PG150-C03

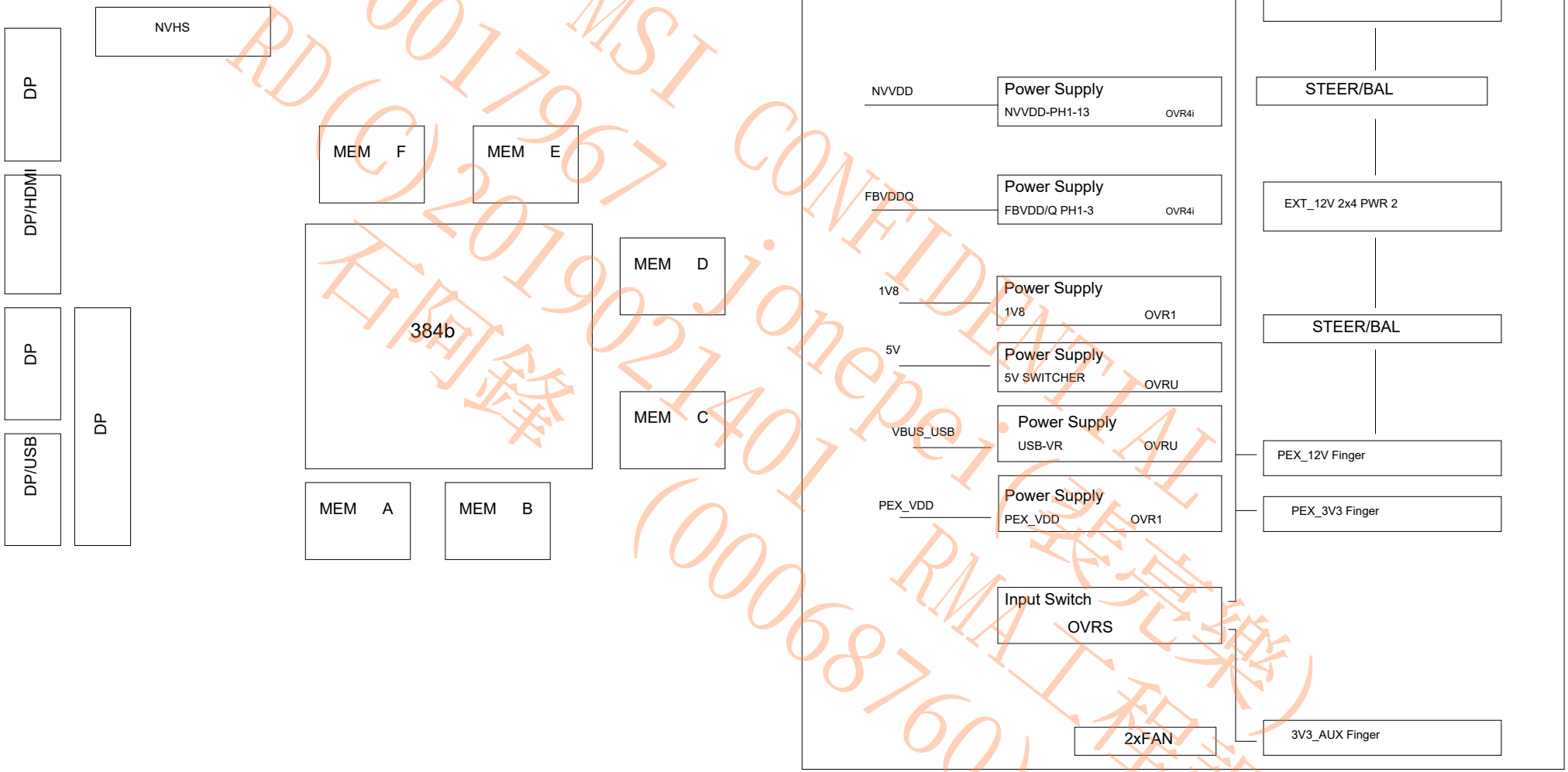
384b GDDR6 x16
TALL DP + DP + DP + HDMI/DP + USB

TABLE OF CONTENTS

Page	Description
1	Table of Contents
2	BLOCK DIAGRAM
3	PCI EXPRESS
4	PCIE TERM
5	MEMORY: GPU PARTITION A/B
6	MEMORY: FBA PARTITION[31:0]
7	MEMORY: FBA PARTITION[63:32]
8	MEMORY: FBB PARTITION[31:0]
9	MEMORY: FBB PARTITION[63:32]
10	MEMORY: GPU PARTITION C/D
11	MEMORY: FBC PARTITION[31:0]
12	MEMORY: FBC PARTITION[63:32]
13	MEMORY: FBD PARTITION[31:0]
14	MEMORY: FBD PARTITION[63:32]
15	MEMORY: GPU PARTITION E/F
16	MEMORY: FBE PARTITION[31:0]
17	MEMORY: FBE PARTITION[63:32]
18	MEMORY: FBF PARTITION[31:0]
19	MEMORY: FBF PARTITION[63:32]
20	GPU PWR AND GND
21	GPU PWR, GND and NCs
22	GPU DECOUPLING
23	GPU DECOUPLING 2
24	IFPA/B DP
25	IFPE DP
26	IFPF USB
27	IFPC HDMI/DP
28	IFPD DP
29	NVHS X16
30	MISC: THERMAL, JTAG, GPIO, STEREO
31	MISC: ROM, STRAPS
32	MISC: XTAL, PLL
33	MISC: USB PPC
34	PS: USB_C VR
35	PS: 5V
36	PS: PEXVDD 1V8 Rail
37	PS: FBVDD Controller
38	PS: FBVDD Controller OVR3
39	PS: FBVDD Phase 1, 2
40	PS: FBVDD Phase 3
41	PS: NVVDD Controller_OVR8
42	PS: NVVDD Phase 1
43	PS: NVVDD Phase 2
44	PS: NVVDD Phase 3, 4
45	PS: NVVDD Phase 5
46	PS: NVVDD Phase 7, 8
47	PS: NVVDD Phase 9, 10
48	PS: NVVDD Phase 11, 12
49	PS: NVVDD Phase 13, 14
50	PS: INPUT SWITCH_RTD3
51	PS: INPUT SWITCH_RTD3 USB
52	PS: INPUT SWITCH RAIL BALANCE
53	PS: DISCRETE STEERING
54	PS: Input, filtering, and Monitoring
55	PS: Current Sterring, Hot Unplug
56	PS: Prefilter
57	Sequence: 5V, 1V8, NV3V3 EN
58	Sequence: NV, PEX, FB EN
59	Sequence: PCIE Voltage Monitor
60	Sequence: Discharge
61	Sequence: MISC
62	MISC: FAN & LED1
63	MISCL: LED 2
64	MCU ZERO POWER IDLE
65	MECH
66	VR Thermal Protection

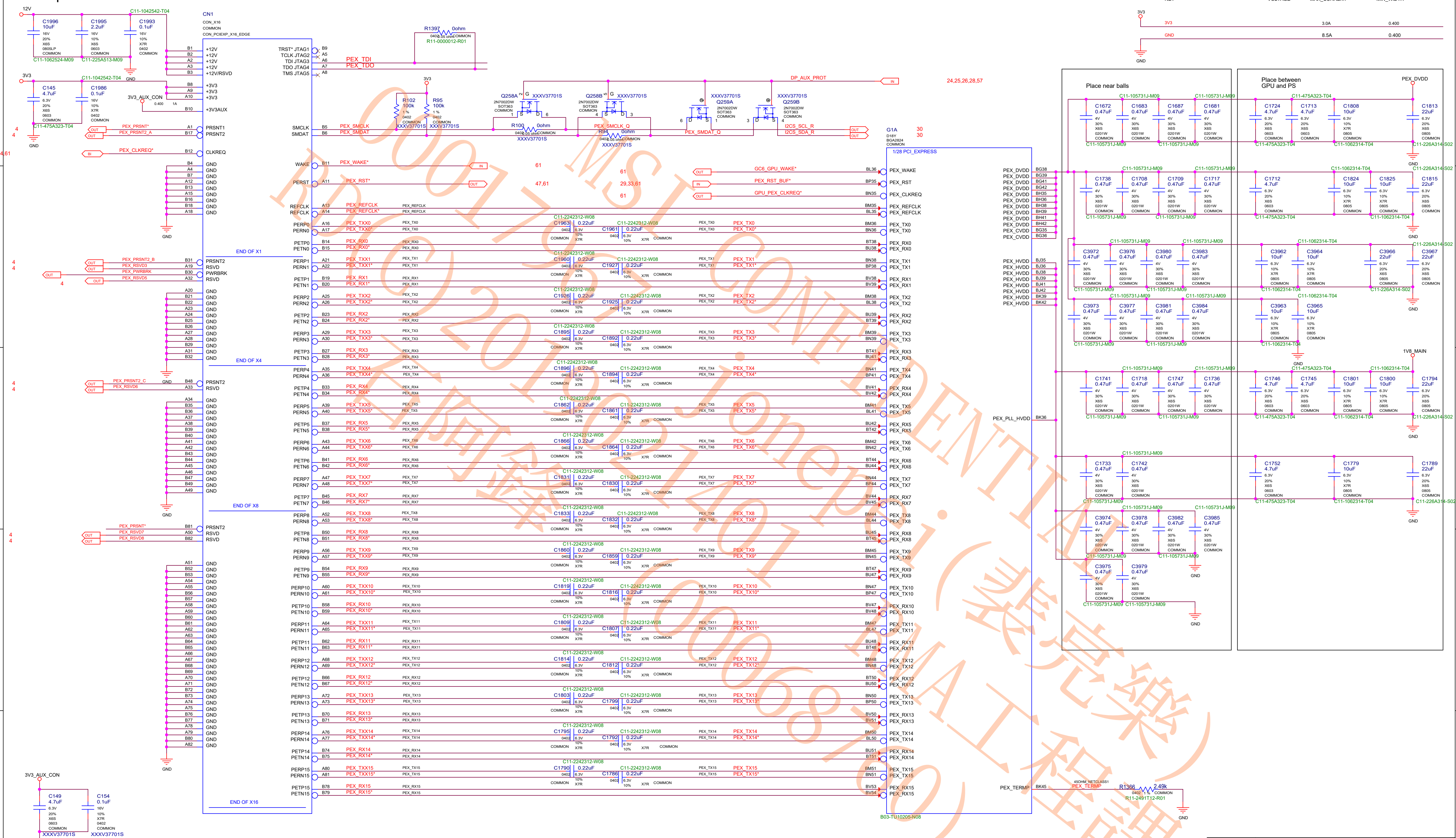
MICRO-STAR INT'L CO.,LTD
MS-V377
Size: Custom | Document Description: MEMORY: GPU Partition A/B | Rev: 1.1
Date: Thursday, October 11, 2018 | Sheet 1 of 66

Block Diagram



MICRO-STAR INT'L CO.,LTD
MS-V377
Size: Custom | Document Description: MEMORY: GPU Partition A/B | Rev: 1.0
Date: Monday, October 01, 2018 | Sheet 2 of 66

PCI Express


CN1
CON_X16
CON_PCIEXP_X16_EDGE
12V
3V3
3V3_AUX_CON
PRSNT1
PRSNT2
CLKREQ
WAKE
PERST
REFCLK
SMCLK
SMDAT
END OF X1
END OF X4
END OF X8
END OF X16
PEX_TDI
PEX_TDO
PEX_PRSNT*
PEX_CLKREQ*
PEX_WAKE*
PEX_RST*
PEX_SMCLK
PEX_SMDAT
PEX_REFCLK
PEX_REFCLK*
DP_AUX_PROT
I2CS_SCL_R
I2CS_SDA_R
GC6_GPU_WAKE*
PEX_RST_BUF*
GPU_PEX_CLKREQ*
G1A
1/28 PCI_EXPRESS
PEX_DVDD
PEX_CVDD
PEX_HVDD
PEX_PLL_HVDD
PEX_TERMP
R1366 2.49k
Place near balls
Place between GPU and PS
NET
VOLTAGE
MAX_CURRENT
MIN_WIDTH
1V8_MAIN
GND
B03-TU10205-N08

MICRO-STAR INT'L CO.,LTD

MS-V377

Size: Custom

Document Description: MEMORY: GPU Partition A/B

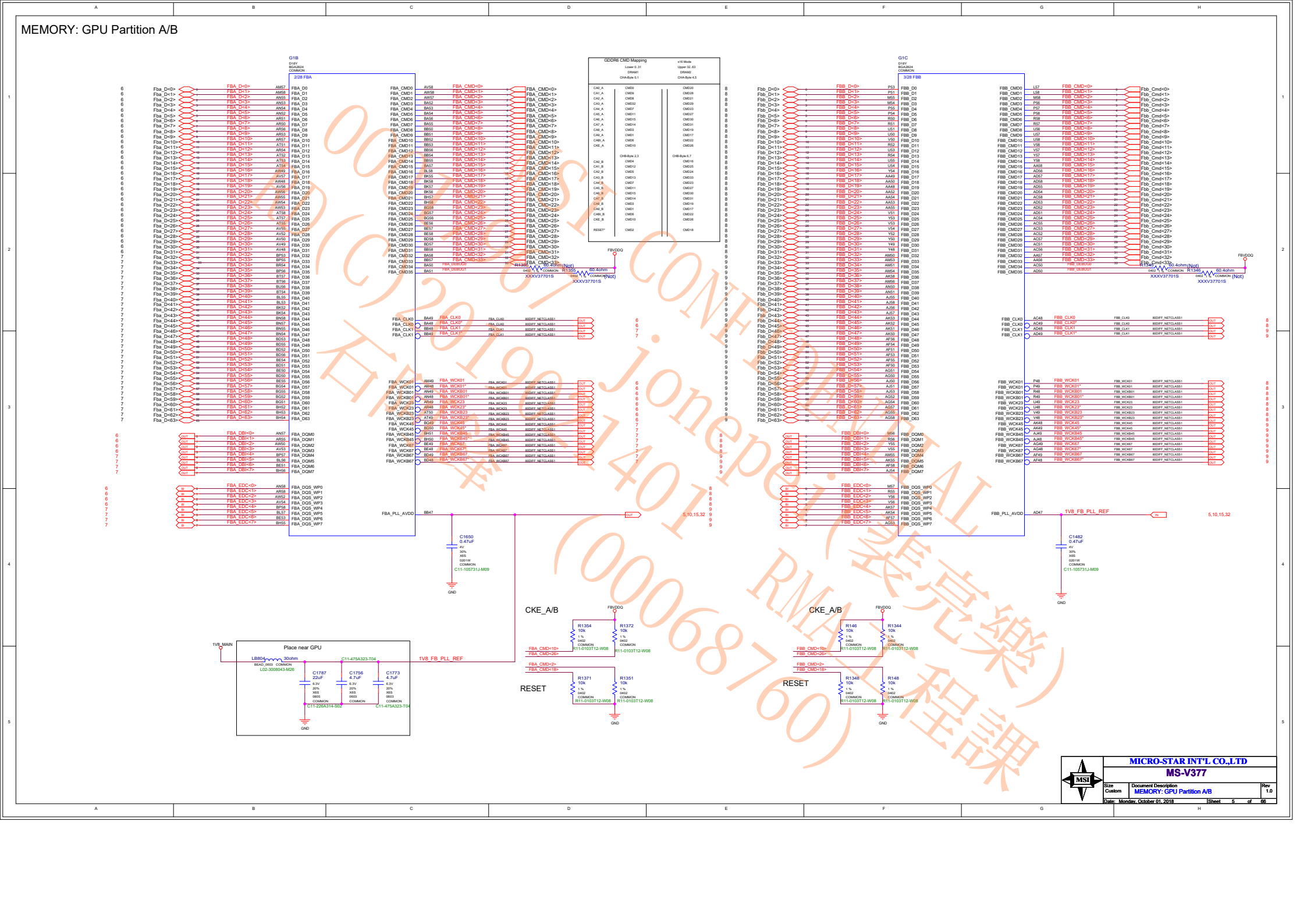
Rev: 1.0

Date: Monday, October 01, 2018 | Sheet 3 of 66

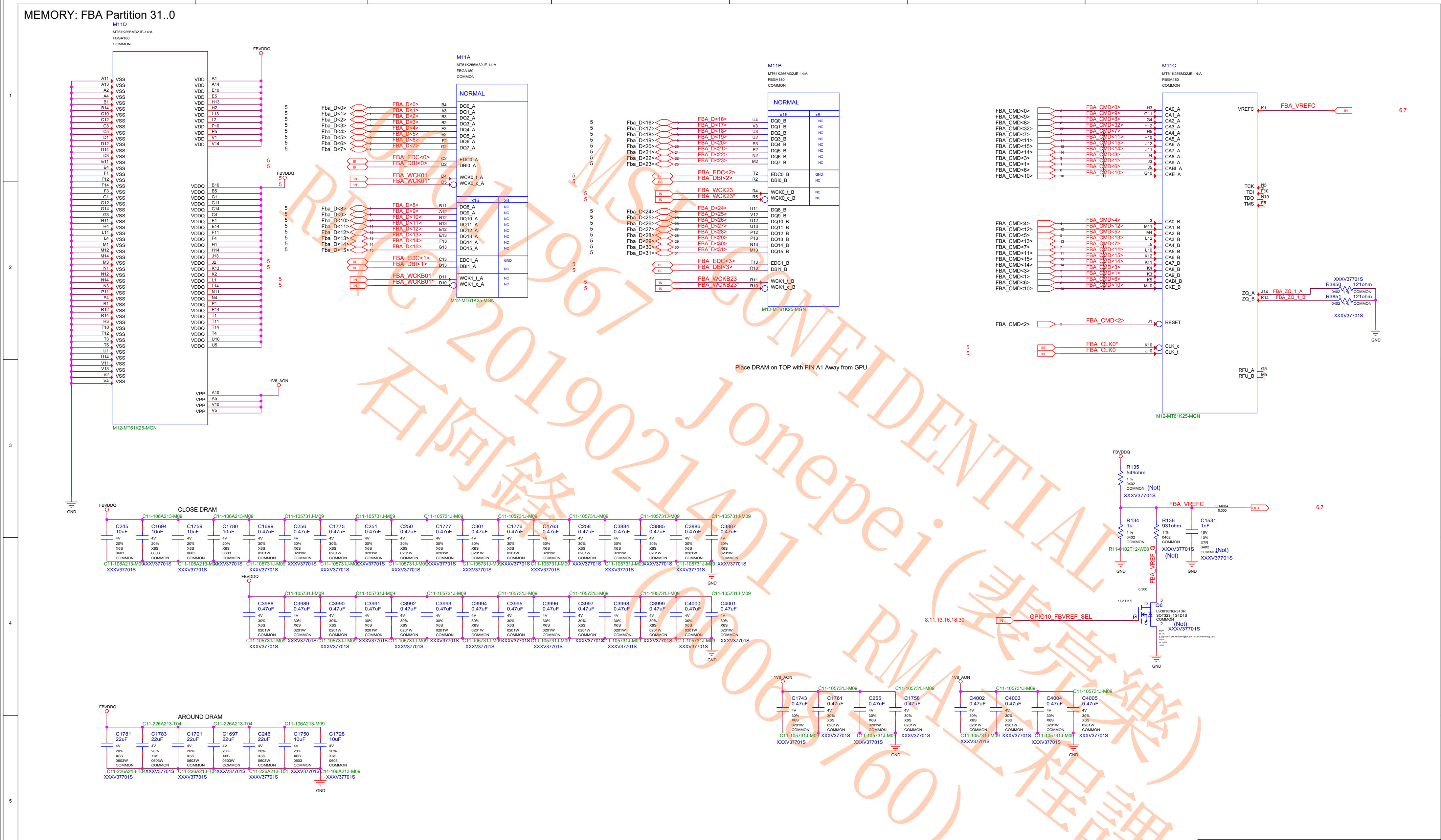
PCI TERM

MICRO-STAR INT'L CO.,LTD	
MS-V377	
Size: Custom	Document Description: MEMORY: GPU Partition A/B
Rev: 1.0	
Date: Monday, October 01, 2018	Sheet 4 of 66

MEMORY: GPU Partition A/B

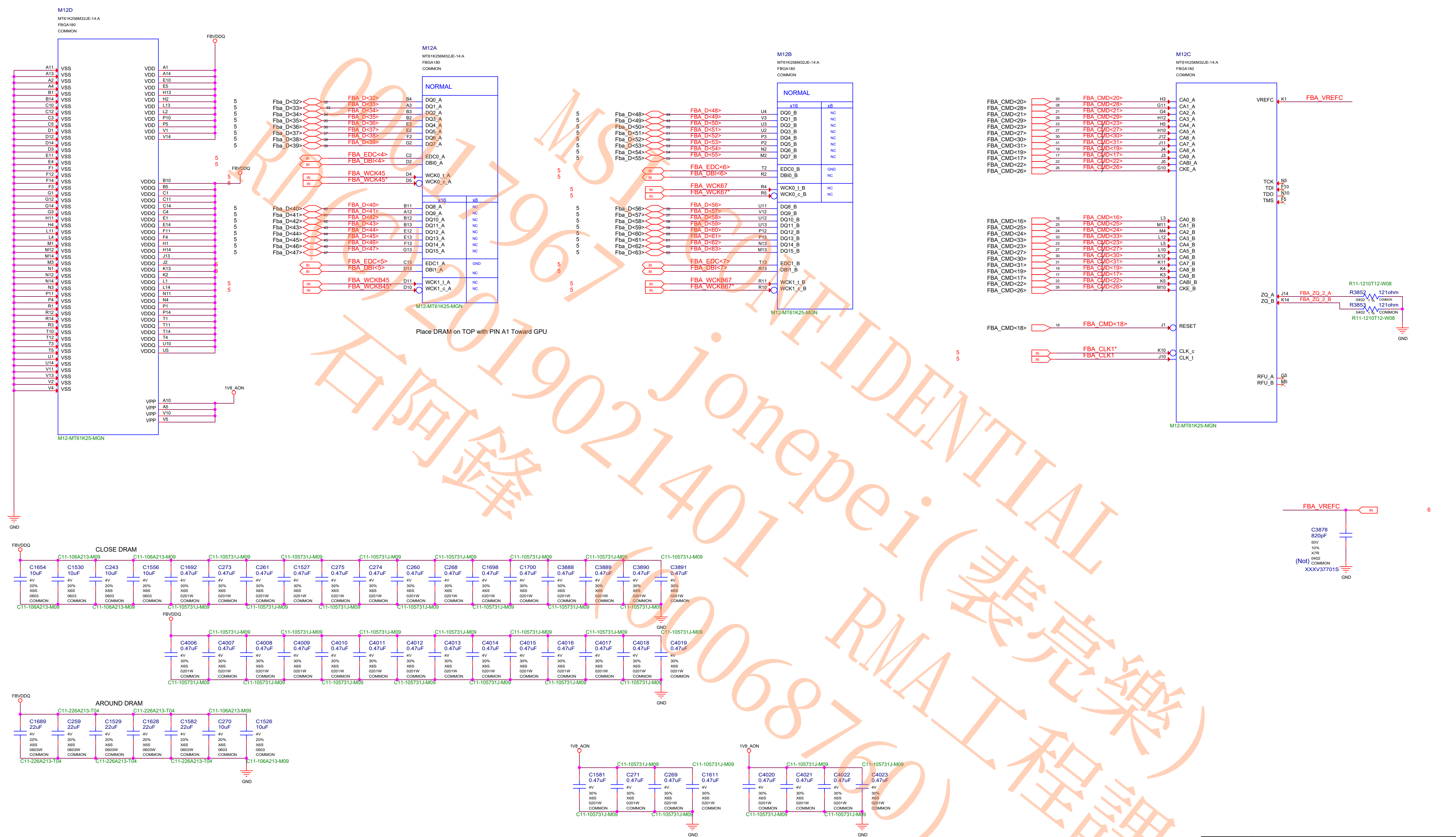


MEMORY: FBA Partition 31..0



MICRO-STAR INT'L CO.,LTD			
MS-V377			
Size: Custom	Document Description: MEM_A		Rev: 1.0
Date: Monday, October 01, 2018	Sheet 6	of 66	

