MS-AA821

Ver: 0A

Intel Sharkbay plamform H81

CPU:

INTEL-Haswell LGA1150

System Chipset:

INTEL-LYNX

Memory:

DDRIII SO-DIMM (1333/1666MHz) * 2 (Dual Channel)

PWM:

VRD12 - ISL95812

OnBoard Chipset:

HD Audio Codec:RTL887

LAN-realtek8111G

SIO:NUVOTON 5533D

SPI ROM: 64 MB

Other:

HDMI*1

SATA3*2

Side USB3.0 *2

REAL USB2.0 *4

COM Port *1

Expansion Slots:

Mini PCI Express Slot * 2

MICRO-STAR INT'L CO.,LTD

MS-AA821

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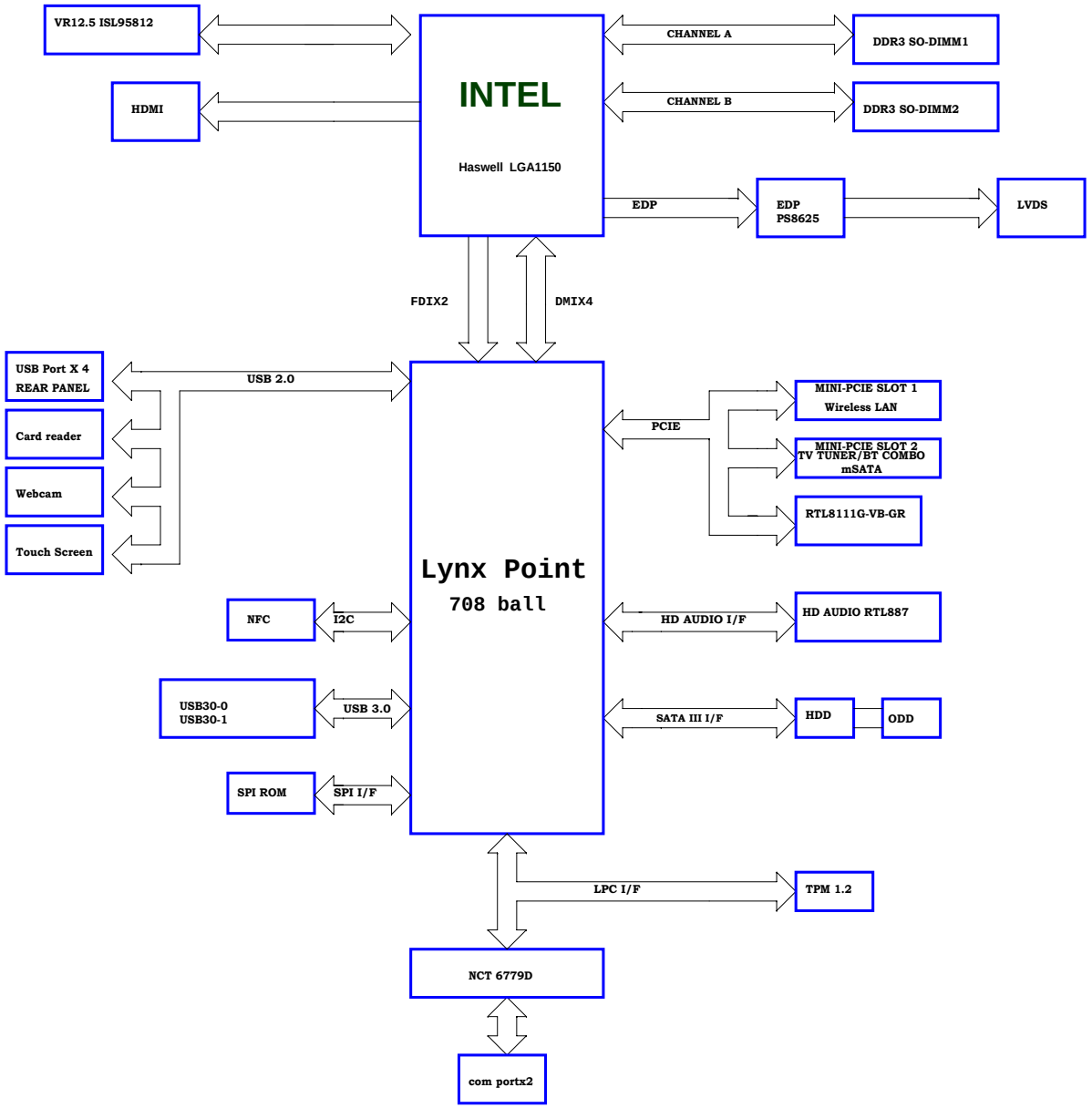
MS-AA821 Block Diagram



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	MS-AA821	
Size: Custom	Document Description: Block Diagram	Rev: 0A
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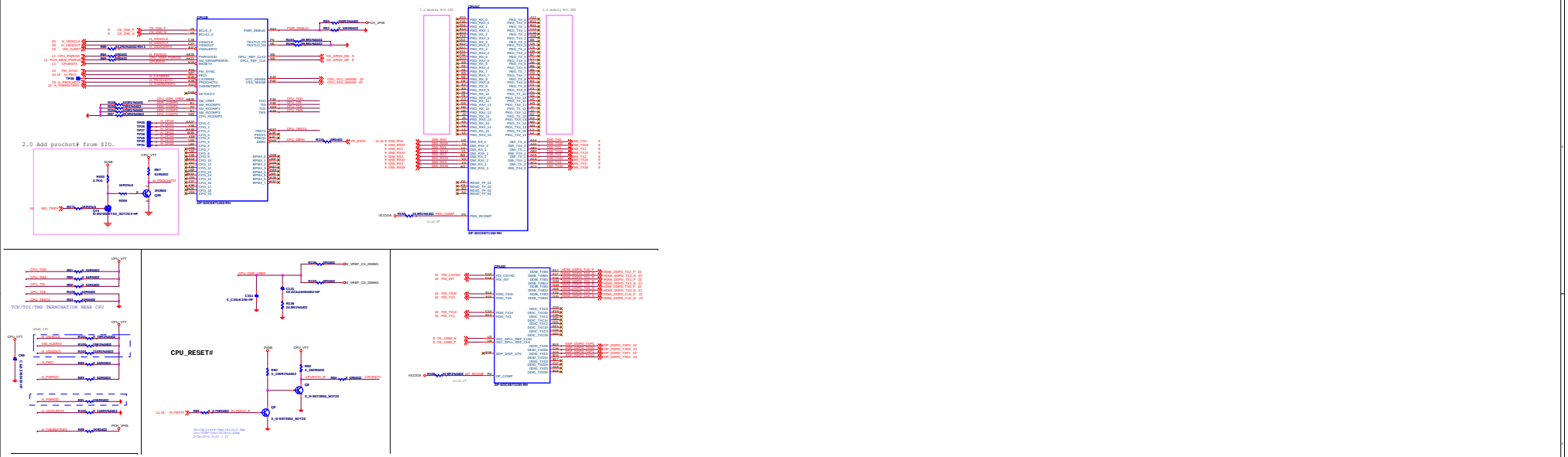
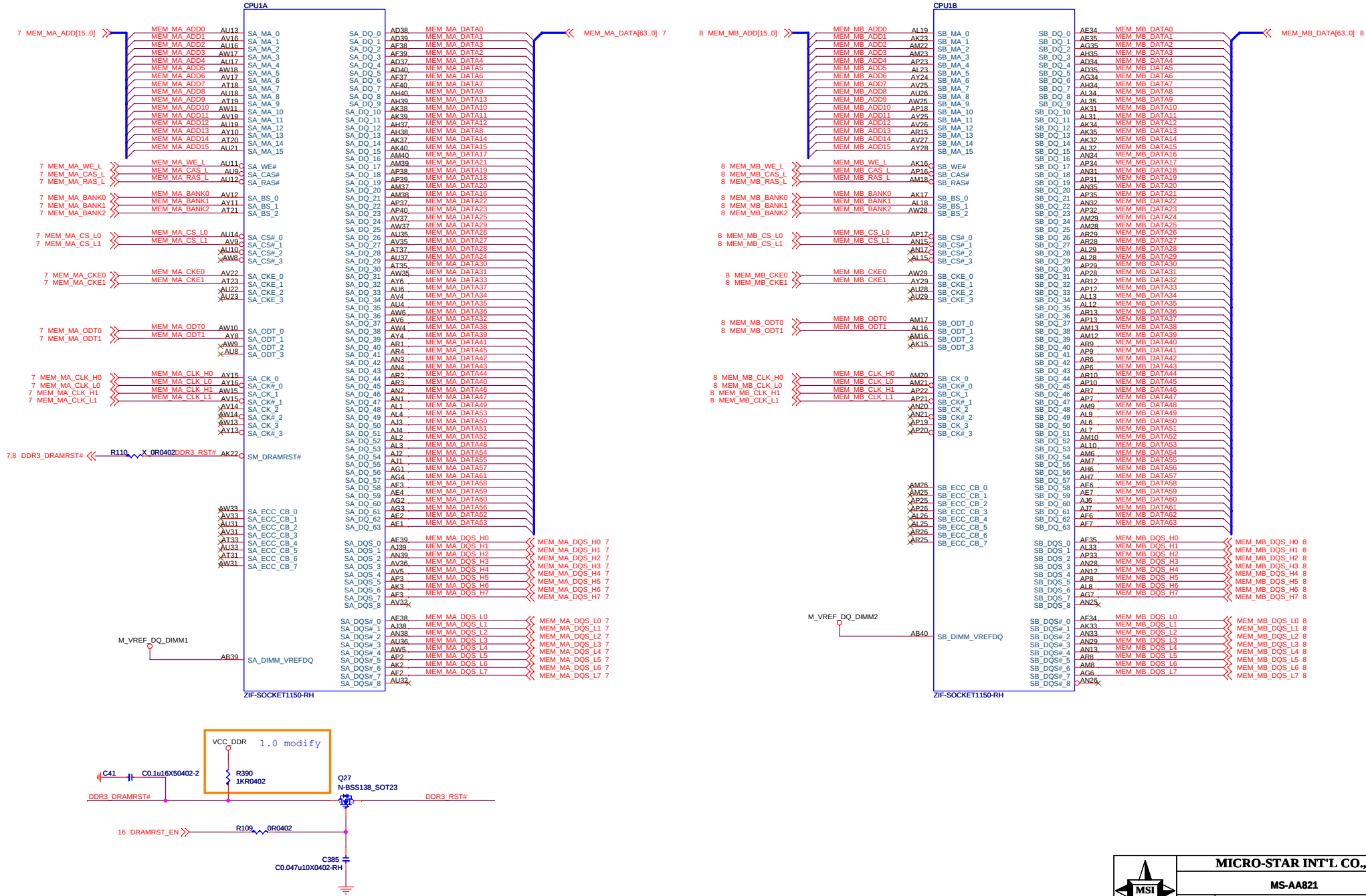
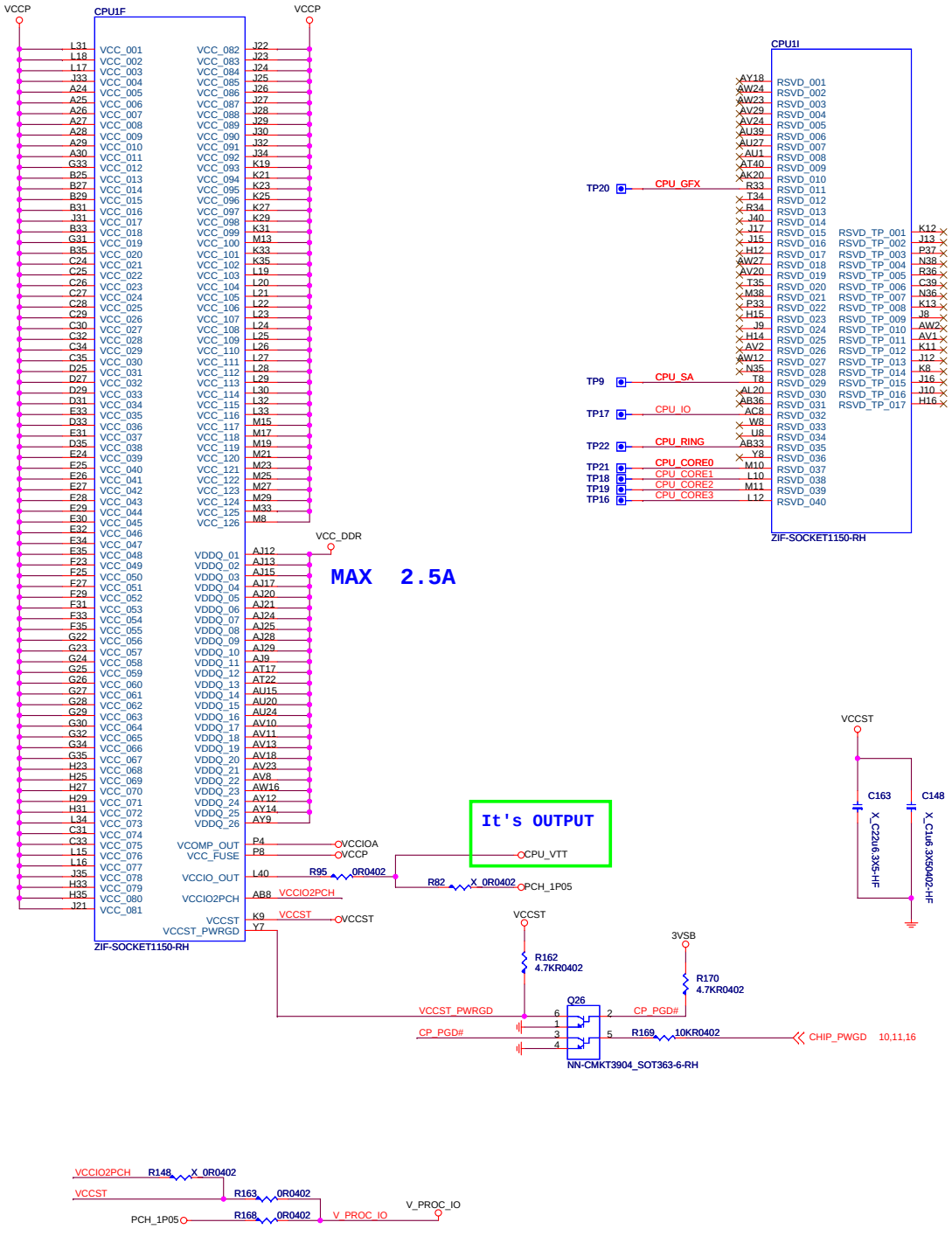
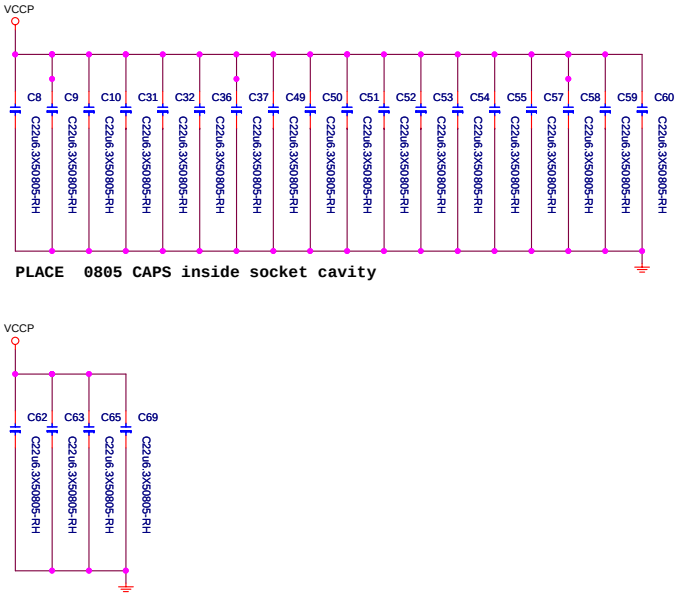


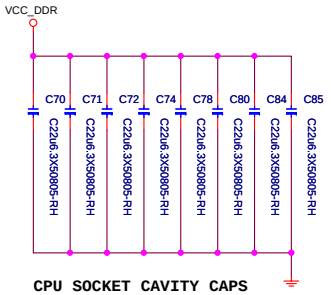




+CPU_VCCP-Decoupling



+1.5V_DDR3-Decoupling



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MS-AA821	
Size: Custom	Document Description: CPU-Power
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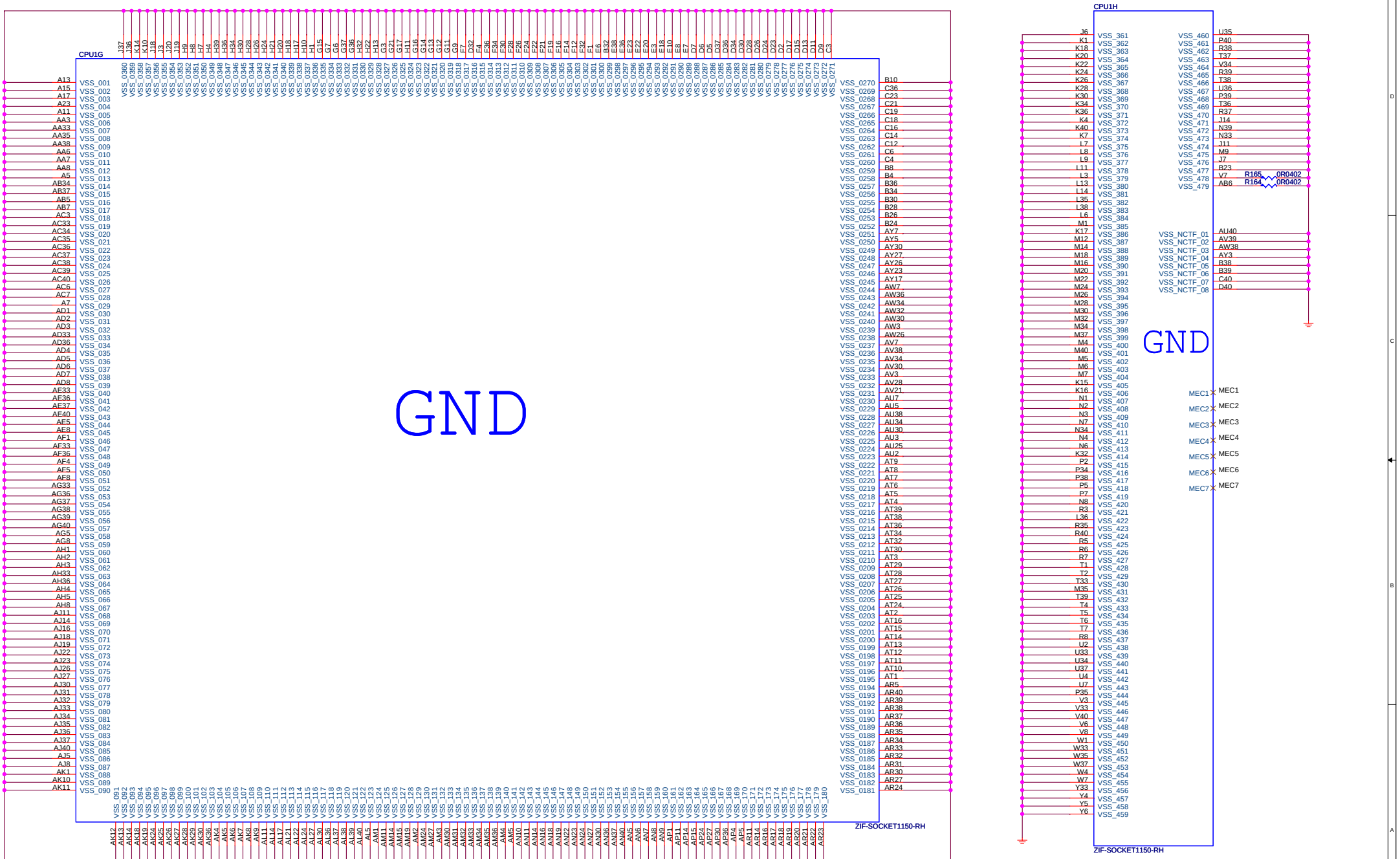

