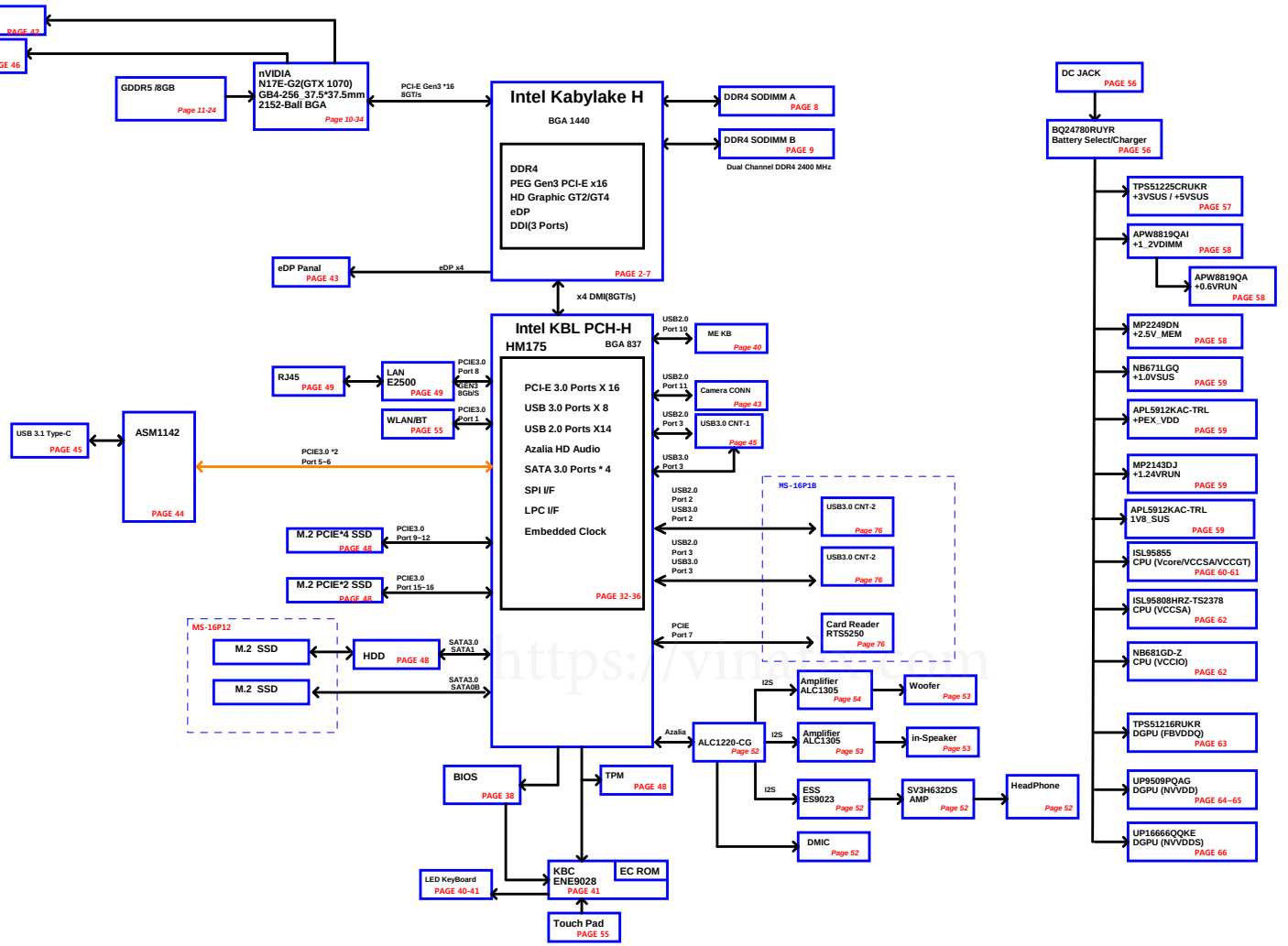
MS-16P1 Ver: 0A Intel Kabylake platform

Wednesday, May 03, 2017



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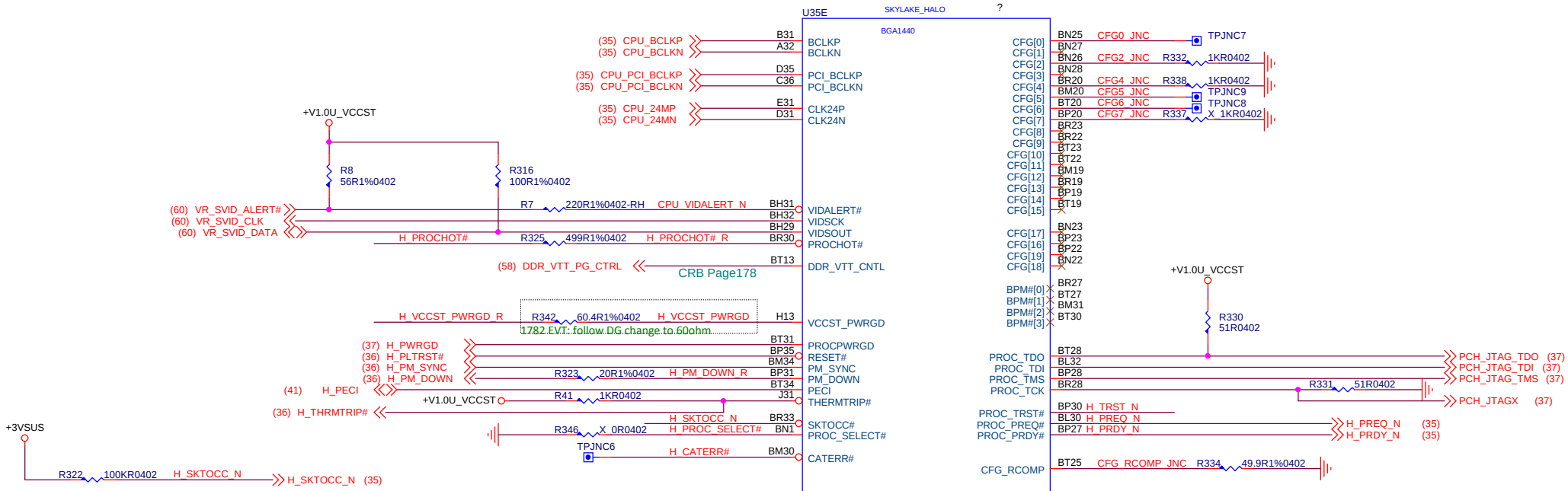
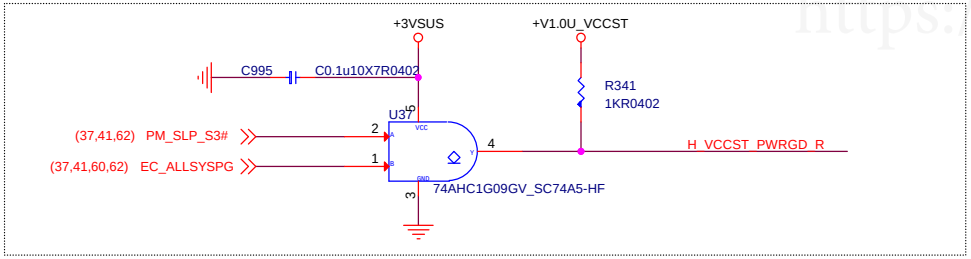
Block Diagram

MS-16P1

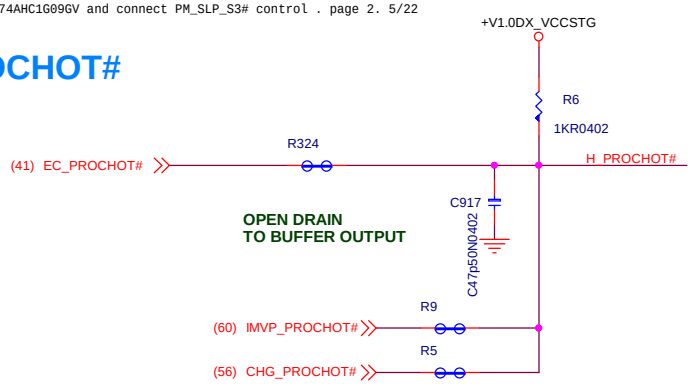
2.0





Modify U83 74AHC1G09GV and connect PM_SLP_S3# control . page 2. 5/22

PROCHOT#



MSR Privacy Bit Feature	
CFG3	1 = Debug capability is determined by IA32_Debug_Interface_MSR (0xC80) bit[0] setting 0 = IA32_Debug_Interface_MSR (0xC80) bit[0] default setting overridden

eDP Enable	
CFG4	1 = Disabled 0 = Enabled

PEG DEFER TRAINING	
CFG7	1: (Default) PEG Train immediately following xxRESETB de assertion 0: PEG Wait for BIOS for training

PCIE Express * Static X16 Lane Numbering Reversal	
CFG2	CFG[2]: PCI Express* Static x16 Lane Numbering Reversal. 1 = Normal operation 0 = Lane numbers reversed.

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*

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Title: Skylake(HOST)			
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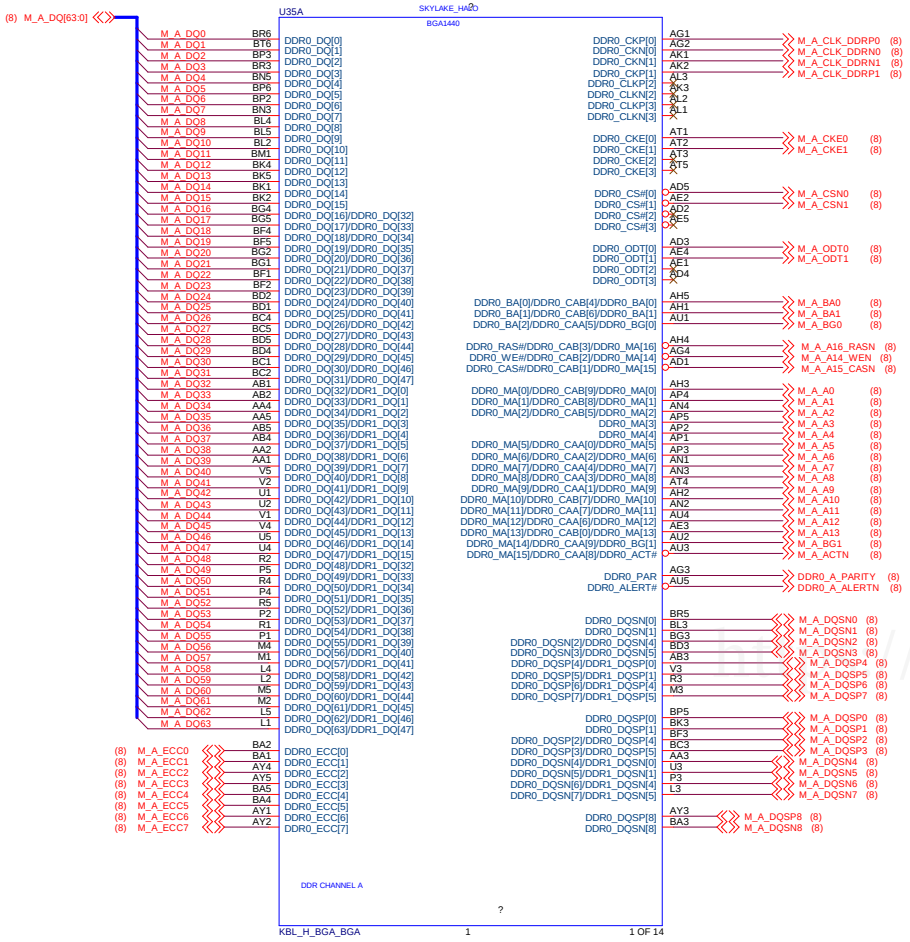
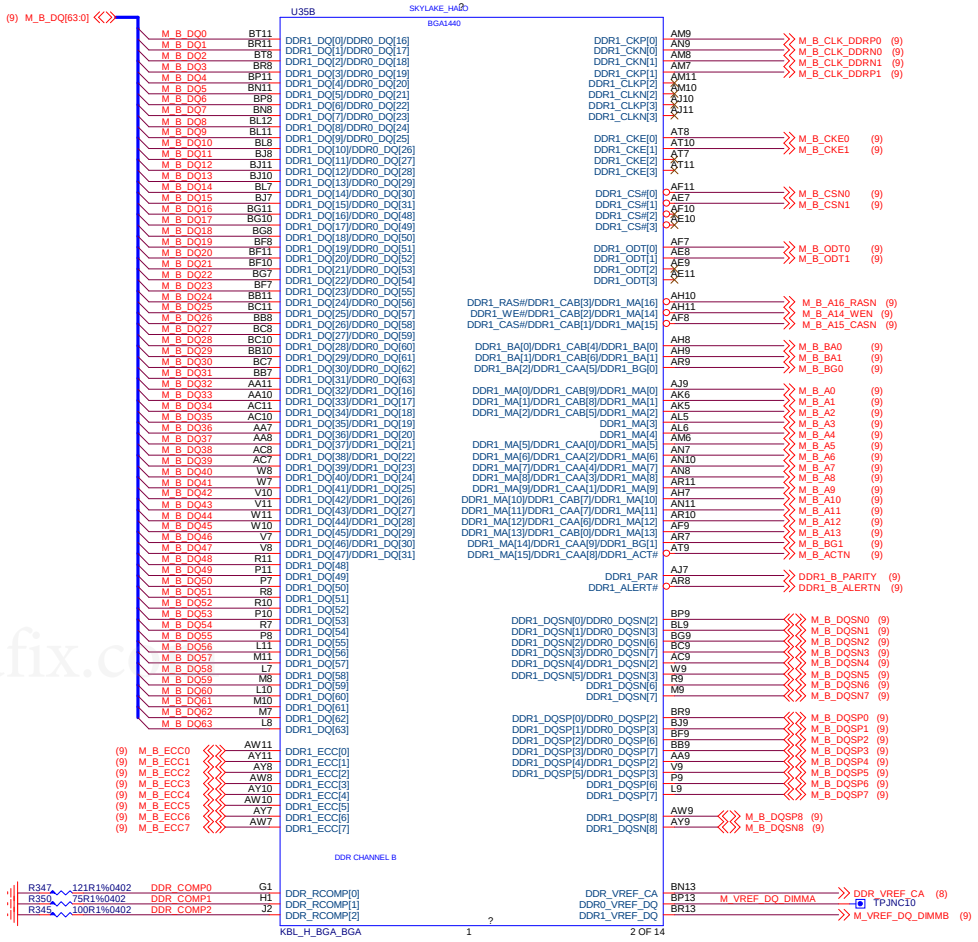
DDR Channel A



DDR Channel B



Title	Skylake(DDR3)	
Size: Custom	Document Number: MS-16P11	Rev: 0A
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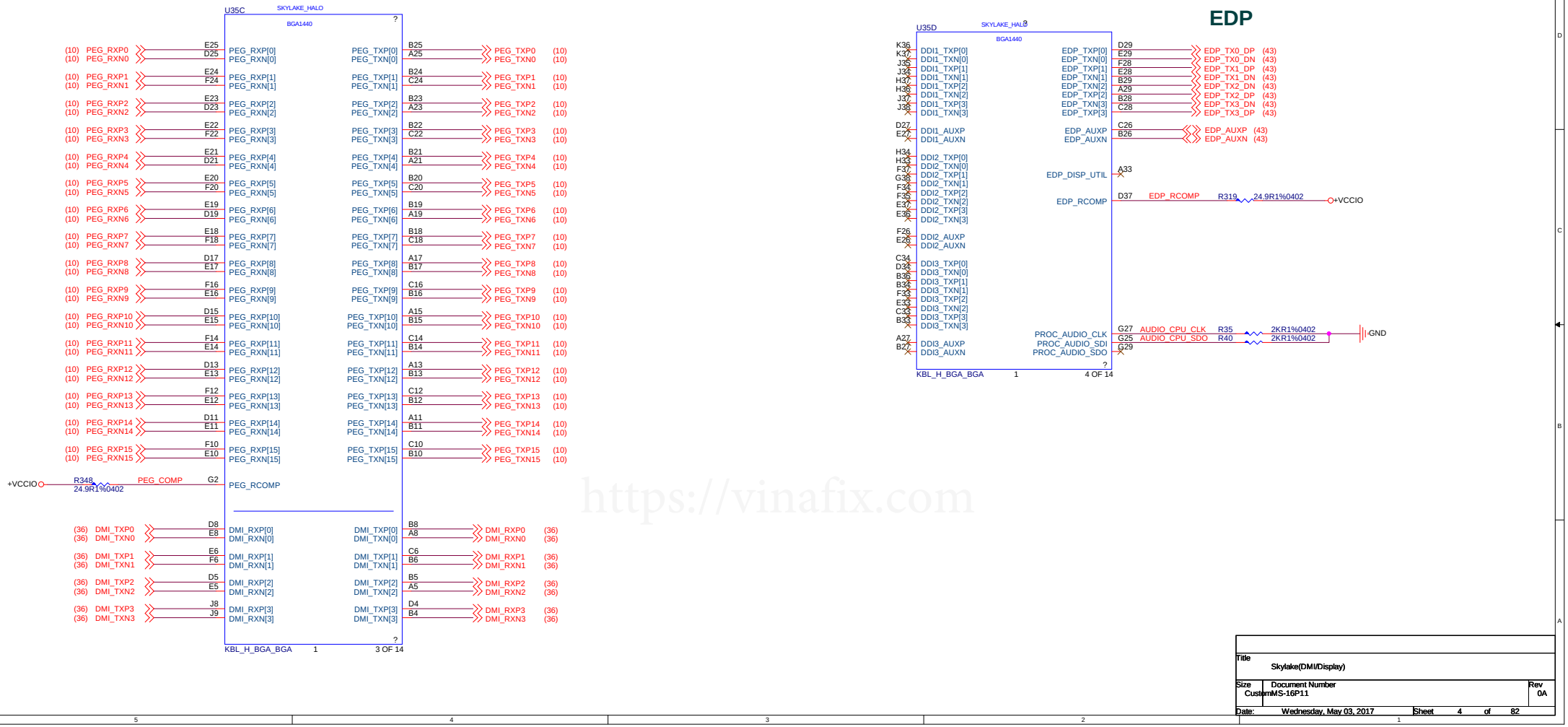

Title	Skylake(DMI/Display)	
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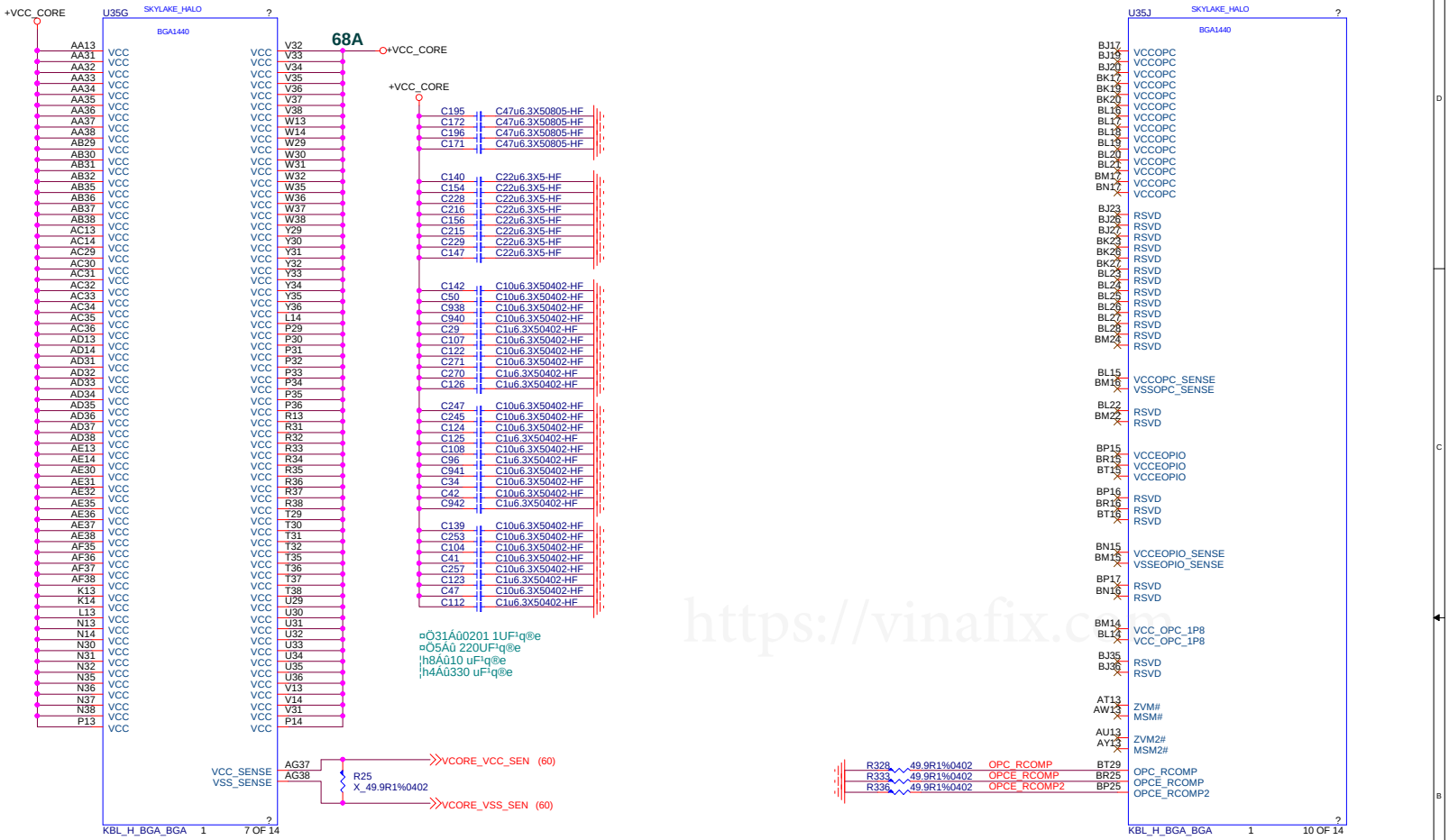

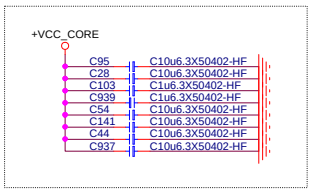

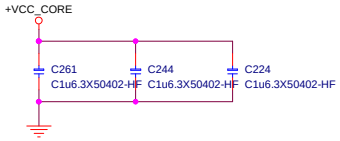

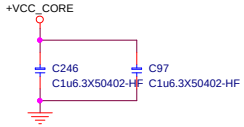

Title	Skylake(Power1)		
Size Custom	Document Number MS-16P11		Rev 0A
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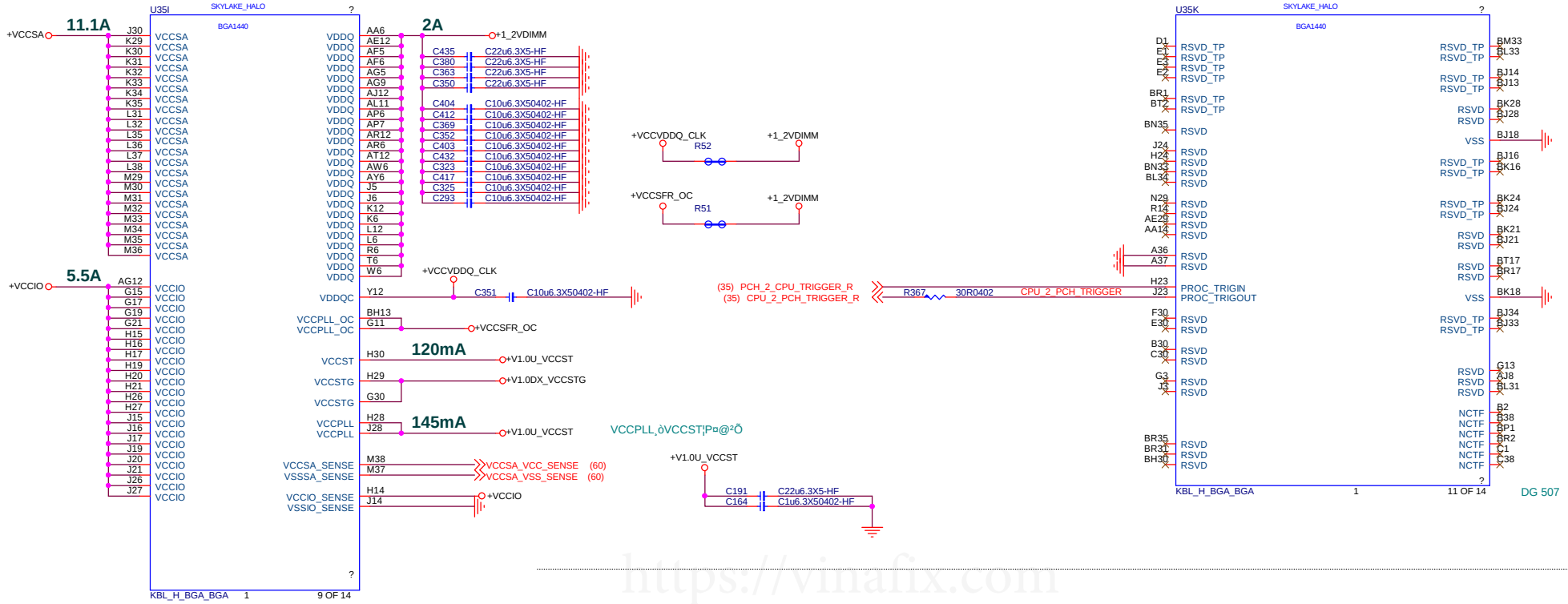

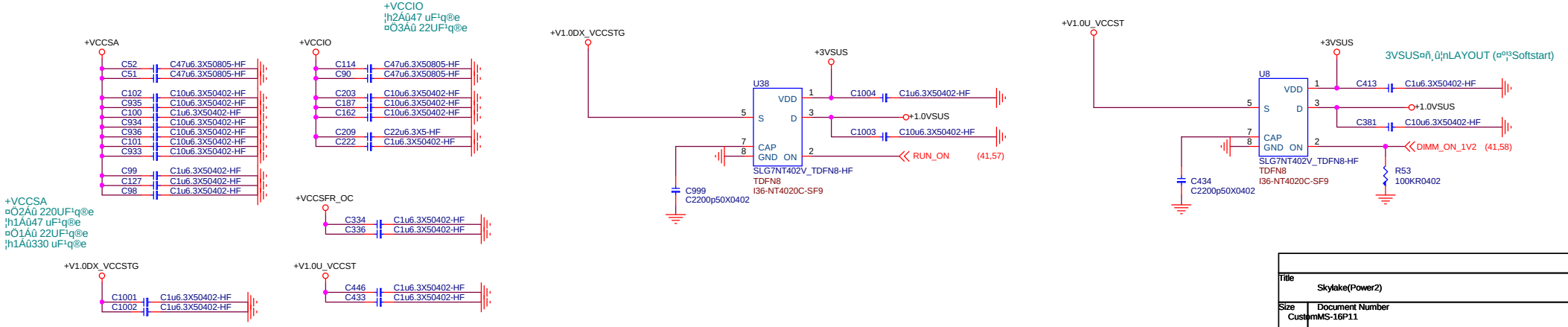

Title	Skylake(Power2)		
Size	Document Number		Rev
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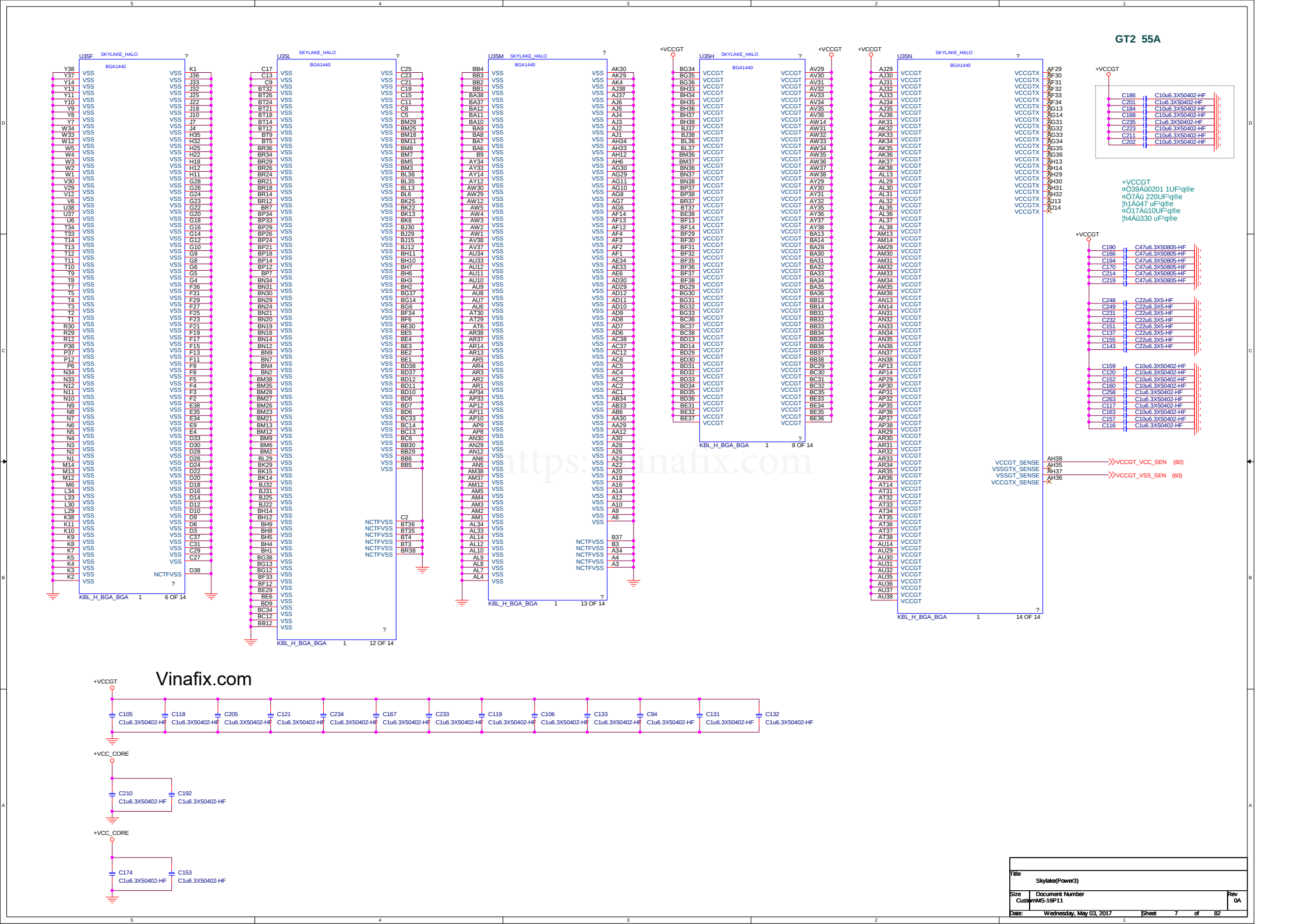
GT2 55A
U35F SKYLAKE_HALO BGA1440
KBL_H_BGA_BGA 1 6 OF 14
U35L SKYLAKE_HALO BGA1440
KBL_H_BGA_BGA 1 12 OF 14
U35M SKYLAKE_HALO BGA1440
KBL_H_BGA_BGA 1 13 OF 14
U35H SKYLAKE_HALO BGA1440
KBL_H_BGA_BGA 1 8 OF 14
U35N SKYLAKE_HALO BGA1440
KBL_H_BGA_BGA 1 14 OF 14
+VCCGT
VCCGT_SENSE
VSSGTX_SENSE
VSSGT_SENSE
VCCGTX_SENSE
VCCGT_VCC_SEN (60)
VCCGT_VSS_SEN (60)
+VCCGT
C105 C1u6.3X50402-HF
C118 C1u6.3X50402-HF
C205 C1u6.3X50402-HF
C121 C1u6.3X50402-HF
C234 C1u6.3X50402-HF
C167 C1u6.3X50402-HF
C233 C1u6.3X50402-HF
C119 C1u6.3X50402-HF
C106 C1u6.3X50402-HF
C133 C1u6.3X50402-HF
C94 C1u6.3X50402-HF
C131 C1u6.3X50402-HF
C132 C1u6.3X50402-HF
+VCC_CORE
C210 C1u6.3X50402-HF
C192 C1u6.3X50402-HF
+VCC_CORE
C174 C1u6.3X50402-HF
C153 C1u6.3X50402-HF
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Title Skylake(Power3)
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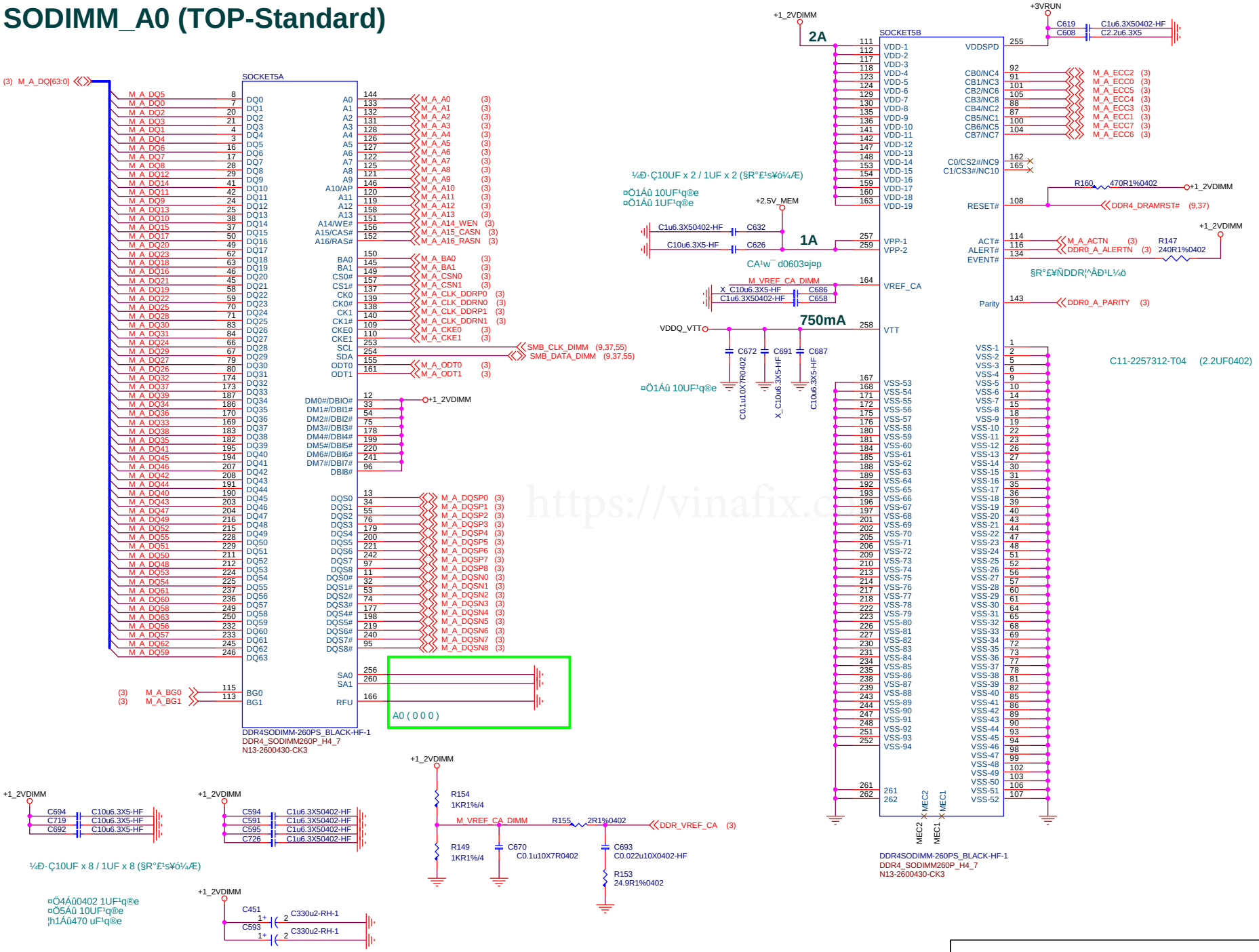
SODIMM_A0 (TOP-Standard)



Title	DDR4_SODIMM_A0	
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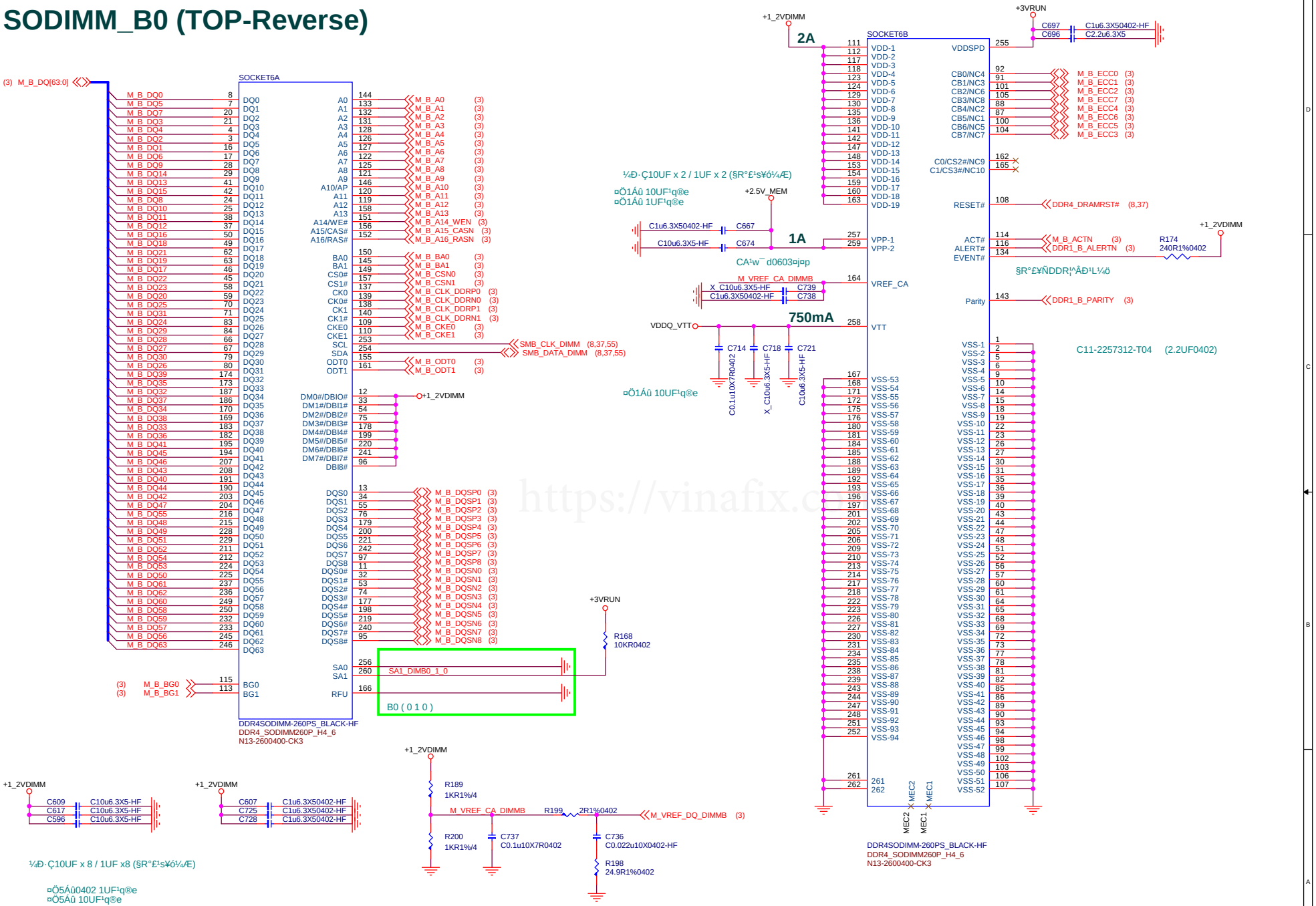
SODIMM_B0 (TOP-Reverse)



Title	DDR4_SODIMM_B0		
Size: Custom	Document Number: MS-16P11		Rev: 0A
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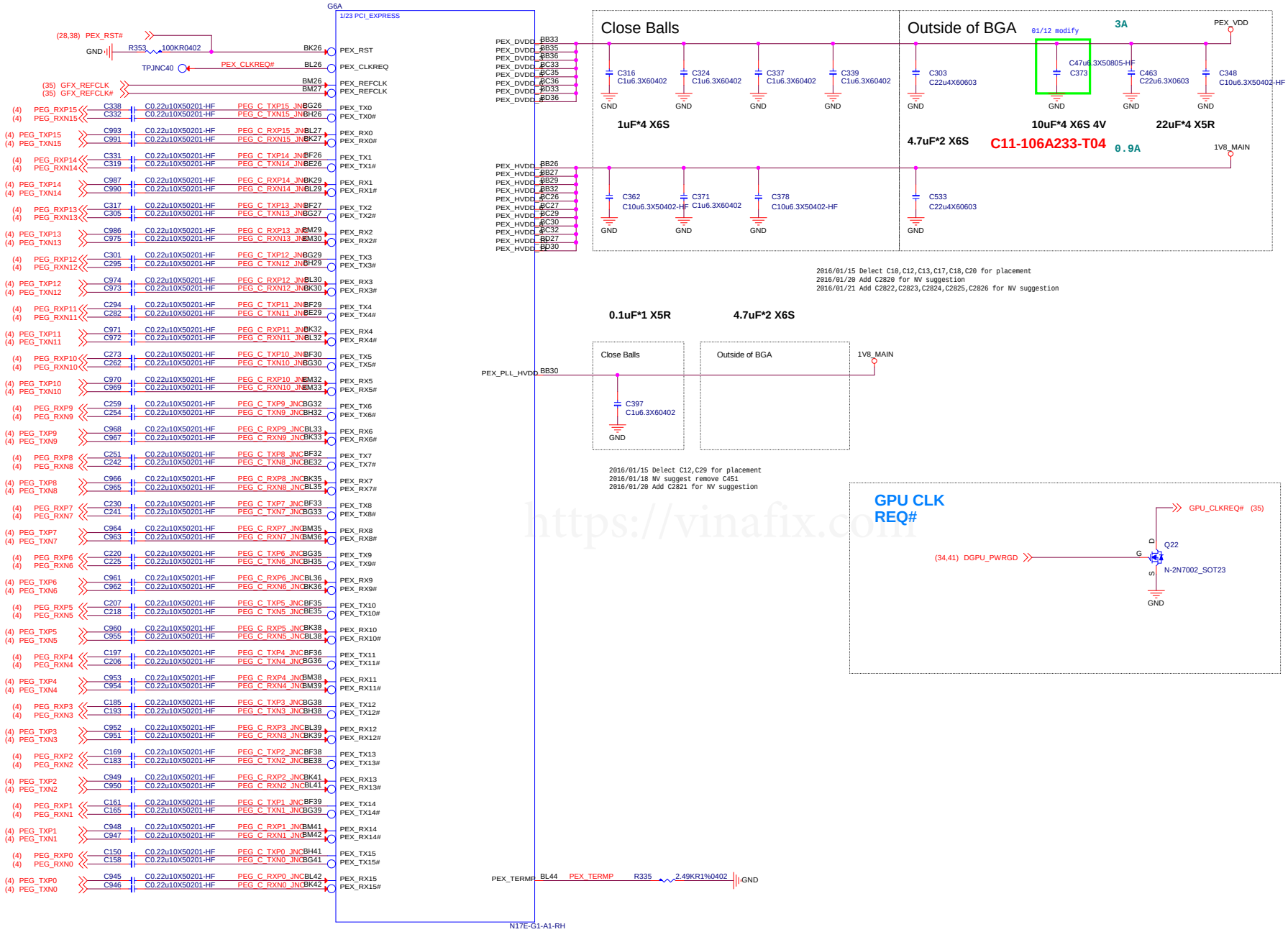
GPU PCI EXPRESS



