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MS-7B28

ATX:230mm*185mm

Intel -CoffeeLake-S plamform

CPU:

LGA1151

*CPU POWER PAK *4Phase*

*GT POWER PAK *2 Phase*

System Chipset:

H310

Onboard Chip:

SIO: NUVOTON 5567
HD Audio Codec: ALC887
LAN: INTEL I219V
Flash ROM: SPI 64 MB
CUT VBAT:SLG4B41231

PWM:

VCORE - RT3607	*138A*
VGT- RT3607	*45A*
DDR - RT8231	*11.525A*
DDR VPP25- MP2143	*1.12A*
PCH(1.05V) - RT8125E	*10.743A*
VCCSA - RT8125E	*11.1A*
VCCIO - SY8288	*6.4A*

Main Memory:

*DDR4 * 2 (Dual Channel)*

ACPI:

5VDAUL:uP7501
5VDIMM:uP7501
3VSB:GS7133+N MOS
1P8_VSB:GS7166
3VDSW:L11831
VCCSTPLL:GS7133

Expansion Slots:

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

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MS-7B28	
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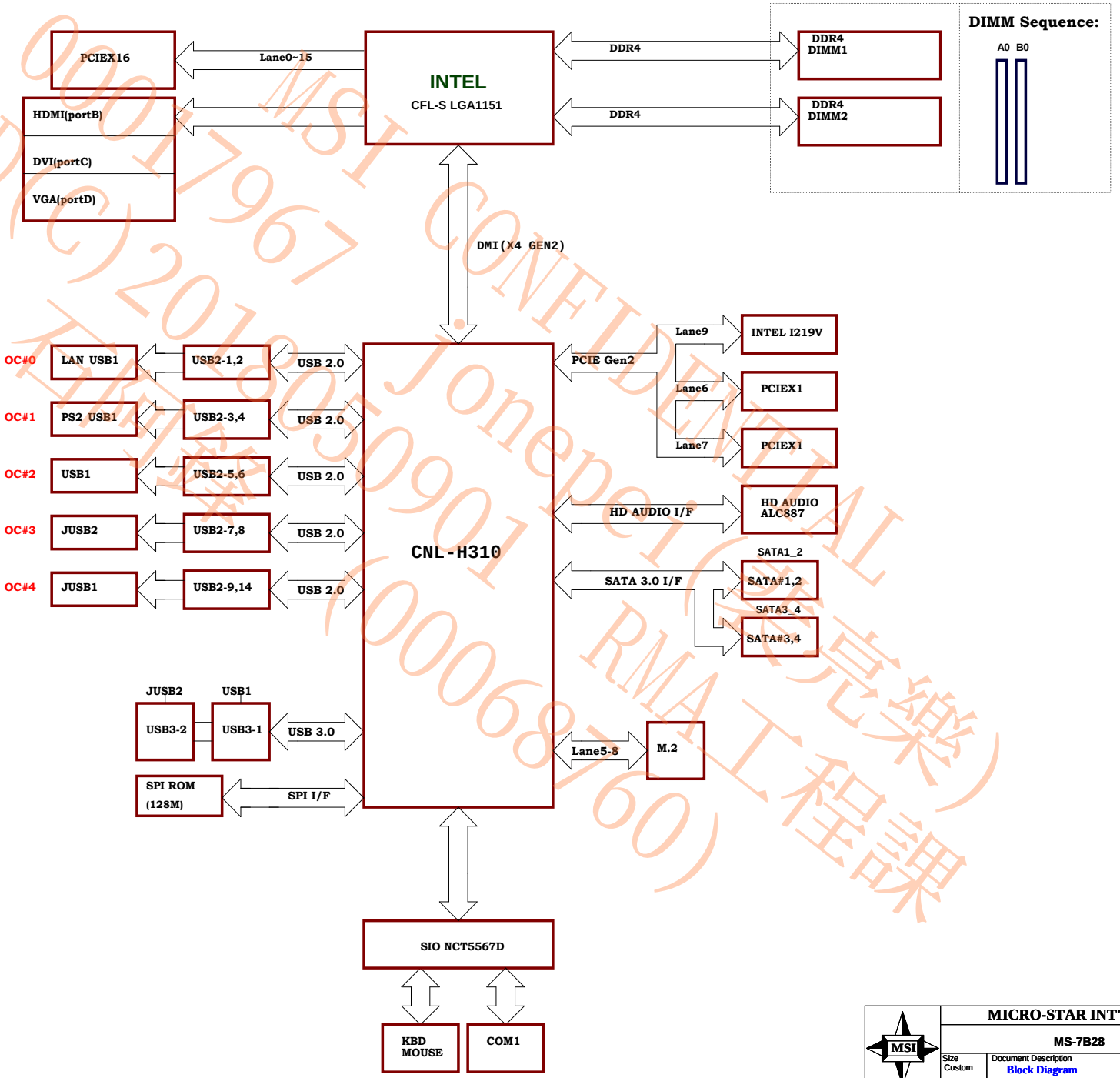
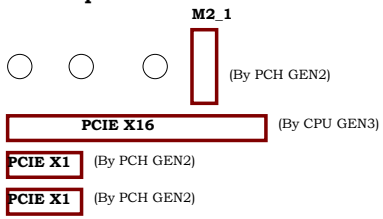
Block Diagram



Slot Sequence:



MICRO-STAR INT'L CO.,LTD	
MS-7B28	
Size: Custom	Document Description: Block Diagram
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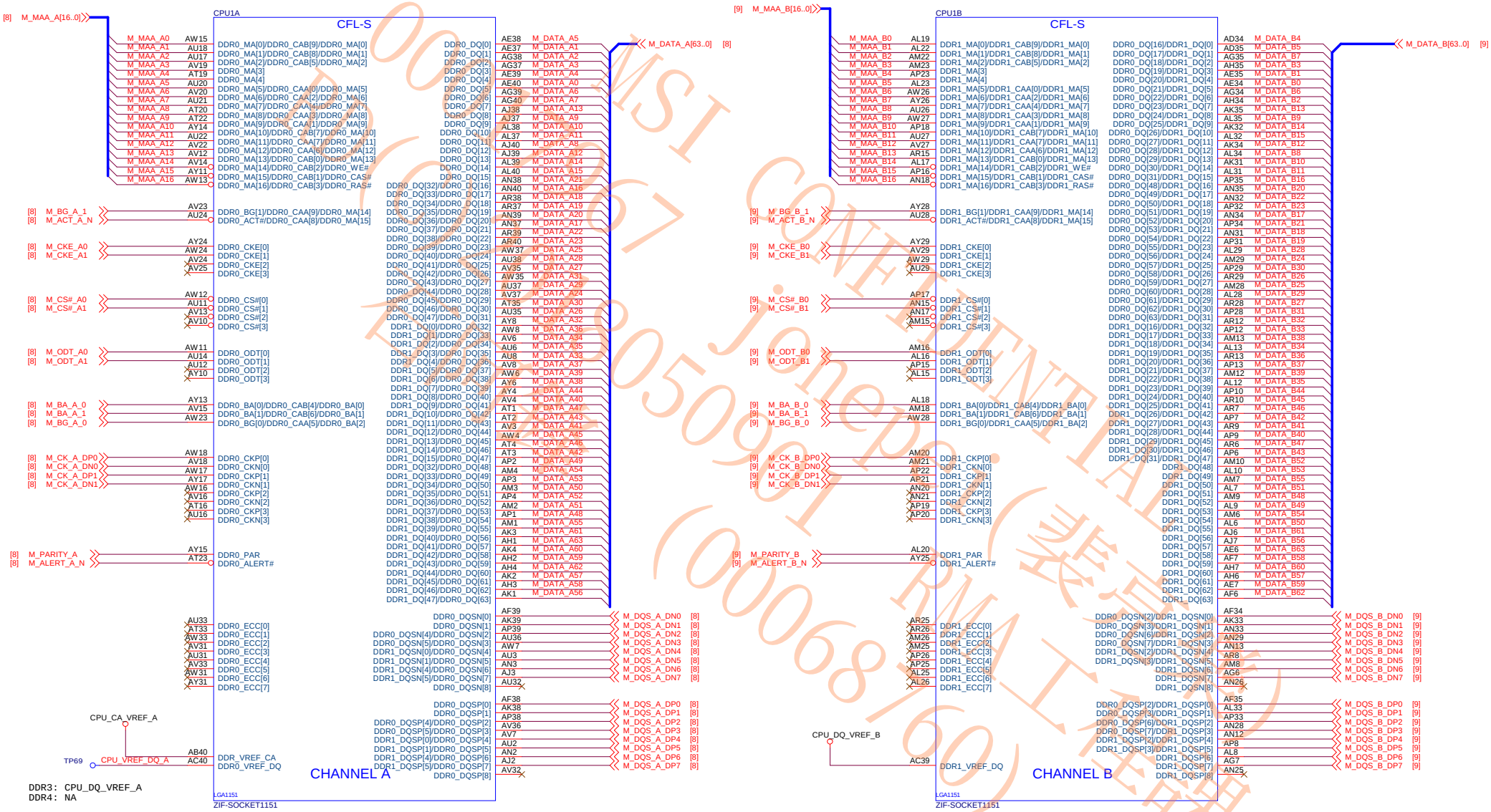

MICRO-STAR INT'L CO.,LTD

MS-7B28

Size	Document Description	Rev
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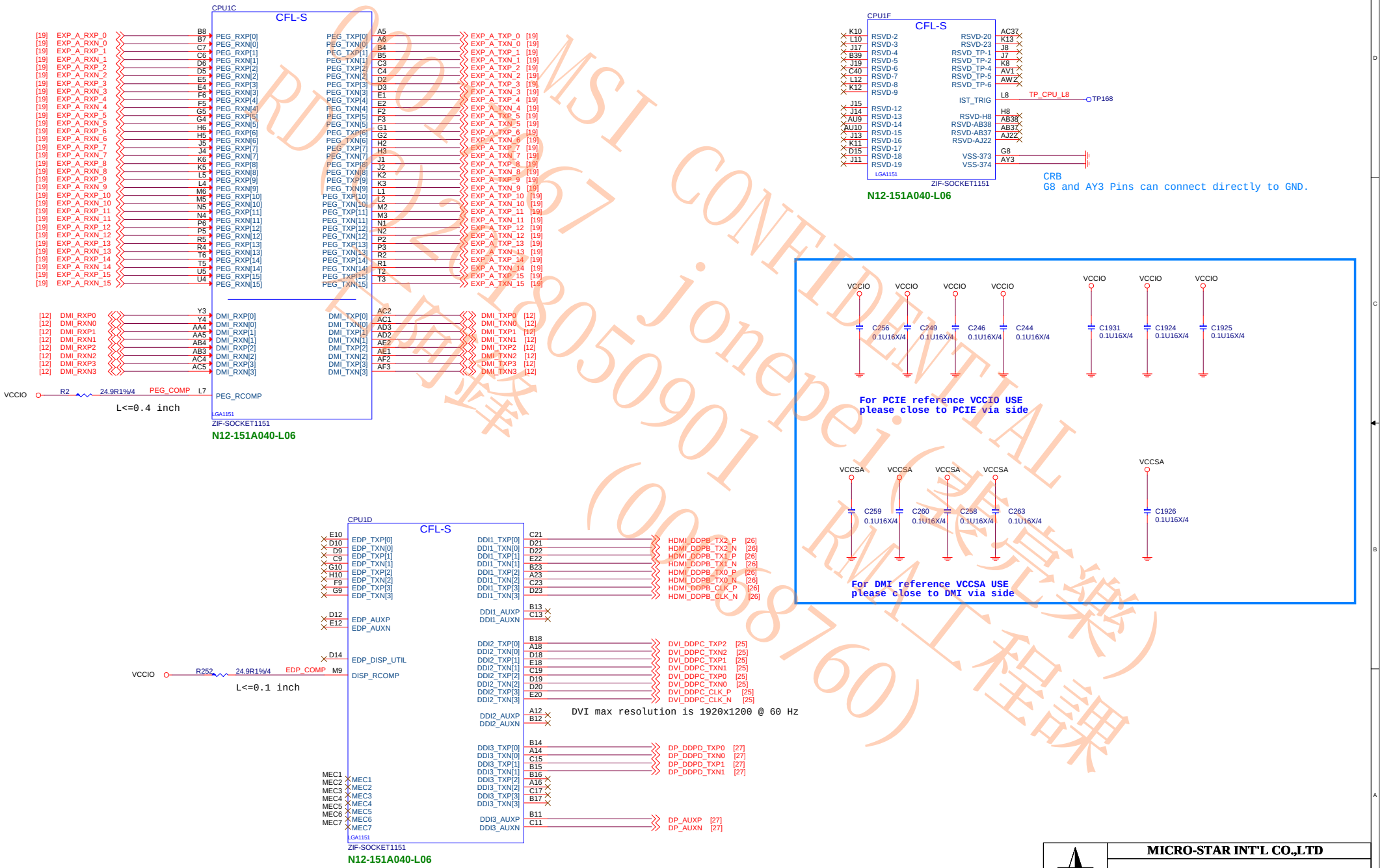

MICRO-STAR INT'L CO.,LTD	
MS-7B28	
Size: Custom	Document Description: CPU-PEG/Display
Rev: 11/21/31	
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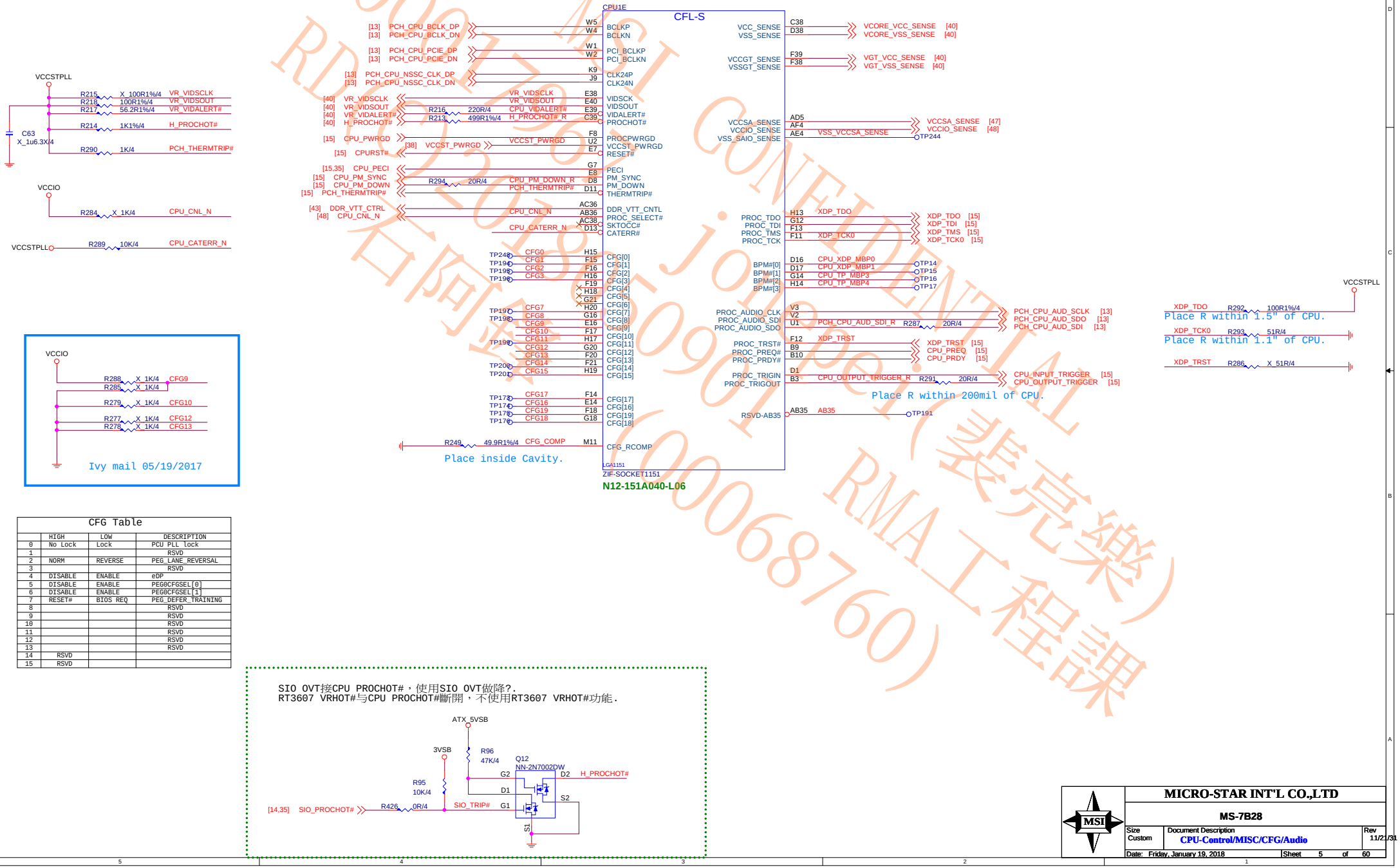

CFG Table

	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	PEG0CFGSEL[0]
6	DISABLE	ENABLE	PEG0CFGSEL[1]
7	RESET#	BIOS REQ	PEG_DEFER_TRAINING
8			RSVD
9			RSVD
10			RSVD
11			RSVD
12			RSVD
13			RSVD
14	RSVD		
15	RSVD		

MICRO-STAR INT'L CO.,LTD

MS-7B28

Size: Custom | Document Description: CPU-Control/MISC/CFG/Audio | Rev: 11/21/31

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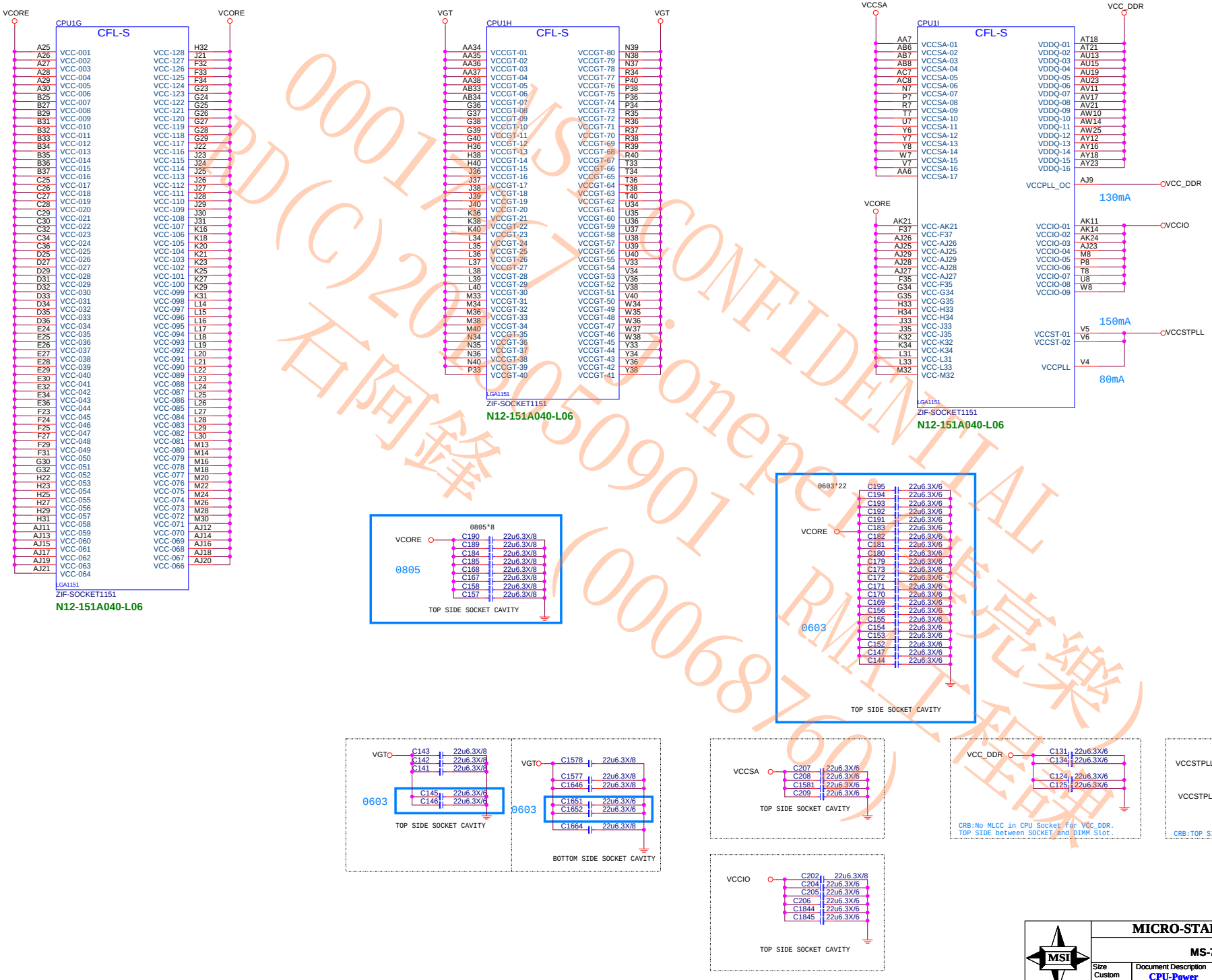

MICRO-STAR INT'L CO.,LTD

MS-7B28

Size: Custom | Document Description: CPU-Power | Rev: 11/21/31

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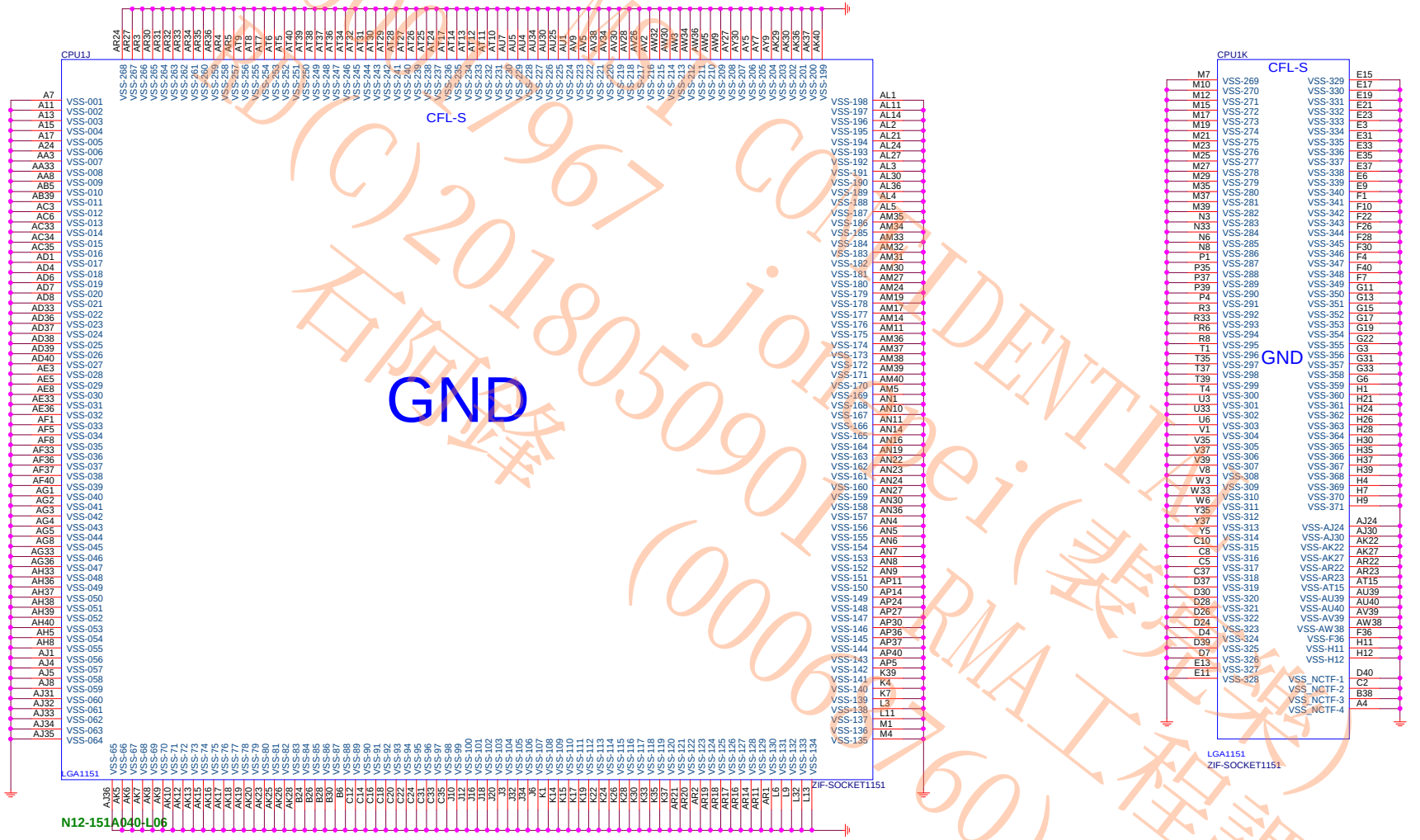

MICRO-STAR INT'L CO.,LTD		
MS-7B28		
Size: Custom	Document Description: CPU-GND	Rev: 11/21/31
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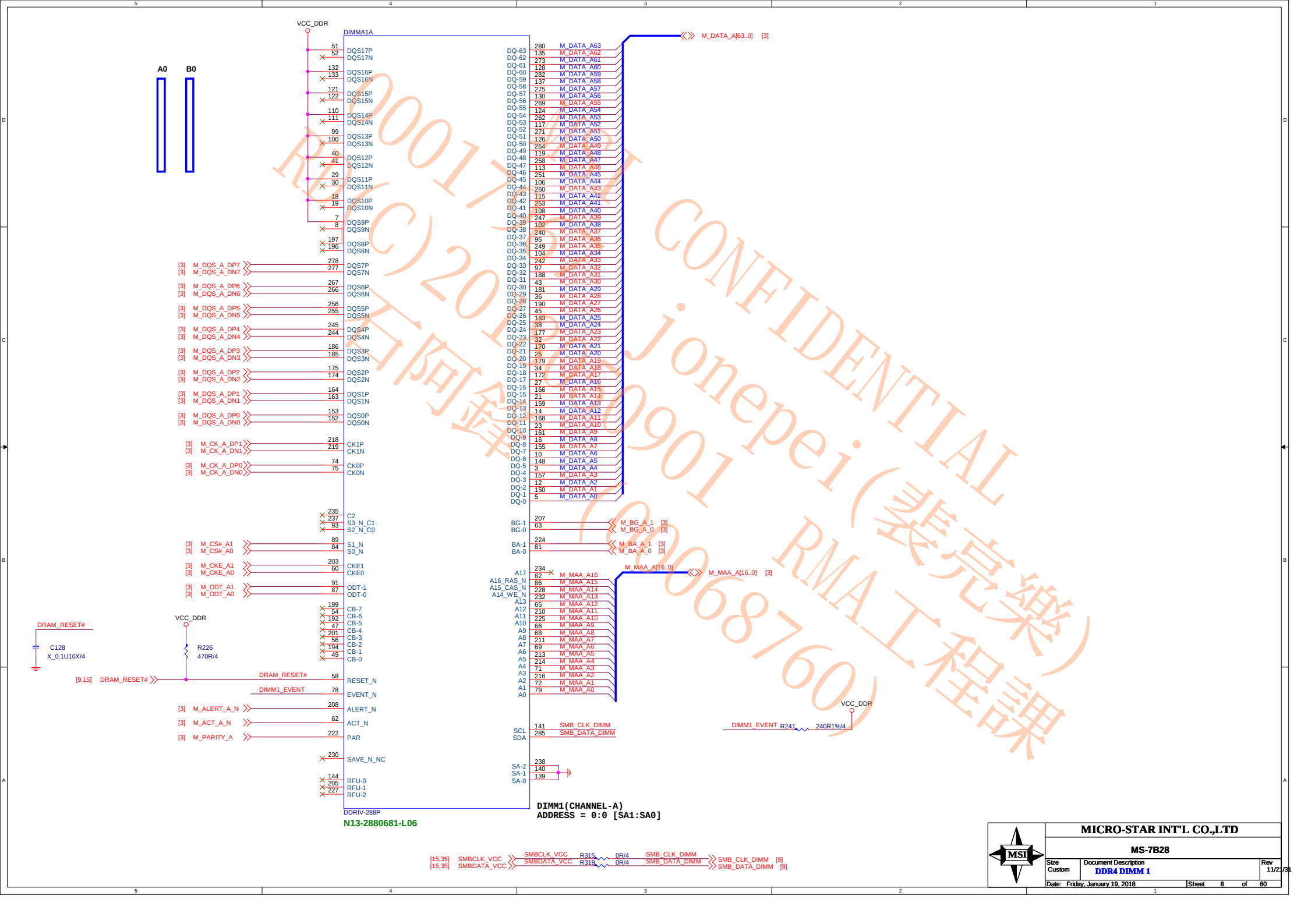