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	MS-AA821	
Size: Custom	Document Description: CPU-GND	Rev: 0A
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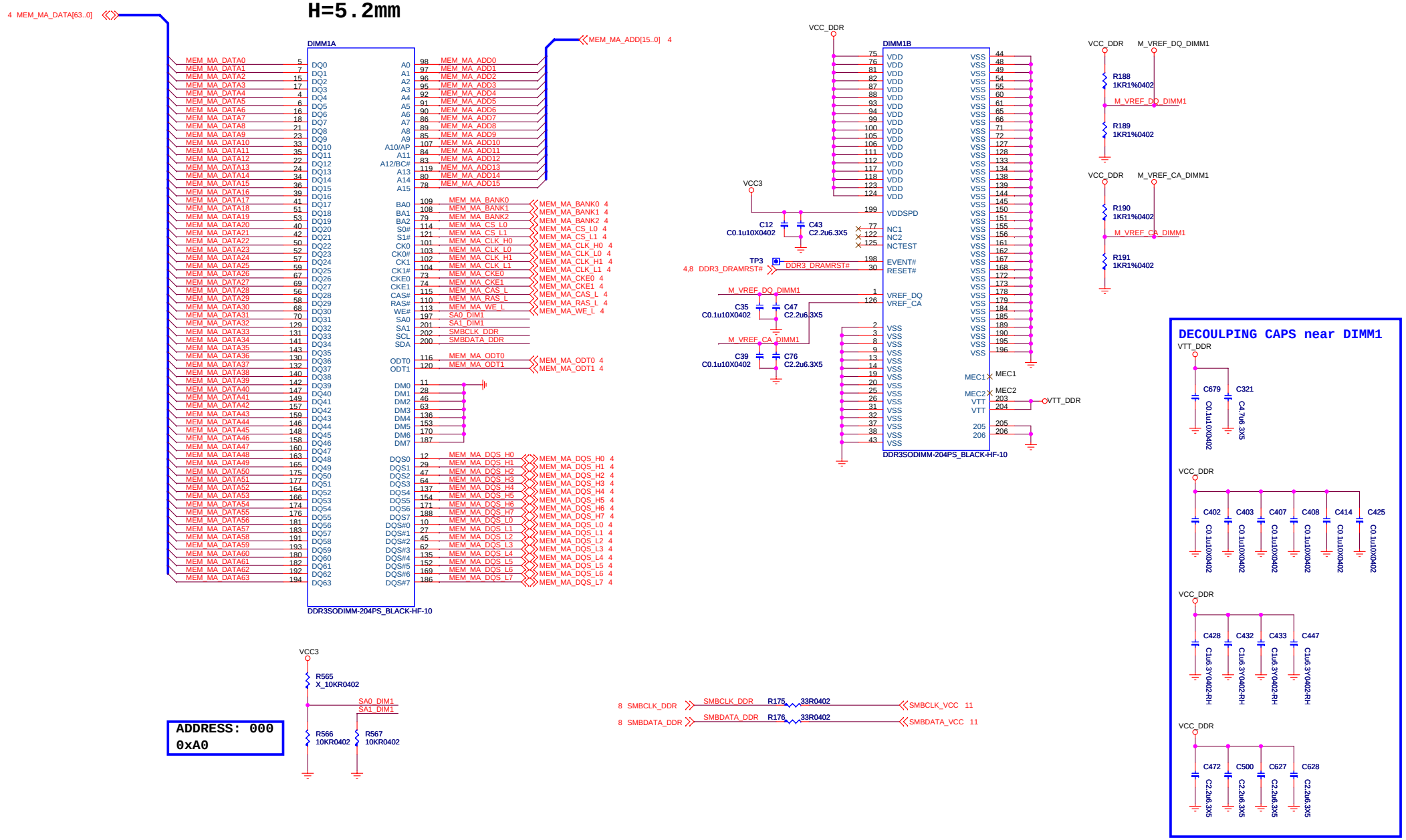
SO DIMM1 #A

H=5.2mm



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Size: Custom	Document Description: DDR III SODIMM 1
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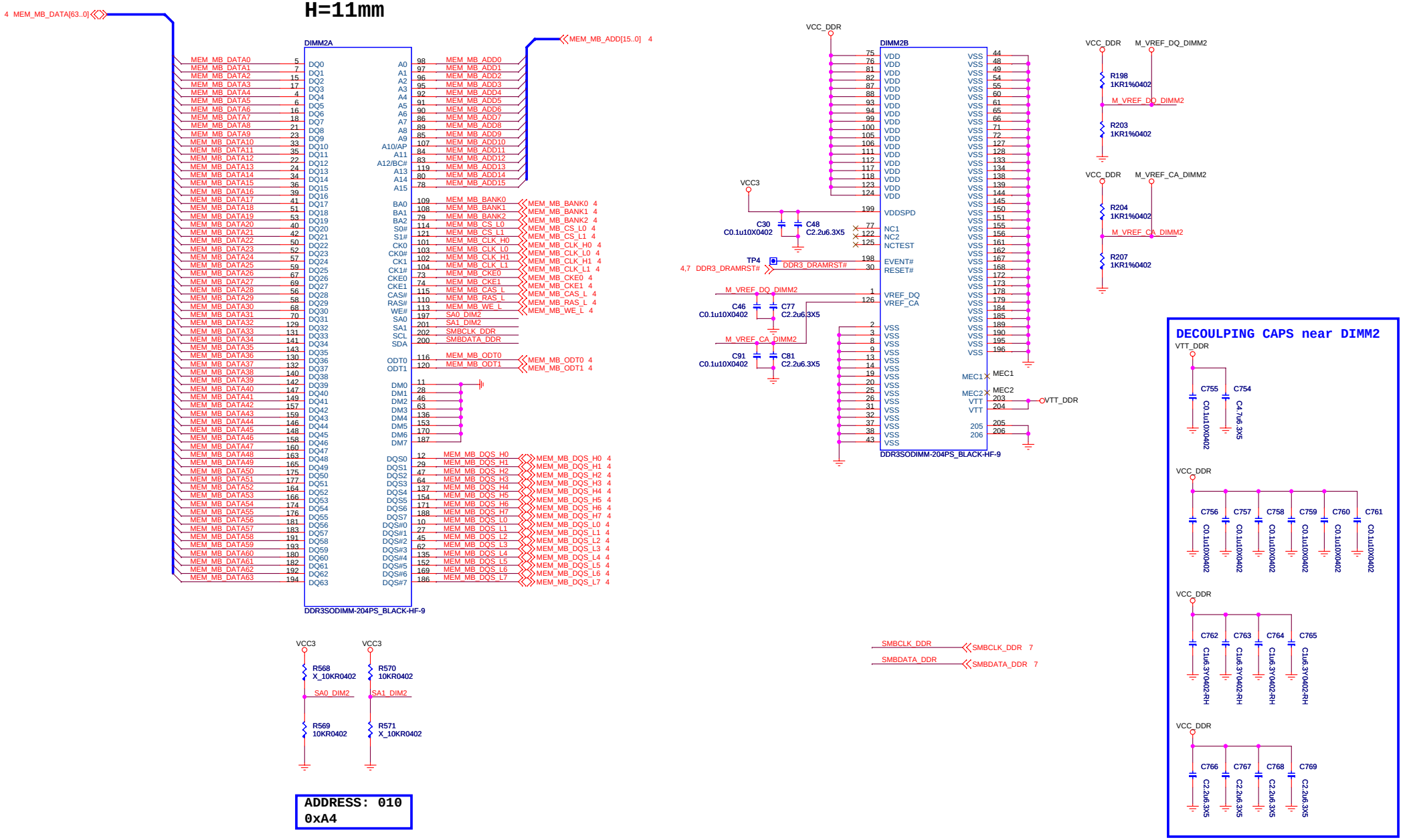
SO DIMM2 #B

H=11mm



ADDRESS: 010
0xA4

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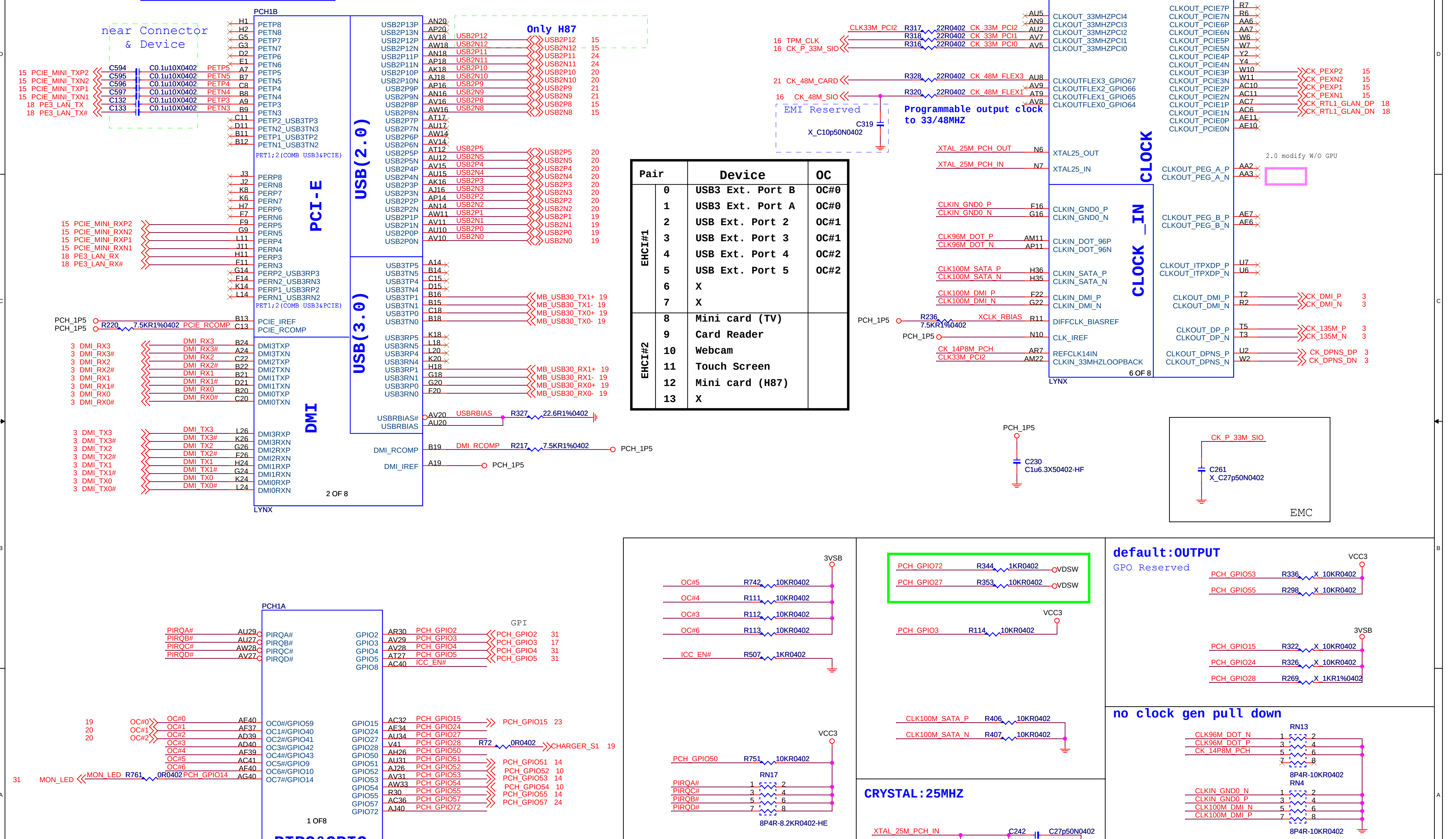
USB 2.0 ports 6,7,12 and 13 are disabled on 10 port SKUs.
Only USB 3.0 ports 1 and 2 are enabled.
pcie port7,8 NA

H87 SKU P/N — H87 — INTEL-DH82H87-RH



Pair		Device	OC
EHCI#1	0	USB3 Ext. Port B	OC#0
	1	USB3 Ext. Port A	OC#0
	2	USB Ext. Port 2	OC#1
	3	USB Ext. Port 3	OC#1
	4	USB Ext. Port 4	OC#2
	5	USB Ext. Port 5	OC#2
	6	X	
	7	X	
EHCI#2	8	Mini card (TV)	
	9	Card Reader	
	10	Webcam	
	11	Touch Screen	
	12	Mini card (H87)	
	13	X	

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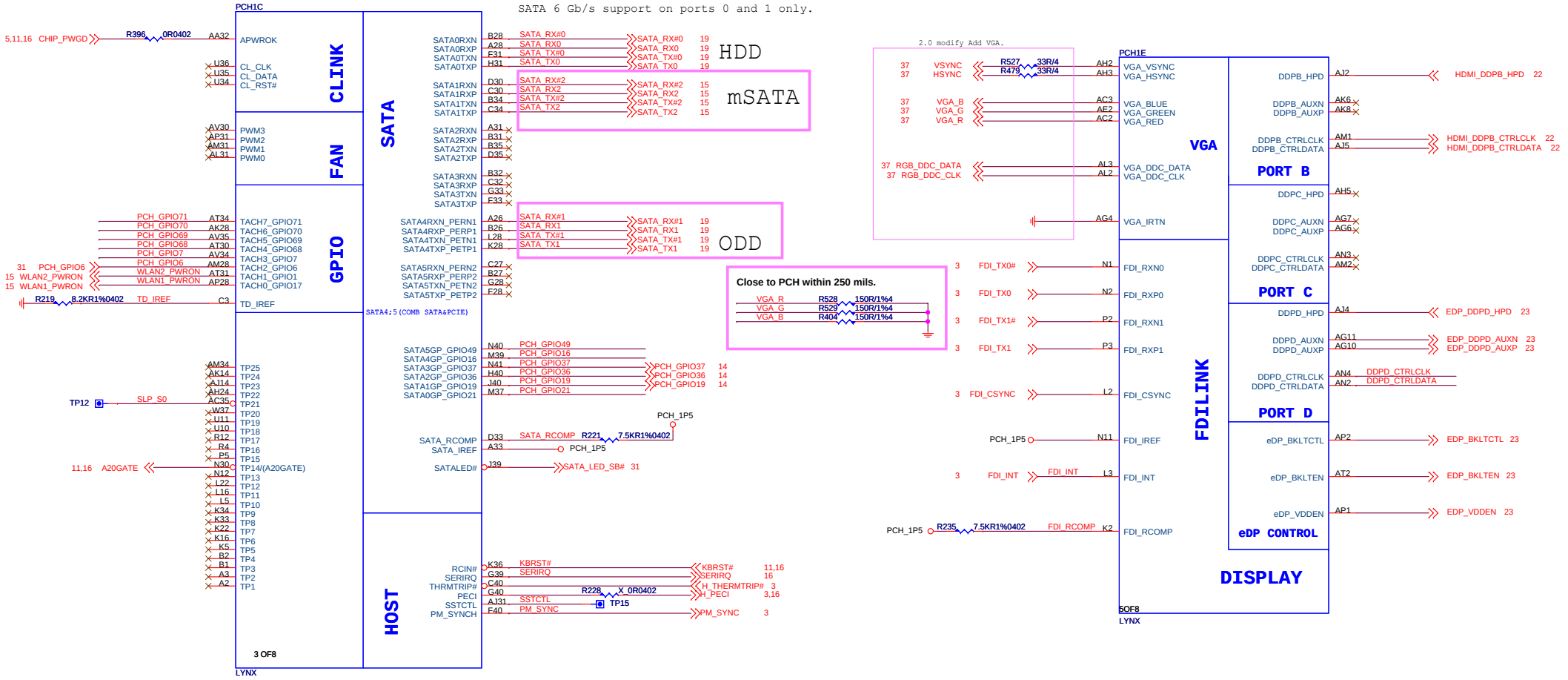
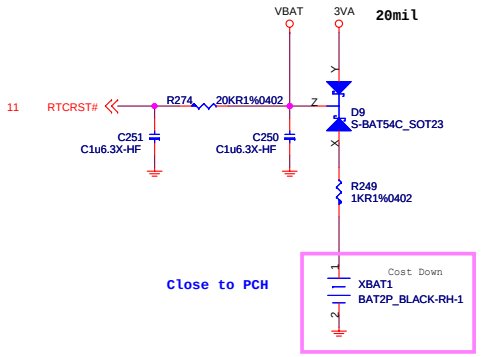
SATA ports 2 and 3 are disabled on 4 port SKUs.
SATA 6 Gb/s support on ports 0 and 1 only.

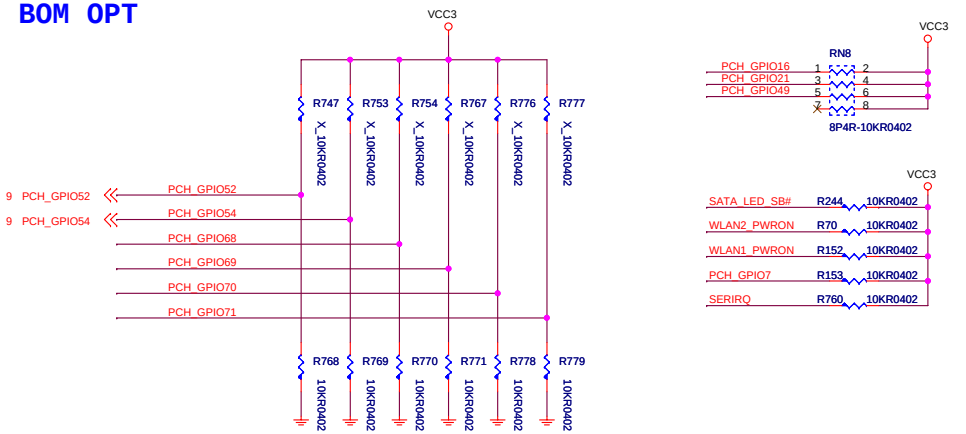


RTC

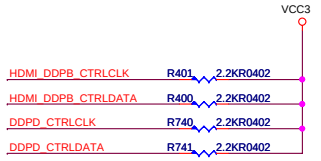


change to N32-1020B40-H06 02/04

BOM OPT



Enable VGA(CTRLCLK/DATA Pull High)



MICRO-STAR INT'L CO.,LTD

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Size	Document Description	Rev
Custom	LYNX-SATA/HOST/FAN/GPIO/VGA	0A

