MS-7C88

ATX:236mm*192mm

Ver: 1.1

Intel -CometLake-S plamform

CPU:

LGA1200

*CPU POWER PAK *4 Phase*

*GT POWER PAK *1 Phase*

System Chipset:

Comet Lake PCH-V B460

Onboard Chip:

eSIO:NCT5887D-M
HD Audio Codec: ALC892
LAN: RTL8111H
Flash ROM: SPI 128 MB
eDP to VGA: RTD2166

PWM:

VCORE - RT3607	*140A*
DDR - RT8231	*10.07A*
DDR VPP25- SY8113K	*2A*
PCH(1V) - RT8125H	*10.074A*
VCCSA - TPS56C230	*11.1A*
VCCIO - TPS568230	*6.4A*

Main Memory:

*DDR4 * 2 (Dual Channel)*

ACPI:

5VDAUL:uP7501

5VDIMM:uP7501

3VSB:LDO+MOS

3VDSW:GS711

VCCSTPLL:TPS22976D

Expansion Slots:

*PCI Express (X16) Slot * 1*

*PCI Express (X1) Slot * 2*

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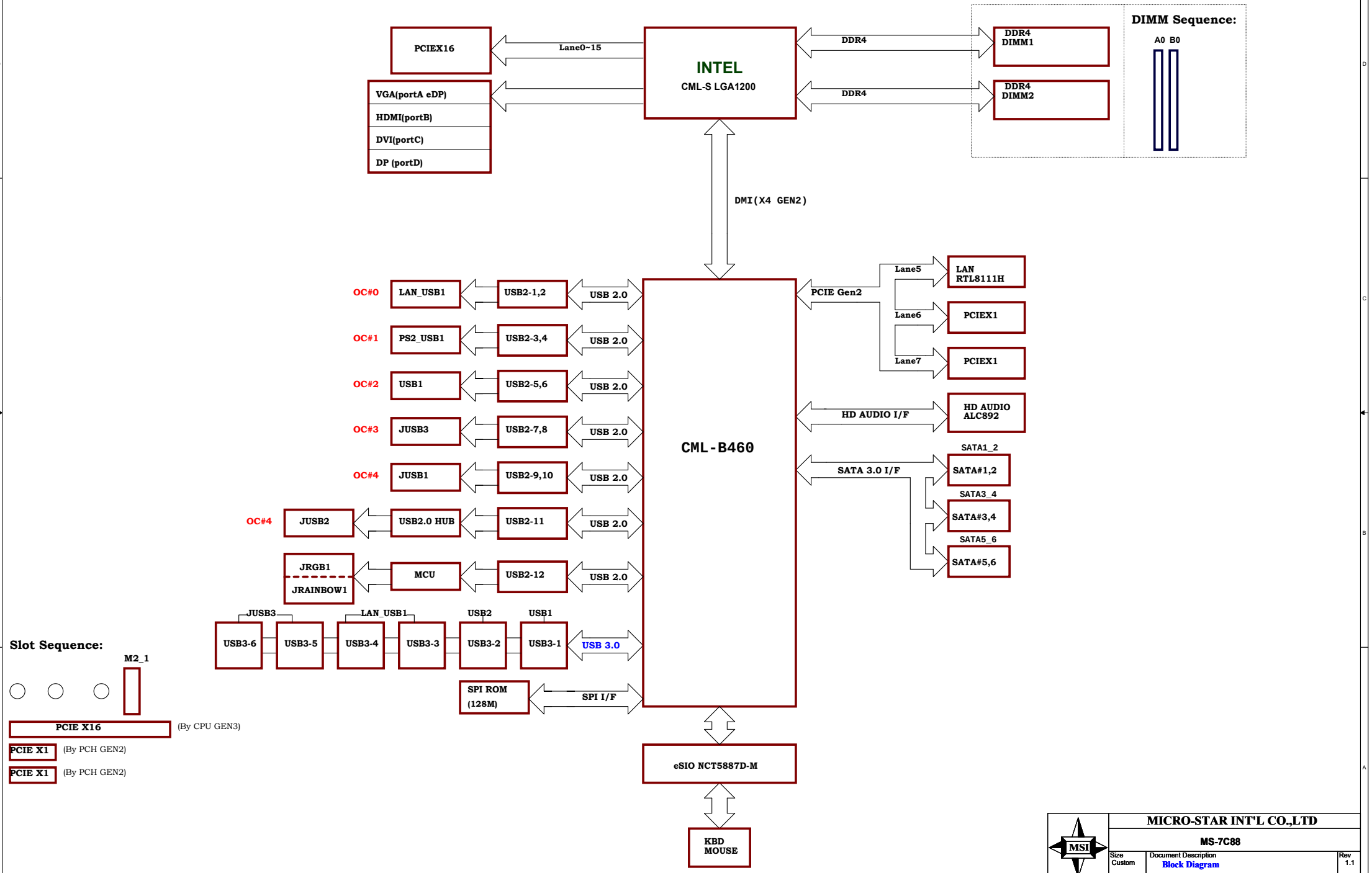
MS-7C88

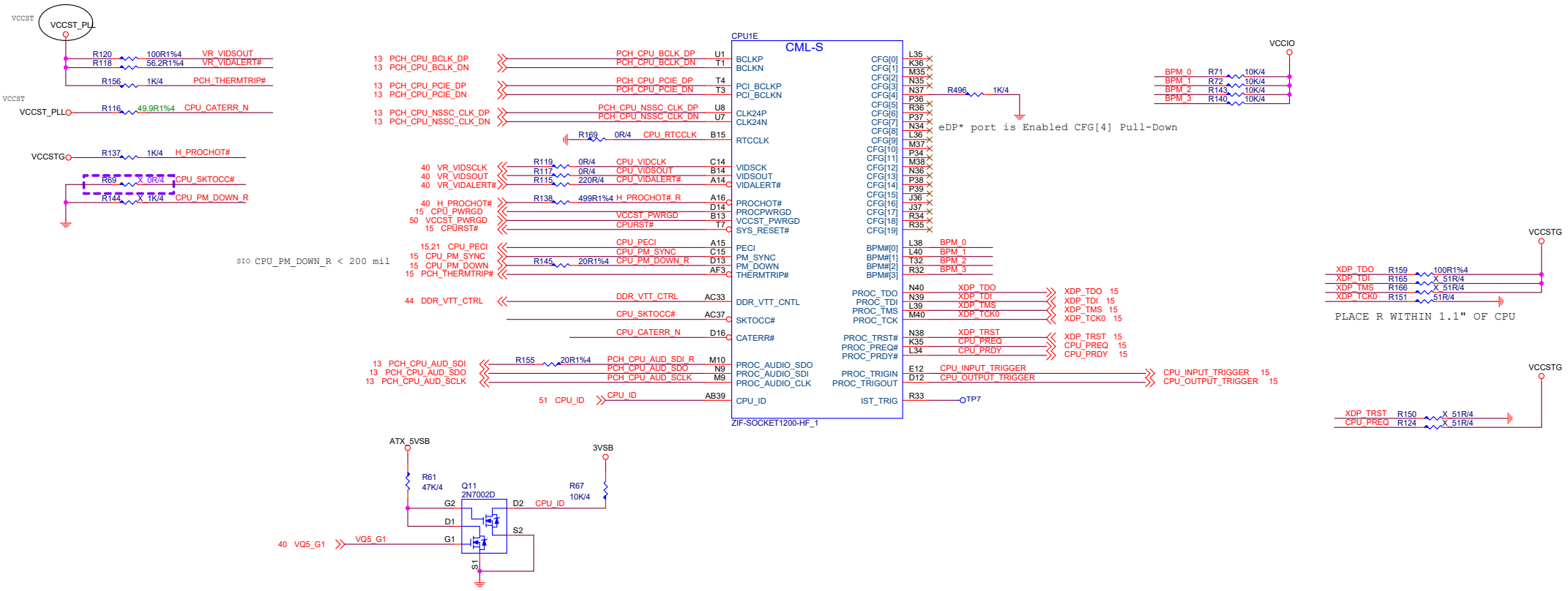
Size: Custom | Document Description: Cover Sheet | Rev: 1.1

Date: Monday, April 27, 2020 | Sheet 1 of 60

MS-7C88 Block Diagram



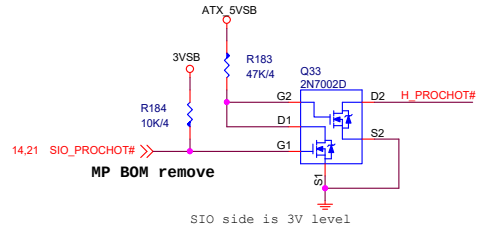
MICRO-STAR INT'L CO.,LTD		
MS-7C88		
Size: Custom	Document Description: Block Diagram	Rev: 1.1
Date: Monday, April 27, 2020	Sheet 2 of 60	



CFG Strap

CFG Table

	HIGH	LOW	DESCRIPTION
0	No Lock	Lock	PCU PLL lock
1			RSVD
2	NORM	REVERSE	PEG LANE REVERSAL
3			RSVD
4	DISABLE	ENABLE	eDP
5			RSVD
6			RSVD
7	RESET#	BIOS REQ	PEG_DEFER_TRAINING
8			RSVD
9			RSVD
10			RSVD
11			RSVD
12			RSVD
13			RSVD
14			RSVD
15			RSVD
16			RSVD
17			RSVD
18			RSVD
19			RSVD



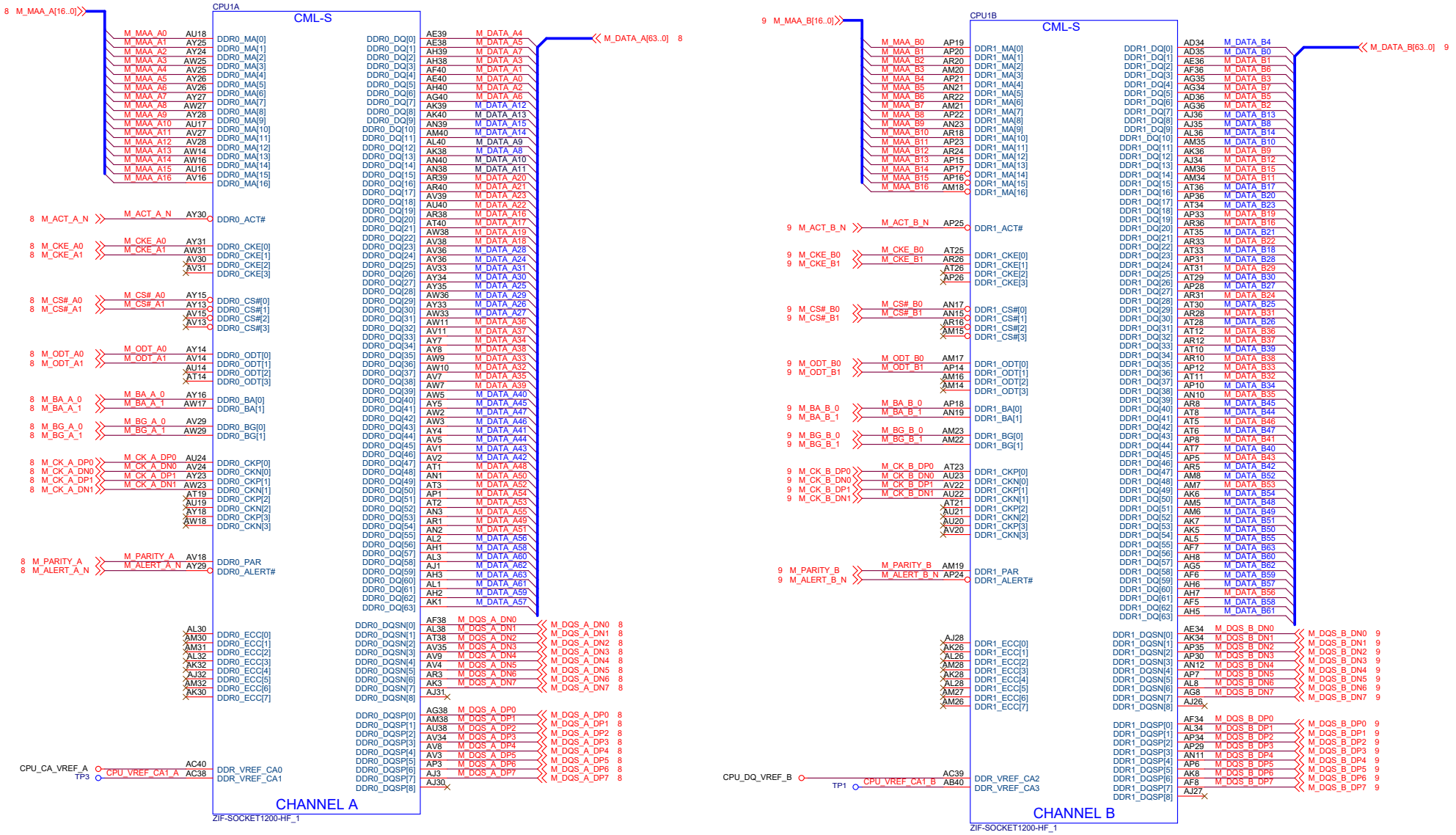
MICRO-STAR INT'L CO.,LTD

MS-7C88

Size	Document Description	Rev
Custom	CPU-Control/MISC/CFG	1.1

Date: Monday, April 27, 2020 Sheet 3 of 60

SOCKET PN N12-151A010-L06

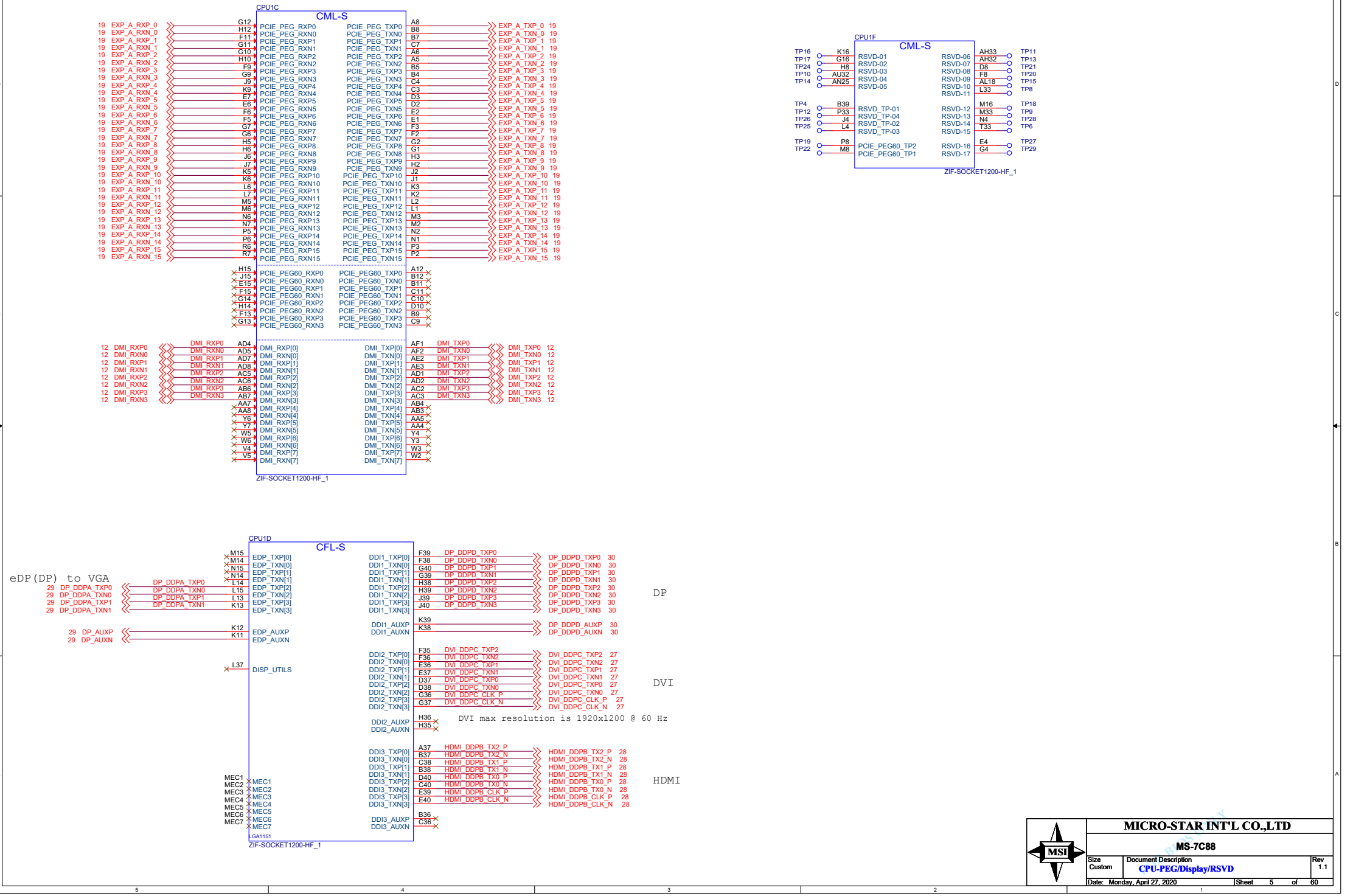


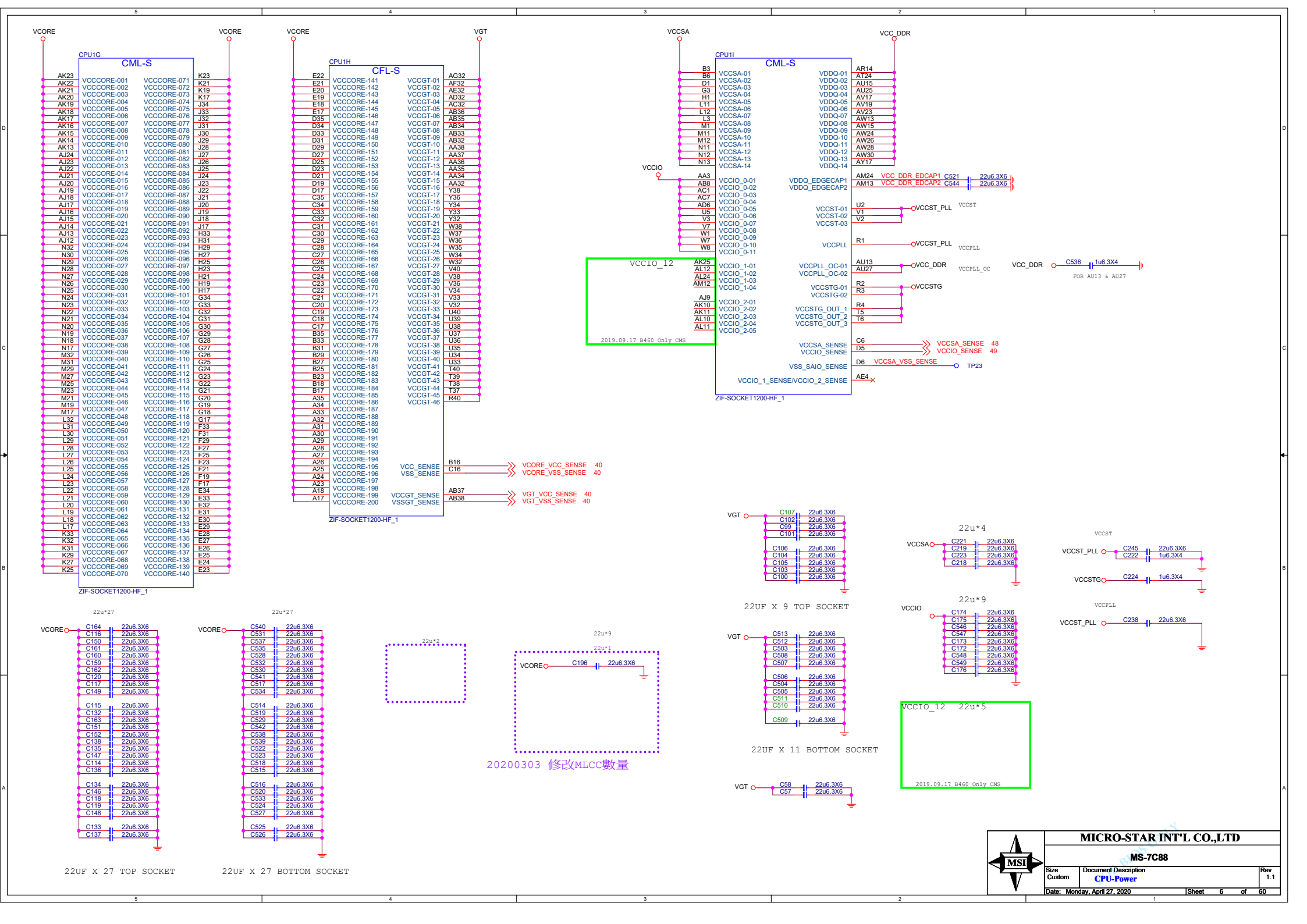
MICRO-STAR INT'L CO.,LTD

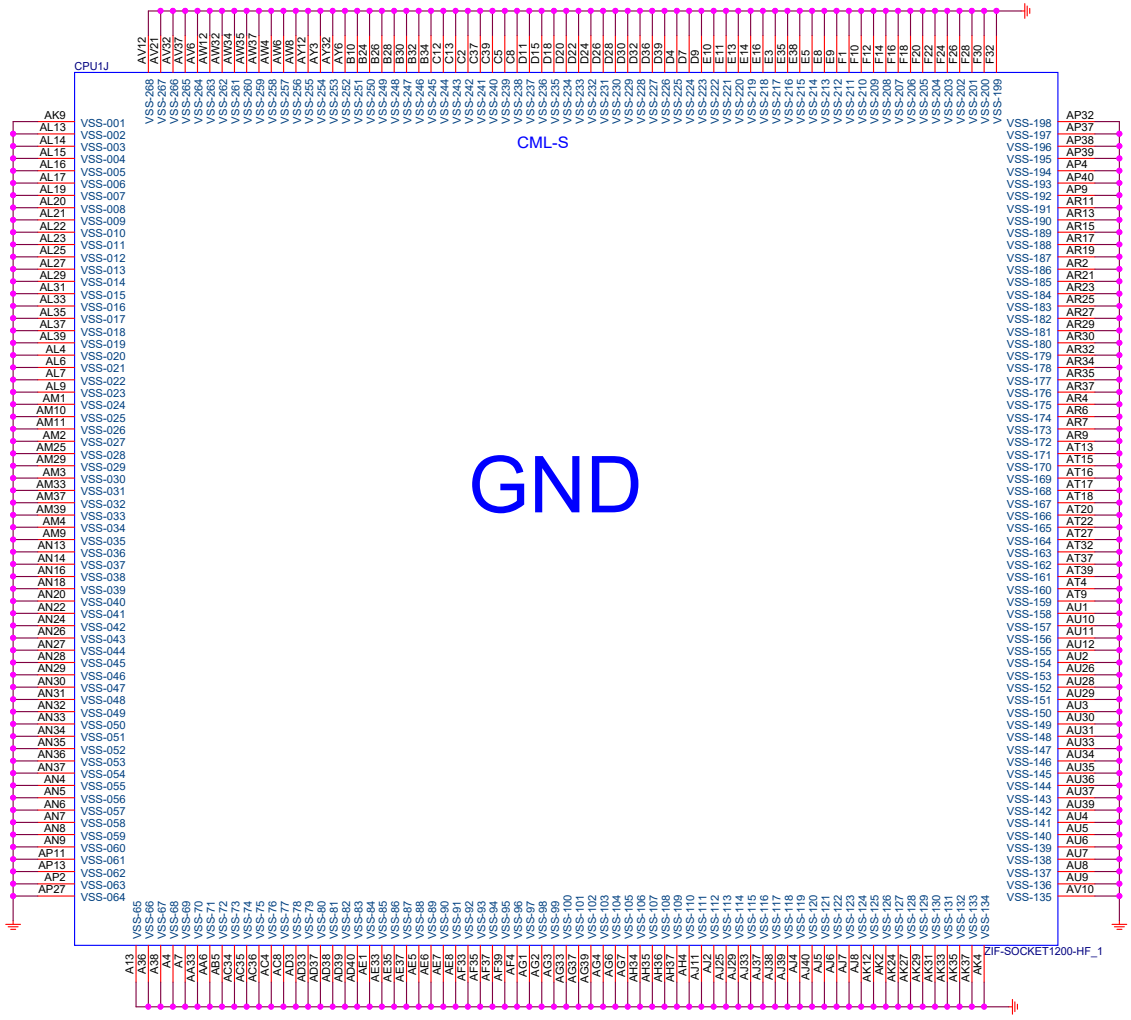
MS-7C88

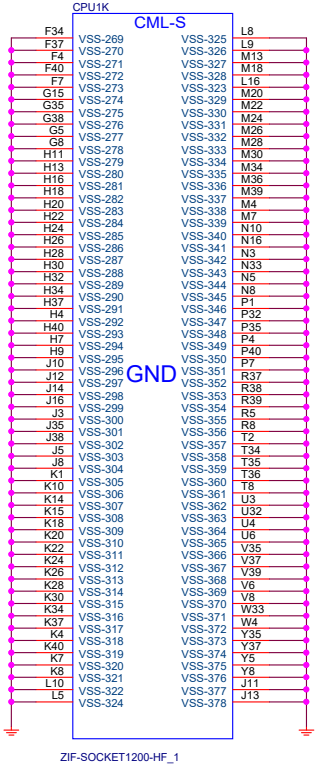
Size	Document Description	Rev
Custom	CPU-Memory	1.1