MICRO-STAR INT'L CO.,LTD	
MS-7B28	
Size: Custom	Document Description: DDR4 DIMM 1
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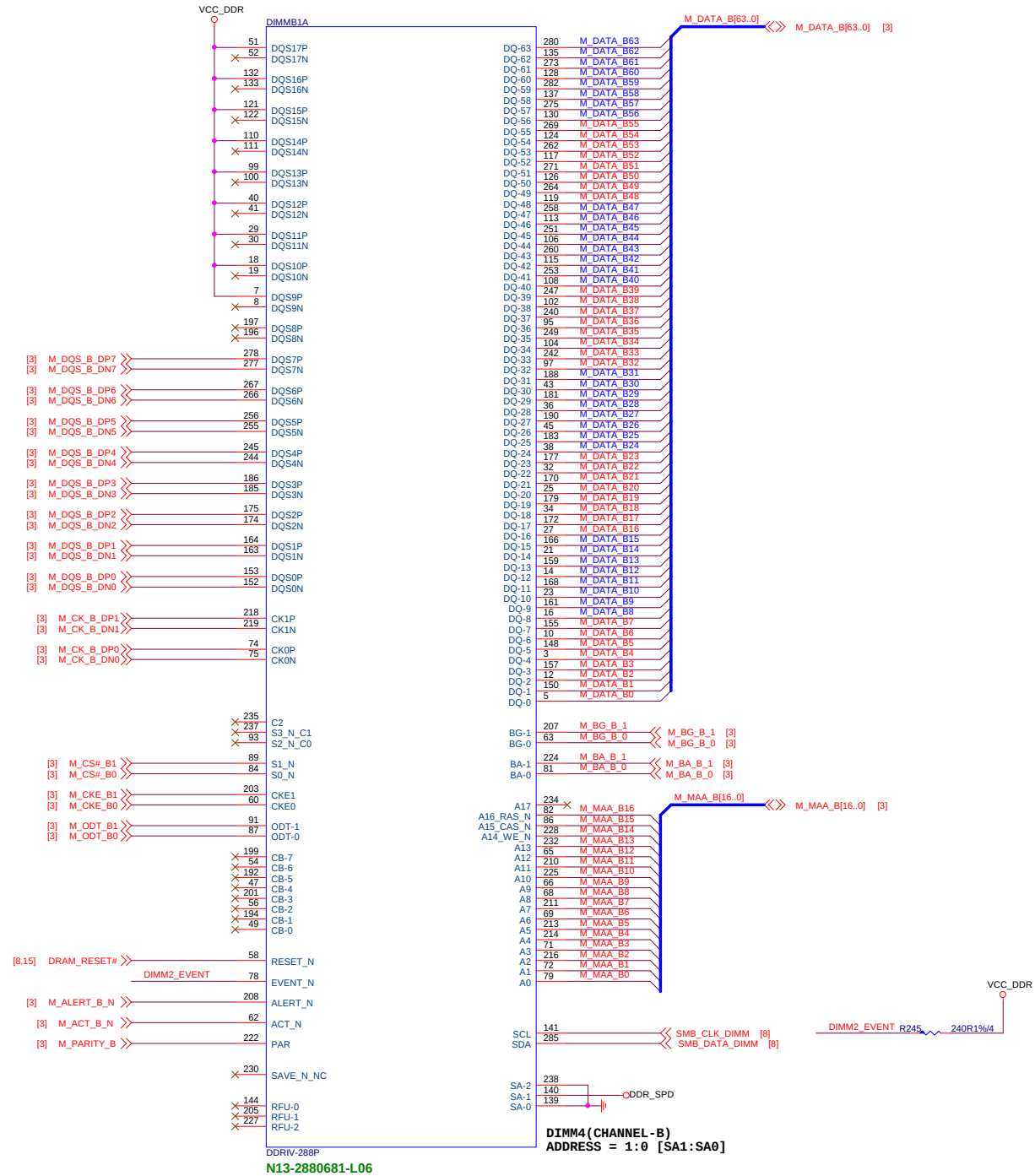
VCC_DDR
DIMMB1A
M_DATA_B[63..0]
M_DATA_B[63..0] [3]
DQS17P
DQS17N
DQS16P
DQS16N
DQS15P
DQS15N
DQS14P
DQS14N
DQS13P
DQS13N
DQS12P
DQS12N
DQS11P
DQS11N
DQS10P
DQS10N
DQS9P
DQS9N
DQS8P
DQS8N
DQS7P
DQS7N
DQS6P
DQS6N
DQS5P
DQS5N
DQS4P
DQS4N
DQS3P
DQS3N
DQS2P
DQS2N
DQS1P
DQS1N
DQS0P
DQS0N
CK1P
CK1N
CK0P
CK0N
C2
S3_N_C1
S2_N_C0
S1_N
S0_N
CKE1
CKE0
ODT-1
ODT-0
CB-7
CB-6
CB-5
CB-4
CB-3
CB-2
CB-1
CB-0
RESET_N
EVENT_N
ALERT_N
ACT_N
PAR
SAVE_N_NC
RFU-0
RFU-1
RFU-2
DDRIV-288P
M_BG_B_1
M_BG_B_0
M_BA_B_1
M_BA_B_0
M_MAA_B[16..0]
M_MAA_B[16..0] [3]
SMB_CLK_DIMM [8]
SMB_DATA_DIMM [8]
DDR_SPD
DIMM2_EVENT
R245
240R1%/4
VCC_DDR
DIMM4(CHANNEL-B)
ADDRESS = 1:0 [SA1:SA0]
N13-2880681-L06
MICRO-STAR INT'L CO.,LTD
MS-7B28
Size Custom
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DDR4 DIMM 2
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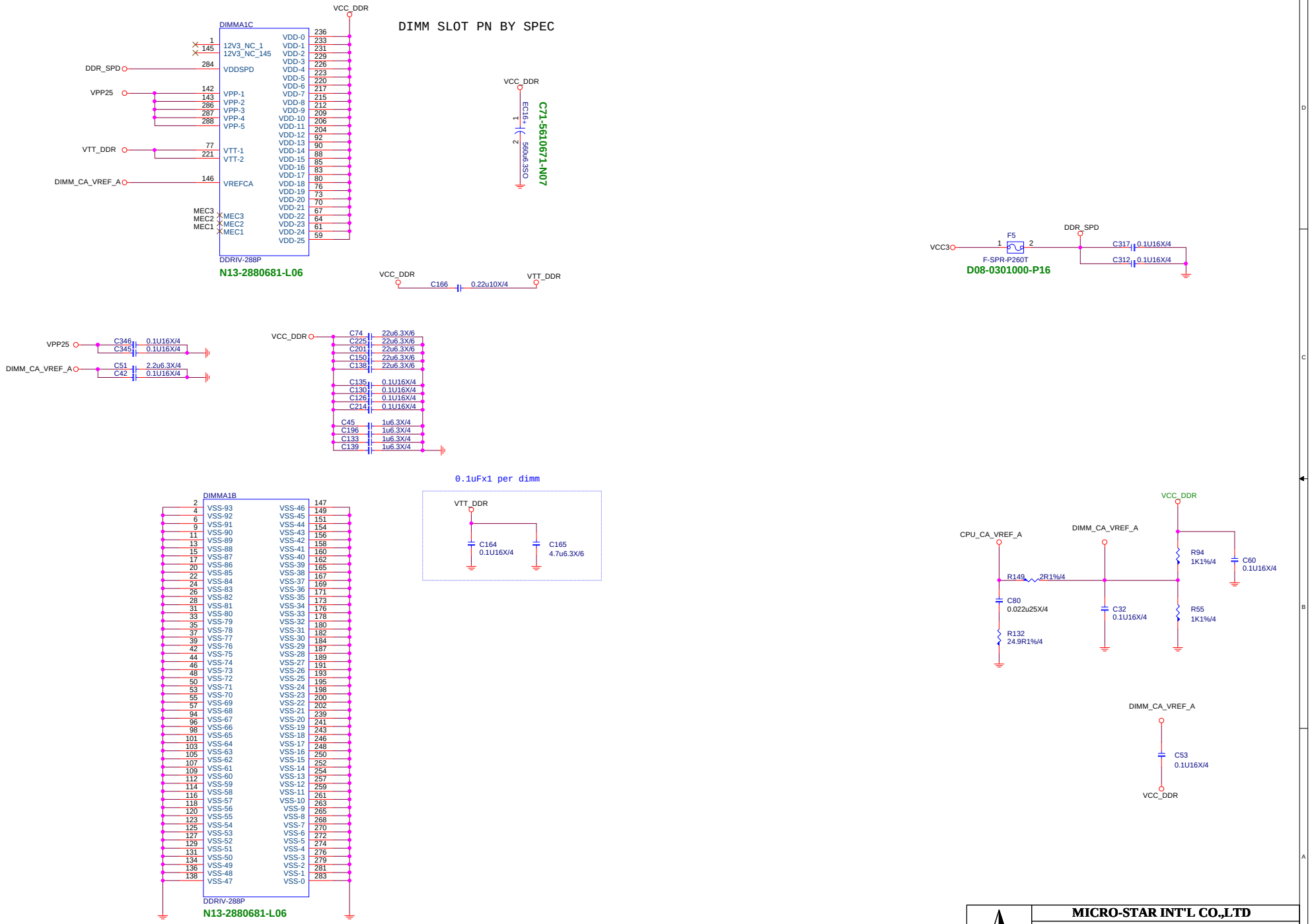

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Size: Custom	Document Description: DDR4-POWER/GND-1
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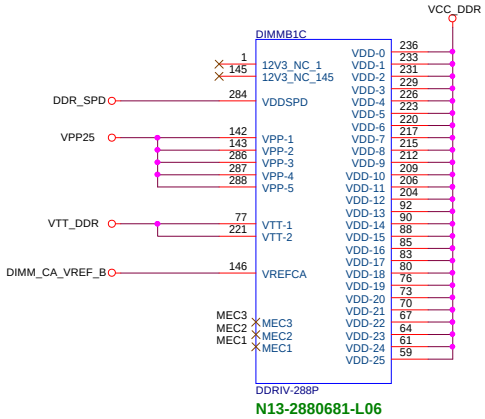
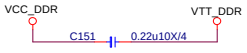
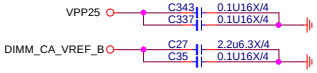
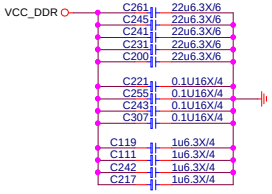
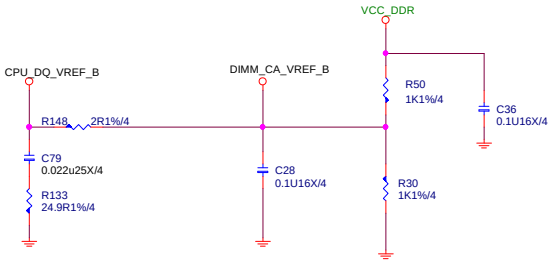
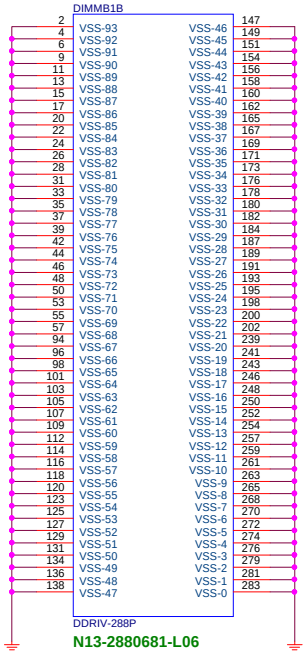

VCC_DDR
DIMMB1C
1
145
12V3_NC_1
12V3_NC_145
284
VDDSPD
DDR_SPD
142
143
286
287
288
VPP-1
VPP-2
VPP-3
VPP-4
VPP-5
VPP25
77
221
VTT-1
VTT-2
VTT_DDR
146
VREFCA
DIMM_CA_VREF_B
MEC3
MEC2
MEC1
DDRIV-288P
N13-2880681-L06

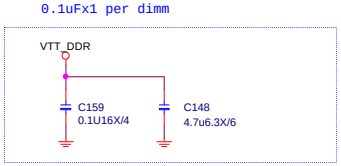

VCC_DDR
VTT_DDR
C151
0.22u10X/4

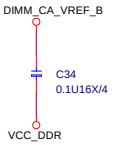

VPP25
C343
0.1U16X/4
C337
0.1U16X/4
DIMM_CA_VREF_B
C27
2.2u6.3X/4
C35
0.1U16X/4


VCC_DDR
C261
22u6.3X/6
C245
22u6.3X/6
C241
22u6.3X/6
C231
22u6.3X/6
C200
22u6.3X/6
C221
0.1U16X/4
C255
0.1U16X/4
C243
0.1U16X/4
C307
0.1U16X/4
C119
1u6.3X/4
C111
1u6.3X/4
C242
1u6.3X/4
C217
1u6.3X/4


VCC_DDR
CPU_DQ_VREF_B
R148
2R1%/4
C79
0.022u25X/4
R133
24.9R1%/4
DIMM_CA_VREF_B
C28
0.1U16X/4
R50
1K1%/4
R30
1K1%/4
C36
0.1U16X/4


DIMMB1B
VSS-93
VSS-92
VSS-91
VSS-90
VSS-89
VSS-88
VSS-87
VSS-86
VSS-85
VSS-84
VSS-83
VSS-82
VSS-81
VSS-80
VSS-79
VSS-78
VSS-77
VSS-76
VSS-75
VSS-74
VSS-73
VSS-72
VSS-71
VSS-70
VSS-69
VSS-68
VSS-67
VSS-66
VSS-65
VSS-64
VSS-63
VSS-62
VSS-61
VSS-60
VSS-59
VSS-58
VSS-57
VSS-56
VSS-55
VSS-54
VSS-53
VSS-52
VSS-51
VSS-50
VSS-49
VSS-48
VSS-47
VSS-46
VSS-45
VSS-44
VSS-43
VSS-42
VSS-41
VSS-40
VSS-39
VSS-38
VSS-37
VSS-36
VSS-35
VSS-34
VSS-33
VSS-32
VSS-31
VSS-30
VSS-29
VSS-28
VSS-27
VSS-26
VSS-25
VSS-24
VSS-23
VSS-22
VSS-21
VSS-20
VSS-19
VSS-18
VSS-17
VSS-16
VSS-15
VSS-14
VSS-13
VSS-12
VSS-11
VSS-10
VSS-9
VSS-8
VSS-7
VSS-6
VSS-5
VSS-4
VSS-3
VSS-2
VSS-1
VSS-0
DDRIV-288P
N13-2880681-L06


0.1uFx1 per dimm
VTT_DDR
C159
0.1U16X/4
C148
4.7u6.3X/6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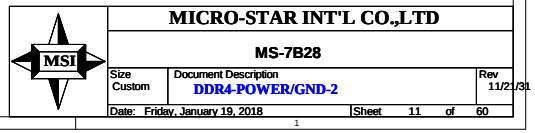
C34
0.1U16X/4
VCC_DDR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MS-7B28
Size
Custom
Document Description
DDR4-POWER/GND-2
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PCH DMI Lane Reversal

PCH1B

H310 DMI GEN2

DMI

PCIE

H310 don't support PCIe port 1~4

H310 DMI GEN2

H310 port 9 only support intel LAN

H310 don't support PCIe port 10

M.2

Share M.2

H310只有SATA功能

H310 don't support PCIe port 17~24

PCIECOMP_P

PCIECOMP_N

R399 100R1%/4

intel內部的SATA與PCIE互切換才需使用

SMI Pin

R489 10K/4

VCC3

Default Native F2/PS_ON#/output

PCH_H310

OB1-7B53003-I06

PCH DMI Lane Reversal

H310 DMI GEN2

H310 don't support PCIe port 1~4

H310 DMI GEN2

H310 port 9 only support intel LAN

H310 don't support PCIe port 10

H310 don't support PCIe port 17~24

PCH1C

USB3

H310 don't support USB3.0 5~6

USB2

H310 don't support USB2.0 10~13

R402 0R/4

R396 10K/4

R397 113R1%/4

USB2_COMP <1000 mil

PCH_H310

OB1-7B53003-I06

PCIECOMP_P

PCIECOMP_N

Length Match < 5mil

SMI Pin

SMI Pin

SMI Pin

GPP_F1/GPP_F2預留PCH SAMPLE

SATAXPCIE0-PE9

SATAXPCIE1-PE10

SATAXPCIE2-PE15

SATAXPCIE3-PE16

SATAXPCIE4-PE17

SATAXPCIE5-PE18

0--PCIE

1--SATA

R1223 X 10K/4 GPP_F8

R1221 X 10K/4 GPP_F9

R502 1K/4

R511 10K/4 PCH_CONFIG

R464 X 10K/4

R466 10K/4 PCH_RSVD

R478 20K1%/4

R487 X 10K/4 SV_ADVANCE

R488 X 10K/4

R501 10K/4 GFX_CRB_DETECT

MICRO-STAR INT'L CO.,LTD

MS-7B28

Size: Custom

Document Description: PCH-USB/PCIE/DMI/SATA

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RTC Block

Close to PCH

C472 12p50N/6 RTCX2
Y2
R535 10M/6 <1 inch
C481 12p50N/6 RTCX1
32.768KHZ12.5p
D04-0305901-F07

C332 18p50N/4 XTAL_24M_PCH_IN_R1 R102 0R/4 XTAL_24M_PCH_IN
Y1
XTAL_24M_PCH_OUT_R2
24MHZ12p
R1887 0R/4
D04-3903900-F07
AVL : D04-3903800-T16
R448 200K1%/4
C326 18p50N/4 XTAL_24M_PCH_OUT_R1 R103 0R/4 XTAL_24M_PCH_OUT

Net need reference GND

C901 X_10p50N/4
[35] CLK_SIO_PCI R587 22R/4 CLK_PCH_LPC0
[49] CLK_24M_TPM R1365 22R/4 CLK_PCH_24M
C1921 X_10p50N/4

PCH1E

BB36 GPP_A9/CLKOUT_LPC0/ESPI_CLK
BB34 GPP_A10/CLKOUT_LPC1
LPC

RTCX1 BA49 RTCX1
RTCX2 BA48 RTCX2
RTC

XTAL_24M_PCH_IN U10 XTAL_IN
XTAL_24M_PCH_OUT U9 XTAL_OUT
R433 60.4R1%/4 XCLK_BIASREF T3 XCLK_BIASREF
R2265 10K/4 PCH_CLKIIN_XTAL R6 CLKIN_XTAL
24MHZ

XCLK_BIASREF < 1000 mil

3VSB R295 10K/4
[24] LAN_CLKREQ#4
BF31 GPP_B5/SRCCLKREQ0#
BE31 GPP_B6/SRCCLKREQ1#
AR32 GPP_B7/SRCCLKREQ2#
BB30 GPP_B8/SRCCLKREQ3#
BA30 GPP_B9/SRCCLKREQ4#
AN29 GPP_B10/SRCCLKREQ5#
CLK_REQ
AE47 GPP_H0/SRCCLKREQ6#
AC48 GPP_H1/SRCCLKREQ7#
AE41 GPP_H2/SRCCLKREQ8#
AF48 GPP_H3/SRCCLKREQ9#
AC41 GPP_H4/SRCCLKREQ10#
[28] M2_CLKREQ#9
PU VCC3 to M.2 slot
AC39 GPP_H5/SRCCLKREQ11#
AE39 GPP_H6/SRCCLKREQ12#
AB48 GPP_H7/SRCCLKREQ13#
AC44 GPP_H8/SRCCLKREQ14#
AC43 GPP_H9/SRCCLKREQ15#

CLKOUT_CPUBCLK_P B8 PCH_CPU_BCLK_DP [5]
CLKOUT_CPUBCLK_N C8 PCH_CPU_BCLK_DN [5] 100M
CLKOUT_CPUNSSC_P D7 PCH_CPU_NSSC_CLK_DP [5]
CLKOUT_CPUNSSC_N C6 PCH_CPU_NSSC_CLK_DN [5] 24M
CLKOUT_CPUPCIBCLK_P A6 PCH_CPU_PCIE_DP [5]
CLKOUT_CPUPCIBCLK_N B6 PCH_CPU_PCIE_DN [5] 100M
CLKOUT_ITPXDP_P Y4
CLKOUT_ITPXDP_N Y3
CLKOUT_PCIE_P0 AJ7 CK_SLOT1_DP [19]
CLKOUT_PCIE_N0 AJ6 CK_SLOT1_DN [19]
CLKOUT_PCIE_P1 AH10 CK_SLOT2_DP [20]
CLKOUT_PCIE_N1 AH9 CK_SLOT2_DN [20]
CLKOUT_PCIE_P2 AE15 CK_SLOT3_DP [20]
CLKOUT_PCIE_N2 AE14 CK_SLOT3_DN [20]
CLKOUT_PCIE_P3 AE7
CLKOUT_PCIE_N3 AE6
CLKOUT_PCIE_P4 AC3 CLK_LAN_DP [24]
CLKOUT_PCIE_N4 AC2 CLK_LAN_DN [24]
CLKOUT_PCIE_P5 AB3
CLKOUT_PCIE_N5 AB2
CLKOUT_PCIE_P6 W3
CLKOUT_PCIE_N6 W4
CLKOUT_PCIE_P7 W6
CLKOUT_PCIE_N7 W7
CLKOUT_PCIE_P8 AC15
CLKOUT_PCIE_N8 AC14
CLKOUT_PCIE_P9 U3 CLK_M2_1_DP [28]
CLKOUT_PCIE_N9 U2 CLK_M2_1_DN [28]
CLKOUT_PCIE_P10 AC11
CLKOUT_PCIE_N10 AC9
CLKOUT_PCIE_P11 AE11
CLKOUT_PCIE_N11 AE9
CLKOUT_PCIE_P12 AC6
CLKOUT_PCIE_N12 AC7
CLKOUT_PCIE_P13 Y2
CLKOUT_PCIE_N13 AA1
CLKOUT_PCIE_P14 T1
CLKOUT_PCIE_N14 T2
CLKOUT_PCIE_P15 V3
CLKOUT_PCIE_N15 V2

PCH_H310
OB1-7B53003-I06

EMI
AZ_BITCLK
C496 X_10p50N/4

PCH1D

[22] AZ_SDIN0 BE11 HDA_SDI0/I2S0_RXD
BF10 HDA_SDI1/I2S1_RXD
[18] AZ_SDOUT_R R549 33R/4 AZ_SDOUT_R BF12 HDA_SDO/I2S0_TXD
[22] AZ_SDOUT
[22] AZ_BITCLK AZ_BITCLK R548 33R/4 AZ_BITCLK_LR BD11 HDA_BCLK/I2S0_SCLK
[22] AZ_RST# R567 33R/4 AZ_RST#_R BE10 HDA_RST#/I2S1_SCLK
[22] AZ_SYNC R568 33R/4 AZ_SYNC_R BG13 HDA_SYNC/I2S0_SFRM
AUDIO
[5] PCH_CPU_AUD_SDO R499 30R/4 PCH_CPU_AUD_SDO_R AM2 HDACPU_SDO
[5] PCH_CPU_AUD_SDI PCH_CPU_AUD_SDI_R AN3 HDACPU_SDI
[5] PCH_CPU_AUD_SCLK R507 30R/4 PCH_CPU_AUD_SCLK_R AM3 HDACPU_SCLK
BE12 I2S1_TXD/SNDW2_DATA
BD12 I2S1_SFRM/SNDW2_CLK

Default Native F3/CNV_RF_R_ESET#.

BE16 GPP_D5/I2S2_SFRM/CNV_RF_RESET#
BA17 GPP_D6/I2S2_TXD/MODEM_CLKREQ
AW18 GPP_D7/I2S2_RXD
AV18 GPP_D8/I2S2_SCLK
AW15 GPP_D17/DMIC_CLK1/SNDW3_CLK
AV16 GPP_D18/DMIC_DATA1/SNDW3_DATA
BD16 GPP_D19/DMIC_CLK0/SNDW4_CLK
BF15 GPP_D20/DMIC_DATA0/SNDW4_DATA

Default Native F3/MODEM_CLKREQ.

