PG166-A02

TU116,192b GDDR6 2CHx16,90W/120W
DVI-D DL + HDMI + DP

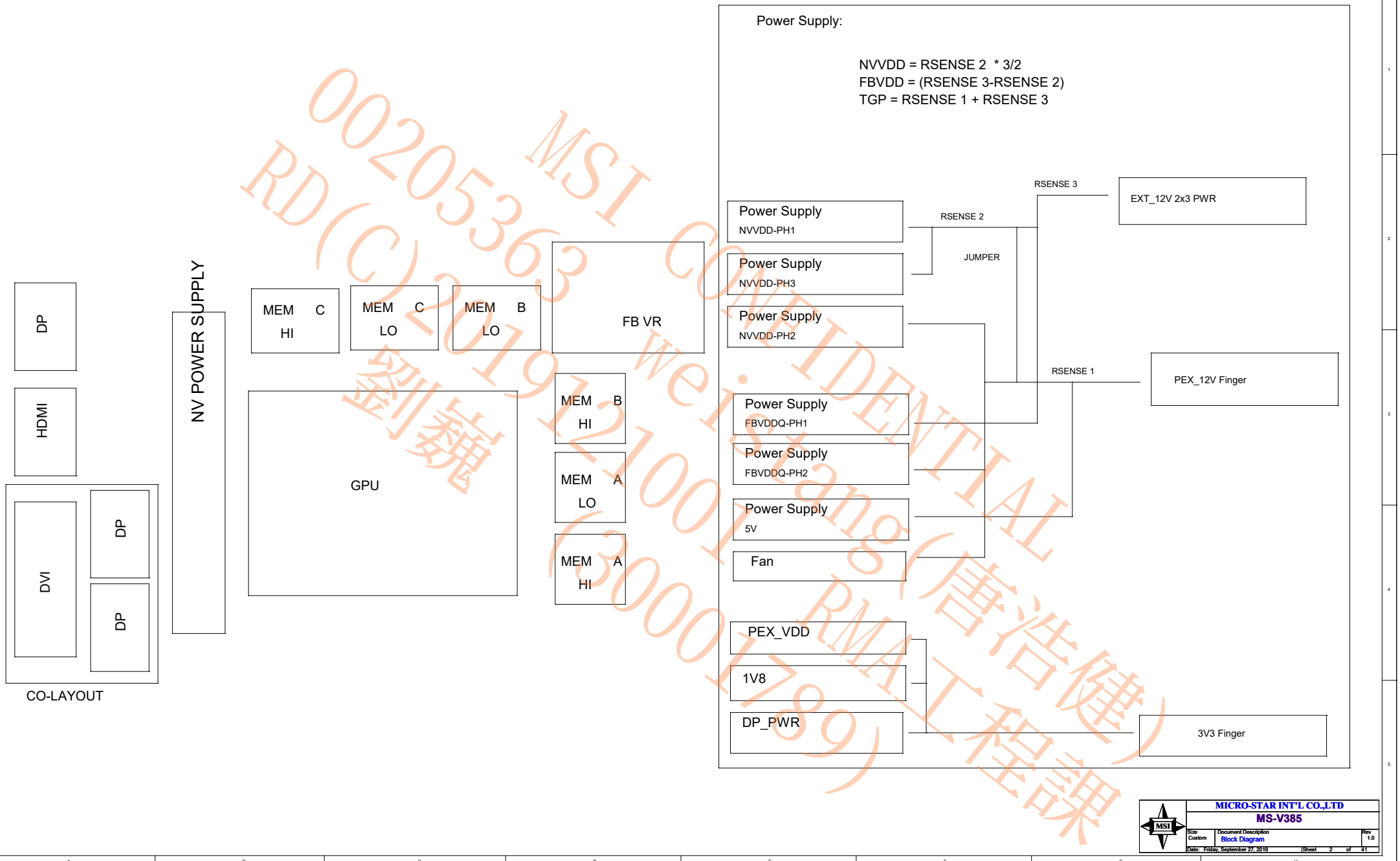
TABLE OF CONTENTS

Page	Description
1	Table of Contents
2	Block Diagram
3	PCI Express
4	MEMORY: GPU FB_AB
5	MEMORY: FBA[31:0]
6	MEMORY: FBA[63:32]
7	MEMORY: FBB[31:0]
8	MEMORY: FBB[63:32]
9	MEMORY: GPU FB_CD
10	MEMORY: FBC[31:0]
11	MEMORY: FBC[63:32]
12	GPU PWR & GND
13	GPU DECOUPLING 1
14	GPU DECOUPLING 2
15	IO: IFPAB DVI-D-DL
16	IO: IFPA DP
17	IO: IFPB DP
18	IO: IFPE & IFPF NC
19	IO: IFPC HDMI
20	IO: IFPD DP
21	IO: NVHS INTERFACE AND FRAME LOCK
22	MISC1: JTAG,GPIO,ADC,I2C,OVERT
23	MISC2: ROM, XTAL,STRAPS
24	PS: 1V8_AON
25	PS: 5V
26	PS: PEXVDD
27	PS: FBVDDQ
28	PS: FBVDDQ PH2
29	PS: FBVDDQ VR option
30	PS: NVVDD Controller
31	PS: NVVDD Phase 1,3
32	PS: NVVDD Phase 2
33	PS: Input, Filtering, and Monitoring
34	PS: STEERING, UPB & HOT-UNPLUG
35	SEQ: 1V8_AON, 3V3_SEQ, NV3V3, DDC_5V, DP_AUX_PROT
36	SEQ: NVVDD, PEX, FBVDDQ ENABLE
37	SEQ: MISC
38	FAN
39	PS: OVRM_PWR SENSE
40	PS:Voltage Monitor
41	MECH

Page	Description
V385-1.0	Change List
12	R519～R522 chang to 0402
22	Add LOGO_LED_BRAKE Remove GPIO25_FBVDD_PSI*
27	Remove up1666 & Add L-MOS
28	Remove FBVDD Phase2
33	Add Fuse for 12V_F & 12V_PEX6 Remove OPTION FOR TGP 75W SUPPORT Change J9/L42/L53 footprint
38	Add U250 Remove 2-PIN FAN

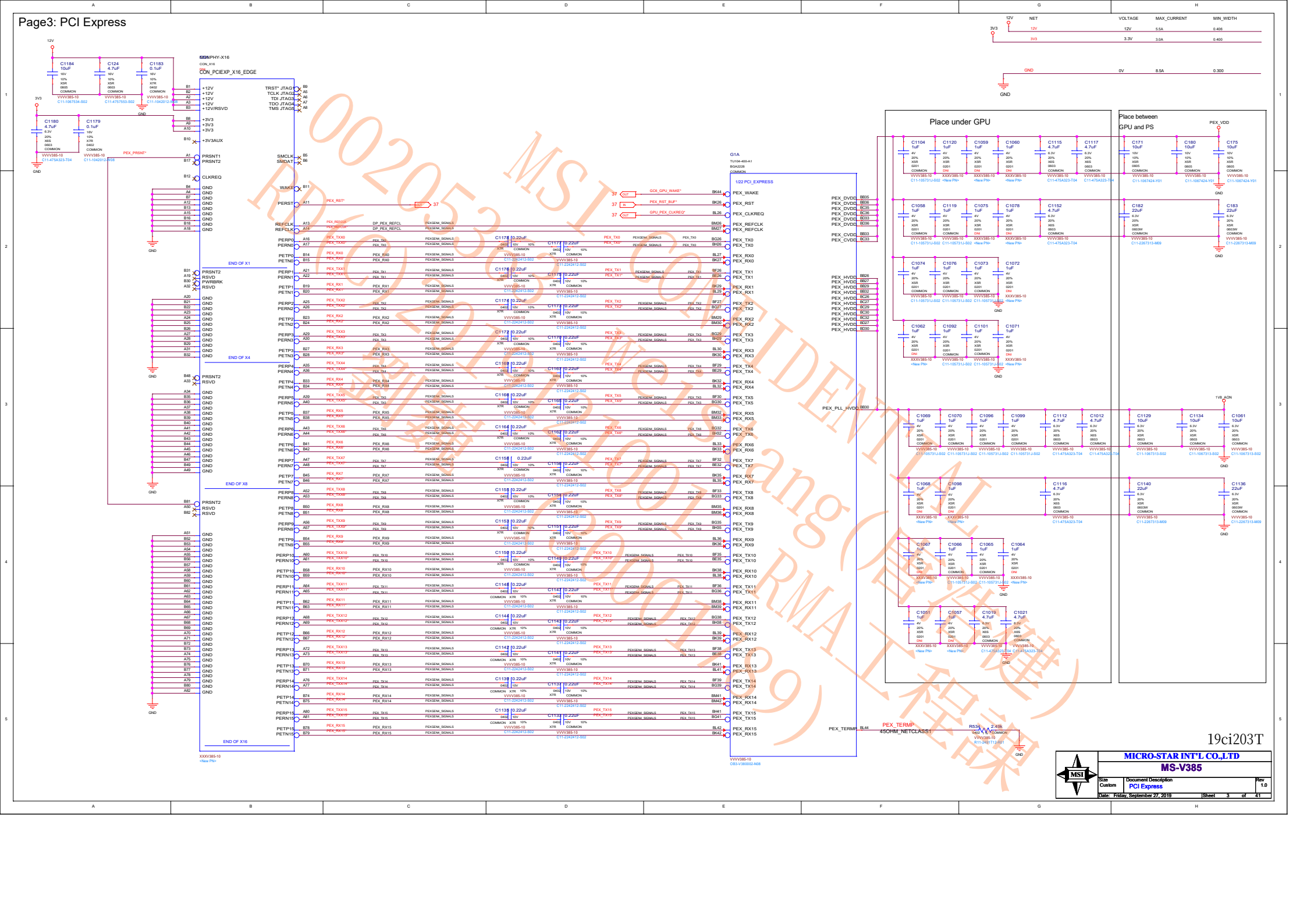
MICRO-STAR INT'L CO.,LTD
MS-V385
Size: Custom | Document Description: TABLE | Rev: 1.0
Date: Friday, September 27, 2019 | Sheet 1 of 41

Page2: Block Diagram

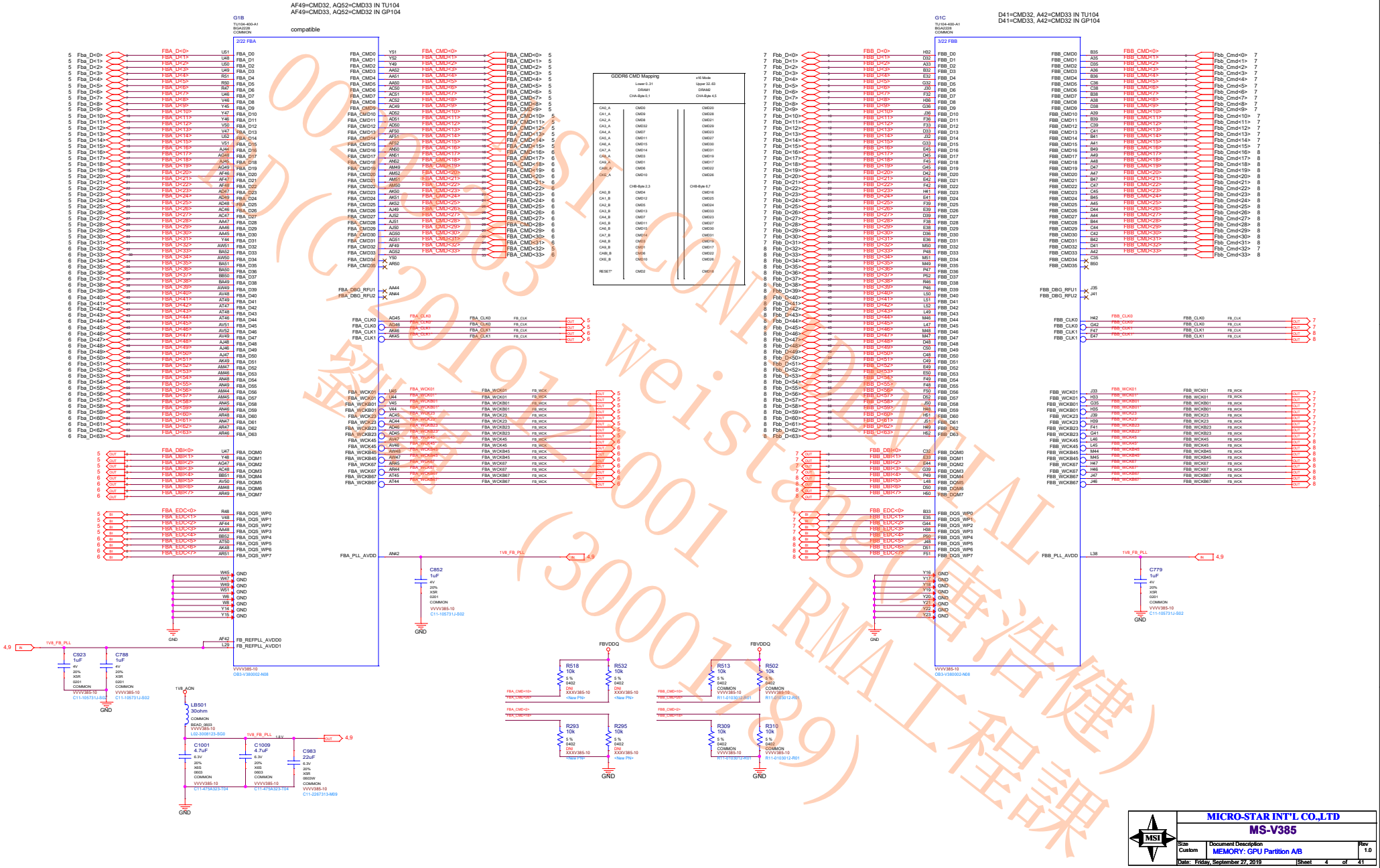


MICRO-STAR INT'L CO.,LTD
MS-V385
Size: Custom | Document Description: Block Diagram | Rev: 1.0
Date: Friday, September 27, 2019 | Sheet 2 of 41

