GA102 DT SKU P-BOARD

350W, FH Std PCB, 384b, GDDR6X x8
DP + DP + DP + HDMI/DP

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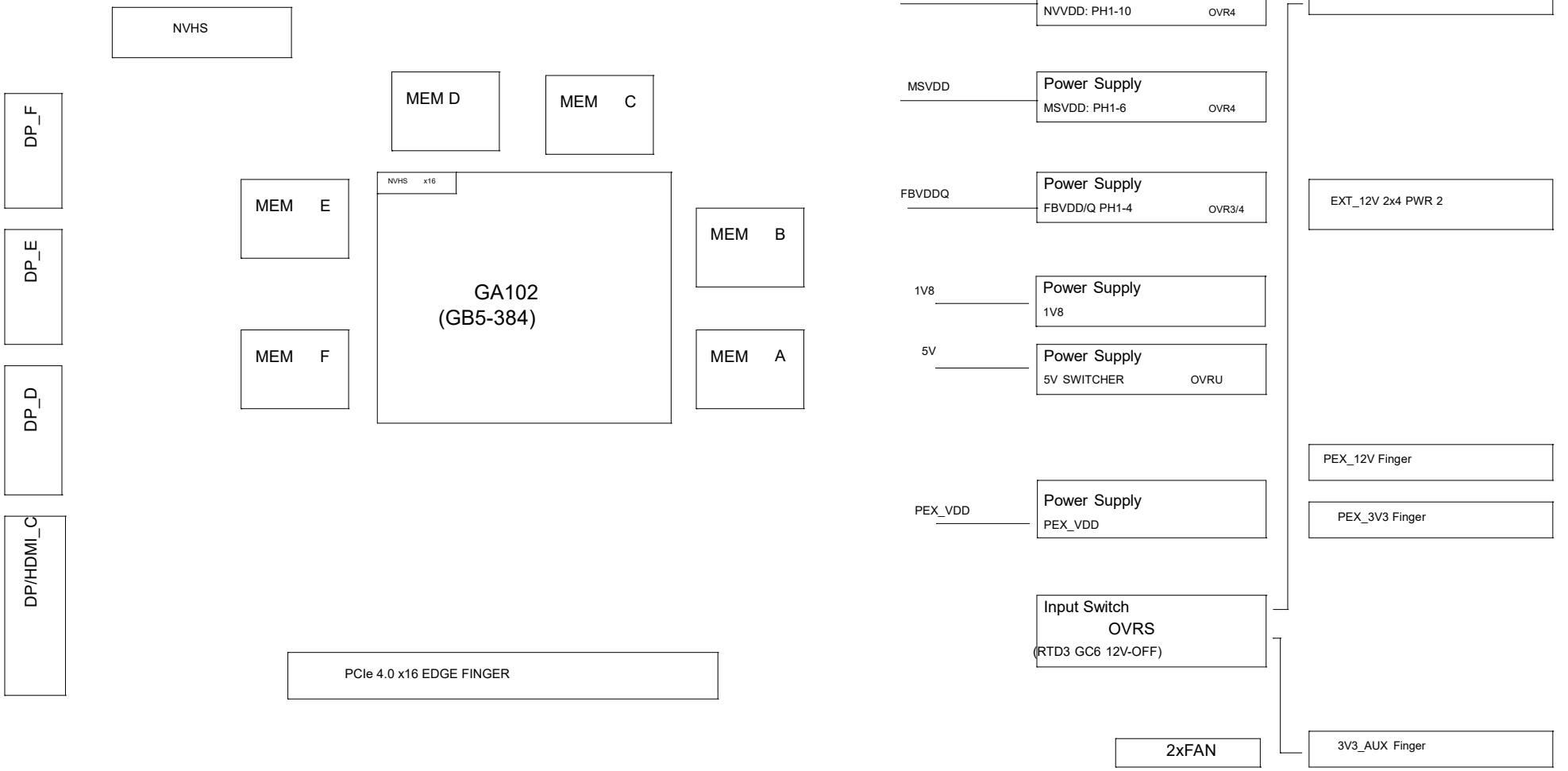
Block Diagram



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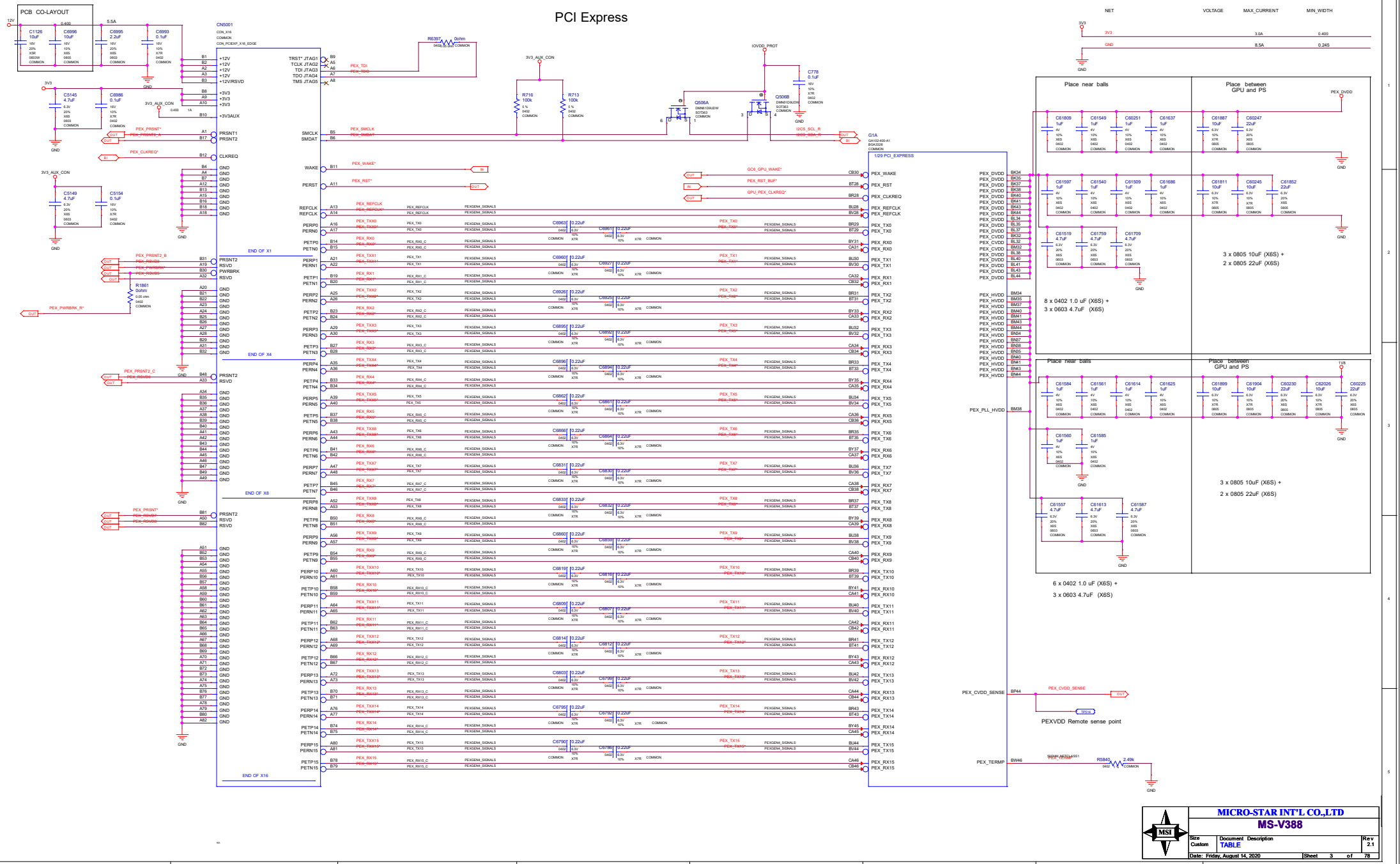
PCI Express



NET	VOLTAGE	MAX_CURRENT	MIN_WIDTH
3V3	3V3	3.0A	0.400
GND	GND	8.5A	0.245

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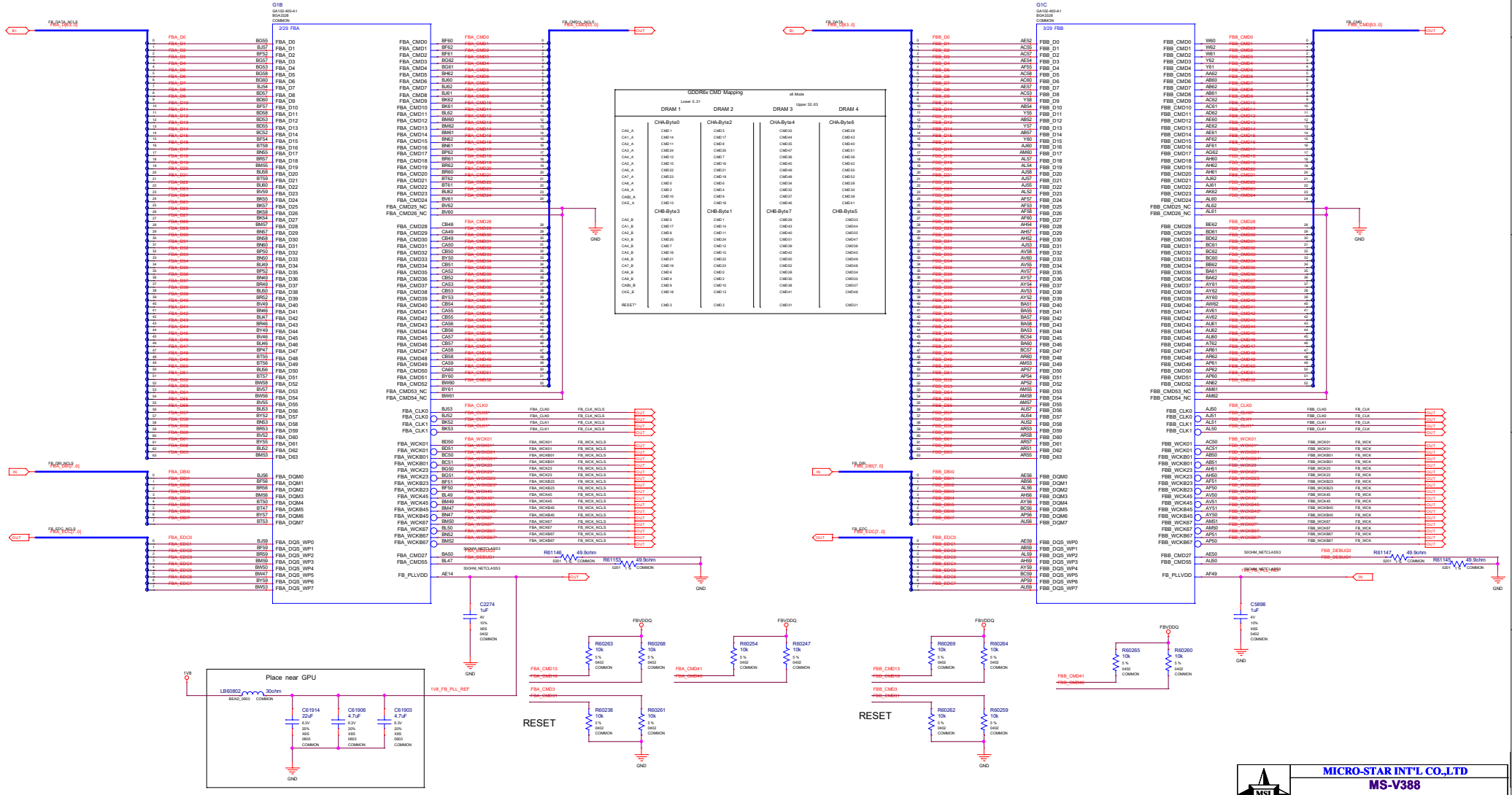
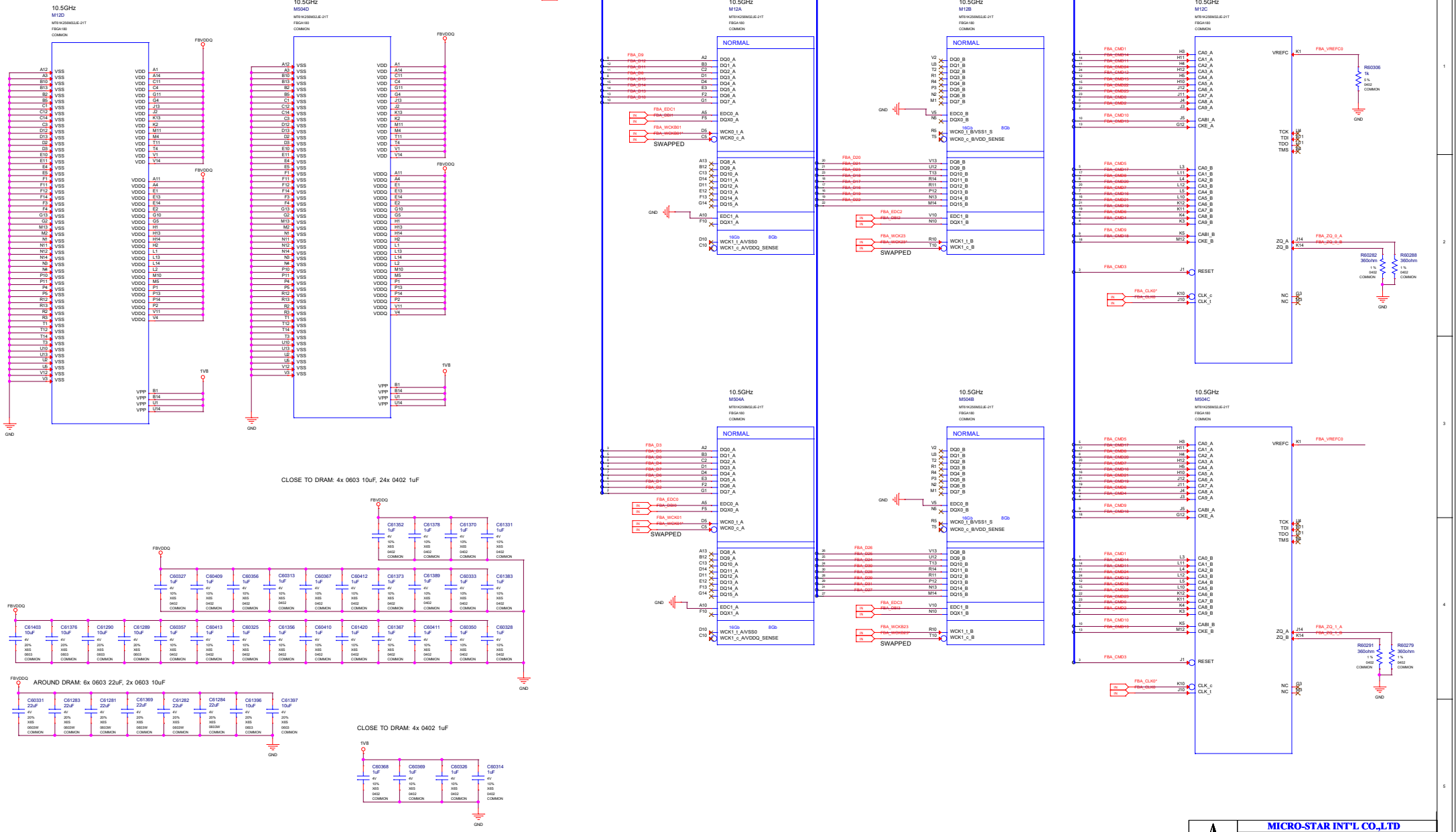
MEMORY: GPU Partition A/B



Page5: MEMORY: FBA Partition 31..0



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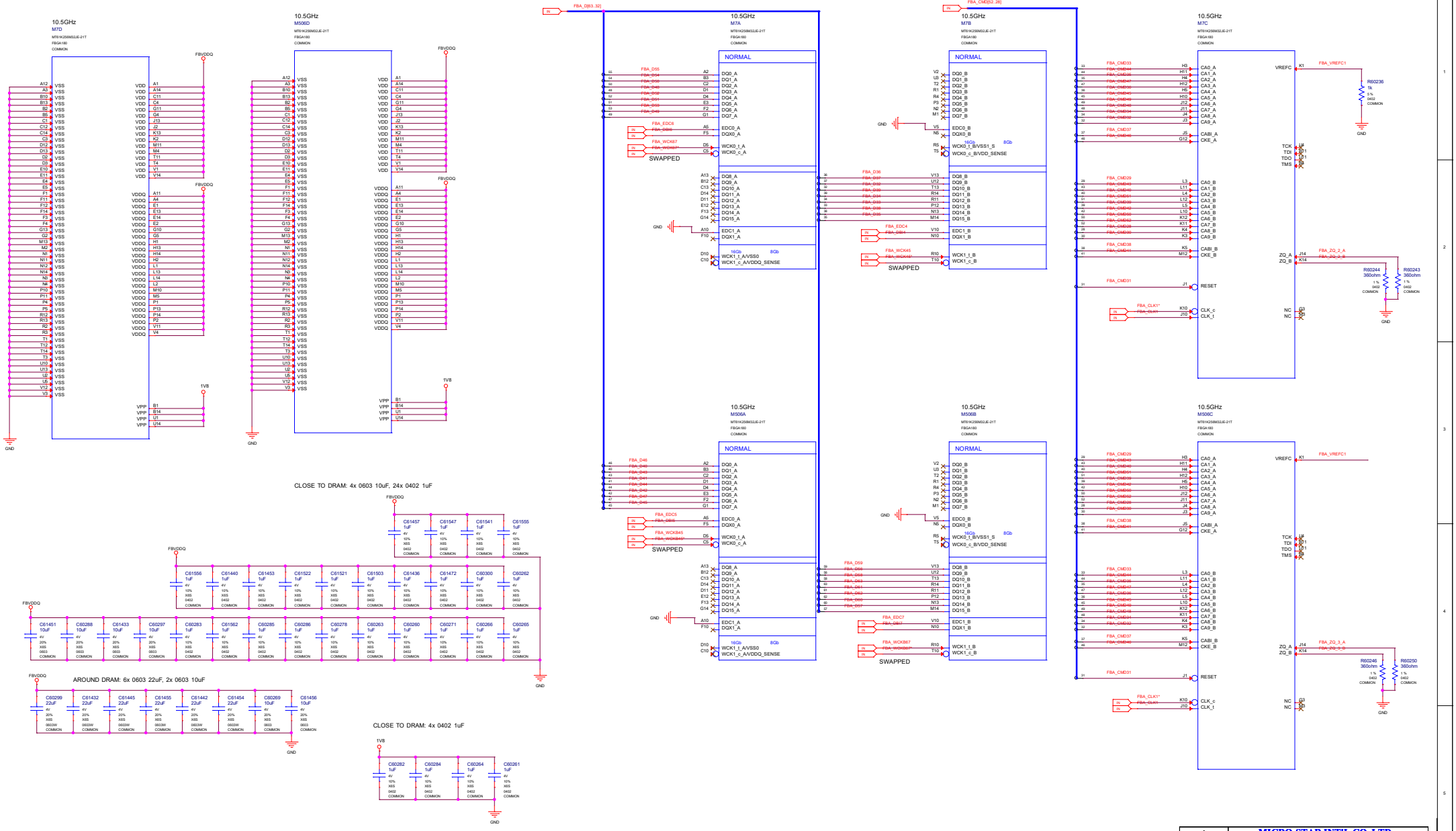
Page6: MEMORY: FBA Partition 63..32



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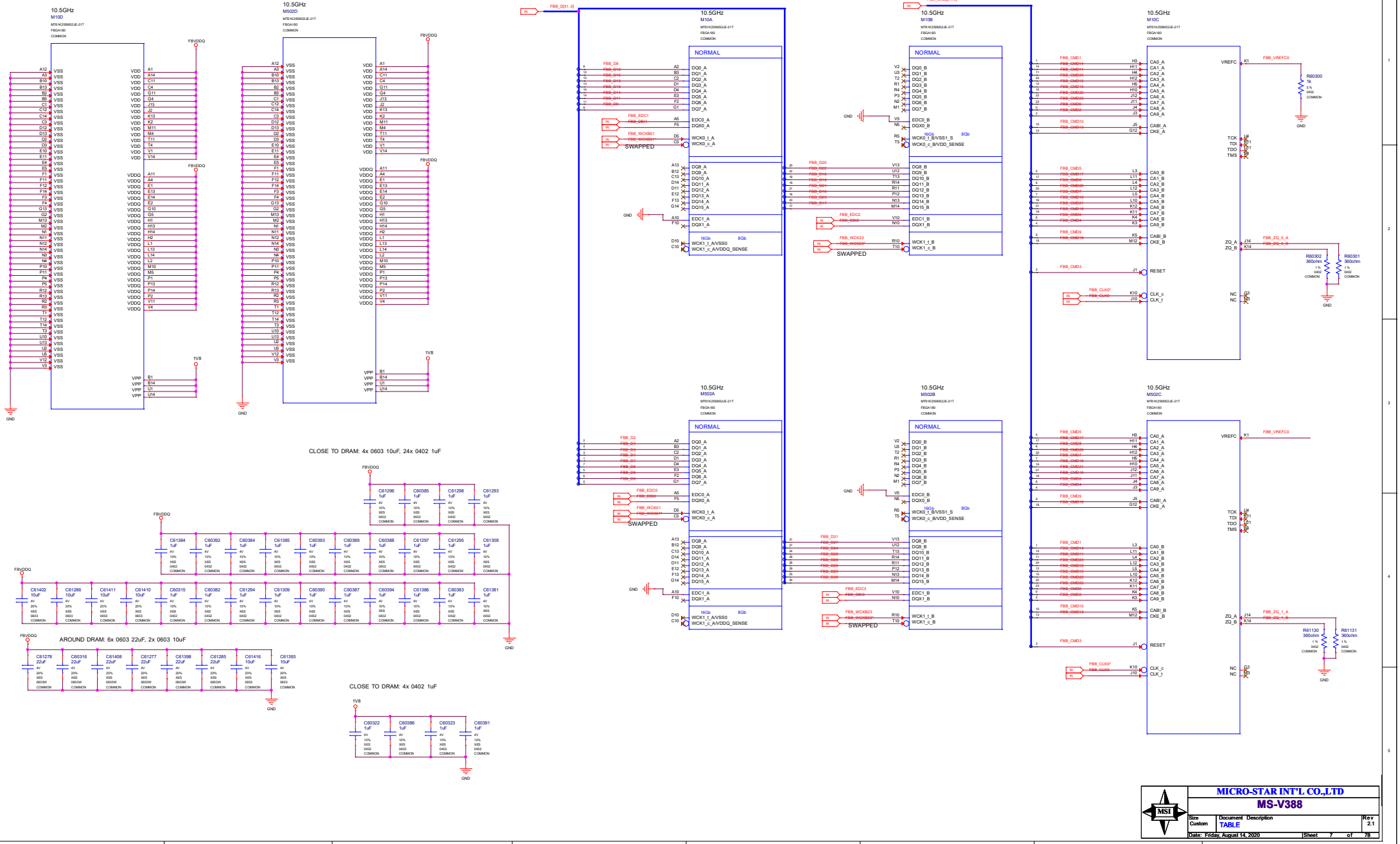
Page7: MEMORY: FBB Partition 31..0



