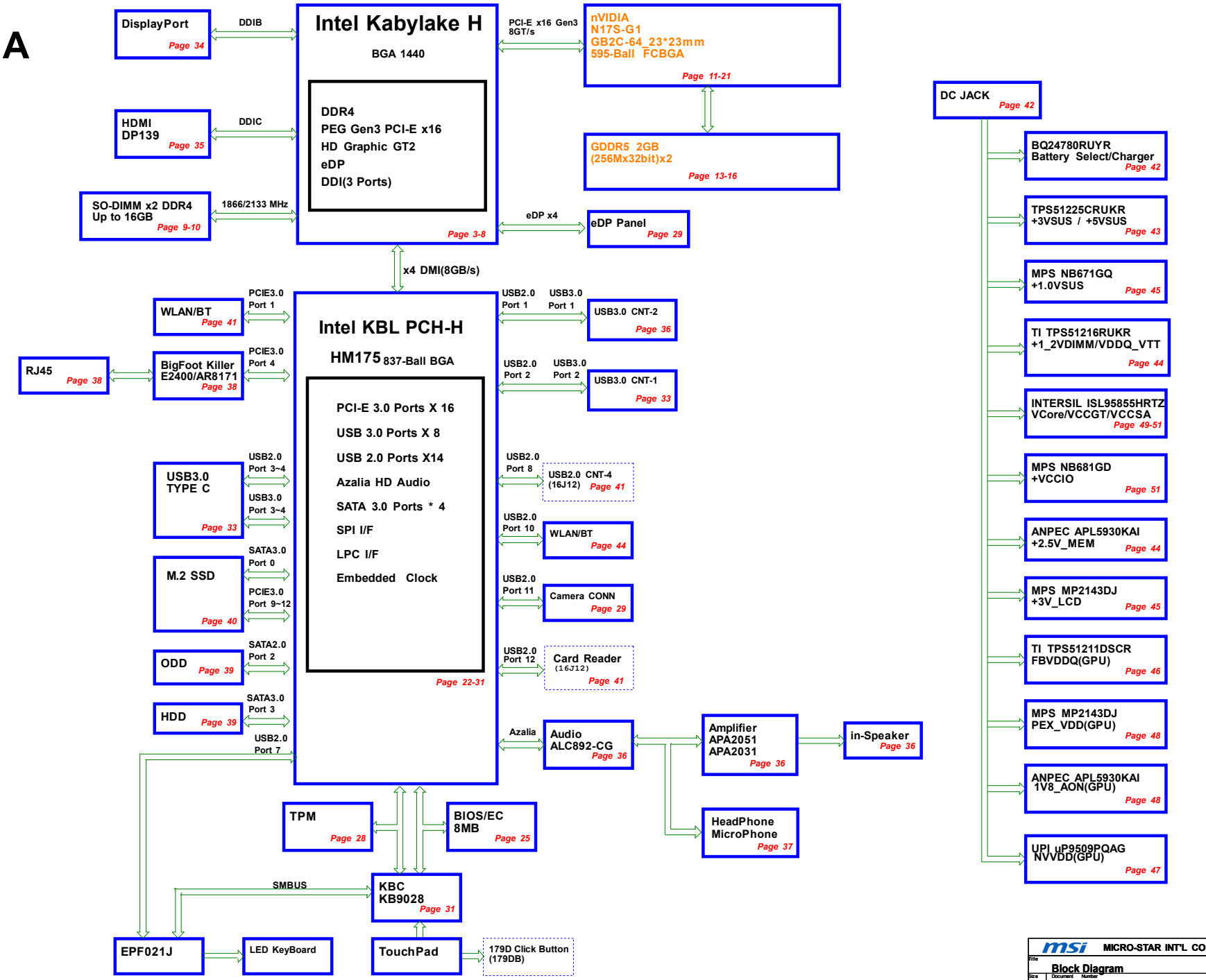
MS-16JD/MS-179D

Intel Kabylake Mobile

Ver:0A

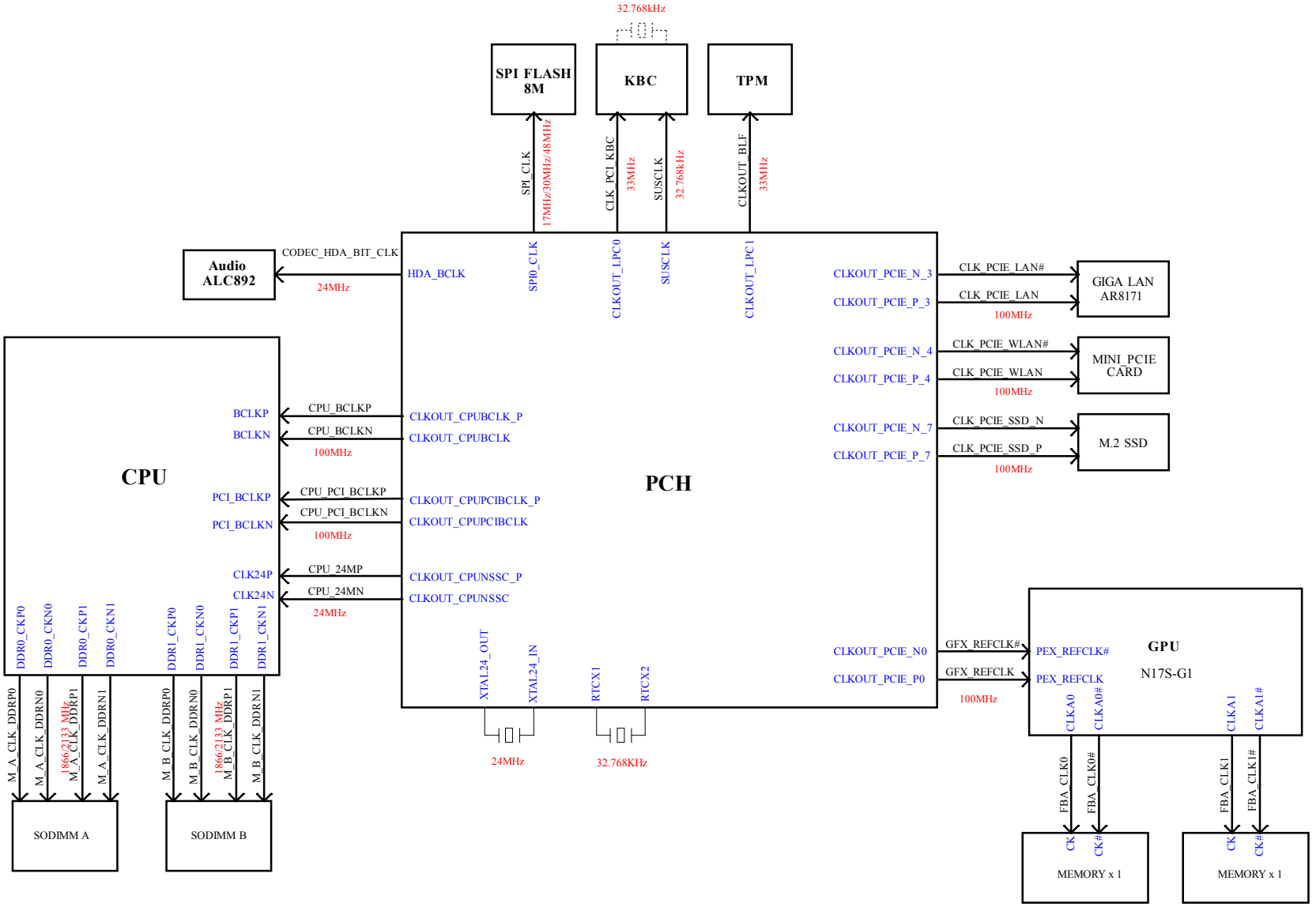


MICRO-STAR INT'L CO.,LTD.

Title: Block Diagram

Size | Document Number: MS-16JD | Rev: 0A

Date: | Sheet 1 of 60

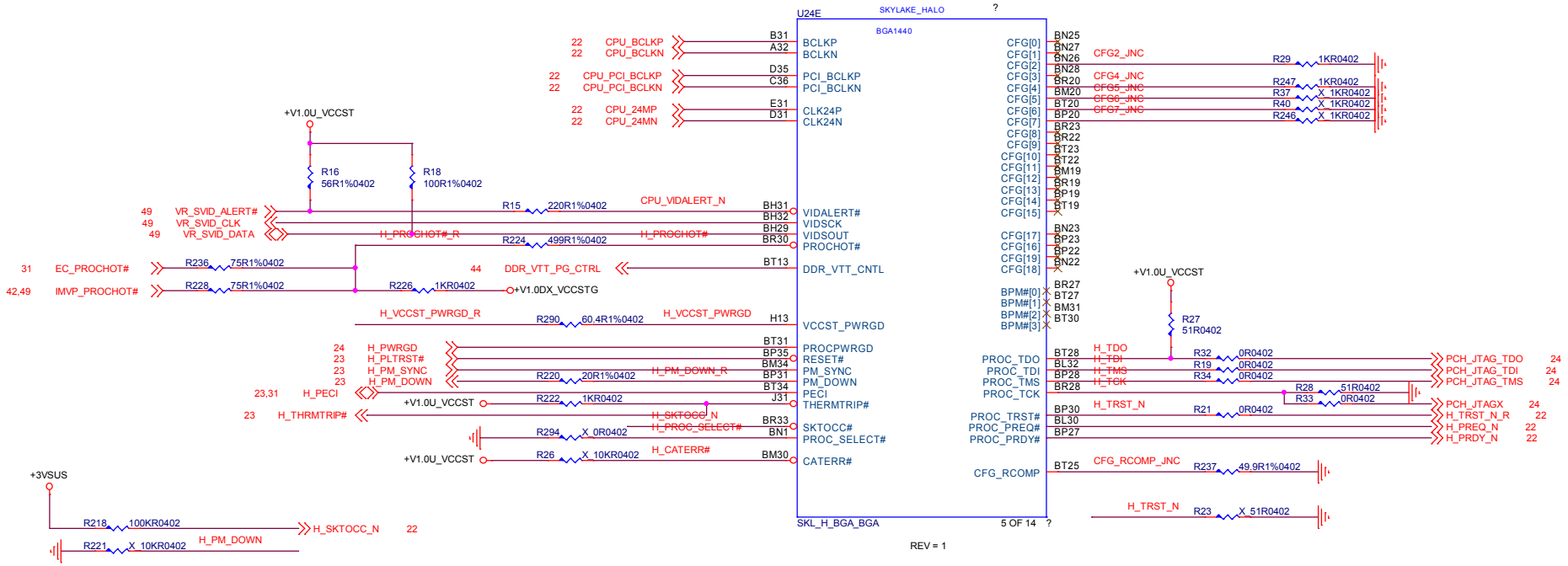


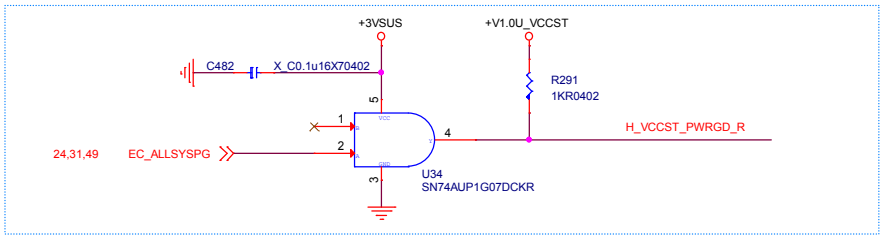
MICRO-STAR INT'L CO.,LTD.

Title: CLock Delivery chart

Size: | Document Number: MS-16JD | Rev: 0A

Date: Thursday, March 23, 2017 | Sheet 2 of 60





I7-7700HQ

I7_7700

A0D-7700H05-I06

X_I7-7700HQ

PCI Express* Static x16 Lane Numbering Reversal	
CFG2	1 = Normal operation 0 = Lane numbers reserved

Display Port Presence strap	
CFG4	1:Disabled - No Physical Display Port attached to Embedded DisplayPort*. No connect for disable. 0:Enabled - A Display Port device is connected to the Embedded Display Port. Pull-down to GND through a 1 KΩ ± 5% resistor to enable port

PCI Express* Bifurcation	
CFG[6:5]	00 = 1x8, 2x4 PCI Express* 01 = reserved 10 = 2x8 PCI Express* 11 = 1x16 PCI Express* Recommend 1K Ω ± 5% pull-down resistor to GND

PEG Training	
CFG7	1 = (default) PEG train immediately following RESET# de assertion. 0 = PEG wait BIOS for training.

MICRO-STAR INT'L CO.,LTD.

Title: Kabylake(HOST)

Size: A3 | Document Number: MS-16JD | Rev: 0A

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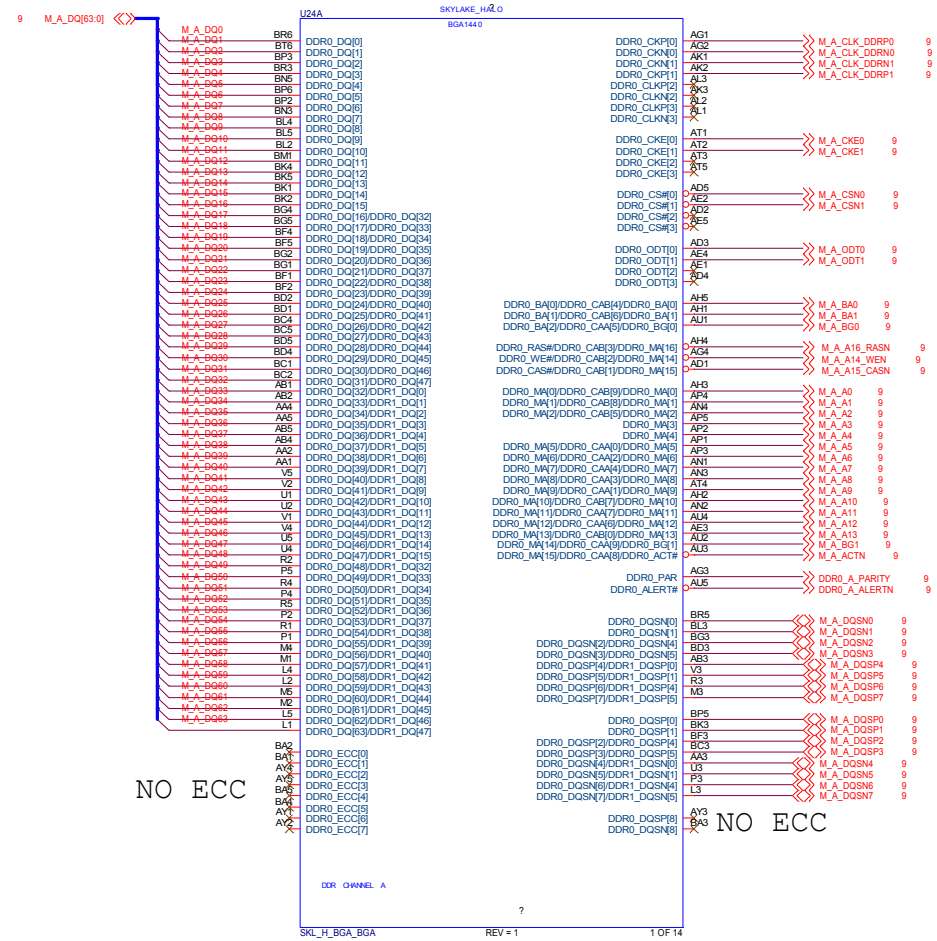
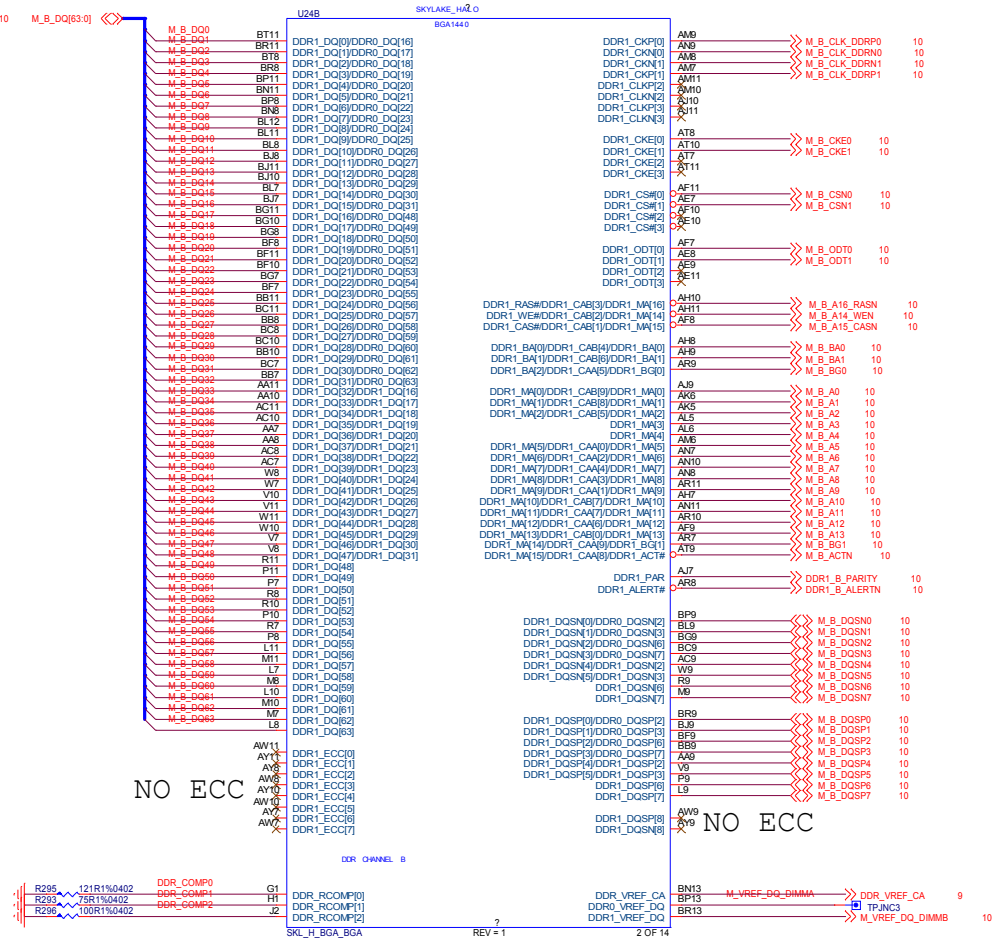
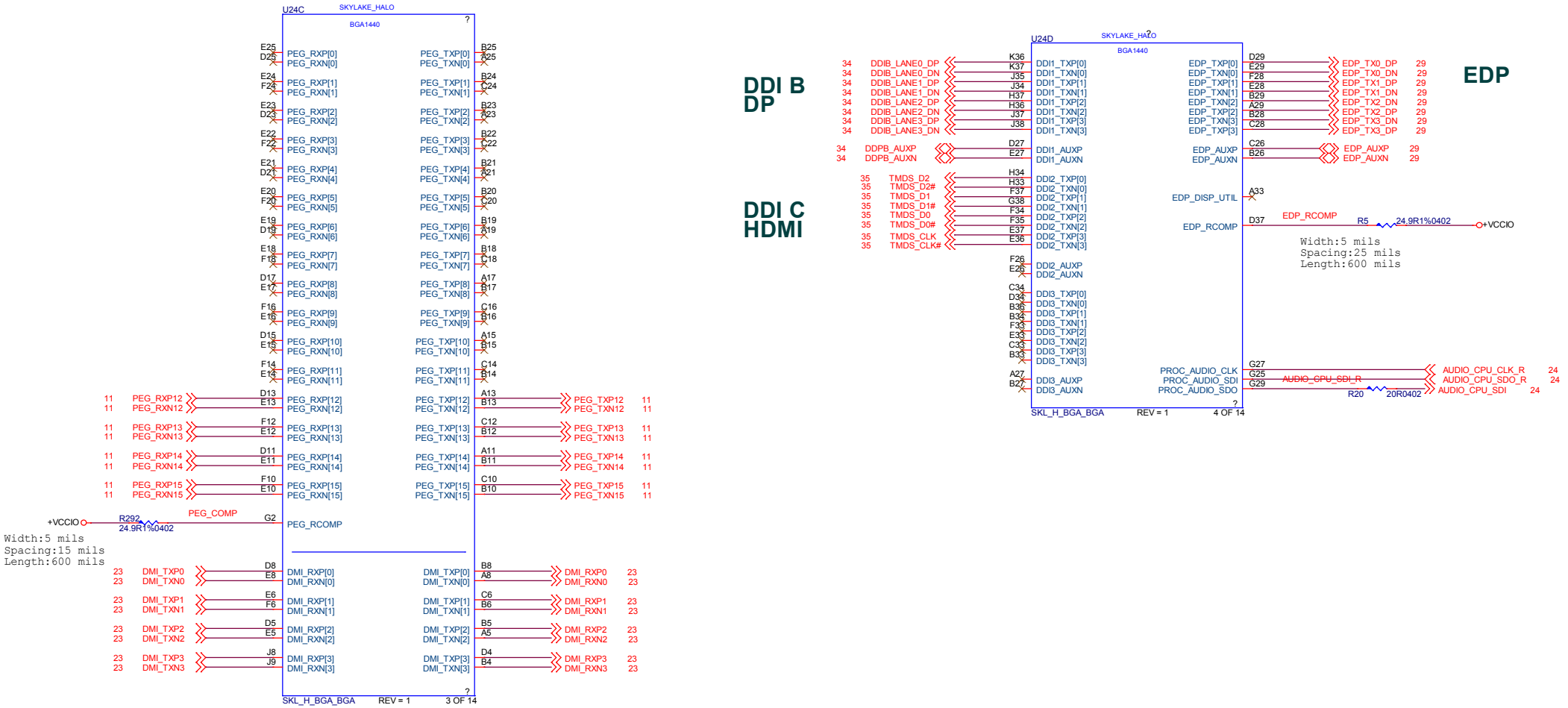
DDR Channel A



DDR Channel B



MICRO-STAR INT'L CO.,LTD.			
Title: Kabylake(DDR4)			
Size: Custom	Document Number: MS-16JD		Rev: 0A
Date: Thursday, March 23, 2017	Sheet 4 of 60		

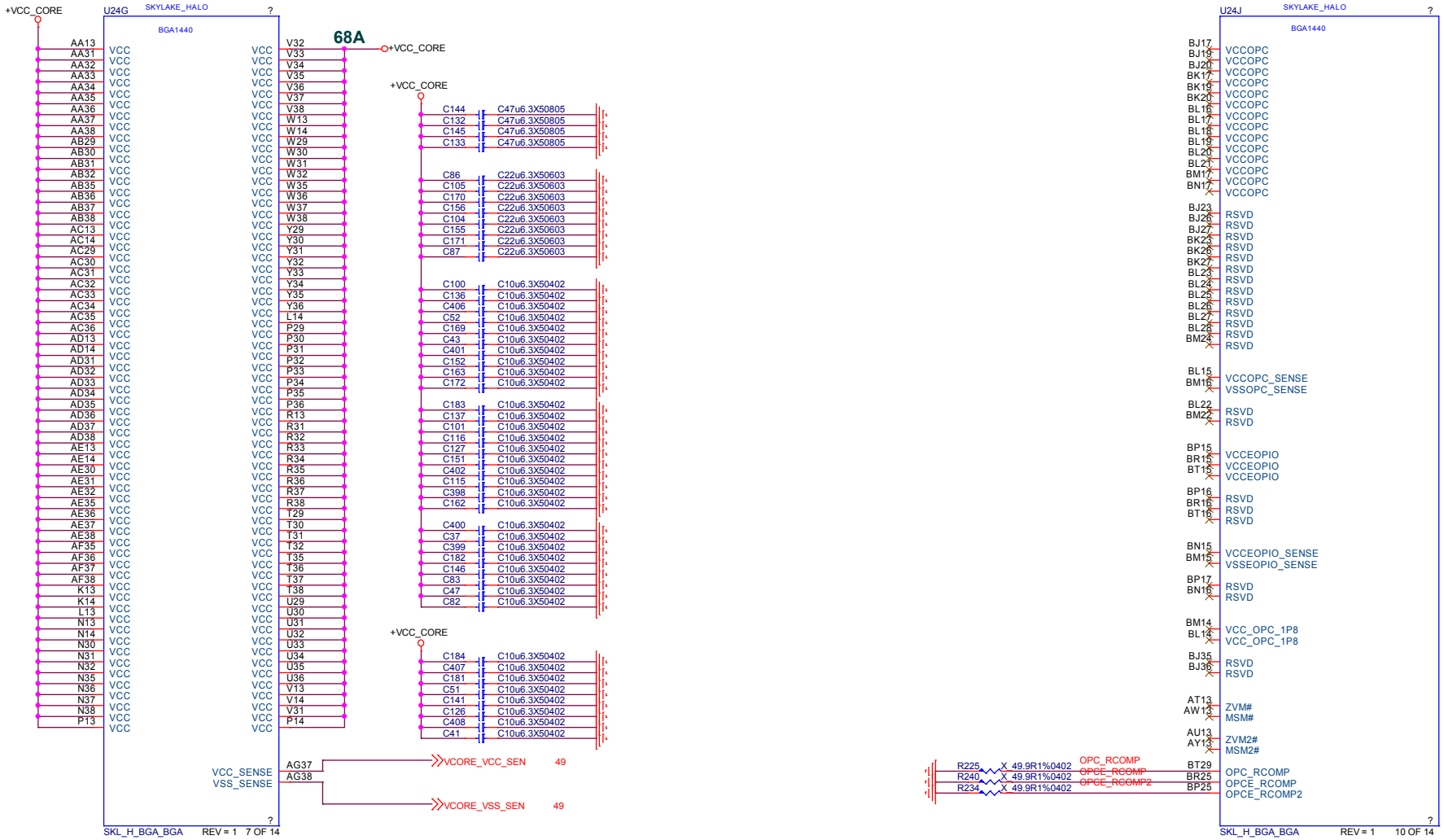


MICRO-STAR INT'L CO.,LTD.

Title: Kabylake(DMI/Display)

Size: Custom | Document Number: MS-16JD | Rev: 0A

Date: Thursday, March 23, 2017 | Sheet 5 of 60

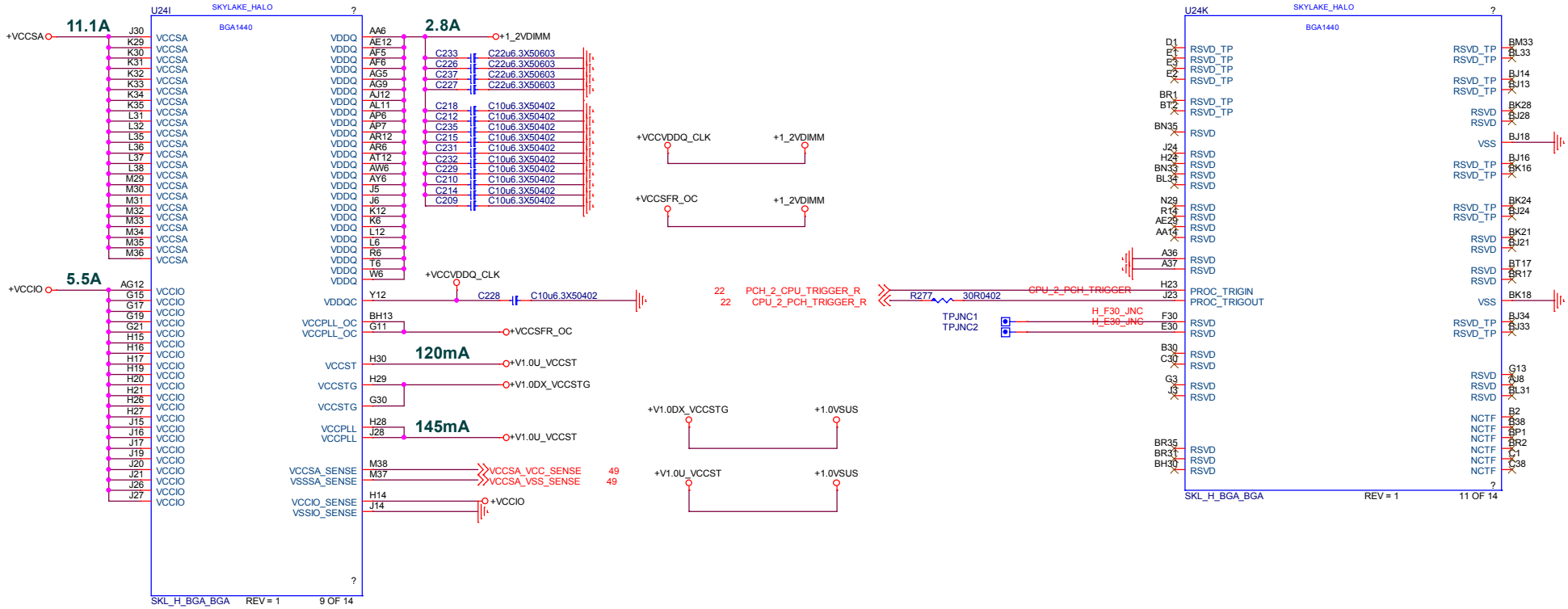


MICRO-STAR INT'L CO.,LTD.