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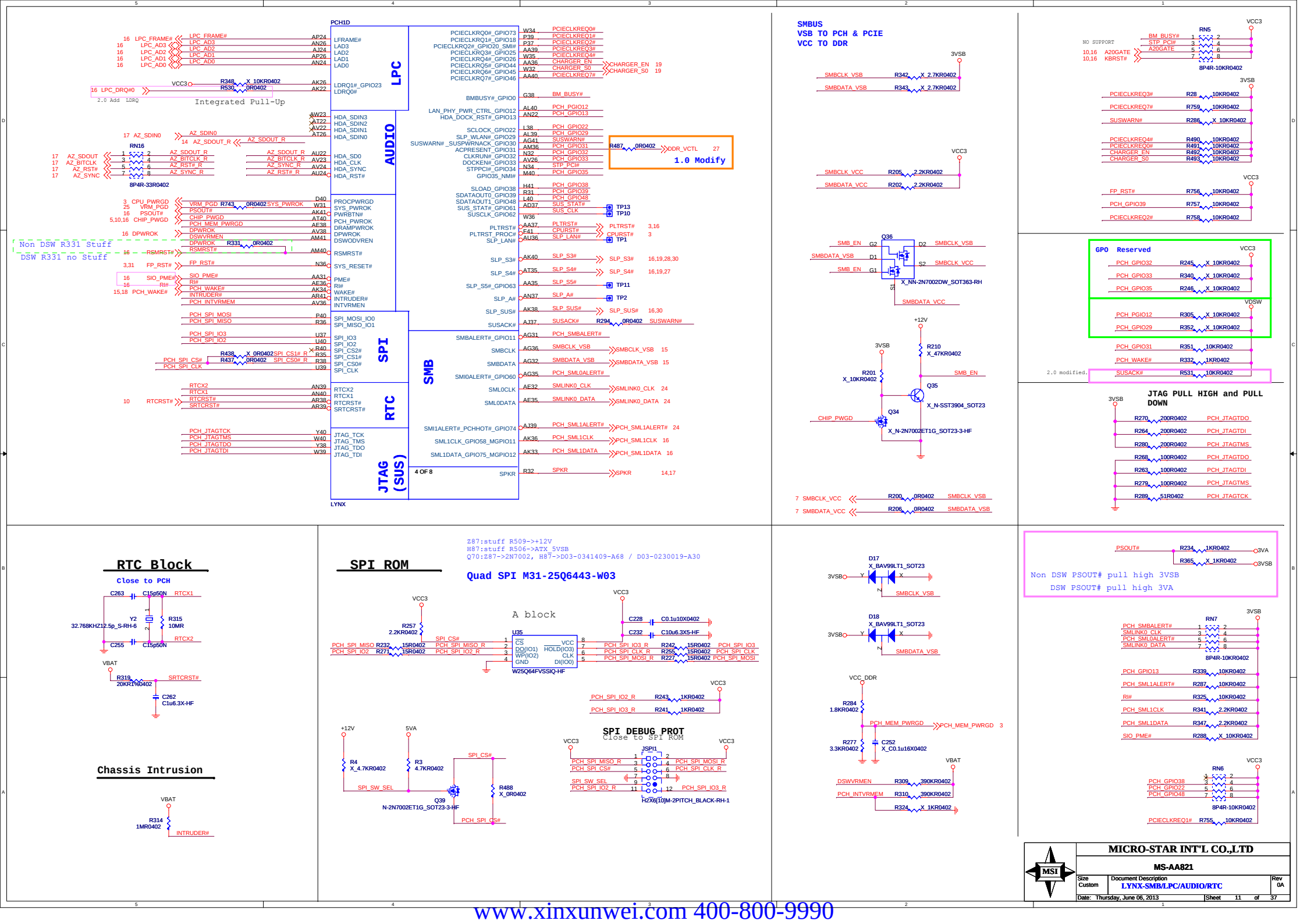
PCH1D
LPC
AUDIO
SPI
RTC
SMB
JTAG (SUS)
LYNX
4 OF 8
Integrated Pull-Up
1.0 Modify
Non DSW R331 Stuff
DSW R331 no Stuff
SMBUS
VSB TO PCH & PCIE
VCC TO DDR
GPO Reserved
JTAG PULL HIGH and PULL DOWN
RTC Block
Close to PCH
Chassis Intrusion
SPI ROM
Quad SPI M31-25Q6443-W03
A block
SPI DEBUG PROT
Close to SPI ROM
Non DSW PSOUT# pull high 3VSB
DSW PSOUT# pull high 3VA
MICRO-STAR INT'L CO.,LTD
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LYNX-SMB/LPC/AUDIO/RTC
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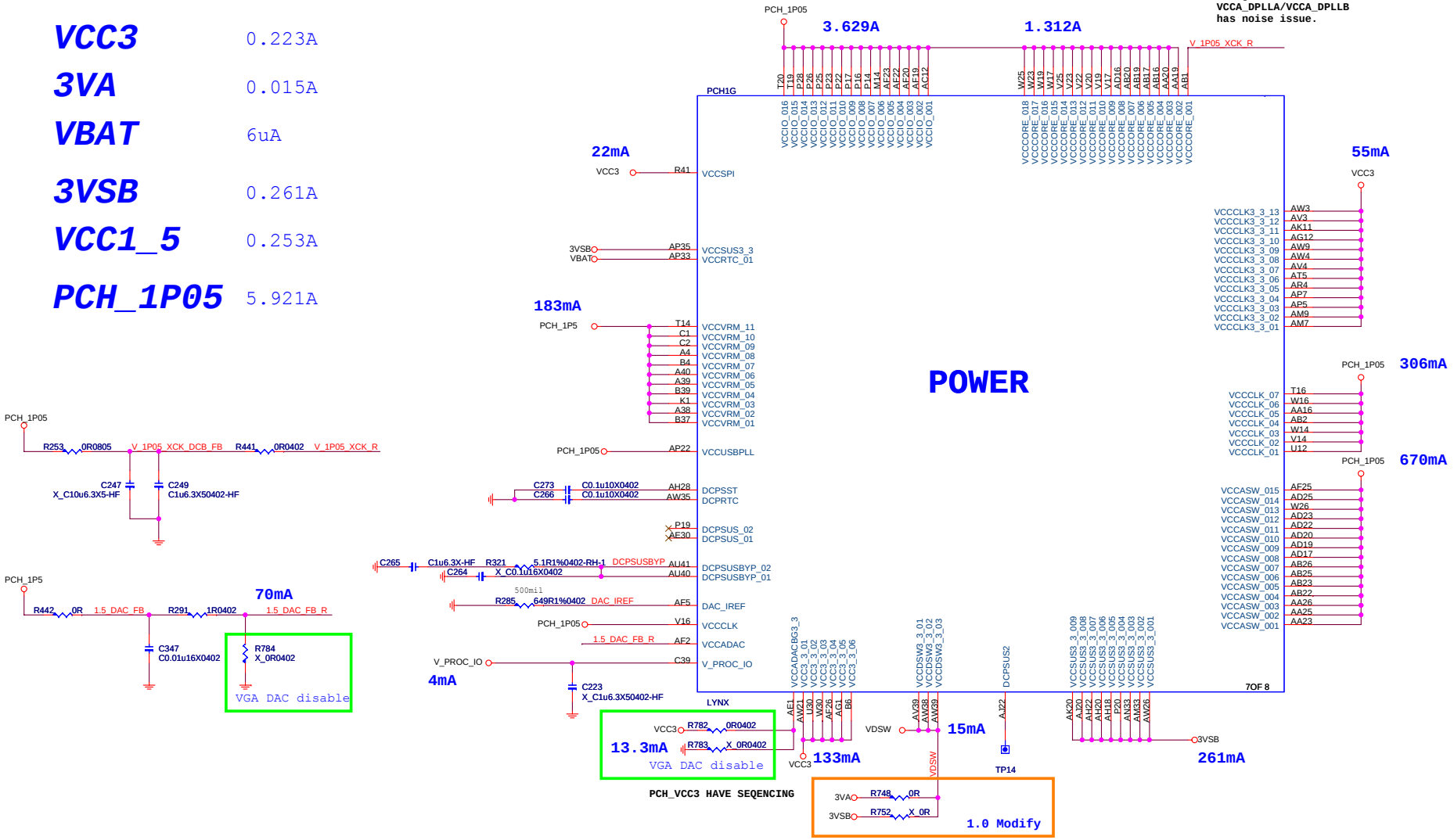
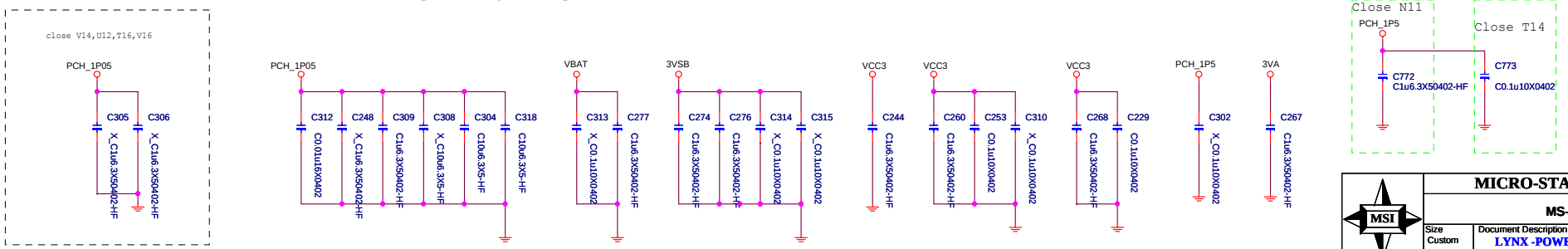
www.xinxunwei.com 400-800-9990

VCC3	0.223A
3VA	0.015A
VBAT	6uA
3VSB	0.261A
VCC1_5	0.253A
PCH_1P05	5.921A

Change to 10UH if VCCA_DPLLA/VCCA_DPLLB has noise issue.



PCH decoupling cap



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MS-AA821			
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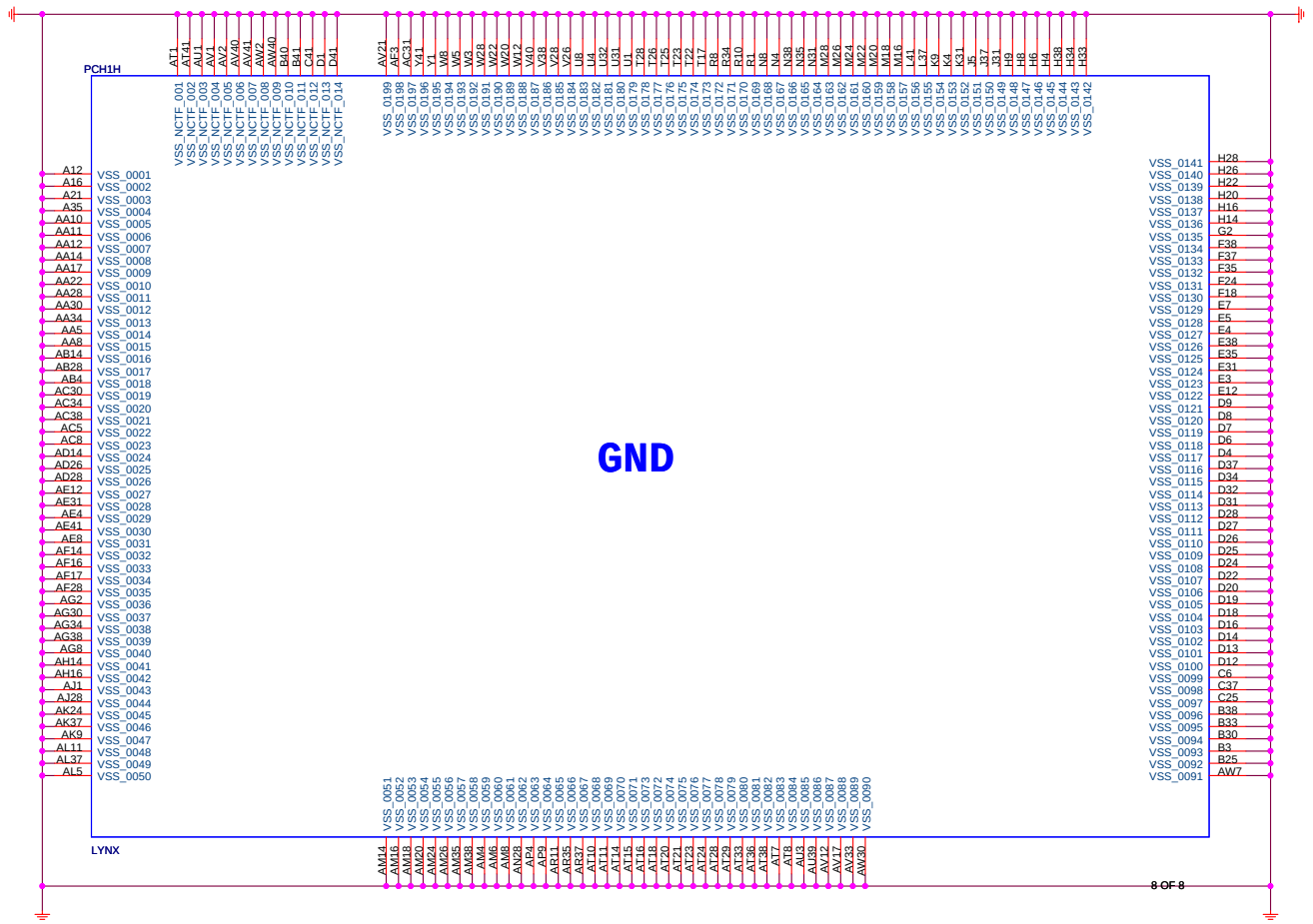

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PCH Straps

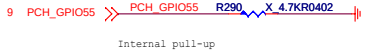
SPKR

Default Mode:

Internal weak Pull-down.

No Reboot Mode with TCO Disabled:

Connect to Vcc3_3 with 8.2k-10k Ohm weak pullup resistor.



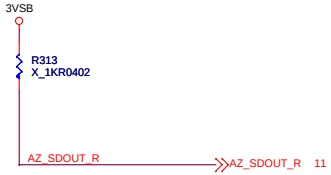
GPIO55

Default Mode:

Internal pull-up.

Top Block Swap Mode:

Connect to ground with 4.7k Ohm weak pulldown resistor.



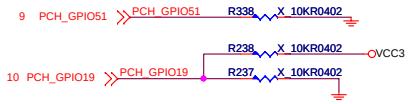
HDA_SDO

Default:

Do not pull high.

Disable ME in Manufacturing Mode:

Connect to VccSusHDA with 1k Ohm pull-up resistor through a jumper.



SATA1GP/GPIO19, GPIO51

Default (SPI):

Left both SATA1GP/GPIO19 and GPIO51 floating.

No pull up required.

Boot from PCI:

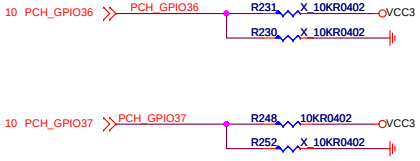
Connect SATA1GP/GPIO19 to ground with 1k Ohm pull-down resistor.

Leave GPIO51 Floating.

Boot from LPC:

Connect both SATA1GP/GPIO19 and GPIO51 to ground with 1k Ohm pull-down resistor.

Boot device	GPIO51	GPIO19
LPC	0	0
SPI	1	1



GPIO37

Enable TLS:

Pull up with 1k Ohm to VccSus3.3.

Default (Disable TLS):

Leave NC. Internal pull down.

GPIO53

Do not pull low.

Connect to ground with 1k Ohm pull-down resistor.

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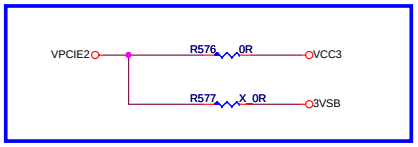
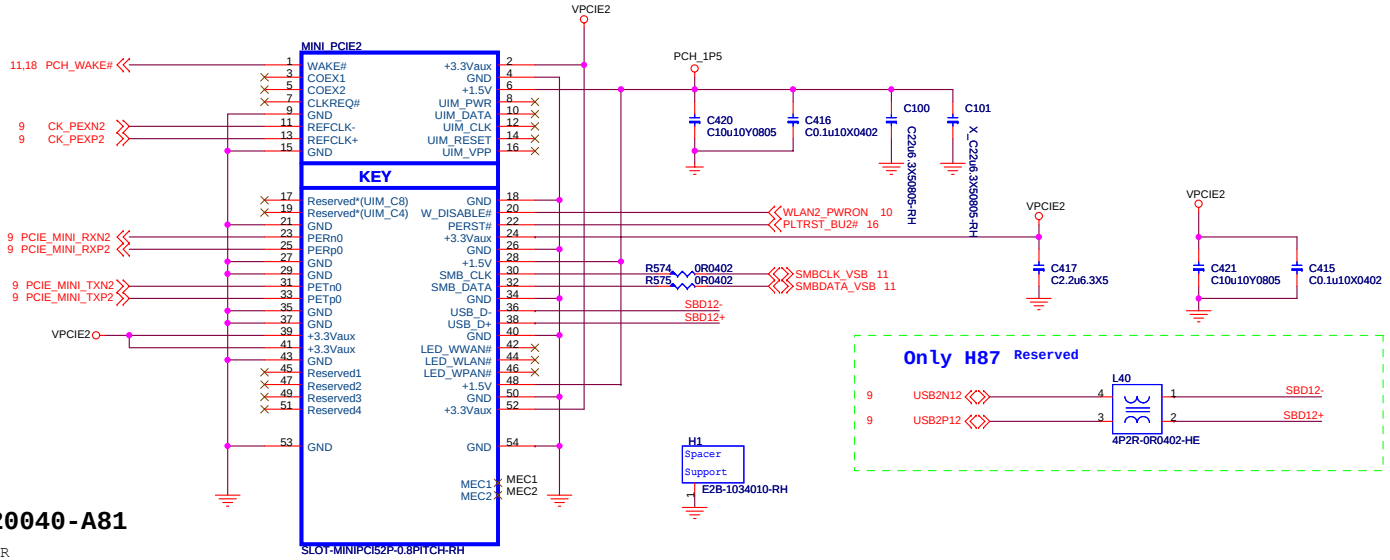
Wireless LAN(Short Card)



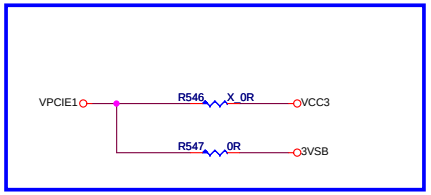


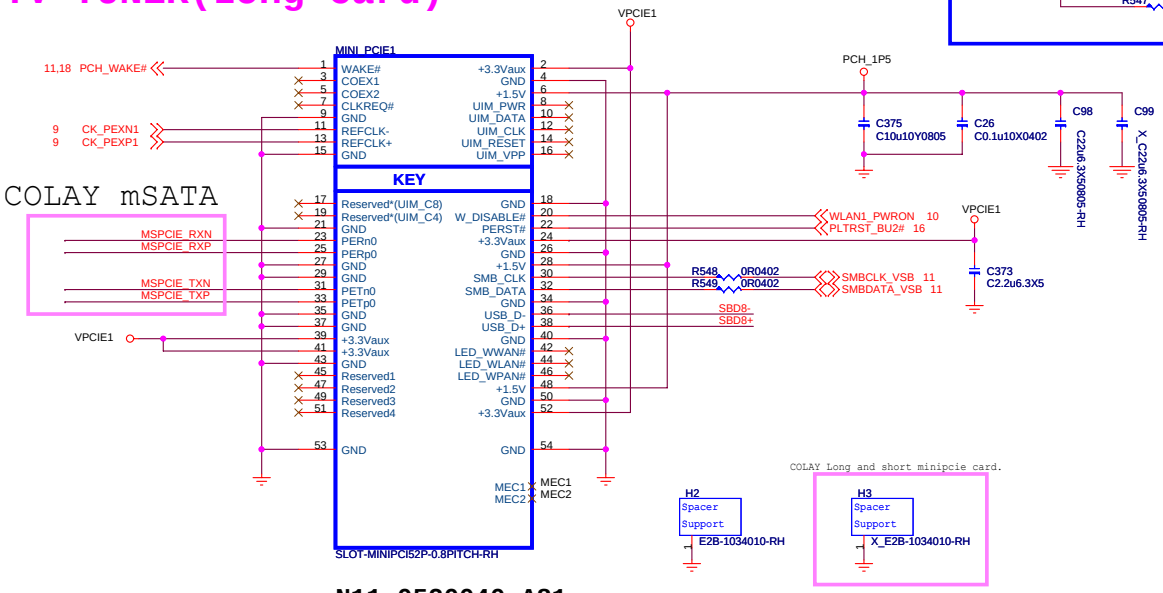
Only H87 Reserved

N11-0520040-A81

PCI ExpressR
Mini Card Electromechanical
Specification
Revision 1.2

TV TUNER(Long Card)



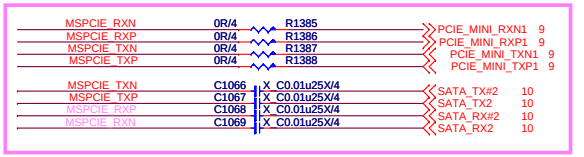


COLAY mSATA

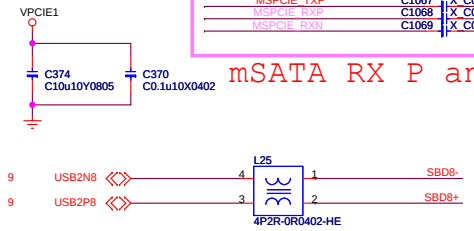
mSATA

SATA 6G PORT 1

COLAY mSATA



mSATA RX P and N is reversed.