Date: Monday, April 27, 2020 Sheet 4 of 60

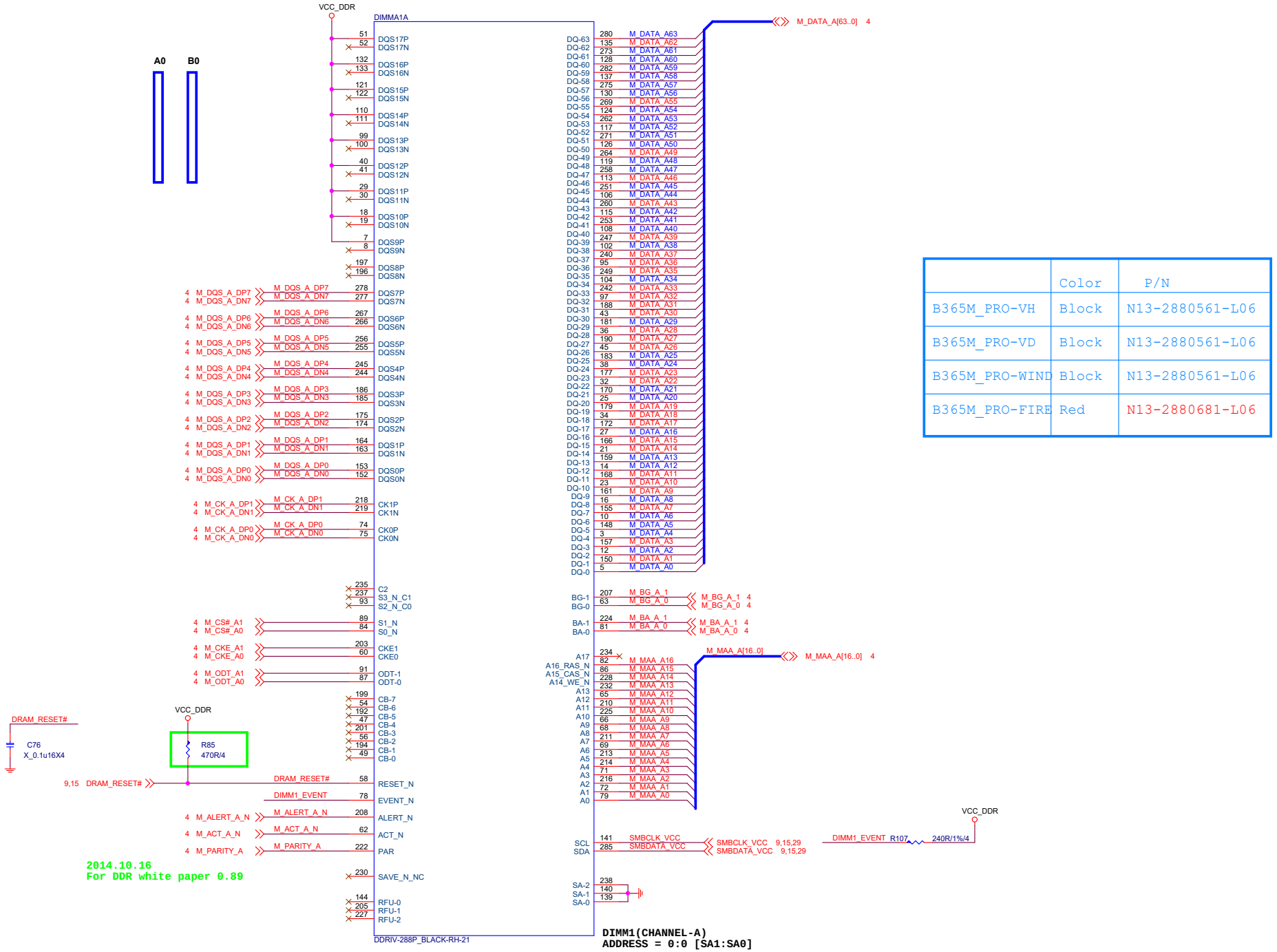

CPU1C
CML-S
PCIE_PEG_RXP0
PCIE_PEG_RXN0
PCIE_PEG_RXP1
PCIE_PEG_RXN1
PCIE_PEG_RXP2
PCIE_PEG_RXN2
PCIE_PEG_RXP3
PCIE_PEG_RXN3
PCIE_PEG_RXP4
PCIE_PEG_RXN4
PCIE_PEG_RXP5
PCIE_PEG_RXN5
PCIE_PEG_RXP6
PCIE_PEG_RXN6
PCIE_PEG_RXP7
PCIE_PEG_RXN7
PCIE_PEG_RXP8
PCIE_PEG_RXN8
PCIE_PEG_RXP9
PCIE_PEG_RXN9
PCIE_PEG_RXP10
PCIE_PEG_RXN10
PCIE_PEG_RXP11
PCIE_PEG_RXN11
PCIE_PEG_RXP12
PCIE_PEG_RXN12
PCIE_PEG_RXP13
PCIE_PEG_RXN13
PCIE_PEG_RXP14
PCIE_PEG_RXN14
PCIE_PEG_RXP15
PCIE_PEG_RXN15
PCIE_PEG_TXP0
PCIE_PEG_TXN0
PCIE_PEG_TXP1
PCIE_PEG_TXN1
PCIE_PEG_TXP2
PCIE_PEG_TXN2
PCIE_PEG_TXP3
PCIE_PEG_TXN3
PCIE_PEG_TXP4
PCIE_PEG_TXN4
PCIE_PEG_TXP5
PCIE_PEG_TXN5
PCIE_PEG_TXP6
PCIE_PEG_TXN6
PCIE_PEG_TXP7
PCIE_PEG_TXN7
PCIE_PEG_TXP8
PCIE_PEG_TXN8
PCIE_PEG_TXP9
PCIE_PEG_TXN9
PCIE_PEG_TXP10
PCIE_PEG_TXN10
PCIE_PEG_TXP11
PCIE_PEG_TXN11
PCIE_PEG_TXP12
PCIE_PEG_TXN12
PCIE_PEG_TXP13
PCIE_PEG_TXN13
PCIE_PEG_TXP14
PCIE_PEG_TXN14
PCIE_PEG_TXP15
PCIE_PEG_TXN15
EXP_A_TXP_0
EXP_A_TXN_0
EXP_A_TXP_1
EXP_A_TXN_1
EXP_A_TXP_2
EXP_A_TXN_2
EXP_A_TXP_3
EXP_A_TXN_3
EXP_A_TXP_4
EXP_A_TXN_4
EXP_A_TXP_5
EXP_A_TXN_5
EXP_A_TXP_6
EXP_A_TXN_6
EXP_A_TXP_7
EXP_A_TXN_7
EXP_A_TXP_8
EXP_A_TXN_8
EXP_A_TXP_9
EXP_A_TXN_9
EXP_A_TXP_10
EXP_A_TXN_10
EXP_A_TXP_11
EXP_A_TXN_11
EXP_A_TXP_12
EXP_A_TXN_12
EXP_A_TXP_13
EXP_A_TXN_13
EXP_A_TXP_14
EXP_A_TXN_14
EXP_A_TXP_15
EXP_A_TXN_15
PCIE_PEG60_RXP0
PCIE_PEG60_RXN0
PCIE_PEG60_RXP1
PCIE_PEG60_RXN1
PCIE_PEG60_RXP2
PCIE_PEG60_RXN2
PCIE_PEG60_RXP3
PCIE_PEG60_RXN3
PCIE_PEG60_TXP0
PCIE_PEG60_TXN0
PCIE_PEG60_TXP1
PCIE_PEG60_TXN1
PCIE_PEG60_TXP2
PCIE_PEG60_TXN2
PCIE_PEG60_TXP3
PCIE_PEG60_TXN3
DMI_RXP[0]
DMI_RXN[0]
DMI_RXP[1]
DMI_RXN[1]
DMI_RXP[2]
DMI_RXN[2]
DMI_RXP[3]
DMI_RXN[3]
DMI_RXP[4]
DMI_RXN[4]
DMI_RXP[5]
DMI_RXN[5]
DMI_RXP[6]
DMI_RXN[6]
DMI_RXP[7]
DMI_RXN[7]
DMI_TXP[0]
DMI_TXN[0]
DMI_TXP[1]
DMI_TXN[1]
DMI_TXP[2]
DMI_TXN[2]
DMI_TXP[3]
DMI_TXN[3]
DMI_TXP[4]
DMI_TXN[4]
DMI_TXP[5]
DMI_TXN[5]
DMI_TXP[6]
DMI_TXN[6]
DMI_TXP[7]
DMI_TXN[7]
ZIF-SOCKET1200-HF_1
CPU1F
CML-S
RSVD-01
RSVD-02
RSVD-03
RSVD-04
RSVD-05
RSVD_TP-01
RSVD_TP-04
RSVD_TP-02
RSVD_TP-03
PCIE_PEG60_TP2
PCIE_PEG60_TP1
RSVD-06
RSVD-07
RSVD-08
RSVD-09
RSVD-10
RSVD-11
RSVD-12
RSVD-13
RSVD-14
RSVD-15
RSVD-16
RSVD-17
ZIF-SOCKET1200-HF_1
CPU1D
CFL-S
eDP(DP) to VGA
EDP_TXP[0]
EDP_TXN[0]
EDP_TXP[1]
EDP_TXN[1]
EDP_TXP[2]
EDP_TXN[2]
EDP_TXP[3]
EDP_TXN[3]
EDP_AUXP
EDP_AUXN
DISP_UTILS
DDI1_TXP[0]
DDI1_TXN[0]
DDI1_TXP[1]
DDI1_TXN[1]
DDI1_TXP[2]
DDI1_TXN[2]
DDI1_TXP[3]
DDI1_TXN[3]
DDI1_AUXP
DDI1_AUXN
DDI2_TXP[0]
DDI2_TXN[0]
DDI2_TXP[1]
DDI2_TXN[1]
DDI2_TXP[2]
DDI2_TXN[2]
DDI2_TXP[3]
DDI2_TXN[3]
DDI2_AUXP
DDI2_AUXN
DDI3_TXP[0]
DDI3_TXN[0]
DDI3_TXP[1]
DDI3_TXN[1]
DDI3_TXP[2]
DDI3_TXN[2]
DDI3_TXP[3]
DDI3_TXN[3]
DDI3_AUXP
DDI3_AUXN
DP_DDPA_TXP0
DP_DDPA_TXN0
DP_DDPA_TXP1
DP_DDPA_TXN1
DP_AUXP
DP_AUXN
DP_DDPD_TXP0
DP_DDPD_TXN0
DP_DDPD_TXP1
DP_DDPD_TXN1
DP_DDPD_TXP2
DP_DDPD_TXN2
DP_DDPD_TXP3
DP_DDPD_TXN3
DP_DDPD_AUXP
DP_DDPD_AUXN
DP
DVI_DDPC_TXP2
DVI_DDPC_TXN2
DVI_DDPC_TXP1
DVI_DDPC_TXN1
DVI_DDPC_TXP0
DVI_DDPC_TXN0
DVI_DDPC_CLK_P
DVI_DDPC_CLK_N
DVI
DVI max resolution is 1920x1200 @ 60 Hz
HDMI_DDPB_TX2_P
HDMI_DDPB_TX2_N
HDMI_DDPB_TX1_P
HDMI_DDPB_TX1_N
HDMI_DDPB_TX0_P
HDMI_DDPB_TX0_N
HDMI_DDPB_CLK_P
HDMI_DDPB_CLK_N
HDMI
MEC1
MEC2
MEC3
MEC4
MEC5
MEC6
MEC7
LGA1151
ZIF-SOCKET1200-HF_1
MICRO-STAR INT'L CO.,LTD
MS-7C88
Size
Custom
Document Description
CPU-PEG/Display/RSVD
Rev
1.1
Date: Monday, April 27, 2020
Sheet 5 of 60


CPU1G
CML-S
ZIF-SOCKET1200-HF_1
CPU1H
CFL-S
ZIF-SOCKET1200-HF_1
CPU1I
CML-S
ZIF-SOCKET1200-HF_1
VCCIO_12
2019.09.17 B460 Only CMS
22UF X 27 TOP SOCKET
22UF X 27 BOTTOM SOCKET
22UF X 9 TOP SOCKET
22UF X 11 BOTTOM SOCKET
VCCIO_12 22u*5
2019.09.17 B460 Only CMS
20200303 修改MLCC数量
MICRO-STAR INT'L CO.,LTD
MS-7C88
CPU-Power
Monday, April 27, 2020





MICRO-STAR INT'L CO.,LTD		
MS-7C88		
Size: Custom	Document Description: CPU-GND	Rev: 1.1
Date: Monday, April 27, 2020	Sheet 7 of 60	



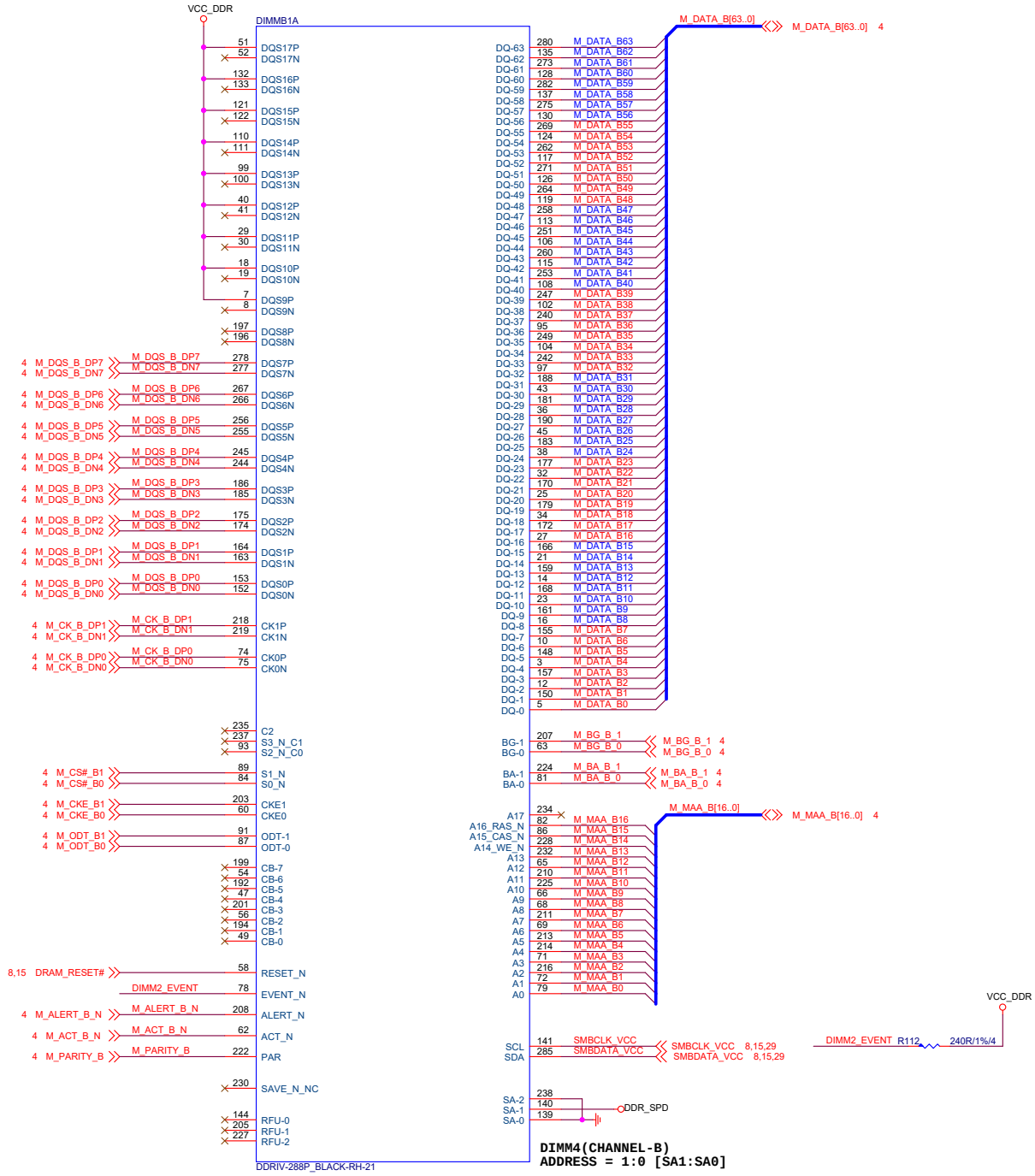
	Color	P/N
B365M_PRO-VH	Block	N13-2880561-L06
B365M_PRO-VD	Block	N13-2880561-L06
B365M_PRO-WIND	Block	N13-2880561-L06
B365M_PRO-FIRE	Red	N13-2880681-L06

MICRO-STAR INT'L CO.,LTD

MS-7C88

Size	Document Description	Rev
Custom	DDR4 DIMM 1	1.1

Date: Monday, April 27, 2020 Sheet 8 of 60

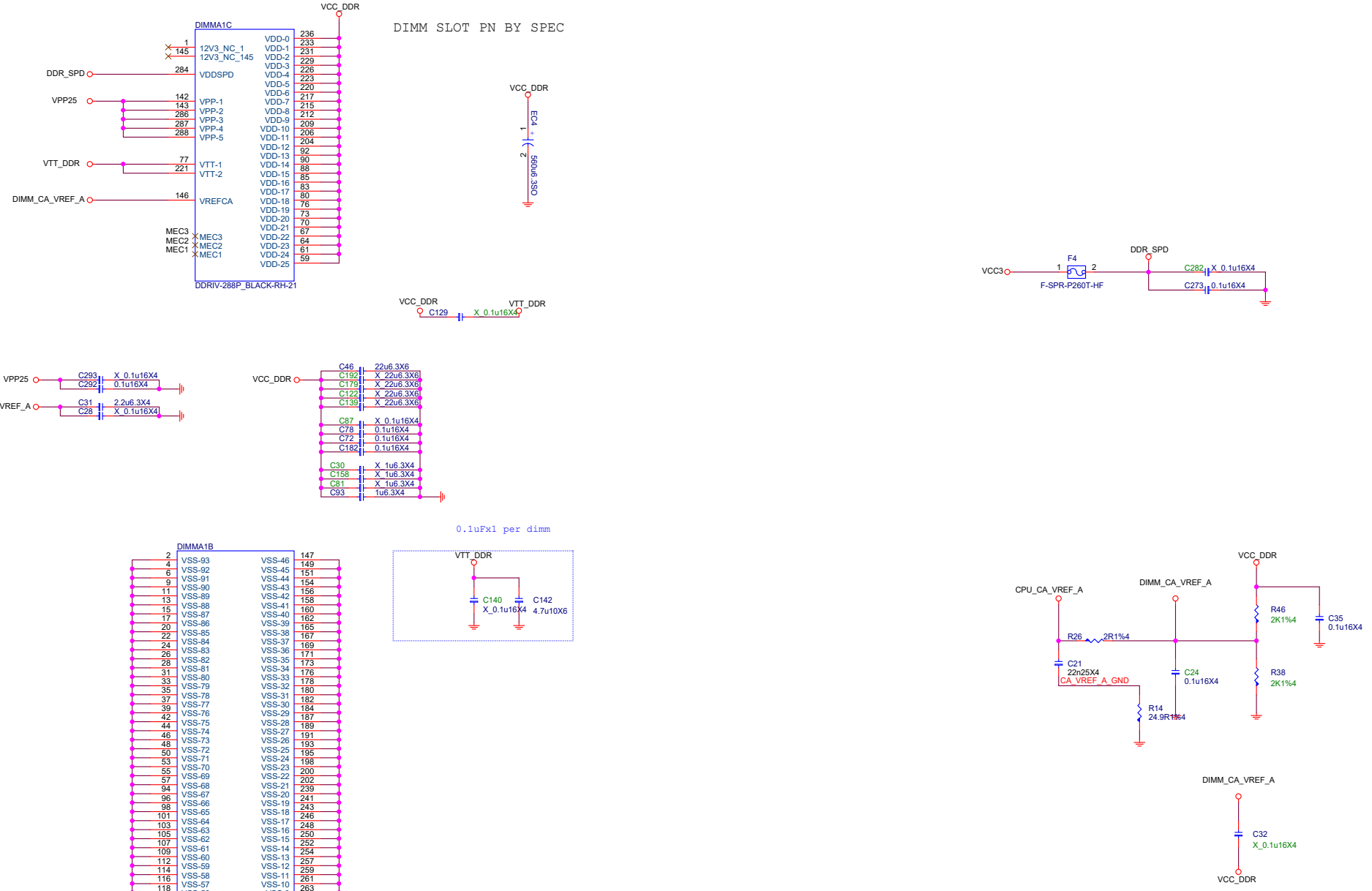


MICRO-STAR INT'L CO.,LTD

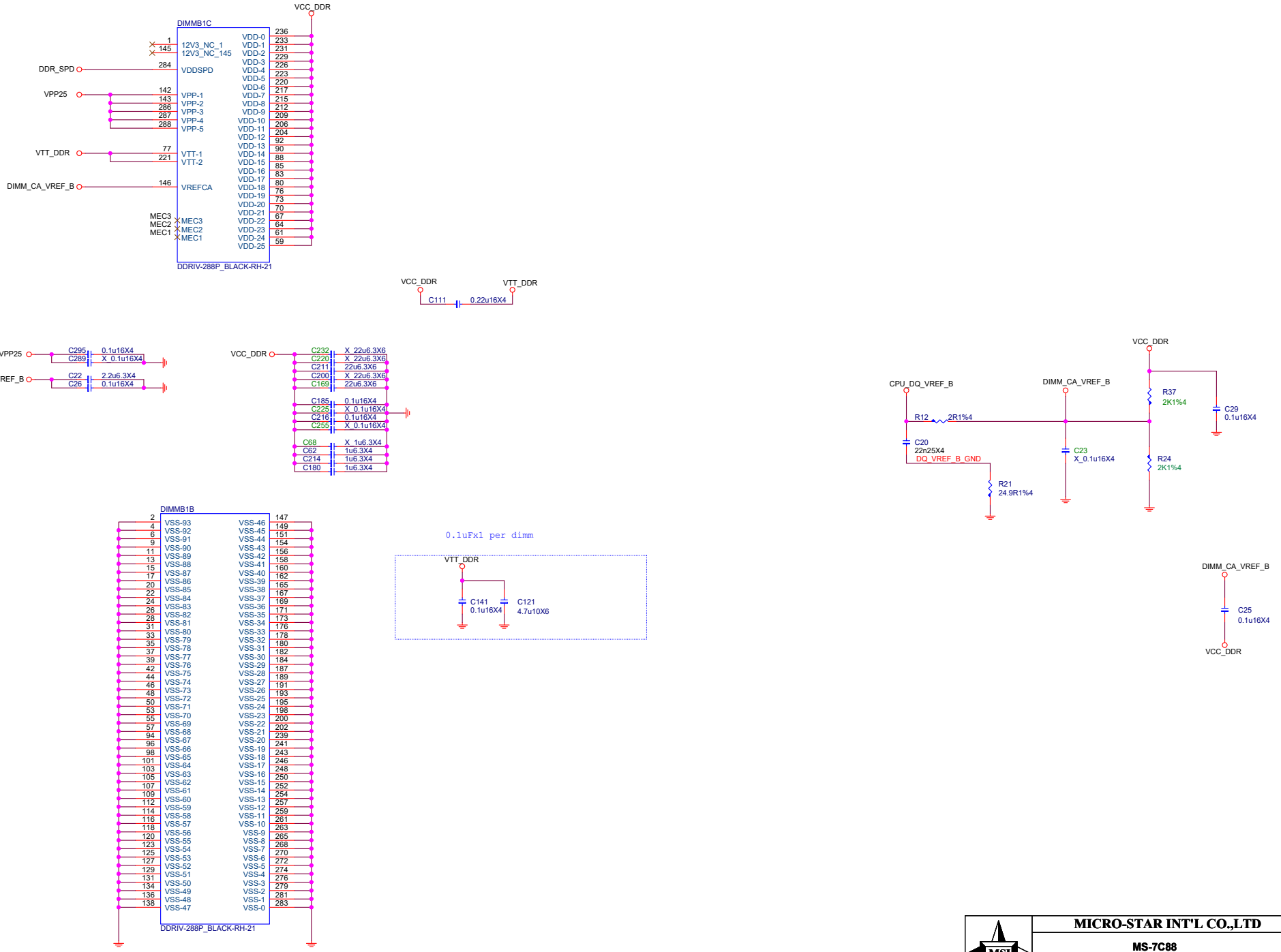
MS-7C88

Size	Document Description	Rev
Custom	DDR4 DIMM 2	1.1

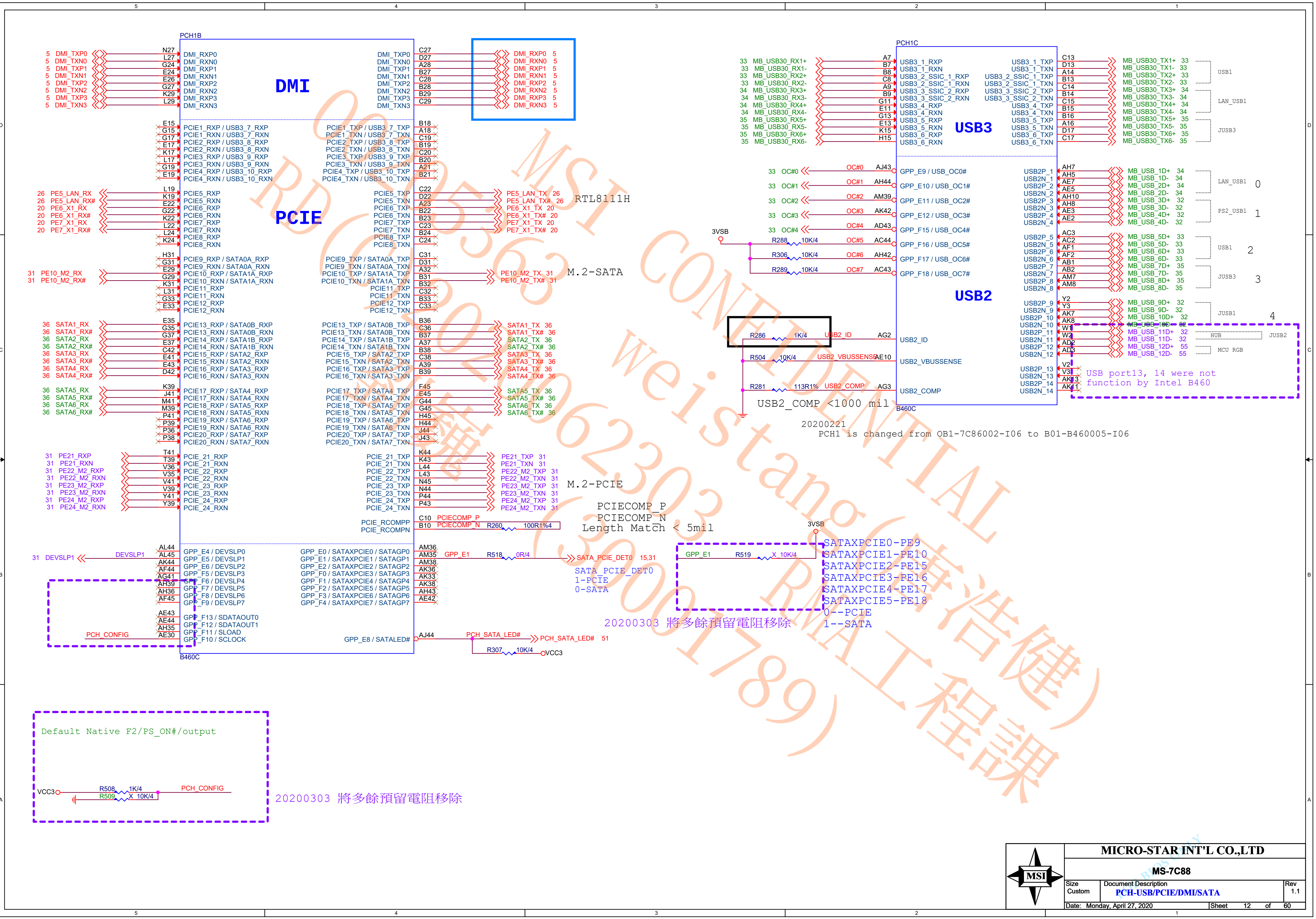
Date: Monday, April 27, 2020 Sheet 9 of 60



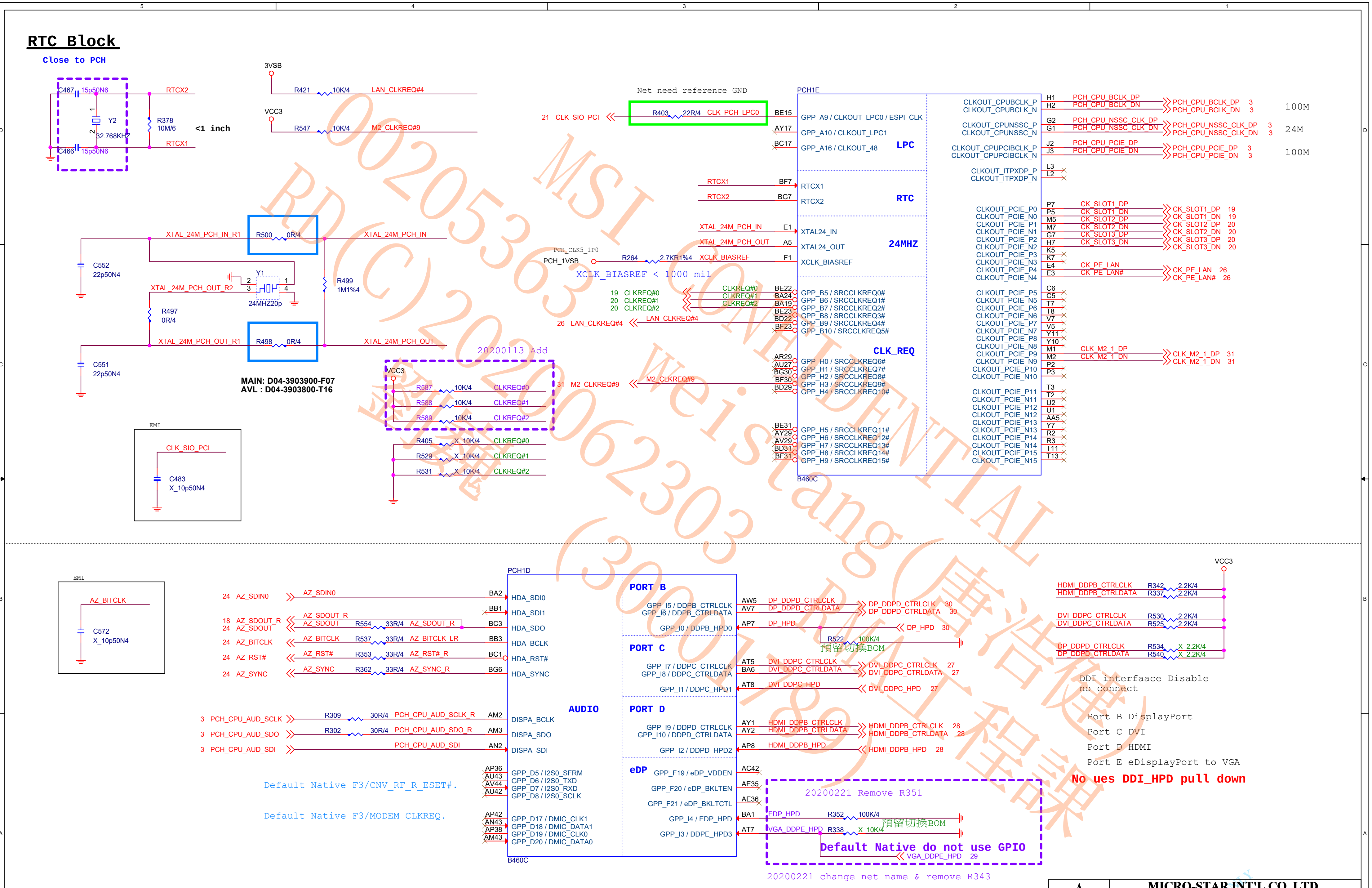
MICRO-STAR INT'L CO.,LTD		
MS-7C88		
Size: Custom	Document Description: DDR4-POWER/GND-1	Rev: 1.1
Date: Monday, April 27, 2020	Sheet 10 of 60	



MICRO-STAR INT'L CO.,LTD		
MS-7C88		
Size: Custom	Document Description: DDR4-POWER/GND-2	Rev: 1.1
Date: Monday, April 27, 2020	Sheet 11 of 60	



PCH1B
DMI
DMI_TXP0
DMI_TXN0
DMI_TXP1
DMI_TXN1
DMI_TXP2
DMI_TXN2
DMI_TXP3
DMI_TXN3
DMI_RXP0
DMI_RXN0
DMI_RXP1
DMI_RXN1
DMI_RXP2
DMI_RXN2
DMI_RXP3
DMI_RXN3
PCIE
PCIE1_RXP / USB3_7_RXP
PCIE1_RXN / USB3_7_RXN
PCIE2_RXP / USB3_8_RXP
PCIE2_RXN / USB3_8_RXN
PCIE3_RXP / USB3_9_RXP
PCIE3_RXN / USB3_9_RXN
PCIE4_RXP / USB3_10_RXP
PCIE4_RXN / USB3_10_RXN
PE5_LAN_RX
PE5_LAN_RX#
PE6_X1_RX
PE6_X1_RX#
PE7_X1_RX
PE7_X1_RX#
PE5_LAN_TX
PE5_LAN_TX#
PE6_X1_TX
PE6_X1_TX#
PE7_X1_TX
PE7_X1_TX#
RTL8111H
PE10_M2_RX
PE10_M2_RX#
PE10_M2_TX
PE10_M2_TX#
M.2-SATA
SATA1_RX
SATA1_RX#
SATA2_RX
SATA2_RX#
SATA3_RX
SATA3_RX#
SATA4_RX
SATA4_RX#
SATA5_RX
SATA5_RX#
SATA6_RX
SATA6_RX#
SATA1_TX
SATA1_TX#
SATA2_TX
SATA2_TX#
SATA3_TX
SATA3_TX#
SATA4_TX
SATA4_TX#
SATA5_TX
SATA5_TX#
SATA6_TX
SATA6_TX#
PE21_RXP
PE21_RXN
PE22_M2_RXP
PE22_M2_RXN
PE23_M2_RXP
PE23_M2_RXN
PE24_M2_RXP
PE24_M2_RXN
PE21_TXP
PE21_TXN
PE22_M2_TXP
PE22_M2_TXN
PE23_M2_TXP
PE23_M2_TXN
PE24_M2_TXP
PE24_M2_TXN
M.2-PCIE
PCIE_RCOMPP
PCIE_RCOMPN
PCIECOMP_P
PCIECOMP_N
Length Match < 5mil
DEVSLP1
GPP_E4 / DEVSLP0
GPP_E5 / DEVSLP1
GPP_E0 / SATAXPCIE0 / SATAGP0
GPP_E1 / SATAXPCIE1 / SATAGP1
SATA_PCIE_DET0
SATA_PCIE_DET0
1-PCIE
0-SATA
SATAXPCIE0-PE9
SATAXPCIE1-PE10
SATAXPCIE2-PE15
SATAXPCIE3-PE16
SATAXPCIE4-PE17
SATAXPCIE5-PE18
0--PCIE
1--SATA
20200303 將多餘預留電阻移除
PCH_CONFIG
GPP_E8 / SATALED#
PCH_SATA_LED#
VCC3
B460C
PCH1C
USB3
USB3_1_RXP
USB3_1_RXN
MB_USB30_RX1+
MB_USB30_RX1-
MB_USB30_TX1+
MB_USB30_TX1-
USB1
LAN_USB1
JUSB3
USB2
GPP_E9 / USB_OC0#
GPP_E10 / USB_OC1#
GPP_E11 / USB_OC2#
GPP_E12 / USB_OC3#
GPP_F15 / USB_OC4#
GPP_F16 / USB_OC5#
GPP_F17 / USB_OC6#
GPP_F18 / USB_OC7#
3VSB
USB2_ID
USB2_VBUSSENSE
USB2_COMP
USB2_COMP <1000 mil
MB_USB_1D+
MB_USB_1D-
LAN_USB1
PS2_USB1
USB1
JUSB3
JUSB1
HUB
JUSB2
MCU RGB
USB port13, 14 were not function by Intel B460
20200221
PCH1 is changed from OB1-7C86002-I06 to B01-B460005-I06
Default Native F2/PS_ON#/output
R508 1K/4
R509 X 10K/4
20200303 將多餘預留電阻移除
MICRO-STAR INT'L CO.,LTD
MS-7C88
Size Custom
Document Description
PCH-USB/PCIE/DMI/SATA
Rev 1.1
Date: Monday, April 27, 2020
Sheet 12 of 60