Title	DGPU_PCI-E Host
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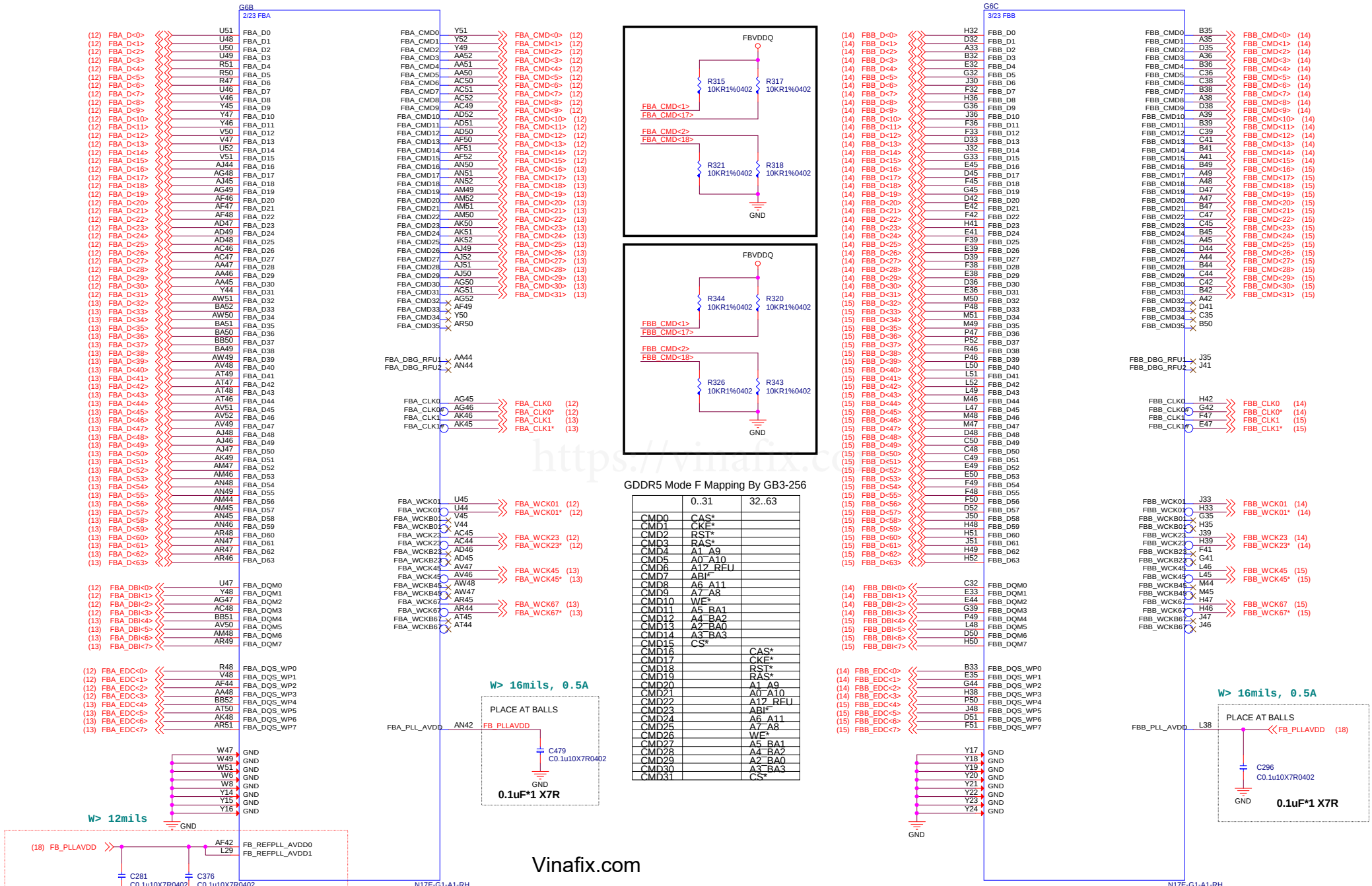
GPU Frame Buffer Partition A/B



GDDR5 Mode F Mapping By GB3-256

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

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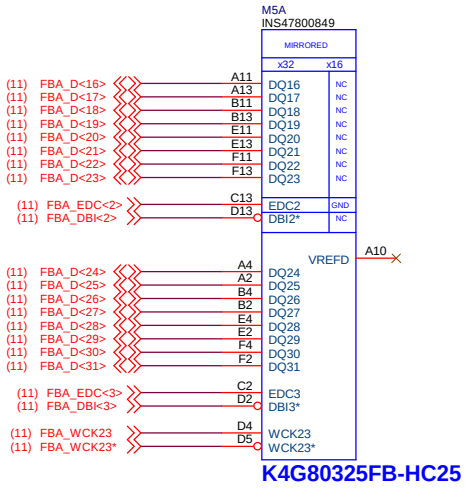
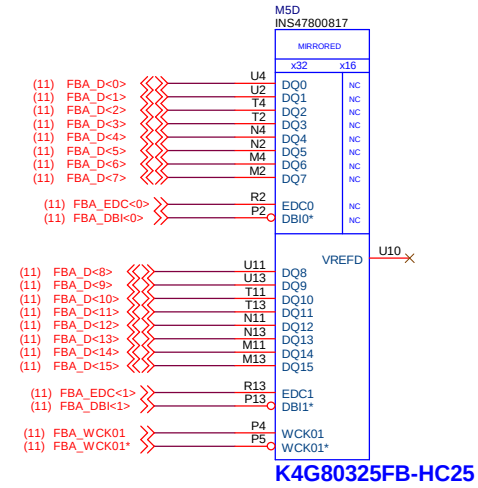
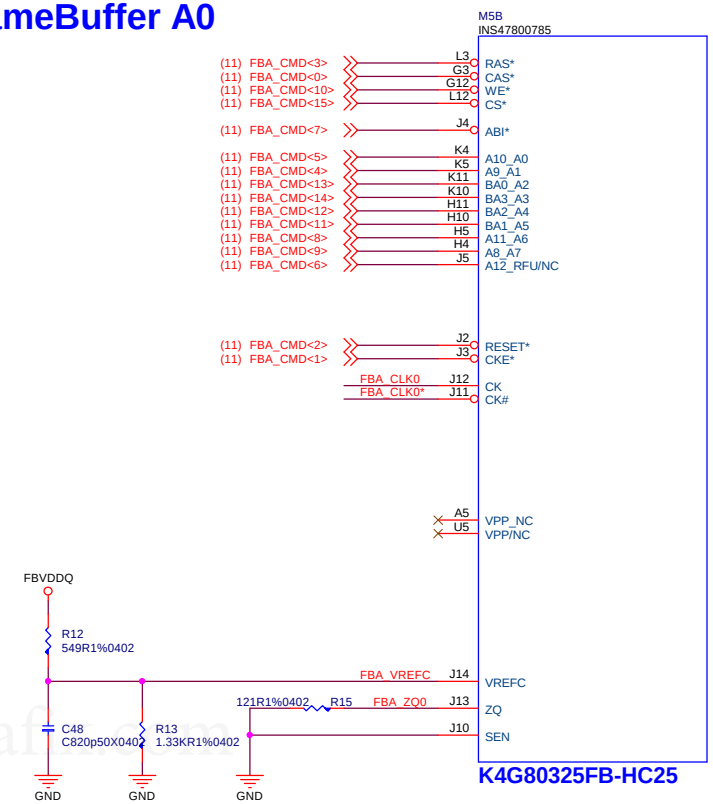
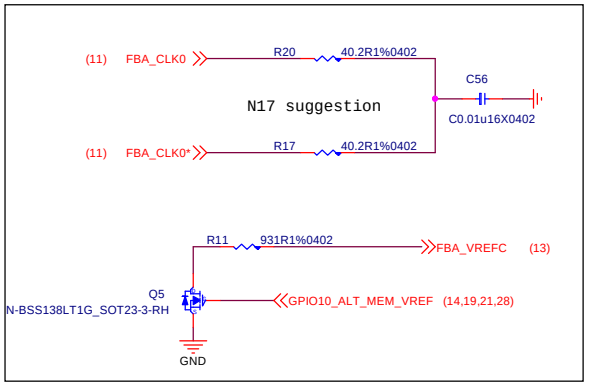
DGPU_GDDR5 FrameBuffer A0









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Hynix PN : M12-5GC4H65-H23 3G(128Mx32bit)

Samsung PN : M12-4132525-S02 3G(128Mx32bit)

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Title: DGPU_GDDR5 FrameBuffer A0

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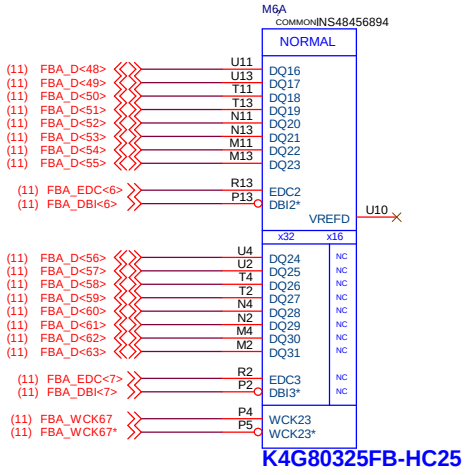
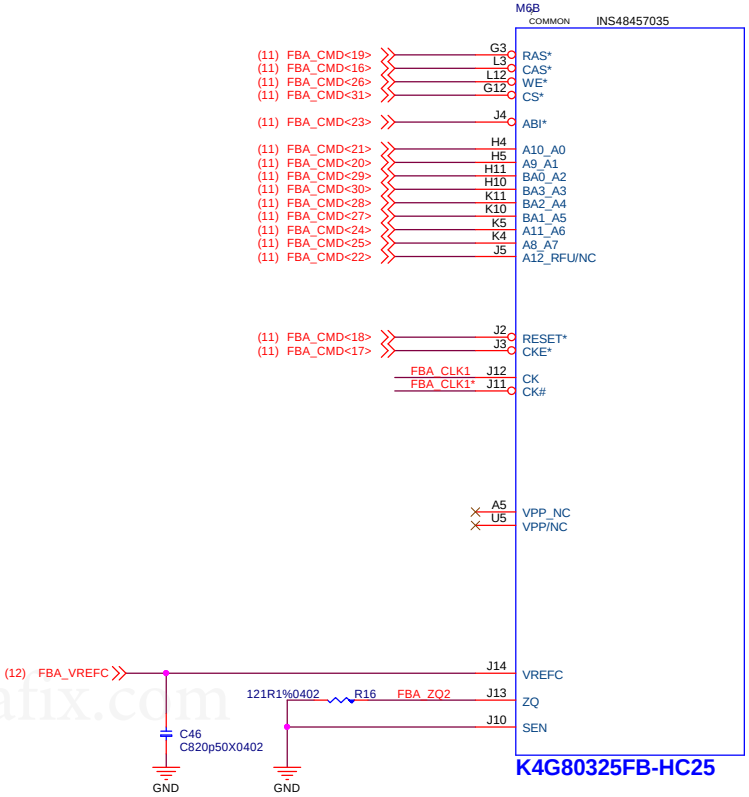
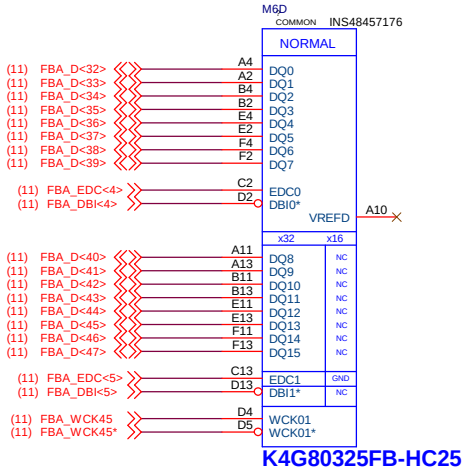
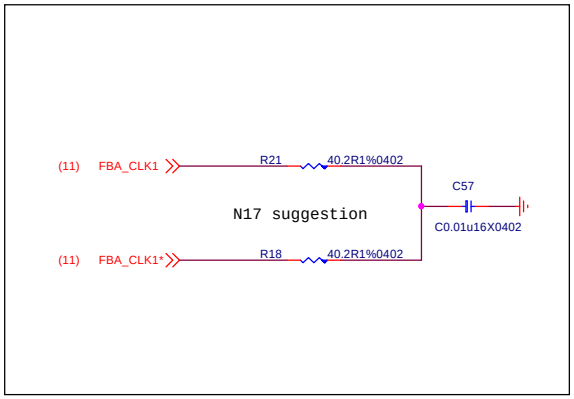
DGPU_GDDR5 FrameBuffer A1









MICRO-STAR INT'L CO.,LTD.		
Title: DGPU_GDDR5 FrameBuffer A1		
Size: A3	Document Number: MS-16P11	Rev: 0A
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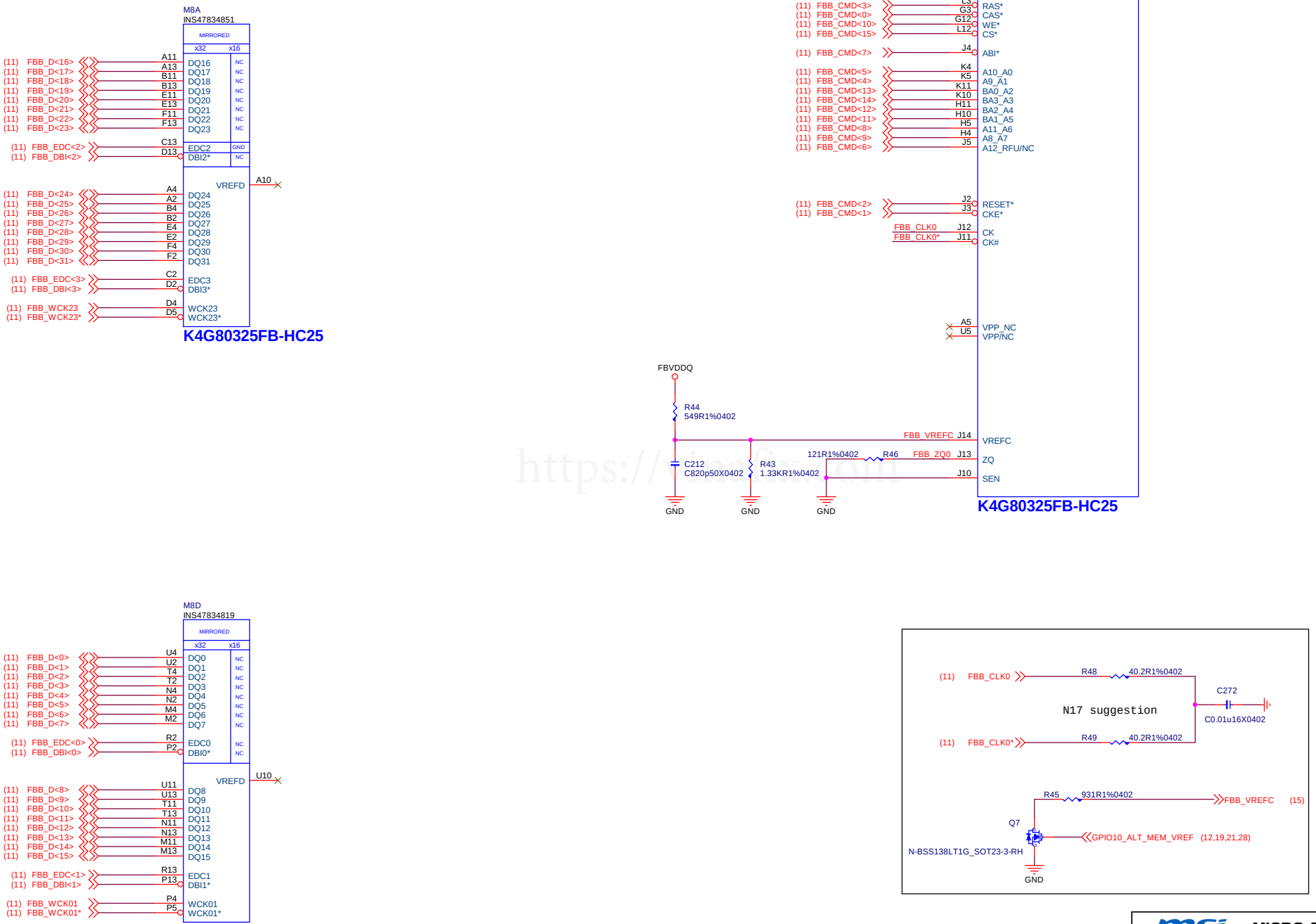
DGPU_GDDR5 FrameBuffer B0



MICRO-STAR INT'L CO.,LTD.		
Title: DGPU_GDDR5 FrameBuffer B0		
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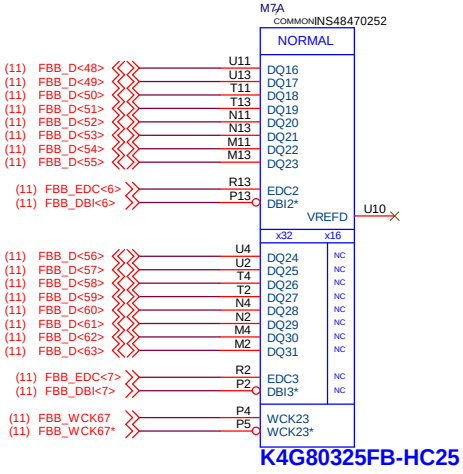
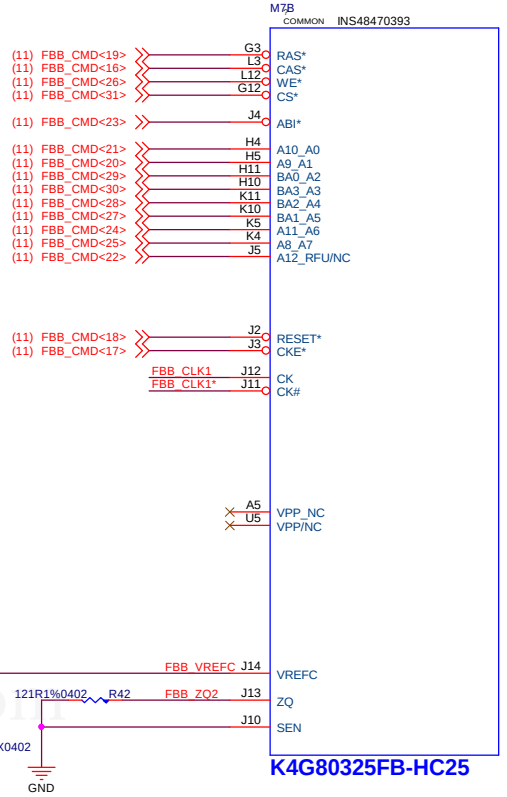
DGPU_GDDR5 FrameBuffer B1





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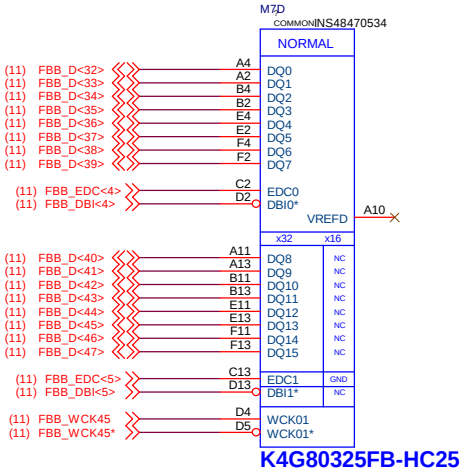

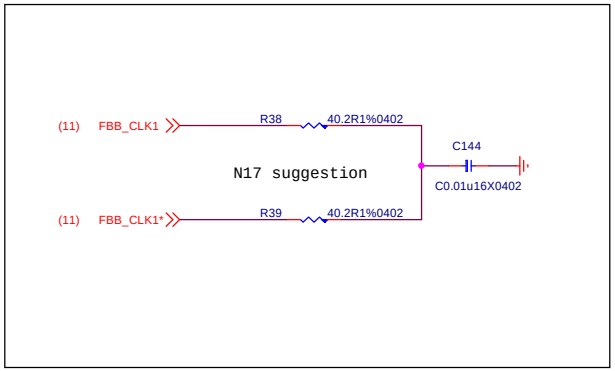

MICRO-STAR INT'L CO.,LTD.		
Title: DGPU_GDDR5 FrameBuffer B1		
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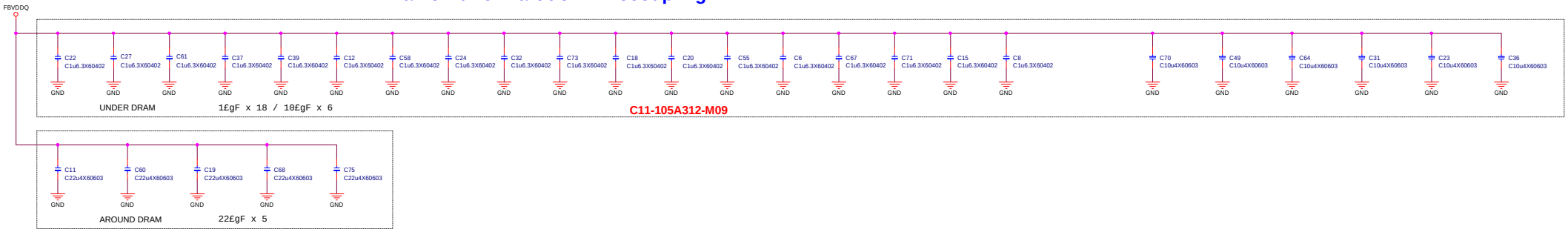
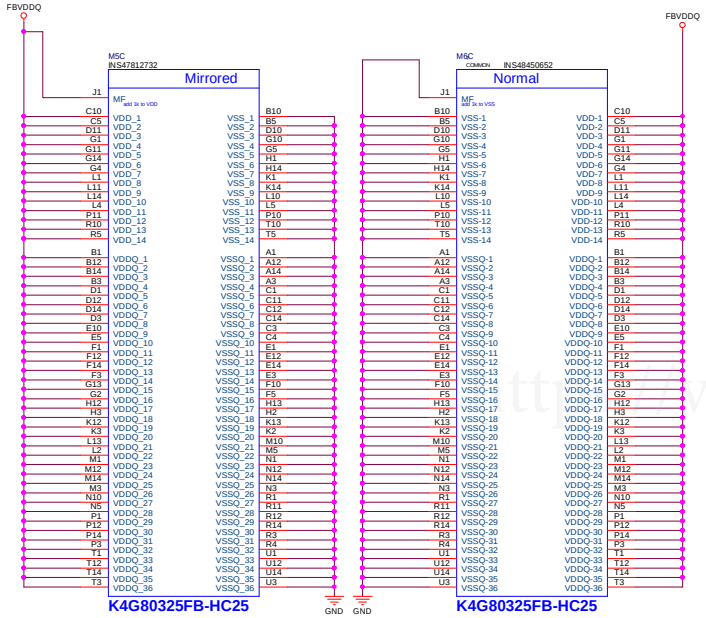
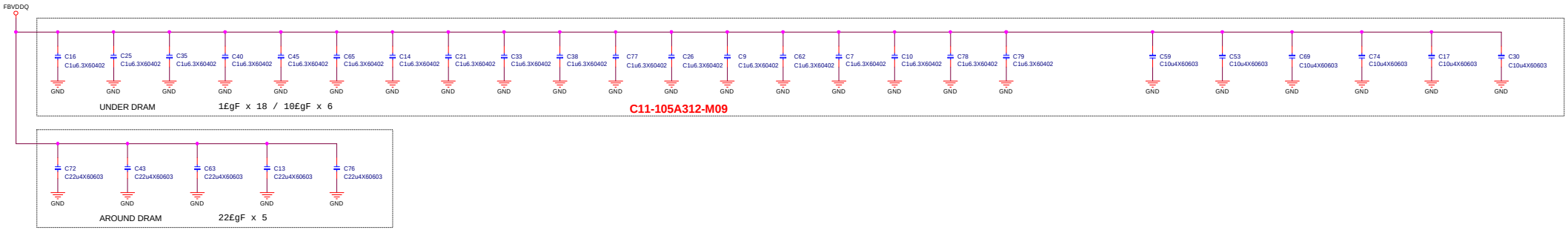
Frame Buffer Partition A Decoupling







msi MICRO-STAR INT'L CO.,LTD.	
Title	DGPU_GDDR5 FB-A_DECOUPLING
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Frame Buffer Partition B Decoupling

MICRO-STAR INT'L CO.,LTD.

Title: DGPU_GDDR5 FB-B_DECOUPLING

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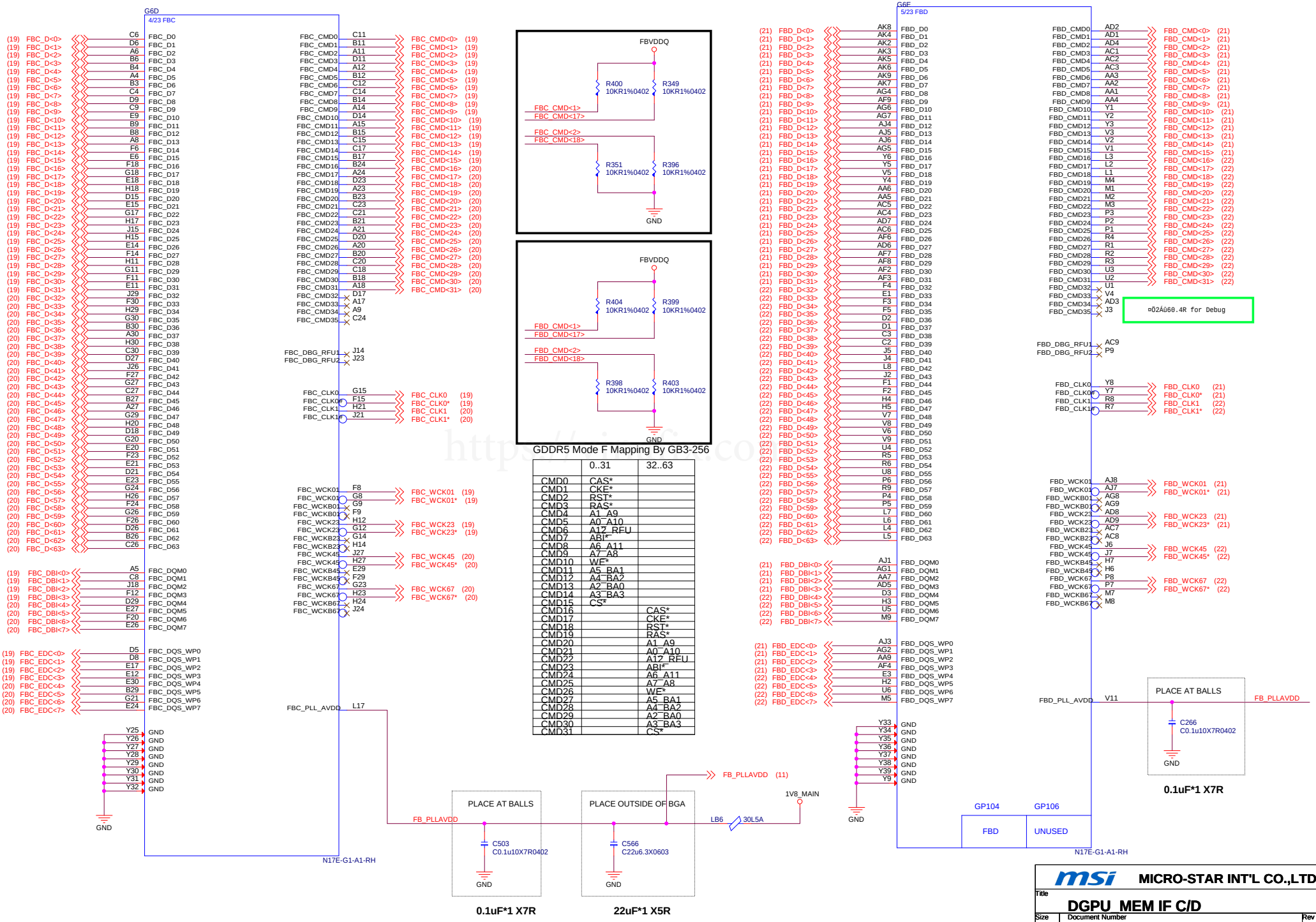
GPU Frame Buffer Partition C/D



Title	DGPU_MEM IF C/D	
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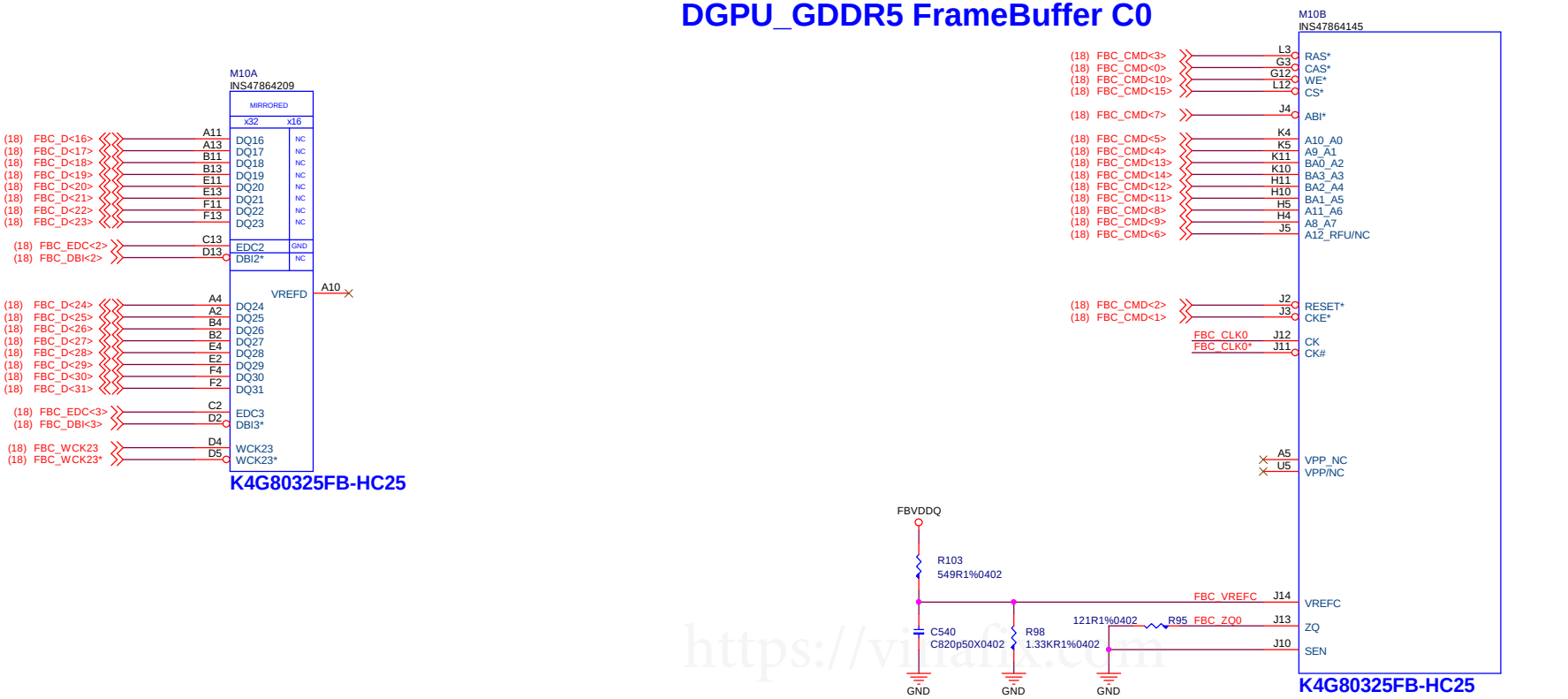
DGPU_GDDR5 FrameBuffer C0



MICRO-STAR INT'L CO.,LTD.		
Title: DGPU_GDDR5 FrameBuffer C		
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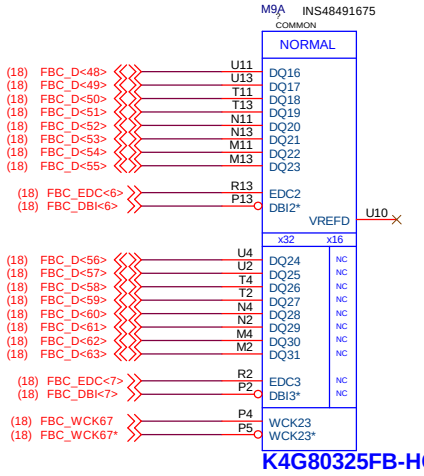
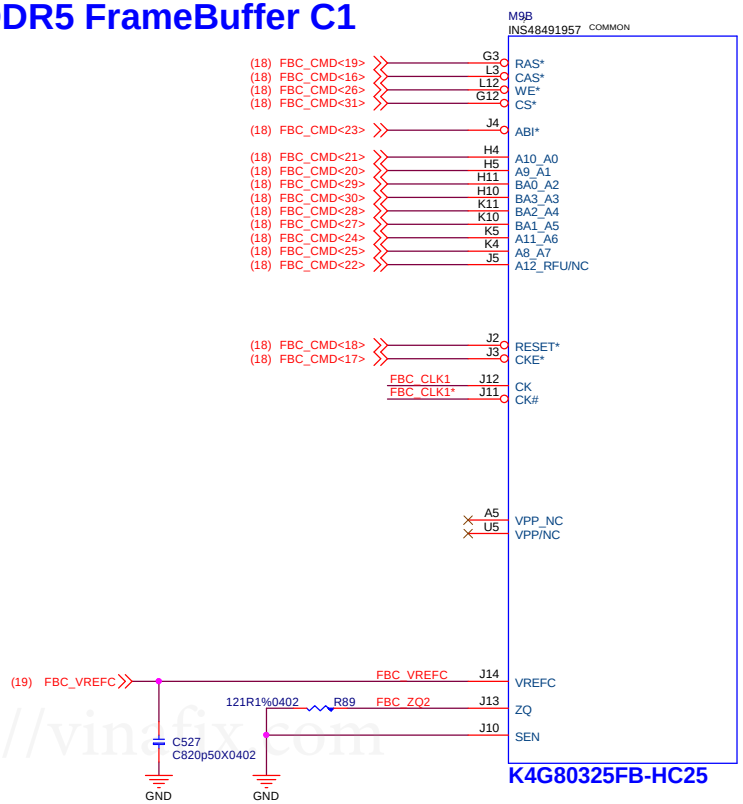
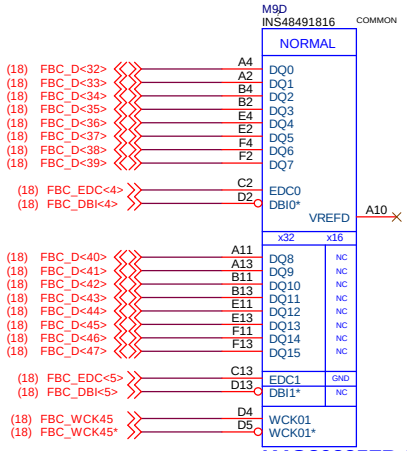
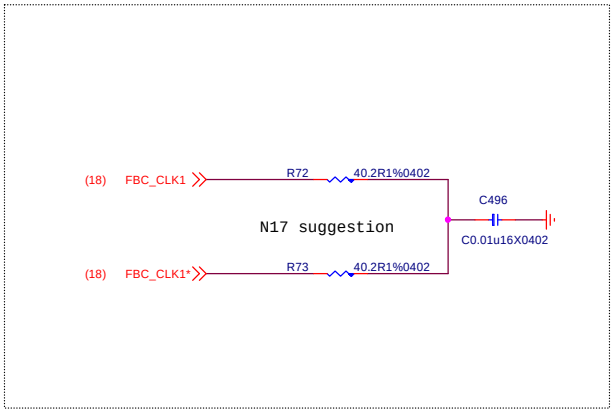
DGPU_GDDR5 FrameBuffer C1









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Title	DGPU_GDDR5 FrameBuffer C	
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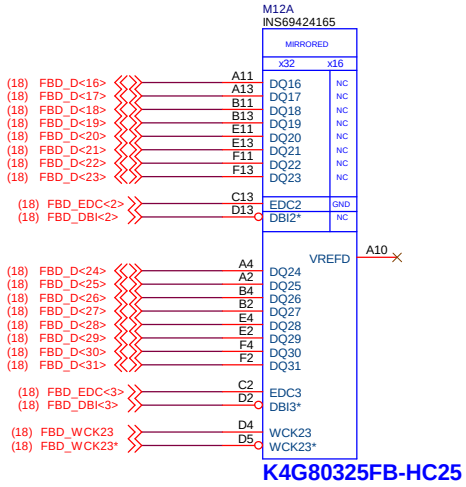
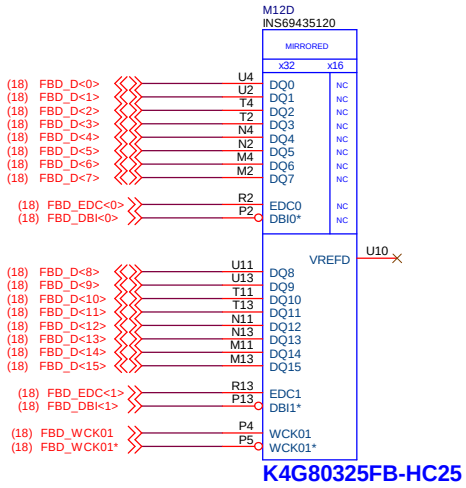
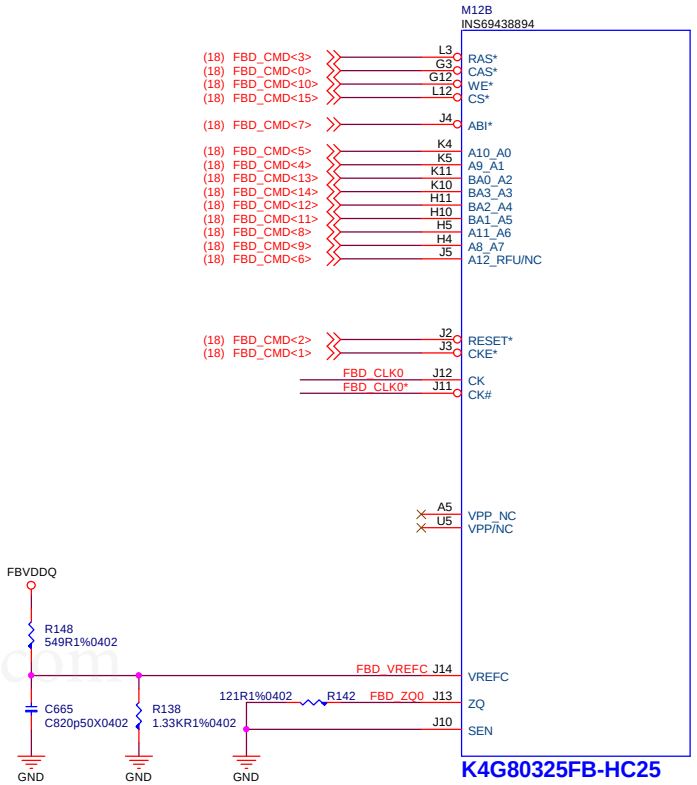
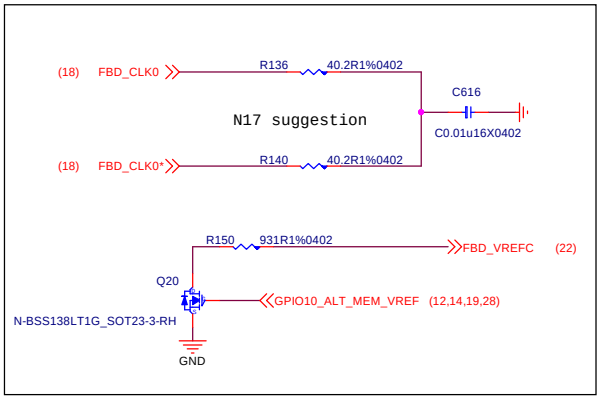
DGPU_GDDR5 FrameBuffer D0









Title	DGPU_GDDR5 FrameBuffer D0	
Size A3	Document Number MS-16P11	Rev 0A
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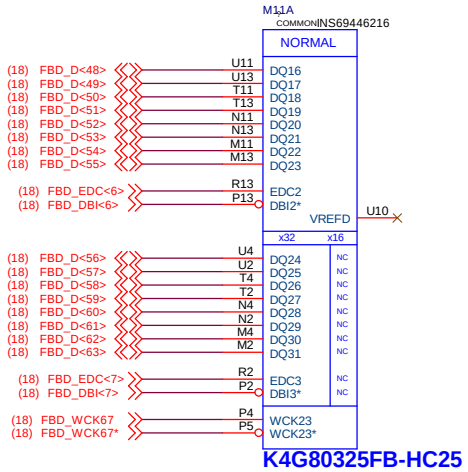
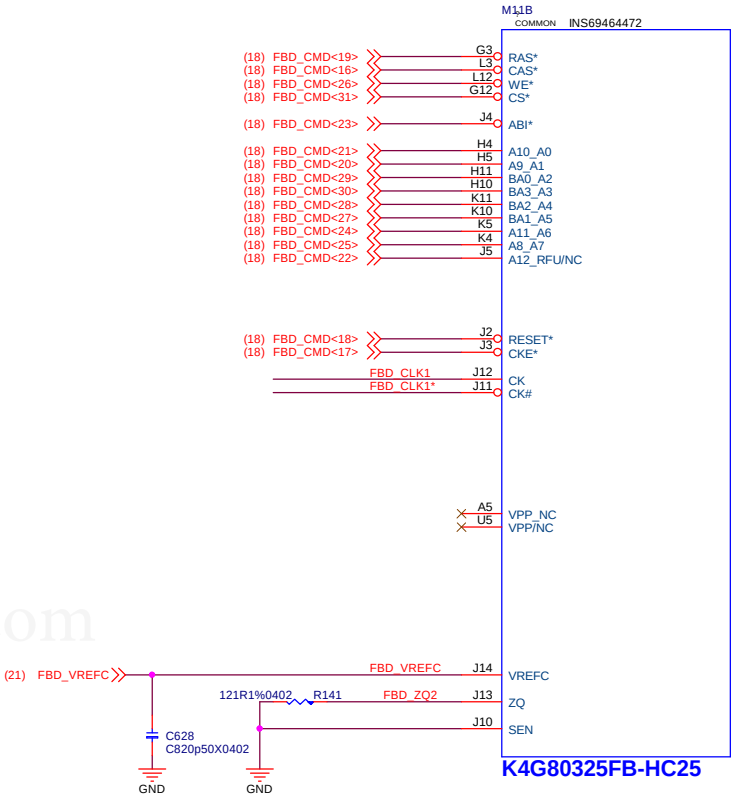
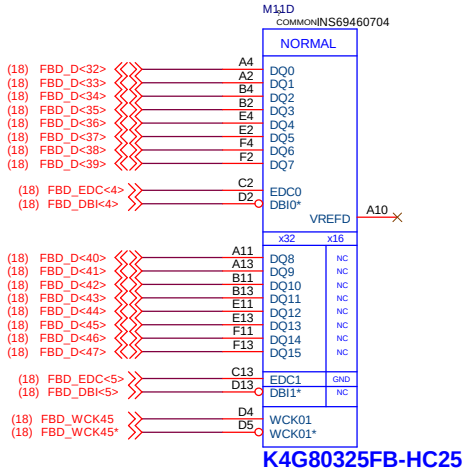
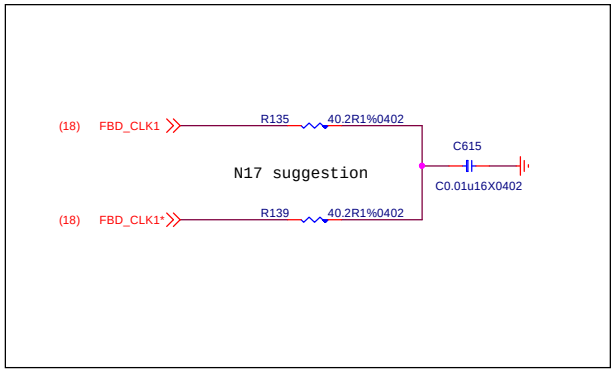
DGPU_GDDR5 FrameBuffer D1









Title	DGPU_GDDR5 FrameBuffer D1	
Size A3	Document Number MS-16P11	Rev 0A
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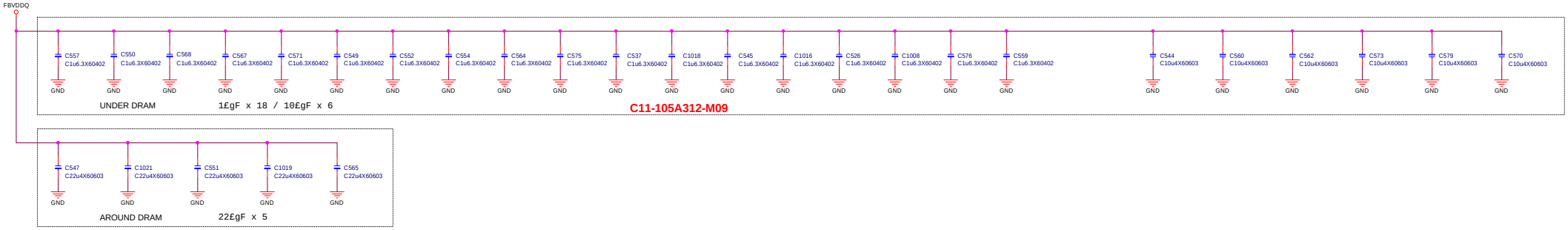
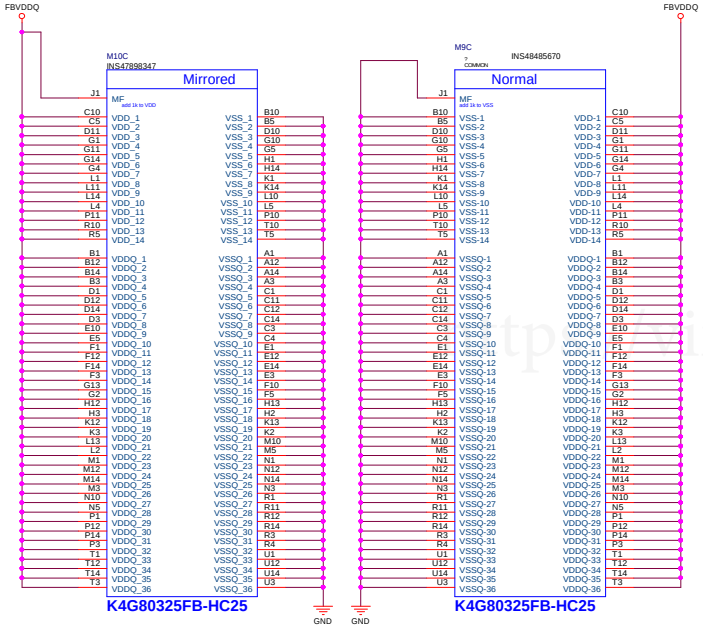
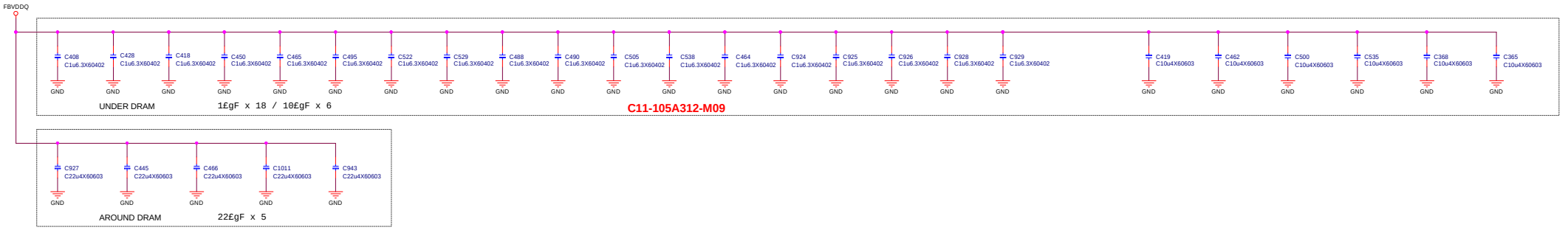
Frame Buffer Partition C Decoupling







