TITLE	Page
Cover Sheet	1
Block Diagram	2
CPU-Memory, CPU-PEG/Display	3,4
CPU-Control/MISC/CFG/Audio	5
CPU-Power,CPU-GND	6,7
DDR4 DIMM1&DDR4 DIMM2	8,9,10,11
PCH-USB/PCIE/DMI/SATA	12
PCH-Audio/Display/Clock	13
PCH-GPIO/USBOC#/SATASTRAP	14
PCH-LPC/SPI/SMBUS/MISC	15
PCH-Power,PCH-GND,PCH-Strap	16,17,18
PCIE SLOT-CPU(X16)	19
PCIE SLOT-PCH(X1)	20
SIO-NCT5567D / FAN CONTROLLOR	21,22
AUDIO - ALC887,AUDIO - depop circuit	23,24
LAN - RTL8111H	25
DVI/HDMI/VGA	26,27,28
USB2.0/USB3.0/LAN_USB/SATA connector	29~32
CLR_CMOS circuit/BIOS ROM	33,34
ACPI CONTROLLER	35
PWM-RT3607BC/VCORE 4PHASE/VGT 2PHASE	36,37,38
DDR-RT8231/DDR-PM2143-VPP25	39,40
CPU PWR_ST/PLL/PCH Core power	41,42
VCCSA - POWER/VCCIO - POWER	43,44
ATX F_Panel/TPM/MSI_LED	45
DEBUG LED/EMI CAP/Manial Part	46,47,48
Power Map/Power Sequence/GPIO MAP	49,50,51
Revision History	52

MS-7B23

ATX:243.8mm*243.8mm

Ver: 1.2

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*

MICRO-STAR INT'L CO.,LTD

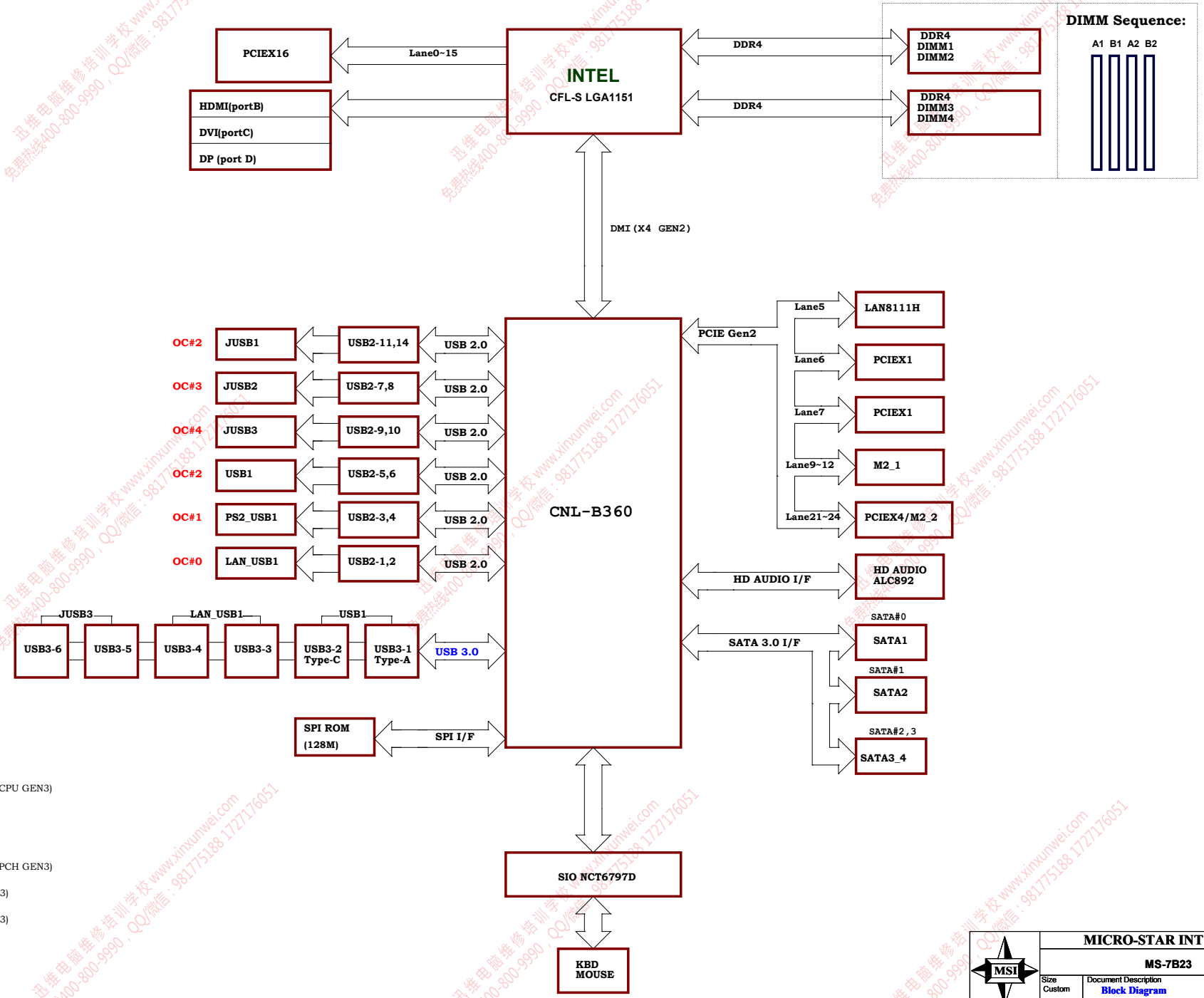
MS-7B23

Size: Custom | Document Description: Cover Sheet | Rev: 1.2

Date: Tuesday, April 10, 2018 | Sheet 1 of 63

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

MS-7B23 Block Diagram



Slot Sequence:

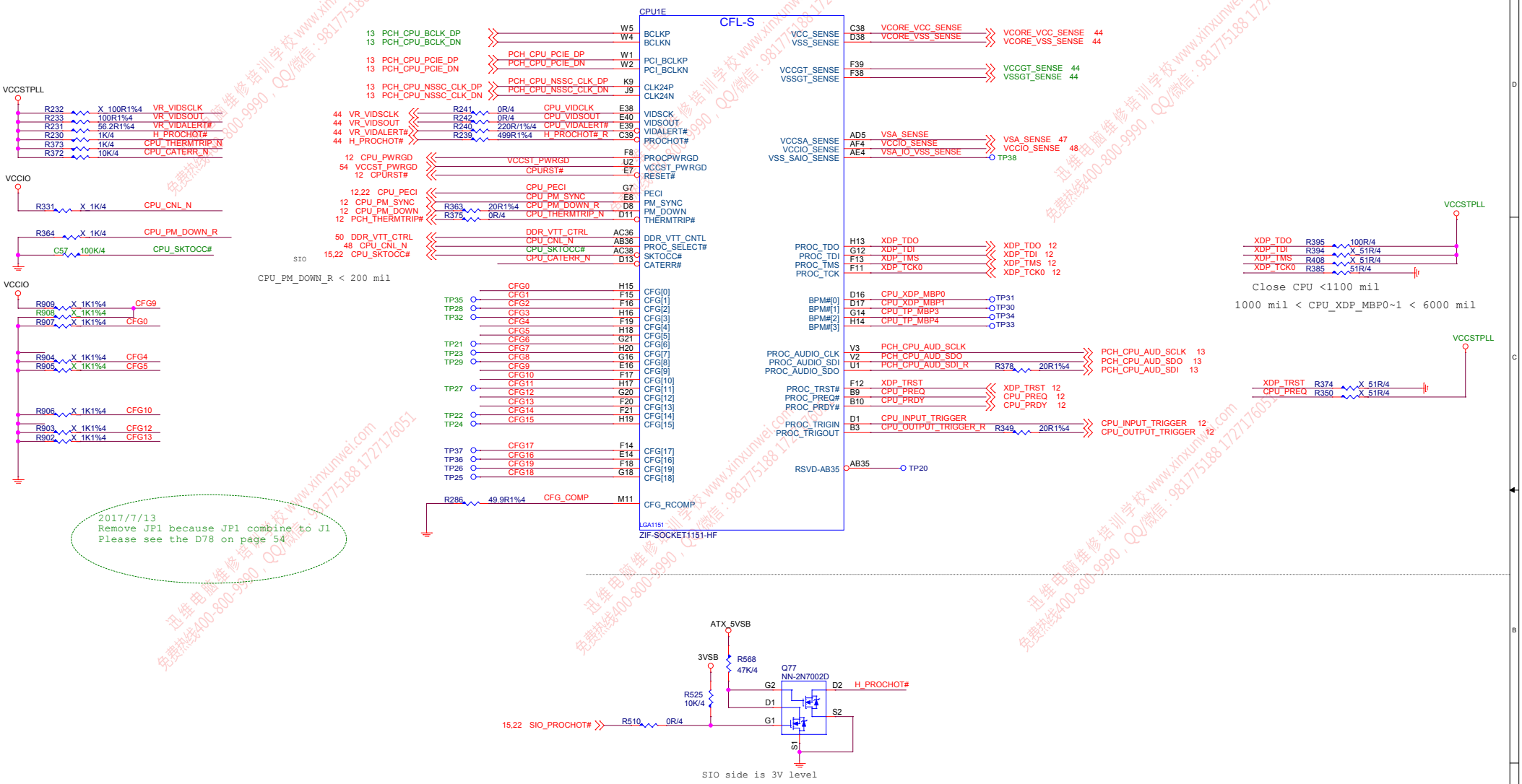
PCIE X16	(By CPU GEN3)
PCIE X1	(By PCH GEN3)
PCIE X1	(By PCH GEN3)
PCIE X4	(By PCH GEN3)
M2_1	(By PCH GEN3)
M2_2	(By PCH GEN3)

MICRO-STAR INT'L CO.,LTD

MS-7B23

Size: Custom | Document Description: Block Diagram | Rev: 1.2

Date: Tuesday, April 10, 2018 | Sheet 2 of 63



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	DISABLE	ENABLE	PEG0CFGSEL[0]
6	DISABLE	ENABLE	PEG0CFGSEL[1]
7	RESET#	BIOS REQ	PEG DEFER TRAINING
8			RSVD
9	PRESENT	NO PRESENT	SVID PRESENT
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-7B23