MICRO-STAR INT'L CO.,LTD

MS-7C88

Size	Document Description	Rev
Custom	PCH-Audio/Display/Clock	1.1

Date: Monday, April 27, 2020 Sheet 13 of 60

	GPP_G21	GPP_G22	GPP_G23
B460M PRO M2	0	0	0
B460M-A PRO M2	0	0	1
B460M GLOCK	0	1	0
B460M-X	0	1	1
	1	0	0

MICRO-STAR INT'L CO.,LTD

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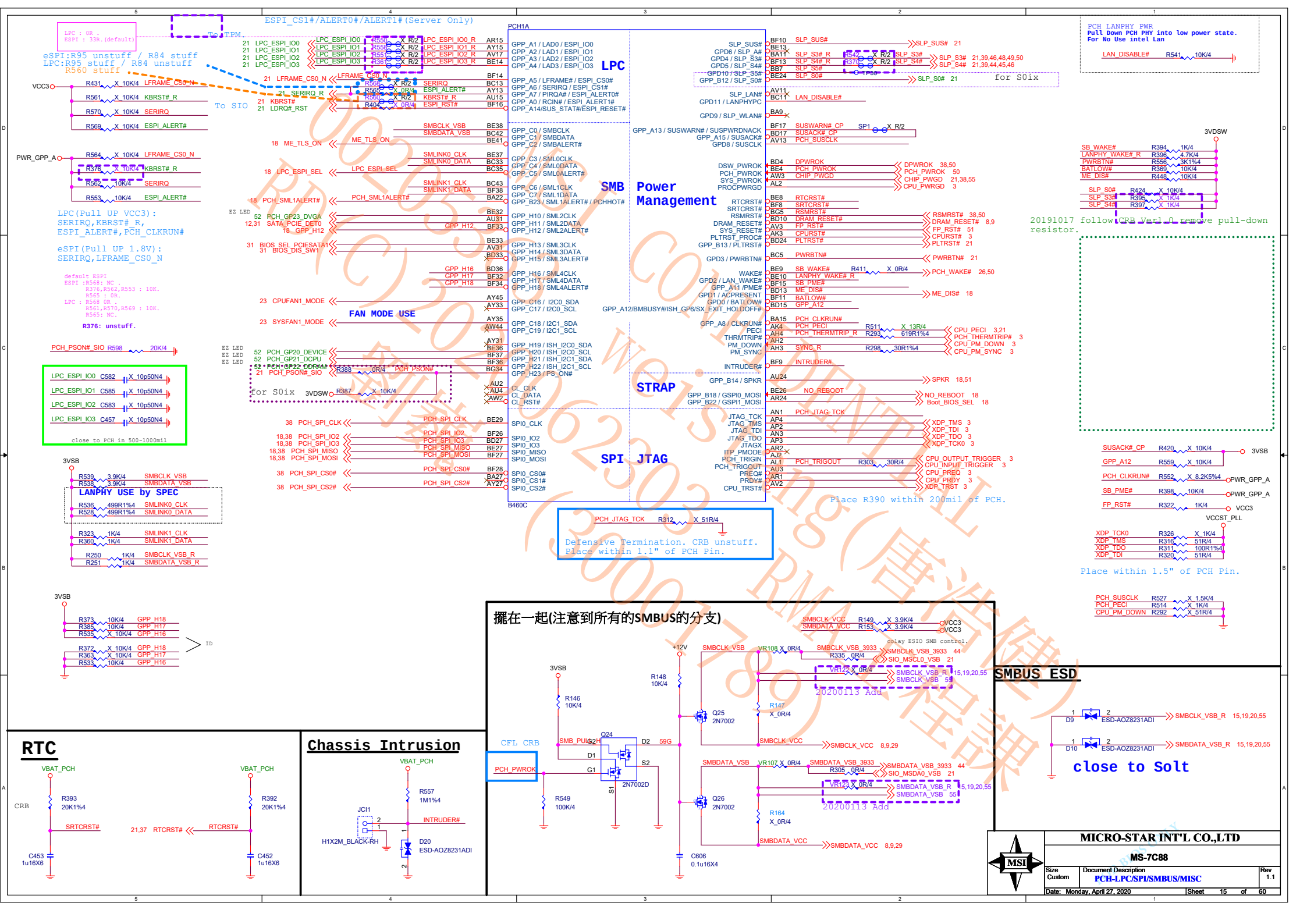
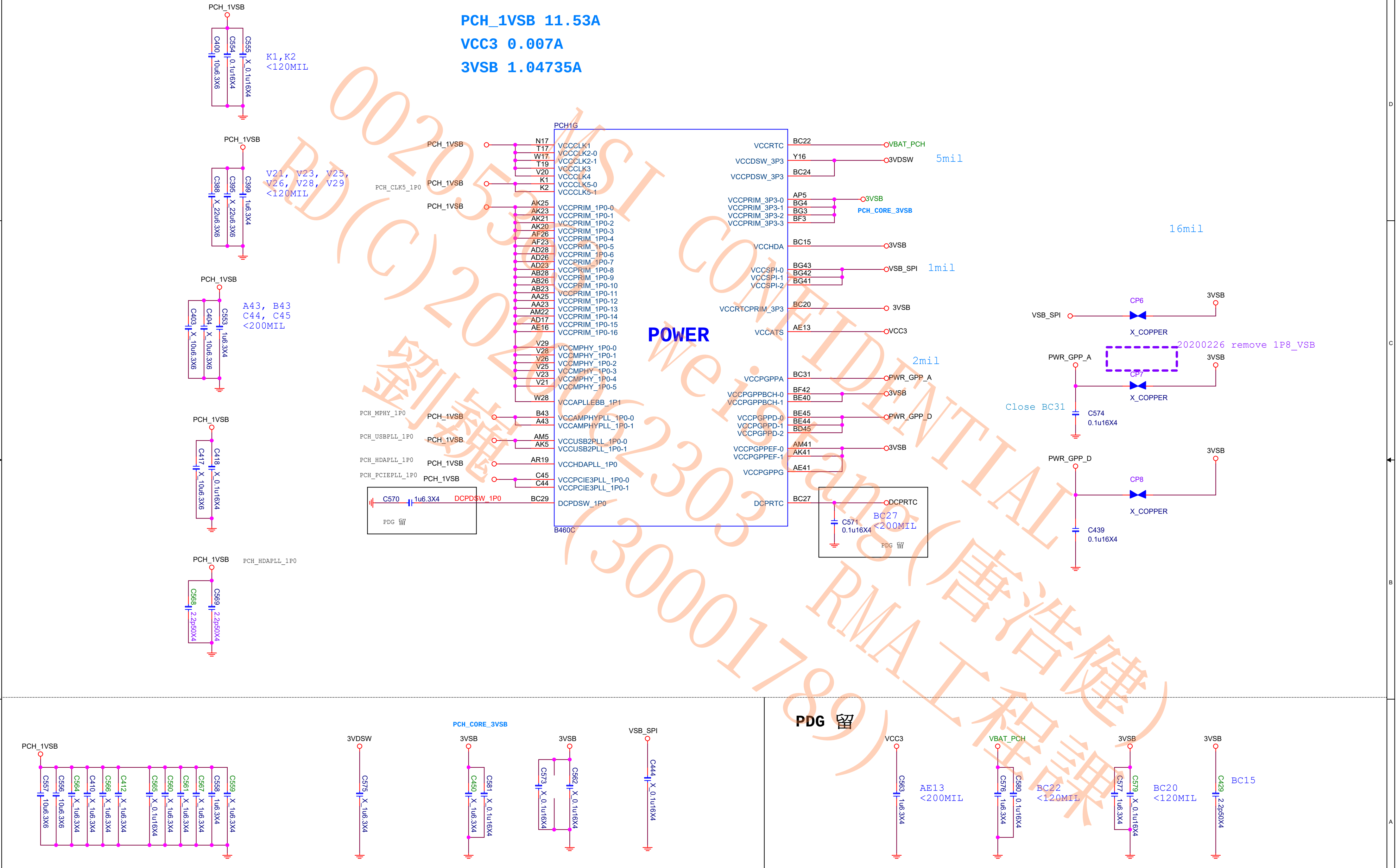
Size: Custom | Document Description: PCH-GPIO | Rev 1.1

Date: Monday, April 27, 2020 | Sheet 14 of 60


PCH1A
LPC
SMB
Power Management
STRAP
SPI JTAG
FAN MODE USE
ESPI_CS1#/ALERT0#/ALERT1#(Server Only)
To TPM.
To SIO
for S0ix
Place R390 within 200mil of PCH.
Defensive Termination. CRB unstuff. Place within 1.1" of PCH Pin.
LANPHY USE by SPEC
close to PCH in 500~1000mil
20191017 follow CRB Ver1.0 remove pull-down resistor.
Place within 1.5" of PCH Pin.
close to Solt
20200113 Add
擺在一起(注意到所有的SMBUS的分支)
CFL CRB
RTC
Chassis Intrusion
SMBUS ESD
MICRO-STAR INT'L CO.,LTD
MS-7C88
PCH-LPC/SPI/SMBUS/MISC
Monday, April 27, 2020



PCH_1VSB 11.53A
VCC3 0.007A
3VSB 1.04735A
PCH1G
POWER
B460C
PCH_1VSB
C400 10u6.3X6
C554 0.1u16X4
C555 X_0.1u16X4
K1,K2 <120MIL
C388 X_22u6.3X6
C395 X_22u6.3X6
C399 1u6.3X4
V21, V23, V25, V26, V28, V29 <120MIL
C403 X_10u6.3X6
C404 X_10u6.3X6
C553 1u6.3X4
A43, B43 C44, C45 <200MIL
C417 X_10u6.3X6
C418 X_0.1u16X4
C568 2.2p50X4
C569 2.2p50X4
PCH_HDAPLL_1P0
PCH_CLK5_1P0
PCH_MPHY_1P0
PCH_USBPLL_1P0
PCH_PCIEPLL_1P0
N17 T17 W17 T19 V20 K1 K2
VCCCLK1
VCCCLK2-0
VCCCLK2-1
VCCCLK3
VCCCLK4
VCCCLK5-0
VCCCLK5-1
AK25 AK23 AK21 AK20 AF26 AF23 AD28 AD26 AD23 AB28 AB26 AB23 AA25 AA23 AM22 AD17 AE16
VCCPRIM_1P0-0 … VCCPRIM_1P0-16
V29 V28 V26 V25 V23 V21
VCCMPHY_1P0-0 … VCCMPHY_1P0-5
W28 VCCAPLLEBB_1P1
B43 A43 VCCAMPHYPLL_1P0-0 VCCAMPHYPLL_1P0-1
AM5 AK5 VCCUSB2PLL_1P0-0 VCCUSB2PLL_1P0-1
AR19 VCCHDAPLL_1P0
C45 C44 VCCPCIE3PLL_1P0-0 VCCPCIE3PLL_1P0-1
C570 1u6.3X4 DCPDSW_1P0 BC29 DCPDSW_1P0
PDG 留
BC22 VCCRTC VBAT_PCH
Y16 VCCDSW_3P3 3VDSW 5mil
BC24 VCCPDSW_3P3
AP5 BG4 BG3 BF3 VCCPRIM_3P3-0 VCCPRIM_3P3-1 VCCPRIM_3P3-2 VCCPRIM_3P3-3 3VSB PCH_CORE_3VSB
BC15 VCCHDA 3VSB
BG43 BG42 BG41 VCCSPI-0 VCCSPI-1 VCCSPI-2 VSB_SPI 1mil
BC20 VCCRTCPRIM_3P3 3VSB
AE13 VCCATS VCC3
BC31 VCCPGPPA PWR_GPP_A 2mil
BF42 BE40 VCCPGPPBCH-0 VCCPGPPBCH-1 3VSB
BE45 BE44 BD45 VCCPGPPD-0 VCCPGPPD-1 VCCPGPPD-2 PWR_GPP_D
AM41 AK41 VCCPGPPEF-0 VCCPGPPEF-1 3VSB
AE41 VCCPGPPG
BC27 DCPRTC DCPRTC
C571 0.1u16X4 BC27 <200MIL
16mil
VSB_SPI CP6 X_COPPER 3VSB
PWR_GPP_A CP7 X_COPPER 3VSB
20200226 remove 1P8_VSB
Close BC31
C574 0.1u16X4
PWR_GPP_D CP8 X_COPPER 3VSB
C439 0.1u16X4
PCH_1VSB
C557 10u6.3X6
C556 10u6.3X6
C564 X_1u6.3X4
C410 X_1u6.3X4
C566 X_1u6.3X4
C412 X_1u6.3X4
C565 X_0.1u16X4
C560 X_1u6.3X4
C561 X_1u6.3X4
C567 X_1u6.3X4
C558 X_1u6.3X4
C559 X_1u6.3X4
3VDSW C575 X_1u6.3X4
PCH_CORE_3VSB 3VSB C450 X_1u6.3X4 C581 X_0.1u16X4
3VSB C573 X_0.1u16X4 C562 X_0.1u16X4
VSB_SPI C444 X_0.1u16X4
PDG 留
VCC3 C563 1u6.3X4 AE13 <200MIL
VBAT_PCH C576 1u6.3X4 C580 0.1u16X4 BC22 <120MIL
3VSB C577 1u6.3X4 C579 X_0.1u16X4 BC20 <120MIL
3VSB C429 2.2p50X4 BC15

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Custom	PCH-Power	1.1

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Size	Document Description	Rev
Custom	PCH-GND	1.1

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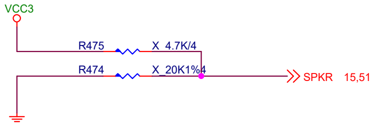
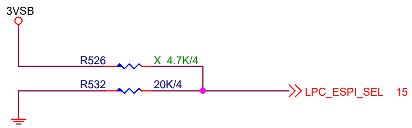
TOP Swap



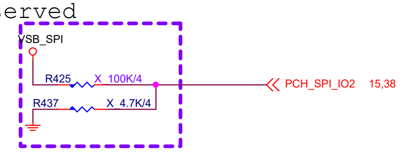
0 : DISABLE (Default)
1 : ENABLE
Internal pull-down 20K is disabled after PCH_PWROK

LPC eSPI Mode

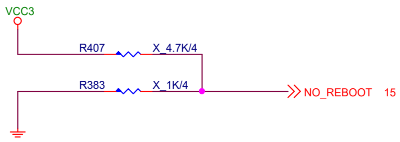


0 : LPC
1 : eSPI
Internal pull-down 20K is disabled after RSMRST

Reserved

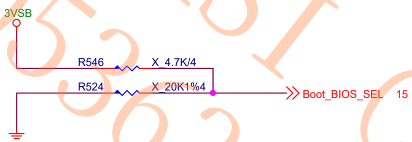


No Reboot



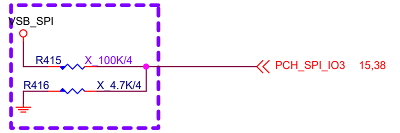
0 : DISABLE (Default)
1 : ENABLE
Internal pull-down 20K is disabled after PLTRST#

Boot BIOS

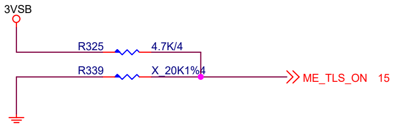


0 : SPI DISABLE (Default)
1 : LPC ENABLE
Internal pull-down is disabled after PCH_PWROK is high.

Reserved



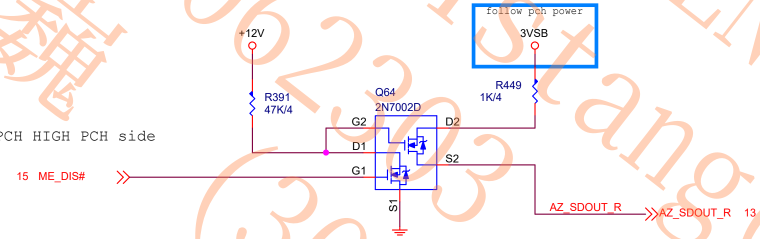
AMT and SBA with confidentiality



0 : DISABLE
1 : ENABLE (Default)
Internal pull-down 20K is disabled after RSMRST

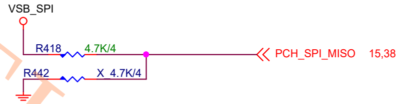
HDA_SDO

ME flash by GPIO

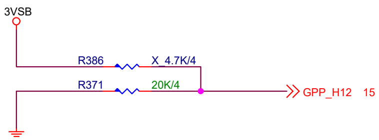


PCH HIGH PCH side

Reserved

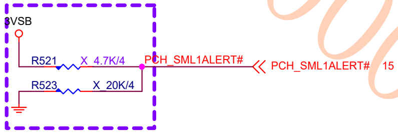


ESPI FLASH SHARING MODE

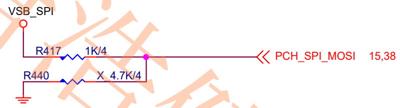


0 : MASTER ATTACHED FLASH SHARING
1 : SLAVE ATTACHED FLASH SHARING
Internal pull-down 20K is disabled after RSMRST

Reserved



Reserved



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Size: Custom	Document Description: PCH-Strap	Rev 1.1
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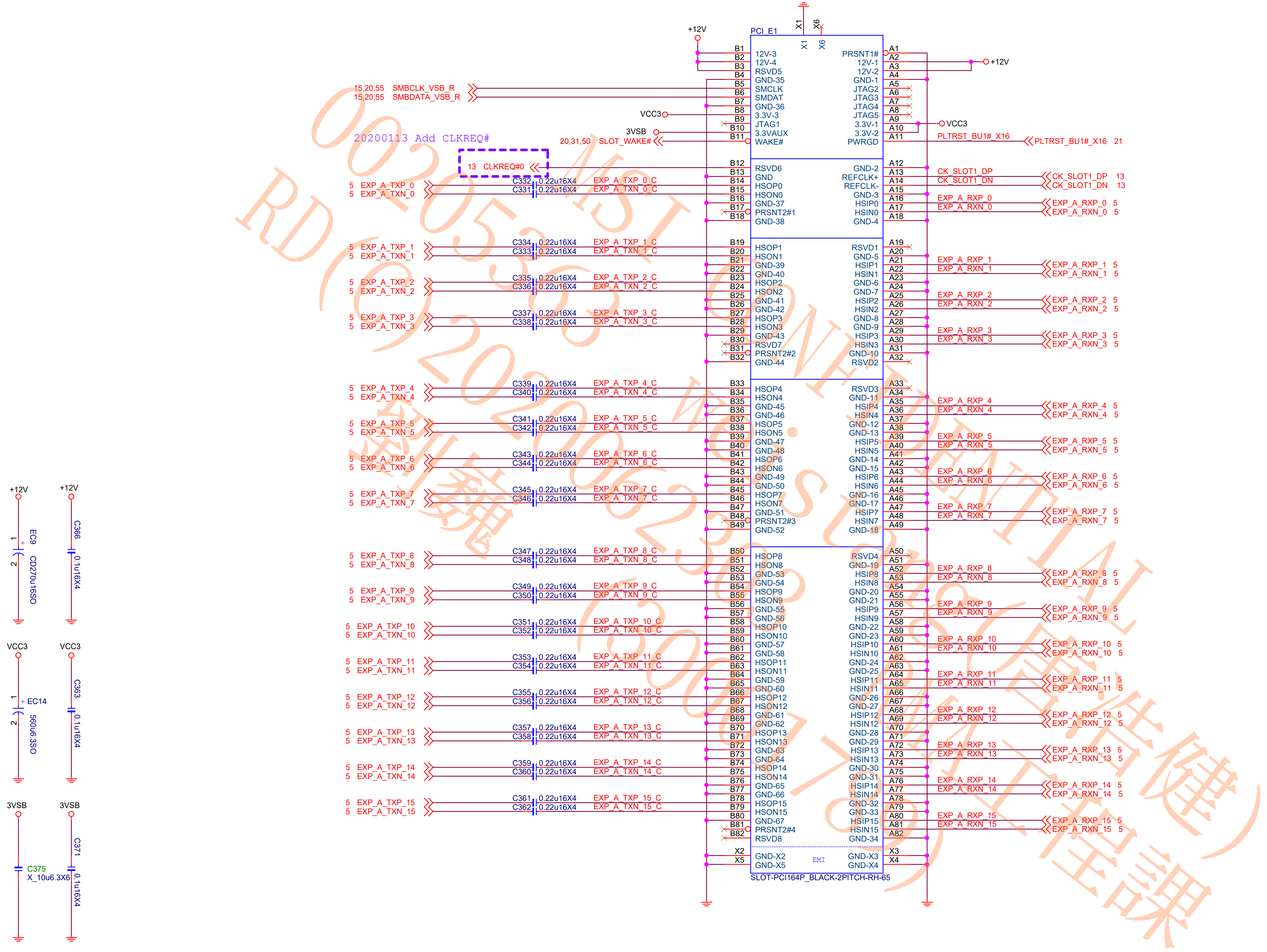

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Size	Document Description	Rev
Custom	PCIE SLOT-CPU(X16)	1.1

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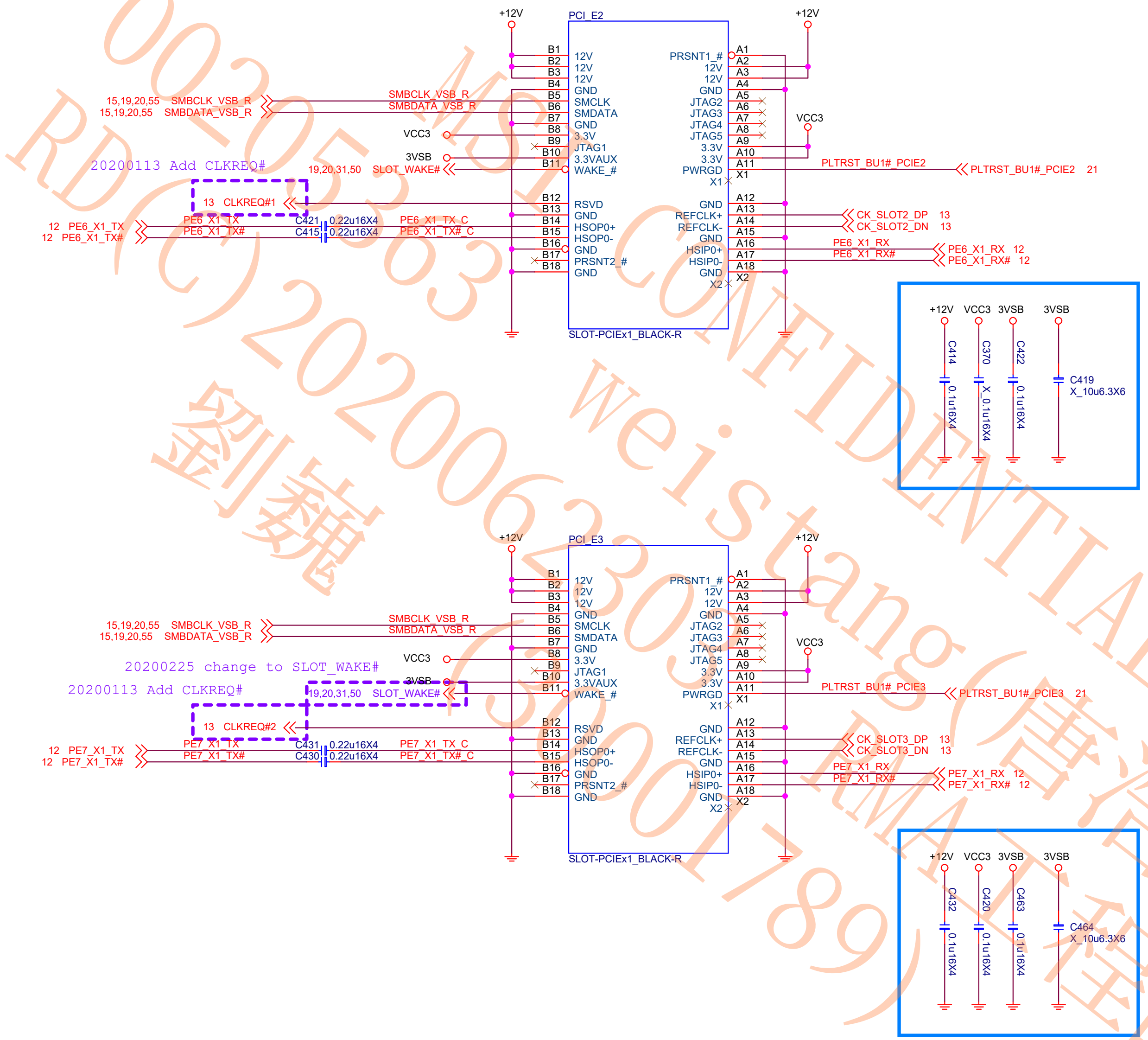

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Size	Document Description	Rev
Custom	PCIE SLOT-PCH(X1)	1.1

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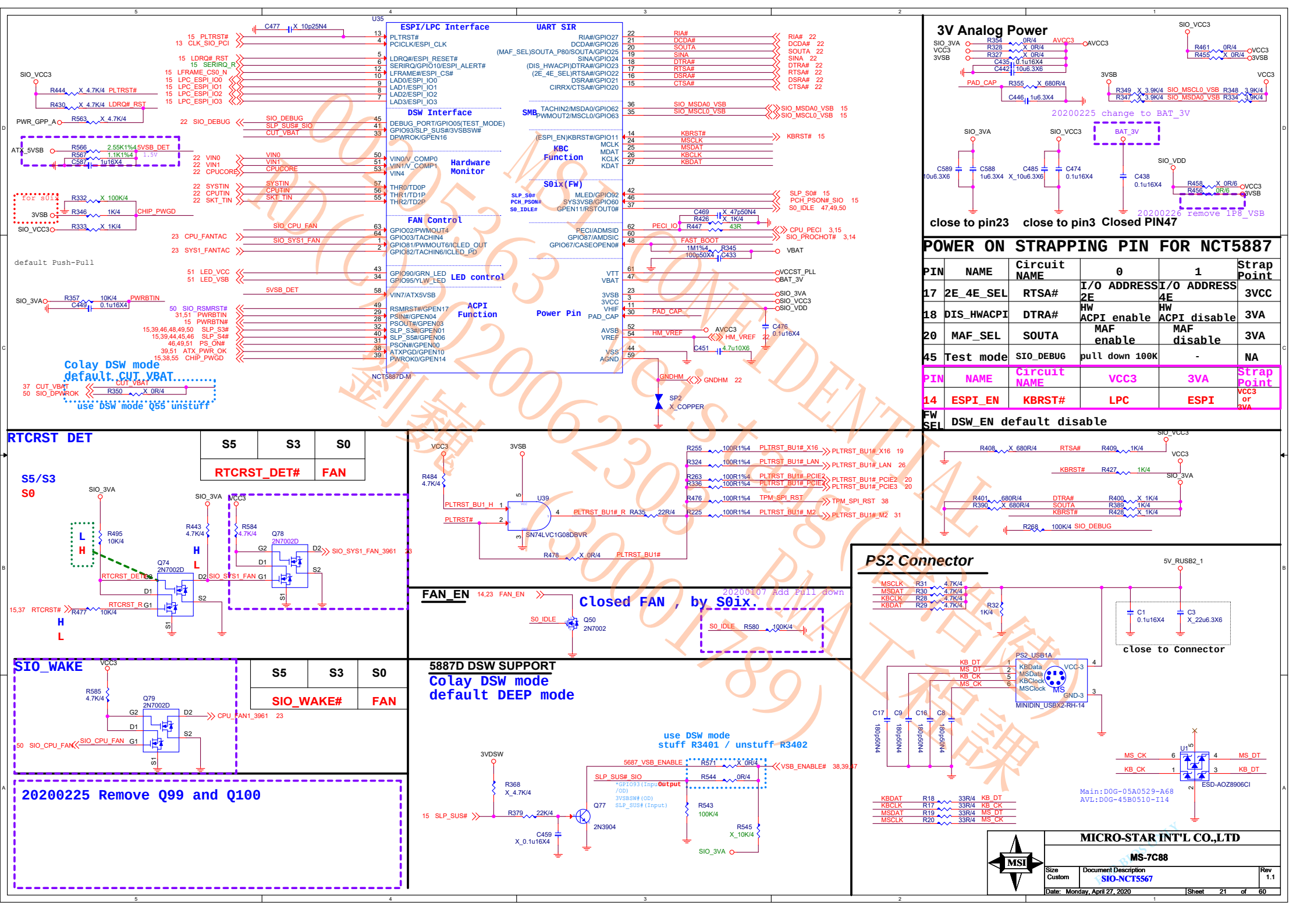
U35
ESPI/LPC Interface
UART SIR
PLTRST#
PCICLK/ESPI_CLK
LDRQ#/ESPI_RESET#
SERIRQ/GPIO10/ESPI_ALERT#
LFRAME#/ESPI_CS#
LAD0/ESPI_IO0
LAD1/ESPI_IO1
LAD2/ESPI_IO2
LAD3/ESPI_IO3
DSW Interface
DEBUG_PORT/GPIO05(TEST_MODE)
GPIO93/SLP_SUS#/3VSBSW#
DPWROK/GPEN16
Hardware Monitor
VIN0/V_COMP0
VIN1/V_COMP1
VIN4
THR0/TD0P
THR1/TD1P
THR2/TD2P
FAN Control
GPIO02/PWMOUT4
GPIO03/TACHIN4
GPIO81/PWMOUT6/ICLED_OUT
GPIO82/TACHIN6/ICLED_PD
LED control
GPIO90/GRN_LED
GPIO95/YLW_LED
ACPI Function
VIN7/ATX5VSB
RSMRST#/GPEN17
PSIN#/GPEN04
PSOUT#/GPEN03
SLP_S3#/GPEN01
SLP_S5#/GPEN06
PSON#/GPEN00
ATXPGD/GPEN10
PWROK0/GPEN14
NCT5887D-M
RIA#/GPIO27
DCDA#/GPIO26
(MAF_SEL)SOUTA_P80/SOUTA/GPIO25
SINA/GPIO24
(DIS_HWACPI)DTRA#/GPIO23
(2E_4E_SEL)RTSA#/GPIO22
DSRA#/GPIO21
CIRRX/CTSA#/GPIO20
SMB
TACHIN2/MSDA0/GPIO62
PWMOUT2/MSCL0/GPIO63
KBC Function
(ESPI_EN)KBRST#/GPIO11
MCLK
MDAT
KCLK
KDAT
S0ix(FW)
SLP_S0#
PCH_PSON#
S0_IDLE#
MLED/GPIO92
SYS3VSB/GPIO60
GPEN11/RSTOUT0#
PECI/ADMSID
GPIO87/AMDSIC
GPIO67/CASEOPEN0#
Power Pin
VTT
VBAT
3VSB
3VCC
VHIF
PAD_CAP
AVSB
VREF
VSS
AGND
SP2
X_COPPER
3V Analog Power
close to pin23
close to pin3
Closed PIN47
20200225 change to BAT_3V
20200226 remove IP8_VSB
POWER ON STRAPPING PIN FOR NCT5887
PIN | NAME | Circuit NAME | 0 | 1 | Strap Point
17 | 2E_4E_SEL | RTSA# | I/O ADDRESS 2E | I/O ADDRESS 4E | 3VCC
18 | DIS_HWACPI | DTRA# | HW ACPI enable | HW ACPI disable | 3VA
20 | MAF_SEL | SOUTA | MAF enable | MAF disable | 3VA
45 | Test mode | SIO_DEBUG | pull down 100K | - | NA
PIN | NAME | Circuit NAME | VCC3 | 3VA | Strap Point
14 | ESPI_EN | KBRST# | LPC | ESPI | VCC3 or 3VA
FW SEL | DSW_EN default disable
Colay DSW mode
default CUT_VBAT
use DSW mode Q55 unstuff
default Push-Pull
for sol
RTCRST DET
S5 | S3 | S0
RTCRST_DET# | FAN
S5/S3
S0
SN74LVC1G08DBVR
FAN_EN
Closed FAN , by S0ix.
20200107 Add Pull down
SIO_WAKE
S5 | S3 | S0
SIO_WAKE# | FAN
5887D DSW SUPPORT
Colay DSW mode
default DEEP mode
use DSW mode
stuff R3401 / unstuff R3402
20200225 Remove Q99 and Q100
PS2 Connector
close to Connector
MINIDIN_USBX2-RH-14
ESD-AOZ8906CI
Main:D0G-05A0529-A68
AVL:D0G-45B0510-I14
MICRO-STAR INT'L CO.,LTD
MS-7C88
Size Custom
Document Description
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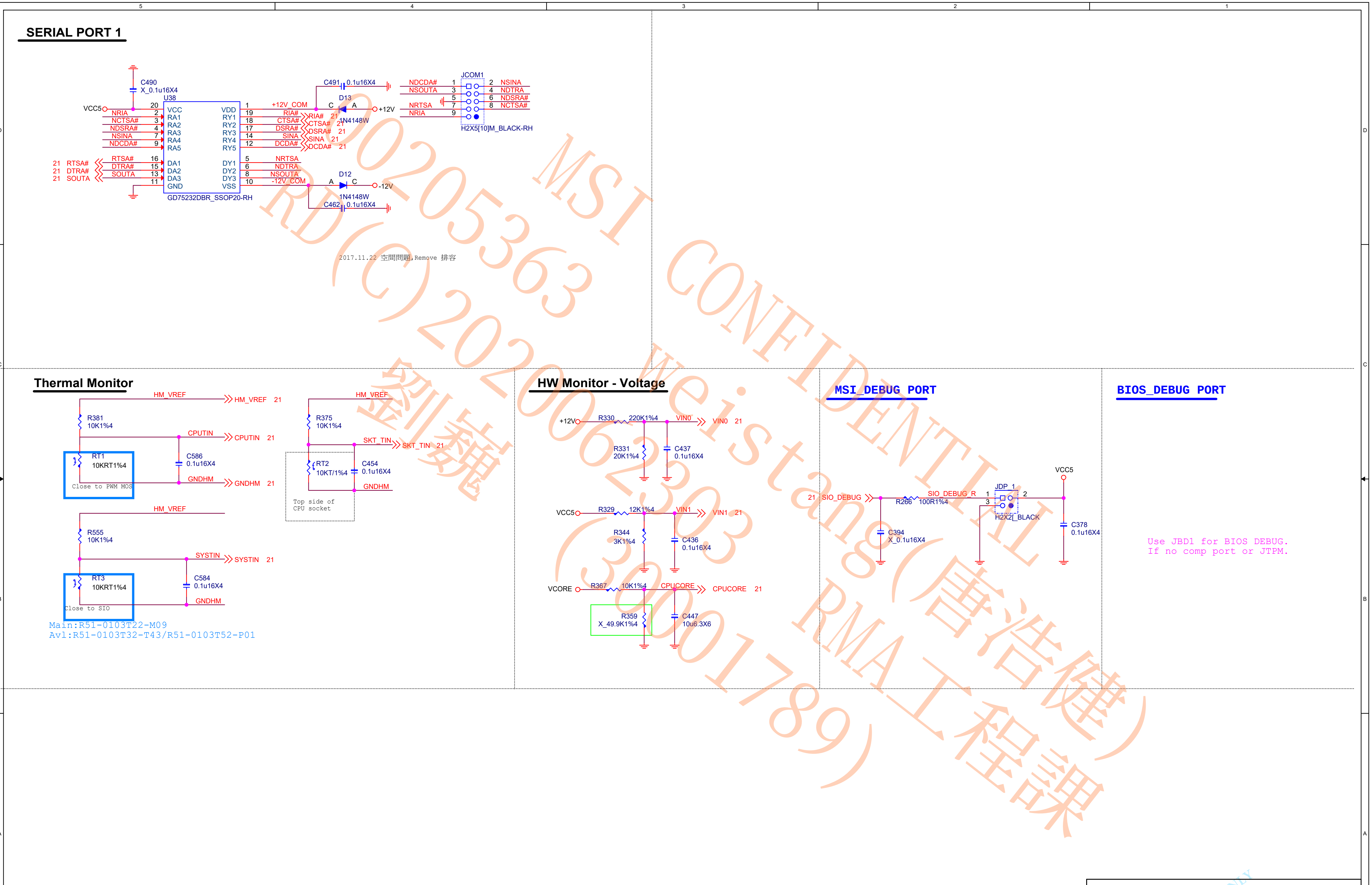