Micron PN :M12-2563215-M30 / MT51J256M32HF-80:A (256Mx32bit)
Samsung PN : M12-8032535-S02 / K4G80325FB-HC25 (256Mx32bit)

MICRO-STAR INT'L CO.,LTD.	
Title	DGPU_GDDR5 FB-C_DECOUPLING
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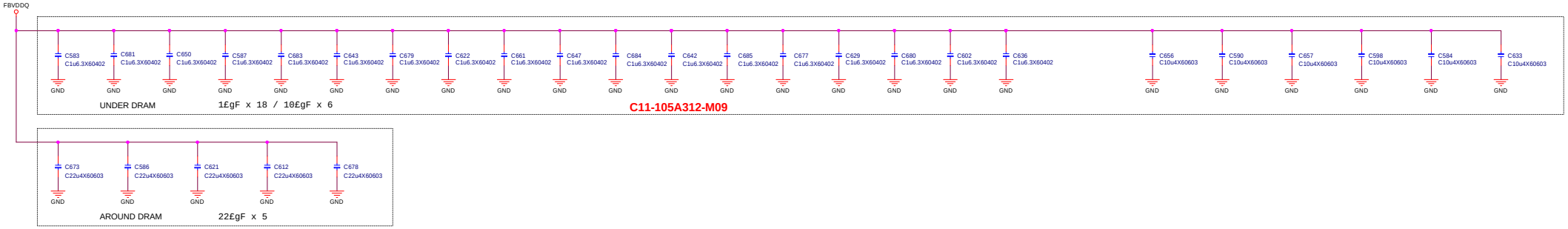
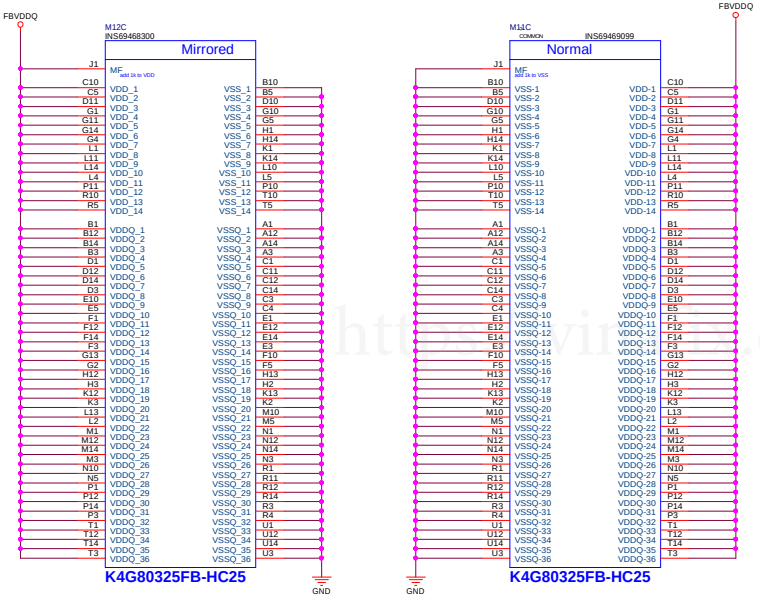
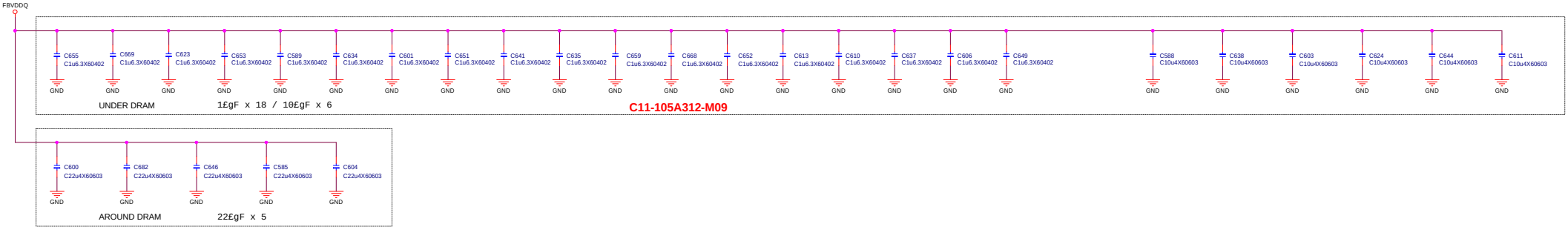
Frame Buffer Partition D Decoupling







Title	<Title>	
Size A2	Document Number MS-16P11	Rev 0A
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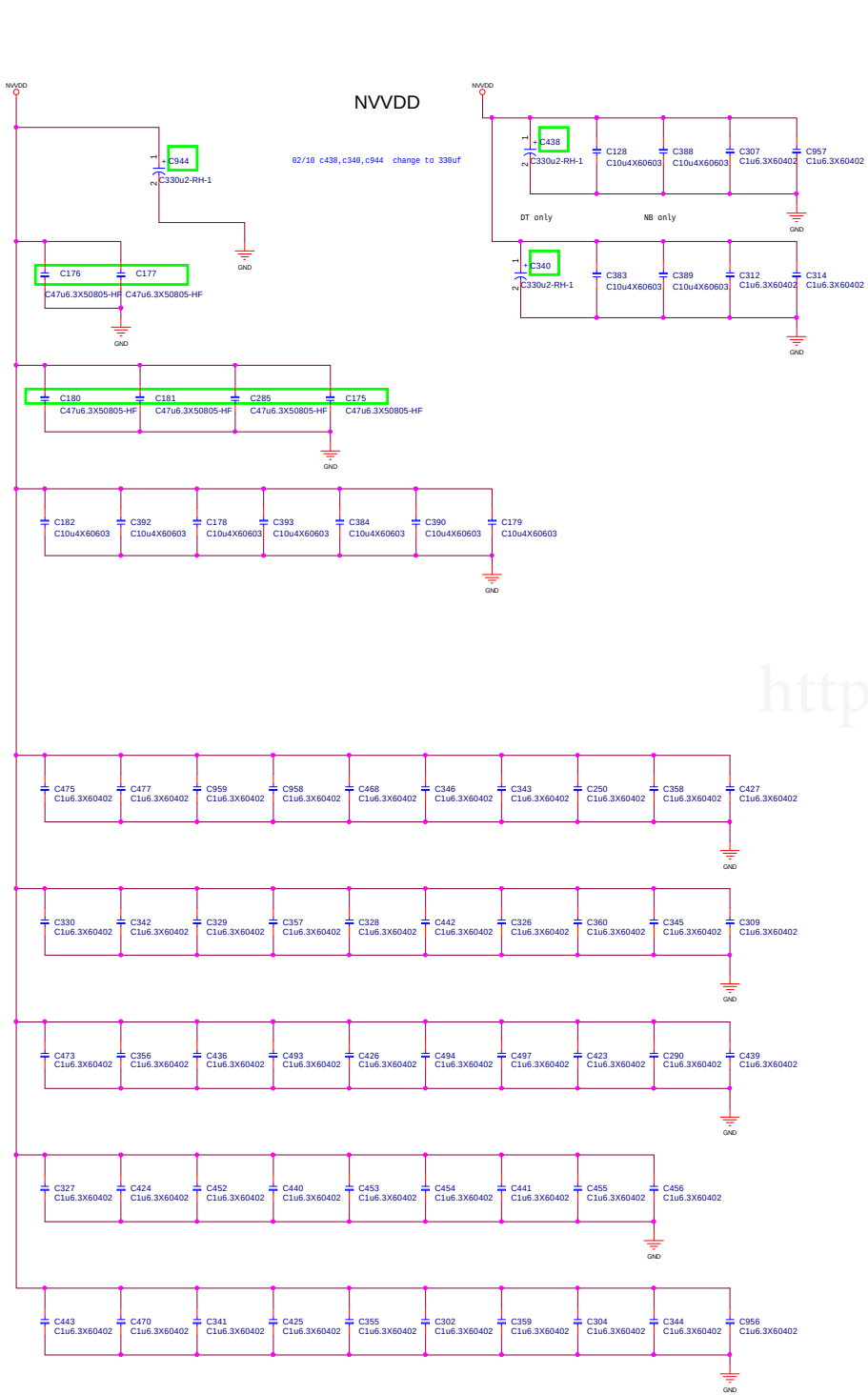
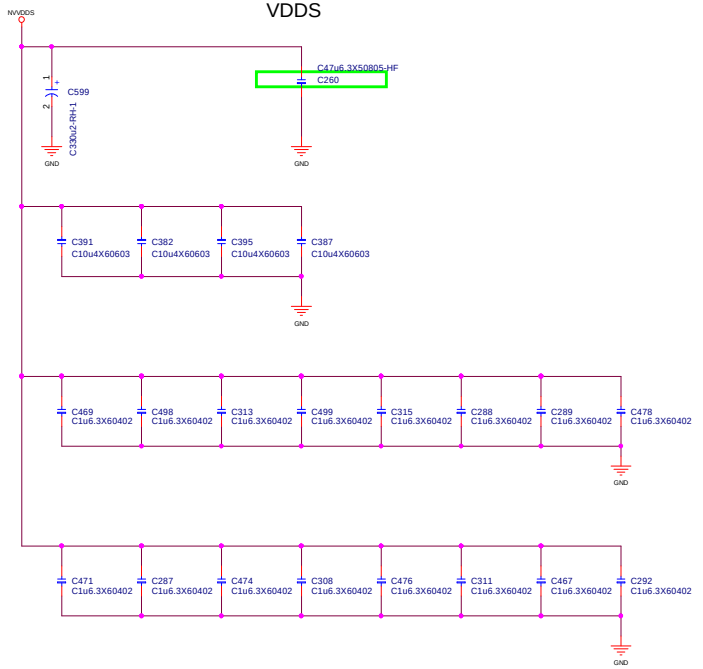
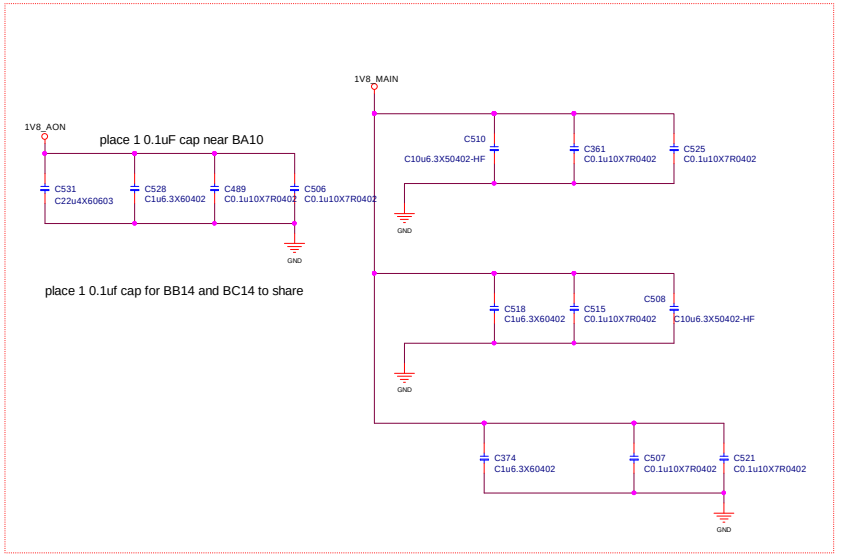
GPU DECOUPLING A







msi MICRO-STAR INT'L CO.,LTD.		
Title: DGPU_GPU DECOUPLING A		
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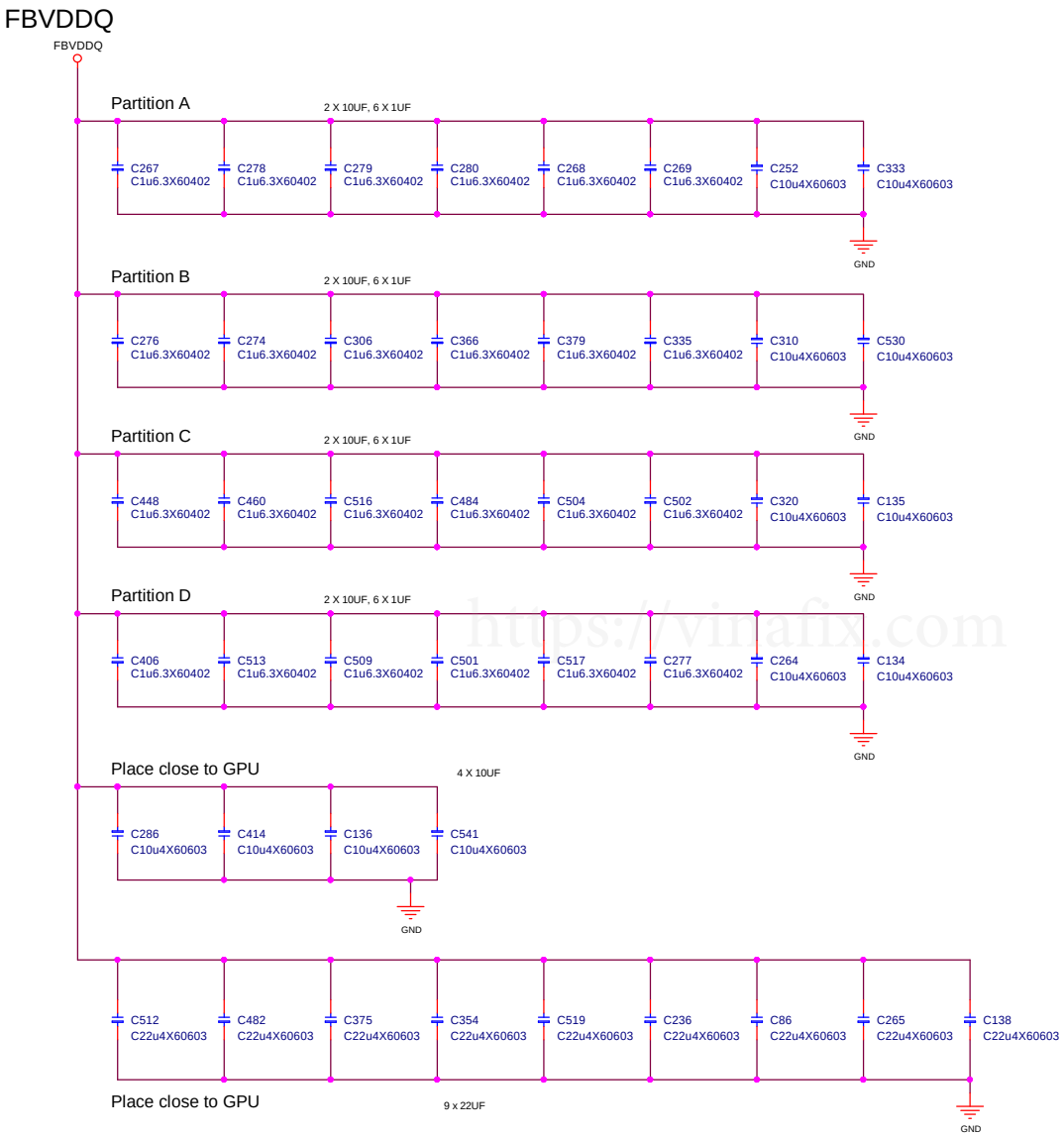
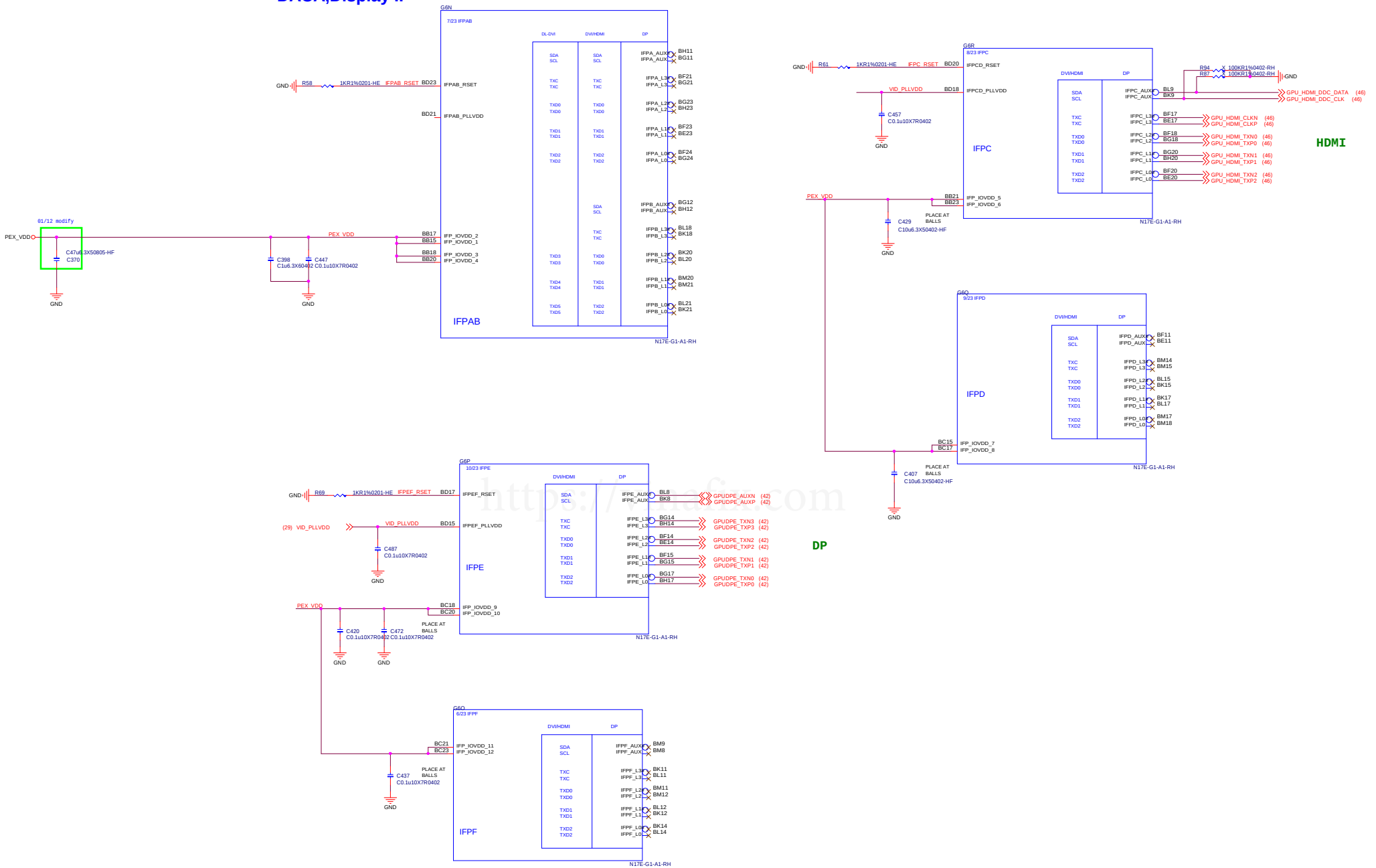
GPU DECOUPLING B



msi MICRO-STAR INT'L CO.,LTD.		
Title: DGPU_GPU DECOUPLING B		
Size: A3	Document Number: MS-16P11	Rev: 0A
Date: Wednesday, May 03, 2017	Sheet 26 of 82	

DACA,Display IF



MICRO-STAR INT'L CO.,LTD.			
Title: DGPU_DACA,Display IF			
Size: A2	Document Number: MS-16P11		Rev: 0A
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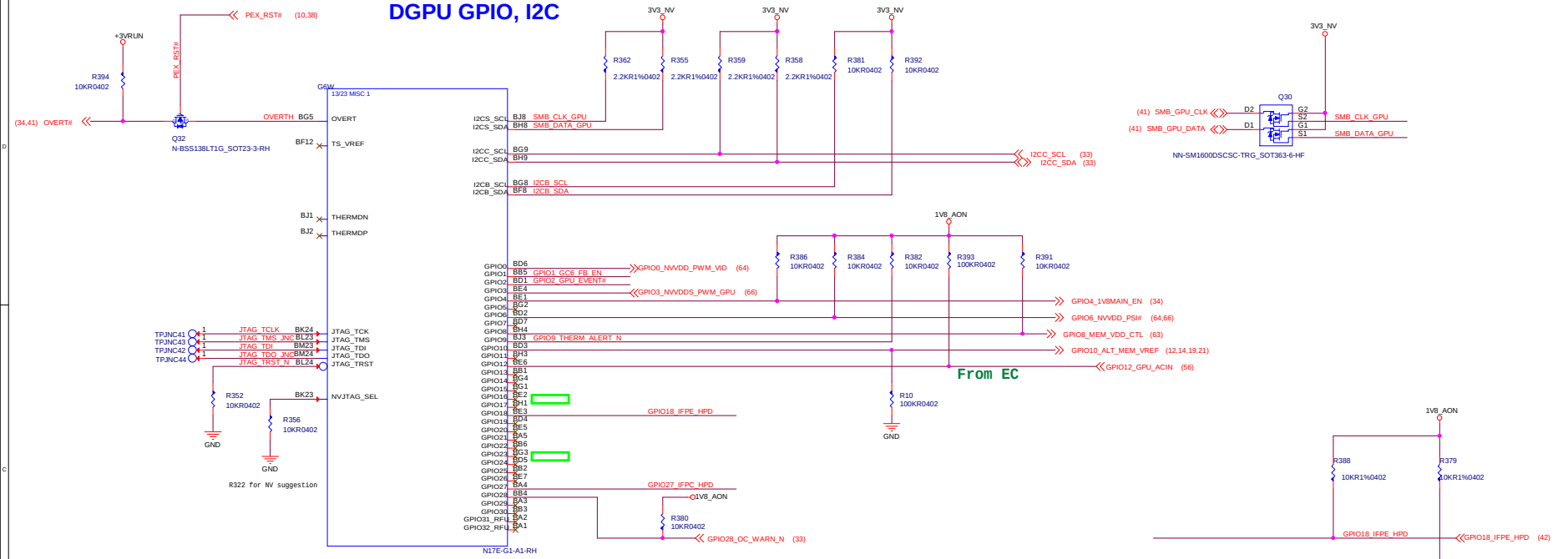
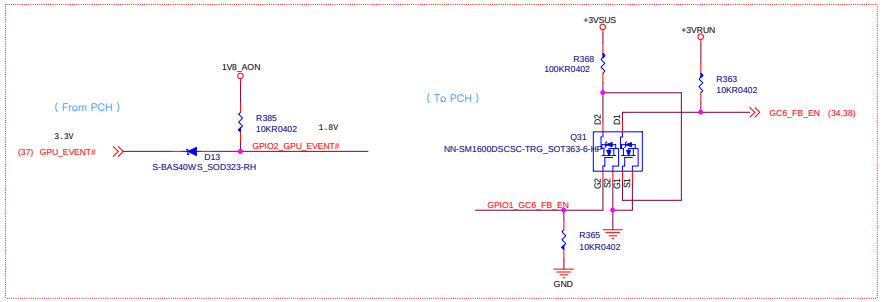
DGPU GPIO, I2C



Pin Name	Normal function	I/O	Functional Description	Recommended Default Pull-up or Pull-down
GPIO0	PWR_VID	O	GPU Core VDD PWM control signal	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	**NVVDD_SRAM_PWM**	O	PWM output to control the SRAM power supply	
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	1V8 pull-up to 1V8 _AON
GPIO6	PSI	O	Phase shedding	10K pull-up to 1V8 _AON
GPIO7	LCD_BL_PWM	O	Panel Backlight PWM Brighteness Control	100K pull-down
GPIO8	**MEM_VDD_CTL**	O	Memory Voltage Control	pull-up/pull-down to set the FBVDD/Q power-on voltage
GPIO9	THERM_ALERT	I/O	Active Low Thermal Alert	10K pull-up to 1V8_AON
GPIO10	MEM_VREF_CTL	O	Memory VREF Control	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	
GPIO15	**HPD_B**	I	Hot Plug Detect for IFPB	
GPIO16	SYS_PEX_RST_MON#	I	System side PCI reset Monitor	10K pull-up to 3V3 _AON
GPIO17	HPD_D	I	Hot Plug Detect for IFPD	
GPIO18	HPD_E	I	Hot Plug Detect for IFPE	
GPIO19	3Dvision	O	3D Vision L/R signal	100K pull-down
GPIO20	**NVVDDS_PSI GC5_MODE**			
GPIO21	SLI_RASTER_SYNC	I	SLI Raster Sync	100K pull-down
GPIO22	SLI_SWAP_DRY	I	SLI Swap Ready	1K pull-up to 3V3 _AON
GPIO23	GPU_PEX_RST_HOLD	O	GPU PCIE self-reset control	10K pull-up to 3V3
GPIO24	HPD_F	I	Hot Plug Detect for IFPDF	
GPIO25	RESERVED			
GPIO26	RESERVED			
GPIO27	HPD_C	I	Hot Plug Detect for IFPC	
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			



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Title: DGPU_GPIO,I2C

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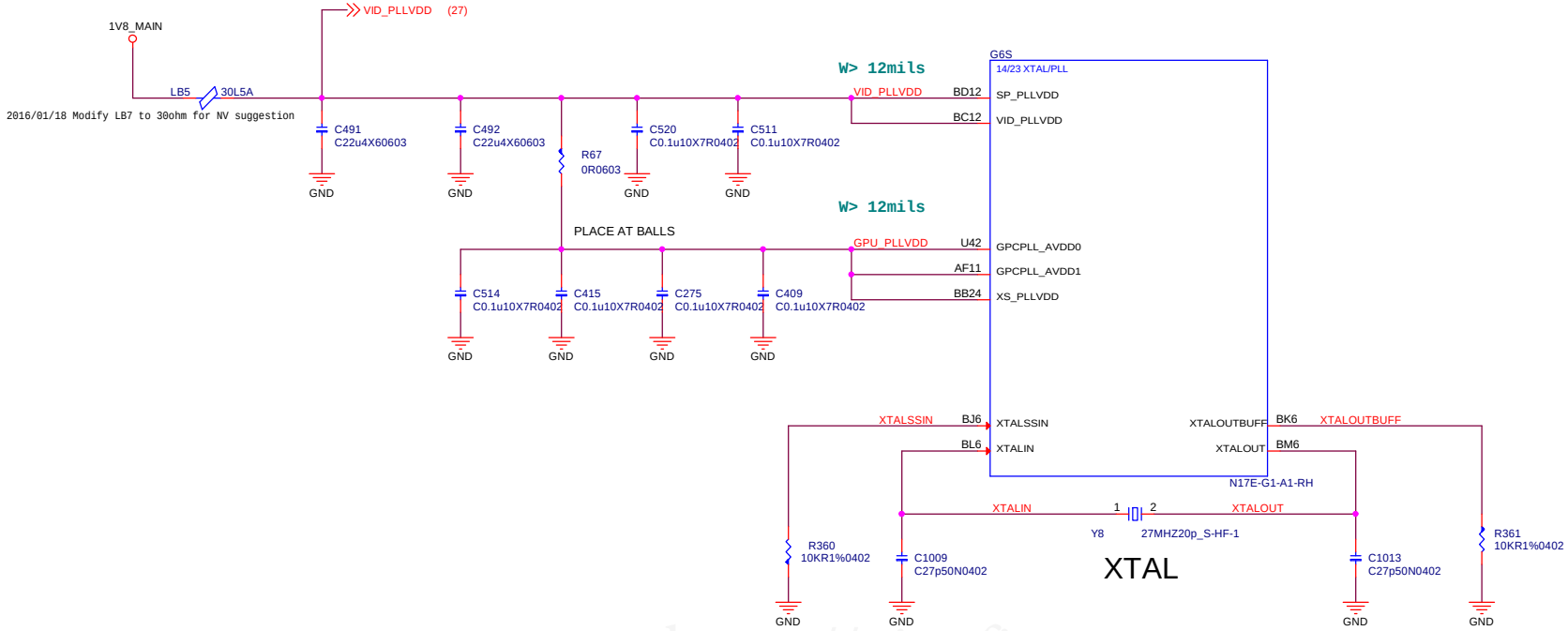
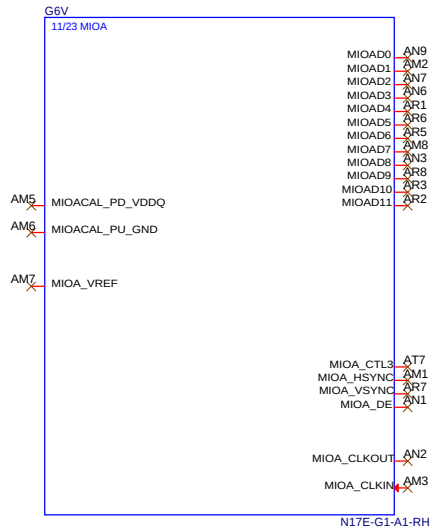
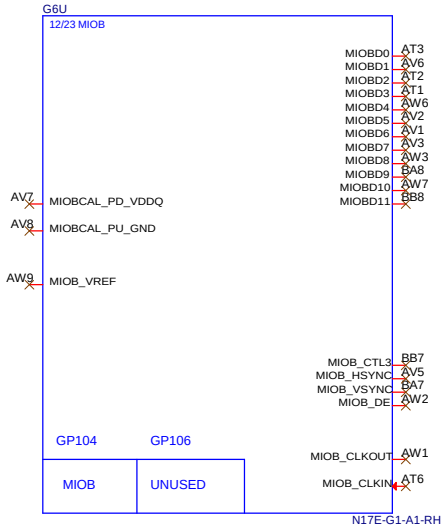
DGPU MIO & XTAL



Multi-use IO(MIO) Interface





MICRO-STAR INT'L CO.,LTD.			
Title: DGPU MIO & XTAL			
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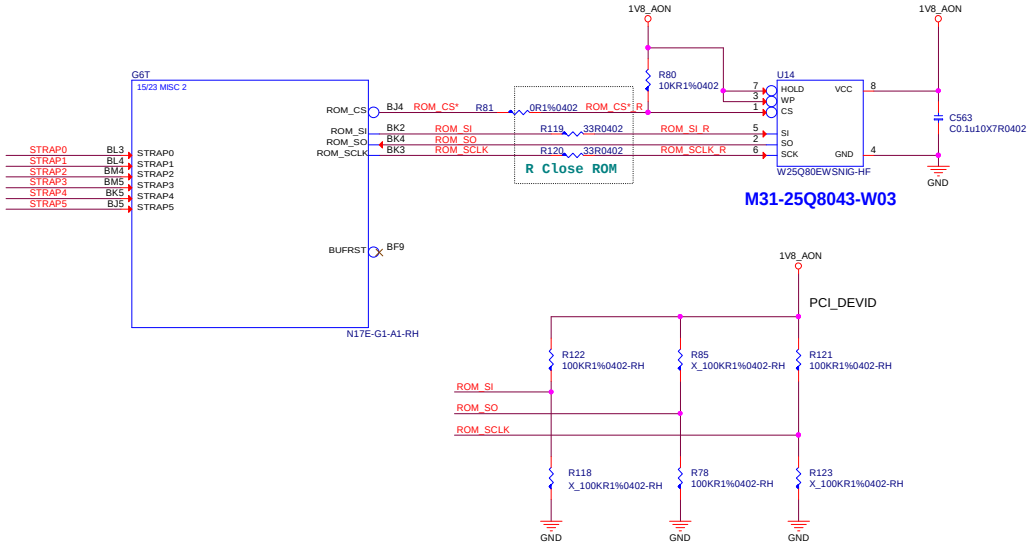
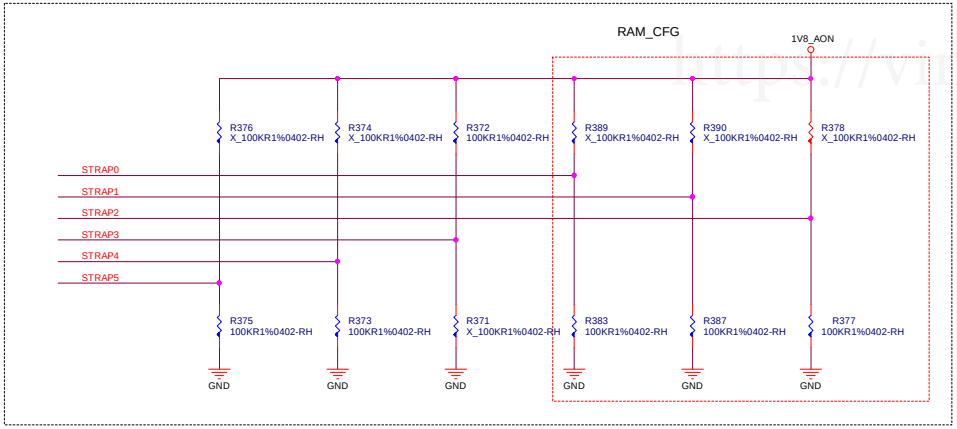
ROM, MULTI-LEVEL STRAPS





DEFAULT SETTING

V_TOP1
5010
M12-8032535-S02
X_K4G80325FB-HC25

V_TOP2
5010
M12-2563215-M30
X_MT51J256M32HF-80:A

V_TOP3
5010
M12-5GC2H05-H23
X_H5GC2H24BFR-T2C

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

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

SAMSUNG 0X0
MICRON 0X1
HYNIX 0X2

ROM_SO	ROM_SI	ROM_SCLK	SOR_EXPOSED[3:0]	1:ENABLE 0:DISABLE
L	L	L	1111 DEFAULT	SOR0/1/2/3 ENABLE
L	L	H	1110	
L	H	L	1101	
L	H	H	1100	
H	L	L	1011	
H	L	H	1010	
H	H	L	1001	
H	H	H	1000	
L	L	M	0111	
L	M	L	0110	
L	M	H	0101	
L	H	M	0100	
H	L	M	0011	
H	M	L	0010	
H	M	H	0001	
H	H	M	0000	V

STRAP5	STRAP4	STRAP3	SMB_ALT_ADDR	DEVID_SEL	PCIE_CFG	VGA_DEVICE
M	H	H	1	1	1	1
M	H	L	1	1	1	0
M	L	H	1	1	0	1
M	L	L	1	1	0	0
L	H	M	1	0	1	1
L	M	H	1	0	1	0
L	M	L	1	0	0	1
L	L	M	1	0	0	0
H	H	H	0	1	1	1
H	H	L	0	1	1	0
H	L	H	0	1	0	1
H	L	L	0	1	0	0
L	H	H	0	0	1	1
L	H	L	0	0	1	0
L	L	H	0	0	0	1 DEFAULT
L	L	L	0	0	0	0 V

1:SMB_ALT_ADDR ENABLE
0:SMB_ALT_ADDR DISABLE

1:DEVID_SEL REBRAND
0:DEVID_SEL ORIGNAL

1:PCIE_CFG LOW POWER
0:PCIE_CFG HIGH POWER

1:VGA_DEVICE ENABLE
0:VGA_DEVICE DISABLE

MICRO-STAR INT'L CO.,LTD.

Title: DGPU_ROM,HW Straps

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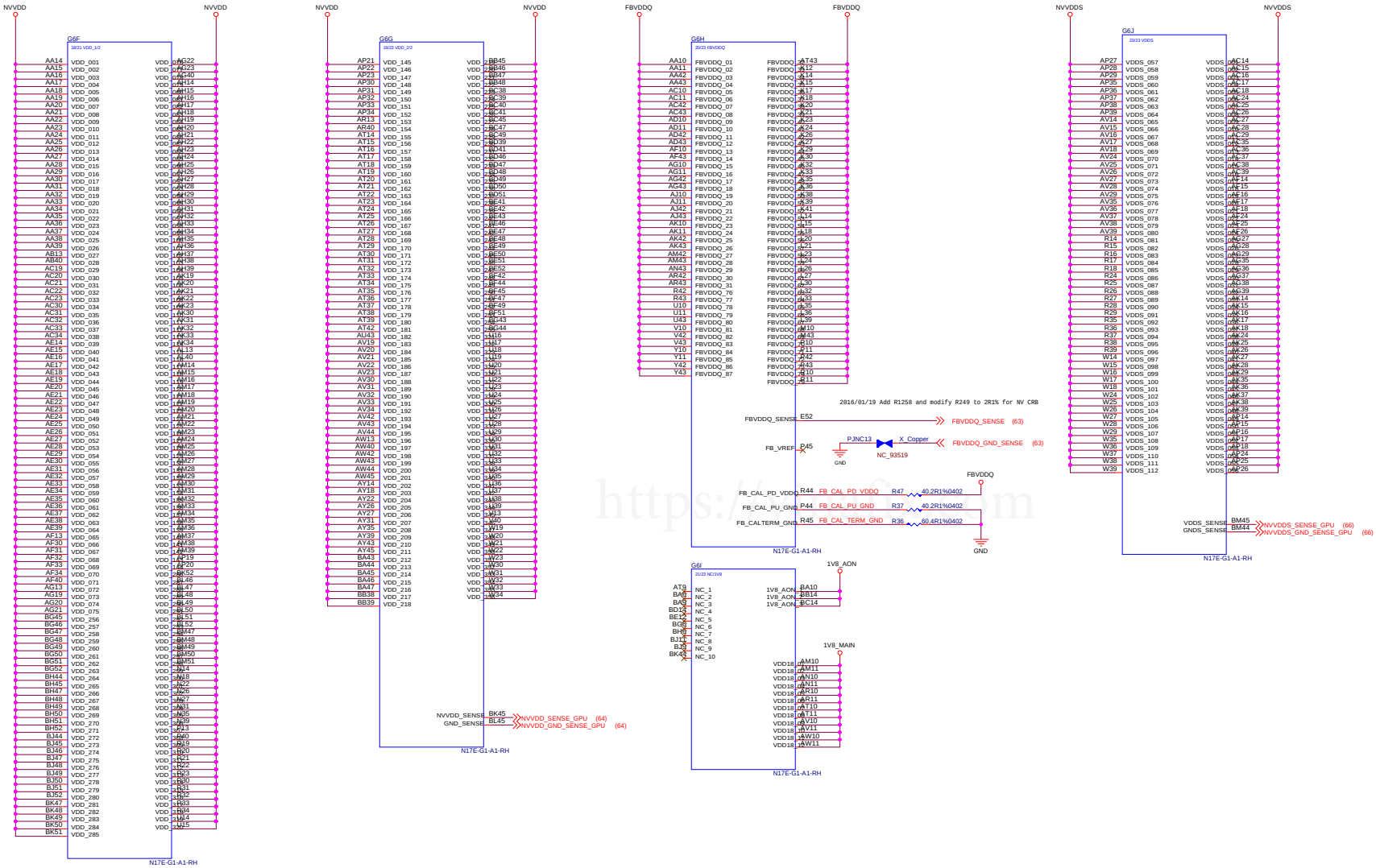
GPU NVVDD, FBVDDQ



MSI MICRO-STAR INT'L CO.,LTD.			
Title: DGPU NVVDD, FBVDDQ			
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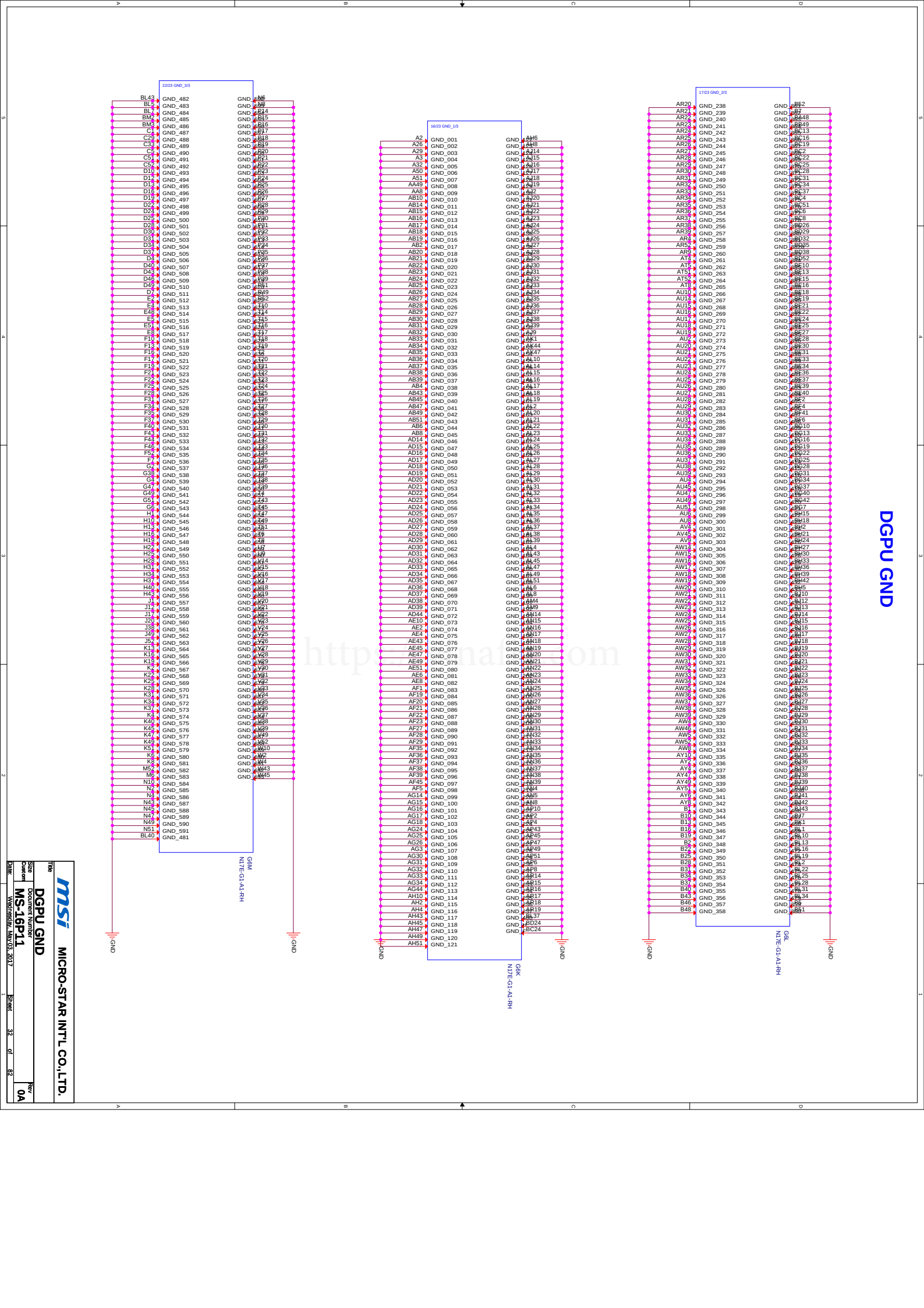
DGPU GND
22/23 GND_3/3
16/23 GND_1/3
17/23 GND_2/3
G6M
N17E-G1-A1-RH
G6K
N17E-G1-A1-RH
G6L
N17E-G1-A1-RH
!GND
MICRO-STAR INT'L CO.,LTD.
DGPU GND
MS-16P11
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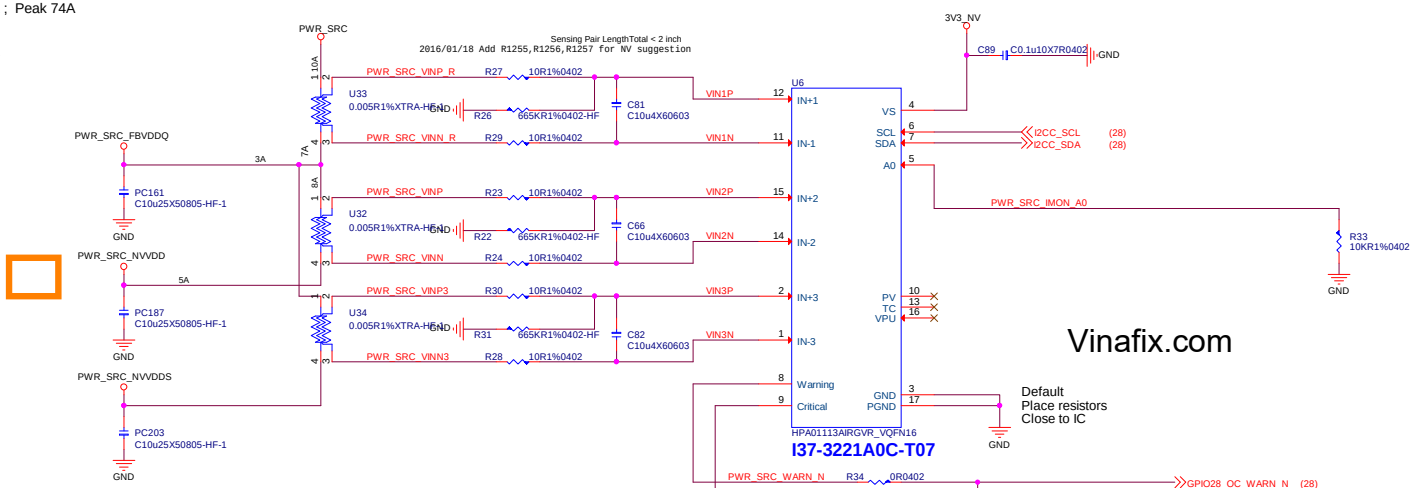
0A

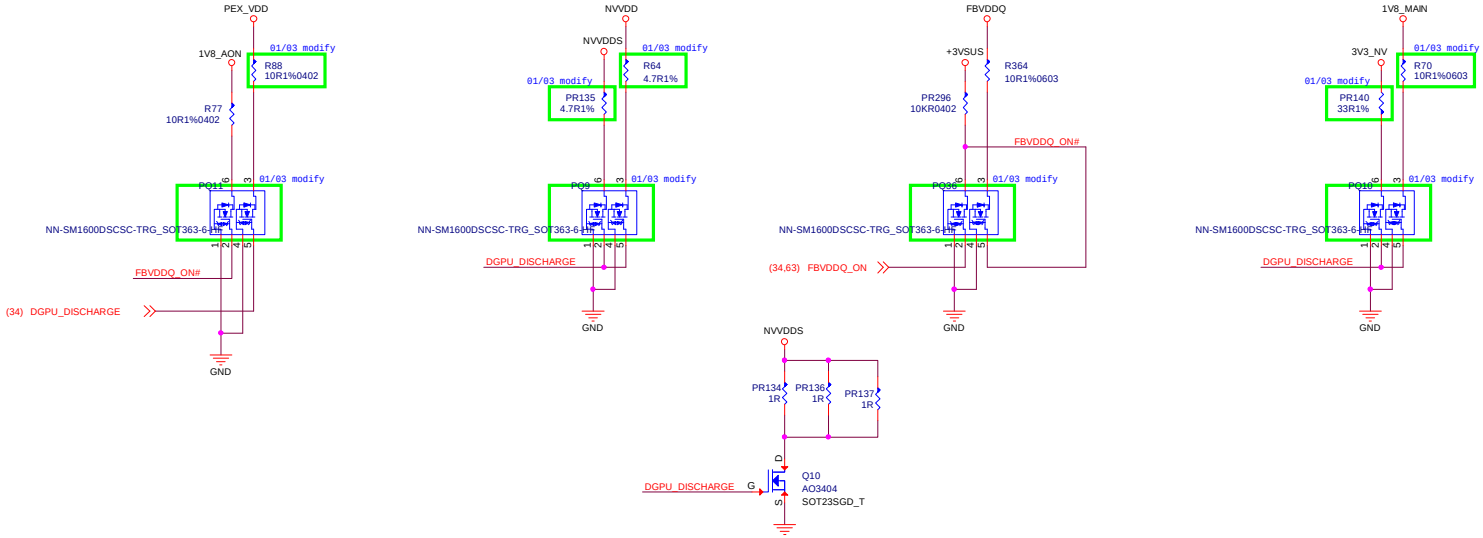
DGPU_Power Control

EDP Design Guide:
N17E-G1(90W)
NVVDD : 58A ; Peak 136A
NVVDDS : 28A ; Peak 74A
1.8V : 0.9A
PEX_VDD : 3A
FBVDDQ : 16A



04/07 1.0 PC161,PC187,PC203 Change to C11-1067620-M09

Discharge



MICRO-STAR INT'L CO.,LTD.

