PG141-H00

GA104/NP GB5/5B-256 DESIGN, 16GB GDDRx, 256b, X16
DP + DP + DP + HDMI/DP

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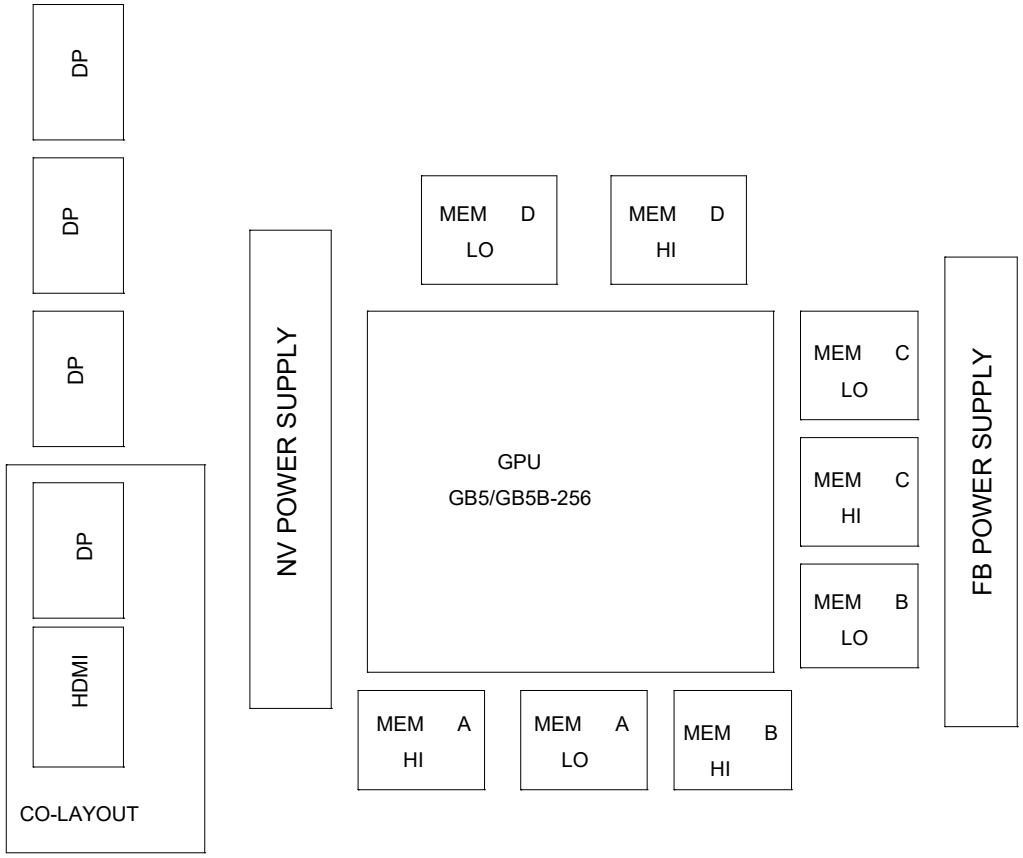
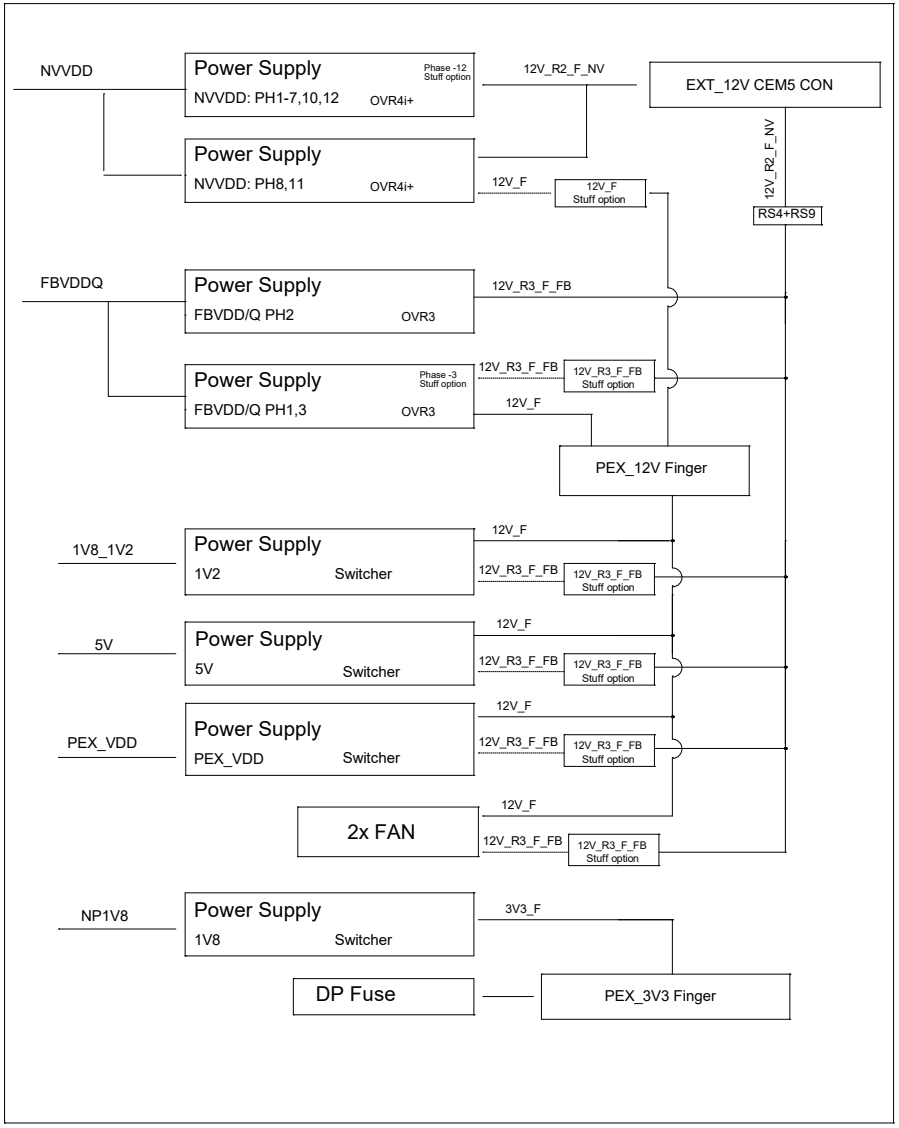
Block Diagram





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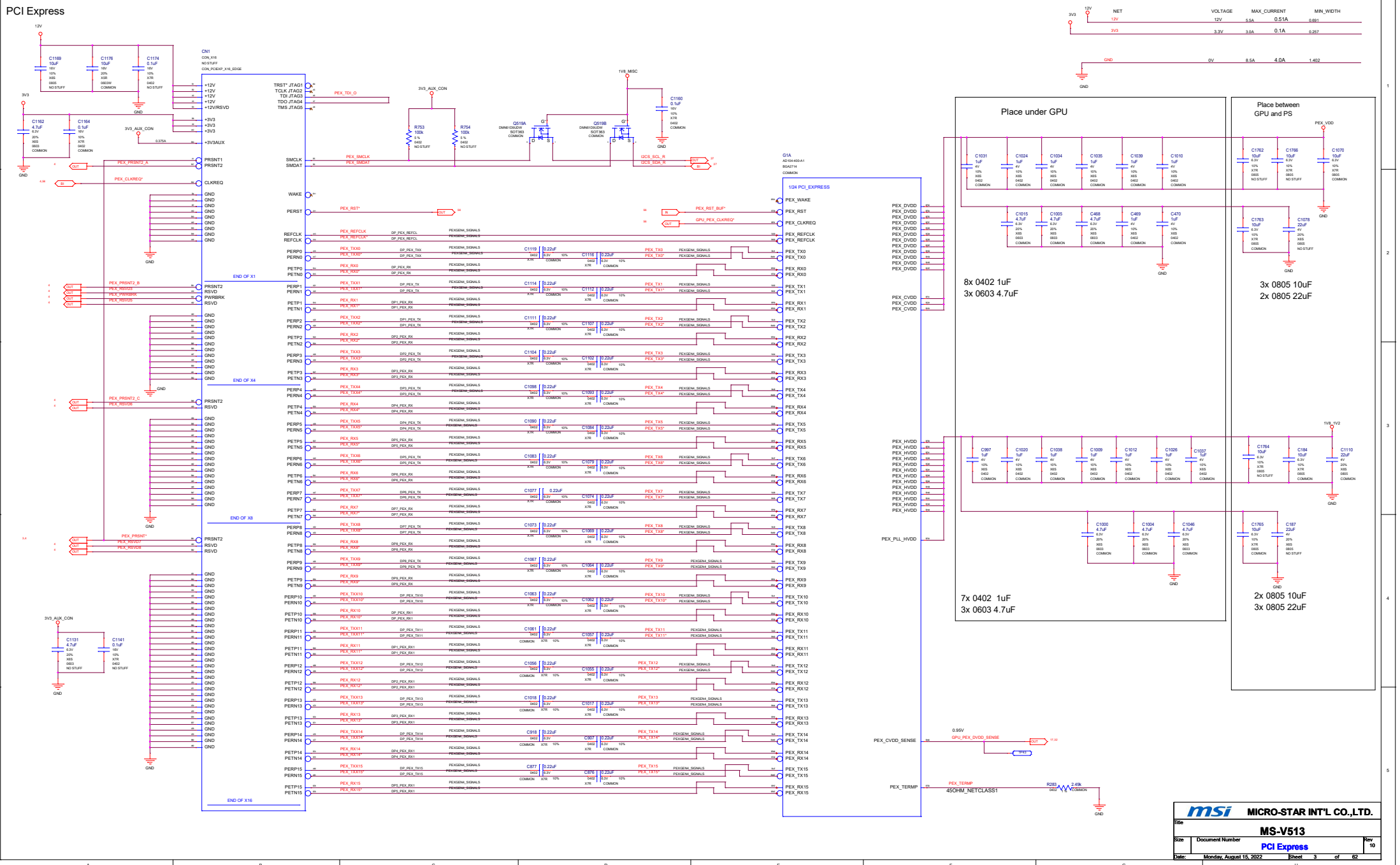
PCI Express



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PCIE GEN4 RC TERMINATIONS

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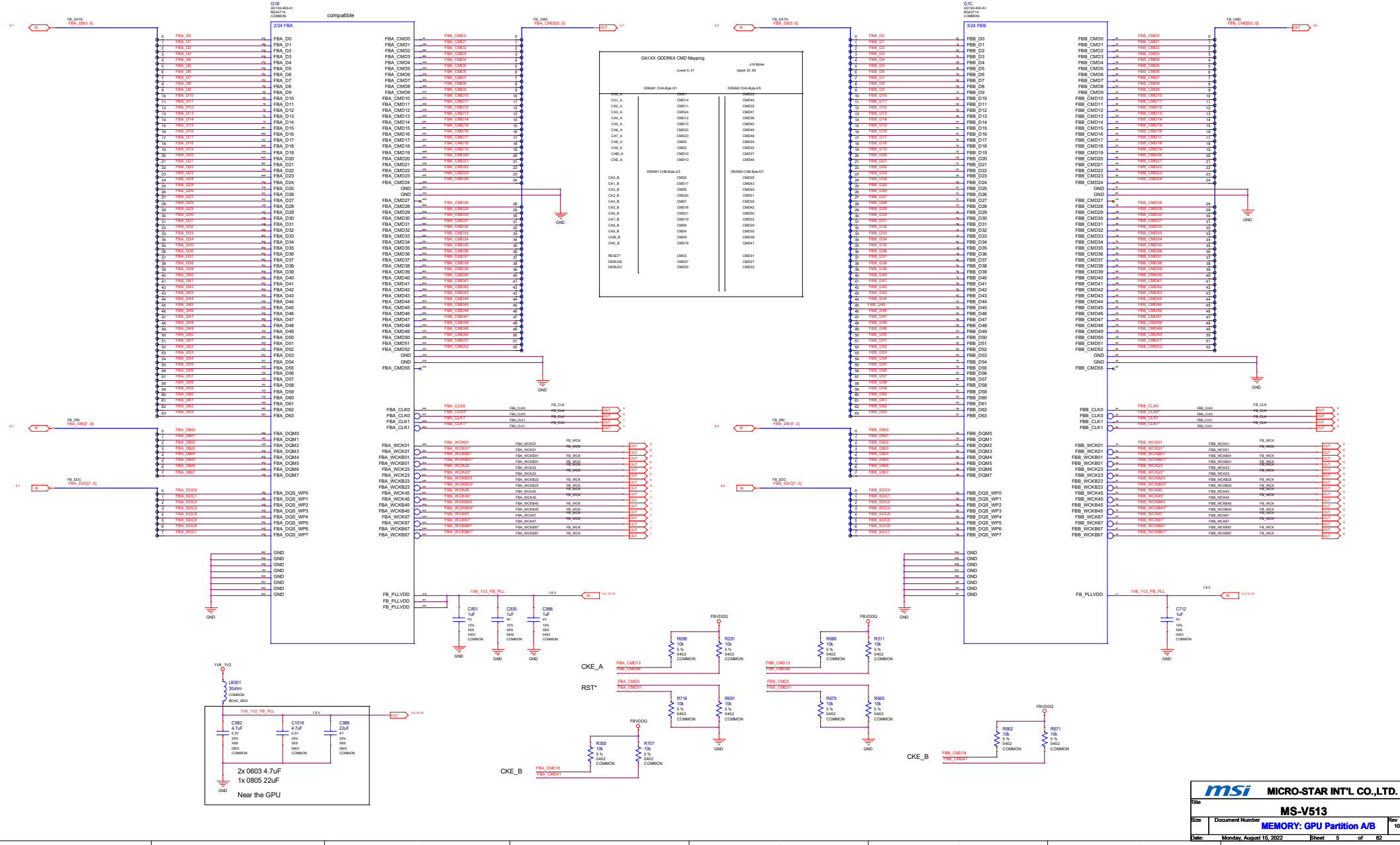
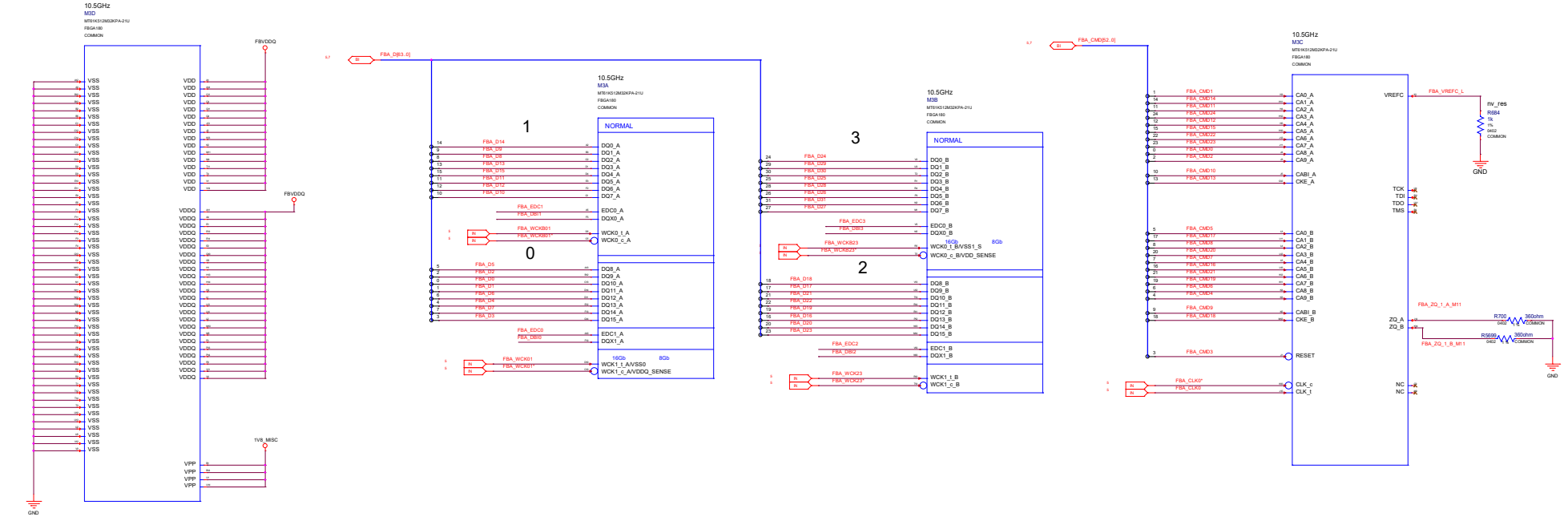
MEMORY: GPU Partition A/B

//syseng/Projects/GA1xx/GA1XX_CMD-Mapping.xlsx



MEMORY: FBA Partition 31..0



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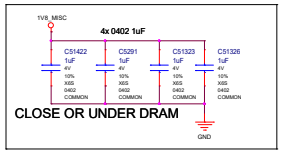
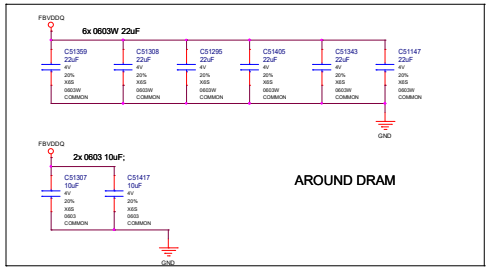
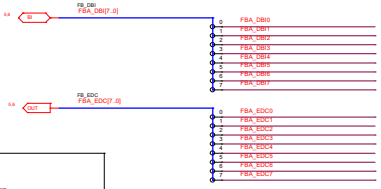
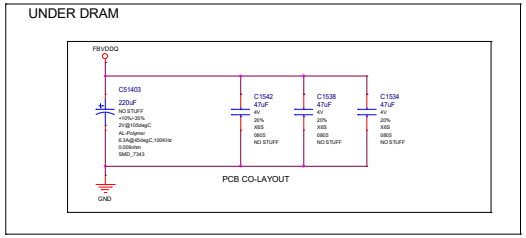
MEMORY: FBA Partition 63..32





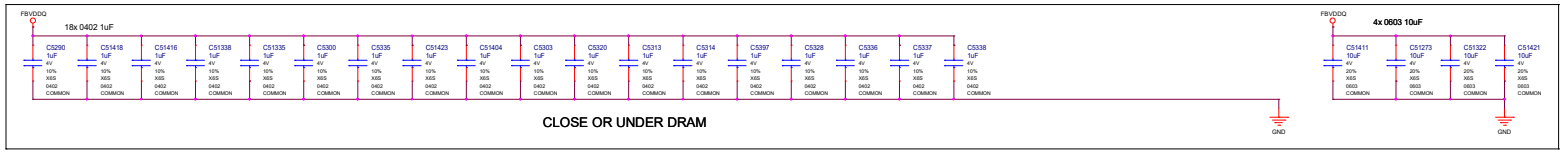




FBVDDQ DECAP per clamshell pair:

Close to DRAM:			Around DRAM:		
18x	1uF	0402	2x	10uF	0603
4x	10uF	0603	6x	22uF	0603W

Need at least 2 gnd and 2 pwr vias per DECAP



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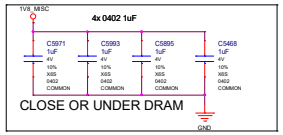
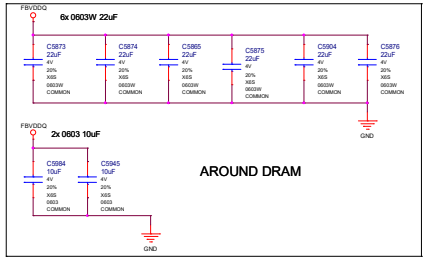
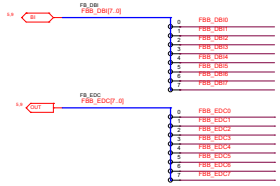
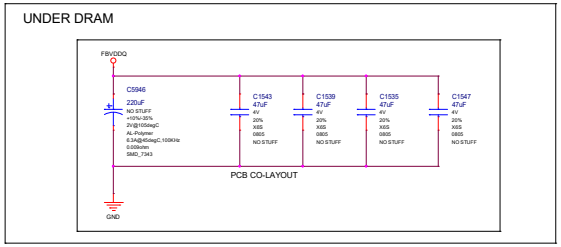
MEMORY: FBB Partition 31..0





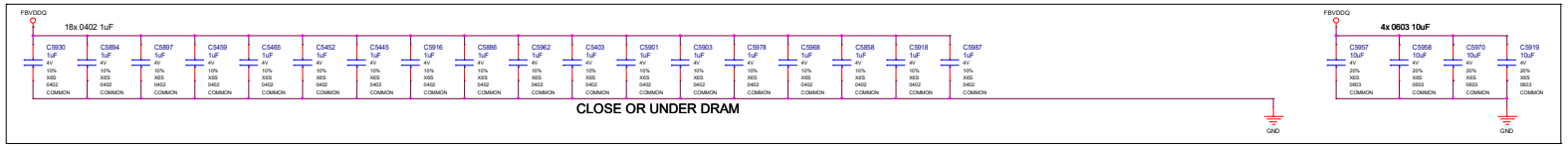




FBVDDQ DECAP per clamshell pair:

Close to DRAM:			Around DRAM:		
18x	1uF	0402	2x	10uF	0603
4x	10uF	0603	6x	22uF	0603W

Need at least 2 gnd and 2 pwr vias per DECAP



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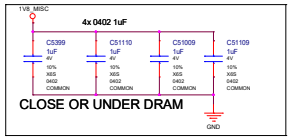
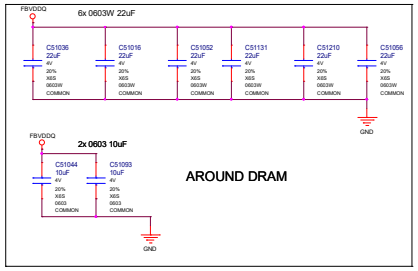
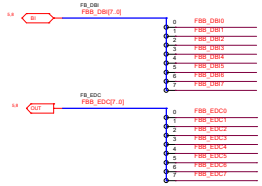
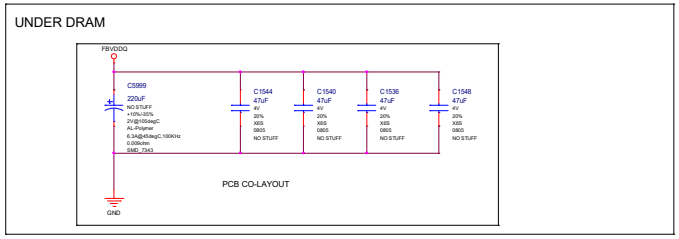
MEMORY: FBB Partition 63..32





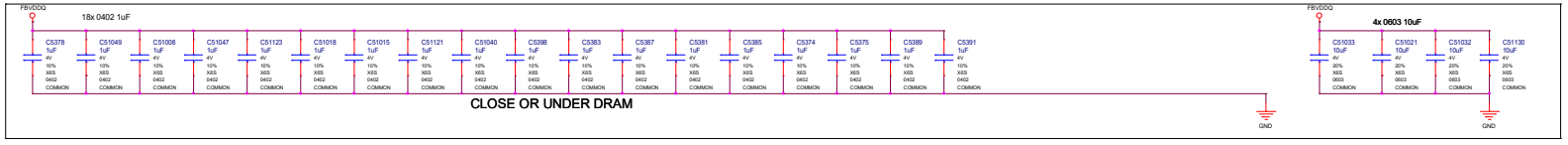




FBVDDQ DECAP per clamshell pair:

Close to DRAM:			Around DRAM:		
18x	1uF	0402	2x	10uF	0603
4x	10uF	0603	6x	22uF	0603W

