# MS-7B47

ATX

Ver: 1.0

## Intel -Coffeelake plamform Z370

### CPU:

*coffeelake-S*

### System Chipset:

*Z370*

### Onboard Chip:

*HD Audio Codec:ALC892*

*LAN:INTEL I219*

*SIO:Nuvoton 6795*

*Flash ROM: SPI 128MB*

### Main Memory:

*DDRIV (2133MHz/2400MHz) * 4 (Dual Channel)*

### ACPI:

*NIKO/UPI*

### PWM:

*UPI9508*

### Expansion Slots:

*PCI Express (X16) Slot *1*

*PCI Express (X4) Slot * 1*

*PCI Express (X1 ) Slot * 4*

*M2 * 2*

### Other:

*SATA3.0 x6 (PCH)*

*FRONT USB2.0 *4*

*FRONTUSB3.0 *4*

*REAR USB3.0 *4*

*REAR USB2.0 *2*

*REAR USB TYPE A+C*

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| Size | Document Description | Rev |
|---|---|---|
| Custom | Cover Sheet | 10 |

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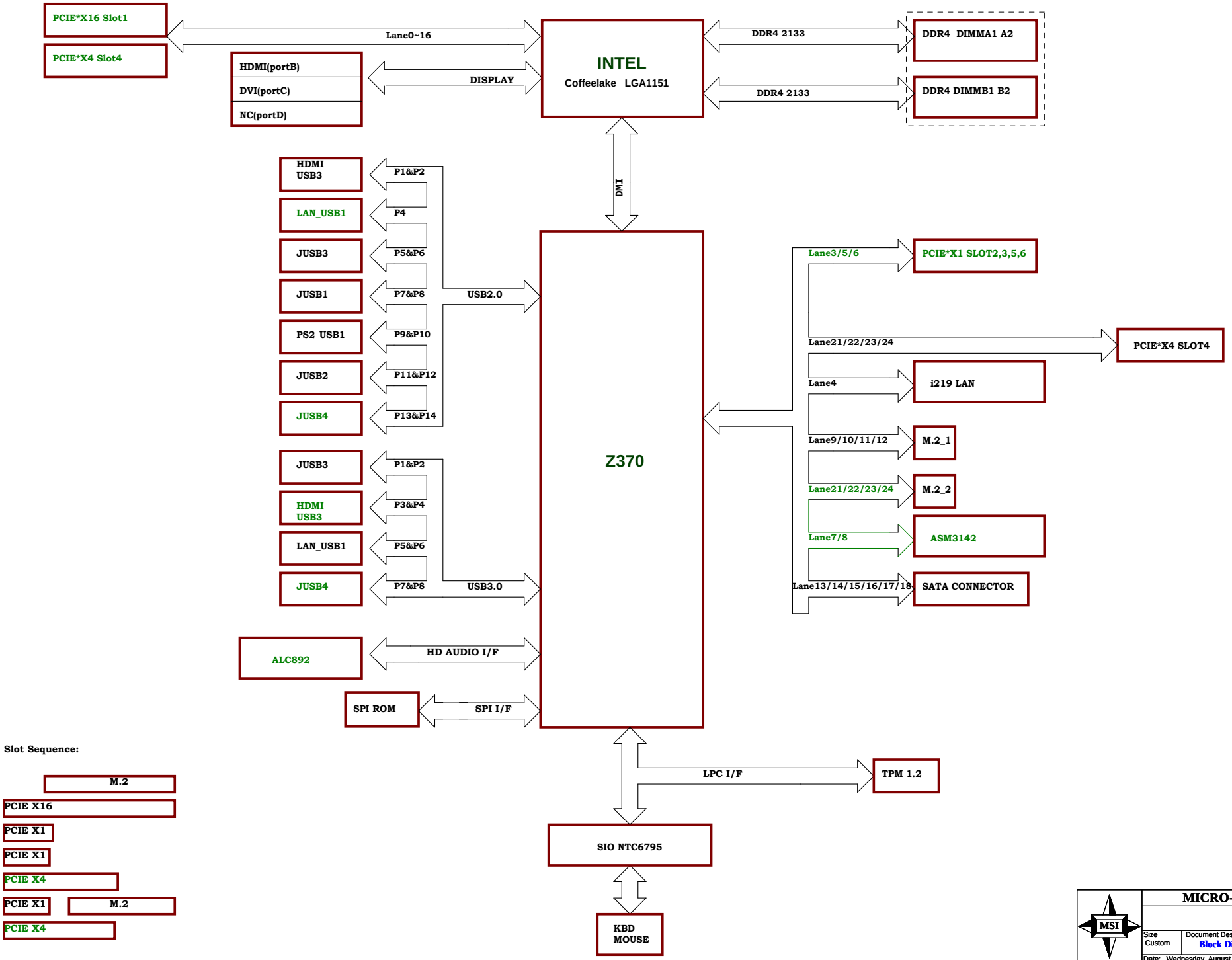
# MS-7A68 Block Diagram




**Slot Sequence:**

- M.2
- PCIE X16
- PCIE X1
- PCIE X1
- PCIE X4
- PCIE X1 / M.2
- PCIE X4

| | |
|---|---|
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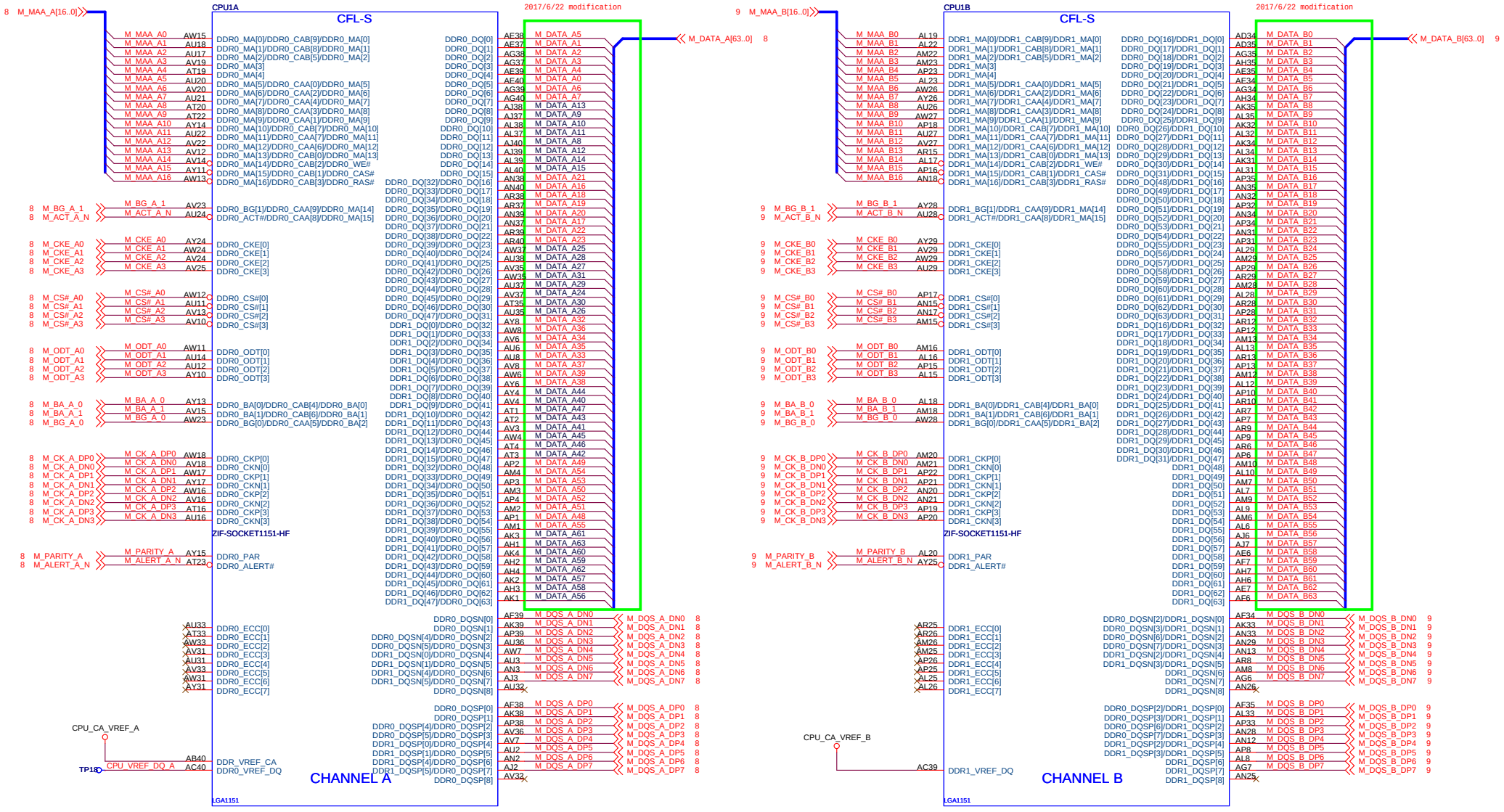
GATE B

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|---|---|---|
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| MS-7B47 | | |
| Size: Custom | Document Description: CPU-Memory | Rev: 10 |
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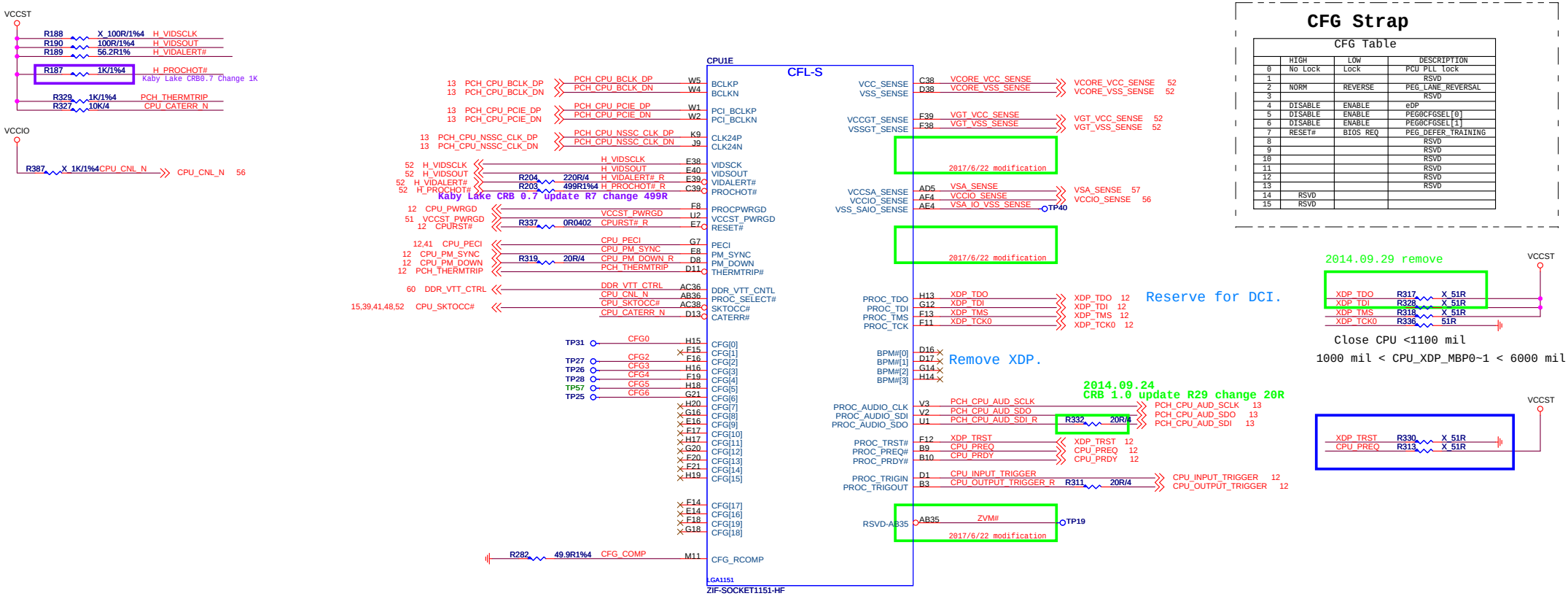


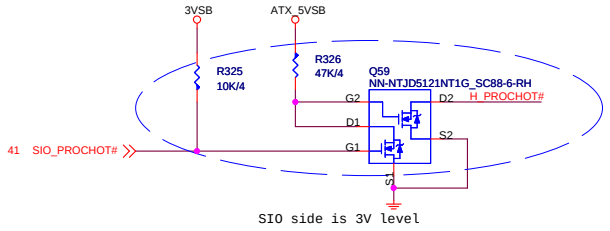


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Size: Custom | Document Description: CPU-Control/MISC/CFG/Audio | Rev: 10

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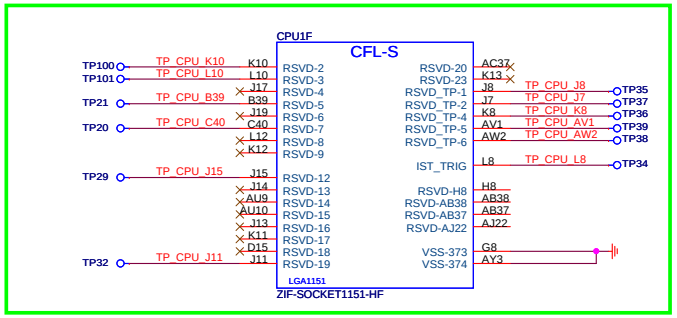
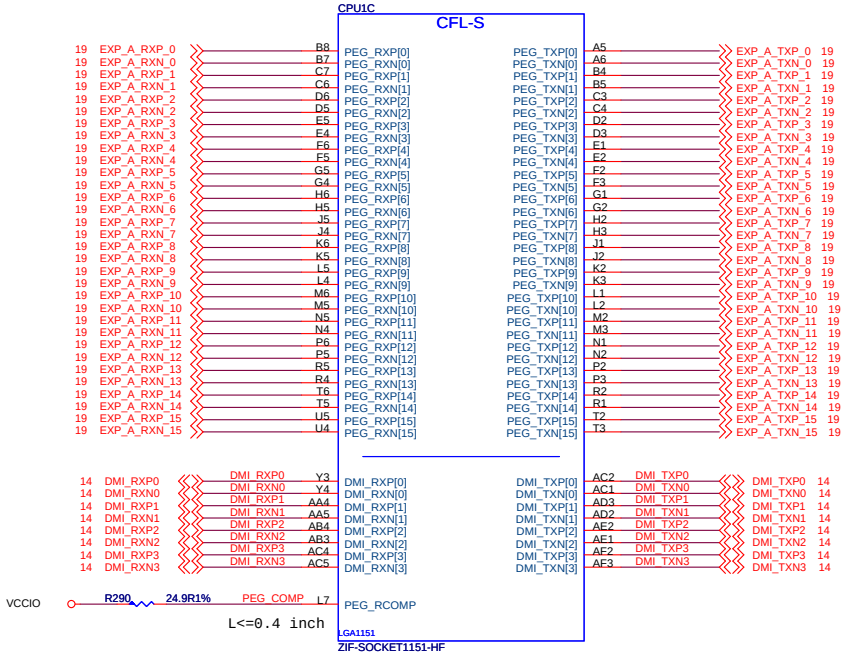
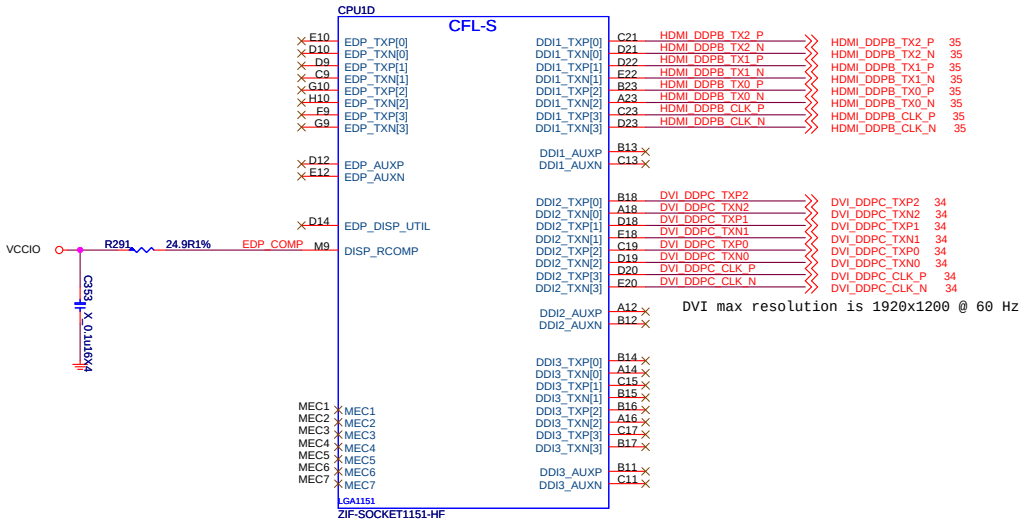
2017/6/22 modification




**TP35, TP37, TP36, TP39, TP38, TP34, TP100, TP101**
**Reservd for CPU XDP debug pin**




DVI max resolution is 1920x1200 @ 60 Hz

| | | |
|---|---|---|
| MSI | MICRO-STAR INT'L CO.,LTD | |
| | MS-7B47 | |
| Size: Custom | Document Description: CPU-PEG/Display | Rev: 10 |
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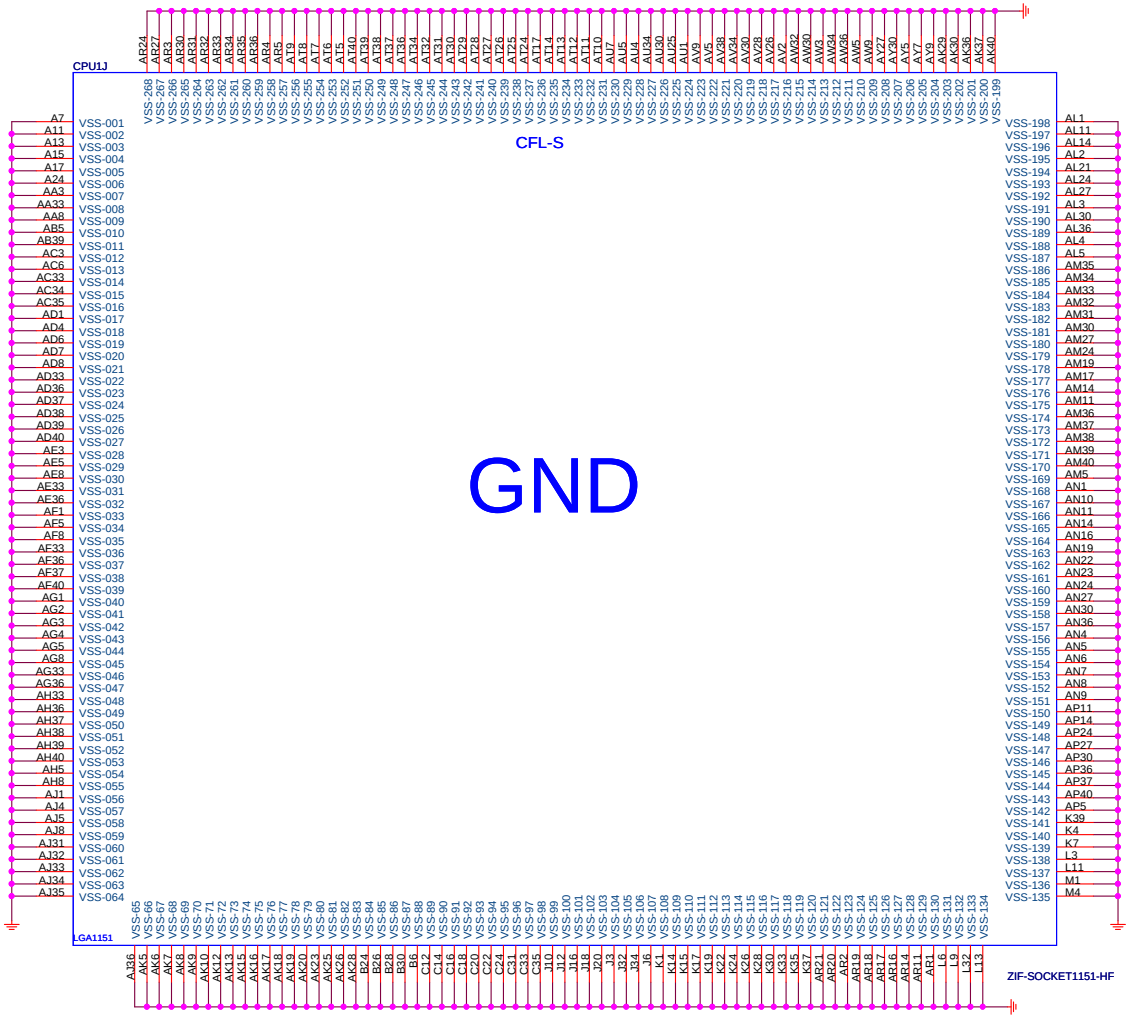


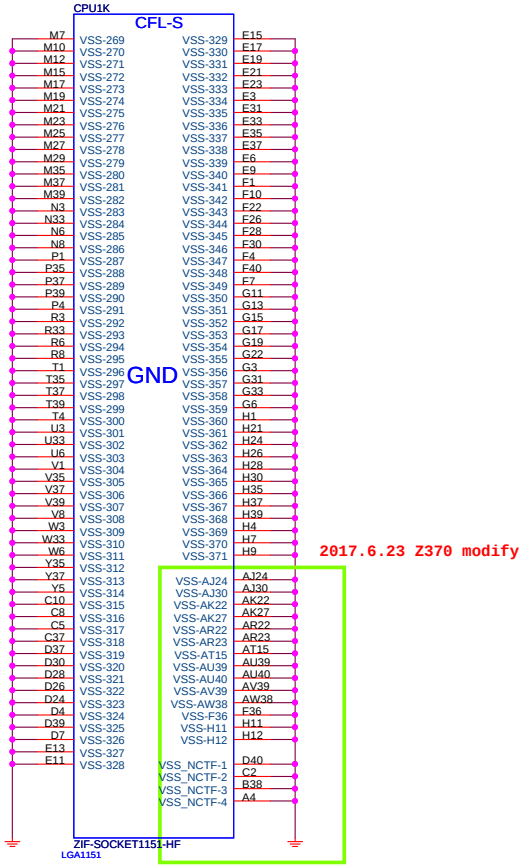


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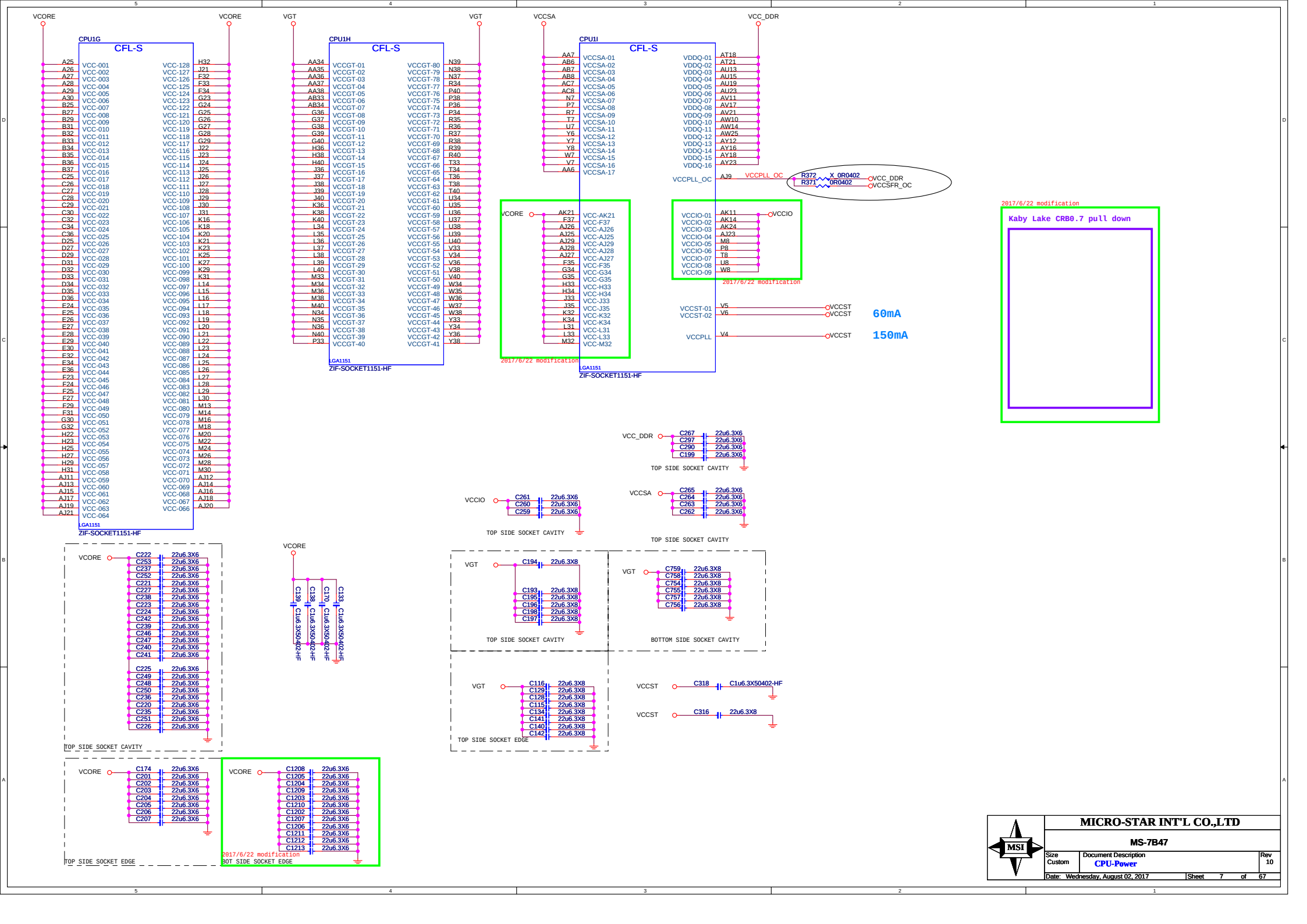
CPU1G
CFL-S
ZIF-SOCKET1151-HF
CPU1H
CFL-S
ZIF-SOCKET1151-HF
CPU1I
CFL-S
ZIF-SOCKET1151-HF
VCCPLL_OC
R372 X 0R0402
R371 0R0402
VCC_DDR
VCCSFR_OC
2017/6/22 modification
Kaby Lake CRB0.7 pull down
60mA
150mA
TOP SIDE SOCKET CAVITY
BOTTOM SIDE SOCKET CAVITY
TOP SIDE SOCKET EDGE
BOT SIDE SOCKET EDGE
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CPU-Power
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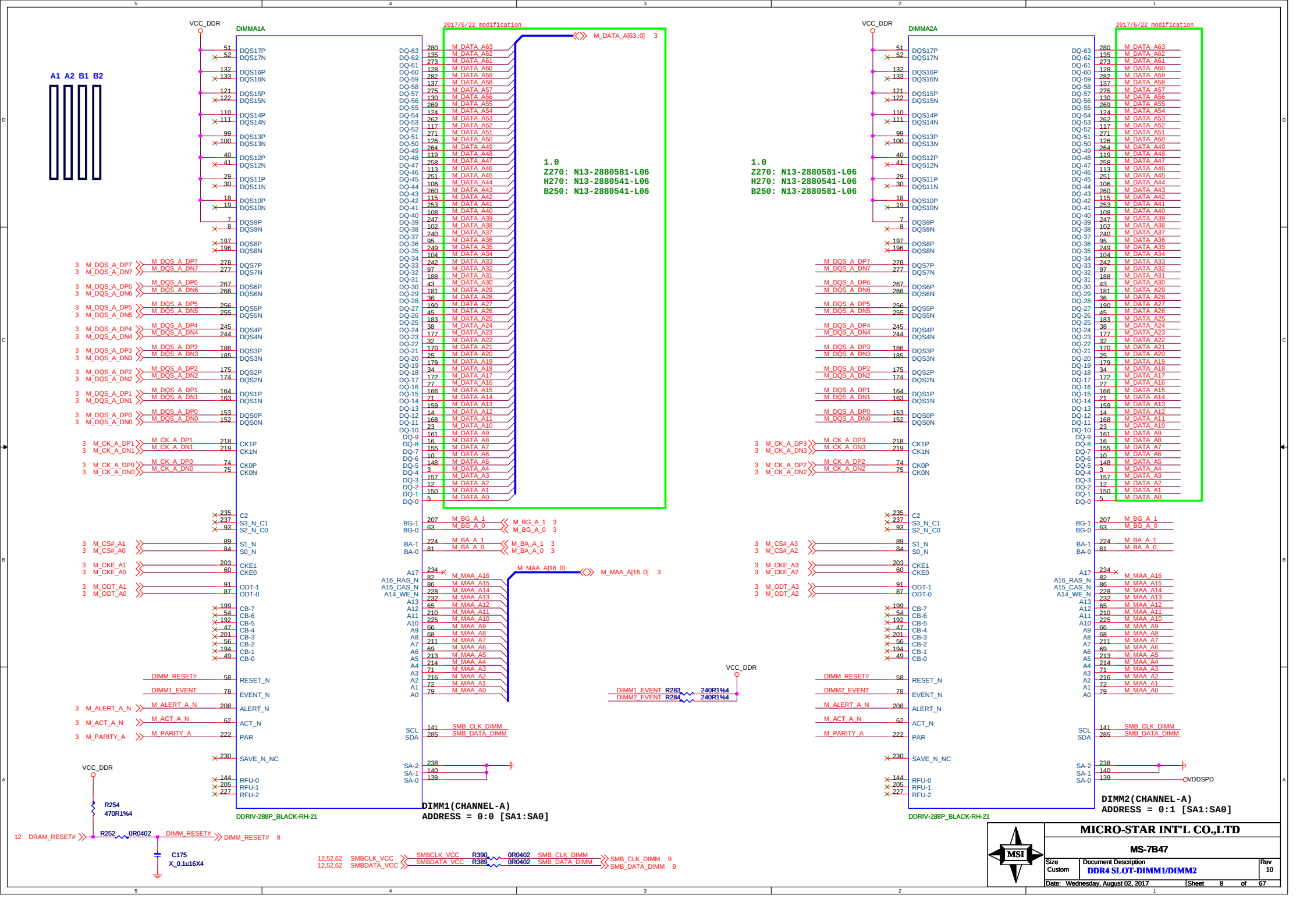
A1 A2 B1 B2
VCC_DDR
DIMMA1A
2017/6/22 modification
M_DATA_A[63..0] 3
1.0
Z270: N13-2880581-L06
H270: N13-2880541-L06
B250: N13-2880541-L06
DDRIV-288P_BLACK-RH-21
DIMM1(CHANNEL-A)
ADDRESS = 0:0 [SA1:SA0]
DIMMA2A
1.0
Z270: N13-2880581-L06
H270: N13-2880541-L06
B250: N13-2880581-L06
DDRIV-288P_BLACK-RH-21
DIMM2(CHANNEL-A)
ADDRESS = 0:1 [SA1:SA0]
M_MAA_A[16..0] 3
DIMM1_EVENT R283 240R1%4
DIMM2_EVENT R284 240R1%4
R254 470R1%4
R252 0R0402
DRAM_RESET#
DIMM_RESET#
C175 X_0.1u16X4
SMBCLK_VCC R390 0R0402 SMB_CLK_DIMM
SMBDATA_VCC R389 0R0402 SMB_DATA_DIMM
VDDSPD
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Size Custom
Document Description DDR4 SLOT-DIMM1/DIMM2
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2017/6/22 modification

DIMMB1A

VCC_DDR

M_DATA_B[63..0] ⟷ M_DATA_B[63..0] 3

1.0
Z270: N13-2880581-L06
H270: N13-2880541-L06
B250: N13-2880541-L06

DIMM3(CHANNEL-B)
ADDRESS = 1:0 [SA1:SA0]

DDRIV-288P_BLACK-RH-21

DIMMB2A

2017/6/22 modification

VCC_DDR

1.0
Z270: N13-2880581-L06
H270: N13-2880541-L06
B250: N13-2880581-L06

DIMM4(CHANNEL-B)
ADDRESS = 1:1 [SA1:SA0]

DDRIV-288P_BLACK-RH-21

DIMM3_EVENT R285 240R1%4
DIMM4_EVENT R286 240R1%4

VDDSPD

M_MAA_B[16..0] ⟷ M_MAA_B[16..0] 3

| | |
|---|---|
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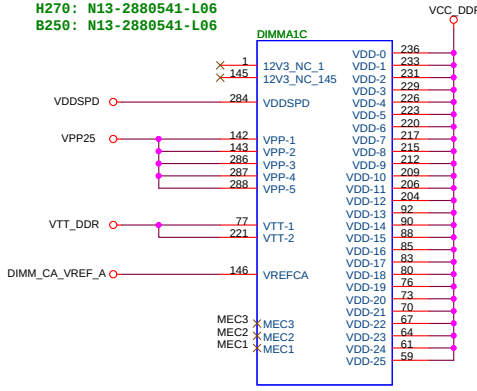
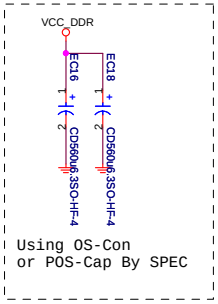
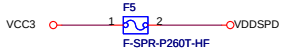
1.0
Z270: N13-2880581-L06
H270: N13-2880541-L06
B250: N13-2880541-L06