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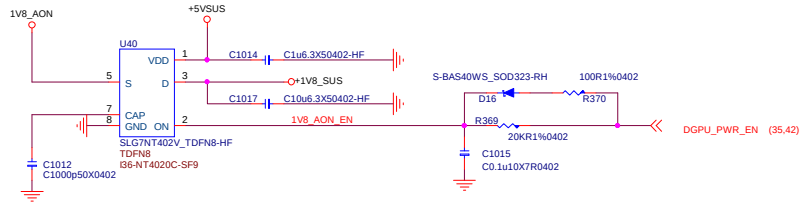
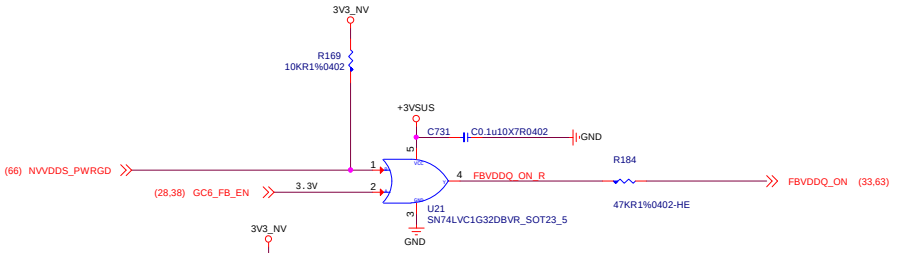
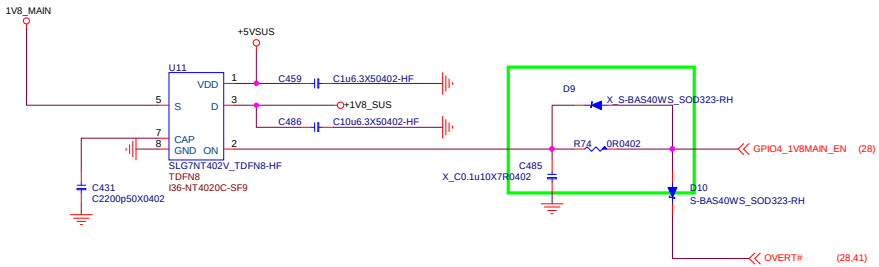
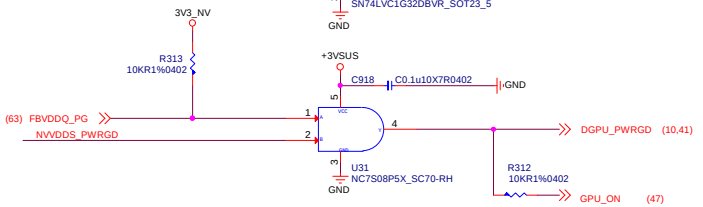
nVIDIA Power Sequence Power UP

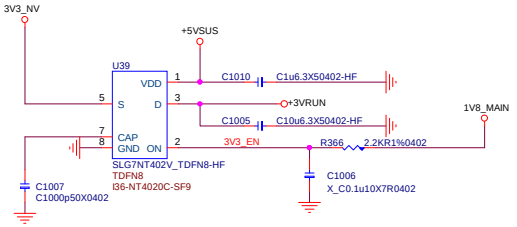
Power on = 1V8_AON -> 1V8_MAIN -> 3V3_NV -> NVVDD -> NVDDS/PEX_VDD -> FBVDDQ -> DGPUPWRGD







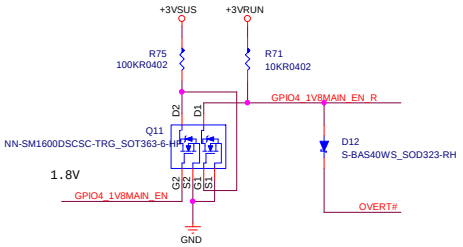


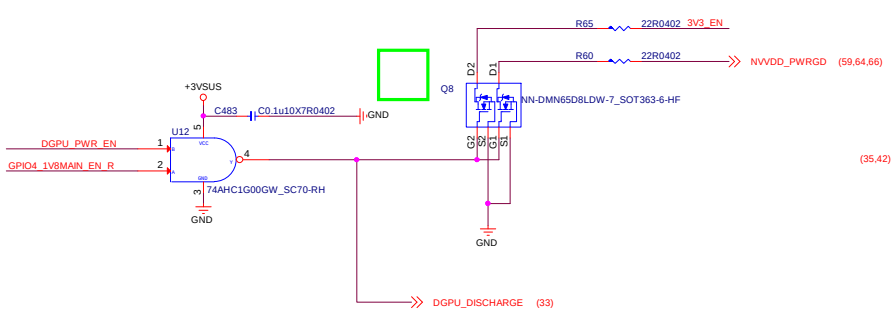


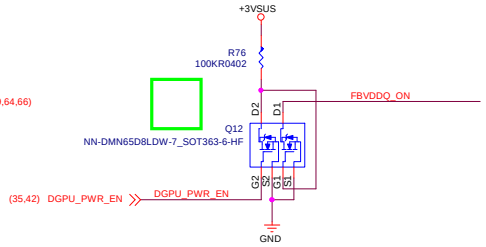
nVIDIA Power Sequence Power Down

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

02/22 Q8,Q12 change to D03-65D8L09-D07







MICRO-STAR INT'L CO.,LTD.

Title: DGPU_Power control, Discharge

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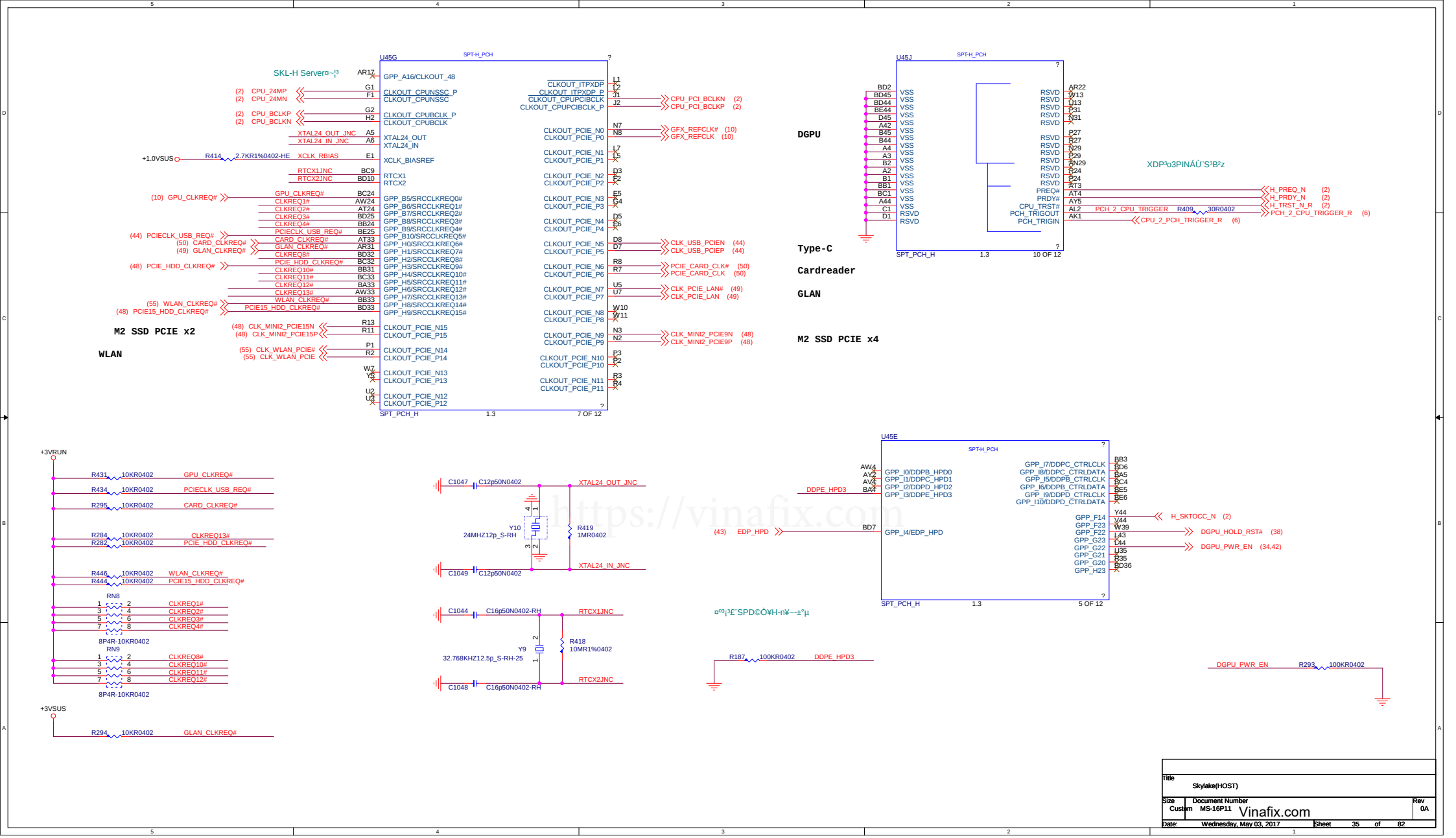
U45G
SPT-H_PCH
SKL-H Servero¬¦³
GPP_A16/CLKOUT_48
CLKOUT_CPUNSSC_P
CLKOUT_CPUNSSC
CLKOUT_CPUBCLK_P
CLKOUT_CPUBCLK
XTAL24_OUT
XTAL24_IN
XCLK_BIASREF
RTCX1
RTCX2
GPP_B5/SRCCLKREQ0#
GPP_B6/SRCCLKREQ1#
GPP_B7/SRCCLKREQ2#
GPP_B8/SRCCLKREQ3#
GPP_B9/SRCCLKREQ4#
GPP_B10/SRCCLKREQ5#
GPP_H0/SRCCLKREQ6#
GPP_H1/SRCCLKREQ7#
GPP_H2/SRCCLKREQ8#
GPP_H3/SRCCLKREQ9#
GPP_H4/SRCCLKREQ10#
GPP_H5/SRCCLKREQ11#
GPP_H6/SRCCLKREQ12#
GPP_H7/SRCCLKREQ13#
GPP_H8/SRCCLKREQ14#
GPP_H9/SRCCLKREQ15#
CLKOUT_PCIE_N15
CLKOUT_PCIE_P15
CLKOUT_PCIE_N14
CLKOUT_PCIE_P14
CLKOUT_PCIE_N13
CLKOUT_PCIE_P13
CLKOUT_PCIE_N12
CLKOUT_PCIE_P12
CLKOUT_ITPXDP
CLKOUT_ITPXDP_P
CLKOUT_CPUPCIBCLK
CLKOUT_CPUPCIBCLK_P
CLKOUT_PCIE_N0
CLKOUT_PCIE_P0
CLKOUT_PCIE_N1
CLKOUT_PCIE_P1
CLKOUT_PCIE_N2
CLKOUT_PCIE_P2
CLKOUT_PCIE_N3
CLKOUT_PCIE_P3
CLKOUT_PCIE_N4
CLKOUT_PCIE_P4
CLKOUT_PCIE_N5
CLKOUT_PCIE_P5
CLKOUT_PCIE_N6
CLKOUT_PCIE_P6
CLKOUT_PCIE_N7
CLKOUT_PCIE_P7
CLKOUT_PCIE_N8
CLKOUT_PCIE_P8
CLKOUT_PCIE_N9
CLKOUT_PCIE_P9
CLKOUT_PCIE_N10
CLKOUT_PCIE_P10
CLKOUT_PCIE_N11
CLKOUT_PCIE_P11
SPT_PCH_H 1.3 7 OF 12
CPU_PCI_BCLKN (2)
CPU_PCI_BCLKP (2)
GFX_REFCLK# (10)
GFX_REFCLK (10)
CLK_USB_PCIEN (44)
CLK_USB_PCIEP (44)
PCIE_CARD_CLK# (50)
PCIE_CARD_CLK (50)
CLK_PCIE_LAN# (49)
CLK_PCIE_LAN (49)
CLK_MINI2_PCIE9N (48)
CLK_MINI2_PCIE9P (48)
M2 SSD PCIE x2
WLAN
U45J
SPT-H_PCH
DGPU
Type-C
Cardreader
GLAN
M2 SSD PCIE x4
SPT_PCH_H 1.3 10 OF 12
XDP³o3PINÁÚ¨S³B²z
H_PREQ_N (2)
H_PRDY_N (2)
H_TRST_N_R (2)
PCH_2_CPU_TRIGGER R409 30R0402
PCH_2_CPU_TRIGGER_R (6)
CPU_2_PCH_TRIGGER_R (6)
+3VRUN
R431 10KR0402 GPU_CLKREQ#
R434 10KR0402 PCIECLK_USB_REQ#
R295 10KR0402 CARD_CLKREQ#
R284 10KR0402 CLKREQ13#
R282 10KR0402 PCIE_HDD_CLKREQ#
R446 10KR0402 WLAN_CLKREQ#
R444 10KR0402 PCIE15_HDD_CLKREQ#
RN8
CLKREQ1#
CLKREQ2#
CLKREQ3#
CLKREQ4#
8P4R-10KR0402
RN9
CLKREQ8#
CLKREQ10#
CLKREQ11#
CLKREQ12#
8P4R-10KR0402
+3VSUS
R294 10KR0402 GLAN_CLKREQ#
C1047 C12p50N0402 XTAL24_OUT_JNC
Y10 24MHZ12p_S-RH
R419 1MR0402
C1049 C12p50N0402 XTAL24_IN_JNC
C1044 C16p50N0402-RH RTCX1JNC
Y9 32.768KHZ12.5p_S-RH-25
R418 10MR1%0402
C1048 C16p50N0402-RH RTCX2JNC
U45E
SPT-H_PCH
GPP_I0/DDPB_HPD0
GPP_I1/DDPC_HPD1
GPP_I2/DDPD_HPD2
GPP_I3/DDPE_HPD3
GPP_I4/EDP_HPD
GPP_I7/DDPC_CTRLCLK
GPP_I8/DDPC_CTRLDATA
GPP_I5/DDPB_CTRLCLK
GPP_I6/DDPB_CTRLDATA
GPP_I9/DDPD_CTRLCLK
GPP_I10/DDPD_CTRLDATA
SPT_PCH_H 1.3 5 OF 12
DDPE_HPD3
(43) EDP_HPD
H_SKTOCC_N (2)
DGPU_HOLD_RST# (38)
DGPU_PWR_EN (34,42)
R187 100KR0402 DDPE_HPD3
DGPU_PWR_EN R293 100KR0402
Title
Skylake(HOST)
Size Custom
Document Number MS-16P11
Rev 0A
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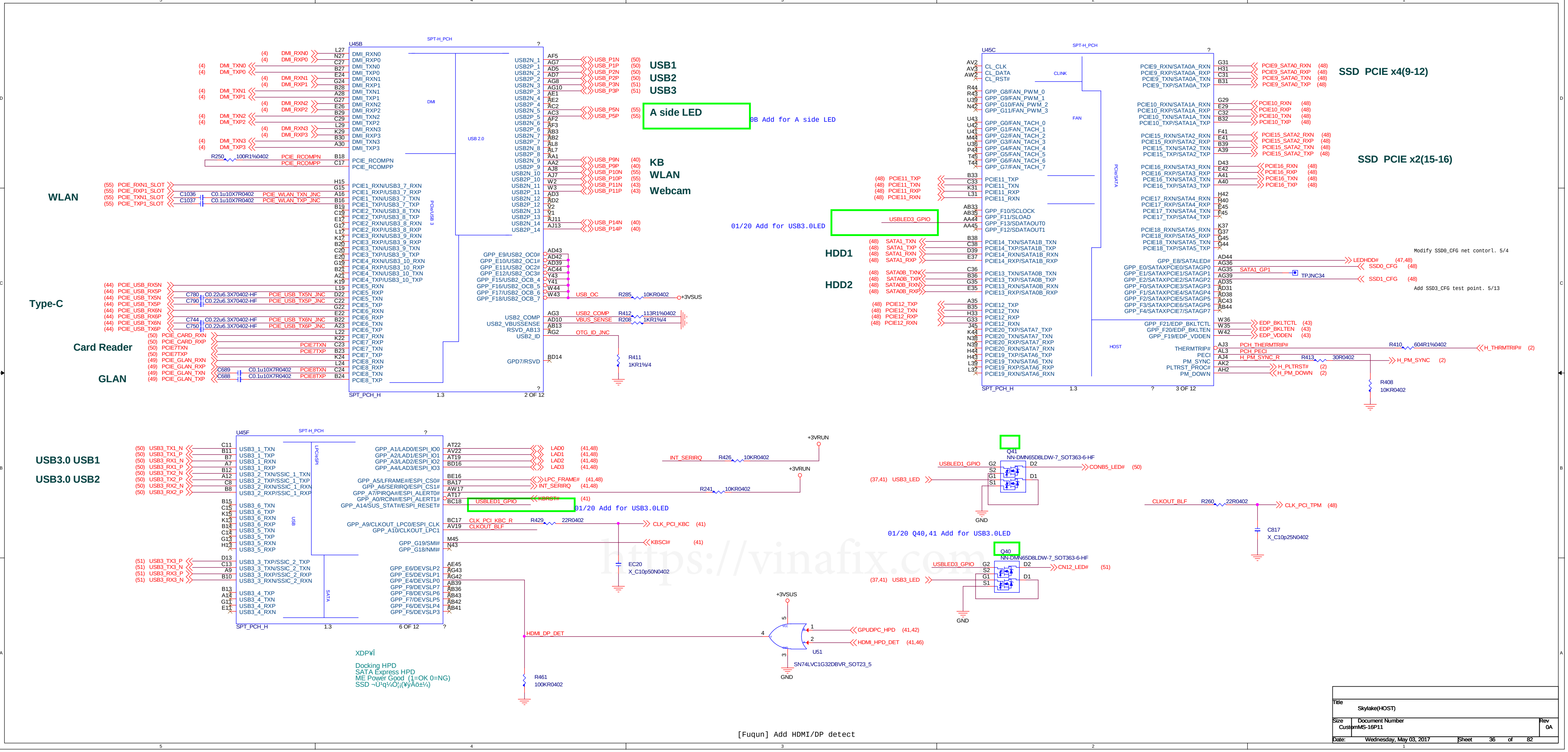
Vinafix.com


USB1
USB2
USB3
A side LED
01/20 Add for A side LED
KB
WLAN
Webcam
WLAN
Type-C
Card Reader
GLAN
SSD PCIE x4(9-12)
SSD PCIE x2(15-16)
01/20 Add for USB3.0LED
HDD1
HDD2
Modify SSD0_CFG net contorl. 5/4
Add SSD3_CFG test point. 5/13
USB3.0 USB1
USB3.0 USB2
01/20 Add for USB3.0LED
01/20 Q40,41 Add for USB3.0LED
U45B
U45C
U45F
SPT_PCH_H
U51
SN74LVC1G32DBVR_SOT23_5
Q41
NN-DMN65D8LDW-7_SOT363-6-HF
Q40
XDP¥Î
Docking HPD
SATA Express HPD
ME Power Good (1=OK 0=NG)
SSD ¬U¹q¼Ò¦¡(¥Ã¤±¼)
[Fuqun] Add HDMI/DP detect
Title
Skylake(HOST)
Size
Custom
Document Number
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Rev
0A
Date: Wednesday, May 03, 2017
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SMBALERT#
0 - Disable (Default Internal 20K PD)
1- Enable (AMT/SBA)

SML0ALERT#
0 - LPC (Default Internal 20K PD)
1- eSPI

PCH EDS Page 52

U45D

SPT-H_PCH

AUDIO

SMBUS

JTAG

HDA_BITCLK
HDA_RST#
(52) CODEC_HDA_SDIN0
(41) FLASH_SECURITY
R407 1KR0402
HDA_SDO
HDA_SYNC

HDA_BCLK
HDA_RST#
HDA_SDI0
HDA_SDI1
HDA_SDO
HDA_SYNC
RSVD_BD1
RSVD_BE2
DISPA_SDO
DISPA_SDI
DISPA_BCLK
GPP_D8/I2S0_SCLK
GPP_D7/I2S0_RXD
GPP_D6/I2S0_TXD
GPP_D5/I2S0_SFRM
GPP_D20/DMIC_DATA0
GPP_D19/DMIC_CLK0
GPP_D18/DMIC_DATA1
GPP_D17/DMIC_CLK1

RTCRST#
SRTCRST#
PCH_PWROK
(41) RSMRST#
SMBALERT#
SUS_SMBCLK
SUS_SMBDATA
SML0ALERT#
SML0_CLK
SML0_DATA
SML1ALERT#
TPJNC35
TPJNC33

RTCRST#
SRTCRST#
PCH_PWROK
RSMRST#
DSW_PWROK
GPP_C2/SMBALERT#
GPP_C0/SMBCLK
GPP_C1/SMBDATA
GPP_C5/SML0ALERT#
GPP_C3/SML0CLK
GPP_C4/SML0DATA
GPP_B23/SML1ALERT#/PCHHOT#
GPP_C6/SML1CLK
GPP_C7/SML1DATA

SPT_PCH_H 1.3 ? 4 OF 12

GPP_A12/BMBUSY#/ISH_GP6/SX_EXIT_HOLDOFF#
GPP_A8/CLKRUN#
GPD11/LANPHYPC
GPD9/SLP_WLAN#
DRAM_RESET#
GPP_B2/VRALERT#
GPP_B1
GPP_B0
GPP_G17/ADR_COMPLETE
GPP_B11
SYS_PWROK
WAKE#
GPD6/SLP_A#
SLP_LAN#
GPP_B12/SLP_S0#
GPD4/SLP_S3#
GPD5/SLP_S4#
GPD10/SLP_S5#
GPD8/SUSCLK
GPD0/BATLOW#
GPP_A15/SUSACK#
GPP_A13/SUSWARN#/SUSPWRDNACK
GPD2/LAN_WAKE#
GPD1/ACPRESENT
SLP_SUS#
GPD3/PWRBTN#
SYS_RESET#
GPP_B14/SPKR
PROCPWRGD
ITP_PMODE
JTAGX
JTAG_TMS
JTAG_TDO
JTAG_TDI
JTAG_TCK

EC_CLKRUN# (41)
·sªºDDR¥ÑPCH°µRESET
DDR4_DRAMRST# (8,9)
SYS_PWROK
¥{-i¥»µ¥CPU PWM OK¦Aµ¤¤]¦æ
¥NEC¹L¯O©¦¦h¥-OAND-n·Q¤@¤U
GPU_EVENT# (28)
GPP_B11(GPO)
R425 1KR0402
+3VSUS
PCIE_WAKE# (44,49)
PM_SLP_S3# (2,41,62)
PM_SLP_S4# (41,58)
TPJNC32
SUSCLK (41)
3sEC
BATLOW#
USBLED2_GPIO
01/20 Add for USB3.0LED
LAN_WAKE#
AC_PRESENT (41)
PM_PWRBTN# (41)
PM_SYSRST#
H_PWRGD (2)
PCH_JTAGX (2)
PCH_JTAG_TMS (2)
PCH_JTAG_TDO (2)
PCH_JTAG_TDI (2)

0 - Enable TCO

+3VRUN
PM_SYSRST# R406 10KR0402
SMB_CLK_DIMM R467 2.2KR0402
SMB_DATA_DIMM R463 2.2KR0402
EC_CLKRUN# R432 8.2KR1%0402
Modify R139,R141, R149,R151 2.2K page33.5/25

Q37
SUS_SMBCLK
SUS_SMBDATA
S1 G1 S2 G2 D1 D2
SMB_CLK_DIMM (8,9,55)
SMB_DATA_DIMM (8,9,55)
NN-DMN65D8LDW-7_SOT363-6-HF

+5VRUN

01/20 Q42 Add for USB3.0LED
Q42
NN-DMN65D8LDW-7_SOT363-6-HF
USBLED2_GPIO
(36,41) USB3_LED
CONB6_LED# (50)
GND

+3VSUS
R298 2.2KR0402 SMBALERT#
R292 2.2KR0402 SUS_SMBCLK
R288 2.2KR0402 SUS_SMBDATA
R297 1KR0402 SML0_CLK
R299 1KR0402 SML0_DATA
RN11
LAN_WAKE#
BATLOW#
AC_PRESENT
8P4R-10KR0402

+3VALW
Change R276 TO 0R . 9/24
R448 1KR0402
Change R279 NC 9/24
Q36 NN-DMN65D8LDW-7_SOT363-6-HF
EC_RTC_RST (41)
R443 100KR0402
PQ48 P-AO3415_SOT23-3-RH
R456 X_C1u10X50405-HF
R450 22R0402
RTCVCC
D17
D18 S-BAT54C_SOT23
1SS355VMTE_SOD323
R206 20KR0402-2 RTCRST#
C748 C1u10X0603
G5
C1060 C1u10X0603
Change D7 9/24
Change R277 TO 1uF . 9/24
RTC_P2
R453 1KR0402
RTC_P3
CN16
BH1X2#S-1.25PITCH_BLACK-HF
R229 20KR0402-2 SRTCRST#
C775 C1u10X0603

(52) CODEC_HDA_BIT_CLK
(52) CODEC_HDA_SDOUT
(52) CODEC_HDA_RST#
(52) CODEC_HDA_SYNC
RN10
HDA_BITCLK
HDA_SDO
HDA_RST#
HDA_SYNC
8P4R-33R0402
EC66 X_C10p50N0402
EC65 X_C10p50N0402
EC64 X_C10p50N0402
EC63 X_C10p50N0402

+3VSUS
C1042 C0.1u10X7R0402
(60) CPU_PWROK
(2,41,60,62) EC_ALLSYSPG
PCH_PWROK
U19
NC7S08P5X_SC70-RH

60¶¥
BAT2
BCR1220H2.8AM1KB
D06-0105701-K26

+3VSUS
C716 C0.1u10X7R0402
PCH_PWROK
(41) EC_PCH_PWROK
SYS_PWROK
EC delay 100ms
U44
NC7S08P5X_SC70-RH

N32-10200Q0-A81

Title	Skylake(HOST)		
Size	Document Number		Rev
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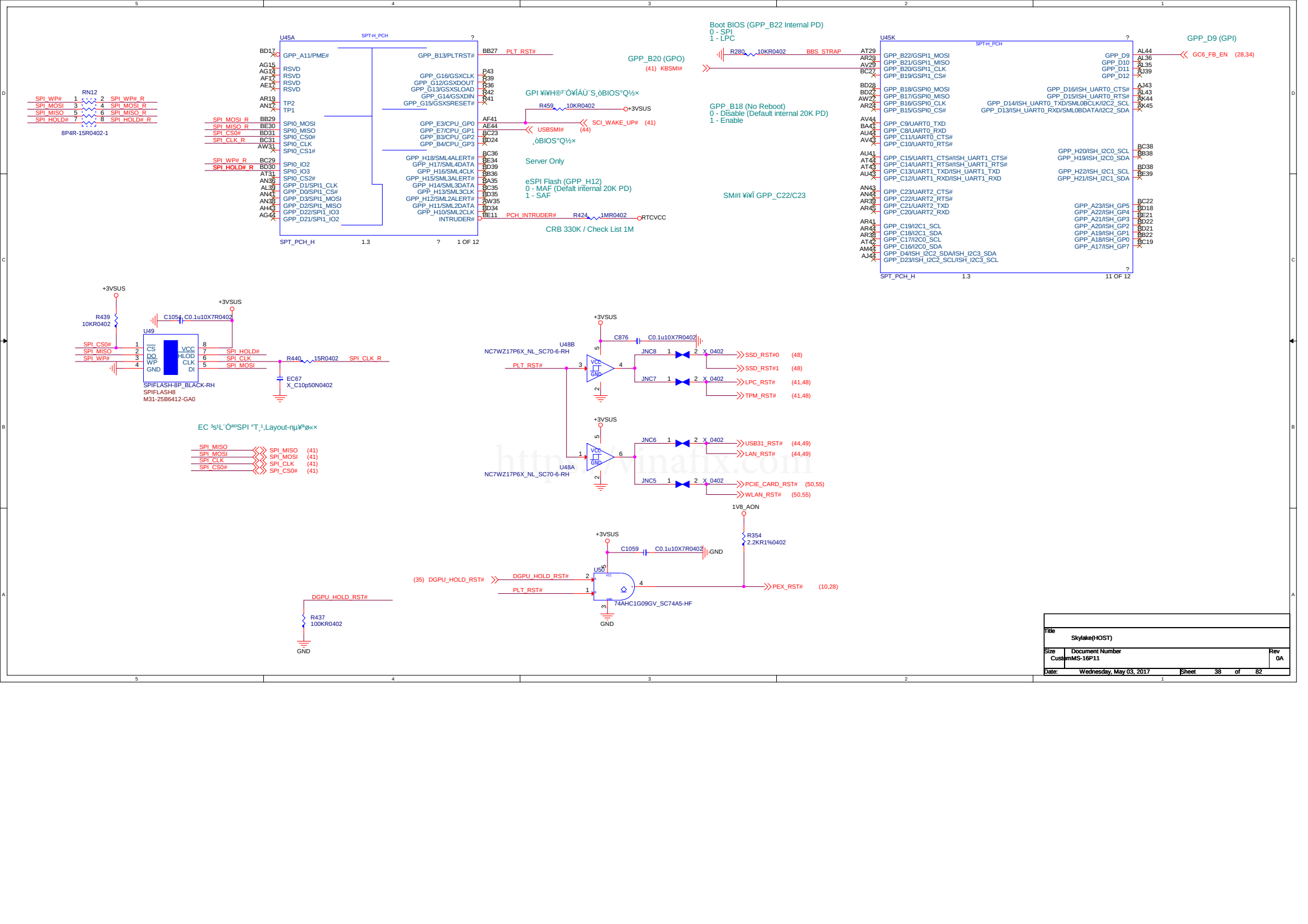
U45A
SPT-H_PCH
SPT_PCH_H
1.3
1 OF 12
GPP_A11/PME#
GPP_B13/PLTRST#
PLT_RST#
GPP_G16/GSXCLK
GPP_G12/GSXDOUT
GPP_G13/GSXSLOAD
GPP_G14/GSXDIN
GPP_G15/GSXSRESET#
RSVD
TP1
TP2
SPI0_MOSI
SPI0_MISO
SPI0_CS0#
SPI0_CLK
SPI0_CS1#
SPI0_IO2
SPI0_IO3
SPI0_CS2#
GPP_D1/SPI1_CLK
GPP_D0/SPI1_CS#
GPP_D3/SPI1_MOSI
GPP_D2/SPI1_MISO
GPP_D22/SPI1_IO3
GPP_D21/SPI1_IO2
GPP_E3/CPU_GP0
GPP_E7/CPU_GP1
GPP_B3/CPU_GP2
GPP_B4/CPU_GP3
GPP_H18/SML4ALERT#
GPP_H17/SML4DATA
GPP_H16/SML4CLK
GPP_H15/SML3ALERT#
GPP_H14/SML3DATA
GPP_H13/SML3CLK
GPP_H12/SML2ALERT#
GPP_H11/SML2DATA
GPP_H10/SML2CLK
INTRUDER#
SPI_MOSI_R
SPI_MISO_R
SPI_CS0#
SPI_CLK_R
SPI_WP#_R
SPI_HOLD#_R
GPI ¥i¥H®ª Ó¥ÍÁÙ¨S¸ôBIOS°Q½×
R459 10KR0402
+3VSUS
USBSMI#
SCI_WAKE_UP#
(41)
(44)
¸ôBIOS°Q½×
Server Only
eSPI Flash (GPP_H12)
0 - MAF (Defalt internal 20K PD)
1 - SAF
PCH_INTRUDER#
R424 1MR0402
RTCVCC
CRB 330K / Check List 1M
Boot BIOS (GPP_B22 Internal PD)
0 - SPI
1 - LPC
R280 10KR0402
BBS_STRAP
GPP_B20 (GPO)
(41) KBSMI#
GPP_B18 (No Reboot)
0 - Disable (Default internal 20K PD)
1 - Enable
SM#I ¥i¥Í GPP_C22/C23
U45K
SPT-H_PCH
SPT_PCH_H
1.3
11 OF 12
GPP_B22/GSPI1_MOSI
GPP_B21/GSPI1_MISO
GPP_B20/GSPI1_CLK
GPP_B19/GSPI1_CS#
GPP_B18/GSPI0_MOSI
GPP_B17/GSPI0_MISO
GPP_B16/GSPI0_CLK
GPP_B15/GSPI0_CS#
GPP_C9/UART0_TXD
GPP_C8/UART0_RXD
GPP_C11/UART0_CTS#
GPP_C10/UART0_RTS#
GPP_C15/UART1_CTS#/ISH_UART1_CTS#
GPP_C14/UART1_RTS#/ISH_UART1_RTS#
GPP_C13/UART1_TXD/ISH_UART1_TXD
GPP_C12/UART1_RXD/ISH_UART1_RXD
GPP_C23/UART2_CTS#
GPP_C22/UART2_RTS#
GPP_C21/UART2_TXD
GPP_C20/UART2_RXD
GPP_C19/I2C1_SCL
GPP_C18/I2C1_SDA
GPP_C17/I2C0_SCL
GPP_C16/I2C0_SDA
GPP_D4/ISH_I2C2_SDA/ISH_I2C3_SDA
GPP_D23/ISH_I2C2_SCL/ISH_I2C3_SCL
GPP_D9
GPP_D10
GPP_D11
GPP_D12
GPP_D16/ISH_UART0_CTS#
GPP_D15/ISH_UART0_RTS#
GPP_D14/ISH_UART0_TXD/SML0BCLK/I2C2_SCL
GPP_D13/ISH_UART0_RXD/SML0BDATA/I2C2_SDA
GPP_H20/ISH_I2C0_SCL
GPP_H19/ISH_I2C0_SDA
GPP_H22/ISH_I2C1_SCL
GPP_H21/ISH_I2C1_SDA
GPP_A23/ISH_GP5
GPP_A22/ISH_GP4
GPP_A21/ISH_GP3
GPP_A20/ISH_GP2
GPP_A19/ISH_GP1
GPP_A18/ISH_GP0
GPP_A17/ISH_GP7
GPP_D9 (GPI)
GC6_FB_EN (28,34)
RN12
8P4R-15R0402-1
SPI_WP#
SPI_MOSI
SPI_MISO
SPI_HOLD#
SPI_WP#_R
SPI_MOSI_R
SPI_MISO_R
SPI_HOLD#_R
+3VSUS
R439 10KR0402
C1054 C0.1u10X7R0402
U49
SPIFLASH-8P_BLACK-RH
SPIFLASH8
M31-25B6412-GA0
SPI_CS0#
SPI_MISO
SPI_WP#
SPI_HOLD#
SPI_CLK
SPI_MOSI
R440 15R0402
SPI_CLK_R
EC67
X_C10p50N0402
EC ³ѕ¹L¨Ó²ªSPI °T¸¹Layout-nµ¥ª¤«×
SPI_MISO (41)
SPI_MOSI (41)
SPI_CLK (41)
SPI_CS0# (41)
U48B
U48A
NC7WZ17P6X_NL_SC70-6-RH
PLT_RST#
C876 C0.1u10X7R0402
JNC8
JNC7
JNC6
JNC5
X_0402
SSD_RST#0 (48)
SSD_RST#1 (48)
LPC_RST# (41,48)
TPM_RST# (41,48)
USB31_RST# (44,49)
LAN_RST# (44,49)
PCIE_CARD_RST# (50,55)
WLAN_RST# (50,55)
1V8_AON
R354 2.2KR1%0402
C1059 C0.1u10X7R0402
U50
74AHC1G09GV_SC74A5-HF
(35) DGPU_HOLD_RST#
DGPU_HOLD_RST#
PEX_RST# (10,28)
R437 100KR0402
GND
Title
Skylake(HOST)
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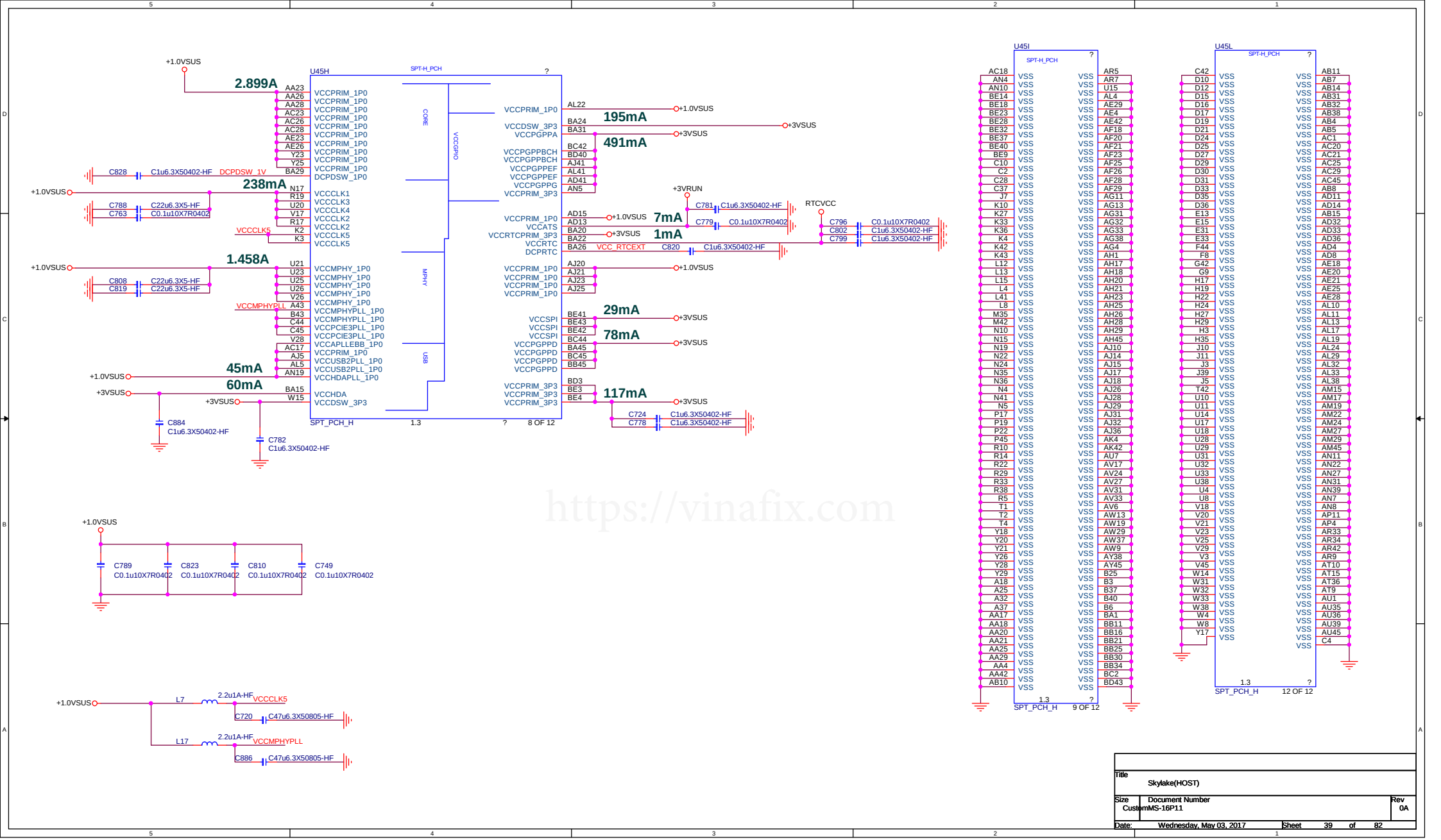