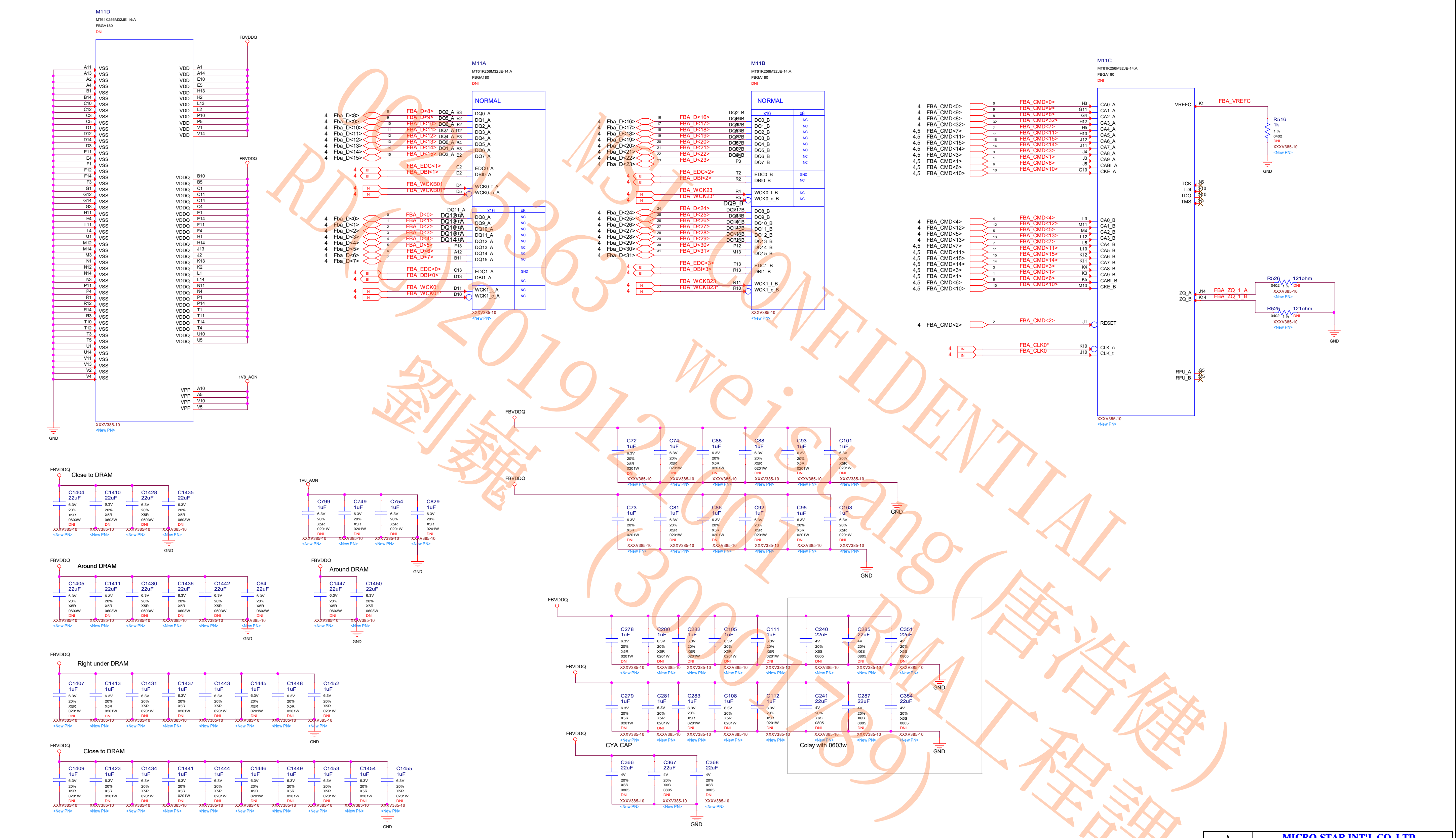
Page3: PCI Express



Page4: MEMORY: GPU Partition A/B

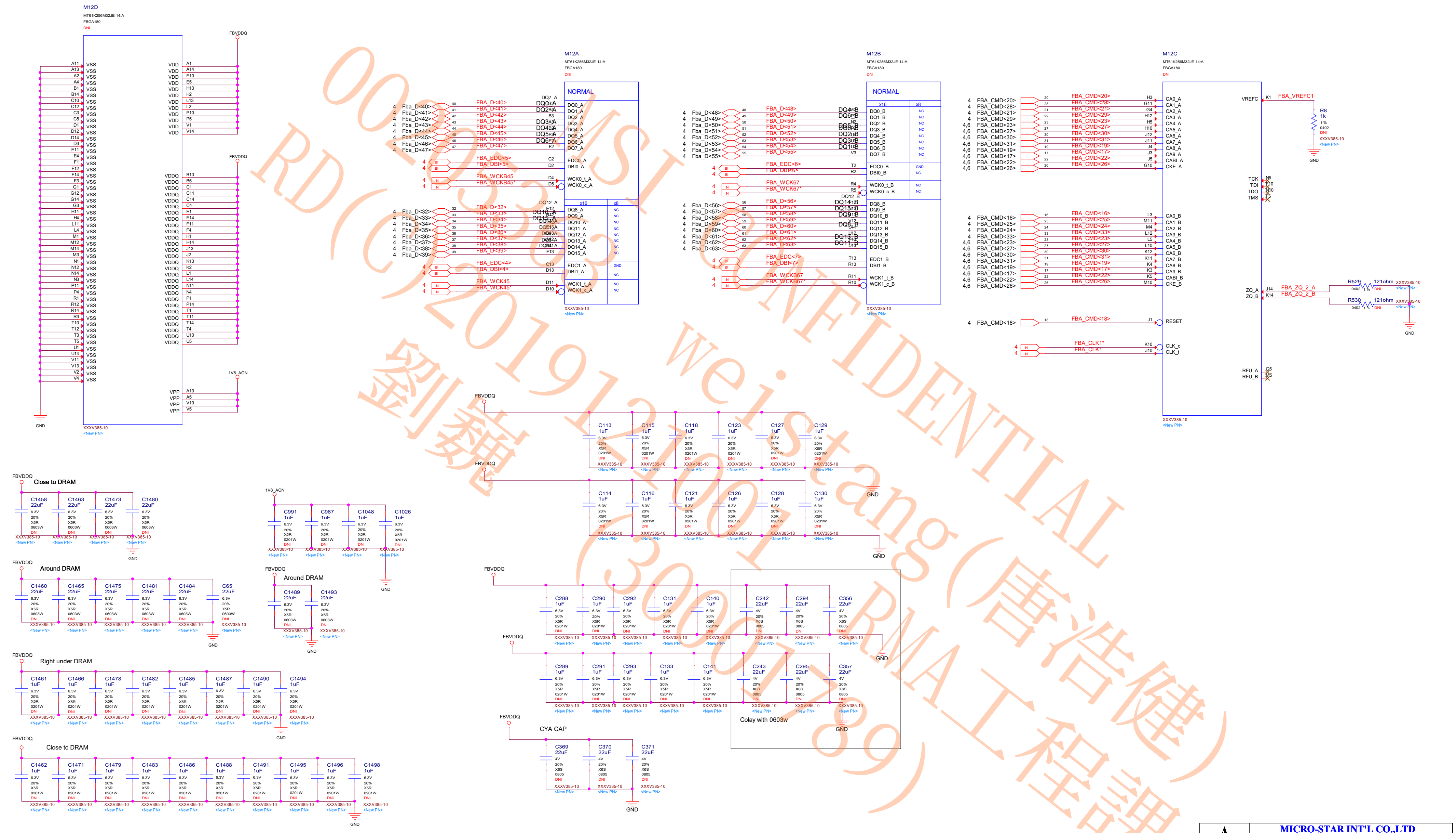


Page5: MEMORY: FBA Partition 31..0



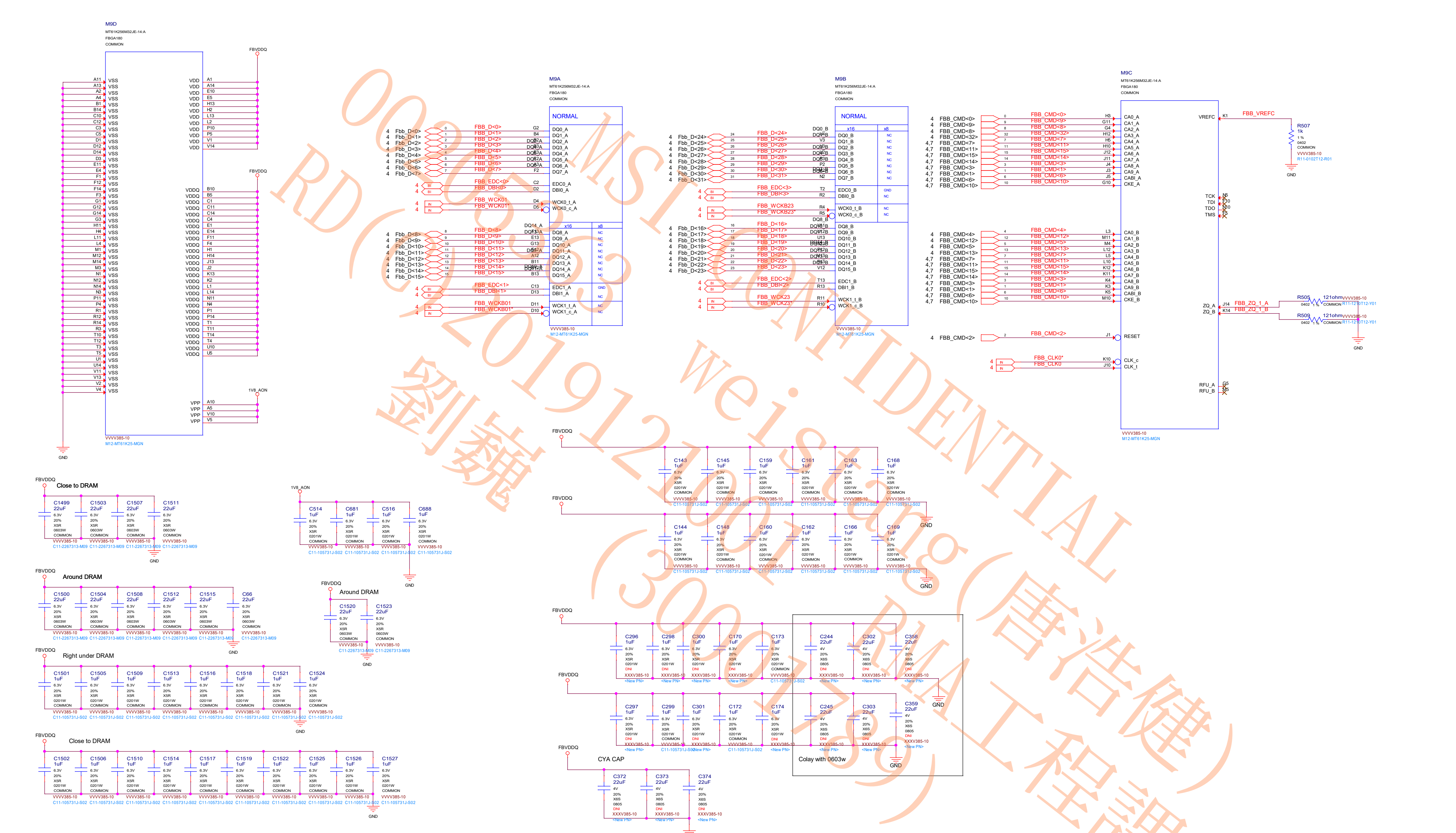
MICRO-STAR INT'L CO.,LTD			
MS-V385			
Size: Custom	Document Description: MEMORY: FBA Partition 31..0		Rev: 1.0
Date: Friday, September 27, 2019	Sheet 5 of 41		

Page6: MEMORY: FBA Partition 63..32



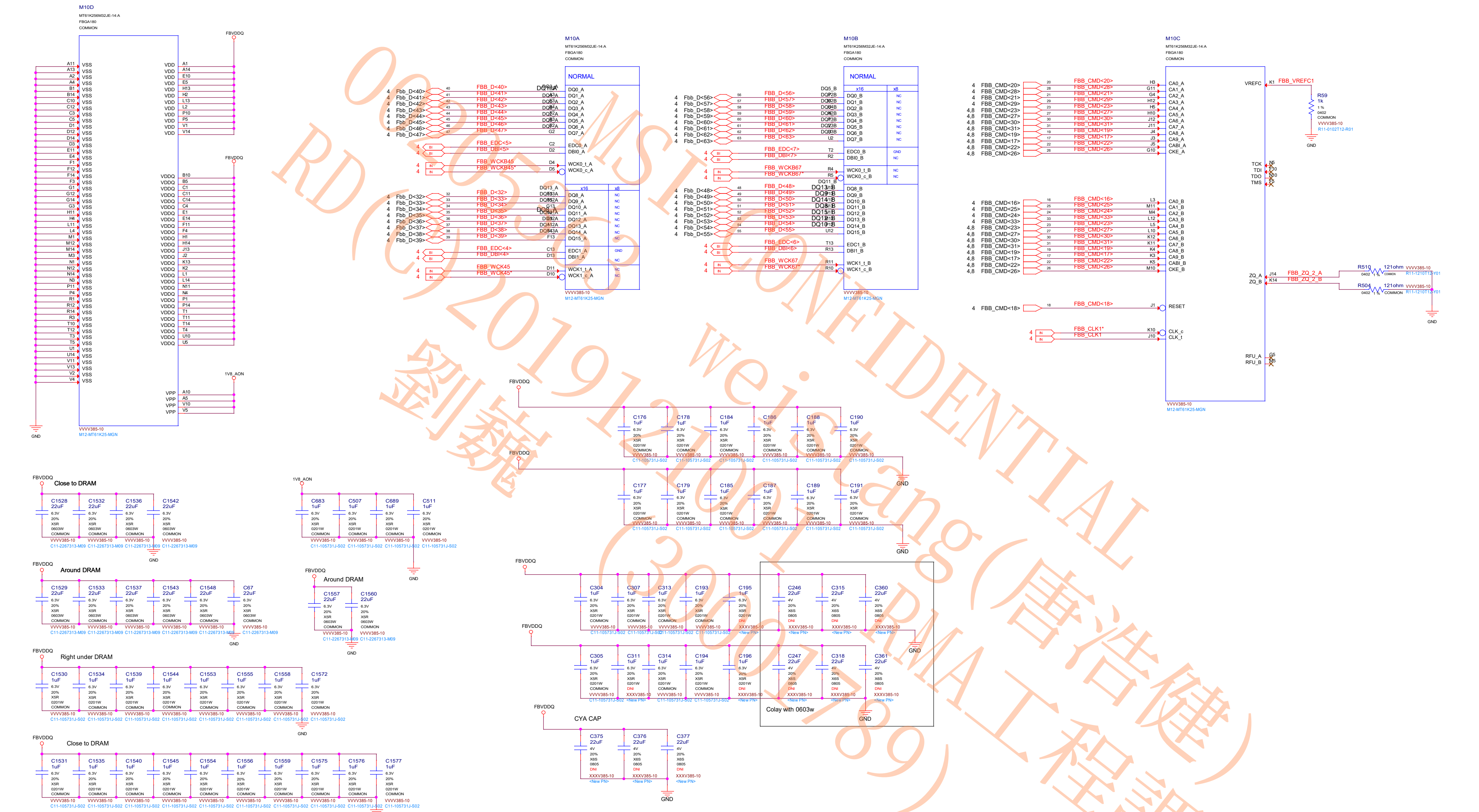
MICRO-STAR INT'L CO.,LTD	
MS-V385	
Size: Custom	Document Description: MEMORY: FBA Partition 63..32	Rev 1.0
Date: Friday, September 27, 2019	Sheet 6 of 41

Page7: MEMORY: FBB Partition 31..0



MICRO-STAR INT'L CO.,LTD		
MS-V385		
Size: Custom	Document Description: MEMORY: FBB Partition 31..0	Rev: 1.0
Date: Friday, September 27, 2019	Sheet 7 of 41	

Page8: MEMORY: FBB Partition 63..32



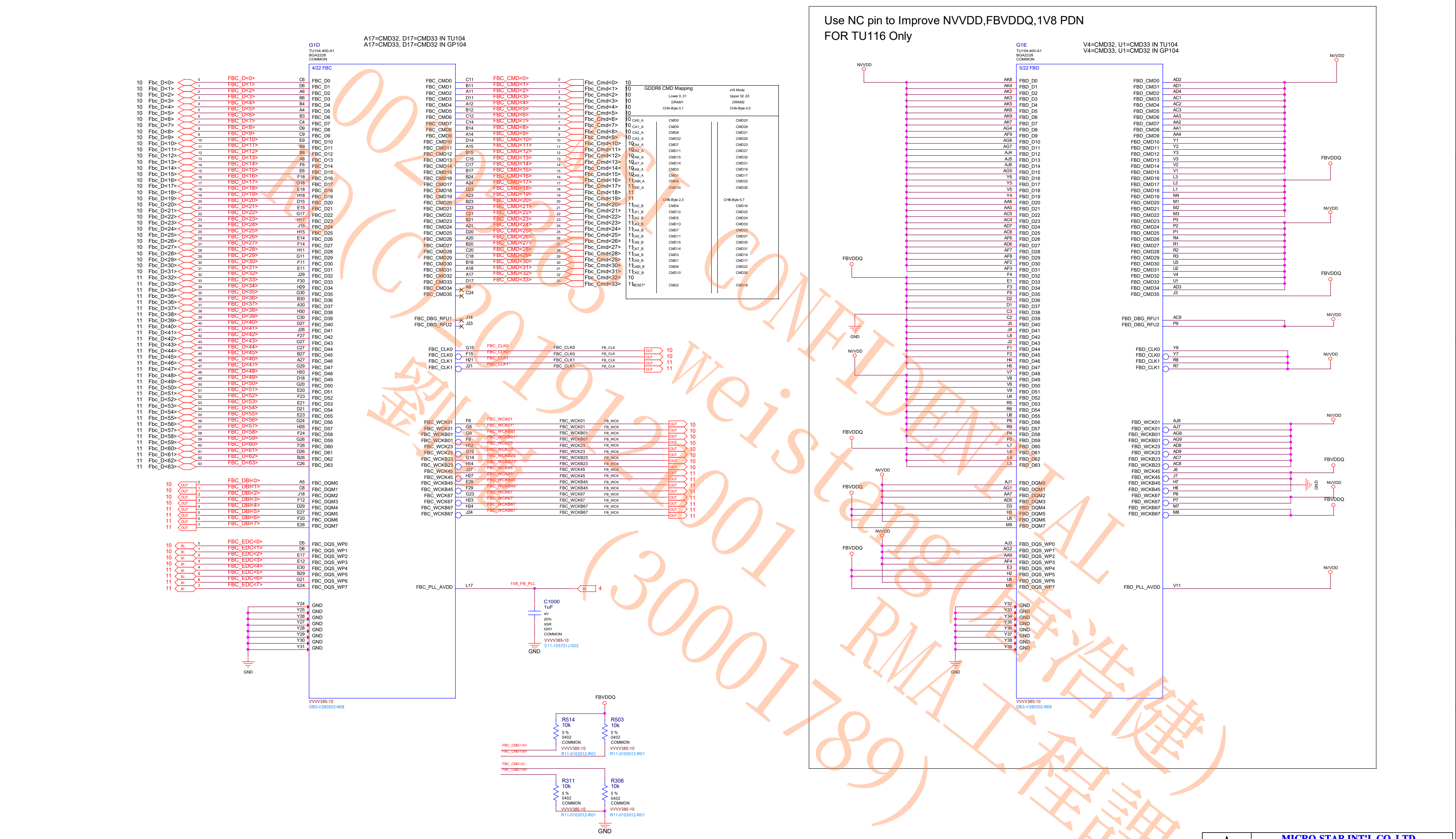
MICRO-STAR INT'L CO.,LTD

MS-V385

Size	Document Description	Rev
Custom	MEMORY: FBB Partition 63..32	1.0

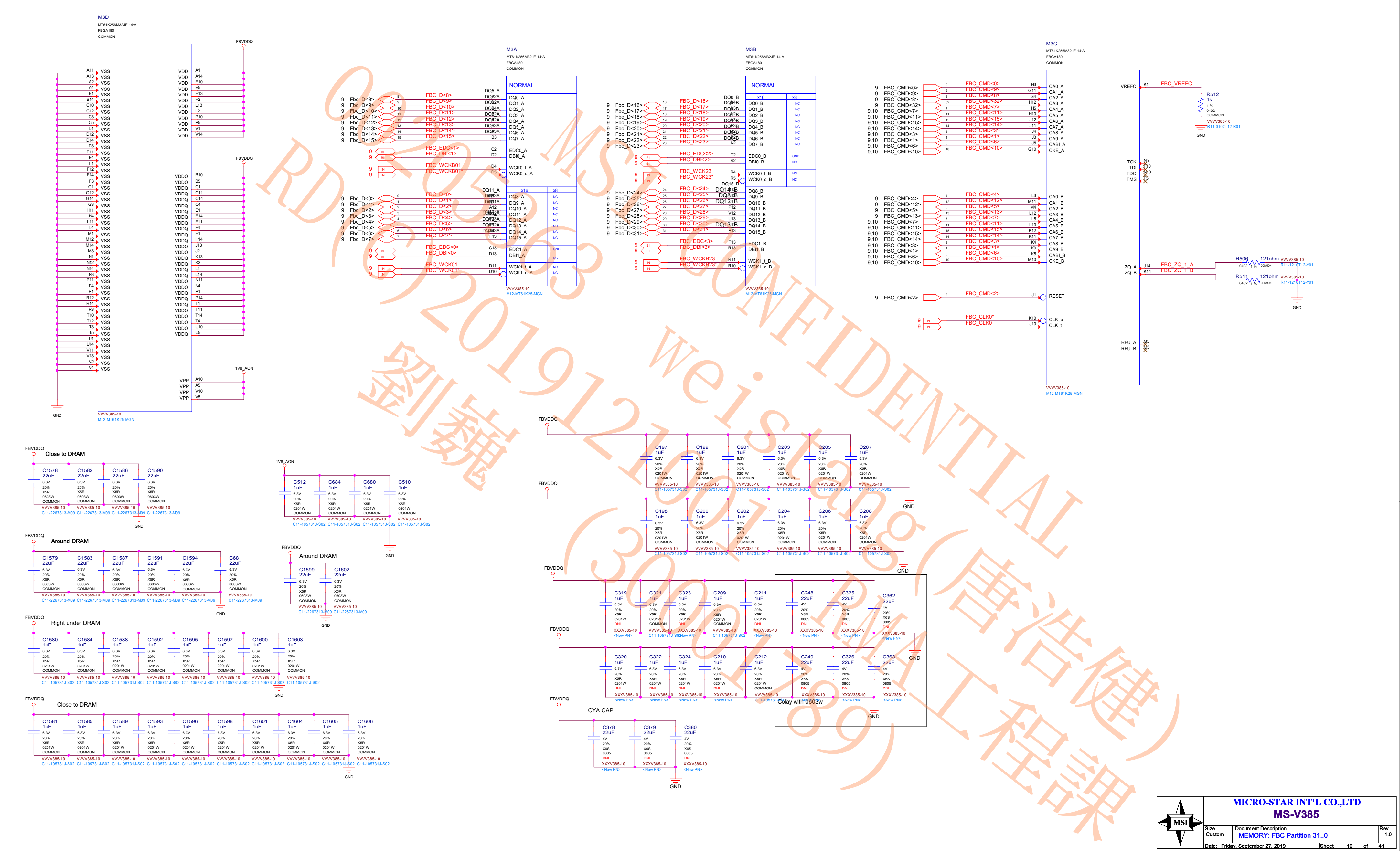
Date: Friday, September 27, 2019 Sheet 8 of 41