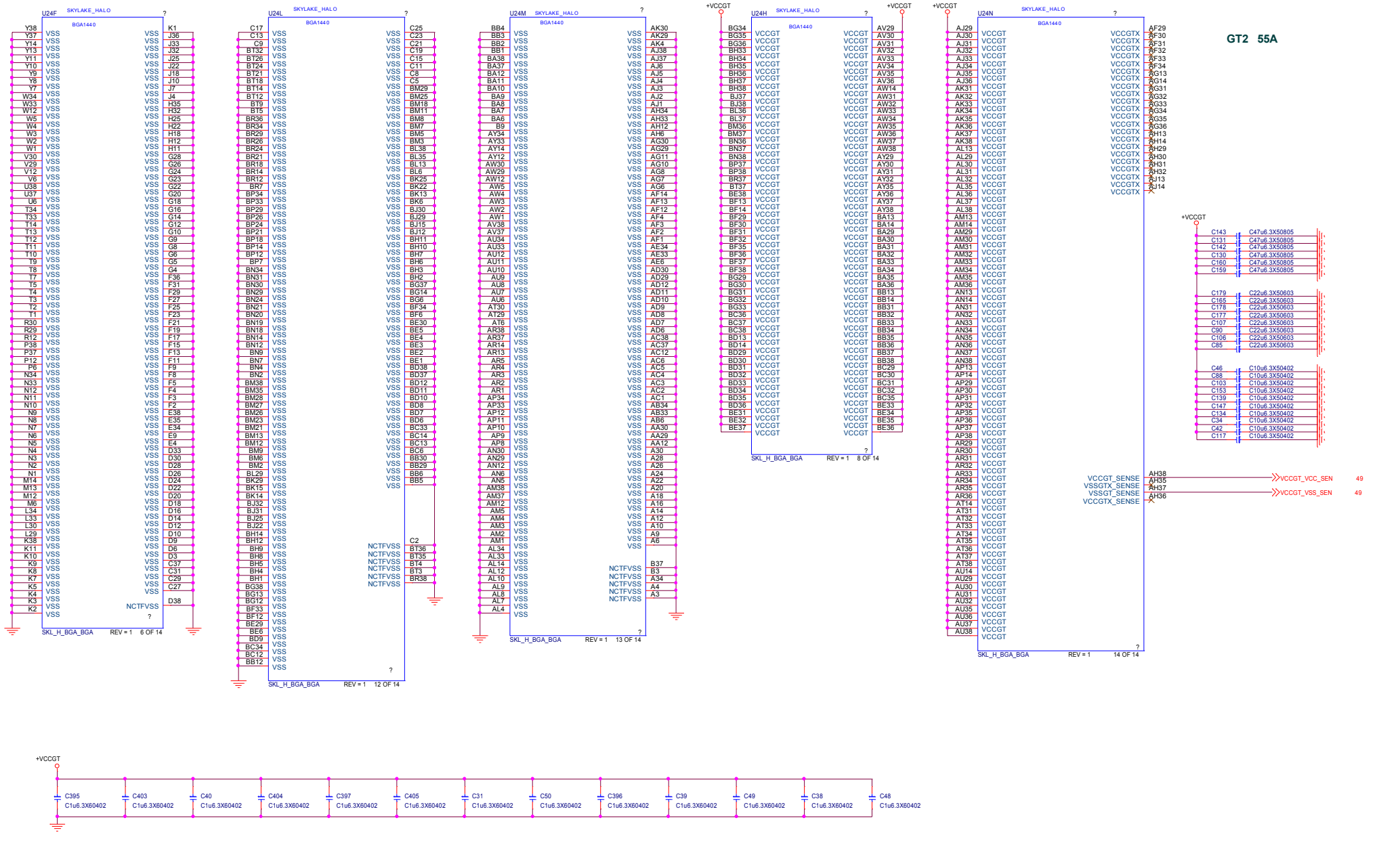
Title: Kabylake(Power1)

Size: A3 | Document Number: MS-16JD | Rev: 0A

Date: Thursday, March 23, 2017 | Sheet 6 of 60



MSI	MICRO-STAR INT'L CO.,LTD.		
Title	Kabylake(Power2)		
Size: Custom	Document Number: MS-16JD		Rev: 0A
Date: Thursday, March 23, 2017	Sheet 7 of 60		



MICRO-STAR INT'L CO.,LTD.		
Title: Kabylake(Power3)		
Size: Custom	Document Number: MS-16JD	Rev: 0A
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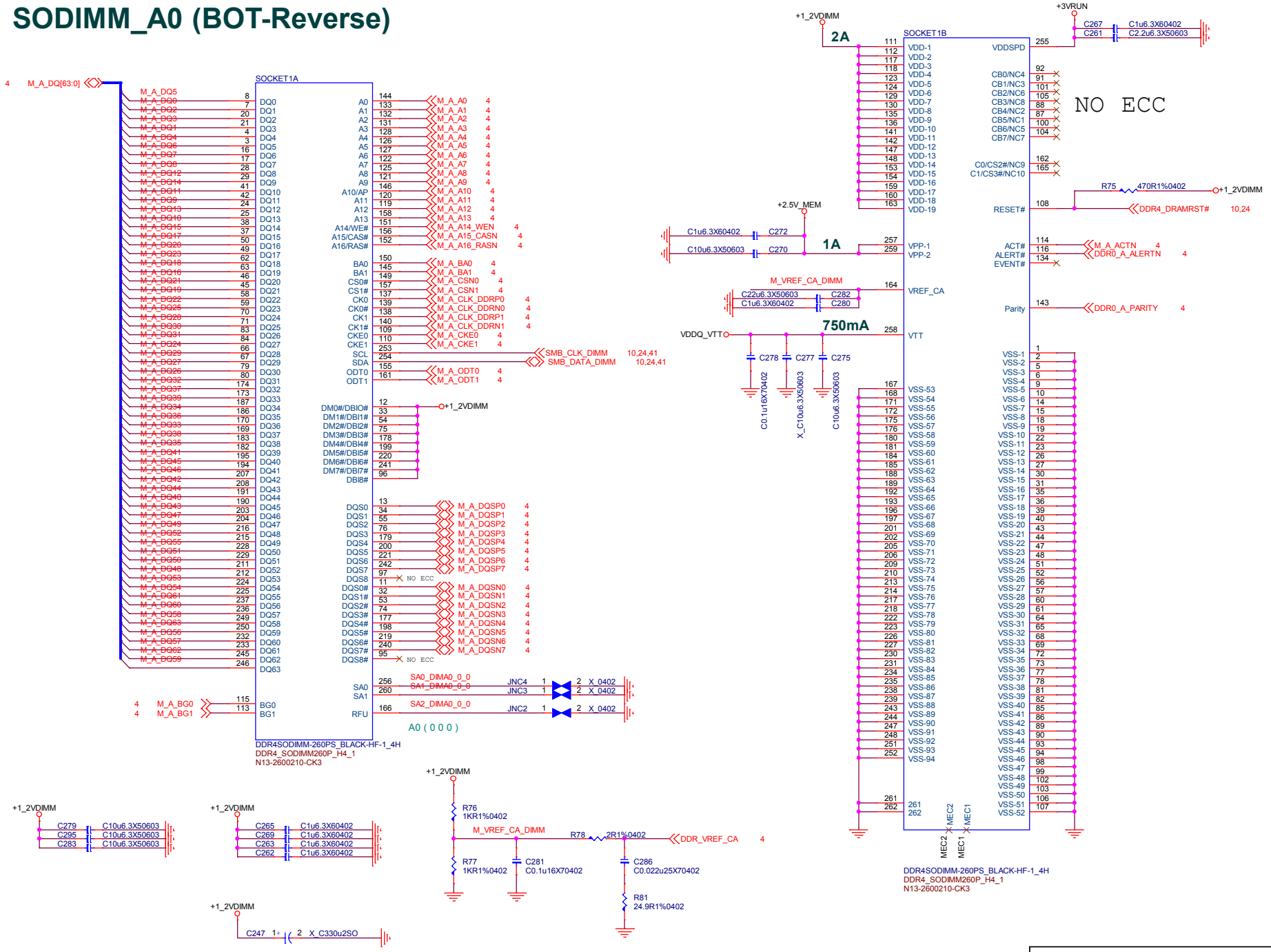
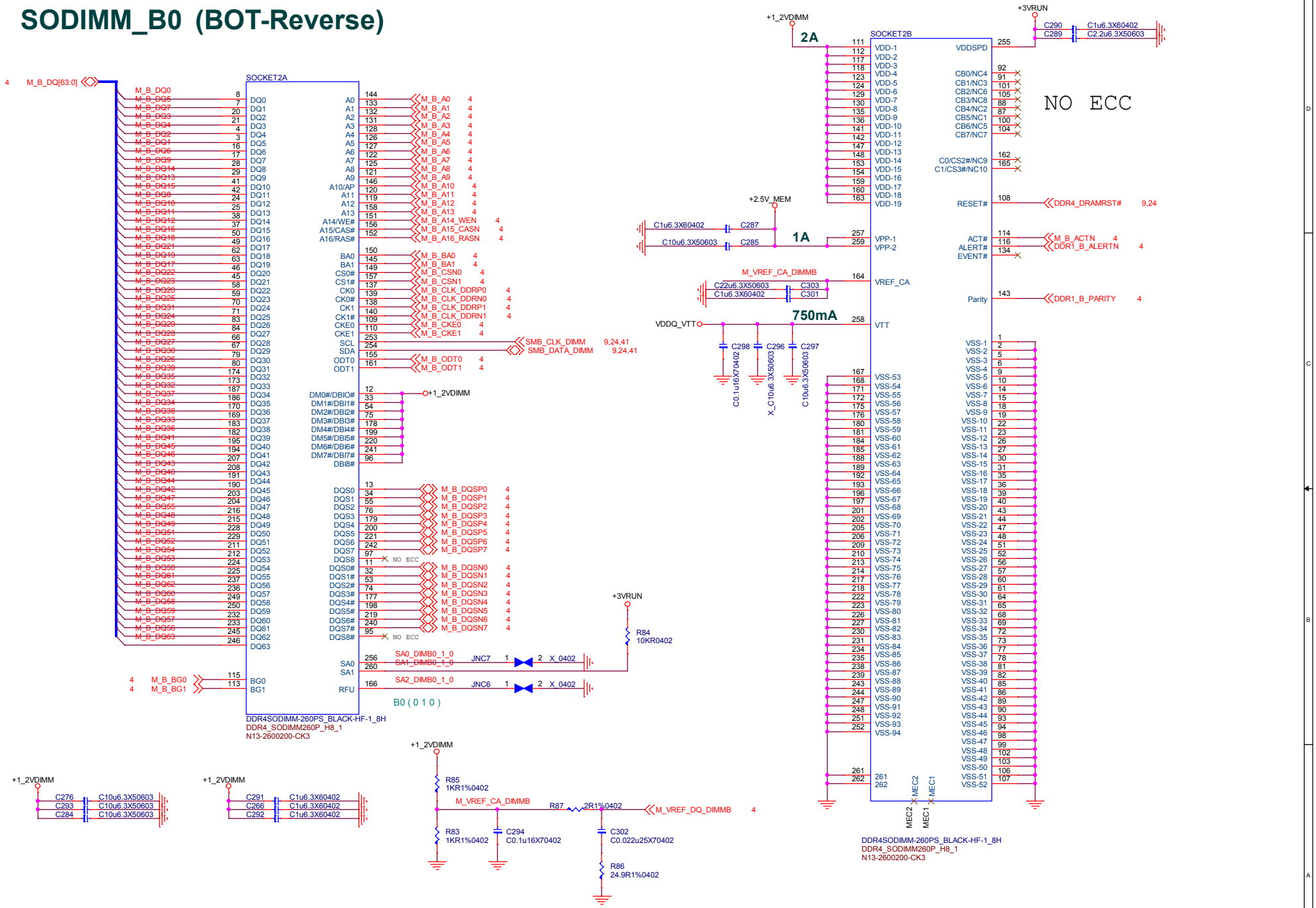
SODIMM_A0 (BOT-Reverse)

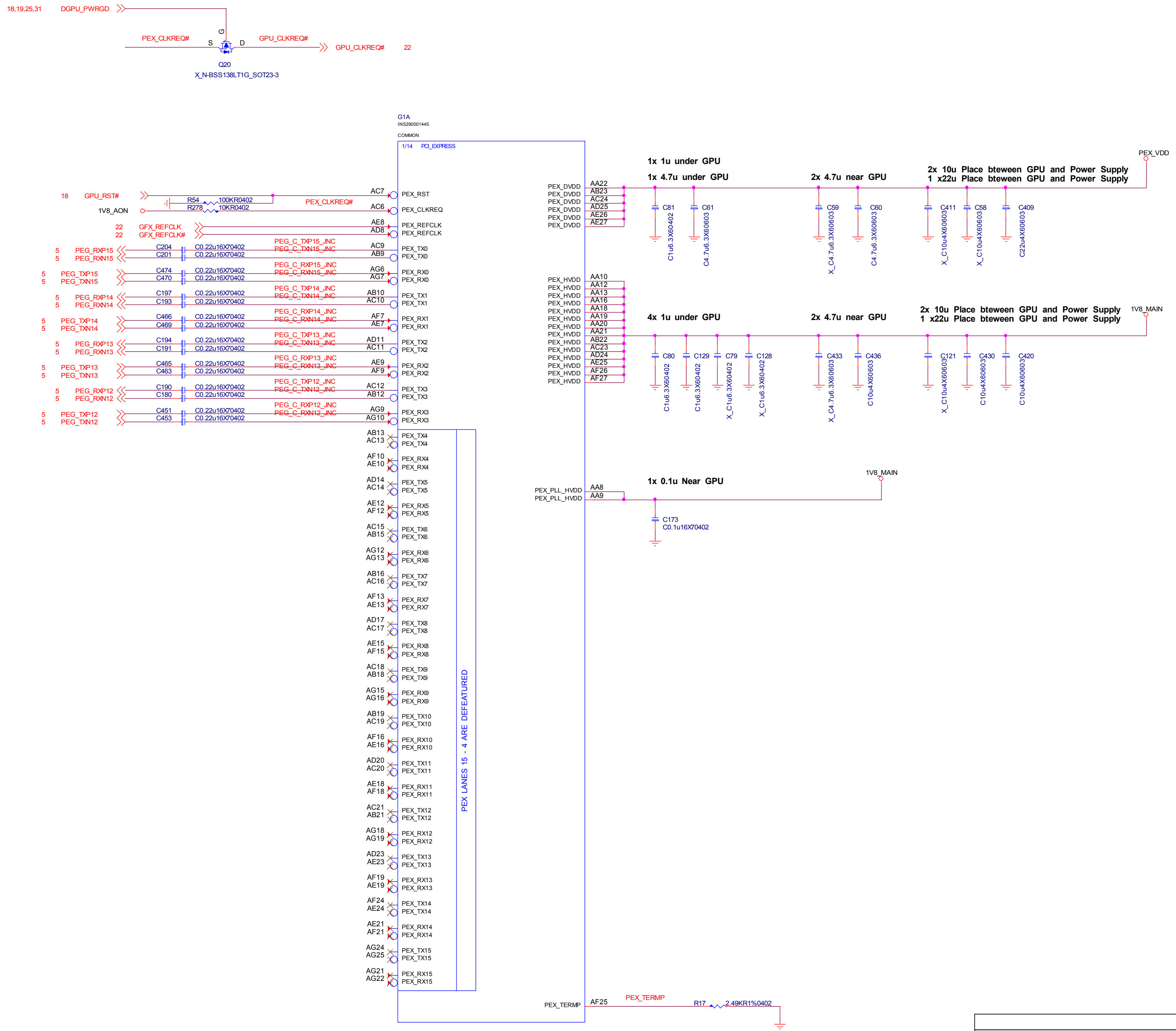


SODIMM_B0 (BOT-Reverse)



MSI	MICRO-STAR INT'L CO.,LTD.	
Title	DDR4_SODIMM_B	
Size: Custom	Document Number: MS-16JD	Rev: 0A
Date: Thursday, March 23, 2017	Sheet 10 of 60	

N17S-G1(PCI-Express Gen3 x4 Interface)



Title	N17S-G1_PCI-E Host	
Size Custom	MS-16JD	Rev 0A
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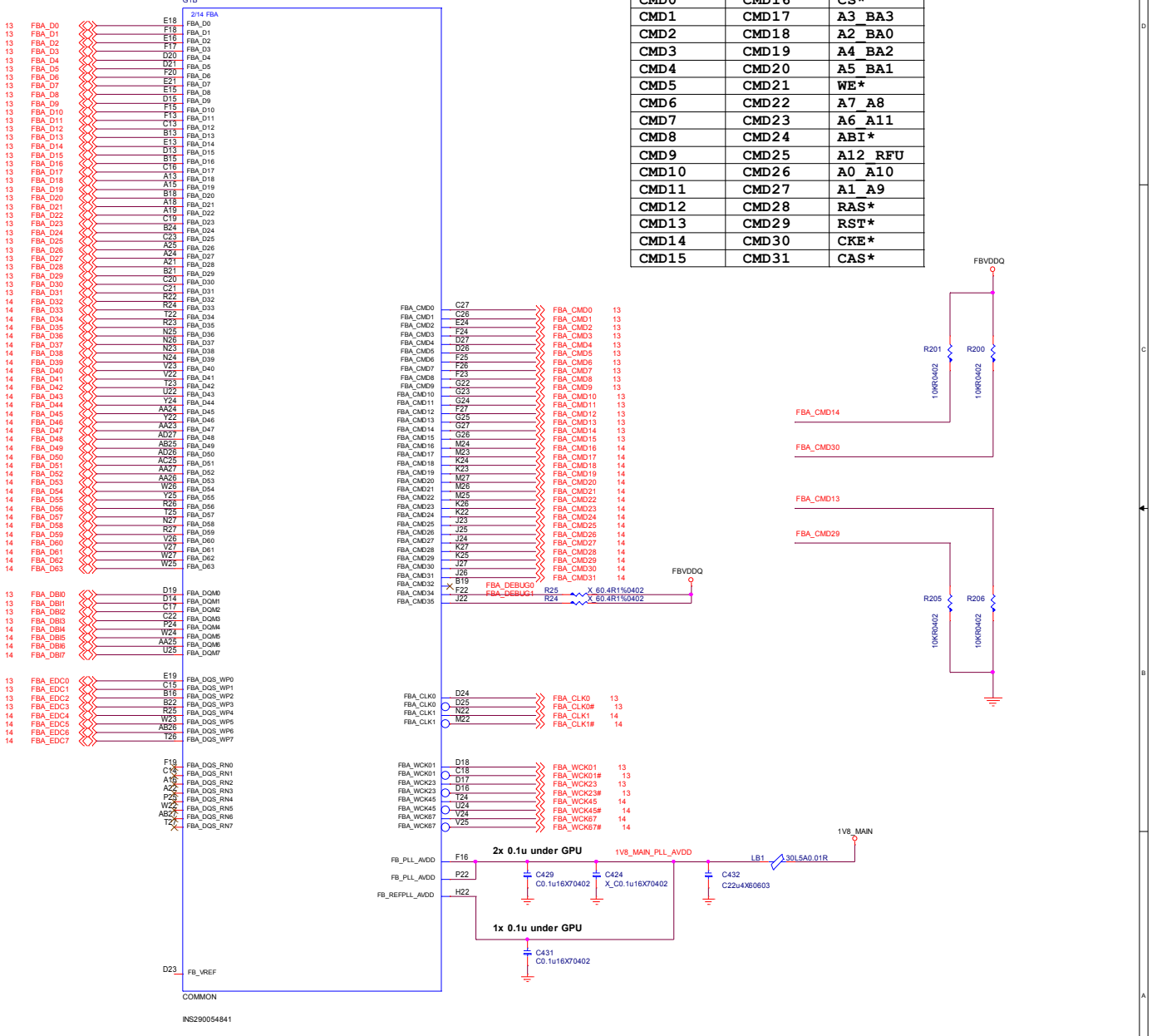
N17S-G1(Frame Buffer Interface)

GDD5 Command Mapping GB2C-64

DQ[31:0]	DQ[63:32]	
CMD0	CMD16	CS*
CMD1	CMD17	A3_BA3
CMD2	CMD18	A2_BA0
CMD3	CMD19	A4_BA2
CMD4	CMD20	A5_BA1
CMD5	CMD21	WE*
CMD6	CMD22	A7_A8
CMD7	CMD23	A6_A11
CMD8	CMD24	ABI*
CMD9	CMD25	A12_RFU
CMD10	CMD26	A0_A10
CMD11	CMD27	A1_A9
CMD12	CMD28	RAS*
CMD13	CMD29	RST*
CMD14	CMD30	CKE*
CMD15	CMD31	CAS*



Title	N17S-G1_MEM IF-A	
Size: Custom	Document Number: MS-16ID	Rev: 0A
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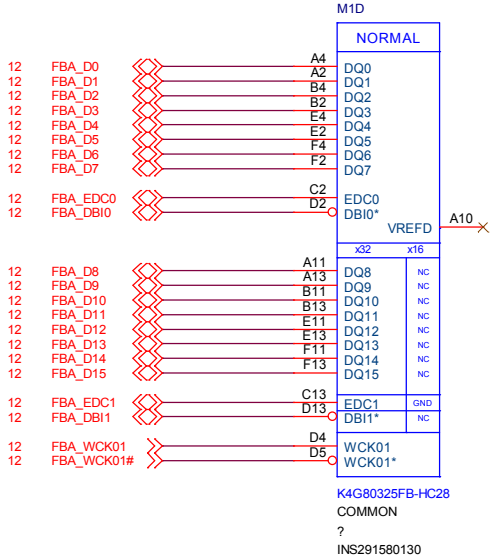
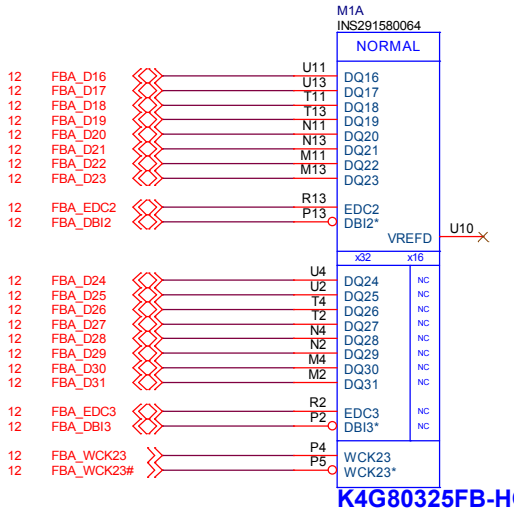
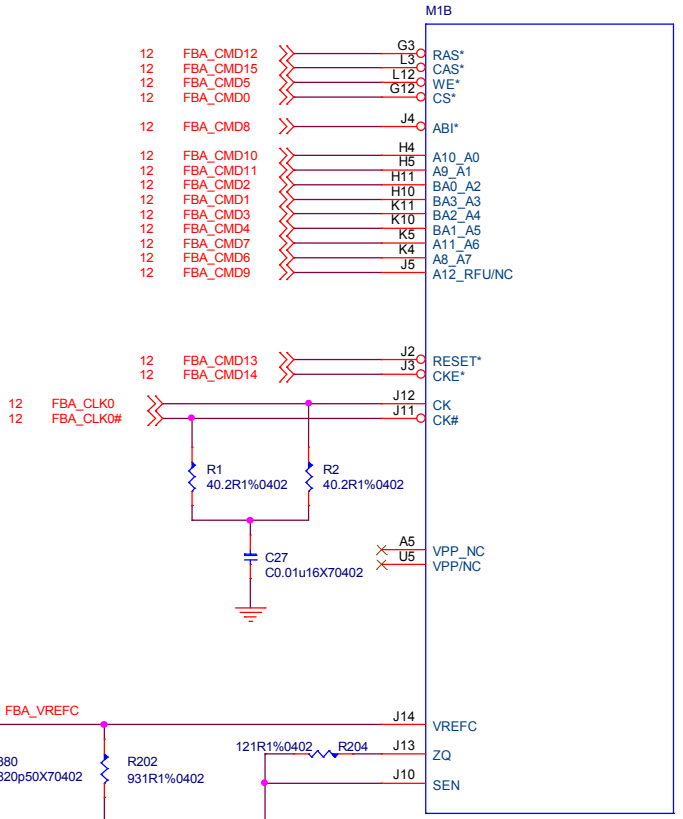
N17S-G1_GDDR5 Frame A-1

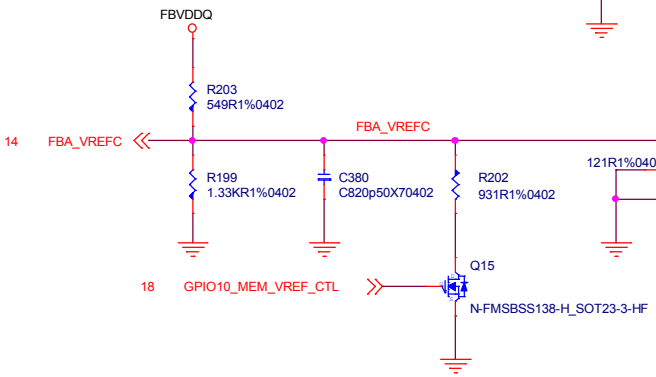
GDD5 Command Mapping GB2C-64

DQ[31:0]	DQ[63:32]	
CMD0	CMD16	CS*
CMD1	CMD17	A3_BA3
CMD2	CMD18	A2_BA0
CMD3	CMD19	A4_BA2
CMD4	CMD20	A5_BA1
CMD5	CMD21	WE*
CMD6	CMD22	A7_A8
CMD7	CMD23	A6_A11
CMD8	CMD24	ABI*
CMD9	CMD25	A12_RFU
CMD10	CMD26	A0_A10
CMD11	CMD27	A1_A9
CMD12	CMD28	RAS*
CMD13	CMD29	RST*
CMD14	CMD30	CKE*
CMD15	CMD31	CAS*









Title	N17S-G1_GDDR5 Frame A-1		
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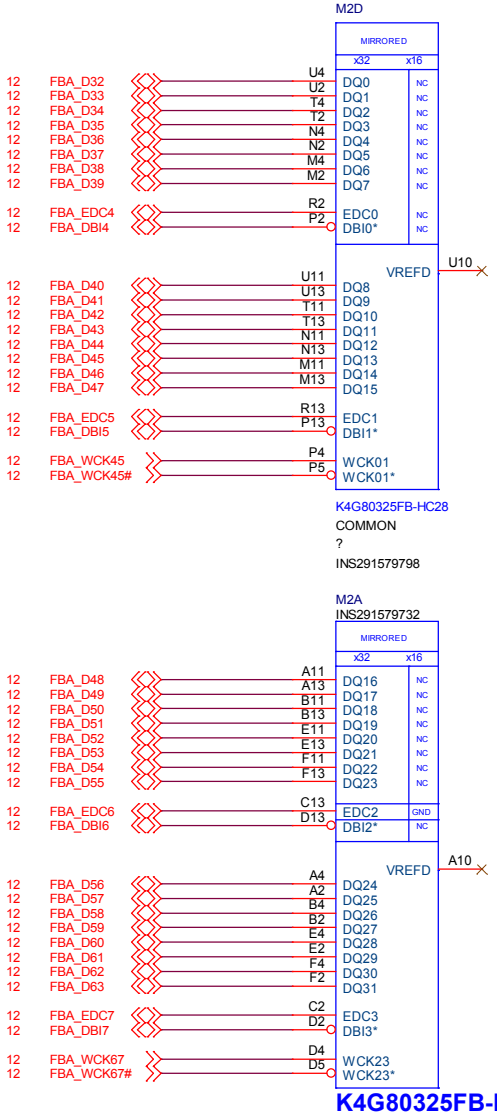
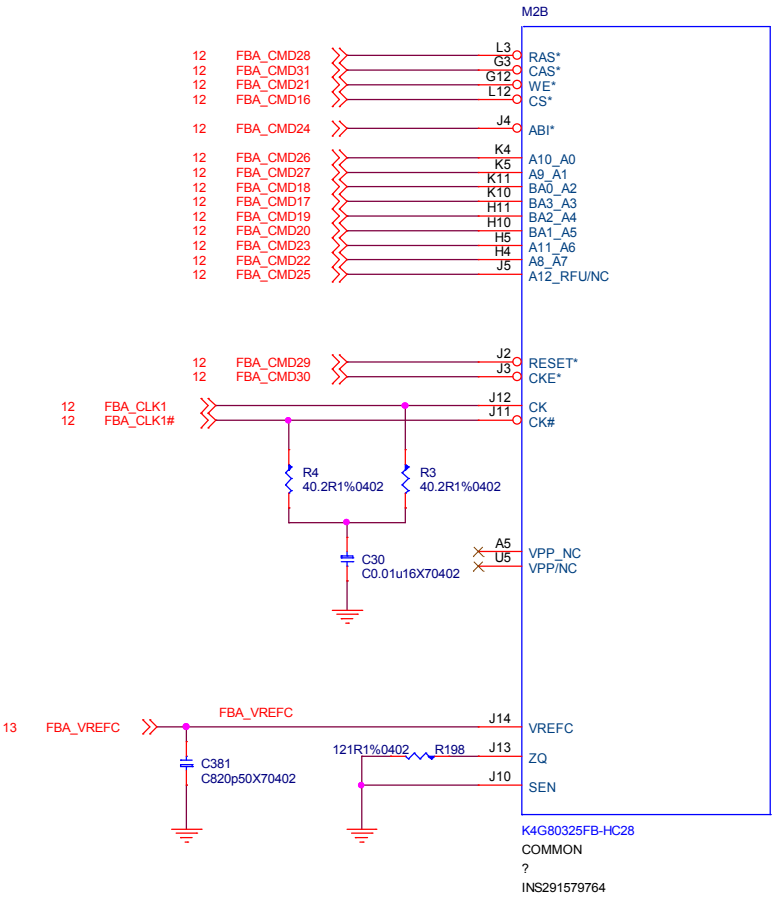
MS-16ID

N17S-G1_GDDR5 Frame A-2



GDD5 Command Mapping GB2C-64

DQ[31:0]	DQ[63:32]	
CMD0	CMD16	CS*
CMD1	CMD17	A3_BA3
CMD2	CMD18	A2_BA0
CMD3	CMD19	A4_BA2
CMD4	CMD20	A5_BA1
CMD5	CMD21	WE*
CMD6	CMD22	A7_A8
CMD7	CMD23	A6_A11
CMD8	CMD24	ABI*
CMD9	CMD25	A12_RFU
CMD10	CMD26	A0_A10
CMD11	CMD27	A1_A9
CMD12	CMD28	RAS*
CMD13	CMD29	RST*
CMD14	CMD30	CKE*
CMD15	CMD31	CAS*



