MS-7C08

ATX:230mm*185mm

Intel -CoffeeLake-S plamform

CPU:

LGA1151
*CPU POWER PAK *4Phase*
*GT POWER PAK *2 Phase*

System Chipset:

H310C

Onboard Chip:

SIO: NUVOTON 5567
HD Audio Codec: ALC887
LAN: INTEL I219V
Flash ROM: SPI 64 MB

PWM:

VCORE - RT3607	*138A*
VGT- RT3607	*45A*
DDR - RT8231	*11.525A*
DDR VPP25- MP2143	*1.12A*
PCH(1.0V) - RT8125E	*10.743A*
VCCSA - RT8125E	*11.1A*
VCCIO - SY8288	*6.4A*

Main Memory:

*DDR4 * 2 (Dual Channel)*

ACPI:

5VDAUL:uP7501
5VDIMM:uP7501
3VSB:MP2147
3VDSW:GS7133
VCCSTPLL:GS7133

Expansion Slots:

*PCI Express (X16) Slot * 1*
*PCI Express (X1) Slot * 2*

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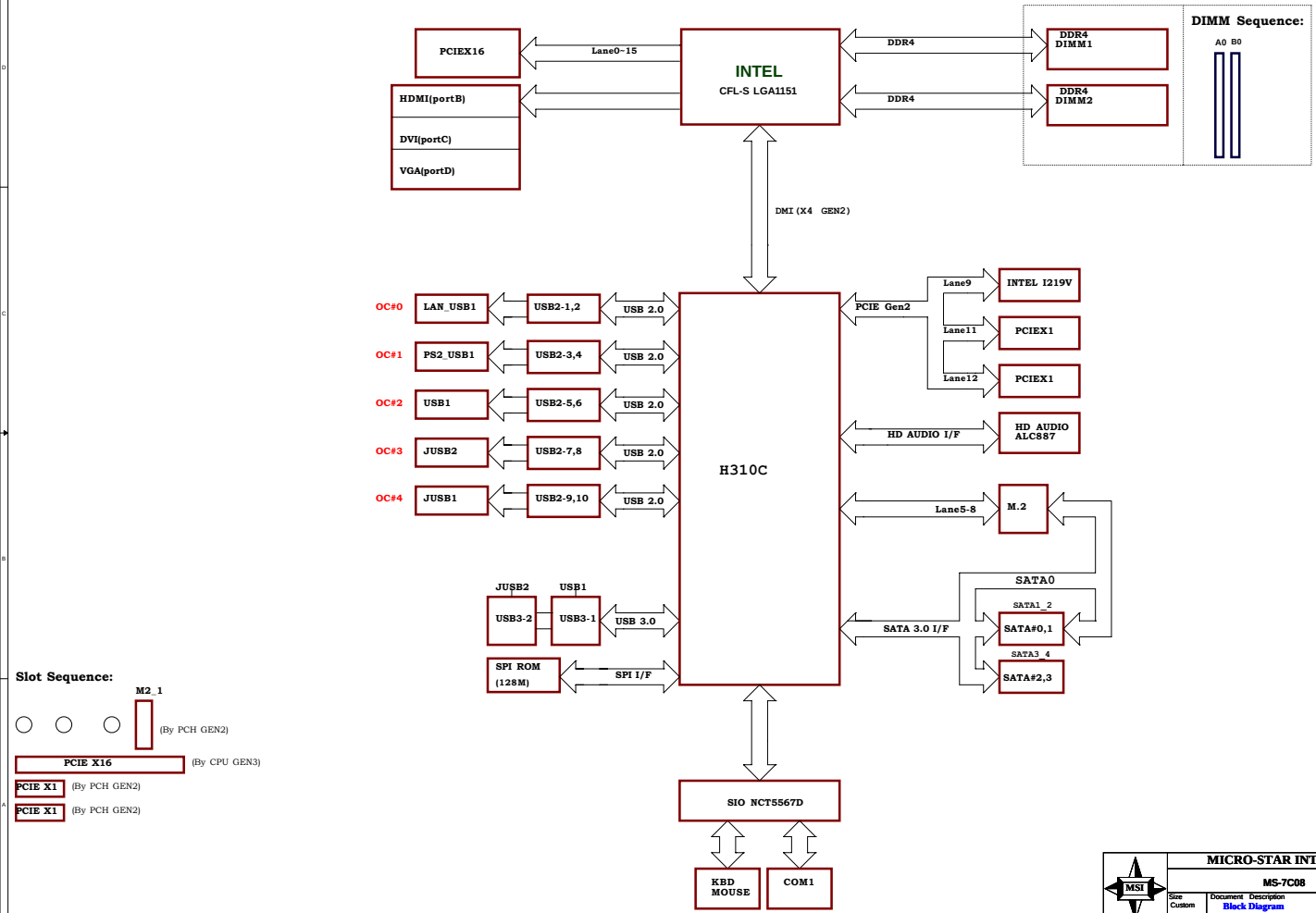
Block Diagram



Slot Sequence:

MICRO-STAR INT'L CO.,LTD		
MS-7C08		
Size: Custom	Document Description: Block Diagram	Rev: 1.0
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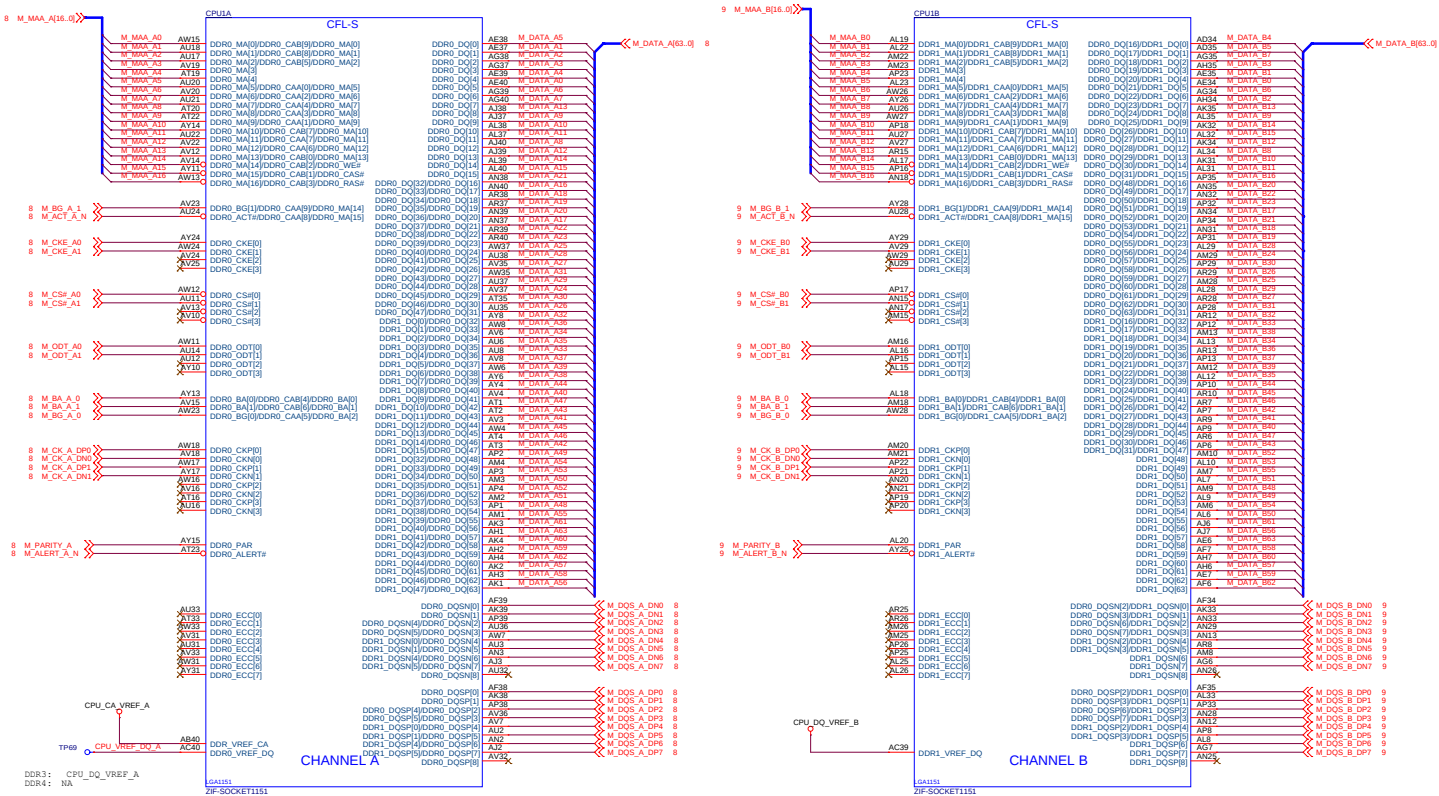

MICRO-STAR INT'L CO.,LTD

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Size	Document Description	Rev
Custom	CPU-Memory	1.0

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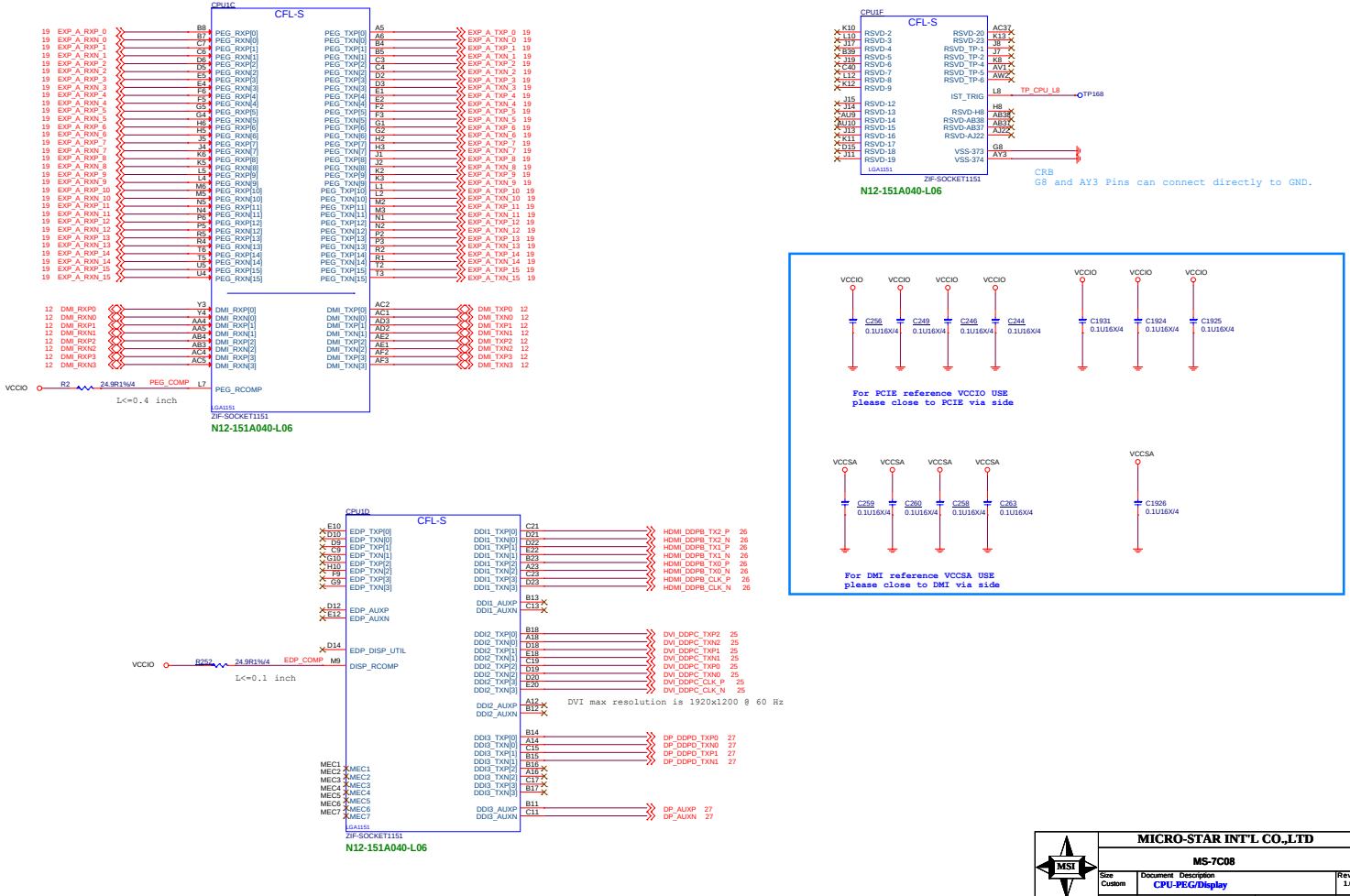

MICRO-STAR INT'L CO.,LTD	
MS-7C08	
Size: Custom	Document Description: CPU-PEG/Display
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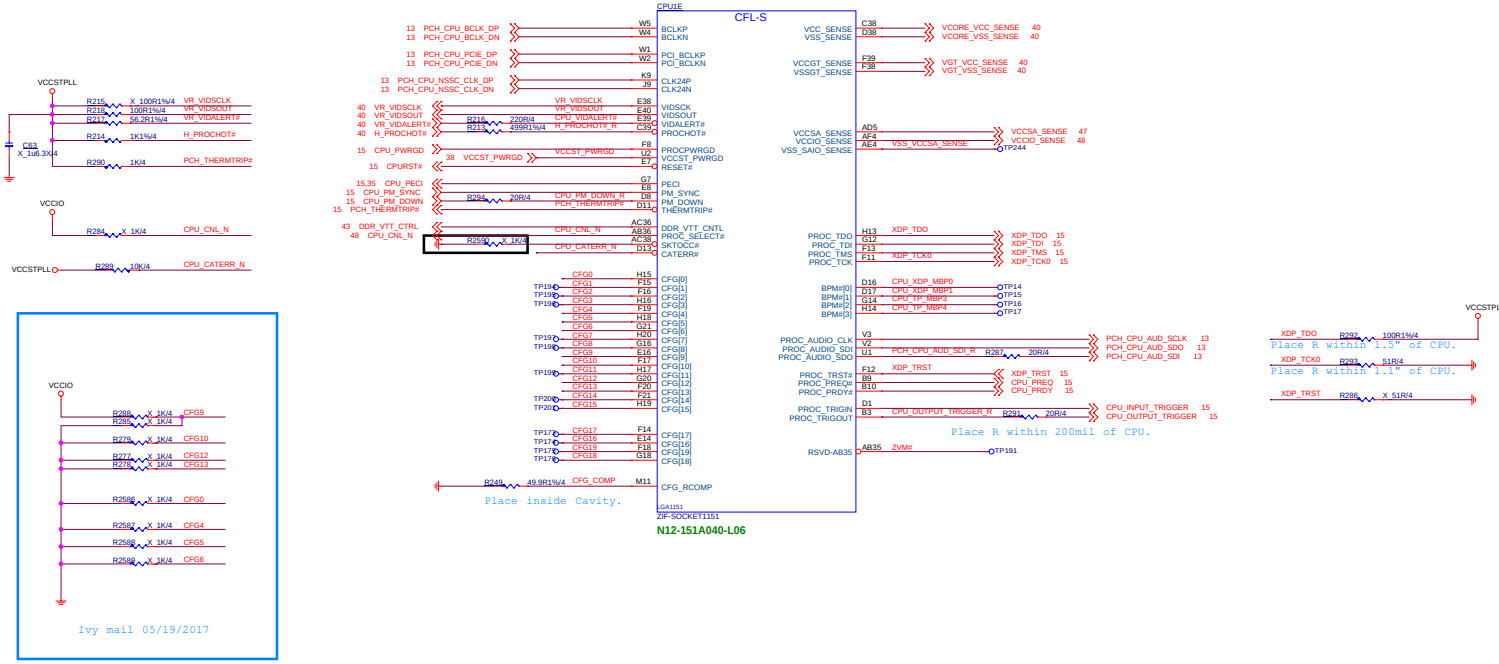
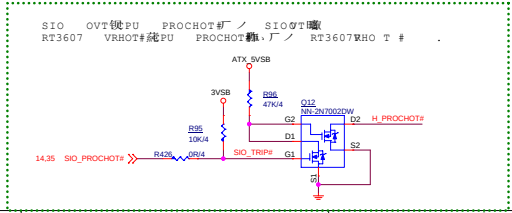


CFG Table

	HIGH	LOW	DESCRIPTION
0	No Lock	Lock	PCU PLL lock
1	-	-	RSVD
2	NORM	REVERSE	PEG_LANE_REVERSAL
3	-	-	RSVD
4	DISABLE	ENABLE	eDP
5	DISABLE	ENABLE	PEG2CFGSEL[0]
6	DISABLE	ENABLE	PEG2CFGSEL[1]
7	RESET#	BIOS REQ	PEG_DEFER_TRAINING
8			RSVD
9			RSVD
10			RSVD
11			RSVD
12			RSVD
13			RSVD
14	RSVD		
15	RSVD		



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	MS-7C08	
Size: Custom	Document Description: CPU-Control/MISC/CFG/Audio	Rev: 1.0
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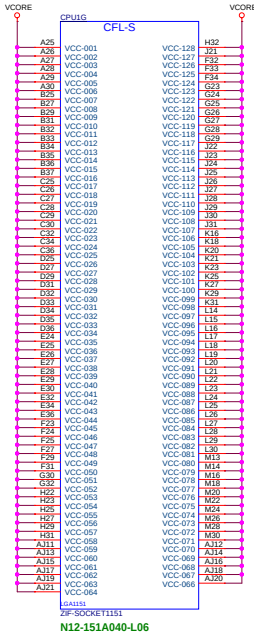

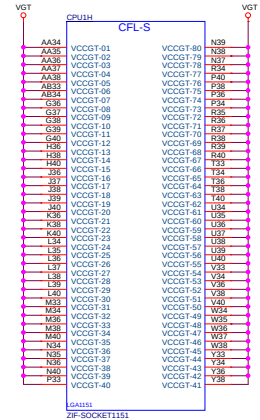

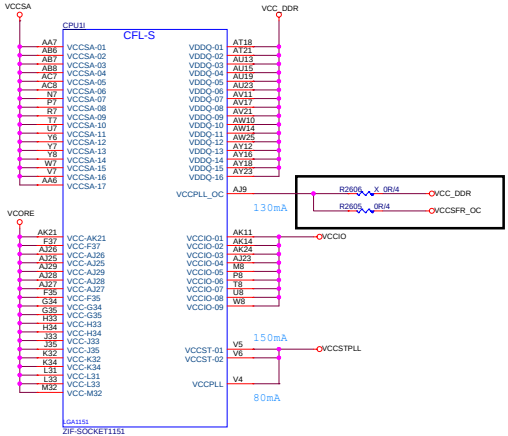

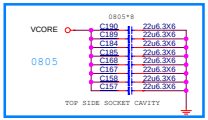

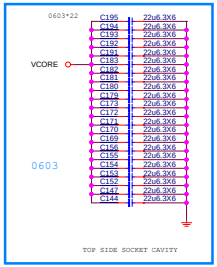

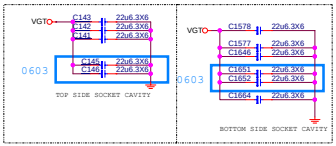

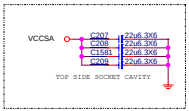

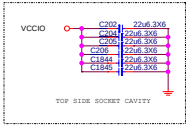

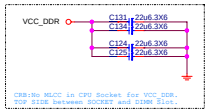

MICRO-STAR INT'L CO.,LTD

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Size	Document Description	Rev
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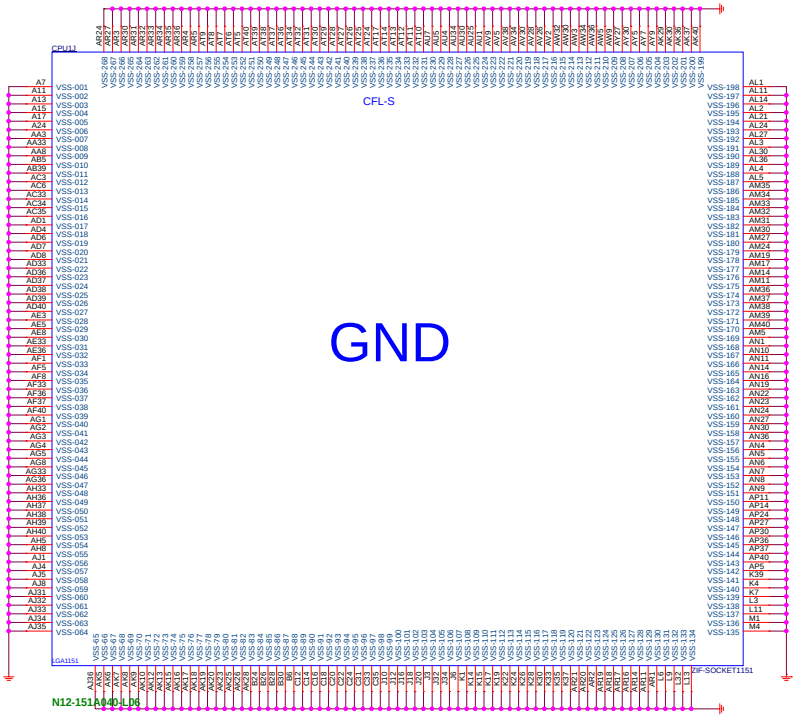