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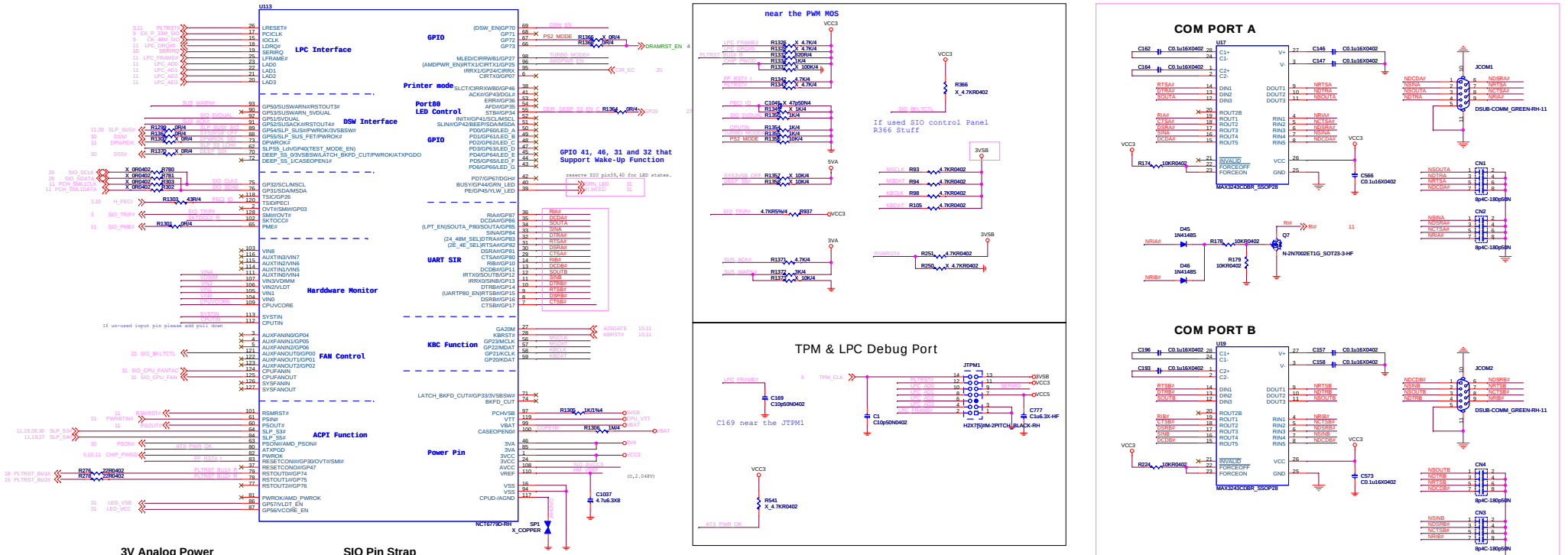

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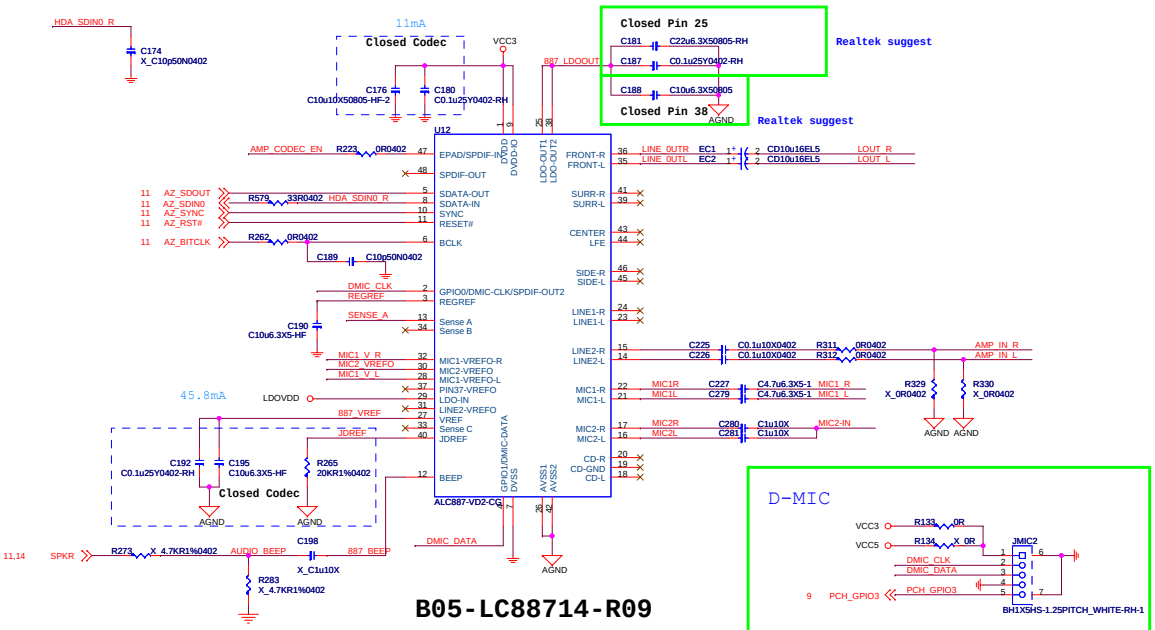

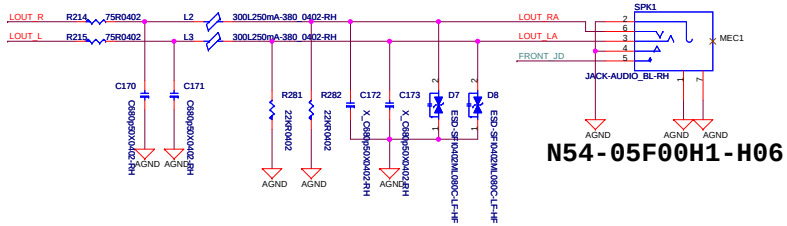

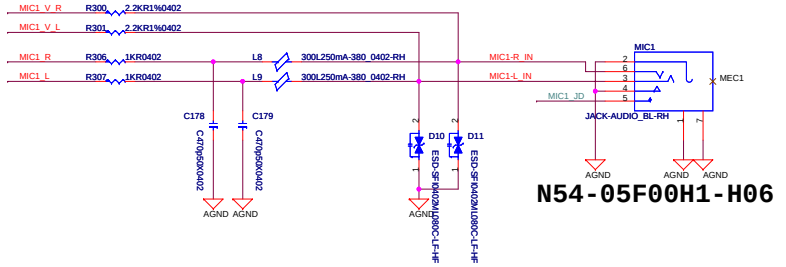

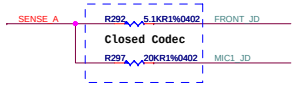

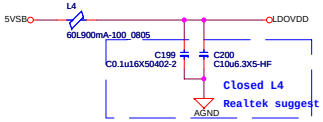

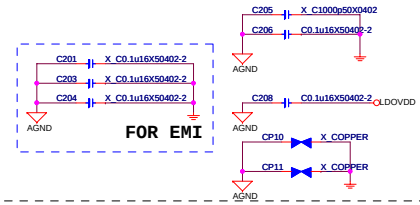

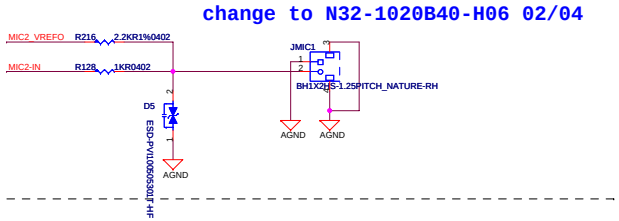

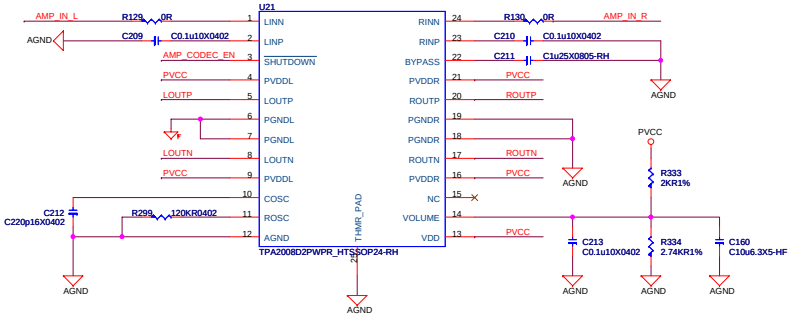

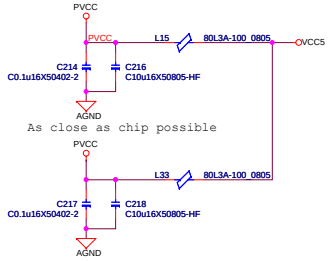

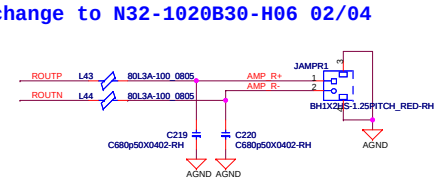

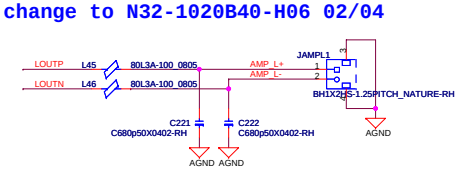

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Size: Custom	Document Description: AUDIO ALC 887 & AMP
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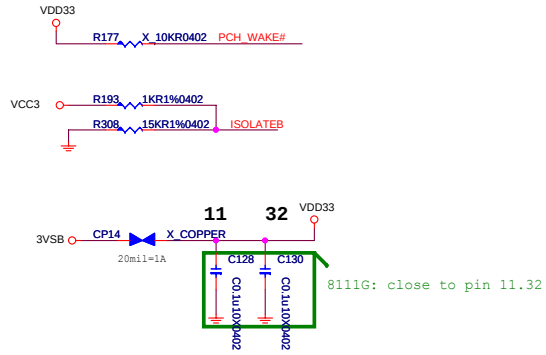
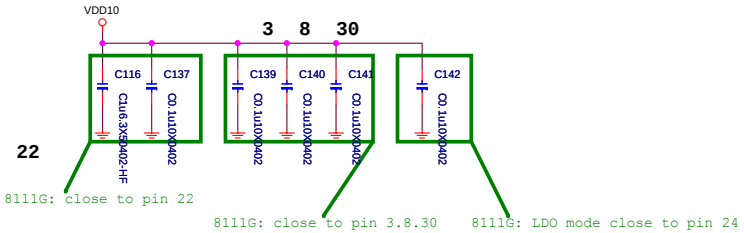
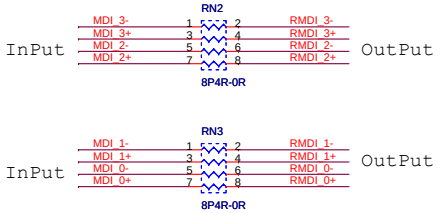
RTL8111G Giga LAN

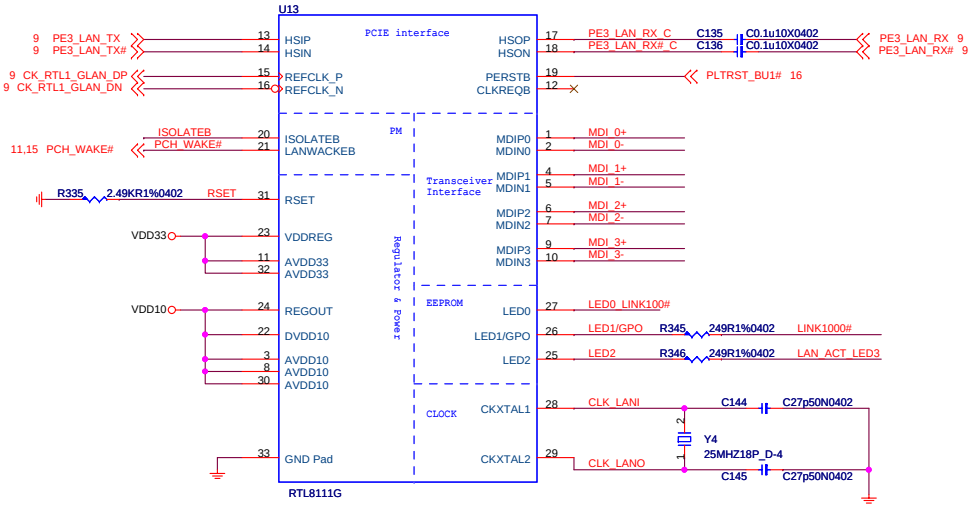


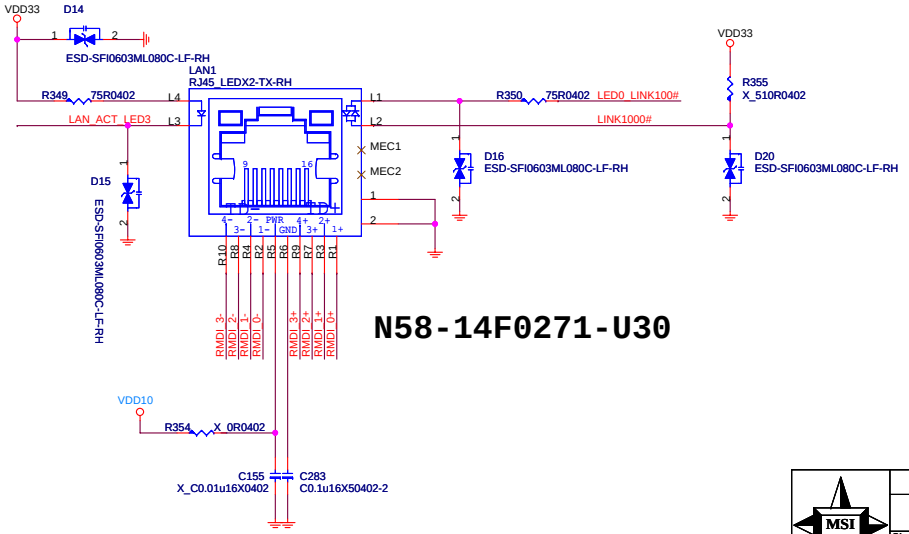
Icc33 average operating supply current from3.3V
At 1Gbps with heavy network traffic 70mA



Icc10 average operating supply current from1.0V
At 1Gbps with heavy network traffic 300mA

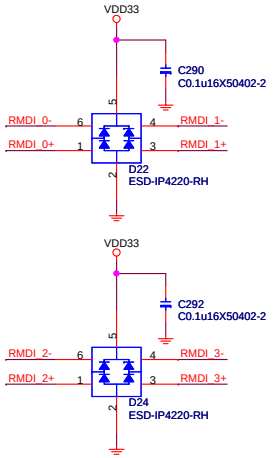






N58-14F0271-U30

Reserve ESD Protect
for connector



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	MS-AA821	
Size: Custom	Document Description: LAN RTL8111G	Rev: 0A
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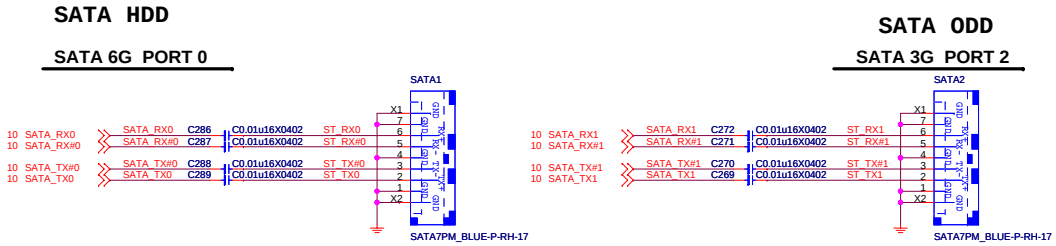
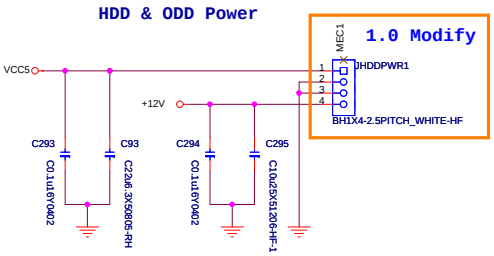
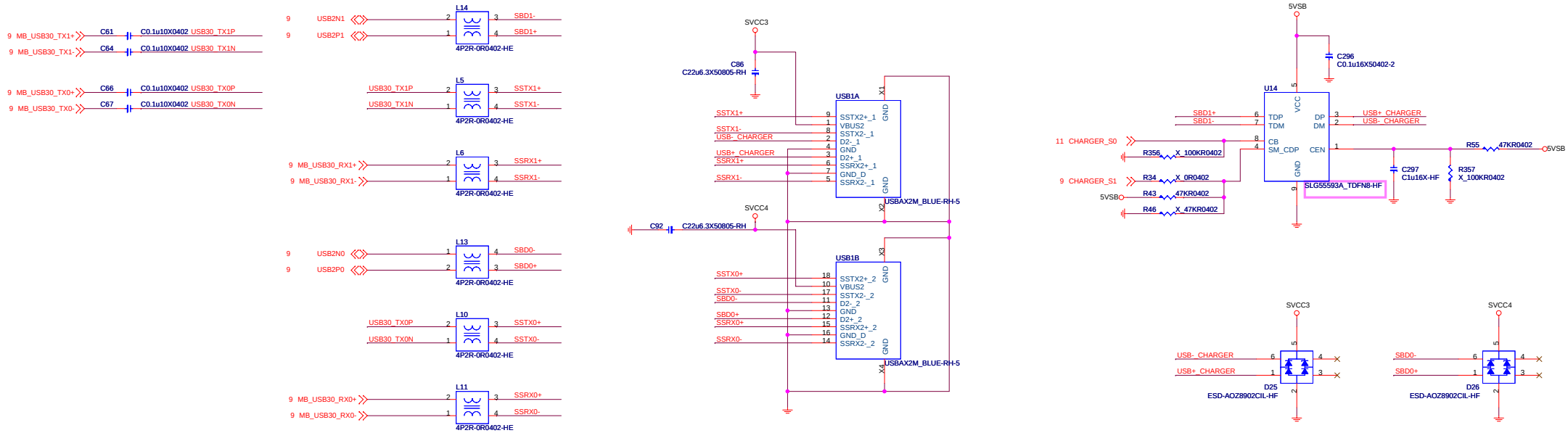
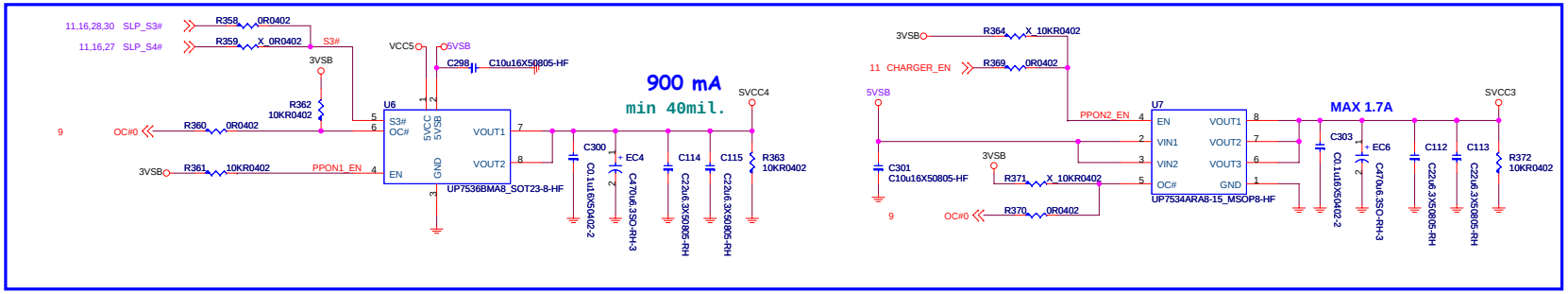






