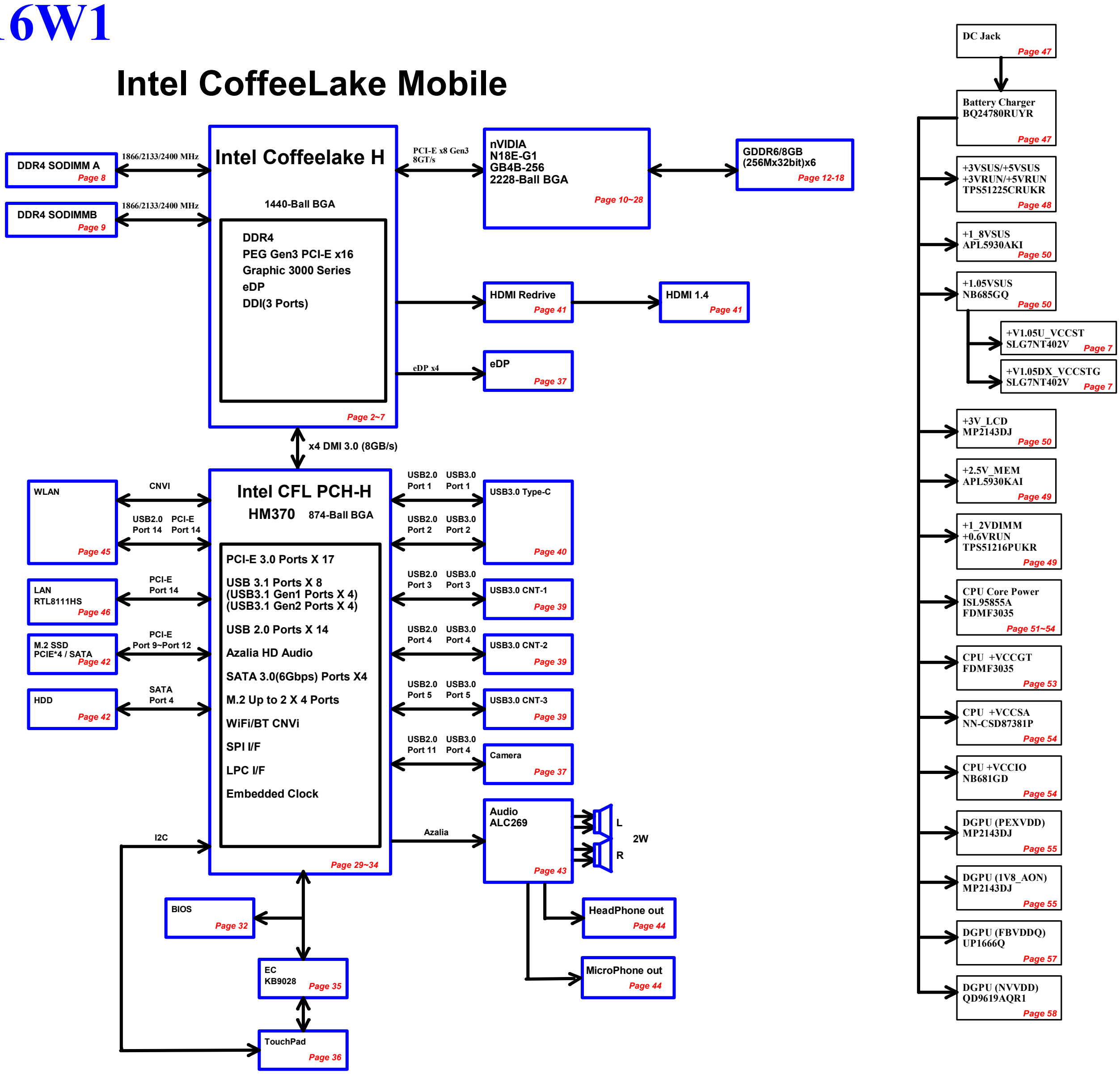
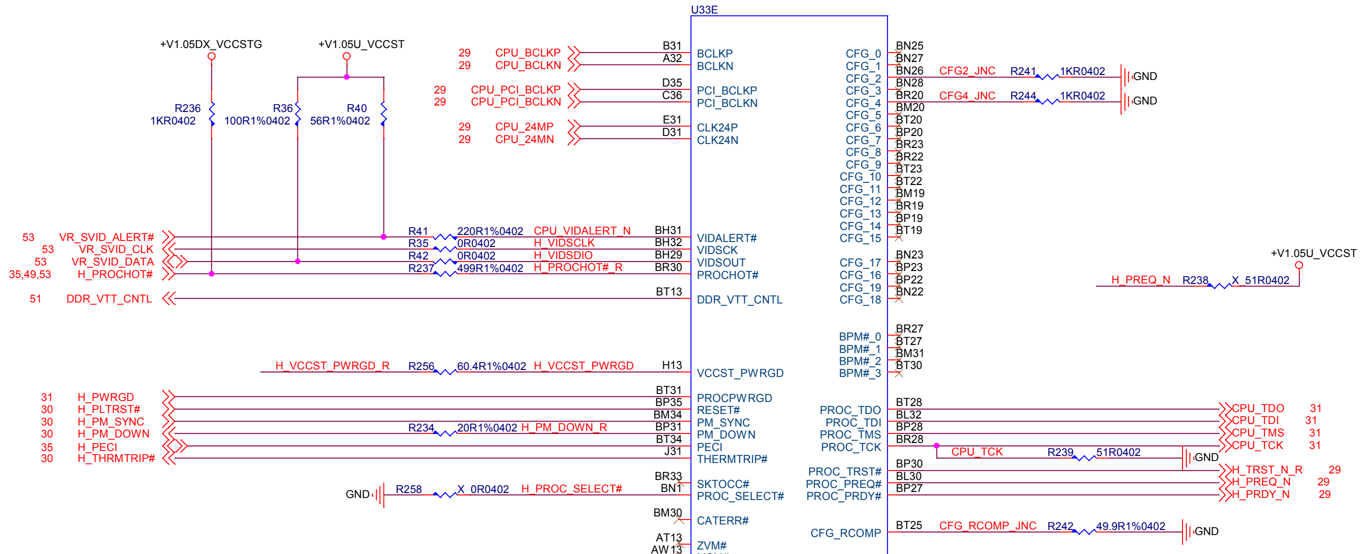
MS-16W1

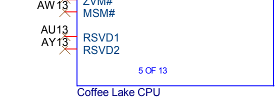
Ver:10 Intel CoffeeLake Mobile



MICRO-STAR INT'L CO.,LTD.		
Title: Block Diagram		
Size: Custom	Document Number: MS-16W1	Rev: 10
Date:	Sheet 1 of 66	



PROC SELECT	
H_PROC_SELECT#	Float = SKL GND = CNL



Stall reset sequence after PCU PLL lock until de-asserted	
CFG0	1 = (Default) Normal Operation; No stall 0 = Stall

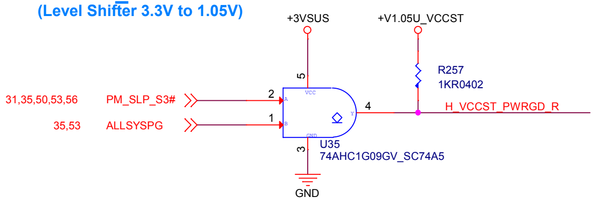
PCIE Express * Static X16 Lane Numbering Reversal	
CFG2	1 = Normal operation 0 = Lane numbers reversed.

eDP Enable	
CFG4	1 = Disabled 0 = Enabled

PCI Express* Bifurcation	
CFG[6:5]	00 = 1 x8, 2 x4 PCI Express* 01 = reserved 10 = 2 x8 PCI Express* 11 = 1 x16 PCI Express*

PEG DEFER TRAINING	
CFG7	1: (default) PEG Train immediately following RESET# de assertion. 0: PEG Wait for BIOS for training

VCCST_PWRGD
(Level Shifter 3.3V to 1.05V)



I7-9750H

I7_9750

A0D-9750H05-I06

X_I7-9750

I5-9300H

I5-9300

A0C-9300H05-I06

X_I5-9300

MICRO-STAR INT'L CO.,LTD.		
Title: Coffeelake(HOST)		
Size: Custom	Document Number: MS-16W1	Rev: 10
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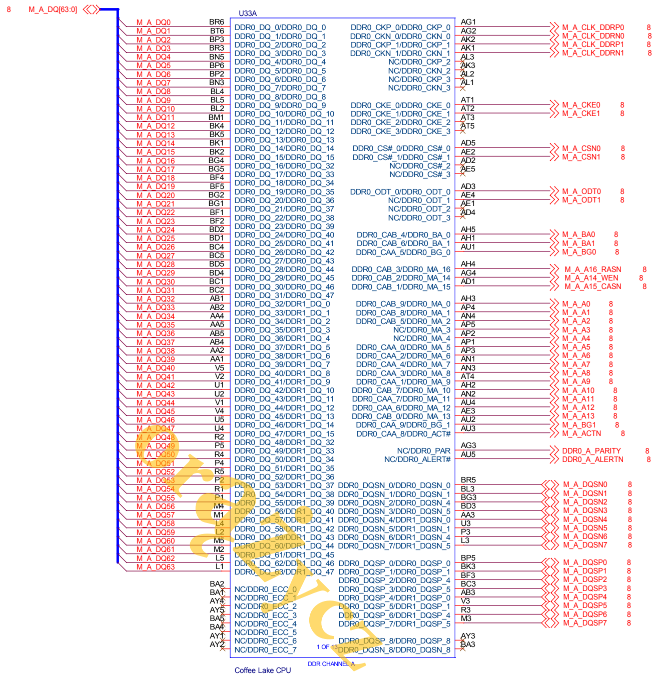
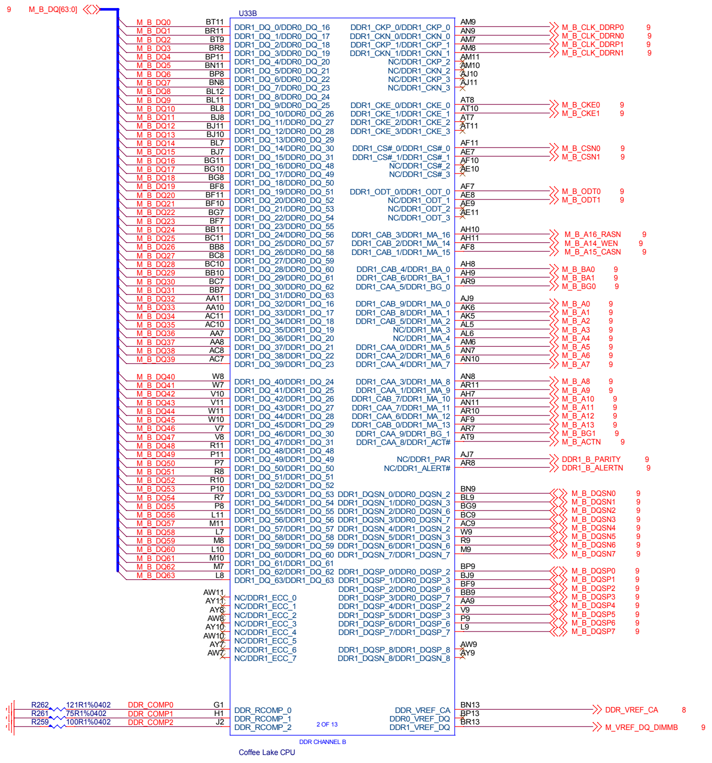
DDR Channel A

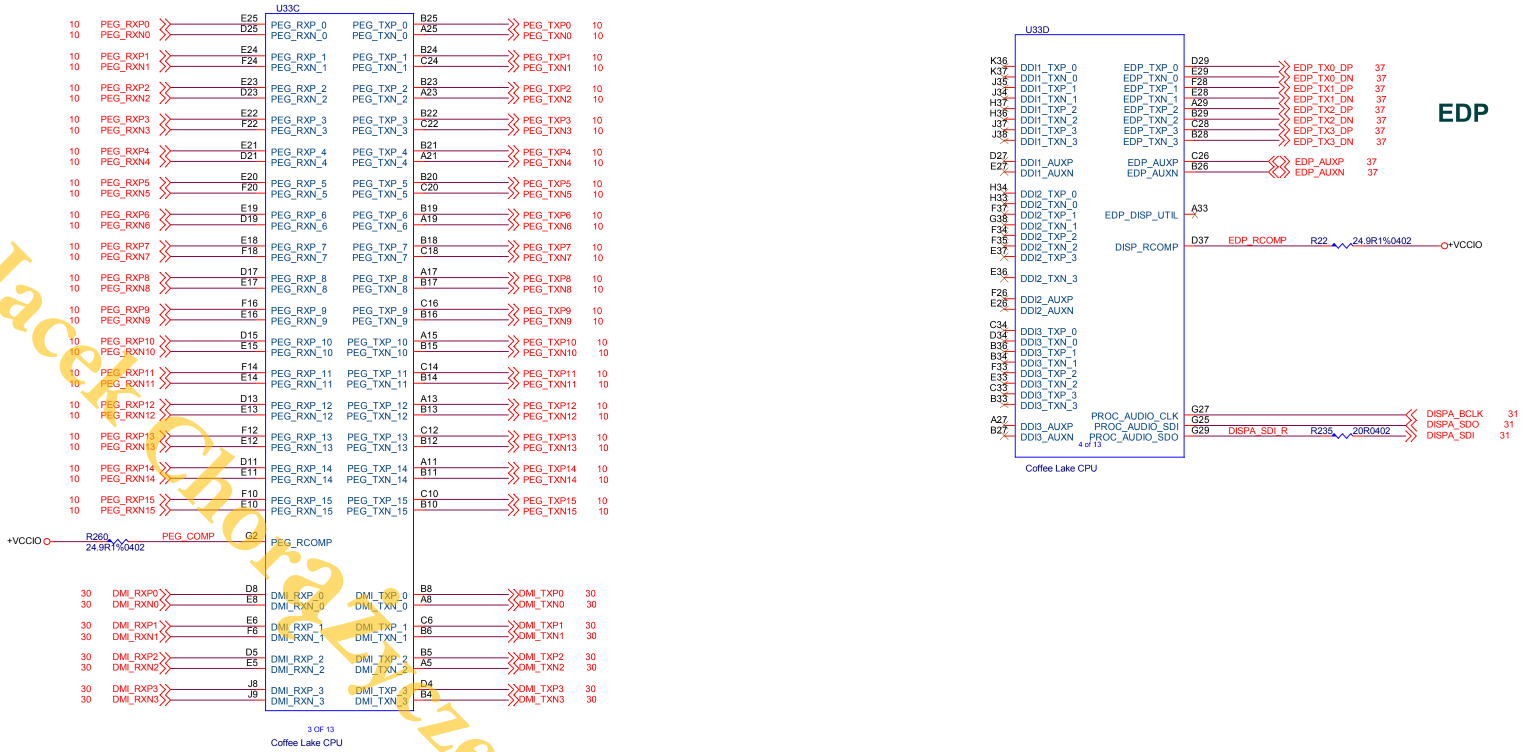


DDR Channel B



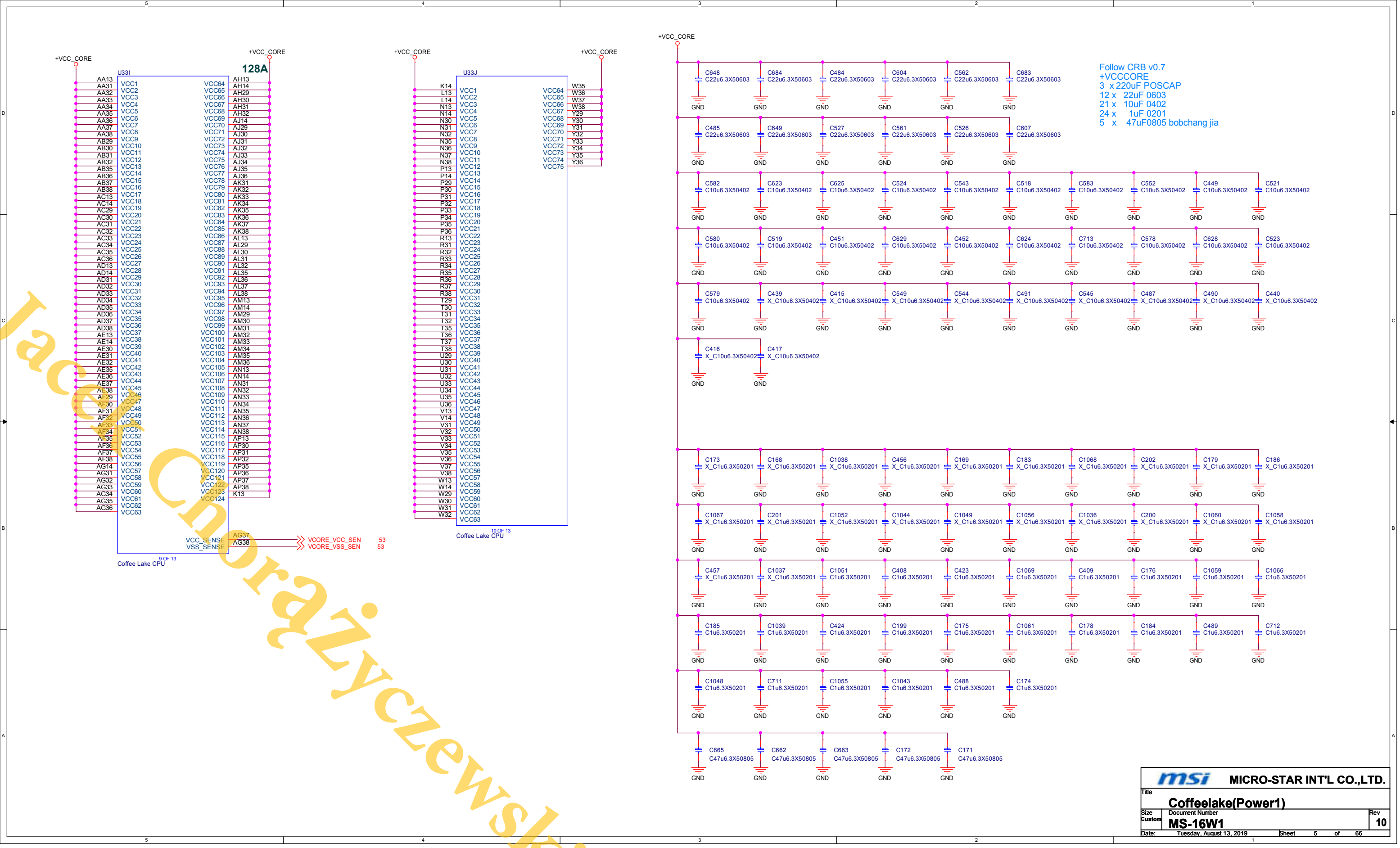
MICRO-STAR INT'L CO.,LTD.

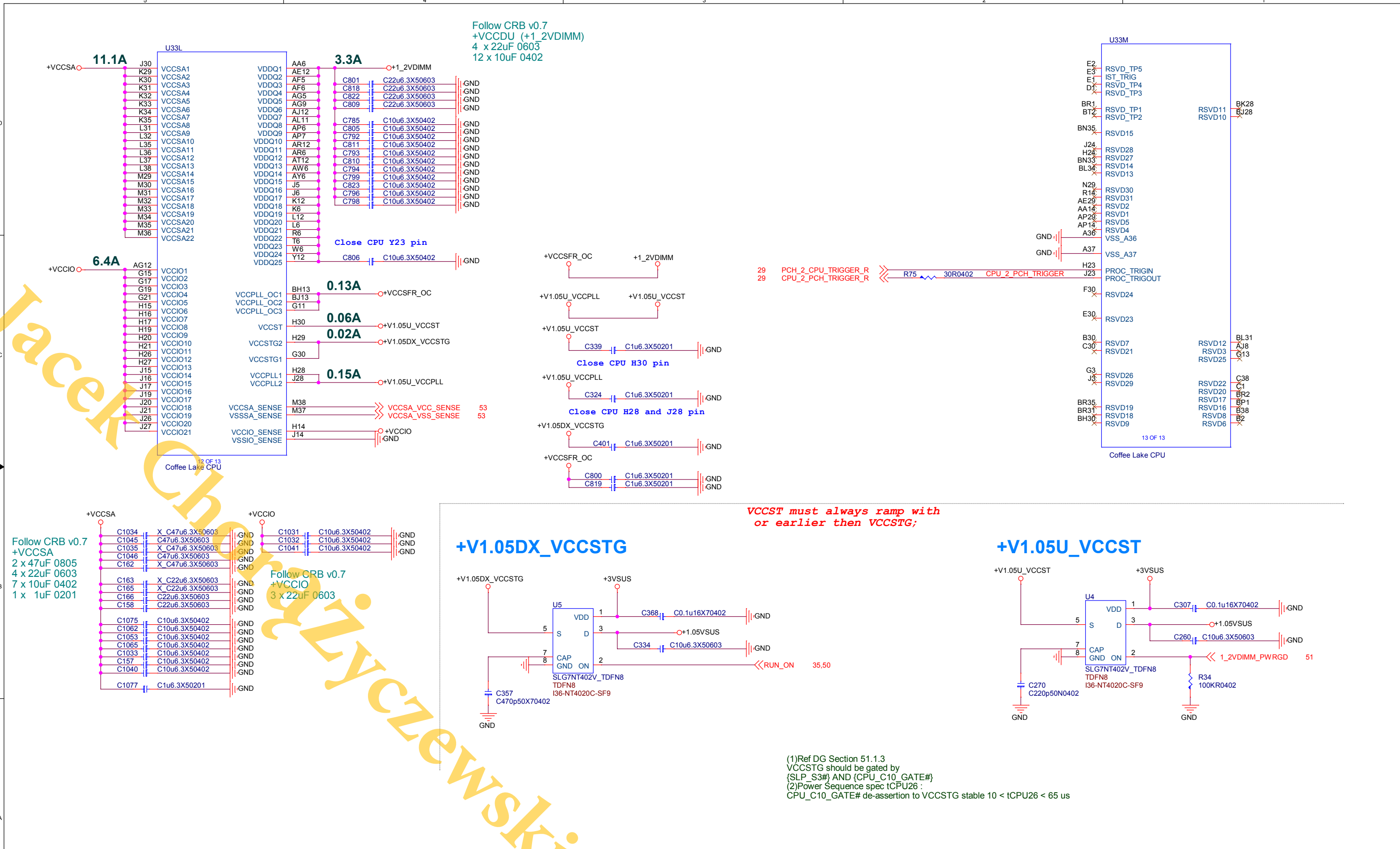
Title	Coffeelake(DDR4)	
Size Custom	Document Number MS-16W1	Rev 10
Date: Tuesday, August 13, 2019	Sheet 3 of 66	



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

Title	Coffeelake(DMI/Display)	
Size Custom	Document Number MS-16W1	Rev 10
Date: Tuesday, August 13, 2019	Sheet 4 of 66	


Follow CRB v0.7
+VCCCORE
3 x 220uF POSCAP
12 x 22uF 0603
21 x 10uF 0402
24 x 1uF 0201
5 x 47uF0805 bobchang jia
128A
+VCC_CORE
VCORE_VCC_SEN
VCORE_VSS_SEN
Coffee Lake CPU
MICRO-STAR INT'L CO.,LTD.
Title
Coffeelake(Power1)
Size
Custom
Document Number
MS-16W1
Rev
10
Date: Tuesday, August 13, 2019
Sheet 5 of 66

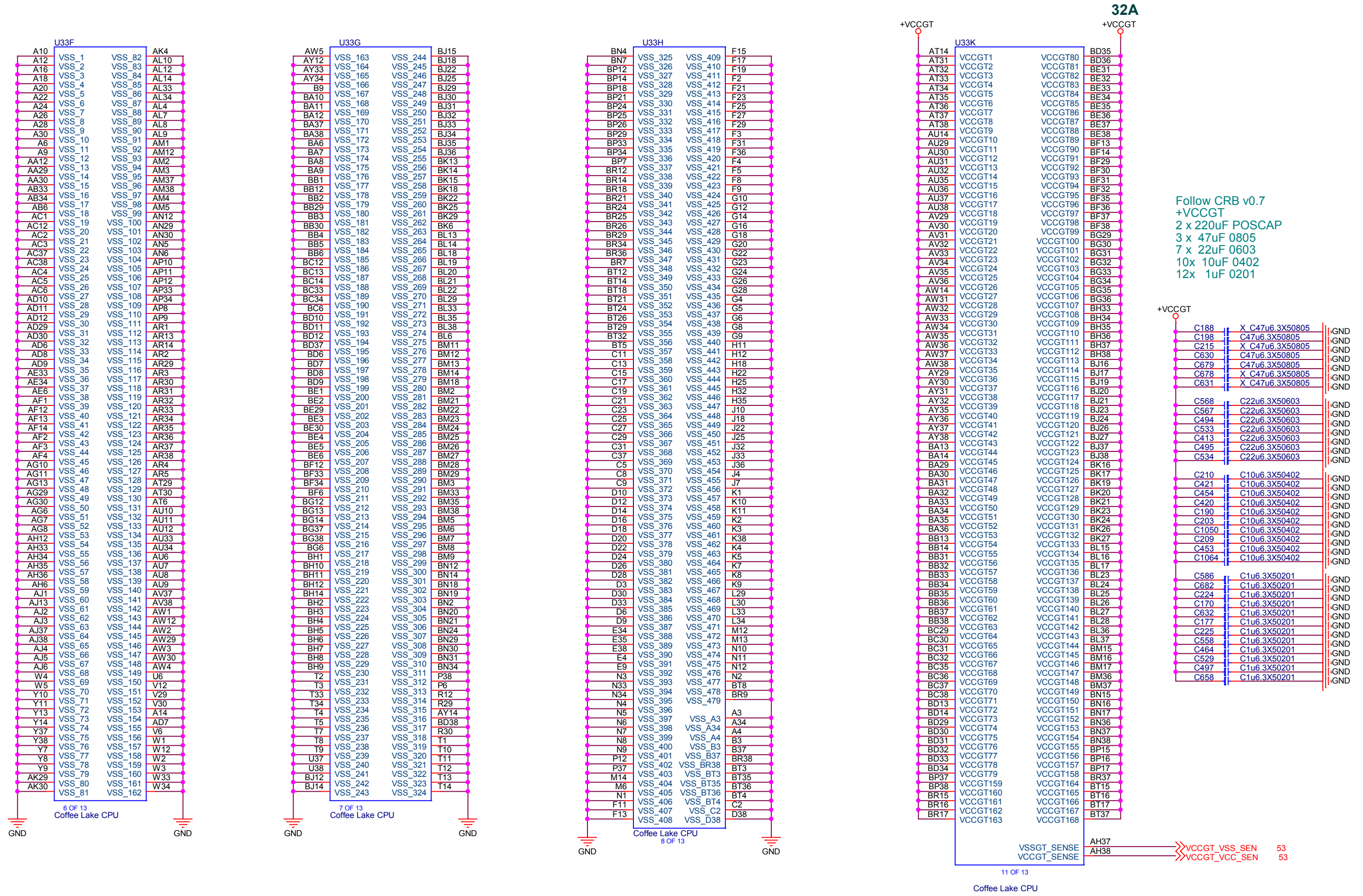


MSI MICRO-STAR INT'L CO.,LTD.

Title: Coffeelake(Power2)

Size: Custom | Document Number: MS-16W1 | Rev: 10

Date: Tuesday, August 13, 2019 | Sheet 6 of 66



msi	MICRO-STAR INT'L CO.,LTD.	
Title	Coffeelake(Power3)	
Size Custom	Document Number MS-16W1	Rev 10
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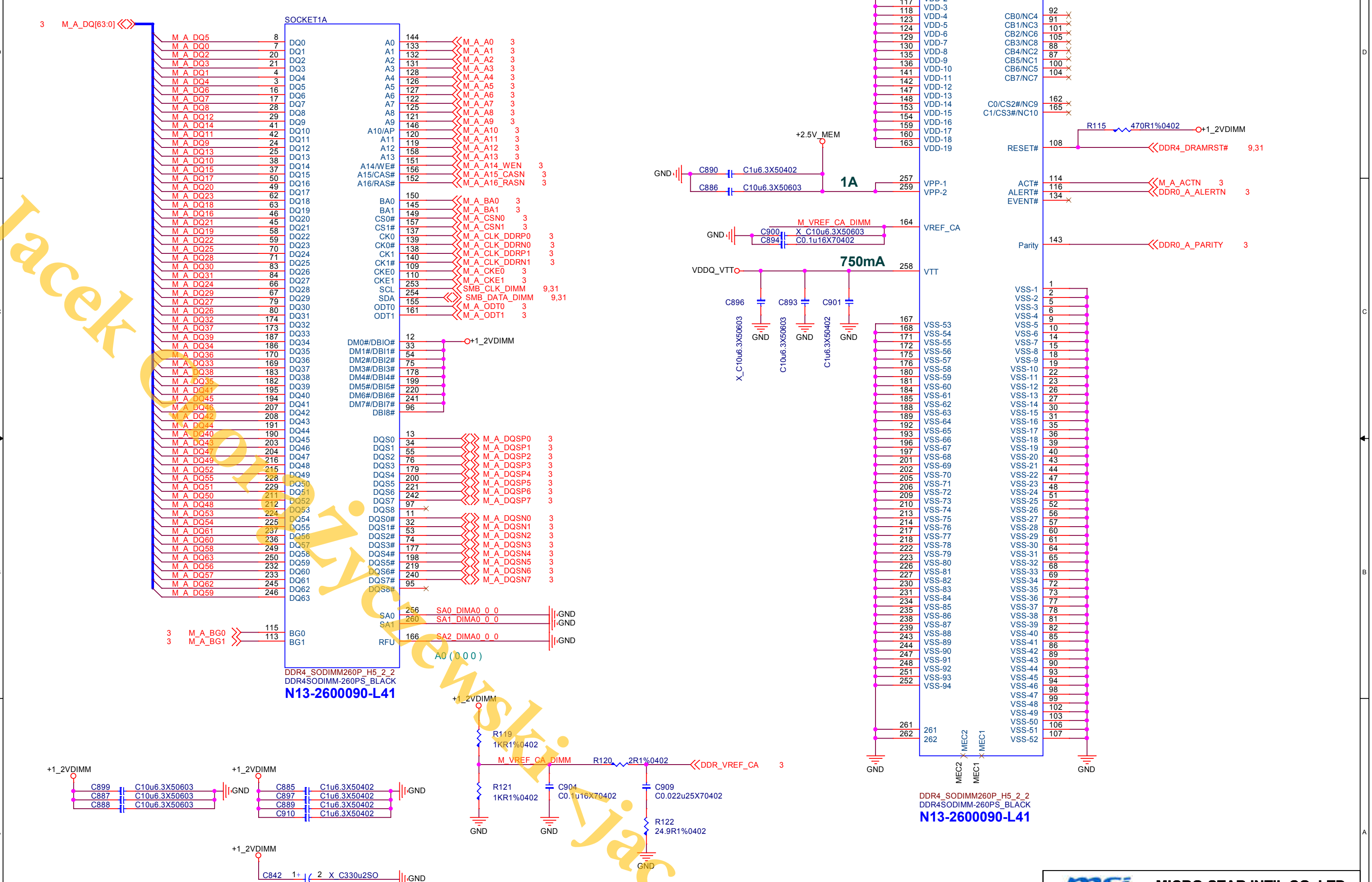
SODIMM_A0 (TOP-Reverse)