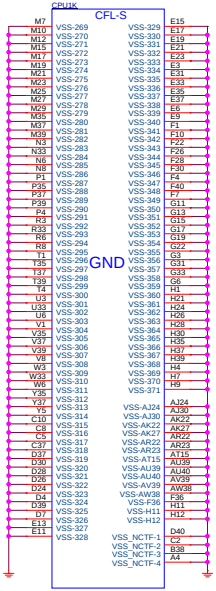

MICRO-STAR INT'L CO.,LTD		
MS-7C08		
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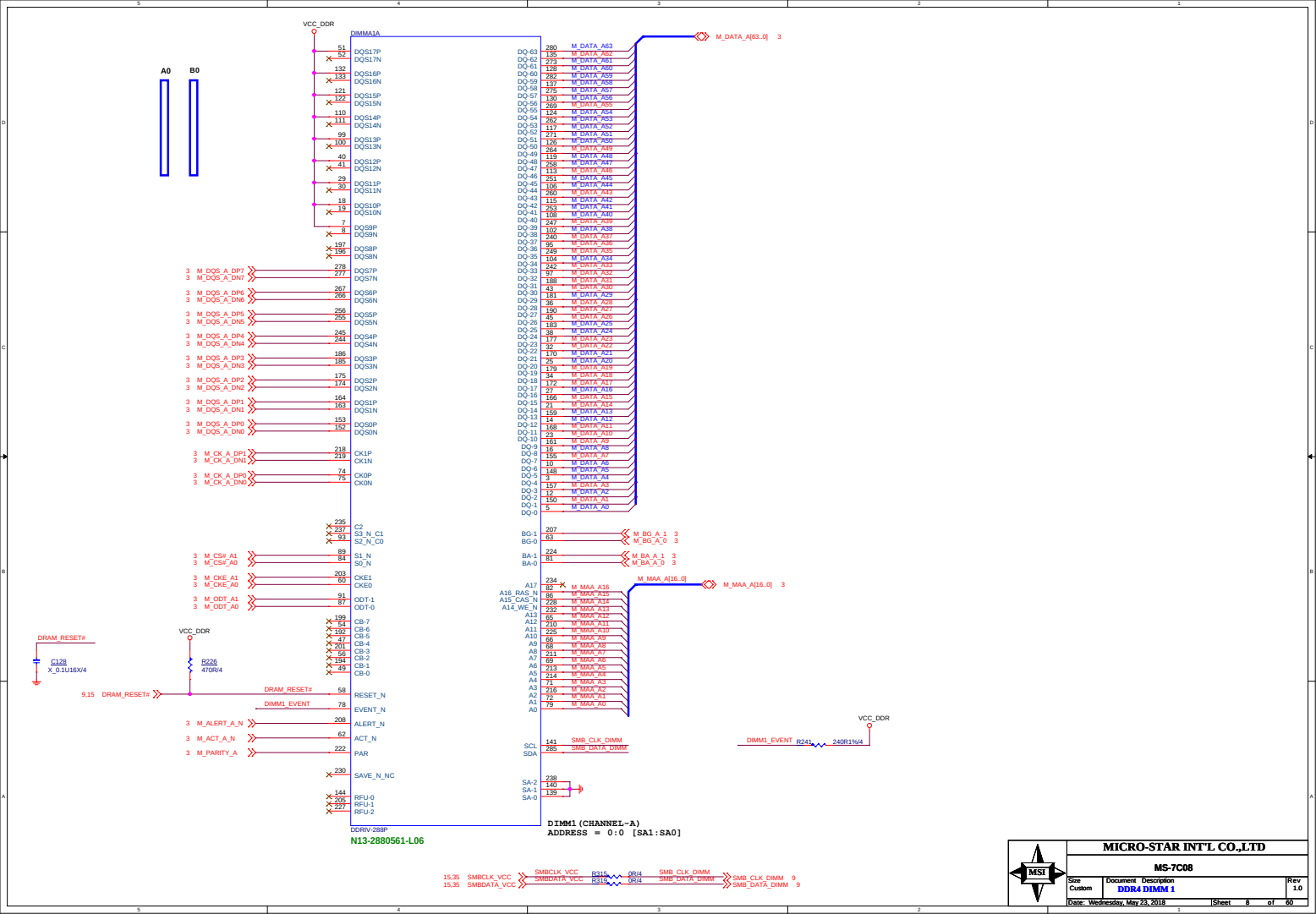

MICRO-STAR INT'L CO.,LTD	
MS-7C08	
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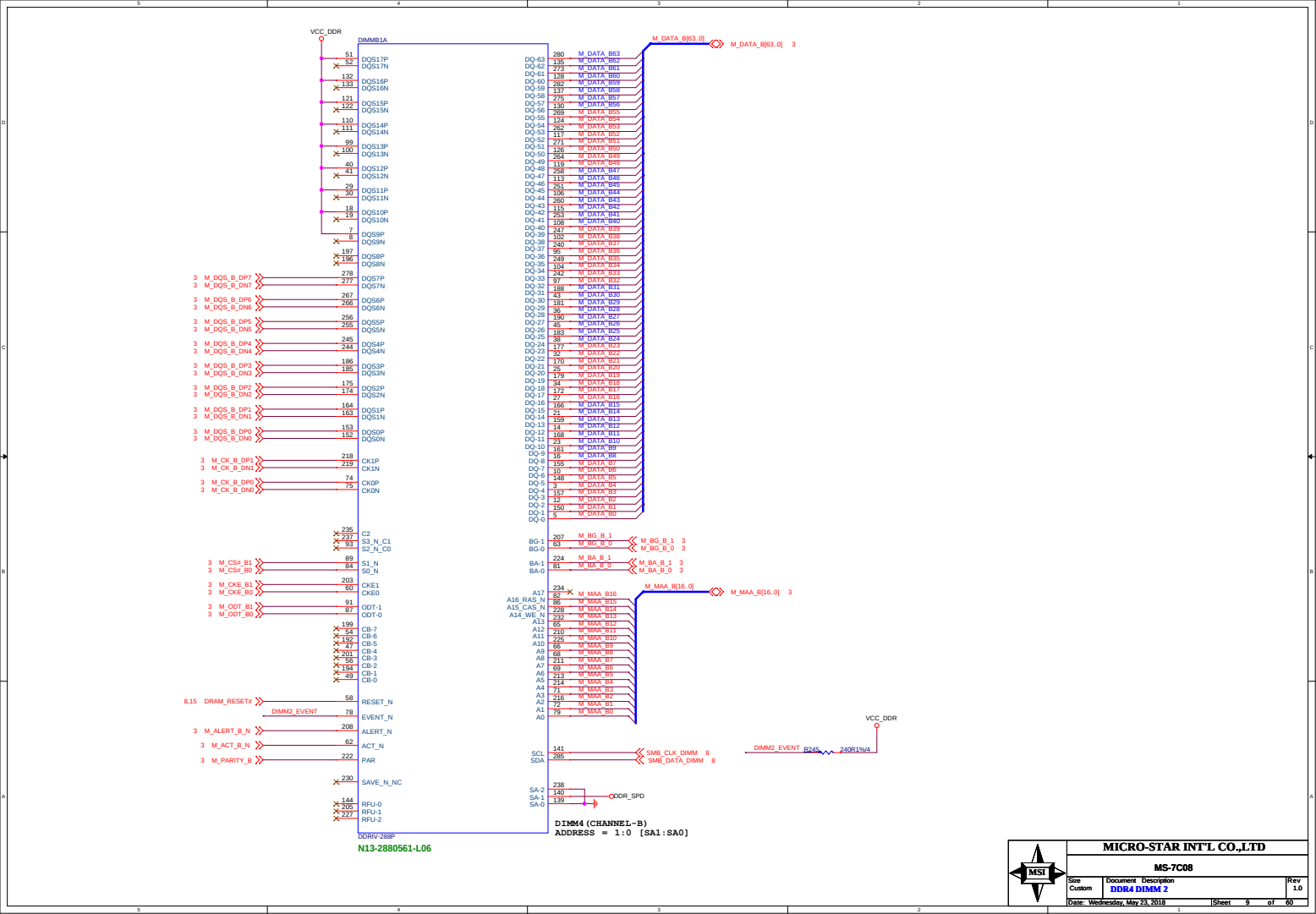
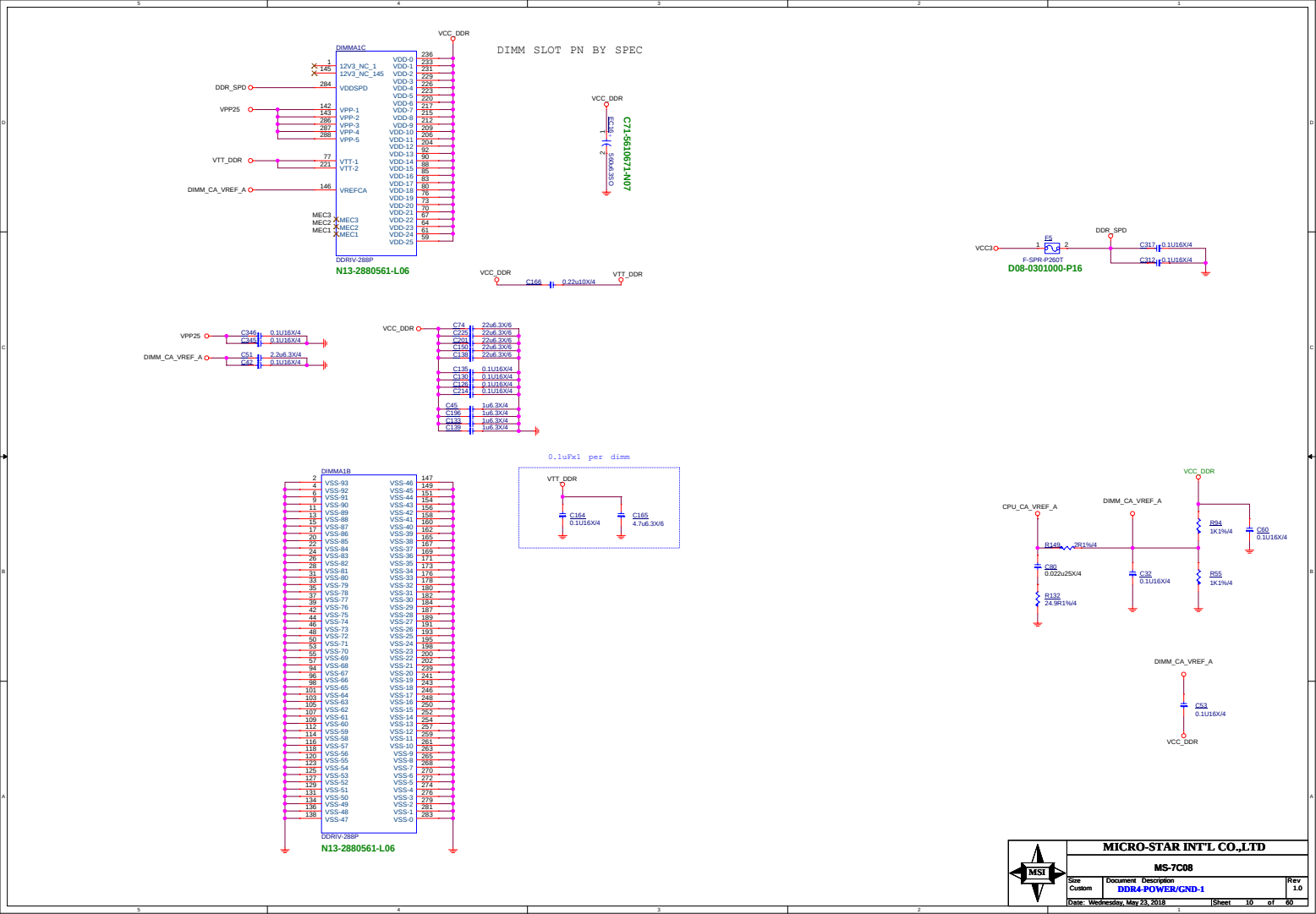


MICRO-STAR INT'L CO.,LTD	
MS-7C08	
Size: Custom	Document Description: DDR4 DIMM 2
Rev: 1.0	
Date: Wednesday, May 23, 2018	Sheet 9 of 60



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	MS-7C08	
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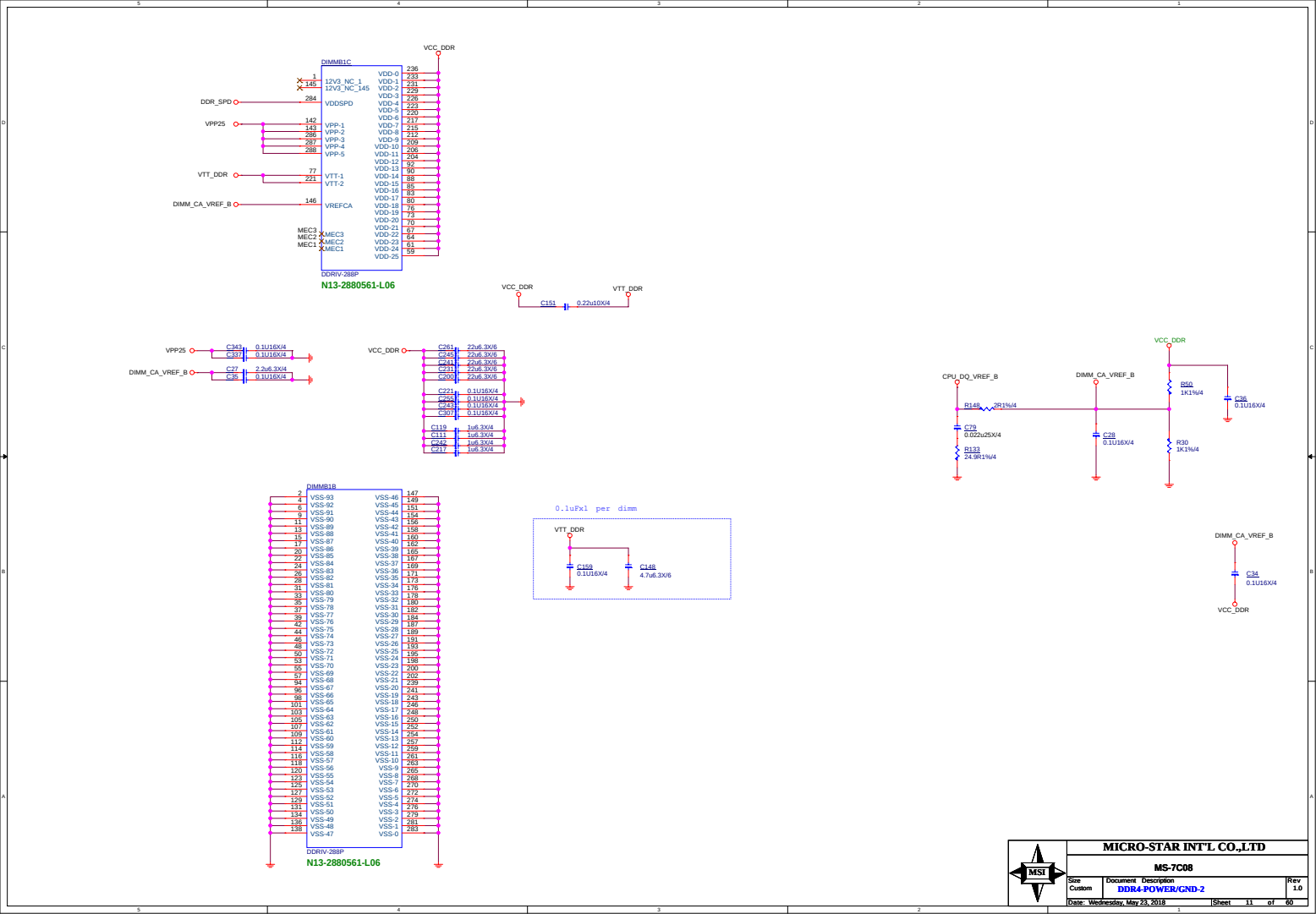
Date: Wednesday, May 23, 2018	Sheet 10 of 60	



MSI	MICRO-STAR INT'L CO.,LTD		
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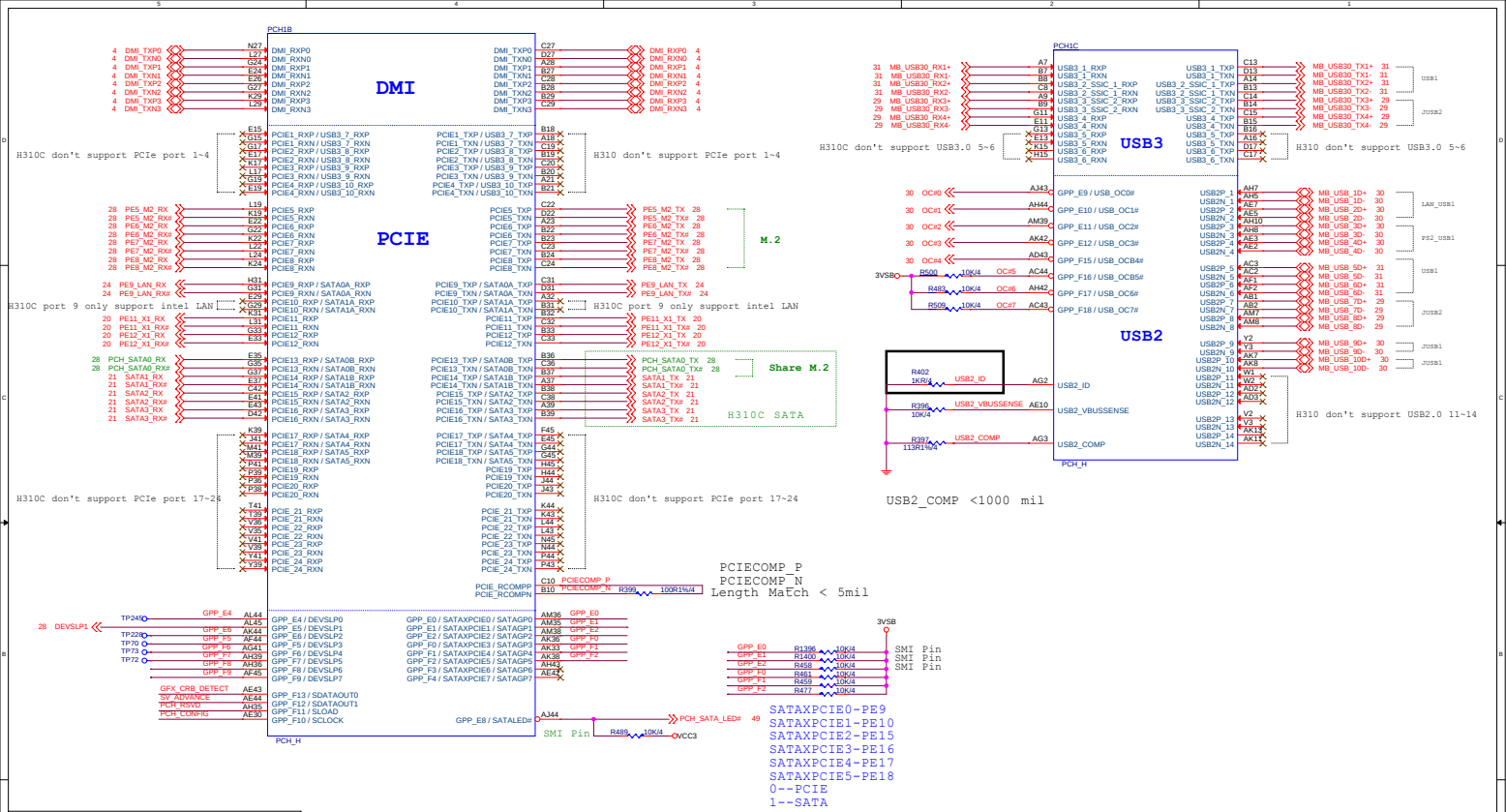
Size: Custom	Document Description: DDR4-POWER/GND-2		Rev: 1.0
Date: Wednesday, May 23, 2018	Sheet 11 of 60		