PCH_H310
OB1-7B53003-I06

PORT B
GPP_I5/DDPB_CTRLCLK AL13 HDMI_DDPB_CTRLCLK HDMI_DDPB_CTRLCLK [26]
GPP_I6/DDPB_CTRLDATA AR8 HDMI_DDPB_CTRLDATA HDMI_DDPB_CTRLDATA [26]
GPP_I0/DDPB_HPD0/DISP_MISC0 AT6 HDMI_DDPB_HPD [26]
SMI Pin
PORT C
GPP_I7/DDPC_CTRLCLK AN13 DVI_DDPC_CTRLCLK DVI_DDPC_CTRLCLK [25]
GPP_I8/DDPC_CTRLDATA AL10 DVI_DDPC_CTRLDATA DVI_DDPC_CTRLDATA [25]
GPP_I1/DDPC_HPD1/DISP_MISC1 AN10 DVI_DDPC_HPD [25]
SMI Pin
PORT D
GPP_I9/DDPD_CTRLCLK AL9 DP_DDPD_CTRLCLK
GPP_I10/DDPD_CTRLDATA AR3 DP_DDPD_CTRLDATA
GPP_I2/DPPD_HPD2/DISP_MISC2 AP9 DP_HPD DP_HPD [27]
PORT F
GPP_F22/DDPF_CTRLCLK AT49 GPP_F22 TP213 R1954 X_2.2K/4 VCC3
GPP_F23/DDPF_CTRLDATA AN40 GPP_F23
Display Port F Detected.
Internal 20K pull down.
eDP
GPP_F19/EDP_VDDEN AV44
GPP_F20/EDP_BKLTEN AV46
GPP_F21/EDP_BKLTCTL AU48
GPP_I4/EDP_HPD/DISP_MISC4 AN6 EDP_HPD R176 100K/4
GPP_I3/DPPE_HPD3/DISP_MISC3 AL15 DDPE_HPD3 R160 10K/4
SMI Pin

VCC3
HDMI_DDPB_CTRLCLK R347 2.2K/4
HDMI_DDPB_CTRLDATA R349 2.2K/4
DVI_DDPC_CTRLCLK R465 2.2K/4
DVI_DDPC_CTRLDATA R462 2.2K/4
DP_DDPD_CTRLCLK R527 2.2K/4
DP_DDPD_CTRLDATA R498 2.2K/4

DDI interfaace Disable
no connect

Port B HDMI

Port C DVI,HDMI2.0 OR Others

Port D Disable

Port D DisplayPort to VGA

DP_HPD RHP2286 10K/4
I,NI,I
Stuff H310M Gaming
unStuff H310-A Pro

Schematic Cfg	Project	
CFG1-7B38-H310 (H310M GAMING PLUS) ver.1.0	V	A
CFG1-7B38-H310-APRO (H310-A Pro) ver.2.0	X	B
CFG1-7B38-H310 (H310-A GAMING ARCTIC) ver.3.0	V	C

MICRO-STAR INT'L CO.,LTD
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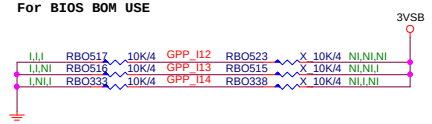
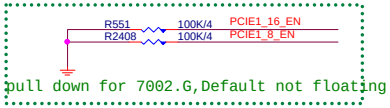
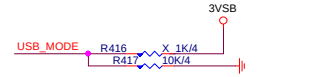
GPIO(SMI/NMI):
GPP_B14,GPP_B20,GPP_B23
GPP_C[23:22]
GPP_D[4:0]
GPP_E[8:0]
GPP_I[3:0]
GPP_G[7:0](Support SMI# only)

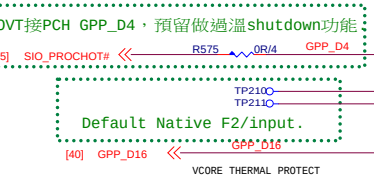
	GPP_I12	GPP_I13	GPP_I14
H310_GPLUS	0	0	0
H310_APRO	0	0	1
H310_GARCTIC	0	1	0

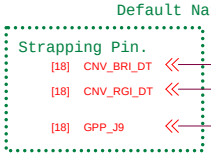
For BIOS BOM USE

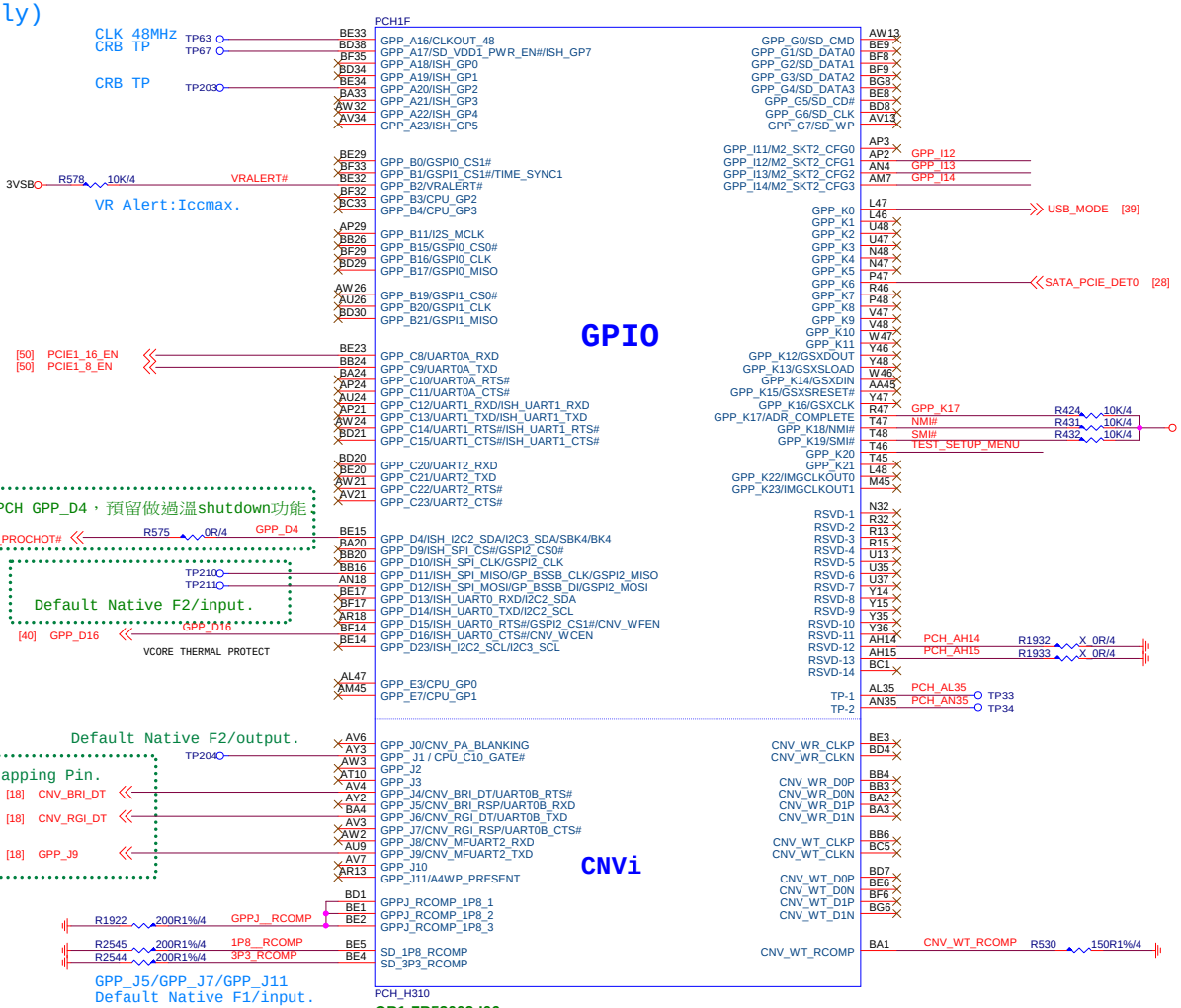












CRB no RSVD.

ESPI_CS1#/ALERT0#/ALERT1#(Server Only)

To TPM

To SIO

CRB 3VDUAL

close to PCH in 500~1000mil

LANPHY USE by SPEC

EZ LED:
PU HIgh to LED side

BIOS distinction CHANNEL OR ODM

PCH1A

LPC eSPI

SMB

Power Management

STRAP

SPI

JTAG

OB1-7B53003-I06

Default Native F1/input/3VDSW

Place Rwithin 200mil of PCH.

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.

Defensive Termination. CRB unstuff.
Place within 1.1" of PCH Pin.

RSMRST#要在VccPrimary stable 10ms
300系列預留線路，防止BIOS把SIO DSW DISABLE時，
造成AC POWER LOSS而產生的異常動作，而產生NO POWER的ISSUE.

RSMRST# USE solution

IO internal sink low

擺在一起(注意到所有的SMBUS的分支)

CFL CRB

SMBUS ESD

D0G-130050C-A68

close to PCH

RTC

Chassis Intrusion

N31-1020151-H06

MICRO-STAR INT'L CO.,LTD		
MS-7B28		
Size: Custom	Document Description: PCH-LPC/SPI/SMBUS/MISC	Rev: 11/21/31
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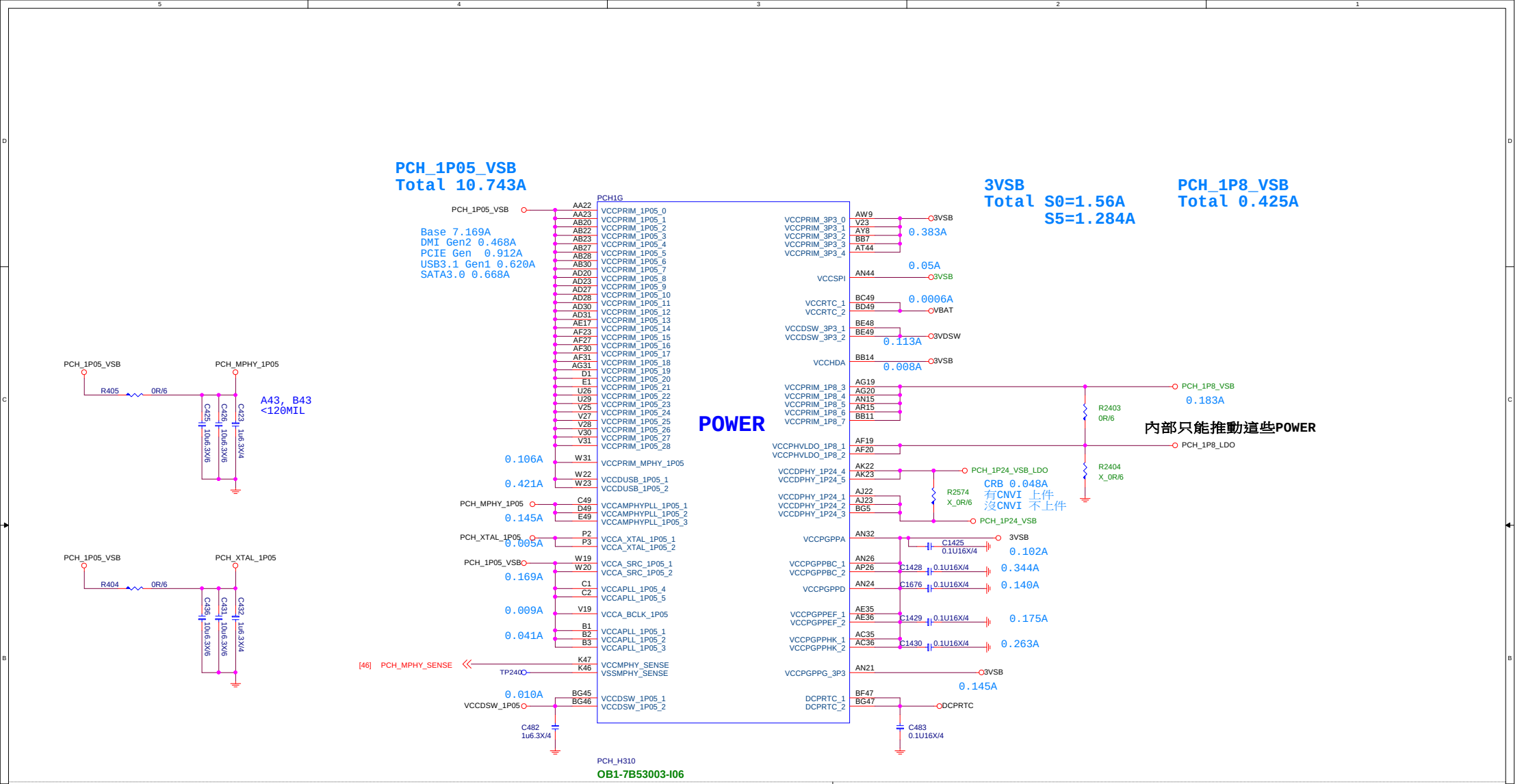
PCH_1P05_VSB
Total 10.743A
Base 7.169A
DMI Gen2 0.468A
PCIE Gen 0.912A
USB3.1 Gen1 0.620A
SATA3.0 0.668A
3VSB
Total S0=1.56A
S5=1.284A
PCH_1P8_VSB
Total 0.425A
POWER
PCH1G
PCH_H310
OB1-7B53003-I06
A43, B43
<120MIL
內部只能推動這些POWER
CRB 0.048A
有CNVI 上件
沒CNVI 不上件
0.106A
0.421A
0.145A
0.005A
0.169A
0.009A
0.041A
0.010A
0.383A
0.05A
0.0006A
0.113A
0.008A
0.183A
0.102A
0.344A
0.140A
0.175A
0.263A
0.145A
Near AN44
PCH_MPHY_1P05
PCH_XTAL_1P05
PCH_1P24_VSB_LDO
PCH_1P24_VSB
PCH_1P8_VSB
PCH_1P8_LDO
3VSB
3VDSW
VBAT
DCPRTC
[46] PCH_MPHY_SENSE
TP240
R405 0R/6
R404 0R/6
R2403 0R/6
R2404 X_0R/6
R2574 X_0R/6

OB1-7B53003-I06

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MS-7B28			
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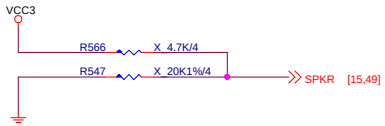
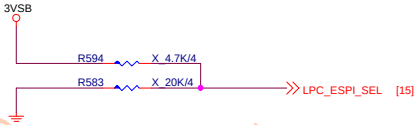
TOP Swap



Internal pull-down 20K is disabled after PLTRST#

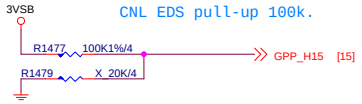
LPC eSPI Mode



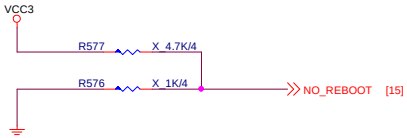
0 : LPC
1 : eSPI

Internal pull-down 20K is disabled after RSMRST

Reserved



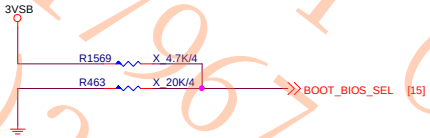
No Reboot



0 : DISABLE (Default)
1 : ENABLE

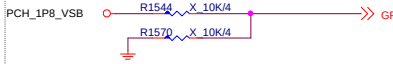
Internal pull-down 20K is disabled after PLTRST#

Boot BIOS



0 : SPI
1 : LPC

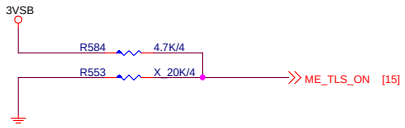
Internal pull-down 20K is disabled after PLTRST



VCCSPI 3.3V,Internal pull-down.

SELECT THE SPI BIOS FLASH INTERFACE OPERATING VOLTAGE
0 = VCCPSPI IS CONNECTED TO 3.3V RAIL - DEFAULT
1 = VCCPSPI IS CONNECTED TO 1.8V RAIL
PCH HAS INTERNAL 20K PD

AMT and SBA with confidentiality

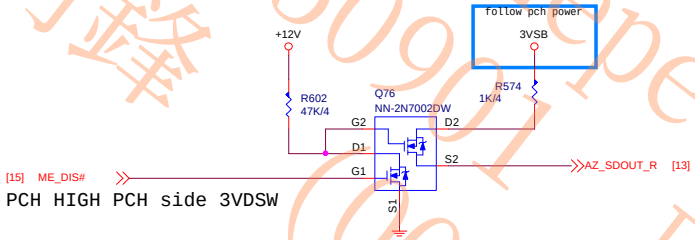


0 : DISABLE
1 : ENABLE (Default)

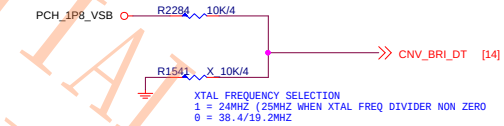
Internal pull-down 20K is disabled after RSMRST

HDA_SDO

ME flash by GPIO

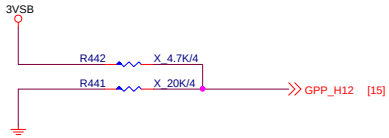


PCH HIGH PCH side 3VDSW



XTAL FREQUENCY SELECTION
1 = 24MHZ (25MHZ WHEN XTAL FREQ DIVIDER NON ZERO
0 = 38.4/19.2MHZ

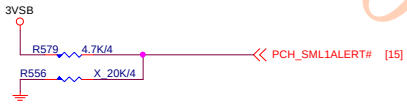
ESPI FLASH SHARING MODE

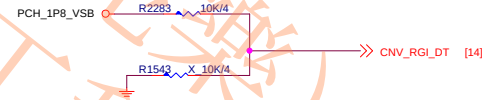


0 : MASTER ATTACHED FLASH SHARING
1 : SLAVE ATTACHED FLASH SHARING

Internal pull-down 20K is disabled after RSMRST

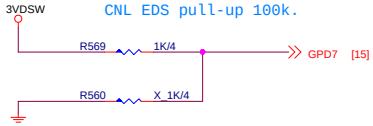
Reserved



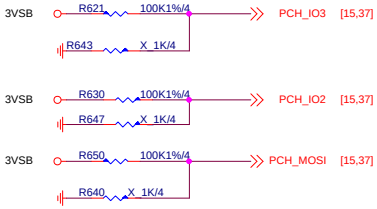


An external pull-up or pull-down is required.
0 = Integrated CNVi enable
1 = Integrated CNVi disable
Voltage level ~ 1.8V only

Reserved



XTAL INPUT MODE
0 = XTAL INPUT IS SINGLE-ENDED
1 = XTAL INPUT IS DIFFERENTIAL
PCH HAS INTERNAL 20K PD



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Size: Custom | Document Description: PCH-Strap | Rev: 11/21/31

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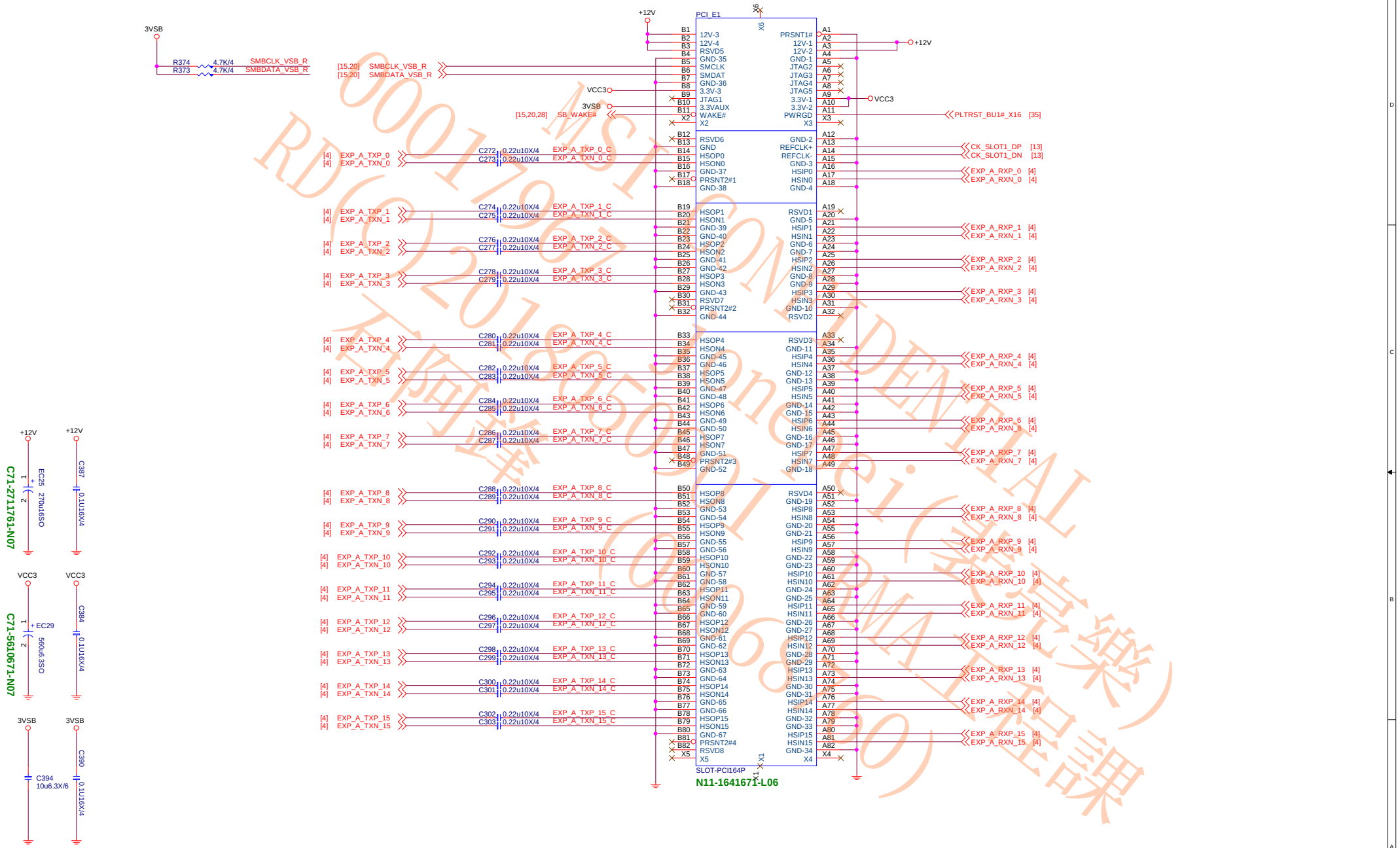

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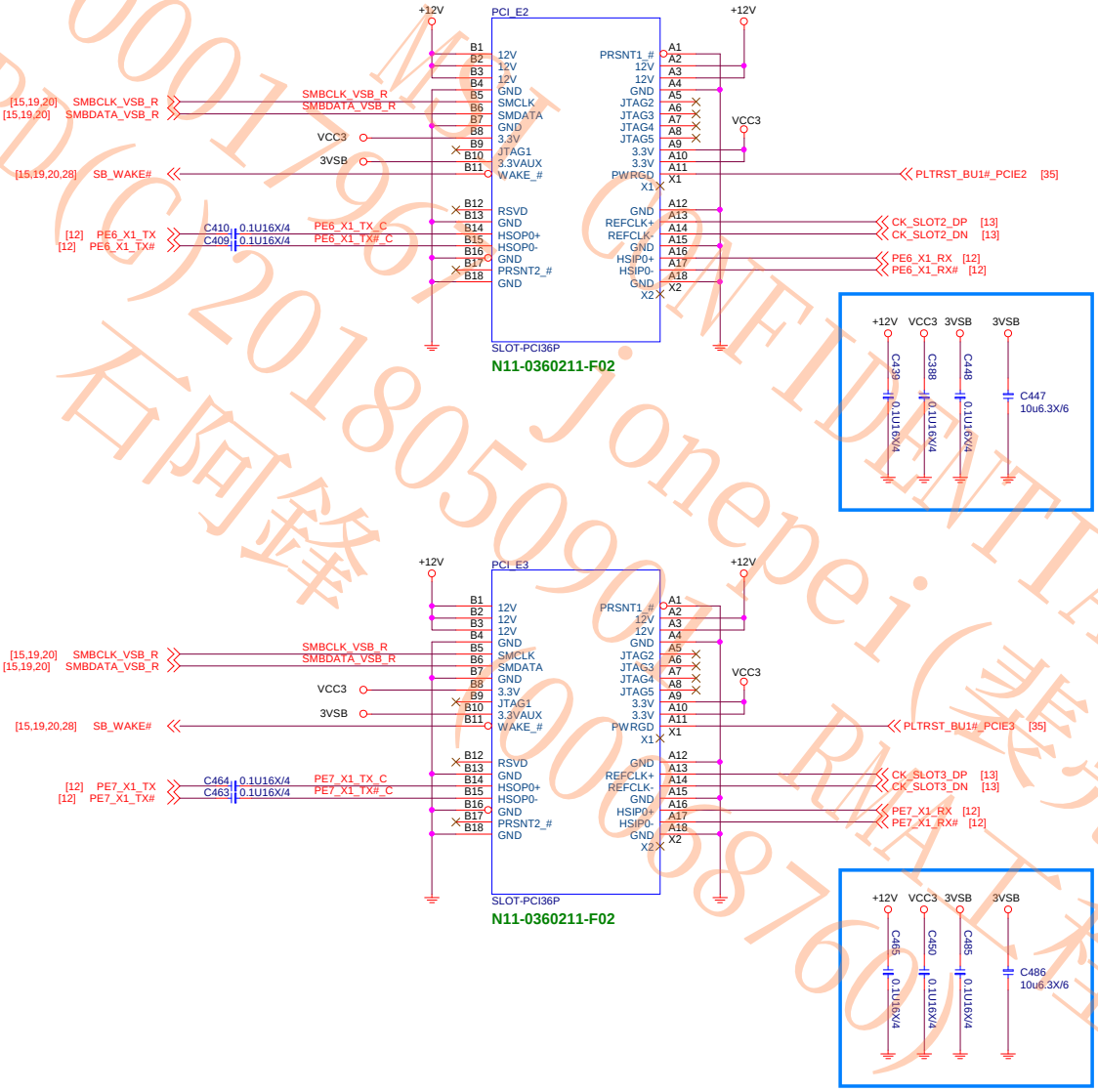
MS-7B28		
Size: Custom	Document Description: PCIE SLOT-CPU(X16)	Rev: 11/21/31
Date: Friday, January 19, 2018	Sheet 19 of 60	



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MS-7B28		
Size: Custom	Document Description: PCIE SLOT-PCH(X1)	Rev: 11/21/31
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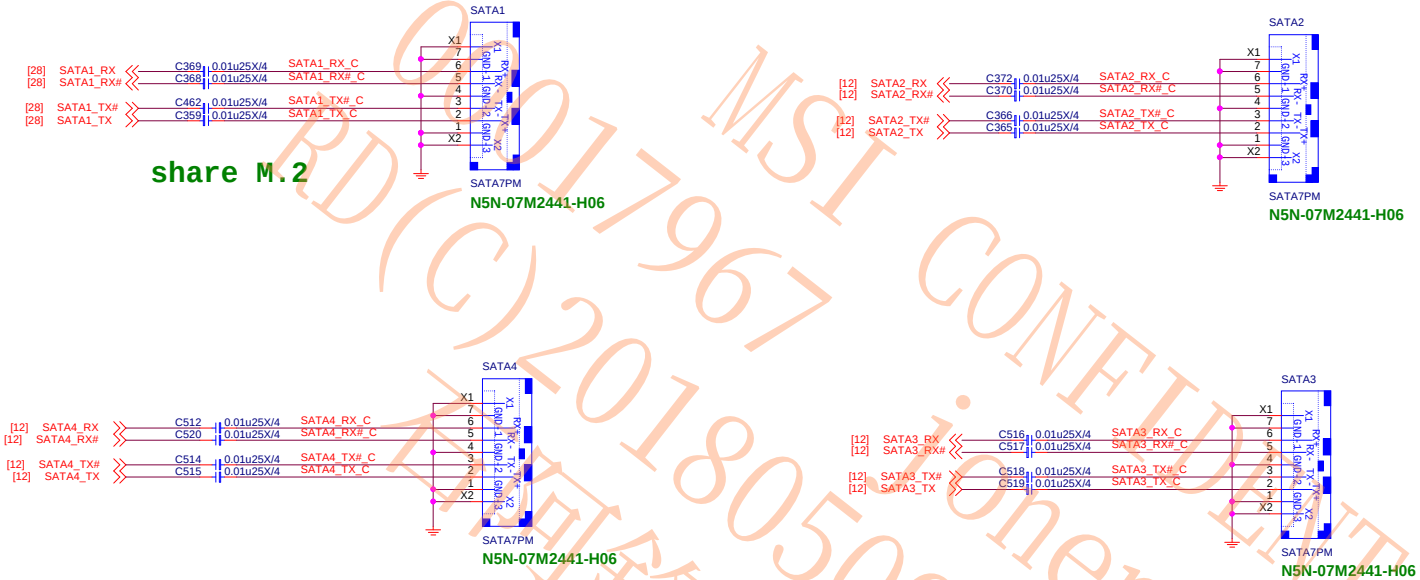
SATA 6G



