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# MS-7B23

ATX:243.8mm\*243.8mm

Ver: 3.3

## Intel -CoffeeLake-S plamform

### CPU:

LGA1151

CPU POWER PAK \*4Phase

GT POWER PAK \*2 Phase

### Onboard Chip:

SIO: NCT5567D colay NCT5565D

HD Audio Codec: ALC887

LAN: RTL8111H

Flash ROM: SPI 64 MB

DP to VGA: RTD2167

CUT VBAT:SLG4B41231

### Main Memory:

DDR4 \* 4 (Dual Channel)

### ACPI:

5VDAUL:uP7501

5VDIMM:uP7501

3VSB:GS7133+N MOS

1P8\_VSB:GS7133

3VDSW:GS7116

VCCSTPLL:GS7133

### System Chipset:

Cannon Lake B360

### PWM:

VCORE - RT3606

DDR - RT8125E

DDR VPP25- MP2147

PCH(1.05V) - RT8125E

VCCSA - RT8125E

VCCIO - SY8288

### Expansion Slots:

PCI Express (X16) Slot \* 1

PCI Express (X1) Slot \* 2

M.2 Slot \* 2



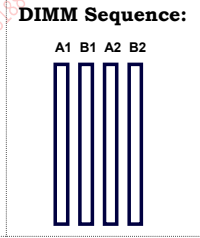
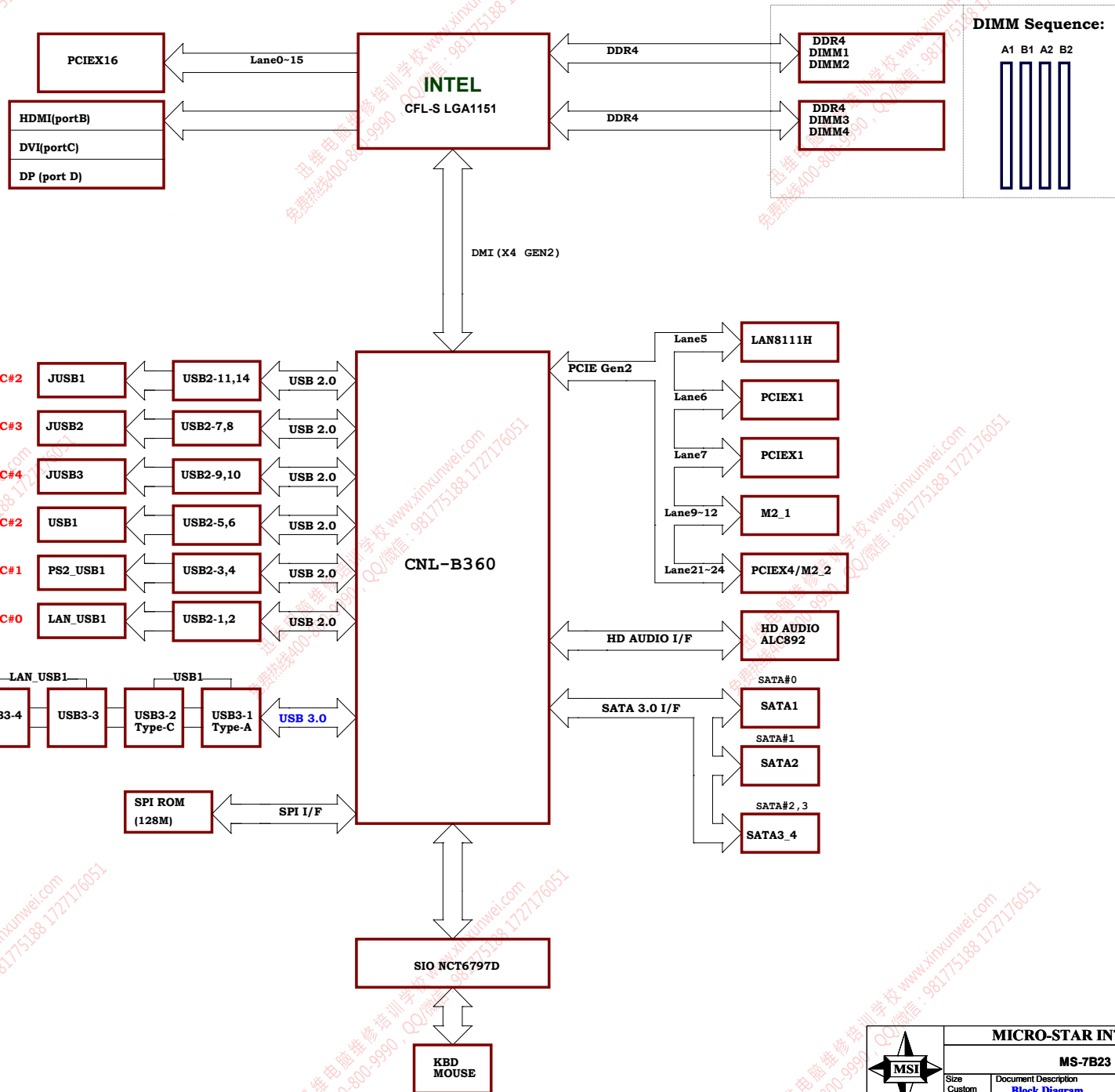
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MS-7B23

|                                  |                                     |            |
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| Size<br>Custom                   | Document Description<br>Cover Sheet | Rev<br>3.3 |
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# MS-7B23 Block Diagram

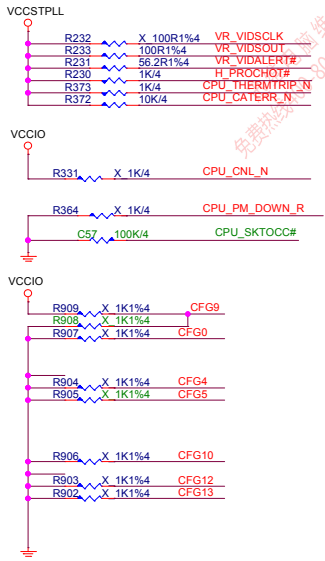
迅维电脑维修培训学校 www.xinwei.com  
 免费热线400-800-9990, QQ/微信: 981775188 1727176051



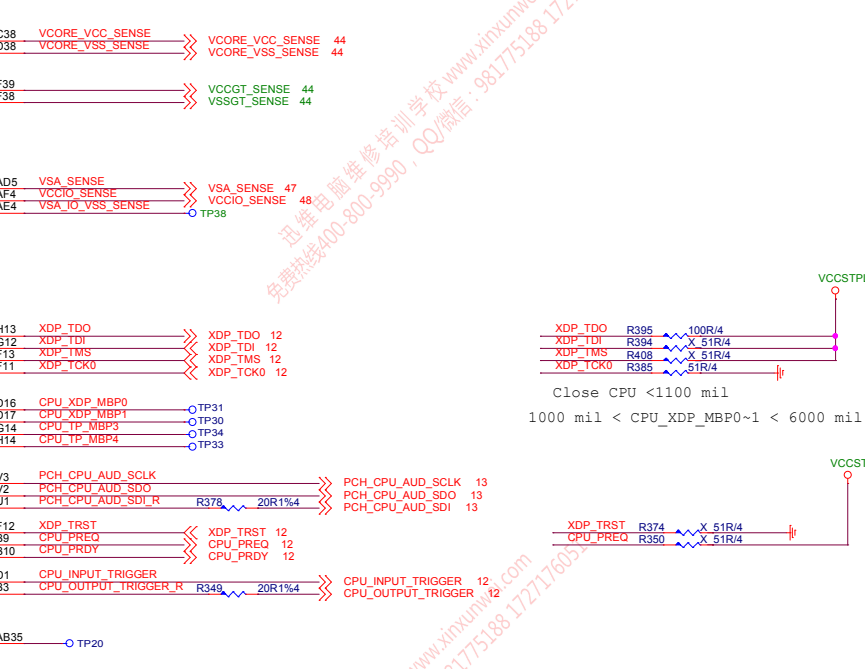
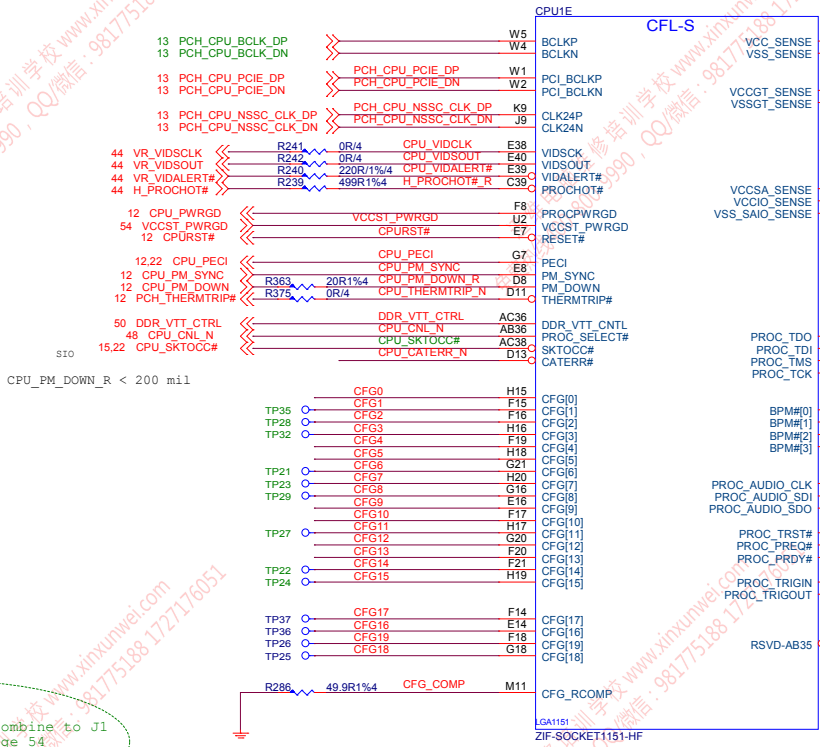
**Slot Sequence:**

- PCIEX16** (By CPU GEN3)
- PCIEX1** (By PCH GEN3)
- PCIEX1** (By PCH GEN3)
- PCIEX X4** (By PCH GEN3)
- M2\_1** (By PCH GEN3)
- M2\_2** (By PCH GEN3)

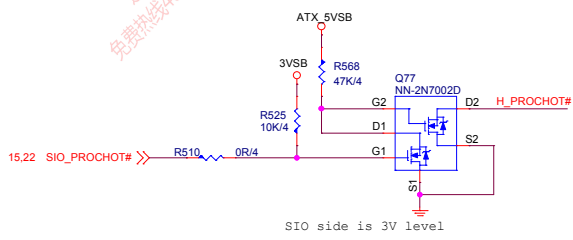
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| <b>MICRO-STAR INT'L CO.,LTD</b>  |  |               |
| <b>MS-7B23</b>                   |  |               |
| Size<br>Custom                   | Document Description<br><b>Block Diagram</b> | Rev<br>3.3    |
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2017/7/13  
Remove JP1 because JP1 combine to J1  
Please see the D78 on page 54



Close CPU <1100 mil  
1000 mil < CPU\_XDP\_MBP0~1 < 6000 mil



### CFG Strap

| CFG Table |         |                    |
|-----------|---------|--------------------|
| HIGH      | LOW     | DESCRIPTION        |
| 0         | No Lock | Lock               |
| 1         | RSVD    | FCU PLL lock       |
| 2         | NORM    | REVERSE            |
| 3         | RSVD    | PEG LANE REVERSAL  |
| 4         | DISABLE | ENABLE             |
| 5         | DISABLE | ENABLE             |
| 6         | DISABLE | ENABLE             |
| 7         | RESET#  | BIOS REQ           |
| 8         | RSVD    | PEG DEFER TRAINING |
| 9         | PRESENT | NO PRESENT         |
| 10        | RSVD    | SVID PRESENT       |
| 11        | RSVD    | RSVD               |
| 12        | RSVD    | RSVD               |
| 13        | RSVD    | RSVD               |
| 14        | RSVD    | RSVD               |
| 15        | RSVD    | RSVD               |
| 16        | RSVD    | RSVD               |
| 17        | RSVD    | RSVD               |
| 18        | RSVD    | RSVD               |
| 19        | RSVD    | RSVD               |

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|                                  |                      |               |
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| Size                             | Document Description | Rev           |
| Custom                           | CPU-Control/MISC/CFG | 3.3           |
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8 M\_MAA\_A[16.0]

9 M\_MAA\_B[16.0]

M\_DATA\_B[63.0] 9

CPU1A

follow 7B16-0A DDR 走線

CPU1B

CFL-S

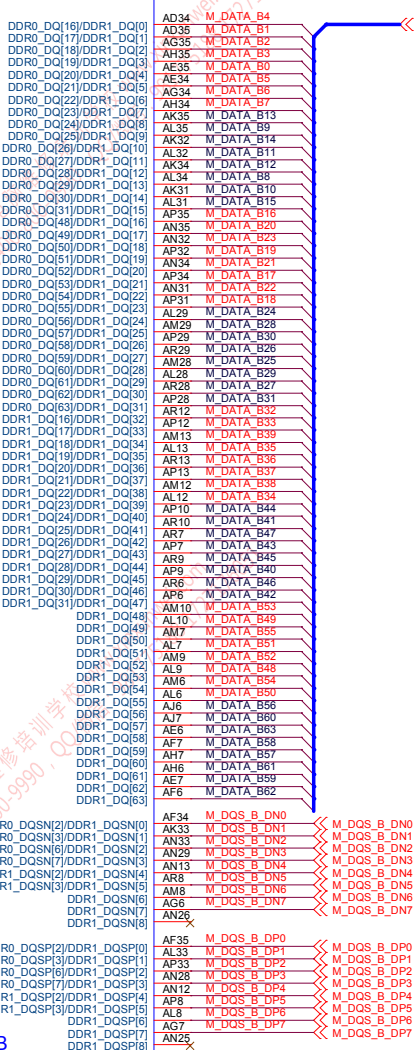
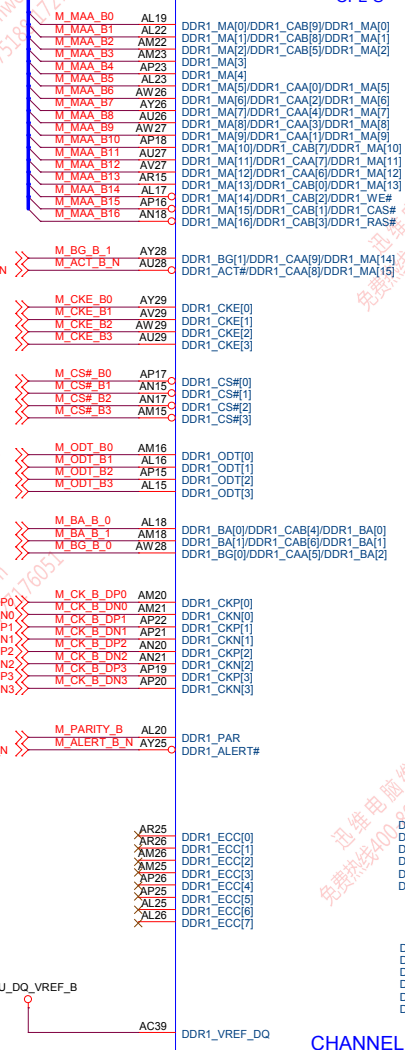
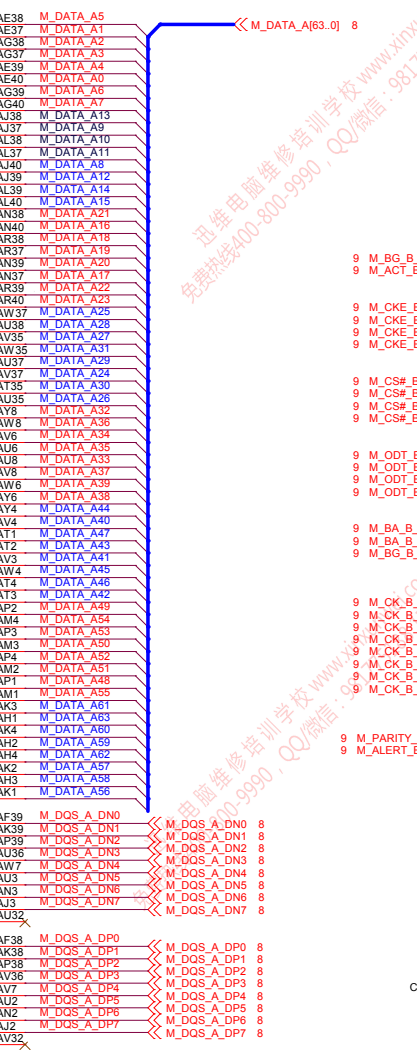
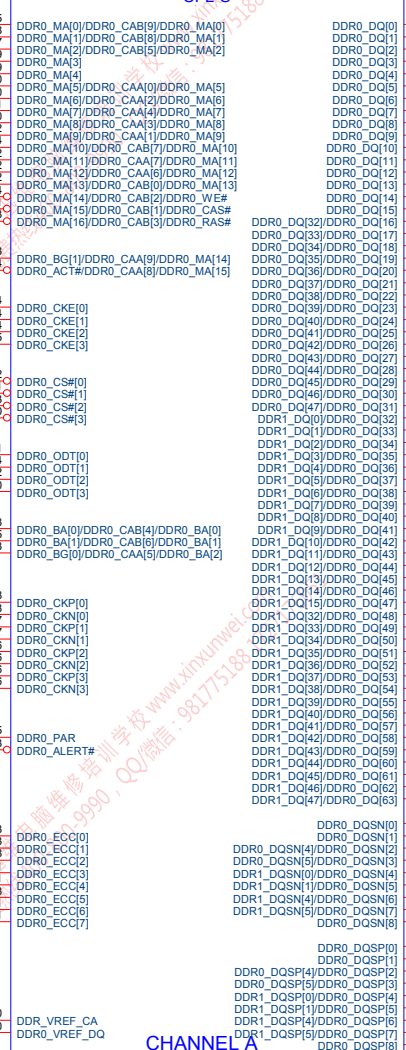
CFL-S

CHANNEL A

CHANNEL B

GA1151  
ZIF-SOCKET1151-HF

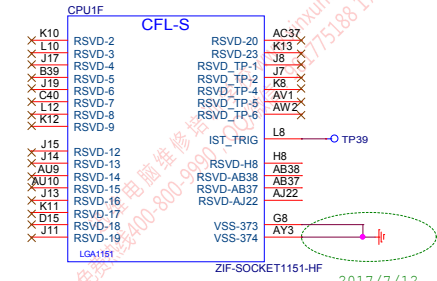
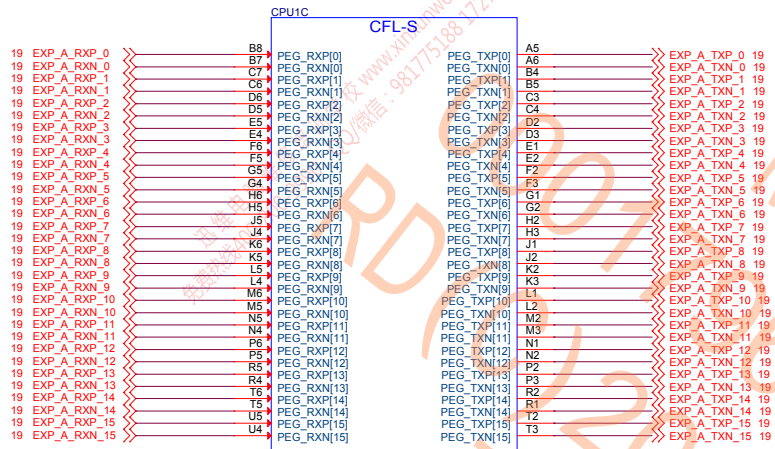
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ZIF-SOCKET1151-HF



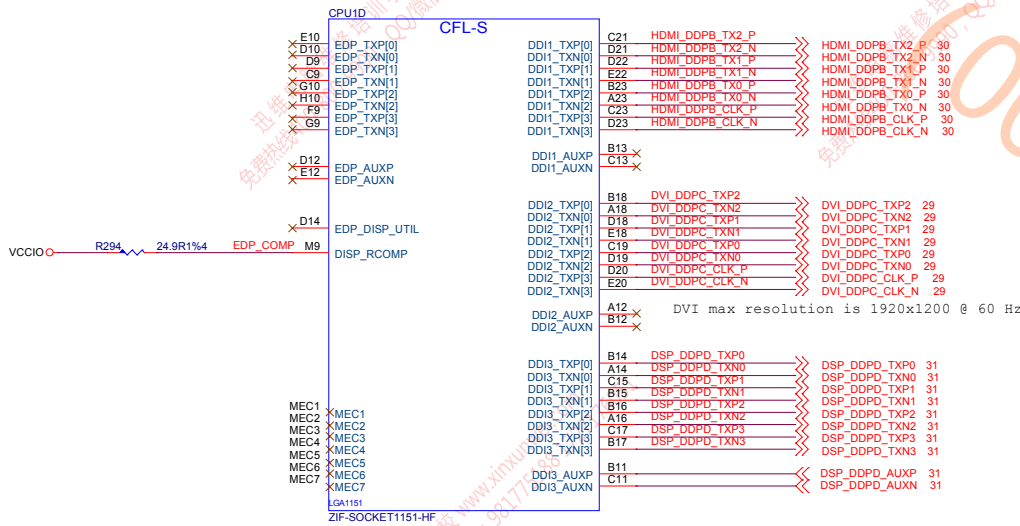
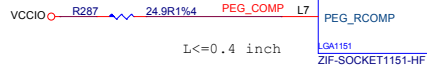
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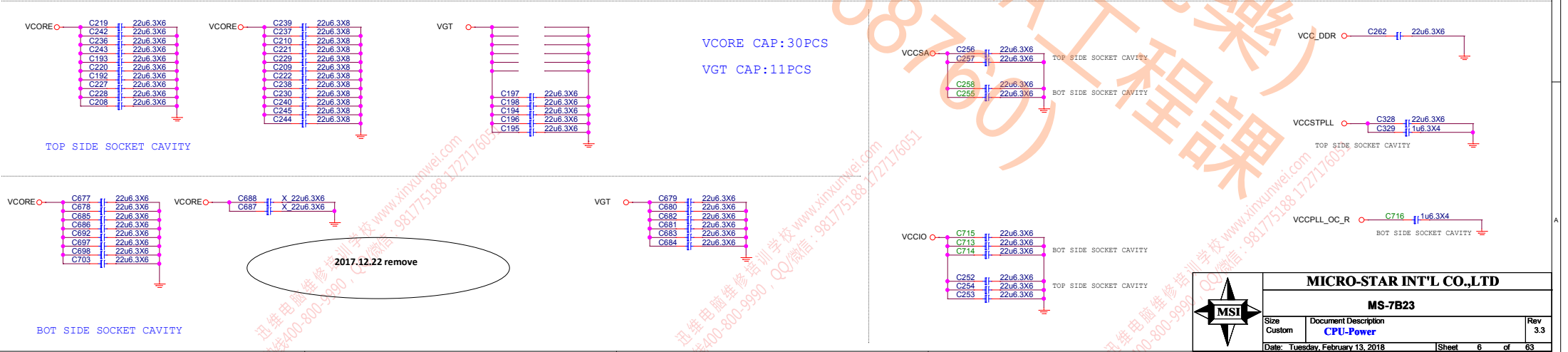
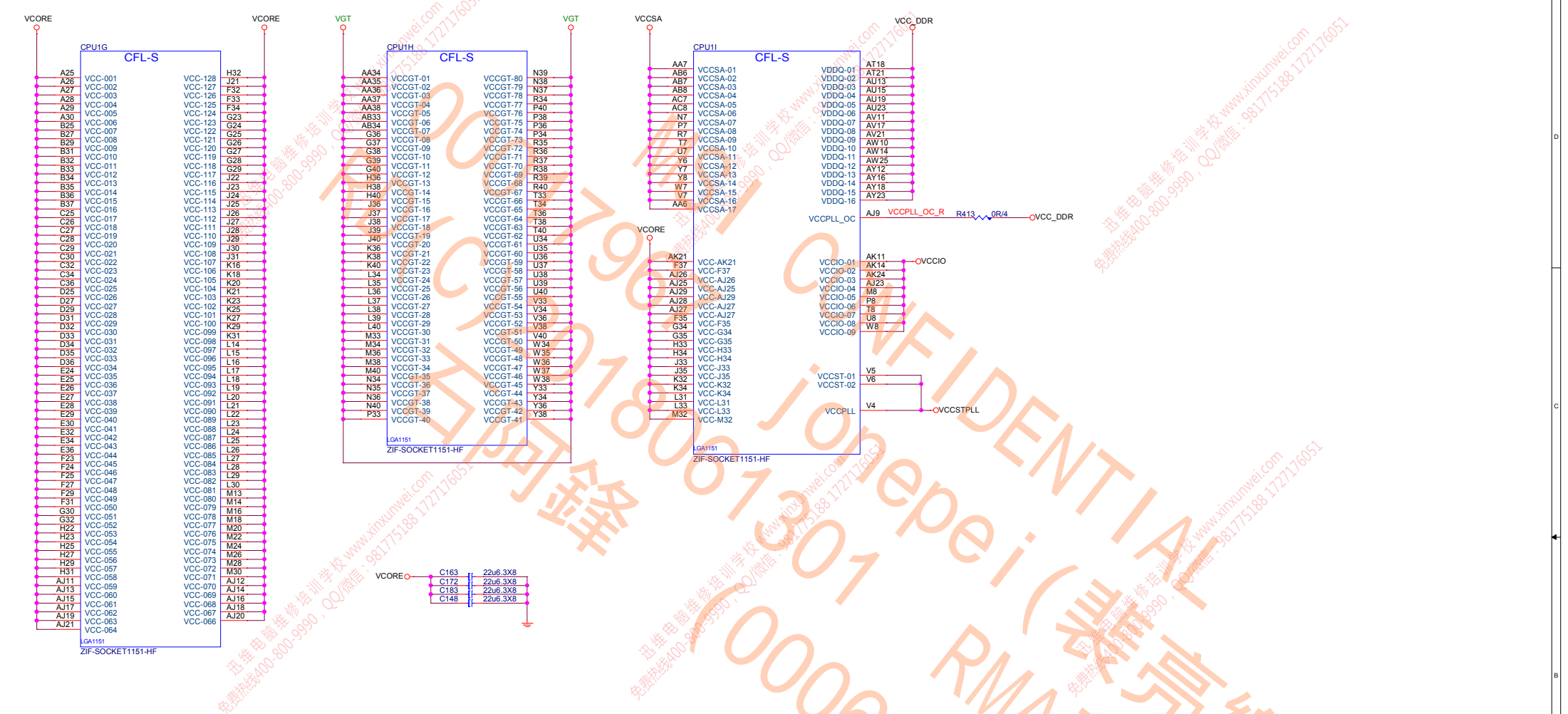
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|----------------------------------|---|---------------|
| Size<br>Custom                   | Document Description<br><b>CPU-Memory</b> | Rev<br>3.3    |
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2017/7/12  
G8 and AY3 can connect directly by CRB 1.0



|                                  |  |         |
|----------------------------------|--|---------|
| <b>MICRO-STAR INT'L CO.,LTD</b>  |  |         |
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| Size Custom                      | Document Description<br><b>CPU-PEG/Display</b> | Rev 3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 5 of 63                                  |         |

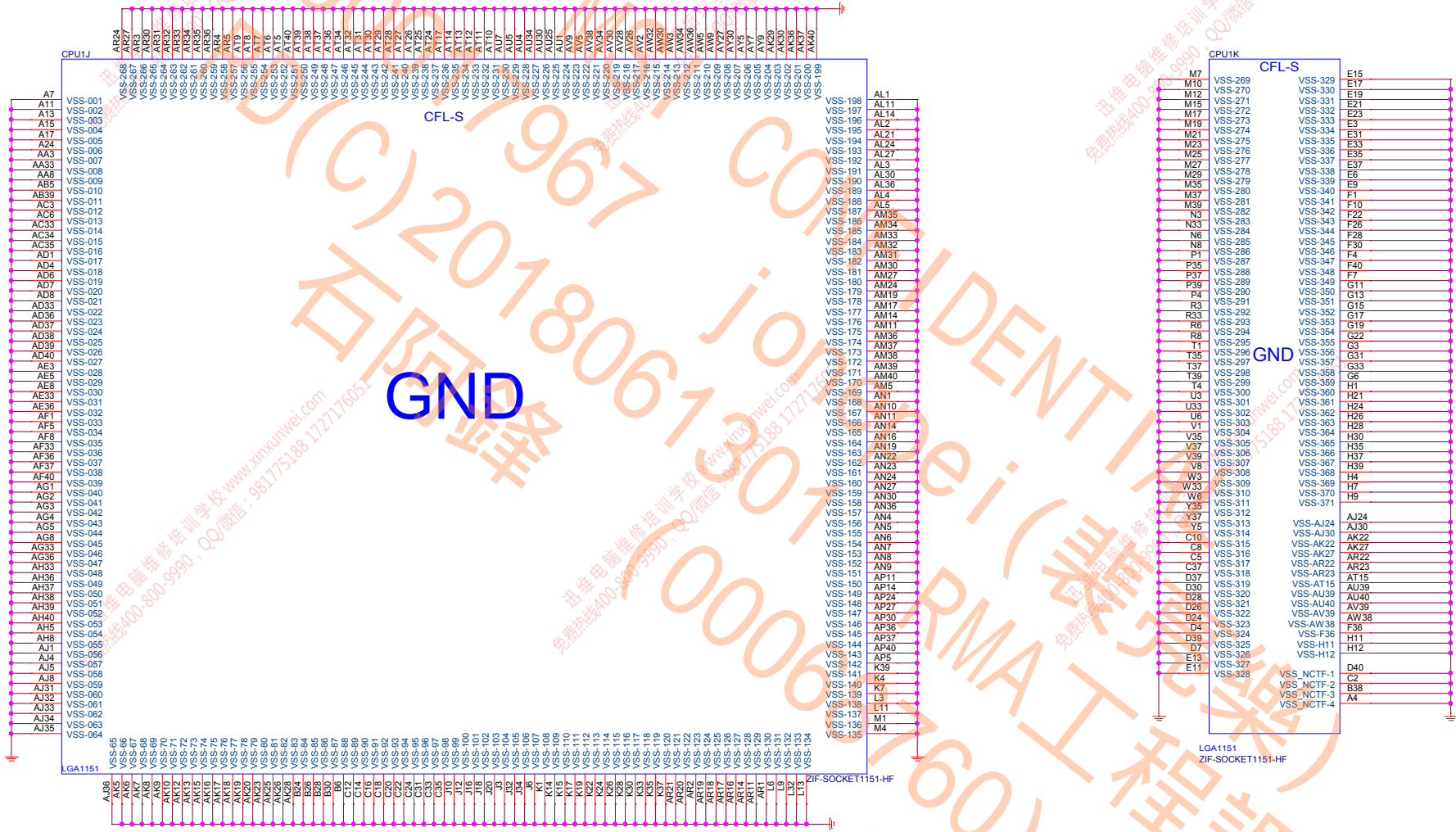


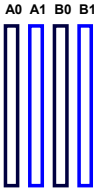
**MSI**

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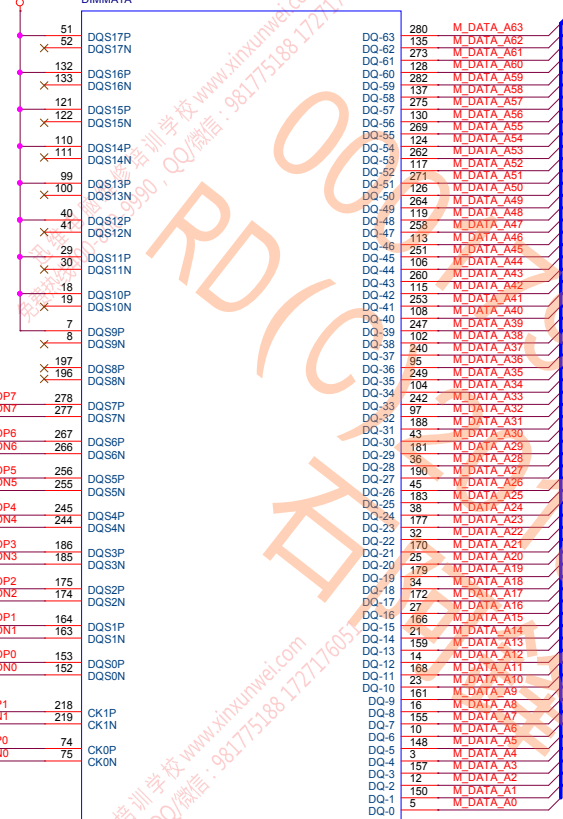
**MS-7B23**

|                                  |                      |         |
|----------------------------------|----------------------|---------|
| Size                             | Document Description | Rev     |
| Custom                           | CPU-Power            | 3.3     |
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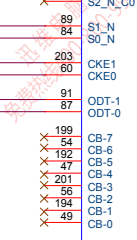




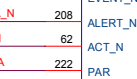
VCC\_DDR DIMM1A1



C2 S3\_N\_C1 S2\_N\_C0



DIMM\_RESET# DIMM1\_EVENT



SAVE\_N\_NC



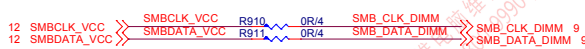
DDRIV-288P\_WHITE-RH-7

DIMM1 (CHANNEL-A)  
ADDRESS = 0:0 [SA1:SA0]