MICRO-STAR INT'L CO.,LTD.	
Title	DDR4_SODIMM_A0
Size: Custom	Document Number: MS-16W1
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Date:	Tuesday, August 13, 2019
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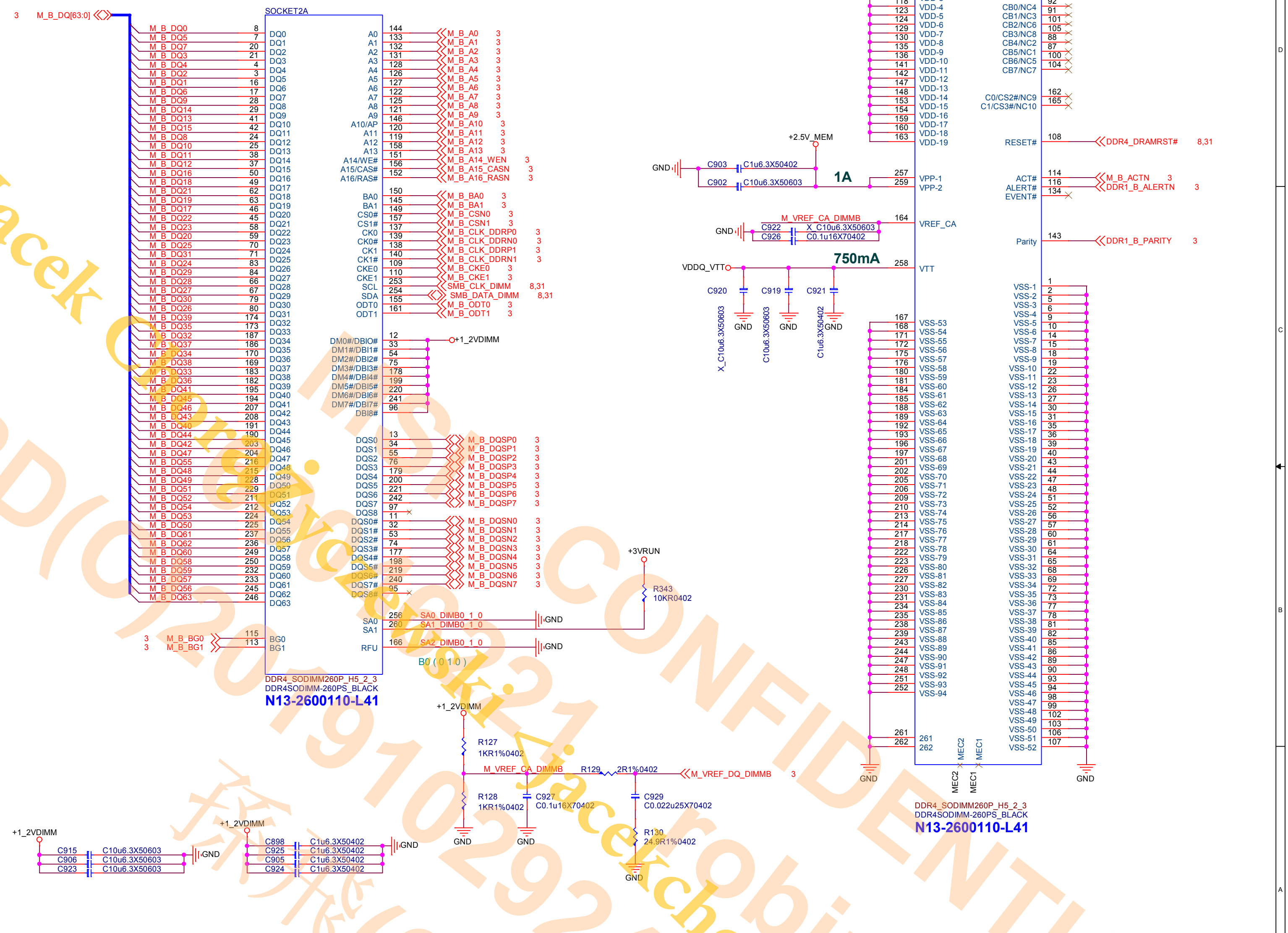
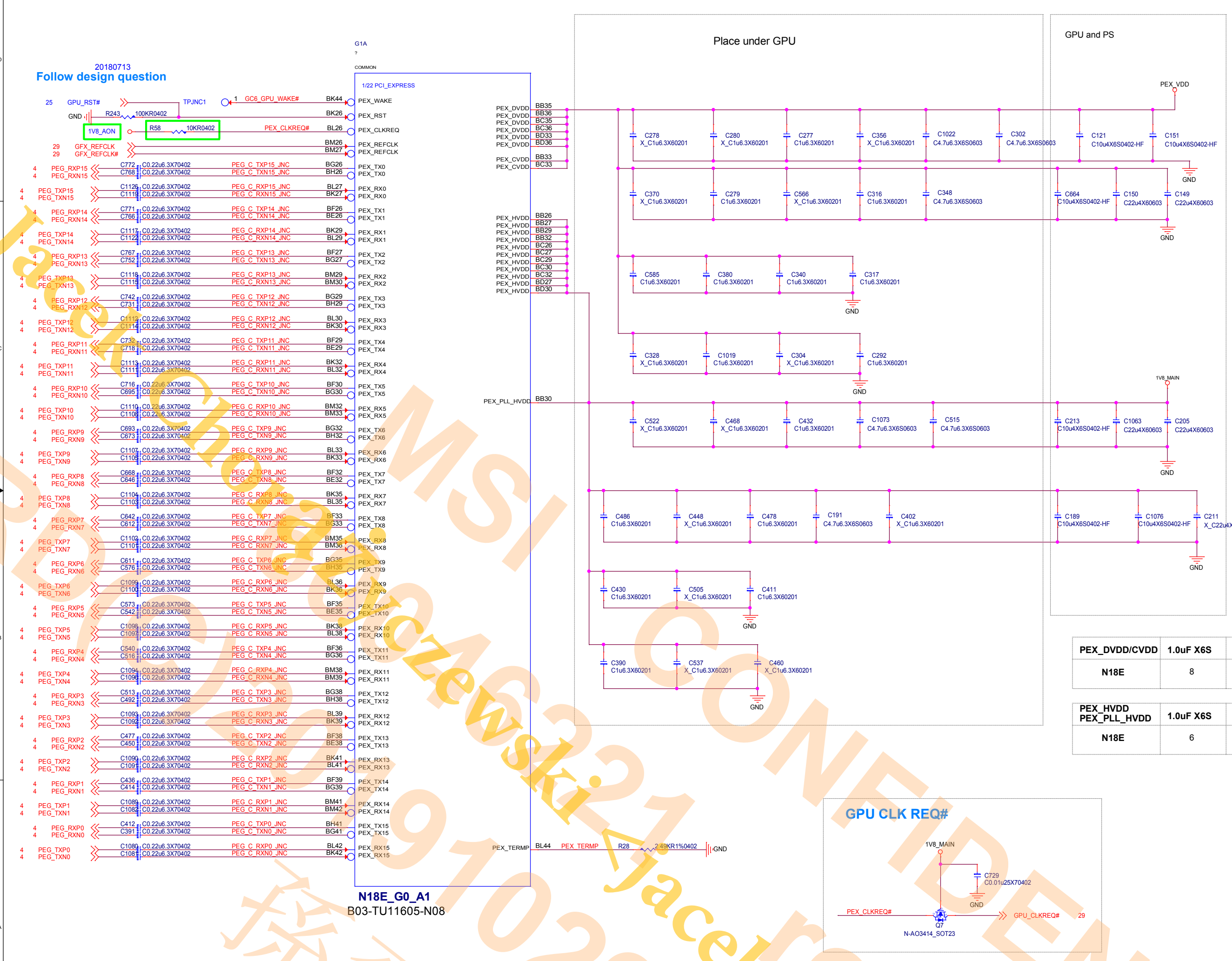
SODIMM_B0 (TOP-Standard)



MICRO-STAR INT'L CO.,LTD.			
Title	DDR4_SODIMM_B0		
Size Custom	Document Number MS-16W1		Rev 10
Date:	Tuesday, August 13, 2019	Sheet 9 of 66	



PEX_DVDD/CVDD	1.0uF X6S	4.7uF X6S	10uF X6S	22uF X5R
N18E	8	3	3	2

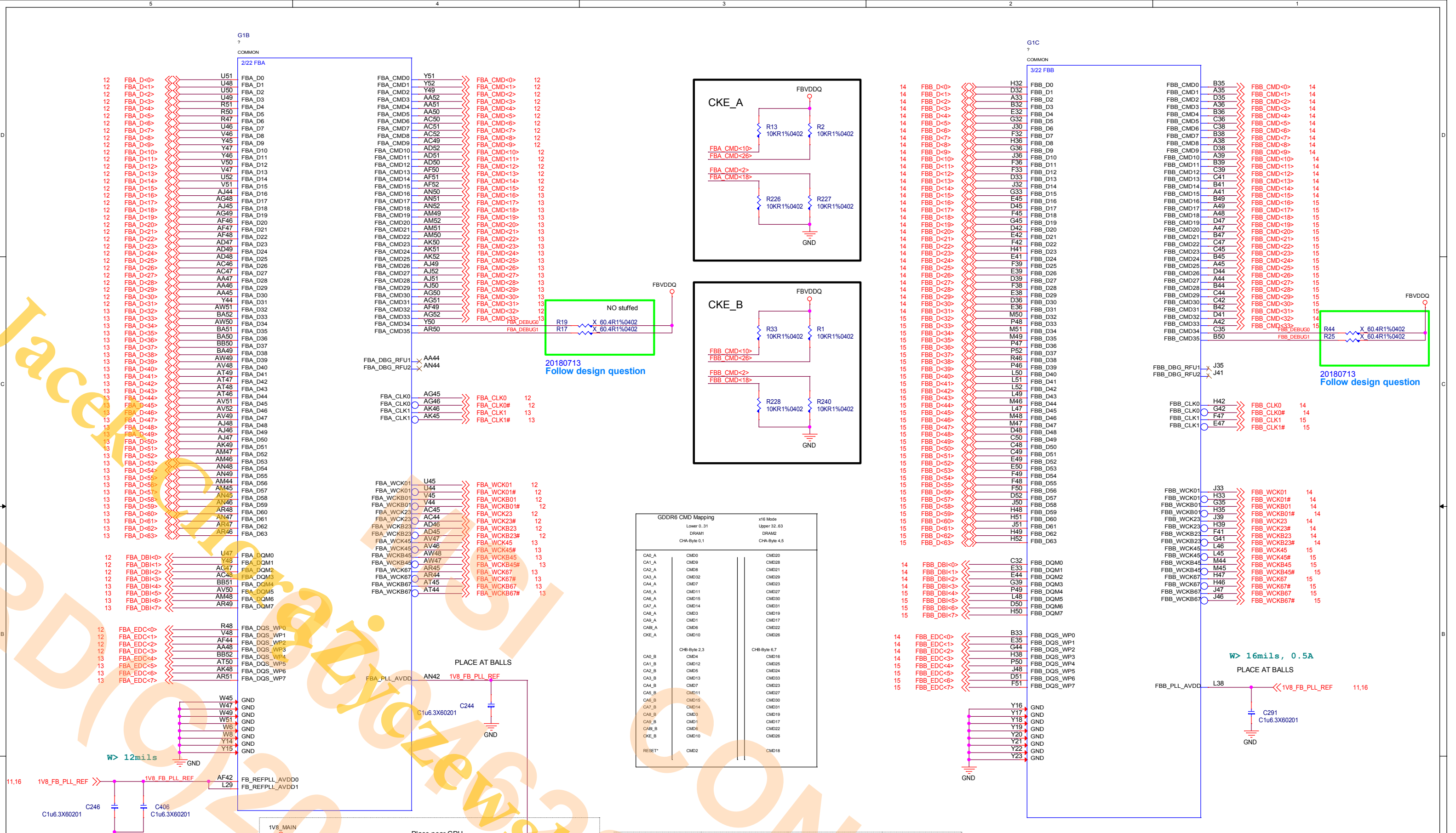
PEX_HVDD PEX_PLL_HVDD	1.0uF X6S	4.7uF X6S	10uF X6S	22uF X5R
N18E	6	3	3	2

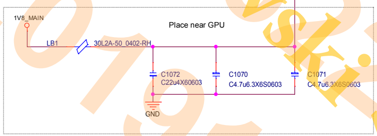
MICRO-STAR INT'L CO.,LTD.

Title: DGPU_PCI-E Host

Size: Custom | Document Number: MS-16W1 | Rev: 10

Date: Tuesday, August 13, 2019 | Sheet 10 of 66





PBA_PLL_AVDD PBB_PLL_AVDD PBC_PLL_AVDD PBD_PLL_AVDD	1.0uF 0201 X6S	4.7uF 0402 X6S	22uF 0805
N18E	4	2	1

FB_REFPLL_AVDD0 PB_REFPLL_AVDD1	1.0uF 0201 X6S
N18E	2

MICRO-STAR INT'L CO.,LTD.

Title: DGPU_MEM IF A/B

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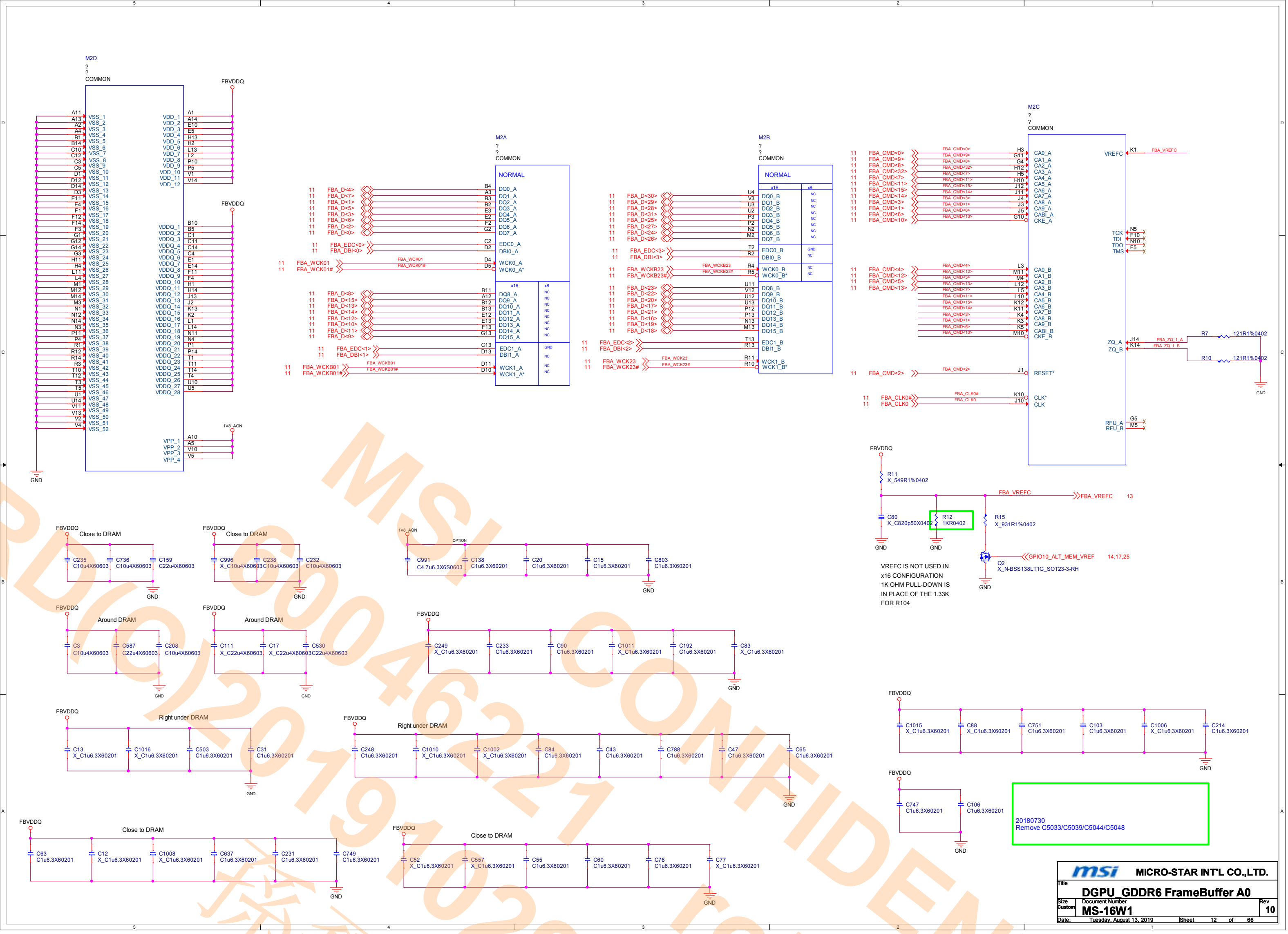
M2D
M2A
M2B
M2C
FBVDDQ
Close to DRAM
Around DRAM
Right under DRAM
VREFC IS NOT USED IN
x16 CONFIGURATION
1K OHM PULL-DOWN IS
IN PLACE OF THE 1.33K
FOR R104
20180730
Remove C5033/C5039/C5044/C5048
MICRO-STAR INT'L CO.,LTD.
Title
DGPU_GDDR6 FrameBuffer A0
Size Custom
Document Number
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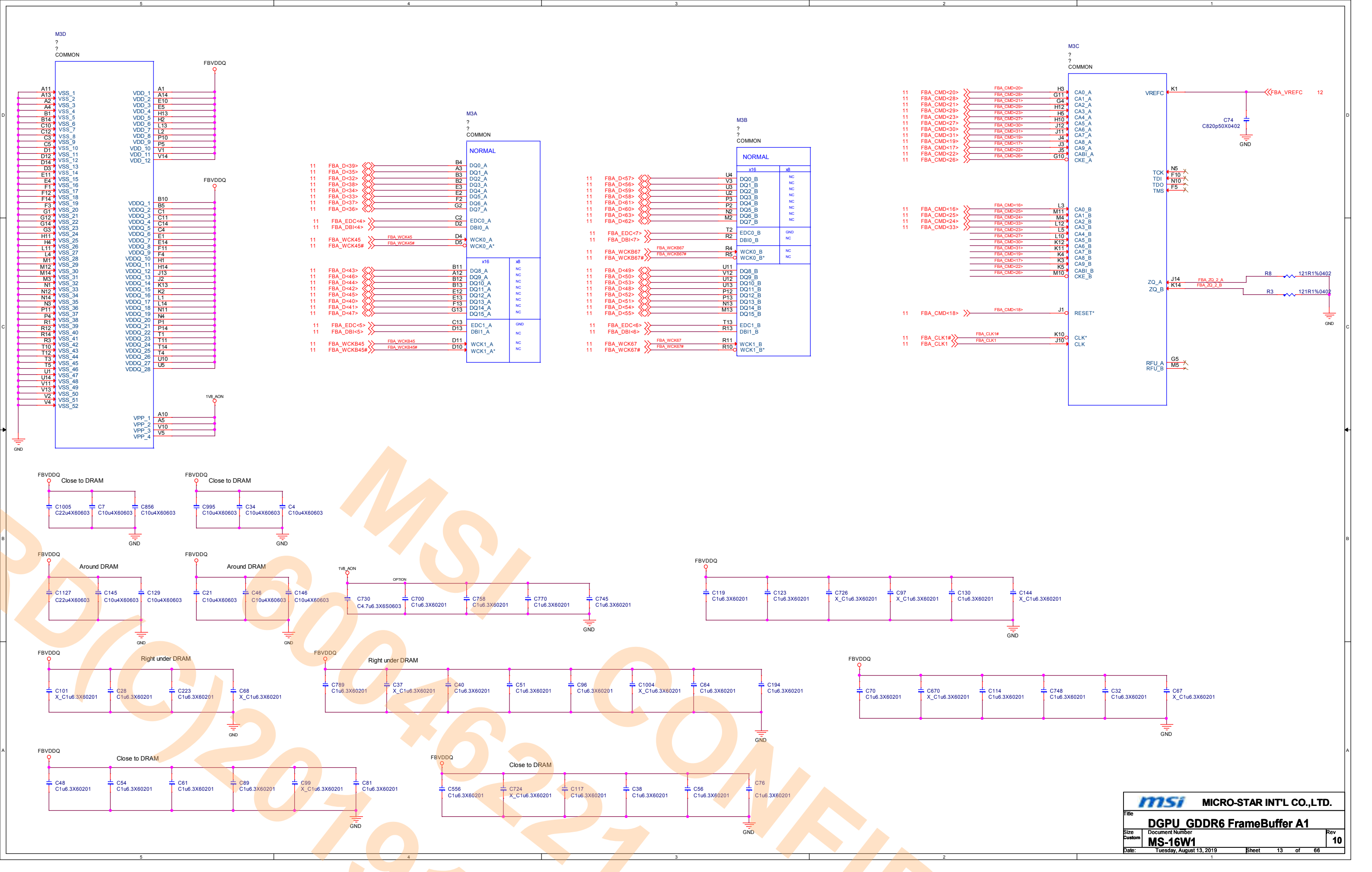
Rev
10
Date: Tuesday, August 13, 2019
Sheet 12 of 66

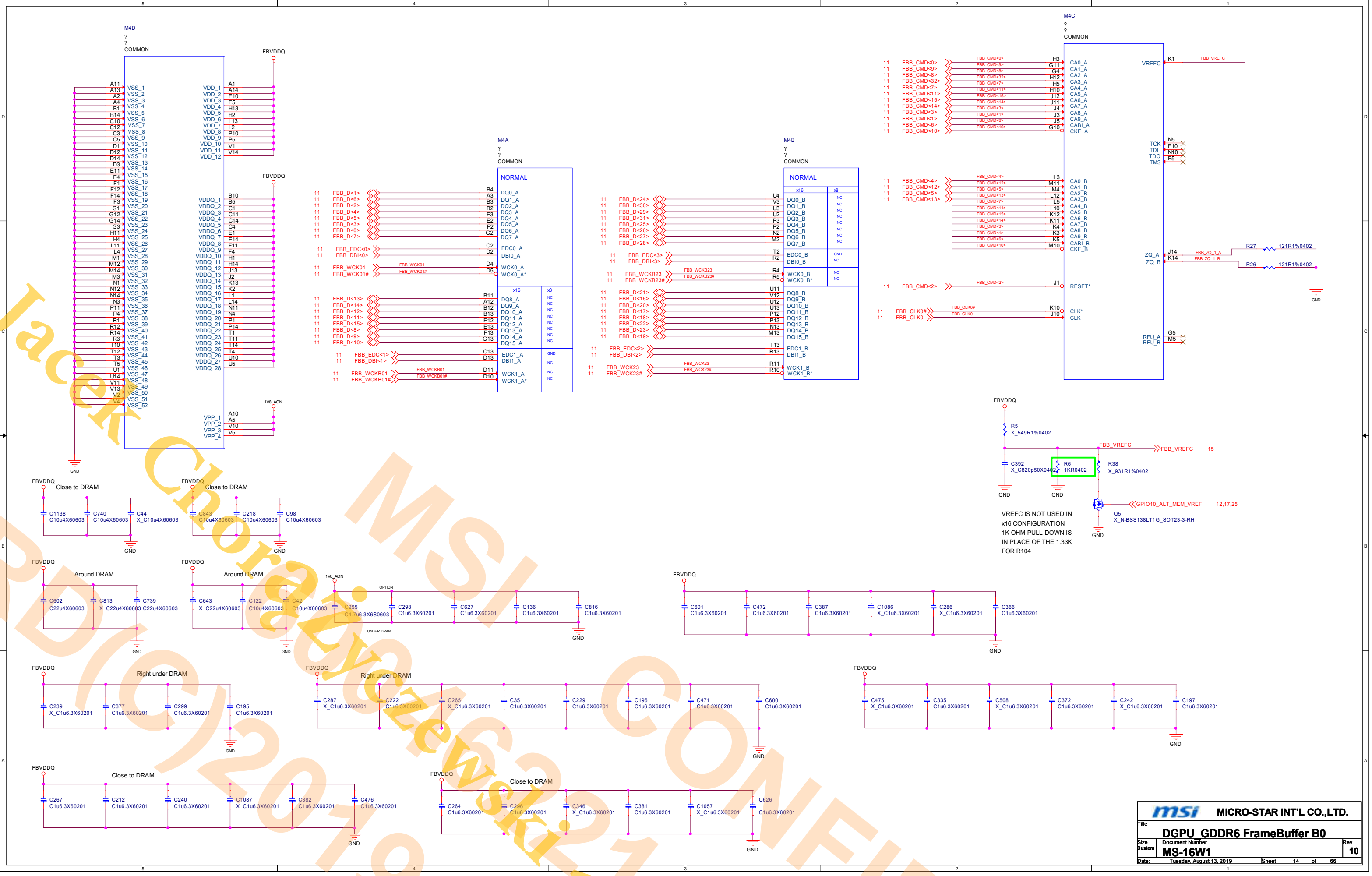


MICRO-STAR INT'L CO.,LTD.

Title: DGPU_GDDR6 FrameBuffer A1

Size: Custom | Document Number: MS-16W1 | Rev: 10

Date: Tuesday, August 13, 2019 | Sheet 13 of 66


M4D
COMMON
FBVDDQ
M4A
NORMAL
M4B
NORMAL
M4C
COMMON
VREFC
RESET*
CLK*
CLK
ZQ_A
ZQ_B
RFU_A
RFU_B
Close to DRAM
Around DRAM
Right under DRAM
VREFC IS NOT USED IN
x16 CONFIGURATION
1K OHM PULL-DOWN IS
IN PLACE OF THE 1.33K
FOR R104
GND
MICRO-STAR INT'L CO.,LTD.
Title
DGPU_GDDR6 FrameBuffer B0
Size
Custom
Document Number
MS-16W1
Rev
10
Date: Tuesday, August 13, 2019
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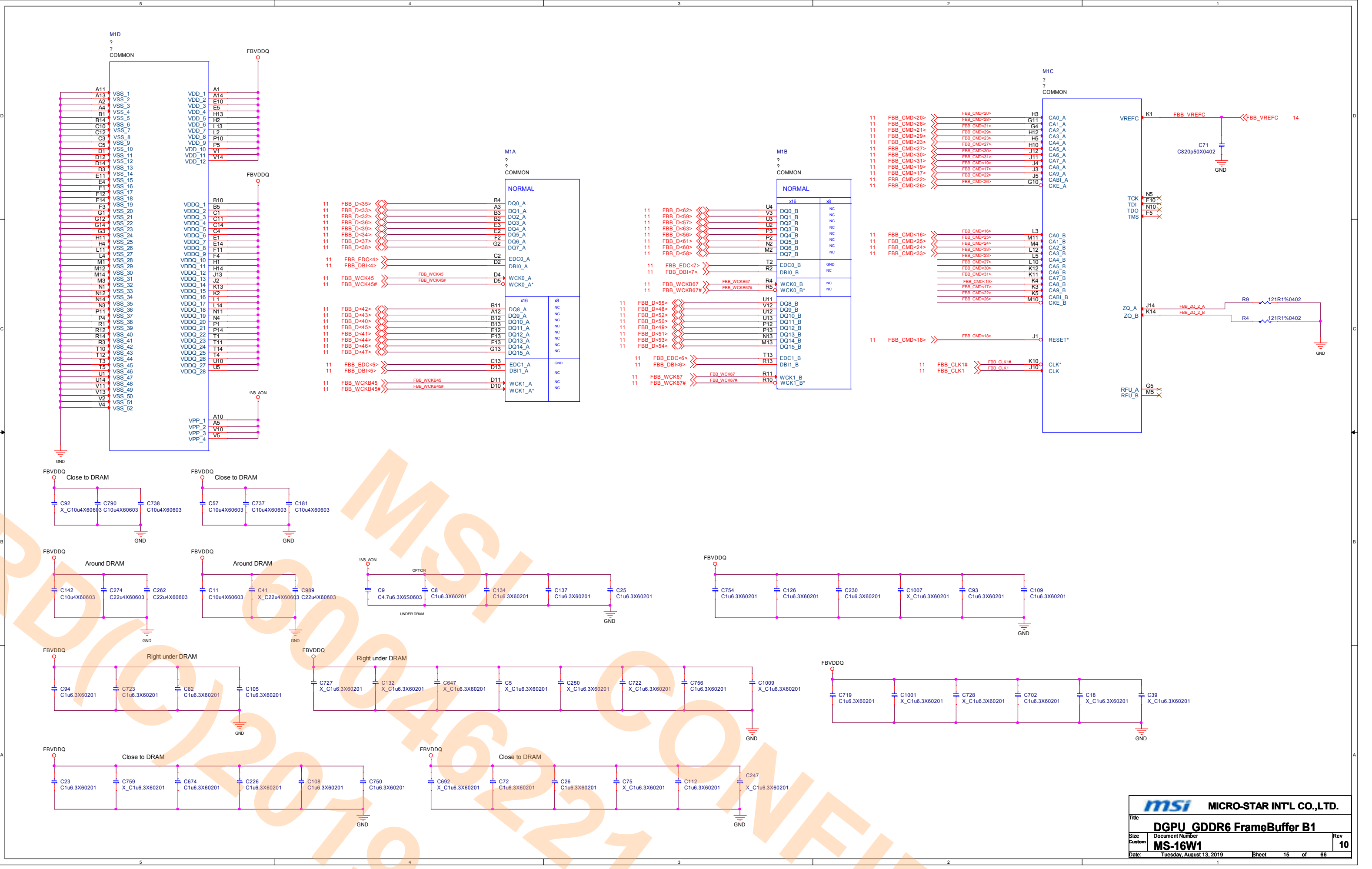
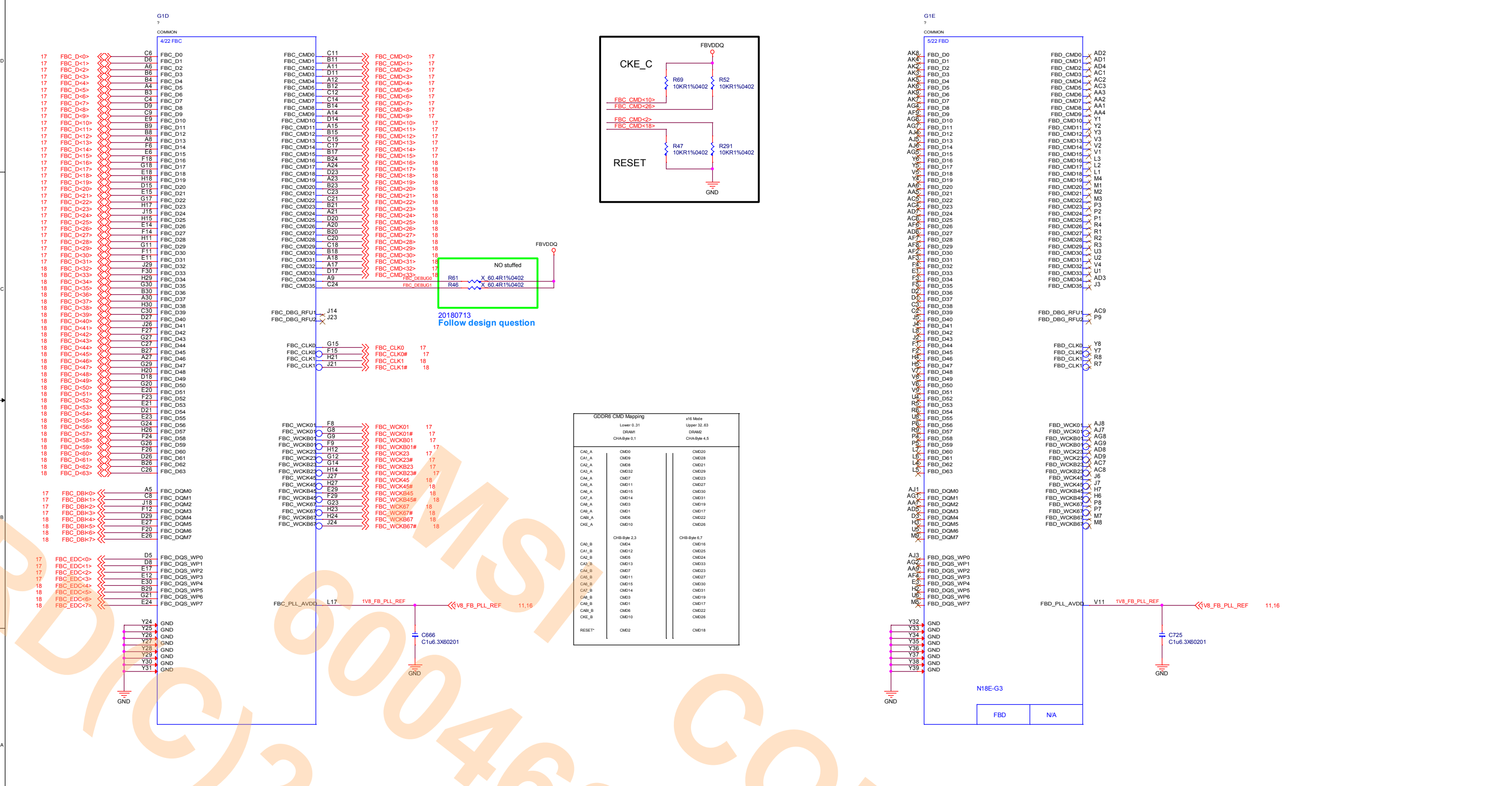


MICRO-STAR INT'L CO.,LTD.

