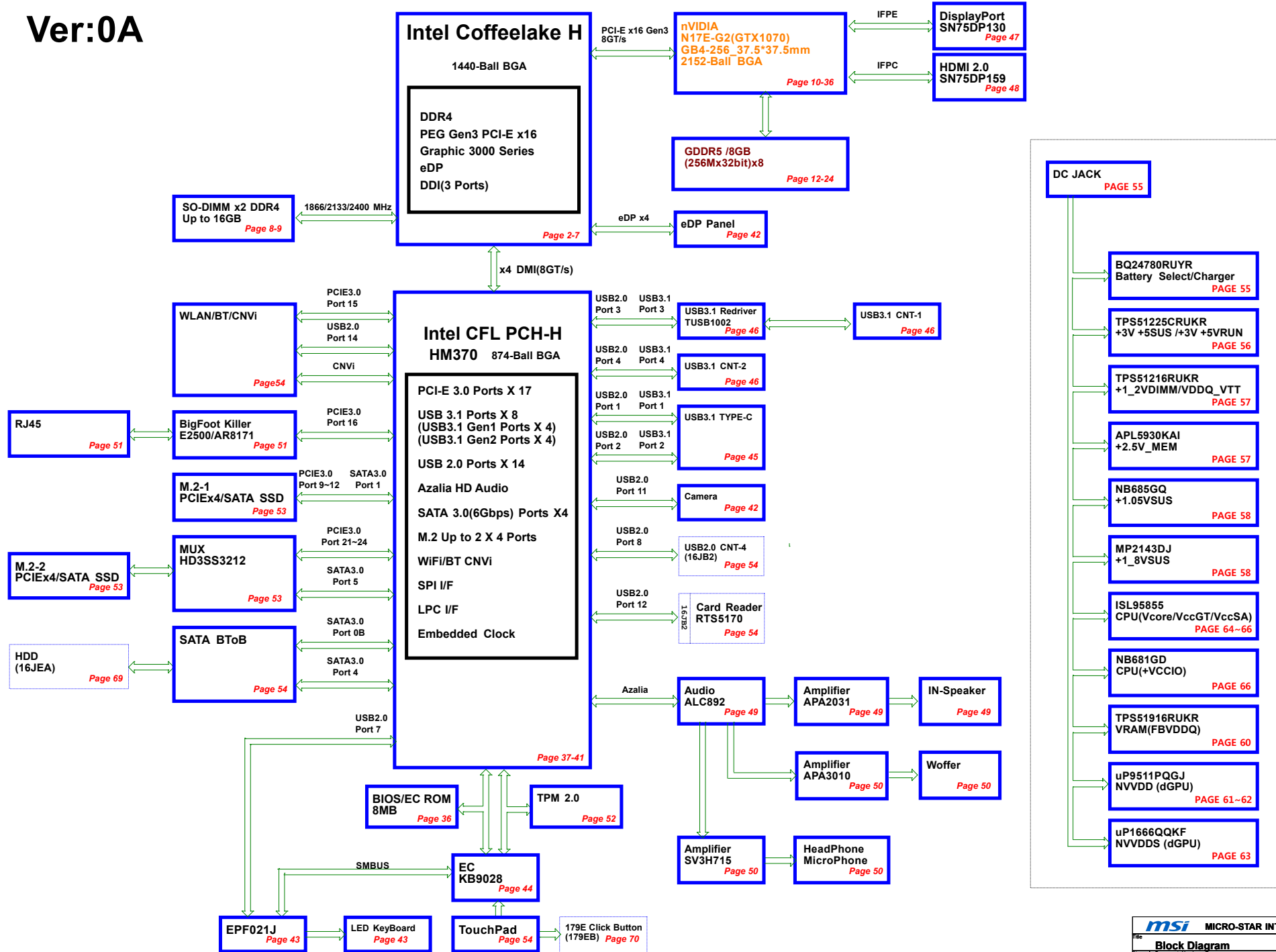
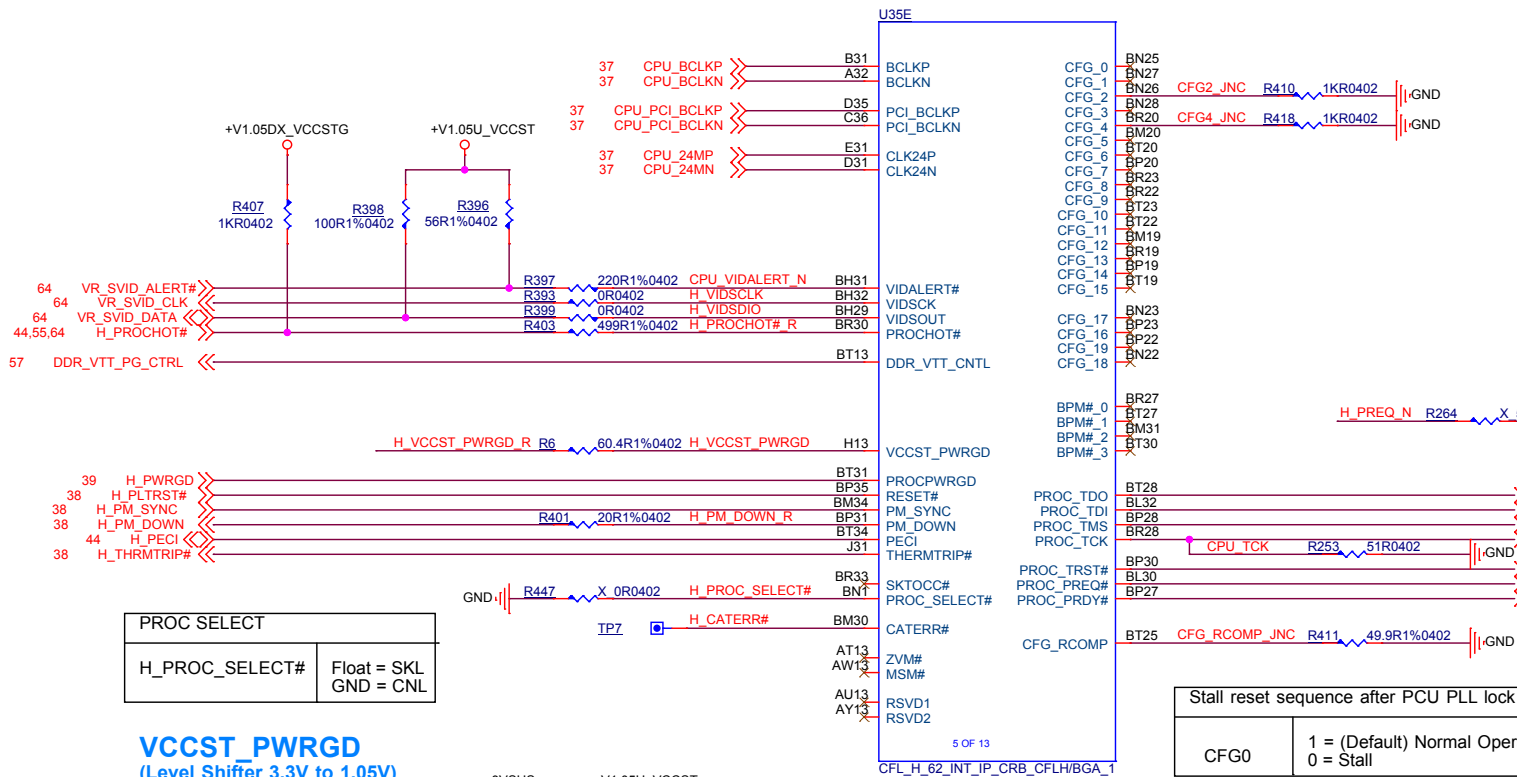


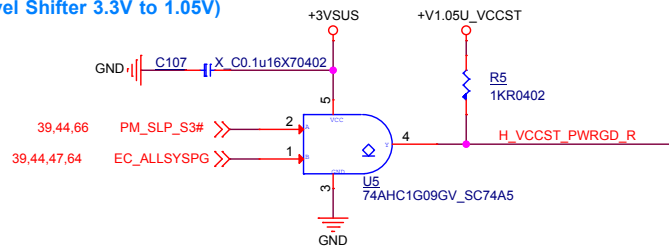
Ver:0A





PROC SELECT	
H_PROC_SELECT#	Float = SKL GND = CNL

VCCST_PWRGD (Level Shifter 3.3V to 1.05V)



I7-2400

I7_2400

OAD-16P5002-I06

X_I7-2400

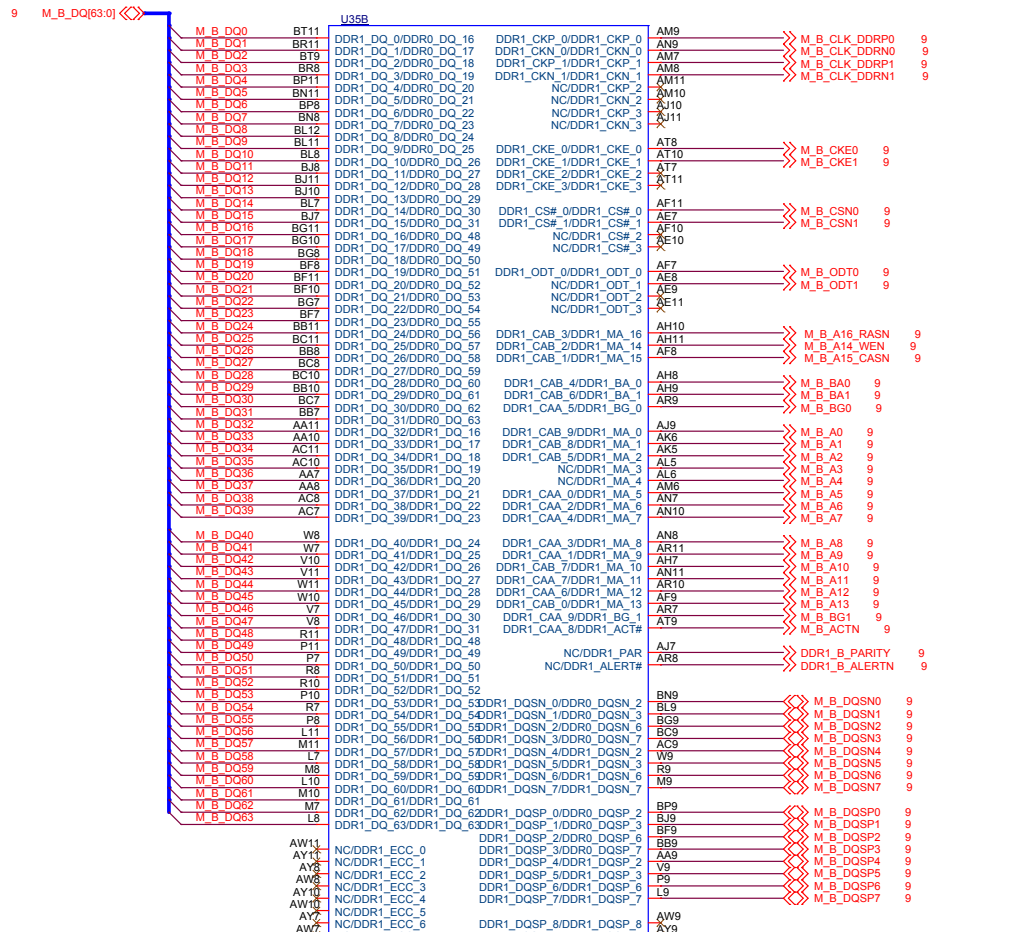
Stall reset sequence after PCU PLL lock until de-asserted	
CFG0	1 = (Default) Normal Operation; No stall 0 = Stall
PCIe Express * Static X16 Lane Numbering Reversal	
CFG2	1 = Normal operation 0 = Lane numbers reversed.
eDP Enable	
CFG4	1 = Disabled 0 = Enabled
PCI Express* Bifurcation	
CFG[6:5]	00 = 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

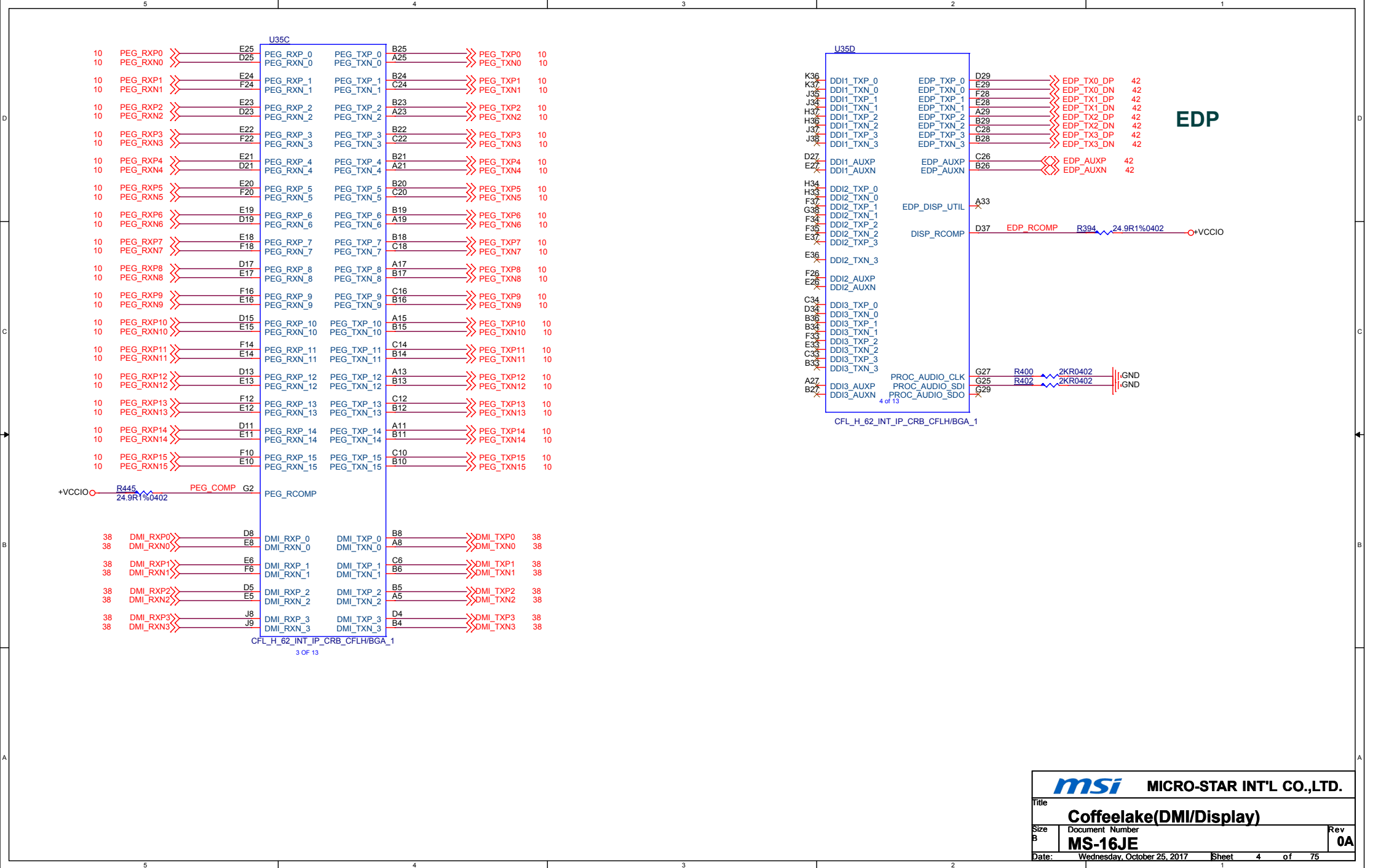


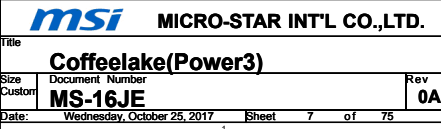
MICRO-STAR INT'L CO.,LTD.

Title		
Coffeelake(HOST)		
Size	Document Number	Rev
Custom	MS-16JE	0A
Date: Wednesday, October 25, 2017		
Sheet 2 of 75		

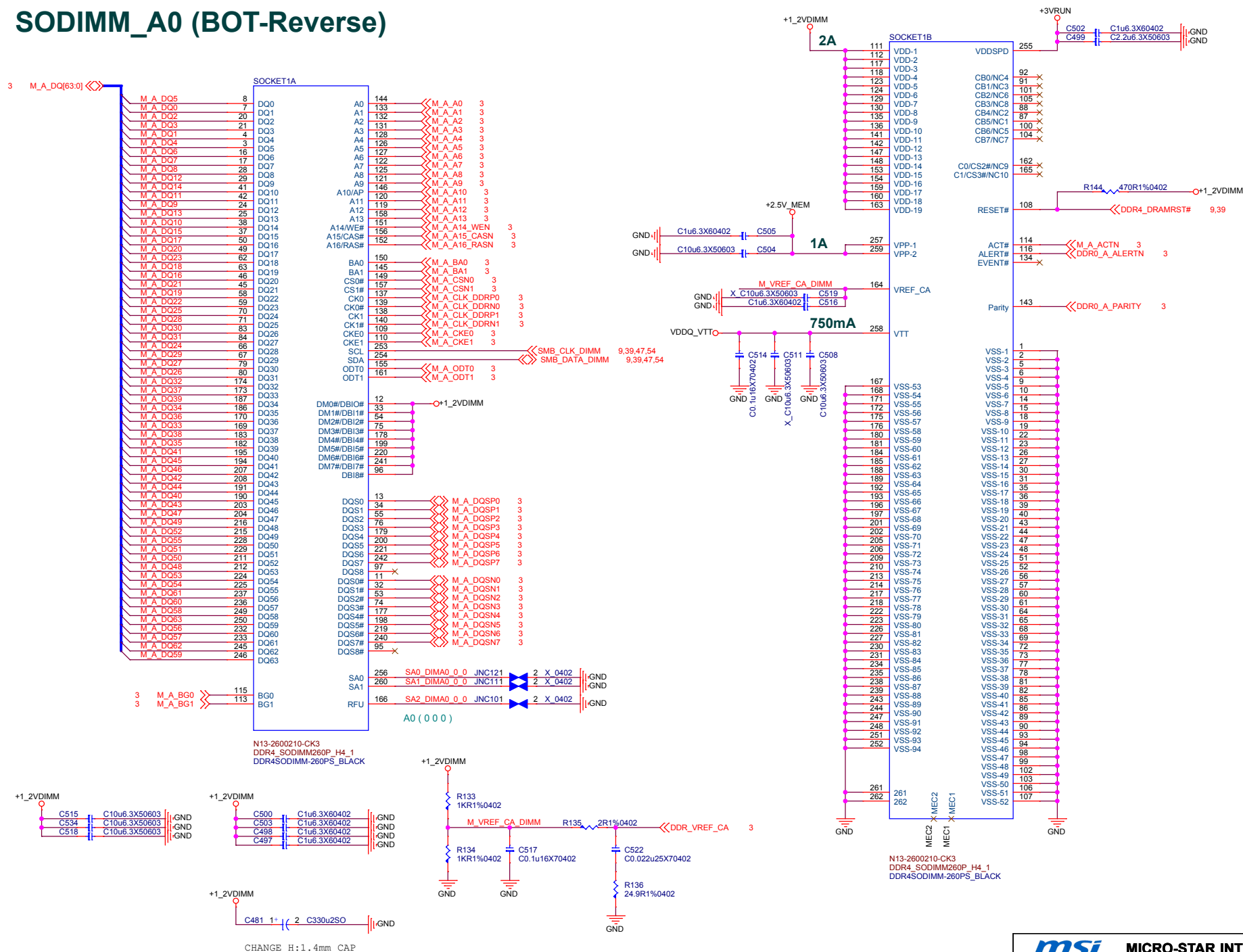
DDR Channel B



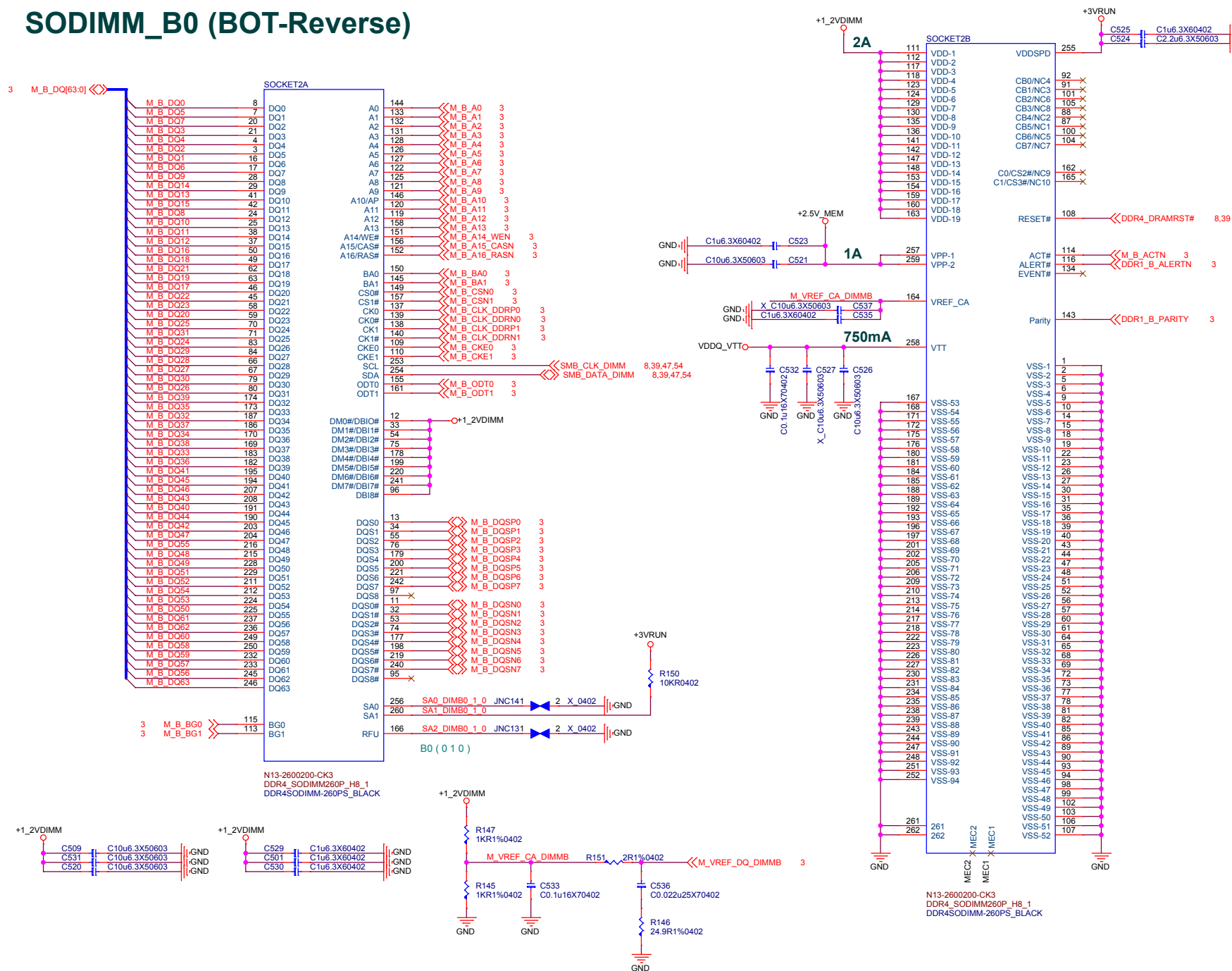




SODIMM_A0 (BOT-Reverse)



SODIMM_B0 (BOT-Reverse)



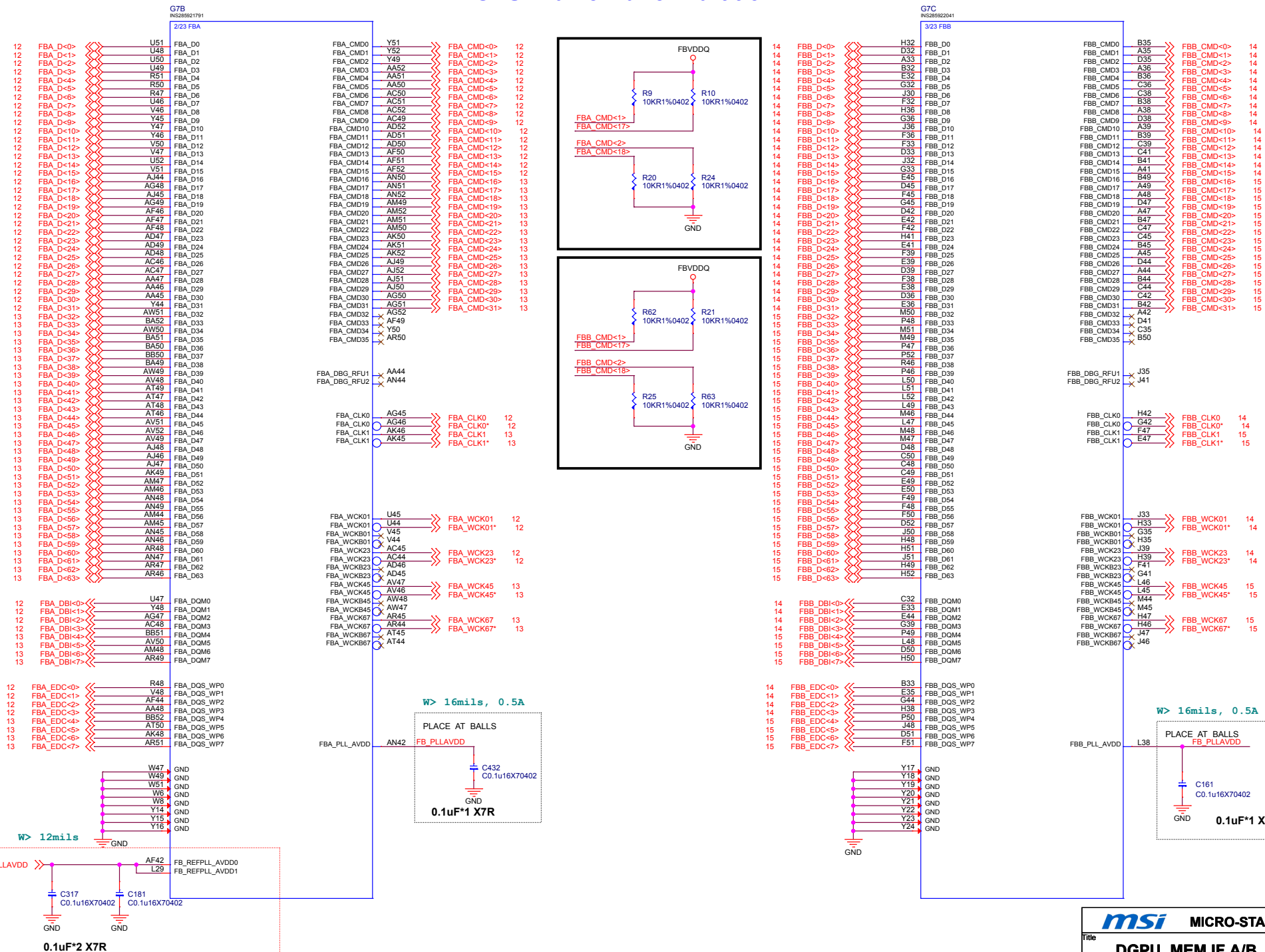
G7A







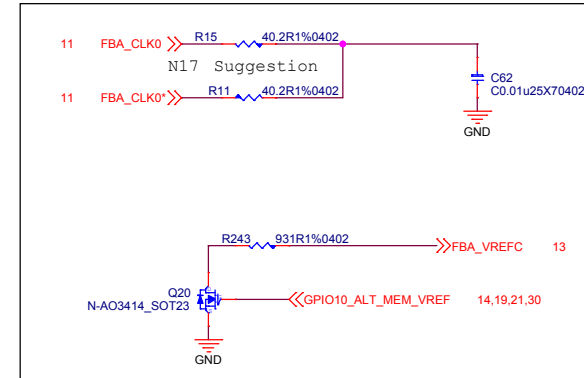
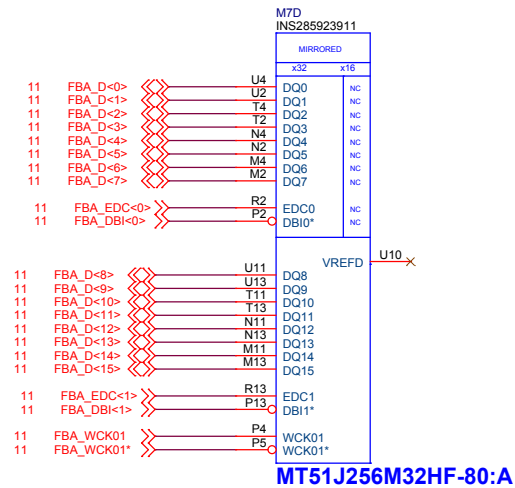
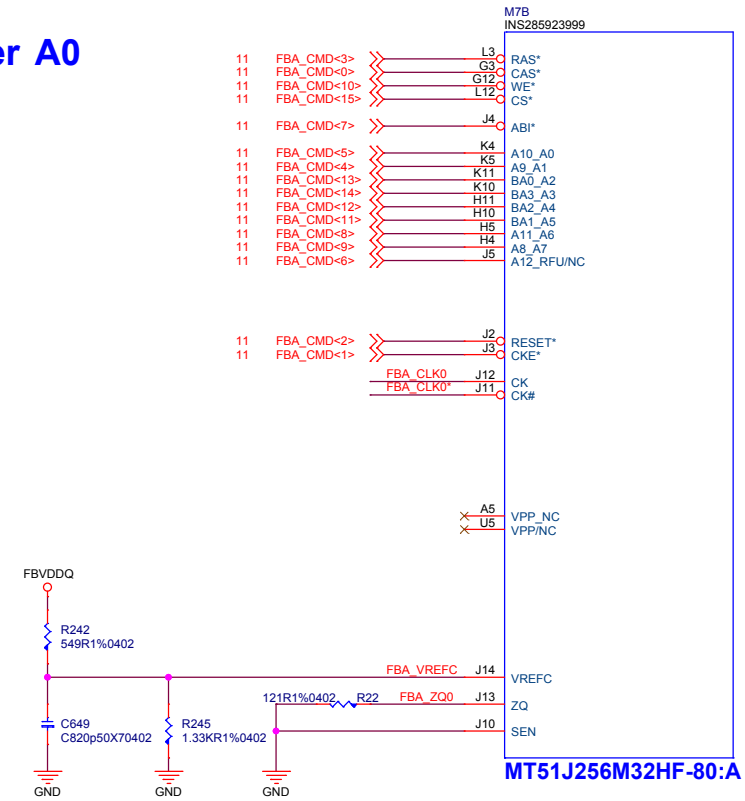
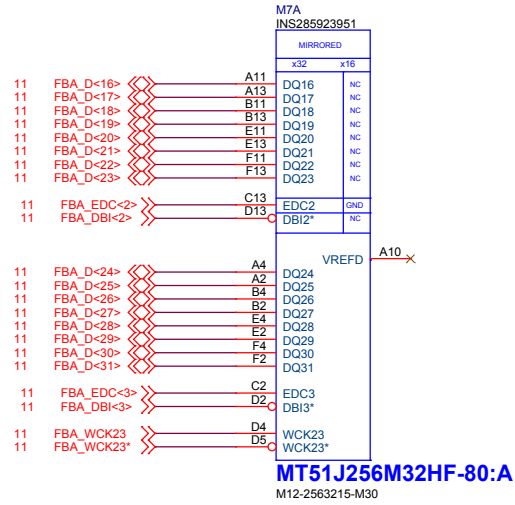
GPU Frame Buffer Partition A/B



DGPU_GDDR5 FrameBuffer A0

GDD5 Command Mapping GB4-256

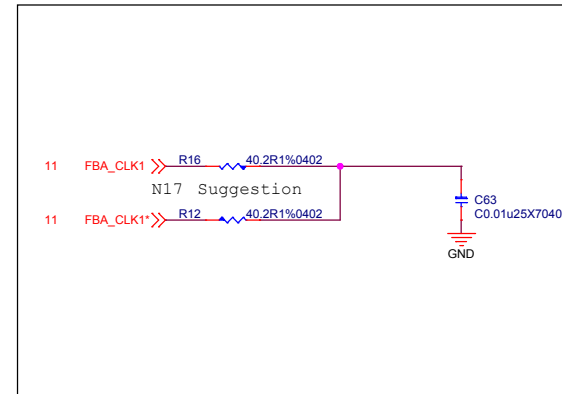
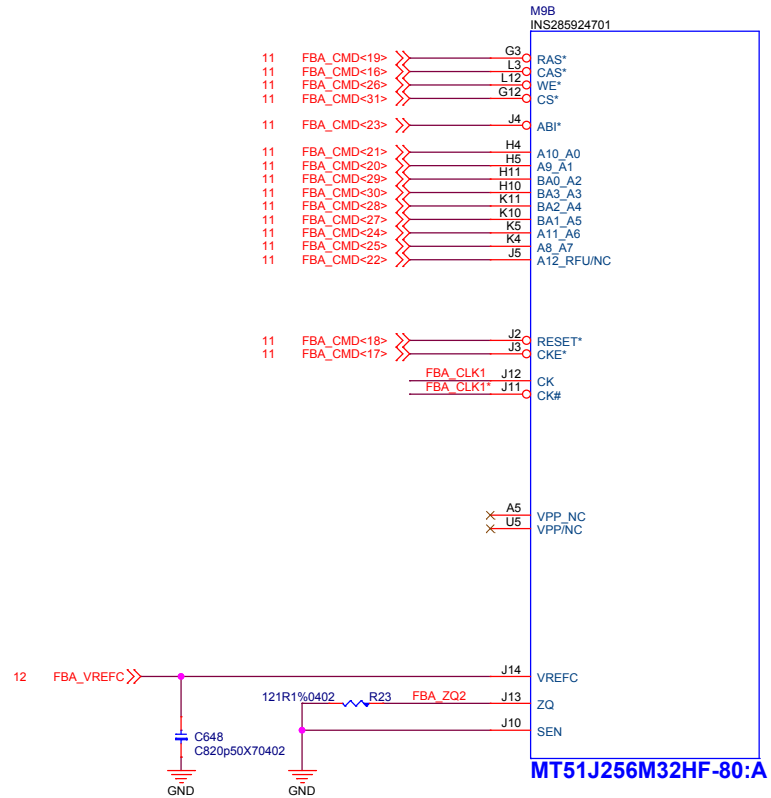
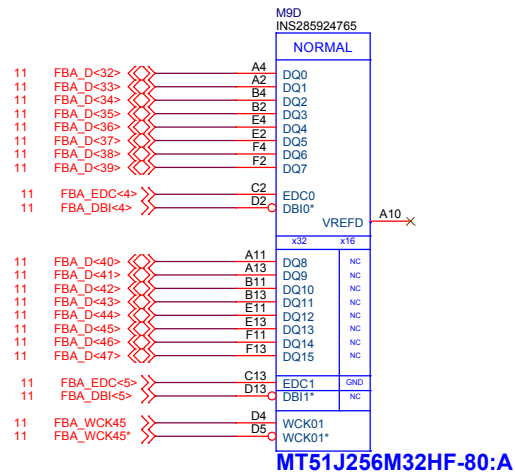
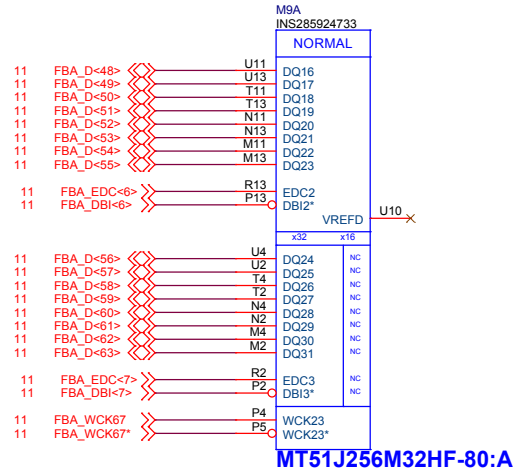
DQ[31:0]	DQ[63:32]	
CMD0	CMD16	CAS*
CMD1	CMD17	CKE*
CMD2	CMD18	RST*
CMD3	CMD19	RAS*
CMD4	CMD20	A1 A9
CMD5	CMD21	A0 A10
CMD6	CMD22	A12 RFU
CMD7	CMD23	ABI*
CMD8	CMD24	A6 A11
CMD9	CMD25	A7 A8
CMD10	CMD26	WE*
CMD11	CMD27	A5 BA1
CMD12	CMD28	A4 BA2
CMD13	CMD29	A2 BA0
CMD14	CMD30	A3 BA3
CMD15	CMD31	CS*