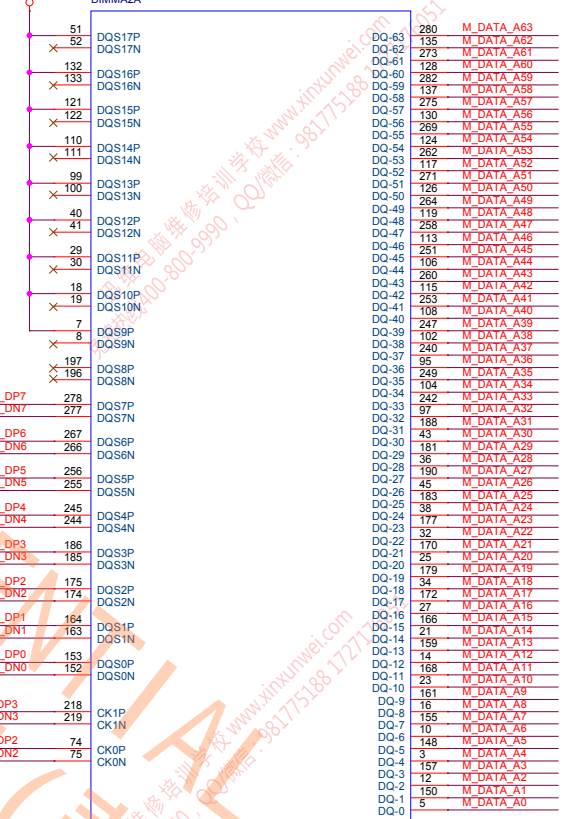
M\_DATA\_A[63:0] 4

M\_MAA\_A[16:0] 4

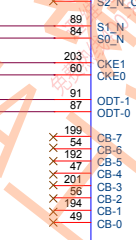
SMB\_CLK\_DIMM SMB\_DATA\_DIMM



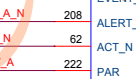
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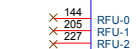
C2 S3\_N\_C1 S2\_N\_C0



DIMM\_RESET# DIMM2\_EVENT



SAVE\_N\_NC



DDRIV-288P\_BLACK-RH-23

DIMM2 (CHANNEL-B)  
ADDRESS = 0:1 [SA1:SA0]

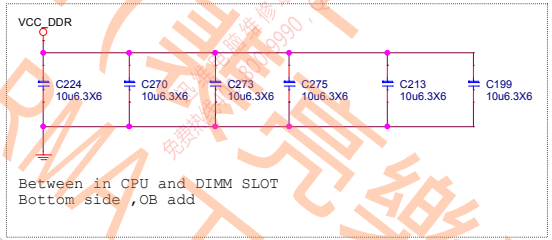
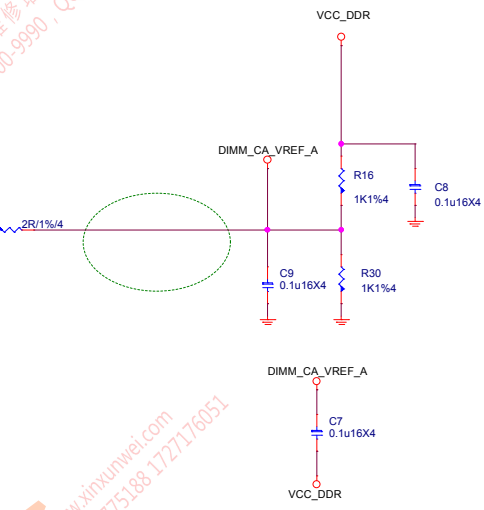
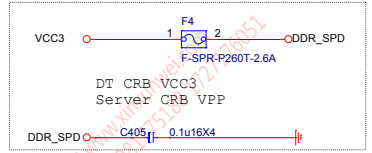
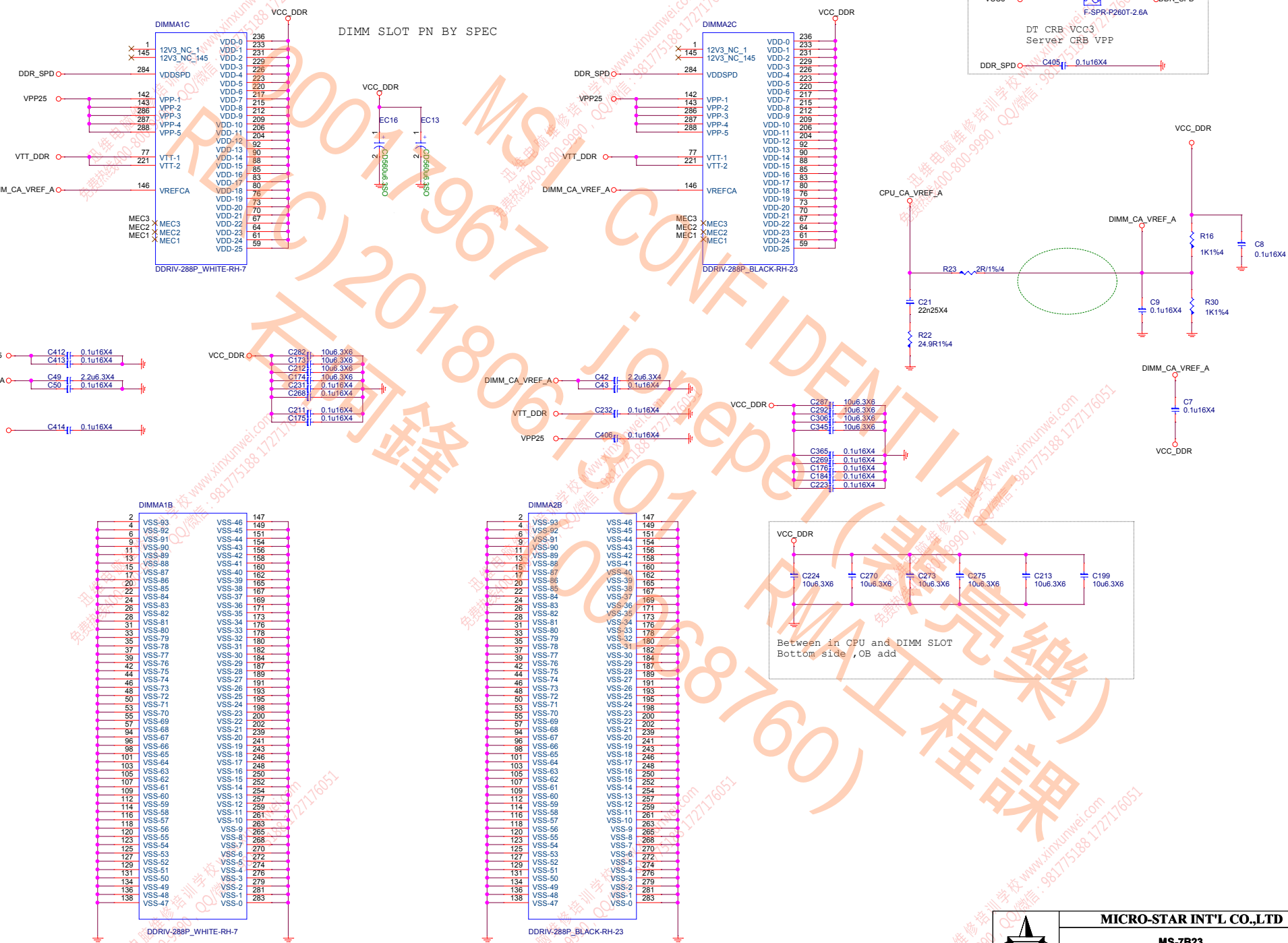


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|--------|----------------------------|---------------|
| Size   | Document Description       | Rev           |
| Custom | DDR4 SLOT-DIMM1/DIMM2      | 3.3           |
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**DIMMA1B**

|     |        |        |     |
|-----|--------|--------|-----|
| 2   | VSS-83 | VSS-46 | 147 |
| 4   | VSS-92 | VSS-45 | 149 |
| 6   | VSS-91 | VSS-44 | 151 |
| 9   | VSS-90 | VSS-42 | 154 |
| 11  | VSS-89 | VSS-41 | 156 |
| 13  | VSS-88 | VSS-40 | 158 |
| 15  | VSS-87 | VSS-39 | 160 |
| 17  | VSS-86 | VSS-38 | 162 |
| 20  | VSS-85 | VSS-37 | 165 |
| 22  | VSS-84 | VSS-36 | 167 |
| 24  | VSS-83 | VSS-35 | 169 |
| 26  | VSS-82 | VSS-34 | 171 |
| 28  | VSS-81 | VSS-33 | 173 |
| 31  | VSS-80 | VSS-32 | 176 |
| 33  | VSS-79 | VSS-31 | 178 |
| 35  | VSS-78 | VSS-30 | 180 |
| 37  | VSS-77 | VSS-29 | 182 |
| 39  | VSS-76 | VSS-28 | 184 |
| 42  | VSS-75 | VSS-27 | 187 |
| 44  | VSS-74 | VSS-26 | 189 |
| 46  | VSS-73 | VSS-25 | 191 |
| 48  | VSS-72 | VSS-24 | 193 |
| 50  | VSS-71 | VSS-23 | 195 |
| 53  | VSS-70 | VSS-22 | 198 |
| 55  | VSS-69 | VSS-21 | 200 |
| 57  | VSS-68 | VSS-20 | 202 |
| 94  | VSS-67 | VSS-19 | 239 |
| 96  | VSS-66 | VSS-18 | 241 |
| 98  | VSS-65 | VSS-17 | 243 |
| 101 | VSS-64 | VSS-16 | 246 |
| 103 | VSS-63 | VSS-15 | 248 |
| 105 | VSS-62 | VSS-14 | 250 |
| 107 | VSS-61 | VSS-13 | 252 |
| 109 | VSS-60 | VSS-12 | 254 |
| 112 | VSS-59 | VSS-11 | 257 |
| 114 | VSS-58 | VSS-10 | 259 |
| 116 | VSS-57 | VSS-9  | 261 |
| 118 | VSS-56 | VSS-8  | 263 |
| 120 | VSS-55 | VSS-7  | 265 |
| 123 | VSS-54 | VSS-6  | 268 |
| 125 | VSS-53 | VSS-5  | 270 |
| 127 | VSS-52 | VSS-4  | 272 |
| 129 | VSS-51 | VSS-3  | 274 |
| 131 | VSS-49 | VSS-2  | 276 |
| 134 | VSS-48 | VSS-1  | 279 |
| 136 | VSS-47 | VSS-0  | 281 |
| 138 | VSS-46 | VSS-0  | 283 |

DDRIV-288P\_WHITE-RH-7

**DIMMA2B**

|     |        |        |     |
|-----|--------|--------|-----|
| 2   | VSS-93 | VSS-46 | 147 |
| 4   | VSS-92 | VSS-45 | 149 |
| 6   | VSS-91 | VSS-44 | 151 |
| 9   | VSS-90 | VSS-42 | 154 |
| 11  | VSS-89 | VSS-41 | 156 |
| 13  | VSS-88 | VSS-40 | 158 |
| 15  | VSS-87 | VSS-39 | 160 |
| 17  | VSS-86 | VSS-38 | 162 |
| 20  | VSS-85 | VSS-37 | 165 |
| 22  | VSS-84 | VSS-36 | 167 |
| 24  | VSS-83 | VSS-35 | 169 |
| 26  | VSS-82 | VSS-34 | 171 |
| 28  | VSS-81 | VSS-33 | 173 |
| 31  | VSS-80 | VSS-32 | 176 |
| 33  | VSS-79 | VSS-31 | 178 |
| 35  | VSS-78 | VSS-30 | 180 |
| 37  | VSS-77 | VSS-29 | 182 |
| 39  | VSS-76 | VSS-28 | 184 |
| 42  | VSS-75 | VSS-27 | 187 |
| 44  | VSS-74 | VSS-26 | 189 |
| 46  | VSS-73 | VSS-25 | 191 |
| 48  | VSS-72 | VSS-24 | 193 |
| 50  | VSS-71 | VSS-23 | 195 |
| 53  | VSS-70 | VSS-22 | 198 |
| 55  | VSS-69 | VSS-21 | 200 |
| 57  | VSS-68 | VSS-20 | 202 |
| 94  | VSS-67 | VSS-19 | 239 |
| 96  | VSS-66 | VSS-18 | 241 |
| 98  | VSS-65 | VSS-17 | 243 |
| 101 | VSS-64 | VSS-16 | 246 |
| 103 | VSS-63 | VSS-15 | 248 |
| 105 | VSS-62 | VSS-14 | 250 |
| 107 | VSS-61 | VSS-13 | 252 |
| 109 | VSS-60 | VSS-12 | 254 |
| 112 | VSS-59 | VSS-11 | 257 |
| 114 | VSS-58 | VSS-10 | 259 |
| 116 | VSS-57 | VSS-9  | 261 |
| 118 | VSS-56 | VSS-8  | 263 |
| 120 | VSS-55 | VSS-7  | 265 |
| 123 | VSS-54 | VSS-6  | 268 |
| 125 | VSS-53 | VSS-5  | 270 |
| 127 | VSS-52 | VSS-4  | 272 |
| 129 | VSS-51 | VSS-3  | 274 |
| 131 | VSS-49 | VSS-2  | 276 |
| 134 | VSS-48 | VSS-1  | 279 |
| 136 | VSS-47 | VSS-0  | 281 |
| 138 | VSS-46 | VSS-0  | 283 |

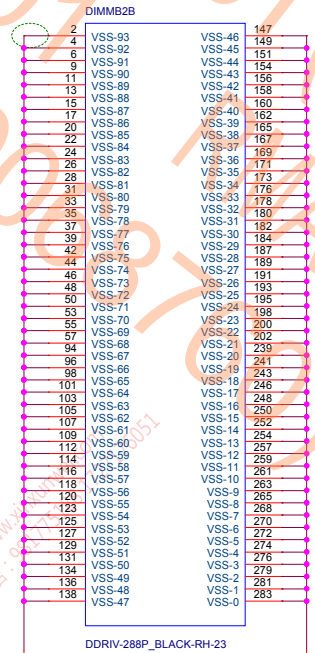
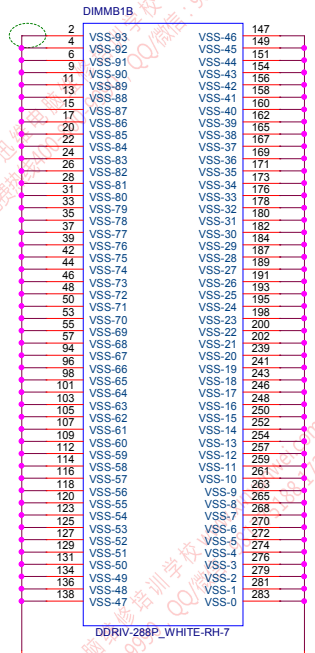
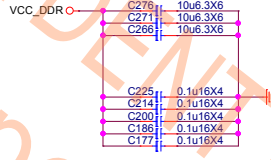
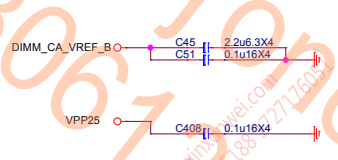
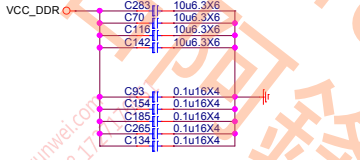
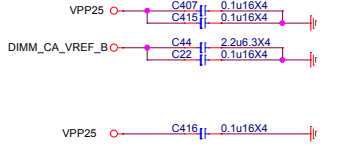
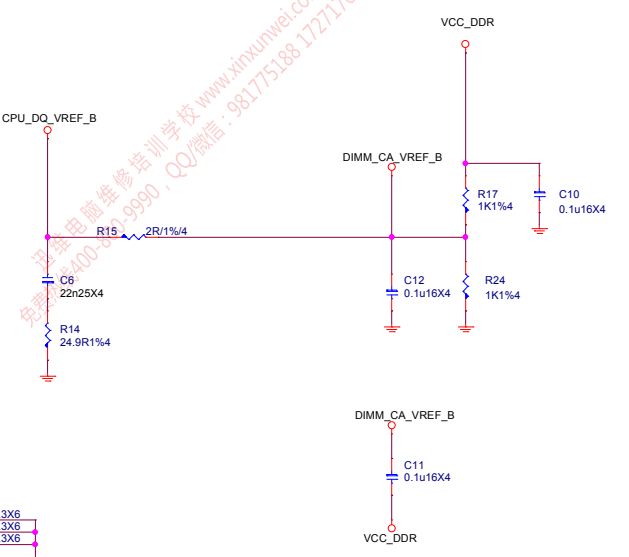
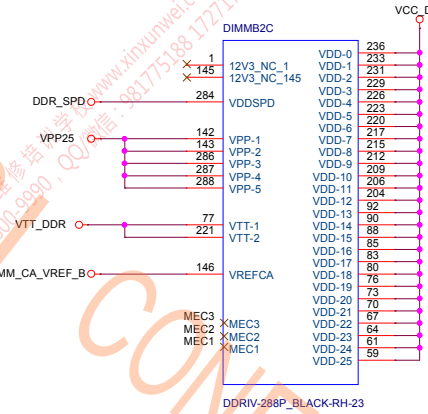
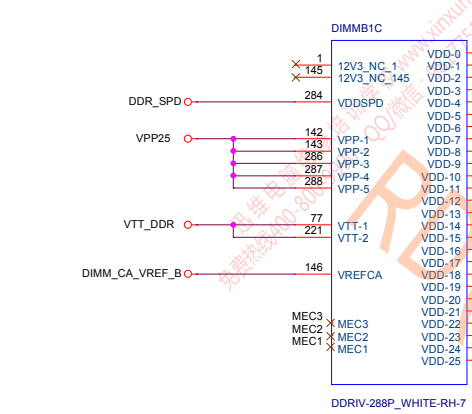
DDRIV-288P\_BLACK-RH-23

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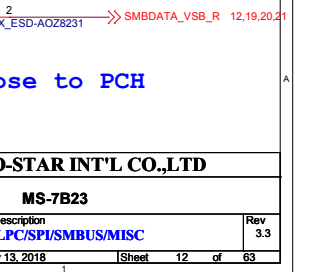
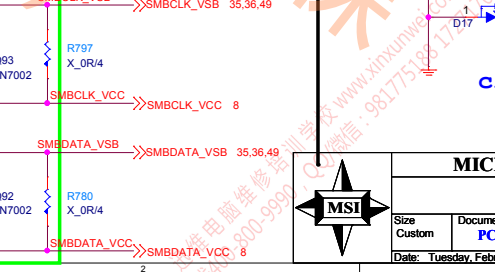
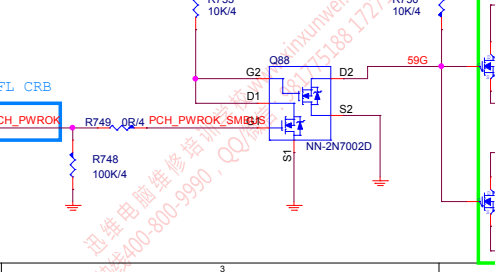
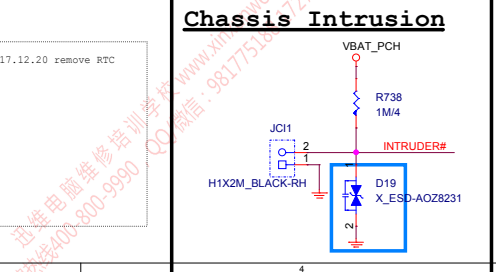
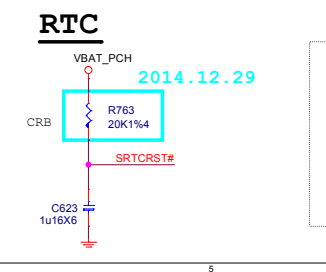
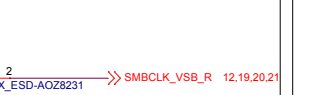
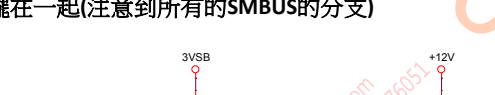
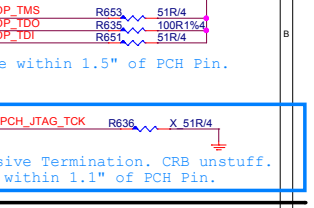
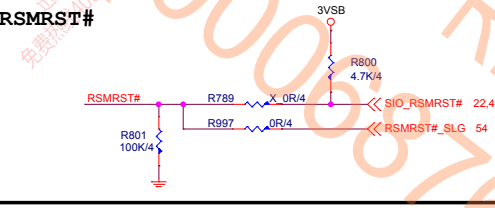
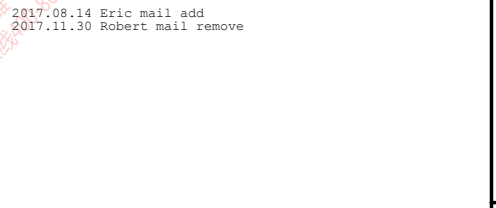
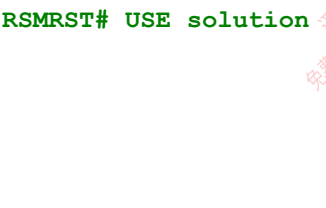
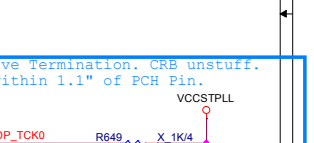
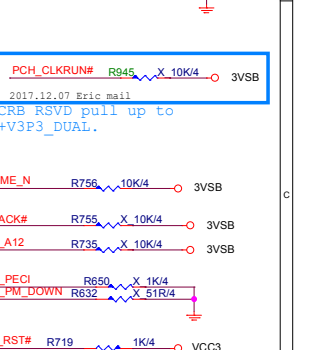
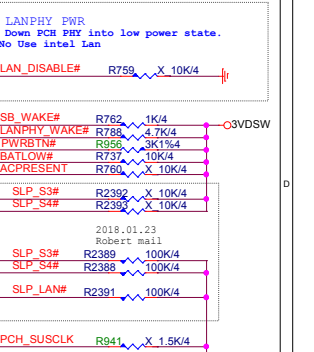
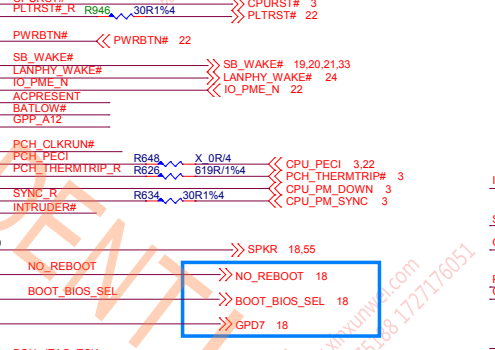
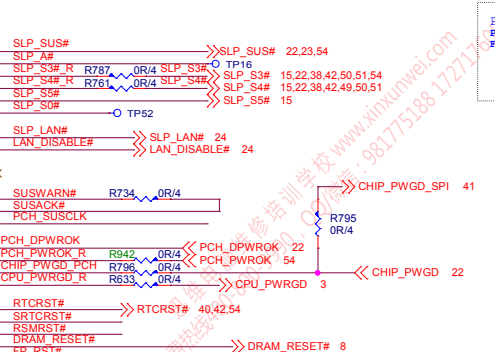
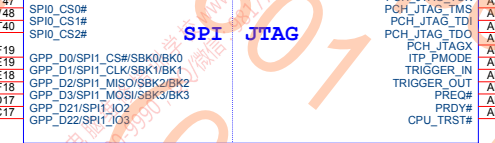
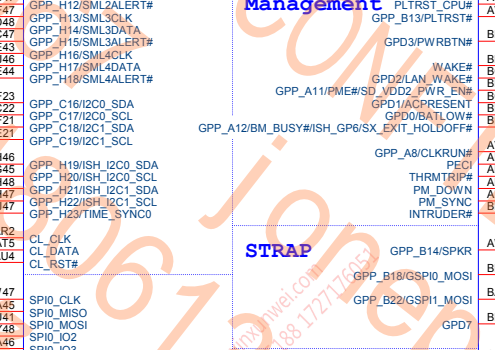
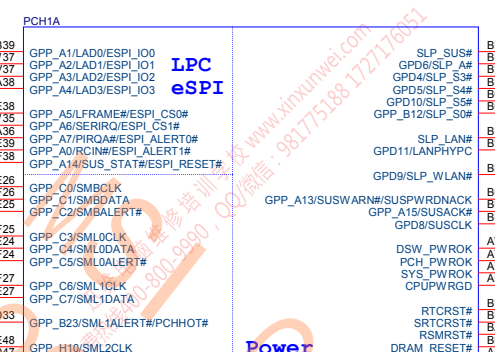
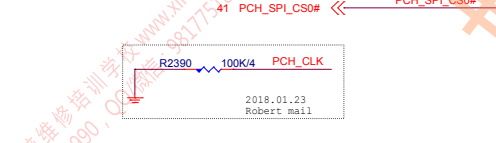
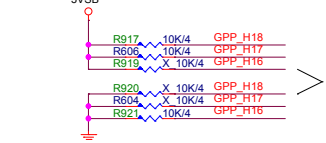
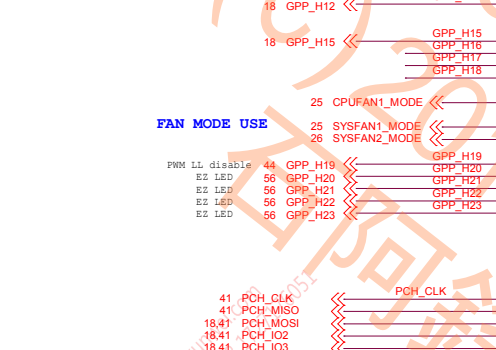
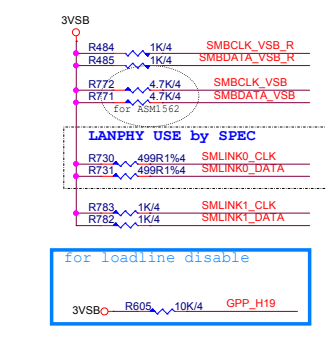
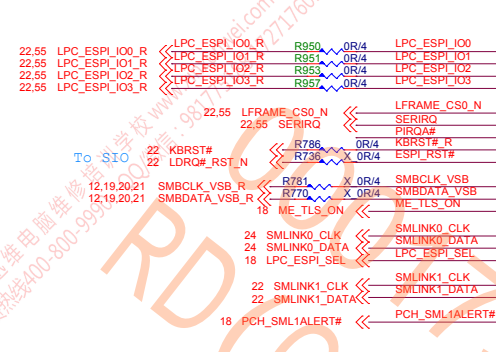
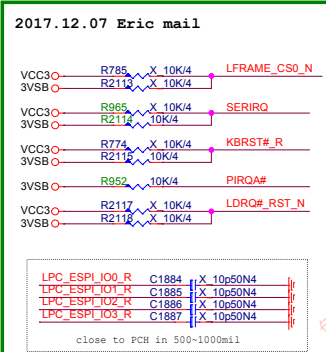
**MS-7B23**

Size Custom Document Description **DDR4-POWER/GND-1** Rev 3.3

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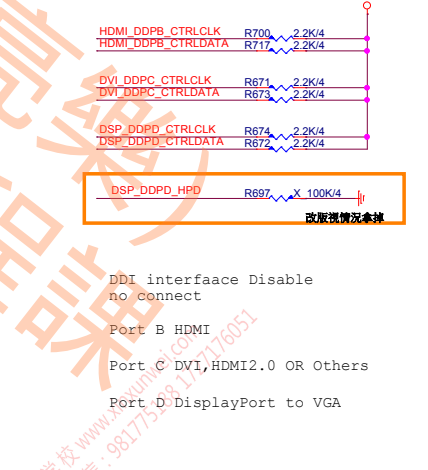
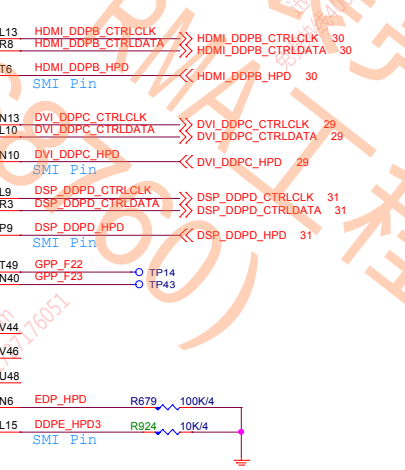
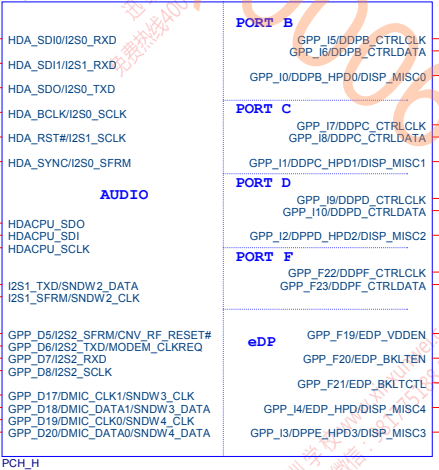
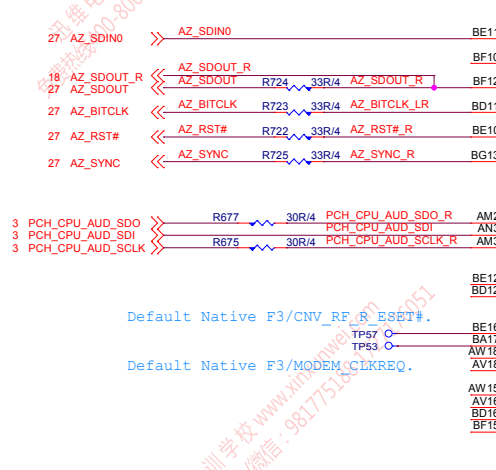
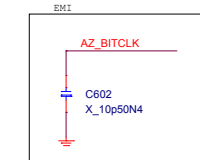
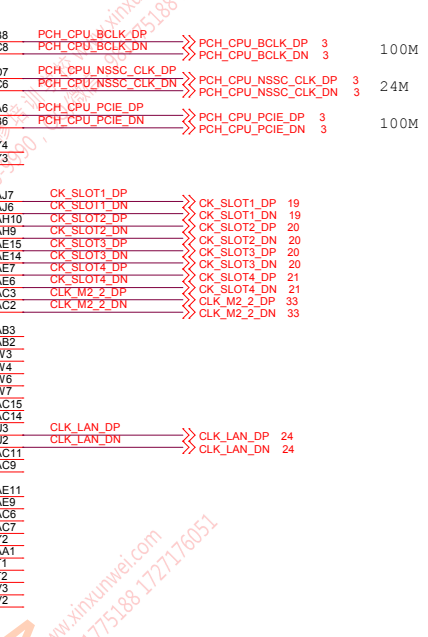
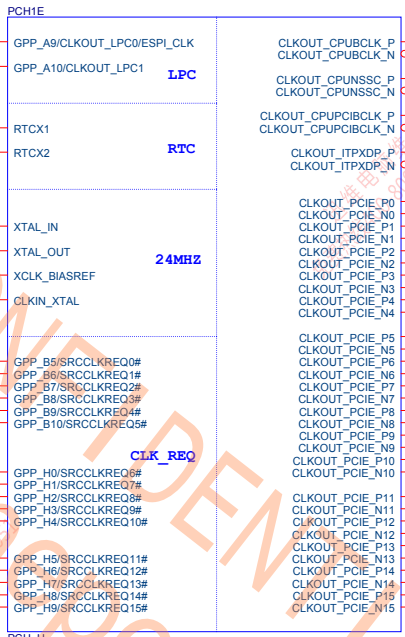
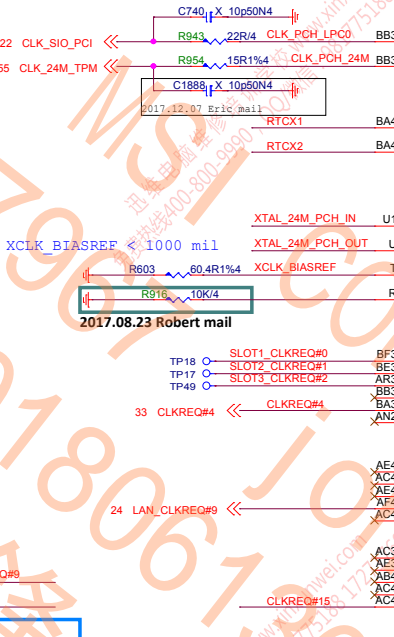
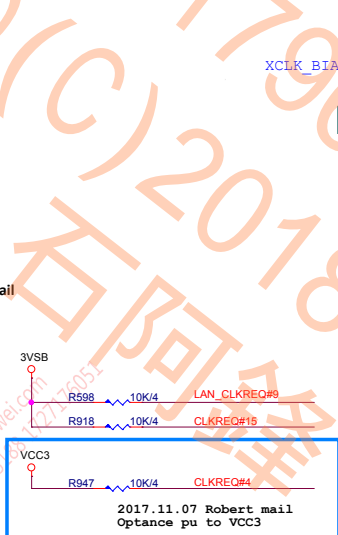
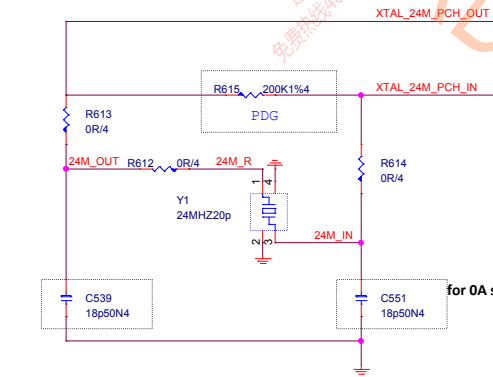
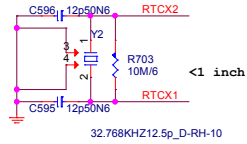



|                                  |   |            |
|----------------------------------|---|------------|
| <b>MSI</b>                       |   |            |
| <b>MICRO-STAR INT'L CO.,LTD</b>  |   |            |
| <b>MS-7B23</b>                   |   |            |
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# RTC Block