Page9: MEMORY: GPU Partition C/D

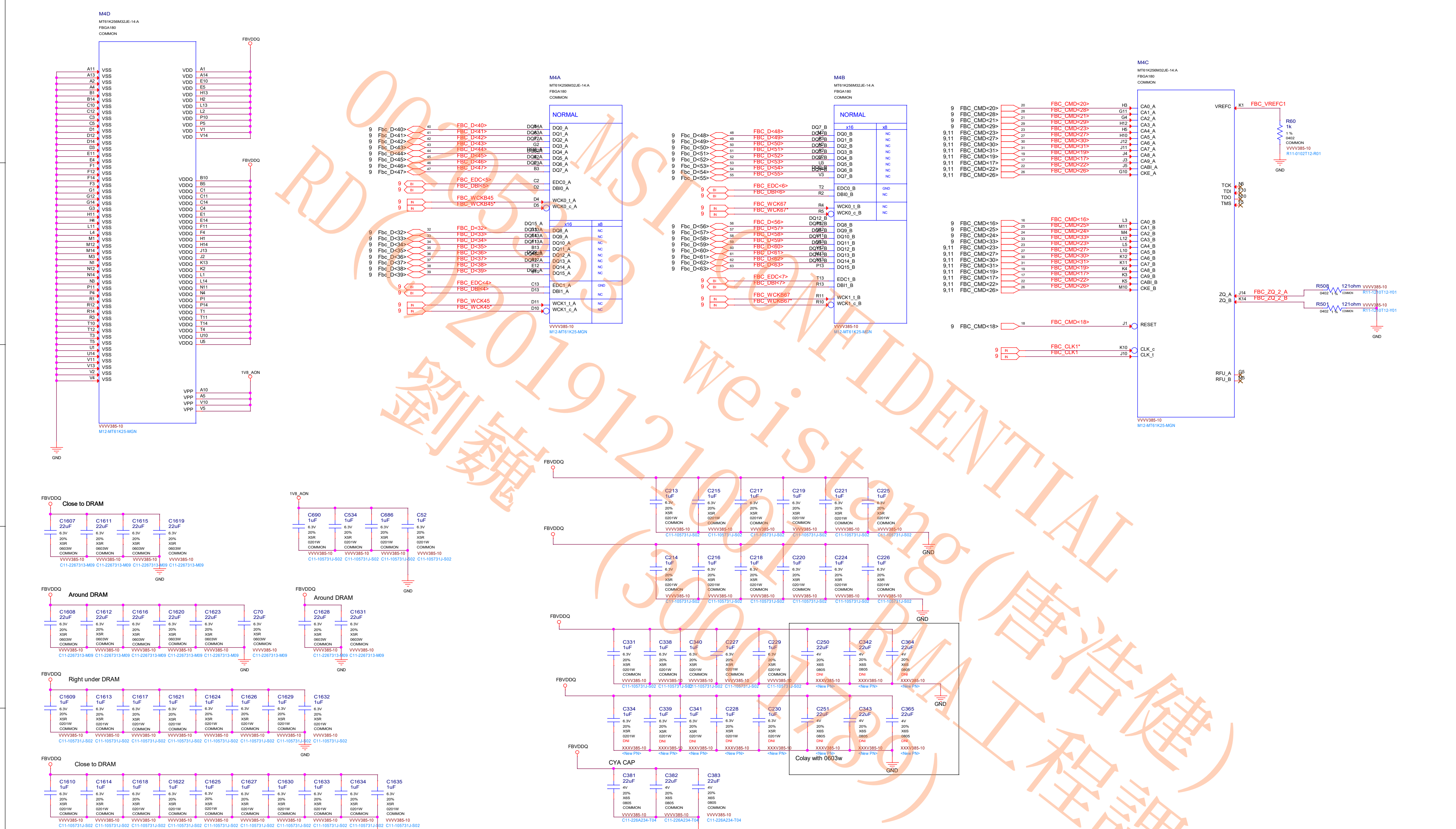


MICRO-STAR INT'L CO.,LTD		
MS-V385		
Size: Custom	Document Description: MEMORY: GPU Partition C/D	Rev: 1.0
Date: Friday, September 27, 2019	Sheet 9 of 41	

Page10: MEMORY: FBC Partition 31..0

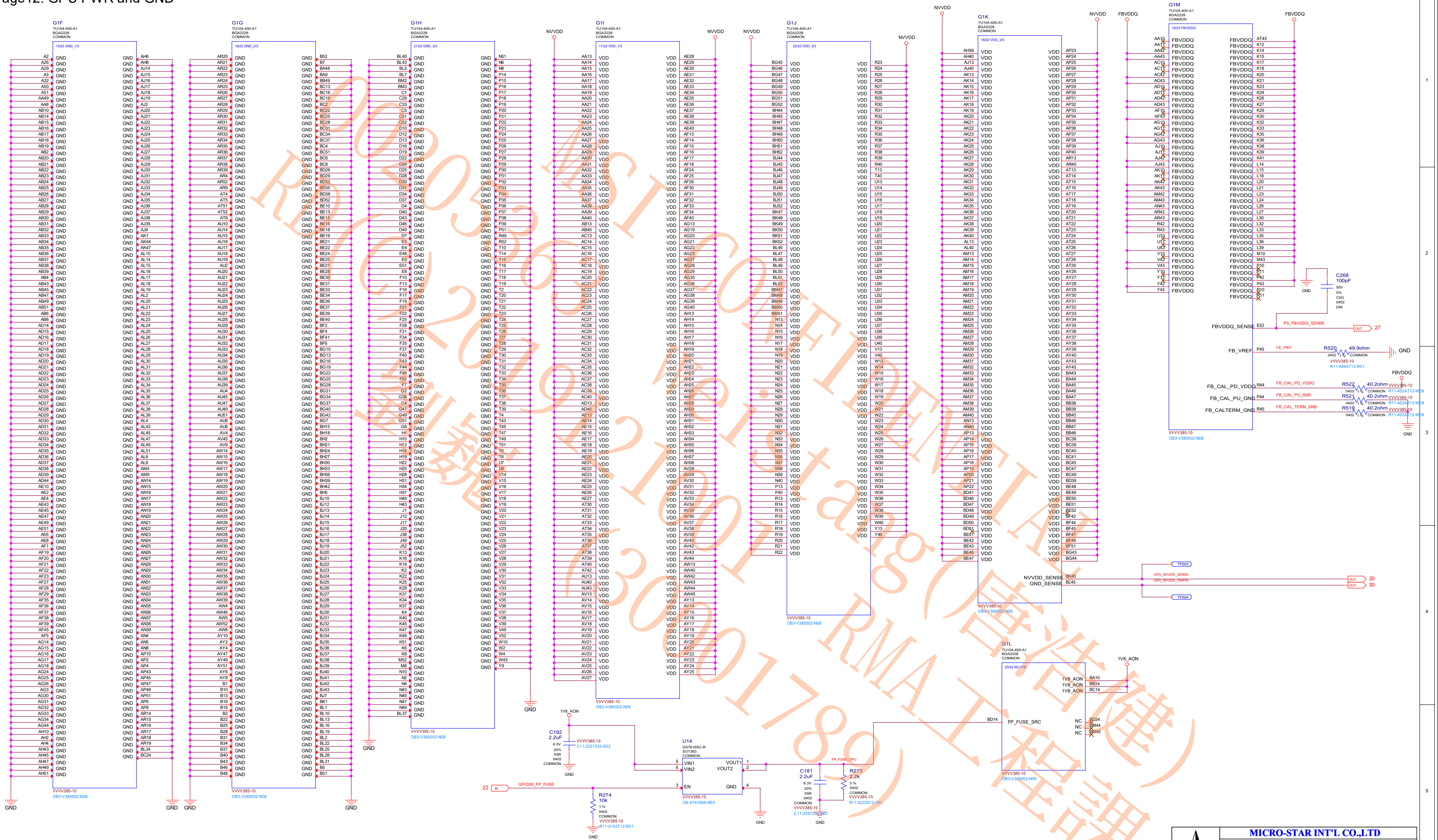


Page11: MEMORY: FBC Partition 63..32



MICRO-STAR INT'L CO.,LTD		
MS-V385		
Size: Custom	Document Description: MEMORY: FBC Partition 63..32	Rev 1.0
Date: Tuesday, October 01, 2019	Sheet 11 of 41	

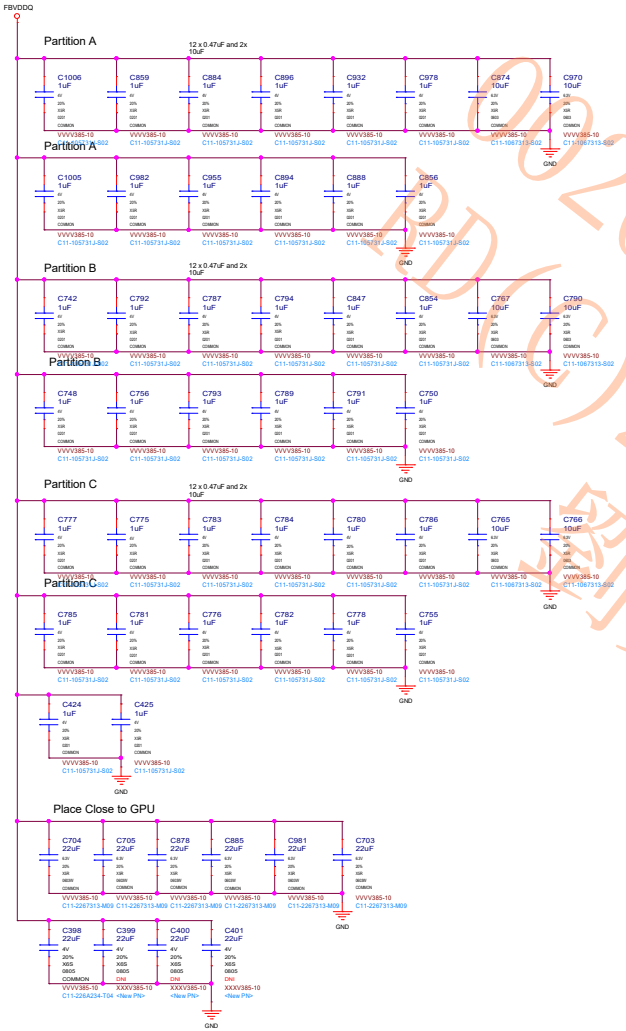
Page12: GPU PWR and GND


G1F
TU104-400-A1
BGA2228
COMMON
15/22 GND_1/3
G1G
16/22 GND_2/3
G1H
21/22 GND_3/3
G1I
17/22 VDD_1/3
G1J
22/22 VDD_3/3
G1K
18/22 VDD_2/3
G1M
19/22 FBVDDQ
G1L
20/22 NC/1V8
NVVDD
FBVDDQ
GND
1V8_AON
FBVDDQ_SENSE
PS_FBVDDQ_SENSE
FB_VREF
R520
49.9ohm
FB_CAL_PD_VDDQ
R522
40.2ohm
FB_CAL_PU_GND
R521
40.2ohm
FB_CALTERM_GND
R519
40.2ohm
C268
100pF
NVVDD_SENSE
GND_SENSE
GPU_NVVDD_SENSE
GPU_NVDD_FBRTN
TP503
TP504
FP_FUSE_SRC
FP_FUSE_GPU
U14
GS7616SC-R
SOT363
COMMON
VIN1
VIN2
VOUT1
VOUT2
EN
GND
C192
2.2uF
C181
2.2uF
R273
2.2k
R274
10k
GPIO26_FP_FUSE
VVVV385-10
OB3-V380002-N08

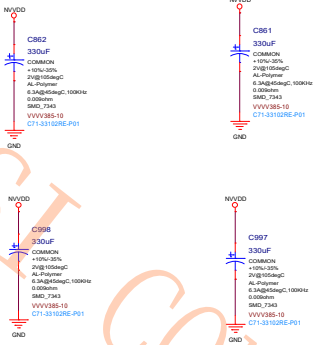
MICRO-STAR INT'L CO.,LTD		
MS-V385		
Size: Custom	Document Description: GPU PWR and GND	Rev: 1.0
Date: Friday, September 27, 2019	Sheet 12 of 41	

Page13: GPU DECOUPLING 1

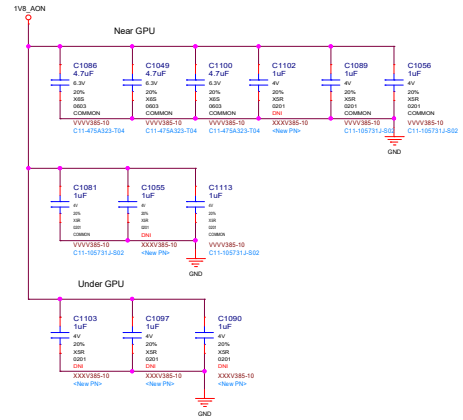
FBVDDQ



NVVDD



1V8_AON



19ci203T

MSI	MICRO-STAR INT'L CO.,LTD	
	MS-V385	
Size: Custom	Document Description: GPU DECOUPLING 1	Rev: 1.0
Date: Tuesday, October 01, 2019	Sheet 13 of 41	