Size: Custom | Document Description: CPU-Control/MISC/CFG | Rev: 1.2

Date: Tuesday, April 10, 2018 | Sheet 3 of 63

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

SOCKET PN N12-151A010-L06

follow 7B16-0A DDR 走線

CPU1A

CFL-S

CHANNEL A

ZIF-SOCKET1151-HF

CPU1B

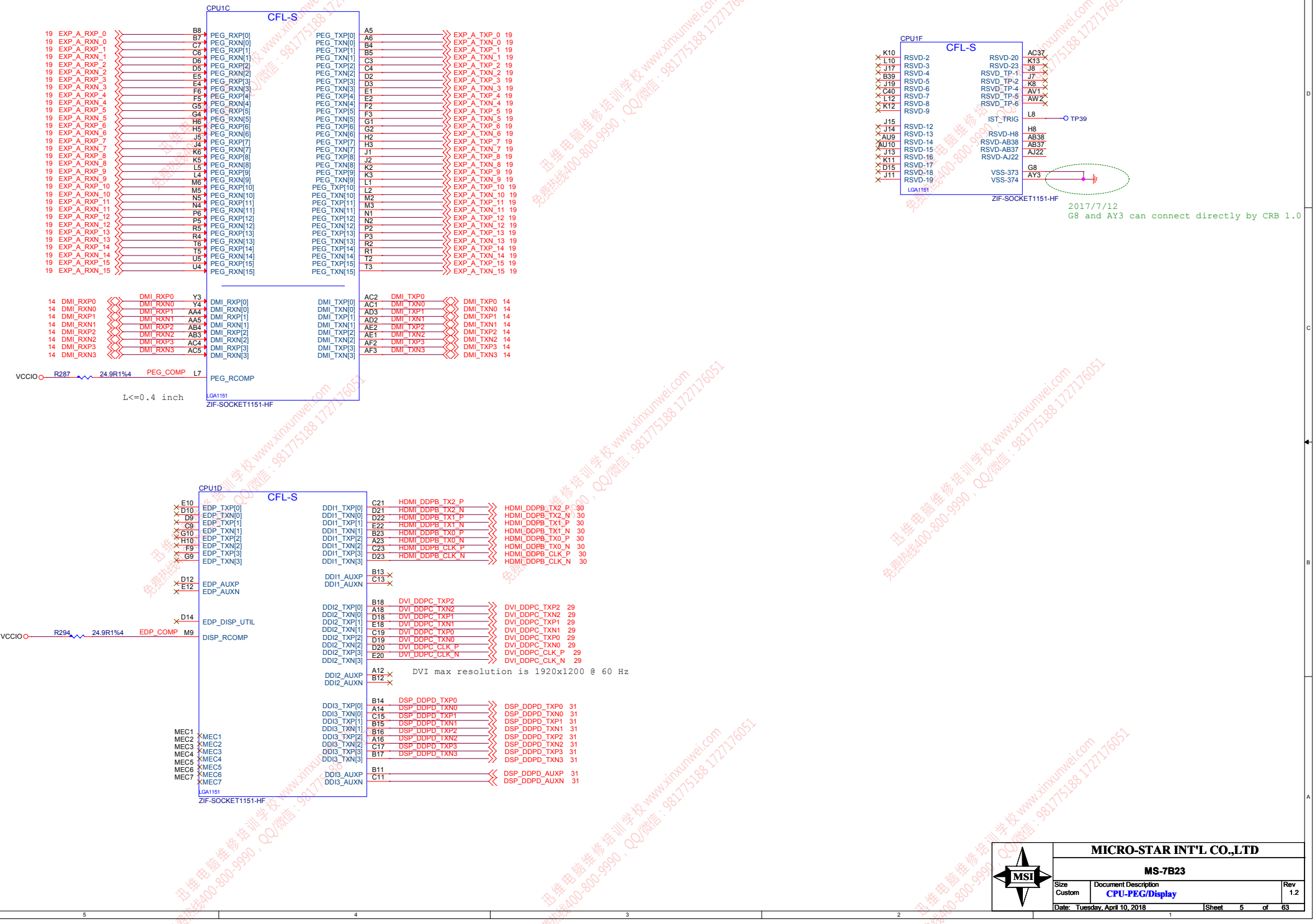
CFL-S

CHANNEL B

ZIF-SOCKET1151-HF

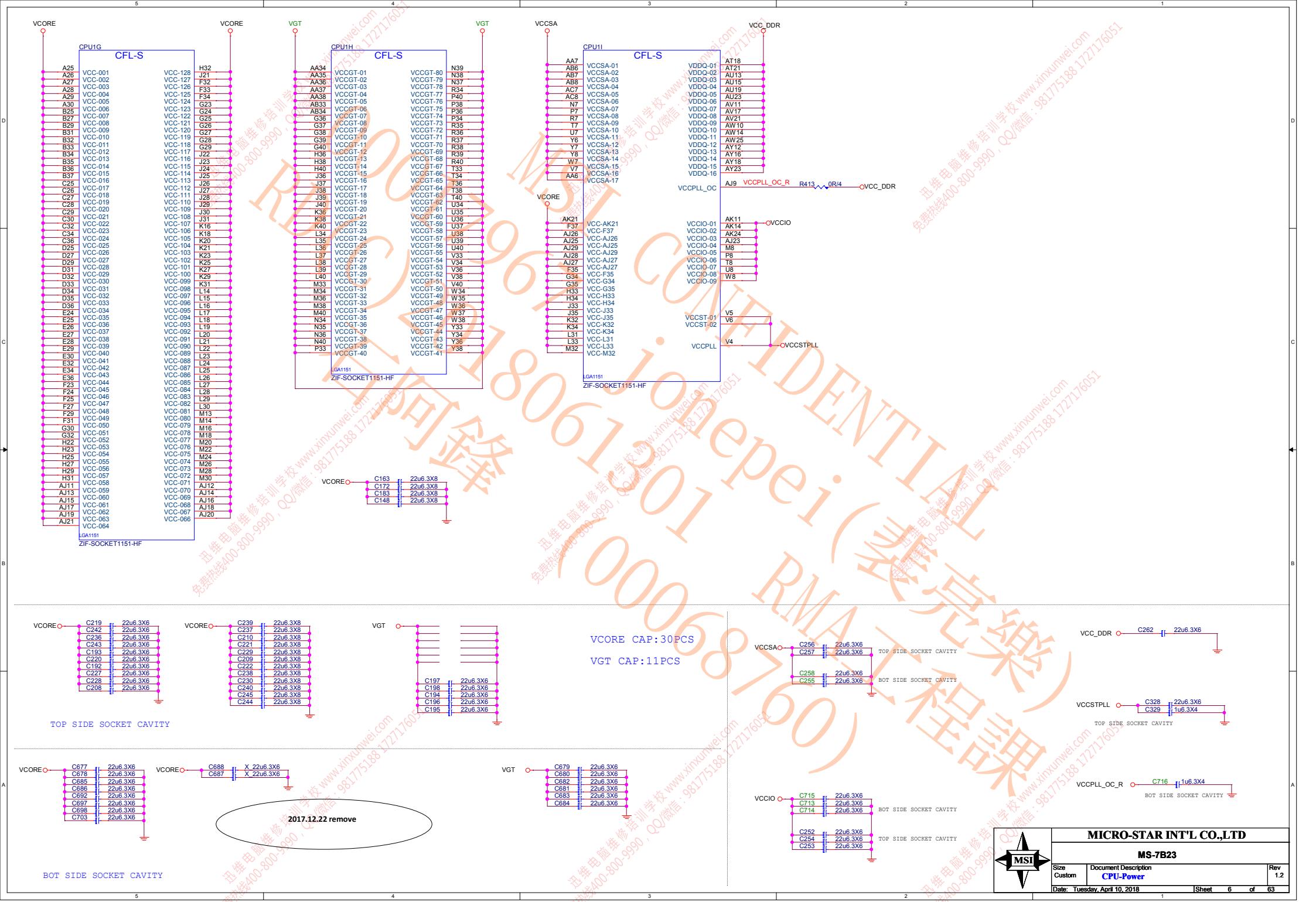
迅维电脑维修培训学校 www.xinxunwei.com 免费热线400-800-9990，QQ/微信：981775188 1727176051

MICRO-STAR INT'L CO.,LTD		
MS-7B23		
Size: Custom	Document Description: CPU-Memory	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 4 of 63	



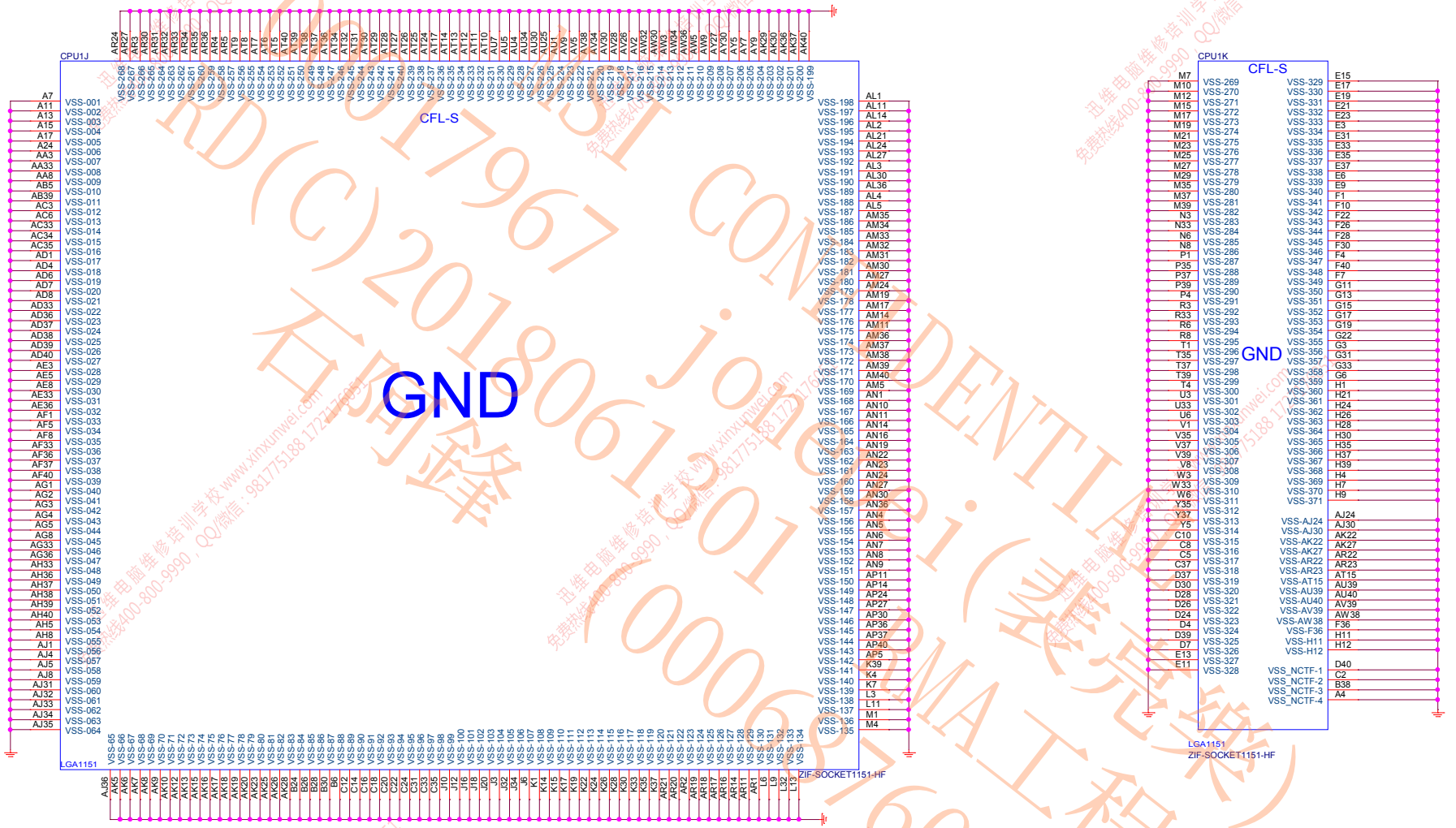
迅维电脑维修培训学校 www.xinxunwei.com 免费热线400-800-9990，QQ/微信：981775188 1727176051

MICRO-STAR INT'L CO.,LTD	
MS-7B23	
Size: Custom	Document Description: CPU-PEG/Display
Rev: 1.2	
Date: Tuesday, April 10, 2018	Sheet 5 of 63



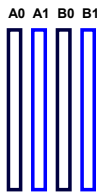
MICRO-STAR INT'L CO.,LTD	
MS-7B23	
Size: Custom	Document Description: CPU-Power
Rev: 1.2	
Date: Tuesday, April 10, 2018	Sheet 6 of 63

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
MSI CONFIDENTIAL 仅限Jonepei(装完集) RMA工程课 (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
CONFIDENTIAL jone wei（装配线） RD(C)20180612001(0006760) MA工程课 石同锋

MICRO-STAR INT'L CO.,LTD			
MS-7B23			
Size: Custom	Document Description: CPU-GND		Rev: 1.2
Date: Tuesday, April 10, 2018		Sheet 7 of 63	