Close to PCH

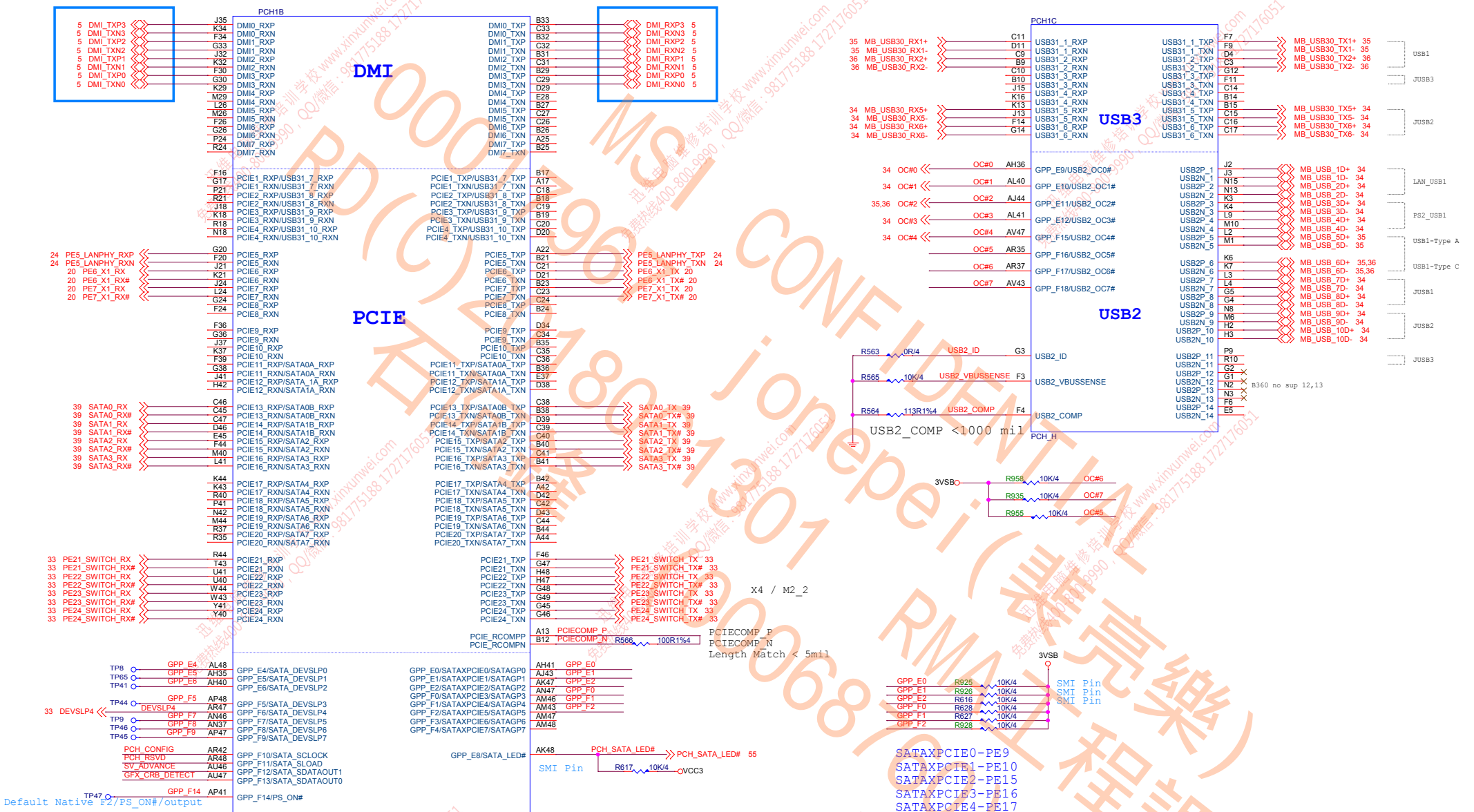




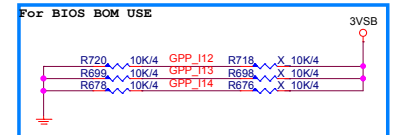
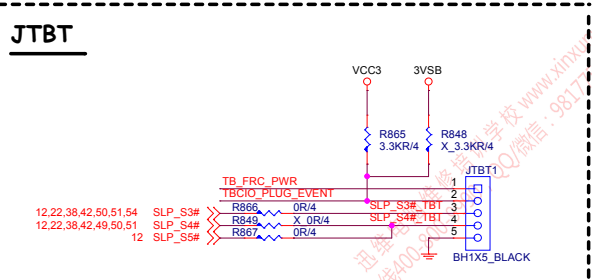
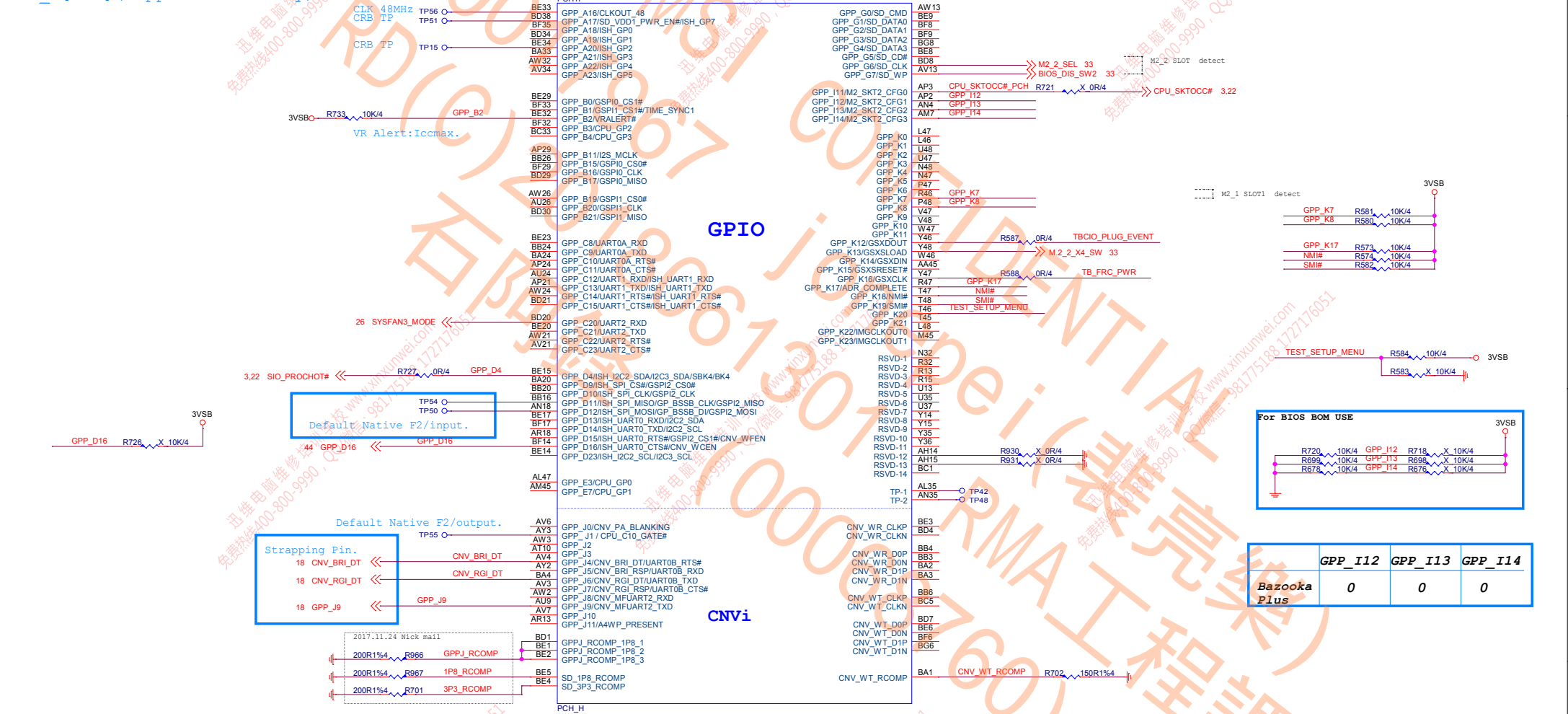
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**MS-7B23**

|                                  |  |         |
|----------------------------------|--|---------|
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GPIO (SMI/NMI) :  
 GPP\_B14, GPP\_B20, GPP\_B23  
 GPP\_C[23:22]  
 GPP\_D[4:0]  
 GPP\_E[8:0]  
 GPP\_I[3:0]  
 GPP\_G[7:0] (Support SMI# only)



|              | GPP_I12 | GPP_I13 | GPP_I14 |
|--------------|---------|---------|---------|
| Bazooka Plus | 0       | 0       | 0       |

**MSI**

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**MS-7B23**

Size Custom Document Description **PCH-GPIO/USB0#/SATASTRAP** Rev 3.3

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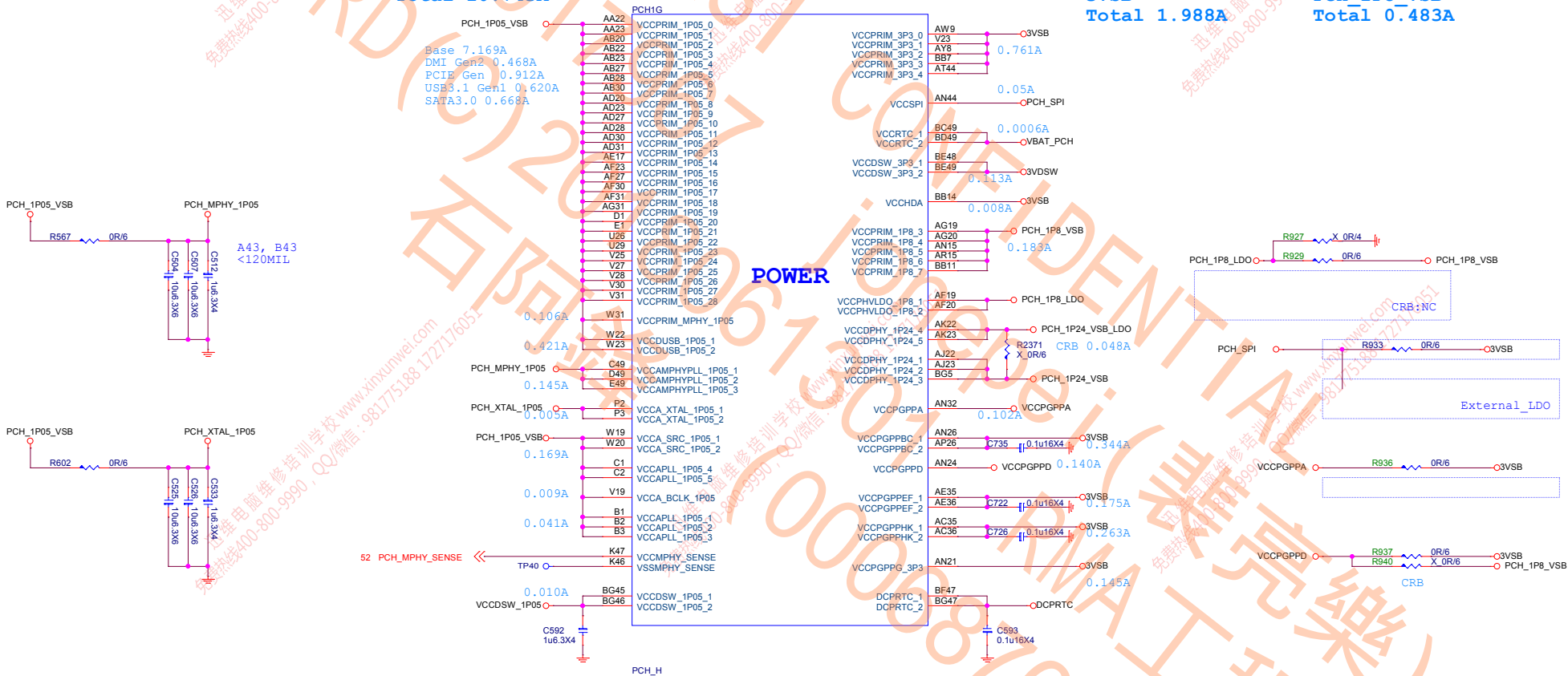
迅维电脑维修培训学校 www.xinwei.com  
 免费热线:400-800-9990, QQ:微信: 981775188 1727176051

**PCH\_1P05\_VSB**  
**Total 10.743A**

Base 7.169A  
 DMI Gen2 0.468A  
 PCIe Gen 0.912A  
 USB3.1 Gen1 0.620A  
 SATA3.0 0.668A

**3VSB**  
**Total 1.988A**

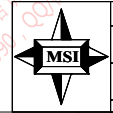
**PCH\_1P8\_VSB**  
**Total 0.483A**



|                                  |  |            |
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| <b>MICRO-STAR INT'L CO.,LTD</b>  |  |            |
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# VSS

| PCH_H | VSS     | PCH_H   | VSS  |
|-------|---------|---------|------|
| AL12  | VSS_72  | VSS_123 | BC13 |
| AL17  | VSS_73  | VSS_124 | BC15 |
| AL21  | VSS_74  | VSS_125 | BC19 |
| AL24  | VSS_75  | VSS_126 | BC24 |
| AL26  | VSS_76  | VSS_127 | BC26 |
| AL29  | VSS_77  | VSS_128 | BC31 |
| AL33  | VSS_78  | VSS_129 | BC35 |
| AL37  | VSS_79  | VSS_130 | BC40 |
| AL38  | VSS_80  | VSS_131 | BC45 |
| AM1   | VSS_81  | VSS_132 | BD43 |
| AM18  | VSS_82  | VSS_133 | BE44 |
| AM32  | VSS_83  | VSS_134 | BF1  |
| AM49  | VSS_84  | VSS_135 | BF2  |
| AN12  | VSS_85  | VSS_136 | BF3  |
| AN16  | VSS_86  | VSS_137 | BF48 |
| AN38  | VSS_87  | VSS_138 | BF49 |
| AP4   | VSS_88  | VSS_139 | BG17 |
| AP46  | VSS_89  | VSS_140 | BG2  |
| AR12  | VSS_90  | VSS_141 | BG22 |
| AR16  | VSS_91  | VSS_142 | BG25 |
| AR34  | VSS_92  | VSS_143 | BG28 |
| AR38  | VSS_93  | VSS_144 | BG3  |
| AT1   | VSS_94  | VSS_145 | BG33 |
| AT16  | VSS_95  | VSS_146 | BG37 |
| AT18  | VSS_96  | VSS_147 | BG4  |
| AT21  | VSS_97  | VSS_148 | BG48 |
| AT24  | VSS_98  | VSS_149 | C12  |
| AT26  | VSS_99  | VSS_150 | C25  |
| AT29  | VSS_100 | VSS_151 | C30  |
| AT32  | VSS_101 | VSS_152 | C4   |
| AT34  | VSS_102 | VSS_153 | C48  |
| AT45  | VSS_103 | VSS_154 | C5   |
| AV11  | VSS_104 | VSS_155 | D12  |
| AV39  | VSS_105 | VSS_156 | D16  |
| AW10  | VSS_106 | VSS_157 | D17  |
| AW4   | VSS_107 | VSS_158 | D30  |
| AW40  | VSS_108 | VSS_159 | D33  |
| AW46  | VSS_109 | VSS_160 | D8   |
| B47   | VSS_110 | VSS_161 | E10  |
| B48   | VSS_111 | VSS_162 | E13  |
| B49   | VSS_112 | VSS_163 | E18  |
| BA12  | VSS_113 | VSS_164 | E17  |
| BA14  | VSS_114 | VSS_165 | E19  |
| BA44  | VSS_115 | VSS_166 | E22  |
| BA5   | VSS_116 | VSS_167 | E24  |
| BA6   | VSS_117 | VSS_168 | E26  |
| BB41  | VSS_118 | VSS_169 | E31  |
| BB9   | VSS_119 | VSS_170 | E33  |
| BC10  | VSS_120 | VSS_171 | E35  |
|       | VSS_121 | VSS_172 | E40  |
|       | VSS_122 | VSS_173 |      |
| A2    | VSS_0   |         |      |
| A28   | VSS_1   |         |      |
| A3    | VSS_2   |         |      |
| A37   | VSS_3   |         |      |
| A4    | VSS_4   |         |      |
| A45   | VSS_5   |         |      |
| A46   | VSS_6   |         |      |
| A48   | VSS_7   |         |      |
| A5    | VSS_8   |         |      |
| A8    | VSS_9   |         |      |
| AA    | VSS_10  |         |      |
| AA20  | VSS_12  |         |      |
| AA25  | VSS_13  |         |      |
| AA27  | VSS_14  |         |      |
| AA30  | VSS_15  |         |      |
| AA31  | VSS_16  |         |      |
| AA49  | VSS_18  |         |      |
| AA5   | VSS_19  |         |      |
| AB19  | VSS_20  |         |      |
| AB25  | VSS_21  |         |      |
| AB31  | VSS_22  |         |      |
| AC12  | VSS_24  |         |      |
| AC33  | VSS_25  |         |      |
| AC38  | VSS_26  |         |      |
| AC4   | VSS_27  |         |      |
| AD1   | VSS_28  |         |      |
| AD19  | VSS_30  |         |      |
| AD2   | VSS_31  |         |      |
| AD25  | VSS_33  |         |      |
| AD49  | VSS_34  |         |      |
| AE12  | VSS_35  |         |      |
| AE38  | VSS_37  |         |      |
| AE4   | VSS_38  |         |      |
| AE46  | VSS_39  |         |      |
| AF22  | VSS_41  |         |      |
| AF28  | VSS_42  |         |      |
| AG1   | VSS_43  |         |      |
| AG22  | VSS_45  |         |      |
| AG25  | VSS_46  |         |      |
| AG27  | VSS_47  |         |      |
| AG28  | VSS_48  |         |      |
| AG30  | VSS_50  |         |      |
| AH12  | VSS_51  |         |      |
| AH17  | VSS_52  |         |      |
| AH38  | VSS_54  |         |      |
| AH39  | VSS_55  |         |      |
| AJ20  | VSS_56  |         |      |
| AJ25  | VSS_58  |         |      |
| AJ28  | VSS_59  |         |      |
| AK20  | VSS_60  |         |      |
| AK31  | VSS_61  |         |      |
| AK39  | VSS_63  |         |      |
| AK25  | VSS_64  |         |      |
| AK27  | VSS_65  |         |      |
| AK30  | VSS_67  |         |      |
| AK31  | VSS_68  |         |      |
| AK4   | VSS_69  |         |      |
| AK48  | VSS_71  |         |      |

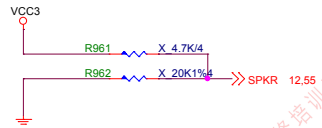


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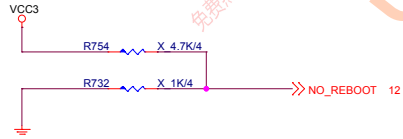
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| Size Custom                      | Document Description<br><b>PCH-GND</b> | Rev 3.3 |
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TOP Swap



Internal pull-down 20K is disabled after PLTRST#

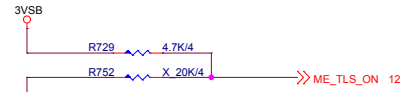
No Reboot



0 : DISABLE (Default)  
1 : ENABLE

Internal pull-down 20K is disabled after PLTRST#

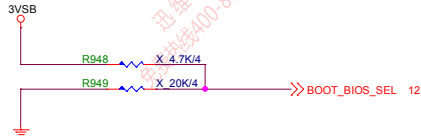
AMT and SBA with confidentiality



0 : DISABLE  
1 : ENABLE (Default)

Internal pull-down 20K is disabled after RSMRST

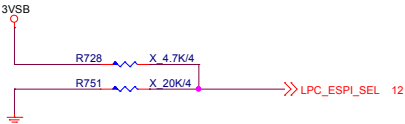
Boot BIOS



0 : SPI  
1 : LPC

Internal pull-down 20K is disabled after PLTRST

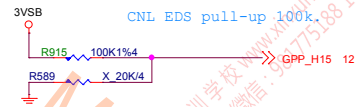
LPC eSPI Mode



0 : LPC  
1 : eSPI

Internal pull-down 20K is disabled after RSMRST

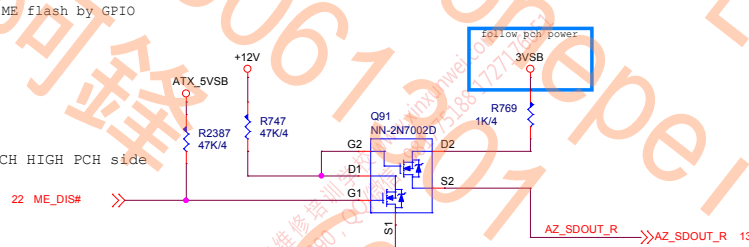
Reserved



Reserved



HDA\_SDO



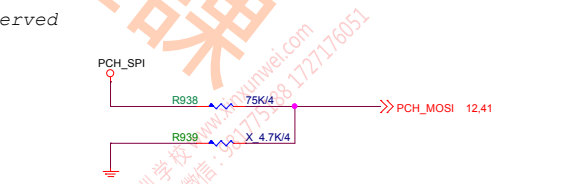
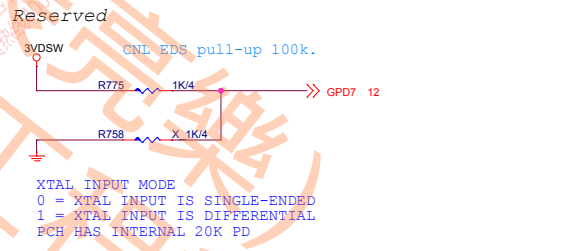
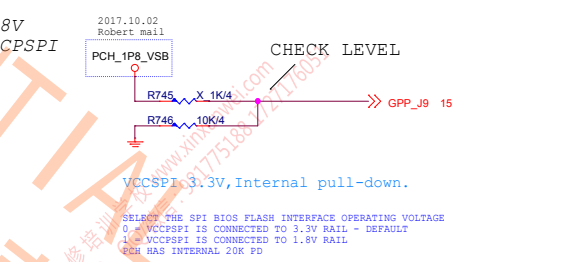
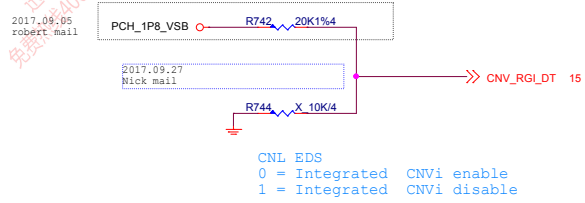
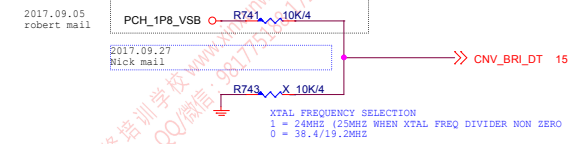
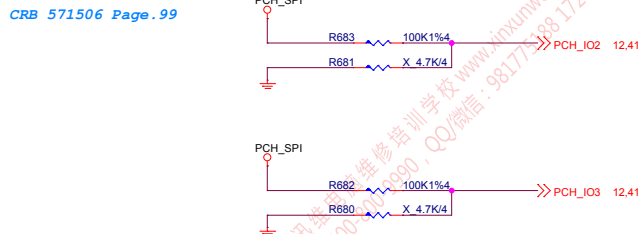
eSPI FLASH SHARING MODE



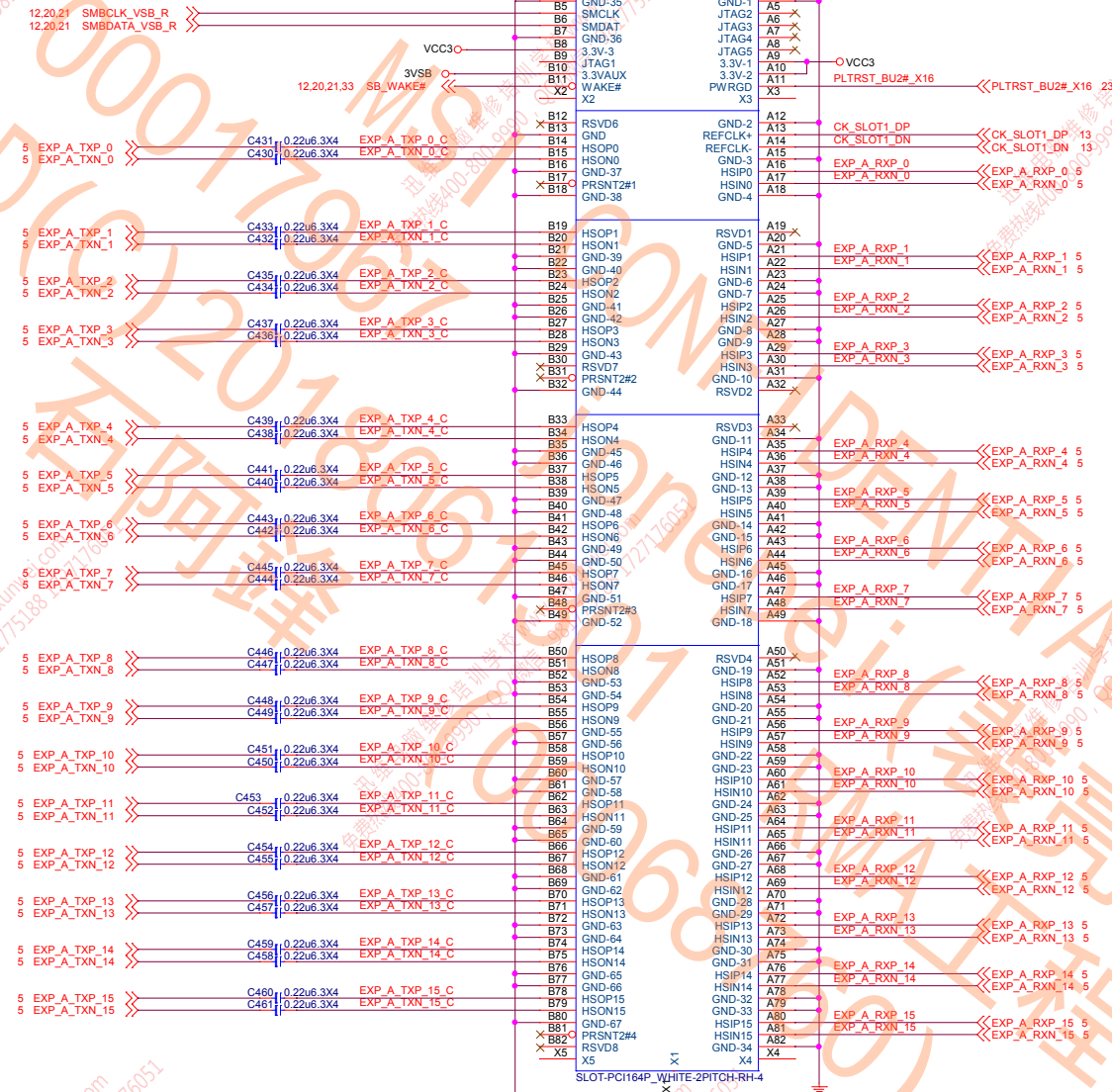
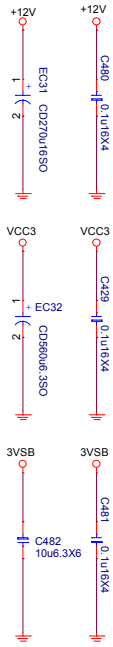
0 : MASTER ATTACHED FLASH SHARING  
1 : SLAVE ATTACHED FLASH SHARING


Internal pull-down 20K is disabled after RSMRST

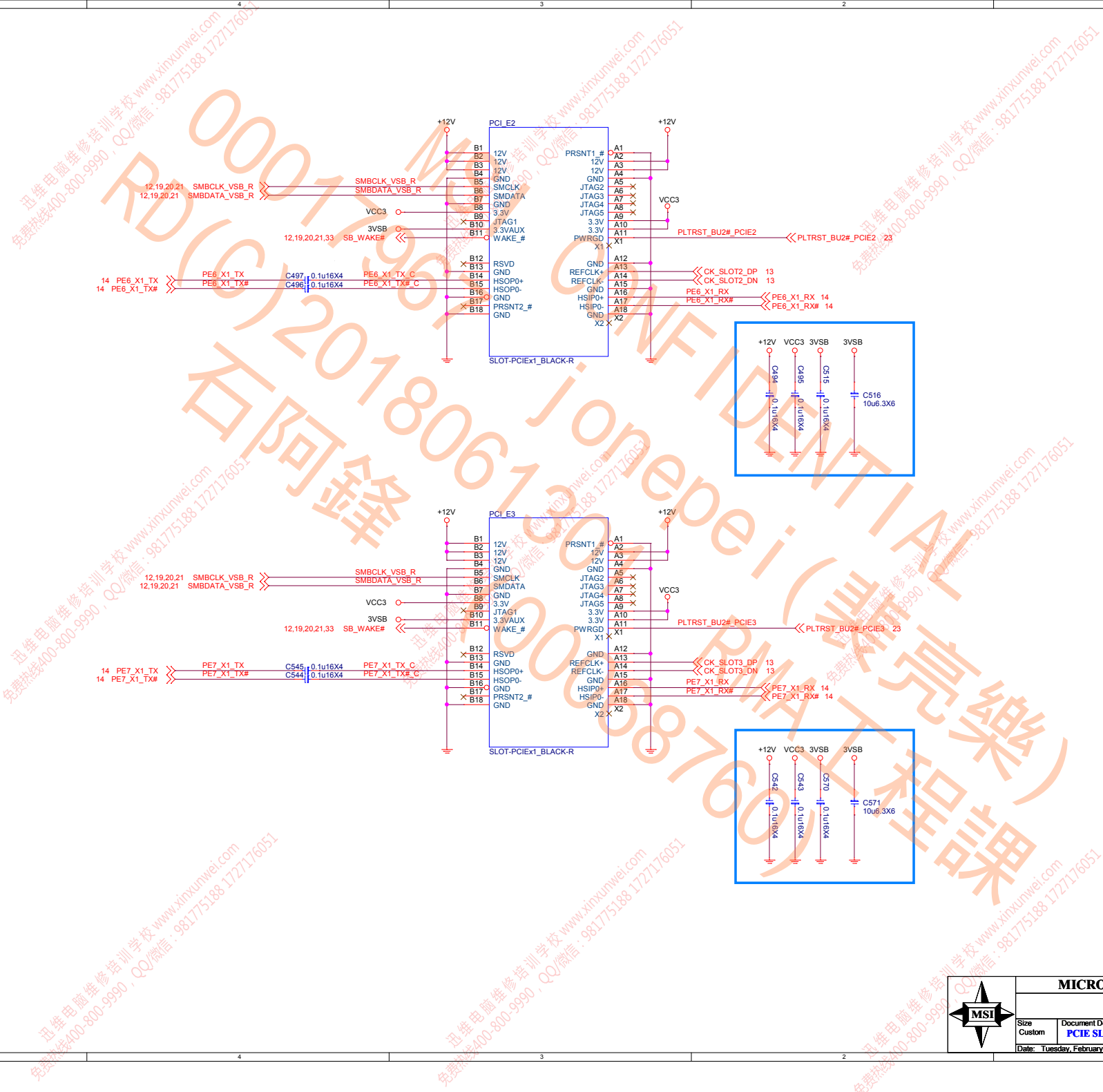
Reserved



|                                  |  |            |
|----------------------------------|--|------------|
| <b>MSI</b>                       |  |            |
| <b>MICRO-STAR INT'L CO.,LTD</b>  |  |            |
| <b>MS-7B23</b>                   |  |            |
| Size<br>Custom                   | Document Description<br><b>PCH-Strap</b> | Rev<br>3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 18                                 | of 63      |

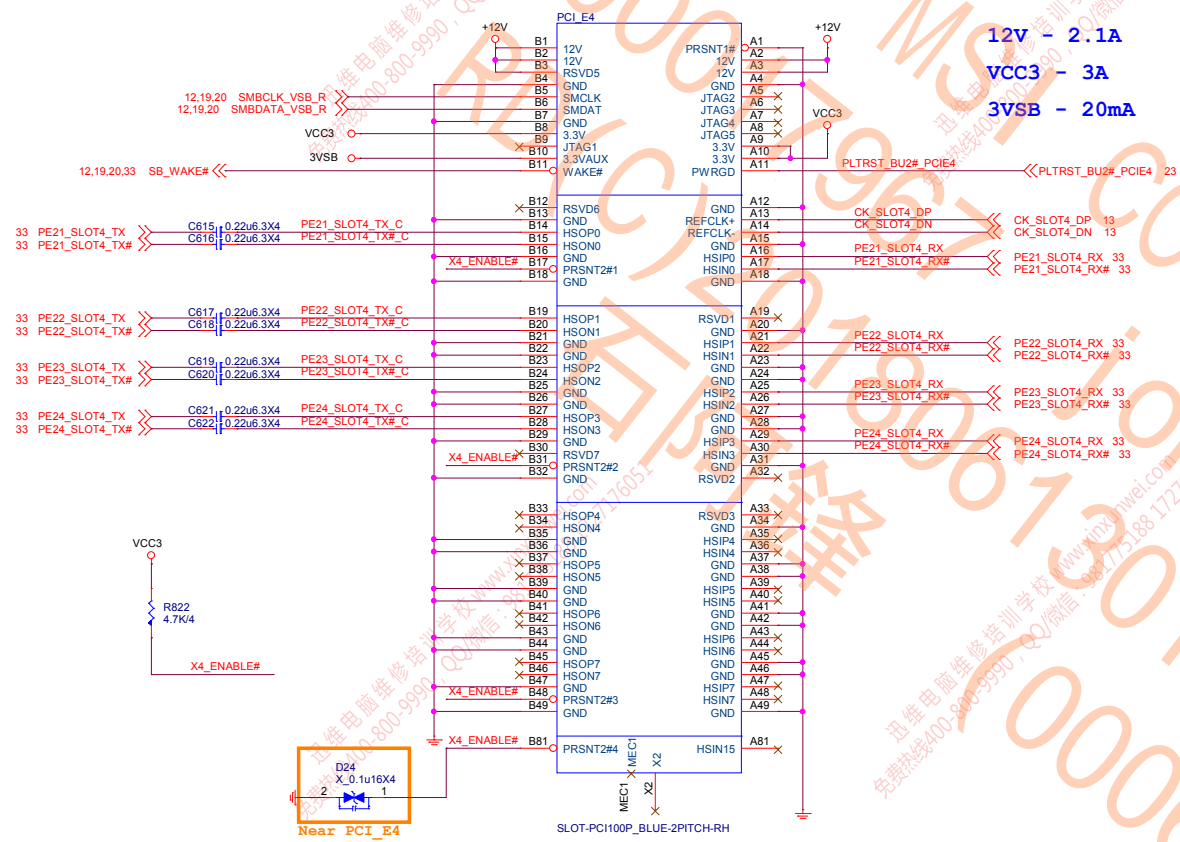


|   |                            |       |                                 |       |
|---|----------------------------|-------|---------------------------------|-------|
|  |                            |       | <b>MICRO-STAR INT'L CO.,LTD</b> |       |
| <b>MS-7B23</b>  |                            |       |                                 |       |
| Size  | Document Description       |       |                                 | Rev   |
| Custom  | PCI SLOT-CPU(X16)          |       |                                 | 3.3   |
| Date:   | Tuesday, February 13, 2018 | Sheet | 19                              | of 63 |

