK*
CMD31 CAS*

```

ASSEMBLY	SKU504 GM107 X16 GDDR5 MEMORY
PAGE DETAIL	FRAME BUFFER A GPU INTERFACE

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NV_PN		600-52757-0504-200		
PCB REV	B2757-A01	PAGE	3 OF 20	
BOM REV	J	DATE	05-FEB-2015	

FRAME BUFFER B GPU INTERFACE

G1  
GM107-975-A2  
BGA908\_NB  
CHANGED

GDDR5\_BGA170\_MIRR COMMAND MAP

	D...31	32...63
CMD0	CS*	
CMD1	A3_BA3	
CMD2	A2_BA0	
CMD3	A4_BA2	
CMD4	A5_BA1	
CMD5	WE*	
CMD6	A7_A8	
CMD7	A6_A11	
CMD8	AB1*	
CMD9	A12_RFU	
CMD10	A0_A10	
CMD11	A1_A9	
CMD12	RAS*	
CMD13	RST*	
CMD14	CKE*	
CMD15	CAS*	
CMD16		CS*
CMD17	A3_BA3	
CMD18	A2_BA0	
CMD19	A4_BA2	
CMD20	A5_BA1	
CMD21	WE*	
CMD22	A7_A8	
CMD23	A6_A11	
CMD24	AB1*	
CMD25	A12_RFU	
CMD26	A0_A10	
CMD27	A1_A9	
CMD28	RAS*	
CMD29	RST*	
CMD30	CKE*	
CMD31	CAS*	

8.18c< 7.18c< BI FBB D<63...0>

NV\_NETCLASS  
FB\_DATA

NET\_NAME

0	FBB D<0>	G9
1	FBB D<1>	G8
2	FBB D<2>	F9
3	FBB D<3>	F8
4	FBB D<4>	F11
5	FBB D<5>	G11
6	FBB D<6>	F12
7	FBB D<7>	G12
8	FBB D<8>	G6
9	FBB D<9>	F5
10	FBB D<10>	E6
11	FBB D<11>	F6
12	FBB D<12>	F4
13	FBB D<13>	G4
14	FBB D<14>	E2
15	FBB D<15>	F3
16	FBB D<16>	C2
17	FBB D<17>	D4
18	FBB D<18>	D3
19	FBB D<19>	C3
20	FBB D<20>	B3
21	FBB D<21>	C4
22	FBB D<22>	B5
23	FBB D<23>	C5
24	FBB D<24>	A11
25	FBB D<25>	C11
26	FBB D<26>	D11
27	FBB D<27>	B11
28	FBB D<28>	D8
29	FBB D<29>	A8
30	FBB D<30>	C8
31	FBB D<31>	B8
32	FBB D<32>	G24
33	FBB D<33>	E24
34	FBB D<34>	G24
35	FBB D<35>	E24
36	FBB D<36>	E21
37	FBB D<37>	E21