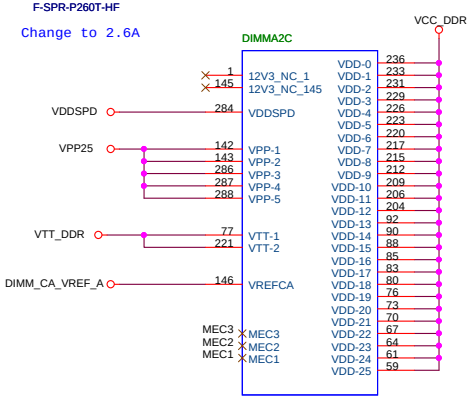
DIMM SLOT PN BY SPEC

Change to 2.6A

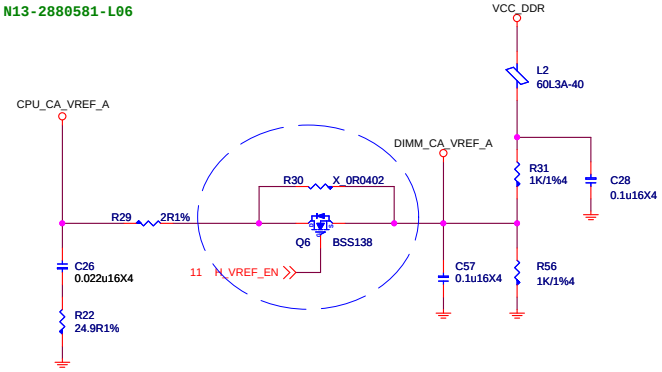


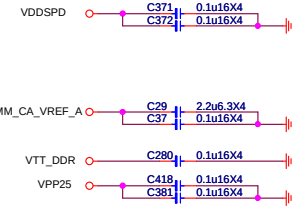



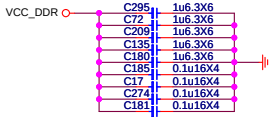



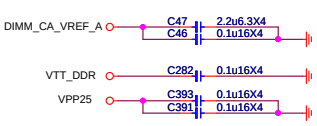



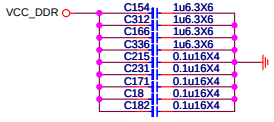

1.0
Z270: N13-2880581-L06
H270: N13-2880541-L06
B250: N13-2880581-L06

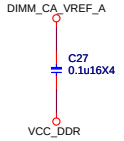


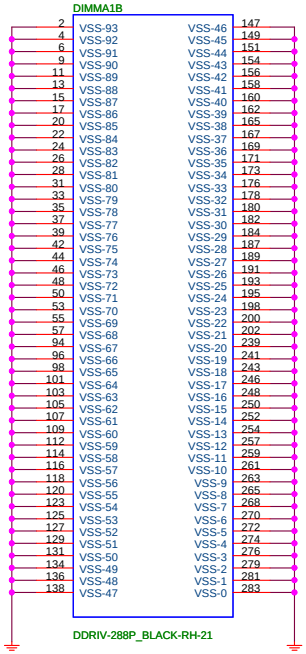



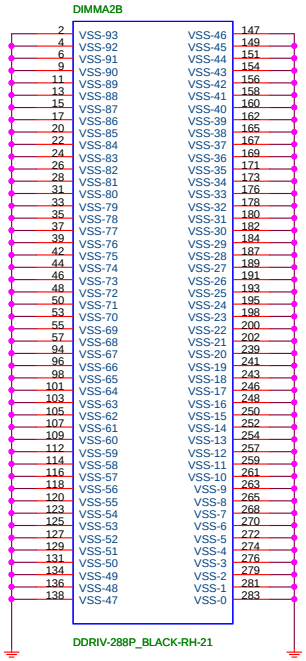




1.0
Z270: N13-2880581-L06
H270: N13-2880541-L06
B250: N13-2880541-L06




1.0
Z270: N13-2880581-L06
H270: N13-2880541-L06
B250: N13-2880581-L06

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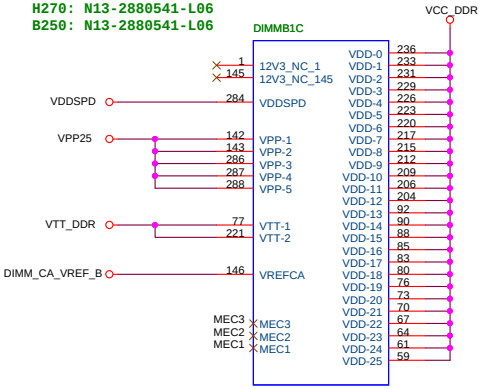
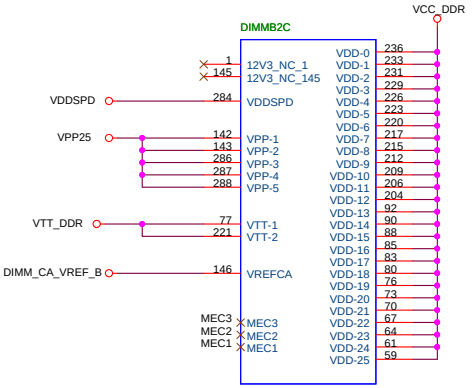
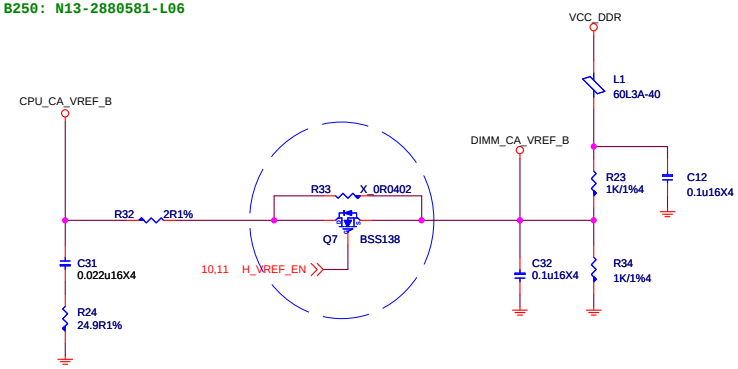
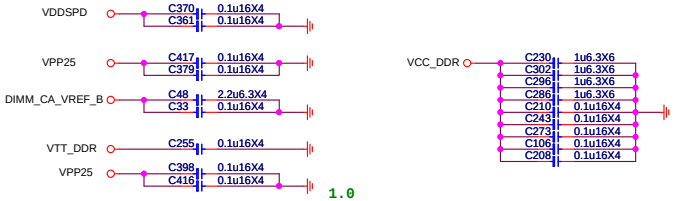
1.0
Z270: N13-2880581-L06
H270: N13-2880541-L06
B250: N13-2880541-L06

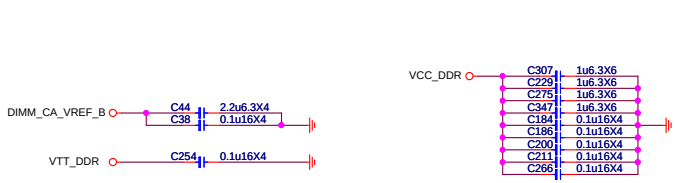


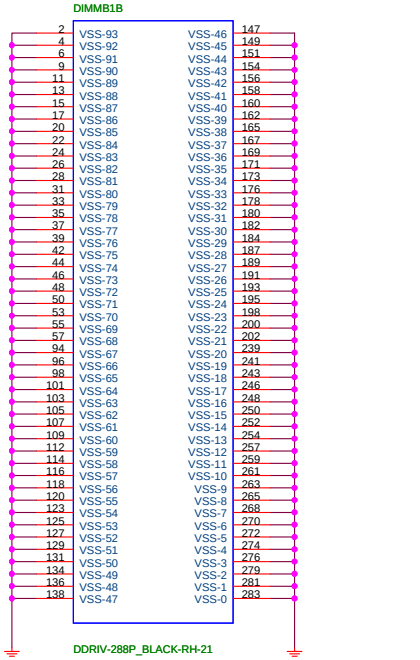

1.0
Z270: N13-2880581-L06
H270: N13-2880541-L06
B250: N13-2880581-L06



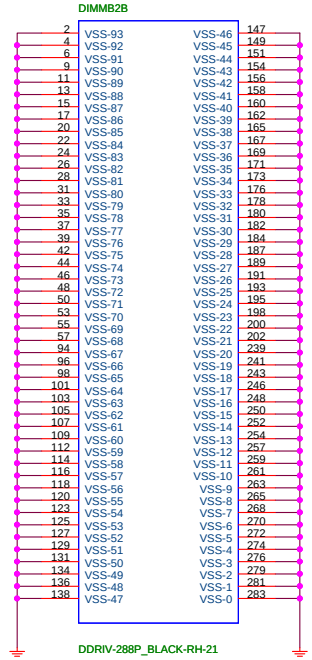



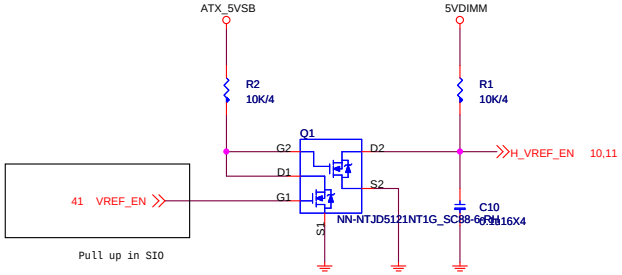




1.0
Z270: N13-2880581-L06
H270: N13-2880541-L06
B250: N13-2880581-L06




1.0
Z270: N13-2880581-L06
H270: N13-2880541-L06
B250: N13-2880581-L06

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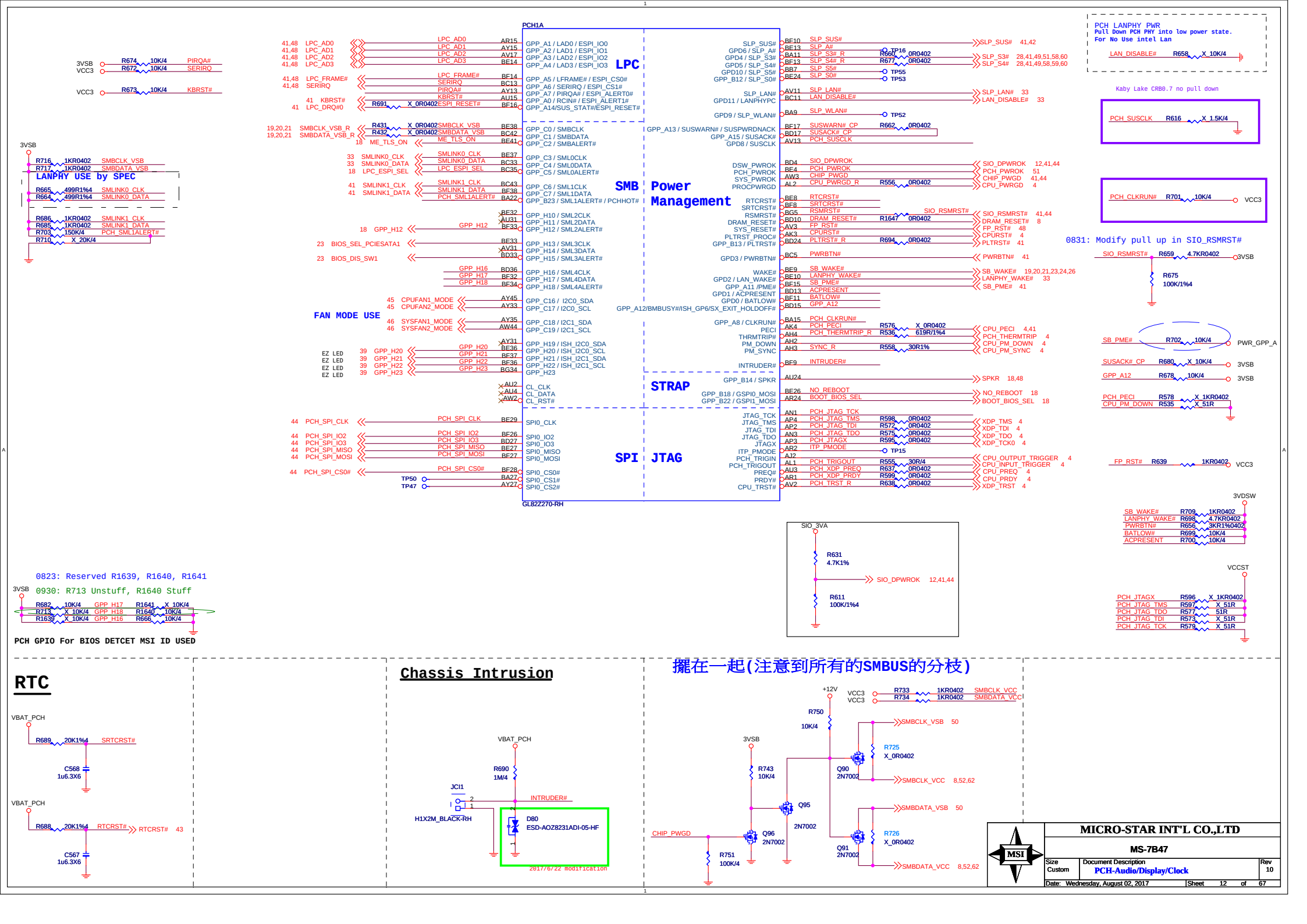
PCH1A
LPC
SMB
Power Management
STRAP
SPI
JTAG
GL82Z270-RH
LANPHY USE by SPEC
FAN MODE USE
PCH_LANPHY_PWR
Pull Down PCH PHY into low power state.
For No Use intel Lan
Kaby Lake CRB0.7 no pull down
0831: Modify pull up in SIO_RSMRST#
0823: Reserved R1639, R1640, R1641
0930: R713 Unstuff, R1640 Stuff
PCH GPIO For BIOS DETCET MSI ID USED
RTC
Chassis Intrusion
擺在一起(注意到所有的SMBUS的分枝)
MICRO-STAR INT'L CO.,LTD
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PCH-Audio/Display/Clock
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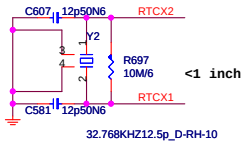
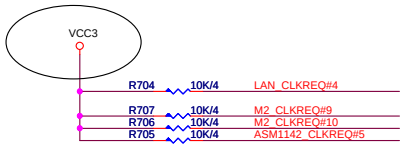
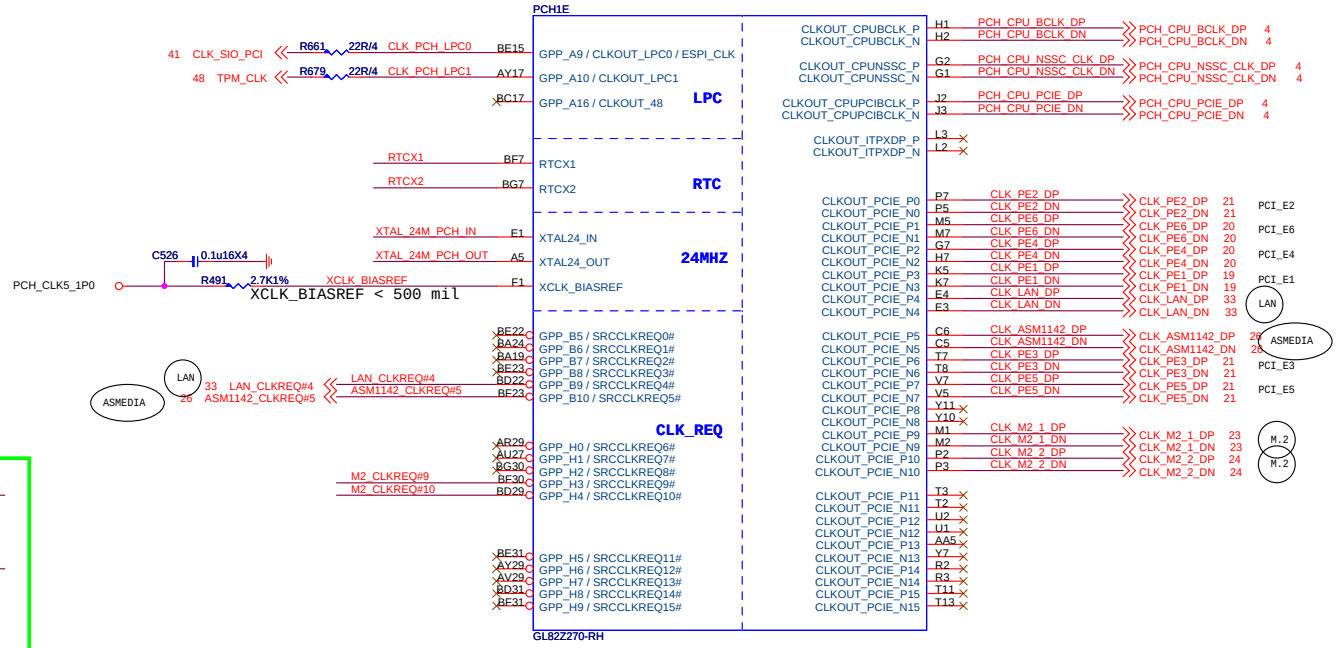
# PCH_CLK

## RTC_Block

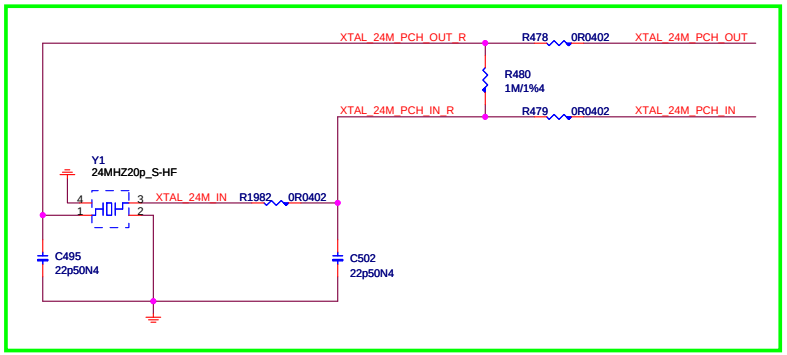
Close to PCH

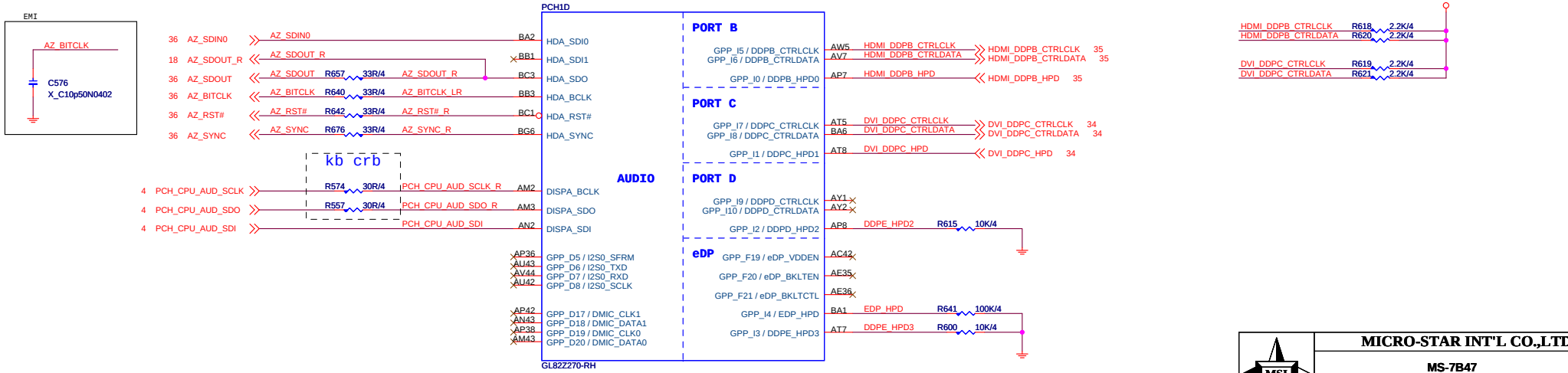



2017/6/22 modification

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|---|---|---|
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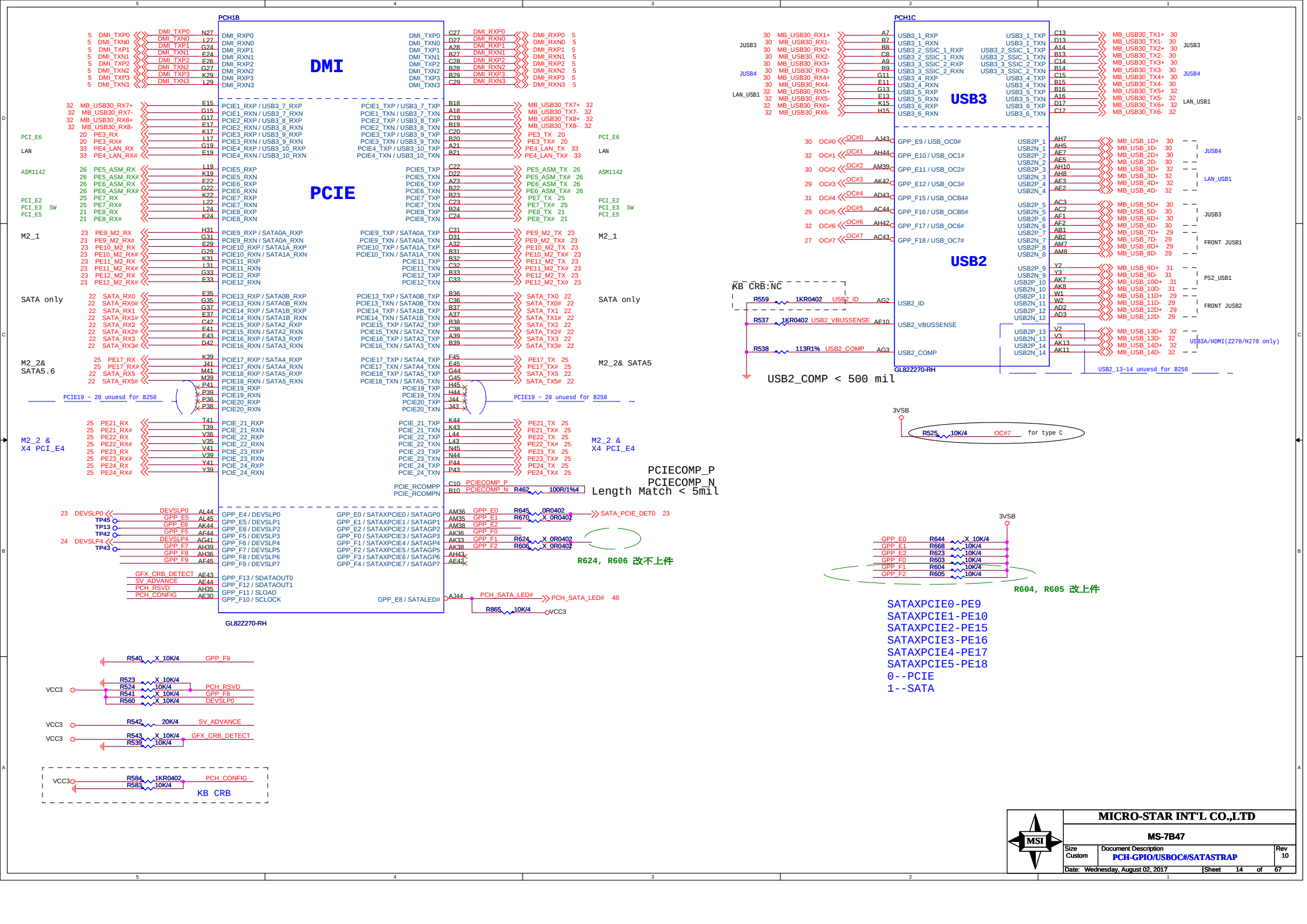
PCH1B
DMI
PCIE
GL82Z270-RH
PCH1C
USB3
USB2
GL82Z270-RH
KB CRB:NC
USB2_COMP < 500 mil
PCIECOMP_P
PCIECOMP_N
Length Match < 5mil
R624, R606 改不上件
R604, R605 改上件
SATAXPCIE0-PE9
SATAXPCIE1-PE10
SATAXPCIE2-PE15
SATAXPCIE3-PE16
SATAXPCIE4-PE17
SATAXPCIE5-PE18
0--PCIE
1--SATA
KB CRB
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MS-7B47
PCH-GPIO/USBOC#/SATASTRAP
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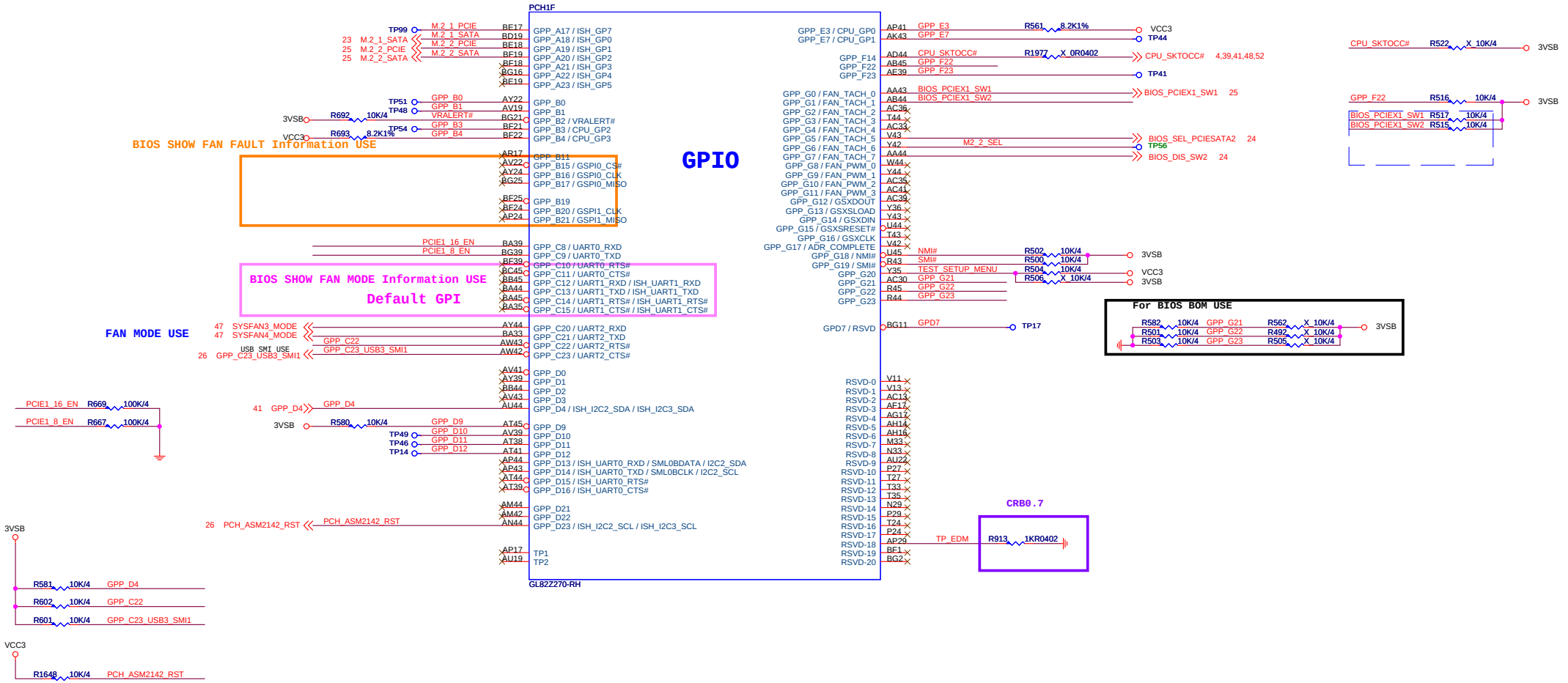
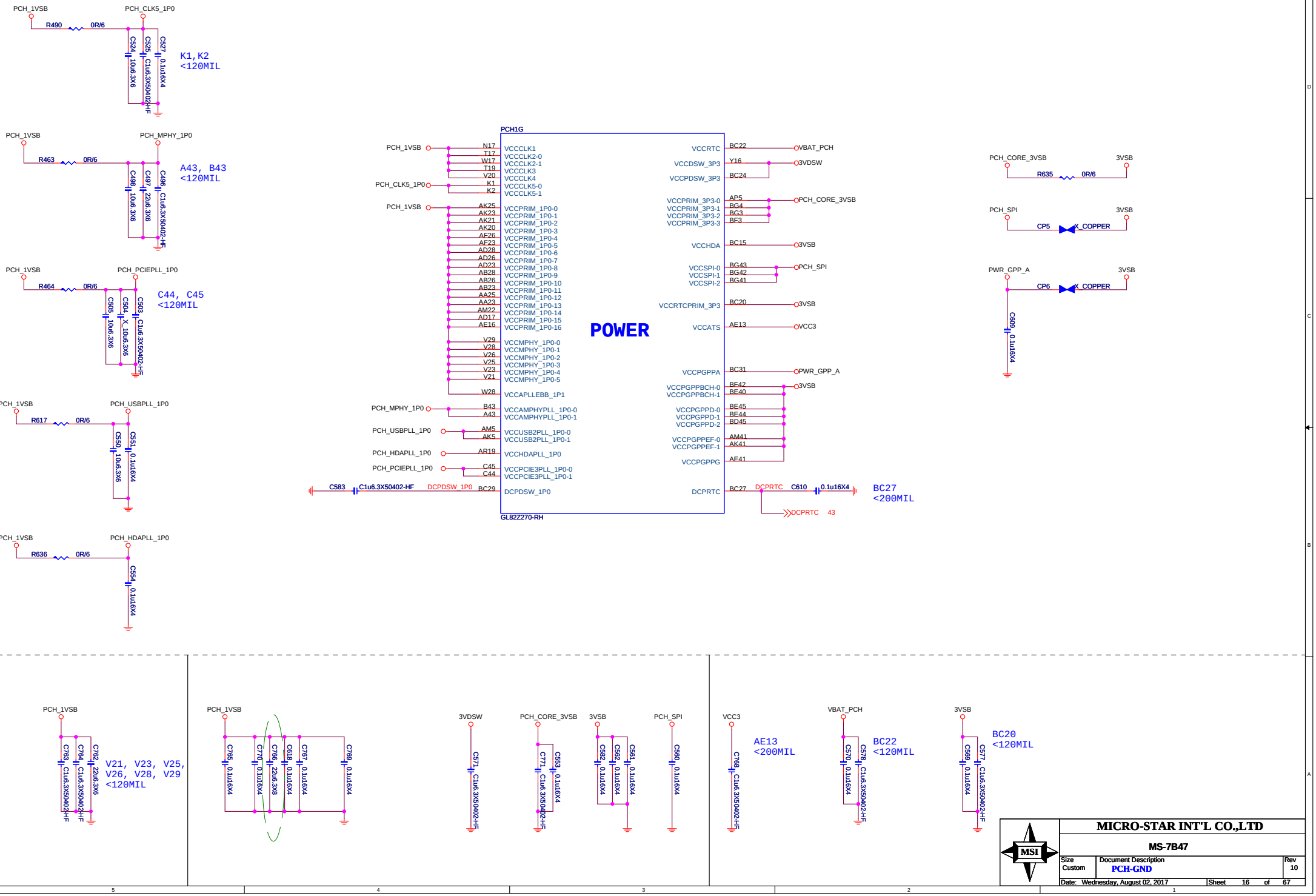
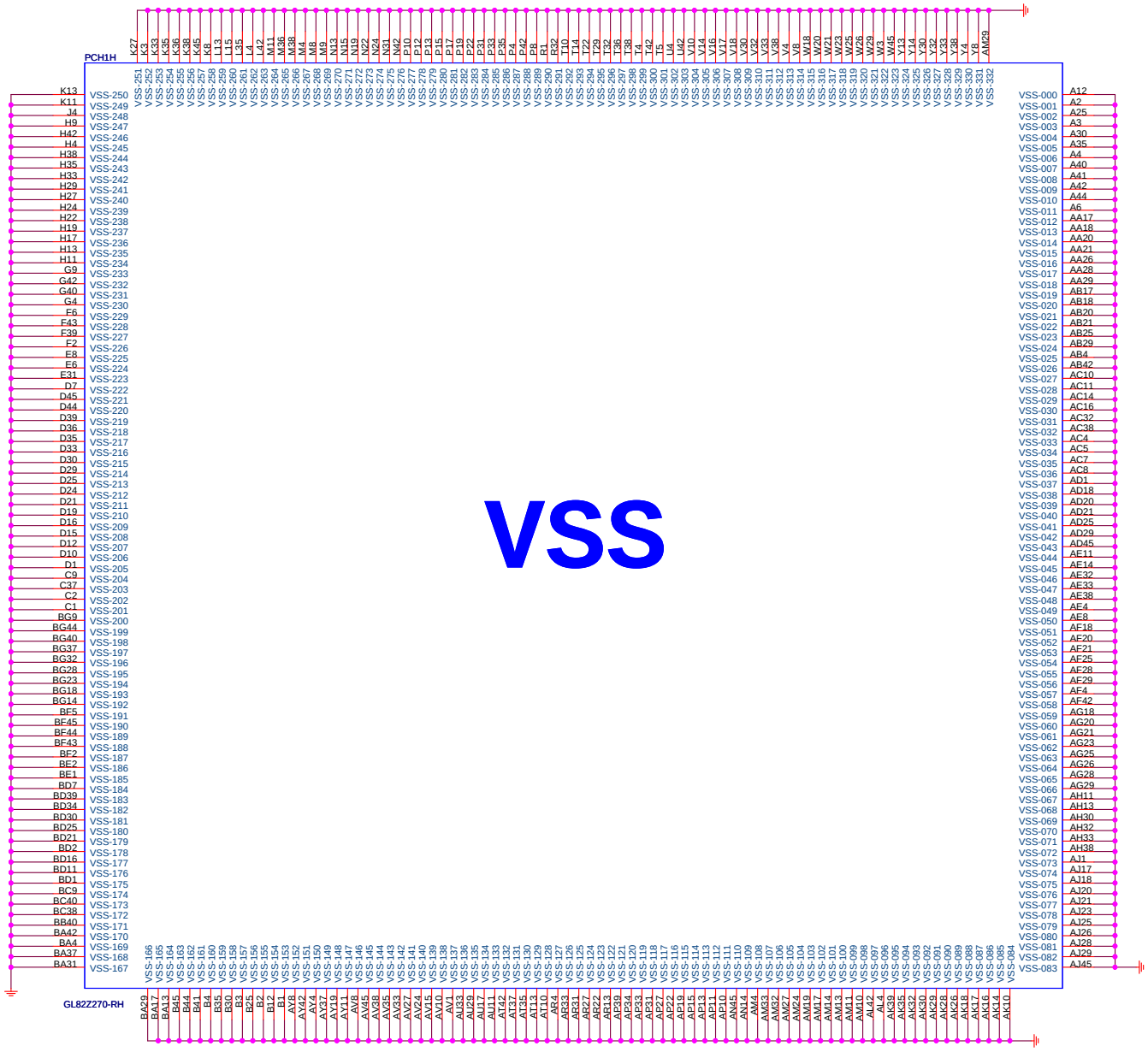



| | | |
|---|---|---|
| MICRO-STAR INT'L CO.,LTD | | |
| MS-7B47 | | |
| Size: Custom | Document Description: PCH-LPC/SPI/SMBUS/MISC | Rev: 10 |
| Date: Wednesday, August 02, 2017 | Sheet 15 of 67 | |

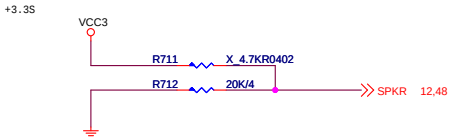



| | |
|---|---|
| MICRO-STAR INT'L CO.,LTD | |
| MS-7B47 | |
| Size: Custom | Document Description: PCH-GND |
| Rev: 10 | |
| Date: Wednesday, August 02, 2017 | Sheet 16 of 67 |



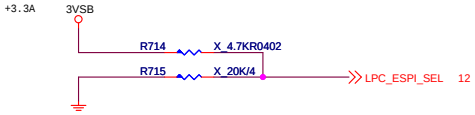

| | | |
|---|---|---|
| MICRO-STAR INT'L CO.,LTD | | |
| MS-7B47 | | |
| Size: Custom | Document Description: PCH-Power | Rev: 10 |
| Date: Wednesday, August 02, 2017 | Sheet 17 of 67 | |

## TOP Swap




Internal pull-down is disabled after PLTRST#

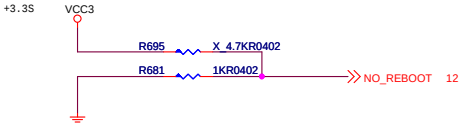
## LPC eSPI Mode




0 : LPC
1 : eSPI

Internal pull-down is disabled after RSMRST

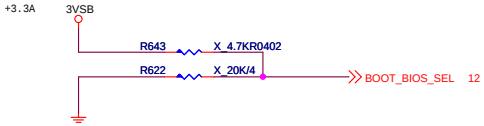
## No Reboot




0 : DISABLE (Default)
1 : ENABLE

Internal pull-down is disabled after PLTRST#

## Boot BIOS




0 : SPI
1 : LPC

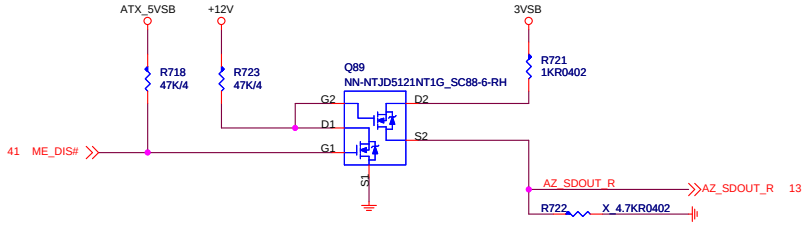
Internal pull-down is disabled after PLTRST