Page14: GPU DECOUPLING 2

NVVDD

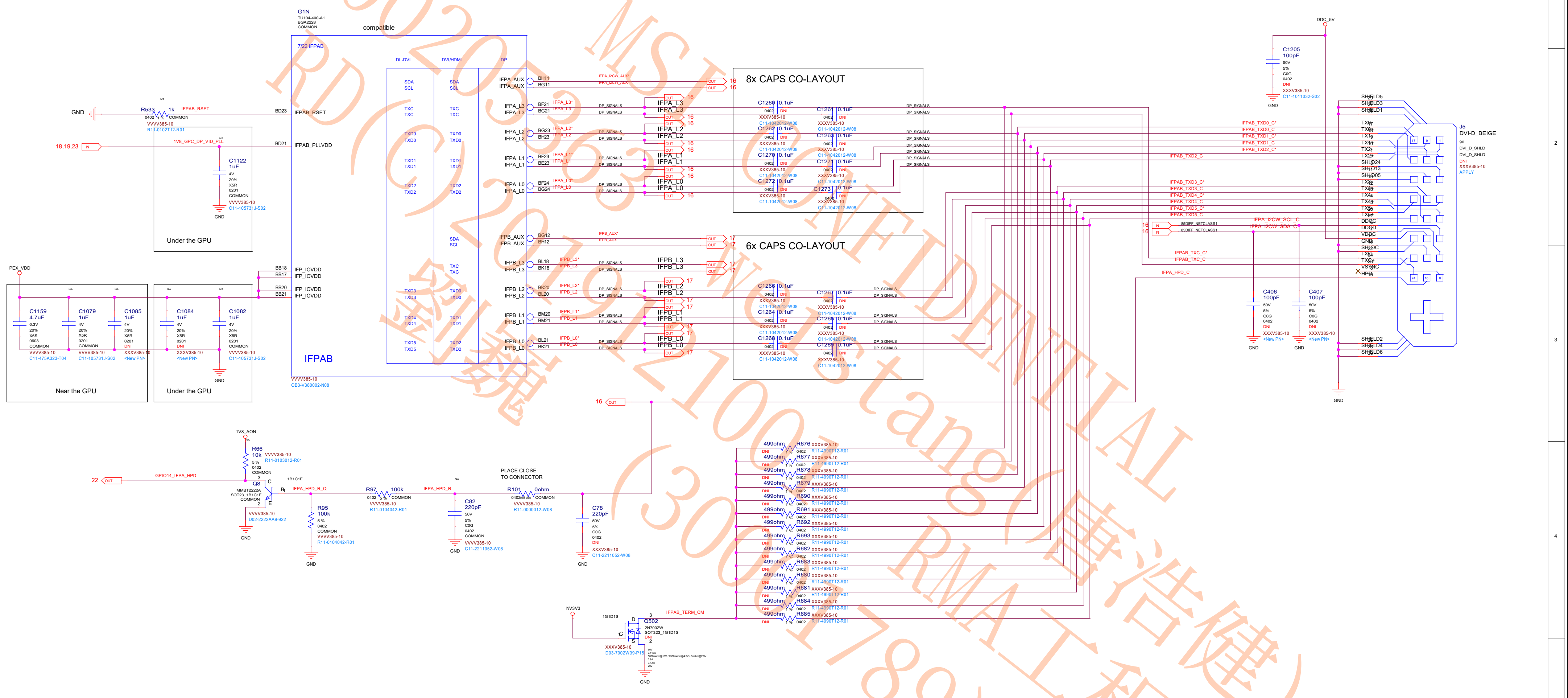
MICRO-STAR INT'L CO.,LTD

MS-V385

Size	Document Description	Rev
Custom	GPU DECOUPLING 2	1.0

Date: Friday, September 27, 2019 Sheet 14 of 41

Page15: IFPAB DVI-D-DL



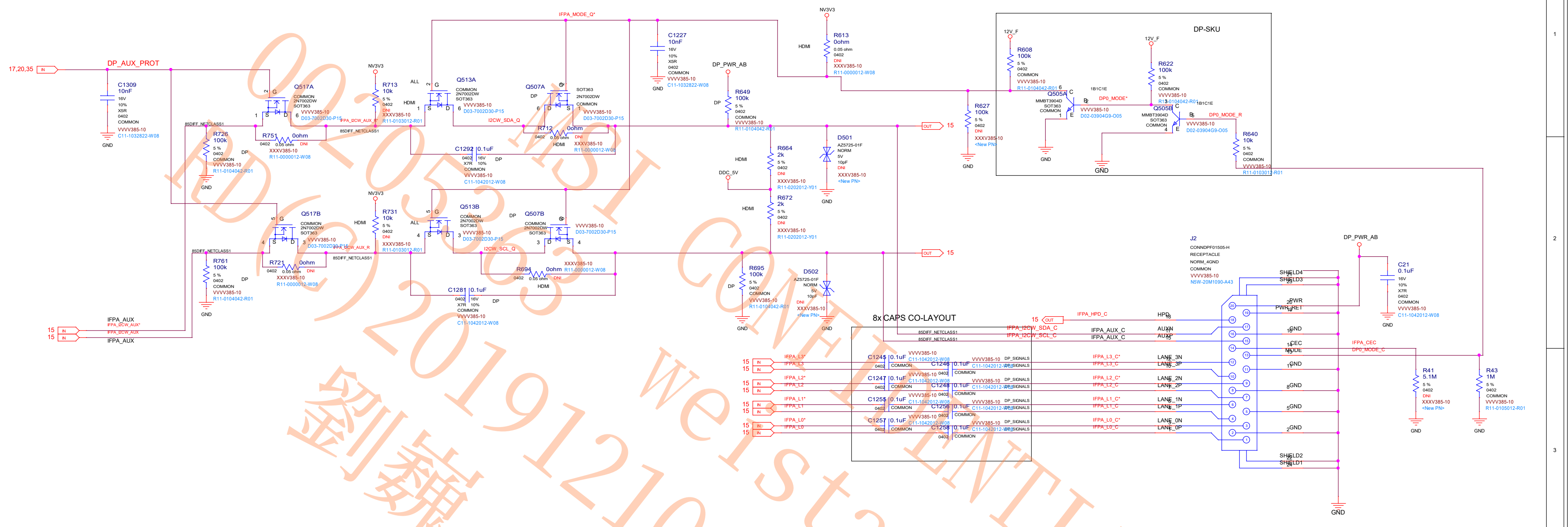
MICRO-STAR INT'L CO.,LTD

MS-V385

Size	Document Description	Rev
Custom	IFPAB DVI-D-DL	1.0

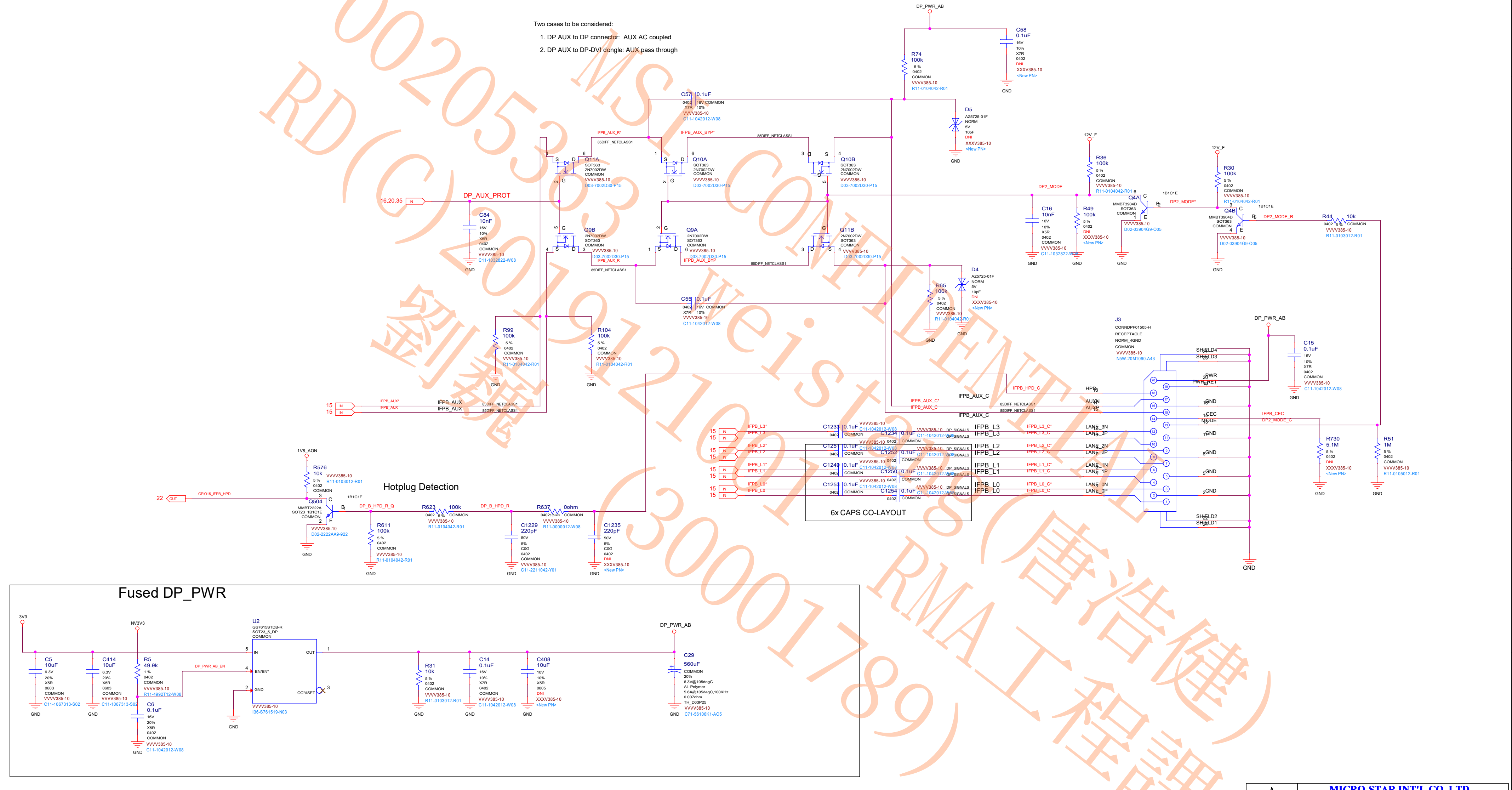
Date: Friday, September 27, 2019 Sheet 15 of 41

Page16: IFPA DP



MICRO-STAR INT'L CO.,LTD		
MS-V385		
Size: Custom	Document Description: IFPA DP	Rev: 1.0
Date: Tuesday, October 01, 2019	Sheet 16 of 41	

Page17: IFPB DP


Two cases to be considered:
1. DP AUX to DP connector: AUX AC coupled
2. DP AUX to DP-DVI dongle: AUX pass through
DP_PWR_AB
C58 0.1uF
R74 100k
D5 AZ5725-01F
C57 0.1uF
IFPB_AUX_R*
IFPB_AUX_BYP*
85DIFF_NETCLASS1
Q11A SOT363 2N7002DW
Q10A SOT363 2N7002DW
Q10B SOT363 2N7002DW
12V_F
R36 100k
R30 100k
DP2_MODE
DP2_MODE*
DP2_MODE_R
Q4A MMBT3904D SOT363
Q4B MMBT3904D SOT363
R44 10k
DP_AUX_PROT
C84 10nF
Q9B 2N7002DW
Q9A 2N7002DW
Q11B 2N7002DW
C16 10nF
R49 100k
C55 0.1uF
R65 100k
D4 AZ5725-01F
R99 100k
R104 100k
J3 CONNDPF01505-H RECEPTACLE
C15 0.1uF
IFPB_AUX
IFPB_AUX_C
IFPB_HPD_C
IFPB_CEC
DP2_MODE_C
HPD
AUXN
AUXP
PWR
PWR_RET
CEC
MODE
GND
IFPB_L3
IFPB_L2
IFPB_L1
IFPB_L0
LANE_3N
LANE_3P
LANE_2N
LANE_2P
LANE_1N
LANE_1P
LANE_0N
LANE_0P
SHIELD1
SHIELD2
SHIELD3
SHIELD4
C1233 0.1uF
C1234 0.1uF
C1251 0.1uF
C1252 0.1uF
C1249 0.1uF
C1250 0.1uF
C1253 0.1uF
C1254 0.1uF
6x CAPS CO-LAYOUT
R730 5.1M
R51 1M
1V8_AON
R576 10k
GPIO15_IFPB_HPD
Q504 MMBT2222A
Hotplug Detection
DP_B_HPD_R_Q
R623 100k
DP_B_HPD_R
R637 0ohm
R611 100k
C1229 220pF
C1235 220pF
Fused DP_PWR
3V3
NV3V3
C5 10uF
C414 10uF
R5 49.9k
C6 0.1uF
DP_PWR_AB_EN
U2 GS7615STDB-R SOT23_5_DP
IN
OUT
EN/EN*
GND
OC*/SET
R31 10k
C14 0.1uF
C408 10uF
C29 560uF

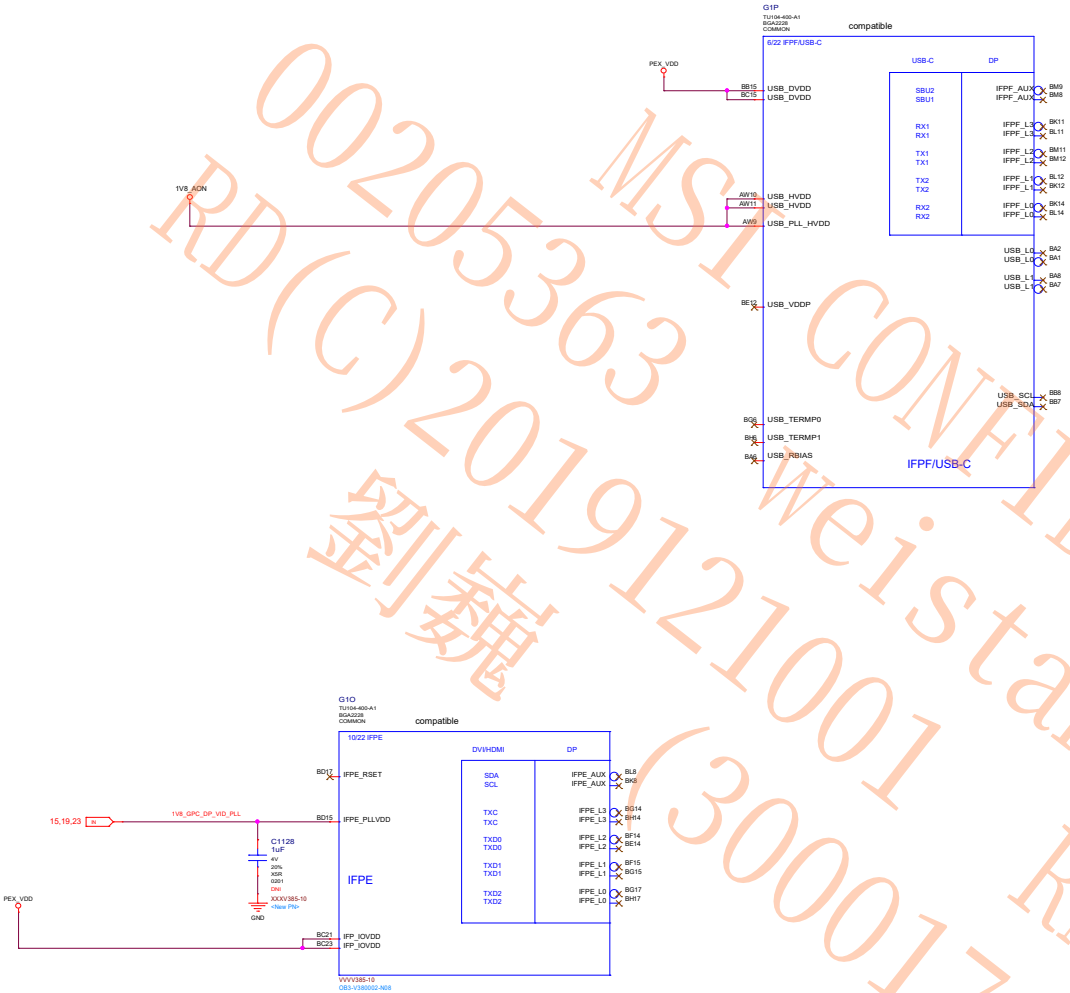
MICRO-STAR INT'L CO.,LTD

MS-V385

Size	Document Description	Rev
Custom	IFPB DP	1.0

Date: Tuesday, October 01, 2019 Sheet 17 of 41

Page18: IFPE & IFPF NC

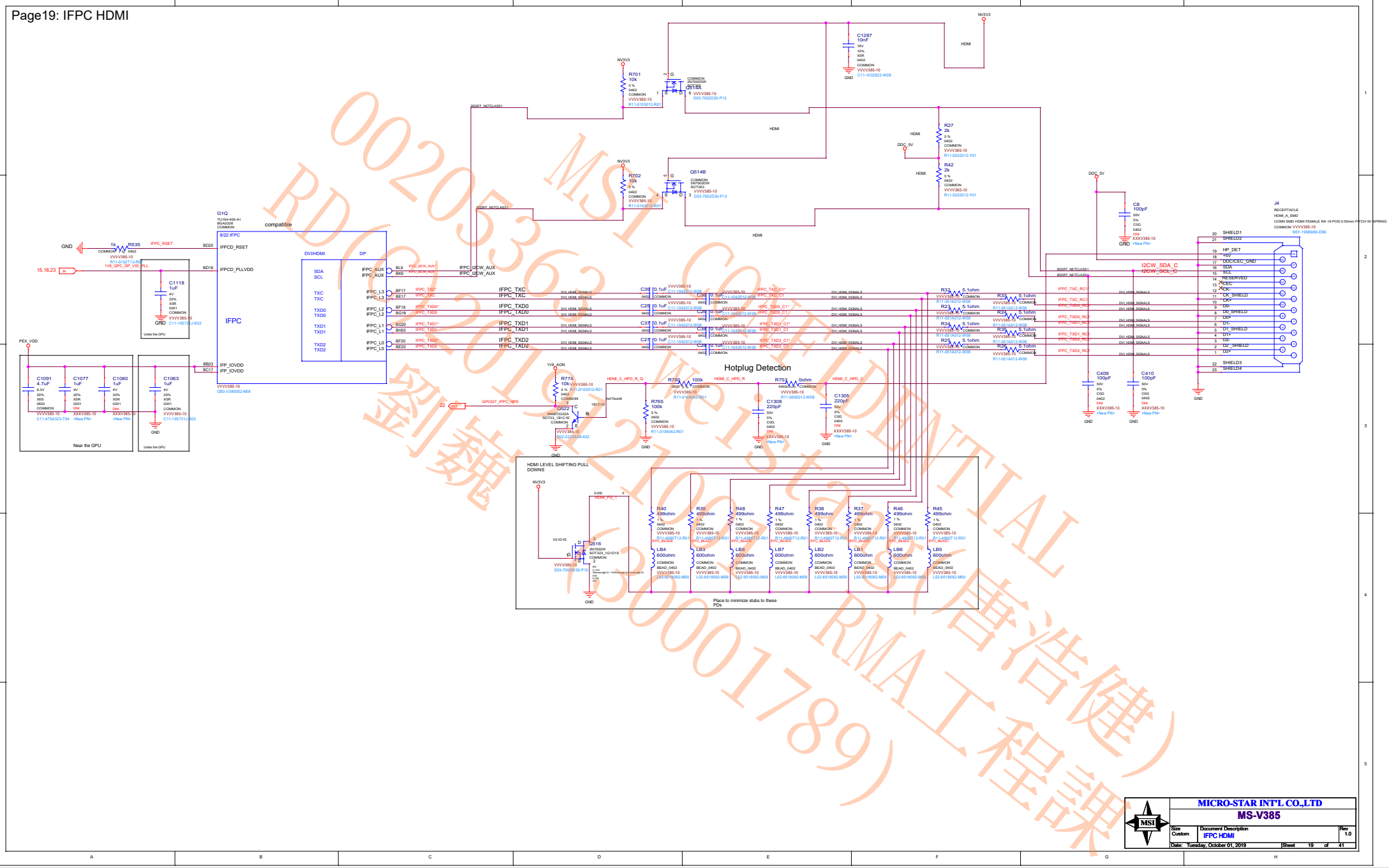


MICRO-STAR INT'L CO.,LTD
MS-V385

Size	Document Description	Rev
Custom	IFPE & IFPF NC	1.0

Date: Friday, September 27, 2019 Sheet 18 of 41

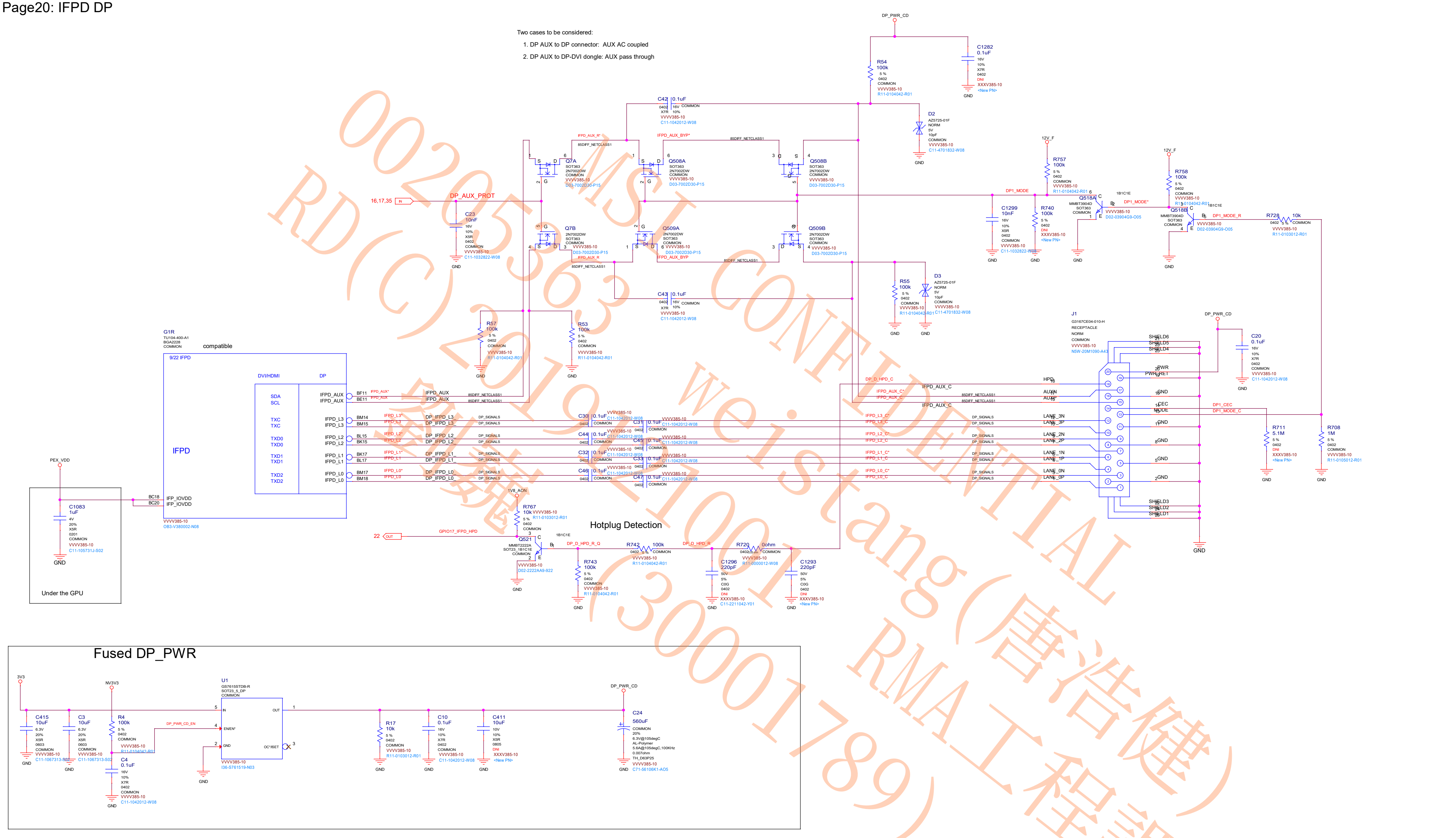
01-AUG-2019


Page19: IFPC HDMI
G1Q
compatible
IFPC
DVI/HDMI
DP
Hotplug Detection
HDMI LEVEL SHIFTING PULL DOWNS
Near the GPU
Under the GPU
Place to minimize stubs to these PDs
MICRO-STAR INT'L CO.,LTD
MS-V385
IFPC HDMI
Tuesday, October 01, 2019

Page20: IFPD DP

Two cases to be considered:

1. DP AUX to DP connector: AUX AC coupled
2. DP AUX to DP-DVI dongle: AUX pass through



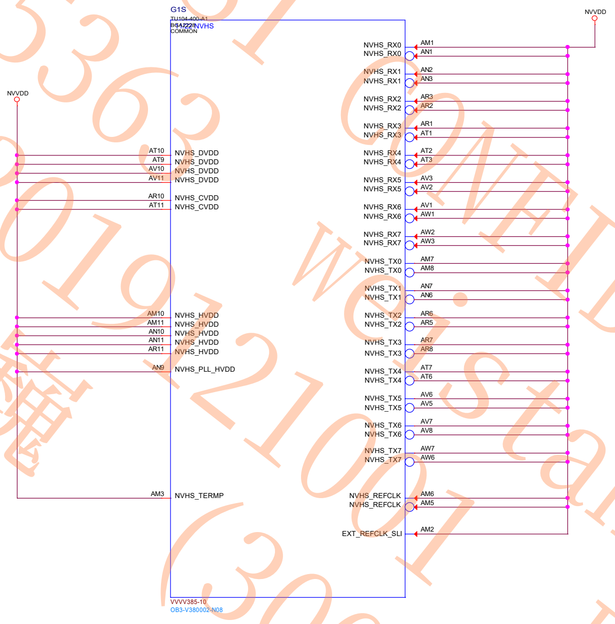
DP_PWR_CD
DP_AUX_PROT
16,17,35
G1R
compatible
9/22 IFPD
DVI/HDMI
DP
IFPD
SDA
SCL
TXC
TXD0
TXD1
TXD2
IFPD_AUX
IFPD_L3
IFPD_L2
IFPD_L1
IFPD_L0
IFP_IOVDD
PEX_VDD
C1083
Under the GPU
Hotplug Detection
GPIO17_IFPD_HPD
DP_D_HPD_R_Q
DP_D_HPD_R
DP_D_HPD_C
Q7A
Q7B
Q508A
Q508B
Q509A
Q509B
Q518A
Q518B
Q521
D2
D3
J1
HPD
AUXN
AUXP
LANE_3N
LANE_3P
LANE_2N
LANE_2P
LANE_1N
LANE_1P
LANE_0N
LANE_0P
CEC
MODE
PWR
PWR_RET
SHIELD1
SHIELD2
SHIELD3
SHIELD4
SHIELD5
SHIELD6
DP1_MODE
DP1_CEC
DP1_MODE_C
DP1_MODE_R
12V_F
1V8_AON
GND
Fused DP_PWR
3V3
NV3V3
U1
GS7615STDB-R
DP_PWR_CD_EN
IN
OUT
EN/EN*
GND
OC*DET
C415
C3
R4
C4
R17
C10
C411
C24
560uF