38	FBB D<38>	G21
39	FBB D<39>	F21
40	FBB D<40>	G27
41	FBB D<41>	D27
42	FBB D<42>	G26
43	FBB D<43>	E27
44	FBB D<44>	E29
45	FBB D<45>	F29
46	FBB D<46>	E30
47	FBB D<47>	D30
48	FBB D<48>	A32
49	FBB D<49>	C31
50	FBB D<50>	C32
51	FBB D<51>	B32
52	FBB D<52>	D29
53	FBB D<53>	A29
54	FBB D<54>	C29
55	FBB D<55>	B29
56	FBB D<56>	B21
57	FBB D<57>	C23
58	FBB D<58>	A21
59	FBB D<59>	C21
60	FBB D<60>	B24
61	FBB D<61>	C24
62	FBB D<62>	B26
63	FBB D<63>	C26

3/17 FBB  
ALL PINS NC FOR GM108/  
GK208/GP117

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FBB_CMD1	E14	FBB_CMD<1>	1
FBB_CMD2	F14	FBB_CMD<2>	2
FBB_CMD3	A12	FBB_CMD<3>	3
FBB_CMD4	B12	FBB_CMD<4>	4
FBB_CMD5	C14	FBB_CMD<5>	5
FBB_CMD6	B14	FBB_CMD<6>	6
FBB_CMD7	G15	FBB_CMD<7>	7
FBB_CMD8	F15	FBB_CMD<8>	8
FBB_CMD9	D15	FBB_CMD<9>	9
FBB_CMD10	A14	FBB_CMD<10>	10
FBB_CMD11	D14	FBB_CMD<11>	11
FBB_CMD12	D14	FBB_CMD<12>	12
FBB_CMD13	A15	FBB_CMD<13>	13
FBB_CMD14	B15	FBB_CMD<14>	14
FBB_CMD15	C17	FBB_CMD<15>	15
FBB_CMD16	D18	FBB_CMD<16>	16
FBB_CMD17	F18	FBB_CMD<17>	17
FBB_CMD18	B20	FBB_CMD<18>	18
FBB_CMD19	A20	FBB_CMD<19>	19
FBB_CMD20	B20	FBB_CMD<20>	20
FBB_CMD21	C18	FBB_CMD<21>	21
FBB_CMD22	B18	FBB_CMD<22>	22
FBB_CMD23	G18	FBB_CMD<23>	23
FBB_CMD24	G17	FBB_CMD<24>	24
FBB_CMD25	F17	FBB_CMD<25>	25
FBB_CMD26	D16	FBB_CMD<26>	26
FBB_CMD27	A18	FBB_CMD<27>	27
FBB_CMD28	D17	FBB_CMD<28>	28
FBB_CMD29	A17	FBB_CMD<29>	29
FBB_CMD30	B17	FBB_CMD<30>	30
FBB_CMD31	E17	FBB_CMD<31>	31