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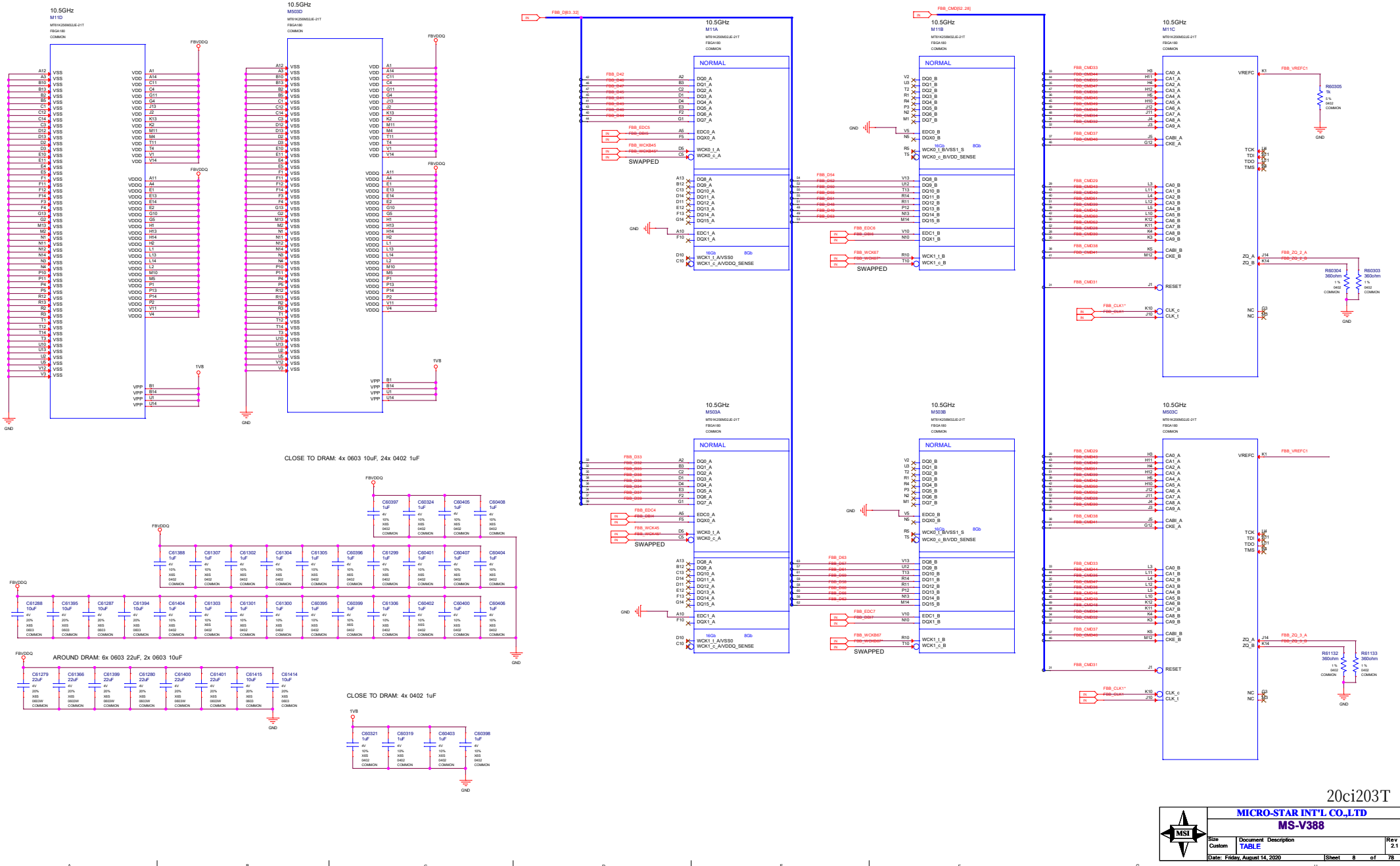
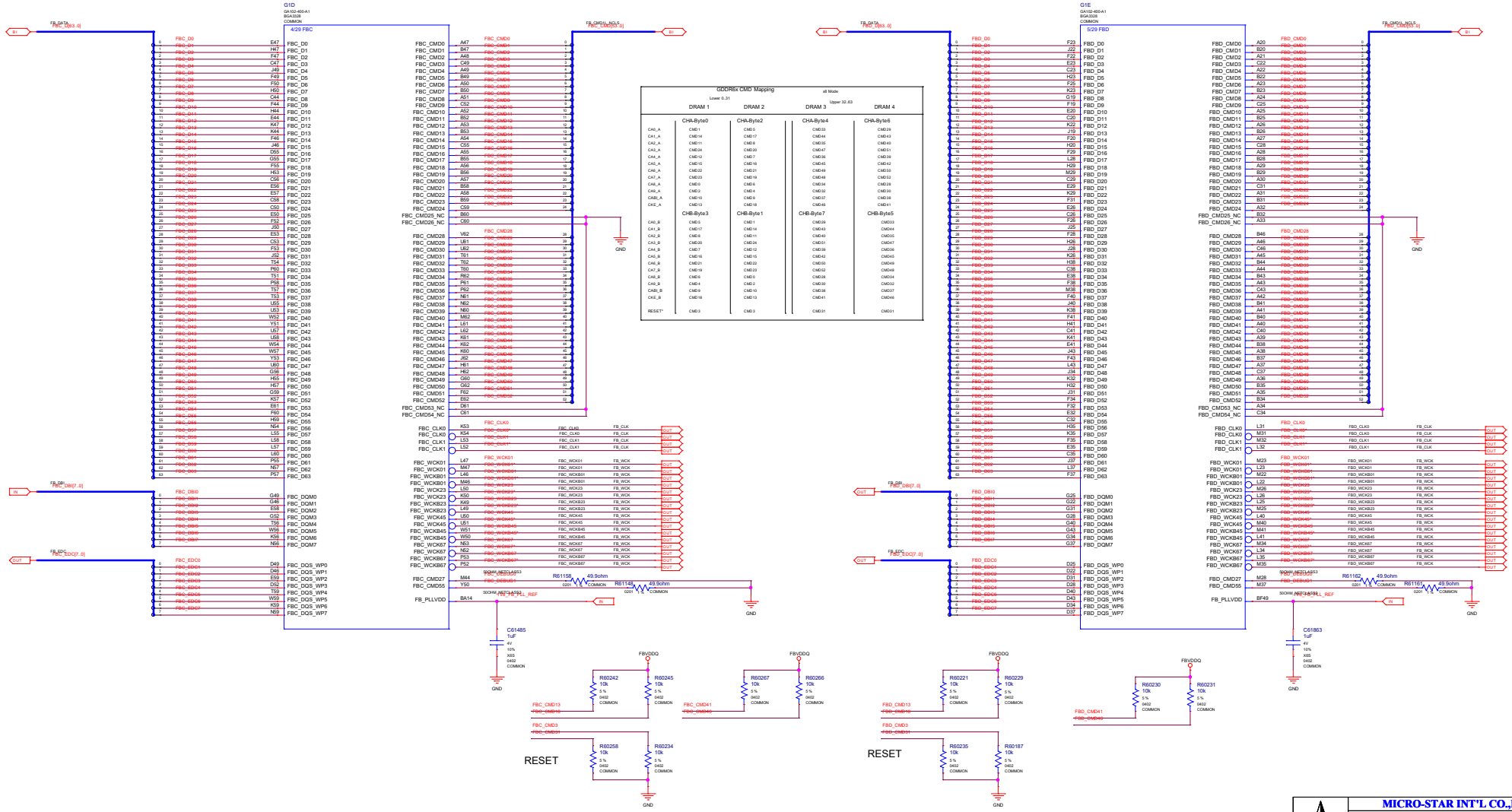
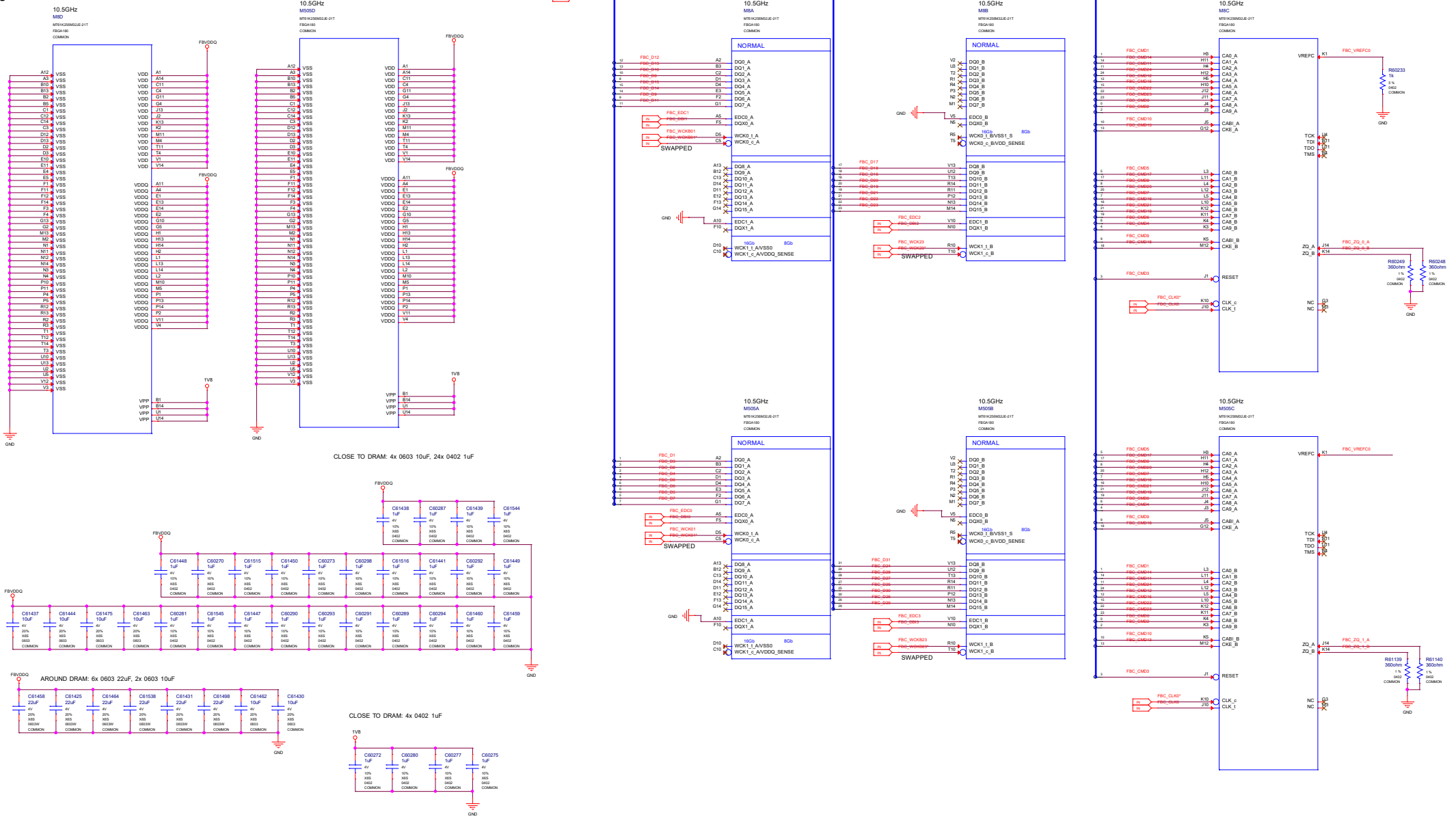
Page8: MEMORY: FBB Partition 63..32

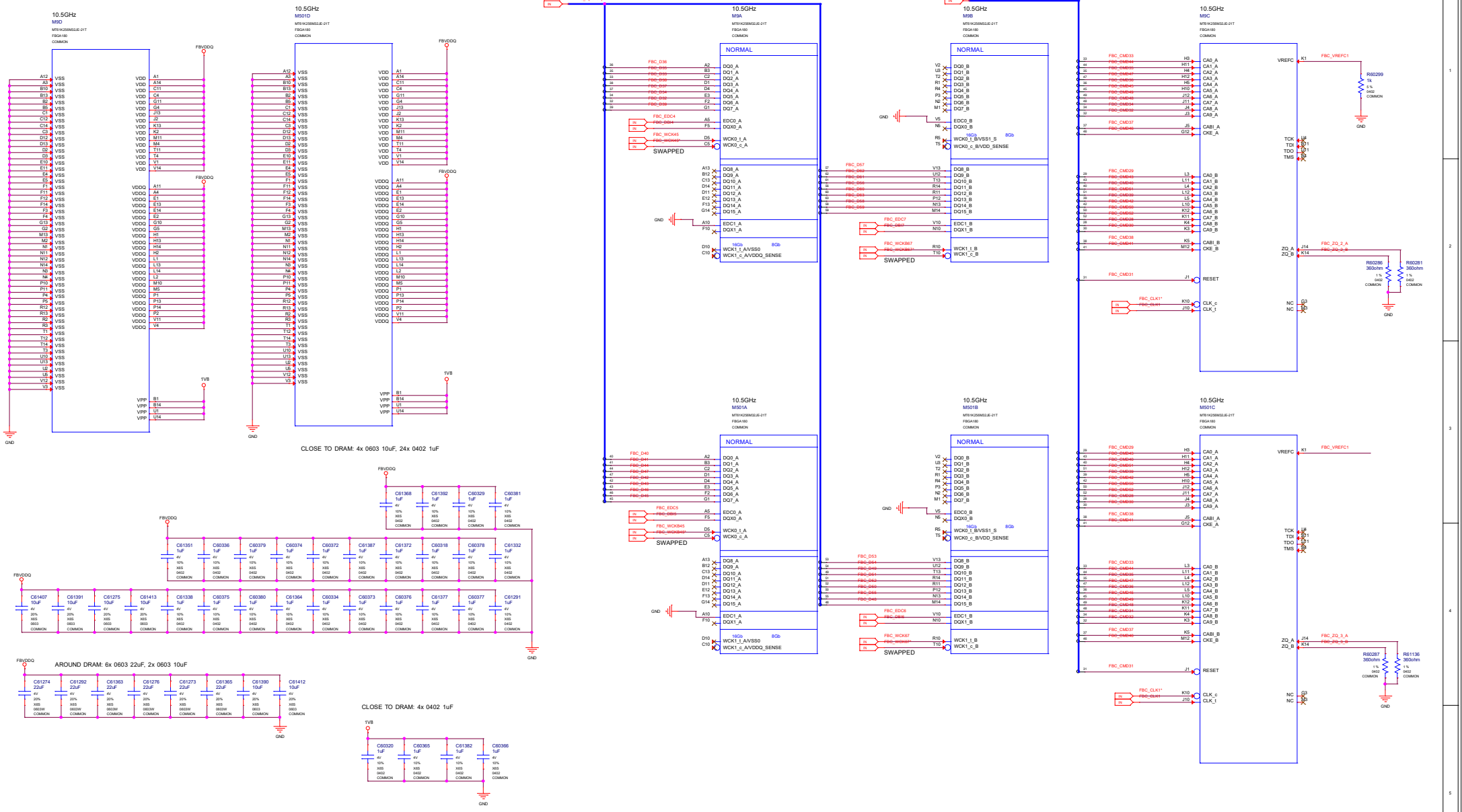


MEMORY: GPU Partition C/D



Page 10: MEMORY: FBC Partition 31..0




10.5GHz
M9D
10.5GHz
M501D
10.5GHz
M9A
NORMAL
10.5GHz
M9B
NORMAL
10.5GHz
M9C
10.5GHz
M501A
NORMAL
10.5GHz
M501B
NORMAL
10.5GHz
M501C
SWAPPED
SWAPPED
CLOSE TO DRAM: 4x 0603 10uF, 24x 0402 1uF
AROUND DRAM: 6x 0603 22uF, 2x 0603 10uF
CLOSE TO DRAM: 4x 0402 1uF
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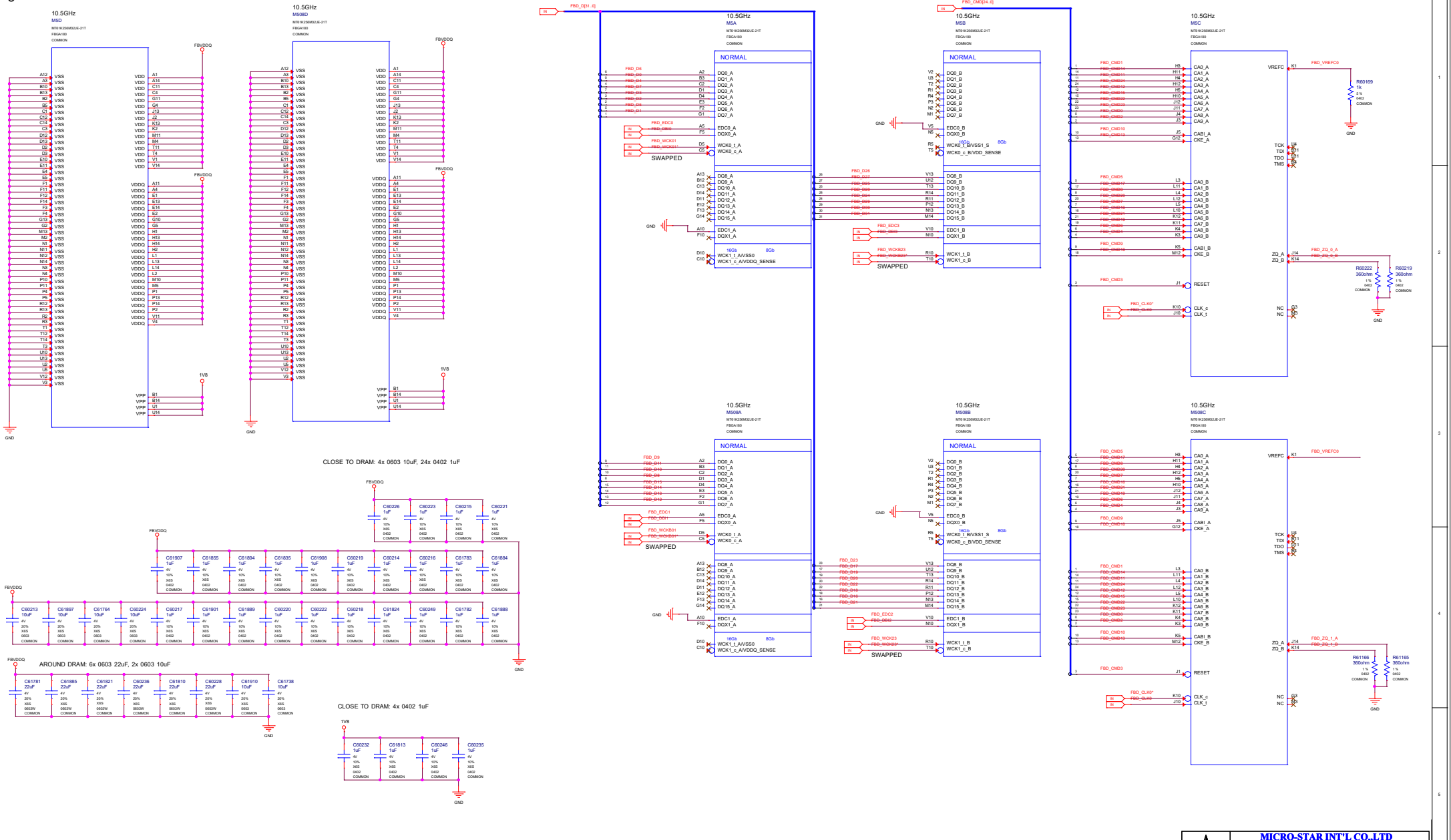
Page 12: MEMORY: FBD Partition 31..0



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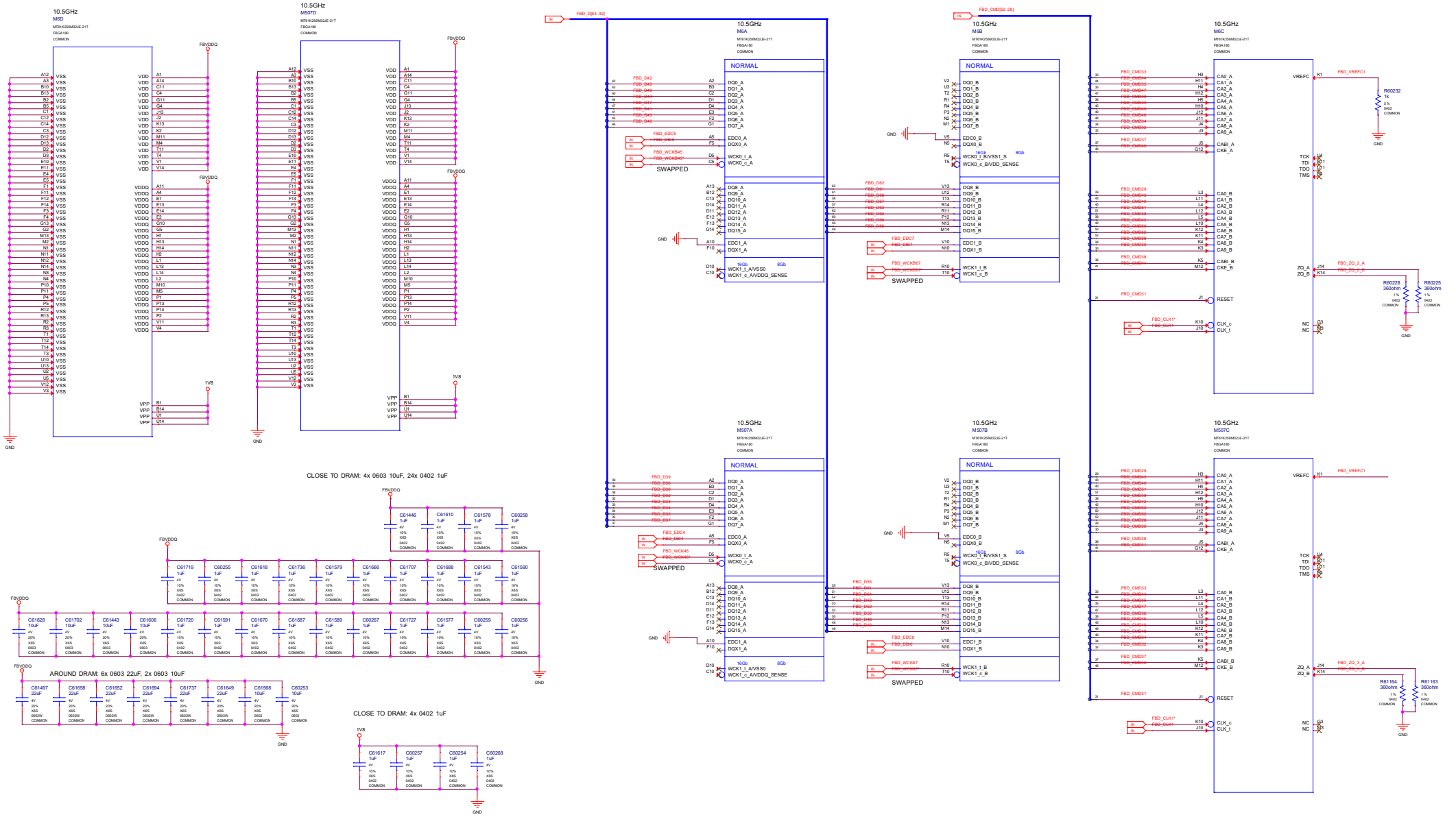
10.5Ghz
M6D
MT61K256M32JE-21T
FBGA180
COMMON
10.5Ghz
M507D
MT61K256M32JE-21T
FBGA180
COMMON
FBVDDQ
1V8
GND
CLOSE TO DRAM: 4x 0603 10uF, 24x 0402 1uF
AROUND DRAM: 6x 0603 22uF, 2x 0603 10uF
CLOSE TO DRAM: 4x 0402 1uF
10.5Ghz
M6A
MT61K256M32JE-21T
FBGA180
COMMON
NORMAL
SWAPPED
10.5Ghz
M6B
MT61K256M32JE-21T
FBGA180
COMMON
NORMAL
SWAPPED
10.5Ghz
M6C
MT61K256M32JE-21T
FBGA180
COMMON
10.5Ghz
M507A
MT61K256M32JE-21T
FBGA180
COMMON
NORMAL
SWAPPED
10.5Ghz
M507B
MT61K256M32JE-21T
FBGA180
COMMON
NORMAL
SWAPPED
10.5Ghz
M507C
MT61K256M32JE-21T
FBGA180
COMMON
FBD_D[63..32]
FBD_CMD[52..28]
FBD_VREFC1
FBD_ZQ_2_A
FBD_ZQ_2_B
FBD_ZQ_3_A
FBD_ZQ_3_B
FBD_CLK1*
FBD_WCKB45
FBD_WCKB67
FBD_EDC5
FBD_EDC4
FBD_EDC6
FBD_EDC7
R60232
1k
R60228
360ohm
R60225
360ohm
R61164
360ohm
R61163
360ohm
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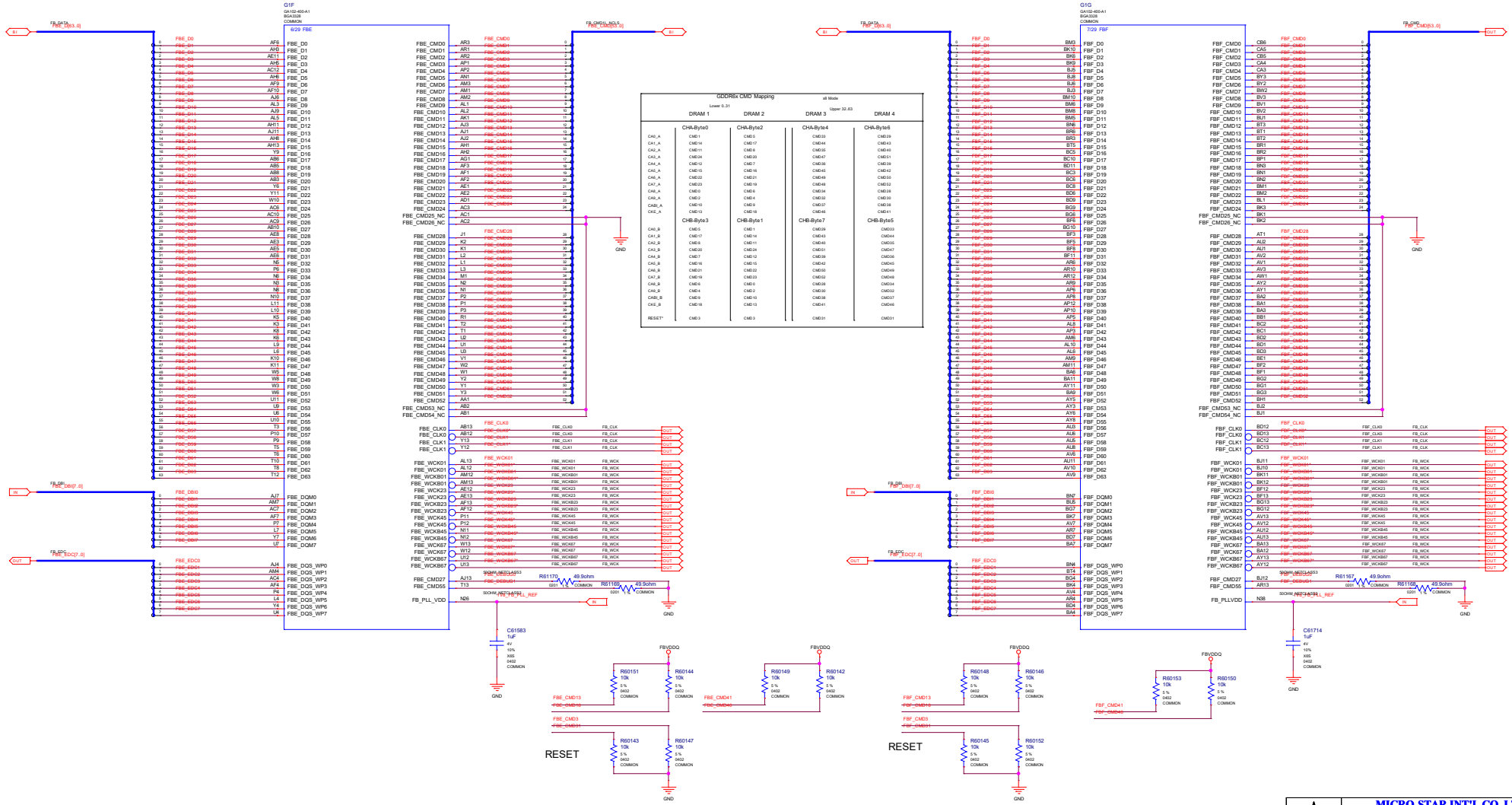
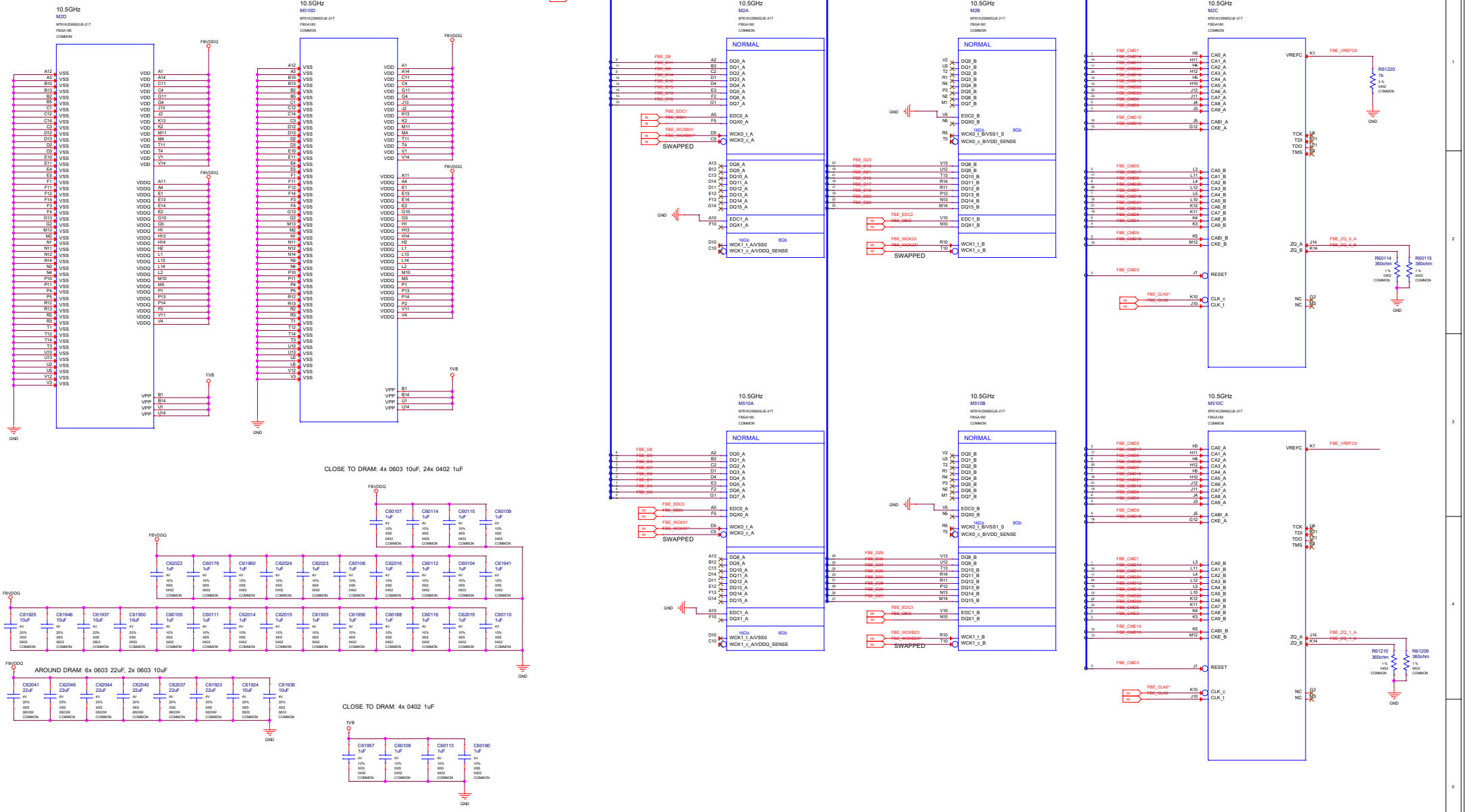
MEMORY: GPU Partition E/F