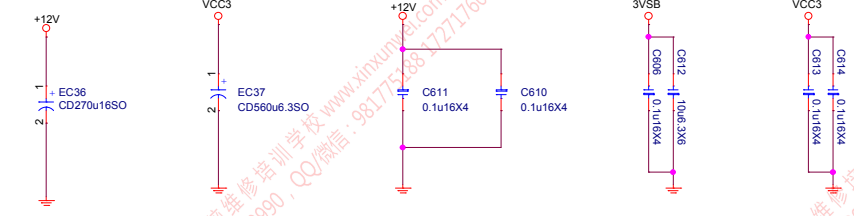


|                                 |                            |                |
|---------------------------------|----------------------------|----------------|
| <b>MICRO-STAR INT'L CO.,LTD</b> |                            |                |
| <b>MS-7B23</b>                  |                            |                |
| Size                            | Document Description       | Rev            |
| Custom                          | <b>PCIe SLOT-PCH(X1)</b>   | 3.3            |
| Date:                           | Tuesday, February 13, 2018 | Sheet 20 of 63 |

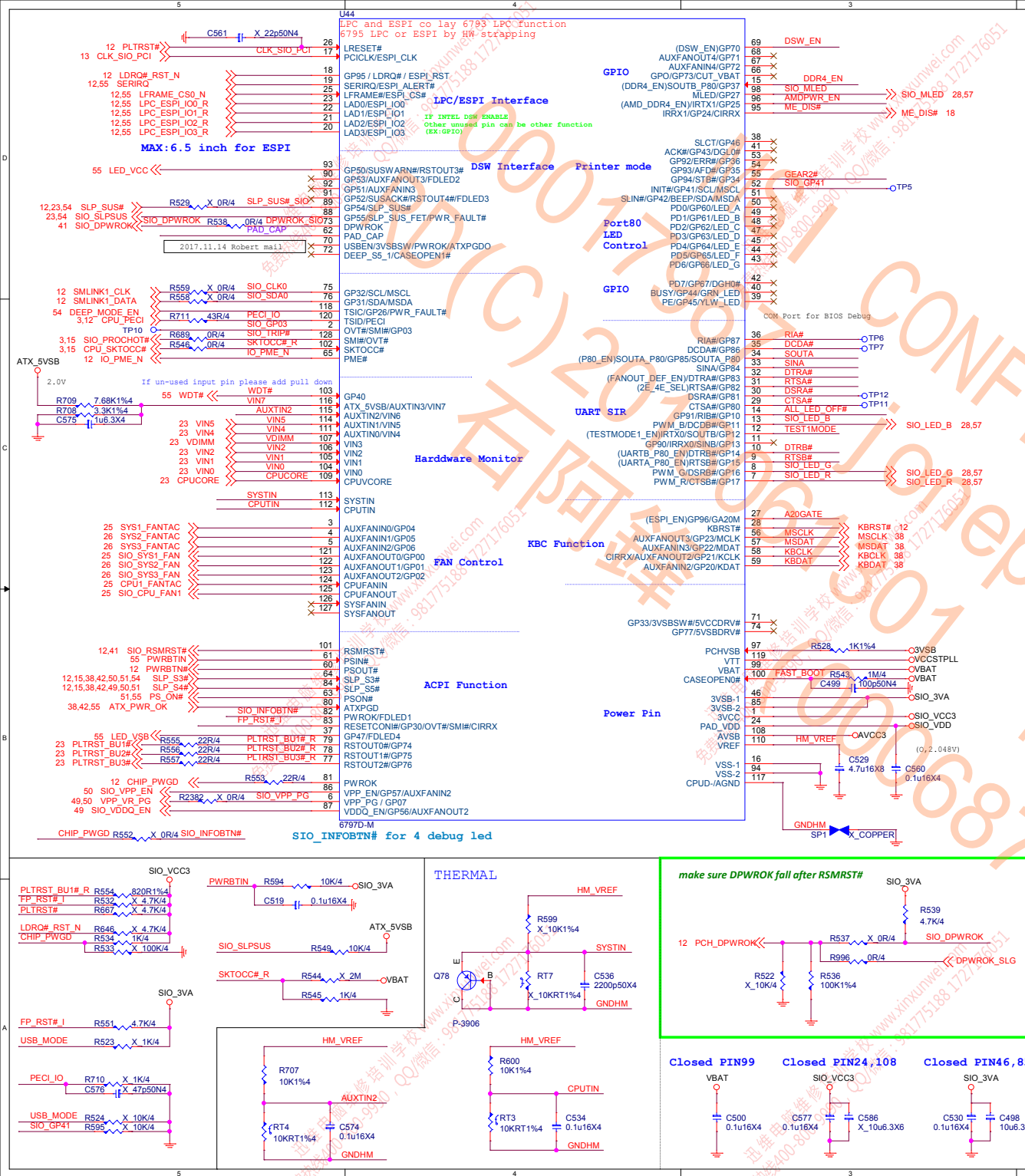
**PCI Express X4 Slot**



**Near PCI\_E4**



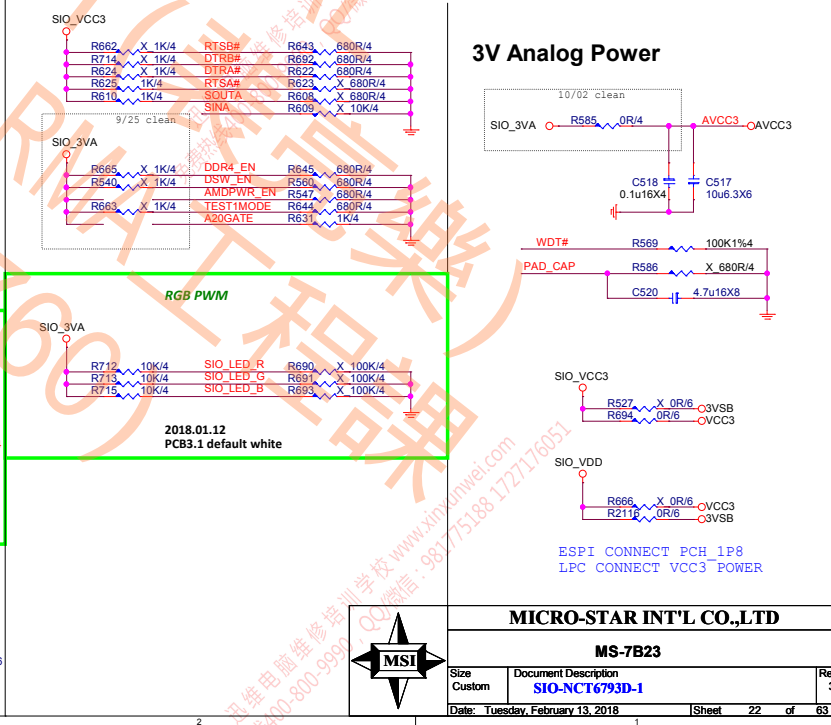
|                                  |   |            |
|----------------------------------|---|------------|
| <b>MSI</b>                       |   |            |
| <b>MICRO-STAR INT'L CO.,LTD</b>  |   |            |
| <b>MS-7B23</b>                   |   |            |
| Size<br>Custom                   | Document Description<br><b>PCI SLOT-PCH(X4)</b> | Rev<br>3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 21 of 63                                  |            |



**POWER ON STRAPPING PIN FOR NCT6797**

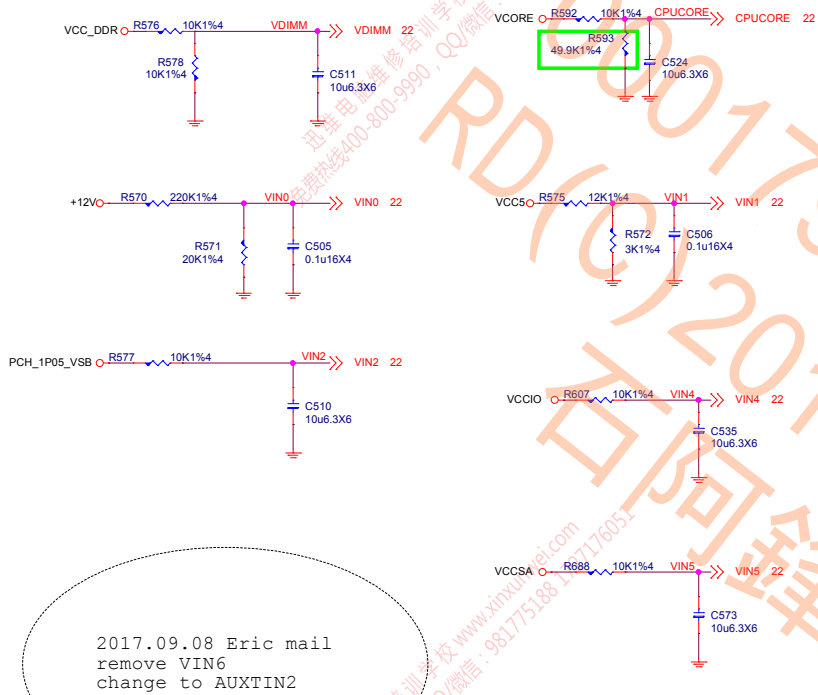
| PIN | NAME          | Circuit NAME | 0                   | 1                  | Strap Point     |
|-----|---------------|--------------|---------------------|--------------------|-----------------|
| 9   | UARTA_P80_EN  | RTSB#        | DISABLE UARTA80     | ENABLE UARTA80     | LRESET          |
| 10  | UARTB_P80_EN  | DTRB#        | DISABLE UARTB80     | ENABLE UARTB80     | LRESET          |
| 12  | TESTMODE_EN   | TEST1MODE    | DISABLE TEST1MODE   | ENABLE TEST1MODE   | LRESET          |
| 15  | DDR4_EN       | DDR4_EN      | Disable             | Enable             |                 |
| 27  | ESPI_EN       | A20GATE      | LPC                 | ESPI               |                 |
| 31  | 2E_4E_SEL     | RTSA#        | I/O ADDRESS 2E      | I/O ADDRESS 4E     | LRESET          |
| 32  | FANOUT_DEF_EN | DTRA#        | default 50%         | 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 |

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

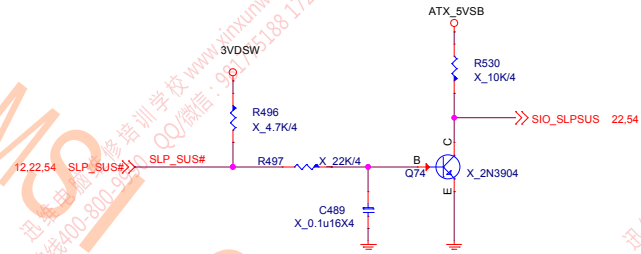


## HW Monitor - Voltage

SIO HM Voltage voer 2V will not detect

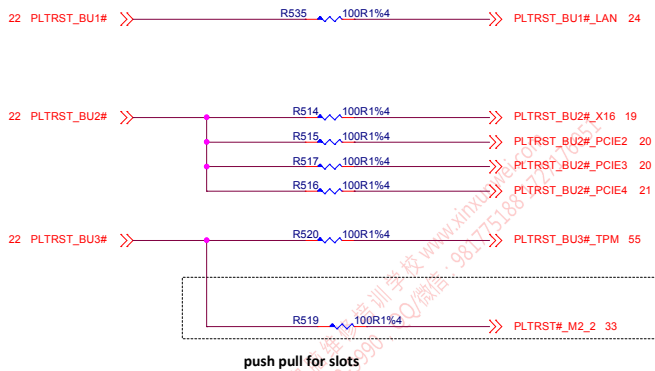


## SLP\_SUS Co-lay circuit



## PLTRST#

oper drain for onboard chip



## SERIAL PORT 1

2017.09.25  
remove JCOM1



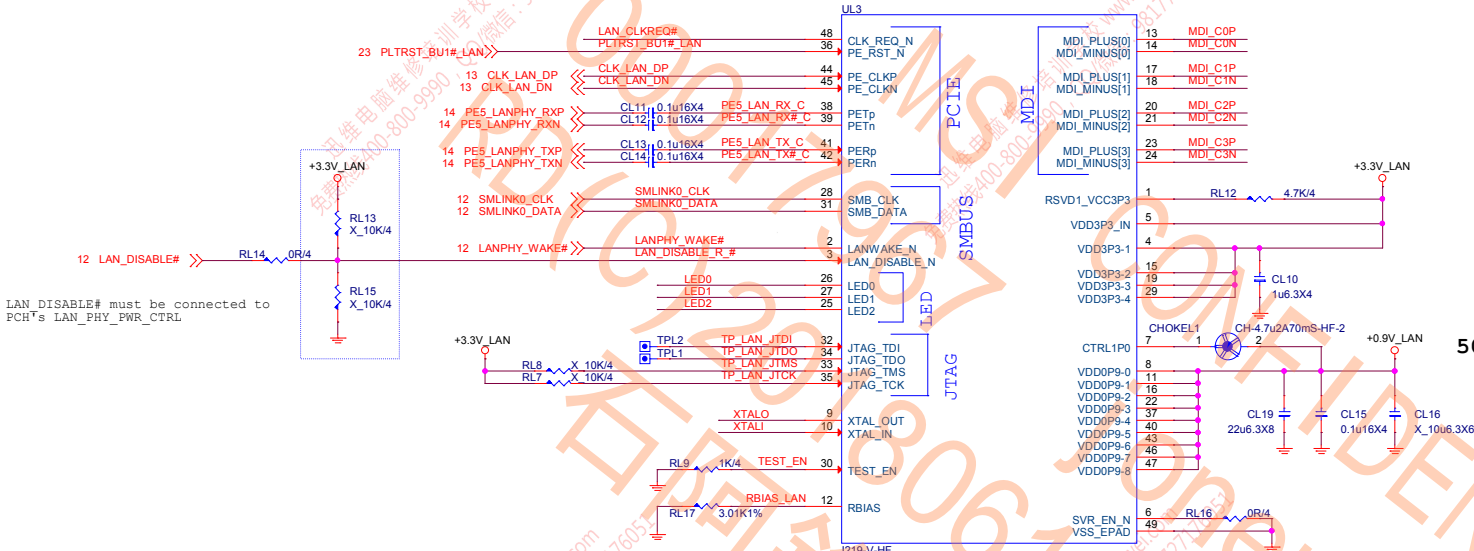
MICRO-STAR INT'L CO.,LTD

MS-7B23

|                                  |  |            |
|----------------------------------|--|------------|
| Size<br>Custom                   | Document Description<br>SIO-NCT6793D-2 | Rev<br>3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 23                               | of 63      |

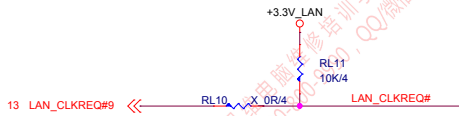
# Intel Lan- i219

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



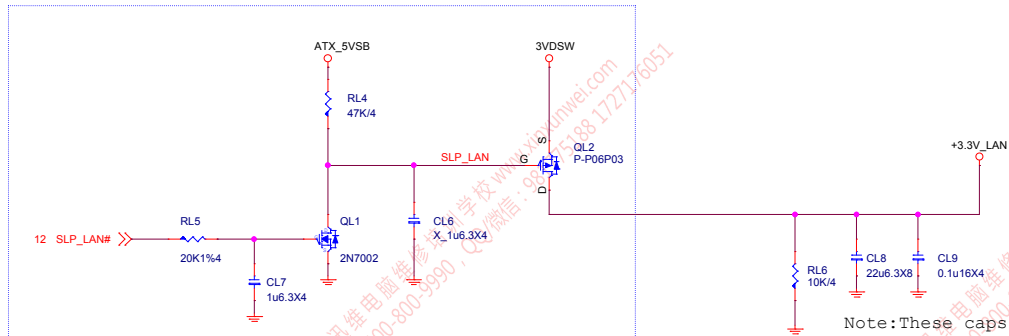
LAN\_DISABLE# must be connected to PCH's LAN\_PHY\_FWR\_CTRL

PCH's PCIECLKRQ<n> port must be mapped to PCH's PET/R<n+1>port. If CLK\_REQ\_N is not used, pin48 is pulled up 10K to 3.3V LAN



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

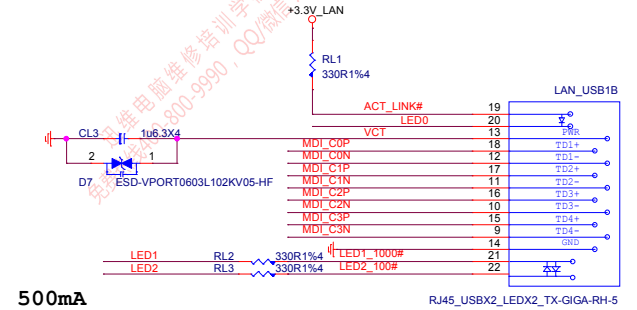
support WOL from Deep Sx:  
Power source from 3VA (DSW power) & make sure MAX current is enough to support i218/i219.



Note: These caps closed to PHY

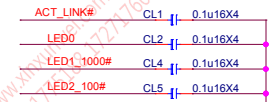
**+3.3V LAN**  
I218: 132mA  
I219: 542mW

## LAN Connector

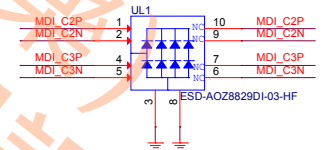
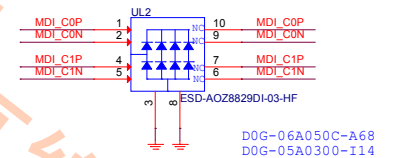


500mA

For EMI



UL2&UL3 close to connector



Do not pair MDI0 and MDI1 on the same TVS device (avoid LAN POE connecting issue). Other pairing combination is ok.

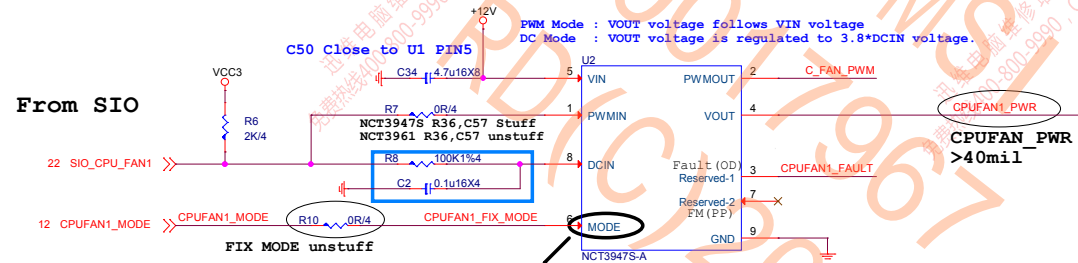


|                                  |                                       |         |
|----------------------------------|---------------------------------------|---------|
| MICRO-STAR INT'L CO.,LTD         |                                       |         |
| MS-7B23                          |                                       |         |
| Size Custom                      | Document Description LAN - Intel I219 | Rev 3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 24                              | of 63   |

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

2.GPIO可以由BIOS切换 PWM/DC MODE

From SIO



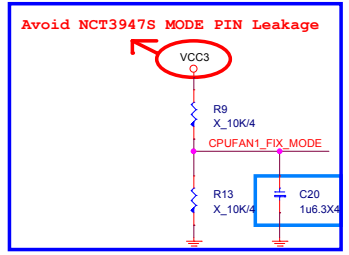
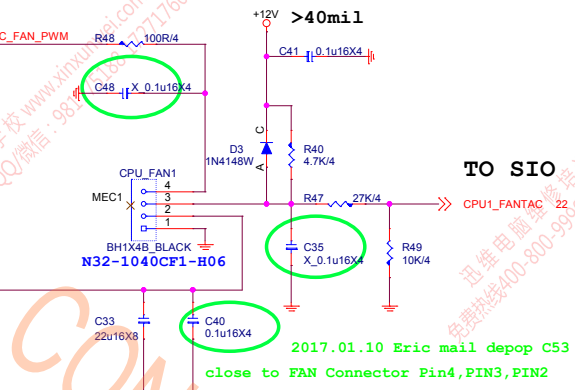
GPIO Control

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

Internall pull up 1.65V

colay NCT3961

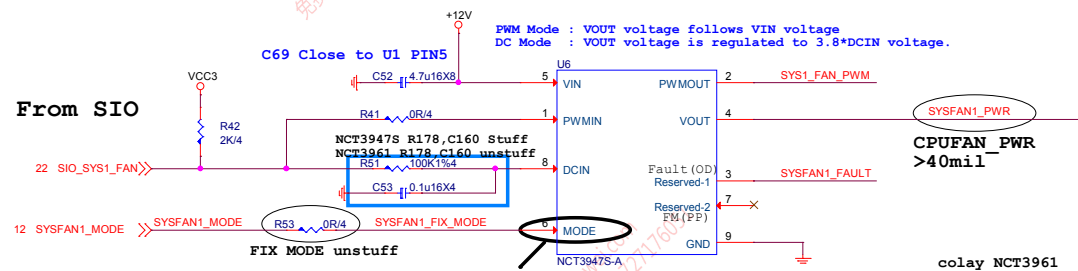
| OCSET    | R1    |                   |
|----------|-------|-------------------|
| 1.2~1.8A | 100K  | default           |
| 2.2~2.8A | 49.9K | OC SET By FM SPEC |
| 3.2~3.8A | 10K   | 20170428          |



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

2.GPIO可以由BIOS切换 PWM/DC MODE

From SIO



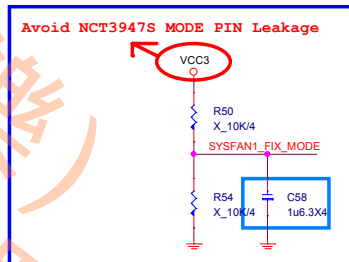
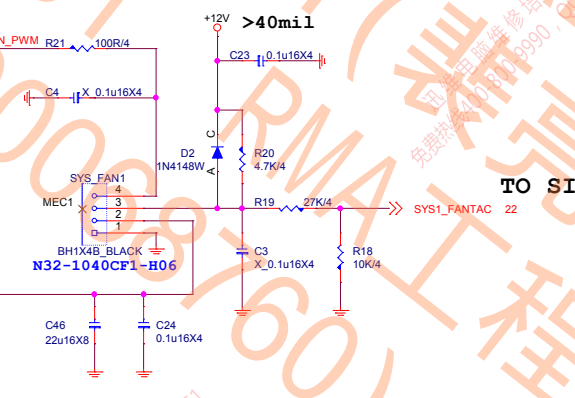
GPIO Control

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

Internal pull up 1.65V

colay NCT3961

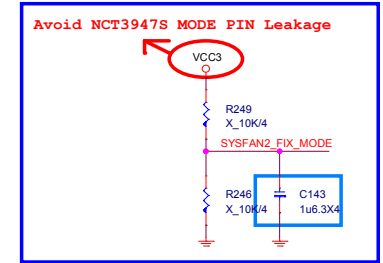
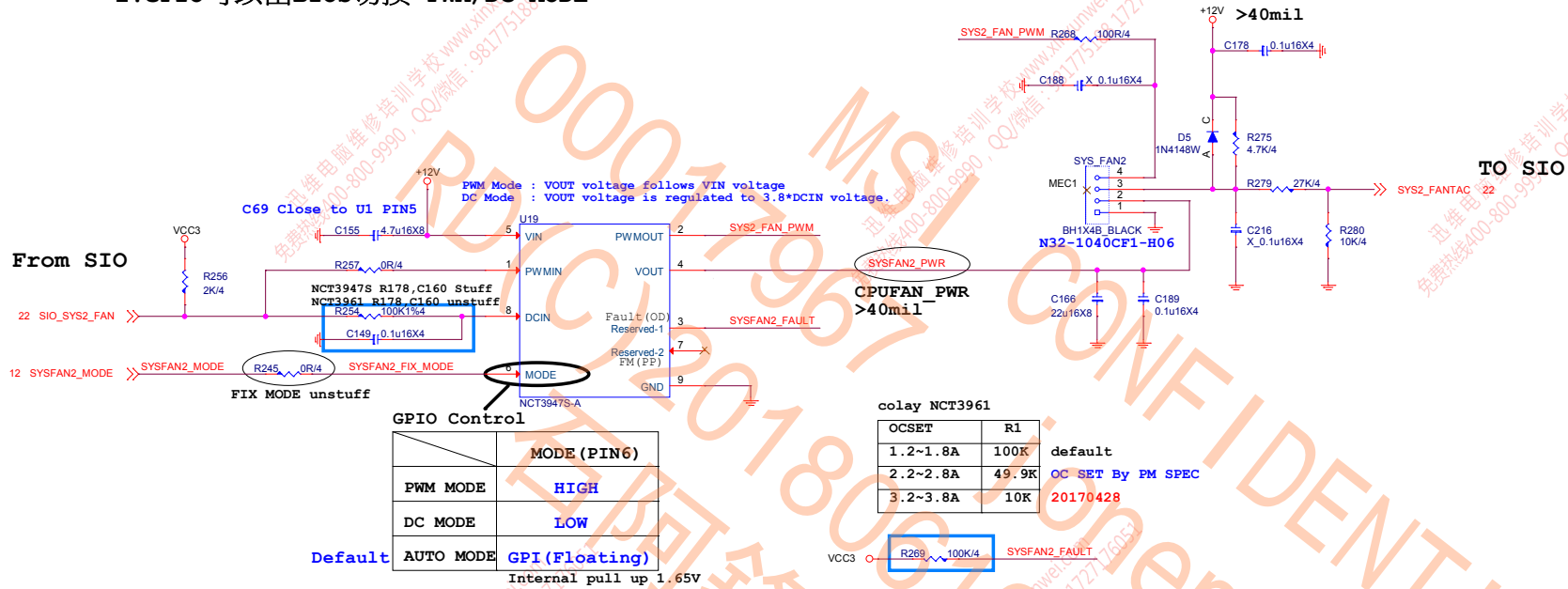
| OCSET    | R1    |                   |
|----------|-------|-------------------|
| 1.2~1.8A | 100K  | default           |
| 2.2~2.8A | 49.9K | OC SET By FM SPEC |
| 3.2~3.8A | 10K   | 20170428          |



|                                  |                                     |         |
|----------------------------------|-------------------------------------|---------|
| MICRO-STAR INT'L CO.,LTD         |                                     |         |
| MS-7B23                          |                                     |         |
| Size Custom                      | Document Description FAN CONTROLLER | Rev 3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 25                            | of 63   |

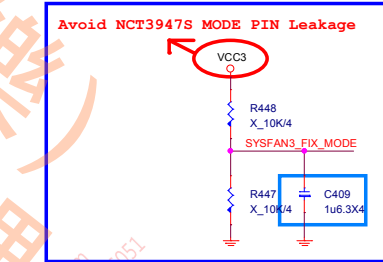
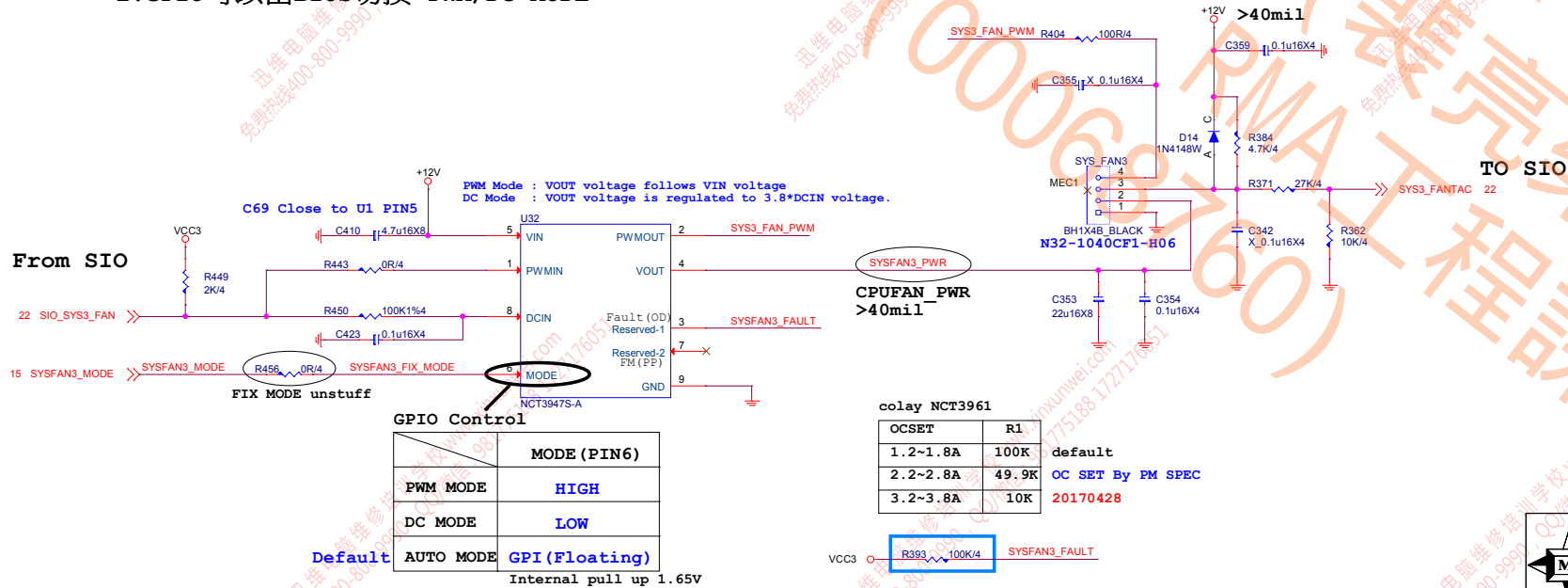
**TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE**

2.GPIO可以由BIOS切换 PWM/DC MODE



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

2.GPIO可以由BIOS切换 PWM/DC MODE

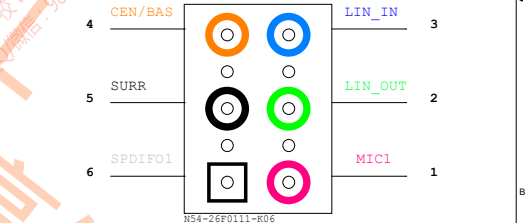
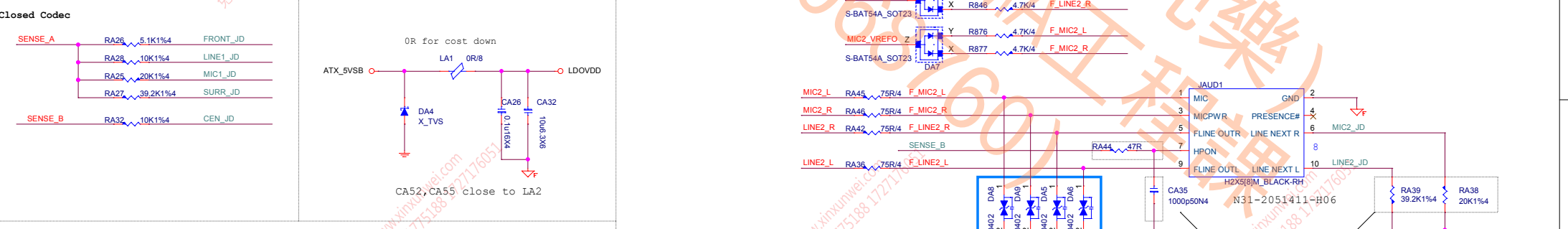
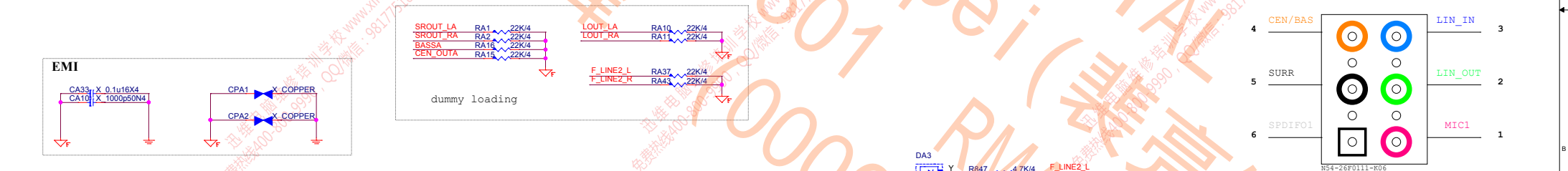
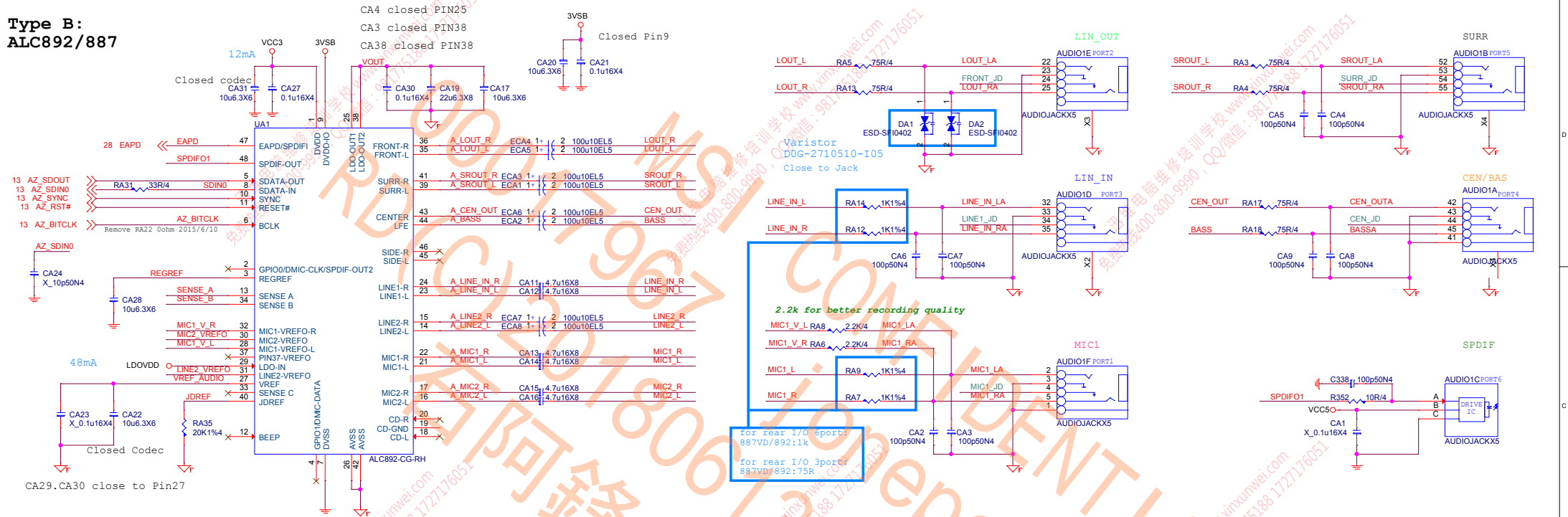