DIMMA1A

DDRIV-288P_BLACK-RH-23

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

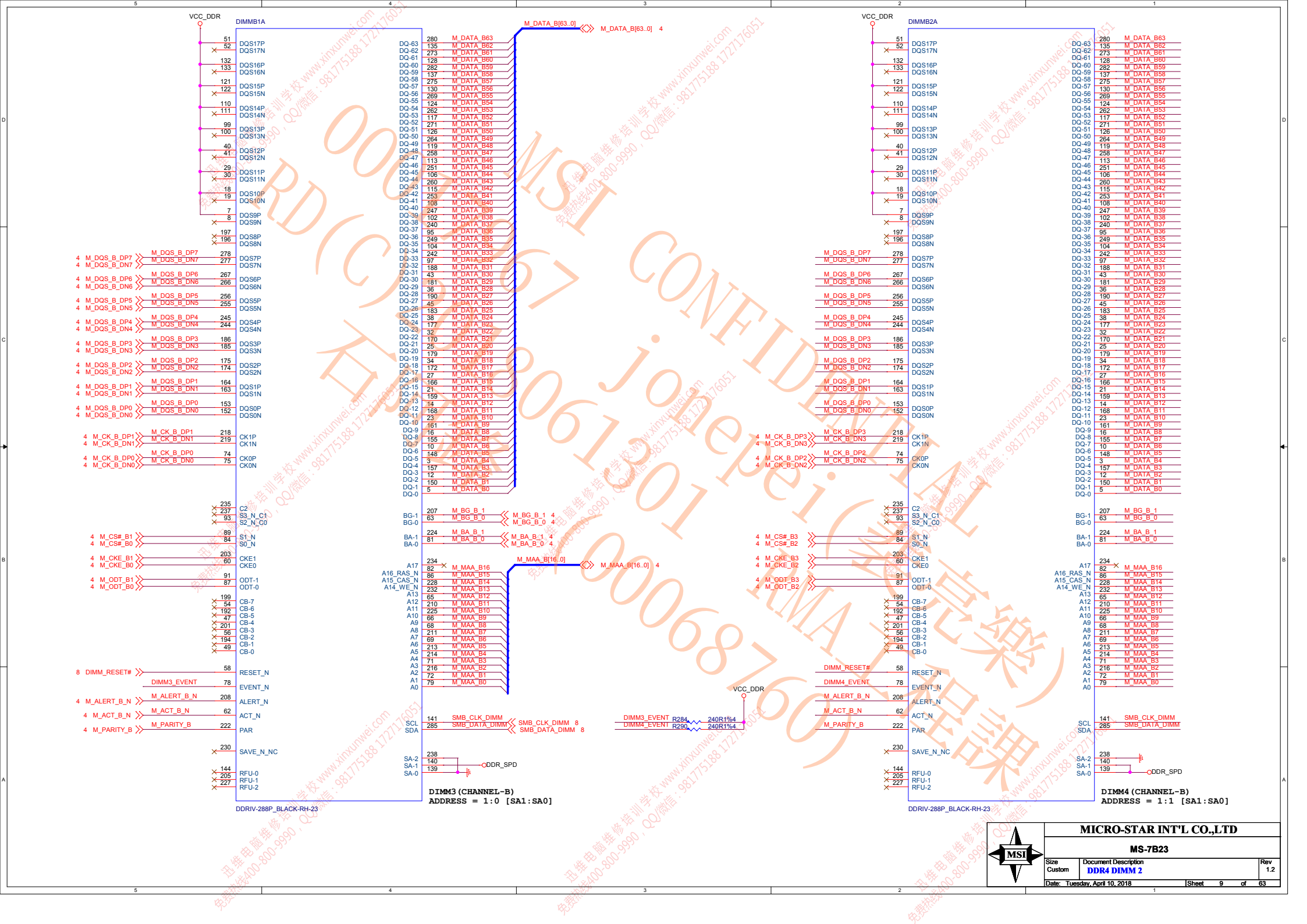
DIMMA2A

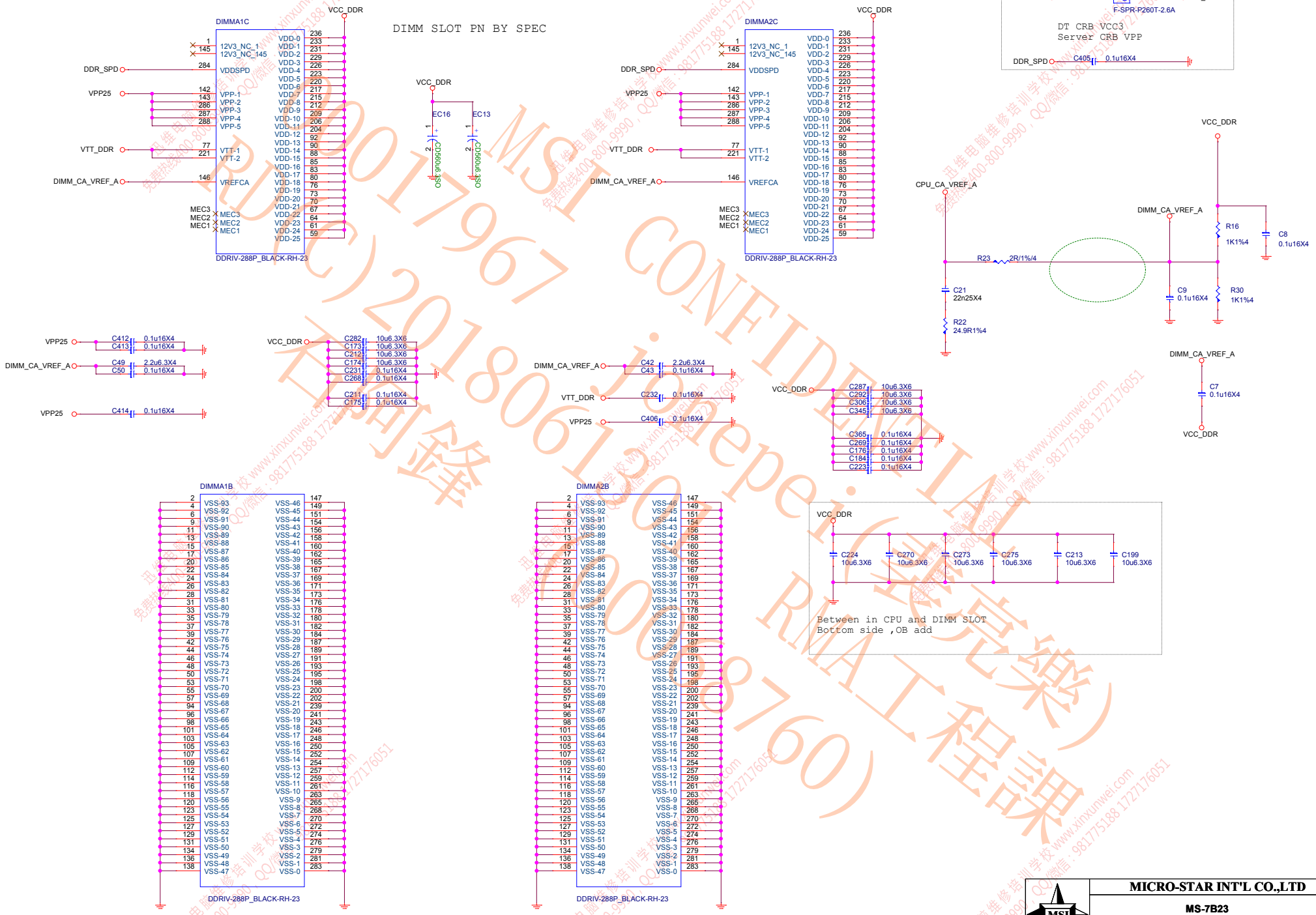
DDRIV-288P_BLACK-RH-23

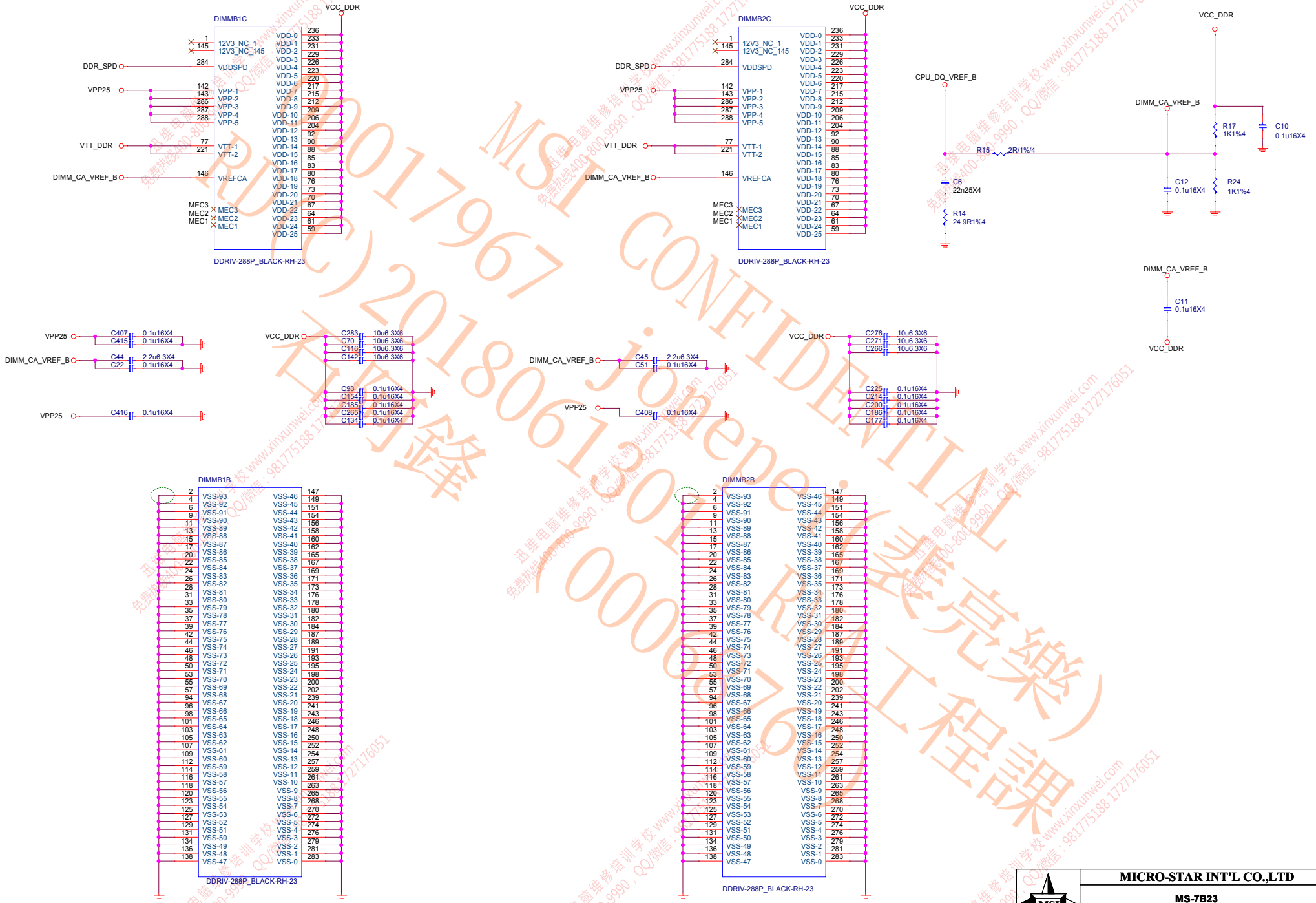
DIMM2 (CHANNEL-A)
ADDRESS = 0:1 [SA1:SA0]

MICRO-STAR INT'L CO.,LTD	
MS-7B23	
Size: Custom	Document Description: DDR4 SLOT-DIMM1/DIMM2
Rev: 1.2	
Date: Tuesday, April 10, 2018	Sheet 8 of 63

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
MSI CONFIDENTIAL jonepei(微信) DIMM A 报价


VCC_DDR
DIMMB1A
DDRIV-288P_BLACK-RH-23
M_DATA_B[63..0]
M_DATA_B[63..0] 4
M_BG_B_1
M_BG_B_0
M_BA_B_1
M_BA_B_0
M_MAA_B[16..0]
M_MAA_B[16..0] 4
SMB_CLK_DIMM
SMB_DATA_DIMM
SMB_CLK_DIMM 8
SMB_DATA_DIMM 8
DDR_SPD
DIMM3_EVENT R284 240R1%4
DIMM4_EVENT R290 240R1%4
DIMM3 (CHANNEL-B)
ADDRESS = 1:0 [SA1:SA0]
VCC_DDR
DIMMB2A
DDRIV-288P_BLACK-RH-23
DDR_SPD
DIMM4 (CHANNEL-B)
ADDRESS = 1:1 [SA1:SA0]
MICRO-STAR INT'L CO.,LTD
MS-7B23
Size Custom
Document Description DDR4 DIMM 2
Rev 1.2
Date: Tuesday, April 10, 2018
Sheet 9 of 63


DIMM SLOT PN BY SPEC
DIMMA1C
DIMMA2C
DIMMA1B
DIMMA2B
DDRIV-288P_BLACK-RH-23
VCC_DDR
DDR_SPD
VPP25
VTT_DDR
DIMM_CA_VREF_A
CPU_CA_VREF_A
F4
F-SPR-P260T-2.6A
DT CRB VCC3
Server CRB VPP
Between in CPU and DIMM SLOT
Bottom side ,OB add
MICRO-STAR INT'L CO.,LTD
MS-7B23
DDR4-POWER/GND-1
Rev 1.2
Date: Tuesday, April 10, 2018
Sheet 10 of 63



MSI CONFIDENTIAL
joneper
R0017967
(C)20180612 01
R00006761
(完整版)
工程课
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

2017.12.07 Eric mail

VCC3 3VSB R785 X_10K/4 R2113 X_10K/4 LFRAME_CS0_N
VCC3 3VSB R965 X_10K/4 R2112 10K/4 SERIRQ
VCC3 3VSB R774 X_10K/4 R2111 10K/4 KBRST#_R
3VSB R952 10K/4 PIRQA#
VCC3 3VSB R2117 X_10K/4 R2118 X_10K/4 LDRQ#_RST_N

LPC_ESPI_IO0_R C1884 X_10p50N4
LPC_ESPI_IO1_R C1885 X_10p50N4
LPC_ESPI_IO2_R C1886 X_10p50N4
LPC_ESPI_IO3_R C1887 X_10p50N4
close to PCH in 500~1000mil

3VSB
R484 1K/4 SMBCLK_VSB_R
R485 1K/4 SMBDATA_VSB_R
R772 4.7K/4 SMBCLK_VSB
R771 4.7K/4 SMBDATA_VSB
for ASM1562

LANPHY USE by SPEC
R730 499R1%4 SMLINK0_CLK
R731 499R1%4 SMLINK0_DATA
R783 1K/4 SMLINK1_CLK
R782 1K/4 SMLINK1_DATA

for loadline disable
3VSB R605 10K/4 GPP_H19

3VSB
R917 10K/4 GPP_H18
R606 10K/4 GPP_H17
R919 X_10K/4 GPP_H16
R920 X_10K/4 GPP_H18
R604 X_10K/4 GPP_H17
R921 10K/4 GPP_H16
ID

22,55 LPC_ESPI_IO0_R R950 0R/4 LPC_ESPI_IO0
22,55 LPC_ESPI_IO1_R R951 0R/4 LPC_ESPI_IO1
22,55 LPC_ESPI_IO2_R R953 0R/4 LPC_ESPI_IO2
22,55 LPC_ESPI_IO3_R R957 0R/4 LPC_ESPI_IO3
22,55 LFRAME_CS0_N LFRAME_CS0_N
22,55 SERIRQ SERIRQ
To SIO 22 KBRST# R786 0R/4 KBRST#_R
22 LDRQ#_RST_N R736 X_0R/4 ESPI_RST#
12,19,20,21 SMBCLK_VSB_R R781 X_0R/4 SMBCLK_VSB
12,19,20,21 SMBDATA_VSB_R R770 X_0R/4 SMBDATA_VSB
18 ME_TLS_ON ME_TLS_ON
24 SMLINK0_CLK SMLINK0_CLK
24 SMLINK0_DATA SMLINK0_DATA
18 LPC_ESPI_SEL LPC_ESPI_SEL
22 SMLINK1_CLK SMLINK1_CLK
22 SMLINK1_DATA SMLINK1_DATA
18 PCH_SML1ALERT# PCH_SML1ALERT#

FAN MODE USE
25 CPUFAN1_MODE
25 SYSFAN1_MODE
26 SYSFAN2_MODE

PWM LL disable 44 GPP_H19
EZ LED 56 GPP_H20
EZ LED 56 GPP_H21
EZ LED 56 GPP_H22
EZ LED 56 GPP_H23

41 PCH_CLK PCH_CLK
41 PCH_MISO
18,41 PCH_MOSI
18,41 PCH_IO2
18,41 PCH_IO3
41 PCH_SPI_CS0# PCH_SPI_CS0#

R2390 100K/4 PCH_CLK
2018.01.23 Robert mail

PCH1A

LPC eSPI
GPP_A1/LAD0/ESPI_IO0 BB39
GPP_A2/LAD1/ESPI_IO1 AW37
GPP_A3/LAD2/ESPI_IO2 AV37
GPP_A4/LAD3/ESPI_IO3 BA38
GPP_A5/LFRAME#/ESPI_CS0# BE38
GPP_A6/SERIRQ/ESPI_CS1# BE35
GPP_A7/PIRQA#/ESPI_ALERT0# BA36
GPP_A0/RCIN#/ESPI_ALERT1# BE39
GPP_A14/SUS_STAT#/ESPI_RESET# BF38

SMB
GPP_C0/SMBCLK BE26
GPP_C1/SMBDATA BF26
GPP_C2/SMBALERT# BE25
GPP_C3/SML0CLK BF25
GPP_C4/SML0DATA BE24
GPP_C5/SML0ALERT# BF24
GPP_C6/SML1CLK BF27
GPP_C7/SML1DATA BE27
GPP_B23/SML1ALERT#/PCHHOT# BD33

GPP_H10/SML2CLK AE48
GPP_H11/SML2DATA AD47
GPP_H12/SML2ALERT# AB47
GPP_H13/SML3CLK AF47
GPP_H14/SML3DATA AD48
GPP_H15/SML3ALERT# AC47
GPP_H16/SML4CLK AE43
GPP_H17/SML4DATA AJ46
GPP_H18/SML4ALERT# AE44

SPI JTAG
SPI0_CLK AW47
SPI0_MISO BA45
SPI0_MOSI AU41
SPI0_IO2 AY48
SPI0_IO3 BA46
SPI0_CS0# AY47
SPI0_CS1# AW48
SPI0_CS2# AT40
GPP_D0/SPI1_CS#/SBK0/BK0 BF19
GPP_D1/SPI1_CLK/SBK1/BK1 BE19
GPP_D2/SPI1_MISO/SBK2/BK2 BE18
GPP_D3/SPI1_MOSI/SBK3/BK3 BF18
GPP_D21/SPI1_IO2 BD17
GPP_D22/SPI1_IO3 BC17

Power Management
SLP_SUS# BD39 SLP_SUS# 22,23,54
GPD6/SLP_A# BE40 SLP_A#
SLP_S3# R787 0R/4 SLP_S3# TP16
GPD4/SLP_S3# BF42 SLP_S3# 15,22,38,42,50,51,54
GPD5/SLP_S4# BE42 SLP_S4# R761 0R/4 SLP_S4#
GPD10/SLP_S5# BC42 SLP_S5# SLP_S4# 15,22,38,42,49,50,51
GPP_B12/SLP_S0# BC28 SLP_S5# 15
SLP_S0# TP52
SLP_LAN# BF40 SLP_LAN# SLP_LAN# 24
GPD11/LANPHYPC BF41 LAN_DISABLE# LAN_DISABLE# 24
GPD9/SLP_WLAN# BD42
GPP_A13/SUSWARN#/SUSPWRDNACK BC37 SUSWARN# R734 0R/4 CHIP_PWGD_SPI 41
GPP_A15/SUSACK# BE35 SUSACK#
GPD8/SUSCLK BE45 PCH_SUSCLK R795 0R/4
DSW_PWROK AW41 PCH_DPWROK
PCH_PWROK AY42 PCH_PWROK_R R942 0R/4 PCH_DPWROK 22
SYS_PWROK AU3 CHIP_PWGD_PCH R796 0R/4 PCH_PWROK 54
CPUPWRGD AE3 CPU_PWRGD_R R633 0R/4 CHIP_PWGD 22
CPU_PWRGD 3
RTCRST# BE47 RTCRST# RTCRST# 40,42,54
SRTCRST# BD46 SRTCRST#
RSMRST# BA47 RSMRST#
DRAM_RESET# BB46 DRAM_RESET# DRAM_RESET# 8
SYS_RESET# AU2 FP_RST# FP_RST# 55
PLTRST_CPU# AG5 CPURST# CPURST# 3
GPP_B13/PLTRST# AV29 PLTRST#_R R946 30R1%4 PLTRST# 22
GPD3/PWRBTN# BE46 PWRBTN# PWRBTN# 22
WAKE# BB47 SB_WAKE# SB_WAKE# 19,20,21,32,33
GPD2/LAN_WAKE# BC44 LANPHY_WAKE# LANPHY_WAKE# 24
GPP_A11/PME#/SD_VDD2_PWR_EN# BE36 IO_PME_N IO_PME_N 22
GPD1/ACPRESENT BG42 ACPRESENT
GPD0/BATLOW# BF44 BATLOW#
GPP_A12/BM_BUSY#/ISH_GP6/SX_EXIT_HOLDOFF# BF36 GPP_A12
GPP_A8/CLKRUN# AV32 PCH_CLKRUN#
PECI AF2 PCH_PECI R648 X_0R/4 CPU_PECI 3,22
THRMTRIP# AD3 PCH_THERMTRIP_R R626 619R/1%4 PCH_THERMTRIP# 3
PM_DOWN AE2 CPU_PM_DOWN 3
PM_SYNC AF3 SYNC_R R634 30R1%4 CPU_PM_SYNC 3
INTRUDER# BB44 INTRUDER#

STRAP
GPP_B14/SPKR AW29 SPKR SPKR 18,55
GPP_B18/GSPI0_MOSI BE30 NO_REBOOT NO_REBOOT 18
GPP_B22/GSPI1_MOSI BA26 BOOT_BIOS_SEL BOOT_BIOS_SEL 18
GPD7 BE41 GPD7 18

PCH_JTAG_TCK AJ3 PCH_JTAG_TCK
PCH_JTAG_TMS AJ4 XDP_TMS 3
PCH_JTAG_TDI AH2 XDP_TDI 3
PCH_JTAG_TDO AH3 XDP_TDO 3
PCH_JTAGX AH4 XDP_TCK0 3
ITP_PMODE AL3 ITP_PMODE TP13
TRIGGER_IN AK2 CPU_OUTPUT_TRIGGER 3
TRIGGER_OUT AK3 PCH_TRIGOUT R652 30R/4 CPU_INPUT_TRIGGER 3
PREQ# AL2 CPU_PREQ 3
PRDY# AM5 CPU_PRDY 3
CPU_TRST# AM4 XDP_TRST 3

Place R390 within 200mil of PCH.