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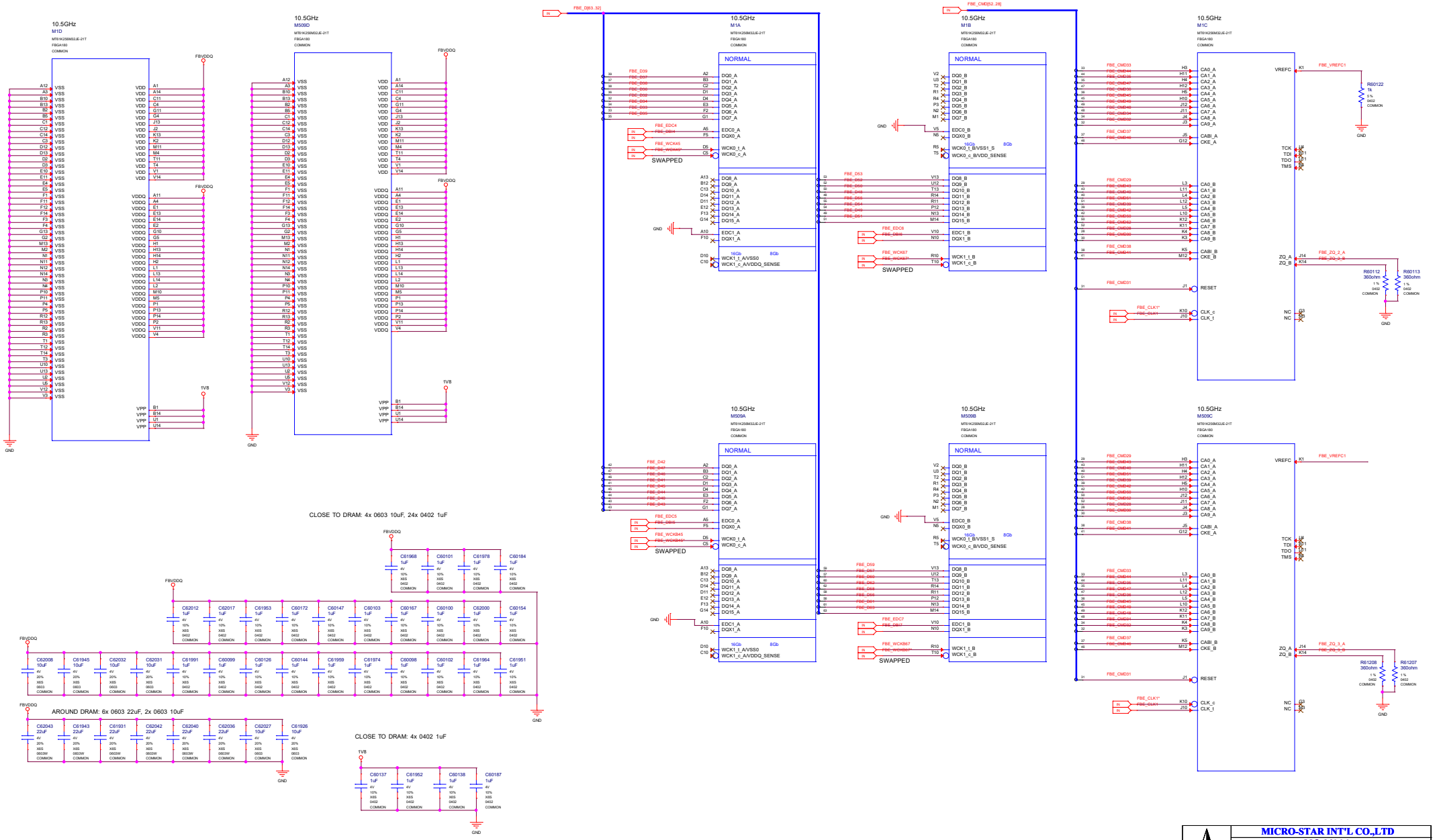
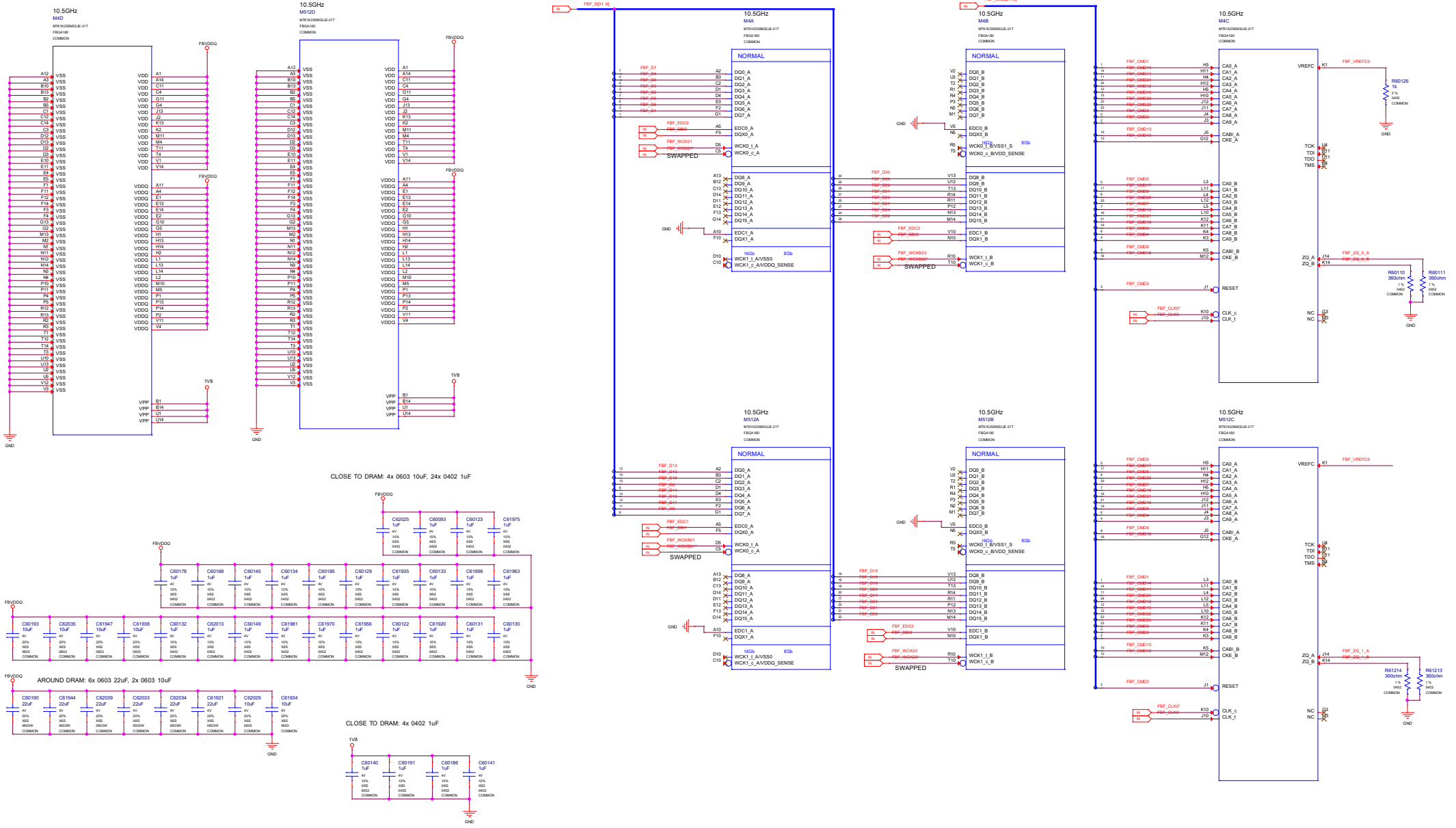
Page 16: MEMORY: FBE Partition 63..32




10.5GHz
M4D
10.5GHz
M512D
10.5GHz
M4A
NORMAL
10.5GHz
M4B
NORMAL
10.5GHz
M4C
10.5GHz
M512A
NORMAL
10.5GHz
M512B
NORMAL
10.5GHz
M512C
SWAPPED
SWAPPED
CLOSE TO DRAM: 4x 0603 10uF, 24x 0402 1uF
AROUND DRAM: 6x 0603 22uF, 2x 0603 10uF
CLOSE TO DRAM: 4x 0402 1uF
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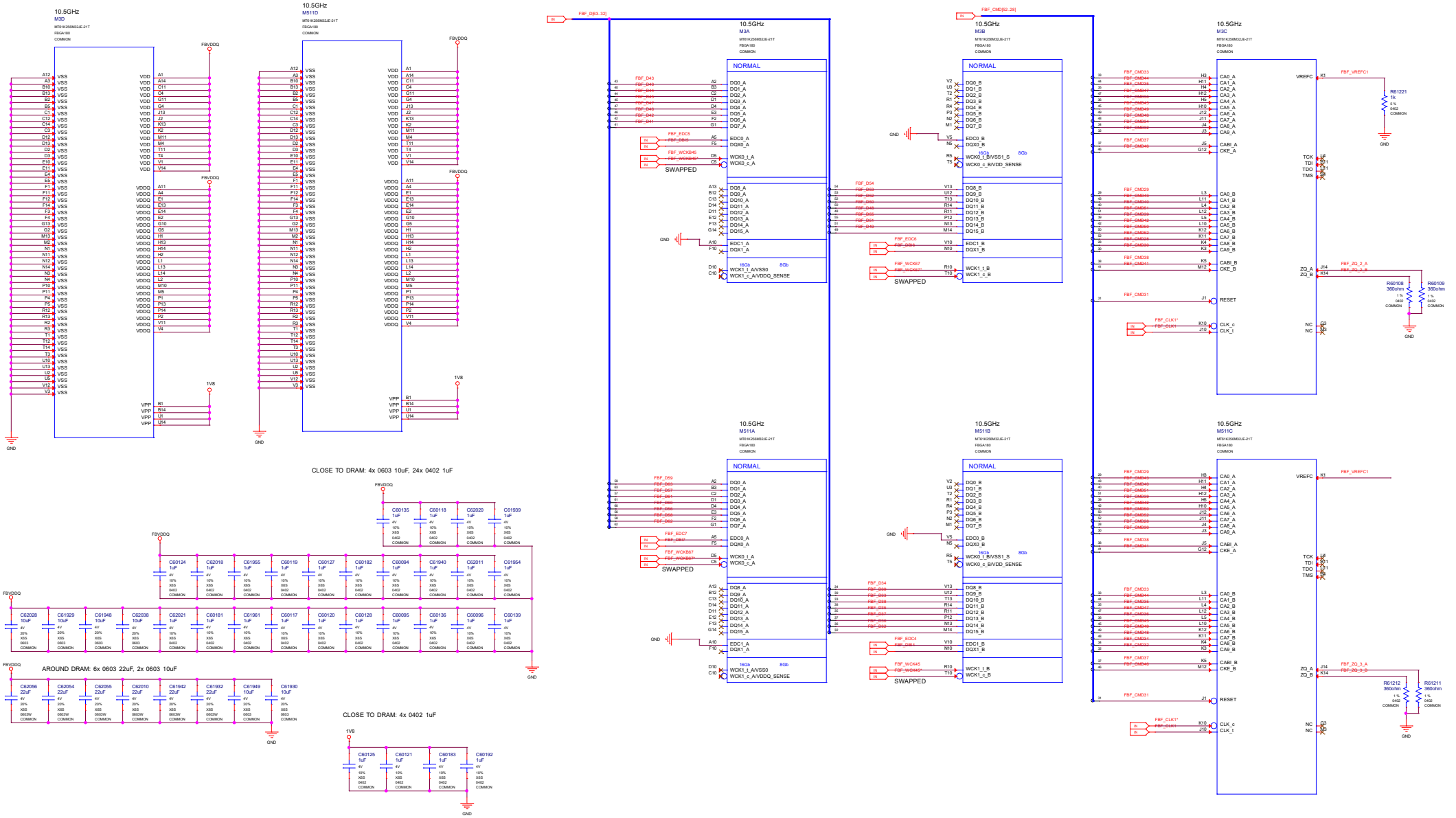

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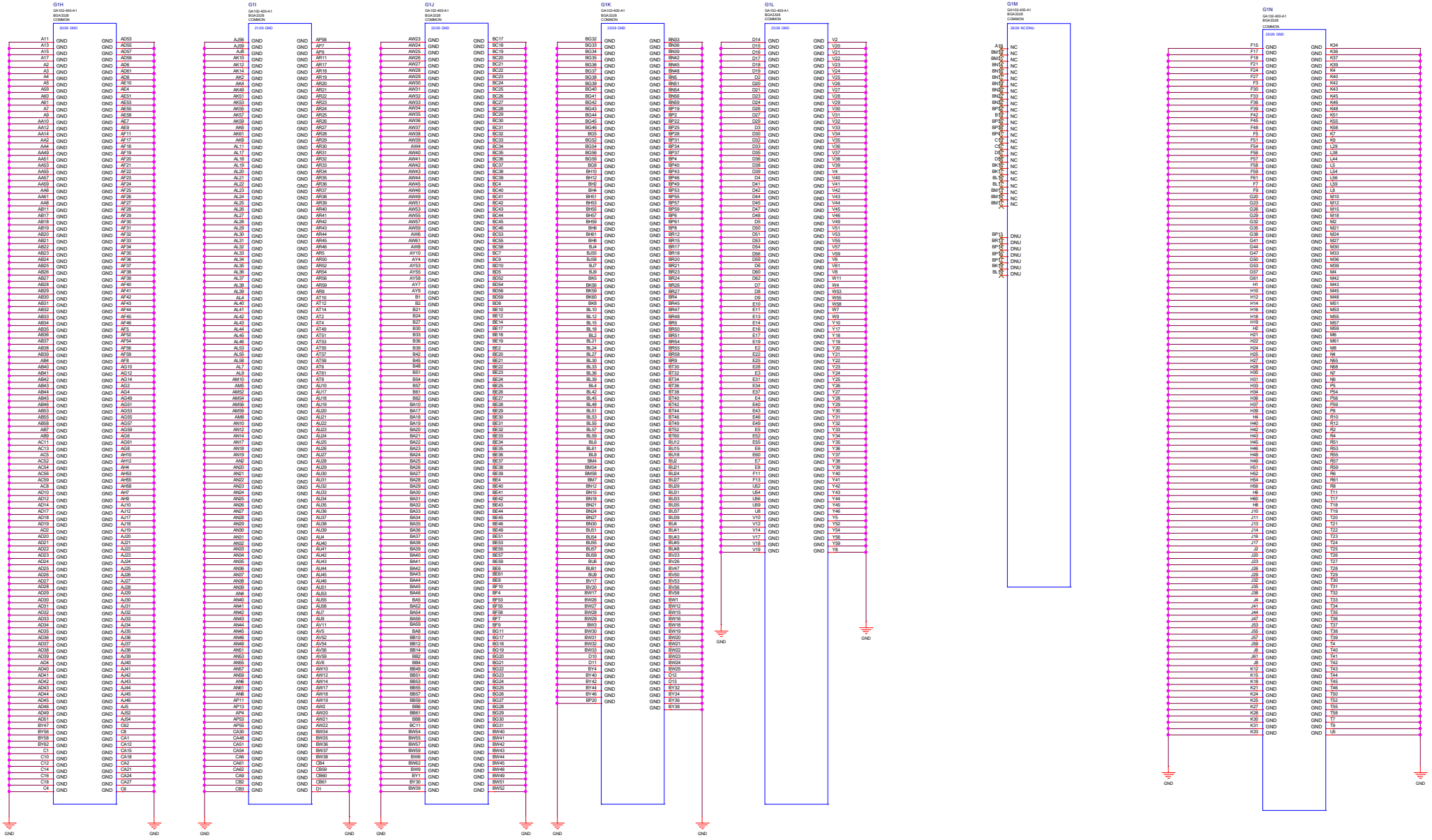
GPU GND, RFUs & RSVD



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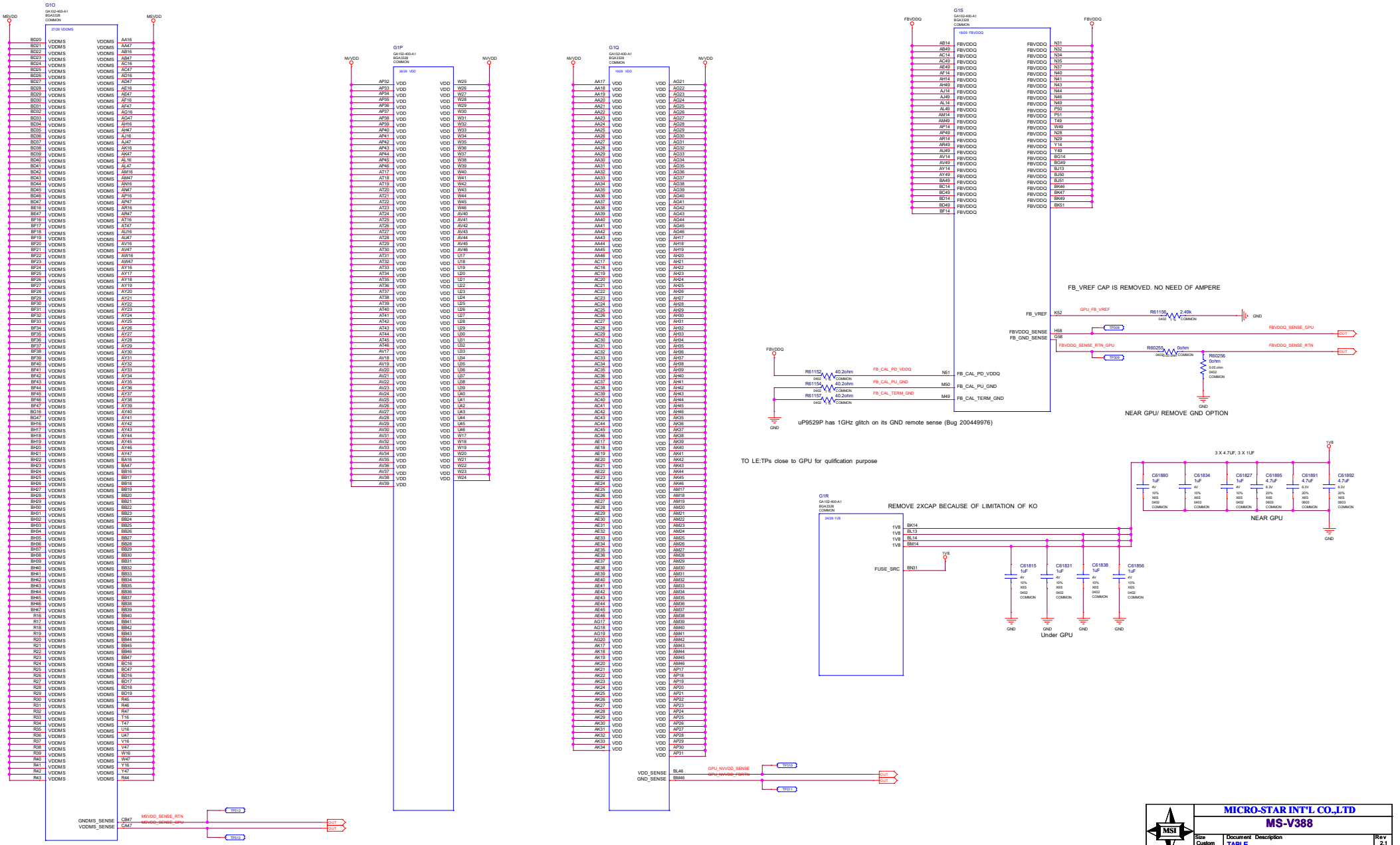
GPU PWR and GND



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NVVDD

UNDER GPU

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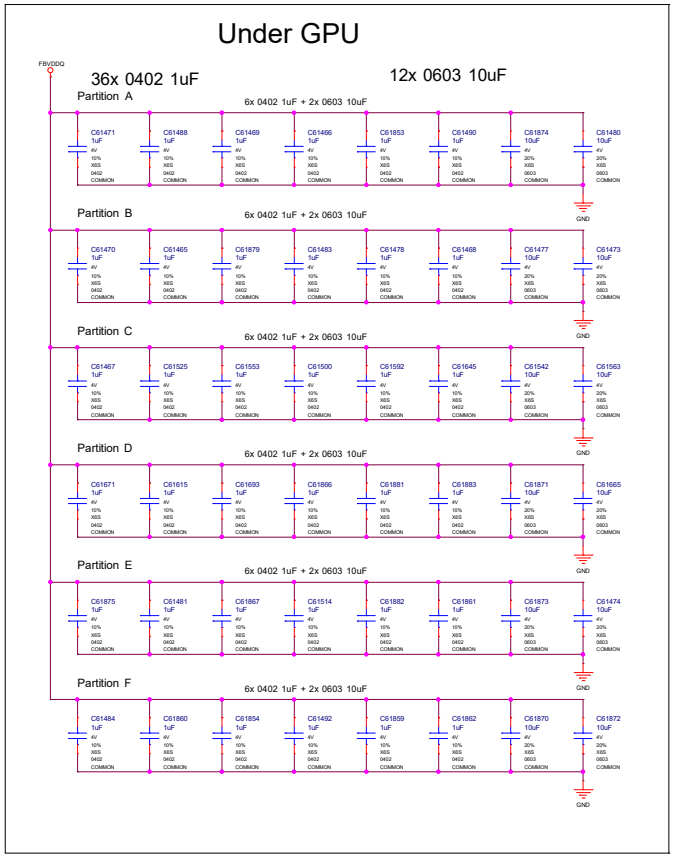
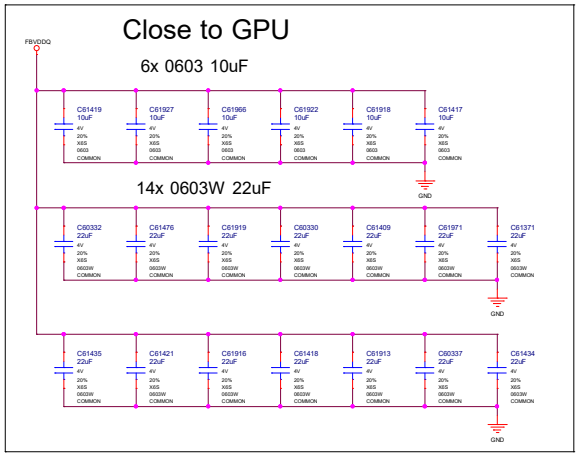
FBVDDQ





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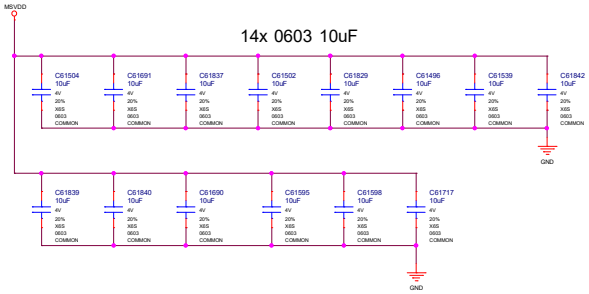
Page 23: GPU: MSVDD DECOUPLING

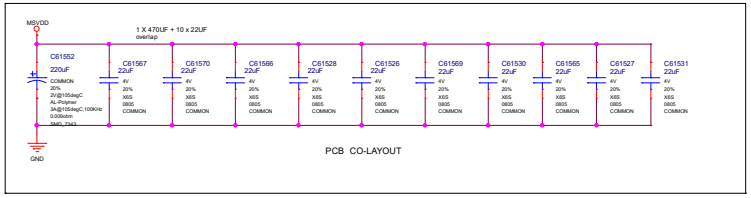
UNDER GPU

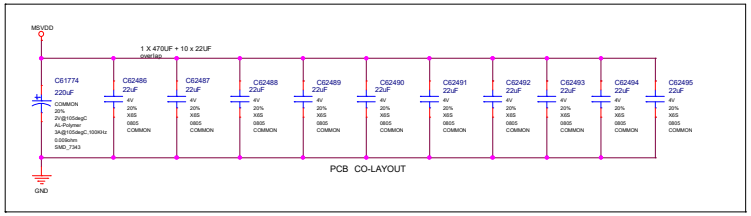
MSVDD

14x 0603 10uF

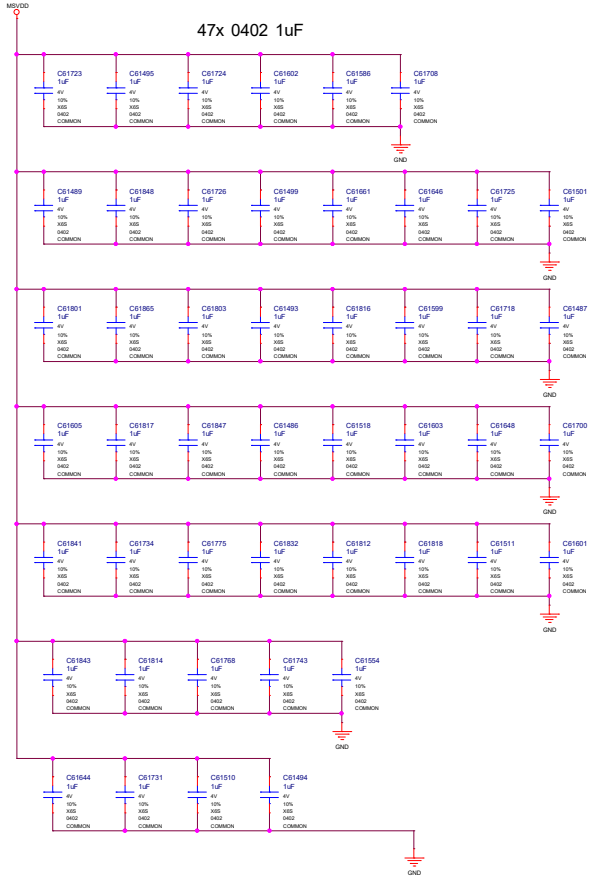


2x SMD7343 220uF (EACH CO-LAYOUT WITH 10x 22uF 0805)





47x 0402 1uF



REMOVED 3X 1uF 0402 DUE TO SPACE RESTRICTION

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BLANK

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NVHS Interface and FRAME LOCK

NEAR GPU

UNDER GPU

C60169 22uF 6.3V 20% X6S 0805 COMMON
C60092 22uF 6.3V 20% X6S 0805 COMMON
C60160 10uF 6.3V 10% X7R 0805 COMMON
C60173 10uF 6.3V 10% X7R 0805 COMMON
C60175 10uF 6.3V 10% X7R 0805 COMMON
C61797 4.7uF 6.3V 20% X6S 0603 COMMON
C61798 4.7uF 6.3V 20% X6S 0603 COMMON
C61763 4.7uF 6.3V 20% X6S 0603 COMMON
C61876 1uF 4V 10% X6S 0402 COMMON
C61760 1uF 4V 10% X6S 0402 COMMON
C61878 1uF 4V 10% X6S 0402 COMMON
C61732 1uF 4V 10% X6S 0402 COMMON
C61776 1uF 4V 10% X6S 0402 COMMON
C61741 1uF 4V 10% X6S 0402 COMMON
C61777 1uF 4V 10% X6S 0402 COMMON

GND

REMOVE ONE BECAUSE OF KO LIMITATION

BRIDGE POR

LED -> NO

ID ROM ->YES

NEAR GPU

UNDER GPU

C60195 22uF 6.3V 20% X6S 0805 COMMON
C60199 22uF 6.3V 20% X6S 0805 COMMON
C60206 10uF 6.3V 10% X7R 0805 COMMON
C60189 10uF 6.3V 10% X7R 0805 COMMON
C61905 10uF 6.3V 10% X7R 0805 COMMON
C61877 4.7uF 6.3V 20% X6S 0603 COMMON
C61822 4.7uF 6.3V 20% X6S 0603 COMMON
C61820 4.7uF 6.3V 20% X6S 0603 COMMON
C61807 1uF 4V 10% X6S 0402 COMMON
C61857 1uF 4V 10% X6S 0402 COMMON
C61806 1uF 4V 10% X6S 0402 COMMON
C61845 1uF 4V 10% X6S 0402 COMMON
C61846 1uF 4V 10% X6S 0402 COMMON
C61844 1uF 4V 10% X6S 0402 COMMON

GND

REMOVE ONE BECAUSE OF KO LIMITATION

GPIO21_RASTER_SYNC0 → R1558 33.2ohm 0402 1% COMMON → GPIO21_RASTER_SYNC0_R 45OHM_NETCLASS2

GPIO32_RASTER_SYNC1 → R1559 33.2ohm 0402 1% COMMON

DEL ~(That's for Quadro series.)