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Size: Custom	Document Description: SATA connector	Rev: 11/21/31
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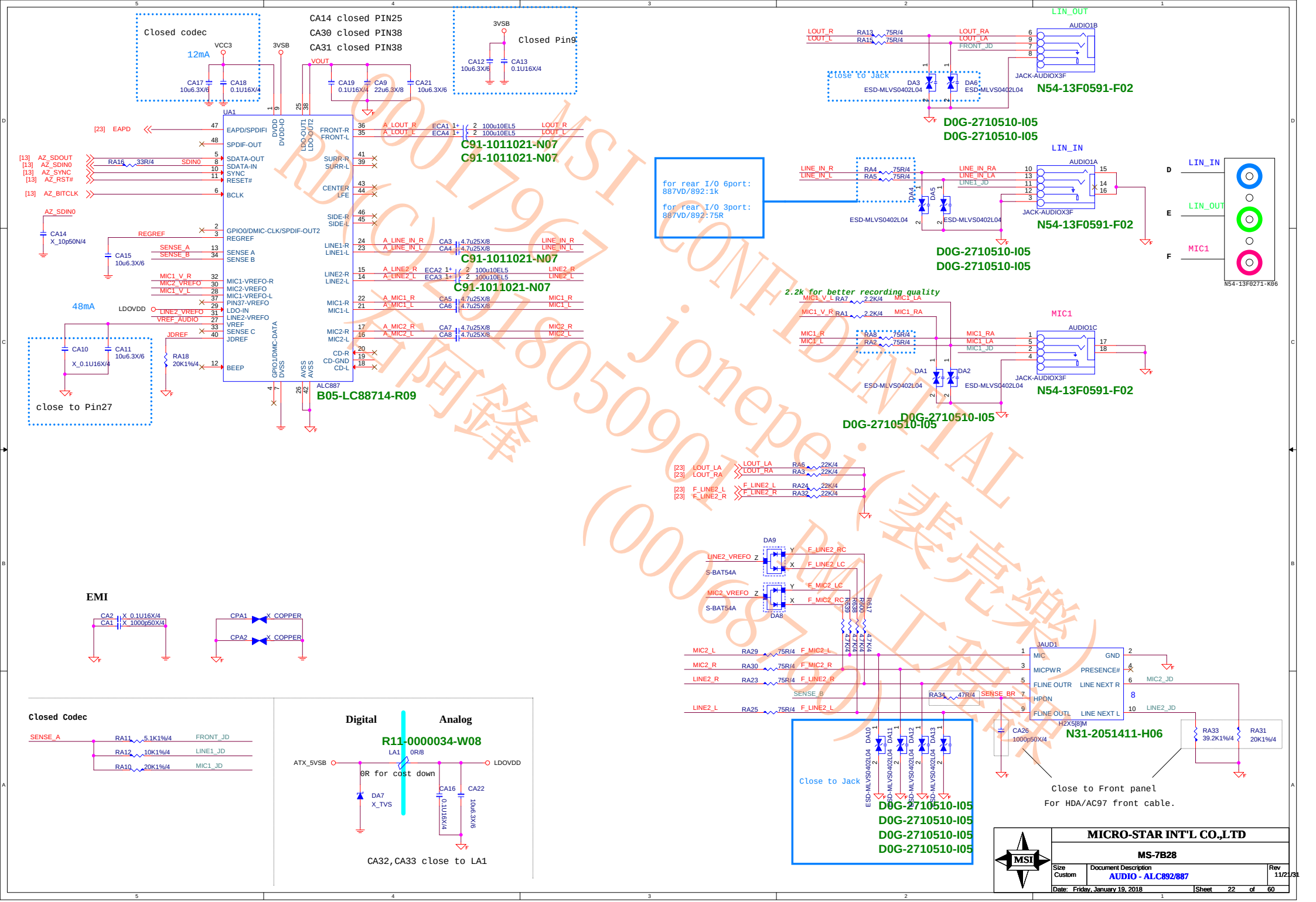
Closed codec
12mA
VCC3
3VSB
CA17 10u6.3X/6
CA18 0.1U16X/4
CA14 closed PIN25
CA30 closed PIN38
CA31 closed PIN38
VOUT
CA19 0.1U16X/4
CA9 22u6.3X/8
CA21 10u6.3X/6
Closed Pin9
CA12 10u6.3X/6
CA13 0.1U16X/4
UA1
EAPD/SPDIFI
SPDIF-OUT
SDATA-OUT
SDATA-IN
SYNC
RESET#
BCLK
GPIO0/DMIC-CLK/SPDIF-OUT2
REGREF
SENSE 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
DVDD
DVDD-IO
LDO-OUT1
LDO-OUT2
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
AVSS
DVSS
ALC887
B05-LC88714-R09
C91-1011021-N07
C91-1011021-N07
C91-1011021-N07
C91-1011021-N07
close to Pin27
48mA
LDOVDD
LINE2_VREFO
VREF_AUDIO
CA10 X_0.1U16X/4
CA11 10u6.3X/6
CA15 10u6.3X/6
CA14 X_10p50N/4
RA18 20K1%/4
RA16 33R/4
AZ_SDOUT
AZ_SDIN0
AZ_SYNC
AZ_RST#
AZ_BITCLK
EAPD
LOUT_R
LOUT_L
RA13 75R/4
RA15 75R/4
LOUT_RA
LOUT_LA
FRONT_JD
AUDIO1B
JACK-AUDIOX3F
Close to Jack
DA3 ESD-MLVS0402L04
DA6 ESD-MLVS0402L04
N54-13F0591-F02
D0G-2710510-I05
D0G-2710510-I05
LIN_OUT
LIN_IN
LINE_IN_R
LINE_IN_L
RA4 75R/4
RA5 75R/4
LINE_IN_RA
LINE_IN_LA
LINE1_JD
AUDIO1A
DA4
DA5
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
D
LIN_IN
E
LIN_OUT
F
MIC1
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
RA3 75R/4
RA2 75R/4
MIC1_JD
AUDIO1C
DA1
DA2
ESD-MLVS0402L04
JACK-AUDIOX3F
N54-13F0591-F02
D0G-2710510-I05
[23] LOUT_LA
[23] LOUT_RA
RA6 22K/4
RA3 22K/4
[23] F_LINE2_L
[23] F_LINE2_R
RA24 22K/4
RA32 22K/4
DA9
LINE2_VREFO
S-BAT54A
F_LINE2_RC
F_LINE2_LC
DA8
MIC2_VREFO
F_MIC2_LC
F_MIC2_RC
R638 47/4
R639 47/4
R640 47/4
R641 47/4
MIC2_L
MIC2_R
LINE2_R
LINE2_L
RA29 75R/4
RA30 75R/4
RA23 75R/4
RA25 75R/4
SENSE_B
RA34 47R/4
SENSE_BR
JAUD1
MIC
MICPWR
FLINE OUTR
HPON
FLINE OUTL
GND
PRESENCE#
LINE NEXT R
LINE NEXT L
H2X5[8]M
MIC2_JD
LINE2_JD
N31-2051411-H06
CA26 1000p50X/4
RA33 39.2K1%/4
RA31 20K1%/4
Close to Front panel
For HDA/AC97 front cable.
Close to Jack
DA10 DA11 DA12 DA13
ESD-MLVS0402L04
D0G-2710510-I05
D0G-2710510-I05
D0G-2710510-I05
D0G-2710510-I05
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
LA1 0R/8
ATX_5VSB
LDOVDD
0R for cost down
DA7 X_TVS
CA16 0.1U16X/4
CA22 10u6.3X/6
CA32,CA33 close to LA1
MICRO-STAR INT'L CO.,LTD
MS-7B28
Size Custom
Document Description
AUDIO - ALC892/887
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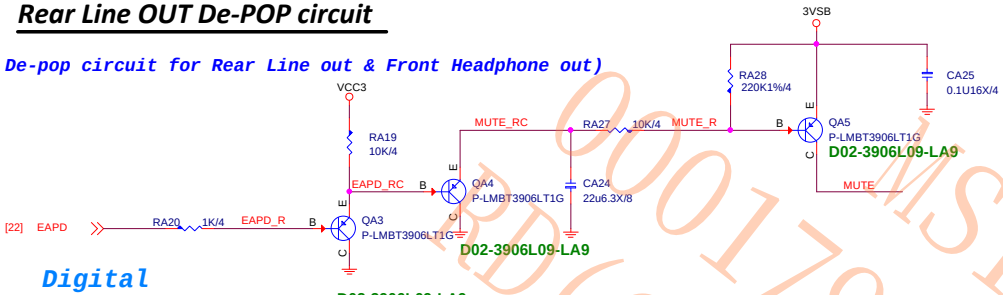
Rear Line OUT De-POP circuit

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

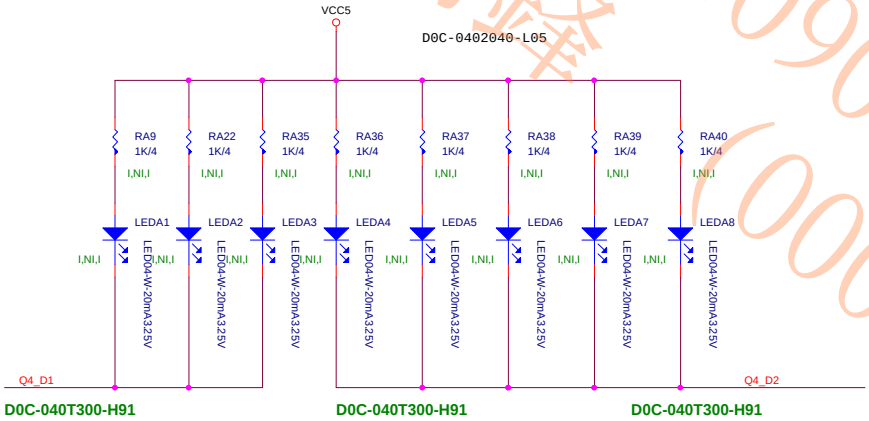


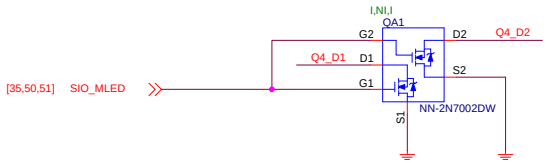
Digital

Analog

Audio moat is transparent and width 40mil

Audio LED





Schematic Cfg	Project	
CFG1-7B38-H310 (H310M GAMING PLUS) ver.1.0	V	A
CFG1-7B38-H310-APRO (H310-A Pro) ver.2.0	X	B
CFG1-7B38-H310 (H310-A GAMING ARCTIC) ver.3.0	V	C

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Size: Custom | Document Description: AUDIO - depop circuit | Rev: 11/21/31

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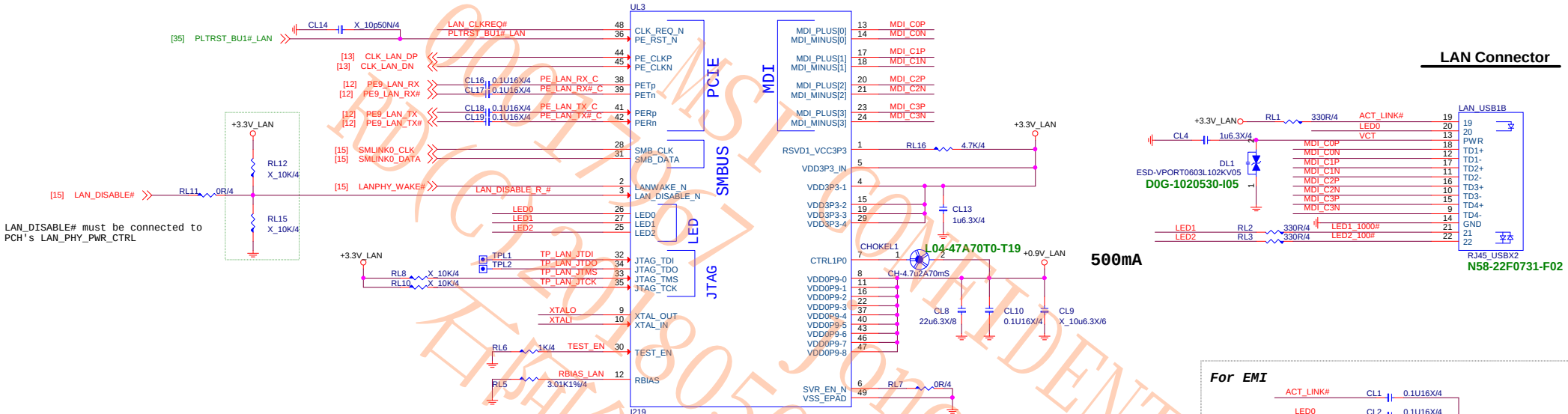
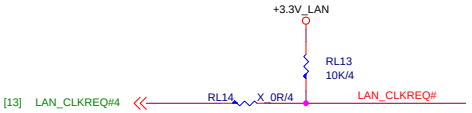
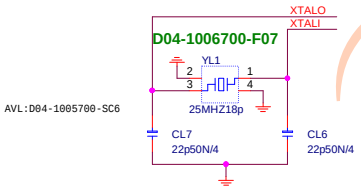
Intel Lan- I219



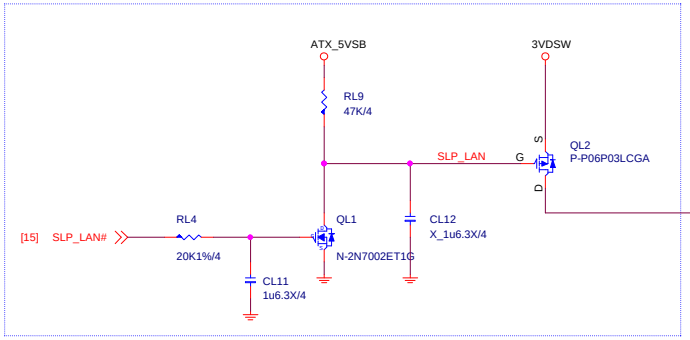
PCH's PCIECLKRQ<n> port mustbe mapped to PCH's PET/R<n+1>port.
If CLK_REQ_N is not used, pin48 is pulled up 10KR to 3.3V_LAN





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.

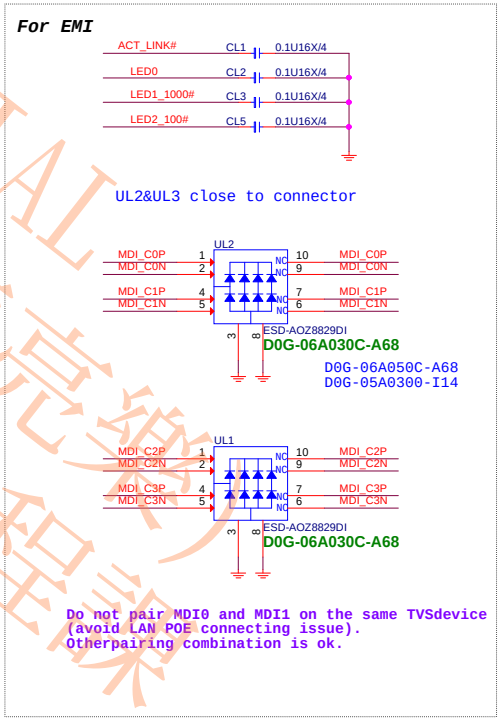
support WOL from Deep Sx:
Power source from 3VA (DSW power) & make sure MAX current is enough to support i218/i219.



+3.3V_LAN

I219:542mW

Note:These caps closed to PHY



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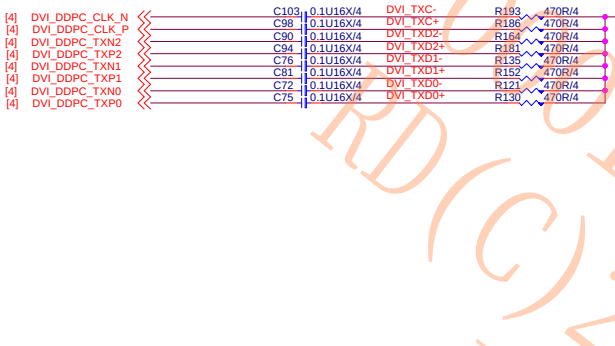
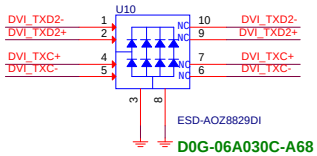
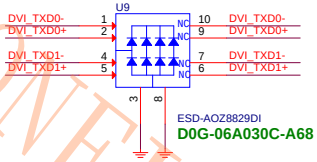
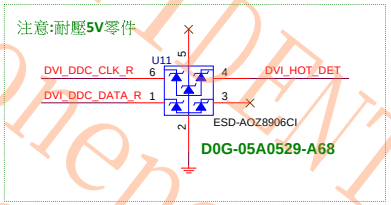
DVI level shifter

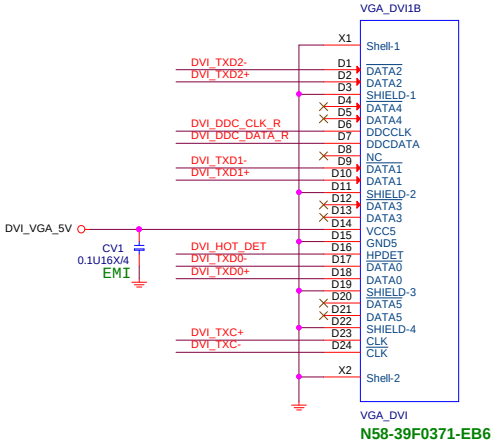
VGA: resolution of 2048x1536 pixels with 32-bit color at 75 Hz (4:3 QXGA)

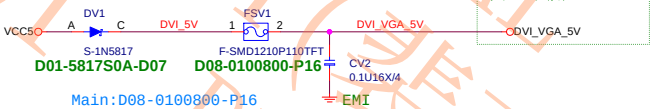


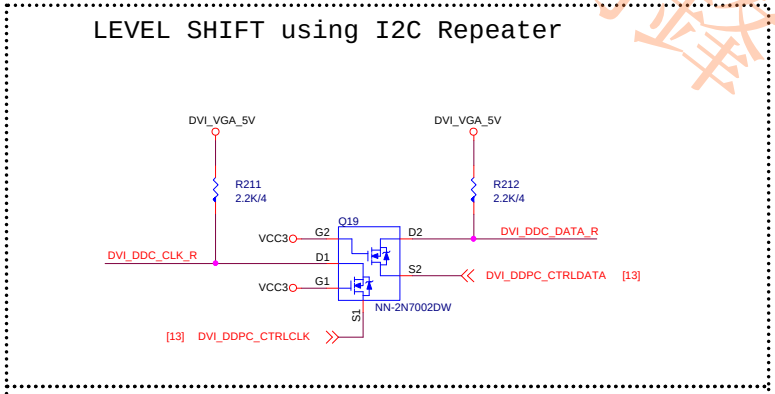


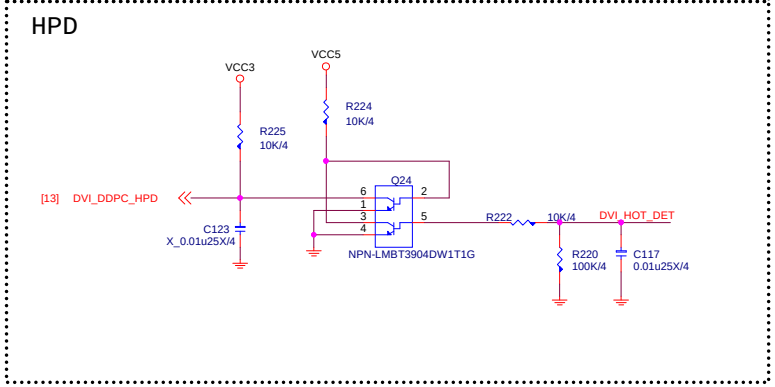


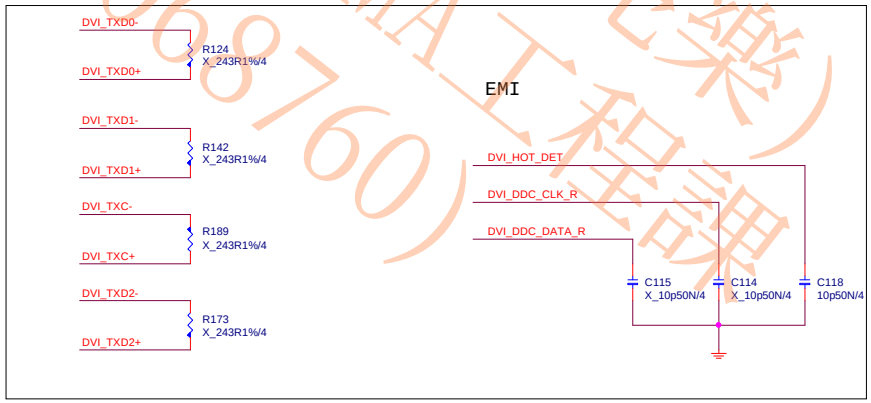












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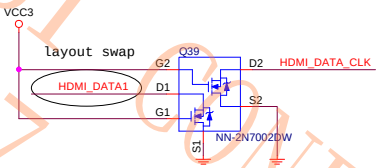
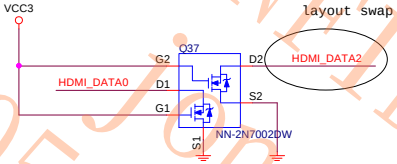
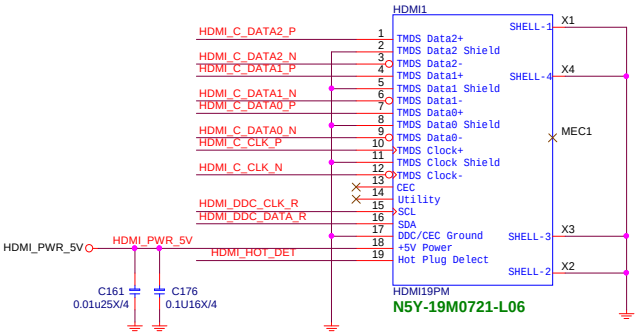
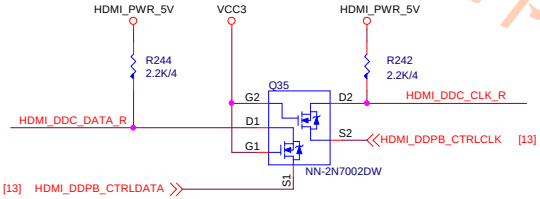
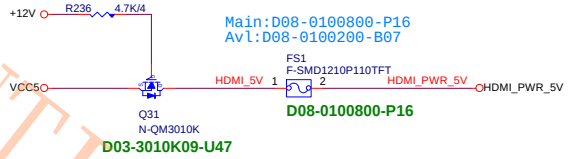
HDMI, DVI : 1920x1200 at 60 Hz (16:10 WUXGA)

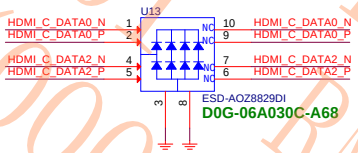


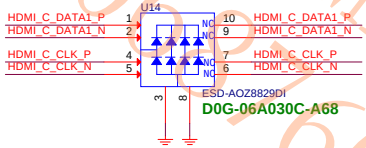


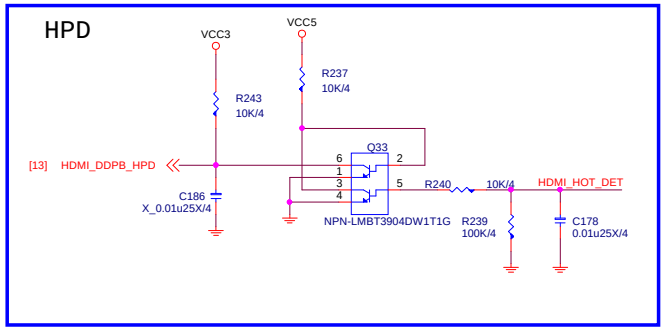


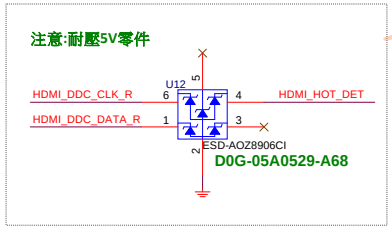


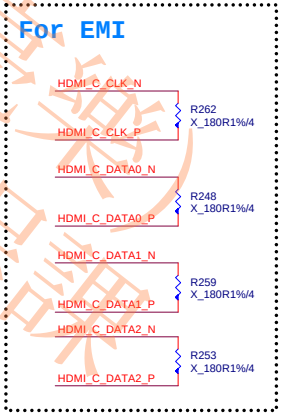












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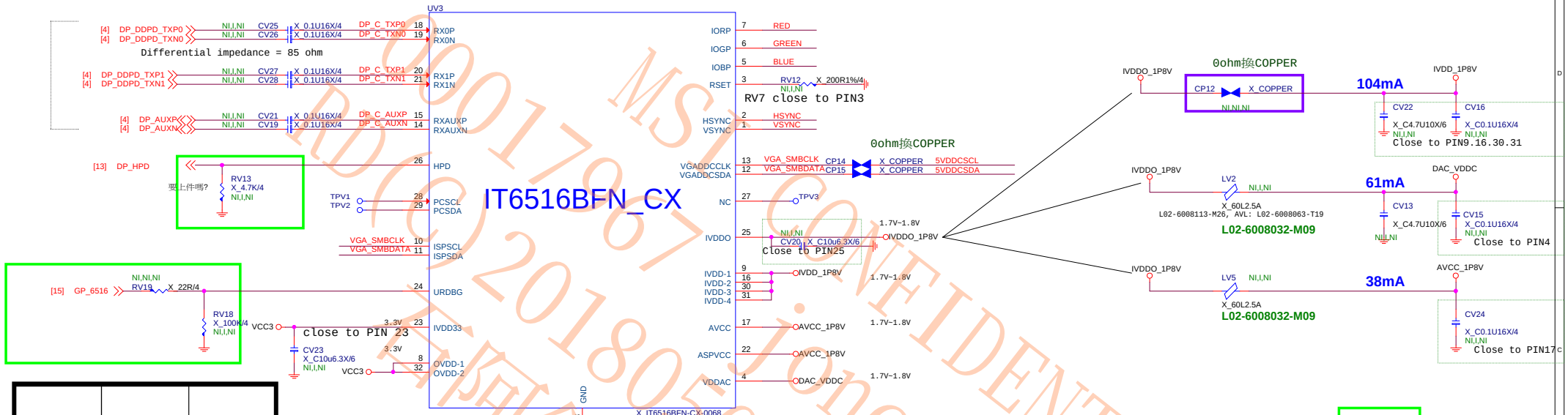
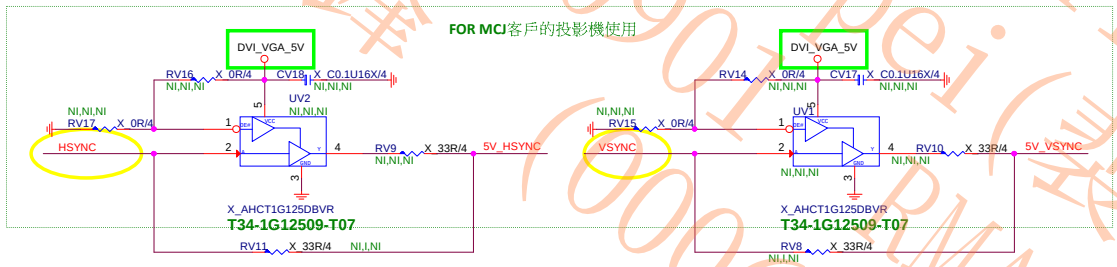
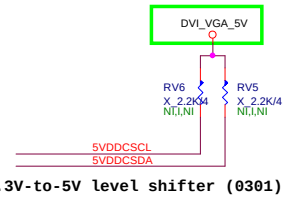
Note:

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

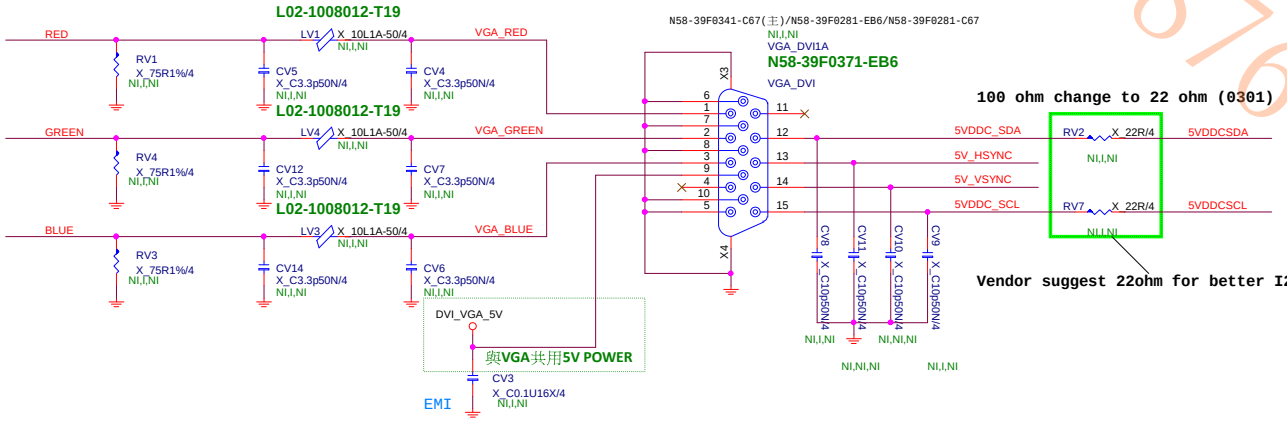


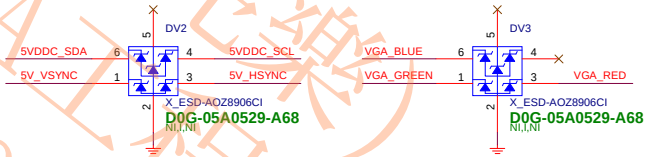
System Status	GPIO	IT6516b's HPD
Legacy Mode (VBIOS) /DOS MOde	HIGH	Force HIGH
Windows /UEFI Mode (GOP)	LOW	Depend on VGA device's plug/unplug





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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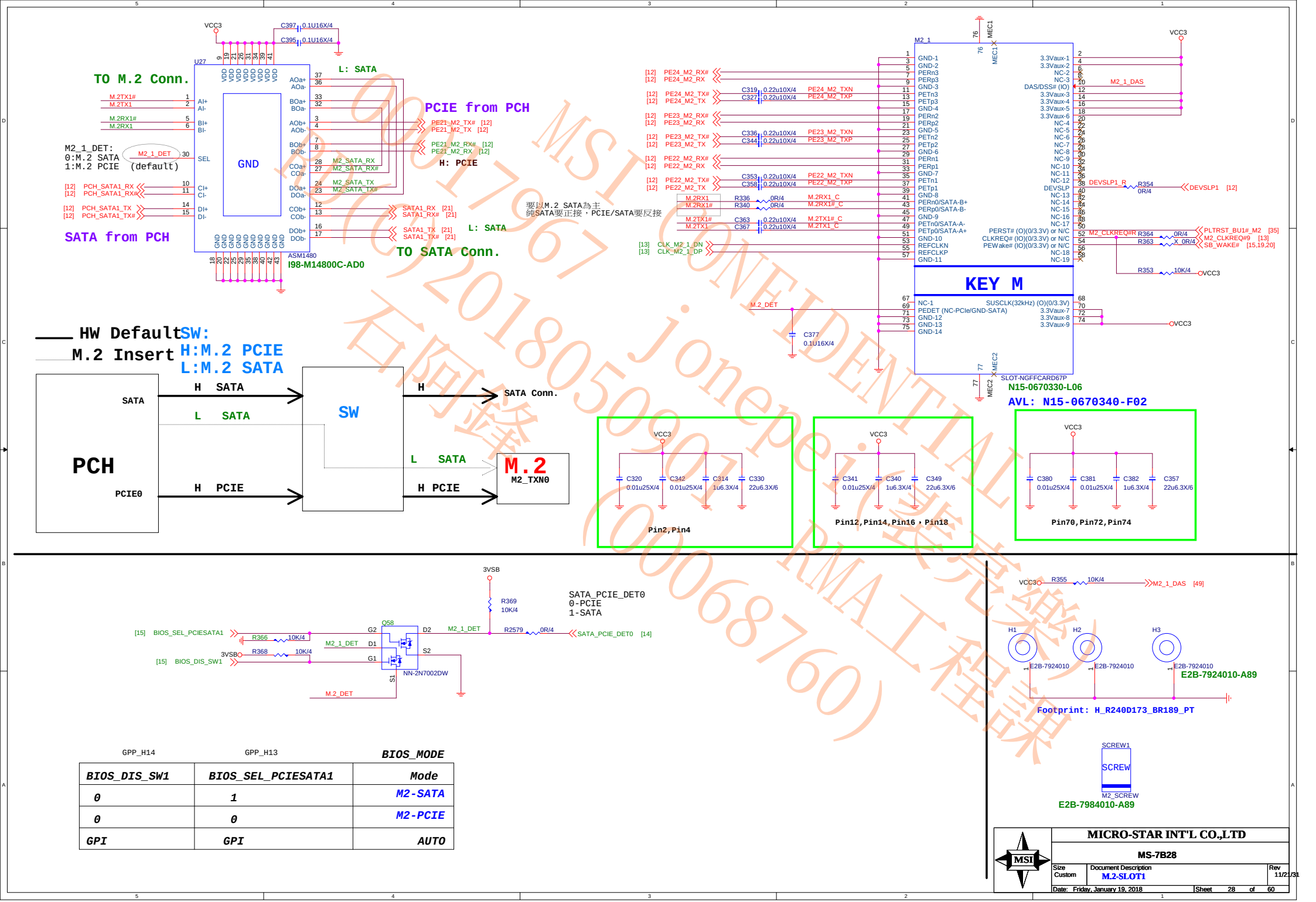

GPP_H14	GPP_H13	BIOS_MODE
BIOS_DIS_SW1	BIOS_SEL_PCIESATA1	Mode
0	1	M2-SATA
0	0	M2-PCIE
GPI	GPI	AUTO

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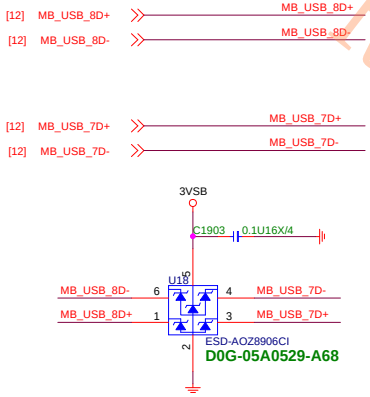
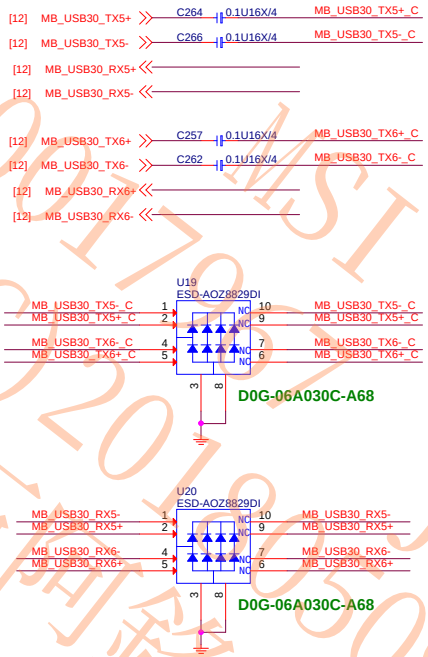
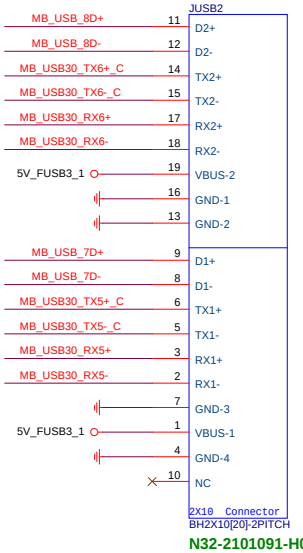
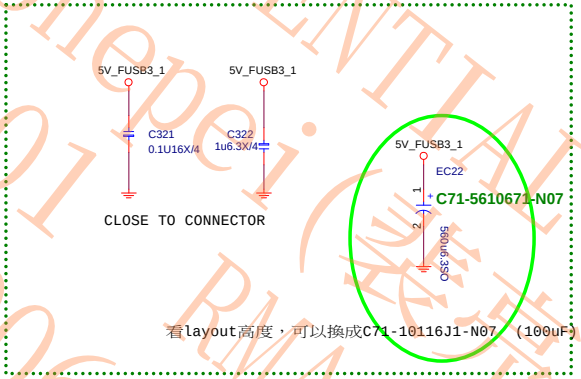
Front JUSB3 port 7,8









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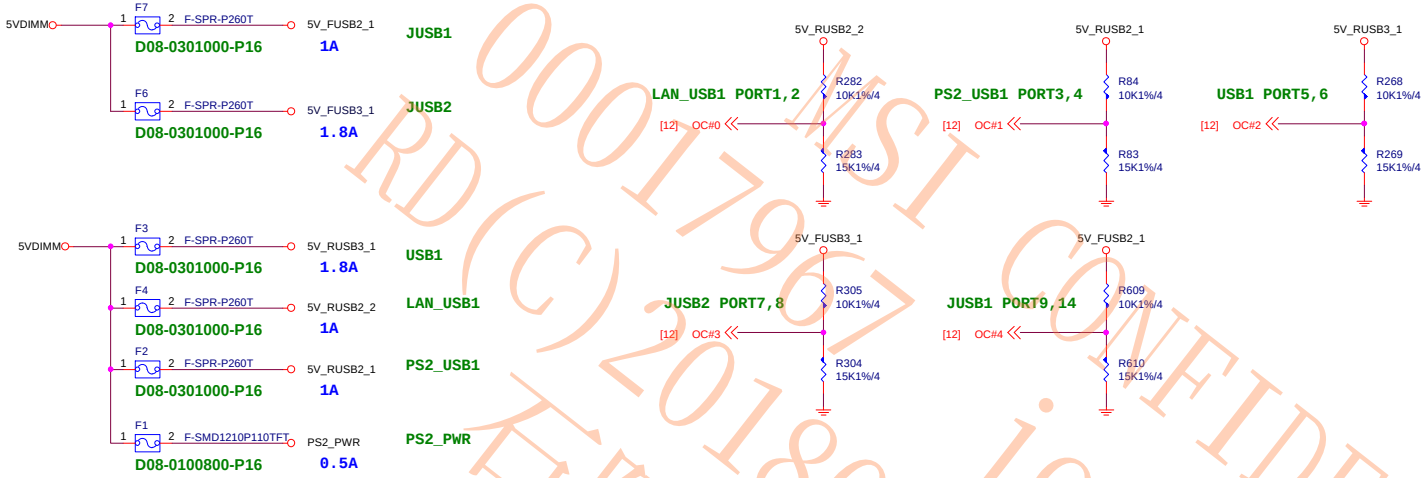
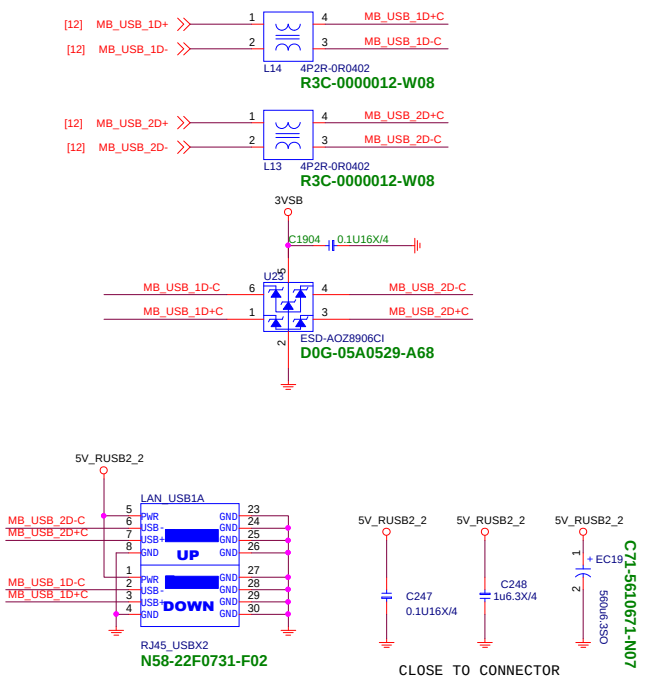
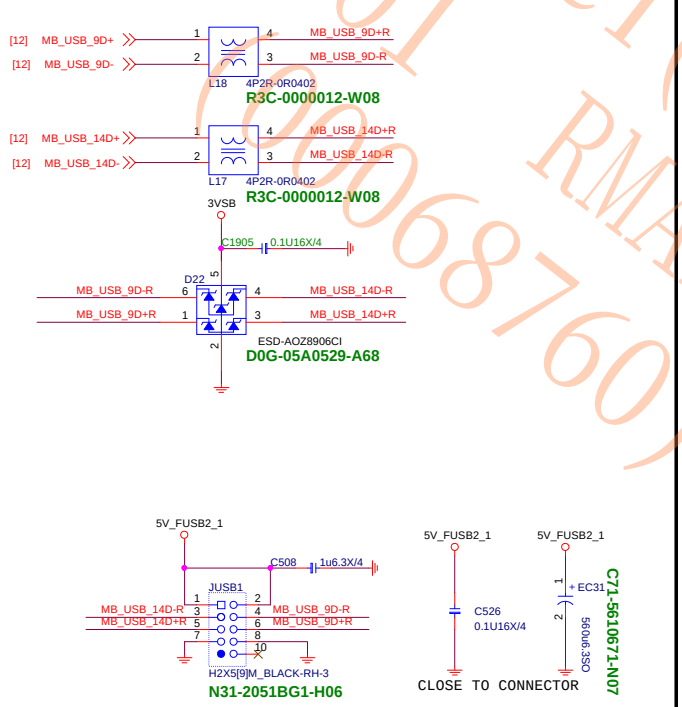


USB CONN	USB POWER	PCH PORT	OC# SIGNAL
LAN_USB1	5V_RUSB2_2	Port1,2	OC#0
PS2_USB1	5V_RUSB2_1	Port3,4	OC#1
USB1	5V_RUSB3_1	Port5,6	OC#2
JUSB2	5V_FUSB3_1	Port7,8	OC#3
JUSB1	5V_FUSB2_1	Port9,14	OC#4

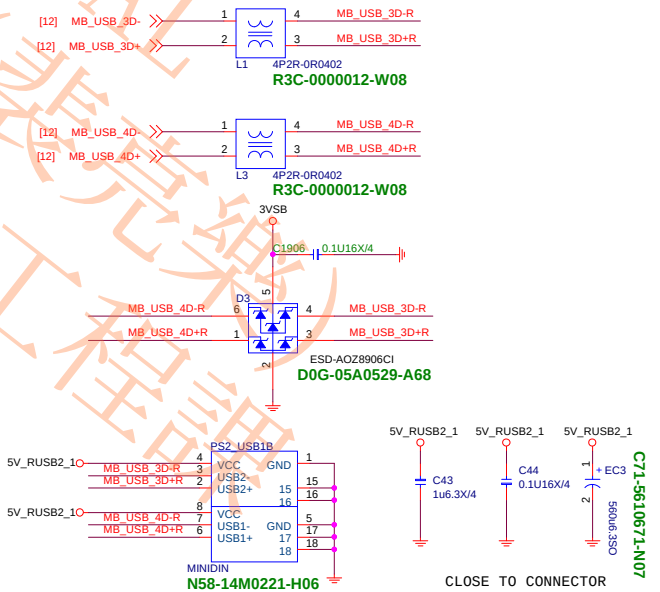
Rear USB1 port 1,2



JUSB1 PORT 9,14



PS2_USB1 PORT 3,4



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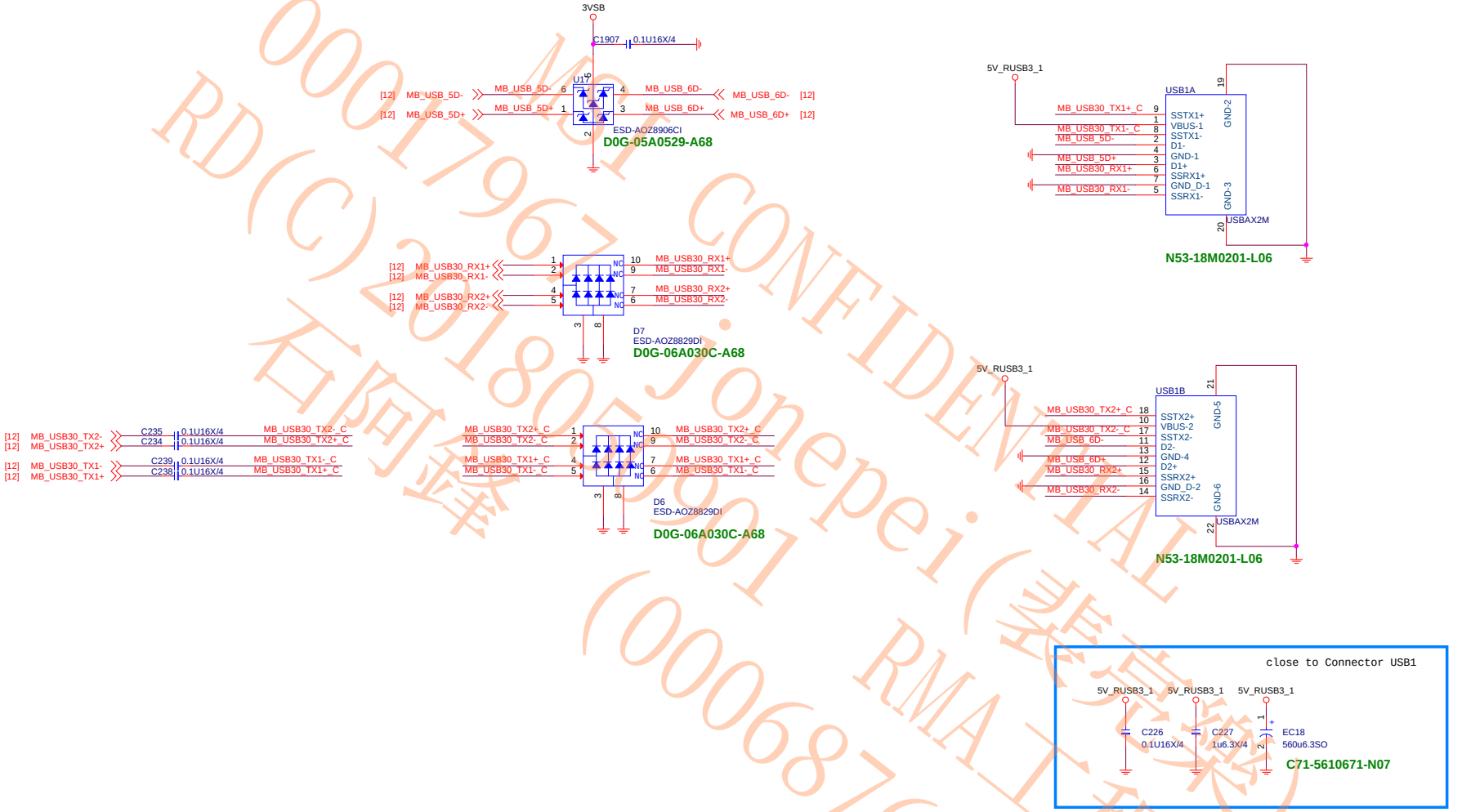
REAR USB1 Connect



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Size: Custom	Document Description: REAR USB1 Connect	Rev: 11/21/31
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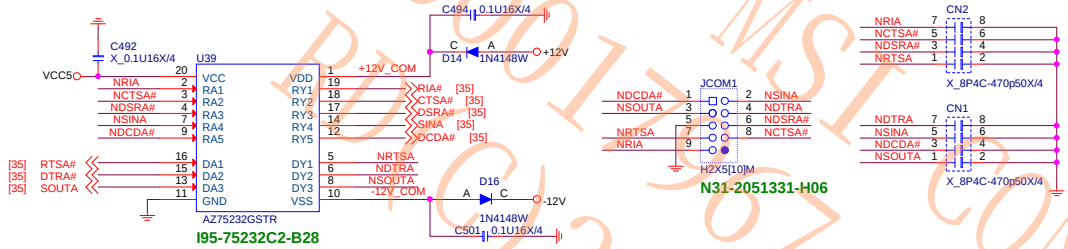
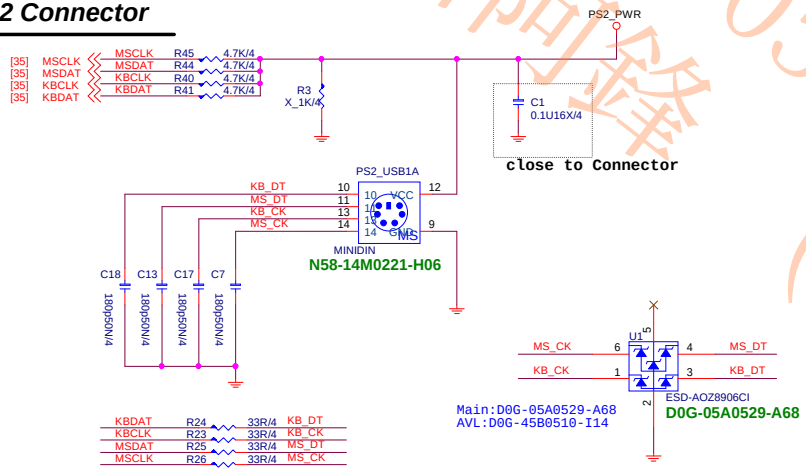
SERIAL PORT 1



I95-75232C2-B28

N31-2051331-H06

PS2 Connector



N58-14M0221-H06

D0G-05A0529-A68

MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7B28	
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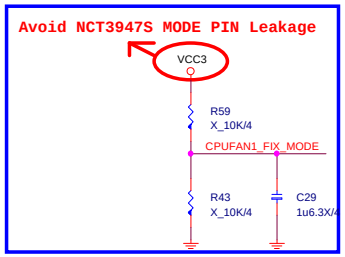
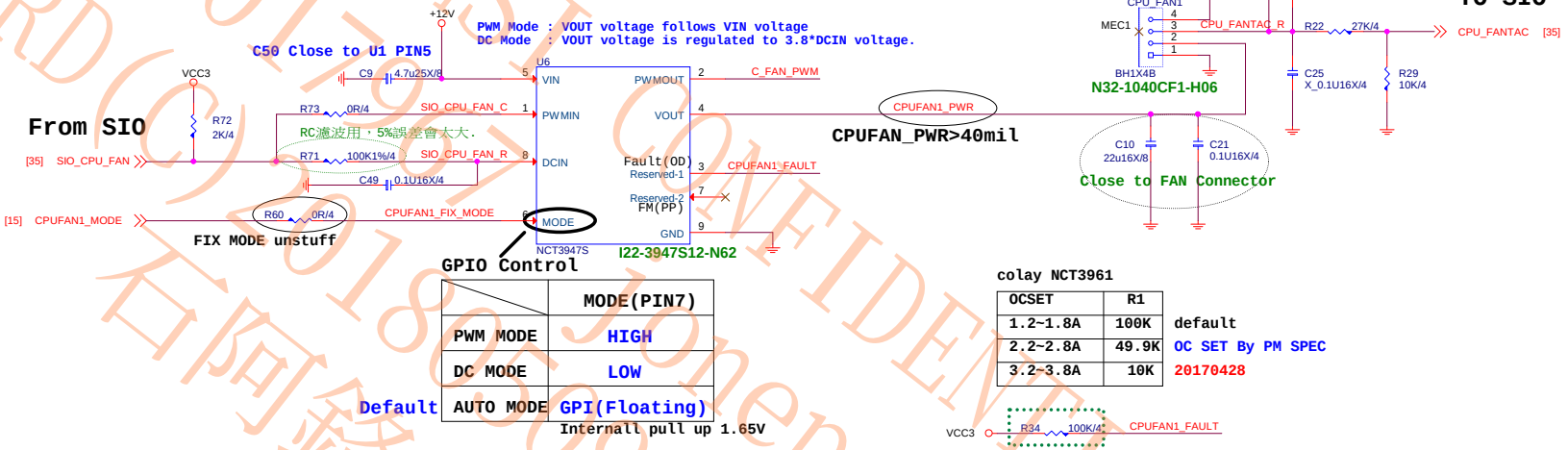
TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE

GPIO可以由BIOS切換 PWM/DC MODE





	MODE(PIN7)
PWM MODE	HIGH
DC MODE	LOW
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