Need at least 2 gnd and 2 pwr vias per DECAP



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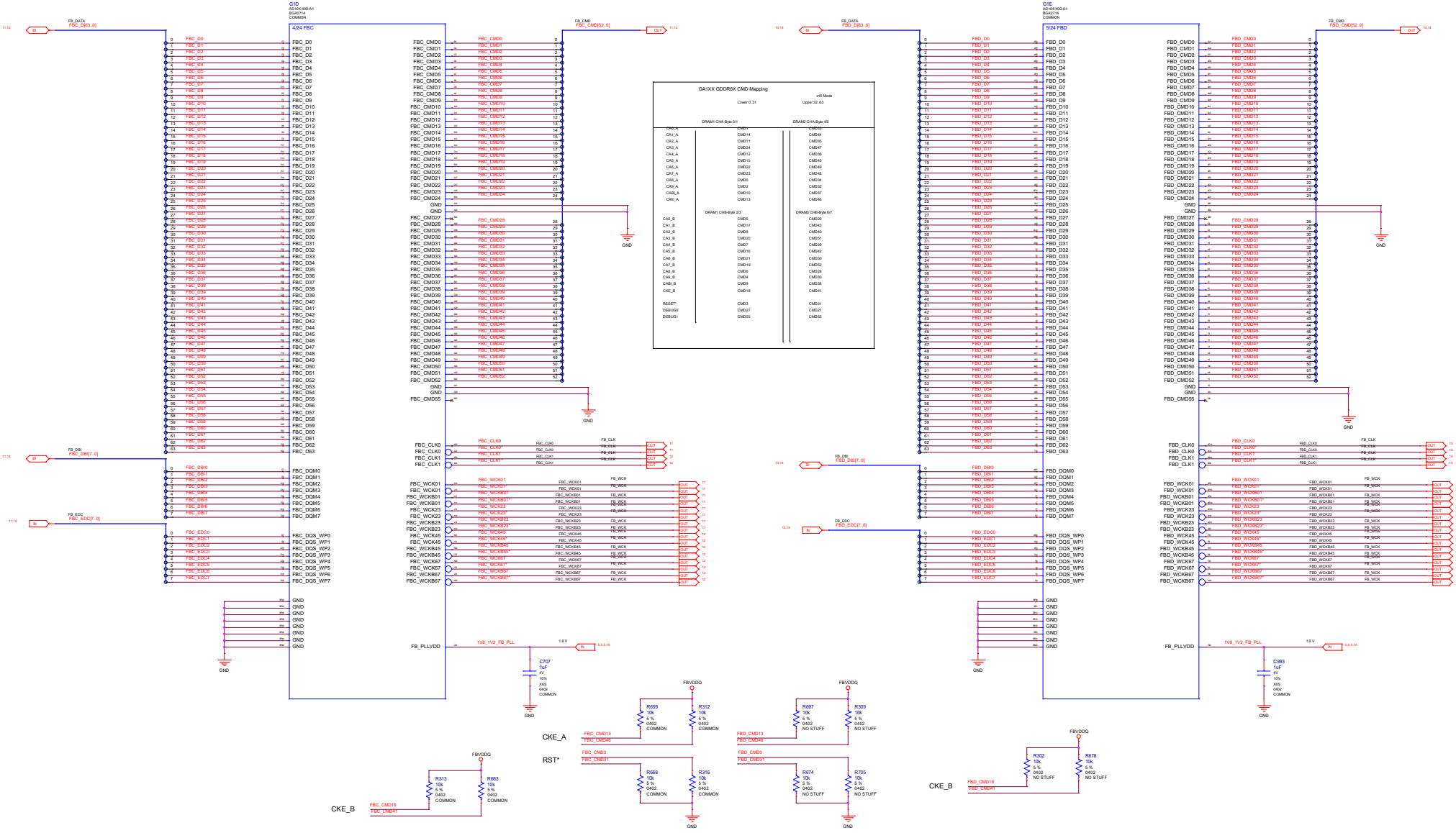
MEMORY: GPU Partition C/D

//syseng/Projects/GA1xx/GA1XX_CMD-Mapping.xlsx



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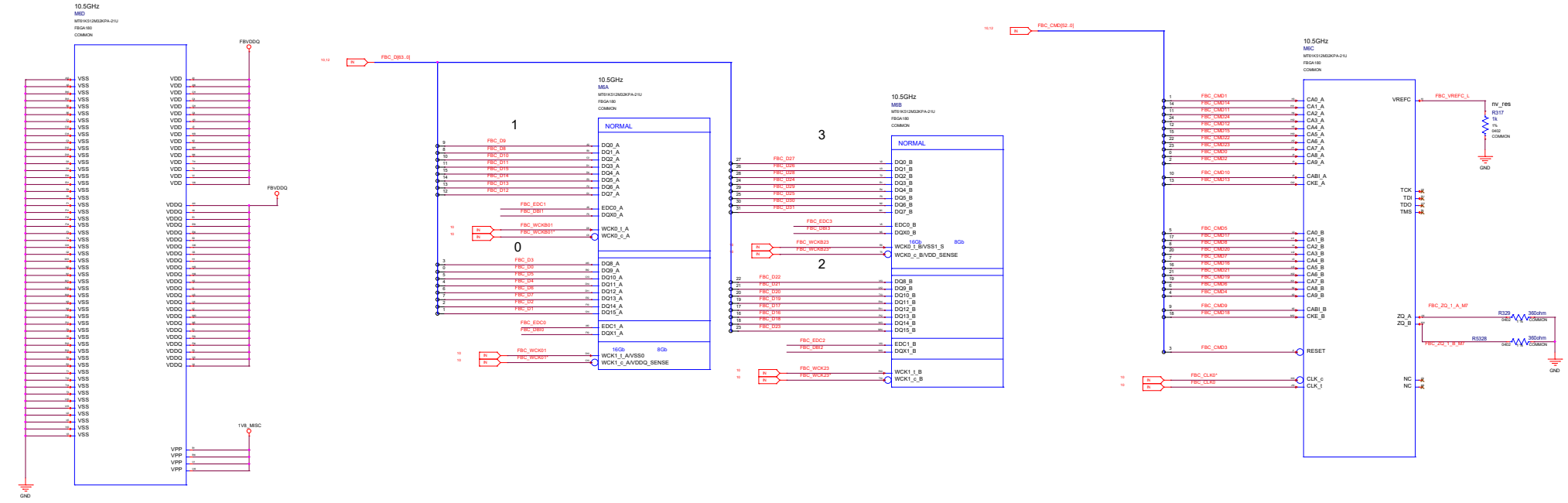
MEMORY: FBC Partition 31..0



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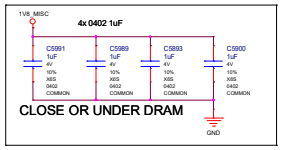
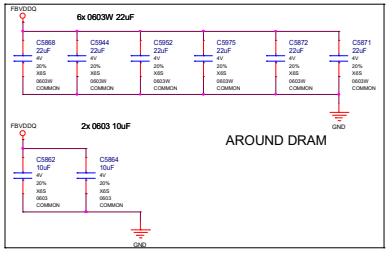
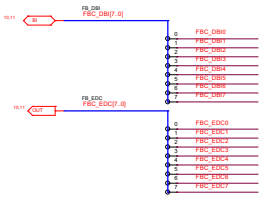
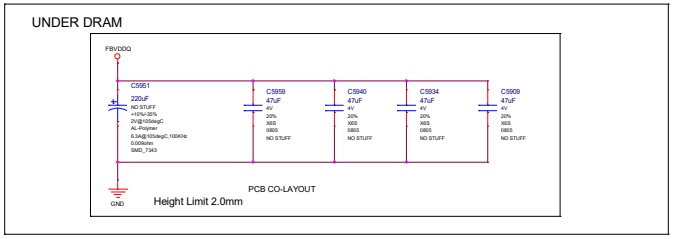
MEMORY: FBC Partition 63..32





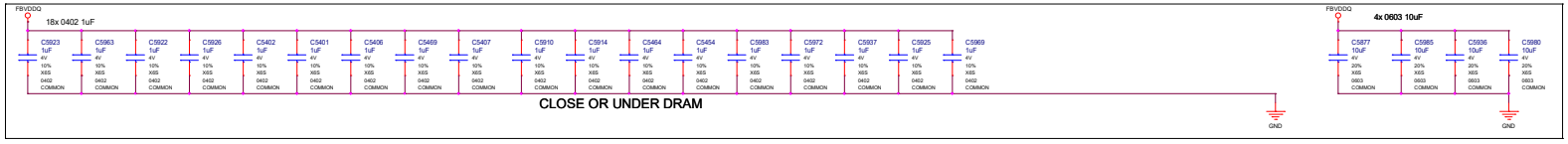




FBVDDQ DECAP per clamshell pair:

Close to DRAM:			Around DRAM:		
18x	1uF	0402	2x	10uF	0603
4x	10uF	0603	6x	22uF	0603W

Need at least 2 gnd and 2 pwr vias per DECAP



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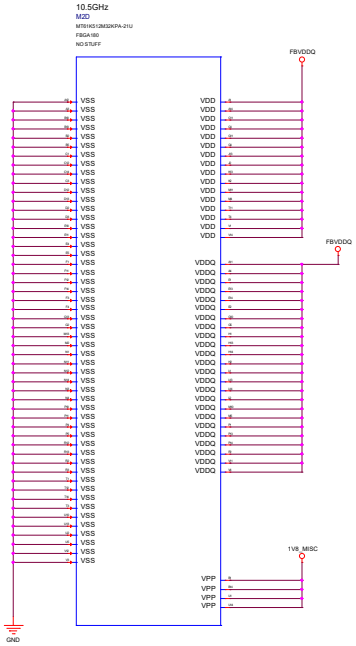
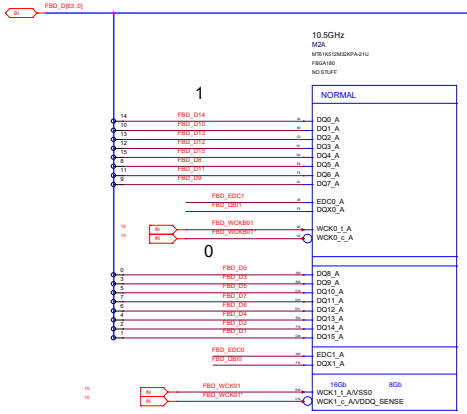
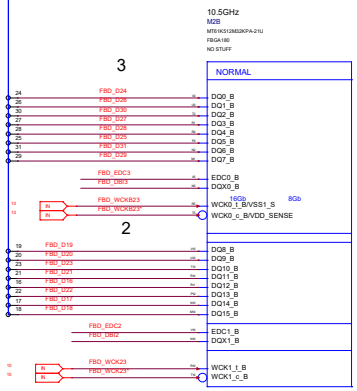
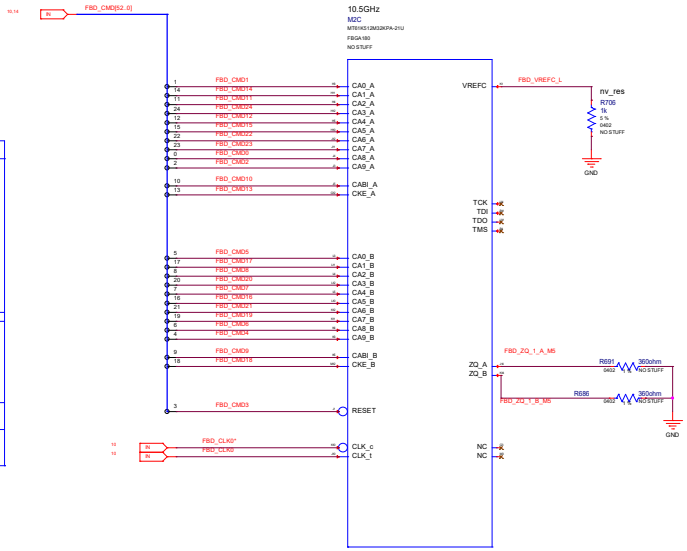
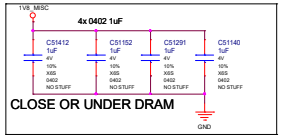
MEMORY: FBD Partition 31..0

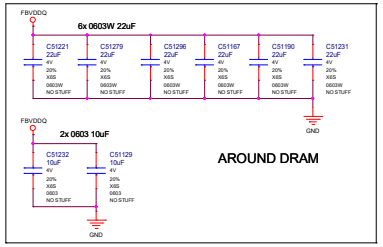


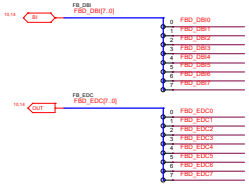


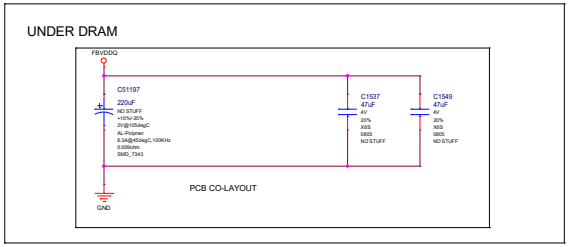








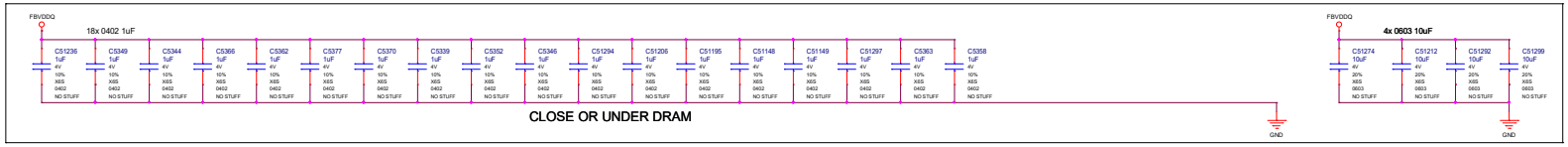




FBVDDQ DECAP per clamshell pair:

Close to DRAM:			Around DRAM:		
18x	1uF	0402	2x	10uF	0603
4x	10uF	0603	6x	22uF	0603W

Need at least 2 gnd and 2 pwr vias per DECAP



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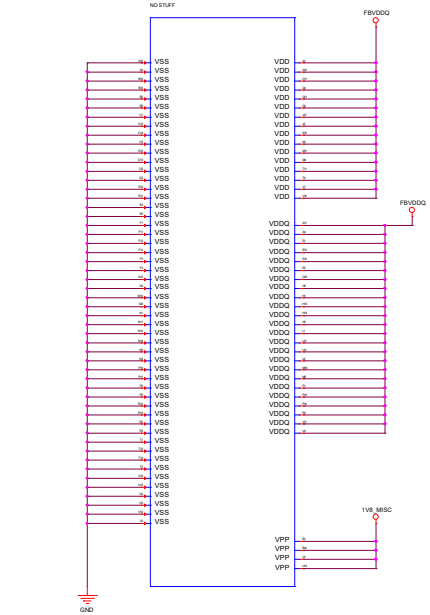
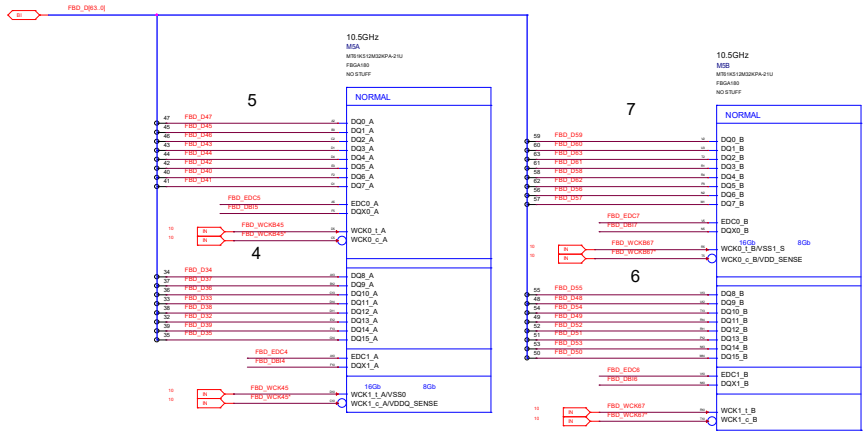
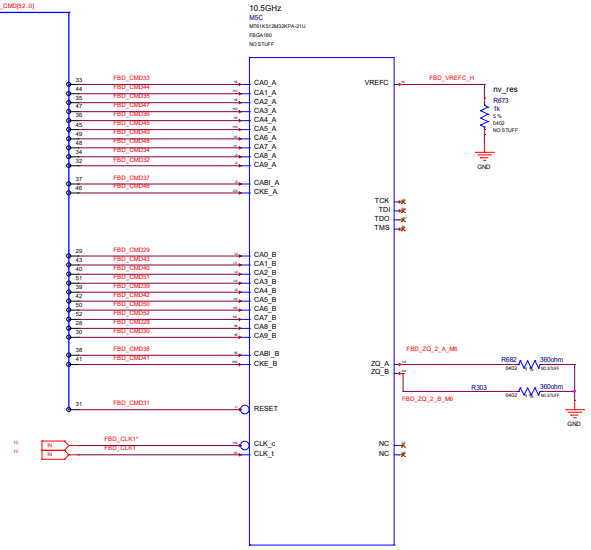
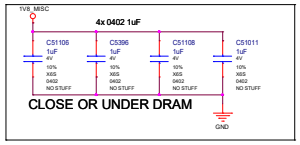
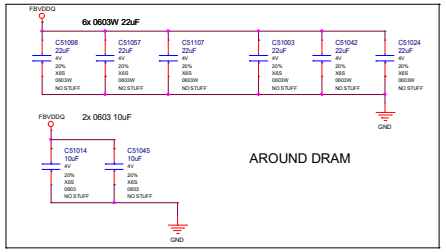
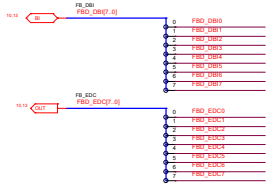


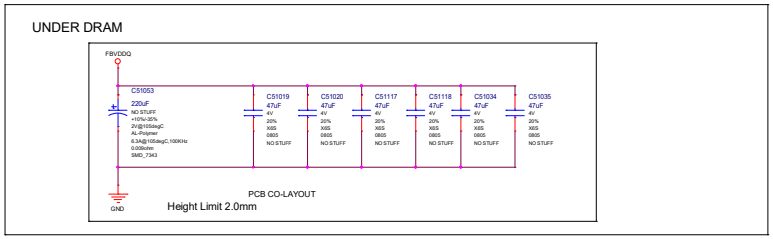








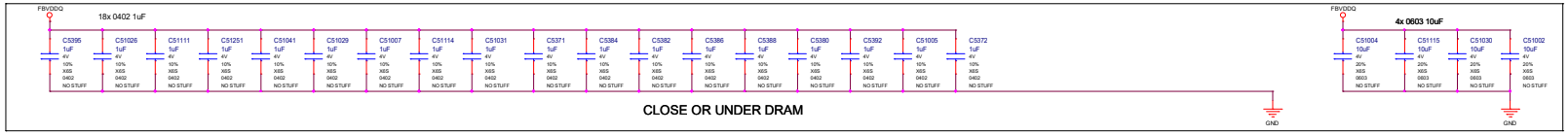




FBVDDQ DECAP per clamshell pair:

Close to DRAM:			Around DRAM:		
18x	1uF	0402	2x	10uF	0603
4x	10uF	0603	6x	22uF	0603W

Need at least 2 gnd and 2 pwr vias per DECAP



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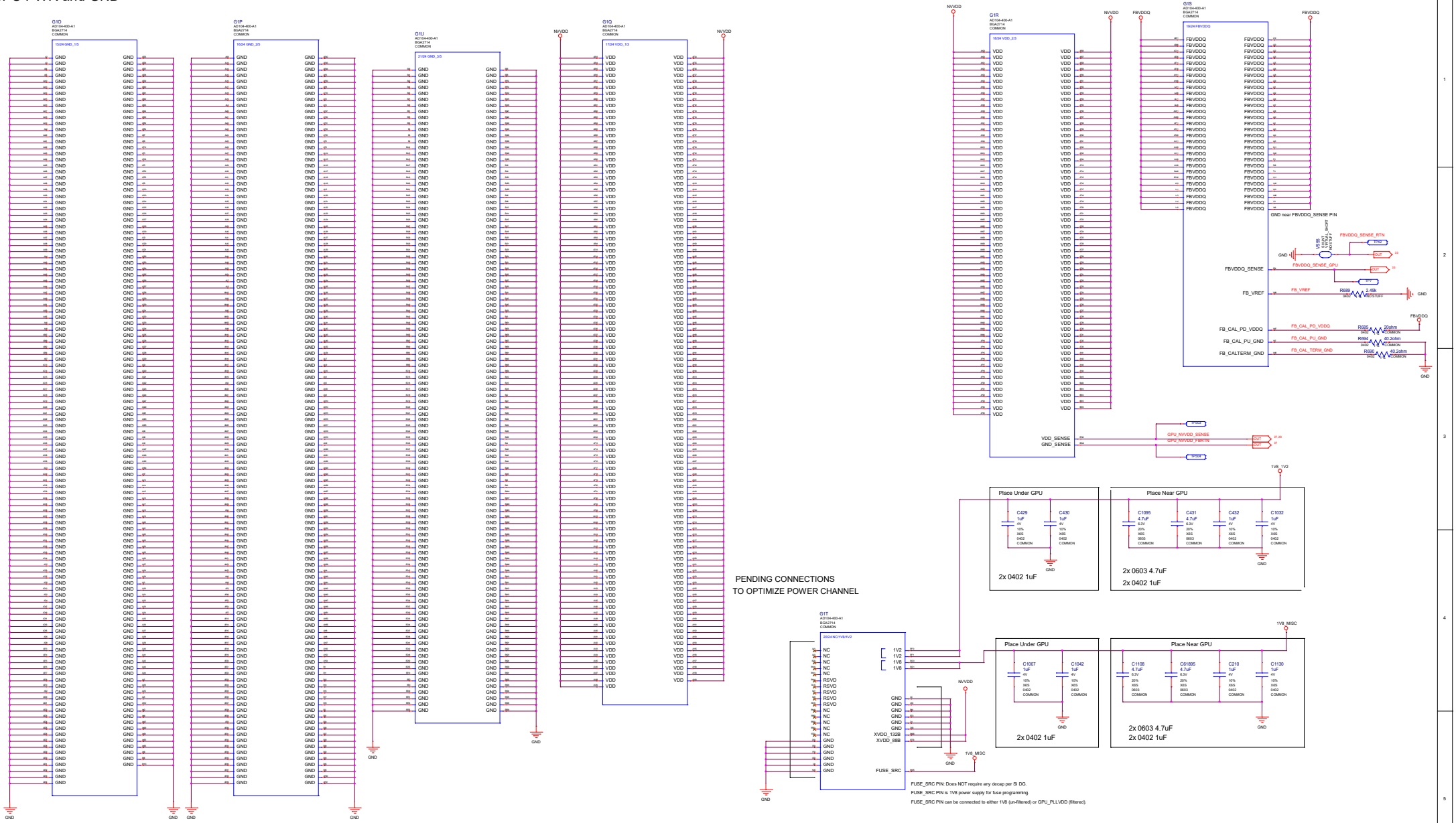
GPU PWR and GND



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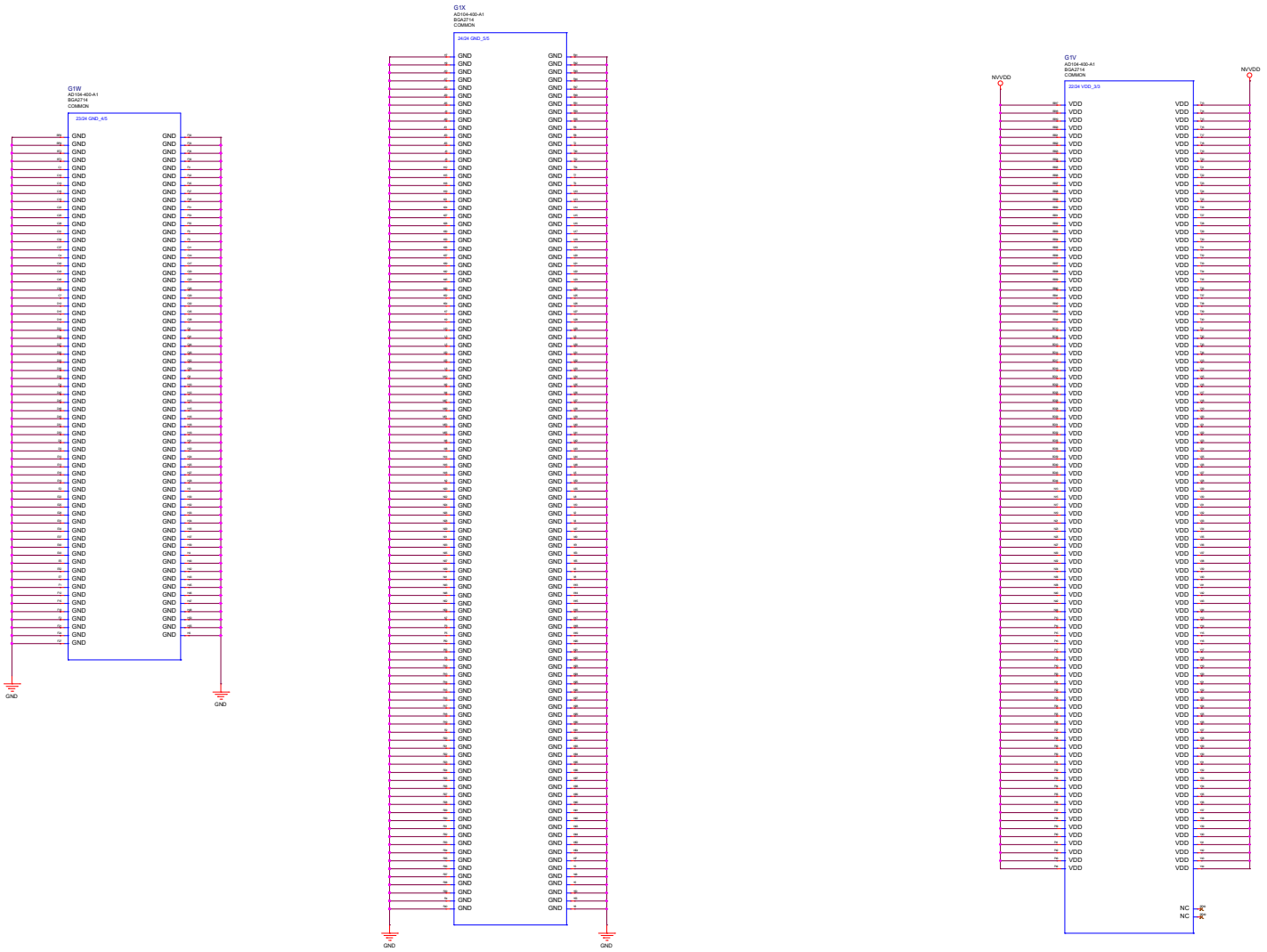
GPU PWR and GND 2