SERIAL PORT 1
C490
X_0.1u16X4
U38
VCC5
VCC
RA1
RA2
RA3
RA4
RA5
DA1
DA2
DA3
GND
VDD
RY1
RY2
RY3
RY4
RY5
DY1
DY2
DY3
VSS
GD75232DBR_SSOP20-RH
NRIA
NCTSA#
NDSRA#
NSINA
NDCDA#
21 RTSA#
21 DTRA#
21 SOUTA
RTSA#
DTRA#
SOUTA
+12V_COM
RIA#
CTSA#
DSRA#
SINA
DCDA#
NRTSA
NDTRA
NSOUTA
-12V_COM
C491
0.1u16X4
D13
1N4148W
+12V
D12
1N4148W
-12V
C462
0.1u16X4
JCOM1
NDCDA#
NSOUTA
NRTSA
NRIA
NSINA
NDTRA
NDSRA#
NCTSA#
H2X5[10]M_BLACK-RH
2017.11.22 空間問題,Remove 排容
Thermal Monitor
HM_VREF
HM_VREF 21
R381
10K1%4
CPUTIN
CPUTIN 21
RT1
10KRT1%4
C586
0.1u16X4
Close to PWM MOS
GNDHM
GNDHM 21
R555
10K1%4
SYSTIN
SYSTIN 21
RT3
10KRT1%4
C584
0.1u16X4
Close to SIO
Main:R51-0103T22-M09
Avl:R51-0103T32-T43/R51-0103T52-P01
R375
10K1%4
SKT_TIN
SKT_TIN 21
RT2
10KT/1%4
C454
0.1u16X4
Top side of CPU socket
HW Monitor - Voltage
+12V
R330
220K1%4
VIN0
VIN0 21
R331
20K1%4
C437
0.1u16X4
VCC5
R329
12K1%4
VIN1
VIN1 21
R344
3K1%4
C436
0.1u16X4
VCORE
R367
10K1%4
CPUCORE
CPUCORE 21
R359
X_49.9K1%4
C447
10u6.3X6
MSI_DEBUG PORT
21 SIO_DEBUG
SIO_DEBUG_R
R266
100R1%4
JDP_1
H2X2[_BLACK
VCC5
C394
X_0.1u16X4
C378
0.1u16X4
BIOS_DEBUG PORT
Use JBD1 for BIOS DEBUG.
If no comp port or JTPM.

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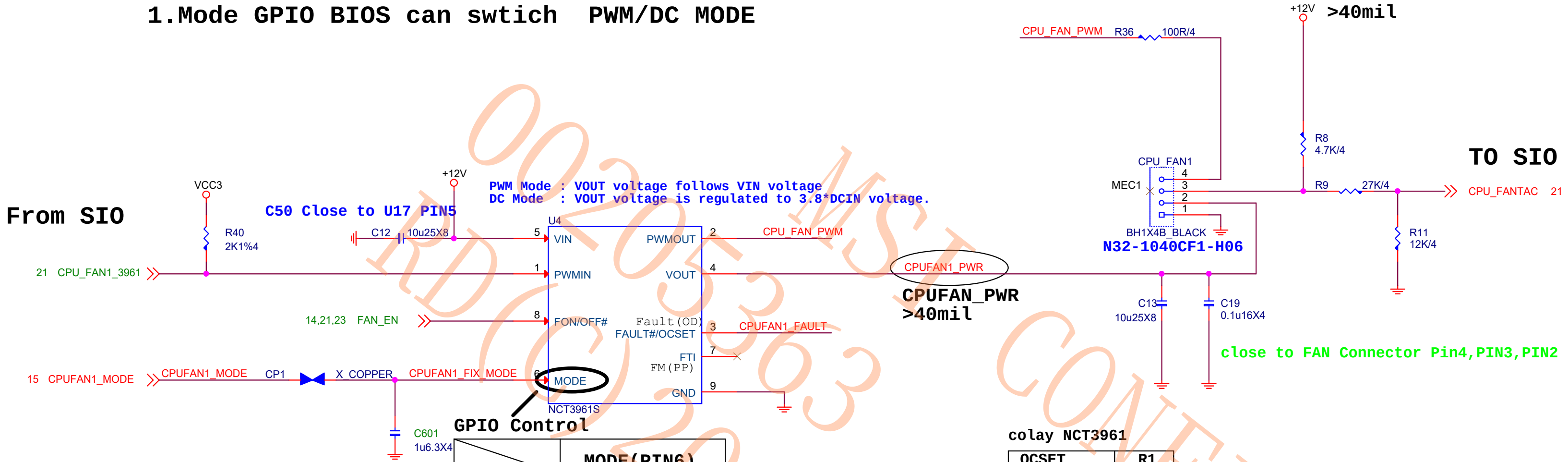
TYPE M : 4 PIN CPU FAN USE NCT3961S USE PCH GPIO CONTROL FAN MODE

1.Mode GPIO BIOS can swtich PWM/DC MODE



GPIO Control

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

Default (AUTO MODE) — Internall pull up 1.65V

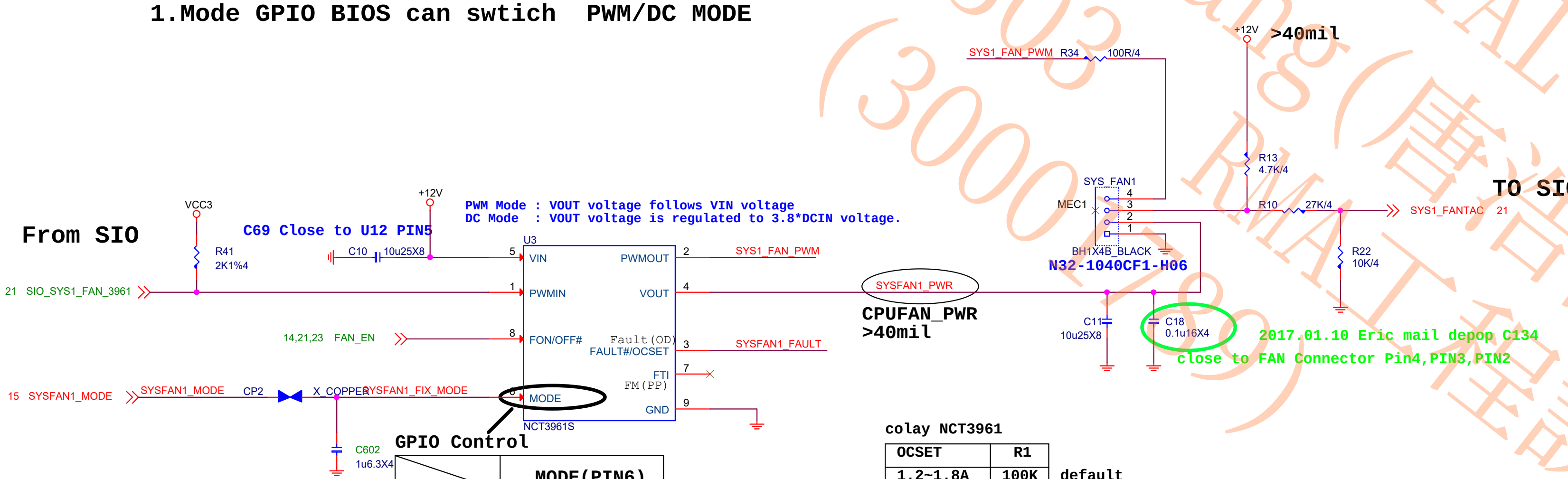
colay NCT3961

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

VCC3 R25 100K/4 CPUFAN1_FAULT

TYPE M : 4 PIN CPU FAN USE NCT3961S USE PCH GPIO CONTROL FAN MODE

1.Mode GPIO BIOS can swtich PWM/DC MODE



GPIO Control

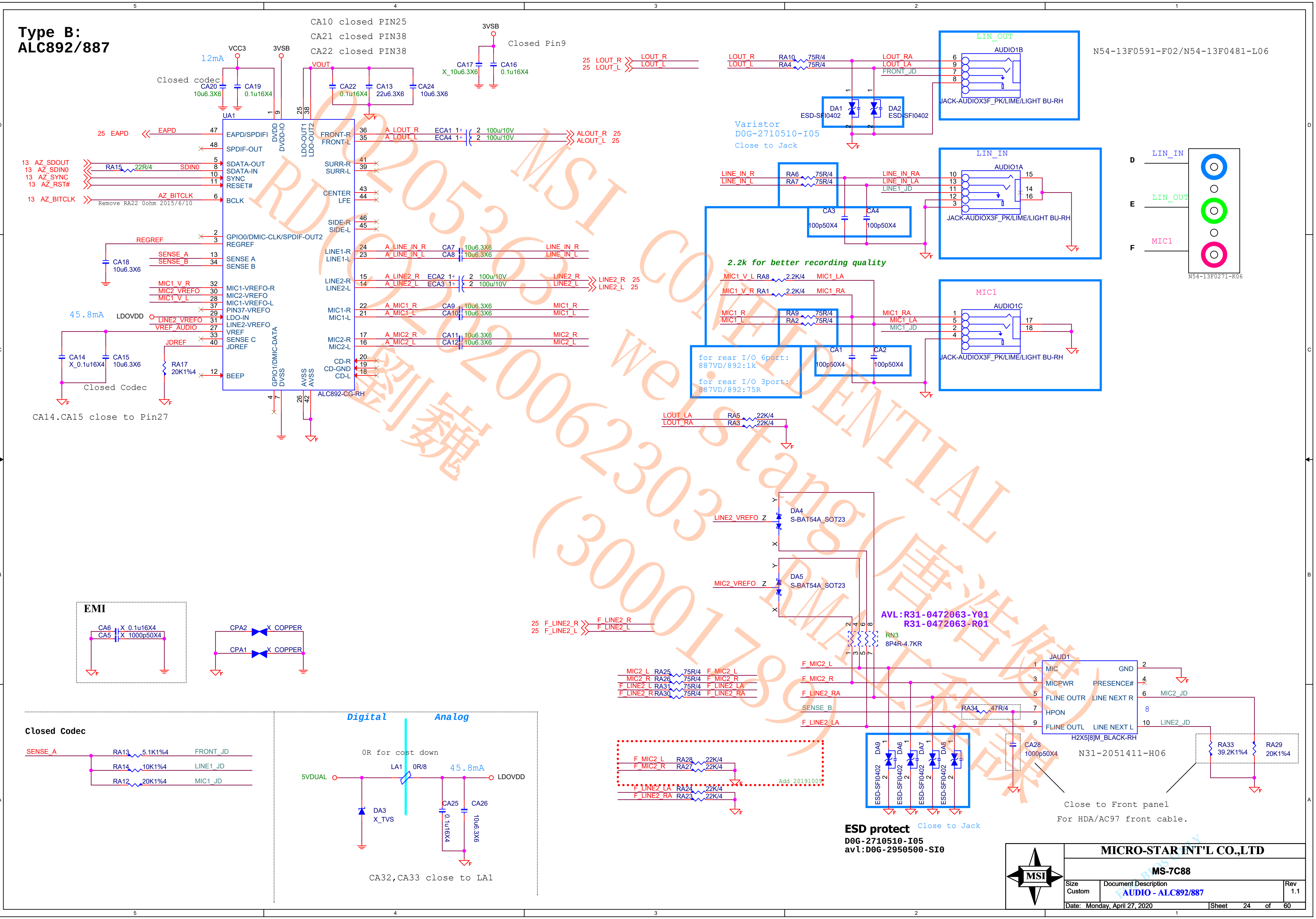
	MODE(PIN6)
PWM MODE	HIGH
DC MODE	LOW
AUTO MODE	GPI(Floating)

Default (AUTO MODE) — Internall pull up 1.65V

colay NCT3961

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

VCC3 R33 100K/4 SYSFAN1_FAULT



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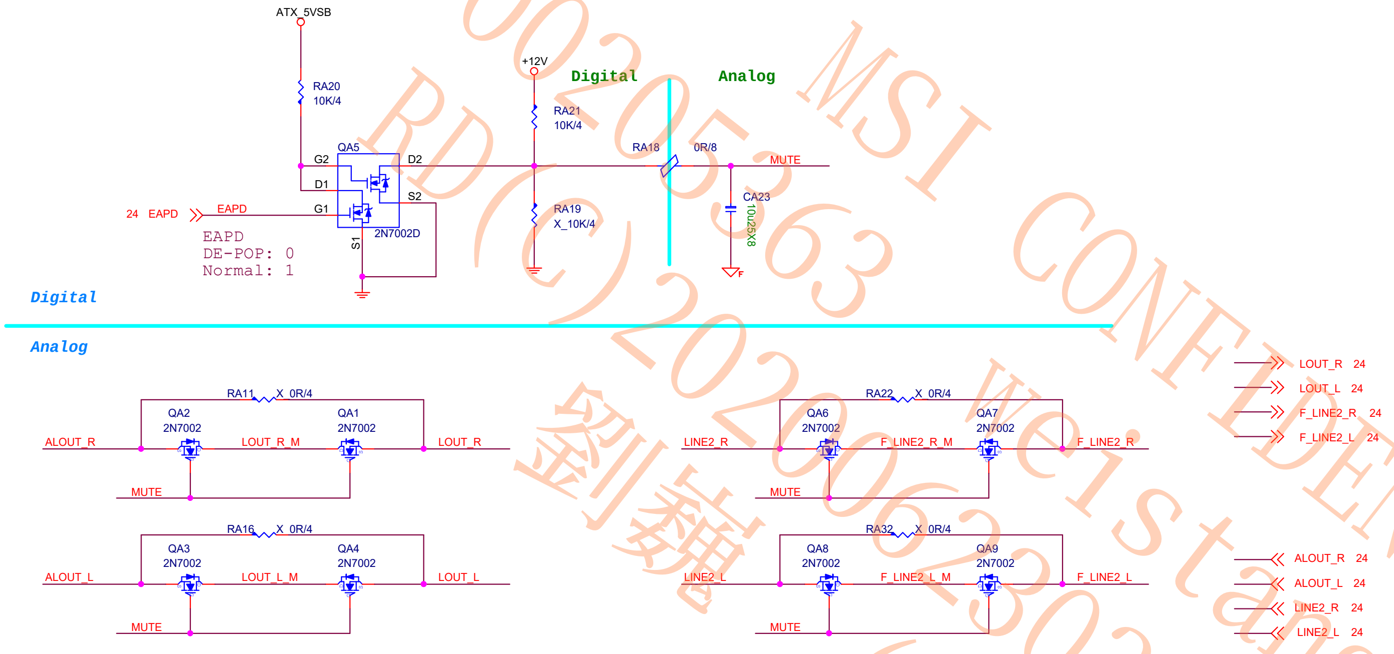
Rear Line OUT De-POP circuit

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



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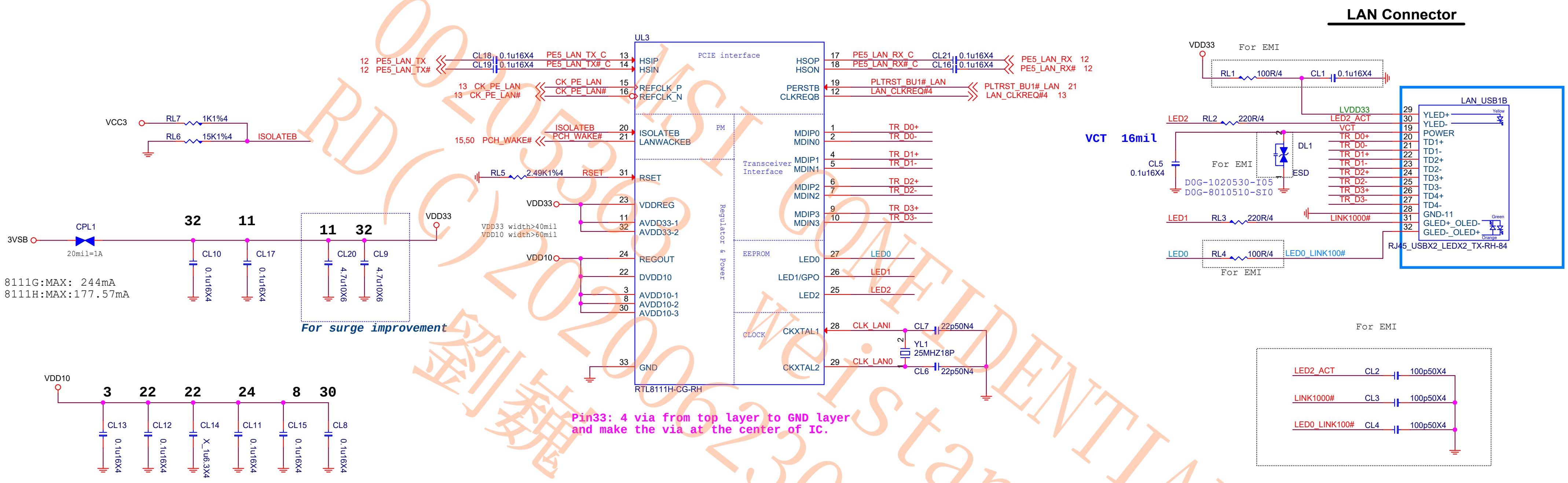
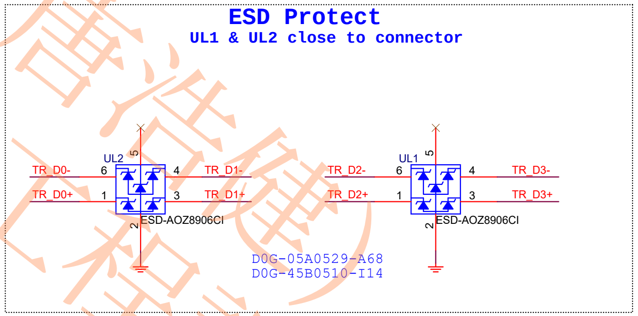
RTL8111G/RTL8111H Giga LAN

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





8111G POWER Consumption

	3.3V @ mA	mW
10 M Idle/TxRx	17.15/116.7	56.6/385.1
100 M Idle/TxRx	71.45/129.5	235.8/427.4
Giga Idle/TxRx	179.1/243.9	591/804.9
ALDPS	6.41	21.15

8111H POWER Consumption

	3.3V @ mA	mW
10 M Idle/TxRx	9.9/84.69	32.67/279.48
100 M Idle/TxRx	48.11/92.44	158.76/305.05
Giga Idle/TxRx	124.5/177.57	410.85/585.98
ALDPS	5.50	18.15

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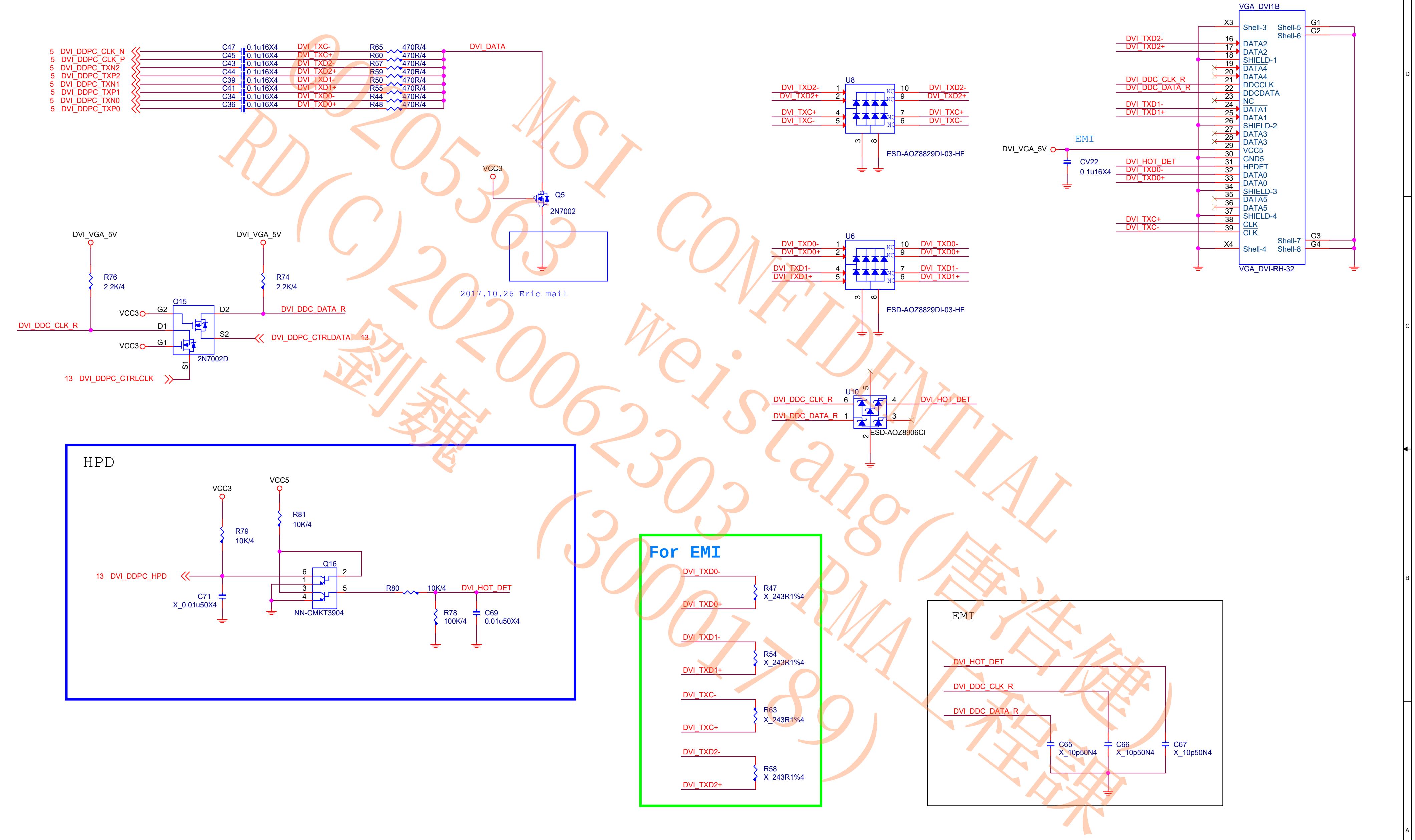
DVI level shifter

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



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Custom	DVI	1.1

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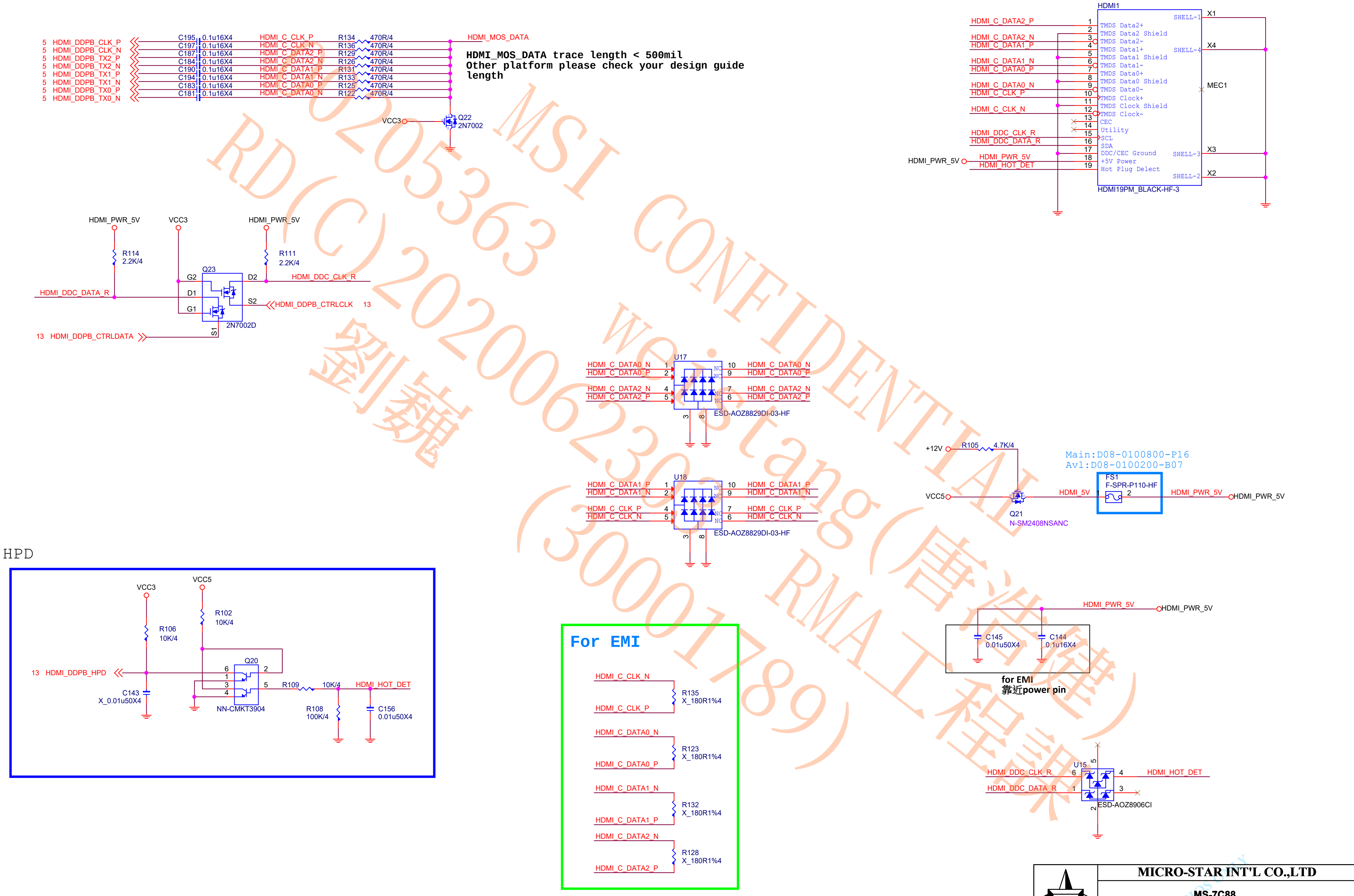
HDMI, DVI : 1920x1200 at 60 Hz (16:10 WUXGA)