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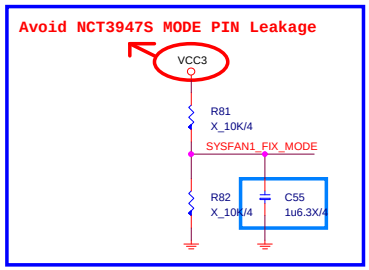
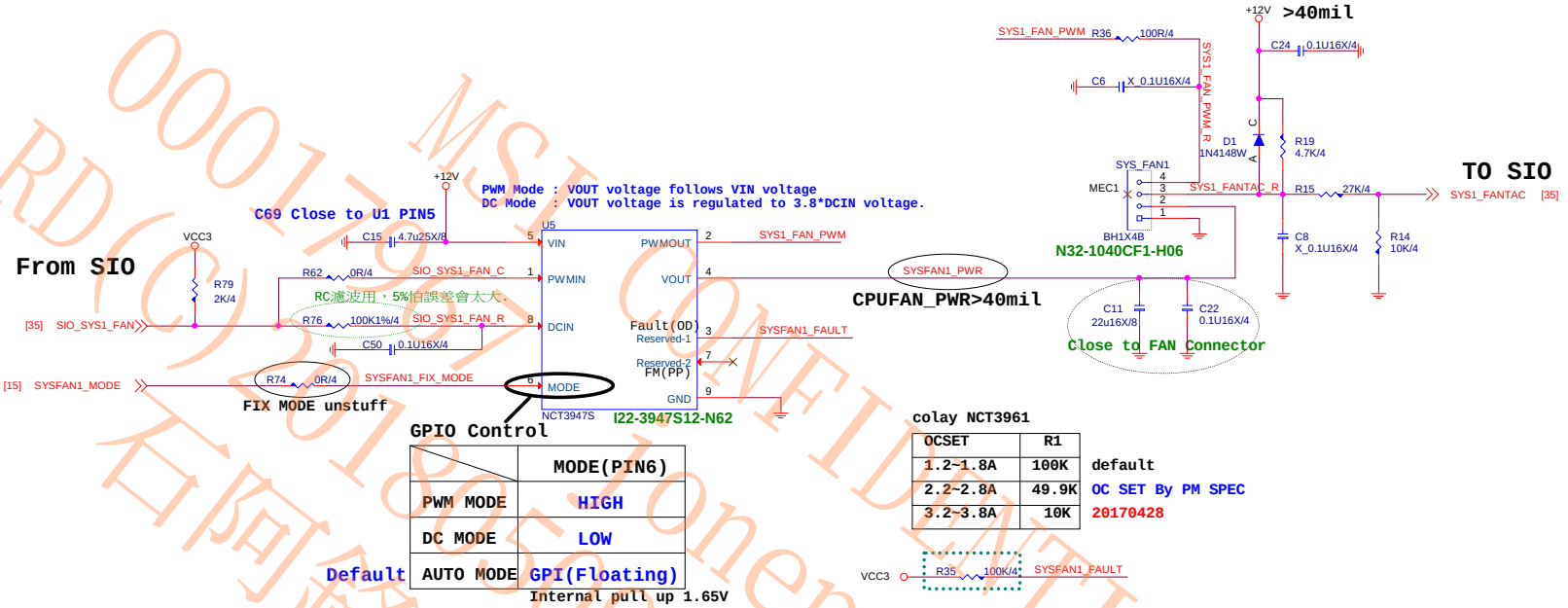
TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE





MICRO-STAR INT'L CO.,LTD

MS-7B28

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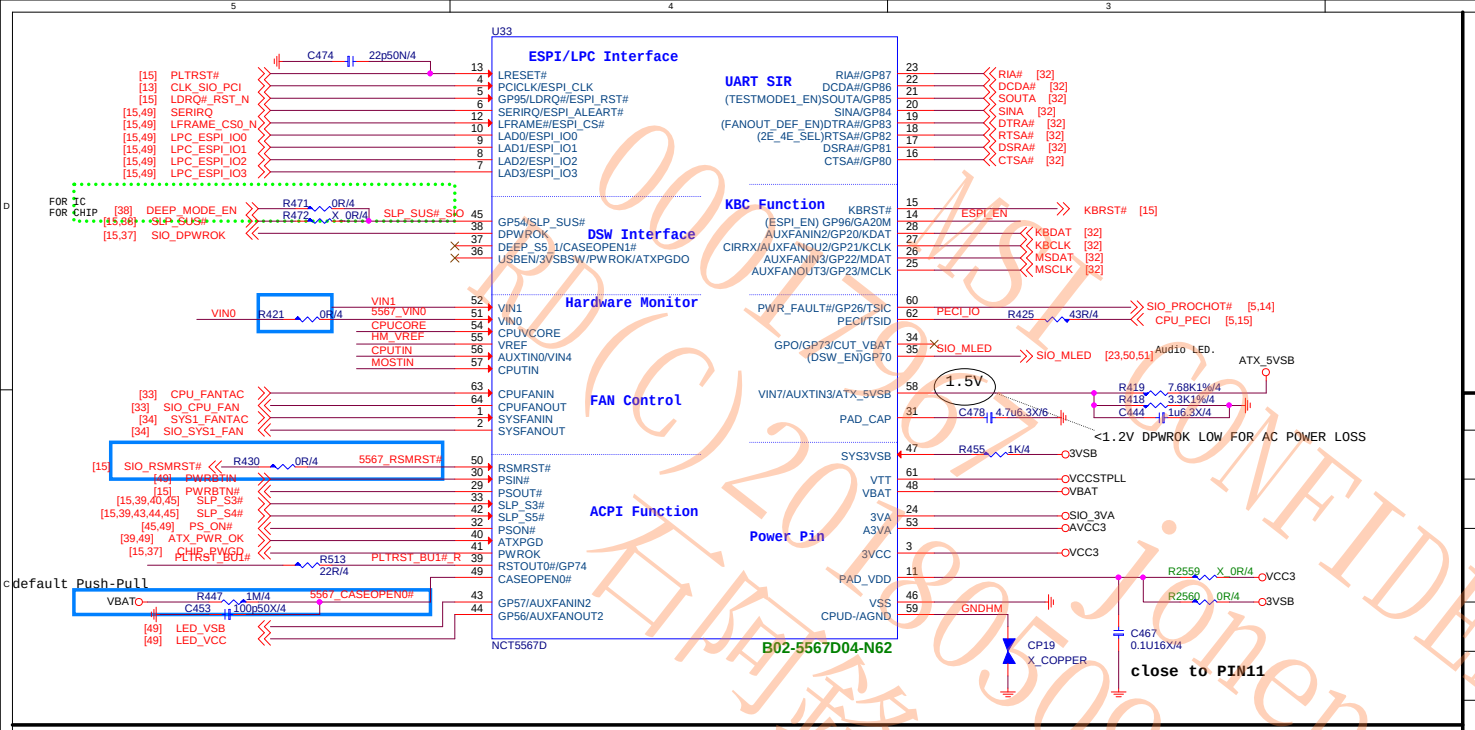
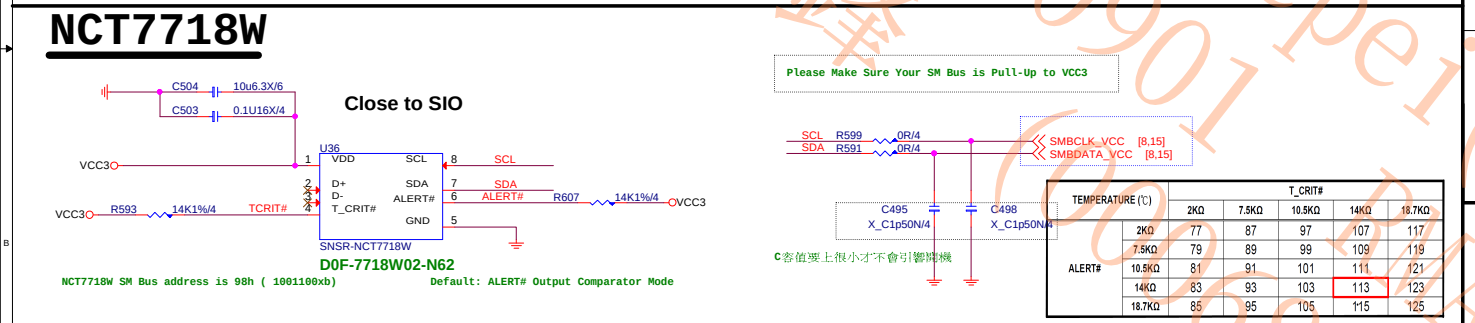
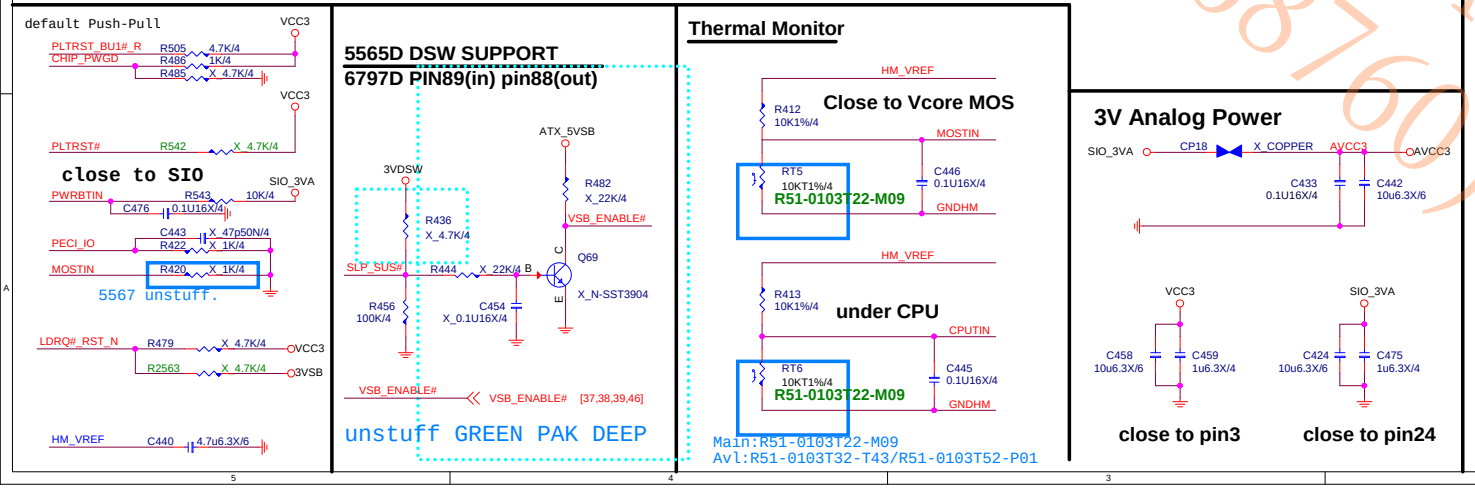
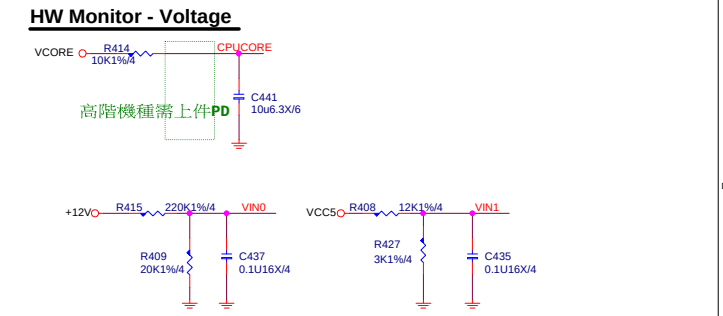
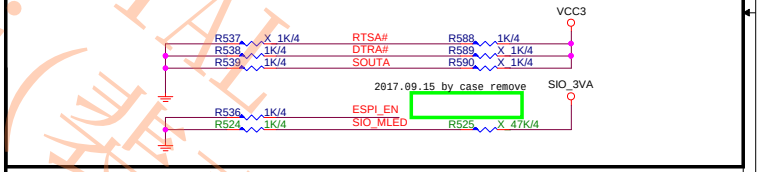


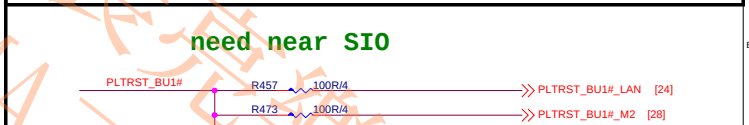


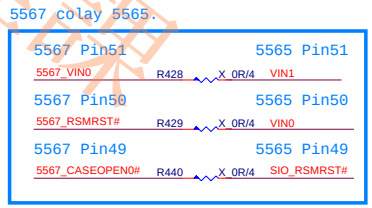




PIN	5567D NAME	Circuit NAME	0	1
18	2E_4E_SEL	RTSA#	I/O ADDRESS 2E	I/O ADDRESS 4E
19	FANOUT_DEF_EN	DTRA#	CPU FANOUT default RPM 50%.	CPU FANOUT default RPM 100%
21	TESTMODE1_EN	SOUTA	DISABLE TEST1MODE	ENABLE TEST1MODE
14	ESPI_EN	GA20M	ENABLE LPC	ENABLE ESPI
35	DSW_EN	DSW_EN	DISABLE	ENABLE DSW_EN







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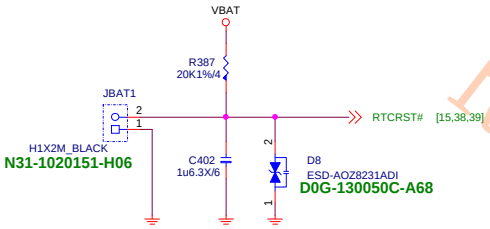
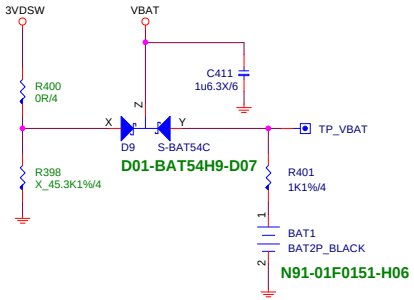
Cut VBAT



VBAT



MICRO-STAR INT'L CO.,LTD		
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Size: Custom	Document Description: CUT VBAT circuit	Rev: 11/21/31
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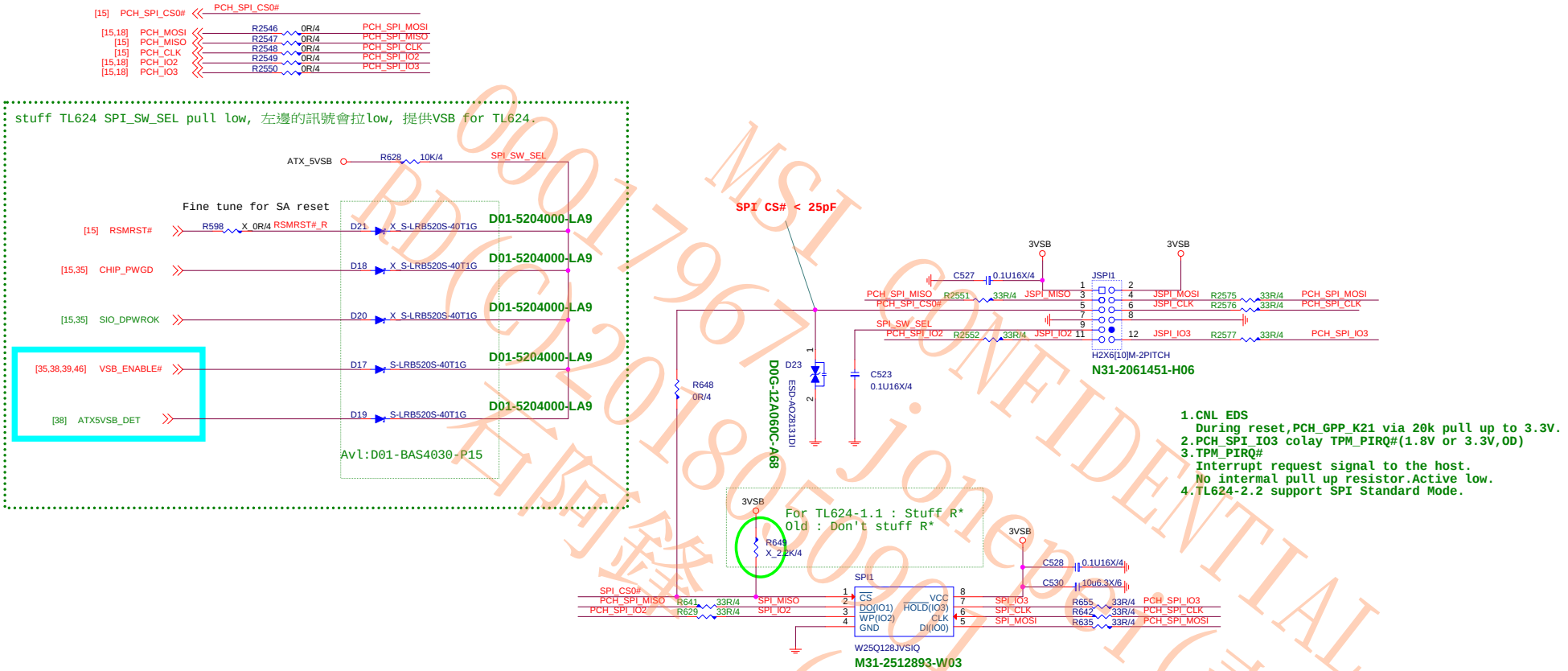

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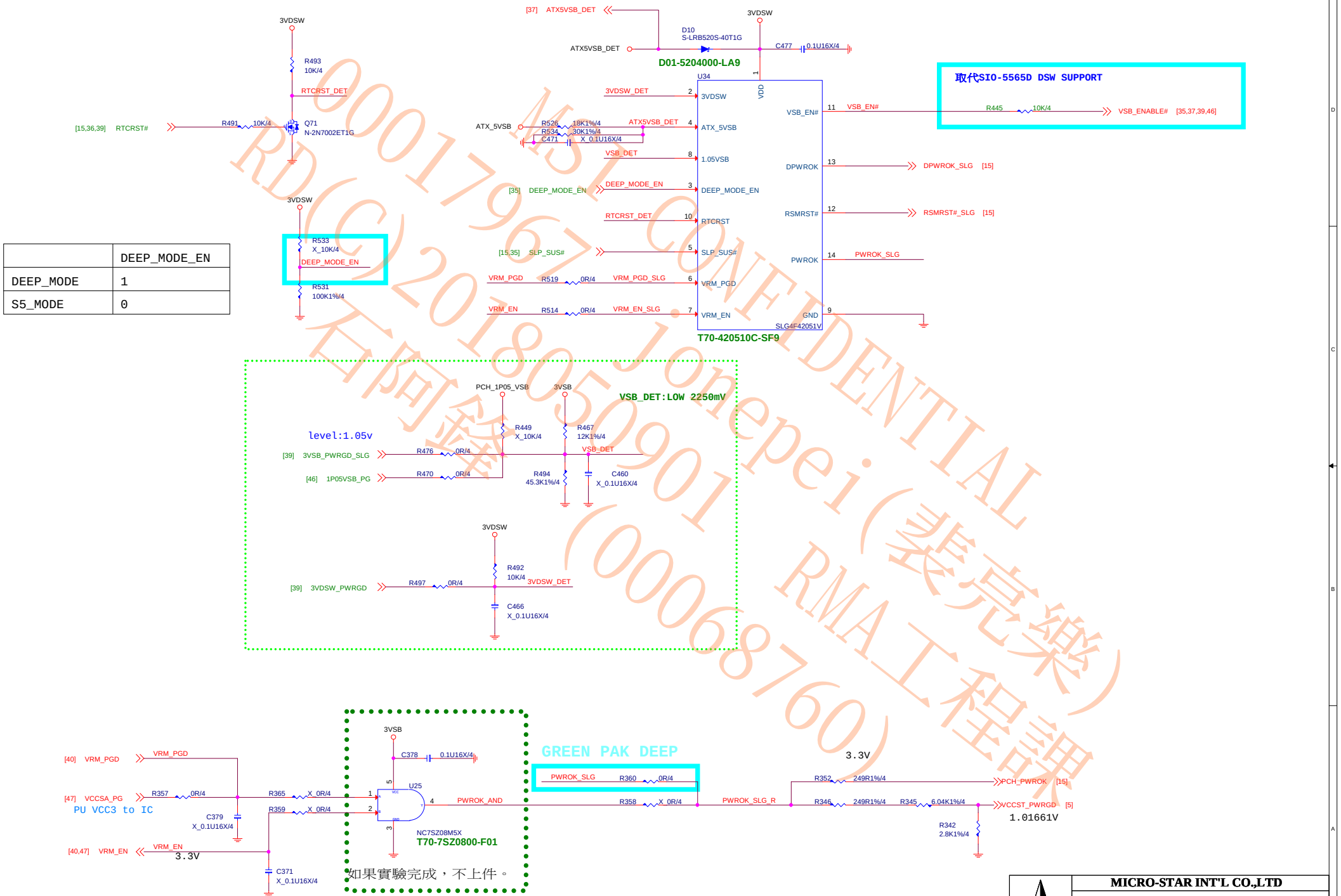

	DEEP_MODE_EN
DEEP_MODE	1
S5_MODE	0

MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7B28	
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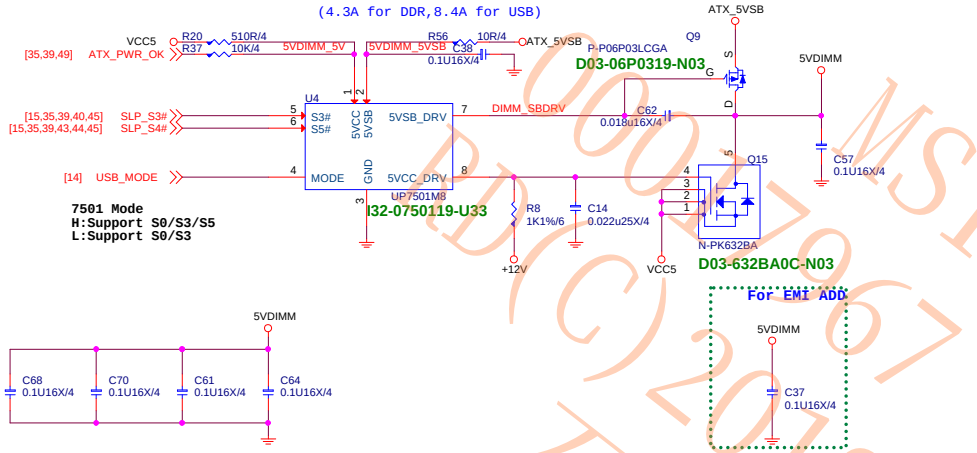
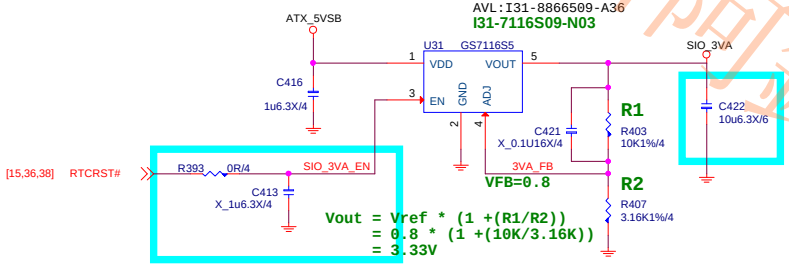
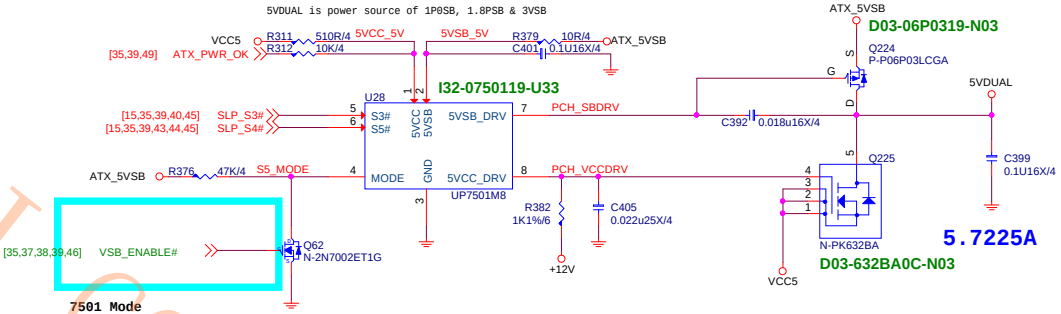
5VDIMM@5V/11.3075A



SIO_3VA@3.3V/20mA

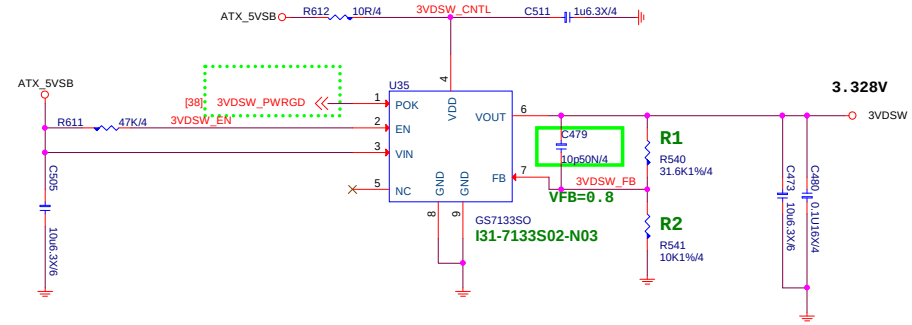


5VDUAL@5V/5.7225A



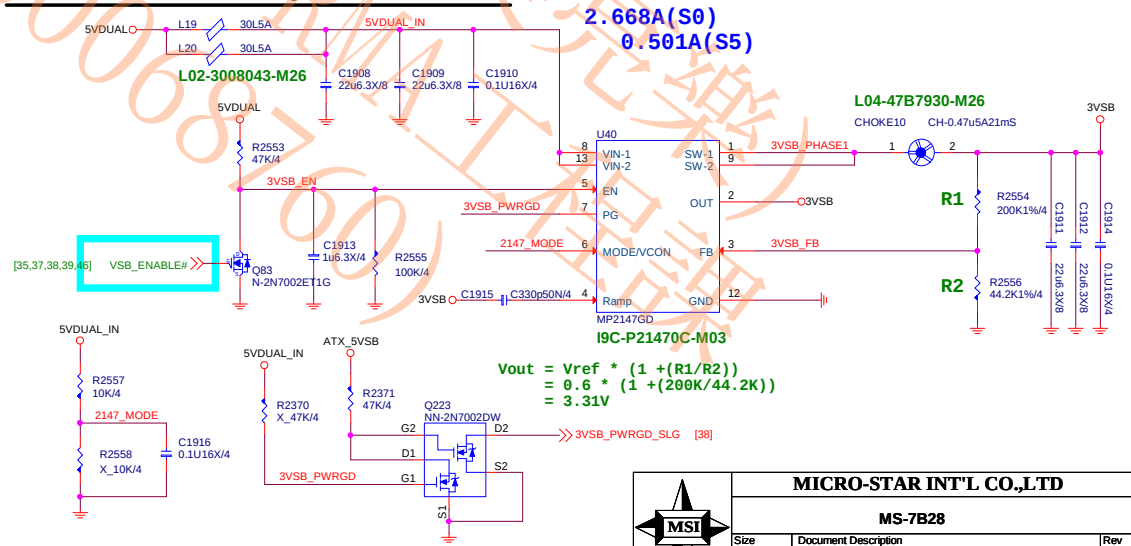
3VDSW@3.3V/0.3A

Intel Lan 不能用小顆IC，因為LAN瞬間電流會很大。
113mA(PCH)+0.6mA(RTC)+200mA(LAN-I219)+SIO



3VSB cost down@3.3V/3.281A

2.253A(PCH)+0.415A(PE SLOT*3)
2.668A(S0)
0.501A(S5)



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

SLP_S3# assertion to IMVP VRM_EN deassertion max:1us

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

2017.12.05 NICK mail add

close to phase1 CHOKE

close to phase1 CHOKE

Sensor POR min 2V

VCORE Default VR_HOT 120℃,ALERT 110℃.