G1U GA102-400-A1 BGA3328 COMMON
13/29 NVHS0

PEX_DVDD

M13 M14 M16 M17 M19 M20 N14 N16 N17 N19 N20 N22 N23 N25 P13 NVHS_DVDD

1V8

K13 K14 K16 K17 K19 K20 L13 L14 L16 L17 L19 NVHS_HVDD

L20 NVHS_PLL_HVDD

G1 NVHS_TERMP

R5001 2.49k 1% 0402 COMMON

GND

G1T GA102-400-A1 BGA3328 COMMON
14/29 NVHS1

PEX_DVDD

T14 U14 NVHS_CVDD

NVHS0_0_RX0 H7 NVHS0_RX0_P
NVHS0_0_RX0 G17 NVHS0_RX0_N
NVHS0_0_RX1 G16 NVHS0_RX1_P
NVHS0_0_RX1 F16 NVHS0_RX1_N
NVHS0_0_RX2 H15 NVHS0_RX2_P
NVHS0_0_RX2 G15 NVHS0_RX2_N
NVHS0_0_RX3 G14 NVHS0_RX3_P
NVHS0_0_RX3 F14 NVHS0_RX3_N
NVHS0_1_RX0 F12 NVHS0_RX4_P
NVHS0_1_RX0 G12 NVHS0_RX4_N
NVHS0_1_RX1 G13 NVHS0_RX5_P
NVHS0_1_RX1 H13 NVHS0_RX5_N
NVHS0_1_RX2 G11 NVHS0_RX6_P
NVHS0_1_RX2 H11 NVHS0_RX6_N
NVHS0_1_RX3 F10 NVHS0_RX7_P
NVHS0_1_RX3 G10 NVHS0_RX7_N
NVHS0_0_TX0 A18 NVHS0_TX0_P
NVHS0_0_TX0 B18 NVHS0_TX0_N
NVHS0_0_TX1 B17 NVHS0_TX1_P
NVHS0_0_TX1 C17 NVHS0_TX1_N
NVHS0_0_TX2 A16 NVHS0_TX2_P
NVHS0_0_TX2 B16 NVHS0_TX2_N
NVHS0_0_TX3 B15 NVHS0_TX3_P
NVHS0_0_TX3 C15 NVHS0_TX3_N
NVHS0_1_TX0 A14 NVHS0_TX4_P
NVHS0_1_TX0 B14 NVHS0_TX4_N
NVHS0_1_TX1 B13 NVHS0_TX5_P
NVHS0_1_TX1 C13 NVHS0_TX5_N
NVHS0_1_TX2 A12 NVHS0_TX6_P
NVHS0_1_TX2 B12 NVHS0_TX6_N
NVHS0_1_TX3 B11 NVHS0_TX7_P
NVHS0_1_TX3 C11 NVHS0_TX7_N

NVHS_REFCLK H5 NVHS_REFCLK_A_P
NVHS_REFCLK G5 NVHS_REFCLK_A_N
EXT_REFCLK_SLI BR8 EXT_REFCLKA

26,64 I2CB_SCL_R
26,64 I2CB_SDA_R
R5003 0ohm 0402 1% COMMON
R5006 0ohm 0402 1% COMMON
I2CB_SCL_NVHS
I2CB_SDA_NVHS

I2C IS REQUIRED FOR EEPROM ON QD BRIDGE

1V8
R5002 2.21k 0402 1% COMMON
26 GPIO34_SWAPRDY_IN

26 GPIO32_RASTER_SYNC1
25,26 GPIO21_RASTER_SYNC0_R
R5004 33.2ohm 0402 1% COMMON
R5005 33.2ohm 0402 1% COMMON
NVHS_RASTER_SYNC1
45OHM_NETCLASS2

NVHS0_2_RX0 F8 NVHS1_RX0_P
NVHS0_2_RX0 G8 NVHS1_RX0_N
NVHS0_2_RX1 H9 NVHS1_RX1_P
NVHS0_2_RX1 G9 NVHS1_RX1_N
NVHS0_2_RX2 F8 NVHS1_RX2_P
NVHS0_2_RX2 G8 NVHS1_RX2_N
NVHS0_2_RX3 G7 NVHS1_RX3_P
NVHS0_2_RX3 H7 NVHS1_RX3_N
NVHS0_3_RX0 F2 NVHS1_RX4_P
NVHS0_3_RX0 G2 NVHS1_RX4_N
NVHS0_3_RX1 F1 NVHS1_RX5_P
NVHS0_3_RX1 E1 NVHS1_RX5_N
NVHS0_3_RX2 F4 NVHS1_RX6_P
NVHS0_3_RX2 G4 NVHS1_RX6_N
NVHS0_3_RX3 G3 NVHS1_RX7_P
NVHS0_3_RX3 H3 NVHS1_RX7_N
NVHS0_2_TX0 A10 NVHS1_TX0_P
NVHS0_2_TX0 B10 NVHS1_TX0_N
NVHS0_2_TX1 B9 NVHS1_TX1_P
NVHS0_2_TX1 C9 NVHS1_TX1_N
NVHS0_2_TX2 A8 NVHS1_TX2_P
NVHS0_2_TX2 B8 NVHS1_TX2_N
NVHS0_2_TX3 B7 NVHS1_TX3_P
NVHS0_2_TX3 C7 NVHS1_TX3_N
NVHS0_3_TX0 A6 NVHS1_TX4_P
NVHS0_3_TX0 B6 NVHS1_TX4_N
NVHS0_3_TX1 B5 NVHS1_TX5_P
NVHS0_3_TX1 C5 NVHS1_TX5_N
NVHS0_3_TX2 B4 NVHS1_TX6_P
NVHS0_3_TX2 B3 NVHS1_TX6_N
NVHS0_3_TX3 C3 NVHS1_TX7_P
NVHS0_3_TX3 C2 NVHS1_TX7_N

CN5004 CON_NVLINK_X16_EDGE_GA10X MDNPHN-X16-GA10X COMMON
CON_NVLINK_GA10X

NVHSX_0_RX0 B61 NVHSX_0_RX0
NVHSX_0_RX0 B60 NVHSX_0_RX0
NVHSX_0_RX1 B58 NVHSX_0_RX1
NVHSX_0_RX1 B57 NVHSX_0_RX1
NVHSX_0_RX2 B55 NVHSX_0_RX2
NVHSX_0_RX2 B54 NVHSX_0_RX2
NVHSX_0_RX3 B52 NVHSX_0_RX3
NVHSX_0_RX3 B51 NVHSX_0_RX3
NVHSX_1_RX0 B49 NVHSX_1_RX0
NVHSX_1_RX0 B48 NVHSX_1_RX0
NVHSX_1_RX1 B46 NVHSX_1_RX1
NVHSX_1_RX1 B45 NVHSX_1_RX1
NVHSX_1_RX2 B43 NVHSX_1_RX2
NVHSX_1_RX2 B42 NVHSX_1_RX2
NVHSX_1_RX3 B40 NVHSX_1_RX3
NVHSX_1_RX3 B39 NVHSX_1_RX3
NVHSX_0_TX0 A61 NVHSX_0_TX0
NVHSX_0_TX0 A60 NVHSX_0_TX0
NVHSX_0_TX1 A58 NVHSX_0_TX1
NVHSX_0_TX1 A57 NVHSX_0_TX1
NVHSX_0_TX2 A55 NVHSX_0_TX2
NVHSX_0_TX2 A54 NVHSX_0_TX2
NVHSX_0_TX3 A52 NVHSX_0_TX3
NVHSX_0_TX3 A51 NVHSX_0_TX3
NVHSX_1_TX0 A49 NVHSX_1_TX0
NVHSX_1_TX0 A48 NVHSX_1_TX0
NVHSX_1_TX1 A46 NVHSX_1_TX1
NVHSX_1_TX1 A45 NVHSX_1_TX1
NVHSX_1_TX2 A43 NVHSX_1_TX2
NVHSX_1_TX2 A42 NVHSX_1_TX2
NVHSX_1_TX3 A40 NVHSX_1_TX3
NVHSX_1_TX3 A39 NVHSX_1_TX3

NVHS_REFCLK_IN B11 NVHS_REFCLK_IN
NVHS_REFCLK_IN B12 NVHS_REFCLK_IN
EXT_REFCLK A4
NVHS_PRSNT B3
I2CB_SCL B7
I2CB_SDA A8
NC A11
NC A12
SWAPRDY_IN A9
RASTERSYNCH1 B8

3V3_PROT
3V3_PWR1 B5
3V3_PWR2 B6
12V_PWR B2
12V_PWR A2

A1 ADDR
A6 PWR_EN
B9 PEX_RST_BUF*

PEX_RST_BUF* 3,73
R5007 10k 1% 0402 COMMON
LED_PEX_RST
R5008 10k 1% 0402 COMMON
NVHS_PWR_EN
NVHS_ADDR
R5009 0ohm 0.05 ohm 0402 COMMON
R1922 10k 1% 0402 COMMON

GND B38 GND B35 GND B32 GND B29 GND B26 GND B25 GND B22 GND B19 GND B16 GND B13 GND B62 GND B10 GND B4 GND B1 GND A62 GND A59 GND A56 GND A53 GND A50 GND A47 GND A44 GND B59 GND A41 GND A38 GND A35 GND A32 GND A29 GND A28 GND A25 GND A22 GND A19 GND A16 GND B56 GND A13 GND A10 GND A7 GND A5 GND A3 GND B53 GND B50 GND B47 GND B44 GND B41

GND

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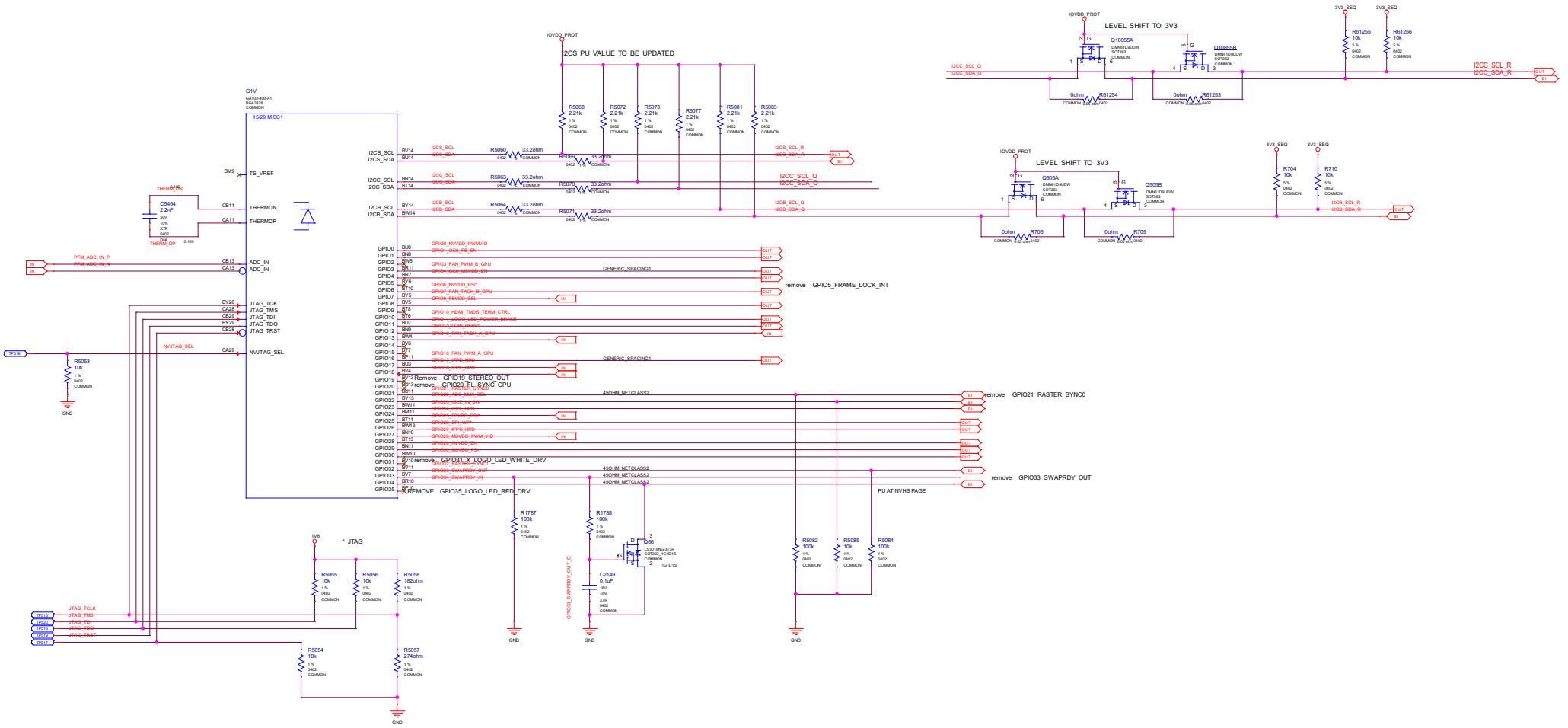
MISC1: Fan, Thermal, JTAG, GPIO, STEREO



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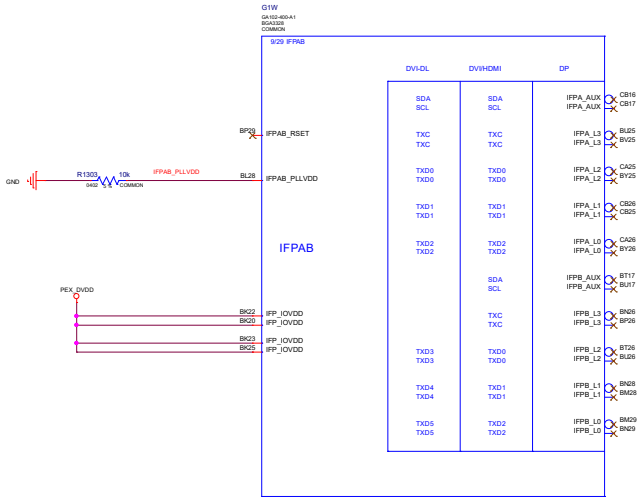
IFPA UNUSED, IFPB UNUSED



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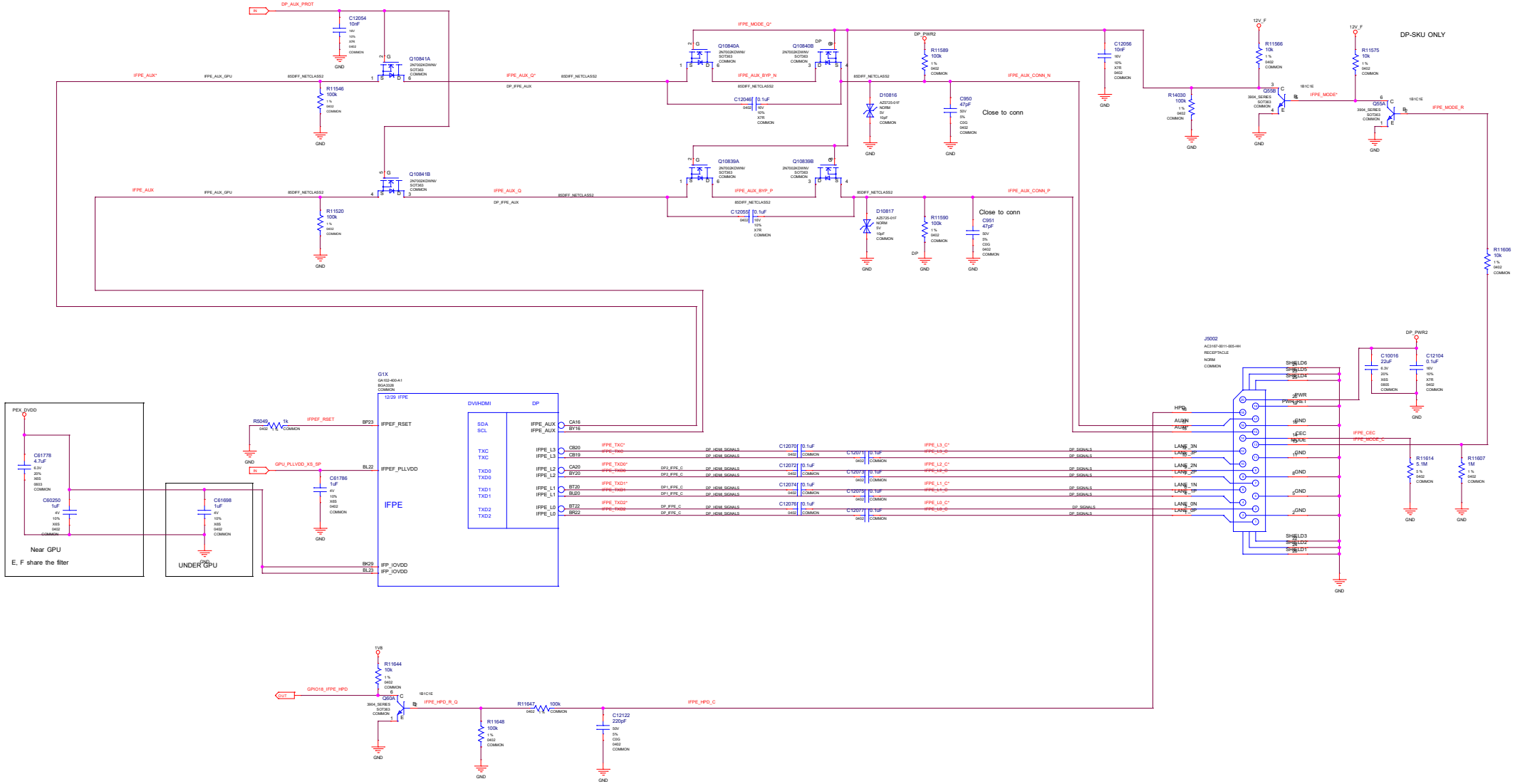
IFPE DP



20ci203T

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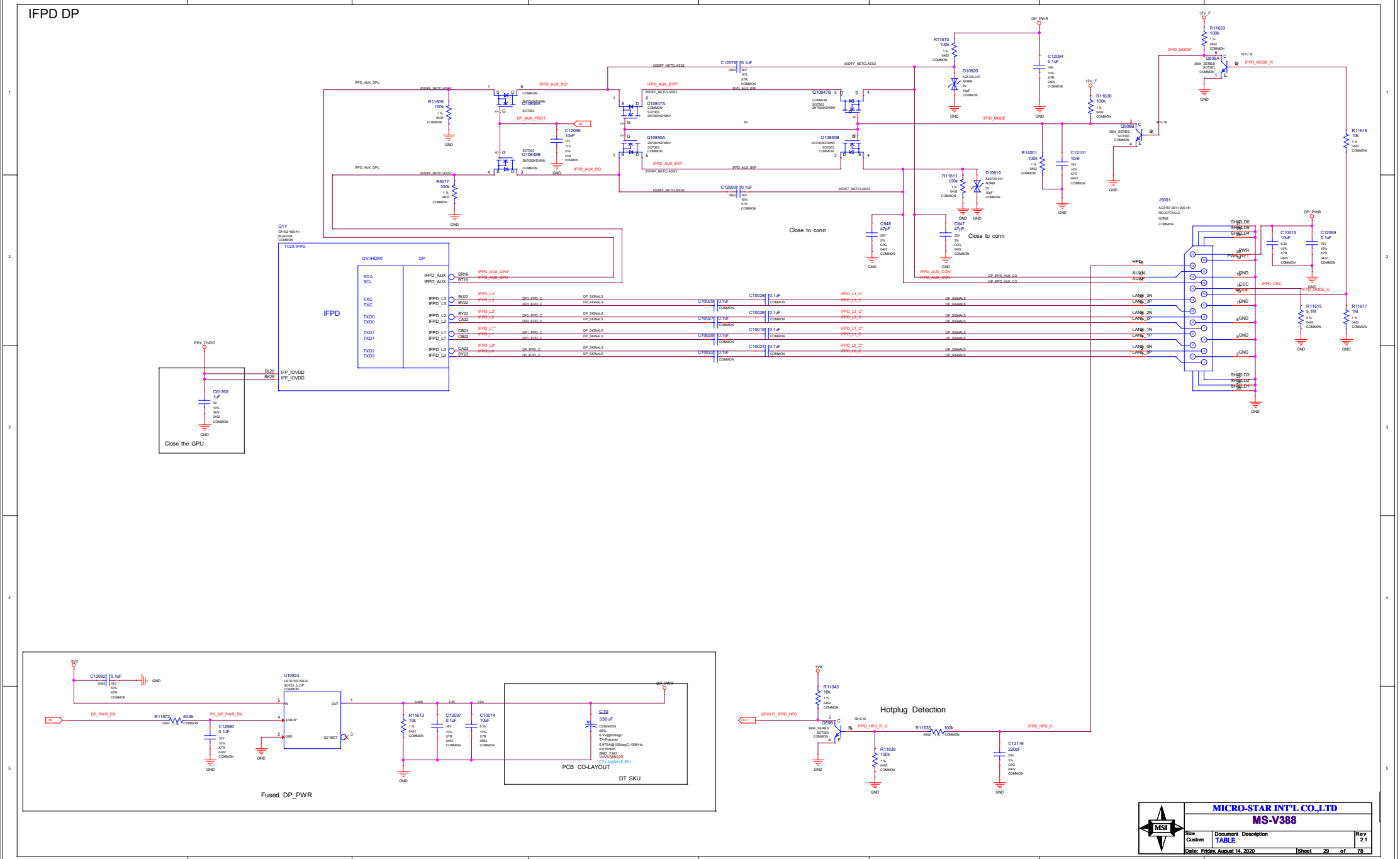
IFPD DP



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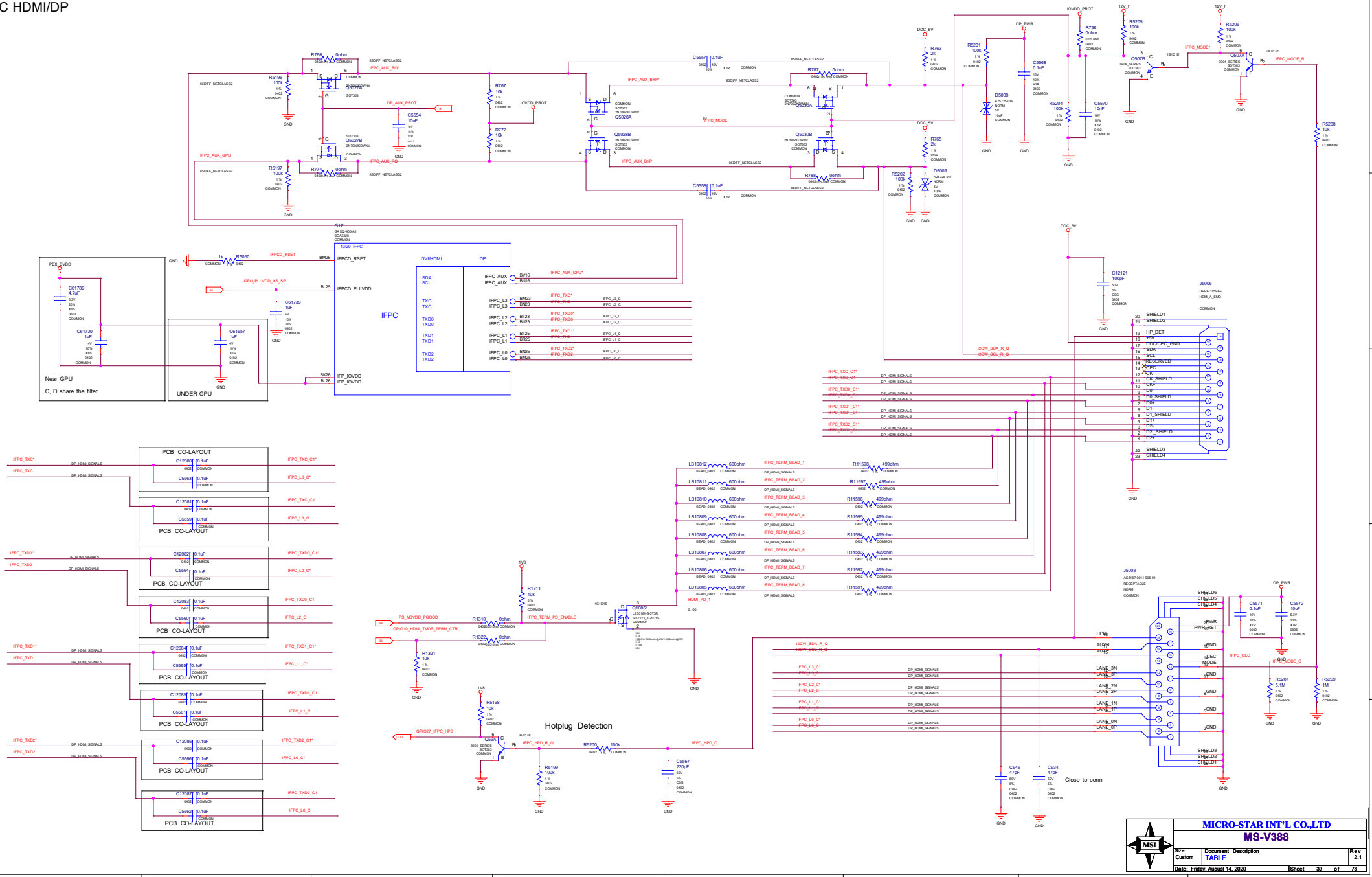
IFPC HDMI/DP