FBB_CMD32	G14	SNN FBB_CMD32	
FBB_CMD33	G20	SNN FBB_CMD33	
FBB_CMD34	C12	FBB GM107_DEBUG0	
FBB_CMD35	C20	FBB GM107_DEBUG1	

FBB_DEBUG0	GM107
FBB_DEBUG1	GM107
NC	
NC	

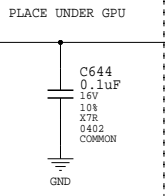
NET_NAME	DIFF_PAIR	NV_NETCLASS
D12 FBB_CLK0	DP_FBB_CLK0	FB_CLK
E12 FBB_CLK0*	DP_FBB_CLK0	FB_CLK
E20 FBB_CLK1	DP_FBB_CLK1	FB_CLK
F20 FBB_CLK1*	DP_FBB_CLK1	FB_CLK

F8 FBB_WCK01	FB_WCK	DP_FBB_WCK01
B8 FBB_WCK01*	FB_WCK	DP_FBB_WCK01
A5 FBB_WCK23	FB_WCK	DP_FBB_WCK23
A6 FBB_WCK23*	FB_WCK	DP_FBB_WCK23
D24 FBB_WCK45	FB_WCK	DP_FBB_WCK45
D25 FBB_WCK45*	FB_WCK	DP_FBB_WCK45
B27 FBB_WCK67	FB_WCK	DP_FBB_WCK67
C27 FBB_WCK67*	FB_WCK	DP_FBB_WCK67

FBB_WCKBxx ARE RESERVED, NC ON: GM108/GM107 USED ONLY ON: GK107	FBB_WCKB01 FBB_WCKB01* FBB_WCKB23 FBB_WCKB23* FBB_WCKB45 FBB_WCKB45* FBB_WCKB67 FBB_WCKB67*
---	--

FBB\_PLL\_AVDD

0.062 Amps GK107



8.4F< 7.58< IN FBB DBI<7...0>  
FB\_DBI

8.3F< 7.5A< OUT FBB EDC<7...0>  
FB\_EDC

0	FBB DBI<0>	E11
1	FBB DBI<1>	E3
2	FBB DBI<2>	A3
3	FBB DBI<3>	C9
4	FBB DBI<4>	F23
5	FBB DBI<5>	F27
6	FBB DBI<6>	C30
7	FBB DBI<7>	A24

0	FBB EDC<0>	D10
1	FBB EDC<1>	D6
2	FBB EDC<2>	C3
3	FBB EDC<3>	B9
4	FBB EDC<4>	E23
5	FBB EDC<5>	E26
6	FBB EDC<6>	B30
7	FBB EDC<7>	A23

SNN FBB_DQS_RN<0>	D9
SNN FBB_DQS_RN<1>	E4
SNN FBB_DQS_RN<2>	B2
SNN FBB_DQS_RN<3>	A9
SNN FBB_DQS_RN<4>	D22
SNN FBB_DQS_RN<5>	D28
SNN FBB_DQS_RN<6>	A30
SNN FBB_DQS_RN<7>	B23

FBB\_DQS\_WP0

FBB\_DQS\_WP1

FBB\_DQS\_WP2

FBB\_DQS\_WP3

FBB\_DQS\_WP4

FBB\_DQS\_WP5