MEMORY: FBA Partition 63..32



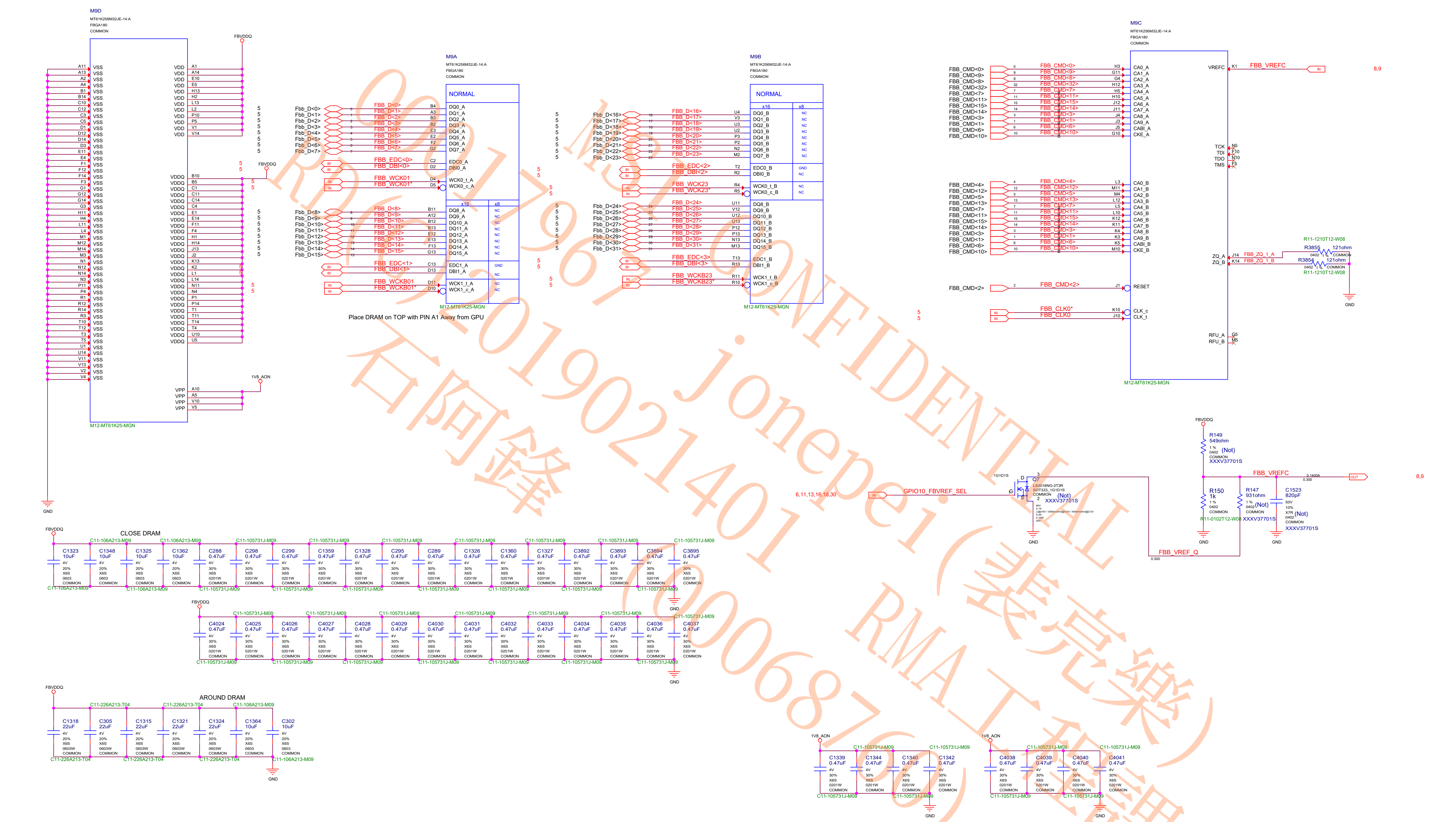
MICRO-STAR INT'L CO.,LTD

MS-V377

Size	Document Description	Rev
Custom	MEMORY: GPU Partition A	1.0

Date: Monday, October 01, 2018 Sheet 7 of 66

MEMORY: FBB Partition 31..0



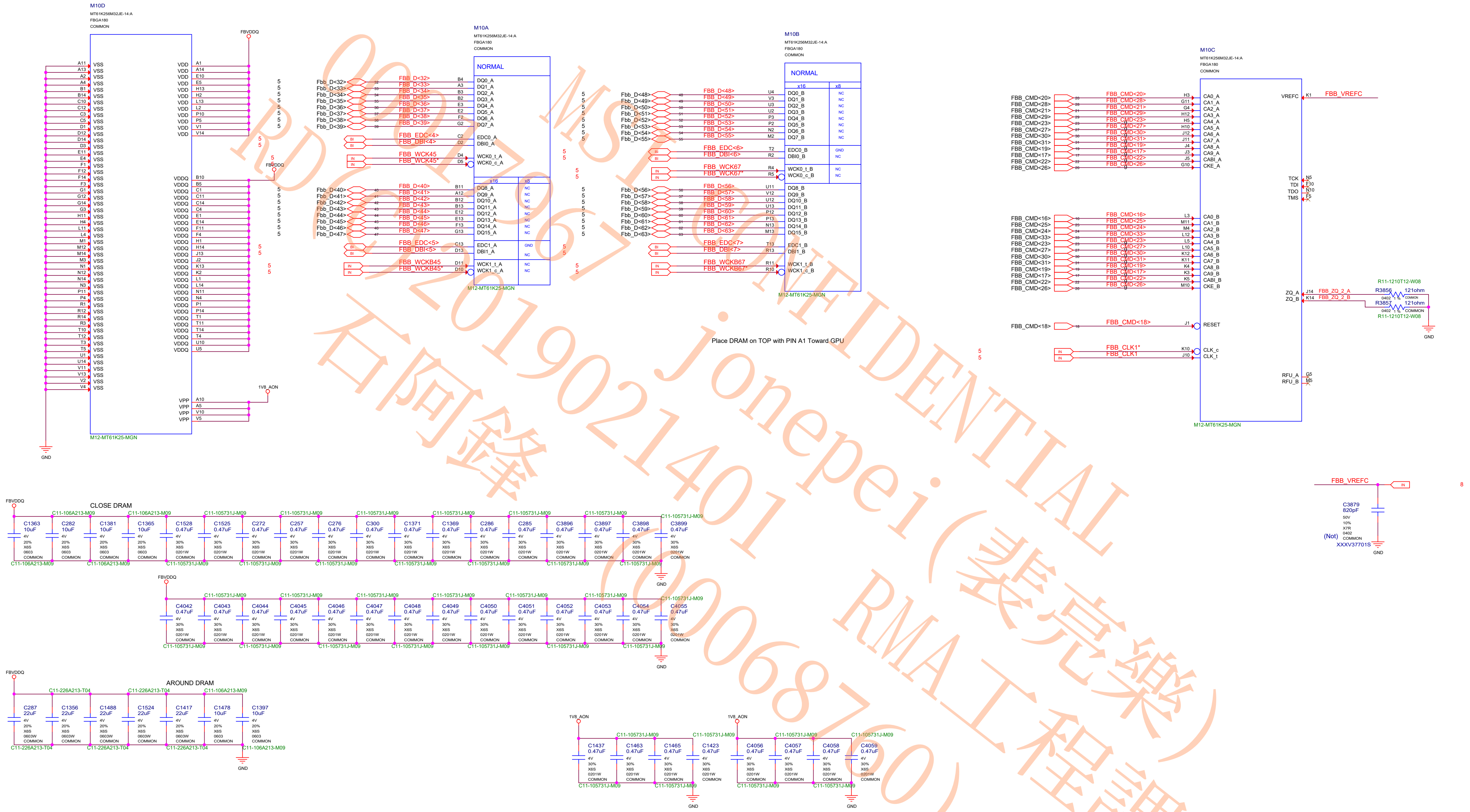
MICRO-STAR INT'L CO.,LTD

MS-V377

Size	Document Description	Rev
Custom	MEMORY: GPU Partition B	1.0

Date: Monday, October 01, 2018 Sheet 8 of 66

MEMORY: FBB Partition 63..32



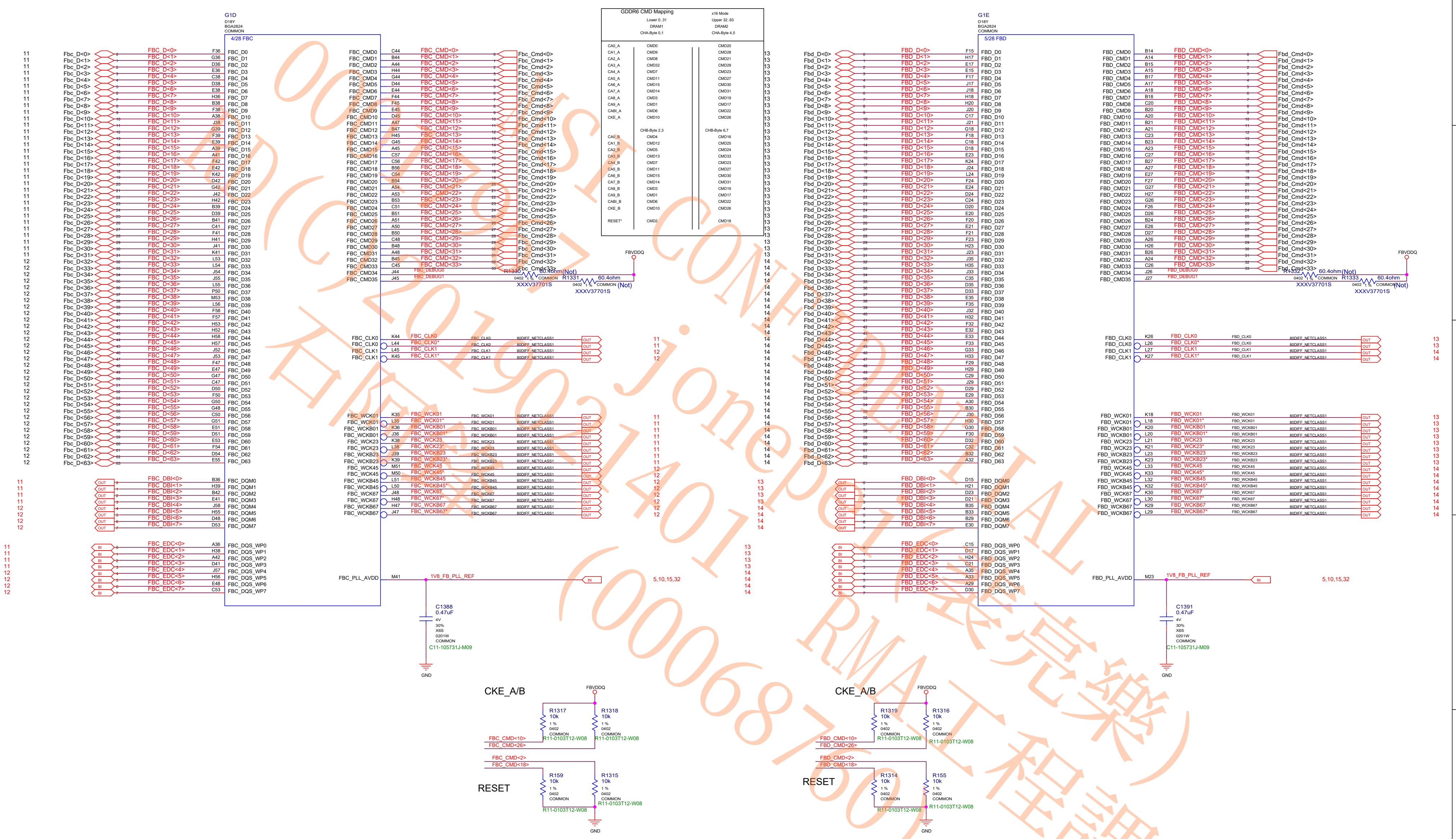
MICRO-STAR INT'L CO.,LTD

MS-V377

Size	Document Description	Rev
Custom	MEMORY: GPU Partition B	1.0

Date: Monday, October 01, 2018 Sheet 9 of 66

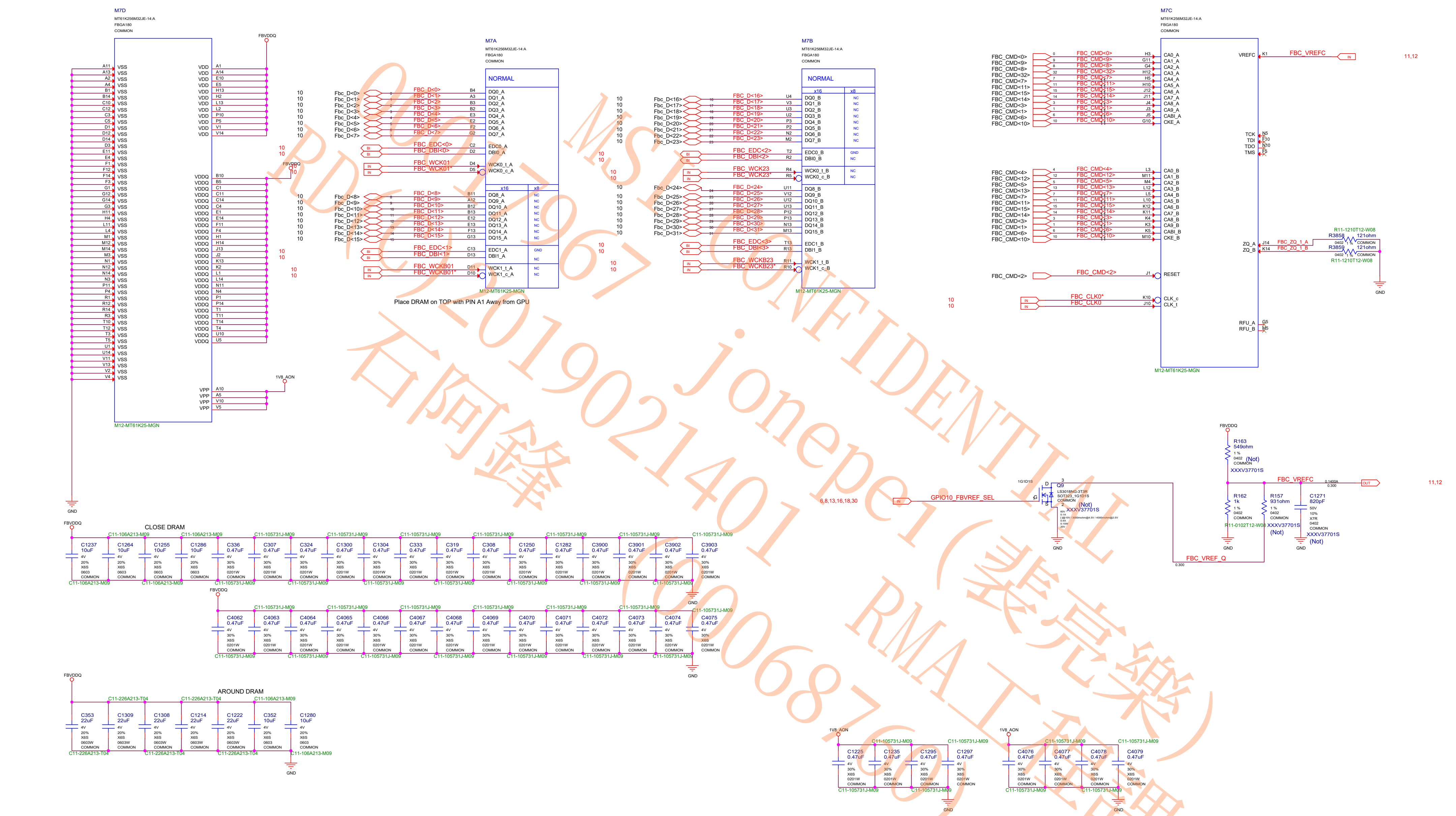
MEMORY: GPU Partition C/D



G1D
D18V
BGA2824
COMMON
4/28 FBC
FBC_D0 … FBC_D63
FBC_DQM0 … FBC_DQM7
FBC_DQS_WP0 … FBC_DQS_WP7
FBC_CMD0 … FBC_CMD35
FBC_CLK0
FBC_CLK0*
FBC_CLK1
FBC_CLK1*
FBC_WCK01
FBC_WCK01*
FBC_WCKB01
FBC_WCKB01*
FBC_WCK23
FBC_WCK23*
FBC_WCKB23
FBC_WCKB23*
FBC_WCK45
FBC_WCK45*
FBC_WCKB45
FBC_WCKB45*
FBC_WCK67
FBC_WCK67*
FBC_WCKB67
FBC_WCKB67*
FBC_PLL_AVDD
1V8_FB_PLL_REF
5,10,15,32
FBC_DEBUG0
FBC_DEBUG1
R1330 60.4ohm (Not)
R1331 60.4ohm (Not)
XXXV37701S
FBVDDQ
C1388
0.47uF
4V
30%
X6S
0201W
COMMON
C11-105731J-M09
GND
GDDR6 CMD Mapping
x16 Mode
Lower 0..31
Upper 32..63
DRAM1
DRAM2
CHA-Byte 0,1
CHA-Byte 4,5
CHB-Byte 2,3
CHB-Byte 6,7
RESET*
G1E
D18V
BGA2824
COMMON
5/28 FBD
FBD_D0 … FBD_D63
FBD_DQM0 … FBD_DQM7
FBD_DQS_WP0 … FBD_DQS_WP7
FBD_CMD0 … FBD_CMD35
FBD_CLK0
FBD_CLK0*
FBD_CLK1
FBD_CLK1*
FBD_PLL_AVDD
FBD_DEBUG0
FBD_DEBUG1
R1332 60.4ohm (Not)
R1333 60.4ohm (Not)
C1391
0.47uF
80DIFF_NETCLASS1
CKE_A/B
R1317 10k
R1318 10k
R1319 10k
R1316 10k
1 %
0402
COMMON
R11-0103T12-W08
FBC_CMD<10>
FBC_CMD<26>
FBC_CMD<2>
FBC_CMD<18>
FBD_CMD<10>
FBD_CMD<26>
FBD_CMD<2>
FBD_CMD<18>
RESET
R159 10k
R1315 10k
R1314 10k
R155 10k

MICRO-STAR INT'L CO.,LTD			
MS-V377			
Size: Custom	Document Description: MEMORY: GPU Partition C/D		Rev: 1.0
Date: Monday, October 01, 2018		Sheet 10 of 66	

MEMORY: FBC Partition 31..0



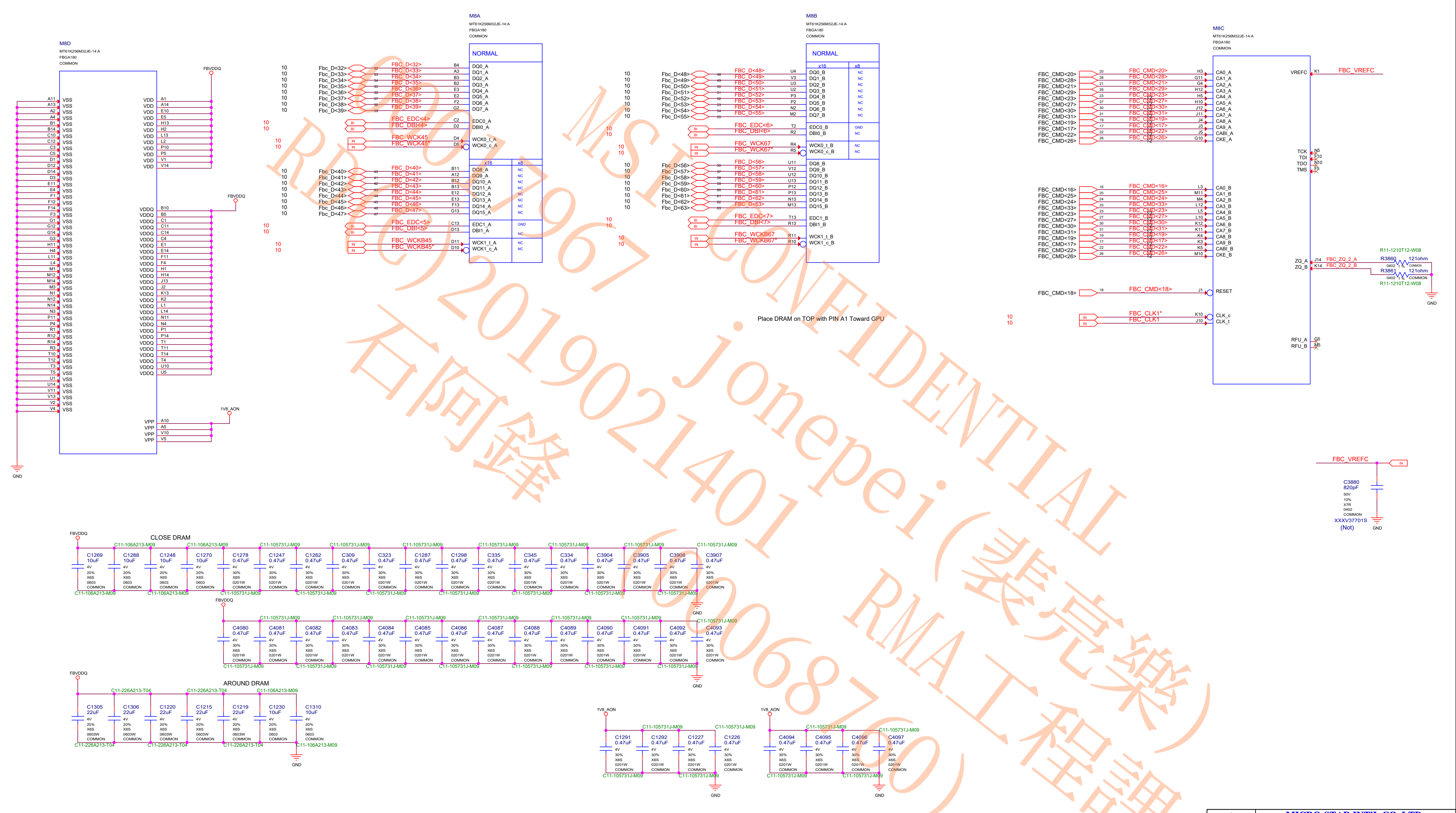
MICRO-STAR INT'L CO.,LTD

MS-V377

Size	Document Description	Rev
Custom	MEMORY: GPU Partition C	1.0

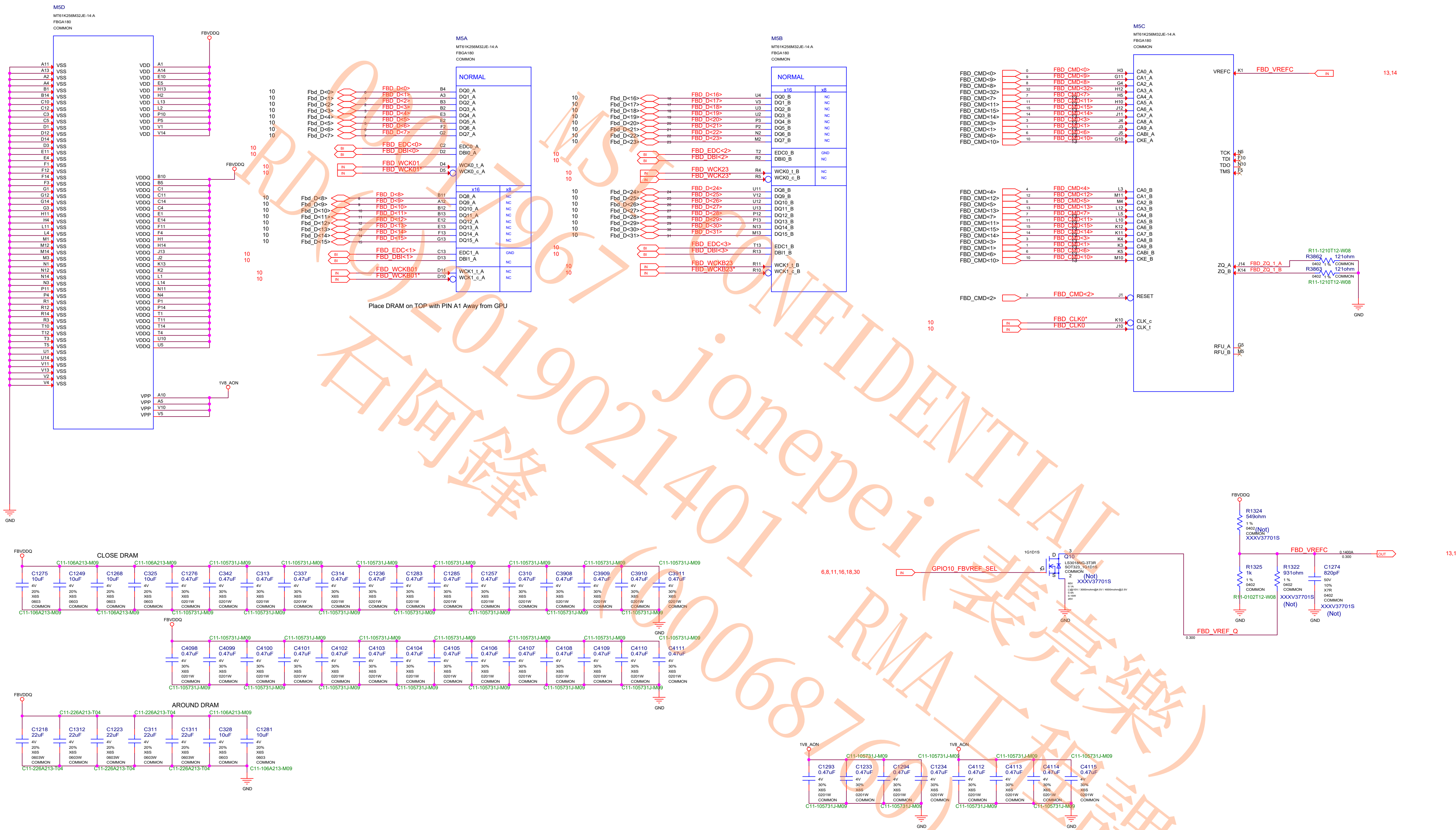
Date: Monday, October 01, 2018 Sheet 11 of 66

MEMORY: FBC Partition 63..32



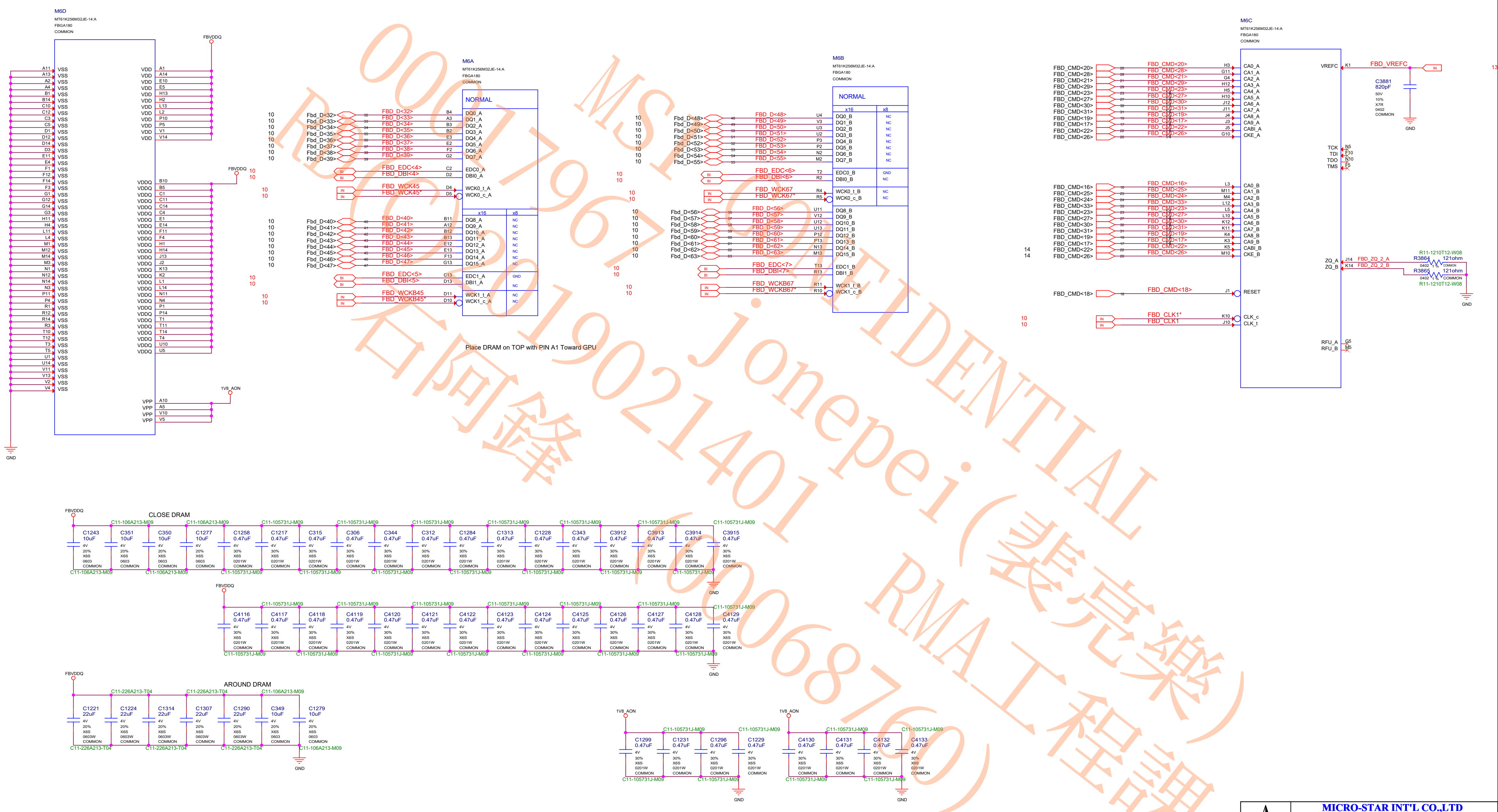
MICRO-STAR INT'L CO.,LTD		
MS-V377		
Size: Custom	Document Description: MEMORY: GPU Partition C	Rev: 1.0
Date: Monday, October 01, 2018	Sheet 12 of 66	

MEMORY: FBD Partition 31..0


M5D
MT61K256M32JE-14:A
FBGA180
COMMON
M5A
NORMAL
M5B
M5C
FBVDDQ
1V8_AON
GND
VSS
VDD
VDDQ
VPP
FBD_D<0>
FBD_EDC<0>
FBD_DBI<0>
FBD_WCK01
FBD_WCK01*
FBD_WCKB01
FBD_WCKB01*
FBD_WCK23
FBD_WCK23*
FBD_WCKB23
FBD_WCKB23*
FBD_CMD<0>
FBD_VREFC
FBD_ZQ_1_A
FBD_ZQ_1_B
FBD_CLK0*
FBD_CLK0
RESET
VREFC
TCK
TDI
TDO
TMS
RFU_A
RFU_B
Place DRAM on TOP with PIN A1 Away from GPU
CLOSE DRAM
AROUND DRAM
GPIO10_FBVREF_SEL
FBD_VREF_Q
Q10
R1324 549ohm
R1325 1k
R1322 931ohm
C1274 820pF
R3862 121ohm
R3863 121ohm

MICRO-STAR INT'L CO.,LTD		
MS-V377		
Size: Custom	Document Description: MEMORY: GPU Partition D	Rev: 1.0
Date: Monday, October 01, 2018	Sheet 13 of 66	

MEMORY: FBD Partition 63..32



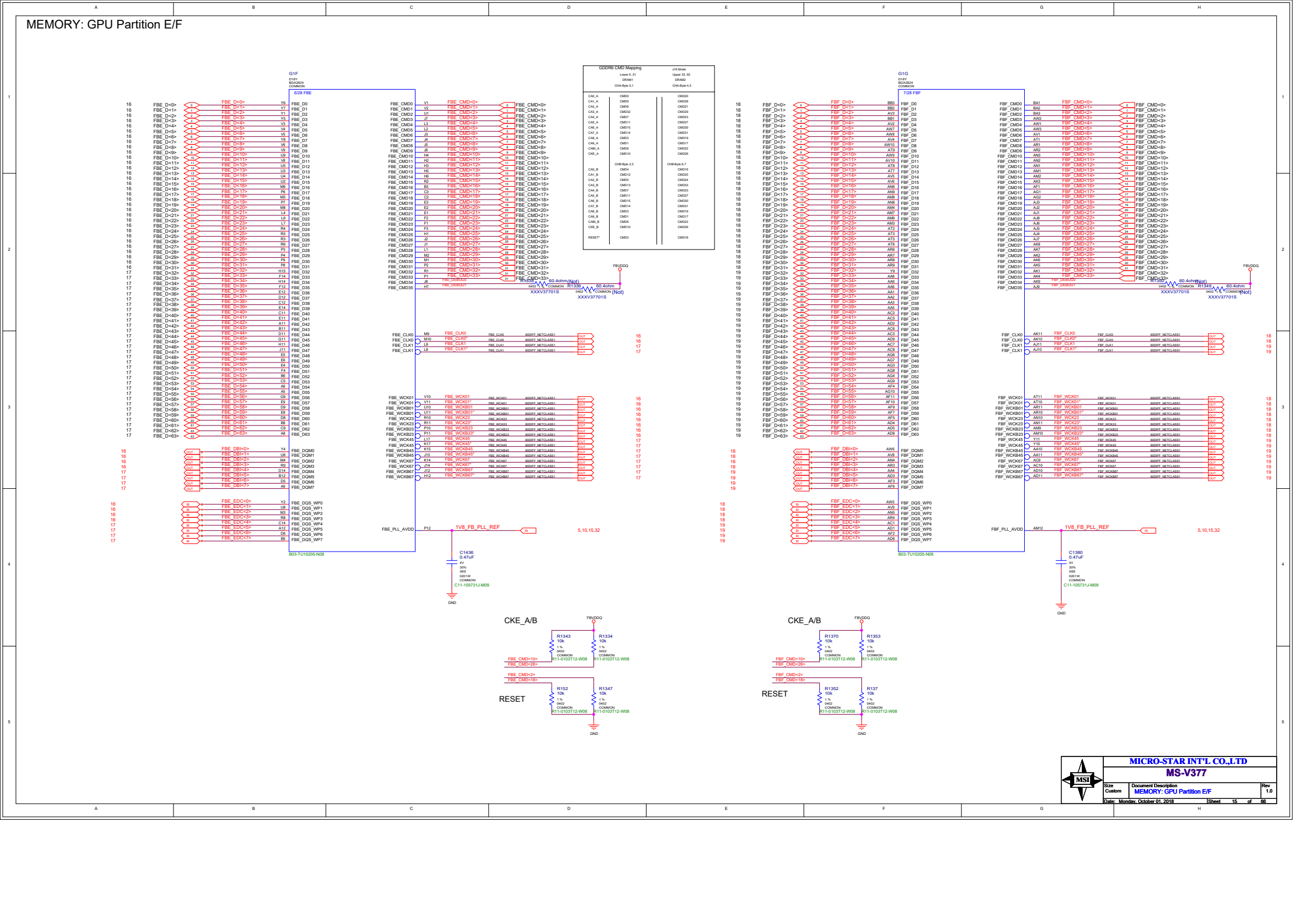
MICRO-STAR INT'L CO.,LTD

MS-V377

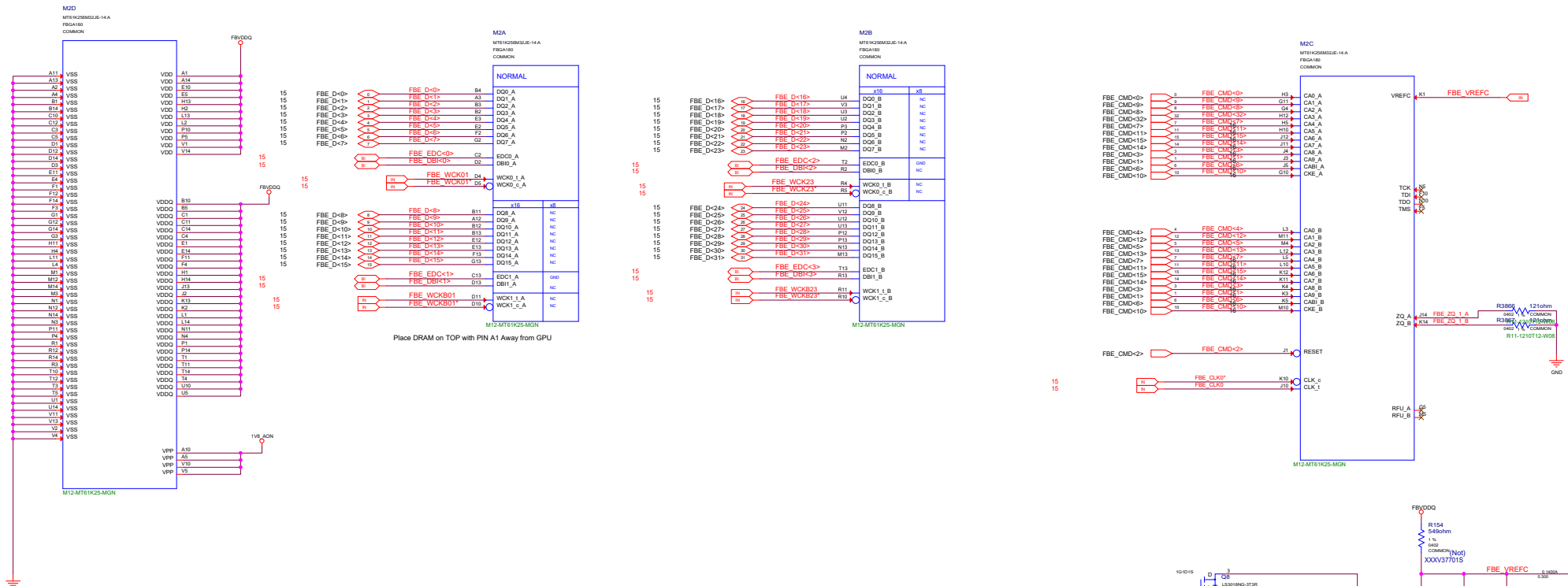
Size	Document Description	Rev
Custom	MEMORY: GPU Partition C/D	1.0

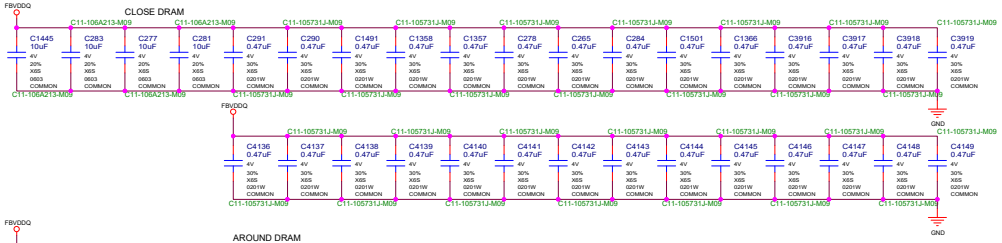
Date: Monday, October 01, 2018 Sheet 14 of 66

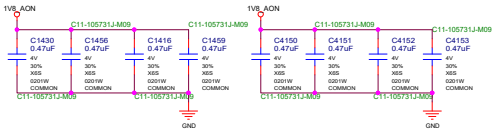
MEMORY: GPU Partition E/F



MEMORY: FBE Partition 31..0

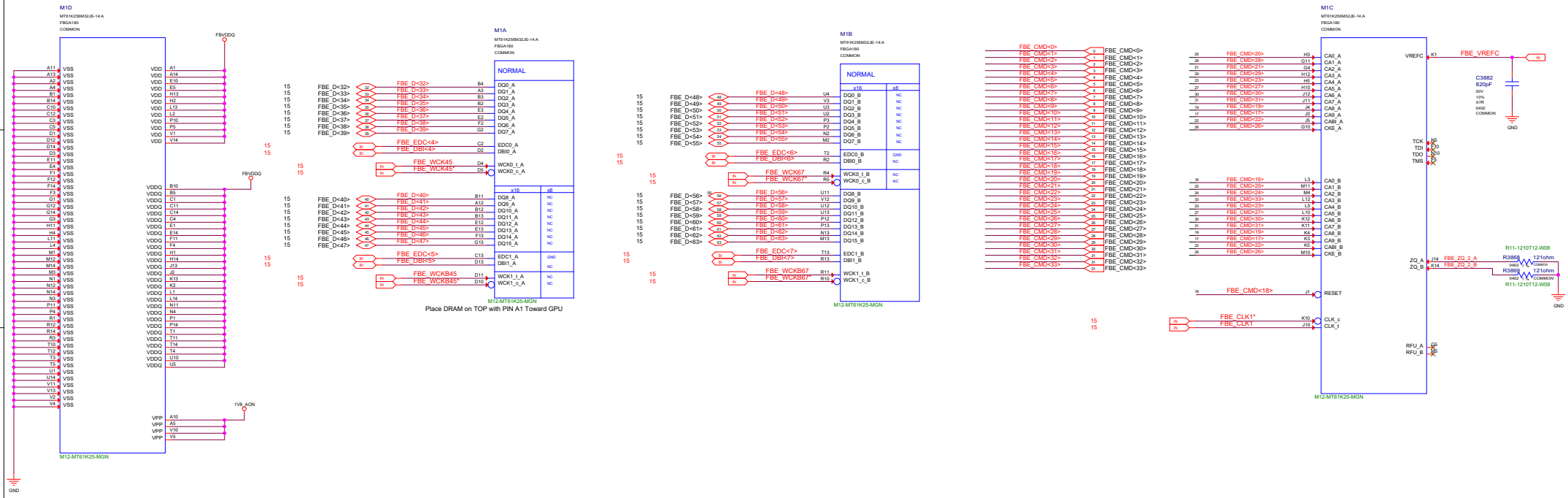


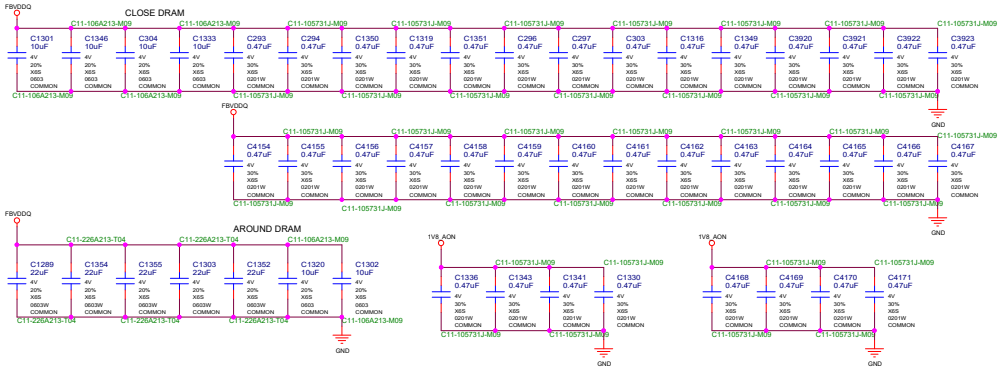




MICRO-STAR INT'L CO.,LTD			
MS-V377			
Size: Custom	Document Description: MEMORY: GPU Partition E/F		Rev: 1.0
Date: Monday, October 01, 2018	Sheet 16 of 66		