MICRO-STAR INT'L CO.,LTD		
MS-V385		
Size: Custom	Document Description: IFPD DP	Rev: 1.0
Date: Tuesday, October 01, 2019	Sheet 20 of 41	

Page21: NVHS INTERFACE AND FRAME LOCK

Use NC pin to Improve NVVDD,FBVDDQ,1V8 PDN

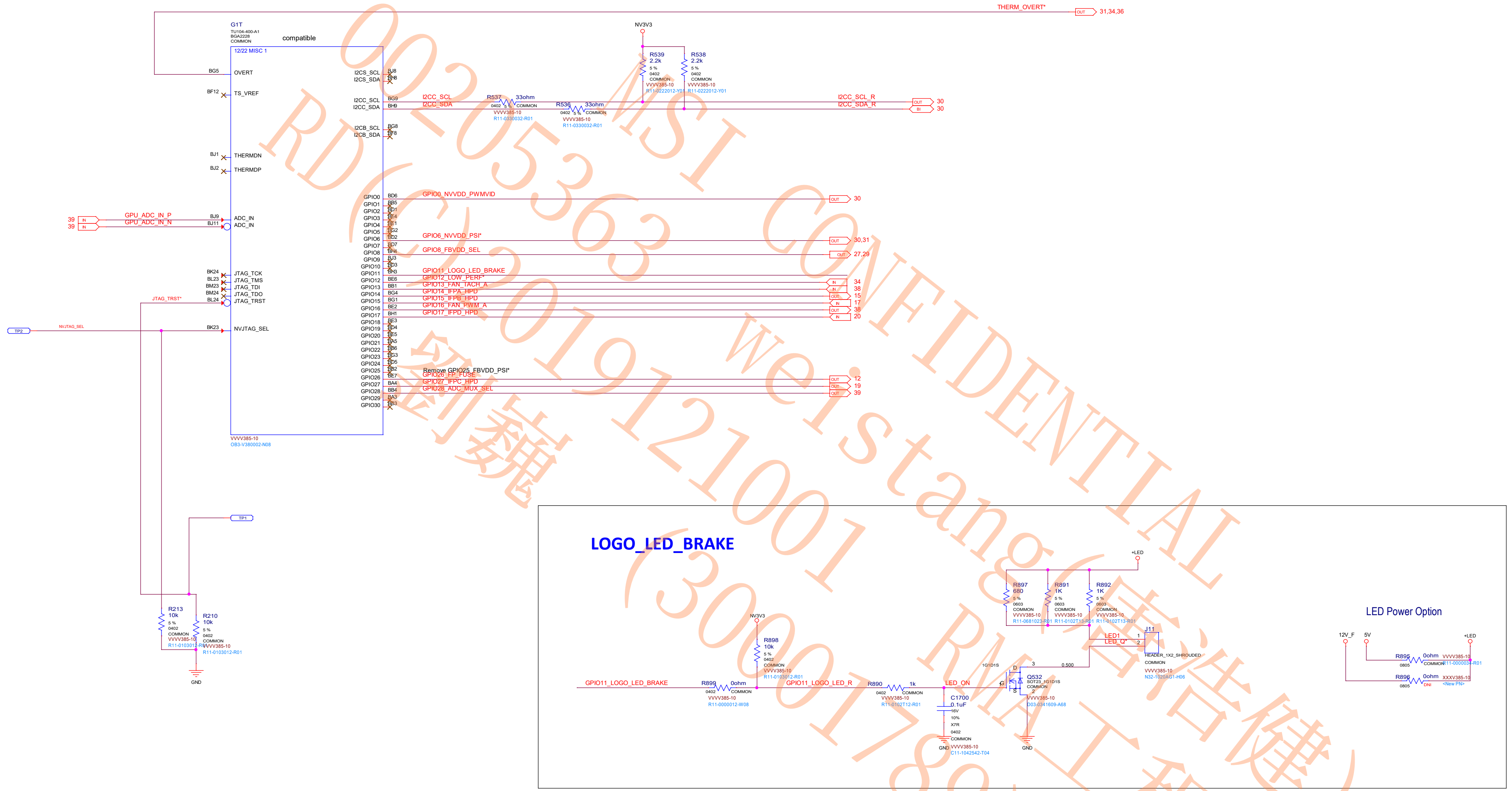
For TU116 Only



G1S
TU104-400-A1
BGA2228
11/22 NVHS
COMMON
NVVDD
AT10 NVHS_DVDD
AT9 NVHS_DVDD
AV10 NVHS_DVDD
AV11 NVHS_DVDD
AR10 NVHS_CVDD
AT11 NVHS_CVDD
AM10 NVHS_HVDD
AM11 NVHS_HVDD
AN10 NVHS_HVDD
AN11 NVHS_HVDD
AR11 NVHS_HVDD
AN9 NVHS_PLL_HVDD
AM3 NVHS_TERMP
NVVDD
NVHS_RX0 AM1
NVHS_RX0 AN1
NVHS_RX1 AN2
NVHS_RX1 AN3
NVHS_RX2 AR3
NVHS_RX2 AR2
NVHS_RX3 AR1
NVHS_RX3 AT1
NVHS_RX4 AT2
NVHS_RX4 AT3
NVHS_RX5 AV3
NVHS_RX5 AV2
NVHS_RX6 AV1
NVHS_RX6 AW1
NVHS_RX7 AW2
NVHS_RX7 AW3
NVHS_TX0 AM7
NVHS_TX0 AM8
NVHS_TX1 AN7
NVHS_TX1 AN6
NVHS_TX2 AR6
NVHS_TX2 AR5
NVHS_TX3 AR7
NVHS_TX3 AR8
NVHS_TX4 AT7
NVHS_TX4 AT6
NVHS_TX5 AV6
NVHS_TX5 AV5
NVHS_TX6 AV7
NVHS_TX6 AV8
NVHS_TX7 AW7
NVHS_TX7 AW6
NVHS_REFCLK AM6
NVHS_REFCLK AM5
EXT_REFCLK_SLI AM2
VVVV385-10
OB3-V380002-N08

MICRO-STAR INT'L CO.,LTD		
MS-V385		
Size: Custom	Document Description: NVHS INTERFACE AND FRAME LOCK	Rev: 1.0
Date: Friday, September 27, 2019	Sheet 21 of 41	

Page22: MISC1: JTAG, GPIO, ADC, I2C, OVERT



G1T
TU104-400-A1
BGA2228
COMMON
compatible
12/22 MISC 1
OVERT
TS_VREF
THERMDN
THERMDP
ADC_IN
JTAG_TCK
JTAG_TMS
JTAG_TDI
JTAG_TDO
JTAG_TRST
NVJTAG_SEL
I2CS_SCL
I2CS_SDA
I2CC_SCL
I2CC_SDA
I2CB_SCL
I2CB_SDA
THERM_OVERT*
31,34,36
NV3V3
R539 2.2k
R538 2.2k
R537 33ohm
R536 33ohm
I2CC_SCL_R
I2CC_SDA_R
GPU_ADC_IN_P
GPU_ADC_IN_N
JTAG_TRST*
NVJTAG_SEL
TP2
TP1
GPIO0_NVVDD_PWMVID
GPIO6_NVVDD_PSI*
GPIO8_FBVDD_SEL
GPIO11_LOGO_LED_BRAKE
GPIO12_LOW_PERF*
GPIO13_FAN_TACH_A
GPIO14_IFPA_HPD
GPIO15_IFPB_HPD
GPIO16_FAN_PWM_A
GPIO17_IFPD_HPD
Remove GPIO25_FBVDD_PSI*
GPIO26_FP_FUSE
GPIO27_IFPC_HPD
GPIO28_ADC_MUX_SEL
VVVV385-10
OB3-V380002-N08
R213 10k
R210 10k
GND
LOGO_LED_BRAKE
+LED
R897 680
R891 1K
R892 1K
R898 10k
R899 0ohm
R890 1k
GPIO11_LOGO_LED_R
LED_ON
C1700 0.1uF
Q532
LED1
LED_Q*
J11
HEADER_1X2_SHROUDED
LED Power Option
12V_F
5V
R895 0ohm
R896 0ohm

MICRO-STAR INT'L CO.,LTD

MS-V385

Size	Document Description	Rev
Custom	MISC1: JTAG, GPIO, ADC, I2C, OVERT	1.0

Date: Friday, September 27, 2019 | Sheet 22 of 41

Page23: MISC2: ROM, XTAL, Straps

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

STRAP2	STRAP1	STRAP0	RAMCFG[4:0]	
L	L	L	0000	Samsung 8Gb 256Mx32 K4Z80325BC-HC14
L	L	H	0001	Micron 8Gb 256Mx32 MT61K256M32JE-14:A
L	H	L	0010	Hynix 8Gb 256Mx32 H56C8H24MJR-S2C
L	H	H	0011	Samsung 8Gb 256Mx32 K4Z8032BC-HC12
H	H	L	0110	
H	H	H	0111	
L	L	M	1000	
L	M	L	1001	

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	M	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

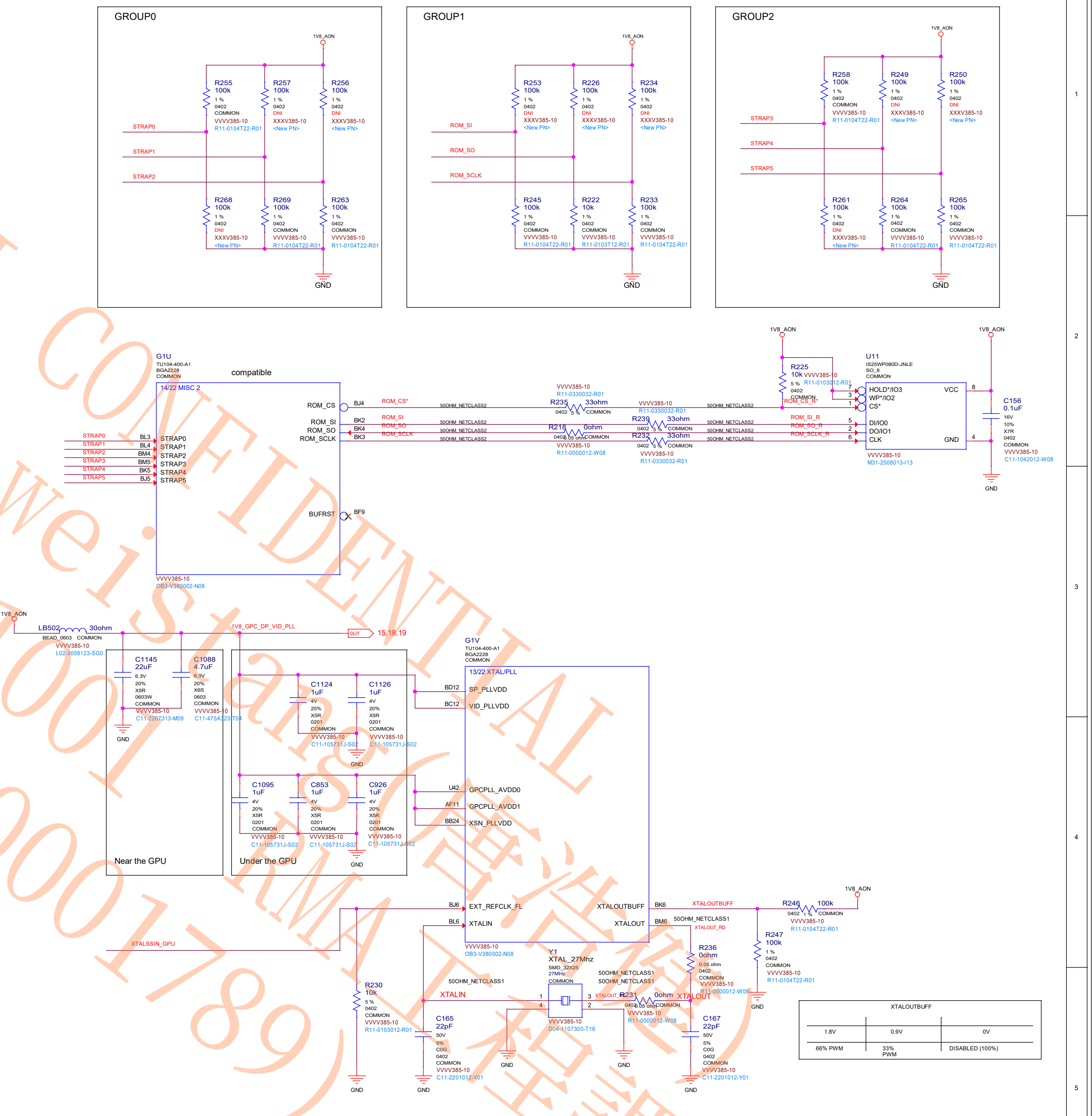
H=High :Tied to 1.8V
M=Middle:Tied to 0.9V
L=Low :Tied to 0V

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-V385

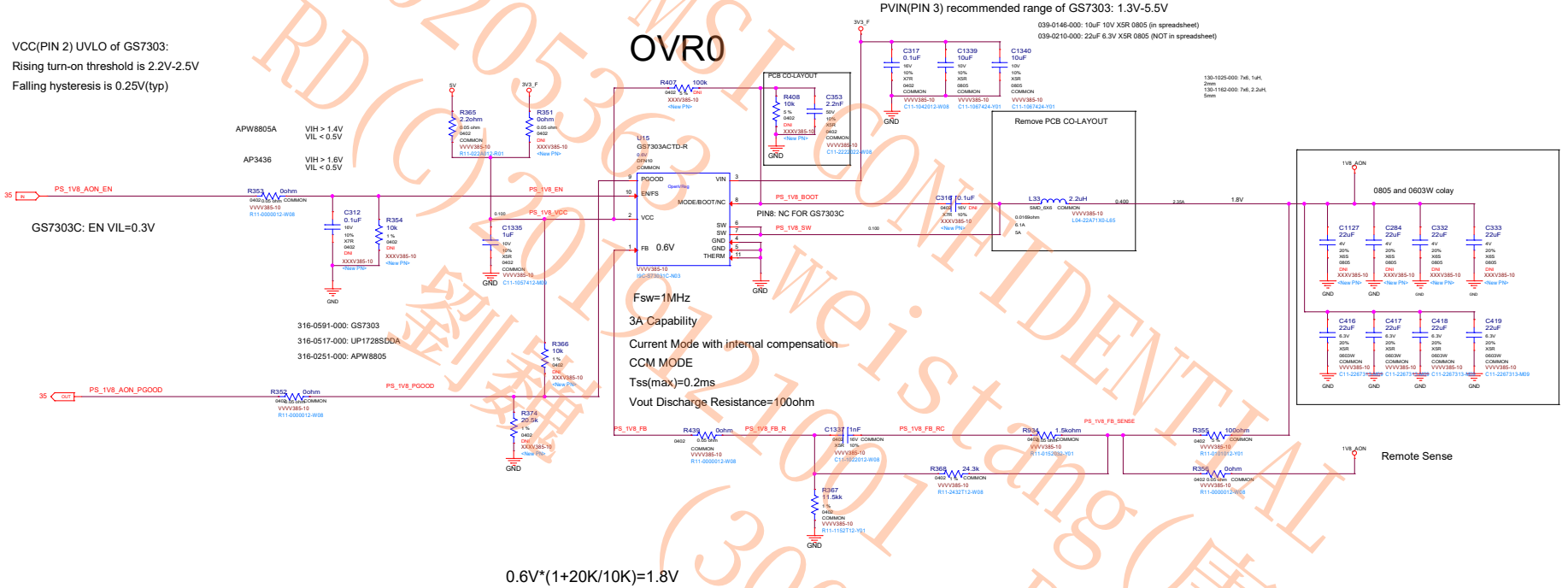
Size	Document Description	Rev
Custom	MISC2: ROM, XTAL, Straps	1.0

Date: Friday, September 27, 2019 Sheet 23 of 41

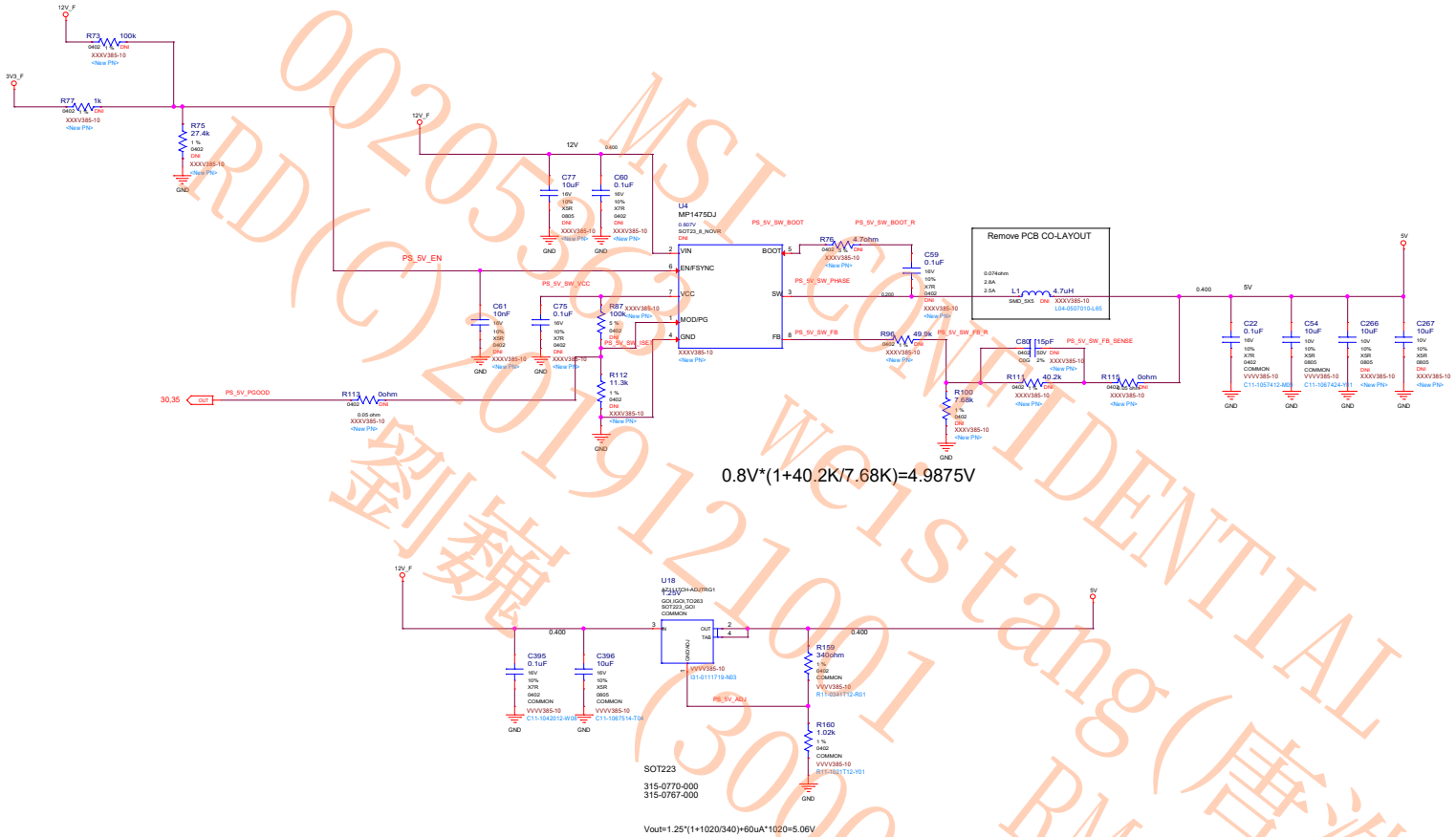
Use 5V as 1V8 OVR0 VCC(PIN 2), can make 1V8_AON power down later(hold more time during power down).
And no glitch on 1V8_PGOOD.