FBB\_DQS\_WP6

FBB\_DQS\_WP7

FBB\_DQS\_RN0

FBB\_DQS\_RN1

FBB\_DQS\_RN2

FBB\_DQS\_RN3

FBB\_DQS\_RN4

FBB\_DQS\_RN5

FBB\_DQS\_RN6

FBB\_DQS\_RN7

ASSEMBLY	SKU504 GM107 X16 GDDR5 MEMORY
PAGE DETAIL	FRAME BUFFER B GPU INTERFACE

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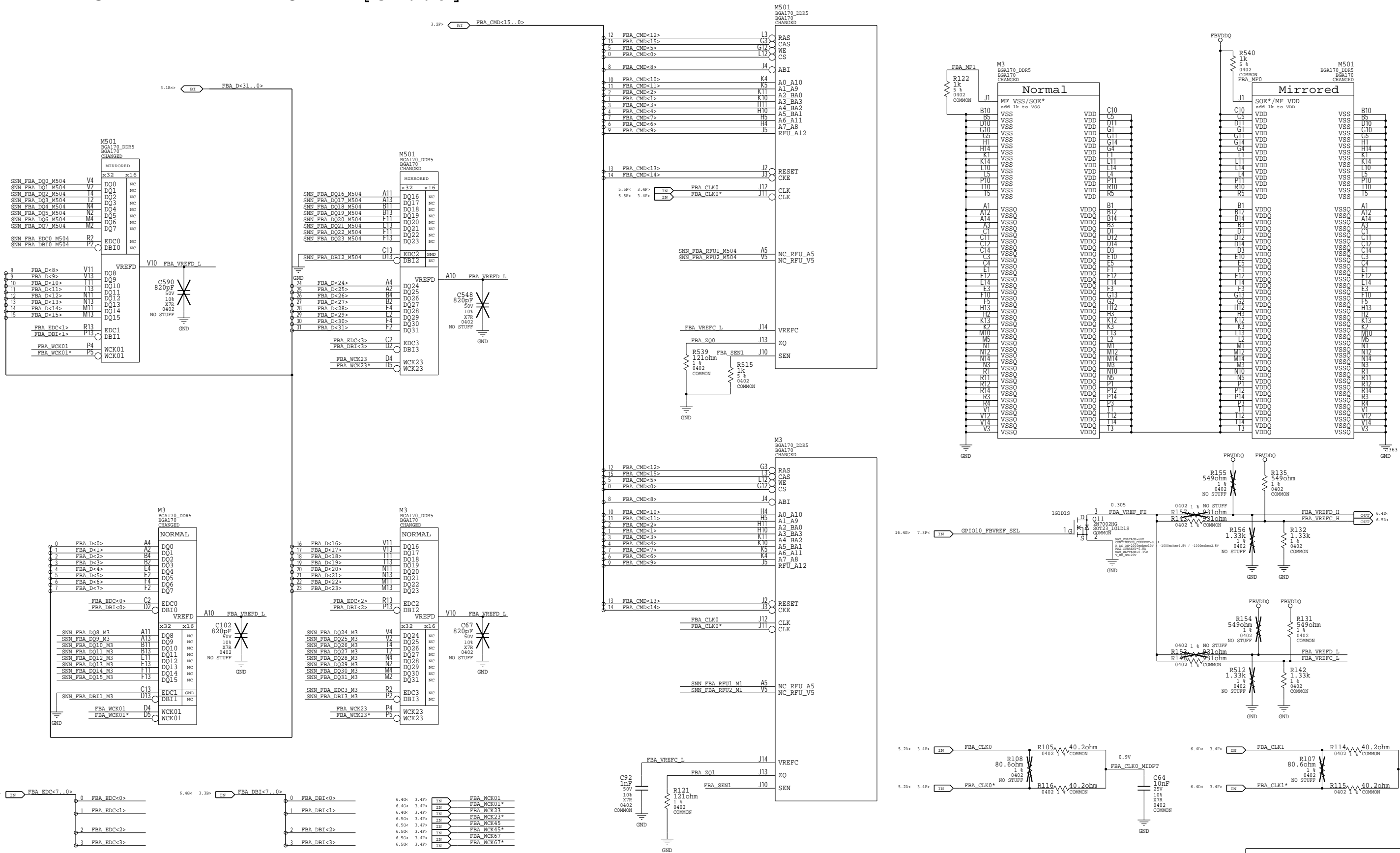
PCB REV P2757-A01

BOM REV J

PAGE 4 OF 20

DATE 05-FEB-2015

## FRAME BUFFER PARTITION A [31..0]



FRAME BUFFER PARTITION A [63..32]

1

2

3

4

5

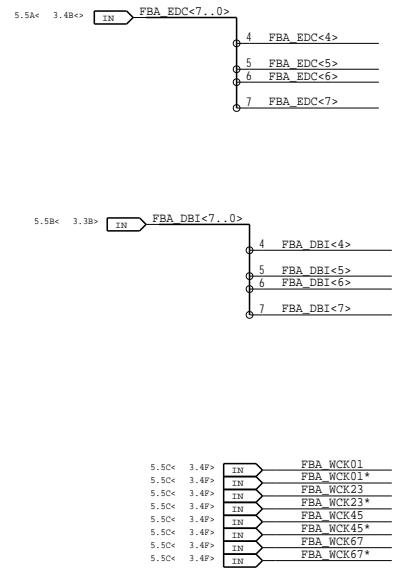
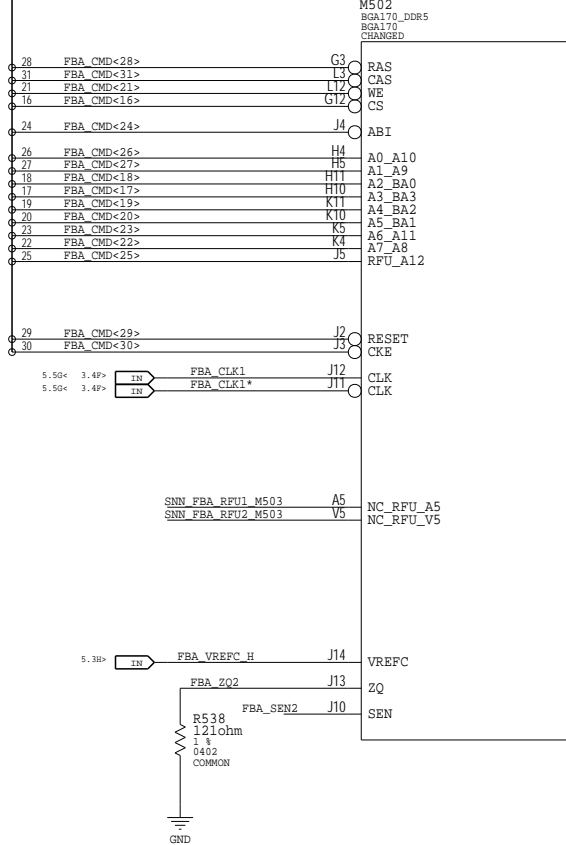
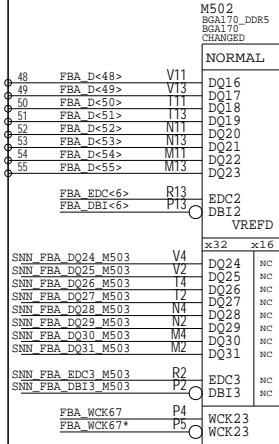
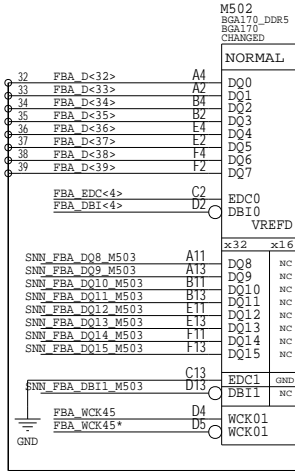
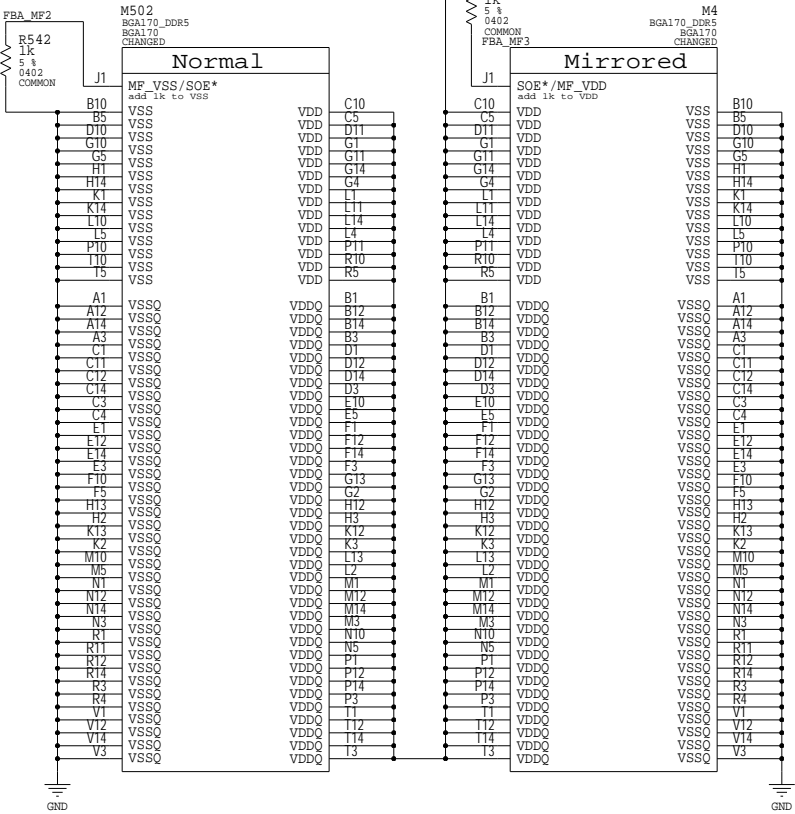
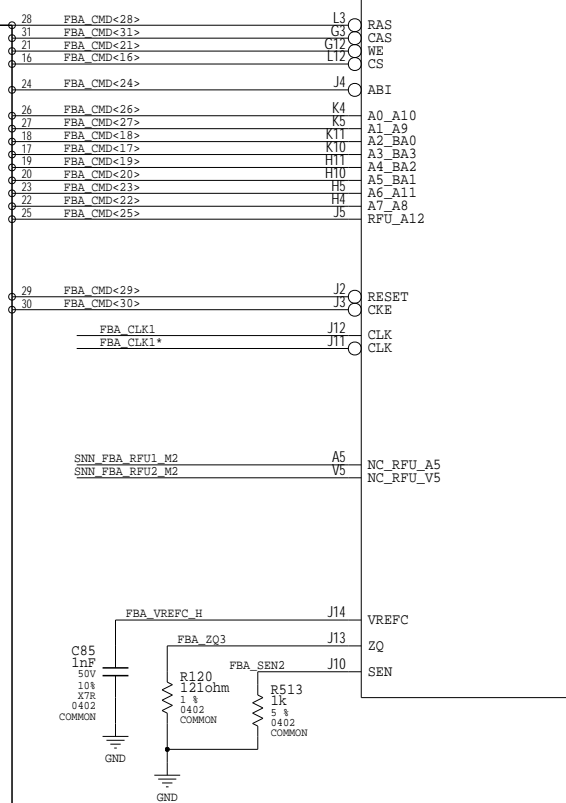
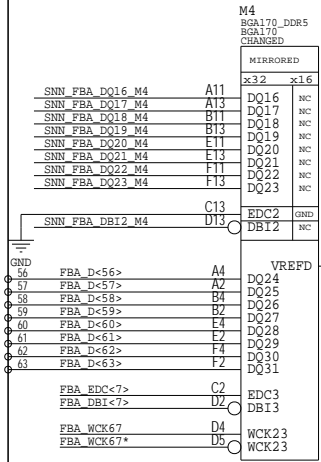
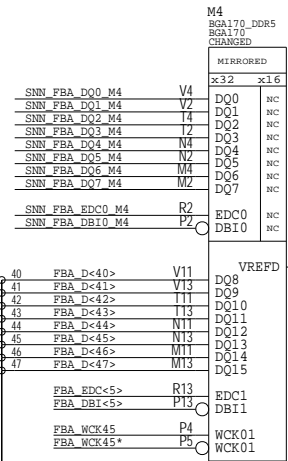
1

2

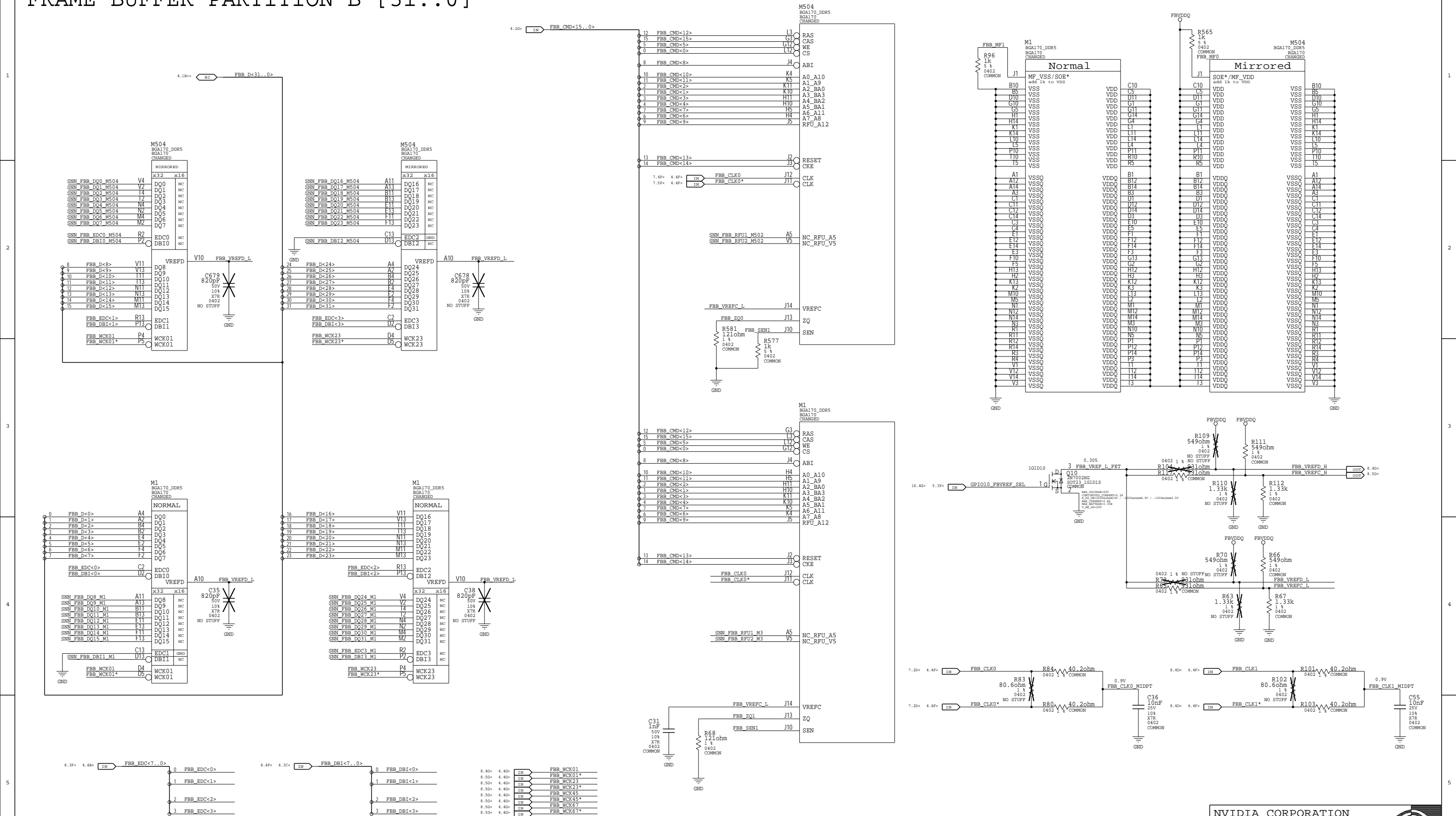
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4

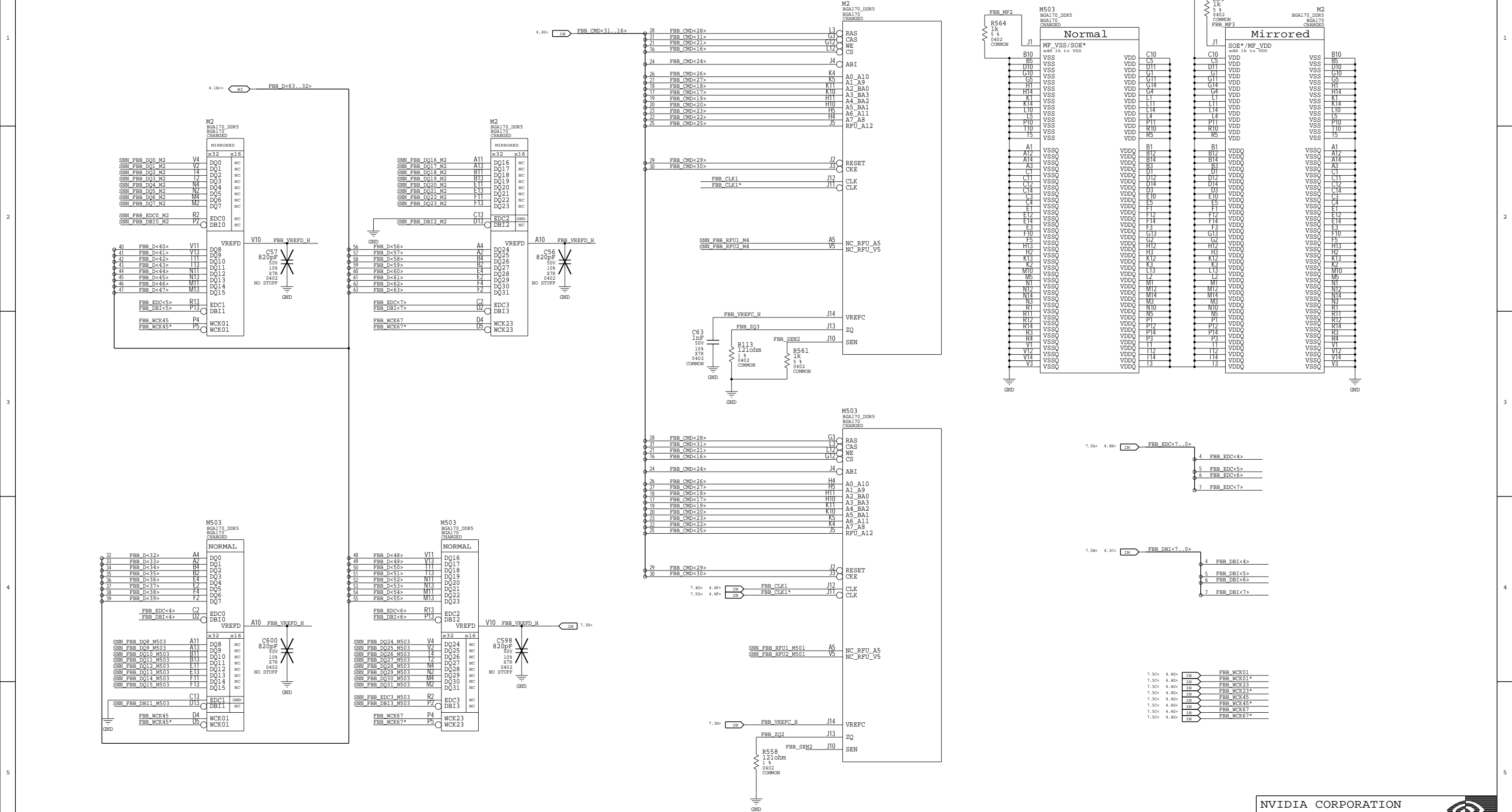
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FRAME BUFFER PARTITION B [31..0]
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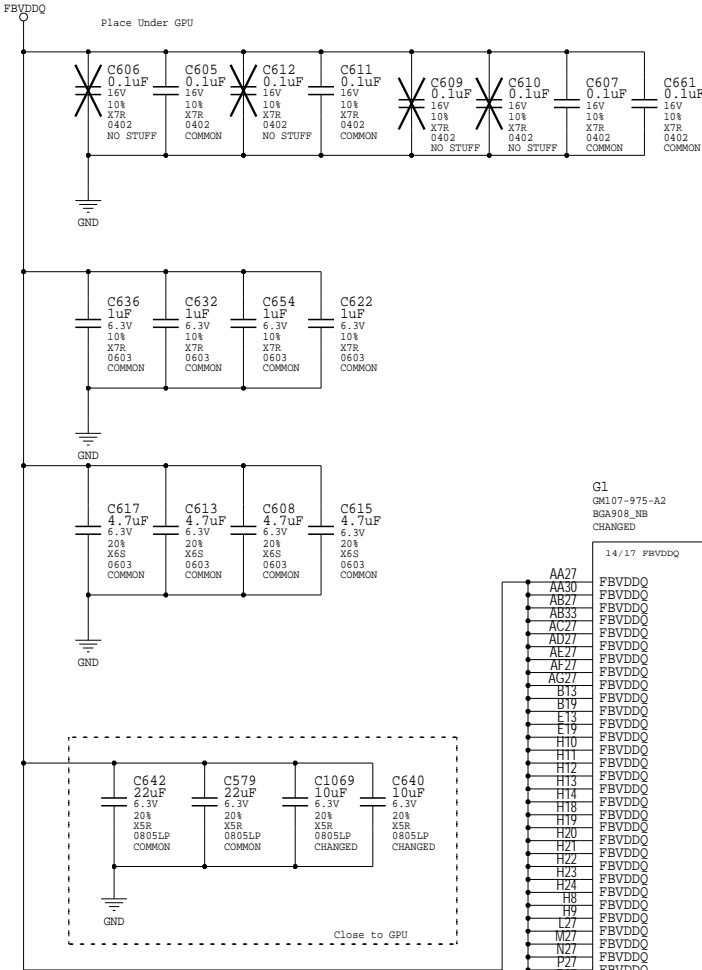
FRAME BUFFER PARTITION B [63..32]





MEMORY DECOUPLING CAPS

0402 x 0.1uF x4(4pcs Option)  
0603 x 1uF x4  
0603 x 4.7uF x4  
0805 X 10uF x2  
0805 X 22uF x2



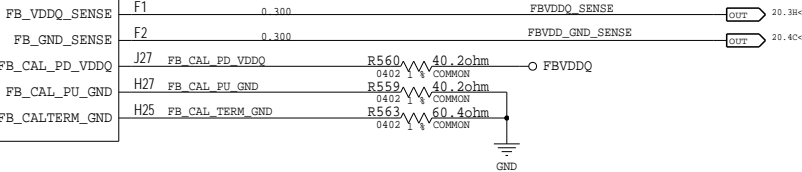
G1  
GM107-975-A2  
BGA908\_NB  
CHANGED

14/17 FBVDDQ

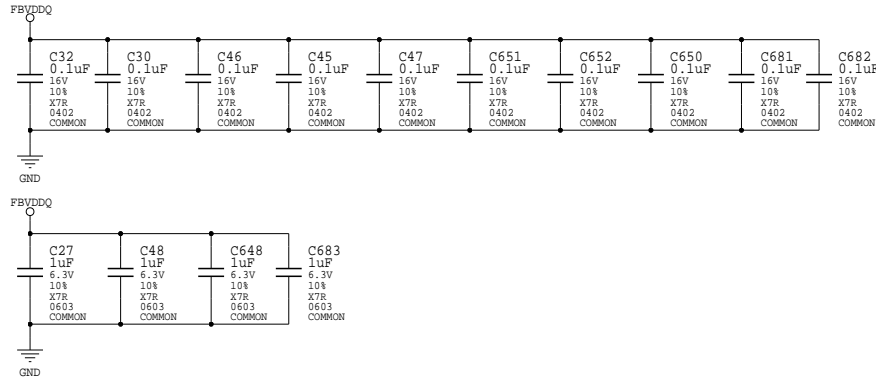