MICRO-STAR INT'L CO.,LTD		
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Size: Custom	Document Description: PCH-USB/PCIE/DMI/SATA	Rev: 1.0
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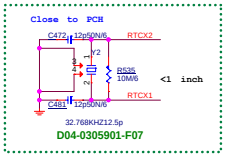
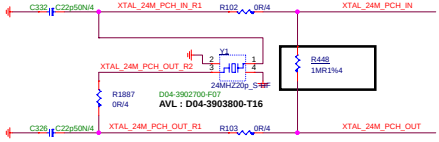
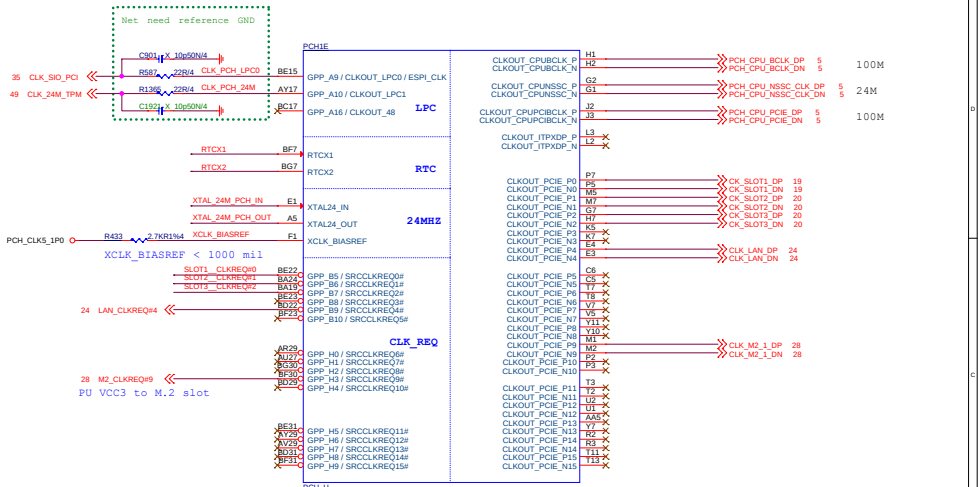
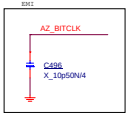
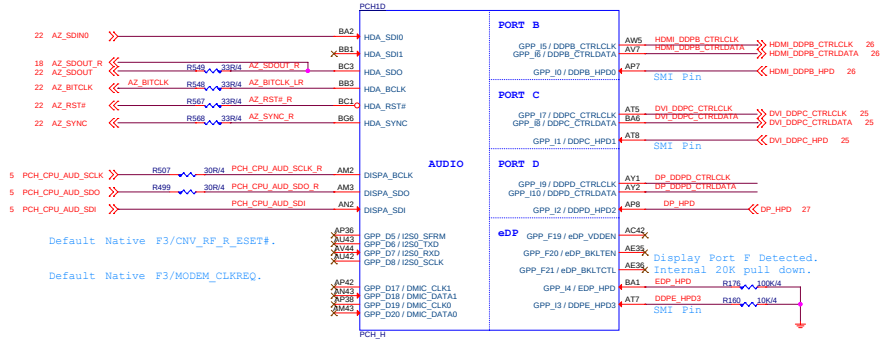
RTC Block

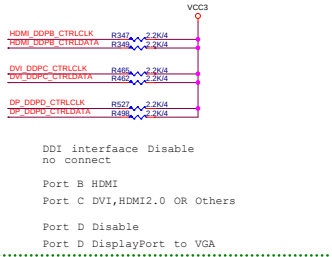












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MS-7C08			
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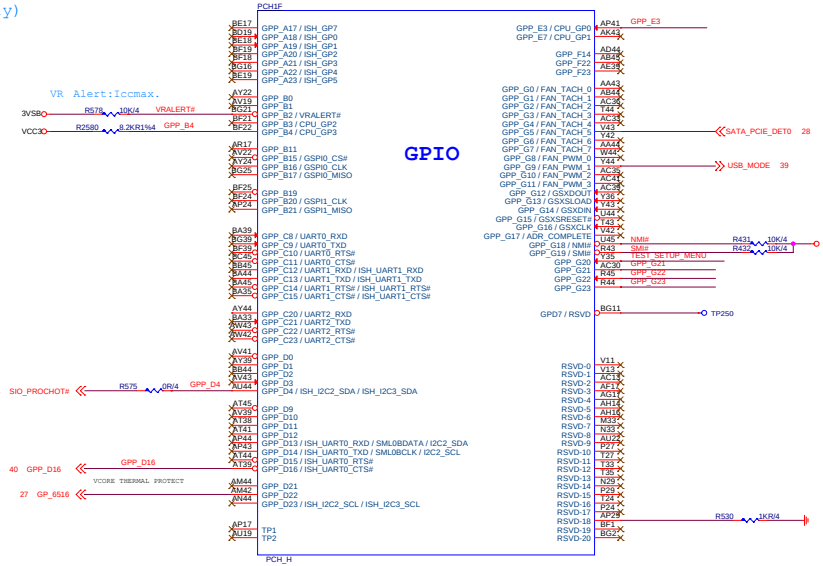
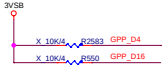
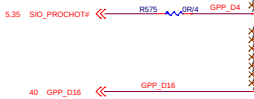
GPIO(SMI/NMI):
GPP_B14,GPP_B20,GPP_B23
GPP_C[23:22]
GPP_D[4:0]
GPP_E[8:0]
GPP_I[3:0]
GPP_G[7:0](Support SMI# only)

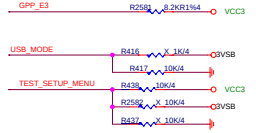
	GPP_I12	GPP_I13	GPP_I14
H310_GPLUS	0	0	0

For BIOS BOM USE









MICRO-STAR INT'L CO.,LTD			
MS-7C08			
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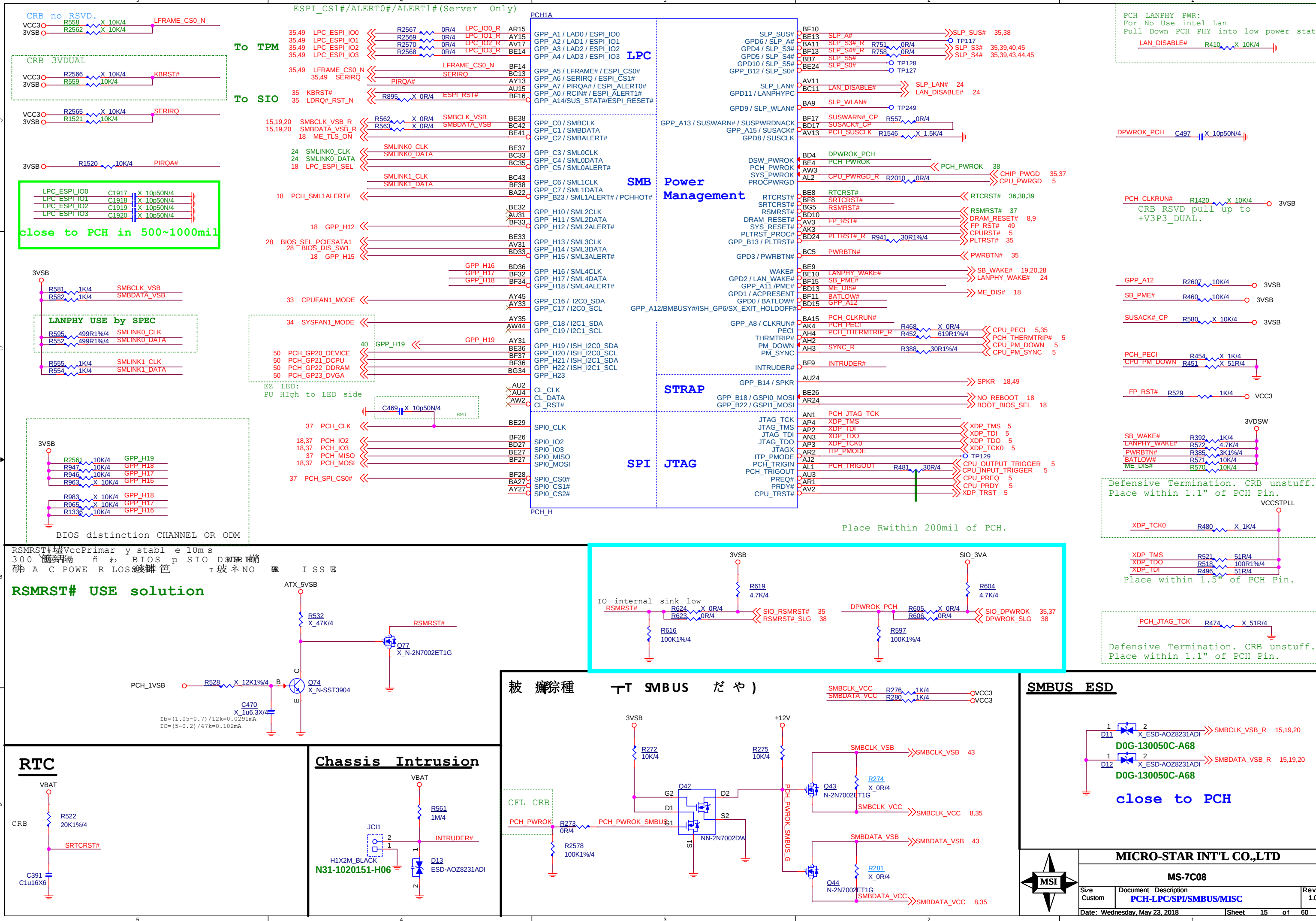
ESPI_CS1#/ALERT0#/ALERT1#(Server Only)
PCH1A
CRB no RSVD.
CRB 3VDUAL
To TPM
To SIO
LPC
SMB
Power Management
STRAP
SPI
JTAG
close to PCH in 500~1000mil
LANPHY USE by SPEC
EZ LED:
PU HIgh to LED side
BIOS distinction CHANNEL OR ODM
PCH LANPHY PWR:
For No Use intel Lan
Pull Down PCH PHY into low power state.
CRB RSVD pull up to +V3P3_DUAL.
Defensive Termination. CRB unstuff.
Place within 1.1" of PCH Pin.
Place Rwithin 200mil of PCH.
Place within 1.5" of PCH Pin.
RSMRST# USE solution
IO internal sink low
Ib=(1.05-0.7)/12k=0.0291mA
IC=(5-0.2)/47k=0.102mA
RTC
Chassis Intrusion
SMBUS
SMBUS ESD
CFL CRB
D0G-130050C-A68
close to PCH
N31-1020151-H06
MICRO-STAR INT'L CO.,LTD
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Size Custom
Document Description
PCH-LPC/SPI/SMBUS/MISC
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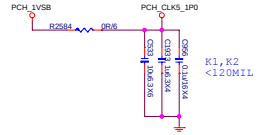
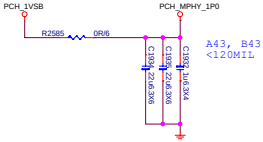
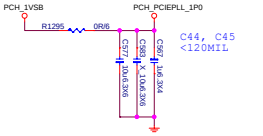
PCH_1VSB 8.72A

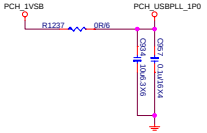
VCC3 0.007A

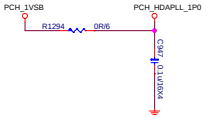
3VSB 0.846A

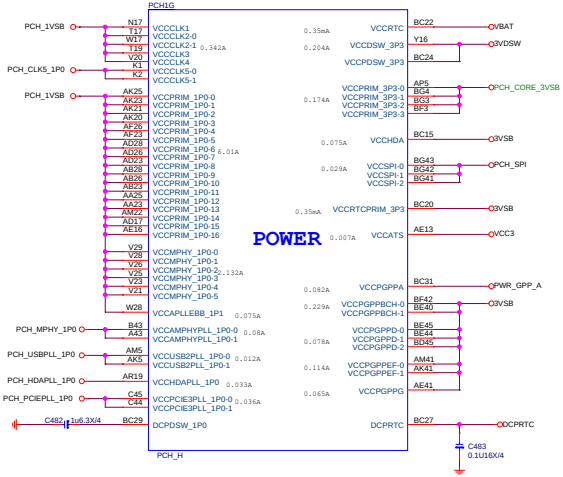


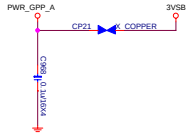


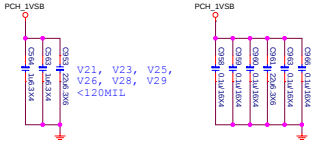


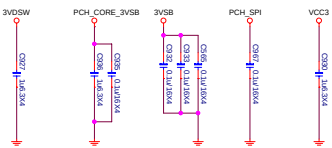












AE13
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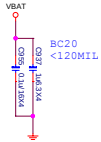

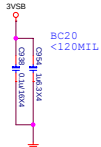

BC20
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MICRO-STAR INT'L CO.,LTD		
MS-7C08		
Size: Custom	Document Description: PCH-Power	Rev: 1.0
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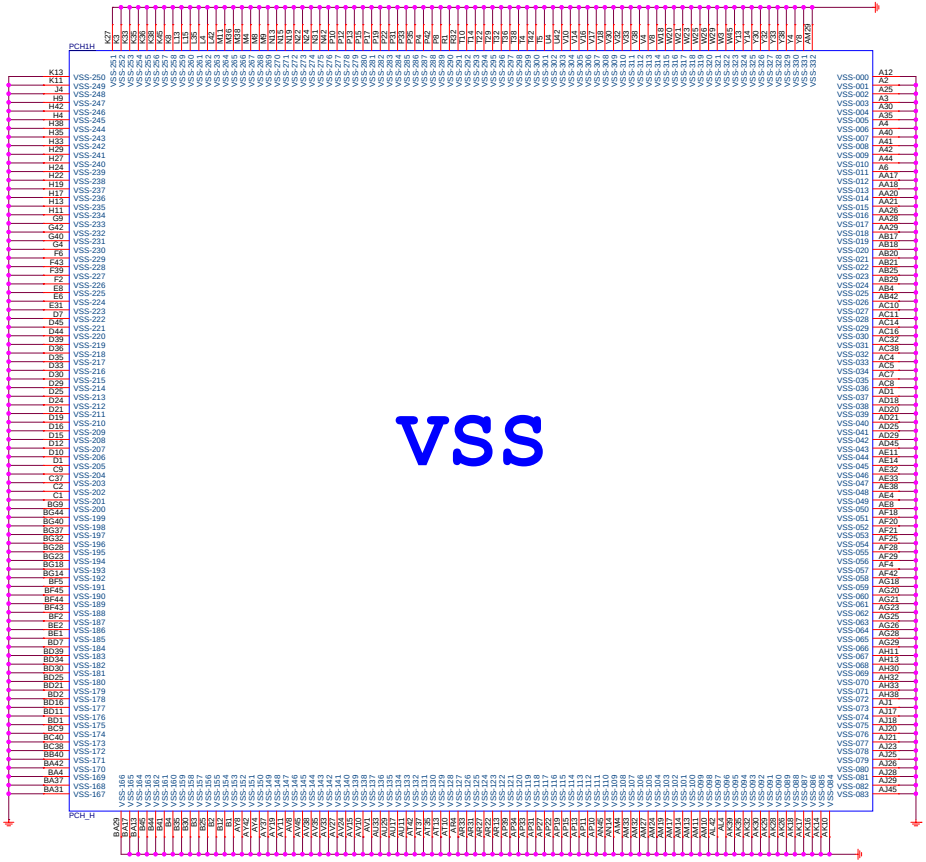

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MS-7C08	
Size: Custom	Document Description: PCH-GND
Rev: 1.0	
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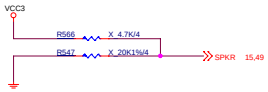
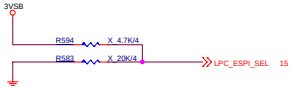
TOP Swap



Internal pull-down 20K is disabled after PLTRST#

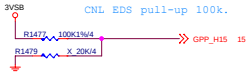
LPC eSPI Mode



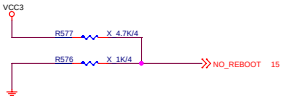
0 : LPC
1 : eSPI

Internal pull-down 20K is disabled after RSMRST

Reserved



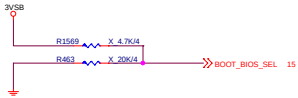
No Reboot



0 : DISABLE (Default)
1 : ENABLE

Internal pull-down 20K is disabled after PLTRST#

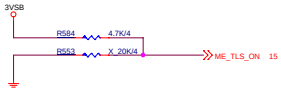
Boot BIOS



0 : SPI
1 : LPC

Internal pull-down 20K is disabled after PLTRST

AMT and SBA with confidentiality

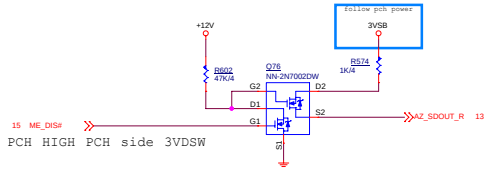


0 : DISABLE
1 : ENABLE (Default)

Internal pull-down 20K is disabled after RSMRST

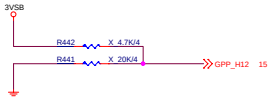
HDA_SDO

ME flash by GPIO



PCH HIGH PCH side 3VDSW

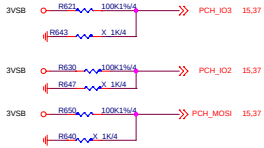
ESPI FLASH SHARING MODE



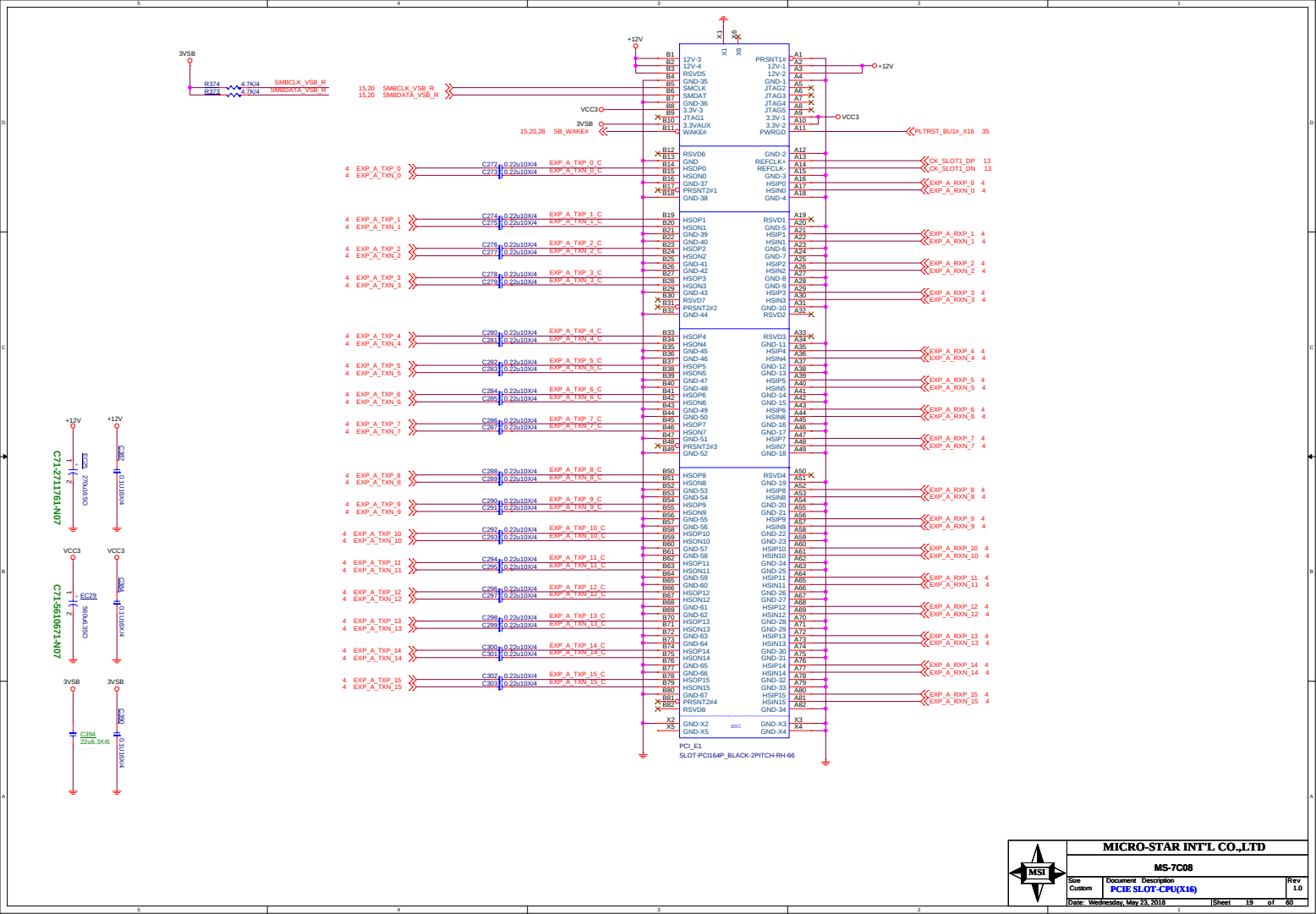
0 : MASTER ATTACHED FLASH SHARING
1 : SLAVE ATTACHED FLASH SHARING

Internal pull-down 20K is disabled after RSMRST

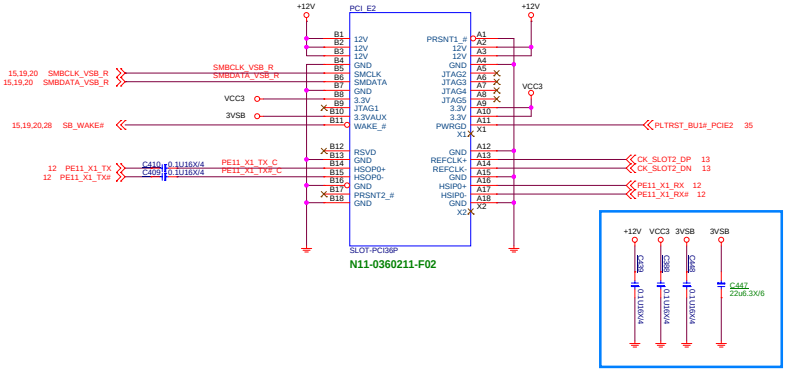
Reserved



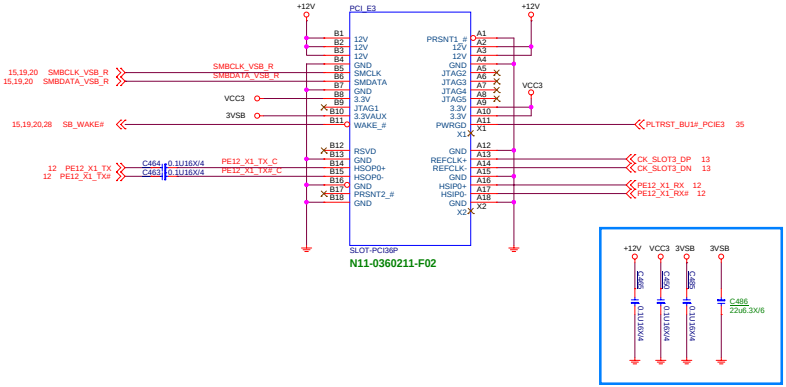
MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7C08	
Size: Custom	Document Description: PCH-Strap	Rev: 1.0
Date: Wednesday, May 23, 2018	Sheet 18 of 60	



MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7C08	
Size: Custom	Document Description: PCIE SLOT-CPU(X16)	Rev: 1.0
Date: Wednesday, May 23, 2018	Sheet 19 of 60	



N11-0360211-F02



N11-0360211-F02

MICRO-STAR INT'L CO.,LTD		
MS-7C08		
Size: Custom	Document Description: PCIE SLOT-PCH(X1)	Rev: 1.0
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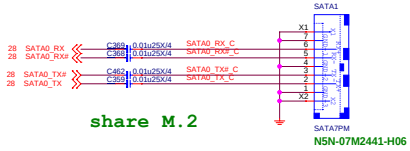
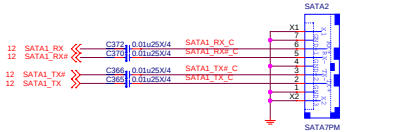
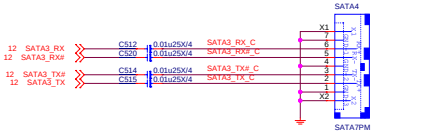
SATA 6G



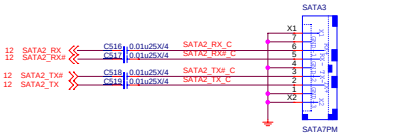
N5N-07M2441-H06



N5N-07M2441-H06

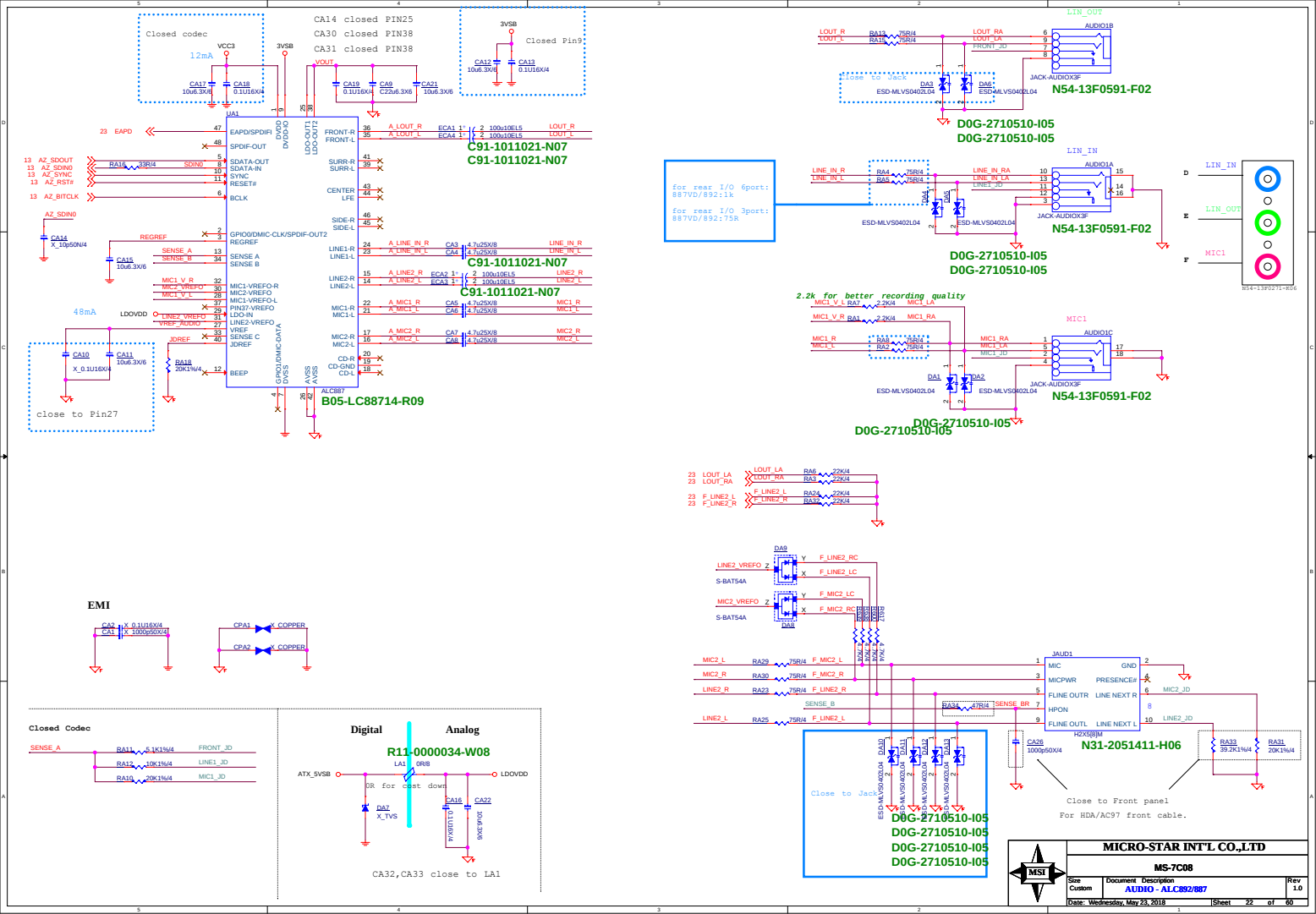


N5N-07M2441-H06



N5N-07M2441-H06

MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7C08	
Size: Custom	Document Description: SATA connector	Rev: 1.0
Date: Wednesday, May 23, 2018	Sheet 21 of 60	


Closed codec
CA14 closed PIN25
CA30 closed PIN38
CA31 closed PIN38
Closed Pin9
12mA
VCC3
3VSB
VOUT
CA17 10u6.3X/6
CA18 0.1U16X/4
CA19 0.1U16X/4
CA9 C22u6.3X/6
CA21 10u6.3X/6
CA12 10u6.3X/6
CA13 0.1U16X/4
UA1
EAPD/SPDIFI
SPDIF-OUT
SDATA-OUT
SDATA-IN
SYNC
RESET#
BCLK
GPIO0/DMIC-CLK/SPDIF-OUT2
REGREF
SENSE A
SENSE B
MIC1-VREFO-R
MIC2-VREFO
MIC1-VREFO-L
PIN37-VREFO
LDO-IN
LINE2-VREFO
VREF
SENSE C
JDREF
BEEP
GPIO1/DMIC-DATA
DVSS
AVDD
AVSS
ALC887
FRONT-R
FRONT-L
SURR-R
SURR-L
CENTER
LFE
SIDE-R
SIDE-L
LINE1-R
LINE1-L
LINE2-R
LINE2-L
MIC1-R
MIC1-L
MIC2-R
MIC2-L
CD-R
CD-GND
CD-L
23 EAPD
AZ_SDOUT
AZ_SDIN0
AZ_SYNC
AZ_RST#
AZ_BITCLK
SDIN0
RA16 33R/4
CA14 X_10p50N/4
CA15 10u6.3X/6
48mA
LDOVDD
CA10 X_0.1U16X/4
CA11 10u6.3X/6
JDREF
RA18 20K1%/4
close to Pin27
C91-1011021-N07
C91-1011021-N07
C91-1011021-N07
C91-1011021-N07
B05-LC88714-R09
EMI
CA2 X_0.1U16X/4
CA1 X_1000p50X/4
CPA1 X_COPPER
CPA2 X_COPPER
Closed Codec
SENSE_A
RA11 5.1K1%/4
RA12 10K1%/4
RA10 20K1%/4
FRONT_JD
LINE1_JD
MIC1_JD
Digital
Analog
R11-0000034-W08
ATX_5VSB
LA1 0R/8
LDOVDD
OR for cost down
DA7 X_TVS
CA16 10u6.3X/6
CA22 10u6.3X/6
CA32,CA33 close to LA1
LOUT_R
LOUT_L
RA13 75R/4
RA15 75R/4
LOUT_RA
LOUT_LA
FRONT_JD
LINE_OUT
AUDIO1B
Close to Jack
DA3
DA6
ESD-MLVS0402L04
JACK-AUDIOX3F
N54-13F0591-F02
D0G-2710510-I05
D0G-2710510-I05
for rear I/O 6port: 887VD/892:1k
for rear I/O 3port: 887VD/892:75R
LINE_IN_R
LINE_IN_L
RA4 75R/4
RA5 75R/4
LINE_IN_RA
LINE_IN_LA
LINE1_JD
AUDIO1A
DA4
DA5
N54-13F0591-F02
D0G-2710510-I05
D0G-2710510-I05
LIN_IN
LIN_OUT
MIC1
D
E
F
N54-13F0271-K06
2.2k for better recording quality
MIC1_V_L
MIC1_V_R
RA7 2.2K/4
RA1 2.2K/4
MIC1_LA
MIC1_RA
MIC1_R
MIC1_L
RA8 75R/4
RA2 75R/4
MIC1_JD
AUDIO1C
DA1
DA2
N54-13F0591-F02
D0G-2710510-I05
D0G-2710510-I05
23 LOUT_LA
23 LOUT_RA
23 F_LINE2_L
23 F_LINE2_R
RA6 22K/4
RA3 22K/4
RA24 22K/4
RA33 22K/4
DA9
DA8
S-BAT54A
LINE2_VREFO
MIC2_VREFO
F_LINE2_RC
F_LINE2_LC
F_MIC2_LC
F_MIC2_RC
RA26 2K/4
RA27 2K/4
RA28 2K/4
RA32 2K/4
MIC2_L
MIC2_R
LINE2_R
LINE2_L
RA29 75R/4
RA30 75R/4
RA23 75R/4
RA25 75R/4
F_MIC2_L
F_MIC2_R
F_LINE2_R
F_LINE2_L
SENSE_B
RA34 47K/4
SENSE_BR
JAUD1
MIC
GND
MICPWR
PRESENCE#
FLINE OUTR
LINE NEXT R
HPON
FLINE OUTL
LINE NEXT L
MIC2_JD
LINE2_JD
H2X5(8)M
CA26 1000p50X/4
RA33 39.2K1%/4
RA31 20K1%/4
N31-2051411-H06
Close to Jack
DA10
DA11
DA12
DA13
ESD-MLVS0402L04
D0G-2710510-I05
D0G-2710510-I05
D0G-2710510-I05
D0G-2710510-I05
Close to Front panel
For HDA/AC97 front cable.
MICRO-STAR INT'L CO.,LTD
MS-7C08
Size Custom
Document Description
AUDIO - ALC892/887
Rev 1.0
Date: Wednesday, May 23, 2018
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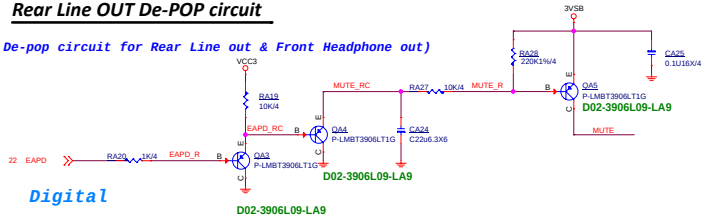
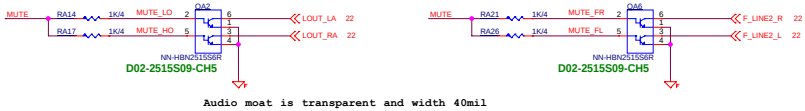
Rear Line OUT De-POP circuit

De-pop circuit for Rear Line out & Front Headphone out)



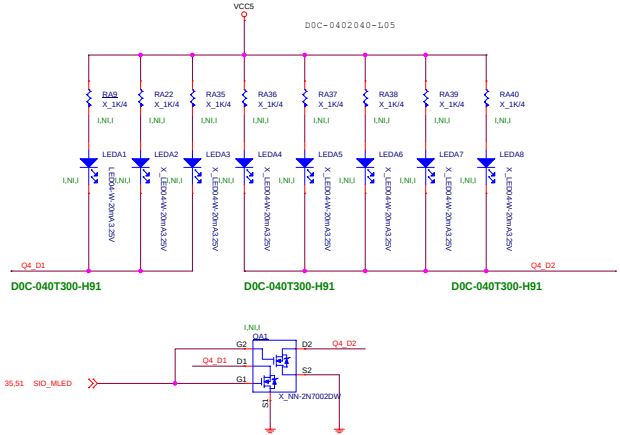
Digital

Analog



Audio moat is transparent and width 40mil

Audio LED



MSI	MICRO-STAR INT'L CO.,LTD		
	MS-7C08		
Size: Custom	Document Description: AUDIO - depop circuit		Rev: 1.0
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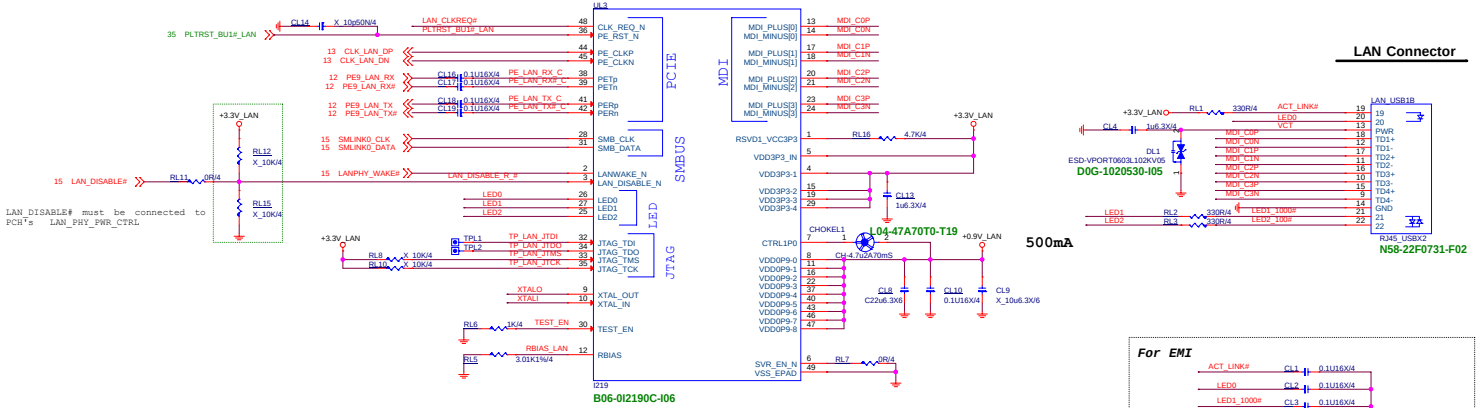
Intel Lan- I219

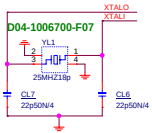


B06-0I2190C-I06

LAN Connector

N58-22F0731-F02

PCH's PCIECLKRQ<n> port mustbe mapped to PCH's PET/R<n+1>port.
If CLK_REQ_N is not used, pin48 is pulled up 10KR to 3.3V_LAN

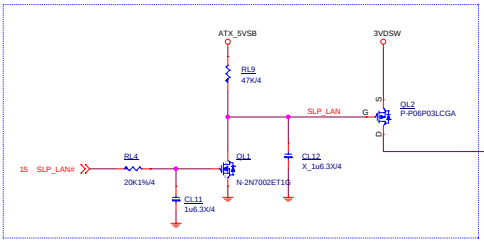


D04-1006700-F07

AVL:D04-1005700-SC6

The 10Kohm pull-up resistor (RL18) of CLK_REQ_N is connected to 3.3V Suspend/Core/etc. power well, depending on the power well of PCH's input PCIECLKRQ<n> buffer.

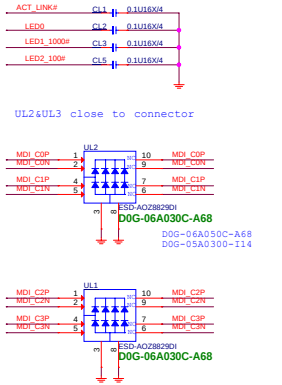
support WOL from Deep Sx:
Power source from 3VA (DSW power) & make sure MAX current is enough to support i218/i219.



+3.3V_LAN
I219:542mW

Note:These caps closed to PHY

For EMI



MICRO-STAR INT'L CO.,LTD		
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Size: Custom	Document Description: LAN - I219	Rev: 1.0
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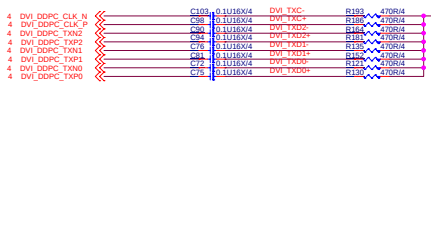
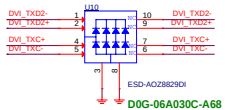
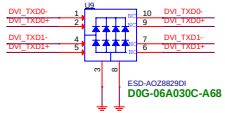
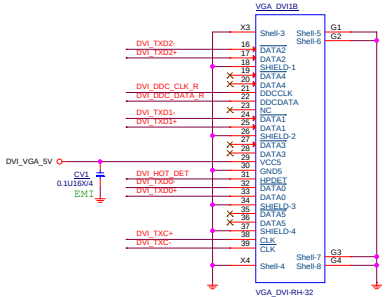
DVI level shifter

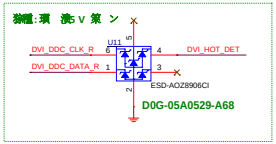
VGA: resolution of 2048x1536 pixels with 32-bit color at 75 Hz (4:3 QXGA)

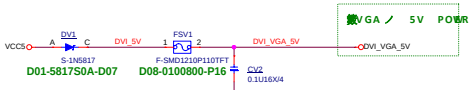




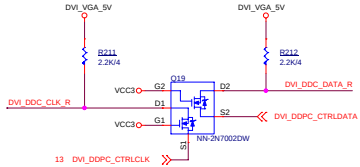




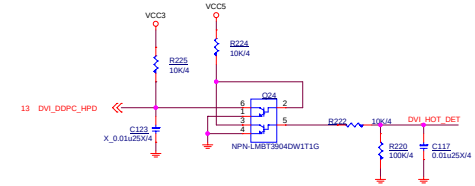


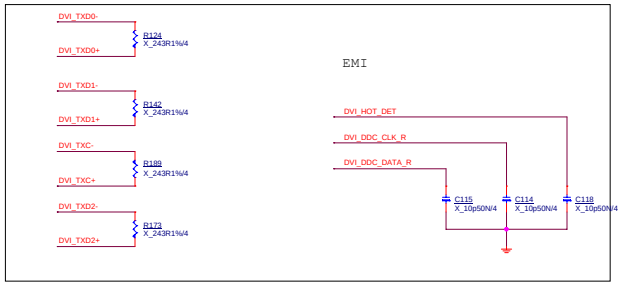


LEVEL SHIFT using I2C Repeater



HPD





MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7C08	
Size: Custom	Document Description: DVI	Rev: 1.0
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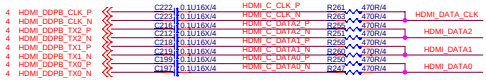
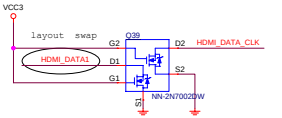
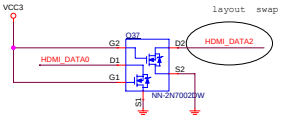
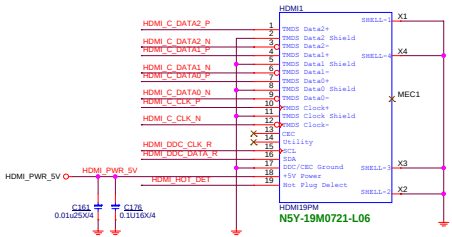
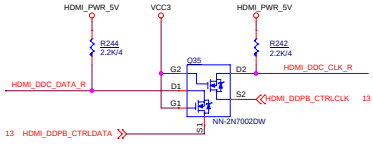
HDMI, DVI : 1920x1200 at 60 Hz (16:10 WUXGA)