1v8 Switcher

OVR0



MICRO-STAR INT'L CO.,LTD		
MS-V385		
Size: Custom	Document Description: PS: 1V8_AON	Rev: 1.0
Date: Tuesday, October 01, 2019	Sheet 24 of 41	



19ci203T

MSI	MICRO-STAR INT'L CO.,LTD	
	MS-V385	
Size: Custom	Document Description: PS: 5V	Rev: 1.0
Date: Friday, September 27, 2019	Sheet 25 of 41	

Page26: PS: PEXVDD

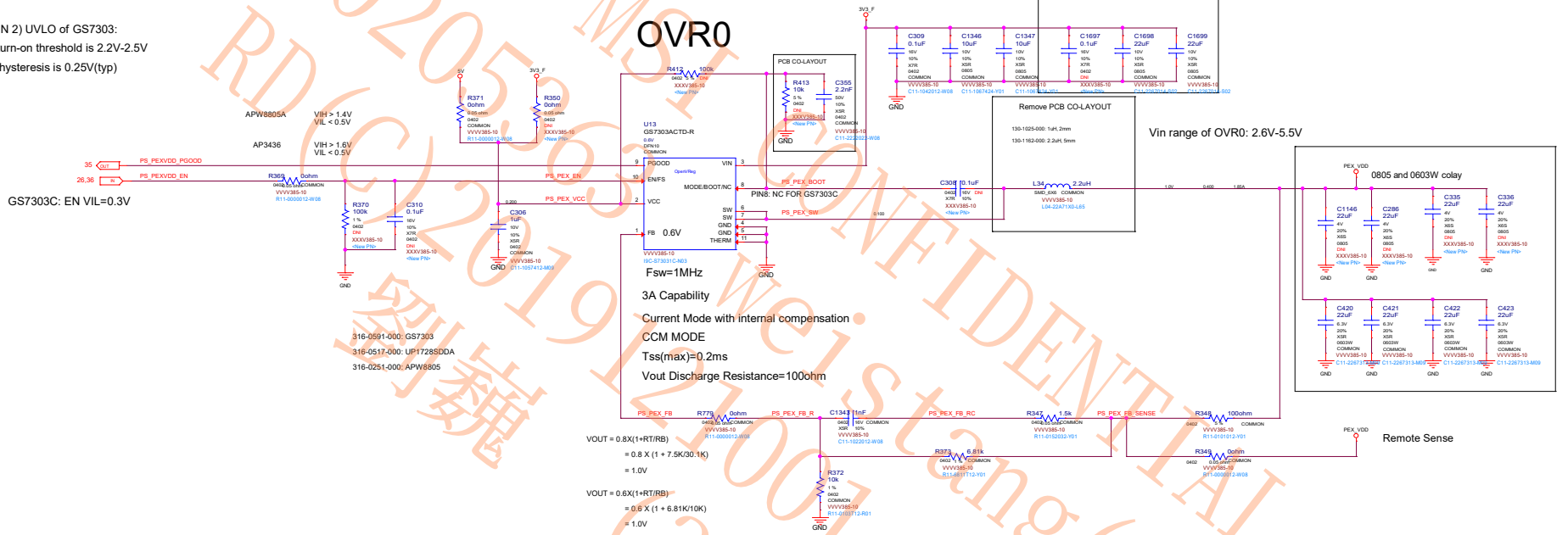
DUE

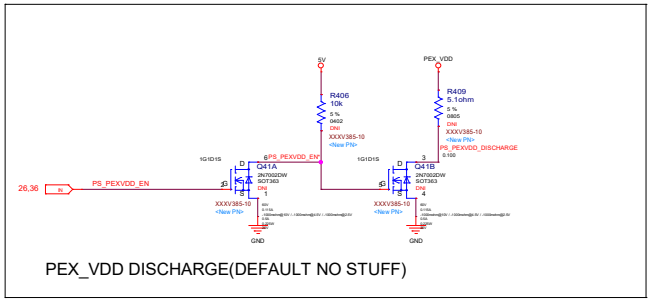
Use 5V as PEX_VDD OVR0 VCC(PIN 2),
enable PEX_VDD OVR0 internal discharge(100ohm typ), making PEX_VDD power down faster.

PEX_VDD Switcher

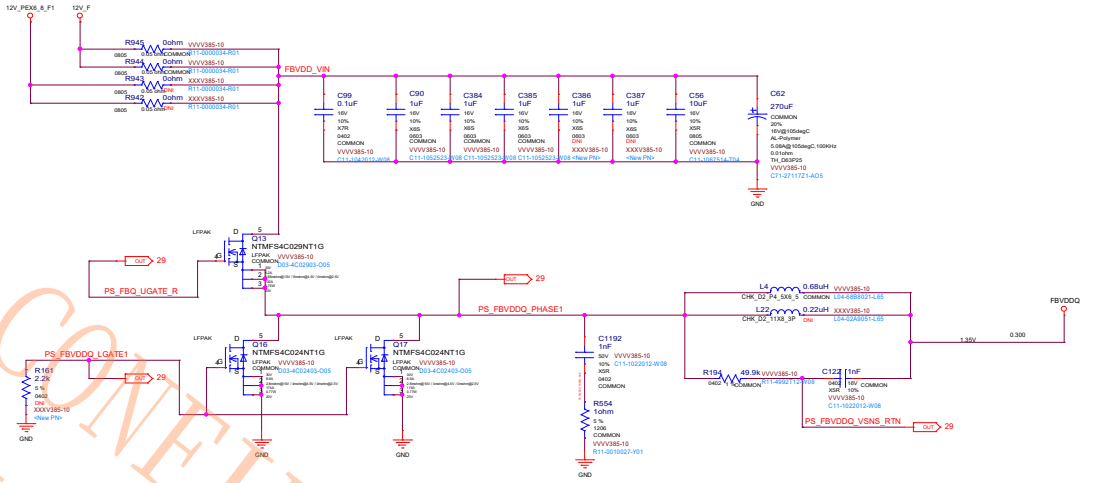
ADD 3 MORE MLCC
3V3_F is Far Away From Source

VCC(PIN 2) UVLO of GS7303:
Rising turn-on threshold is 2.2V-2.5V
Falling hysteresis is 0.25V(typ)





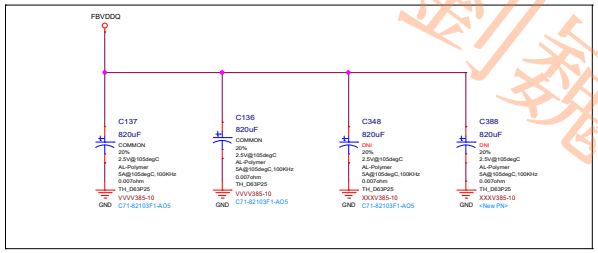
MICRO-STAR INT'L CO.,LTD
MS-V385
Size: Custom | Document Description: PS: PEXVDD | Rev: 1.0
Date: Tuesday, October 01, 2019 | Sheet 26 of 41

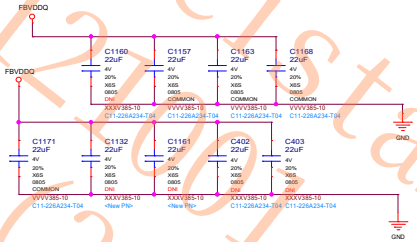


Remove uP1666

MICRO-STAR INT'L CO.,LTD	
MS-V385	
Size: Custom	Document Description: PS: FBVDDQ
Rev: 1.0	
Date: Tuesday, October 01, 2019	Sheet 27 of 41

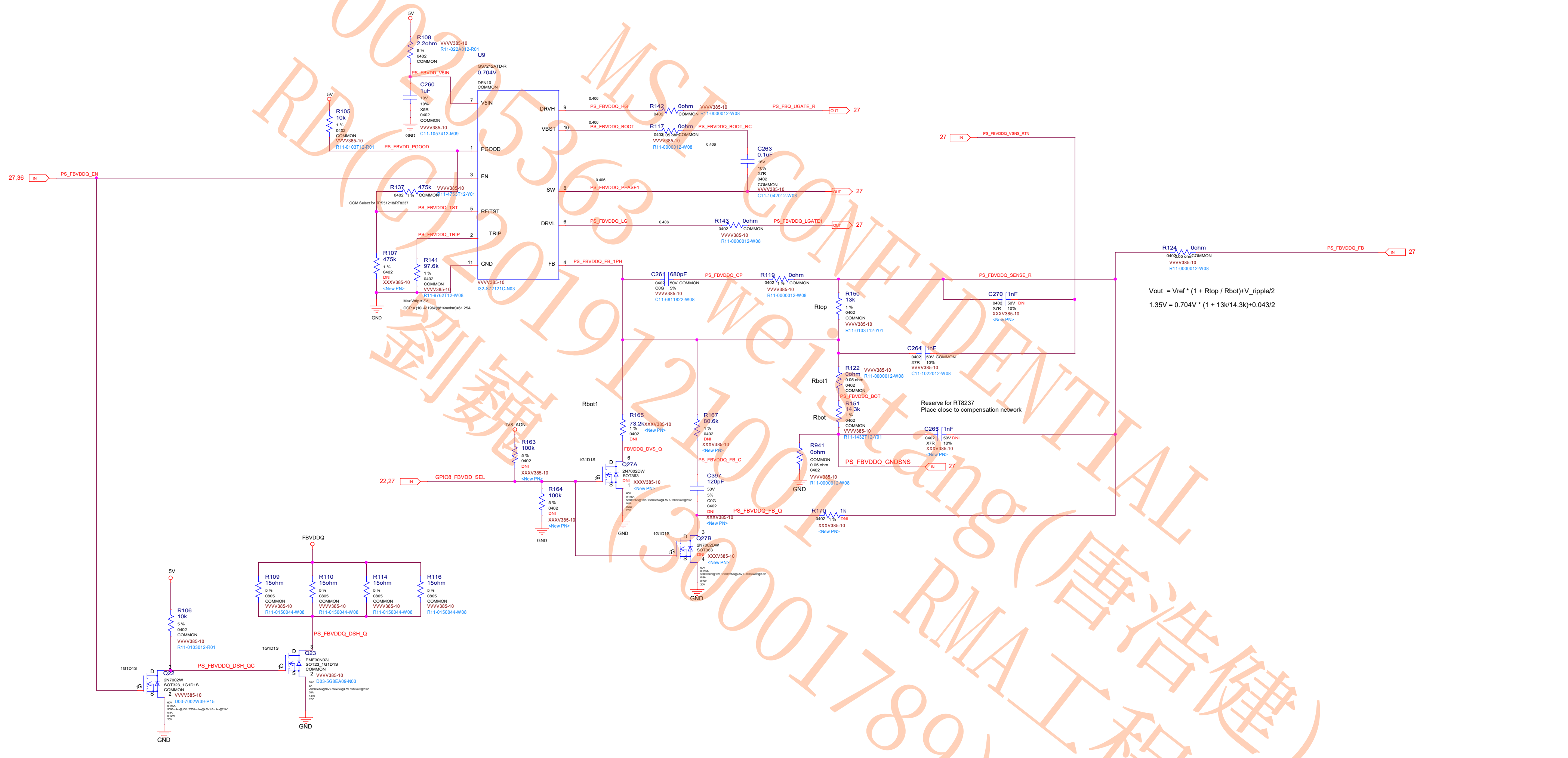
Page28: PS: FBVDDQ PH2





MSI	MICRO-STAR INT'L CO.,LTD	
	MS-V385	
Size: Custom	Document Description: PS: FBVDDQ PH2	Rev: 1.0
Date: Tuesday, October 01, 2019	Sheet 28 of 41	

Page29: PS: FBVDDQ



U9
G5721ATD-R
0.704V
DFN10
COMMON
VSIN
DRVH
VBST
PGOOD
EN
SW
RF/TST
TRIP
DRVL
GND
FB
R108 2.2ohm
C260 1uF
R105 10k
R137 475k
R107 475k
R141 97.6k
R142 0ohm
R117 0ohm
C263 0.1uF
R143 0ohm
R124 0ohm
R119 0ohm
C261 680pF
R150 13k
C270 1nF
C264 1nF
R122 0ohm
R151 14.3k
C265 1nF
R941 0ohm
R165 73.2k
R167 80.6k
R163 100k
R164 100k
C397 120pF
R170 1k
Q27A 2N7002DW
Q27B 2N7002DW
R109 150hm
R110 150hm
R114 150hm
R116 150hm
R106 10k
Q22 2N7002W
Q23 EMF30N02J
PS_FBVDDQ_EN
PS_FBVDDQ_PGOOD
PS_FBVDD_VSIN
PS_FBVDDQ_TST
PS_FBVDDQ_TRIP
PS_FBVDDQ_HG
PS_FBQ_UGATE_R
PS_FBVDDQ_BOOT
PS_FBVDDQ_BOOT_RC
PS_FBVDDQ_PHASE1
PS_FBVDDQ_LG
PS_FBVDDQ_LGATE1
PS_FBVDDQ_FB_1PH
PS_FBVDDQ_CP
PS_FBVDDQ_SENSE_R
PS_FBVDDQ_FB
PS_FBVDDQ_VSNS_RTN
PS_FBVDDQ_BOT
PS_FBVDDQ_GNDSNS
FBVDDQ_DVS_Q
PS_FBVDDQ_FB_C
PS_FBVDDQ_FB_Q
GPIO8_FBVDD_SEL
PS_FBVDDQ_DSH_Q
PS_FBVDDQ_DSH_QC
FBVDDQ
5V
1V8_AON
GND
Rtop
Rbot1
Rbot
CCM Select for TPS51218/RT8237
Max Vtrip = 3V
OCP = (10uA*196k)/(8*4mohm)=61.25A
Reserve for RT8237
Place close to compensation network
Vout = Vref * (1 + Rtop / Rbot)+V_ripple/2
1.35V = 0.704V * (1 + 13k/14.3k)+0.043/2