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Custom	HDMI Connector	1.1

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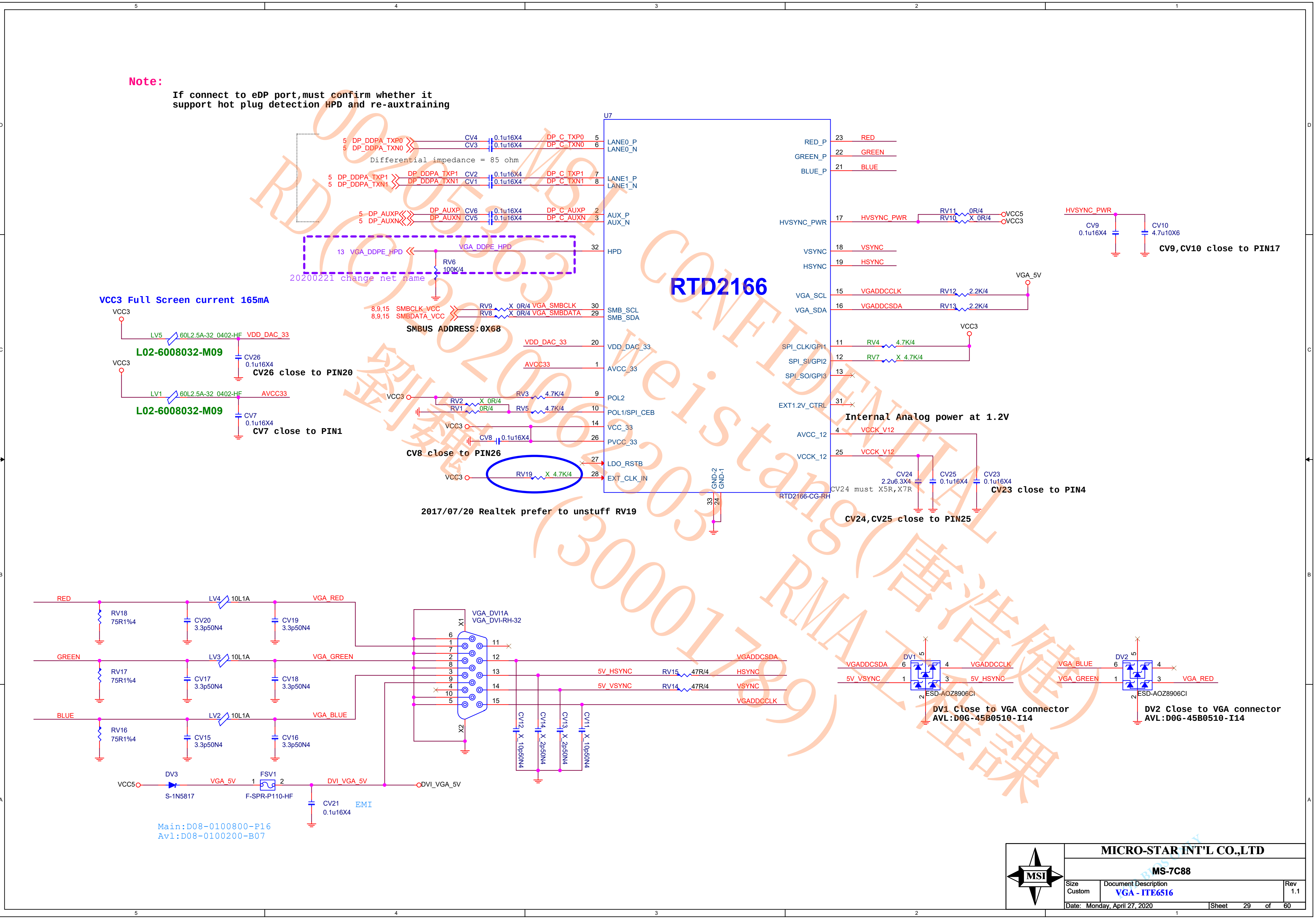
Note:
If connect to eDP port,must confirm whether it support hot plug detection HPD and re-auxtraining
U7
RTD2166
RTD2166-CG-RH
Differential impedance = 85 ohm
20200221 change net name
SMBUS ADDRESS:0X68
VCC3 Full Screen current 165mA
L02-6008032-M09
CV26 close to PIN20
CV7 close to PIN1
CV8 close to PIN26
2017/07/20 Realtek prefer to unstuff RV19
Internal Analog power at 1.2V
CV24 must X5R,X7R
CV23 close to PIN4
CV24,CV25 close to PIN25
CV9,CV10 close to PIN17
LANE0_P
LANE0_N
LANE1_P
LANE1_N
AUX_P
AUX_N
HPD
SMB_SCL
SMB_SDA
VDD_DAC_33
AVCC_33
POL2
POL1/SPI_CEB
VCC_33
PVCC_33
LDO_RSTB
EXT_CLK_IN
RED_P
GREEN_P
BLUE_P
HVSYNC_PWR
VSYNC
HSYNC
VGA_SCL
VGA_SDA
SPI_CLK/GPI1
SPI_SI/GPI2
SPI_SO/GPI3
EXT1.2V_CTRL
AVCC_12
VCCK_12
GND-2
GND-1
VGA_DVI1A
VGA_DVI-RH-32
DV1 Close to VGA connector
AVL:D0G-45B0510-I14
DV2 Close to VGA connector
AVL:D0G-45B0510-I14
ESD-AOZ8906CI
S-1N5817
F-SPR-P110-HF
EMI
Main:D08-0100800-P16
Avl:D08-0100200-B07
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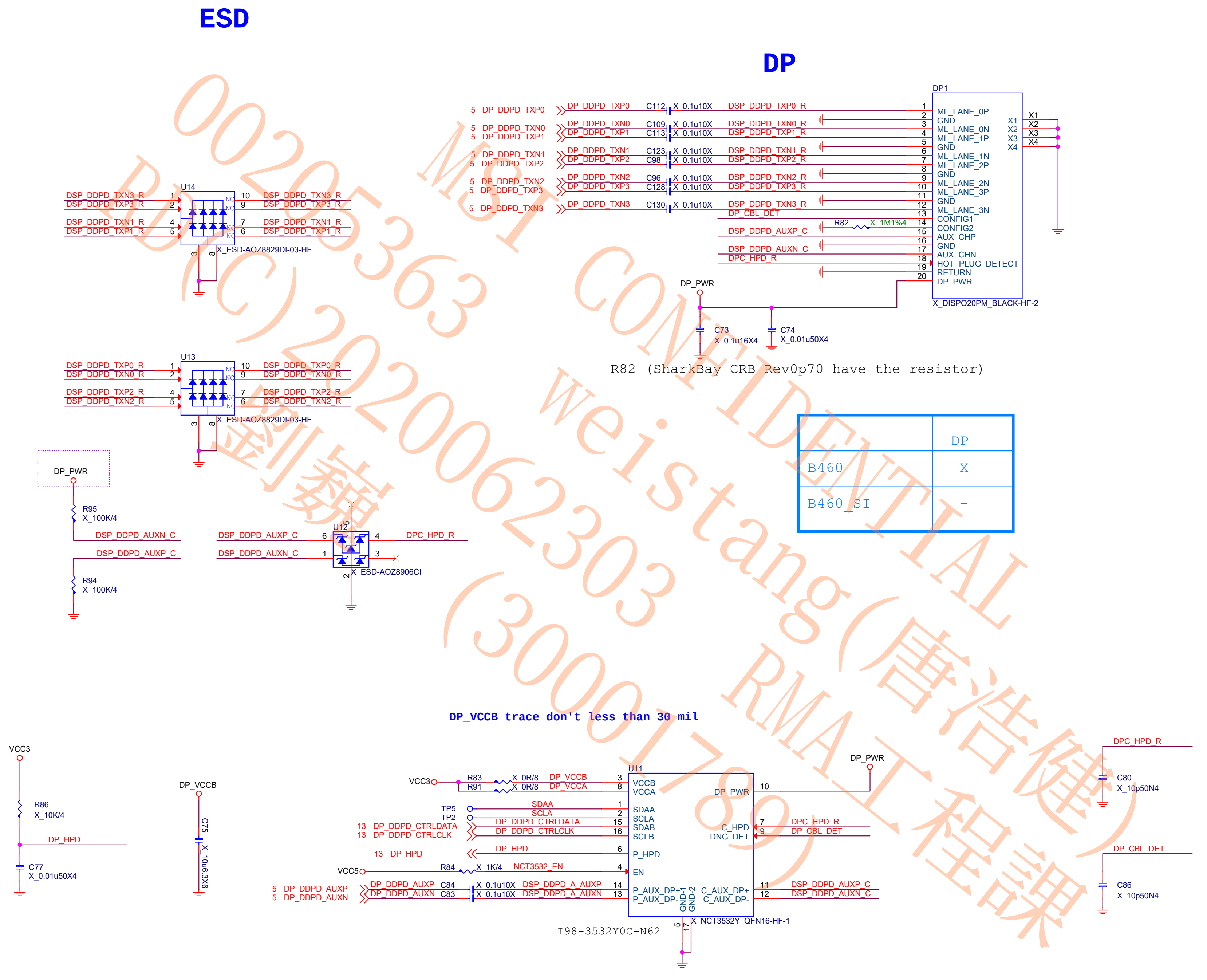

	DP
B460	X
B460_SI	-

Title: DP

Size: Custom | Document Number: MS-7C88 | Rev: 1.1

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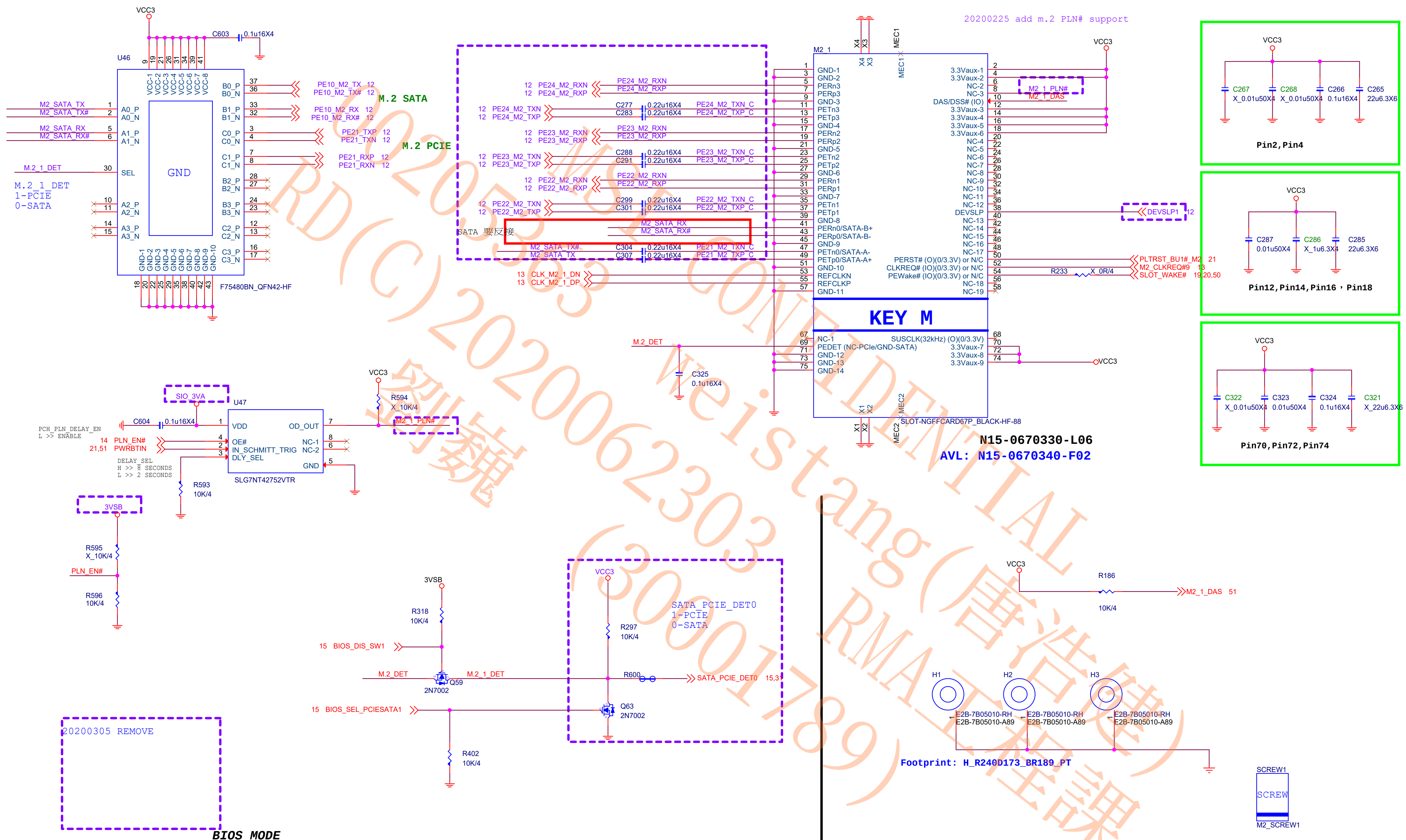

GPP_H14	GPP_H13		GPP_H11 & GPP_E1
BIOS_DIS_SW1	***BIOS_SEL_PCIESATA1***	***Mode***	***SATA_PCIE_DET0***
0	*1*	***M2-SATA***	*0*
0	*0*	***M2-PCIE***	*1*
GPI	***GPI***	***AUTO***	***GPI***

MICRO-STAR INT'L CO.,LTD

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Size	Document Description	Rev
Custom	M.2-SLOT1	1.1

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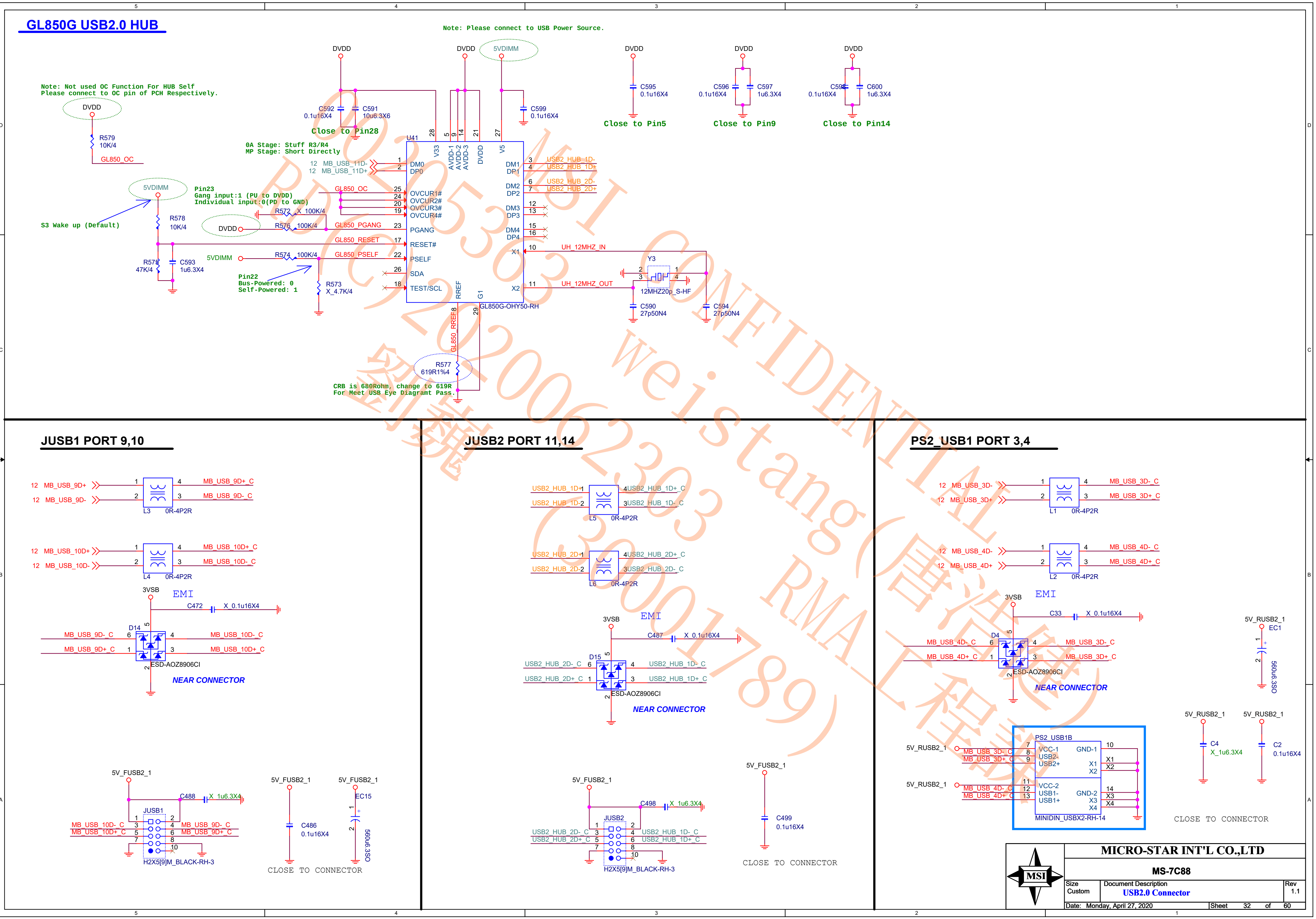
GL850G USB2.0 HUB
Note: Please connect to USB Power Source.
Note: Not used OC Function For HUB Self
Please connect to OC pin of PCH Respectively.
DVDD
R579 10K/4
GL850_OC
C592 0.1u16X4
C591 10u6.3X6
Close to Pin28
0A Stage: Stuff R3/R4
MP Stage: Short Directly
U41
12 MB_USB_11D-
12 MB_USB_11D+
5VDIMM
Pin23
Gang input:1 (PU to DVDD)
Individual input:0(PD to GND)
R578 10K/4
S3 Wake up (Default)
R572 X_100K/4
R576 100K/4
R575 47K/4
C593 1u6.3X4
R574 100K/4
Pin22
Bus-Powered: 0
Self-Powered: 1
R573 X_4.7K/4
GL850_PGANG
GL850_RESET
GL850_PSELF
V33
AVDD-1
AVDD-2
AVDD-3
DVDD
V5
DM0
DP0
OVCUR1#
OVCUR2#
OVCUR3#
OVCUR4#
PGANG
RESET#
PSELF
SDA
TEST/SCL
RREF
G1
DM1
DP1
DM2
DP2
DM3
DP3
DM4
DP4
X1
X2
GL850G-OHY50-RH
C599 0.1u16X4
USB2_HUB_1D-
USB2_HUB_1D+
USB2_HUB_2D-
USB2_HUB_2D+
UH_12MHZ_IN
UH_12MHZ_OUT
Y3
12MHZ20p_S-HF
C590 27p50N4
C594 27p50N4
GL850_RREF
R577 619R1%4
CRB is 680Rohm, change to 619R
For Meet USB Eye Diagramt Pass.
C595 0.1u16X4
Close to Pin5
C596 0.1u16X4
C597 1u6.3X4
Close to Pin9
C598 0.1u16X4
C600 1u6.3X4
Close to Pin14
JUSB1 PORT 9,10
12 MB_USB_9D+
12 MB_USB_9D-
MB_USB_9D+_C
MB_USB_9D-_C
L3 0R-4P2R
12 MB_USB_10D+
12 MB_USB_10D-
MB_USB_10D+_C
MB_USB_10D-_C
L4 0R-4P2R
3VSB
EMI
C472 X_0.1u16X4
D14
ESD-AOZ8906CI
NEAR CONNECTOR
5V_FUSB2_1
C488 X_1u6.3X4
JUSB1
H2X5[9]M_BLACK-RH-3
C486 0.1u16X4
EC15 560u6.3SO
CLOSE TO CONNECTOR
JUSB2 PORT 11,14
USB2_HUB_1D+_C
USB2_HUB_1D-_C
L5 0R-4P2R
USB2_HUB_2D+_C
USB2_HUB_2D-_C
L6 0R-4P2R
C487 X_0.1u16X4
D15
ESD-AOZ8906CI
NEAR CONNECTOR
C498 X_1u6.3X4
JUSB2
H2X5[9]M_BLACK-RH-3
C499 0.1u16X4
CLOSE TO CONNECTOR
PS2_USB1 PORT 3,4
12 MB_USB_3D-
12 MB_USB_3D+
MB_USB_3D-_C
MB_USB_3D+_C
L1 0R-4P2R
12 MB_USB_4D-
12 MB_USB_4D+
MB_USB_4D-_C
MB_USB_4D+_C
L2 0R-4P2R
C33 X_0.1u16X4
D4
ESD-AOZ8906CI
NEAR CONNECTOR
5V_RUSB2_1
EC1 560u6.3SO
PS2_USB1B
VCC-1
USB2-
USB2+
GND-1
VCC-2
USB1-
USB1+
GND-2
MINIDIN_USBX2-RH-14
C4 X_1u6.3X4
C2 0.1u16X4
CLOSE TO CONNECTOR
MICRO-STAR INT'L CO.,LTD
MSI
MS-7C88
Size Custom
Document Description
USB2.0 Connector
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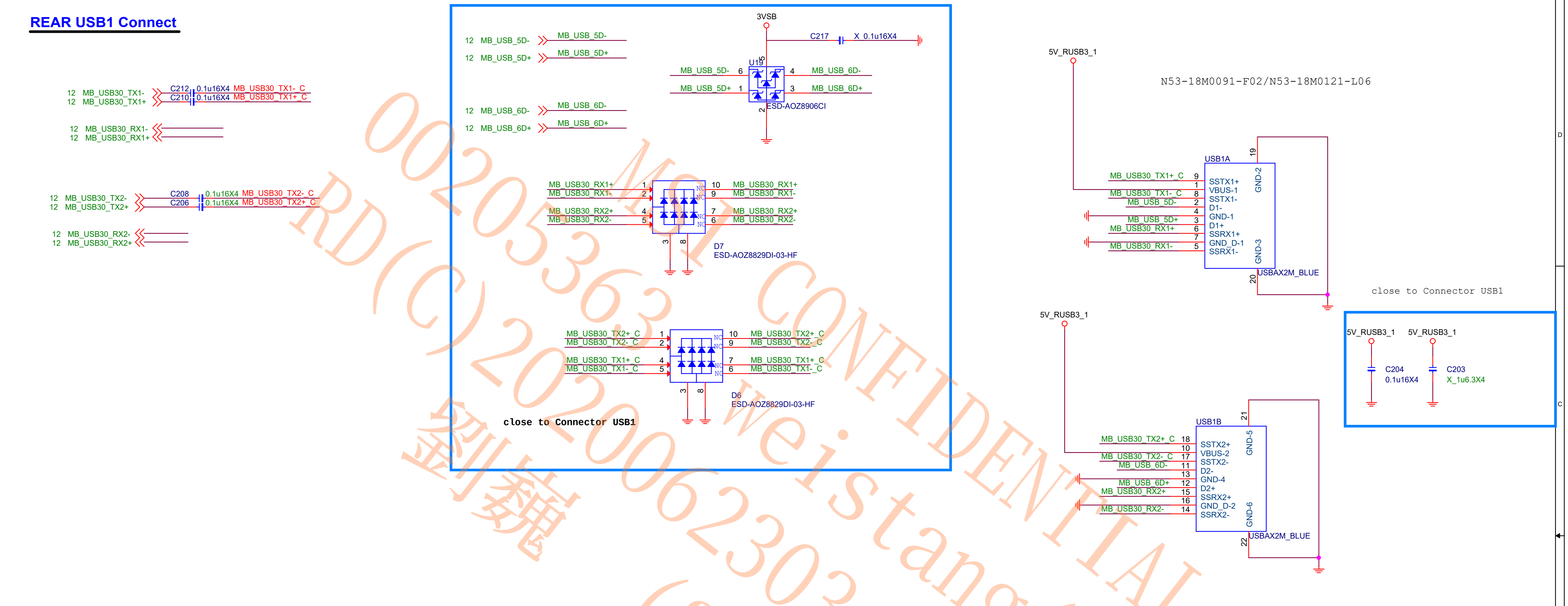
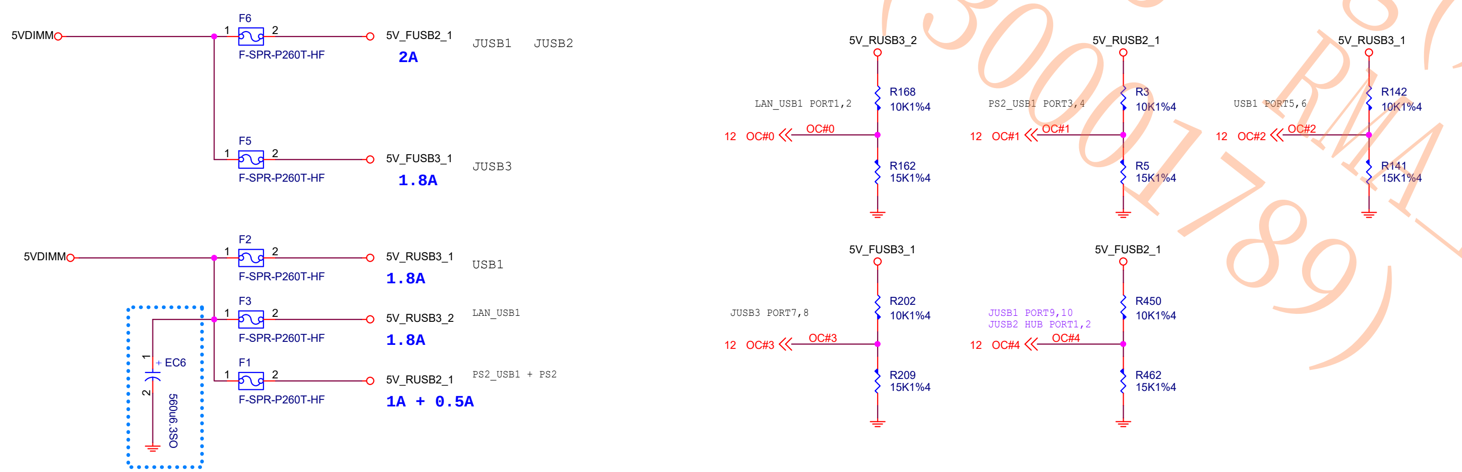
REAR USB1 Connect





EC20 擺放在F4與F5之間

USB CONN	USB POWER	PCH PORT	OC# SIGNAL
LAN_USB1	5V_RUSB3_2	Port1,2	OC#0
PS2_USB1	5V_RUSB2_1	Port3,4	OC#1
USB1	5V_RUSB3_1	Port5,6	OC#2
JUSB3	5V_FUSB3_1	Port7,8	OC#3
JUSB1,2	5V_FUSB2_1	Port9,10 HUB PORT1,2	OC#4

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MS-7C88
Size: Custom
Document Description: REAR USB1 Connect
Rev 1.1
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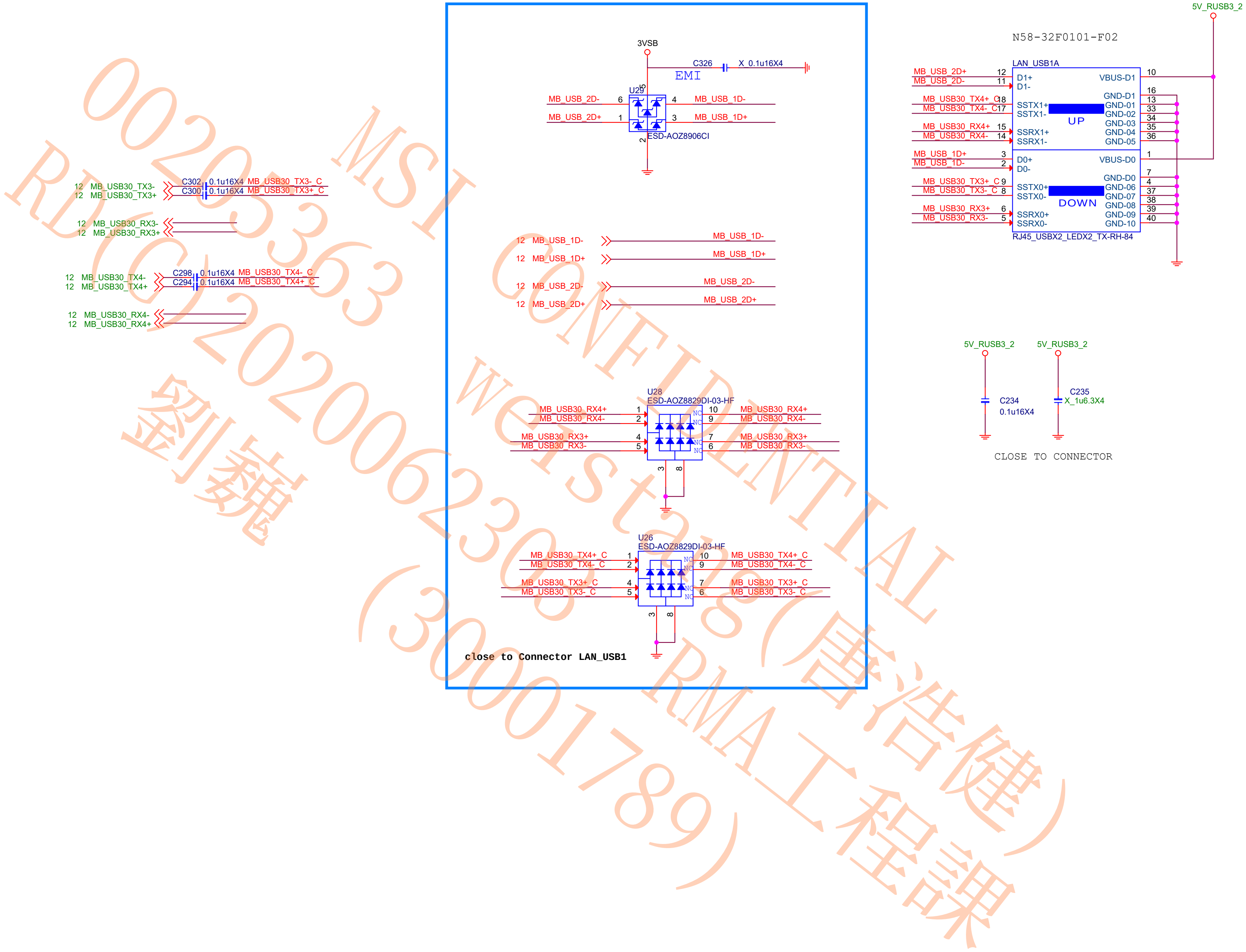
Rear USB1 port 1,2