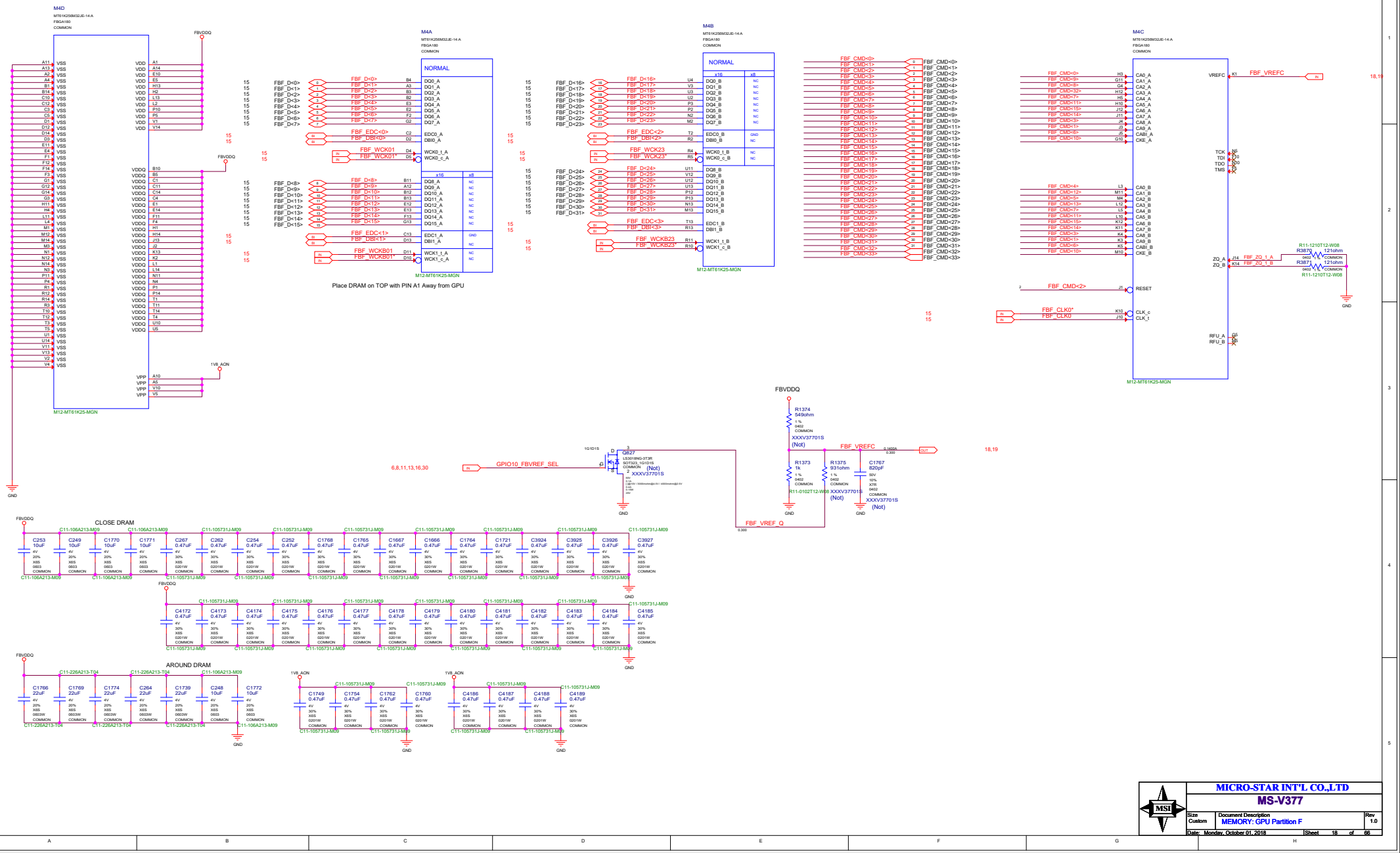
MEMORY: FBE Partition 63..32





MICRO-STAR INT'L CO.,LTD			
MS-V377			
Size: Custom	Document Description: MEMORY: GPU Partition E		Rev: 1.0
Date: Monday, October 01, 2018		Sheet 17 of 66	

MEMORY: FBF Partition 31..0

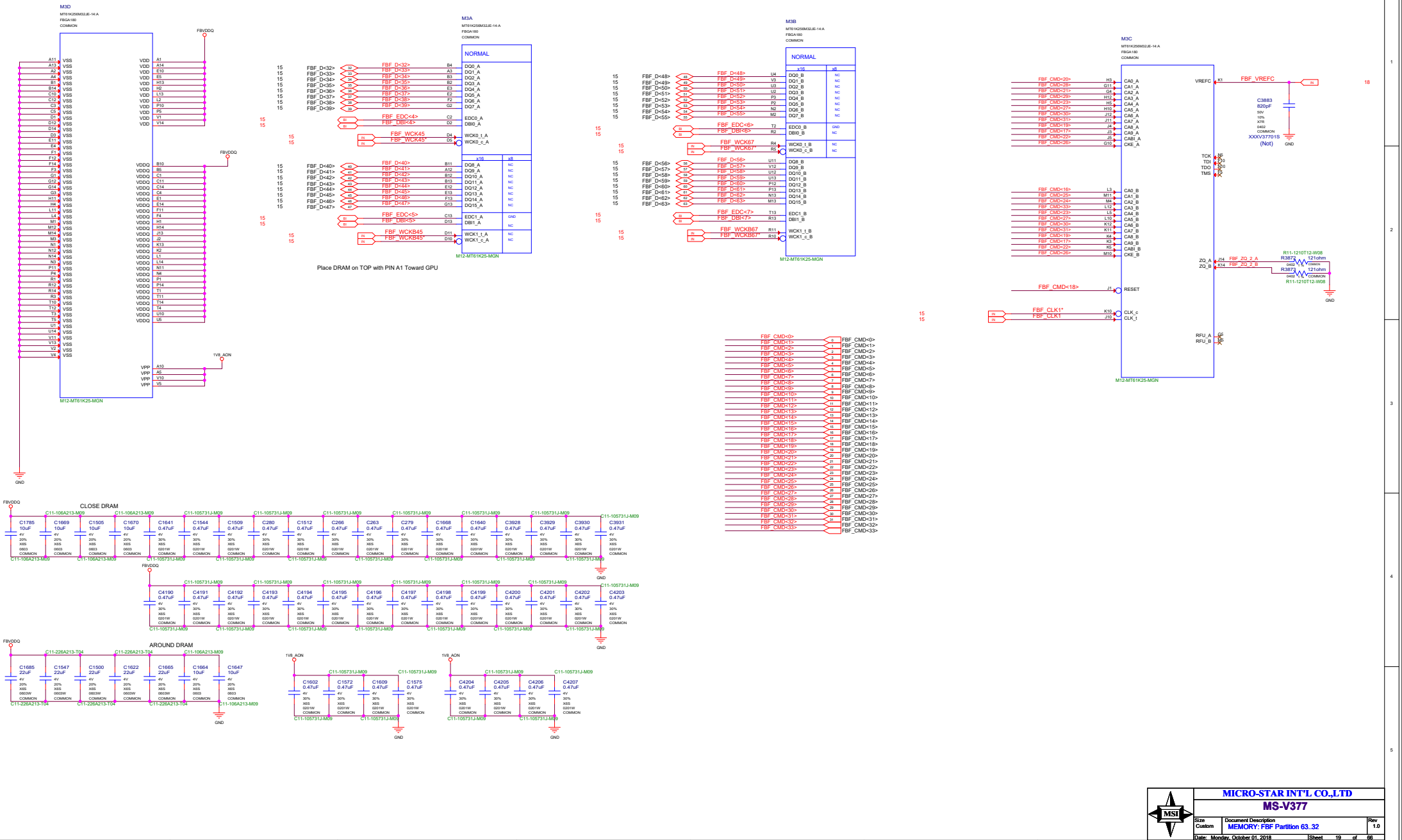


MICRO-STAR INT'L CO.,LTD
MS-V377

Size	Document Description	Rev
Custom	MEMORY: GPU Partition F	1.0

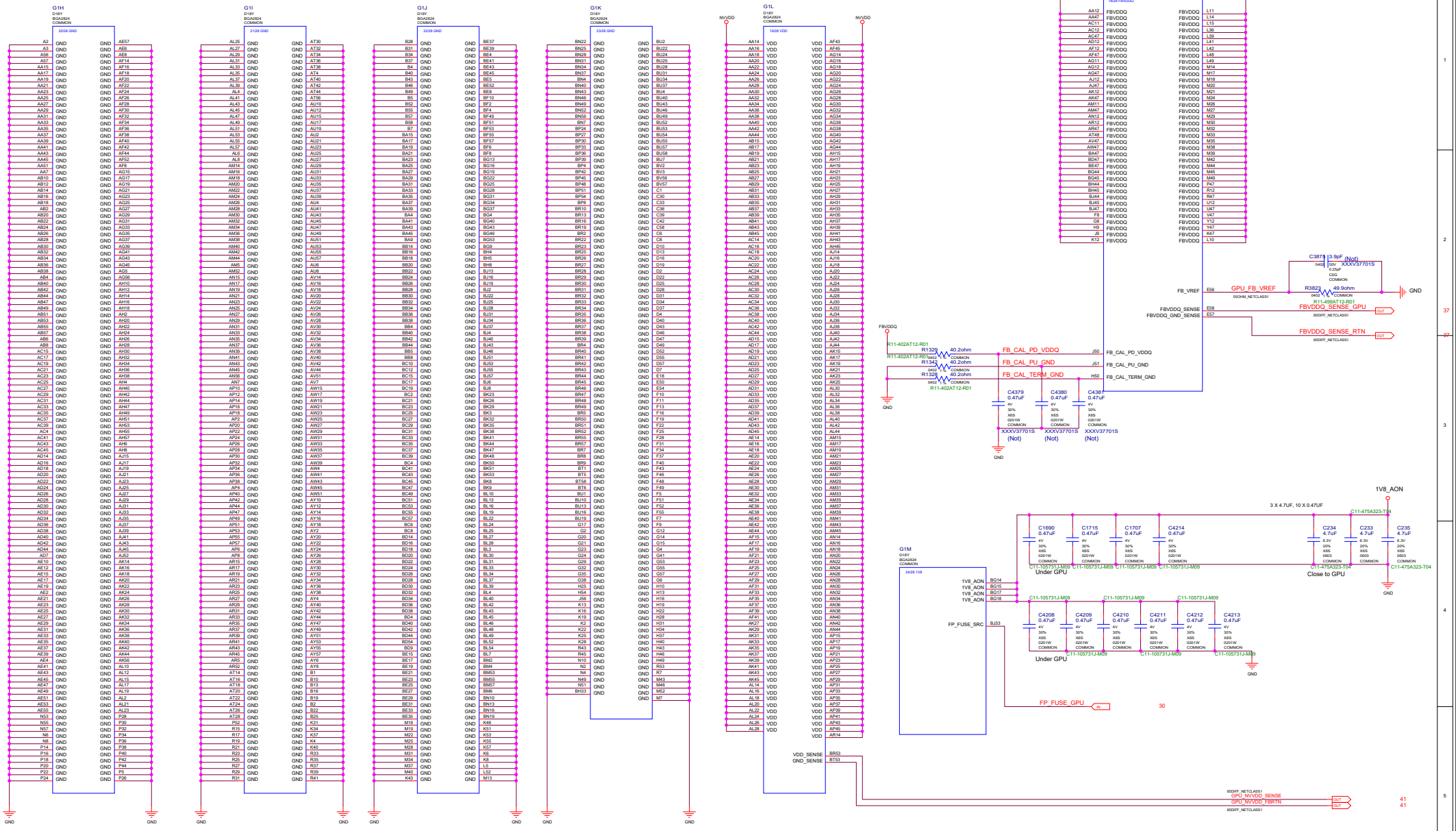
Date: Monday, October 01, 2018 Sheet 18 of 66

MEMORY: FBF Partition 63..32

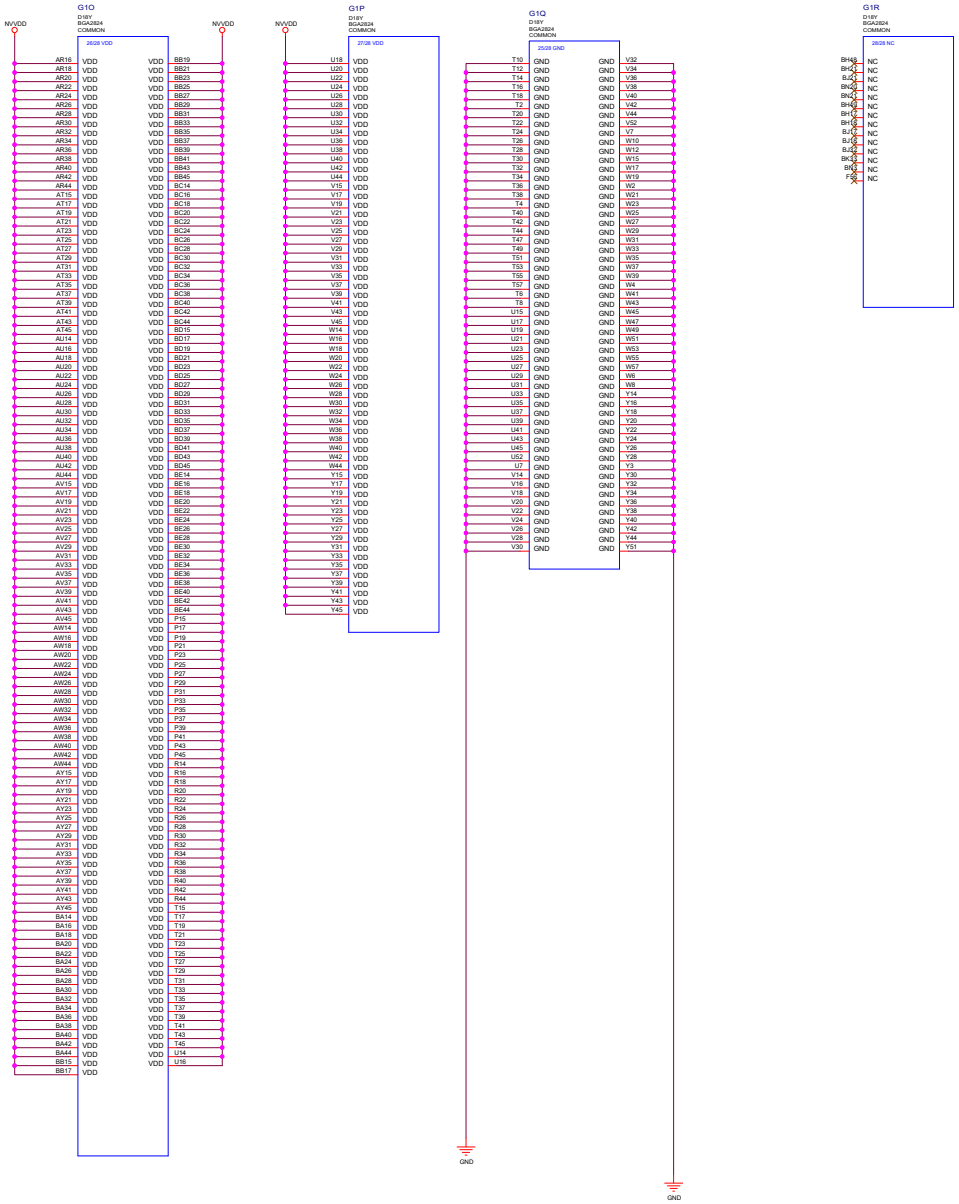


MICRO-STAR INT'L CO.,LTD
MS-V377
Size: Custom
Document Description: MEMORY: FBF Partition 63..32
Rev: 1.0
Date: Monday, October 01, 2018
Sheet 19 of 66

GPU PWR and GND



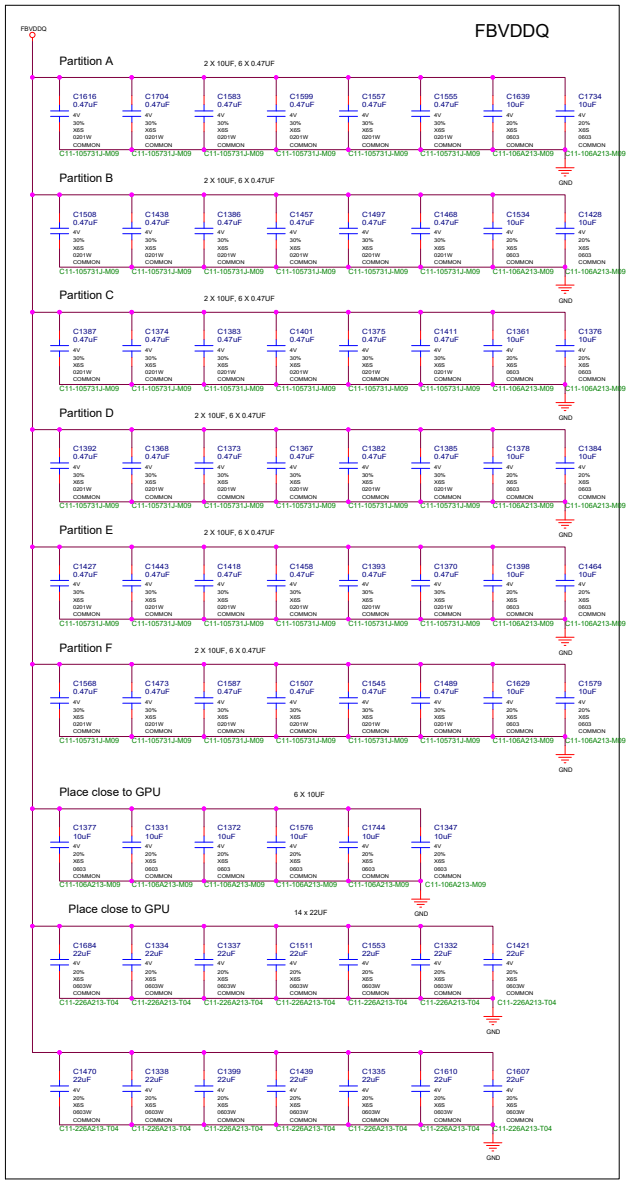
GPU PWR GND NCs



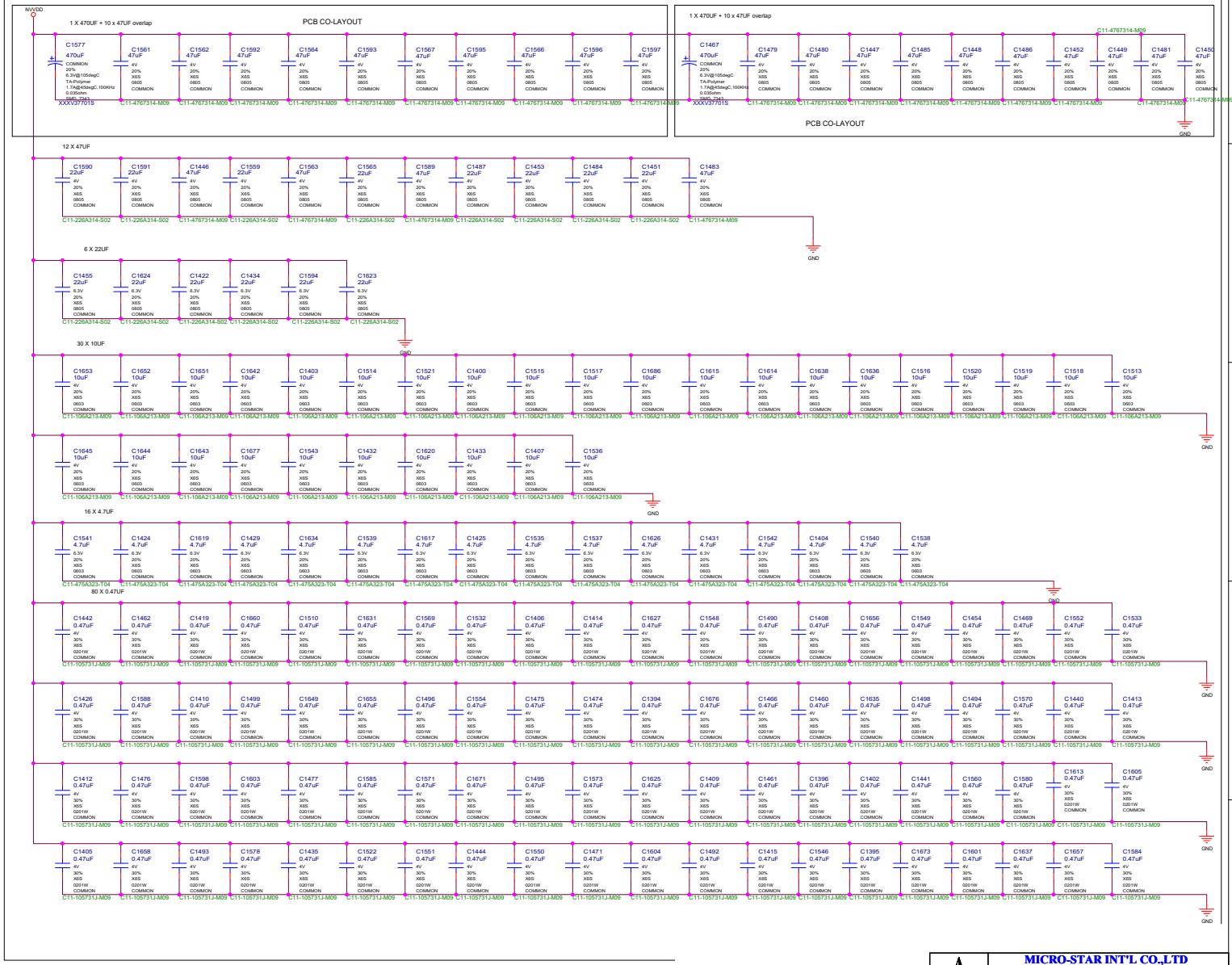
MICRO-STAR INT'L CO.,LTD		
MS-V377		
Size: Custom	Document Description: GPU PWR GND NCs	Rev: 1.0
Date: Monday, October 01, 2018	Sheet 21 of 66	

GPU Decoupling

FBVDDQ



NVVDD



MICRO-STAR INT'L CO.,LTD			
MS-V377			
Size: Custom	Document Description: GPU Decoupling		Rev: 1.0
Date: Monday, October 01, 2018		Sheet 22 of 66	

GPU Decoupling

FBVDDQ

0.47uF ---->1uF

FBVDDQ

Partition A

2 X 10UF, 6 X 0.47UF

C4254 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4260 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4266 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4272 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4278 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4284 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
GND

Partition B

2 X 10UF, 6 X 0.47UF

C4255 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4261 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4267 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4273 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4279 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4285 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
GND

Partition C

2 X 10UF, 6 X 0.47UF

C4256 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4262 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4268 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4274 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4280 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4286 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
GND

Partition D

2 X 10UF, 6 X 0.47UF

C4257 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4263 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4269 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4275 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4281 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4287 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
GND

Partition E

2 X 10UF, 6 X 0.47UF

C4258 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4264 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4270 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4276 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4282 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4288 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
GND

Partition F

2 X 10UF, 6 X 0.47UF

C4259 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4265 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4271 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4277 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4283 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4289 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
GND

NVVDD

NVVDD

80 X 0.47UF

C4290 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4294 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4298 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4302 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4306 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4310 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4314 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4318 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4322 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4326 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4330 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4334 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4338 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4342 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4346 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4350 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4354 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4358 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4362 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4366 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
GND

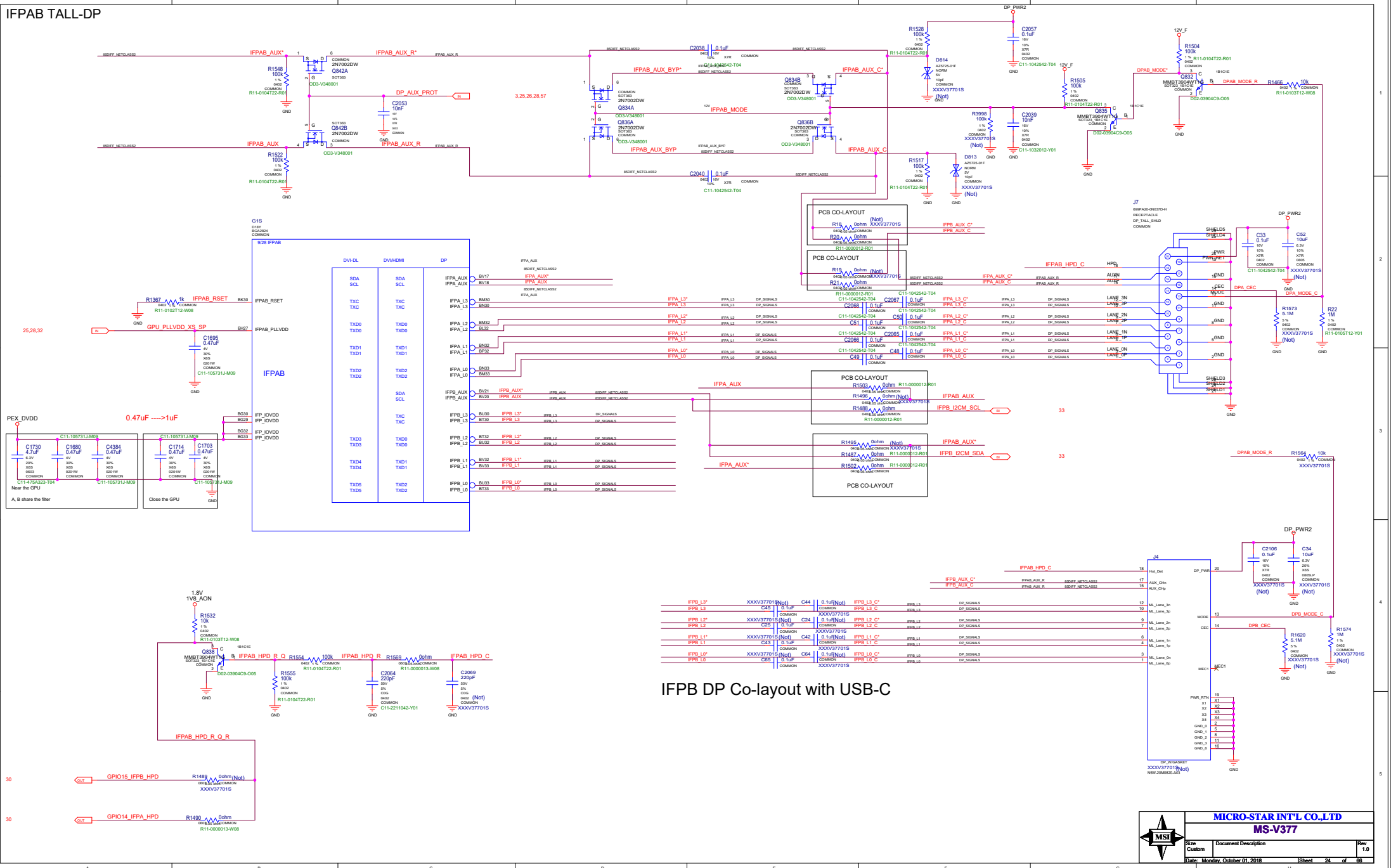
C4291 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4295 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4299 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4303 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4307 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4311 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4315 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4319 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4323 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4327 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4331 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4335 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4339 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4343 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4347 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4351 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4355 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4359 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4363 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4367 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
GND

C4292 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4296 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4300 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4304 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4308 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4312 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4316 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4320 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4324 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4328 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4332 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4336 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4340 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4344 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4348 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4352 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4356 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4360 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4364 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4368 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
GND

C4293 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4297 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4301 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4305 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4309 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4313 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4317 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4321 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4325 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4329 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4333 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4337 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4341 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4345 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4349 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4353 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4357 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4361 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4365 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
C4369 0.47uF 4V 30% X6S 0201W COMMON C11-105731J-M09
GND

MICRO-STAR INT'L CO.,LTD
MS-V377
Size: Custom
Document Description: GPU Decoupling
Rev: 1.0
Date: Monday, October 01, 2018
Sheet 23 of 66

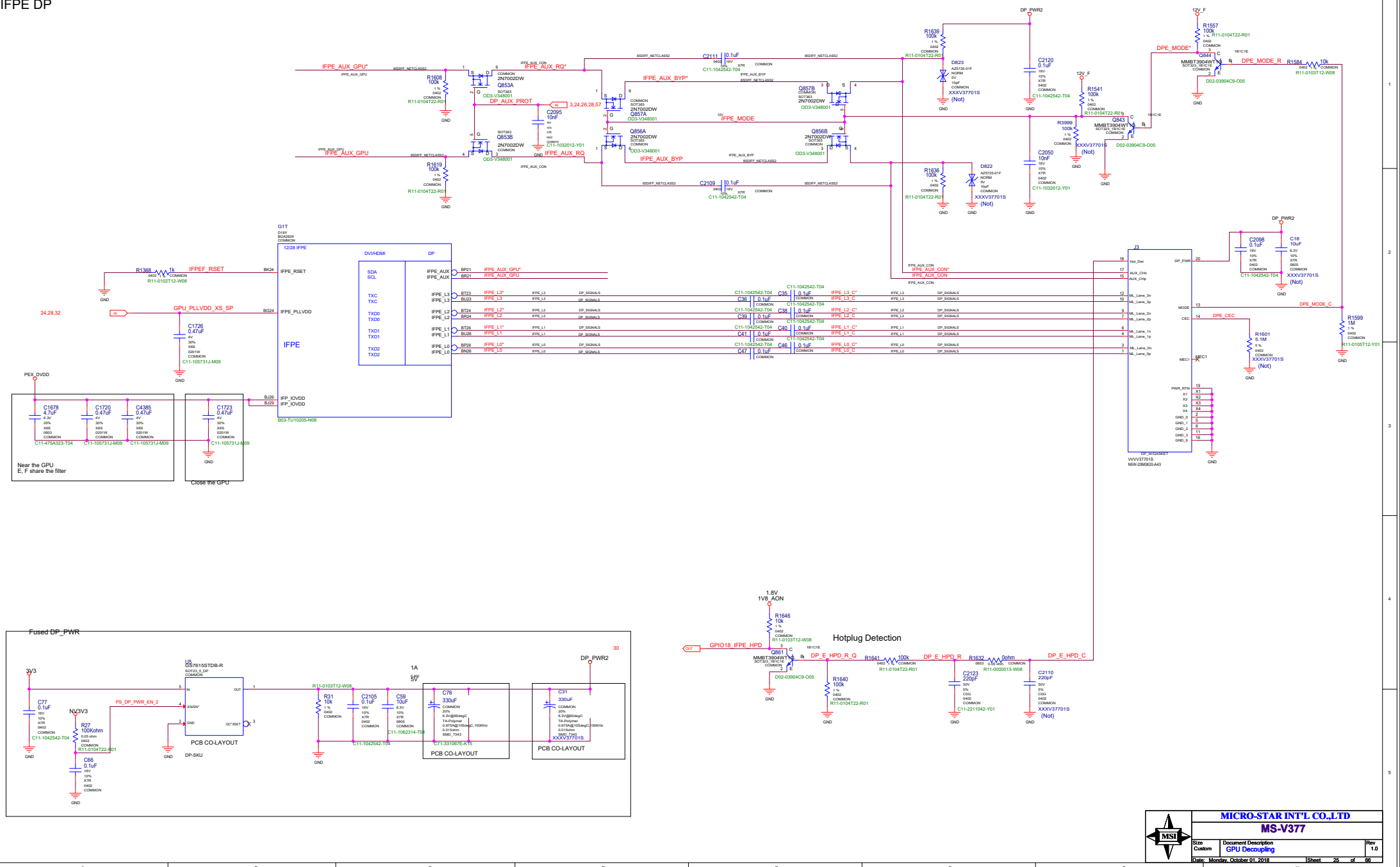
IFPAB TALL-DP



IFPB DP Co-layout with USB-C

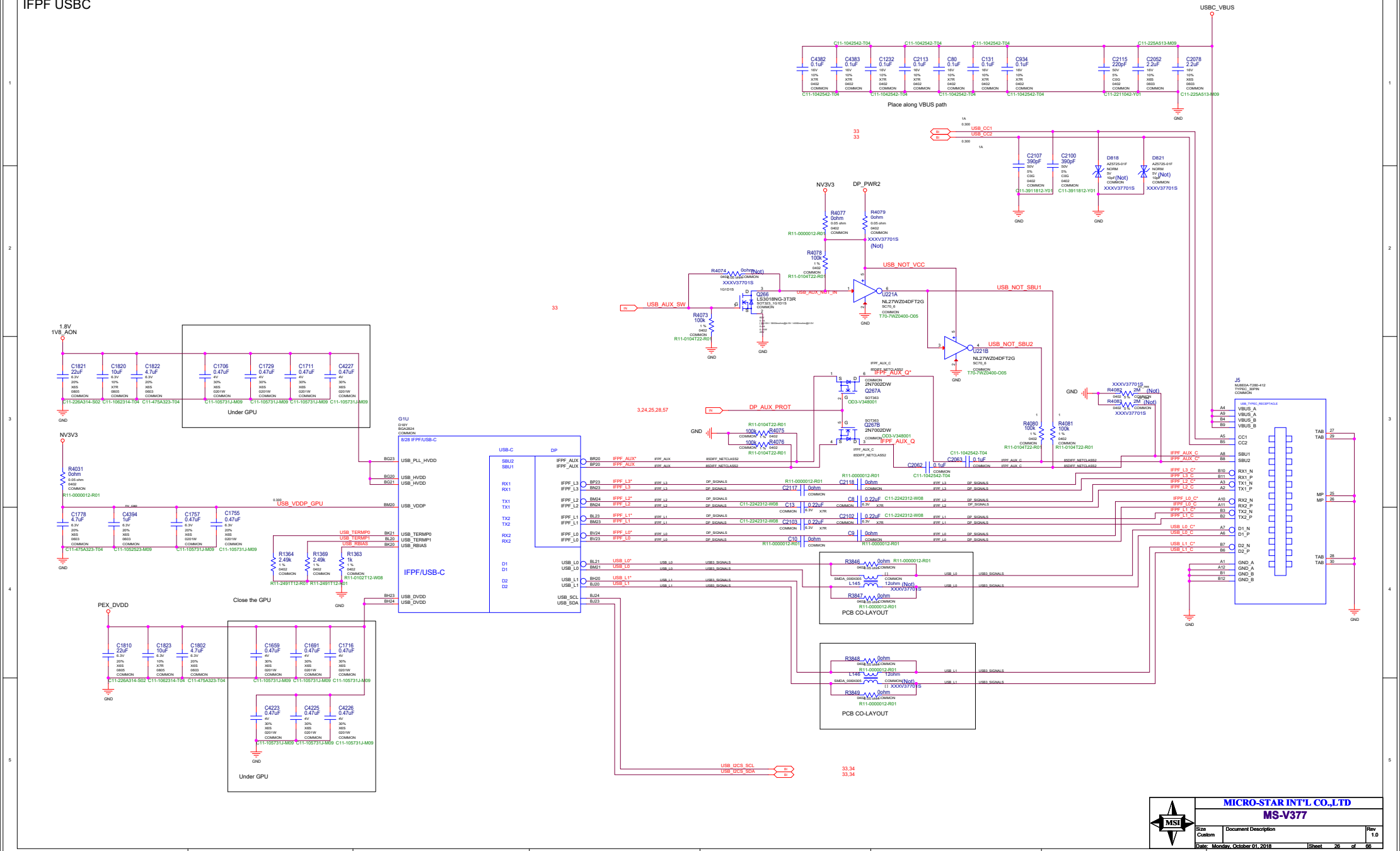
MICRO-STAR INT'L CO.,LTD		
MS-V377		
Size: Custom	Document Description	Rev: 1.0
Date: Monday, October 01, 2018	Sheet 24 of 66	