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- AB27 FBVDDQ
- AB33 FBVDDQ
- AC27 FBVDDQ
- AE27 FBVDDQ
- AF27 FBVDDQ
- AG27 FBVDDQ
- B13 FBVDDQ
- B19 FBVDDQ
- E13 FBVDDQ
- E19 FBVDDQ
- H10 FBVDDQ
- H11 FBVDDQ
- H12 FBVDDQ
- H13 FBVDDQ
- H14 FBVDDQ
- H18 FBVDDQ
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- H21 FBVDDQ
- H22 FBVDDQ
- H23 FBVDDQ
- H24 FBVDDQ
- H8 FBVDDQ
- H9 FBVDDQ
- L27 FBVDDQ
- M27 FBVDDQ
- N27 FBVDDQ
- P27 FBVDDQ
- R27 FBVDDQ
- R30 FBVDDQ
- R33 FBVDDQ
- Y27 FBVDDQ

- B16 FBVDDQ\_AON
- E16 FBVDDQ\_AON
- H15 FBVDDQ\_AON
- H16 FBVDDQ\_AON
- V27 FBVDDQ\_AON
- W27 FBVDDQ\_AON
- W30 FBVDDQ\_AON
- W33 FBVDDQ\_AON

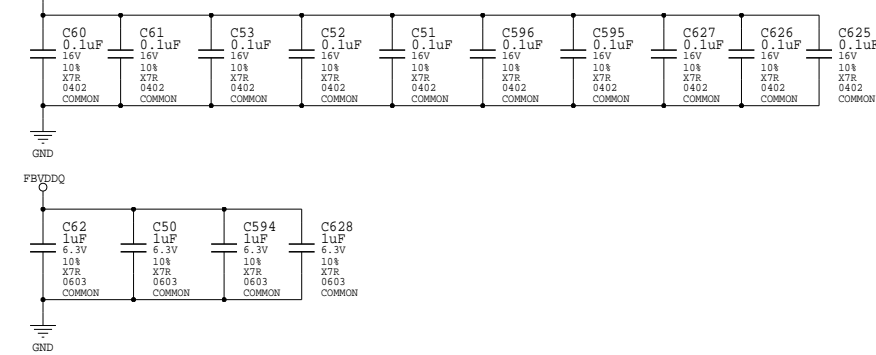
GM107/GM108  
GK208/  
GP117



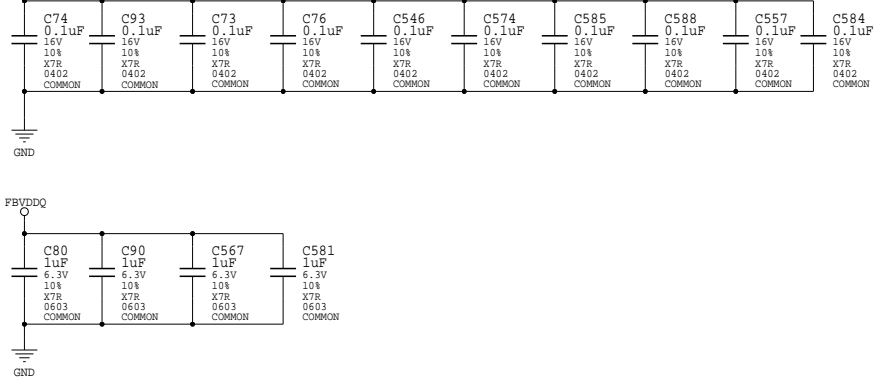
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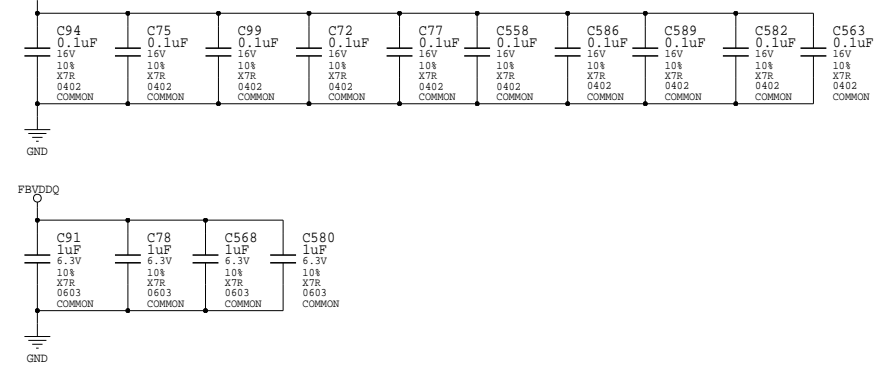
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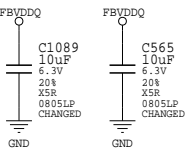
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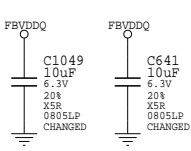
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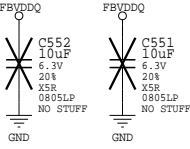
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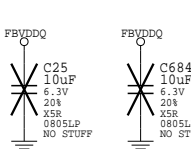
Place Near Partition B Memory



Place as option  
If there is space near Partition A



Place as option  
If there is space near Partition B



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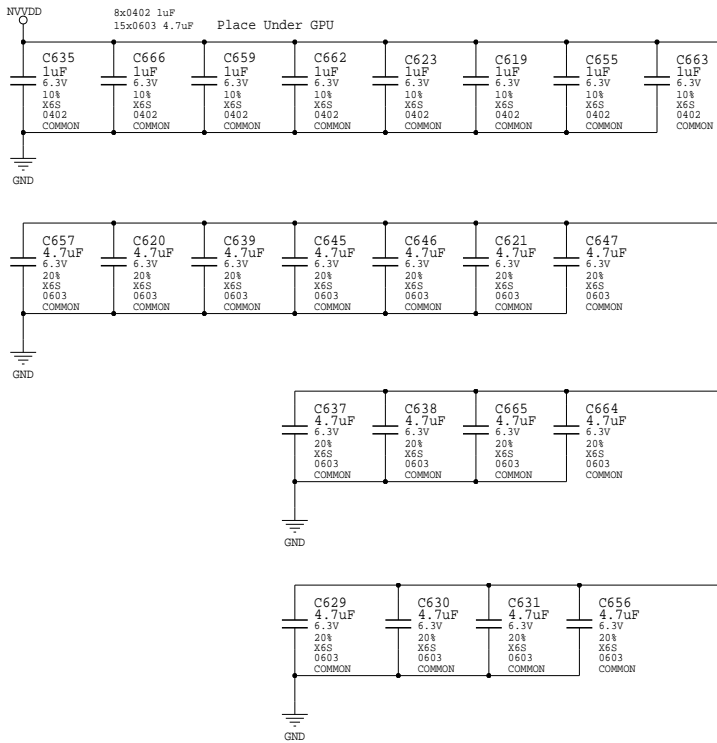