PCH_H

PCH LANPHY PWR
Pull Down PCH PHY into low power state.
For No Use intel Lan
LAN_DISABLE# R759 X_10K/4

SB_WAKE# R762 1K/4
LANPHY_WAKE# R788 4.7K/4
PWRBTN# R956 3K1%4
BATLOW# R737 10K/4
ACPRESENT R760 X_10K/4
3VDSW
SLP_S3# R2392 X_10K/4
SLP_S4# R2393 X_10K/4
2018.01.23 Robert mail
SLP_S3# R2389 100K/4
SLP_S4# R2388 100K/4
SLP_LAN# R2391 100K/4
PCH_SUSCLK R941 X_1.5K/4

PCH_CLKRUN# R945 X_10K/4 3VSB
2017.12.07 Eric mail
CRB RSVD pull up to +V3P3_DUAL.

IO_PME_N R756 10K/4 3VSB
SUSACK# R755 X_10K/4 3VSB
GPP_A12 R735 X_10K/4 3VSB
PCH_PECI R650 X_1K/4
CPU_PM_DOWN R632 X_51R/4
FP_RST# R719 1K/4 VCC3

Defensive Termination. CRB unstuff.
Place within 1.1" of PCH Pin.
VCCSTPLL
XDP_TCK0 R649 X_1K/4
XDP_TMS R653 51R/4
XDP_TDO R635 100R1%4
XDP_TDI R651 51R/4
Place within 1.5" of PCH Pin.

PCH_JTAG_TCK R636 X_51R/4
Defensive Termination. CRB unstuff.
Place within 1.1" of PCH Pin.

RSMRST# USE solution

2017.08.14 Eric mail add
2017.11.30 Robert mail remove

RSMRST#
3VSB R800 4.7K/4
RSMRST# R789 X_0R/4 SIO_RSMRST# 22,41
R997 0R/4 RSMRST#_SLG 54
R801 100K/4

擺在一起(注意到所有的SMBUS的分支)

SMBCLK_VCC R798 4.7K/4
SMBDATA_VCC R779 4.7K/4
VCC3
for ASM1562

3VSB R753 10K/4
+12V R750 10K/4
CFL CRB
PCH_PWROK R749 0R/4 PCH_PWROK_SMBUS
R748 100K/4
Q88 2N7002
59G
SMBCLK_VSB
SMBCLK_VSB 35,36,37,49
R797 X_0R/4
SMBCLK_VCC
SMBCLK_VCC 8
SMBDATA_VSB
SMBDATA_VSB 35,36,37,49
Q92 2N7002
R780 X_0R/4
SMBDATA_VCC
SMBDATA_VCC 8

SMBUS ESD

D18 X_ESD-AOZ8231 SMBCLK_VSB_R 12,19,20,21
D17 X_ESD-AOZ8231 SMBDATA_VSB_R 12,19,20,21
close to PCH

RTC

VBAT_PCH
2014.12.29
CRB R763 20K1%4
SRTCRST#
C623 1u16X6
2017.12.20 remove RTC

Chassis Intrusion

VBAT_PCH
R738 1M/4
JCI1 H1X2M_BLACK-RH
INTRUDER#
D19 X_ESD-AOZ8231

MICRO-STAR INT'L CO.,LTD
MS-7B23
Size Custom
Document Description PCH-LPC/SPI/SMBUS/MISC
Rev 1.2
Date: Tuesday, April 10, 2018 Sheet 12 of 63

RTC Block

Close to PCH

C596 12p50N6 RTCX2
Y2
R703 10M/6 <1 inch
C595 12p50N6 RTCX1
32.768KHZ12.5p_D-RH-10

XTAL_24M_PCH_OUT
R615 200K1%4 XTAL_24M_PCH_IN
PDG
R613 0R/4
24M_OUT R612 0R/4 24M_R
R614 0R/4
Y1 24MHZ20p
24M_IN
C539 18p50N4
C551 18p50N4
for 0A sa fail

C740 X_10p50N4
22 CLK_SIO_PCI R943 22R/4 CLK_PCH_LPC0 BB36
55 CLK_24M_TPM R954 15R1%4 CLK_PCH_24M BB34
C1888 X_10p50N4
2017.12.07 Eric mail
RTCX1 BA49
RTCX2 BA48

XCLK_BIASREF < 1000 mil
XTAL_24M_PCH_IN U10
XTAL_24M_PCH_OUT U9
R603 60.4R1%4 XCLK_BIASREF T3
R916 10K/4 R6
2017.08.23 Robert mail

TP18 SLOT1_CLKREQ#0 BF31
TP17 SLOT2_CLKREQ#1 BE31
TP49 SLOT3_CLKREQ#2 AR32
BB30
33 CLKREQ#4 BA30
AN29
24 LAN_CLKREQ#9 AE47 AC48 AE41 AF48 AC41
AC39 AE39 AB48 AC44
32 CLKREQ#15 AC43

3VSB
R598 10K/4 LAN_CLKREQ#9
R918 10K/4 CLKREQ#15
VCC3
R947 10K/4 CLKREQ#4
2017.11.07 Robert mail
Optance pu to VCC3

PCH1E
GPP_A9/CLKOUT_LPC0/ESPI_CLK
GPP_A10/CLKOUT_LPC1
LPC
RTCX1
RTCX2
RTC
XTAL_IN
XTAL_OUT
XCLK_BIASREF
CLKIN_XTAL
24MHZ
GPP_B5/SRCCLKREQ0#
GPP_B6/SRCCLKREQ1#
GPP_B7/SRCCLKREQ2#
GPP_B8/SRCCLKREQ3#
GPP_B9/SRCCLKREQ4#
GPP_B10/SRCCLKREQ5#
GPP_H0/SRCCLKREQ6#
GPP_H1/SRCCLKREQ7#
GPP_H2/SRCCLKREQ8#
GPP_H3/SRCCLKREQ9#
GPP_H4/SRCCLKREQ10#
GPP_H5/SRCCLKREQ11#
GPP_H6/SRCCLKREQ12#
GPP_H7/SRCCLKREQ13#
GPP_H8/SRCCLKREQ14#
GPP_H9/SRCCLKREQ15#
CLK_REQ
PCH_H

CLKOUT_CPUBCLK_P B8 PCH_CPU_BCLK_DP
CLKOUT_CPUBCLK_N C8 PCH_CPU_BCLK_DN
CLKOUT_CPUNSSC_P D7 PCH_CPU_NSSC_CLK_DP
CLKOUT_CPUNSSC_N C6 PCH_CPU_NSSC_CLK_DN
CLKOUT_CPUPCIBCLK_P A6 PCH_CPU_PCIE_DP
CLKOUT_CPUPCIBCLK_N B6 PCH_CPU_PCIE_DN
CLKOUT_ITPXDP_P Y4
CLKOUT_ITPXDP_N Y3
CLKOUT_PCIE_P0 AJ7 CK_SLOT1_DP
CLKOUT_PCIE_N0 AJ6 CK_SLOT1_DN
CLKOUT_PCIE_P1 AH10 CK_SLOT2_DP
CLKOUT_PCIE_N1 AH9 CK_SLOT2_DN
CLKOUT_PCIE_P2 AE15 CK_SLOT3_DP
CLKOUT_PCIE_N2 AE14 CK_SLOT3_DN
CLKOUT_PCIE_P3 AE7 CK_SLOT4_DP
CLKOUT_PCIE_N3 AE6 CK_SLOT4_DN
CLKOUT_PCIE_P4 AC3 CLK_M2_2_DP
CLKOUT_PCIE_N4 AC2 CLK_M2_2_DN
CLKOUT_PCIE_P5 AB3
CLKOUT_PCIE_N5 AB2
CLKOUT_PCIE_P6 W3
CLKOUT_PCIE_N6 W4
CLKOUT_PCIE_P7 W6
CLKOUT_PCIE_N7 W7
CLKOUT_PCIE_P8 AC15
CLKOUT_PCIE_N8 AC14
CLKOUT_PCIE_P9 U3 CLK_LAN_DP
CLKOUT_PCIE_N9 U2 CLK_LAN_DN
CLKOUT_PCIE_P10 AC11
CLKOUT_PCIE_N10 AC9
CLKOUT_PCIE_P11 AE11
CLKOUT_PCIE_N11 AE9
CLKOUT_PCIE_P12 AC6
CLKOUT_PCIE_N12 AC7
CLKOUT_PCIE_P13 Y2
CLKOUT_PCIE_N13 AA1
CLKOUT_PCIE_P14 T1
CLKOUT_PCIE_N14 T2
CLKOUT_PCIE_P15 V3 CLK_M2_1_DP
CLKOUT_PCIE_N15 V2 CLK_M2_1_DN

PCH_CPU_BCLK_DP 3 / PCH_CPU_BCLK_DN 3 — 100M
PCH_CPU_NSSC_CLK_DP 3 / PCH_CPU_NSSC_CLK_DN 3 — 24M
PCH_CPU_PCIE_DP 3 / PCH_CPU_PCIE_DN 3 — 100M
CK_SLOT1_DP 19 / CK_SLOT1_DN 19
CK_SLOT2_DP 20 / CK_SLOT2_DN 20
CK_SLOT3_DP 20 / CK_SLOT3_DN 20
CK_SLOT4_DP 21 / CK_SLOT4_DN 21
CLK_M2_2_DP 33 / CLK_M2_2_DN 33
CLK_LAN_DP 24 / CLK_LAN_DN 24
CLK_M2_1_DP 32 / CLK_M2_1_DN 32

EMI
AZ_BITCLK
C602 X_10p50N4

PCH1D
27 AZ_SDIN0 BE11 HDA_SDI0/I2S0_RXD
BF10 HDA_SDI1/I2S1_RXD
18 AZ_SDOUT_R / 27 AZ_SDOUT R724 33R/4 AZ_SDOUT_R BF12 HDA_SDO/I2S0_TXD
27 AZ_BITCLK R723 33R/4 AZ_BITCLK_LR BD11 HDA_BCLK/I2S0_SCLK
27 AZ_RST# R722 33R/4 AZ_RST#_R BE10 HDA_RST#/I2S1_SCLK
27 AZ_SYNC R725 33R/4 AZ_SYNC_R BG13 HDA_SYNC/I2S0_SFRM
AUDIO
3 PCH_CPU_AUD_SDO R677 30R/4 PCH_CPU_AUD_SDO_R AM2 HDACPU_SDO
3 PCH_CPU_AUD_SDI PCH_CPU_AUD_SDI_R AN3 HDACPU_SDI
3 PCH_CPU_AUD_SCLK R675 30R/4 PCH_CPU_AUD_SCLK_R AM3 HDACPU_SCLK
BE12 I2S1_TXD/SNDW2_DATA
BD12 I2S1_SFRM/SNDW2_CLK
Default Native F3/CNV_RF_R_ESET#.
TP57 BE16 GPP_D5/I2S2_SFRM/CNV_RF_RESET#
TP53 BA17 GPP_D6/I2S2_TXD/MODEM_CLKREQ
Default Native F3/MODEM_CLKREQ.
AW18 GPP_D7/I2S2_RXD
AV18 GPP_D8/I2S2_SCLK
AW15 GPP_D17/DMIC_CLK1/SNDW3_CLK
AV16 GPP_D18/DMIC_DATA1/SNDW3_DATA
BD16 GPP_D19/DMIC_CLK0/SNDW4_CLK
BF15 GPP_D20/DMIC_DATA0/SNDW4_DATA
PCH_H

PORT B
GPP_I5/DDPB_CTRLCLK AL13 HDMI_DDPB_CTRLCLK
GPP_I6/DDPB_CTRLDATA AR8 HDMI_DDPB_CTRLDATA
GPP_I0/DDPB_HPD0/DISP_MISC0 AT6 HDMI_DDPB_HPD
SMI Pin
PORT C
GPP_I7/DDPC_CTRLCLK AN13 DVI_DDPC_CTRLCLK
GPP_I8/DDPC_CTRLDATA AL10 DVI_DDPC_CTRLDATA
GPP_I1/DDPC_HPD1/DISP_MISC1 AN10 DVI_DDPC_HPD
SMI Pin
PORT D
GPP_I9/DDPD_CTRLCLK AL9 DSP_DDPD_CTRLCLK
GPP_I10/DDPD_CTRLDATA AR3 DSP_DDPD_CTRLDATA
GPP_I2/DPPD_HPD2/DISP_MISC2 AP9 DSP_DDPD_HPD
SMI Pin
PORT F
GPP_F22/DDPF_CTRLCLK AT49 GPP_F22
GPP_F23/DDPF_CTRLDATA AN40 GPP_F23 TP14 TP43
eDP
GPP_F19/EDP_VDDEN AV44
GPP_F20/EDP_BKLTEN AV46
GPP_F21/EDP_BKLTCTL AU48
GPP_I4/EDP_HPD/DISP_MISC4 AN6 EDP_HPD R679 100K/4
GPP_I3/DPPE_HPD3/DISP_MISC3 AL15 DDPE_HPD3 R924 10K/4
SMI Pin

HDMI_DDPB_CTRLCLK R700 2.2K/4
HDMI_DDPB_CTRLDATA R717 2.2K/4
DVI_DDPC_CTRLCLK R671 2.2K/4
DVI_DDPC_CTRLDATA R673 2.2K/4
DSP_DDPD_CTRLCLK R674 2.2K/4
DSP_DDPD_CTRLDATA R672 2.2K/4
DSP_DDPD_HPD R697 X_100K/4
改版視情況拿掉