## AMT and SBA with confidentiality

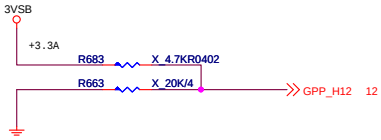

0 : DISABLE
1 : ENABLE (Default)

Internal pull-down is disabled after RSMRST

## HDA_SDO




## ESPI FLASH SHARING MODE




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

Internal pull-down is disabled after RSMRST

MICRO-STAR INT'L CO.,LTD

MS-7B47

| Size | Document Description | Rev |
|---|---|---|
| Custom | PCH-Strap | 10 |

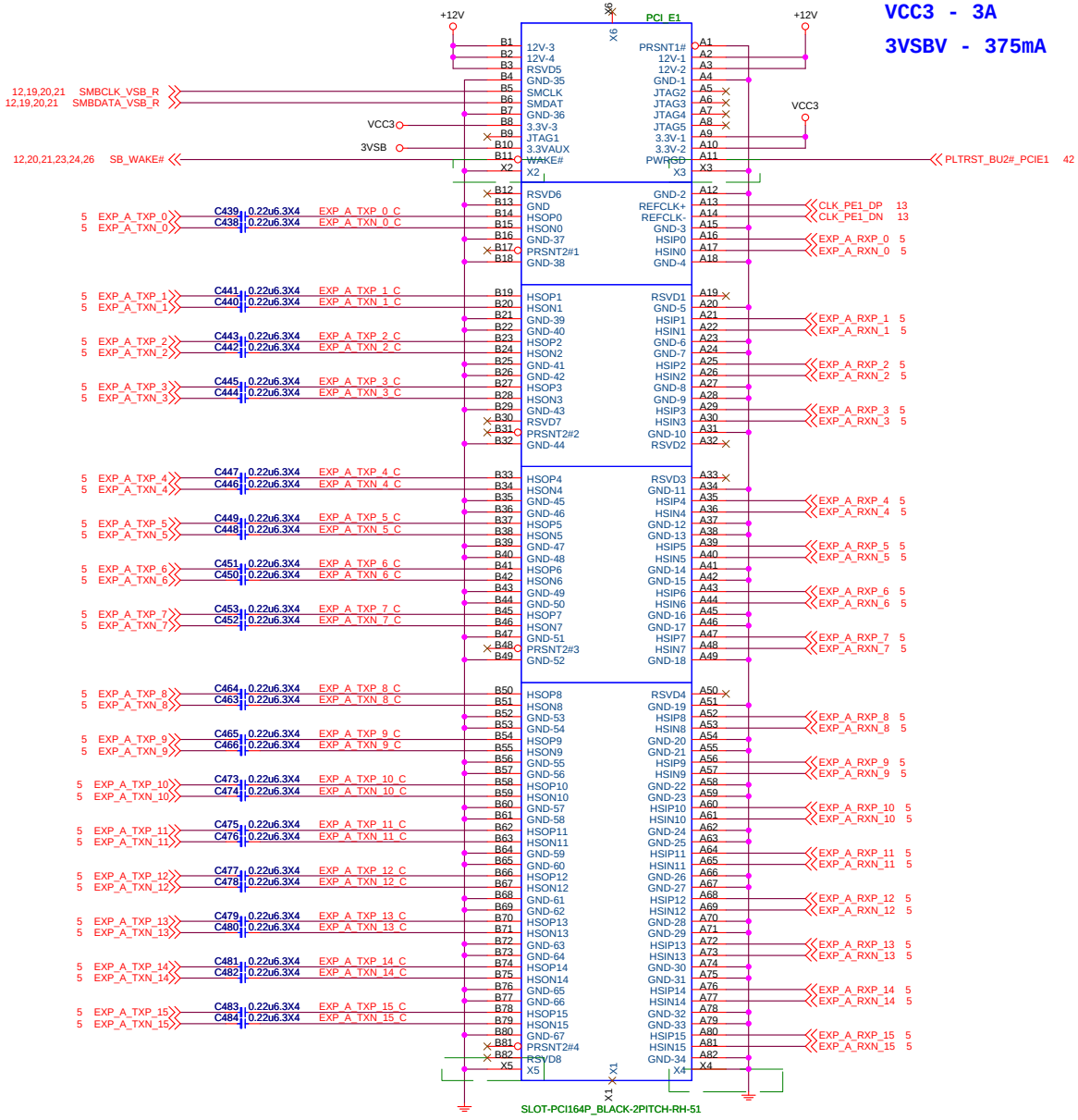
Date: Wednesday, August 02, 2017 | Sheet 18 of 67

Support Crossfire (2 way), N11-1641491-L06 (黑色鐵甲160817更新)

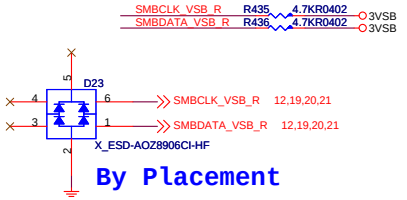
12V - 5.5A

VCC3 - 3A

3VSBV - 375mA



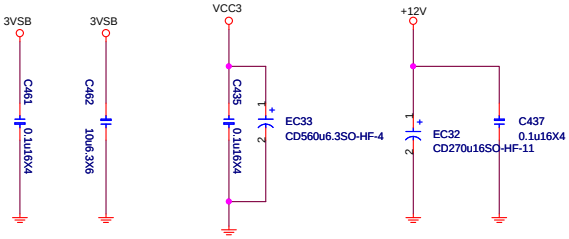

## SMBUS ESD




By Placement

Main:D0G-05A0529-A68

AVL:D0G-45B0510-I14

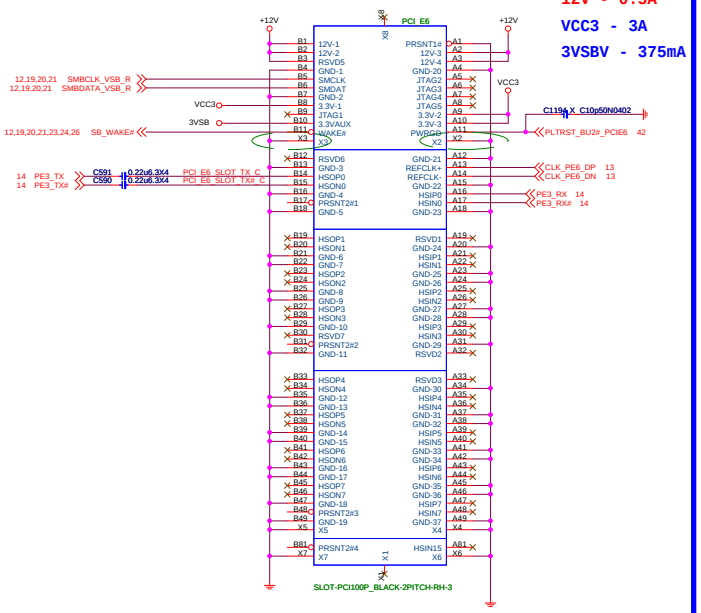


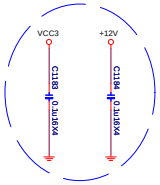

| | |
|---|---|
| MICRO-STAR INT'L CO.,LTD | |
| MS-7B47 | |
| Size: Custom | Document Description: PCIE SLOT (X16) |
| Rev: 10 | |
| Date: Wednesday, August 02, 2017 | Sheet 19 of 67 |

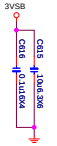
(PCI_E6 獨立使用PE3_TX/RX )

# PCI_Express X4 Slot

12V - 0.5A
VCC3 - 3A
3VSBV - 375mA



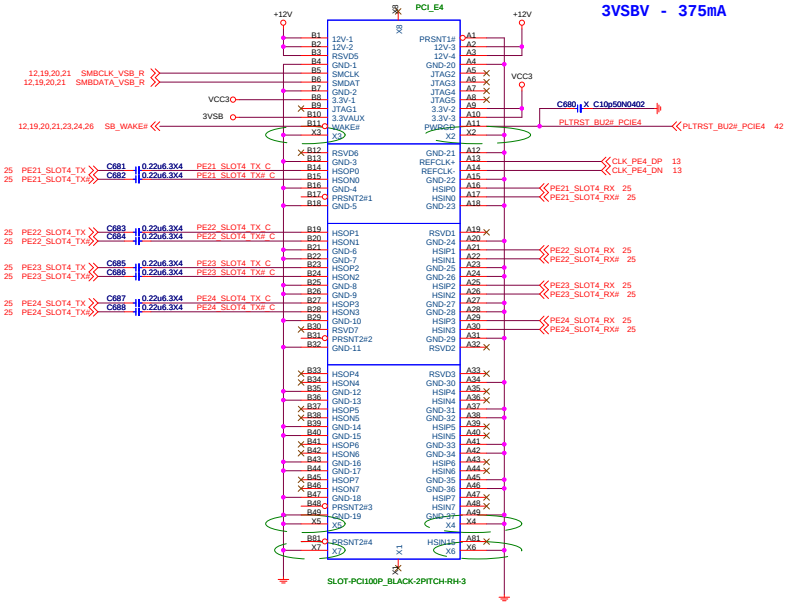



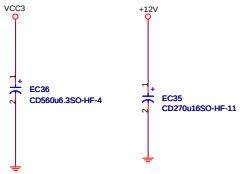

Support Crossfire (2 way)(RUN x4 與M2_2互切, PCIE_E4& M2_2同時有PCIE device為M2_2優先)

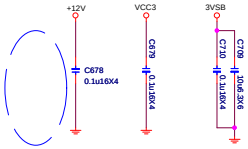
1.0
Z270/H270/B250: N11-1000151-L06

# PCI_Express X4 Slot

12V - 2.1A
VCC3 - 3A
3VSBV - 375mA



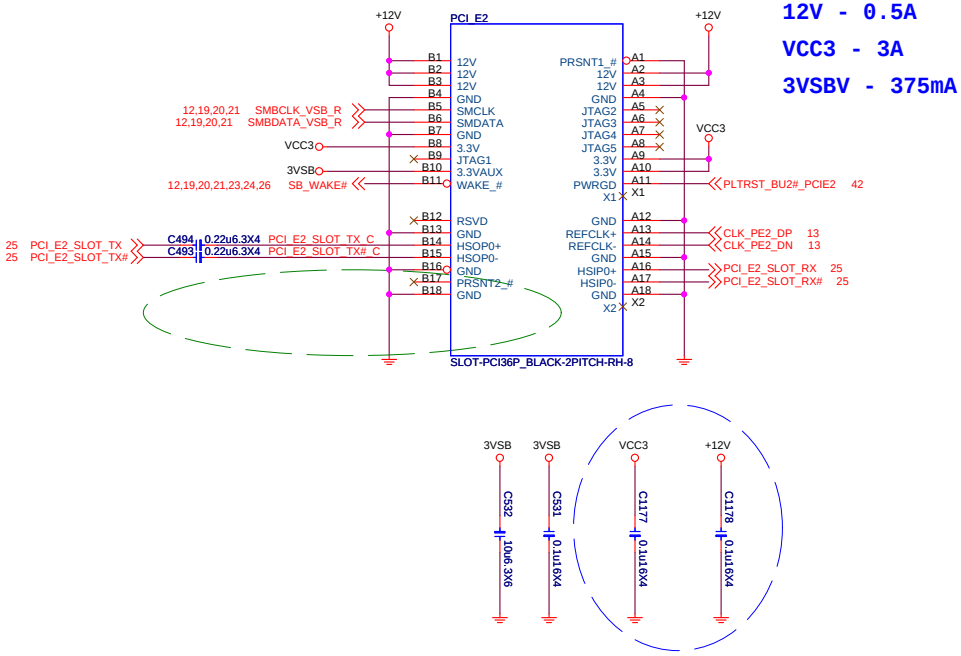




| | | |
|---|---|---|
| MSI | MICRO-STAR INT'L CO.,LTD | |
| | MS-7B47 | |
| Size: Custom | Document Description: PCIE SLOT (X4) | Rev: 10 |
| Date: Wednesday, August 02, 2017 | Sheet 20 of 67 | |

N11-0360211-F02/N11-0360381-L06 (與PCIE_E2 & PCIE_E3互切, PCIE_E2 & PCIE_E3同時有PCIE device 以PCIE_E3 優先)

12V - 0.5A
VCC3 - 3A
3VSBV - 375mA

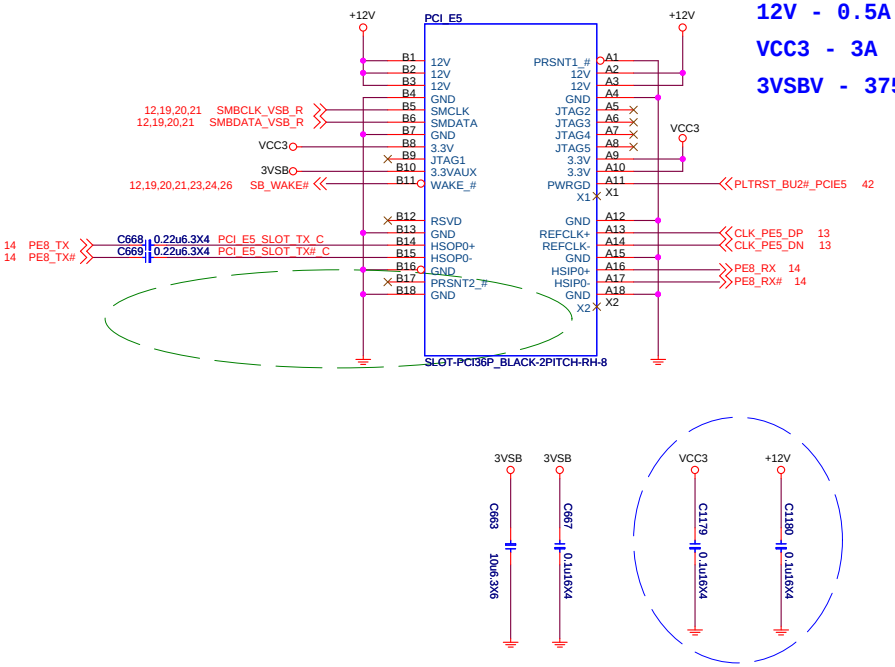






(PCIE_E5 獨立使用PE8_TX/RX)

12V - 0.5A
VCC3 - 3A
3VSBV - 375mA

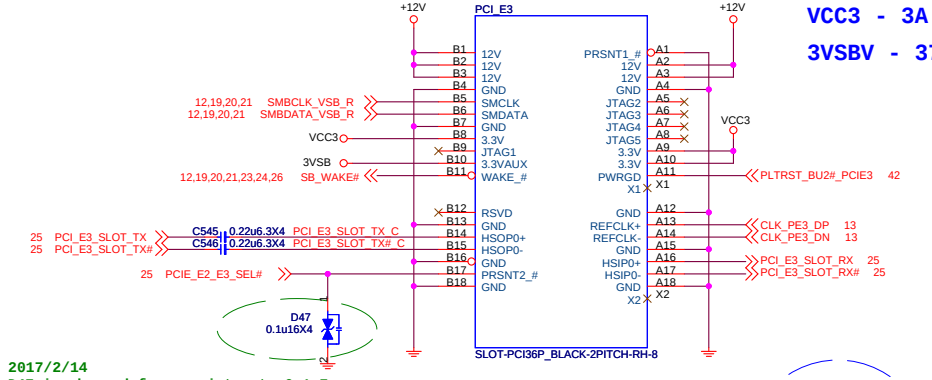




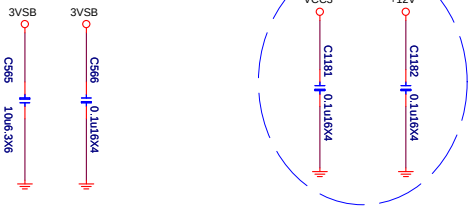


N11-0360211-F02/N11-0360381-L06 (與PCIE_E2 & PCIE_E3互切, PCIE_E2 & PCIE_E3同時有PCIE device 以PCIE_E3 優先)

12V - 0.5A
VCC3 - 3A
3VSBV - 375mA




2017/2/14
D47 is changed from varistor to 0.1uF
by leakage issue




MICRO-STAR INT'L CO.,LTD

MS-7B47

Size: Custom
Document Description: PCIE SLOT (X1)
Rev: 10
Date: Wednesday, August 02, 2017
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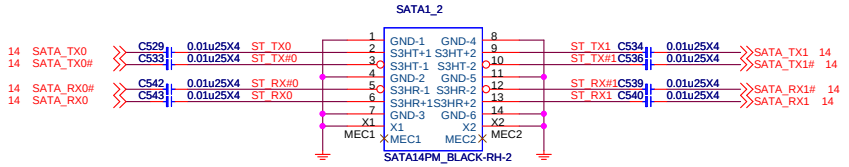
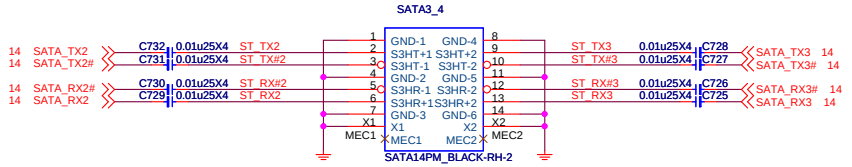
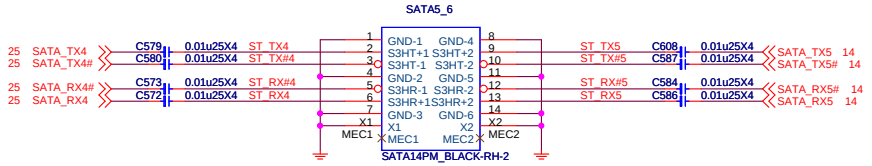
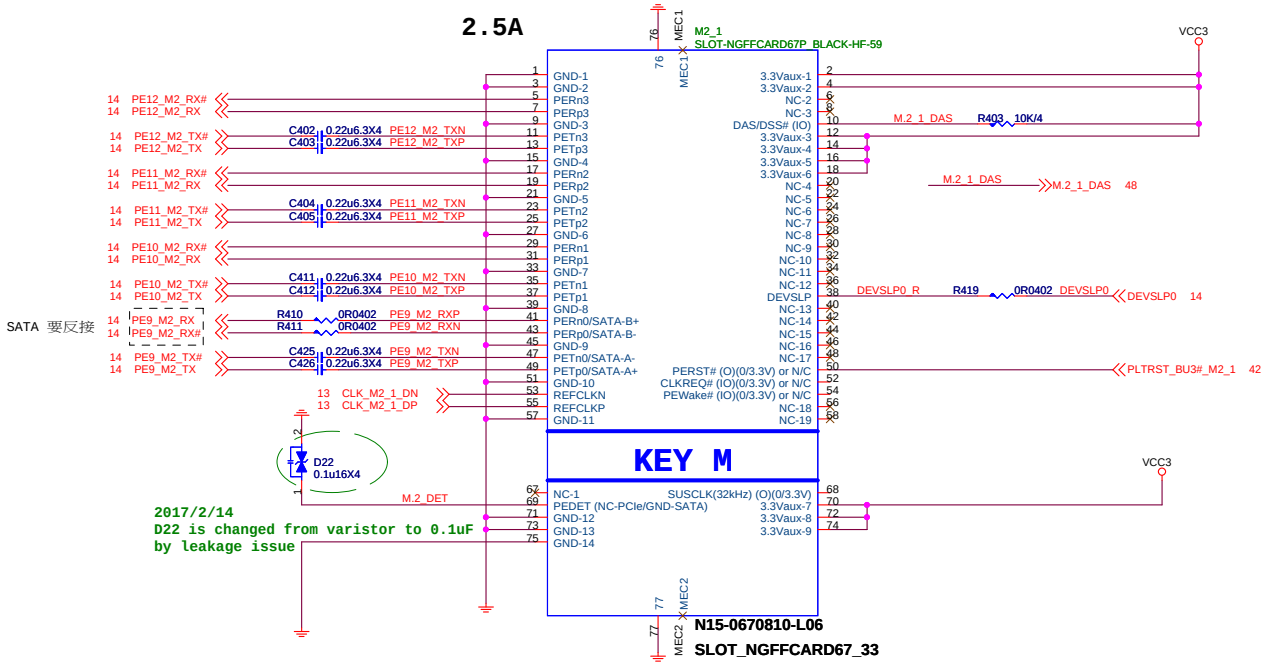
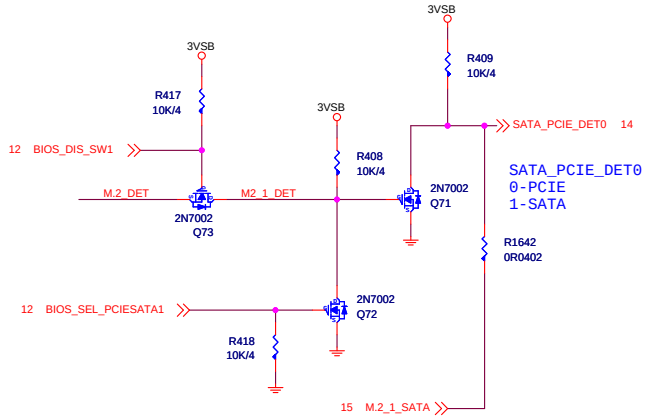



| | | |
|---|---|---|
| MSI | MICRO-STAR INT'L CO.,LTD | |
| | MS-7B47 | |
| Size: Custom | Document Description: SATA Connector | Rev: 10 |
| Date: Wednesday, August 02, 2017 | Sheet 22 of 67 | |



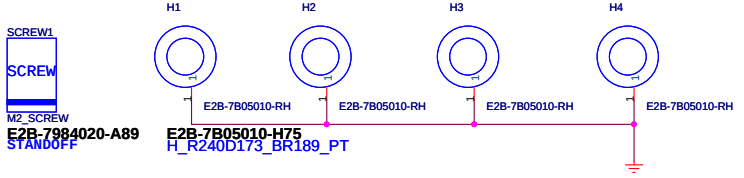



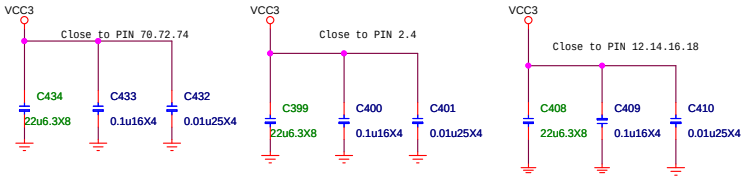

***BIOS_MODE***

| | GPP_H15 | GPP_H13 |
|---|---|---|
| ***BIOS_DIS_SW1*** | ***BIOS_SEL_PCIESATA1*** | ***Mode*** |
| ***0*** | ***1*** | ***M2-SATA*** |
| ***0*** | ***0*** | ***M2-PCIE*** |
| ***GPI*** | ***GPI*** | ***AUTO*** |

2017/6/22 modification

**E2B-7B05010-H75 *4(H1~H4)+**
**Screw E2B-7B05020-A89*1**




MICRO-STAR INT'L CO.,LTD

MS-7B47

| Size | Document Description | Rev |
|---|---|---|
| Custom | M.2-SLOT1 | 10 |

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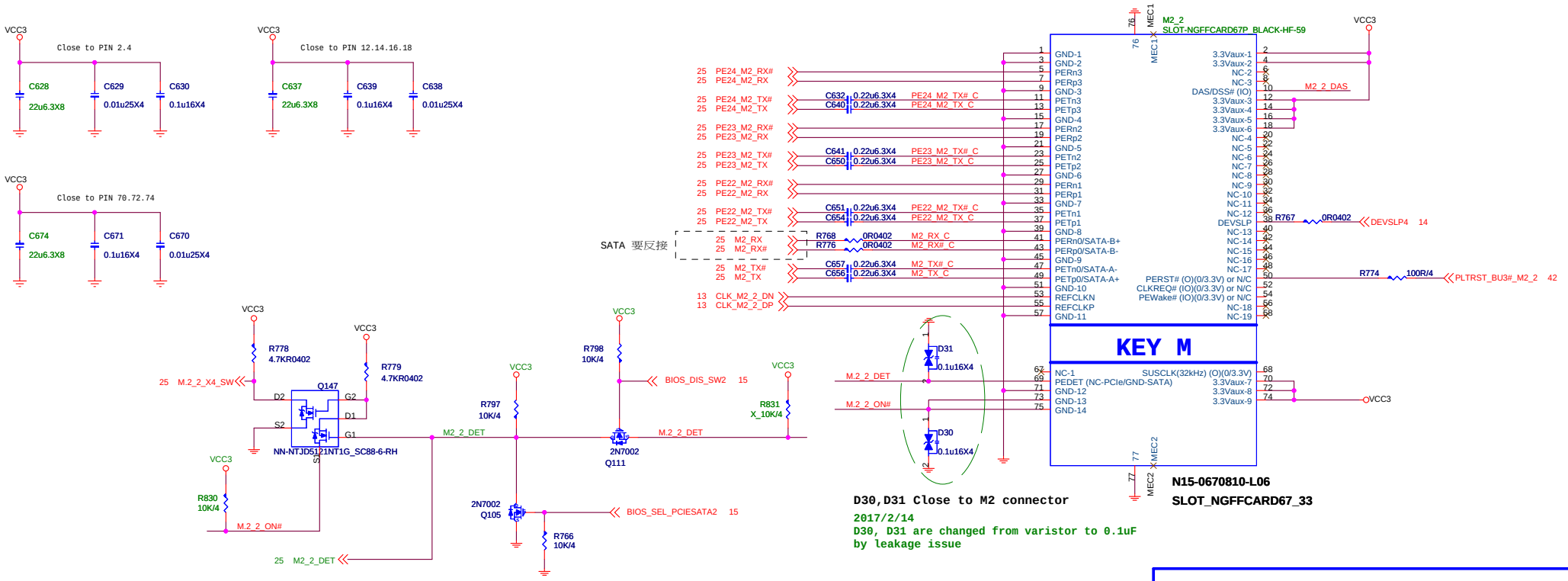



D30,D31 Close to M2 connector

2017/2/14

D30, D31 are changed from varistor to 0.1uF by leakage issue

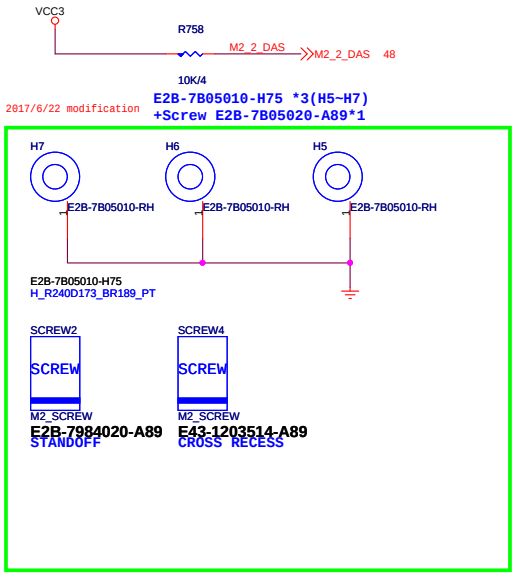
| Pin | BIOS_SEL_PCIESATA2 | BIOS_DIS_SW2 | M.2_2_DET | M.2_2_ON# | M2_2_DET | M.2_2_SATA | M.2_2_X4_SW | M.2_2_PCIE | M2_2 Status | SATA port5 | PCIe x 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GPIO | GPP_G5 | GPP_G7 | X | X | X | GPP_A20 | X | GPP_A19 | X | X | X |
| X | 0 | 1 | H | L | H | 1 | H | 1 | M.2 PCIe type | Active | Inactive |
| X | 0 | 1 | L | L | L | 0 | L | 0 | M.2 SATA type | Inactive | Active |
| X | 0 | 1 | H | H | H | 1 | L | 0 | X | Active | Active |
| Pin | BIOS_SEL_PCIESATA1 | BIOS_DIS_SW1 | M.2_DET | X | M2_1_DET | M.2_1_SATA | X | X | M2_1 Status | SATA port1 | X |
| GPIO | GPP_H13 | GPP_H15 | X | X | X | GPP_A18 | X | X | X | X | X |
| X | 0 | 1 | H | X | L | 0 | X | X | M.2 PCIe type | Active | X |
| X | 0 | 1 | L | X | H | 1 | X | X | M.2 SATA type | Inactive | X |
| X | 0 | 1 | H | X | L | 0 | X | X | X | Active | X |

SATA_PCIE_DET4
0-PCIE
1-SATA

PCH side
0:PCIE
1:SATA
M.2 side
0:SATA
NC:PCIE

***BIOS_MODE***

| *BIOS_DIS_SW2* | *BIOS_SEL_PCIESATA2* | *Mode* |
|---|---|---|
| *1* | *0* | *M2-PCIE* |
| *0* | *1* | *X4 SLOL-PCIE* |
| *GPI* | *GPI* | *GPI* |

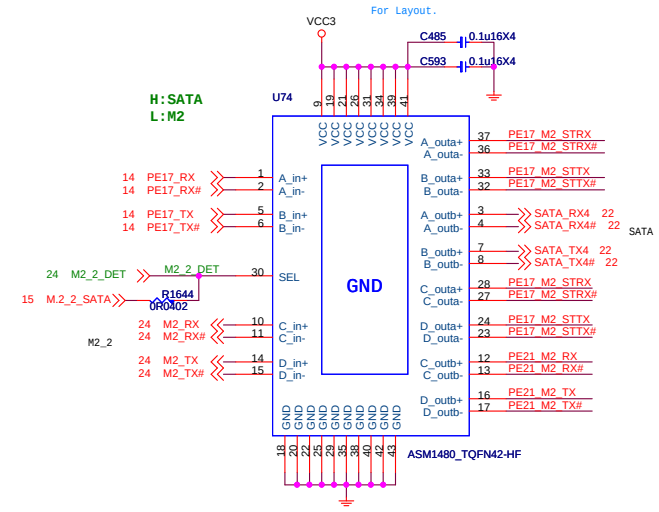


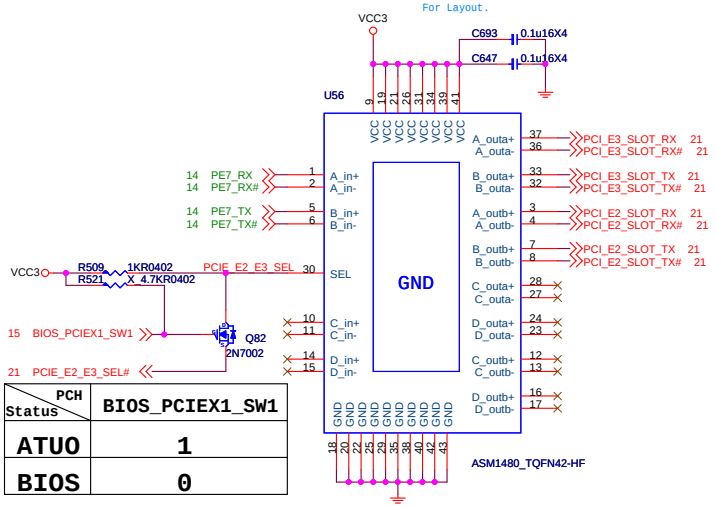

MICRO-STAR INT'L CO.,LTD

MS-7B47

| Size | Document Description | Rev |
|---|---|---|
| Custom | M.2-SLOT2 | 10 |

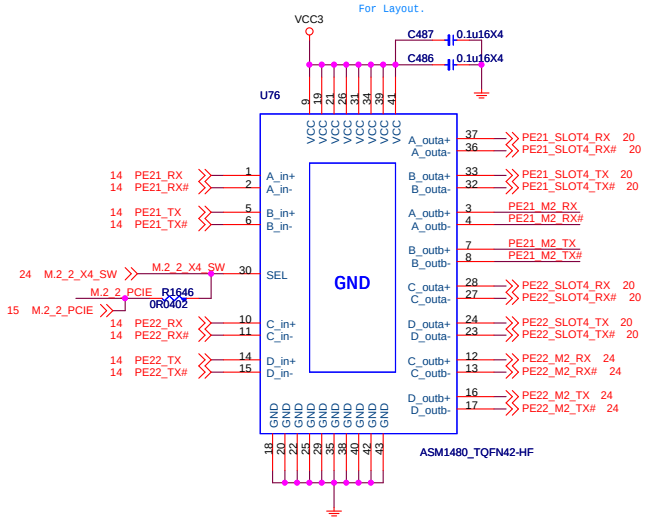
Date: Wednesday, August 02, 2017 Sheet 24 of 67

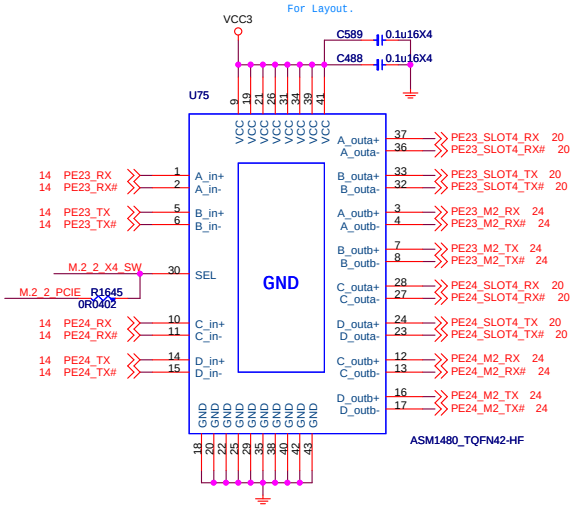



| PCH Status | BIOS_PCIEX1_SW1 |
|---|---|
| ATUO | 1 |
| BIOS | 0 |

SEL H: PCI_E3
SEL L: PCI_E2




2016/8/4 update

| Type | Spec | MSI PN | AVL | Description |
|---|---|---|---|---|
| PCIE gen3 switch | | I98-M14800C-AD0 | 主料 | ,IC BUS SWITCH,ASMEDIA/ASM1480,TQFN-42pin,PCI EXPRESS GEN3 QUICK SWITCH,HALOGEN FREE |
| | | I98-3415R0C-T07 | AVL | ,IC BUS SWITCH,TI/HD3SS3415RUAR,WQFN-42pin,4-CHANNEL HIGH-PERFORMANCE DIFFERENTIAL SWITCH,HALOGEN FREE |
| | | I98-3415R0C-T07的SEL pin內部有對地100KR, 使用上需注意SEL的pull hi電阻阻值, 避免分壓過後電壓位準偏低<br>建議SEL 請 pu 1KR to 3.3V | | |

| | M2_2_ON | M.2_2_X4_SW | M.2 SATA | M.2 PCIE | X4 SLOT | SATA5 |
|---|---|---|---|---|---|---|
| Default | V | V | X | X | V | V |
| M.2_2 PCIE | X | X | X | V | X | V |
| M.2_2 SATA | X | V | V | X | V | X |

MICRO-STAR INT'L CO.,LTD

MS-7B47

Size: Custom | Document Description: M.2/SATA/PCIE SW | Rev: 10

Date: Wednesday, August 02, 2017 | Sheet 25 of 67

# 3142

Minimun gap should be greater of >15mil with other signal.