Title	N17S-G1_GDDR5 Frame A-2		
Size B	Document Number		Rev 0A
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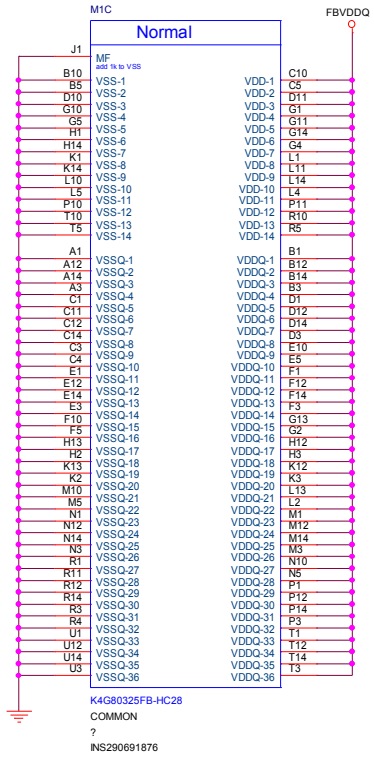
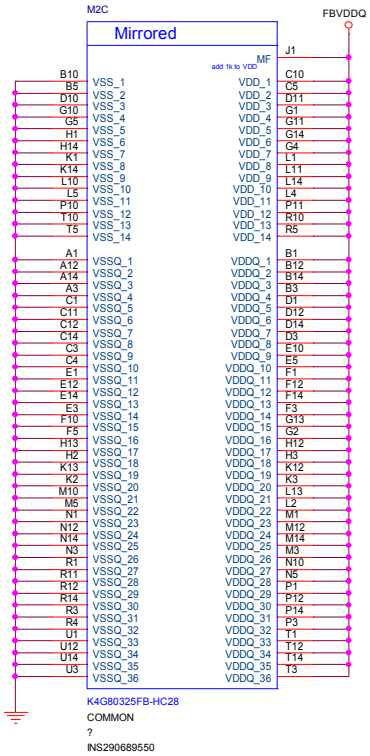
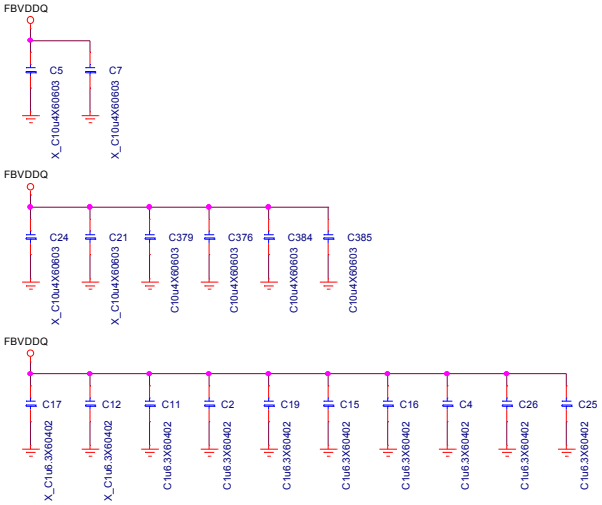
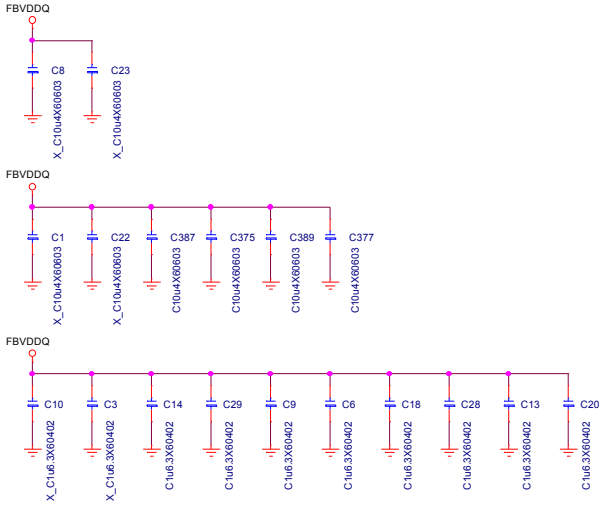
MS-16ID

N17S-G1_GDDR5_DECOUPLING









Title	N17S-G1_GDDR5_DECOUPLING		
Size: Custom	Document Number: MS-16JD		Rev: 0A
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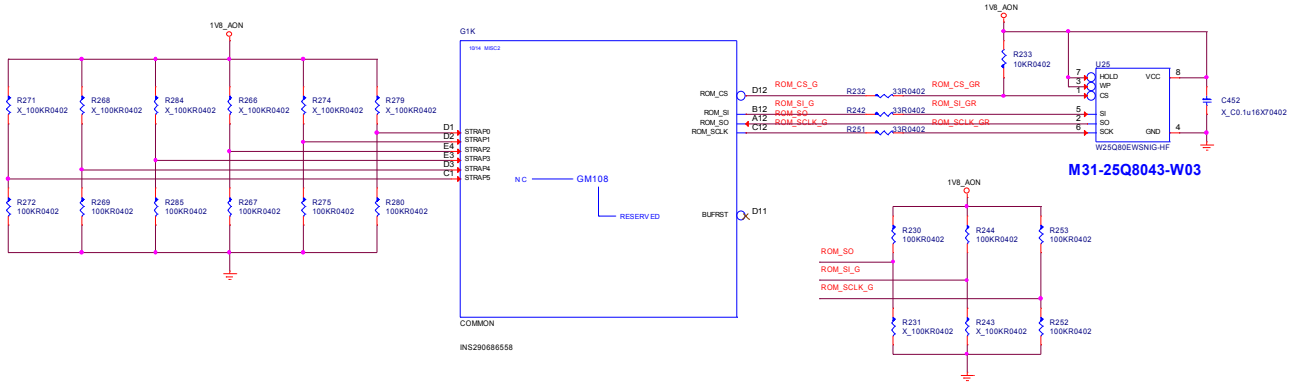
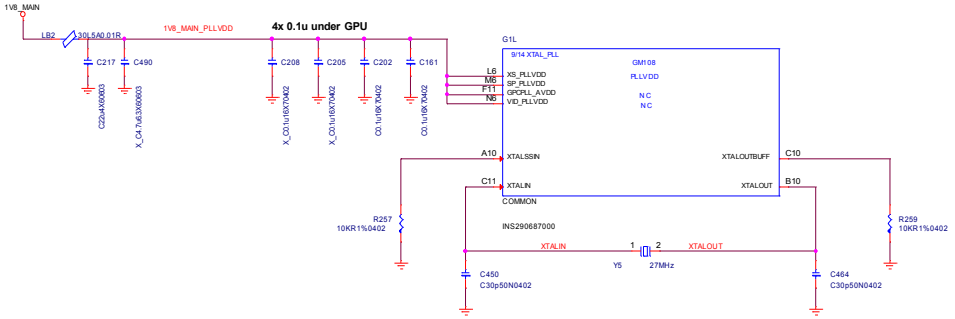
N17S-G1_VBIOS & Straps



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-HC28	
L	L	H	0x1	Microm MT51J2256M32HF-70:A	256M*32
L	H	L	0x2	Hynix H5GC8H24MJR-R0C	
H	H	L	0x6	Hynix H5GC4H24AJR-R0C	
H	H	H	0x7	Samsung K4G41325FE-HC28	128M*32
L	L	M	0x8	Microm EDW4032BABG-70-F	



N17S-G1 N17S-G1

OB3-16JX001-N08

X_N17S-G1-A1

N17S-G1_2G

Samsung V_BOT1

256Mx32bit M12-8032545-S02

X_K4G80325FB-HC28

Title	N17S-G1 VBIOS & Straps			
Size: Custom	Document Number: MS-16JD			Rev: 0A
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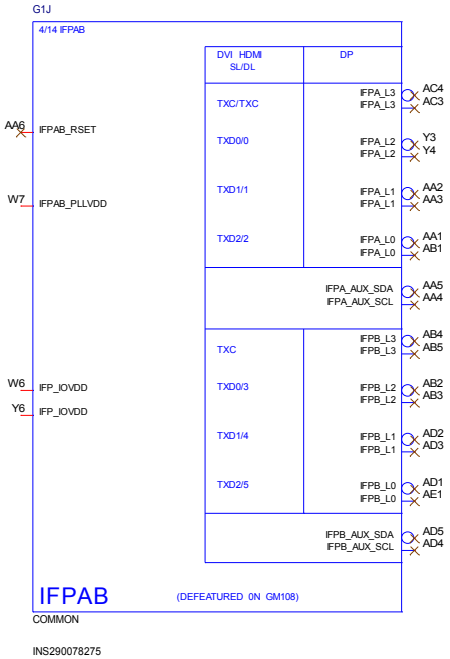
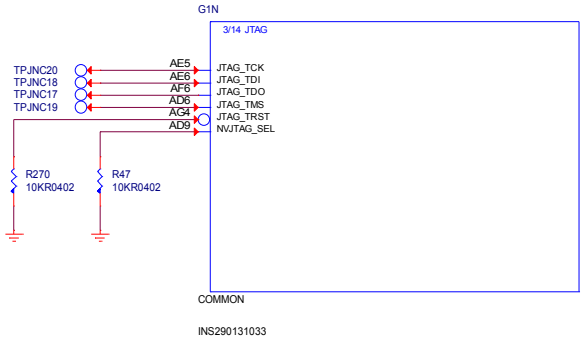
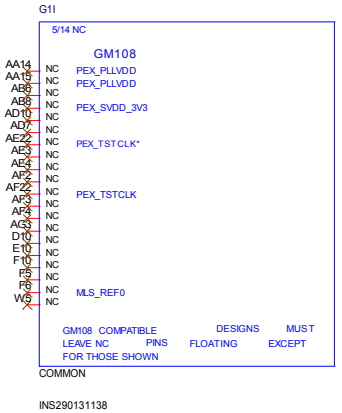
N17S-G1_Display IF







Title	N17S-G1_Display IF		
Size: Custom	Document Number: MS-16ID		Rev: 0A
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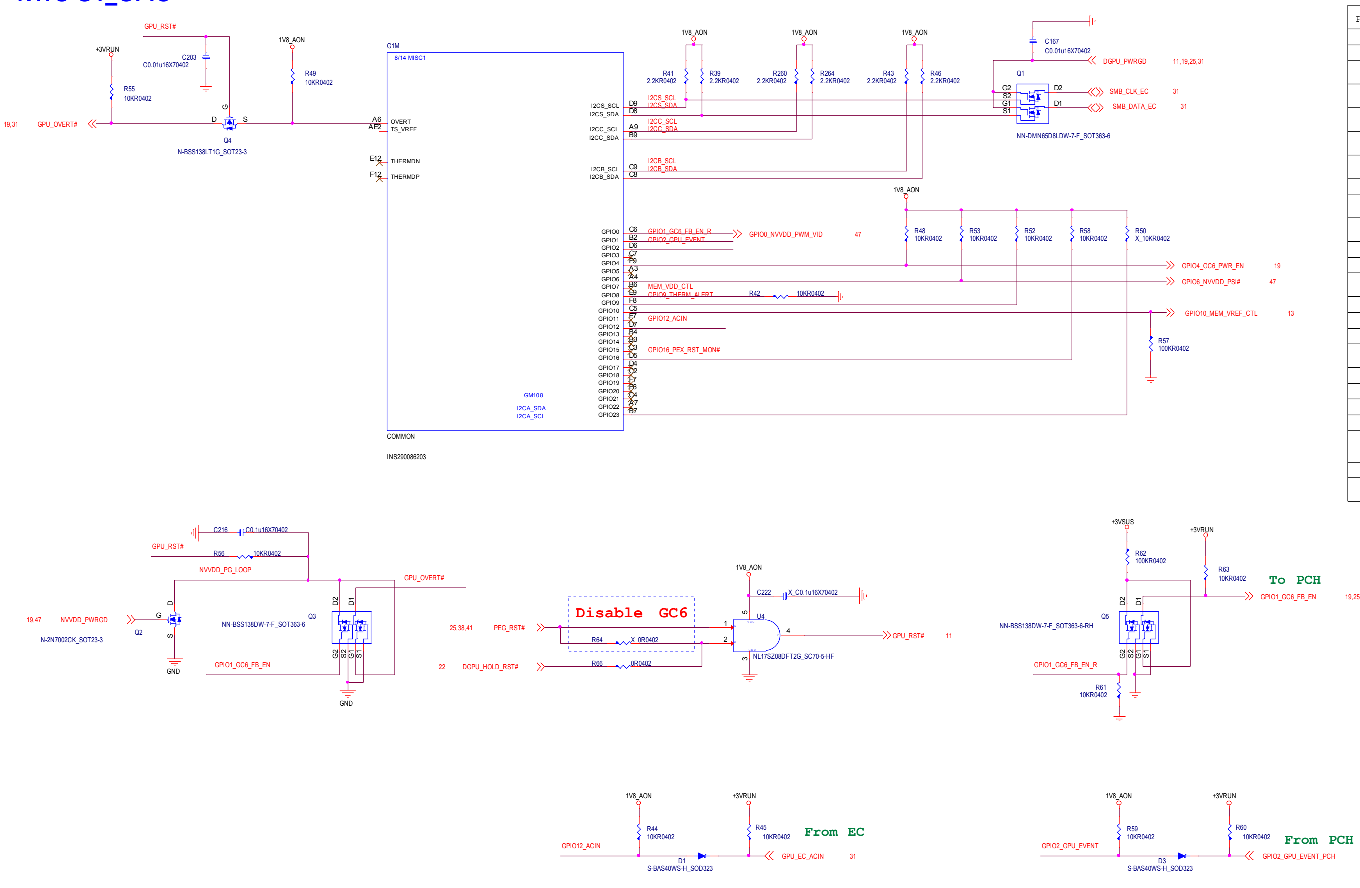
N17S-G1_GPIO



Pin Name	Normal function	I/O	Functional Description	Recommended Default Pull-up or Pull-down
GPIO0	NVVDD_PWM	O	PWM Output To Contral NVVDD	0 TO 1V8 PWM Output
GPIO1	GC6M:GC6_FB_EN	O	FB Enable For GC6 2.1	Open Source 10K Pull-Down
GPIO2	GC6M:GC6_EVENT / WAKE	I	GPU Wake Signal For GC6 2.1	10K Pull-Up To 1V8_AON Unless Driven Actively
GPIO3	NVVDDS_PWM(NC)	I/O	PWM Output To Control The NVVDS Power Supply	0 TO 1V8 Output
GPIO4	GC6M:1V8_MAIN_EN	O	GPU Power Sequencing For GC6 2.1	Open Drain 10K Pull-Up To 1V8_AON
GPIO5	FRM_LCK(NC)	I	Active Low Frame Lock	Open Drain 10K Pull-Up To 1V8_AON
GPIO6	NVVDD_PSI/NVVDDS_PSI	O	Phase Shedding	10K Pull-Up To 1V8_AON To Enable Multiple Phases
GPIO7	LCD_BL_PWM(NC)	O	Panel Backlight Enable	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	Open Drain 10K Pull-Up To 1V8_AON
GPIO10	MEM_VREF_CTL	O	Memory VREF Control	100K pull-down
GPIO11	LCD_VDD	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(NC)	O	LCD Panel Backlight Enable	Panel Backlight Enable
GPIO14	HPD_IFPA	I	Hot Plug Detect for IFPA	
GPIO15	HPD_IFPB	I	Hot Plug Detect for IFPB	
GPIO16	GC6M:SYS_PEX_RST_MON	I	System Side PCIE Reset Monitor	10K Pull-Up To 1V8_AON Unless Driven Actively
GPIO17	UNUSED(NC)	I/O		
GPIO18	UNUSED(NC)	I/O		
GPIO19	3D Vision(NC)	O	3D Vision L/R signal	100K pull-down
GPIO20	GC5_MODE(NC)	I/O		
GPIO21	MEM_VDD_CTL(NC)	O	Frame Buffer VDD Select	Open Drain Pull-Up/Pull-Down To Set The FBVDD/Q Power ON Voltage At Boot Up
GPIO22	UNUSED(NC)	I/O		
GPIO23	GC6M:GPU_PEX_RST_HOLD	O	GPU PCIE Self Reset Control	Open Drain 10K Pull-Up To Gated 3V3

Title: N17S-G1_ROM & Straps & GPIO
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N17S-G1_Power Control

Power on = 1V8_AON -> 1V8_MAIN -> NVVDD+NVVDDS -> PEX_VDD -> FBVDDQ -> DGPUPWRGD

Power down = PEX_VDD/FBVDDQ -> NVVDD+NVVDDS -> 1V8_MAIN -> 1V8_AON

1V8_AON

(1)

(7)

1V8_AON POWER GOOD

1V8_MAIN POWER GOOD

1V8_MAIN

(1)

(2)

1.8V Signal

(6)

Disable GC6

NVVDD

(3)(4)

PEX_VDD

(4) (2)

FBVDDQ

(5)(5)

Disable GC6

FBVDDQ POWER GOOD

DGPU POWER GOOD

(6) (3)

Discharge Circuit

VGS(th): MIN:1.0 Max:2.0

SLG4U41283 Power Sequence Control IC

PIN2: MXM_PWR_EN is 3.3V	INPUT
PIN3: GPIO4_GC6_PWR_EN is 1.8V	INPUT
PIN4: FBVDDQ_ON_INPUT 3.3V	INPUT
PIN6: FBVDDQ_ON_OUTPUT 3.3V	OUTPUT
PIN7: PEX_VDD_EN_IC 3.3V	OUTPUT
PIN9: NVVDD_EN_IC 3.3V	OUTPUT
PIN12:1V8_MAIN_EN_IC 3.3V	OUTPUT
PIN13:1V8_AON_EN_IC 3.3V	OUTPUT

Power Up Sequence

PIN2: MXM_PWR_EN
PIN13: 1V8_AON_EN_IC
PIN12:1V8_MAIN_EN_IC
PIN9: NVVDD_EN_IC
PIN7: PEX_VDD_EN_IC
PIN6: FBVDDQ_ON_OUTPUT

2ms, 250us, 1.5ms, 4ms

GC6 2.1 Exit Sequence

PIN2: MXM_PWR_EN
PIN13: 1V8_AON_EN_IC
PIN4: FBVDDQ_ON_INPUT
PIN3: GPIO4_GC6_PWR_EN
PIN12:1V8_MAIN_EN_IC
PIN9: NVVDD_EN_IC
PIN7: PEX_VDD_EN_IC

(KEEP HIGH), 250us, 1.5ms

Power Down Sequence

PIN2: MXM_PWR_EN
PIN7: PEX_VDD_EN_IC
PIN6: FBVDDQ_ON_OUTPUT
PIN9: NVVDD_EN_IC
PIN12: 1V8_MAIN_EN_IC
PIN13: 1V8_AON_EN_IC

250us, 2ms, 3ms

GC6 2.1 Entry Sequence

PIN2: MXM_PWR_EN
PIN13: 1V8_AON_EN_IC
PIN4: FBVDDQ_ON_INPUT
PIN3: GPIO4_GC6_PWR_EN
PIN7: PEX_VDD_EN_IC
PIN9: NVVDD_EN_IC
PIN12: 1V8_MAIN_EN_IC

(KEEP HIGH), 250us, 2ms

Title: N17S-G1 Power Control
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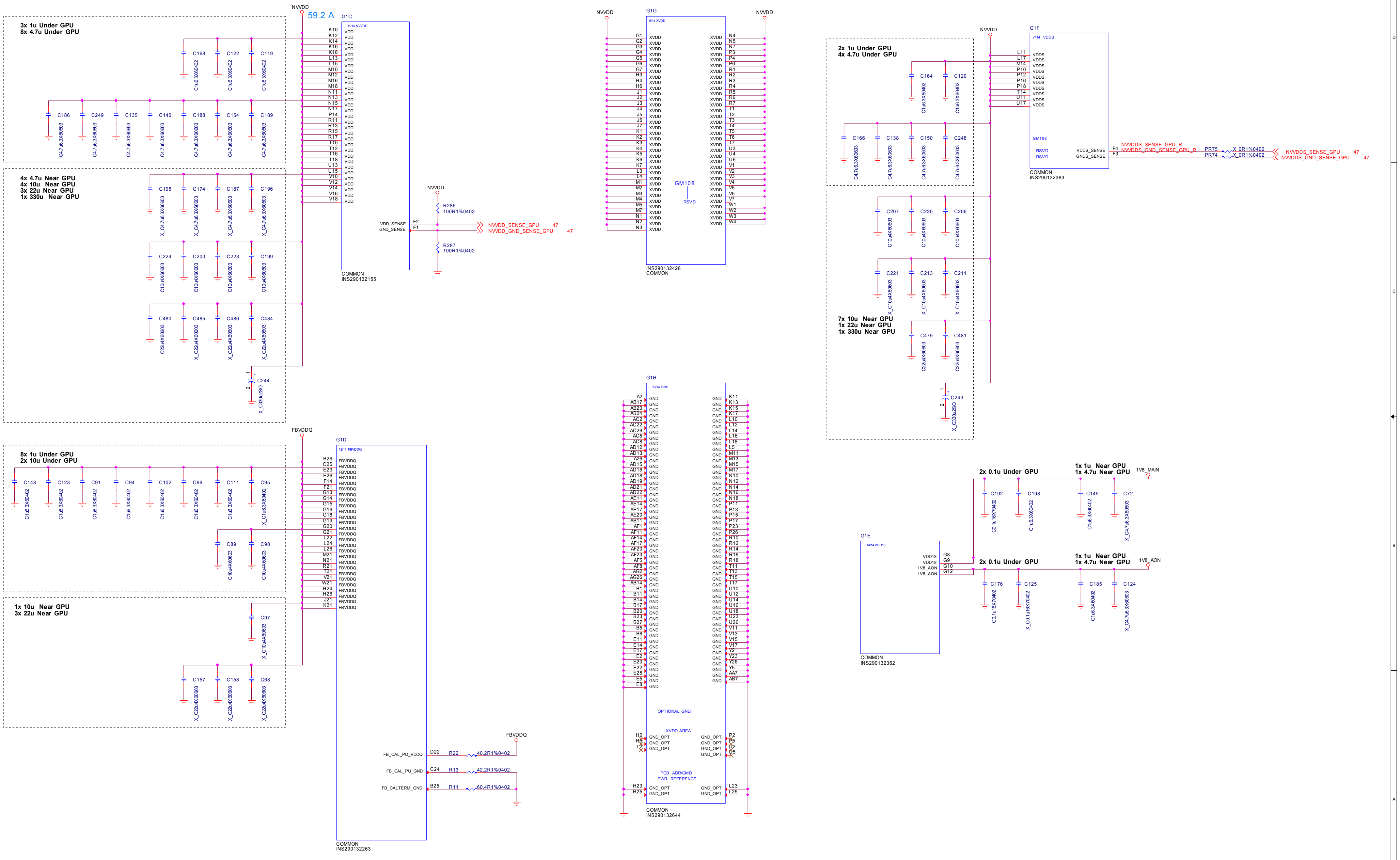
N17S-G1_Power & GND



Title	N17S-G1_Power & GND	
Size: Custom	Document Number: MS-16JD	Rev: 0A
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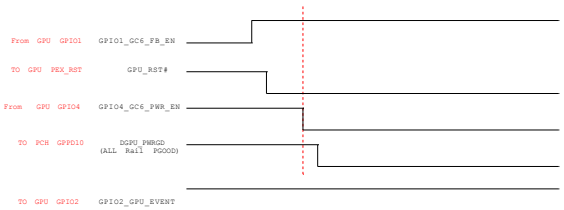
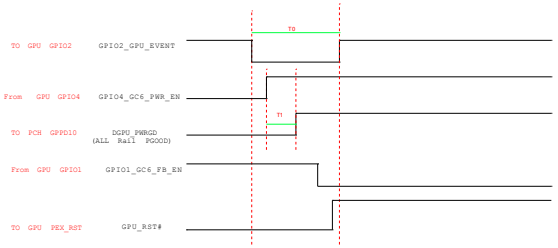
GC6 2.1 ENTRY SEQUENCE



GC6 2.1 EXIT SEQUENCE

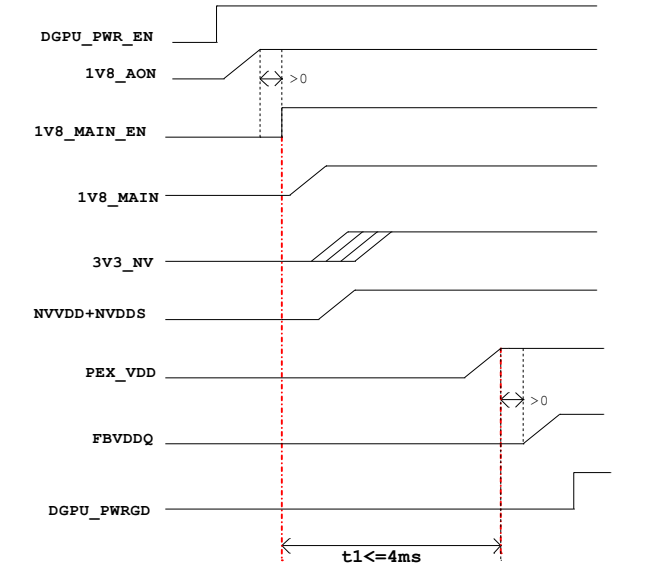


GC6 2.1 TIMING

	Min	Max	Unit	Description
T0	0.001	N/A	mS	GPU_EVENT# assertion
T1	0.04	4	mS	3V3_MAIN_EN assertion to all power rails up and stable

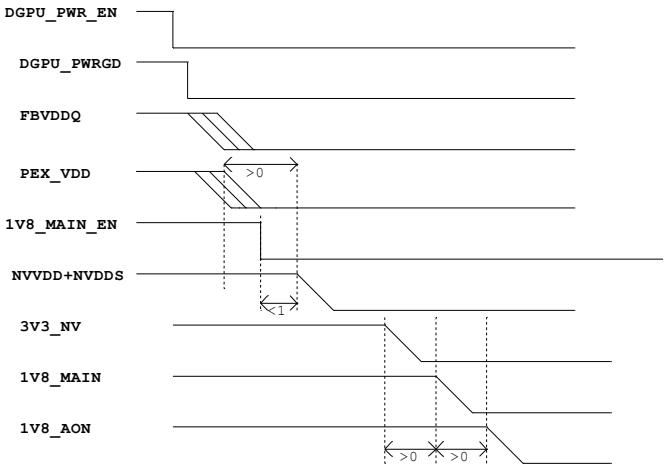
POWER UP Sequence

1V8_AON -> 1V8_MAIN->NV3V3 -> NVVDD+ NVVDS / PEX_VDD -> FBVDDQ



POWER Down Sequence

PEX_VDD/FBVDDQ -> NVVDD+NVVDS -> NV3V3 -> 1V8_MAIN -> 1V8_AON



NOTES:

1. ALL RailPGOOD=1 represents all GPU power rails are ramped up and in regulation.
   If any GPU power rail cannot ge guaranteed in regulation this state should equal to 0.
2. During GC6 exit, the order of power rail ramp-up must follow the Power up sequence described in Chapter 3 with the exception that FBVDD/Q stays on.
3. All delays should be minimized to increase time spent in GC6 for maximum power saving.
4. The entire entry and exit sequence must complete within 200 ms.

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Title: DGPU_POWER SEQUENCE

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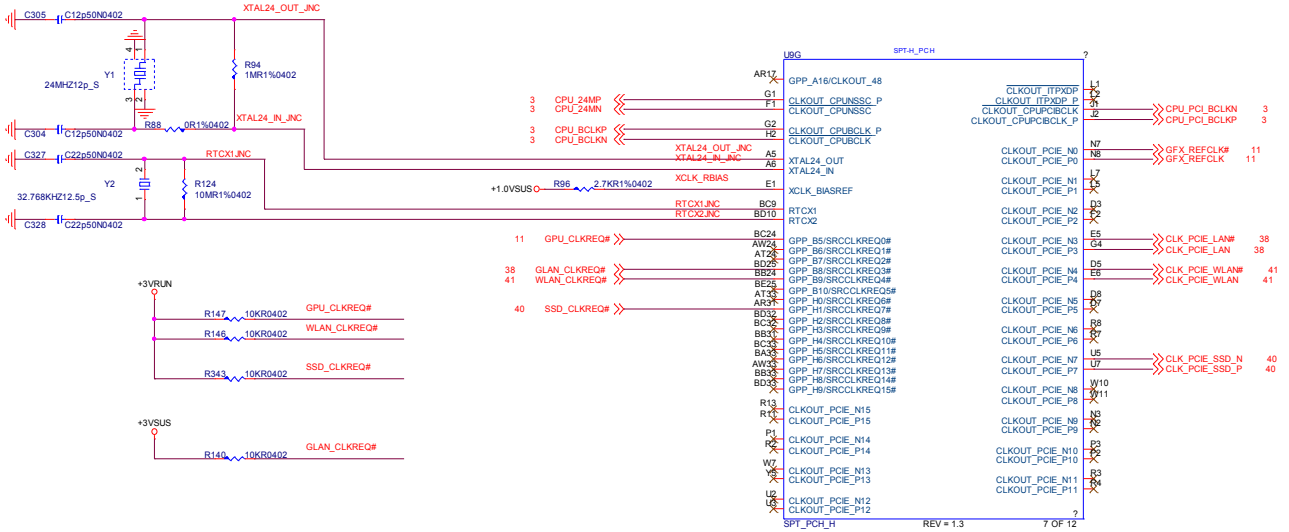

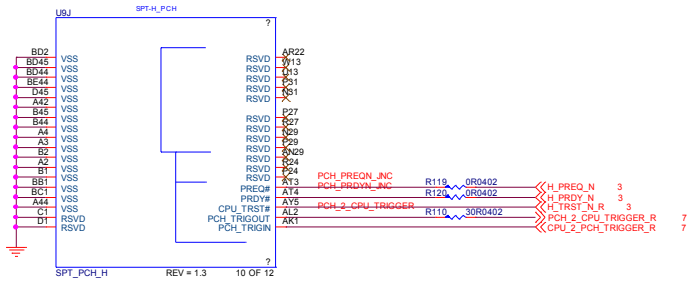

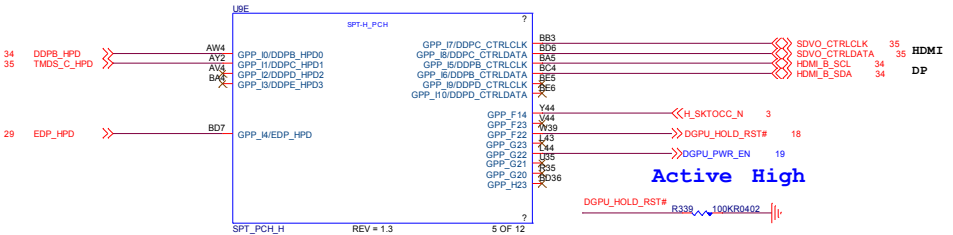

Signal	GPIO Assignment
DGPU_PWR_EN#	GPP_G22
DGPU_PWROK	NA
DGPU_HOLD_RST#	GPP_F22

MICRO-STAR INT'L CO.,LTD.