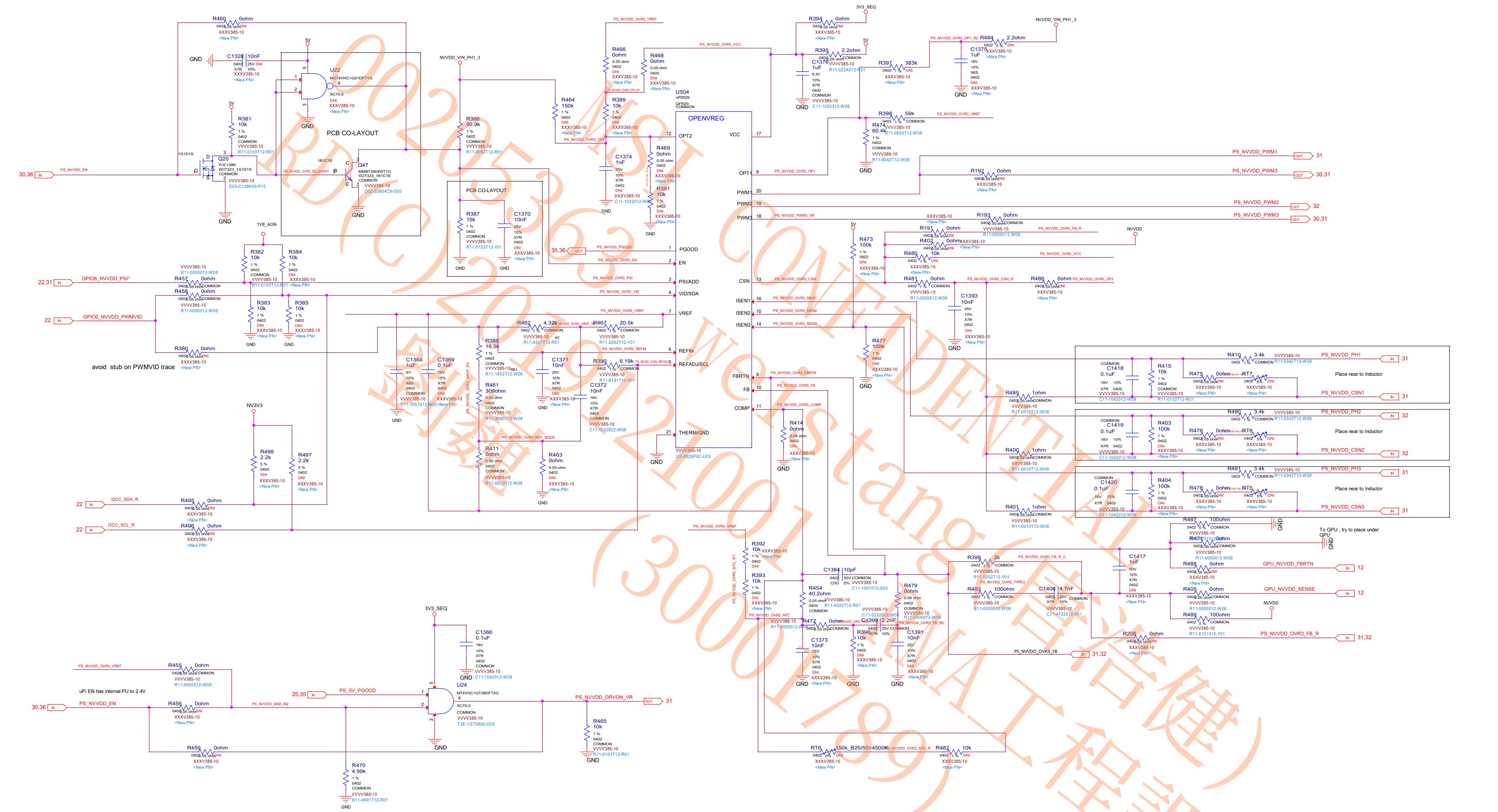
MICRO-STAR INT'L CO.,LTD

MS-V385

Size	Document Description	Rev
Custom	PS: FBVDDQ	1.0

Date: Friday, September 27, 2019 Sheet 29 of 41

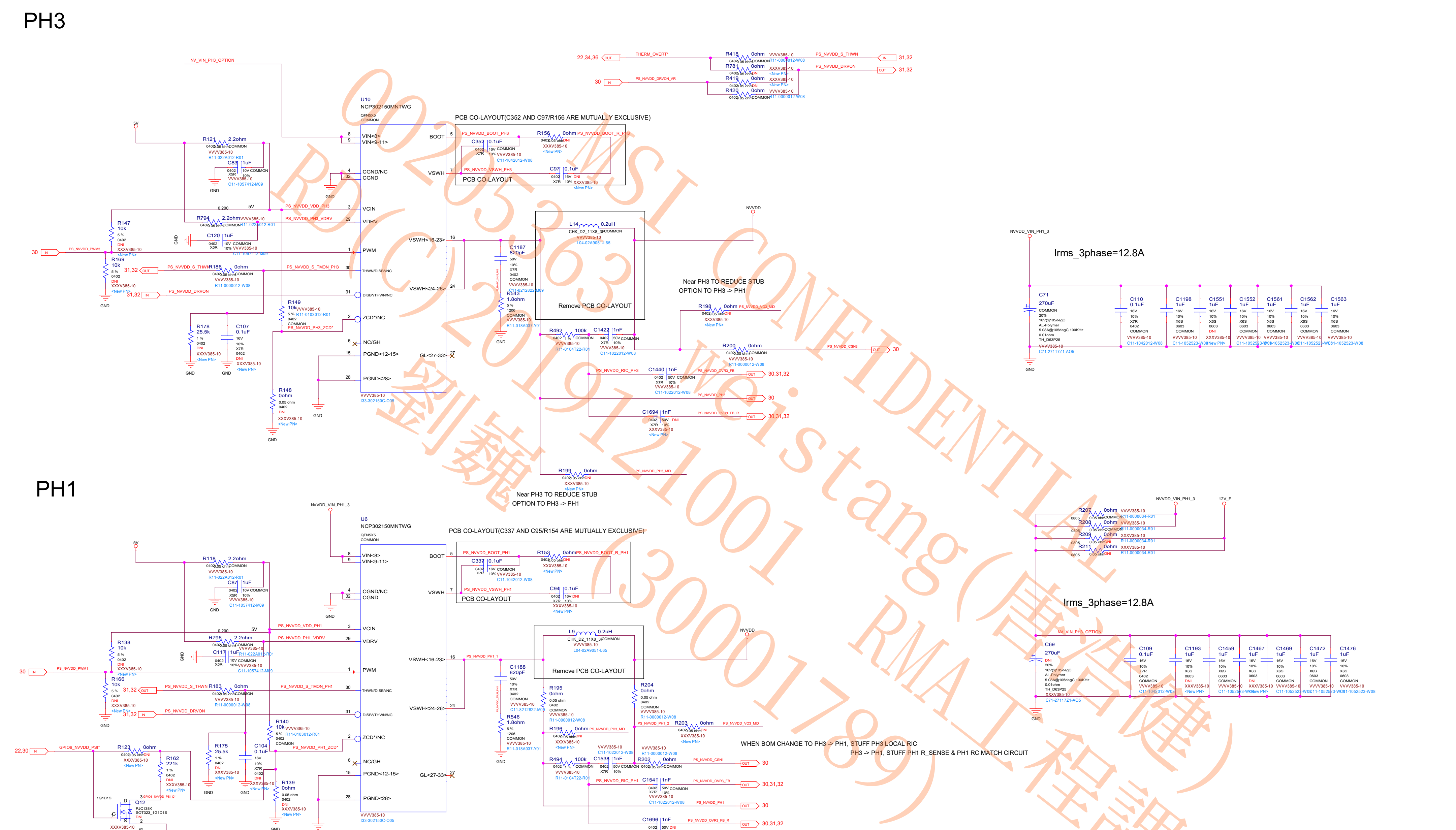
Page30: PS: NVVDD CTR



PCB CO-LAYOUT
U22
Q20
Q47
U504
uP9529
OPENVREG
OPT2
VCC
OPT1
PWM1
PWM2
PWM3
PGOOD
EN
PSI/ADD
VID/SDA
VREF
REFIN
REFADJ/SCL
CSN
ISEN1
ISEN2
ISEN3
FBRTN
FB
COMP
THERM/GND
PS_NVVDD_EN
GPIO6_NVVDD_PSI*
GPIO0_NVVDD_PWMVID
avoid stub on PWMVID trace
I2CC_SDA_R
I2CC_SCL_R
PS_NVVDD_PWM1
PS_NVVDD_PWM3
PS_NVVDD_PWM2
PS_NVVDD_PH1
PS_NVVDD_CSN1
PS_NVVDD_PH2
PS_NVVDD_CSN2
PS_NVVDD_PH3
PS_NVVDD_CSN3
Place near to Inductor
To GPU , try to place under GPU
GPU_NVVDD_FBRTN
GPU_NVVDD_SENSE
PS_NVVDD_OVR3_FB_R
uPi EN has internal PU to 2.4V
PS_5V_PGOOD
PS_NVVDD_DRVON_VR
U24
3V3_SEQ
NVVDD_VIN_PH1_3
NVVDD
GND

MICRO-STAR INT'L CO.,LTD		
MS-V385		
Size: Custom	Document Description: PS: NVVDD CTR	Rev: 1.0
Date: Tuesday, October 01, 2019	Sheet 30 of 41	

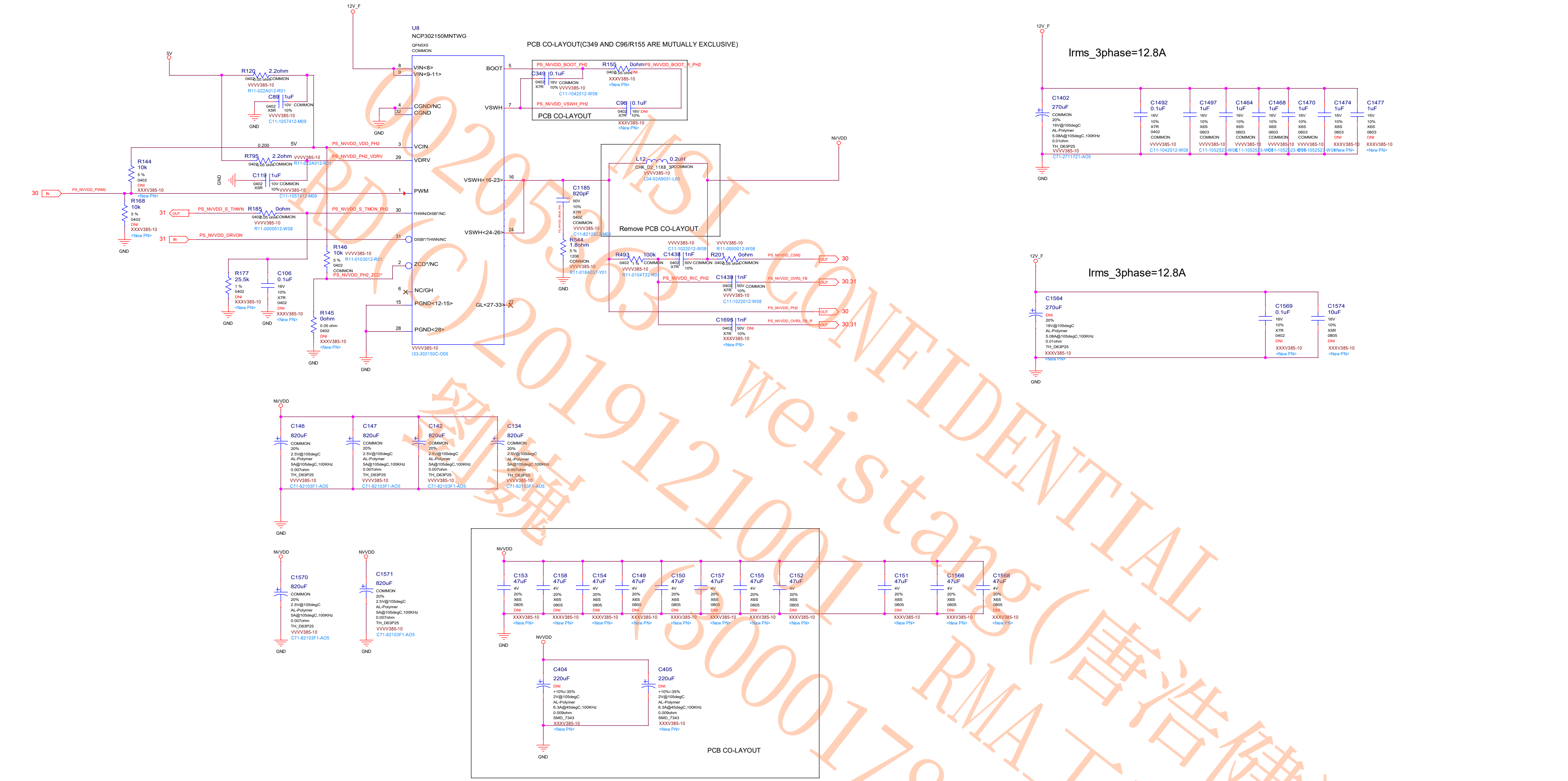
Page31: PS: NVVDD PH1&3



PH3
PH1
U10
NCP302150MNTWG
U6
NCP302150MNTWG
PCB CO-LAYOUT(C352 AND C97/R156 ARE MUTUALLY EXCLUSIVE)
PCB CO-LAYOUT(C337 AND C95/R154 ARE MUTUALLY EXCLUSIVE)
PCB CO-LAYOUT
Remove PCB CO-LAYOUT
Near PH3 TO REDUCE STUB
OPTION TO PH3 -> PH1
Irms_3phase=12.8A
WHEN BOM CHANGE TO PH3 -> PH1, STUFF PH3 LOCAL RIC
PH3 -> PH1, STUFF PH1 R_SENSE & PH1 RC MATCH CIRCUIT
VIN<8>
VIN<9-11>
BOOT
CGND/NC
CGND
VSWH
VCIN
VDRV
PWM
THWN/DISB*/NC
DISB*/THWN/NC
ZCD*/NC
NC/GH
PGND<12-15>
PGND<28>
GL<27-33>
VSWH<16-23>
VSWH<24-26>
NVVDD
NVVDD_VIN_PH1_3
NV_VIN_PH3_OPTION
12V_F
5V
GND
PS_NVVDD_PWM3
PS_NVVDD_PWM1
PS_NVVDD_S_THWN
PS_NVVDD_DRVON
PS_NVVDD_DRVON_VR
THERM_OVERT*
PS_NVVDD_CSN3
PS_NVVDD_CSN1
PS_NVVDD_OVR3_FB
PS_NVVDD_PH3
PS_NVVDD_PH1
L14 0.2uH
L9 0.2uH
C71 270uF
C69 270uF
Q12 PJC138K

MICRO-STAR INT'L CO.,LTD		
MS-V385		
Size: Custom	Document Description: PS: NVVDD PH1&3	Rev: 1.0
Date: Friday, September 27, 2019		Sheet 31 of 41

Page32: PS: NVVDD PH2



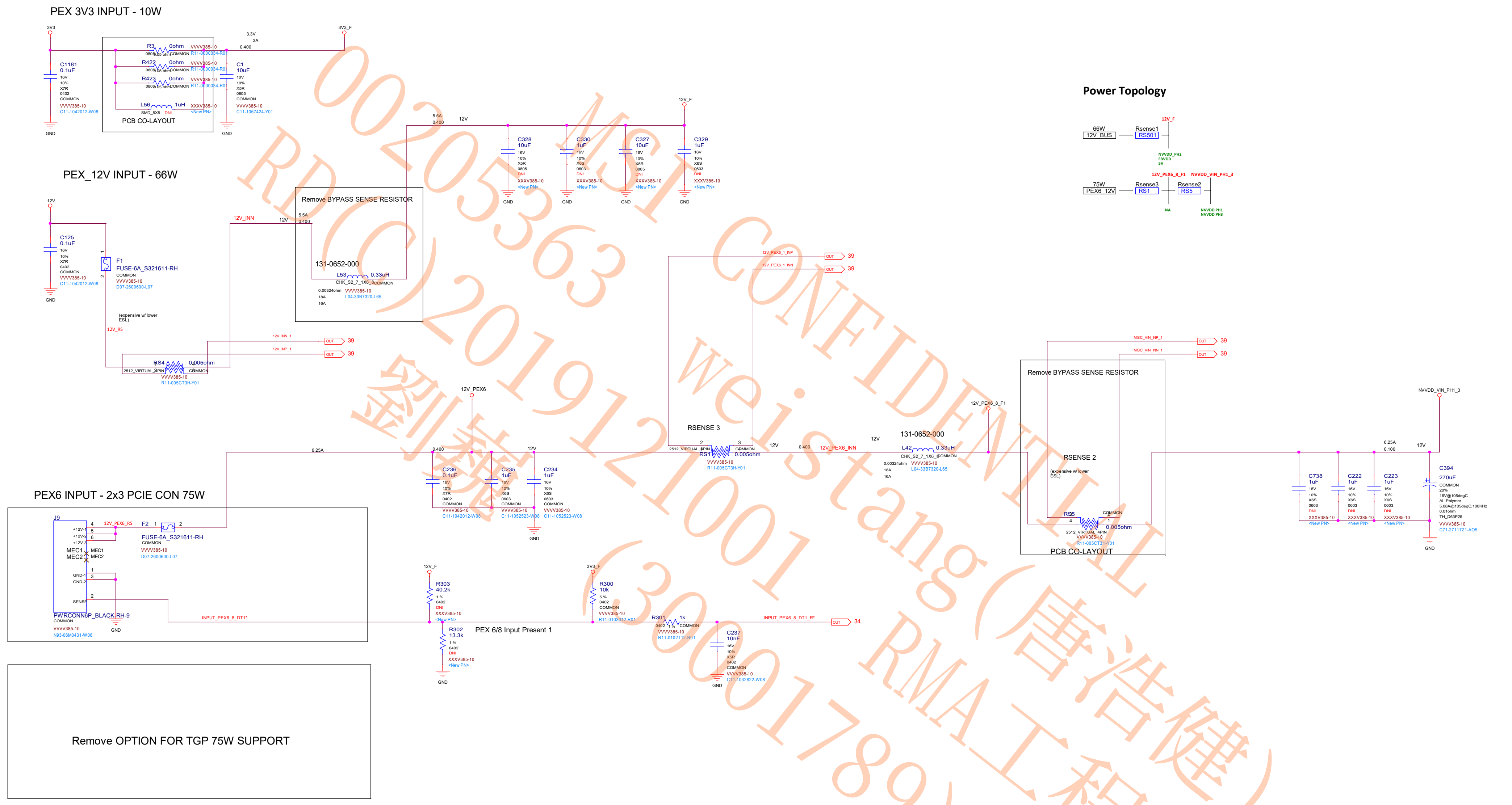
MICRO-STAR INT'L CO.,LTD

MS-V385

Size	Document Description	Rev
Custom	PS: NVVDD PH2	1.0

Date: Friday, September 27, 2019 Sheet 32 of 41

Page33: PS: Inputs, Filtering, and Monitoring



MICRO-STAR INT'L CO.,LTD

MS-V385

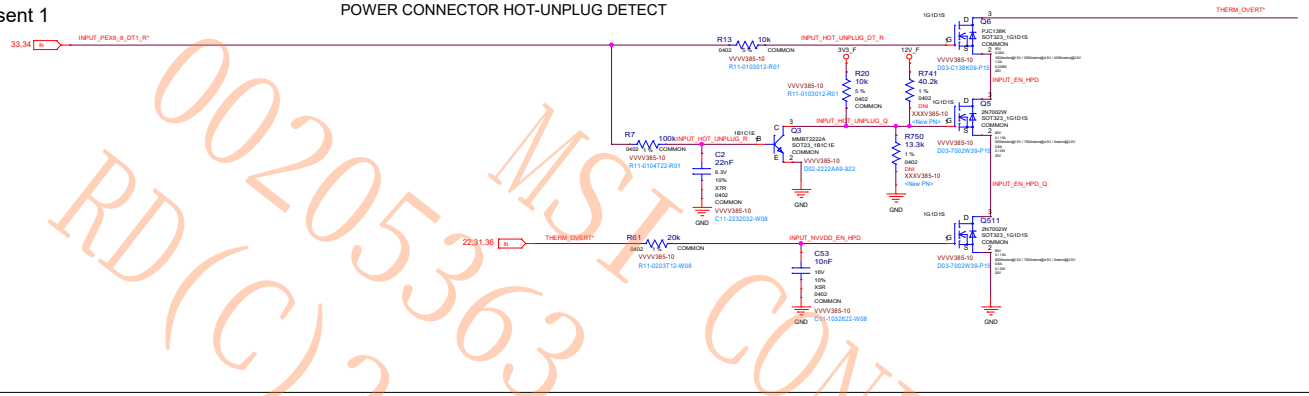
Size	Document Description	Rev
Custom	PS: Inputs, Filtering, and Monitoring	1.0

Date: Tuesday, October 01, 2019 Sheet 33 of 41

Page34: PS: HOT-UNPLUG, UNDER POWER BOOT, CURRENT STEERING

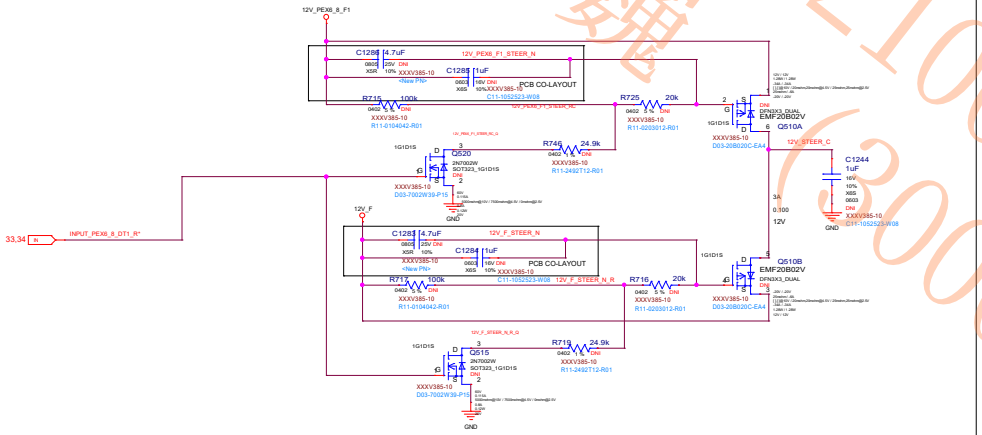
PEX Input Present 1

POWER CONNECTOR HOT-UNPLUG DETECT

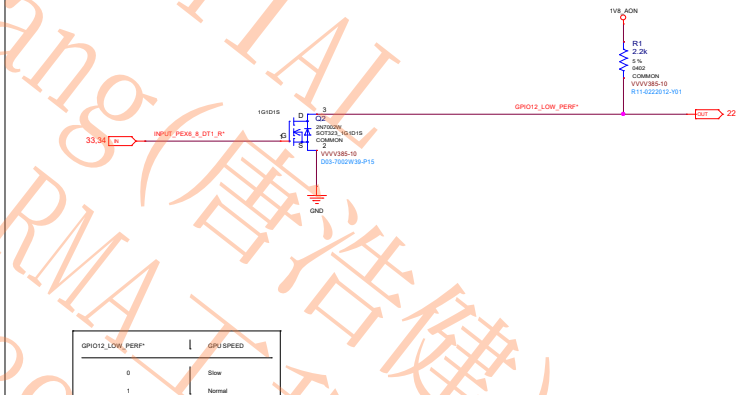


12V CURRENT STEERING (UNDER POWER BOOT):