Title: DGPU_GDDR6 FrameBuffer B1

Size	Document Number	Rev
Custom	MS-16W1	10

Date: Tuesday, August 13, 2019 Sheet 15 of 66

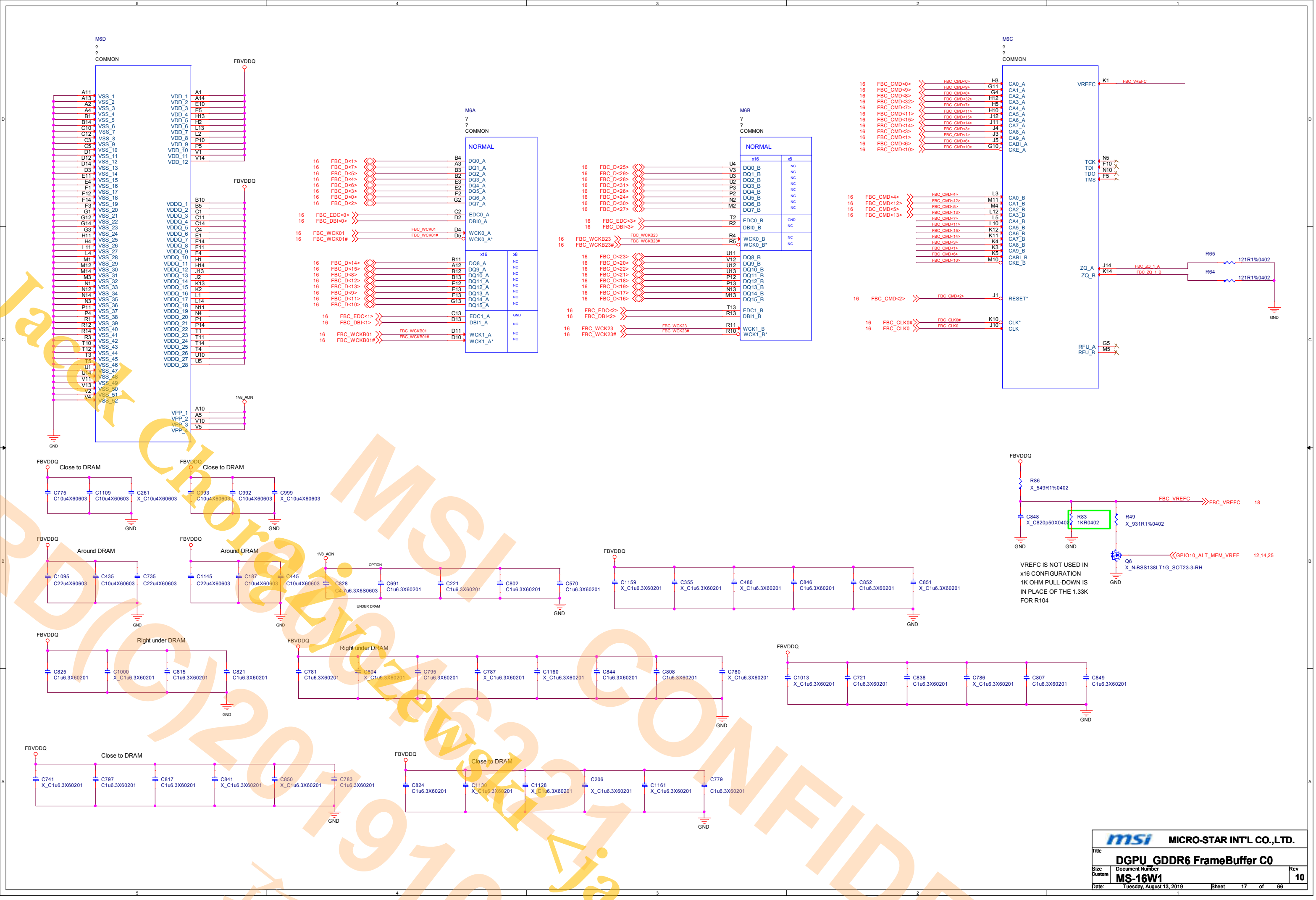


MICRO-STAR INT'L CO.,LTD.

Title: DGPU_MEM IF C/D

Size	Document Number	Rev
Custom	MS-16W1	10

Date: Tuesday, August 13, 2019 Sheet 16 of 66


M6D
COMMON
FBVDDQ
M6A
COMMON
NORMAL
M6B
COMMON
NORMAL
M6C
COMMON
VREFC
RESET*
Close to DRAM
Around DRAM
Right under DRAM
UNDER DRAM
OPTION
FBC_VREFC
GPIO10_ALT_MEM_VREF
VREFC IS NOT USED IN
x16 CONFIGURATION
1K OHM PULL-DOWN IS
IN PLACE OF THE 1.33K
FOR R104
GND
MICRO-STAR INT'L CO.,LTD.
Title
DGPU_GDDR6 FrameBuffer C0
Size
Custom
Document Number
MS-16W1
Rev
10
Date: Tuesday, August 13, 2019
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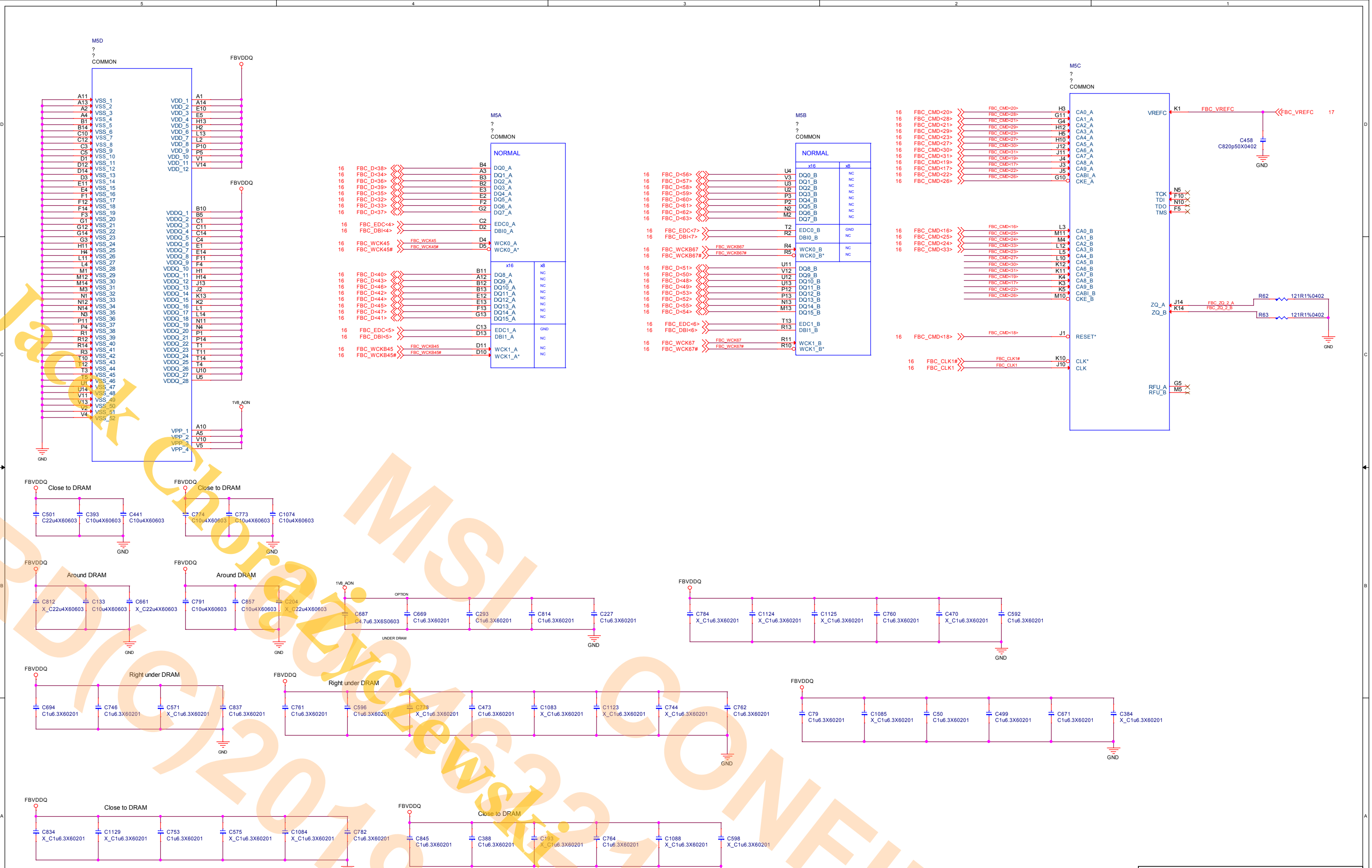
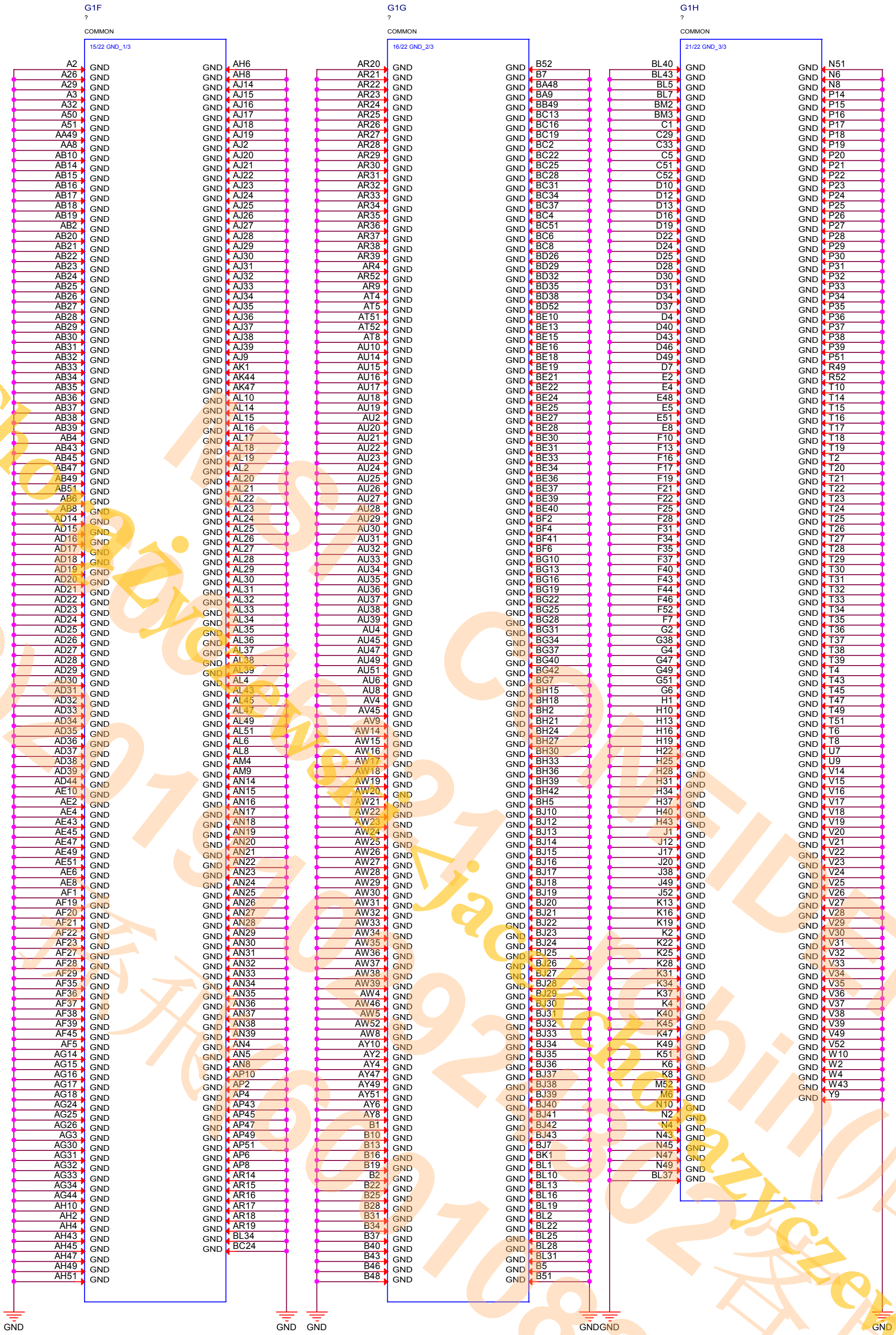


MICRO-STAR INT'L CO.,LTD.

Title: DGPU_GDDR6 FrameBuffer C1

Size	Document Number	Rev
Custom	MS-16W1	10

Date: Tuesday, August 13, 2019 Sheet 18 of 66



MICRO-STAR INT'L CO.,LTD.

Title	DGPU GND
Size	Custom
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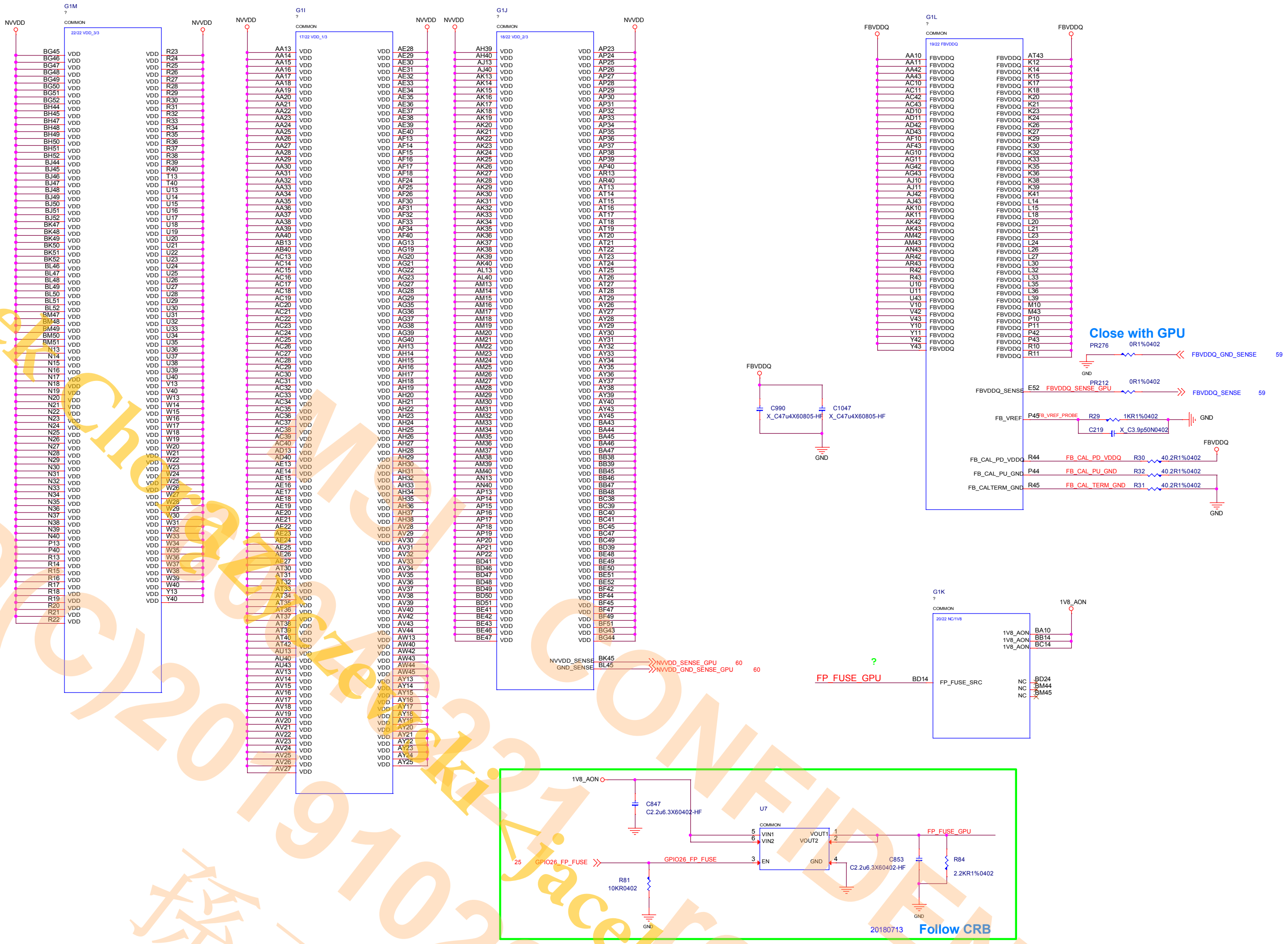
GPU PWR GND NCs



MICRO-STAR INT'L CO.,LTD.

Title	GPU Power
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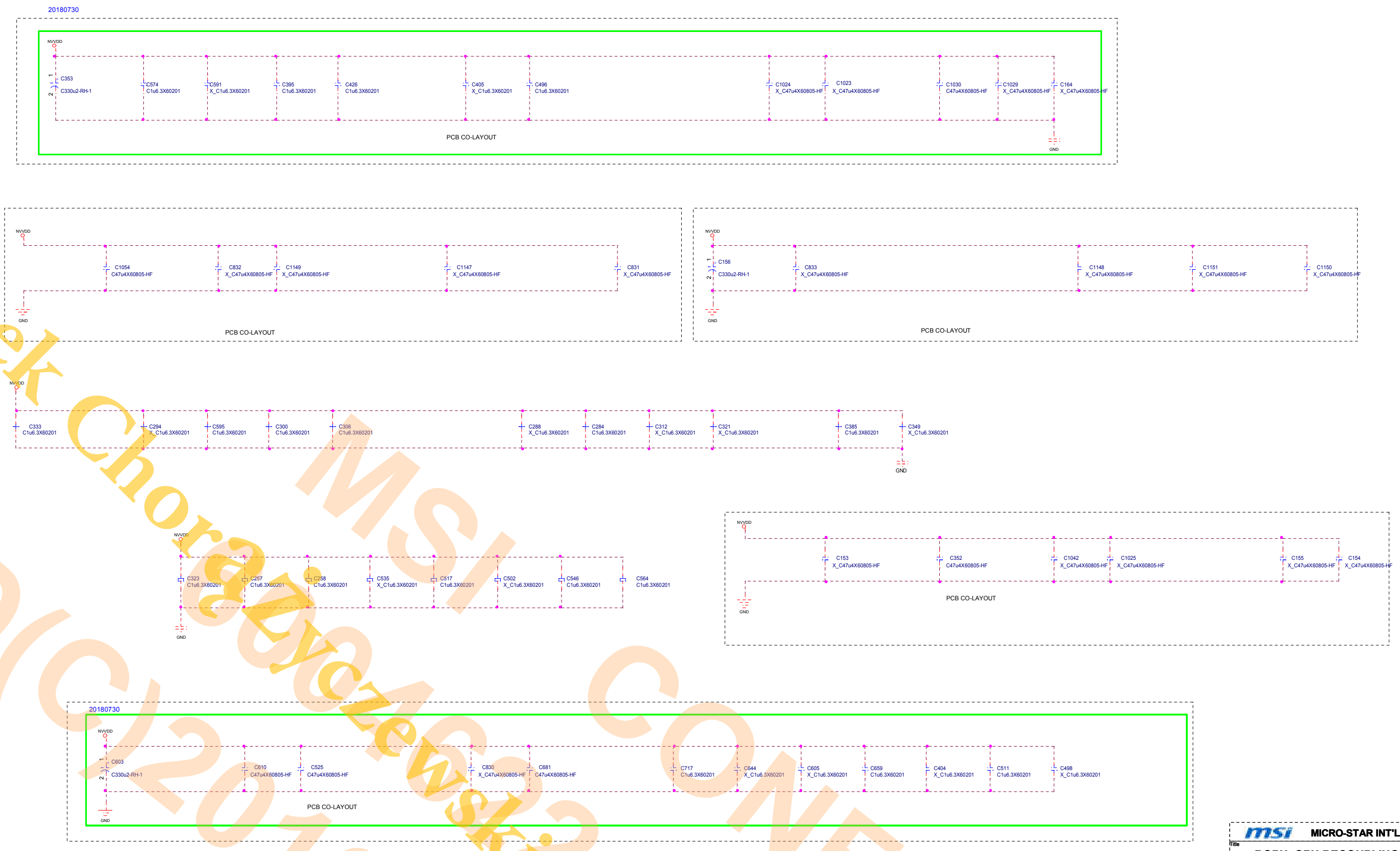
GPU Decoupling
FBVDDQ
24x 1uF(Under GPU)
8 x 10uF(Under GPU)
4 x 10uF(Near GPU)
9 x 22uF(Near GPU)
FBVDDQ_GPU
Partition A
Partition B
Partition C
Partition D
Place Close to GPU
Place Close to GPU
GPU DECOUPLING A
NVVDD
NVVDD+NVDDS
93 x 1uF X6S0201(Under GPU)
23 x 10uF X6S0603(Under GPU)
4 x 22uF X6S0805(Unde GPU)
3 x 47uF X6S0805(Unde GPU)
2 x 470uF(Near GPU)
1V8_AON
3x 1uF X6S 0201 (Under GPU)
3 x 1uF X6S 0402(Near GPU)
3 x 4.7uF X6S 0603(Near GPU)
1V8_AON
MICRO-STAR INT'L CO.,LTD.
DGPU_GPU DECOUPLING A
MS-16W1
10
Tuesday, August 13, 2019

GPU DECOUPLING B

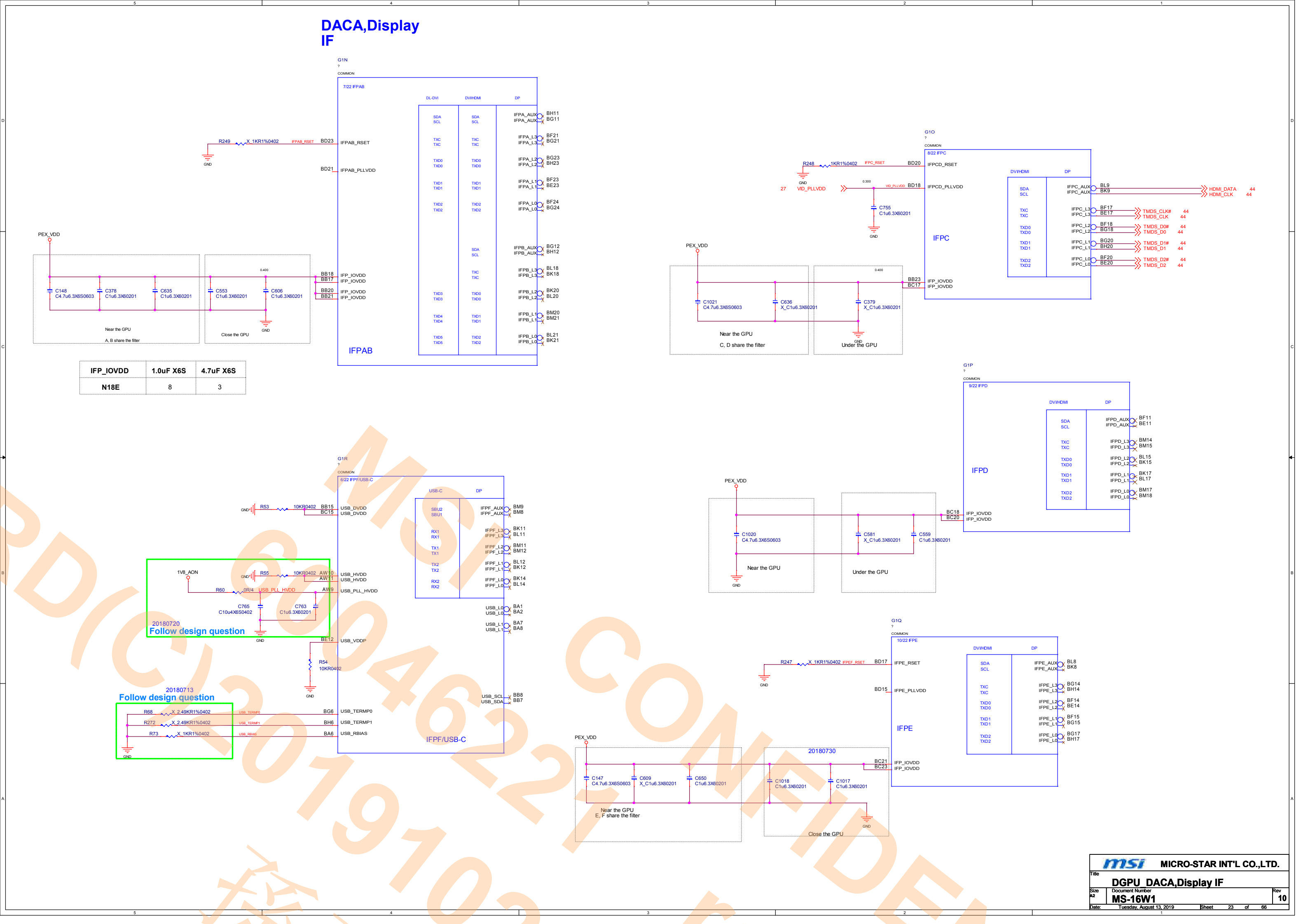
GPU Decoupling



MICRO-STAR INT'L CO.,LTD.

Title: DGPU_GPU DECOUPLING B

Size: Custom | Document Number: MS-16W1 | Rev: 10



IFP_IOVDD	1.0uF X6S	4.7uF X6S
N18E	8	3

MICRO-STAR INT'L CO.,LTD.

Title: DGPU_DACA,Display IF

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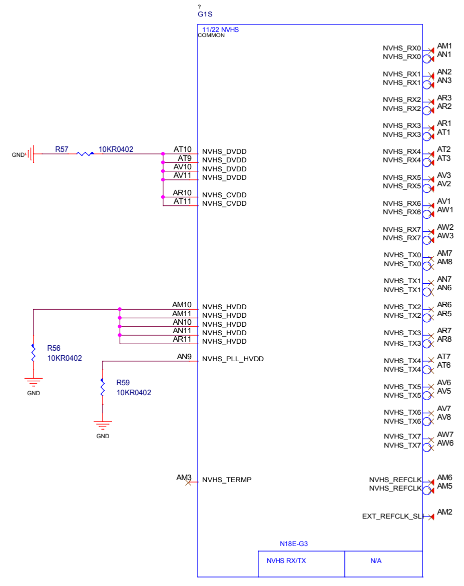
Date: Tuesday, August 13, 2019 | Sheet 23 of 66

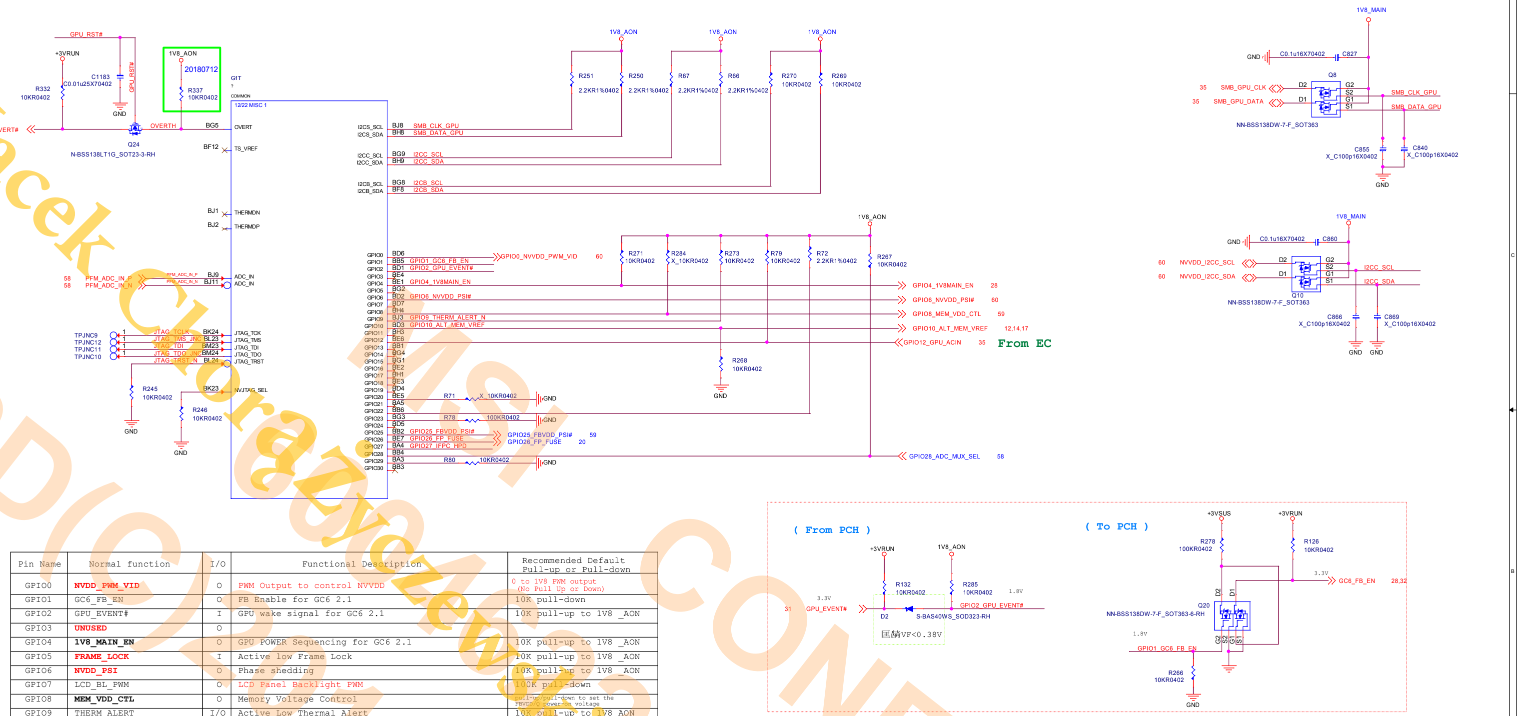


MICRO-STAR INT'L CO.,LTD.

Title: **DGPU_ NVLink & Framelock**

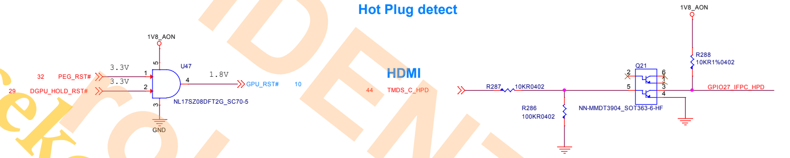
Size	Document Number	Rev
Custom	MS-16W1	10

Date: Tuesday, August 13, 2019 Sheet 24 of 66



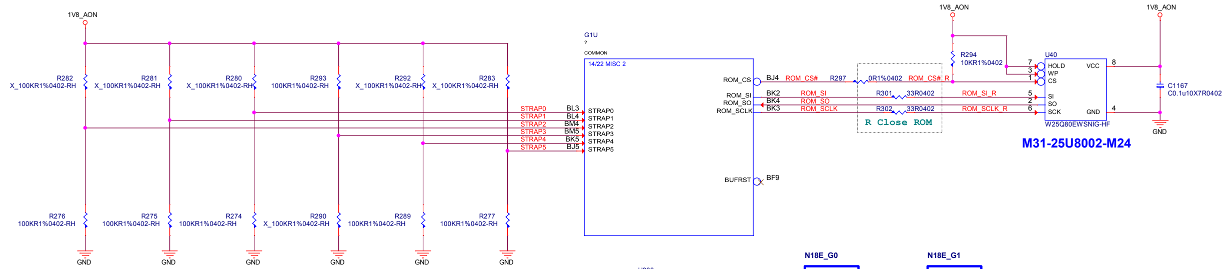
Pin Name	Normal function	I/O	Functional Description	Recommended Default Pull-up or Pull-down
GPIO0	**NVDD_PWM_VID**	O	PWM Output to control NVVDD	0 to 1V8 PWM output (No Pull Up or Down)
GPIO1	GC6_FB_EN	O	FB Enable for GC6 2.1	10K pull-down
GPIO2	GPU_EVENT#	I	GPU wake signal for GC6 2.1	10K pull-up to 1V8 _AON
GPIO3	**UNUSED**	O		
GPIO4	**1V8_MAIN_EN**	O	GPU POWER Sequencing for GC6 2.1	10K pull-up to 1V8 _AON
GPIO5	**FRAME_LOCK**	I	Active low Frame Lock	10K pull-up to 1V8 _AON
GPIO6	**NVDD_PSI**	O	Phase shedding	10K pull-up to 1V8 _AON
GPIO7	LCD_BL_PWM	O	LCD Panel Backlight PWM	100K pull-down
GPIO8	**MEM_VDD_CTL**	O	Memory Voltage Control	pull-up/pull-down to set the FBVDD/Q power-on voltage
GPIO9	THERM_ALERT	I/O	Active Low Thermal Alert	10K pull-up to 1V8_AON
GPIO10	MEM_VREF_CTL	O	Memory VREF Control	10K pull-down
GPIO11	LCD_VCC	O	Panel Power Enable	10K pull-down
GPIO12	PWR_LEVEL	I	AC power detect or power supply overdraw input	10K pull-up to 1V8_AON
GPIO13	**UNUSED**	O		
GPIO14	**HPD_IFPA**	I	Hot Plug Detect for IFPA	10K pull-up to 1V8_AON
GPIO15	**HPD_IFPB**	I	Hot Plug Detect for IFPB	10K pull-up to 1V8_AON
GPIO16	**UNUSED**	**O**		
GPIO17	**HPD_IFPD**	I	Hot Plug Detect for IFPD	10K pull-up to 1V8_AON
GPIO18	**HPD_IFPE**	I	Hot Plug Detect for IFPE	10K pull-up to 1V8_AON
GPIO19	**Reserved**	O		
GPIO20	**NB_FGC6**			10K pull-down
GPIO21	**LCD_BLEN**		**LCD Panel Backlight Enable**	100K pull-down
GPIO22	**SWAPRDY_IN**			2.2K pull-up to 1V8_AON
GPIO23	**RASTER_SYNC1**			100K pull-down
GPIO24	**HPD_IFPF/USBC_HPD or DONGLE_DET**	I	**Hot Plug Detect for IFPF or USBC**	10K pull-up to 1V8_AON
GPIO25	**FBVDD_PSI**	**O**		
GPIO26	**FP_FUSE**			10K pull-down
GPIO27	**HPD_IFPC**	I	Hot Plug Detect for IFPC	10K pull-up to 1V8_AON
GPIO28	**INA_HT/ADC_MUX_SEL**			10K pull-up
GPIO29	**IDLE_IN_SW**	**I**		10K pull-down
GPIO30	**UNUSED**			

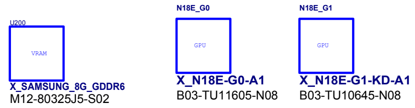
Hot Plug detect



MICRO-STAR INT'L CO.,LTD.