Title: PCH_1(CLK/DDI)

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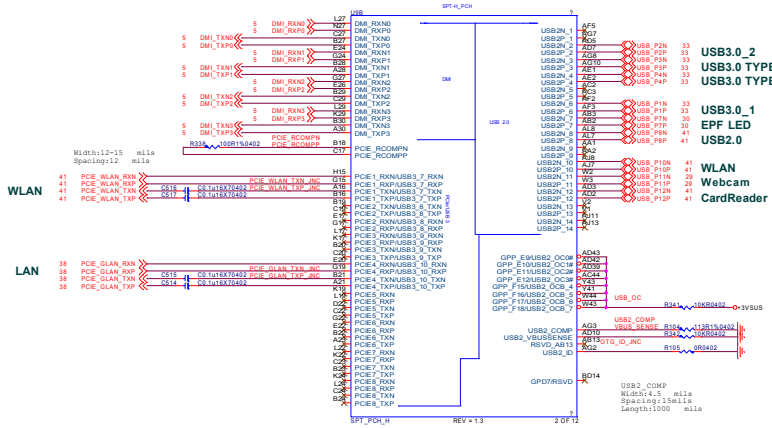
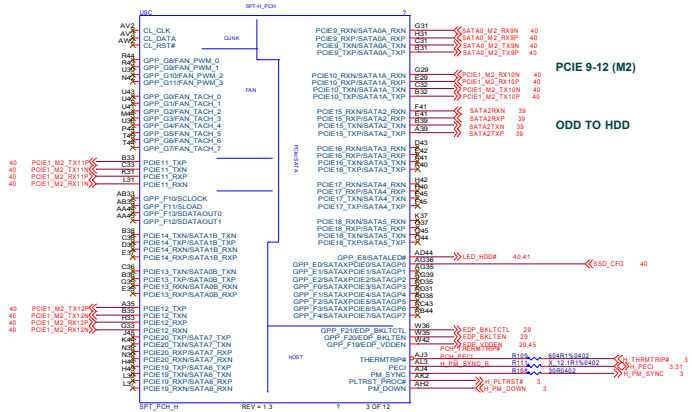
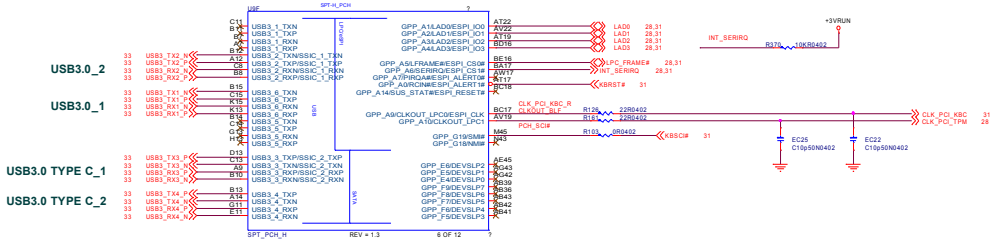


USB			
USB 2.0	USB 3.0	Device	Note
1			NC
2	2	USB 3.0 Port 2	16JD1
3	3	TYPE-C Port 1	16JD1
4	4	TYPE-C Port 2	16JD1
5			NC
6	6	USB 3.0 Port 1	16JD1
7		EPF021	
8		USB 2.0	16JD12
9			NC
10		WLAN	
11		WebCam	
12		CARDREADER	16JD12
13			NC
14			NC





High Speed I/O Ports			
	HM175	C236	Device
1	USB3.0/PCIE	USB3.0/PCIE	WLAN
2	USB3.0/PCIE	USB3.0/PCIE	NC
3	PCIE	USB3.0/PCIE	NC
4	PCIE	USB3.0/PCIE	LAN
5	PCIE	PCIE	NC
6	PCIE	PCIE	NC
7	PCIE	PCIE	NC
8	PCIE	PCIE	NC
9	SATA/PCIE	SATA/PCIE	M.2 SSD
10	SATA/PCIE	SATA/PCIE	
11	PCIE	PCIE	
12	PCIE	PCIE	
13	PCIE	SATA/PCIE	NC
14	PCIE	SATA/PCIE	NC
15	SATA/PCIE	SATA/PCIE	ODD TO HDD
16	SATA/PCIE	SATA/PCIE	NC
17	N/A	SATA/PCIE	NC
18	N/A	SATA/PCIE	NC
19	N/A	SATA/PCIE	NC
20	N/A	SATA/PCIE	NC

MICRO-STAR INT'L CO.,LTD.

Title: PCH 2(USB/SATA/PCIE)

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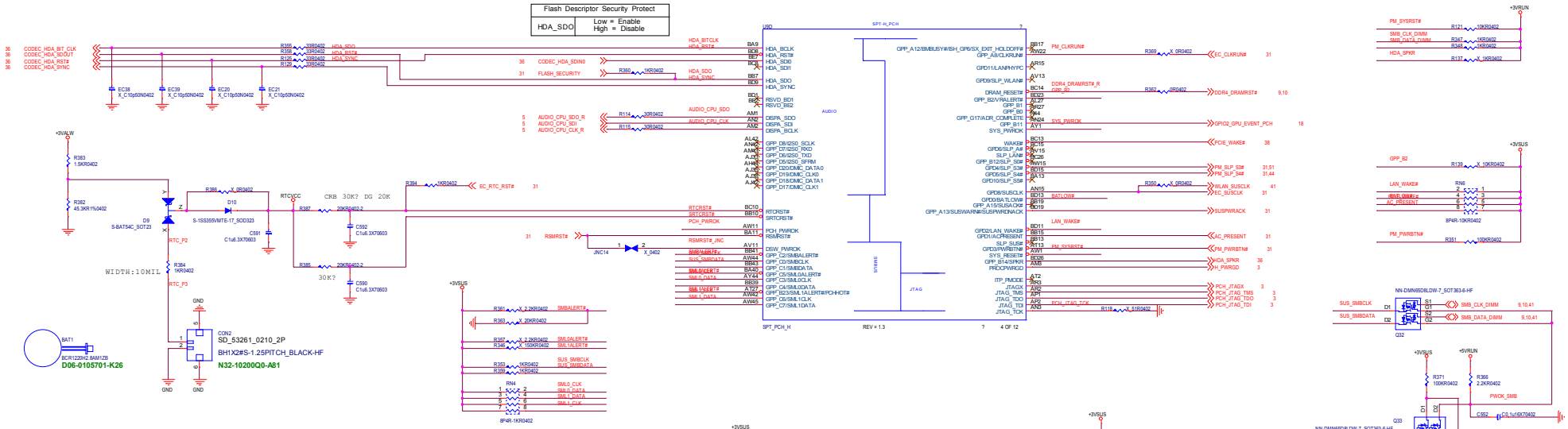

TLS Confidentiality	
SMBALERT#	0 = Disable Intel ME Crypto Transport Layer Security (TLS) cipher suite (no confidentiality).(Default) 1 = Enable Intel ME Crypto Transport Layer Security (TLS) cipher suite (with confidentiality).

eSPI or LPC	
SML0ALERT#	This signal has a weak internal pull-down(20K OHM). 0 = LPC Is selected for EC. (Default) 1 = eSPI Is selected for EC.

SML1ALERT# / PCHHOT# / GPP_B23	
SML1ALERT#	When used as PCHHOT#, a 150k weak board pull-up is recommended to ensure it does not override the internal pull-down strap sampling.

MICRO-STAR INT'L CO.,LTD.

Title: PCH 3(HDA/RTC/SMBUS)

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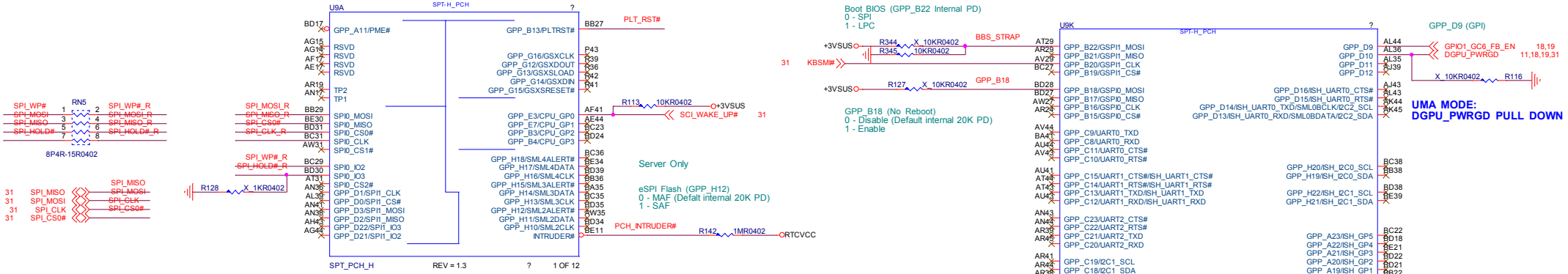

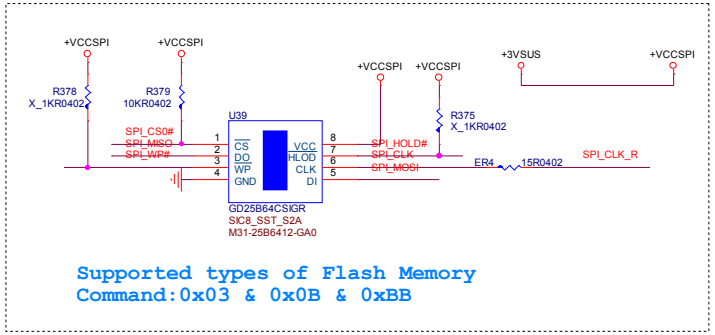

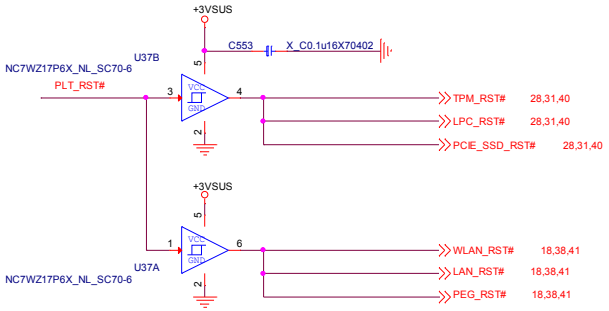

MICRO-STAR INT'L CO.,LTD.			
Title: PCH_4(SPI/GPIO)			
Size: Custom	Document Number: MS-16JD		Rev: 0A
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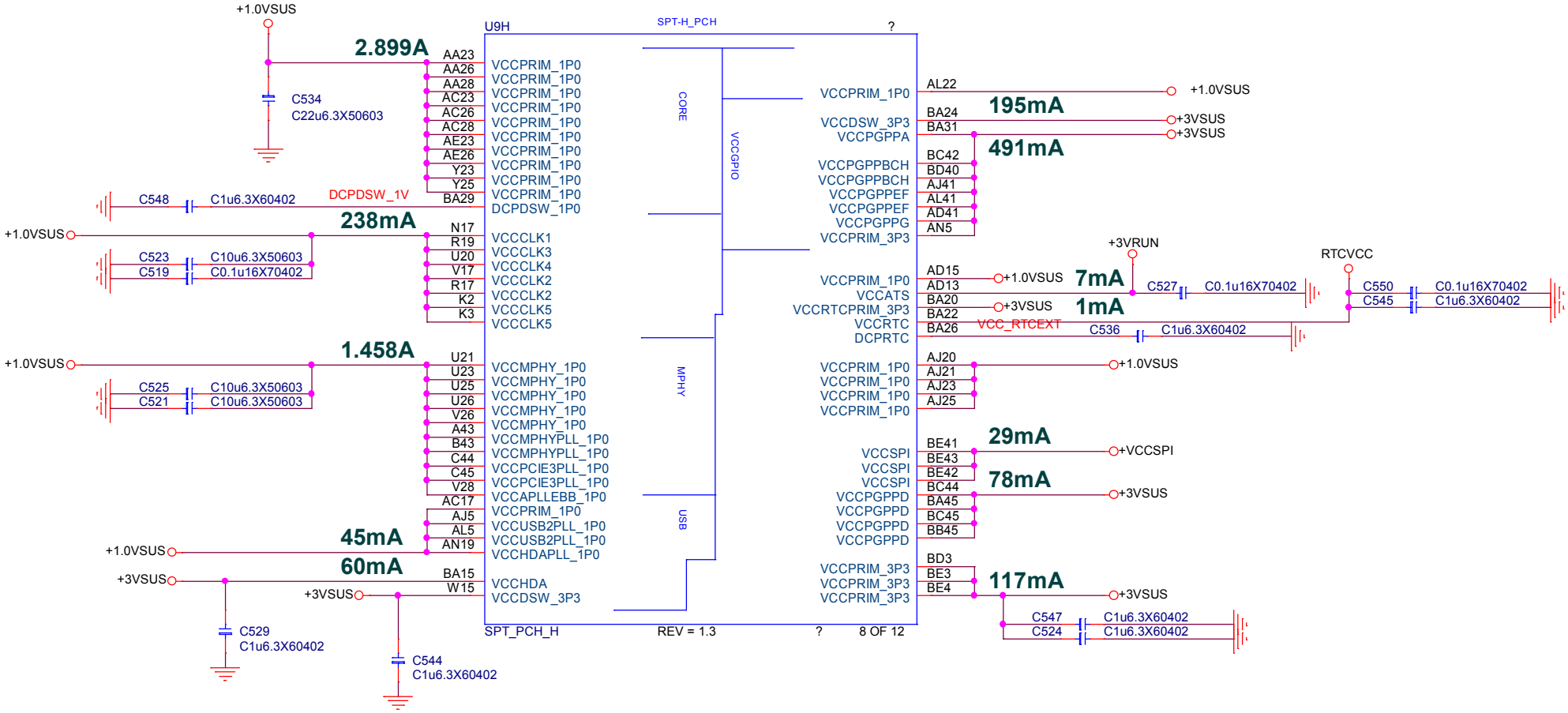

MICRO-STAR INT'L CO.,LTD.

Title: PCH_5(Power1)

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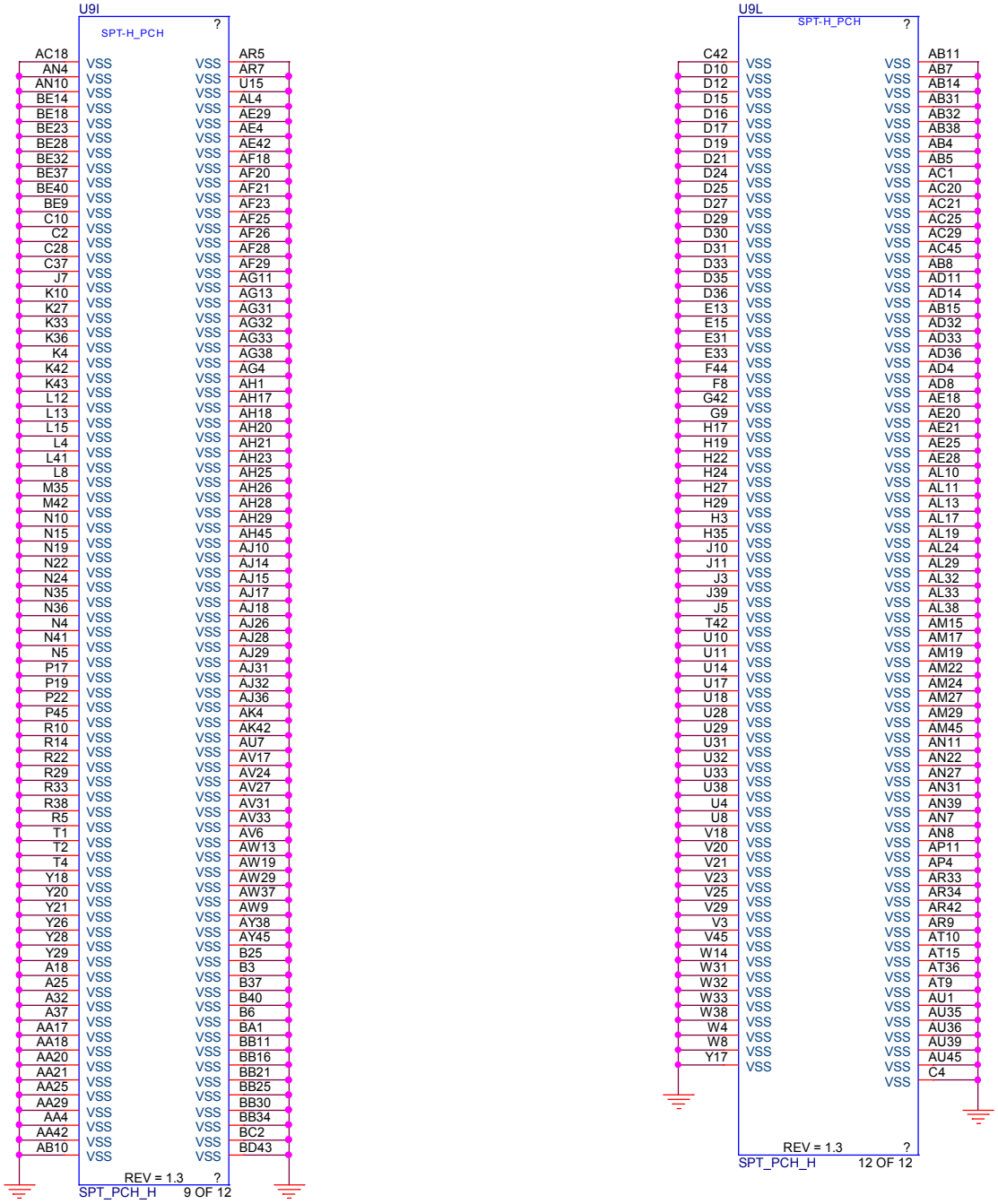

MICRO-STAR INT'L CO.,LTD.

Title: PCH-6 (GND)

Size	Document Number	Rev
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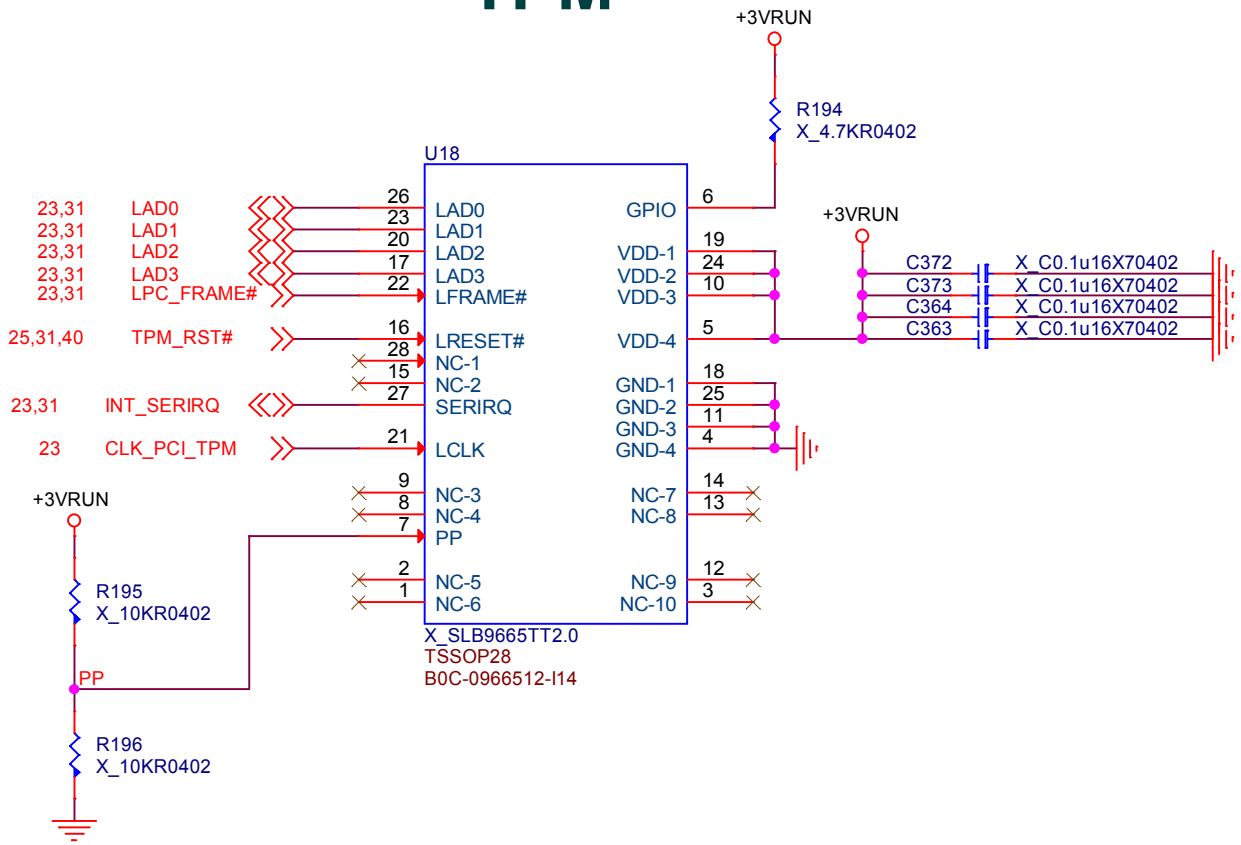
TPM



MICRO-STAR INT'L CO.,LTD.		
Title: TPM		
Size	Document Number: MS-16JD	Rev: 0A
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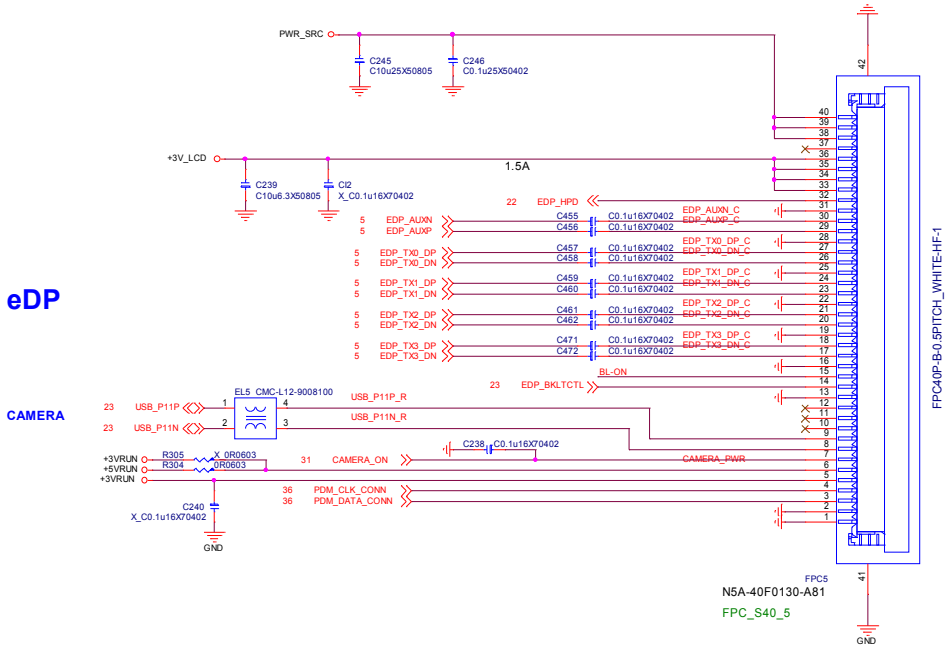

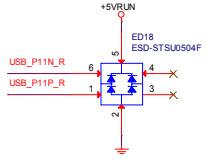

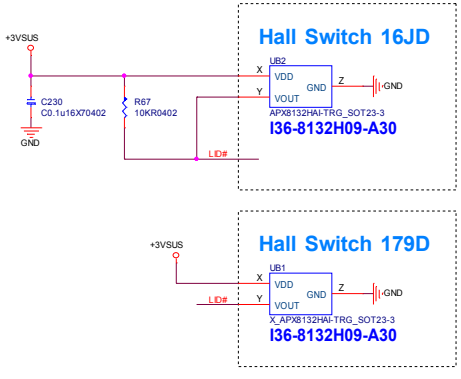

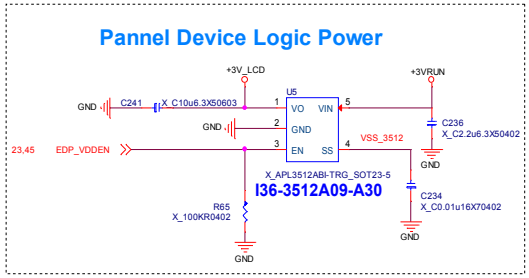

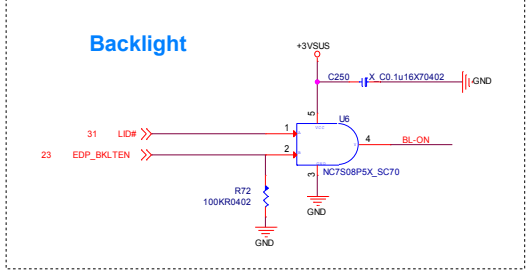

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Title: eDP /Camera		
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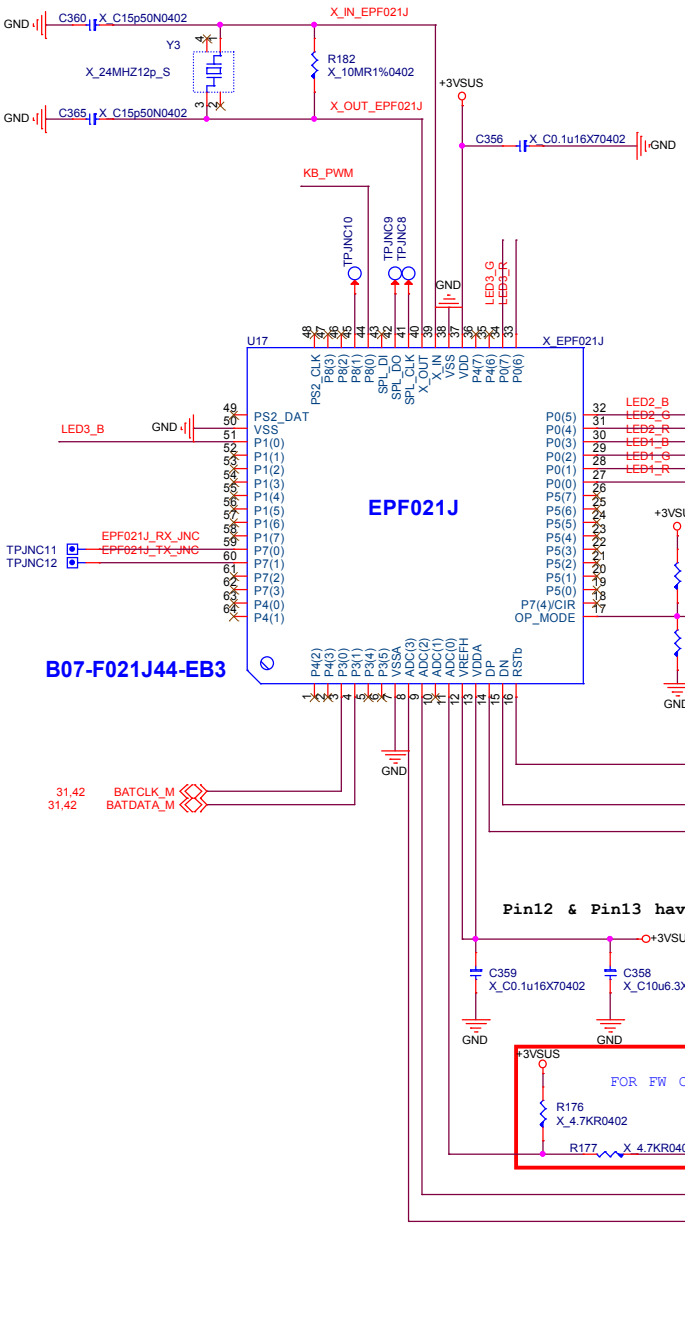
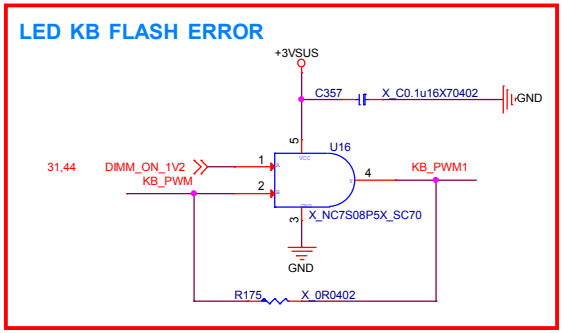
Keyboard LED (EPF021J)

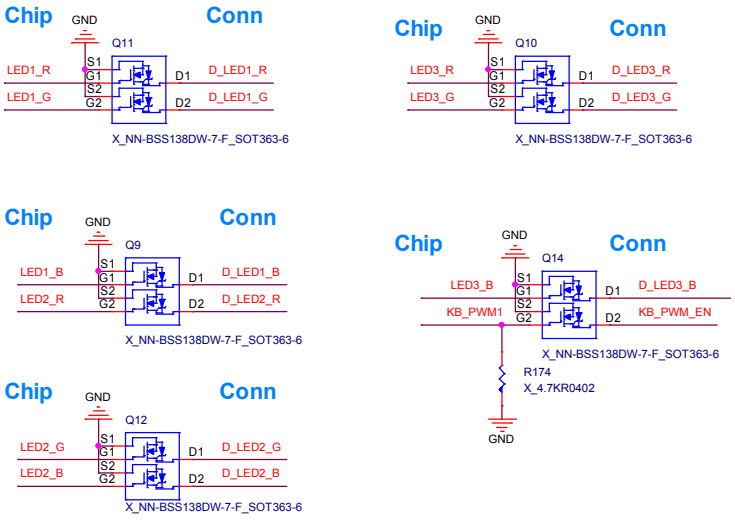
C749 and C750 change to 15pF for SA



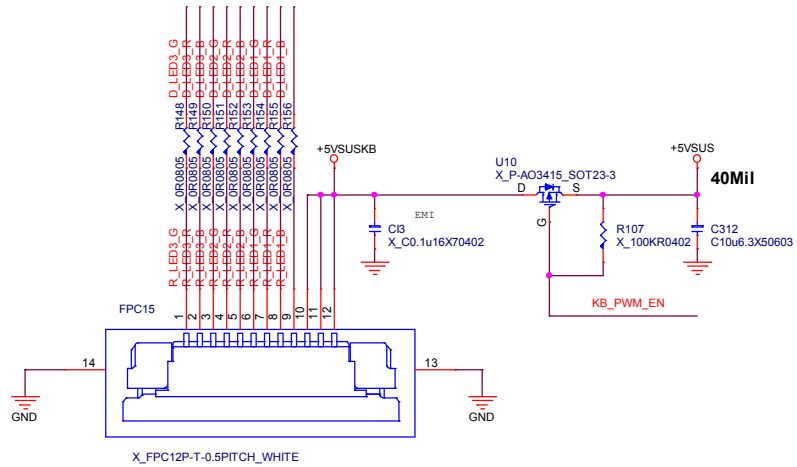
LED KB FLASH ERROR



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

MICRO-STAR INT'L CO.,LTD.