IFPC
DVI/HDMI
DP
Near GPU
C, D share the filter
UNDER GPU
Hotplug Detection
Close to conn
PCB CO-LAYOUT
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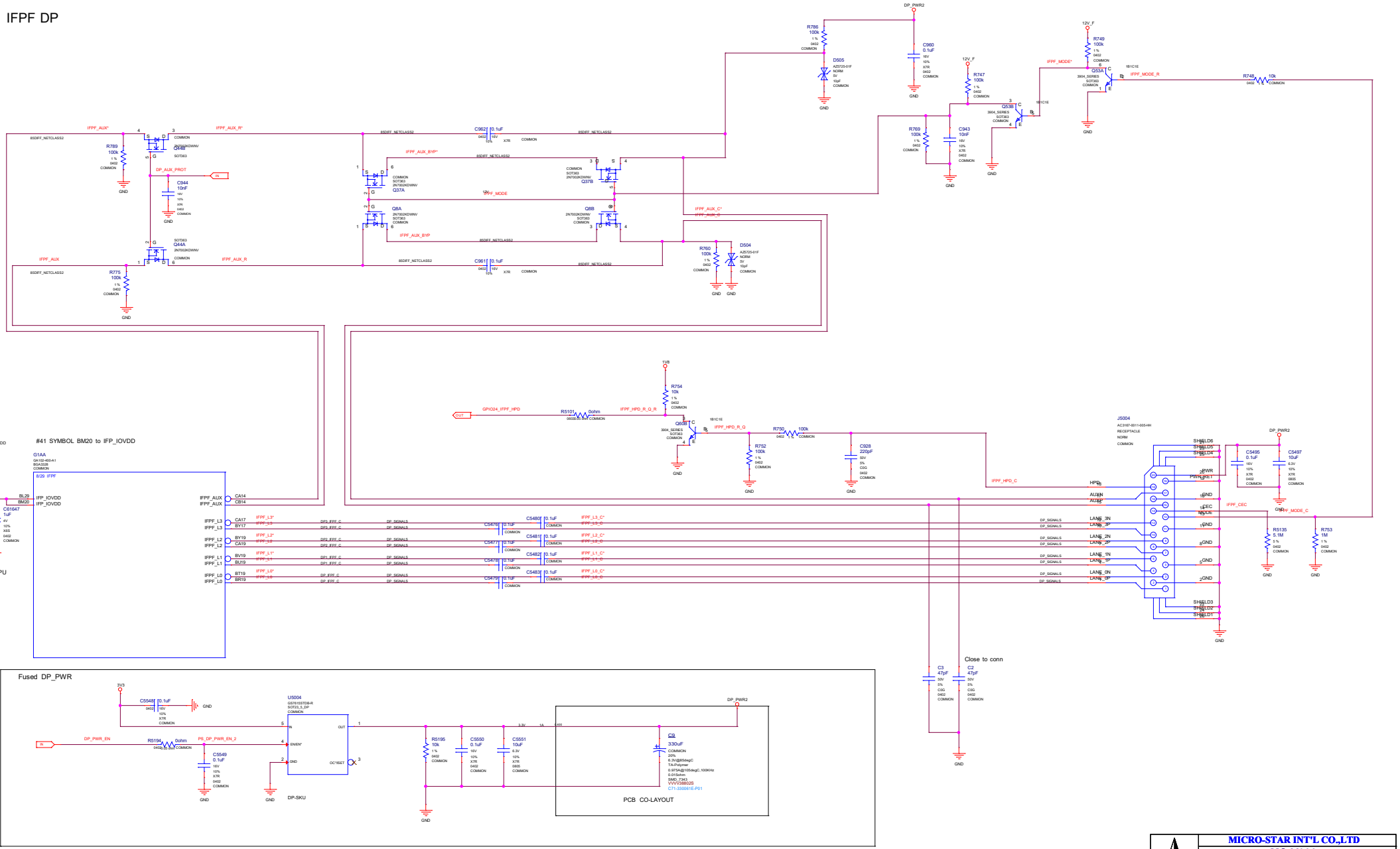
IFPF DP



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MISC: ROM, Straps

STRAP2	STRAP1	STRAP0	RAMCFG[4:0]	
L	L	L	00000	RAMCFG MICRON 8Gb 19Gbps
L	H	L	00010	RAMCFG TBD
H	L	L	00100	RAMCFG TBD
H	L	L	00101	RAMCFG TBD
H	L	H	00101	RAMCFG MICRON 8Gb 21Gbps

DEFAULT

H=High :Tied to 1.8V
M=Middle:Tied to 0.9V
L=Low :Tied to 0V

ROM_SO	ROM_SI	ROM_SCLK	SMARTFAN[2:0],FS_OVERT	1:ENABLE 0:DISABLE
H	H	H	0111	FS_OVERT ENABLE
L	L	L	0000	FS_OVERT DISABLE

DEFAULT

STRAP5	STRAP4	STRAP3	SMB_ALT_ADDR	DEVID_SEL	PCIE_CFG	VGA_DEVICE
M	H	H	1	1	1	1
M	H	L	1	H 1	1	0
M	L	H	1	1	0	1
M	L	L	1	1	0	0
L	H	M	1	0	1	1
L	M	H	1	0	1	0
L	M	L	1	0	0	1
L	L	M	1	0	0	0
H	H	H	0	1	1	1
H	H	L	0	1	1	0
H	L	H	0	1	0	1
H	L	L	0	1	0	0
L	H	H	0	0	1	1
L	H	L	0	0	1	0
L	L	H	0	0	0	1
L	L	L	0	0	0	0

Default

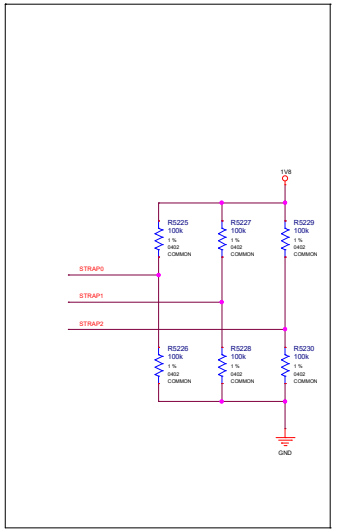
1:SMB_ALT_ADDR ENABLE
0:SMB_ALT_ADDR DISABLE

1:DEVID_SEL REBRAND
0:DEVID_SEL ORIGNAL

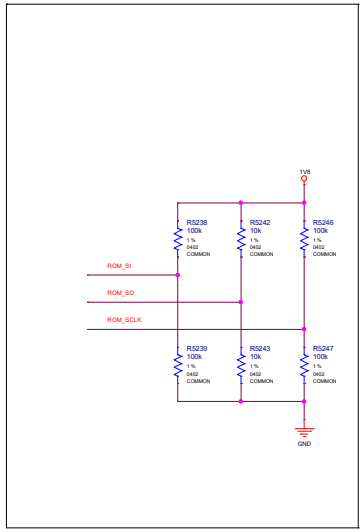
1:PCIE_CFG LOW POWER
0:PCIE_CFG HIGH POWER

1:VGA_DEVICE ENABLE
0:VGA_DEVICE DISABLE

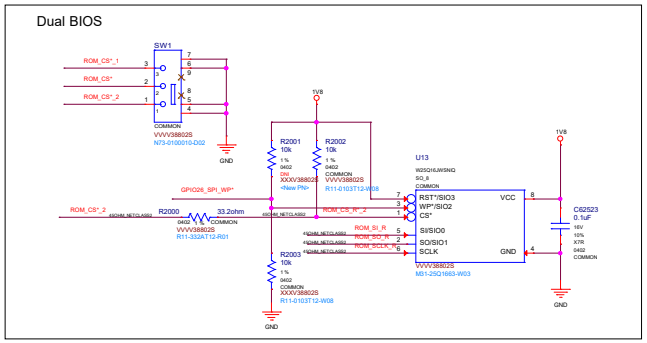
GROUP0



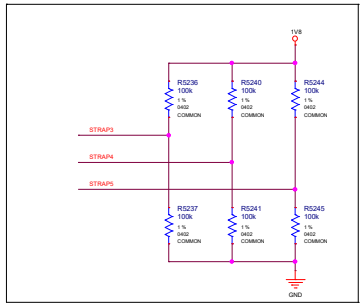
GROUP1

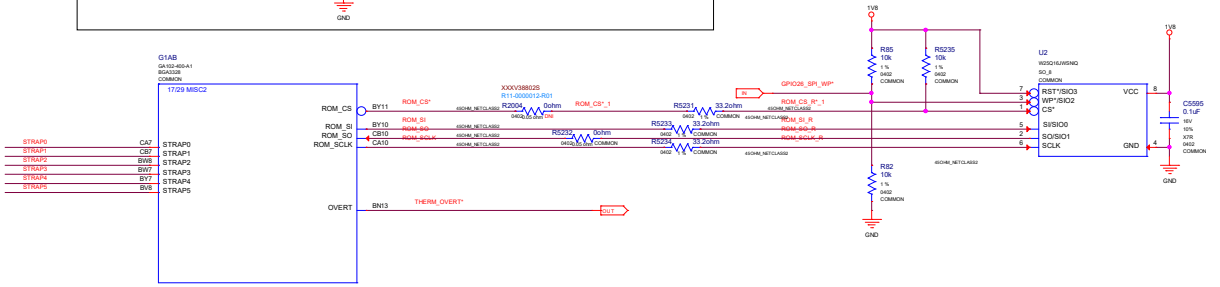


Dual BIOS



GROUP2





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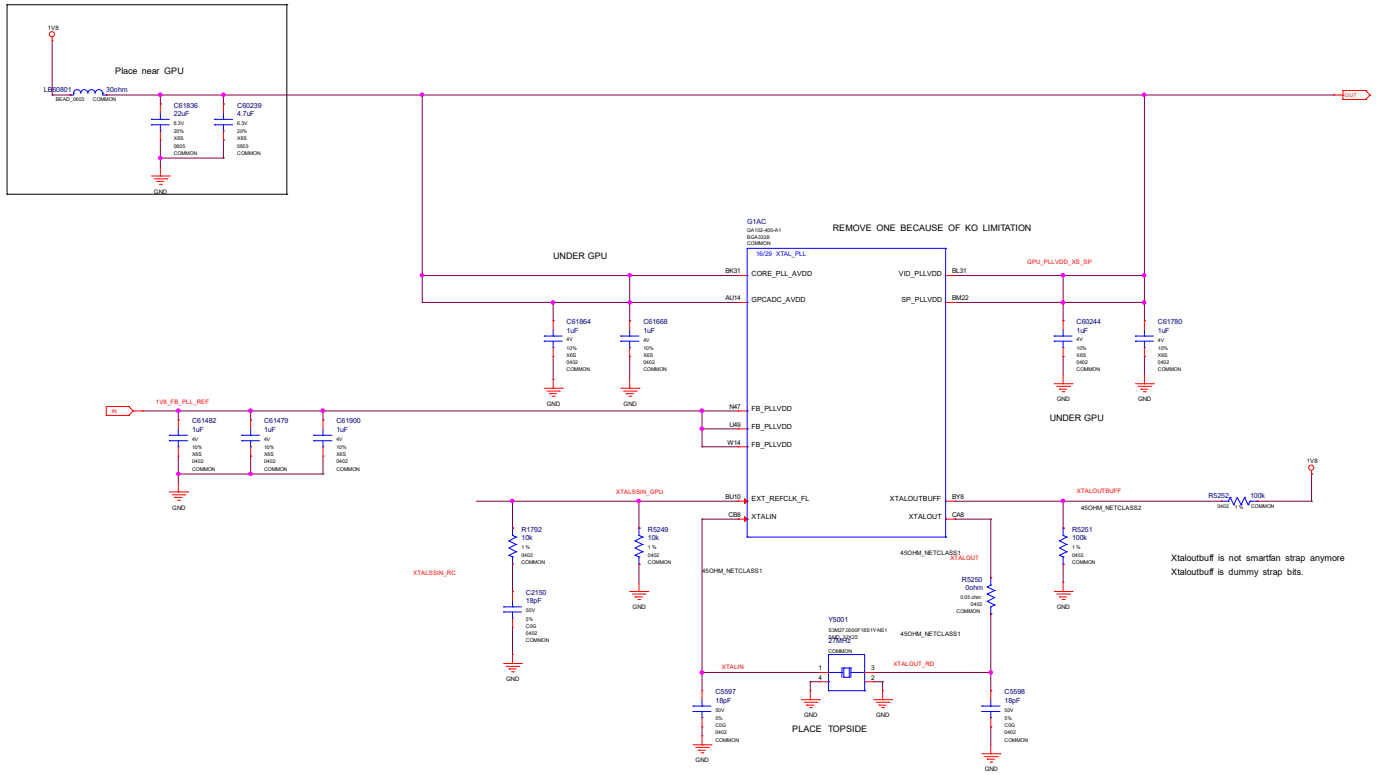
MISC: XTAL. PLL



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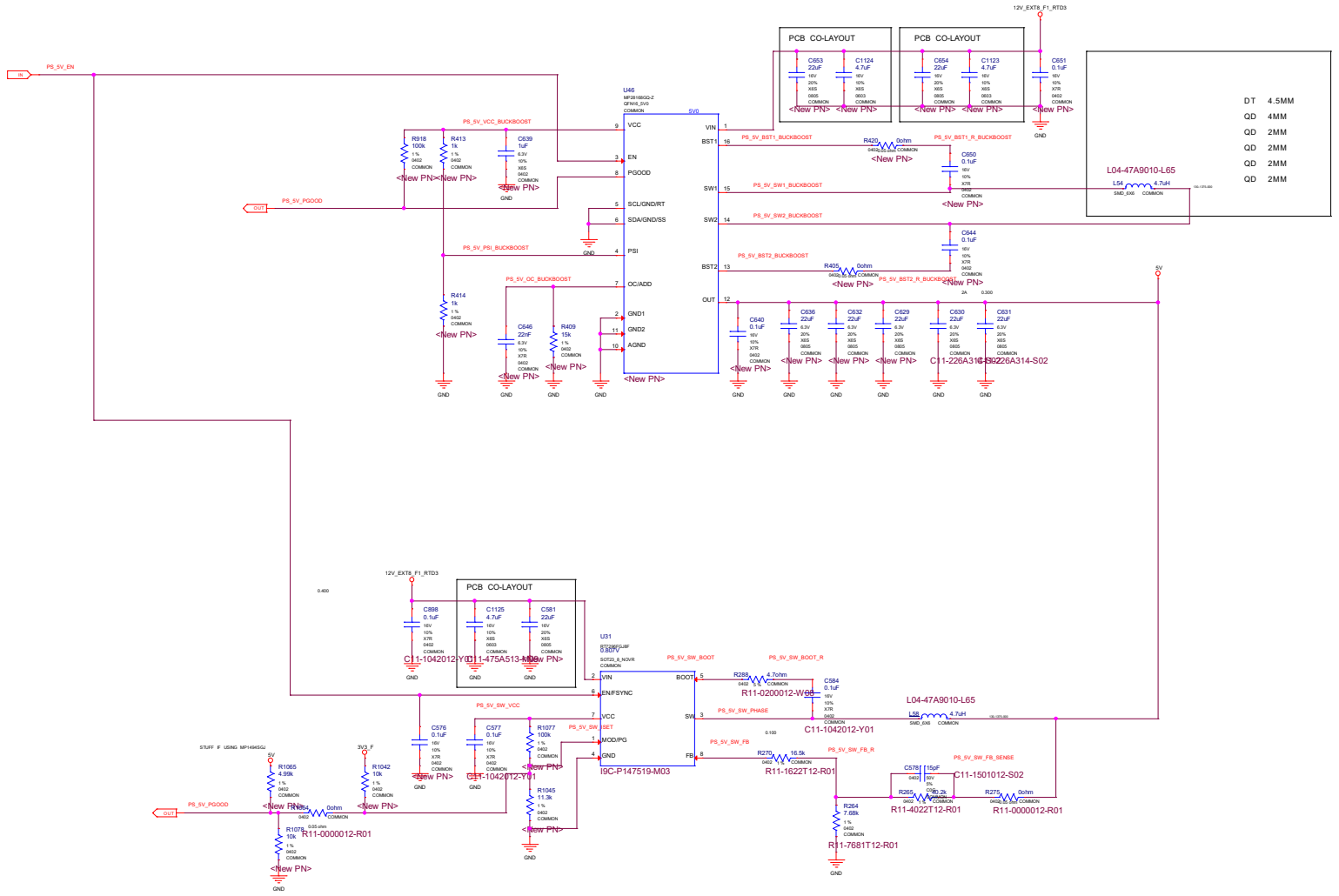
PS: 5V, 5V_BACKUP



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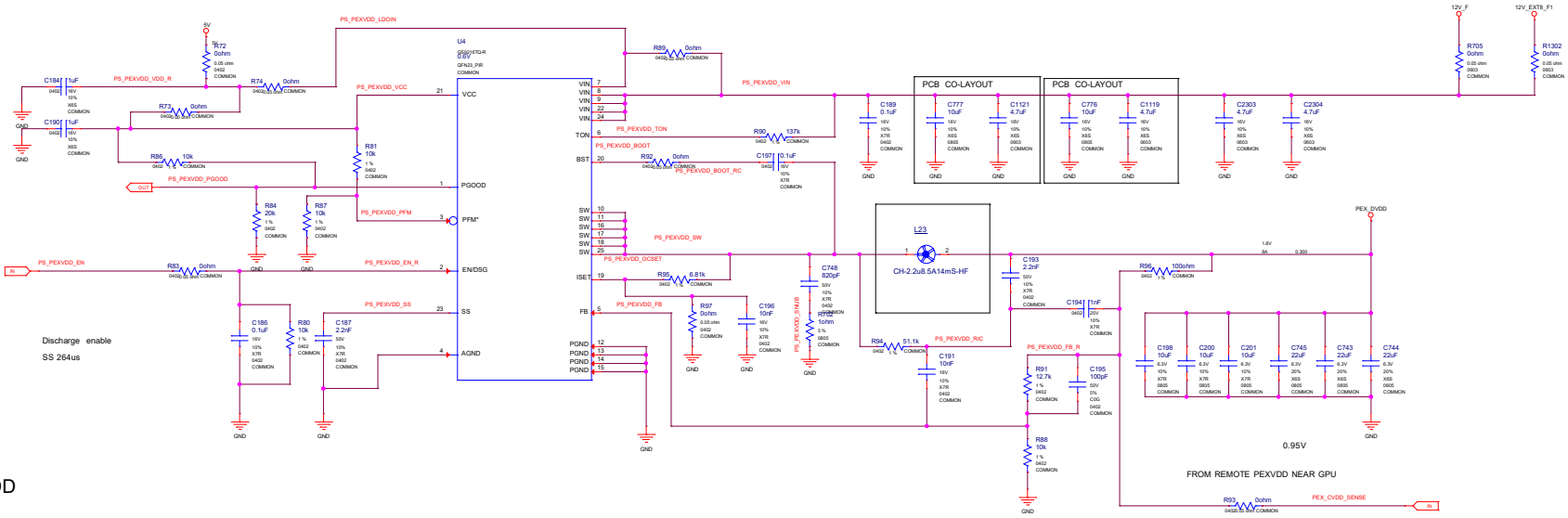
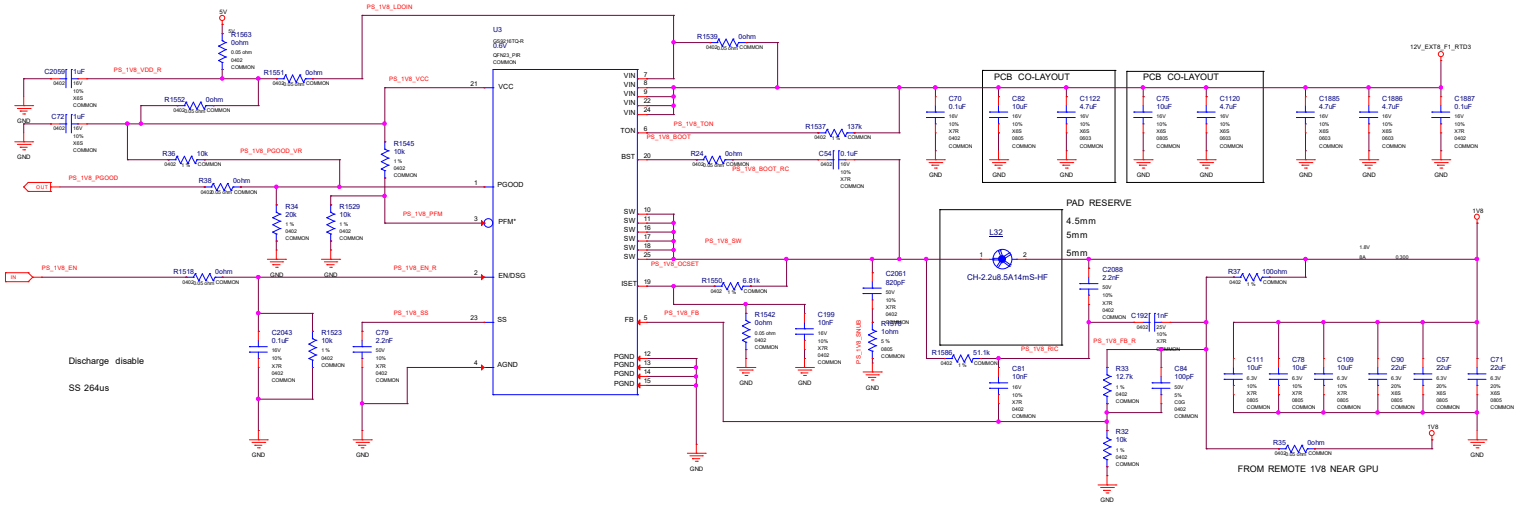
PS: PEX_DVDD 1V8 Rail



PEX_DVDD



1V8

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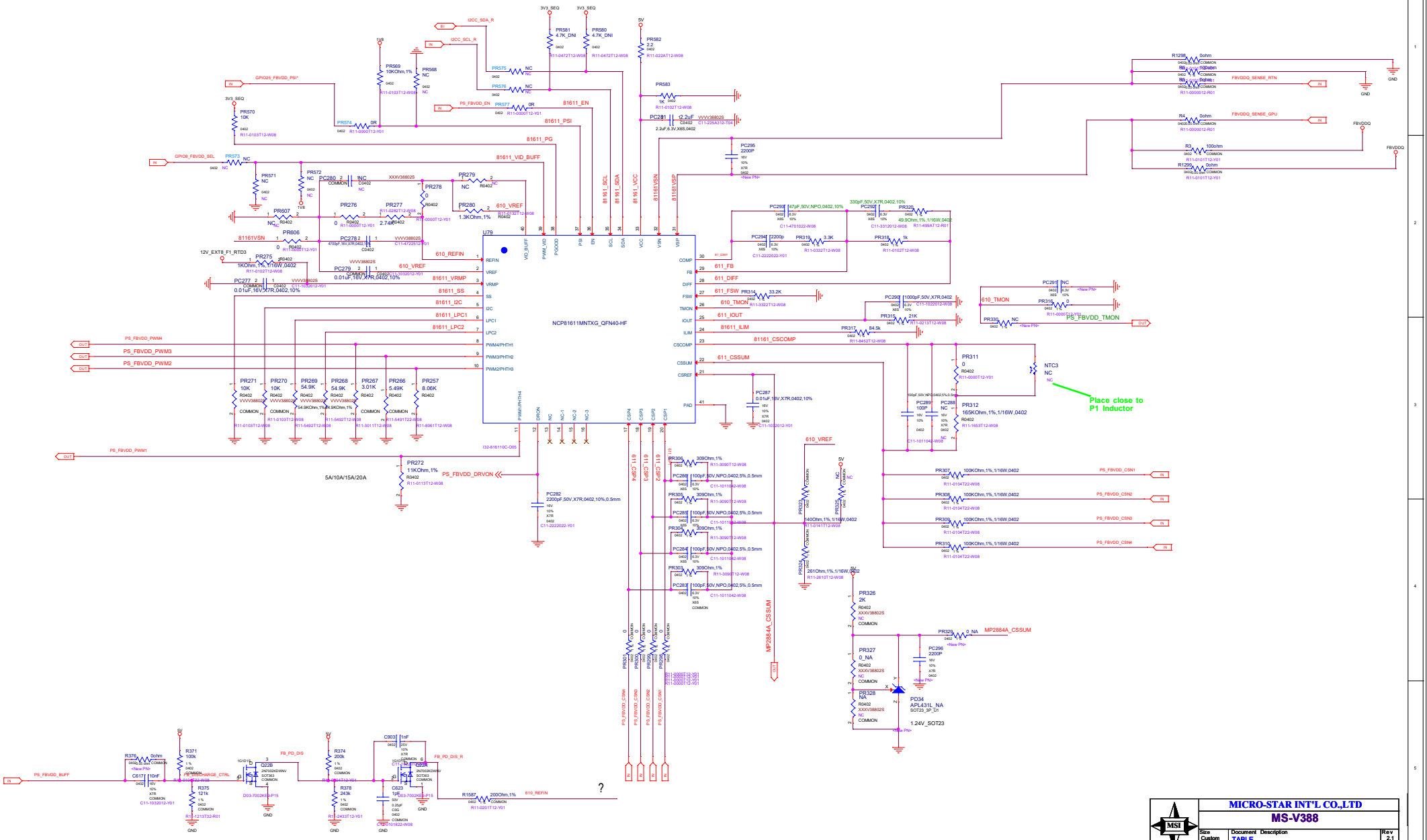

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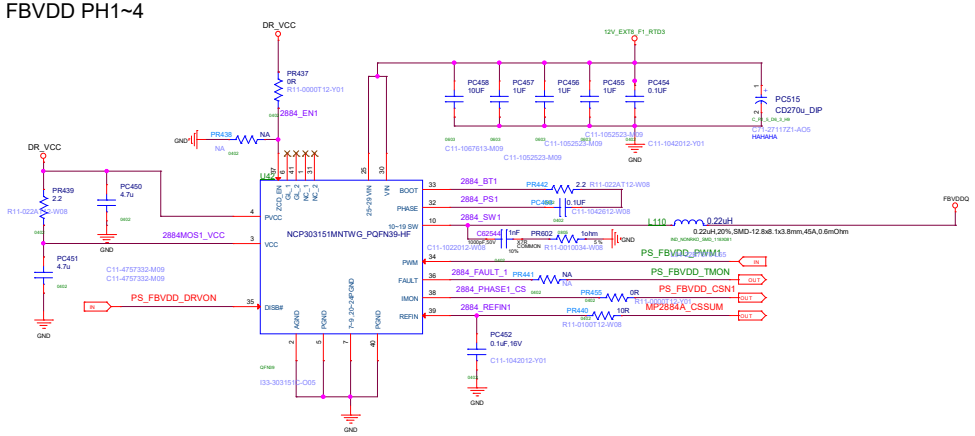
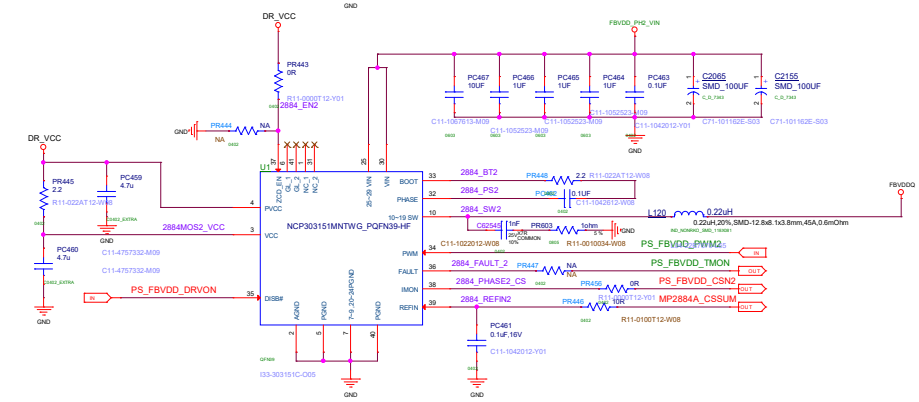
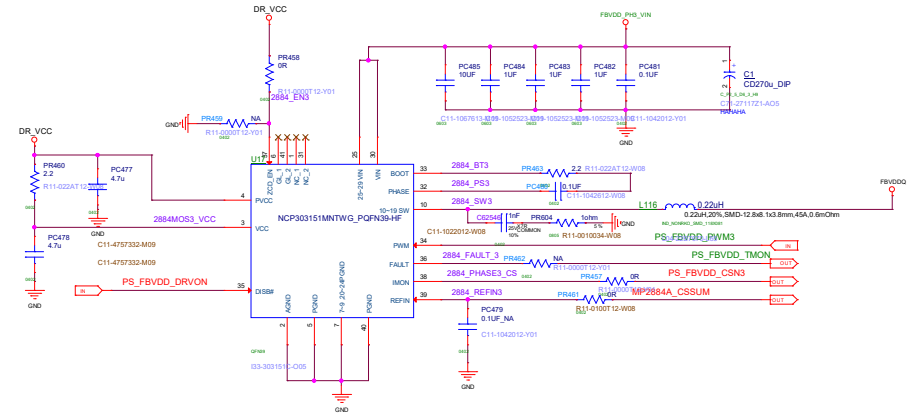
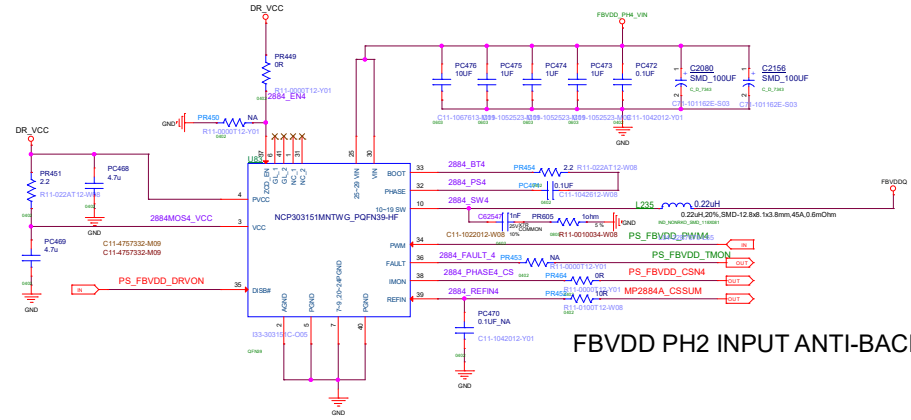
PS: FBVDD PH1~4