USB HS (90Ohm-Diff) Chip to Connector ¯1.5 inch.

**Power Consumption**

| | 3.3V | 1.2V(1.05V | 3.3VSUS | 1.05VSUS(1.2VSUS) | 2.5V | Total Power |
|---|---|---|---|---|---|---|
| ASM1142 | 250mA | 650mA | 56mA | 15mA | NA | 1573.8(mW) |
| ASM2142 | 4mA | 470mA | 9mA | 10mA | 220mA | TDP |

CLK Rule (Follow SB PDG)

PCIE Rule (Follow SB PDG)

SMI connect to GPI which support smi function.
SB side pull high 10K ohm to 3VSB.
(Intel 8X & 9X series use GPIO10)
(Intel SKL use GPP_C23)

Layout Guide:

1.) USB3.1 to Connector Total Length < 1.5"
2.) VIA hole <2

ASM1142 RU16 stuff RU17 unstuff
ASM2142 RU16 unstuff RU17 stuff

PPON_X Internal Pull-up to VCC3

OCI_X Internal Pull-up to 3VS

RX/TX Internal Pull-up

2017/6/22 modification

ASM2142 U144 stuff RU24 unstuff
ASM1142 U144 unstuff RU24 stuff

YU1
D04-0900900-SC6(M)
D04-0901200-F07
D04-0901100-T16

2016 . 8 .25 modification

ASM1142 RU19 stuff RU18 unstuff
ASM2142 RU19 unstuff RU18 stuff

2017/2/14
DU1 is changed from varistor to 0.1uF by leakage issue

atx5vsb change to vcc5

ASM_SMI has internal Pull-up to VCC
ASM_WAKE has internal Pull-up to VCCSUS

X0/XI (95hm-Diff,Spacing 30mil )
UREXT,PEUREXT(W/S) : 10/7
OCIA,OCIB,PPONA,PPONB(W/S) : 5/8

## ASM1142 1.2 VCC Power

SN:L01-0107118-M26

MP2143DJ_TSOT23-8-RH

2017/6/22 modification

ASM1142 RU13/RU14 200K/187K____1.24V
ASM2142 RU13/RU14 196K/261K____1.05V

## ASM1142 1.2 VSB Power

ASM1142 RU9 18K____1.24V
ASM2142 RU9 31.6K__1.05V

2017/6/22 modification

ASM1142 UU2 unstuff
ASM2142 UU2 stuff

## EEPROM

MX25L1006EMI-10G(T)

2016 . 7 .20
ASM1142 UU3 M31-2551222-M24(512K bit)
ASM2142 UU3 M31-25L1022-M24(1M bit)

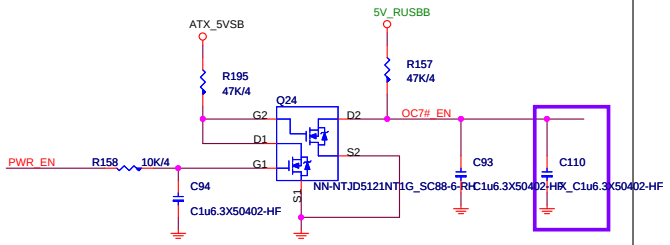
MICRO-STAR INT'L CO.,LTD

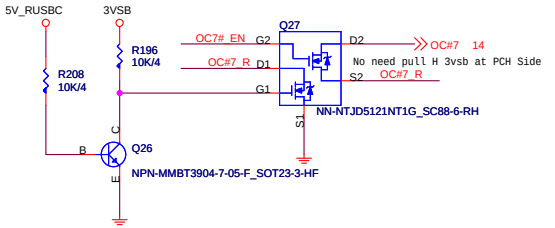
MS-7B47

Size: Custom | Document Description: ASM 1142 | Rev: 10

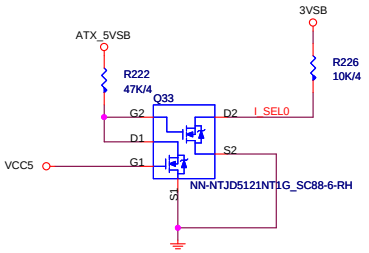
Date: Wednesday, August 02, 2017 | Sheet 26 of 67

# VBUS OC#




# Current Mode

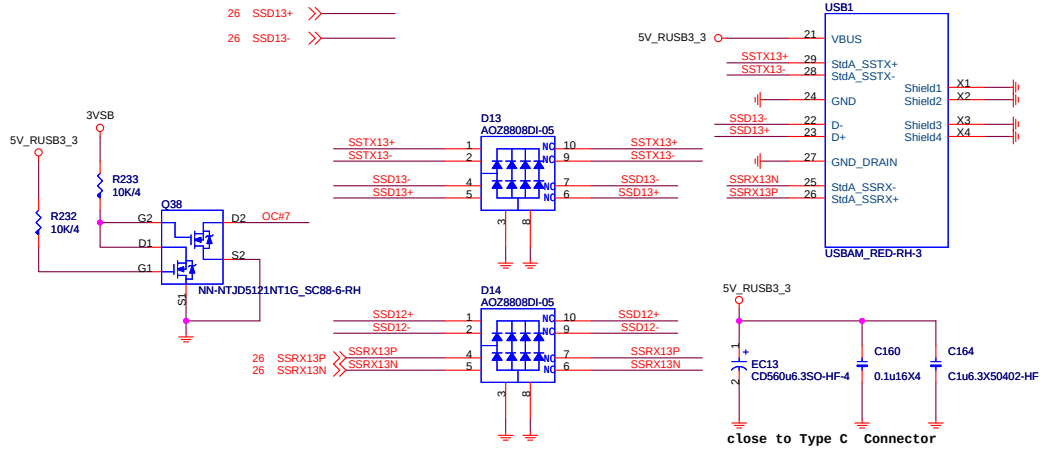



I_SEL0 : I_SEL1

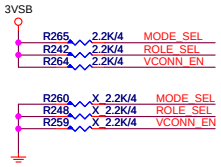
| | | |
|---|---|---|
| X | 0 | Default for 900mA |
| 0 | 1 | 1.5A @5V |
| 1 | 1 | 3A @5V |

*1.5A under S3 mode*
*3A under S0 mode*

# TYPE-A

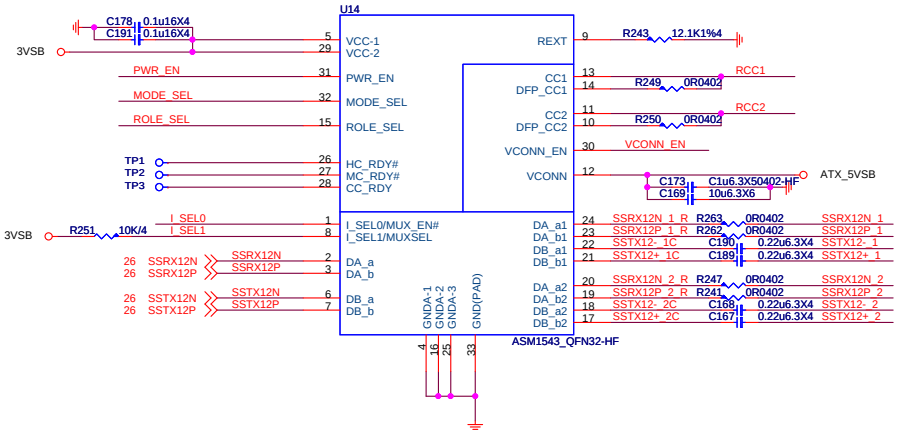

# USB Type-C MUX with Configuration Channel (CC)

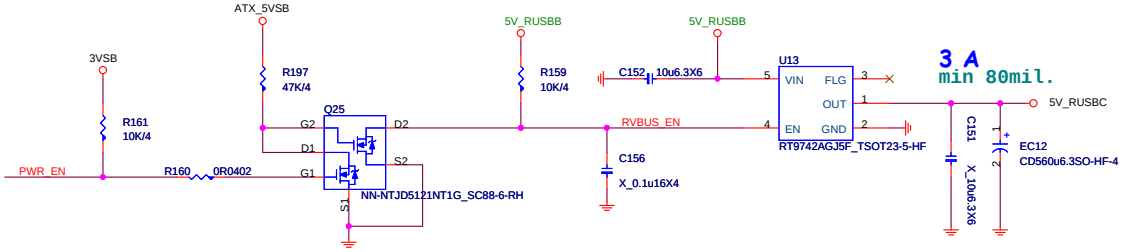



| MODE_SEL | |
|---|---|
| 1 | CCL MODE (default) |
| 0 | Mux MODE |

| ROLE_SEL | |
|---|---|
| 1 | DFP role (default) |
| 0 | UFP role |

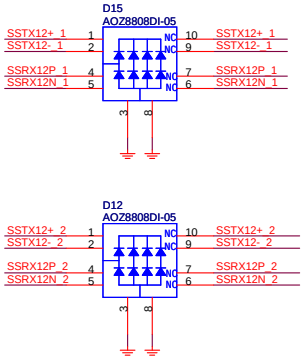
| VCONN_EN | |
|---|---|
| 1 | enable |
| 0 | disable |



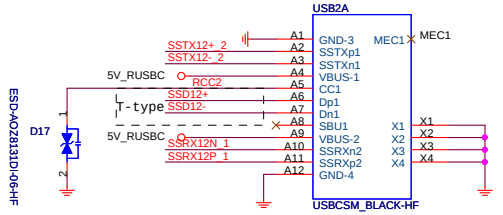

# TYPE-C


***ESD Protection***
***NEAR CONNECTOR***

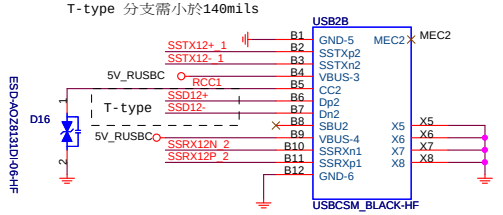



USB3.0
D0G-06A050C-A68 Main
D0G-05A0300-I14 AVL
D0G-45B031C-005 AVL

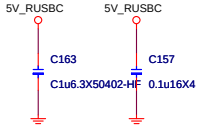
OC#7




T-type 分支需小於140mils

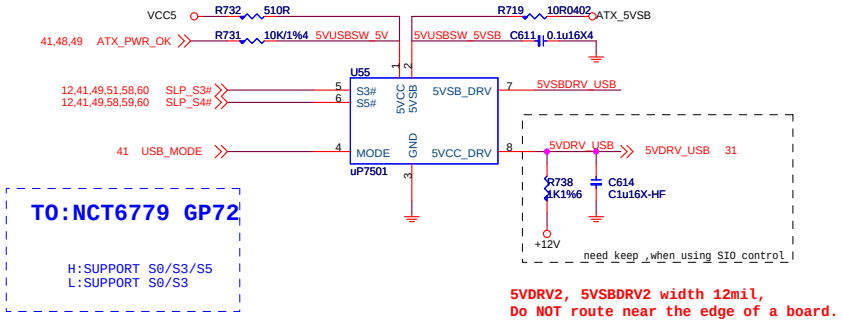



close to Type C Connector



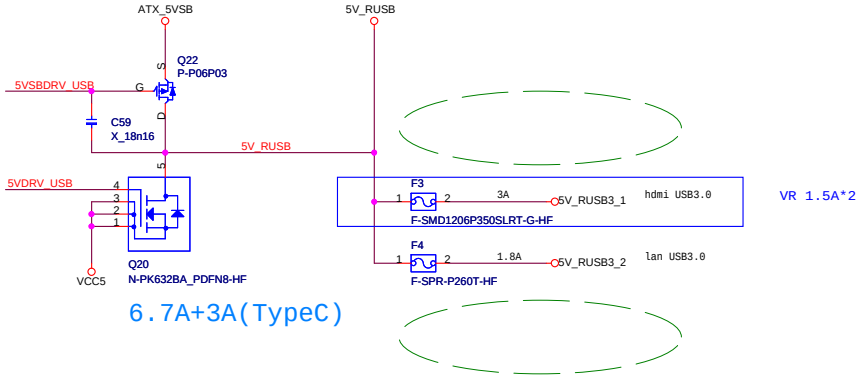

| | |
|---|---|
| MICRO-STAR INT'L CO.,LTD | |
| MS-7B47 | |
| Size: Custom | Document Description: USB TYPE C |
| Rev: 10 | |
| Date: Wednesday, August 02, 2017 | Sheet 27 of 67 |

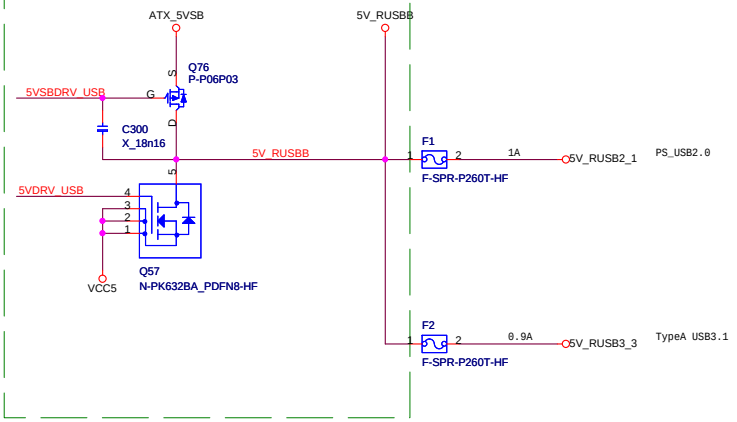
## USB PORT POWER



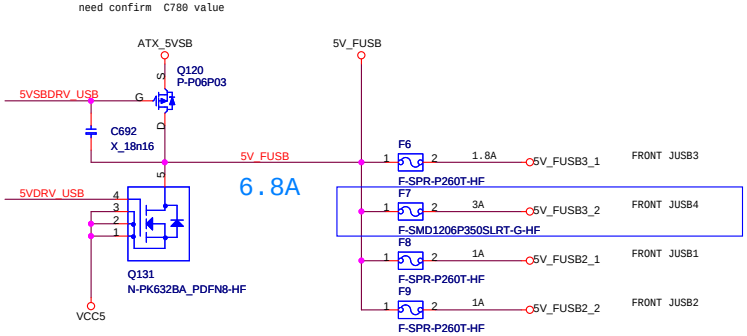

**5VDRV2, 5VSBDRV2 width 12mil,**
**Do NOT route near the edge of a board.**

## REAR USB PORT POWER




## FRONT USB PORT POWER

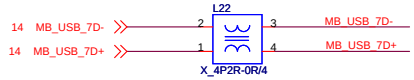


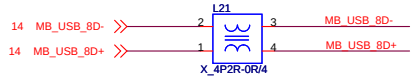

P-MOS
D03-06P0319-N03

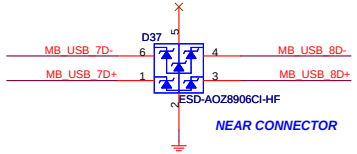
N-MOS
D03-510BA0C-N03
D03-3056M00-U47
D03-4C05N03-O05
D03-3830D09-N47
D03-632BA0C-N03

**D08-0301000-P16**
**D08-0301100-B07**

| | | |
|---|---|---|
| MICRO-STAR INT'L CO.,LTD | | |
| MS-7B47 | | |
| Size: Custom | Document Description: USB POWER UP7501 | Rev: 10 |
| Date: Wednesday, August 02, 2017 | Sheet 28 of 67 | |

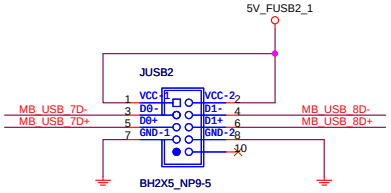


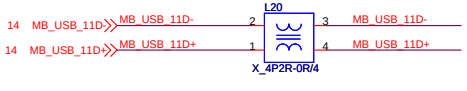



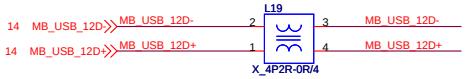



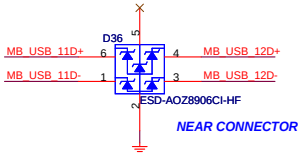

Main:D0G-05A0529-A68
AVL:D0G-45B0510-I14

1.0A



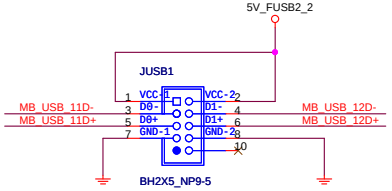



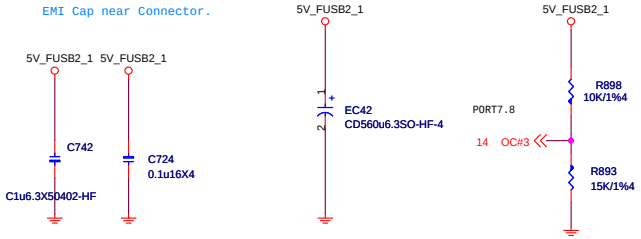




Main:D0G-05A0529-A68
AVL:D0G-45B0510-I14

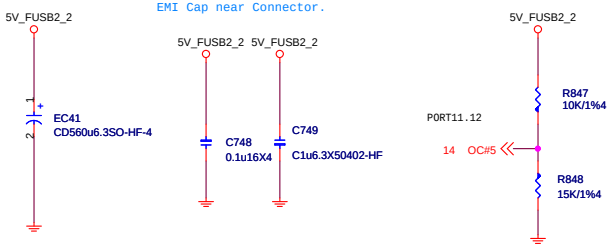
1.0A



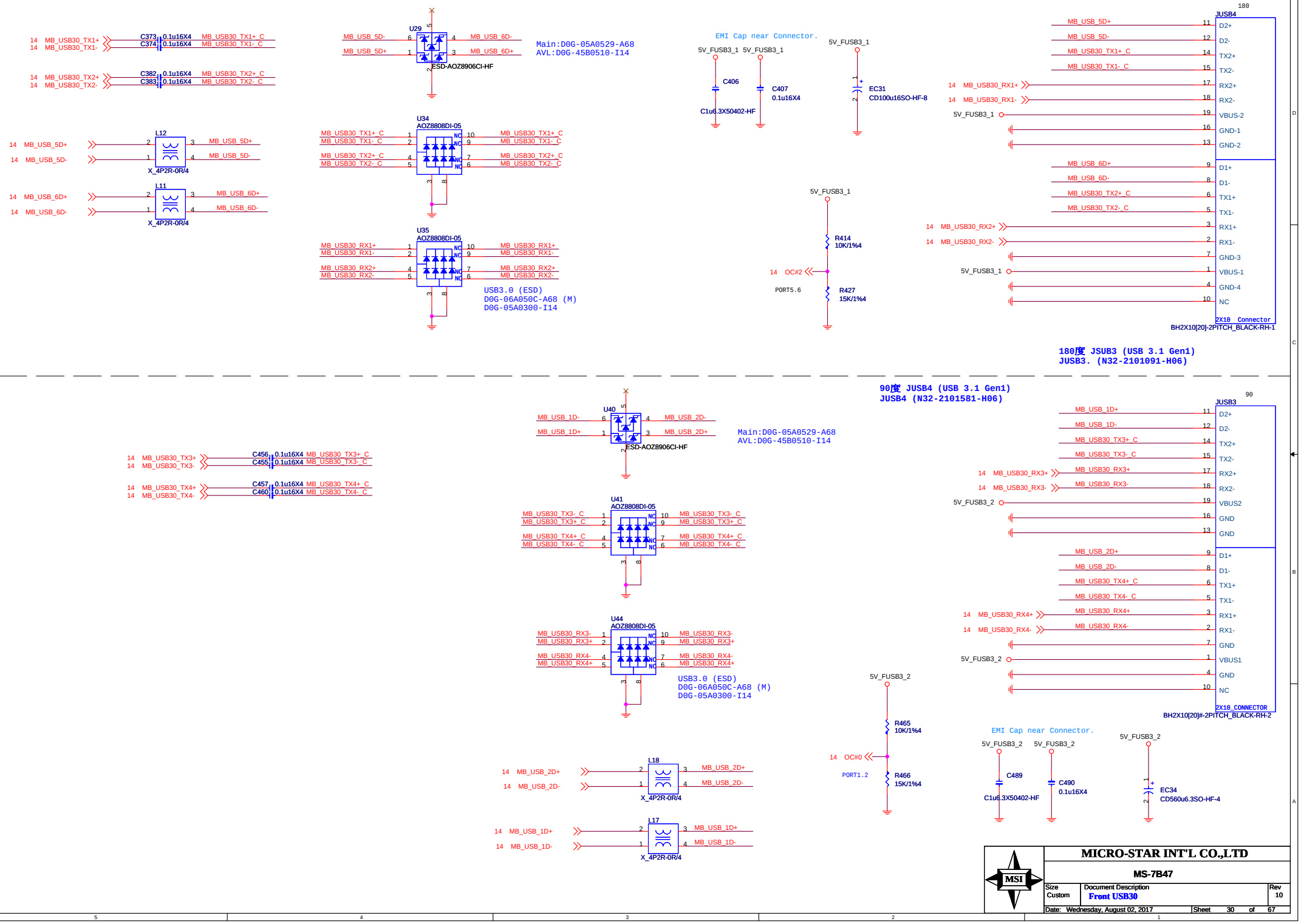

EMI Cap near Connector.




EMI Cap near Connector.




| | | |
|---|---|---|
| MICRO-STAR INT'L CO.,LTD | | |
| MS-7B47 | | |
| Size: Custom | Document Description: Front USB20 | Rev: 10 |
| Date: Wednesday, August 02, 2017 | Sheet 29 of 67 | |


14 MB_USB30_TX1+
14 MB_USB30_TX1-
C373 0.1u16X4
C374 0.1u16X4
MB_USB30_TX1+_C
MB_USB30_TX1-_C
14 MB_USB30_TX2+
14 MB_USB30_TX2-
C382 0.1u16X4
C383 0.1u16X4
MB_USB30_TX2+_C
MB_USB30_TX2-_C
U29
MB_USB_5D-
MB_USB_5D+
MB_USB_6D-
MB_USB_6D+
ESD-AOZ8906CI-HF
Main:D0G-05A0529-A68
AVL:D0G-45B0510-I14
EMI Cap near Connector.
5V_FUSB3_1
C406
C1u6.3X50402-HF
C407
0.1u16X4
EC31
CD100u16SO-HF-8
180
JUSB4
MB_USB_5D+
MB_USB_5D-
MB_USB30_TX1+_C
MB_USB30_TX1-_C
MB_USB30_RX1+
MB_USB30_RX1-
D2+
D2-
TX2+
TX2-
RX2+
RX2-
VBUS-2
GND-1
GND-2
MB_USB_6D+
MB_USB_6D-
MB_USB30_TX2+_C
MB_USB30_TX2-_C
MB_USB30_RX2+
MB_USB30_RX2-
D1+
D1-
TX1+
TX1-
RX1+
RX1-
GND-3
VBUS-1
GND-4
NC
2X10 Connector
BH2X10[20]-2PITCH_BLACK-RH-1
L12
L11
X_4P2R-0R/4
U34
U35
AOZ8808DI-05
USB3.0 (ESD)
D0G-06A050C-A68 (M)
D0G-05A0300-I14
R414
10K/1%4
R427
15K/1%4
OC#2
PORT5.6
180度 JSUB3 (USB 3.1 Gen1)
JUSB3. (N32-2101091-H06)
90度 JUSB4 (USB 3.1 Gen1)
JUSB4 (N32-2101581-H06)
90
JUSB3
MB_USB_1D+
MB_USB_1D-
MB_USB_2D+
MB_USB_2D-
MB_USB30_TX3+_C
MB_USB30_TX3-_C
MB_USB30_TX4+_C
MB_USB30_TX4-_C
MB_USB30_RX3+
MB_USB30_RX3-
MB_USB30_RX4+
MB_USB30_RX4-
D2+
D2-
TX2+
TX2-
RX2+
RX2-
VBUS2
GND
D1+
D1-
TX1+
TX1-
RX1+
RX1-
GND
VBUS1
GND
NC
2X10_CONNECTOR
BH2X10[20]#-2PITCH_BLACK-RH-2
C456 0.1u16X4
C455 0.1u16X4
C457 0.1u16X4
C460 0.1u16X4
U40
U41
U44
Main:D0G-05A0529-A68
AVL:D0G-45B0510-I14
USB3.0 (ESD)
D0G-06A050C-A68 (M)
D0G-05A0300-I14
L18
L17
X_4P2R-0R/4
R465
10K/1%4
R466
15K/1%4
OC#0
PORT1.2
EMI Cap near Connector.
C489
C1u6.3X50402-HF
C490
0.1u16X4
EC34
CD560u6.3SO-HF-4
MICRO-STAR INT'L CO.,LTD
MS-7B47
Size
Custom
Document Description
Front USB30
Rev
10
Date: Wednesday, August 02, 2017
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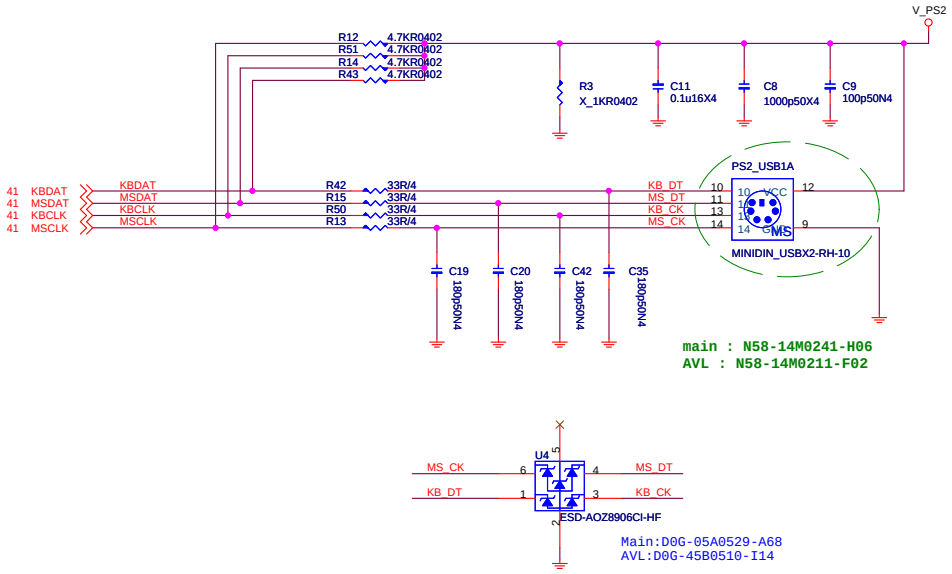
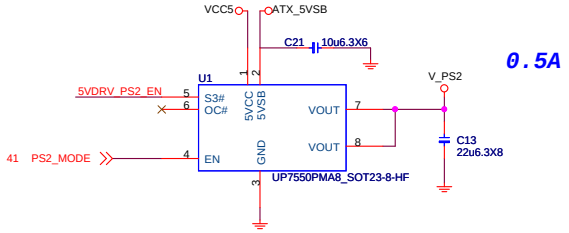
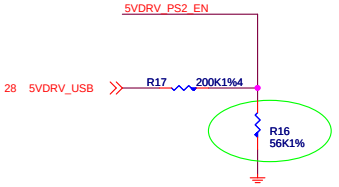
## PS2 Connector



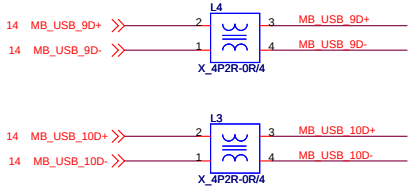

## PS2 Power

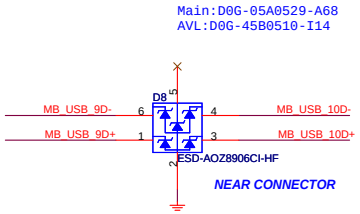


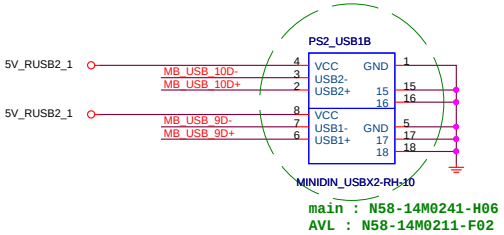

## USB MODE

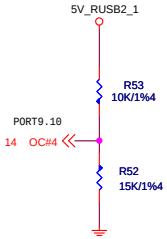


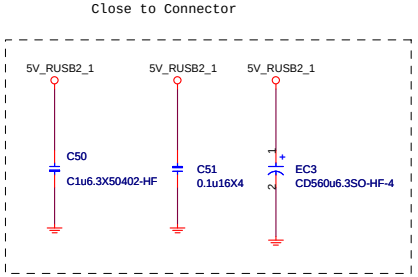

## PS2 _USB




| | | |
|---|---|---|
| MICRO-STAR INT'L CO.,LTD | | |
| MS-7B47 | | |
| Size: Custom | Document Description: Real USB2&PS2 CONNECTOR | Rev: 10 |
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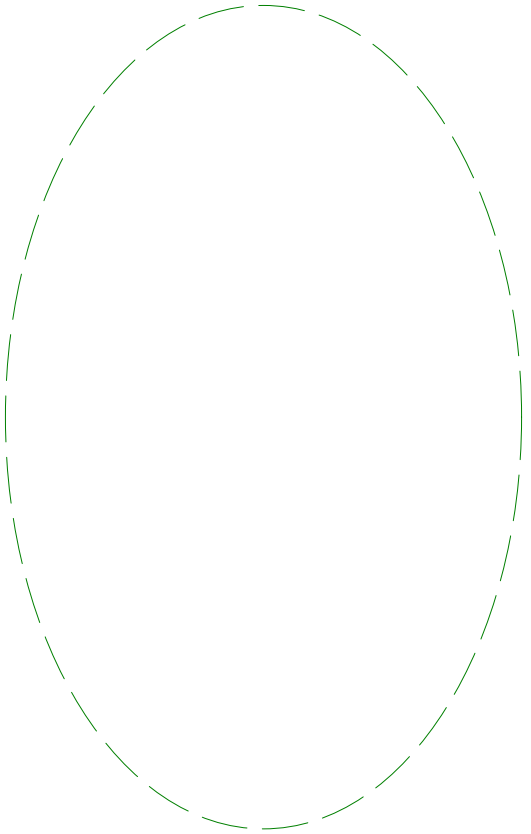
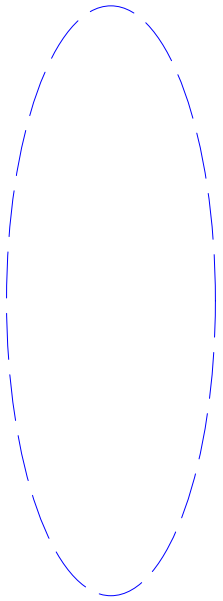
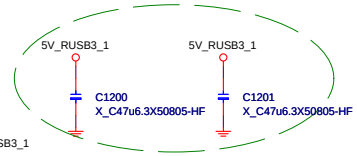
# LAN USB3.0

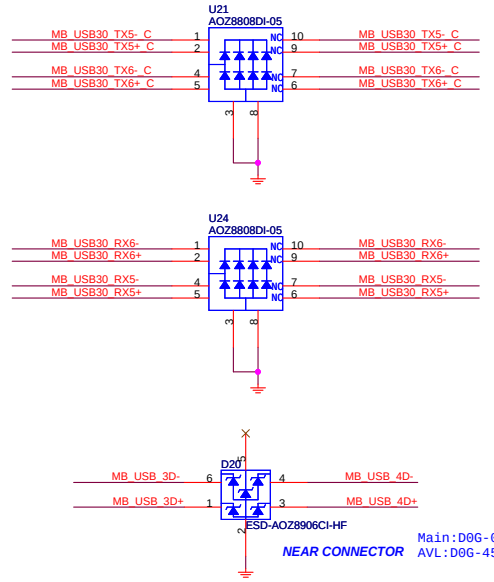
# HDMI USB3.0

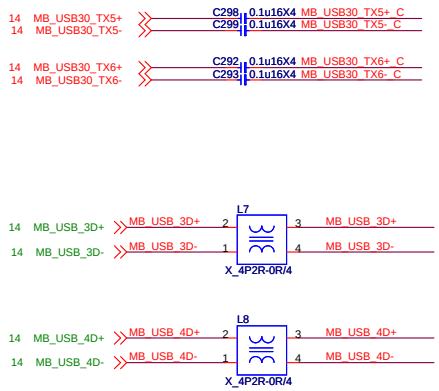
**For Z270/H270 only**

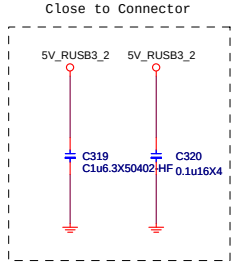


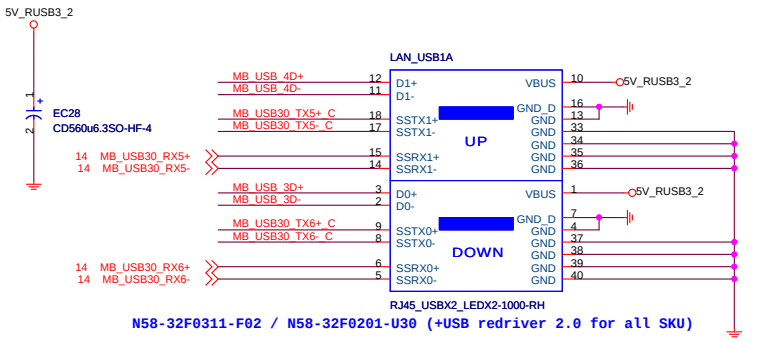


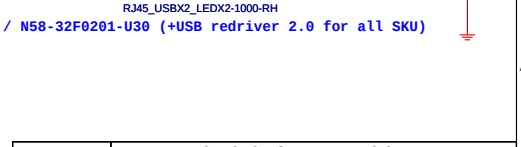


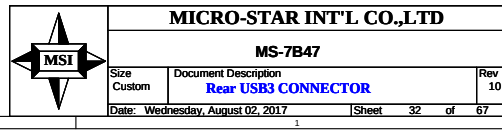






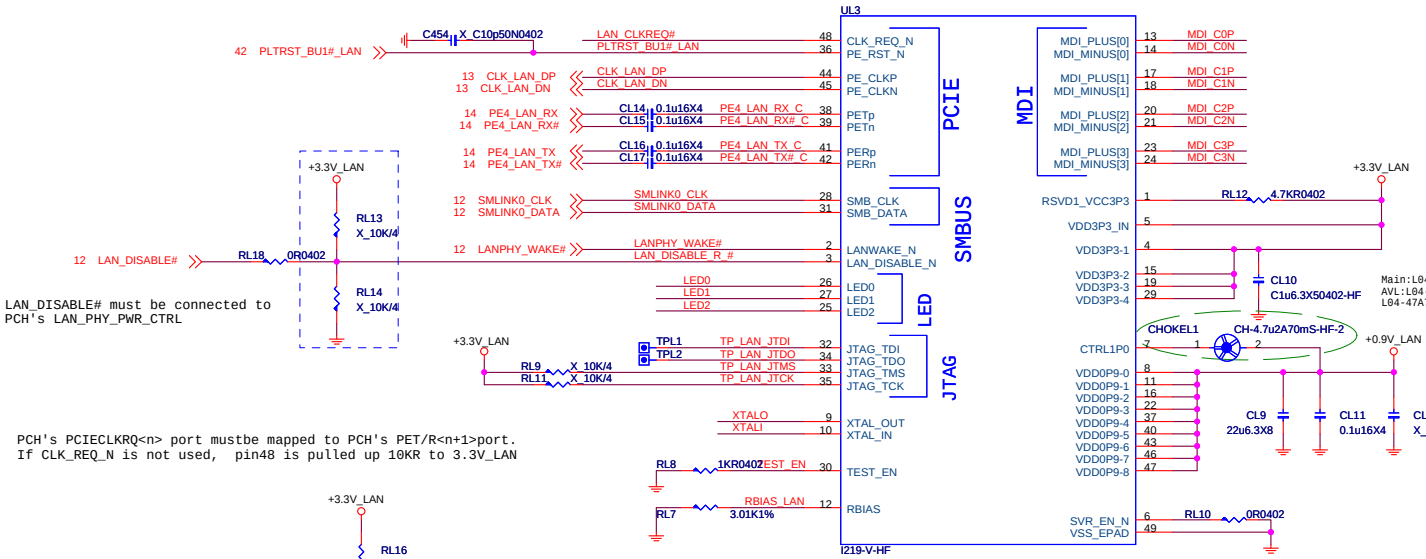






# Intel Lan- i219

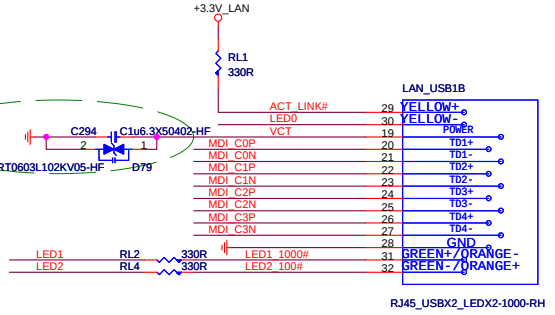
8111H:B06-08111CC-R09
8111G:B06-081116C-R09




Main:L04-47A70E0-T19
AVL:L04-47A7870-C08
L04-47A7690-M26

**500mA**

## LAN Connector




RJ45_USBX2_LEDX2-1000-RH

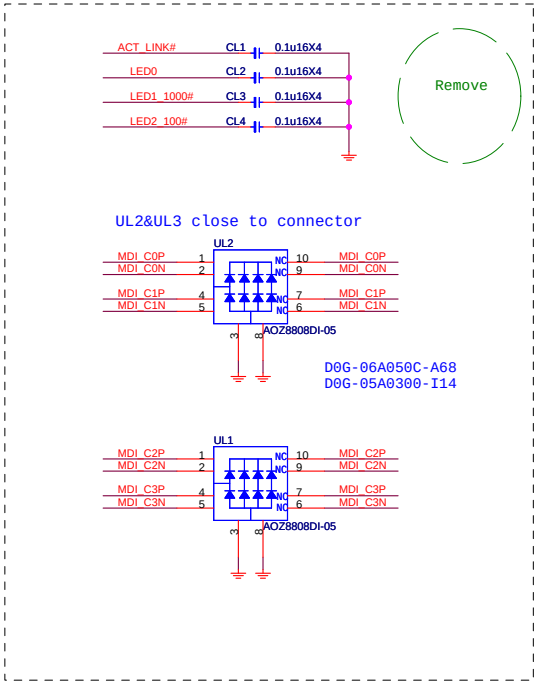
N58-32F0311-F02 / N58-32F0201-U30 (+USB redriver 2.0 for all SKU)

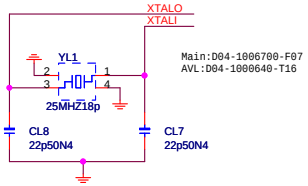
LAN_DISABLE# must be connected to PCH's LAN_PHY_PWR_CTRL

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.