IFPE DP



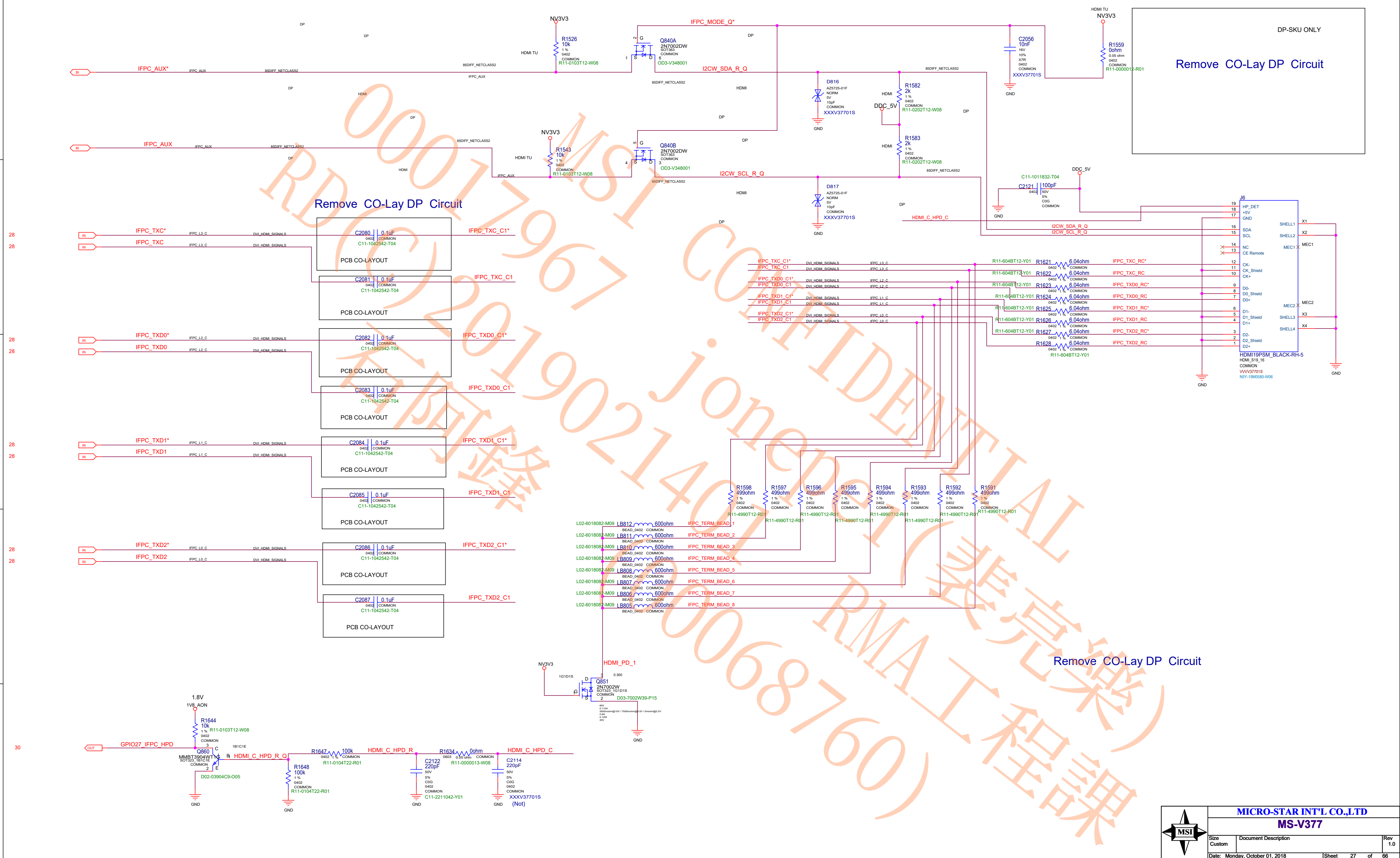
MICRO-STAR INT'L CO.,LTD	
MS-V377	
Size: Custom	Document Description: GPU Decoupling
Rev: 1.0	
Date: Monday, October 01, 2018	Sheet 25 of 66

IFPF USBC



MICRO-STAR INT'L CO.,LTD	
MS-V377	
Size: Custom	Document Description
Rev: 1.0	
Date: Monday, October 01, 2018	Sheet 26 of 66

IFPC HDMI 2.0/DP



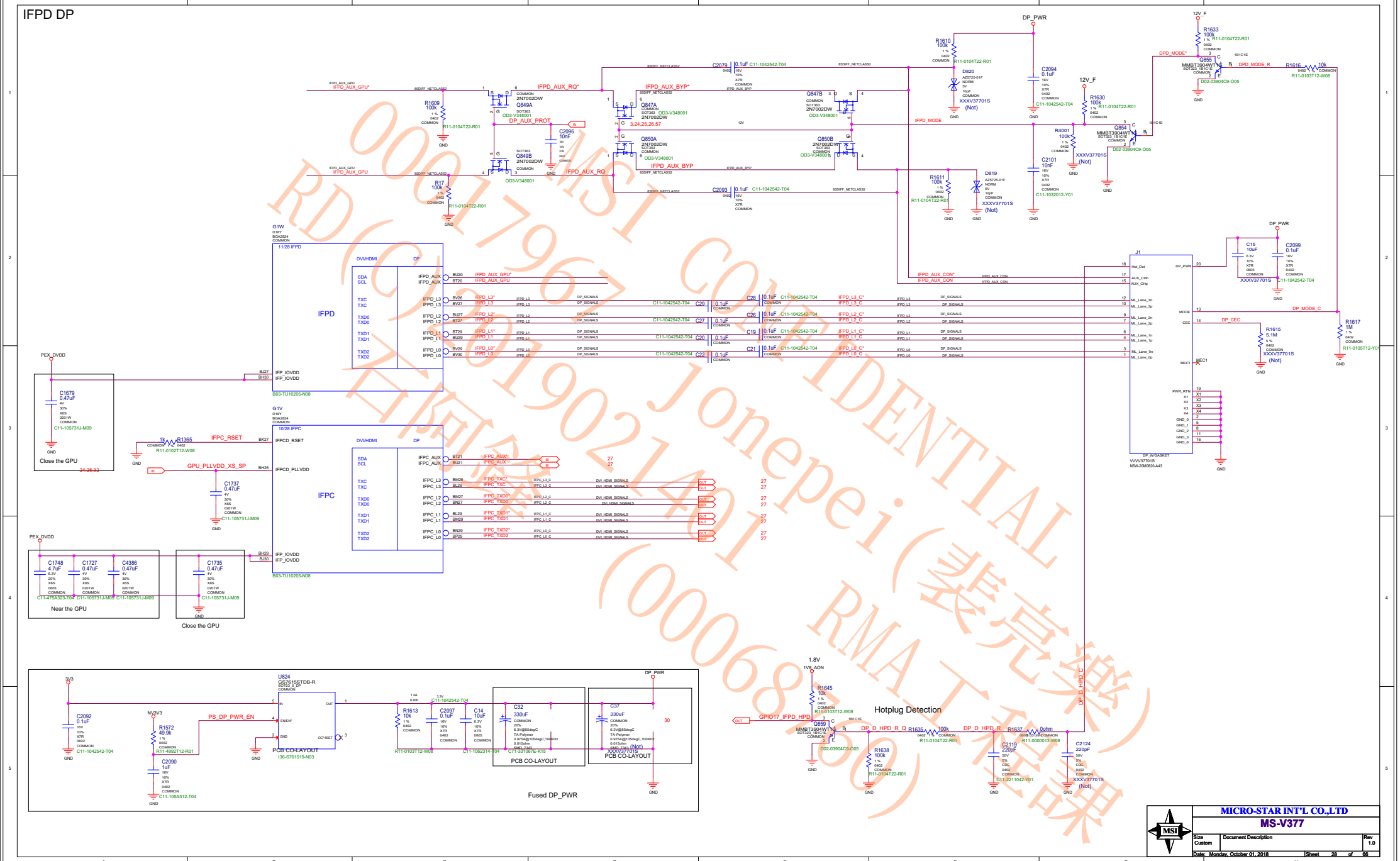
Remove CO-Lay DP Circuit
DP-SKU ONLY
IFPC_AUX*
IFPC_AUX
IFPC_MODE_Q*
I2CW_SDA_R_Q
I2CW_SCL_R_Q
NV3V3
R1526 10k
R1543 10k
Q840A 2N7002DW
Q840B 2N7002DW
D816
D817
R1582 2k
R1583 2k
DDC_5V
C2056 10nF
R1559 0ohm
C2121 100pF
HDMI_C_HPD_C
J6
HDMI19PSM_BLACK-RH-5
IFPC_TXC*
IFPC_TXC
IFPC_TXD0*
IFPC_TXD0
IFPC_TXD1*
IFPC_TXD1
IFPC_TXD2*
IFPC_TXD2
C2080 0.1uF
C2081 0.1uF
C2082 0.1uF
C2083 0.1uF
C2084 0.1uF
C2085 0.1uF
C2086 0.1uF
C2087 0.1uF
PCB CO-LAYOUT
IFPC_TXC_C1*
IFPC_TXC_C1
IFPC_TXD0_C1*
IFPC_TXD0_C1
IFPC_TXD1_C1*
IFPC_TXD1_C1
IFPC_TXD2_C1*
IFPC_TXD2_C1
R1621 6.04ohm
R1622 6.04ohm
R1623 6.04ohm
R1624 6.04ohm
R1625 6.04ohm
R1626 6.04ohm
R1627 6.04ohm
R1628 6.04ohm
IFPC_TXC_RC*
IFPC_TXC_RC
IFPC_TXD0_RC*
IFPC_TXD0_RC
IFPC_TXD1_RC*
IFPC_TXD1_RC
IFPC_TXD2_RC*
IFPC_TXD2_RC
R1598 499ohm
R1597 499ohm
R1596 499ohm
R1595 499ohm
R1594 499ohm
R1593 499ohm
R1592 499ohm
R1591 499ohm
LB812 600ohm
LB811 600ohm
LB810 600ohm
LB809 600ohm
LB808 600ohm
LB807 600ohm
LB806 600ohm
LB805 600ohm
IFPC_TERM_BEAD_1
IFPC_TERM_BEAD_2
IFPC_TERM_BEAD_3
IFPC_TERM_BEAD_4
IFPC_TERM_BEAD_5
IFPC_TERM_BEAD_6
IFPC_TERM_BEAD_7
IFPC_TERM_BEAD_8
HDMI_PD_1
Q851 2N7002W
1.8V
1V8_AON
R1644 10k
GPIO27_IFPC_HPD
Q860 MMBT3904WT1G
HDMI_C_HPD_R_Q
R1648 100k
R1647 100k
HDMI_C_HPD_R
C2122 220pF
R1634 0ohm
HDMI_C_HPD_C
C2114 220pF
(Not)
GND

MICRO-STAR INT'L CO.,LTD

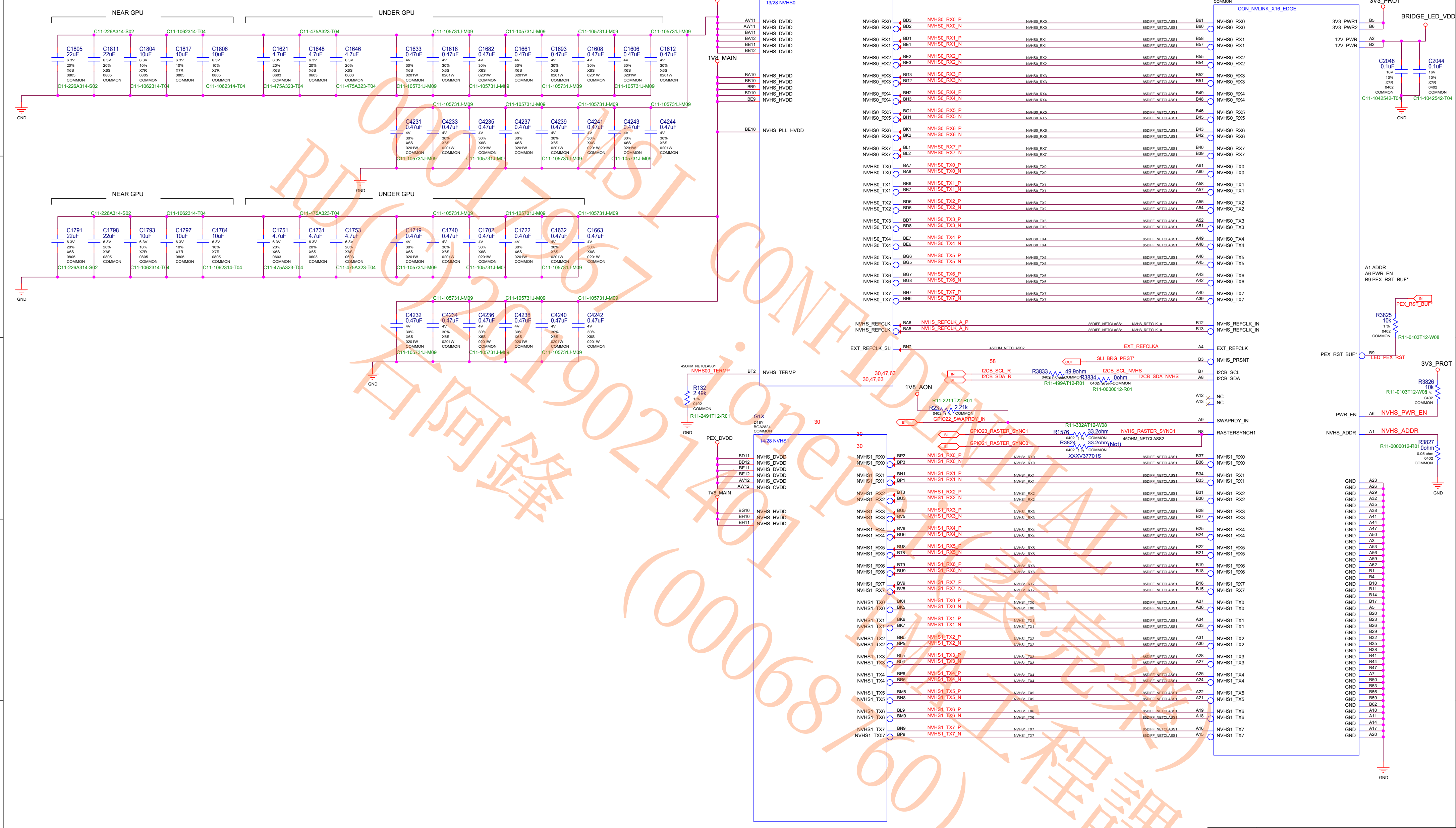
MS-V377

Size: Custom | Document Description | Rev 1.0

Date: Monday, October 01, 2018 | Sheet 27 of 66


IFPD DP
IFPD_AUX_RQ*
IFPD_AUX_BYP*
DP_AUX_PROT
IFPD_AUX_BYP
IFPD_AUX_RQ
IFPD_MODE
IFPD_AUX_CON*
IFPD_AUX_CON
IFPD
IFPC
DP_PWR
12V_F
DPD_MODE*
DPD_MODE_R
DP_MODE_C
DP_CEC
Hotplug Detection
GPIO17_IFPD_HPD
DP_D_HPD_R_Q
DP_D_HPD_R
DP_D_HPD_C
PEX_DVDD
Close the GPU
Near the GPU
Close the GPU
PS_DP_PWR_EN
PCB CO-LAYOUT
Fused DP_PWR
MICRO-STAR INT'L CO.,LTD
MS-V377
Size
Custom
Document Description
Rev
1.0
Date: Monday, October 01, 2018
Sheet 28 of 66

NVHS Interface and FRAME LOCK



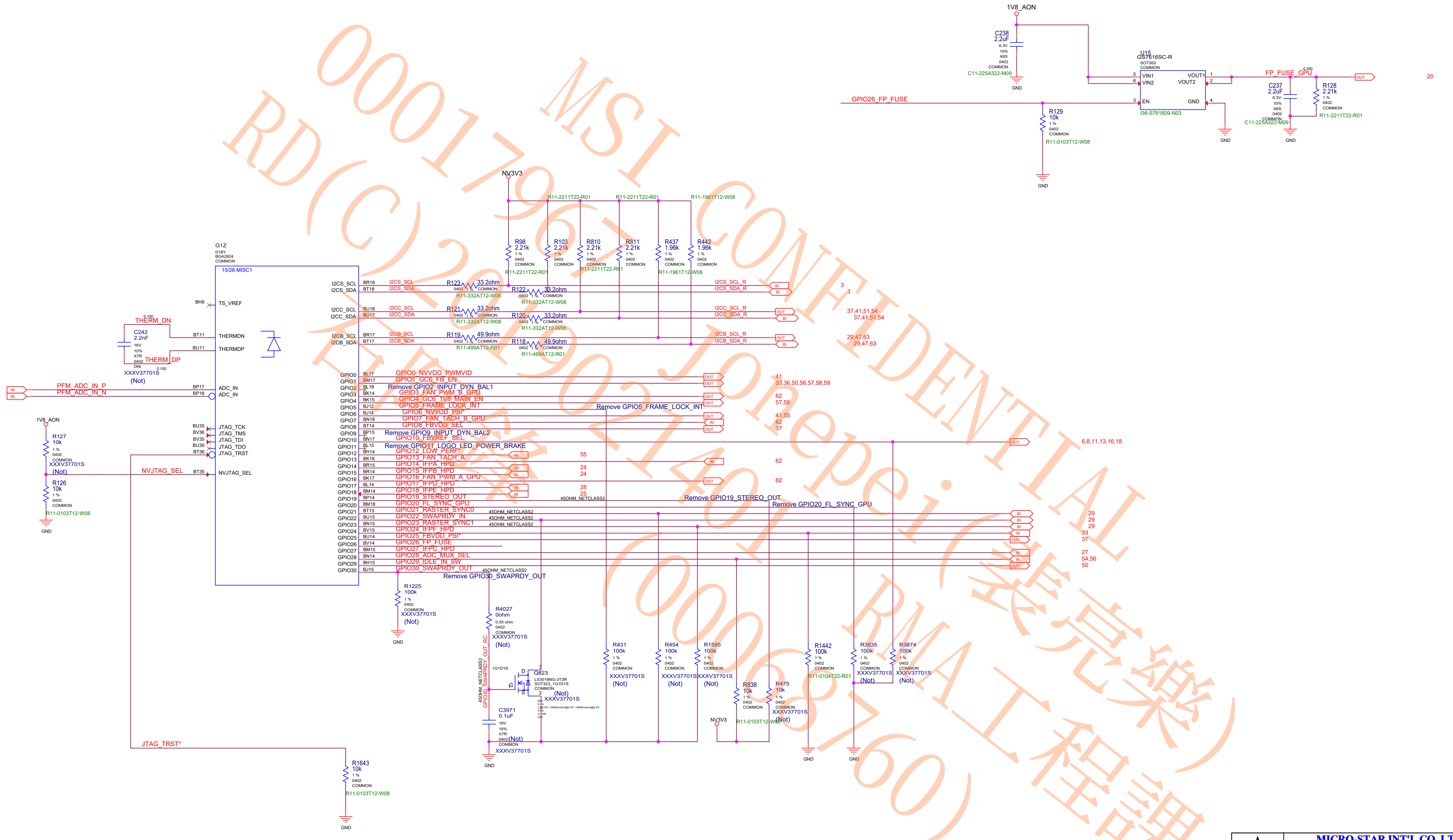
MICRO-STAR INT'L CO.,LTD

MS-V377

Size	Document Description	Rev
Custom		1.0

Date: Monday, October 01, 2018 Sheet 29 of 66

MISC1: Fan, Thermal, JTAG, GPIO, STEREO



1V8_AON
U15 G5761 6SC-R
FP_FUSE_GPU
GPIO26_FP_FUSE
NV3V3
G1Z
TS_VREF
THERM_DN
THERM_DP
THERMDN
THERMDP
PFM_ADC_IN_P
PFM_ADC_IN_N
ADC_IN
JTAG_TCK
JTAG_TMS
JTAG_TDI
JTAG_TDO
JTAG_TRST
NVJTAG_SEL
JTAG_TRST*
I2CS_SCL
I2CS_SDA
I2CC_SCL
I2CC_SDA
I2CB_SCL
I2CB_SDA
GPIO0_NVVDD_PWMVID
GPIO1_GC6_FB_EN
Remove GPIO2_INPUT_DYN_BAL1
GPIO3_FAN_PWM_B_GPU
GPIO4_GC6_1V8_MAIN_EN
GPIO5_FRAME_LOCK_INT
Remove GPIO5_FRAME_LOCK_INT
GPIO6_NVVDD_PSI*
GPIO7_FAN_TACH_B_GPU
GPIO8_FBVDD_SEL
Remove GPIO9_INPUT_DYN_BAL2
GPIO10_FBVREF_SEL
Remove GPIO11_LOGO_LED_POWER_BRAKE
GPIO12_LOW_PERF*
GPIO13_FAN_TACH_A
GPIO14_IFPA_HPD
GPIO15_IFPB_HPD
GPIO16_FAN_PWM_A_GPU
GPIO17_IFPD_HPD
GPIO18_IFPE_HPD
GPIO19_STEREO_OUT
Remove GPIO19_STEREO_OUT
GPIO20_FL_SYNC_GPU
Remove GPIO20_FL_SYNC_GPU
GPIO21_RASTER_SYNC0
GPIO22_SWAPRDY_IN
GPIO23_RASTER_SYNC1
GPIO24_IFPF_HPD
GPIO25_FBVDD_PSI*
GPIO26_FP_FUSE
GPIO27_IFPC_HPD
GPIO28_ADC_MUX_SEL
GPIO29_IDLE_IN_SW
GPIO30_SWAPRDY_OUT
Remove GPIO30_SWAPRDY_OUT
GND

MICRO-STAR INT'L CO.,LTD
MS-V377

Size: Custom | Document Description | Rev 1.0

Date: Monday, October 01, 2018 |

MISC2: ROM, Straps

STRAP2	STRAP1	STRAP0	RAMCFG[4:0]	
L	L	L	00000	
L	L	H	00001	DEFAULT
L	H	L	00010	
L	H	H	00011	
H	L	L	00100	
H	L	H	00101	
H	H	L	00110	
H	H	H	00111	
L	L	M	01000	
L	M	L	01001	

ROM_SO	ROM_SI	ROM_SCLK	DUMMY[2:0],FS_OVERT	1:ENABLE 0:DISABLE	
L	L	L	XXX1	FS_OVERT ENABLE	DEFAULT
L	L	H	XXX0	FS_OVERT DISABLE	

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	SKU 200

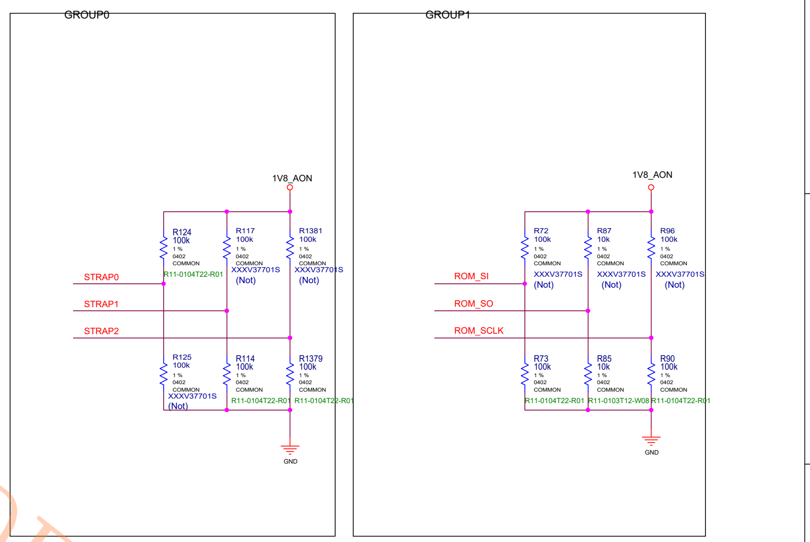
H=High :Tied to 1.8V
M=Middle:Tied to 0.9V
L=Low :Tied to 0V

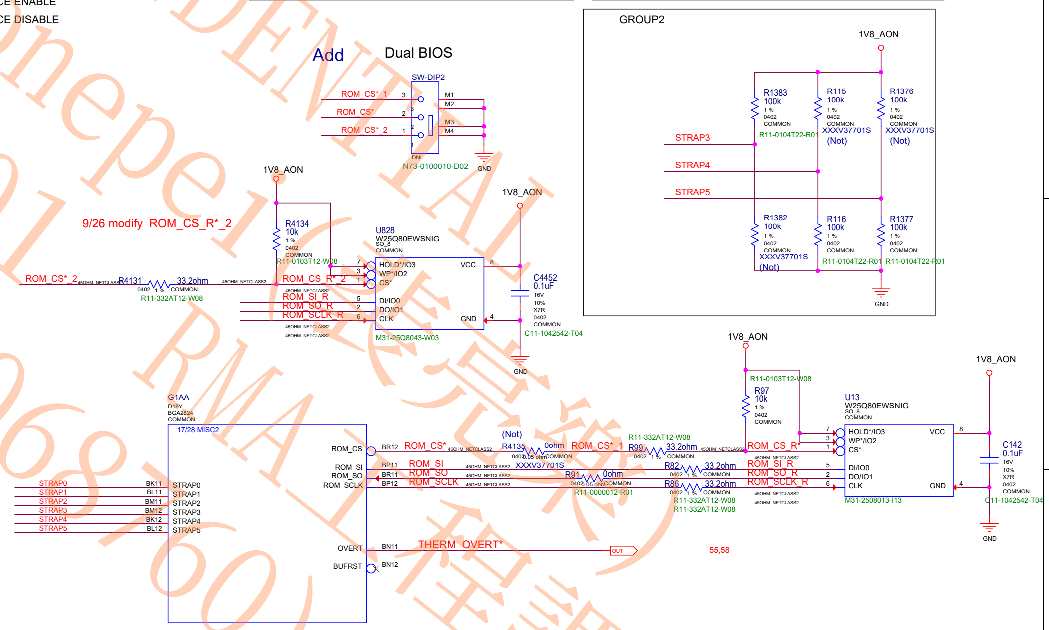
1:SMB_ALT_ADDR ENABLE
0:SMB_ALT_ADDR DISABLE

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



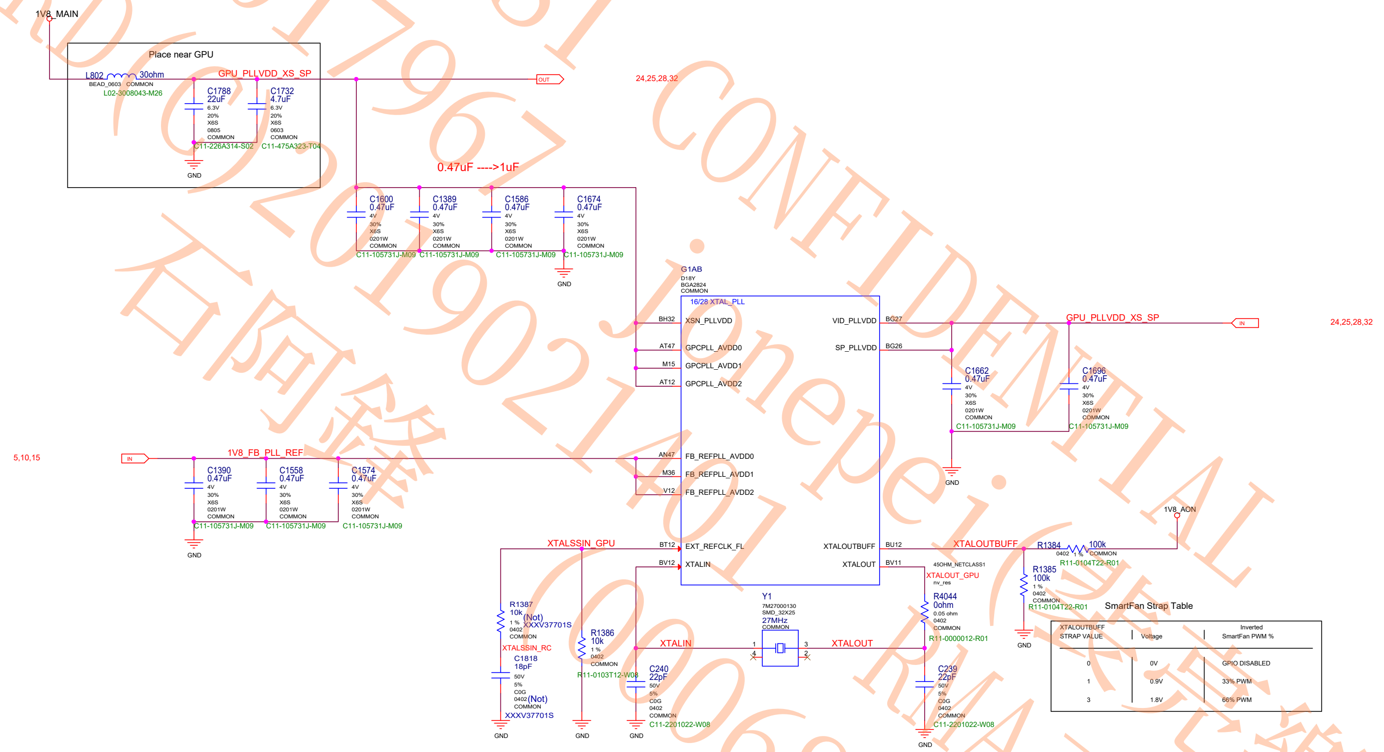


MICRO-STAR INT'L CO.,LTD
MS-V377

Size	Document Description	Rev
Custom	GPU Decoupling	1.0

Date: Monday, October 01, 2018 Sheet 31 of 66

MISC2: XTAL. PLL



1V8_MAIN
Place near GPU
L802 30ohm
BEAD_0603 COMMON
L02-3008043-M26
GPU_PLLVDD_XS_SP
C1788 22uF 6.3V 20% X6S 0805 COMMON
C11-226A314-S02
C1732 4.7uF 6.3V 20% X6S 0603 COMMON
C11-475A323-T04
GND
OUT
24,25,28,32
0.47uF ---->1uF
C1600 0.47uF
C1389 0.47uF
C1586 0.47uF
C1674 0.47uF
4V 30% X6S 0201W COMMON
C11-105731J-M09
G1AB
D18Y
BGA2824
COMMON
16/28 XTAL_PLL
BH32 XSN_PLLVDD
AT47 GPCPLL_AVDD0
M15 GPCPLL_AVDD1
AT12 GPCPLL_AVDD2
AN47 FB_REFPLL_AVDD0
M36 FB_REFPLL_AVDD1
V12 FB_REFPLL_AVDD2
BT12 EXT_REFCLK_FL
BV12 XTALIN
VID_PLLVDD BG27
SP_PLLVDD BG26
XTALOUTBUFF BU12
XTALOUT BV11
GPU_PLLVDD_XS_SP
IN
24,25,28,32
C1662 0.47uF
C1696 0.47uF
C11-105731J-M09
5,10,15
IN
1V8_FB_PLL_REF
C1390 0.47uF
C1558 0.47uF
C1574 0.47uF
C11-105731J-M09
XTALSSIN_GPU
R1387 10k 1 % 0402 COMMON (Not) XXXV37701S
XTALSSIN_RC
C1818 18pF 50V 5% C0G 0402 COMMON (Not) XXXV37701S
R1386 10k 1 % 0402 COMMON
R11-0103T12-W08
XTALIN
Y1
7M27000130
SMD_32X25
27MHz
COMMON
XTALOUT
C240 22pF 50V 5% C0G 0402 COMMON
C11-2201022-W08
45OHM_NETCLASS1
XTALOUT_GPU
R4044 0ohm 0.05 ohm 0402 COMMON
R11-0000012-R01
C239 22pF 50V 5% C0G 0402 COMMON
C11-2201022-W08
XTALOUTBUFF
R1384 100k 0402 1 % COMMON
R11-0104T22-R01
1V8_AON
R1385 100k 1 % 0402 COMMON
R11-0104T22-R01
GND

SmartFan Strap Table

XTALOUTBUFF STRAP VALUE	Voltage	Inverted SmartFan PWM %
0	0V	GPIO DISABLED
1	0.9V	33% PWM
3	1.8V	66% PWM