Title: Keyboard LED (EPF021J)

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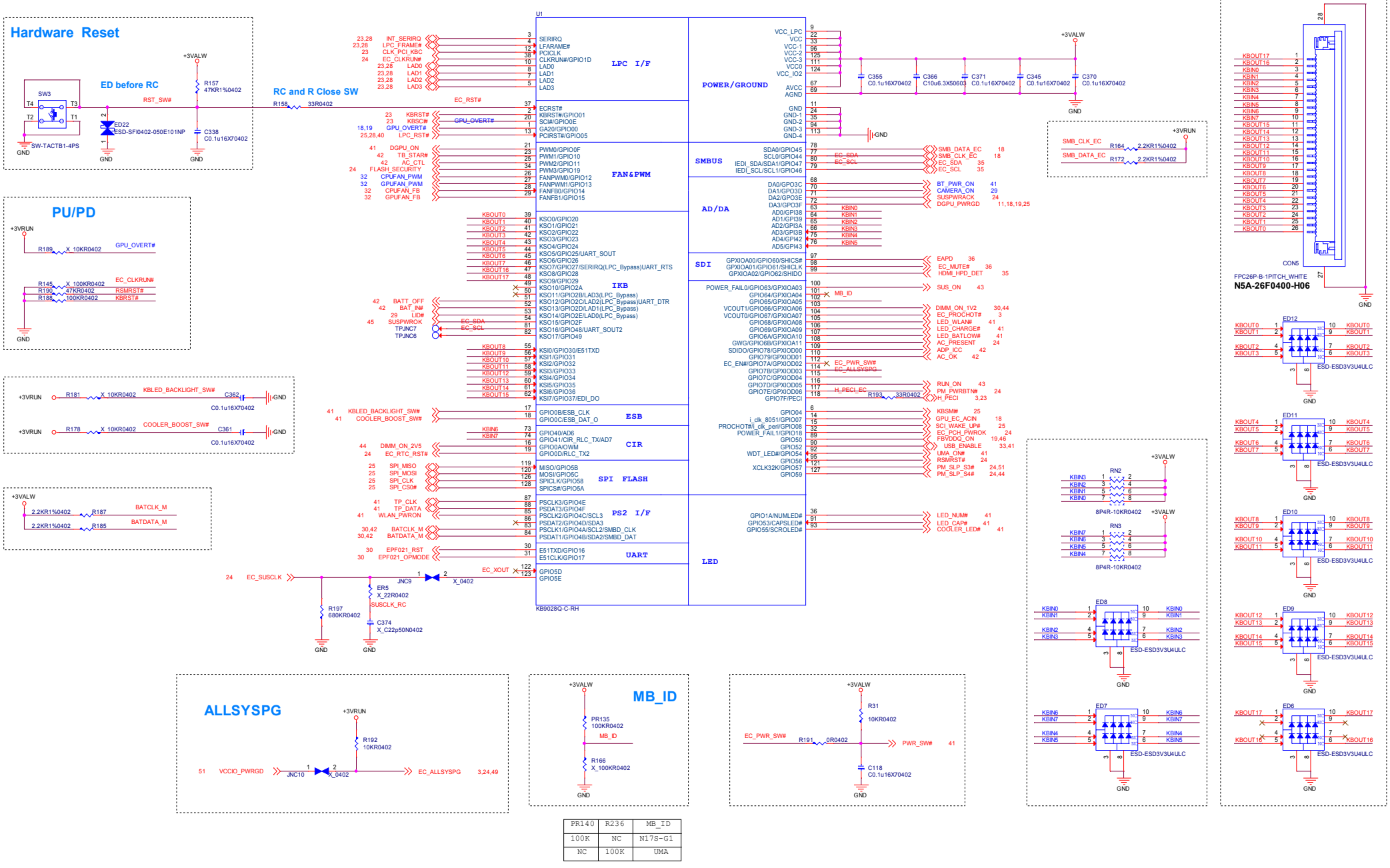
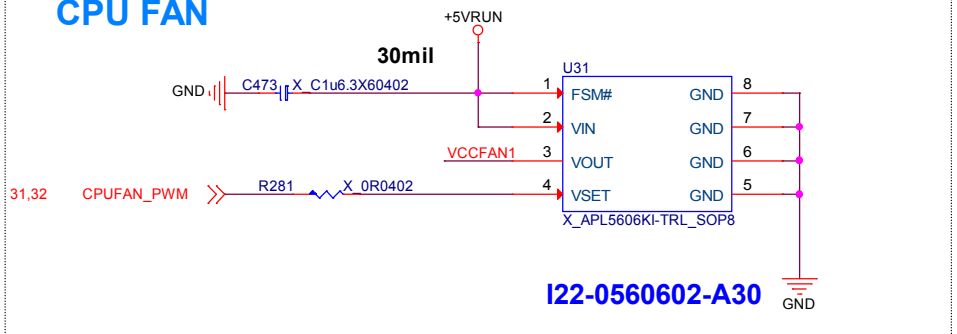
EC (ENE9028)

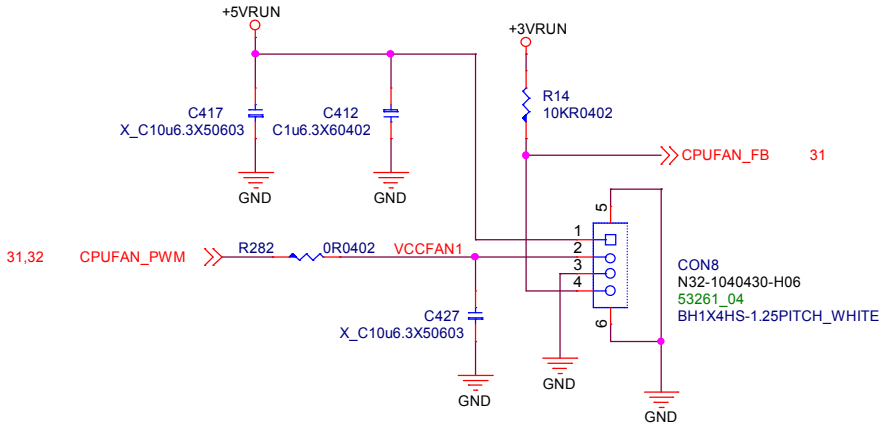


PR140	R236	MB_ID
100K	NC	N17S-G1
NC	100K	UMA

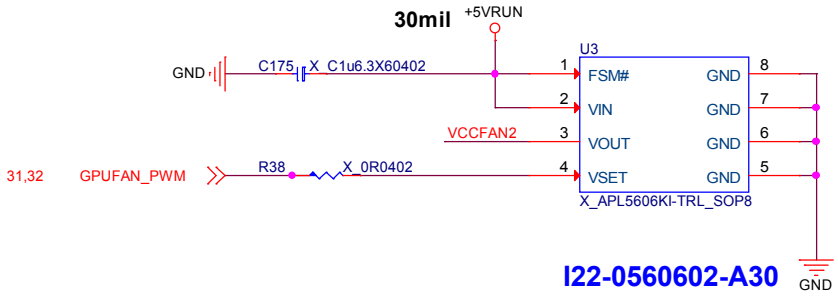
CPU FAN



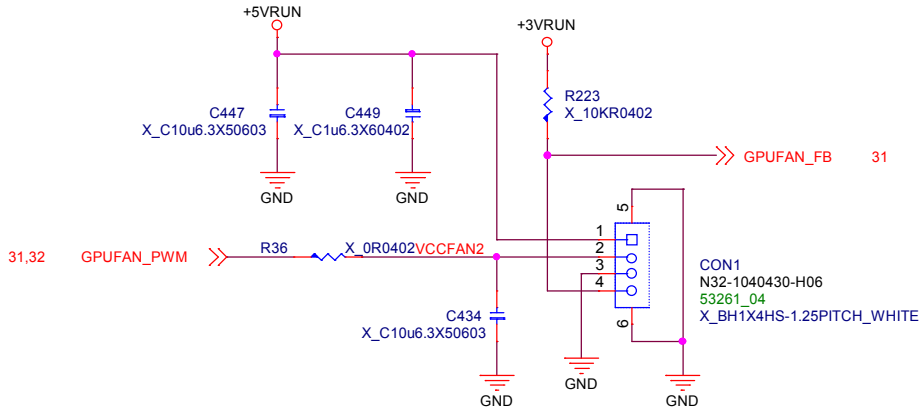
I22-0560602-A30



DGPU FAN



I22-0560602-A30



MICRO-STAR INT'L CO.,LTD.		
Title: FAN		
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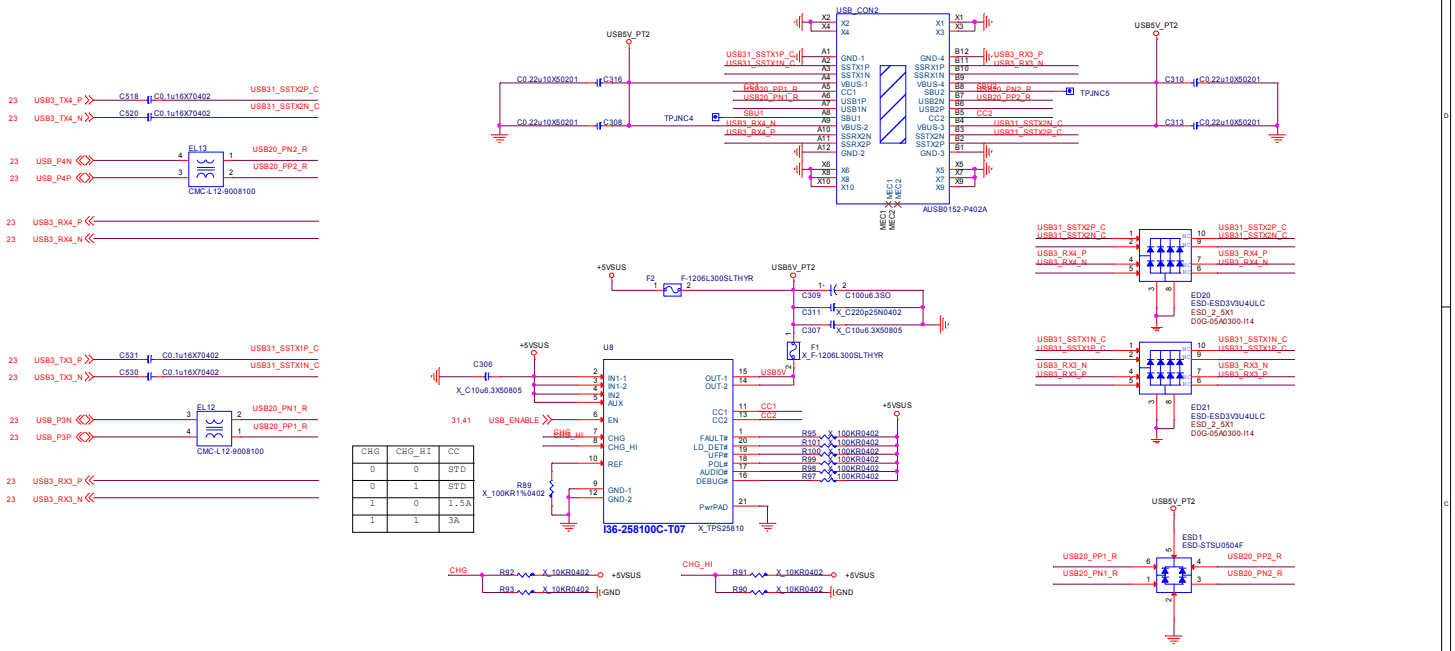
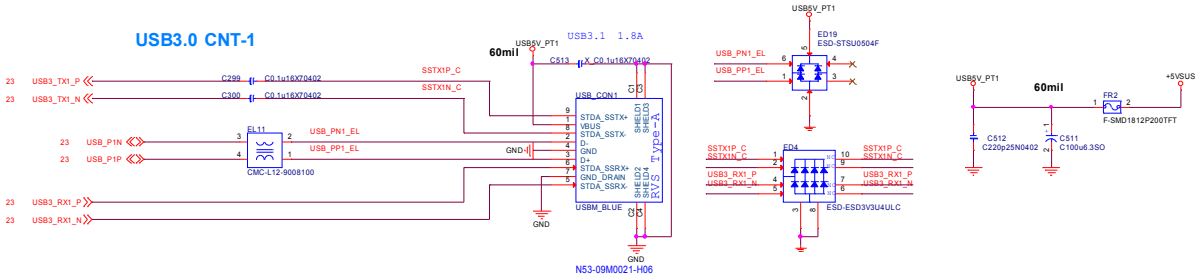
USB 3.0 TYPE_C

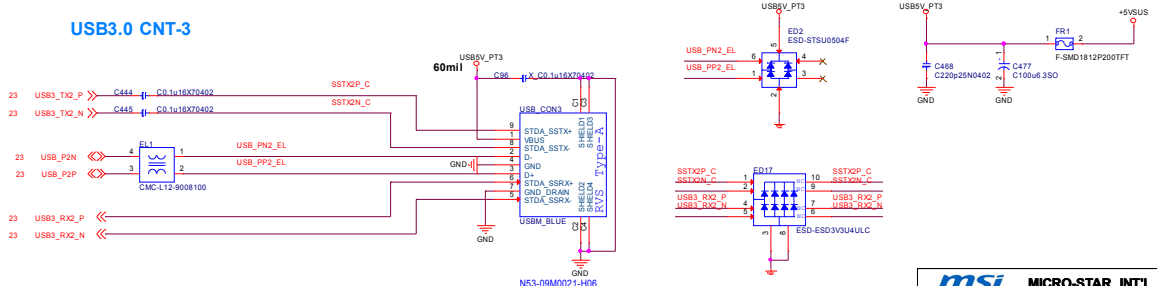


CHG	CHG_HI	CC
0	0	STD
0	1	STD
1	0	1.5A
1	1	3A

USB3.0 CNT-1



USB3.0 CNT-3



	MICRO-STAR INT'L CO.,LTD.	
Title	USB 3.0/USB TYPE-C	
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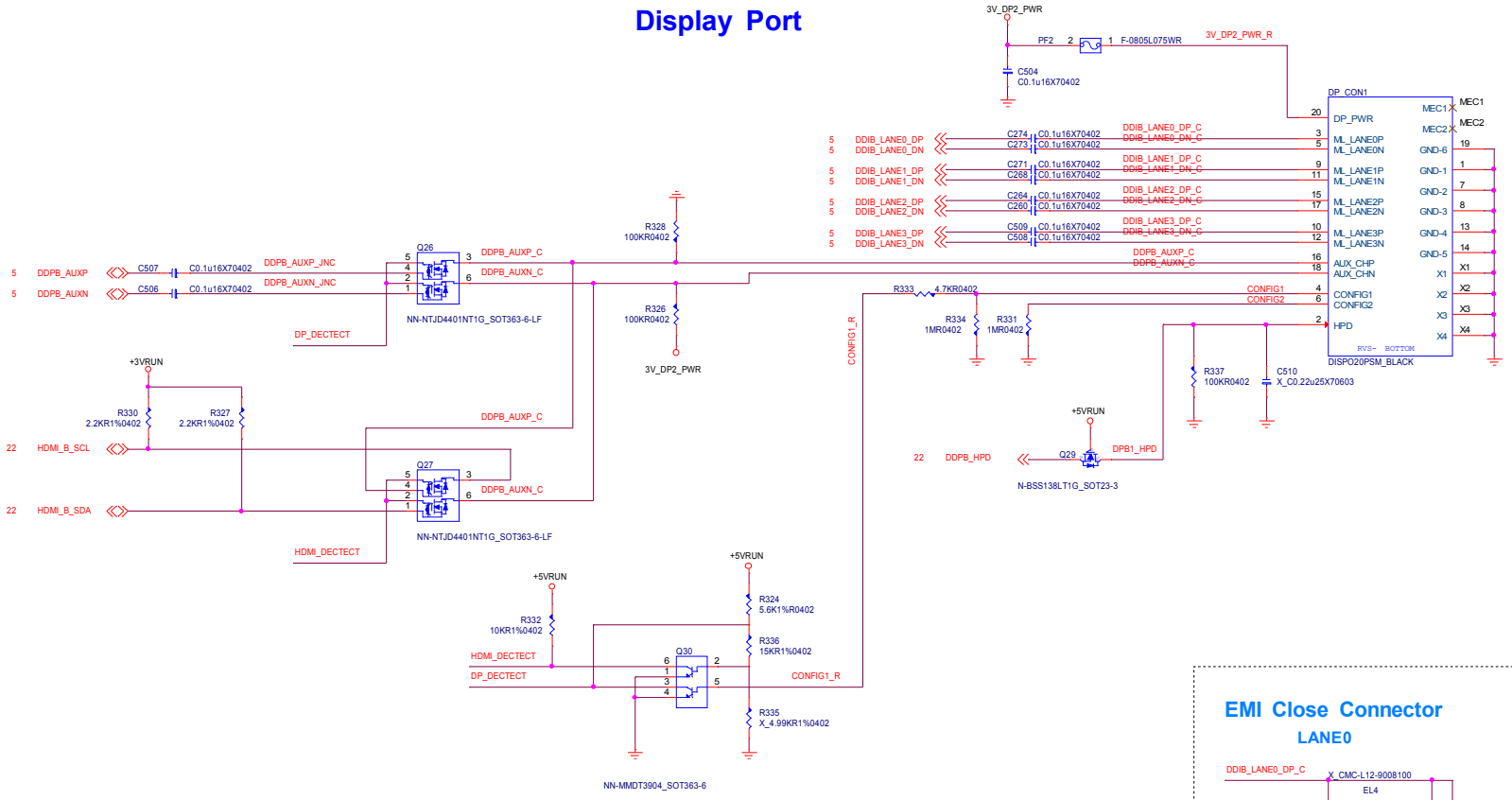
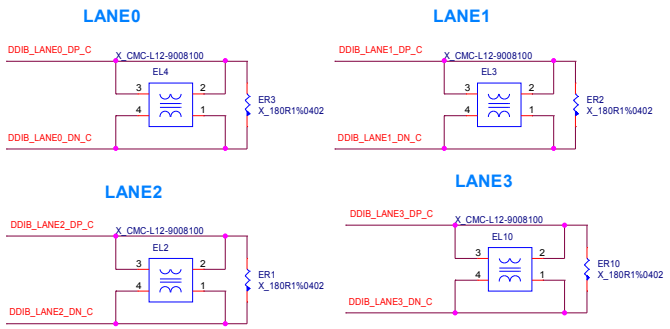
Display Port



EMI Close Connector



msi MICRO-STAR INT'L CO.,LTD.		
Title: DP		
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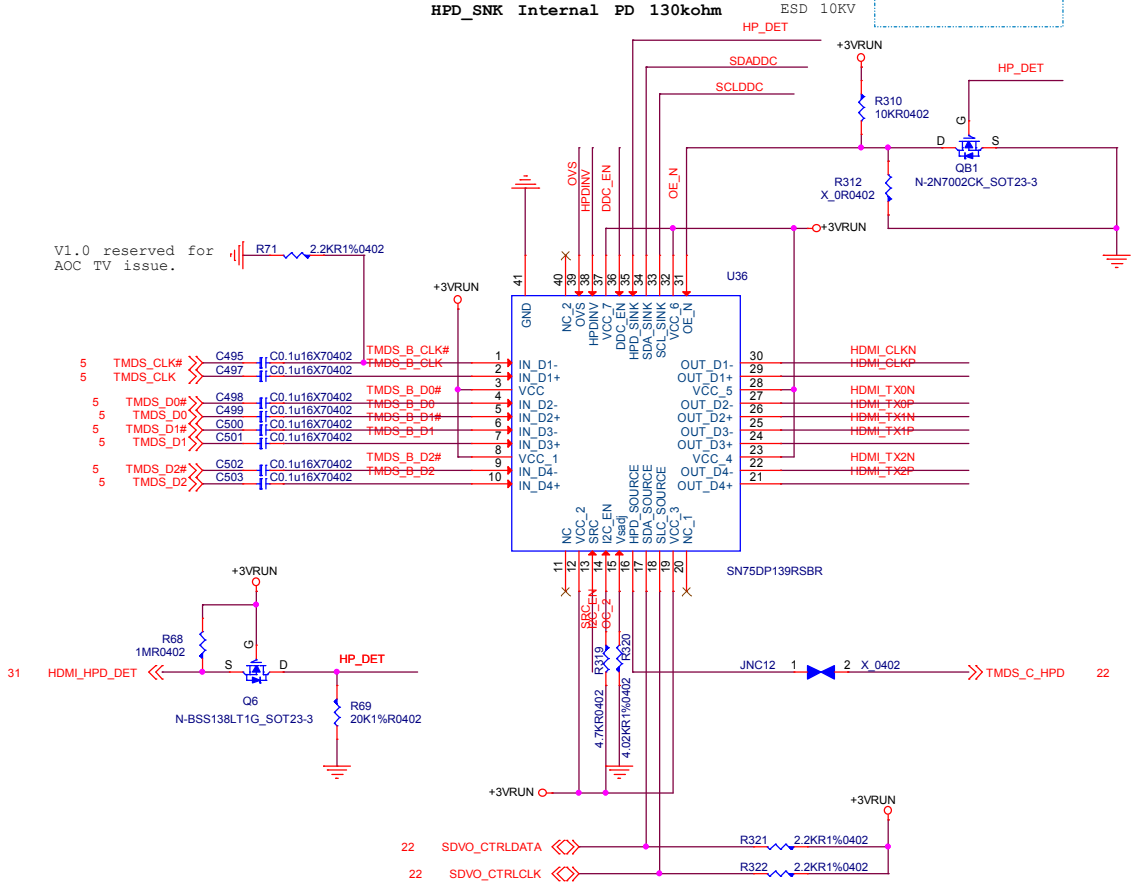
HDMI Level Shifter

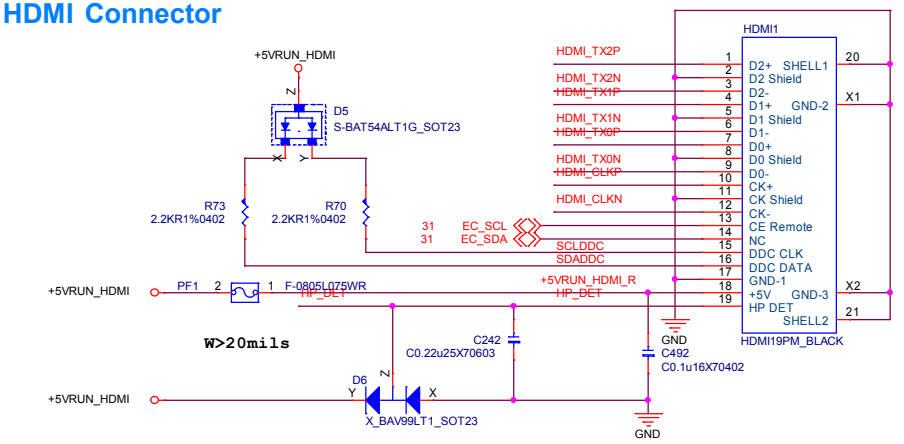
HP_DET
PLUGGED 5V
UNPLUGGED 0V

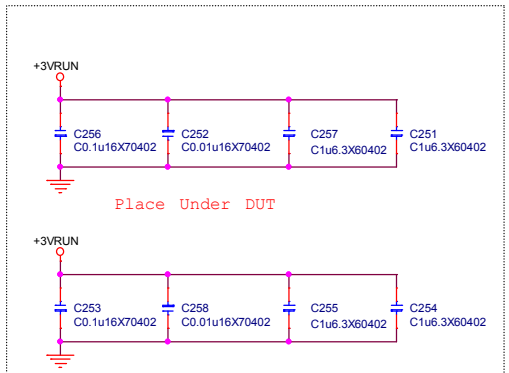
HPD_SNK Internal PD 130kohm ESD 10KV

V1.0 reserved for AOC TV issue.

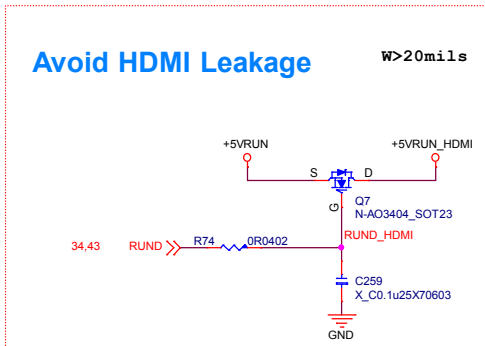


HDMI Connector

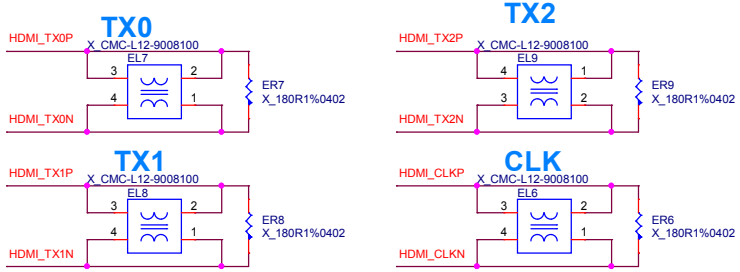


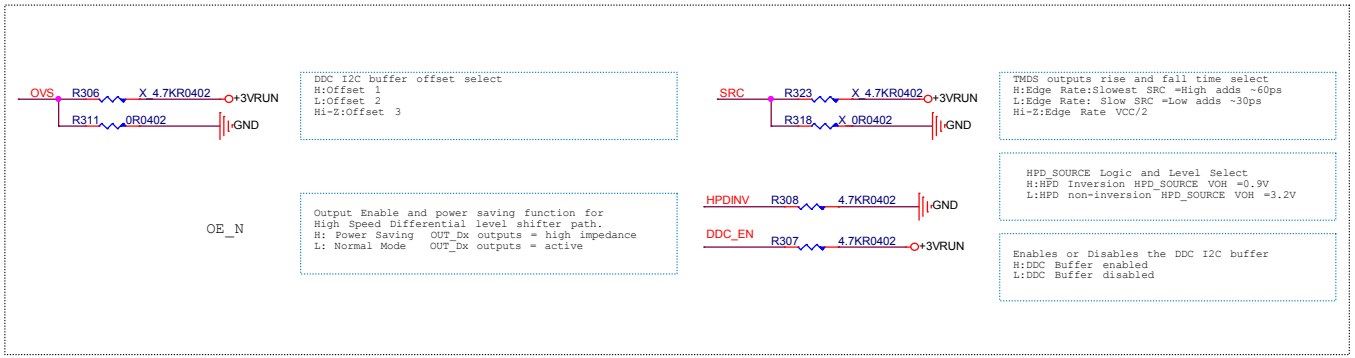


Avoid HDMI Leakage



EMI Close Connector





MICRO-STAR INT'L CO.,LTD.

Title	HDMI DP139	
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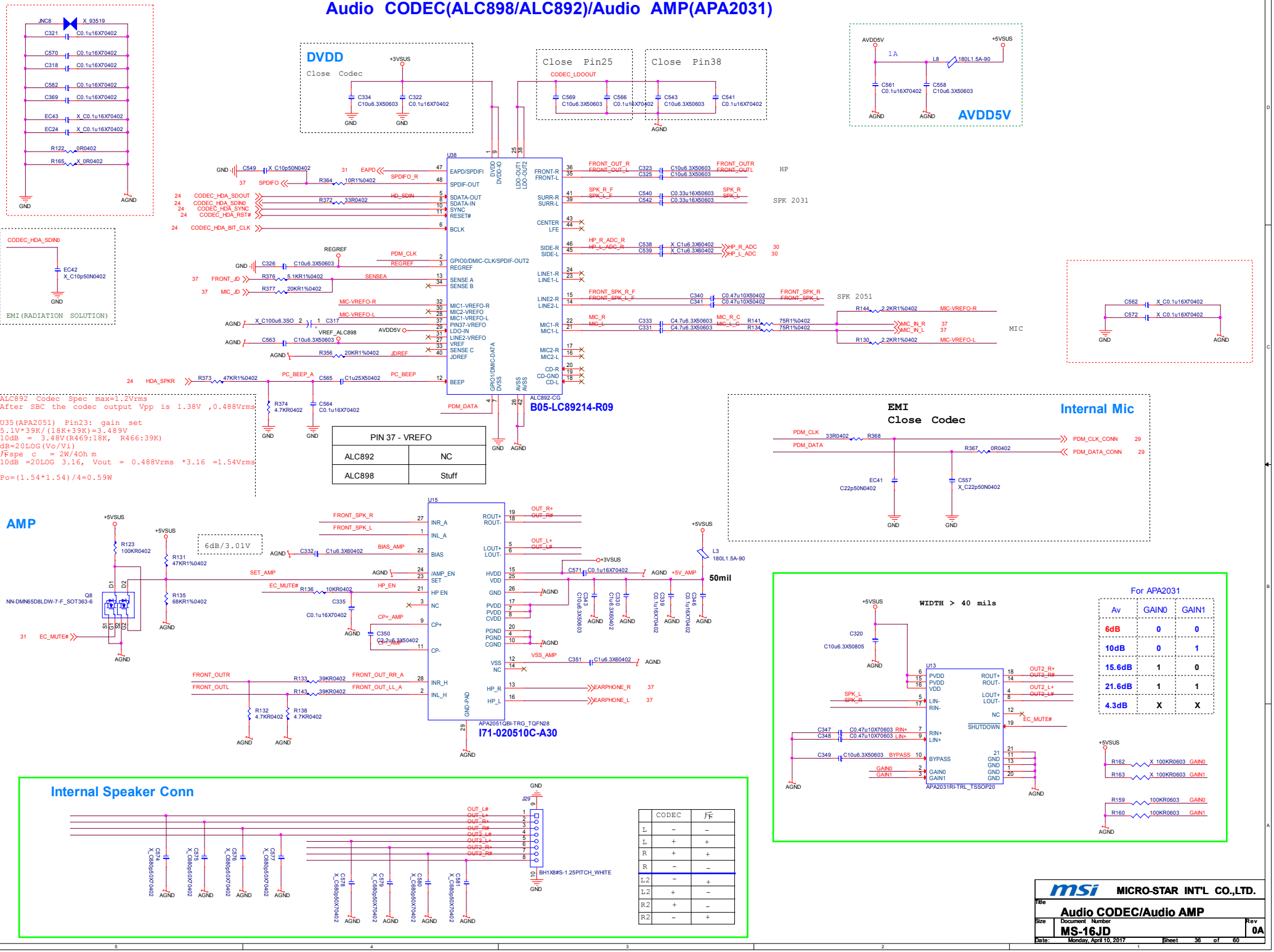
Audio CODEC(ALC898/ALC892)/Audio AMP(APA2031)



ALC892 Codec Spec max=1.2Vrms
After SBC the codec output Vpp is 1.38V ,0.488Vrms

U35(APA2051) Pin23: gain set
5.1V*39K/(18K+39K)=3.489V
10dB = 3.48V(R469:18K, R466:39K)
dB=20LOG(Vo/Vi)
功率 = 2W/4Ohm
10dB =20LOG 3.16, Vout = 0.488Vrms *3.16 =1.54Vrms