DDI interfaace Disable
no connect

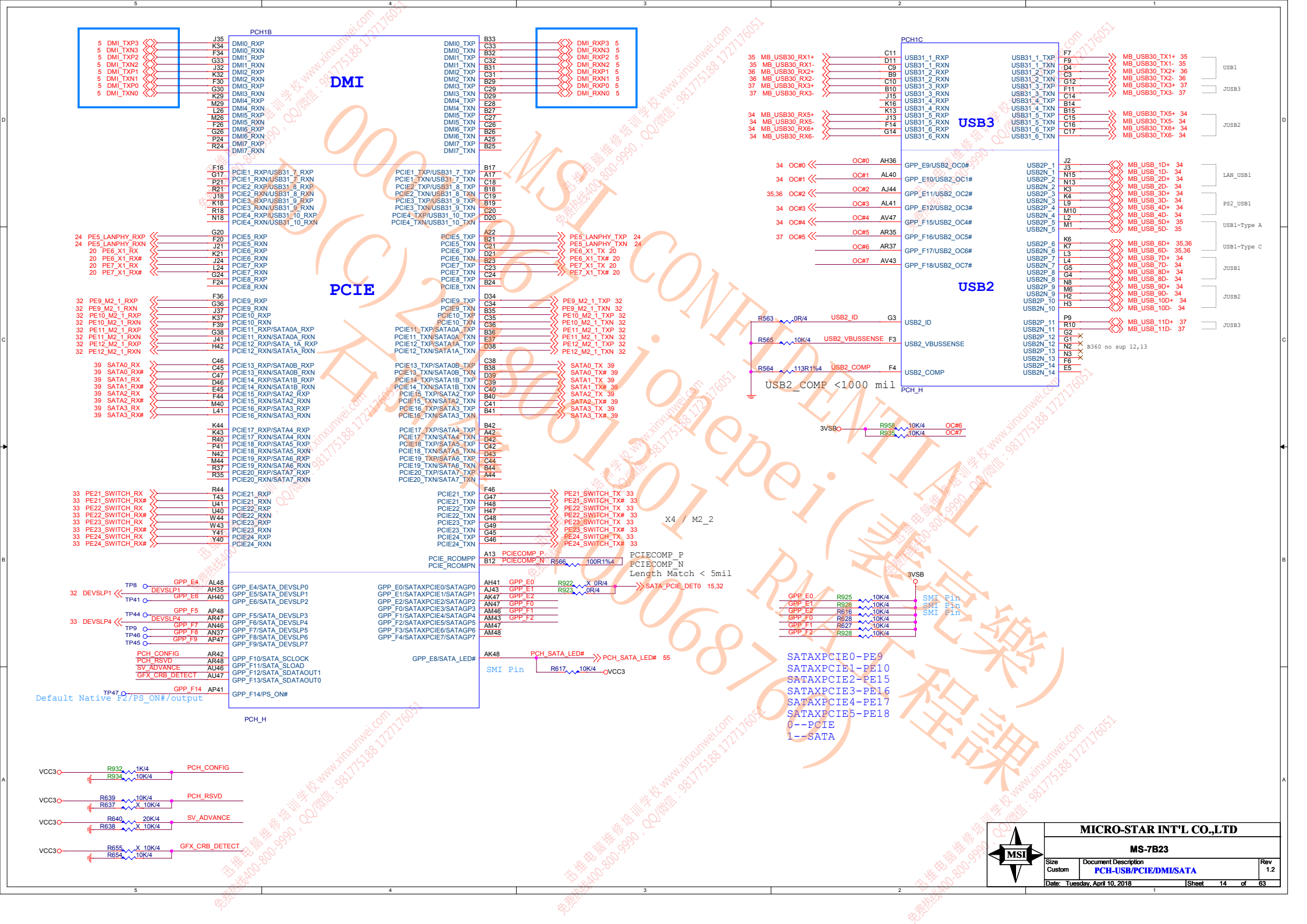
Port B HDMI

Port C DVI,HDMI2.0 OR Others

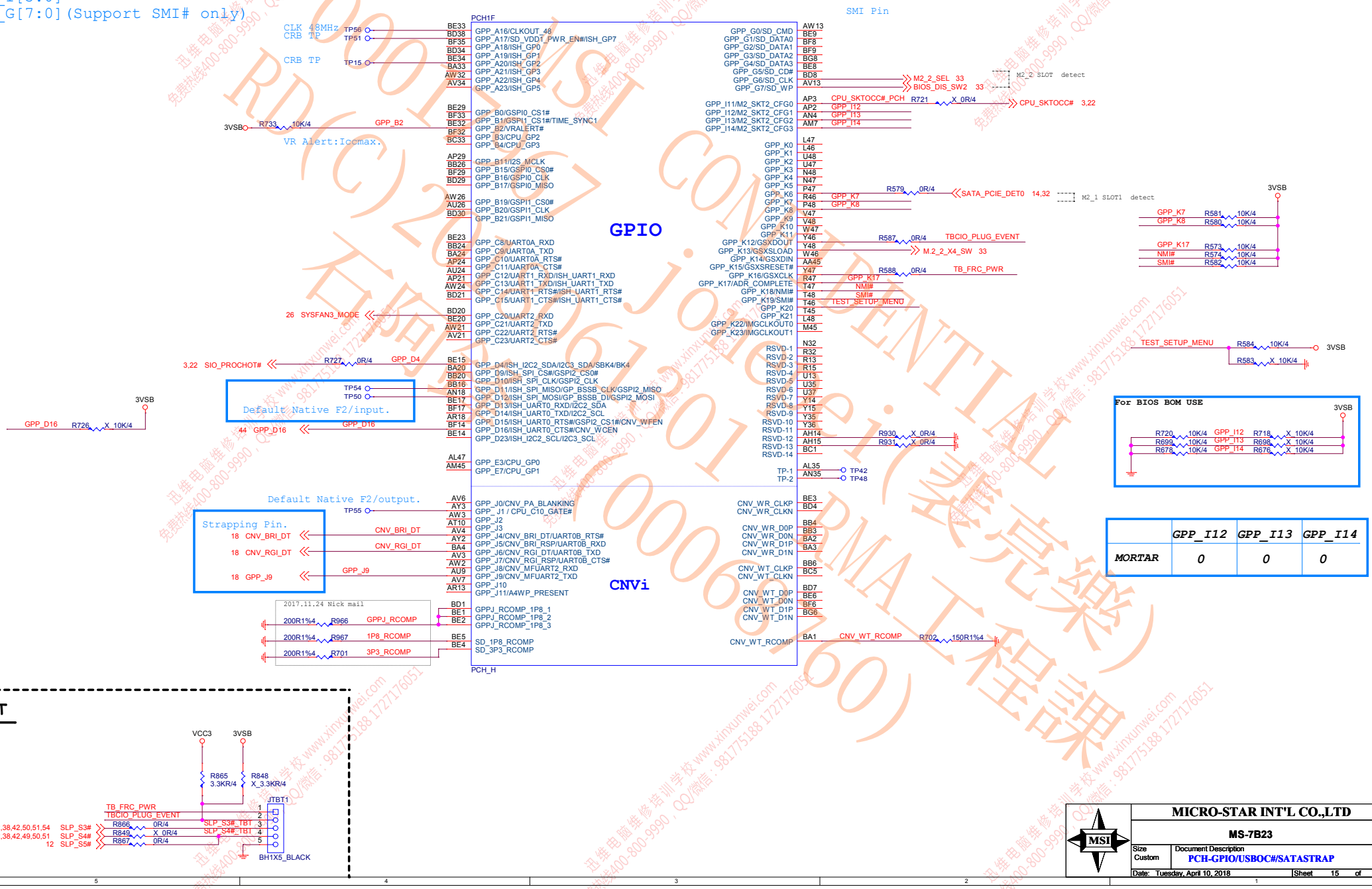
Port D DisplayPort to VGA

MICRO-STAR INT'L CO.,LTD
MS-7B23
Size: Custom
Document Description: PCH-Audio/Display/Clock
Rev: 1.2
Date: Tuesday, April 10, 2018
Sheet 13 of 63

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
0001967 CONFIDENTIAL MSI RD(C)20180612 joe pei(裴完策) 0006260 研发工程师


PCH1B
DMI
PCIE
PCH_H
PCH1C
USB3
USB2
X4 / M2_2
PCIECOMP_P
PCIECOMP_N
Length Match < 5mil
USB2_COMP <1000 mil
SMI Pin
SATAXPCIE0-PE9
SATAXPCIE1-PE10
SATAXPCIE2-PE15
SATAXPCIE3-PE16
SATAXPCIE4-PE17
SATAXPCIE5-PE18
0--PCIE
1--SATA
Default Native F2/PS_ON#/output
MICRO-STAR INT'L CO.,LTD
MS-7B23
PCH-USB/PCIE/DMI/SATA
Date: Tuesday, April 10, 2018
Sheet 14 of 63

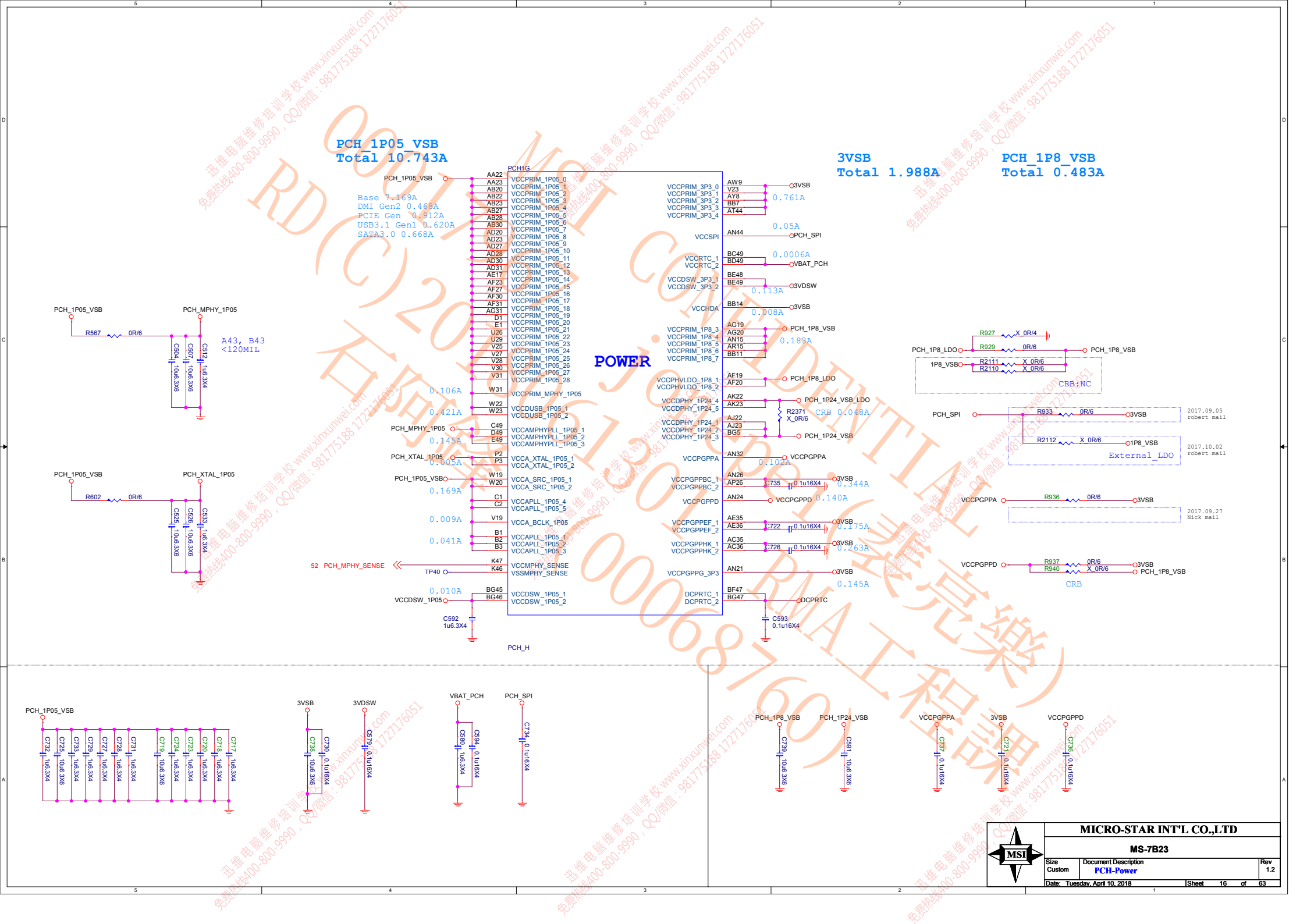
GPIO(SMI/NMI):
GPP_B14,GPP_B20,GPP_B23
GPP_C[23:22]
GPP_D[4:0]
GPP_E[8:0]
GPP_I[3:0]
GPP_G[7:0](Support SMI# only)



	GPP_I12	GPP_I13	GPP_I14
MORTAR	0	0	0

Company	MICRO-STAR INT'L CO.,LTD
Model	MS-7B23
Size	Custom
Document Description	PCH-GPIO/USBOC#/SATASTRAP
Rev	1.2
Date	Tuesday, April 10, 2018
Sheet	15 of 63

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
001167 MSI CONFIDENTIAL jorge (最终完稿) RD(C)2018.01.10 00066760 RMA工程课


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
PCH1G
POWER
PCH_H
3VSB
Total 1.988A
PCH_1P8_VSB
Total 0.483A
PCH_1P05_VSB
PCH_MPHY_1P05
R567 0R/6
C504 10u6.3X6
C507 10u6.3X6
C512 1u6.3X4
A43, B43
<120MIL
PCH_XTAL_1P05
R602 0R/6
C525 10u6.3X6
C526 10u6.3X6
C533 1u6.3X4
PCH_MPHY_SENSE
TP40
C592 1u6.3X4
C593 0.1u16X4
0.106A
0.421A
0.145A
0.005A
0.169A
0.009A
0.041A
0.010A
0.761A
0.05A
0.0006A
0.113A
0.008A
0.183A
0.048A
0.102A
0.344A
0.140A
0.175A
0.263A
0.145A
PCH_SPI
VBAT_PCH
3VDSW
R927 X_0R/4
R929 0R/6
R2111 X_0R/6
R2110 X_0R/6
CRB:NC
R933 0R/6
R2112 X_0R/6
External_LDO
2017.09.05 robert mail
2017.10.02 robert mail
R936 0R/6
2017.09.27 Nick mail
R937 0R/6
R940 X_0R/6
CRB
MICRO-STAR INT'L CO.,LTD
MS-7B23
Size Custom
Document Description PCH-Power
Rev 1.2
Date: Tuesday, April 10, 2018
Sheet 16 of 63

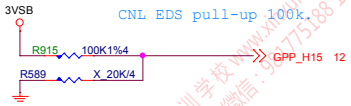
MSI CONFIDENTIAL
001796 jonepei (完樂)
(C)20180612 (MA工程課)
00068760)
石阿鋒
迅维电脑维修培训学校 www.xinxunwei.com
免费热线400-800-9990，QQ/微信：981775188 1727176051

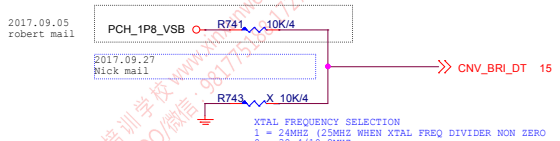
MICRO-STAR INT'L CO.,LTD	
MS-7B23	
Size: Custom	Document Description: PCH-GND
Rev: 1.2	
Date: Tuesday, April 10, 2018	Sheet 17 of 63

TOP Swap

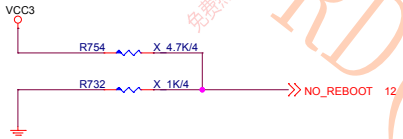
Internal pull-down 20K is disabled after PLTRST#

Reserved





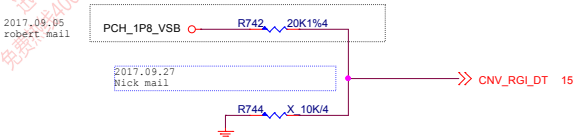
No Reboot



0 : DISABLE (Default)
1 : ENABLE

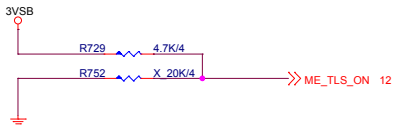
Internal pull-down 20K is disabled after PLTRST#

Reserved



CNL EDS
0 = Integrated CNVi enable
1 = Integrated CNVi disable

AMT and SBA with confidentiality

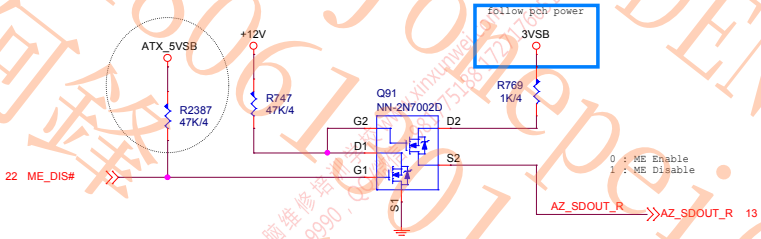


0 : DISABLE
1 : ENABLE (Default)

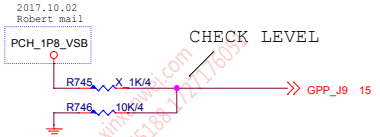
Internal pull-down 20K is disabled after RSMRST

HDA_SDO

ME flash by GPIO



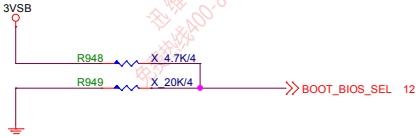
1.8V VCCPSPI



VCCSPI 3.3V,Internal pull-down.