MICRO-STAR INT'L CO.,LTD

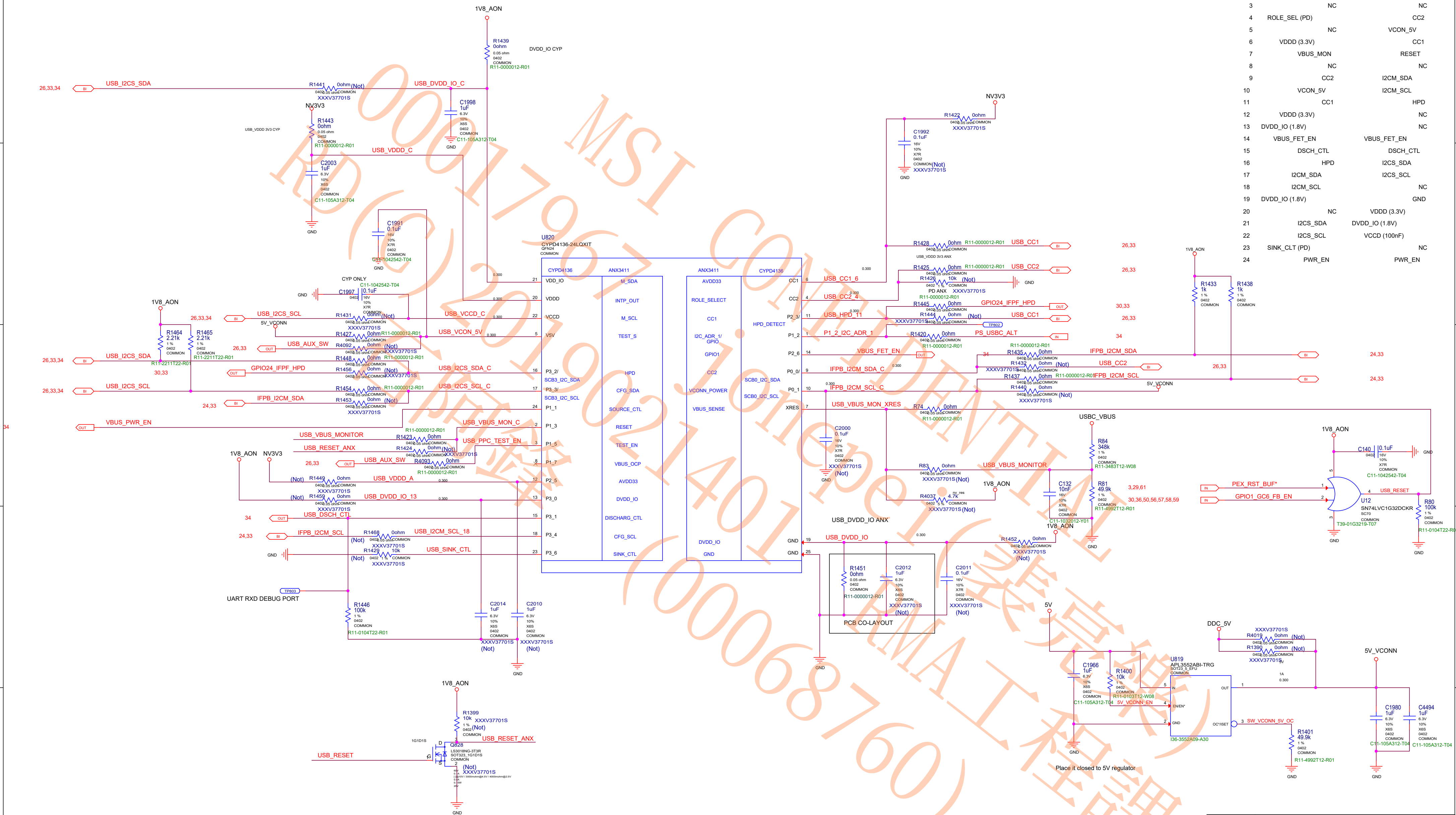
MS-V377

Size	Document Description	Rev
Custom	GPU Decoupling	1.0

Date: Monday, October 01, 2018 | Sheet 32 of 66

MISC: USB PPC

PIN	ANX	CYP
1	TP	TP
2	RESET	VBUS_MON
3	NC	NC
4	ROLE_SEL (PD)	CC2
5	NC	VCON_5V
6	VDDD (3.3V)	CC1
7	VBUS_MON	RESET
8	NC	NC
9	CC2	I2CM_SDA
10	VCON_5V	I2CM_SCL
11	CC1	HPD
12	VDDD (3.3V)	NC
13	DVDD_IO (1.8V)	NC
14	VBUS_FET_EN	VBUS_FET_EN
15	DSCH_CTL	DSCH_CTL
16	HPD	I2CS_SDA
17	I2CM_SDA	I2CS_SCL
18	I2CM_SCL	NC
19	DVDD_IO (1.8V)	GND
20	NC	VDDD (3.3V)
21	I2CS_SDA	DVDD_IO (1.8V)
22	I2CS_SCL	VCCD (100nF)
23	SINK_CLT (PD)	NC
24	PWR_EN	PWR_EN



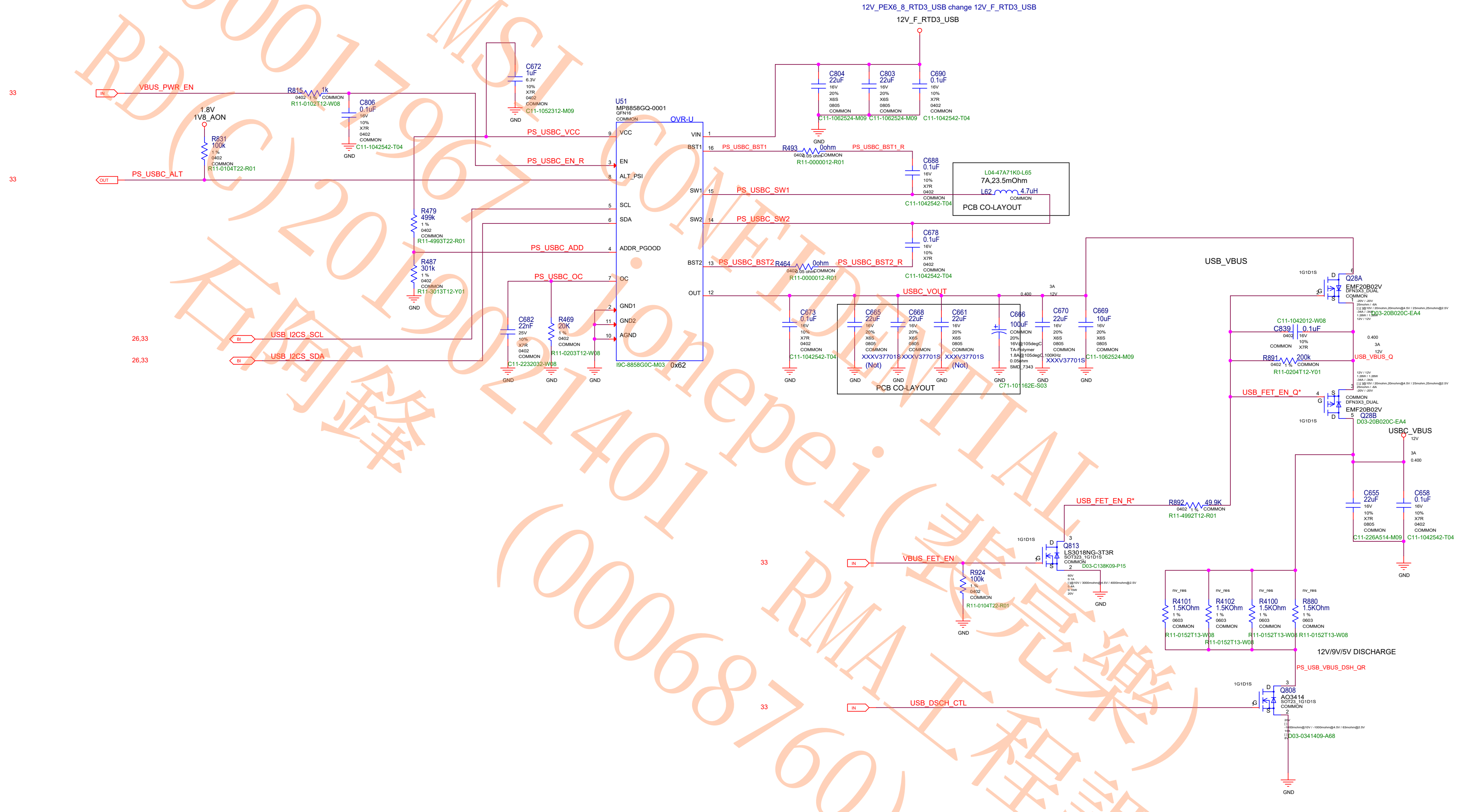
1V8_AON
NV3V3
DVDD_IO CYP
USB_I2CS_SDA
USB_DVDD_IO_C
USB_VDDD_C
USB_I2CS_SCL
USB_VCCD_C
USB_VCON_5V
USB_AUX_SW
GPIO24_IFPF_HPD
IFPB_I2CM_SDA
VBUS_PWR_EN
USB_VBUS_MONITOR
USB_RESET_ANX
USB_VBUS_MON_C
USB_PPC_TEST_EN
USB_VDDD_A
USB_DVDD_IO_13
USB_DSCH_CTL
IFPB_I2CM_SCL
USB_I2C_SCL_18
USB_SINK_CTL
UART RXD DEBUG PORT
U820
CYPD4136-24LQXIT
CYPD4136
ANX3411
USB_CC1
USB_CC2
USB_HPD
GPIO24_IFPF_HPD
PS_USBC_ALT
P1_2_I2C_ADR_1
VBUS_FET_EN
IFPB_I2CM_SDA_C
IFPB_I2CM_SCL_C
USB_VBUS_MON_XRES
USB_DVDD_IO ANX
USB_DVDD_IO
PCB CO-LAYOUT
USBC_VBUS
PEX_RST_BUF*
GPIO1_GC6_FB_EN
USB_RESET
U12
SN74LVC1G32DCKR
DDC_5V
5V_VCONN
U819
APL3552ABI-TRG
SW_VCONN_5V_OC
5V_VCONN_EN
Place it closed to 5V regulator
Q828
LB3018NG-3T3R

MICRO-STAR INT'L CO.,LTD
MS-V377

Size	Document Description	Rev
Custom	GPU Decoupling	1.0

Date: Monday, October 01, 2018 Sheet 33 of 66

PS: USB VR



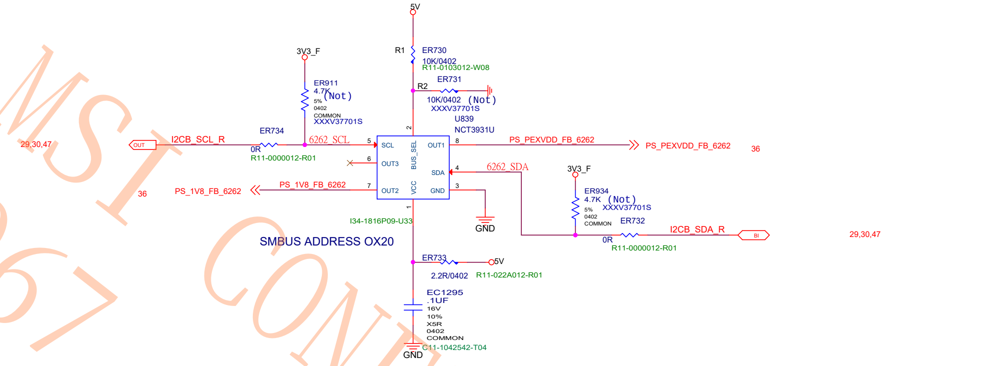
12V_PEX6_8_RTD3_USB change 12V_F_RTD3_USB
12V_F_RTD3_USB
VBUS_PWR_EN
R815 1k
1.8V 1V8_AON
C806 0.1uF
C672 1uF
R831 100k
PS_USBC_ALT
U51 MP8858GQ-0001
OVR-U
PS_USBC_VCC
PS_USBC_EN_R
VCC
EN
ALT_PSI
SCL
SDA
ADDR_PGOOD
OC
GND1
GND2
AGND
VIN
BST1
SW1
SW2
BST2
OUT
R479 499k
R487 301k
PS_USBC_ADD
PS_USBC_OC
C682 22nF
R469 20K
USB_I2CS_SCL
USB_I2CS_SDA
0x62
C804 22uF
C803 22uF
C690 0.1uF
PS_USBC_BST1
R493 0ohm
PS_USBC_BST1_R
C688 0.1uF
L04-47A71K0-L65
7A,23.5mOhm
L62 4.7uH
PCB CO-LAYOUT
PS_USBC_SW1
PS_USBC_SW2
C678 0.1uF
PS_USBC_BST2
R464 0ohm
PS_USBC_BST2_R
USBC_VOUT
C673 0.1uF
C665 22uF
C668 22uF
C661 22uF
C666 100uF
C670 22uF
C669 10uF
PCB CO-LAYOUT
USB_VBUS
Q28A EMF20B02V
C839 0.1uF
R891 200k
USB_VBUS_Q
USB_FET_EN_Q*
Q28B EMF20B02V
USBC_VBUS
C655 22uF
C658 0.1uF
USB_FET_EN_R*
R892 49.9K
Q813 LS3018NG-3T3R
VBUS_FET_EN
R924 100k
R4101 1.5KOhm
R4102 1.5KOhm
R4100 1.5KOhm
R880 1.5KOhm
12V/9V/5V DISCHARGE
PS_USB_VBUS_DSH_QR
Q808 AO3414
USB_DSCH_CTL
GND

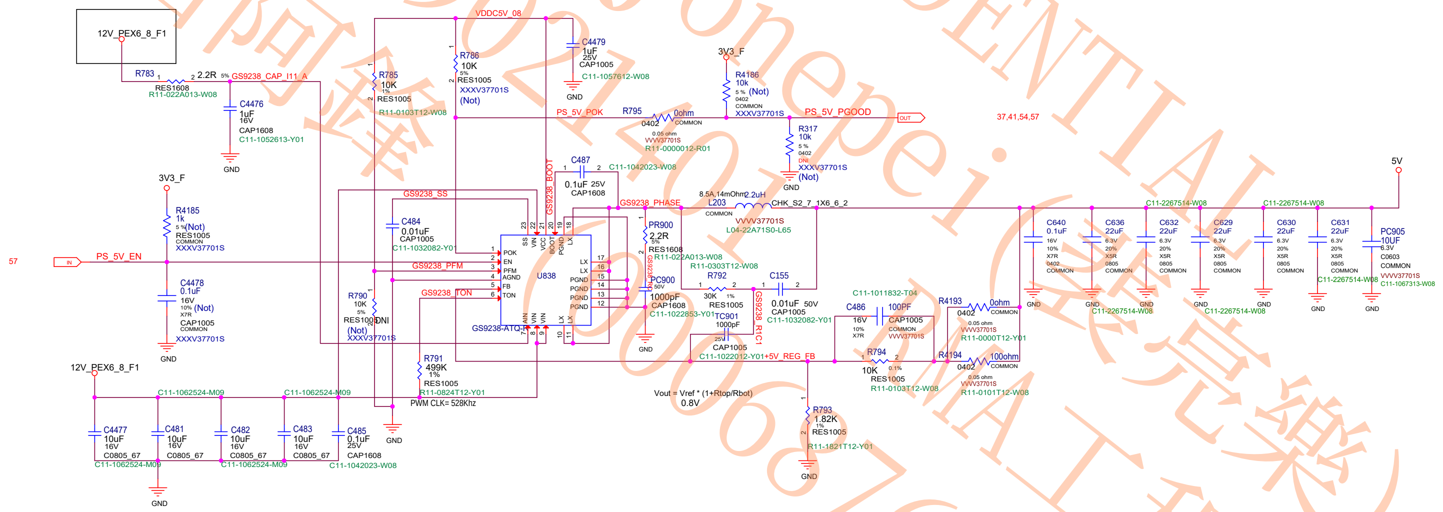
MICRO-STAR INT'L CO.,LTD		
MS-V377		
Size: Custom	Document Description: GPU Decoupling	Rev: 1.0
Date: Monday, October 01, 2018	Sheet 34 of 66	

PS: 5V, 5V_BACKUP

Table 1. Recommended Address Programming

Address	0x2A	0x28	0x26	0x24	0x22	0x20
R1 (kΩ)	open	3.9	3	2.2	1.3	10
R2 (kΩ)	10	1.3	2.2	3	3.9	open
BUS_SEL Voltage (% of VCC)	0	25	42	58	75	100

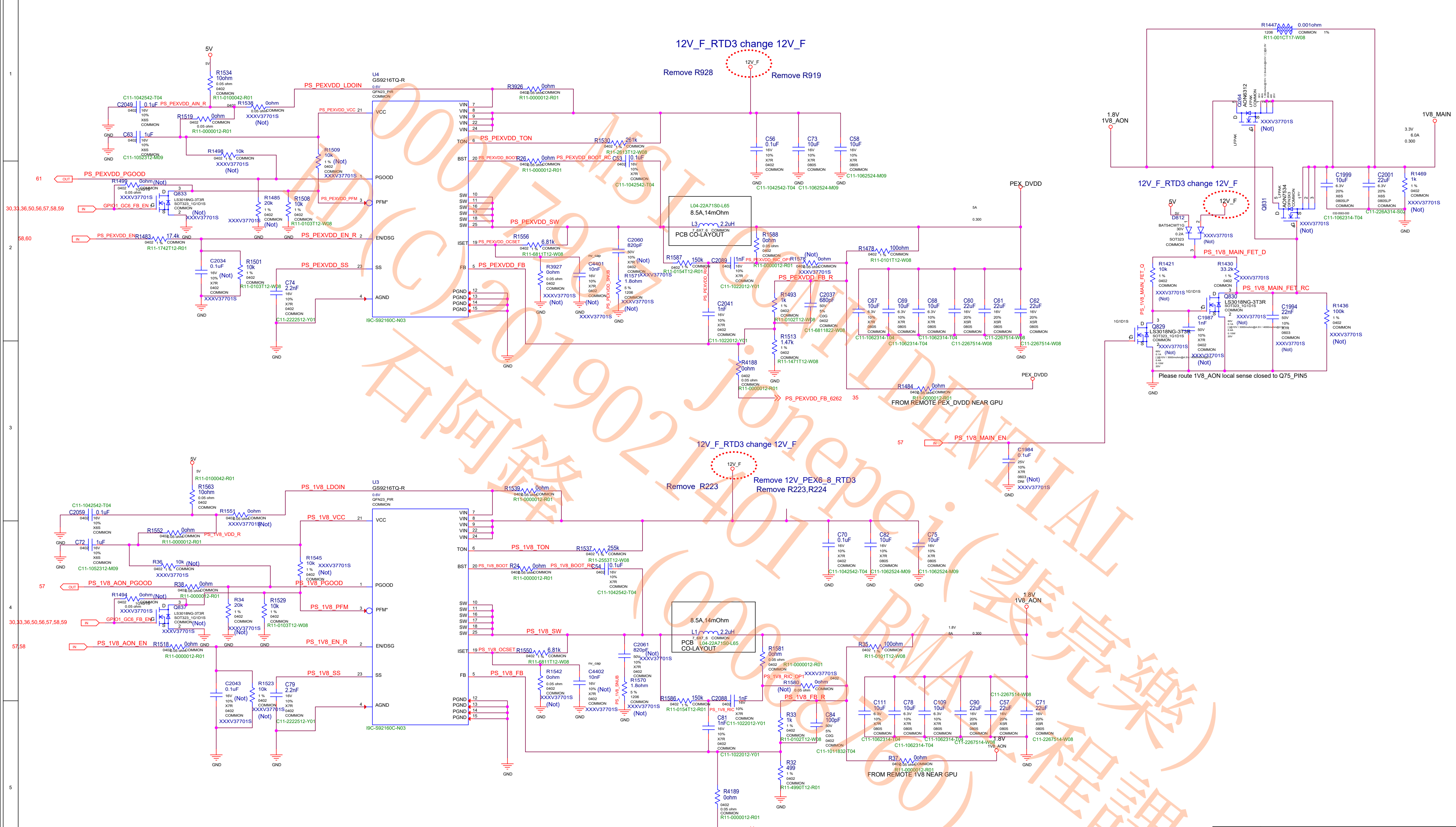




12V_PEX6_8_F1
R783 2.2R
GS9238_CAP_I11_A
VDDC5V_08
C4479 1uF 25V
R786 10K
R785 10K
C4476 1uF 16V
3V3_F
R4186 10k (Not)
PS_5V_POK
R795 0ohm
PS_5V_PGOOD
R317 10k (Not)
3V3_F
R4185 1k (Not)
PS_5V_EN
C4478 0.1uF 16V (Not)
C487 0.1uF 25V
GS9238_SS
GS9238_BOOT
GS9238_PHASE
L203 2.2uH
5V
C484 0.01uF
GS9238_PFM
GS9238_TON
U838 GS9238-ATQ
PR900 2.2R
PC900 1000pF
R792 30K
C155 0.01uF 50V
TC901 1000pF
C486 100PF
R4193 0ohm
R4194 100ohm
R794 10K
+5V_REG_FB
R790 10K (Not)
R791 499K
PWM CLK= 528Khz
Vout = Vref * (1+Rtop/Rbot)
0.8V
R793 1.82K
C640 0.1uF
C636 22uF
C632 22uF
C629 22uF
C630 22uF
C631 22uF
PC905 10UF
12V_PEX6_8_F1
C4477 10uF
C481 10uF
C482 10uF
C483 10uF
C485 0.1uF
GND

MICRO-STAR INT'L CO.,LTD		
MS-V377		
Size: Custom	Document Description: GPU Decoupling	Rev: 1.0
Date: Monday, October 01, 2018	Sheet 35 of 66	

PS: PEXVDD 1V8 Rail



12V_F_RTD3 change 12V_F
Remove R928
Remove R919
12V_F
U4
GS9216TQ-R
PS_PEXVDD_LDOIN
PS_PEXVDD_VCC
PS_PEXVDD_TON
PS_PEXVDD_PGOOD
PS_PEXVDD_EN_R
PS_PEXVDD_SS
PS_PEXVDD_SW
PS_PEXVDD_FB
PS_PEXVDD_FB_R
PS_PEXVDD_FB_6262
PEX_DVDD
L3 2.2uH
8.5A,14mOhm
PCB CO-LAYOUT
FROM REMOTE PEX_DVDD NEAR GPU
1.8V
1V8_AON
1V8_MAIN
12V_F_RTD3 change 12V_F
PS_1V8_MAIN_FET_D
PS_1V8_MAIN_FET_RC
PS_1V8_MAIN_EN
Please route 1V8_AON local sense closed to Q75_PIN5
12V_F_RTD3 change 12V_F
Remove R223
Remove 12V_PEX6_8_RTD3
Remove R223,R224
U3
GS9216TQ-R
PS_1V8_LDOIN
PS_1V8_VCC
PS_1V8_TON
PS_1V8_AON_PGOOD
PS_1V8_PGOOD
PS_1V8_PFM
PS_1V8_AON_EN
PS_1V8_EN_R
PS_1V8_SS
PS_1V8_SW
PS_1V8_FB
PS_1V8_FB_R
PS_1V8_FB_6262
L1 2.2uH
8.5A,14mOhm
PCB CO-LAYOUT
FROM REMOTE 1V8 NEAR GPU

MICRO-STAR INT'L CO.,LTD

MS-V377

Size	Document Description	Rev
Custom	PS: PEXVDD 1V8 Rail	1.0

Date: Monday, October 01, 2018 Sheet 36 of 66

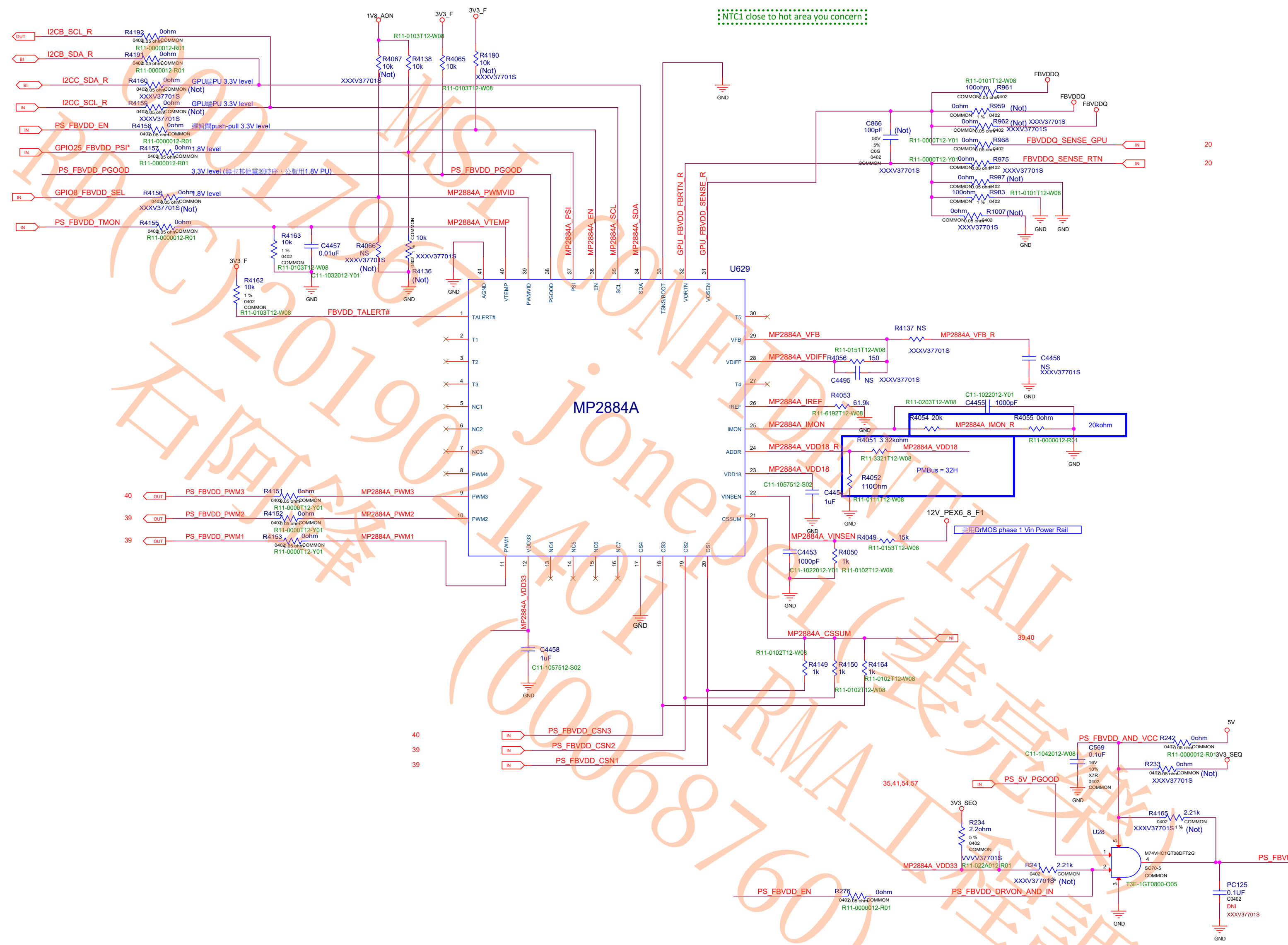
PS: FBVDD Controller

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

	+NVVDD
TDC	??A
IccMax	??A
Vboot	1.35V
Load Line	0mohm



NTC1 close to hot area you concern
U629
MP2884A
I2CB_SCL_R
I2CB_SDA_R
I2CC_SDA_R
I2CC_SCL_R
PS_FBVDD_EN
GPIO25_FBVDD_PSI*
PS_FBVDD_PGOOD
GPIO8_FBVDD_SEL
PS_FBVDD_TMON
FBVDD_TALERT#
MP2884A_PWMVID
MP2884A_VTEMP
MP2884A_PSI
MP2884A_EN
MP2884A_SCL
MP2884A_SDA
GPU_FBVDD_FBRTN_R
GPU_FBVDD_SENSE_R
FBVDDQ_SENSE_GPU
FBVDDQ_SENSE_RTN
MP2884A_VFB
MP2884A_VFB_R
MP2884A_VDIFF
MP2884A_IREF
MP2884A_IMON
MP2884A_IMON_R
MP2884A_VDD18_R
MP2884A_VDD18
MP2884A_VINSEN
MP2884A_CSSUM
MP2884A_VDD33
PMBus = 32H
12V_PEX6_8_F1
PS_FBVDD_PWM3
PS_FBVDD_PWM2
PS_FBVDD_PWM1
MP2884A_PWM3
MP2884A_PWM2
MP2884A_PWM1
PS_FBVDD_CSN3
PS_FBVDD_CSN2
PS_FBVDD_CSN1
PS_FBVDD_AND_VCC
PS_5V_PGOOD
PS_FBVDD_DRVON
PS_FBVDD_EN
PS_FBVDD_DRVON_AND_IN
U28

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

MICRO-STAR INT'L CO.,LTD

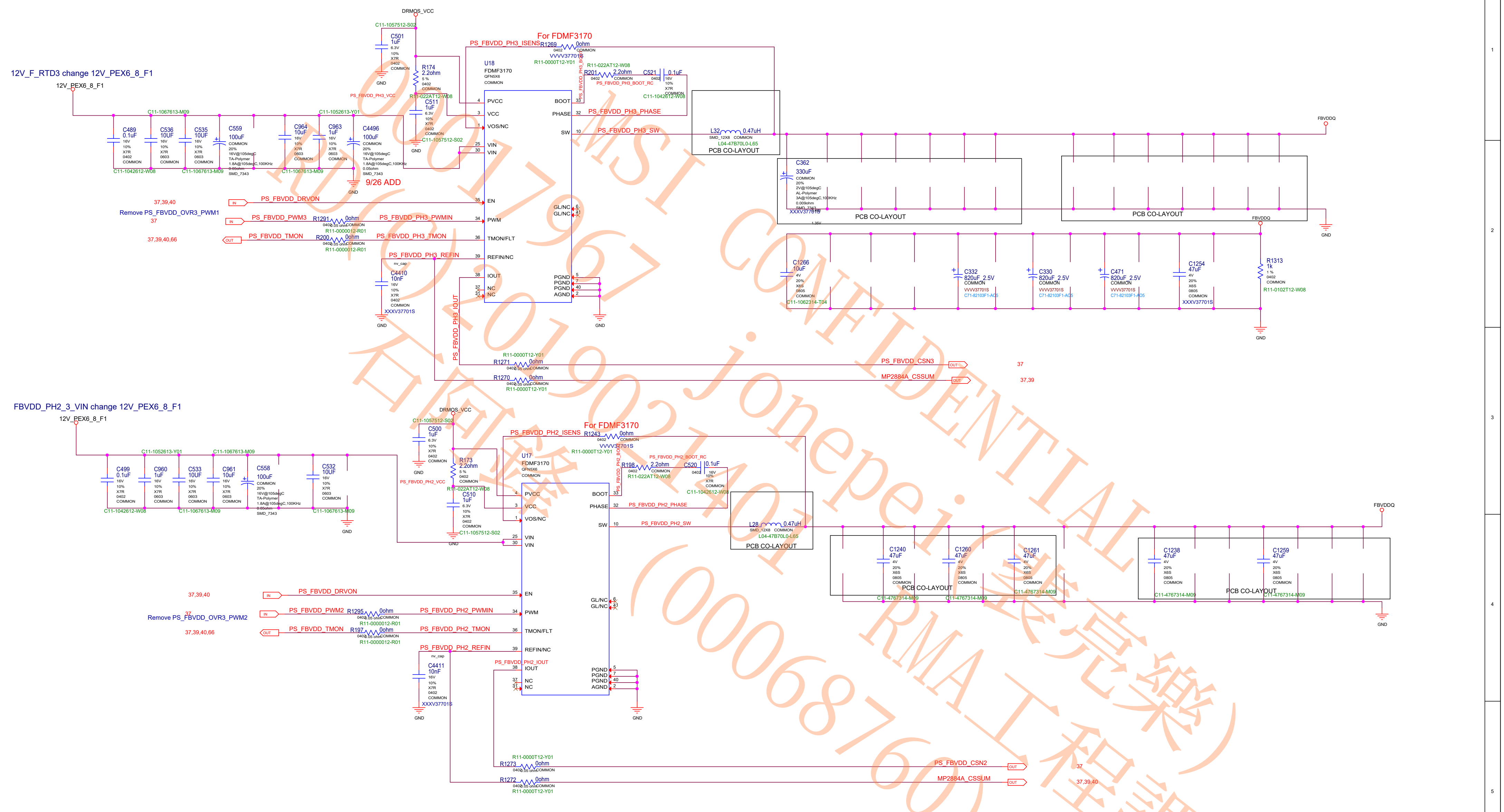
MS-V377

Size	Document Description	Rev
Custom		1.0

Date: Monday, October 01, 2018

PS: FBVDD Controller OVR3

PS: FBVDD PH2,3



12V_F_RTD3 change 12V_PEX6_8_F1
12V_PEX6_8_F1
DRMOS_VCC
For FDMF3170
PS_FBVDD_PH3_ISENS
R1269 0ohm
U18 FDMF3170
PVCC
VCC
VOS/NC
VIN
EN
PWM
TMON/FLT
REFIN/NC
IOUT
NC
BOOT
PHASE
SW
GL/NC
PGND
AGND
PS_FBVDD_PH3_PHASE
PS_FBVDD_PH3_SW
PS_FBVDD_PH3_BOOT_RC
L32 0.47uH
PCB CO-LAYOUT
C362 330uF
C332 820uF_2.5V
C330 820uF_2.5V
C471 820uF_2.5V
C1254 47uF
C1266 10uF
R1313 1k
FBVDDQ
GND
9/26 ADD
PS_FBVDD_DRVON
Remove PS_FBVDD_OVR3_PWM1
PS_FBVDD_PWM3
R1291 0ohm
PS_FBVDD_PH3_PWMIN
PS_FBVDD_TMON
R200 0ohm
PS_FBVDD_PH3_TMON
PS_FBVDD_PH3_REFIN
C4410 10nF
PS_FBVDD_PH3_IOUT
R1271 0ohm
PS_FBVDD_CSN3
R1270 0ohm
MP2884A_CSSUM
FBVDD_PH2_3_VIN change 12V_PEX6_8_F1
PS_FBVDD_PH2_ISENS
R1243 0ohm
U17 FDMF3170
R173 2.2ohm
PS_FBVDD_PH2_VCC
R198 2.2ohm
C520 0.1uF
PS_FBVDD_PH2_BOOT_RC
PS_FBVDD_PH2_PHASE
PS_FBVDD_PH2_SW
L28 0.47uH
C1240 47uF
C1260 47uF
C1261 47uF
C1238 47uF
C1259 47uF
Remove PS_FBVDD_OVR3_PWM2
PS_FBVDD_PWM2
R1295 0ohm
PS_FBVDD_PH2_PWMIN
R197 0ohm
PS_FBVDD_PH2_TMON
PS_FBVDD_PH2_REFIN
C4411 10nF
PS_FBVDD_PH2_IOUT
R1273 0ohm
PS_FBVDD_CSN2
R1272 0ohm