Title	DGPU_GPIO,I2C	
Size: Custom	Document Number: MS-16W1	Rev: 10
Date: Tuesday, August 13, 2019	Sheet 25 of 66	

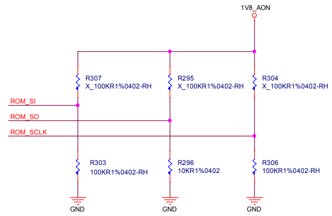




STRAP 5	STRAP 4	STRAP 3	
L	L	L	Optimus
L	L	H	Discrete
H	L	H	Discrete with Gsync

STRAP 2	STRAP 1	STRAP 0		N18E-G1	
L	L	L	0x0	Samsung K4Z80325BC-HC14	256M*16
L	L	H	0x1	Microm MT61K256M32JE-14:A	

			N18E-G1
ROM_SO	ROM_SI	ROM_SCLK	FS_OVERT# Function
L	L	L	ENABLED
L	L	H	DISABLED
L	H	L	Invalid Do not configure
L	H	H	
H	H	H	
H	H	M	



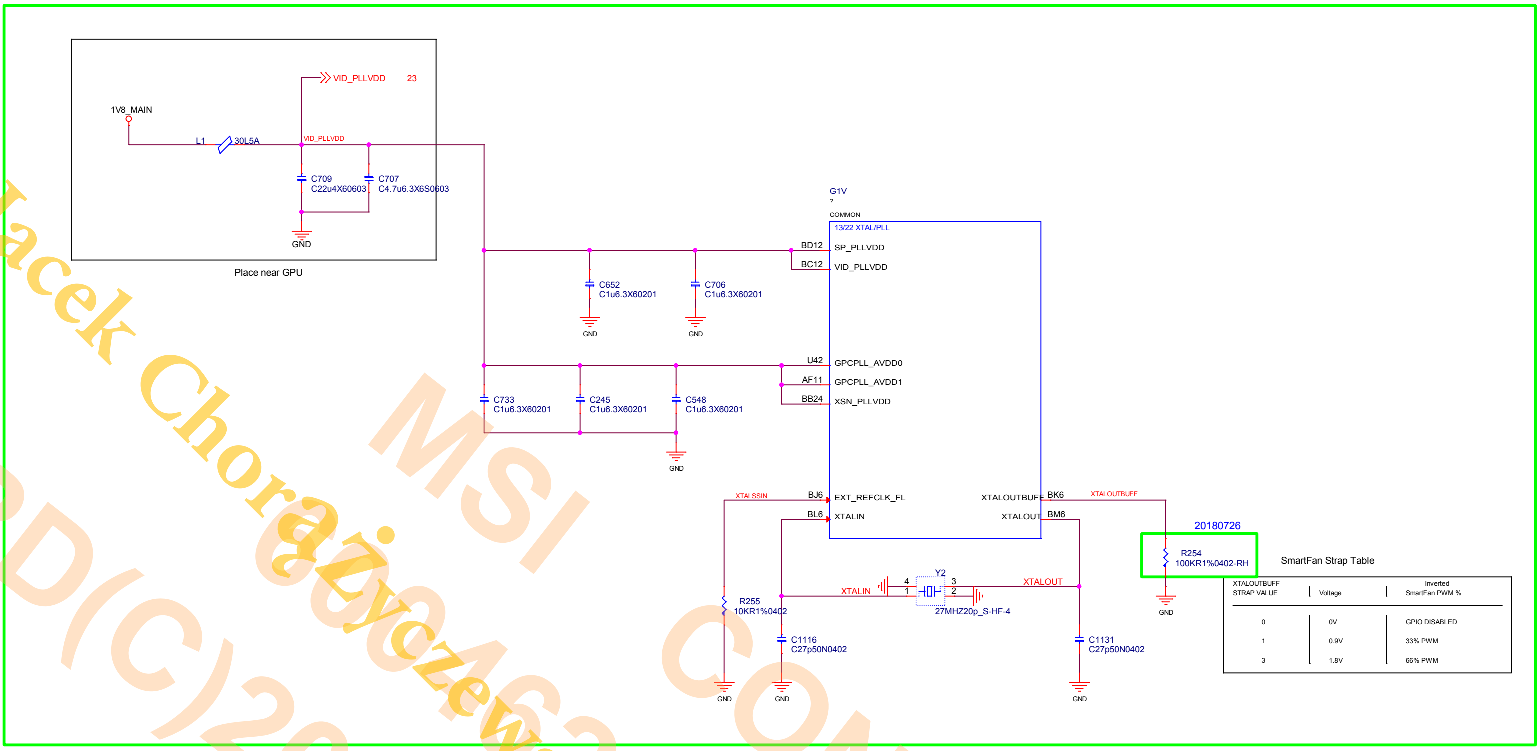
MICRO-STAR INT'L CO.,LTD.

Title: DGPU_ROM,HW Straps

Size: Custom | Document Number: MS-16W1 | Rev: 10

Date: Tuesday, August 13, 2019 | Sheet 26 of 66

Check!!!!!!



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.

Title: DGPU MIO & XTAL

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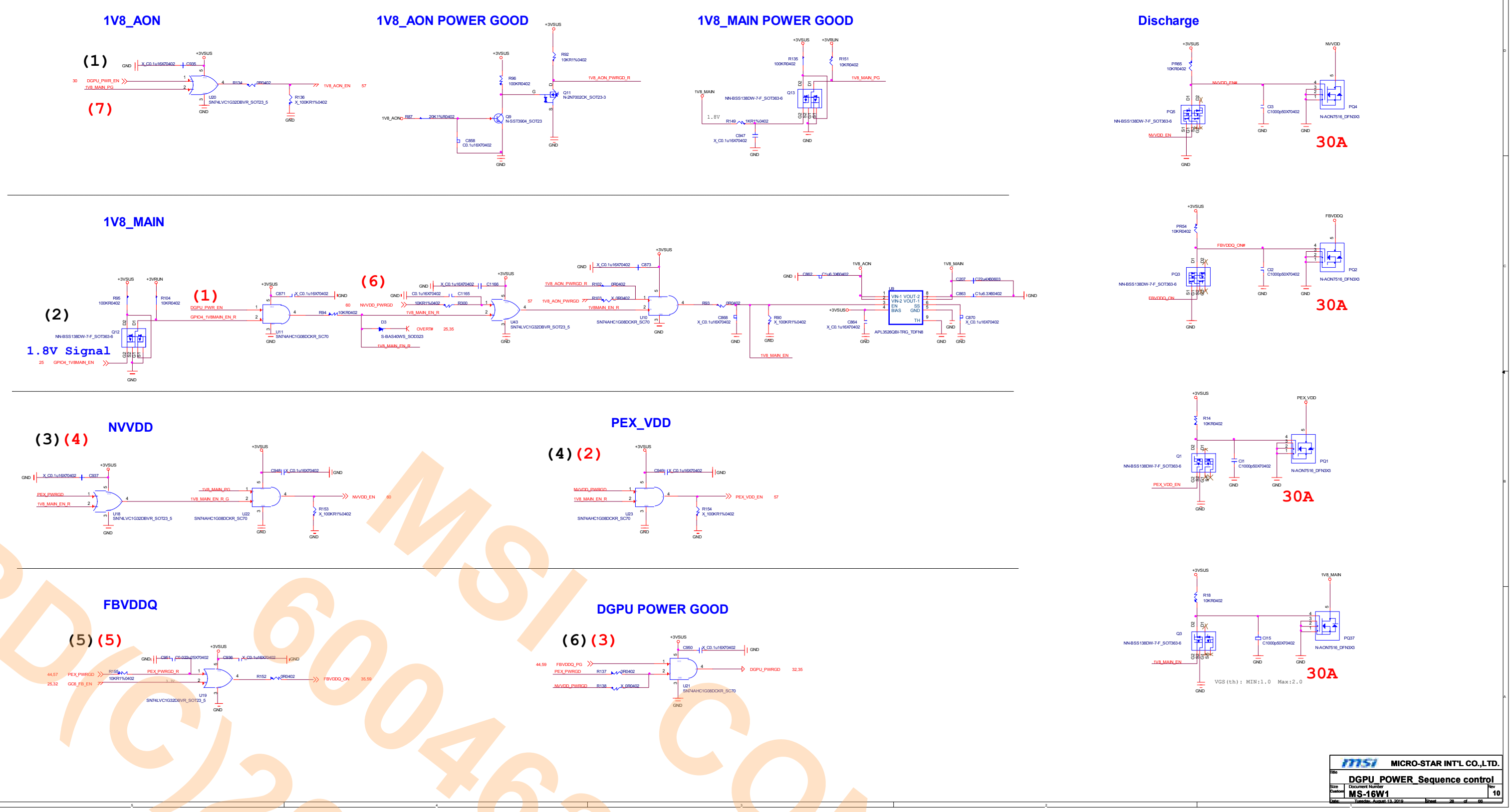
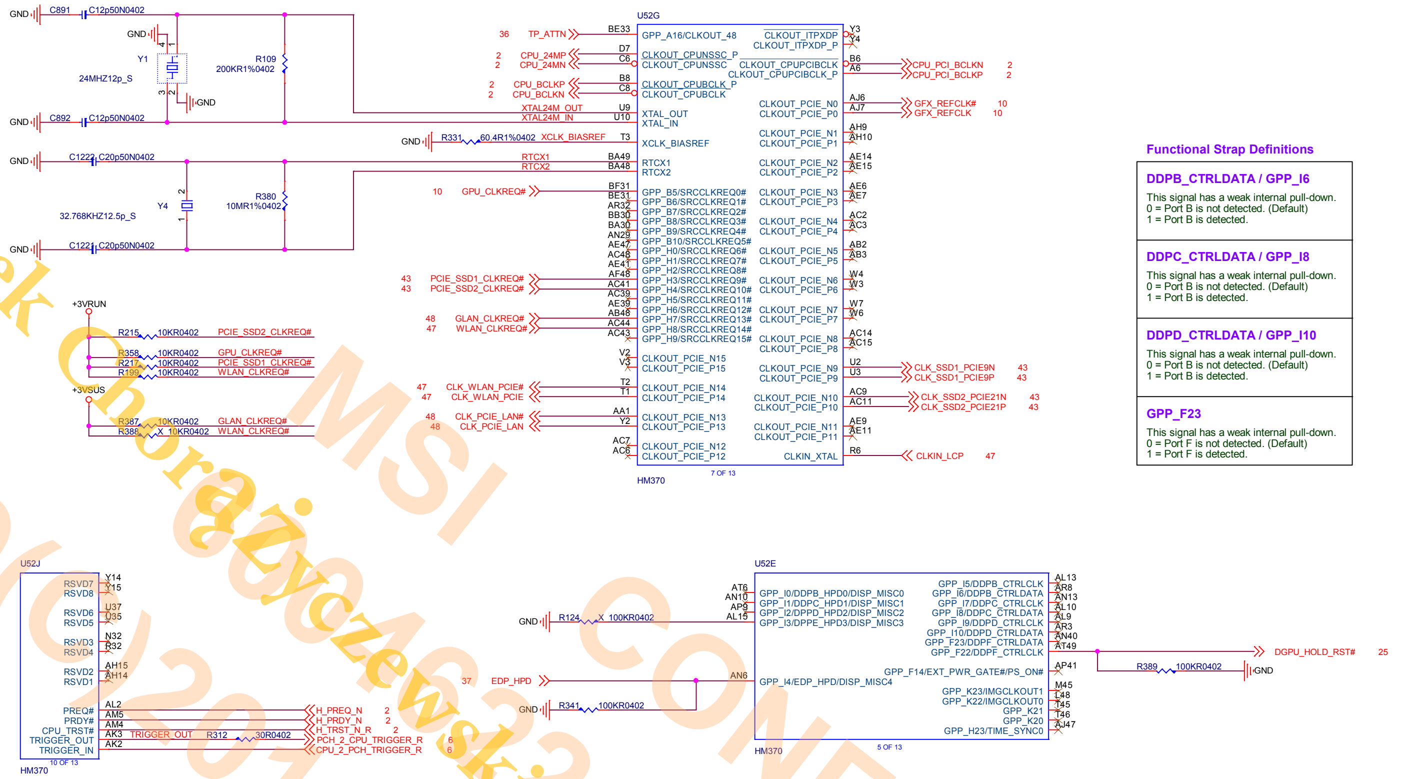
nVIDIA Power Sequence Control

Power on = 1V8_AON -> 1V8_MAIN -> 3V3_NV/NVVDD -> NVDDS/PEX_VDD -> FBVDDQ -> DGPUPWRGD

Power down = NVDDS -> PEX_VDD -> NVVDD/FBVDDQ -> 3V3_NV -> 1V8_MAIN -> 1V8_AON



HM370 (RTC/PCIE_Clock/Clock/RSVD)



Functional Strap Definitions

DDPB_CTRLDATA / GPP_I6

This signal has a weak internal pull-down.
0 = Port B is not detected. (Default)
1 = Port B is detected.

DDPC_CTRLDATA / GPP_I8

This signal has a weak internal pull-down.
0 = Port B is not detected. (Default)
1 = Port B is detected.

DDPD_CTRLDATA / GPP_I10

This signal has a weak internal pull-down.
0 = Port B is not detected. (Default)
1 = Port B is detected.

GPP_F23

This signal has a weak internal pull-down.
0 = Port F is not detected. (Default)
1 = Port F is detected.

msi	MICRO-STAR INT'L CO.,LTD.	
Title	PCH-1(CLK/DDI)	
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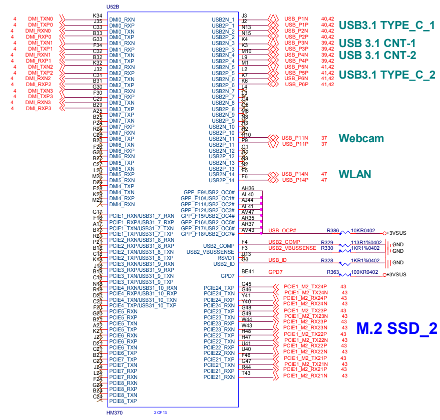
HM370 (DMI/PCIE/USB3.1/USB2.0/CNVi)

GPP_K10	
N17P	PULL LOW
N18P	PULL HIGH

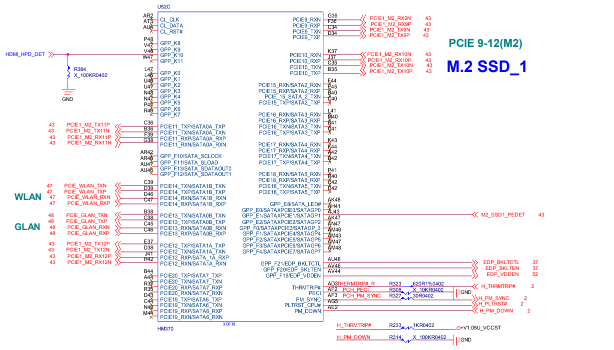


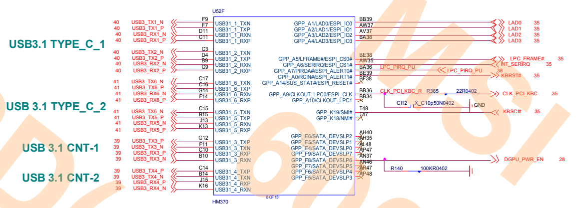
USB			
USB 2.0	USB 3.1	Device	Note
1	1	USB TYPE_C-1	
2	3	USB TYPE_C-2	
3	3	USB TYPE_A-1	
4	4	USB TYPE_A-2	
5	5	USB TYPE_A-3	
6			
7			
8			
9			
10			
11		WebCam	
12			
13			
14		WLAN	

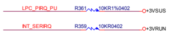
GPD7
External pull-up is required. Recommend 100K.
This strap should sample HIGH. There should NOT be any on-board device driving it to opposite direction during strap sampling

High Speed I/O Ports			
	HM370		Device
1	USB3.1 Gen 1		NC
2	USB3.1 Gen 1		NC
3	N/A		NC
4	N/A		NC
5	INTEL LAN Only		NC
6	N/A		NC
7	N/A		NC
8	N/A		NC
9	PCIE/LAN	PICE Configurable M.2	M.2 SSD-1
10	PCIE		
11	PCIE/SATA0A		
12	PCIE/LAN/SATA1A		
13	PCIE/LAN/SATA0B		LAN
14	PCIE/SATA1B		WLAN
15	PCIE		NC
16	PCIE		NC
17	PCIE/SATA4		HDD
18	PCIE/SATA5		NC
19	PCIE		NC
20	PCIE		NC
21	PCIE		NC
22	PCIE		
23	PCIE		
24	PCIE		

SATA Lane 0 has the flexibility to be mapped to PCIE 11 or 13
SATA Lane 1 has the flexibility to be mapped to PCIE 12 or 14







GPP_A6
PCI Interrupt Request Ax
Note: An external Pull-up is required

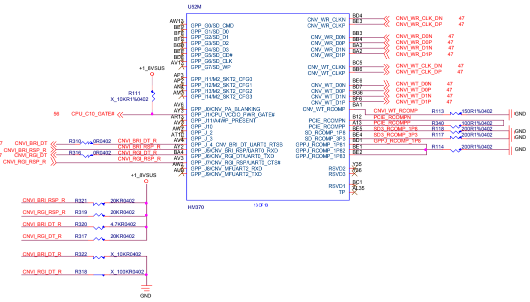
GPP_A7
PCI Interrupt Request Ax
Note: An external Pull-up is required

GPP_A14
LPC Mode - Suspend Status:
This signal is asserted by the PCH to indicate that the system will be entering a low power state soon.

GPP_J4 / CNV_BRI_DT
This signal has a weak internal pull-down.
An external pull-up is required on this strap since 38.4 MHz XTAL is not supported on the PCH.
0 = 38.4 XTAL frequency selected. (Default)
1 = 24MHz XTAL frequency selected.

GPP_J6 / CNV_RGI_DT
An external pull-up or pull-down is required.
0 = Integrated CNVi enable.
1 = Integrated CNVi disable.

GPP_J9
The signal has a weak internal pull-down
0 = VCCSPI is connected to 3.3V rail
1 = VCCSPI is connected to 1.8V rail



MICRO-STAR INT'L CO.,LTD.		
Title: PCH-2(DMI/PCIE/USB/SATA)		
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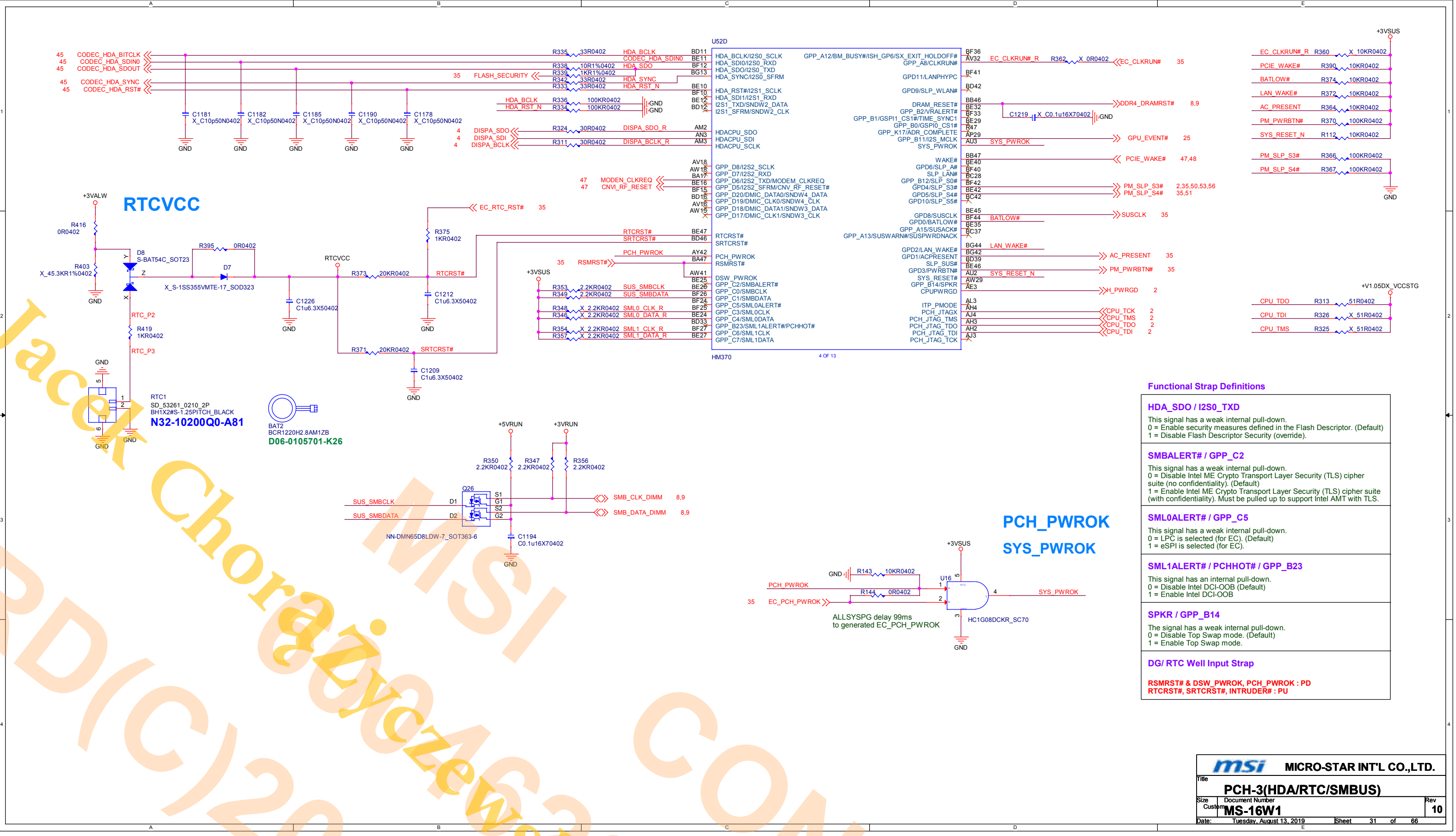

Functional Strap Definitions

HDA_SDO / I2S0_TXD

This signal has a weak internal pull-down.
0 = Enable security measures defined in the Flash Descriptor. (Default)
1 = Disable Flash Descriptor Security (override).

SMBALERT# / GPP_C2

This signal has a weak internal pull-down.
0 = Disable Intel ME Crypto Transport Layer Security (TLS) cipher suite (no confidentiality). (Default)
1 = Enable Intel ME Crypto Transport Layer Security (TLS) cipher suite (with confidentiality). Must be pulled up to support Intel AMT with TLS.

SML0ALERT# / GPP_C5

This signal has a weak internal pull-down.
0 = LPC is selected (for EC). (Default)
1 = eSPI is selected (for EC).

SML1ALERT# / PCHHOT# / GPP_B23

This signal has an internal pull-down.
0 = Disable Intel DCI-OOB (Default)
1 = Enable Intel DCI-OOB

SPKR / GPP_B14

The signal has a weak internal pull-down.
0 = Disable Top Swap mode. (Default)
1 = Enable Top Swap mode.

DG/ RTC Well Input Strap

RSMRST# & DSW_PWROK, PCH_PWROK : PD
RTCRST#, SRTCRST#, INTRUDER# : PU

MICRO-STAR INT'L CO.,LTD.		
Title: PCH-3(HDA/RTC/SMBUS)		
Size: Custom	Document Number: MS-16W1	Rev: 10
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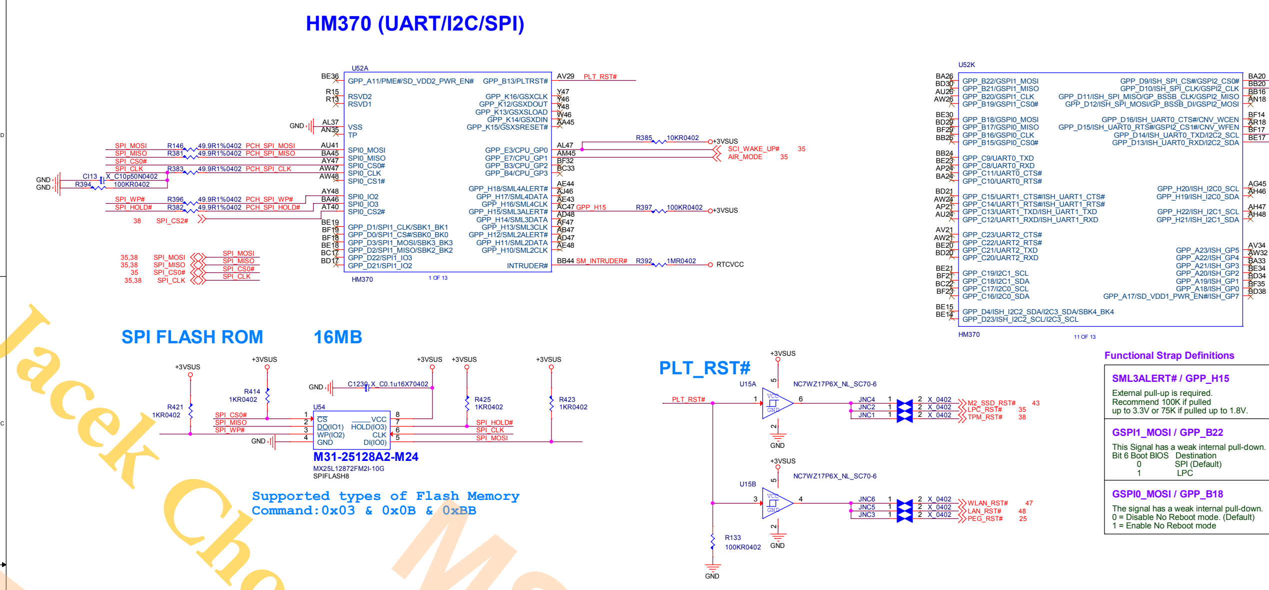

Functional Strap Definitions

SML3ALERT# / GPP_H15

External pull-up is required.
Recommend 100K if pulled
up to 3.3V or 75K if pulled up to 1.8V.