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

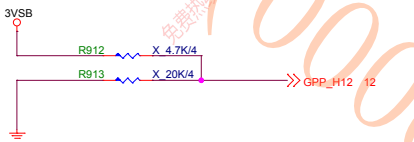
Boot BIOS



0 : SPI
1 : LPC

Internal pull-down 20K is disabled after PLTRST

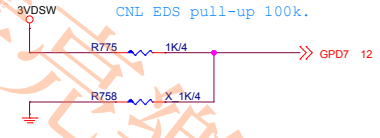
ESPI FLASH SHARING MODE



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

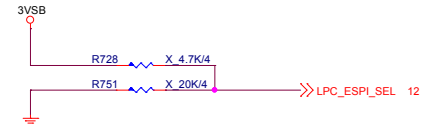
Internal pull-down 20K is disabled after RSMRST

Reserved



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

LPC eSPI Mode

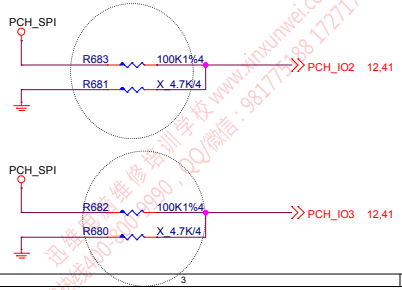


0 : LPC
1 : eSPI

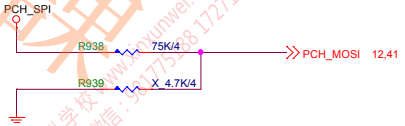
Internal pull-down 20K is disabled after RSMRST

Reserved

CRB 571506 Page.99

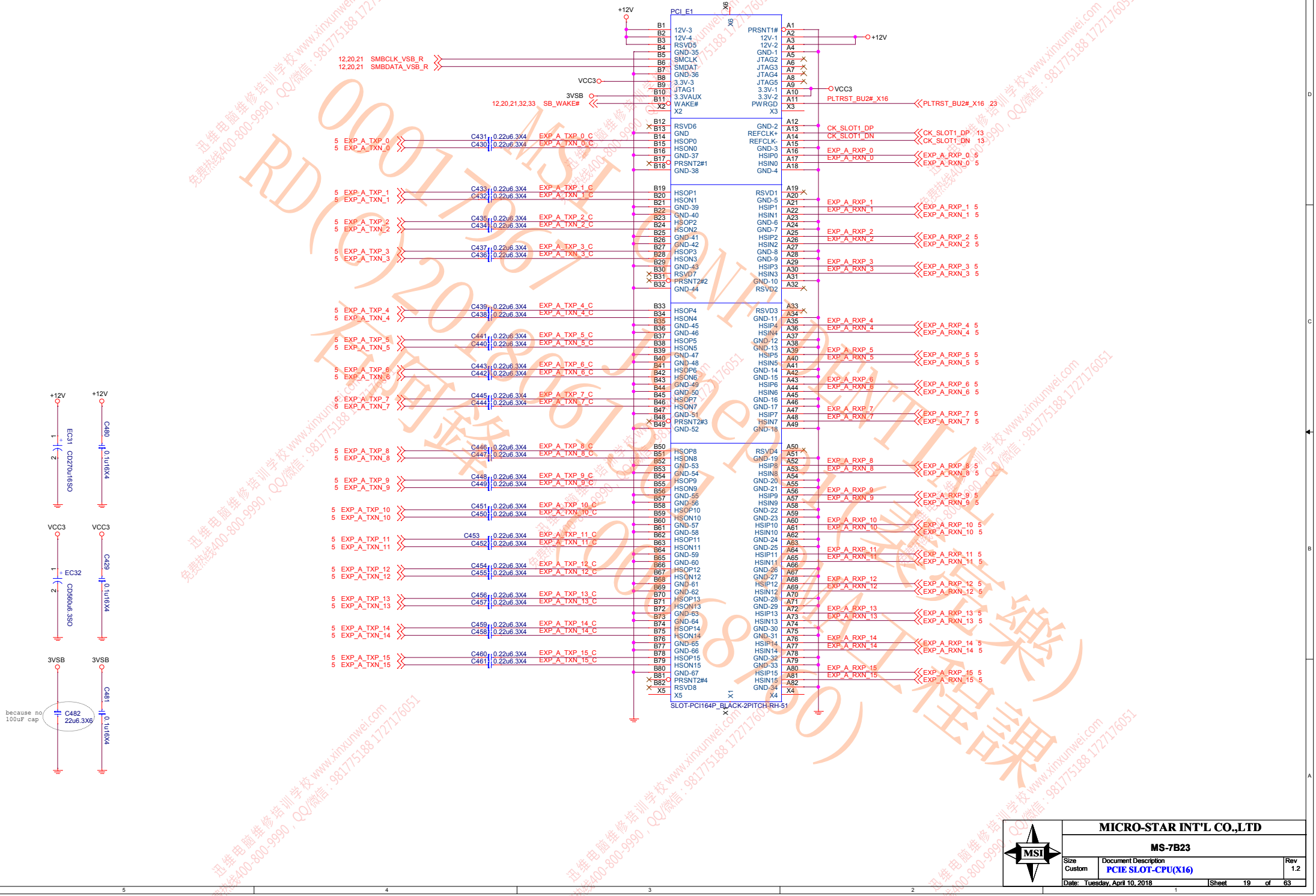


Reserved



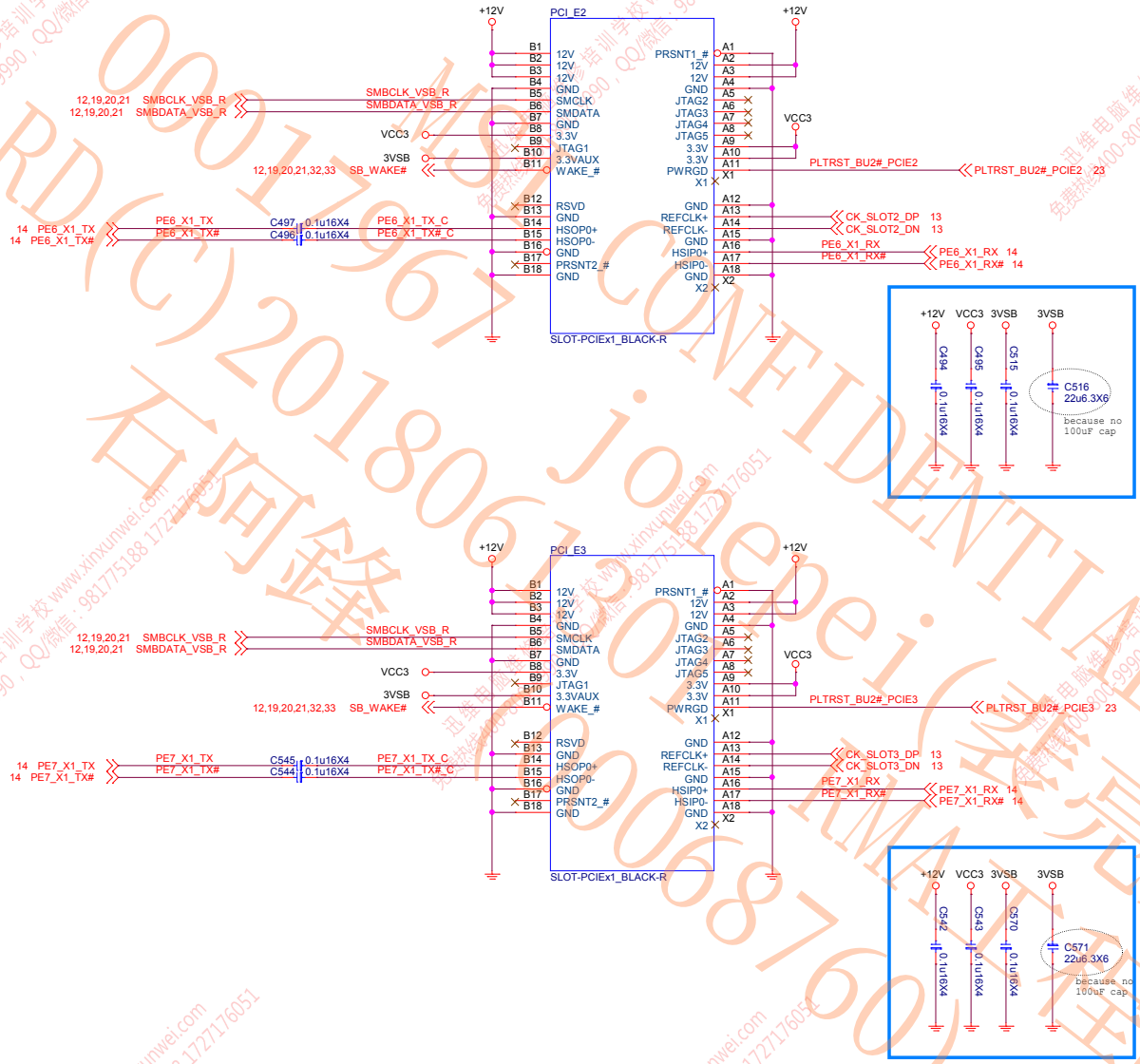
MICRO-STAR INT'L CO.,LTD		
MS-7B23		
Size: Custom	Document Description: PCH-Strap	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 18 of 63	

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
0001796 MSI CONFIDENTIAL
RD(C)20180613 joepei(裴俊维)
石阿姨 0006876 RMA工程课



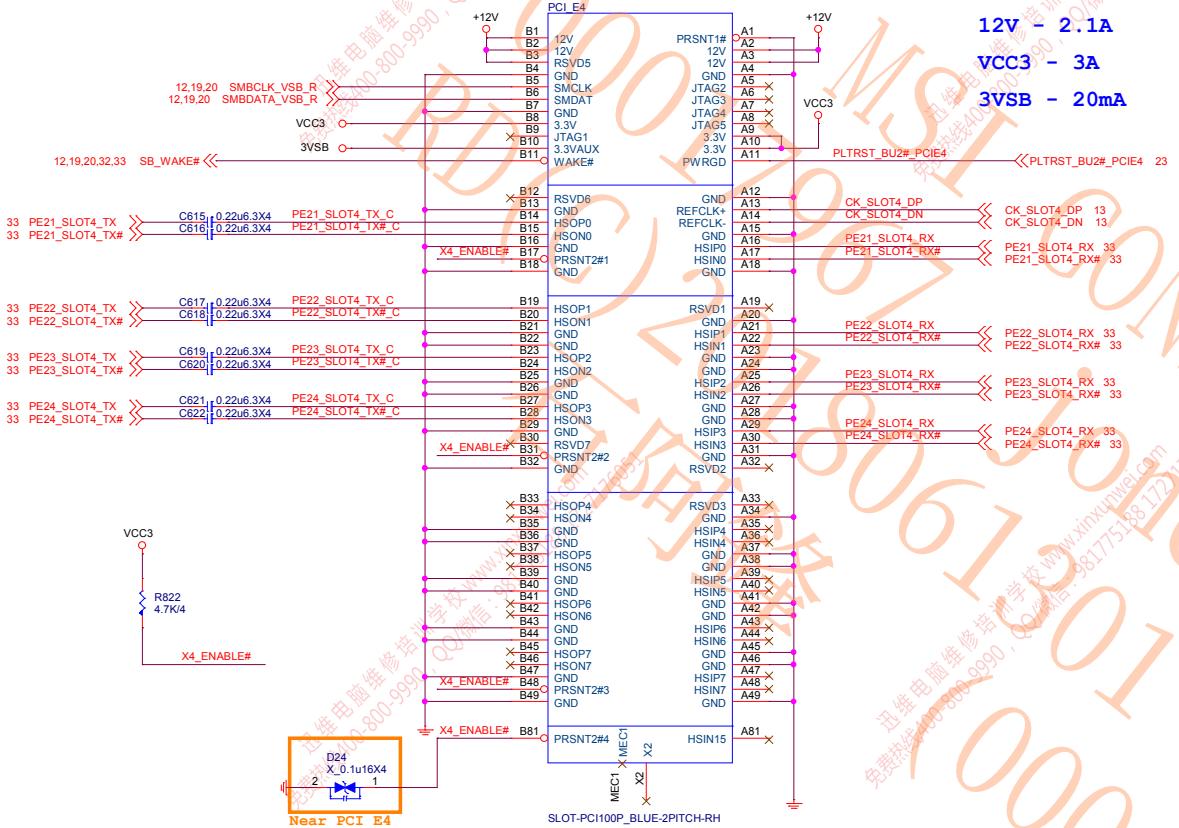
迅维电脑维修培训学校 www.xinxunwei.com 免费热线400-800-9990，QQ/微信：981775188 1727176051
MSI 内部资料 仅供维修人员使用 RD(6) 2018/6/1 00017967

MICRO-STAR INT'L CO.,LTD	
MS-7B23	
Size: Custom	Document Description: PCIE SLOT-CPU(X16)
Rev: 1.2	
Date: Tuesday, April 10, 2018	Sheet 19 of 63

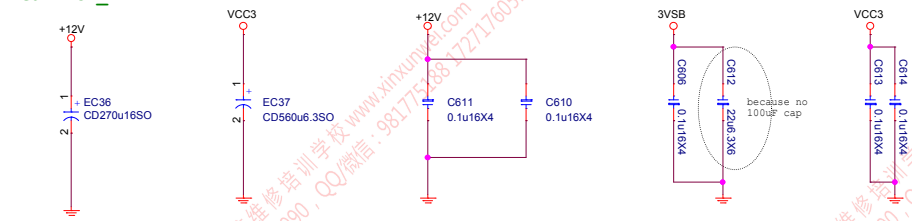


MICRO-STAR INT'L CO.,LTD	
MS-7B23	
Size: Custom	Document Description: PCIE SLOT-PCH(X1)
Rev: 1.2	
Date: Tuesday, April 10, 2018	Sheet 20 of 63