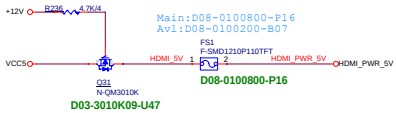


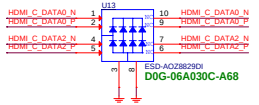


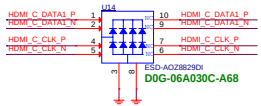


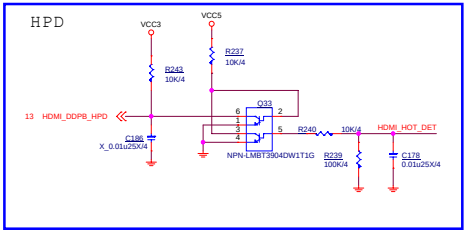


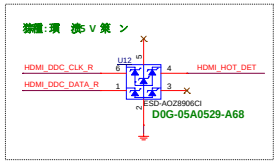


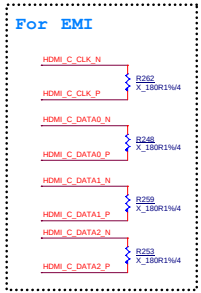












MICRO-STAR INT'L CO.,LTD

MS-7C08

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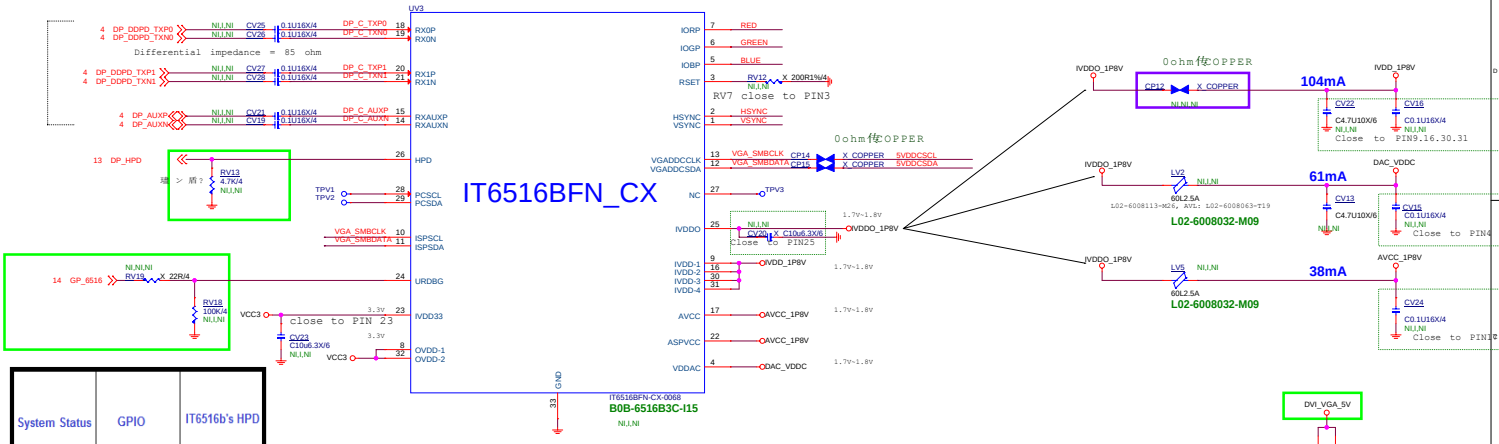
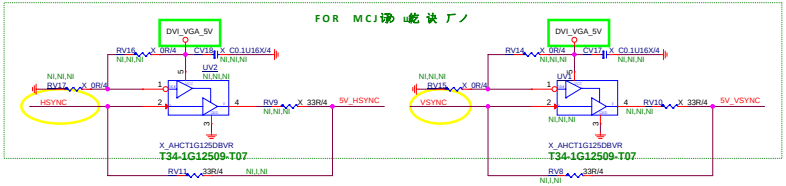
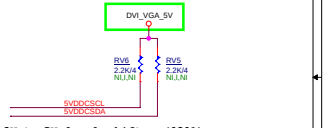
Note:

If connect to eDP port,must confirm whether it support hot plug detection HPD and re-auxtraining



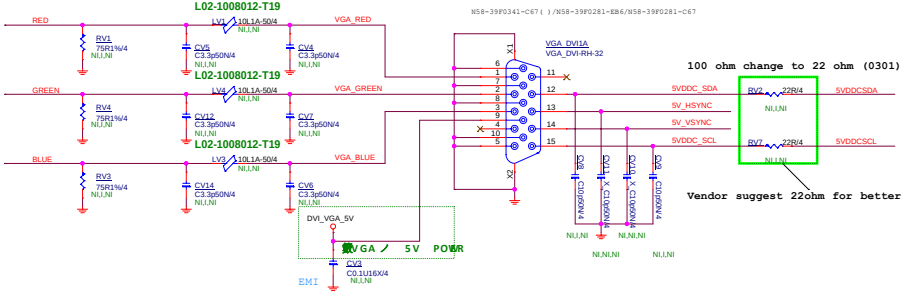
System Status	GPIO	IT6516b's HPD
Legacy Mode (VBIOS) /DOS MOde	HIGH	Force HIGH
Windows /UEFI Mode (GOP)	LOW	Depend on VGA device's plug/unplug





remove 3.3V-to-5V level shifter (0301)

If have VSIS1.2 SPEC requset,can change bead to L02-2208012-M09 use, It test pass.



Schematic Cfg	Project	
CFG1-7B38-H310 (H310M Gaming)	X	A
CFG1-7B38-H310-APRO (H310-A Pro)	V	B

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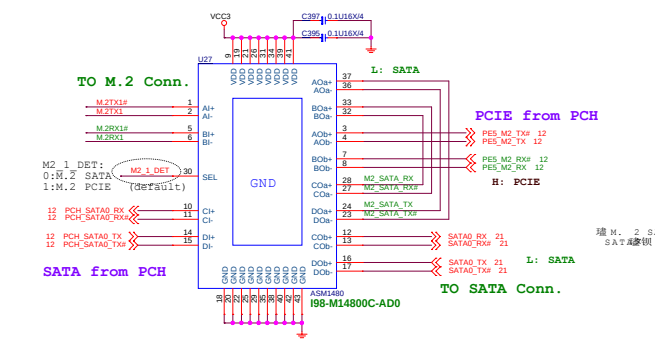
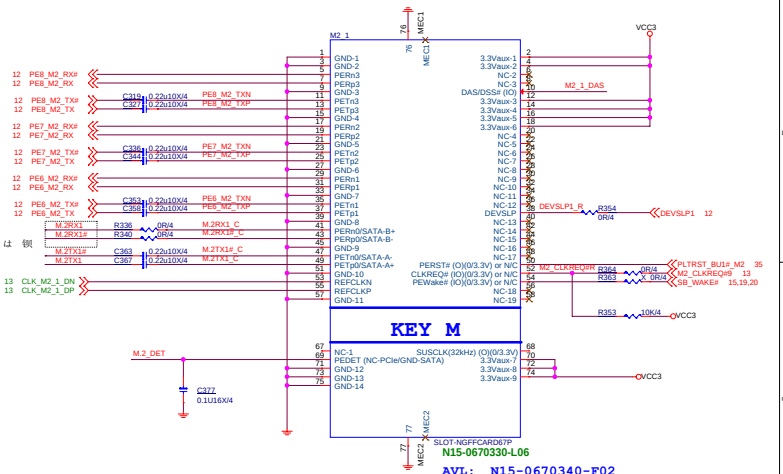
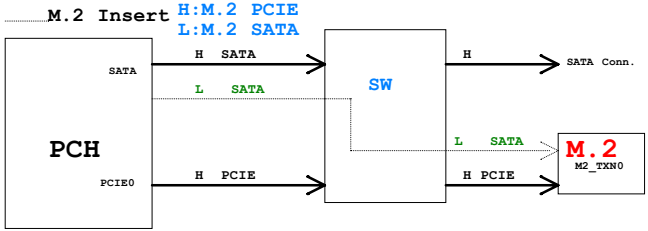
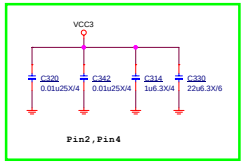
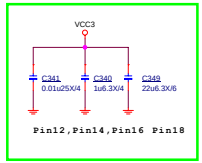
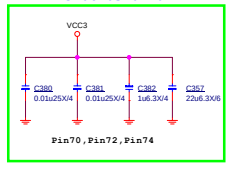


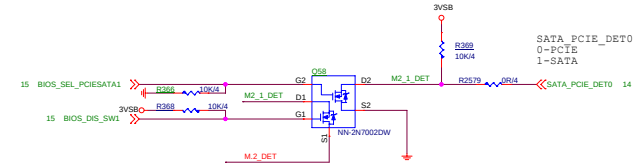






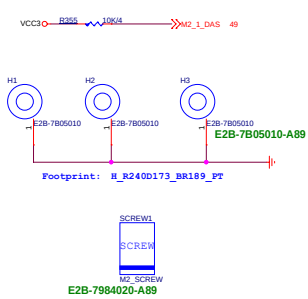






GPP_H14 GPP_H13 **BIOS_MODE**

BIOS_DIS_SW1	BIOS_SEL_PCIESATA1	Mode
0	1	M2-SATA
0	0	M2-PCIE
GPI	GPI	AUTO



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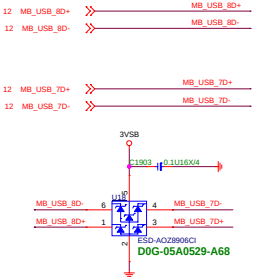
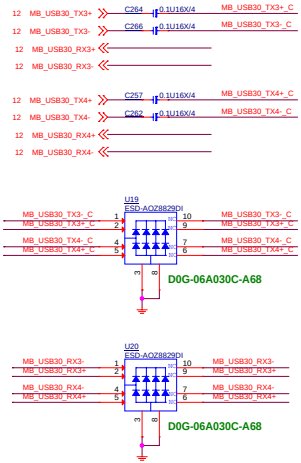
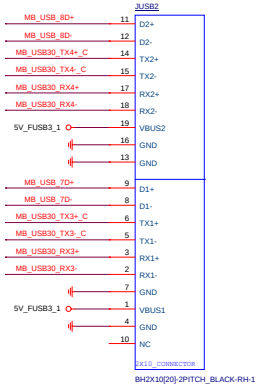
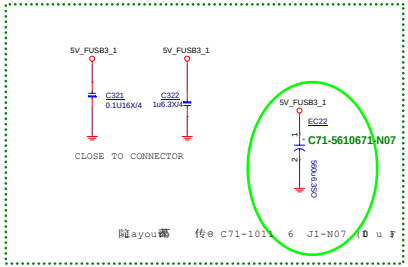
Front JUSB3 port 7,8









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MS-7C08		
Size: Custom	Document Description: Front USB3.0 Connector	Rev: 1.0
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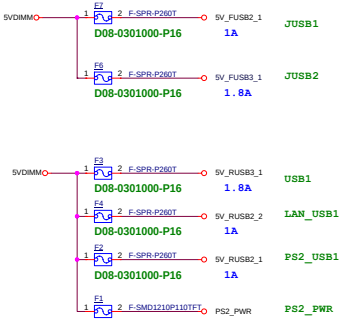
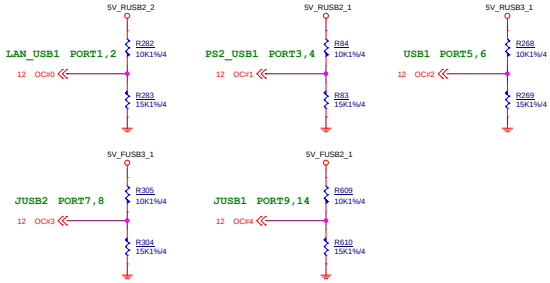
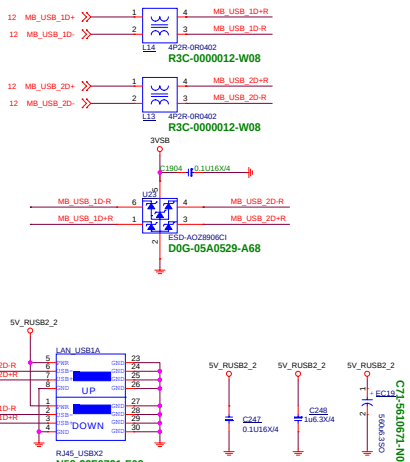


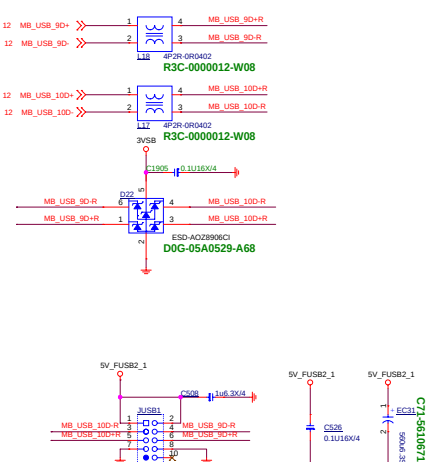


USB CONN	USB POWER	PCH PORT	OC# SIGNAL
LAN_USB1	5V_RUSB2_2	Port1,2	OC#0
PS2_USB1	5V_RUSB2_1	Port3,4	OC#1
USB1	5V_RUSB3_1	Port5,6	OC#2
JUSB2	5V_FUSB3_1	Port7,8	OC#3
JUSB1	5V_FUSB2_1	Port9,14	OC#4

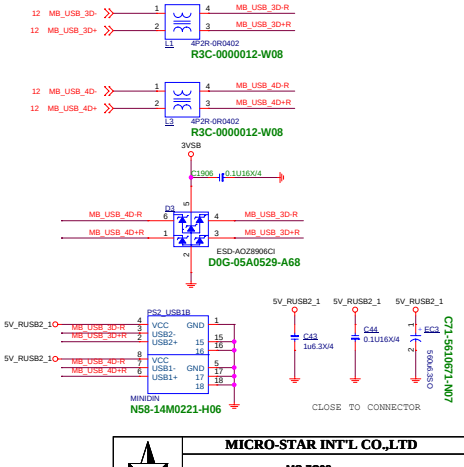
Rear USB1 port 1,2



JUSB1 PORT 9,14



PS2_USB1 PORT 3,4



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Custom	USB2.0 Connector	1.0

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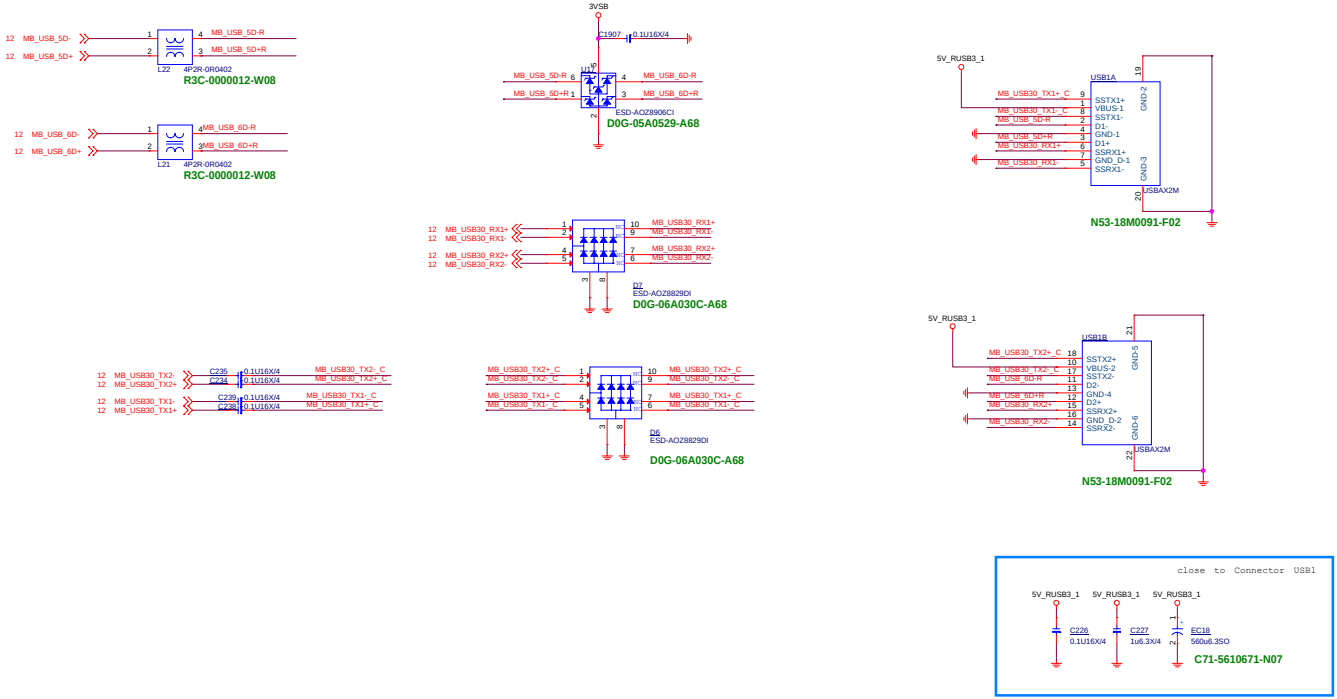
REAR USB1 Connect



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	MS-7C08	
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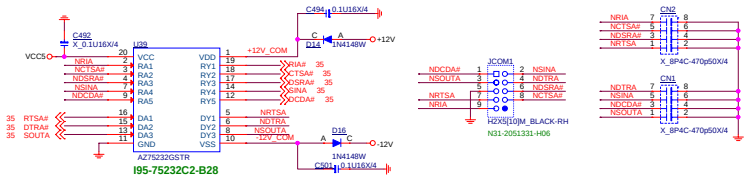
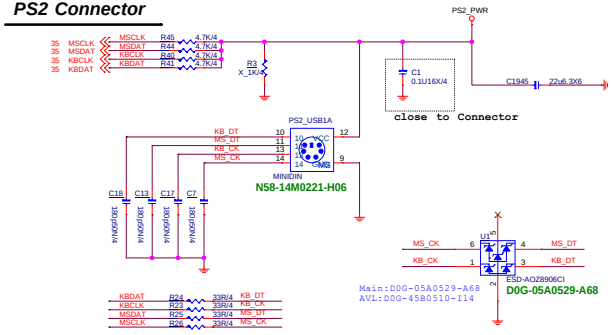
SERIAL PORT 1



PS2 Connector



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MS-7C08		
Size: Custom	Document Description: SERIAL POR/PS2	Rev: 1.0
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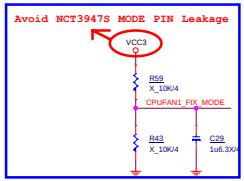
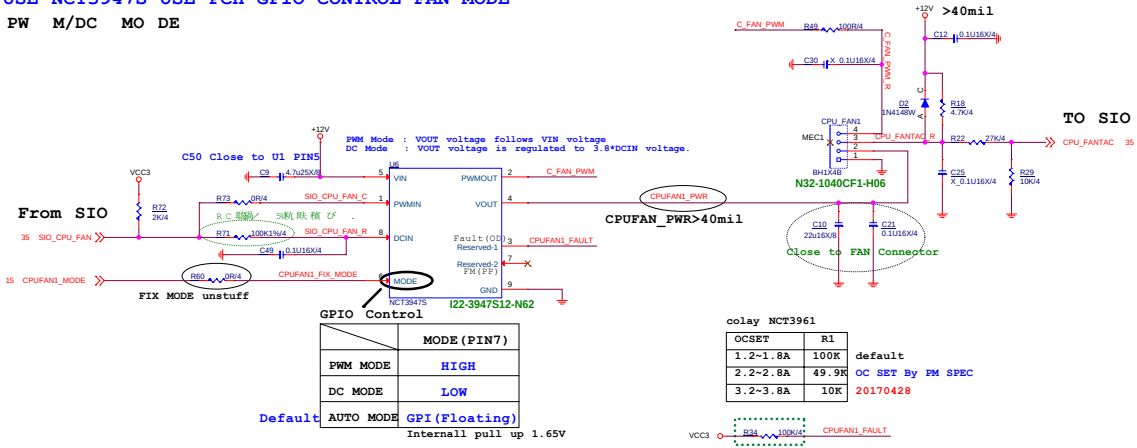
TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE

GPIO パB8 ち传 PW M/DC MO DE





MICRO-STAR INT'L CO.,LTD		
MS-7C08		
Size: Custom	Document Description: CPU FAN	Rev: 1.0
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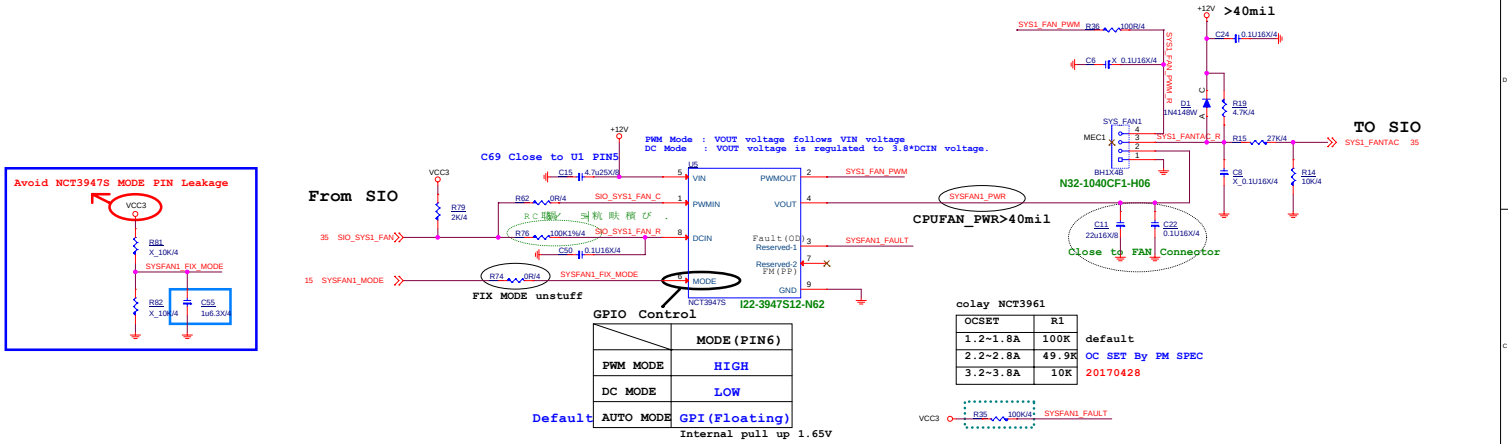
TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE



	MODE(PIN6)
PWM MODE	HIGH
DC MODE	LOW
Default AUTO MODE	GPI(Floating)

OCSET	R1	
1.2~1.8A	100K	default
2.2~2.8A	49.9K	OC SET By PM SPEC
3.2~3.8A	10K	20170428

Internal pull up 1.65V

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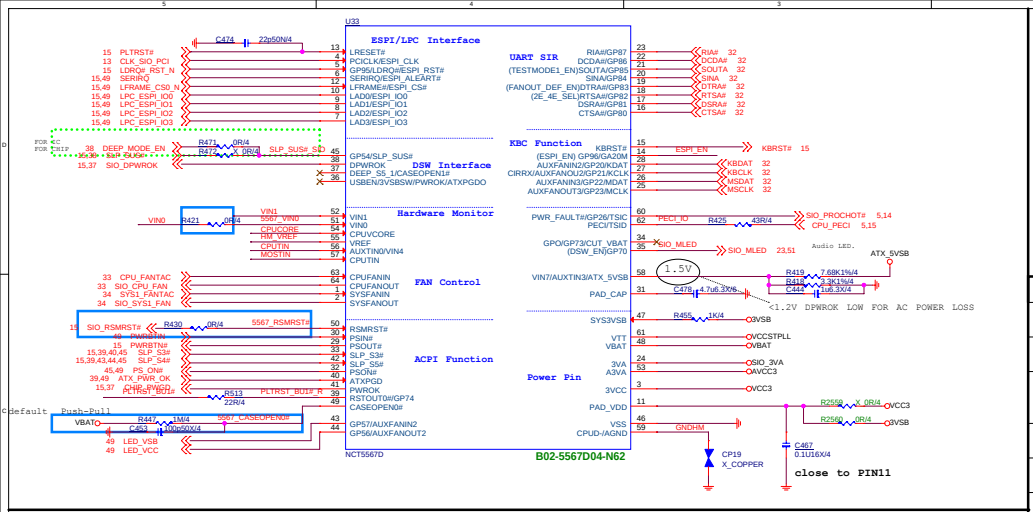
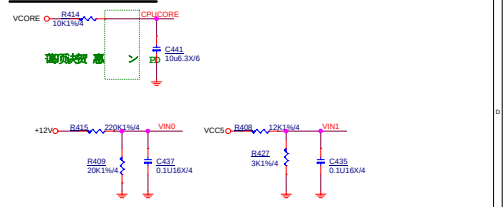
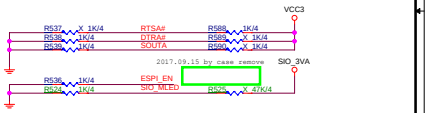


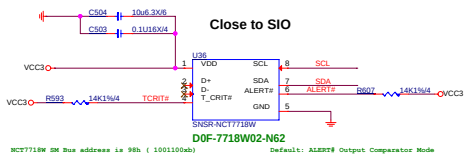
HW Monitor - Voltage

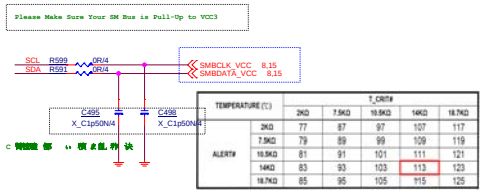


PIN	5567D NAME	Circuit NAME	0	1
18	2E_4E_SEL	RTSA#	I/O ADDRESS 2E	I/O ADDRESS 4E
19	FANOUT_DEF_EN	DTRA#	CPU FANOUT default RPM 50%.	CPU FANOUT default RPM 100%
21	TESTMODE1_EN	SOUTA	DISABLE TEST1MODE	ENABLE TEST1MODE
14	ESPI_EN	GA20M	ENABLE LPC	ENABLE ESPI
35	DSW_EN	DSW_EN	DISABLE	ENABLE DSW_EN

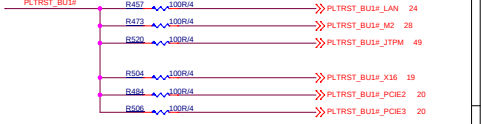


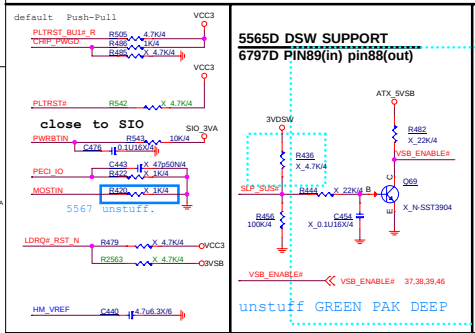
NCT7718W

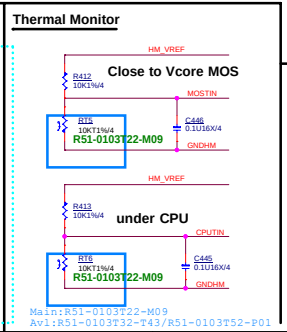


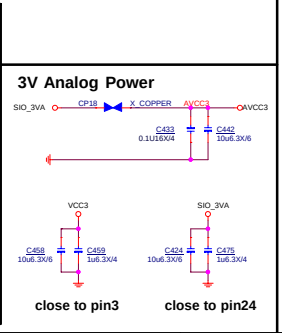


need near SIO









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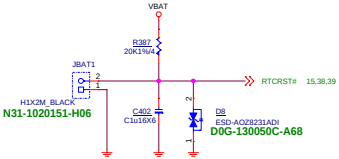
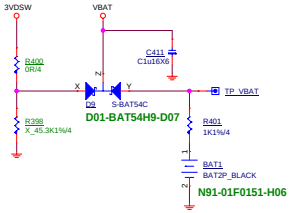
Cut VBAT



VBAT



MSI	MICRO-STAR INT'L CO.,LTD	
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Size: Custom	Document Description: CUT VBAT circuit	Rev: 1.0
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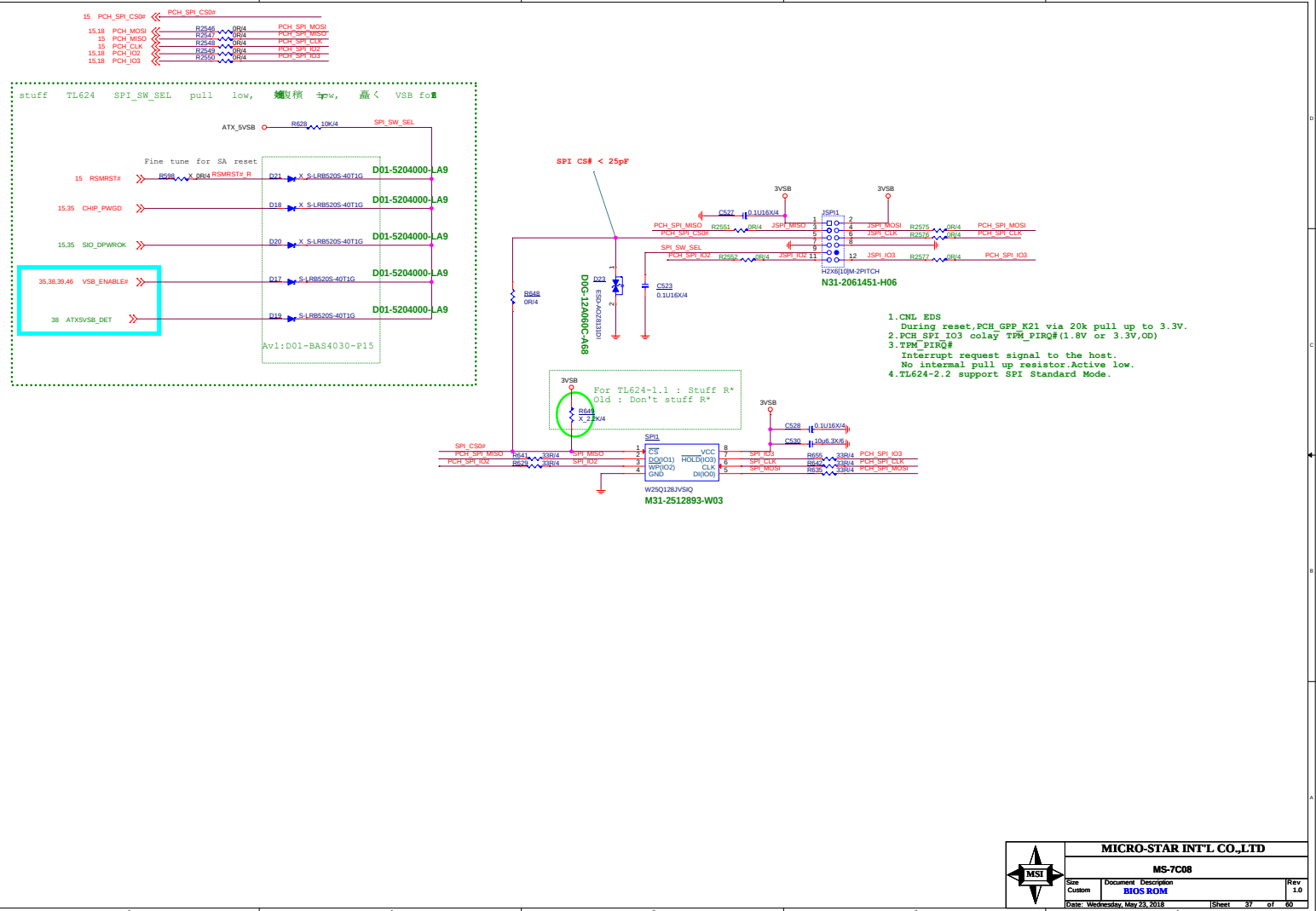
15 PCH_SPI_CS0#
PCH_SPI_CS0#
15,18 PCH_MOSI R2546 0R/4 PCH_SPI_MOSI
15 PCH_MISO R2547 0R/4 PCH_SPI_MISO
15 PCH_CLK R2548 0R/4 PCH_SPI_CLK
15,18 PCH_IO2 R2549 0R/4 PCH_SPI_IO2
15,18 PCH_IO3 R2550 0R/4 PCH_SPI_IO3
stuff TL624 SPI_SW_SEL pull low,
ATX_5VSB R628 10K/4 SPI_SW_SEL
Fine tune for SA reset
15 RSMRST# R598 X 0R/4 RSMRST#_R
15,35 CHIP_PWGD
15,35 SIO_DPWROK
35,38,39,46 VSB_ENABLE#
38 ATX5VSB_DET
D21 X_S-LRB520S-40T1G
D18 X_S-LRB520S-40T1G
D20 X_S-LRB520S-40T1G
D17 S-LRB520S-40T1G
D19 S-LRB520S-40T1G
D01-5204000-LA9
Av1:D01-BAS4030-P15
SPI CS# < 25pF
3VSB
C527 0.1U16X/4
PCH_SPI_MISO R2551 0R/4 JSPI_MISO
PCH_SPI_CS0#
SPI_SW_SEL
PCH_SPI_IO2 R2552 0R/4 JSPI_IO2
JSPI1
JSPI_MOSI R2575 0R/4 PCH_SPI_MOSI
JSPI_CLK R2578 0R/4 PCH_SPI_CLK
JSPI_IO3 R2577 0R/4 PCH_SPI_IO3
H2X6[10]M-2PITCH
N31-2061451-H06
D23
DDG-12A060C-A68
C523 0.1U16X/4
R648 0R/4
1.CNL EDS
During reset,PCH_GPP_K21 via 20k pull up to 3.3V.
2.PCH_SPI_IO3 colay TPM_PIRQ#(1.8V or 3.3V,OD)
3.TPM_PIRQ#
Interrupt request signal to the host.
No intermal pull up resistor.Active low.
4.TL624-2.2 support SPI Standard Mode.
For TL624-1.1 : Stuff R*
Old : Don't stuff R*
R649 X_ZJ/4
SPI1
SPI_CS0#
PCH_SPI_MISO R641 33R/4 SPI_MISO
PCH_SPI_IO2 R629 33R/4 SPI_IO2
CS
DO(IO1)
WP(IO2)
GND
VCC
HOLD(IO3)
CLK
DI(IO0)
SPI_IO3
SPI_CLK
SPI_MOSI
R655 33R/4 PCH_SPI_IO3
R642 33R/4 PCH_SPI_CLK
R639 33R/4 PCH_SPI_MOSI
C528 0.1U16X/4
C530 10u6.3X/6
W25Q128JVSIQ
M31-2512893-W03
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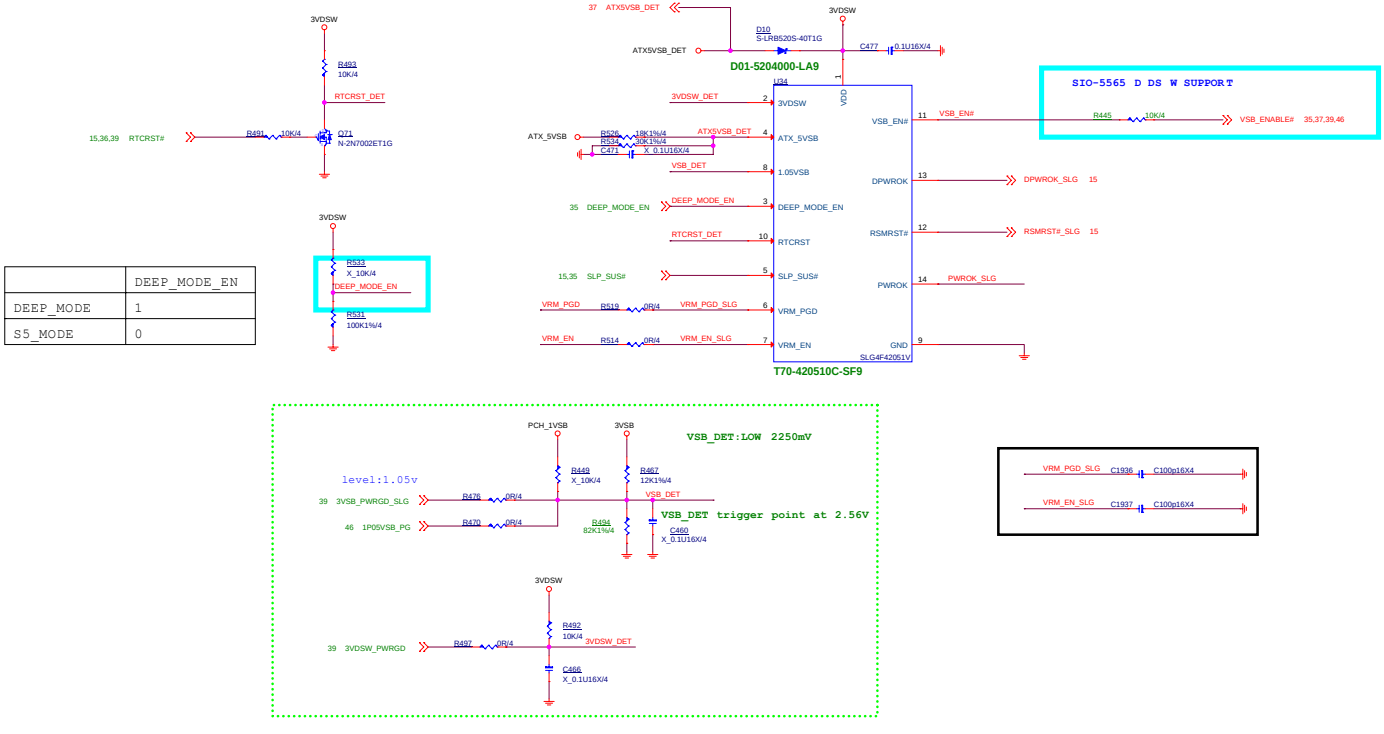

	DEEP_MODE_EN
DEEP_MODE	1
S5_MODE	0

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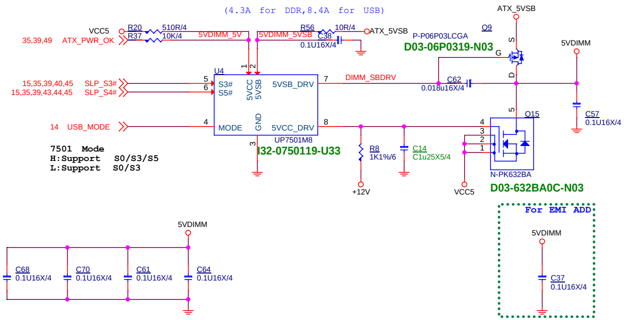
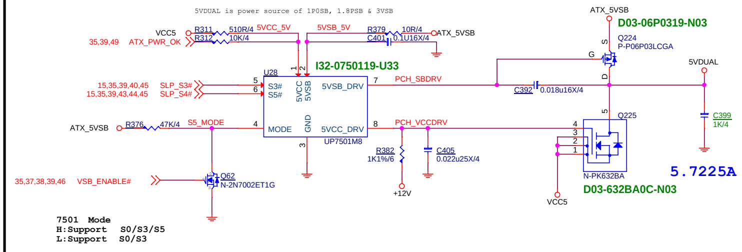
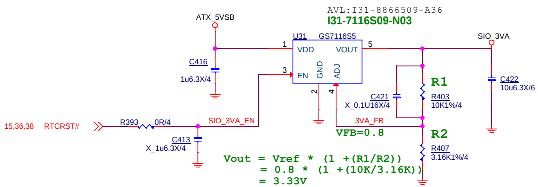
5VDIMM@5V/11.3075A



5VDUAL@5V/5.7225A



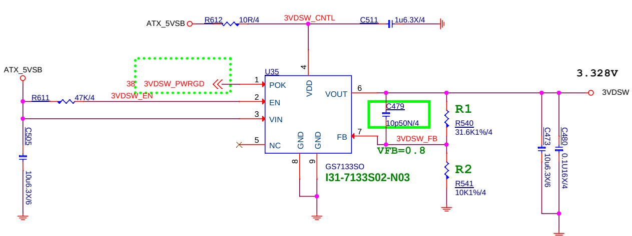
SIO_3VA@3.3V/20mA



3VDSW@3.3V/0.3A

I n t e l   L a n   い ノ   耷 C   成A利丁籮積郇

113mA(PCH)+0.6mA(RTC)+200mA(LAN-I219)+SIO

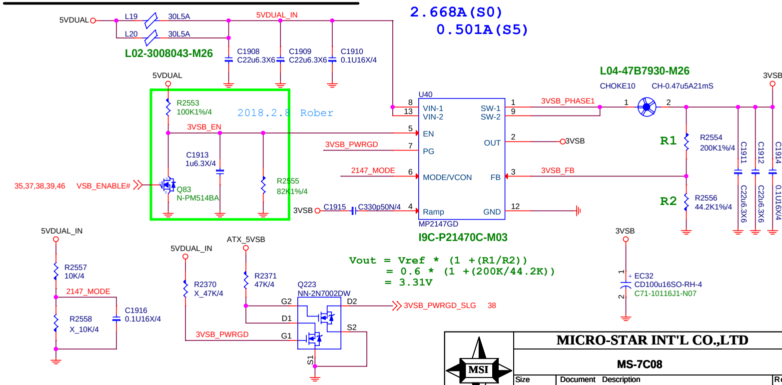


Vout = Vref * (1 +(R1/R2))
= 0.8 * (1 +(31.6K/10K))
= 3.328V

3VSB cost down@3.3V/3.281A

2.253A(PCH)+0.415A(PE SLOT*3)

2.668A(S0)
0.501A(S5)



Vout = Vref * (1 +(R1/R2))
= 0.6 * (1 +(200K/44.2K))
= 3.31V

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VCORE Iccmax 138A,TDC 91A.
VGT Iccmax 45A,TDC 30A.

Sensor POR min 2V

SLP_S3# assertion to IMVP VRM_EN deassertion max:1us

0LL_EN:
Zero load-line function setting.
Connect to 5V can enable 0LL function.

VCORE Default VR_HOT 120 . ALERT 110 .
ALERT 97 .

VOFS=0.4*(VOFSM-1.7)
-500mV≤VOFS≤2590mV .
Disable offset function,OFSM Pin to GND.