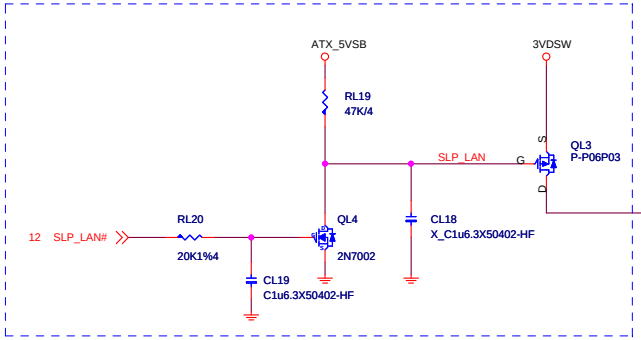
*For EMI*




Remove

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





**+3.3V_LAN**
**I218:132mA**
**I219:542mW**

Note:These caps closed to PHY


MICRO-STAR INT'L CO.,LTD
MS-7B47
Size: Custom
Document Description: Intel Lan- i219
Rev: 10
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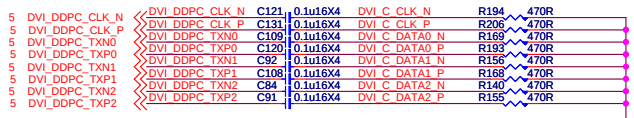
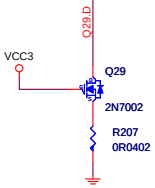
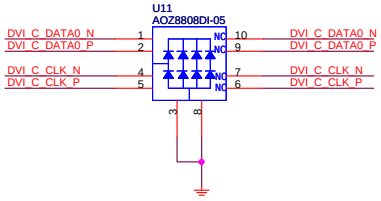
# VGA: resolution of 2048x1536 pixels with 32-bit color at 75 Hz (4:3 QXGA)

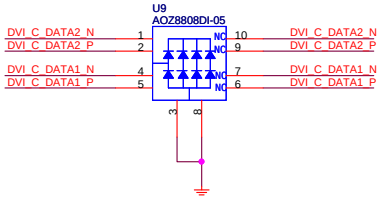


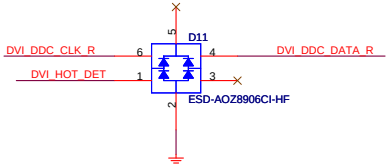




U26 AVL:D0G-05A050C-O05
D0G-06A050C-A68

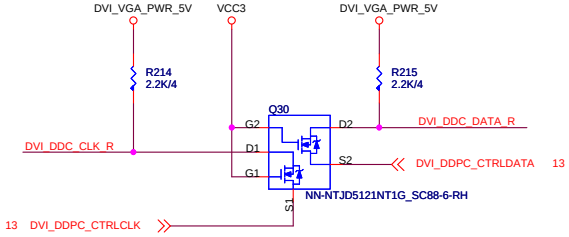


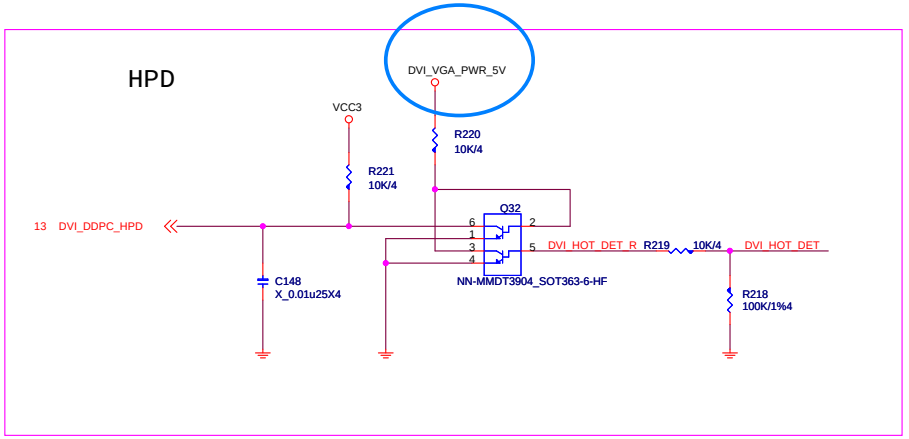

U27 AVL:D0G-05A050C-O05
D0G-06A050C-A68

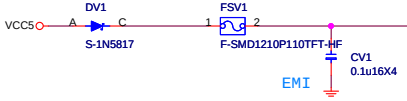


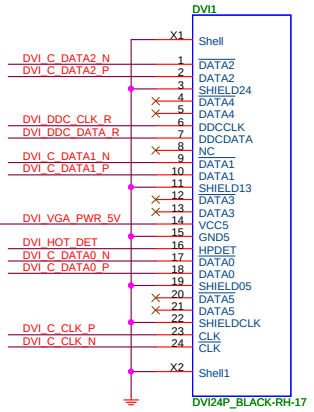



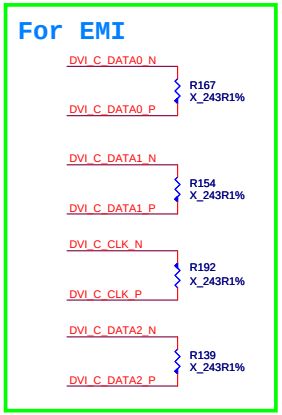

Main:D0G-05A0529-A68
AVL:D0G-45B0510-I14

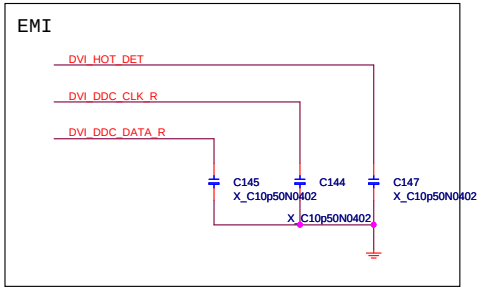



| | | |
|---|---|---|
| MICRO-STAR INT'L CO.,LTD | | |
| MS-7B47 | | |
| Size: Custom | Document Description: DVI Connector | Rev: 10 |
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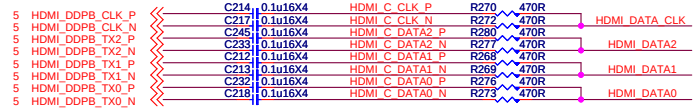
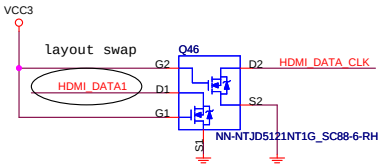
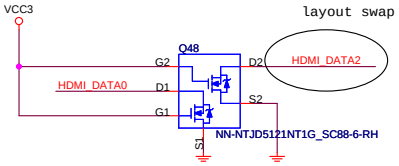
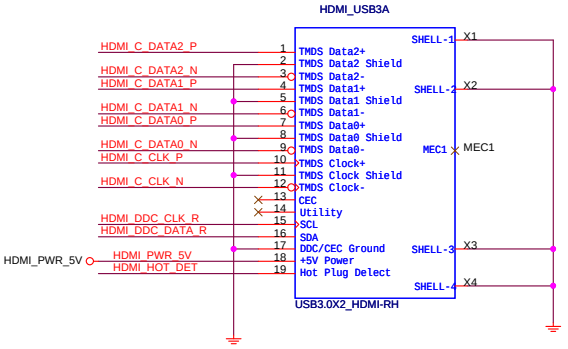
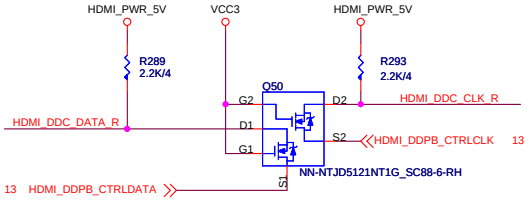
# HDMI, DVI : 1920x1200 at 60 Hz (16:10 WUXGA)

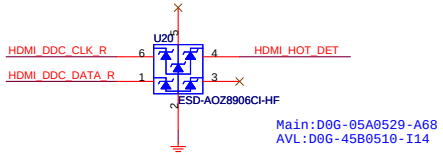


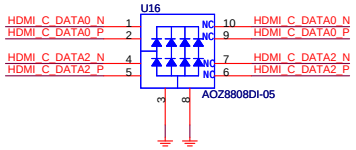



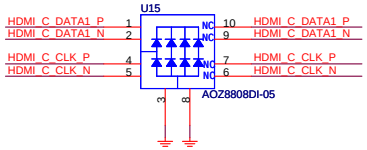



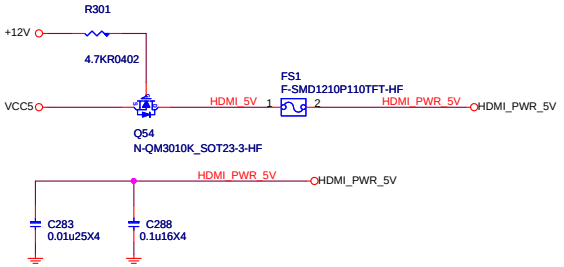



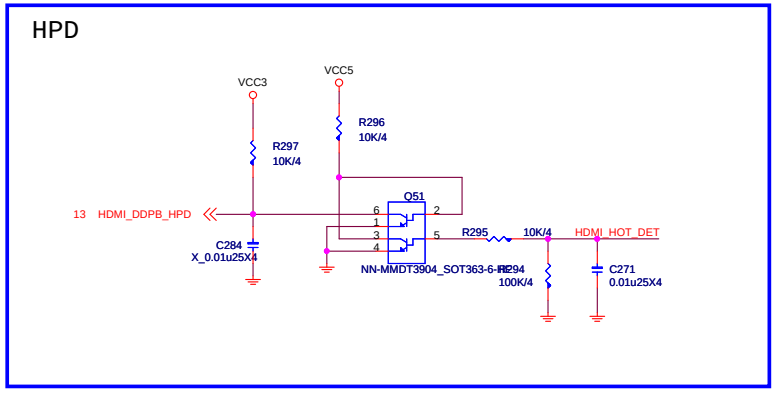



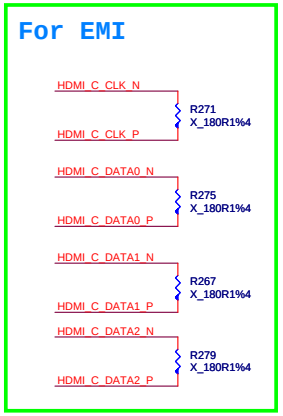



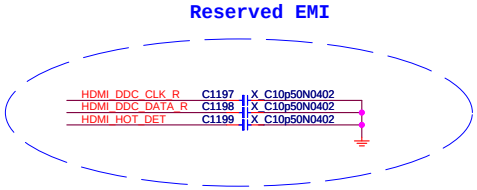

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MS-7B47

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|---|---|---|
| Custom | HDMI Connector | 10 |

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# Type B: ALC892/~~887~~

2015.04.24 Modify from ALC1150 to ALC892

Closed PIN1 Closed PIN9 11mA

CA24 close to PIN25

CA25, CA32 close to PIN38

SMD CAP: Fail to test THD+N

EL/SOLID cap: Test THD+N will Pass

公版放 10uF

Follow up PM spec

2.2k for better recording quality

for rear I/O 6port: 887VD/892:1k

for rear I/O 3port: 887VD/892:75R

45.8mA

Closed Codec

CA26.CA28 close to Pin27

0R for cost down

CA close to LA

## Rear Line OUT De-POP circuit

*(reserve de-pop circuit for Rear Line out & Front Headphone out)*

All components are mounted by PM request

Digital

Analog

Close to Front panel

For HDA/AC97 front cable.

Varister --> cap for cost down

D0G-2950500-SI0

D0G-3010510-I05

Close to Jack

N31-2051411-H06

| | |
|---|---|
| MICRO-STAR INT'L CO.,LTD | |
| MS-7B47 | |
| Size: Custom | Document Description: AUDIO ALC892 |
| Rev: 10 | |
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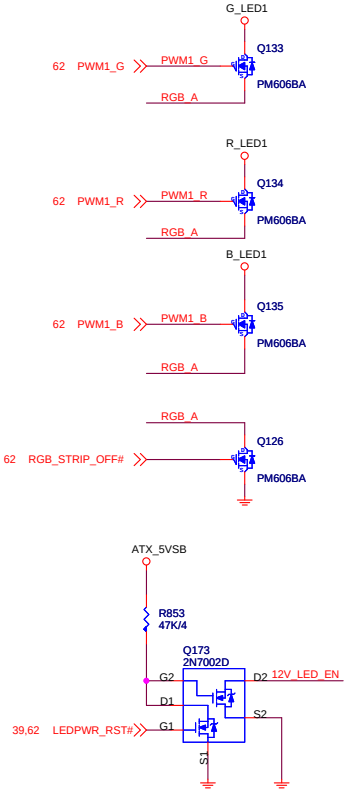
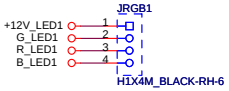
# LED STRIPLINE(LEFT)

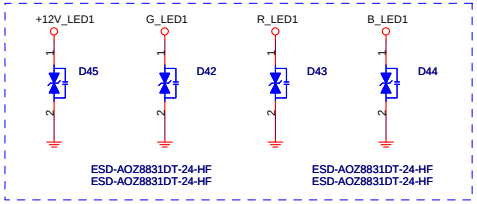




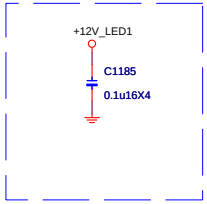




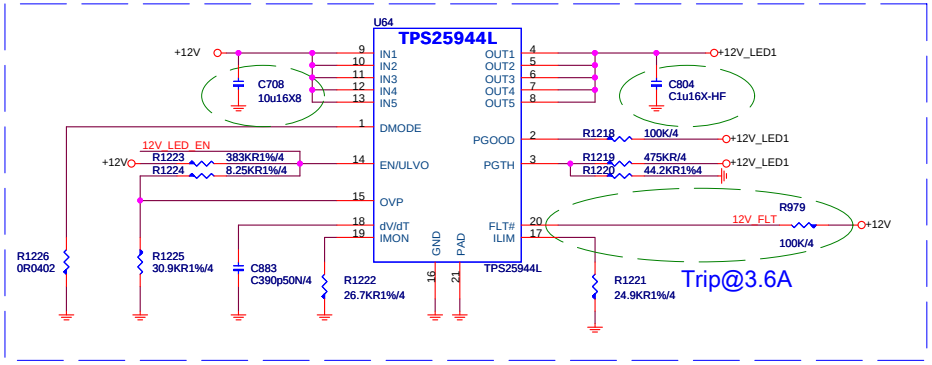

2016.08.02 stuff ESD
2016.07.06 only reserve now
2017.03.06 ESD change to used D0G-35B240C-A68




2016.08.02 Add +12V_LED 0.1uF

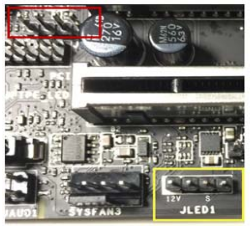



2016.07.06 Use TPS25944L



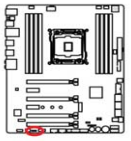

| | | |
|---|---|---|
| B250 KRAIT GAMING | Z270 TOMAHAWK | Z270 TOMAHAWK ARCTIC |
| O | O | O |
| O | O | O |
| X | X | X |
| SIO-- Nuvoton 6795 (128 pin) SIO 呼吸 -->SIO PIN96(MLED/GP27) ALL LED ON/OFF -->SIO PIN96(MLED/GP27) | SIO-- Nuvoton 6795 (128 pin) SIO 呼吸 -->SIO PIN96(MLED/GP27) ALL LED ON/OFF -->SIO PIN96(MLED/GP27) | SIO-- Nuvoton 6795 (128 pin) SIO 呼吸 -->SIO PIN96(MLED/GP27) ALL LED ON/OFF -->SIO PIN96(MLED/GP27) |
| RGB | RGB | RGB |
| 白 | 紅 | 白 |
| On/Off | On/Off | On/Off |
| 呼吸/On/Off | 呼吸/On/Off | 呼吸/On/Off |

位置統一於下板邊
RGB ：（參考7A20） ， 單色 ：（參考7A45）方便USER 操作 *若走線遇到困難時 ， 再另外提出討論*
使用MCU就必須搭配 JT1 燒錄FW的Connect （如紅框）
PCB 文字面 & 手冊說明如下:




**JLED1: LED connector**

This connector allows you to connect the single color LED strip.



| | | | |
|---|---|---|---|
| 1 | +12V | 2 | NC |
| 3 | Singal | 4 | NC |

*Important*

- *This connector supports 5050 single-color LED strips with the maximum power rating of 3A (12V). Note that the length of the strip shall be no longer than 2 meters, or the LED brightness would become weak.*
- *Always turn off the power supply and unplug the power cord from the power outlet before installing or removing the RGB LED strip.*
- *Please use the **LED Effect** of GAMING APP to control the LED light, refer to the Software section for details.*

外接LED 燈條 (RGB )
---- PCB 文字面 (JLED1)
---- 手冊 註明 RGB 接頭支援標準 5050 RGB LED 燈條 (12V/G/R/B) , 燈條總輸出電流限制為3安培 (12 伏特) ,
長度限制為2公尺 (待7A20驗證)

| | | |
|---|---|---|
| MSI | MICRO-STAR INT'L CO.,LTD | |
| | MS-7B47 | |
| Size: Custom | Document Description: LED STRIPLINE | Rev: 10 |
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## DIMM_SLOT

TOMAHAWK (Z270) / CAMO SQUAD(Z270)
紅 : X (1.0) / X (4.0)
KRAIT GAMING (B250)
白 : M:D0C-040T200-H91 / S:D0C-040S200-E07*4
TOMAHAWK ARCTIC(H270)
白 : X (1.0)

需做紅白LED colay 線路 . 因VF值不一樣 , 供電的電壓要特別注意

LED 命名請以DIMM_LEDn  n為數字

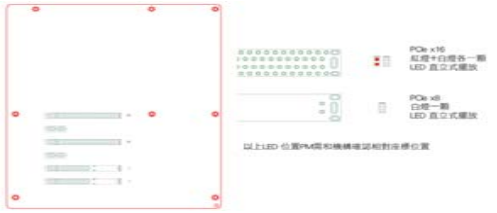
HW Detect+SIO 說明
HW Detect
DIMM1/2/3/4
-->DIMM PIN2 control
SIO 呼吸
-->SIO PIN98(MLED/GP27)
ALL LED ON/OFF
-->SIO PIN98(MLED/GP27)

## PCI SLOT LED

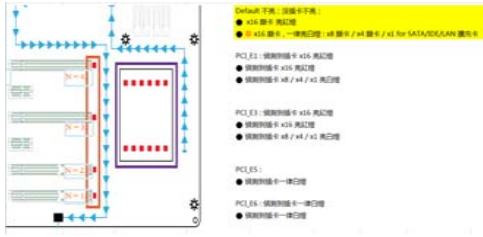
TOMAHAWK (Z270) / TOMAHAWK ARCTIC(H270) / CAMO SQUAD (Z270)
PCIE x16 : X(1.0) / X(2.0) / X(4.0)
KRAIT GAMING (B250)
PCIE x16 紅 : M:D0C-040P100-H91 / S:D0C-040S500-E07*1
白 : M:D0C-040T200-H91 / S:D0C-040S200-E07*1

TOMAHAWK (Z270) / TOMAHAWK ARCTIC(H270) / CAMO SQUAD (Z270)
PCIE x4 : X(1.0) / X(2.0) / X(4.0)
KRAIT GAMING (B250)
PCIE x4  白 : M:D0C-040T200-H91 / S:D0C-040S200-E07*1

PCIE SLOT4



PCIEx16 & x8(可切X16/X8的X16 SLOT) : GPIO X2/呼吸控制
高階(M5/M7/M9/XPOWER)有加GPIO CONTROL IC(5605)在確認
其他切換的GPIO
-->紅/PCH GPP_C8
-->白/PCH GPP_C9
-->呼吸控制-->SIO PIN98(MLED/GP27)
-->ALL LED ON/OFF-->SIO PIN98(MLED/GP27)
其他X16 SLOT : HW Detect/呼吸控制
HW DETECT
-->PCIE PRSENT控制
呼吸控制
-->SIO PIN98(MLED/GP27)
ALL LED ON/OFF
-->SIO PIN98(MLED/GP27)



| | | |
|---|---|---|
| MICRO-STAR INT'L CO.,LTD | | |
| MS-7B47 | | |
| Size: Custom | Document Description: LED DIMM/PCIE | Rev: 10 |
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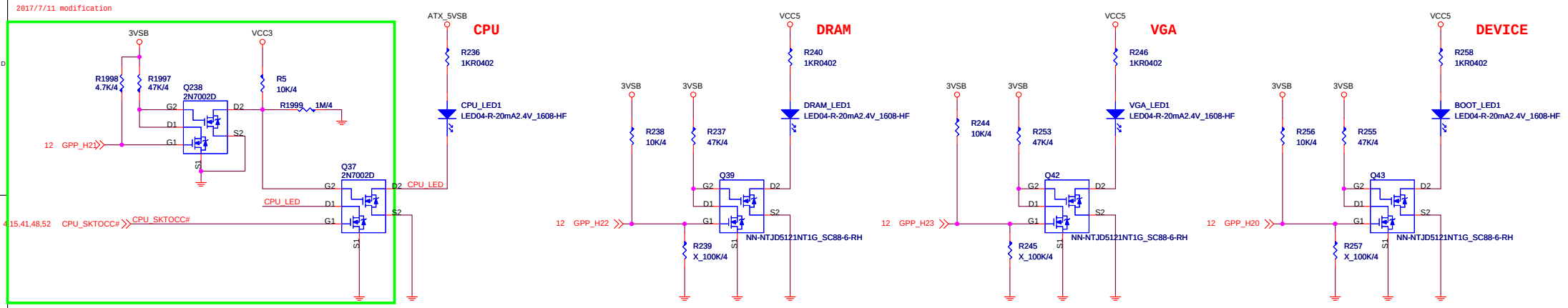
# EZ DEBUG LED





位置統一於右側JPWR1上方區塊（參考 7A20）*若走線遇到困難時 ， 再另外提出討論*
需做紅白LED colay 線路 . 因VF值不一樣 ， 供電的電壓要特別注意

關機斷電狀態下，4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減掉。
2. 接著依序進行Memory /memory LED亮check PASS後則memory LED減掉。
3. VGA的check/VGA LED亮，check PASS後則VGA LED減掉。
4. 因此最後正常順利開機後，三個LED燈都是減掉的。
   （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）

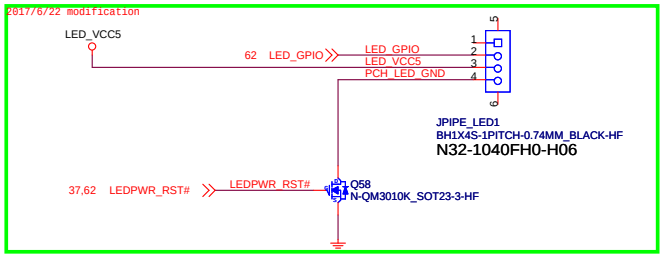
| LED | PCH_GP20 | PCH_GP21 | PCH_GP22 | PCH_GP23 |
|---|---|---|---|---|
| 亮 | NATIVE PULL HIGH | GPO PULL HIGH | GPO PULL HIGH | NATIVE PULL HIGH |
| 滅 | NATIVE LOW | GPO LOW (default LOW) | GPO LOW (default LOW) | GPO LOW (default LOW) |

# PCH Heatsink color LED

**PIPE_VCC5 > 20mil**

**PIPE_VCC5 please check your Heatsink LED USE**

**單色 : 電流0.02 A x 總燈數**

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Size: Custom | Document Description: LED EZ DEBUG/PCH | Rev: 10

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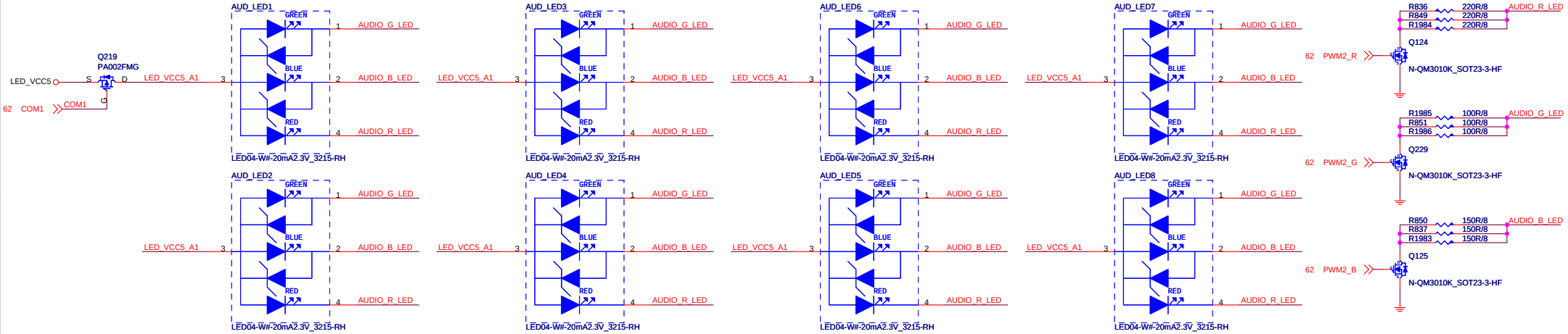
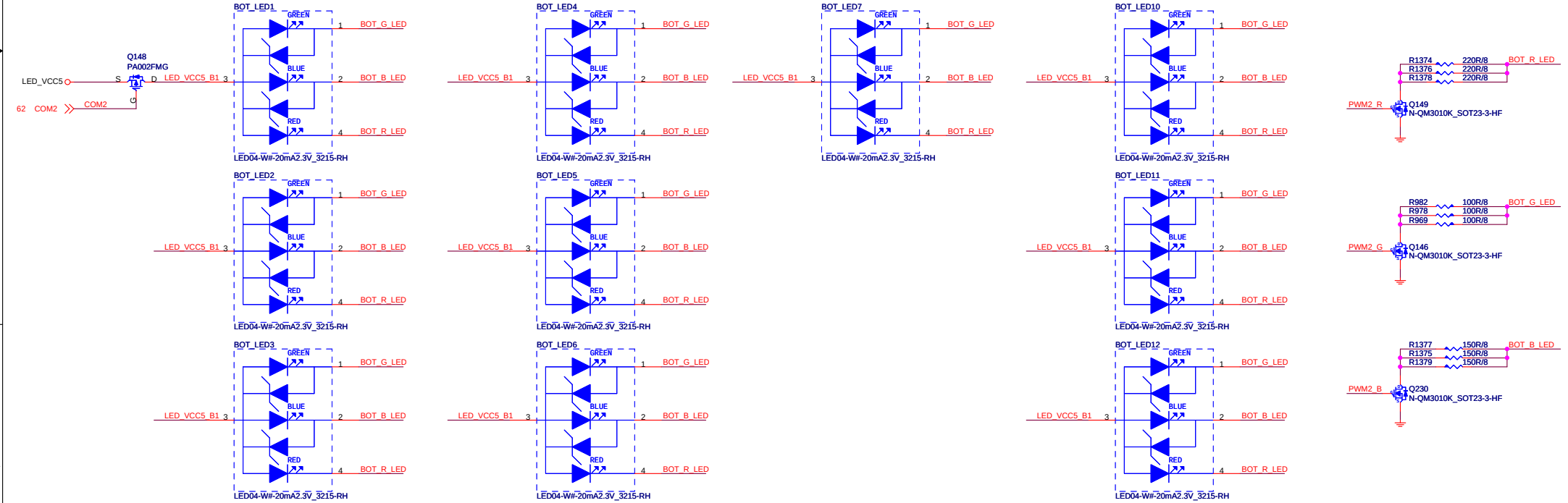
# AUDIO RGB LED

Audio moat is transparent and width 40mil




# BOTTOM LED




MICRO-STAR INT'L CO.,LTD

MS-7B47

| Size | Document Description | Rev |
|---|---|---|
| Custom | ED BOTTOM/AUDIO | 10 |

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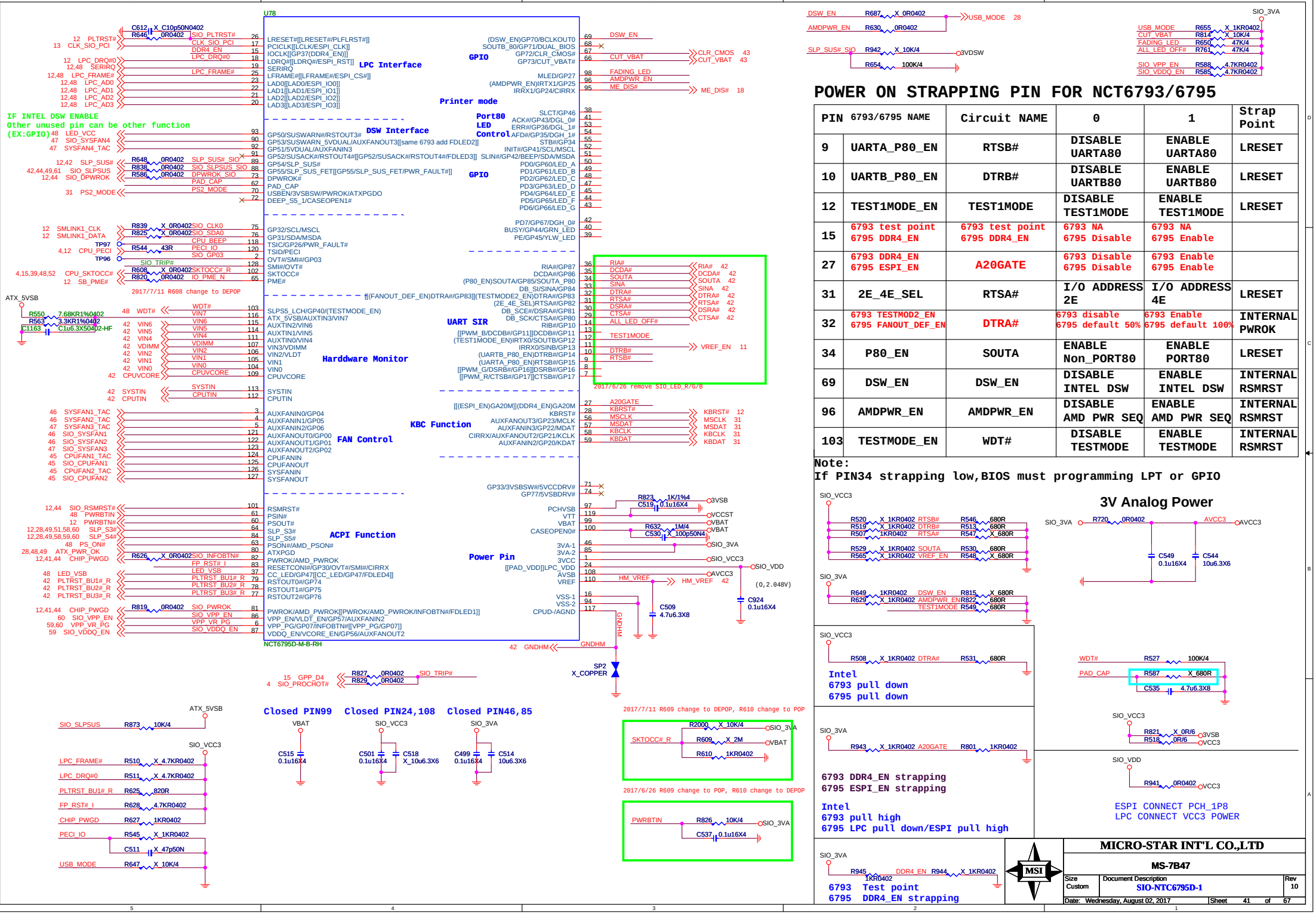