PCI Express X4 Slot

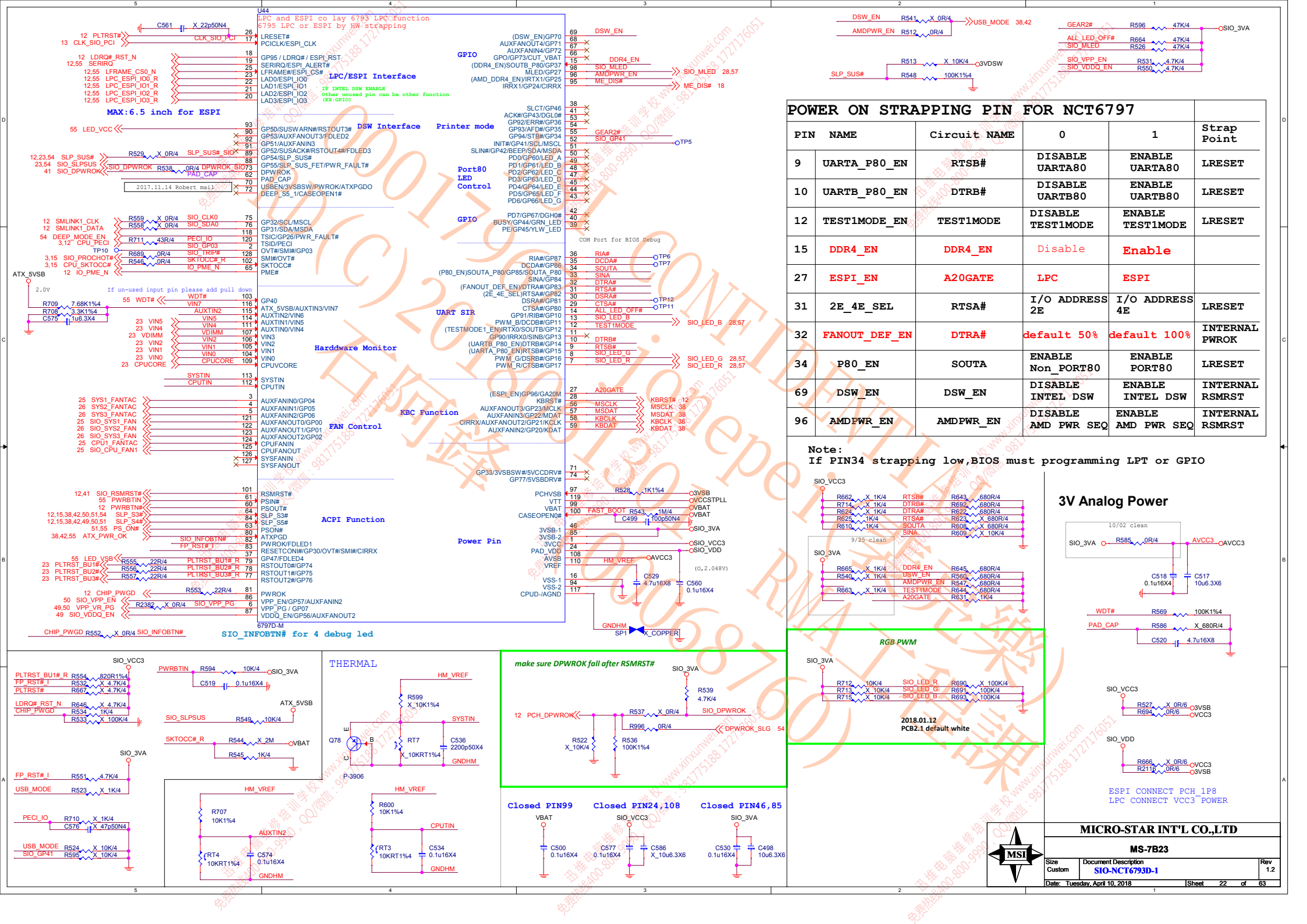


Near PCI_E4



MICRO-STAR INT'L CO.,LTD		
MS-7B23		
Size: Custom	Document Description: PCIE SLOT-PCH(X4)	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 21 of 63	

MSI CONFIDENTIAL 002(2018061201 Shenzhen(装完樂) RMA工程課 (00068760) RD(2018061201)



POWER ON STRAPPING PIN FOR NCT6797

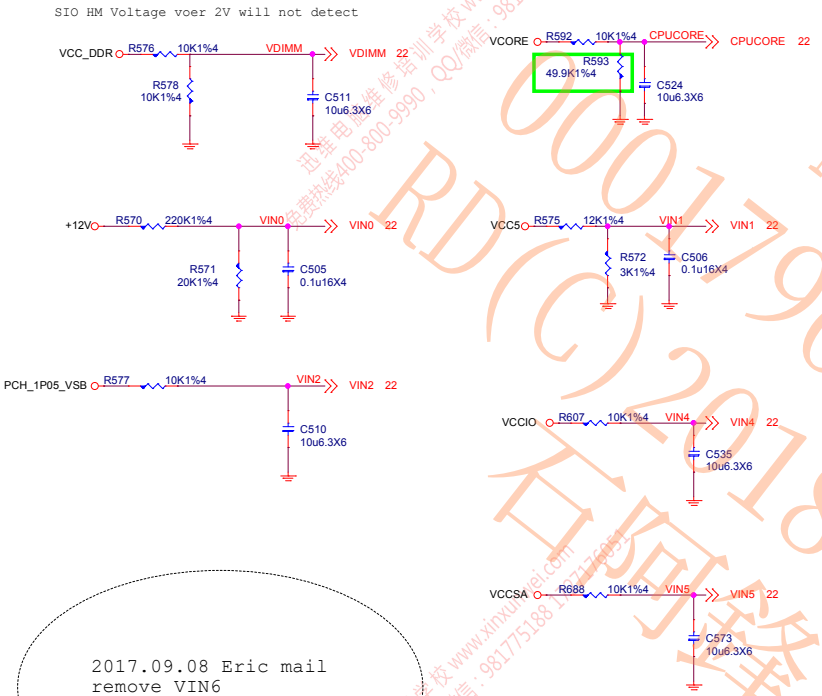
PIN	NAME	Circuit NAME	0	1	Strap Point
9	UARTA_P80_EN	RTSB#	DISABLE UARTA80	ENABLE UARTA80	LRESET
10	UARTB_P80_EN	DTRB#	DISABLE UARTB80	ENABLE UARTB80	LRESET
12	TEST1MODE_EN	TEST1MODE	DISABLE TEST1MODE	ENABLE TEST1MODE	LRESET
15	DDR4_EN	DDR4_EN	Disable	Enable	
27	ESPI_EN	A20GATE	LPC	ESPI	
31	2E_4E_SEL	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

2018.01.12
PCB2.1 default white

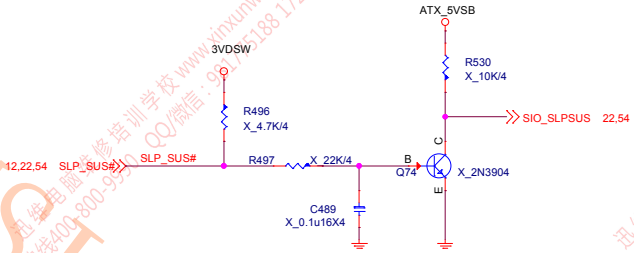
MICRO-STAR INT'L CO.,LTD			
MS-7B23			
Size: Custom	Document Description: SIO-NCT6793D-1		Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 22 of 63		

HW Monitor - Voltage



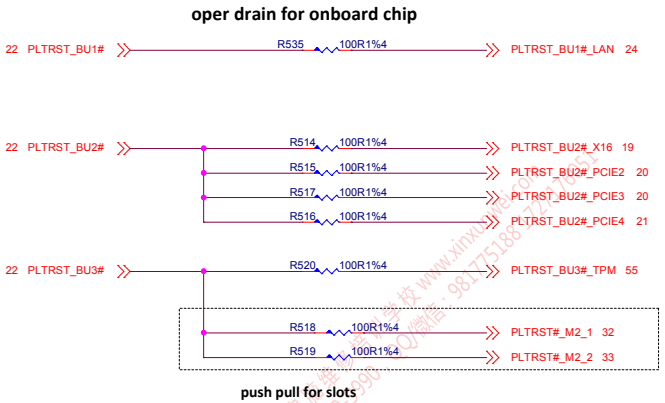
2017.09.08 Eric mail
remove VIN6
change to AUXTIN2

SLP_SUS Co-lay circuit



2017.09.25
remove for space

PLTRST#



SERIAL PORT 1

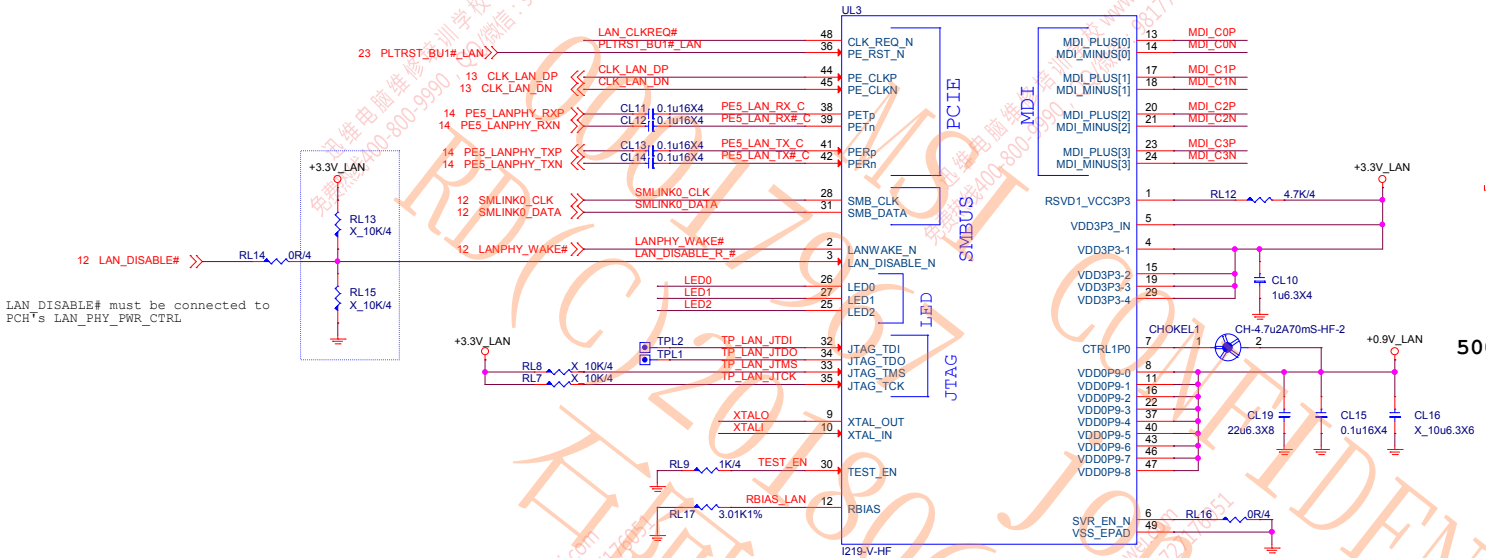
2017.09.25
remove JCOM1

MICRO-STAR INT'L CO.,LTD		
MS-7B23		
Size: Custom	Document Description: SIO-NCT6793D-2	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 23 of 63	

00017967 MSI CONFIDENTIAL
RD(C)20180601 jonepei(裝完樂)
石頭錄 (0006876O) RMA工程課
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

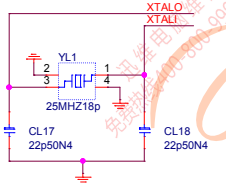
Intel Lan- i219

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



LAN_DISABLE# must be connected to PCH's LAN_PHY_PWR_CTRL

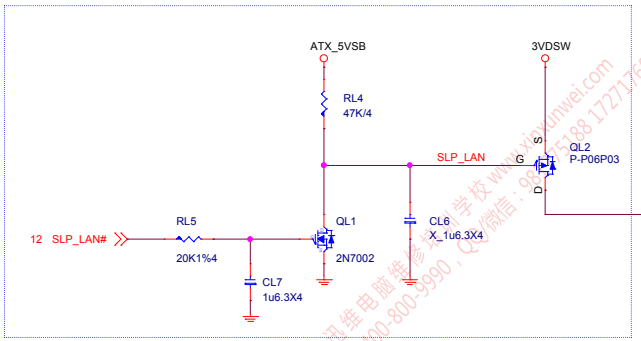
PCH's PCIECLKRQ<n> port mustbe mapped to PCH's PET/R<n+1>port.
If CLK_REQ_N is not used, pin48 is pulled up 10KR to 3.3V_LAN



AVL:D04-1005700-SC6

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

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

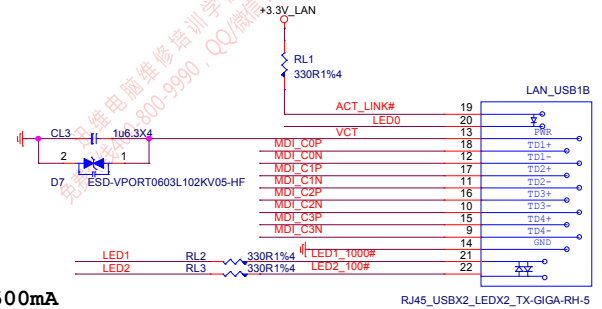


Note:These caps closed to PHY

+3.3V_LAN

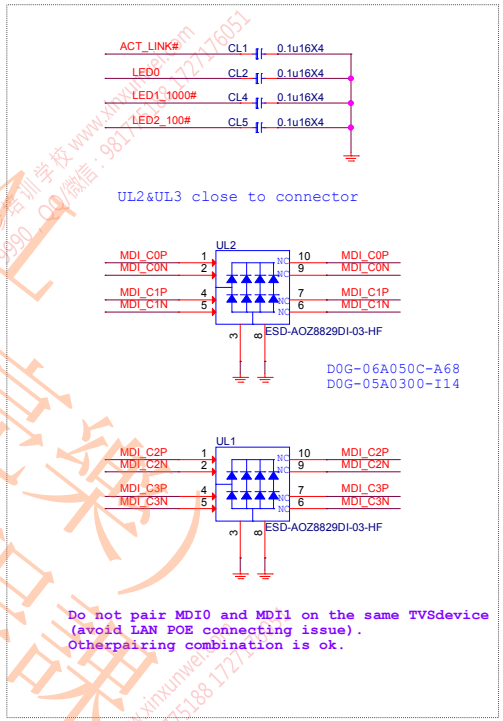
I218:132mA
I219:542mW

LAN Connector



500mA

For EMI



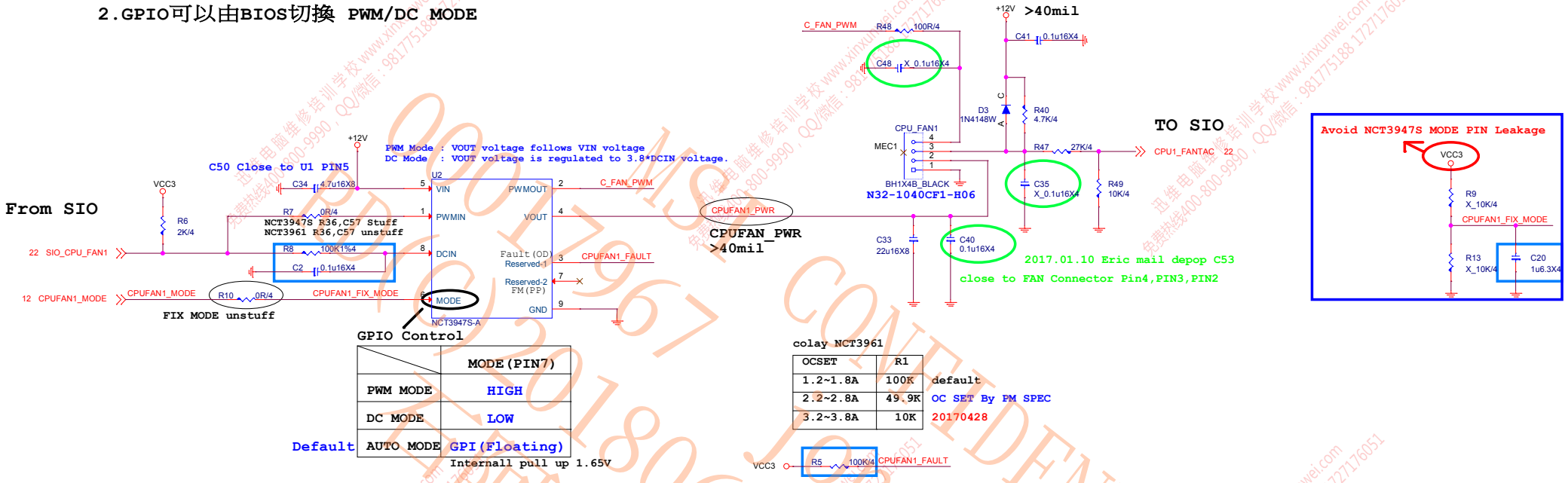
Do not pair MDI0 and MDI1 on the same TVSdevice (avoid LAN POE connecting issue).
Otherpairing combination is ok.