MICRO-STAR INT'L CO.,LTD

MS-7C88

Size	Document Description	Rev
Custom	USB3.0 Rear Connector	1.1

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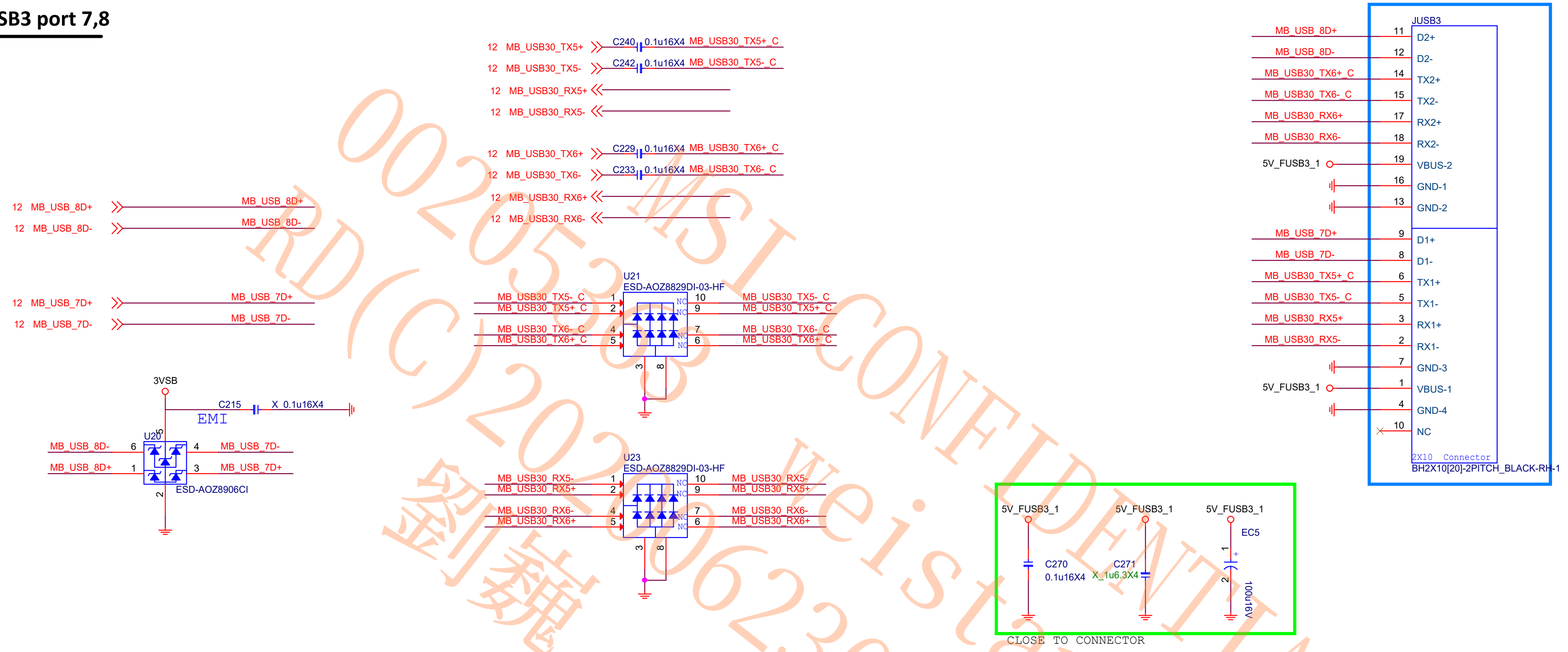
Front JUSB3 port 7,8



MICRO-STAR INT'L CO.,LTD		
MS-7C88		
Size: Custom	Document Description: Front USB3.0 Connector	Rev 1.1
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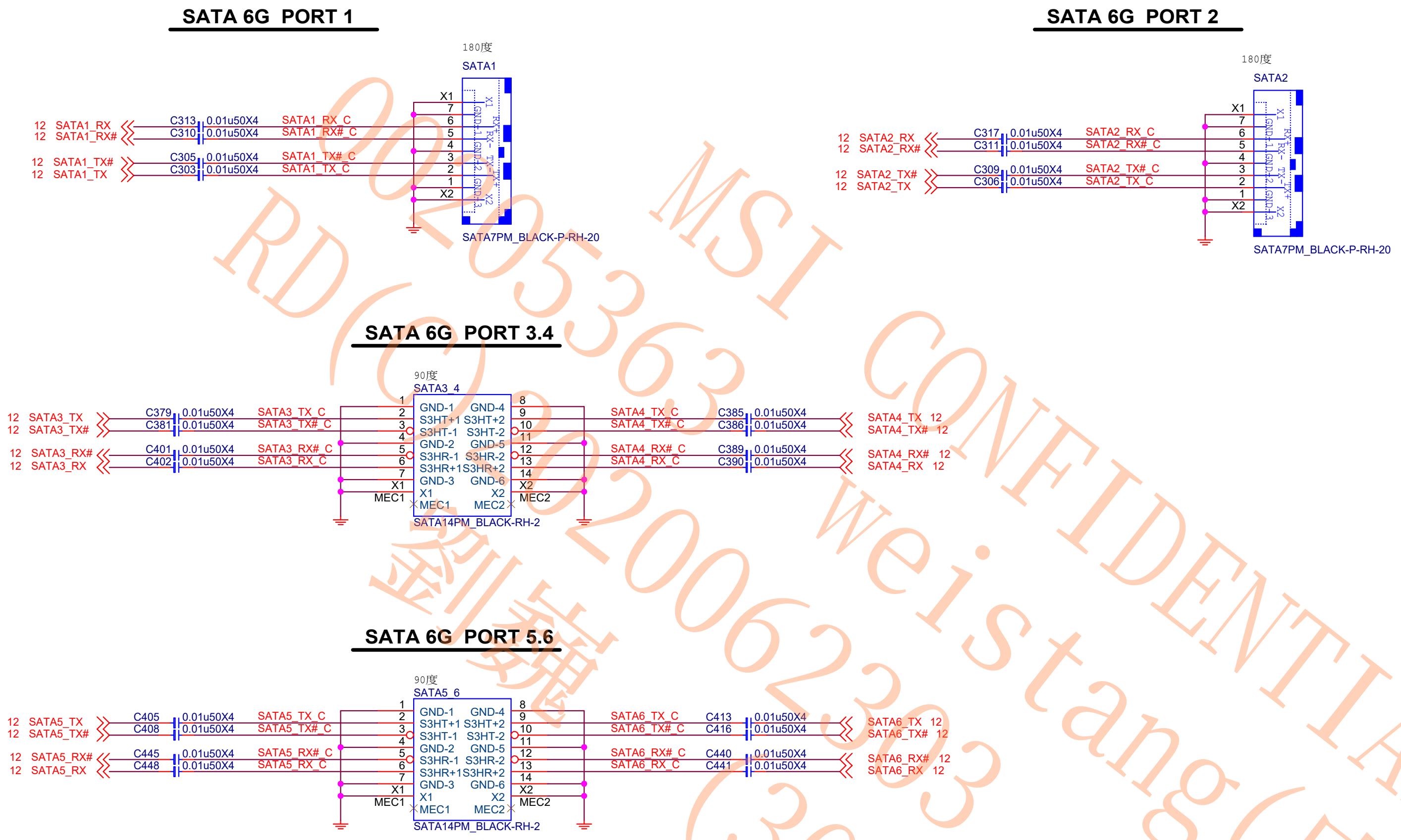

MICRO-STAR INT'L CO.,LTD		
MS-7C88		
Size Custom	Document Description SATA connector	Rev 1.1
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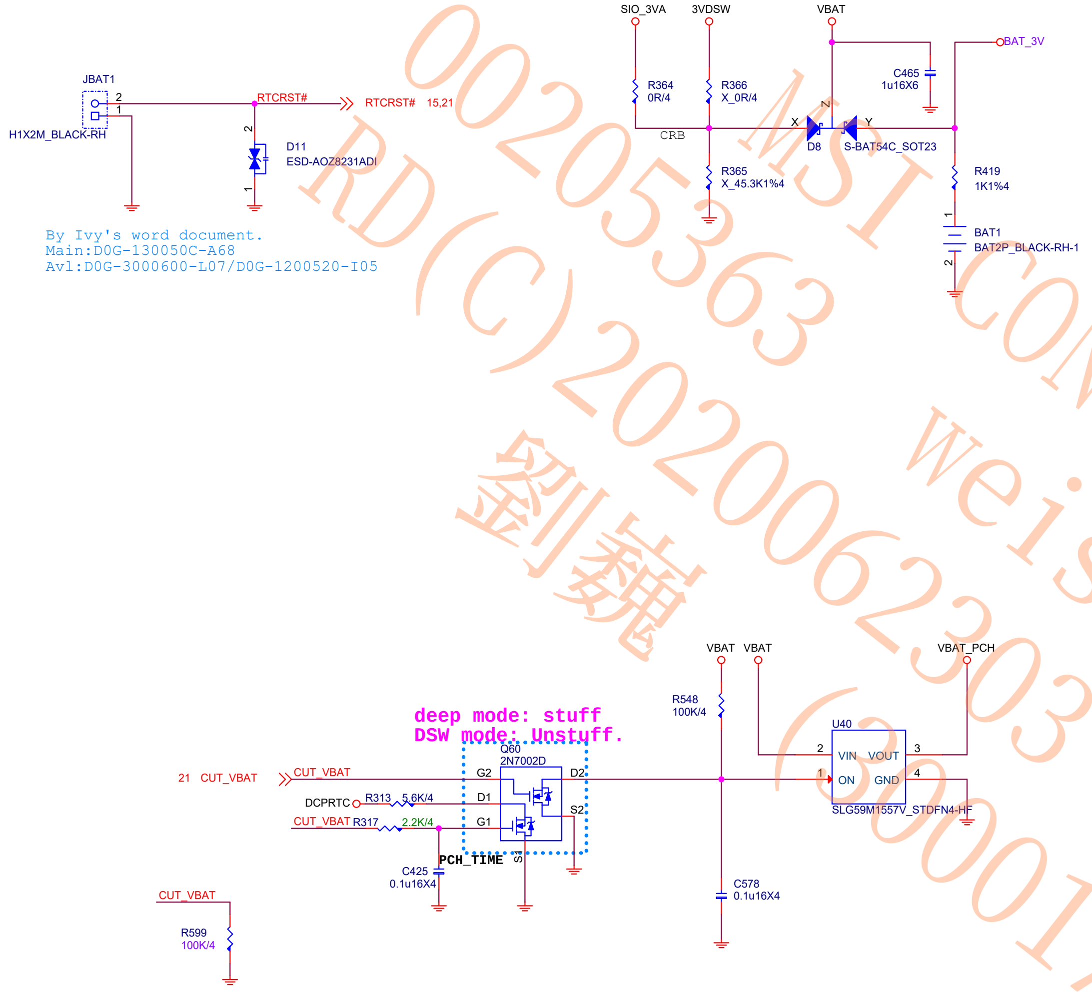
Cut VBAT

VBAT



MICRO-STAR INT'L CO.,LTD		
MS-7C88		
Size: Custom	Document Description: CUT VBAT circuit	Rev 1.1
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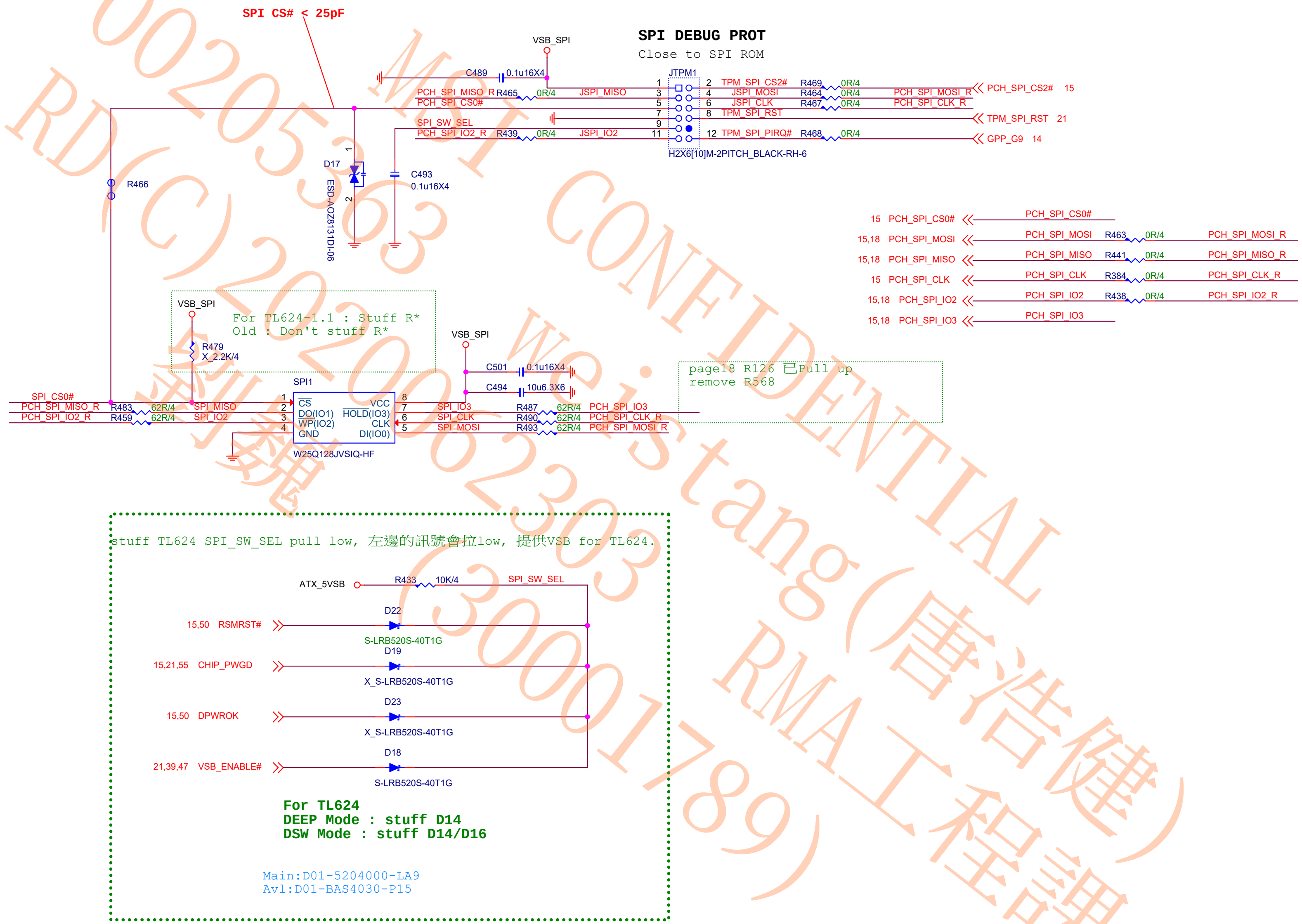
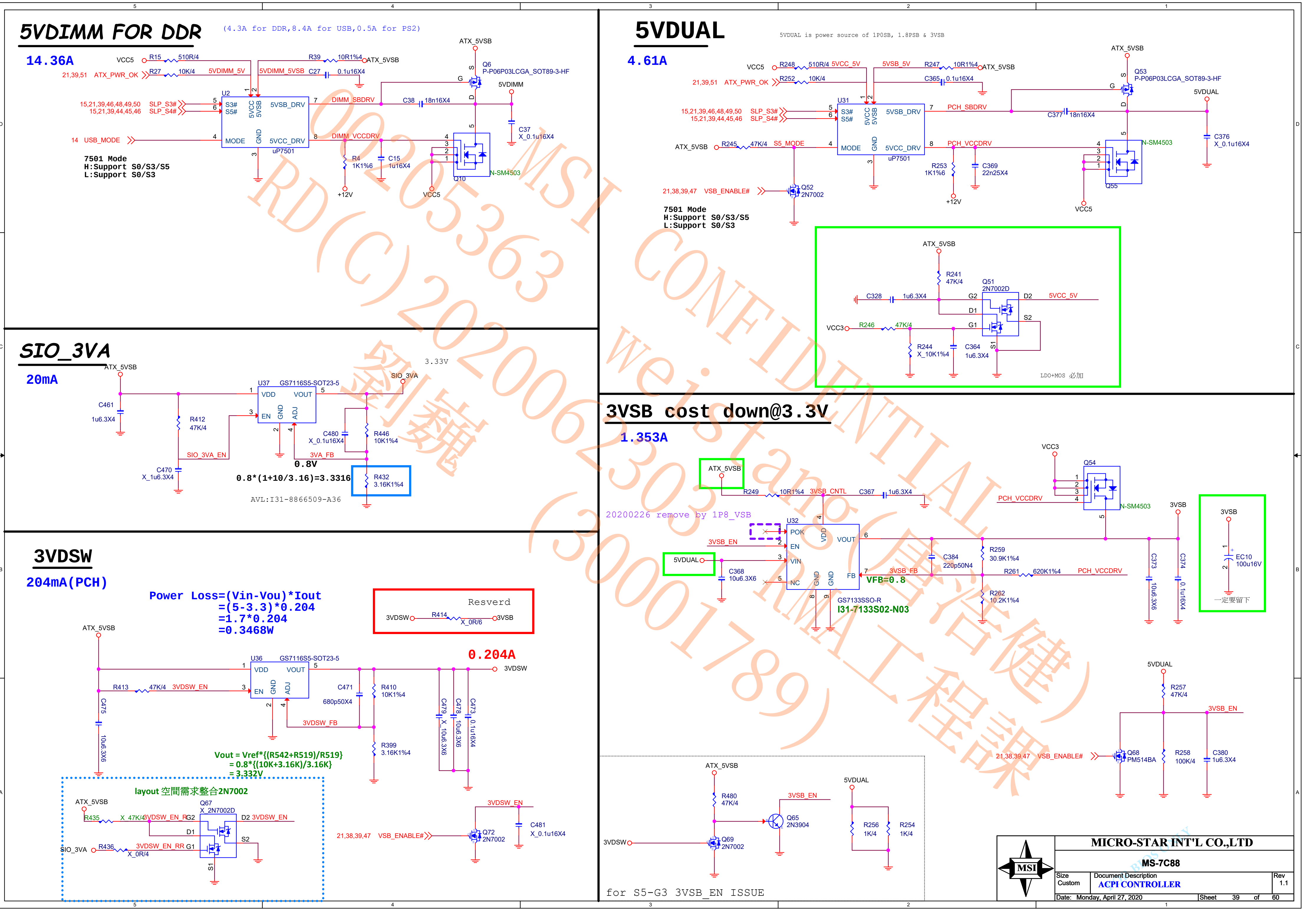
BIOS ROM



MICRO-STAR INT'L CO.,LTD			
MS-7C88			
Size: Custom	Document Description: BIOS ROM		Rev: 1.1
Date: Monday, April 27, 2020	Sheet 38 of 60		



5VDIMM FOR DDR
(4.3A for DDR,8.4A for USB,0.5A for PS2)
14.36A
VCC5
R15 510R/4
R27 10K/4
R39 10R1%4
ATX_5VSB
21,39,51 ATX_PWR_OK
5VDIMM_5V
5VDIMM_5VSB
C27 0.1u16X4
Q6 P-P06P03LCGA_SOT89-3-HF
5VDIMM
15,21,39,46,48,49,50 SLP_S3#
15,21,39,44,45,46 SLP_S4#
U2
S3#
S5#
5VCC
5VSB
5VSB_DRV
DIMM_SBDRV
C38 18n16X4
C37 X_0.1u16X4
14 USB_MODE
MODE
GND
5VCC_DRV
DIMM_VCCDRV
uP7501
R4 1K1%6
C15 1u16X4
Q10
N-SM4503
+12V
VCC5
7501 Mode
H:Support S0/S3/S5
L:Support S0/S3
5VDUAL
5VDUAL is power source of 1P0SB, 1.8PSB & 3VSB
4.61A
R248 510R/4 5VCC_5V
5VSB_5V
R247 10R1%4
R252 10K/4
C365 0.1u16X4
Q53 P-P06P03LCGA_SOT89-3-HF
U31
PCH_SBDRV
C377 18n16X4
C376 X_0.1u16X4
R245 47K/4 S5_MODE
PCH_VCCDRV
R253 1K1%6
C369 22n25X4
Q55
21,38,39,47 VSB_ENABLE#
Q52 2N7002
ATX_5VSB
R241 47K/4
Q51 2N7002D
C328 1u6.3X4
5VCC_5V
VCC3
R246 47K/4
R244 X_10K1%4
C364 1u6.3X4
LDO+MOS 必加
SIO_3VA
20mA
3.33V
C461 1u6.3X4
R412 47K/4
U37 GS7116S5-SOT23-5
VDD
VOUT
EN
ADJ
SIO_3VA_EN
C470 X_1u6.3X4
C480 X_0.1u16X4
R446 10K1%4
3VA_FB
0.8V
0.8*(1+10/3.16)=3.3316
R432 3.16K1%4
AVL:I31-8866509-A36
3VSB cost down@3.3V
1.353A
VCC3
Q54
N-SM4503
R249 10R1%4 3VSB_CNTL
C367 1u6.3X4
20200226 remove by 1P8_VSB
U32
POK
3VSB_EN
EN
VIN
NC
5VDUAL
C368 10u6.3X6
C384 220p50N4
R259 30.9K1%4
R261 620K1%4
3VSB_FB
VFB=0.8
R262 10.2K1%4
GS7133SSO-R
I31-7133S02-N03
3VSB
C373 10u6.3X6
C374 0.1u16X4
EC10 100u16V
一定要留下
3VDSW
204mA(PCH)
Power Loss=(Vin-Vou)*Iout
=(5-3.3)*0.204
=1.7*0.204
=0.3468W
Resverd
3VDSW
R414 X_0R/6
3VSB
0.204A
U36 GS7116S5-SOT23-5
R413 47K/4 3VDSW_EN
C475 10u6.3X6
C471 680p50X4
R410 10K1%4
3VDSW_FB
R399 3.16K1%4
C479 X_10u6.3X6
C478 10u6.3X6
C473 0.1u16X4
Vout = Vref*{(R542+R519)/R519}
= 0.8*{(10K+3.16K)/3.16K}
= 3.332V
layout 空間需求整合2N7002
R435 X_47K/4 3VDSW_EN_R
Q67 X_2N7002D
R436 3VDSW_EN_RR
X_0R/4
3VDSW_EN
21,38,39,47 VSB_ENABLE#
Q72 2N7002
C481 X_0.1u16X4
5VDUAL
R257 47K/4
3VSB_EN
Q68 PM514BA
R258 100K/4
C380 1u6.3X4
R480 47K/4
Q65 2N3904
Q69 2N7002
R256 1K/4
R254 1K/4
for S5-G3 3VSB_EN ISSUE

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Size: Custom | Document Description: ACPI CONTROLLER | Rev 1.1

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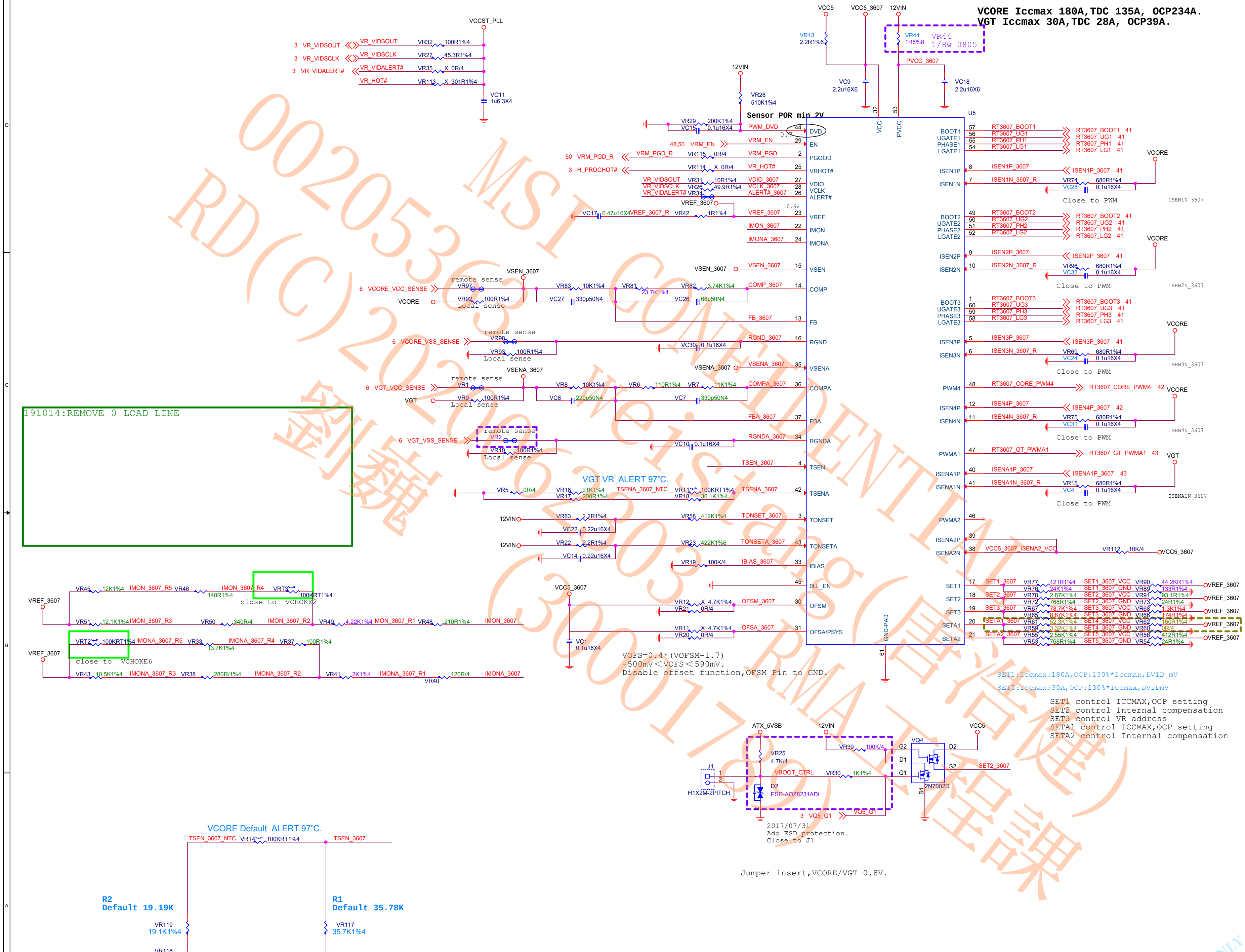

Thermal Protection Table

	R1	R2	Thermal Alert#	VR_HOT#	Thermal Alert#/VR_HOT#
VCORE	35.78K	19.19K	106℃	127℃(SIO)	83.46%
VGT	35.78K	19.19K	106℃		83.46%

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Size: Custom | Document Description: PWM-RT3607BC | Rev 1.1

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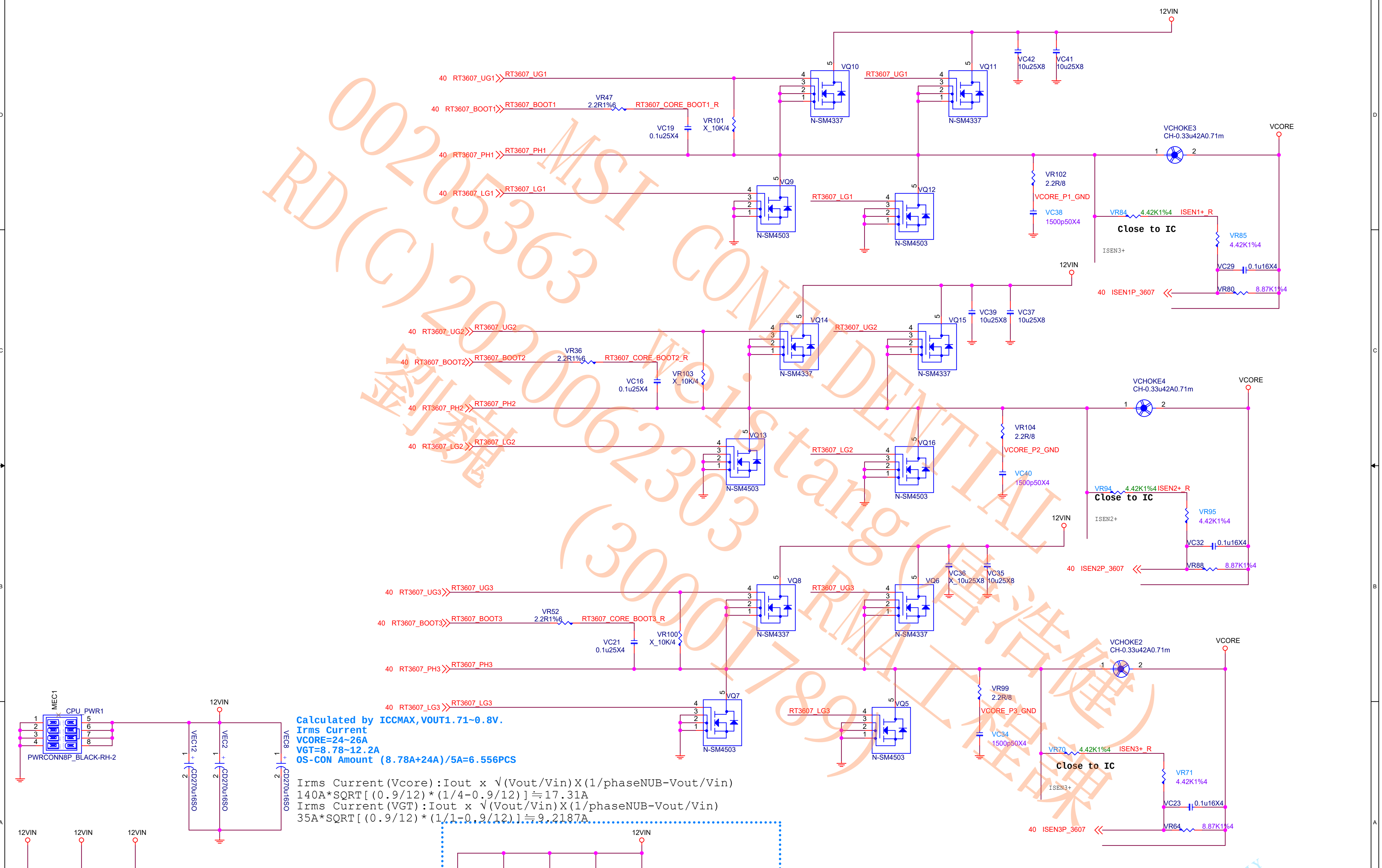