Title	Skylake(HOST)	
Size: CustomMS-16P11	Document Number	Rev: 0A
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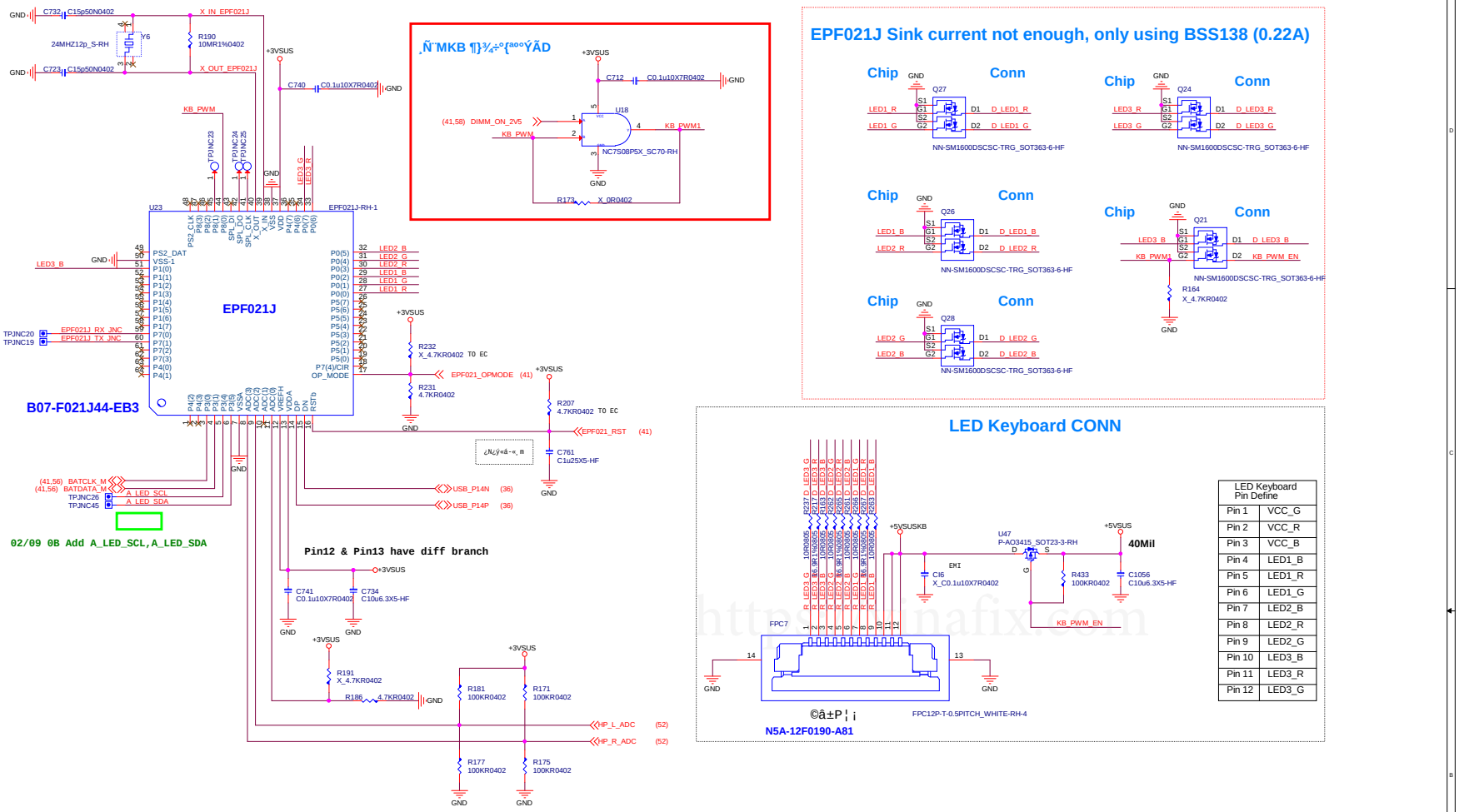
LED 8051 Controller

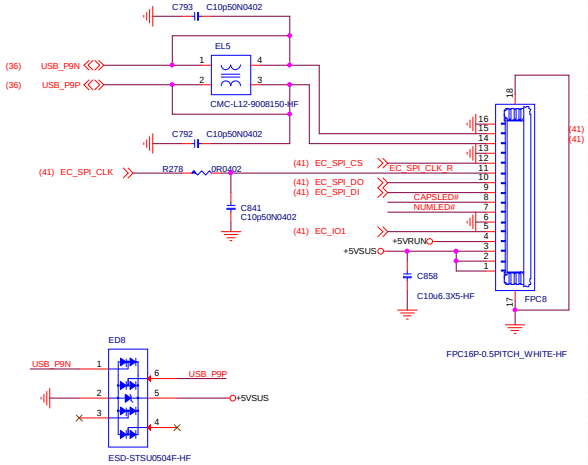


EPF021J Sink current not enough, only using BSS138 (0.22A)

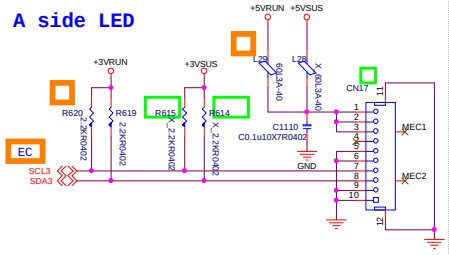
LED Keyboard CONN

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

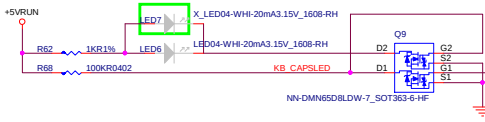
KB CON



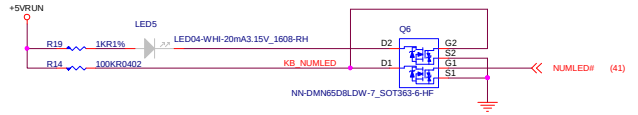
A side LED



CAPSLED 02/06 0B Add LED7 for17"



NUMLED



Title	LED 8051 Controller		
Size	Custom	Document Number MS-16P11	Rev 0A
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RSMRST# follow DGm odify to 10K

KBC/EC/uP (ENE9028)

PU/PD

R428 47KR0402 RSMRST#
R427 100KR0402 KBRST#

KB pull Hi 10k

+3VALW
RN6: KBIN3 KBIN2 KBIN1 KBIN0 — 8P4R-10KR0402
RN7: KBIN7 KBIN6 KBIN5 KBIN4 — 8P4R-10KR0402

LID pull hi 10K

+3VALW
R455 10KR0402 LID#

+3VALW
R435 4.7KR0402 BATCLK_M
R430 4.7KR0402 BATDATA_M

Hardware Reset

SW5 SW-TACT615-HF
RST_SW# R454 100R1%0402 ECRST#
C1062 C0.1u10X7R0402
N71-0101630-D02 D20 ESD-SFI0402-050E101NP-LF-RH

03/21 1.0 ADD EC_IO1

03/24 1.0 modify SCL3,SDA3

U46

LPC I/F
(36,48) INT_SERIRQ
(36,48) LPC_FRAME#
(36) CLK_PCI_KBC
(37) EC_CLKRUN#
(36,48) LAD0
(36,48) LAD1
(36,48) LAD2
(36,48) LAD3

FAN&PWM
(36) KBRST#
(36) KBSCI#
(28,34) OVERT#
(38,48) LPC_RST#
(40) EC_IO1
(36,37) USB3_LED
(56) AC_CTL
(37) FLASH_SECURITY
(47) CPU_PWM0
(47) DGPU_PWM1
(47) CPUFAN_FB
(47) GPUFAN_FB

IKB
KBOUT0 KBOUT1 KBOUT2 KBOUT3 KBOUT4 KBOUT5 KBOUT6 KBOUT7 KBOUT16 KBOUT17
(47) FAN_SW#
(47) KB_LED_SW#
(56) BATT_EN
(56) BAT_IN#
(43) LID#
(59) SUSPWROK
TPJNC47 TPJNC46
EC_SDA EC_SCL
KBOUT8 KBOUT9 KBOUT10 KBOUT11 KBOUT12 KBOUT13 KBOUT14 KBOUT15

ESB
(52) EAPD
(53) EC_MUTE#

CIR
KBIN6 KBIN7
(40,58) DIMM_ON_2V5
(37) EC_RTC_RST

SPI FLASH
(38) SPI_MISO
(38) SPI_MOSI
(38) SPI_CLK
(38) SPI_CS0#

PS2 I/F
(55) TP_CLK
(55) TP_DATA
(40) SCL3
(40) SDA3
(40,56) BATCLK_M
(40,56) BATDATA_M

UART
(40) EPF021_RST
(40) EPF021_OPMODE
JNC111 2 X 0402 UART_TX
JNC121 2 X 0402 UART_RX

MB_ID
R423 0R0402 EC_XOUT_JNC
(37) SUSCLK
R417 680KR0402-HE

POWER/GROUND
VCC_LPC VCC VCC-1 VCC-2 VCC-3 VCC0 VCC_IO2
AVCC AGND
GND GND-1 GND-2 GND-3 GND-4
+3VALW
C1063 C1055 C1057 C1053 C1058 C0.1u10X7R0402

SMBUS
SDA0/GPIO45 SCL0/GPIO44 IEDI_SDA/SDA1/GPIO47 IEDT_SCL/SCL1/GPIO46
SMB_GPU_DATA (28)
SMB_GPU_CLK (28)
EC_SDA (46)
EC_SCL (46)

AD/DA
DA0/GPO3C DA1/GPO3D DA2/GPO3E DA3/GPO3F
AD0/GPI38 AD1/GPI39 AD2/GPI3A AD3/GPI3B AD4/GPI42 AD5/GPI43
BT_PWR_ON (55)
CAMERA_ON (43)
DGPU_PWRGD (10,34)
PANEL_OD (43)
KBIN0 KBIN1 KBIN2 KBIN3 KBIN4 KBIN5

SDI
GPXIOA00/GPIO60/SHICS#
GPXIOA01/GPIO61/SHICLK
GPXIOA02/GPIO62/SHIDO
EC_SPI_CS (40)
EC_SPI_CLK (40)
EC_SPI_DO (40)

POWER_FAIL0/GPIO63/GPXIOA03
GPIO64/GPXIOA04
GPIO65/GPXIOA05
VCOUT1/GPIO66/GPXIOA06
VCOUT0/GPIO67/GPXIOA07
GPIO68/GPXIOA08
GPIO69/GPXIOA09
GPIO6A/GPXIOA10
GWG/GPIO6B/GPXIOA11
SDIDO/GPIO78/GPXIOD00
GPIO79/GPXIOD01
EC_EN#/GPIO7A/GPXIOD02
GPIO7B/GPXIOD03
GPIO7C/GPXIOD04
GPIO7D/GPXIOD05
GPIO7E/GPXIOD06
GPIO7F/PECI
SUS_ON (57)
WLAN_PWRON (55)
ADP_ICC (56)
DIMM_ON_1V2 (6,58)
EC_PROCHOT# (2)
TB_STAR# (56)
LED_CHARGE (47)
LED_BATLOW (47)
AC_PRESENT (37)
EC_SPI_DI (40)
AC_OK (56)
GPU_ACIN1 (56)
PWR_SW# (47)
EC_ALLSYSPG
RUN_ON (6,57)
PM_PWRBTN# (37)
H_PECI (2)
H_PECI_R R420 33R0402

GPIO04 i_clk_8051/GPIO07 PROCHOT#/i_clk_peri/GPIO08 POWER_FAIL1/GPIO18 GPIO50 GPIO52 WDT_LED#/GPIO54 GPIO56 XCLK32K/GPIO57 GPIO59
KBSMI# (38)
GPUDPC_HPD (36,42)
SCI_WAKE_UP# (38)
EC_PCH_PWROK (37)
WLAN_LED (47)
USB_ENABLE (45,50,51)
PWR_LED# (47)
RSMRST# (37)
PM_SLP_S3# (2,37,62)
PM_SLP_S4# (37,58)

LED
GPIO1A/NUMLED# GPIO53/CAPSLED# GPIO55/SCROLED#
NUMLED# (40)
CAPSLED# (40)
HDMI_HPD_DET (36,46)

KB9028Q-C-RH

+3VRUN
SMB_GPU_CLK R438 2.2KR0402
SMB_GPU_DATA R436 2.2KR0402

+3VRUN
R172 2.2KR0402
EC_ALLSYSPG (2,37,60,62)
C1051 X_C2200p50X0402

FPC6 FPC26P-T-1PITCH_WHITE-RH-1
KBOUT17 KBOUT16 KBIN0 KBIN1 KBIN2 KBIN3 KBIN4 KBIN5 KBIN6 KBIN7 KBOUT15 KBOUT14 KBOUT13 KBOUT12 KBOUT11 KBOUT10 KBOUT9 KBOUT8 KBOUT7 KBOUT6 KBOUT5 KBOUT4 KBOUT3 KBOUT2 KBOUT1 KBOUT0
N5A-26F0270-A81

For EMI
EC21 KBOUT7 KBOUT6 KBOUT5 KBOUT4 — ESD-SFI0508-050S00NP-A4-LF-HF
EC25 KBOUT3 KBOUT2 KBOUT1 KBOUT0 — ESD-SFI0508-050S00NP-A4-LF-HF
EC23 KBOUT11 KBOUT10 KBOUT9 KBOUT8 — ESD-SFI0508-050S00NP-A4-LF-HF
EC24 KBOUT15 KBOUT14 KBOUT13 KBOUT12 — ESD-SFI0508-050S00NP-A4-LF-HF
D19 KBOUT16 — ESD-SFI0402-050E101NP-LF-RH
D14 KBOUT17 — ESD-SFI0402-050E101NP-LF-RH

MotherBoard ID
+3VALW
R422 10KR0402
MB_ID
R421 X_10KR0402

MICRO-STAR INT'L CO.,LTD.
Title: KBC/EC/up (ENE3930)
Size: Custom
Document Number: MS-16P11
Rev: 0A
Date: Wednesday, May 03, 2017
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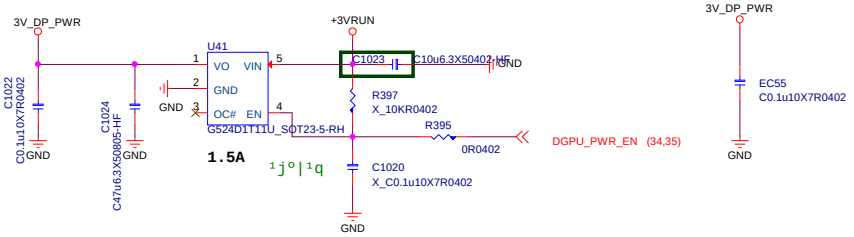
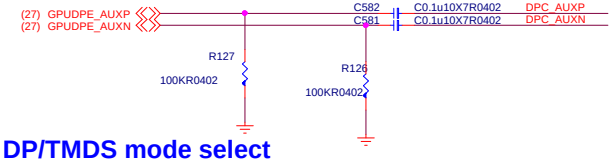
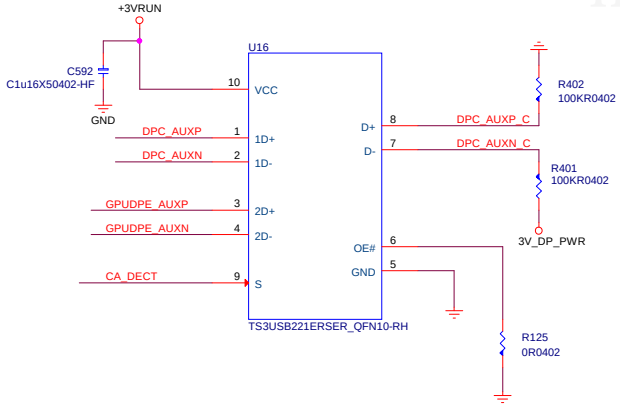
Display Port

The preset trip limit must not exceed 3A at the Upstream device connector DP_PWR pin and 1.5A at the Downstream device connector DP_PWR pin.

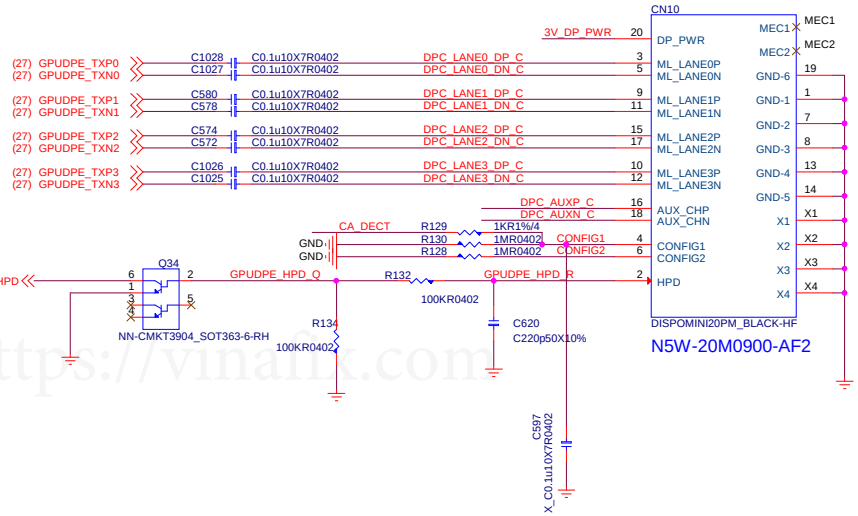




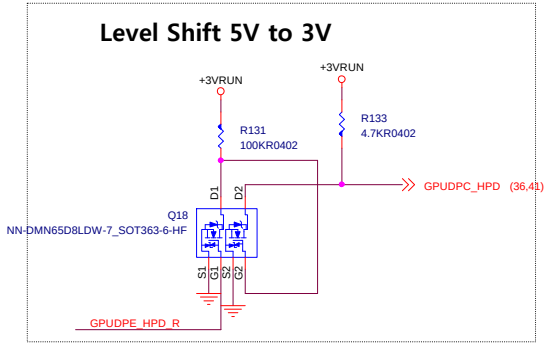
DP/TMDS mode select



Display Port



Level Shift 5V to 3V



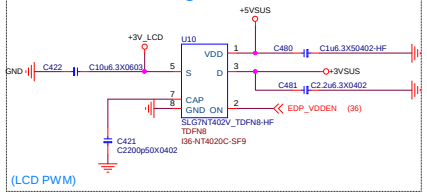
TS3USB221A TRUTH TABLE

S	OE#	FUNCTION
X	H	Disconnect
L	L	D = 1D
H	L	D = 2D

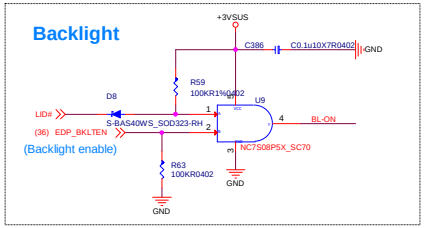
msi	MICRO-STAR INT'L CO.,LTD.	
Title	DP	
Size: Custom	Document Number: MS-16P11	Rev: 0A
Date: Wednesday, May 03, 2017	Sheet 42 of 82	

eDP/Camera

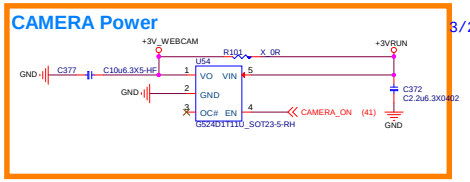
Pannel Device Logic Power



Backlight

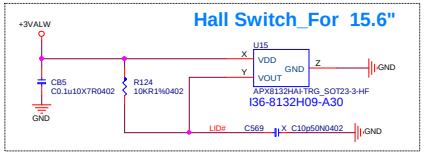


CAMERA Power



3/24 1.0 Add CAMERA Power U54

Hall Switch_For 15.6"



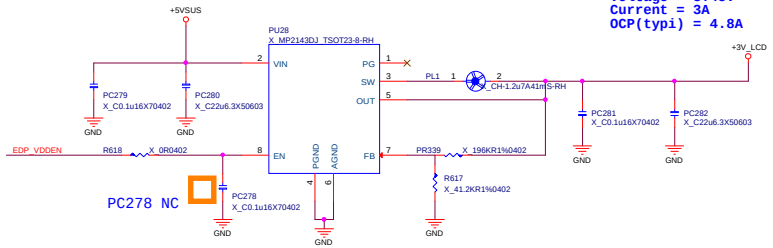
+3V_LCD

¹w¯d PU28 for +3V_LCD 3.45V

3/24 1.0 Add PU28

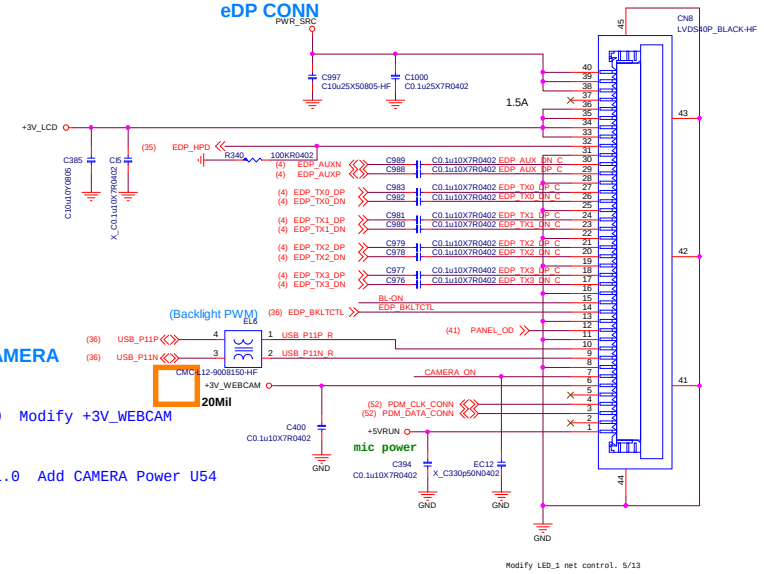
Pannel Device Logic Power

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



eDP CONN

N5Q-40F0130-L41

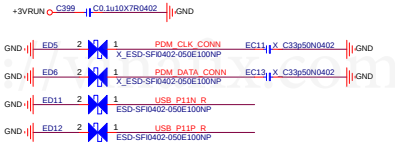


CAMERA

3/24 1.0 Modify +3V_WEBCAM

Modify LED_1 net control. 5/13

Close Connector



LCD Module Pin Define FOR FULL HD PANEL

Pin No	Symbol	Description
1	Vcom SDA	Vcom IIC SDA
2	H_GND	High Speed Ground
3	LAN1_N	Complement Signal-Lane 1
4	LAN1_P	True Signal-Main Lane 1
5	H_GND	High Speed Ground
6	LAN0_N	Complement Signal-Lane 0
7	LAN0_P	True Signal-Main Lane 0
8	H_GND	High Speed Ground
9	AUX+	True Signal-Auxiliary Channel
10	AUX-	Complement Signal-Auxiliary Channel
11	H_GND	High Speed Ground
12	LCD_VCC	Power Supply +3.3 V (typical)
13	LCD_VCC	Power Supply +3.3 V (typical)
14	NC	No Connection (Reserved for CMI test)
15	H_GND	Ground
16	H_GND	Ground
17	HPD	Hot Plug Detect
18	BL_GND	BL Ground
19	BL_GND	BL Ground
20	BL_GND	BL Ground
21	BL_GND	BL Ground
22	BL_EN	BL_Enable Signal of LED Converter
23	BL_PWM	PWM Dimming Control Signal of LED Converter
24	Vcom SCL	Vcom IIC SCL
25	NC	No Connection (Reserved)
26	LED_VCCS	BL Power
27	LED_VCCS	BL Power
28	LED_VCCS	BL Power
29	LED_VCCS	BL Power
30	**OE_EN**	**OD_Enable Signal of TCON**

LCD Module Pin Define FOR WQHD PANEL

Pin No	Symbol	Description
1	NC	Reserved for LCD manufactureer's use
2	H_GND	High Speed Ground
3	Lane3_N	Complement Signal Link Lane 3
4	Lane3_P	True Signal Link Lane 3
5	H_GND	High Speed Ground
6	Lane2_N	Complement Signal Link Lane 2
7	Lane2_P	True Signal Link Lane 2
8	H_GND	High Speed Ground
9	Lane1_N	Complement Signal Link Lane 1
10	Lane1_P	True Signal Link Lane 1
11	H_GND	High Speed Ground
12	Lane0_N	Complement Signal Link Lane 0
13	Lane0_P	True Signal Link Lane 0
14	H_GND	High Speed Ground
15	AUX_CH_P	True Signal Auxiliary Channel
16	AUX_CH_N	Complement Signal Auxiliary Channel
17	H_GND	High Speed Ground
18	VDD	LCD logic and driver power(3.3V)
19	VDD	LCD logic and driver power(3.3V)
20	VDD	LCD logic and driver power(3.3V)
21	VDD	LCD logic and driver power(3.3V)
22	BIST	BIST patterns selection L : Disable [default] , H : Enable
23	LCD_GND	LCD logic and driver ground
24	LCD_GND	LCD logic and driver ground
25	LCD_GND	LCD logic and driver ground
26	LCD_GND	LCD logic and driver ground
27	HPD	HPD signal pin
28	BL_GND	Backlight ground
29	BL_GND	Backlight ground
30	BL_GND	Backlight ground
31	BL_GND	Backlight ground
32	BL_ENABLE	Backlight On/0ff
33	BL_PWM_DIM	System PWM
34	NC	Reserved for LCD manufacturer¡¦s use
35	NC	Reserved for LCD manufacturer¡¦s use
36	VBL	Backlight power
37	VBL	Backlight power
38	VBL	Backlight power
39	VBL	Backlight power
40	**OE_EN**	**OD_Enable Signal of TCON**

MICRO-STAR INT'L CO.,LTD.

Title: eDP Connector

Size: Custom | Document Number: MS-16P11 | Rev: 0A

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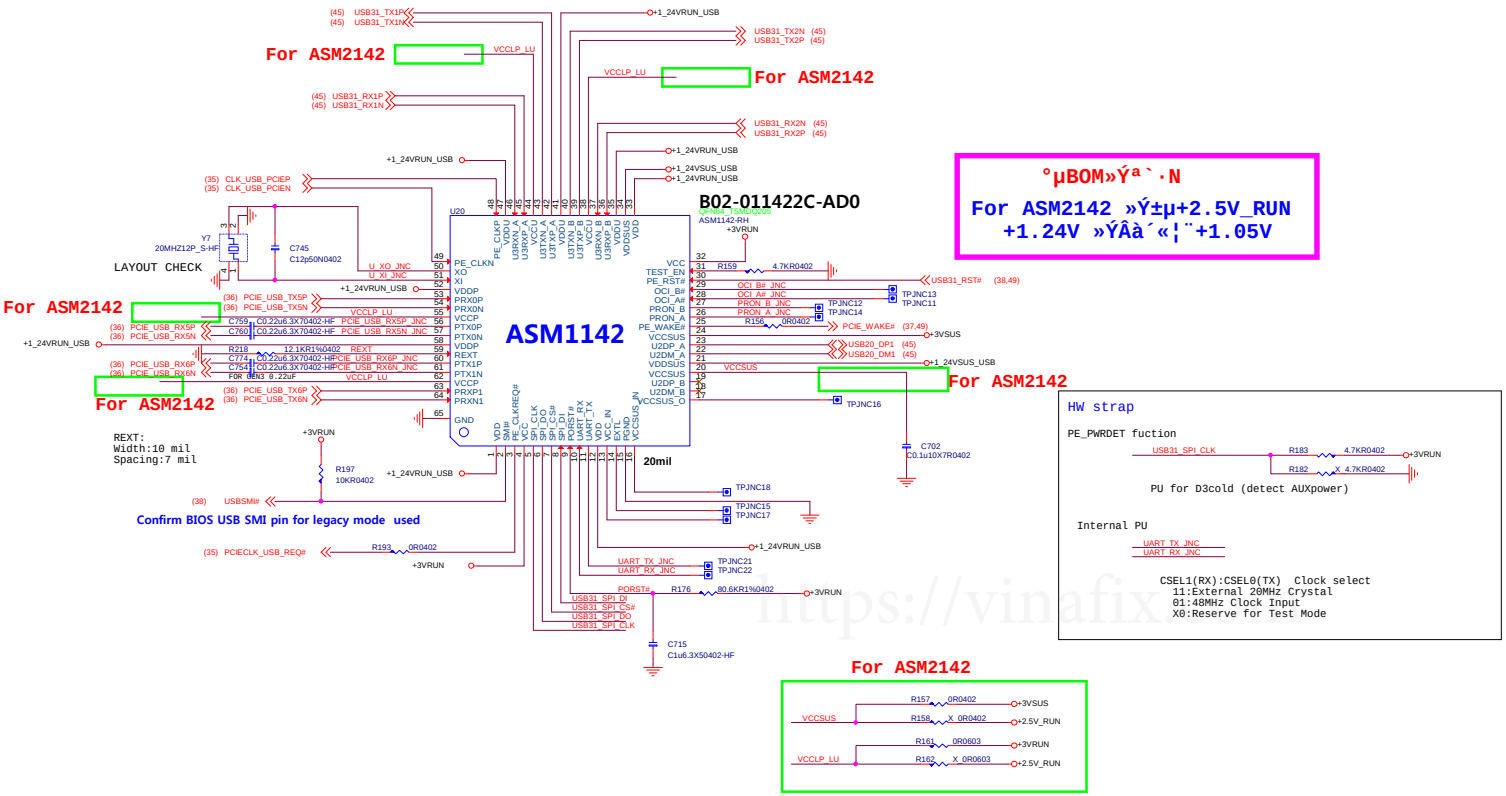
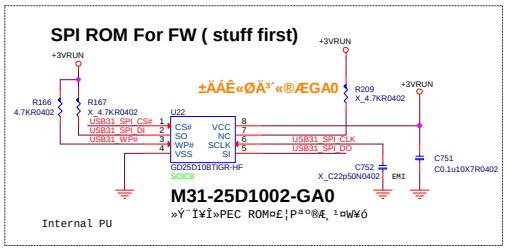
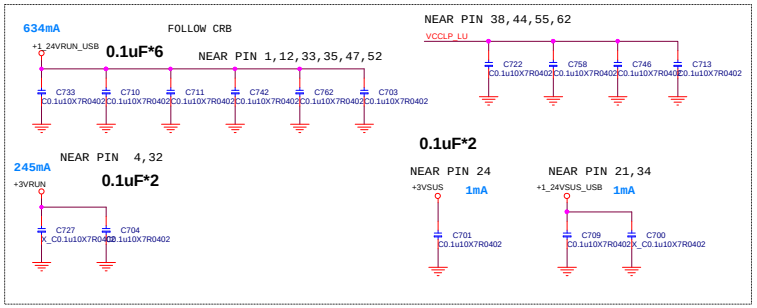
PCIE to USB 3.1

USB 3.0/ USB.3.1

Vinafix.com







MICRO-STAR INT'L CO.,LTD.		
Title: Alpine Ridge(TBT)		
Size	Document Number: MS-16P11	Rev: 0A
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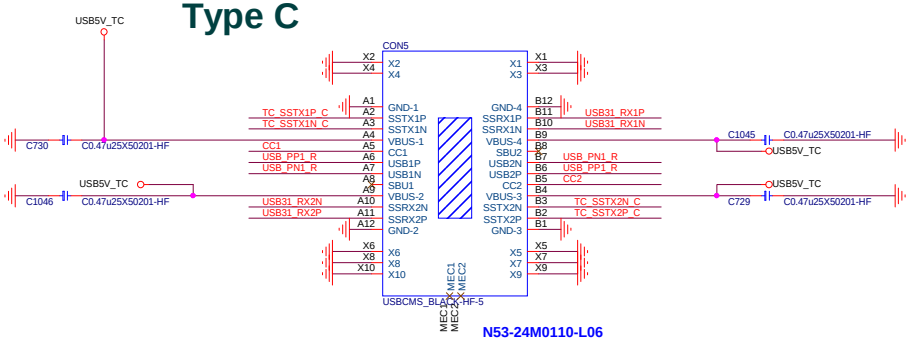
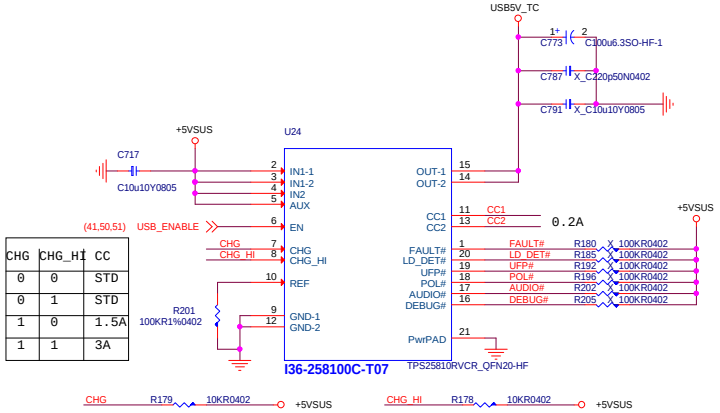
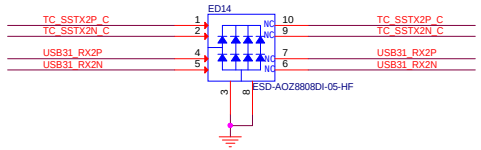
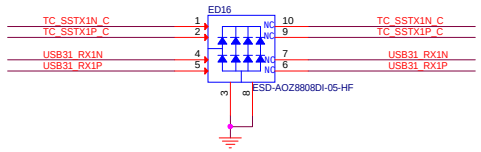
Type C

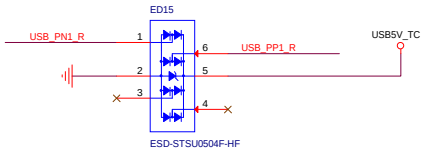




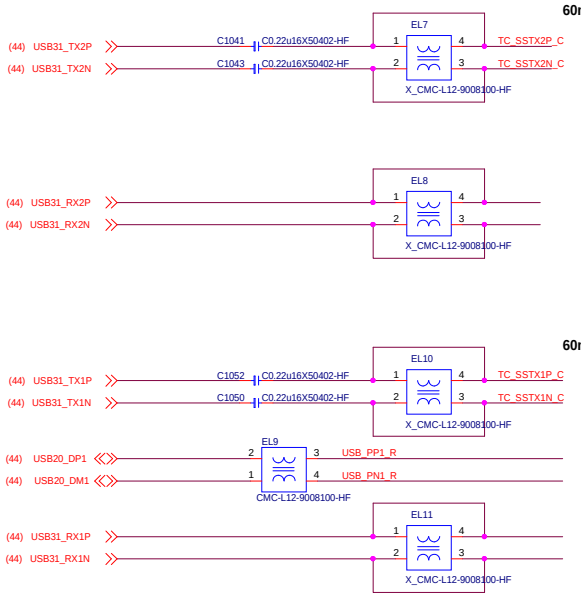
CHG	CHG_HI	CC
0	0	STD
0	1	STD
1	0	1.5A
1	1	3A







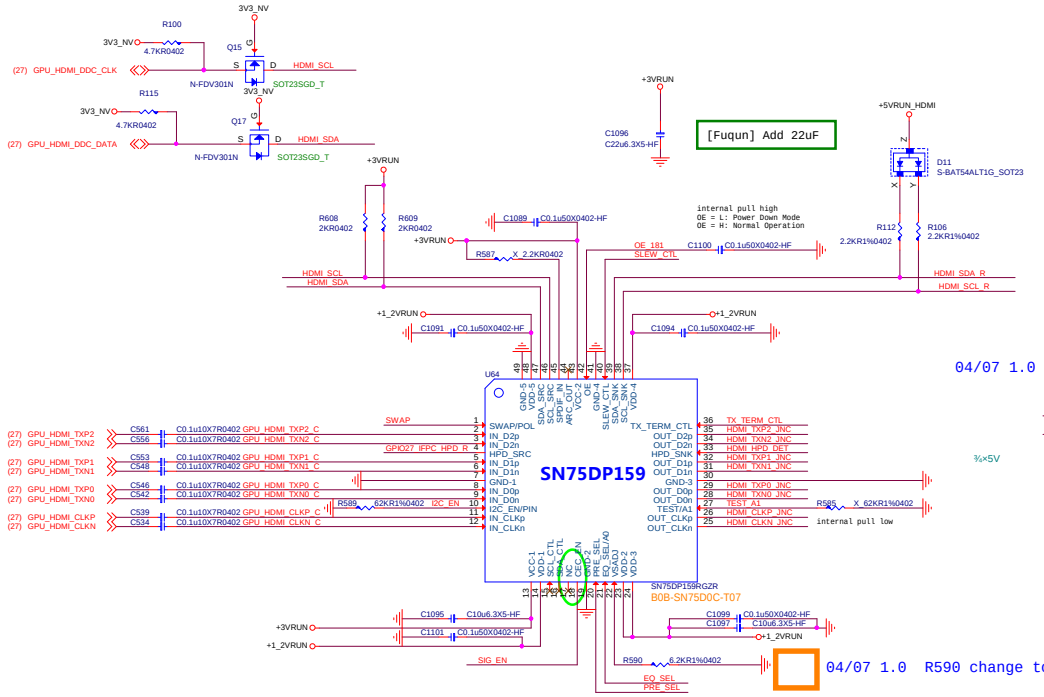
USB3.1 TYPE C



for EMI

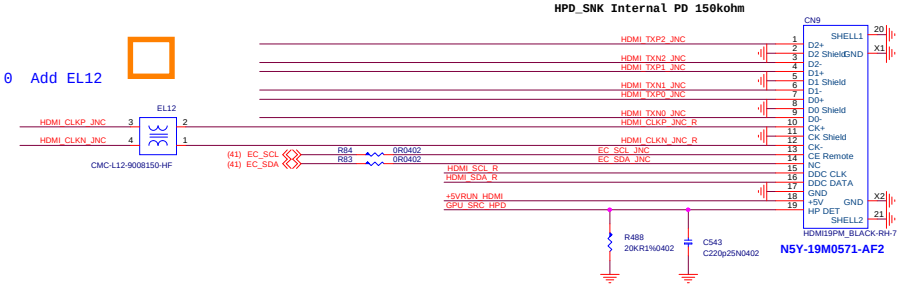
Title	Skylake(HOST)		
Size	Document Number		Rev
Custom	MS-16P11		0A
Date:	Wednesday, May 03, 2017	Sheet 45 of 82	

HDMI connector



An HDMI Source shall have +5V Power signal over-current protection of no more than 0.5A.

HPD_SNK Internal PD 150kohm



VCC/2 Normal operation

TX_TERM_CTL = H, No transmit Termination
TX_TERM_CTL = L, Transmit Termination impedance in 75~150Ω[
TX_TERM_CTL = Vcc/2, Automaticly selects the termination

PRE_SEL = L: -2.5dB
PRE_SEL = Vcc/2: 0dB
PRE_SEL = H: -5dB

EQ_SEL = L: Fixed EQ at 7.5dB @ 3GHz
EQ_SEL = Vcc/2: Adaptive EQ
EQ_SEL = H: Fixed at 14B @ 3GHz

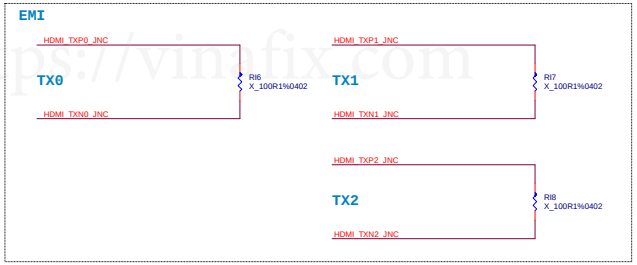
SLEW_CTL = H, Fastest data rate(Default)
SLEW_CTL = L, 20ps slow
SLEW_CTL = Vcc/2, 40ps slow

SIG_EN = L: Signal Detect Circuit Disabled (Default)
SIG_EN = H: Signal Detect Circuit Enabled:
When no valid clock device enters Standby Mode

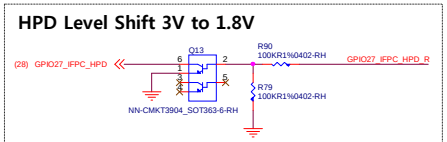
internal pull low

20160901 Vendor suggest R597,R592 stuff

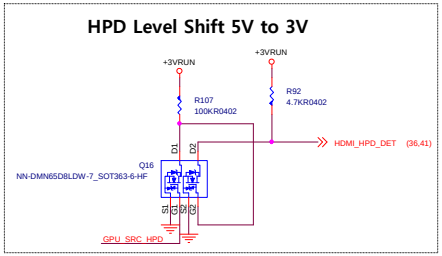
EMI

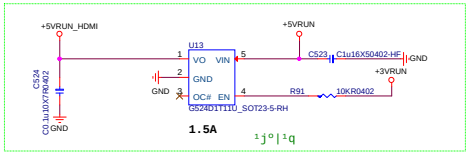


HPD Level Shift 3V to 1.8V



HPD Level Shift 5V to 3V





MSI	MICRO-STAR INT'L CO.,LTD.
Title	HDMI
Size: Custom	Document Number: MS-16P11
Rev	0A
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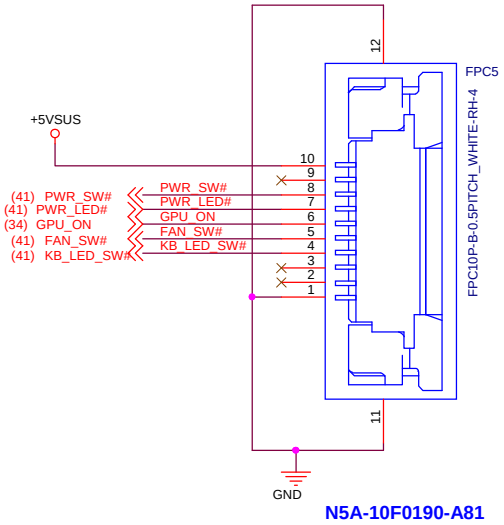
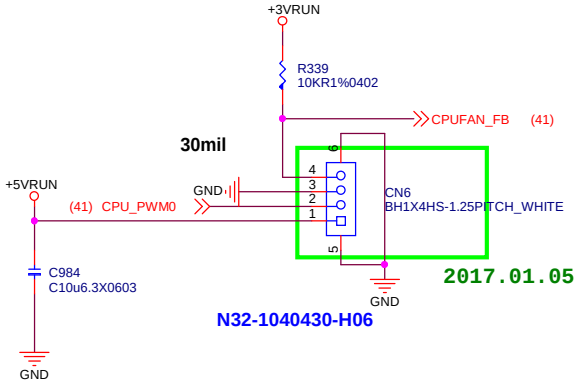
CPU FAN/CPU FAN/POWER CONN/ LED CONN

Power Switch Connector



N5A-10F0190-A81

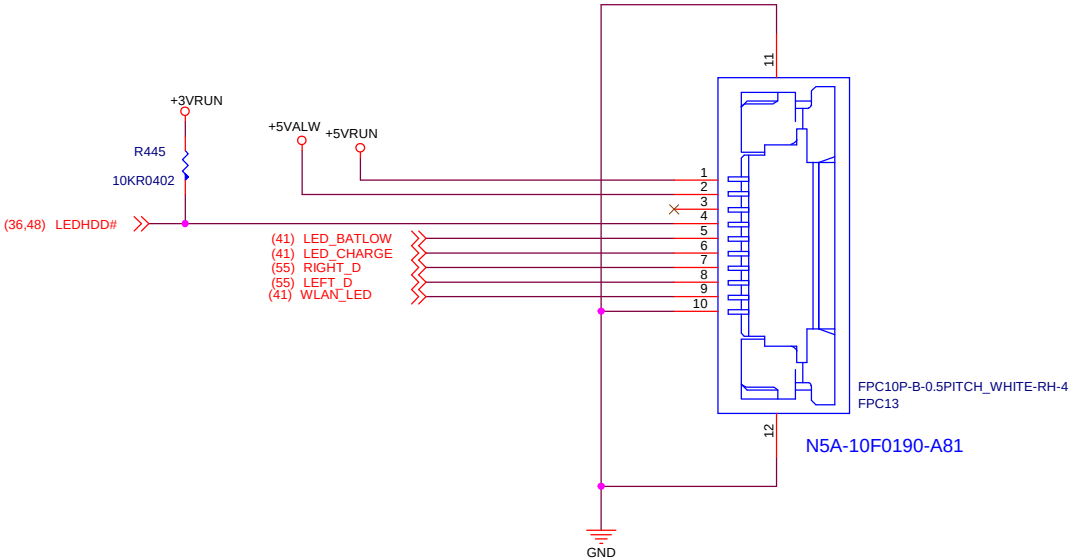
CPU FAN



N32-1040430-H06

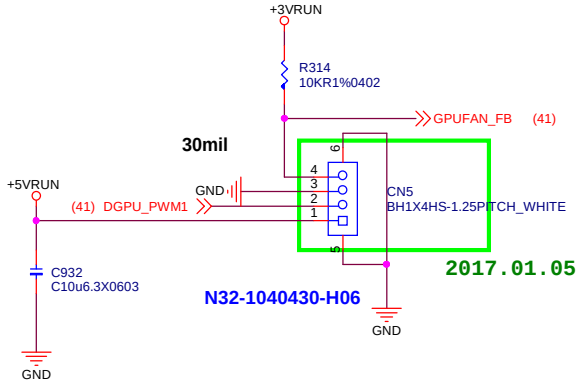
2017.01.05 CN6§ï[illegible]¥ß¦¡conn

Switch connector



N5A-10F0190-A81

DGPU FAN



N32-1040430-H06

2017.01.05 CN5§ï[illegible]¥ß¦¡conn

MICRO-STAR INT'L CO.,LTD.