USB3.0 & USB2.0 SKU POWER KEEP



MICRO-STAR INT'L CO.,LTD	
MS-AA821	
Size: Custom	Document Description: SATA /USB3.0 Connector
Rev: 0A	
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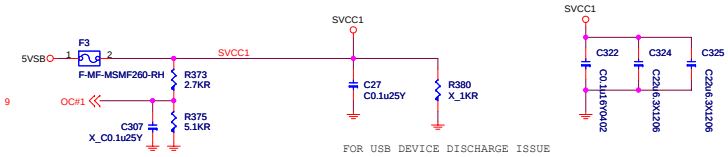
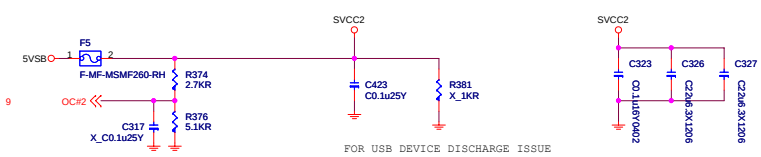
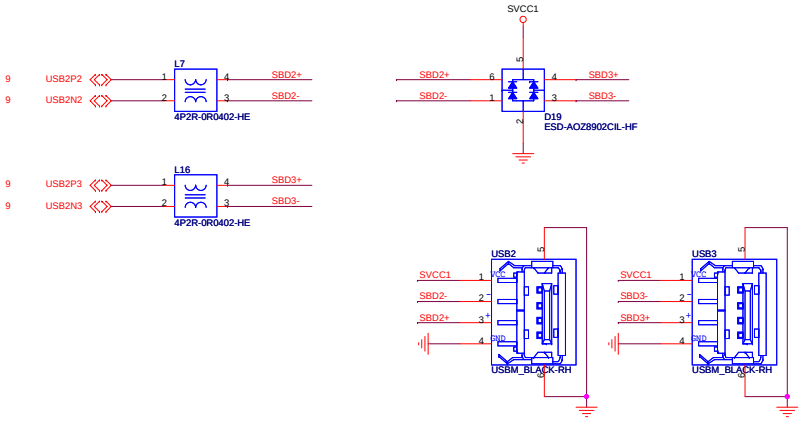
POWER CIRCUIT FOR USB PORT 0,1 (REAR)



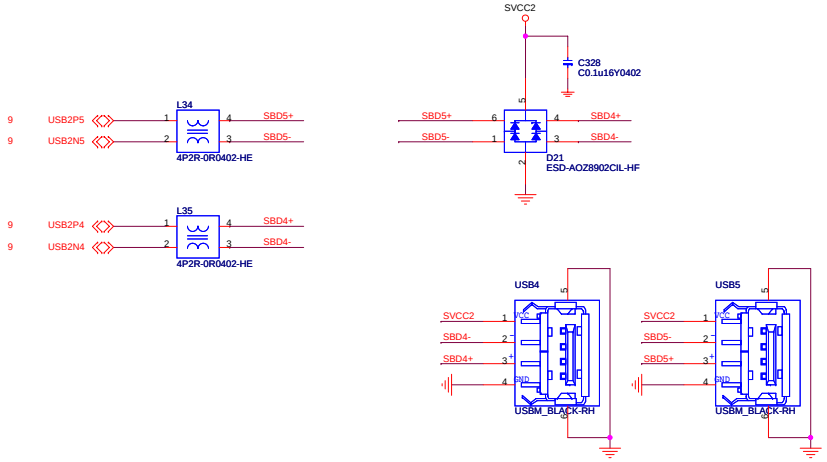
POWER CIRCUIT FOR USB PORT 2,3 (REAR)



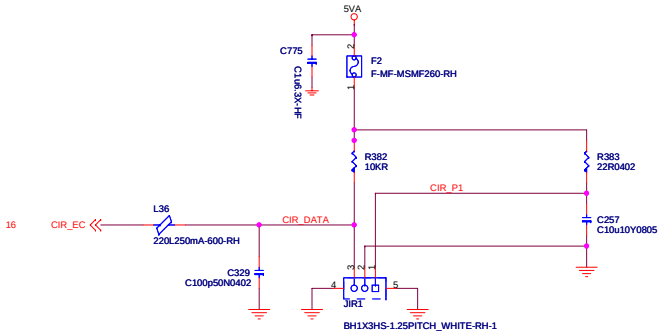
REAR PANEL USB CONNECTOR FOR USB PORT 0,1



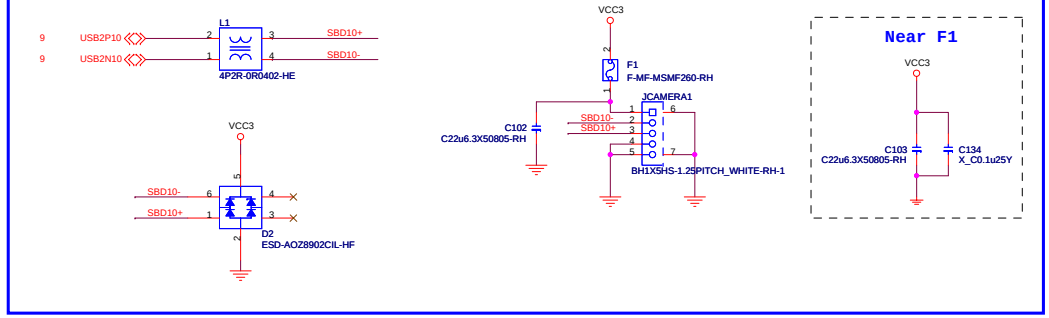
REAR PANEL USB CONNECTOR FOR USB PORT 2,3



IR



Webcam



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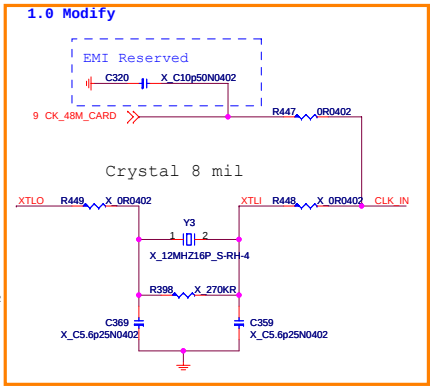
SBD6 + (USB_CARD_P) / SBD6 - (USB_CARD_N) (Zdiff) is 90Ω±10%
Maintain at least 20 mils air gap to the edge of the reference plane

| CLK - DATA | trace length ≦ 100 mils
| DATA - DATA | trace length ≦ 100 mils
no more 2 via ; 2 inch (maximum)

CLK	MODE1 Pin 27 R446	MODE0 Pin 42 R458
48MHz	X	X
24MHz	X	1
12MHz (XTAL)	1	1

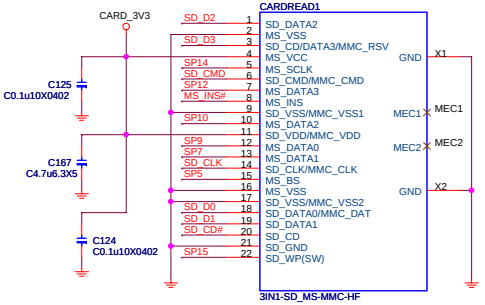
MS_SCLK (Pin 37 SP14) & SD_CLK (Pin 22 SD_CLK)
are impedance are 50Ω±15%

1.0 Modify

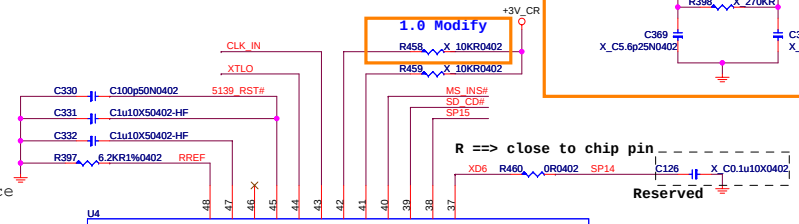


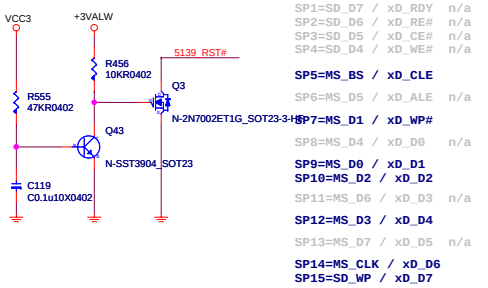
OLD N58-38F0010-TB4
N58-38F0030-TB4

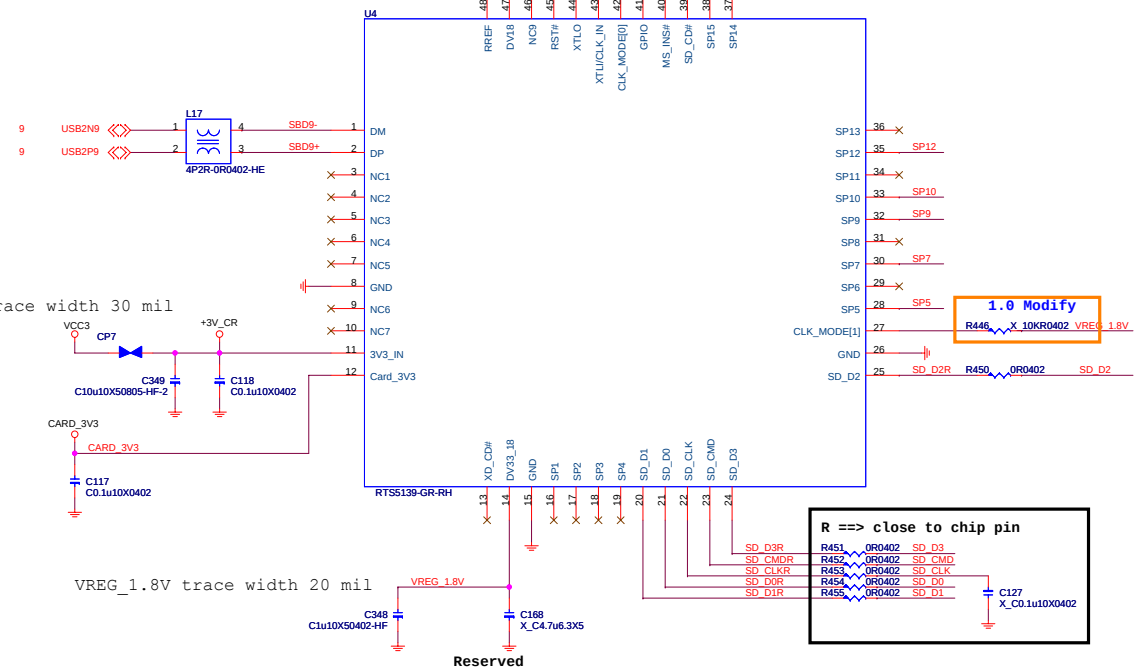
NEW N58-22F1600-T01
N58-22F1610-T01



Pin 48(RREF trace width 12 mil)
trace must far away 48MHz clock trace







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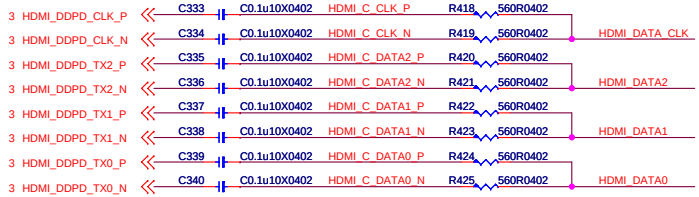
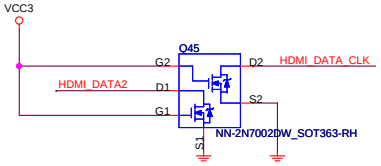
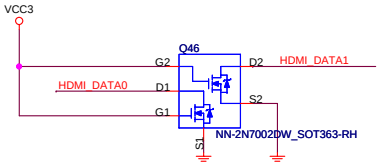
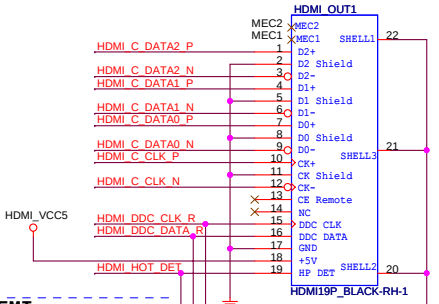
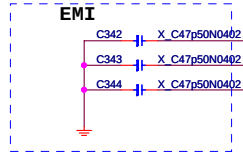
HDMI, DVI : 1920x1200 at 60 Hz (16:10 WUXGA)

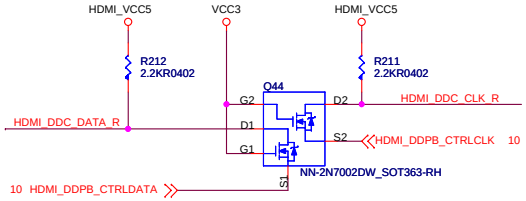


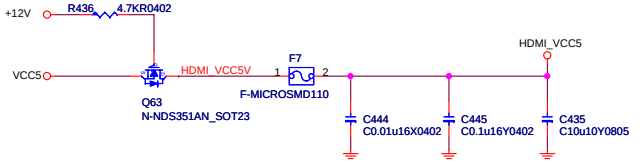


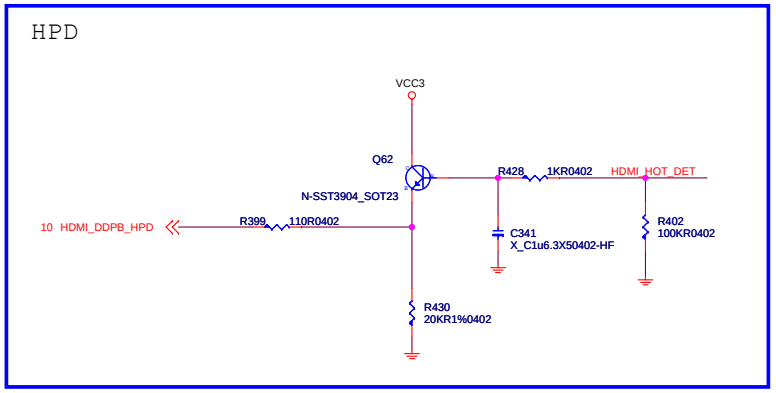


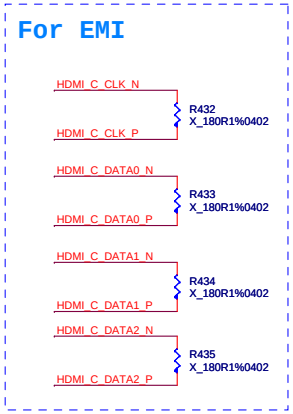


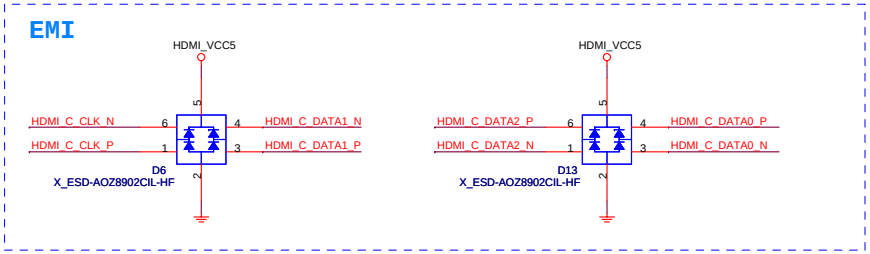












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Custom	HDMI	0A

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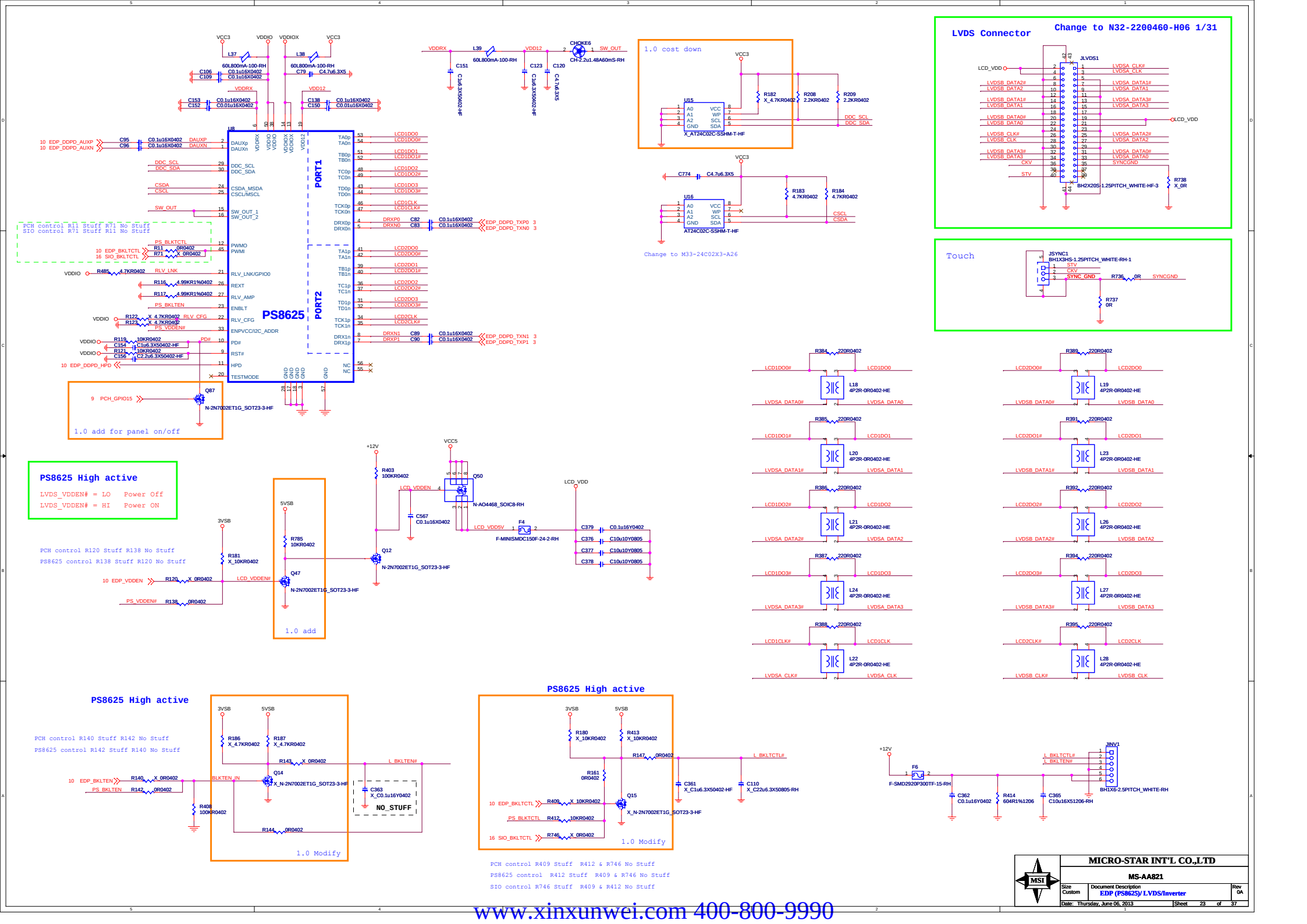
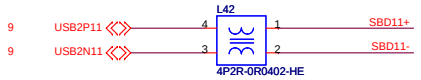
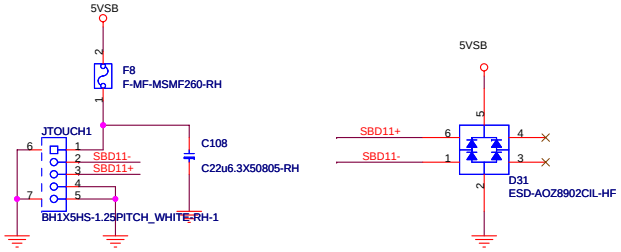
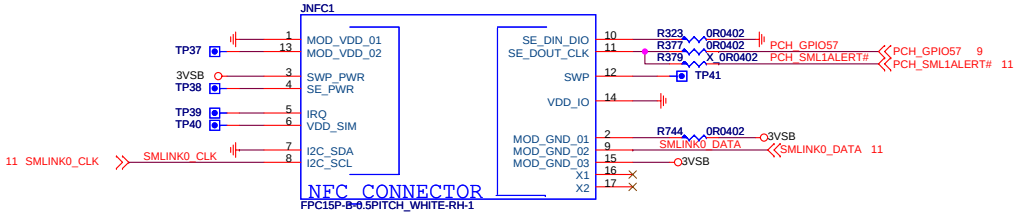