PAGE 9 OF 20

DATE 05-FEB-2015

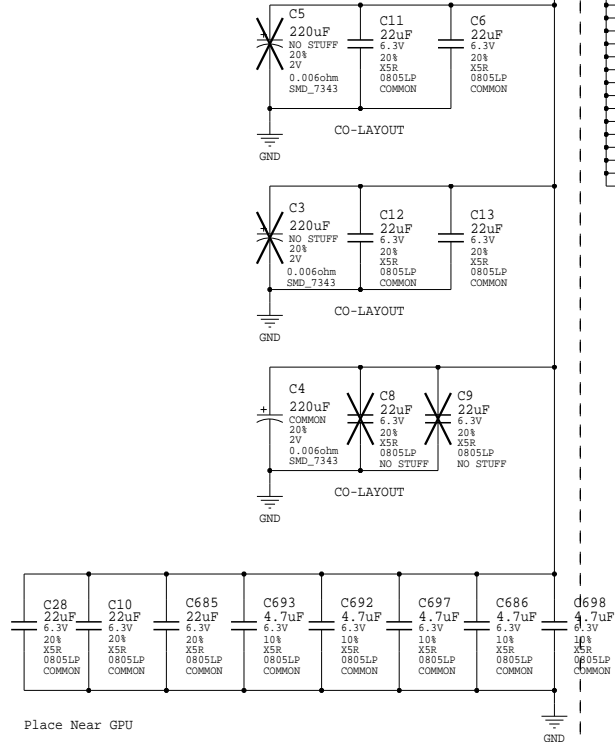
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GPU VDD\DCPLNG\GND

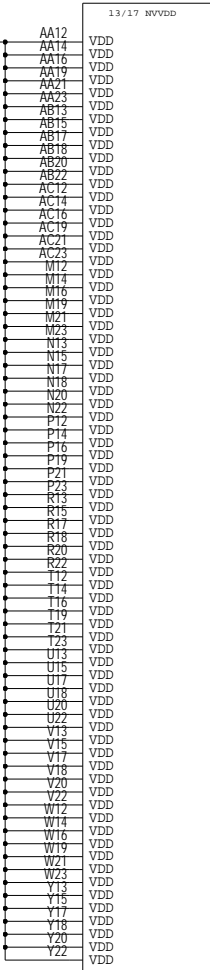
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0603x15x4.7uF X6S  
0402x8x1.0uF X6S



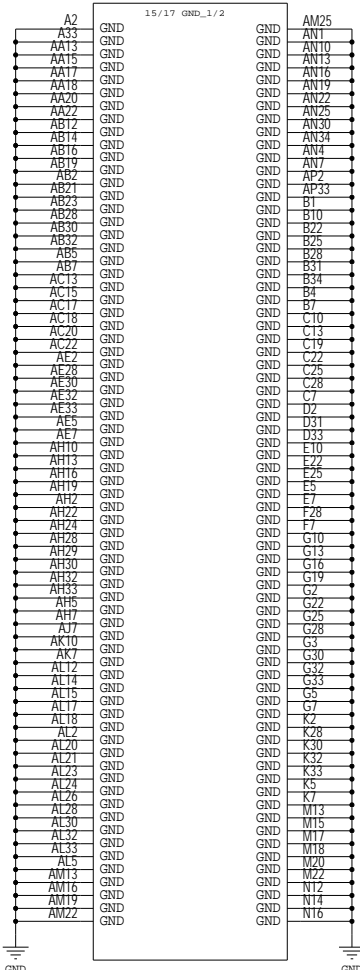
GM107-Near GPU(default)  
7 x 0805 22uF X5R  
5 x 0805 4.7uF X5R  
1x 220uF POSCAP(3 X 7343 Footprint)



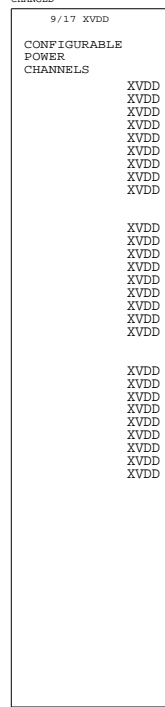
G1  
GM107-975-A2  
BGA908\_NB  
CHANGED



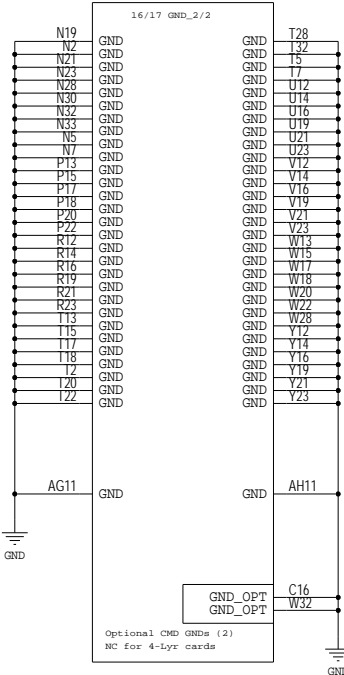
G1  
GM107-975-A2  
BGA908\_NB  
CHANGED



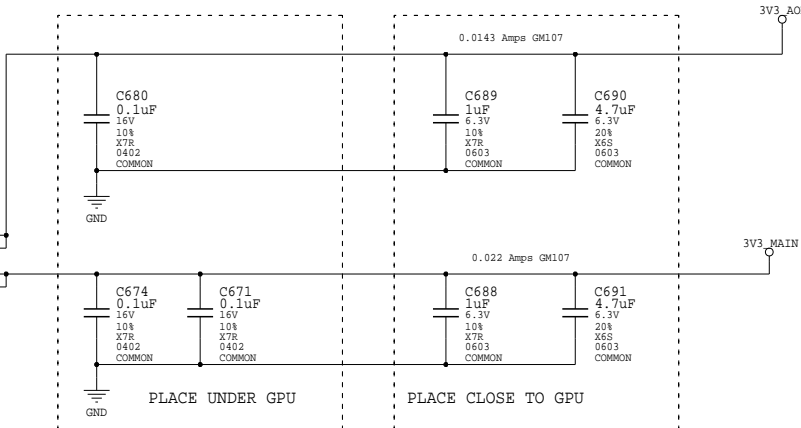
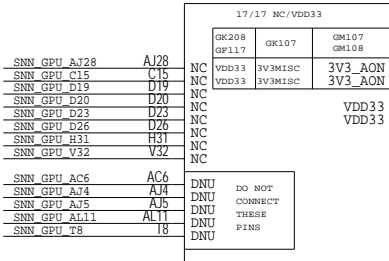
G1  
GM107-975-A2  
BGA908\_NB  
CHANGED



G1  
GM107-975-A2  
BGA908\_NB  
CHANGED



G1  
GM107-975-A2  
BGA908\_NB  
CHANGED



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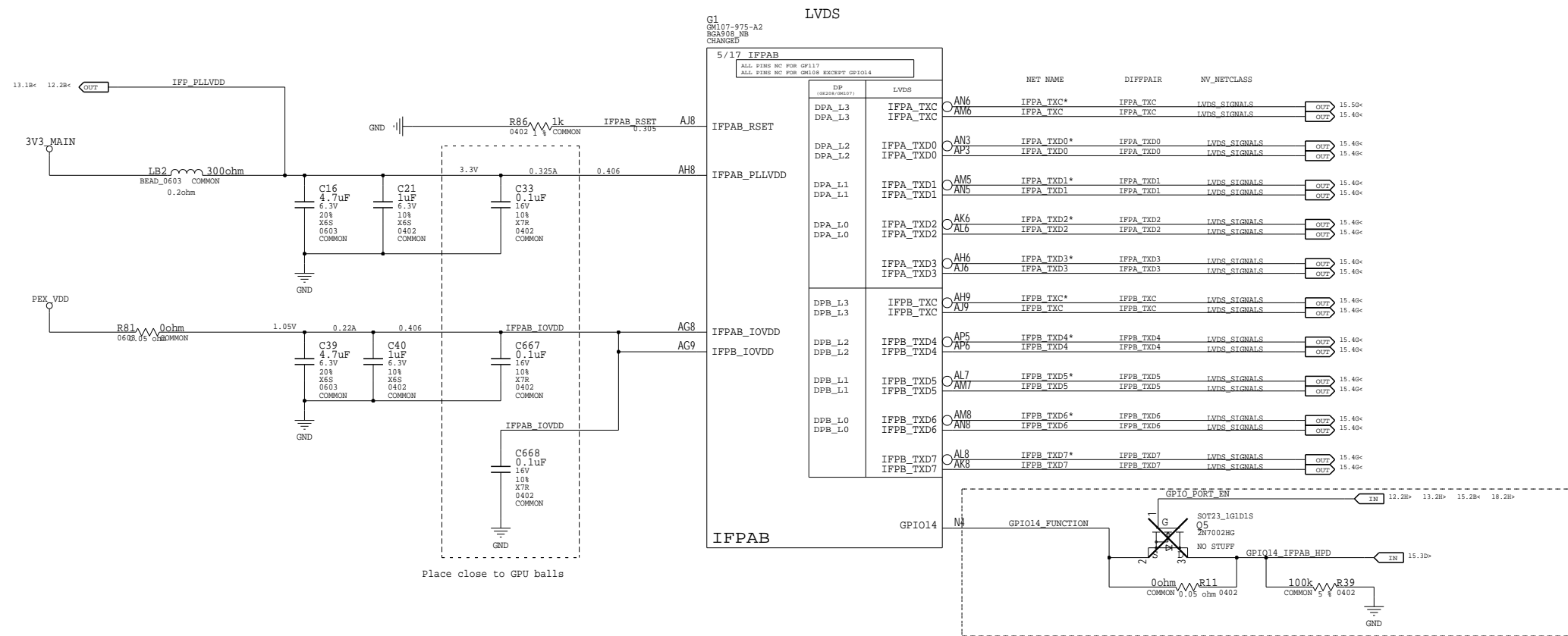
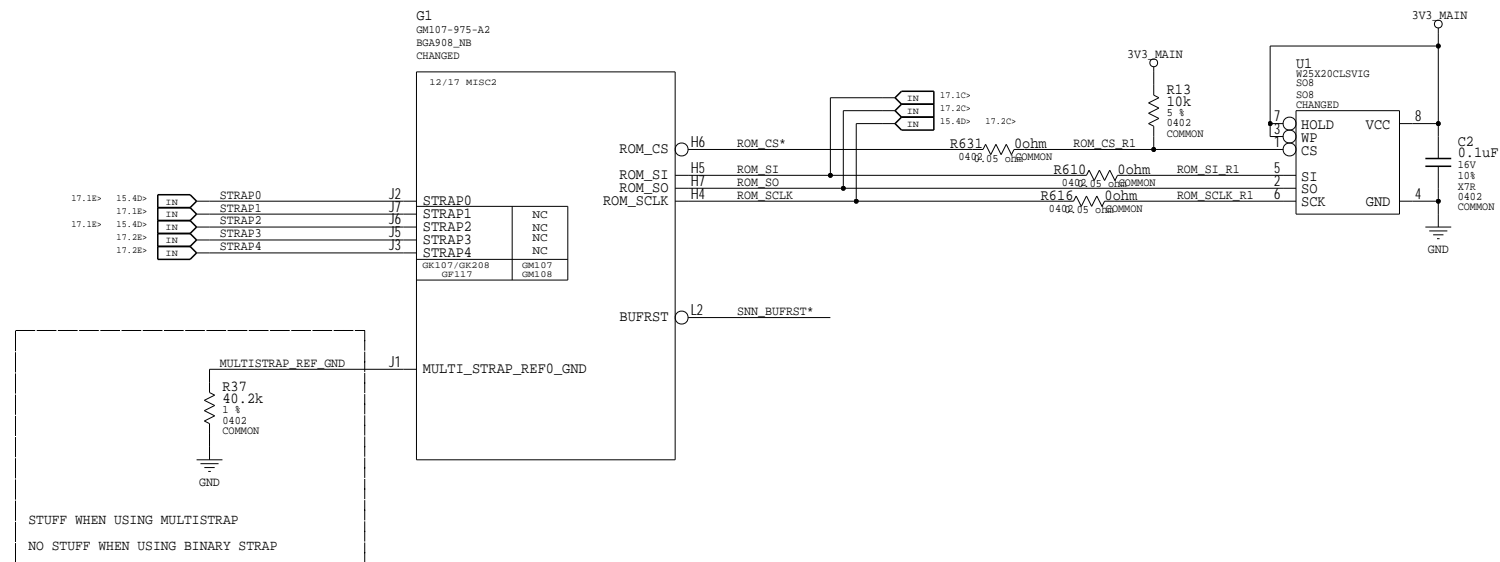
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PAGE 10 OF 20

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## LVDS, VBIOS



ASSEMBLY	SKU504 GM107 X16 GDDR5 MEMORY
PAGE DETAIL	LVDS, VBIOS

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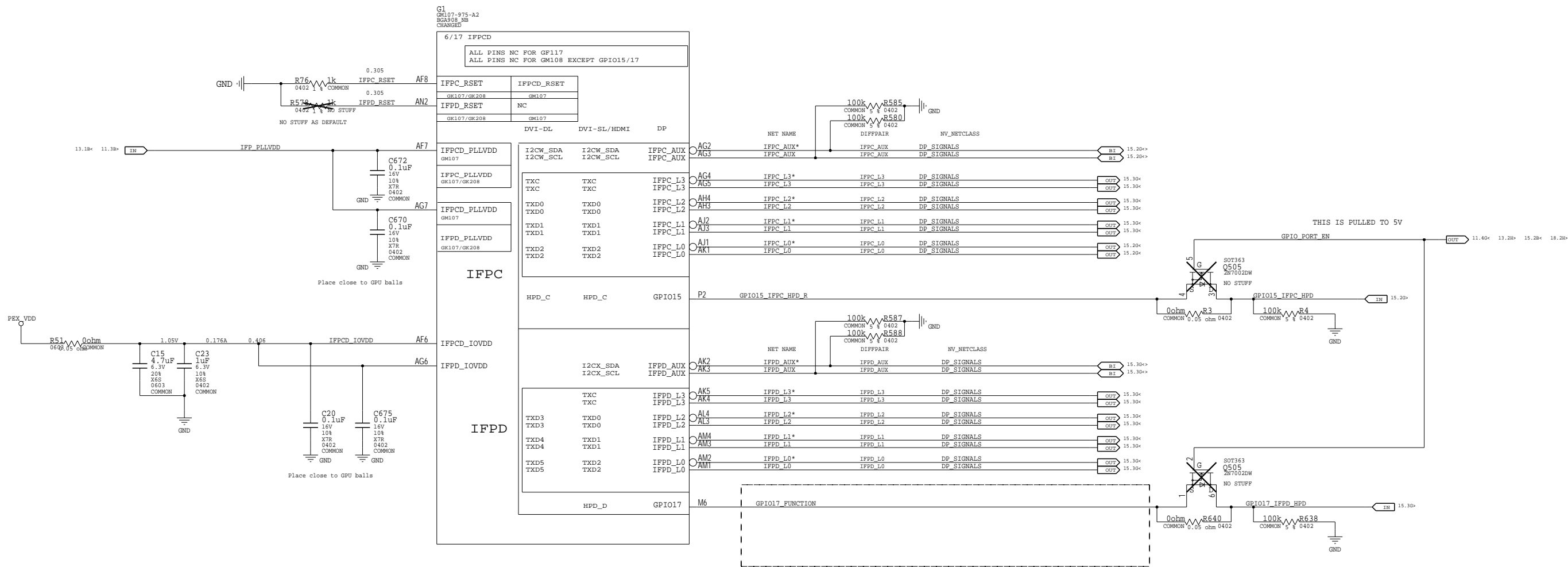
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PCB REV	P2757-A01	PAGE	11 OF 20
BOM REV	J	DATE	05-FEB-2015



DP LINKS C,D