Title	CPU FAN/BTB CONN/LED	
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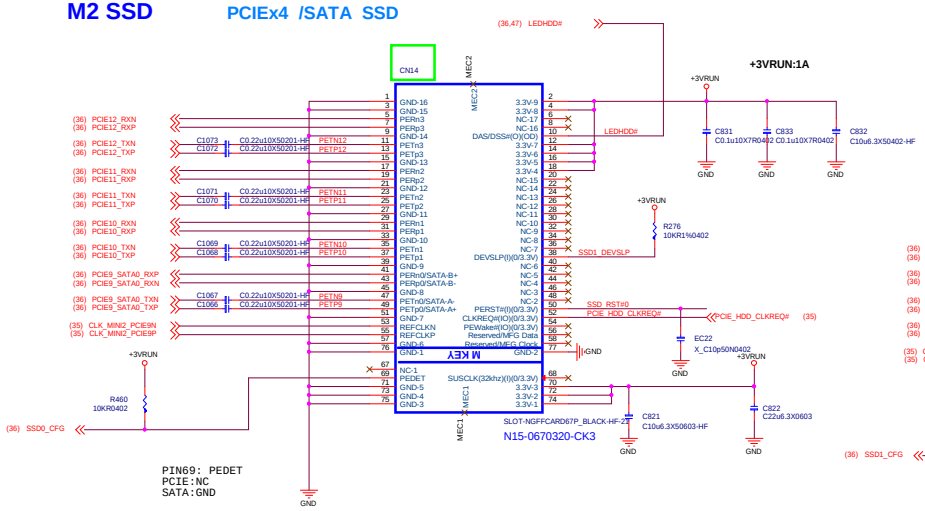
M2 SSD

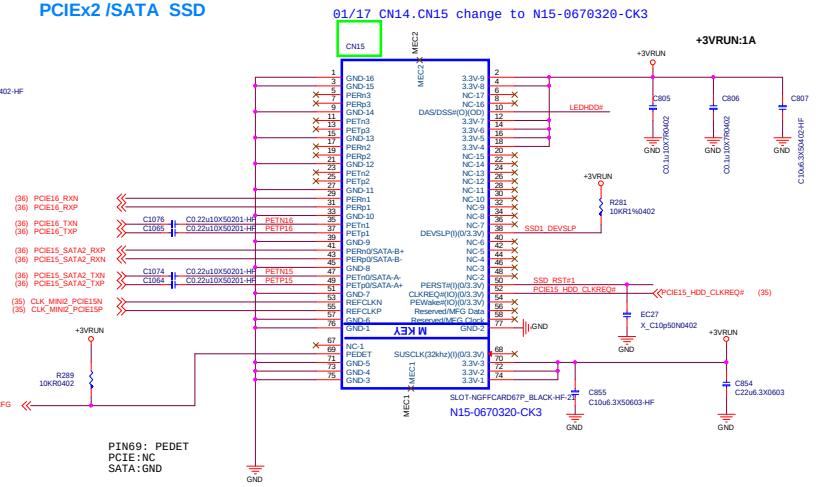
PCIEx4 /SATA SSD

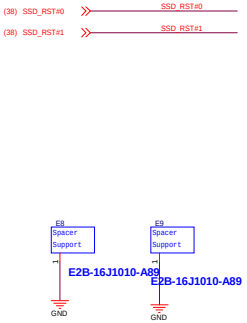


M2 SSD

PCIEx2 /SATA SSD

01/17 CN14.CN15 change to N15-0670320-CK3

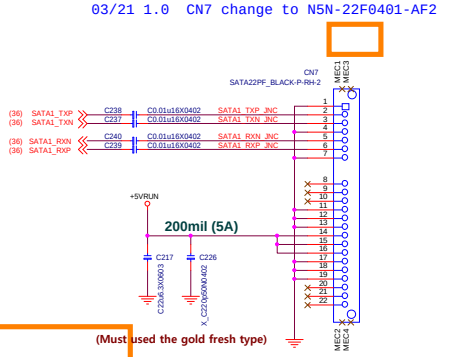


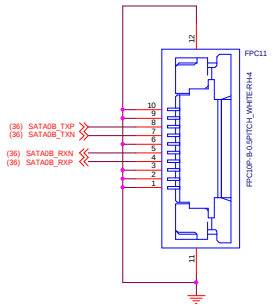


40	NC	No Connect
41	SATA-B+/PERn0	Host receiver differential signal pair
42	NC	No Connect
43	SATA-B-/PERp0	Host receiver differential signal pair
44	NC	No Connect
45	GND	Ground
46	NC	No Connect
47	SATA-A-/PETn0	Host Transmitter differential signal pair
48	NC	No Connect
49	SATA-A+/PETp0	Host transmitter differential signal pair

HDD

03/21 1.0 CN7 change to N5N-22F0401-AF2

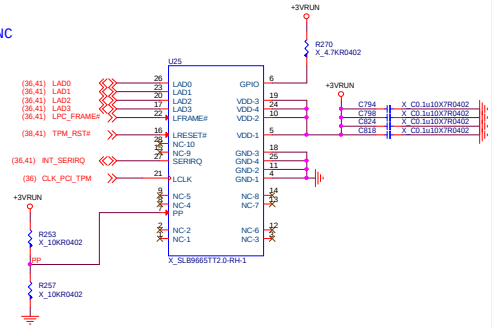




03/21 1.0 Add E43-1205022-H29 Á³µ·

TPM

04/17 1.0 TPM U25 NC



MSI	MICRO-STAR INT'L CO.,LTD.
Title	M2 SSD/HDD/TPM
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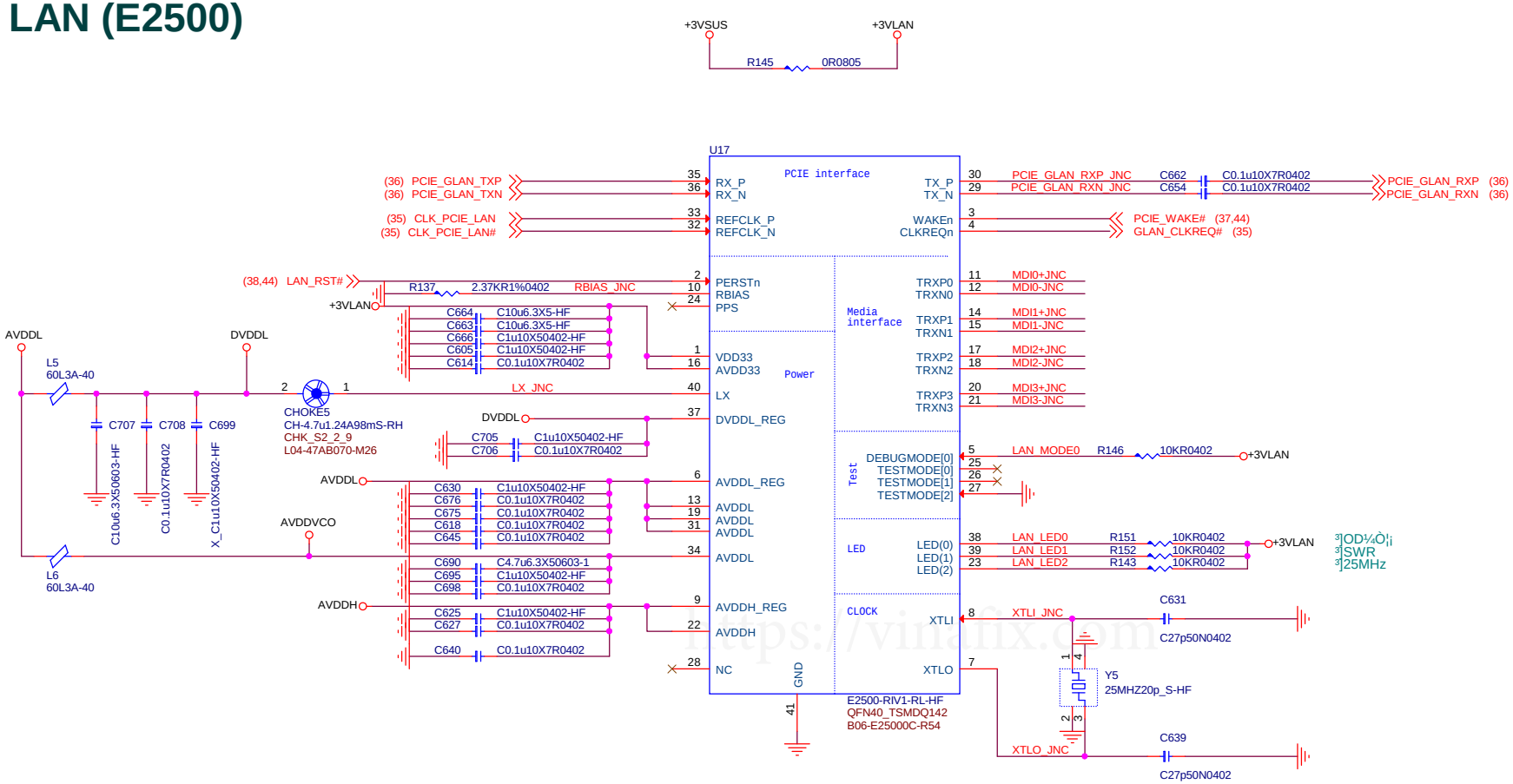
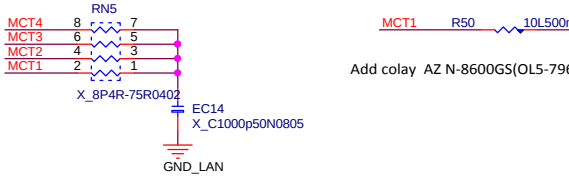
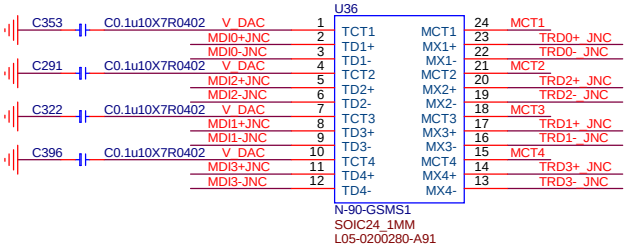
LAN (E2500)

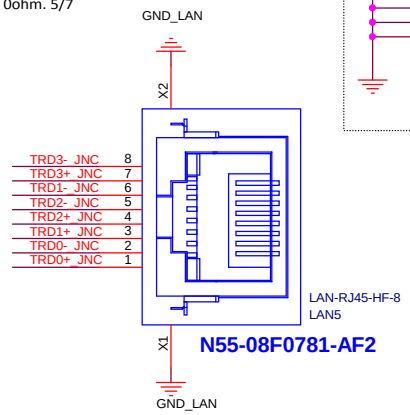


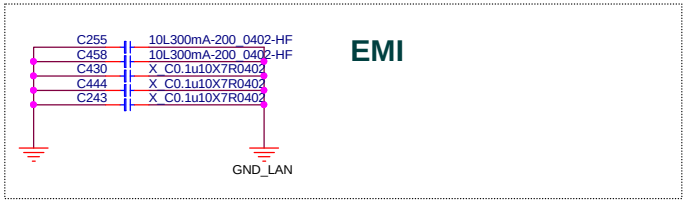


MCT1 R50 10L500mA-200_0603-HF

Add colay AZ N-8600GS(OL5-7966001) R866 0ohm. 5/7







MSI	MICRO-STAR INT'L CO.,LTD.		
Title	GigaLAN (E2500)		
Size: Custom	Document Number: MS-16P11		Rev: 0A
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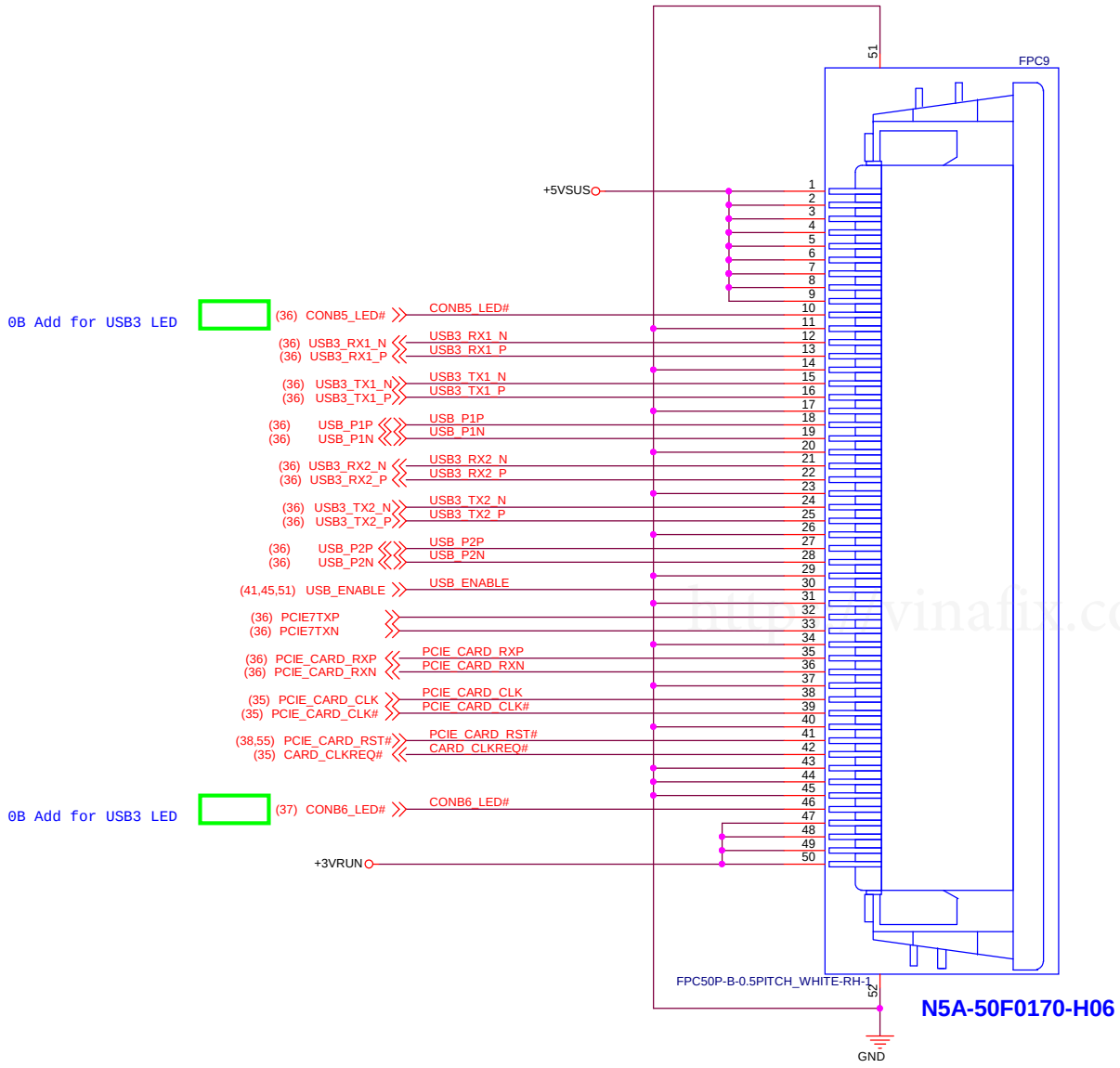

MICRO-STAR INT'L CO.,LTD.

Title: USB 3.0 connector

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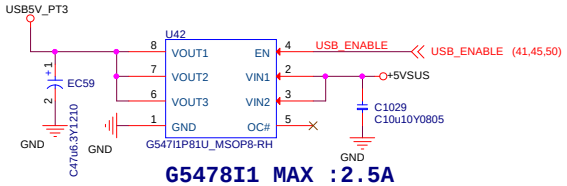
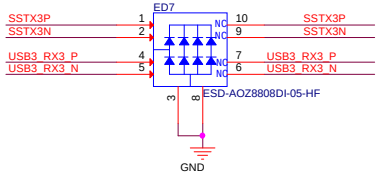
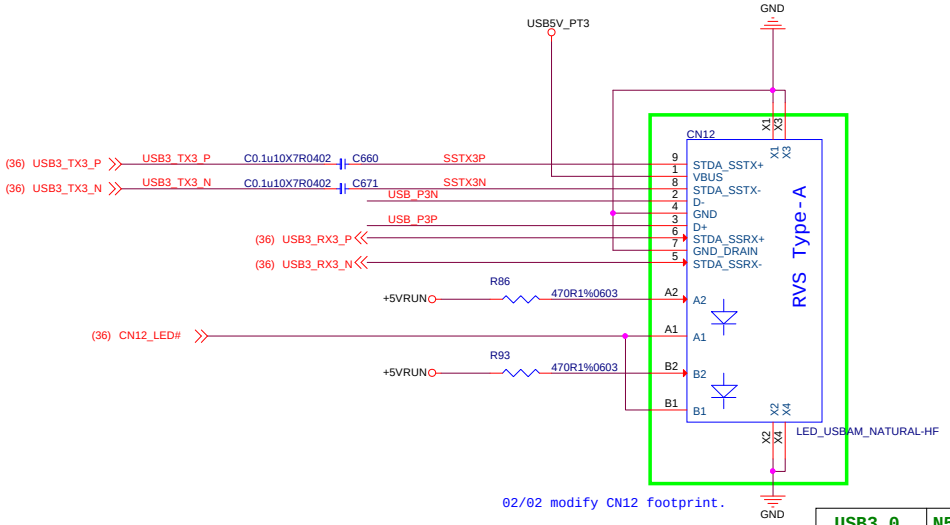
USB 3.0 CNT 3



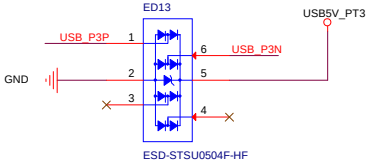
G5478I1 MAX :2.5A

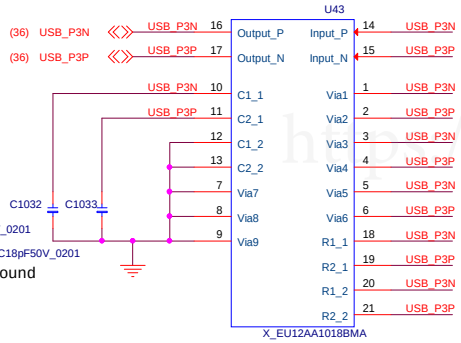




02/02 modify CN12 footprint.

USB3.0	N53-09M0681-AF2
USB3.0_LED	N53-13M0031-L06





Replaced with 18pF 0201 capacitors

Connect to system ground

MICRO-STAR INT'L CO.,LTD.

Title: **USB 3.0 connector**

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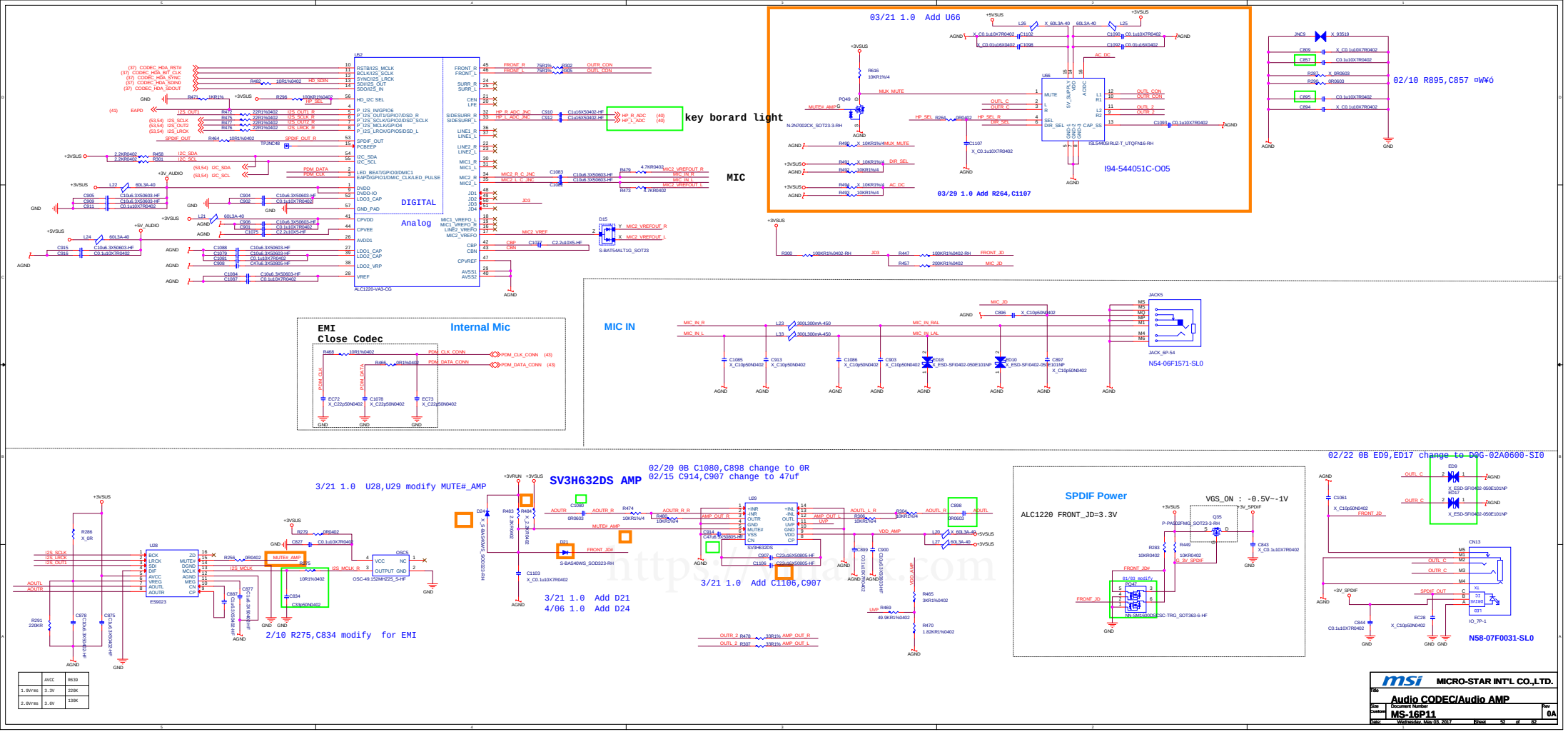
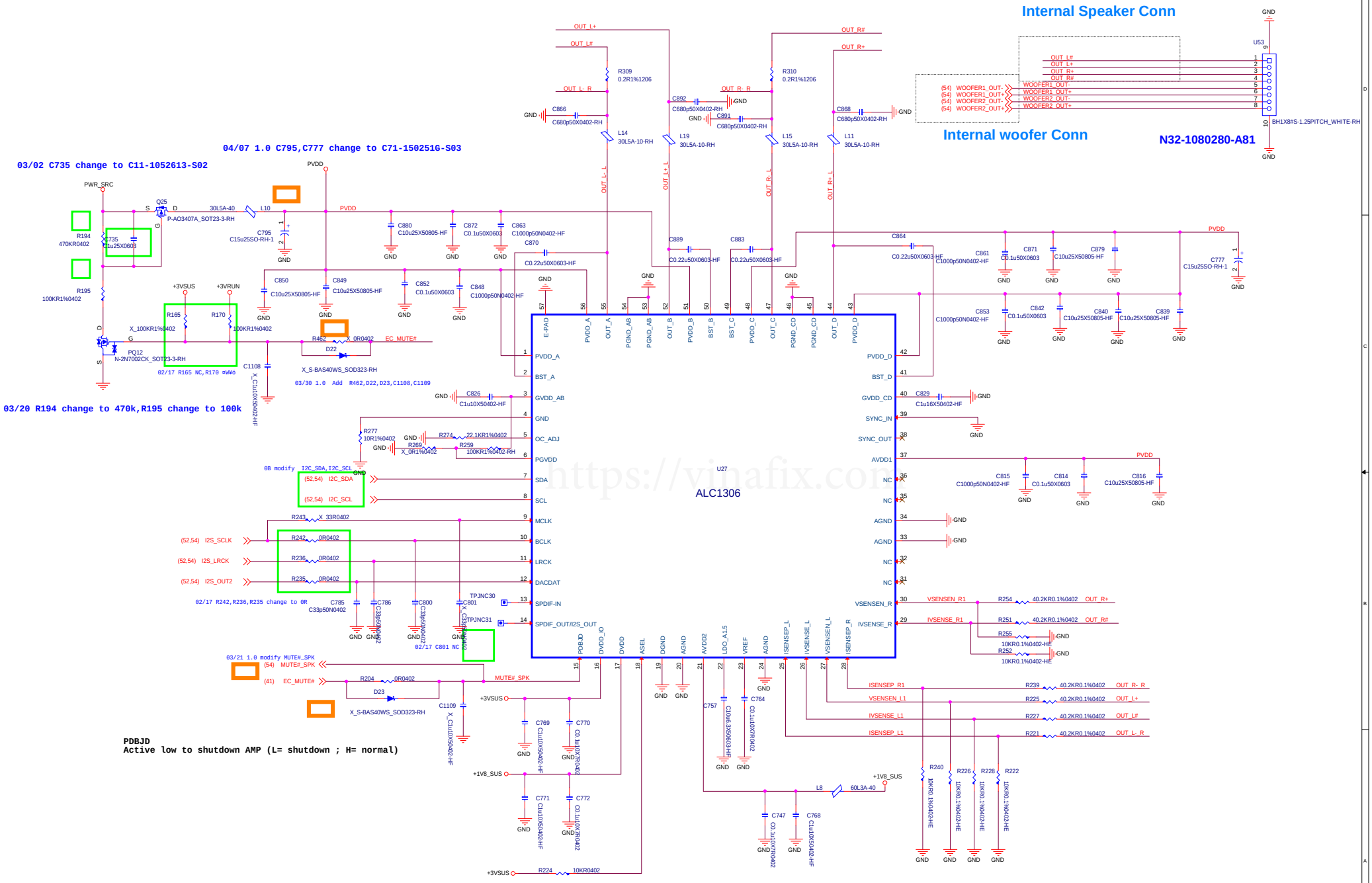

03/21 1.0 Add U66
03/29 1.0 Add R264,C1107
I94-544051C-O05
key borard light
MIC
DIGITAL
Analog
ALC1220-VA3-CG
EMI
Close Codec
Internal Mic
MIC IN
JACK5
JACK_6P-S4
N54-06F1571-SL0
02/10 R895,C857 ¤W¥ó
02/20 0B C1080,C898 change to 0R
02/15 C914,C907 change to 47uf
SV3H632DS AMP
3/21 1.0 U28,U29 modify MUTE#_AMP
2/10 R275,C834 modify for EMI
3/21 1.0 Add C1106,C907
3/21 1.0 Add D21
4/06 1.0 Add D24
02/22 0B ED9,ED17 change to D0G-02A0600-SI0
SPDIF Power
ALC1220 FRONT_JD=3.3V
VGS_ON : -0.5V~-1V
N58-07F0031-SL0
MICRO-STAR INT'L CO.,LTD.
Audio CODEC/Audio AMP
MS-16P11
0A
Wednesday, May 03, 2017



Title	Speaker
Size	C
Document Number	MS-16P11
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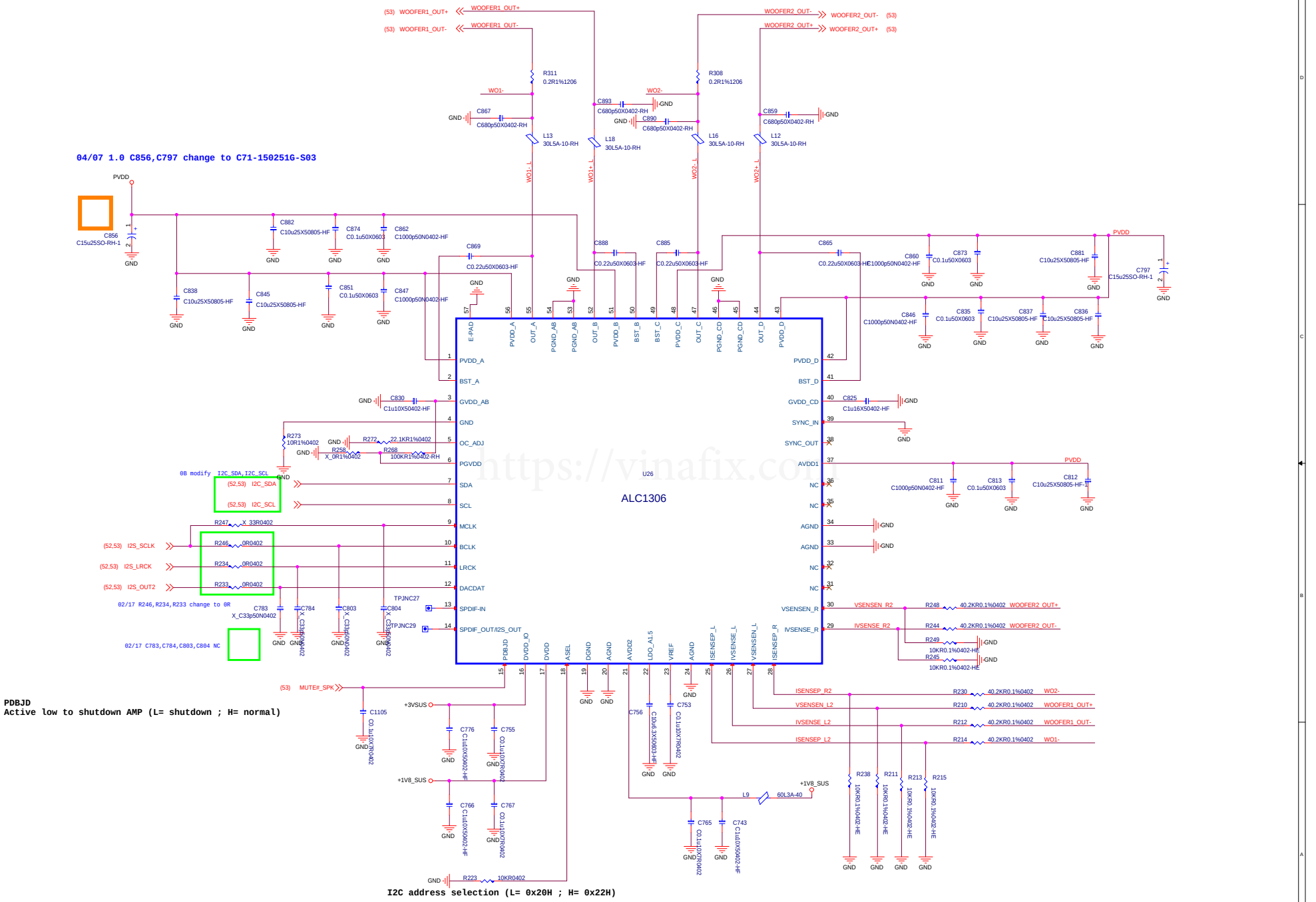
MICRO-STAR INT'L CO.,LTD.


04/07 1.0 C856,C797 change to C71-150251G-S03
ALC1306
U26
PDBJD
Active low to shutdown AMP (L= shutdown ; H= normal)
I2C address selection (L= 0x20H ; H= 0x22H)
0B modify I2C_SDA,I2C_SCL
02/17 R246,R234,R233 change to 0R
02/17 C783,C784,C803,C804 NC
WOOFER1_OUT+
WOOFER1_OUT-
WOOFER2_OUT+
WOOFER2_OUT-
I2S_SCLK
I2S_LRCK
I2S_OUT2
I2C_SDA
I2C_SCL
MUTE#_SPK
PVDD
+3VSUS
+1V8_SUS
MICRO-STAR INT'L CO.,LTD.
Woofer
MS-16P11
0A
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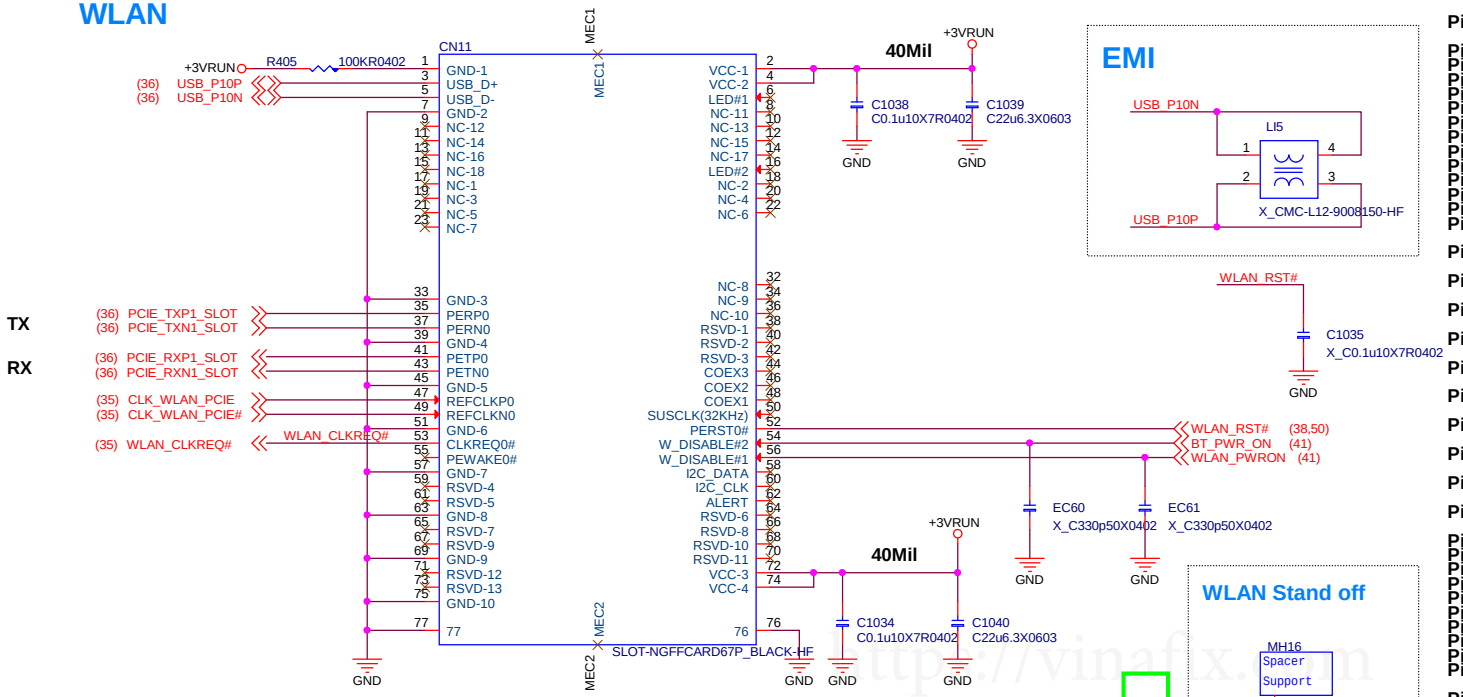
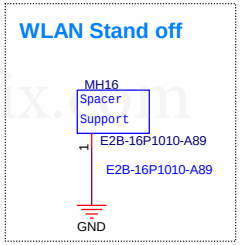
WLAN /Touch Pad

WLAN





N15-0670260-L06

SLOT_NGFFCARD67_15

03/20 MH16 change to E2B-16P1010-A89

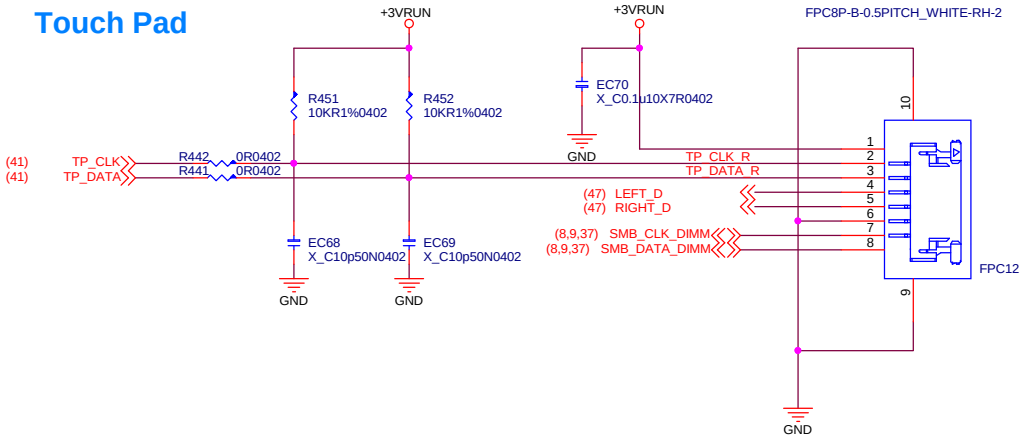
Pin 1	GND		
Pin 3	USB_D+	Pin 2	3.3V
Pin 5	USB_D-	Pin 4	3.3V
Pin 7	GND	Pin 6	LED1#
Pin 9	Module Key	Pin 8	Module Key
Pin 11	Module Key	Pin 10	Module Key
Pin 13	Module Key	Pin 12	Module Key
Pin 15	Module Key	Pin 14	Module Key
Pin 17	N/C	Pin 16	LED2#
Pin 19	N/C	Pin 18	GND
Pin 21	N/C	Pin 20	N/C
Pin 23	N/C	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

03/20 FPC12 change to N5A-08F0130-H06

N5A-08F0130-H06

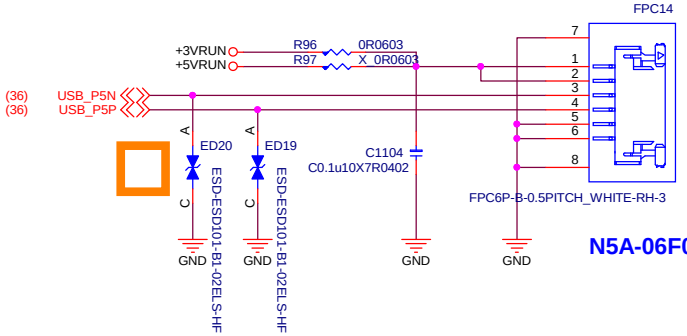
FPC8P-B-0.5PITCH_WHITE-RH-2

Touch Pad



03/21 1.0 Add FPC14

FP



N5A-06F0210-A81

04/06 1.0 Add ED19,ED20

msi	MICRO-STAR INT'L CO.,LTD.		
Title	WLAN /ClickPad		
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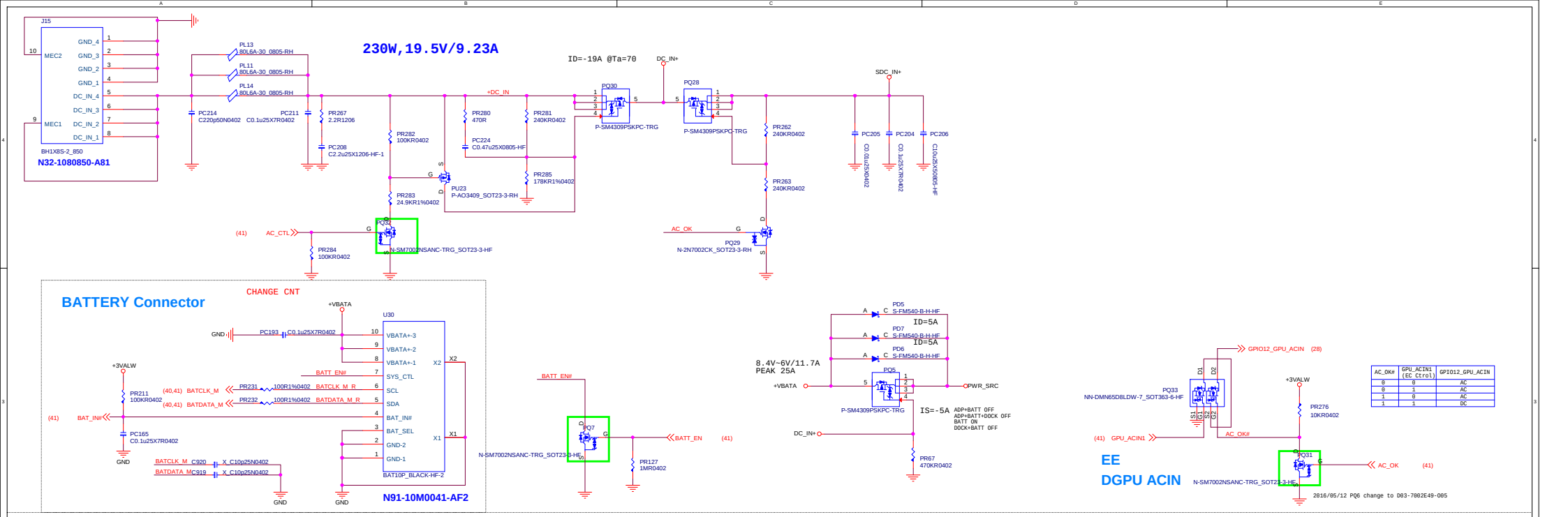

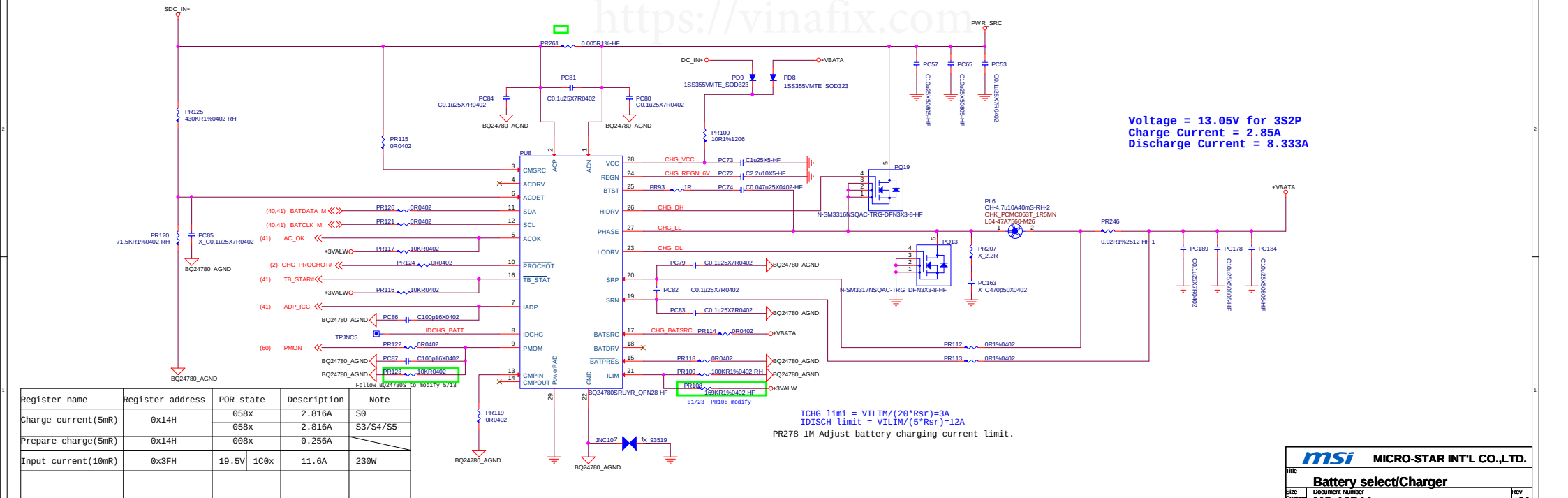

Register name	Register address	POR state	Description	Note
Charge current(5mR)	0x14H	058x	2.816A	S0
		058x	2.816A	S3/S4/S5
Prepare charge(5mR)	0x14H	008x	0.256A	
Input current(10mR)	0x3FH	19.5V 1C0x	11.6A	230W

MICRO-STAR INT'L CO.,LTD.