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MS-7C88

Size	Document Description	Rev
Custom	VCORE(P-PAK) PHASE1-4	1.1

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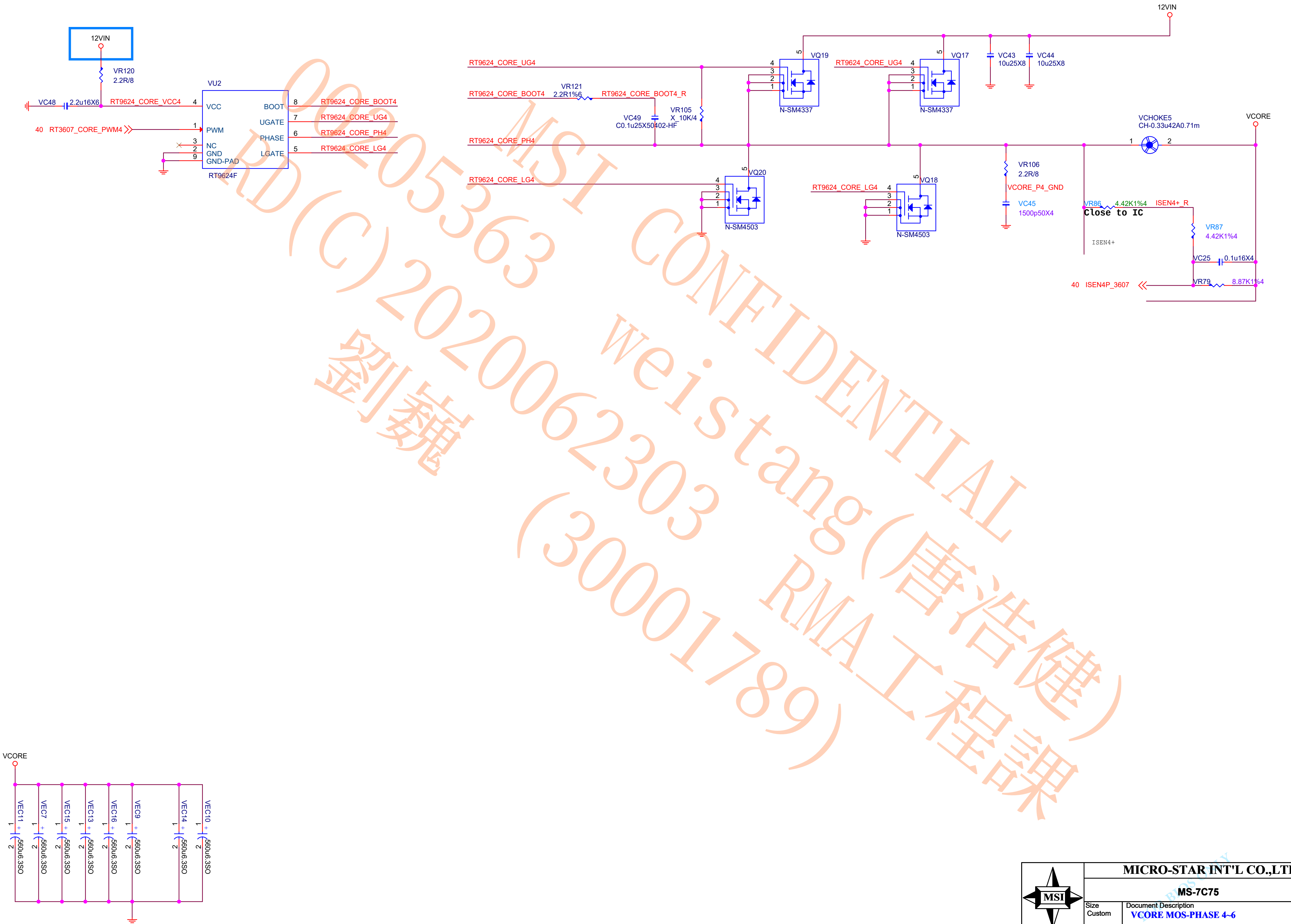

MICRO-STAR INT'L CO.,LTD

MS-7C75

Size	Document Description	Rev
Custom	VCORE MOS-PHASE 4~6	1.1

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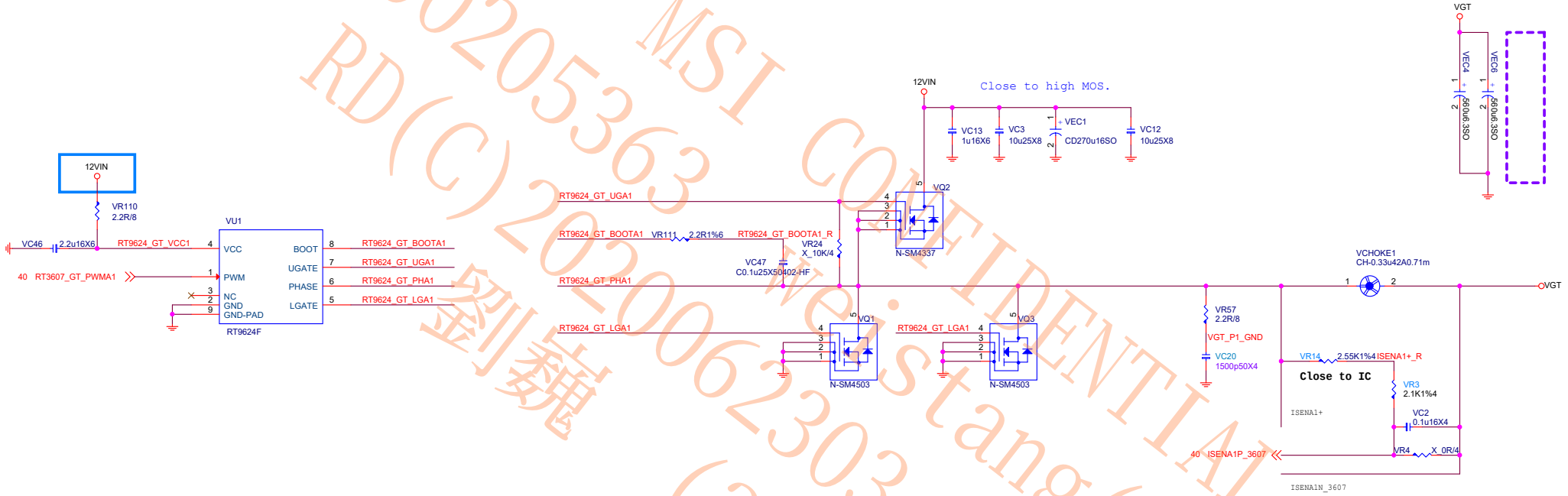

MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7C88	
Size: Custom	Document Description: VGT(P-PAK) PHASE1	Rev: 1.1
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DDR4_1.2V 3.7A+ 5.825A+0.375A+0.17A=10.07A

3.7A FOR CPU
5.825A FOR 2DIMM DDR4
0.375A FOR VTT_DDR
0.17A FOR VCCPLL_OC

OCP: 15.625A

D03-810BA0C-N03
Current limit= 150K*5uA/10/3.6mohm)=20.83A
Current limit= 150K*5uA/10/4.8mohm)=15.625A

CHOKE = 32A

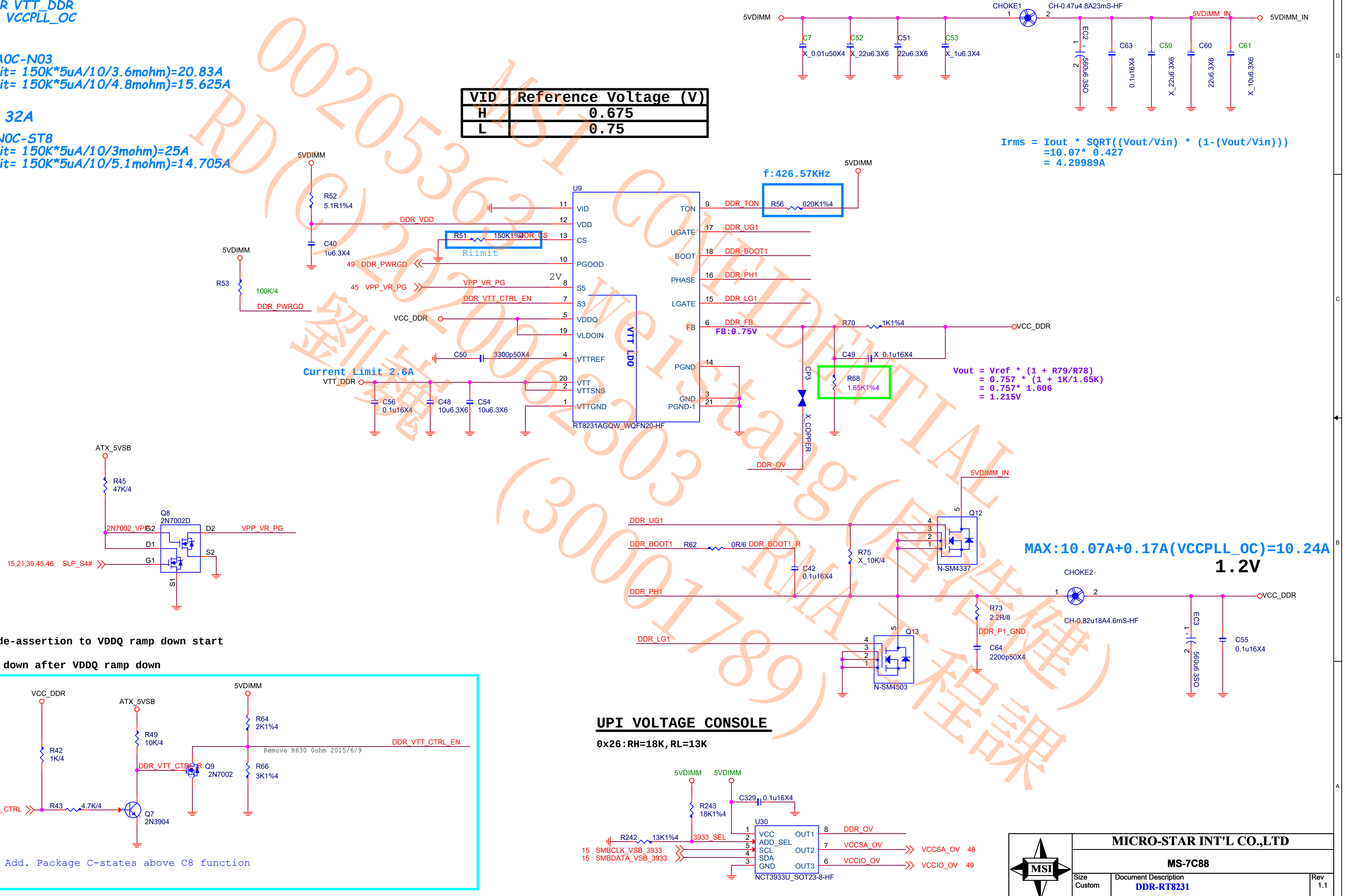
D03-4503N0C-ST8
Current limit= 150K*5uA/10/3mohm)=25A
Current limit= 150K*5uA/10/5.1mohm)=14.705A

Iin=10.07A*1.2V/0.8/5V=3.021A
L04-47B70N0-M09
Over 85℃ ,Rated Current 1.5A.

Iin=10.07A*1.2V/0.8/5V=3.021A
L04-82B7090-M26
Over 85℃ ,Rated Current 1.5A.

VID	Reference Voltage (V)
H	0.675
L	0.75

Irms = Iout * SQRT((Vout/Vin) * (1-(Vout/Vin)))
=10.07* 0.427
= 4.29989A



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Size	Document Description	Rev
Custom	DDR-RT8231	1.1

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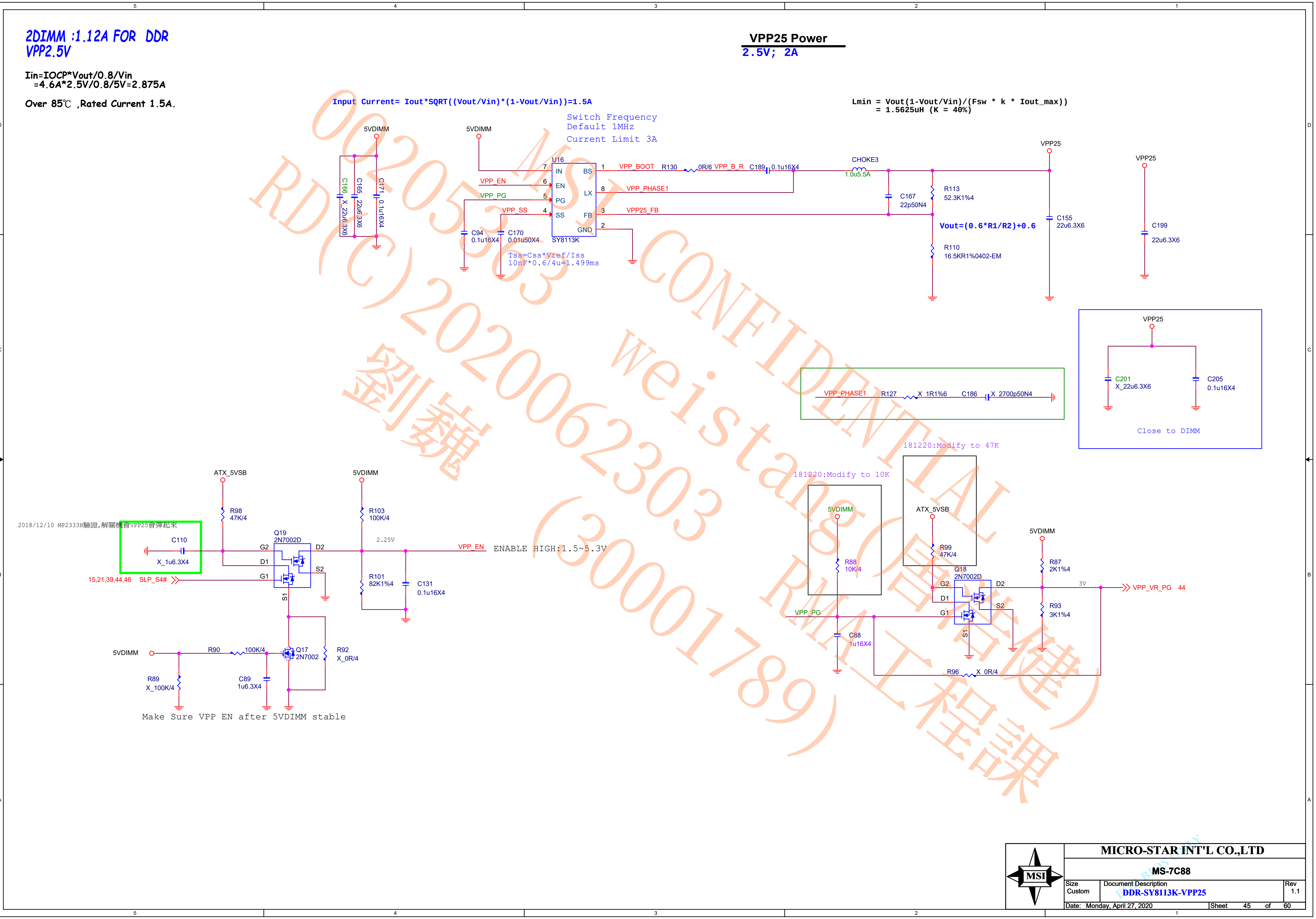
2DIMM :1.12A FOR DDR
VPP2.5V
Iin=IOCP*Vout/0.8/Vin
=4.6A*2.5V/0.8/5V=2.875A
Over 85℃ ,Rated Current 1.5A.
VPP25 Power
2.5V; 2A
Input Current= Iout*SQRT((Vout/Vin)*(1-Vout/Vin))=1.5A
Lmin = Vout(1-Vout/Vin)/(Fsw * k * Iout_max))
= 1.5625uH (K = 40%)
Switch Frequency
Default 1MHz
Current Limit 3A
5VDIMM
C166 X_22u6.3X6
C165 22u6.3X6
C171 0.1u16X4
U16
IN
BS
EN
LX
PG
SS
FB
GND
SY8113K
VPP_EN
VPP_PG
VPP_SS
VPP_BOOT
R130 0R/6
VPP_B_R
C189 0.1u16X4
VPP_PHASE1
VPP25_FB
CHOKE3
1.0u5.5A
C167 22p50N4
R113 52.3K1%4
R110 16.5KR1%0402-EM
Vout=(0.6*R1/R2)+0.6
VPP25
C155 22u6.3X6
C199 22u6.3X6
C94 0.1u16X4
C170 0.01u50X4
Tss=Css*Vref/Iss
10nF*0.6/4u=1.499ms
VPP_PHASE1
R127 X_1R1%6
C186 X_2700p50N4
C201 X_22u6.3X6
C205 0.1u16X4
Close to DIMM
181220:Modify to 47K
181220:Modify to 10K
ATX_5VSB
R98 47K/4
R103 100K/4
2018/12/10 MP2333H驗證,解關機會VPP25會彈起來
C110 X_1u6.3X4
Q19 2N7002D
G2
D2
D1
G1
S2
S1
2.25V
VPP_EN
ENABLE HIGH:1.5~5.3V
15,21,39,44,46
SLP_S4#
R101 82K1%4
C131 0.1u16X4
R90 100K/4
Q17 2N7002
R92 X_0R/4
R89 X_100K/4
C89 1u6.3X4
Make Sure VPP EN after 5VDIMM stable
R88 10K/4
R99 47K/4
Q18 2N7002D
R87 2K1%4
3V
VPP_VR_PG 44
VPP_PG
C88 1u16X4
R93 3K1%4
R96 X_0R/4
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MS-7C88
Size Custom
Document Description
DDR-SY8113K-VPP25
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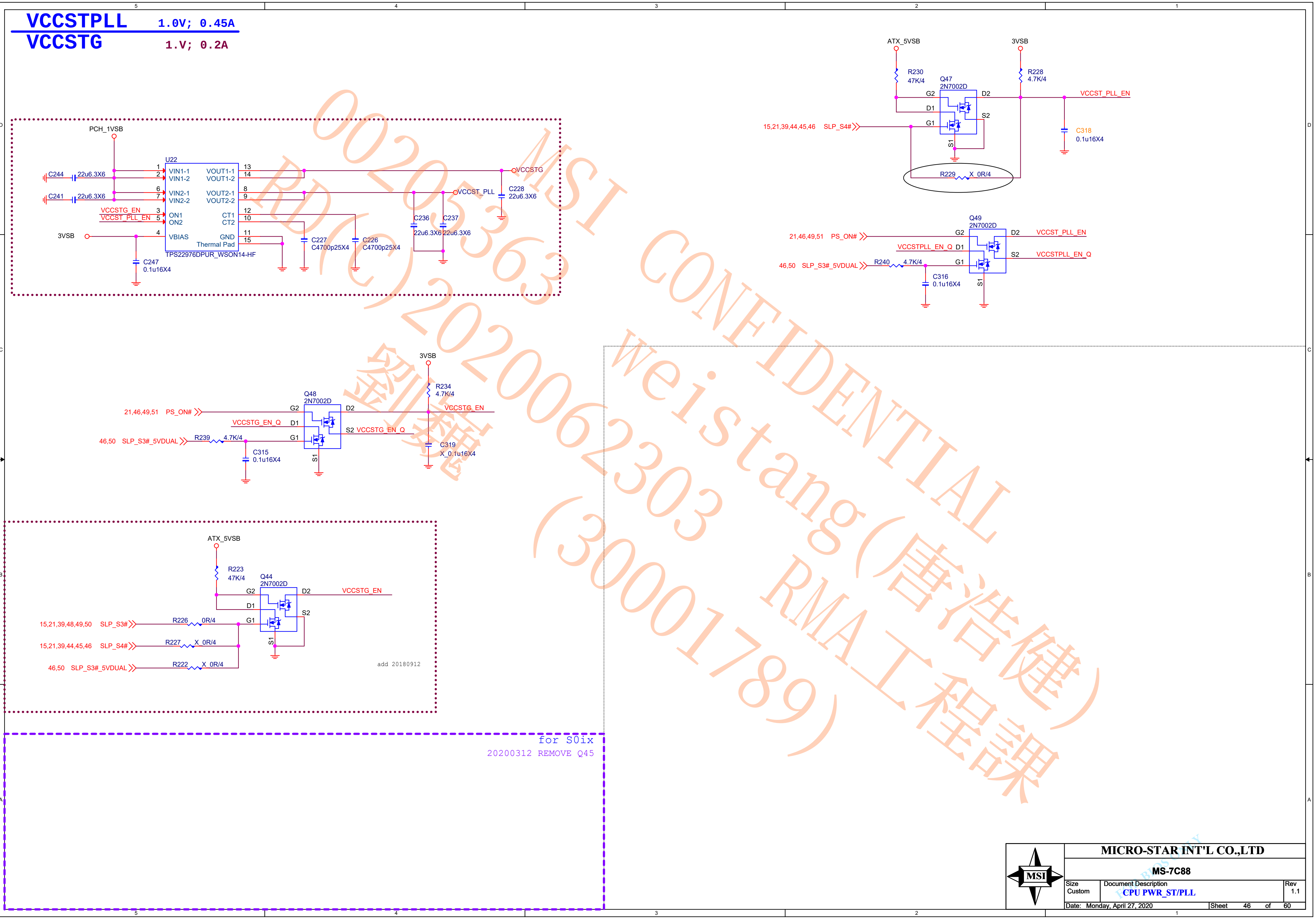
VCCSTPLL 1.0V; 0.45A
VCCSTG 1.V; 0.2A
PCH_1VSB
U22
TPS22976DPUR_WSON14-HF
VIN1-1 VIN1-2 VIN2-1 VIN2-2 ON1 ON2 VBIAS
VOUT1-1 VOUT1-2 VOUT2-1 VOUT2-2 CT1 CT2 GND Thermal Pad
C244 22u6.3X6
C241 22u6.3X6
VCCSTG_EN
VCCST_PLL_EN
3VSB
C247 0.1u16X4
VCCSTG
VCCST_PLL
C228 22u6.3X6
C236 22u6.3X6
C237 22u6.3X6
C227 C4700p25X4
C226 C4700p25X4
ATX_5VSB
3VSB
R230 47K/4
R228 4.7K/4
Q47 2N7002D
VCCST_PLL_EN
15,21,39,44,45,46 SLP_S4#
C318 0.1u16X4
R229 X_0R/4
Q49 2N7002D
21,46,49,51 PS_ON#
VCCSTPLL_EN_Q
VCCST_PLL_EN
VCCSTPLL_EN_Q
46,50 SLP_S3#_5VDUAL
R240 4.7K/4
C316 0.1u16X4
3VSB
R234 4.7K/4
Q48 2N7002D
21,46,49,51 PS_ON#
VCCSTG_EN
VCCSTG_EN_Q
VCCSTG_EN_Q
46,50 SLP_S3#_5VDUAL
R239 4.7K/4
C315 0.1u16X4
C319 X_0.1u16X4
ATX_5VSB
R223 47K/4
Q44 2N7002D
VCCSTG_EN
15,21,39,48,49,50 SLP_S3#
R226 0R/4
15,21,39,44,45,46 SLP_S4#
R227 X_0R/4
46,50 SLP_S3#_5VDUAL
R222 X_0R/4
add 20180912
for S0ix
20200312 REMOVE Q45
MICRO-STAR INT'L CO.,LTD
MSI
MS-7C88
Size Custom
Document Description
CPU PWR_ST/PLL
Rev 1.1
Date: Monday, April 27, 2020
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PCH_1VSB Power:1V,10.074A

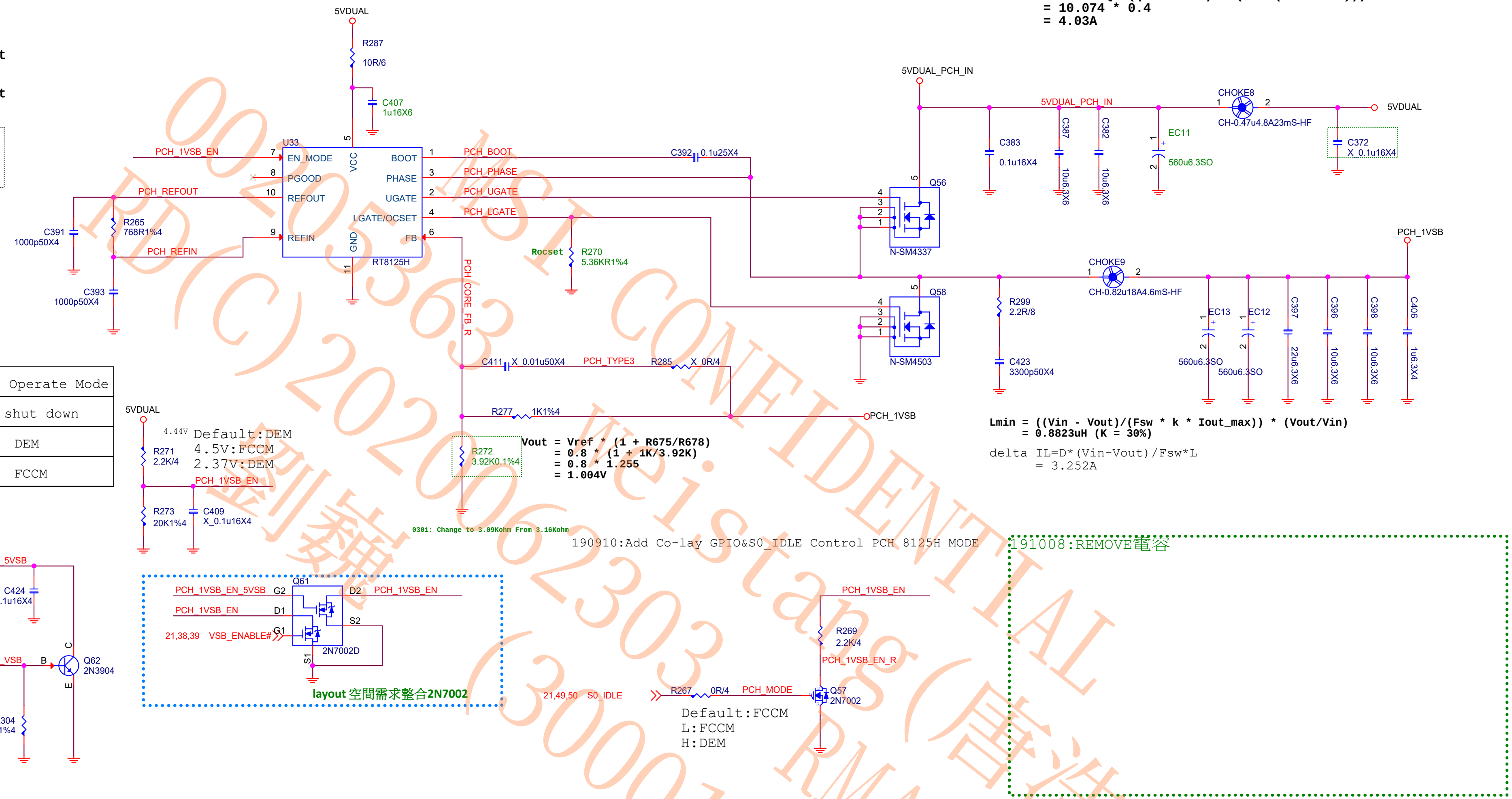
OCP = 14A

Rocset =Iocp*Rdson(low) /Ioset
=14*3.6m/10uA
=5.04K
Rocset =Iocp*Rdson(max) /Ioset
=14*4.8m/10uA
=6.72K

Rdson(Low Side) 5V
D03-810BA0C-N03:3.6 ~4.8 mohm

Rocset(5.36K)
OCP(14.88A~11.166A)

Irms = Iout * SQRT((Vout/Vin) * (1 - (Vout/Vin)))
= 10.074 * 0.4
= 4.03A



Vout = Vref * (1 + R675/R678)
= 0.8 * (1 + 1K/3.92K)
= 0.8 * 1.255
= 1.004V

Lmin = ((Vin - Vout)/(Fsw * k * Iout_max)) * (Vout/Vin)
= 0.8823uH (K = 30%)

delta IL=D*(Vin-Vout)/Fsw*L
= 3.252A

EN_MODE Pin Voltage	IC Operate Mode
<0.4V	shut down
2.1~2.7V	DEM
4.3~5V	FCCM

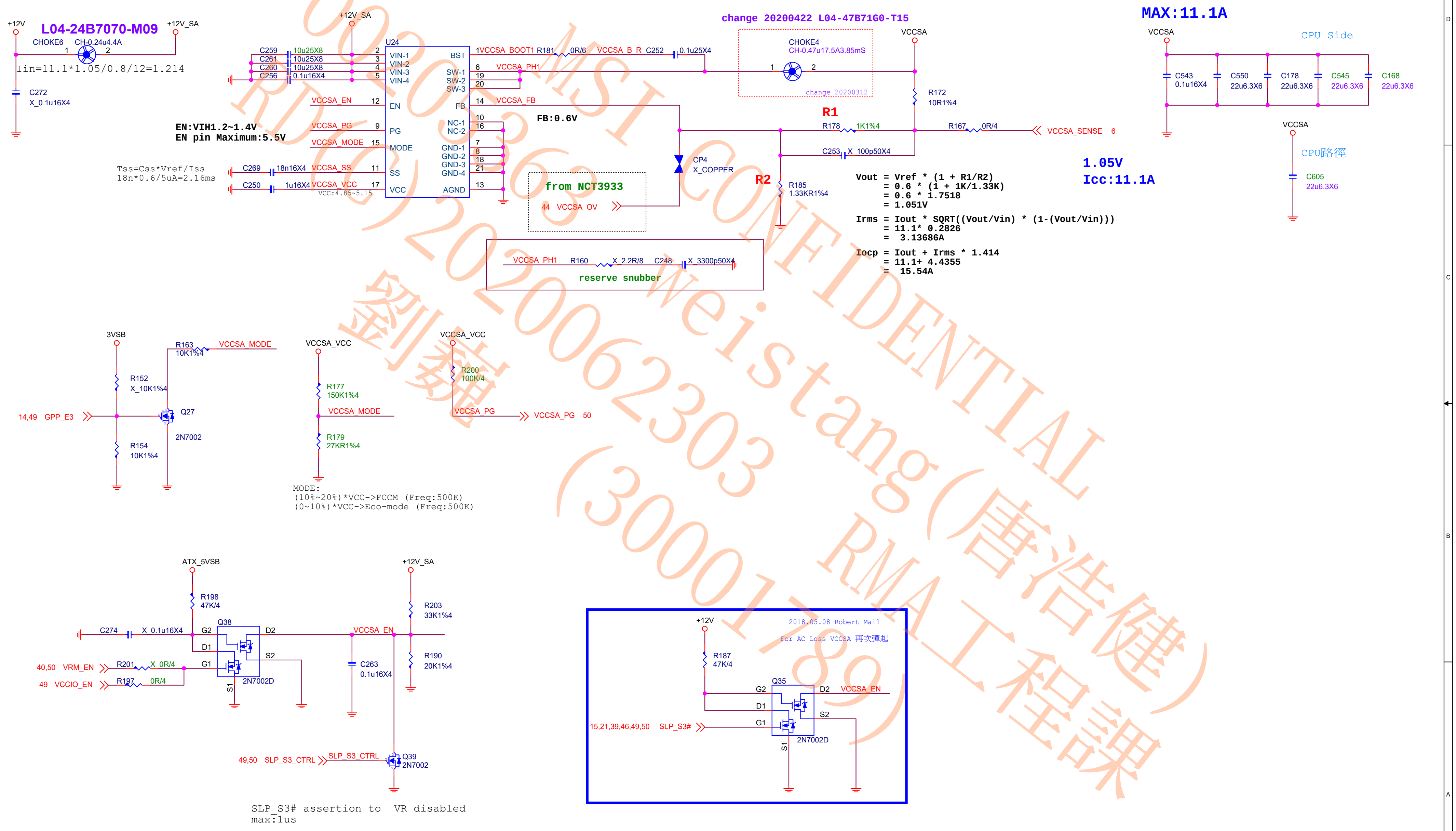
1P8_VSB Power:1.8V, 0.21A

20200226 remove 1P8_VSB power Circuit design

VCCSA

Iin =12V, 1.214A

Iout = 1.05V , 11.1A



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VCCIO

Iin = 12V , 0.64A

Iout = 0.95V; 6.4A

L04-24B7070-M09

Irms1 = Iout * SQRT((Vout/Vin) * (1 - (Vout/Vin)))
= 6.4 * 0.2776
= 1.7767A

EN:VIH1.2~1.4V
EN pin Maximum:5.5V

Tss=Css*Vref/Iss
22n*0.6/5uA=2.64ms

FB:0.6V

from NCT3933

reserve snubber

Vout = Vref * (1 + R1/R2)
= 0.6 * (1 + 1K/1.69K)
= 0.6 * 1.5917
= 0.955V

0.95V
Icc:6.4A

MODE:
(40.48%~49%)*VCC->FCCM(Freq:800K)
(18.04~24%)*VCC->OOA mode(Freq:800K)
(4.35~7%)*VCC->Eco-mode(Freq:800K)