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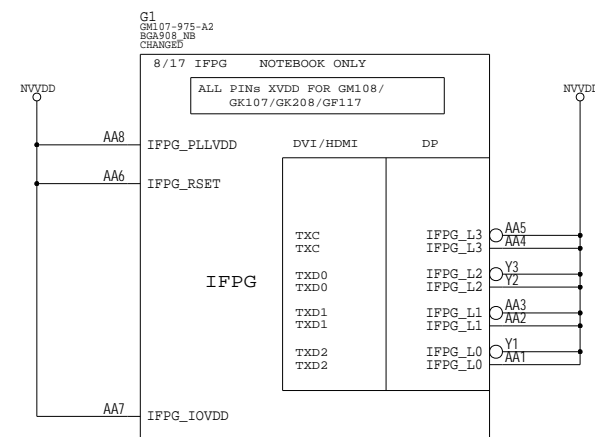
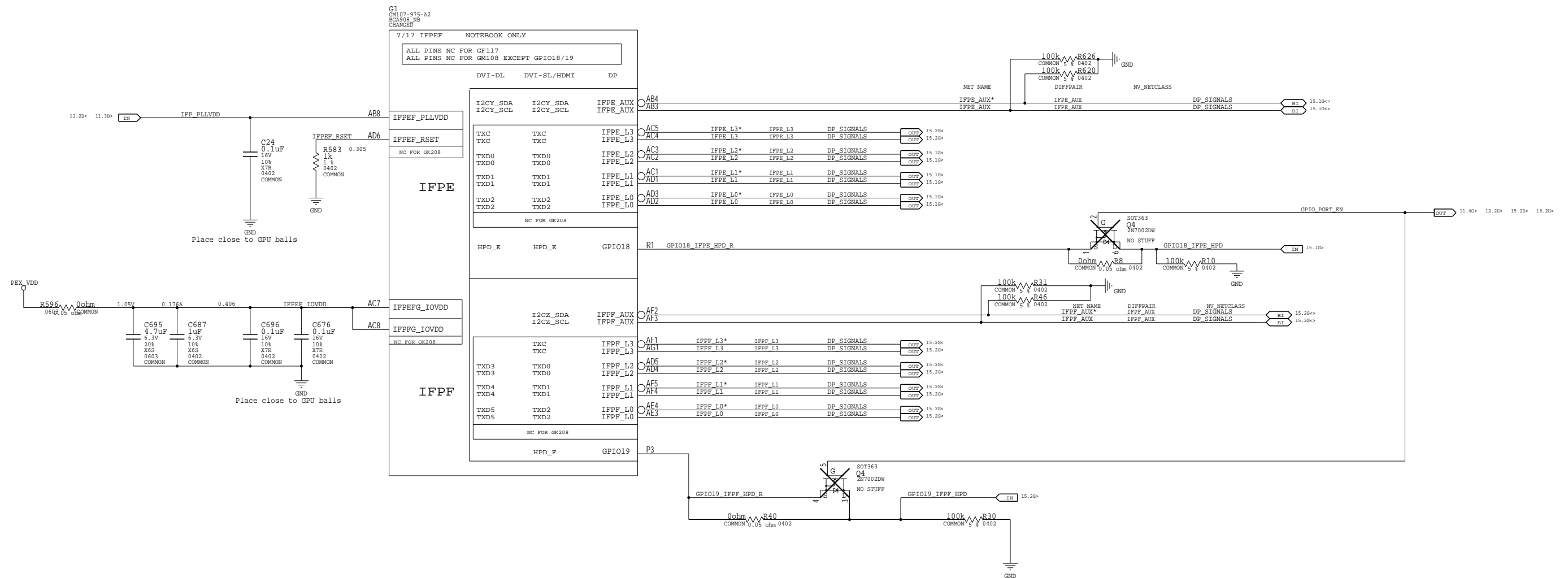
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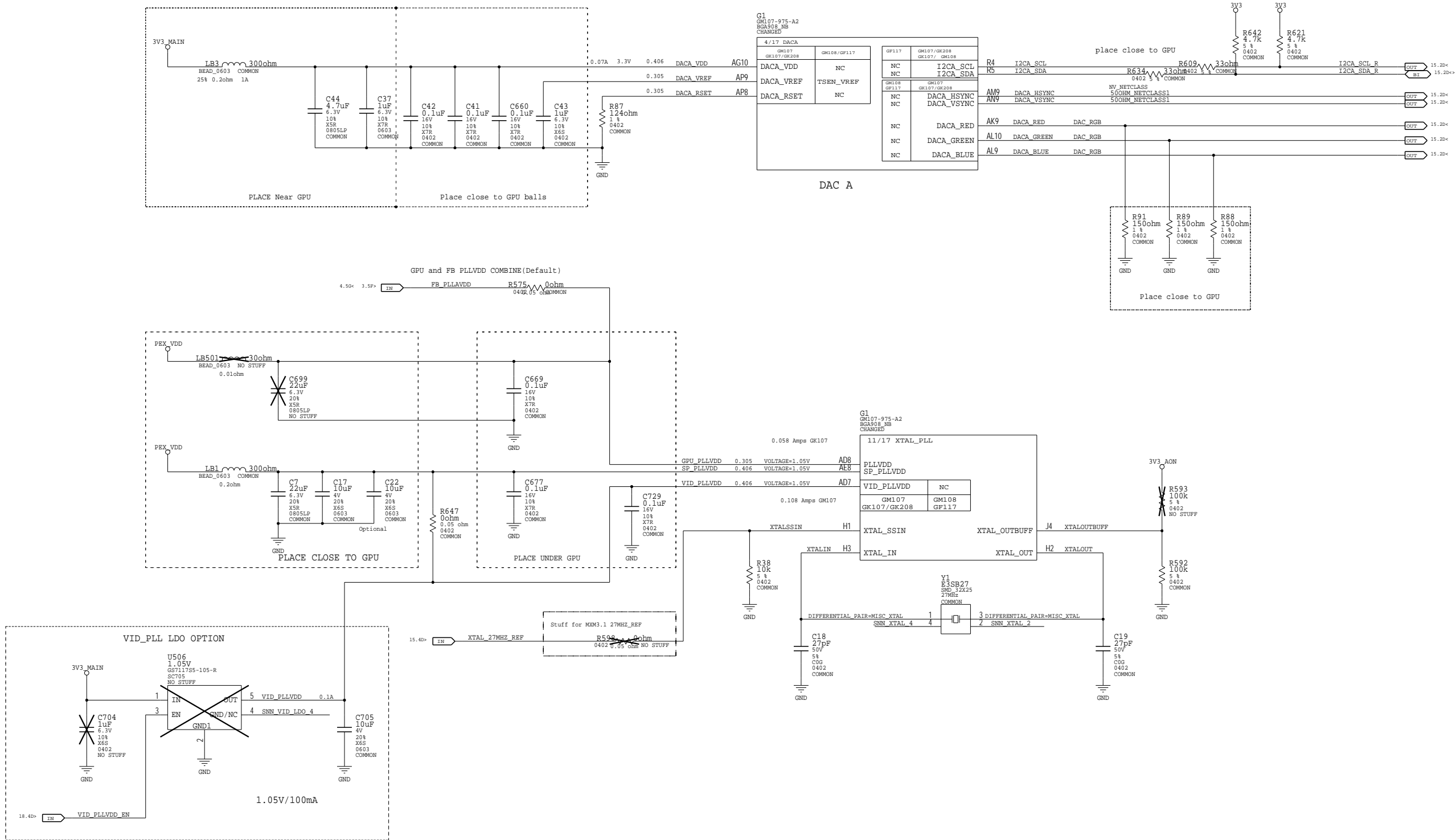
PAGE 12 OF 20

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DP LINKS E, F, G



DACA PLL, CRYSTAL



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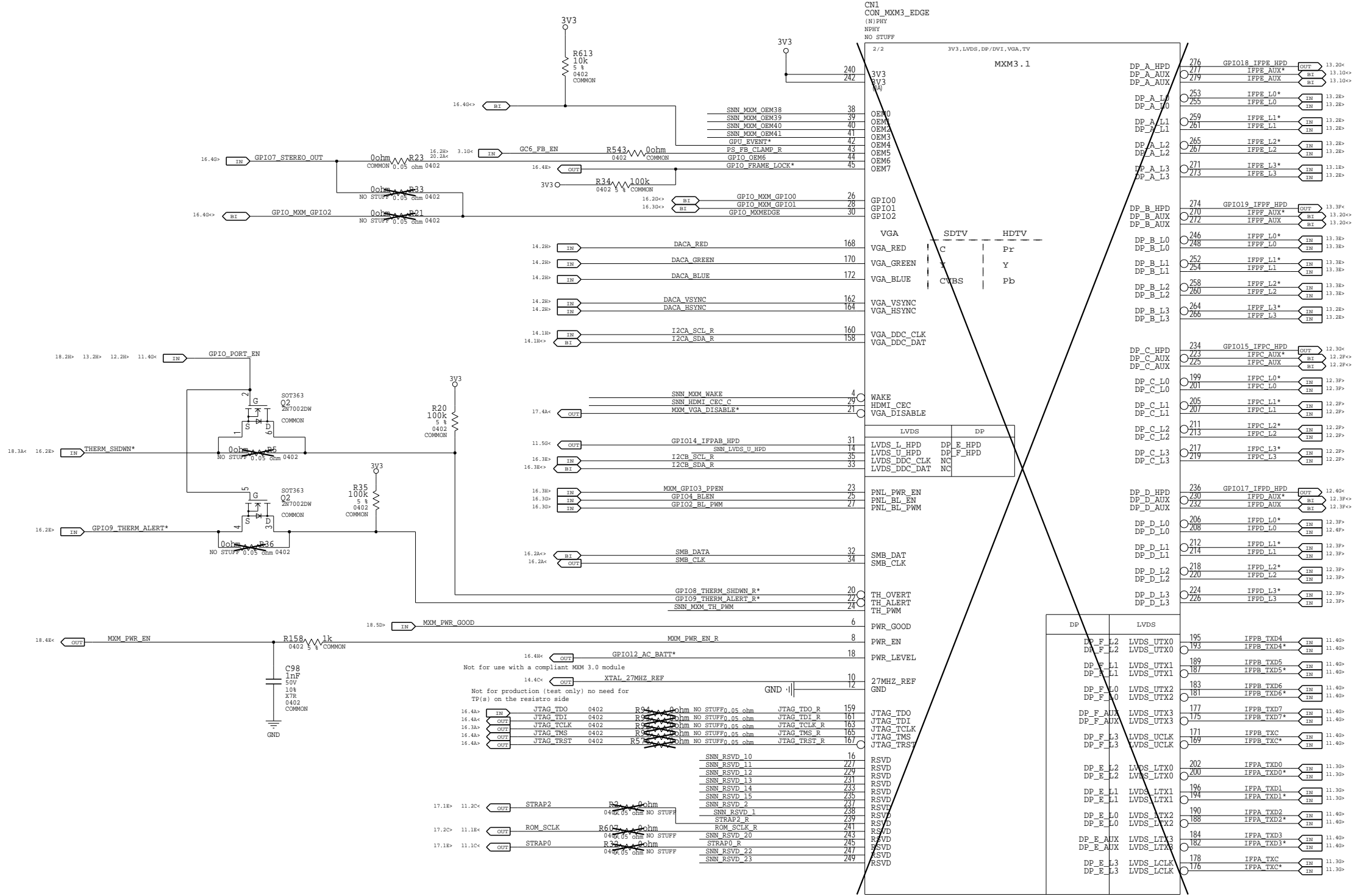


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PCB REV	P2757-A01	PAGE	14 OF 20
BOM REV	J	DATE	05-FEB-2015

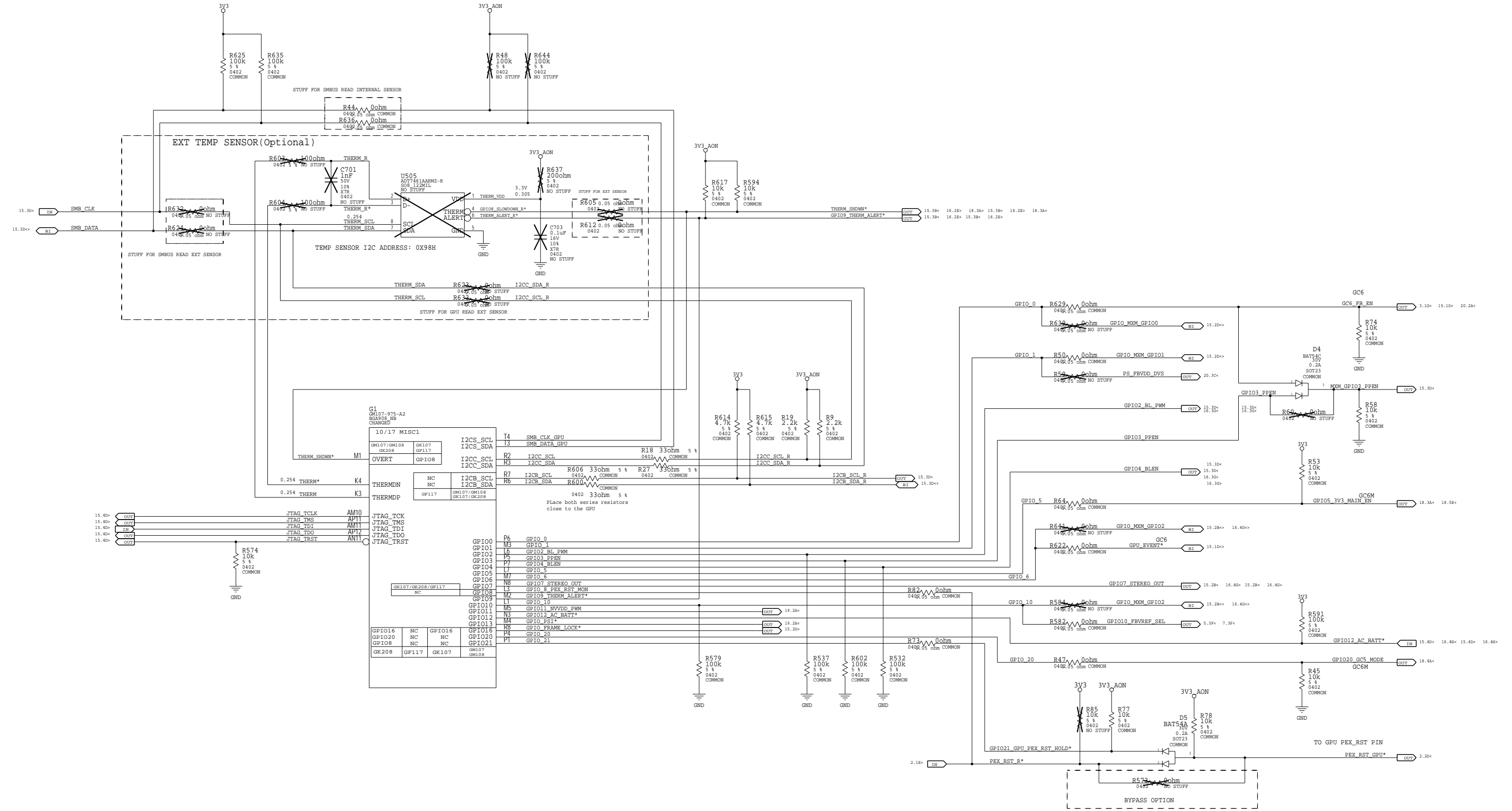
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MXM CONNECTOR, IO-SECTION



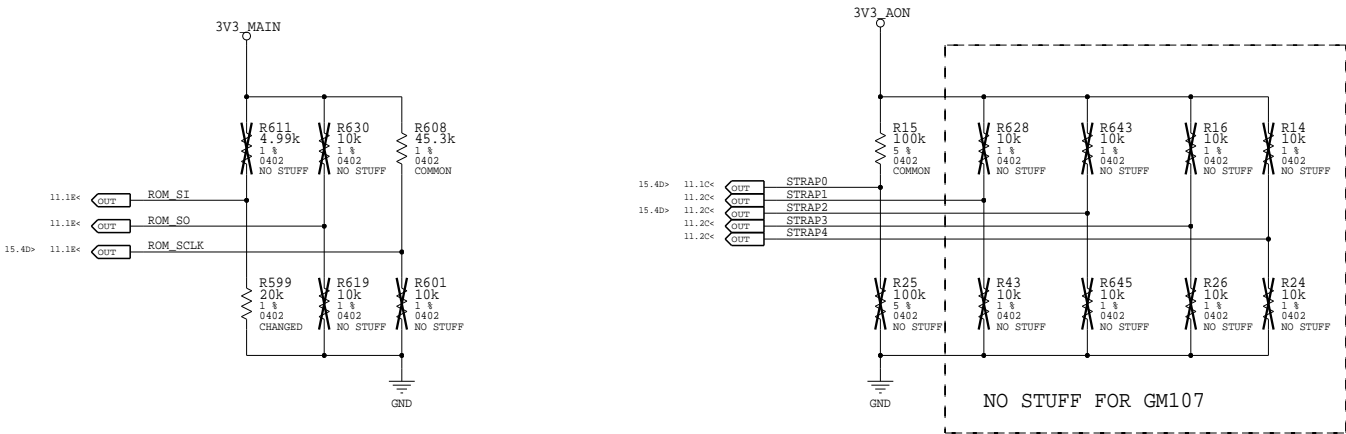
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GPIO, JTAG, TEMP SENSOR





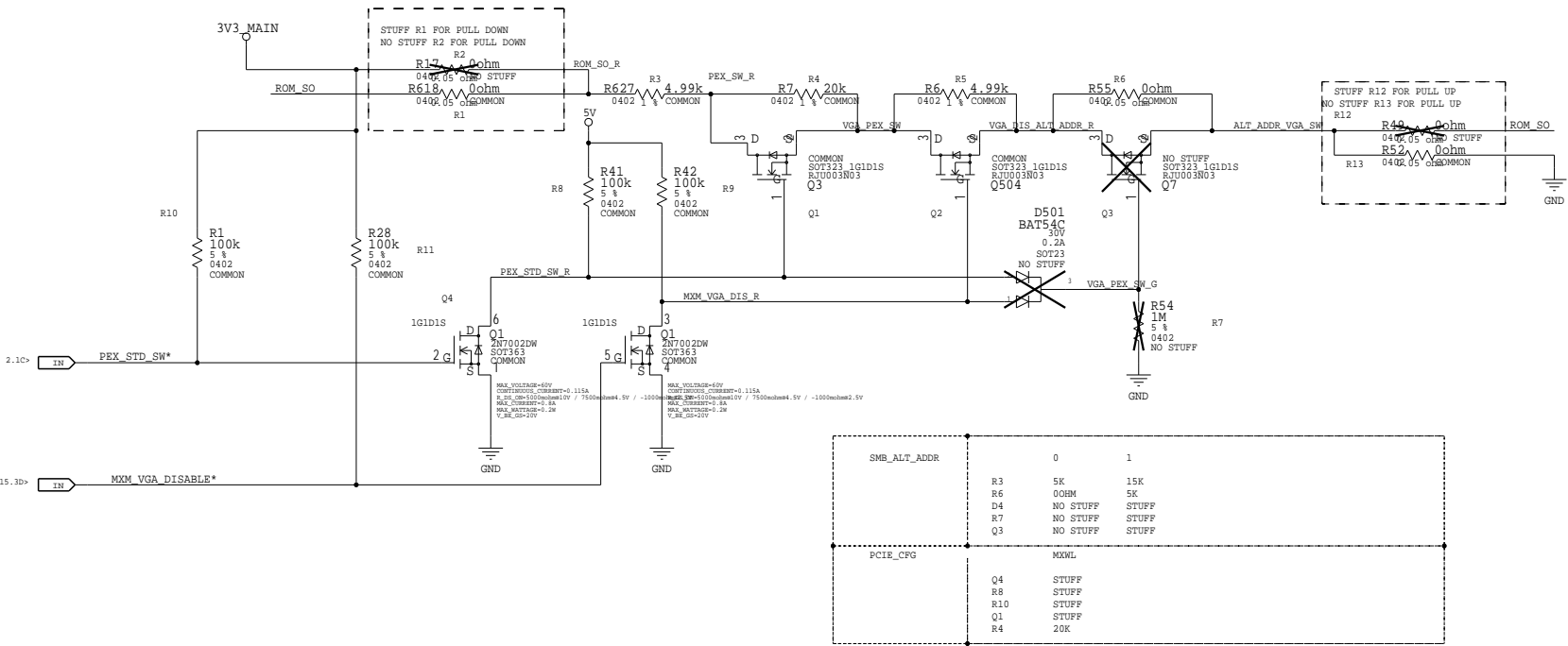
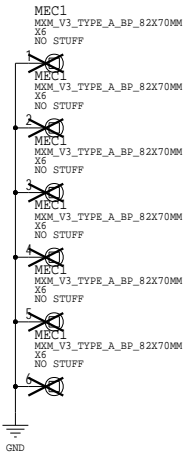
STRAPS AND MOUNTING HOLES



GB4B-128 Straps

Maxwell	Bit Signal	Values
ROM_SI	03: RAMCFG[3]	
	02: RAMCFG[2]	
	01: RAMCFG[1]	0011 256Mx16 128bit Samsung Primary
	00: RAMCFG[0]	0110 256Mx16 128bit Hynix-A Second 0100 256Mx16 128bit Elpida Third
ROM_SO	03: DEVID_SEL	0 DEFAULT
	02: PCIE_CFG	0 HS 1 LS
	01: SMB_ALT_ADDR	0 DISABLED 1 ENABLED
	00: VGA_DEVICE	0 DISABLED 1 ENABLED
ROM_SCLK	03: SOR3_EXPOSED	0 DISABLED 1 ENABLED
	02: SOR2_EXPOSED	0 DISABLED 1 ENABLED
	01: SOR1_EXPOSED	0 DISABLED 1 ENABLED
	00: SOR0_EXPOSED	0 DISABLED 1 ENABLED
STRAP0		100kOHM PULL UP TO 3V3_AON
	RESERVED	