Title: Battery select/Charger

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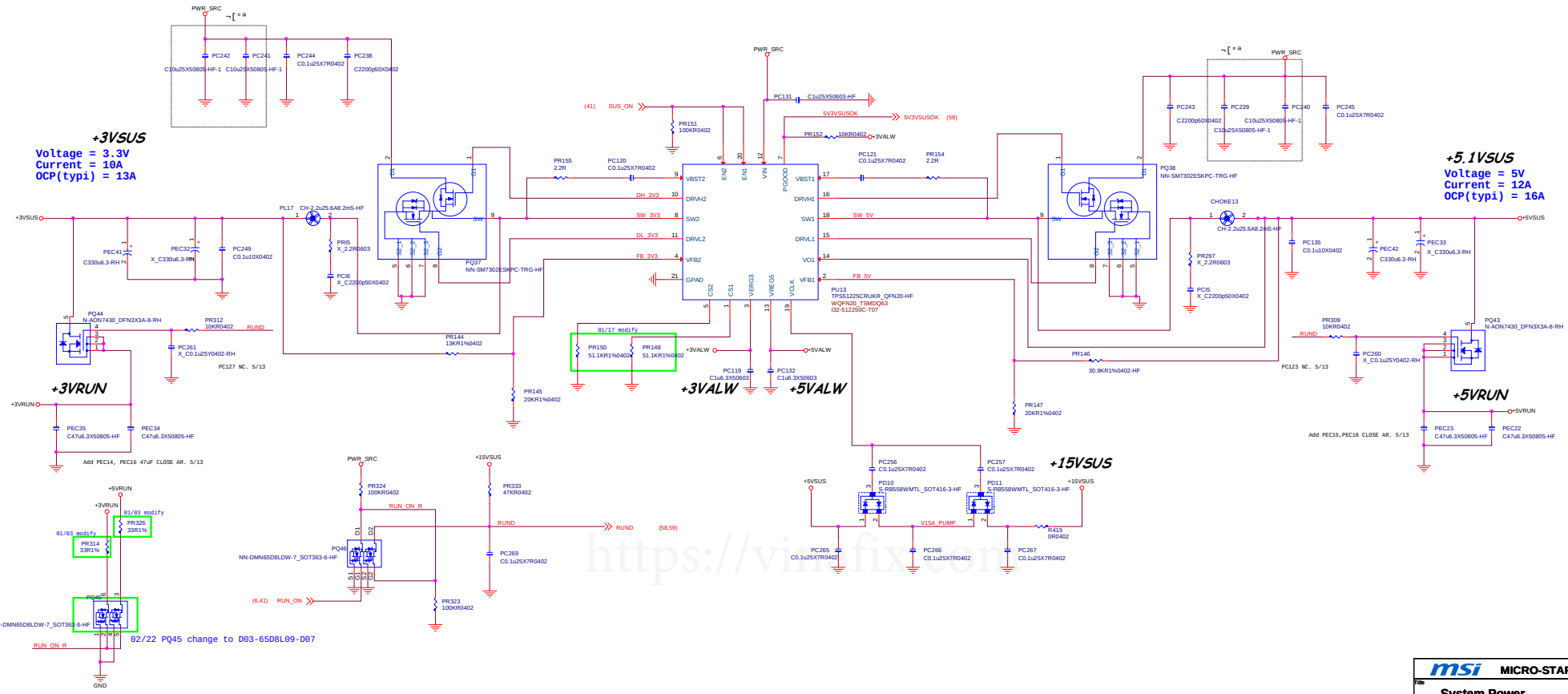

msi	MICRO-STAR INT'L CO.,LTD.
Title	System Power
Size / Custom	Document Number: MS-16P11
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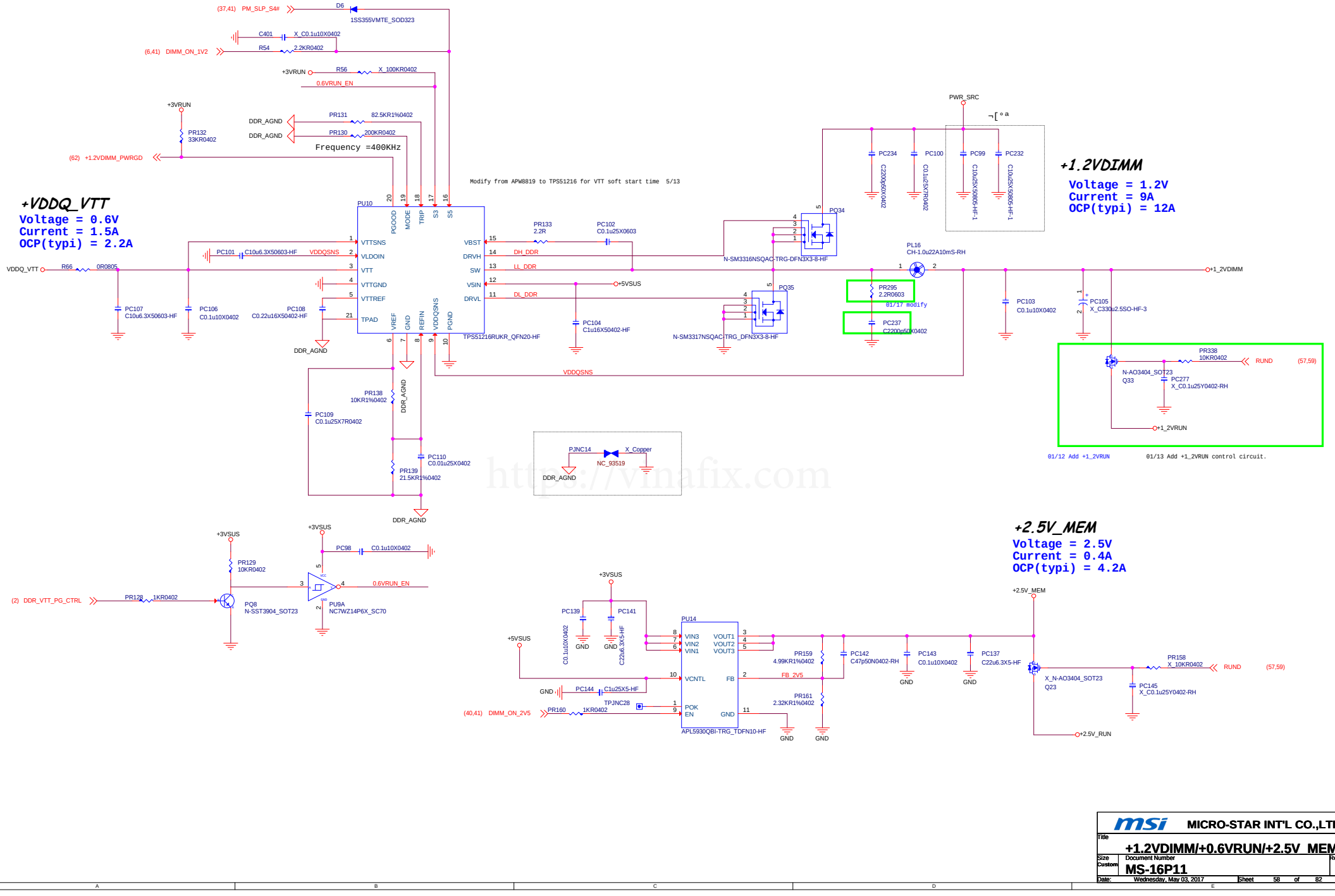

Title	+1.2VDIMM/+0.6VRUN/+2.5V_MEM
Size	Custom
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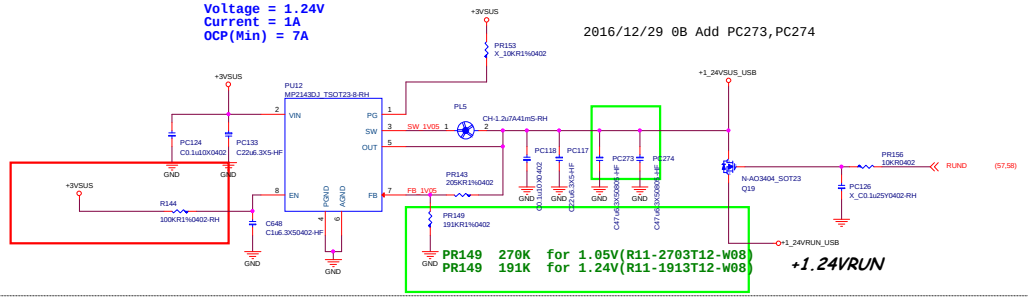
MICRO-STAR INT'L CO.,LTD.

+1.24VSUS

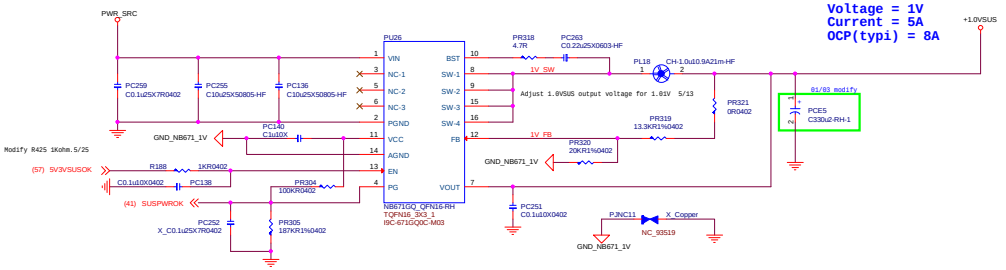
Voltage = 1.24V
Current = 1A
OCP(Min) = 7A

2016/12/29 0B Add PC273,PC274



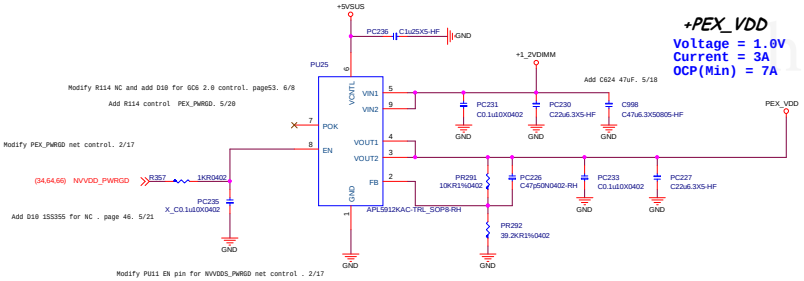
+1.01VSUS

Voltage = 1V
Current = 5A
OCP(typi) = 8A



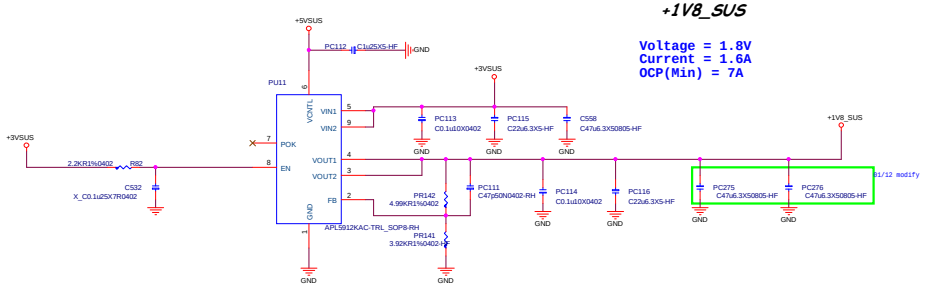
+PEX_VDD

Voltage = 1.0V
Current = 3A
OCP(Min) = 7A



+1V8_SUS

Voltage = 1.8V
Current = 1.6A
OCP(Min) = 7A



msi MICRO-STAR INT'L CO.,LTD.			
Title: +1VSUS/+PEX_VDD/+1.24VSUS/+1V8_SUS			
Size: Custom	Document Number: MS-16P11		Rev: 0A
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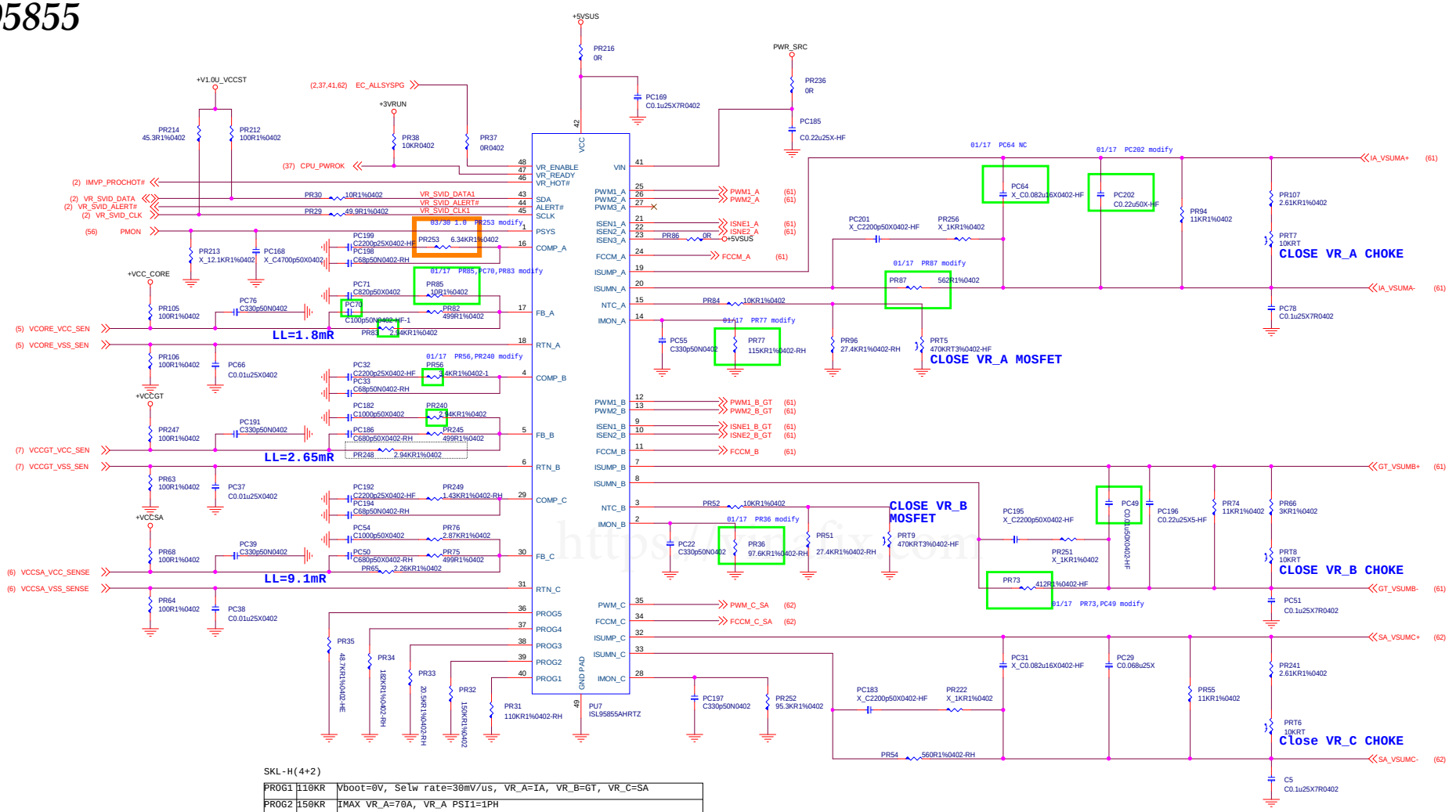
Skylake H-line 42 45W
ISL95855



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

Title	Skylake(HOST)		
Size C	Document Number MS-16P11		Rev 0A
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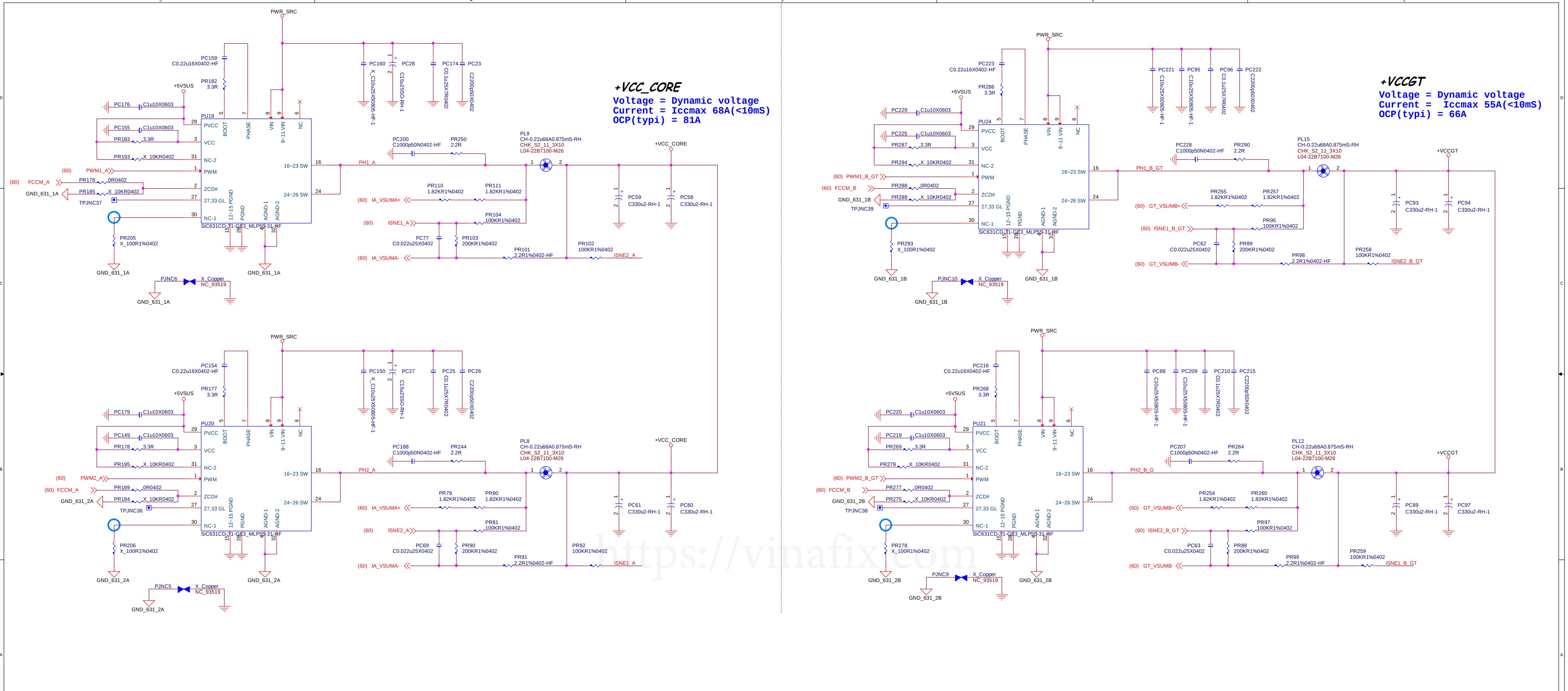
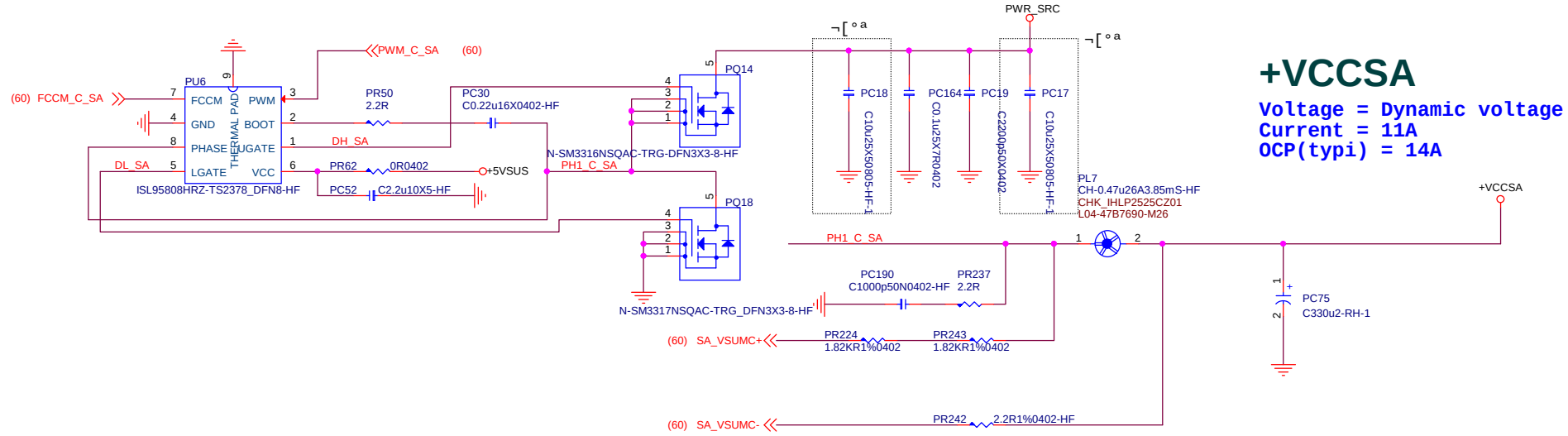
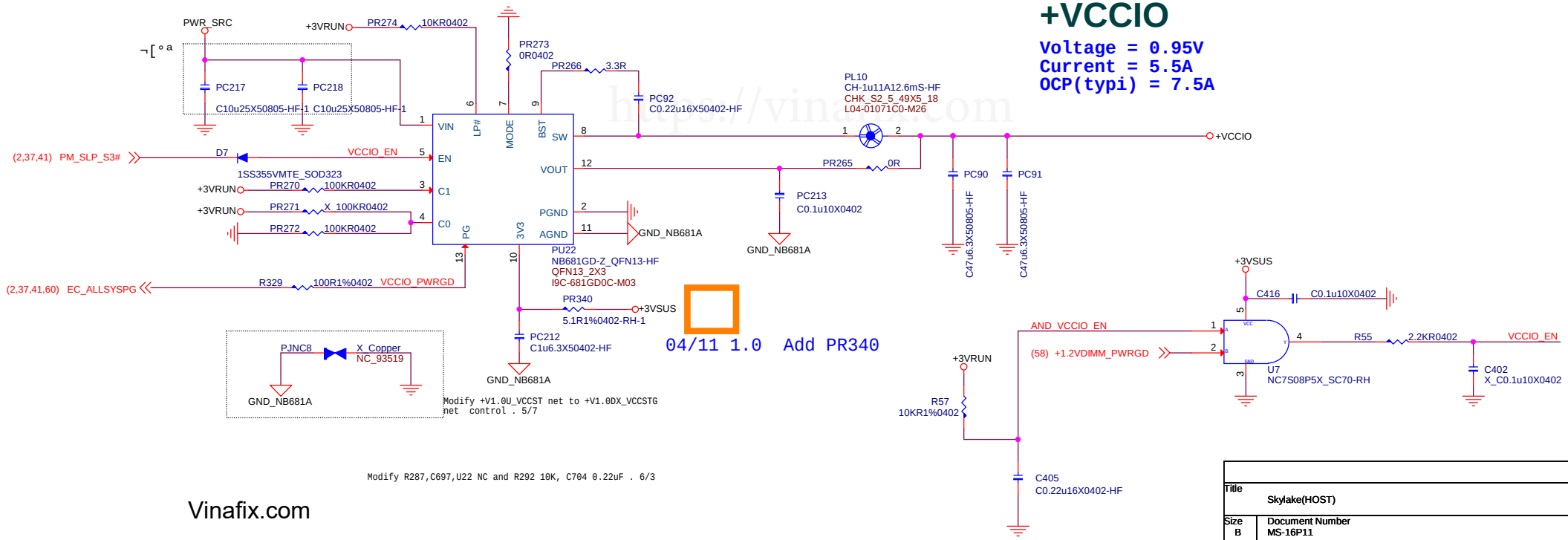


+VCC_CORE
Voltage = Dynamic voltage
Current = Iccmax 68A(<10mS)
OCP(typi) = 81A
+VCCGT
Voltage = Dynamic voltage
Current = Iccmax 55A(<10mS)
OCP(typi) = 66A
PWR_SRC
+5VSUS
+VCC_CORE
+VCCGT
PU19
PU20
PU21
PU24
SiC631CD-T1-GE3_MLP55-31-HF
PVCC
VCC
NC-2
PWM
ZCD#
27,33 GL
NC-1
BOOT
PHASE
VIN
9~11 VIN
NC
16~23 SW
24~26 SW
12~15 PGND
PGND
AGND-1
AGND-2
PL9
PL8
PL12
PL15
CH-0.22u68A0.875mS-RH
CHK_S2_11_3X10
L04-22B7100-M26
PH1_A
PH2_A
PH1_B_GT
PH2_B_G
PWM1_A
PWM2_A
PWM1_B_GT
PWM2_B_GT
FCCM_A
FCCM_B
IA_VSUMA+
IA_VSUMA-
ISNE1_A
ISNE2_A
GT_VSUMB+
GT_VSUMB-
ISNE1_B_GT
ISNE2_B_GT
GND_631_1A
GND_631_2A
GND_631_1B
GND_631_2B
PJNC5
PJNC6
PJNC9
PJNC10
X_Copper
NC_93519
TPJNC36
TPJNC37
TPJNC38
TPJNC39
C330u2-RH-1
C0.22u16X0402-HF
C1u10X0603
C1000p50N0402-HF
C0.022u25X0402
1.82KR1%0402
100KR1%0402
200KR1%0402
2.2R1%0402-HF
X_100R1%0402
X_10KR0402
0R0402
3.3R
2.2R

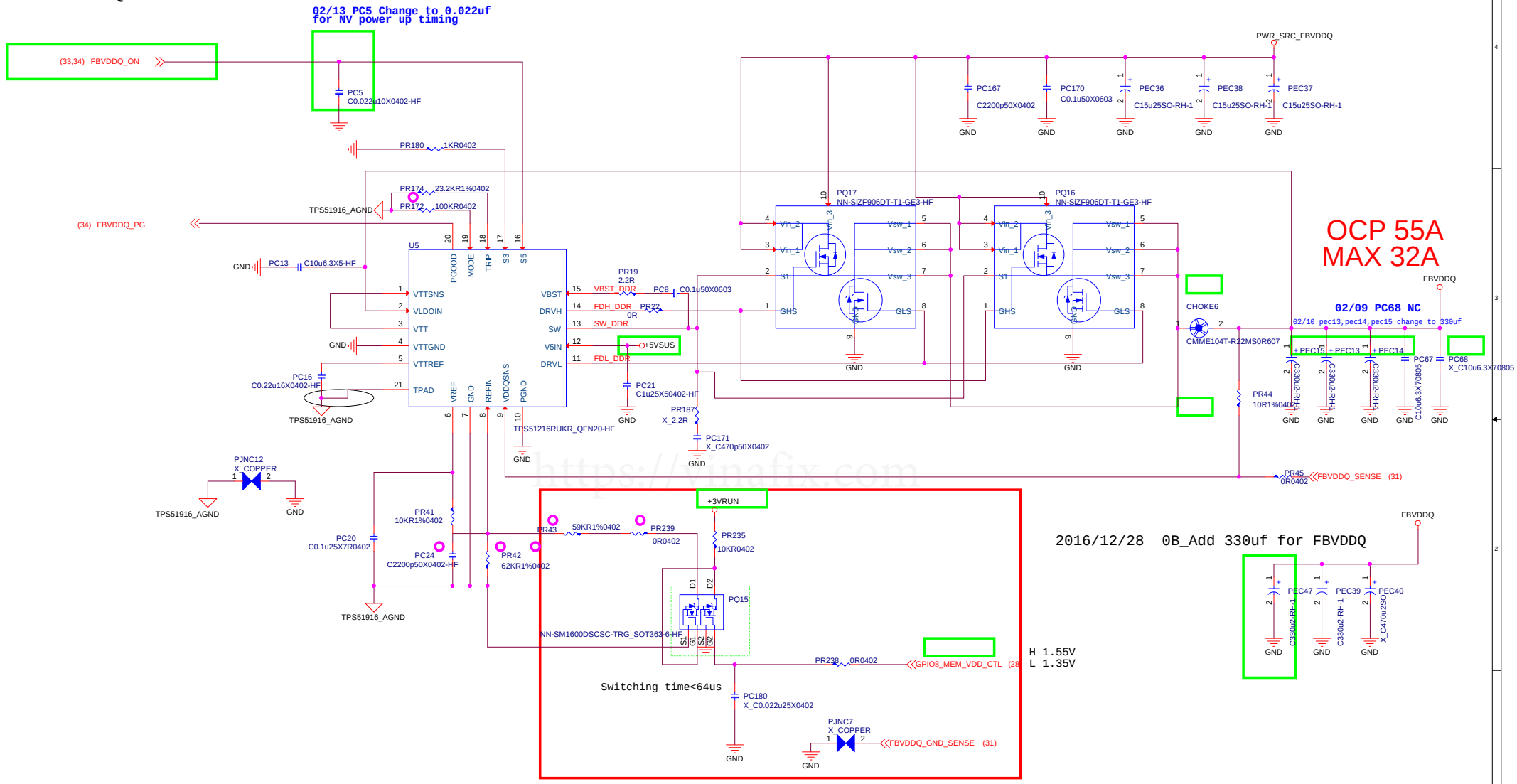
Title	Skylake(HOST)		
Size Custom	Document Number MS-16P11		Rev 0A
Date:	Wednesday, May 03, 2017	Sheet 61	of 82





Title	Skylake(HOST)	
Size B	Document Number MS-16P11	Rev 0A
Date: Wednesday, May 03, 2017	Sheet 62 of 82	

PAGE53: FBVDDQ



MICRO-STAR INT'L CO.,LTD.		
Title: FBVDDQ		
Size	Document Number: MS-16P11	Rev: 0A
Date:	Sheet 63 of 82	

DGPU POWER / UP9511P

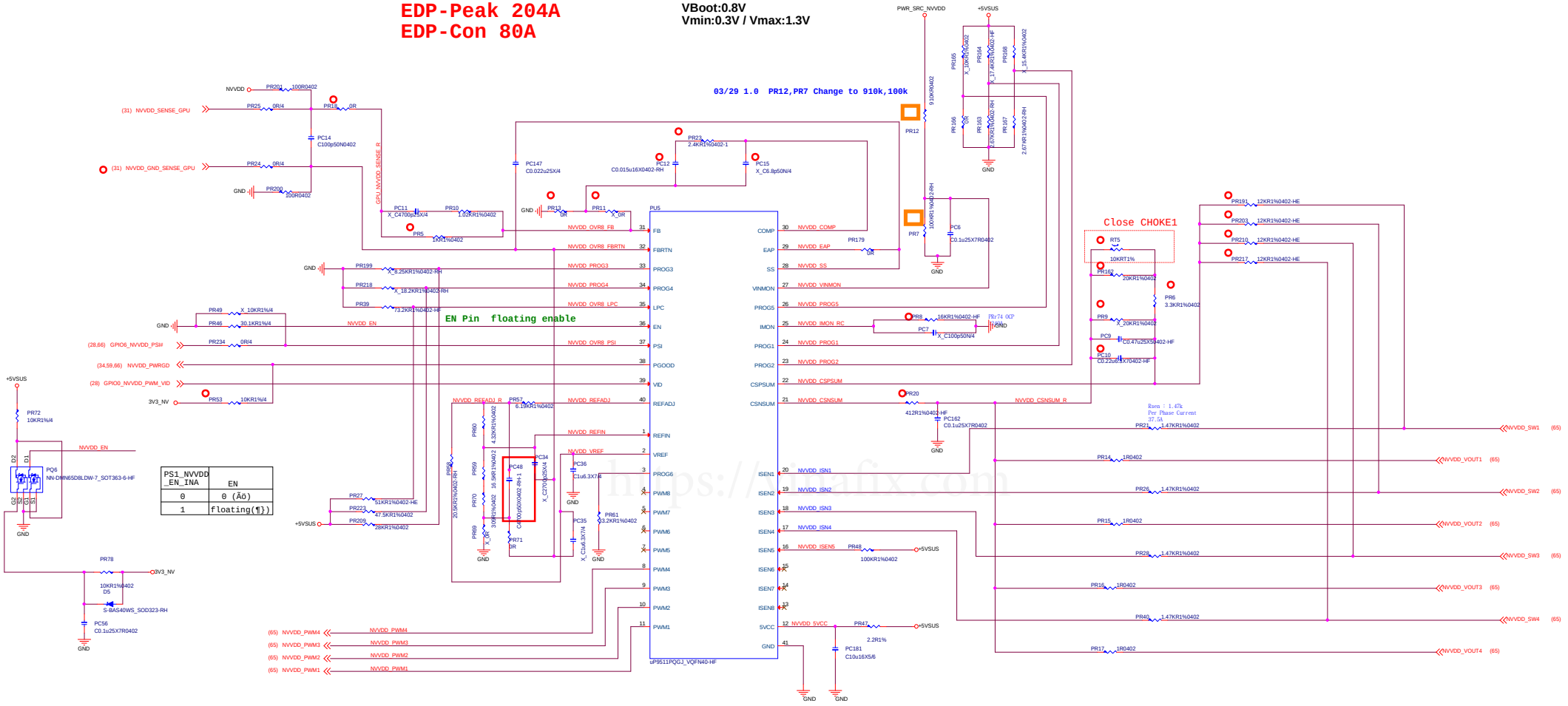
EDP-Peak 204A

EDP-Con 80A

DGPU POWER NVVDD

VBoot:0.8V

Vmin:0.3V / Vmax:1.3V

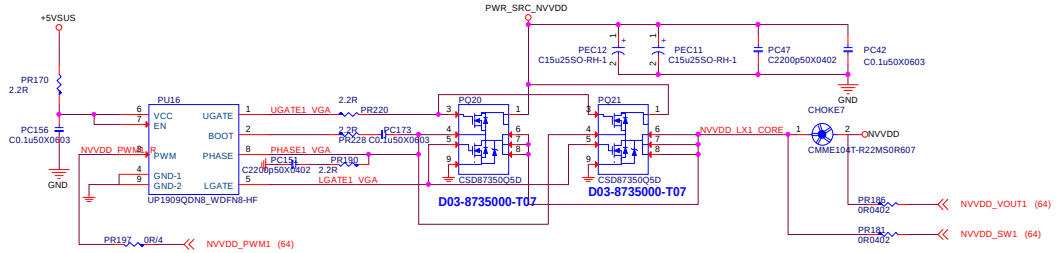


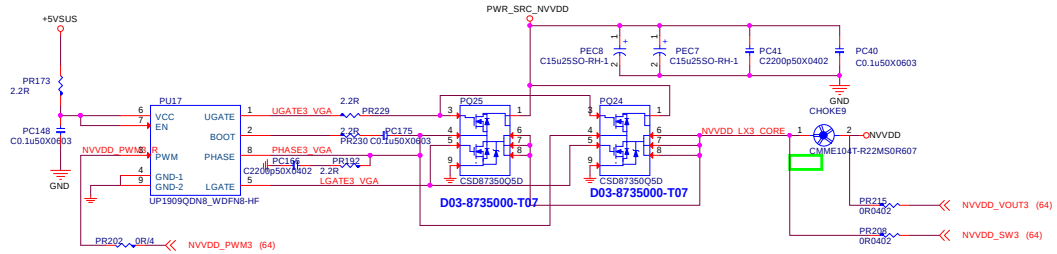
PS1_NVVDD_EN_INA	EN
0	0 (Äò)
1	floating(¶})

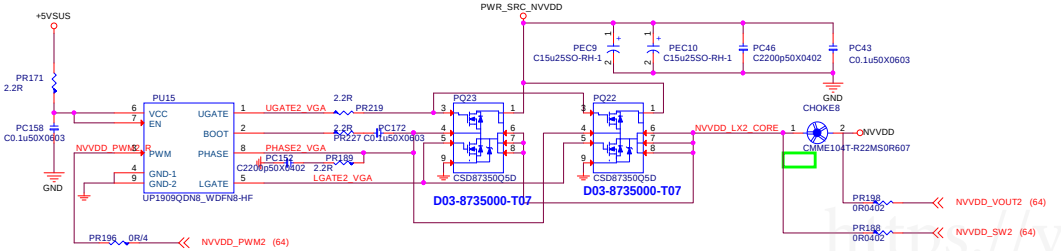
	PR885	PR897	PR92	PR104	PR1208	PC76
CONFIG	R1	R2	R3	R4	R5	C
N17E-G1	6.19K	20.5K	4.32K	16.5K	309R	1.5nF

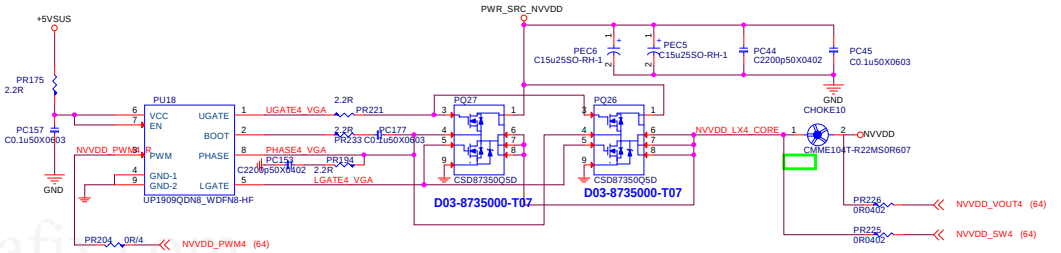
MSI	MICRO-STAR INT'L CO.,LTD.
Title	NVVDD PWM IC (UP1633)
Size	Document Number: MS-16P11
Rev	0A
Date:	Sheet 64 of 82

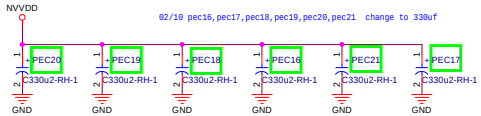
DGPU POWER
EDP-Peak 300A
EDP-Con 115A



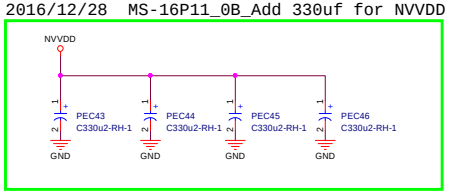








2016/12/28 MS-16P11_0B_Add 330uf for NVVDD



Title	<Title>	
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DGPU POWER / UP1666P

EDP-Peak 74A

EDP-Con 28A

DGPU POWER NVVDDS

VBoot:0.8V

Vmin:0.5V / Vmax:1.25V

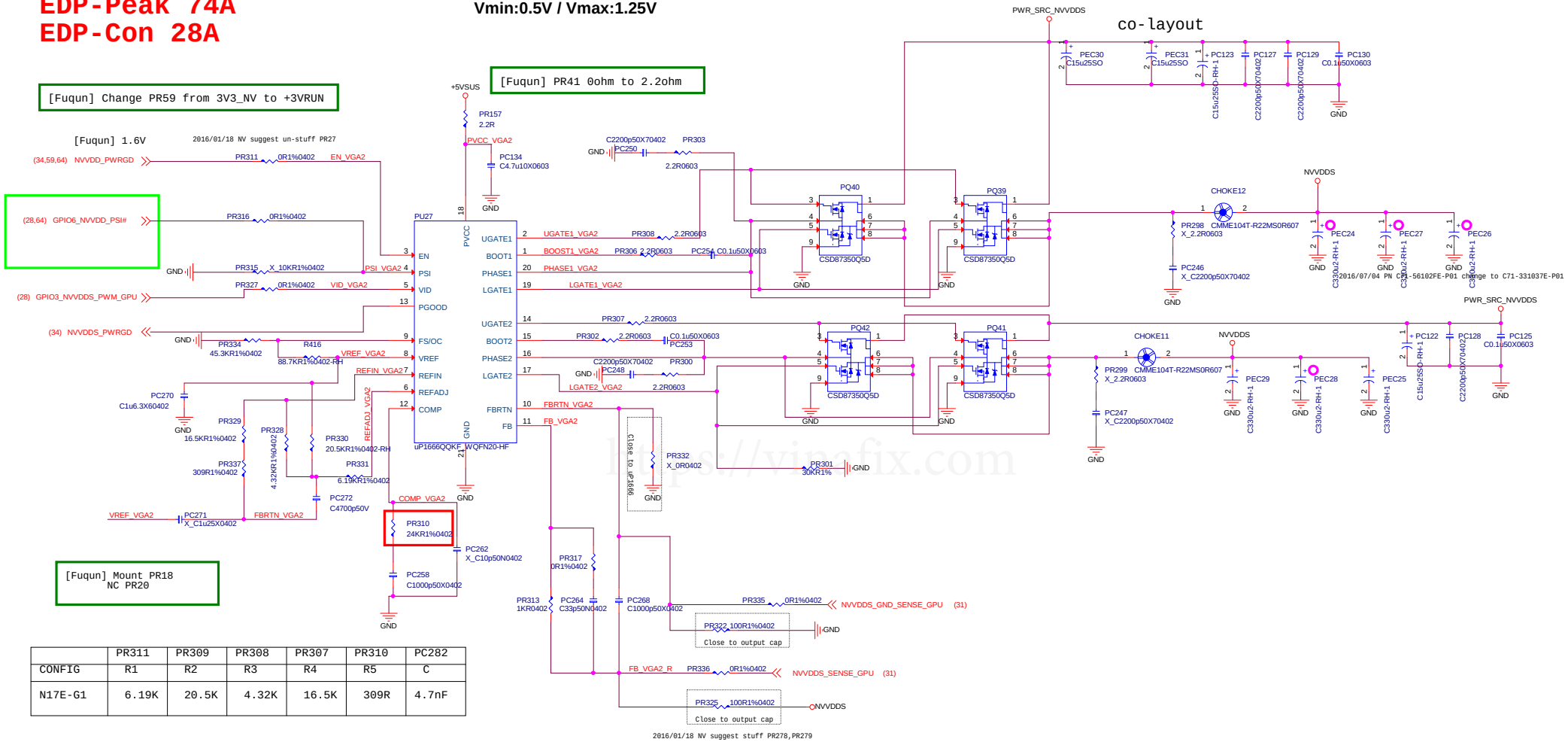
[Fuqun] Change PR59 from 3V3_NV to +3VRUN

[Fuqun] PR41 0ohm to 2.2ohm

[Fuqun] 1.6V

2016/01/18 NV suggest un-stuff PR27

co-layout



[Fuqun] Mount PR18
NC PR20

	PR311	PR309	PR308	PR307	PR310	PC282
CONFIG	R1	R2	R3	R4	R5	C
N17E-G1	6.19K	20.5K	4.32K	16.5K	309R	4.7nF

2016/01/18 NV suggest stuff PR278,PR279

MICRO-STAR INT'L CO.,LTD.

Title: NVVDD PHASE 1~4

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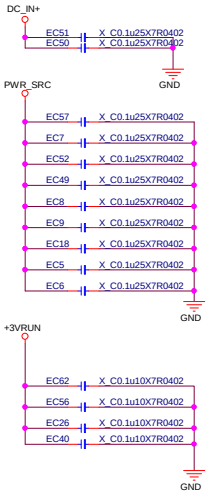
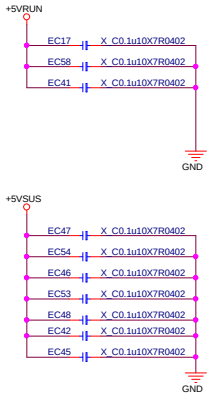
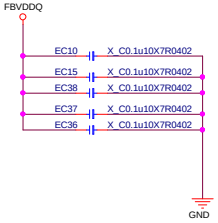
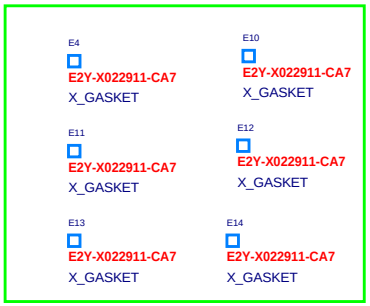
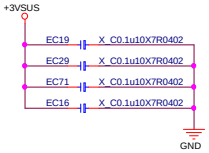


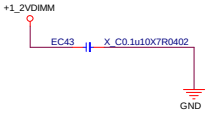




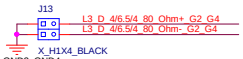


Add E4,E5,E6,E7,E8,E9for EMI.5/22

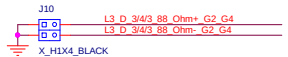


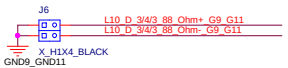


80 OHM / CLK/WCK

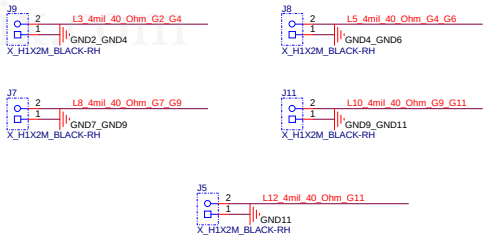


88 OHM /Alpine Ridge/DDR4 CLK



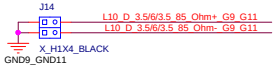


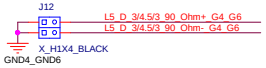
40 OHM / DDR4 CTRL



85 OHM /SATA /PCH PCIE/ EDP
USB /HDMI/DP/DMI/CLK/PEG

90 AR type-C





MICRO-STAR INT'L CO.,LTD.

Title: EMI

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CPU Holes

MCPU5 H_R142D126BR197_MB_N
MCPU6 H_R142D126BR197_MB_N
MCPU9 H_R142D126BR197_MB_N

H_R197D91_N MH11 X_HOLES_R236D98_1034
H_R197D91_N MH18 X_HOLES_R236D98_1034
H_R197D91_N MH10 X_HOLES_R236D98_1034
H_R197D91_N MH14 X_HOLES_R236D98_1034
MH19 E2B-1032010-RH
E2B-1032010-A89
H_R197D91_N MH7 X_HOLES_R236D98_1034
H_R197D91_N MH17 X_HOLES_R236D98_1034
MH9 H_R197D91_N
H_R197D91_N MH5 X_HOLES_R236D98_1034

FM19 FM23 FM27 FM12
FM28 FM7 FM8 FM15
FM24 FM16 FM10 FM6
FM11 FM20 FM17 FM22

npth_80 MH6 X_npth_80
npth_80 MH8 X_npth_80

H_R197D118_V3_N MH15 X_H_R197D118_V3_N

H_R236D157_V3_N MH12 X_H_R236D157_V3_N
H_R197D91_N MH13 X_HOLES_R236D98_1034

RU1 RU6 RU10 RU14
RU2 RU5 RU9 RU13
RU3 RU8 RU12 RU16
RU4 RU7 RU11 RU15
E2Y-4A10711-Y40
RUBBER

FM14 FM5 FM25 FM13
FM26 FM18 FM9 FM21

NPTH_98 MHC14 X_NPTH_98
NPTH_98 MHC15 X_NPTH_98

160529

RU17 E2Y-4A10811-Y40 RUBBER
RU18 E2Y-4A10811-Y40 RUBBER
RU19 E2Y-4A10911-Y40 RUBBER

NPTH118 MHC7 X_NPTH118
NPTH118 MHC16 X_NPTH118
NPTH118 MHC17 X_NPTH118
NPTH118 MHC6 X_NPTH118

UME5 CPU BKT — CPU BKT — 307-6P10111-HG0
UME6 GPU BKT — GPU BKT — 307-6P10211-HG0
UME3 COMPLIANCE MYLAR — COMPLIANCE_mylar — E2P-4A11411-Y42
UME11 COMPLIANCE MYLAR — COMPLIANCE_mylar — E2Y-4A11011-Y42

PCB1 — PD0-16P1110-H73
PD0-16P1110-H73
Hannstar:PD0-16P1110-H73
TRIPOD: PD0-16P1110-T53

UME15 MB MYLAR — MB_mylar — E2P-6P11311-Y42
UME16 MB MYLAR — MB_mylar — E2P-6P11311-Y42
UME17 MB MYLAR — MB_mylar — E2P-6P11311-Y42
UME18 MB MYLAR — MB_mylar — E2P-6P11311-Y42

UME1 HDMI Lable — HDMI ROYALTY — Y01-RHDMI03-000
UME2 BIOS Lable — BIOS_LABEL — G51-N1CO041-A09
For MP

DGPU Holes

MCPU8 MCPU10 MCPU7 MCPU11
H_R142D126BR197_MB_N

E5 X_HS-MS1011-RH
E6 X_HS-MS1011-RH

MICRO-STAR INT'L CO.,LTD.