Multi Touch





NFC



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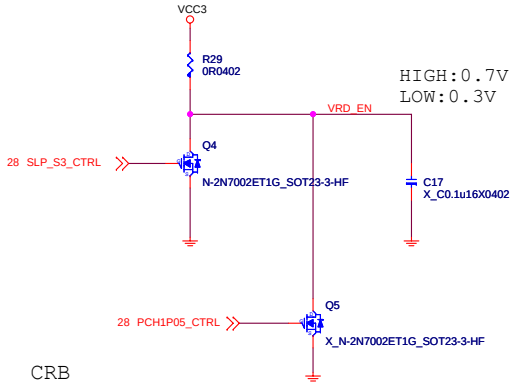
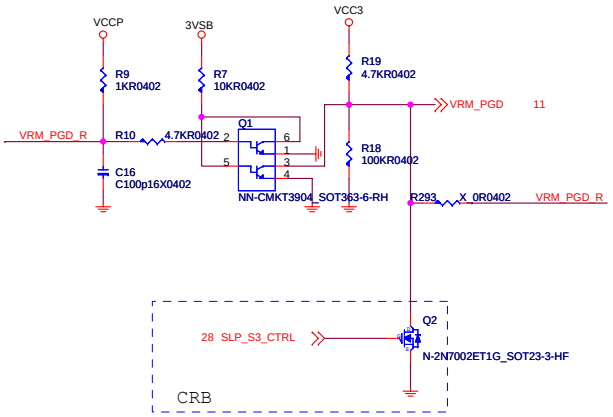
VCORE power on by s3 and VCC3

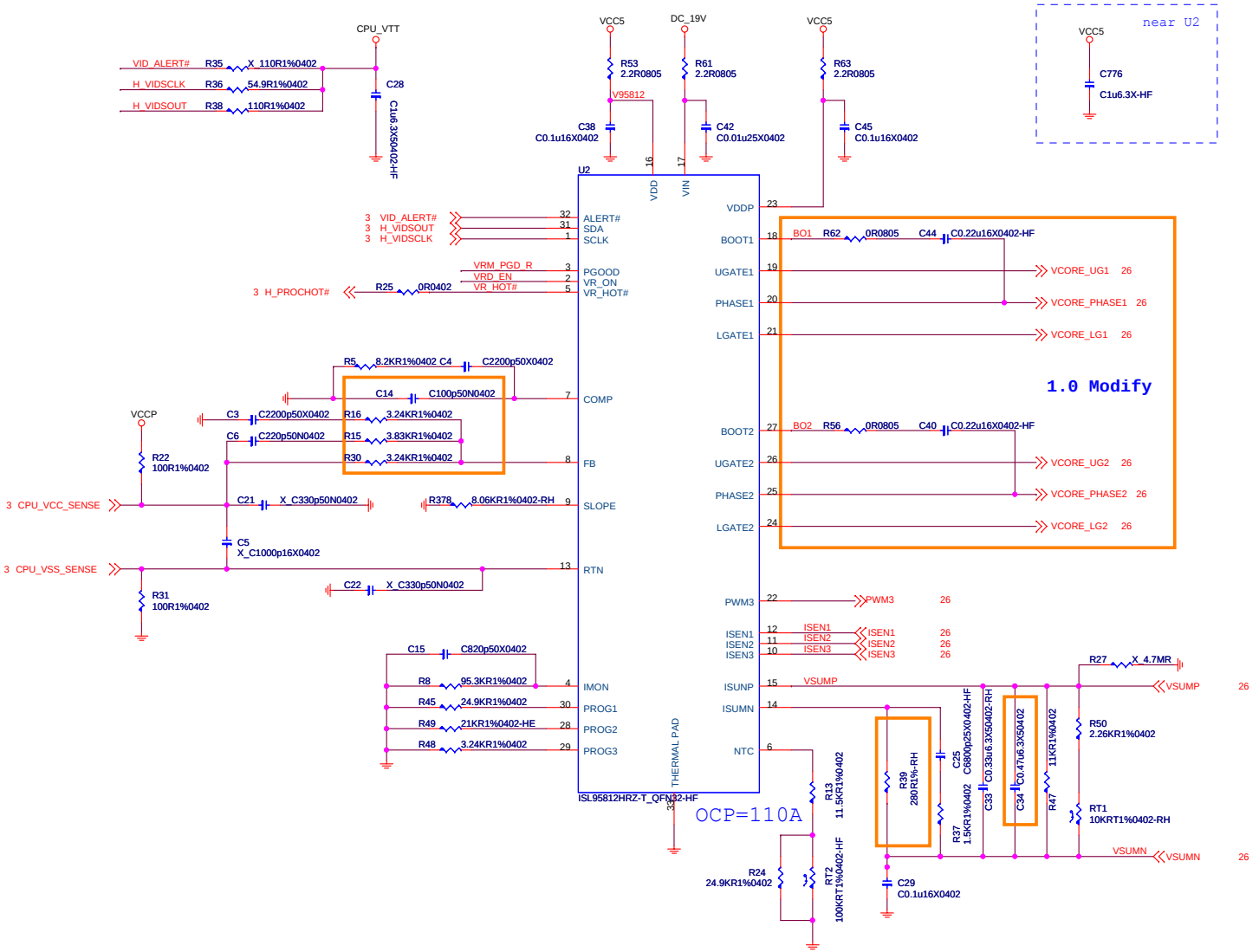


CRB

HIGH:by PCH_1P05V
LOW:by S3

VRMPWRGD LEVEL SHIFT





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MS-AA821		
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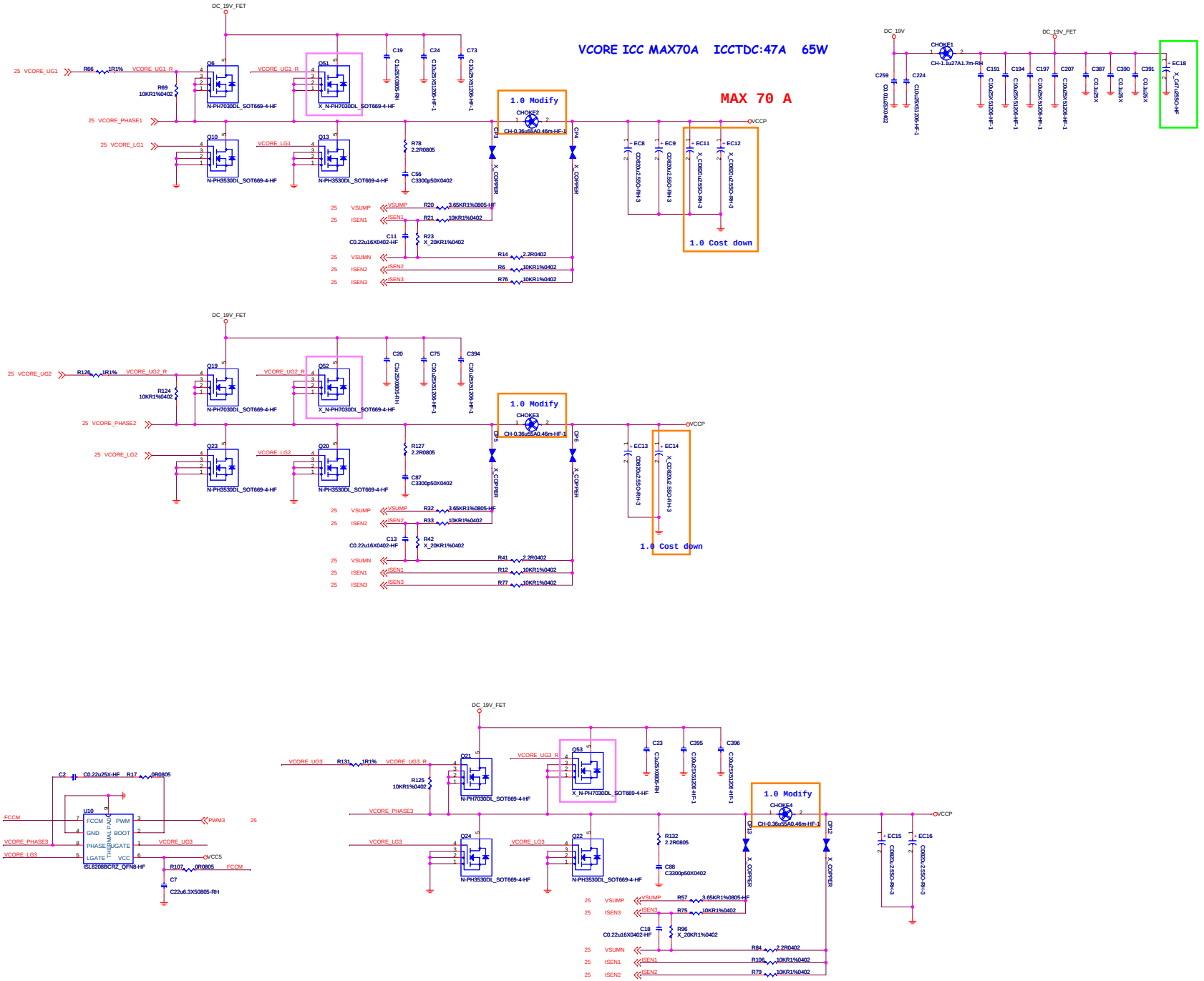
VCCP POWER



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MS-AA821	
Size: Custom	Document Description: CPU Power - MOS
Rev: 0A	
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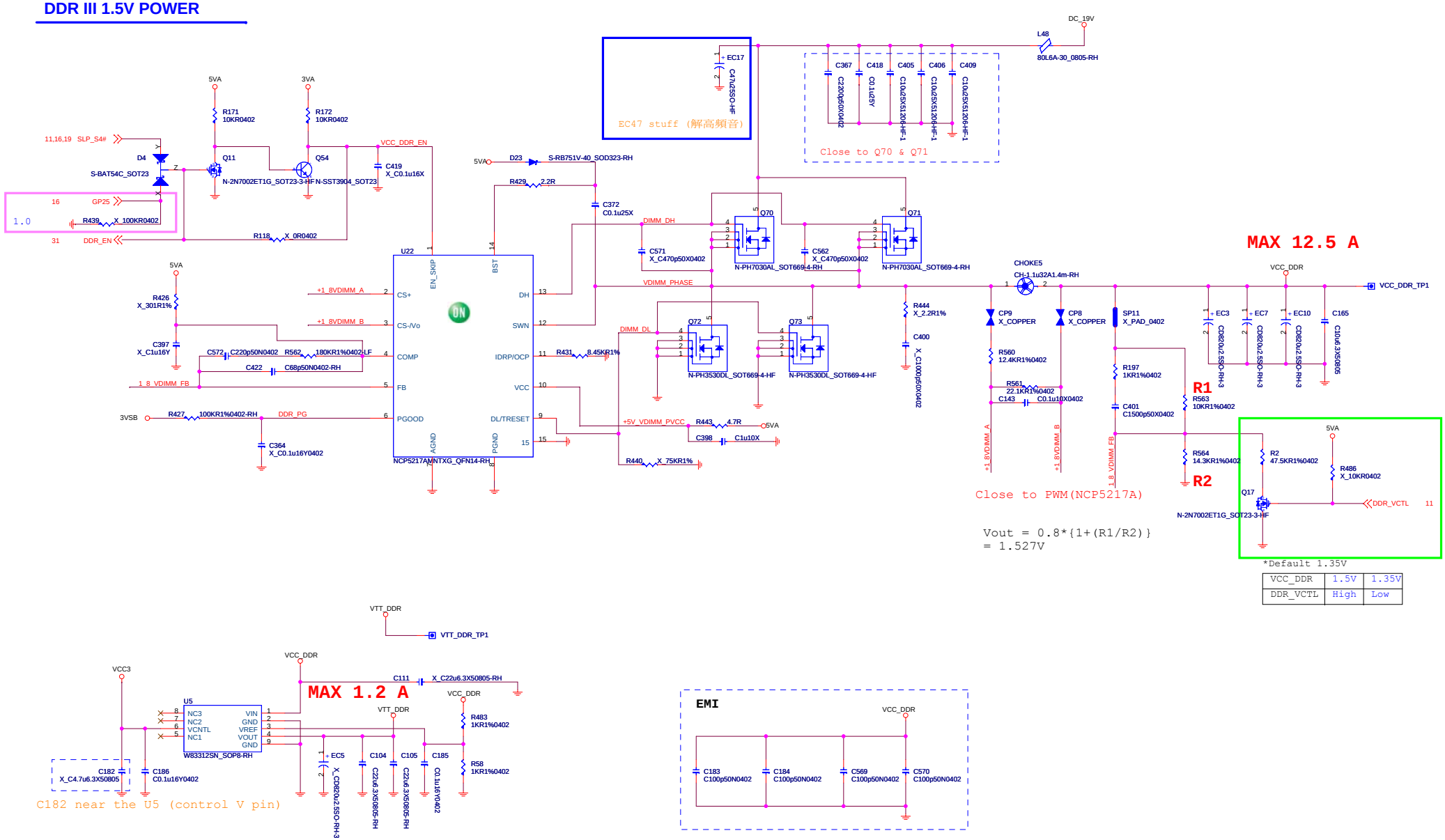
DDR III 1.5V POWER



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MS-AA821		
Size: Custom	Document Description: DDR POWER (NCP5217)	Rev: 0A
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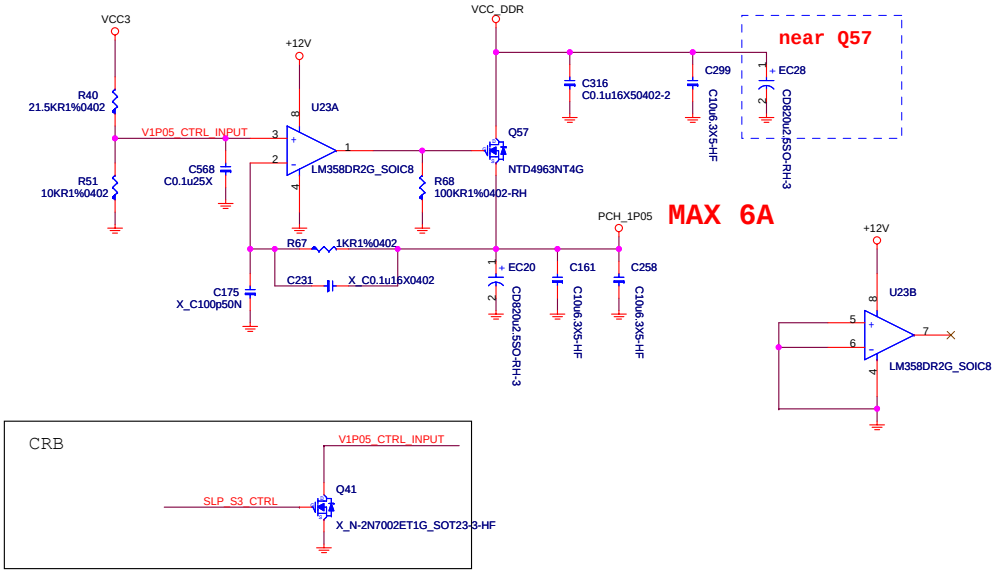
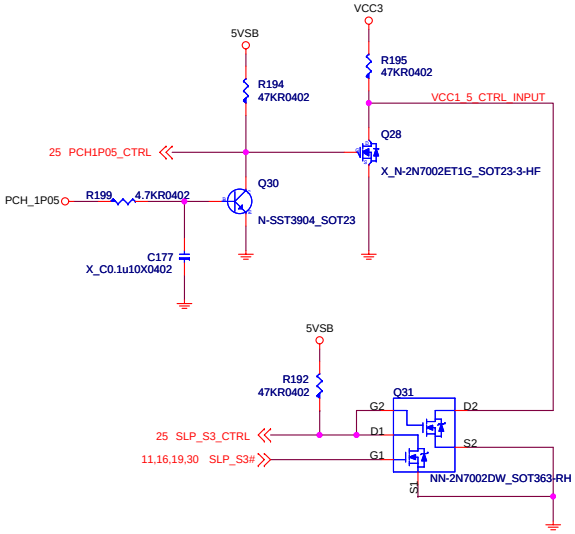
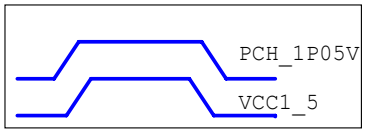
PCH Power:1.05V 5.917 A
GPU Power:1.05V 2.853 A

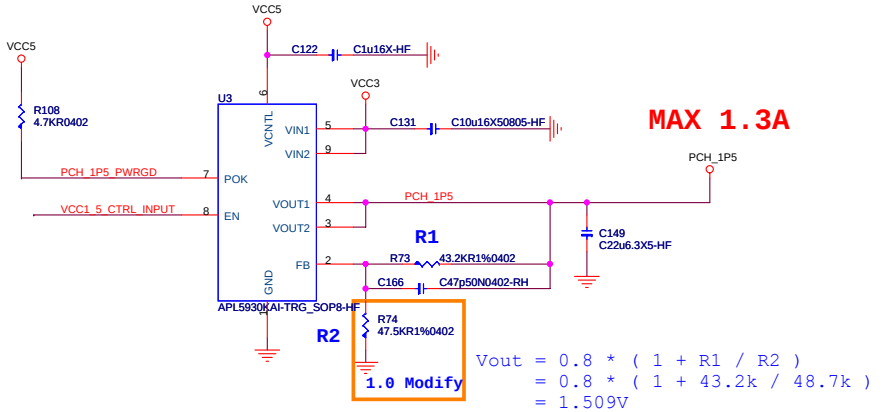


PCH Power:1.5V 0.253 A
Mini PCIE Power:1.5V 1 A



VCC1_5_CTRL_INPUT:
0:1P05V low or S3 low
1:1P05V HIGH and S3 HIGH





MICRO-STAR INT'L CO.,LTD		
MS-AA821		
Size: Custom	Document Description: PCH Power & ACPI	Rev: 0A
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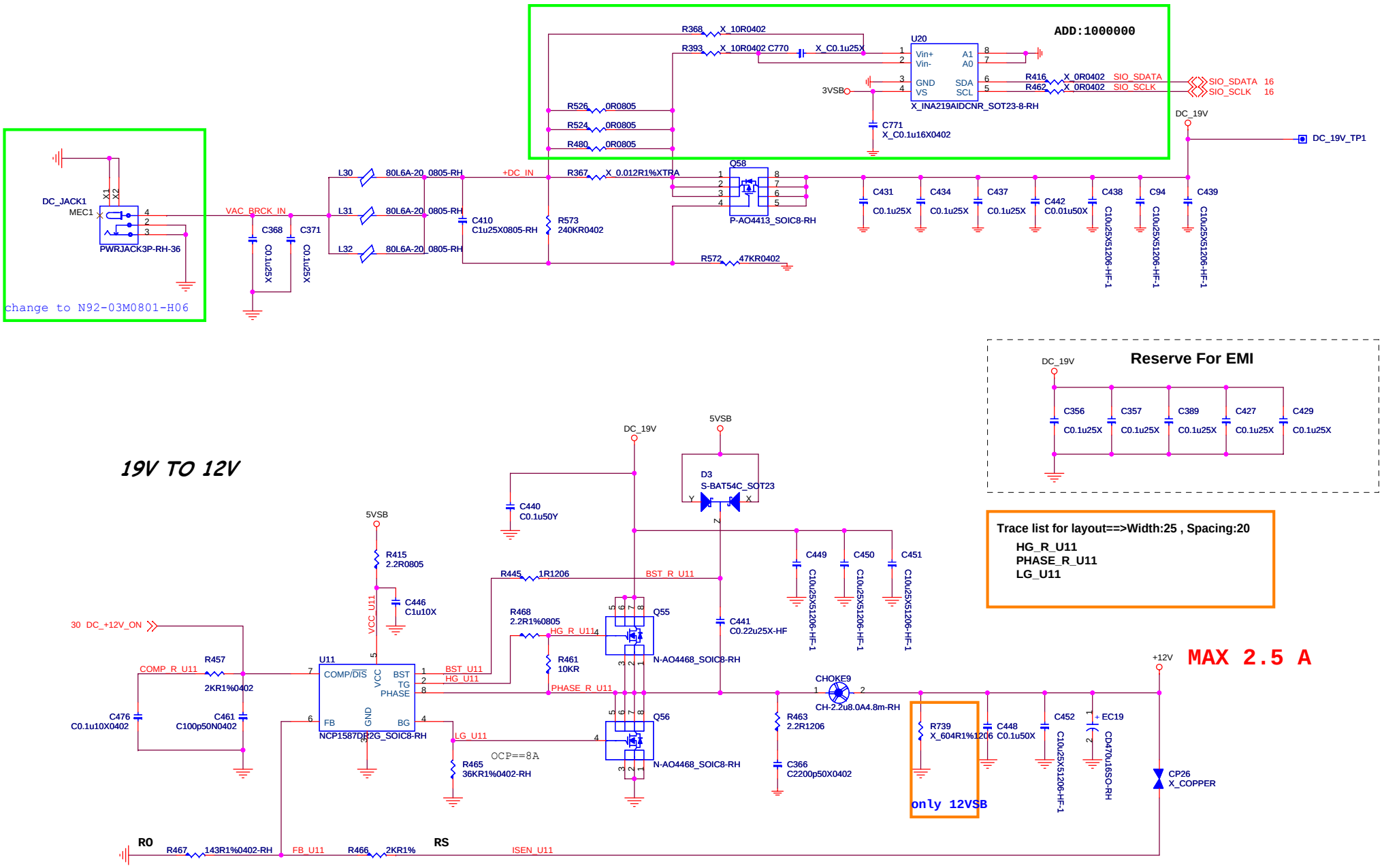