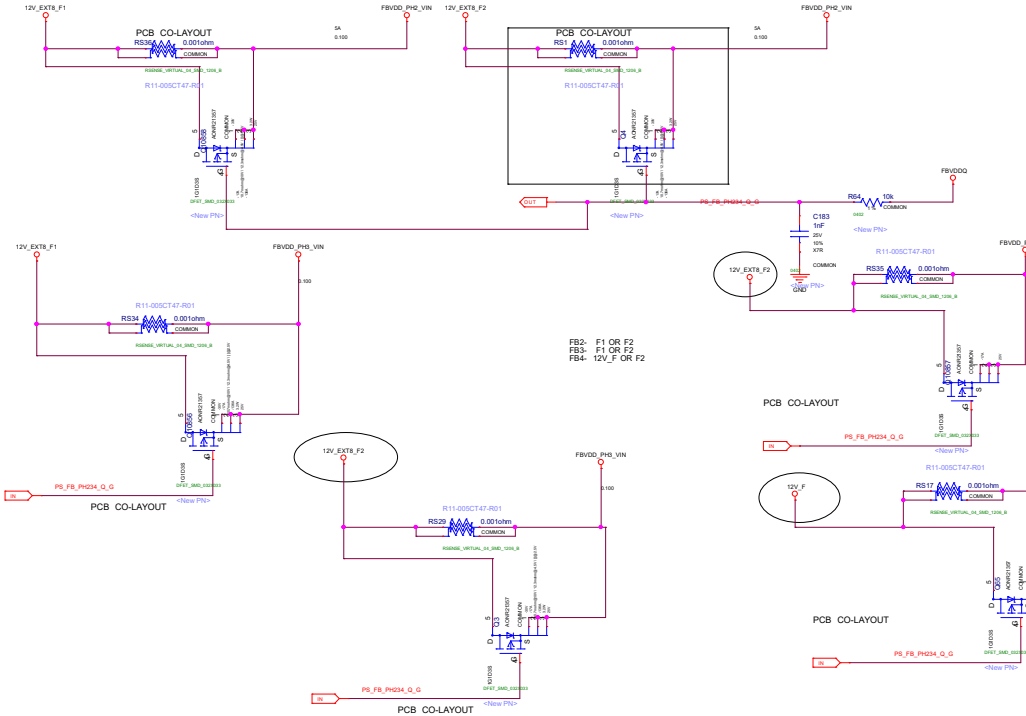








FBVDD PH2 INPUT ANTI-BACKDRIVE



FBVDD PH3 INPUT ANTI-BACKDRIVE

FBVDD PH3 INPUT ANTI-BACKDRIVE

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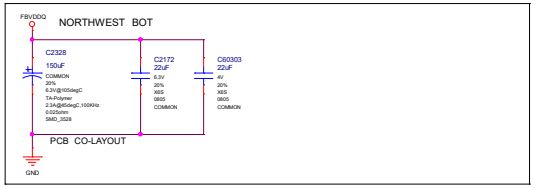
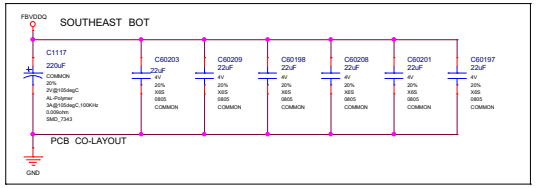
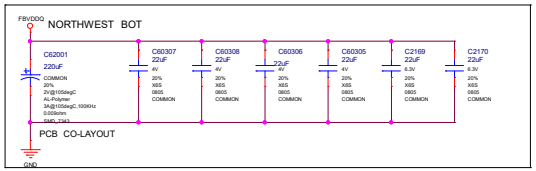
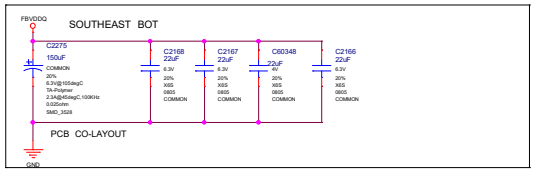
PS: FBVDD OUTPUT CAP

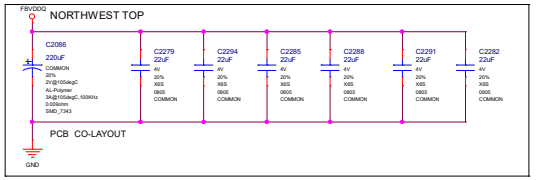
REFER TO PCB FOR BOM STUFFING

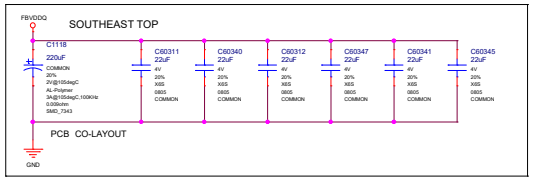


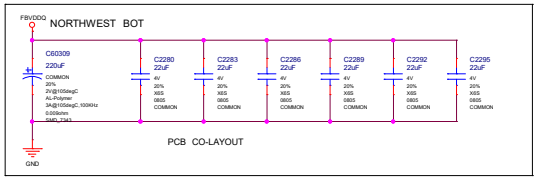


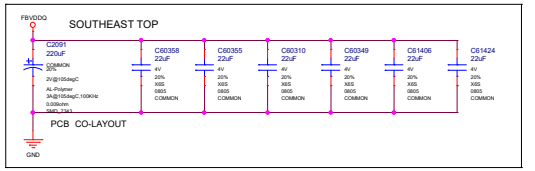


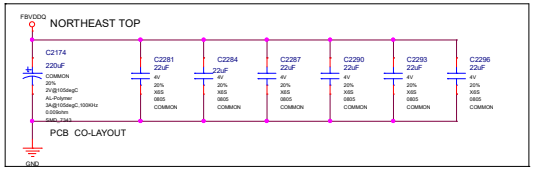


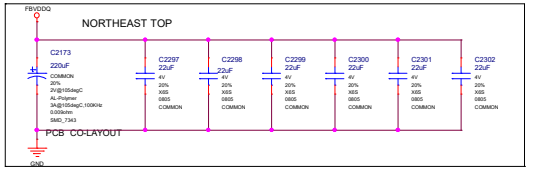


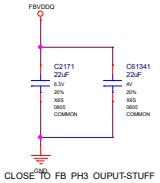




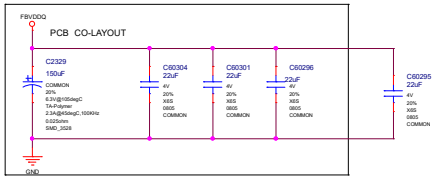








CLOSE TO FB PH3 OUPUT-STUFF



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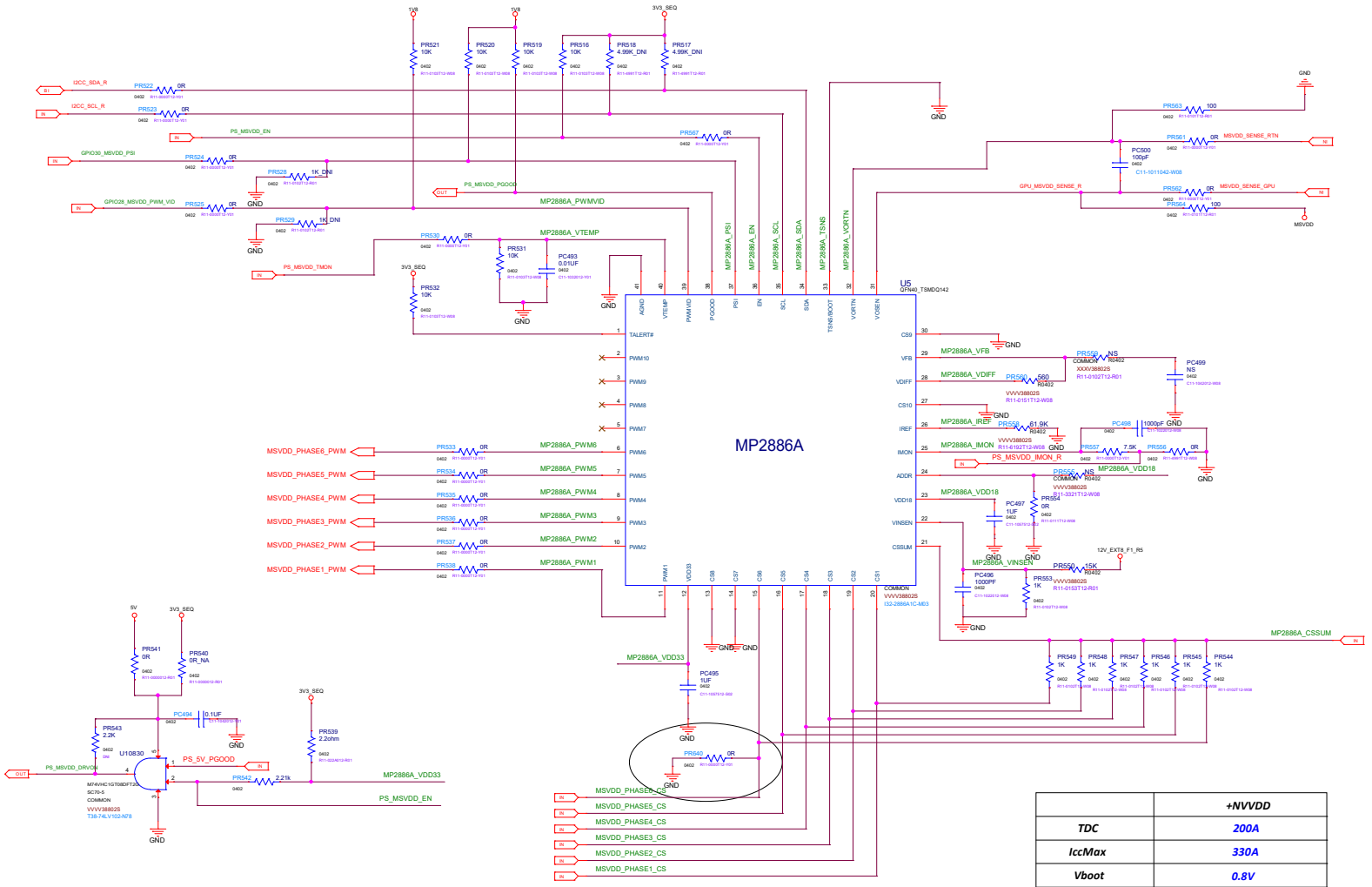

EN Type	R3
Open Drain	10k
Push Pull	NS

PSI	Mode
High	High Phase Count
Hi-Z	Auto Power Mode
Low	Low Phase Count

PWMVID	Vout
High	VID in 24h
Hi-Z	VID in 21h
Low	VID in 1Fh

PMBus Address	Setting Point(V)	R_{ADDR1} (kΩ) 1%	R_{ADDR2} (kΩ) 1%
20h	0	-	0
21h	0.031	3.32	0.059
22h	0.057	3.32	0.11
23h	0.084	3.32	0.162
24h	0.116	3.32	0.226
25h	0.156	3.32	0.316
26h	0.205	3.32	0.43
27h	0.266	3.32	0.576
28h	0.340	3.32	0.768
29h	0.430	3.32	1.05
2Ah	0.540	3.32	1.43
2Bh	0.675	3.32	2
2Ch	0.844	3.32	2.94
2Dh	1.048	3.32	4.64
2Eh	1.301	3.32	8.66
2Fh	1.500	3.32	16.5

	+NVVDD
TDC	200A
IccMax	330A
Vboot	0.8V
Load Line	0mohm

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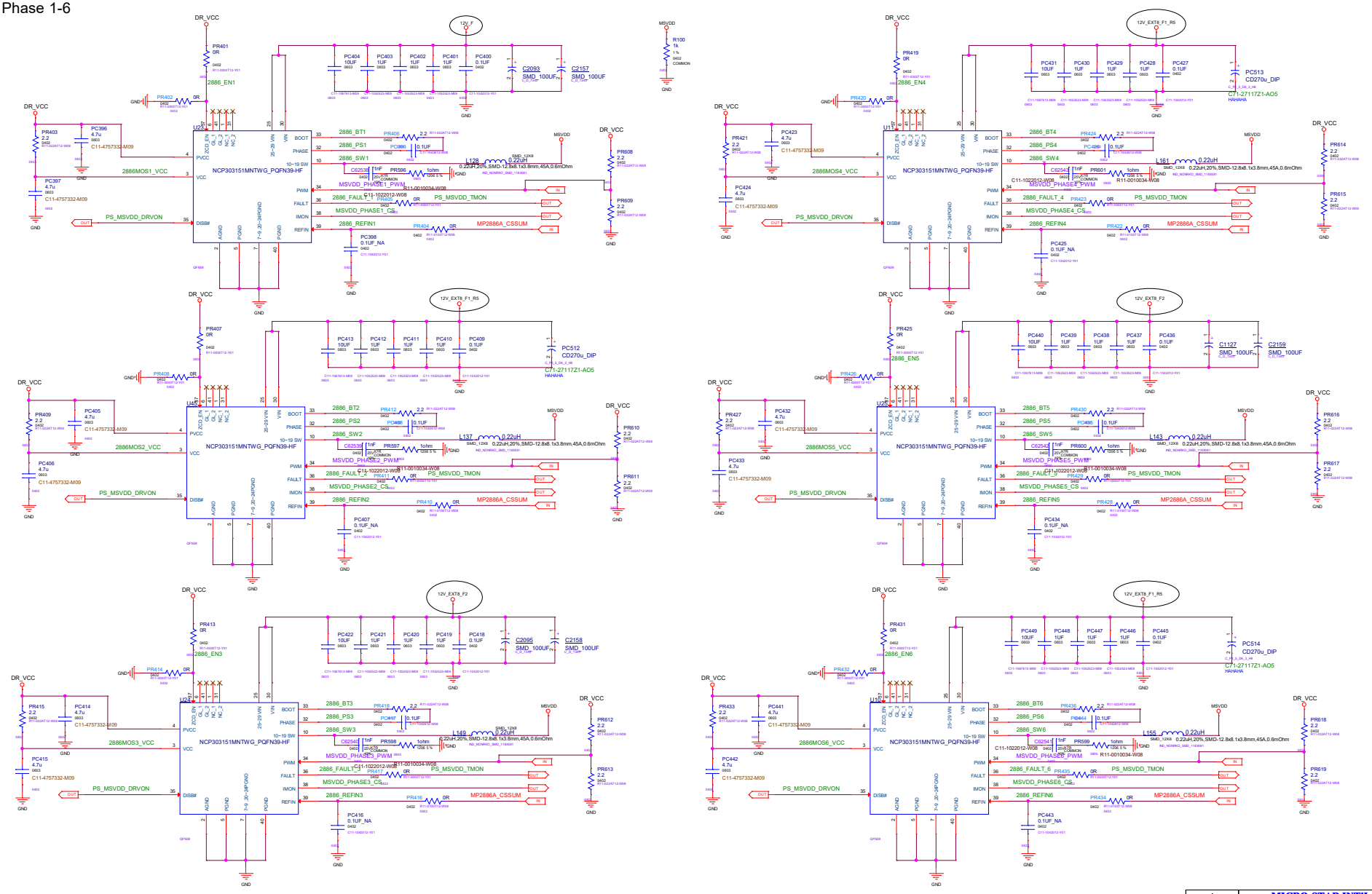
MSVDD Phase 1-6



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PS:MSVDD OUTPUT CAP (TOP)

IMPLIED WARRANTIES INCLUDING, WITHOUT LIMITATION, THE WARRANTIES OF DESIGN, OF NONINFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, OR ARISING FROM A COURSE OF DEALING, TRADE USAGE, TRADE PRACTICE, OR INDUSTRY STANDARDS.

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DATE

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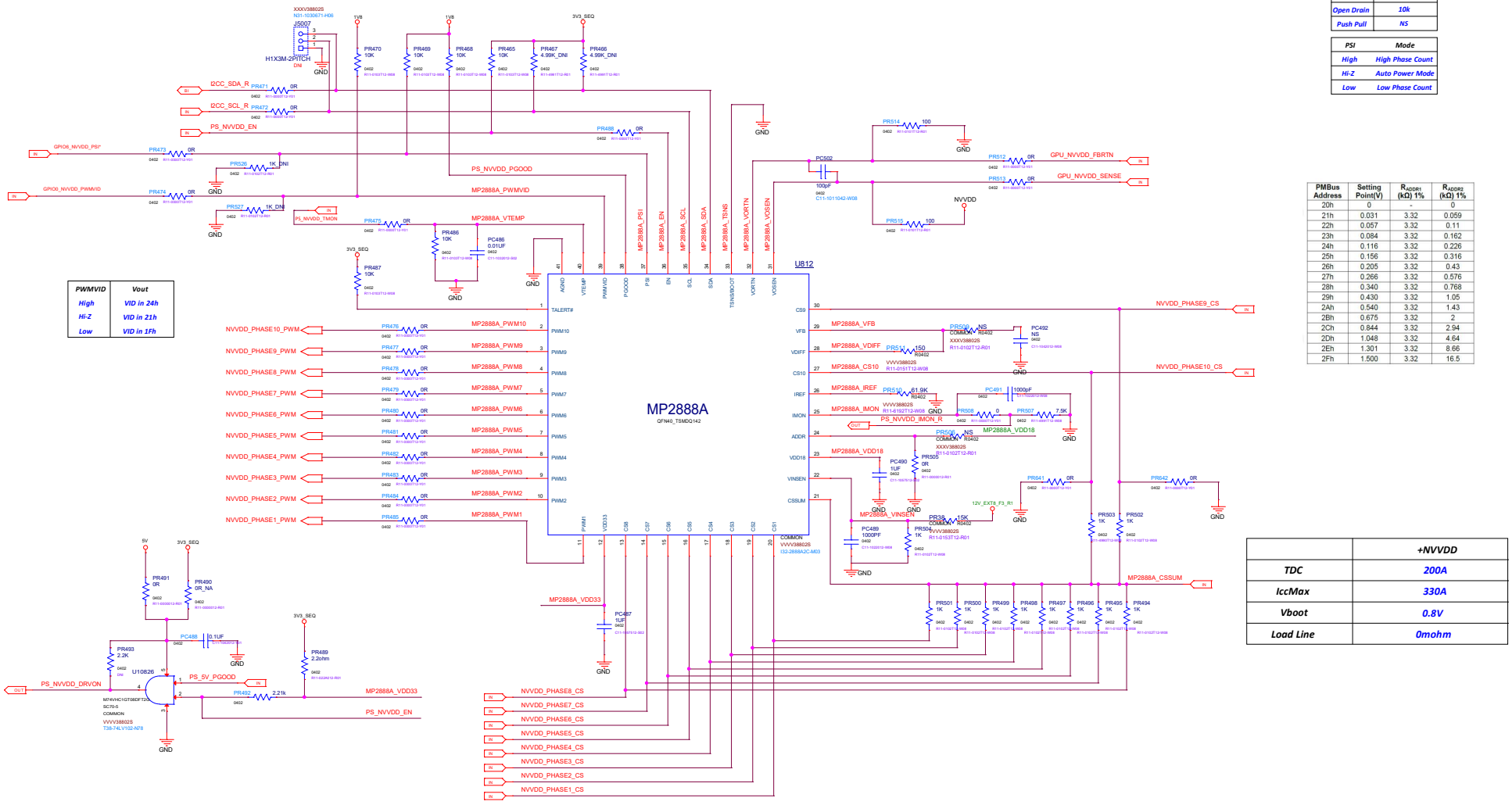
PS: NVVDD Controller_OVR8



EN Type	R3
Open Drain	10k
Push Pull	NS

PSI	Mode
High	High Phase Count
Hi-Z	Auto Power Mode
Low	Low Phase Count

PMBus Address	Setting Point(V)	R_{ADDR1} (kΩ) 1%	R_{ADDR2} (kΩ) 1%
20h	0		
21h	0.031	3.32	0.059
22h	0.057	3.32	0.11
23h	0.084	3.32	0.162
24h	0.116	3.32	0.226
25h	0.156	3.32	0.316
26h	0.205	3.32	0.43
27h	0.266	3.32	0.576
28h	0.340	3.32	0.768
29h	0.430	3.32	1.05
2Ah	0.540	3.32	1.43
2Bh	0.675	3.32	2
2Ch	0.844	3.32	2.94
2Dh	1.048	3.32	4.64
2Eh	1.301	3.32	8.66
2Fh	1.500	3.32	16.5

PWMVID	Vout
High	VID in 24h
Hi-Z	VID in 21h
Low	VID in 1Fh

	+NVVDD
TDC	200A
IccMax	330A
Vboot	0.8V
Load Line	0mohm

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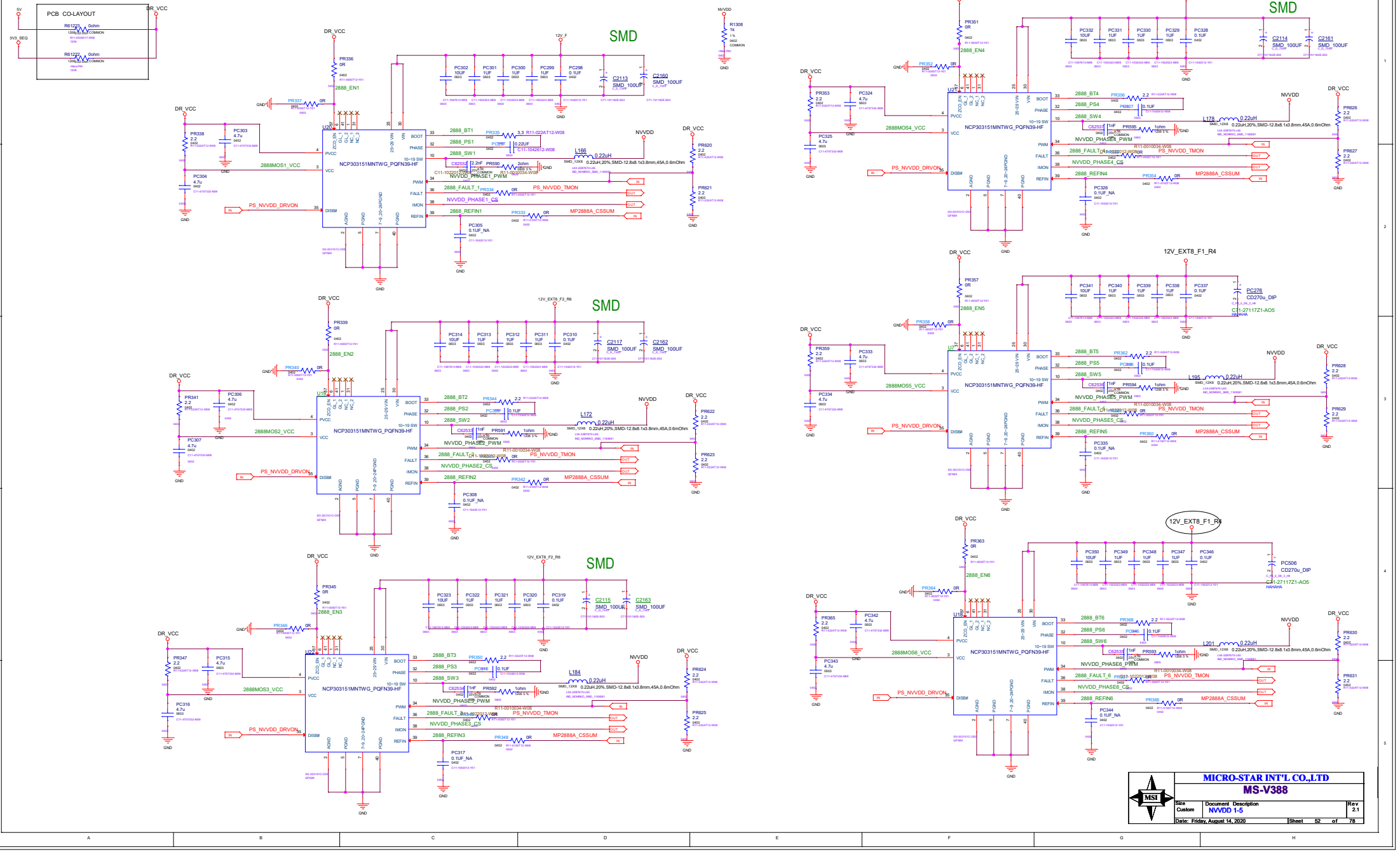
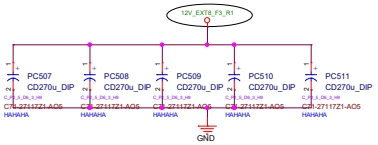
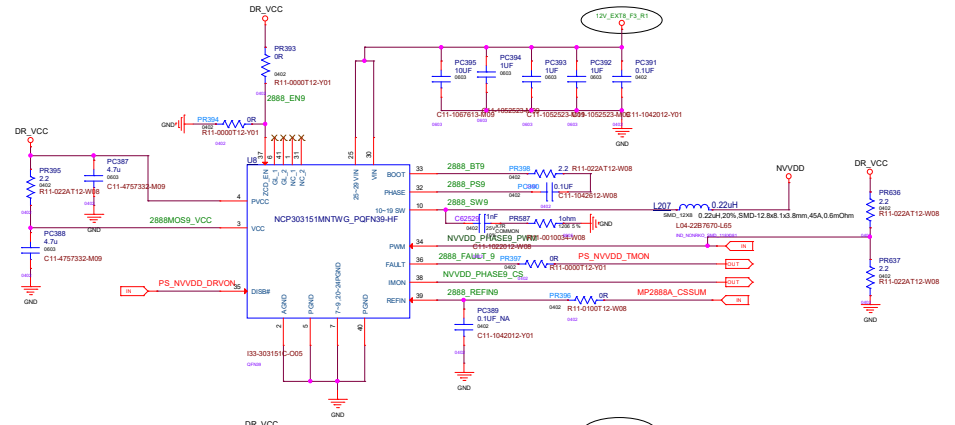
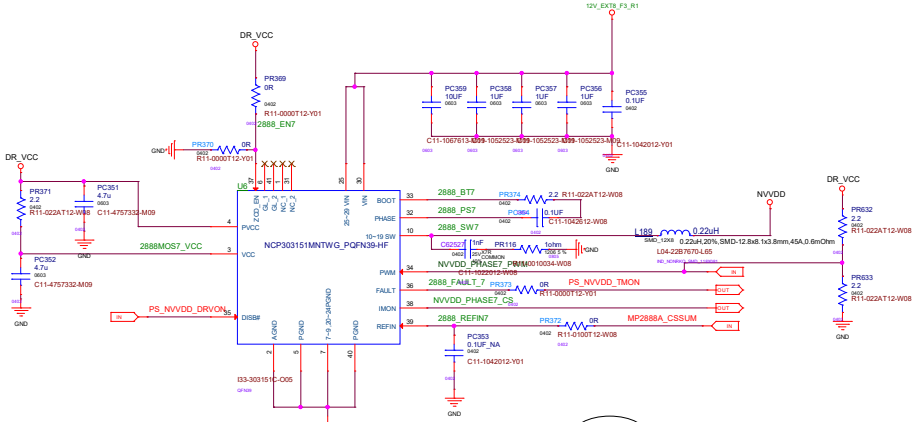
PS: NVVDD Phase 1