STRAP1		
	RESERVED	
STRAP2		
	RESERVED	
STRAP3		
	RESERVED	
STRAP4		
	RESERVED	

Multilevel Straps		
0000	4.99K to GND	1000 4.99K to VCC
0001	10K to GND	1001 10K to VCC
0010	15K to GND	1010 15K to VCC
0011	20K to GND	1011 20K to VCC
0100	24.9K to GND	1100 24.9K to VCC
0101	30.1K to GND	1101 30.1K to VCC
0110	34.8K to GND	1110 34.8K to VCC
0111	45.3K to GND	1111 45.3K to VCC



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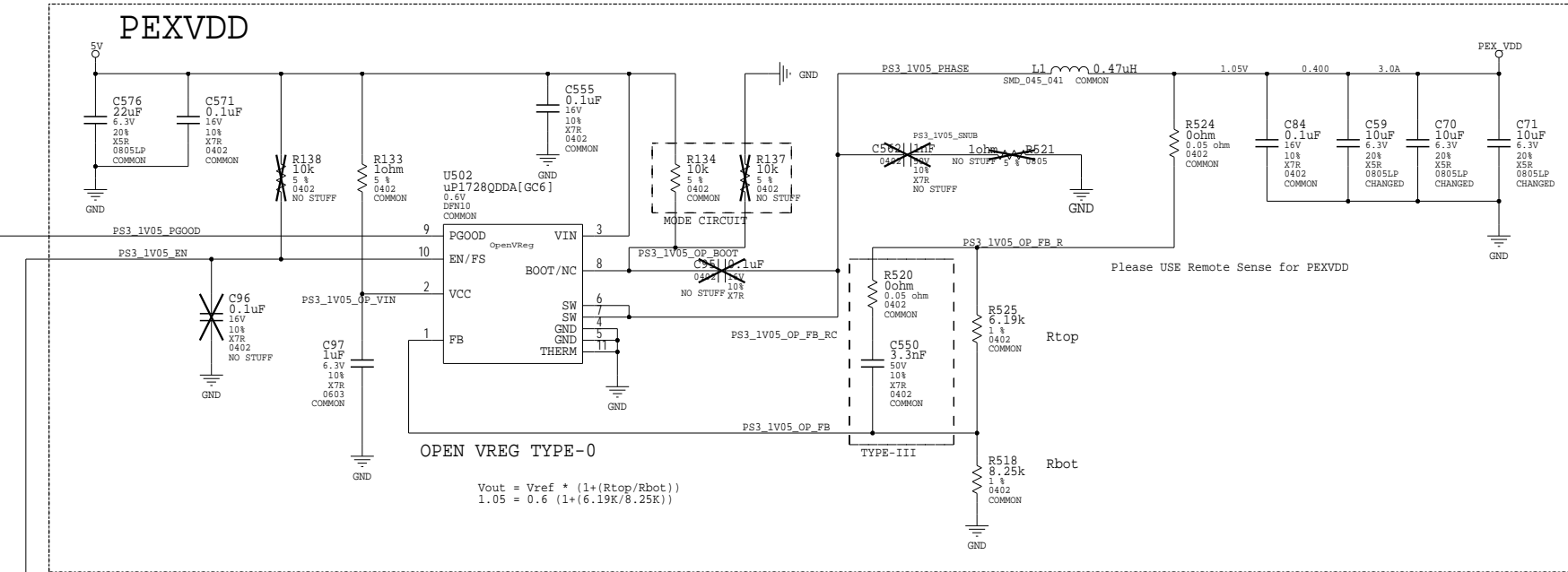
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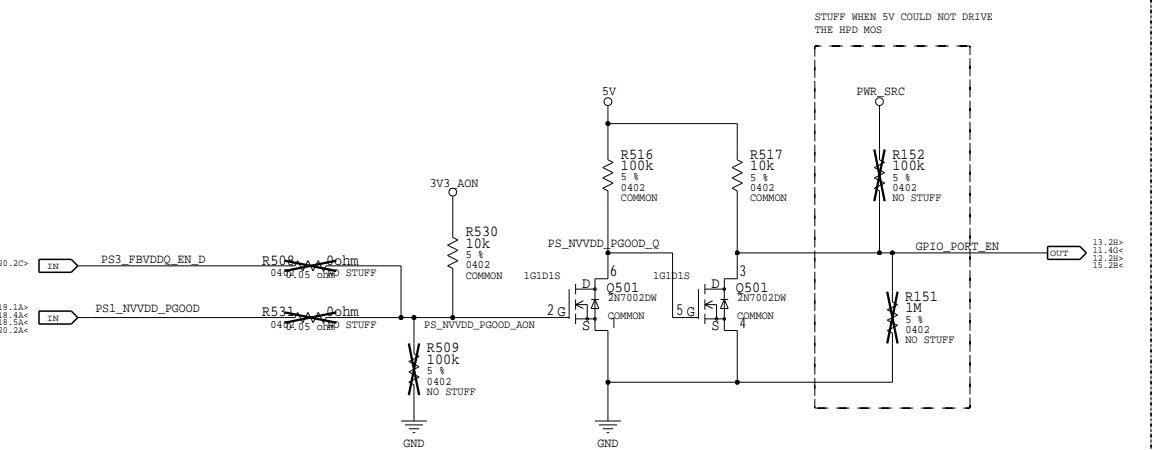
PAGE 17 OF 20

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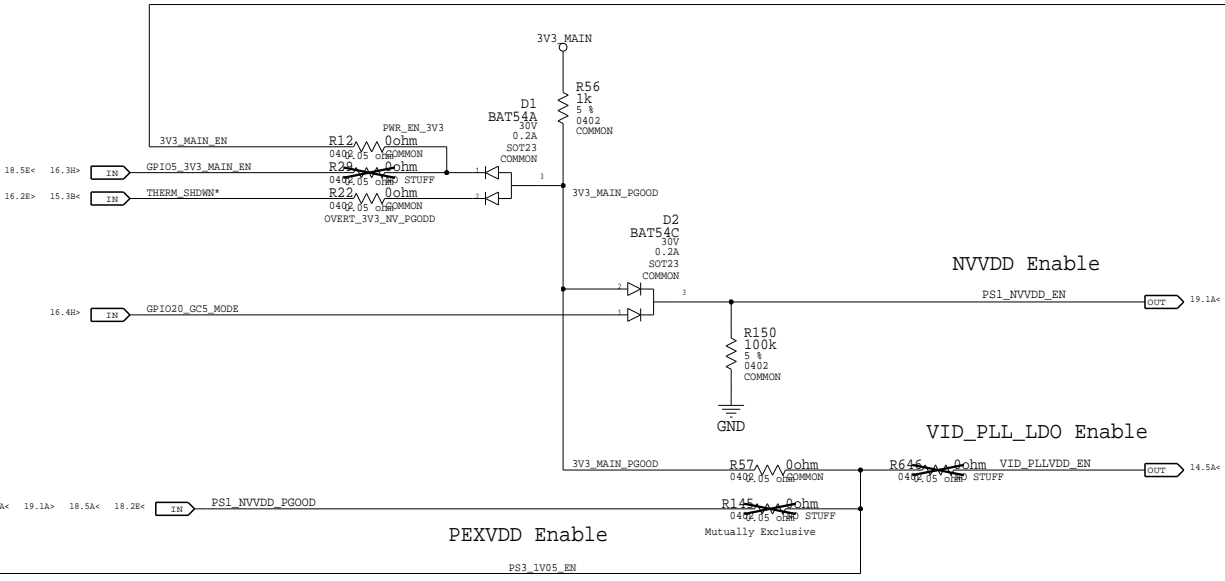
PEXVDD 3V3\_AON 3V3\_MAIN



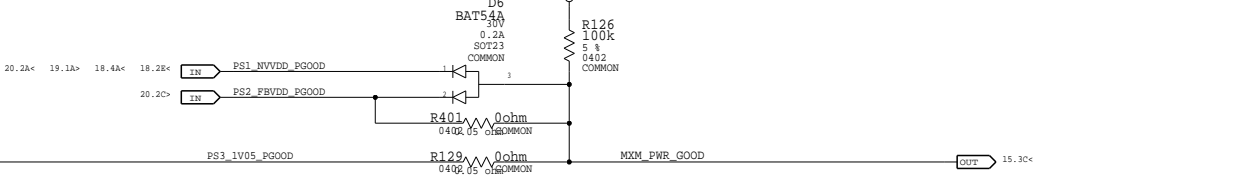
GPIO PROTECT ENABLE



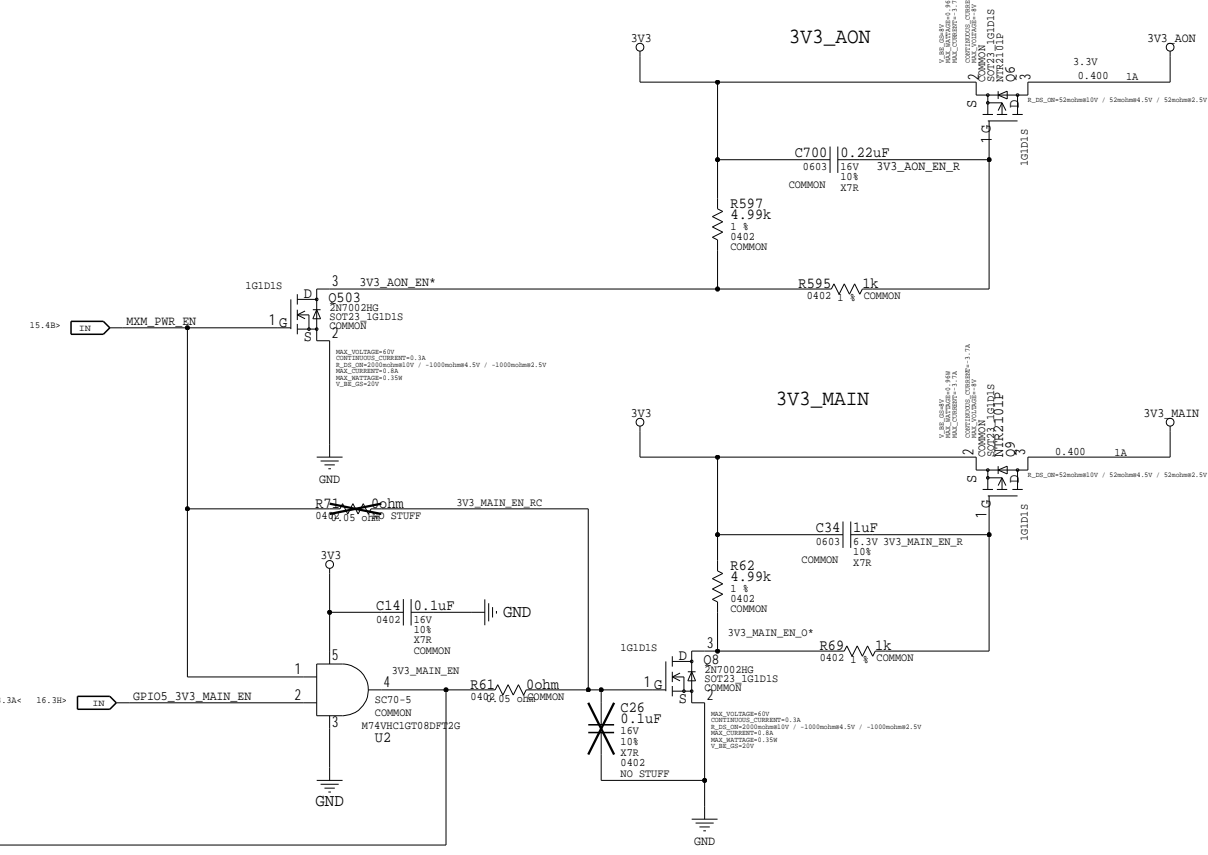
NVVDD&PEXVDD ENABLE



MXM POWER GOOD



3V3\_MAIN&3V3\_AON ENABLE



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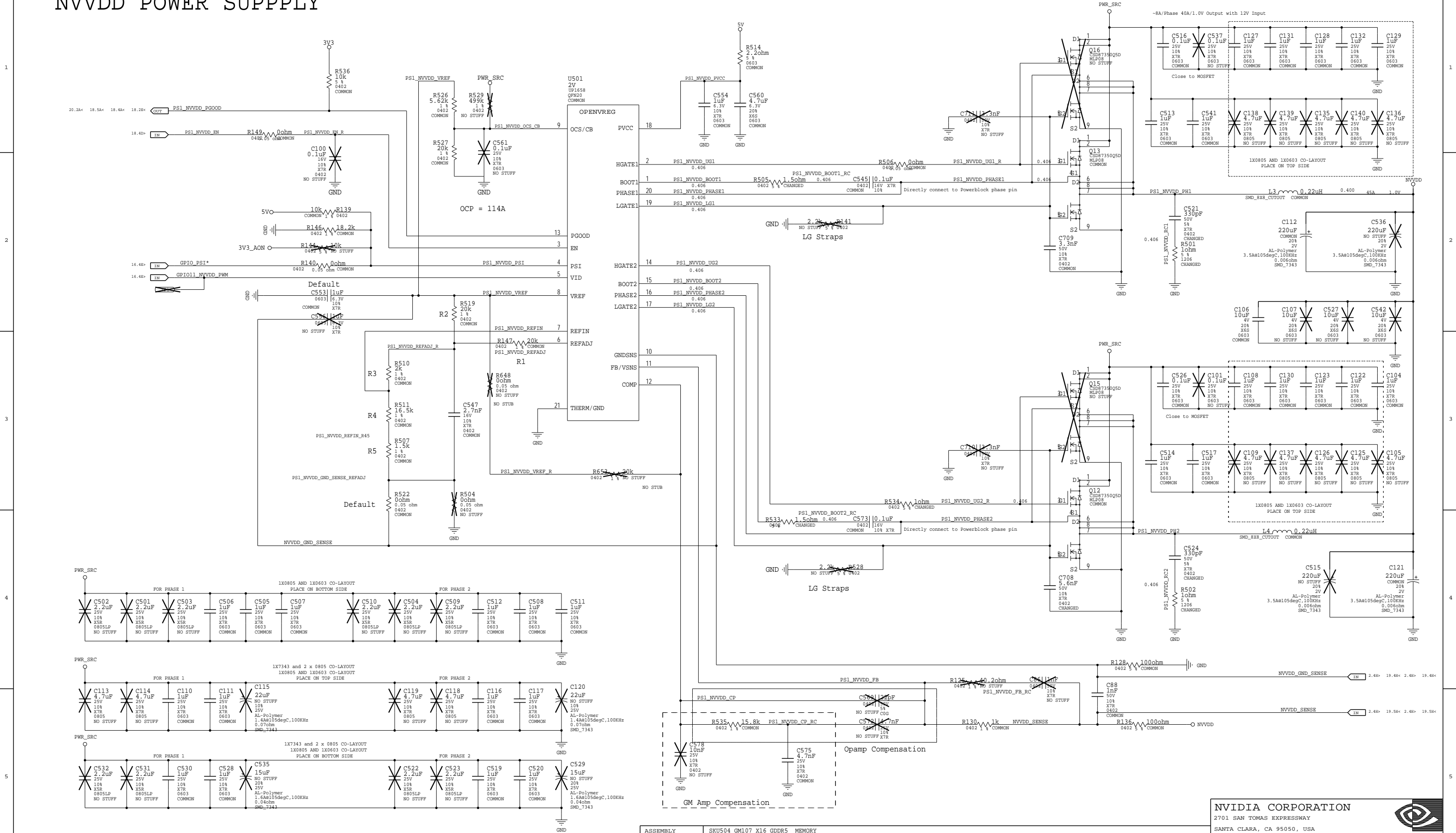
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PAGE 18 OF 20

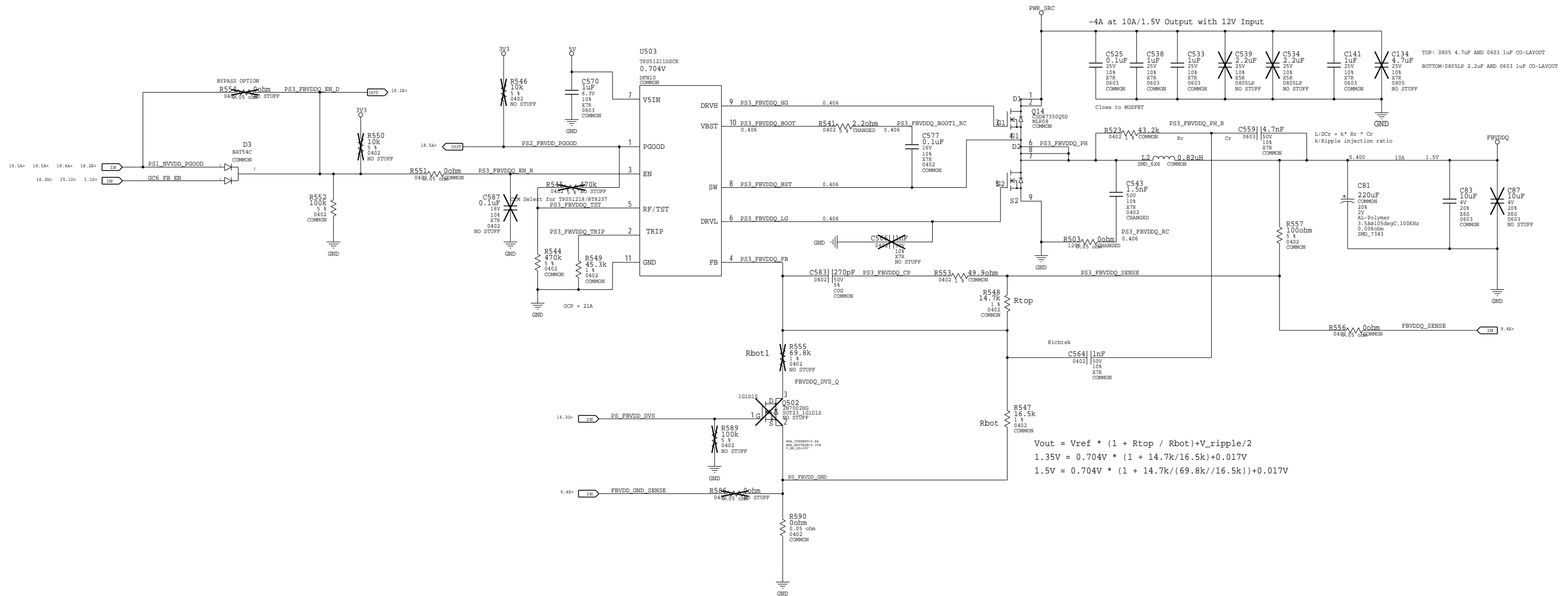
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NVDD POWER SUPPLY



## FBVDDQ POWER SUPPLY


$$\begin{aligned} V_{out} &= V_{ref} * (1 + R_{top} / R_{bot}) + V_{ripple}/2 \\ 1.35V &= 0.704V * (1 + 14.7k/16.5k) + 0.017V \\ 1.5V &= 0.704V * (1 + 14.7k/(69.8k//16.5k)) + 0.017V \end{aligned}$$

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