Po=(1.54*1.54)/4=0.59W

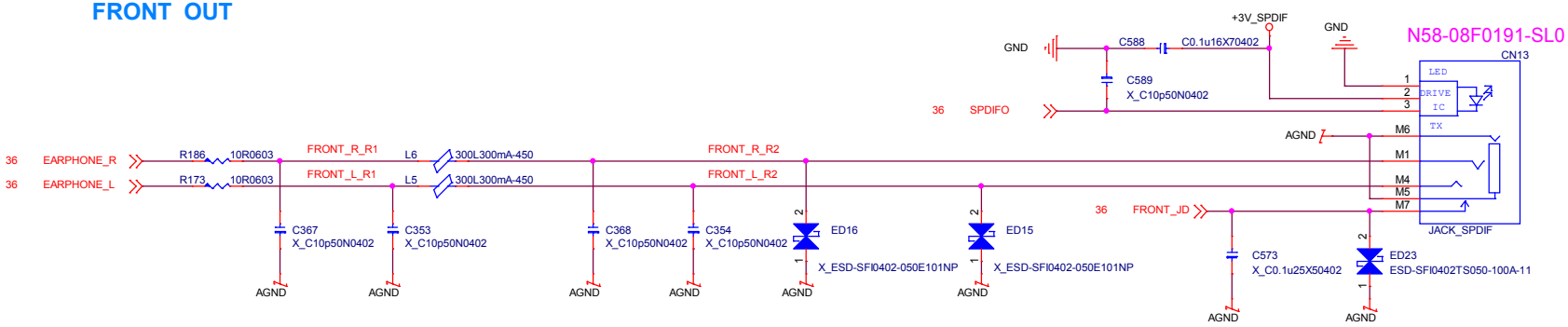
PIN 37 - VREFO	
ALC892	NC
ALC898	Stuff

	CODEC	功率
L	-	-
L	+	+
R	+	+
R	-	-
L2	-	+
L2	+	-
R2	+	-
R2	-	+

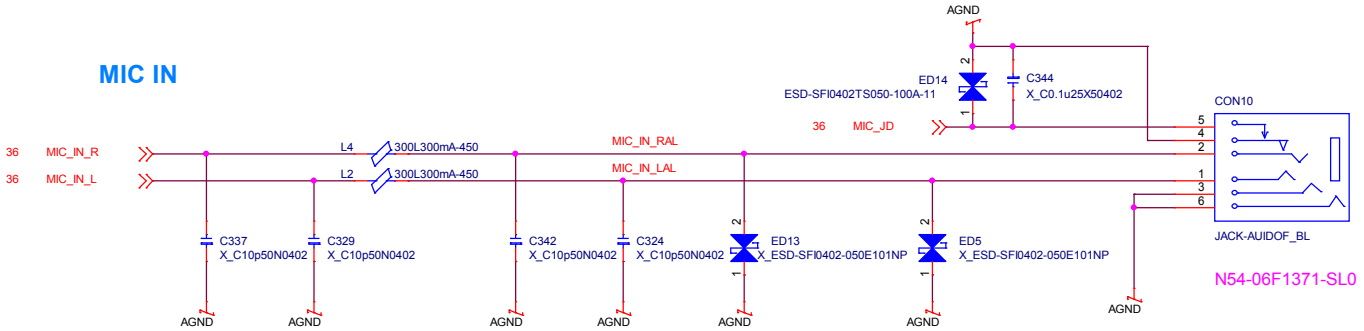
For APA2031		
Av	GAIN0	GAIN1
6dB	0	0
10dB	0	1
15.6dB	1	0
21.6dB	1	1
4.3dB	X	X

Audio CONN

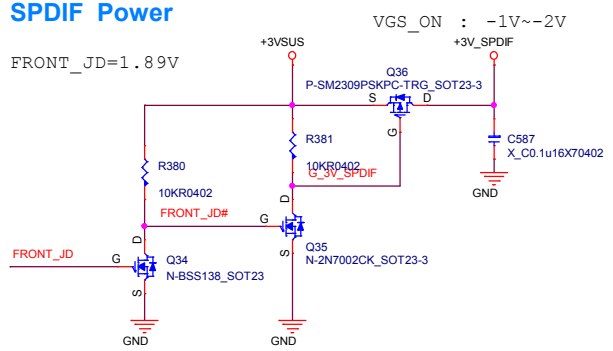
FRONT OUT



MIC IN



SPDIF Power



MICRO-STAR INT'L CO.,LTD.		
Title: Audio CONN		
Size	Document Number: MS-16JD	Rev: 0A
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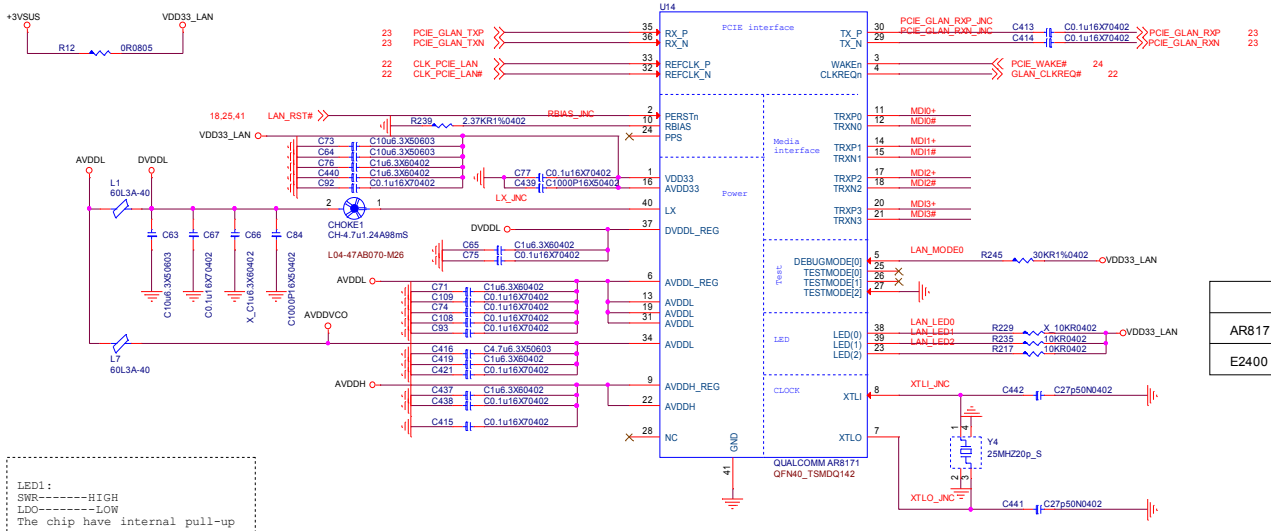
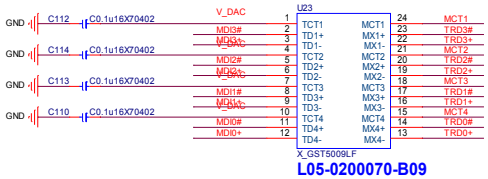
GIGA LAN(BFN2400/AR8171)



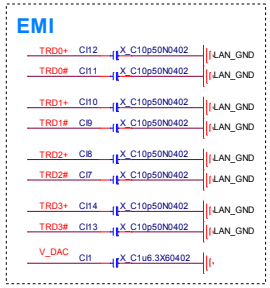
PIN 38 (LAN_LED0)	
AR8171	NC
E2400	Stuff

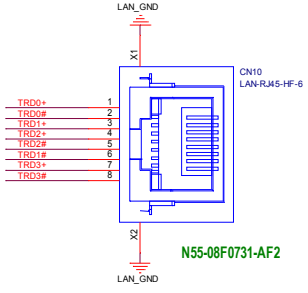
```
LED1:
SWR-------HIGH
LDO--------LOW
The chip have internal pull-up


LED2:
25MHz--------HIGH
48MHz---------LOW
The chip have internal pull-up
```

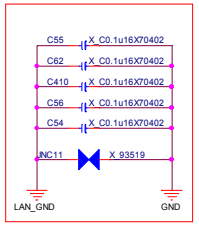


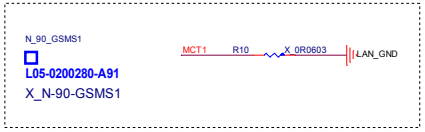
L05-0200070-B09

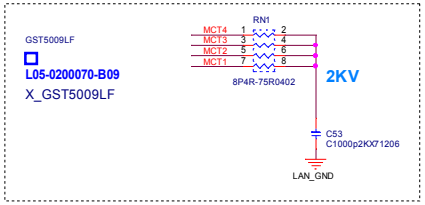




N55-08F0731-AF2







msi	MICRO-STAR INT'L CO.,LTD.		
Title	GIGA LAN(BFN2400/AR8171)		
Size	Document Number		Rev
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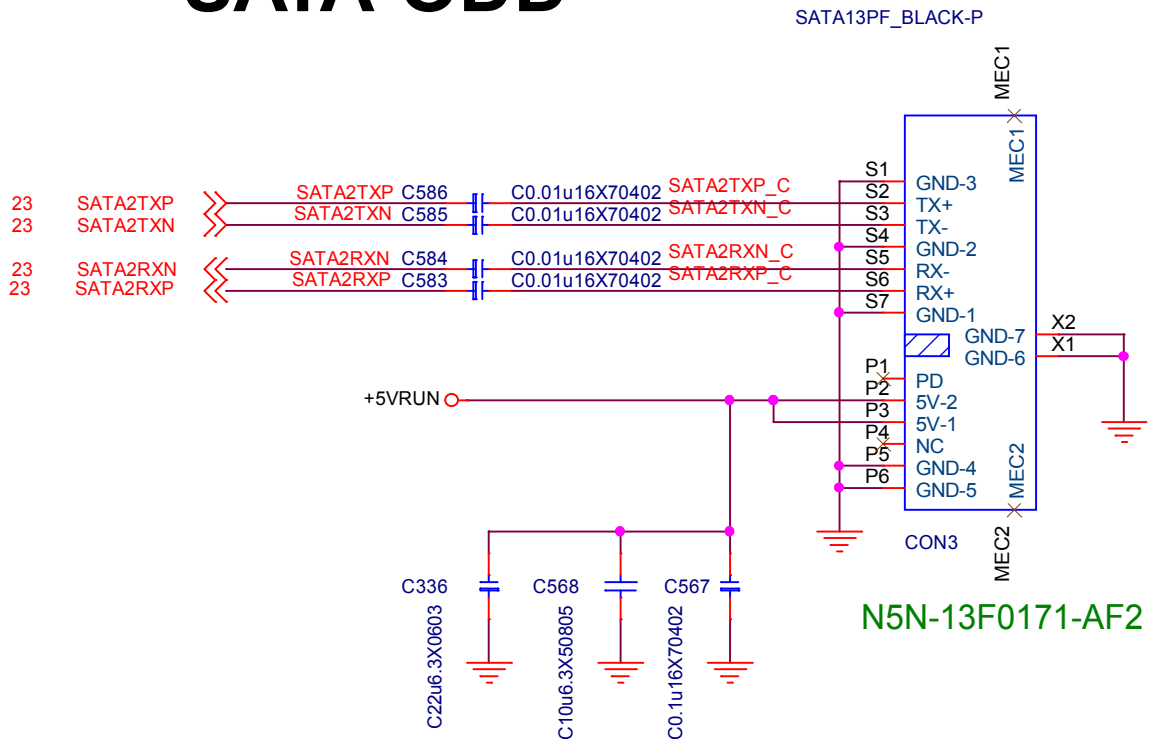
SATA ODD



Title: ODD		
Size: A	Document Number: MS-16ID	Rev: 0A
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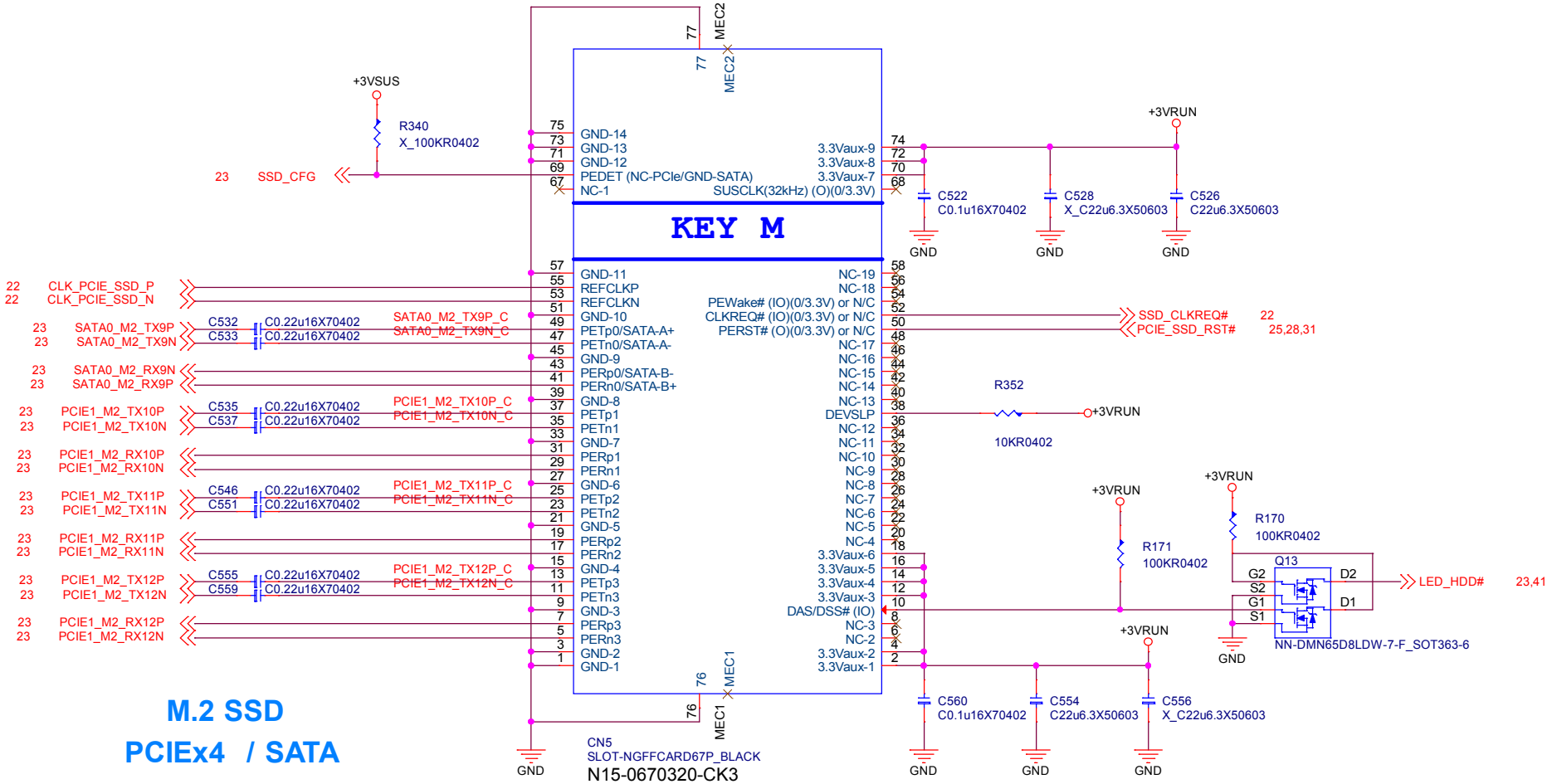
SSD



M.2 SSD

PCIEx4 / SATA

MICRO-STAR INT'L CO.,LTD.		
Title: SSD		
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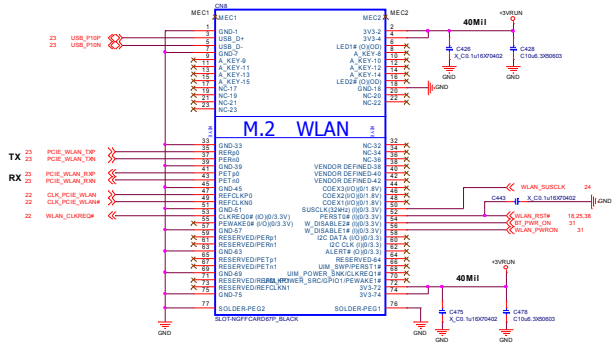
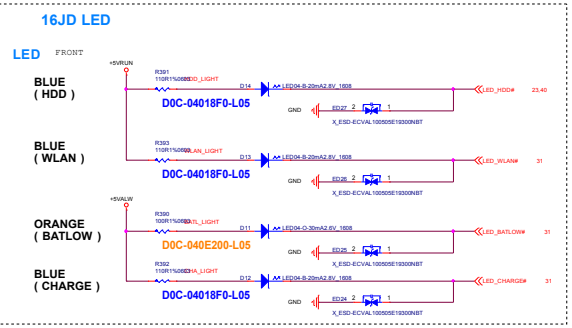
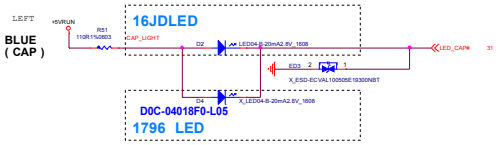
WLAN



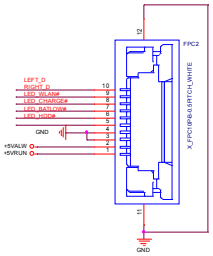
Pin 1	GND		
Pin 3	USB_D+	Pin 2	3.3V
Pin 5	USB_D-	Pin 4	3.3V
Pin 7	GND	Pin 6	LED1#
Pin 9	Module Key	Pin 8	Module Key
Pin 11	Module Key	Pin 10	Module Key
Pin 13	Module Key	Pin 12	Module Key
Pin 15	Module Key	Pin 14	Module Key
Pin 17	N/C	Pin 16	LED2#
Pin 19	N/C	Pin 18	GND
Pin 21	N/C	Pin 20	N/C
Pin 23	N/C	Pin 22	N/C
Pin 25	Module Key	Pin 24	Module Key
Pin 27	Module Key	Pin 26	Module Key
Pin 29	Module Key	Pin 28	Module Key
Pin 31	Module Key	Pin 30	Module Key
Pin 33	GND	Pin 32	N/C
Pin 35	PERP0	Pin 34	N/C
Pin 37	PERN0	Pin 36	N/C
Pin 39	GND	Pin 38	Clink Reset (I 3.3V)
Pin 41	PETP0	Pin 40	N/C
Pin 43	PETN0	Pin 42	N/C
Pin 45	GND	Pin 44	N/C
Pin 47	REFCLKP0	Pin 46	N/C
Pin 49	REFCLKN0	Pin 48	N/C
Pin 51	GND	Pin 50	N/C (SUSCLK (32kHz) for DSx)
Pin 53	CLKREQ0#	Pin 52	PERST0#
Pin 55	PEWAKE0#	Pin 54	BT_EN (W_DISABLE2#)
Pin 57	GND	Pin 56	WLAN_EN (W_DISABLE2#)
Pin 59	N/C	Pin 58	N/C
Pin 61	N/C	Pin 60	N/C
Pin 63	GND	Pin 62	N/C
Pin 65	N/C	Pin 64	Resever
Pin 67	N/C	Pin 66	N/C
Pin 69	GND	Pin 68	N/C
Pin 71	N/C	Pin 70	N/C
Pin 73	N/C	Pin 72	3.3V
Pin 75	GND	Pin 74	3.3V

16JD LED

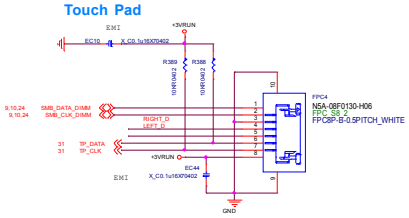




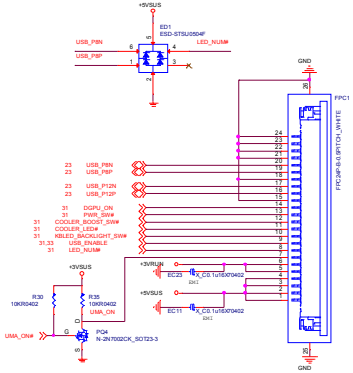
To 179DB (LED / TP Switch Board)



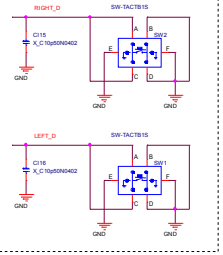
Touch Pad



To 16J12 (Power Board/USB2.0/Card Reader Board)



16JD Touch Pad Switch



msi	MICRO-STAR INT'L CO.,LTD.		
Title	WLAN/LED/TP		
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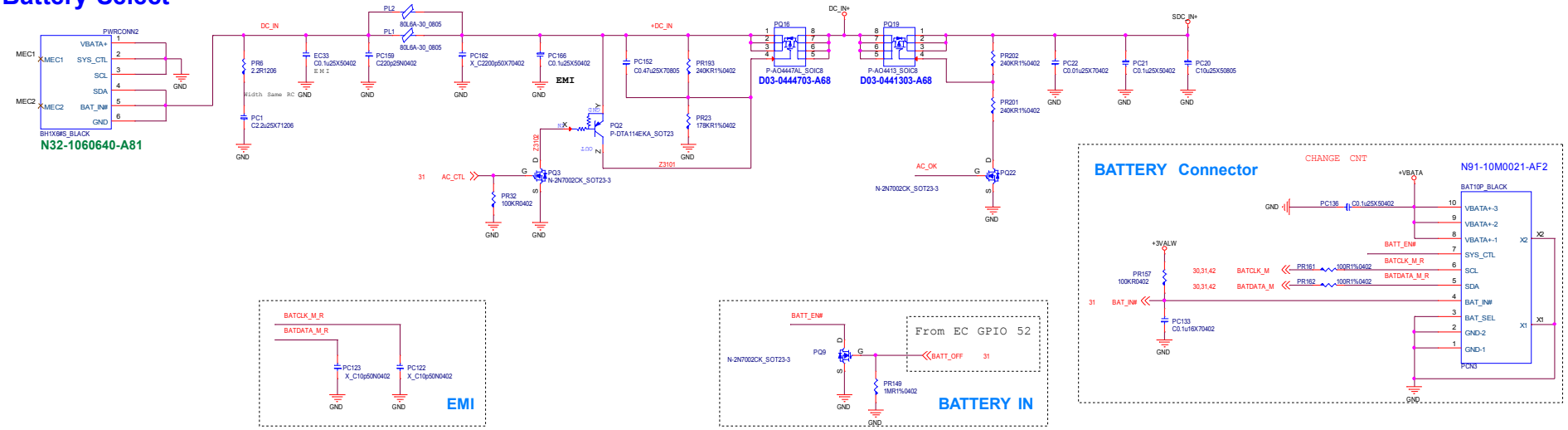
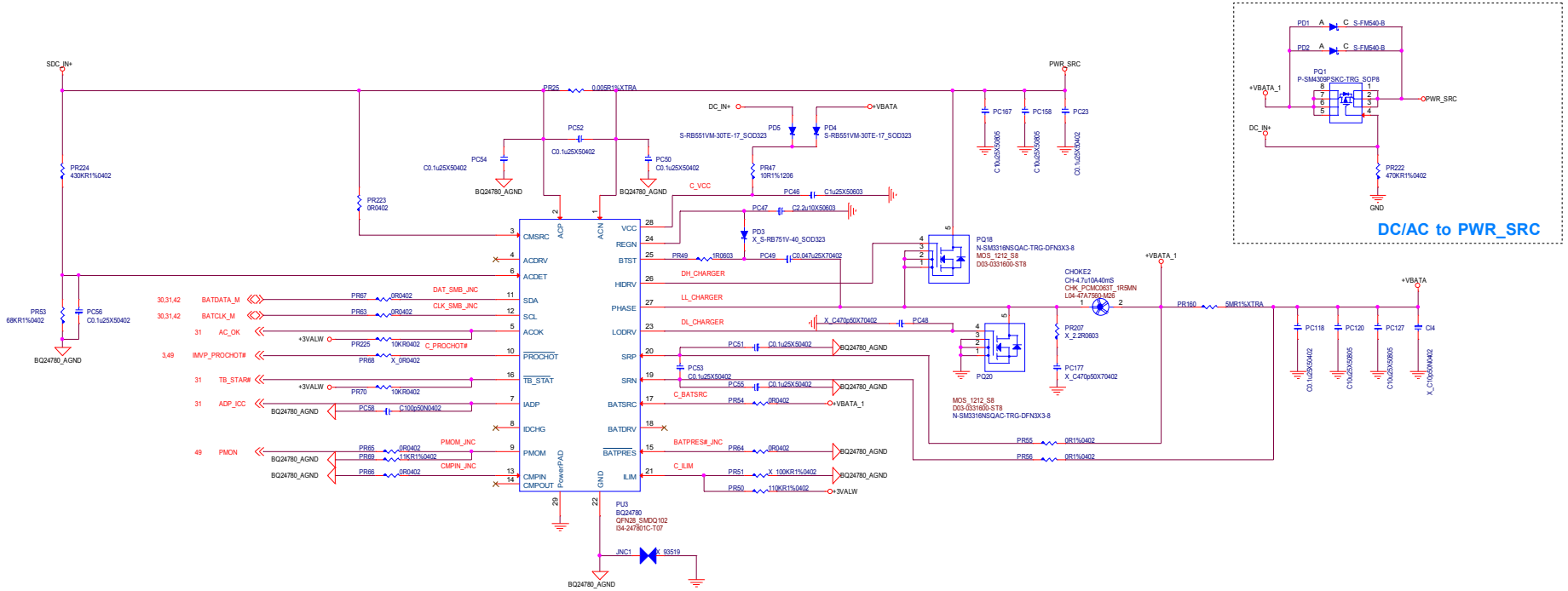
Battery Select/Charger

Battery Select



Battery Charger



MICRO-STAR INT'L CO.,LTD.

Title: Battery Select/Charger

Size: | Document Number: MS-16JD | Rev: 0A

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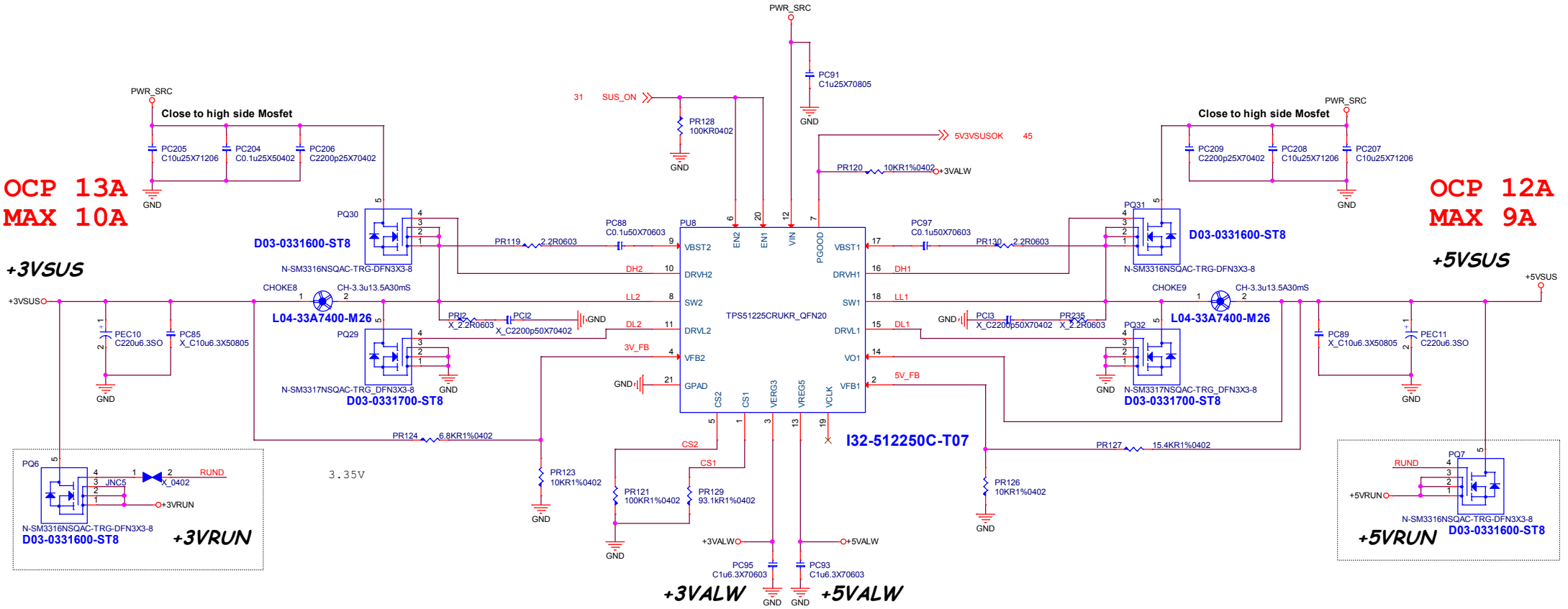
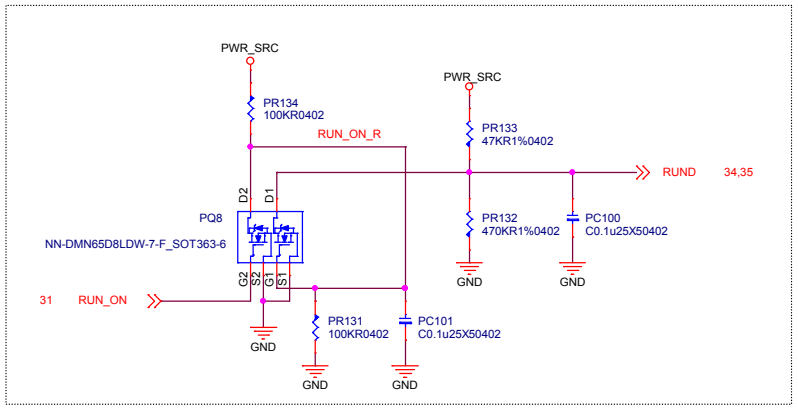
System Power