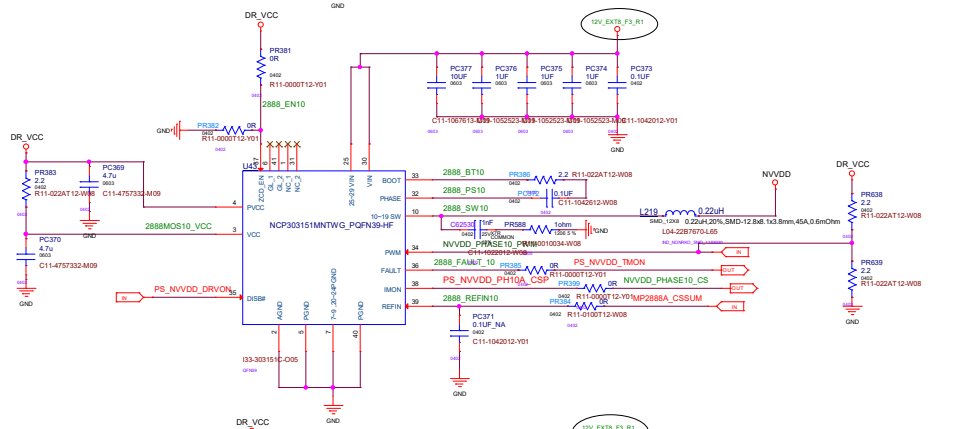


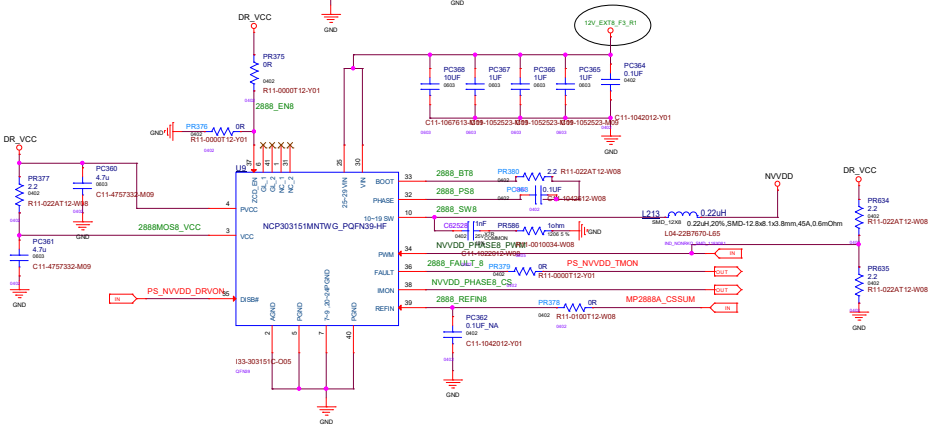
Page36: PS: NVVDD Phase 7-11

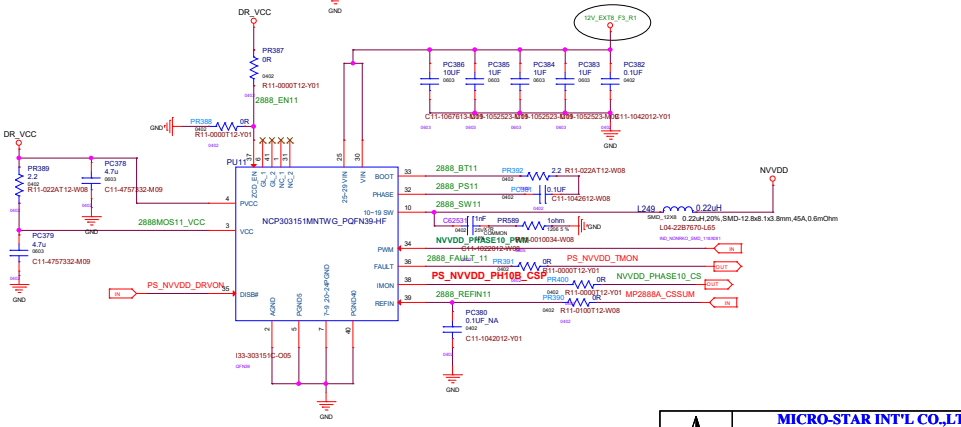












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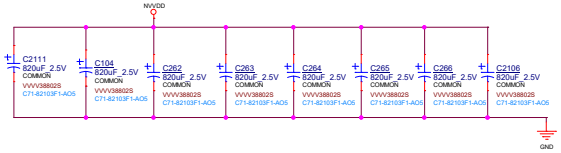
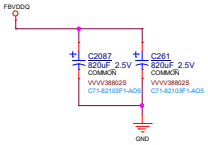
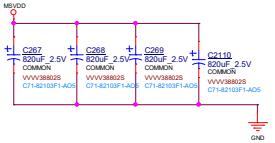
PS: NVVDD OUTPUT CAP(TOP)







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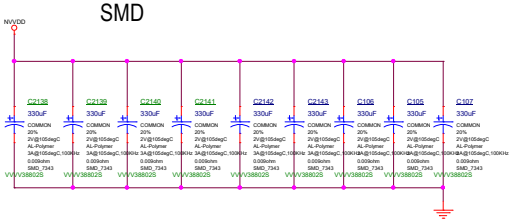

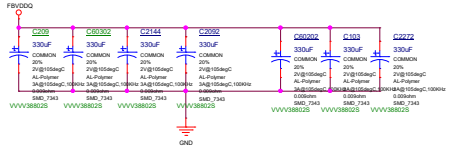

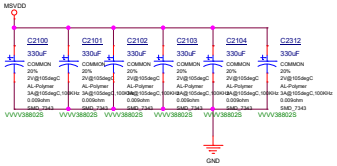

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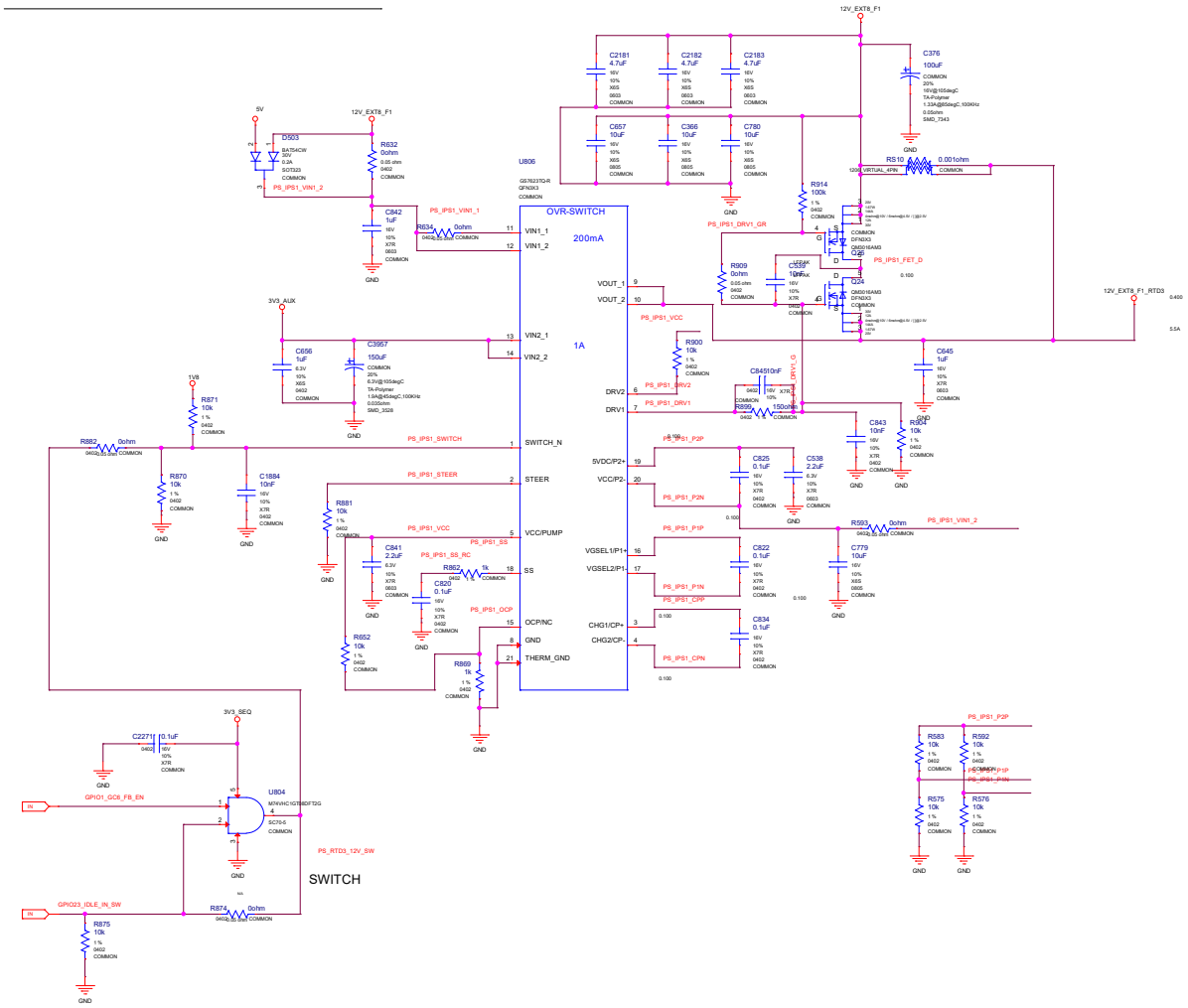
PS: INPUT SWITCH RTD3

AND GATE LOGIC FOR P-BOARD

GPIO1	GPIO23	SWITCH	VOUT
0	0	0	12V_F
0	1	0	12V_F
1	0	0	12V_F
1	1	1	3V3A



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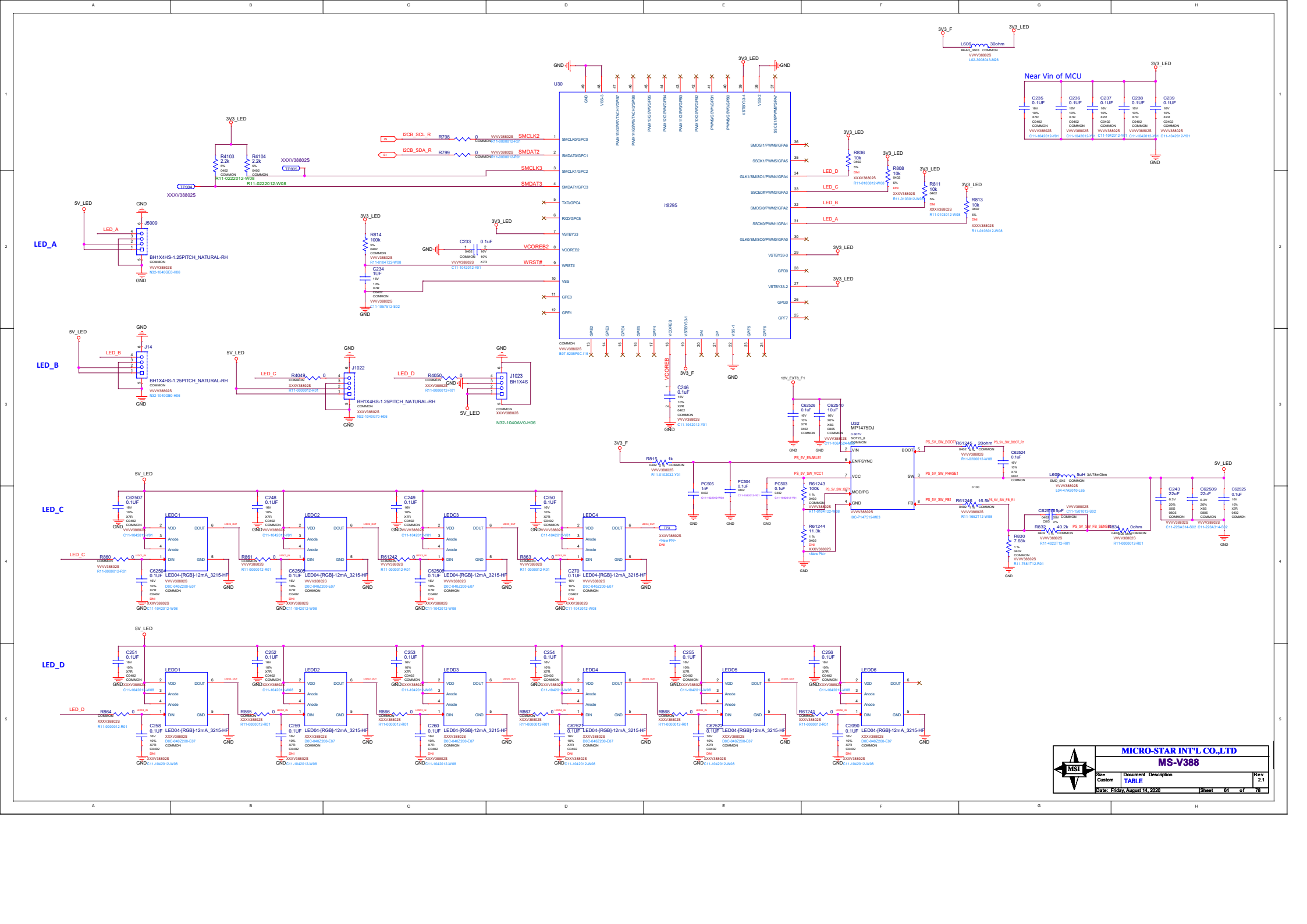
LED_A
LED_B
LED_C
LED_D
Near Vin of MCU
i8295
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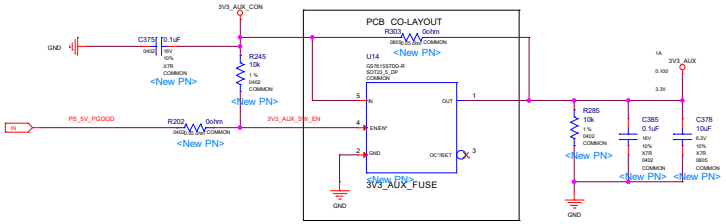
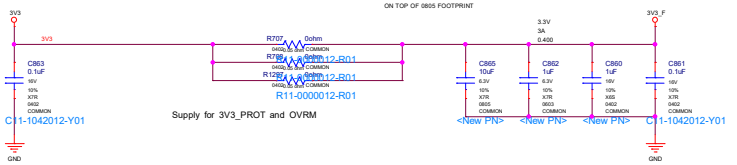
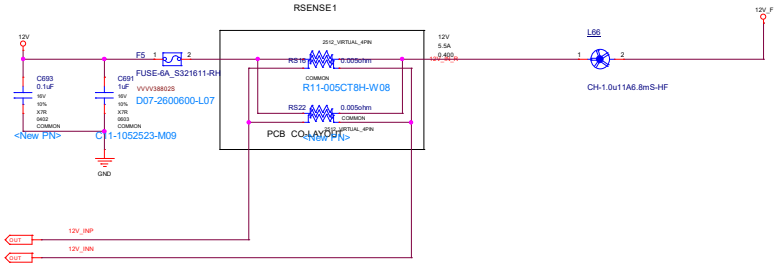
PS: Inputs, Filtering, and Monitoring



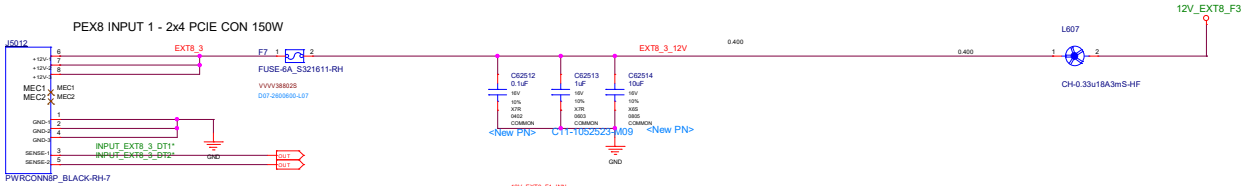
PEX 3V3 INPUT - 10W



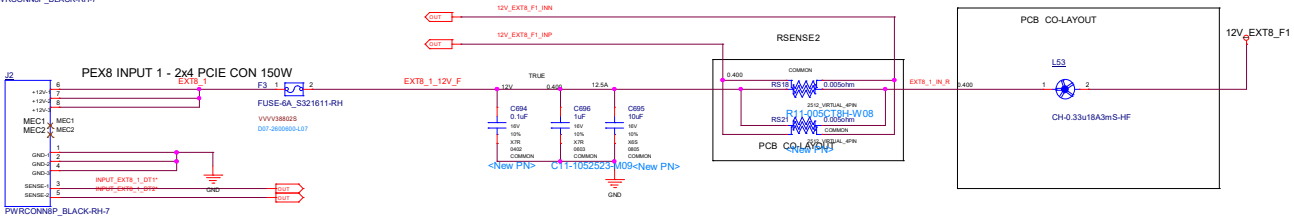
PEX_12V INPUT - 66W



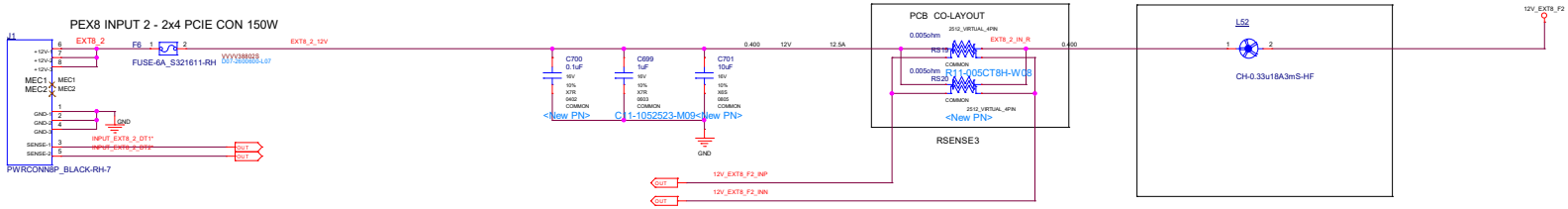
PEX8 INPUT 1 - 2x4 PCIE CON 150W



PEX8 INPUT 1 - 2x4 PCIE CON 150W



PEX8 INPUT 2 - 2x4 PCIE CON 150W



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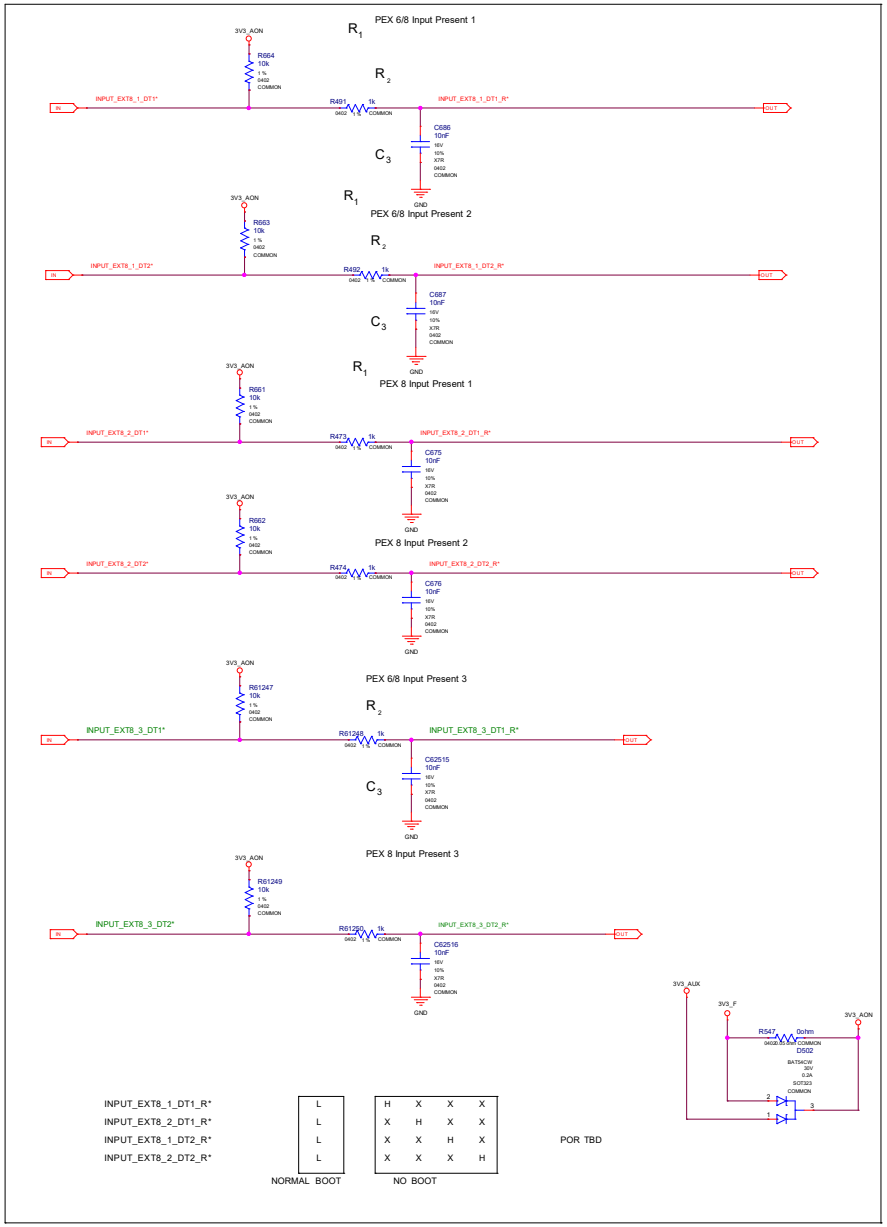
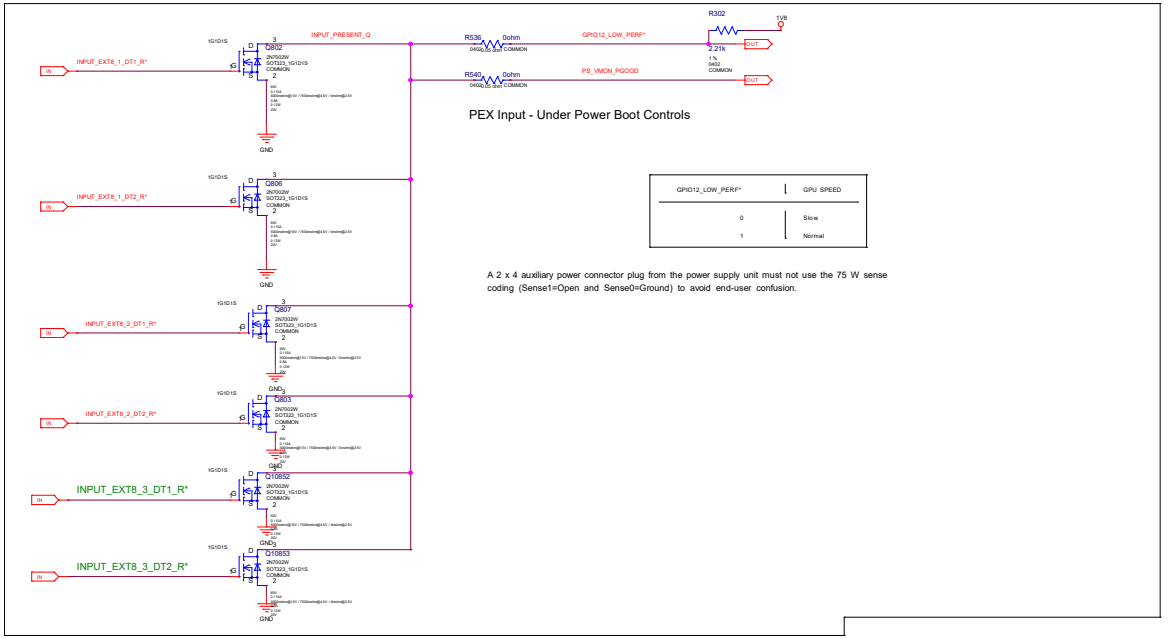
PS: 12V Current Steering & Hot Unplug Detect



- The “Hot Unplug” circuit is optional.

REMOVE HOT UNPLUG



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PS: Discrete Steering

Power Supply Features

- "Low Performance Boot" feature is optional.