DGPU_GDDR5 FrameBuffer A1

GDD5 Command Mapping GB4-256

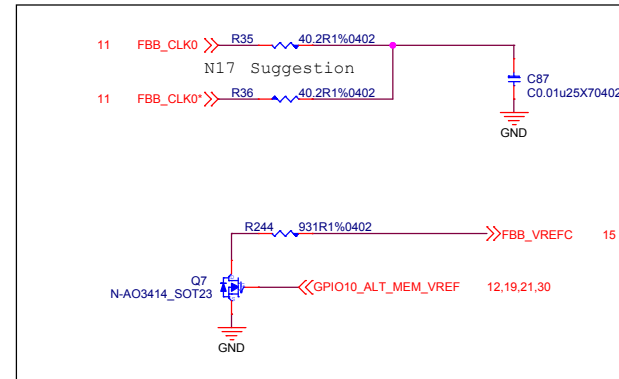
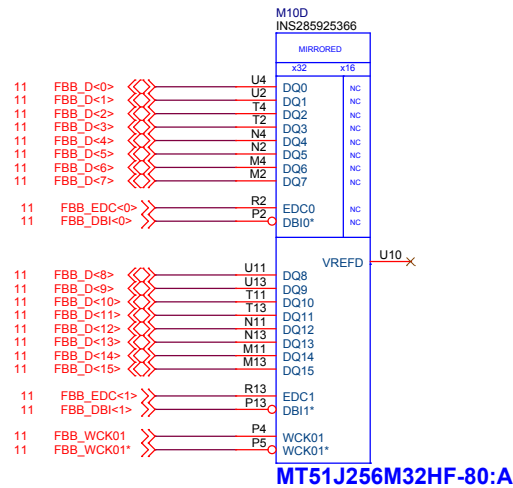
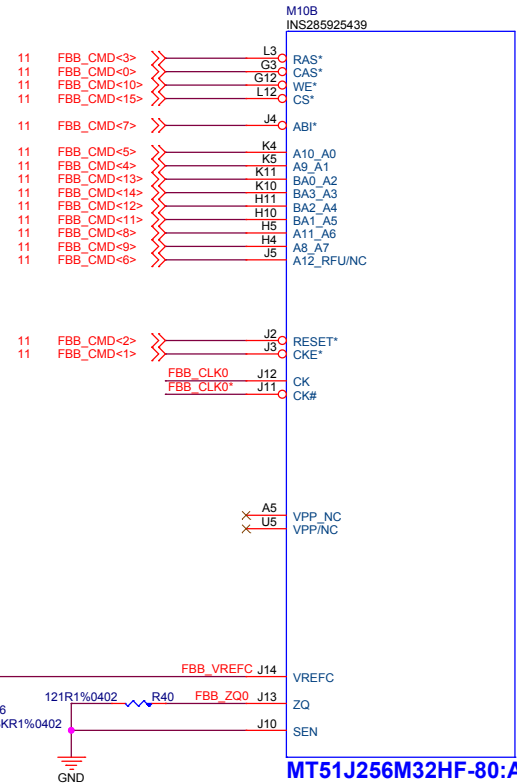
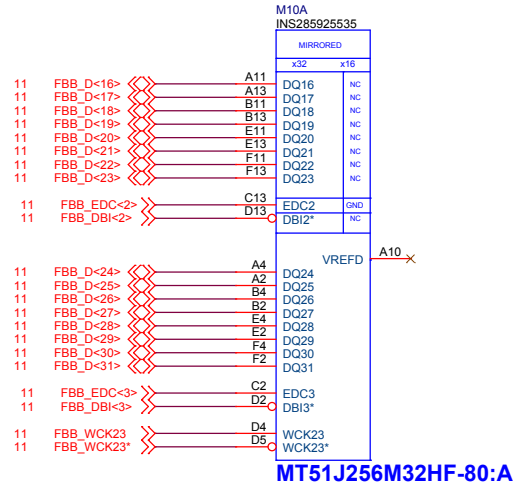
DQ[31:0]	DQ[63:32]	
CMD0	CMD16	CAS*
CMD1	CMD17	CKE*
CMD2	CMD18	RST*
CMD3	CMD19	RAS*
CMD4	CMD20	A1 A9
CMD5	CMD21	A0 A10
CMD6	CMD22	A12 RFU
CMD7	CMD23	ABI*
CMD8	CMD24	A6 A11
CMD9	CMD25	A7 A8
CMD10	CMD26	WE*
CMD11	CMD27	A5 BA1
CMD12	CMD28	A4 BA2
CMD13	CMD29	A2 BA0
CMD14	CMD30	A3 BA3
CMD15	CMD31	CS*



DGPU_GDDR5 FrameBuffer B0

GDD5 Command Mapping GB4-256

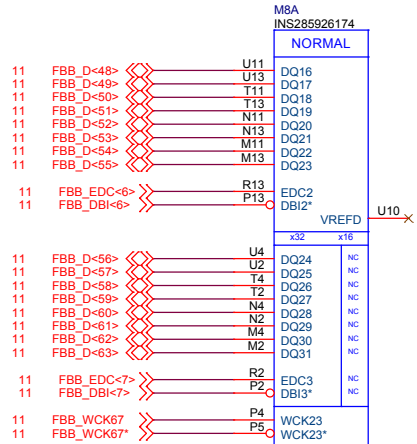
DQ[31:0]	DQ[63:32]	
CMD0	CMD16	CAS*
CMD1	CMD17	CKE*
CMD2	CMD18	RST*
CMD3	CMD19	RAS*
CMD4	CMD20	A1 A9
CMD5	CMD21	A0 A10
CMD6	CMD22	A12 RFU
CMD7	CMD23	ABI*
CMD8	CMD24	A6 A11
CMD9	CMD25	A7 A8
CMD10	CMD26	WE*
CMD11	CMD27	A5 BA1
CMD12	CMD28	A4 BA2
CMD13	CMD29	A2 BA0
CMD14	CMD30	A3 BA3
CMD15	CMD31	CS*



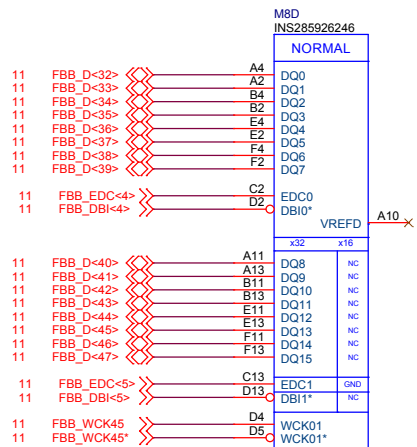
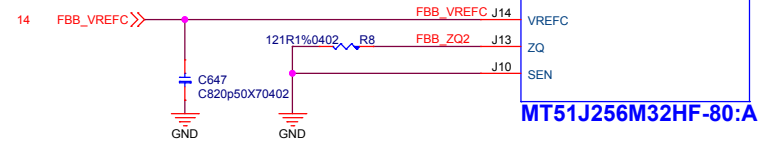
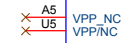
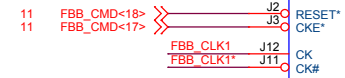
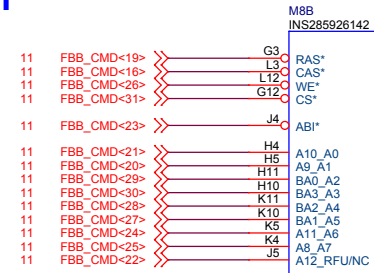
DGPU_GDDR5 FrameBuffer B1

GDD5 Command Mapping GB4-256

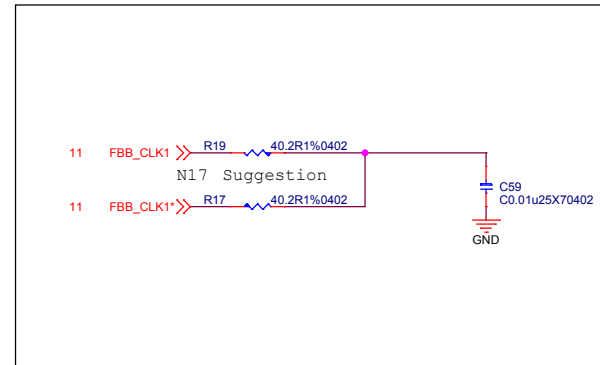
DQ[31:0]	DQ[63:32]	
CMD0	CMD16	CAS*
CMD1	CMD17	CKE*
CMD2	CMD18	RST*
CMD3	CMD19	RAS*
CMD4	CMD20	A1 A9
CMD5	CMD21	A0 A10
CMD6	CMD22	A12 RFU
CMD7	CMD23	ABI*
CMD8	CMD24	A6 A11
CMD9	CMD25	A7 A8
CMD10	CMD26	WE*
CMD11	CMD27	A5 BA1
CMD12	CMD28	A4 BA2
CMD13	CMD29	A2 BA0
CMD14	CMD30	A3 BA3
CMD15	CMD31	CS*



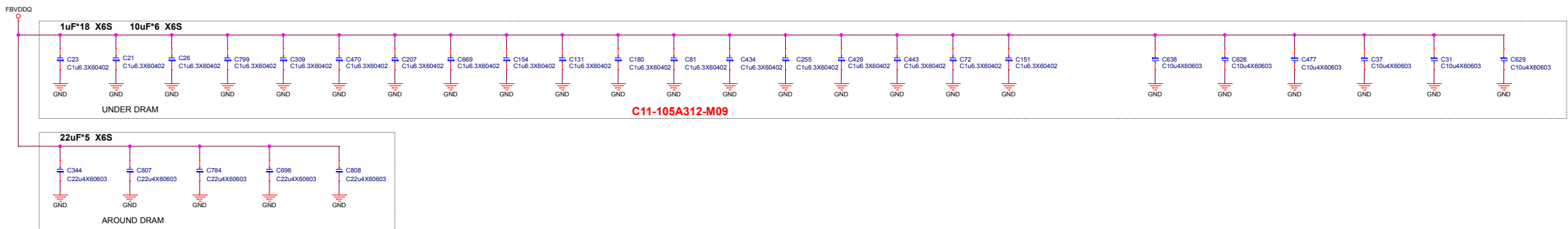
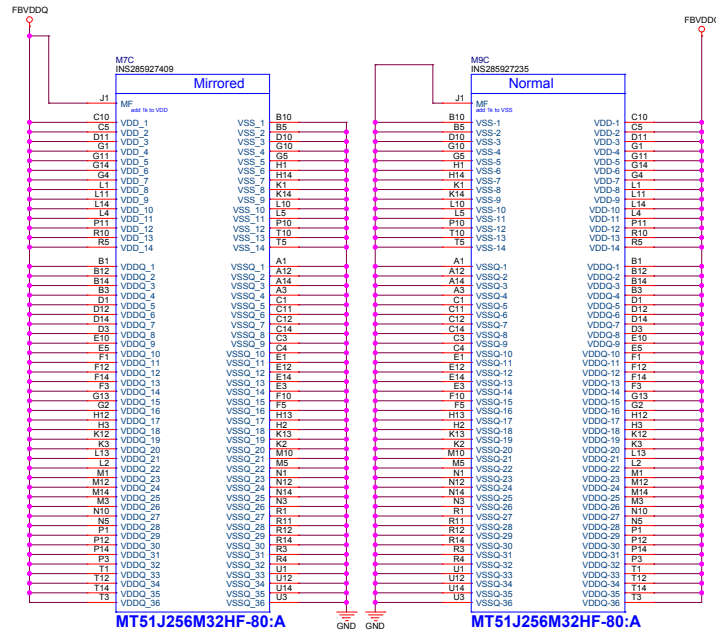
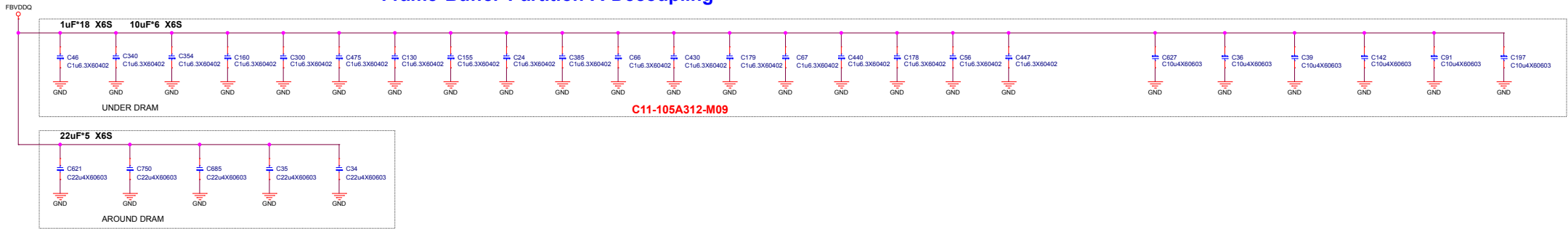
MT51J256M32HF-80:A



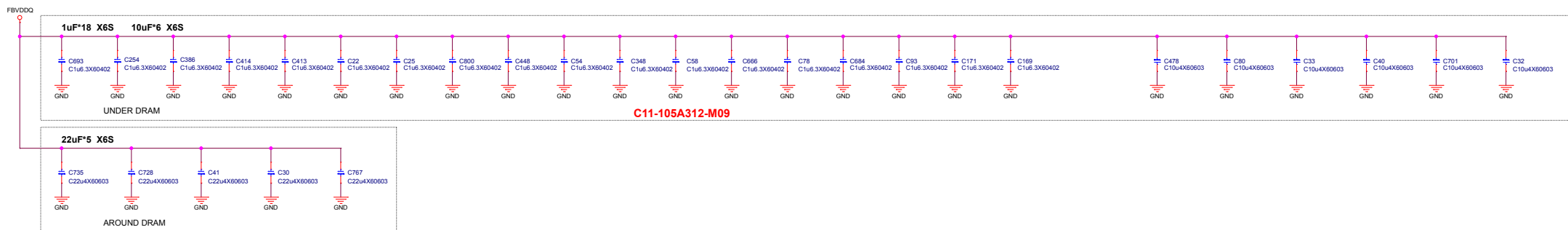
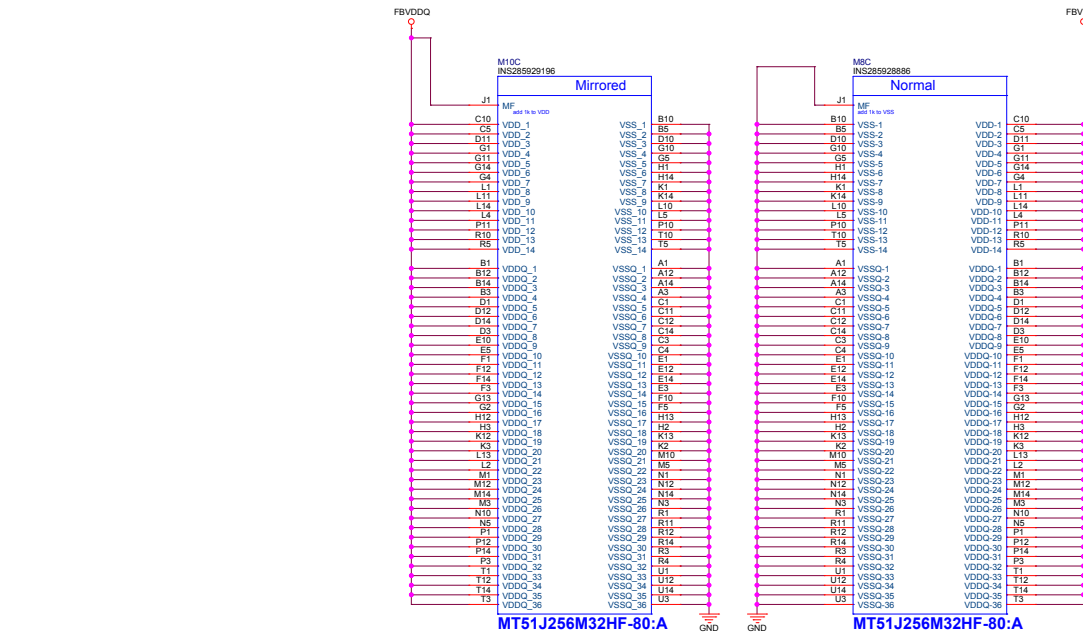
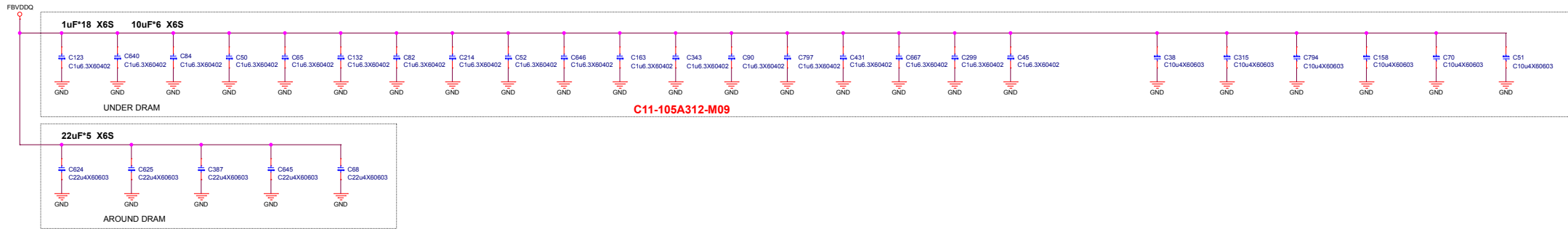
MT51J256M32HF-80:A



Frame Buffer Partition A Decoupling



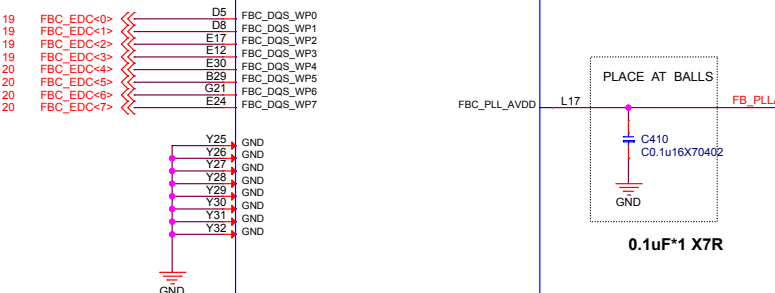
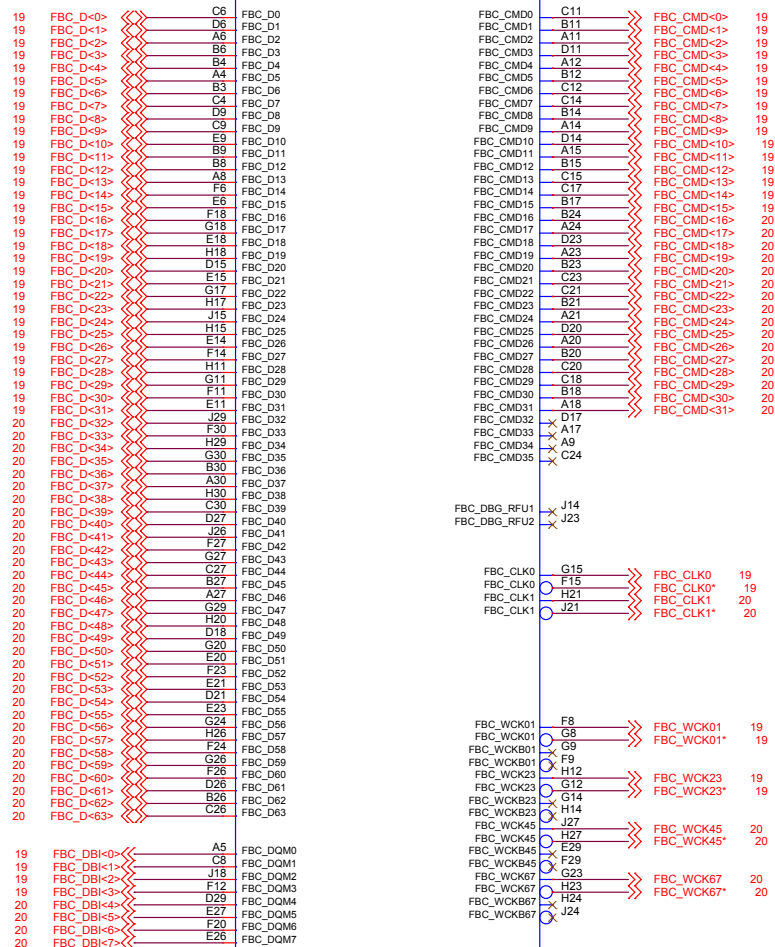
Frame Buffer Partition B Decoupling



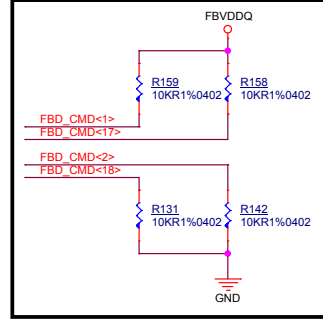
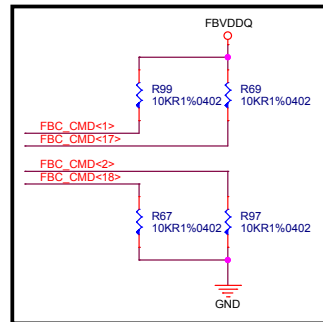
GPU Frame Buffer Partition C/D

G7D
N528930177

4/23 FBC

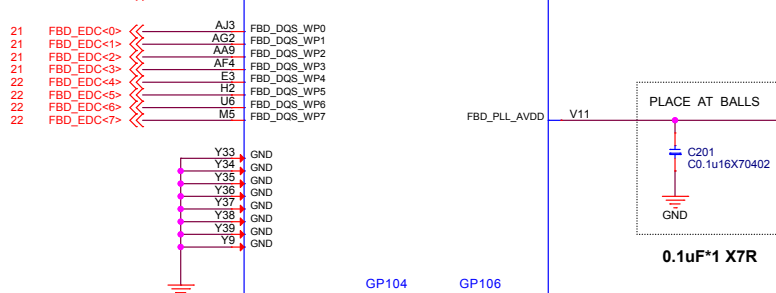
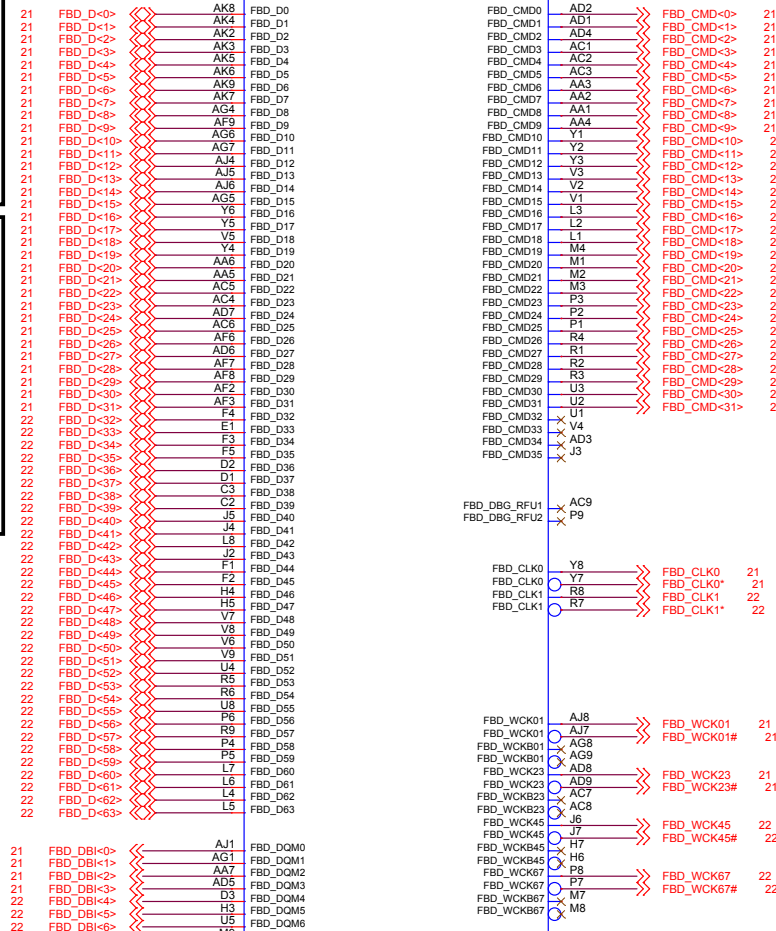


N17E-G2-A1



G7E
N528930338

5/23 FBD



N17E-G2-A1

GP104 GP106
FBD UNUSED

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

Title: DGPU MEM IF C/D

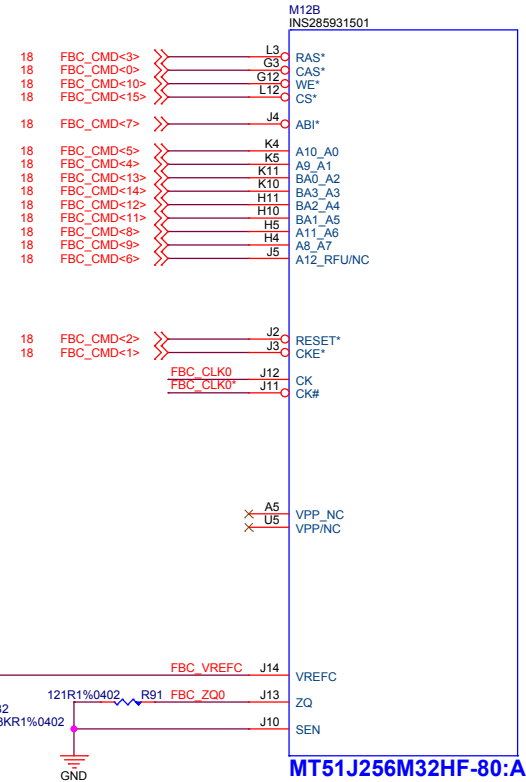
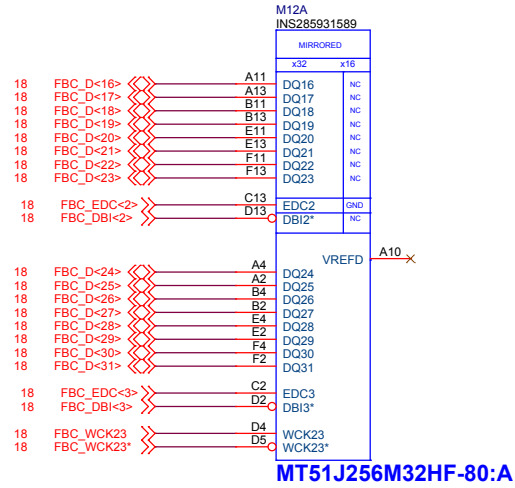
Size: Document Number MS-16JE

Date: Wednesday, October 25, 2017 Sheet 18 of 75

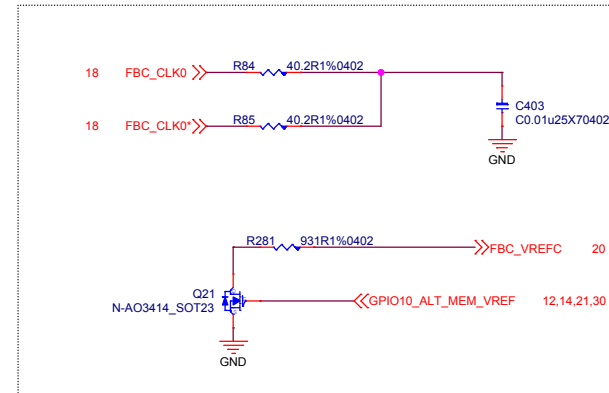
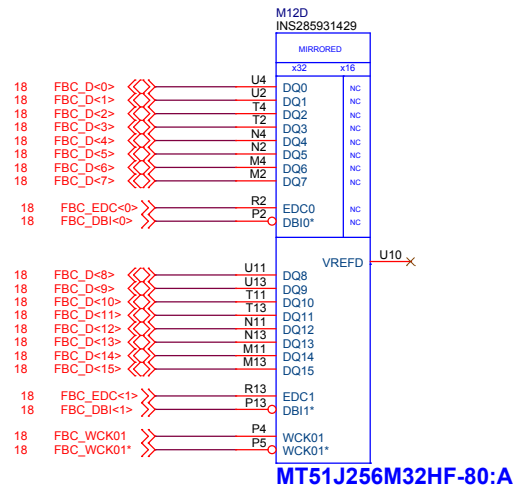
DGPU_GDDR5 FrameBuffer C0

GDD5 Command Mapping GB4-256

DQ[31:0]			DQ[63:32]		
CMD0	CMD16	CAS*	CMD1	CMD17	CKE*
CMD2	CMD18	RST*	CMD3	CMD19	RAS*
CMD4	CMD20	A1 A9	CMD5	CMD21	A0 A10
CMD6	CMD22	A12 RFU	CMD7	CMD23	ABI*
CMD8	CMD24	A6 A11	CMD9	CMD25	A7 A8
CMD10	CMD26	WE*	CMD11	CMD27	A5 BA1
CMD12	CMD28	A4 BA2	CMD13	CMD29	A2 BA0
CMD14	CMD30	A3 BA3	CMD15	CMD31	CS*

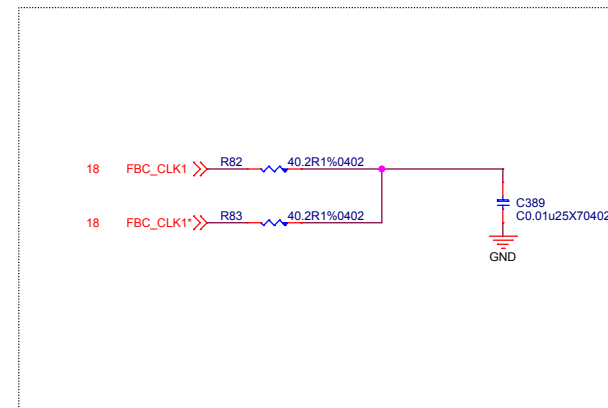
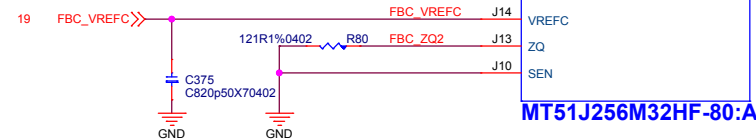
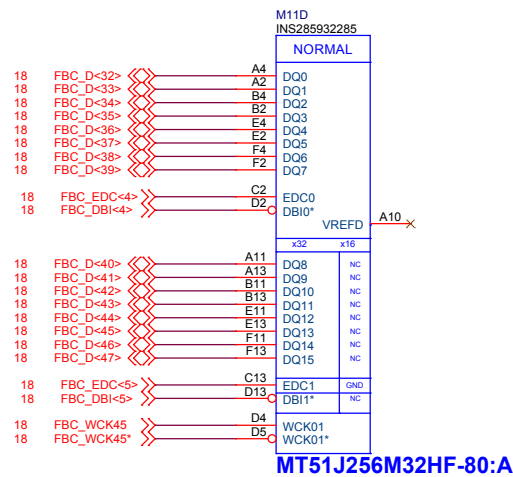
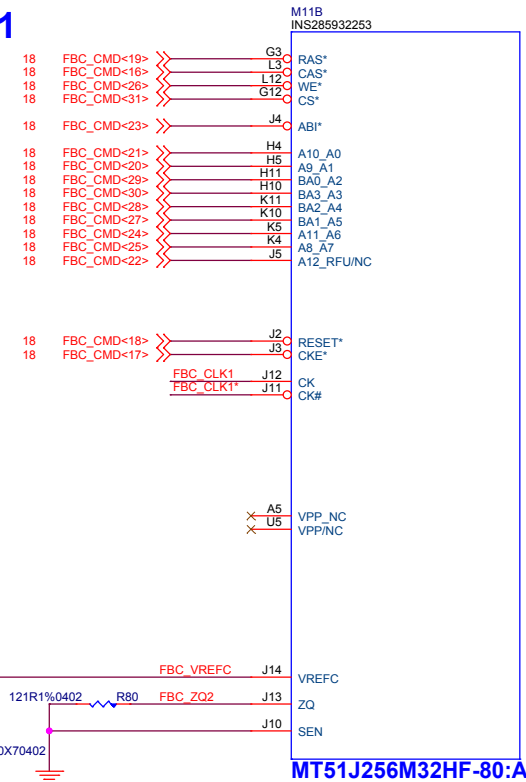
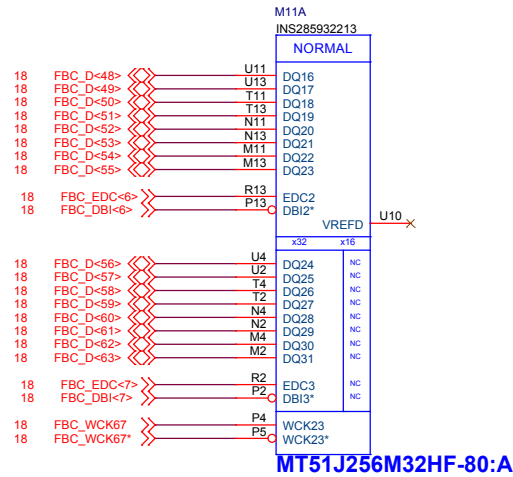