GUIDES CURRENT FROM PEX EDGE TO PEX 6 PIN INPUT AREA



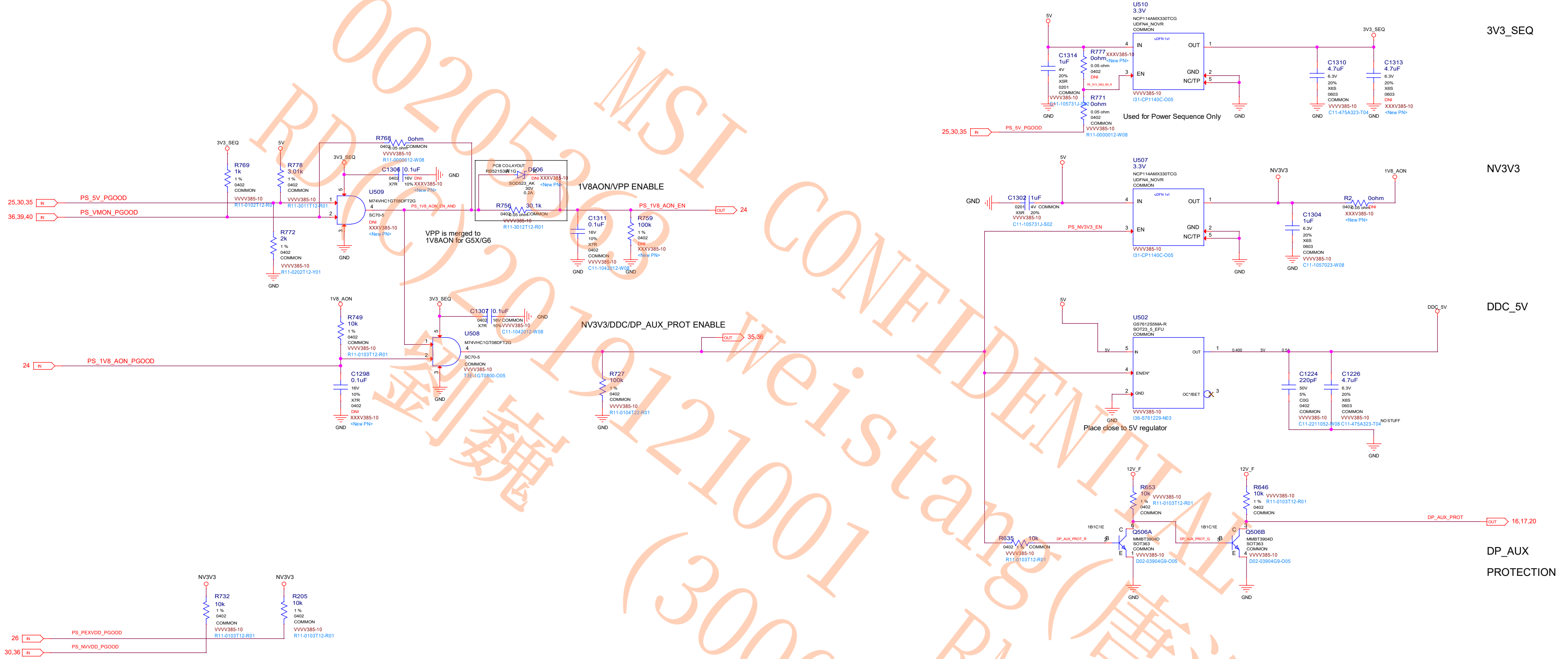
PEX Input - Power Level/PSI* Control



GPIO12_LOW_PERF*	GPU SPEED
0	Slow
1	Normal

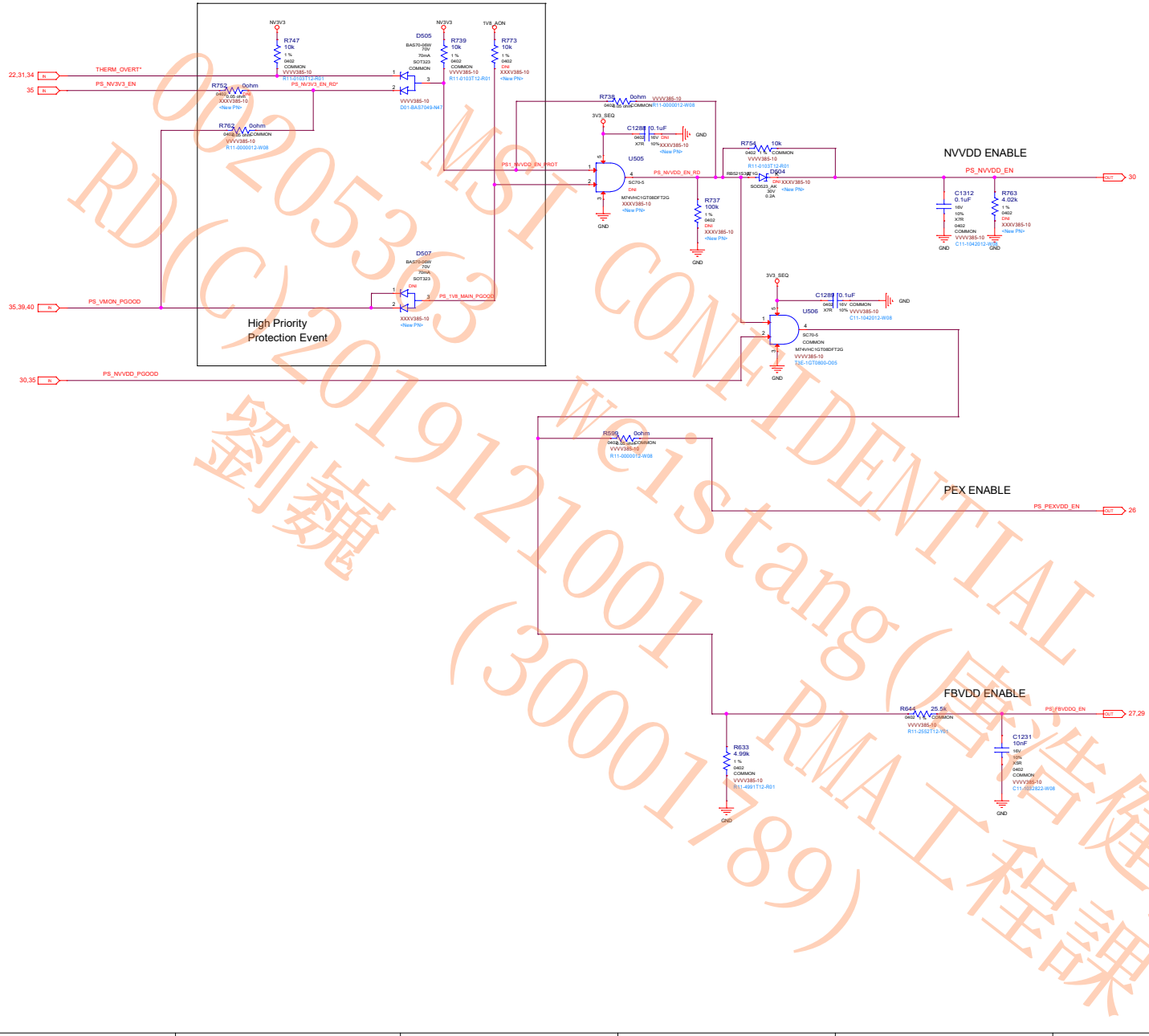
MICRO-STAR INT'L CO.,LTD		
MS-V385		
Size: Custom	Document Description: PS: HOT-UNPLUG, UNDER POWER BOOT, CURRENT STEERING	Rev: 1.0
Date: Tuesday, October 01, 2019	Sheet 34 of 41	

Page35: SEQ:1V8_AON, 3V3_SEQ, NV3V3, DDC_5V, DP_AUX_PROT



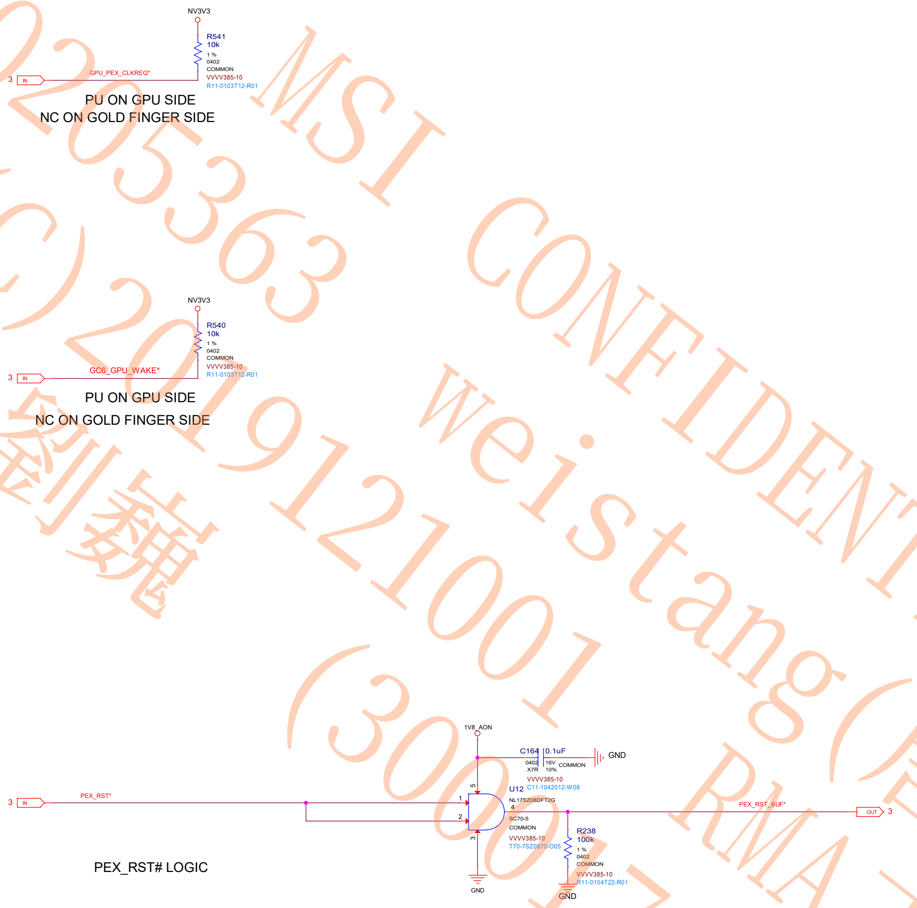
MICRO-STAR INT'L CO.,LTD		
MS-V385		
Size: Custom	Document Description: SEQ:1V8_AON, 3V3_SEQ, NV3V3, DDC_5V, DP_AUX_PROT	Rev: 1.0
Date: Tuesday, October 01, 2019	Sheet 35 of 41	

Page36: SEQ:NVVDD, PEX, FBVDDQ ENABLE



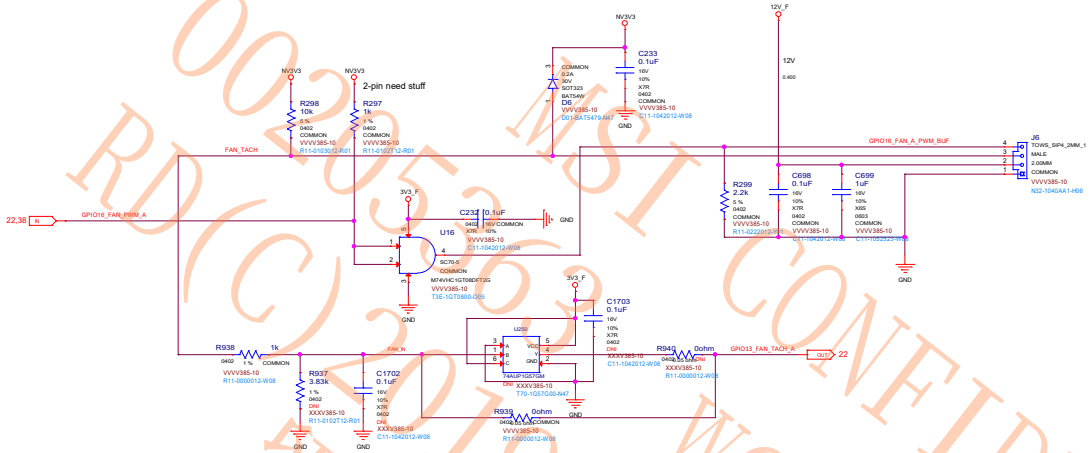
MICRO-STAR INT'L CO.,LTD			
MS-V385			
Size: Custom	Document Description: SEQ:NVVDD, PEX, FBVDDQ ENABLE		Rev: 1.0
Date: Tuesday, October 01, 2019	Sheet 36 of 41		

Page37: SEQ:MISC



MICRO-STAR INT'L CO.,LTD	
MS-V385	
Size: Custom	Document Description: SEQ:MISC
Rev: 1.0	
Date: Friday, September 27, 2019	Sheet 37 of 41

4-PIN FAN



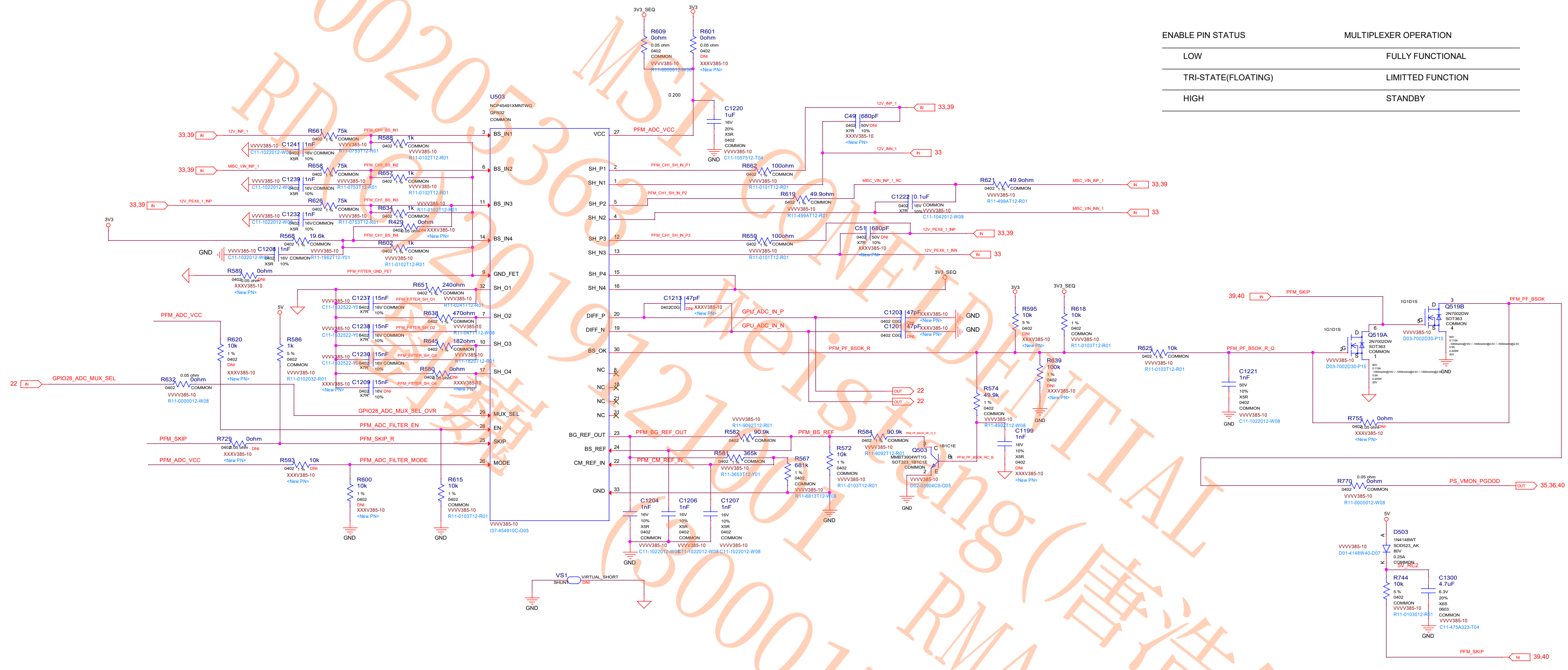
Remove 2-PIN FAN

MSI	MICRO-STAR INT'L CO.,LTD		
	MS-V385		
Size: Custom	Document Description: FAN		Rev: 1.0
Date: Friday, September 27, 2019		Sheet 38 of 41	

Page39: 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



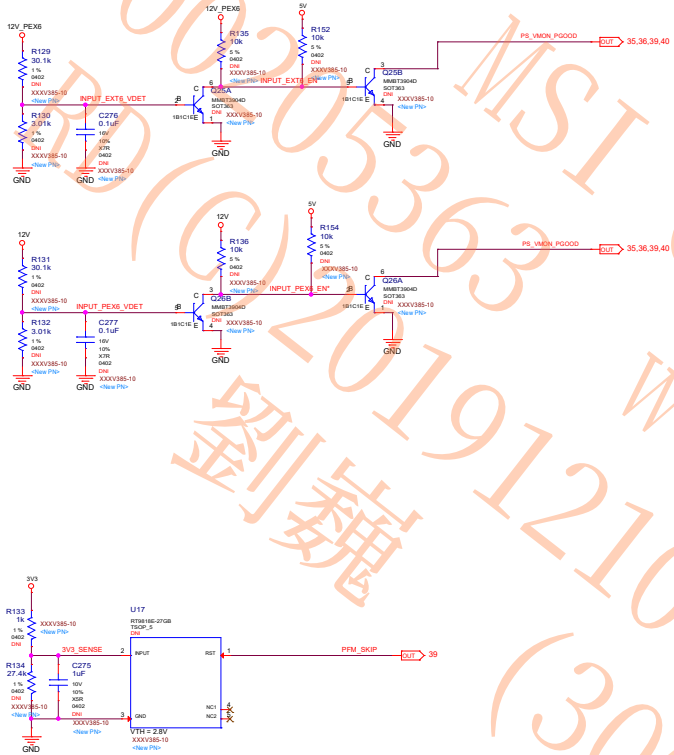
MICRO-STAR INT'L CO.,LTD

MS-V385

Size	Document Description	Rev
Custom	OVRM_PWR SENSE	1.0

Date: Tuesday, October 01, 2019 Sheet 39 of 41

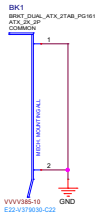
PAGE40:SEQUENCE:Voltage Monitor



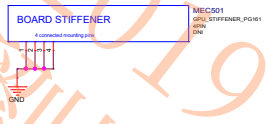
Route the trace to PEX Golden Finger

MSI	MICRO-STAR INT'L CO.,LTD	
	MS-V385	
Size: Custom	Document Description: SEQUENCE:Voltage Monitor	Rev: 1.0
Date: Friday, September 27, 2019	Sheet 40 of 41	

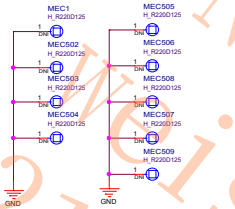
Bracket:



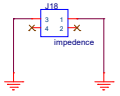
BACK STIFFENER:

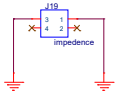


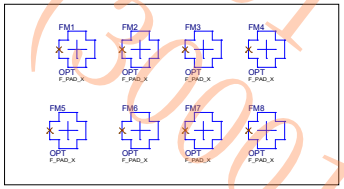
MOUNTING HOLES FOR HS:



Screw







MSI	MICRO-STAR INT'L CO.,LTD	
	MS-V385	
Size: Custom	Document Description: MECH	Rev: 1.0
Date: Friday, September 27, 2019	Sheet 41 of 41	