## POWER ON STRAPPING PIN FOR NCT6793/6795

| PIN | 6793/6795 NAME | Circuit NAME | 0 | 1 | Strap Point |
|---|---|---|---|---|---|
| 9 | UARTA_P80_EN | RTSB# | DISABLE UARTA80 | ENABLE UARTA80 | LRESET |
| 10 | UARTB_P80_EN | DTRB# | DISABLE UARTB80 | ENABLE UARTB80 | LRESET |
| 12 | TEST1MODE_EN | TEST1MODE | DISABLE TEST1MODE | ENABLE TEST1MODE | LRESET |
| 15 | 6793 test point<br>6795 DDR4_EN | 6793 test point<br>6795 DDR4_EN | 6793 NA<br>6795 Disable | 6793 NA<br>6795 Enable | |
| 27 | 6793 DDR4_EN<br>6795 ESPI_EN | A20GATE | 6793 Disable<br>6795 Disable | 6793 Enable<br>6795 Enable | |
| 31 | 2E_4E_SEL | RTSA# | I/O ADDRESS 2E | I/O ADDRESS 4E | LRESET |
| 32 | 6793 TESTMOD2_EN<br>6795 FANOUT_DEF_EN | DTRA# | 6793 disable<br>6795 default 50% | 6793 Enable<br>6795 default 100% | INTERNAL PWROK |
| 34 | P80_EN | SOUTA | ENABLE Non_PORT80 | ENABLE PORT80 | LRESET |
| 69 | DSW_EN | DSW_EN | DISABLE INTEL DSW | ENABLE INTEL DSW | INTERNAL RSMRST |
| 96 | AMDPWR_EN | AMDPWR_EN | DISABLE AMD PWR SEQ | ENABLE AMD PWR SEQ | INTERNAL RSMRST |
| 103 | TESTMODE_EN | WDT# | DISABLE TESTMODE | ENABLE TESTMODE | INTERNAL RSMRST |

**Note:**
**If PIN34 strapping low,BIOS must programming LPT or GPIO**

### 3V Analog Power

Intel
6793 pull down
6795 pull down

6793 DDR4_EN strapping
6795 ESPI_EN strapping

Intel
6793 pull high
6795 LPC pull down/ESPI pull high

ESPI CONNECT PCH_1P8
LPC CONNECT VCC3 POWER

6793 Test point
6795 DDR4_EN strapping

| MICRO-STAR INT'L CO.,LTD | | |
|---|---|---|
| MS-7B47 | | |
| Size: Custom | Document Description: SIO-NTC6795D-1 | Rev: 10 |
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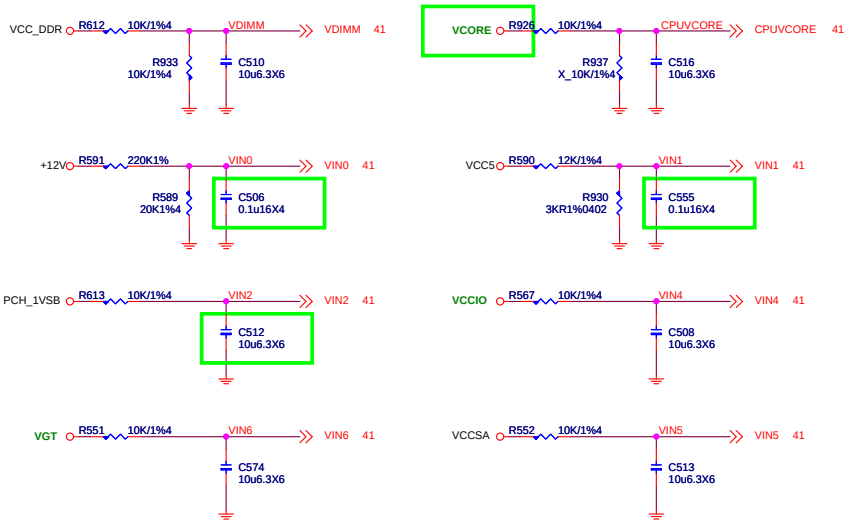
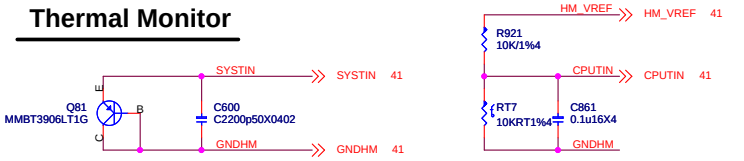
## HW Monitor - Voltage

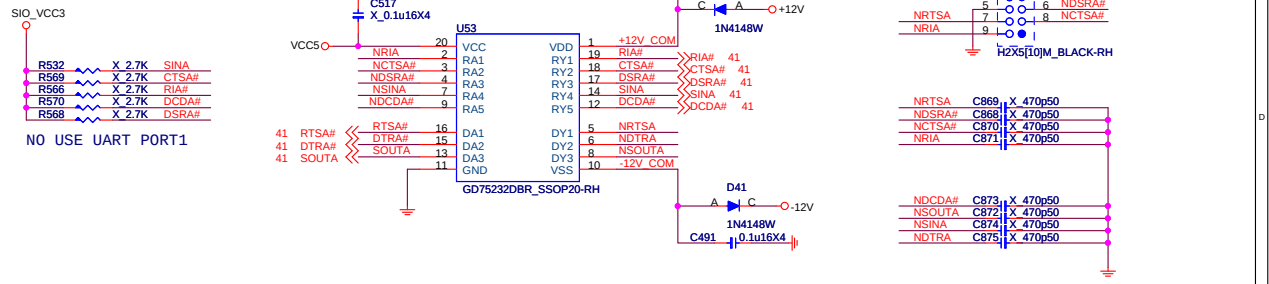
SIO HM Voltage voer 2V will not detect



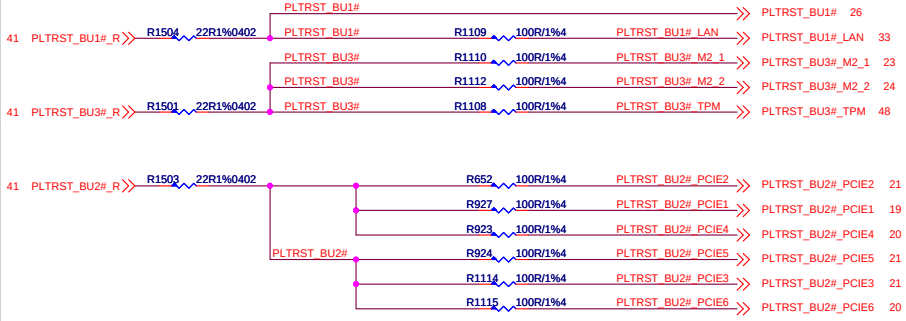

## Thermal Monitor



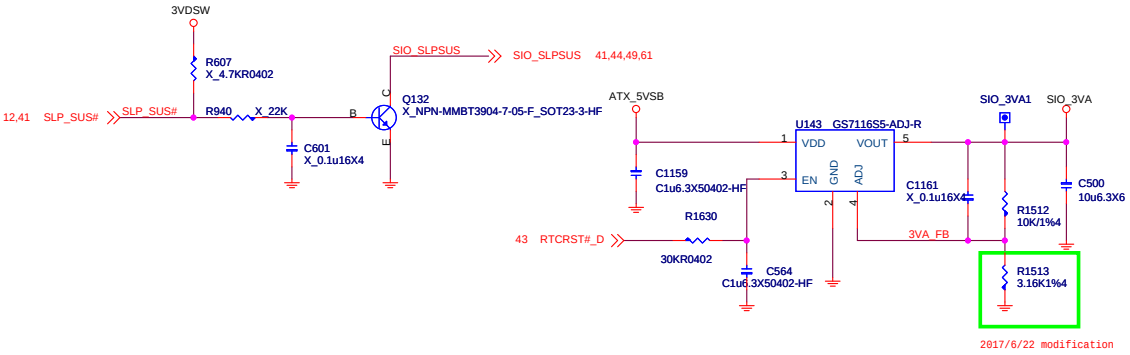

## SERIAL PORT 1




## PARALLAL PORT

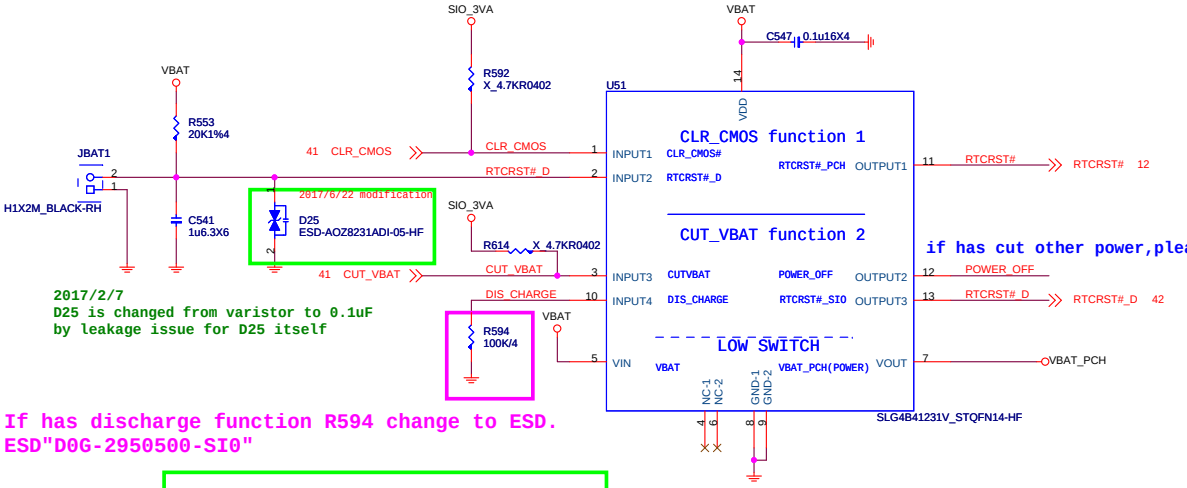



## SLP_SUS Co-lay circuit




| | | |
|---|---|---|
| MSI | MICRO-STAR INT'L CO.,LTD | |
| | MS-7B47 | |
| Size: Custom | Document Description: SIO-NTC6795D-2 | Rev: 10 |
| Date: Wednesday, August 02, 2017 | Sheet 42 of 67 | |

# CLR_CMOS

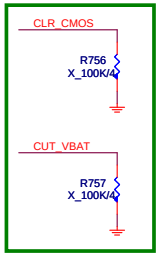


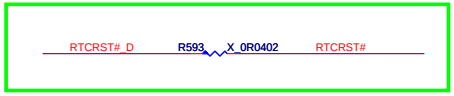

2017/2/7
D25 is changed from varistor to 0.1uF
by leakage issue for D25 itself

if has cut other power,please use output 2.

If has discharge function R594 change to ESD.
ESD"D0G-2950500-SI0"

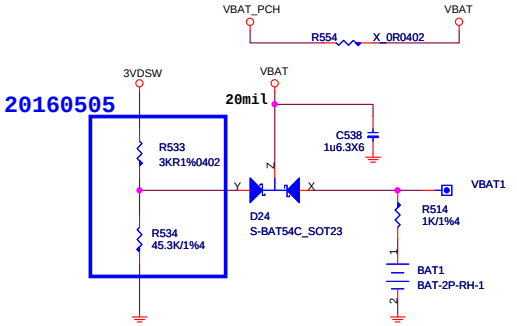
20160629



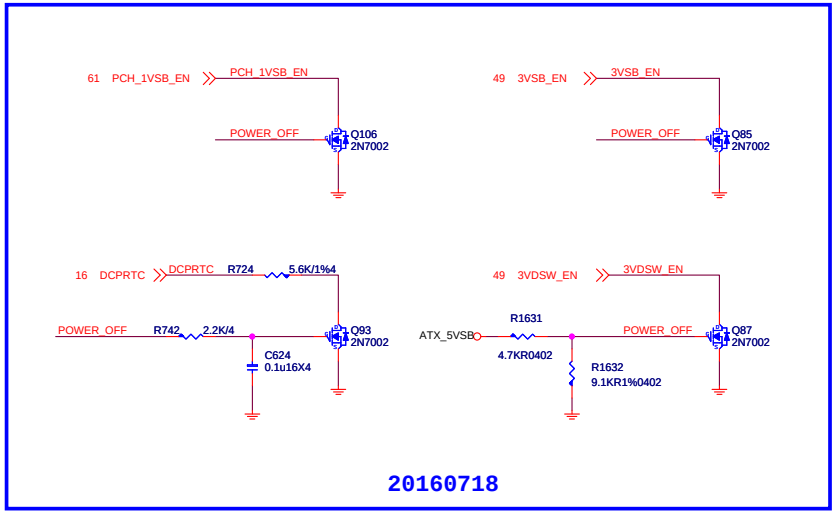




Co-Lay NOT USE U12 , R139 STUFF
If STUFF R139 Please Check RTCRST# Double Pull High

# VBAT




Co-Lay NOT USE U12 , ALL UNSTUFF




| Function 1 | | |
|---|---|---|
| IN | | OUT |
| INPUT1 | INPUT2 | OUTPUT1 |
| 0 | 1 | 1 |
| 1 | 0 | 0 |
| 1 | 1 | 0 |
| 0 | 0 | 0 |

Default

| Function 2 | | | | |
|---|---|---|---|---|
| IN | | OUT | | |
| INPUT3 & lowswitch EN | INPUT4 | OUTPUT2 | OUTPUT3 | VOUT |
| 0 | 0 | 0 | 1 | 1 |
| 1 | 0 | 1 | 1 | 0 (discharge) |
| 0 | 1 | 1 | 0 | 0 (discharge) |
| 1 | 1 | 1 | 0 | 0 (discharge) |

Default

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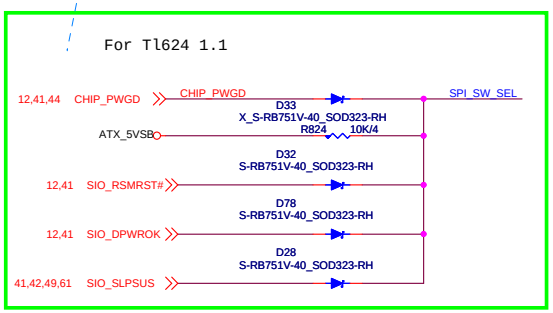
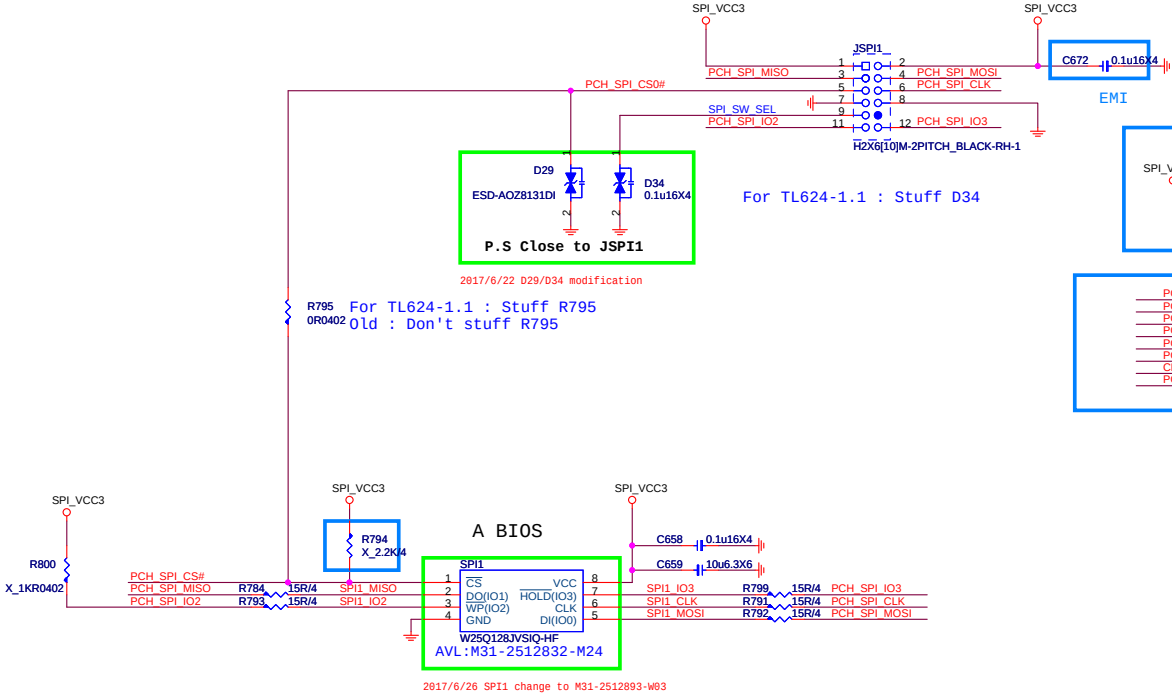
**8/18 For SKYLAKE/KABYLAKE,DPWROK DIODE改上件,CHIP_PWGD DIODE不上**

Module Stuff CHIP_PWGD,
But PCH_PWROK may ramp up before CHIP_PWGD.




| | | |
|---|---|---|
| MICRO-STAR INT'L CO.,LTD | | |
| MS-7B47 | | |
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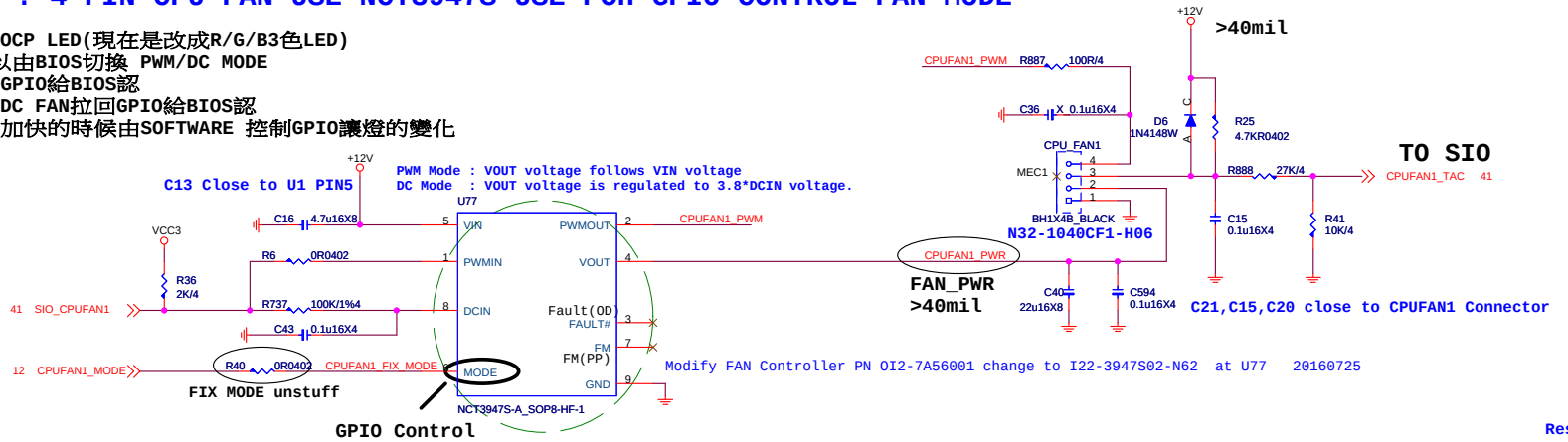
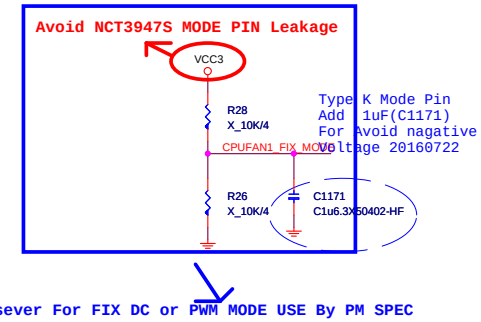
# TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE

1.PWM/DC/OCP LED(現在是改成R/G/B3色LED)
2.GPIO可以由BIOS切換 PWM/DC MODE
3.OCP拉回GPIO給BIOS認
4.PWM OR DC FAN拉回GPIO給BIOS認
5.FAN轉速加快的時候由SOFTWARE 控制GPIO讓燈的變化

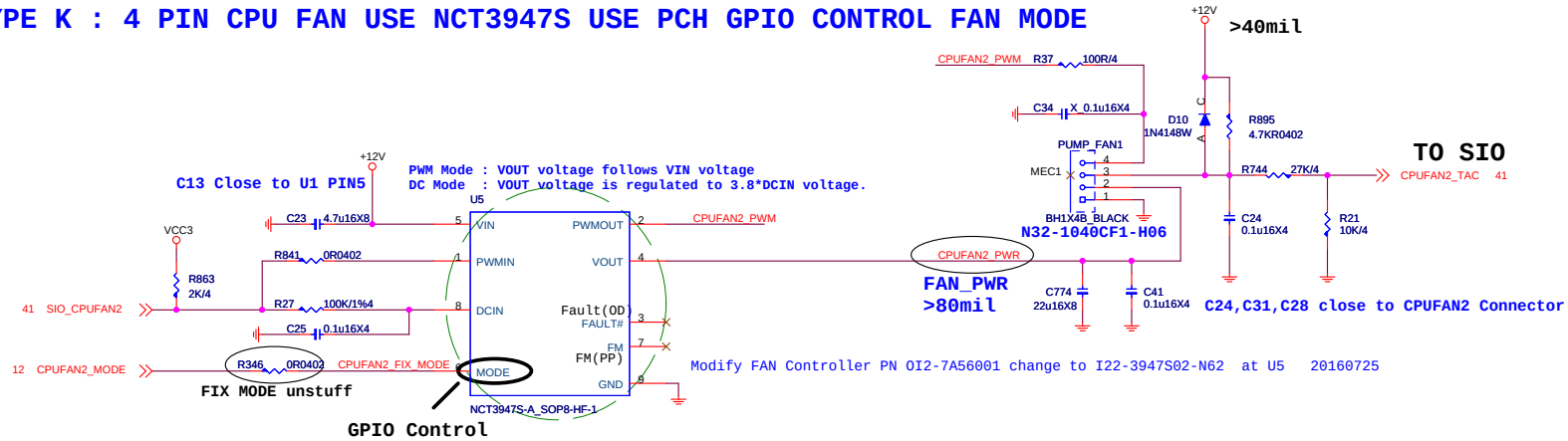



| | MODE(PIN7) |
|---|---|
| PWM MODE | HIGH |
| DC MODE | LOW |
| Default AUTO MODE | GPI(Floating) |

Internall pull up 1.65V

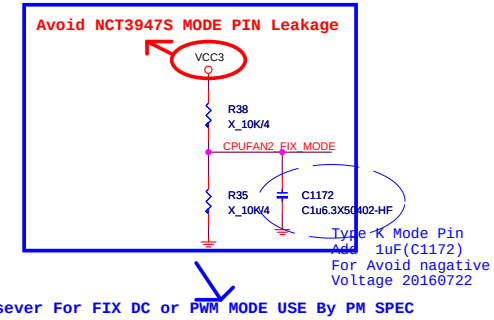



# TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE




| | MODE(PIN7) |
|---|---|
| PWM MODE | HIGH |
| DC MODE | LOW |
| Default AUTO MODE | GPI(Floating) |

Internall pull up 1.65V




1.MODE : USE MODE PIN change FAN MODE(PWM or DC FAN)
2.FAULT : USE FAULT PIN Triger OVT/OCP Protection,LOW Atcive (Reserve NEW IC)
3.FM : USE FM PIN For BIOS USE to Detect PWM or DC FAN & Show information(Reserve NEW IC)

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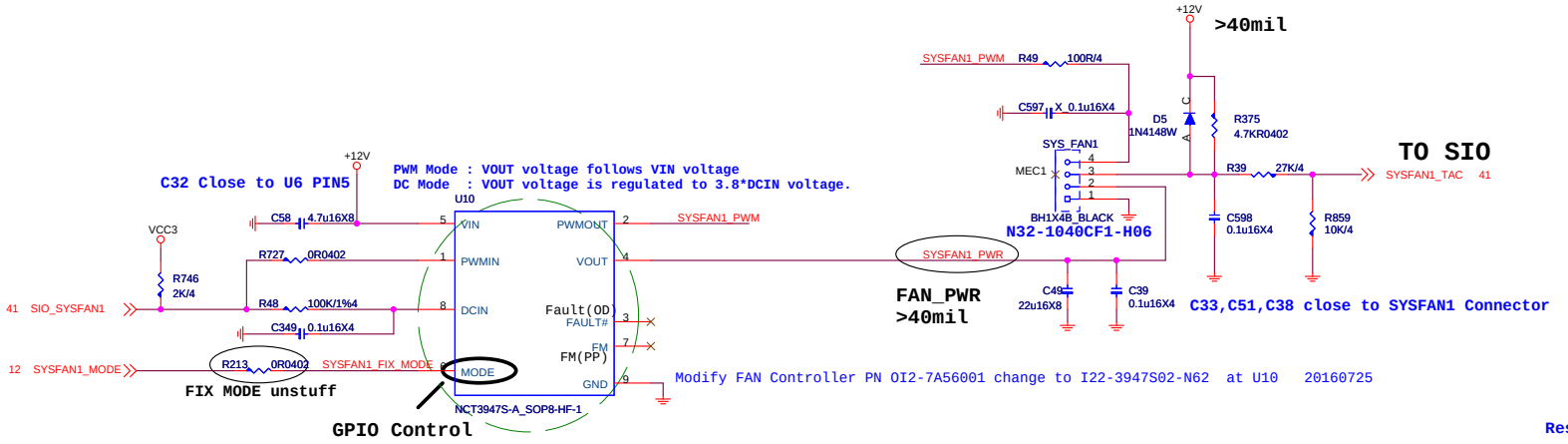
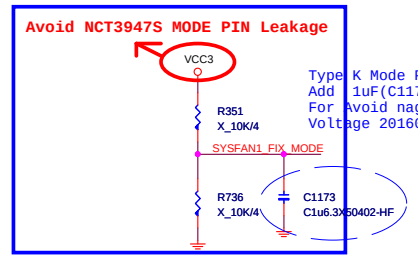
# TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE



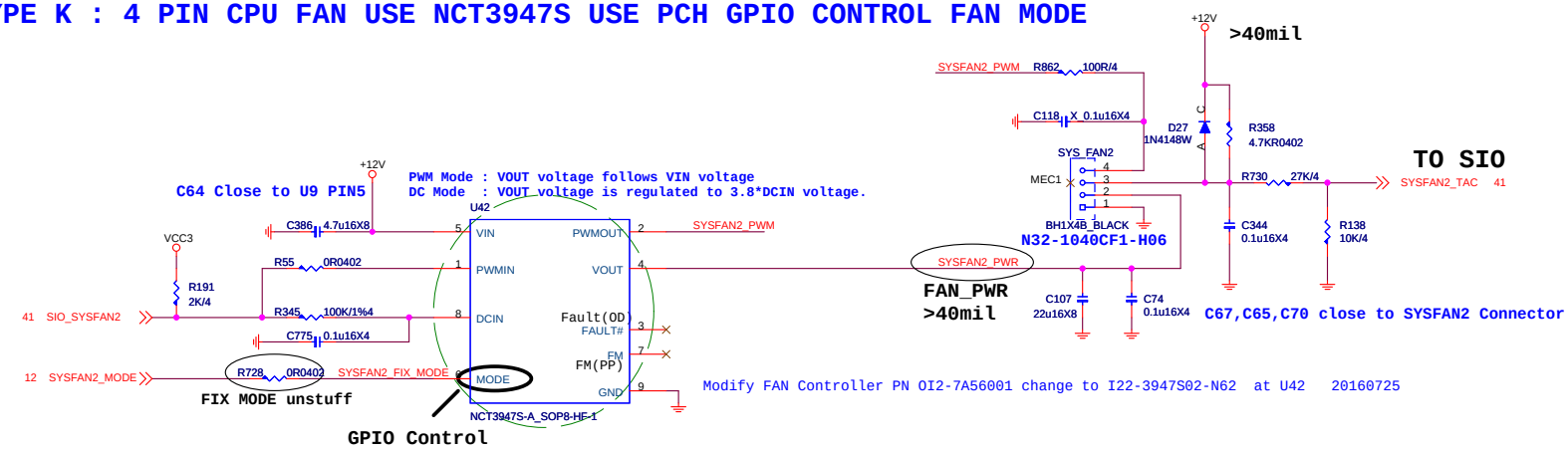

| | MODE(PIN7) |
|---|---|
| PWM MODE | HIGH |
| DC MODE | LOW |
| Default AUTO MODE | GPI(Floating) |

Internall pull up 1.65V



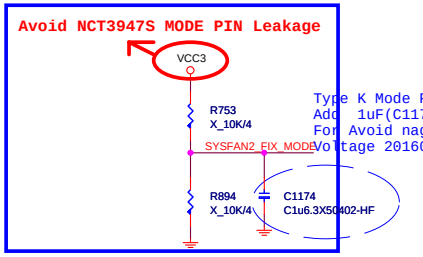

Resever For FIX DC or PWM MODE USE By PM SPEC

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




| | MODE(PIN7) |
|---|---|
| PWM MODE | HIGH |
| DC MODE | LOW |
| Default AUTO MODE | GPI(Floating) |

Internall pull up 1.65V




Resever For FIX DC or PWM MODE USE By PM SPEC

| | |
|---|---|
| MICRO-STAR INT'L CO.,LTD | |
| MS-7B47 | |
| Size: Custom | Document Description: SYSTEM FAN 1/2 |
| Rev: 10 | |
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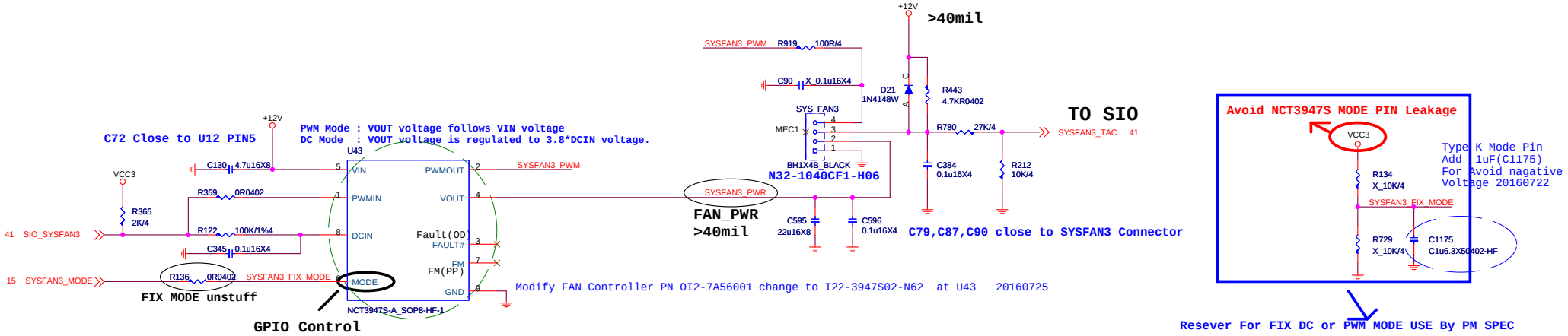
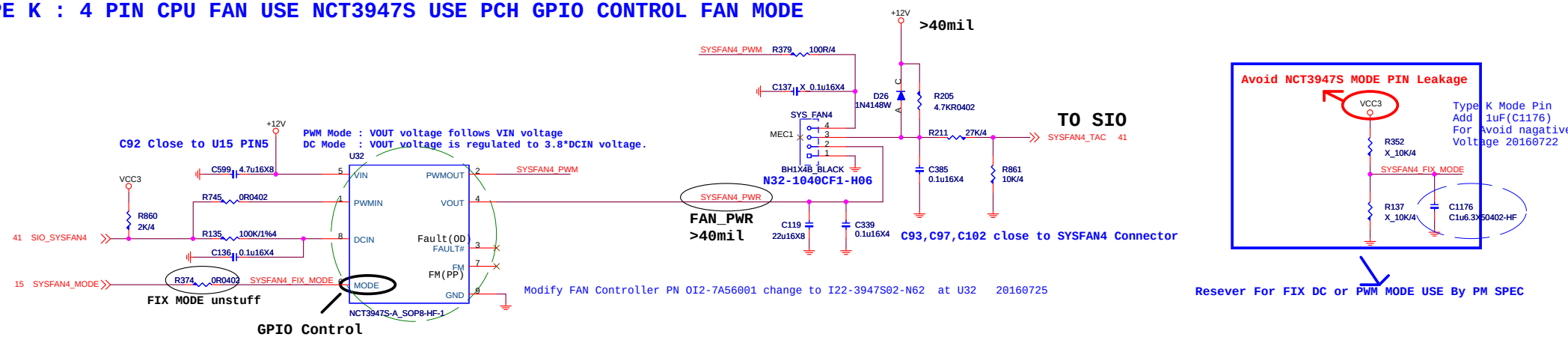
# TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE




| | MODE(PIN7) |
|---|---|
| PWM MODE | HIGH |
| DC MODE | LOW |
| Default AUTO MODE | GPI(Floating) |

Internall pull up 1.65V

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




| | MODE(PIN7) |
|---|---|
| PWM MODE | HIGH |
| DC MODE | LOW |
| Default AUTO MODE | GPI(Floating) |