A12_RFU



GDD5 Command Mapping GB4-256

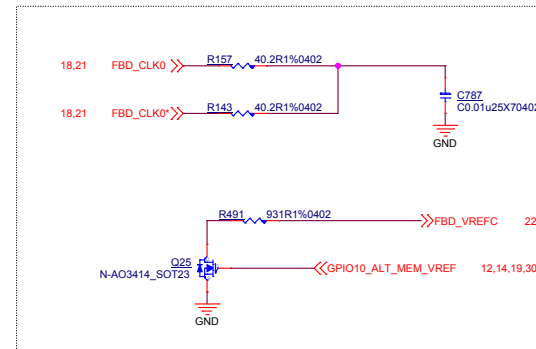
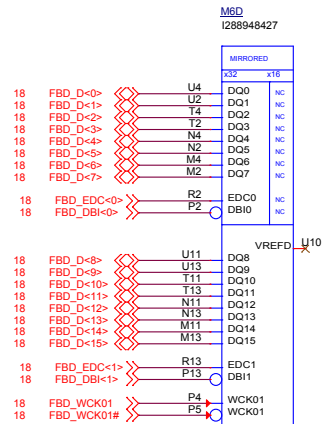
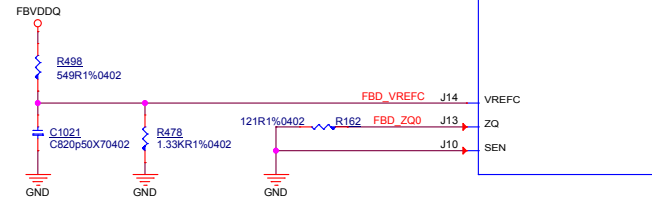
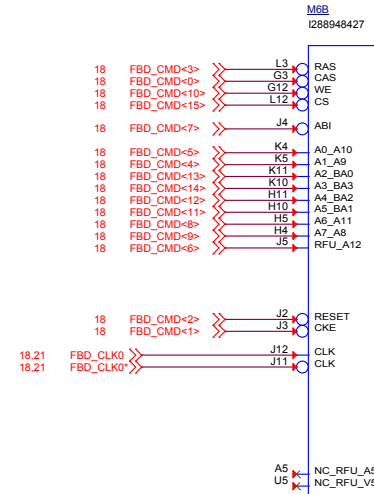
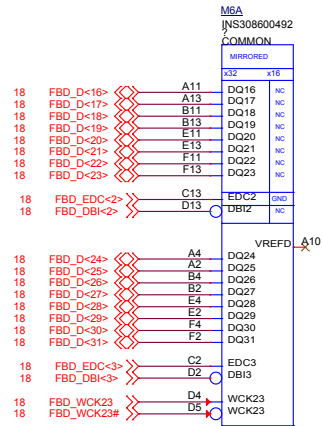
DQ[31:0]	DQ[63:32]	
CMD0	CMD16	CAS*
CMD1	CMD17	CKE*
CMD2	CMD18	RST*
CMD3	CMD19	RAS*
CMD4	CMD20	A1 A9
CMD5	CMD21	A0 A10
CMD6	CMD22	A12 RFU
CMD7	CMD23	ABI*
CMD8	CMD24	A6 A11
CMD9	CMD25	A7 A8
CMD10	CMD26	WE*
CMD11	CMD27	A5 BA1
CMD12	CMD28	A4 BA2
CMD13	CMD29	A2 BA0
CMD14	CMD30	A3 BA3
CMD15	CMD31	CS*



DGPU_GDDR5 FrameBuffer D0

GDD5 Command Mapping GB4-256

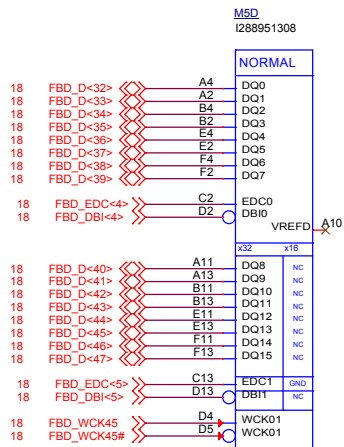
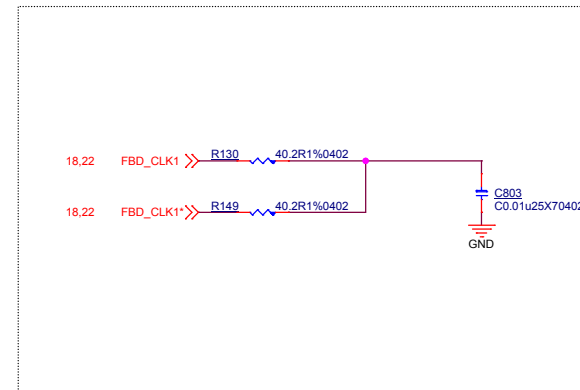
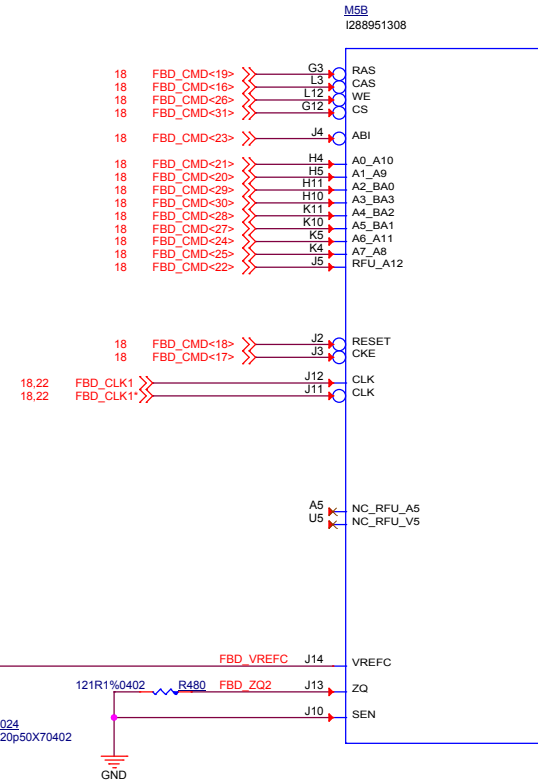
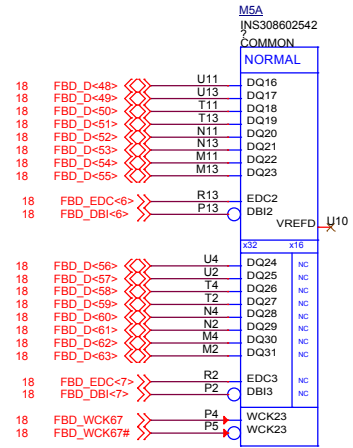
DQ[31:0]	DQ[63:32]	
CMD0	CMD16	CAS*
CMD1	CMD17	CKE*
CMD2	CMD18	RST*
CMD3	CMD19	RAS*
CMD4	CMD20	A1 A9
CMD5	CMD21	A0 A10
CMD6	CMD22	A12 RFU
CMD7	CMD23	ABI*
CMD8	CMD24	A6 A11
CMD9	CMD25	A7 A8
CMD10	CMD26	WE*
CMD11	CMD27	A5 BA1
CMD12	CMD28	A4 BA2
CMD13	CMD29	A2 BA0
CMD14	CMD30	A3 BA3
CMD15	CMD31	CS*



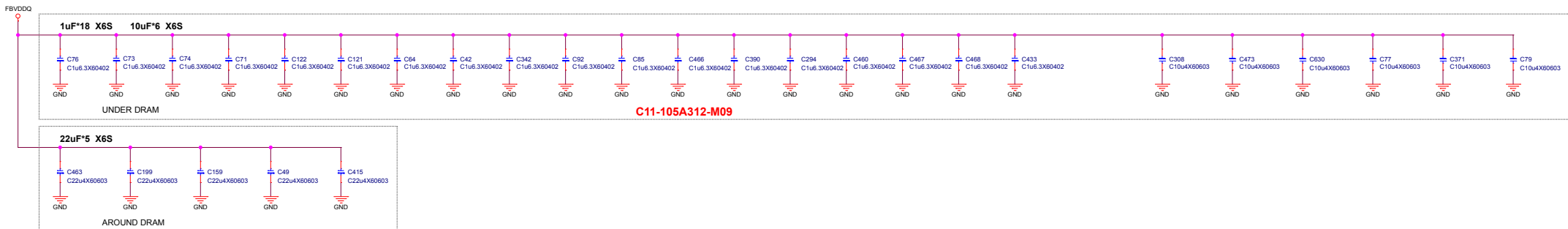
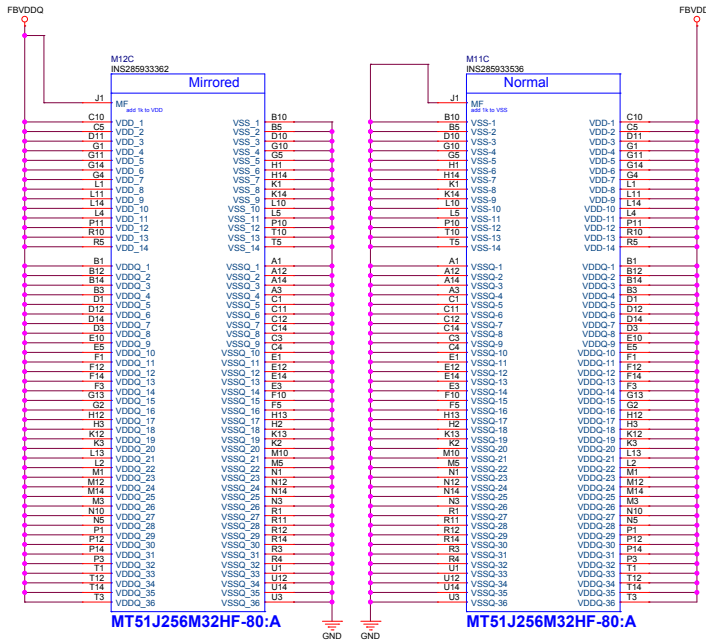
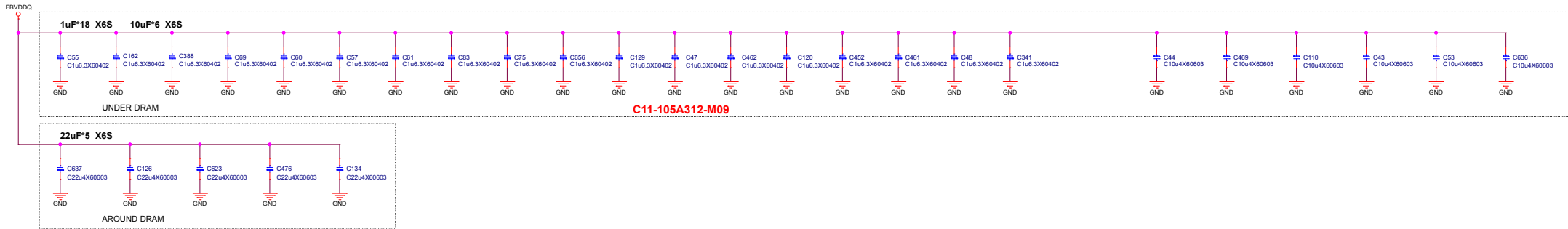
DGPU_GDDR5 FrameBuffer D1

GDD5 Command Mapping GB4-256

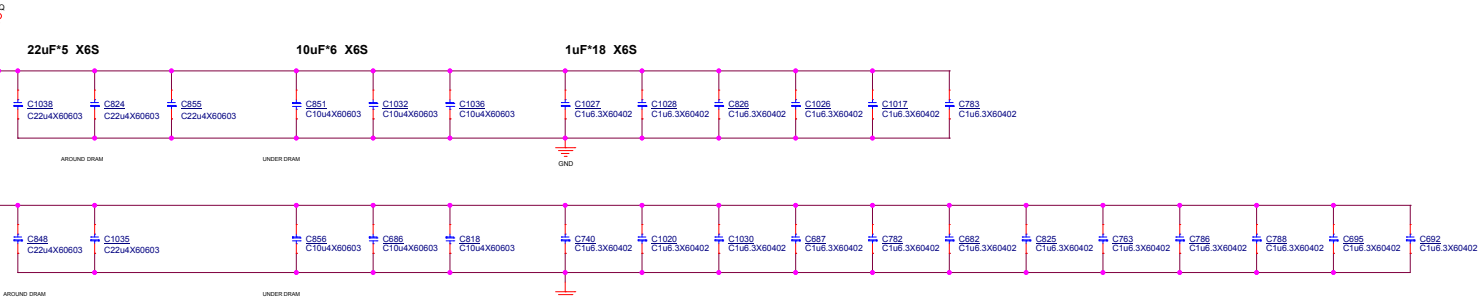
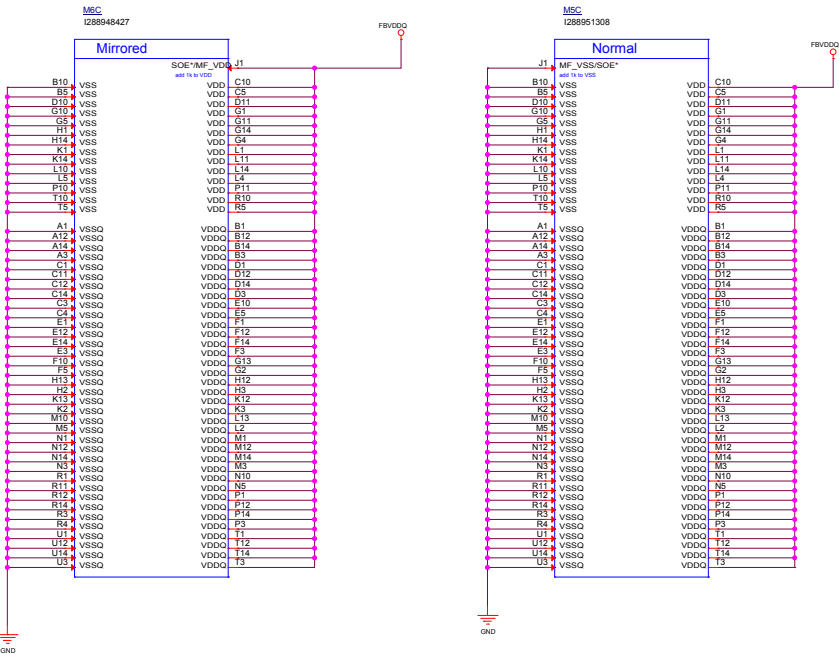
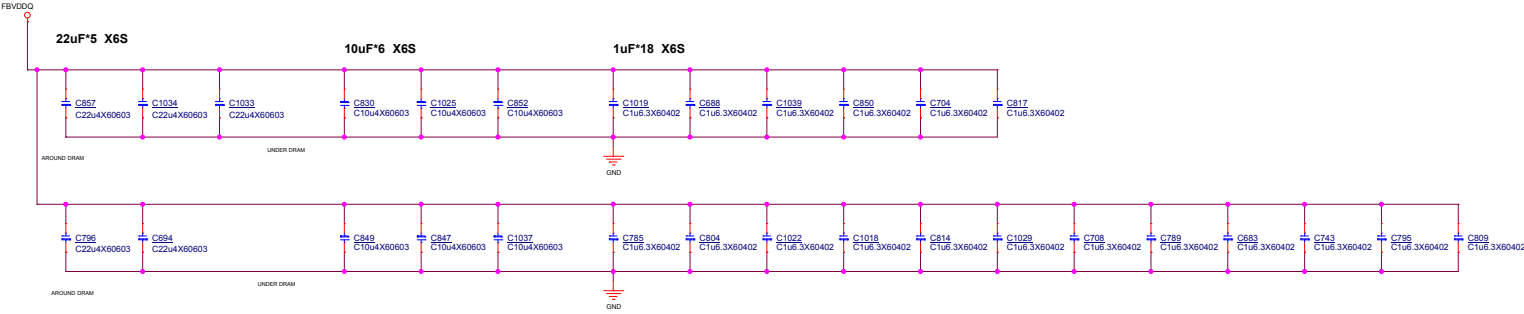
DQ[31:0]	DQ[63:32]	
CMD0	CMD16	CAS*
CMD1	CMD17	CKE*
CMD2	CMD18	RST*
CMD3	CMD19	RAS*
CMD4	CMD20	A1 A9
CMD5	CMD21	A0 A10
CMD6	CMD22	A12 RFU
CMD7	CMD23	ABI*
CMD8	CMD24	A6 A11
CMD9	CMD25	A7 A8
CMD10	CMD26	WE*
CMD11	CMD27	A5 BA1
CMD12	CMD28	A4 BA2
CMD13	CMD29	A2 BA0
CMD14	CMD30	A3 BA3
CMD15	CMD31	CS*



Frame Buffer Partition C Decoupling



Frame Buffer Partition D Decoupling

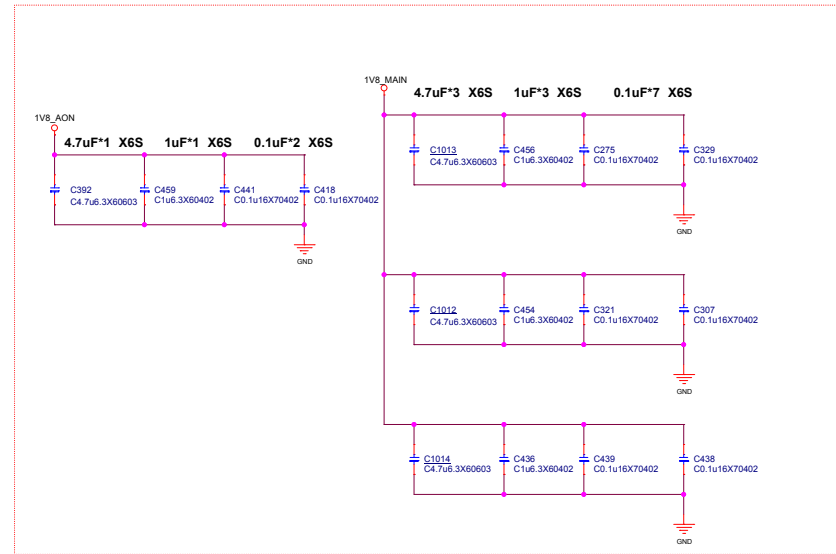
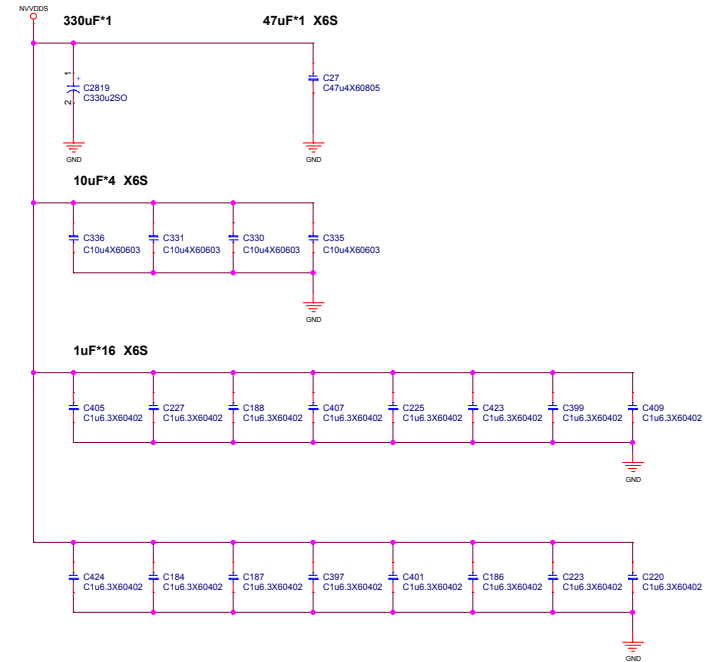


GPU DECOUPLING A

NVDD



VDDS



GPU DECOUPLING B

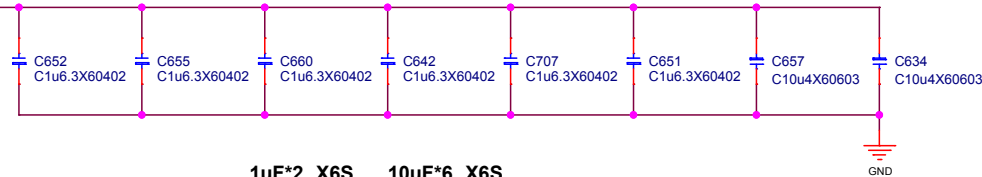
FBVDDQ

FBVDDQ

Partition A

1uF*2 X6S

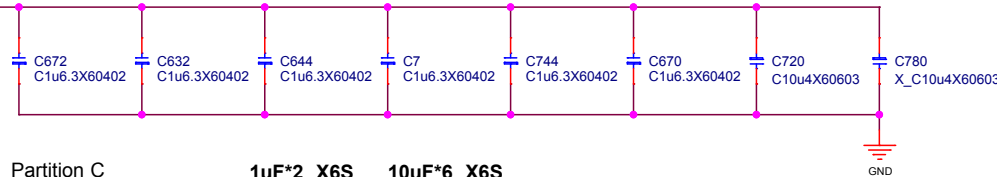
10uF*6 X6S



Partition B

1uF*2 X6S

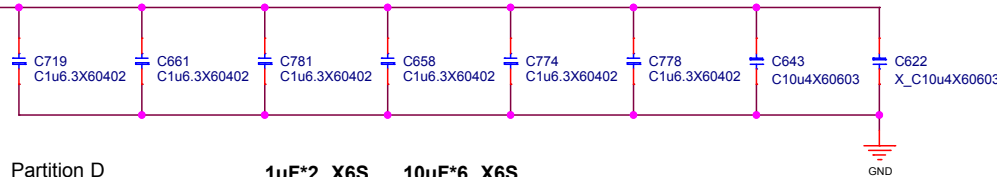
10uF*6 X6S



Partition C

1uF*2 X6S

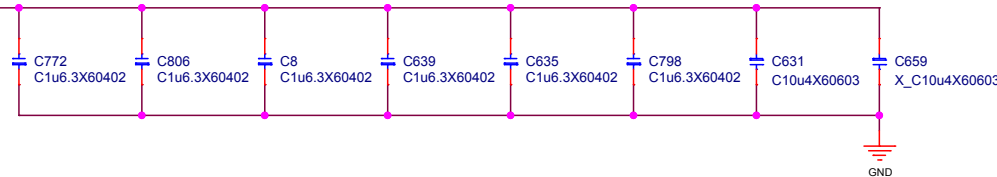
10uF*6 X6S



Partition D

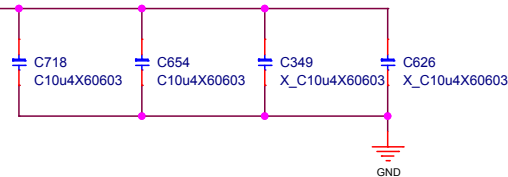
1uF*2 X6S

10uF*6 X6S

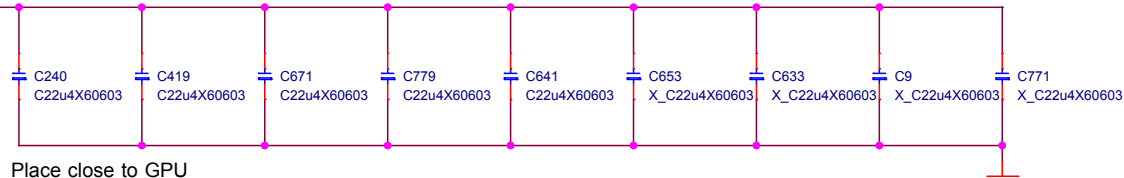


Place close to GPU

10uF*4 X6S



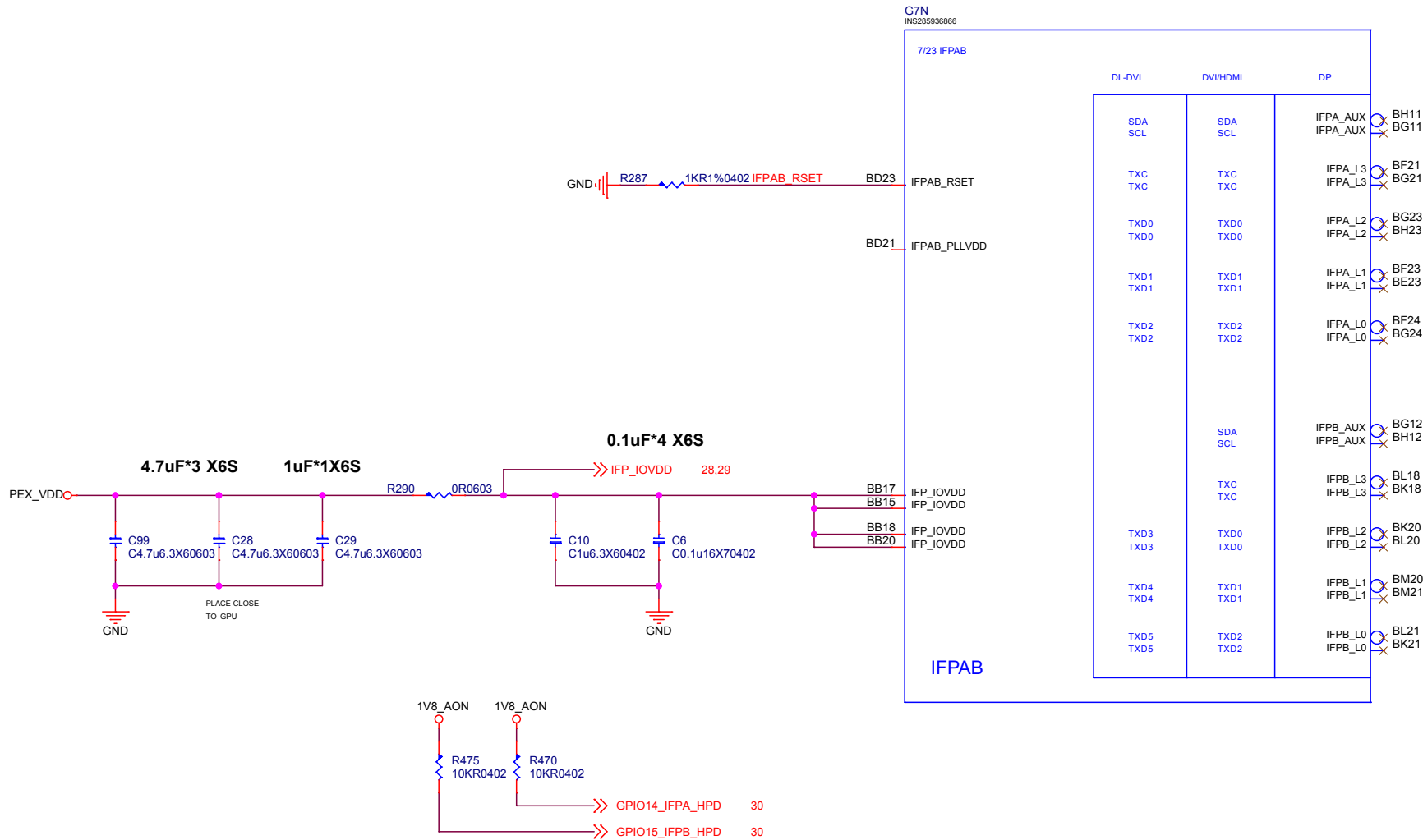
22uF*9 X6S



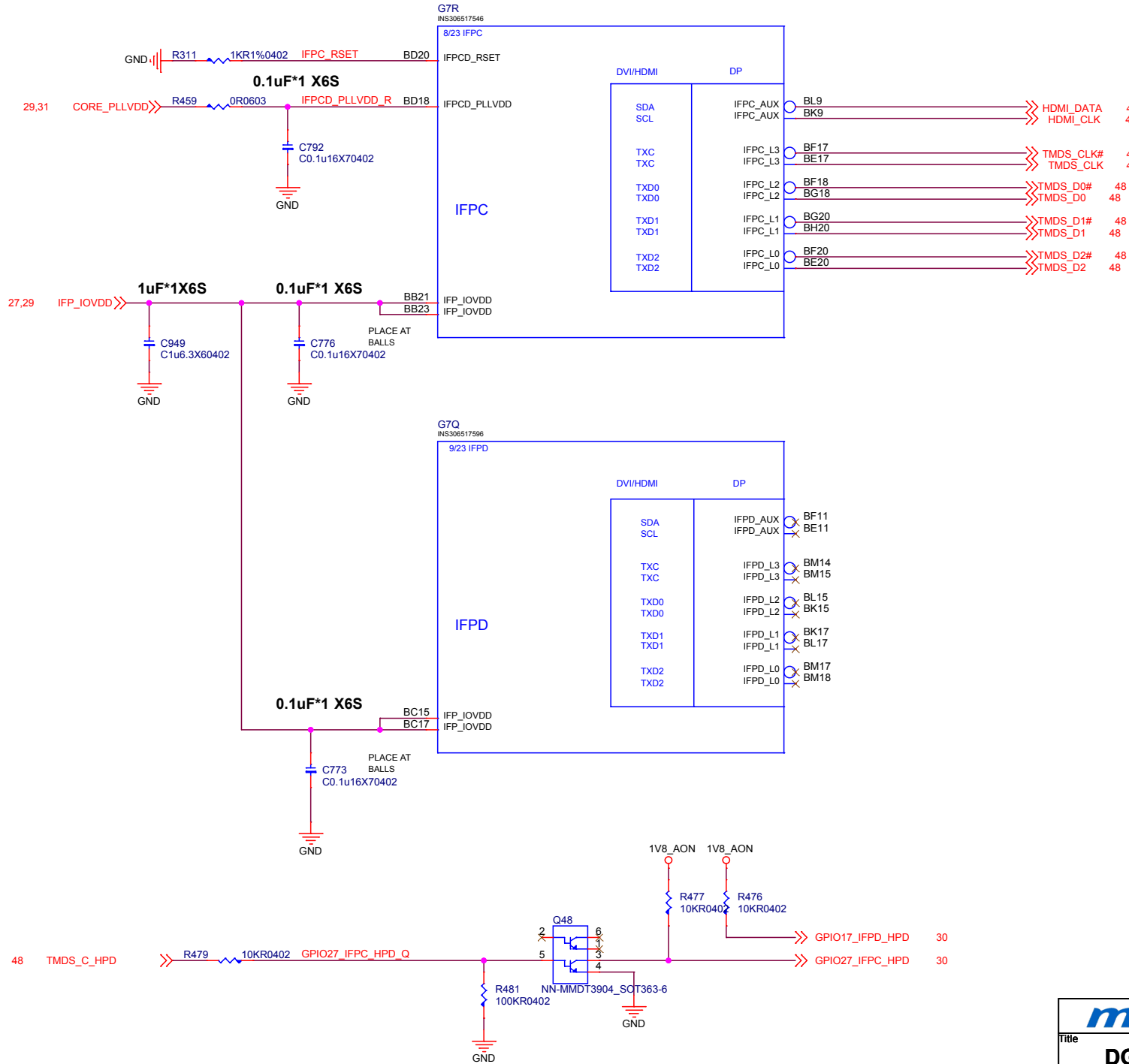
Place close to GPU

msi MICRO-STAR INT'L CO.,LTD.	
Title	
DGPU GPU DECOUPLING B	
Size	Document Number
MS-16JE	
Date:	Wednesday, October 25, 2017
Sheet	26 of 75

IFPCD



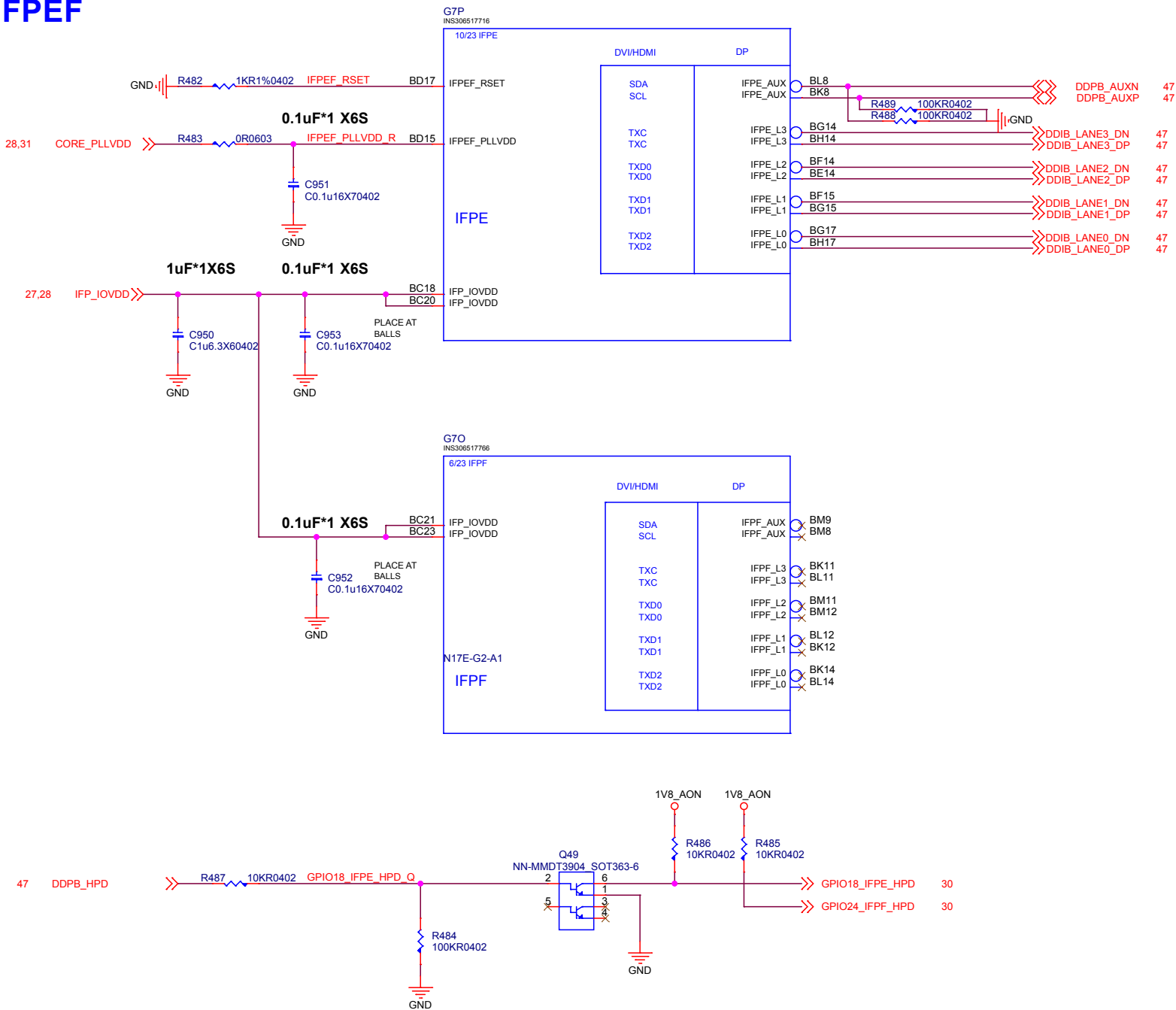
IFPCD

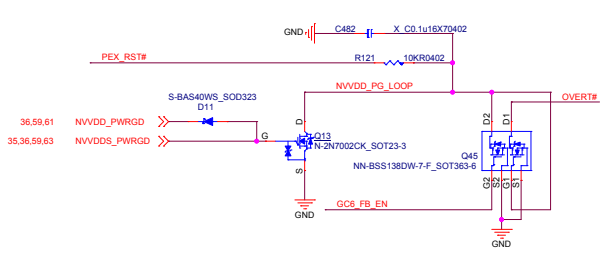
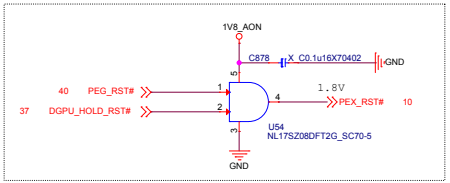
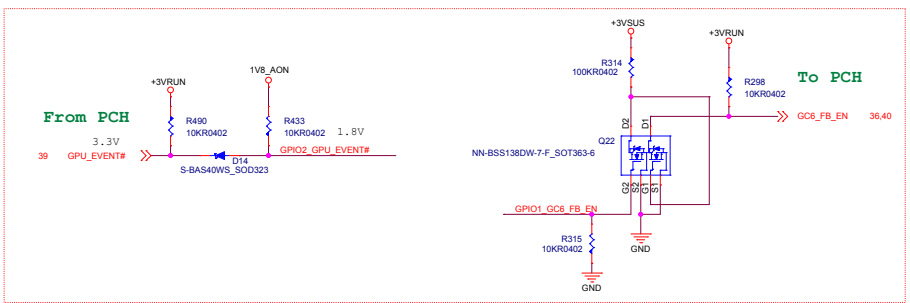