REMOVE steerin

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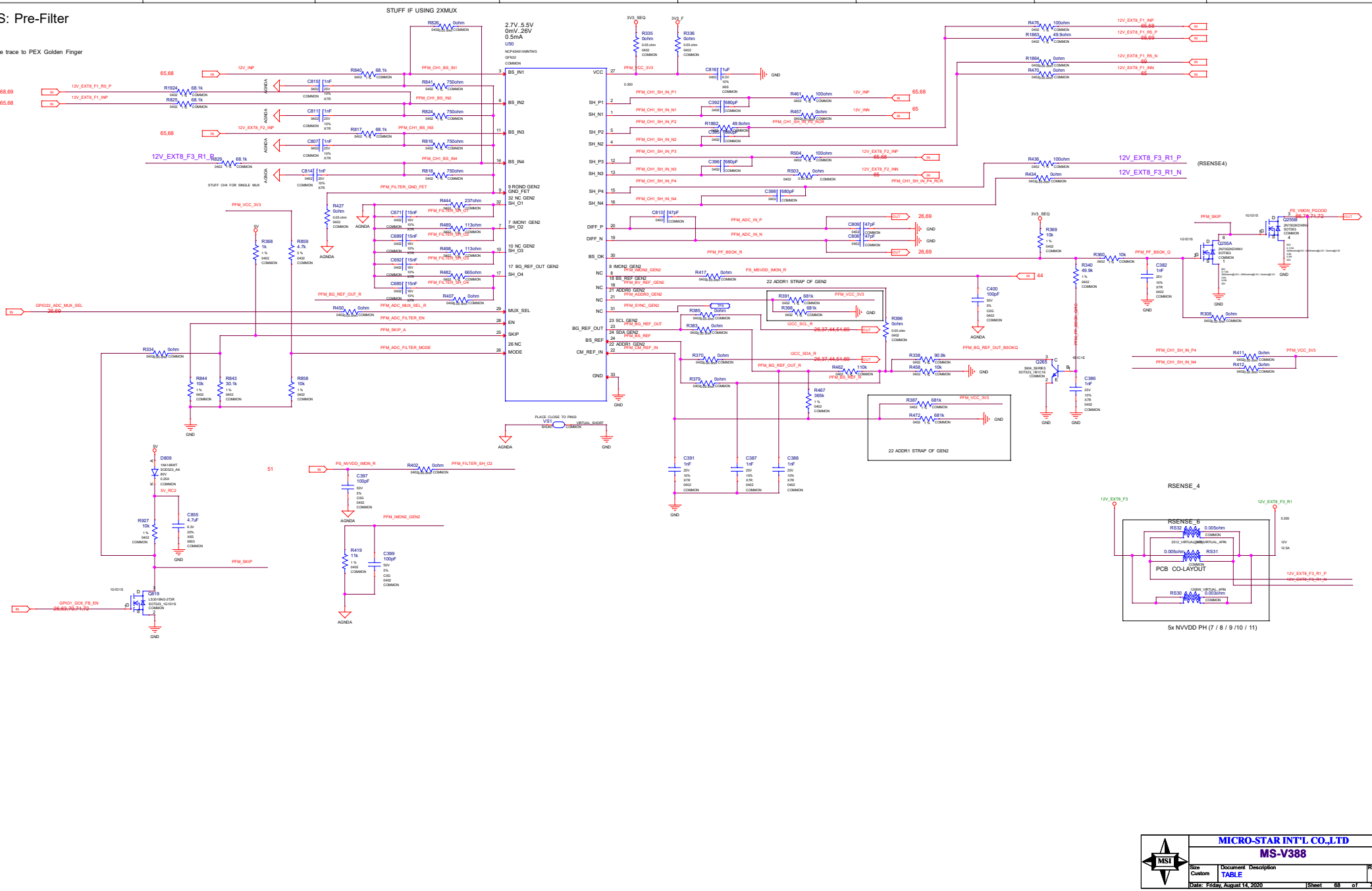
PS: Pre-Filter

Route the trace to PEX Golden Finger



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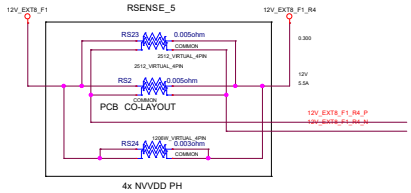
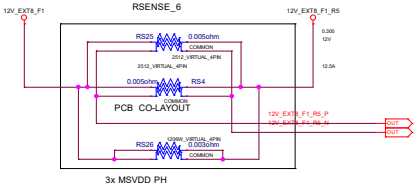
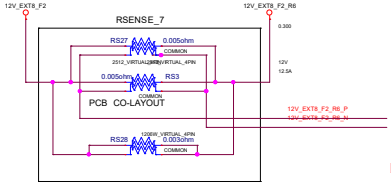
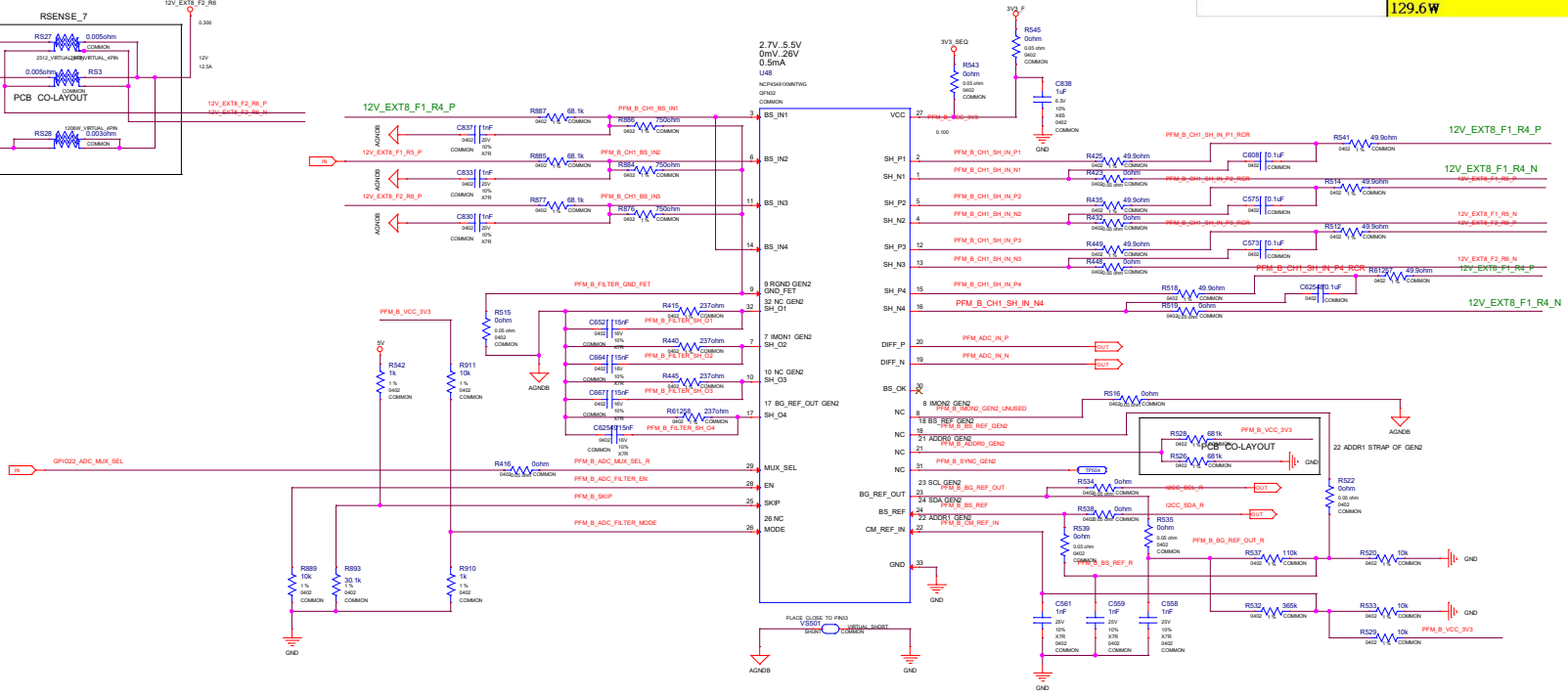
PS: Pre-Filter B

BUS	connect A	connect B	connect C
(RSENSE1)	(RSENSE2)	(RSENSE3)	(RSENSE4)
12V_F	NET NAME: F1	NET NAME: F2	NET NAME:12V_EXT8_F8_R1
FB 4	PEXVDD	FB-2(左	
MSVDD1		FB-3	
NVVDD1	(RSENSE2)	MSVDD3(左	NVVDD7
	NET NAME:12V_EXT8_F1_RTD	MSVDD5(左	NVVDD8
	FB 1	(RSENSE7)	NVVDD9
	5V	NET NAME: 12V_EXT8_F2_R6	NVVDD10
	1V8	NVVDD2(左	NVVDD11
	(RSENSE6)	NVVDD3(左	
	NET NAME:12V_EXT8_F1_R5	NVVDD4(左	
	MSVDD2		
	MSVDD4		
52.8W	MSVDD6	73.5+27+30=130.5W	122.5W
	(RSENSE5)		
	NET NAME: 12V_EXT8_F1_R4		
	NVVDD5-F1-R4		
	NVVDD6-F1-R4		
	129.6W		80W/6=13.3W/270W/11=24.5W









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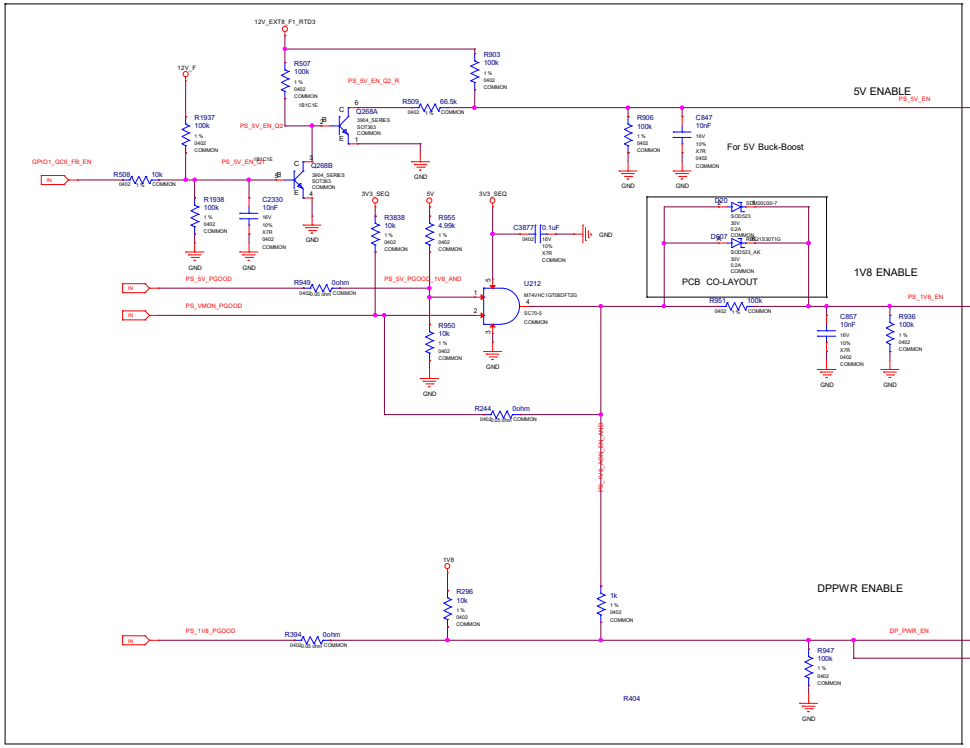
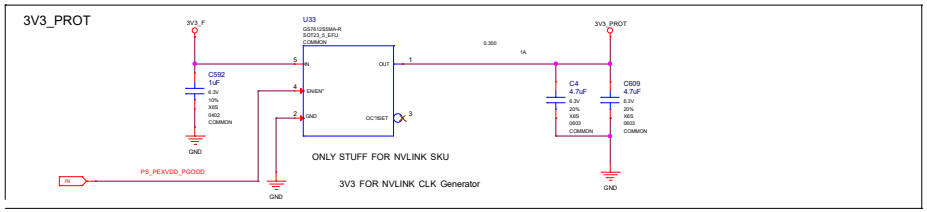
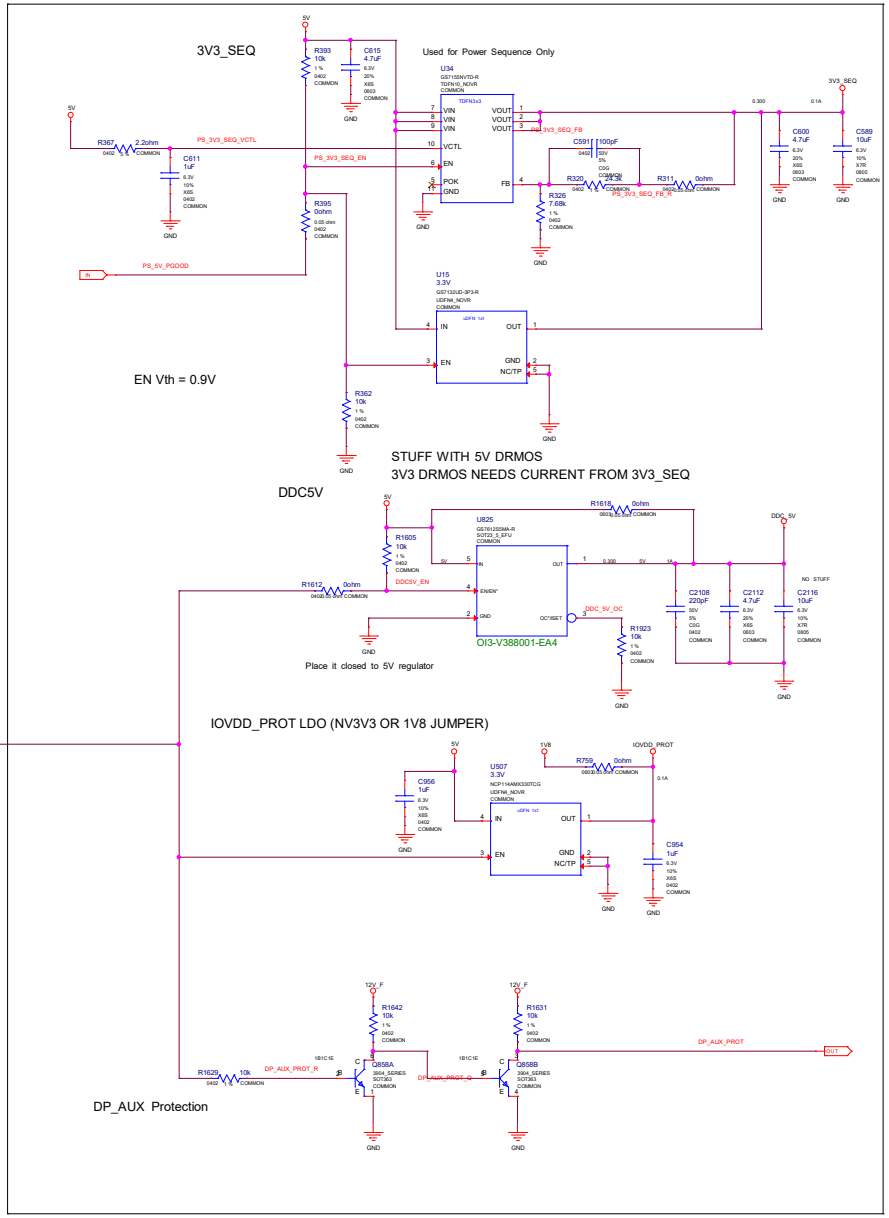
SEQUENCE:5V,1V8,3V3_SEQ ENABLE







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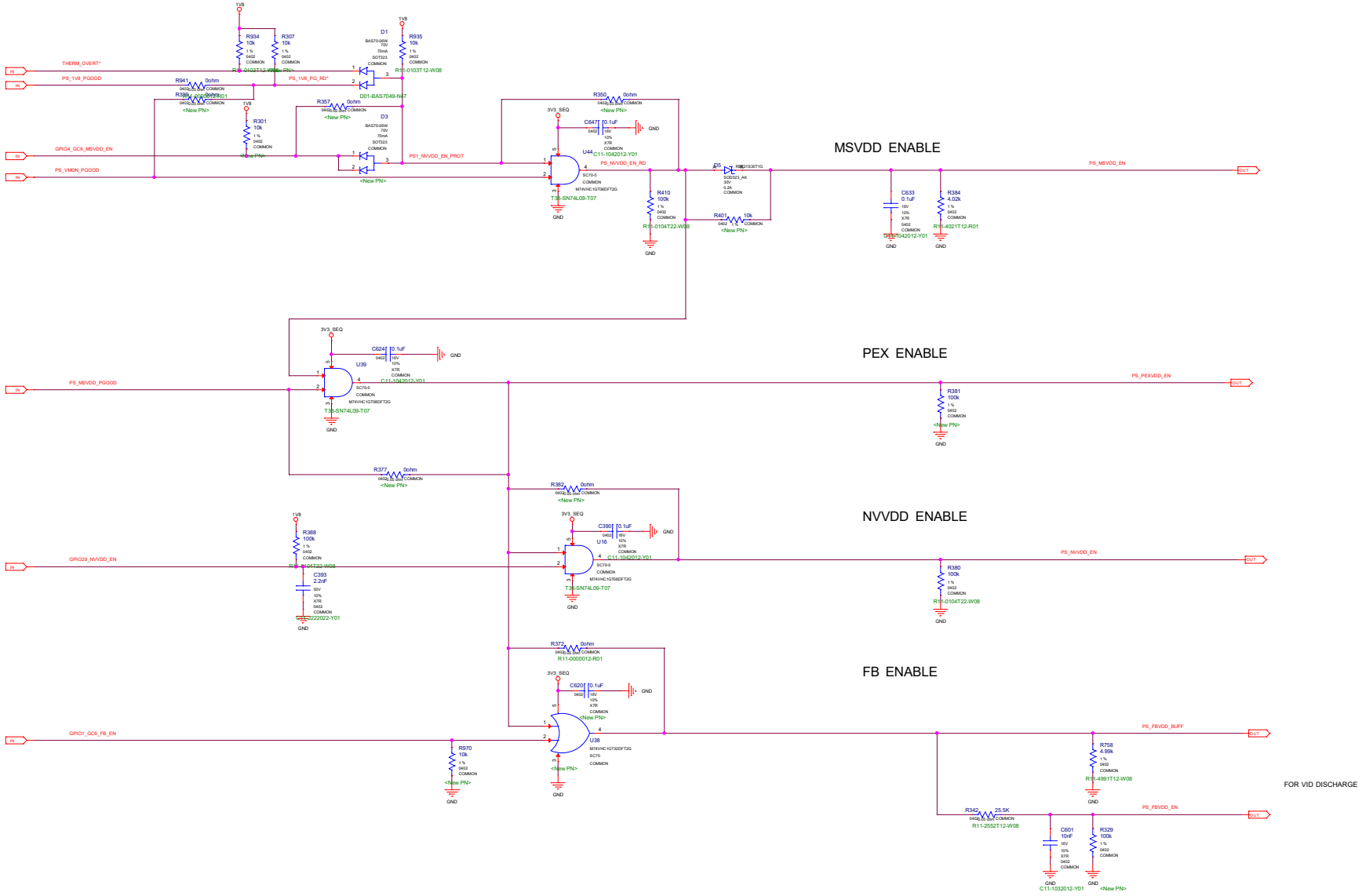
SEQUENCE:NV,PEX,FB ENABLE



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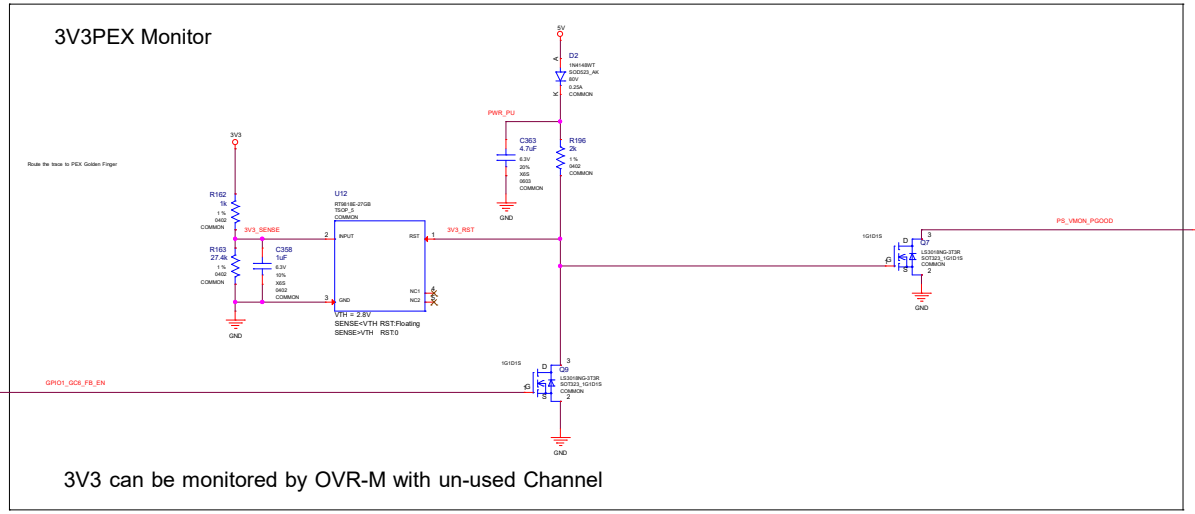
Sequence: 3V3 MONITOR



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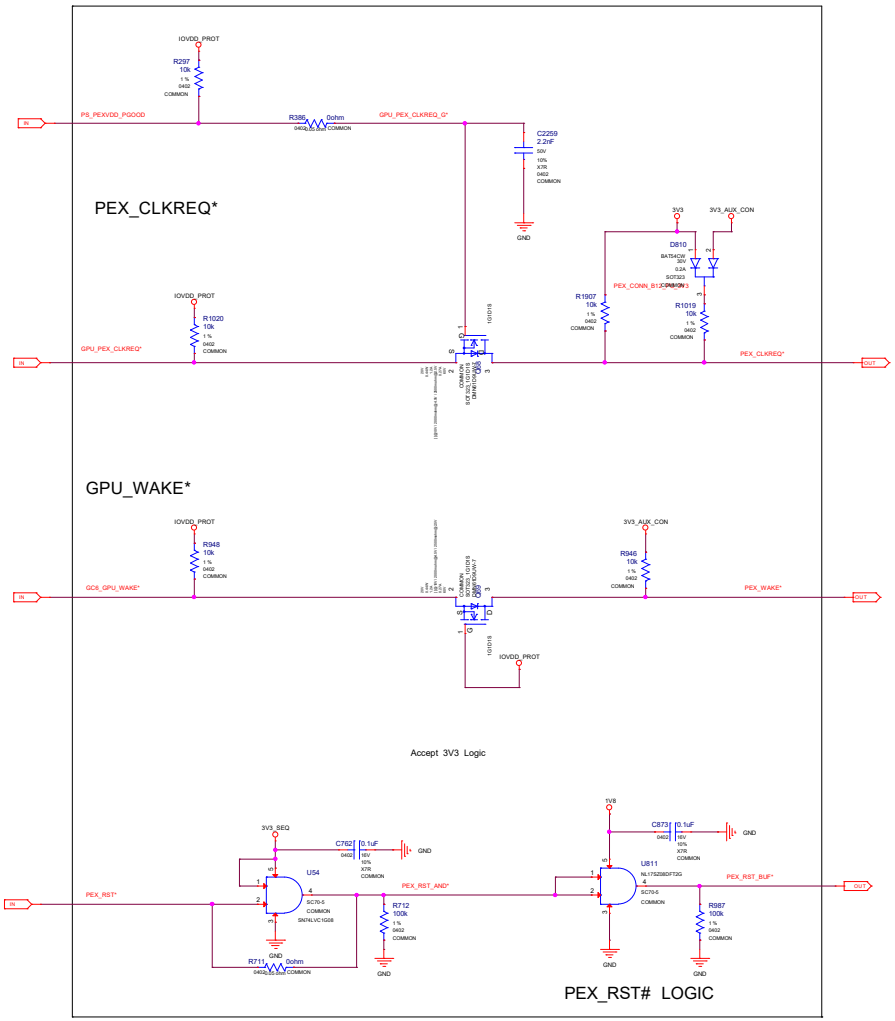
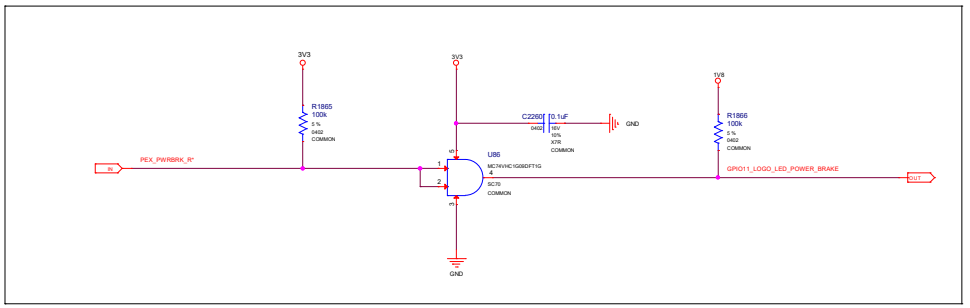
SEQUENCE:MISC





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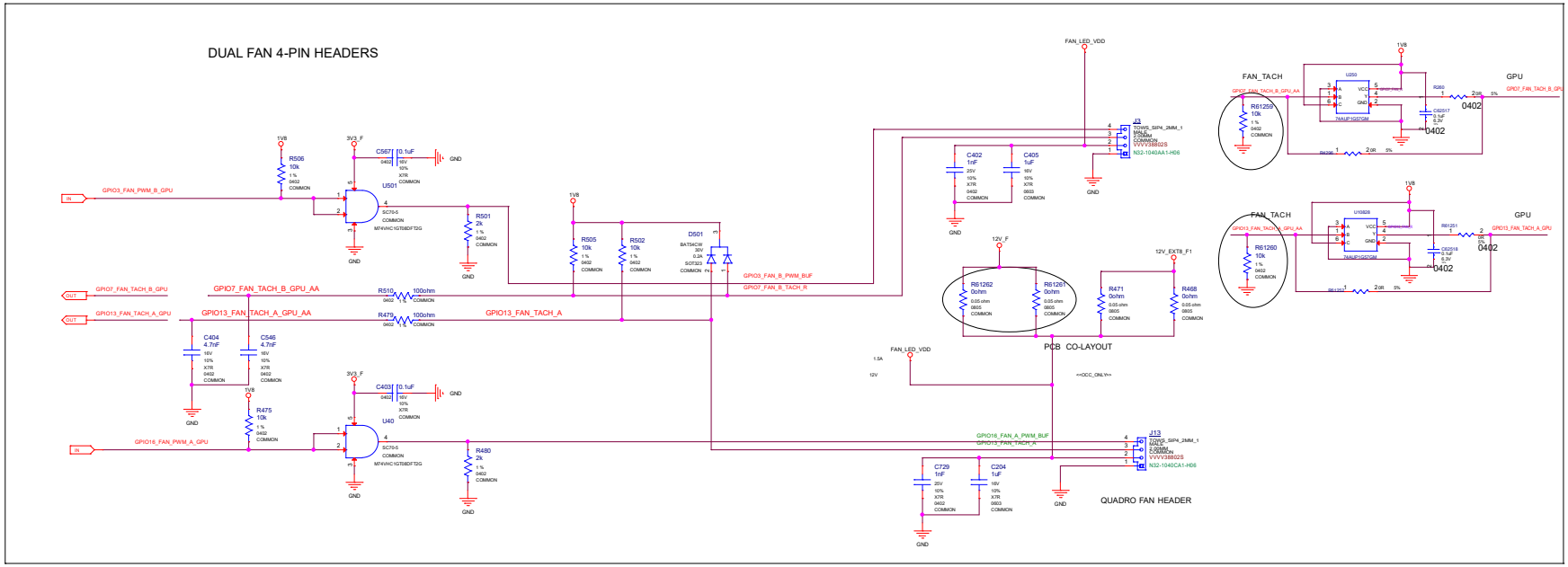
MISC: LED & FAN

remove LED /GPIO 35



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MISC: RGBW LED REF

REMOVE LED

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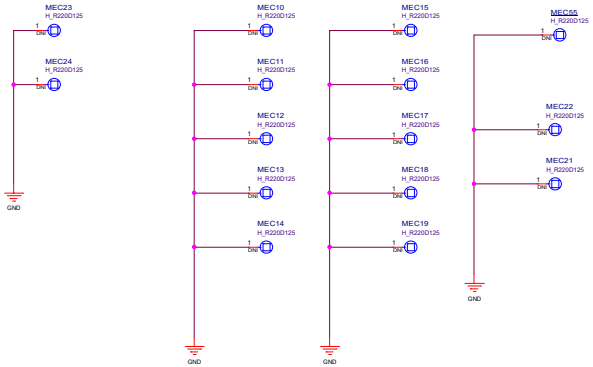
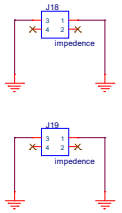
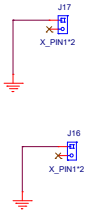
Mechanical: Mounting holes

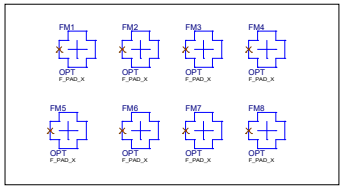
Mechanical Holes Symbol



BACK STIFFENER:







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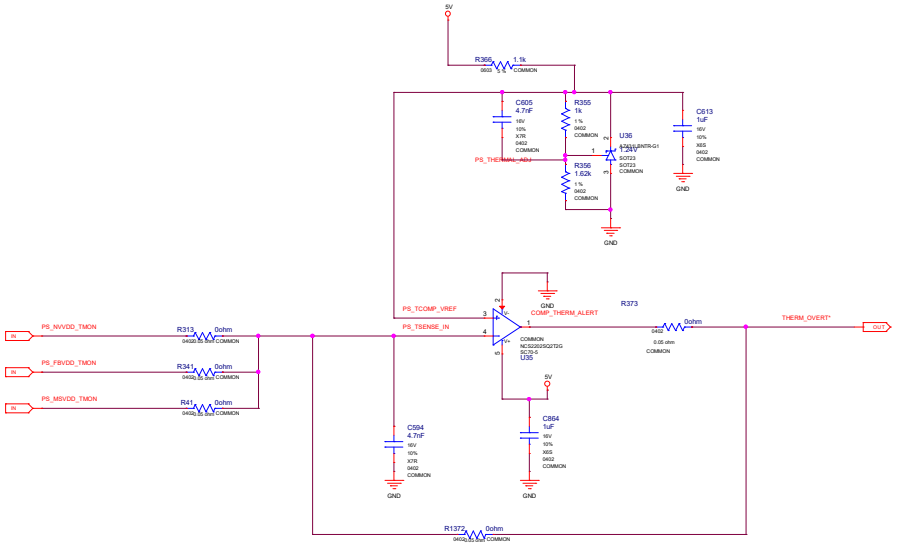
VR THERMAL PROTECTION



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PCI TERM

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