GSPI1_MOSI / GPP_B22

This Signal has a weak internal pull-down.
Bit 6 Boot BIOS Destination
0 SPI (Default)
1 LPC

GSPI0_MOSI / GPP_B18

The signal has a weak internal pull-down.
0 = Disable No Reboot mode. (Default)
1 = Enable No Reboot mode

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

Title	PCH-4(SPI/GPIO)	
Size	Document Number MS-16W1	Rev 10
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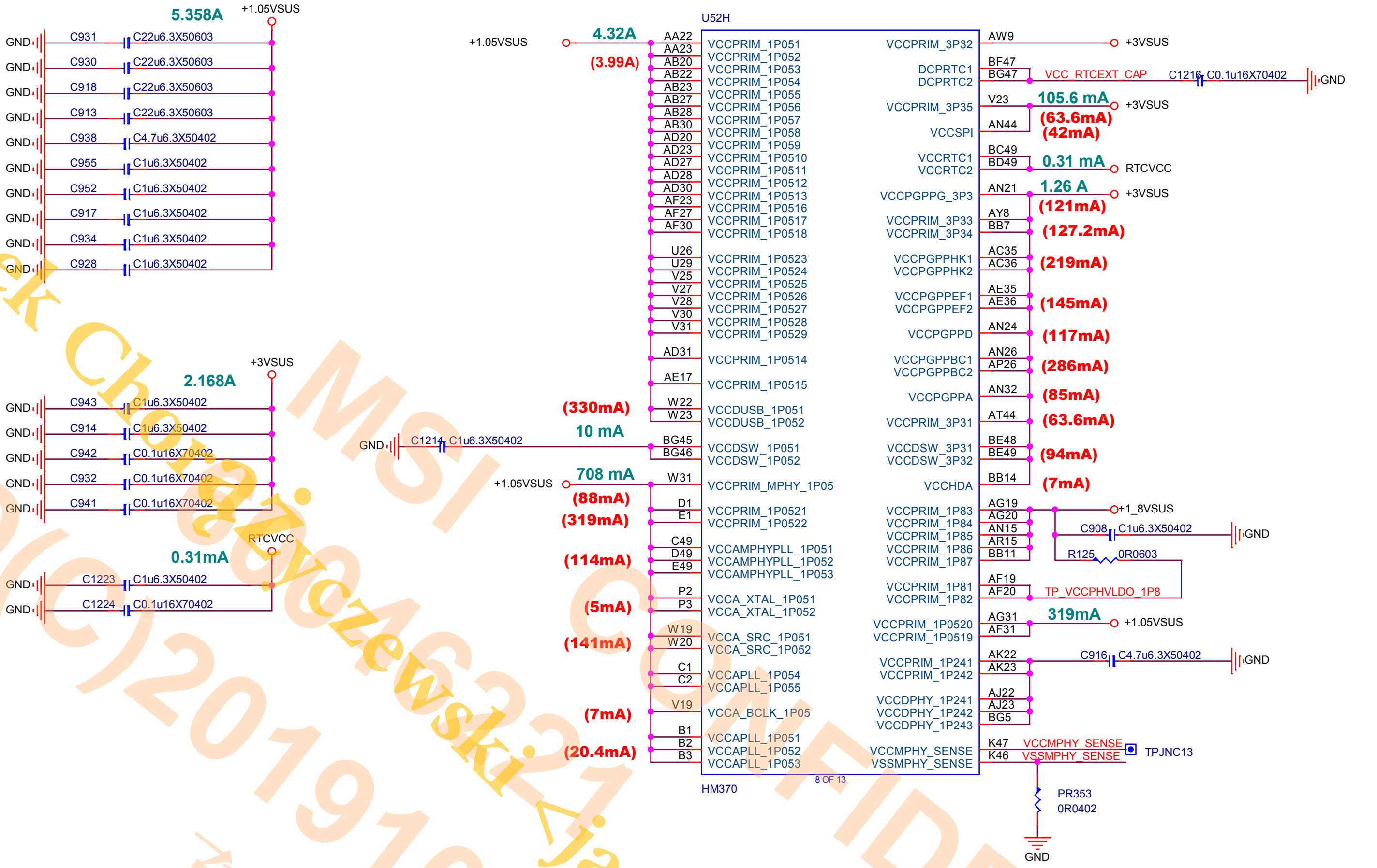
HM370 (Power)



msi	MICRO-STAR INT'L CO.,LTD.	
Title	PCH-5(Power)	
Size Custom	Document Number MS-16W1	Rev 10
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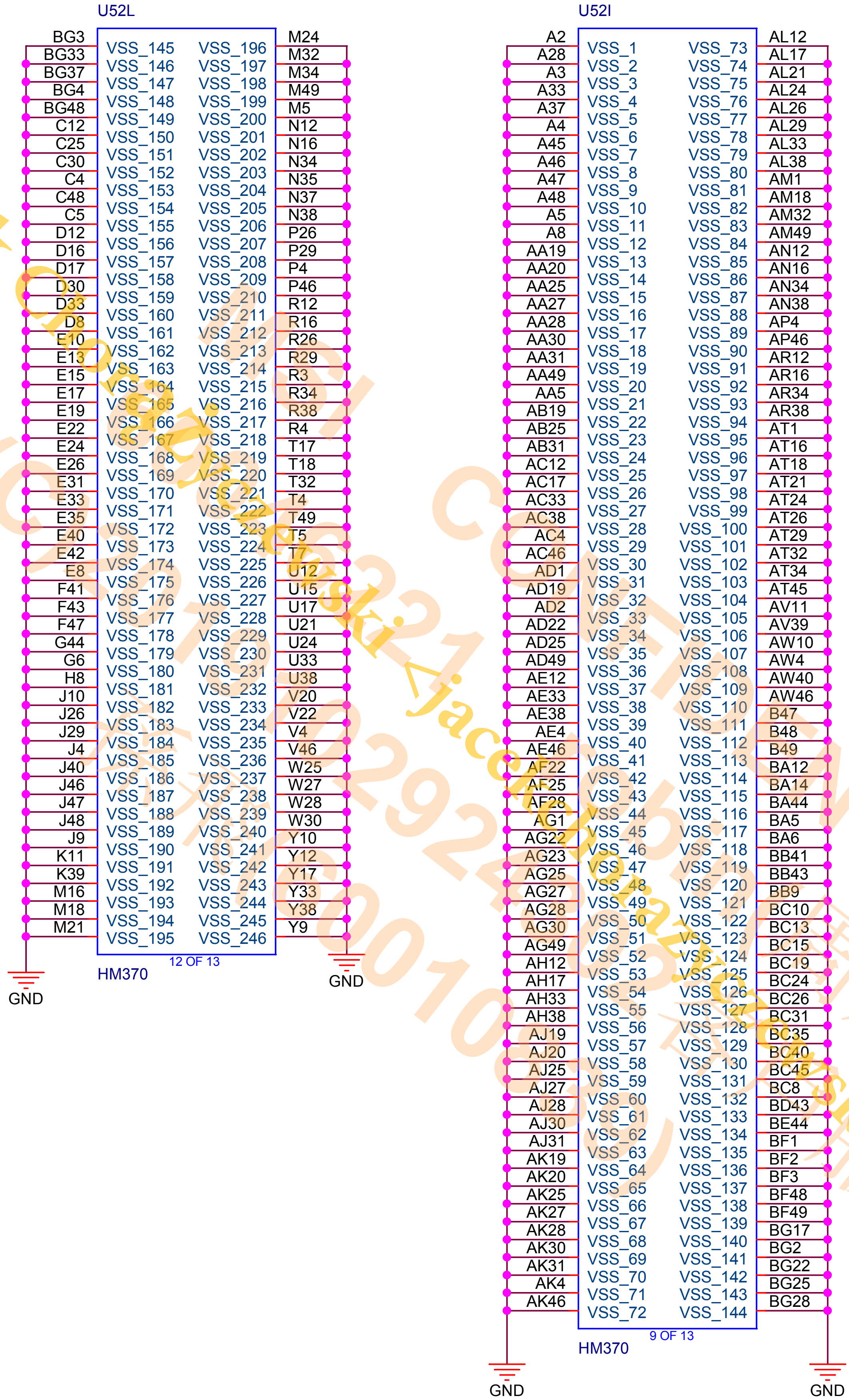
PCH-H(GND)



msi	MICRO-STAR INT'L CO.,LTD.	
Title: PCH-6(GND)		
Size: Custom	Document Number: MS-16W1	Rev: 10
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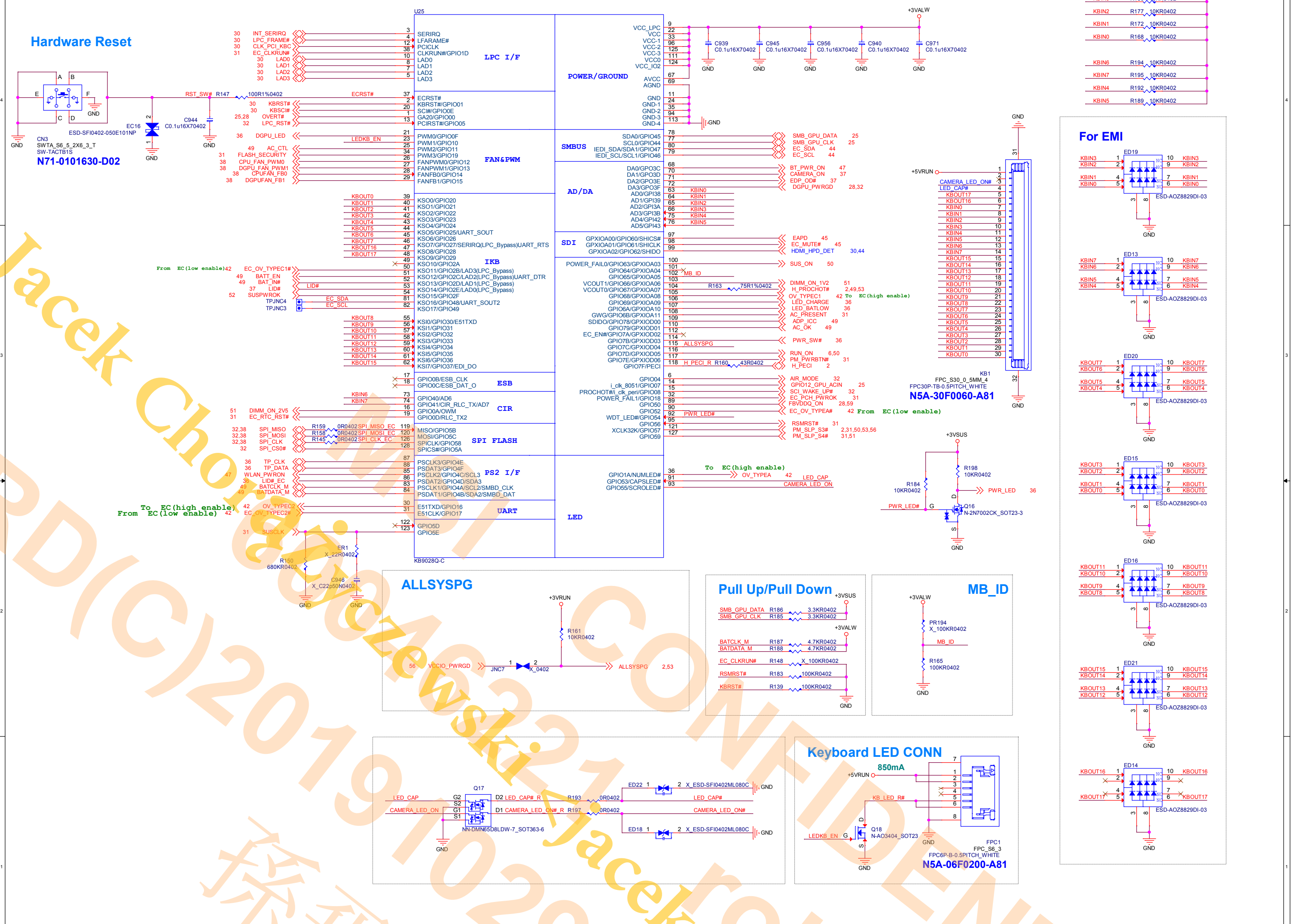
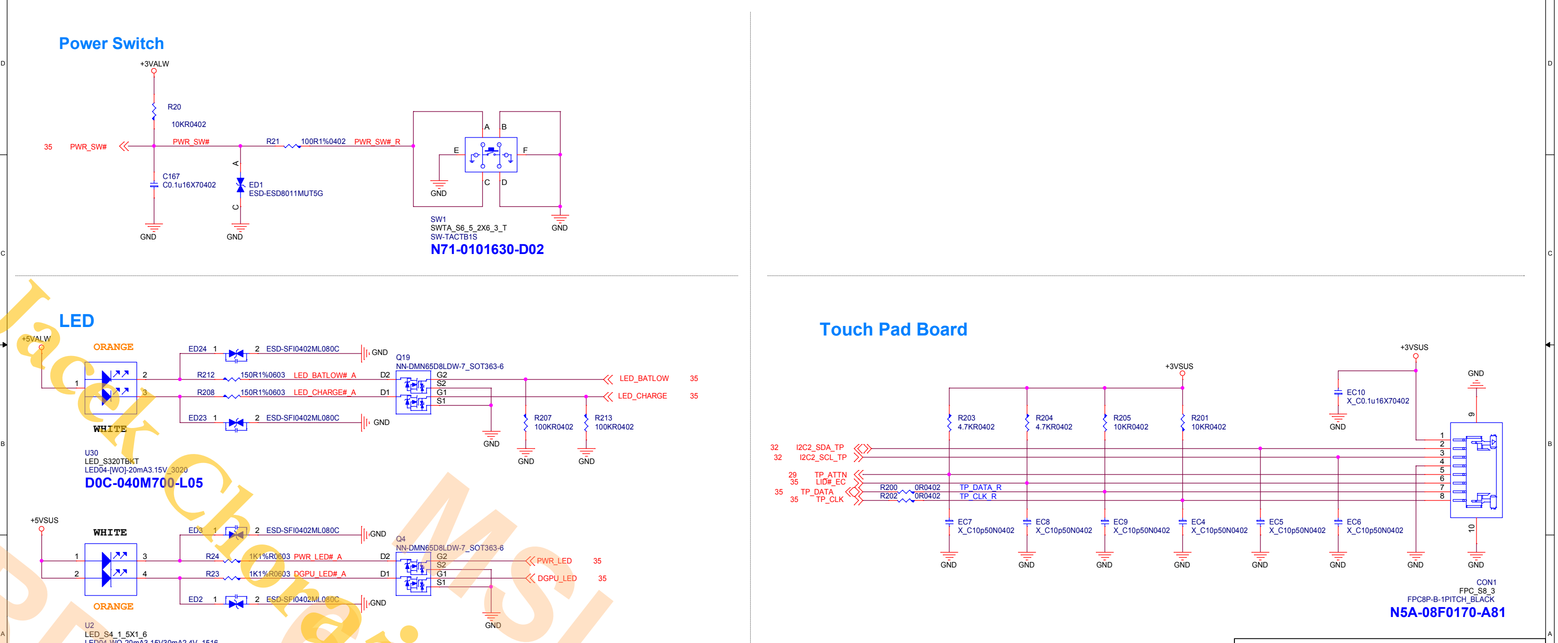
KBC/EC/uP (ENE9028)



msi	MICRO-STAR INT'L CO.,LTD.	
Title	EC(ENE9028)	
Size Custom	Document Number MS-16W1	Rev 10
Date:	Tuesday, August 13, 2019	Sheet 35 of 66

Power Switch /Touch Pad / LED



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

Title	Power Switch/FAN/Touch Pad/LED	
Size Custom	Document Number MS-16W1	Rev 10
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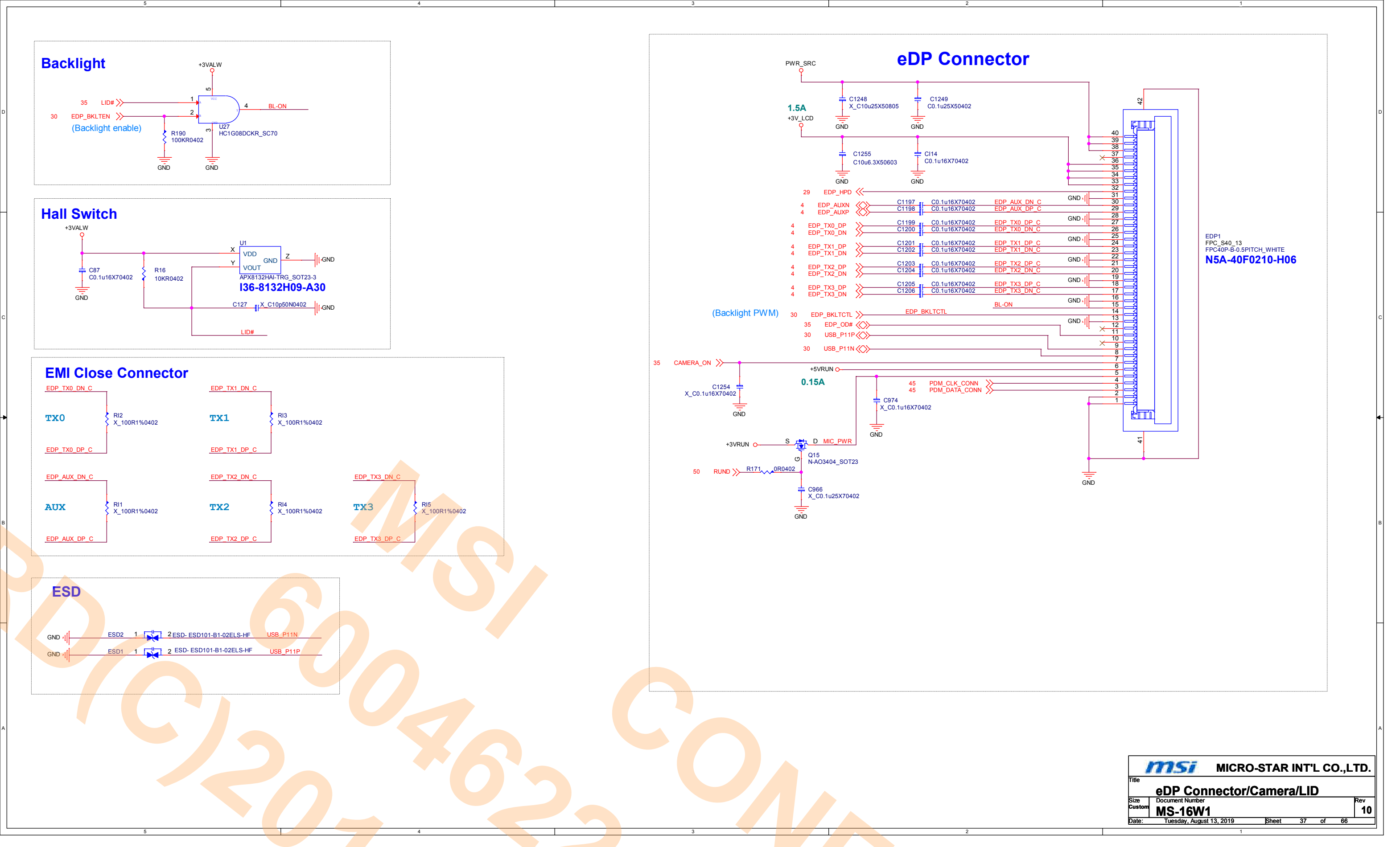

msi MICRO-STAR INT'L CO.,LTD.

Title	eDP Connector/Camera/LID	
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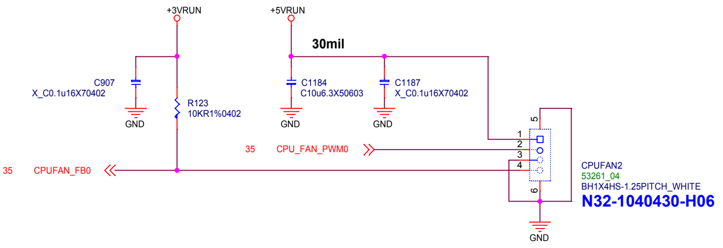
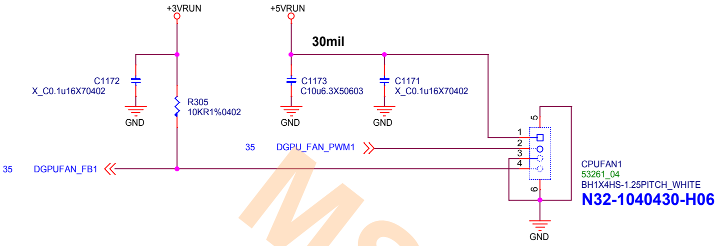
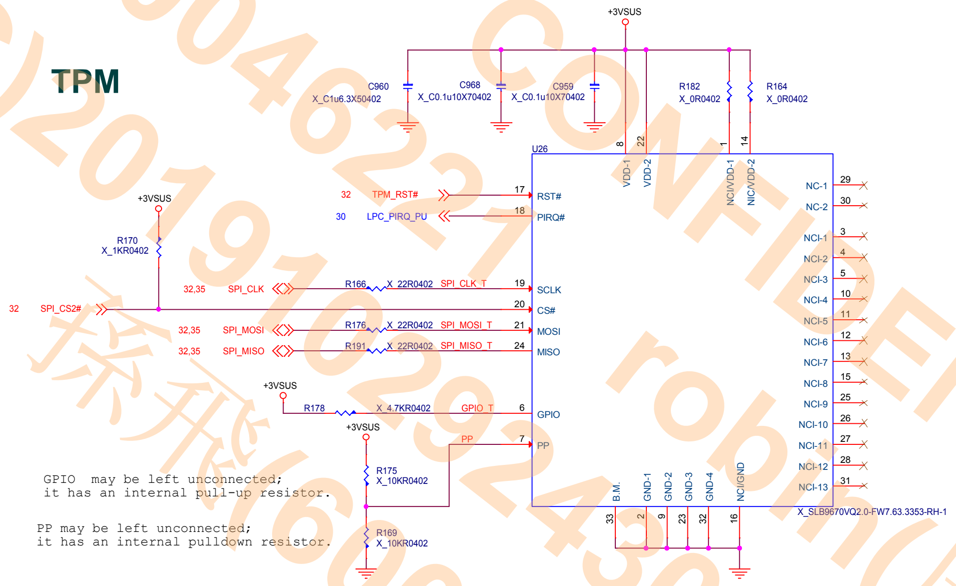
CPU FAN



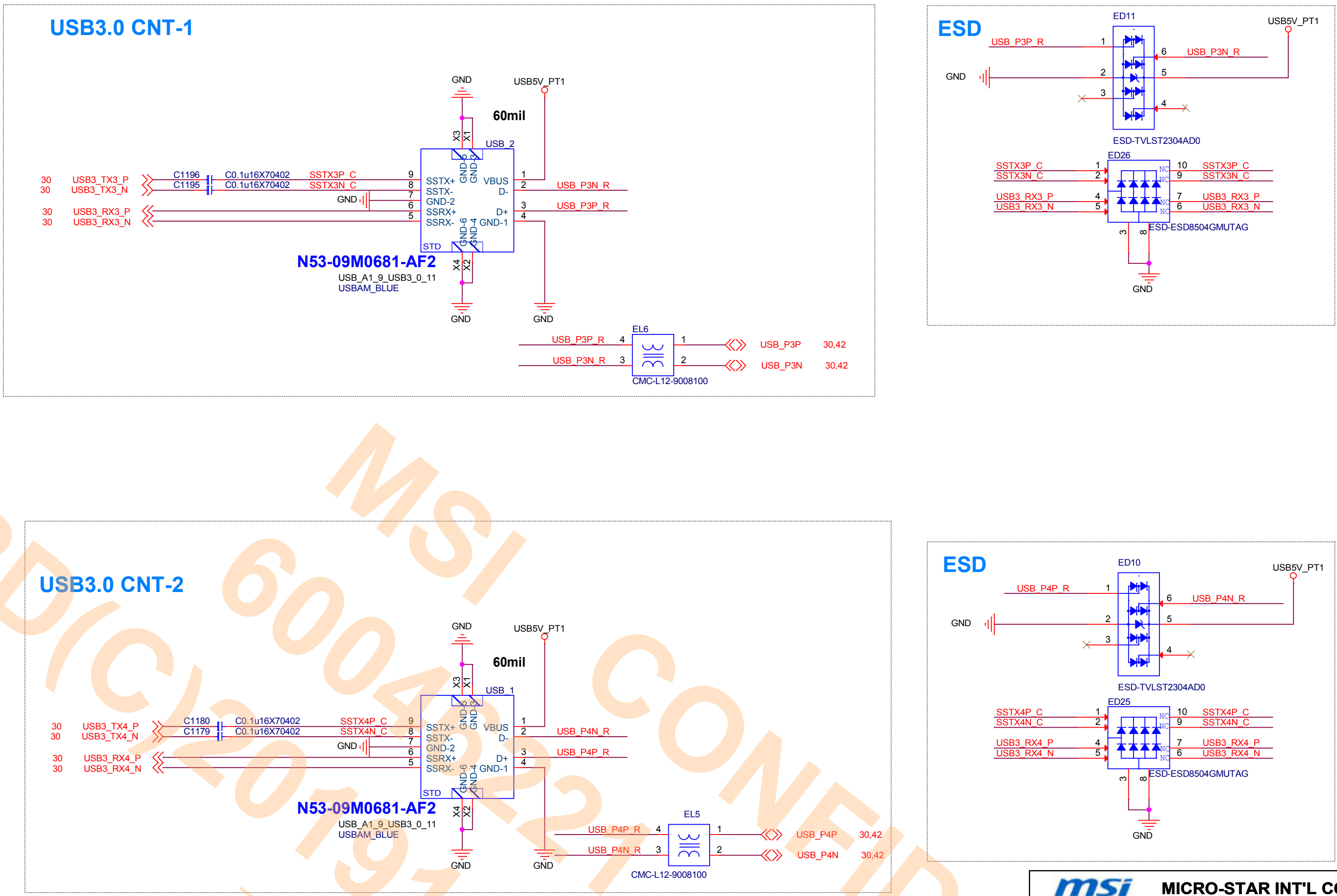
DGPU FAN



TPM



msi	MICRO-STAR INT'L CO.,LTD.	
Title	FAN	
Size Custom	Document Number MS-16W1	Rev 10
Date: Tuesday, August 13, 2019	Sheet 38 of 66	



MICRO-STAR INT'L CO.,LTD.

Title	USB 3.0 TYPE_A	
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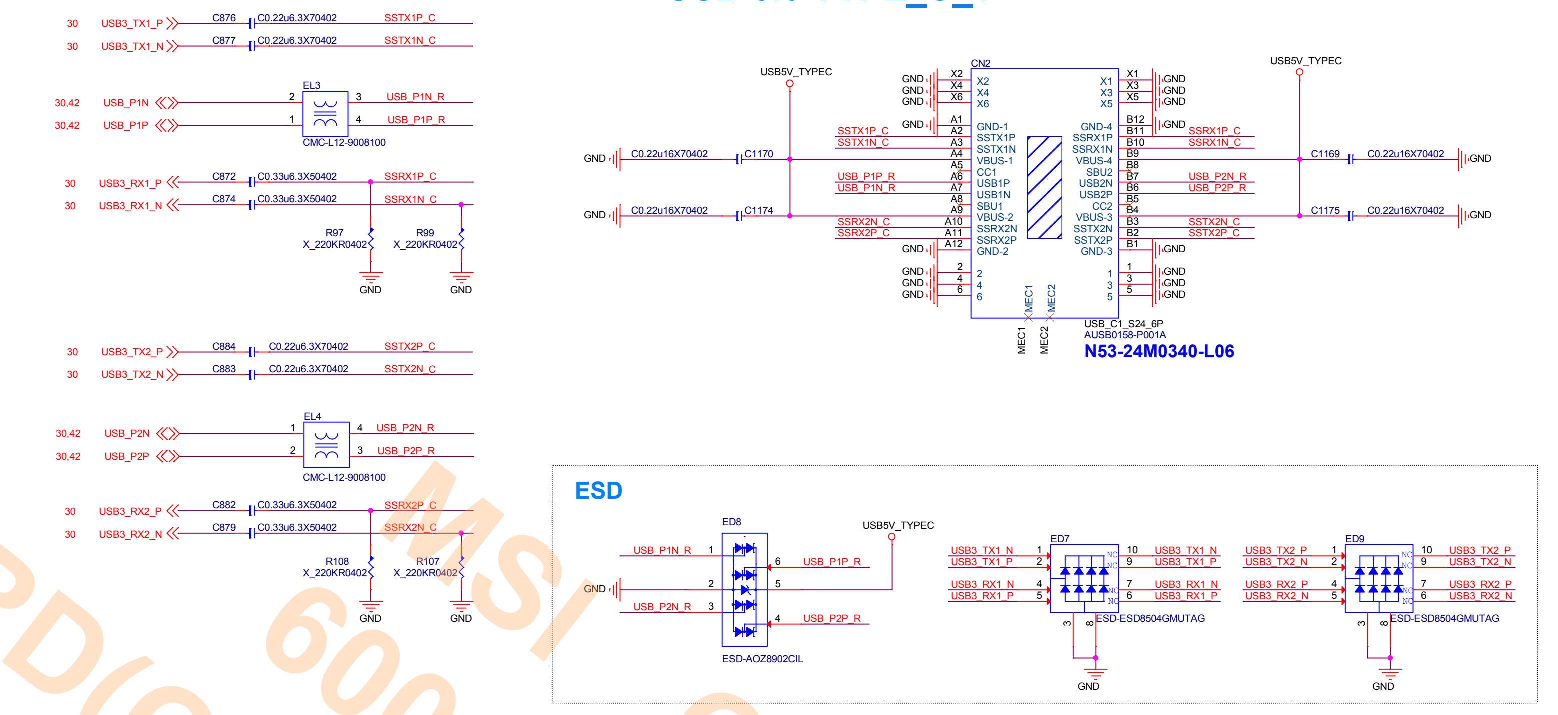
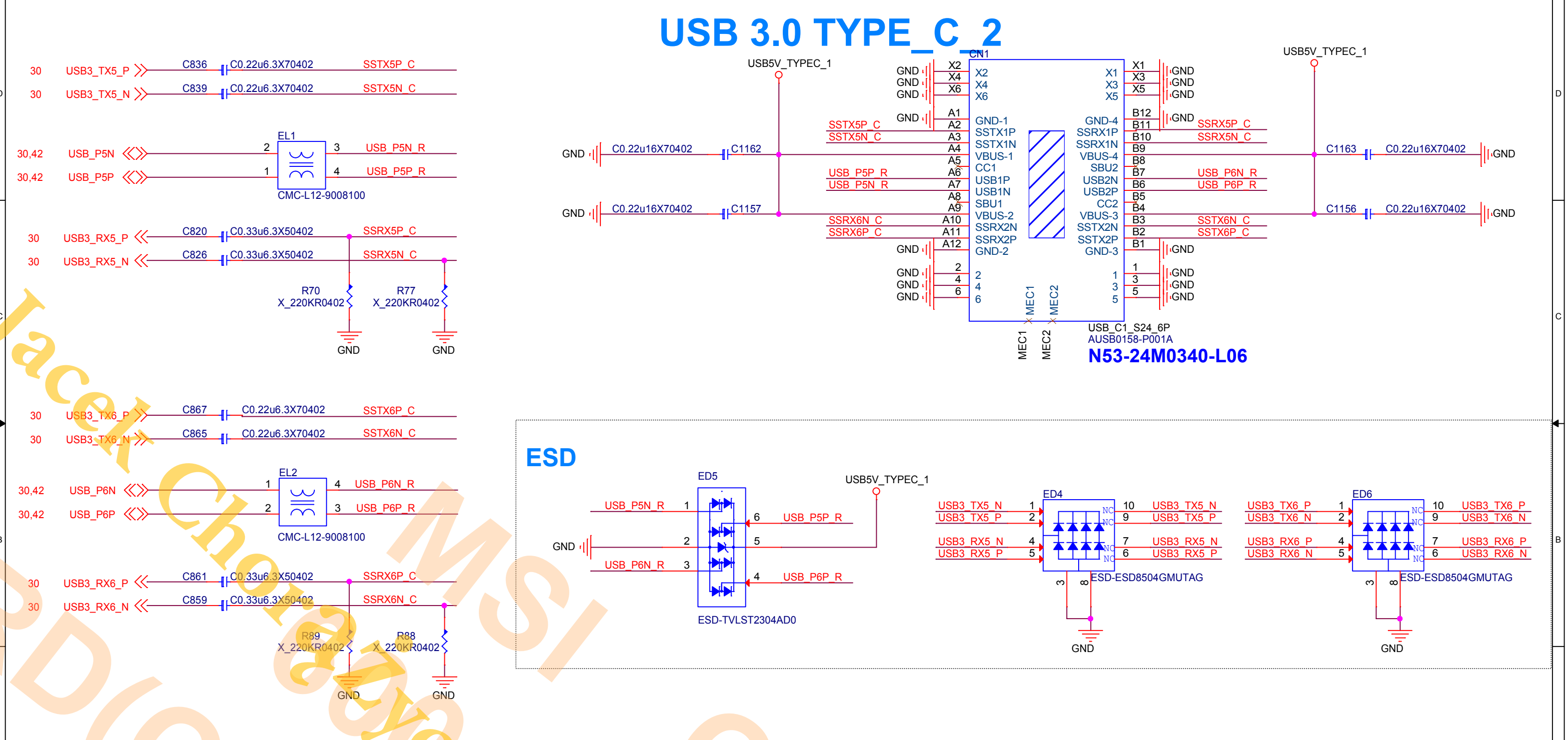
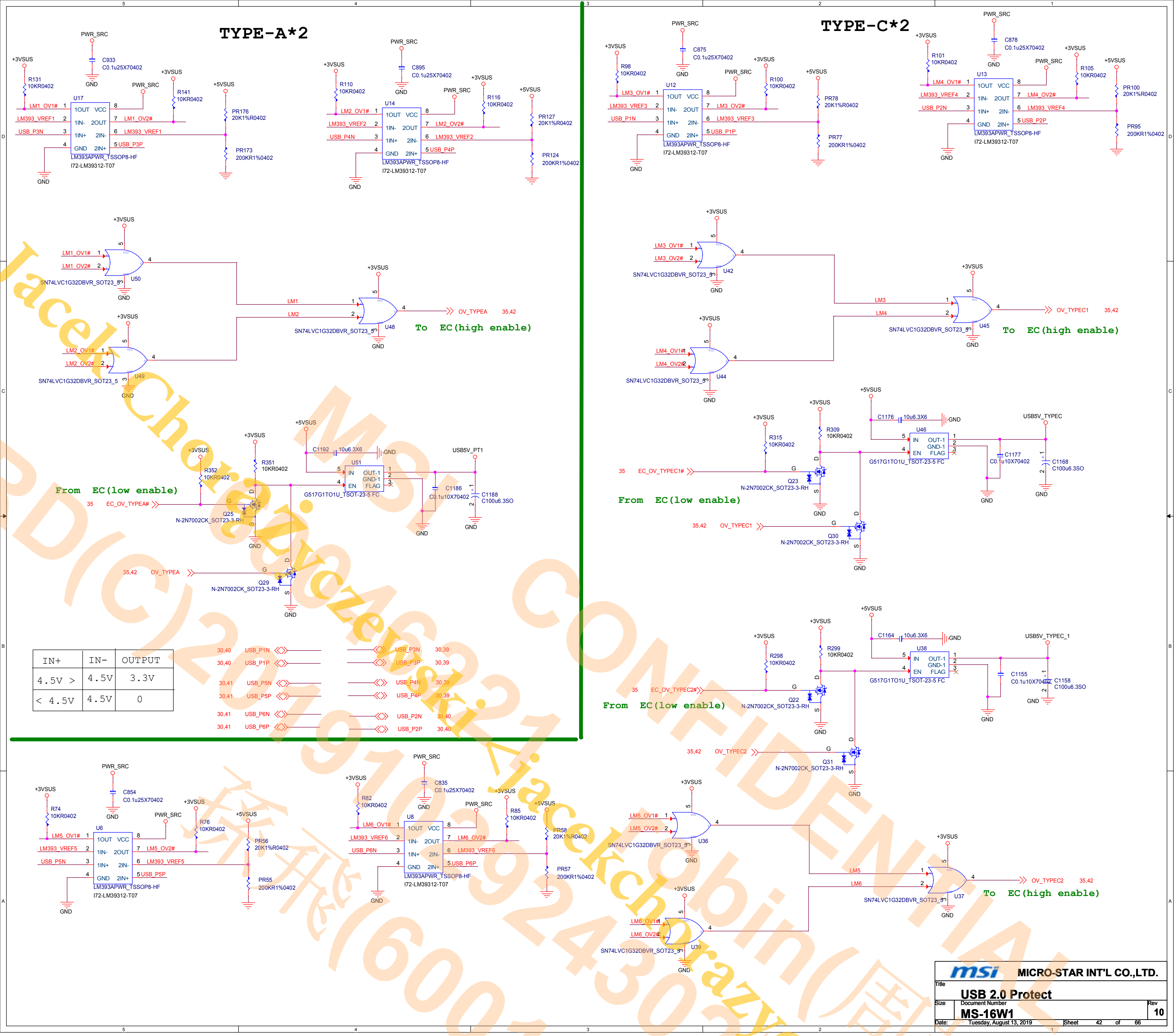
USB 3.0 TYPE_C_1





MICRO-STAR INT'L CO.,LTD.