**MICRO-STAR INT'L CO.,LTD**

**MS-7B23**

|                                  |   |         |
|----------------------------------|---|---------|
| Size Custom                      | Document Description<br><b>FAN CONTROLLER</b> | Rev 3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 26 of 63                                |         |

**Type B:**  
**ALC892/887**



**MSI**

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

**MS-7B23**

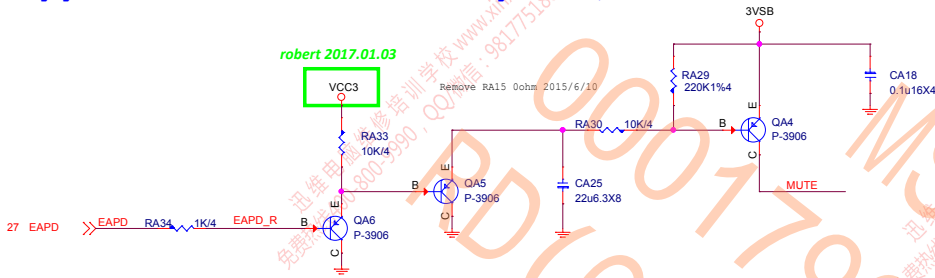
|                                  |   |         |
|----------------------------------|---|---------|
| Size Custom                      | Document Description<br><b>AUDIO - ALC892/887</b> | Rev 3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 27  | of 63   |

# Rear Line OUT De-POP circuit

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

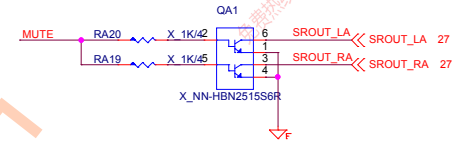
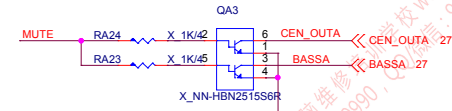
(add de-pop circuit by PM spec or customer request,  
NOTE: add de-pop circuit need to change CA21,CA37, CA38, CA39, CA40, CA41 to TVS)

robert 2017.01.03

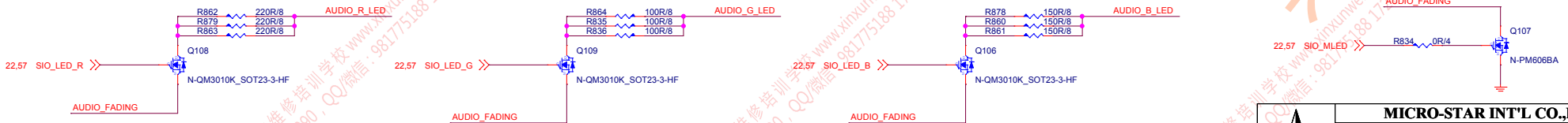
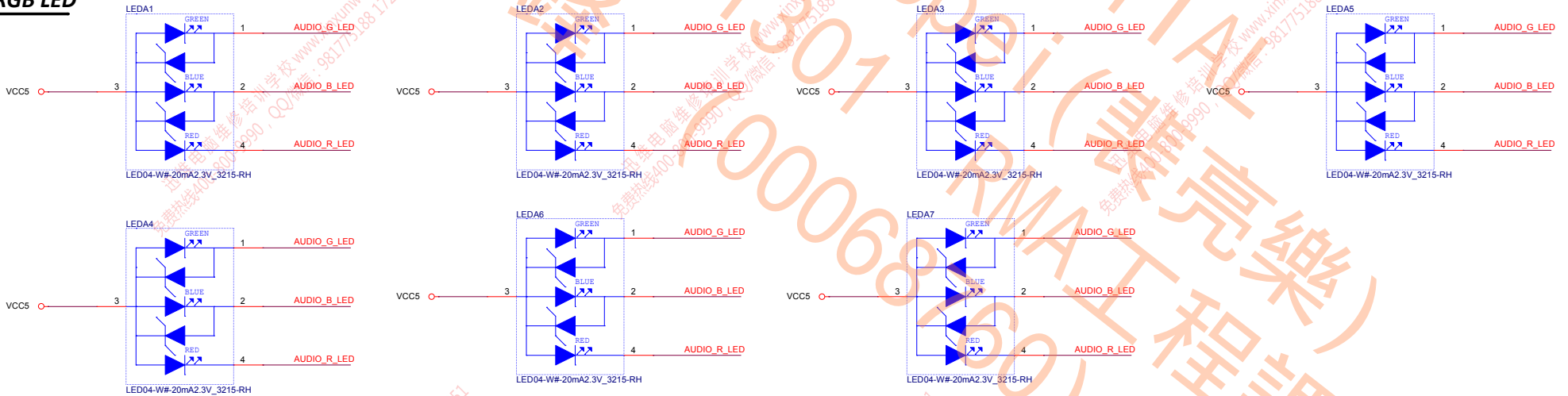


Digital

Analog



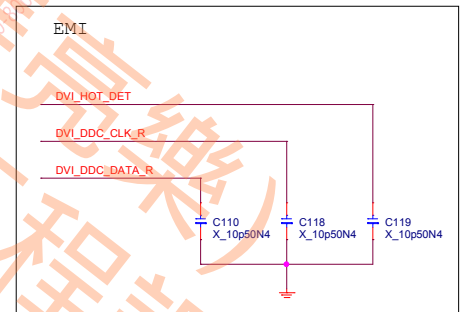
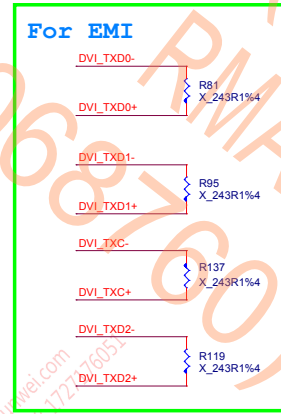
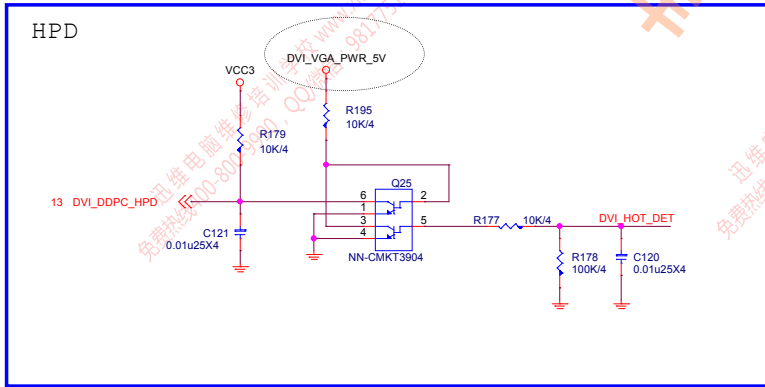
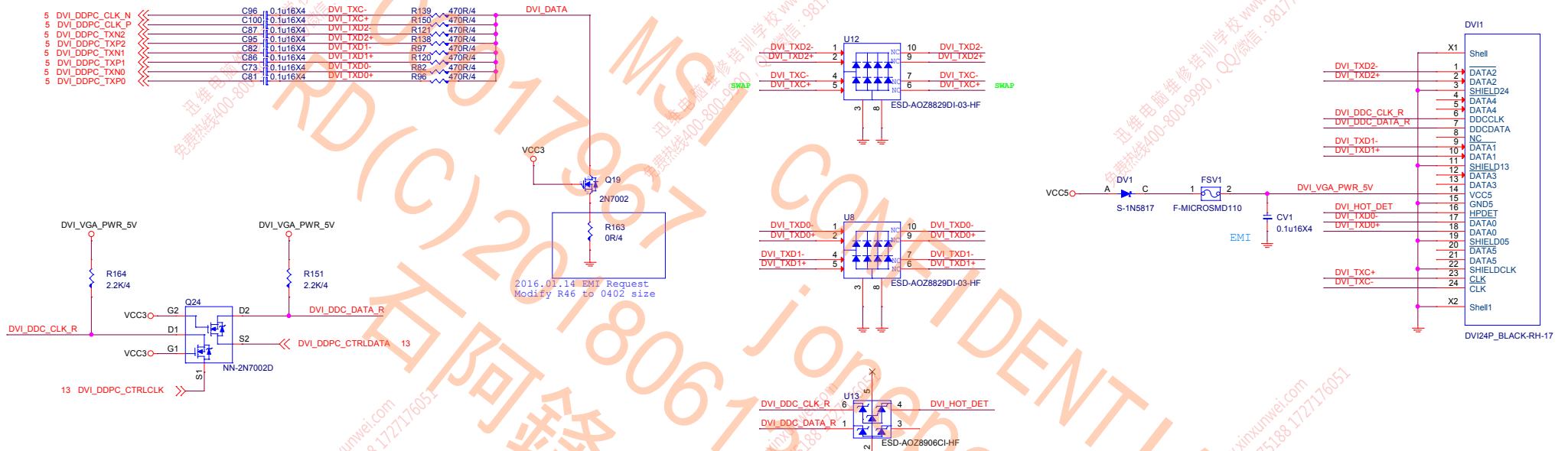
# Audio RGB LED



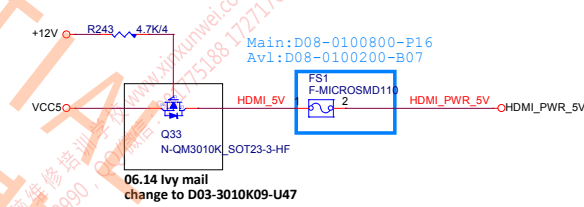
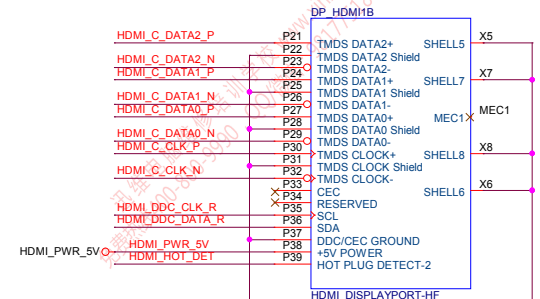
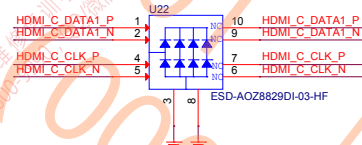
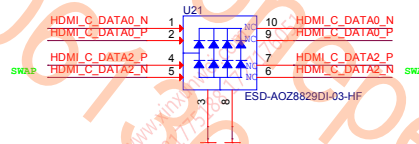
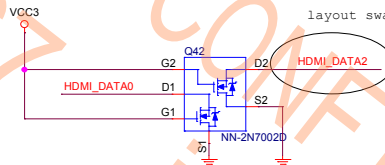
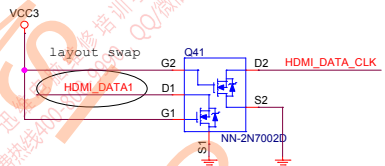
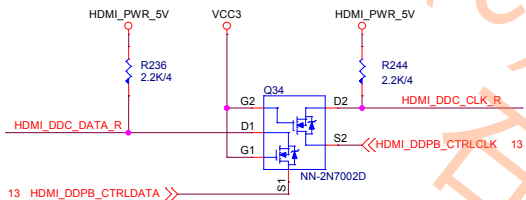
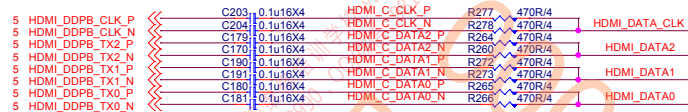
|                                  |  |         |
|----------------------------------|--|---------|
| <b>MSI</b>                       |  |         |
| <b>MICRO-STAR INT'L CO.,LTD</b>  |  |         |
| <b>MS-7B23</b>                   |  |         |
| Size Custom                      | Document Description<br><b>AUDIO - depop circuit</b> | Rev 3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 28   | of 63   |

# DVI level shifter

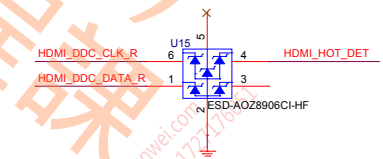
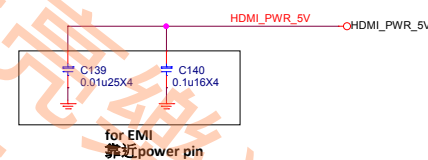
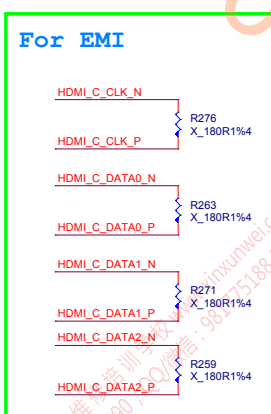
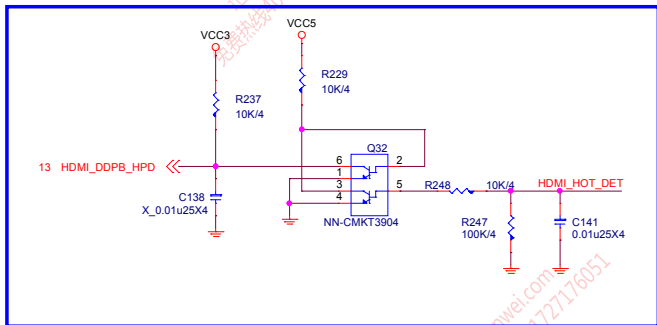
VGA: resolution of 2048x1536 pixels with 32-bit color at 75 Hz (4:3 QXGA)



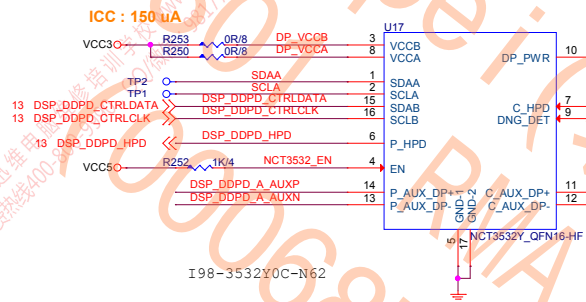
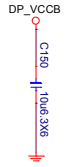
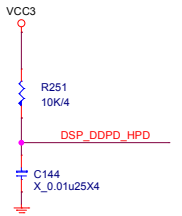
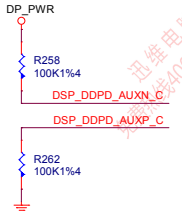
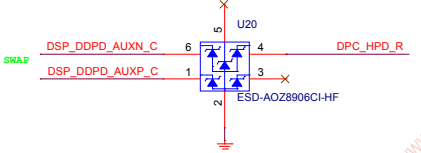
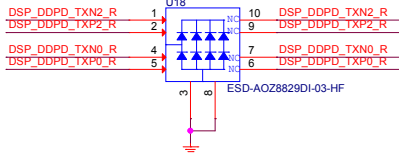
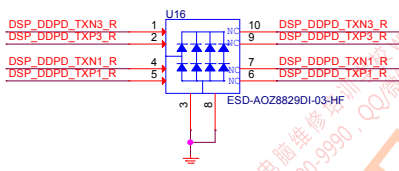
HDMI, DVI: 1920x1200 at 60 Hz (16:10 WUXGA)



HPD



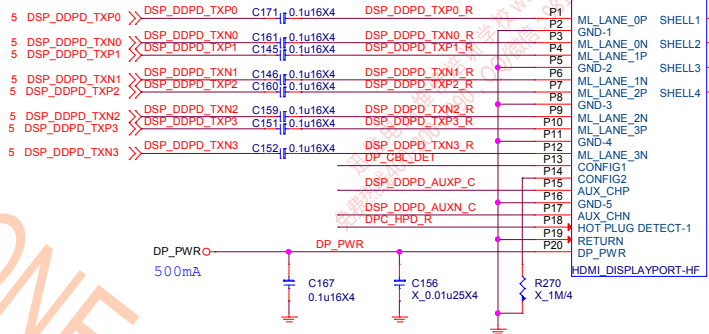
|                                  |   |         |
|----------------------------------|---|---------|
| <b>MSI</b>                       |   |         |
| <b>MICRO-STAR INT'L CO.,LTD</b>  |   |         |
| <b>MS-7B23</b>                   |   |         |
| Size Custom                      | Document Description<br><b>HDMI Connector</b> | Rev 3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 30                                      | of 63   |



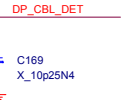
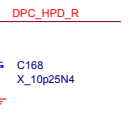
DP\_VCCB trace don't less than 30 mil

ICC : 150 uA

I98-3532Y0C-N62



DP



|                                  |  |                |
|----------------------------------|--|----------------|
| <b>MICRO-STAR INT'L CO.,LTD</b>  |  |                |
| <b>MS-7B23</b>                   |  |                |
| Size Custom                      | Document Description<br><b>DisplayPort Connector</b> | Rev 3.3        |
| Date: Tuesday, February 13, 2018 |  | Sheet 31 of 63 |

D20,D21 Close to M2 connector

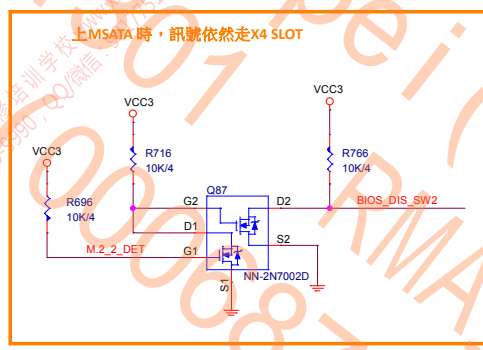
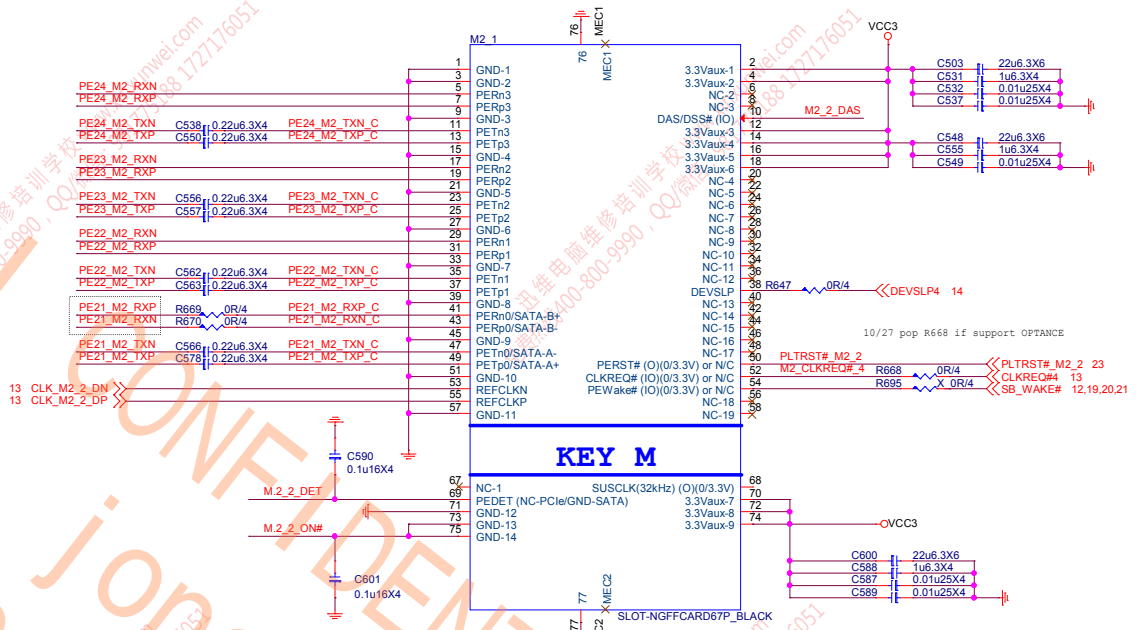
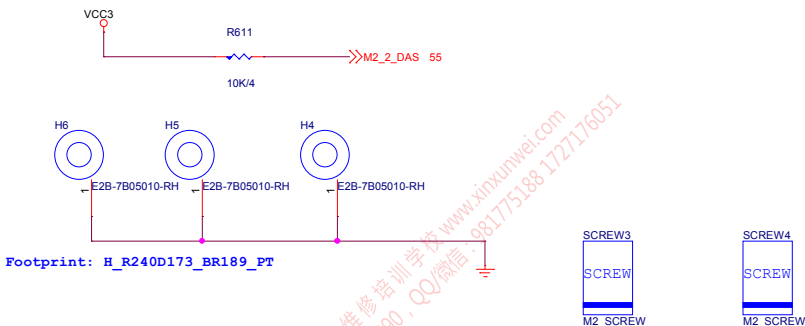
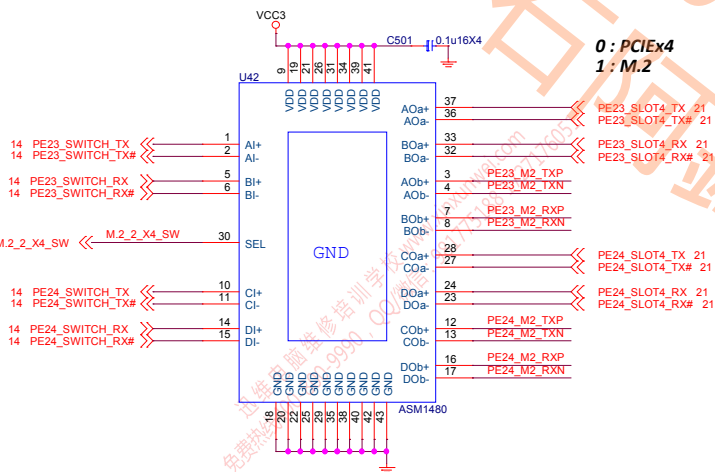
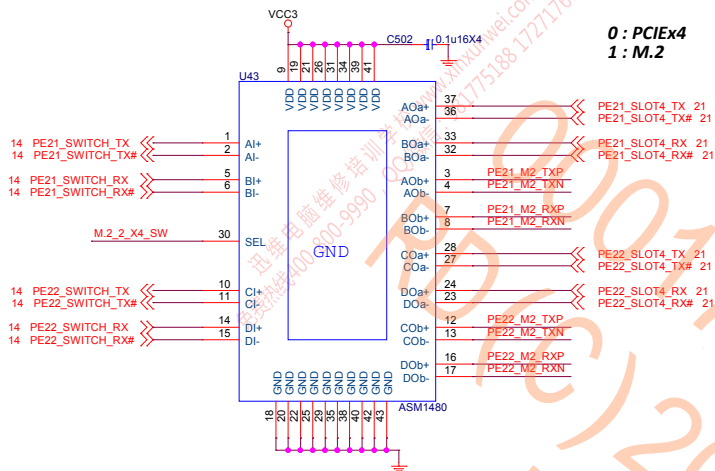
SATA\_PCIE\_DET0  
0-PCIE  
1-SATA

**BIOS\_MODE**

| DIS_SW     | M1_SEL_PCIESATA | Mode           |
|------------|-----------------|----------------|
| 0          | 1               | <b>M2-SATA</b> |
| 0          | 0               | <b>M2-PCIE</b> |
| <b>GPI</b> | <b>GPI</b>      | <b>AUTO</b>    |



|                                  |   |            |
|----------------------------------|---|------------|
| <b>MICRO-STAR INT'L CO.,LTD</b>  |   |            |
| <b>MS-7B23</b>                   |   |            |
| Size<br>Custom                   | Document Description<br><b>M2-SLOT1</b> | Rev<br>3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 32                                | of 63      |



**BIOS\_MODE**

| BIOS_DIS_SW2 | M2_2_SEL | Mode         |
|--------------|----------|--------------|
| 0            | 0        | M2 SLOT-PCIe |
| 0            | 1        | X4 SLOT-PCIe |
| GPI          | GPI      | GPI          |



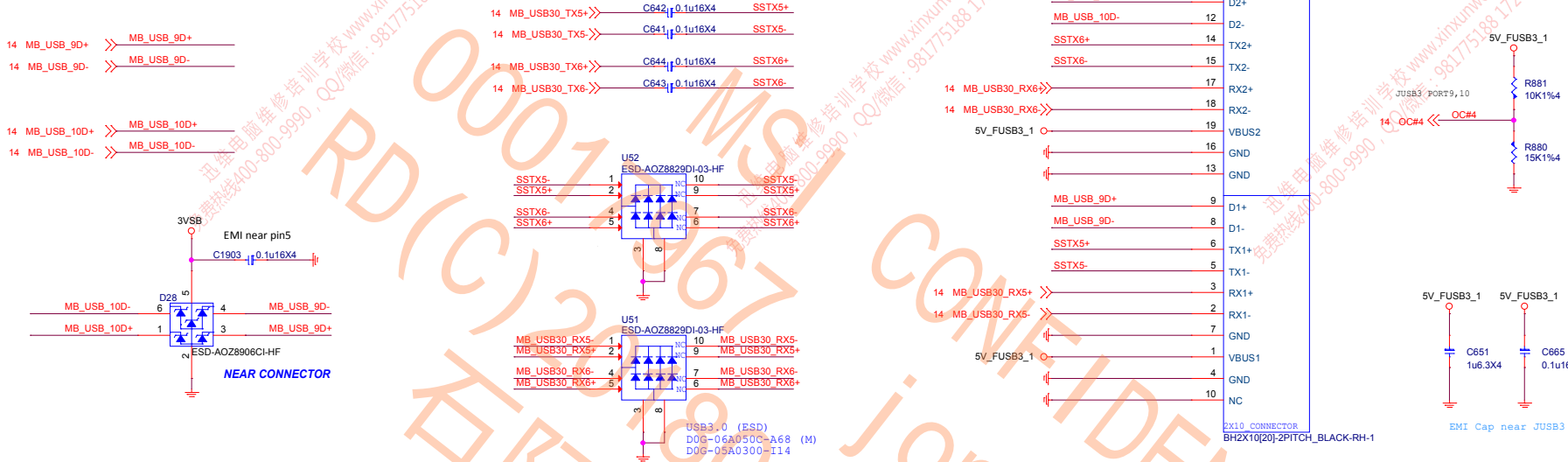
**MICRO-STAR INT'L CO.,LTD**

**MS-7B23**

Size Custom Document Description **M2-SLOT2** Rev 3.3

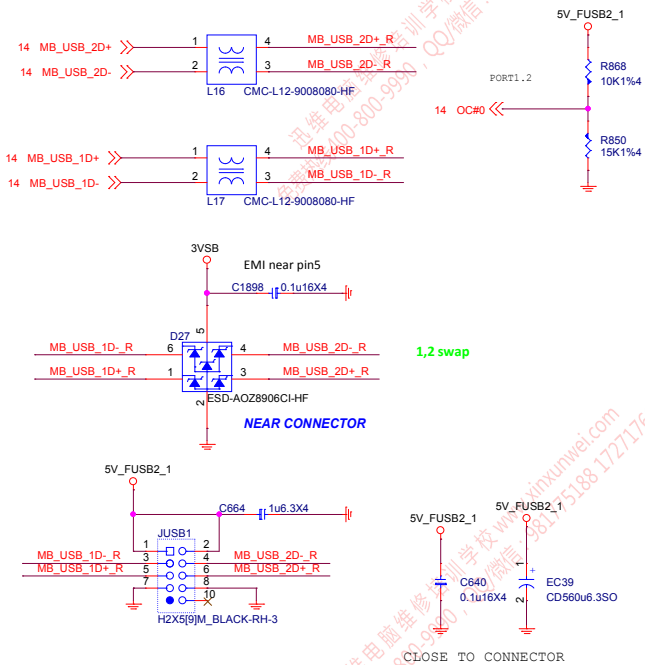
Date: Tuesday, February 13, 2018 | Sheet 33 of 63

### JUSB3 PORT9,10



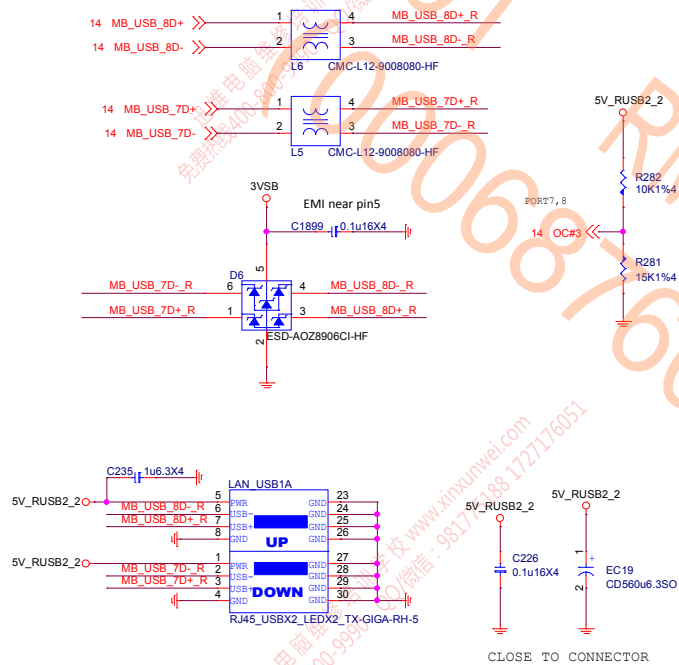
### JUSB1 PORT 7,8

2017.12.12  
swap 1,2 to 7,8 for layout

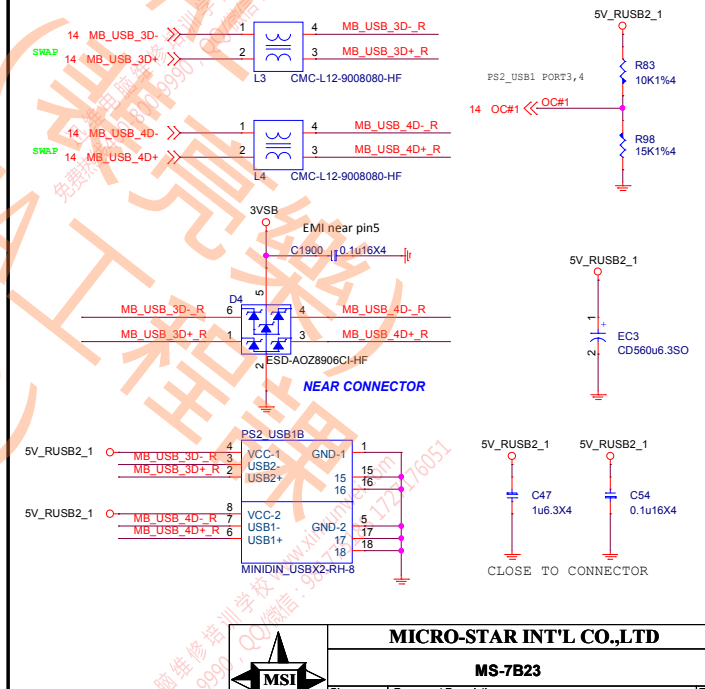


### LAN USB1 PORT 1,2

2017.12.12  
swap 1,2 to 7,8 for layout



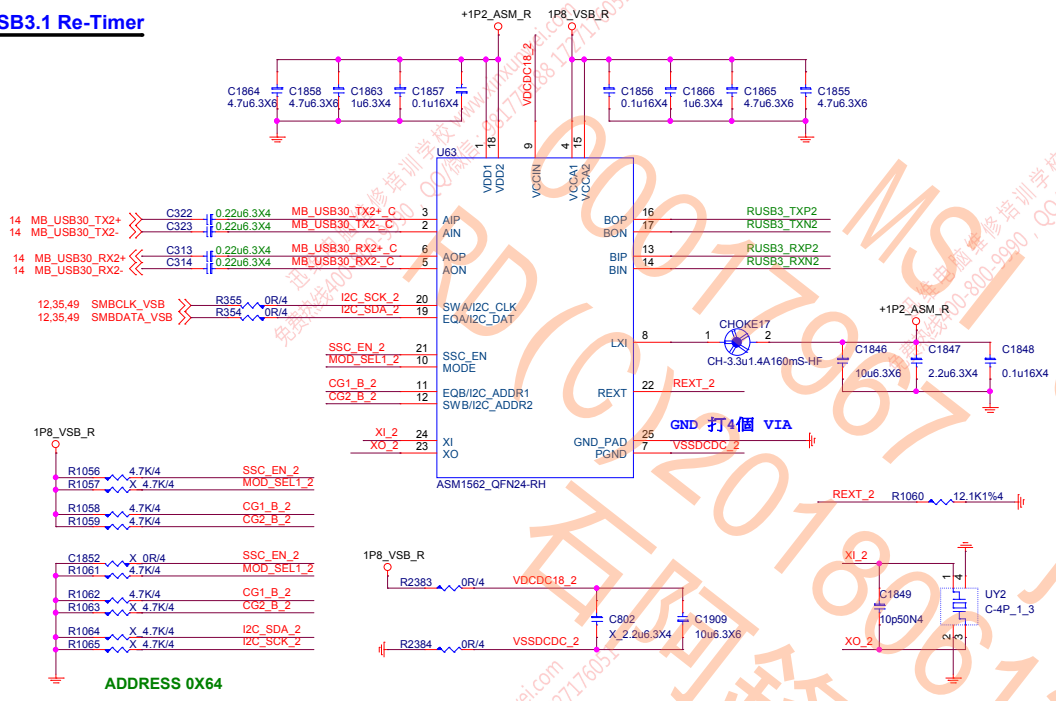
### REAR PS2\_USB1 PORT 3,4



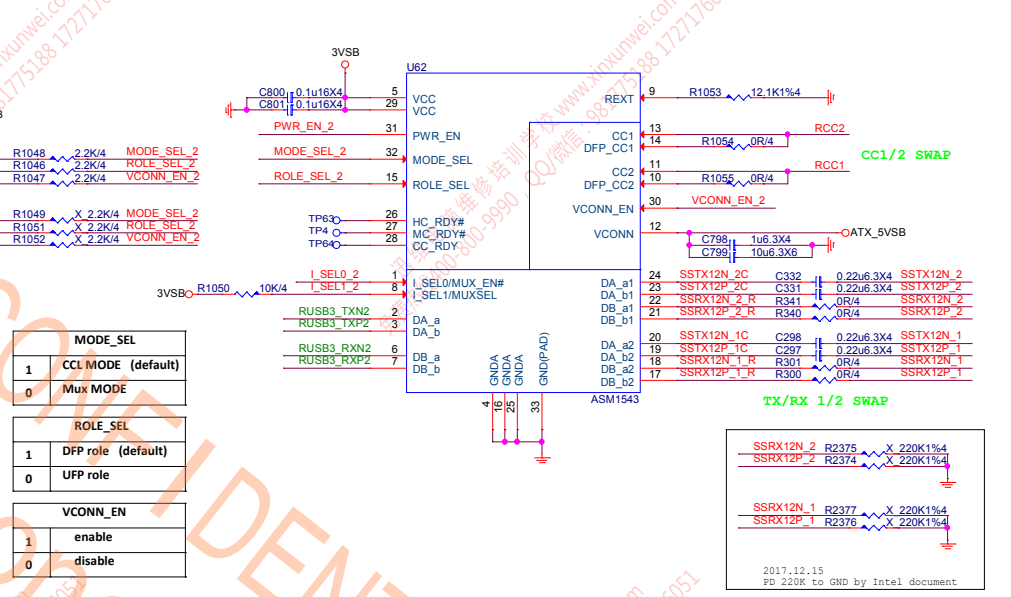
|                                  |  |         |
|----------------------------------|--|---------|
| <b>MSI</b>                       |  |         |
| <b>MICRO-STAR INT'L CO.,LTD</b>  |  |         |
| <b>MS-7B23</b>                   |  |         |
| Size Custom                      | Document Description<br><b>Front USB/ PS2_USB1</b> | Rev 3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 34   | of 63   |