HDMI

OUT_D0==>IN_D2
OUT_D1==>IN_D1
OUT_D2==>IN_D0

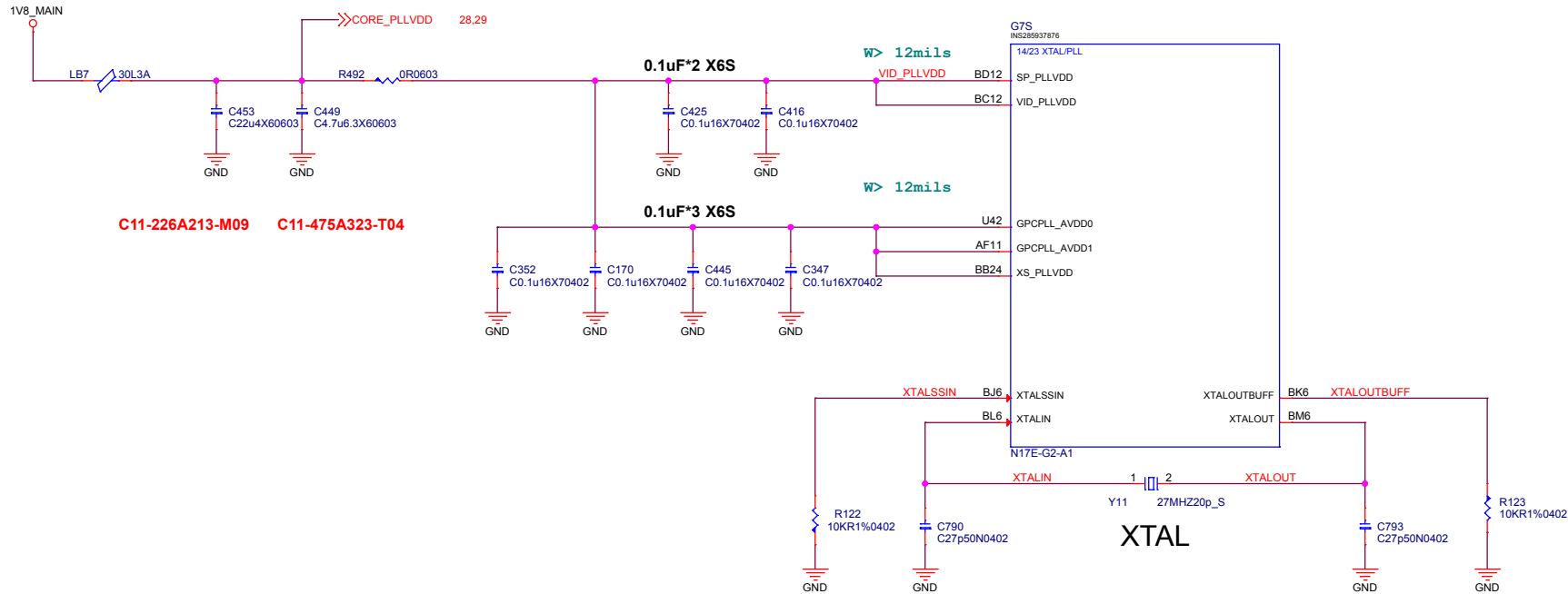
IFPEF



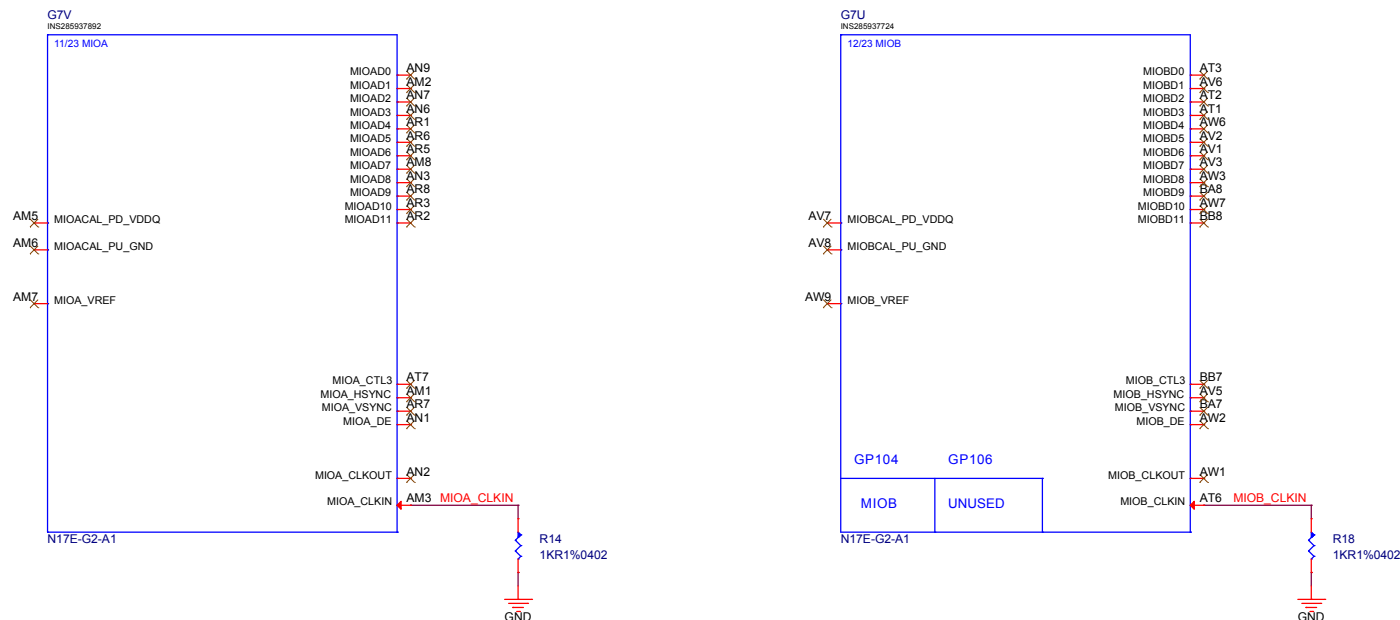
[illegible]

Pin Name	Normal function	I/O	Functional Description	Recommended Default Pull-up or Pull-down
GPIO0	PWR_VID	O	PWM Output to Control NVVD	0 to 1V8 PWM output
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	NVVDSS_PWM	O	PWM output to control the NVVDSS power supply	0 to 1V8 PWM output
GPIO4	1V8_MAIN_EN	O	GPU POWER Sequencing for GC6 2.1	10K pull-up to 1V8_AON
GPIO5	FRM_LCK	I	Active Low Fram Lock	10K pull-up to 1V8_AON
GPIO6	NVVDD_PSI	O	Phase shedding	10K pull-up to 1V8_AON
GPIO7	LCD_BI_PWM	O	Panel Backlight PWM Brightness Control	100K pull-down
GPIO8	MEM_VDD_CTL	O	Memory Voltage Control	pull-up/pull-down to set the FBVDD/O 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	100K pull-down
GPIO11	LCD_VCC	O	Panel Power Enable	100K pull-down
GPIO12	PWR_LEVEL	I	AC power detect or power supply overdraw input	100K pull-up to 1V8_AON
GPIO13	LCD_BLEN	O	Panel Backlight Enable	100K pull-down
GPIO14	HPD_A	I	Hot Plug Detect for IFPA	10K pull-up to 1V8_AON
GPIO15	HPD_B	I	Hot Plug Detect for IFPB	10K pull-up to 1V8_AON
GPIO16	SYS_PEX_RST_MON#	I	System side PCI reset Monitor	10K pull-up to 1V8_AON
GPIO17	HPD_D	I	Hot Plug Detect for IFPD	10K pull-up to 1V8_AON
GPIO18	HPD_E	I	Hot Plug Detect for IFPE	10K pull-up to 1V8_AON
GPIO19	3Dvision	O	3D Vision L/R signal	100K pull-down
GPIO20	NVVDSS_PSI	O	Phase shedding	10K pull-up to 1V8_AON
GPIO21	SLI_RASTER_SYNC	I	SLI Raster Sync	100K pull-down
GPIO22	SLI_SWAP_DRY	I	SLI Swap Ready	
GPIO23	GPU_PEX_RST_HOLD	O	GPU PCIe self-reset control	10K pull-up to 1V8_AON
GPIO24	HPD_F	I	Hot Plug Detect for IFPDF	10K pull-up to 1V8_AON
GPIO25	RESERVED			
GPIO26	RESERVED			
GPIO27	HPD_C	I	Hot Plug Detect for IFPC	10K pull-up to 1V8_AON
GPIO28	OC_WARN	I	Over current throttling	10K pull-up to 1V8_AON
GPIO29	EDPC_OUTPUT_CAP	I	Input from power supply	0 to 1V8
GPIO30	RESERVED			

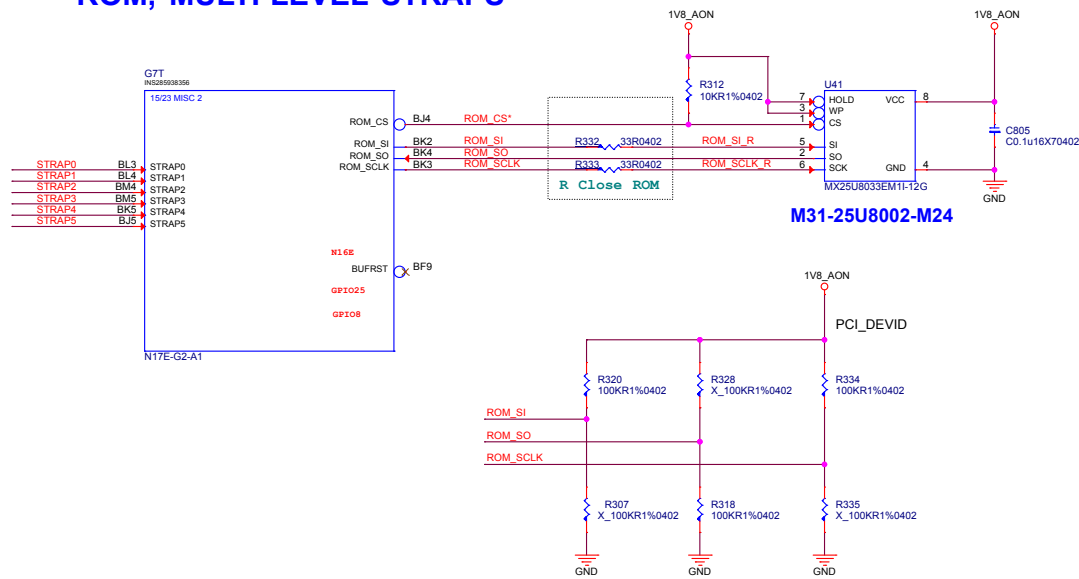
DGPU MIO & XTAL



Multi-use IO(MIO) Interface



ROM, MULTI-LEVEL STRAPS



ROM_SO	ROM_SI	ROM_SCLK	SOR_EXPOSED3	SOR_EXPOSED2	SOR_EXPOSED1	SOR_EXPOSED0
L	L	L	1:ENABLE	1:ENABLE	1:ENABLE	1:ENABLE
L	L	H	1:ENABLE	1:ENABLE	1:ENABLE	0:DISABLE
L	H	L	1:ENABLE	1:ENABLE	0:DISABLE	1:ENABLE
L	H	H	1:ENABLE	1:ENABLE	0:DISABLE	0:DISABLE
H	H	H	1:ENABLE	0:DISABLE	0:DISABLE	0:DISABLE
H	H	M	0:DISABLE	0:DISABLE	0:DISABLE	0:DISABLE

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		
L	L	L	0x0	Samsung K4G80325FB-HC25
L	L	H	0x1	Microm MT51J2256M32HF-80:A
L	H	L	0x2	Hynix H5GC8H24MJR-R4C
H	H	L	0x6	Hynix H5GQ4H24AJR-R4C
H	H	H	0x7	Samsung K4G41325FE-HC25

V_BOT1

☐ Samsung 256Mx32bit

☐ M12-8032535-S02

X_K4G80325FB-HC25

V_BOT2

☐ Samsung 128Mx32bit

☐ M12-41325D5-S02

X_K4G41325FE-HC25

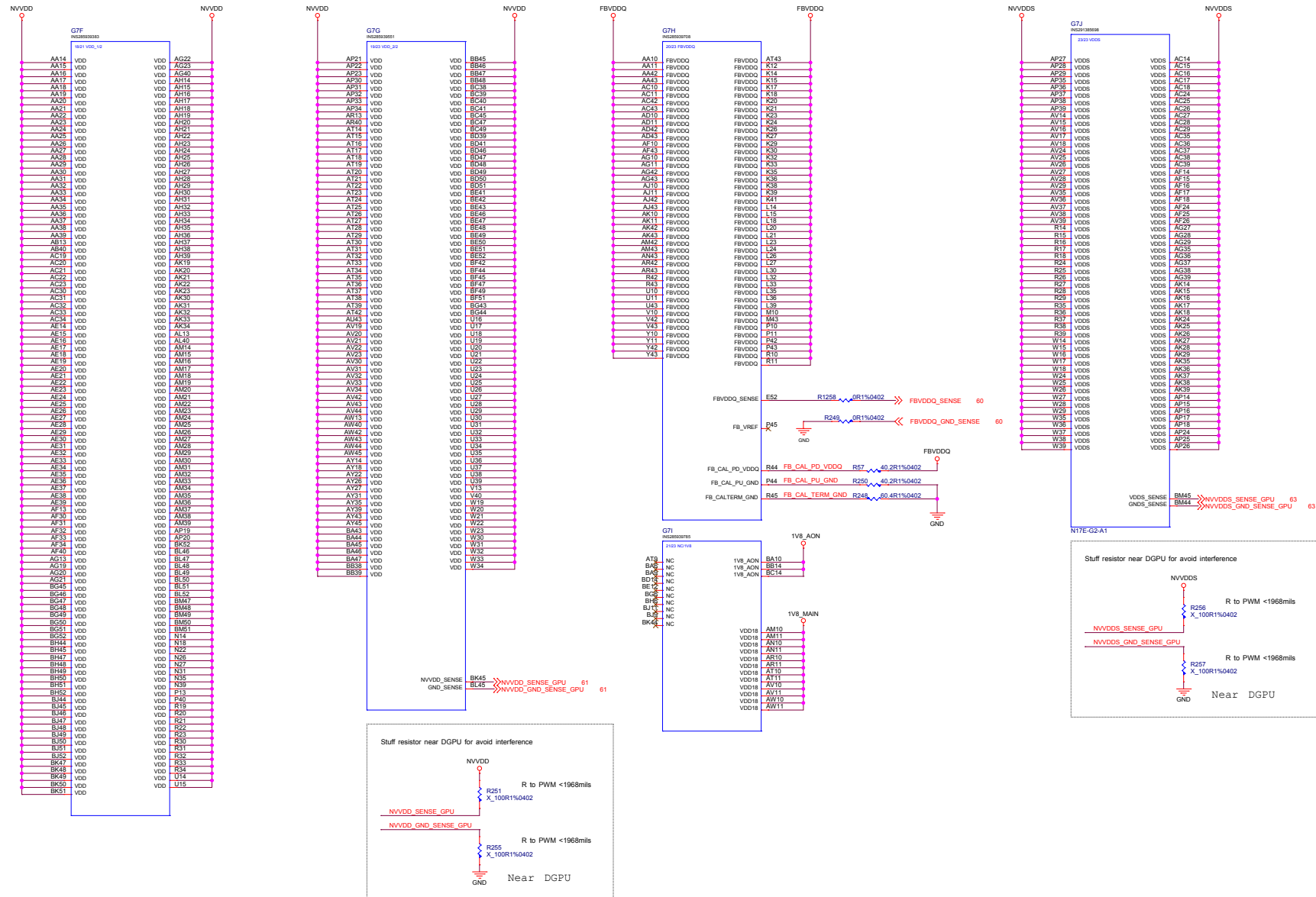
N17E-G2
(GTX1070)

N17E_G2
☐ B03-0N17E05-N08
X_N17E-G2-A1

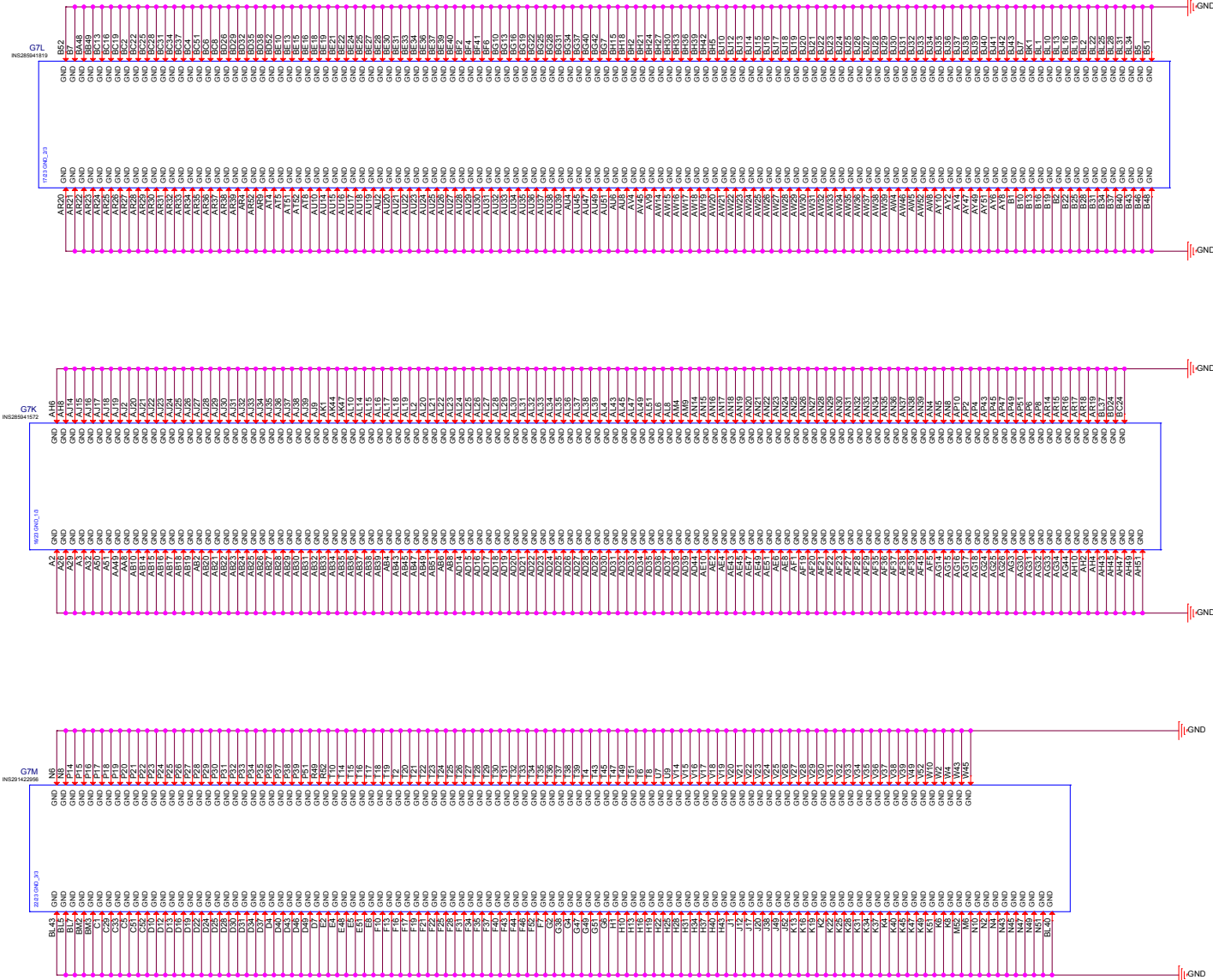
N17E-G1
(GTX1060)

N17E_G1
☐ B03-0N17E25-N08
X_N17E-G1-A1

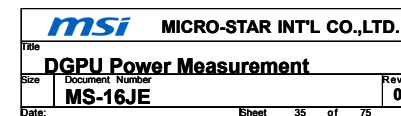
GPU NVVDD, FBVDDQ



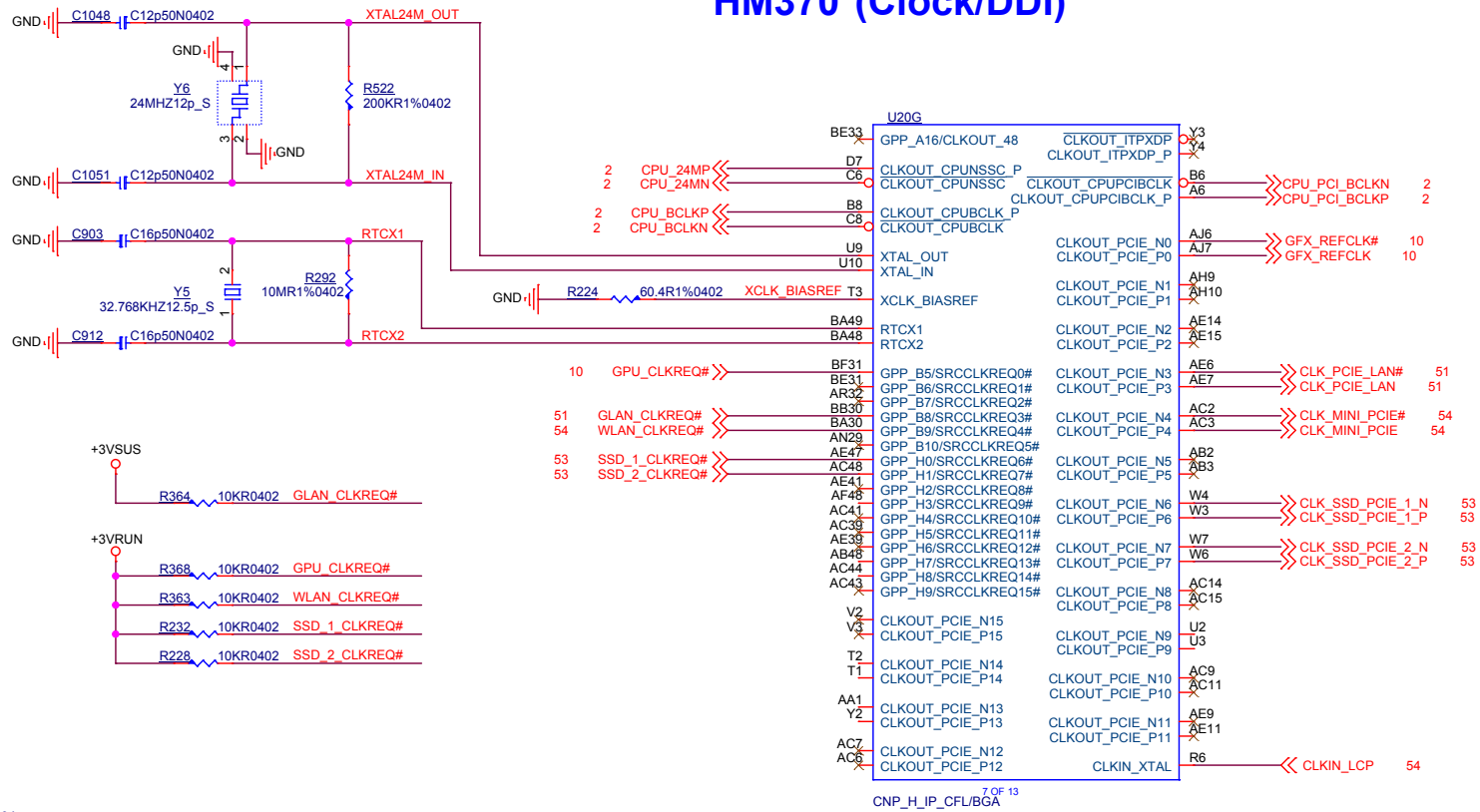
DGPU GND



DGPU Power Measurement



HM370 (Clock/DDI)



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

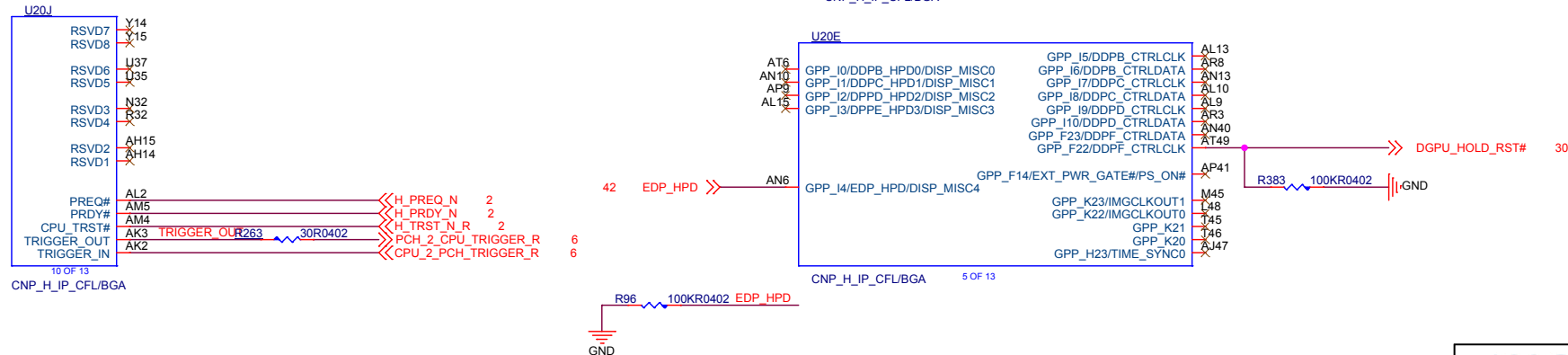
This signal has a weak internal pull-down.
0 = Port B is not detected. (Default)
1 = Port B is detected.

DDPD_CTRLDATA / GPP_I10

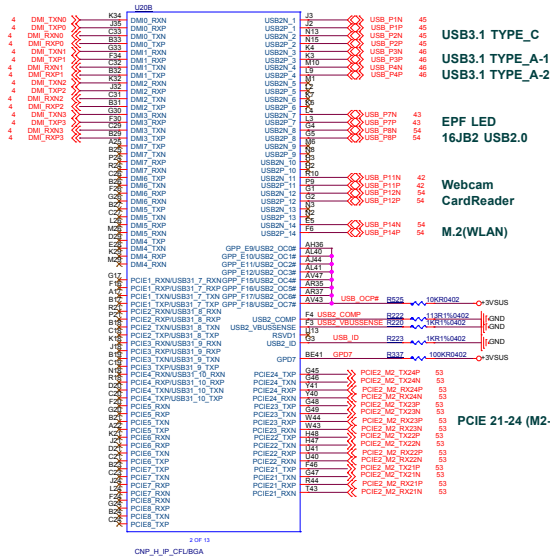
This signal has a weak internal pull-down.
0 = Port B is not detected. (Default)
1 = Port B is detected.

GPP_F23

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



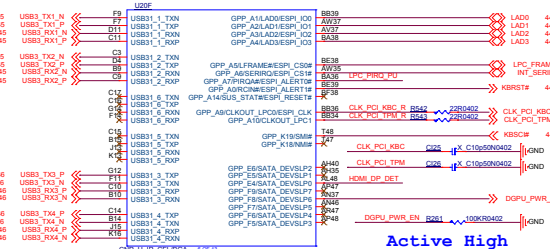
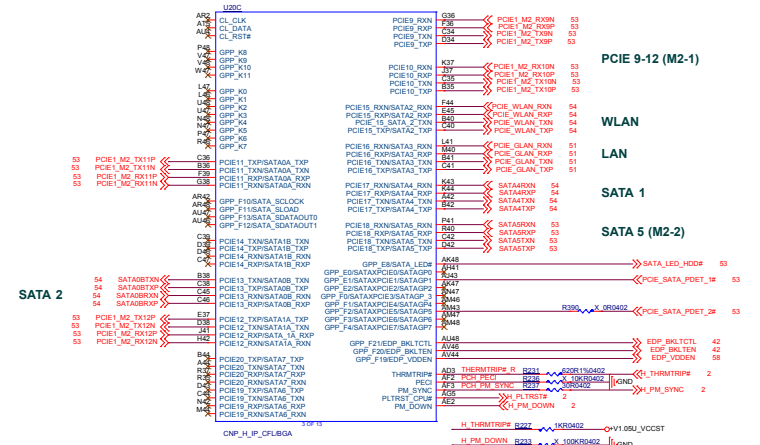
HM370 (DMI/PCIE/USB/CNVI)



USB			
USB 2.0	USB 3.1	Device	Note
1	1	USB TYPE_C-1	
2	2	USB TYPE_C-2	
3	3	USB TYPE_A-1	
4	4	USB TYPE_A-2	
5			
6		INTEL LAN Only	
7		N/A	
8		N/A	
9		PCIeLAN	
10		PCIe	
11		PCIeSATA0A	
12		PCIeLAN/SATA0B	
13		PCIe	
14		WLAN	

High Speed I/O Ports			
HM370		Device	
1	USB3.1 Gen 1	USB TYPE_A-1	
2	USB3.1 Gen 1	USB TYPE_A-2	
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	PCIeLAN		
10	PCIe	PCIe Configurable M.2	M.2 SSD-1
11	PCIeSATA0A		
12	PCIeLAN/SATA0B		
13	PCIeLAN/SATA0B		SATA 2
14	PCIe		NC
15	PCIe		LAN
16	PCIe		WLAN
17	PCIeSATA4		SATA 1
18	PCIeSATA5		M.2 SSD-2
19	PCIe		NC
20	PCIe		NC
21	PCIe		PCIe Configurable M.2
22	PCIe		M.2 SSD-2
23	PCIe		
24	PCIe		

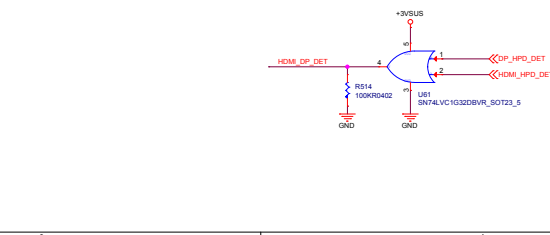
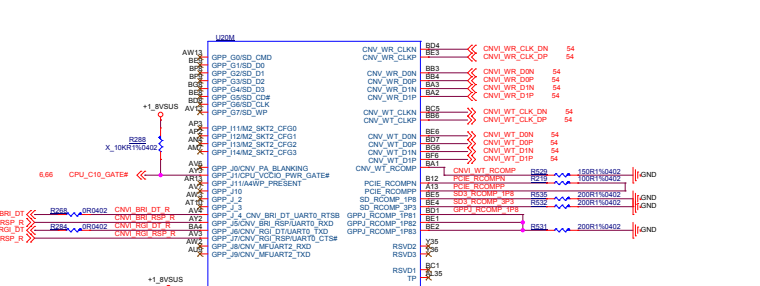
SATA Lane 0 has the flexibility to be mapped to PCIe 11 or 13
 SATA Lane 1 has the flexibility to be mapped to PCIe 12 or 14



USB			
USB 2.0	USB 3.1	Device	Note
1	1	USB TYPE_C-1	
2	2	USB TYPE_C-2	
3	3	USB TYPE_A-1	
4	4	USB TYPE_A-2	
5			
6		INTEL LAN Only	
7		N/A	
8		N/A	
9		PCIeLAN	
10		PCIe	
11		PCIeSATA0A	
12		PCIeLAN/SATA0B	
13		PCIe	
14		WLAN	

High Speed I/O Ports			
HM370		Device	
1	USB3.1 Gen 1	USB TYPE_A-1	
2	USB3.1 Gen 1	USB TYPE_A-2	
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	PCIeLAN		
10	PCIe	PCIe Configurable M.2	M.2 SSD-1
11	PCIeSATA0A		
12	PCIeLAN/SATA0B		
13	PCIeLAN/SATA0B		SATA 2
14	PCIe		NC
15	PCIe		LAN
16	PCIe		WLAN
17	PCIeSATA4		SATA 1
18	PCIeSATA5		M.2 SSD-2
19	PCIe		NC
20	PCIe		NC
21	PCIe		PCIe Configurable M.2
22	PCIe		M.2 SSD-2
23	PCIe		
24	PCIe		

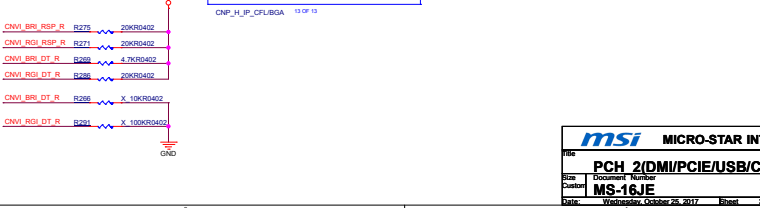
SATA Lane 0 has the flexibility to be mapped to PCIe 11 or 13
 SATA Lane 1 has the flexibility to be mapped to PCIe 12 or 14