MICRO-STAR INT'L CO.,LTD.			
Title: System Power			
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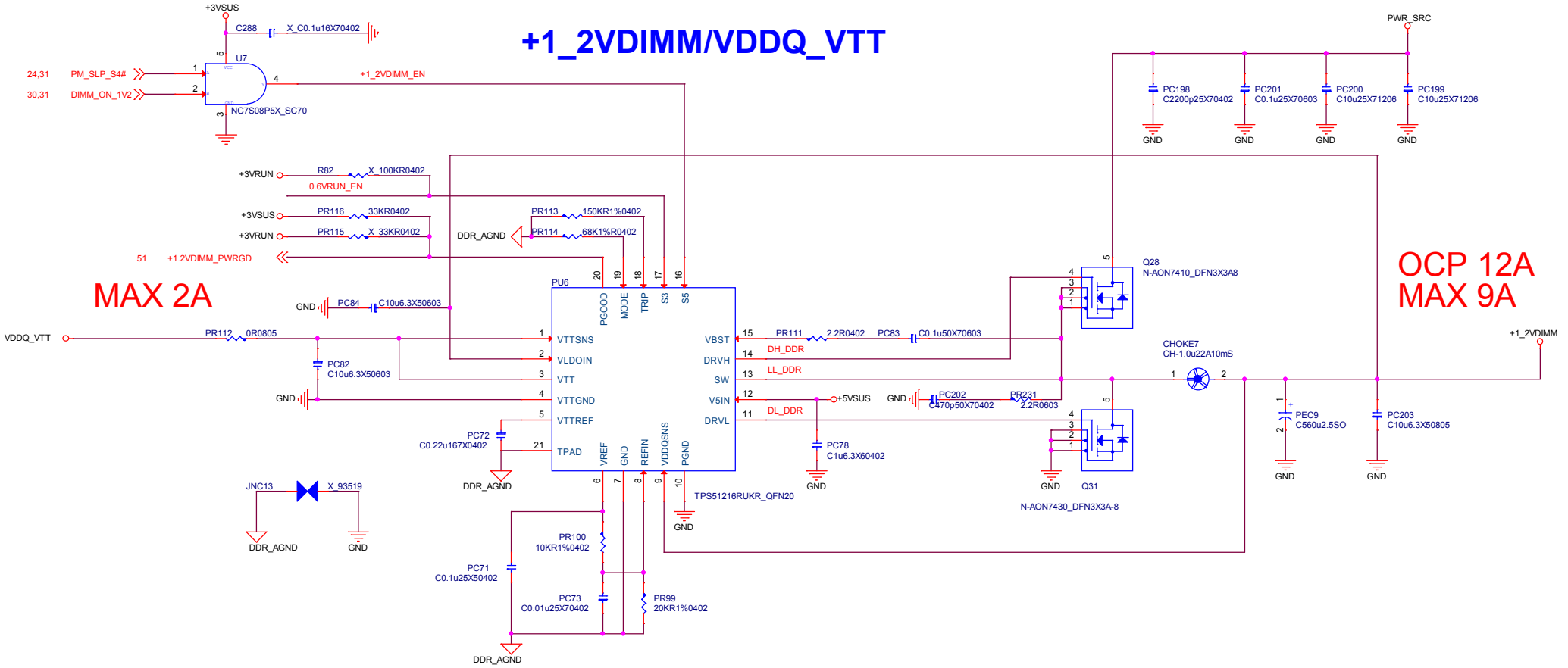
+1_2VDIMM/VDDQ_VTT



+2.5V_MEM

MICRO-STAR INT'L CO.,LTD.		
Title: +1.2VDIMM/VDDQ_VTT/+2.5VMEM		
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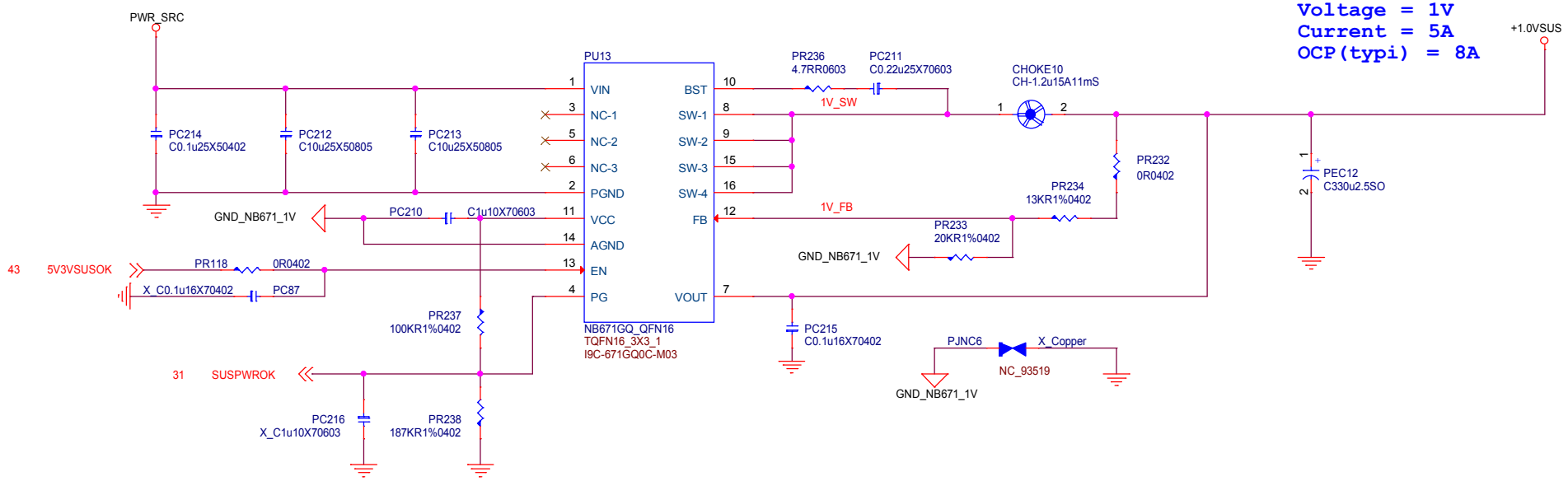
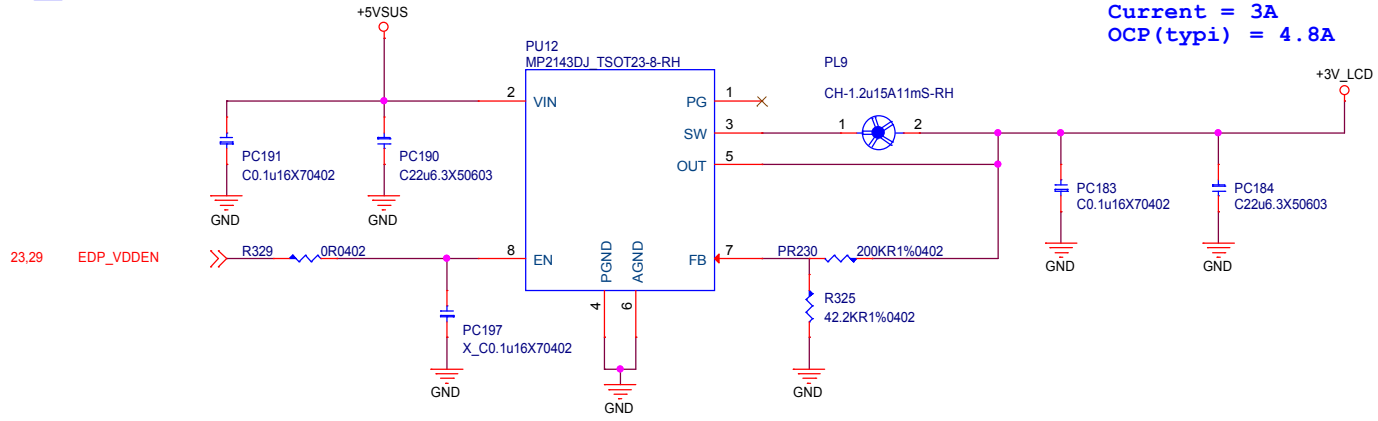
+1VSUS



+3V_LCD

Pannel Device Logic Power



MICRO-STAR INT'L CO.,LTD.		
Title: 1VSUS / +3V_LCD		
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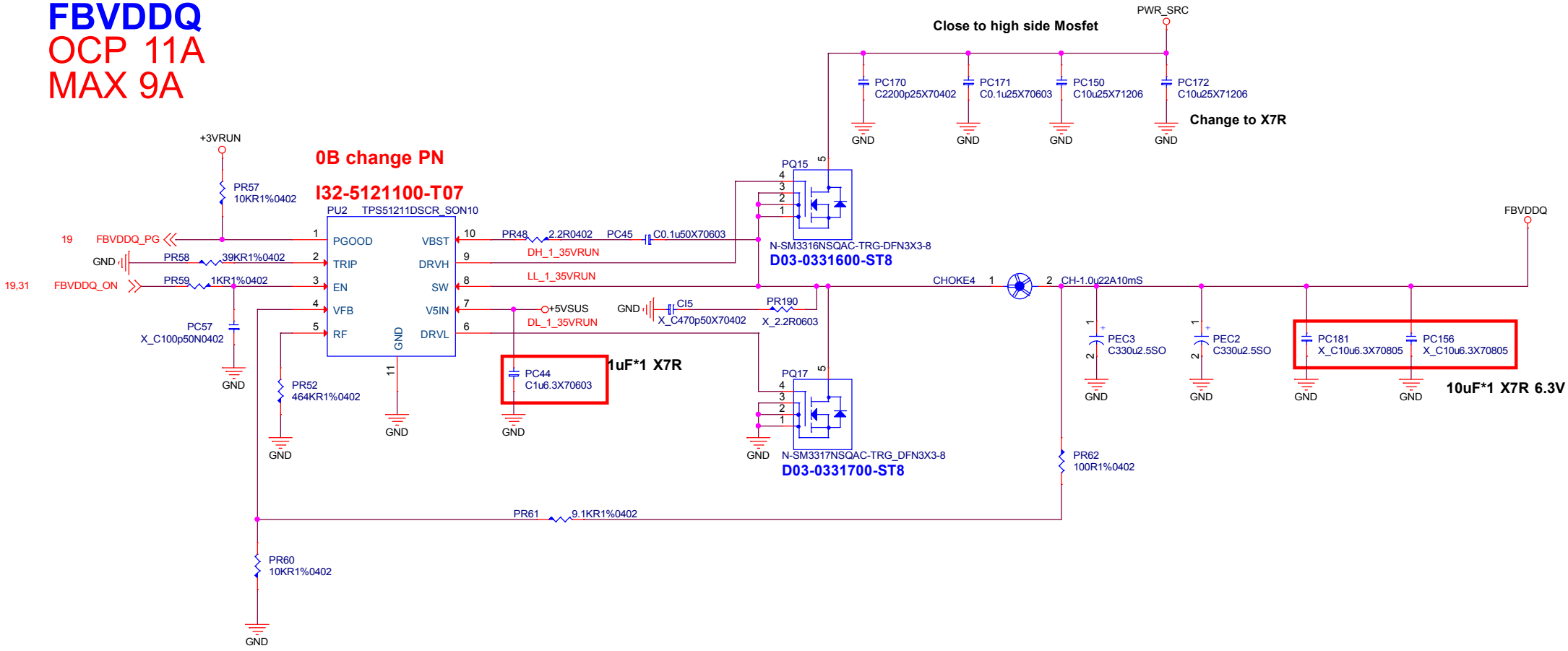
DGPU POWER FBVDDQ

FBVDDQ
OCP 11A
MAX 9A



MICRO-STAR INT'L CO.,LTD.		
Title: DGPU POWER FBVDDQ		
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DGPU POWER / UP1642PQAG

EDP-Peak 70A

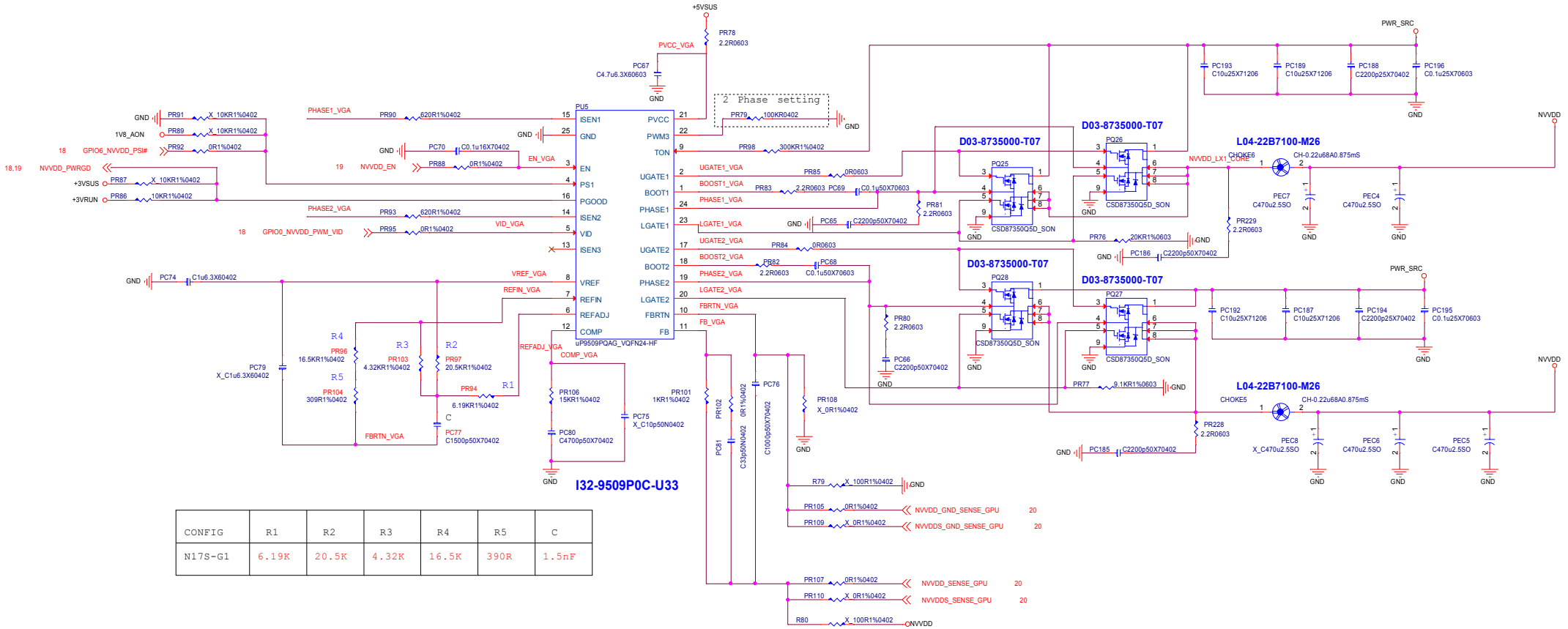
EDP-Con 50A

DGPU POWER NVVDD

CONFIG A

VBoot:0.875V

Vmin:0.6V / Vmax:1.2V



CONFIG	R1	R2	R3	R4	R5	C
N17S-G1	6.19K	20.5K	4.32K	16.5K	390R	1.5nF

msi	MICRO-STAR INT'L CO.,LTD.	
Title	DGPU POWER NVVDD	
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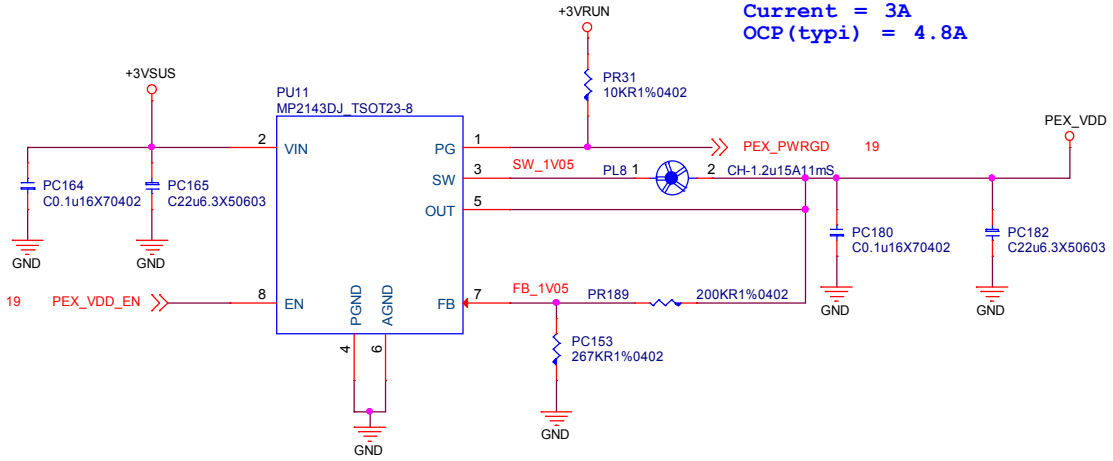
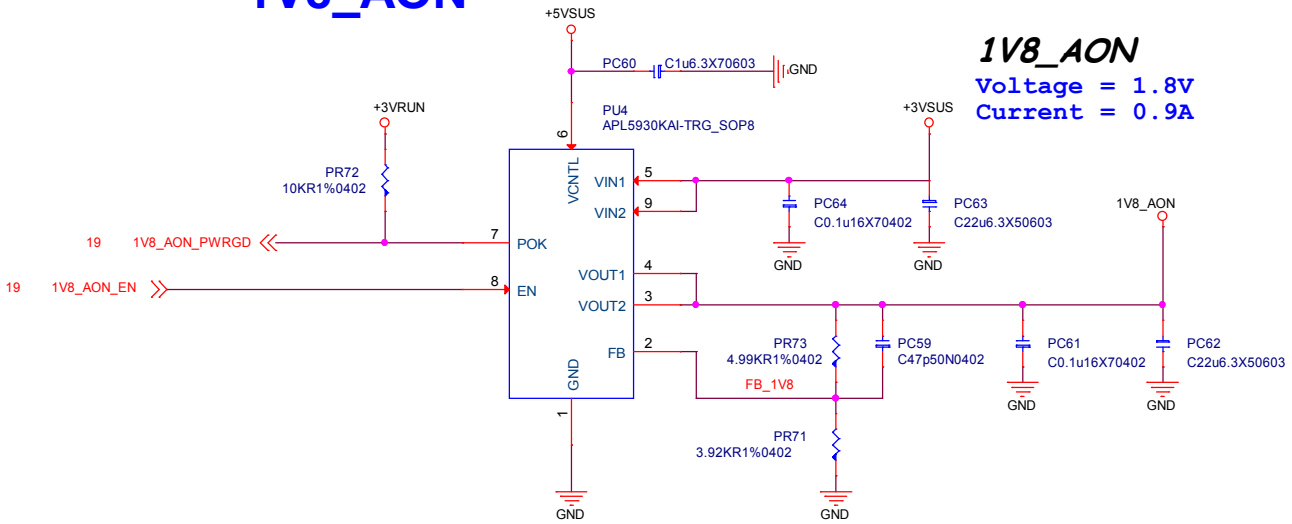
PEX_VDD

Voltage = 1.05V
Current = 3A
OCP(typi) = 4.8A



1V8_AON



2016/02/17 Modify PR255 3.92Kohm for
Power suggestion

MICRO-STAR INT'L CO.,LTD.

Title: DGPU POWER PEX_VDD / 1V8_AON

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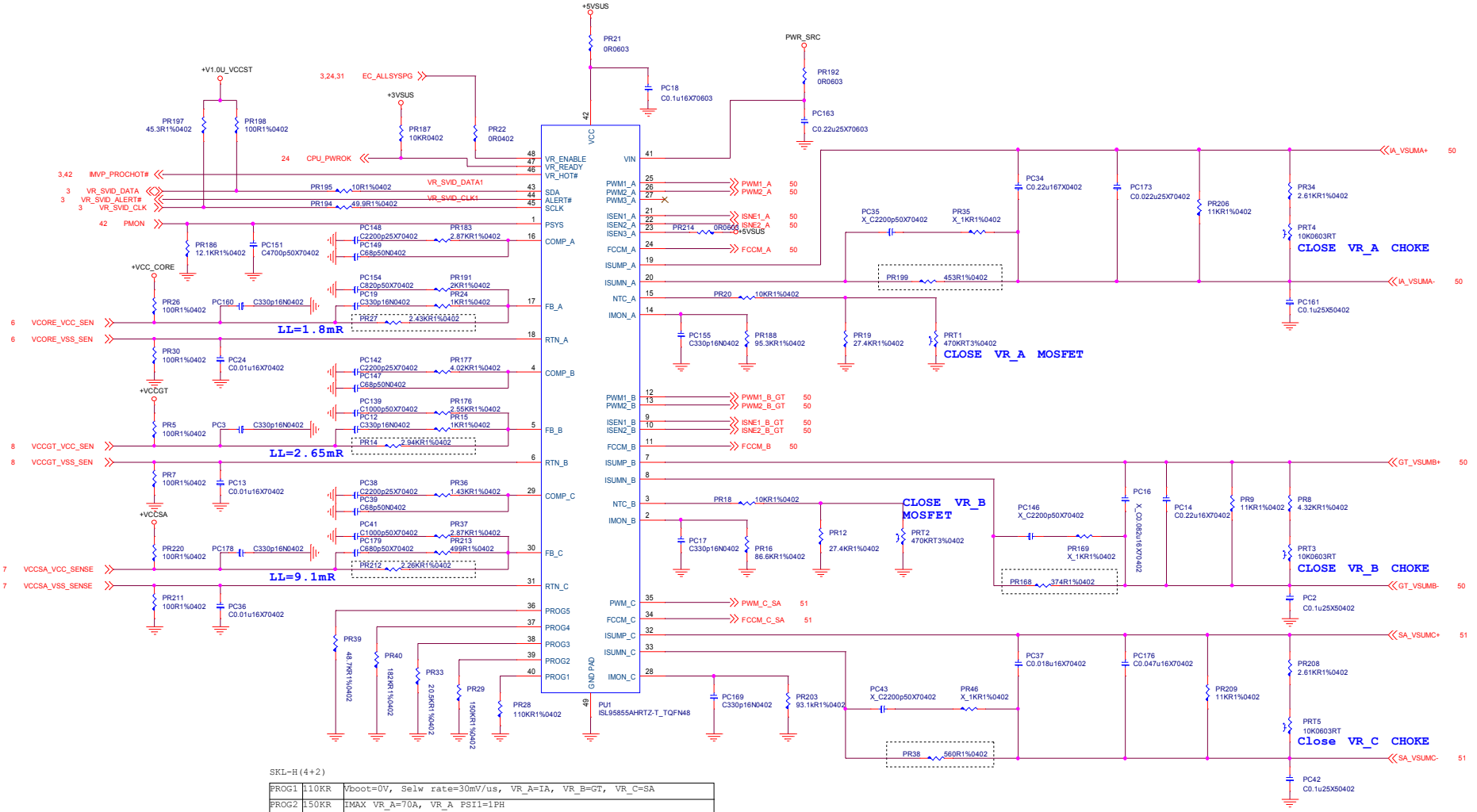
Skylake H-line 42 45W ISL95855



SKL-H(4+2)

PROG1	110KR	Vboot=0V, Selw rate=30mV/us, VR_A=IA, VR_B=GT, VR_C=SA
PROG2	150KR	IMAX VR_A=70A, VR_A PSI1=1PH
PROG3	20.5KR	IMAX VR_B=60A, DROOP VR_B Active
PROG4	182KR	DROOP VR_A Active, DROOP VR_C Active, VR_A VR_B Frequency=750kHz
PROG5	48.7KR	IMAX VR_C=12A, Frequency=450kHz

MICRO-STAR INT'L CO.,LTD.

Title: Skylake CPU Power

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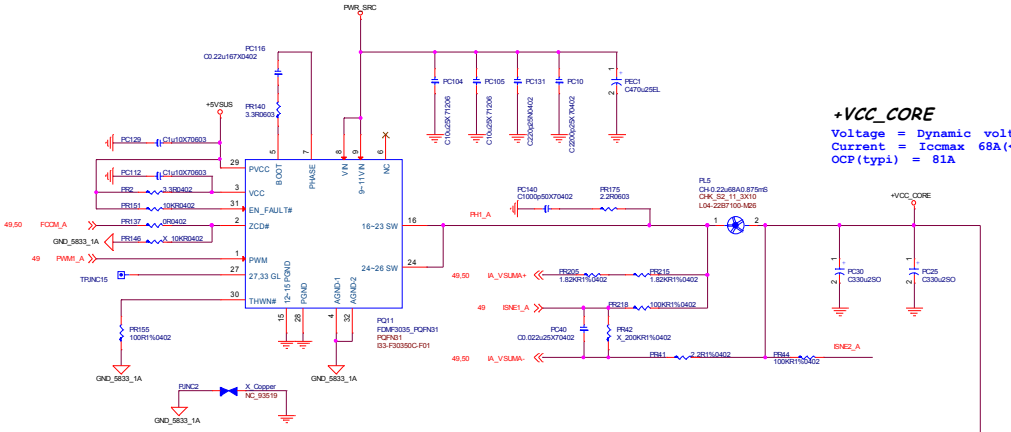

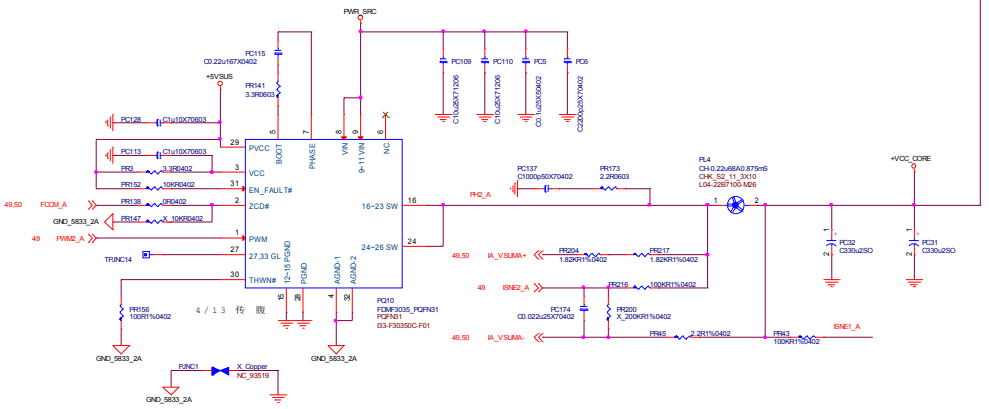

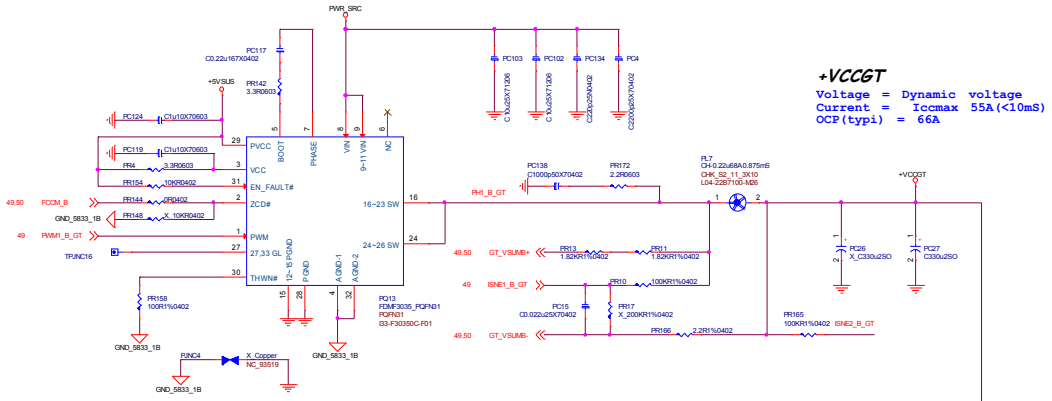

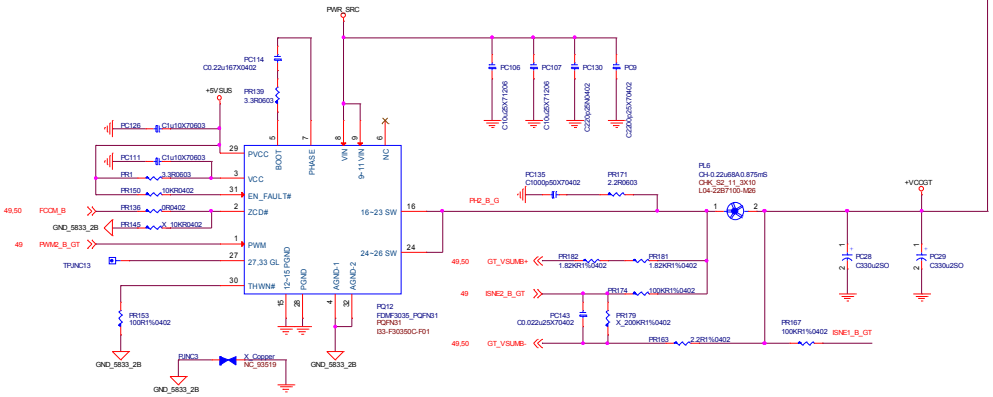

MSI MICRO-STAR INT'L CO.,LTD.			
Title: Skylake VCore/VCCGT			
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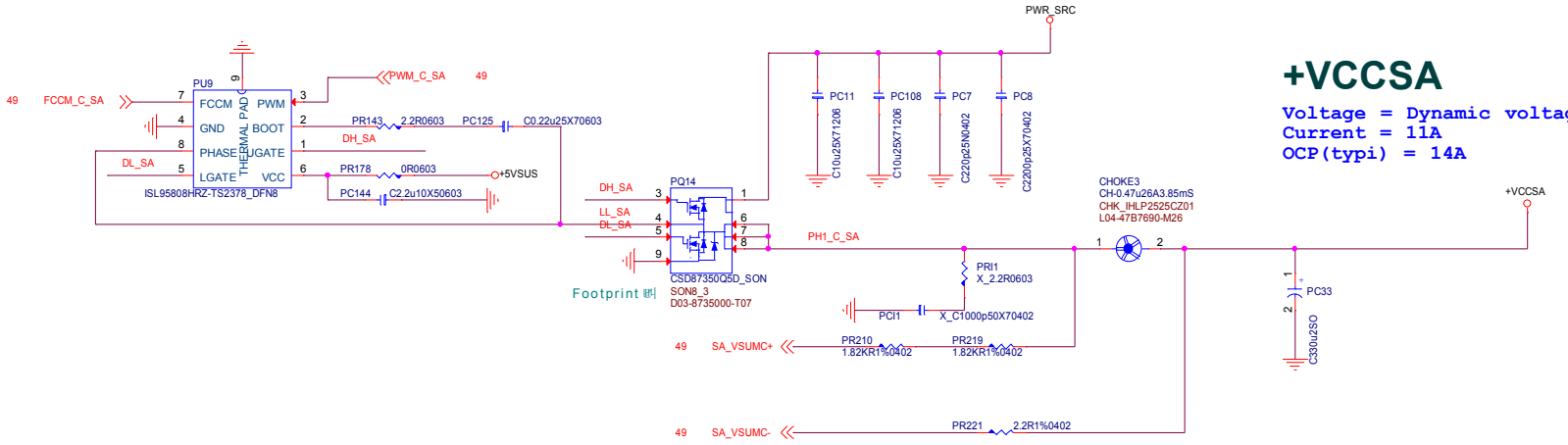

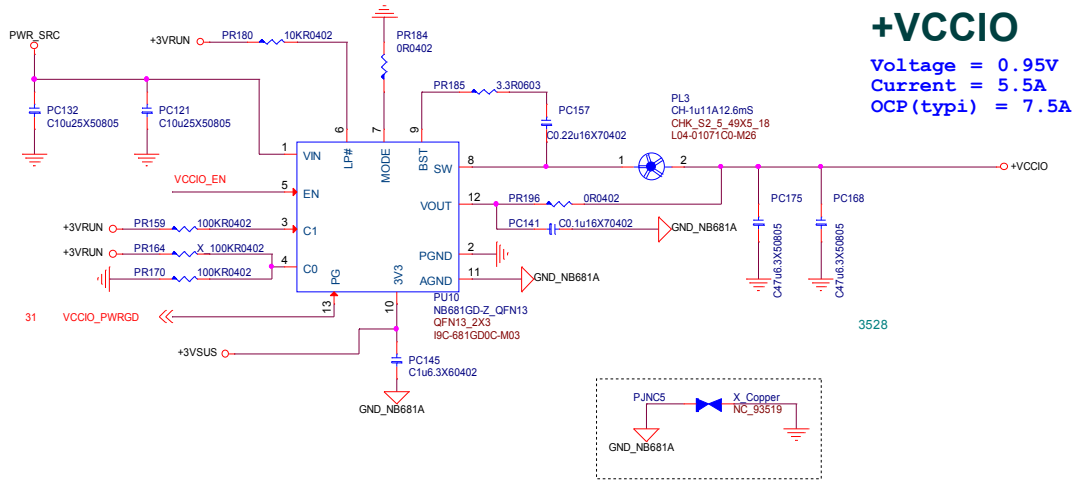

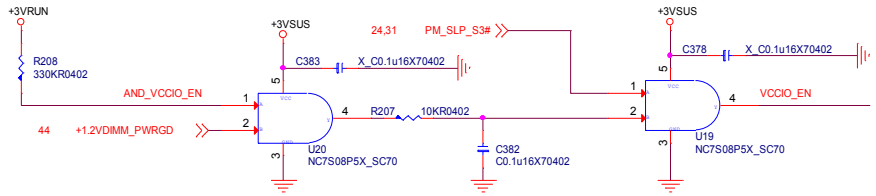

MICRO-STAR INT'L CO.,LTD.