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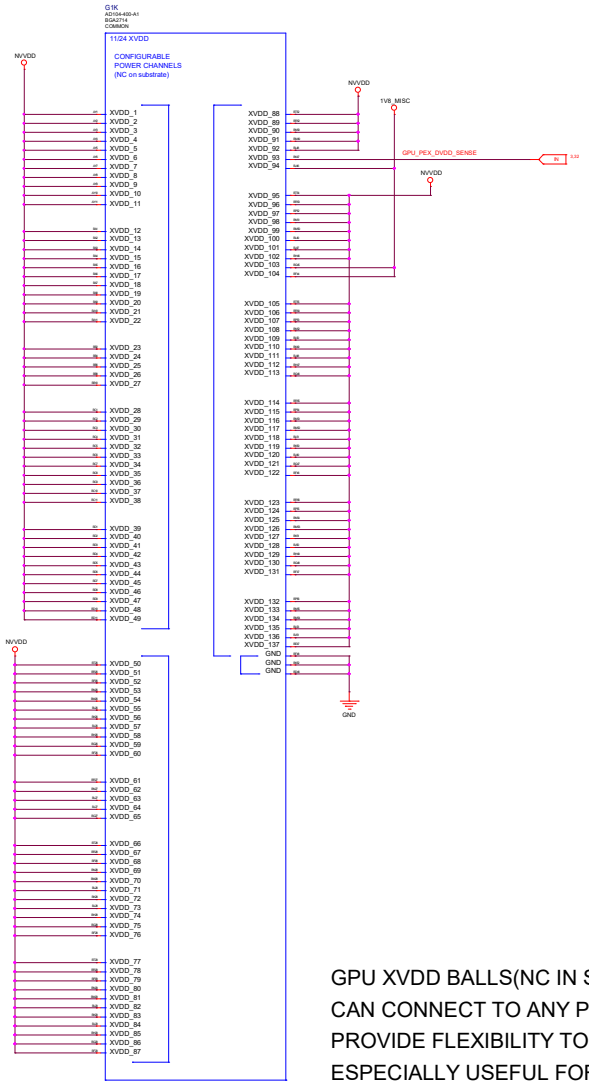
XVDD



GPU XVDD BALLS(NC IN SUBSTRATE):
CAN CONNECT TO ANY POWER NET(NV/MS/1V8/PEX,etc) ON SYSTEM BOARD,
PROVIDE FLEXIBILITY TO OPTIMIZE POWER CHANNELS ON SYSTEM BOARD,
ESPECIALLY USEFUL FOR LOW-COST DESIGN WITH REDUCED PCB LAYERS.

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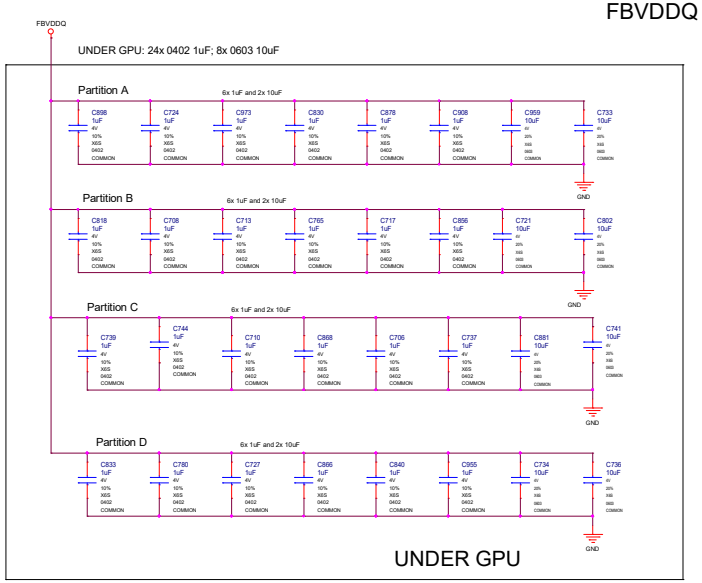
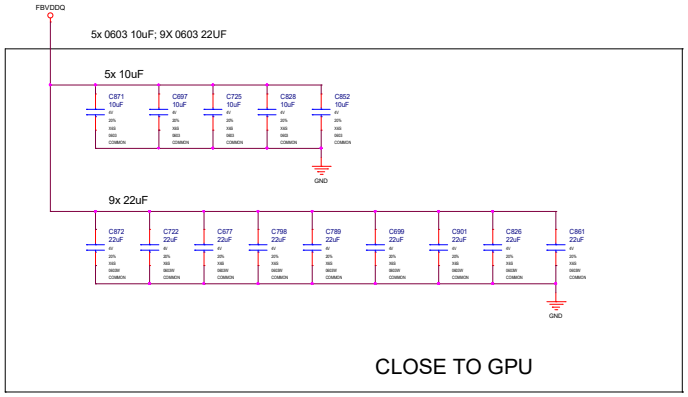
GPU DECOUPLING FBVDDQ

FBVDDQ





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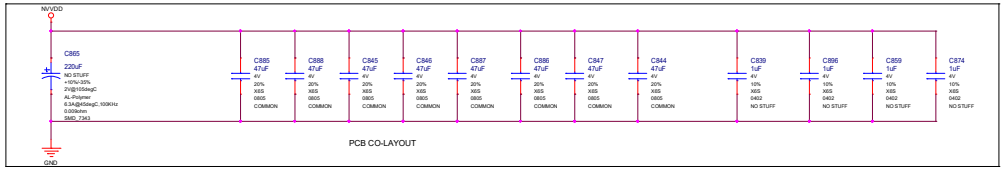
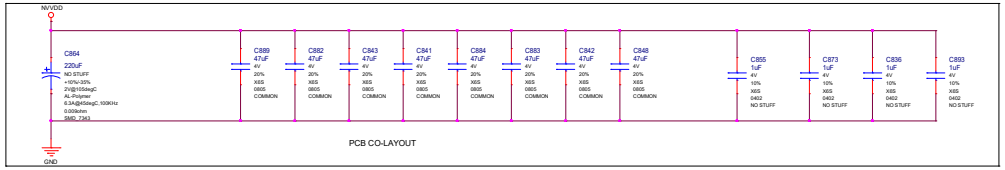
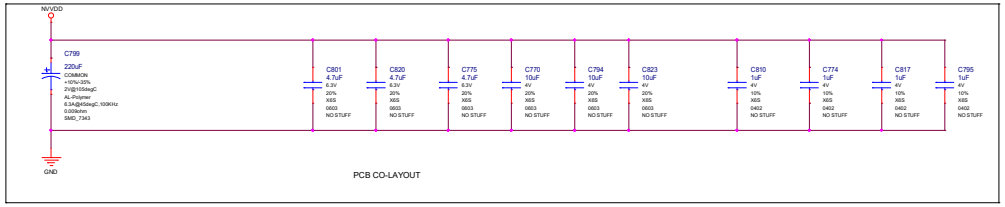
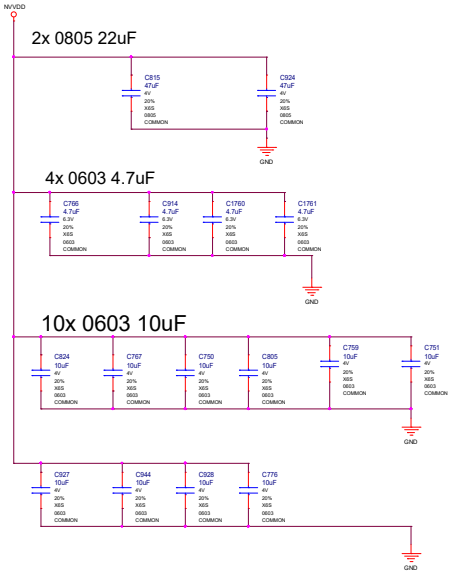
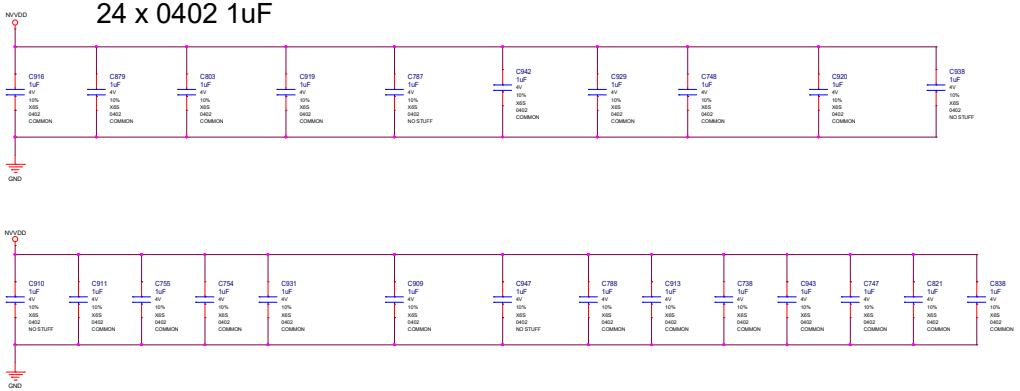
GPU DECOUPLING NVVDD











UNDER GPU

msi MICRO-STAR INT'L CO.,LTD.		
Title: MS-V513		
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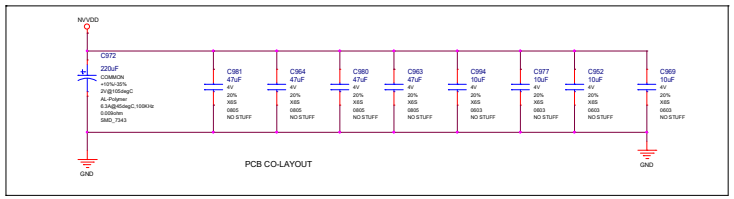
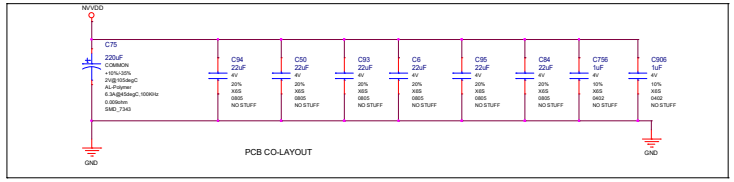
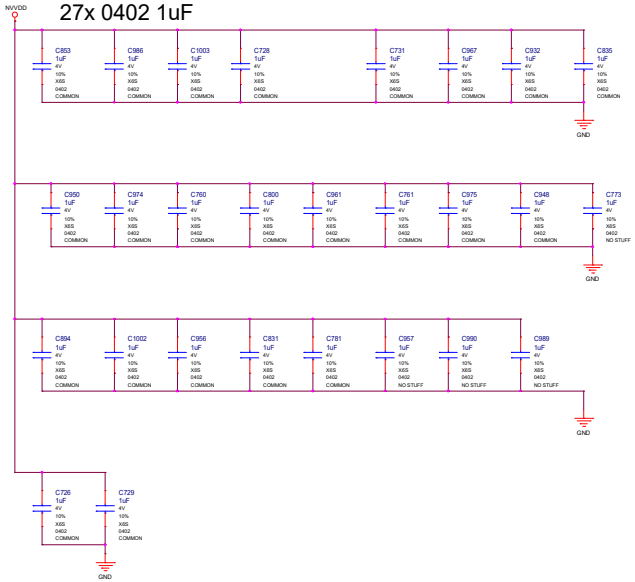
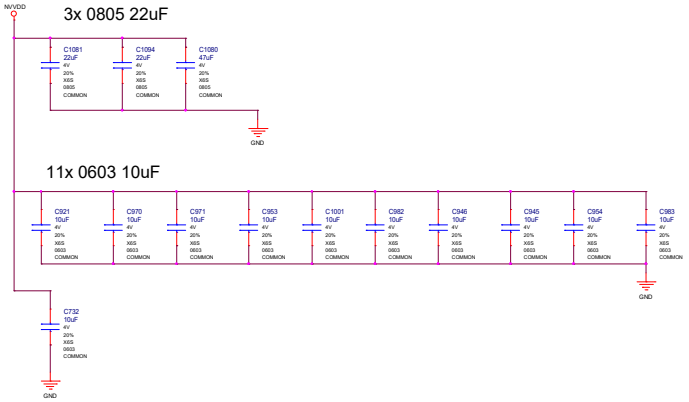
GPU DECOUPLING NVVDD









UNDER GPU

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Title: MS-V513		
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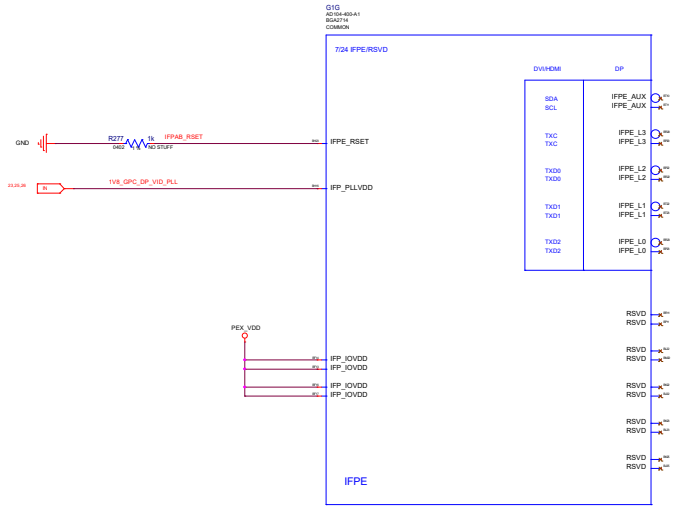
GA IFPA/NP IFPE(NC)



msi MICRO-STAR INT'L CO.,LTD.			
Title: MS-V513			
Size	Document Number: IO: GA IFPAB NC/NP IFPE NC		Rev: 10
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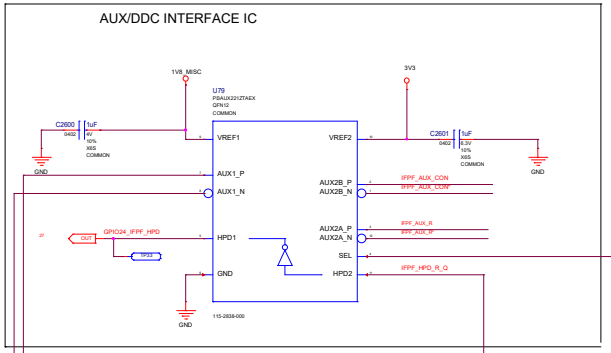
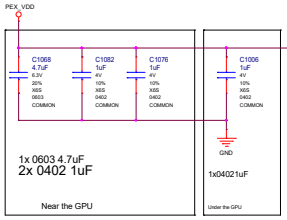
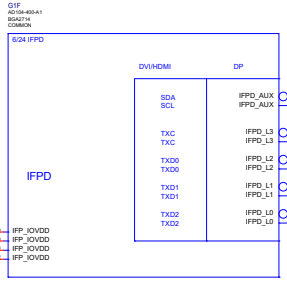
GA IFPF/NP IFPD DP

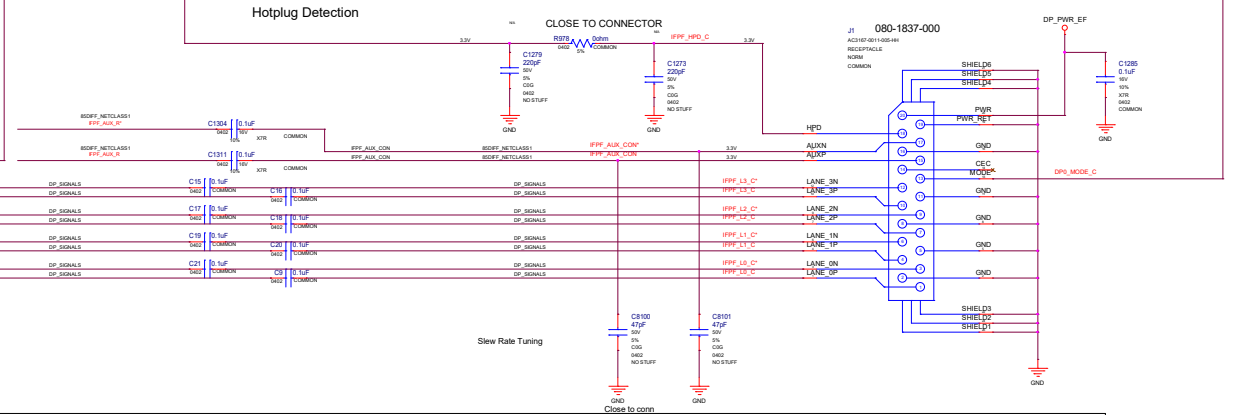
1. DP AUX to DP connector: AUX AC coupled

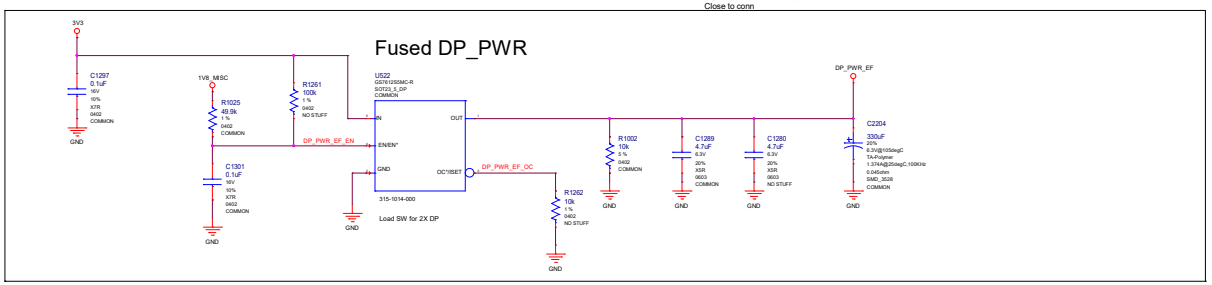
2. DP AUX to DP-DVI dongle: AUX pass through











msi MICRO-STAR INT'L CO.,LTD.			
Title: MS-V513			
Size	Document Number: IO: GA IFPF/NP IFPD DP		Rev: 10
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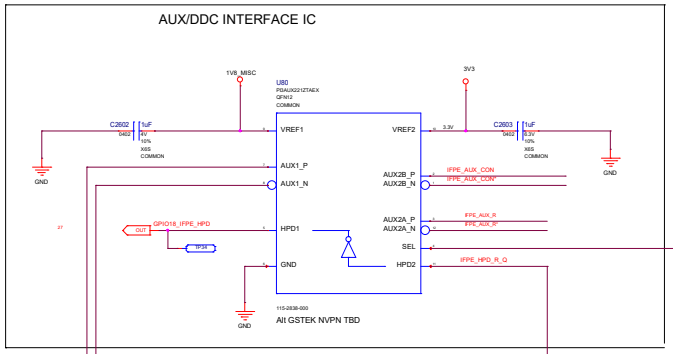
GA IFPE/NP IFPC DP

1. DP AUX to DP connector: AUX AC coupled

2. DP AUX to DP-DVI dongle: AUX pass through



Hotplug Detection

CLOSE TO CONNECTOR

080-1837-000

Slew Rate Tuning

Close to conn

1x 0402 1uF
Under the GPU

1x 0402 1uF
Under the GPU

MICRO-STAR INT'L CO.,LTD.			
Title	MS-V513		
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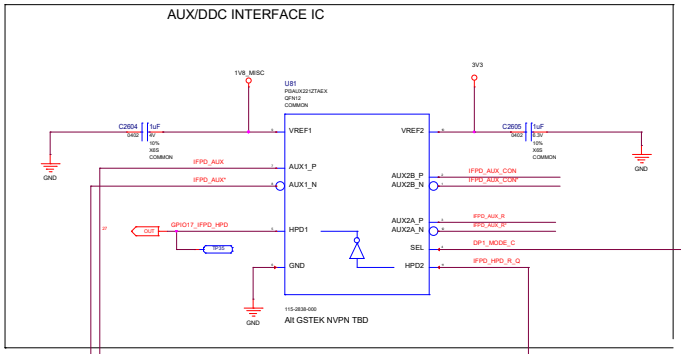
GA IFPD/NP IFPB DP

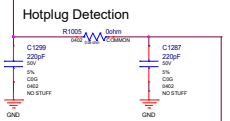
1. DP AUX to DP connector: AUX AC coupled

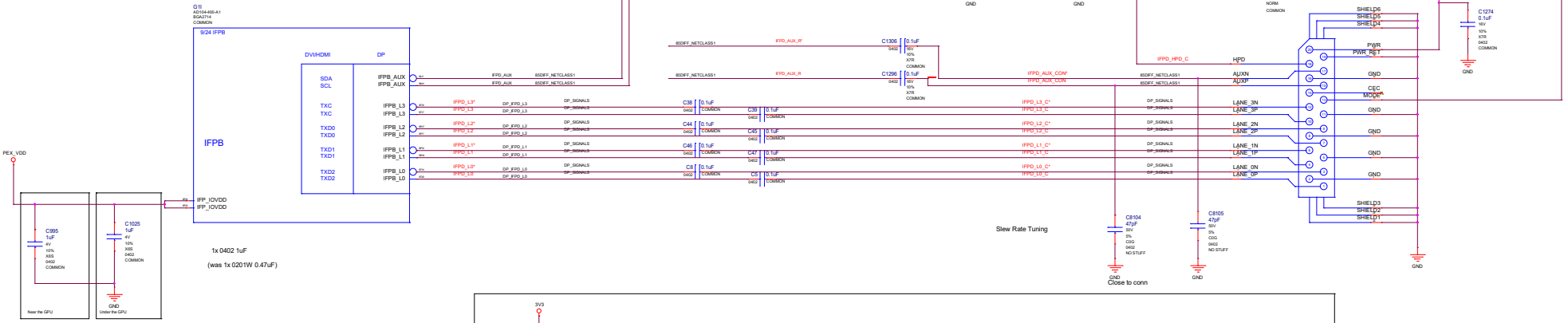
2. DP AUX to DP-DVI dongle: AUX pass through

AUX/DDC INTERFACE IC

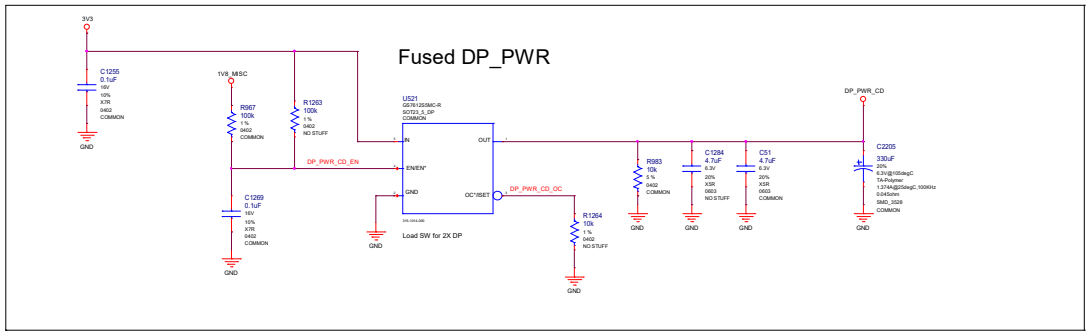


Hotplug Detection





Fused DP_PWR



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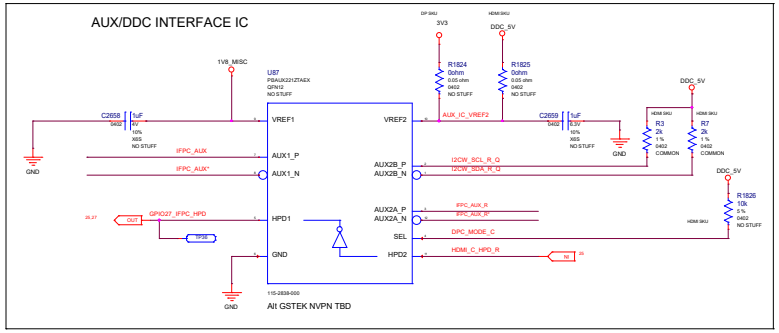
30-MAY-2022