0330: Follow 300 Series Update

S0IX: VCCIO/SA/VCCSTG OFF

20200312 REMOVE Q46

for S0ix

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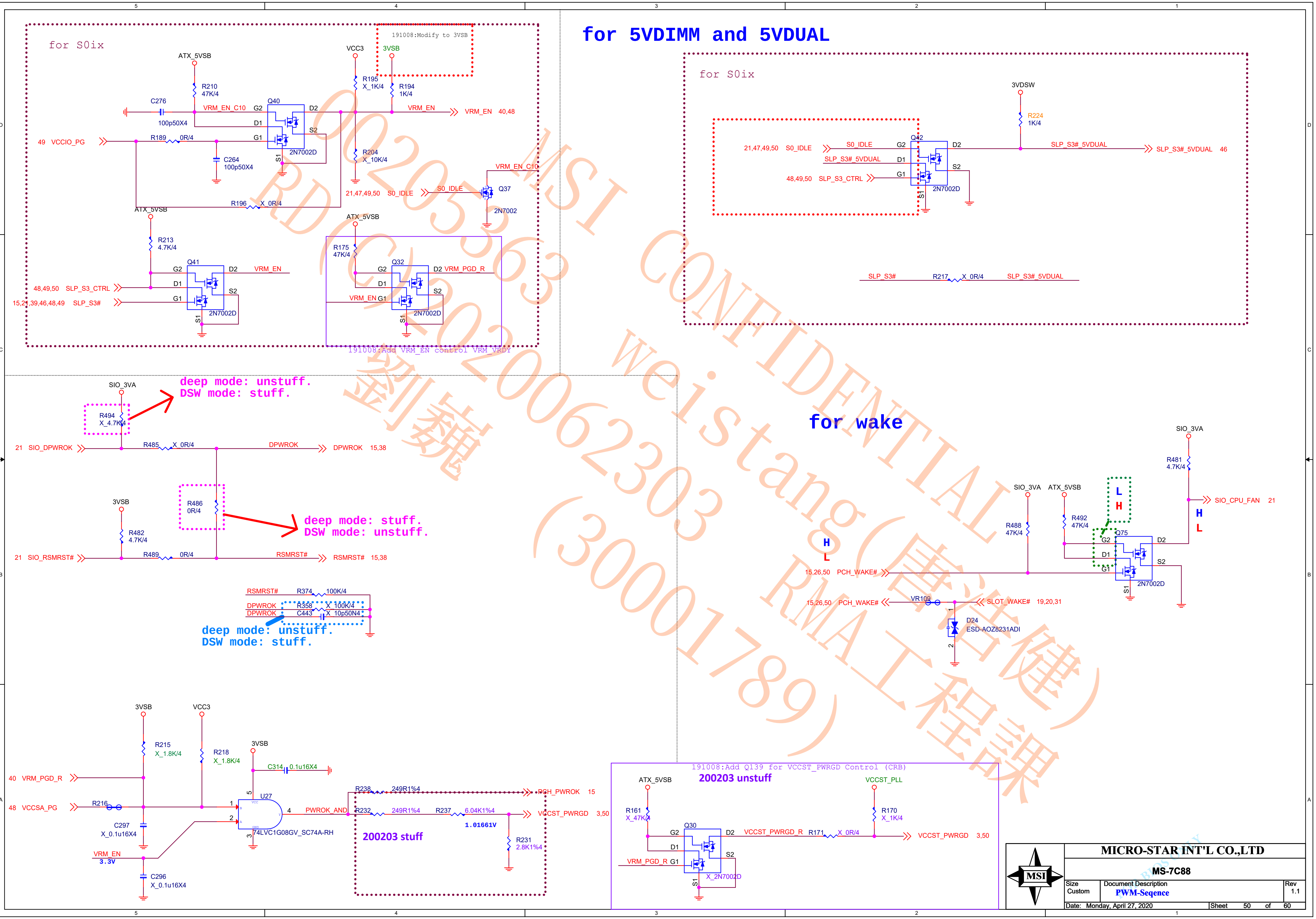

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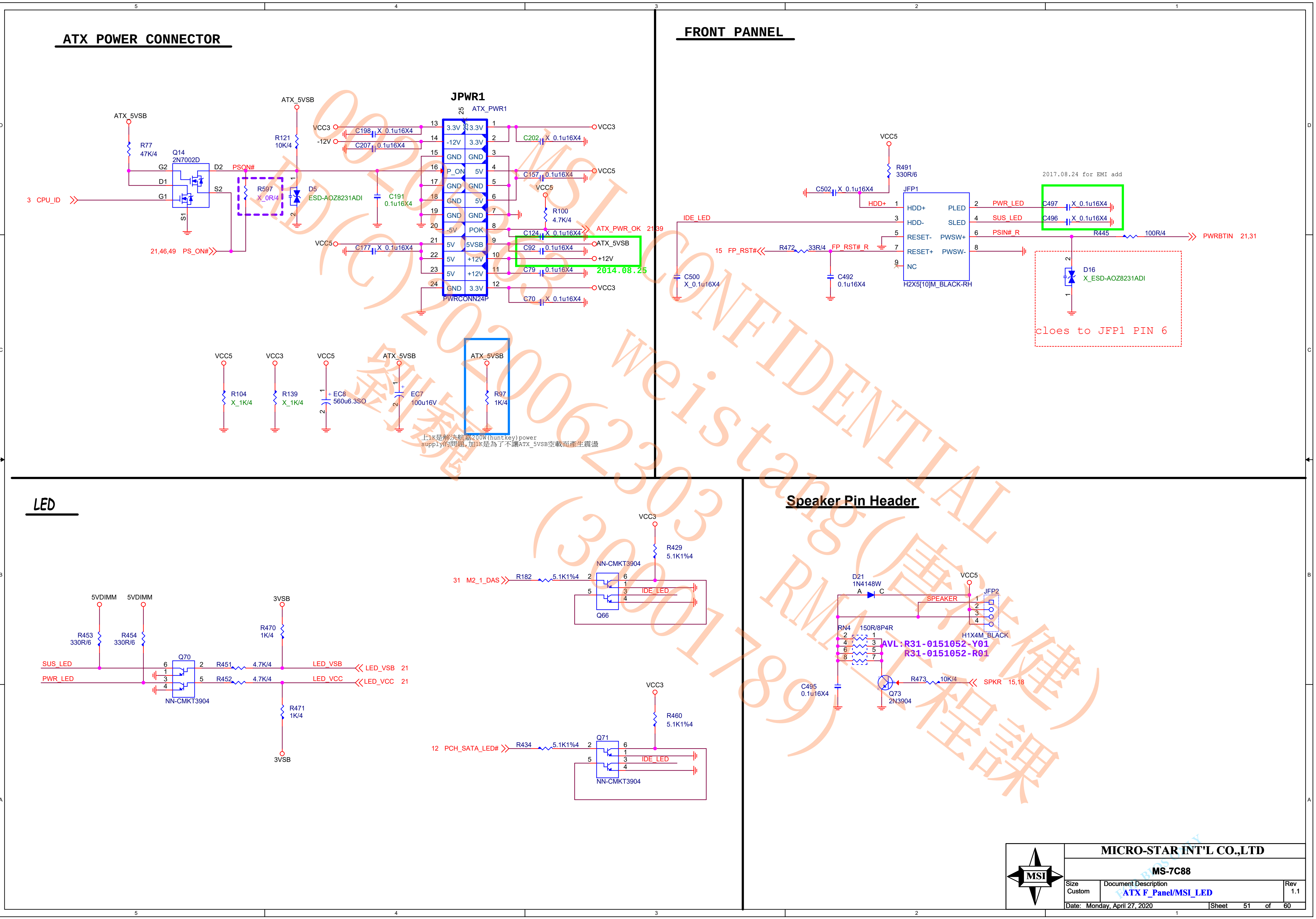

ATX POWER CONNECTOR
JPWR1
ATX_PWR1
PWRCONN24P
ATX_5VSB
R77 47K/4
Q14 2N7002D
PSON#
R597 X_0R/4
D5 ESD-AOZ8231ADI
C191 0.1u16X4
R121 10K/4
3 CPU_ID
21,46,49 PS_ON#
VCC3
-12V
VCC5
C198 X_0.1u16X4
C207 0.1u16X4
C177 X_0.1u16X4
C202 X_0.1u16X4
C157 0.1u16X4
C124 X_0.1u16X4
C92 0.1u16X4
C79 0.1u16X4
C70 X_0.1u16X4
R100 4.7K/4
ATX_PWR_OK 21,39
+12V
2014.08.25
3.3V
-12V
GND
P_ON
5V
-5V
POK
5VSB
+12V
R104 X_1K/4
R139 X_1K/4
EC8 560u6.3SO
EC7 100u16V
R97 1K/4
上1K是解決航嘉200W(huntkey)power supply的問題,加1K是為了不讓ATX_5VSB空載而產生震盪
FRONT PANNEL
R491 330R/6
C502 X_0.1u16X4
JFP1
HDD+
HDD-
RESET-
RESET+
NC
PLED
SLED
PWSW+
PWSW-
H2X5[10]M_BLACK-RH
IDE_LED
PWR_LED
SUS_LED
PSIN#_R
2017.08.24 for EMI add
C497 X_0.1u16X4
C496 X_0.1u16X4
R445 100R/4
PWRBTIN 21,31
15 FP_RST#
R472 33R/4
FP_RST#_R
C500 X_0.1u16X4
C492 0.1u16X4
D16 X_ESD-AOZ8231ADI
cloes to JFP1 PIN 6
LED
5VDIMM
R453 330R/6
R454 330R/6
Q70
NN-CMKT3904
R451 4.7K/4
R452 4.7K/4
3VSB
R470 1K/4
R471 1K/4
LED_VSB 21
LED_VCC 21
31 M2_1_DAS
R182 5.1K1%4
R429 5.1K1%4
Q66
IDE_LED
12 PCH_SATA_LED#
R434 5.1K1%4
R460 5.1K1%4
Q71
Speaker Pin Header
D21 1N4148W
JFP2
SPEAKER
H1X4M_BLACK
RN4 150R/8P4R
AVL:R31-0151052-Y01
R31-0151052-R01
C495 0.1u16X4
Q73 2N3904
R473 10K/4
SPKR 15,18
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ATX F_Panel/MSI_LED
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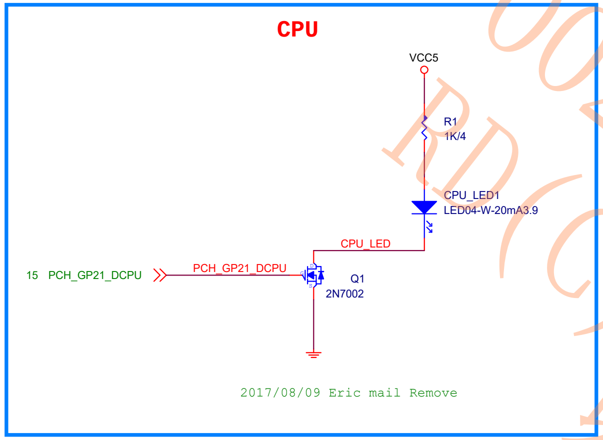
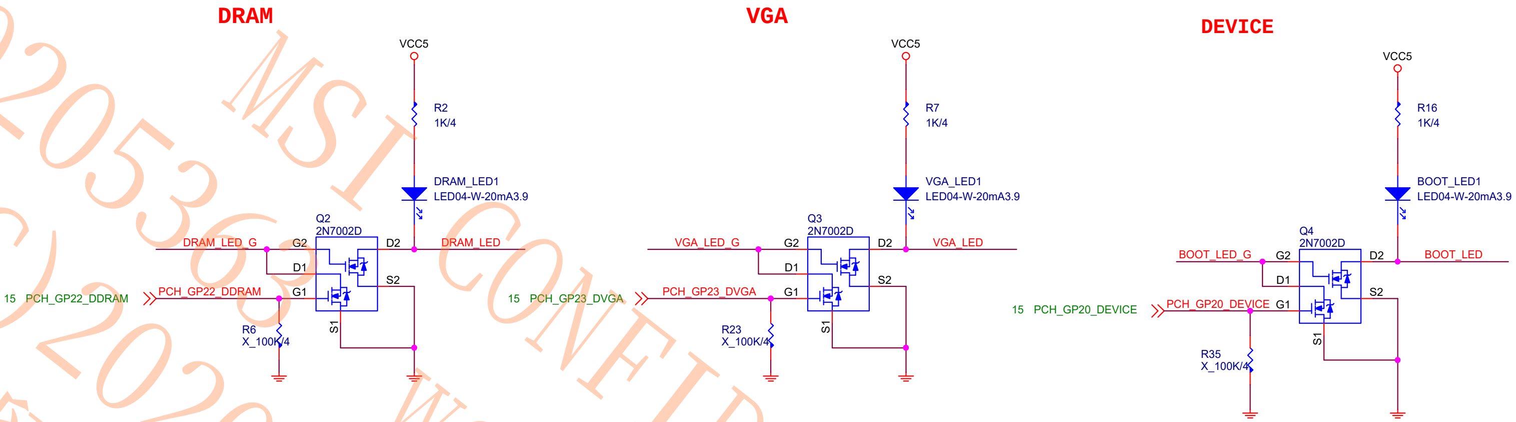
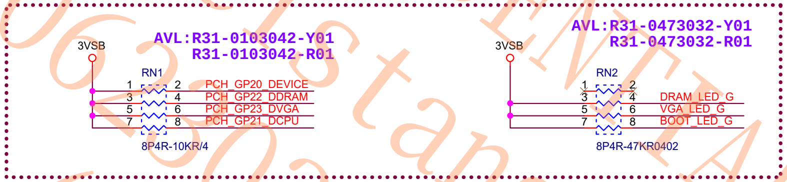
DEBUG LED







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

關機斷電狀態下，3個LED先維持default全暗，開機通電後：

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

TPM

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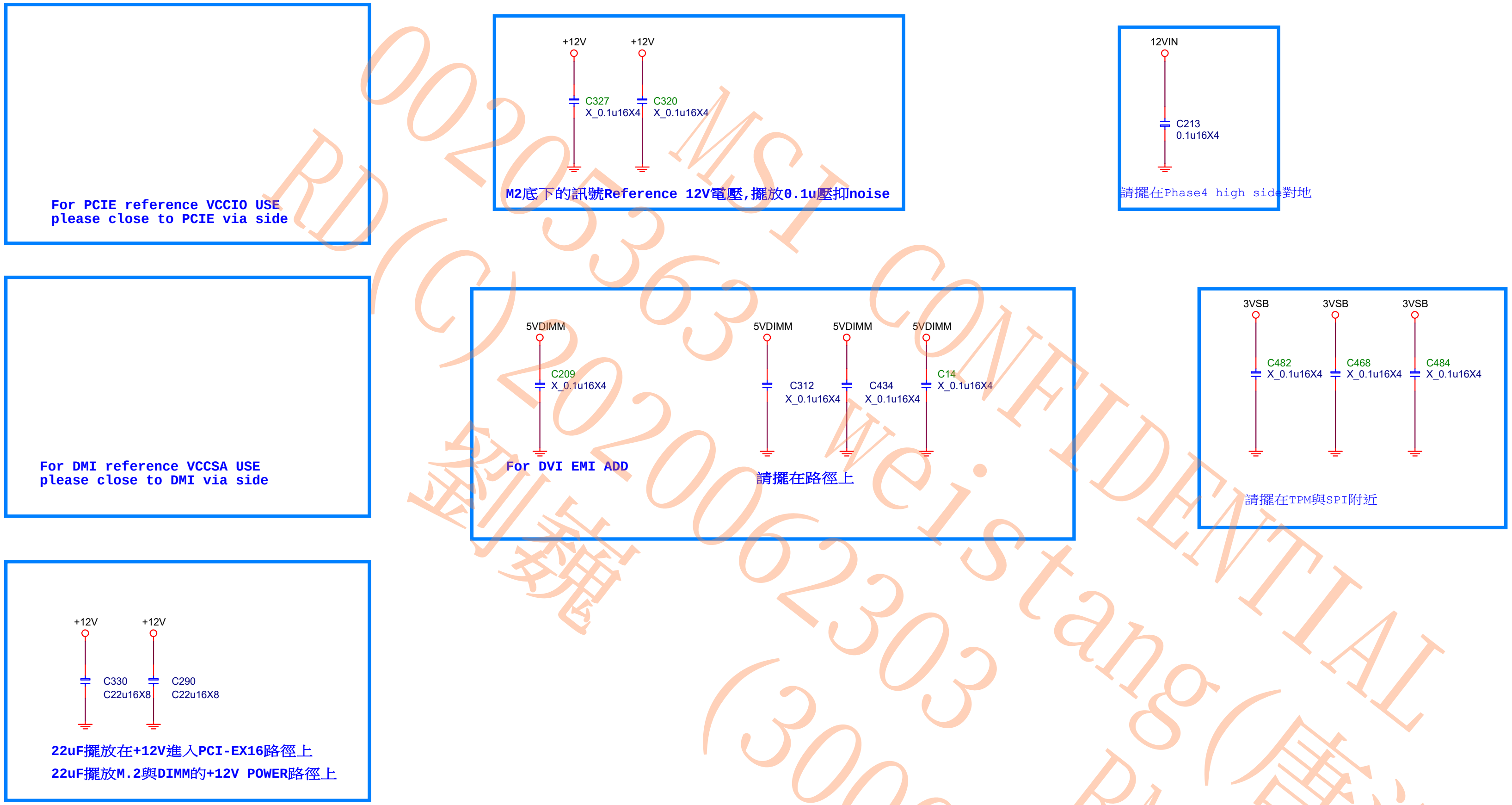
EMI CAP



For PCIE reference VCCIO USE
please close to PCIE via side
+12V
+12V
C327
X_0.1u16X4
C320
X_0.1u16X4
M2底下的訊號Reference 12V電壓,擺放0.1u壓抑noise
12VIN
C213
0.1u16X4
請擺在Phase4 high side對地
For DMI reference VCCSA USE
please close to DMI via side
5VDIMM
C209
X_0.1u16X4
For DVI EMI ADD
5VDIMM
5VDIMM
5VDIMM
C312
X_0.1u16X4
C434
X_0.1u16X4
C14
X_0.1u16X4
請擺在路徑上
3VSB
3VSB
3VSB
C482
X_0.1u16X4
C468
X_0.1u16X4
C484
X_0.1u16X4
請擺在TPM與SPI附近
+12V
+12V
C330
C22u16X8
C290
C22u16X8
22uF擺放在+12V進入PCI-EX16路徑上
22uF擺放M.2與DIMM的+12V POWER路徑上

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IF no JPWRLED1 & JPIPE_LED spec

MCU can powered by 5VDUAL directly.
LED_VCC5 replace with 5VDUAL.

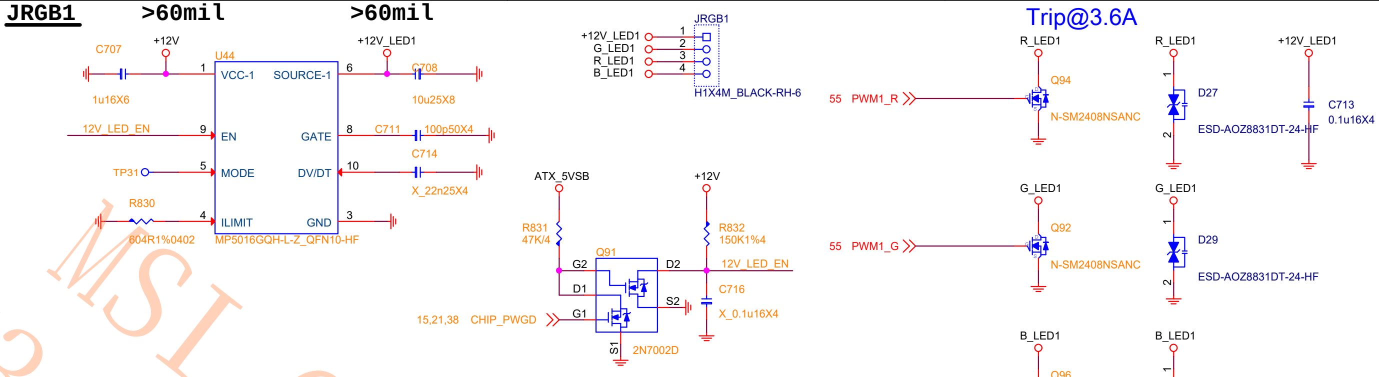
JT1 for FW update

20200225 remove JF1

GPIO select by platform
GPIO:Default GPI Low, Active High

JRGB1 >60mil >60mil

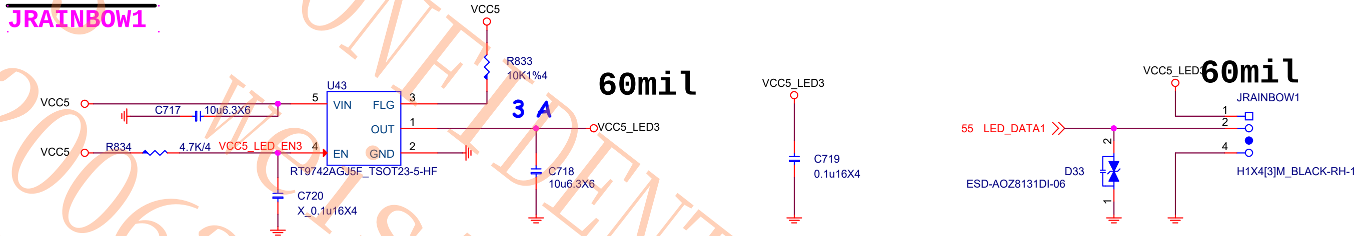
Trip@3.6A



外接LED 燈條 (RGB)
---- PCB 文字面 (JRGB1)
---- 手冊 註明 RGB 接頭支援標準 5050 RGB LED 燈條 (12V/G/R/B) , 燈條總輸出電流限制為3安培 (12 伏特) ,
長度限制為2公尺

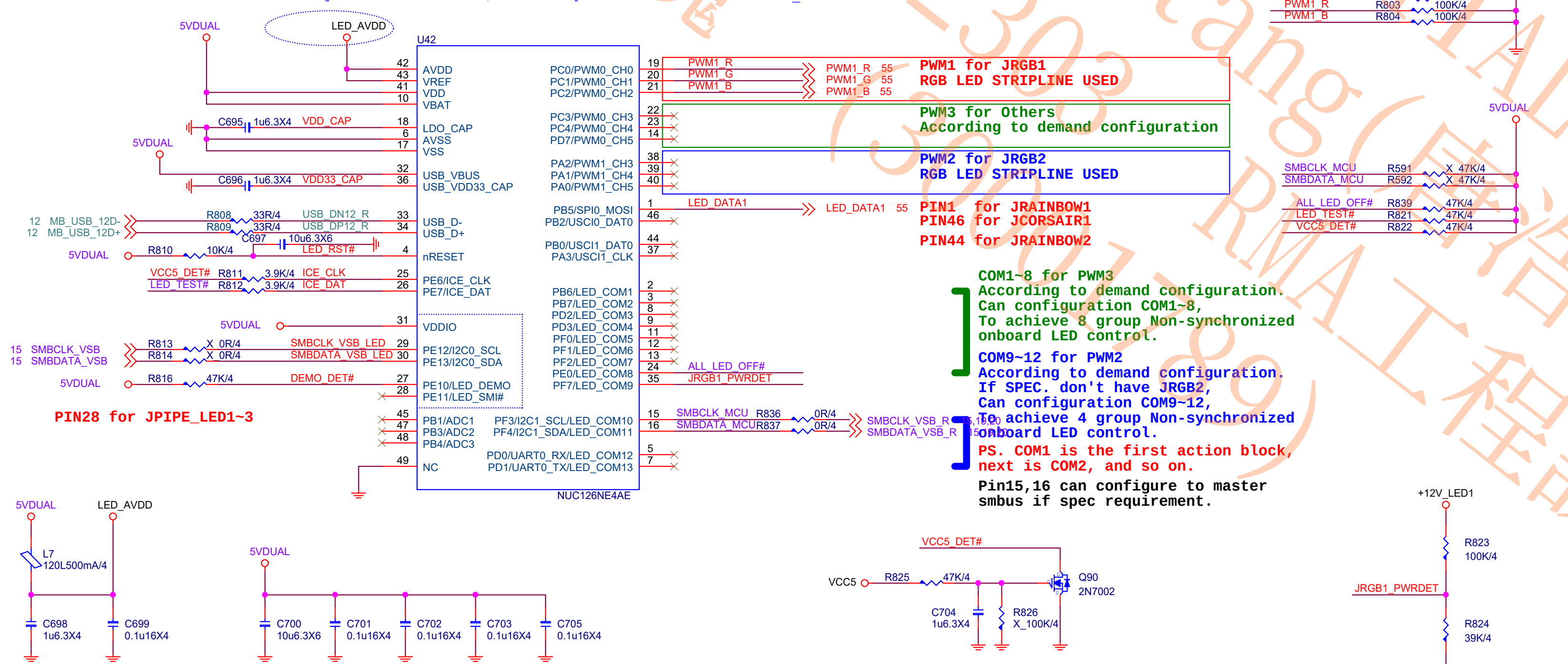
JRAINBOW1

60mil 3 A 60mil



48 PIN LED MCU

If you use ADC function,need to separate VREF from AVDD and 4_09VREF stuff for VREF.



COM1~8 for PWM3
According to demand configuration.
Can configuration COM1~8,
To achieve 8 group Non-synchronized
onboard LED control.

COM9~12 for PWM2
According to demand configuration.
If SPEC. don't have JRGB2,
Can configuration COM9~12,
To achieve 4 group Non-synchronized
onboard LED control.

PS. COM1 is the first action block,
next is COM2, and so on.

Pin15,16 can configure to master
smbus if spec requirement.

Control	Net Name	PWM USE
PCH	LED_DATA4	No Use
AUDIO Cover	LED_GPIO_01	No Use
MOS/IO cover	LED_GPIO_02	No Use
JRAINBOW1	LED_DATA1	No Use
JRAINBOW2	LED_DATA3	No Use
JCORSAIR1	LED_DATA2	No Use
JRGB1/JRGB2	PWM1/ PWM2	PWM1/ PWM2
Board Side LED	COM 1~8	PWM3
Board Side LED	COM 9~12	PWM2

C1822 & C1823 near AVDD Pin. C1820 & C1821 near VDD Pin.
C1824 near VBAT Pin.
C1827 & C1828 near VDDIO & USB_VBUS Pin.

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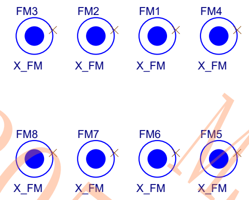
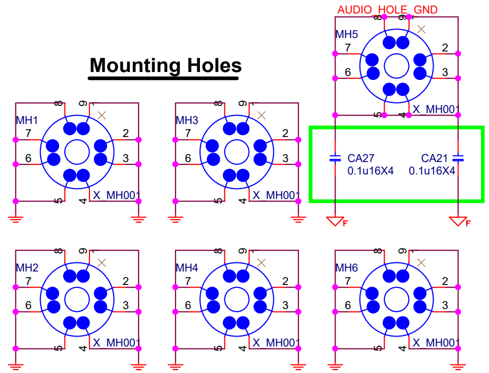
		P/N
B460M	ALL have 4 Displayport	
B460M PRO M2	NO DP	
B460M-A PRO M2	NO VGA&DP	
B460M GLOCK (PRC)	NO VGA&DP	
B460M-X (iCafe)	HDMI only	

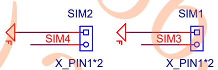
Optical Fiducial Marks-120

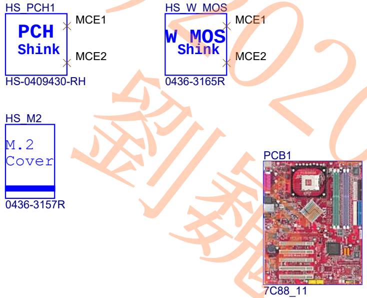


Mounting Holes



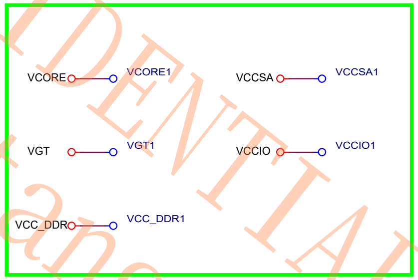
Simulation

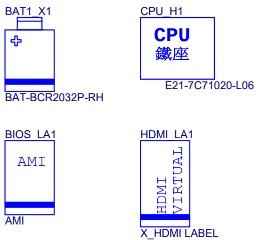




PK0-07C8811-E48(競華)
PK0-07C8811-G37(精成)

QC check





Marketing Name

G51-M1SPP97-Q13

	P/N LABEL	CAP	P/N	CAP	P/N	CAP	P/N
B460M PRO M2	G51-M1SPP97-Q13						
B460M-A PRO M2	G51-M1SPP98-Q13						
B460M GLOCK (PRC)	G51-M1SPQ06-Q13						
B460M-X (iCafe)	G51-M1SPQ05-Q13						

N5B-24F0821-EB6
G51-M1SPP98-Q13
G51-M1SPQ06-Q13
G51-M1SPQ05-Q13

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