Title	USB 3.0 TYPE_C	
Size Custom	Document Number MS-16W1	Rev 10
Date:	Sheet 41 of 66	



IN+	IN-	OUTPUT
4.5V >	4.5V	3.3V
< 4.5V	4.5V	0

MICRO-STAR INT'L CO.,LTD.

Title: USB 2.0 Protect

Size | Document Number: MS-16W1 | Rev: 10

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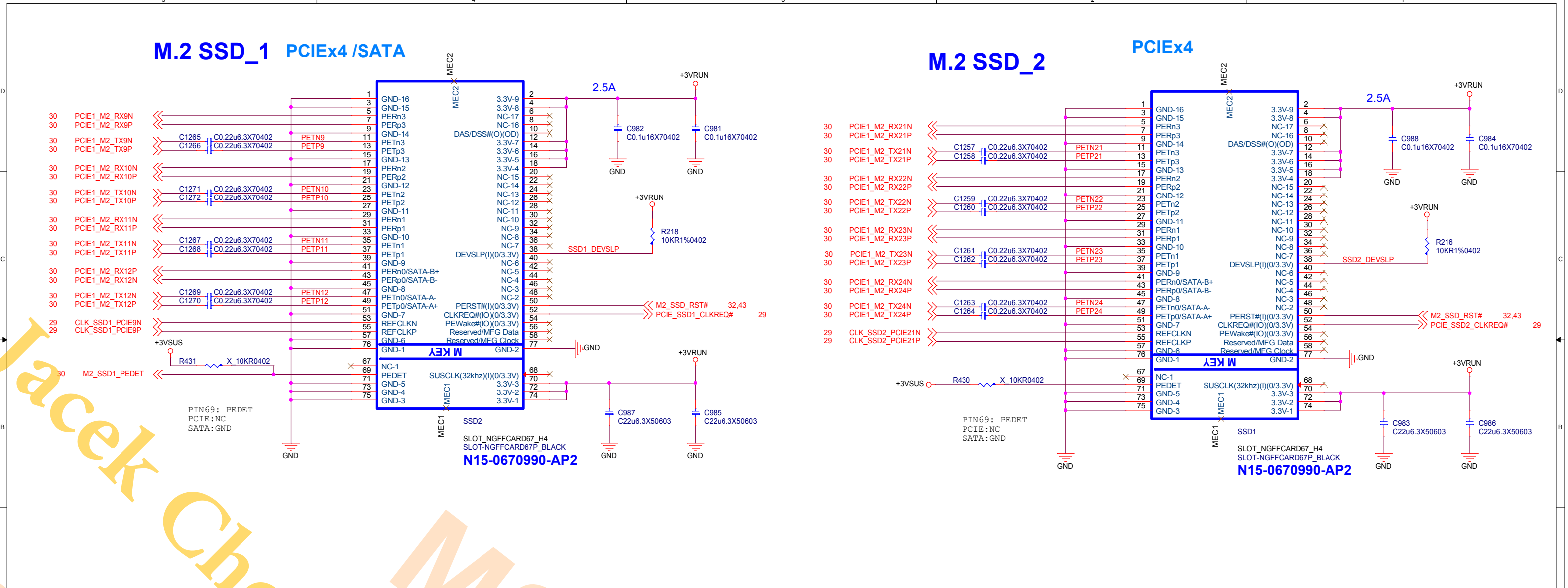

MICRO-STAR INT'L CO.,LTD.

Title	M.2 SSD/HDD
Size: Custom	Document Number: MS-16W1
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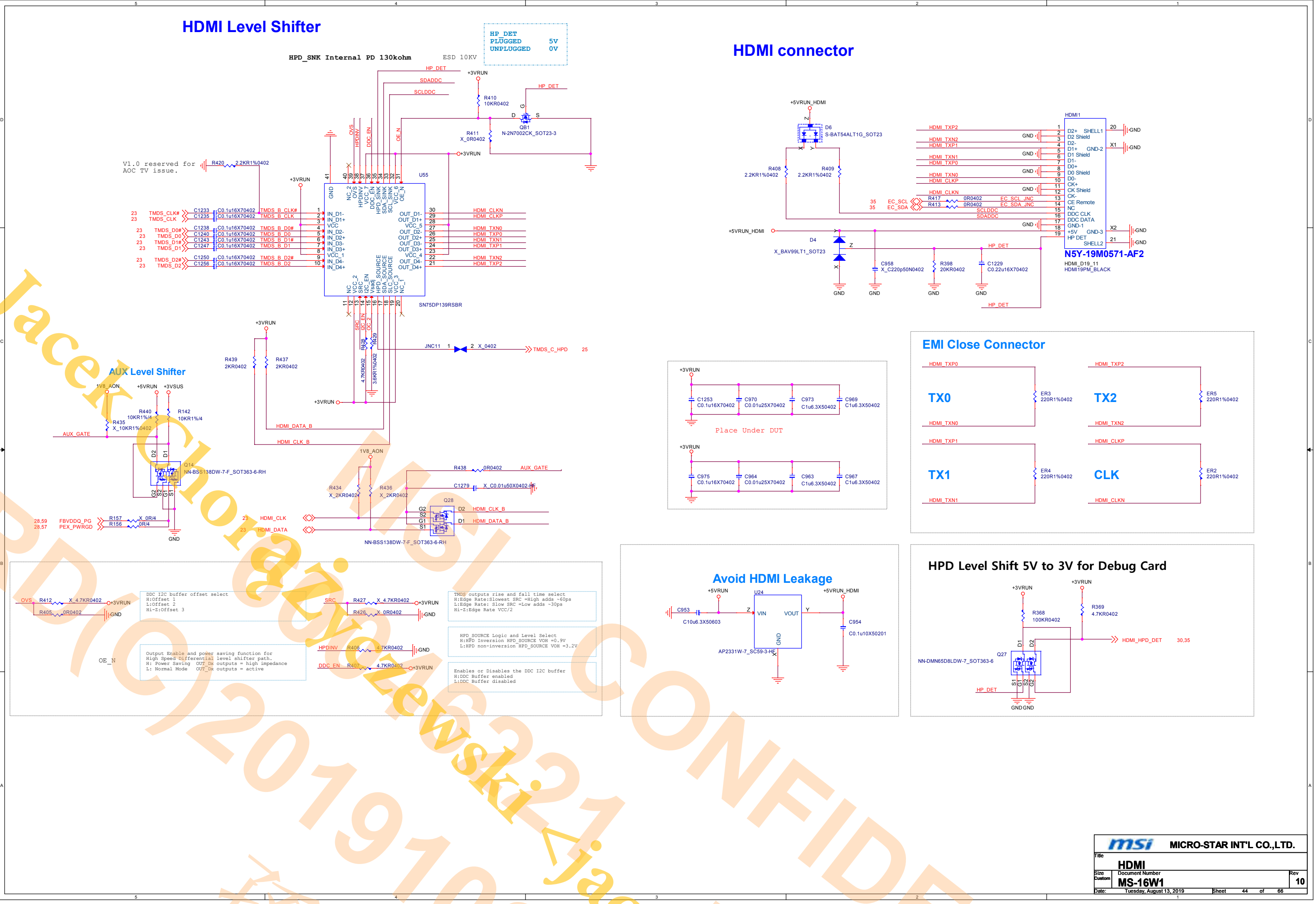

MICRO-STAR INT'L CO.,LTD.

Title	HDMI
Size Custom	Document Number MS-16W1
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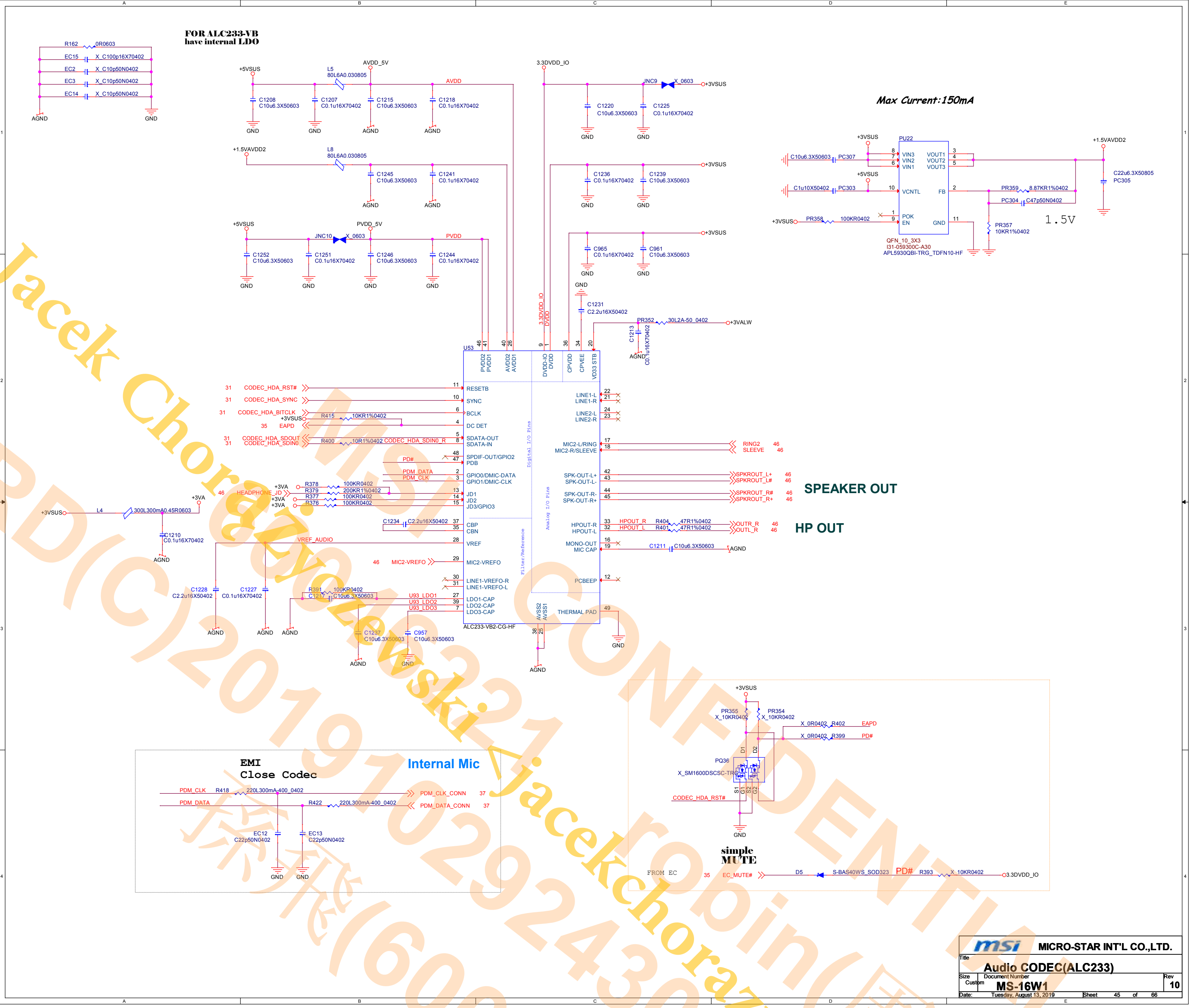
FOR ALC233-VB
have internal LDO
Max Current:150mA
1.5V
SPEAKER OUT
HP OUT
EMI
Close Codec
Internal Mic
simple
MUTE
FROM EC
U53
ALC233-VB2-CG-HF
PU22
APL5930QBI-TRG_TDFN10-HF
RESETB
SYNC
BCLK
DC DET
SDATA-OUT
SDATA-IN
SPDIF-OUT/GPIO2
PDB
GPIO0/DMIC-DATA
GPIO1/DMIC-CLK
JD1
JD2
JD3/GPIO3
CBP
CBN
VREF
MIC2-VREFO
LINE1-VREFO-R
LINE1-VREFO-L
LDO1-CAP
LDO2-CAP
LDO3-CAP
LINE1-L
LINE1-R
LINE2-L
LINE2-R
MIC2-L/RING
MIC2-R/SLEEVE
SPK-OUT-L+
SPK-OUT-L-
SPK-OUT-R-
SPK-OUT-R+
HPOUT-R
HPOUT-L
MONO-OUT
MIC CAP
PCBEEP
THERMAL PAD
CODEC_HDA_RST#
CODEC_HDA_SYNC
CODEC_HDA_BITCLK
EAPD
CODEC_HDA_SDOUT
CODEC_HDA_SDIN0
PDM_DATA
PDM_CLK
HEADPHONE_JD
VREF_AUDIO
MIC2-VREFO
RING2
SLEEVE
SPKROUT_L+
SPKROUT_L#
SPKROUT_R#
SPKROUT_R+
OUTR_R
OUTL_R
PDM_CLK_CONN
PDM_DATA_CONN
EC_MUTE#
PD#
+3VSUS
+5VSUS
+1.5VAVDD2
AVDD_5V
PVDD_5V
3.3DVDD_IO
+3VALW
+3VA
AGND
GND
MICRO-STAR INT'L CO.,LTD.
Title
Audio CODEC(ALC233)
Size
Custom
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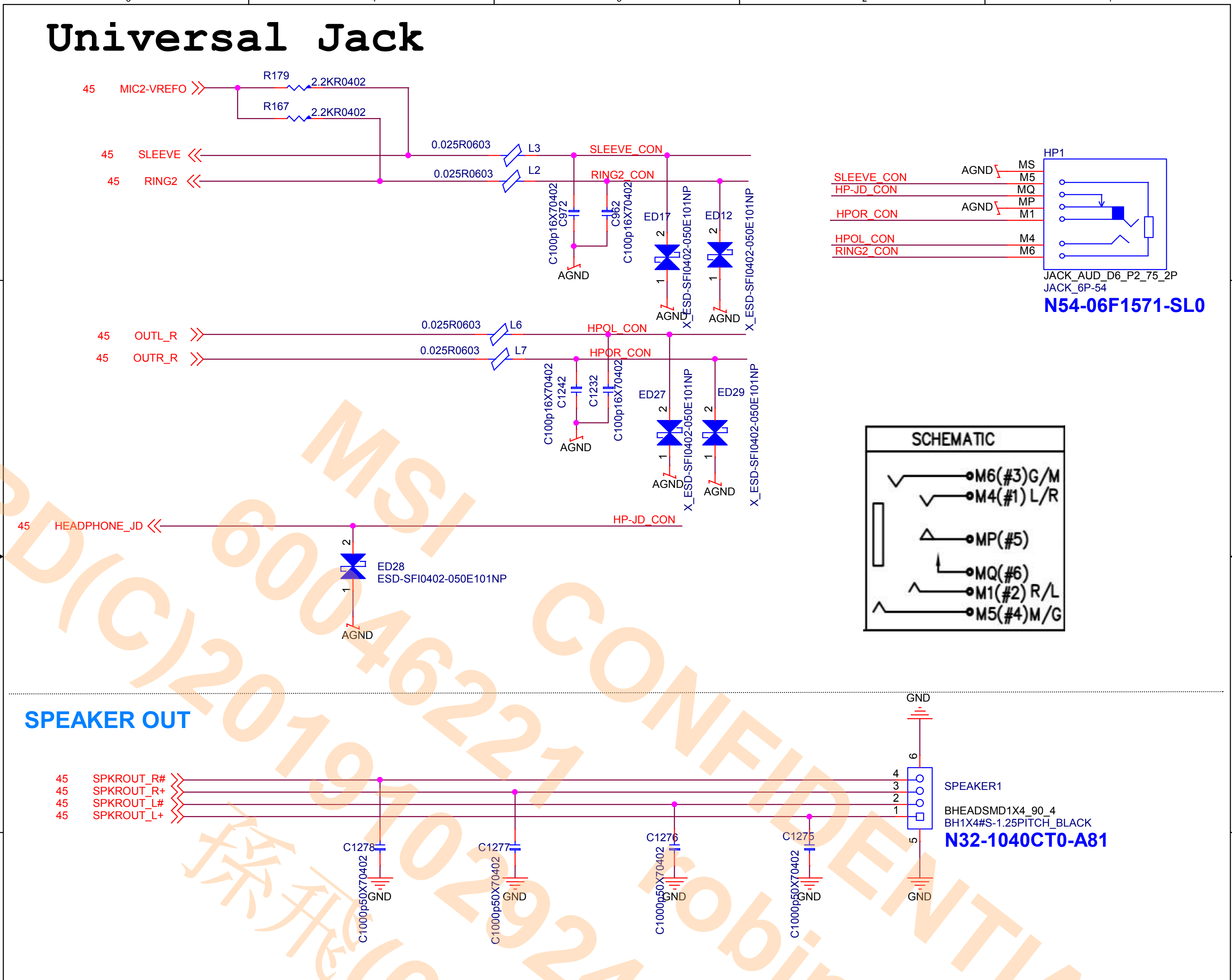
Universal Jack



MICRO-STAR INT'L CO.,LTD.

Title	Audio CONN	
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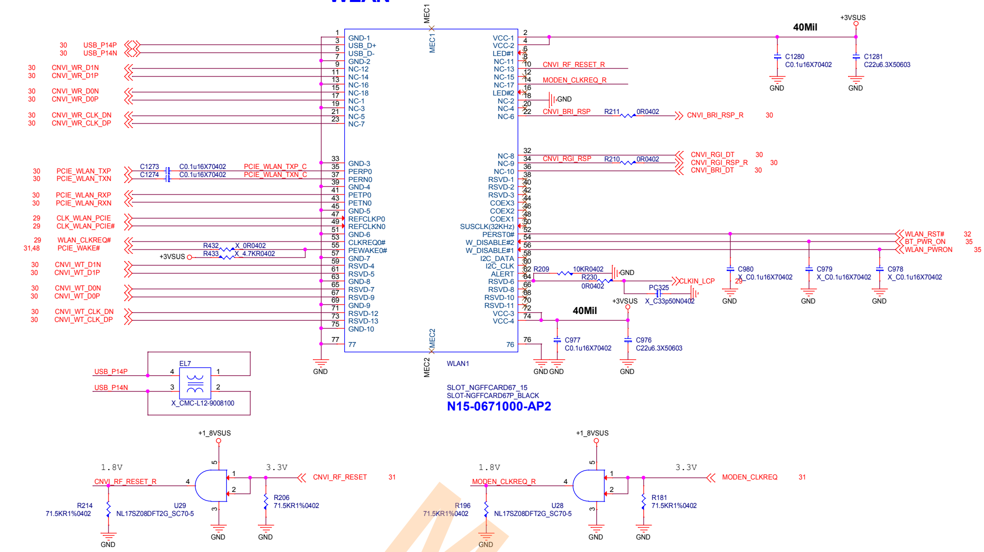
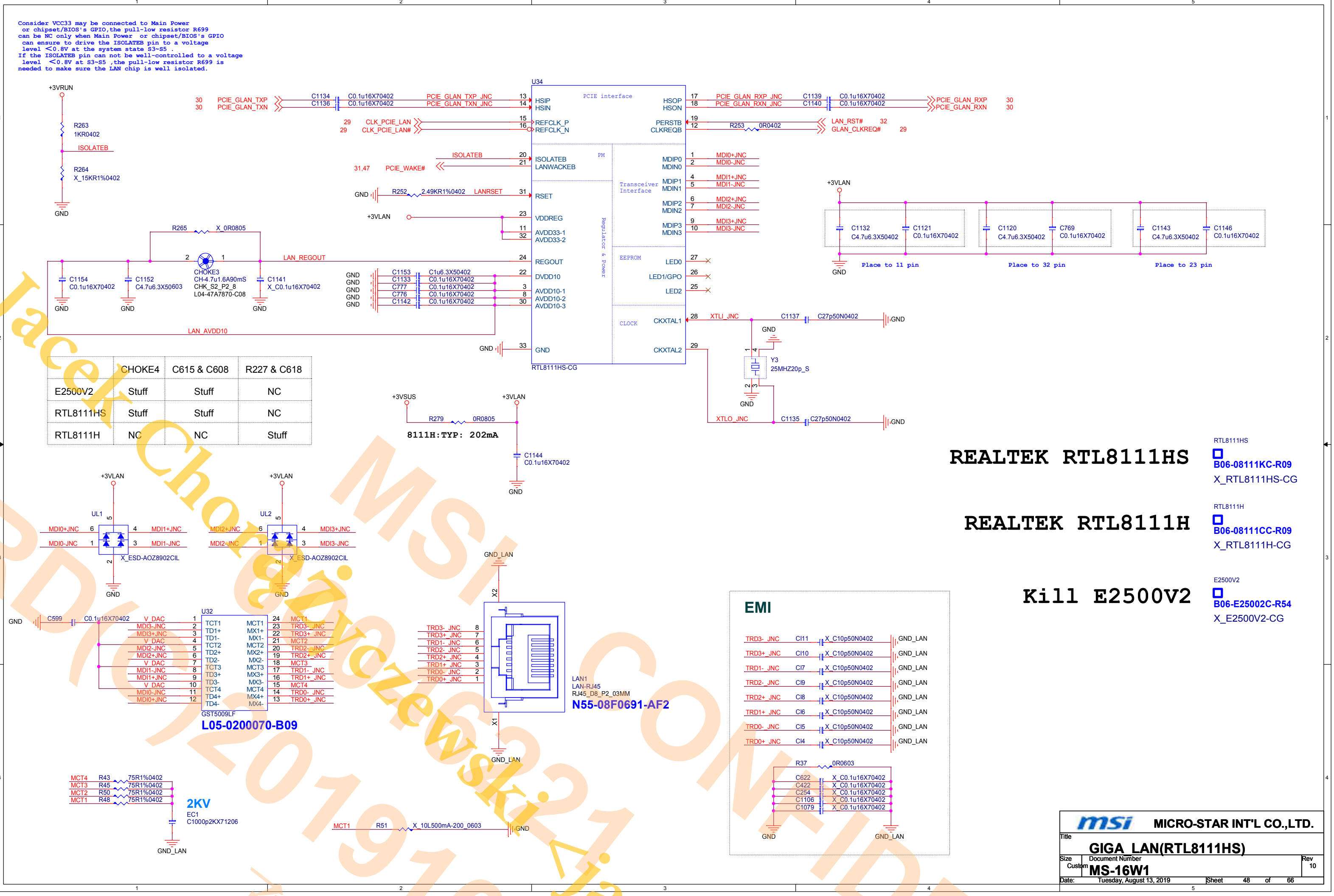
WLAN



Pin #	M.2 WLAN	INTEL CNVi WLAN	Pin #	M.2 WLAN	INTEL CNVi WLAN
Pin 1	GND	GND	Pin 2	3.3V	3.3V
Pin 3	USB_D+	N/C	Pin 4	3.3V	3.3V
Pin 5	USB_D-	N/C	Pin 6	LED1#	LED1#
Pin 7	GND	GND	Pin 8	Module Key	N/C
Pin 9	Module Key	WGR_D1N	Pin 10	Module Key	RF_RESET_B(1.8V)
Pin 11	Module Key	WGR_D1P	Pin 12	Module Key	N/C
Pin 13	Module Key	GND	Pin 14	Module Key	CLKREQ0(1.8V)
Pin 15	Module Key	WGR_D0N	Pin 16	LED2#	LED2#
Pin 17	N/C	WGR_D0P	Pin 18	GND	GND
Pin 19	N/C	GND	Pin 20	N/C	N/C
Pin 21	N/C	WGR_CLKN	Pin 22	N/C	BRI_RSP(1.8V)
Pin 23	N/C	WGR_CLKP	Pin 24	Module Key	Module Key
Pin 25	Module Key	Module Key	Pin 26	Module Key	Module Key
Pin 27	Module Key	Module Key	Pin 28	Module Key	Module Key
Pin 29	Module Key	Module Key	Pin 30	Module Key	Module Key
Pin 31	Module Key	Module Key	Pin 32	N/C	RGI_DT(1.8V)
Pin 33	GND	GND	Pin 34	N/C	RGI_RSP(1.8V)
Pin 35	PERP0	N/C	Pin 36	N/C	BGI_DT(1.8V)
Pin 37	PERN0	N/C	Pin 38	N/C	N/C
Pin 39	GND	GND	Pin 40	N/C	N/C
Pin 41	PETP0	N/C	Pin 42	N/C	N/C
Pin 43	PETN0	N/C	Pin 44	N/C	N/C
Pin 45	GND	GND	Pin 46	N/C	N/C
Pin 47	REFCLKP0	N/C	Pin 48	N/C	N/C
Pin 49	REFCLKN0	N/C	Pin 50	SUSCLK (32KHz)	SUSCLK (32KHz)
Pin 51	GND	GND	Pin 52	PERST0#	N/C
Pin 53	CLKREQ0#	N/C	Pin 54	BT_EN (W_DISABLE2#)	BT_EN (W_DISABLE2#)
Pin 55	PEWAKE0#	N/C	Pin 56	WLAN_EN (W_DISABLE2#)	WLAN_EN (W_DISABLE2#)
Pin 57	GND	GND	Pin 58	N/C	N/C
Pin 59	N/C	WT_D1N	Pin 60	N/C	N/C
Pin 61	N/C	WT_D1P	Pin 62	N/C	N/C
Pin 63	GND	GND	Pin 64	Resever	REFCLK0(38.4MKz)
Pin 65	N/C	WT_D0N	Pin 66	N/C	N/C
Pin 67	N/C	WT_D0P	Pin 68	N/C	N/C
Pin 69	GND	GND	Pin 70	N/C	N/C
Pin 71	N/C	WT_CLKN	Pin 72	3.3V	3.3V
Pin 73	N/C	WT_CLKP	Pin 74	3.3V	3.3V
Pin 75	GND	GND			



	CHOKE4	C615 & C608	R227 & C618
E2500V2	Stuff	Stuff	NC
RTL8111HS	Stuff	Stuff	NC
RTL8111H	NC	NC	Stuff

MICRO-STAR INT'L CO.,LTD.

Title	GIGA_LAN(RTL8111HS)	
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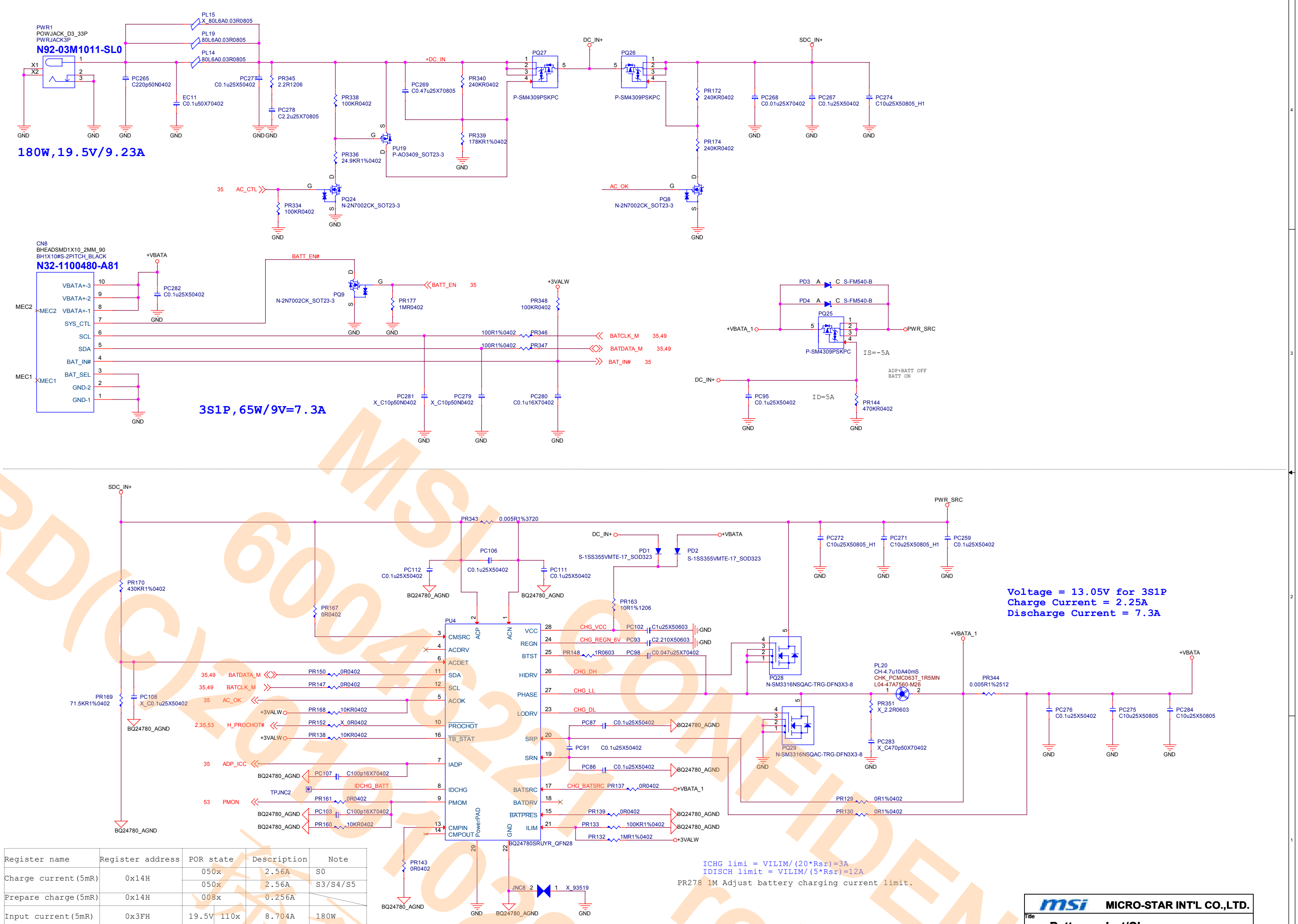

Register name	Register address	POR state		Description	Note
Charge current(5mR)	0x14H	050x		2.56A	S0
		050x		2.56A	S3/S4/S5
Prepare charge(5mR)	0x14H	008x		0.256A	
Input current(5mR)	0x3FH	19.5V	110x	8.704A	180W
Charge voltage	0x15H	43Fx		17.392V	4S1P
Discharge current(5mR)	0x39H	080x		4.096A	BOOST current

ICHG limi = VILIM/(20*Rsr)=3A
IDISCH limit = VILIM/(5*Rsr)=12A
PR278 1M Adjust battery charging current limit.

MICRO-STAR INT'L CO.,LTD.