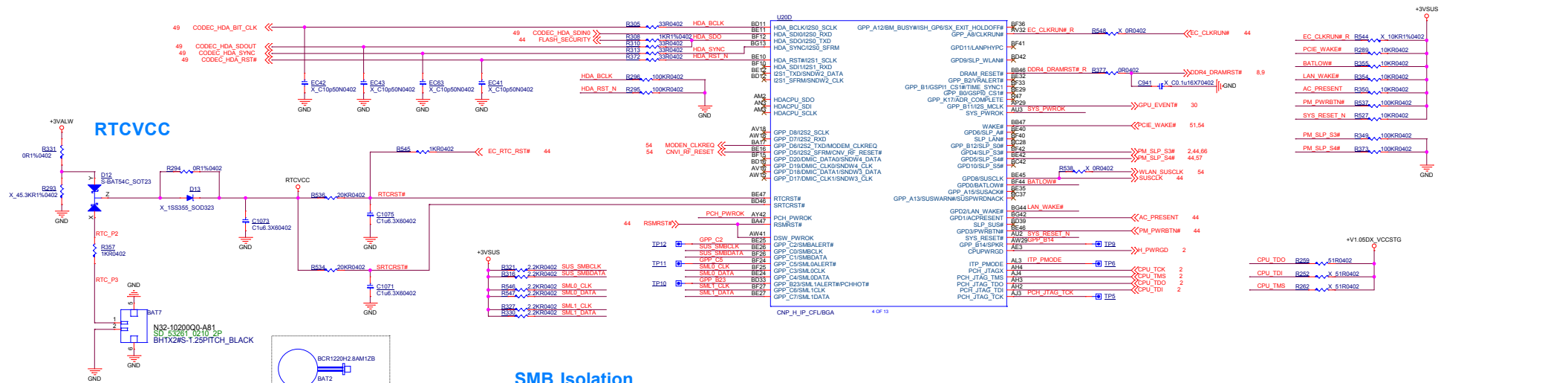
USB			
USB 2.0	USB 3.1	Device	Note
1	1	USB TYPE_C-1	
2	2	USB TYPE_C-2	
3	3	USB TYPE_A-1	
4	4	USB TYPE_A-2	
5			
6		INTEL LAN Only	
7		N/A	
8		N/A	
9		PCIeLAN	
10		PCIe	
11		PCIeSATA0A	
12		PCIeLAN/SATA0B	
13		PCIe	
14		WLAN	

High Speed I/O Ports			
HM370		Device	
1	USB3.1 Gen 1	USB TYPE_A-1	
2	USB3.1 Gen 1	USB TYPE_A-2	
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	PCIeLAN		
10	PCIe	PCIe Configurable M.2	M.2 SSD-1
11	PCIeSATA0A		
12	PCIeLAN/SATA0B		
13	PCIeLAN/SATA0B		SATA 2
14	PCIe		NC
15	PCIe		LAN
16	PCIe		WLAN
17	PCIeSATA4		SATA 1
18	PCIeSATA5		M.2 SSD-2
19	PCIe		NC
20	PCIe		NC
21	PCIe		PCIe Configurable M.2
22	PCIe		M.2 SSD-2
23	PCIe		
24	PCIe		

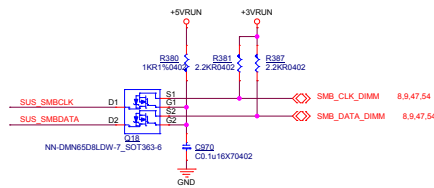
SATA Lane 0 has the flexibility to be mapped to PCIe 11 or 13
 SATA Lane 1 has the flexibility to be mapped to PCIe 12 or 14



HM370 (HDA/RTC/SMBUS)



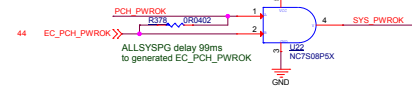
SMB Isolation



PCH_PWROK



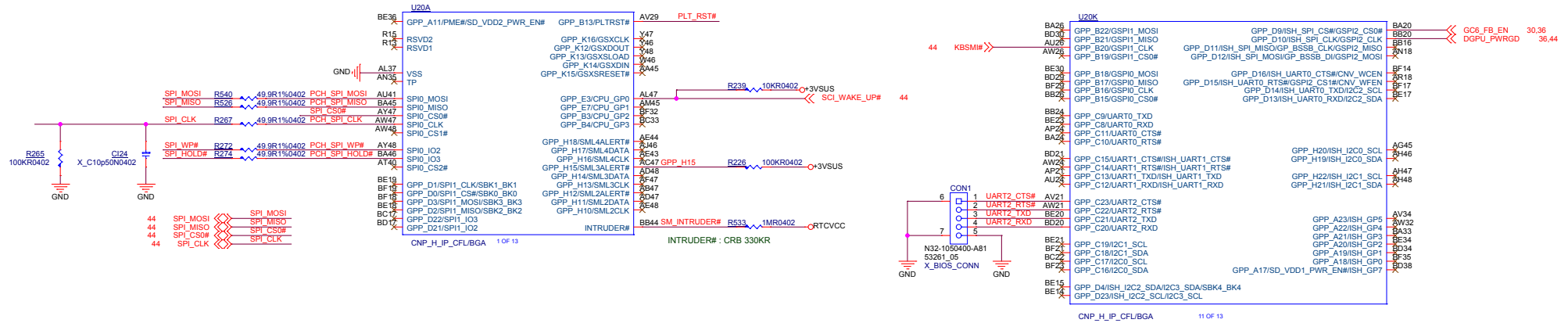
SYS_PWROK



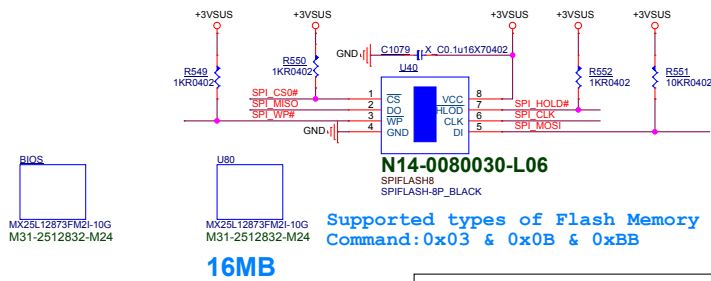
Functional Strap Definitions

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-OQB (Default) 1 = Enable Intel DCI-OQB
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#, SRTCST#, INTRUDER# : PU

HM370 (SPI/GPIO)



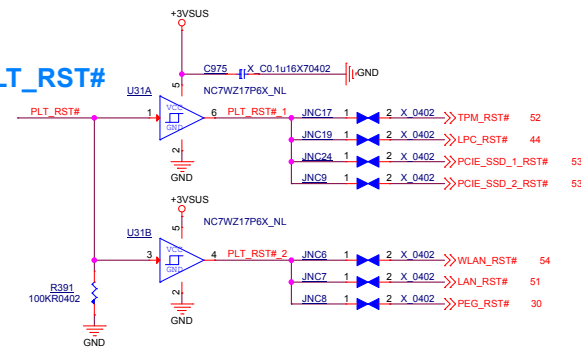
SPI FLASH ROM



DG / Single Flash Topology Table 29-3
(1) R use 50 Ohm for 3.3V
(2) SPIO_IO2/IO3 PU 1KR when using quad mode

SPIO_IO2 External pull-up is required. Recommend 100K if pulled up to 3.3V or 75K if pulled up to 1.8V.
SPIO_IO3 External pull-up is required. Recommend 100K if pulled up to 3.3V or 75K if pulled up to 1.8V.
SPIO_MOSI External pull-up is required. Recommend 100K if pulled up to 3.3V or 75K if pulled up to 1.8V.

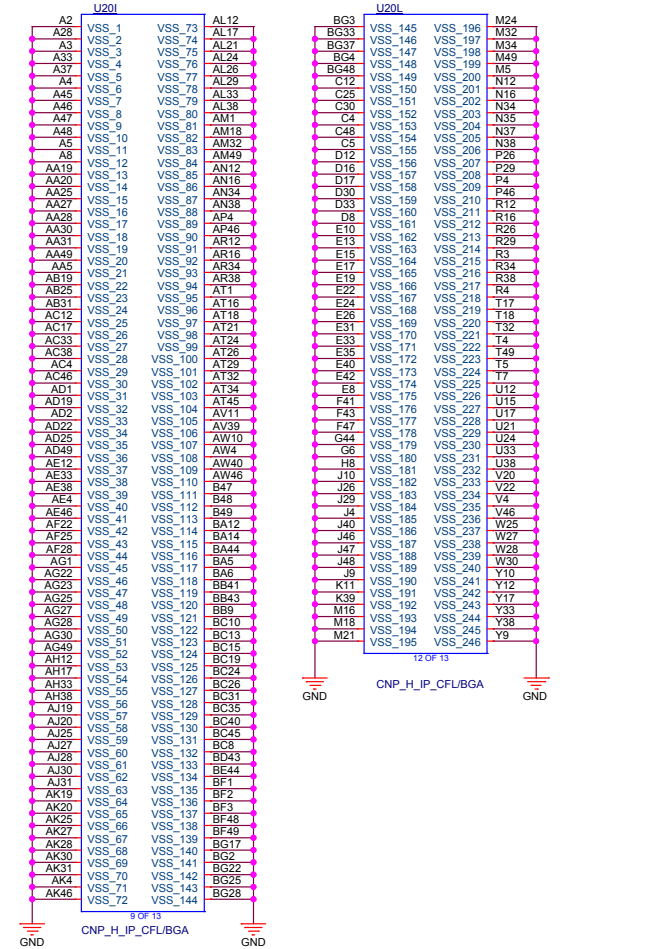
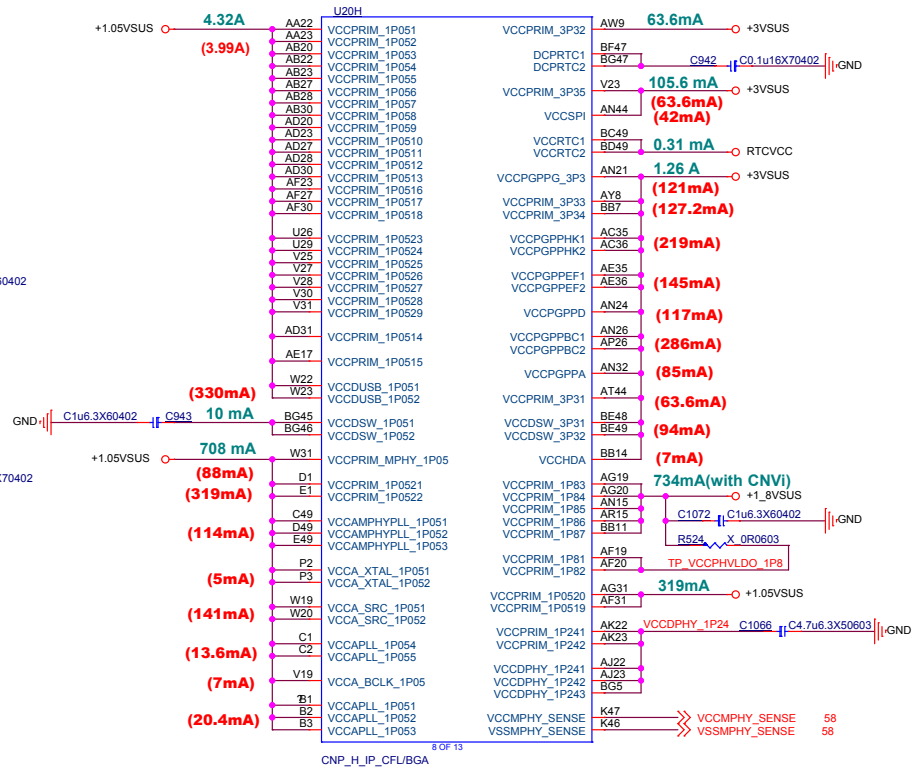
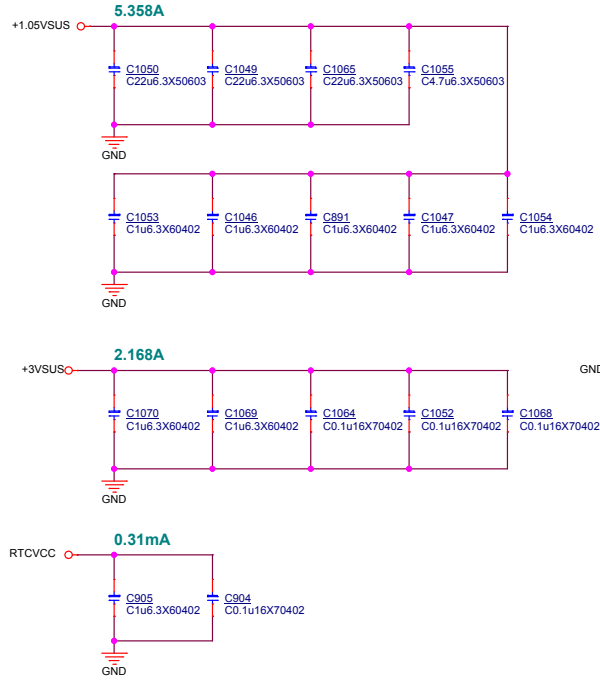
PLT_RST#



Functional Strap Definitions

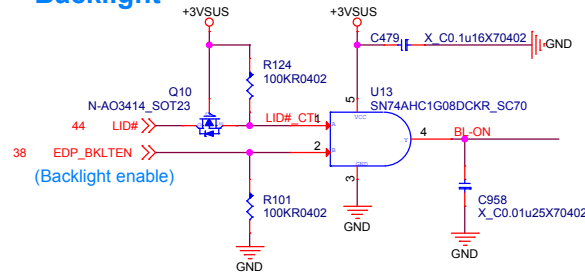
SML3ALERT# / GPP_H15 External pull-up is required. Recommend 100K if pulled up to 3.3V or 75K if pulled up to 1.8V.
GSP11_MOSI / GPP_B22 This Signal has a weak internal pull-down. Bit 6 Boot BIOS Destination SPI (Default) LPC
GSP10_MOSI / GPP_B18 The signal has a weak internal pull-down. 0 = Disable No Reboot mode. (Default) 1 = Enable No Reboot mode

HM370 (Power & GND)

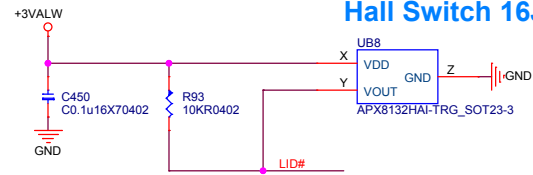


eDP / Camera

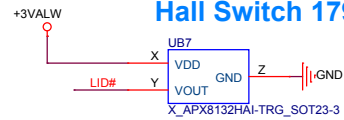
Backlight



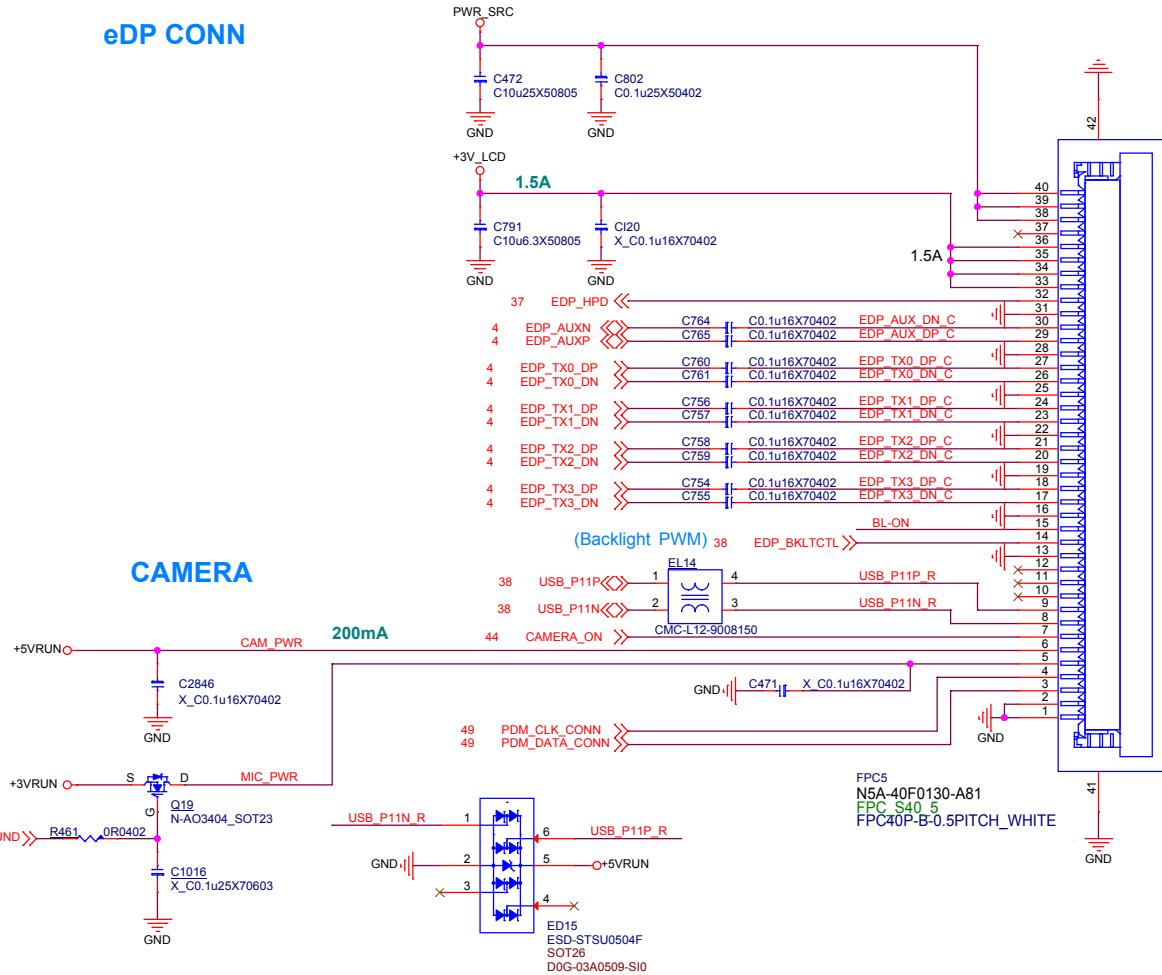
Hall Switch 16JE



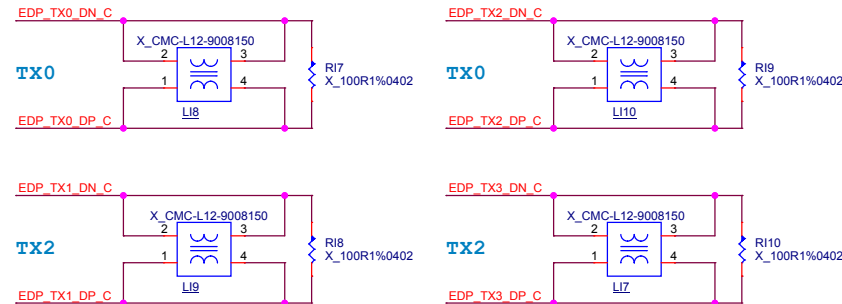
Hall Switch 179E



eDP CONN



CAMERA

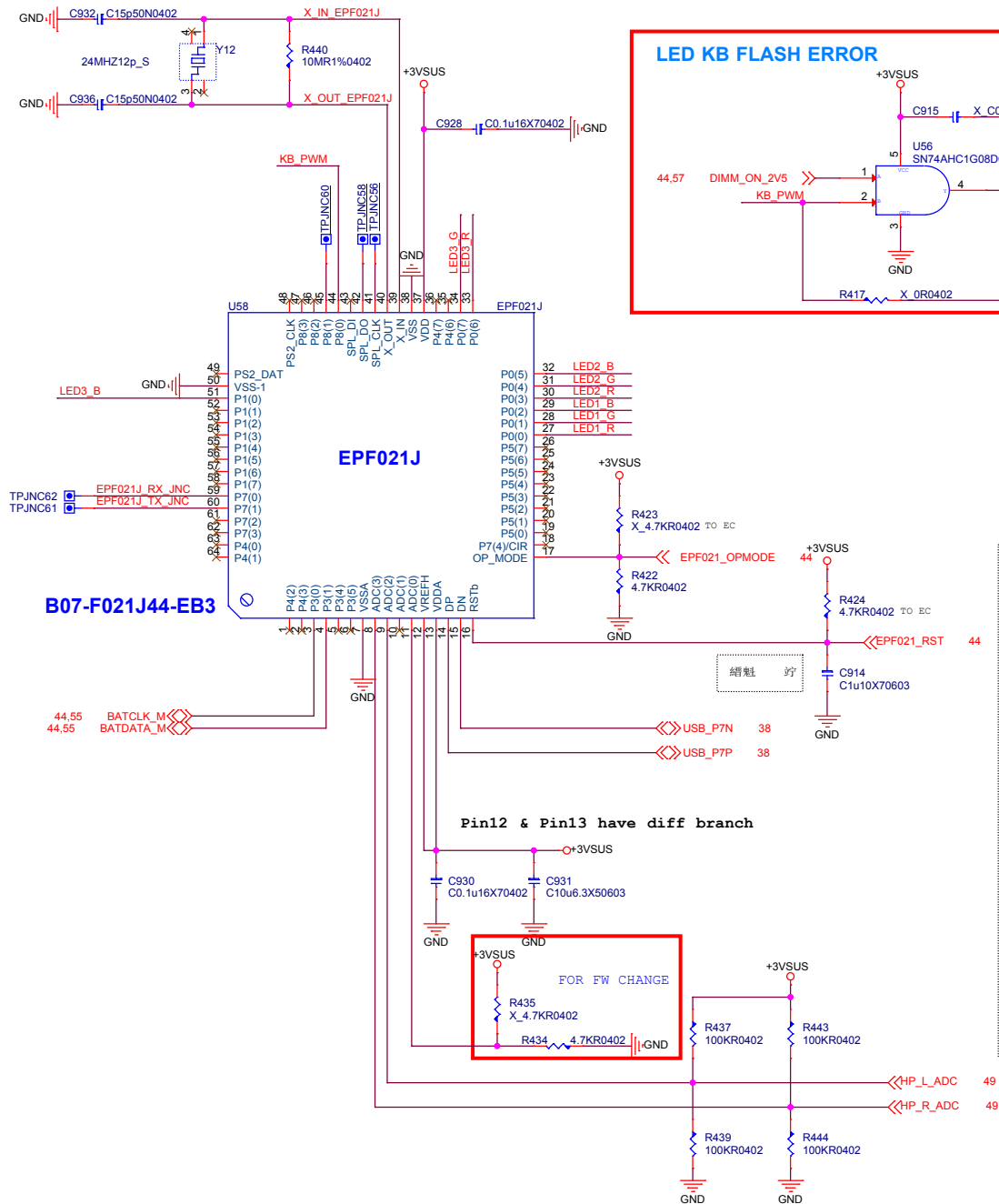


msi

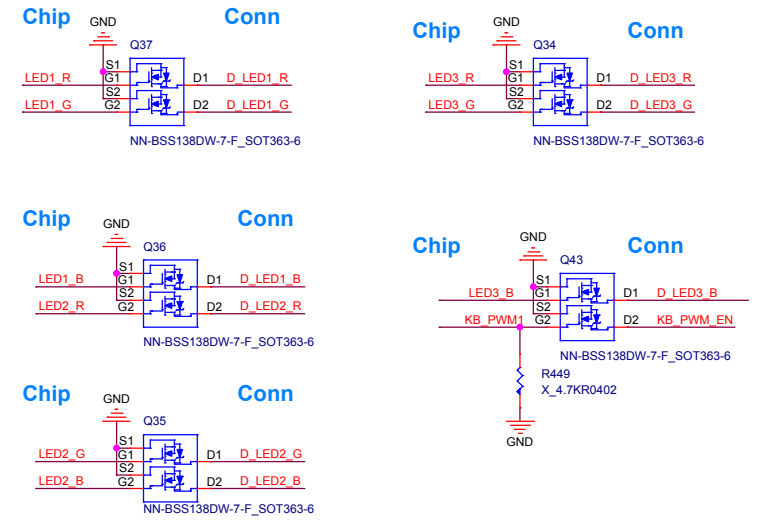
MICRO-STAR INT'L CO.,LTD.

Title		eDP /Camera
Size	Document Number	MS-16JE
Date:	Wednesday, October 25, 2017	Sheet 42 of 75
Rev	0A	

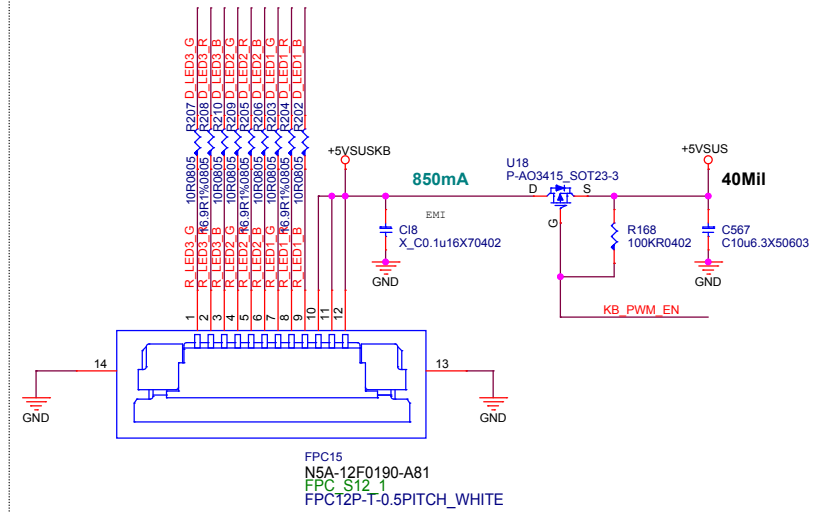
Keyboard LED (EPF021J)



EPF021J Sink current not enough, only using BSS138 (0.22A)

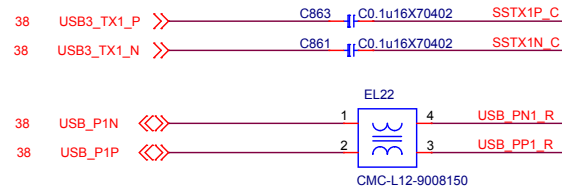
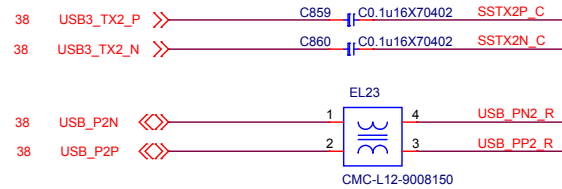


LED Keyboard CONN

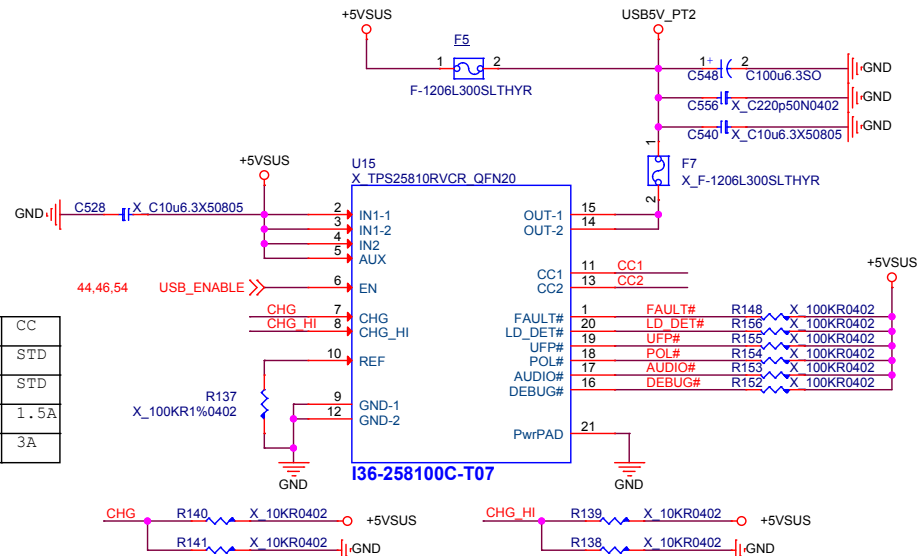
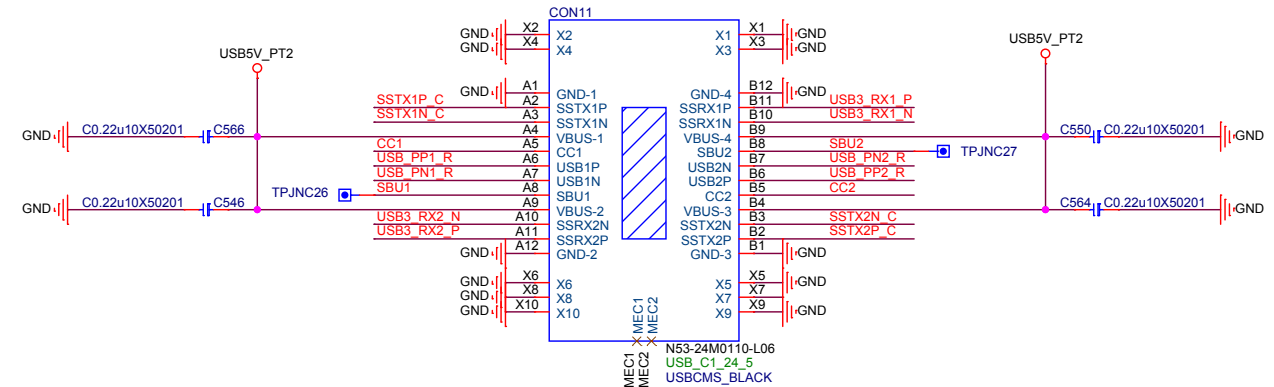
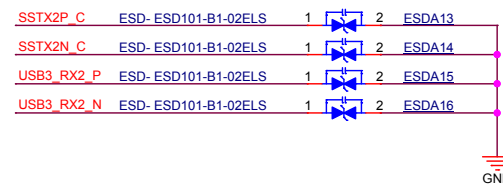
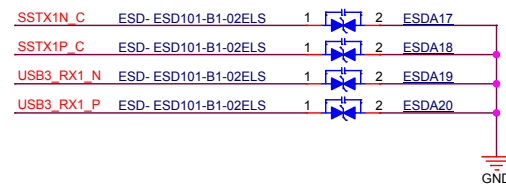
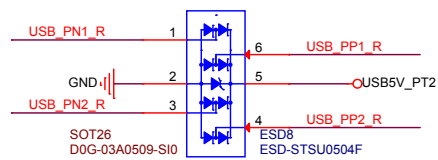


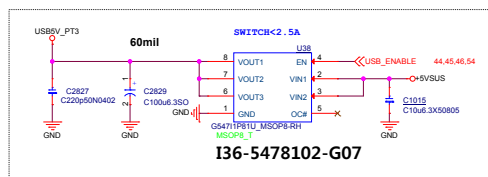
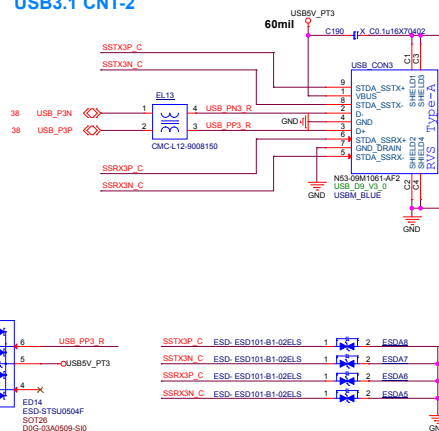
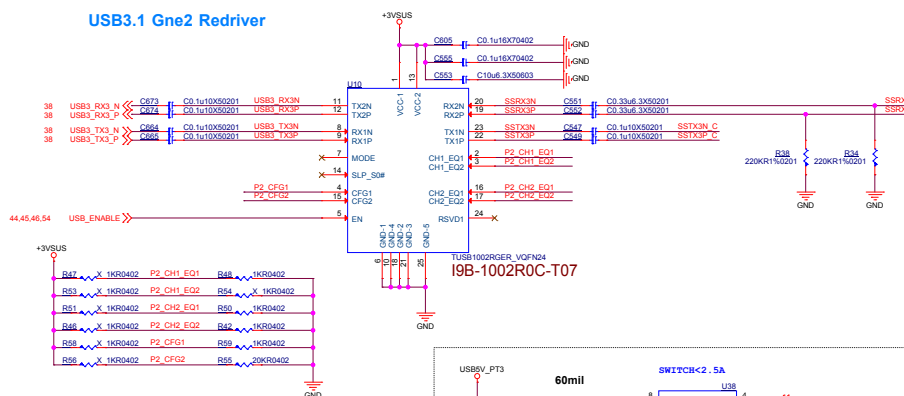
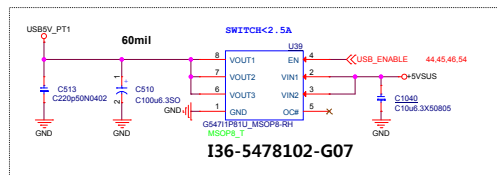
LED Keyboard Pin Define	
Pin 1	VCC_G
Pin 2	VCC_R
Pin 3	VCC_B
Pin 4	LED1_B
Pin 5	LED1_R
Pin 6	LED1_G
Pin 7	LED2_B
Pin 8	LED2_R
Pin 9	LED2_G
Pin 10	LED3_B
Pin 11	LED3_R
Pin 12	LED3_G