I32-3607B0C-R11

SET1:Iccmax:134A,OCP:160%*Iccmax,DVID 61mV
SETA1:Iccmax:48A,OCP:160%*Iccmax,DVID 39.7mV

SET1 control ICCMAX,OCP setting
SET2 control Internal compensation
SET3 control VR address
SETA1 control ICCMAX,OCP setting
SETA2 control Internal compensation

close to phase1 CHOKE

close to phase1 CHOKE

R2
Default 8.55K

R1
Default 274.32K

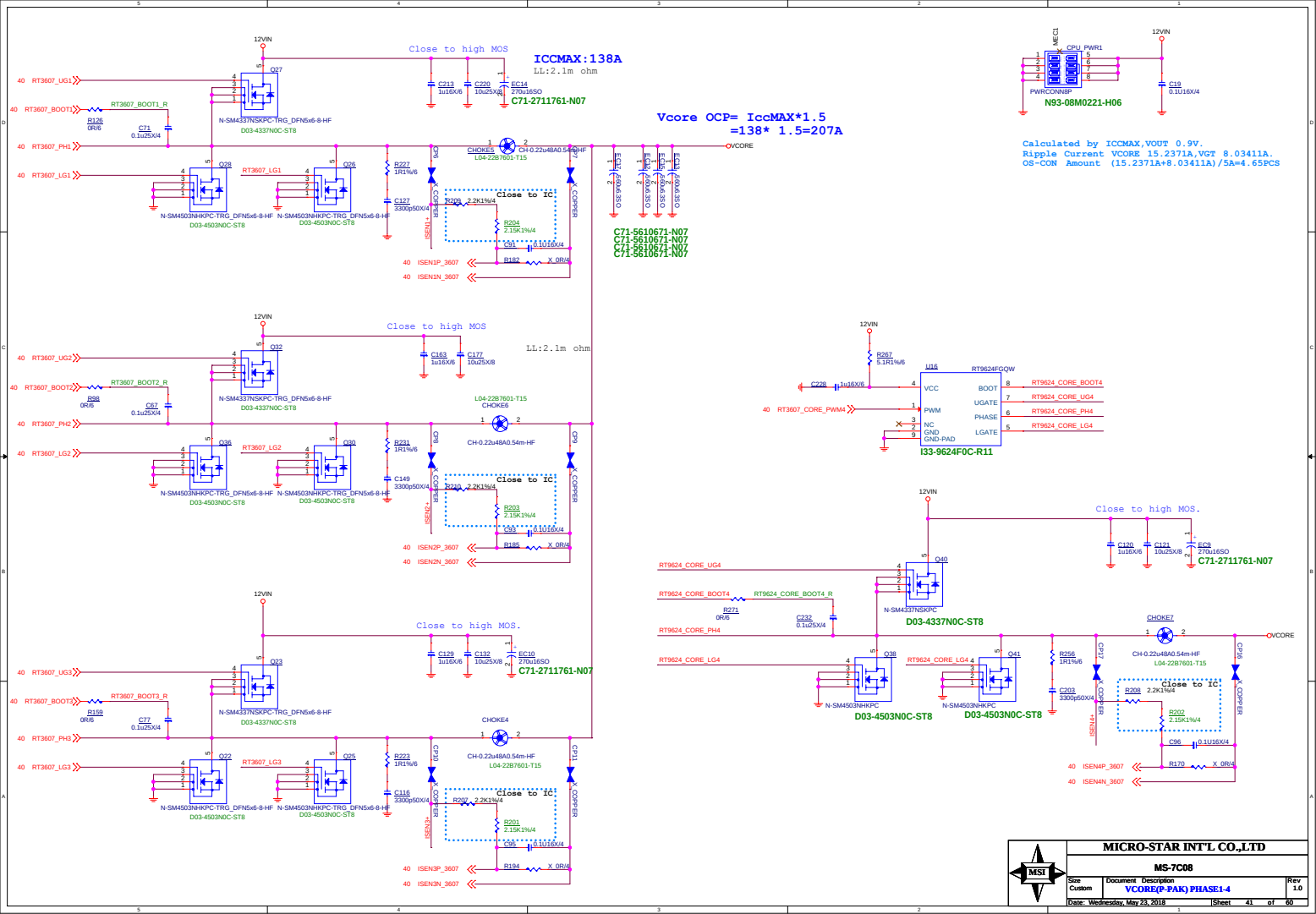
2017/07/31
Add ESD protection.
Close to J1

Jumper insert,VCORE/VGT 0.8V.

VCORE Thermal Protection Table

GPP_D16	R1	R2	Thermal Alert#	VR_HOT#	SIO_PROCHOT#
GPI(1)	112.42K	11.35K	106	NC	115
GPI(0) Default	274.32K	8.56K	97	NC	115

MICRO-STAR INT'L CO.,LTD
MS-7C08
Size: Custom | Document Description: PWM-RT3607BC | Rev: 1.0
Date: Wednesday, May 23, 2018 | Sheet 40 of 60


Close to high MOS
ICCMAX:138A
LL:2.1m ohm
C71-2711761-N07
Vcore OCP= IccMAX*1.5
=138* 1.5=207A
Calculated by ICCMAX,VOUT 0.9V.
Ripple Current VCORE 15.2371A,VCT 8.03411A.
OS-CON Amount (15.2371A+8.03411A)/5A=4.65PCS
N93-08M0221-H06
C71-5610671-N07
C71-5610671-N07
C71-5610671-N07
C71-5610671-N07
I33-9624F0C-R11
Close to high MOS.
LL:2.1m ohm
Close to IC
MICRO-STAR INT'L CO.,LTD
MS-7C08
VCORE(P-PAK) PHASE1-4
Date: Wednesday, May 23, 2018
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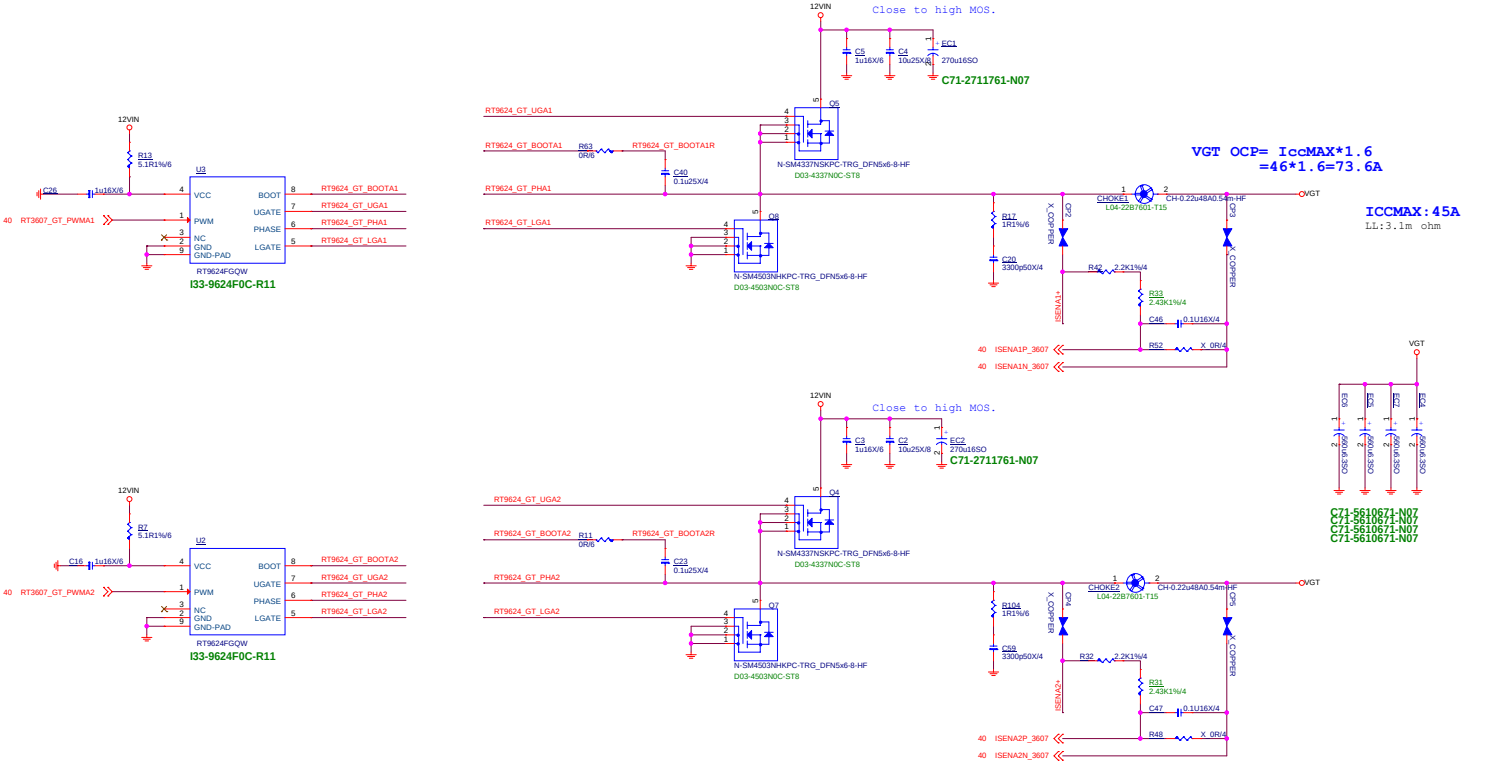


MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7C08	
Size: Custom	Document Description: VGT(P-PAK) PHASE1-2	Rev: 1.0
Date: Wednesday, May 23, 2018	Sheet 42 of 60	

VCC_DDR@1.2V/11.525A

DDR4_1.2V 3.3A+ 7.85A+0.375A=11.525A

3.3A FOR CPU
10A FOR 2DIMM DDR4
0.375A FOR VTT_DDR

D03-632BA0C-N03 3~4.6mohm/4.5V
Current limit= 174K*5uA/3.9mohm)= 22.3A
Current limit= 174K*5uA/5.1mohm)=17.1A
OUTPUT CHOCKE Isat=32A
Vcs=174K*5uA=0.87V(Spec:0.4V~3V)

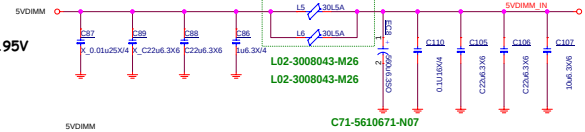
4503 Rdson
10V 2.5~3mohm
4.5V 3.9~5.1mohm

Vout=0.75V/1.65K*(1.65K+1K)=1.204V

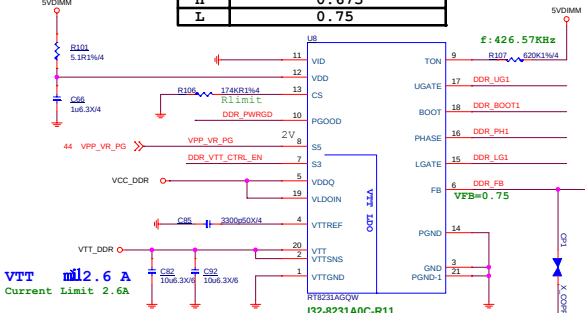
NCT3933 source 10uA
Vout=[VREF*(1+R171/R153)]+10uA*R171
=0.75V*(1+1K/1.65K)+10uA*1K=1.204V+0.010V=1.215V

NCT3933 sink 10uA
Vout=[VREF*(1+R171/R153)]-10uA*R171
=0.75V*(1+1K/1.69K)-10uA*1K=1.204V-0.010V=1.195V

Iin=IOCP*Vout/08/Vin
=22.3A*1.2V/0.8/5V=6.69A
L02-3008043-M26
Over 85 ,Rated Current 1.5A



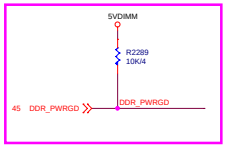
VID	Reference Voltage (V)
H	0.675
L	0.75

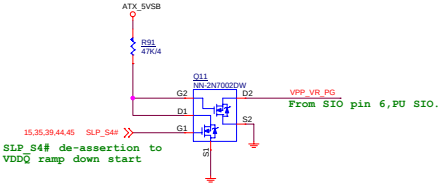


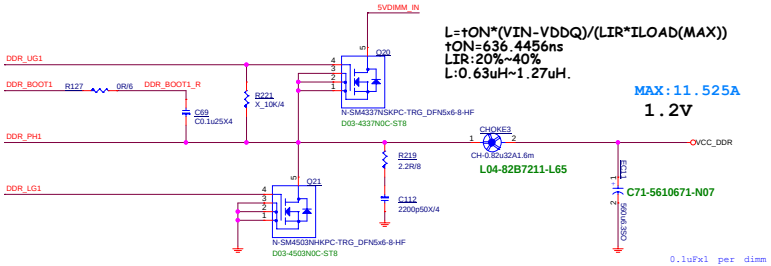
VTT mI2.6 A
Current Limit 2.6A

Vout = Vref * (1 +(R1/R2))
= 0.75 * (1 +(1K/1.65K))
= 1.204V

Irms = Iout * SQRT((Vout/Vin) * (1-(Vout/Vin)))
=11.525 * 0.427
= 4.921A



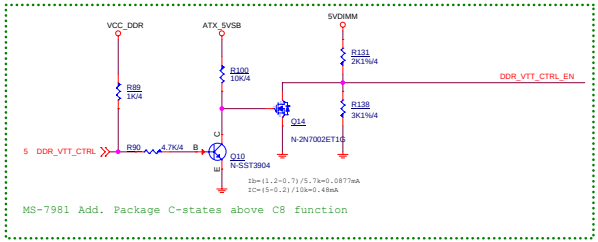




L=tON*(VIN-VDDQ)/(LIR*ILOAD(MAX))
tON=636.4456ns
LIR:20%~40%
L:0.63uH~1.27uH.

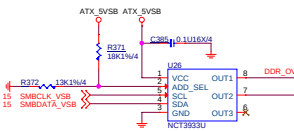
MAX:11.525A
1.2V

VPP ramp down after VDDQ ramp down



UPI VOLTAGE CONSOLE

0x26:RH=18K,RL=13K



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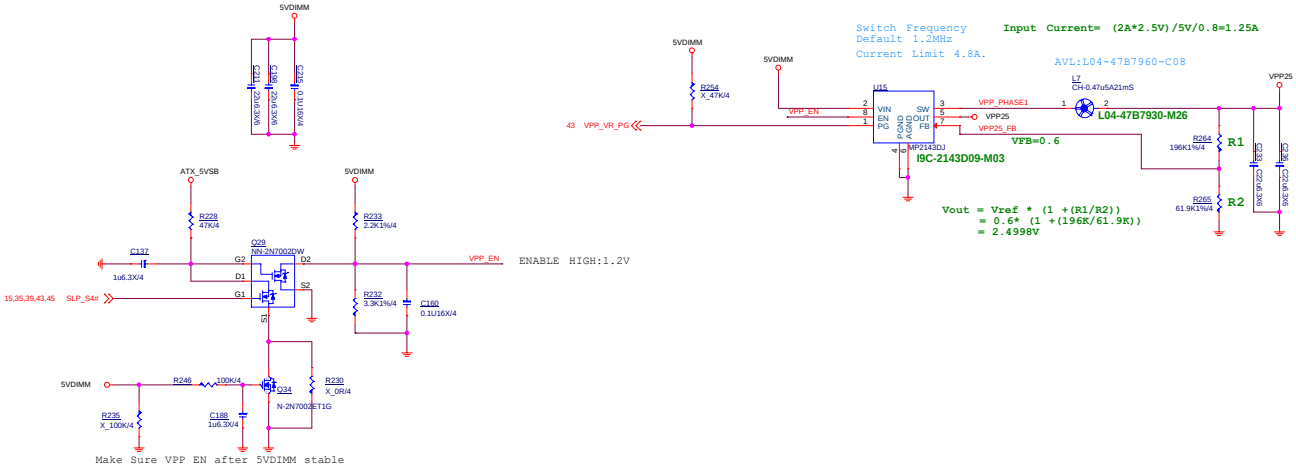
VPP25 @2.5V/2A

2DIMM :1.12A FOR DDR VPP2.5V

DDR VPP mil4.8



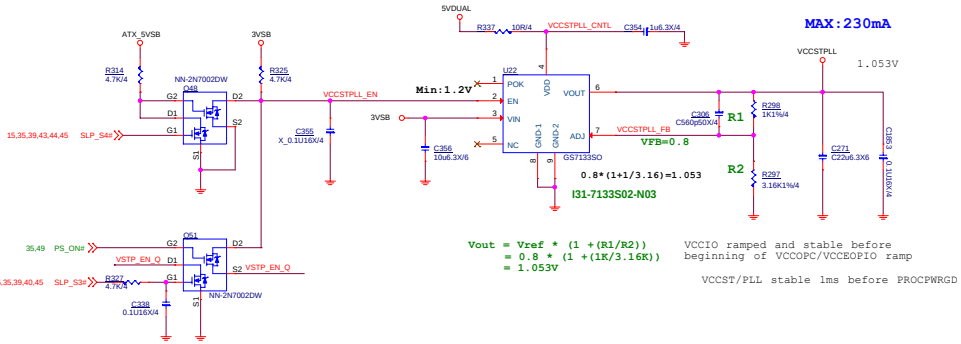
Switch Frequency
Default 1.2MHz
Current Limit 4.8A.

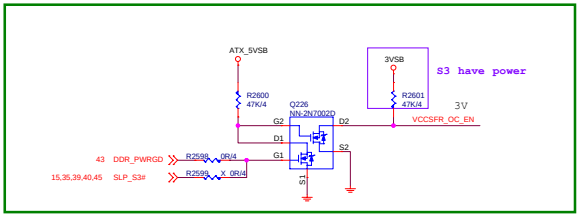
Input Current= (2A*2.5V)/5V/0.8=1.25A

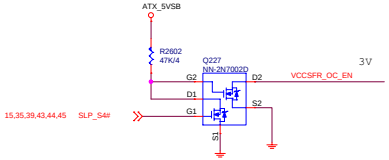
AVL:L04-47B7960-C08

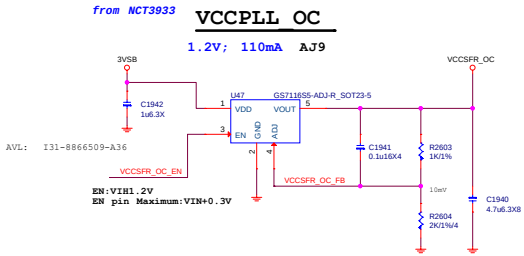
MICRO-STAR INT'L CO.,LTD			
MS-7C08			
Size: Custom	Document Description: DDR-MP2143-VPP25		Rev: 1.0
Date: Wednesday, May 23, 2018	Sheet 44 of 60		

VCCSTPLL@1.05V/230mA









MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7C08	
Size: Custom	Document Description: VCCSTPLL&VCCSFR_OC	Rev: 1.0
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PCH_1VSB@1V/8.72A

4503 Rdson
10V 2.5~3mohm
4.5V 3.9~5.1mohm

Current limit= 6.65K*10uA/3.9mohm)=17.05A
Current limit= 6.65K*10uA/5.1mohm)=13.04A
CHOKE Isat=18A
From CHOKE I-L Curve,when I=25A, L=0.6uH.