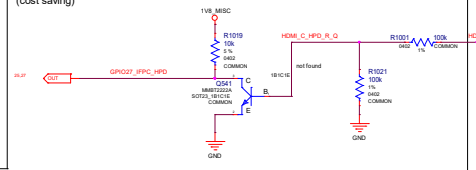
GA IFPC/NP IFPA HDMI/DP co-layout



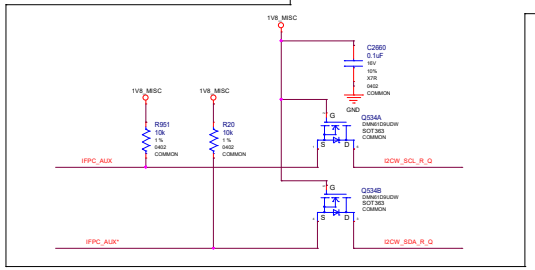
1. DP AUX to DP connector: AUX AC coupled

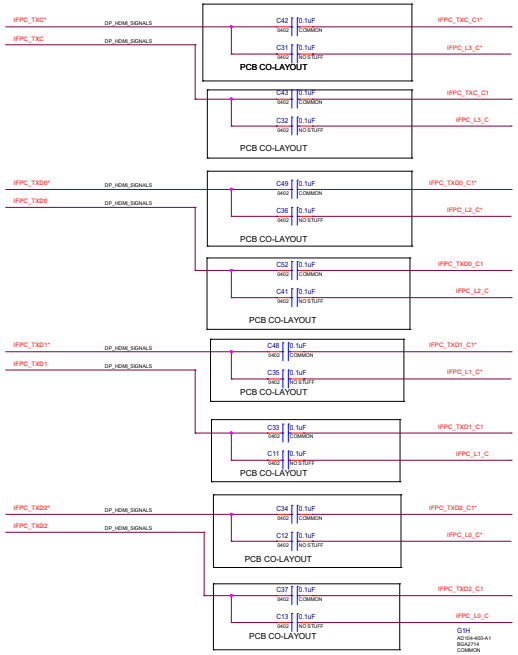
2. DP AUX to DP-DVI dongle: AUX pass through

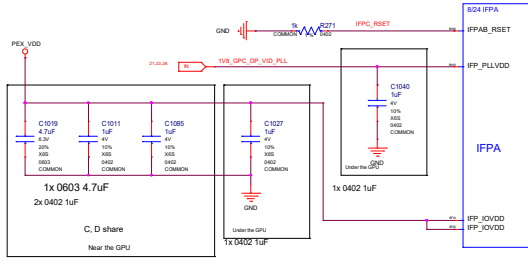
OPTION to replace the MUX IC for HDMI SKU
(cost saving)

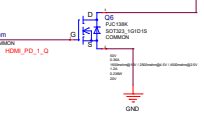


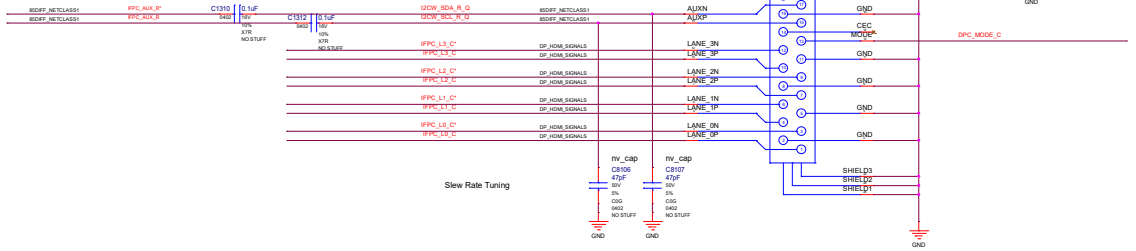
Hotplug Detection

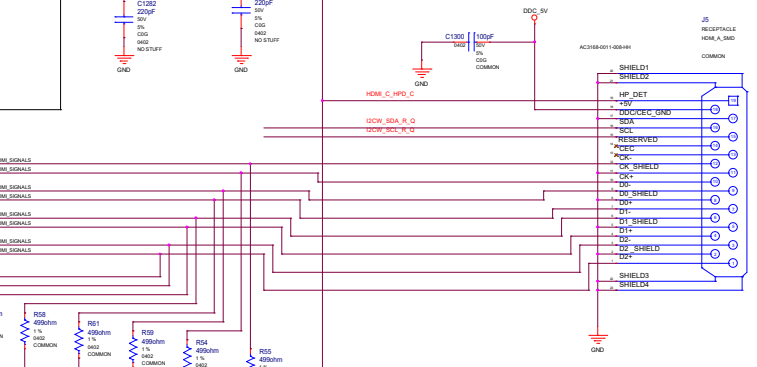












msi	MICRO-STAR INT'L CO.,LTD.		
Title	MS-V513		
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MISC2: ROM, XTAL, Straps

GROUP0

STRAP2	STRAP1	STRAP0	RAMCFG[4:0]	
L	L	L	00000	RAMCFG MICRON 16Gb G6X 24Gbps (161-0480-900)
L	L	H	00001	RAMCFG MICRON 16Gb G6X 21Gbps (161-0479-900)

GROUP1

ROM_SO	ROM_SI	ROM_SCLK	SMARTFAN[2:0],FS_OVERT		1:ENABLE 0:DISABLE	
L	M	L	1001	FAN0/1=33%33%	FS_OVERT ENABLE	<-DEFAULT

GROUP2

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

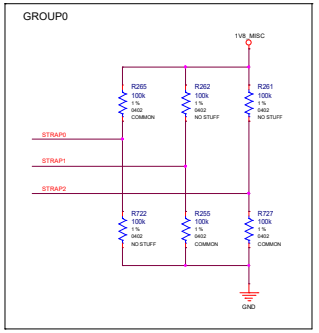
H=High :Tied to 1.8V
M=Middle:Tied to 0.9V
L=Low :Tied to 0V

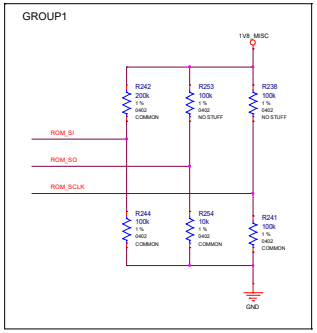
1:SMB_ALT_ADDR ENABLE
0:SMB_ALT_ADDR DISABLE

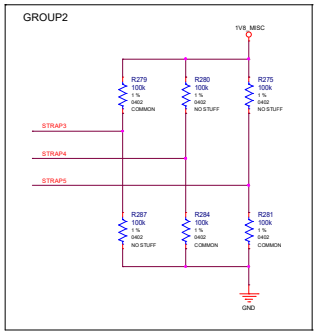
1:DEVID_SEL REBRAND
0:DEVID_SEL ORIGNAL

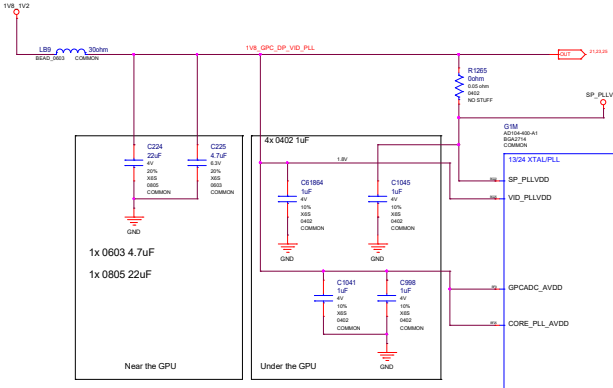
1:PCIE_CFG LOW POWER
0:PCIE_CFG HIGH POWER

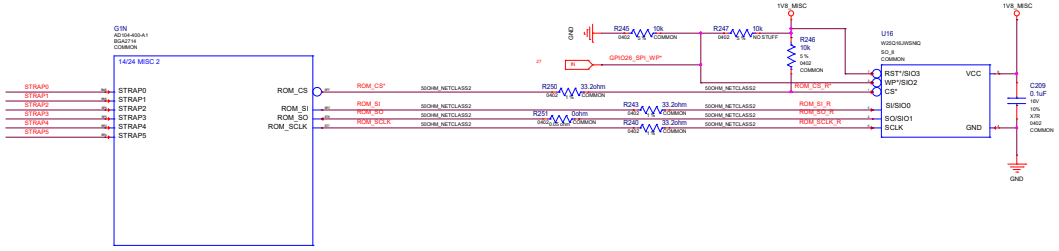
1:VGA_DEVICE ENABLE
0:VGA_DEVICE DISABLE

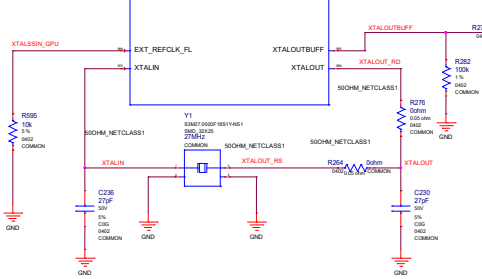












H:I2C Device List1
M:I2C Device List2
L:I2C Device List3

msi	MICRO-STAR INT'L CO.,LTD.	
Title	MS-V513	
Size	Document Number: MISC1: ROM, XTAL,STRAPS	Rev: 10
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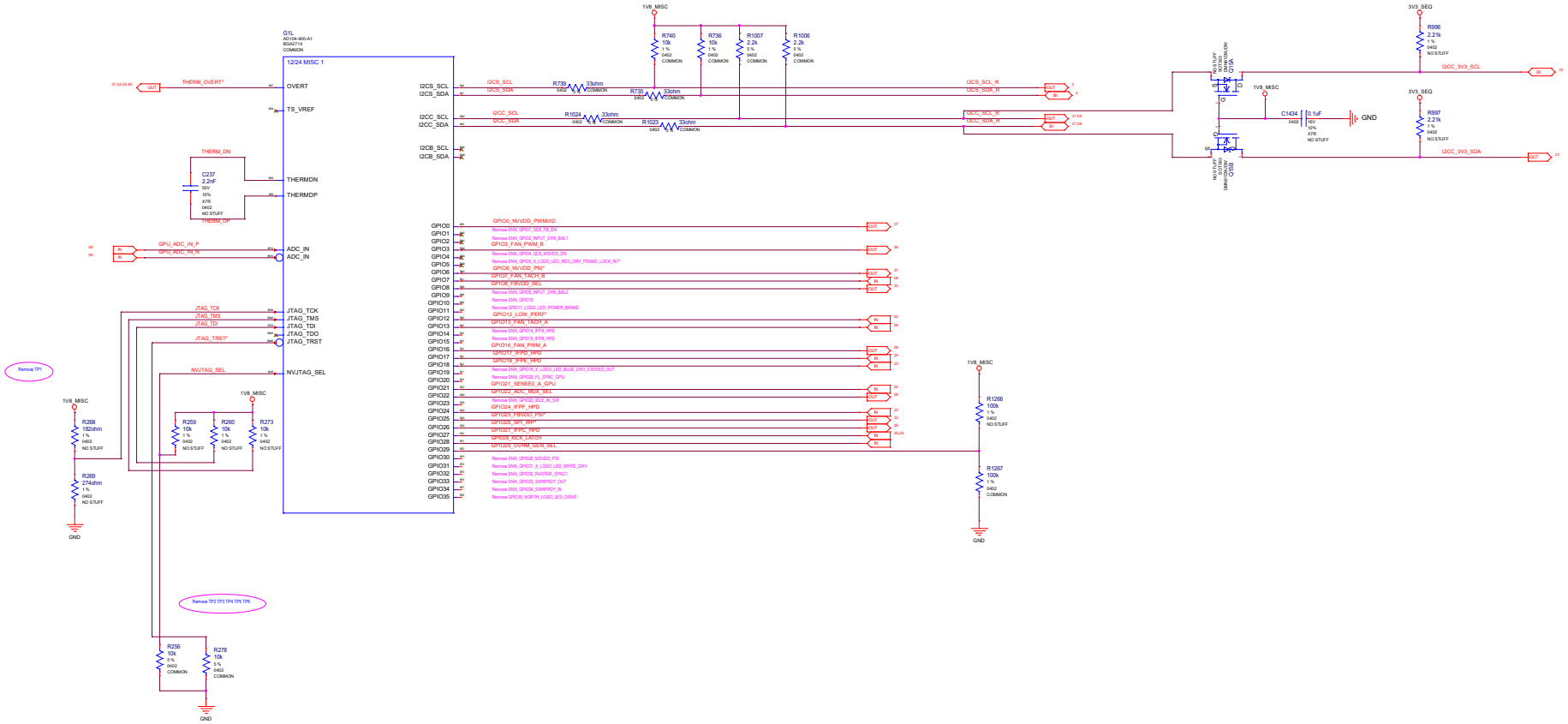
MISC1: JTAG, GPIO, ADC, I2C, OVERT



MICRO-STAR INT'L CO.,LTD.			
Title: MS-V513			
Size	Document Number: MISC2: JTAG,GPIO,ADC,I2C		Rev: 10
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X/V RGB LED

DELETED ID LED CKT; NOT SUPPORTED ON MEITNER

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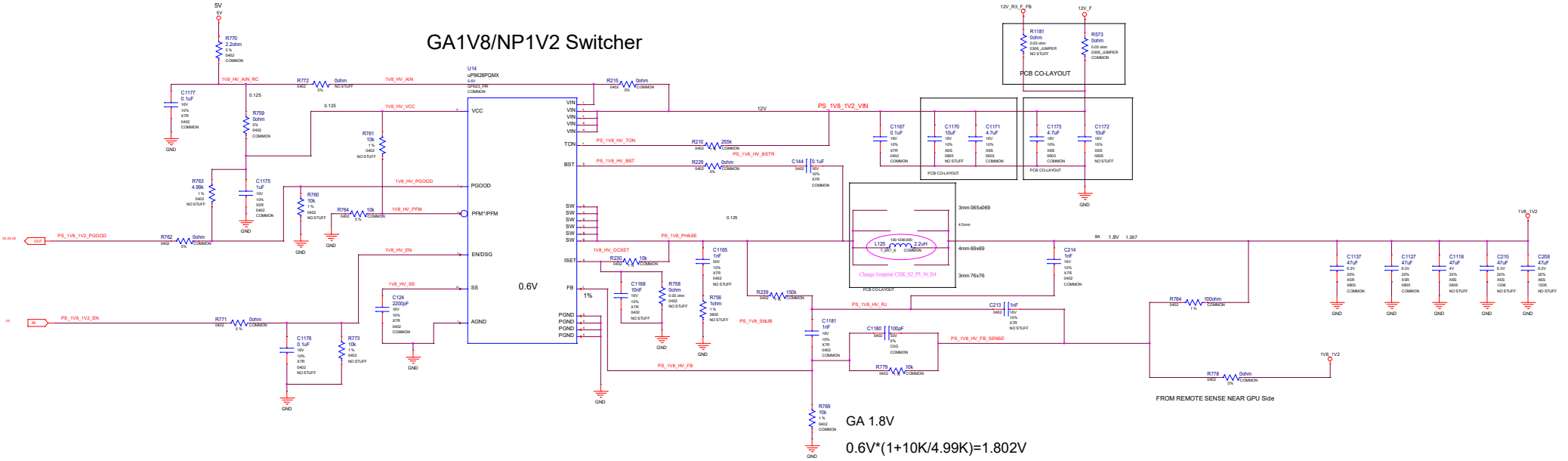
PS: GA1V8/NP1V2

GA1V8/NP1V2 Switcher



GA 1.8V

0.6V*(1+10K/4.99K)=1.802V

NP 1.2V

0.6V*(1+10K/10K)=1.2V

msi MICRO-STAR INT'L CO.,LTD.			
Title	MS-V513		
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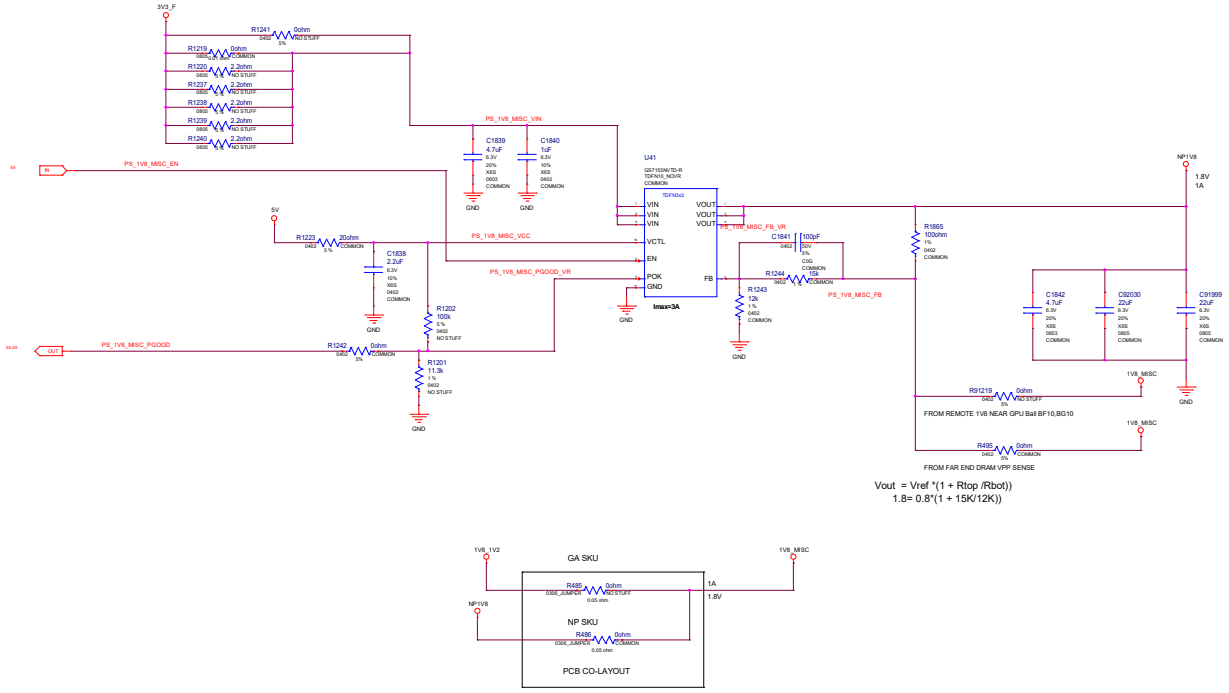
NP1V8



msi MICRO-STAR INT'L CO.,LTD.		
Title: MS-V513		
Size	Document Number: PS:NP1V8,1V8_MISC	Rev: 10
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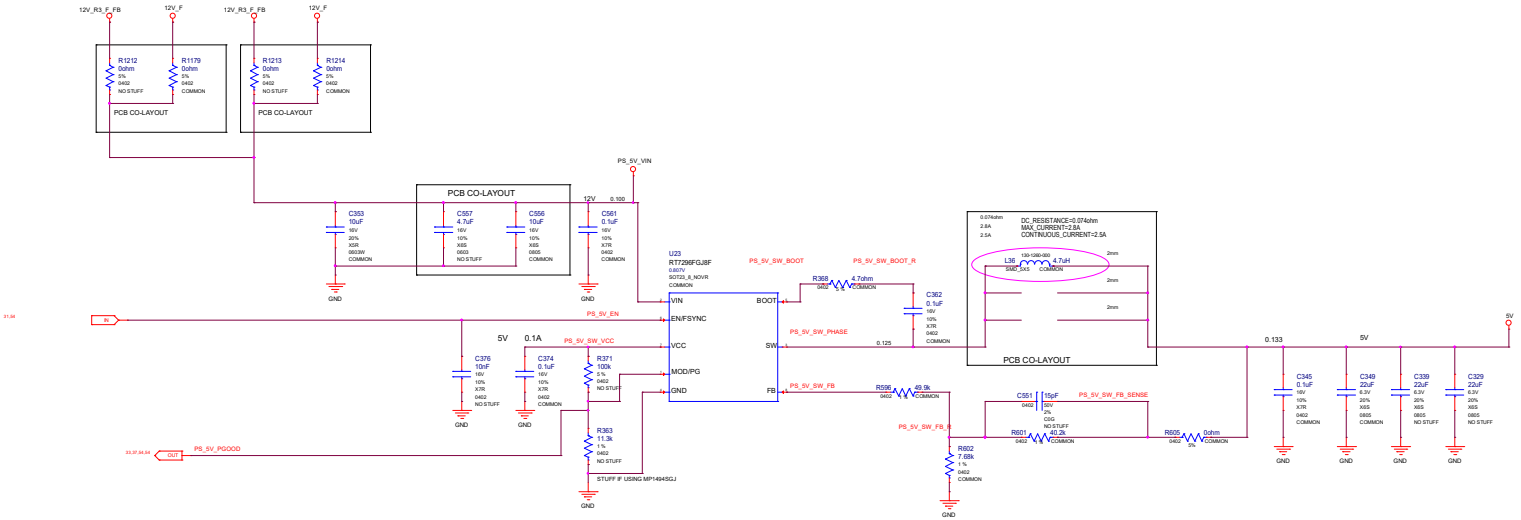
PS: 5V



Vout = Vref *(1 + Rtop /Rbot))

0.807V*(1+40.2K/7.68K)=5.03V

RIPPLE CURRENT=1.24A FOR 12V->5V 500KHz 4.7uH

msi MICRO-STAR INT'L CO.,LTD.			
Title: MS-V513			
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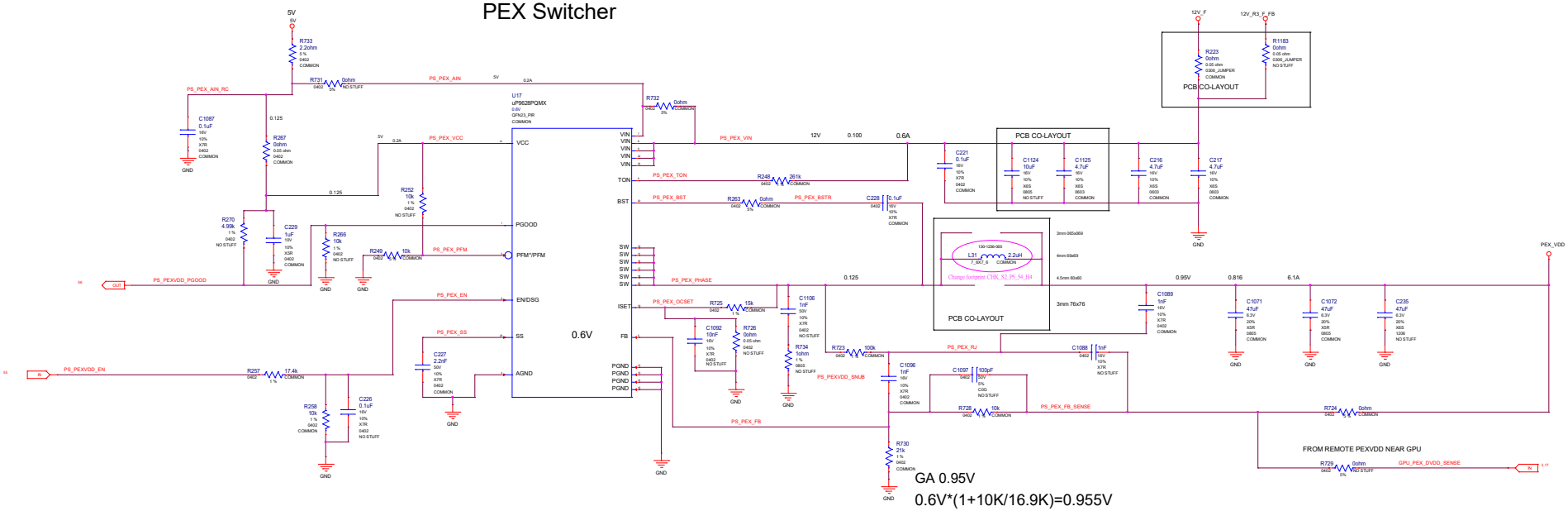
PS: PEXVDD