ALERT 97℃.

VOFS=0.4*(VOFSM-1.7)
-500mV＜VOFS＜590mV.
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

N31-1020311-H06

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

Jumper insert,VCORE/VGT 0.8V.

R2
Default 8.55K

R1
Default 274.32K

2017.09.26 For default thermal alert# 97 ℃

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℃

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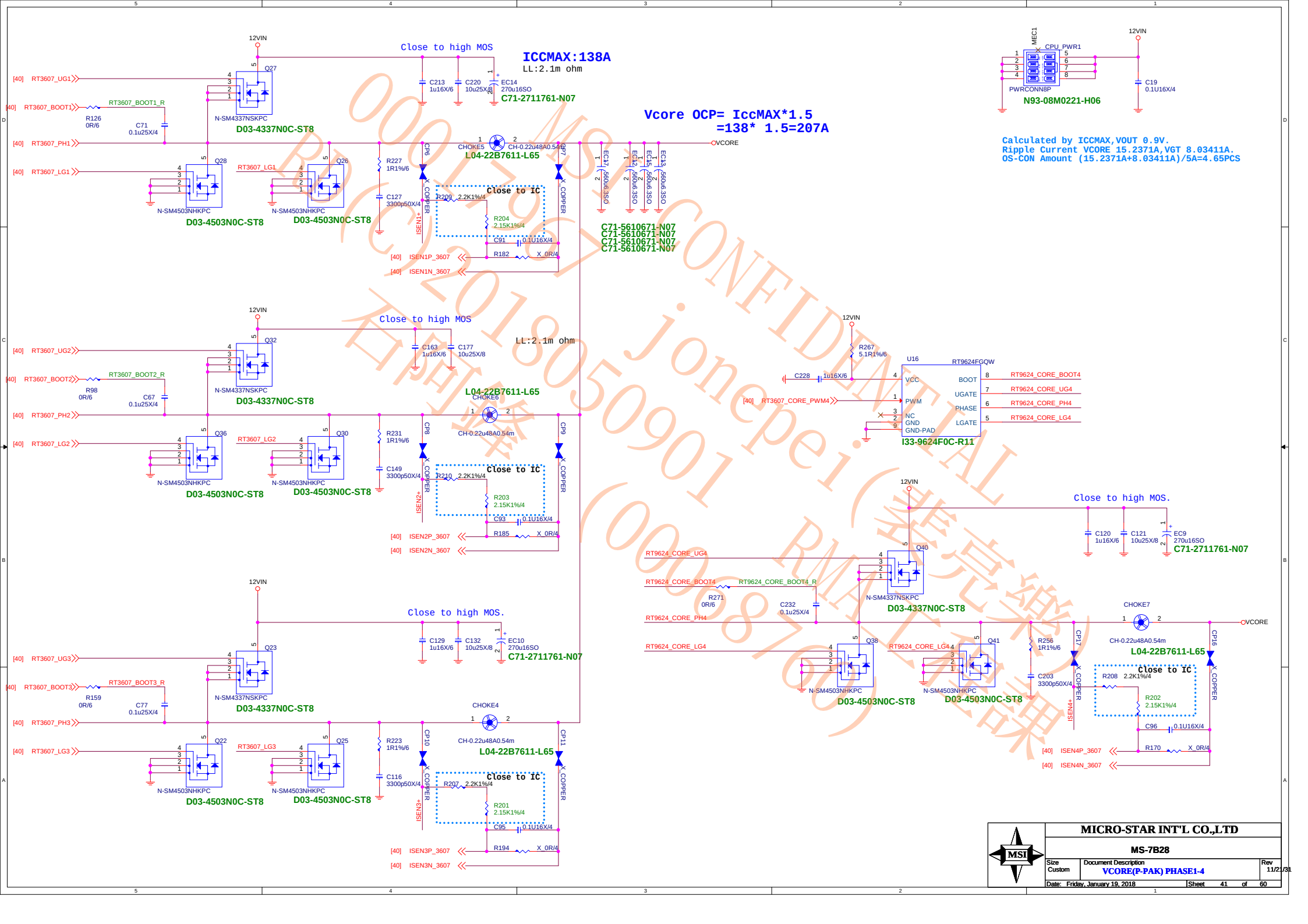
ICCMAX:138A
LL:2.1m ohm
Vcore OCP= IccMAX*1.5
=138* 1.5=207A
Calculated by ICCMAX,VOUT 0.9V.
Ripple Current VCORE 15.2371A,VGT 8.03411A.
OS-CON Amount (15.2371A+8.03411A)/5A=4.65PCS
Close to high MOS
Close to high MOS.
Close to IC
12VIN
VCORE
D03-4337N0C-ST8
D03-4503N0C-ST8
L04-22B7611-L65
C71-2711761-N07
C71-5610671-N07
N93-08M0221-H06
I33-9624F0C-R11
MSI CONFIDENTIAL
Jonepei(待完善)
RMA(00068760)
00017967
B(C)2018050901
石阳林
MICRO-STAR INT'L CO.,LTD
MS-7B28
VCORE(P-PAK) PHASE1-4
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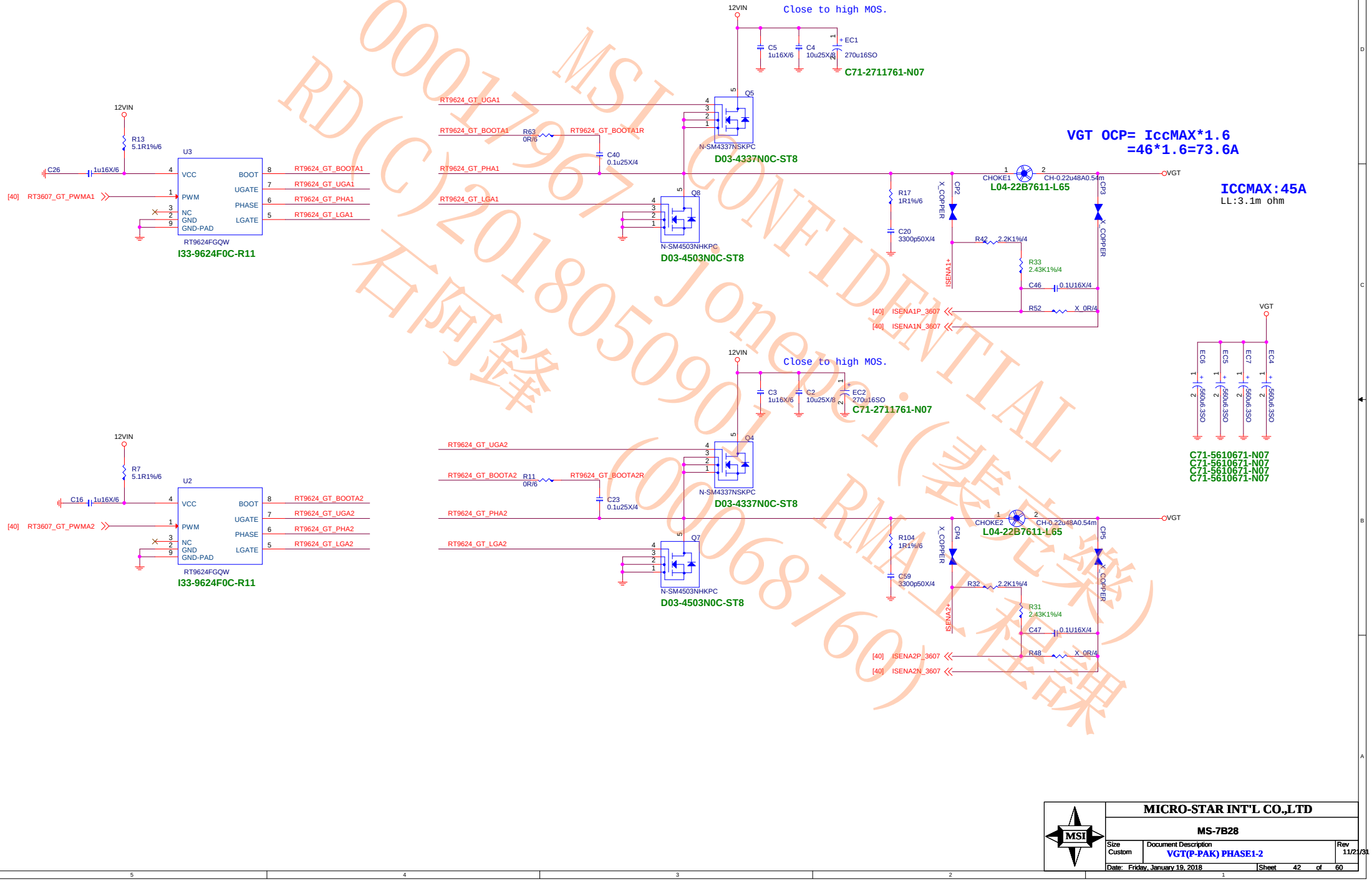

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Size: Custom	Document Description: VGT(P-PAK) PHASE1-2	Rev: 11/21/31
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VCC_DDR@1.2V/11.525A

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

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

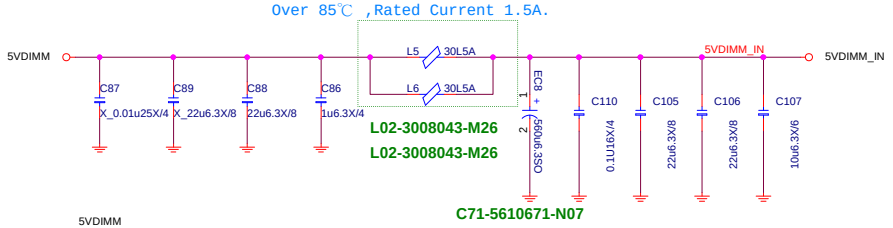
Rlimit = Llimit * Rds * 10 /5uA
Rlimit = 14.9825*4*10/5

D03-632BA0C-N03
Current limit= 118k*5uA/10/4mohm)=14.75A

0.4V<=Rlimit *5uA<=3V

Input Current= (11.525A*1.2V)/5V/0.8=3.4575A
L02-3008043-M26
Over 85℃ ,Rated Current 1.5A.

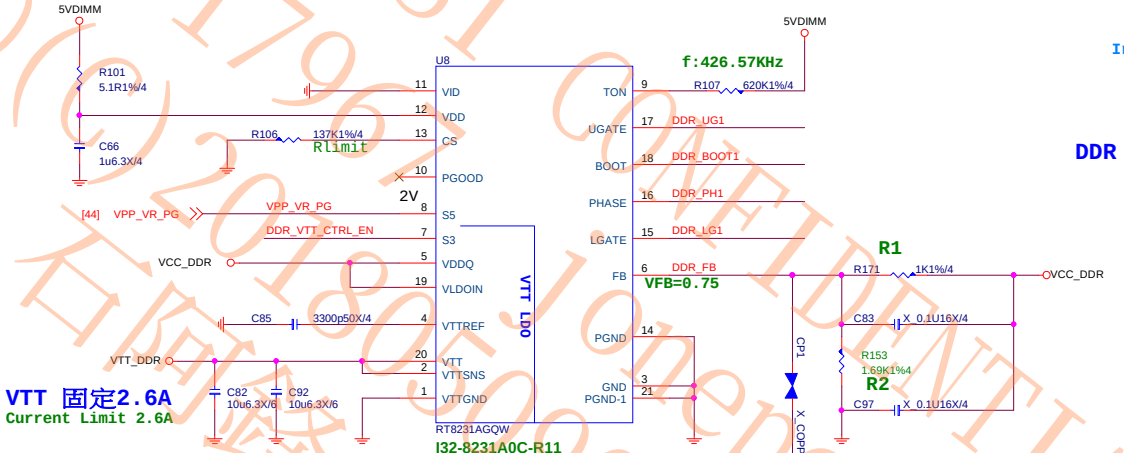
VID	Reference Voltage (V)
H	0.675
L	0.75



C71-5610671-N07

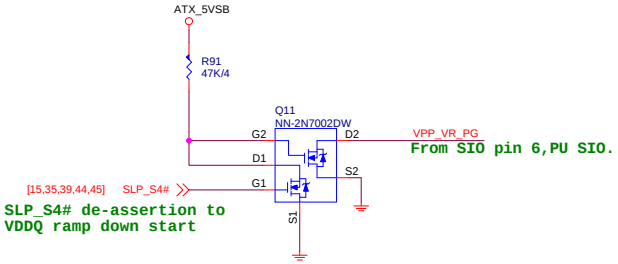
Irms = Iout * SQRT((Vout/Vin) * (1-(Vout/Vin)))
=11.525* 0.427
= 4.921175A

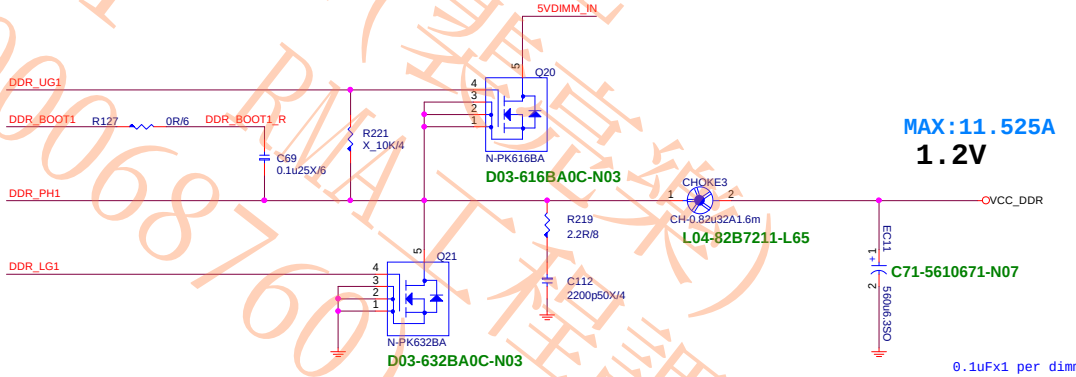
DDR OCP= R44*5uA/10/Dds(on)
138k*5uA/10/3m=23A
138k*5uA/10/4.6m=15A
MOS Rds(on)是3m~4.6m ohm



VTT 固定2.6A
Current Limit 2.6A

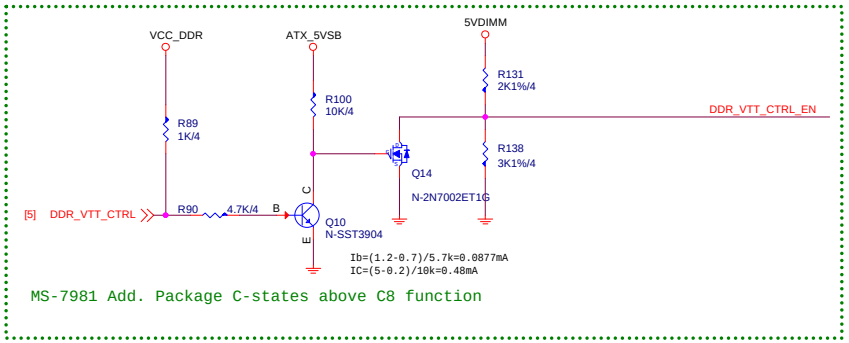
Vout = Vref * (1 +(R1/R2))
= 0.75 * (1 +(1K/1.65K))
= 1.204V





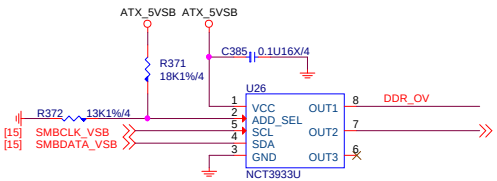
MAX:11.525A
1.2V

VPP ramp down after VDDQ ramp down

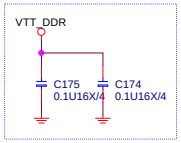


UPI VOLTAGE CONSOLE

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



0.1uFx1 per dimm



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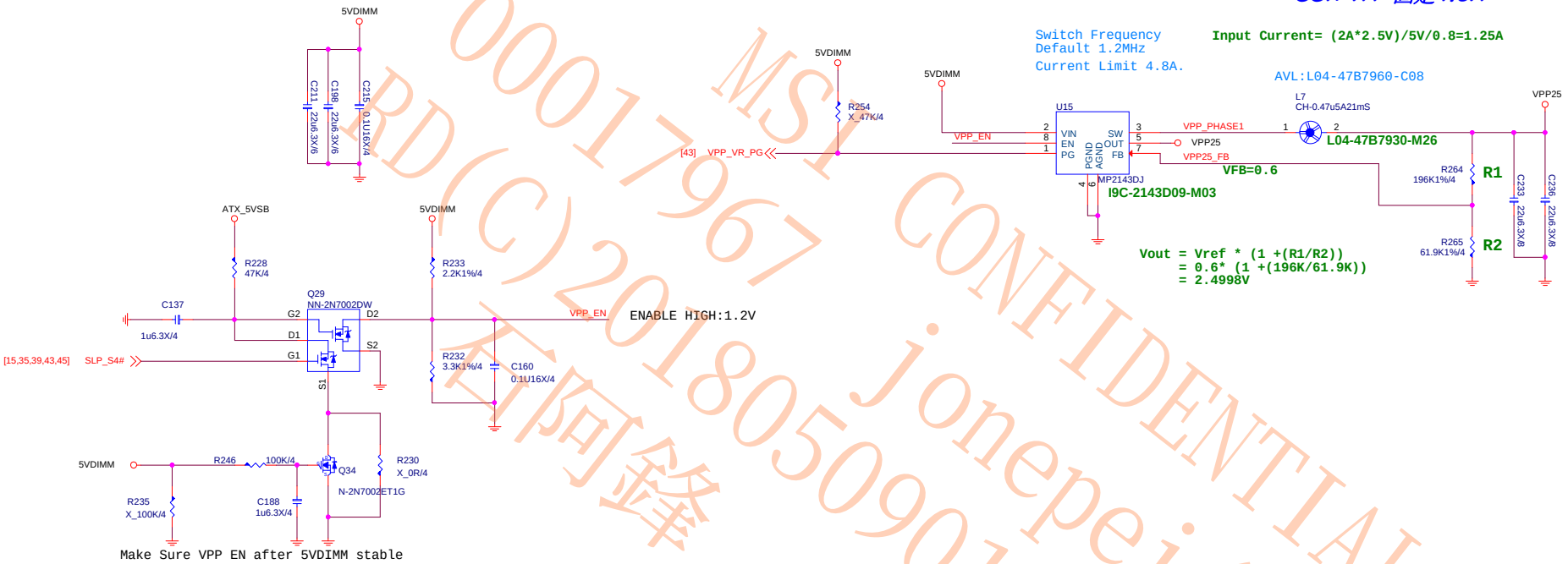
VPP25 @2.5V/2A

2DIMM :1.12A FOR DDR VPP2.5V

DDR VPP 固定4.8A



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MS-7B28		
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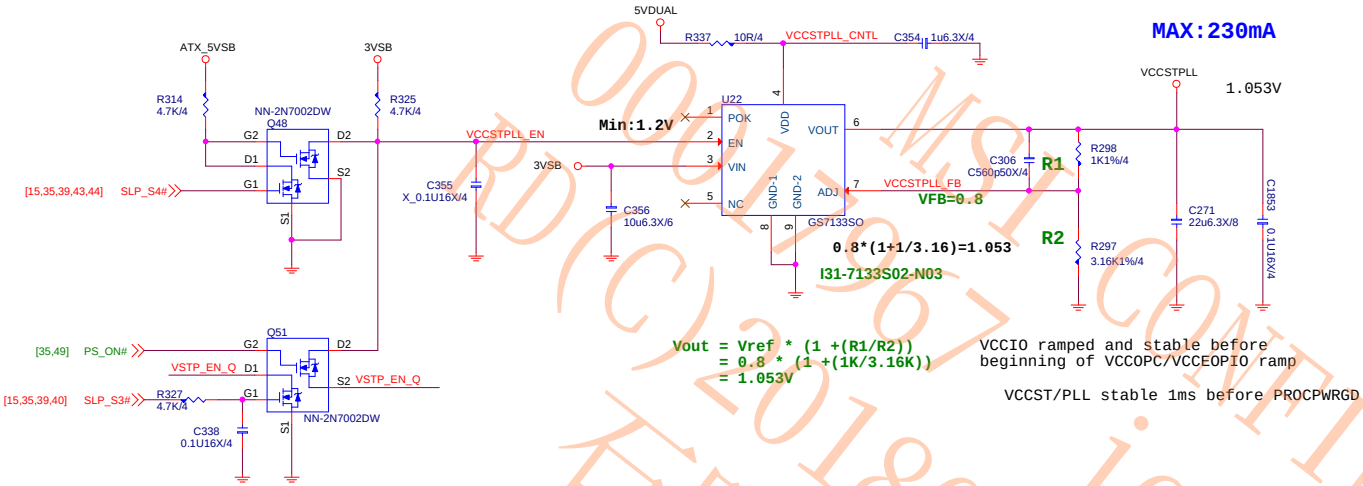
VCCSTPLL@1.05V/230mA



1P8_VSB@1.8V/500mA

2017/1/3 Layout空間不足

MSI	MICRO-STAR INT'L CO.,LTD	
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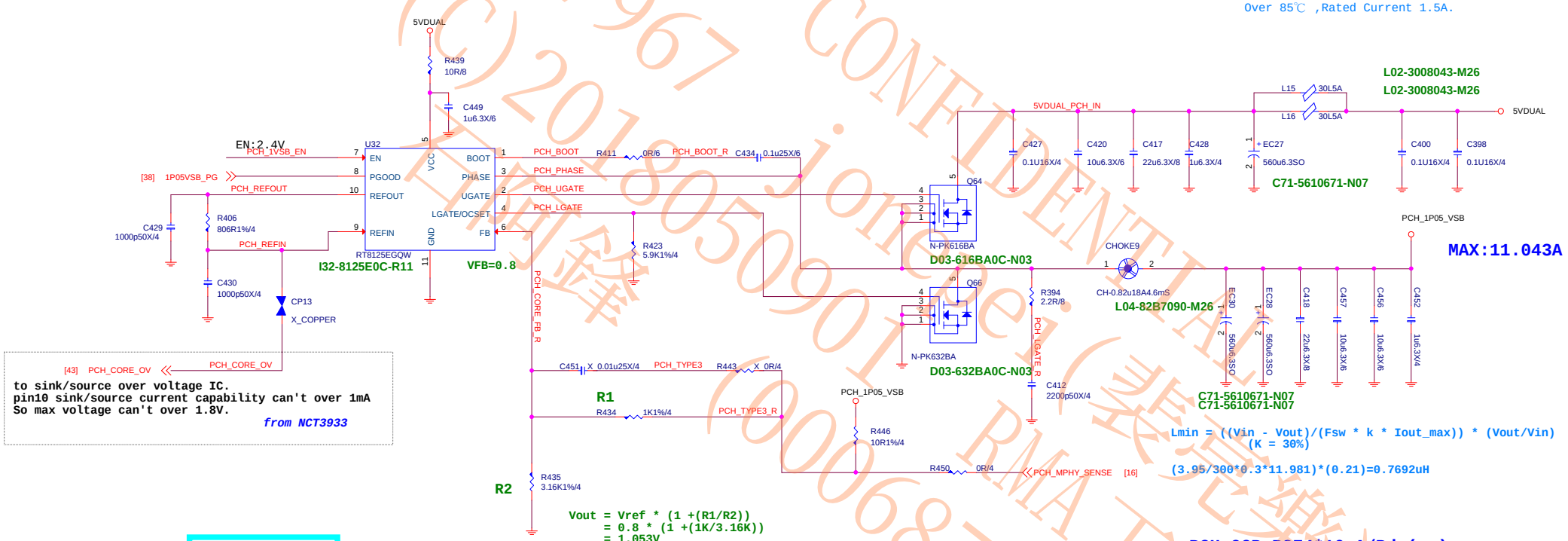
PCH_1VSB@1.05V/11.981A

D03-632BA0C-N03
Current limit= 5.6K*10uA/4mohm)=14.75A

Irms = Iout * SQRT((Vout/Vin) * (1 - (Vout/Vin)))
=11.981 * 0.407
=4.876A

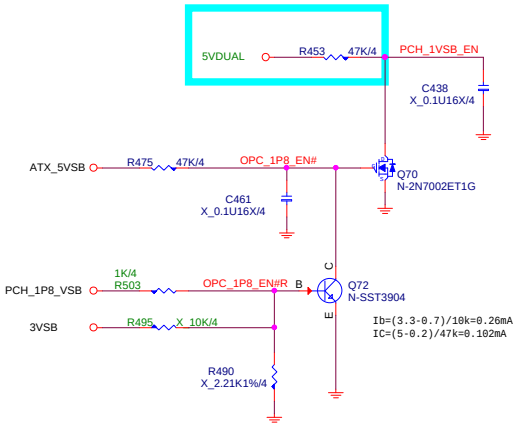
Iin=11.043A*1.05V/0.8/5V=2.898A
Over 85℃ ,Rated Current 1.5A.