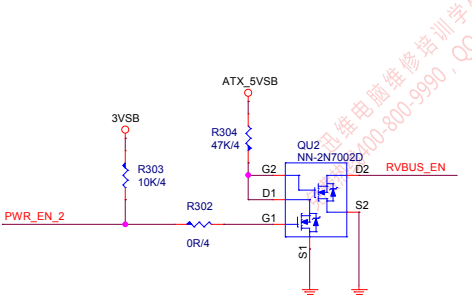
# USB3.1 Re-Timer



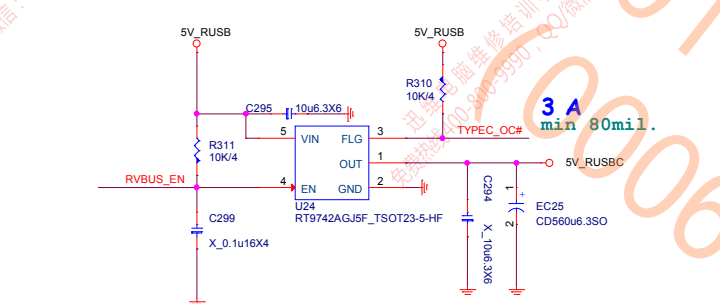
# USB Type-C MUX with Configuration Channel (CC)



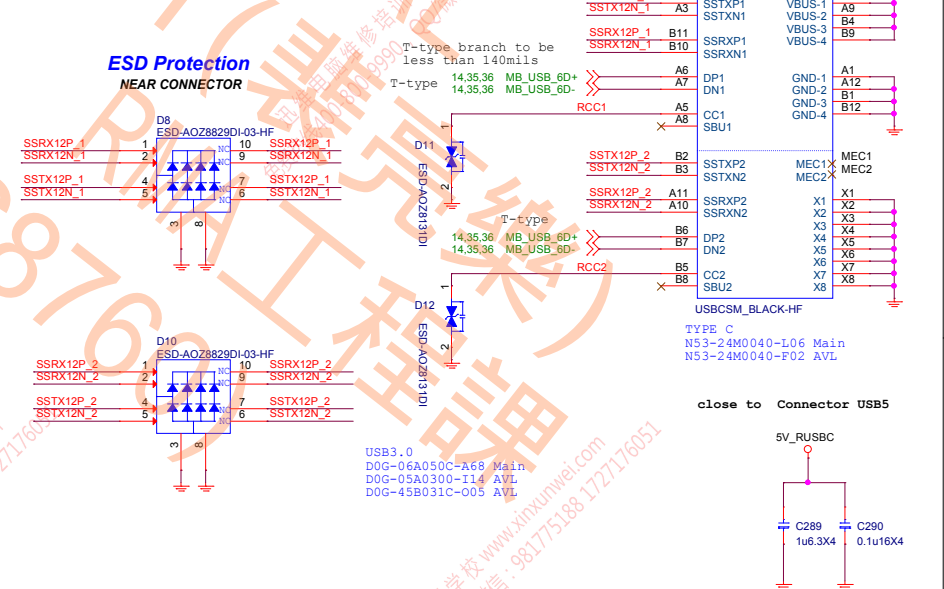
# VCOM OC#



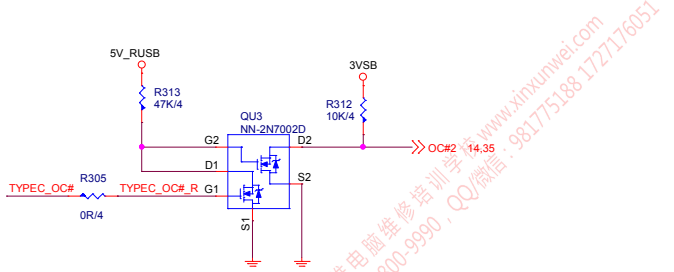
# VBUS EN



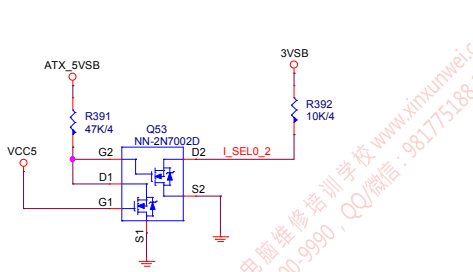
# TYPE-C



# VBUS OC# LEVEL SHIFT



# Current Mode



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

**MS-7B23**

|                                  |   |         |
|----------------------------------|---|---------|
| Size Custom                      | Document Description<br><b>Rear Type-C &amp; Re-Timer</b> | Rev 3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 36 of 63  |         |

ASM1562 USB3.1 re-timer

| ADDRESS         | 0x62 | 0x64 | 0x66 | 0x68 | 0x70 | 0x72 | 0x74 | 0x76 | 0x78 |
|-----------------|------|------|------|------|------|------|------|------|------|
| PIN11 RH (KOhm) | 4.7K | 4.7K | N/A  | 4.7K | 4.7K | N/A  | 4.7K | 4.7K | N/A  |
| PIN11 RL (KOhm) | N/A  | 4.7K | 4.7K | N/A  | 4.7K | 4.7K | N/A  | 4.7K | 4.7K |
| PIN12 RH (KOhm) | 4.7K | 4.7K | 4.7K | 4.7K | 4.7K | 4.7K | N/A  | N/A  | N/A  |
| PIN12 RL (KOhm) | N/A  | N/A  | N/A  | 4.7K | 4.7K | 4.7K | 4.7K | 4.7K | 4.7K |

ADDRESS 0x66

VCOM OC#

VBUS EN

3 A  
min 80mil.

CC1/2 SWAP

VBUS OC# LEVEL SHIFT

Current Mode

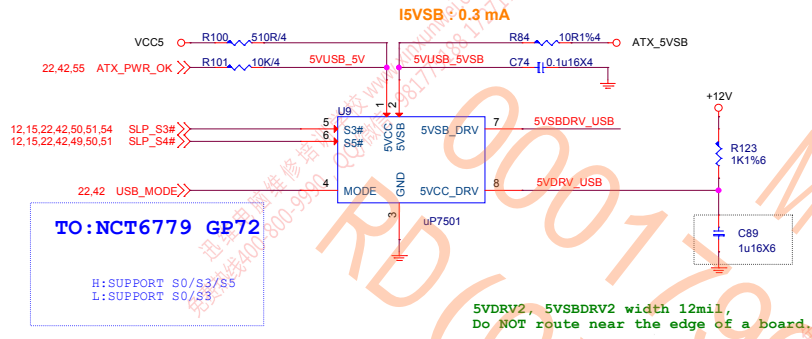


MICRO-STAR INT'L CO.,LTD

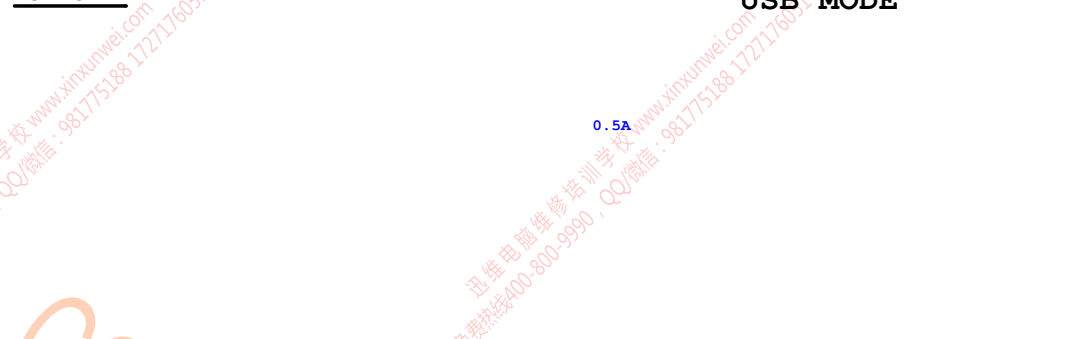
MS-7B23

|        |                            |                |
|--------|----------------------------|----------------|
| Size   | Document Description       | Rev            |
| Custom | Front Type-C & Re-driver   | 3.3            |
| Date:  | Tuesday, February 13, 2018 | Sheet 37 of 63 |

### USB POWER

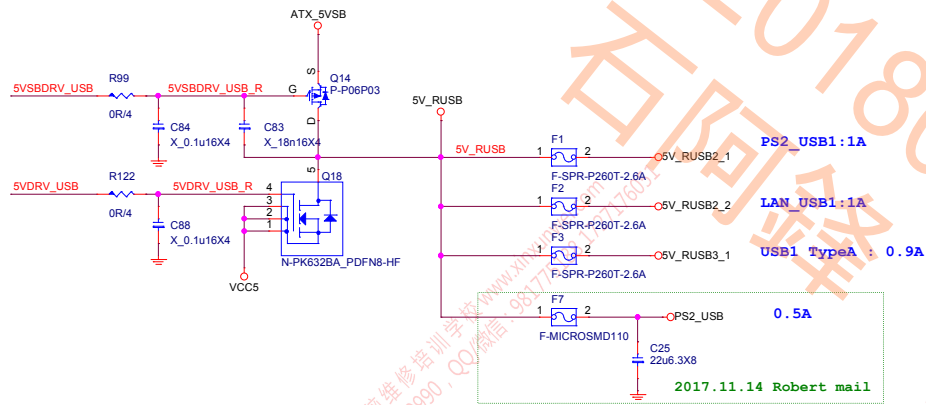


### PS2 POWER

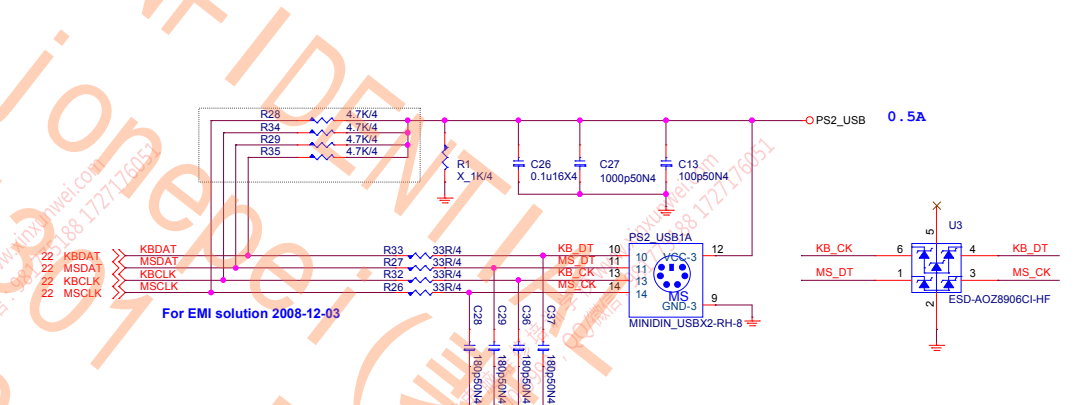


### USB MODE

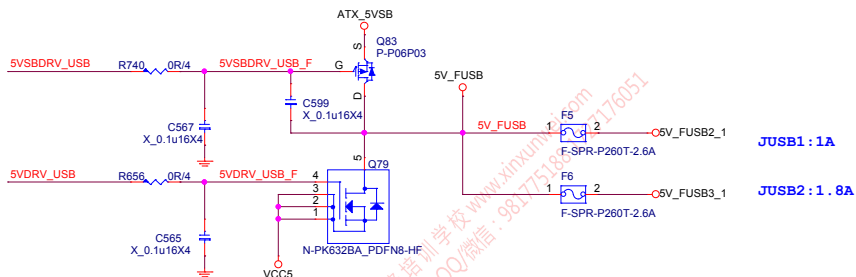
### REAR USB PORT POWER



### PS2 KEYBOARD & MOUSE CONNECTOR



### FRONT USB PORT POWER



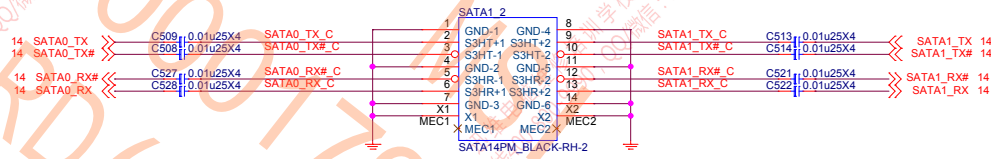
| USB CONN | USB POWER  | PCH PORT | OC# SIGNAL |
|----------|------------|----------|------------|
| LAN USB1 | 5V_FUSB2_1 | Port5,6  | OC#0       |
| PS2 USB1 | 5V_RUSB2_2 | Port9,10 | OC#1       |
| USB1     | 5V_FUSB3_1 | Port1,2  | OC#2       |
| JUSB3    | 5V_RUSB3_1 | Port3,4  | OC#3       |
| JUSB2    | 5V_RUSB2_1 | Port7,8  | OC#4       |



|                                  |  |         |
|----------------------------------|--|---------|
| <b>MICRO-STAR INT'L CO.,LTD</b>  |  |         |
| <b>MS-7B23</b>                   |  |         |
| Size Custom                      | Document Description<br><b>USB Power</b> | Rev 3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 38                                 | of 63   |

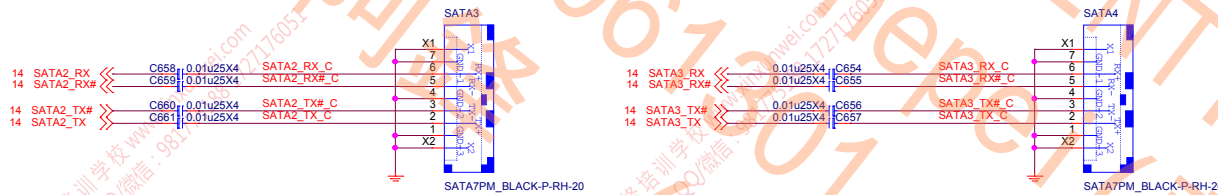
### SATA PORT 0,1

Black 90 degree



### SATA PORT 2,3

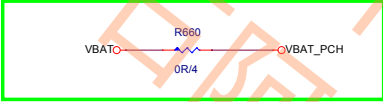
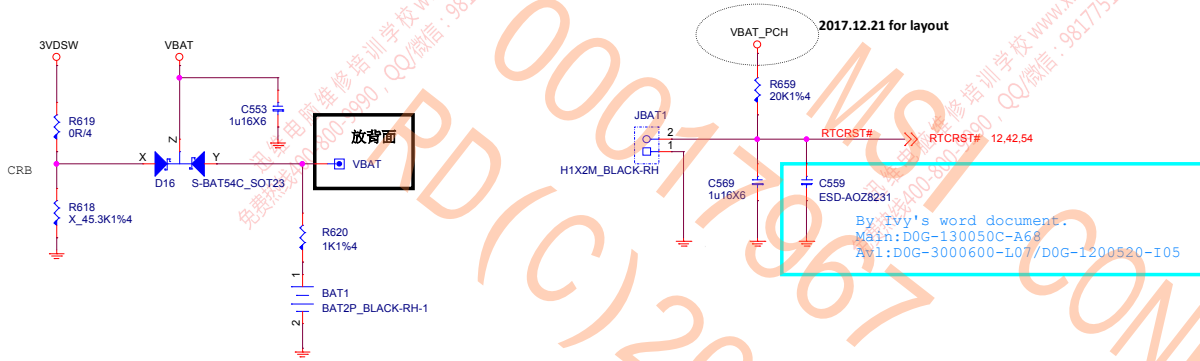
Black 180 degree



|                                  |   |            |
|----------------------------------|---|------------|
| <b>MICRO-STAR INT'L CO.,LTD</b>  |   |            |
| <b>MS-7B23</b>                   |   |            |
| Size<br>Custom                   | Document Description<br><b>SATA connector</b> | Rev<br>3.3 |
| Date: Tuesday, February 13, 2018 |   |            |
| Sheet 39 of 63                   |   |            |

# VBAT

# Cut VBAT



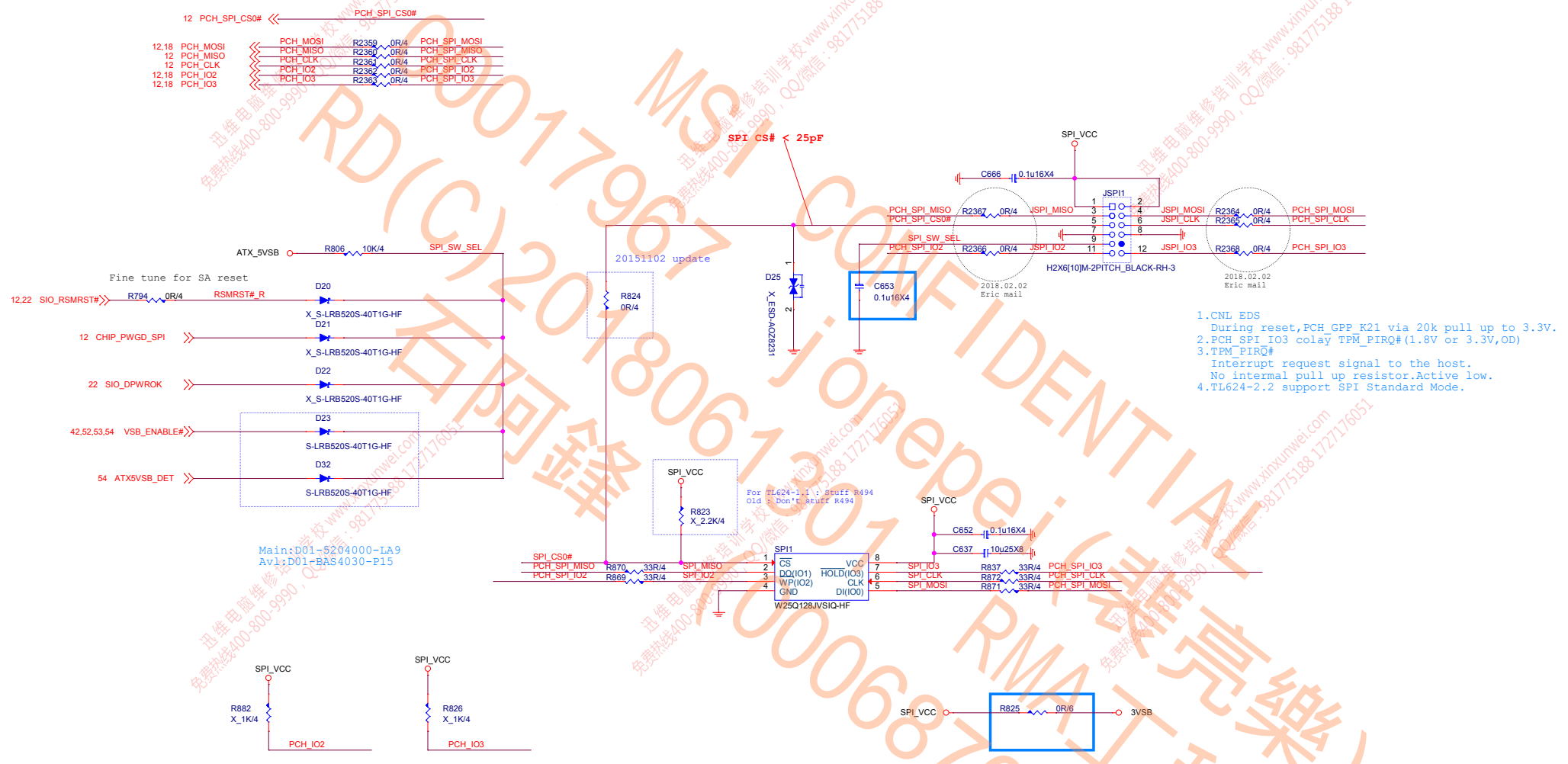
| Function 1 |        |         |
|------------|--------|---------|
| IN         |        | OUT     |
| INPUT1     | INPUT2 | OUTPUT1 |
| 0          | 1      | 1       |
| 1          | 0      | 0       |
| 1          | 1      | 0       |
| 0          | 0      | 0       |

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

|                                  |   |         |
|----------------------------------|---|---------|
| <b>MICRO-STAR INT'L CO.,LTD</b>  |   |         |
| <b>MS-7B23</b>                   |   |         |
| Size Custom                      | Document Description<br><b>CUT VBAT circuit</b> | Rev 3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 40 of 63                                  |         |

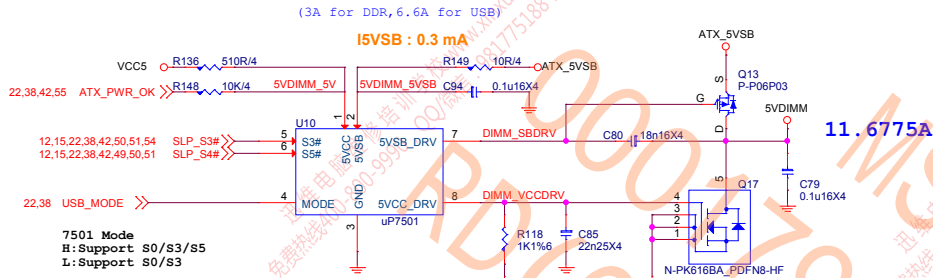


1. CNL EDS During reset, PCH GPP K21 via 20k pull up to 3.3V.
2. PCH\_SPL\_IO3 colay TPM\_PIRQ# (1.8V or 3.3V, OD)
3. TPM\_PIRQ# Interrupt request signal to the host. No internal pull up resistor. Active low.
4. TL624-2.2 support SPI Standard Mode.

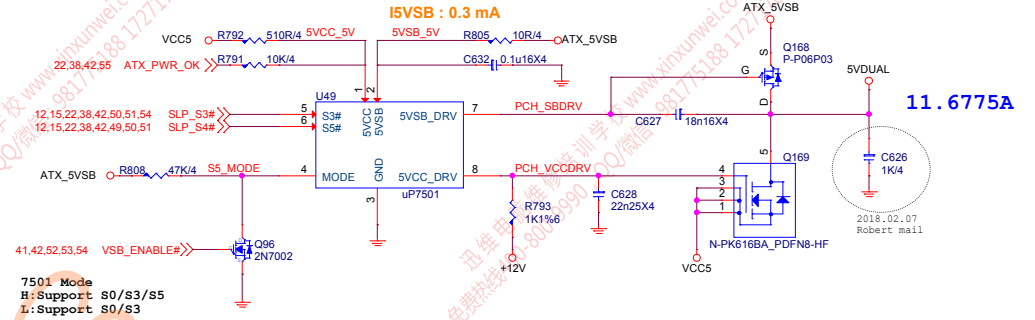
Main: D01-5204000-LA9  
 Av1: D01-BAS4030-P15

|                                  |   |                |
|----------------------------------|---|----------------|
| <b>MICRO-STAR INT'L CO.,LTD</b>  |   |                |
| <b>MS-7B23</b>                   |   |                |
| Size<br>Custom                   | Document Description<br><b>BIOS ROM</b> | Rev<br>3.3     |
| Date: Tuesday, February 13, 2018 |   | Sheet 41 of 63 |

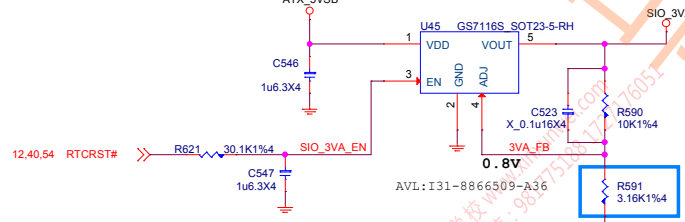
# 5VDIMM FOR DDR



# 5VDUAL

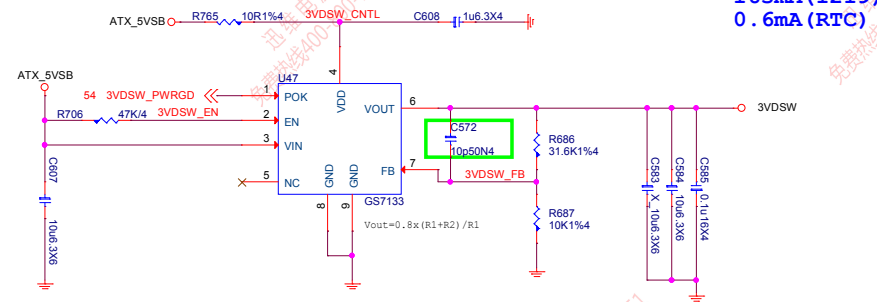


# SIO\_3VA

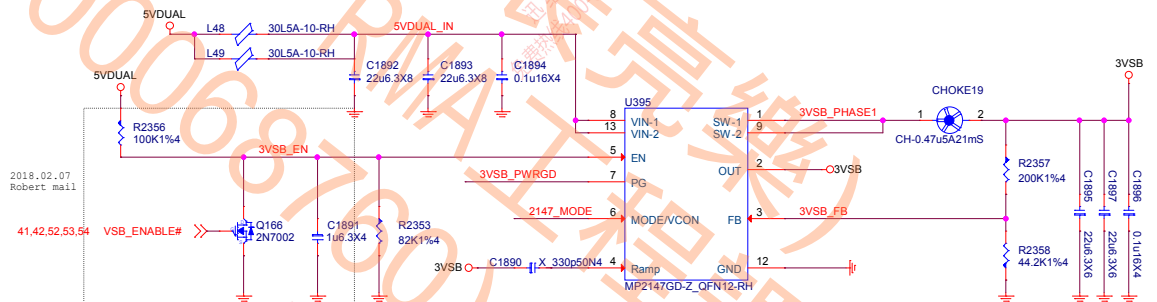


For power 700W solution (only for uP7501+uP7506 for 3VSB solution)  
 The power supply VCC3 delay 12ms after VCC5 assert.  
 The chip U7501 5VDRV1 work when the VCC5 ready  
 (When VCC5 up to 4.2V and the 5VDRV1 delay 6ms assert), but  
 VCC5 not ready and let the 3VSB sequence fail.