Title	Screw/ME		
Size: Custom	Document Number: MS-16P11		Rev: 0A
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MS-16P1 Power Delivery Chart

MICRO-STAR INT'L CO.,LTD.

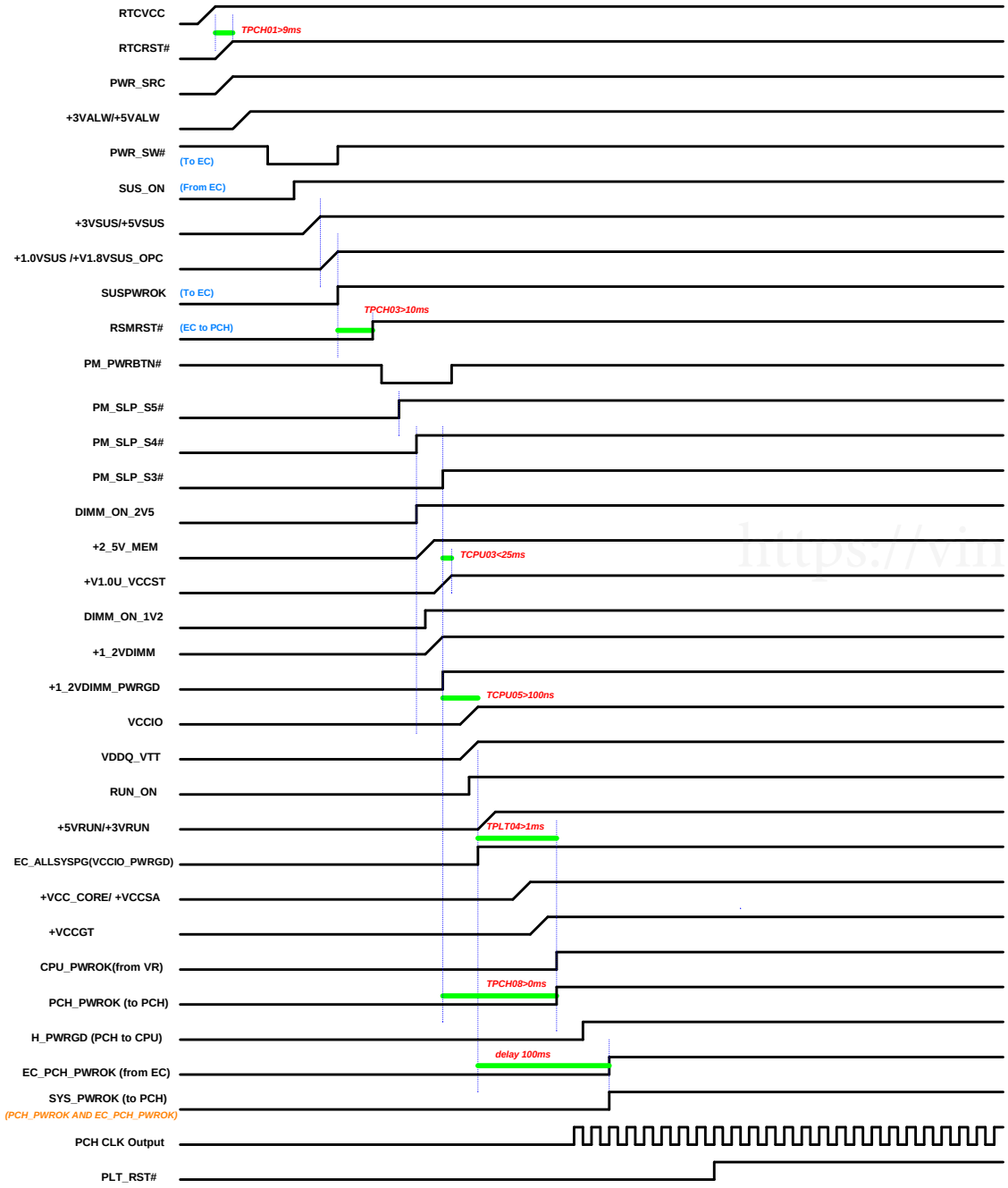
Power Delivery Map

MS-16P11

0A

Power on Sequence

G3 -> S0



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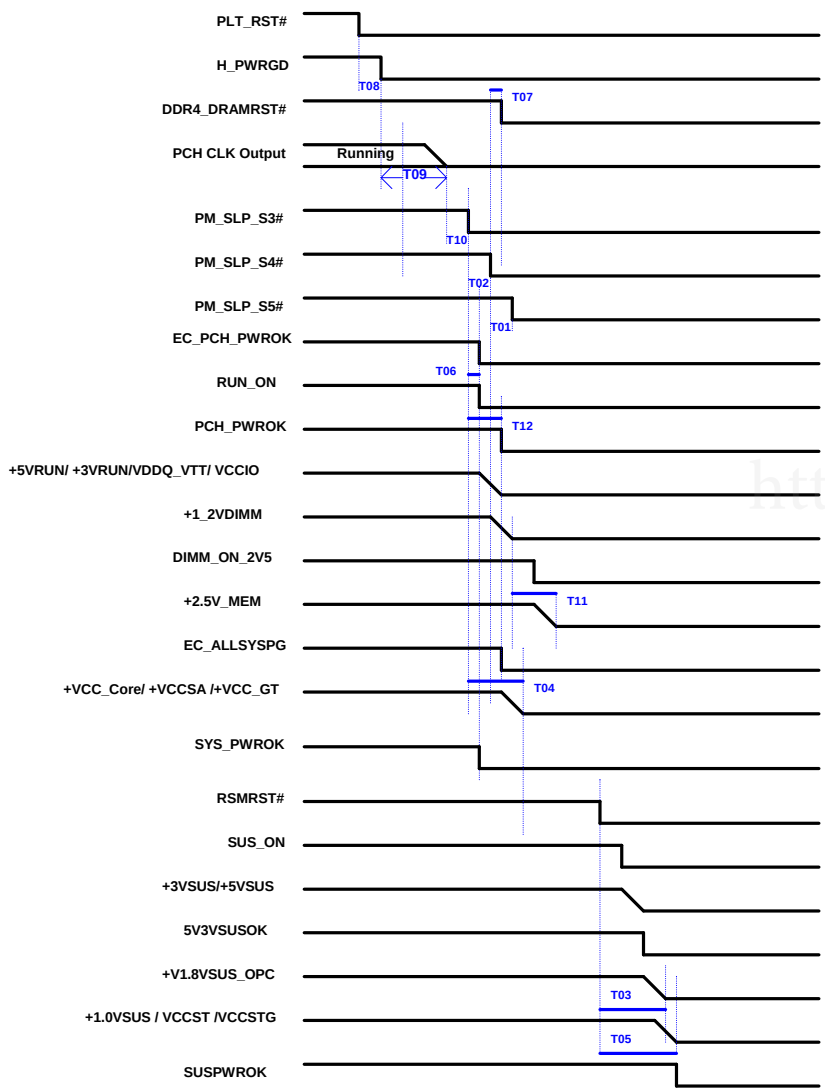
Power down Sequence

S0 -> G3



	MIN	MAX	Units	Description
T01	30		us	SLP_S5# assertion to SLP_S4#
T02	30		us	SLP_S4# assertion to SLP_S3#
T03	1		us	RSMRST# asserting to VccPRIM dropping 5% of nominal value
T04		500	ms	SLP_S3# assertion to VCC, VCCGT, VCCIO and VCCSA rails completely off.
T05	1		us	RSMRST# asserting to VccPRIM dropping 5% of nominal value
T06		1	us	SLP_S3# assertion to VCCIO VR disabled
T07	-100		ns	DDR_RESET# assertion to SLP_S4# assertion
T08	30		us	PLTRST# assertion to PROCPWRGD deassertion
T09	10		us	PROCPWRGD de-assertion to CLKOUT_BCLK turning OFF.
T10	1		us	CLKOUT_BCLK turning OFF to SLP_S3# assertion
T11	30		ms	VDDQ ramped down to VPP ramp down
T12	0		ms	SLP_S3# assertion to PCH_PWROK deassertion

MICRO-STAR INT'L CO.,LTD.

Title: Power down Sequence

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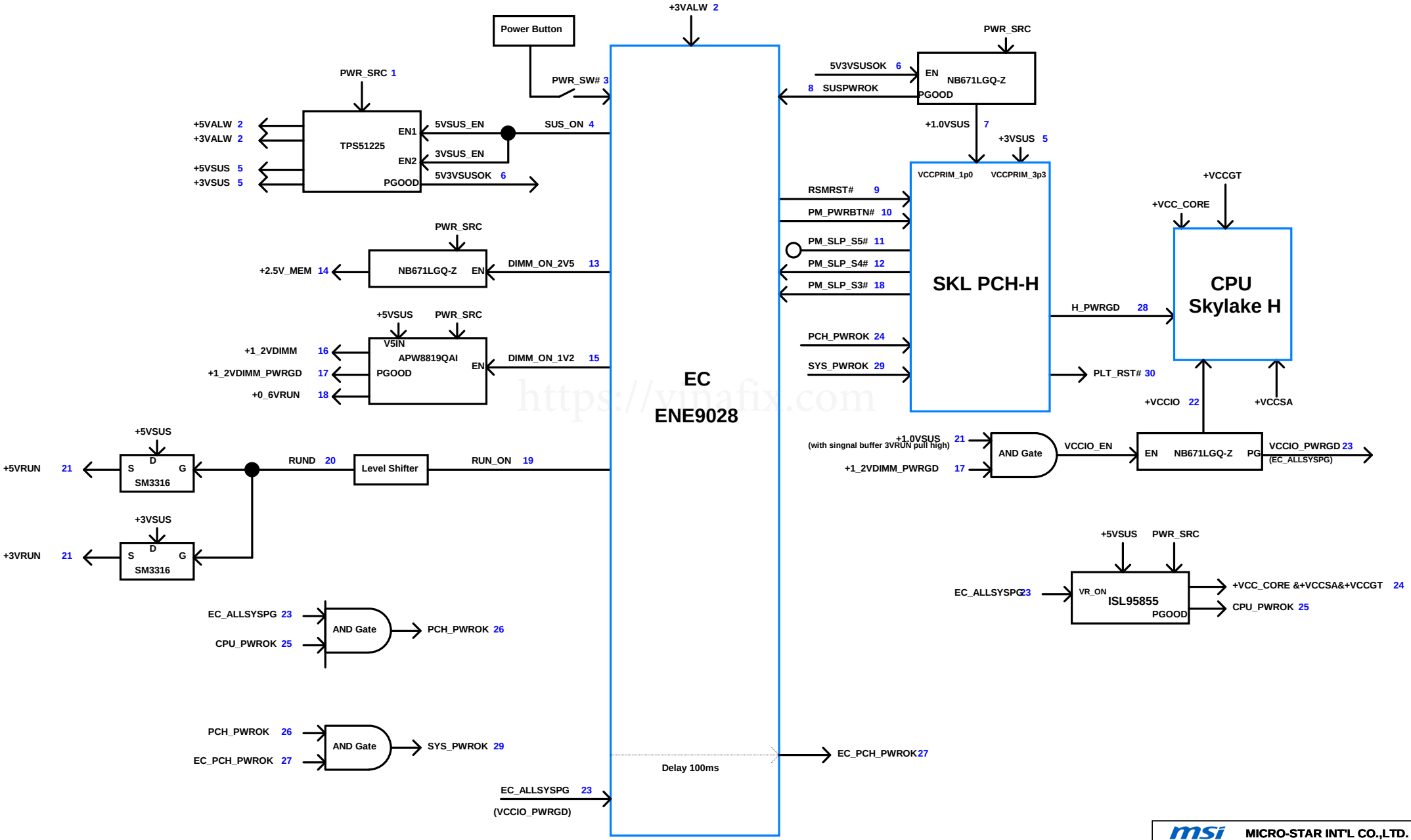
MS-16P1 Power on Block Diagram



msi MICRO-STAR INT'L CO.,LTD.			
Title: Power on Block Diagram			
Size: Custom	Document Number: MS-16P11		Rev: 0A
Date: Wednesday, May 03, 2017		Sheet 72 of 82	

History

0B:

2017/01/03

1. PCE5 P/N change to C71-33102AE-P01 on page59.
2. PQ47, PQ11, PQ9, PQ36, PQ10, PQ45 P/N change to D03-138DW19-D07 on page33, 52, 57..
3. R88, PR135, R64, PR140, R70, PR314, PR326 modify resistor value on page33, 57

2017/01/12

1. C175,C176,C177,C180,C181,C260,C285 P/N change to C11-4767314-M09 on page25.
2. Add PC275,PC276 on page 59
3. C370,C373 Change to 47uf/0805 on page10,27
4. Add +1_2VRUN page58
5. Add HDMI Retimer page46

2017/01/16

1. CN12 change to N53-09M0681-AF2

2017/01/17

1.PR150,PR148 §151.1K R11-5112T12-Y01
2.PR295¤W¥ó
3.PC237 §12.2nF C11-2222022-Y01
4.PR253 §13K R11-0302T12-Y01
5.PR85 §i 10R R11-0100T12-Y01
6.PC70 §i 100p C11-1011042-M09
7.PR83 §i 2.94K R11-2941T12-Y01
8.PR56 §i 3.4K R11-0342T12-Y01
9.PR240 §i 2.94K R11-2941T12-Y01
10.PC64 §i NC¤E¤W¥ó
11.PC202 §i 0.22uF C11-2242813-Y01
12.PR87 §i 562R R11-5620T12-Y01
13.PR77 §1115K R11-1153T12-Y01
14.PR36 §i 97.6K R11-9762T12-Y01
15.PR73 §1412R R11-4120T12-Y01
16.PC49 §10.01uF C11-1032822-Y01

17.CN14.CN15 change to N15-0670320-CK3

2017/01/20

1. CN12 change to N53-13M0031-L06
2. Add Q40 for USB3.0LED

2017/01/23

1. PR108 change to 169K
2. Modify U64 pin17,18 Pin defin

2017/01/25

1. Modify CN12 pin define

2017/02/06

1. R481 NC,R483 ¤W¥ó
2. Add LED7 for17"

2017/02/08

1. R86,R93 change to 0603

2017/02/09

1. Add CN17,add A_LED_SCL,A_LED_SDA net
2. U28 modify HP_SEL

2017/02/10

1. Add SW5,SW7 for 17"
2. Delete E7
3. C438,C340,C944,PEC13,PEC14,PEC15,PEC16,PEC17,PEC18,PEC19,PEC20,PEC21 change to 330uf
4. R895,C857 ¤W¥ó
5. R275,C834 modify for EMI
6. Add R614,R615

2017/02/13

1. C856,C797,C777,C795 change to C11-1062617-S02
2. PC5 Change to 0.022uf

2017/02/14

1. Add Q43,Q45,Q46 for audio impedance sense

2017/02/17

1. R242,R236,R235,R246,R234,R233 change to 0R
2. R165 NC,R170 ¤W¥ó

2017/02/22

1. ED9,ED17 change to D0G-02A0600-SI0
2. Q8,Q12,Q43,PQ45 change to D03-65D8L09-D07

2017/03/02

1. C735 change to C11-1052613-S02

2017/03/20

1. MH16 change to E2B-16P1010-A89
2. FPC12 change to N5A-08F0130-H06
3. Add UME15,UME16,UME17,UME18
4. C856,C797,C777,C795 change to C11-2267618-M09

1.0:

2017/03/21

1. ADD U66
2. Add FPC14
3. modify SMP_SCL,SMP_SDA on Page.40.41
4. CN7 change to N5N-22F0401-AF2
5. Add E43-1205022-H29 Ây-
6. U28,U29 modify MUTE#_AMP
7. Add D21
8. U26,U27 modify MUTE#_SPK
9. ADD Nets EC_IO1
10. ADD c1106,c907

2017/03/24

1. Add CAMERA Power U54
2. Modify +3V_WEBCAM on page.43
3. Add PU28 on Page.43
4. modify SCL3,SDA3 on Page.40.41

2017/03/29

1. Add R264,C1107
2. PR12,PR7 Change to 910k,100k
3. Delete UME9

2017/03/30

1. Add R462,D22,D23,C1108,C1109
2. PR253 modify

2017/03/31

1. EL6 Mirror

2017/04/06

1. Add ED19,ED20
2. Add R619,R620,L28,L29,C1110
3. Add D24

2017/04/07

1. Add EL12.
2. Delete R15
3. R590 change to 6.2K
3. C795,C777,C856,C797 change to C71-150251G-S03
4. PC161,PC187,PC203 Change to C11-1067620-M09
5. CN12 §160¶¥

2017/04/10

1. Remove R622,R623

2017/04/11

1. Add PR340
2. Add R484

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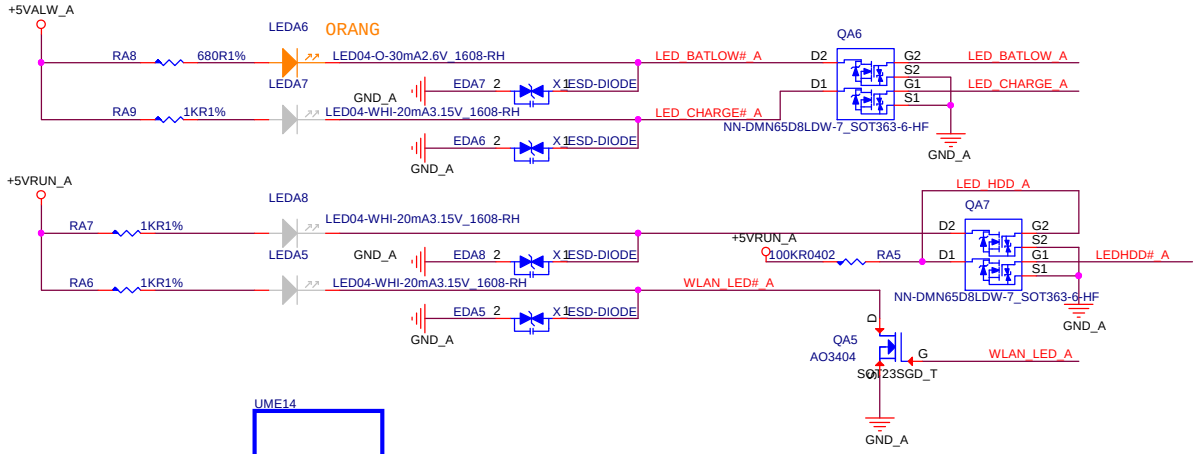
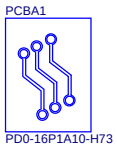
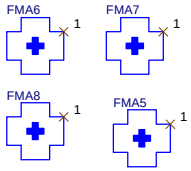


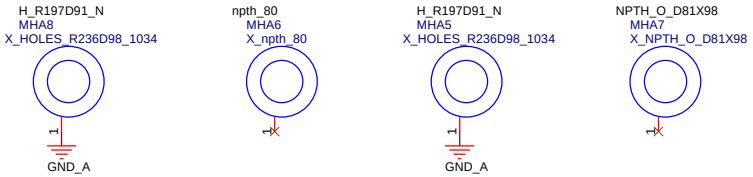
E2Y-6P11111-Y42

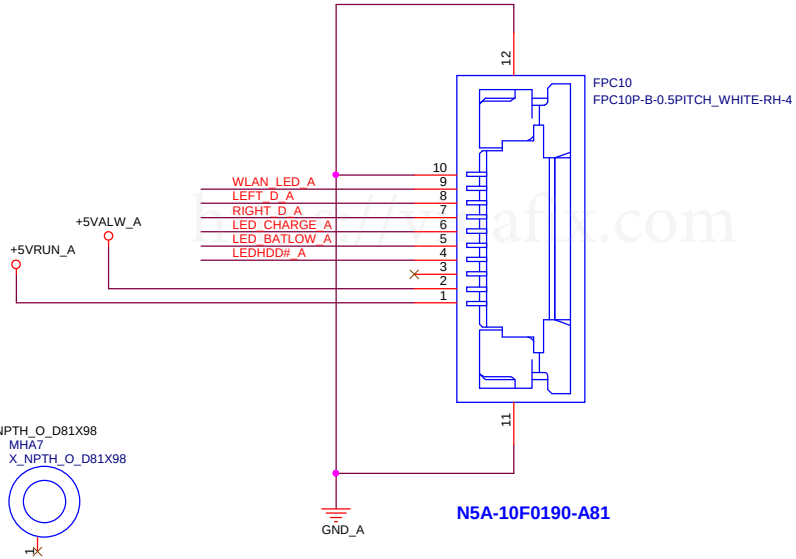


PD0-16P1A10-H73

Hannstar:PD0-16P1A10-H73
TRIPOD: PD0-16P1A10-T53

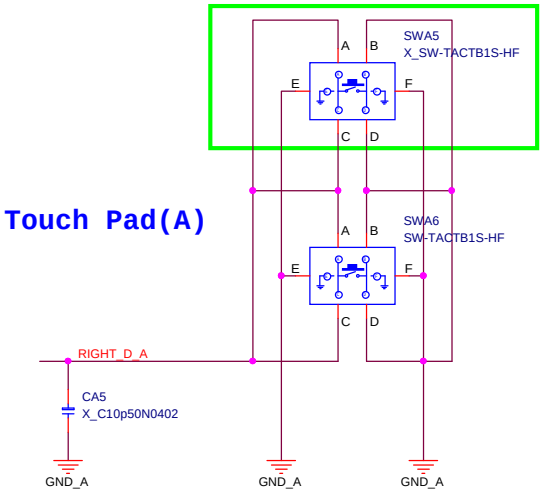






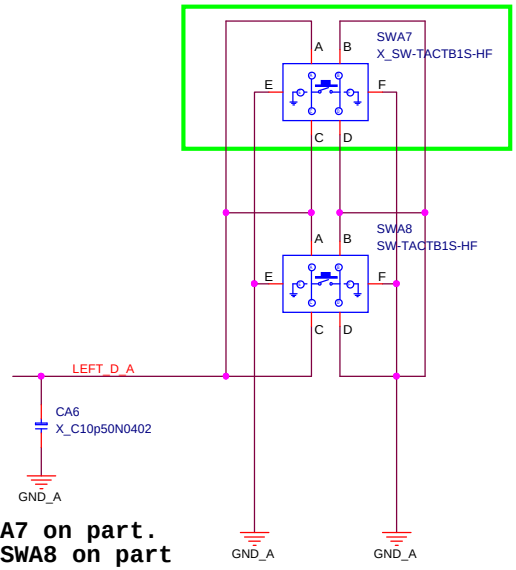
N5A-10F0190-A81

02/10 0B Add SWA5 for17"



17" SWA5 on part.
15.6" SWA6 on part

02/10 0B Add SWA7 for17"



17" SWA7 on part.
15.6" SWA8 on part

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History

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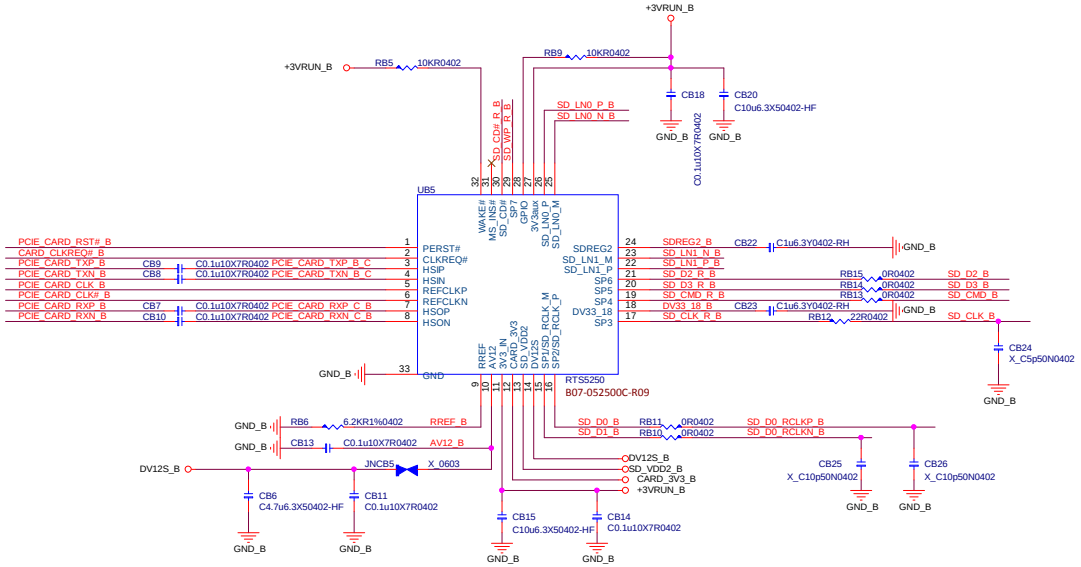
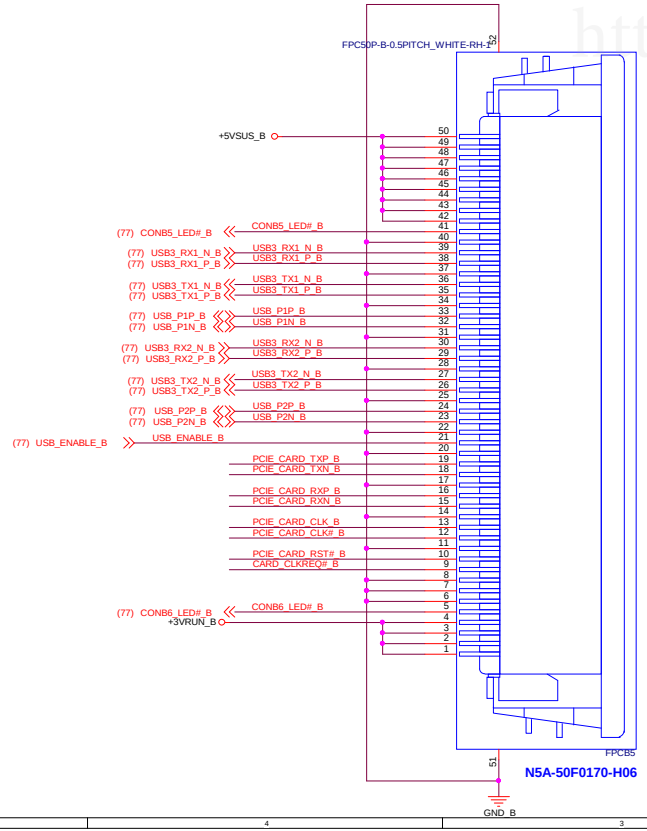
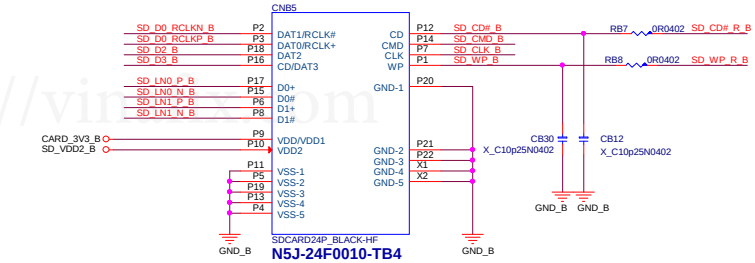
CardReader (RTS5250)

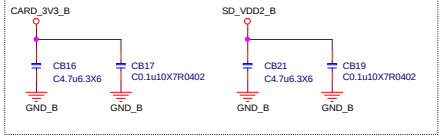


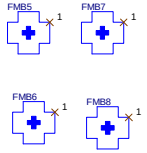
B to B

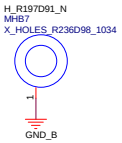


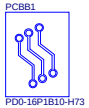


Close Connector



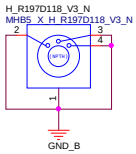






PD0-16P1B10-H73

Hannstar:PD0-16P1B10-H73
TRIPOD: PD0-16P1B10-T53



Title	CardReader/BTB CONN		
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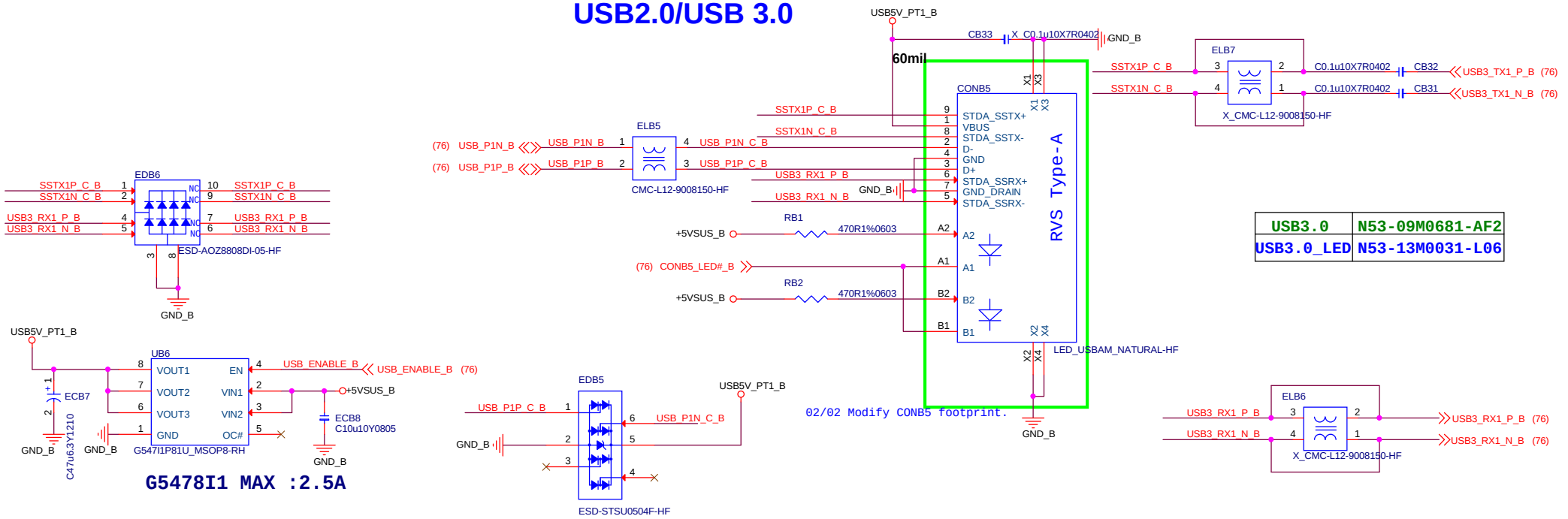
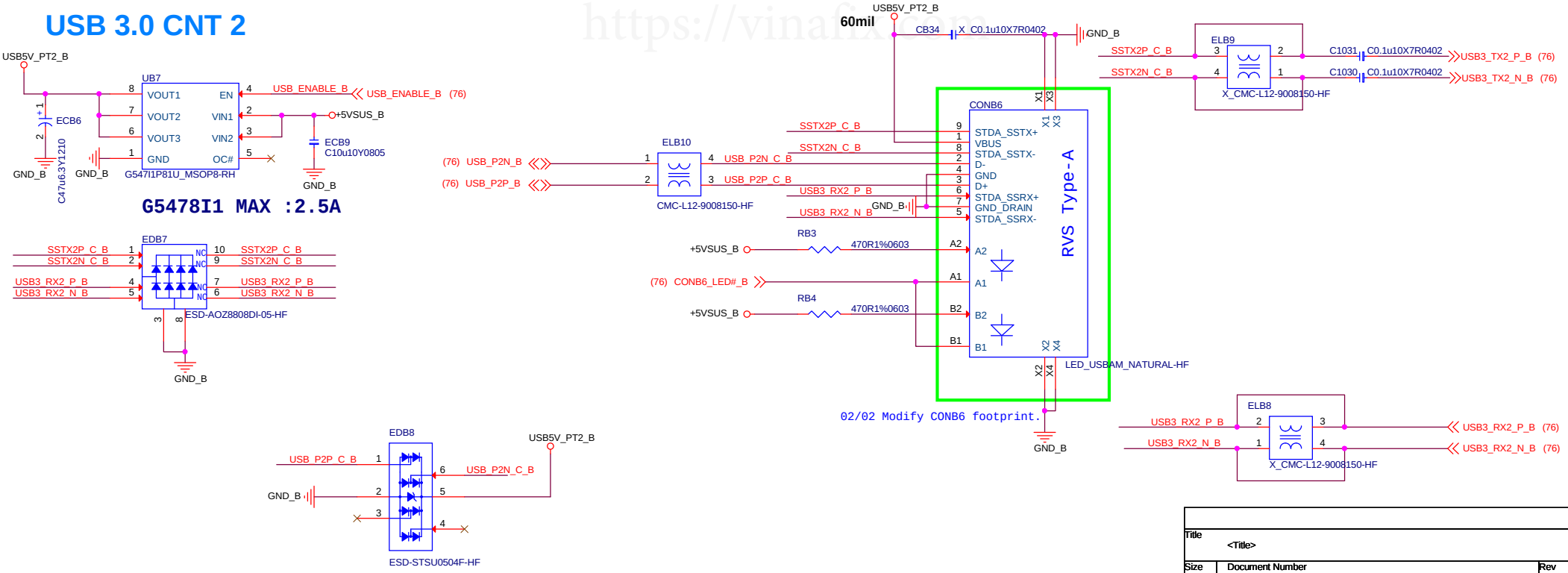
USB2.0/USB 3.0



USB3.0	N53-09M0681-AF2
USB3.0_LED	N53-13M0031-L06

USB 3.0 CNT 2



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2017/01/20

1. CONB5,CONB6 change to N53-13M0031-L06
2. Add QB1,QB2 for USB3.0LED

2017/01/25

1. Modify CONB5,CONB6 pin define

2017/02/08

1. RB1,RB2,RB3,RB4 change to 0603

2017/04/07

1. CONB5,CONB6 §ï 60¶¥

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Power LED

Current 30mA

+5VSUS_D

LEDD5 LED04-WO-20mA3.15V30mA2.4V_1516-RH

RD7 680R1% PWR_LIGHT_D 1 3 PWR_LED#_D_D

RD8 1KR1% HYBRID_LIGHT_D 2 4 HYBRID_LED#_D

FMD7 FMD6 FMD5 FMD8

PWR_LED#_D_D EDD5 1 2 ESD-SFI0402-050E101NP-LF-RH

HYBRID_LED#_D EDD7 1 2 ESD-SFI0402-050E101NP-LF-RH

GND_D

FAN_SW#_D RD6 100R1%0402

CD7 X_C10p50N0402

SWD7 SW-TACTB1S-HF

N71-0101630-D02

KB_LED_SW#_D RD5 100R1%0402

CD5 X_C10p50N0402

SWD6 SW-TACTB1S-HF

N71-0101630-D02

Power Switch

PWR_SW#_D RD9 100R1%0402

EDD6 X_ESD-DIODE

CD6 X_C0.1u10X7R0402

PWR_SW#_D

SWD5 SW-TACTB1S-HF

N71-0101630-D02

Control PWR LED

+5VSUS_D

RD10 100KR0402

RD11 100KR0402

QD6 NN-DMN65D8LDW-7_SOT363-6-HF

PWR_LED#_D_D D2 G2 S2

GPU_LED#_D D1 G1 S1

PWR_LED#_D

GND_D

UME12 MB MYLAR POWER_BOARD_mylar

E2P-6P11711-Y42

UME13 MB MYLAR POWER_ADHESIVE

E2Y-6P11011-Y42

QD5 NN-DMN65D8LDW-7_SOT363-6-HF

HYBRID_LED#_D D2 G2 S2

GPU_LED#_D D1 G1 S1

GPU_ON_D

PCBD1 PD0-16P1D10-H73

PD0-16P1D10-H73

Hannstar:PD0-16P1D10-H73

TRIPOD:PD0-16P1D10-T53

NPTH_98 MHC13 X_NPTH_98

H_R197D91_N MHD6 X_HOLES_R236D98_1034

npth_80 MHD5 X_npth_80

npth_80 MHD7 X_npth_80

02/05 add MHD7

+5VSUS_D

PWR_SW#_D

PWR_LED#_D

GPU_ON_D

FAN_SW#_D

KB_LED_SW#_D

FPC10P-B-0.5PITCH_WHITE-RH-4 FPCD5

N5A-10F0190-A81

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2017/02/06

1. Add MHD7, delete MHC13

2017/02/09

1. Add MHC13

Title <Title>			
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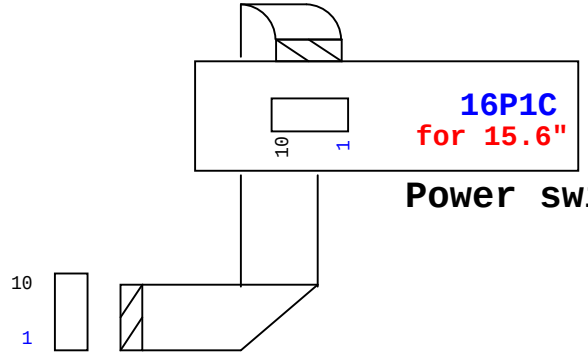
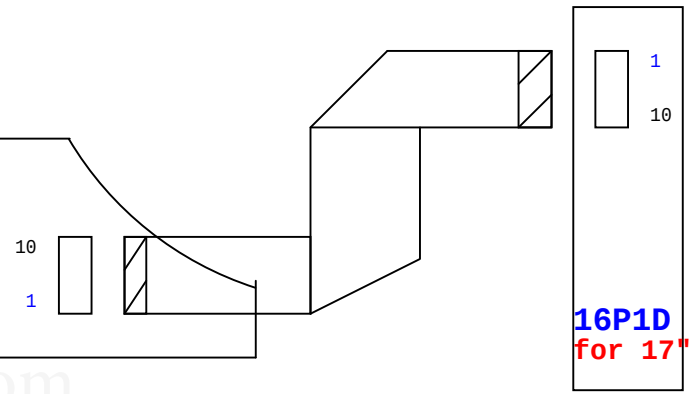
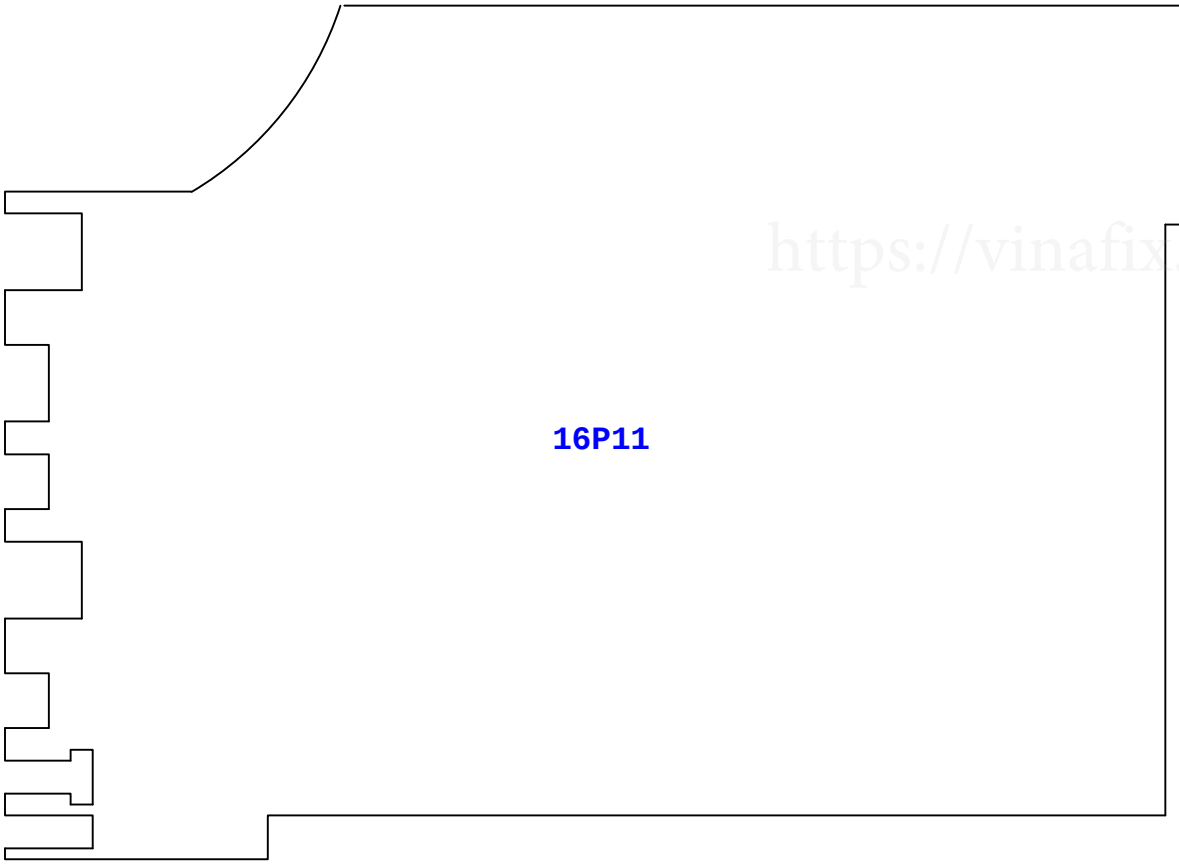
TOP







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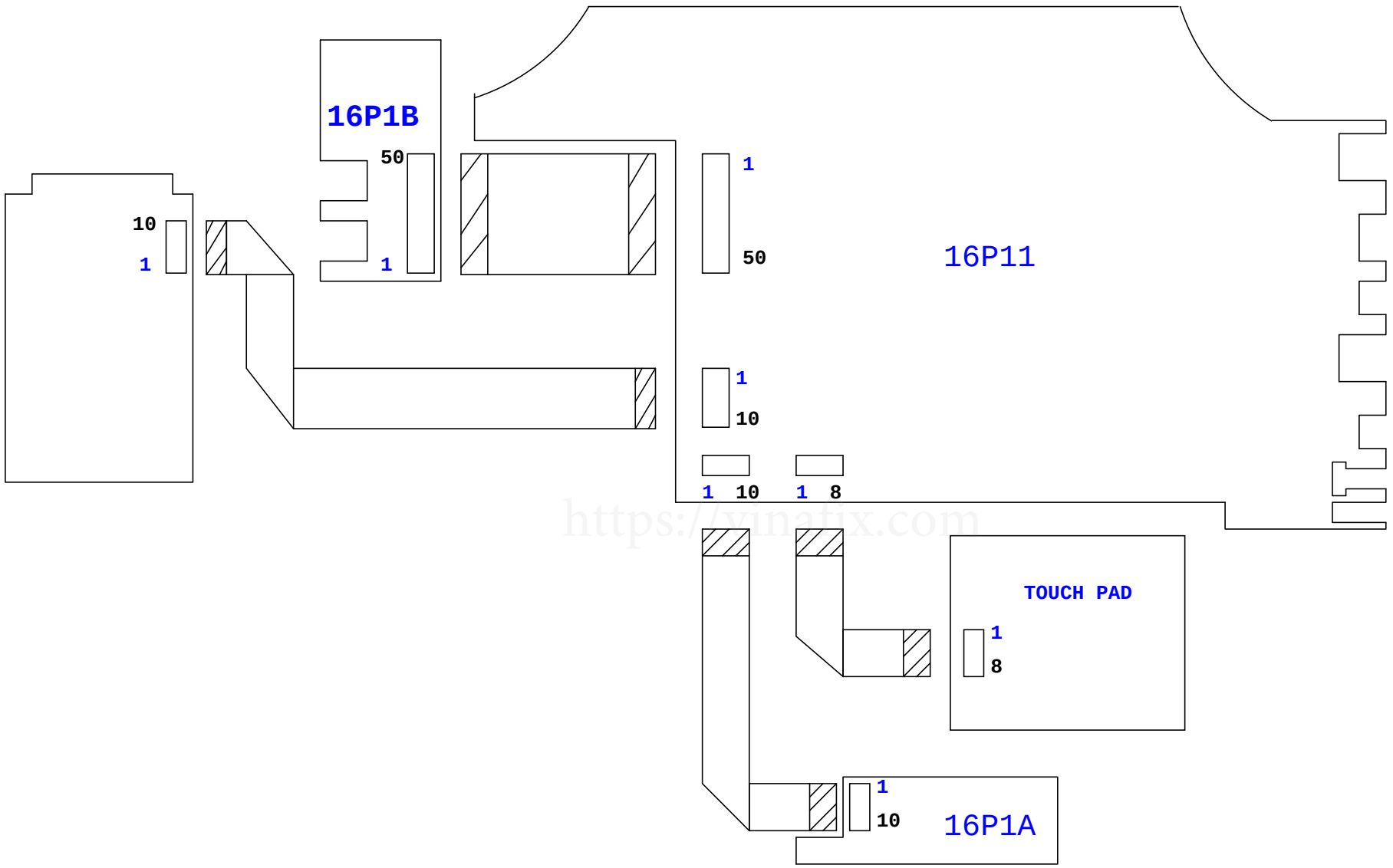
Bottom VIEW



Title: Bottom VIEW		
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