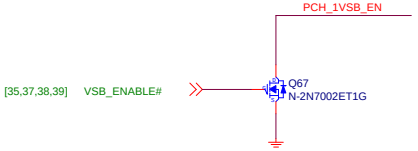


Lmin = ((Vin - Vout)/(Fsw * k * Iout_max)) * (Vout/Vin)
(K = 30%)

(3.95/300*0.3*11.981)*(0.21)=0.7692uH

PCH OCP=R374*10uA/Rds(on)
=5.9k*10uA/3m ohm=19.67A
=5.9k*10uA/4.6m ohm=12.82A





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Size: Custom	Document Description: PCH Core power
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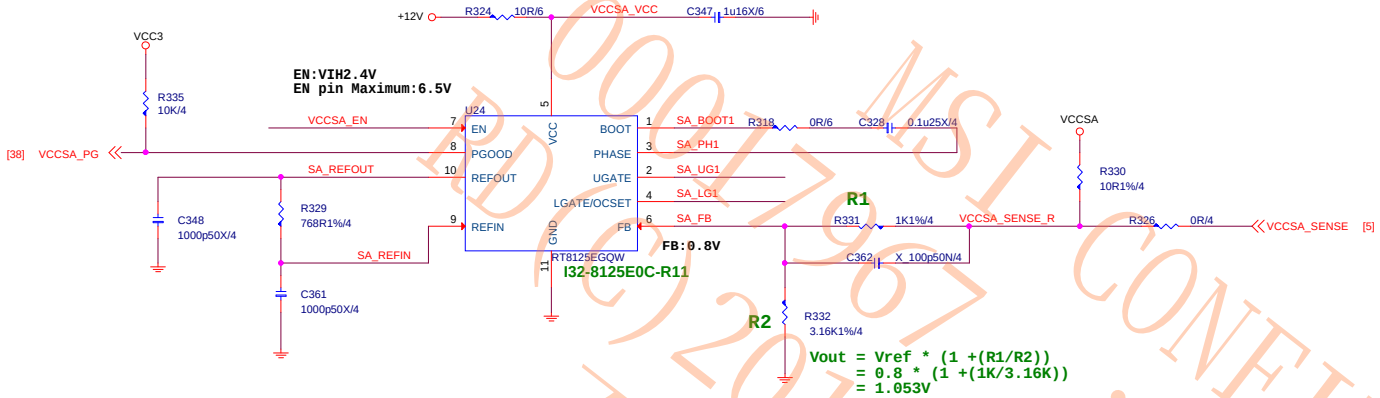
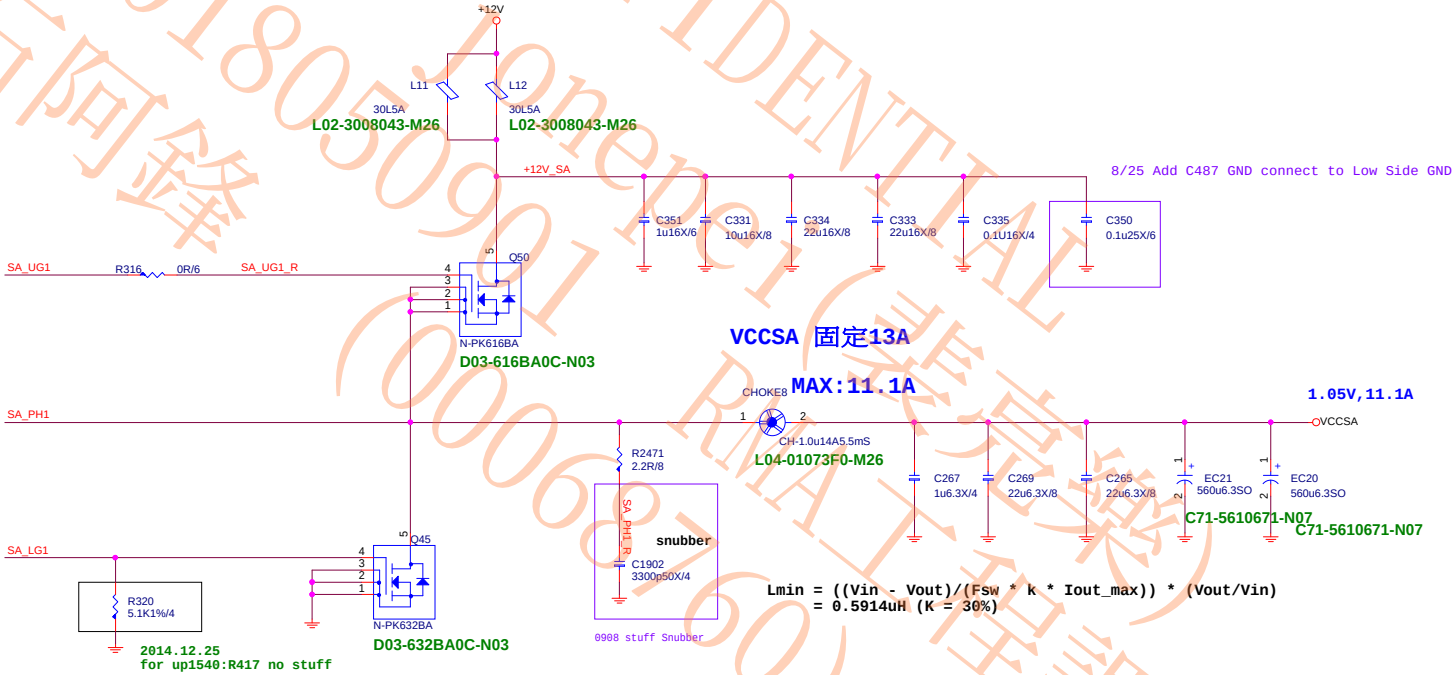
VCCSA@1.05V/11.1A

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

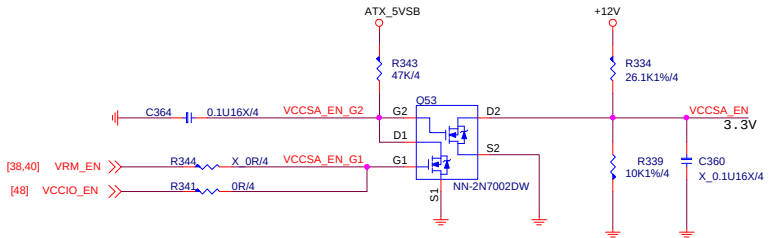
Width:＞20mil



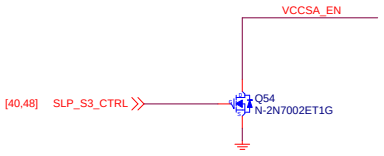
Vout = Vref * (1 +(R1/R2))
= 0.8 * (1 +(1K/3.16K))
= 1.053V



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



EN:VIH2.4V
EN pin Maximum:6.5V



SLP_S3# assertion to VR disabled
max:1us

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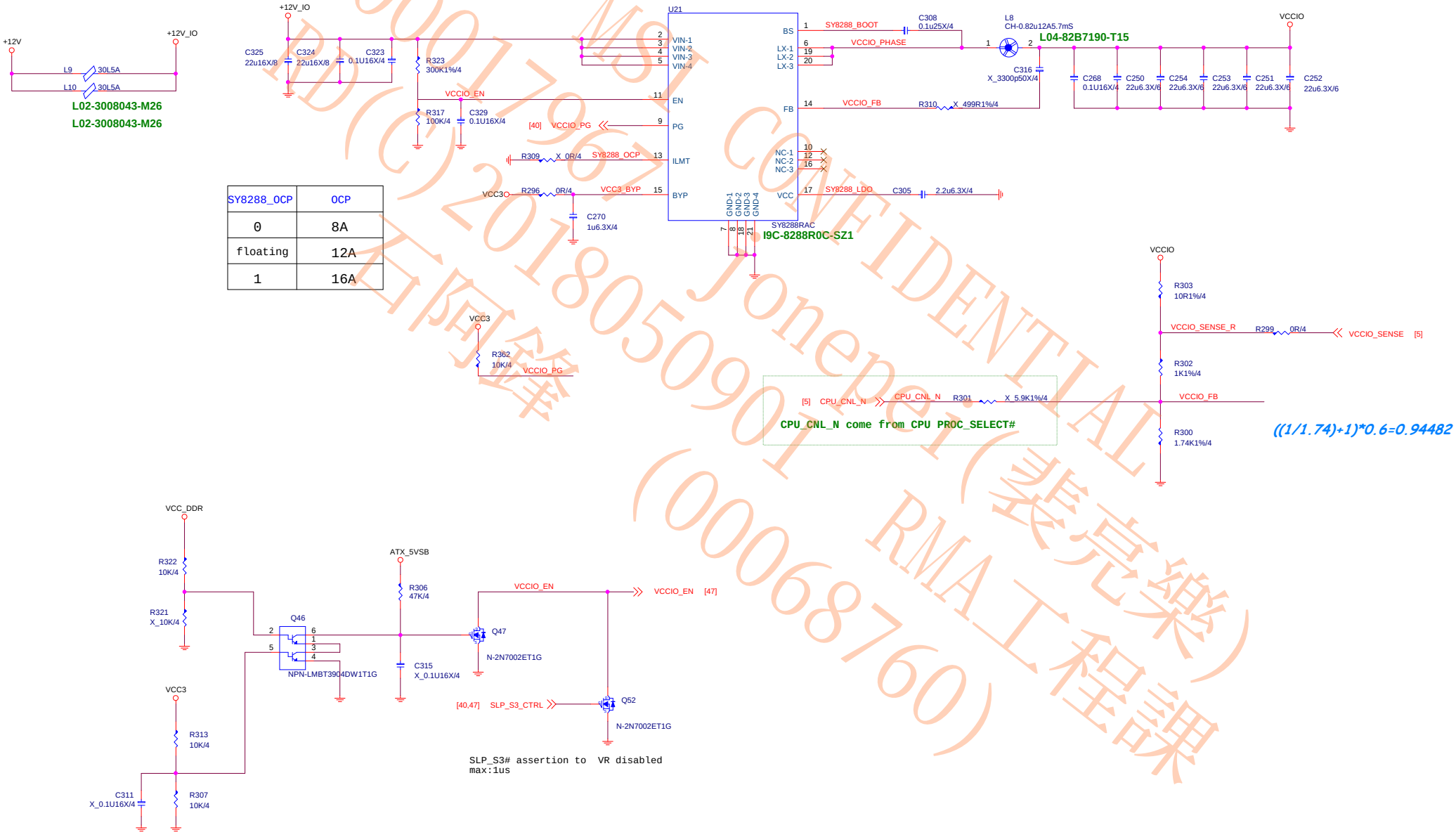
VCCIO@0.95V/6.4A

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

VCCIO 固定12A(floating)

MAX:6.4A



SY8288_OCP	OCP
0	8A
floating	12A
1	16A

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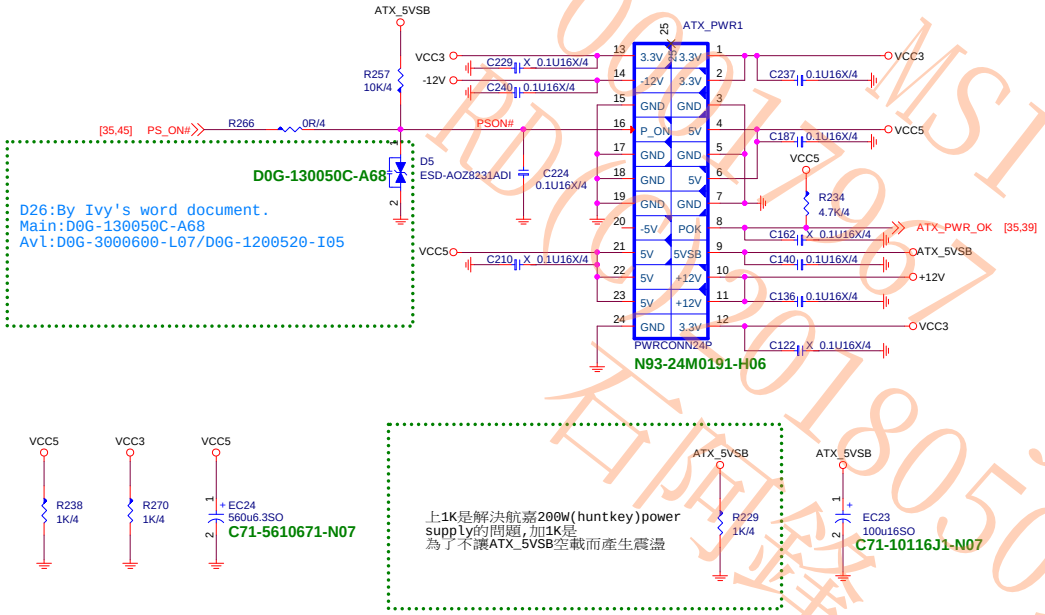
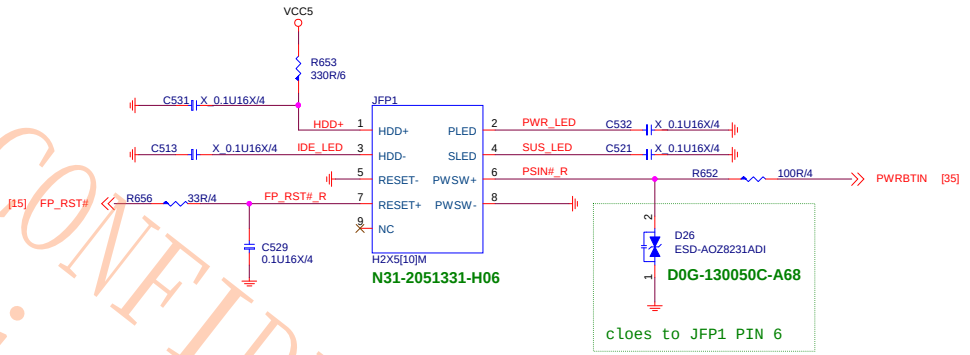
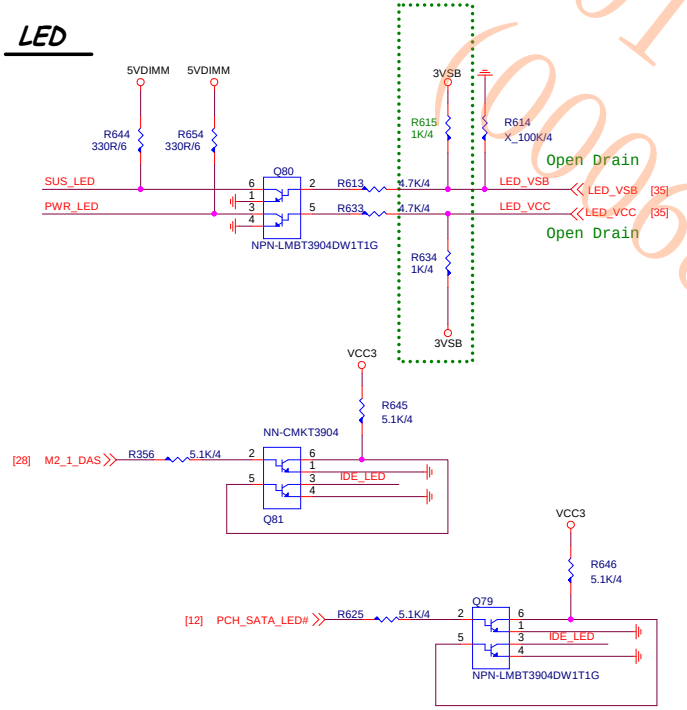
ATX POWER CONNECTOR



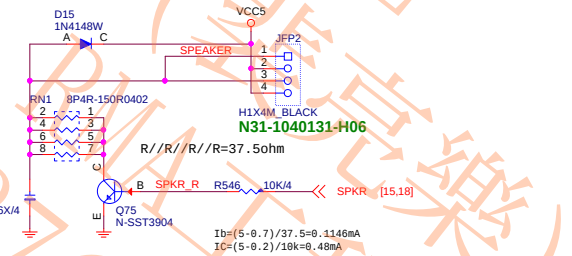
FRONT PANNEL



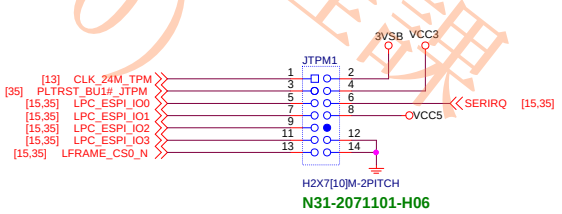
LED

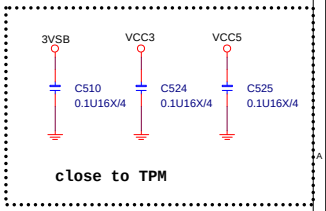


Speaker Pin Header



TPM





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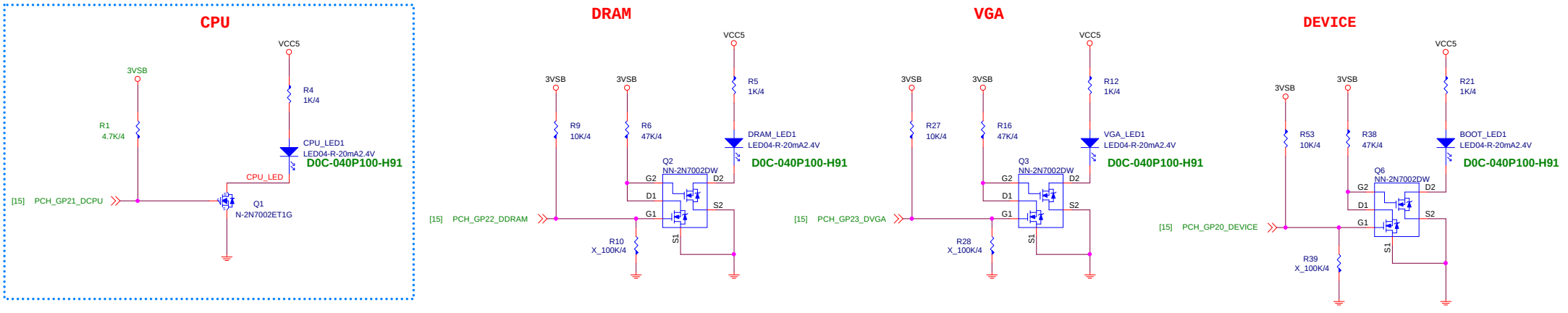
EZ DEBUG LED



LED	PCH_GP20	PCH_GP21	PCH_GP22	PCH_GP23
亮	NATIVE PULL HIGH	GPO PULL HIGH	GPO PULL HIGH	NATIVE PULL HIGH
滅	NATIVE LOW	GPO LOW (default LOW)	GPO LOW (default LOW)	GPO LOW (default LOW)

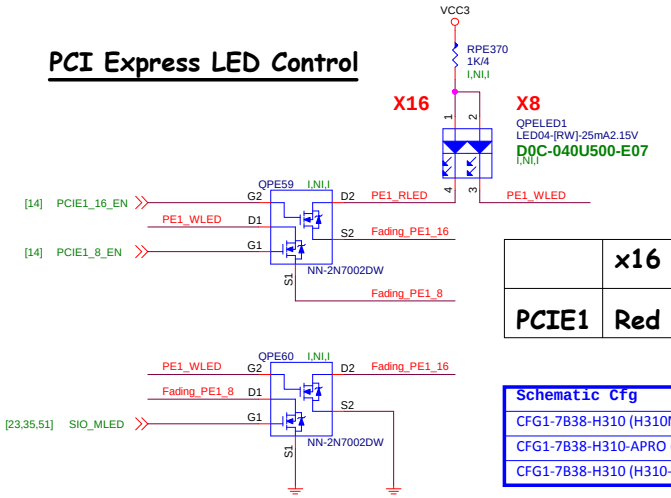
LED
RED:D0C-040P100-H91
AVL:D0C-040S500-E07

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

關機斷電狀態下，3個LED先維持default全暗，開機通電後：
1. 首先進行CPU checkCPU LED 亮，check PASS後則CPU LED滅掉。
2. 接著依序進行Memory /memory LED亮check PASS後則memory LED滅掉。
3. VGA的check/VGA LED亮，check PASS後則VGA LED滅掉。
4. 因此最後正常順利開機後，三個LED燈都是滅掉的。

（系統重啟或其他原因造成系統重開機，則LED仍按上述行為動作）

PCI Express LED Control



	x16	x8
PCIE1	Red	White

Schematic Cfg	Project	
CFG1-7B38-H310 (H310M GAMING PLUS) ver.1.0	V	A
CFG1-7B38-H310-APRO (H310-A Pro) ver.2.0	X	B
CFG1-7B38-H310 (H310-A GAMING ARCTIC) ver.3.0	V	C

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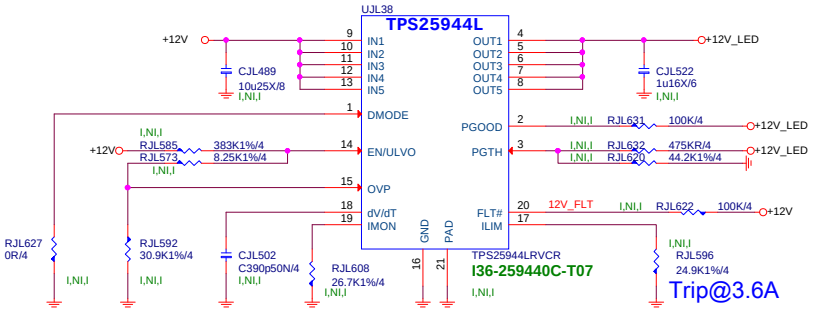
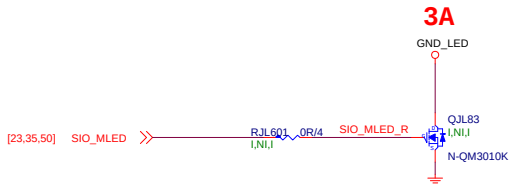
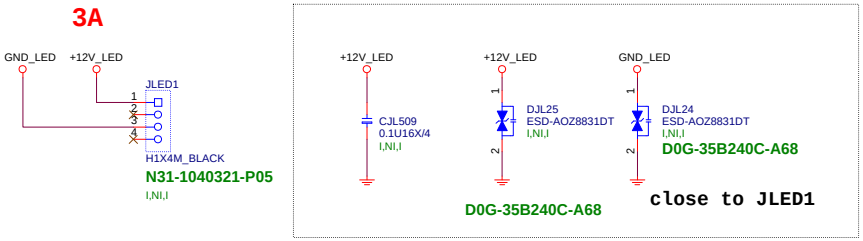
LED Control by SIO(JLED1)







Schematic Cfg	Project	
CFG1-7B38-H310 (H310M GAMING PLUS) ver.1.0	V	A
CFG1-7B38-H310-APRO (H310-A Pro) ver.2.0	X	B
CFG1-7B38-H310 (H310-A GAMING ARCTIC) ver.3.0	V	C

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OPTION BOM PARTS

Schematic Cfg	Project
CFG1-7B38-H310 (H310M GAMING PLUS) ver.1.0	A
CFG1-7B38-H310-APRO (H310-A Pro) ver.2.0	B
CFG1-7B38-H310 (H310-A GAMING ARCTIC) ver.3.0	C

5010 Level

	A	B	C
EZ Debug LED	O_EZ_GP Audio/bot_LED LED04-R-20mA2.4V_1608-HF D0C-040P100-H91 Red	O_EZ_PRO Audio/bot_LED LED04-R-20mA2.4V_1608-HF D0C-040T200-H91 White	O_EZ_GAR Audio/bot_LED LED04-R-20mA2.4V_1608-HF D0C-040T200-H91 White
PCB	PD0-07B2810-E48 PD0-07B2811-G37 O_PCB_GP  7B28_11	PK0-07B2820-E48 PK0-07B2821-G37 O_PCB_PRO  7B28_21	PS0-07B2830-E48 PS0-07B2831-G37 O_PCB_GAR  7B28_31

5020 Level

	A	B	C
AUDIO LED	O_AUDLED_GP AUDIO_LED LED04-[BR]-25mA2.35V USB_C1_24_2 D0C-040S600-E07 Red		O_AUDLED_GAR AUDIO_LED LED04-W-20mA3.9V_1608-RH USB_C1_24_2 D0C-040T300-H91 White

60 Level

	A	B	C
REAR U3	O_REARU3_GP LAN+_U3 USBAX2M_RED-RH-2 USB_C1_24_2 N53-18M0201-L06	O_REARU3_PRO LAN+_U3 USBAX2M_BLUE-RH-6 USB_C1_24_2 N53-18M0091-F02	O_REARU3_GAR LAN+_U3 USBAX2M_RED-RH-2 USB_C1_24_2 N53-18M0201-L06
DDR Slot	O_DDRSLOT_GP DDR_Slot DDRIV-288P_RED-RH-1 DDRIV_D288 N13-2880681-L06	O_DDRSLOT_PRO DDR_Slot DDRIV-288P_BLACK-RH-21 DDRIV_D288 N13-2880561-L06	O_DDRSLOT_GAR DDR_Slot DDRIV-288P_BLACK-RH-21 DDRIV_D288 N13-2880521-L06
PCIEx16 Slot	O_PCIEX16_GP PCIE_16 SLOT-PCI164P_RED-2PITCH-RH-1 N11-1641671-L06	O_PCIEX16_PRO PCIE_16 SLOT-PCI164P_BLACK-2PITCH-RH-38 N11-1641221-L06	O_PCIEX16_GAR PCIE_16 SLOT-PCI164P_WHITE-2PITCH-RH-4 N11-1641601-L06
DVI	O_VGA_GP VGA DVI24P_BLACK-RH-17 N5B-24F0771-EB6		O_VGA_GAR VGA DVI24P_BLACK-RH-17 N5B-24F0771-EB6
VGA+DVI		O_VGADVI_PRO VGA+DVI VGA_DVI-RH-31 N58-39F0371-EB6	
PACK LABEL	O_LA_GP B310 Lable MKT G51-M1SPM62-Q13	O_LA_PRO B310 Lable MKT G51-M1SPM61-Q13	O_LA_GAR B310 Lable MKT G51-M1SPM60-Q13
PCH Heatsink	O_PHSK_GP Heatsink HS-0409490 E31-0409490-K08	O_PHSK_PRO Heatsink HS-0409430 E31-0409430-K08	O_PHSK_GAR Heatsink HS-0409520 E31-0409520-K08
CPU Heatsink	O_CHSK_GP CPU 鐵座 CPU_H1 E21-7869020-F02	O_CHSK_PRO CPU 鐵座 CPU_H1 E21-7869020-F02	O_CHSK_GAR CPU 鐵座 CPU_H1 E21-7A45010-L06

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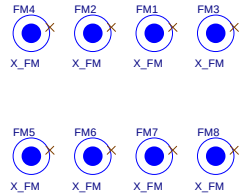
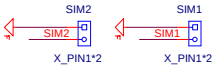
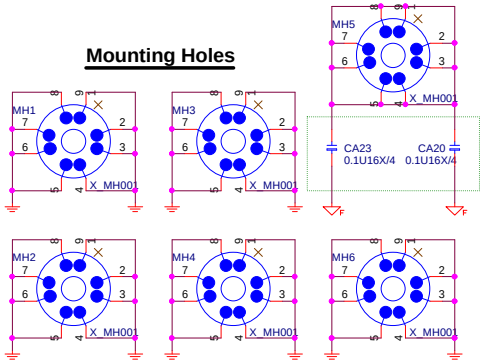
Optical Fiducial Marks-120



Simulation



Mounting Holes



HOLES_4S

VPP25 — TP_VPP25
VTT_DDR — TP_VTT_DDR
5VDIMM — TP_5VDIMM
3VSB — TP_3VSB
3VDSW — TP_3VDSW
PCH_1P8_VSB — TP_PCH_1P8_VSB
VGT — TP_VGT
VCCSTPLL — TP_VCCSTPLL
VCCIO — TP_VCCIO
VCCSA — TP_VCCSA
VCC_DDR — TP_VCC_DDR
PCH_1P05_VSB — TP_PCH_1P05_VSB
SIO_3VA — TP_SIO_3VA

Near SIO CHIP

+12V — TP_+12V
VCORE — TP_VCORE
VCC5 — TP_VCC5

BAT1_X1

BAT-BCR2032P

D06-0100101-K26

BIOS_LA1

AMI

AMI

G51-M1SPXXA-A09

HDMI_LA1

HDMI VIRTUAL

HDMI LABEL

Y01-RHDMI03-000

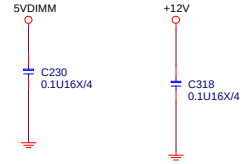
LA10

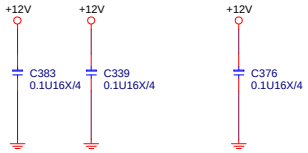
B310
SW

MKT

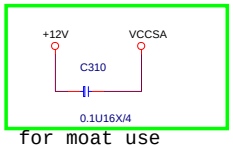
Y02-MU00170-CFO

return path





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



for moat use

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