PEX Switcher



GA 0.95V

0.6V*(1+10K/16.9K)=0.955V

NP 0.9V

0.6V*(1+10K/20K)=0.900V

msi	MICRO-STAR INT'L CO.,LTD.	
Title	MS-V513	
Size	Document Number: PS: PEXVDD	Rev: 10
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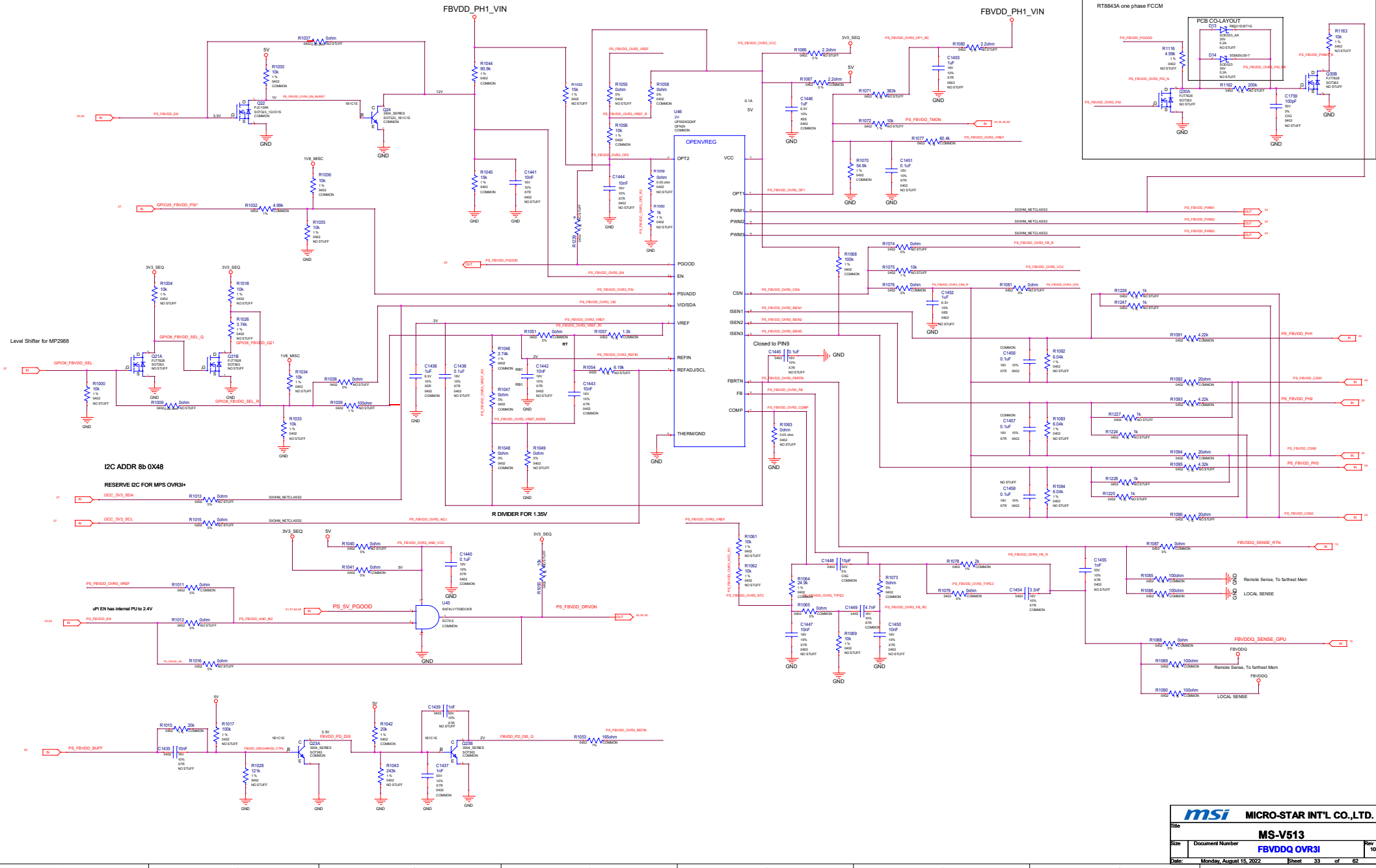
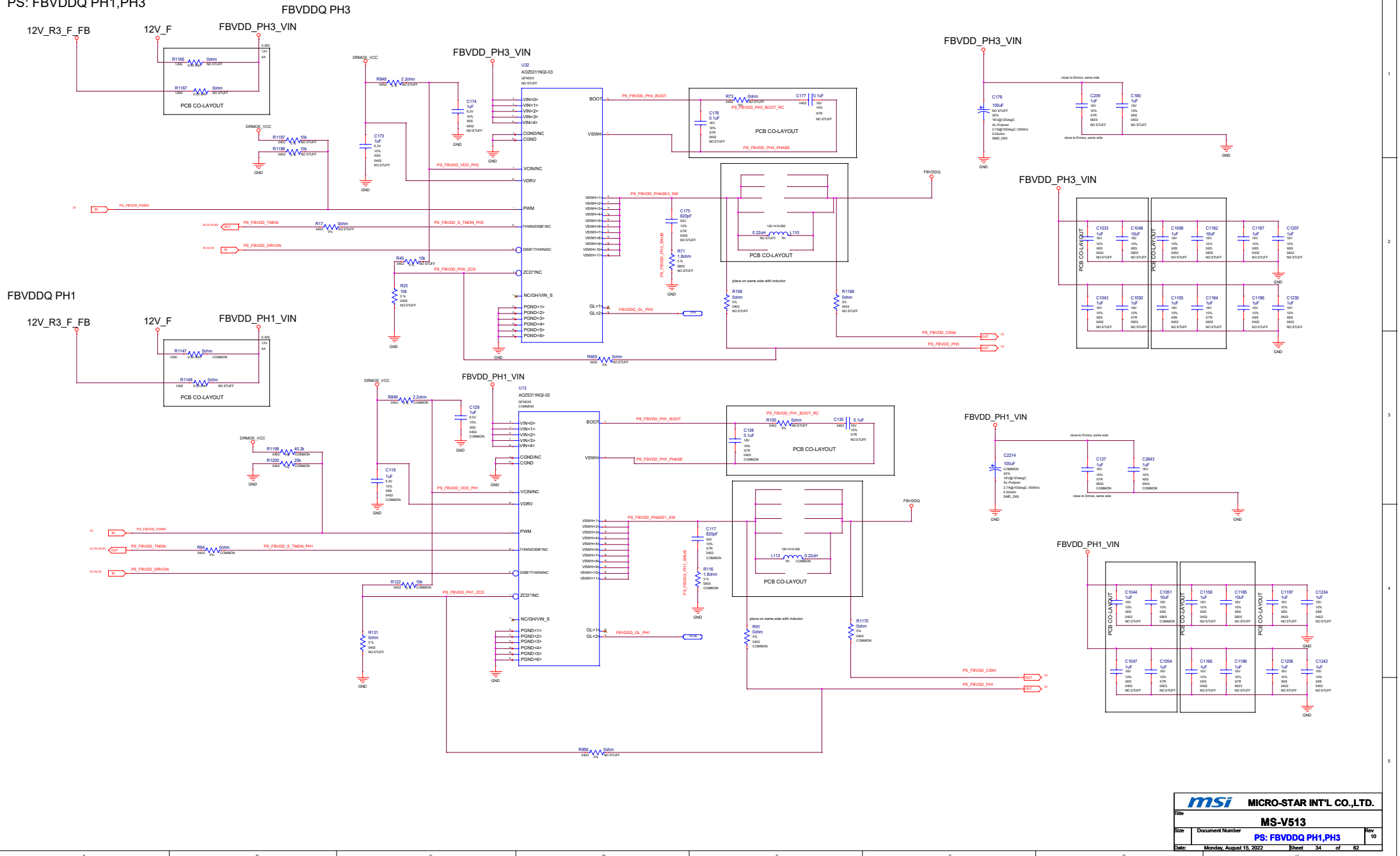
PS: FBVDDQ OVR3



PS: FBVDDQ PH1,PH3



Title	MICRO-STAR INT'L CO.,LTD.		
	MS-V513		
Size	Document Number		Rev
	PS: FBVDDQ PH1,PH3		10
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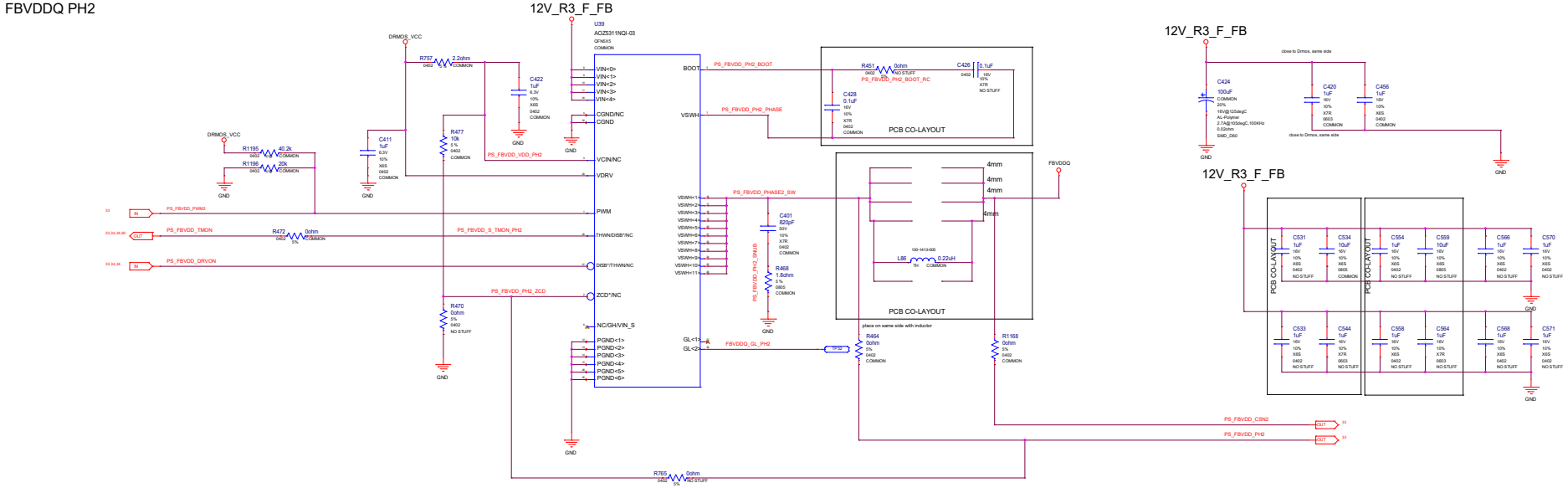
PS: FBVDDQ PH2



msi MICRO-STAR INT'L CO.,LTD.			
Title	MS-V513		
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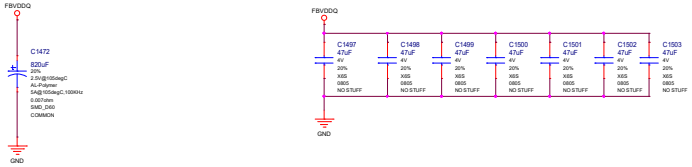
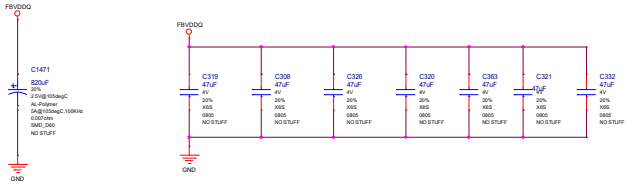
FBVDDQ OUTPUT CAP

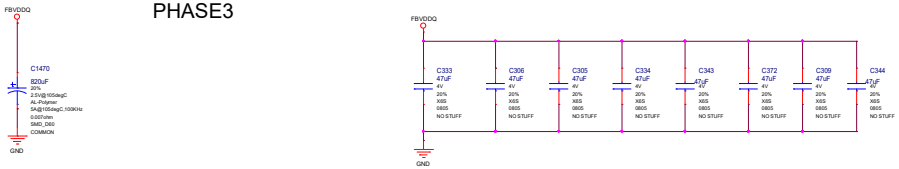
PHASE1



PHASE2



PHASE3



MICRO-STAR INT'L CO.,LTD.		
Title: MS-V513		
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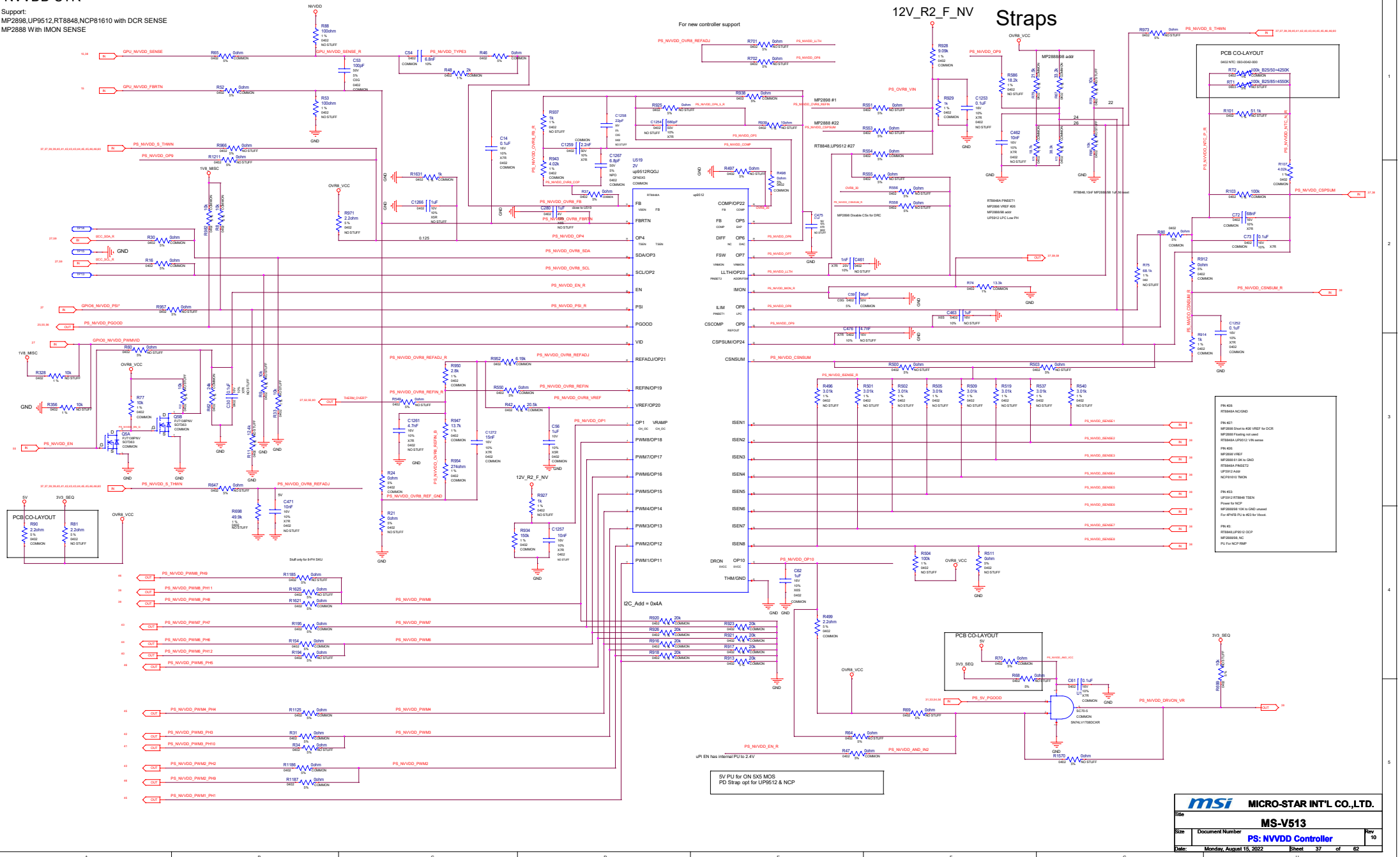
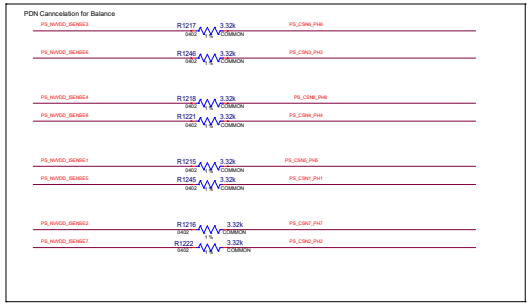
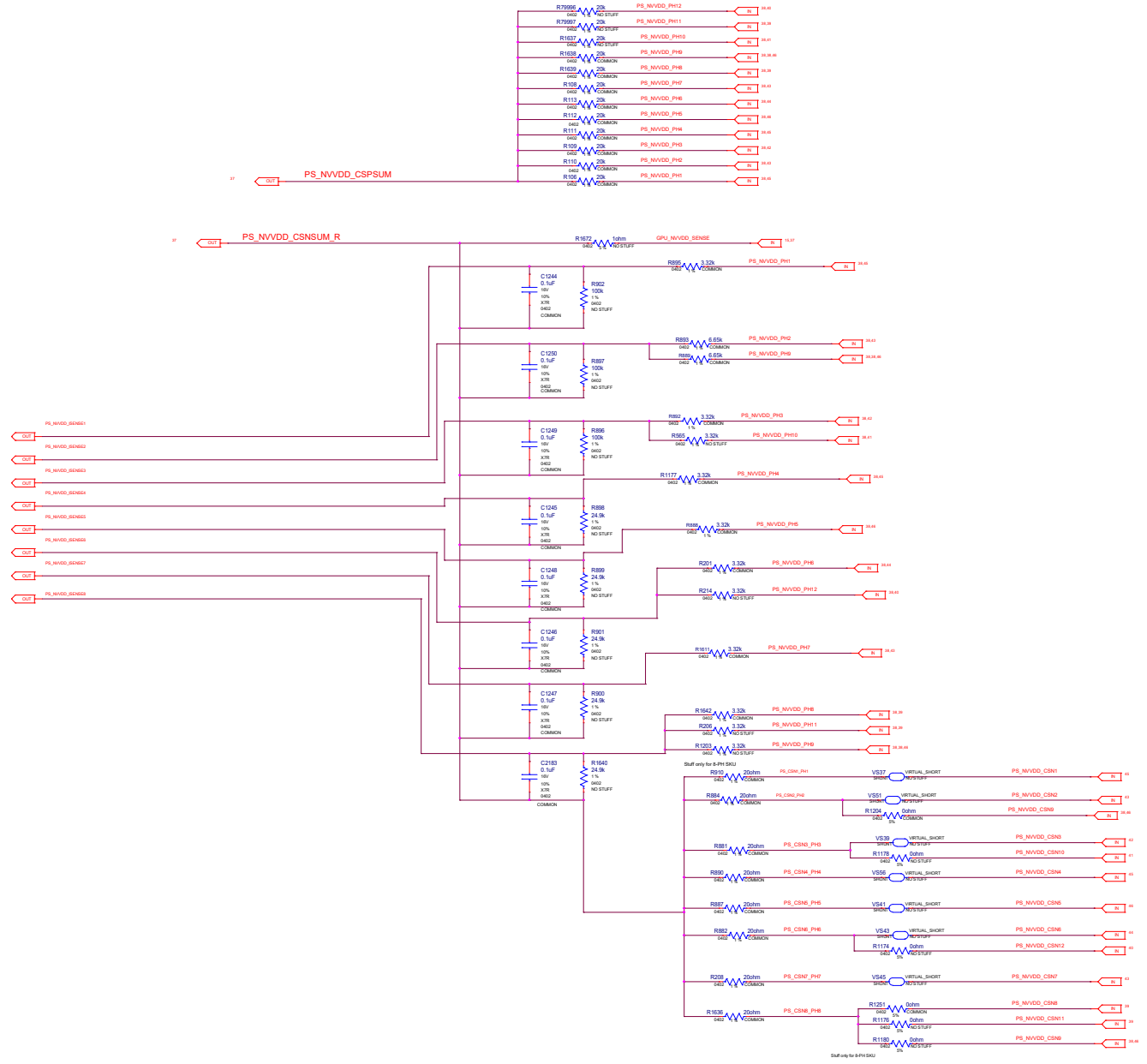
NVVDD CTR

Support:
MP2898,UP9512,RT8848,NCP81610 with DCR SENSE
MP2888 With IMON SENSE



NVVDD PDN Cancellation





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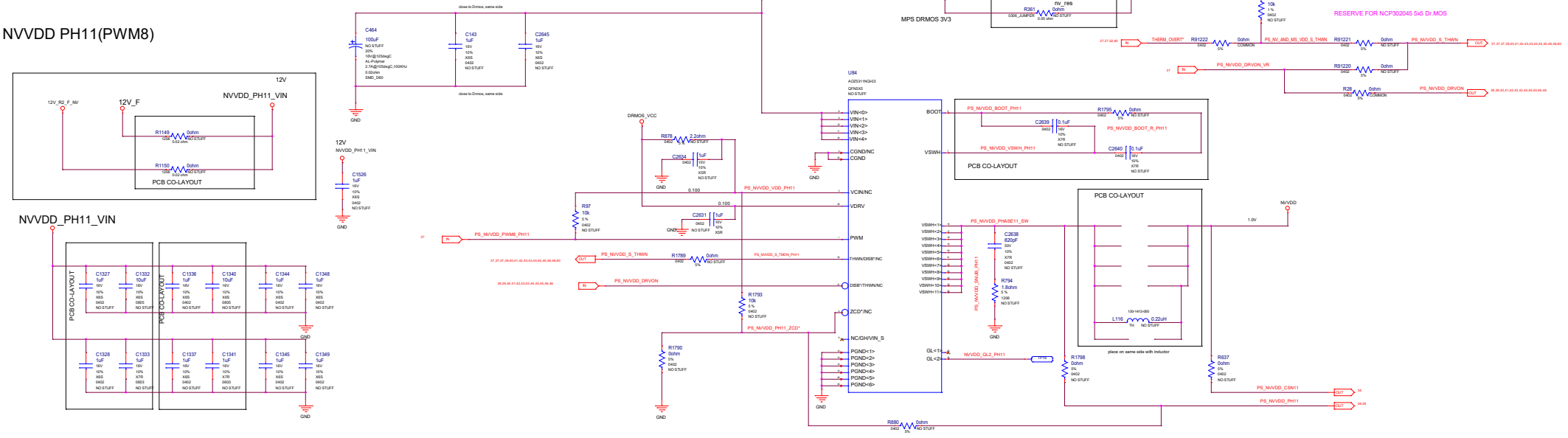
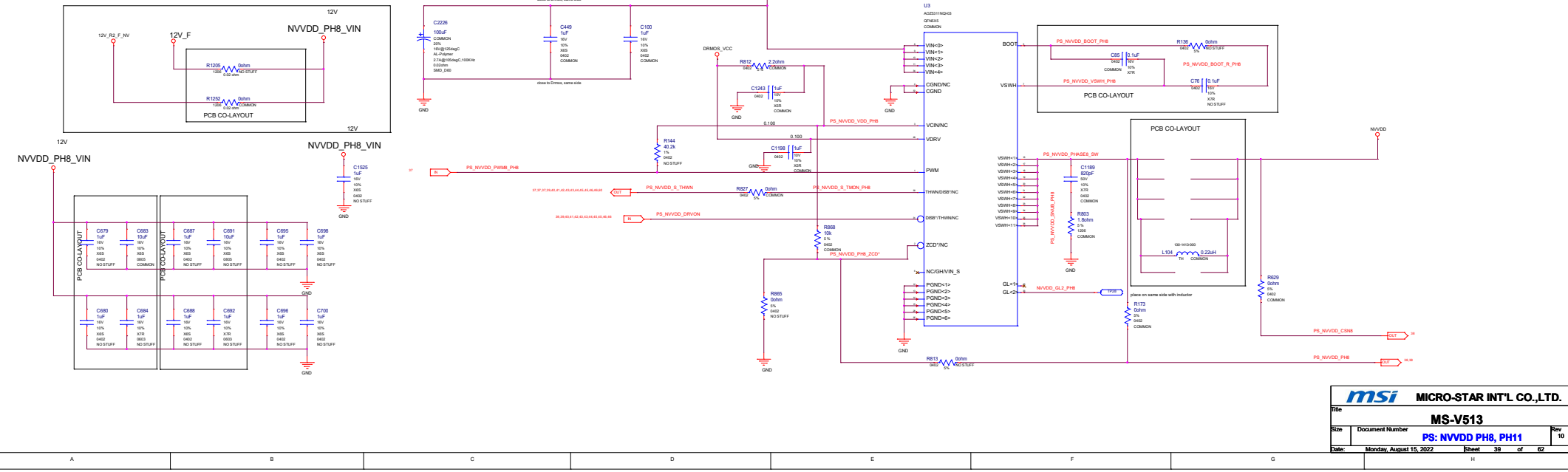
NVVDD PH11 & PH8

NVVDD PH11(PWM8)



NVVDD PH8(PWM8)