MICRO-STAR INT'L CO.,LTD	
MS-AA821	
Size: Custom	Document Description: DC-IN / +12V
Rev: 0A	
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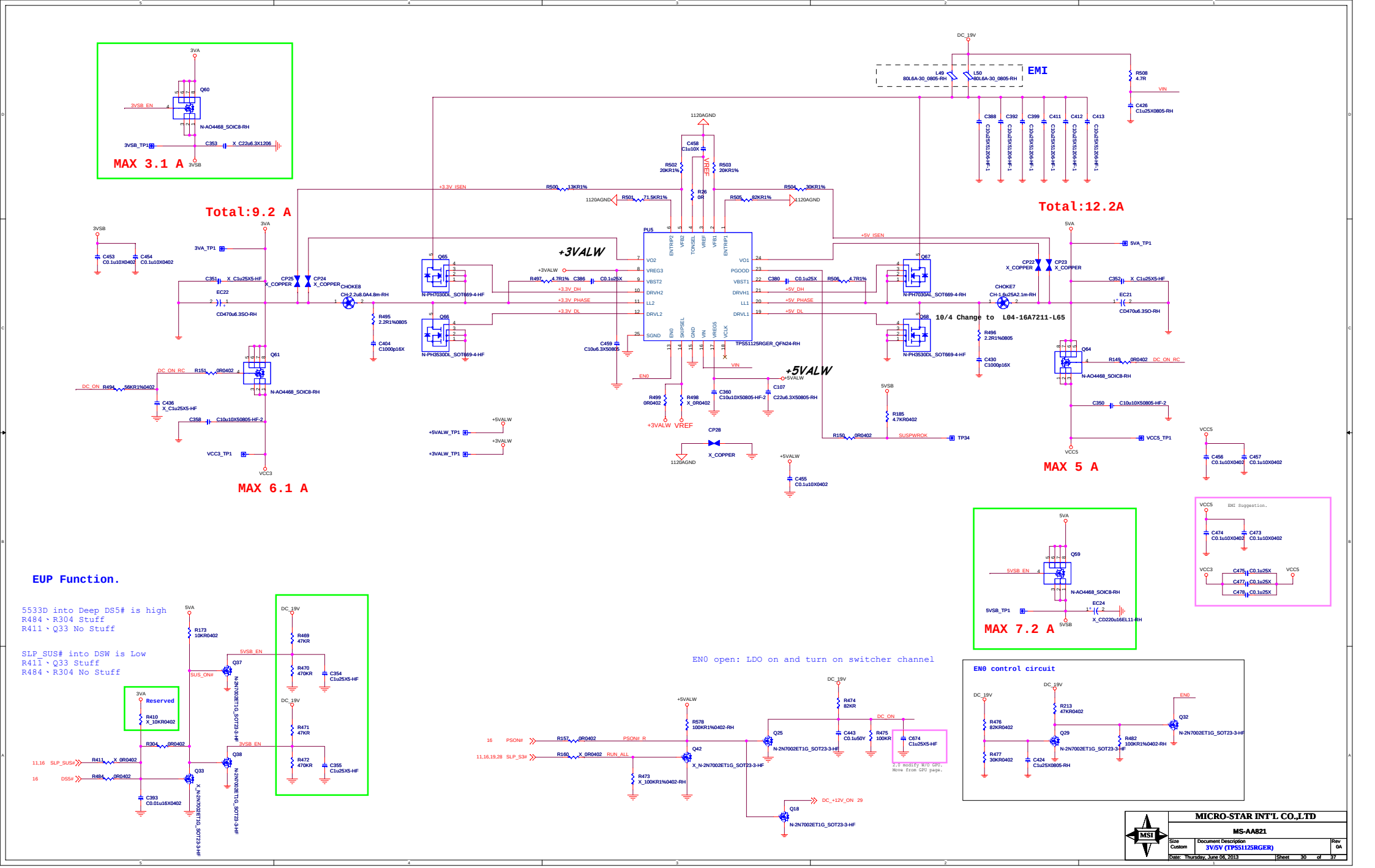
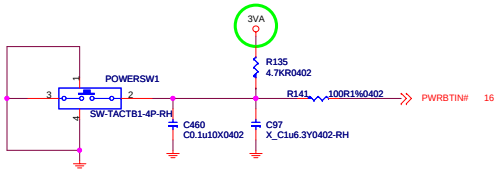
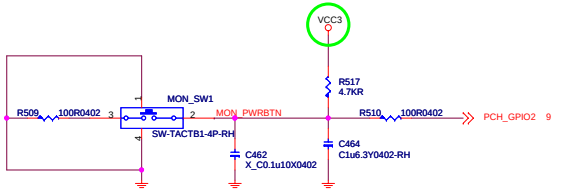


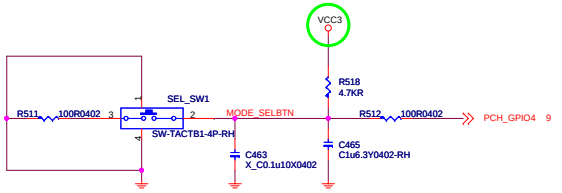
POWER ON/OFF BUTTON



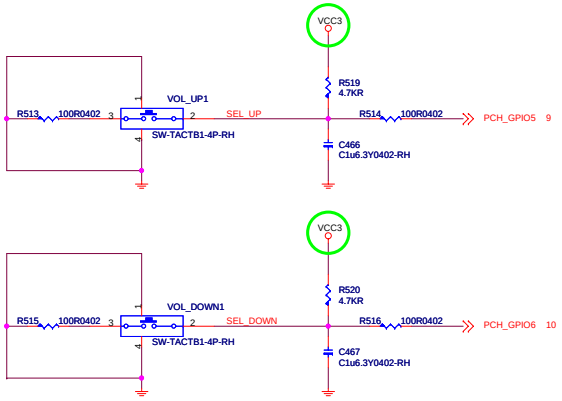
MONITOR ON/OFF BUTTON

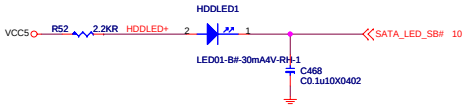


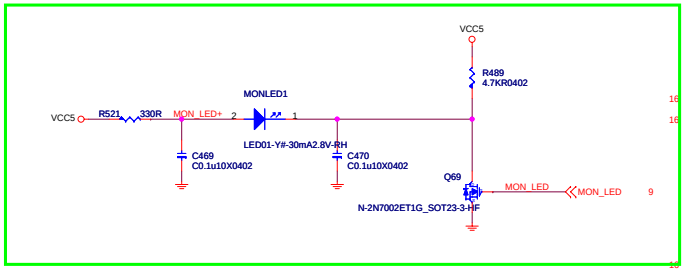
MODE SELECT BUTTON

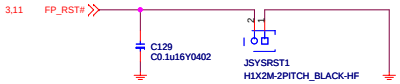


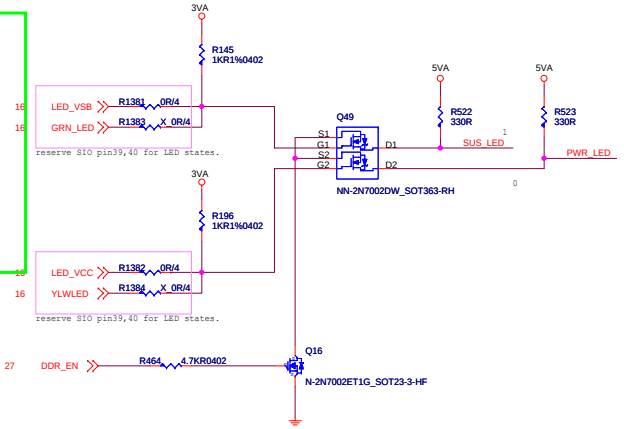
MODE SELECT CONTROL



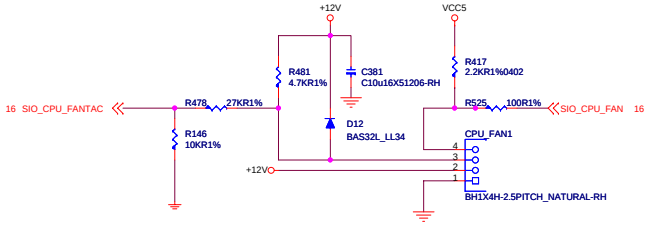








CPU FAN



MICRO-STAR INT'L CO.,LTD		
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Size: C	Document Description: HOTKEY/LED/FAN	Rev: 0A
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PCB1
MS-AA821 0A

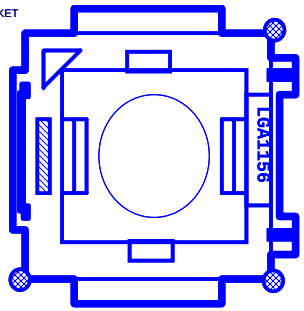
LABEL1
RESISTER
BIOS LABEL

Cost Down
BAT1
BAT-BCR2032P-RH

HDMI Royalty
LABEL2
HDMI ROYALTY
Certificated
HDMI_ROYALTY_0.04

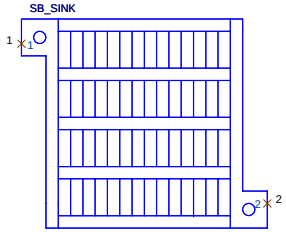
CPU SOCKET

CPU1_X1
CPU SOCKET



MSI P/N E21-AC71010-L06

SB_SINK



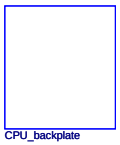
AURAS (0P103760)

PWM MOSFET heat-pipe stand off.

H88
Spacer
Support
E2B-4028010-A89

H89
Spacer
Support
E2B-4028010-A89

CPU_backplate



CPU_backplate

Optical Fiducial Marks-120

FM4 FM3 FM1 FM2
X_FM X_FM X_FM X_FM

FM6 FM8 FM7 FM5 FM9
X_FM X_FM X_FM X_FM X_FM

Simulation Single End 50ohm

SIM1 — L1_4mil_50_Ohm — X_H1X2M_BLACK-RH
SIM2 — L6_4mil_50_Ohm — X_H1X2M_BLACK-RH
SIM3 — L3_5mil_50_Ohm — X_H1X2M_BLACK-RH
SIM4 — L4_5mil_50_Ohm — X_H1X2M_BLACK-RH

EMI

5VSB — C778 X_C0.1u16Y0402
3VSB — C779 X_C0.1u16Y0402
+12V — C780 X_C0.1u16Y0402
VCC3 — C781 X_C0.1u16Y0402

EMI1
X_E23-5566060-RH

Mounting Holes

MH1 MH2 MH3 MH4
MH5 MH6 MH7 MH8

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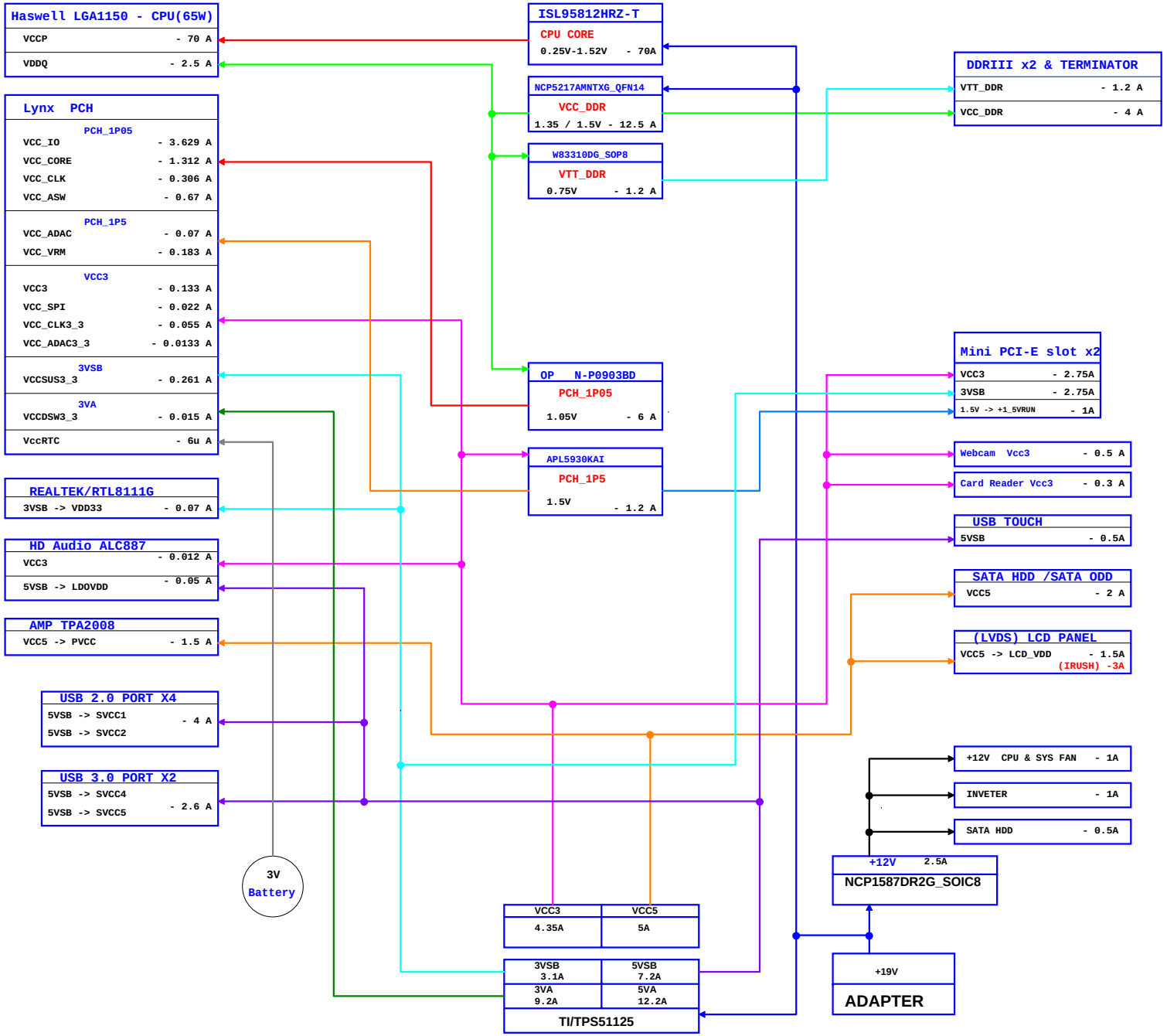