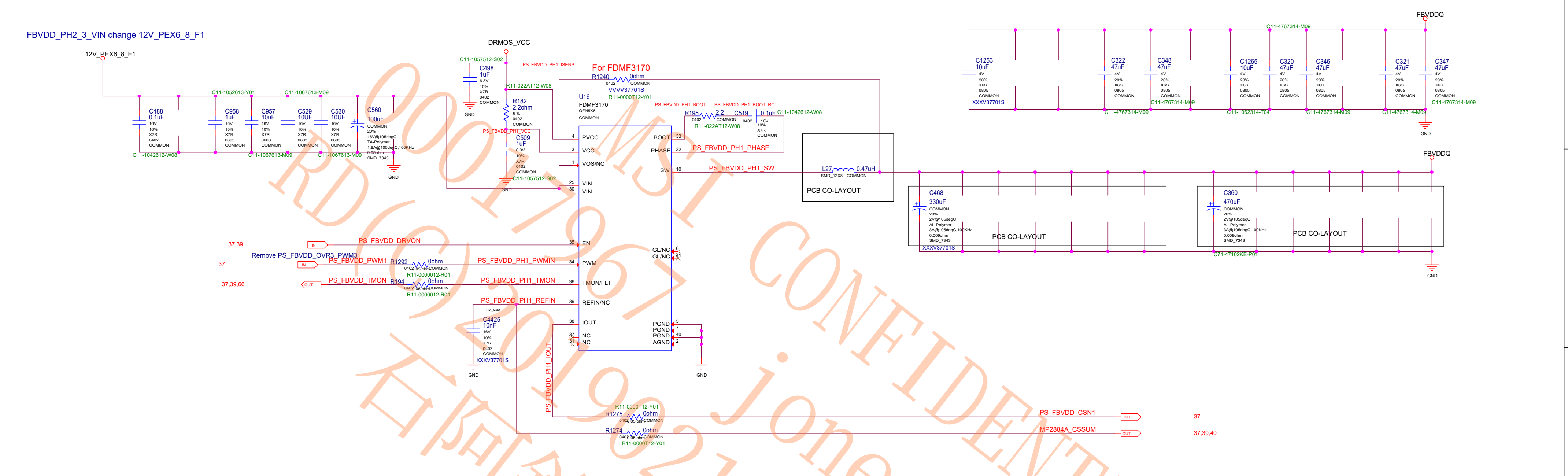
MICRO-STAR INT'L CO.,LTD

MS-V377

Size	Document Description	Rev
Custom		1.0

Date: Monday, October 01, 2018 Sheet 39 of 66

PS: FBVDD PH1

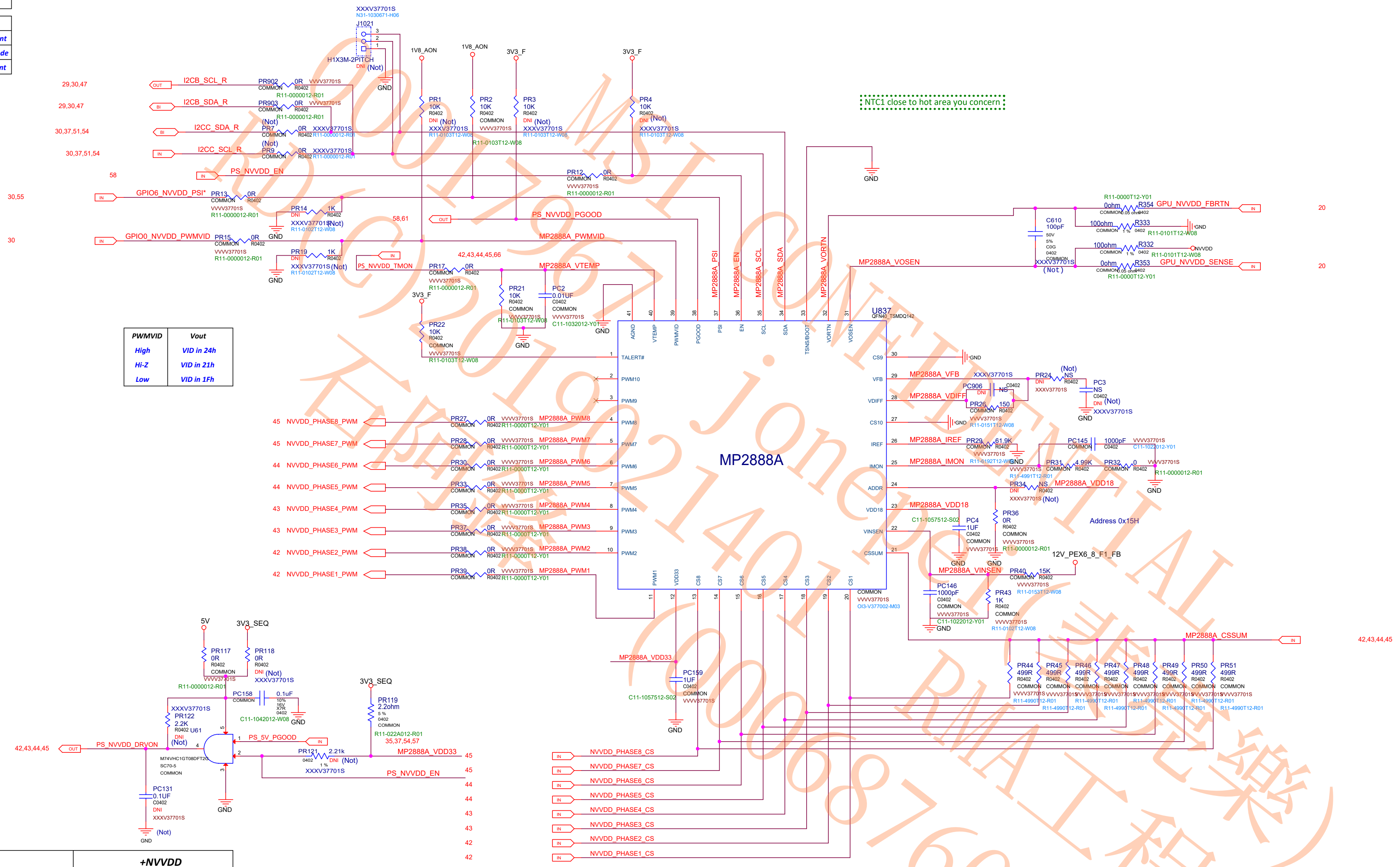


Remove 12V_PEX_FB --->FBVDD_PH2_3_VIN circuit

Page34: PS: NVVDD - MP2888A

EN Type	R3
Open Drain	10k
Push Pull	NS

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



MP2888A
U837
NTC1 close to hot area you concern
I2CB_SCL_R
I2CB_SDA_R
I2CC_SDA_R
I2CC_SCL_R
PS_NVVDD_EN
GPIO6_NVVDD_PSI
GPIO0_NVVDD_PWMVID
PS_NVVDD_PGOOD
MP2888A_PWMVID
PS_NVVDD_TMON
MP2888A_VTEMP
MP2888A_VOSEN
GPU_NVVDD_FBRTN
GPU_NVVDD_SENSE
MP2888A_VFB
MP2888A_VDIFF
MP2888A_IREF
MP2888A_IMON
MP2888A_VDD18
MP2888A_VINSEN
MP2888A_CSSUM
MP2888A_VDD33
12V_PEX6_8_F1_FB
Address 0x15H
NVVDD_PHASE8_PWM
NVVDD_PHASE7_PWM
NVVDD_PHASE6_PWM
NVVDD_PHASE5_PWM
NVVDD_PHASE4_PWM
NVVDD_PHASE3_PWM
NVVDD_PHASE2_PWM
NVVDD_PHASE1_PWM
NVVDD_PHASE8_CS
NVVDD_PHASE7_CS
NVVDD_PHASE6_CS
NVVDD_PHASE5_CS
NVVDD_PHASE4_CS
NVVDD_PHASE3_CS
NVVDD_PHASE2_CS
NVVDD_PHASE1_CS
PS_NVVDD_DRVON
PS_5V_PGOOD
1V8_AON
3V3_F
3V3_SEQ
5V
GND

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

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

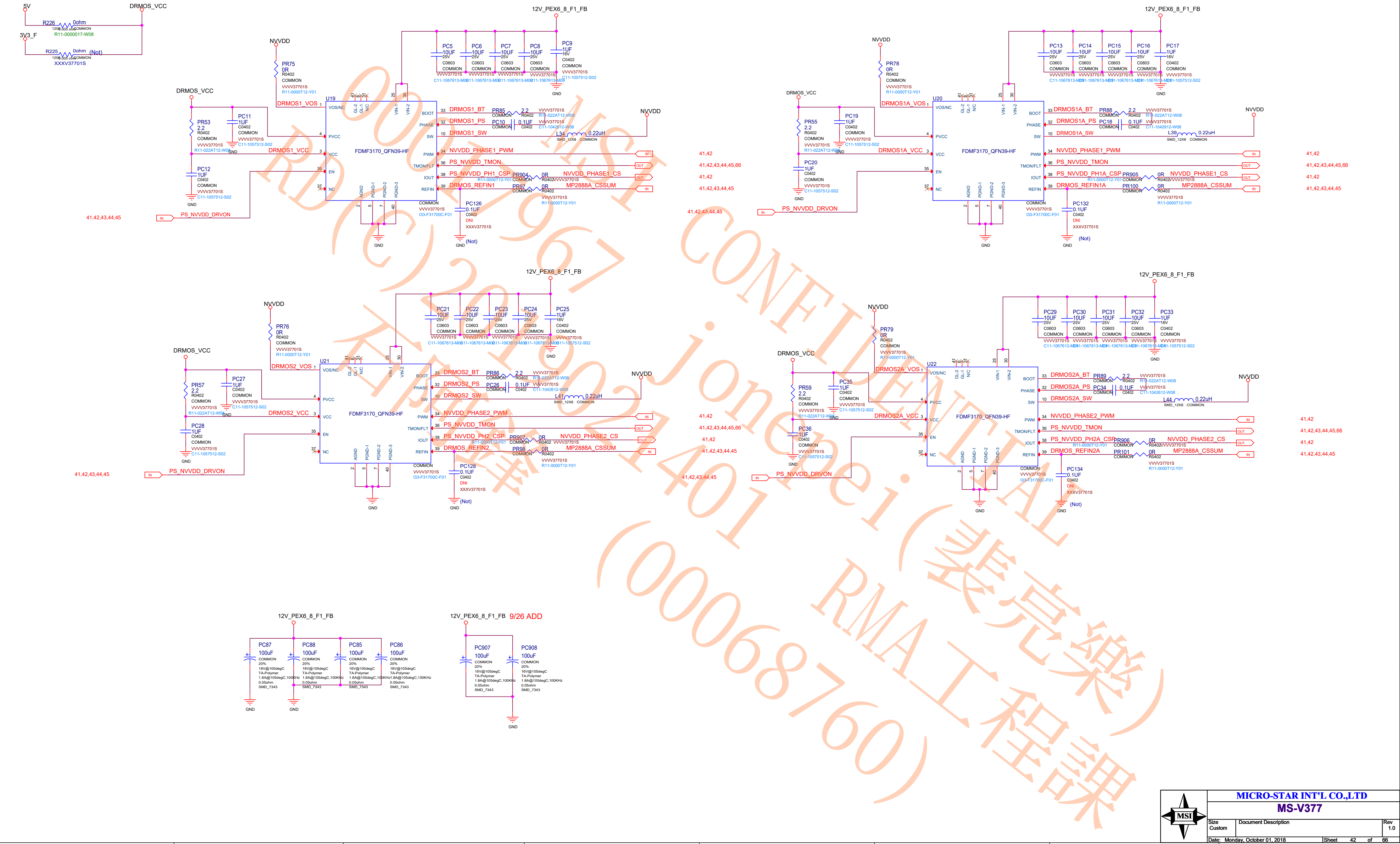
MICRO-STAR INT'L CO.,LTD

MS-V377

Size	Document Description	Rev
Custom	PS: NVVDD - MP2888A	1.0

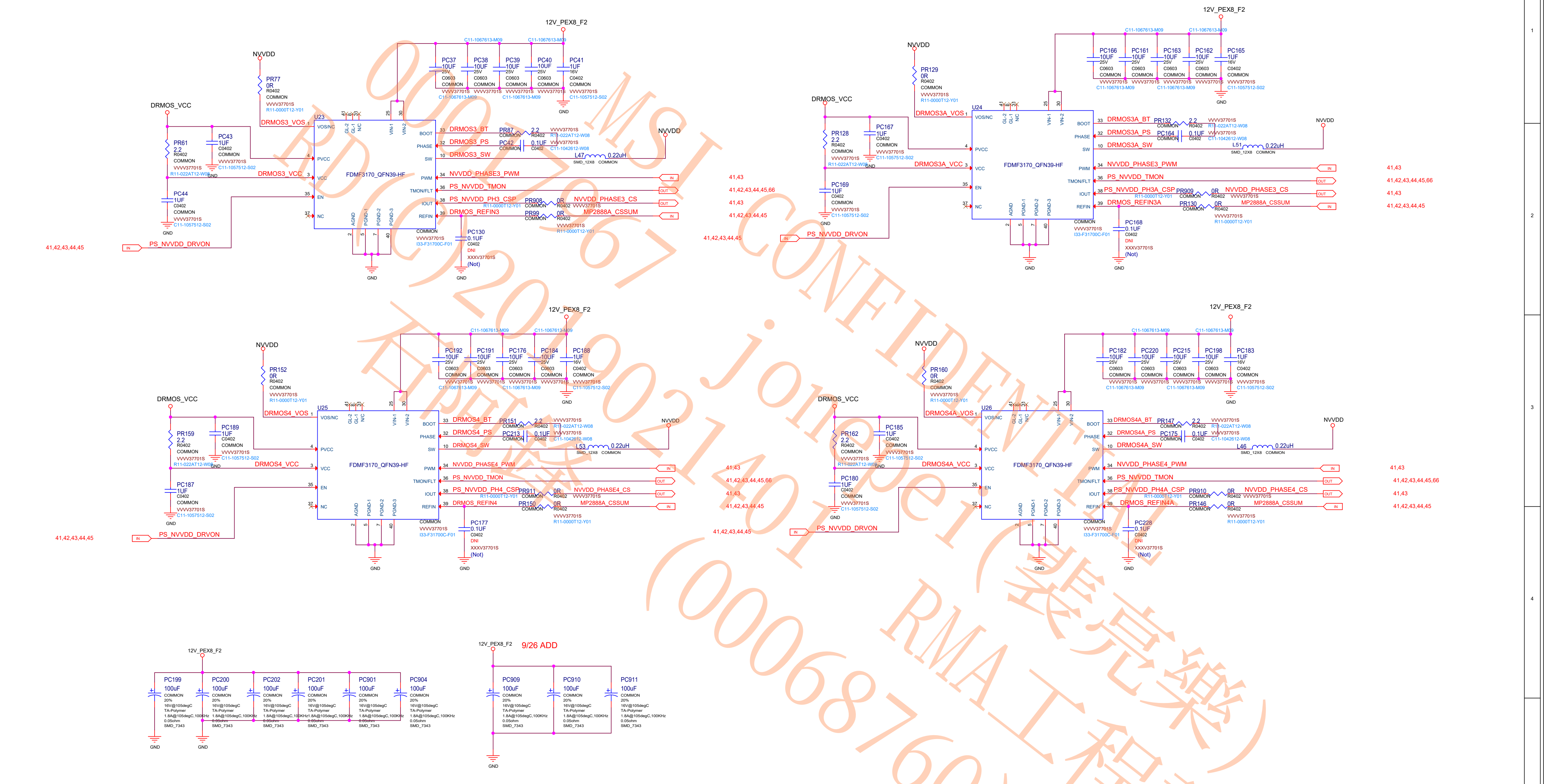
Date: Thursday, October 04, 2018

PS: NVVDD Phase 1~4



5V
DRMOS_VCC
3V3_F
R226 0ohm
R225 0ohm (Not)
NVVDD
12V_PEX6_8_F1_FB
U19
U20
U21
U22
FDMF3170_QFN39-HF
DRMOS1_VOS
DRMOS1_BT
DRMOS1_PS
DRMOS1_SW
DRMOS1_VCC
NVVDD_PHASE1_PWM
PS_NVVDD_TMON
PS_NVVDD_PH1_CSP
NVVDD_PHASE1_CS
DRMOS_REFIN1
MP2888A_CSSUM
PS_NVVDD_DRVON
DRMOS1A_VOS
DRMOS1A_BT
DRMOS1A_PS
DRMOS1A_SW
DRMOS1A_VCC
PS_NVVDD_PH1A_CSP
DRMOS_REFIN1A
DRMOS2_VOS
DRMOS2_BT
DRMOS2_PS
DRMOS2_SW
DRMOS2_VCC
NVVDD_PHASE2_PWM
PS_NVVDD_PH2_CSP
NVVDD_PHASE2_CS
DRMOS_REFIN2
DRMOS2A_VOS
DRMOS2A_BT
DRMOS2A_PS
DRMOS2A_SW
DRMOS2A_VCC
PS_NVVDD_PH2A_CSP
DRMOS_REFIN2A
L34 0.22uH
L39 0.22uH
L41 0.22uH
L44 0.22uH
GND
9/26 ADD
PC87 100uF
PC88 100uF
PC85 100uF
PC86 100uF
PC907 100uF
PC908 100uF
MICRO-STAR INT'L CO.,LTD
MS-V377
Size Custom
Document Description
Rev 1.0
Date: Monday, October 01, 2018
Sheet 42 of 66

PS: NVVDD Phase 5~8



12V_PEX8_F2
NVVDD
DRMOS_VCC
PR77 0R
PC37 10UF
PC38 10UF
PC39 10UF
PC40 10UF
PC41 1UF
U23
FDMF3170_QFN39-HF
DRMOS3_VOS
DRMOS3_VCC
DRMOS3_BT
DRMOS3_PS
DRMOS3_SW
L47 0.22uH
NVDD_PHASE3_PWM
PS_NVVDD_TMON
PS_NVVDD_PH3_CSP
NVVDD_PHASE3_CS
DRMOS_REFIN3
MP2888A_CSSUM
PS_NVVDD_DRVON
U24
DRMOS3A_VOS
DRMOS3A_VCC
DRMOS3A_BT
DRMOS3A_PS
DRMOS3A_SW
L51 0.22uH
NVDD_PHASE3_PWM
PS_NVVDD_PH3A_CSP
NVVDD_PHASE3_CS
DRMOS_REFIN3A
U25
DRMOS4_VOS
DRMOS4_VCC
DRMOS4_BT
DRMOS4_PS
DRMOS4_SW
L53 0.22uH
NVVDD_PHASE4_PWM
PS_NVVDD_PH4_CSP
NVVDD_PHASE4_CS
DRMOS_REFIN4
U26
DRMOS4A_VOS
DRMOS4A_VCC
DRMOS4A_BT
DRMOS4A_PS
DRMOS4A_SW
L46 0.22uH
PS_NVVDD_PH4A_CSP
DRMOS_REFIN4A
PC199 100uF
PC200 100uF
PC202 100uF
PC201 100uF
PC901 100uF
PC904 100uF
9/26 ADD
PC909 100uF
PC910 100uF
PC911 100uF
GND

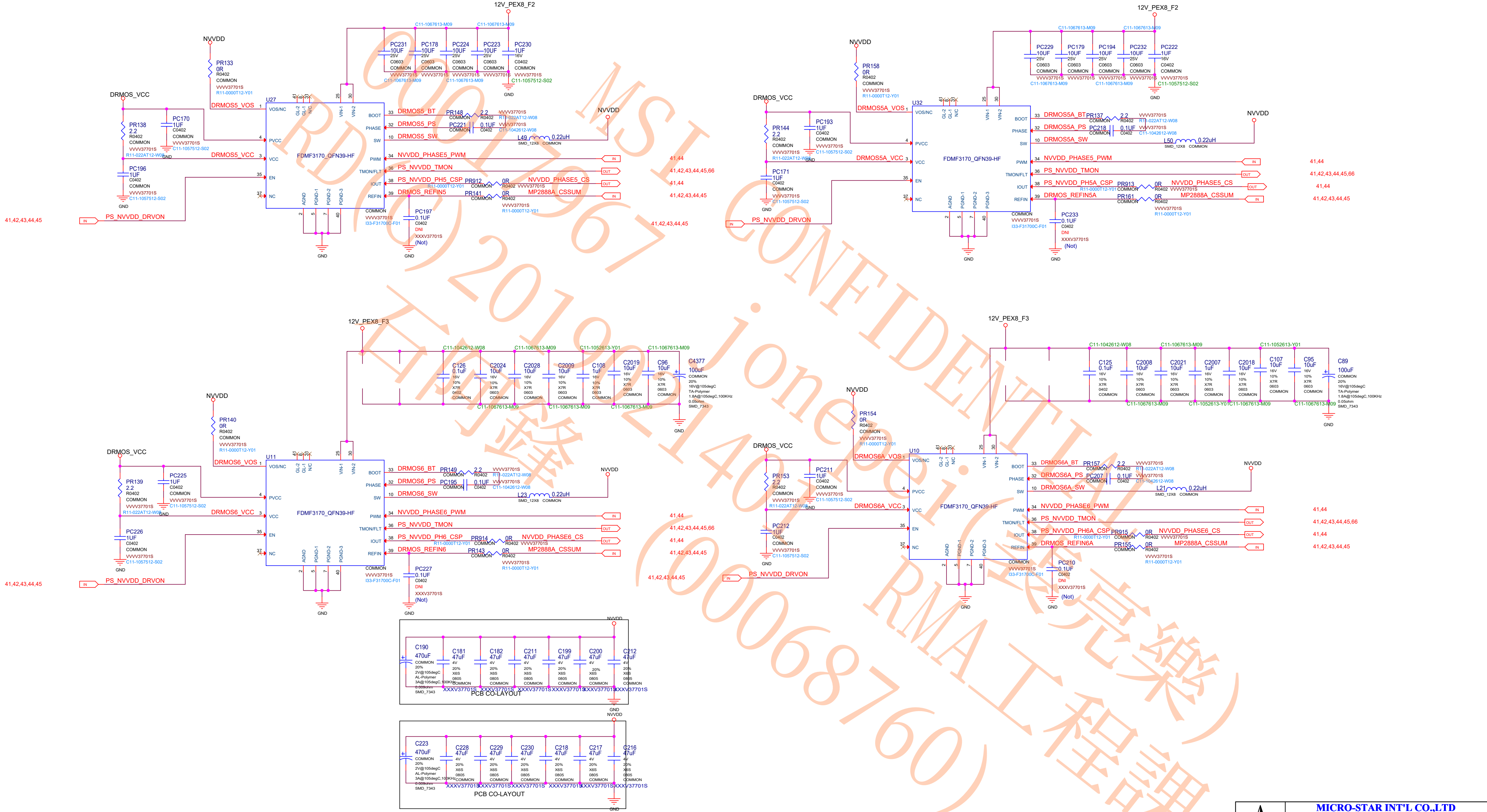
MICRO-STAR INT'L CO.,LTD

MS-V377

Size	Document Description	Rev
Custom		1.0

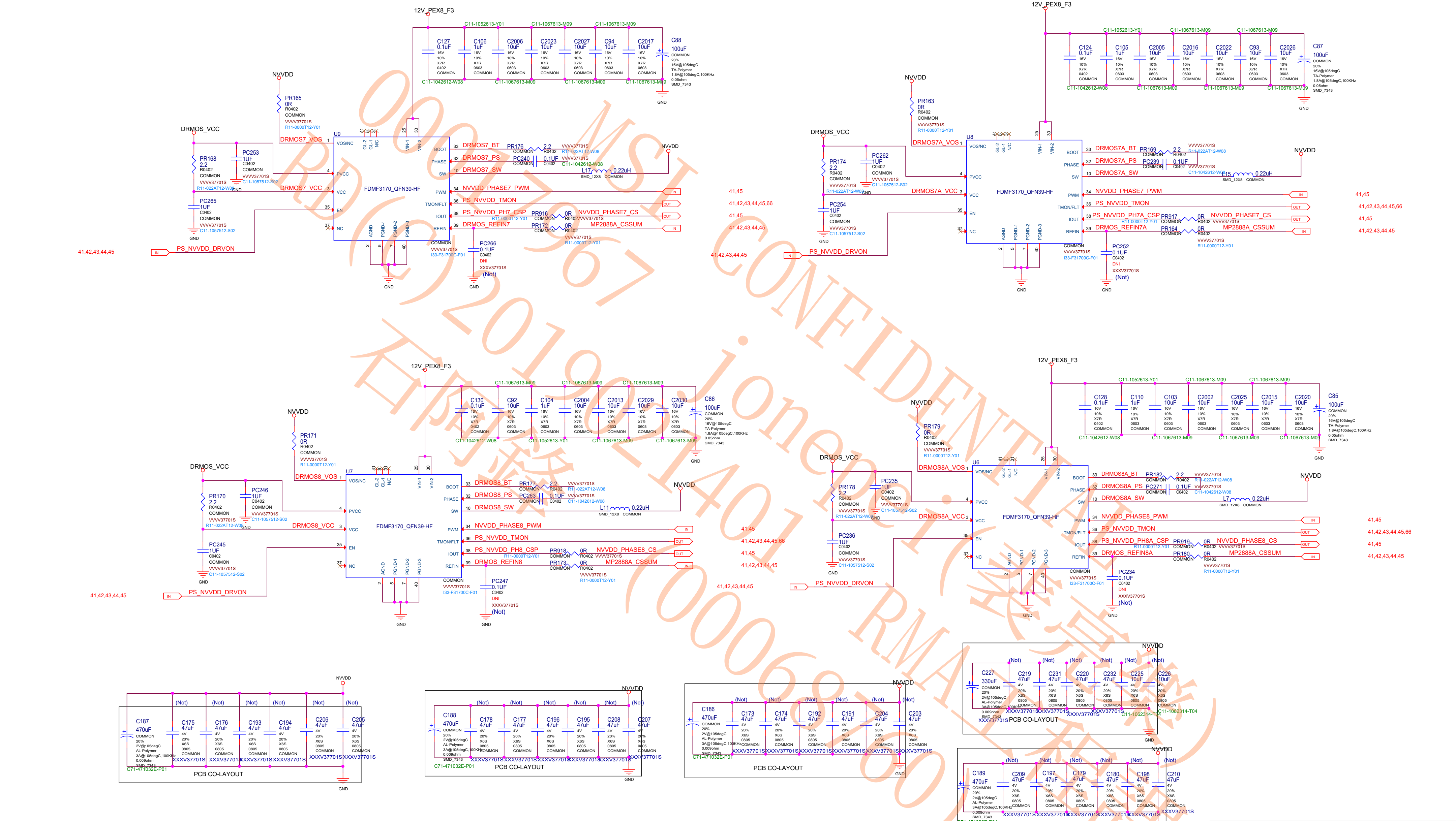
Date: Monday, October 01, 2018 Sheet 43 of 66

PS: NVVDD Phase 9~12


12V_PEX8_F2
NVVDD
DRMOS_VCC
U27
FDMF3170_QFN39-HF
U32
FDMF3170_QFN39-HF
U11
FDMF3170_QFN39-HF
U10
FDMF3170_QFN39-HF
12V_PEX8_F3
DRMOS5_VOS
DRMOS5_VCC
DRMOS5_BT
DRMOS5_PS
DRMOS5_SW
NVVDD_PHASE5_PWM
PS_NVVDD_TMON
PS_NVVDD_PH5_CSP
NVVDD_PHASE5_CS
DRMOS_REFIN5
MP2888A_CSSUM
PS_NVVDD_DRVON
DRMOS5A_VOS
DRMOS5A_VCC
DRMOS5A_BT
DRMOS5A_PS
DRMOS5A_SW
PS_NVVDD_PH5A_CSP
DRMOS_REFIN5A
DRMOS6_VOS
DRMOS6_VCC
DRMOS6_BT
DRMOS6_PS
DRMOS6_SW
NVVDD_PHASE6_PWM
PS_NVVDD_PH6_CSP
NVVDD_PHASE6_CS
DRMOS_REFIN6
DRMOS6A_VOS
DRMOS6A_VCC
DRMOS6A_BT
DRMOS6A_PS
DRMOS6A_SW
PS_NVVDD_PH6A_CSP
DRMOS_REFIN6A
PCB CO-LAYOUT
PCB CO-LAYOUT
GND

MICRO-STAR INT'L CO.,LTD				
MS-V377				
Size: Custom	Document Description			Rev 1.0
Date: Monday, October 01, 2018		Sheet 44	of 66	

PS: NVVDD Phase 13~16



12V_PEX8_F3
NVVDD
DRMOS_VCC
FDMF3170_QFN39-HF
U9
U8
U7
U6
DRMOS7_VOS
DRMOS7_VCC
DRMOS7_BT
DRMOS7_PS
DRMOS7_SW
NVVDD_PHASE7_PWM
PS_NVVDD_TMON
PS_NVVDD_PH7_CSP
NVVDD_PHASE7_CS
DRMOS_REFIN7
MP2888A_CSSUM
PS_NVVDD_DRVON
DRMOS7A_VOS
DRMOS7A_VCC
DRMOS7A_BT
DRMOS7A_PS
DRMOS7A_SW
PS_NVVDD_PH7A_CSP
DRMOS_REFIN7A
DRMOS8_VOS
DRMOS8_VCC
DRMOS8_BT
DRMOS8_PS
DRMOS8_SW
NVVDD_PHASE8_PWM
PS_NVVDD_PH8_CSP
NVVDD_PHASE8_CS
DRMOS_REFIN8
DRMOS8A_VOS
DRMOS8A_VCC
DRMOS8A_BT
DRMOS8A_PS
DRMOS8A_SW
PS_NVVDD_PH8A_CSP
DRMOS_REFIN8A
VOS/NC
PVCC
VCC
EN
NC
BOOT
PHASE
SW
PWM
TMON/FLT
IOUT
REFIN
AGND
PGND-1
PGND-2
PGND-3
GND
41,45
41,42,43,44,45,66
41,42,43,44,45
PCB CO-LAYOUT
(Not)

MICRO-STAR INT'L CO.,LTD

MS-V377

Size	Document Description	Rev
Custom		1.0

Date: Monday, October 01, 2018 Sheet 45 of 66

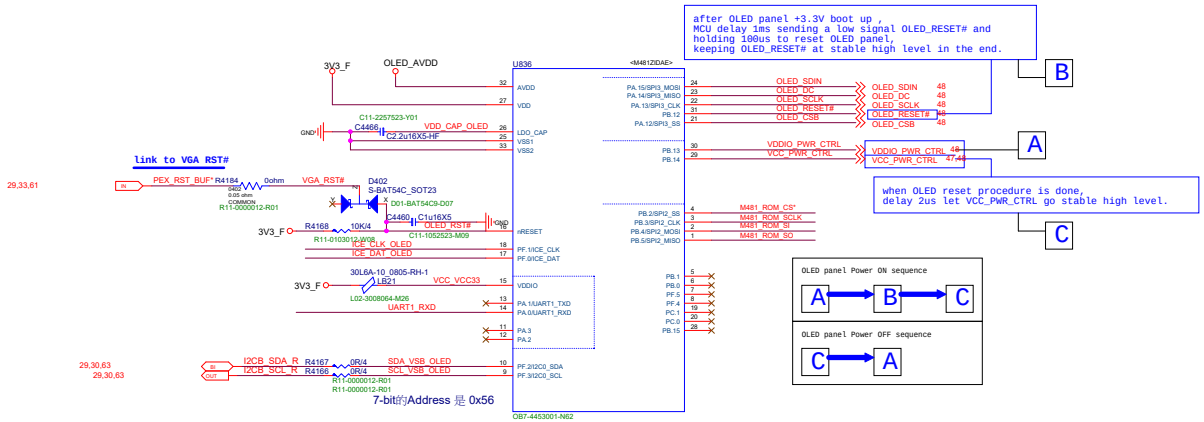
PS:NVVDD Phase 7, 8


NVVDD
PC98 820uF_2.5V COMMON
PC100 820uF_2.5V
PC101 820uF_2.5V
PC102 820uF_2.5V
PC103 820uF_2.5V
PC93 10UF
PC94 10UF
PC95 10UF
PC96 10UF
PC97 10UF
C11-1067313-W08
GND
PC109 820uF_2.5V
PC110 820uF_2.5V
PC111 820uF_2.5V
PC112 820uF_2.5V
PC113 820uF_2.5V
PC902 820uF_2.5V
PC104 10UF
PC105 10UF
PC106 10UF
PC107 10UF
PC108 10UF
PC903 820uF_2.5V
PC115 10UF
PC116 10UF
PC117 10UF
PC118 10UF
PC119 10UF
PC120 10UF
C4484 330uF
C169 470uF
C150 330uF
C213 470uF
C162 470uF
C4486 330uF
C4487 470uF
C1985 470uF
C4488 330uF
C4489 470uF
C4490 330uF
C4491 330uF
C4492 470uF
C71-471032E-P01
C1835 10uF
C1836 10uF
C1837 10uF
C1839 10uF
C1838 10uF
C1840 10uF
C1841 10uF
C1842 10uF
C1844 10uF
C1843 10uF
C1846 10uF
C1845 10uF
C1847 10uF
C1848 10uF
C1849 10uF
C1850 10uF
C1851 10uF
C1852 10uF
C11-1062314-T04
C1853 10uF
C1854 10uF
C1855 10uF
C1856 10uF
C1857 10uF
C1858 10uF
XXXV37701S
DNI

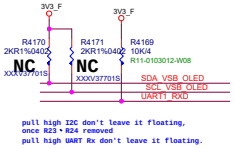
MICRO-STAR INT'L CO.,LTD		
MS-V377		
Size: Custom	Document Description: PS: NVVDD - MP2888A	Rev: 1.0
Date: Monday, October 01, 2018	Sheet 46 of 66	

PS: NVVDD PH 9,10

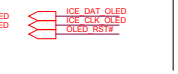
32 PIN OLED MCU



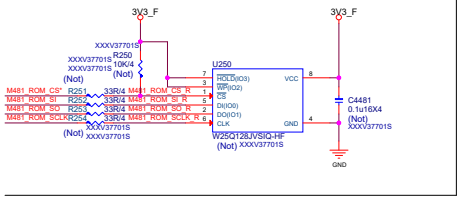
I2C and UART Reserve



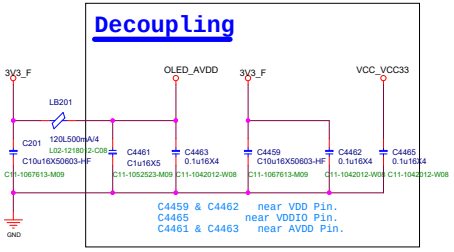
FW update



External 3.3V SPI ROM,128M(16Mx8bit)

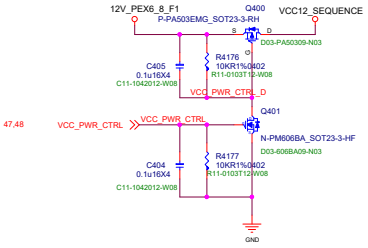


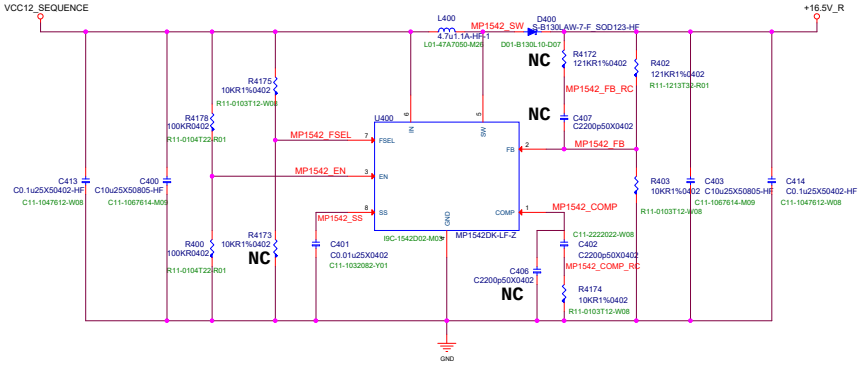
Decoupling



MPS1542 BUCK BOOST FOR OLED POWER 12Vin 16.5Vout

+16.5V power up sequence



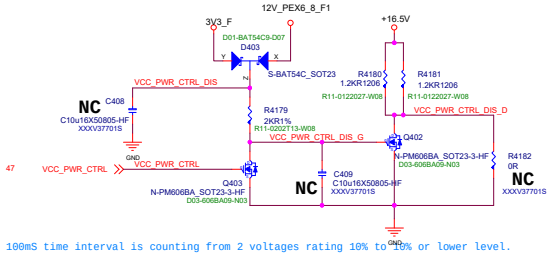


PIN FUNCTIONS

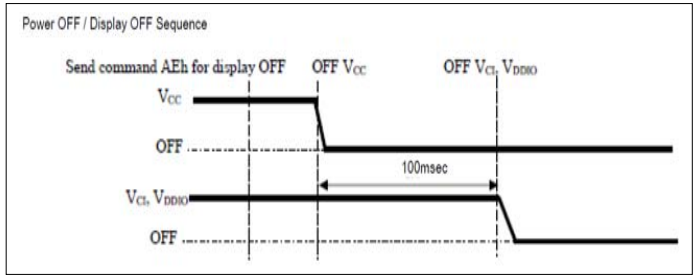
Pin #	Name	Description
1	COMP	Compensation Pin. Connect a capacitor and resistor in series to ground for loop stability.
2	FB	Feedback Input. Reference voltage is 1.25V. Connect a resistor divider to this pin.
3	EN	Regulator On/Off Control Input. A high input at EN turns on the converter, and a low input turns it off. When not used, connect EN to the input source (through a 100kΩ pull-up resistor if V_{IN} > 6V) for automatic startup. EN cannot be left floating.