Internall pull up 1.65V

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MS-7B47

Size: Custom | Document Description: SYSTEM FAN 3/4 | Rev: 10

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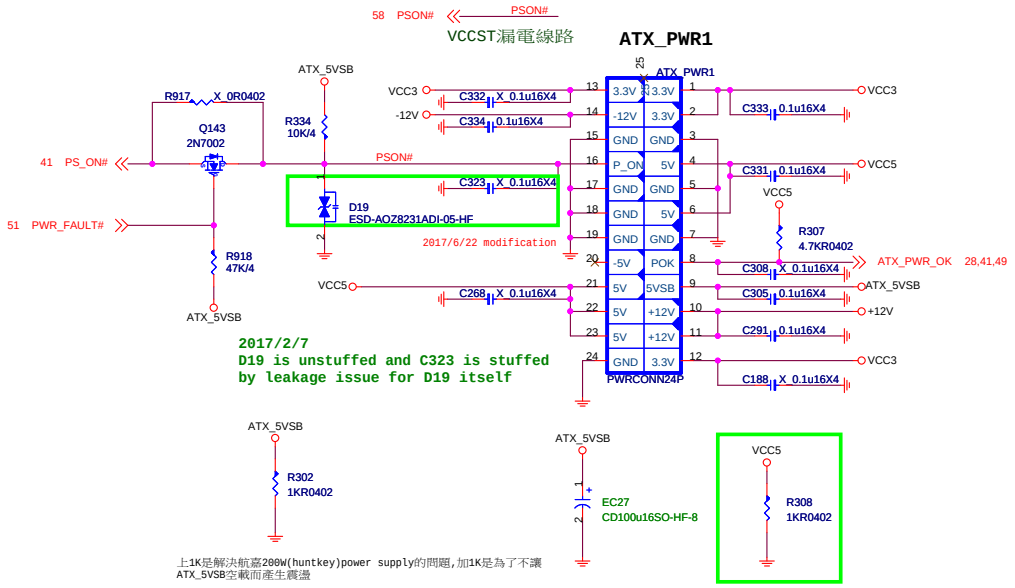
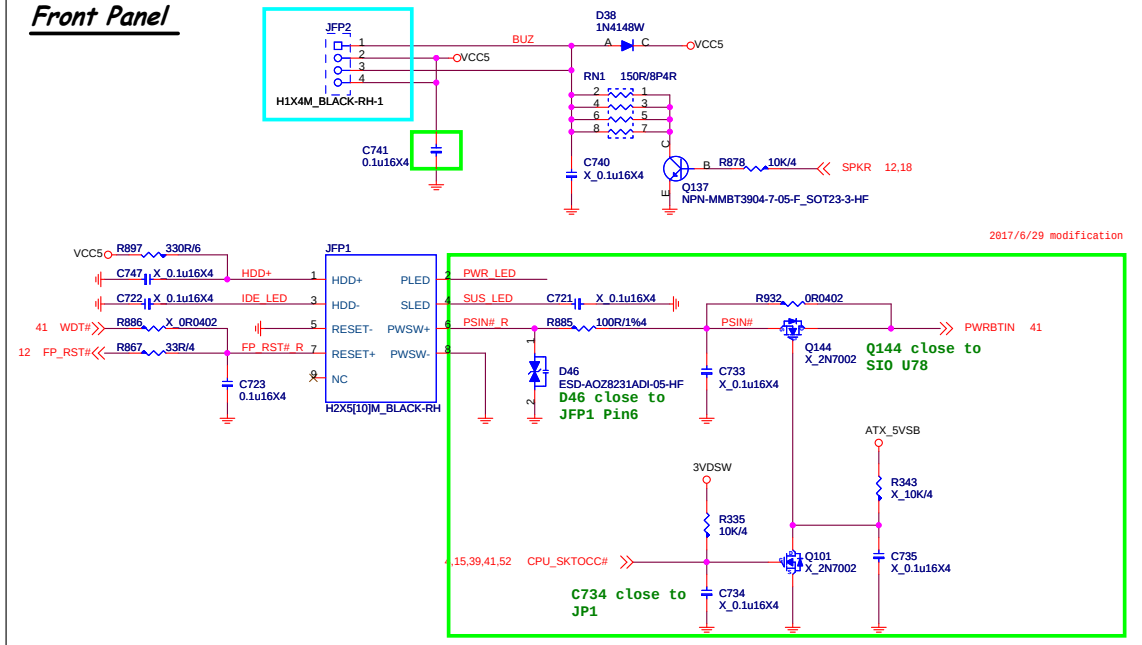
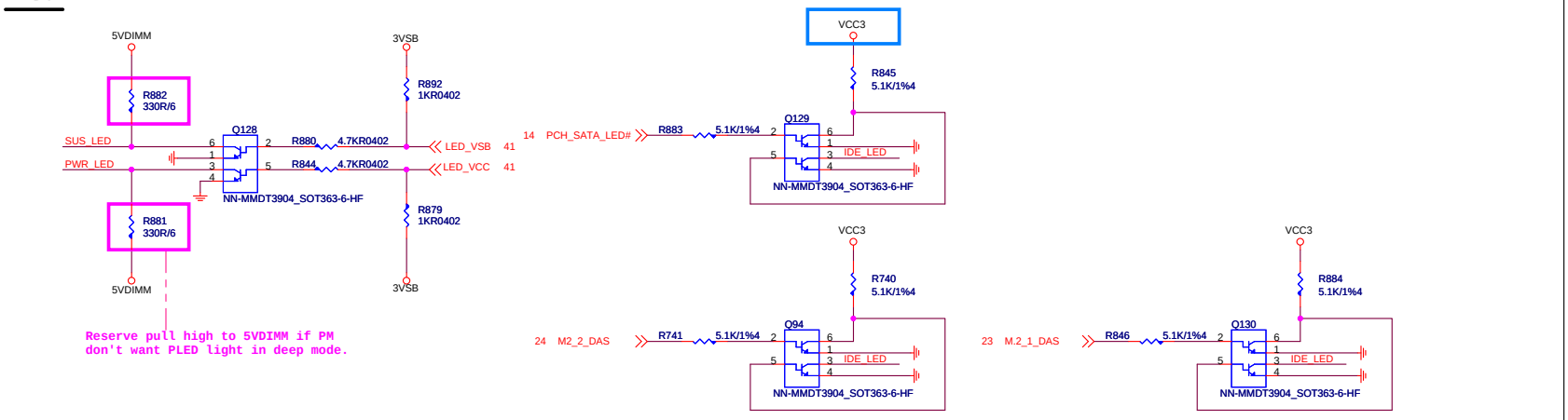
# ATX POWER CONNECTOR




# Front Panel

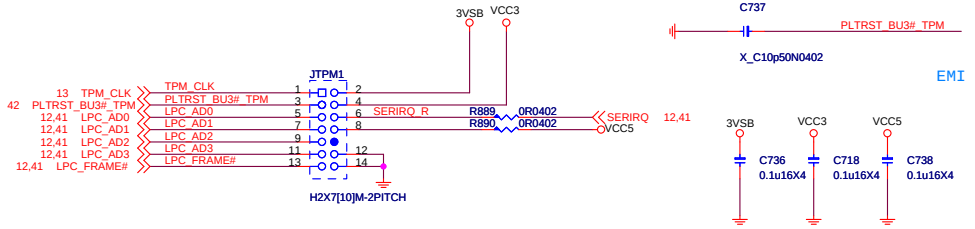


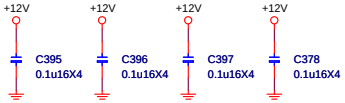

# LED




# TPM

**Confirm ESPI TPM card and TPM card pin difine (Not ready)**

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|---|---|---|
| Custom | ATX Power/F_Panel | 10 |

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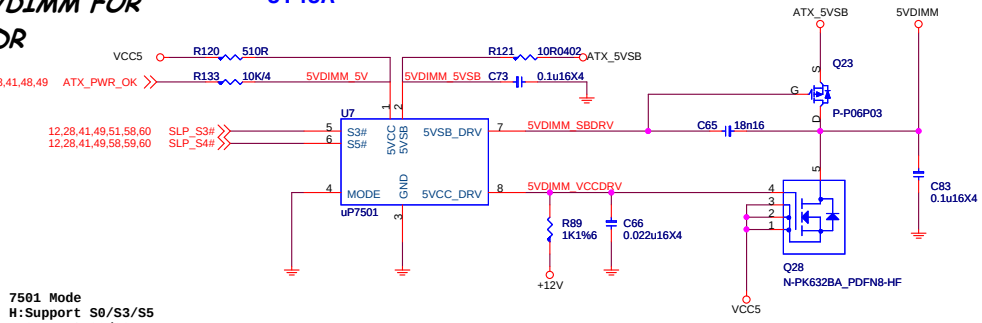
## 5VDIMM FOR DDR

5.45A

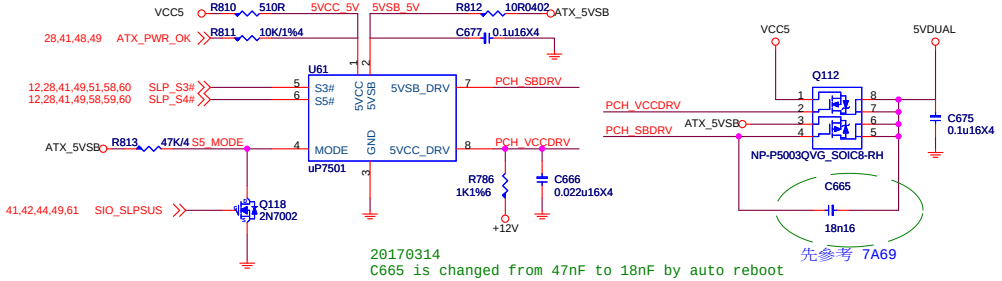



**7501 Mode**
**H:Support S0/S3/S5**
**L:Support S0/S3**

## 5VDUAL

5VDUAL is power source of 1P0SB

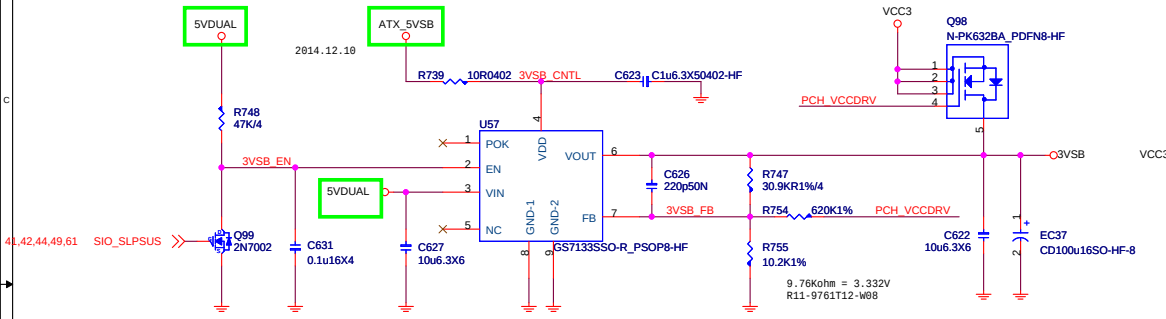
**PCH:2.95A**
**3VSB:4.04A**
**MAX:6.99A**




20170314
C665 is changed from 47nF to 18nF by auto reboot

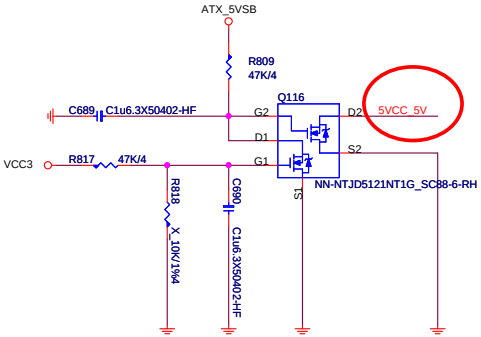
## 3VSB cost down

4.04A

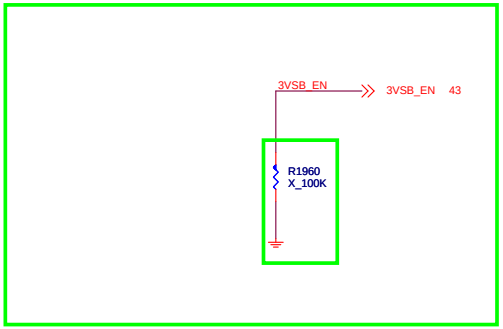



AVL:I31-3730S02-N62 2014.10.15 update

VFB=3.224V for S0->S3 3VSB voltage raise & ATX_5VSB drop.



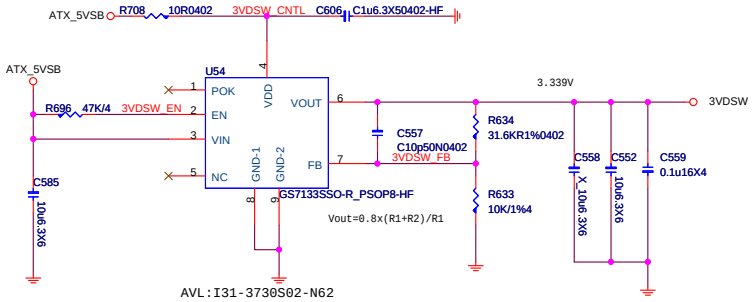

20170321
R765, Q107, R777, R764, Q104 are stuffed by Ivy's comment
2017.6.26
R765, Q107, R777, R764, Q104 are remove by Ivy's comment
Add R1960 pull-down for 3VSB_EN, R1960 depop




防G3-->S5底下5VSBDRV2瞬間有電變沒電,使得下一級電壓爬升有drop

## 3VDSW

0.422A

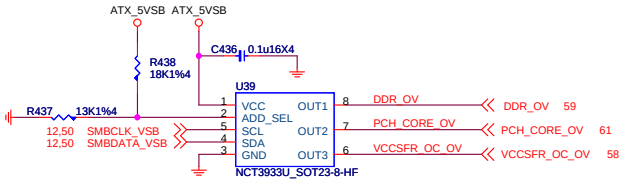



AVL:I31-3730S02-N62

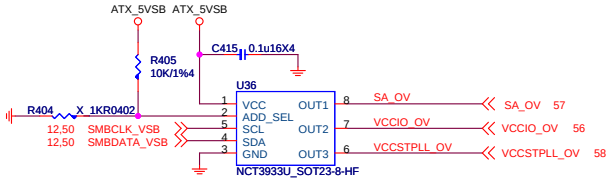

| | | |
|---|---|---|
| MICRO-STAR INT'L CO.,LTD | | |
| MS-7B47 | | |
| Size: Custom | Document Description: ACPI UPI | Rev: 10 |
| Date: Wednesday, August 02, 2017 | Sheet 49 of 67 | |

# UPI VOLTAGE CONSOLE

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




**0x20:RH=10K,RL=OPEN**




| ADDRESS | 0x2A | 0X28 | 0x26 | 0x24 | 0x22 | 0x20 |
|---|---|---|---|---|---|---|
| RH (KOhm) | OPEN | 3.9 | 3 | 2.2 | 1.3 | 10 |
| RL (KOhm) | 10 | 1.3 | 2.3 | 3 | 3.9 | OPEN |
| BUS_SEL | 0% | 25% | 40% | 60% | 75% | 100% |

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Size: Custom | Document Description: OV-NCT3933/GPIO-NCT5605 | Rev: 10

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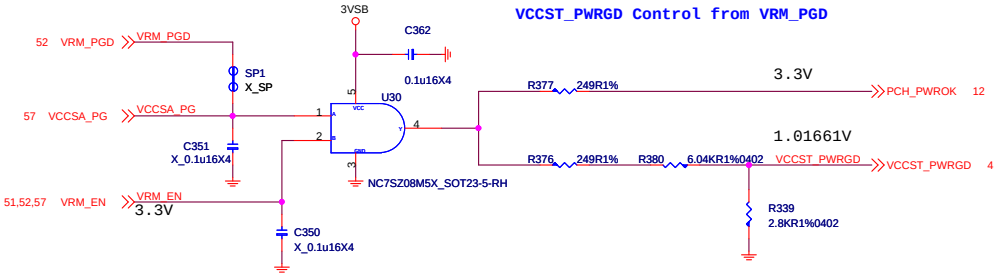
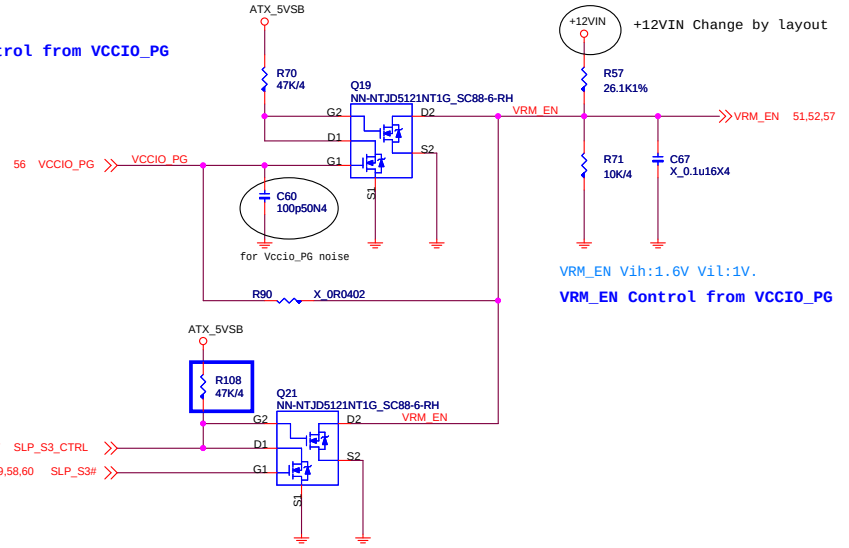
VCCSA&Vcore use same PWM IC, pull up VCC3
VCCSA&Vcore use different PWM IC,pull up VCCSA
VCCST_PWRGD can assert before or equal to PCH_PWROK, but must never lag it.

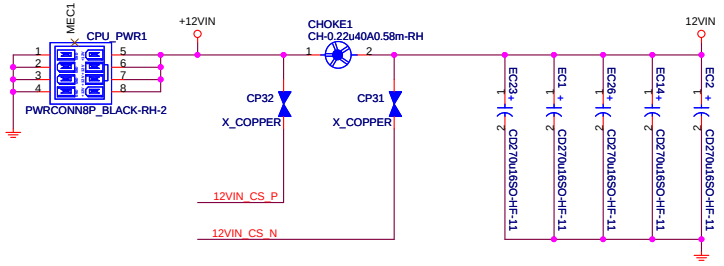
PCH_PWROK Control from VCCIO_PG&VCCSA
VCCST_PWRGD Control from VRM_PGD



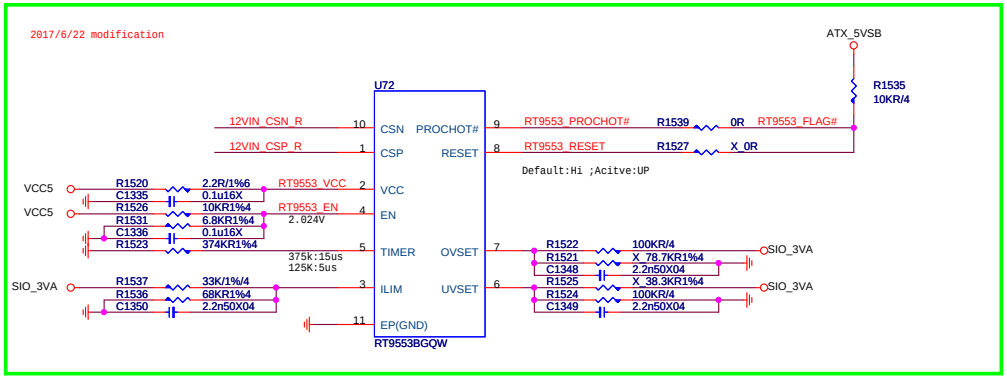

VRM_EN Control from VCCIO_PG

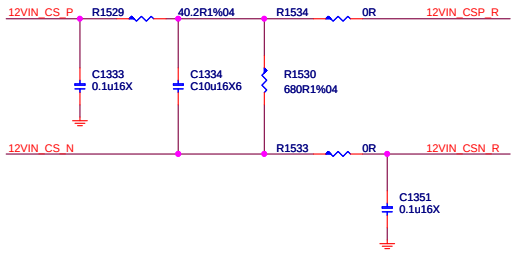


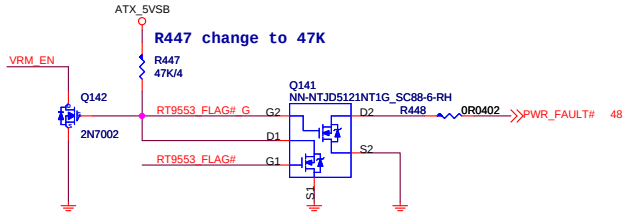

Iripple=30.95A
VCORE 18.101A
VGT 8.457A
VCCSA 4.392A

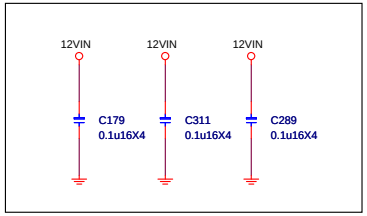



## RT9553B CURRENT SENSE

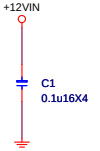



CLose to JPWR2




| | | |
|---|---|---|
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| Size: Custom | Document Description: Rear I/O PS2 | Rev: 10 |
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Vcore: ICC Max 138A
LL: 2.1 mohm
OCP: 200A

VGT: ICC Max 45A
LL: 3.1 mohm
OCP: 75A

U8
uP9508QQGW_VQFN52-HF

R82 改 500ohm

close to VRM < 0.1"

close to VRM <0.1"

直接放在R1105,R1080,R1029旁邊

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MS-7B47
Size: Custom
Document Description: PWM-UP9508 VCORE+VGT
Rev: 10
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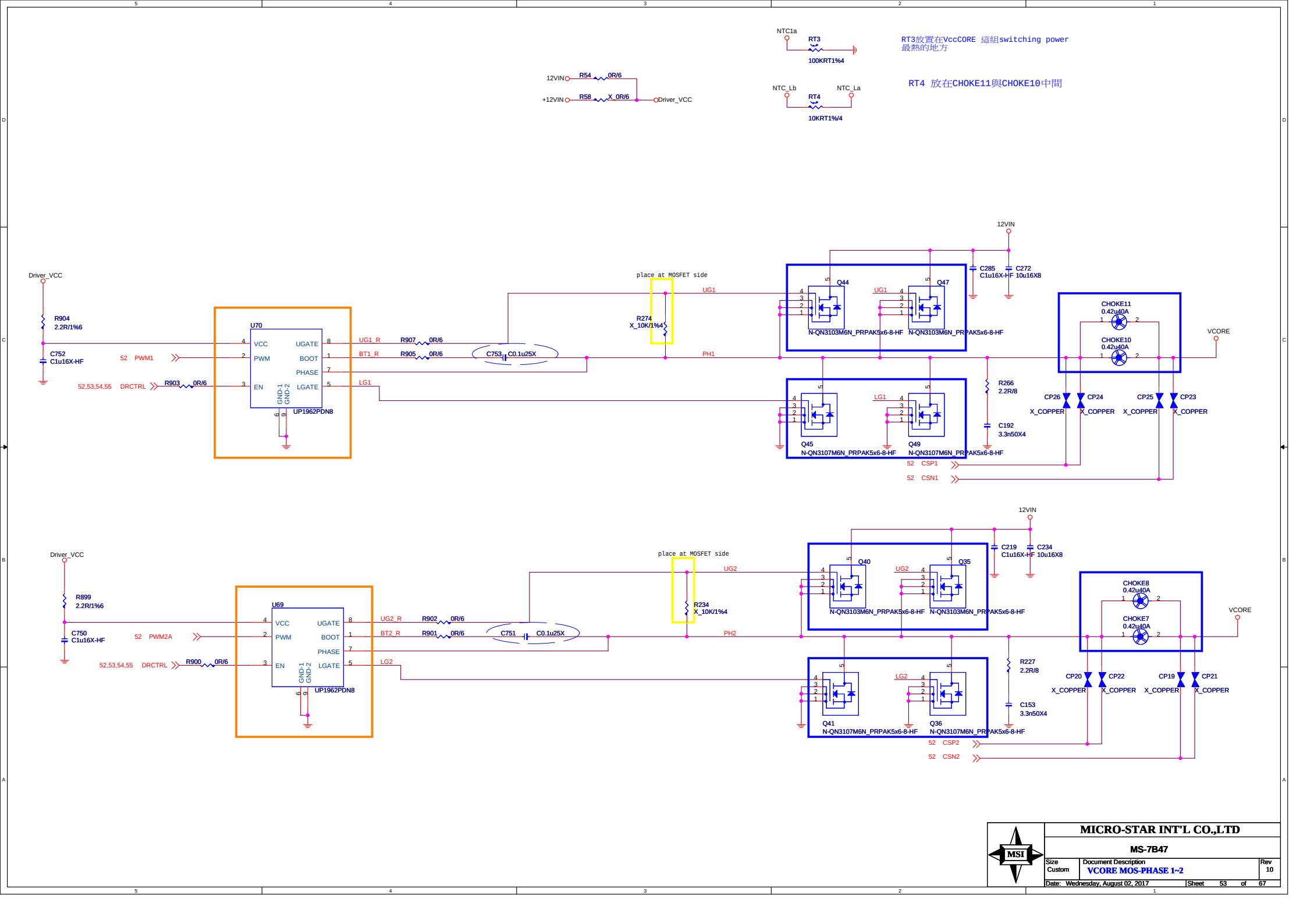


| | | |
|---|---|---|
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| MS-7B47 | | |
| Size: Custom | Document Description: VCORE MOS-PHASE 1~2 | Rev: 10 |
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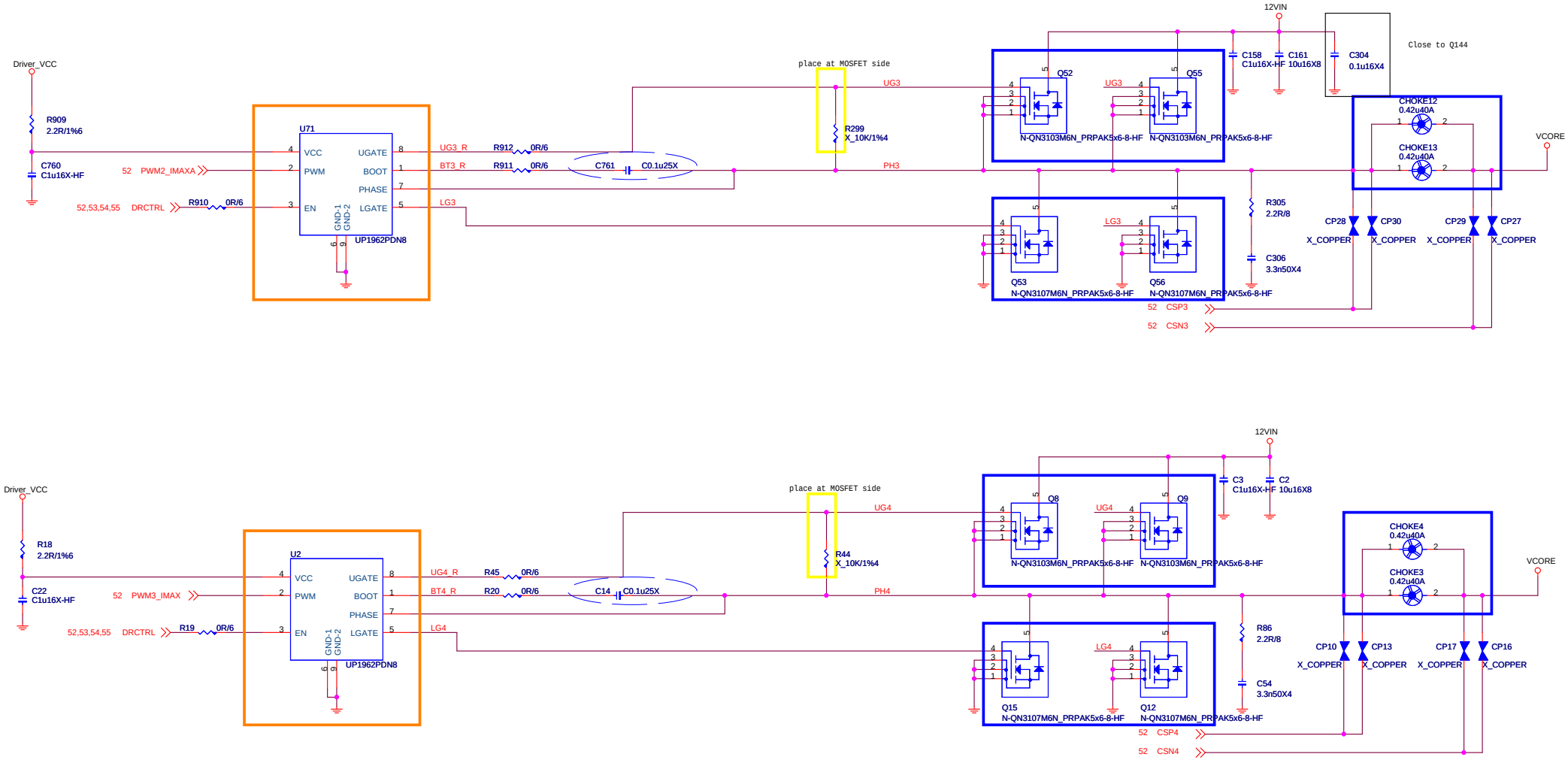


| | | |
|---|---|---|
| MSI | MICRO-STAR INT'L CO.,LTD | |
| | MS-7B47 | |
| Size: Custom | Document Description: VCORE MOS-PHASE 3~4 | Rev: 10 |
| Date: Wednesday, August 02, 2017 | Sheet 54 of 67 | |

RT2 放在 CHOKE5 與 CHOKE6 中間

RT1放置在VccGT 這組switching power 最熱的地方

NTCA_Lb RT2 NTCA_La

10KRT1%/4

NTCA1a RT1

100KRT1%4

12VIN

C5 C1u16X-HF C4 C1u16X-HF

place at MOSFET side

UG1A_R R106 0R/6 UG1A

R46 X_10K/1%4

Q10 N-QN3103M6N_PRPAK5x6-8-HF

BT1A_R R107 0R/6 PH1A

C71 C0.1u25X

LG1A

Q13 N-QN3107M6N_PRPAK5x6-8-HF

Q16 N-QN3107M6N_PRPAK5x6-8-HF

R87 2.2R/8

C55 3.3n50X4

CHOKE5 0.22u60A

VGT

CP12 X_COPPER

CP15 X_COPPER

ISP1 R104 X_0R0402

ISP2 R118 0R0402

ISEN1A-1

52 CSP1A-1

R103 5.6K/1%4

CSP1A-1

C70 1000p50X4

CSN1A-1

52 CSN1A-1

12VIN

C7 10u16X8 C6 10u16X8

place at MOSFET side

UG2A_R R153 0R/6 UG2A

R47 X_10K/1%4

Q11 N-QN3103M6N_PRPAK5x6-8-HF

BT2A_R R152 0R/6 PH2A

C89 C0.1u25X

LG2A

Q14 N-QN3107M6N_PRPAK5x6-8-HF

Q17 N-QN3107M6N_PRPAK5x6-8-HF

R88 2.2R/8

C56 3.3n50X4

CHOKE6 0.22u60A

VGT

CP11 X_COPPER

CP14 X_COPPER

ISP1 R119 0R0402

ISP2 R132 X_0R0402

ISEN1A-2

52 CSP1A-2

R117 5.6K/1%4

CSP1A-2

C81 1000p50X4

CSN1A-2

52 CSN1A-2

D9 S-BAT54A_SOT23

BT1A_R BT2A_R

Driver_VCC

R151 2.2R/1%6

C88 C1u16X-HF

U6

| | | | |
|---|---|---|---|
| 3 | VCC | BOOT1 | 14 |
| 16 | ISP1 | UG1 | 13 |
| 1 | ISP2 | PH1 | 12 |
| 2 | PWM0 | LG1 | 11 |
| 15 | EN | BOOT2 | 7 |
| 4 | ISP0 | UG2 | 8 |
| 6 | NC | PH2 | 9 |
| 5 | GND | LG2 | 10 |
| 17 | GND | | |

BT1A_R BT1A_R UG1A_R PH1A BT2A_R UG2A_R PH2A LG2A

52 PWM1A 52,53,54 DRCTRL R105 0R/6 52 CSP1A CSP1A

uP1961SQDD_WQFN16-HF

1.0

Z270/H270/B250: I33-1961S0C-U33

VGT

EC5 CD560u6.3SO-HF-4 EC7 CD560u6.3SO-HF-4 EC10 CD560u6.3SO-HF-4 EC11 CD560u6.3SO-HF-4 EC6 CD560u6.3SO-HF-4

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Size Custom | Document Description VGT MOS-PHASE 1~2 | Rev 10

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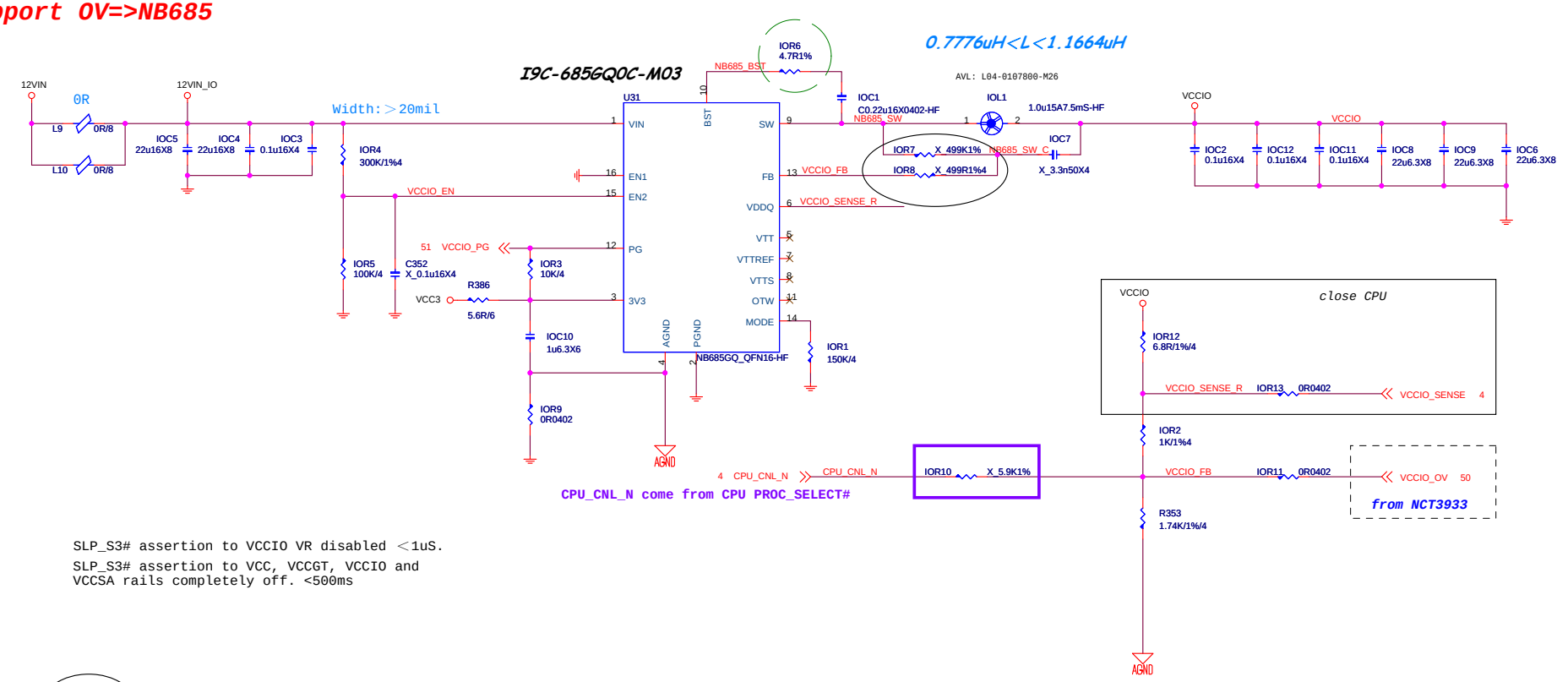
# VCCIO

0.95V; 5.5A

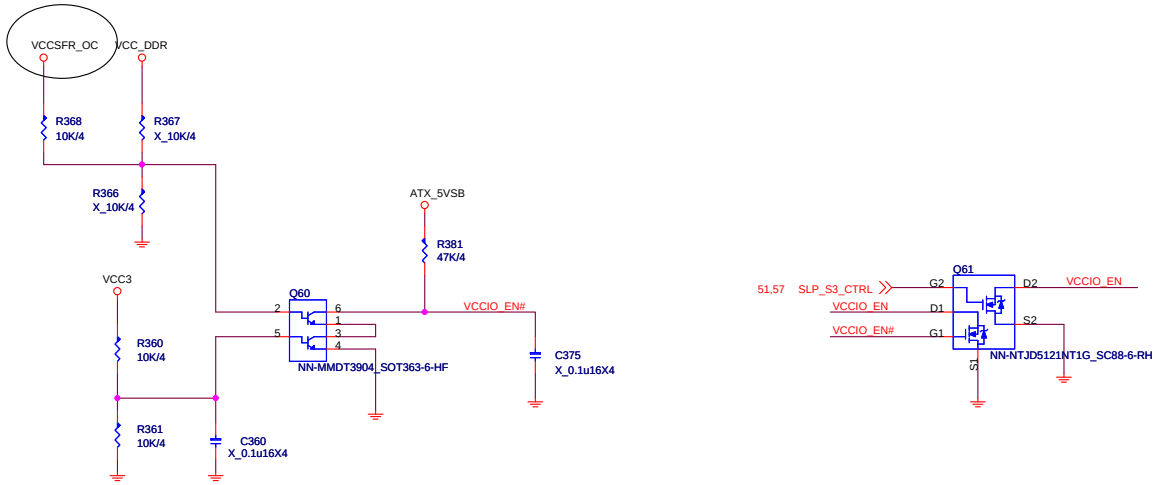
IMAX 10A
ILIMIT=10A~12A
IOC=ILIMIT+40%*IMAX/2=12A~14A.

support OV=>NB685




SLP_S3# assertion to VCCIO VR disabled <1uS.