USB3.1 TYPE C



CHG	CHG_HI	CC
0	0	STD
0	1	STD
1	0	1.5A
1	1	3A

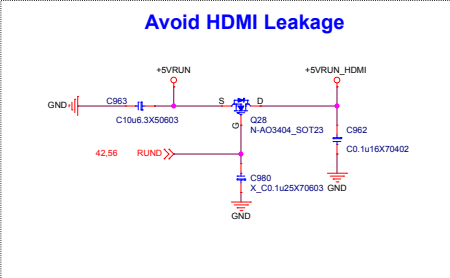
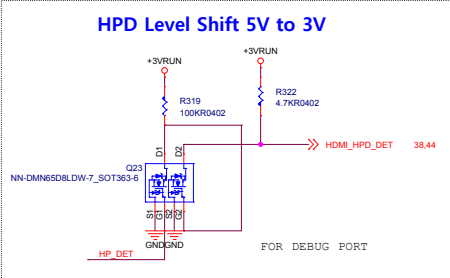
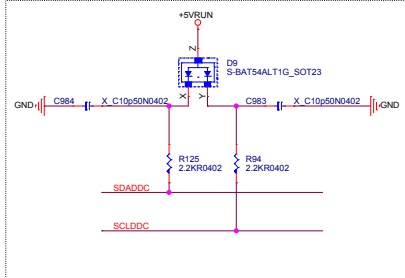
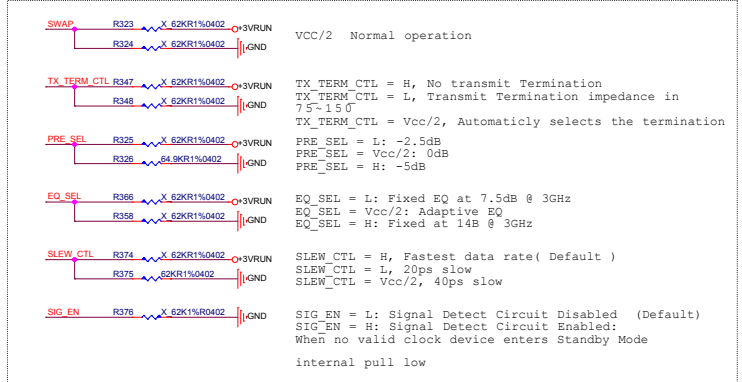
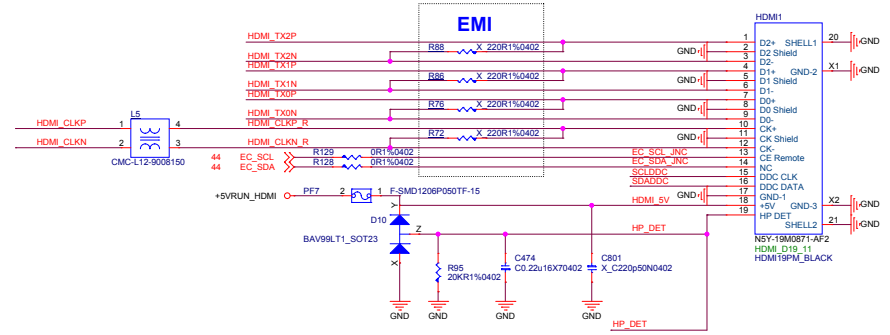
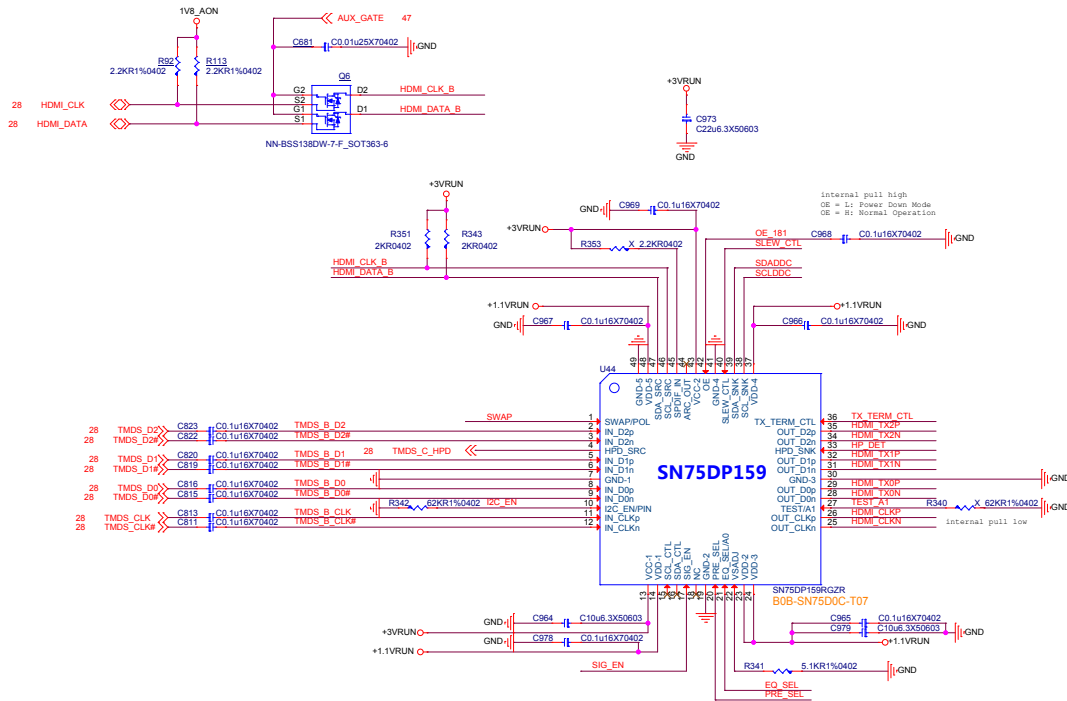




EQ2	EQ1	EQ GAIN at 2.5GHz / 5GHz (db)
1K TO GND [0]	1K TO GND [0]	1.9/5.5
1K TO GND [0]	20K TO GND [R]	2.8/7.1
1K TO GND [0]	Float	3.5/8.2
1K TO GND [0]	1K TO Vcc [1]	4.4/9.3
20K TO GND [R]	1K TO GND [0]	5.0/10.2
20K TO GND [R]	20K TO GND [R]	5.8/11.1
20K TO GND [R]	Float	6.4/11.8
20K TO GND [R]	1K TO Vcc [1]	7.1/12.6
Float	1K TO GND [0]	7.6/13.1
Float	20K TO GND [R]	8.2/13.8
Float	Float	8.7/14.3
Float	1K TO Vcc [1]	9.2/14.8
1K TO Vcc [1]	1K TO GND [0]	9.6/15.2
1K TO Vcc [1]	20K TO GND [R]	10.1/15.6
1K TO Vcc [1]	Float	Reserved
1K TO Vcc [1]	1K TO Vcc [1]	Reserved

CFG1	CFG2	CH1 DC GAIN(db)	CH2 DC GAIN(db)	CH1 Vod LINEAR RANGE(mVpp)	CH2 Vod LINEAR RANGE(mVpp)
1K TO GND [0]	1K TO GND [0]	+1	0	900	900
1K TO GND [0]	20K TO GND [R]	0	+1	900	900
1K TO GND [0]	Float	0	0	900	900
1K TO GND [0]	1K TO Vcc [1]	+1	+1	900	900
20K TO GND [R]	1K TO GND [0]	0	0	1000	1000
20K TO GND [R]	20K TO GND [R]	+1	0	1000	1000
20K TO GND [R]	Float	0	-1	1000	1000
20K TO GND [R]	1K TO Vcc [1]	+2	+2	1000	1000
Float	1K TO GND [0]	-1	-1	1200	1200
Float	20K TO GND [R]	-2	-2	1200	1200
Float	Float	0	0	1200	1200
Float	1K TO Vcc [1]	+1	+1	1200	1200
1K TO Vcc [1]	1K TO GND [0]	-1	0	1200	1200
1K TO Vcc [1]	20K TO GND [R]	0	-1	1200	1200
1K TO Vcc [1]	Float	0	+1	1200	1200
1K TO Vcc [1]	1K TO Vcc [1]	+1	0	1200	1200

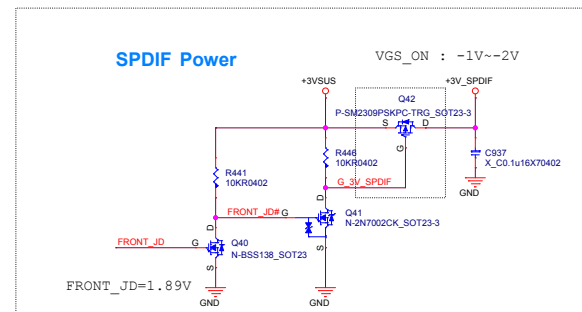
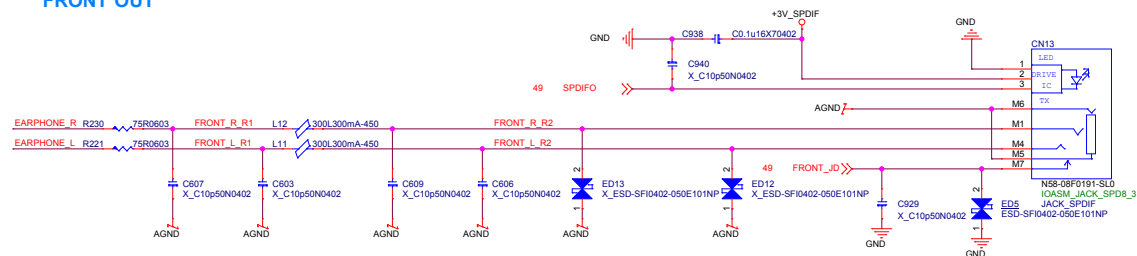
HDMI Level Shifter



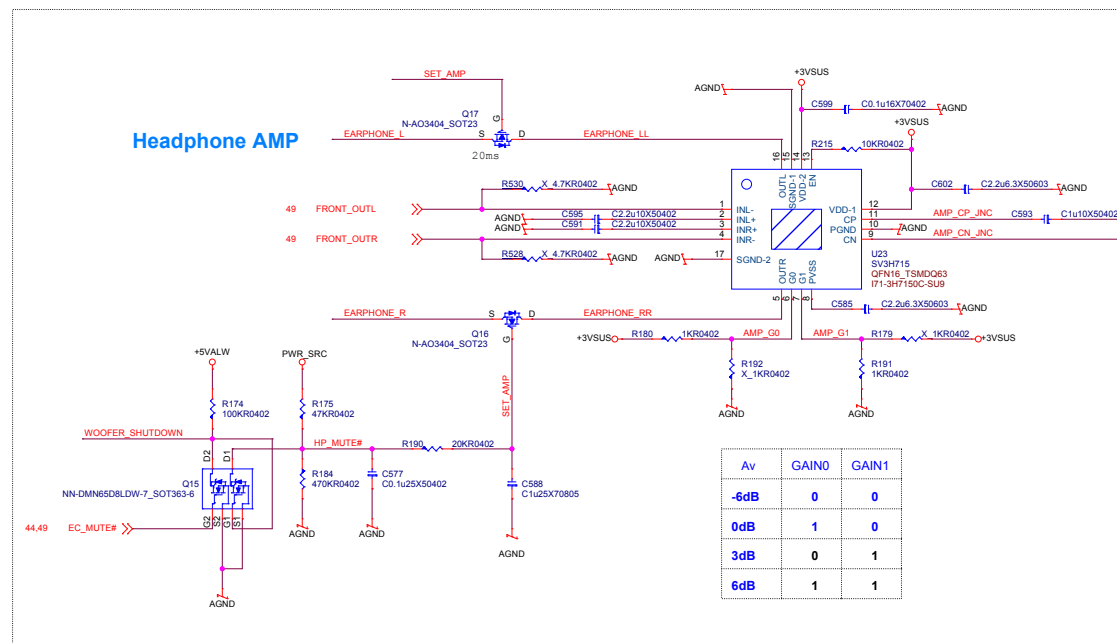
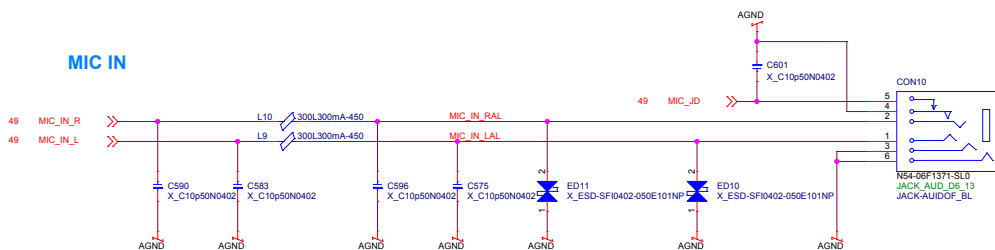
Audio CODEC/Audio AMP

	CODEC	斥
L	-	-
L	+	+
R	+	+
R	-	-
L2	+	+
L2	-	-
R2	-	-
R2	+	+

FRONT OUT



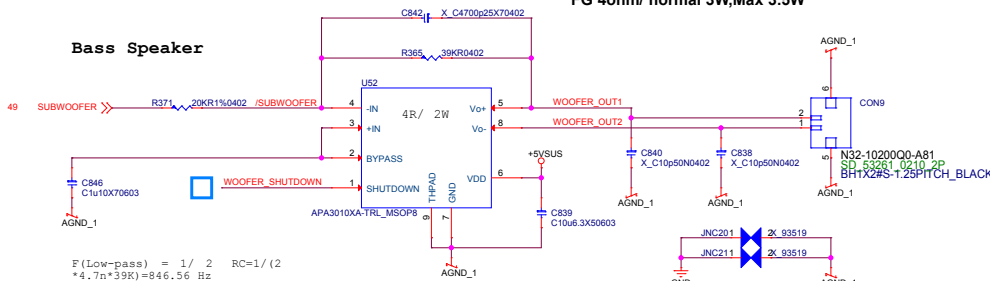
MIC IN



```
ALC892 SPC MAX      1.2Vrms
gain= -2*(R370/R371)= -2*(40K/20K)  = -4
```

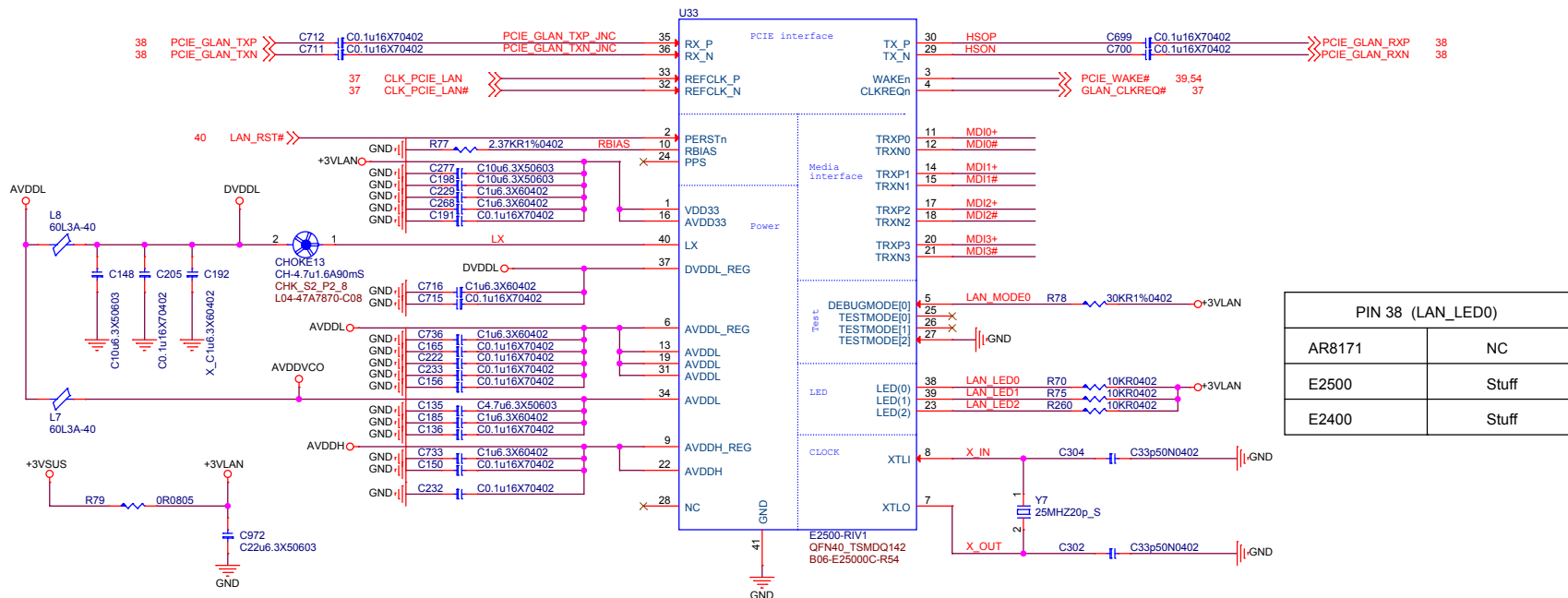
Woofer SPEC
YG 3.8ohm / normal 3W,Max 3.5W
FG 4ohm/ normal 3W,Max 3.5W

Bass Speaker

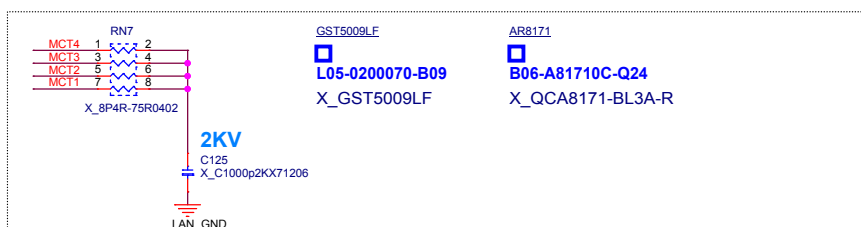
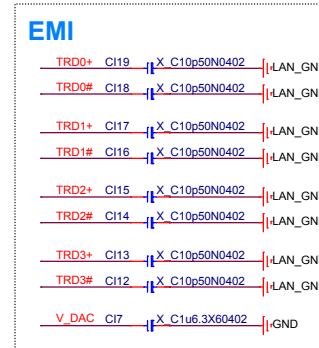
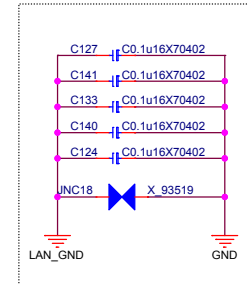
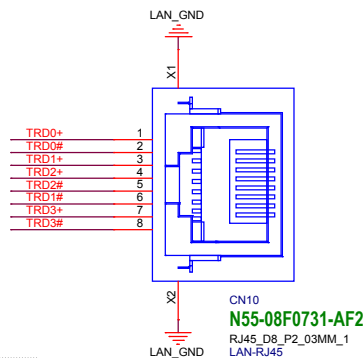
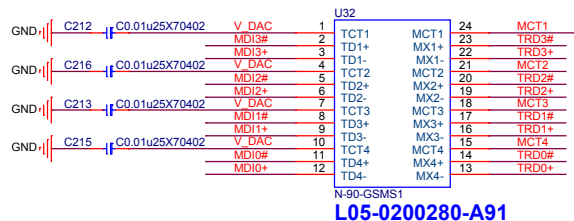


Av	GAIN0	GAIN1
-6dB	0	0
0dB	1	0
3dB	0	1
6dB	1	1

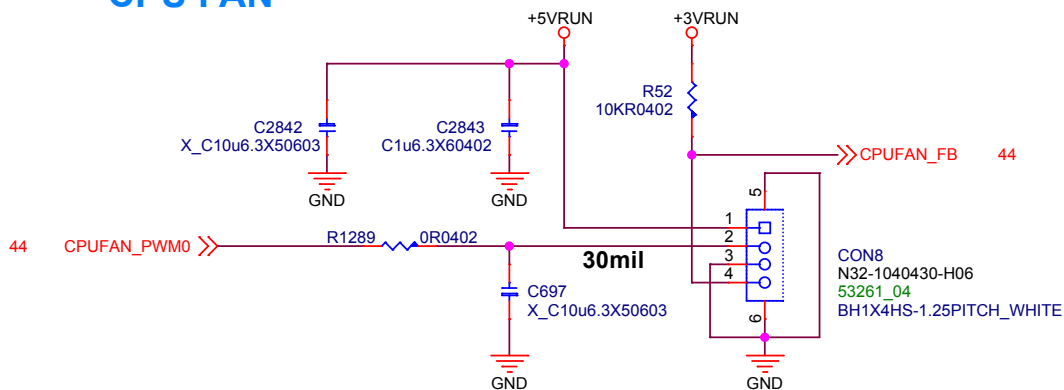
GIGA LAN(BigFoot BFN2500)



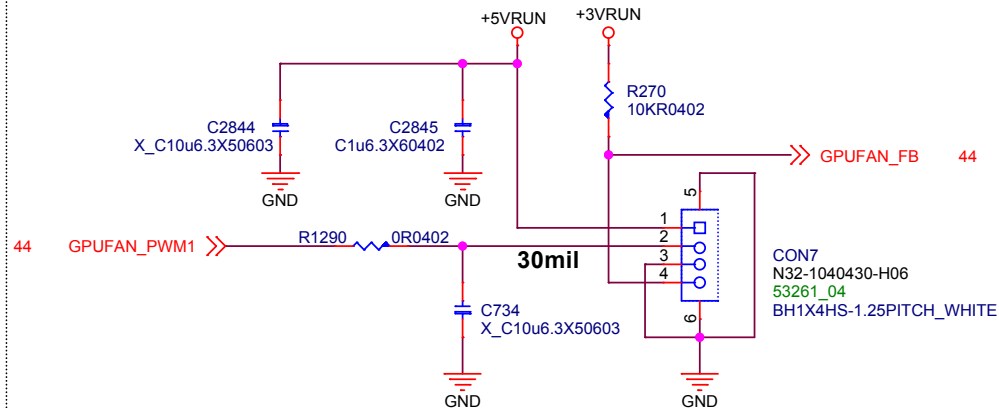
PIN 38 (LAN_LED0)	
AR8171	NC
E2500	Stuff
E2400	Stuff



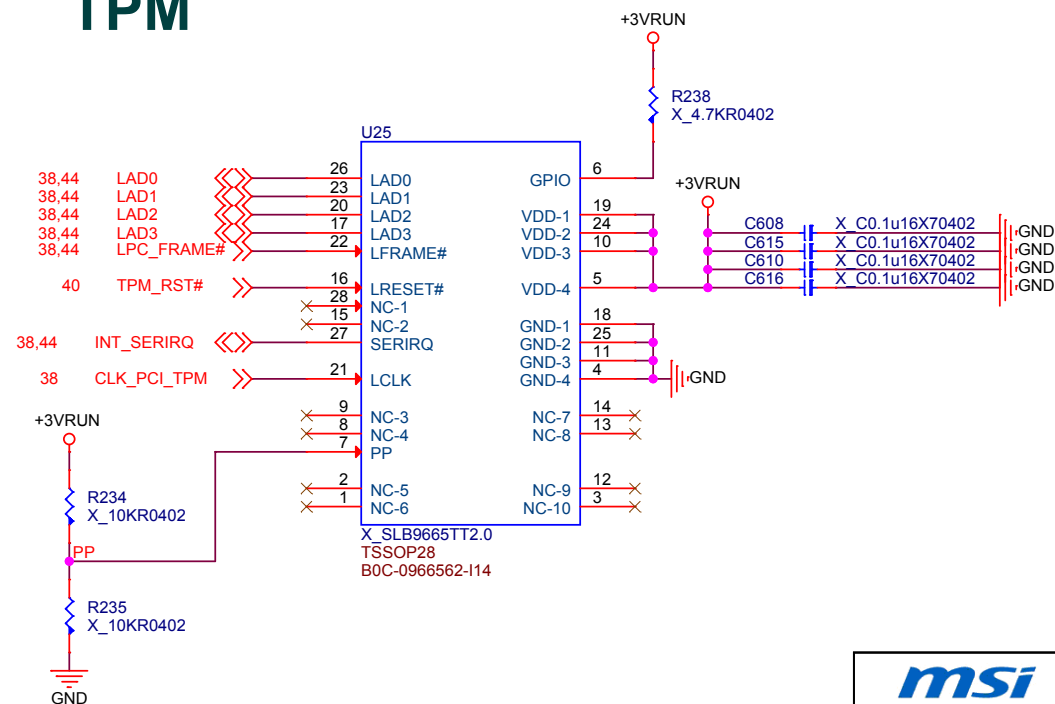
CPU FAN



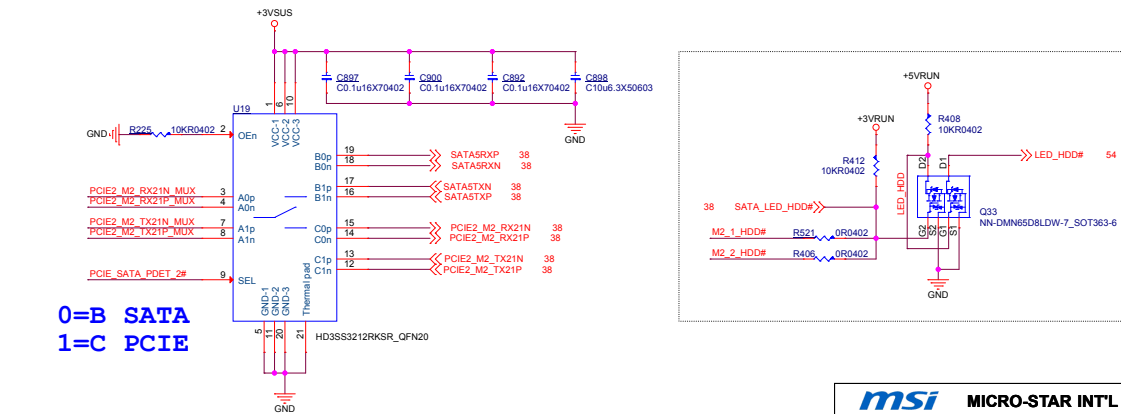
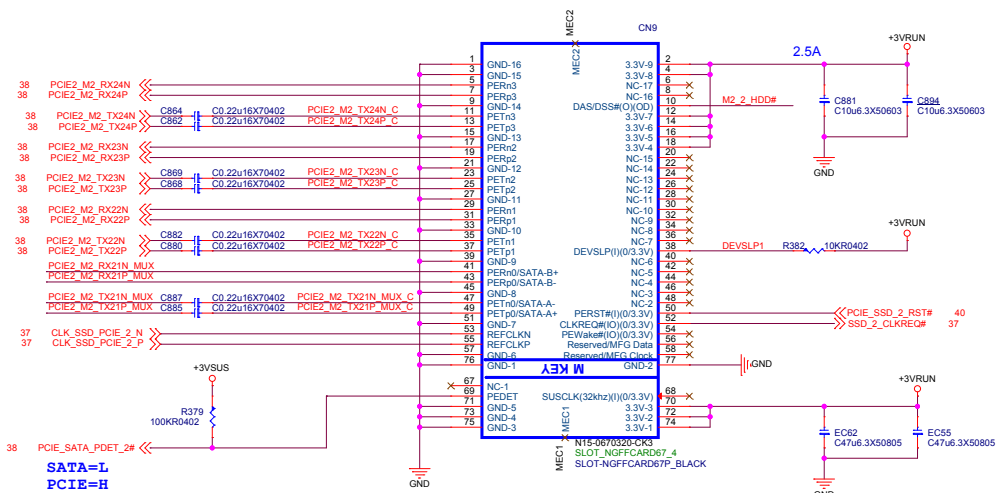
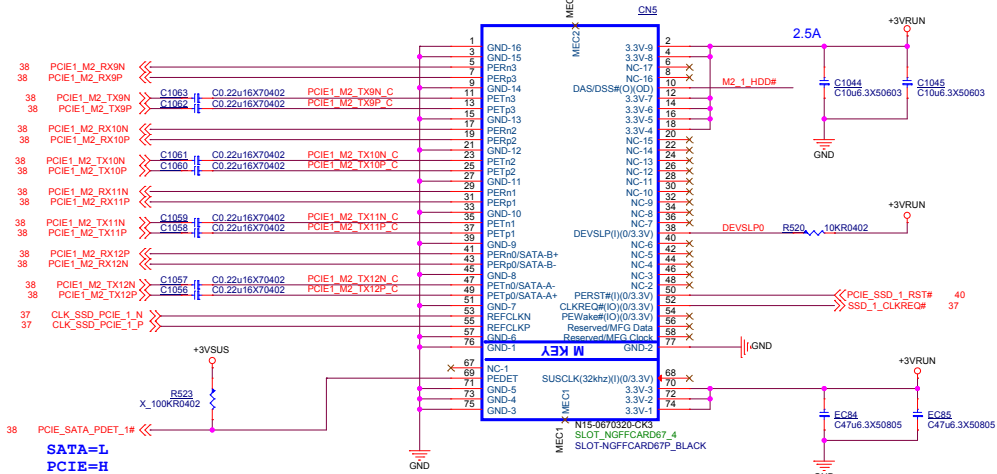
DGPU FAN



TPM



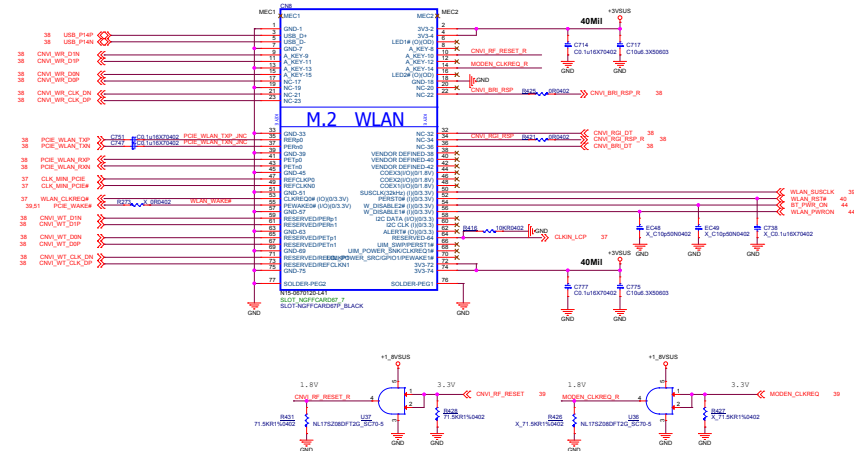
PCIEx4 / SATA M.2 SSD



0=B SATA
1=C PCIE

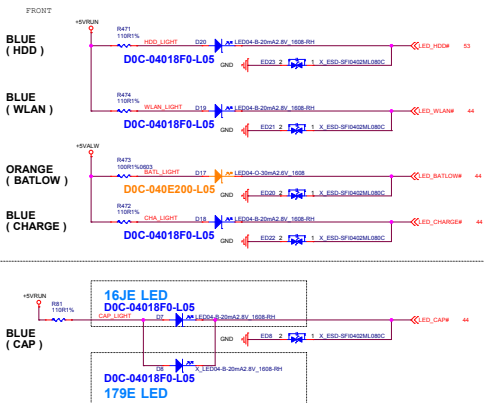
WLAN / LED / TP / BTB

WLAN

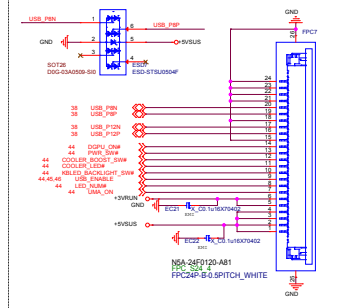


Pin #	M.2 WLAN	INTEL CNVI WLAN	Pin #	M.2 WLAN	INTEL CNVI WLAN
Pin 1	GND	GND	Pin 2	3.3V	3.3V
Pin 3	USB_D+	N/C	Pin 4	3.3V	3.3V
Pin 5	USB_D-	N/C	Pin 6	LED1#	LED1#
Pin 7	GND	GND	Pin 8	Module Key	N/C
Pin 9	Module Key	WGR_DTN	Pin 10	Module Key	RF_RESET_B(1.8V)
Pin 11	Module Key	WGR_DTP	Pin 12	Module Key	N/C
Pin 13	Module Key	GND	Pin 14	Module Key	CLKREQ0(1.8V)
Pin 15	Module Key	WGR_DGN	Pin 16	LED2#	LED2#
Pin 17	N/C	WGR_DDP	Pin 18	GND	GND
Pin 19	N/C	GND	Pin 20	N/C	N/C
Pin 21	N/C	WGR_CLKP	Pin 22	N/C	GND_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	RGL_DTP(1.8V)
Pin 33	GND	GND	Pin 34	N/C	RGL_RSP(1.8V)
Pin 35	PERP0	N/C	Pin 36	N/C	BGL_DTP(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	PERP0	N/C	Pin 42	N/C	N/C
Pin 43	PERN0	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	PERST#	N/C
Pin 53	CLKREQ#	N/C	Pin 54	BT_EN(W_DISABLE#)	BT_EN(W_DISABLE#)
Pin 55	PEWAKE#	N/C	Pin 56	WLAN_EN(W_DISABLE#)	WLAN_EN(W_DISABLE#)
Pin 57	GND	GND	Pin 58	N/C	N/C
Pin 59	N/C	WT_DTN	Pin 60	N/C	N/C
Pin 61	N/C	WT_DTP	Pin 62	N/C	N/C
Pin 63	GND	GND	Pin 64	Resever	REFCLK0(38.4MHz)
Pin 65	N/C	WT_DGN	Pin 66	N/C	N/C
Pin 67	N/C	WT_DDP	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			

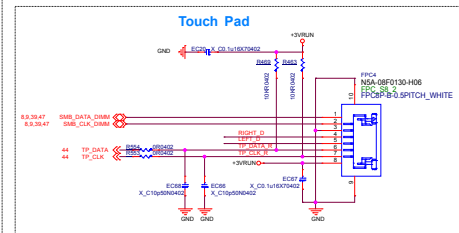
16JE LED



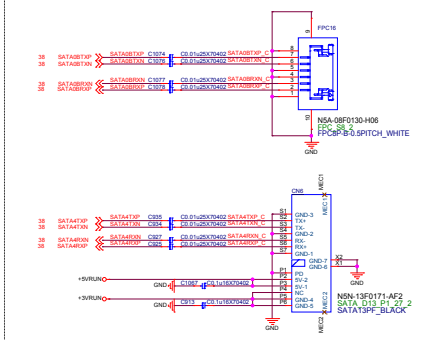
To 16JB2 (Power Board/USB2.0/Card Reader Board)



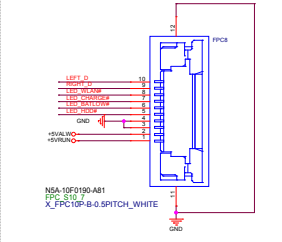
Touch Pad



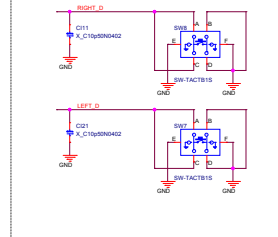
SATA Board To Board



To 179EB (LED / TP Switch Board)