Title: Skylake VCCSA/VCCIO

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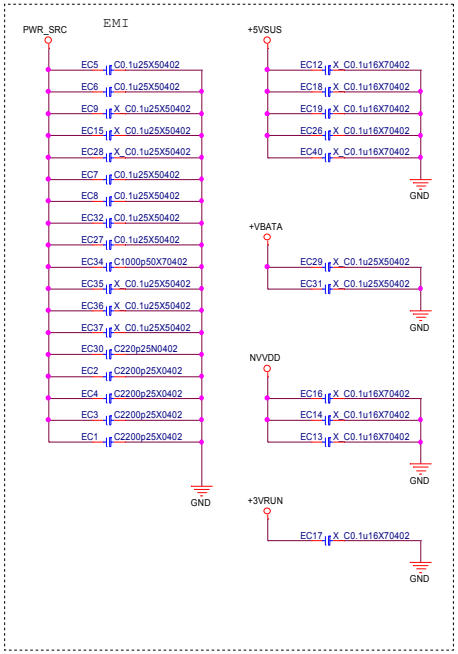
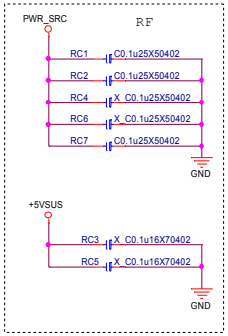
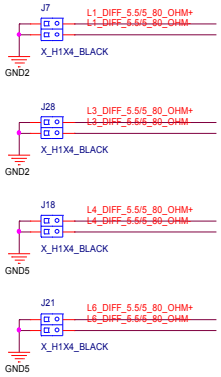
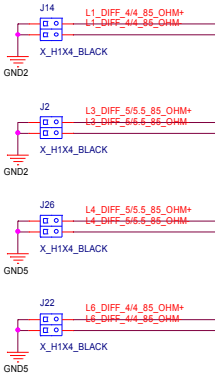




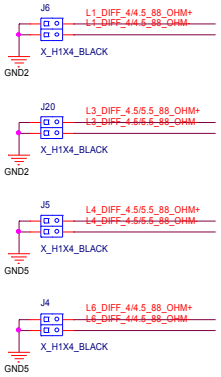
80 OHM Differential



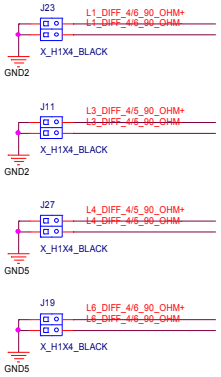
85 OHM Differential



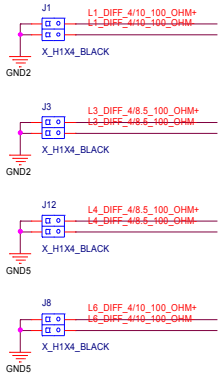
88 OHM Differential



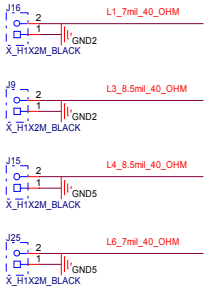
90 OHM Differential



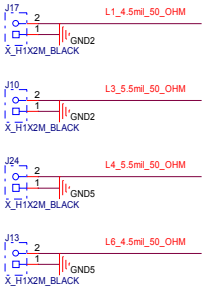
100 OHM Differential



40 OHM Single-End



50 OHM Single-End



MICRO-STAR INT'L CO.,LTD.

Title: EMI/ Impedance

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CPU/GPU Holes

MCPU4 H_R276D169_PB — GND X_CPU_HOLE
MCPU2 H_R276D169_PB — GND X_CPU_HOLE
MCPU3 H_R276D169_PB — GND X_CPU_HOLE
MCPU1 H_R276D169_PB — GND X_CPU_HOLE
MGPU4 H_R276D169_PB — GND X_GPU_HOLE
MGPU2 H_R276D169_PB — GND X_GPU_HOLE
MGPU1 H_R276D169_PB — GND X_GPU_HOLE
MGPU3 H_R276D169_PB — GND X_GPU_HOLE

FM1 FM2 FM3 FM4 FM5 FM6 FM7 FM8 FM9
FM10 FM11 FM12 FM13 FM14 FM15 FM16 FM17 FM18
FM19 FM20 FM21 FM22 FM23 FM24 FM25 FM26 FM27 FM28
All: X_FM

HOLE6 H_NR118D118_1 X_H_NR118D118_1
HOLE7 H_NR118D118_1 X_H_NR118D118_1
HOLE2 NPTH_80 X_NPTH_80
HOLE3 NPTH_80 X_NPTH_80
HOLE5 NPTH_80 X_NPTH_80
HOLE8 NPTH_80 X_NPTH_80
HOLE9 NPTH_80 X_NPTH_80
HOLE10 NPTH_80 X_NPTH_80
HOLE11 NPTH_80 X_NPTH_80
HOLE13 NPTH_80 X_NPTH_80
HOLE14 NPTH_80 X_NPTH_80
HOLE1 npth_98 X_npth_98
HOLE4 npth_98 X_npth_98
HOLE12 npth_98 X_npth_98
HOLE15 npth_98 X_npth_98

MH8 HOLES_8X8_D3MM_VIA8 X_HOLES_8X8_D3MM_VIA8 — GND
MH2 H_R197D118_PT_V3 X_H_R197D118_PT_V3 — LAN_GND
MH3 H_R197D118_PT_V3 X_H_R197D118_PT_V3 — GND
MH1 H_R197D118_PT X_ME_ SCREW HOLE — GND
MH4 H_R197D118_PT X_ME_ SCREW HOLE — GND
MH7 H_R197D118_PT X_ME_ SCREW HOLE — GND
MH5 H_R197D91 X_ME_ SCREW HOLE — GND
MH6 H_R197D91 X_ME_ SCREW HOLE — GND
MH9 H_R197D91 X_ME_ SCREW HOLE — GND

CPU/GPU BRACKET

BRACKET1 CPU BKT — CPU_BRACKET — E2M-7810111-A89
BRACKET2 GPU BKT — GPU_BRACKET — 307-6J30111-HG0

MYLAR2 HDMI/DP MYLAR — HDMI_DP_MYLAR
MYLAR3 USB CON MYLAR — USB3_CON_MYLAR
E2M-3570611-Y42 E2M-3570611-Y42

FMA1 FMA2 FMA4 FMA3 FMA5 FMA8 FMA7 FMA6
All: X_F_PAD_NB_2

SPONGE6 Audio JACK SPONGE — Audio_JACK_SPONGE
SPONGE5 Audio JACK SPONGE — Audio_JACK_SPONGE
E2Y-X047411-CA7 E2Y-X047411-CA7

mSATA SSD 1 STAND OFF

H2 Spacer Support — SSD_STANDOFF H=4.15 — GND
E2B-16J1010-A89

WLAN STAND OFF

H1 Spacer Support — SSD_STANDOFF H=4.15 — GND
E2B-16J1010-A89

Only 16JD

MYLAR5 ME_MYLAR — Hide_Caps_Lock_LED_MYLAR — E2Y-6324111-Y42
SPONGE1 LED SPONGE — LED_SPONGE — E2Y-6J10611-Y42
SPONGE2 LED SPONGE — LED_SPONGE — E2Y-6J10611-Y42

Only 179D

MYLAR6 MB MYLAR — X_MB MYLAR — E2P-7910312-G40
MYLAR7 MB MYLAR — X_MB MYLAR — E2P-0113511-G40
MYLAR8 MB MYLAR — X_MB MYLAR — E2P-7910811-G40
SPONGE4 LED SPONGE — X_LED_SPONGE — E2Y-7910211-G40

UME1 HDMI Lable — HDMI ROYALTY — Y01-RHDMI03-000
UME2 BIOS Lable — BIOS_LABEL — G51-N1CO041-A09
PCB1 — PD0-16JD10A-H73 — PD0-16JD10A-H73

Hannstar: P30-16J6111-H73
TRIPOD: P30-16J6111-T53

MICRO-STAR INT'L CO.,LTD.
Title: Screw/ME
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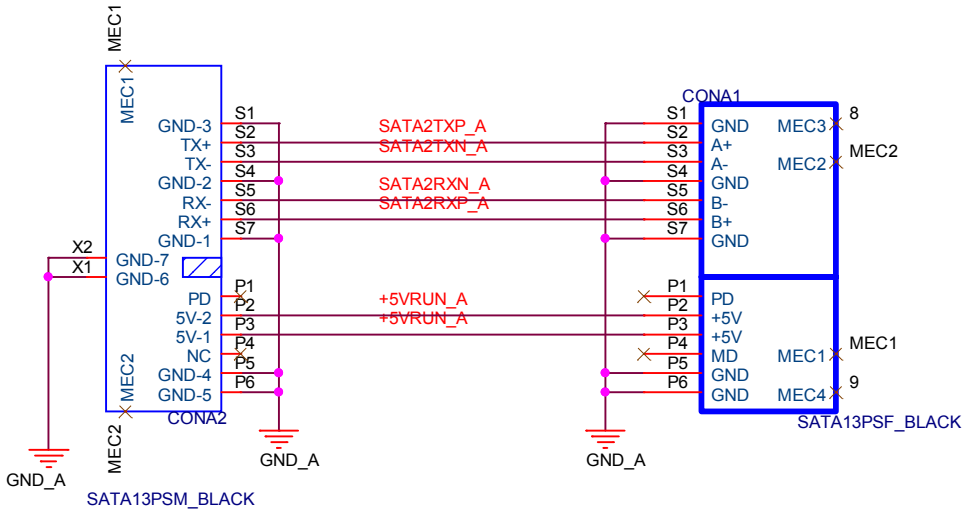
179D-A Board (ODD)



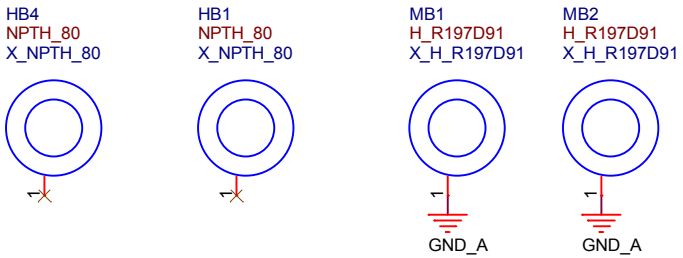
N5N-13M0060-AF2

PCBA1

PD0-16JDA0A-H73

PD0-16JDA0A-H73

Hannstar: PD0-16JDA0A-H73
TRIPOD: PD0-16JDA0A-T53



SCREWA2 SCREWA1

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

MICRO-STAR INT'L CO.,LTD.

Title: [A] 179D ODD

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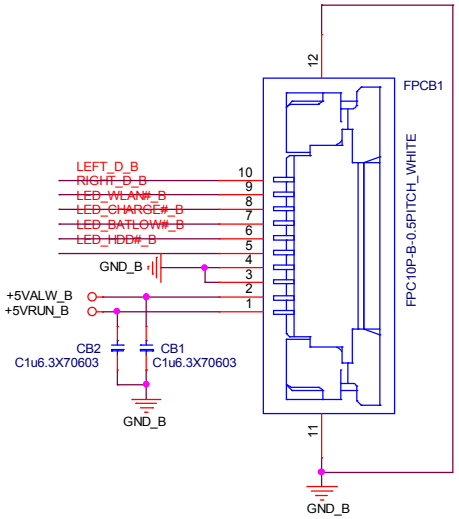
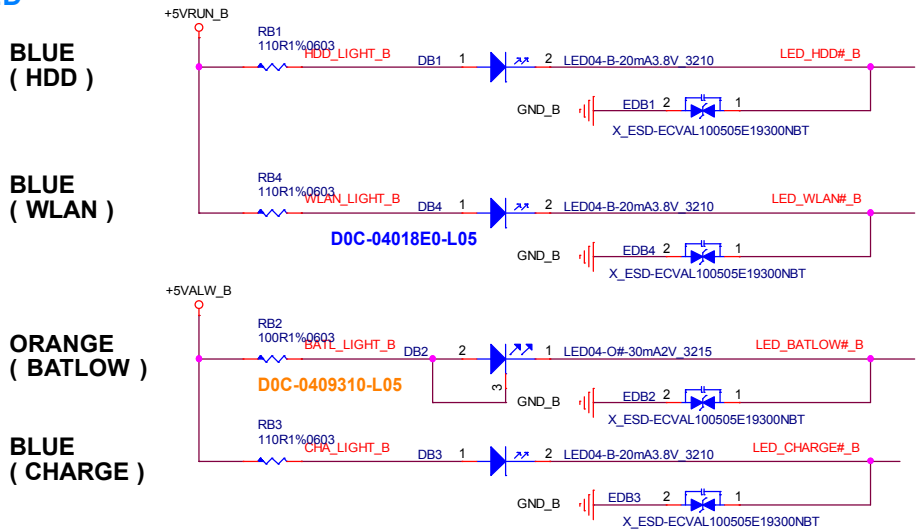
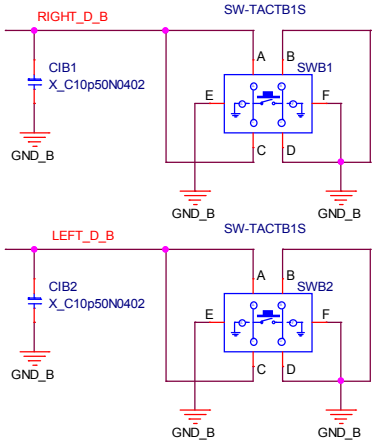
179D-B Board (LED / TP)

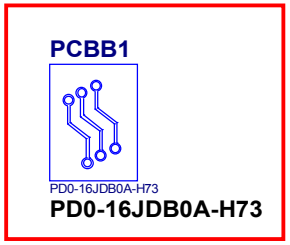


LED FRONT



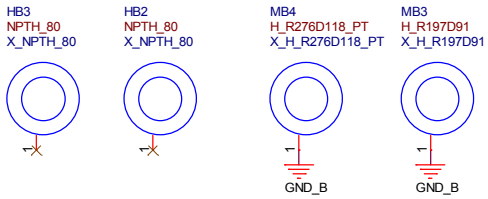


H=1.5mm



PD0-16JDB0A-H73

Hannstar: PD0-16JDB0A-H73
TRIPOD: PD0-16JDB0A-T53



MICRO-STAR INT'L CO.,LTD.

Title	[B] 179D LED / TP	
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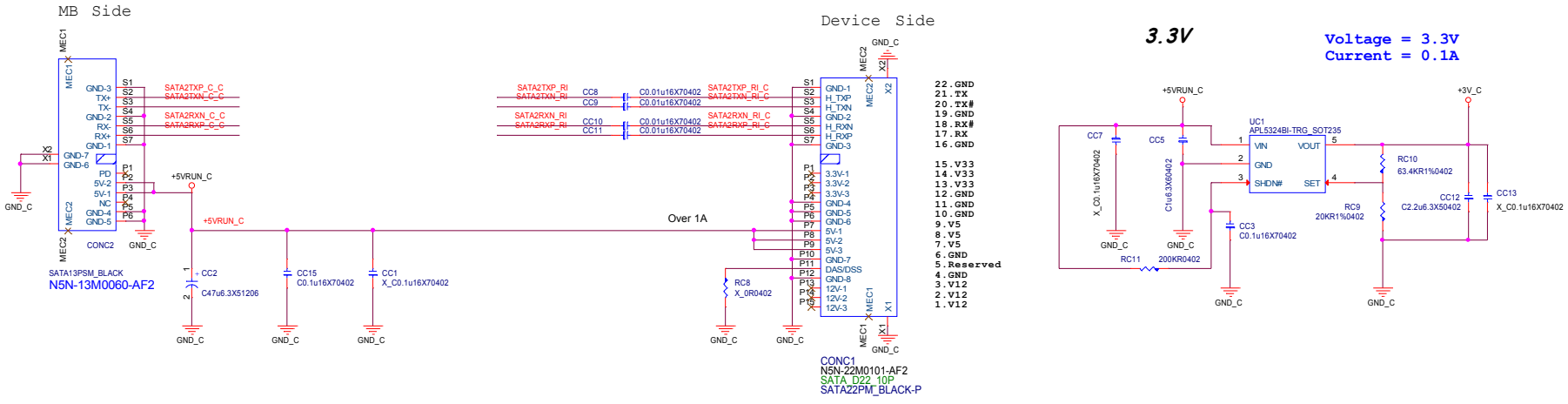
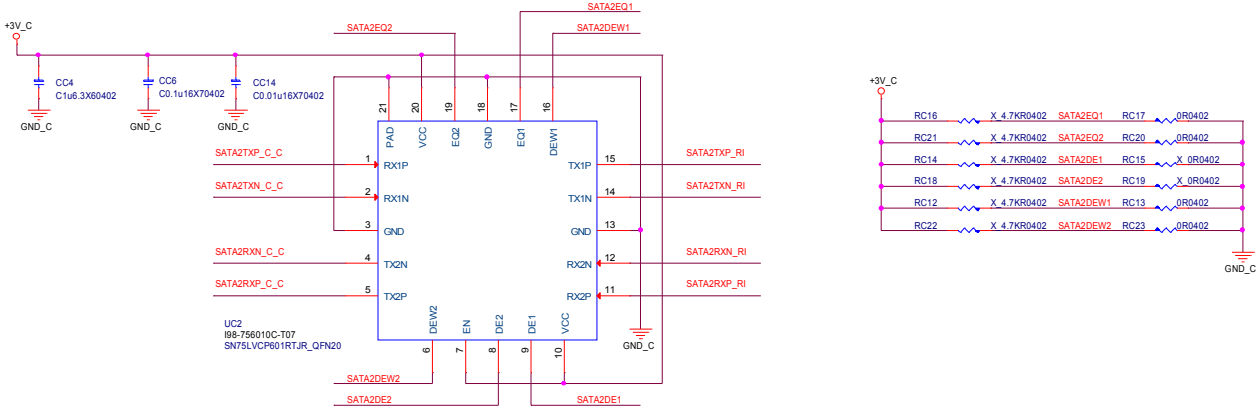
16JD-C Board (ODD TO HDD)



SATA ReDriver



TI SN75LVCP601RTJR HW Setting

DE1/DE2	CH1/CH2De-Emphasis dB(at 6Gbps)	DQ1/DQ2	CH1/CH2De-Emphasis dB(at 6Gbps)
NC(default)	-4	NC(default)	0
0	0	0	7
1	-2	1	14

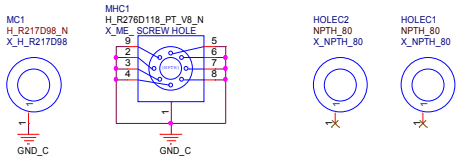
DEW1/DEW2	Device Function --> De Width for CH1/CH2
0	De-emphasis Pulse duration, short(recommended setting when linkoperates at SATA 1.5/3/6 Gbps)
1(default)	De-emphasis Pulse duration, long(recommended setting when linkoperates at SATA 1.5/3/6 Gbps)

PCBC1

PD0-16JDC0A-H73

PD0-16JDC0A-H73

Hannstar: PD0-16JDC0A-H73
TRIPOD: PD0-16JDC0A-T53



MICRO-STAR INT'L CO.,LTD.

Title: [C]16JD HDD BOARD

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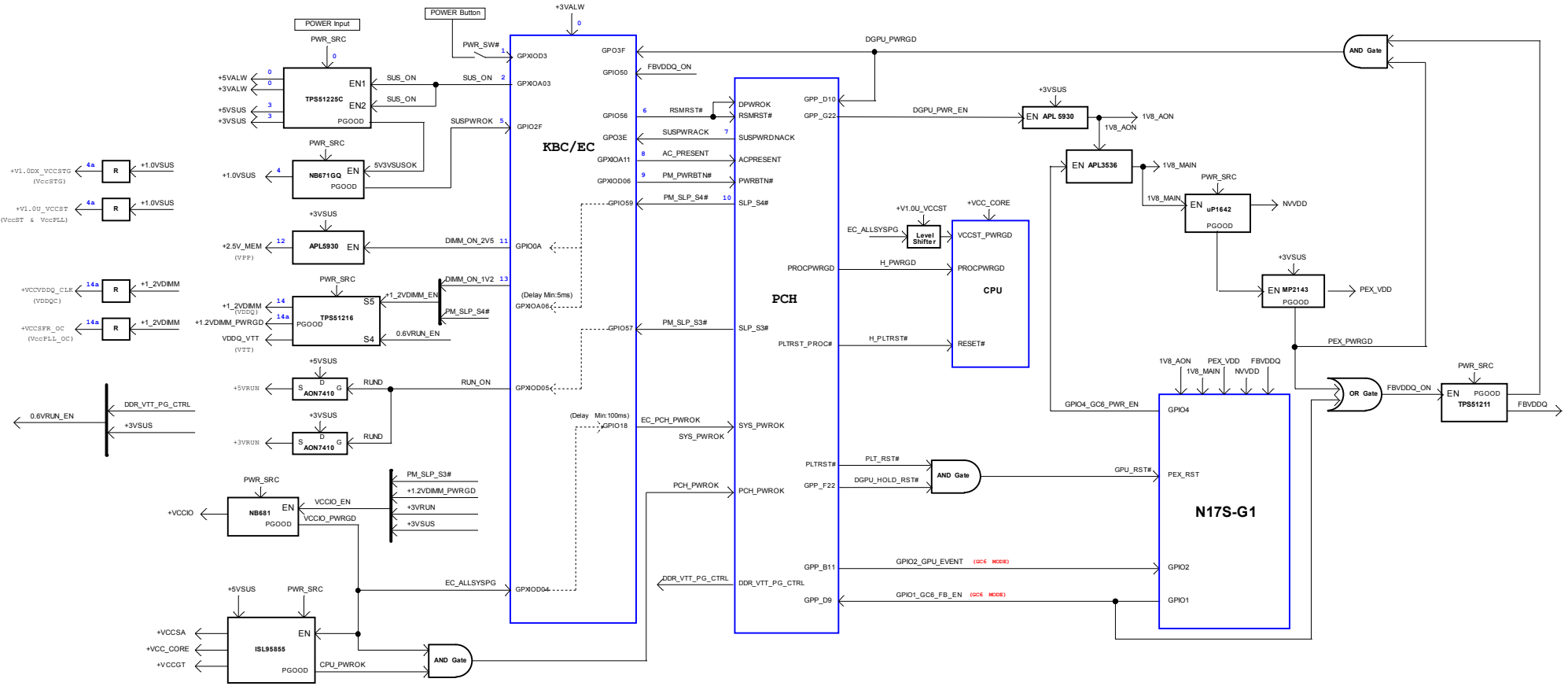
MS-16JD Power on Block Diagram



msi	MICRO-STAR INT'L CO.,LTD.		
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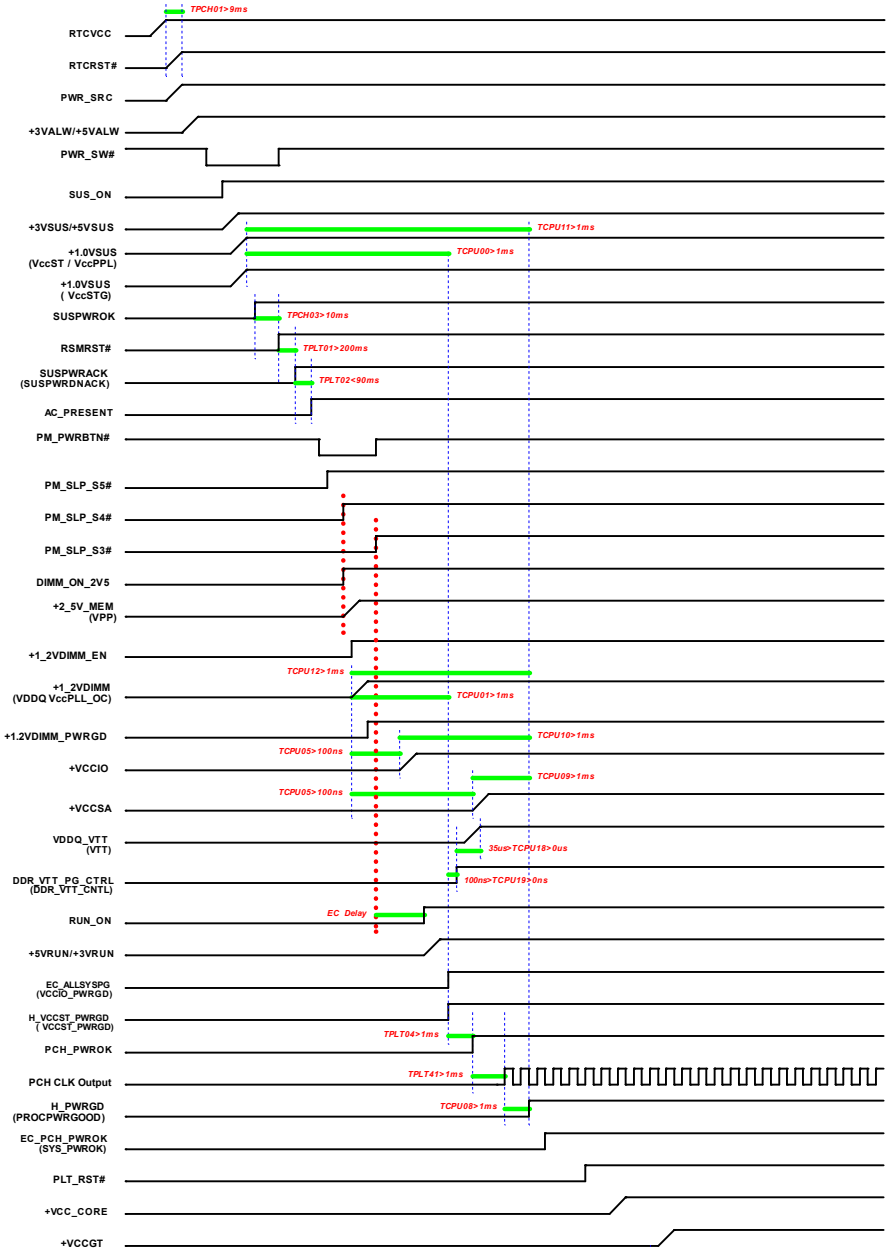
Power on Sequence

G3 -> S0



msi MICRO-STAR INT'L CO.,LTD.		
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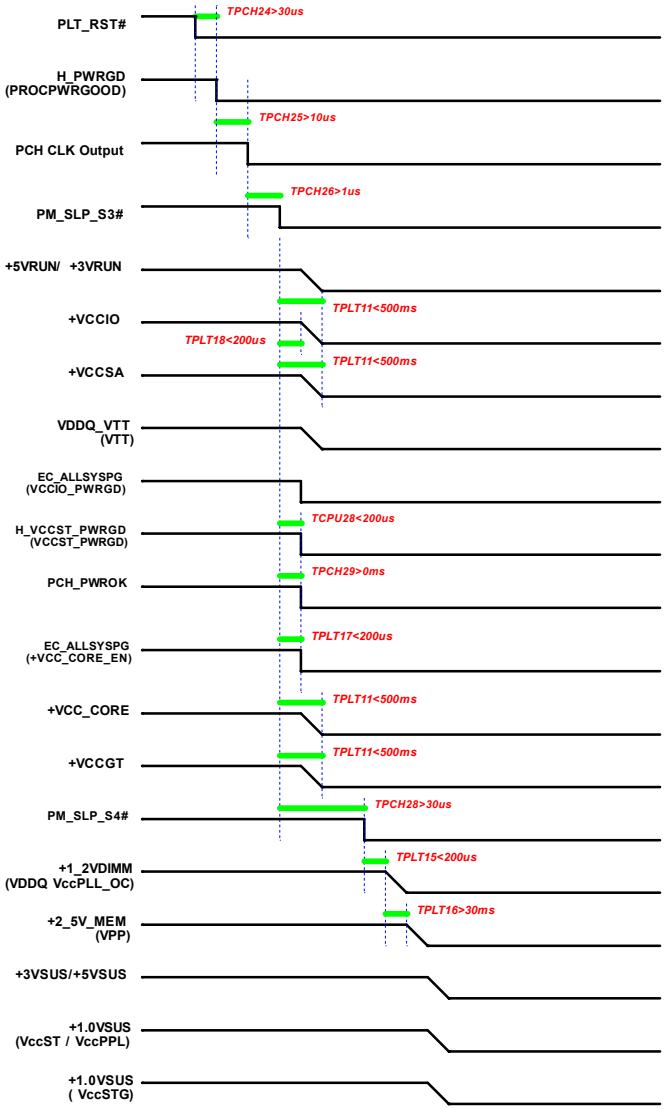
Power Down Sequence

S0 -> G3



msi MICRO-STAR INT'L CO.,LTD.		
Title: Power down Sequence		
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