SLP_S3# assertion to VCC, VCCGT, VCCIO and VCCSA rails completely off. <500ms




SLP_S3# assertion to VR disabled
max:1us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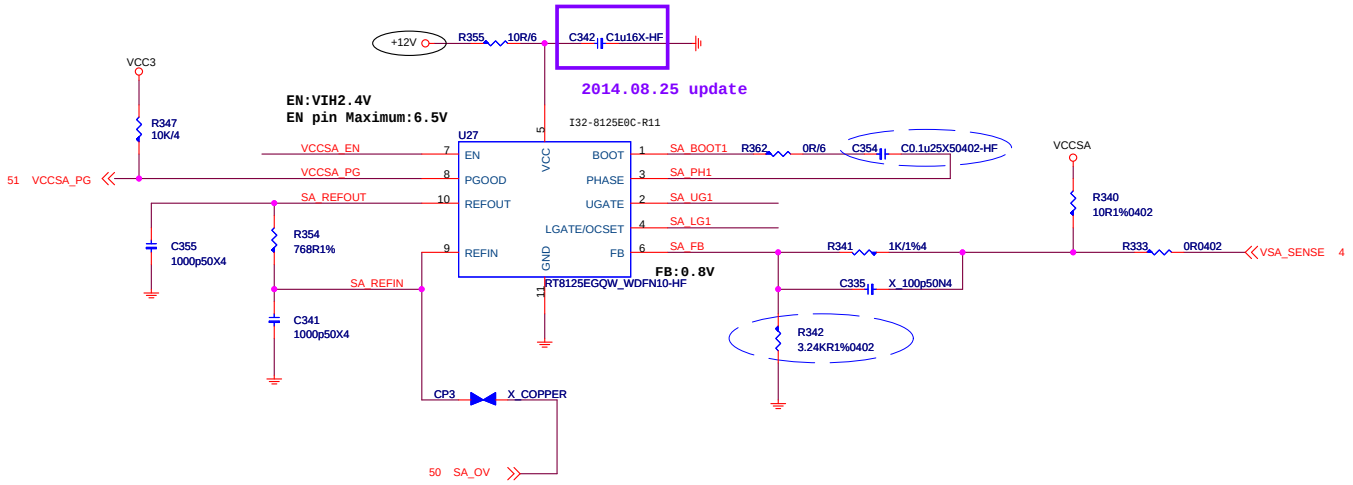
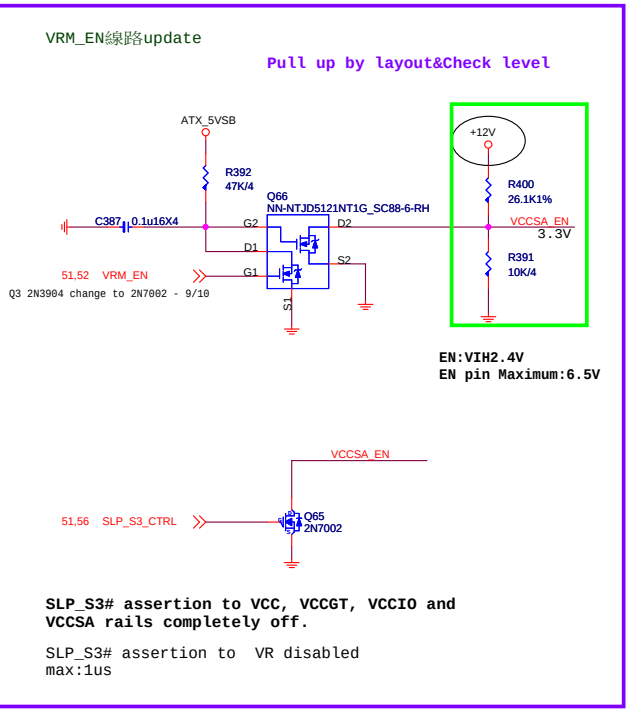
# SA Power:1.05V,11.1A

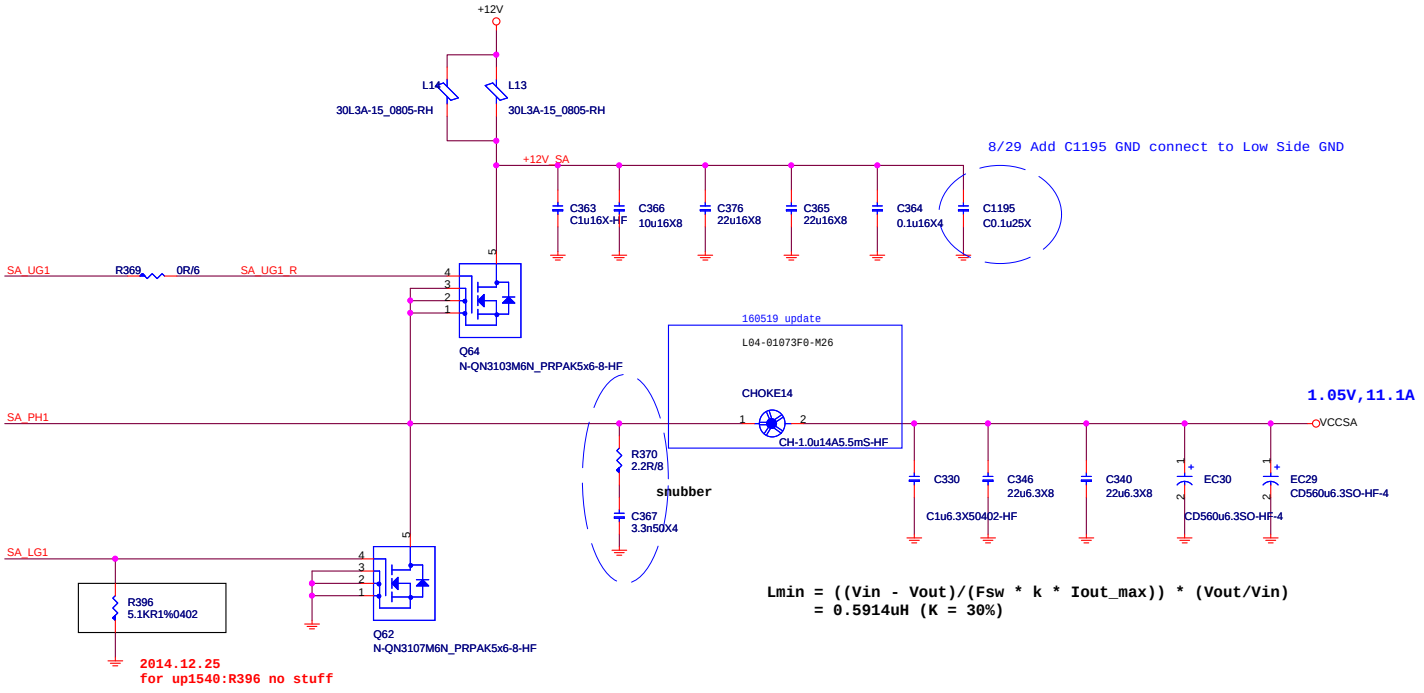
*OCP =11.1A*1.4=15.54A*
*Rocs(R396)=OCP*Rdson(Low side)2.6mohm]/10uA*
*=15.54*(2.6)mohm/10uA*
*=4.0404Kohm <5Kohm*

**Rocs:5.2836K,OCP:**
**D03-4C05N03-O05 : 15.76A**
**D03-632BA0C-N03 : 16.24A**
**use UBIQ MOS need Check**

**Rdson(low)10V**
**D03-4C05N03-O05 : 3.4mohm**
**D03-632BA0C-N03 : 3.3mohm**
**D03-3056M00-U47 : 4.2mohm**
**D03-3107M00-U47 : 2.6mohm**




| | | |
|---|---|---|
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| Size: Custom | Document Description: CPU PWR_SA-RT8125C | Rev: 10 |
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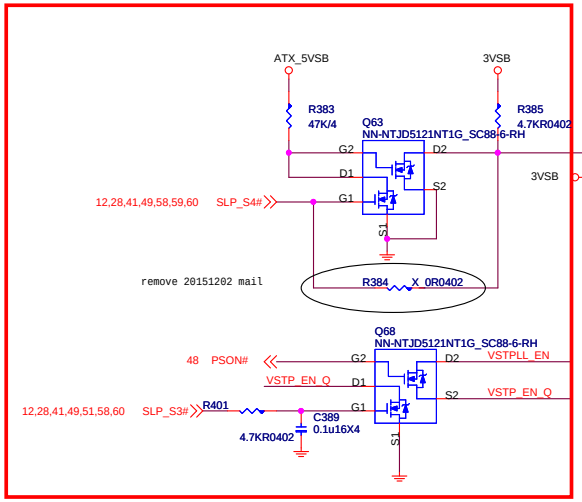
# VCCST

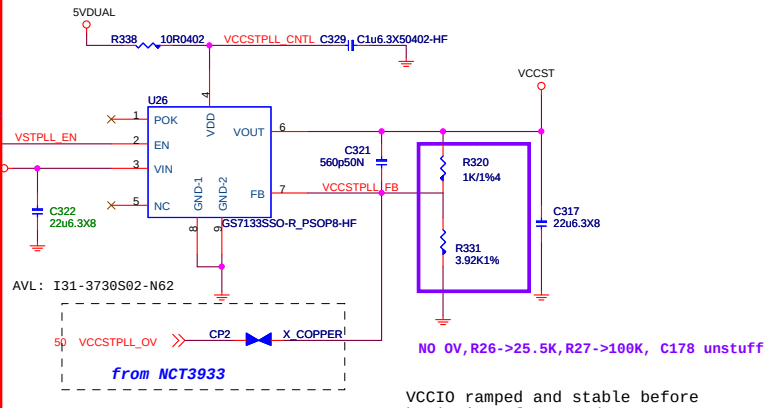
**for Gaming3/5, Classic, ECO and H110**

VCCST:60mA
VCCPLL:150mA

**1.0V; 210mA**

**For Cost down VCCST&VCCPLL merge**




NO OV,R26->25.5K,R27->100K, C178 unstuff

VCCIO ramped and stable before beginning of VCCOPC/VCCEOPIO ramp

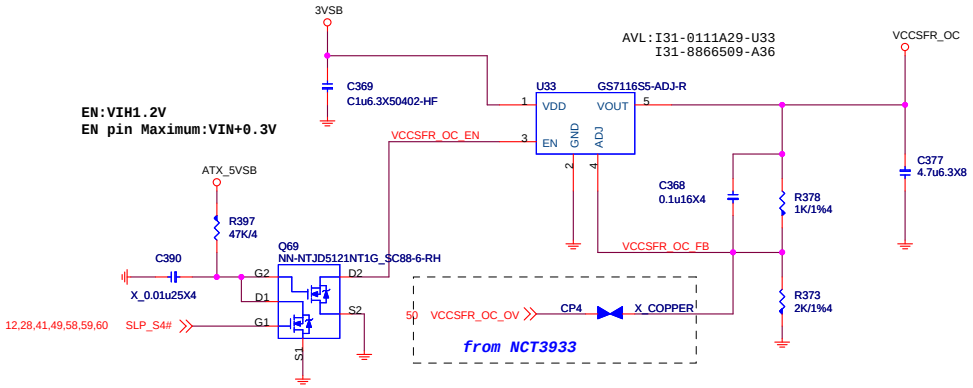
VCCST/PLL stable 1ms before PROCPWRGD

# VCCPLL_OC

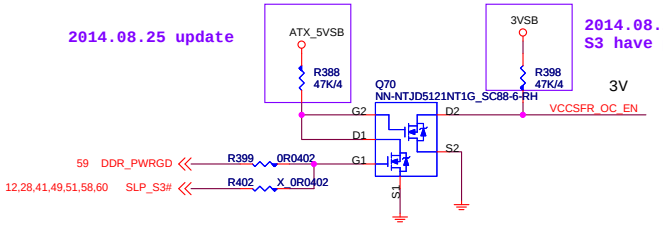
**1.2V; 130mA**

**2014.08.21 update**

**EN:VIH1.2V**
**EN pin Maximum:VIN+0.3V**




**2014.08.25 update**




**2014.08.25 update**
**S3 have power**

| | | |
|---|---|---|
| MICRO-STAR INT'L CO.,LTD | | |
| MS-7B47 | | |
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DDR4_1.2V 2.5A+9.5A+1.2A=13.5A

2.8A FOR CPU

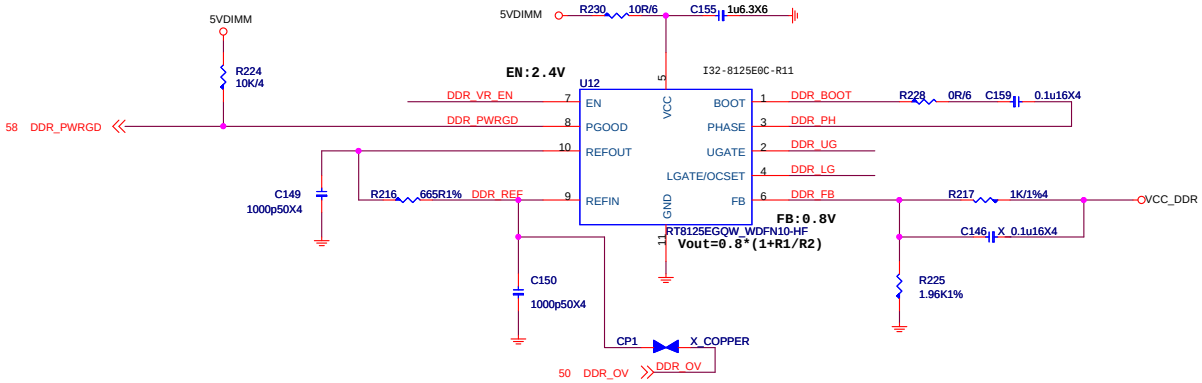
9.5A FOR 4DIMM

1.2A FOR DDR VTT

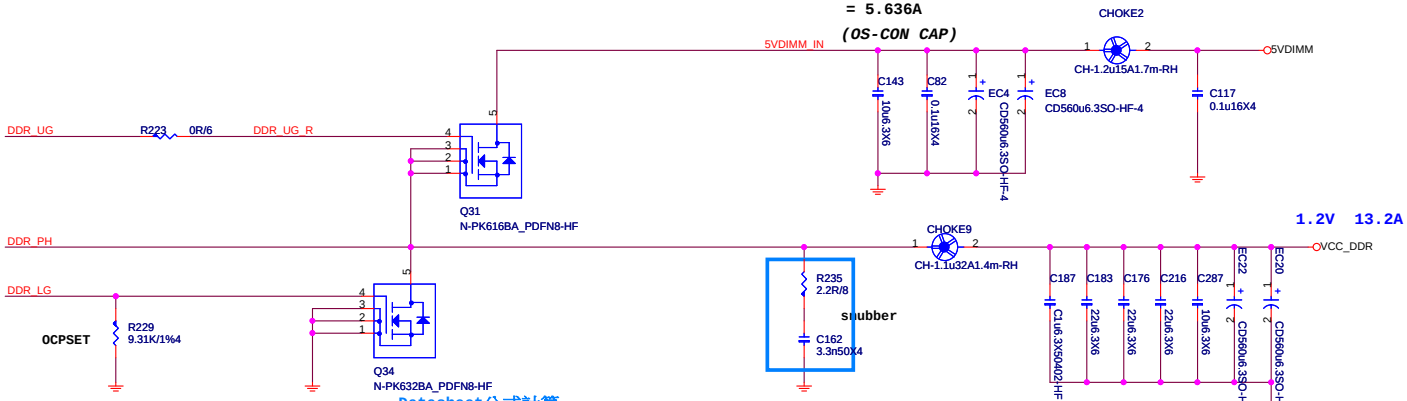
OCP =13.2A*1.5=20.25A
Rocs(R95)=OCP*Rdson[(Low side)]/10uA
=20.25A*(4.6)mohm/10uA
=9.315Kohm

Rocpset:5.1K
OCP=Rocset*Rdson[(Low side)]/10uA
=9.31K*(4.6)mohm/10uA
=20.23A
use UBIQ MOS need Check

Rdson(low)4.5V
D03-4C05N03-005 : 5 mohm
D03-632BA0C-N03 : 4.6mohm
D03-3056M00-U47 : 6.2mohm



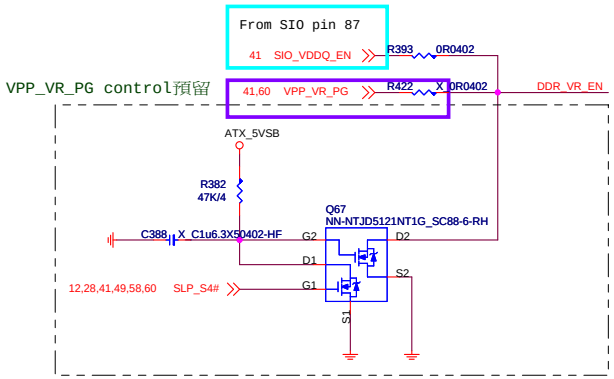

Irms = Iout * SQRT{(Vout/Vin) * [1 - (Vout/Vin)]}
= 13.2* 0.427
= 5.636A
(OS-CON CAP)




Datasheet公式計算
Lmin = ((Vin - 1.2V)/(Fsw * k * Iout_max)) * (Vout/Vin)
= 0.7677uH (K = 30%)

若帶入CAP ESR計算,0.2432uH＜L＜1.2897uH

2014.12.17 update

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|---|---|---|
| Custom | DDR4 Power-RT8125C | 10 |

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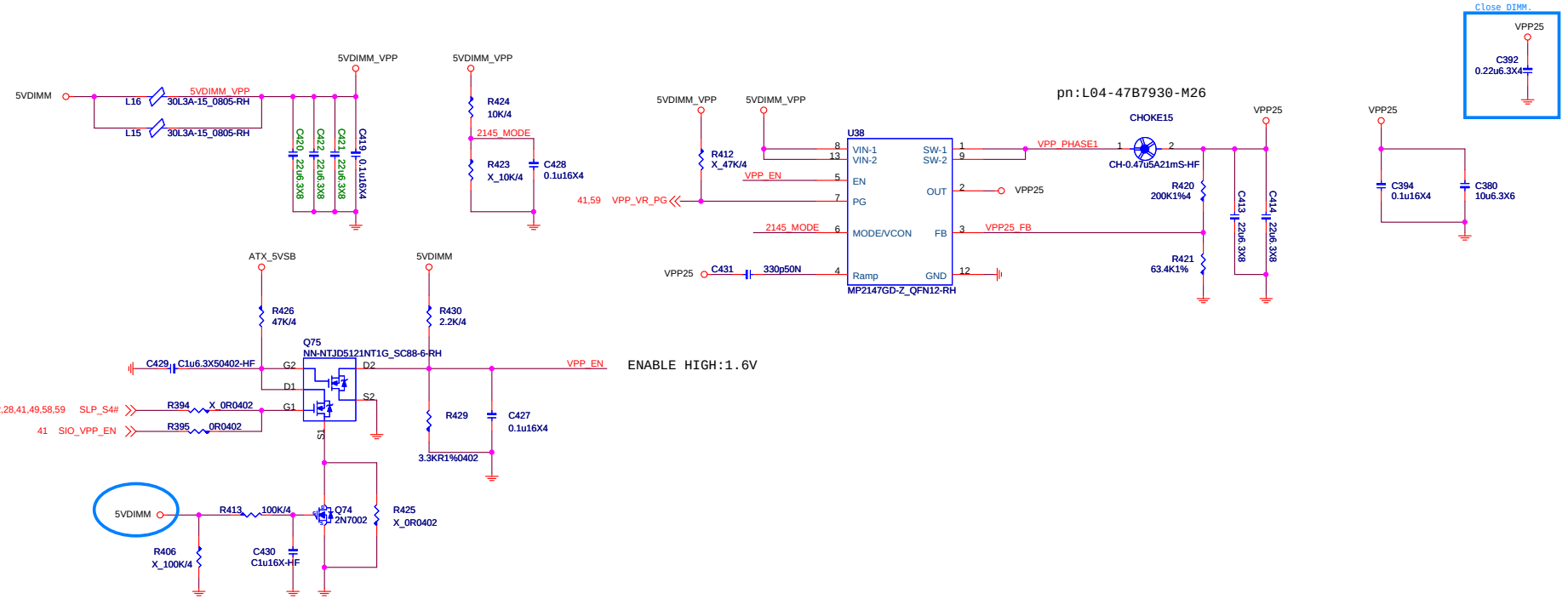
# 4DIMM :2.24A FOR DDR VPP2.5V

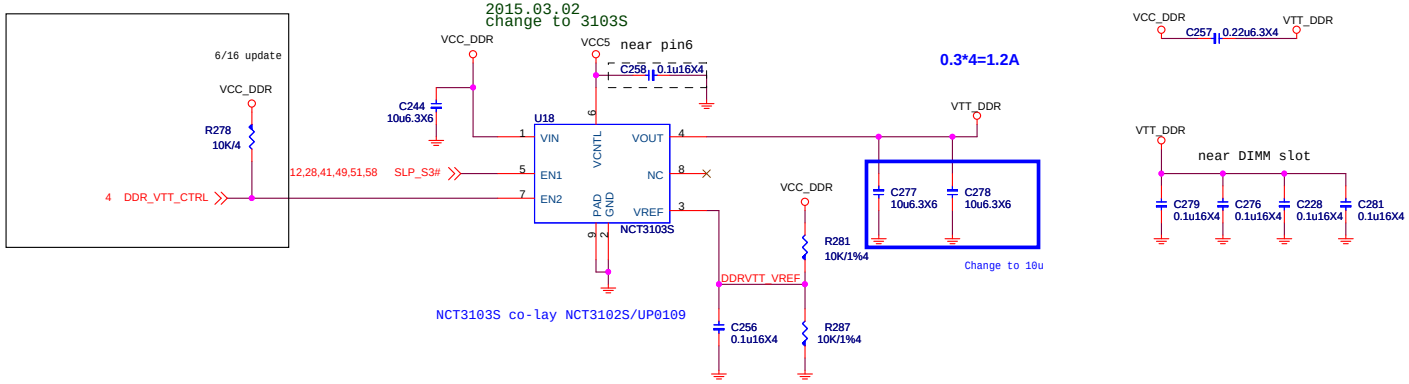
## VPP25 Power

2.5V; 2.24A




To make sure VPP EN after 5VDIMM stable

## DDR VTT Power




| | | |
|---|---|---|
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| MS-7B47 | | |
| Size: Custom | Document Description: DDR4 Power-VPP25 | Rev: 10 |
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# PCH_1VSB

**1.0V; 11.83A**

OCP = 17.745A

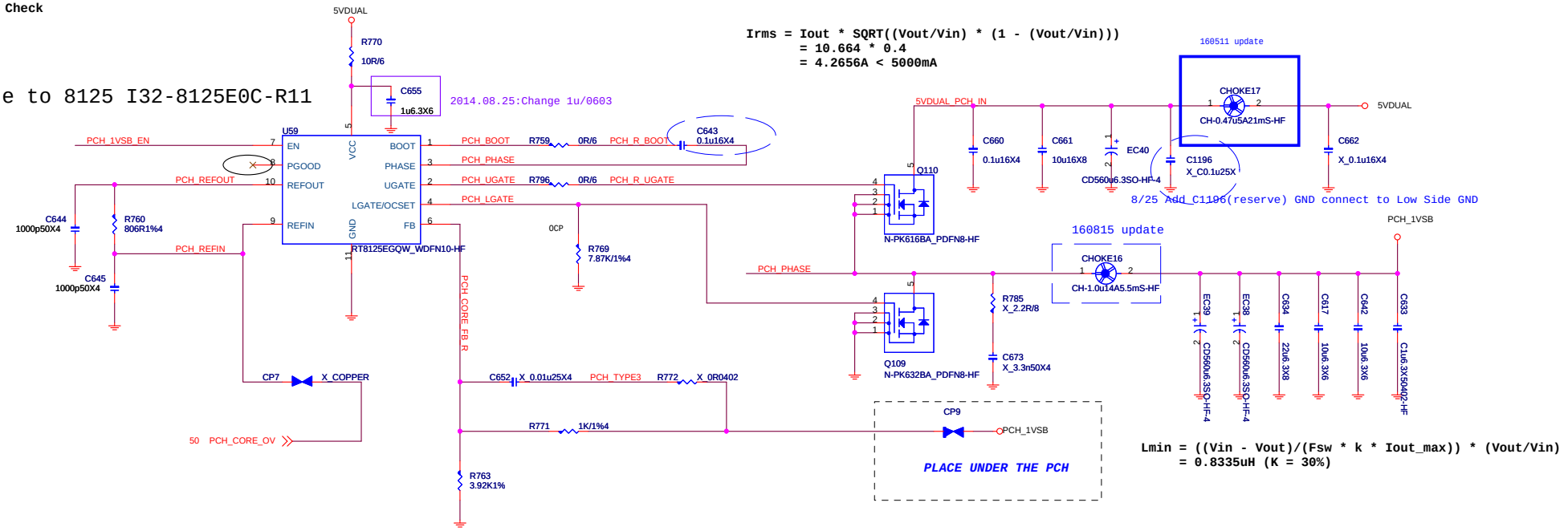
Rocset = 1.5 * Imax * Rdson(low) / Iocset
= 1.5 * 11.83 * 4.6mohm / 10uA
= 8.16K

Rocs:7.87K,OCP:
D03-4C05N03-005 : 15.74A
D03-632BA0C-N03 : 17.1A
use UBIQ MOS need Check

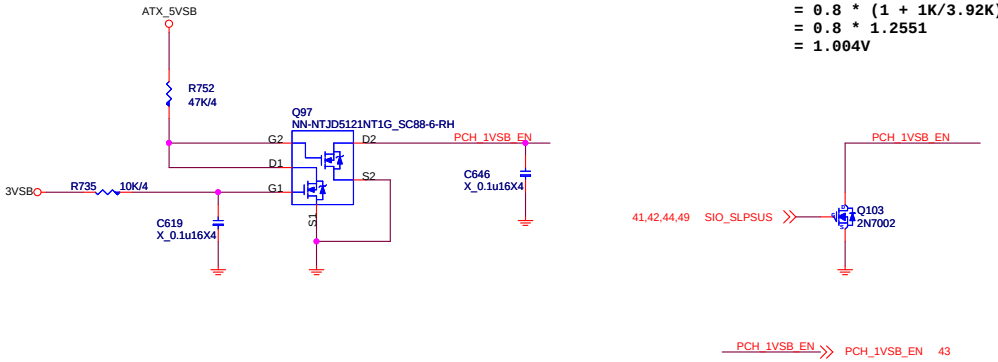
Rdson(low)4.5V
D03-3116M00-U47 : 3.6 mohm
D03-632BA0C-N03 : 4.6mohm
D03-3056M00-U47 : 6.2mohm

1504 change to 8125 I32-8125E0C-R11

Irms = Iout * SQRT((Vout/Vin) * (1 - (Vout/Vin)))
= 10.664 * 0.4
= 4.2656A < 5000mA




Vout = Vref * (1 + R821/R822)
= 0.8 * (1 + 1K/3.92K)
= 0.8 * 1.2551
= 1.004V




Lmin = ((Vin - Vout)/(Fsw * k * Iout_max)) * (Vout/Vin)
= 0.8335uH (K = 30%)

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MS-7B47

| Size | Document Description | Rev |
|---|---|---|
| Custom | PCH Core Power-RT8125 | 10 |

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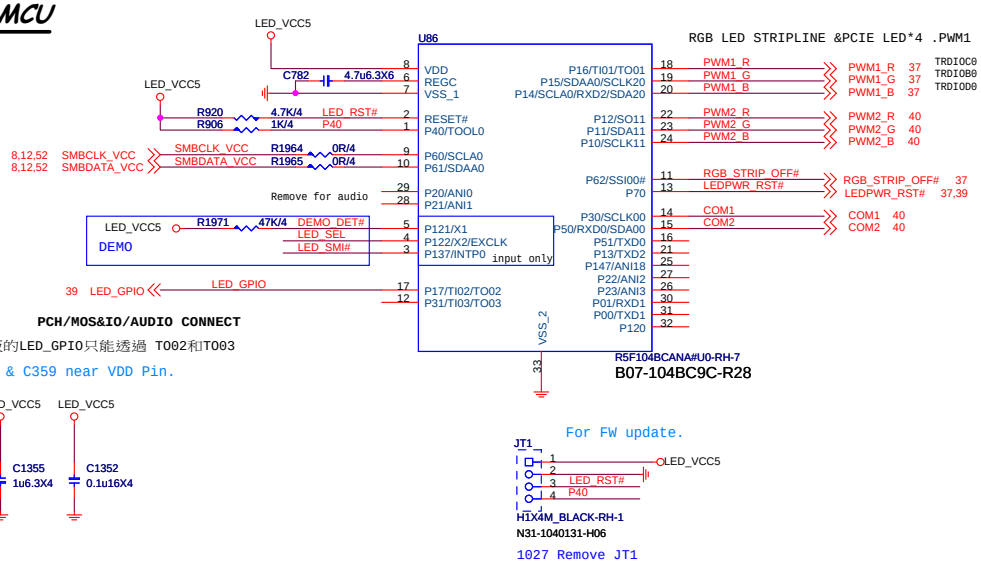
# LED MCU




RGB LED STRIPLINE &PCIE LED*4 .PWM1

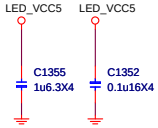
R5F104BCANA#U0-RH-7

B07-104BC9C-R28

**PCH/MOS&IO/AUDIO CONNECT**

控制燈板的LED_GPIO只能透過 T002和T003

C345 & C359 near VDD Pin.

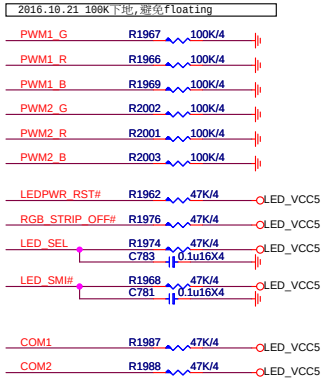



For FW update.



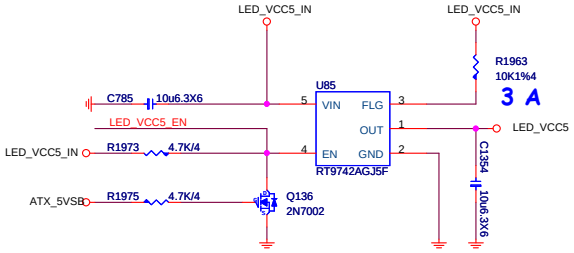

1027 Remove JT1

2016.10.21 100K下地,避免floating



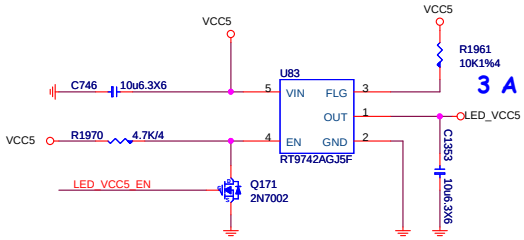

| Control | Net Name | PWM USE | Connector |
|---|---|---|---|
| AUDIO Cover | LED_GPIO | No Use | JPIPE_LED1 |
| PCH | LED_GPIO_01 | No Use | JPIPE_LED2 |
| MOS/IO cover | LED_GPIO_02 | No Use | JPIPE_LED3 |
| LED STRIPLINE | RGB_STRIP_OFF# | PWM1 | JLED1 |
| Board Side LED | COM1~8 | PWM2 | RGB LED |
| PCIE Side LED | COM1~4 | PWM1 | RGB LED |

# EXTERNAL POWER INPUT

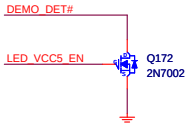



min 80mil.

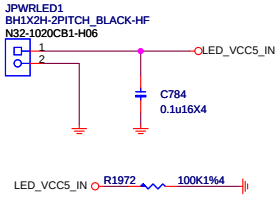
I36-9742A09-R11




# LED Demo Button




**2A Connector**




MICRO-STAR INT'L CO.,LTD

MS-7B05

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AMI_LABLE1

AMI_BIOS LABLE

BIOS_LABLE

HDMI_LABLE1

HDMI LABLE

HDMI LABEL

BAT1_X1

BAT-BCR2032P-RH

SSE_LABLE1

SSE LABEL

X_SSE LABEL

XSPLIT1

XSPLIT

X_XSPLIT

CFOS_LABLE1

CFOS LABLE

CFOS LABEL

EMI CAP

VCC5

C772

X_0.1u16X4

VCC5

C773

X_0.1u16X4

## Test point

VCORE — VCORE1
VGT — VGT1
VCC_DDR — VCC_DDR1
VCCSA — VCCSA1
VCCIO — VCCIO1
PCH_1VSB — PCH_1VSB1
VCCST — VCCST1
VCCSFR_OC — VCCSFR1
VTT_DDR — VTT_DDR1
VPP25 — VPP1

## Optical Fiducial Marks-120

FM1 FM2 FM3 FM4 — X_FM

FM5 FM6 FM7 FM8 — X_FM

## Mounting Holes

MH1 MH2 MH3 MH4 MH5 MH6 MH7 MH8 MH9 — X_MH001

C691 0.1u16X4

C714 0.1u16X4

# Z370 SKU

PCB1

7B47_10_Z370

MK_LABLE1

MARKET LABLE

Z270 TOMAHAWK

CPU_H1

CPU 鐵座

CPU_H1

E21-7869020-F02

HS_MOS1

MEC1 MEC2 MEC3 MEC4 MEC5 MEC6

MPOWER

Rear IO cover
+ left MOS HS

HS-0504333-RH

E31-0504333-A87

HS_MOS2

MEC1 MEC2

HS-0504323-RH

E31-0504323-A87

Top MOS H/S

PCH_HS1

MEC1 MEC2

HS-0408633-RH

E31-0408633-A87

## Simulation

VCC5 — SIM1 — X_PIN1*2

SIM2 — X_PIN1*2

DDR_COVER1

DDR COVER

X1 X2 X3 X4 X5

X_E21-7A63010-RH

| | | |
|---|---|---|
| MICRO-STAR INT'L CO.,LTD | | |
| MS-7B47 | | |
| Size: Custom | Document Description: Manual parts | Rev: 10 |
| Date: Wednesday, August 02, 2017 | Sheet 63 of 67 | |