Title
Battery select/Charger

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Custom	MS-16W1	10

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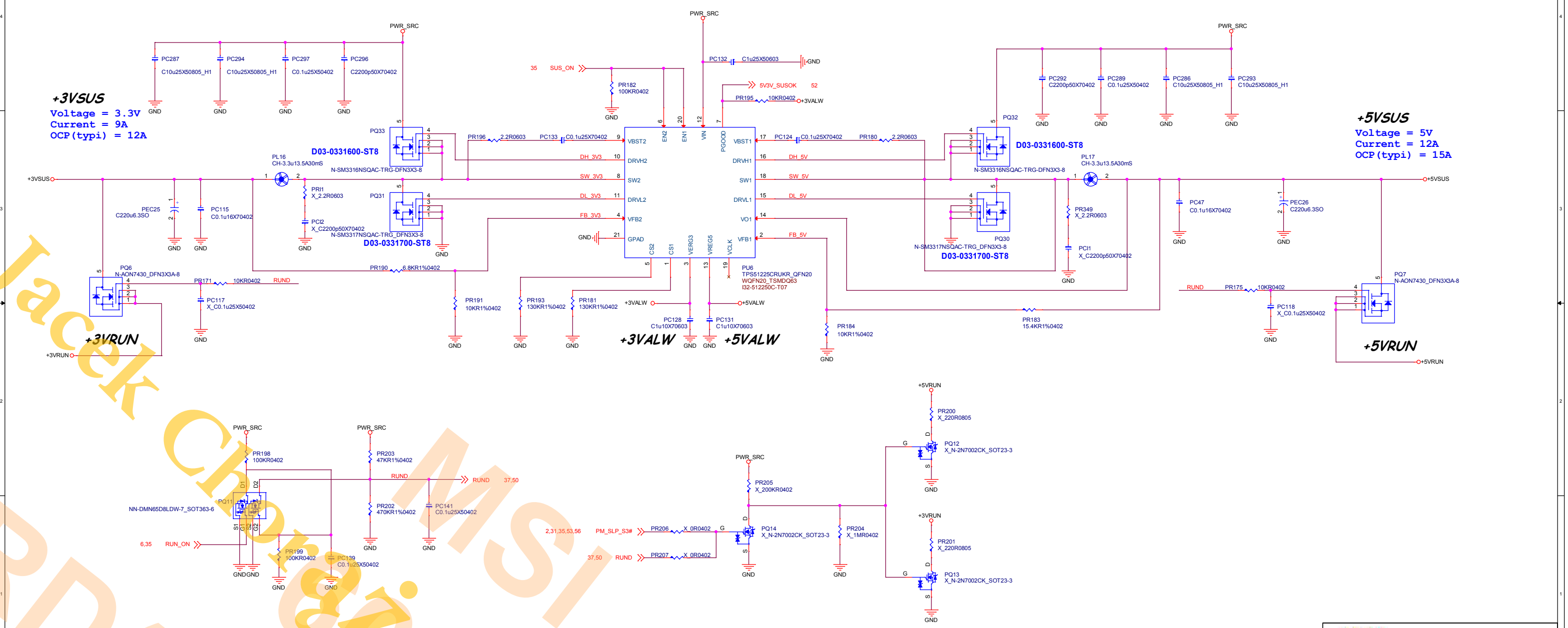
System Power



MICRO-STAR INT'L CO.,LTD.

Title	System Power	
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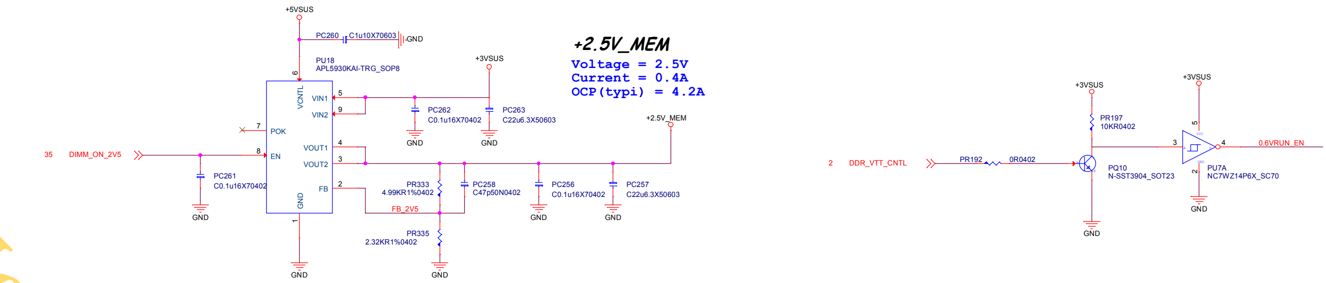
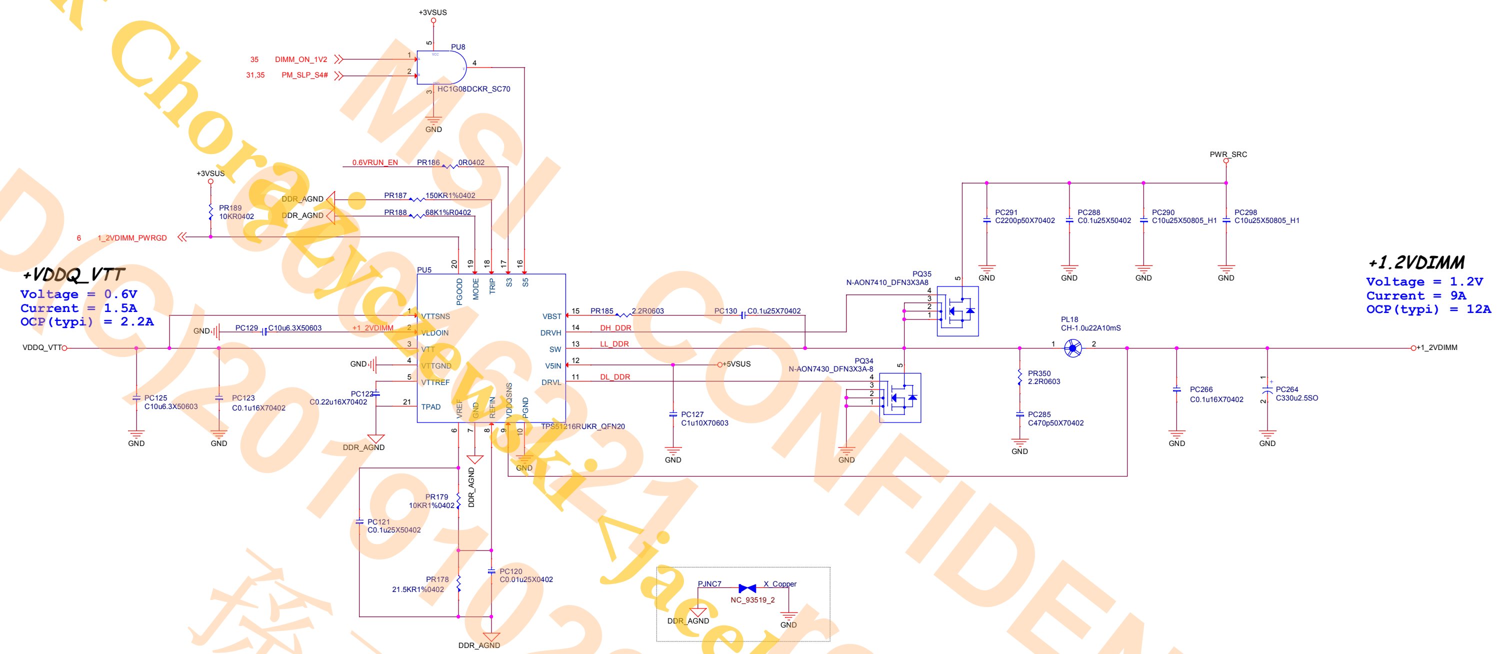
+2.5V_MEM



+1.2VDIMM / VDDQ_VTT(0.6V)



MSI	MICRO-STAR INT'L CO.,LTD.
Title	+2.5VMEM/+1.2VDIMM/VDDQ_VTT
Size: Custom	Document Number: MS-16W1 — Rev 10
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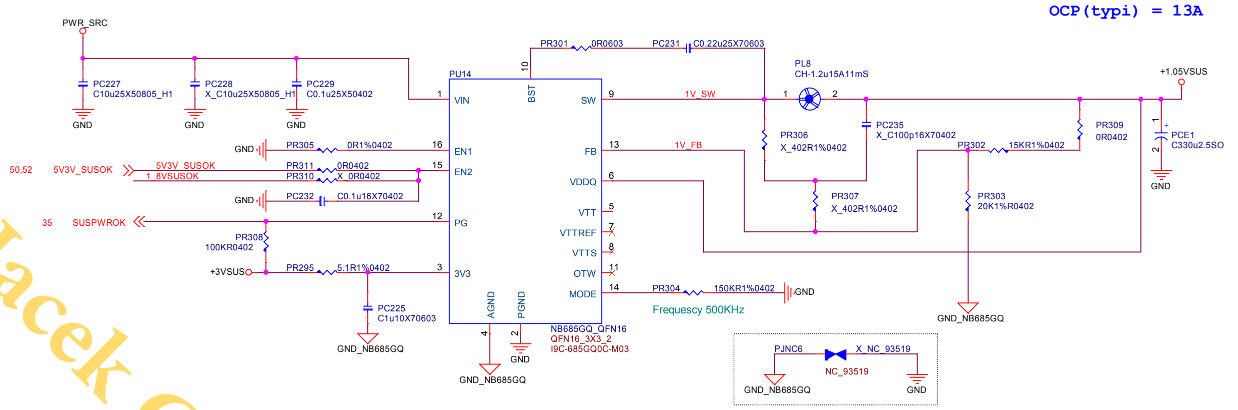
+1.05VSUS

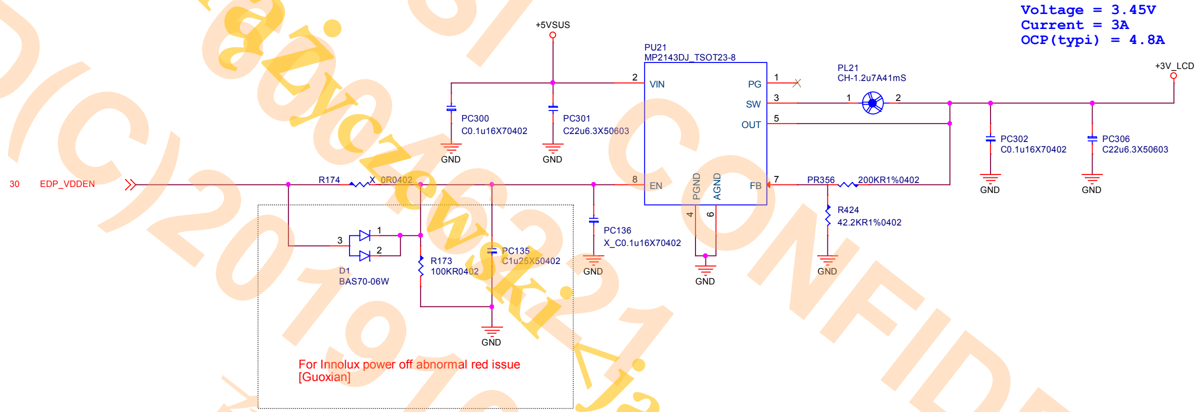
Voltage = 1.05V
Current = 10A
OCP(typi) = 13A



+3V_LCD

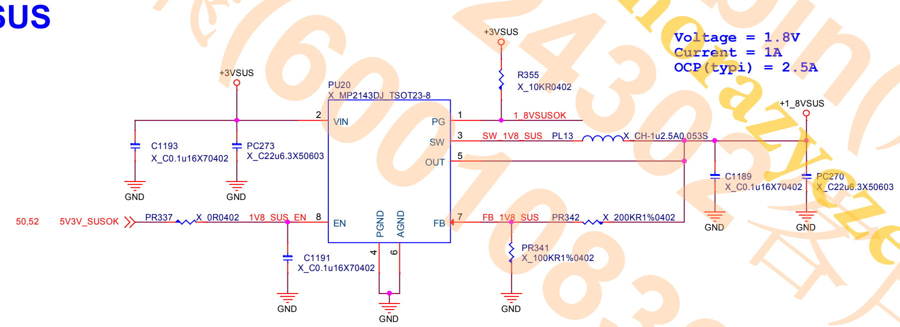
Pannel Device Logic Power

Voltage = 3.45V
Current = 3A
OCP(typi) = 4.8A



+1_8VSUS

Voltage = 1.8V
Current = 1A
OCP(typi) = 2.5A



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

Title	+1.05VSUS/+3V_LCD/+1_8VSUS	
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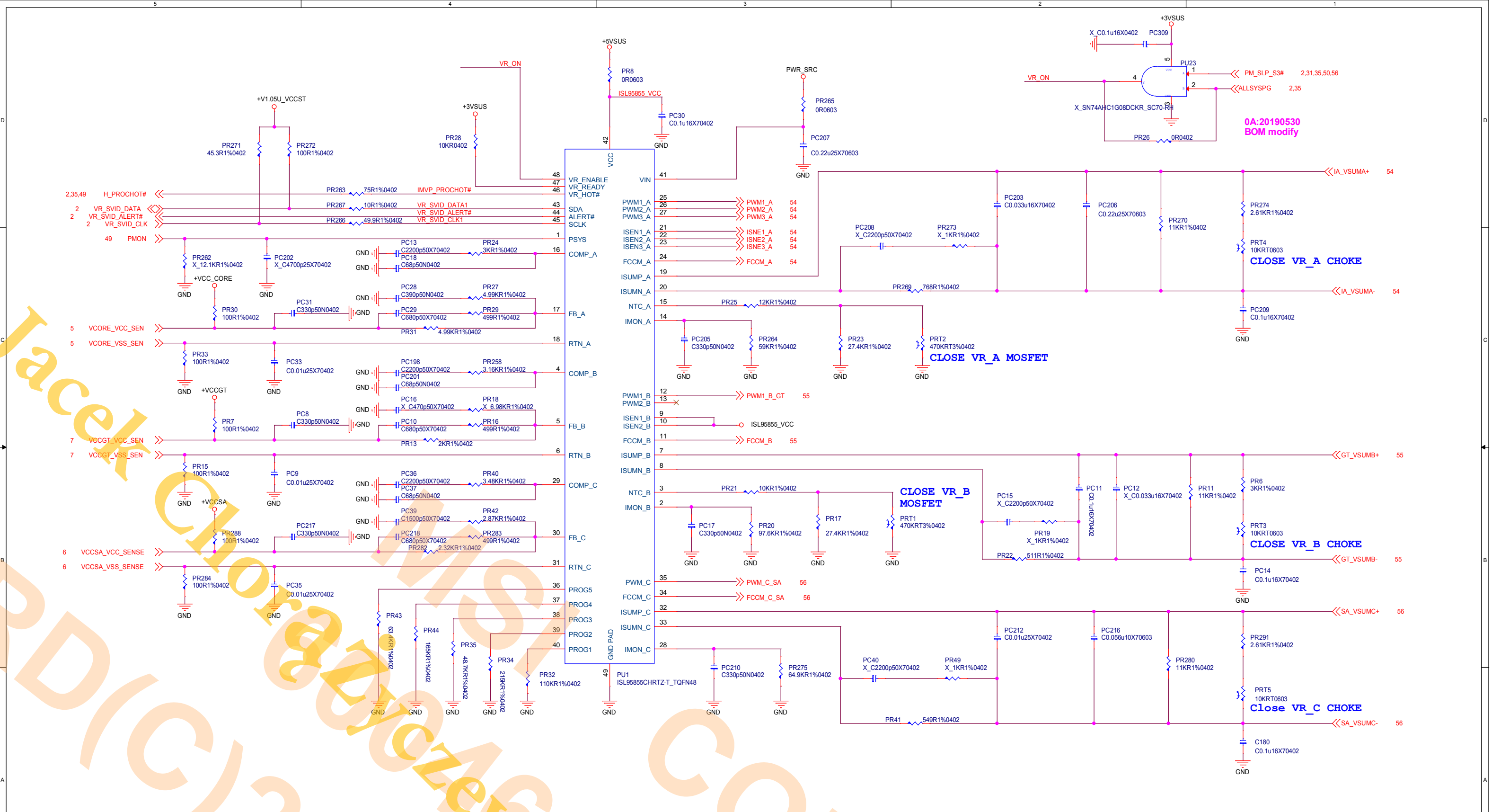

msi	MICRO-STAR INT'L CO.,LTD.	
Title	CPU Power (ISL95855)	
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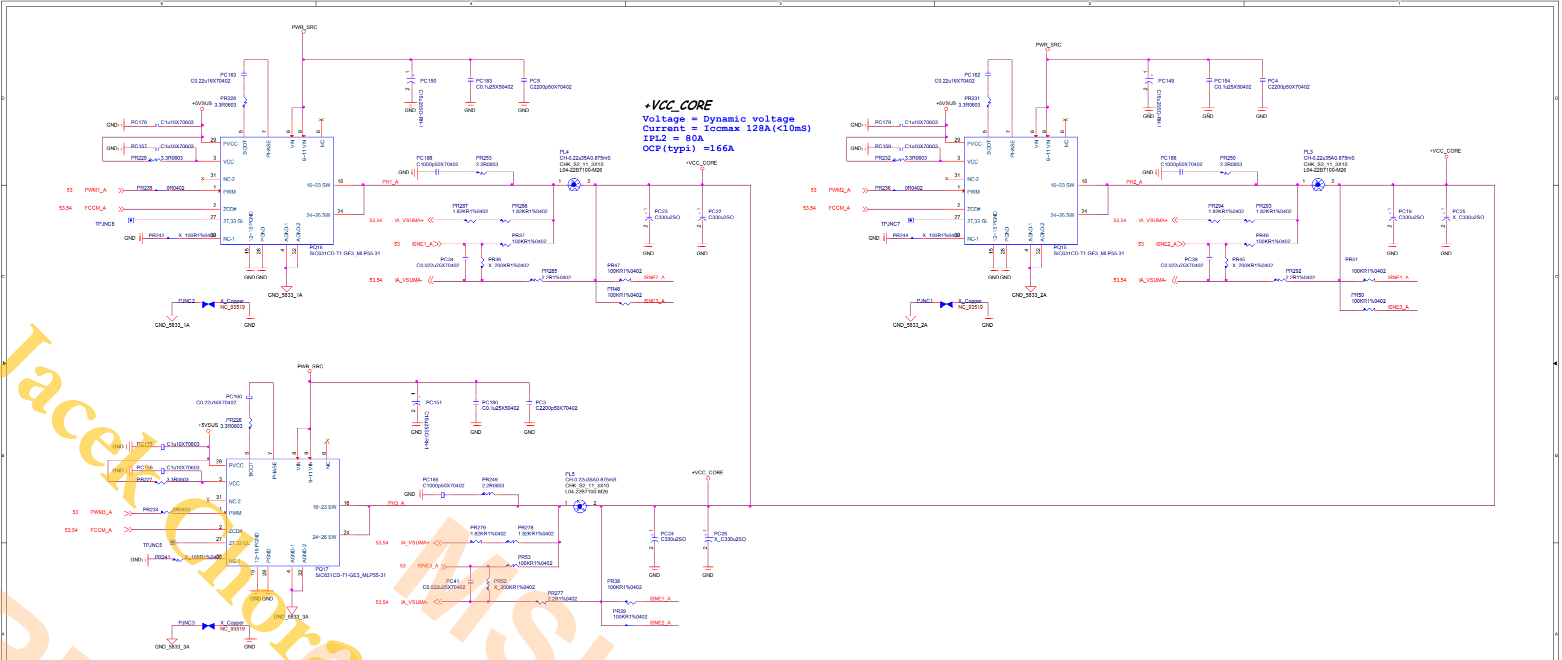

MICRO-STAR INT'L CO.,LTD.

Title	CPU Power (VCore)	
Size: Custom	Document Number: MS-16W1	Rev: 10
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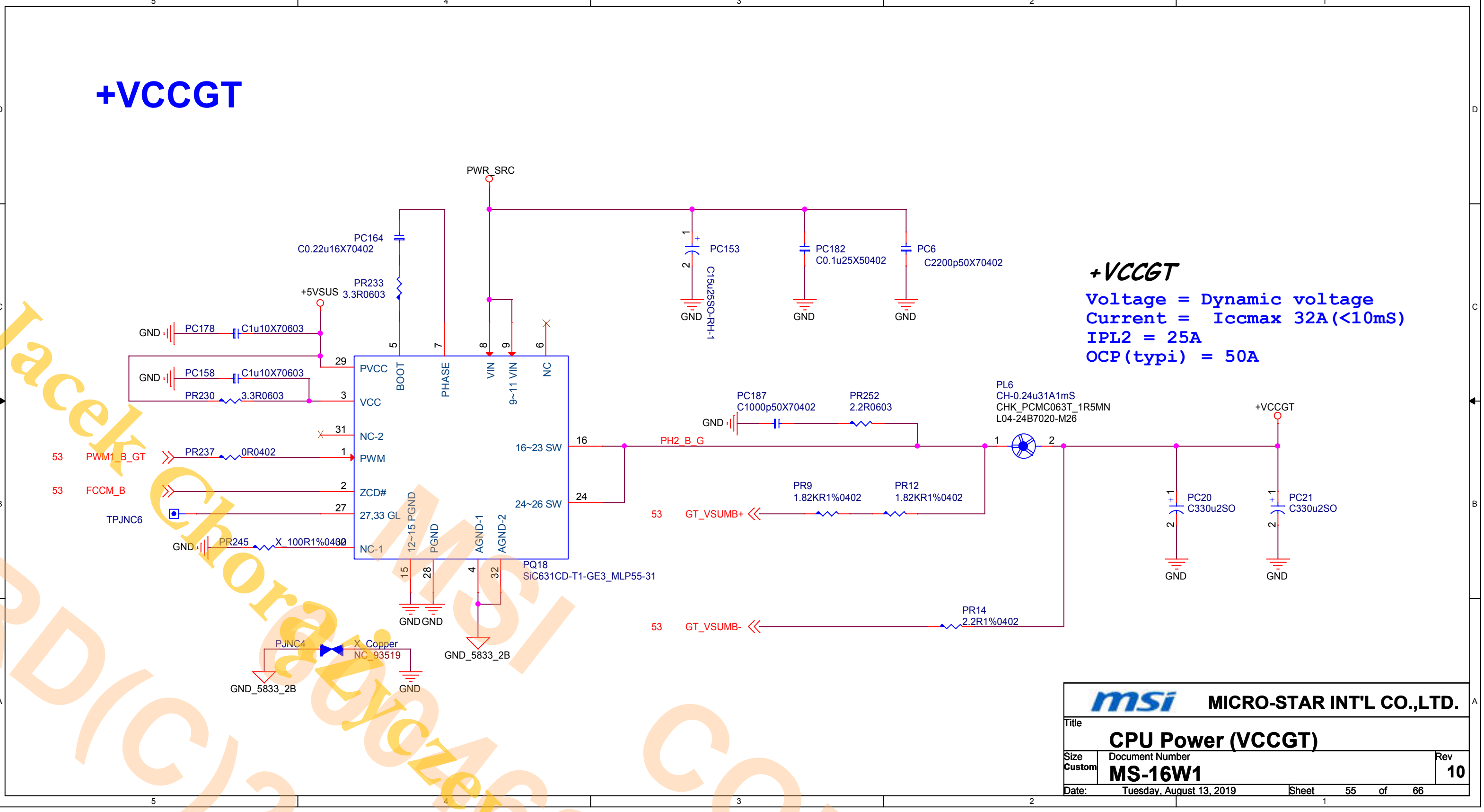
+VCCGT
PWR_SRC
PC164
C0.22u16X70402
PR233
3.3R0603
+5VSUS
GND
PC178
C1u10X70603
PC158
C1u10X70603
PR230
3.3R0603
PC153
C15u25SO-RH-1
PC182
C0.1u25X50402
PC6
C2200p50X70402
PVCC
BOOT
PHASE
VIN
9~11 VIN
NC
VCC
NC-2
PWM
ZCD#
27,33 GL
NC-1
16~23 SW
24~26 SW
12~15 PGND
PGND
AGND-1
AGND-2
PQ18
SiC631CD-T1-GE3_MLP55-31
PWM1_B_GT
PR237
0R0402
FCCM_B
TPJNC6
PR245
100R1%0402
PH2_B_G
PC187
C1000p50X70402
PR252
2.2R0603
PL6
CH-0.24u31A1mS
CHK_PCMC063T_1R5MN
L04-24B7020-M26
+VCCGT
PR9
1.82KR1%0402
PR12
1.82KR1%0402
GT_VSUMB+
GT_VSUMB-
PR14
2.2R1%0402
PC20
C330u2SO
PC21
C330u2SO
PJNC4
Copper
NC_93519
GND_5833_2B
+VCCGT
Voltage = Dynamic voltage
Current = Iccmax 32A(<10mS)
IPL2 = 25A
OCP(typi) = 50A
MICRO-STAR INT'L CO.,LTD.
Title
CPU Power (VCCGT)
Size Custom
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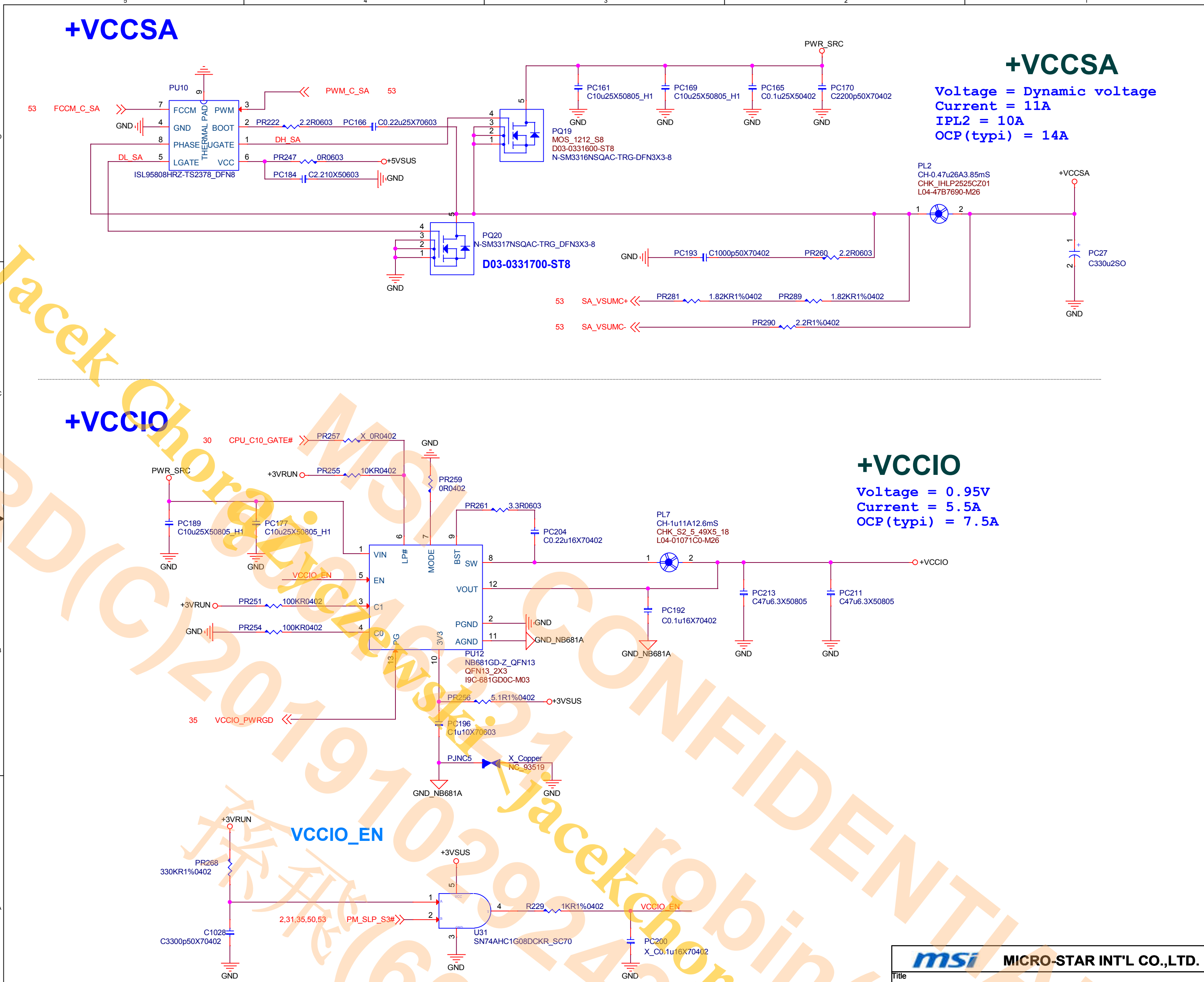

MICRO-STAR INT'L CO.,LTD.