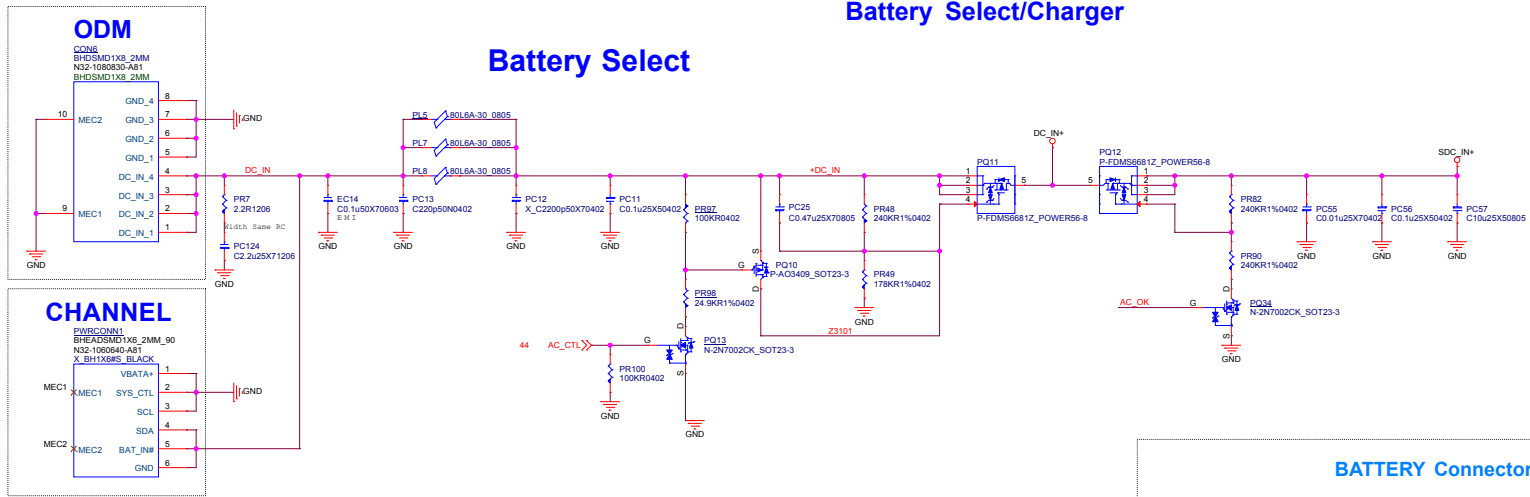


16JE Touch Pad Switch

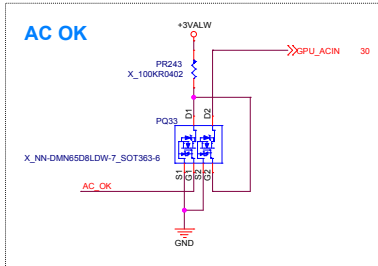


Battery Select/Charger

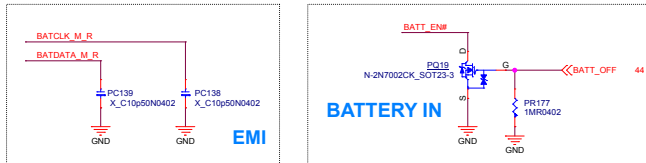
Battery Select



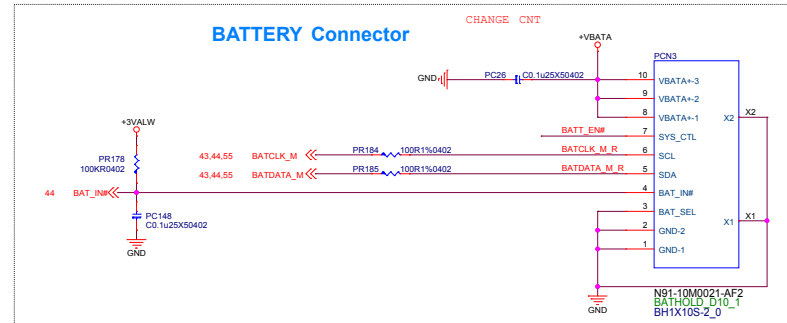
AC OK



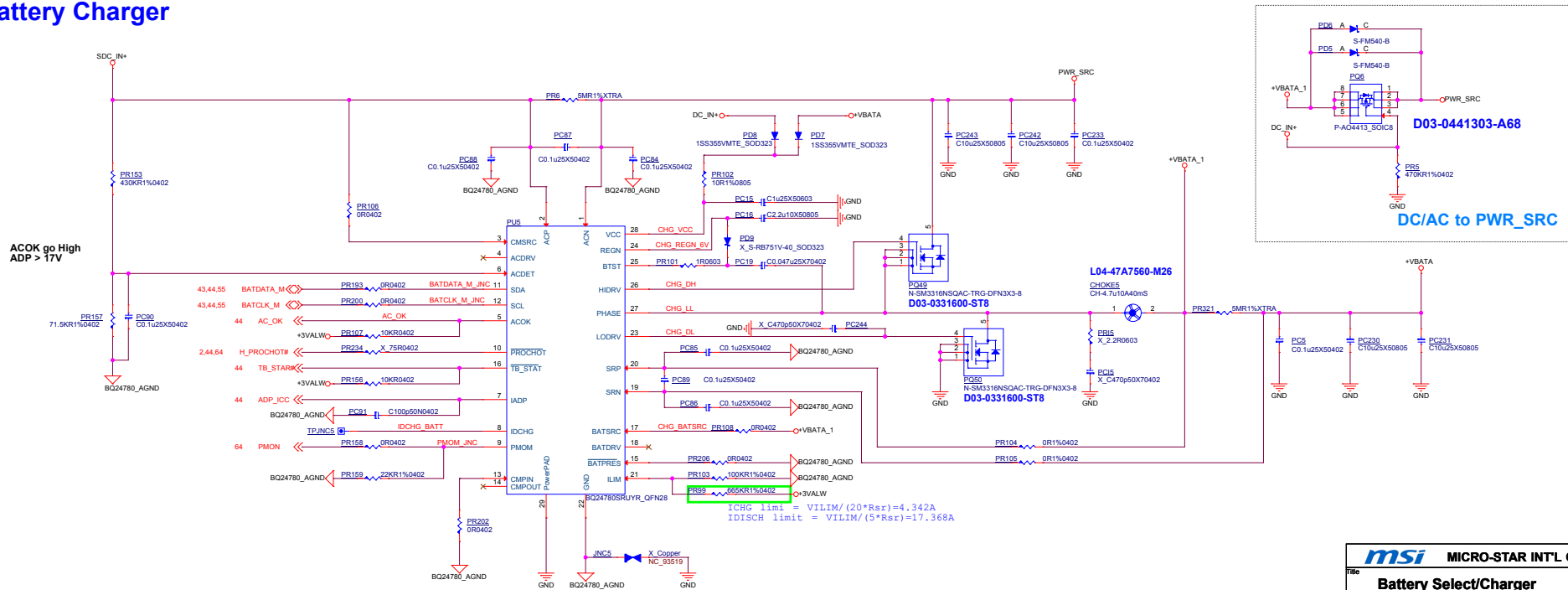
BATTERY IN



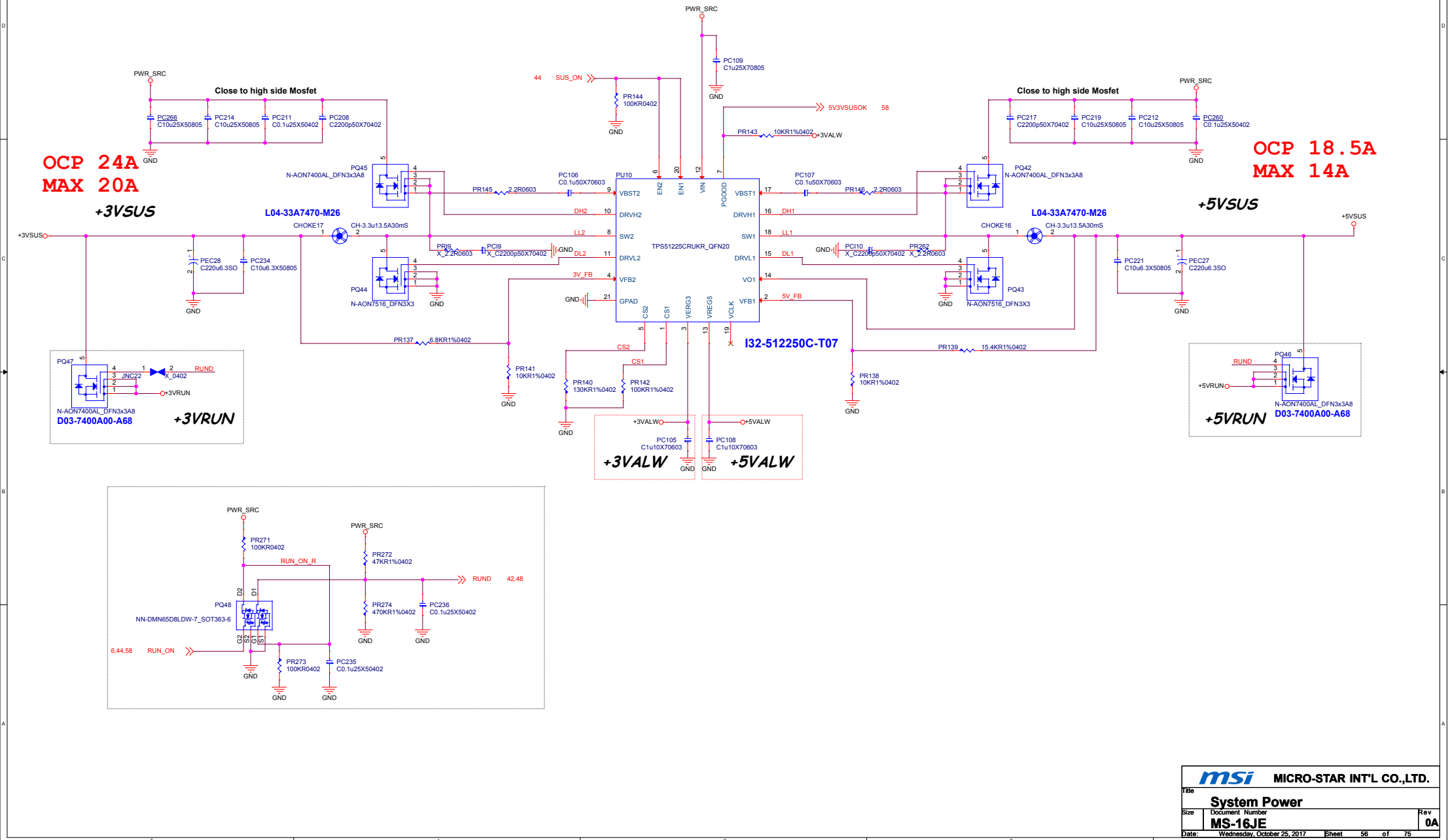
BATTERY Connector



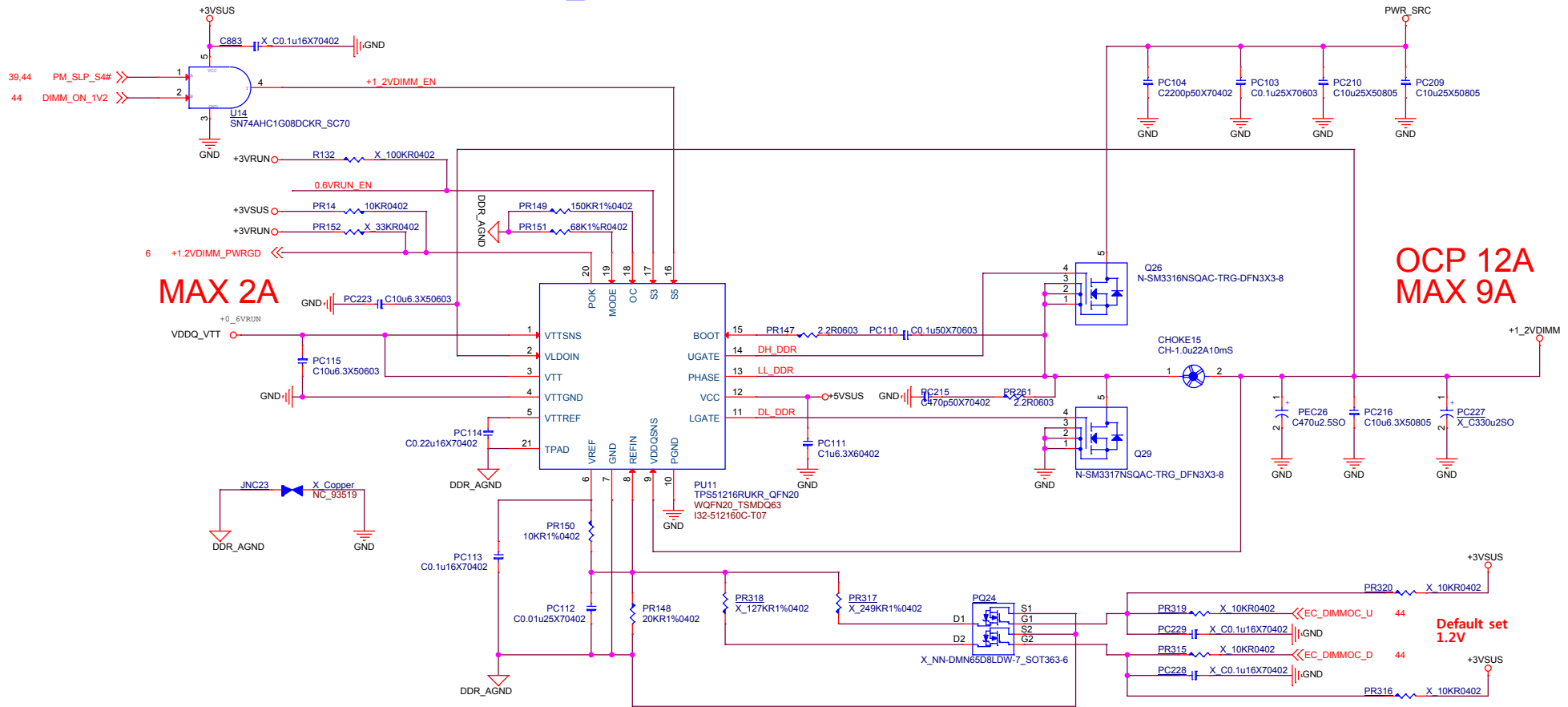
Battery Charger



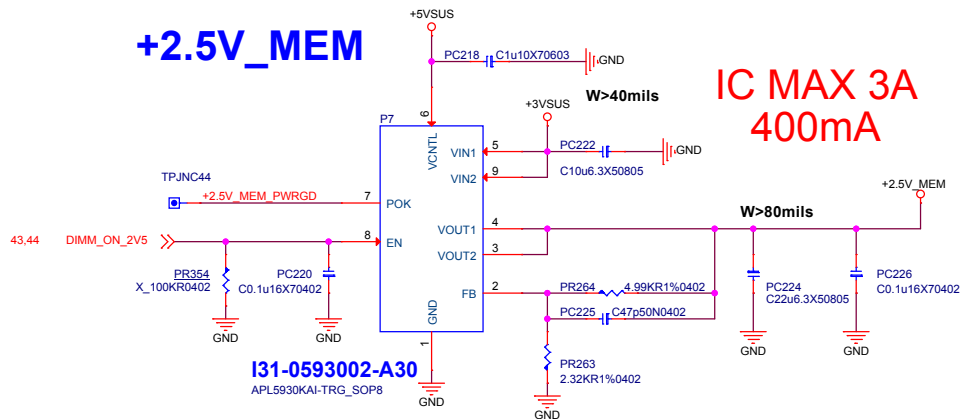
System Power



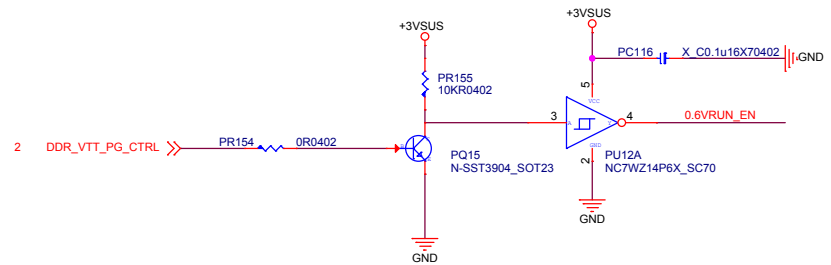
+1_2VDIMM/+0.6VRUN



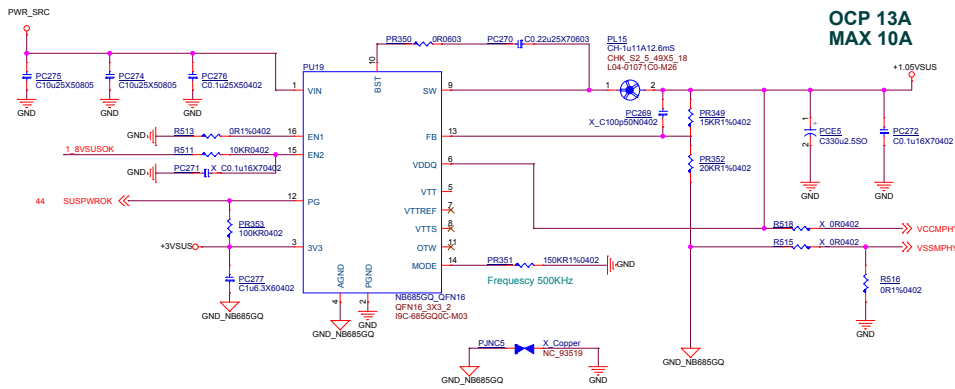
+2.5V_MEM



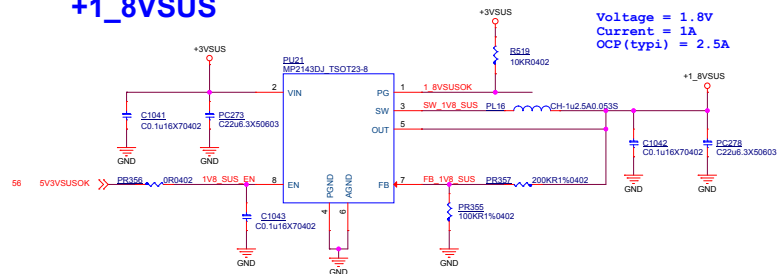
IC MAX 3A
400mA



+1.05VSUS

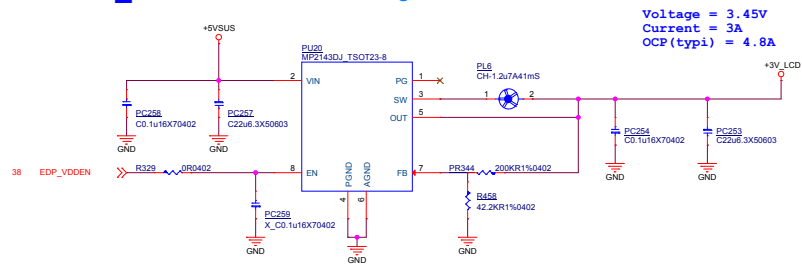


+1_8VSUS

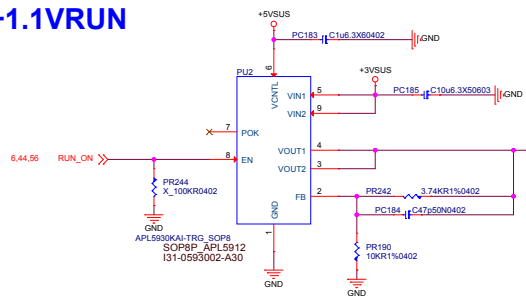


+3V_LCD

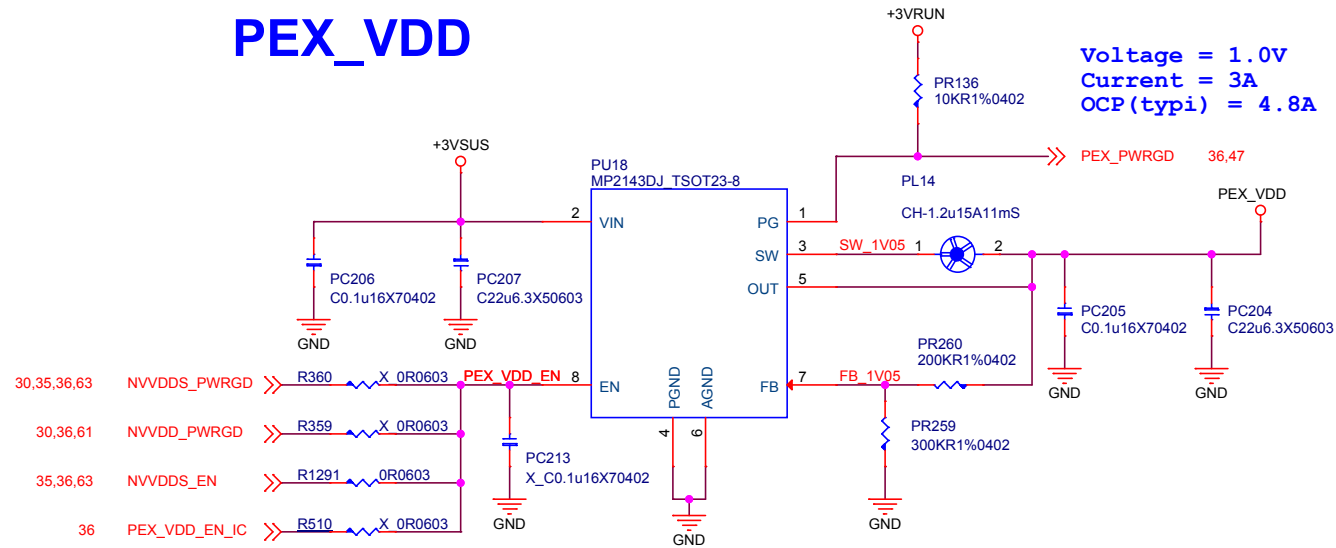
Pannel Device Logic Power



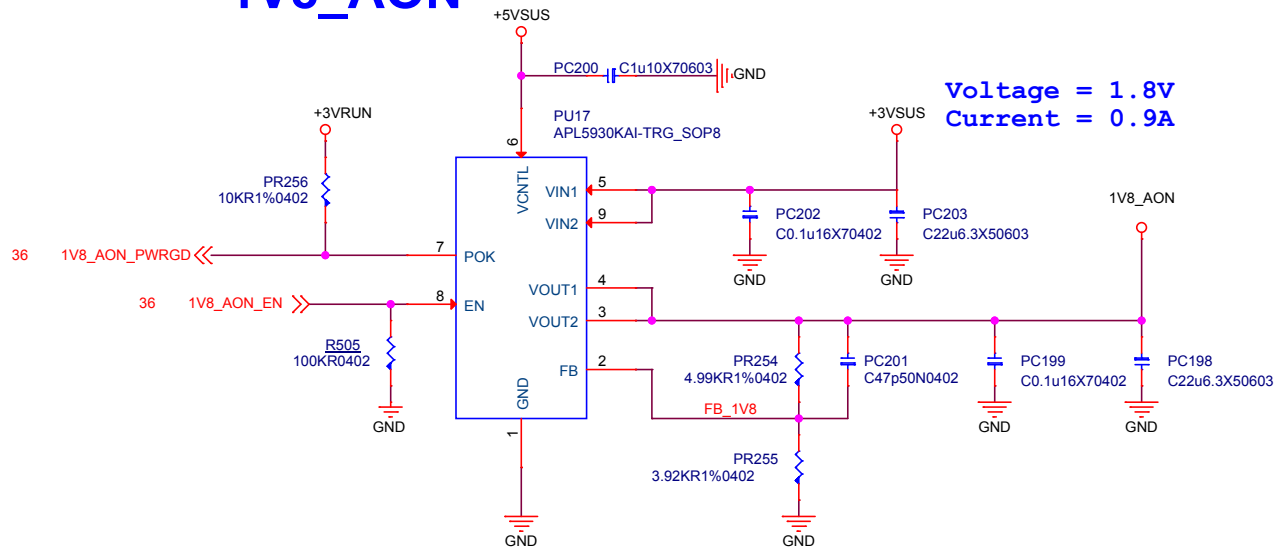
+1.1V RUN



PEX_VDD



1V8_AON



msi

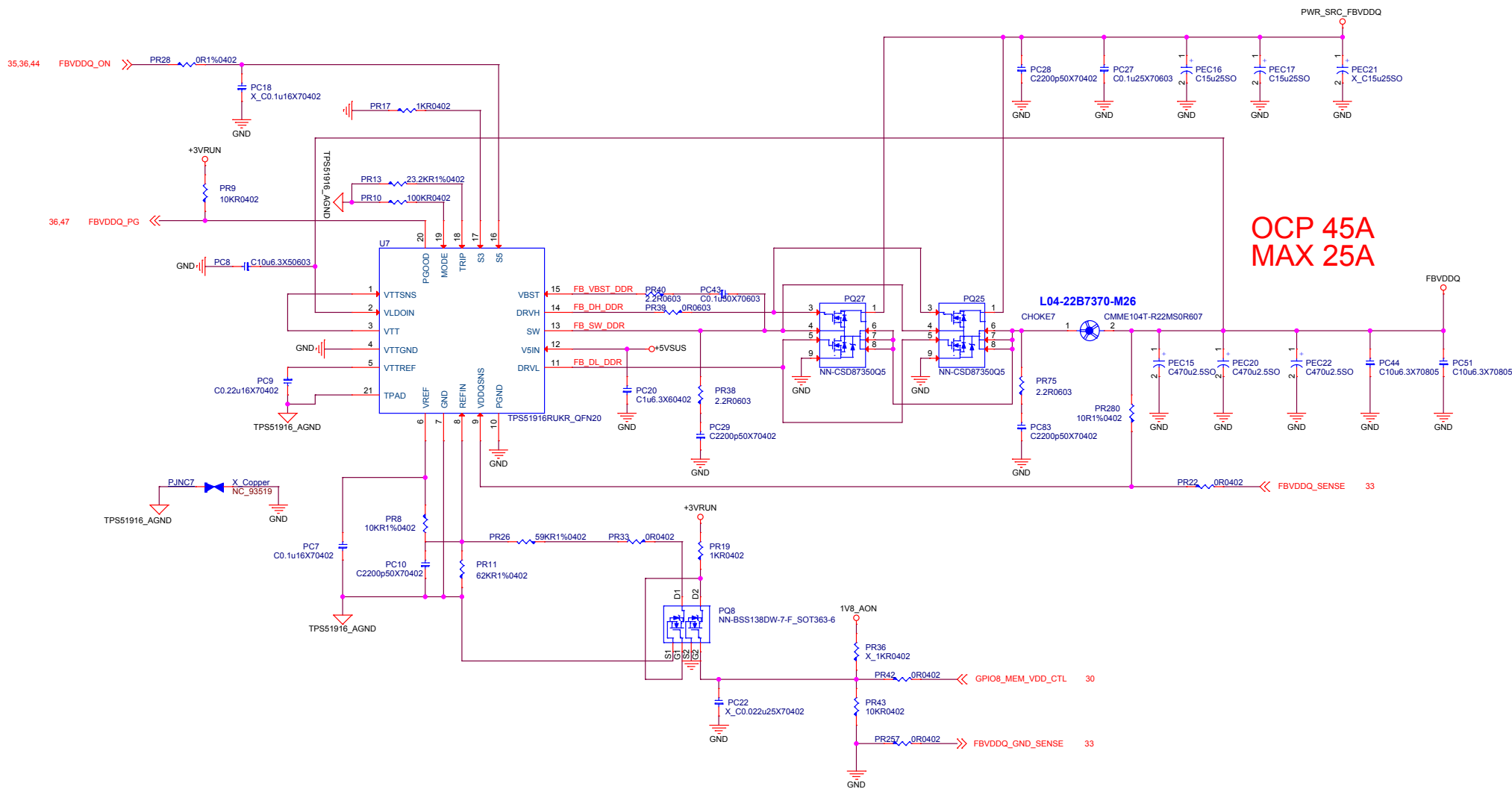
MICRO-STAR INT'L CO.,LTD.

Title **PEX_VDD / 1V8_AON**

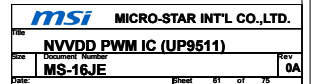
Size Document Number
MS-16JE

Rev
0A

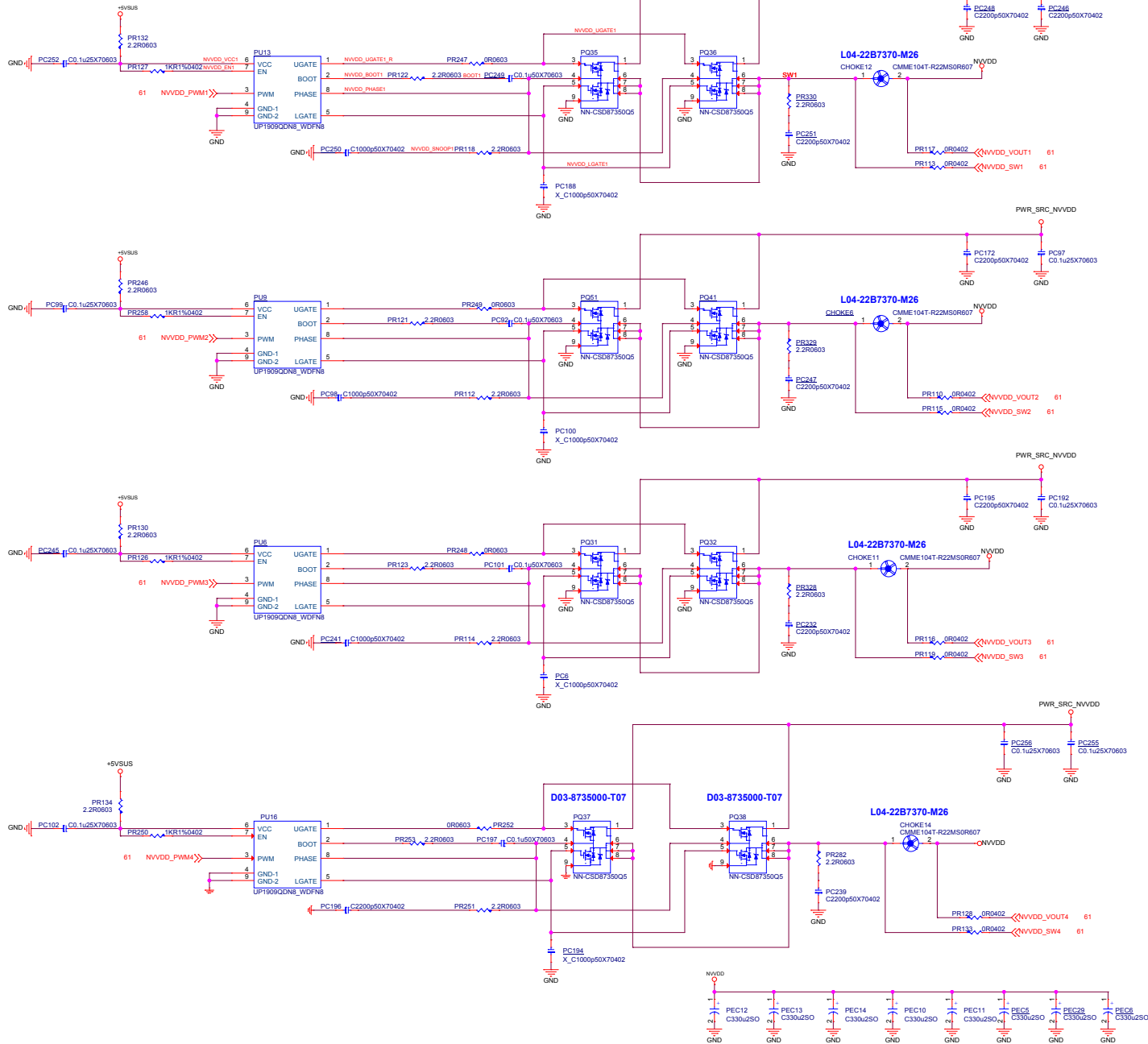
Date: Tuesday, November 07, 2017 Sheet 59 of 75



EDP-Peak 300A
EDP-Con 125A



NVDD Phase1~4 (Config A)