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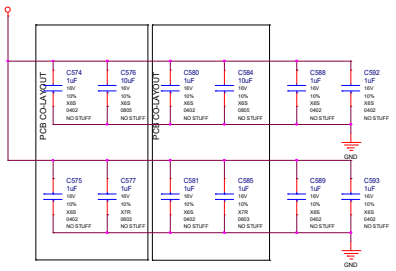
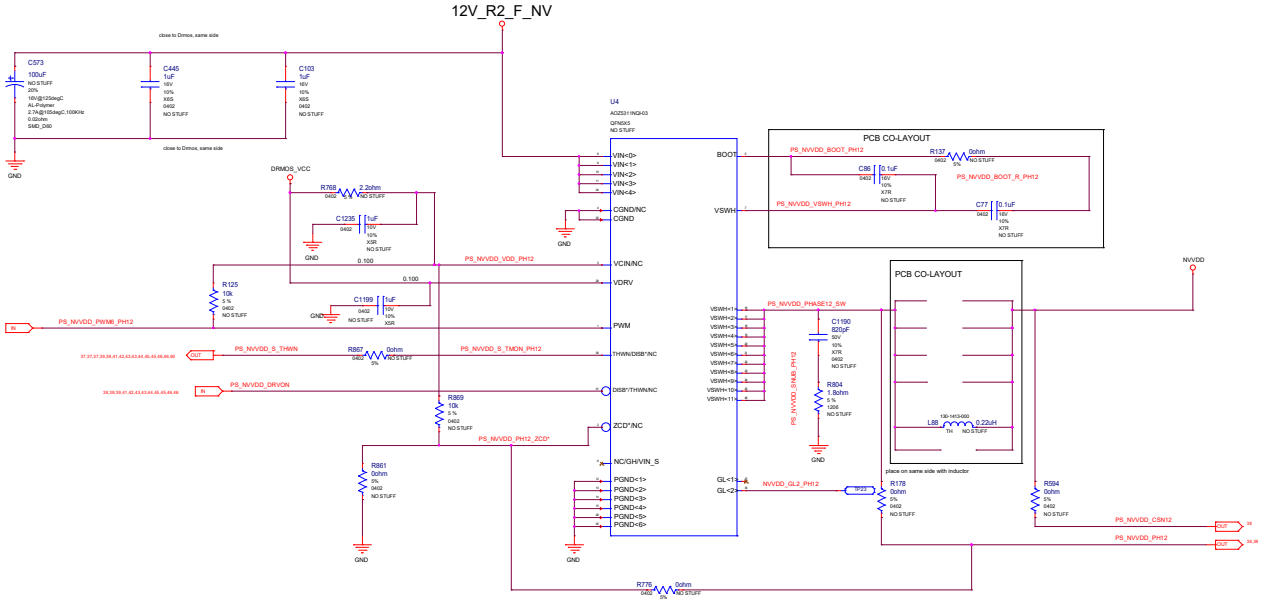
NVVDD PH12

NVVDD PH12(PWM6)

12V_R2_F_NV



12V_R2_F_NV



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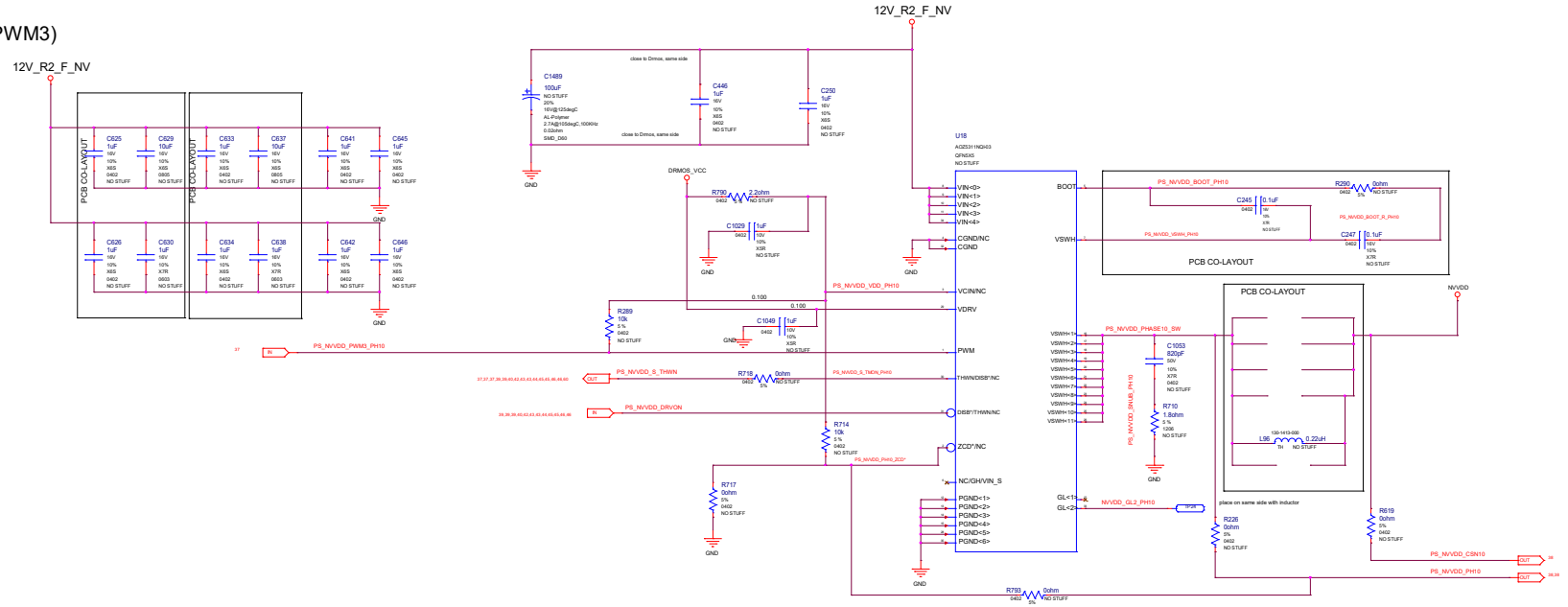
NVVDD PH10

NVVDD PH10(PWM3)



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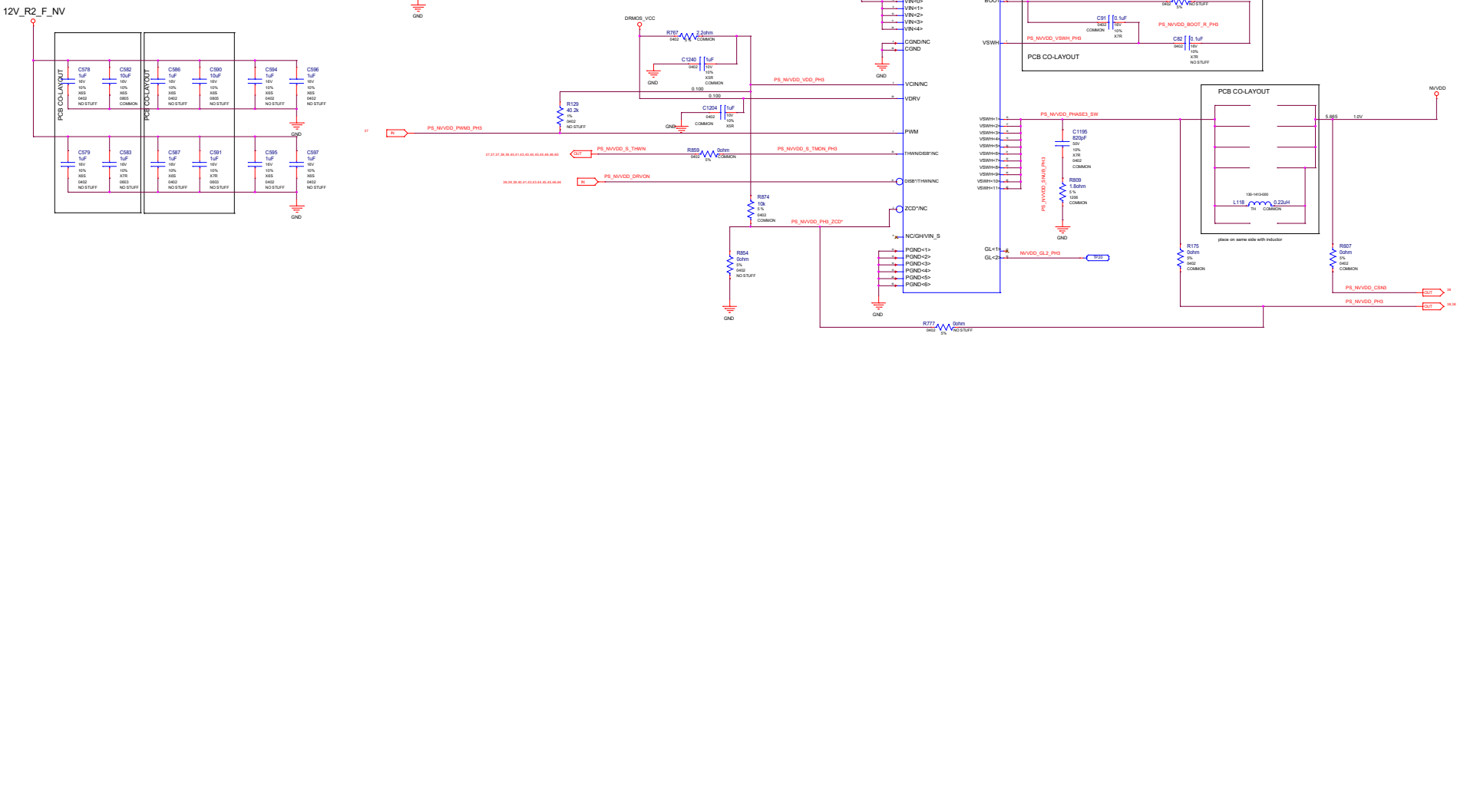
NVVDD PH3

NVVDD PH3(PWM3)



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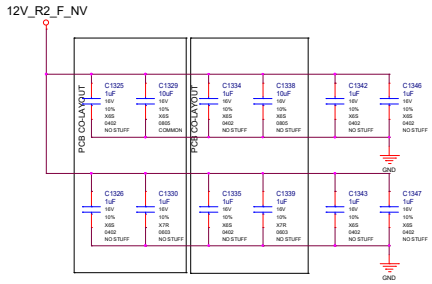
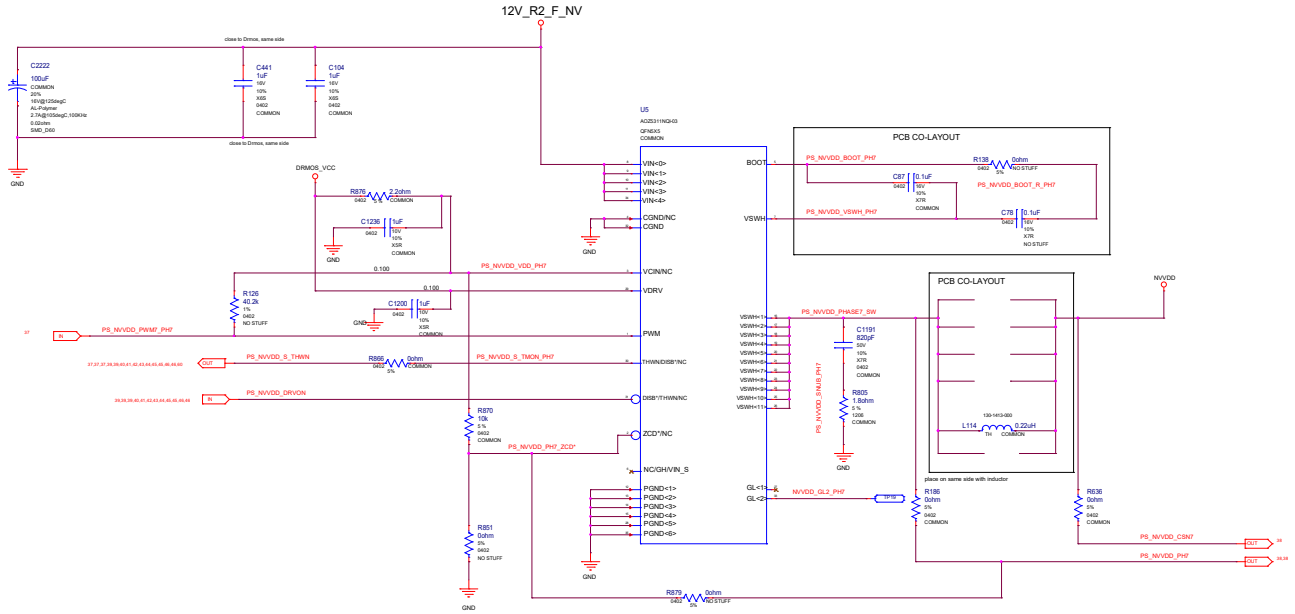
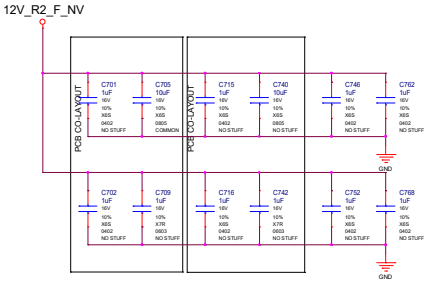
NVVDD PH2 & PH7

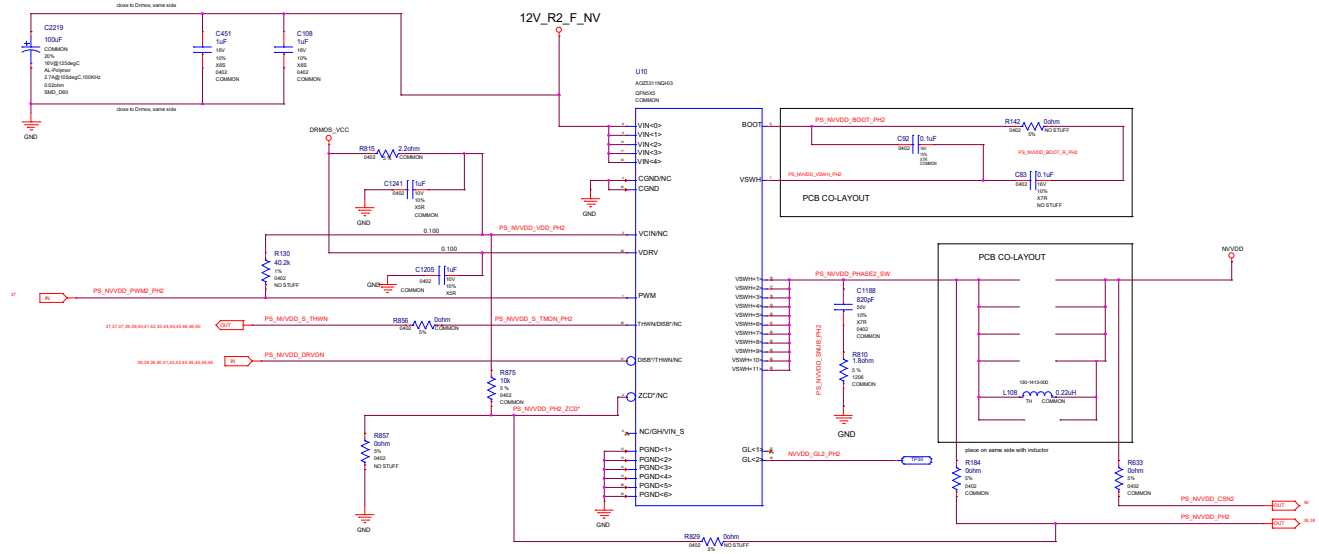
NVVDD PH7(PWM7)





NVVDD PH2(PWM2)





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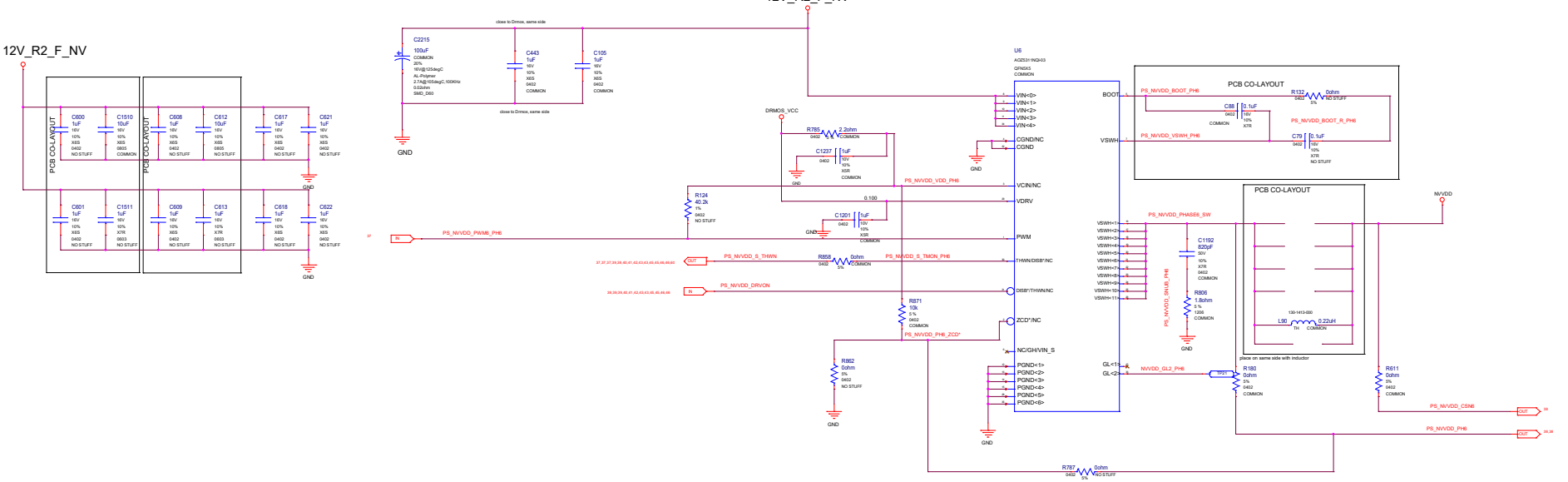
NVVDD PH6

NVVDD PH6(PWM6)



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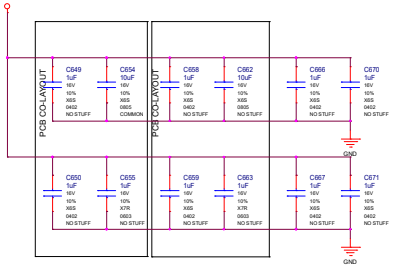
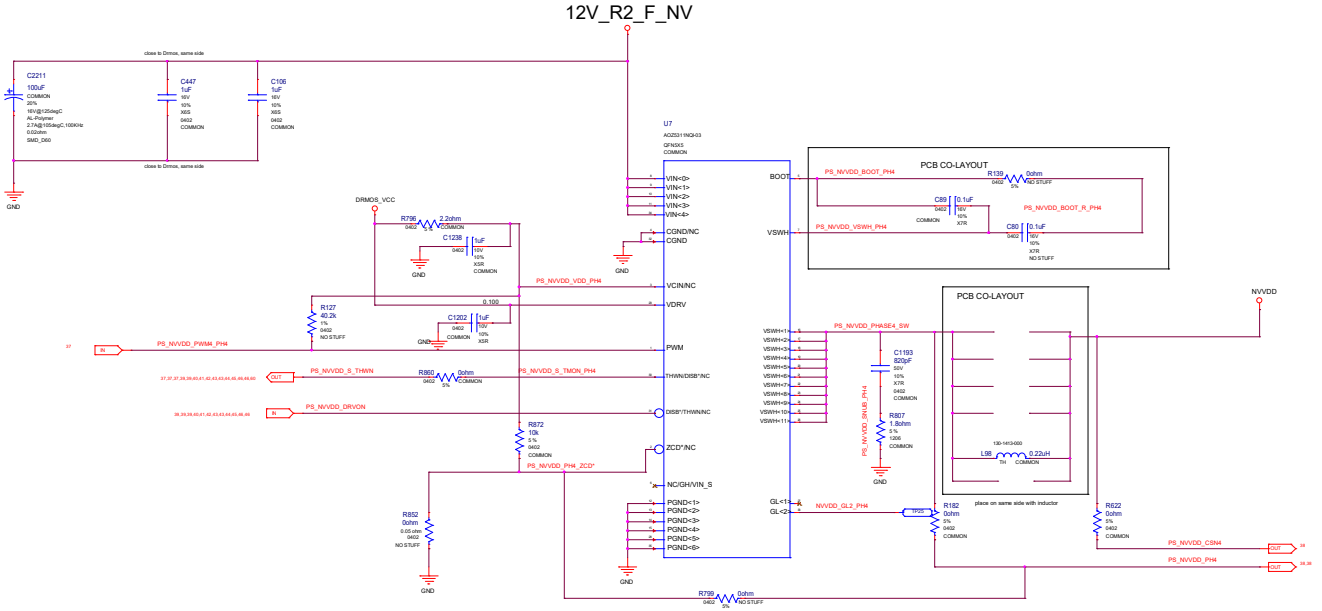
NVVDD PH1 & PH4

NVVDD PH4(PWM4)

12V_R2_F_NV

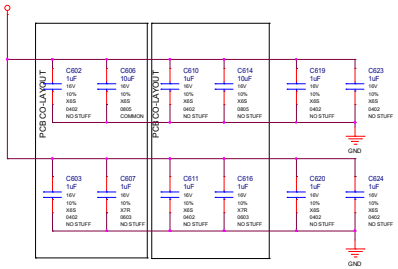


12V_R2_F_NV

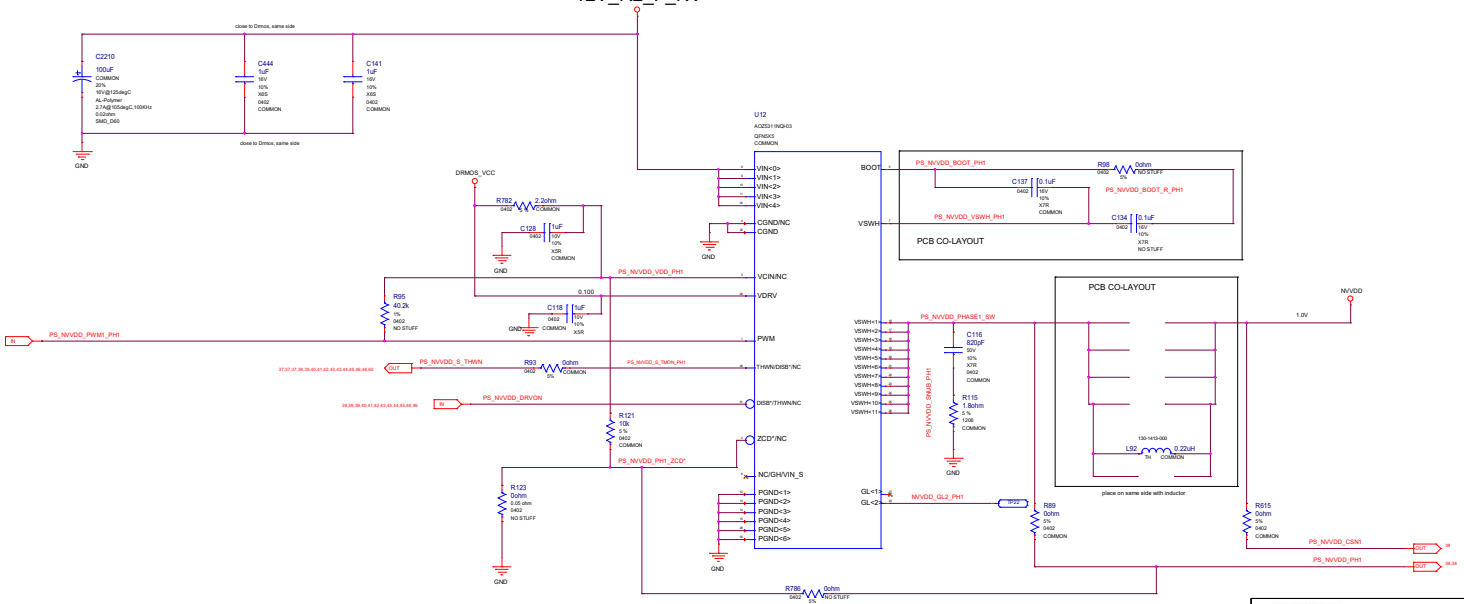


NVVDD PH1(PWM1)