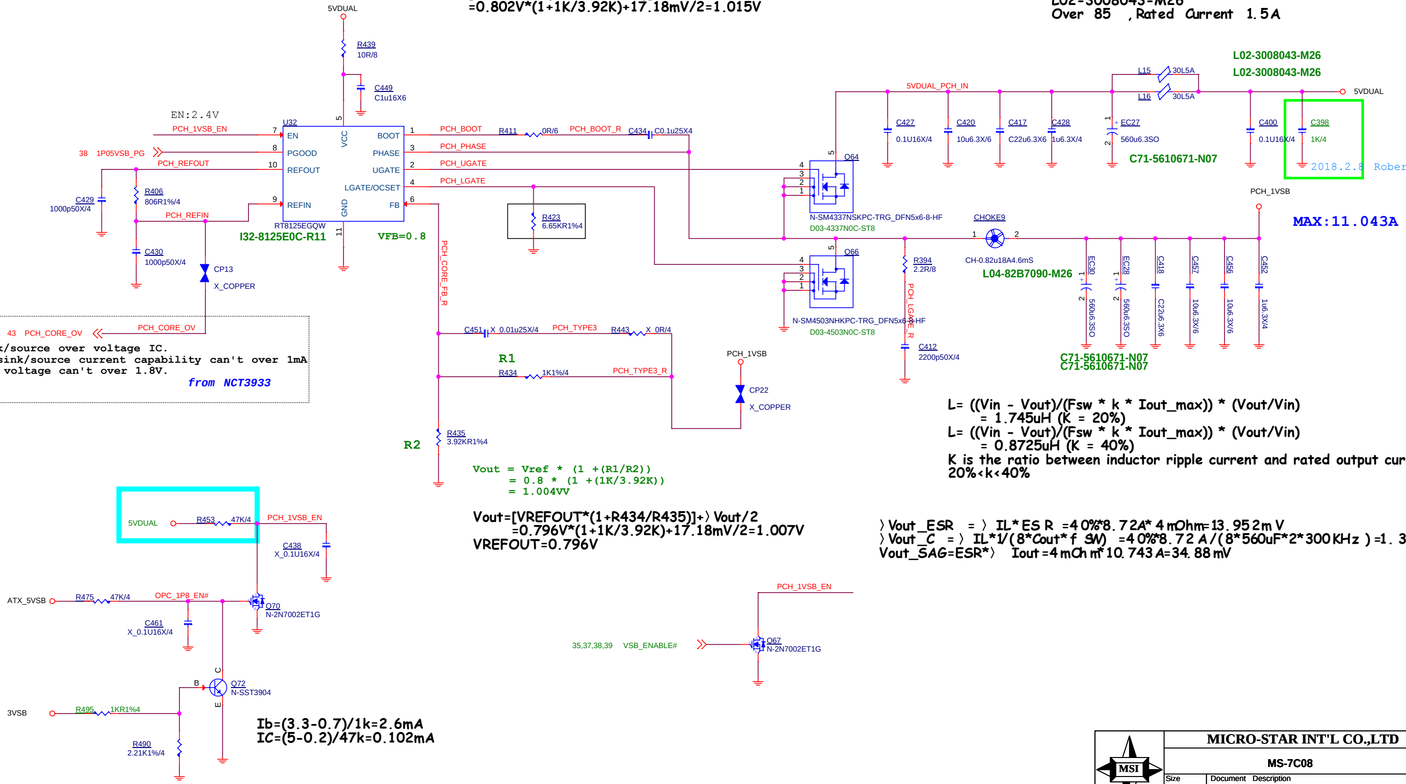
Default Vout=1V

NCT3933 sink 10uA
VREFIN =VREFOUT-10uA*R406=796mV-8mV=788mV
Vout=[VREFOUT*(1+R434/R435)]+〉Vout/2
=0.788V*(1+1K/3.92K)+17.18mV/2=0.997V

NCT3933 source 10uA
VREFIN =VREFOUT+10uA*R407=796mV+8mV=804mV
Vout=[VREFOUT*(1+R434/R435)]+〉Vout/2
=0.802V*(1+1K/3.92K)+17.18mV/2=1.015V

Irms = Iout * SQRT((Vout/Vin) * (1 - (Vout/Vin)))
=8.72 * 0.276
=2.407A

Iin=IOCP*Vout/08/Vin
=17.05A*1.V/0.8/5V=4.2625A
L02-3008043-M26
Over 85 ,Rated Current 1.5A



Vout = Vref * (1 +(R1/R2))
= 0.8 * (1 +(1K/3.92K))
= 1.004VV

Vout=[VREFOUT*(1+R434/R435)]+〉Vout/2
=0.796V*(1+1K/3.92K)+17.18mV/2=1.007V
VREFOUT=0.796V

L= ((Vin - Vout)/(Fsw * k * Iout_max)) * (Vout/Vin)
= 1.745uH (K = 20%)
L= ((Vin - Vout)/(Fsw * k * Iout_max)) * (Vout/Vin)
= 0.8725uH (K = 40%)
K is the ratio between inductor ripple current and rated output current.
20%<k<40%

〉Vout_ESR = 〉 IL*ESR =40%*8.72A*4mOhm=13.952mV
〉Vout_C = 〉 IL*1/(8*Cout*f_SW) =40%*8.72A/(8*560uF*2*300KHz)=1.3mV
Vout_SAG=ESR*〉 Iout=4mOhm*10.743A=34.88mV

Ib=(3.3-0.7)/1k=2.6mA
IC=(5-0.2)/47k=0.102mA

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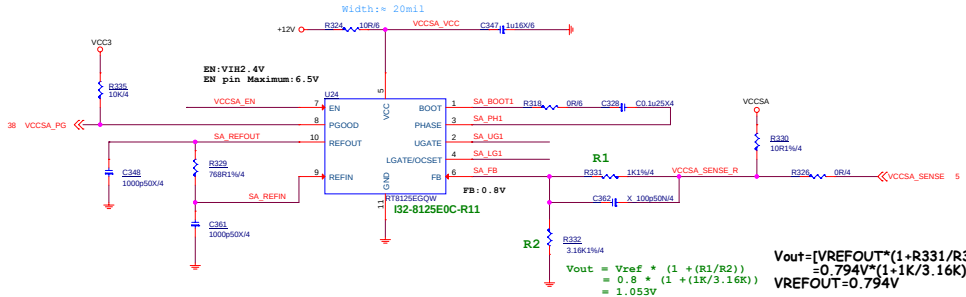
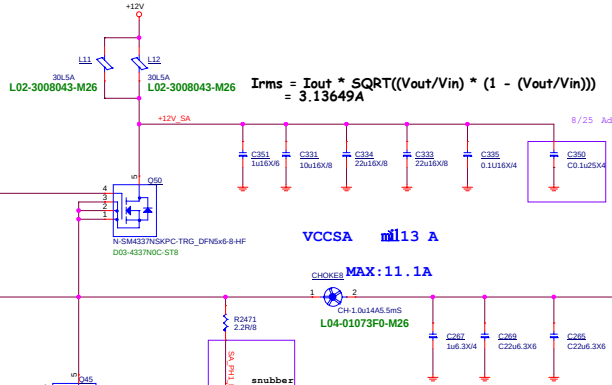
VCCSA@1.05V/11.1A

4503 Rdson
10V 2.5~3mohm
4.5V 3.9~5.1mohm

Current limit= 5.1K*10uA/2.5mohm)=20.4A
Current limit= 5.1K*10uA/3mohm)=17A
CHOKE Isat=17A
From CHOKE I-L Curve,when I=25A, L=0.6uH.



Vout=[VREFOUT*(1+R331/R332)]+) Vout/2
=0.794V*(1+1K/3.16K)+17.76mV/2=1.053V
VREFOUT=0.794V

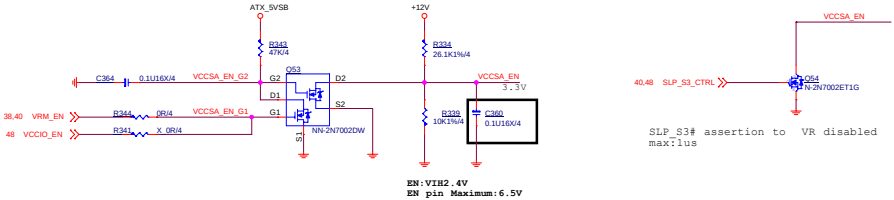


Iin=IOCP*Vout/08/Vin
=20.4A*1.05V/0.8/12V=2.23A
L02-3008043-M26
Over 85 ,Rated Current 1.5A

Lmin = ((Vin - Vout)/(Fsw * k * Iout_max)) * (Vout/Vin)
= 0.5914uH (K = 30%)

L= ((Vin - Vout)/(Fsw * k * Iout_max)) * (Vout/Vin)
= 1.4386uH (K = 20%)
L= ((Vin - Vout)/(Fsw * k * Iout_max)) * (Vout/Vin)
= 0.7193uH (K = 40%)
K is the ratio between inductor ripple current and rated output current.
20%<k<40%

) Vout_ESR =) IL*ESR =40%*11.1A*4mOhm=17.76mV
) Vout_C =) IL*1/(8*Cout*f SW) =40%*11.1A/(8*560uF*2*300KHz) =1.65mV
Vout_SAG=ESR*)Iout=4mCh m*11.1A=44.4mV



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MS-7C08		
Size: Custom	Document Description: VCCSA - POWER NB685GQ	Rev: 1.0
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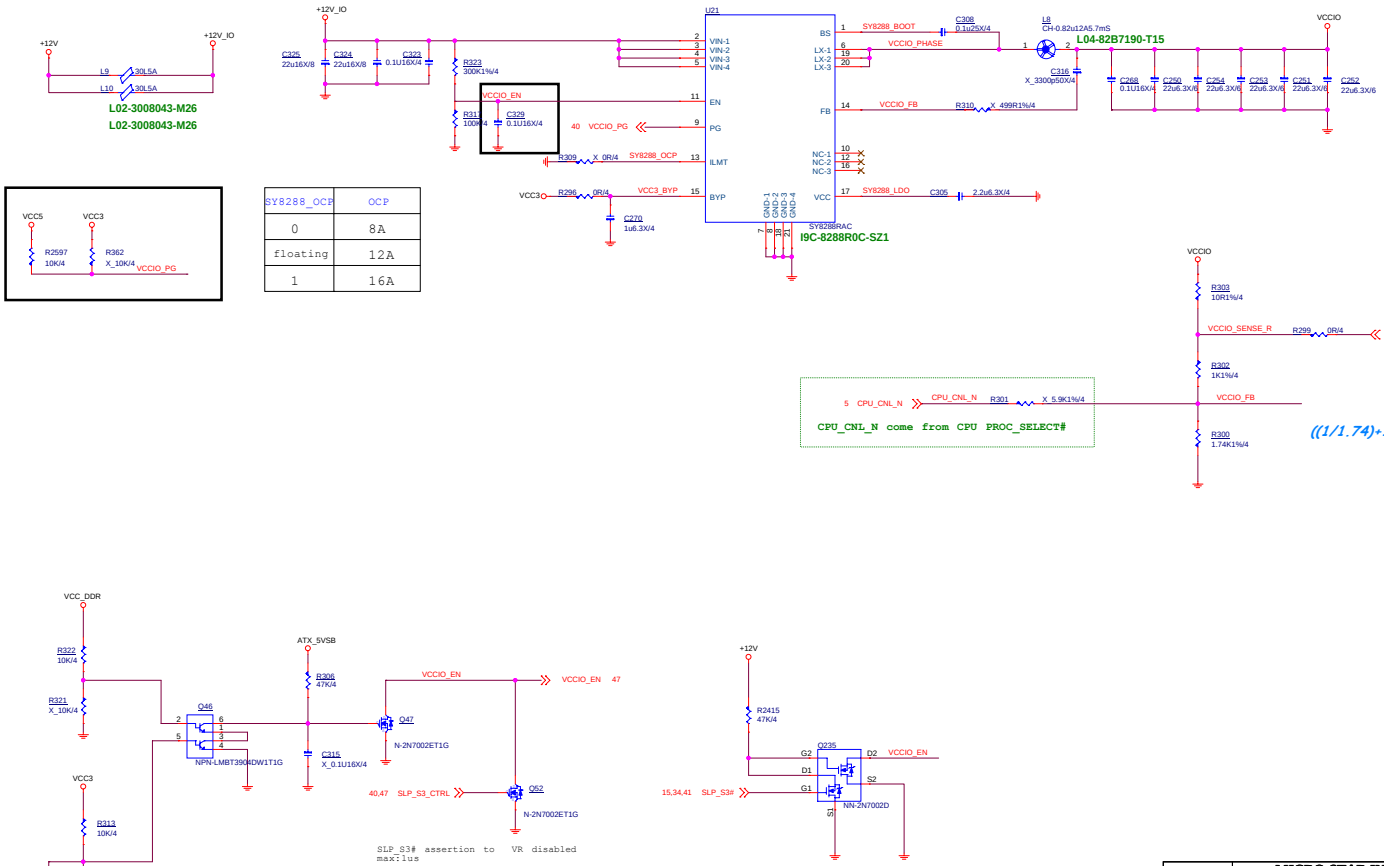
VCCIO@0.95V/6.4A

IMAX 10A
ILIMIT=10A~12A
IOC=ILIMIT+40%*IMAX/2=12A~14A.

VCCIO mil12A(floating)

MAX:6.4A



SY8288_OCP	OCP
0	8A
floating	12A
1	16A

MICRO-STAR INT'L CO.,LTD		
MS-7C08		
Size: Custom	Document Description: VCCIO - POWER SY8288	Rev: 1.0
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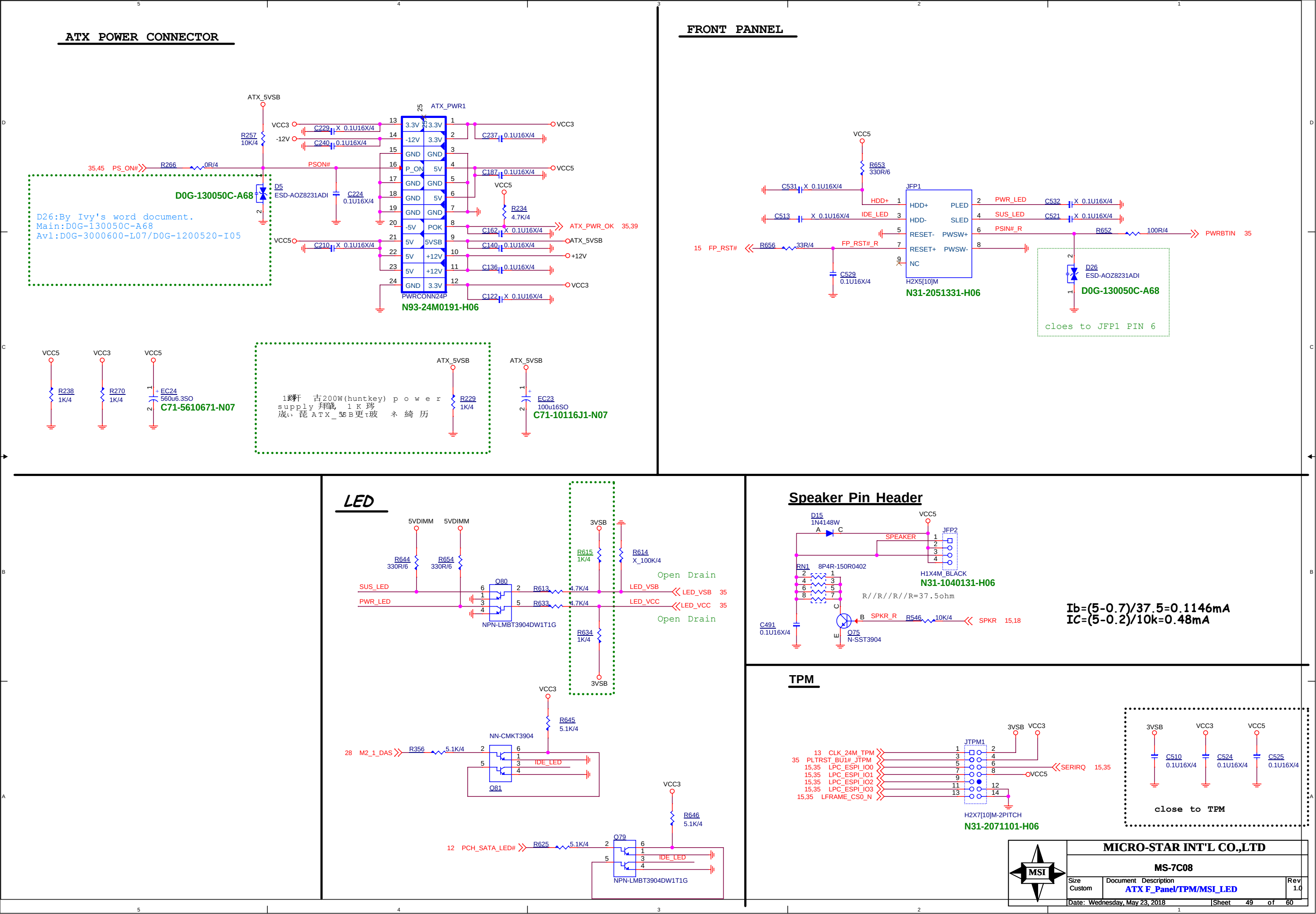

ATX POWER CONNECTOR
ATX_PWR1
PWRCONN24P
N93-24M0191-H06
D0G-130050C-A68
D26:By Ivy's word document.
Main:D0G-130050C-A68
Avl:D0G-3000600-L07/D0G-1200520-I05
C71-5610671-N07
C71-10116J1-N07
FRONT PANNEL
JFP1
H2X5[10]M
N31-2051331-H06
cloes to JFP1 PIN 6
LED
Open Drain
Speaker Pin Header
JFP2
H1X4M_BLACK
N31-1040131-H06
R//R//R//R=37.5ohm
Ib=(5-0.7)/37.5=0.1146mA
IC=(5-0.2)/10k=0.48mA
TPM
JTPM1
H2X7[10]M-2PITCH
N31-2071101-H06
close to TPM
MICRO-STAR INT'L CO.,LTD
MS-7C08
Size Custom
Document Description
ATX F_Panel/TPM/MSI_LED
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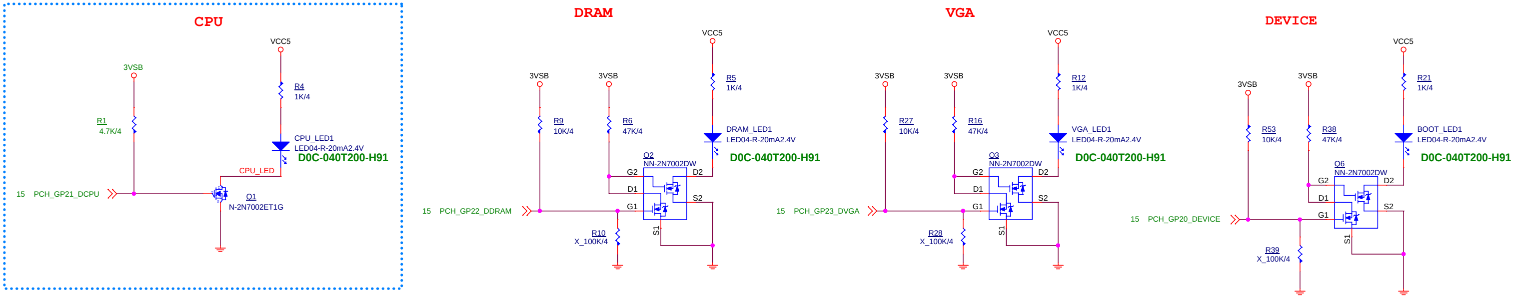
EZ DEBUG LED



LED	PCH_GP20	PCH_GP21	PCH_GP22	PCH_GP23
獯	NATIVE PULL HIGH	GPO PULL HIGH	GPO PULL HIGH	NATIVE PULL HIGH
防	NATIVE LOW	GPO LOW (default LOW)	GPO LOW (default LOW)	GPO LOW (default LOW)

LED
RED:D0C-040P100-H91
AVL:D0C-040S500-E07

WHI:D0C-040T200-H91
AVL:D0C-040S200-E07

闰洪勅餘 㶳 3 湌 L E D 蝴杯default 穭 柞诀砾餘 诶
1. 楗︽ CPU check CPU E 獯 checkPASS 诶玥 L E D防奔
2. 锲秈︽M emory /m emory LED獯 chekPASS诶玥 e m or y L E D 防奔
3. VGA check/VGA LED獯 che ck PASS诶玥 VGA防
4 . 程践夕畤料 柞 诀践 湌 LED 緇常琎 防奔
参琲币┫ 亣 锌 研 ⊙ 参琲柞诀 玥LE Dご邪 瑻︽ 峸 笆

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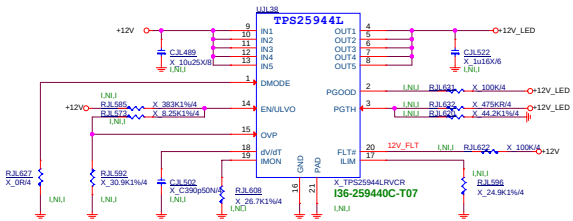
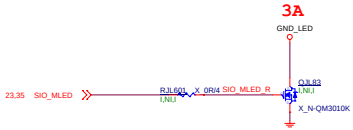
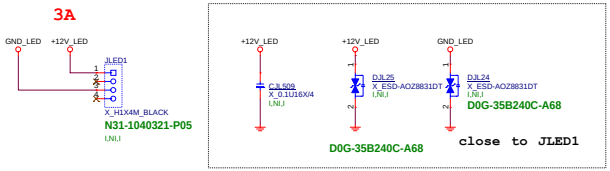
LED Control by SIO(JLED1)

unstuff







MSI	MICRO-STAR INT'L CO.,LTD	
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OPTION BOM PARTS

LA1

9310
Lable

MKT

G51-M1SPM61-Q13

PCH_HS1

Heatsink

HS-0409430

E31-0409430-K08

CPU_H1

CPU
顯秋

CPU_H1

E21-7557050-L06

PD0-07C0810-E48

PD0-07C0810-G37

PCB1

7B28_21

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BAT1_X1

BAT-BCR2032P

D06-0100101-K26

HDMI_LA1

HDMI LABEL

Y01-RHDMI03-000

BIOS_LA1

AMI

G51-M1SPXXA-A09

LA10

MKT

Y02-MU00170-CFO

Optical Fiducial Marks-120

FM4 FM2 FM1 FM3

X_FM X_FM X_FM X_FM

FM5 FM6 FM7 FM8

X_FM X_FM X_FM X_FM

Simulation

SIM2 SIM1

X_PIN1*2 X_PIN1*2

Mounting Holes

MH1 MH3 MH5

MH2 MH4 MH6

X_MH003

CA23 0.1U16X/4 CA20 0.1U16X/4

HOLES_4S

VPP25 — TP_VPP25

VTT_DDR — TP_VTT_DDR

5VDIMM — TP_5VDIMM

3VSB — TP_3VSB

3VDSW — TP_3VDSW

VGT — TP_VGT

VCCSTPLL — TP_VCCSTPLL

VCCIO — TP_VCCIO

VCCSA — TP_VCCSA

VCC_DDR — TP_VCC_DDR

PCH_1VSB — TP_PCH_1P05_VSB

SIO_3VA — TP_SIO_3VA

Near SIO CHIP

+12V — TP_+12V

VCORE — TP_VCORE

VCC5 — TP_VCC5

return path

5VDIMM — C290 0.1U16X/4

+12V — C318 0.1U16X/4

5VDIMM — C1938 0.1U16X/4

5VDIMM — C1939 0.1U16X/4

+12V — C383 0.1U16X/4

+12V — C339 0.1U16X/4

+12V — C376 0.1U16X/4

For M2 reference +12V USE please close to under M2

+12V — C310 — VCCSA

0.1U16X/4

for moat use

5VDIMM — C1943 0.1U16X/4

3VSB — C1944 0.1U16X/4

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