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Lynx Point Platform

GPIO	Alt Func	Type	POWER	SMI	TOL	DEFAULT	SIGNAL NAME	Pull up or Pull down	BIOS
GPIO0	BMBUSY#	I/O	CORE	Y	3.3V	GPI	BM_BUSY#	Pull-up 10K to VCC3	No USE
GPIO1	Unmultiplexed	I/O	CORE	Y	3.3V	GPI	WLAN2_PWRON	Pull-up 10K to VCC3	WLAN2_PWRON
GPIO2	PIRQE#	I/OD	CORE	Y	5V	GPI	PCH_GPIO2	Pull-up 4.7K to VCC3	MON_PWRBTN
GPIO3	PIRQF#	I/OD	CORE	Y	5V	GPI	PCH_GPIO3	Pull-up 10K to VCC3	D-MIC
GPIO4	PIRQG#	I/OD	CORE	Y	5V	GPI	PCH_GPIO4	Pull-up 4.7K to VCC3	MODE_SELBTN
GPIO5	PIRQH#	I/OD	CORE	Y	5V	GPI	PCH_GPIO5	Pull-up 4.7K to VCC3	SEL_UP
GPIO6	Unmultiplexed	I/O	CORE	Y	3.3V	GPI	PCH_GPIO6	Pull-up 4.7K to VCC3	SEL_DOWN
GPIO7	Unmultiplexed	I/O	CORE	Y	3.3V	GPI	PCH_GPIO7	Pull-up 10K to VCC3	No USE
GPIO8	Unmultiplexed	I/O	Suspend	Y	3.3V	GPO	ICC_EN	Pull-down	STRAP
GPIO9	OC5#	I/O	Suspend	Y	3.3V	Native	OC#5	Pull-up 10K to 3VSB	OC5#
GPIO10	OC6#	I/O	Suspend	Y	3.3V	Native	OC#6	Pull-up 10K to 3VSB	OC0#
GPIO11	SMBALERT#	I/O	Suspend	Y	3.3V	Native	PCH_SMBALERT#	Pull-up 10K to 3VSB	No USE
GPIO12	LAN_PHY_PWR_CTRL	I/O	DSW	Y	3.3V	Native	PCH_PGIO12	N/A	No USE
GPIO13	HDA_DOCK_RST#	I/O	Suspend	Y	3.3V	GPI	PCH_GPIO13	Pull-up 10K to 3VSB	No USE
GPIO14	OC7#	I/O	Suspend	Y	3.3V	Native	PCH_GPIO14	Pull-up 10K to 3VSB	MON_LED
GPIO15	Unmultiplexed	I/O	Suspend	Y	3.3V	GPO	PCH_GPIO15	N/A	CHARGER_EN
GPIO16	SATA4GP	I/O	CORE	N	3.3V	GPI	PCH_GPIO16	Pull-UP 10K to VCC3	No USE
GPIO17	Unmultiplexed	I/O	CORE	N	3.3V	GPI	WLAN1_PWRON	Pull-up 10K to VCC3	WLAN1_PWRON
GPIO18	PCIECLKRQ1#	I/O	CORE	N	3.3V	Native	PCIECLKREQ1#	Pull-up 10K to VCC3	PCIECLKRQ1#
GPIO19	SATA1GP	I/O	CORE	N	3.3V	GPI	PCH_GPIO19	Pull-up 10K to VCC3	STRAP
GPIO20	PCIECLKRQ2#	I/O	CORE	N	3.3V	Native	PCIECLKREQ2#	Pull-up 10K to VCC3	PCIECLKREQ2#
GPIO21	SATA0GP	I/O	CORE	N	3.3V	GPI	PCH_GPIO21	Pull-up 10K to VCC3	No USE
GPIO22	SCLOCK	I/O	CORE	N	3.3V	GPI	PCH_GPIO22	Pull-up 10K to VCC3	No USE
GPIO23	LDRQ1#	I/O	CORE	N	3.3V	Native	NC	N/A	No USE
GPIO24	Unmultiplexed	I/O	Suspend	N	3.3V	GPO	PCH_GPIO24	N/A	CHARGER_S0
GPIO25	PCIECLKRQ3#	I/O	Suspend	N	3.3V	Native	PCIECLKREQ3#	Pull-up 10K to 3VSB	PCIECLKREQ3#
GPIO26	PCIECLKRQ4#	I/O	Suspend	N	3.3V	Native	PCIECLKREQ4#	Pull-up 10K to 3VSB	PCIECLKREQ4#
GPIO27	Unmultiplexed	I/O	DSW	N	3.3V	GPI	PCH_GPIO27	Pull-up 10K to 3VA	No USE
GPIO28	Unmultiplexed	I/O	Suspend	N	3.3V	GPO	PCH_GPIO28	N/A	CHARGER_S1
GPIO29	SLP_LAN#	I/O	DSW	N	3.3V	Native	PCH_GPIO29	N/A	No USE
GPIO30	SUSWARN# SUSPWRDNACK	I/O	Suspend	N	3.3V	Native	SUSWARN#	N/A	SUSWARN#
GPIO31	Unmultiplexed	I/O	DSW	N	3.3V	GPI	PCH_GPIO31	Pull-up 10K to 3VA	No USE
GPIO32	only CLKRUN#	I/O	CORE	N	3.3V	GPO	PCH_GPIO32	N/A	No USE
GPIO33	HDA_DOCK_EN#	I/O	CORE	N	3.3V	GPO	PCH_GPIO33	N/A	No USE
GPIO34	Unmultiplexed	I/O	CORE	N	3.3V	GPI	STP_PCI#	Pull-up 10K to VCC3	STP_PCI#
GPIO35	NMI#	I/O	CORE	N	3.3V	GPO	PCH_GPIO35	N/A	DDR_VCTL
GPIO36	SATA2GP	I/O	CORE	N	3.3V	GPI	PCH_GPIO36	N/A	STRAP
GPIO37	SATA3GP	I/O	CORE	N	3.3V	GPI	PCH_GPIO37	Pull-up 10K to VCC3	STRAP
GPIO38	SLOAD	I/O	CORE	N	3.3V	GPI	PCH_GPIO38	Pull-up 10K to VCC3	No USE
GPIO39	SDATAOUT0	I/O	CORE	N	3.3V	GPI	PCH_GPIO39	Pull-up 10K to VCC3	No USE
GPIO40	OC1#	I/O	Suspend	N	3.3V	Native	OC#1	Pull-up 10K to 3VSB	OC1#
GPIO41	OC2#	I/O	Suspend	N	3.3V	Native	OC#2	Pull-up 10K to 3VSB	OC2#
GPIO42	OC3#	I/O	Suspend	N	3.3V	Native	OC#3	Pull-up 10K to 3VSB	OC3#
GPIO43	OC4#	I/O	Suspend	N	3.3V	Native	OC#4	Pull-up about 3VSB	OC4#
GPIO44	PCIECLKRQ5#	I/O	Suspend	N	3.3V	Native	PCIECLKREQ5#	Pull-up 10K to 3VSB	PCIECLKREQ5#
GPIO45	PCIECLKRQ6#	I/O	Suspend	N	3.3V	Native	PCIECLKREQ6#	Pull-up 10K to 3VSB	PCIECLKREQ6#

GPIO	Alt Func	Type	POWER	SMI	TOL	DEFAULT	SIGNAL NAME	Pull up or Pull down	BIOS
GPIO46	PCIECLKRQ7#	I/O	Suspend	N	3.3V	Native	PCIECLKREQ7#	Pull-up 10K to 3VSB	PCIECLKREQ7#
GPIO47	is not available	I/O	Suspend	N	3.3V	Native			
GPIO48	SDATAOUT1	I/O	CORE	N	3.3V	GPI	PCH_GPIO48	Pull-up 10K to VCC3	No USE
GPIO49	SATA5GP	I/O	CORE	N	3.3V	GPI	PCH_GPIO49	Pull-up 10K to VCC3	No USE
GPIO50	Unmultiplexed	I/O	CORE	N	5V	GPI	PCH_GPIO50	Pull-up 10K to VCC3	No USE
GPIO51	Unmultiplexed	I/O	CORE	N	3.3V	GPO	PCH_GPIO51	N/A	STRAP
GPIO52	Unmultiplexed	I/O	CORE	N	5V	GPI	PCH_GPIO52	Pull-up 10K to VCC3	No USE
GPIO53	Unmultiplexed	I/O	CORE	N	3.3V	GPO	PCH_GPIO53	N/A	STRAP
GPIO54	Unmultiplexed	I/O	CORE	N	5V	GPI	PCH_GPIO54	Pull-up 10K to VCC3	No USE
GPIO55	Unmultiplexed	I/O	CORE	N	3.3V	GPO	PCH_GPIO55	N/A	STRAP
GPIO56	is not available	I/O	Suspend	N	3.3V	Native			
GPIO57	Unmultiplexed	I/O	Suspend	N	3.3V	GPI	PCH_GPIO57	Pull-up 10K to 3VSB	NFC
GPIO58	SML1CLK	I/O	Suspend	N	3.3V	Native	PCH_SML1CLK	Pull-up 2.2K to 3VSB	PCH_SML1CLK
GPIO59	OC0#	I/O	Suspend	N	3.3V	Native	OC#0	Pull-up 10K to 3VSB	OC0#
GPIO60	SML0ALERT#	I/O	Suspend	N	3.3V	Native	PCH_SML0ALERT#	Pull-up 10K to 3VSB	No USE
GPIO61	SUS_SATA#	I/O	Suspend	N	3.3V	Native	SUS_STAT#	N/A	No USE
GPIO62	SUSCLK	I/O	Suspend	N	3.3V	Native	SUS_CLK	N/A	No USE
GPIO63	SLP_S5#	I/O	Suspend	N	3.3V	Native	SLP_S5#	N/A	No USE
GPIO64	CLKOUTFLEX0	I/O	CORE	N	3.3V	Native	NC	N/A	No USE
GPIO65	CLKOUTFLEX1	I/O	CORE	N	3.3V	Native	CK_48M_FLEX1	N/A	CK_48M_SIO
GPIO66	CLKOUTFLEX2	I/O	CORE	N	3.3V	Native	NC	N/A	No USE
GPIO67	CLKOUTFLEX3	I/O	CORE	N	3.3V	Native	CK_48M_FLEX3	N/A	CK_48M_CARD
GPIO68	Unmultiplexed	I/O	CORE	N	3.3V	GPI	PCH_GPIO68	Pull-up 10K to VCC3	No USE
GPIO69	Unmultiplexed	I/O	CORE	N	3.3V	GPI	PCH_GPIO69	Pull-up 10K to VCC3	No USE
GPIO70	Unmultiplexed	I/O	CORE	N	3.3V	Native	PCH_GPIO70	Pull-up 10K to VCC3	No USE
GPIO71	Unmultiplexed	I/O	CORE	N	3.3V	Native	PCH_GPIO71	Pull-up 10K to VCC3	No USE
GPIO72	BATLOW#	I/O	DSW	N	3.3V	Native	PCH_GPIO72	Pull-up 1K to 3VA	No USE
GPIO73	PCIECLKRQ0#	I/O	Suspend	N	3.3V	Native	PCIECLKREQ0#	Pull-up 10K to 3VSB	PCIECLKREQ0#
GPIO74	SML1ALERT# PCHHOT#	I/O	Suspend	N	3.3V	Native	PCH_SML1ALERT#	Pull-up 10K to 3VSB	NFC
GPIO75	SML1DATA	I/O	Suspend	N	3.3V	Native	PCH_SML1DATA	Pull-up 2.2K to 3VSB	PCH_SML1DATA

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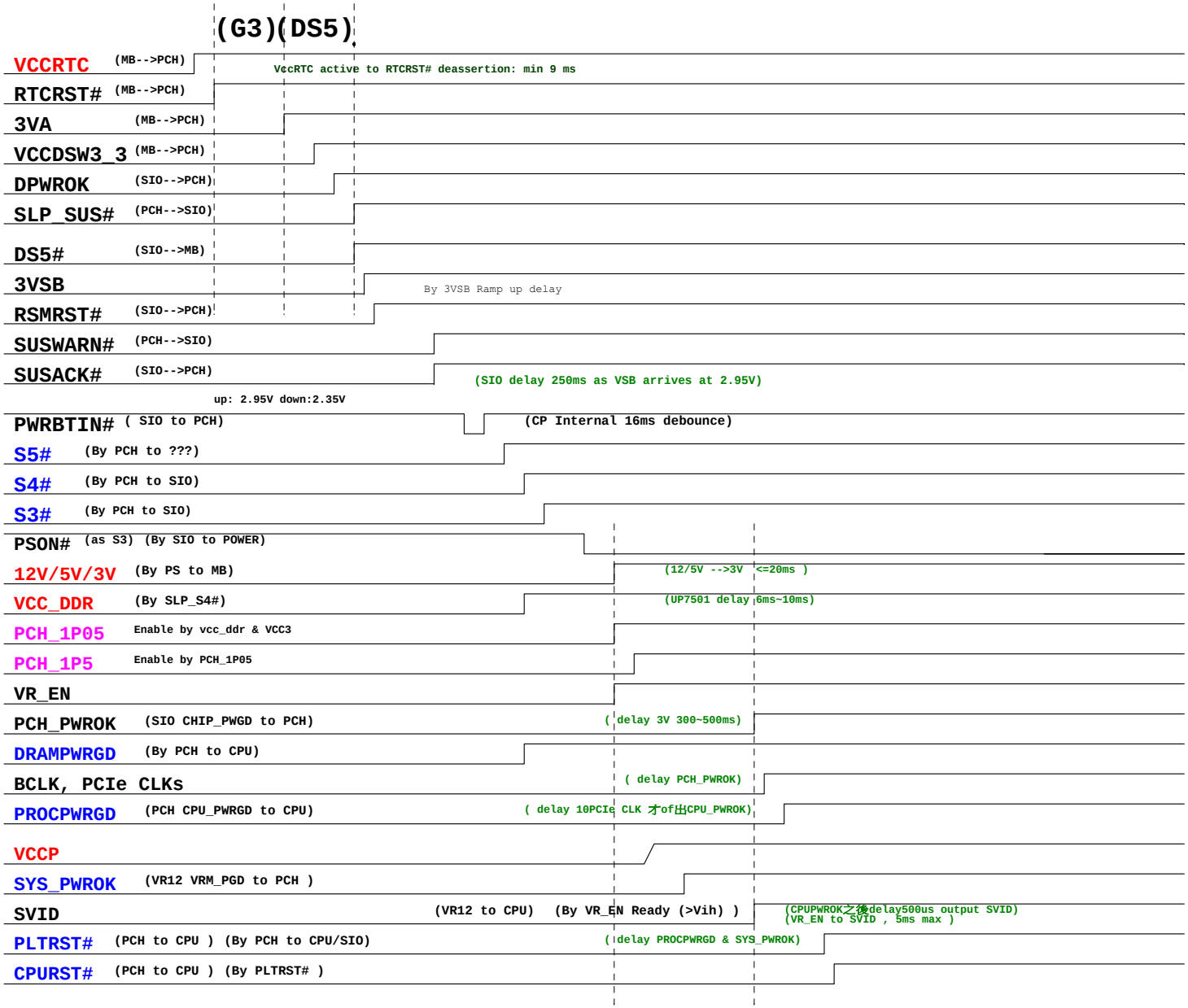

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SPEC

GPU N13P-GE1 (128M*16bit*8 = 2G) co-lay N14M-GE1 (128M*16bit*4 = 1G)
SIO change to 5533D
Use PS8625 eDP to LVDS converter
LAN change to 8111G

0A

Page 11 supports Quad SPI
Page 17 Reserve D-MIC
Page 23 Reserve incell touch 3 Pin
Page 23 LVDS connector change to old N32-2200120-H06
Page 24 Reserve NFC
Page 31 Remove SYS FAN
Page 17 JAMPR1 change to N32-1020B30-H06
Page 17 JAMPL1 & JMIC1 change to N32-1020B40-H06
Page 10 JBAT1 change to N32-1020B40-H06

1.0

Page 23 Modify PS_VDDEN# circuit to High active
Page 23 change BOM for PS8625 signal High active
Page 23 R186 & R180 no stuff
Page 23 U15 no stuff for cost down
Page 25 Modify wrong circuit
Page 25 Change C34 to 0.47uF C11-4747312-M09 for POWER team
Page 25 Change R16 & R30 to 3.24K ohm for POWER team suggest
Page 25 Change C14 to 100pF for POWER team suggest
Page 25 Change R39 to 280 ohm for POWER team suggest
Page 26 Change CHOKE2、3、4 to L04-36B8021-L65 for POWER team suggest
Page 26 EC11、12、14 no stuff for cost down
Page 28 R74 change to 47.5K ohm
Page 21 Card Reader CLOCK change to PCH supply
Page 16 R541 no stuff for Vendor suggest
Page 16 R763 no stuff (SIO GP04 change to push-pull)
Page 43 Modify PEX_VDD circuit
Page 11 & 27 DDR_VCTL change to PCH GPIO31 (DSW)
Page 19 JHDDPWR1 change to N32-1040D31-H06 (防呆)
Page 23 add PCH_GPIO15 control panel on/off
Page 32 add HDMI Royalty
Page 16 & 27 Deep S3 control VCC_DDR POWER signal change to SIO GP25

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Page 3 del PCIE x16 because W/O GPU.
Page 9 del PCIE CLK because W/O GPU.
Page 30 move C674 to page30 because Del GPU.
Page 10,37 Add VGA Function.
Page 11 SUSACK# add pull hi to 3VA.
Page 11 Add PME# to SIO.
Page 11 PSOUT# change from 3VSB to 3VA.
Page 11 Add LDRQ to PCH.

Page 16 change SIO from NCT 5533 to 6779D
Page 16 Change to two COM port.
Page 16 check BIOS to disable ATX_PWR_OK pin.
Page 16 check RI circuit.
Page 16 Reserve DPWGD SX to G3 sequence circuit.
Page 32 Del GPU stand off H3~H6.
Page 3 Add prochot# from SIO..
Page 31,16 reserve SIO pin39,40 for LED states.
Page 15 Reserve stand off for minipcie short and long card colay.
Page 16 Remove some monitor voltage.
Page 10,32 Change BAT to socket type for costdown.
Page 10,15 COLAY mSATA.
Page 30 Add EMI suggestion.
Page 19 Change charge IC to 55593.
Page 26 unstuff Q51~Q53 for costdown.

need to check DPPWROK pull down 10K or not for BAT leak current issue?
need to check DPPWROK S5 to G3 sequence.

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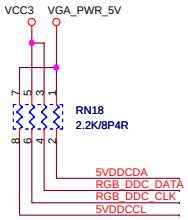
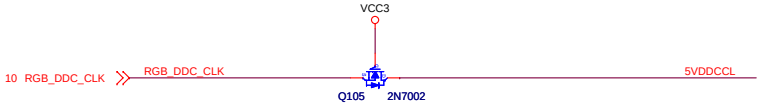
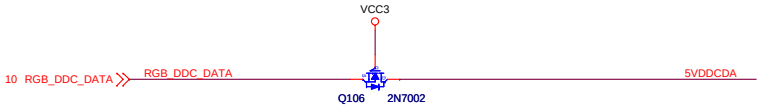
D-Sub

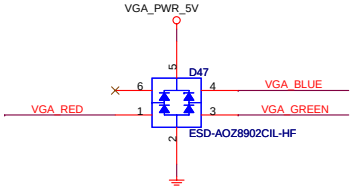
VGA: resolution of 2048x1536 pixels with 32-bit color at 75 Hz (4:3 QXGA)

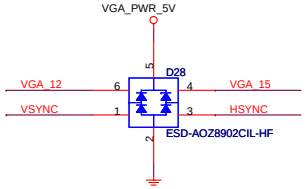
Level shift

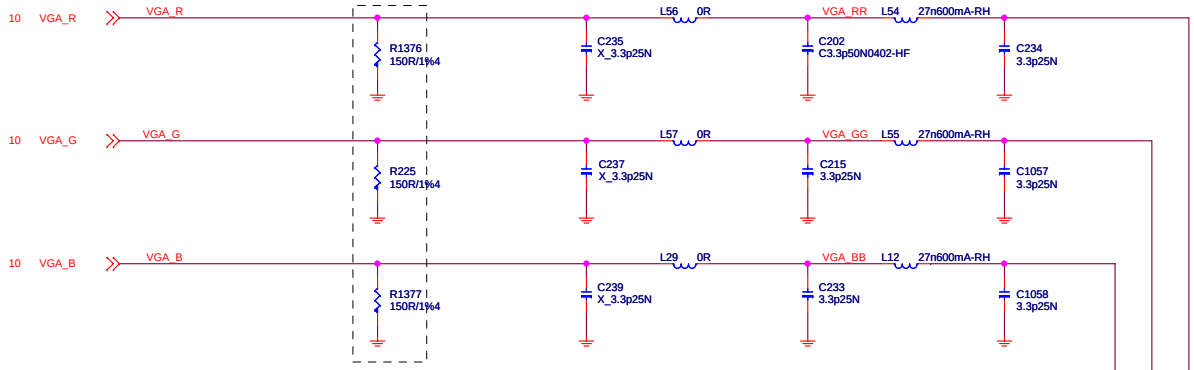




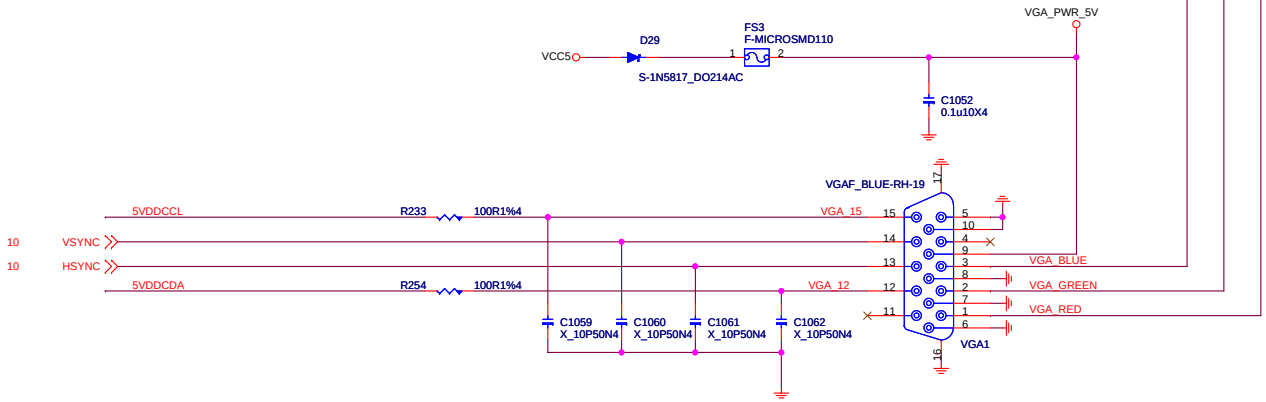








PLACE CLOSE TO VGA CONNECTOR, WITHIN 750 MIL OF PIN



VGA CONN. With Screw.

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