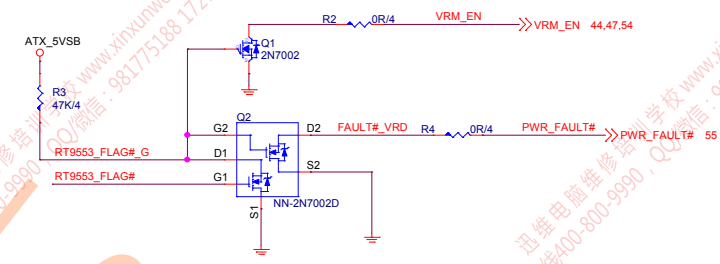
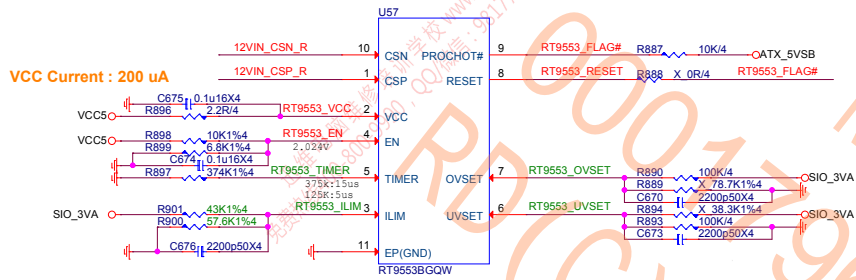
# 3VDSW



# 3VSB



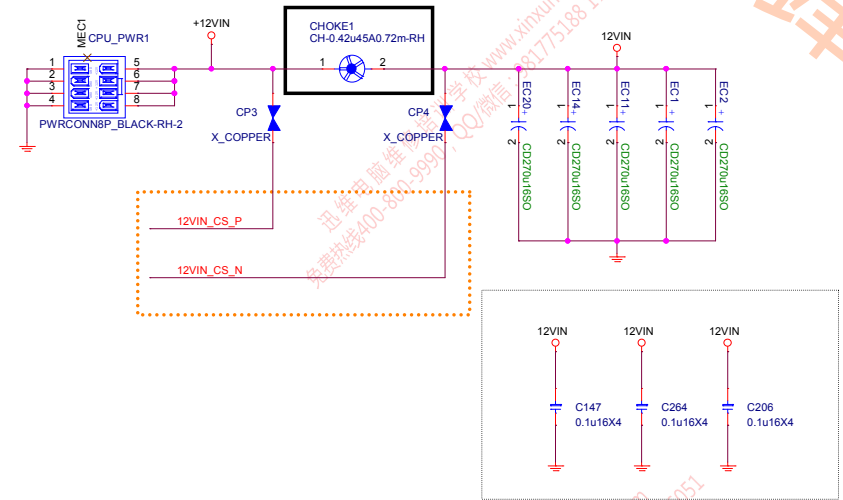
|                                  |                      |     |
|----------------------------------|----------------------|-----|
| <b>MICRO-STAR INT'L CO.,LTD</b>  |                      |     |
| <b>MS-7B23</b>                   |                      |     |
| Size                             | Document Description | Rev |
| Custom                           | ACPI CONTROLLER      | 3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 42 of 63       |     |



OCP: 30A  
 Real OCP: 30.05A  
 $R17+R18 > 100k$      $V_{sio\_3va} = 3.38V$      $R_{dcr} = 0.5 \text{ mohm}$

$I_{3933\_imon} * [R17 * R18 / (R17 + R18)] = I_{step} * R_{dcr} * 100$   
 $I_{3933\_imon} = 10\mu A / \text{step}$   
 $I_{step} = 4.968A$

2017.12.01 Ivy mail  
 0.22uH -> 0.42uH



| D = Vout/Vin |                 |
|--------------|-----------------|
| Vin = 12     | > input voltage |
| Vout = 1.52  | > output Vcore  |
| D = 0.126667 |                 |

| D = Vout/Vin |                 |
|--------------|-----------------|
| Vin = 12     | > input voltage |
| Vout = 1.52  | > output Vcore  |
| D = 0.126667 |                 |

| D = Vout/Vin |                 |
|--------------|-----------------|
| Vin = 12     | > input voltage |
| Vout = 0.95  | > output Vcore  |
| D = 0.079167 |                 |

| Io = Icore(max)*0.8 |                 |
|---------------------|-----------------|
| I core(max) = 138   | > Vcore current |
| I avg. = 110.4      | A               |

| Io = Icore(max)*0.8 |                 |
|---------------------|-----------------|
| I core(max) = 45    | > Vcore current |
| I avg. = 36         | A               |

| Io = Icore(max)*0.8 |                 |
|---------------------|-----------------|
| I core(max) = 6.4   | > Vcore current |
| I avg. = 5.12       | A               |

| I ripple = { Io * sqrt(D) * sqrt(1-D) } / Phase |       |
|---|-------|
| Phase = 4                                       | phase |
| I ripple = 9.179738                             | A     |

| I ripple = { Io * sqrt(D) * sqrt(1-D) } / Phase |       |
|---|-------|
| Phase = 2                                       | phase |
| I ripple = 5.966785                             | A     |

| I ripple = { Io * sqrt(D) * sqrt(1-D) } / Phase |       |
|---|-------|
| Phase = 1                                       | phase |
| I ripple = 1.382393                             | A     |

| How many pcs. Of Cap. |      |
|-----------------------|------|
| I ripple(cap) = 5000  | m A  |
| COE_TEMP = 1          |      |
| Input Cap. = 2        | pcs. |

| How many pcs. Of Cap. |      |
|-----------------------|------|
| I ripple(cap) = 5000  | m A  |
| COE_TEMP = 1          |      |
| Input Cap. = 2        | pcs. |

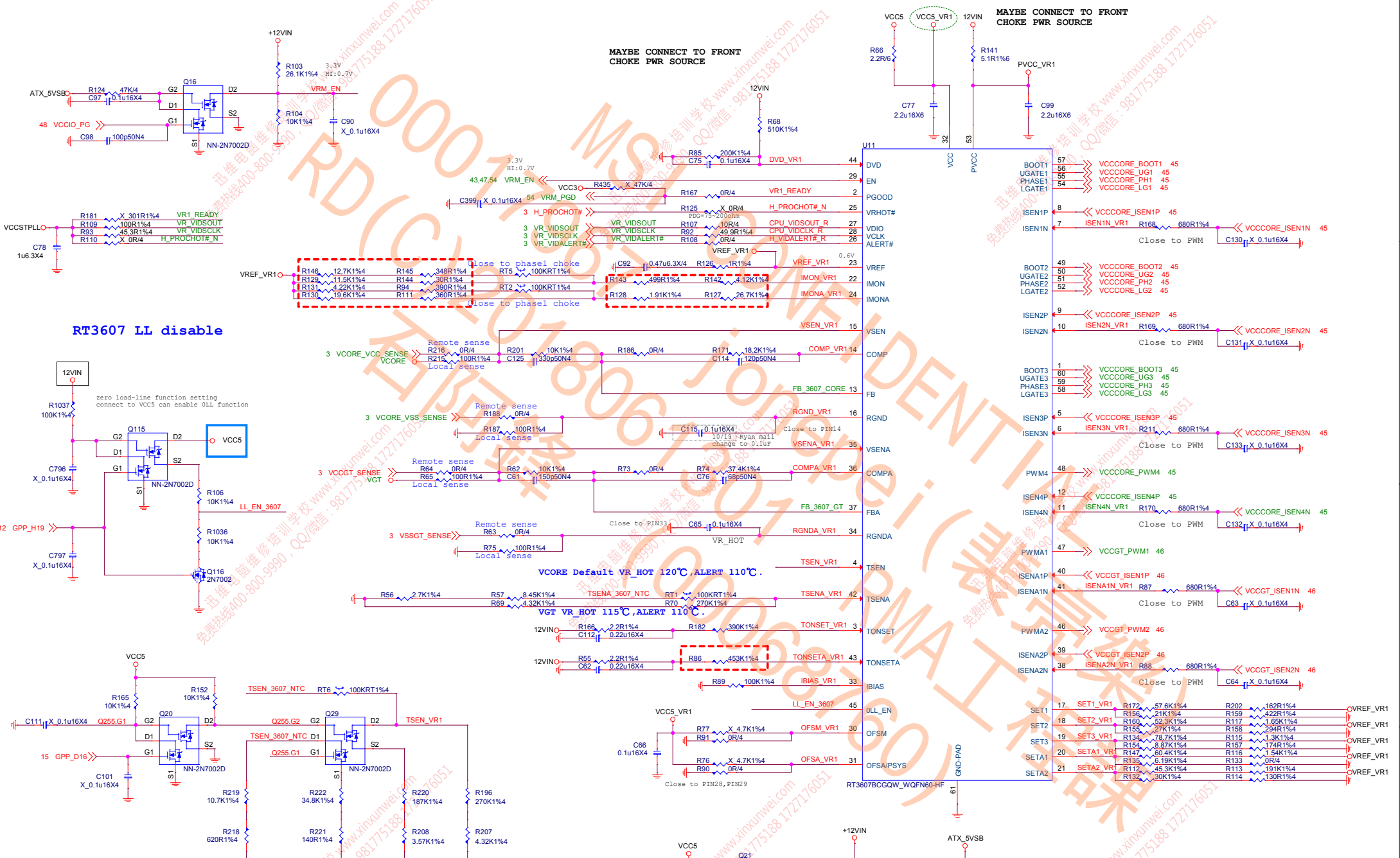
| How many pcs. Of Cap. |      |
|-----------------------|------|
| I ripple(cap) = 5000  | m A  |
| COE_TEMP = 1          |      |
| Input Cap. = 1        | pcs. |

CORE:  
 $D = V_{out}/V_{in}$   
 $= 1.52/12$   
 $= 0.126667$   
 $N = 4$   
 $I_{rms} = I_{out} * [D/N - (D)^2]^{(1/2)}$   
 $= 138 * (0.031667 - 0.016044)^{(1/2)}$   
 $= 17.2489A$

GT:  
 $D = V_{out}/V_{in}$   
 $= 1.52/12$   
 $= 0.126667$   
 $N = 2$   
 $I_{rms} = I_{out} * [D/N - (D)^2]^{(1/2)}$   
 $= 45 * (0.063333 - 0.016044)^{(1/2)}$   
 $= 9.7857A$


VCCIO:  
 $D = V_{out}/V_{in}$   
 $= 0.95/12$   
 $= 0.079167$   
 $N = 1$   
 $I_{rms} = I_{out} * [D/N - (D)^2]^{(1/2)}$   
 $= 6.4 * (0.079167 - 0.006267)^{(1/2)}$   
 $= 1.728A$

|                                  |   |         |
|----------------------------------|---|---------|
| <b>MICRO-STAR INT'L CO.,LTD</b>  |   |         |
| <b>MS-7B23</b>                   |   |         |
| Size Custom                      | Document Description<br><b>12VIN/CURRENT SENSE-RT9553</b> | Rev 3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 43 of 63  |         |



**VCCORE Thermal Protection Table**

| GPP_D16         | R1      | R2     | Thermal Alert# | VR_HOT# | Thermal Alert# / VR_HOT# |
|-----------------|---------|--------|----------------|---------|--------------------------|
| GPI (1) Default | 190.57K | 11.32K | 97°C           | 115°C   | 84.35%                   |
| GPI (0)         | 274.32K | 34.94K | 106°C          | 115°C   | 92.17%                   |



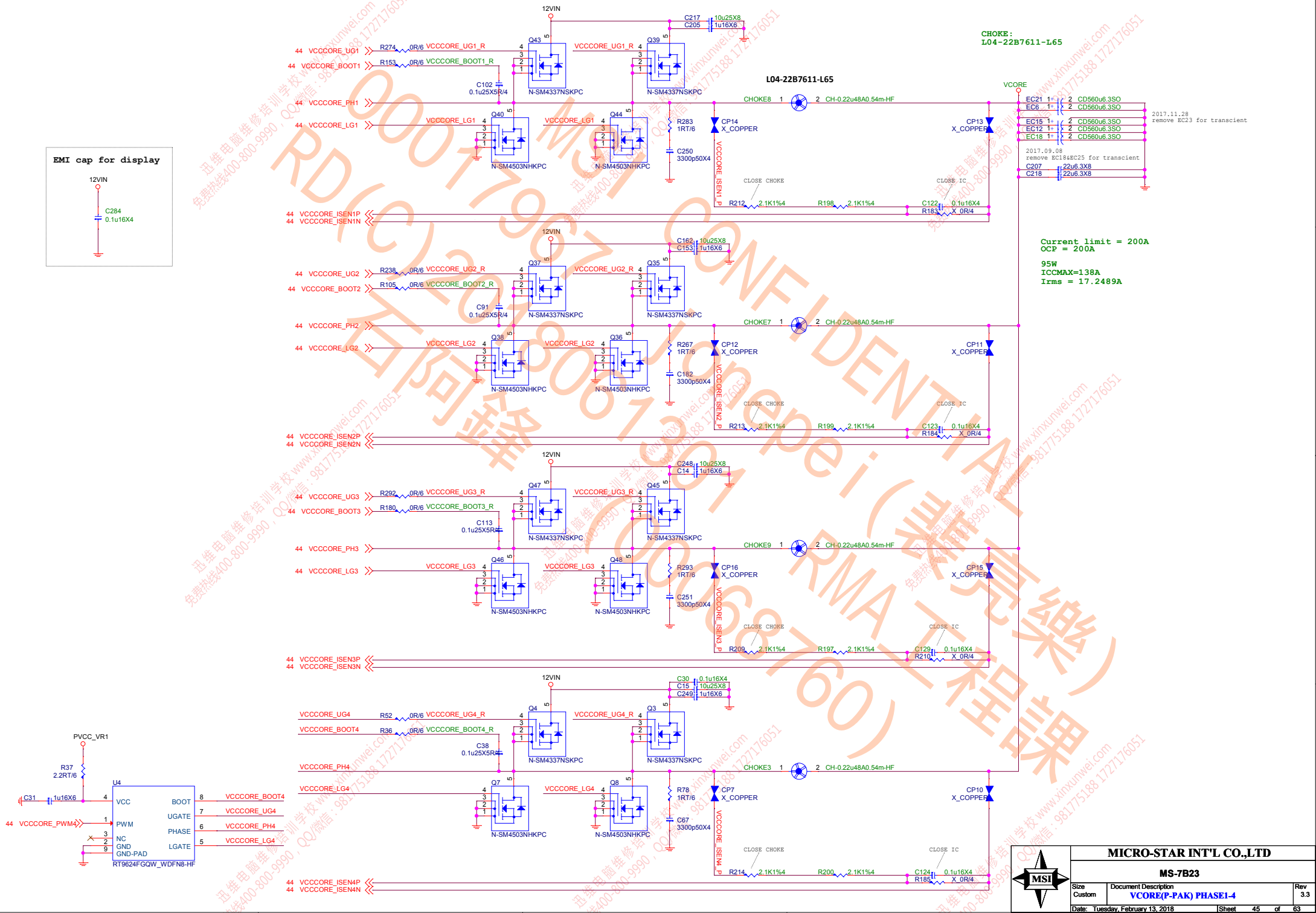
**MICRO-STAR INT'L CO.,LTD**

**MS-7B23**

Size Custom Document Description **PWM-RT3607BC** Rev 3.3

Date: Tuesday, February 13, 2018 | Sheet 44 of 63

EMI cap for display



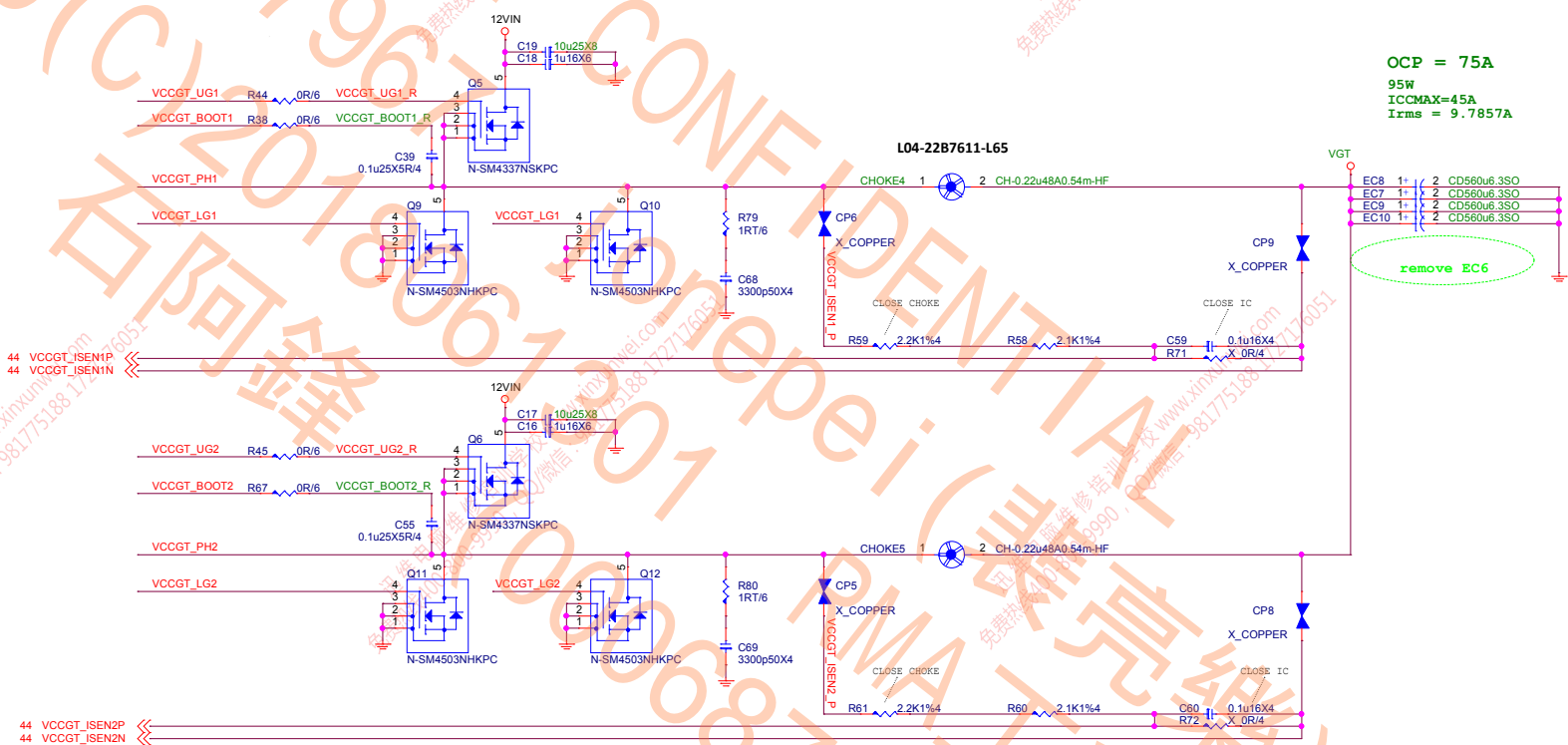
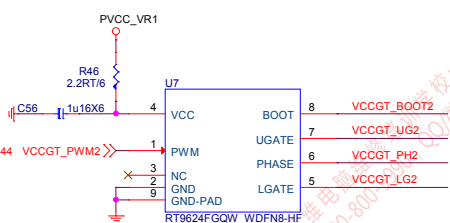
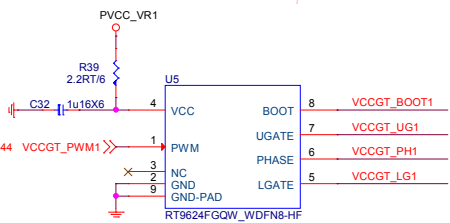
CHOKES:  
L04-22B7611-L65

- EC21 1 2 CD560u6.3SO
  - EC6 1 2 CD560u6.3SO
  - EC15 1 2 CD560u6.3SO
  - EC12 1 2 CD560u6.3SO
  - EC18 1 2 CD560u6.3SO
- 2017.11.28  
remove EC23 for transient
- 2017.09.08  
remove EC18&EC25 for transient
- C207 22u6.3X8
  - C218 22u6.3X8

Current limit = 200A  
OCP = 200A

95W  
ICCMAX=138A  
Irms = 17.2489A

|                                  |  |            |
|----------------------------------|--|------------|
| <b>MICRO-STAR INT'L CO.,LTD</b>  |  |            |
| <b>MS-7B23</b>                   |  |            |
| Size<br>Custom                   | Document Description<br><b>VCCORE(P-PAK) PHASE-4</b> | Rev<br>3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 45   | of 63      |



OCP = 75A  
 95W  
 ICCMAX=45A  
 Irms = 9.7857A

# SA Power:1.05V,11.1A

OCP:16.65A

$$R_{ocset} = 1.5 * I_{max} * R_{dson(LOW)} / I_{ocset}$$

$$= 16.65 * 3m\Omega / 10uA$$

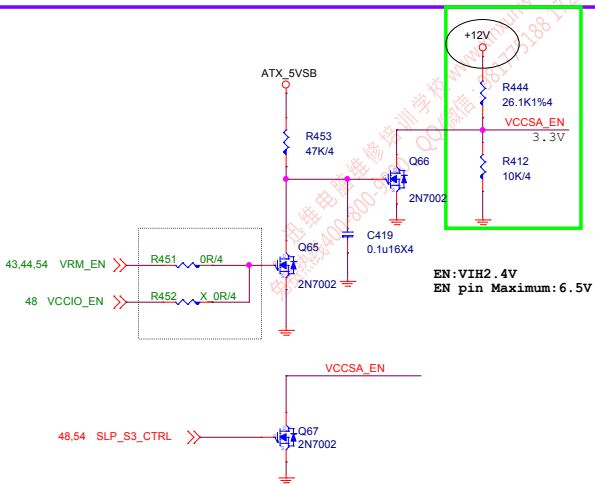
$$= 14.28K$$

Rdson (low) 10V

MOS : 5.1mohm

2014.08.21 update

Pull up by layout&Check level

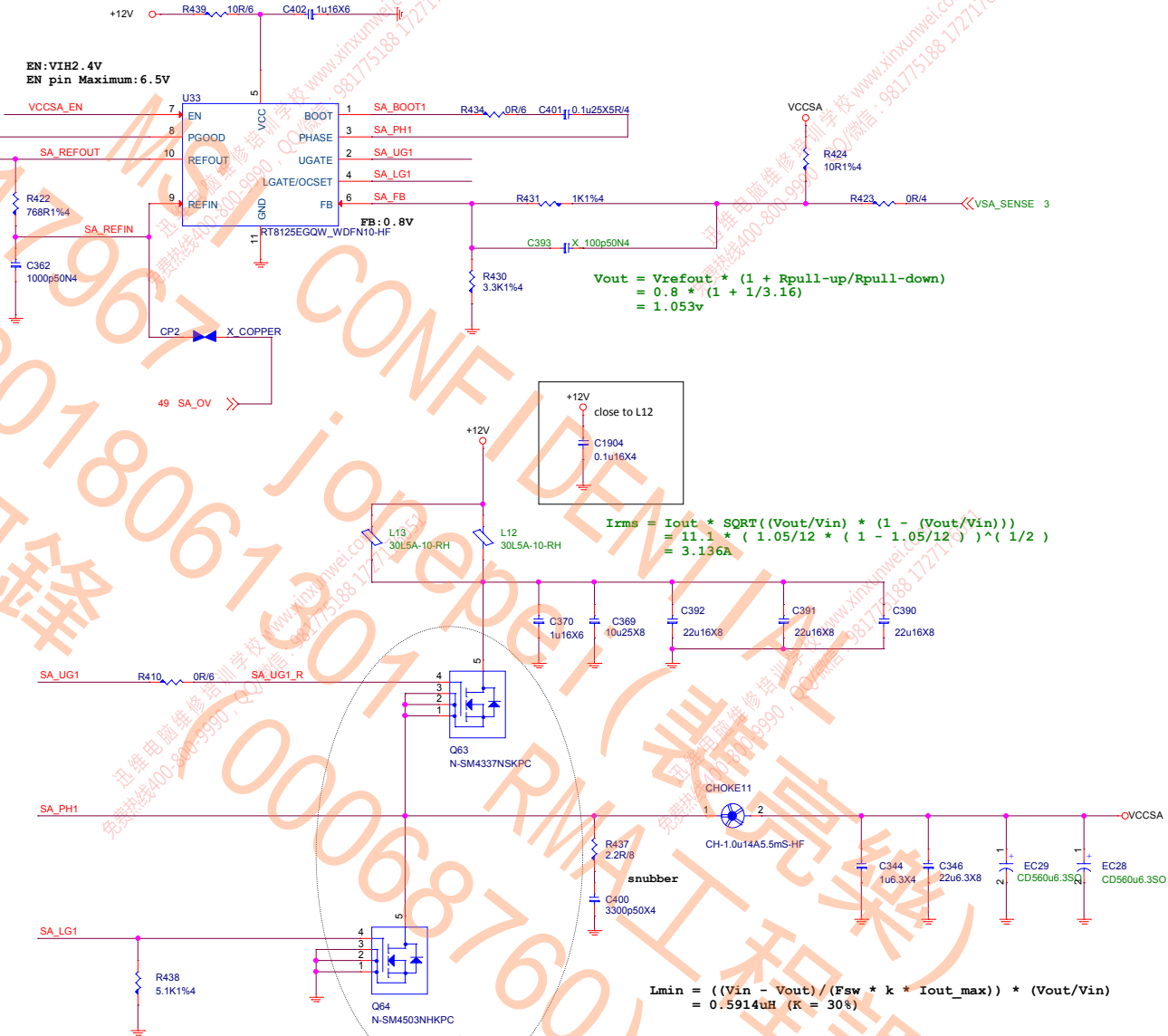


EN:VIH2.4V  
EN pin Maximum: 6.5V

SLP\_S3# assertion to VCC, VCCGT, VCCIO and VCCSA rails completely off.

SLP\_S3# assertion to VR disabled  
max:1us

ICC : 1.25 mA



$$V_{out} = V_{refout} * (1 + R_{pull-up}/R_{pull-down})$$

$$= 0.8 * (1 + 1/3.16)$$

$$= 1.053v$$

$$I_{rms} = I_{out} * \sqrt{(V_{out}/V_{in}) * (1 - (V_{out}/V_{in}))}$$

$$= 11.1 * \sqrt{(1.05/12 * (1 - 1.05/12))}$$

$$= 3.136A$$

$$L_{min} = ((V_{in} - V_{out}) / (F_{sw} * k * I_{out\_max})) * (V_{out}/V_{in})$$

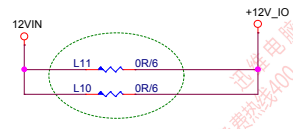
$$= 0.5914uH (K = 30\%)$$

2018.01.31  
change to SINOPOWER

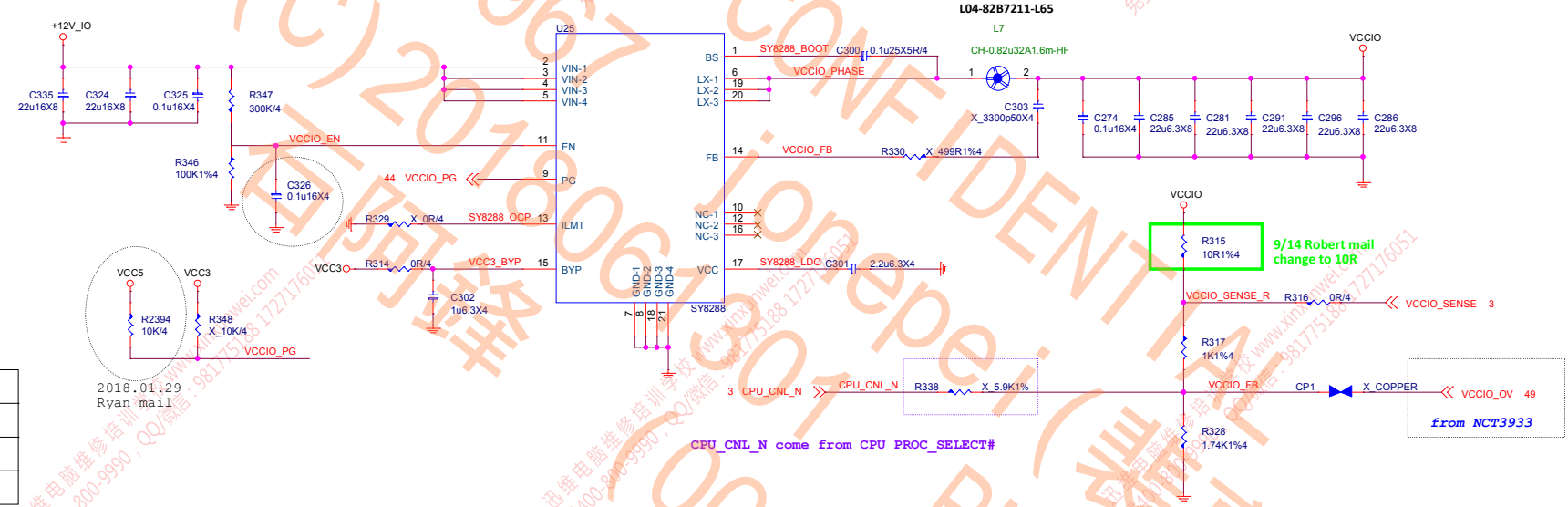
|                                  |  |                |
|----------------------------------|--|----------------|
| <b>MICRO-STAR INT'L CO.,LTD</b>  |  |                |
| <b>MS-7B23</b>                   |  |                |
| Size<br>Custom                   | Document Description<br><b>VCCSA - POWER RT8125E</b> | Rev<br>3.3     |
| Date: Tuesday, February 13, 2018 |  | Sheet 47 of 63 |

IO Power:0.95V,6.4A

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



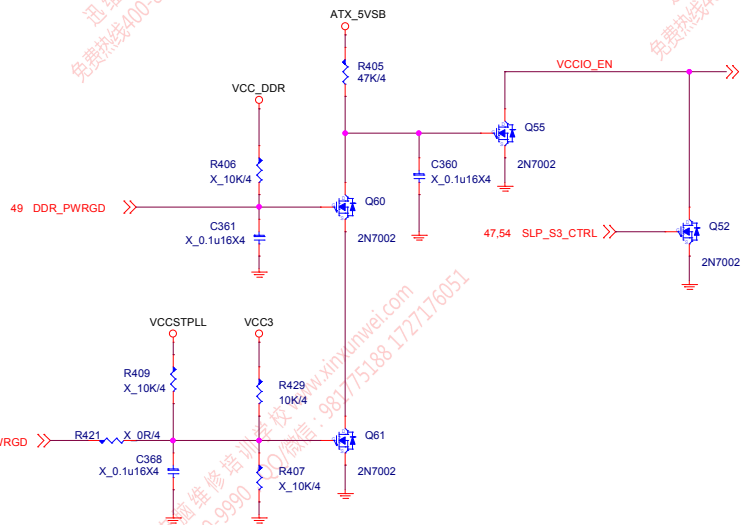
95W  
 ICCMAX=6.4A  
 Irms = 1.728A



| SY8288_OCP | OCP |
|------------|-----|
| 0          | 8A  |
| floating   | 12A |
| 1          | 16A |

2018.01.29  
 Ryan mail

CPU\_CNL\_N come from CPU\_PROC\_SELECT#



DDR4 Power:1.2V,19.8A OCP:28A

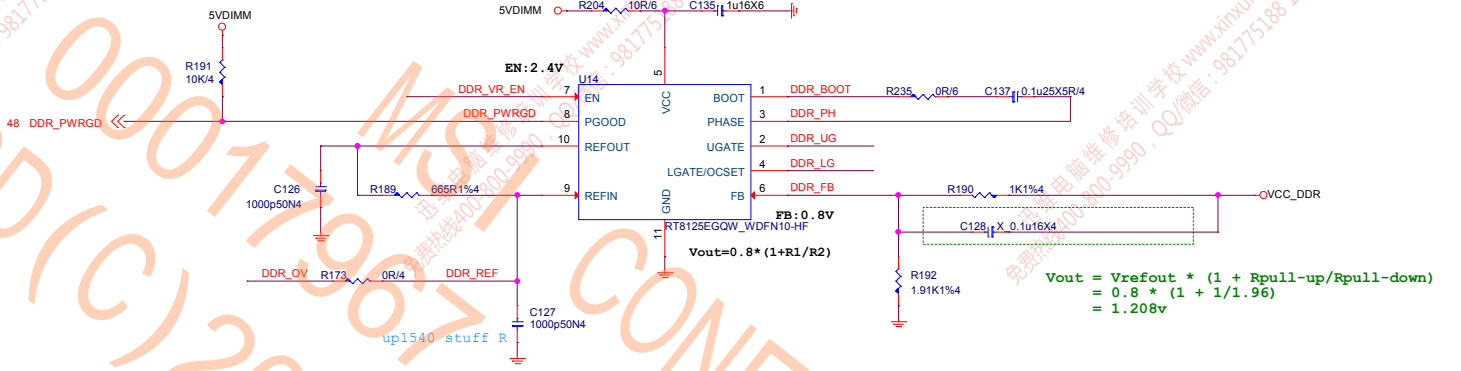
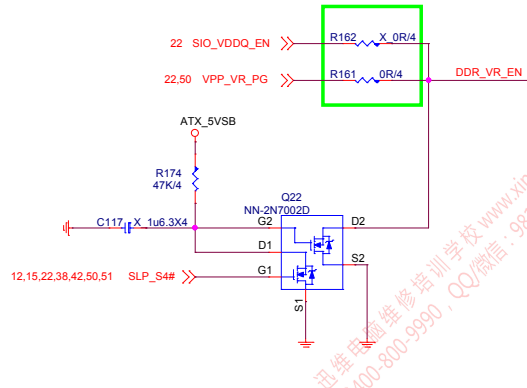
3.3A FOR CPU  
15.7A FOR 4DIMM  
0.7A FOR DDR VTT

OCP = 19.6A

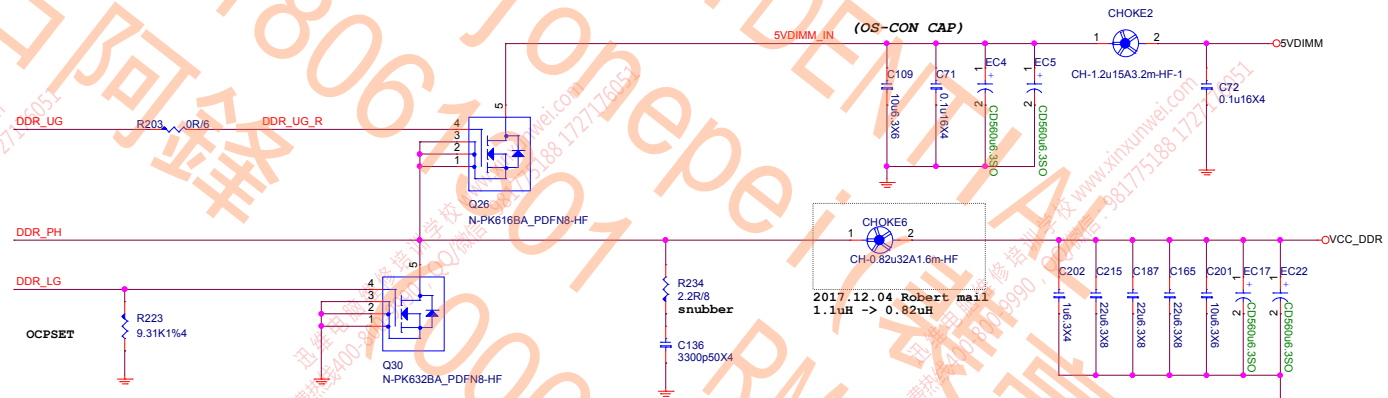
$$\begin{aligned} R_{ocset} &= 1.5 * I_{max} * R_{ds(on)} / I_{ocset} \\ &= 28 * 5.1\text{mohm} / 10\text{uA} \\ &= 14.28\text{K} \end{aligned}$$

R<sub>ds(on)</sub> (low)

D03-4503N0C-ST8 : 5.1mohm



$$\begin{aligned} I_{rms} &= I_{out} * \text{SQRT}((V_{out}/V_{in}) * (1 - (V_{out}/V_{in}))) \\ &= 20.2 * ((1.2/5) * (1 - 1.2/5))^{1/2} \\ &= 8.627\text{A} \end{aligned}$$



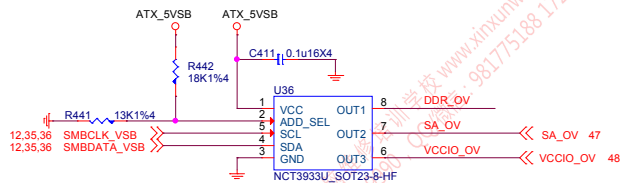
Datasheet公式計算

$$\begin{aligned} L_{min} &= ((V_{in} - 1.2\text{V}) / (F_{sw} * k * I_{out\_max})) * (V_{out}/V_{in}) \\ &= 0.7677\text{uH} \quad (K = 30\%) \end{aligned}$$

若帶入CAP ESR計算, 0.2432uH < L < 1.2897uH

**UPI VOLTAGE CONSOLE**

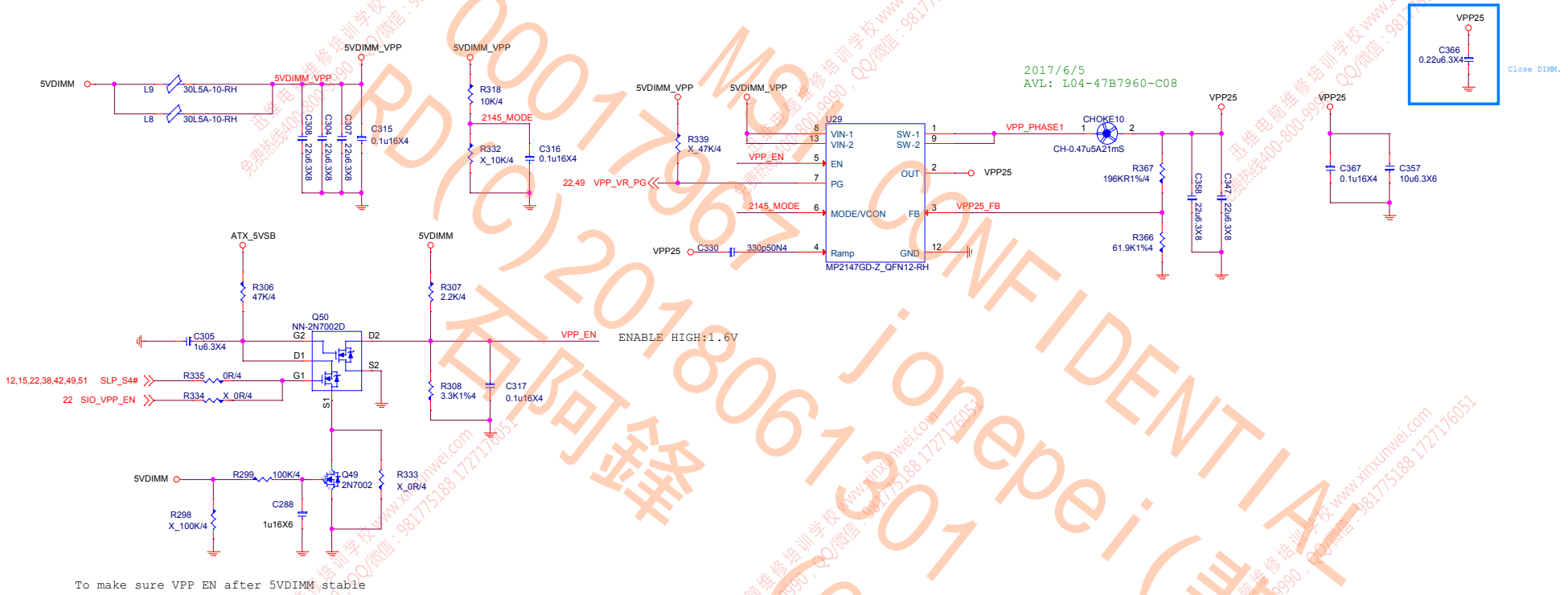
0x26: RH=18K, RL=13K



|                                  |  |         |
|----------------------------------|--|---------|
| <b>MSI</b>                       |  |         |
| <b>MICRO-STAR INT'L CO.,LTD</b>  |  |         |
| <b>MS-7B23</b>                   |  |         |
| Size Custom                      | Document Description<br><b>DDR - RT8125E</b> | Rev 3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 49                                     | of 63   |

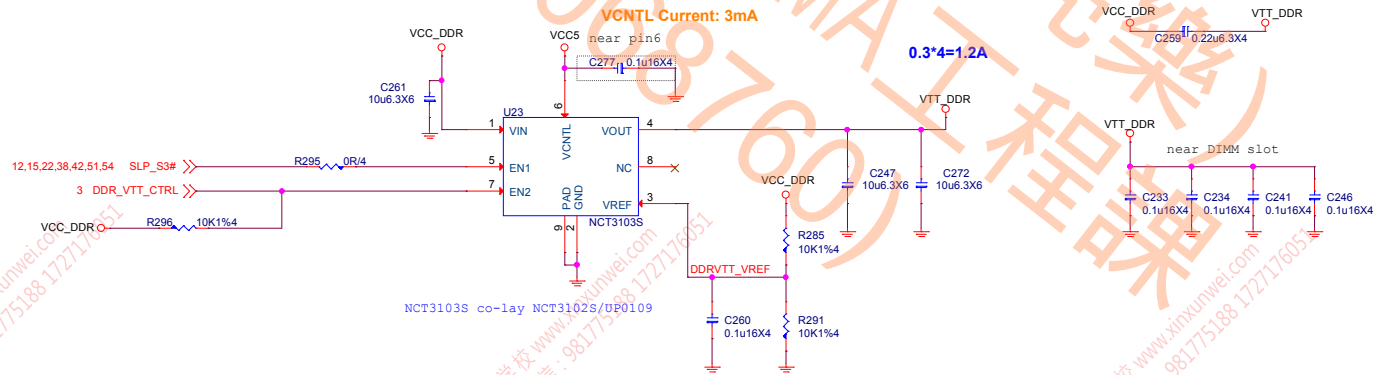
4DIMM :2.24A FOR  
DDR VPP2.5V

**VPP25 Power**  
2.5V; 2.24A



**DDR VTT Power**

To CPU Copper trace width > 250mils , Fill island behind DIMM > 400mils .