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

File NVDD phase1~4

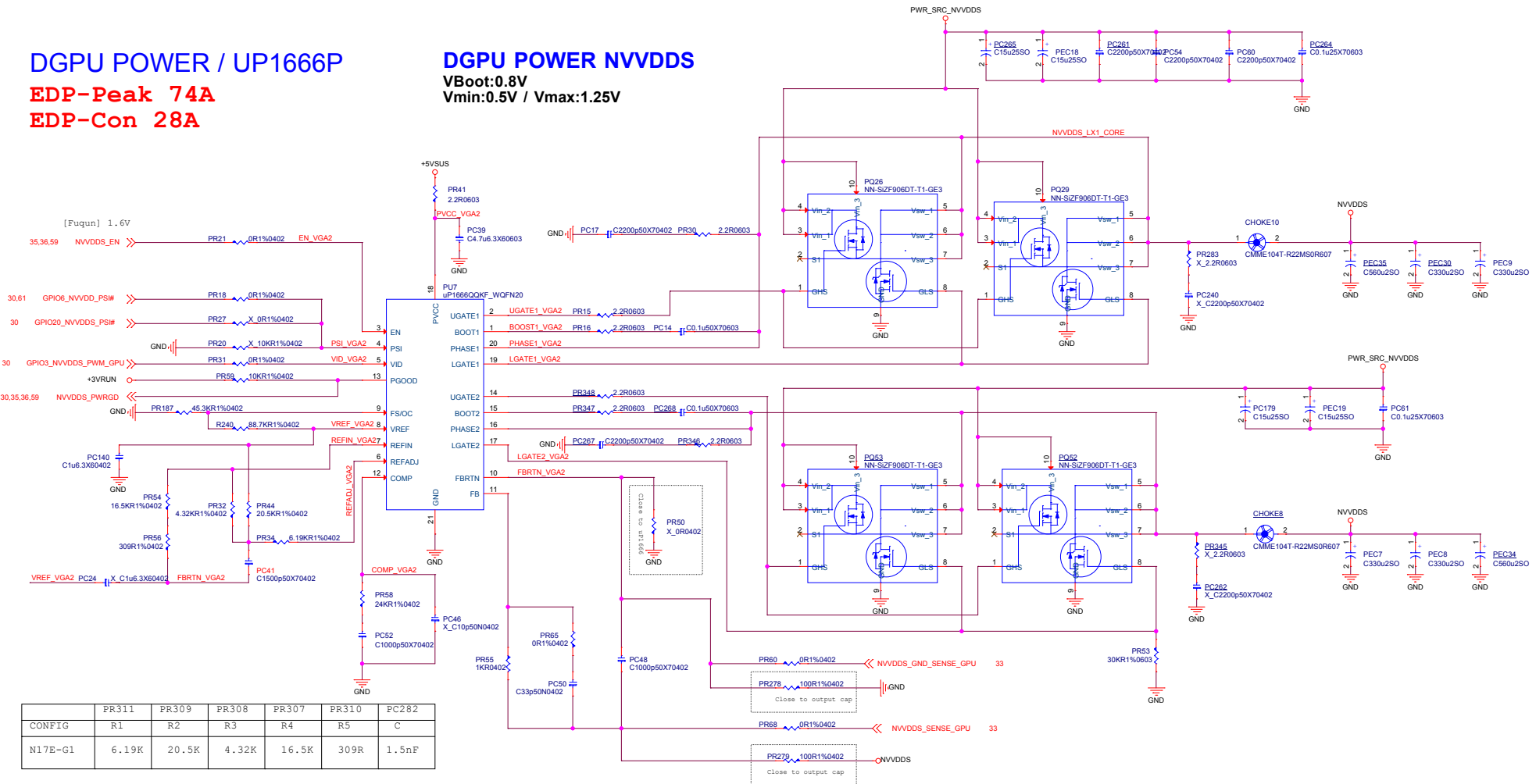
Size Document Number MS-16JE

Date Sheet 62 of 75

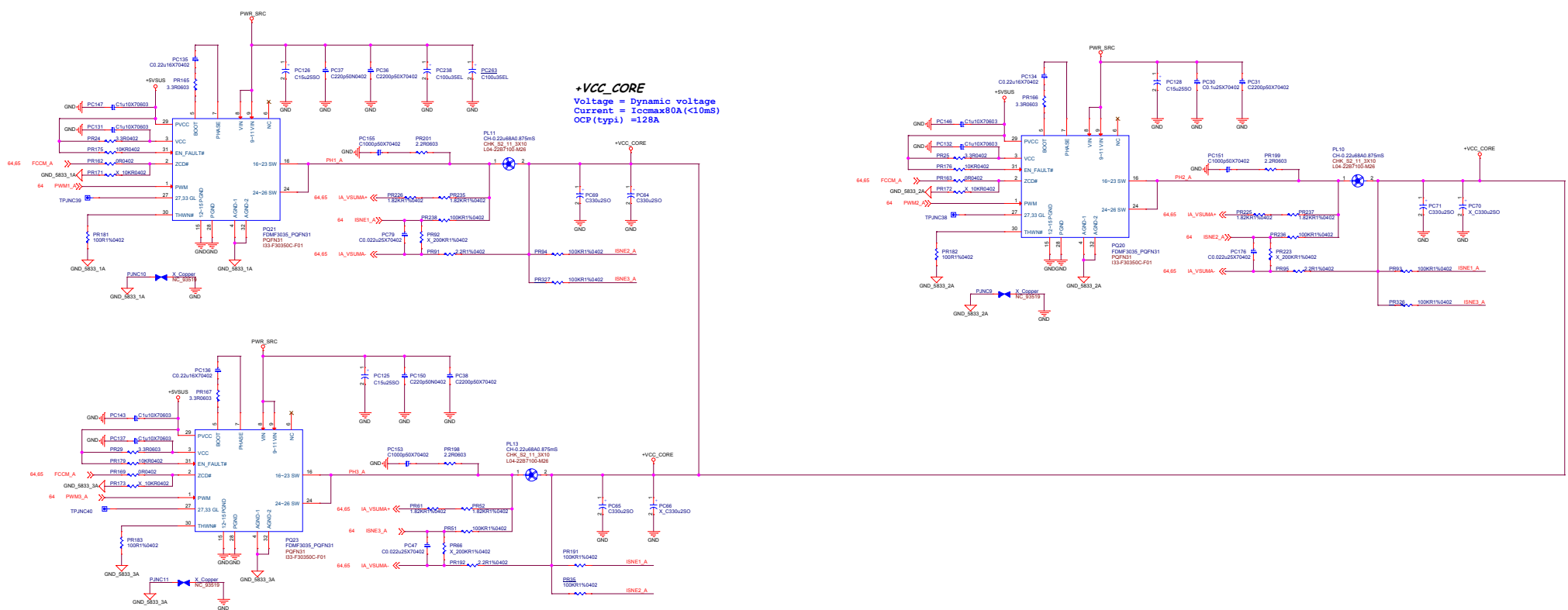
Rev 0A

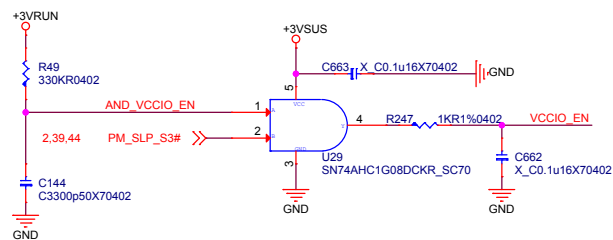
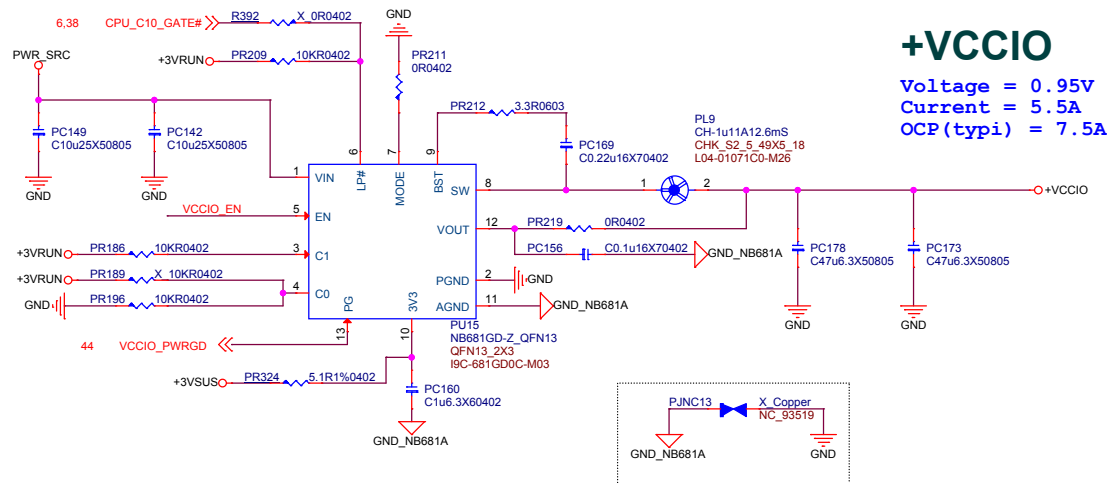
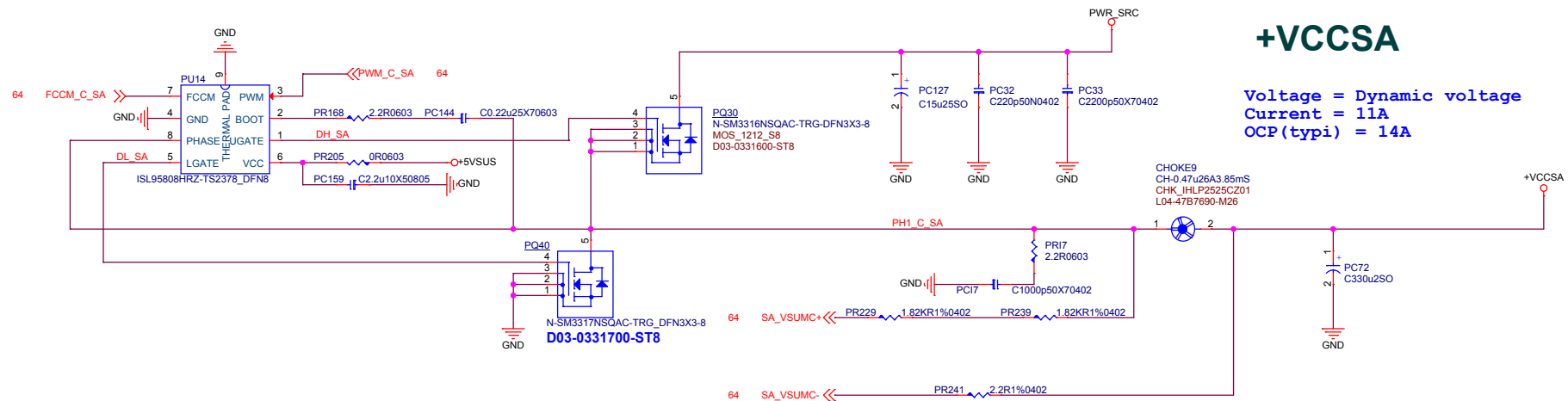
EDP-Peak 74A
EDP-Con 28A

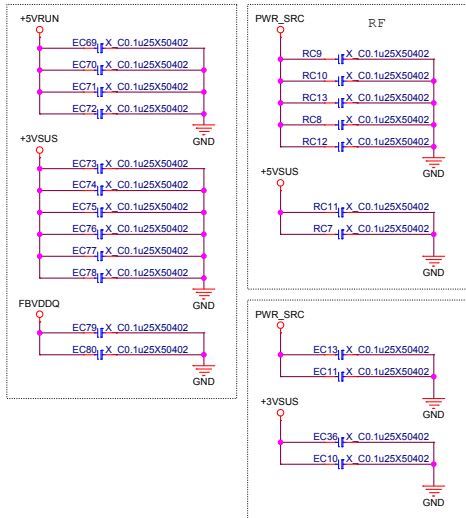
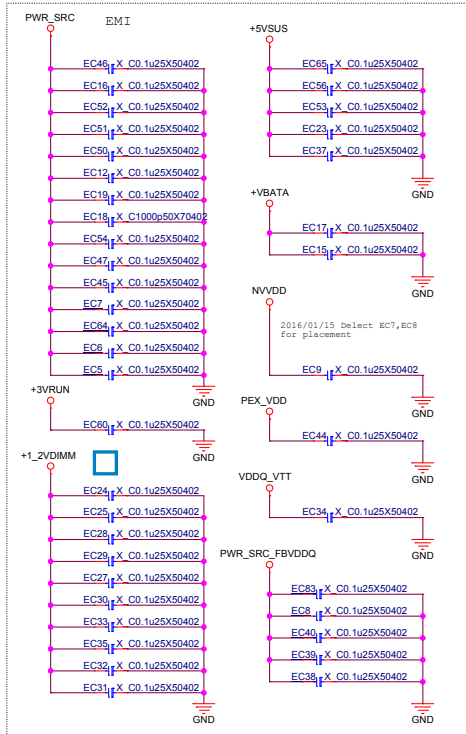
VBoot:0.8V
Vmin:0.5V / Vmax:1.25V



	PR311	PR309	PR308	PR307	PR310	PC282
CONFIG	R1	R2	R3	R4	R5	C
N17E-G1	6.19K	20.5K	4.32K	16.5K	309R	1.5nF



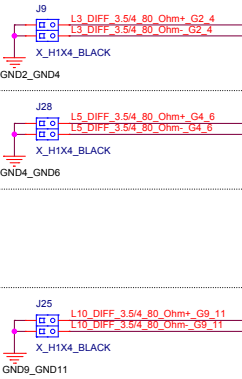




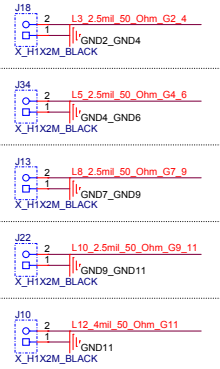
40 OHM Single-End



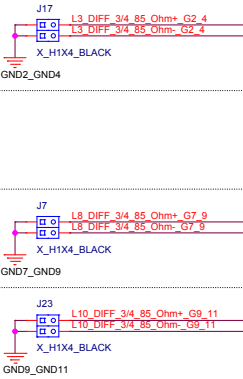
80 OHM Differential



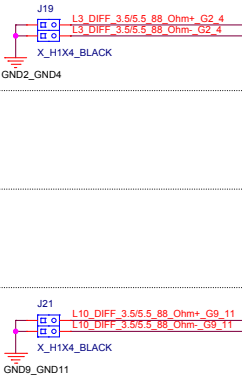
50 OHM Single-End



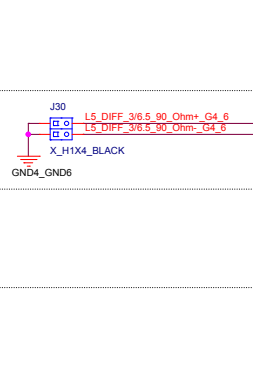
85 OHM Differential



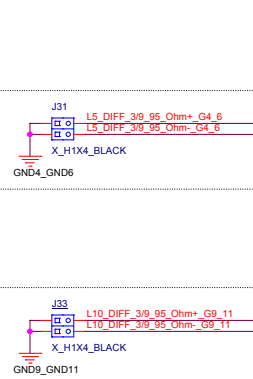
88 OHM Differential



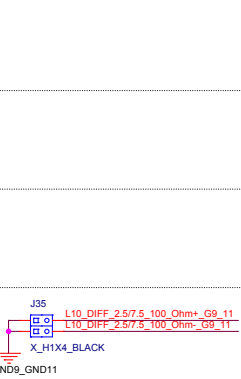
90 OHM Differential



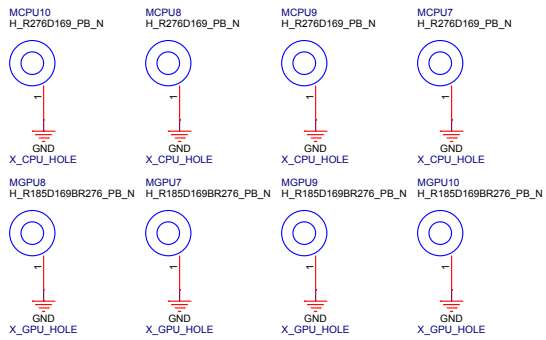
95 OOHM Differential



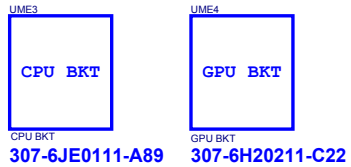
100 OOHM Differential



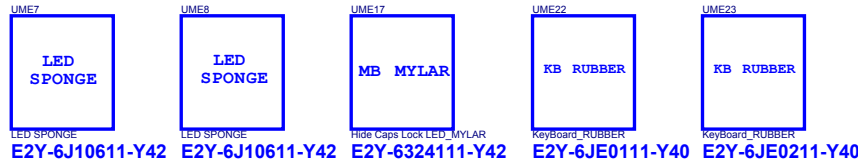
CPU/GPU Holes



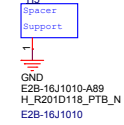
CPU/GPU BRACKET



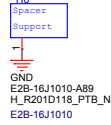
Only 16JE



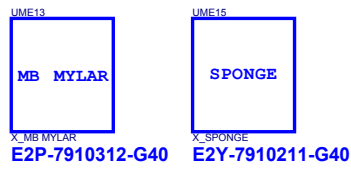
M.2 SSD-1 STAND OFF



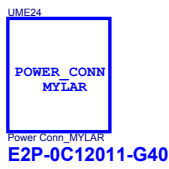
M.2 SSD-2 STAND OFF



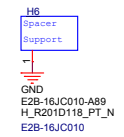
Only 179E



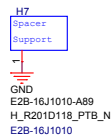
Only ODM



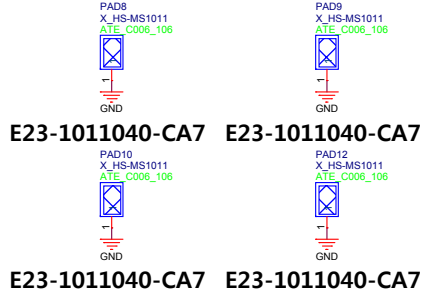
THERMAL STAND OFF



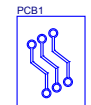
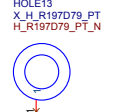
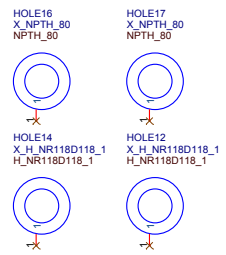
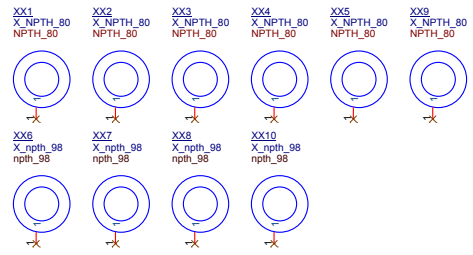
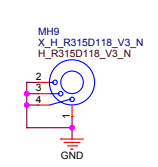
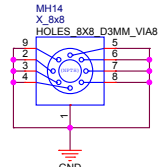
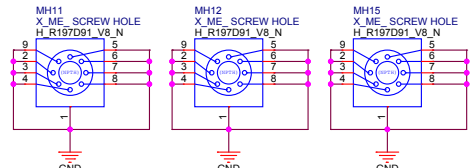
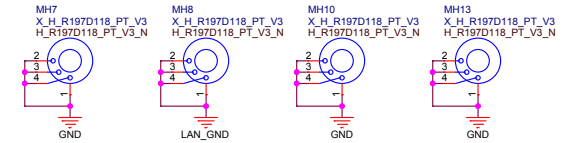
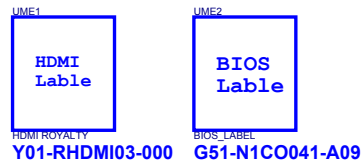
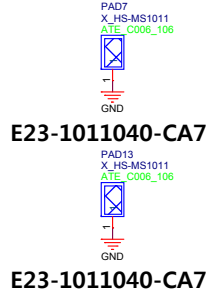
WLAN STAND OFF



Top Spring

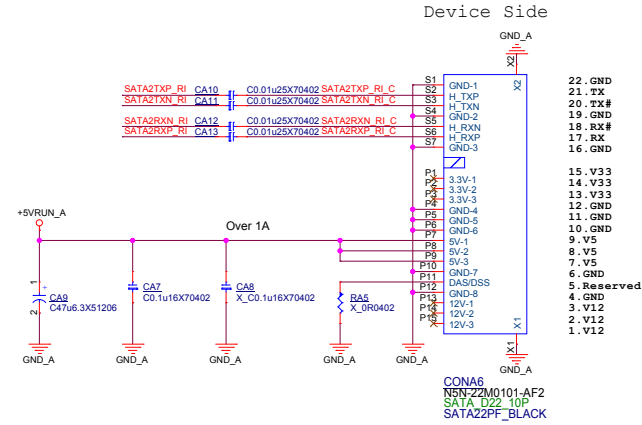
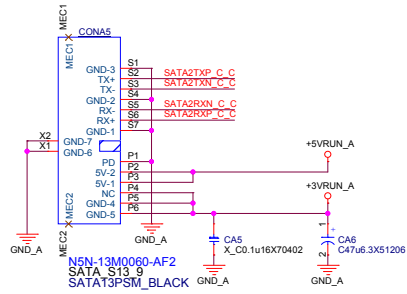


BOT Spring

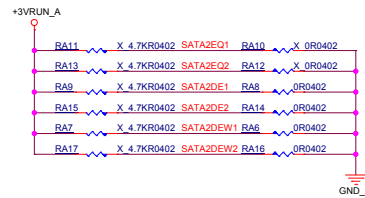
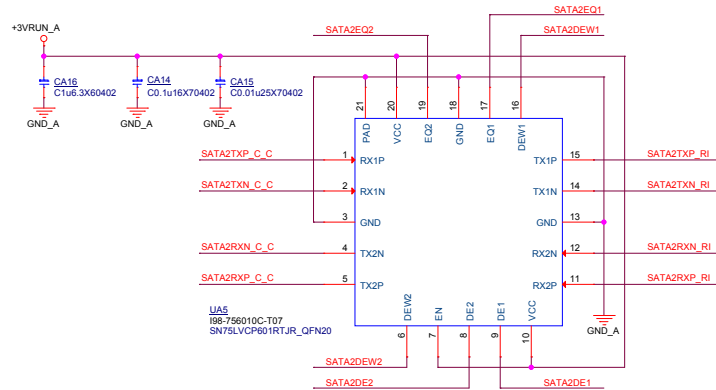


Hannstar: PD0-16JE10A-H73
TRIPOD: PD0-16JE10A-T53

16JE-A Board (SATA HDD)



SATA ReDriver



PCBA1



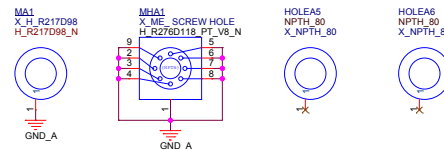
PD0-16JEA0A-H73

Hannstar: PD0-16JEA0A-H73
TRIPOD: PD0-16JEA0A-T53

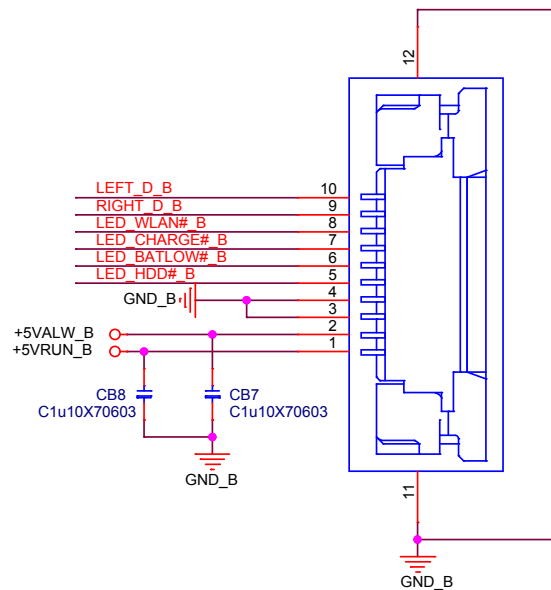
TI SN75LVCP601RTJR HW Setting

DE1/DE2	CH1/CH2De-Emphasis dB(at 6Gbps)	EQ1/EQ2	CH1/CH2De-Emphasis dB(at 6Gbps)
NC(default)	-4	NC(default)	0
0	0	0	7
1	-2	1	14

DEW1/DEW2	Device Function --> De Width for CH1/CH2
0	De-emphasis Pulse duration, short(recommended setting when linkoperates at SATA 1.5/3/6 Gbps)
1(default)	De-emphasis Pulse duration, long(recommended setting when linkoperates at SATA 1.5/3/6 Gbps)



179E-B Board (LED / TP)



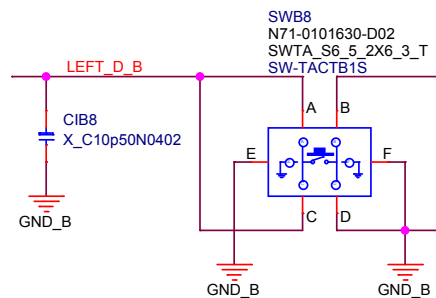
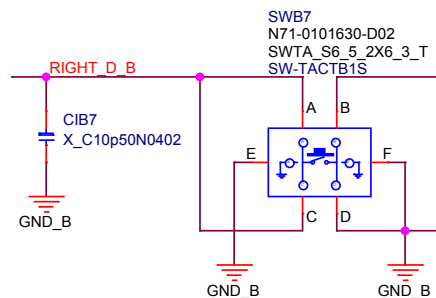
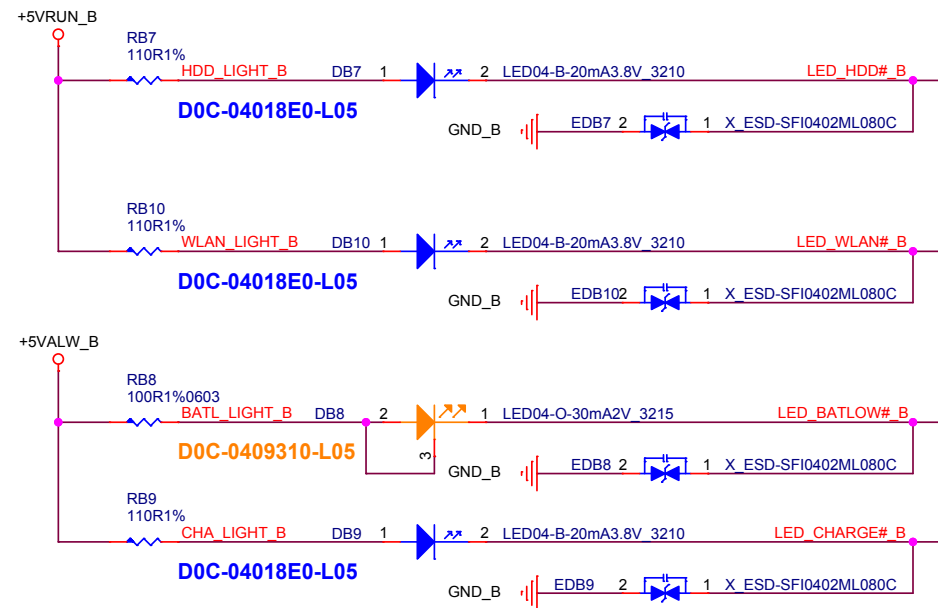
FPCB7
N5A-10F0190-A81
FPC_S10.7
FPC10P-B-0.5PITCH_WHITE

LED
BLUE
(HDD)

BLUE
(WLAN)

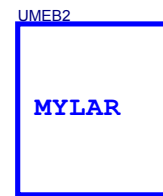
ORANGE
(BATLOW)

BLUE
(CHARGE)



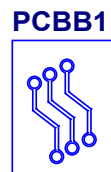
LEAKAGE_MYLAR

E2P-7910811-G40



MYLAR

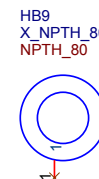
E2P-0113511-G40



PD0-16JEB0A-H73

PD0-16JEB0A-H73

Hannstar:PD0-16JEB0A-H73
TRIPOD: PD0-16JEB0A-T53



HB9
X_NPTH_80
NPTH_80




HB8
X_NPTH_80
NPTH_80



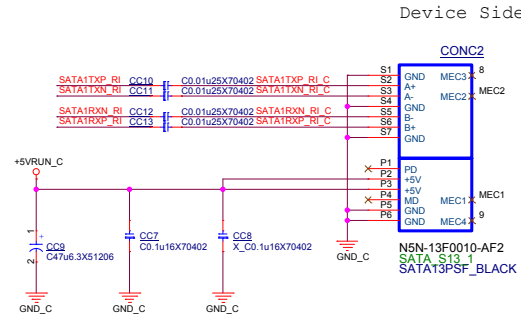
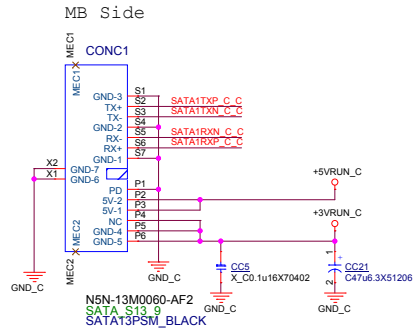
MB10
X_H_R276D118_PT
H_R276D118_PT_N



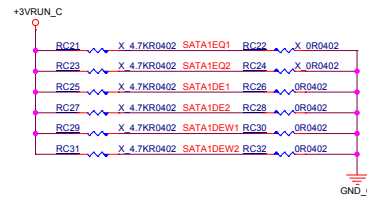
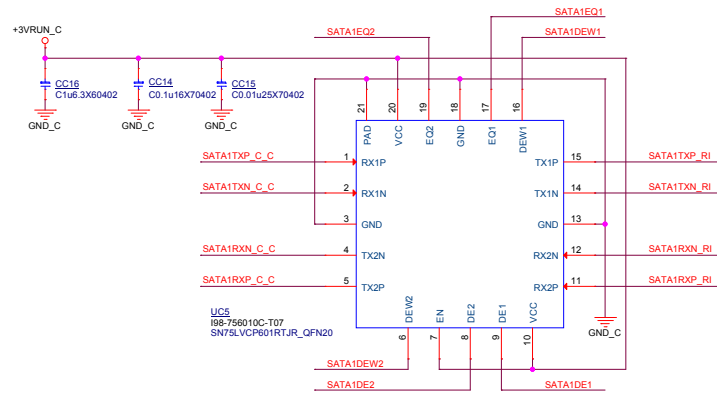
MB9
X_H_R197D91
H_R197D91_N

		MICRO-STAR INT'L CO.,LTD.	
Title			
[B] 179E LED/ TP			
Size	Document Number		Rev
Custom	MS-16JE		0A
Date:	Wednesday, October 25, 2017		Sheet 70 of 75

179E-C Board (ODD)



SATA ReDriver



TI SN75LVCP601RTJR HW Setting

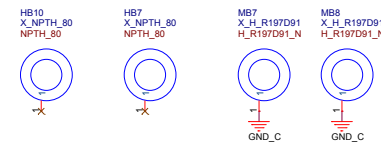
DE1/DE2	CH1/CH2De-Emphasis dB (at 6Gbps)	EQ1/EQ2	CH1/CH2De-Emphasis dB (at 6Gbps)
NC (default)	-4	NC (default)	0
0	0	0	7
1	-2	1	14

DEW1/DEW2	Device Function --> De Width for CH1/CH2
0	De-emphasis Pulse duration, short(recommended setting when linkoperates at SATA 1.5/3/6 Gbps)
1 (default)	De-emphasis Pulse duration, long(recommended setting when linkoperates at SATA 1.5/3/6 Gbps)

PCBC1

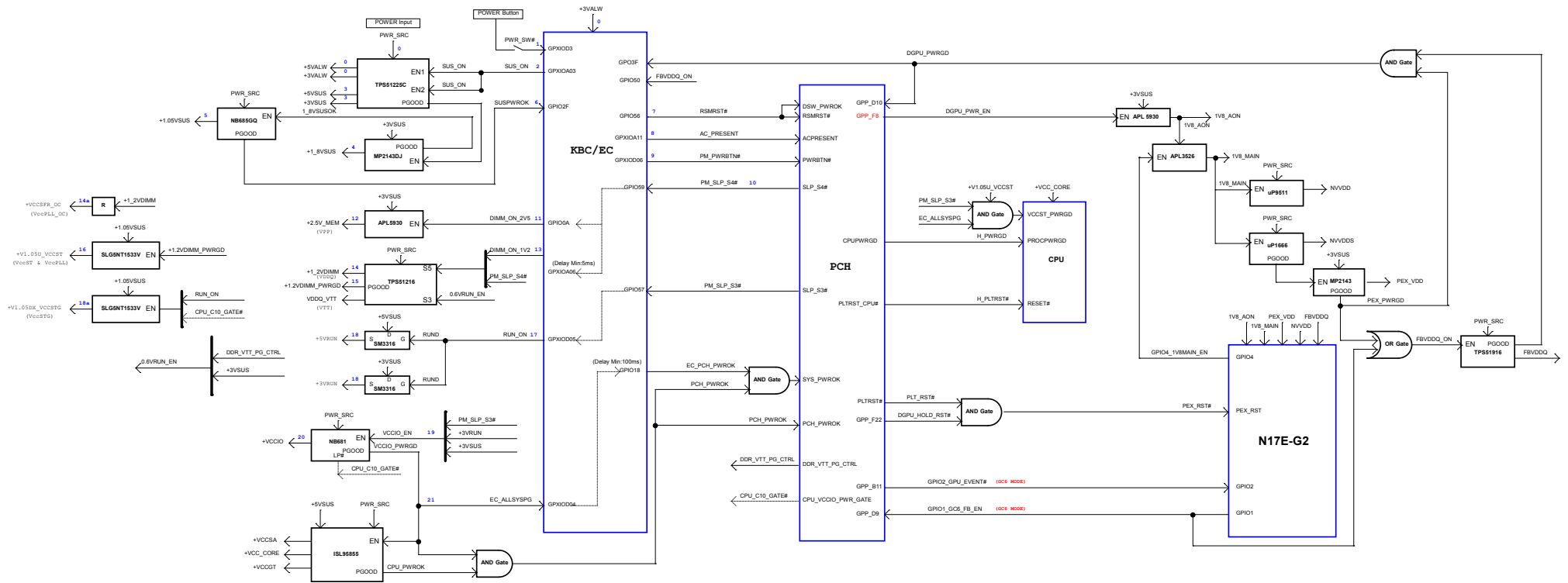


PD0-16JEC0A-H73
PD0-16JEC0A-H73
 Hannstar: PD0-16JEC0A-H73
 TRIPOD: PD0-16JEC0A-T53

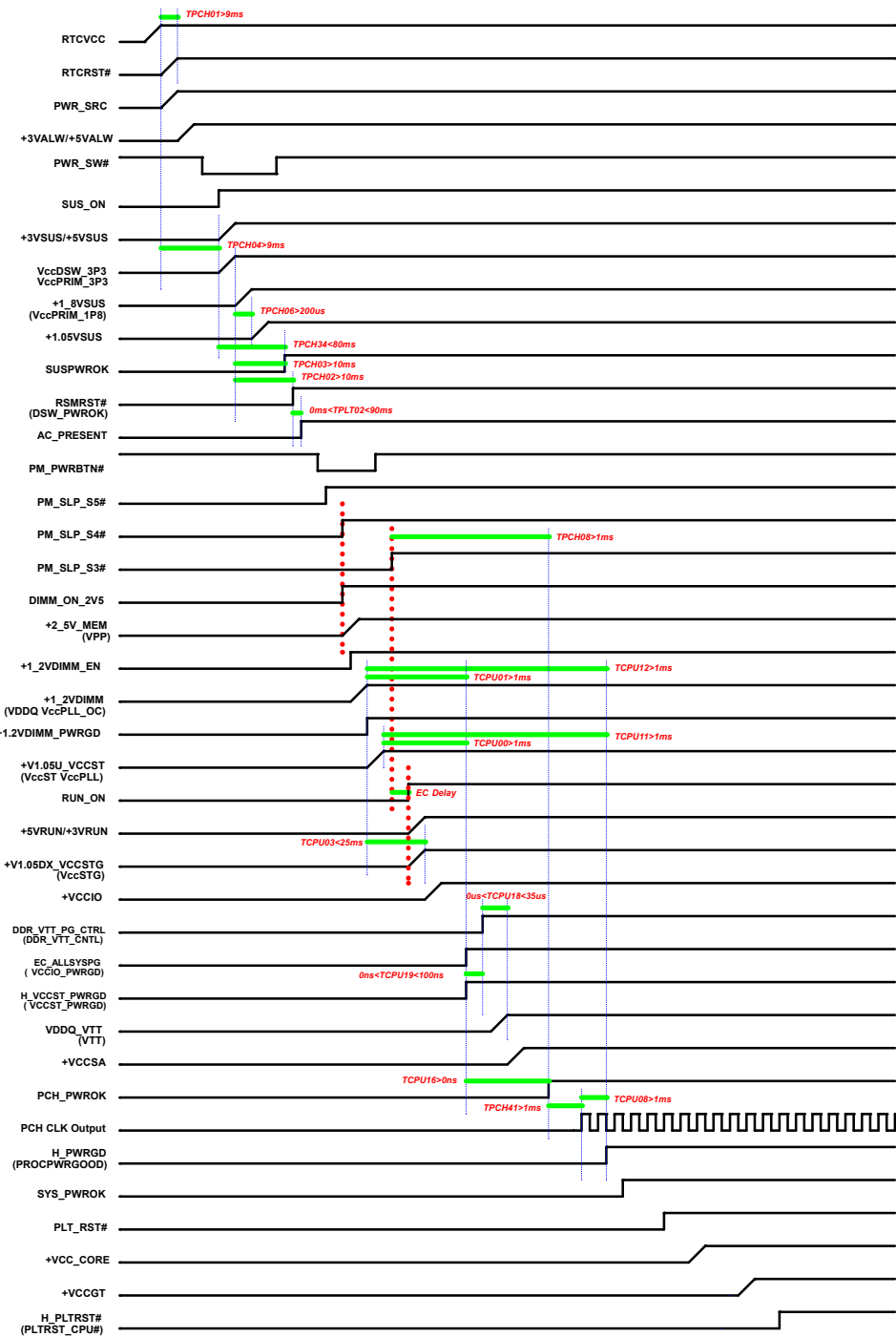


E43-1205003-H29 **E43-1205003-H29**

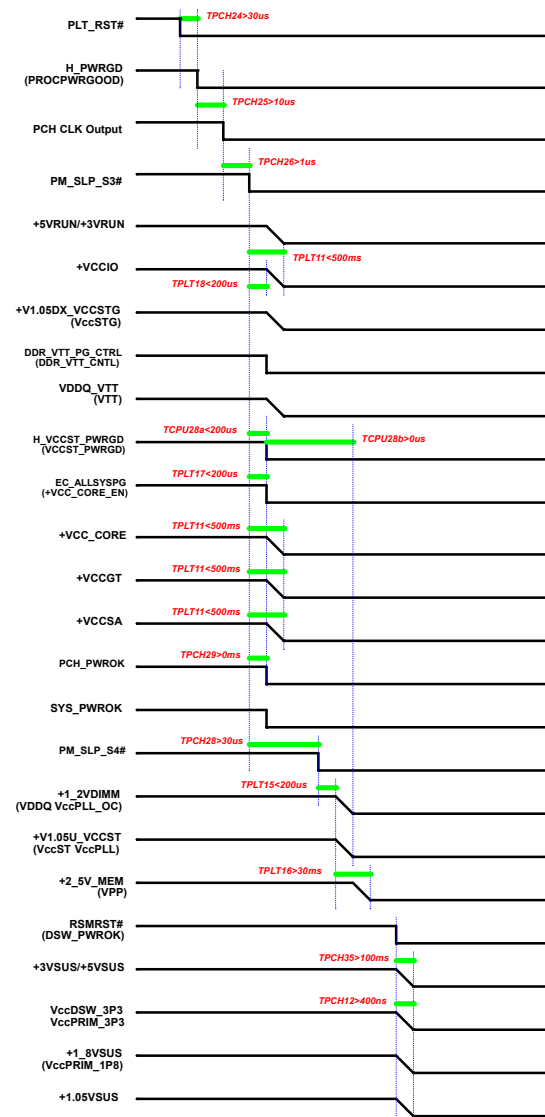
MS-16JE Power on Block Diagram



G3 -> S0



S0 -> G3



0A

10

10

[illegible]