Title	CPU Power (VCCSA/VCCIO)	
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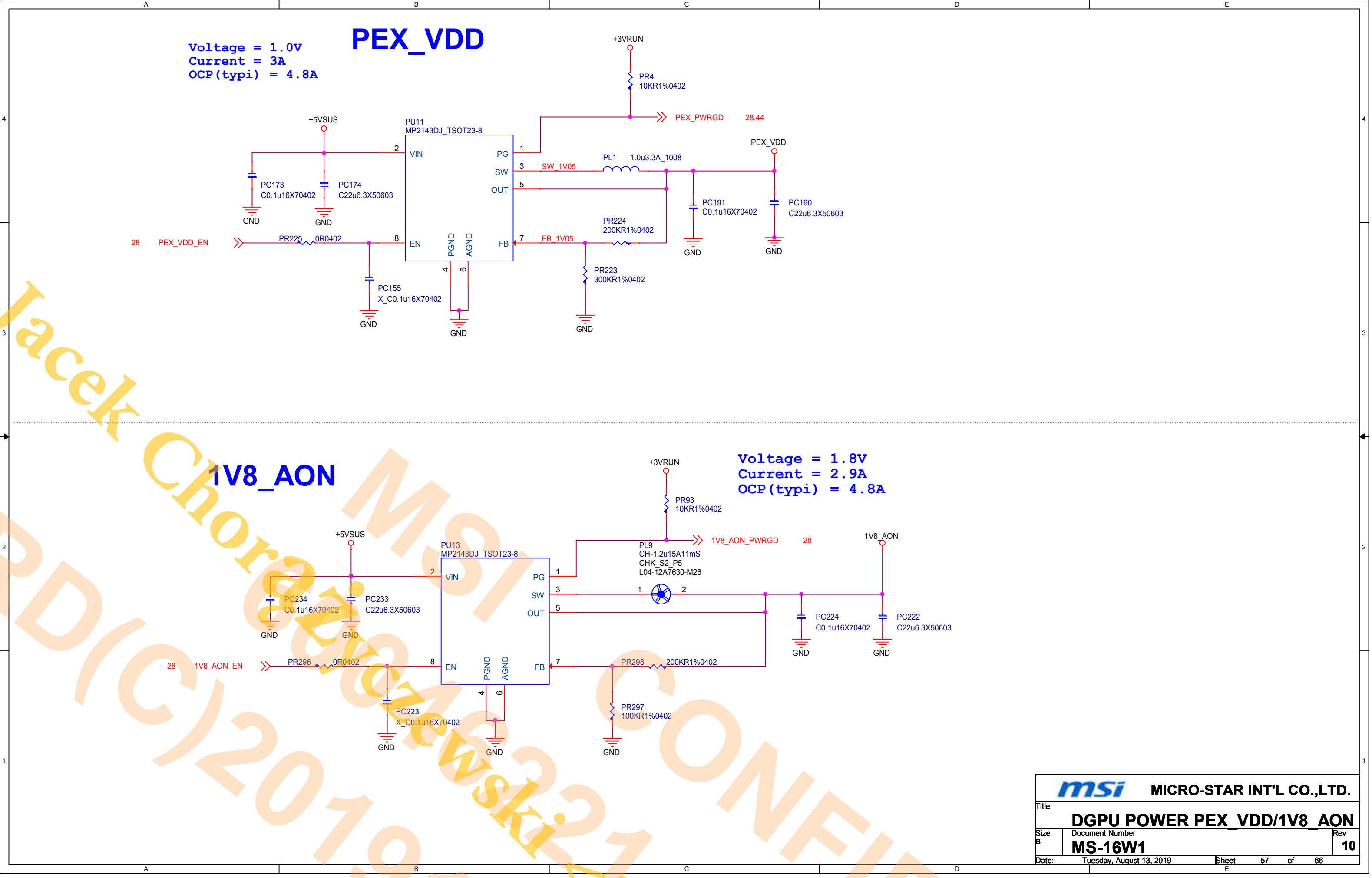
PEX_VDD
Voltage = 1.0V
Current = 3A
OCP(typi) = 4.8A
+3VRUN
PR4
10KR1%0402
PEX_PWRGD
28,44
+5VSUS
PU11
MP2143DJ_TSOT23-8
VIN
PG
SW
OUT
EN
PGND
AGND
FB
SW_1V05
PL1
1.0u3.3A_1008
PEX_VDD
PC173
C0.1u16X70402
PC174
C22u6.3X50603
PC191
C0.1u16X70402
PC190
C22u6.3X50603
PR224
200KR1%0402
28
PEX_VDD_EN
PR225
0R0402
FB_1V05
PC155
X_C0.1u16X70402
PR223
300KR1%0402
GND
1V8_AON
Voltage = 1.8V
Current = 2.9A
OCP(typi) = 4.8A
+3VRUN
PR93
10KR1%0402
+5VSUS
PU13
MP2143DJ_TSOT23-8
1V8_AON_PWRGD
28
1V8_AON
PL9
CH-1.2u15A11mS
CHK_S2_P5
L04-12A7630-M26
PC234
C0.1u16X70402
PC233
C22u6.3X50603
PC224
C0.1u16X70402
PC222
C22u6.3X50603
28
1V8_AON_EN
PR296
0R0402
PR298
200KR1%0402
PC223
X_C0.1u16X70402
PR297
100KR1%0402
GND
msi
MICRO-STAR INT'L CO.,LTD.
Title
DGPU POWER PEX_VDD/1V8_AON
Size
B
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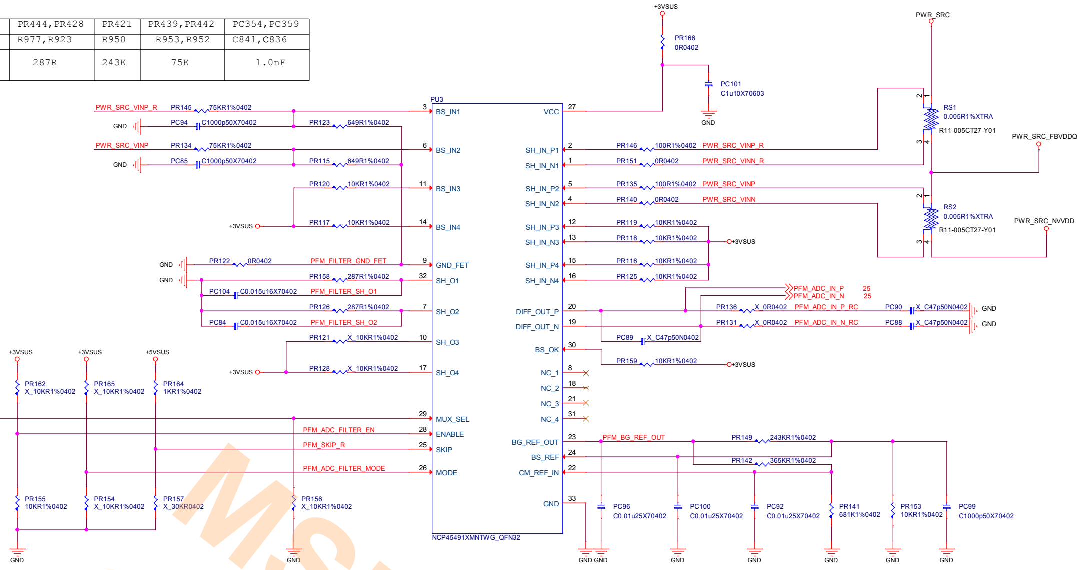
On Semi	PR441,PR437	PR444,PR428	PR421	PR439,PR442	PC354,PC359
CONFIG	R954,R924	R977,R923	R950	R953,R952	C841,C836
N18E-G1	649R	287R	243K	75K	1.0nF



msi	MICRO-STAR INT'L CO.,LTD.	
Title	DGPU POWER Current Measure	
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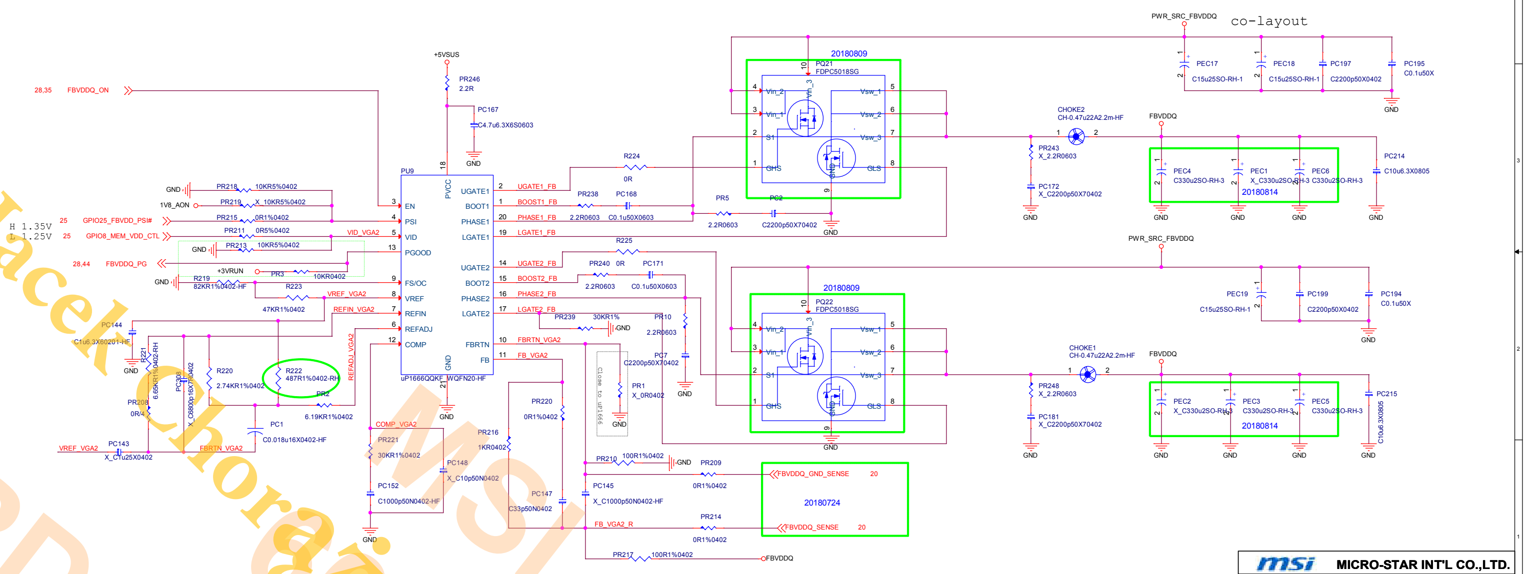
N18E-G1 FBVDDQ / UP1666P

VBoot:1.35V
Vmin:1.25V / Vmax:1.35V

AVG:35A
PEAK:47A
OCP:64A



MICRO-STAR INT'L CO.,LTD.

Title: DGPU POWER FBVDDQ

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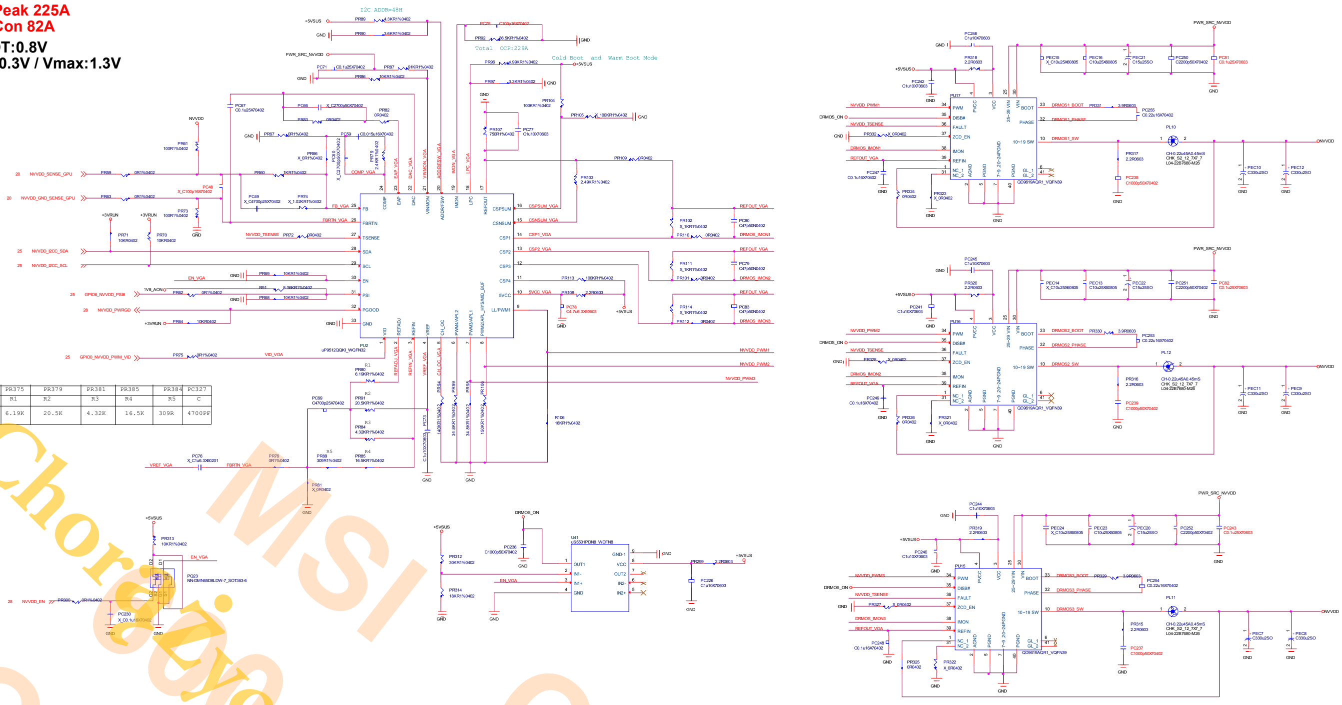
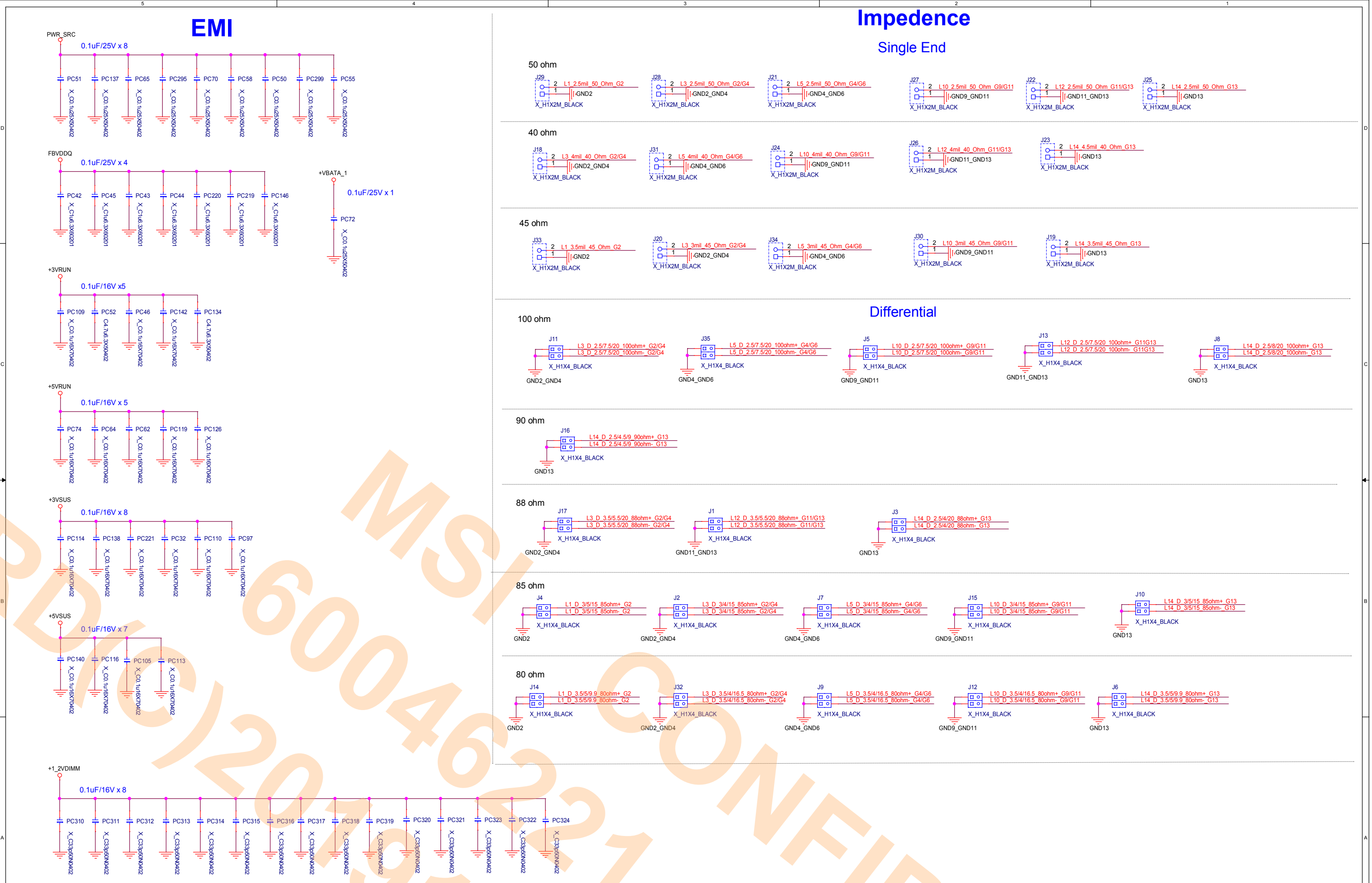
DGPU POWER NVVDD
UP9512Q

EDP-Peak 225A
EDP-Con 82A

VBOOT:0.8V
Vmin:0.3V / Vmax:1.3V



	PR375	PR379	PR381	PR385	PR384	PC327
CONFIG	R1	R2	R3	R4	R5	C
N18E-G1	6.19K	20.5K	4.32K	16.5K	309R	4700PF



MICRO-STAR INT'L CO.,LTD.

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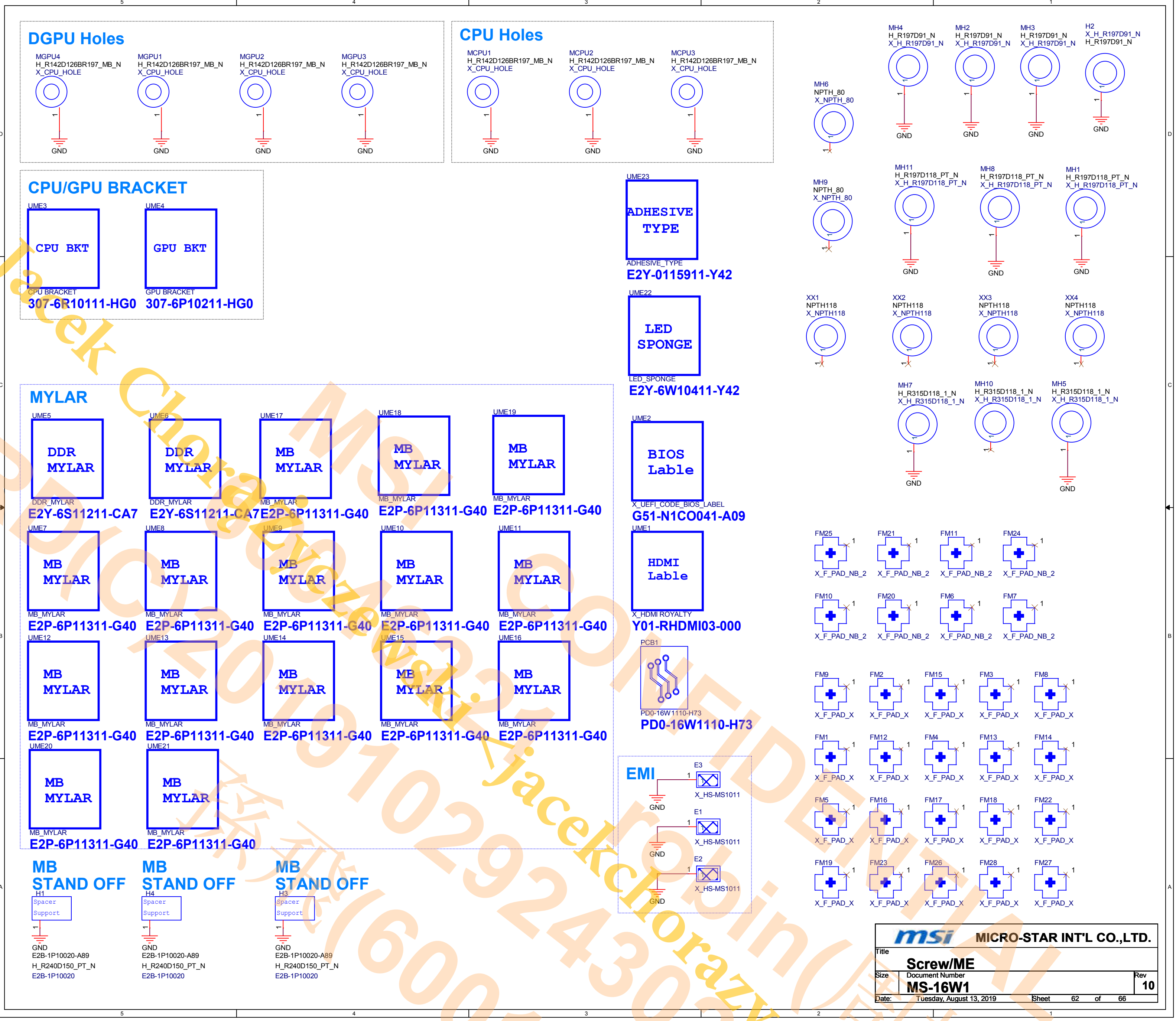
DGPU Holes
MGPU4 H_R142D126BR197_MB_N X_CPU_HOLE
MGPU1 H_R142D126BR197_MB_N X_CPU_HOLE
MGPU2 H_R142D126BR197_MB_N X_CPU_HOLE
MGPU3 H_R142D126BR197_MB_N X_CPU_HOLE
GND
CPU Holes
MCPU1 H_R142D126BR197_MB_N X_CPU_HOLE
MCPU2 H_R142D126BR197_MB_N X_CPU_HOLE
MCPU3 H_R142D126BR197_MB_N X_CPU_HOLE
MH4 H_R197D91_N X_H_R197D91_N
MH2 H_R197D91_N X_H_R197D91_N
MH3 H_R197D91_N X_H_R197D91_N
H2 X_H_R197D91_N H_R197D91_N
MH6 NPTH_80 X_NPTH_80
MH9 NPTH_80 X_NPTH_80
MH11 H_R197D118_PT_N X_H_R197D118_PT_N
MH8 H_R197D118_PT_N X_H_R197D118_PT_N
MH1 H_R197D118_PT_N X_H_R197D118_PT_N
XX1 NPTH118 X_NPTH118
XX2 NPTH118 X_NPTH118
XX3 NPTH118 X_NPTH118
XX4 NPTH118 X_NPTH118
MH7 H_R315D118_1_N X_H_R315D118_1_N
MH10 H_R315D118_1_N X_H_R315D118_1_N
MH5 H_R315D118_1_N X_H_R315D118_1_N
CPU/GPU BRACKET
UME3 CPU BKT CPU BRACKET 307-6R10111-HG0
UME4 GPU BKT GPU BRACKET 307-6P10211-HG0
UME23 ADHESIVE TYPE ADHESIVE_TYPE E2Y-0115911-Y42
UME22 LED SPONGE LED_SPONGE E2Y-6W10411-Y42
MYLAR
UME5 DDR MYLAR DDR_MYLAR E2Y-6S11211-CA7
UME6 DDR MYLAR DDR_MYLAR E2Y-6S11211-CA7
UME17 MB MYLAR MB_MYLAR E2P-6P11311-G40
UME18 MB MYLAR MB_MYLAR E2P-6P11311-G40
UME19 MB MYLAR MB_MYLAR E2P-6P11311-G40
UME7 MB MYLAR MB_MYLAR E2P-6P11311-G40
UME8 MB MYLAR MB_MYLAR E2P-6P11311-G40
UME9 MB MYLAR MB_MYLAR E2P-6P11311-G40
UME10 MB MYLAR MB_MYLAR E2P-6P11311-G40
UME11 MB MYLAR MB_MYLAR E2P-6P11311-G40
UME12 MB MYLAR MB_MYLAR E2P-6P11311-G40
UME13 MB MYLAR MB_MYLAR E2P-6P11311-G40
UME14 MB MYLAR MB_MYLAR E2P-6P11311-G40
UME15 MB MYLAR MB_MYLAR E2P-6P11311-G40
UME16 MB MYLAR MB_MYLAR E2P-6P11311-G40
UME20 MB MYLAR MB_MYLAR E2P-6P11311-G40
UME21 MB MYLAR MB_MYLAR E2P-6P11311-G40
UME2 BIOS Lable X_UEFI_CODE_BIOS_LABEL G51-N1CO041-A09
UME1 HDMI Lable X_HDMI ROYALTY Y01-RHDMI03-000
PCB1 PD0-16W1110-H73 PD0-16W1110-H73
EMI
E3 X_HS-MS1011
E1 X_HS-MS1011
E2 X_HS-MS1011
FM25 FM21 FM11 FM24 X_F_PAD_NB_2
FM10 FM20 FM6 FM7 X_F_PAD_NB_2
FM9 FM2 FM15 FM3 FM8 X_F_PAD_X
FM1 FM12 FM4 FM13 FM14 X_F_PAD_X
FM5 FM16 FM17 FM18 FM22 X_F_PAD_X
FM19 FM23 FM26 FM28 FM27 X_F_PAD_X
MB STAND OFF H1 Spacer Support GND E2B-1P10020-A89 H_R240D150_PT_N E2B-1P10020
MB STAND OFF H4 Spacer Support GND E2B-1P10020-A89 H_R240D150_PT_N E2B-1P10020
MB STAND OFF H3 Spacer Support GND E2B-1P10020-A89 H_R240D150_PT_N E2B-1P10020
msi MICRO-STAR INT'L CO.,LTD.
Title Screw/ME
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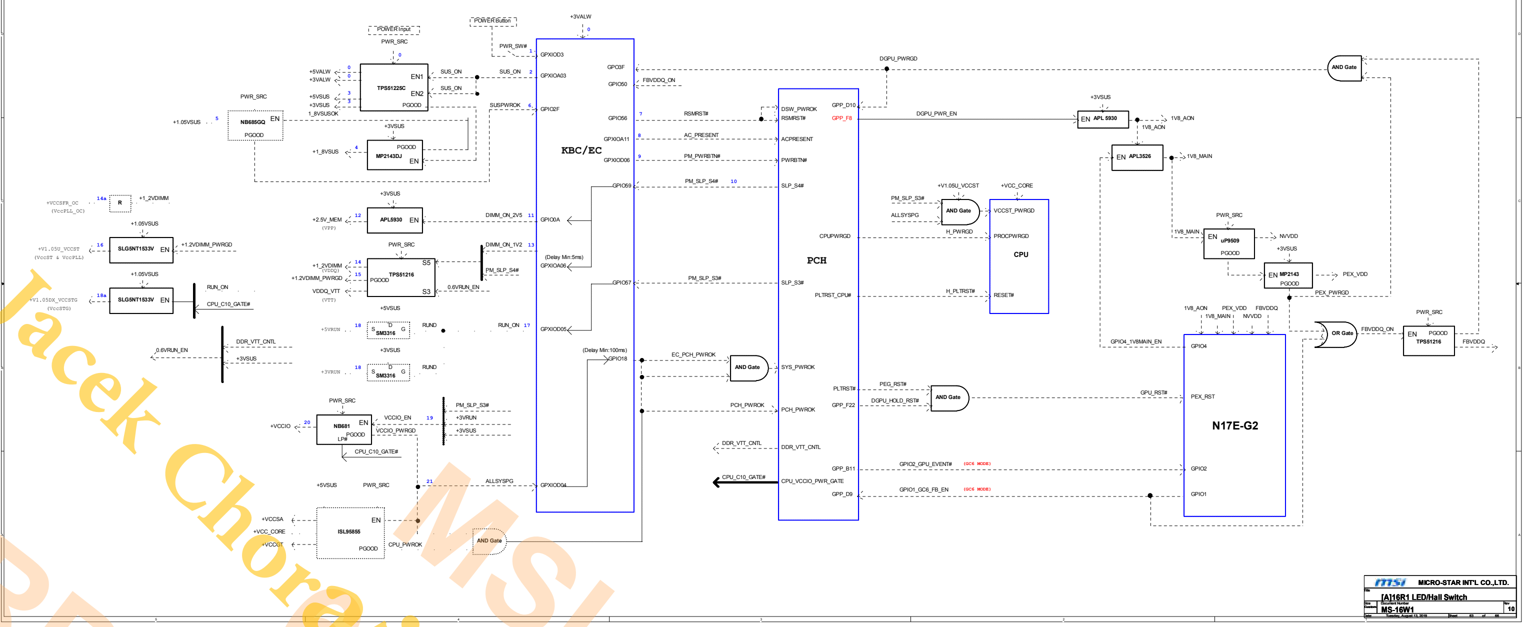
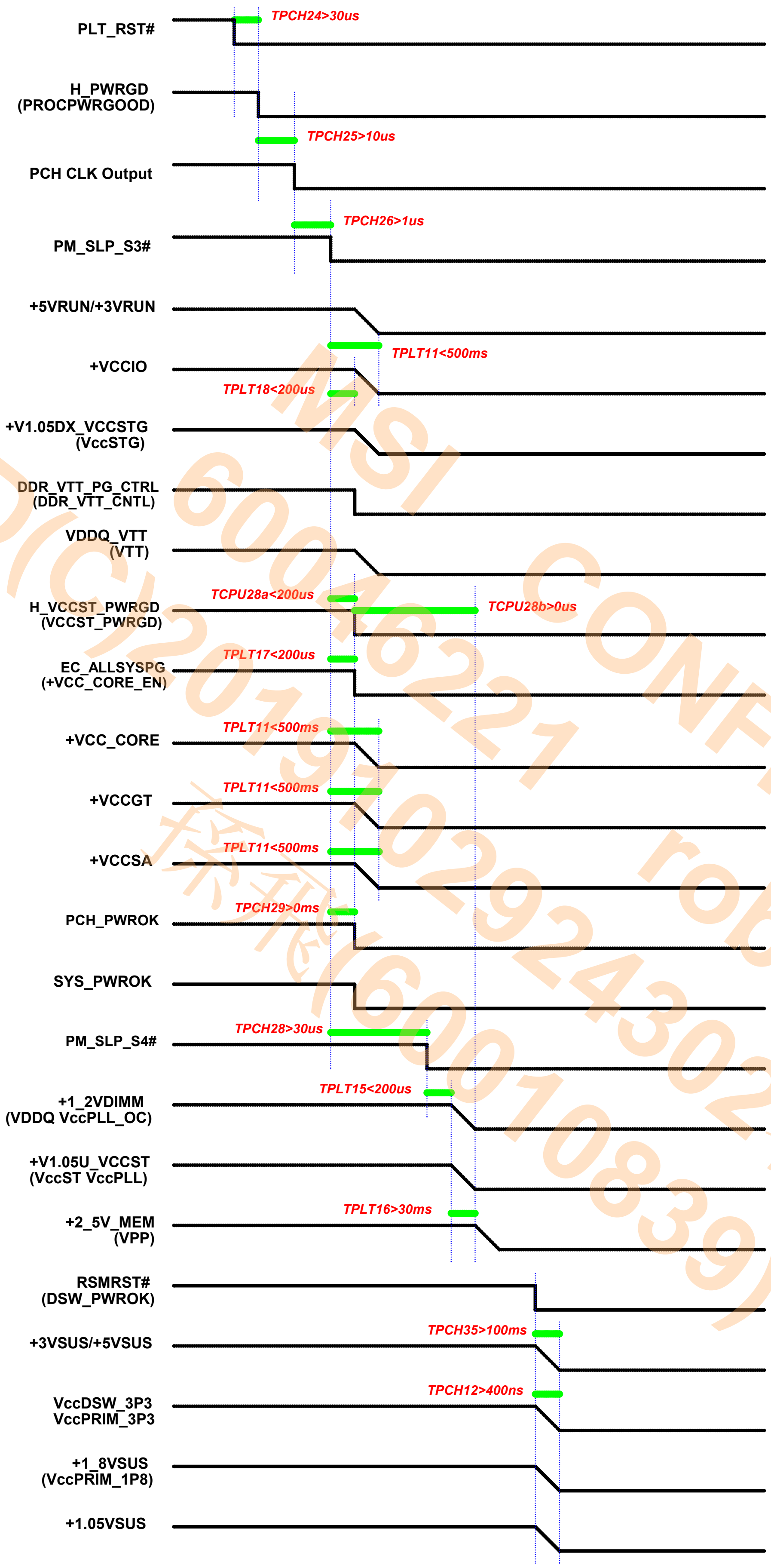
MS-16R1 Power on Block Diagram



S0 -> G3



MICRO-STAR INT'L CO.,LTD.

Title: Power on Sequence

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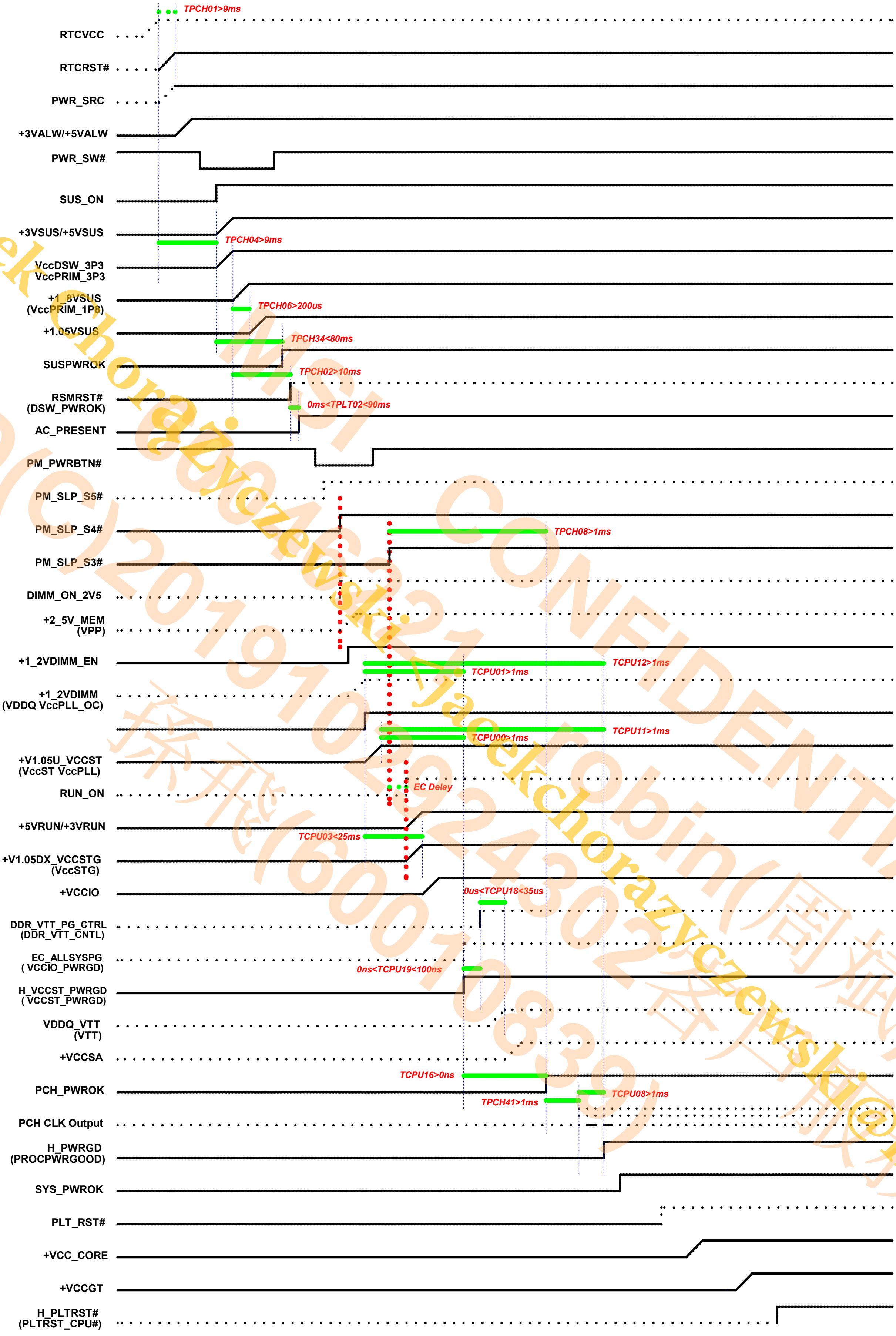
G3 -> S0



MICRO-STAR INT'L CO.,LTD.

Title	Power ON Block Diagram	
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History

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