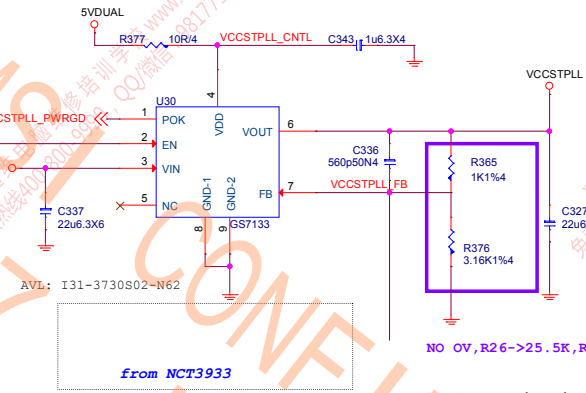
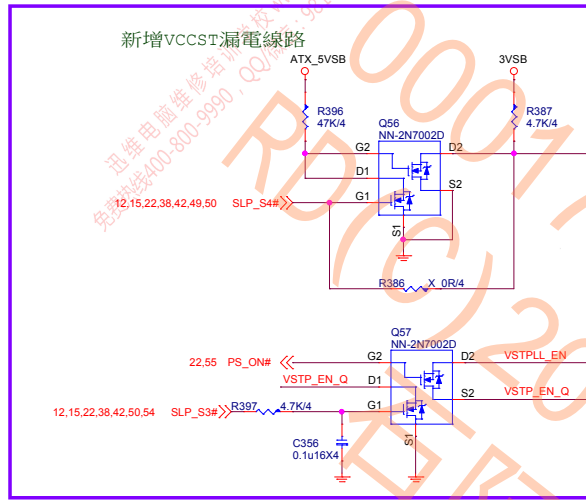


|                                  |  |            |
|----------------------------------|--|------------|
| <b>MICRO-STAR INT'L CO.,LTD</b>  |  |            |
| <b>MS-7B23</b>                   |  |            |
| Size<br>Custom                   | Document Description<br><b>VPP-2147 / VTT-3103</b> | Rev<br>3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 50   | of 63      |

# VCCSTPLL

1.05V; 230mA

For Cost down VCCST&VCCPLL merge



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

VCCIO ramped and stable before beginning of VCCOFC/VCCEPIO ramp

VCCST/PLL stable 1ms before PROC\_PWRGD

# VCCPLL\_OC

1.2V; 130mA



MICRO-STAR INT'L CO.,LTD

MS-7B23

|                                  |                      |     |
|----------------------------------|----------------------|-----|
| Size                             | Document Description | Rev |
| Custom                           | CPU PWR_ST/PLL_OC    | 3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 51 of 63       |     |

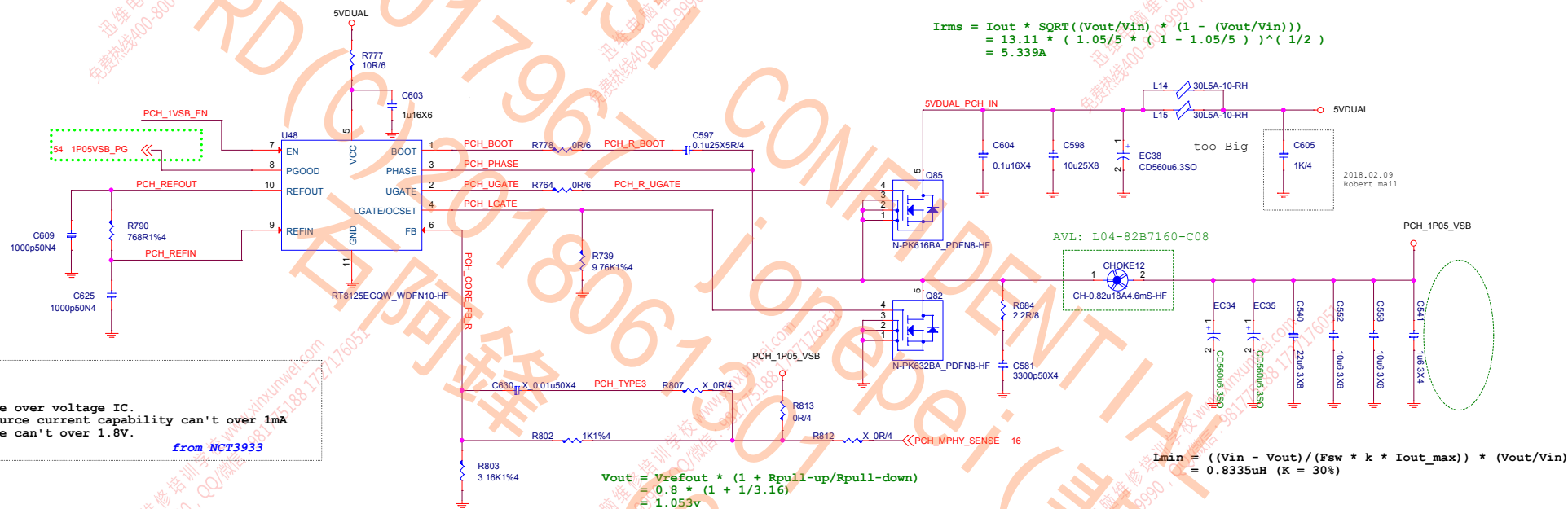
# PCH 1VSB

1.05V; 13.11A

$$OCP = R_{ocset} \times I_{ocset} / R_{lgds(on)}$$

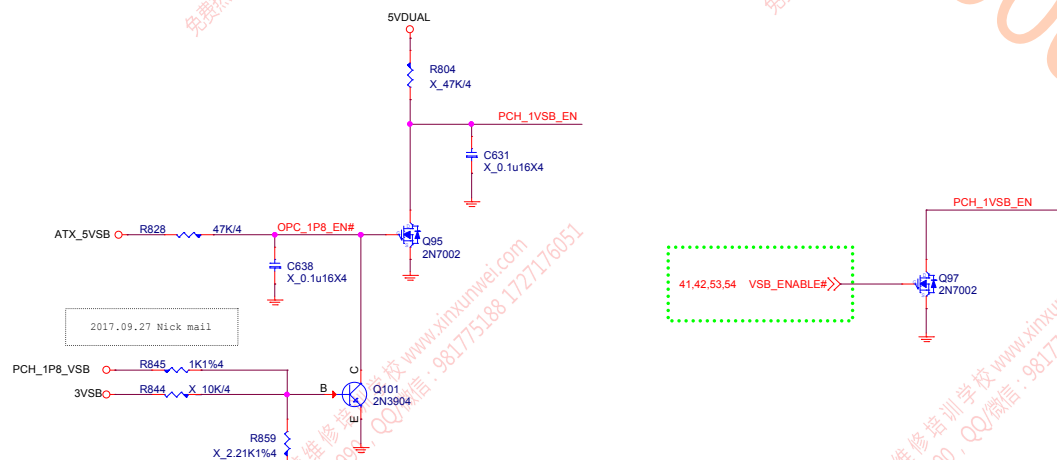
$$= 9.76k \times 10u / 4.6m$$

$$= 21.21A$$



to sink/source over voltage IC.  
pin10 sink/source current capability can't over 1mA  
So max voltage can't over 1.8V.

from NCT3933



|                                  |   |         |
|----------------------------------|---|---------|
| MICRO-STAR INT'L CO.,LTD         |   |         |
| MS-7B23                          |   |         |
| Size Custom                      | Document Description<br><b>PCH Core power</b> | Rev 3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 52 of 63                                |         |

# 1P8 VSB

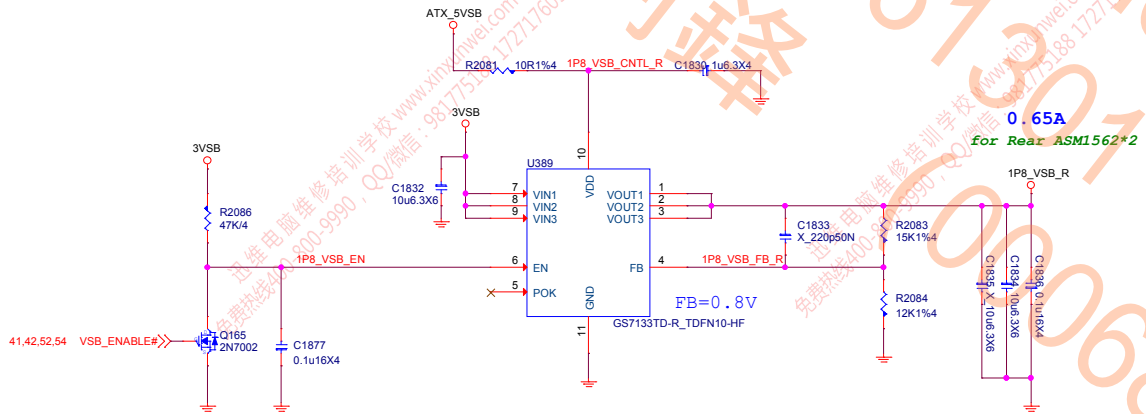
1.8V; 500mA

Current Limit: 3.8A

2017.12.07  
GS7133 down size to I31-S71330C-N03.

0.5A 0.325A  
for PCH & Front ASM1562

0.65A  
for Rear ASM1562\*2



### The power consumption with Internal LDO

| item                             | Power state   | VCCA<br>1.8V (mA) | Total power<br>(mW) |
|----------------------------------|---------------|-------------------|---------------------|
| Without device plug in,          | Power on      | 25.82             | 46.47               |
| USB3.1 Gen2 device is plugged in | Burning state | 324.60            | 584.29              |
| USB3.1 Gen2 device is plugged in | In idle       | 50.58             | 91.05               |
| USB3.1 Gen2 device is plugged in | S3(D3) state  | 50.59             | 91.06               |

### The power consumption with External LDO

| item                             | Power state   | VCCA<br>1.8V (mA) | VDD<br>1.2V (mA) | Total power<br>(mW) |
|----------------------------------|---------------|-------------------|------------------|---------------------|
| Without device plug in,          | Power on      | 10.46             | 17.47            | 39.79               |
| USB3.1 Gen2 device is plugged in | Burning state | 95.34             | 226.37           | 443.25              |
| USB3.1 Gen2 device is plugged in | In idle       | 17.18             | 52.10            | 93.44               |
| USB3.1 Gen2 device is plugged in | S3(D3) state  | 17.17             | 52.10            | 93.42               |



MICRO-STAR INT'L CO.,LTD

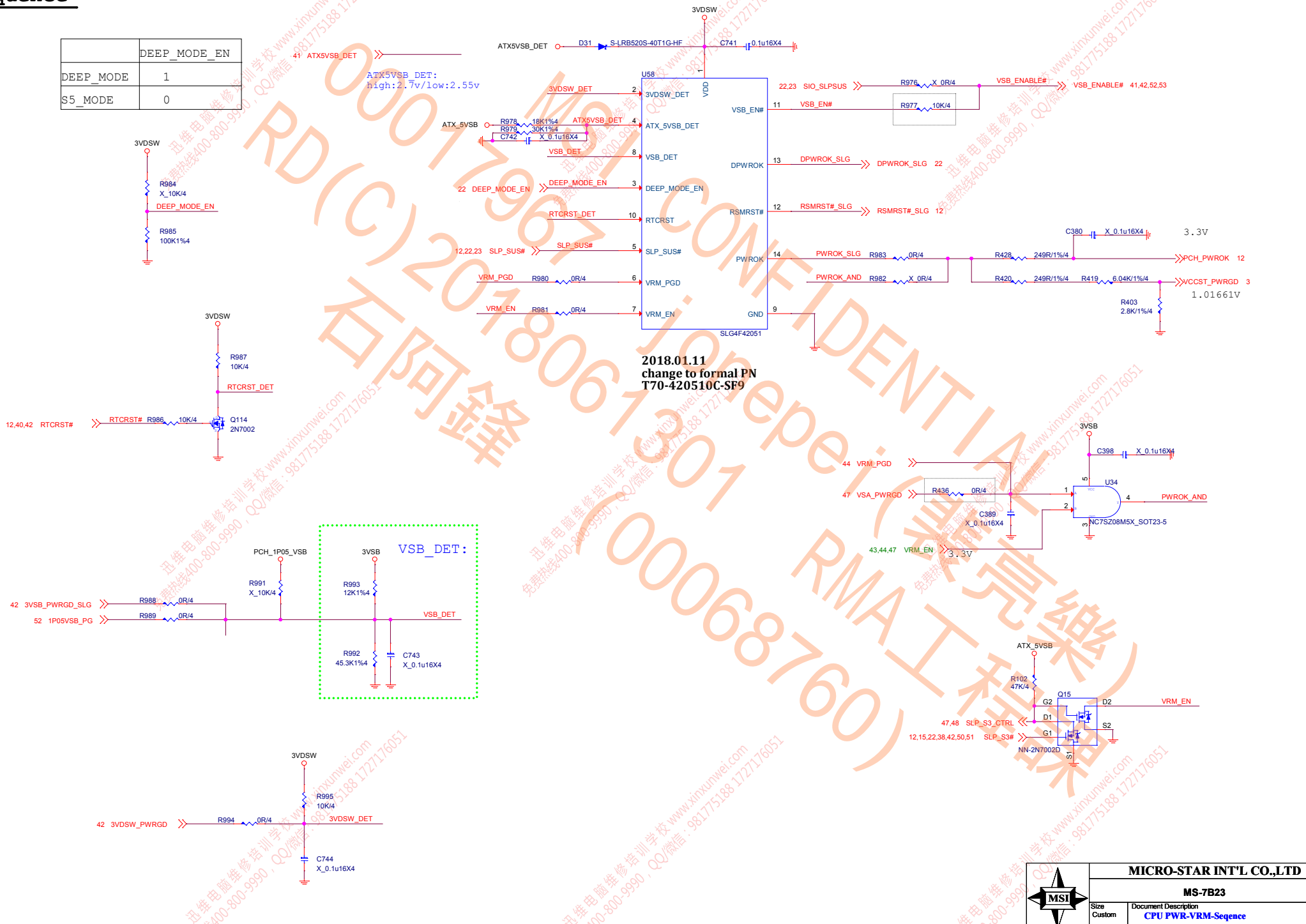
MS-7B23

|                                  |                                  |            |
|----------------------------------|----------------------------------|------------|
| Size<br>Custom                   | Document Description<br>PCH 1P8V | Rev<br>3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 53 of 63                   |            |

# Sequence

|           |              |
|-----------|--------------|
|           | DEEP_MODE_EN |
| DEEP_MODE | 1            |
| S5_MODE   | 0            |

ATX5VSB\_DET:  
high:2.7v/low:2.55v

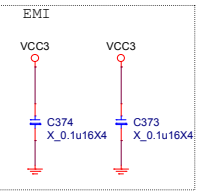
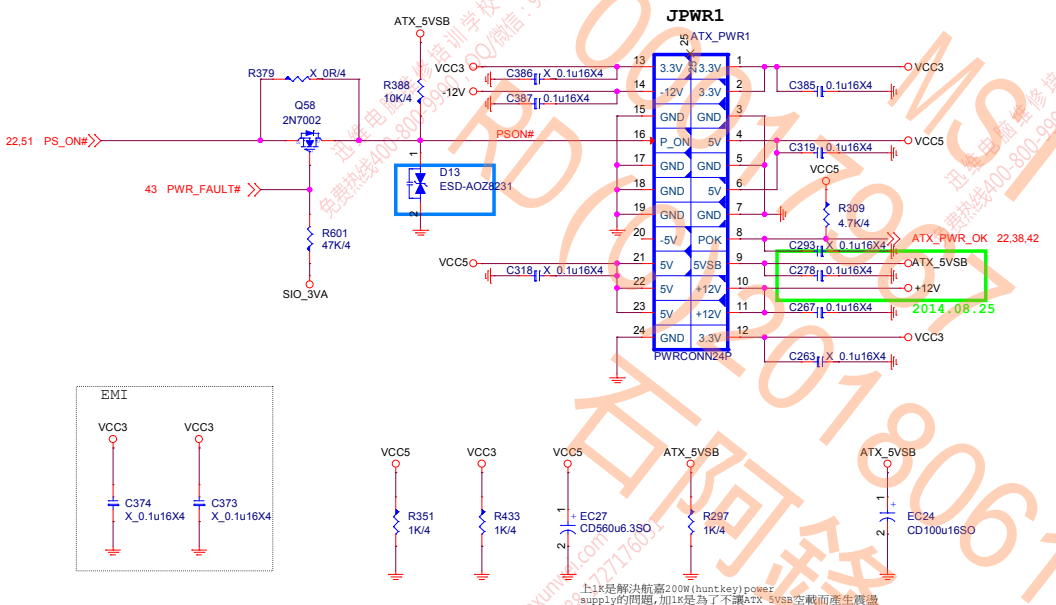


2018.01.11  
change to formal PN  
T70-420510C-SF9

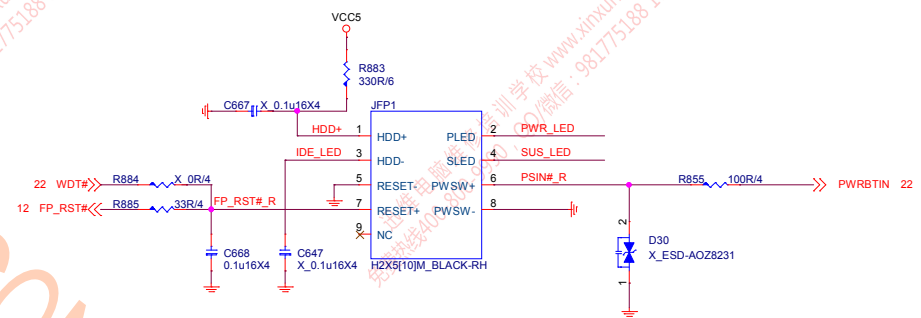
|                                 |                            |                      |
|---------------------------------|----------------------------|----------------------|
| <b>MICRO-STAR INT'L CO.,LTD</b> |                            |                      |
| <b>MS-7B23</b>                  |                            |                      |
|                                 | Size                       | Document Description |
|                                 | Custom                     | CPU PWR-VRM-Sequence |
| Date:                           | Tuesday, February 13, 2018 | Rev 3.3              |
|                                 | Sheet 54                   | of 63                |

### ATX POWER CONNECTOR

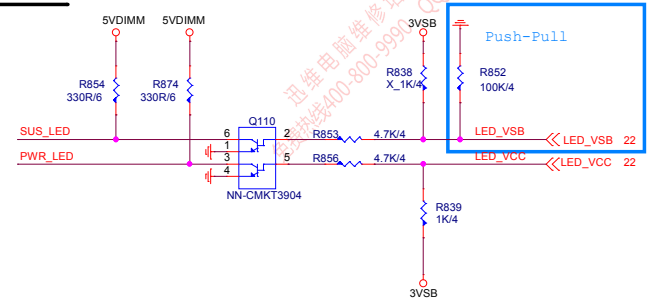
D26:By Ivy's word document.  
Main:D0G-130050C-A68  
Av1:D0G-3000600-L07/D0G-1200520-I05



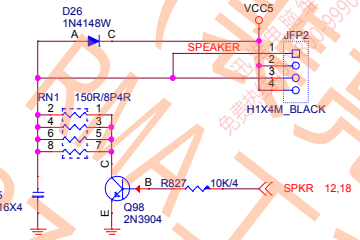
### FRONT PANNEL



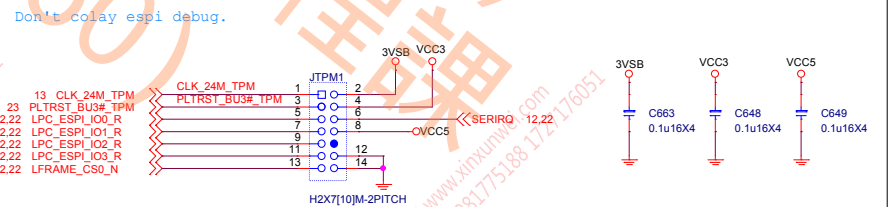
### LED



### Speaker Pin Header



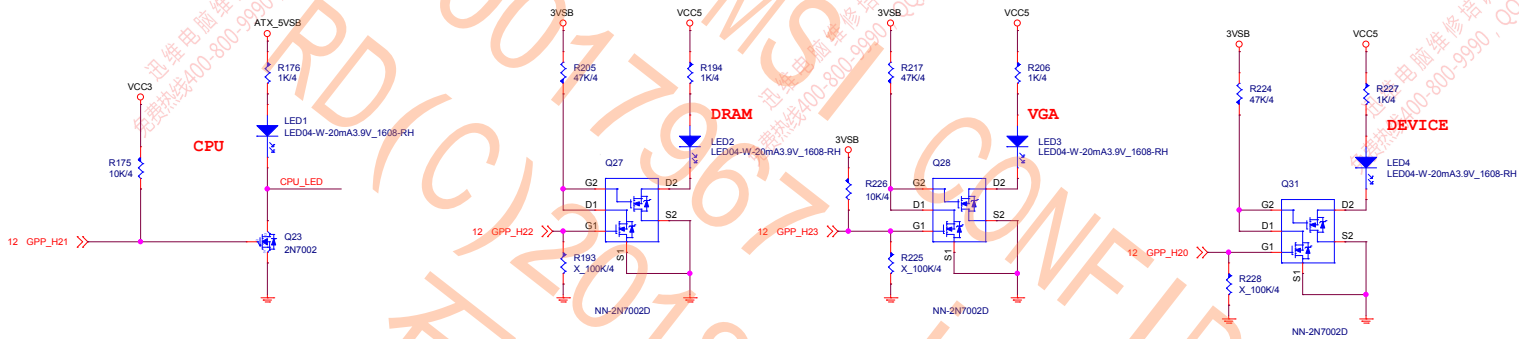
### TPM



|   |  |            |
|---|--|------------|
| <b>MICRO-STAR INT'L CO.,LTD</b>                   |  |            |
| <b>MS-7B23</b>                                    |  |            |
| Size<br>Custom                                    | Document Description<br><b>ATX F_Panel/TPM/MSI_LED</b> | Rev<br>3.3 |
| Date: Tuesday, February 13, 2018   Sheet 55 of 63 |  |            |

# DEBUG LED

2018.01.12  
 PCB3.1 default white LED  
 PN:D0C-040T200-H91  
 AVL:D0C-040S200-E07

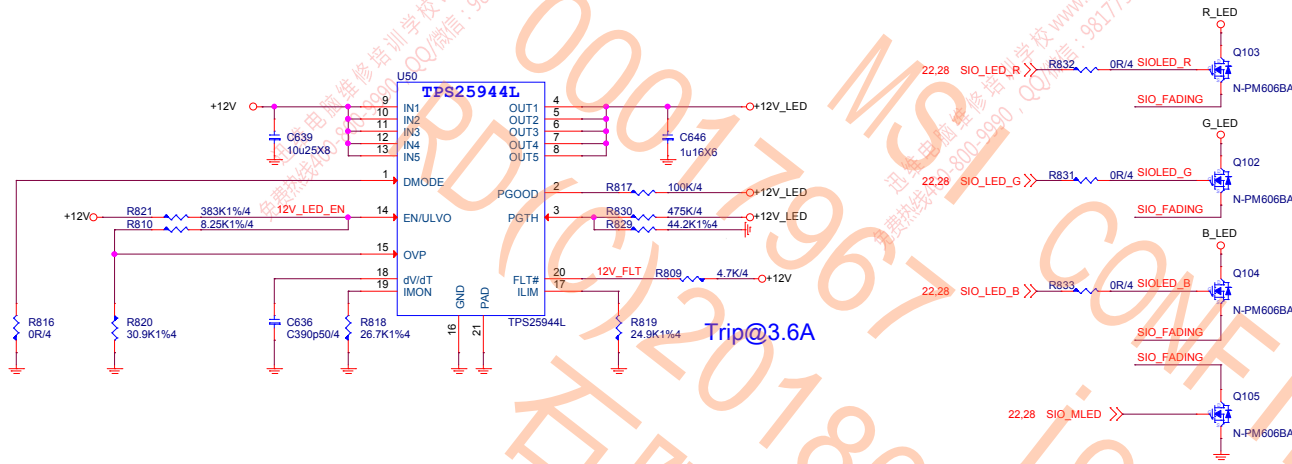


| GPIO LED | PCH_GP20         | PCH_GP21              | PCH_GP22              | PCH_GP23              |
|----------|------------------|-----------------------|-----------------------|-----------------------|
| 亮        | NATIVE PULL HIGH | GPO PULL HIGH         | GPO PULL HIGH         | NATIVE PULL HIGH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

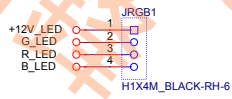
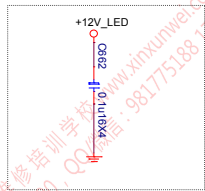
關機斷電狀態下，3個LED先維持default全暗，開機通電後：

1. 首先進行CPU check CPU LED 亮，check PASS後則CPU LED滅掉。
2. 接著依序進行Memory /memory LED亮check PASS後則memory LED滅掉。
3. VGA的check/VGA LED亮，check PASS後則VGA LED滅掉。
4. 因此最後正常順利開機後，三個LED燈都是滅掉的。（系統重啟或其他原因造成系統重開機，則LED仍按上述行為動作）

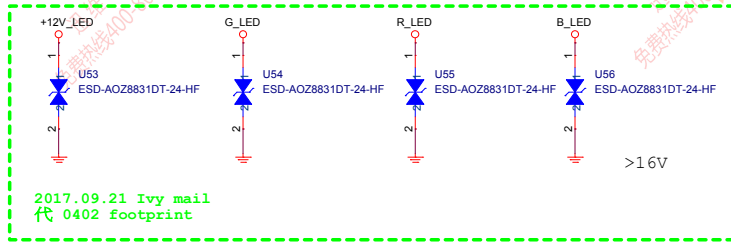
# LED STRIPLINE



2016.08.02 Add +12V\_LED 0.1uF

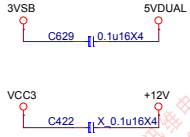


2016.07.06 only reserve now  
2016.08.02 stuff ESD

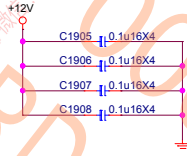


|                                  |  |            |
|----------------------------------|--|------------|
| <b>MSI</b>                       |  |            |
| <b>MICRO-STAR INT'L CO.,LTD</b>  |  |            |
| <b>MS-7B23</b>                   |  |            |
| Size<br>Custom                   | Document Description<br><b>LED STRIP</b> | Rev<br>3.3 |
| Date: Tuesday, February 13, 2018 | Sheet 57 of 63                           |            |

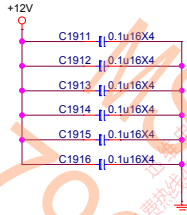
2017.10.13 moat cap



2017.12.21 SA\_PH decouple cap




2018.02.02 SA\_PH decouple cap

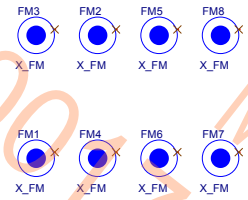


石阿鋒 (2017-967) CONFIDENTIAL jonepei (魏亮樂) RMA工程師 (00068760)

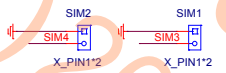
迅维电脑维修培训学校 www.xinxunwei.com  
 免费热线400-800-9990, QQ/微信: 981775188 1727176051

|   |                                    |            |
|---|------------------------------------|------------|
|  |                                    |            |
| <b>MICRO-STAR INT'L CO.,LTD</b>   |                                    |            |
| <b>MS-7B23</b>  |                                    |            |
| Size<br>Custom  | Document Description<br><b>EMI</b> | Rev<br>3.3 |
| Date: Tuesday, February 13, 2018  | Sheet 58                           | of 63      |

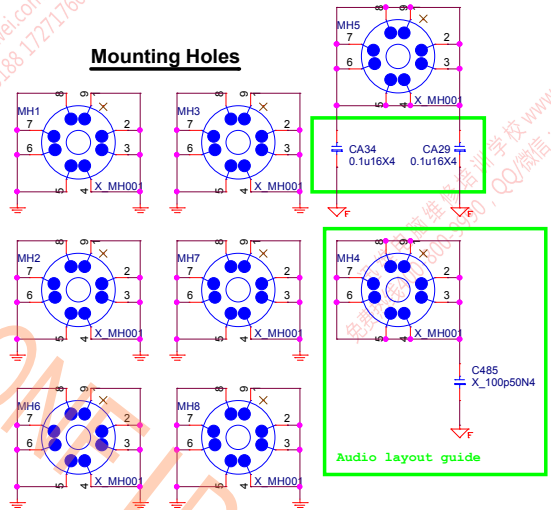
### Optical Fiducial Marks-120



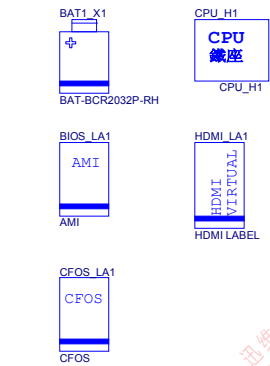
### Simulation



### Mounting Holes

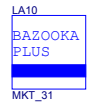


- VCC\_DDR ○ □ VCC\_DDR
- VTT\_DDR ○ □ VTT\_DDR
- 5VDIMM ○ □ 5VDIMM
- 3VSB ○ □ 3VSB
  
- 3VDSW ○ □ 3VDSW
- PCH\_1P05\_VSB ○ □ PCH\_1P05\_VSB
- PCH\_1P8\_VSB ○ □ PCH\_1P8\_VSB
- VCORE ○ □ VCORE
- VGT ○ □ VGT
- VCCSA ○ □ VCCSA
- VCCSTPLL ○ □ VCCSTPLL
- VCCIO ○ □ VCCIO



Marketing Name

### HEATSINK



|                                  |   |                |
|----------------------------------|---|----------------|
| <b>MICRO-STAR INT'L CO.,LTD</b>  |   |                |
| <b>MS-7B23</b>                   |   |                |
| Size<br>Custom                   | Document Description<br><b>Manual Parts</b> | Rev<br>3.3     |
| Date: Tuesday, February 13, 2018 |   | Sheet 59 of 63 |