MICRO-STAR INT'L CO.,LTD		
MS-V377		
Size: Custom	Document Description	Rev: 1.0
Date: Monday, October 01, 2018	Sheet 47 of 66	

+16.5V Discharge



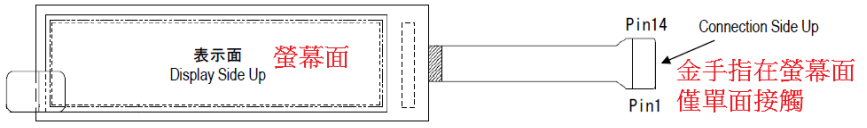
100mS time interval is counting from 2 voltages rating 10% to 10% or lower level.



12-2) 入力端子名称 Pin Assignment

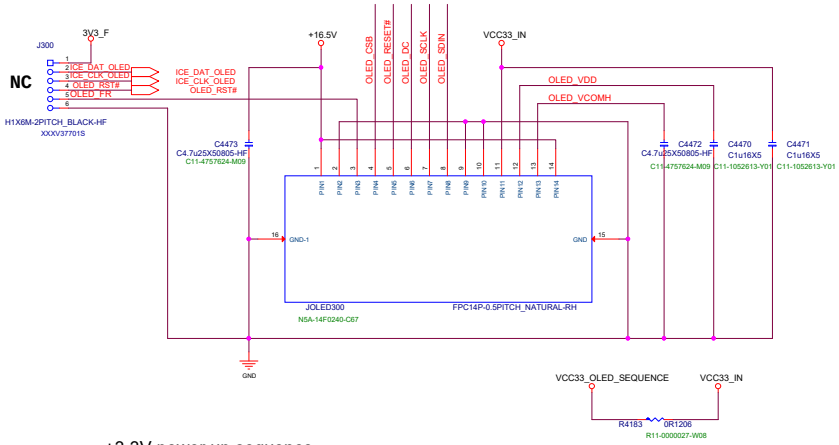
I:Input, O:Output, P:Power

PIN No	名称 Pin Name	機能 Function Description		I/O
1	VCC	OLED駆動電源	OLED Driving Voltage	P
2	AGND	グランド	Analog Ground	P
3	FR	同期信号	Synchronization Signal	O
4	CSB	チップセレクト	Chip Select	I
5	RSTB	リセット	Reset	I
6	DC	データ/コマンド選択	Data/Command Selection	I
7	SCLK	シリアルクロック	Serial Clock	I
8	SDIN	データ	Data Input	I
9	GND	グランド	Ground Pin	P
10	AGND	グランド	Analog Ground	P
11	VCI	ロジック電源	Logic Power Voltage	P
12	VDD	コア電源	Core Voltage	P
13	VCOMH	COMH 電源	COMH Voltage	P
14	VCC	OLED駆動電源	OLED Driving Voltage	P

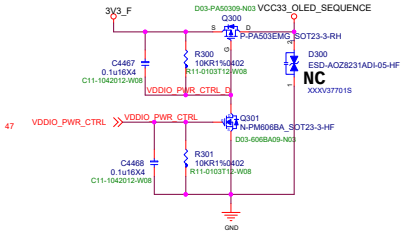


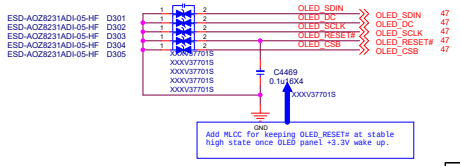
形名 Type No. ELW2106AA

OLED housing



+3.3V power up sequence





LDO A1117 fixed

+5V to +3.3V

BOOST Circuit

+12V to +16.5V

MCU NUC481

OLED controller

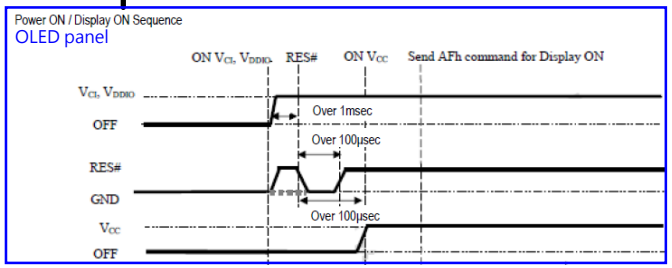
VDDIO for UART

OLED panel

VCC 52mA(max.)

VDD/VCI uA

1. after OLED panel +3.3V boot up , delay 1ms sending a low signal OLED_RESET# and holding 100us to reset OLED panel, keeping OLED_RESET# at stable high level in the end.
2. when OLED reset procedure is done, delay 2us let VCC_PWR_CTRL go stable high level.



MICRO-STAR INT'L CO.,LTD

MS-V377

Size Custom | Document Description | Rev 1.0

Date: Monday, October 01, 2018 | Sheet 48 of 66

PS: NVVDD PH 13,14

MICRO-STAR INT'L CO.,LTD

MS-V377

Size: Custom | Document Description | Rev: 1.0

Date: Monday, October 01, 2018 | Sheet 49 of 66

PS: INPUT SWITCH RTD3

AND GATE LOGIC FOR P-BOARD

GPIO1	GPIO29	SWITCH	VOUT
0	0	0	12V_F
0	1	0	12V_F
1	0	0	12V_F
1	1	1	3V3A

Remove 12V_F_RTD3 circuit

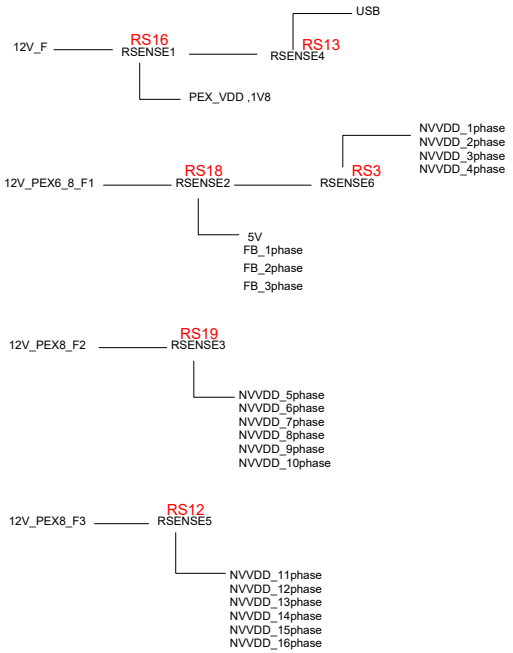
AND GATE LOGIC FOR P-BOARD

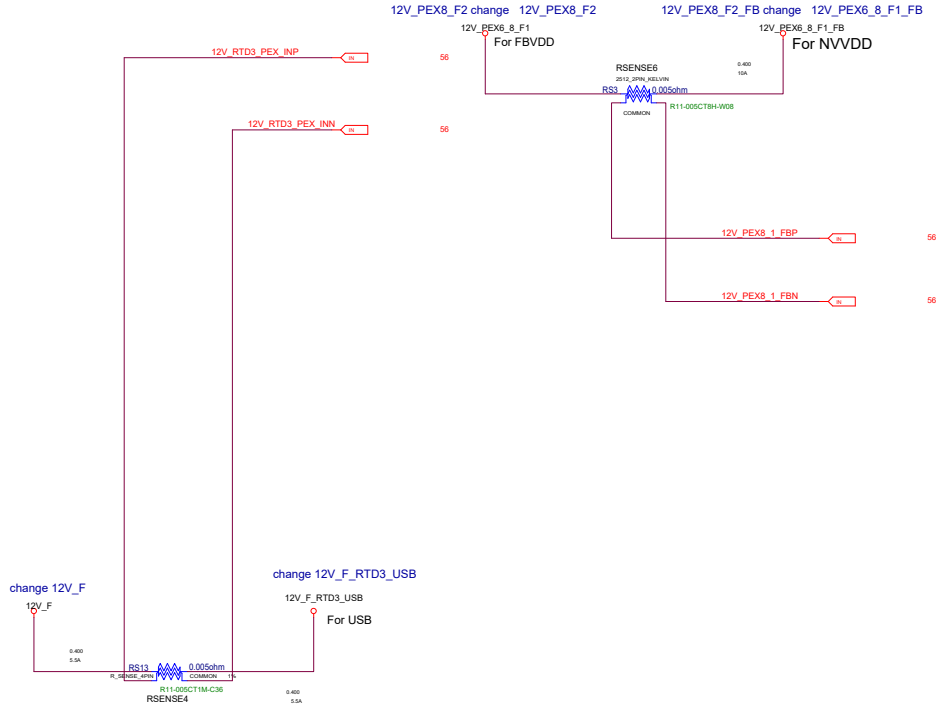
GPIO1	GPIO29	SWITCH	VOUT
0	0	0	3V3
0	1	0	3V3
1	0	0	3V3
1	1	1	3V3A

Remove 3V3_RTD3 circuit

MICRO-STAR INT'L CO.,LTD	
MS-V377	
Size: Custom	Document Description:
Rev: 1.0	
Date: Monday, October 01, 2018	Sheet 50 of 66

Remove U802 Circuit





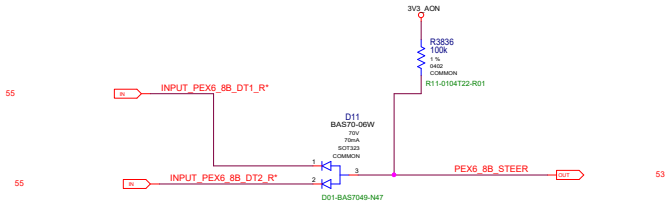
MICRO-STAR INT'L CO.,LTD

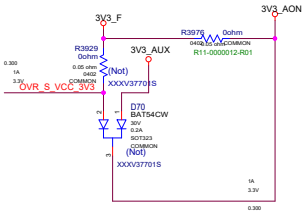
MS-V377

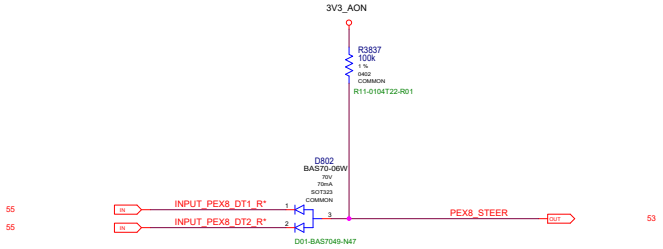
Size: Custom | Document Description | Rev: 1.0

Date: Monday, October 01, 2018 | Sheet 51 of 66

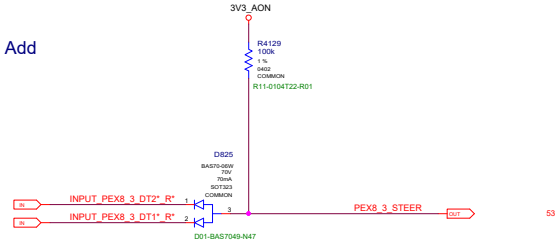
PS: Input Switch Rail Balance







Add

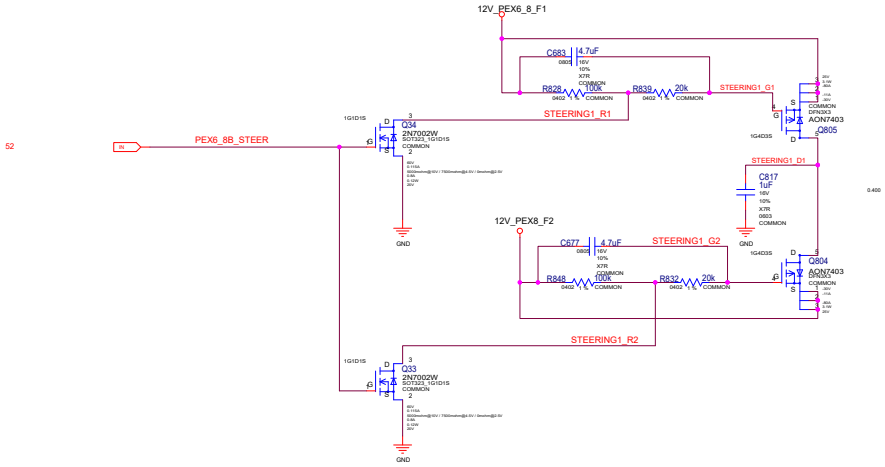


Remove NVVDD VIN change circuit

MICRO-STAR INT'L CO.,LTD		
MS-V377		
Size: Custom	Document Description	Rev: 1.0
Date: Monday, October 01, 2018	Sheet 52 of 66	

12V CURRENT STEERING (UNDER POWER BOOT):

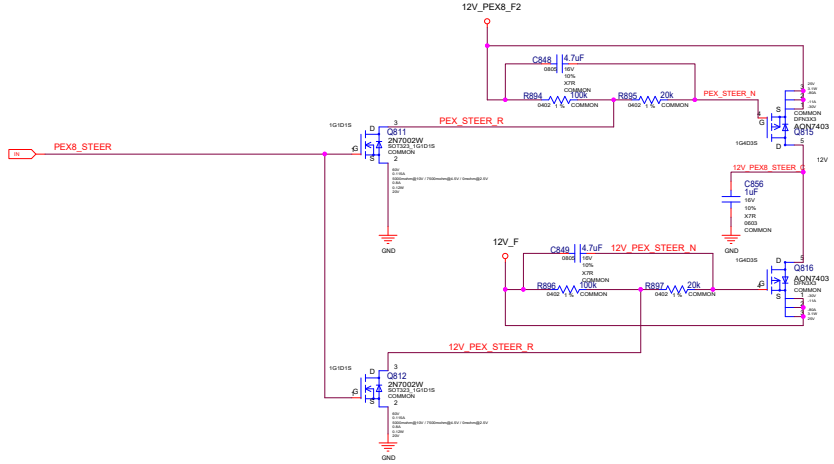
GUIDES CURRENT FROM PEX EDGE TO PEX 6/8 PIN INPUT AREA



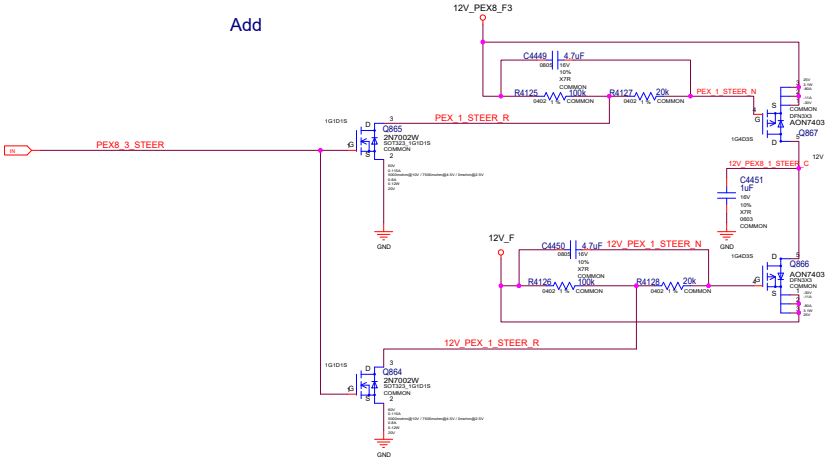
12V CURRENT STEERING (UNDER POWER BOOT):

GUIDES CURRENT FROM PEX EDGE TO PEX 8 PIN INPUT AREA

For OpenVreg Type4 + Phase Doubler, 2 phase PSI mode



Add



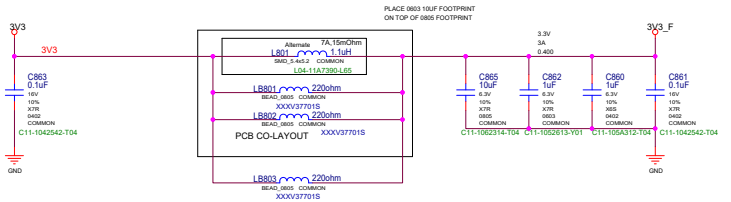
MICRO-STAR INT'L CO.,LTD		
MS-V377		
Size: Custom	Document Description	Rev: 1.0
Date: Monday, October 01, 2018	Sheet 53 of 66	

PS: Inputs, Filtering, and Monitoring

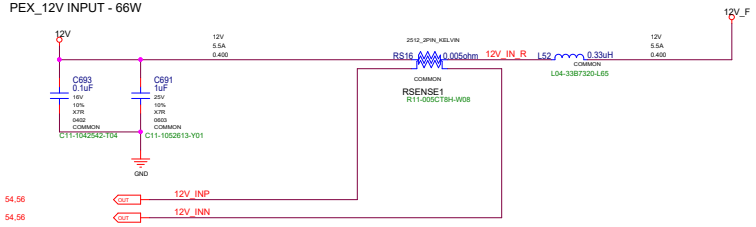
place caps close to INA3221

Remove U801 Circuit

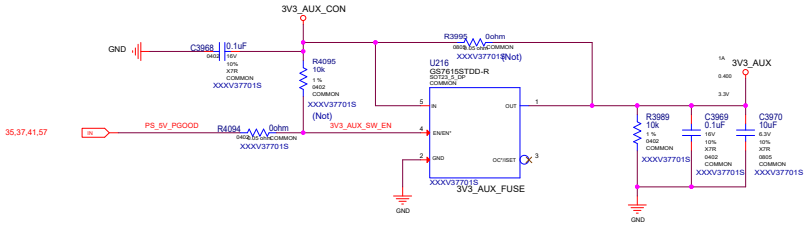
PEX 3V3 INPUT - 10W



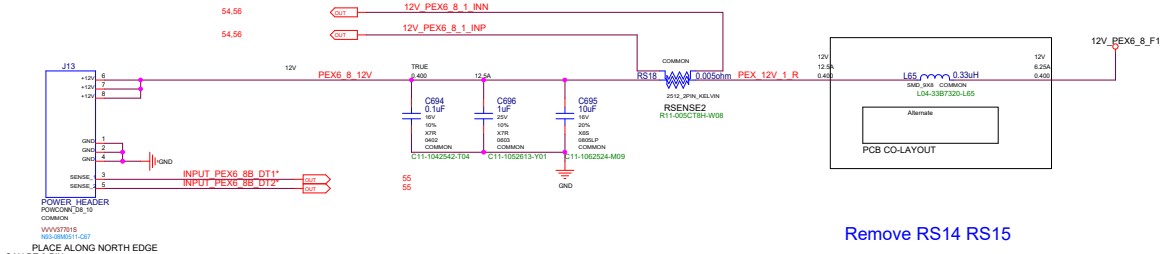
PEX_12V INPUT - 66W



Remove R808 R812

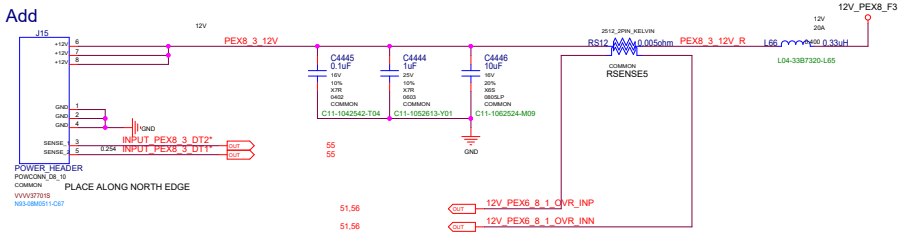


PEX6 INPUT 1 - 2x3 PCIE CON 75W

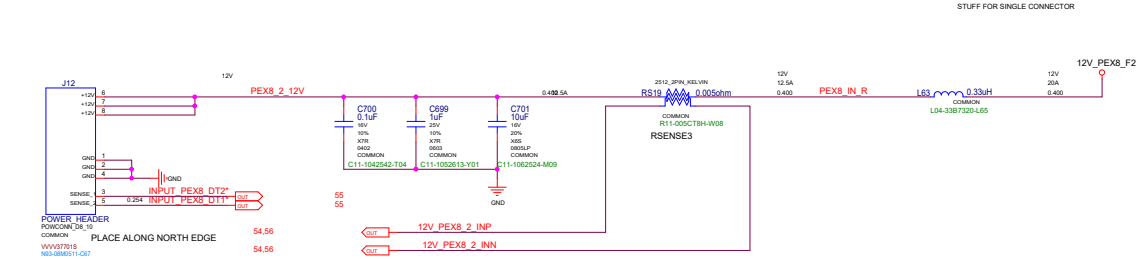


Remove RS14 RS15

Add

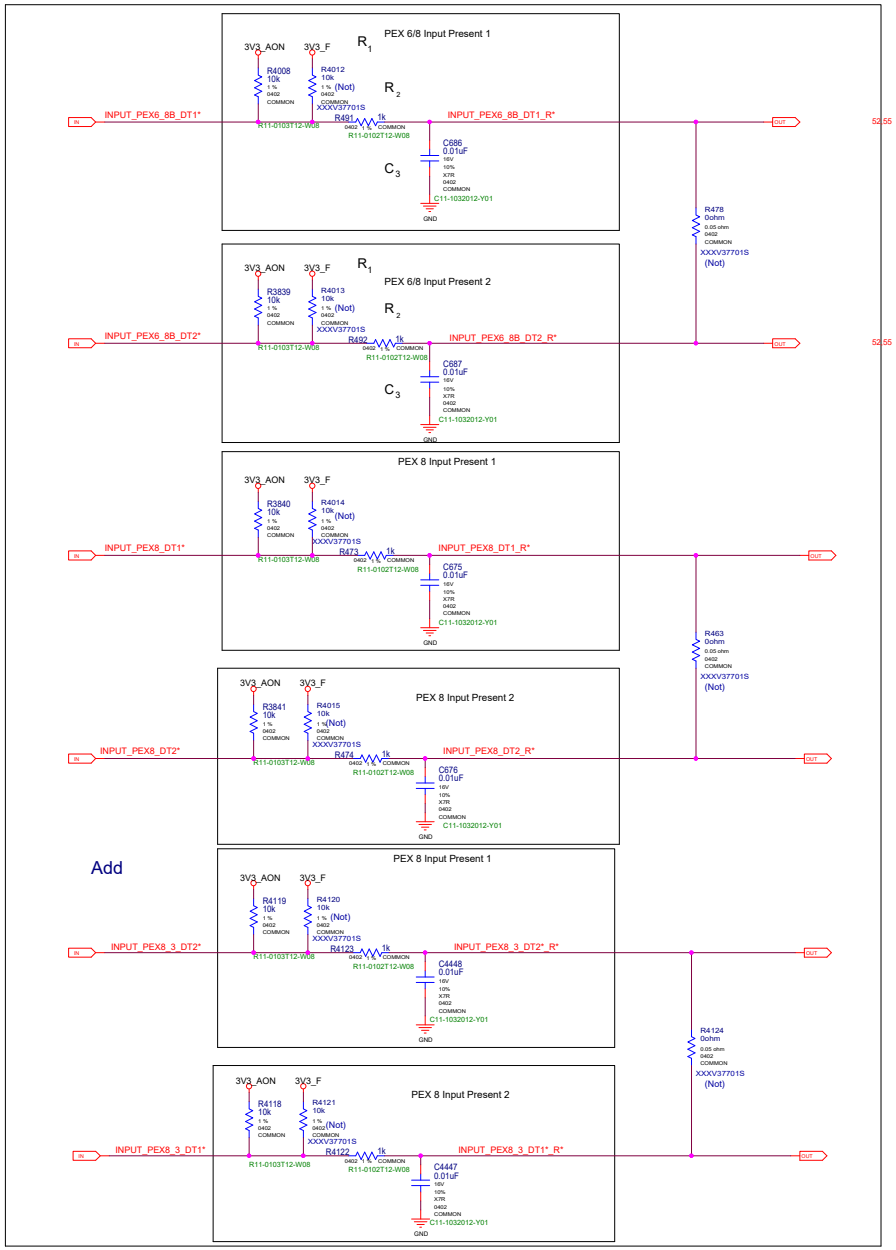


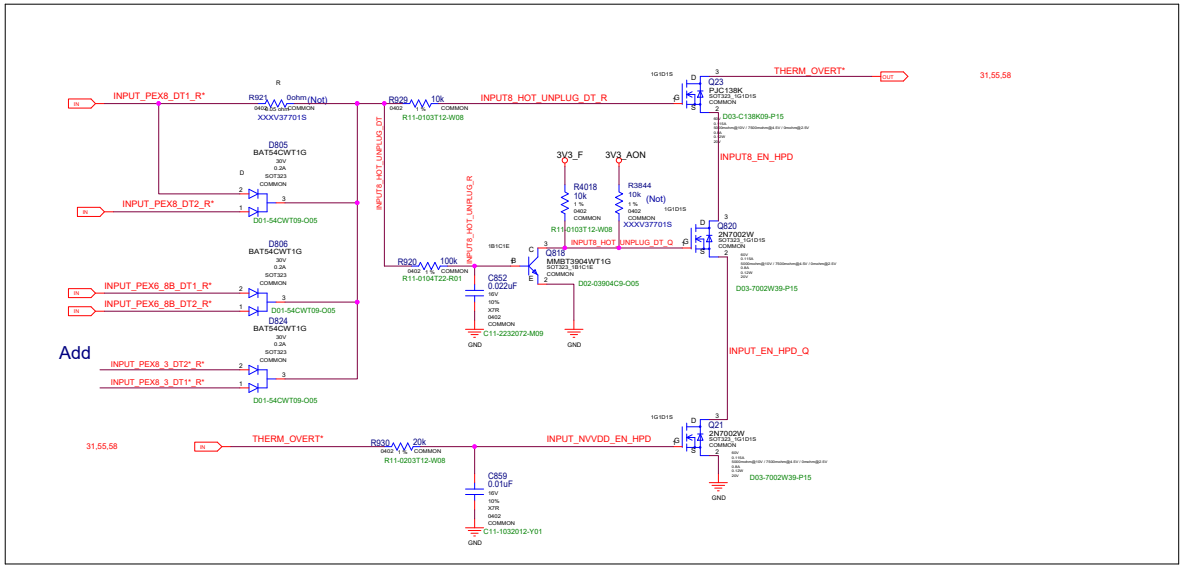
PEX8 INPUT 2 - 2x4 PCIE CON 150W

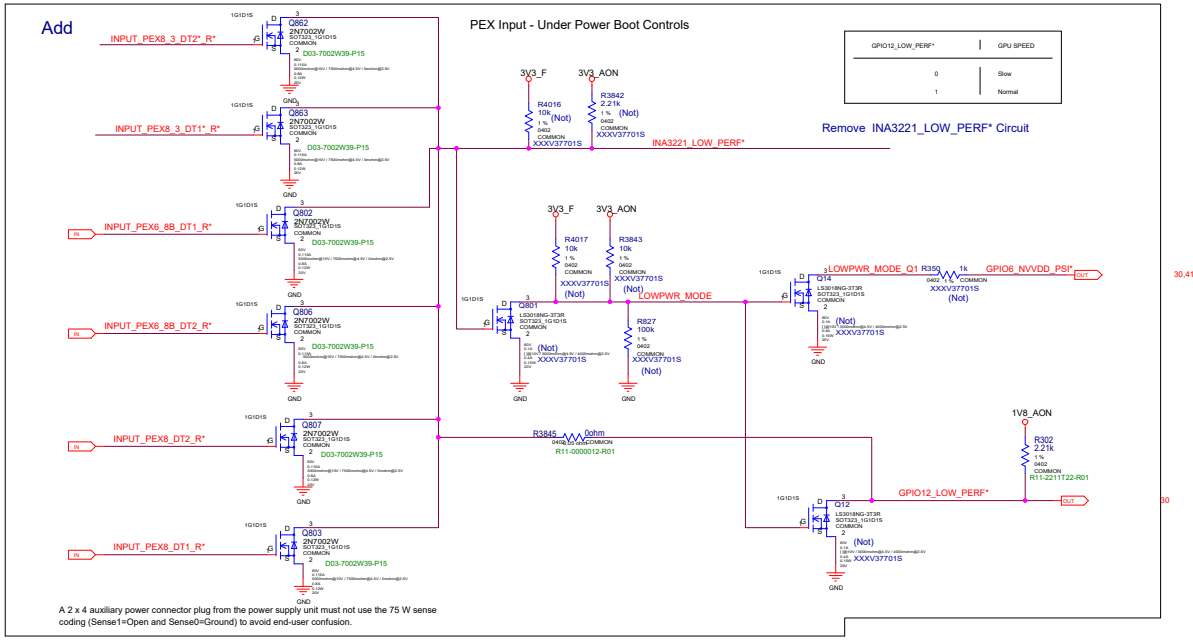


MICRO-STAR INT'L CO.,LTD		
MS-V377		
Size: Custom	Document Description	Rev: 1.0
Date: Monday, October 01, 2018	Sheet 54 of 66	