12V_R2_F_NV



12V_R2_F_NV



msi MICRO-STAR INT'L CO.,LTD.		
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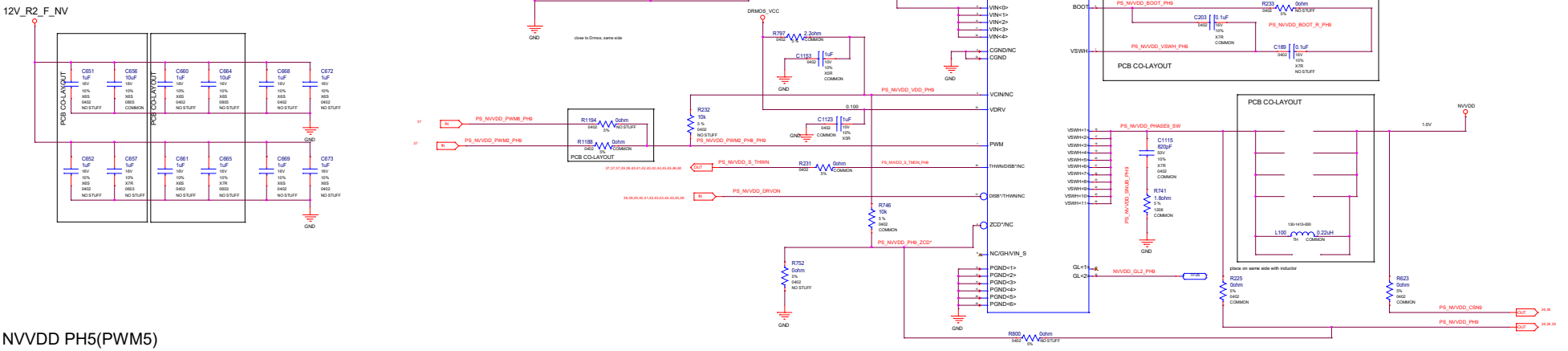
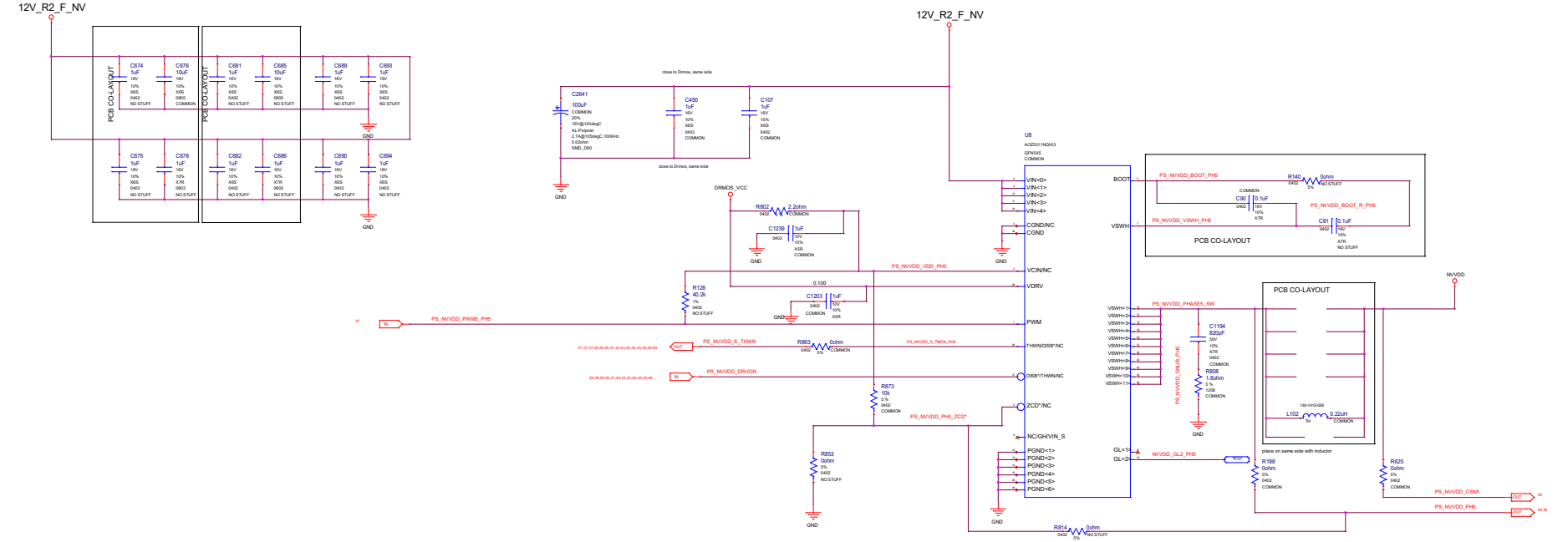
NVVDD PH9 & PH5

NVVDD PH9(PWM2)



NVVDD PH5(PWM5)



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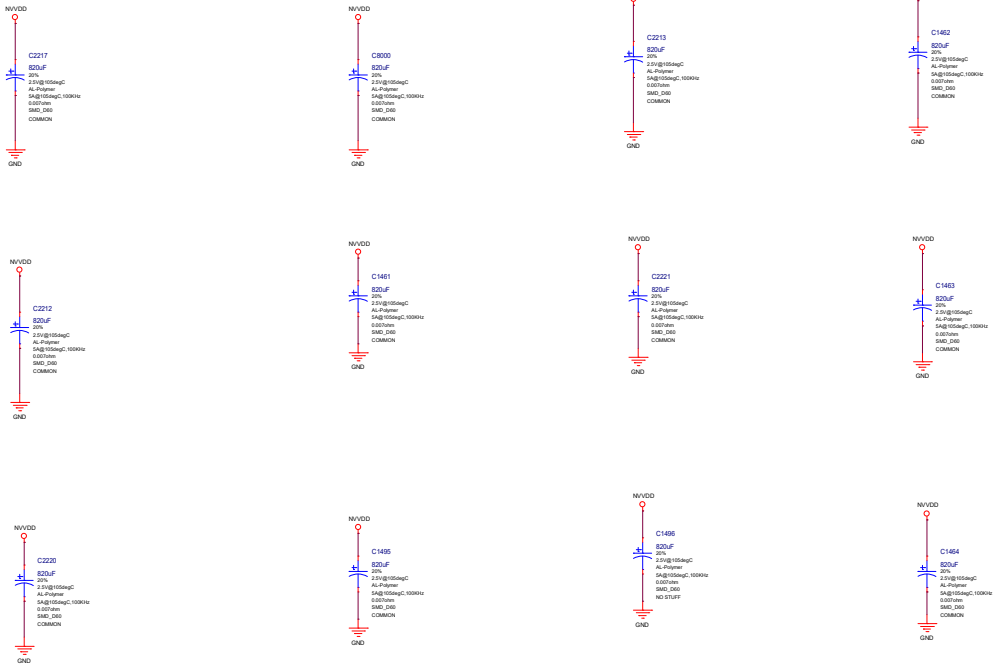
NVVDD OUTPUT CAP 1

12xD60



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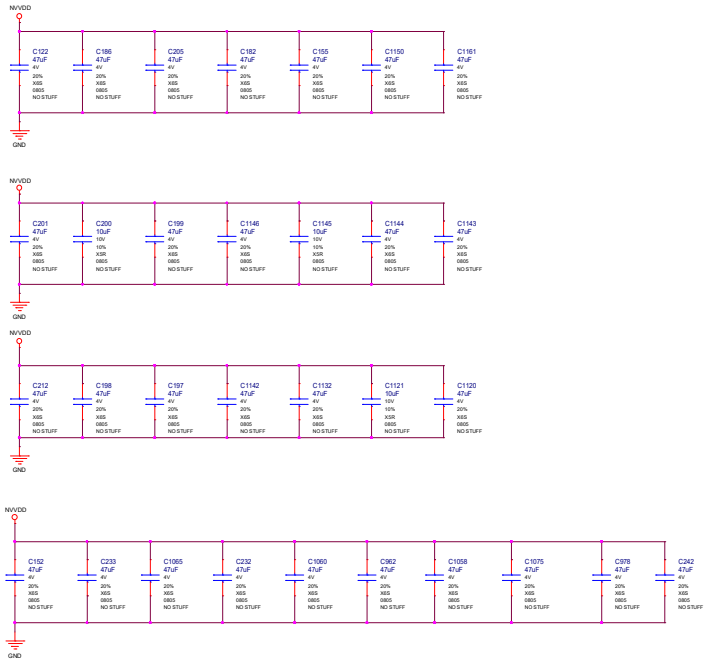
NVVDD OUTPUT CAP 2



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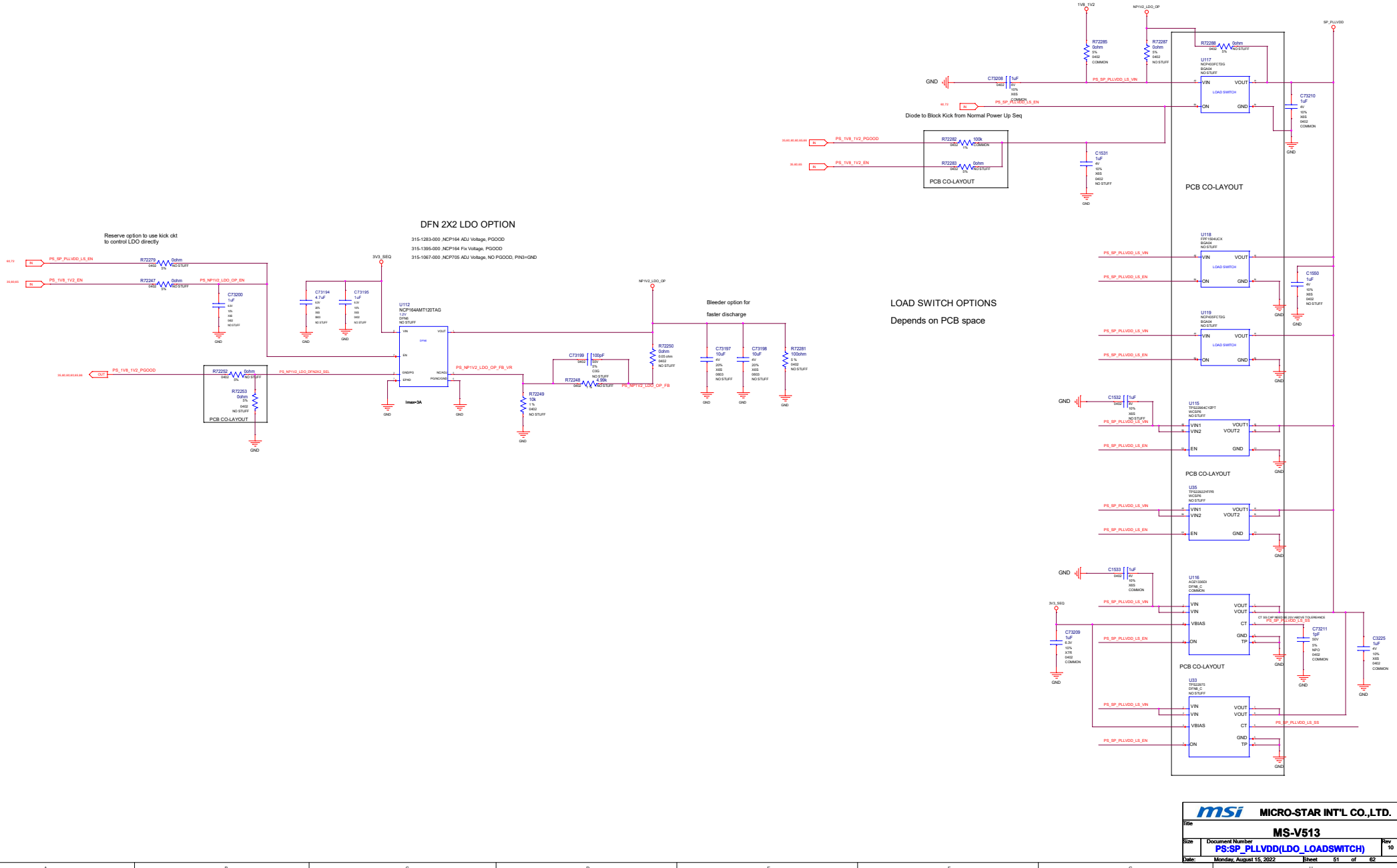
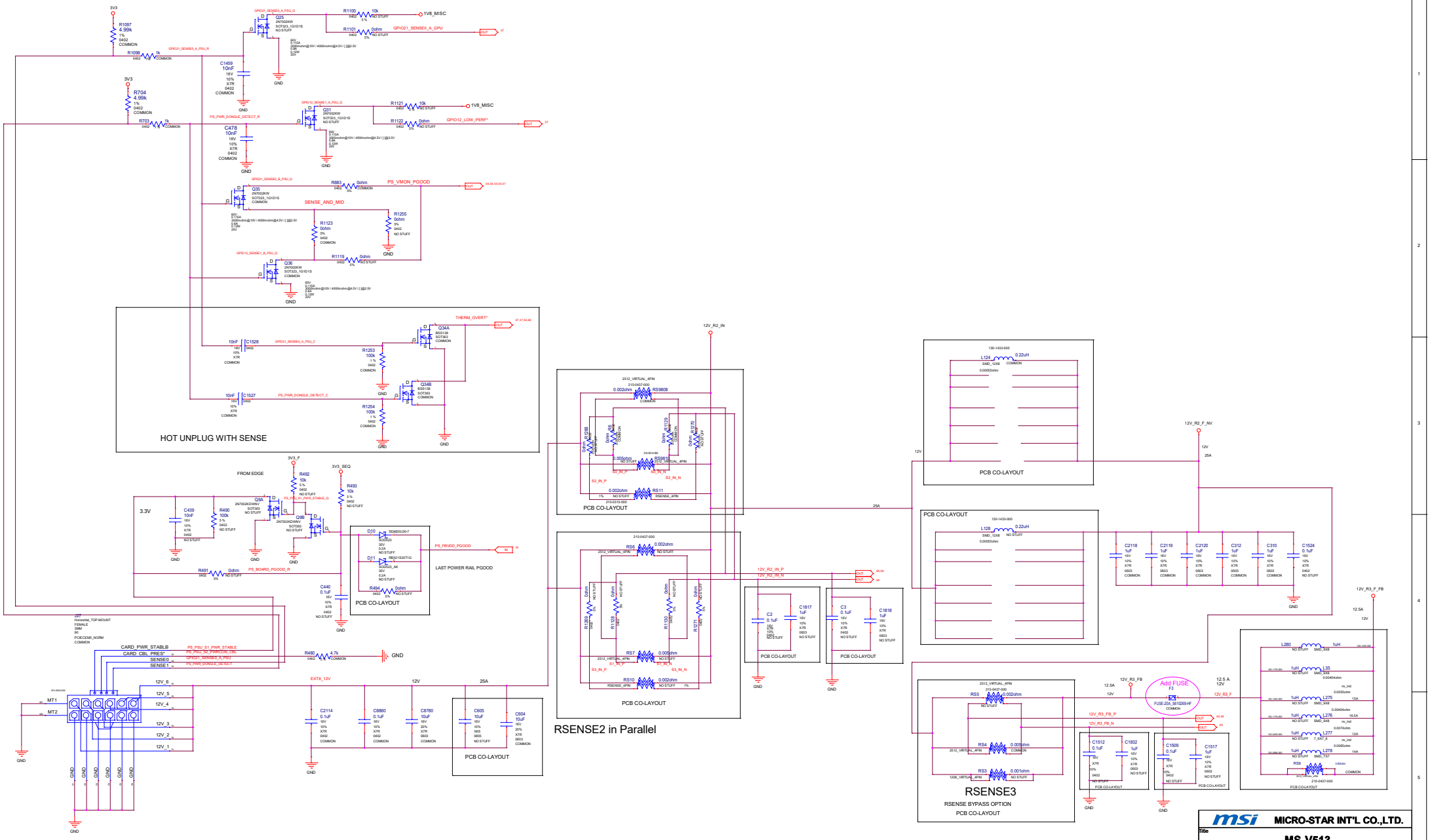
SPPLLVDD_LDO_LOADSWITCH

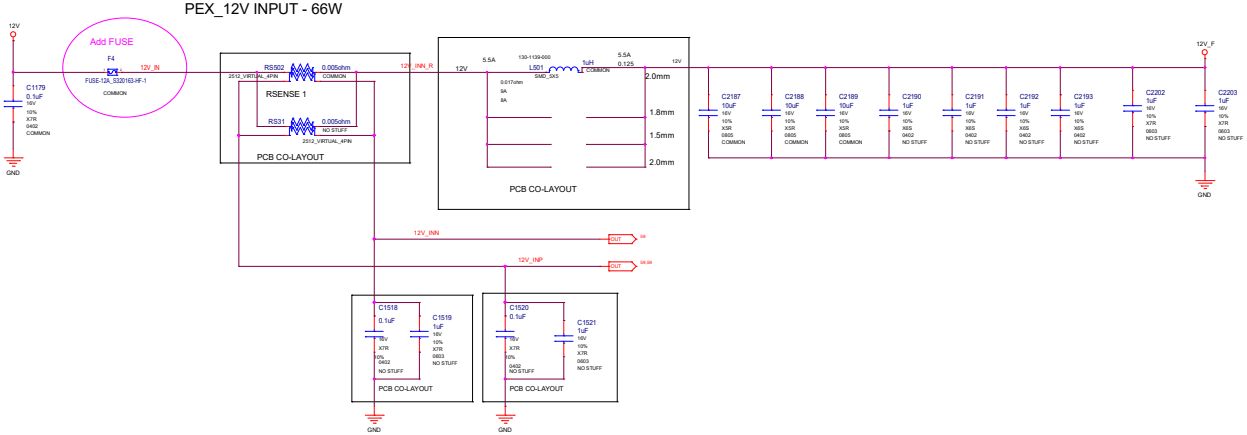


12V_EXT_INPUT, FILTERING

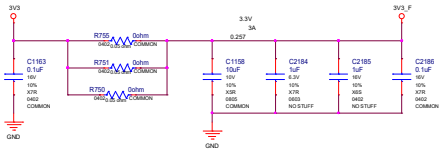


PEX_INPUT & FILTERING, PEX_3V3

PEX_12V INPUT - 66W



PEX 3V3 INPUT - 10W



msi	MICRO-STAR INT'L CO.,LTD.	
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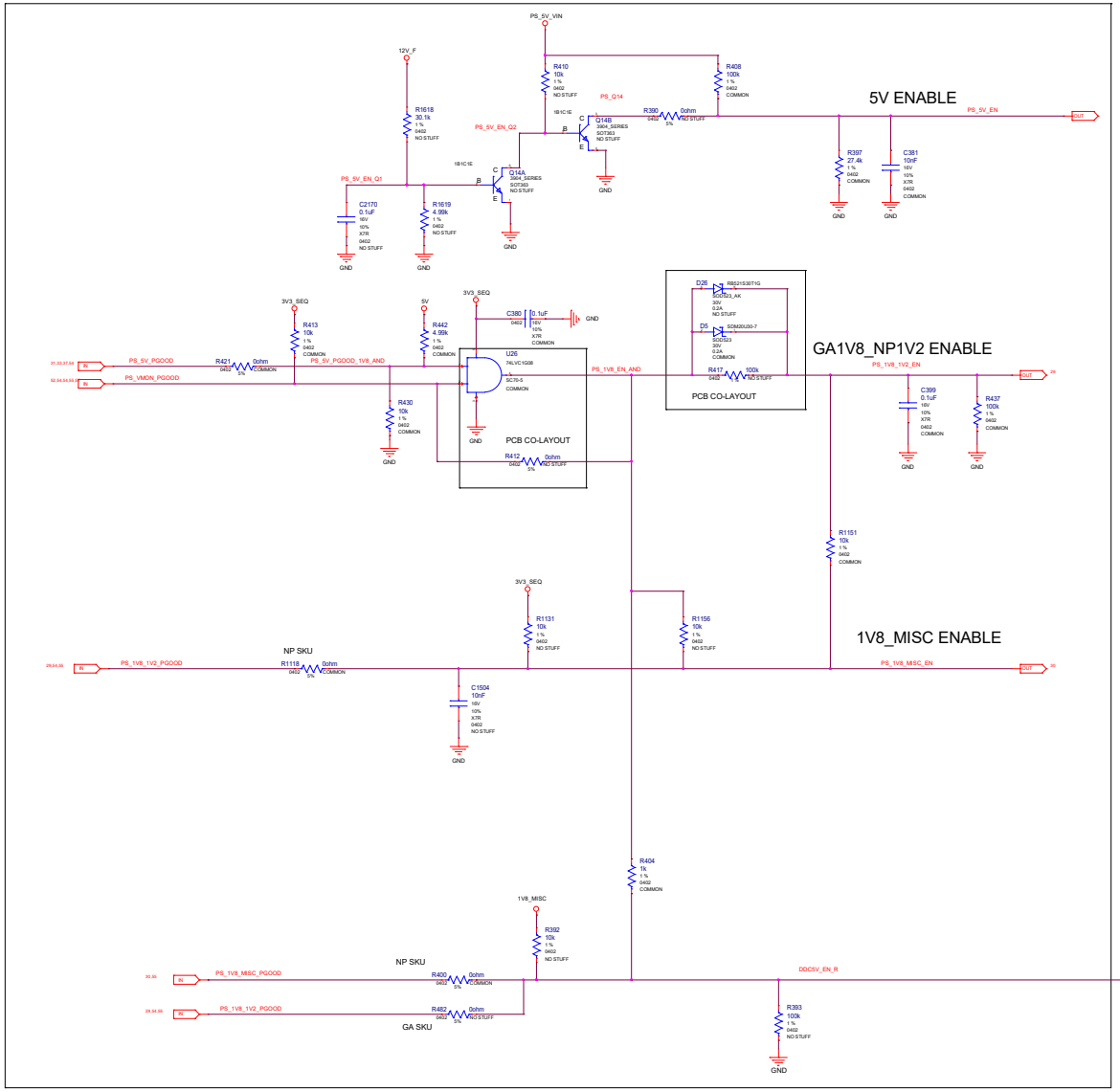
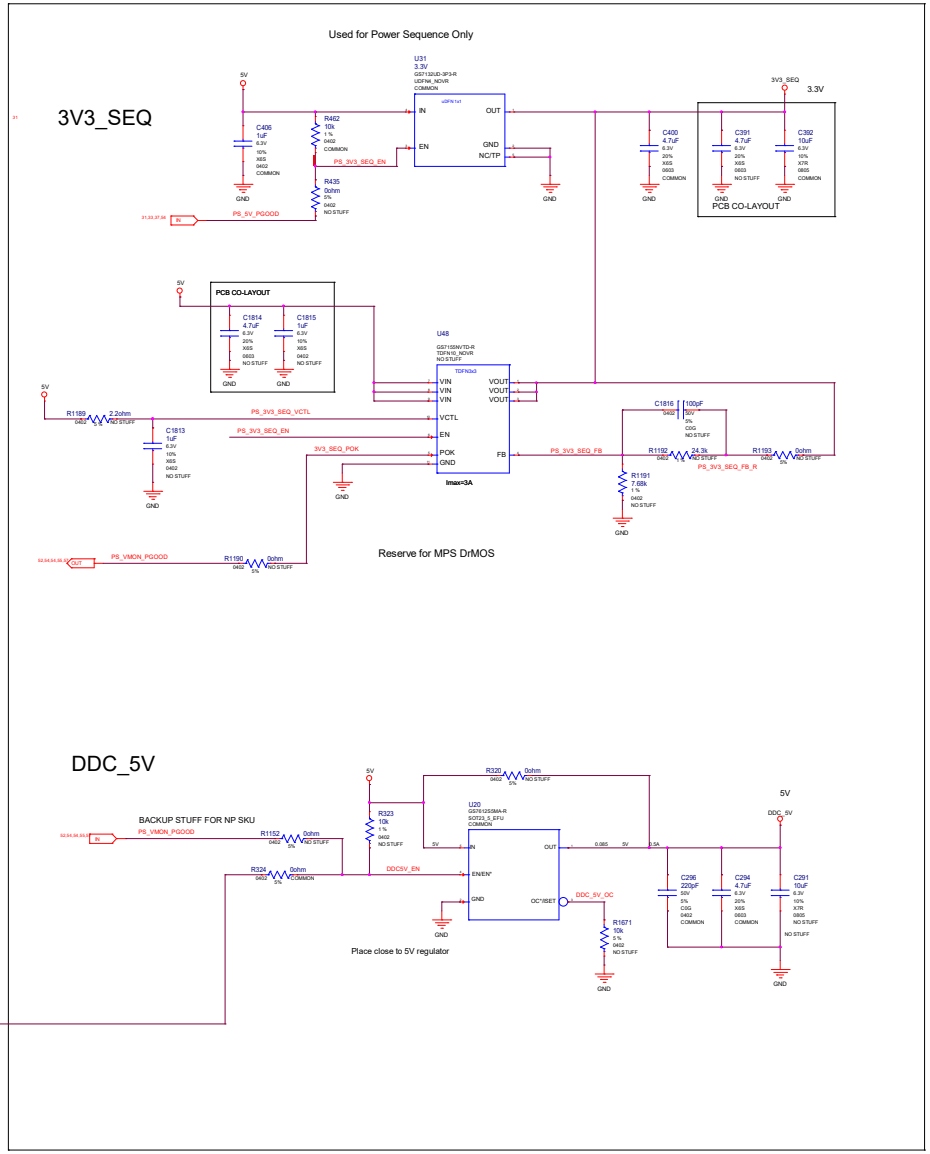
SEQ: 5V, 1V8, 3V3_SEQ, DDC_5V