PS: 12V Current Steering & Hot Unplug Detect

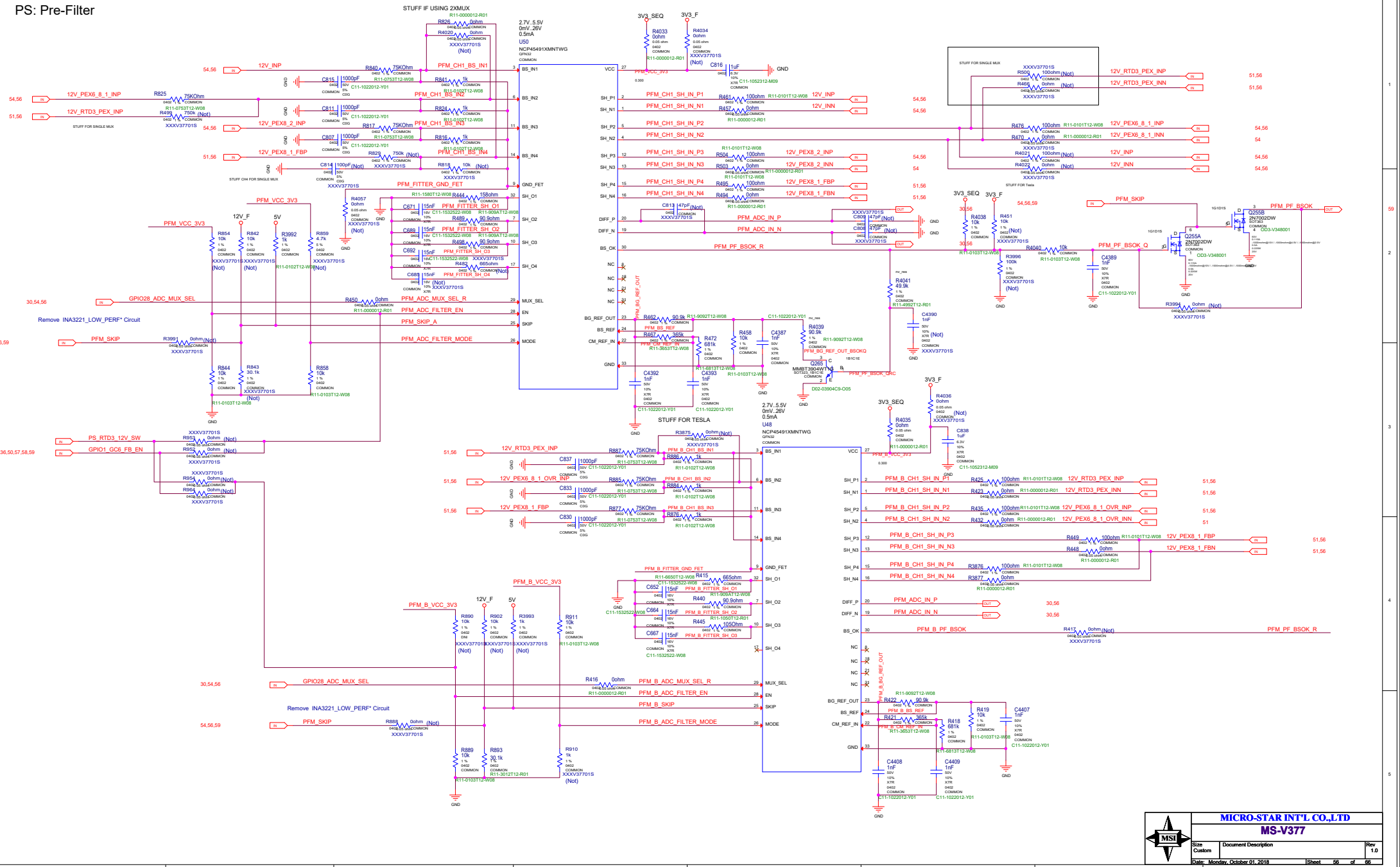




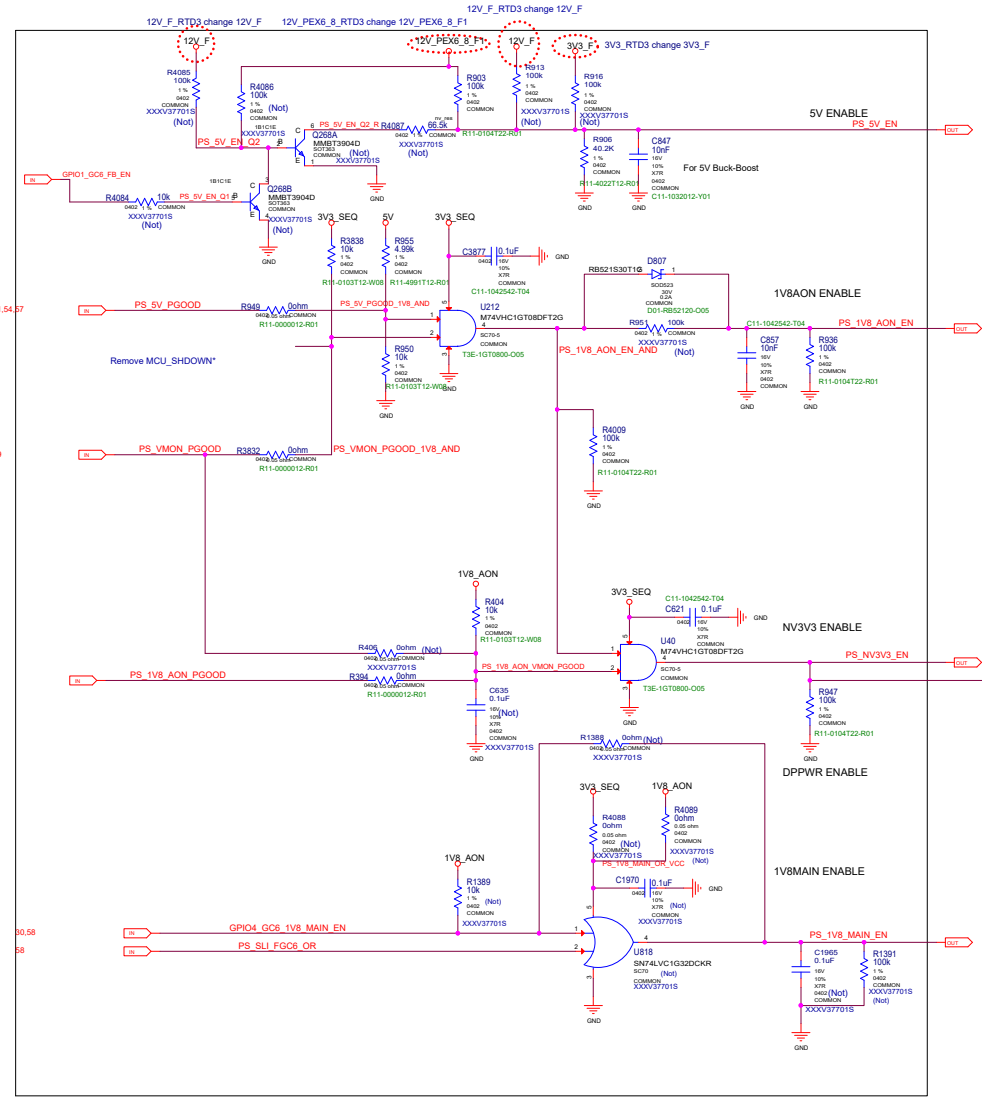


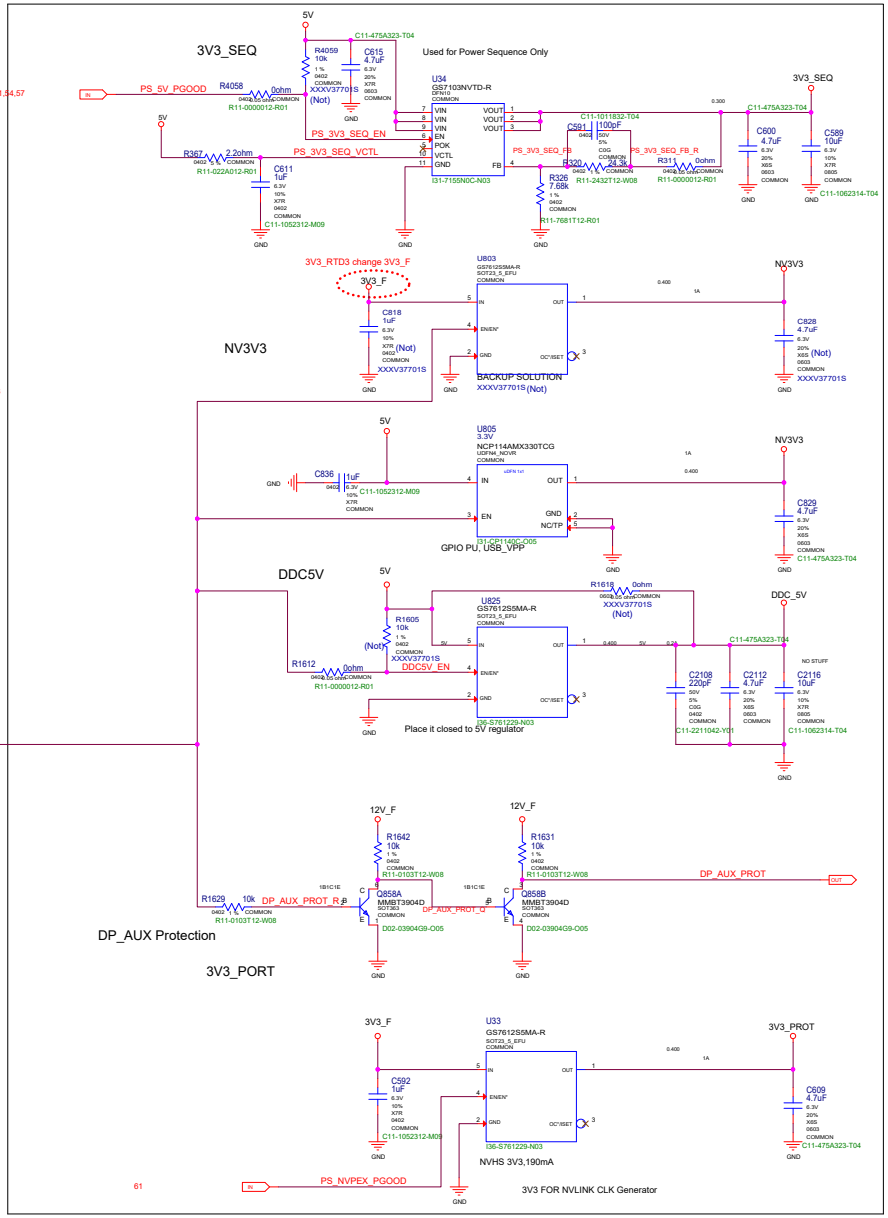
MSI	MICRO-STAR INT'L CO.,LTD		
	MS-V377		
Size: Custom	Document Description: 12V Current Steering & Hot Unplug Detect		Rev: 1.0
Date: Monday, October 01, 2018		Sheet 55 of 66	

PS: Pre-Filter



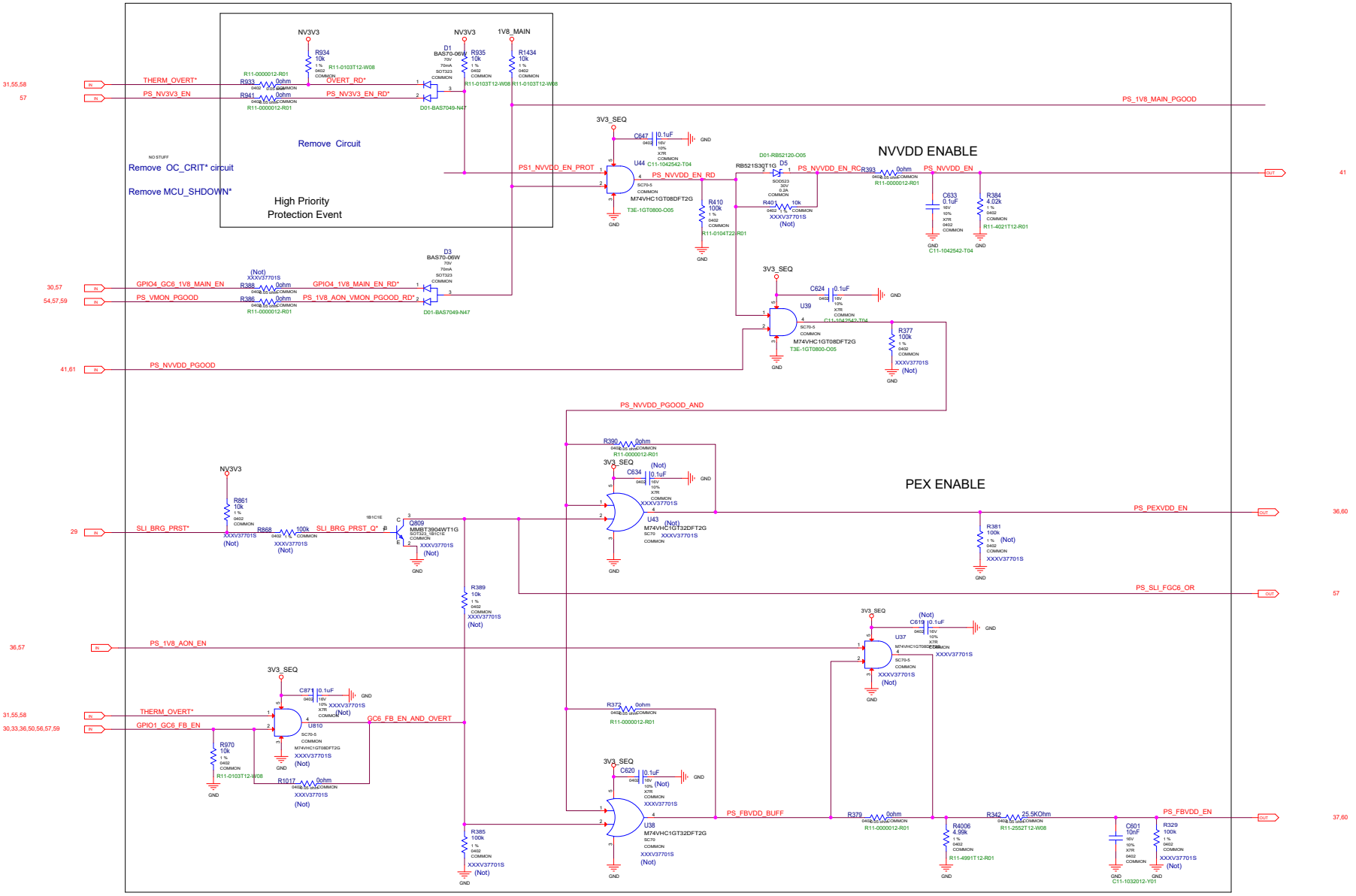
SEQUENCE:5V,1V8,NV3V3 ENABLE





MICRO-STAR INT'L CO.,LTD	
MS-V377	
Size: Custom	Document Description: 5V,1V8,NV3V3 ENABLE
Rev: 1.0	
Date: Monday, October 01, 2018	Sheet 57 of 66

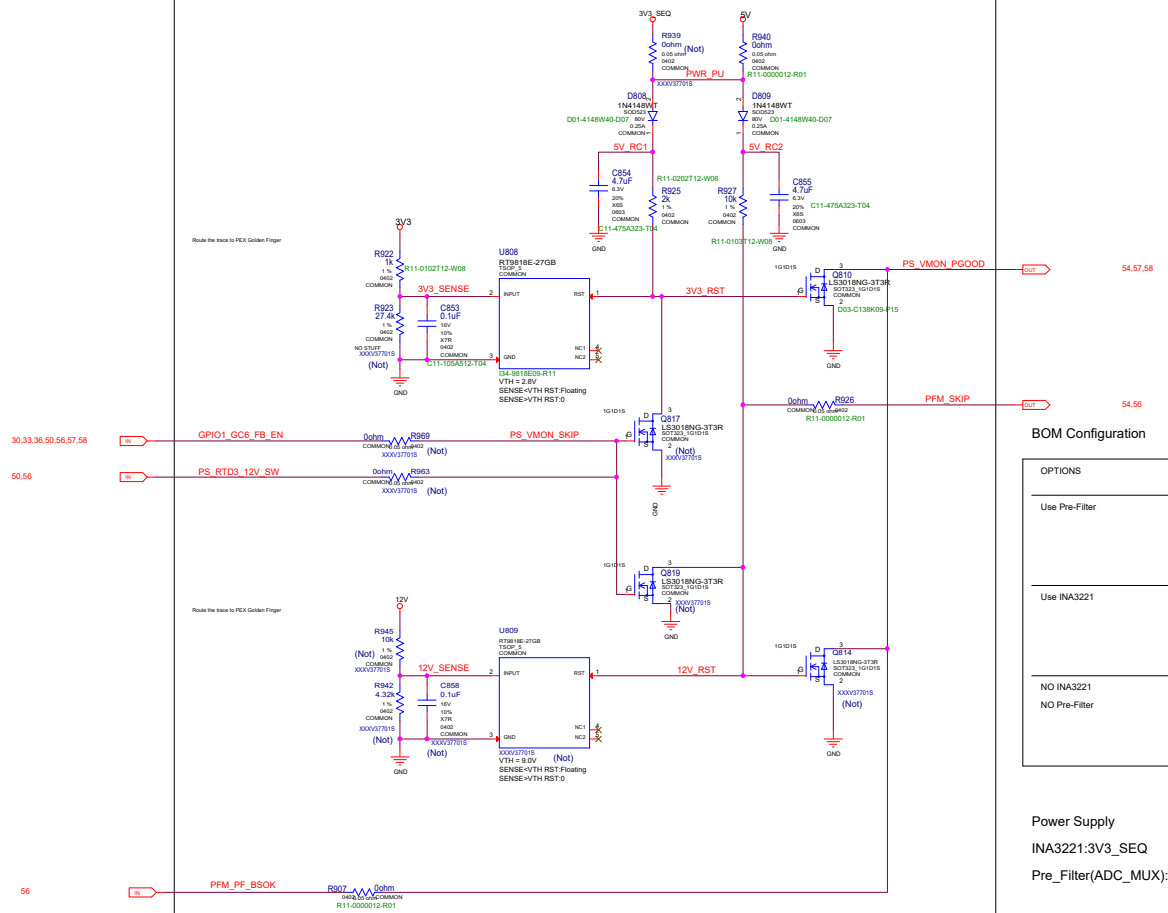
SEQUENCE:NV,PEX,FB ENABLE



MICRO-STAR INT'L CO.,LTD	
MS-V377	
Size: Custom	Document Description: NV,PEX,FB ENABLE
Rev: 1.0	
Date: Monday, October 01, 2018	Sheet 58 of 66

SEQUENCE:PCIE Voltage Monitor

PCIE 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)
PS_RTD3_12V_SW	INPUT	GC6_FB_EN && IDLE_IN_SW

BOM Configuration

OPTIONS	PEX3V3_SENSE	PEX12V_SENSE	OTHER_12V_SENSE
Use Pre-Filter	Pre-Filter NO STUFF U12 NO STUFF Q3,Q5 NO STUFF D15	Pre-Filter NO STUFF U13 NO STUFF Q4	Pre-Filter
Use INA3221	Voltage_Monitor	INA3221 NO STUFF U12 NO STUFF Q4	INA3221
NO INA3221 NO Pre-Filter	Voltage_Monitor	Voltage_Monitor	N/A

Power Supply

INA3221:3V3_SEQ

Pre_Filter(ADC_MUX):3V3(PEX)

Dual Pre-Filter case:

Only use the Primary Pre-Filter to sense 3V3PEX

and All Input 12Vs

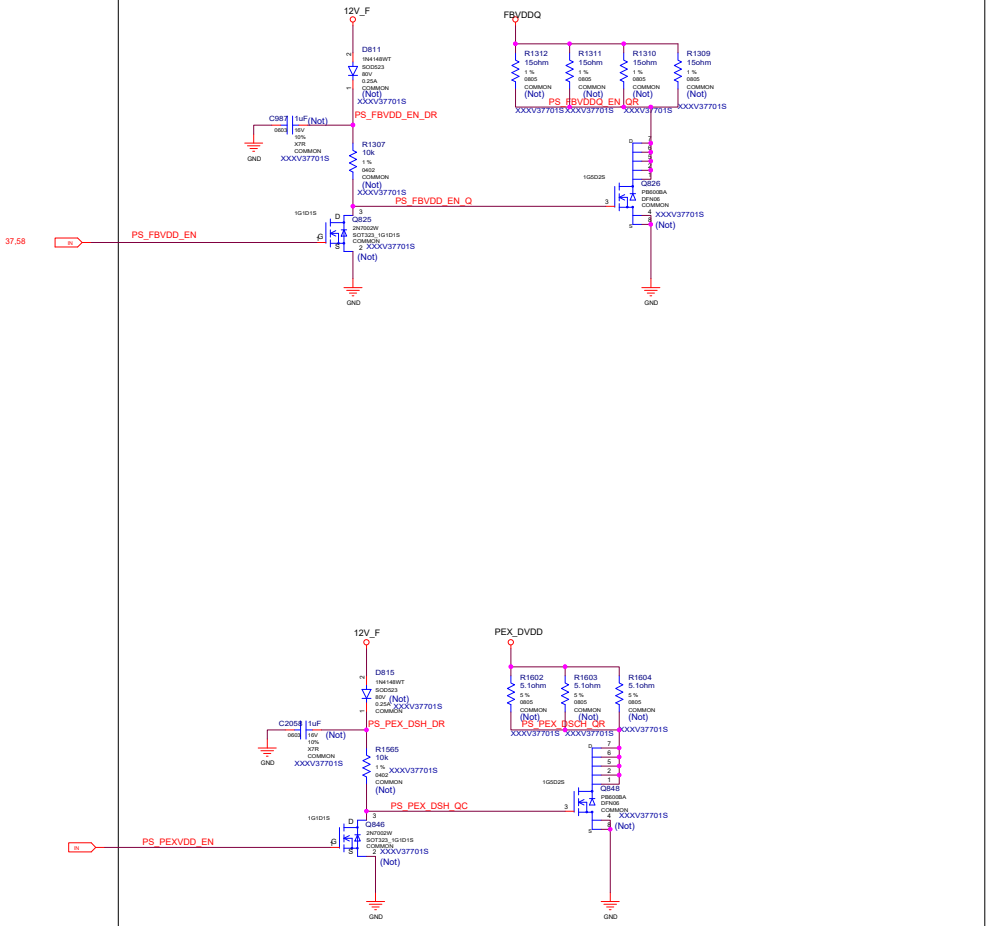
MICRO-STAR INT'L CO.,LTD

MS-V377

Size	Document Description	Rev
Custom	PCIE Voltage Monitor	1.0

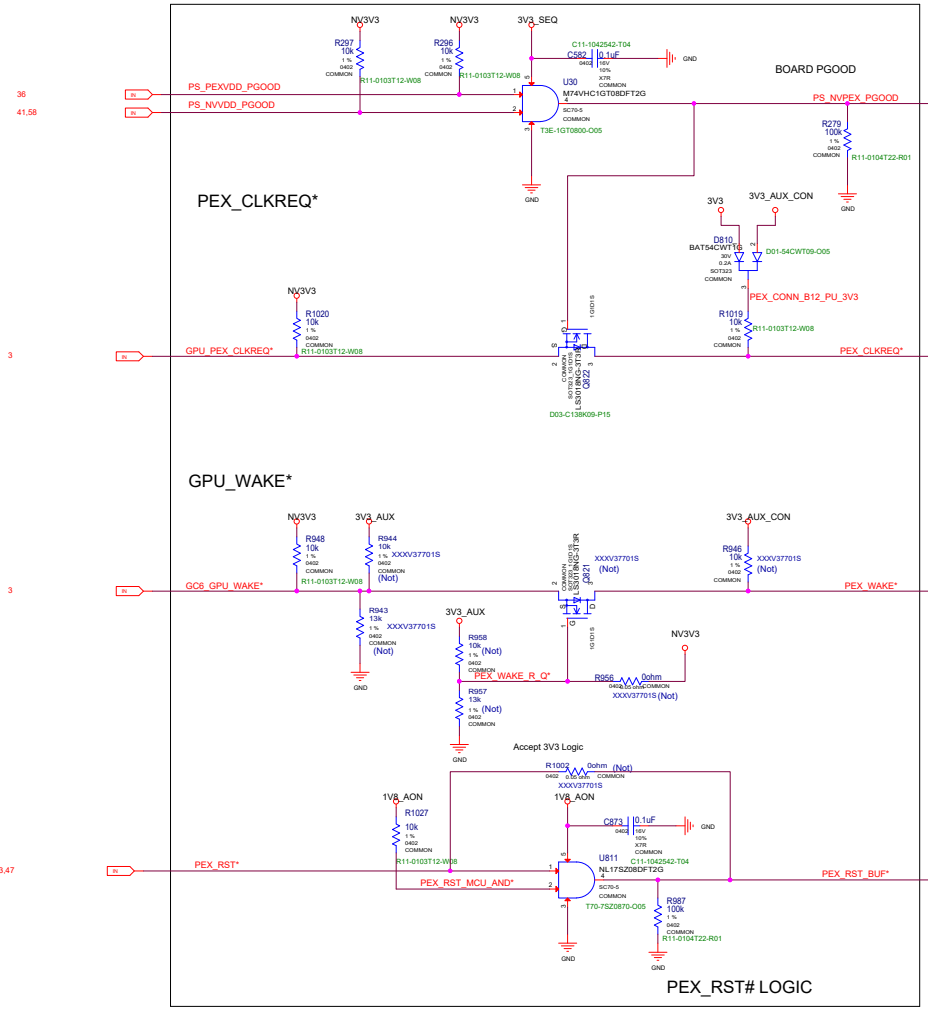
Date: Monday, October 01, 2018 Sheet 59 of 66

SEQUENCE:Discharge



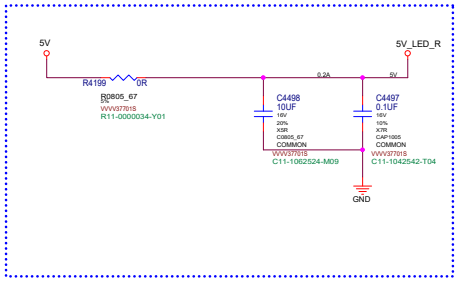
MICRO-STAR INT'L CO.,LTD	
MS-V377	
Size: Custom	Document Description: Discharge
Rev: 1.0	
Date: Monday, October 01, 2018	Sheet 60 of 66

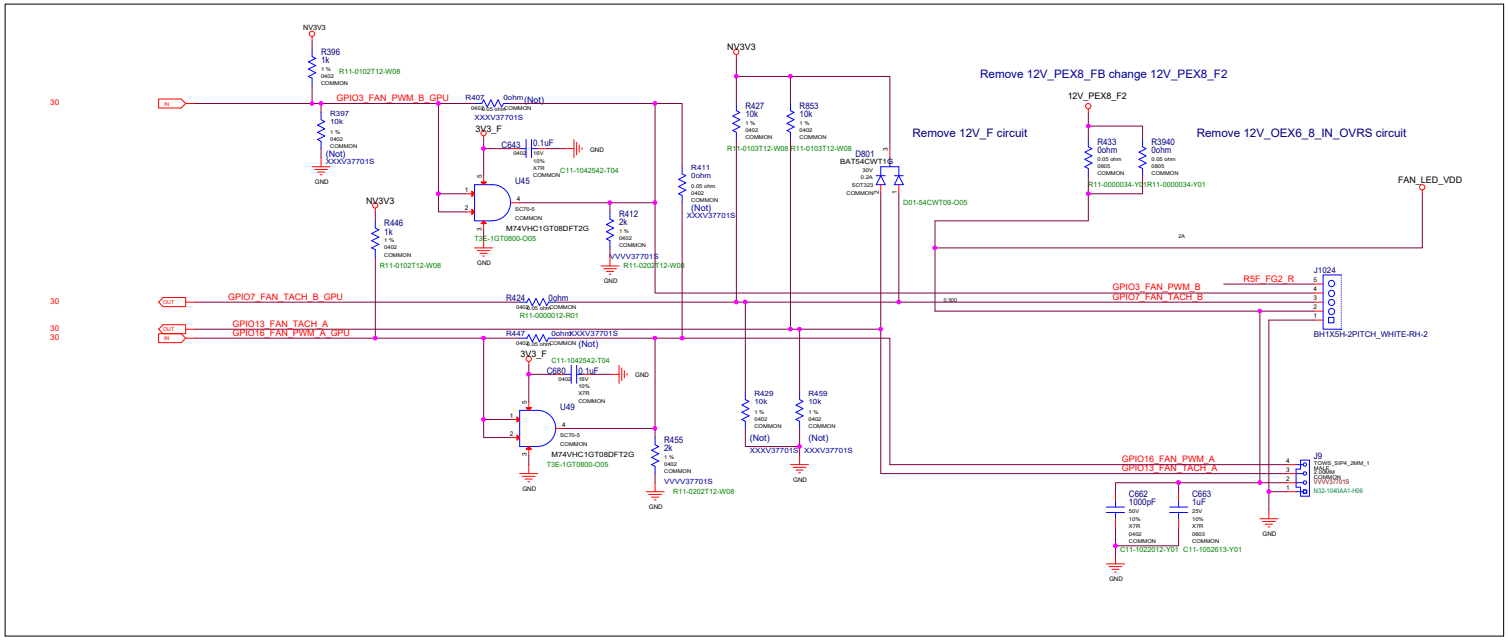
SEQUENCE:MISC



MICRO-STAR INT'L CO.,LTD	
MS-V377	
Size: Custom	Document Description: MISC
Rev: 1.0	
Date: Monday, October 01, 2018	Sheet 61 of 66

MISC: FAN





LED BOOST

Remove LED BOOST

MSI	MICRO-STAR INT'L CO.,LTD	
	MS-V377	
Size: Custom	Document Description: FAN	Rev: 1.0
Date: Monday, October 08, 2018	Sheet 62 of 66	

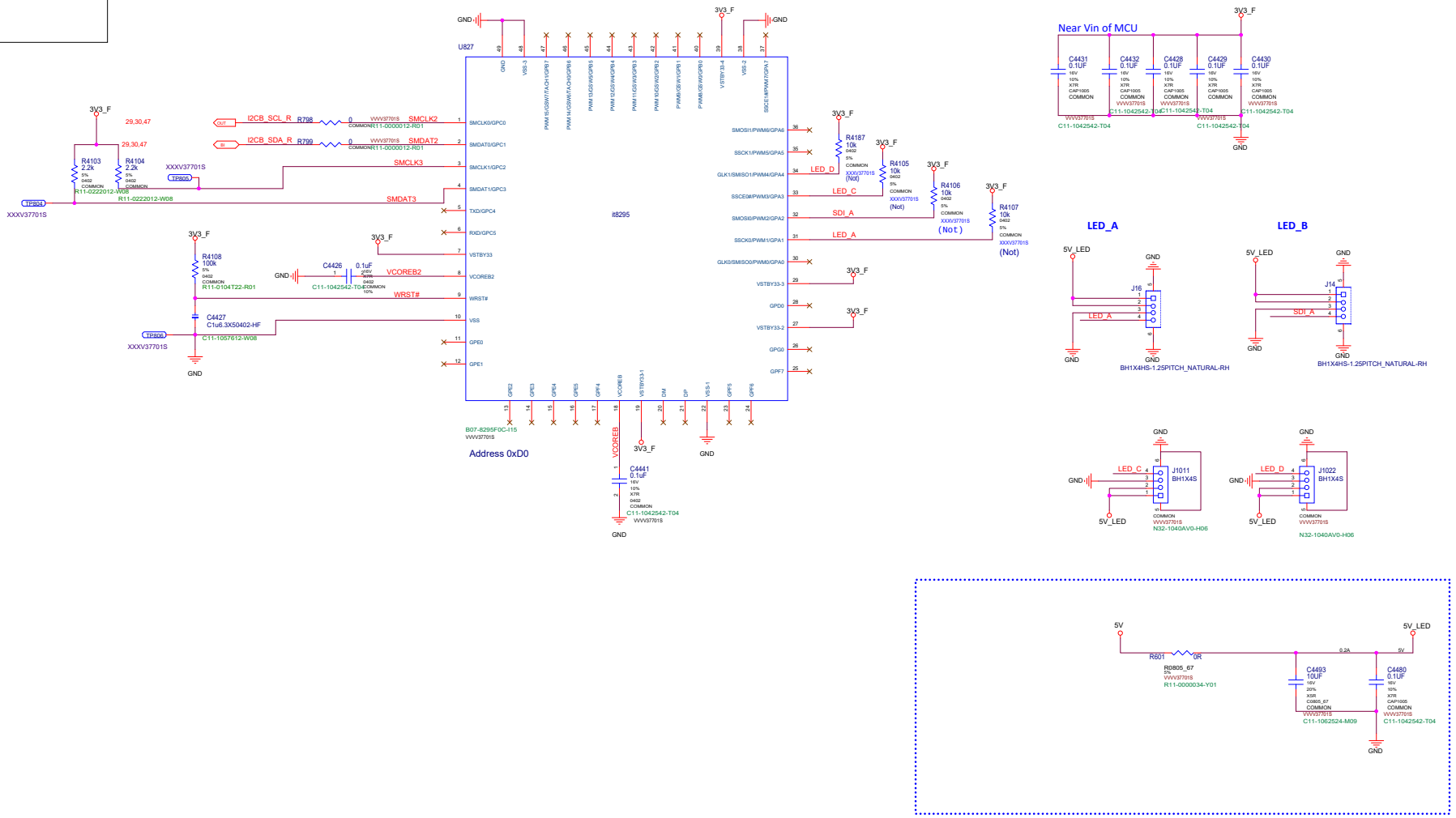
MISC: LED2

LED_CONTROLLER_IT8295

9/27 Remove J803
9/27 ADD TP804 / TP805

Firmware Programming

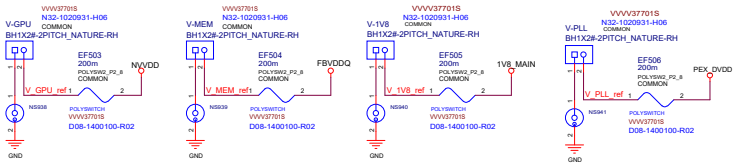
Debug



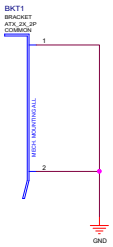
MICRO-STAR INT'L CO.,LTD			
MS-V377			
Size: Custom	Document Description: LED2		Rev: 1.0
Date: Monday, October 01, 2018		Sheet 63 of 66	

ZERO IDLE POWER MCU

Mechanical: Bracket/Thermal Solution



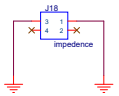
Brackets:

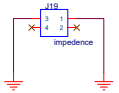


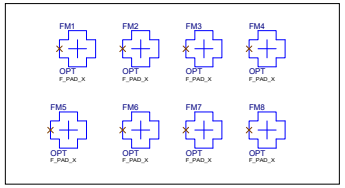
Bracket Screw

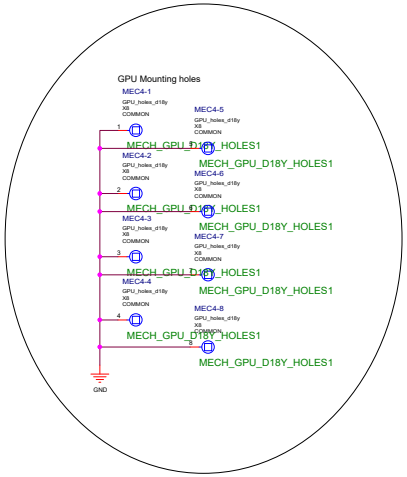
Bracket Screw

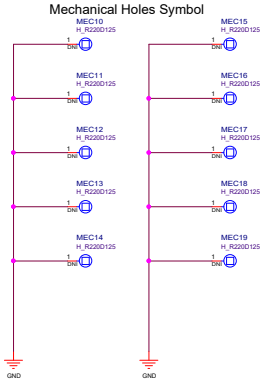
Screw





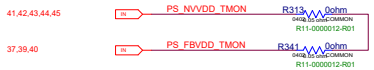






MICRO-STAR INT'L CO.,LTD		
MS-V377		
Size: Custom	Document Description: Bracket/Thermal Solution	Rev: 1.0
Date: Monday, October 01, 2018	Sheet 65 of 66	

VR THERMAL PROTECTION



MICRO-STAR INT'L CO.,LTD

MS-V377

Size	Document Description	Rev
Custom	VR THERMAL PROTECTION	1.0

Date: Monday, October 01, 2018 Sheet 66 of 66