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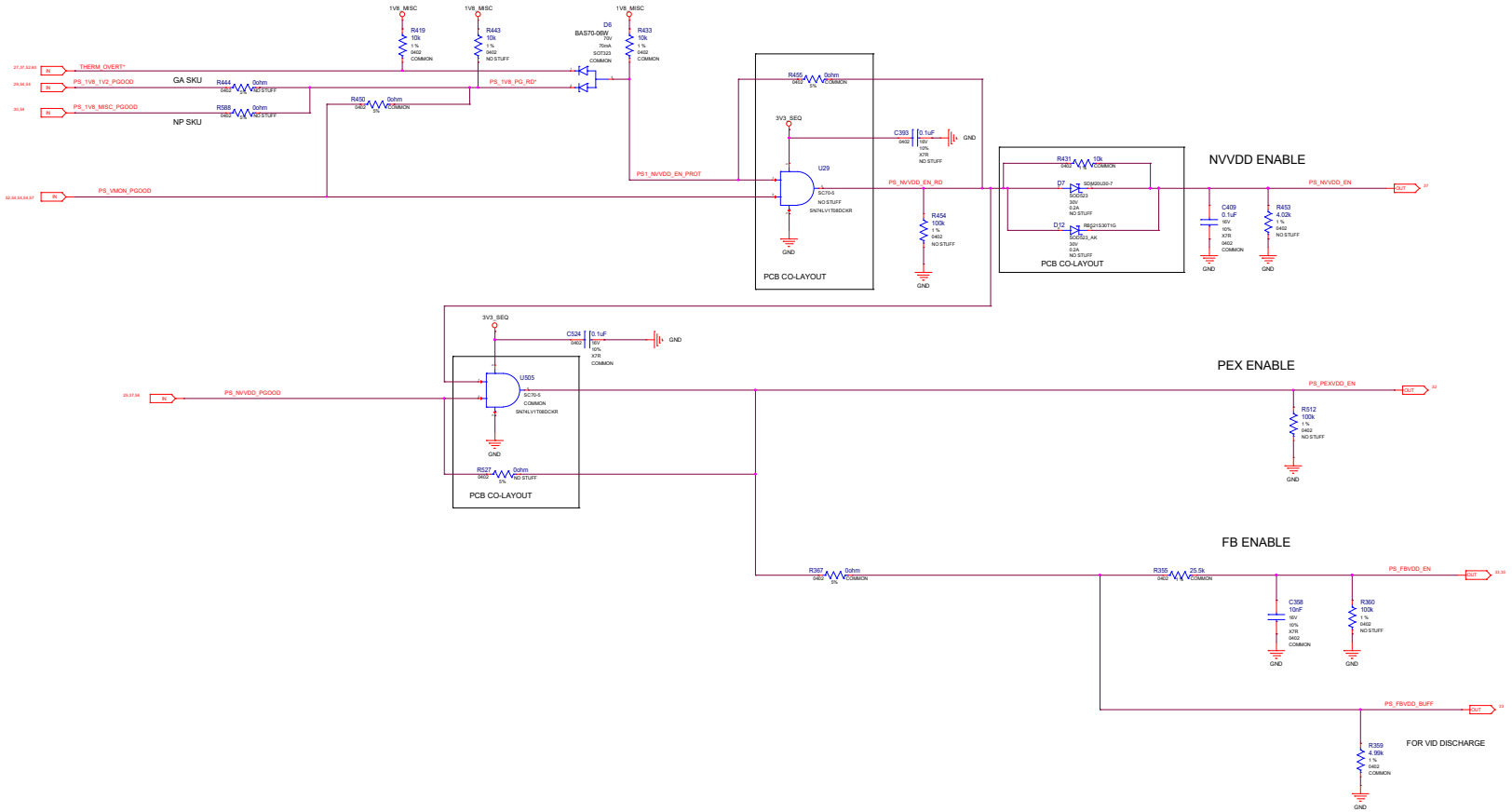
SEQ:NVVDD, PEX, FBVDDQ ENABLE



msi MICRO-STAR INT'L CO.,LTD.			
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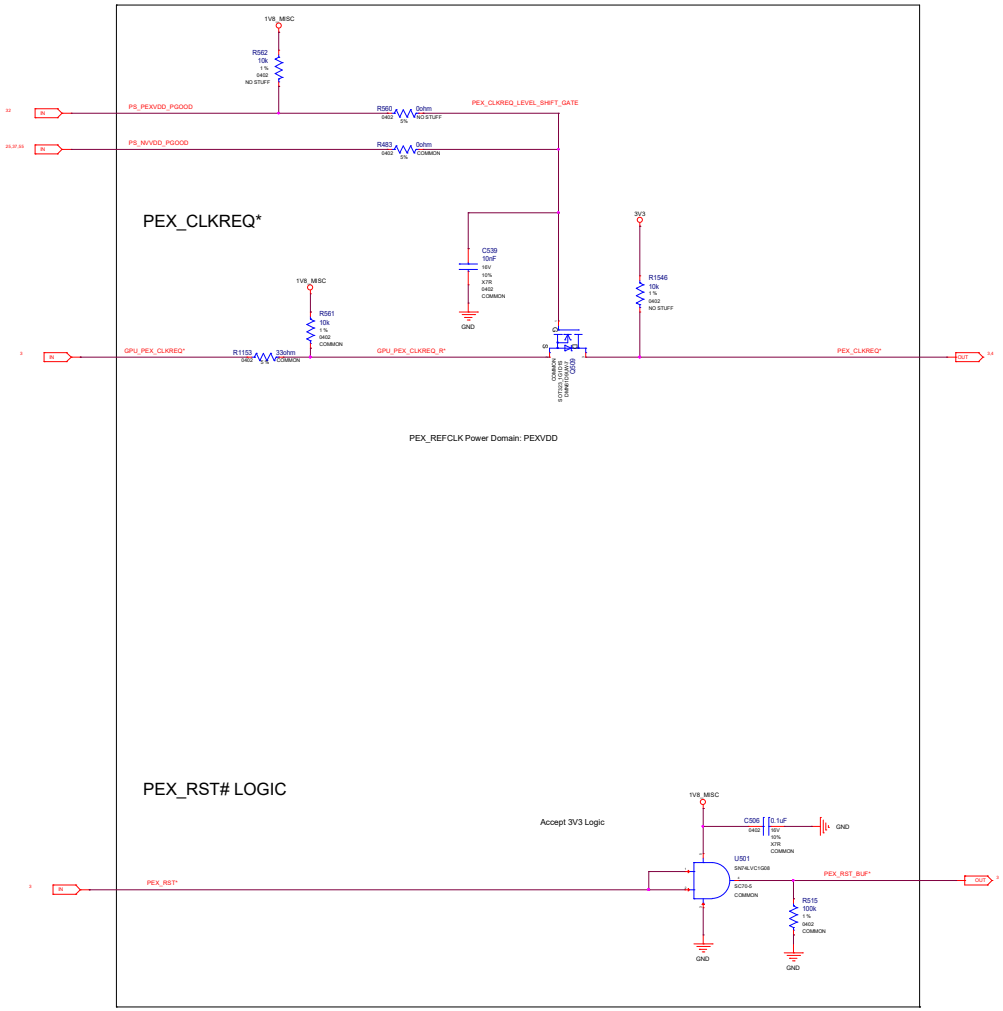
SEQ:MISC



msi MICRO-STAR INT'L CO.,LTD.			
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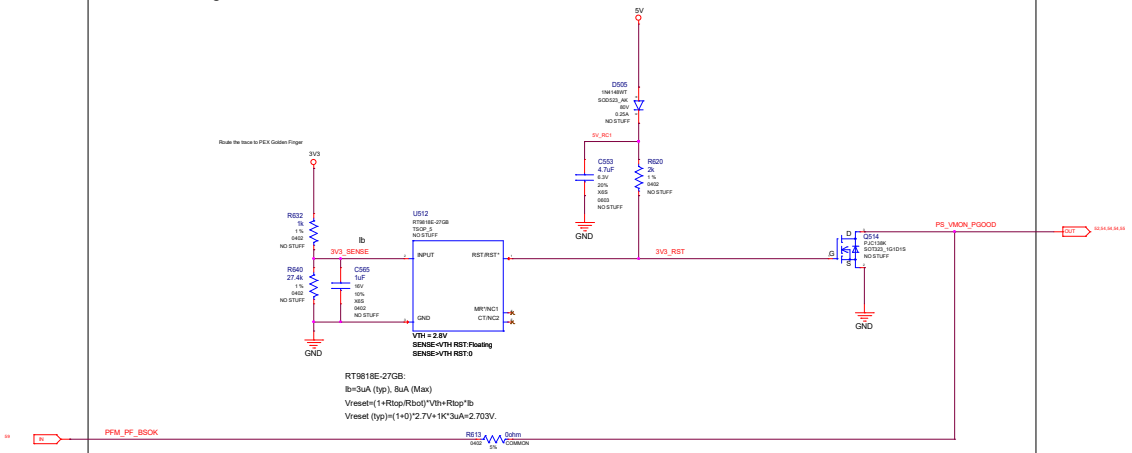
SEQUENCE:Voltage Monitor

3V3PEX Voltage Monitor



Signal	Direction	Function
3V3	INPUT	Sense the 3V3 Voltage from PCIE golden finger
12V	INPUT	Sense the 12V Voltage from PCIE golden finger
PS_VMON_PGOOD	OPEN-DRAIN	Floating(H) once both 3V3 and 12V reach Vth
GC6_FB_EN	INPUT	Indicator for RTD3/GC6 residence,Use to Mask the VMON_PGOOD
PS_PF_SKIP	INPUT	From INA3221(VPU) or Pre-filter(SKIP)
PS_PF_BSOK	INPUT	From INA3221(PV) or Pre-filter(BS_OK)

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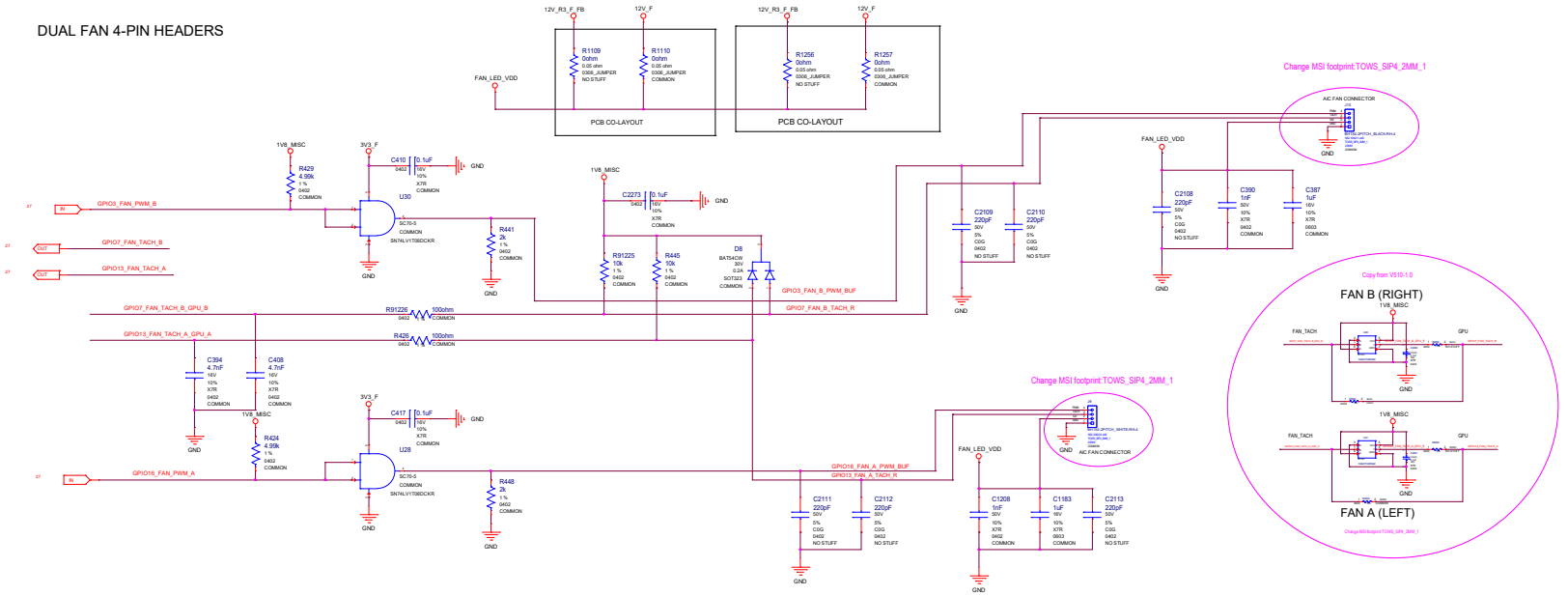
FAN

Remove :2-PIN LED HEADER FOR NORTH LOGO LED (WHITE)

DUAL FAN 4-PIN HEADERS



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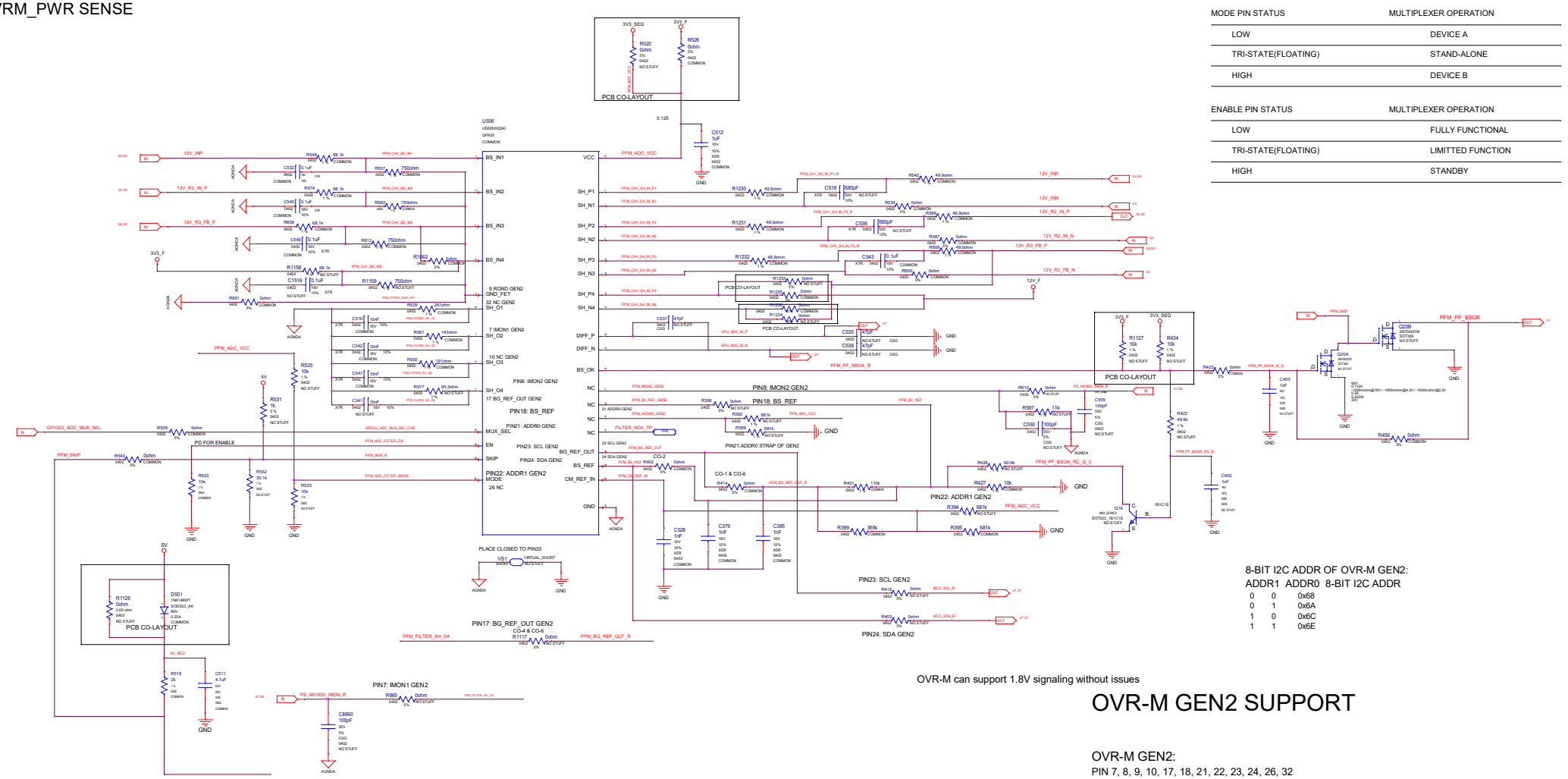
OVRM_PWR SENSE



MODE PIN STATUS	MULTIPLEXER OPERATION
LOW	DEVICE A
TRI-STATE(FLOATING)	STAND-ALONE
HIGH	DEVICE B

ENABLE PIN STATUS	MULTIPLEXER OPERATION
LOW	FULLY FUNCTIONAL
TRI-STATE(FLOATING)	LIMITTED FUNCTION
HIGH	STANDBY

8-BIT I2C ADDR OF OVR-M GEN2:

ADDR1	ADDR0	8-BIT I2C ADDR
0	0	0x68
0	1	0x6A
1	0	0x6C
1	1	0x6E

OVR-M can support 1.8V signaling without issues

OVR-M GEN2 SUPPORT

OVR-M GEN2:
PIN 7, 8, 9, 10, 17, 18, 21, 22, 23, 24, 26, 32
are different from GEN1 OVRM,

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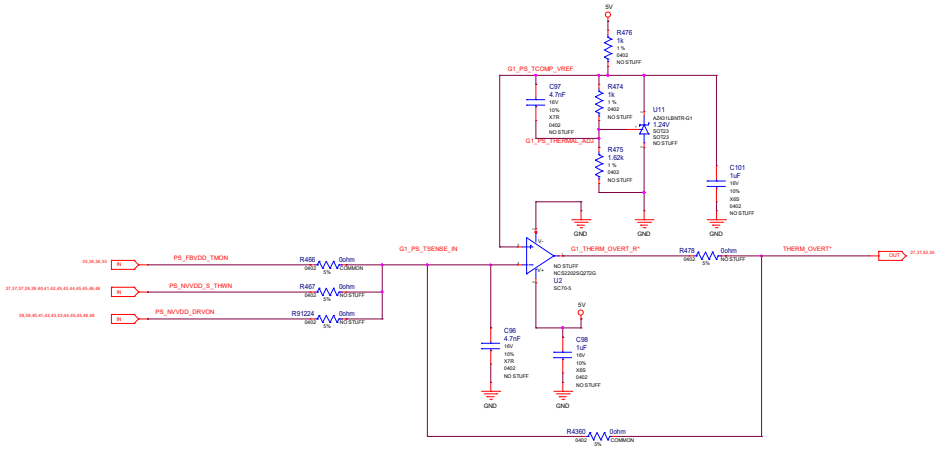
VR THERMAL PROTECTION



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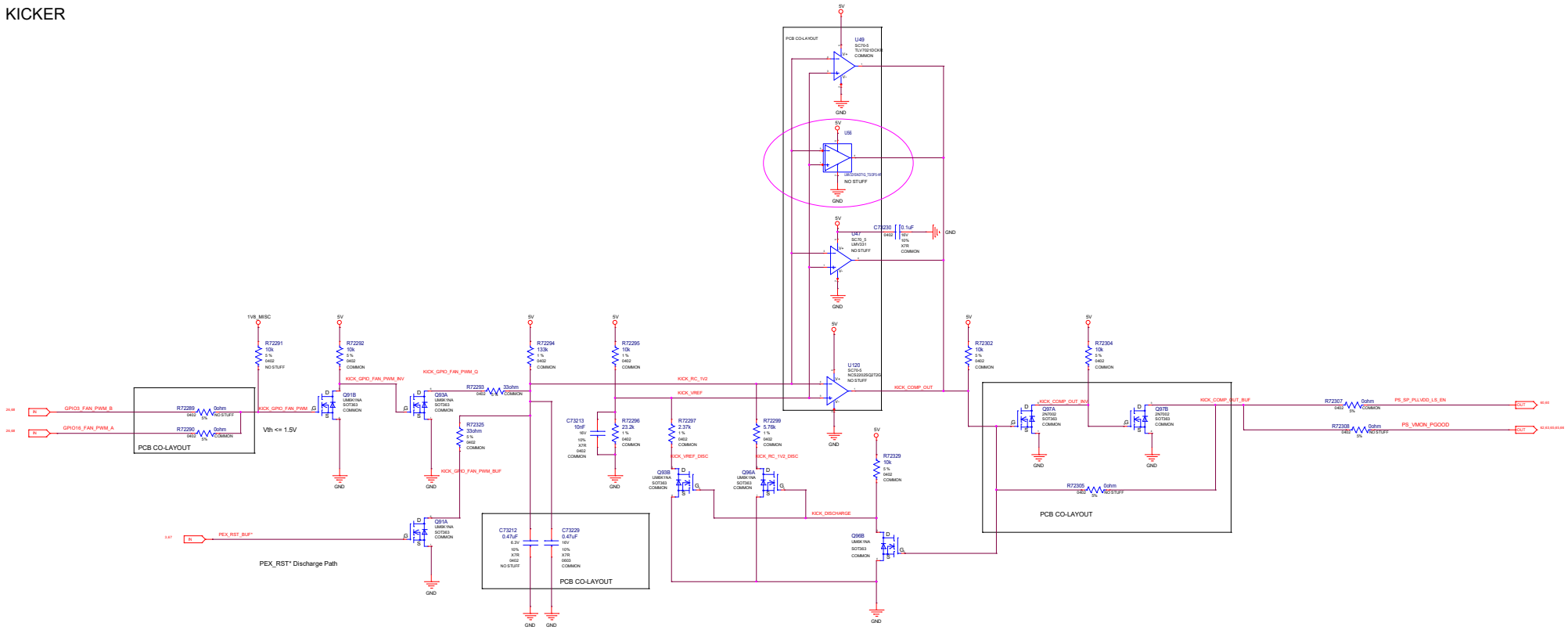
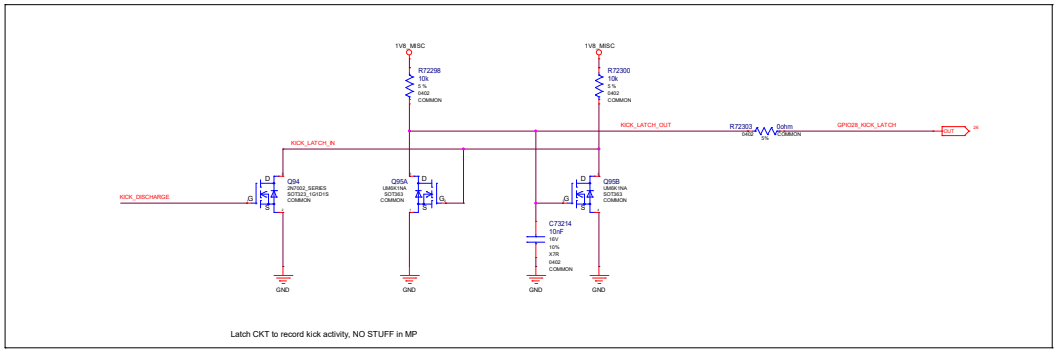
KICKER





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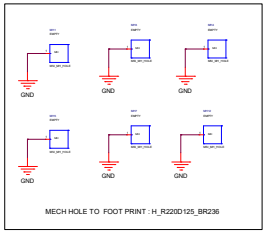
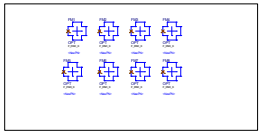
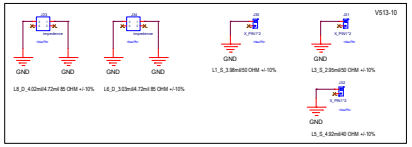
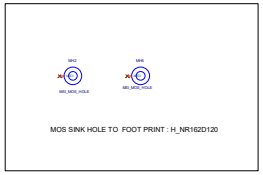
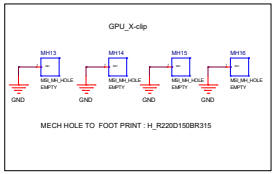
MOUNTING HOLES











msi MICRO-STAR INT'L CO.,LTD.		
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