MICRO-STAR INT'L CO.,LTD		
MS-7B23		
Size: Custom	Document Description: LAN - Intel I219	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 24 of 63	

RDC 20061201 Jonepei(设完策) 00068760 RMA工程师 石向锋 CONFIDENTIAL

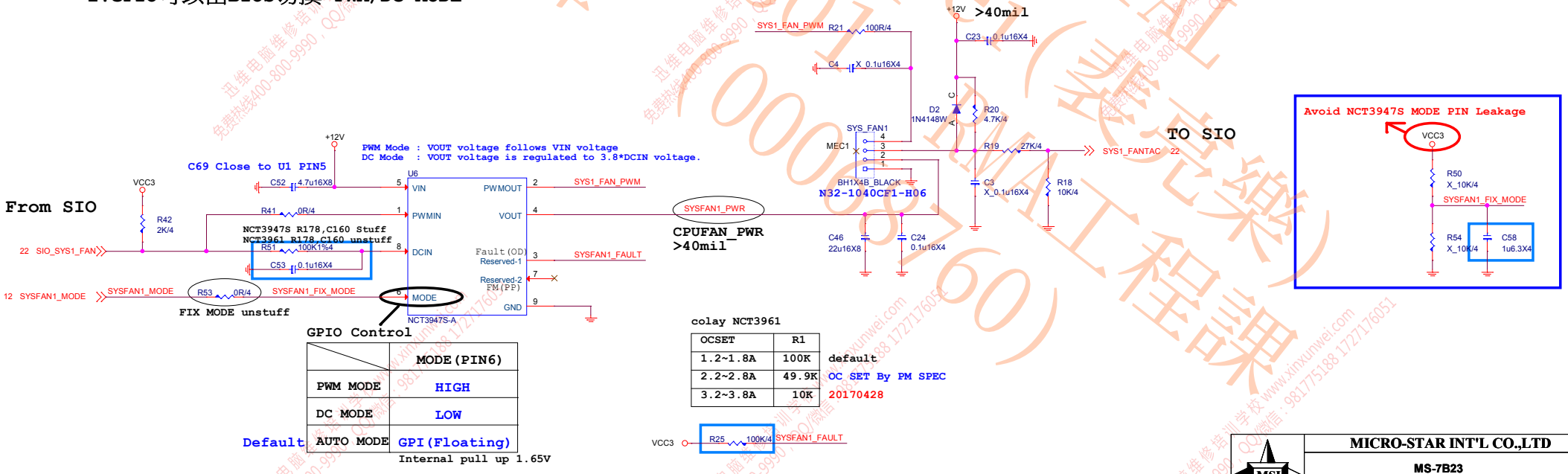
TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE

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

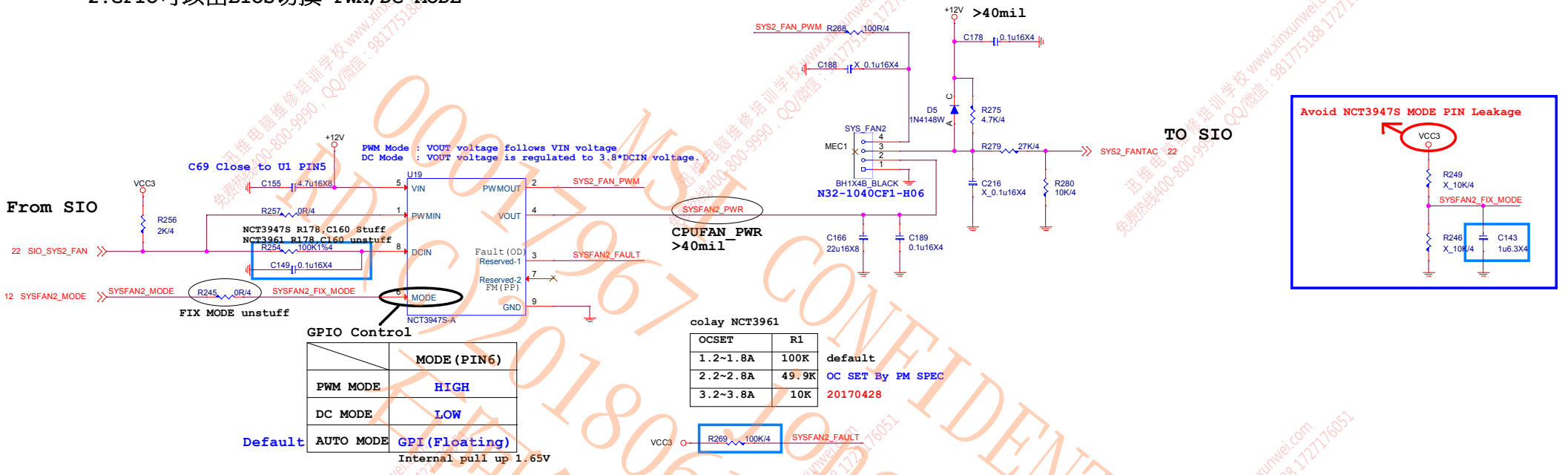


MSI CONFIDENTIAL Jonepei(装配架) RMA工程课 0001796 2018061201 (0006760)

MICRO-STAR INT'L CO.,LTD	
MS-7B23	
Size: Custom	Document Description: FAN CONTROLLOR
Rev: 1.2	
Date: Tuesday, April 10, 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

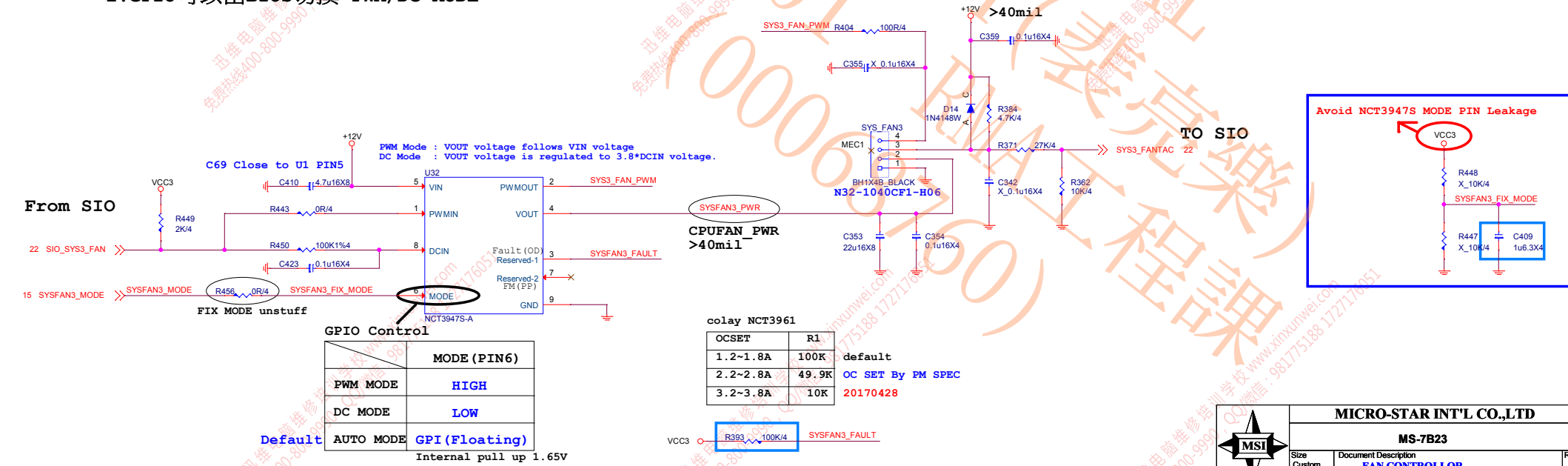


	MODE(PIN6)
PWM MODE	HIGH
DC MODE	LOW
AUTO MODE	GPI(Floating)

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

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



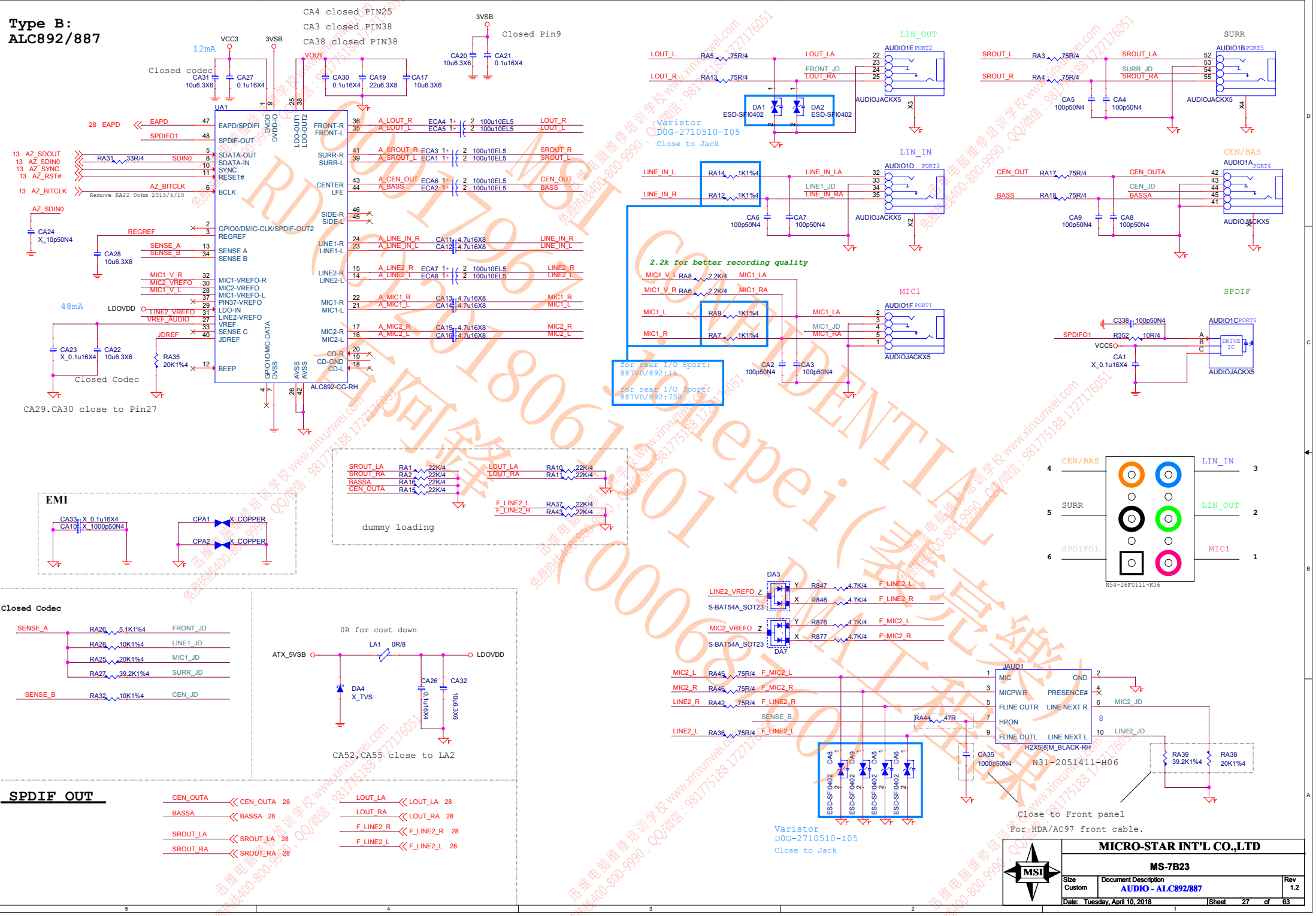
	MODE(PIN6)
PWM MODE	HIGH
DC MODE	LOW
AUTO MODE	GPI(Floating)

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

MICRO-STAR INT'L CO.,LTD		
MS-7B23		
Size: Custom	Document Description: FAN CONTROLLOR	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 26 of 63	

MSI CONFIDENTIAL Penepei(装完集) RMA工程课 0006(0006160) 0017967 2018061201

Type B:
ALC892/887

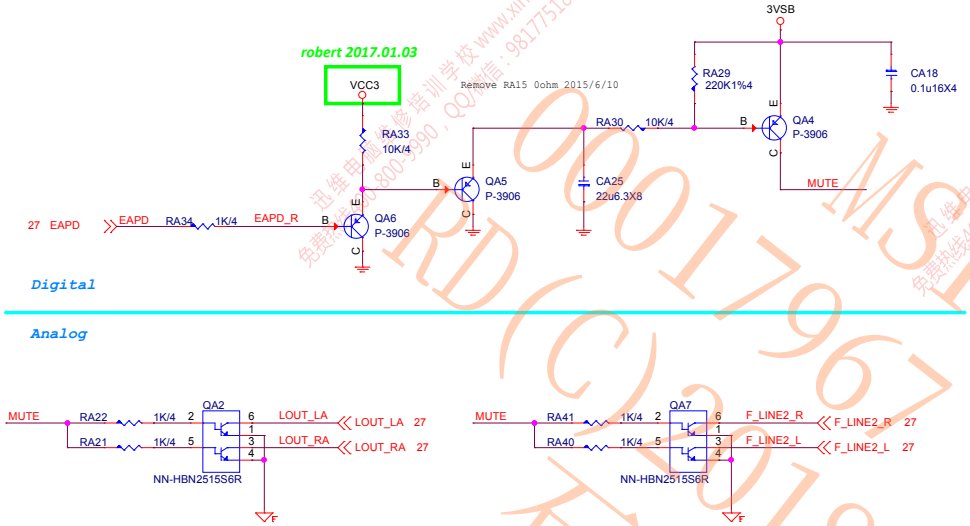


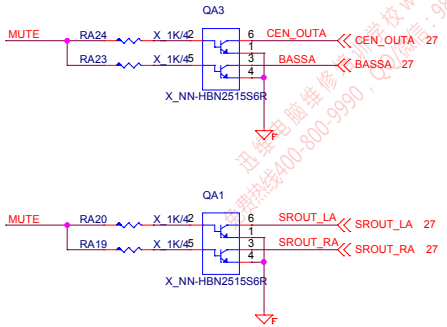
MICRO-STAR INT'L CO.,LTD			
MS-7B23			
Size: Custom	Document Description: AUDIO - ALC892/887		Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 27 of 63		

Rear Line OUT De-POP circuit

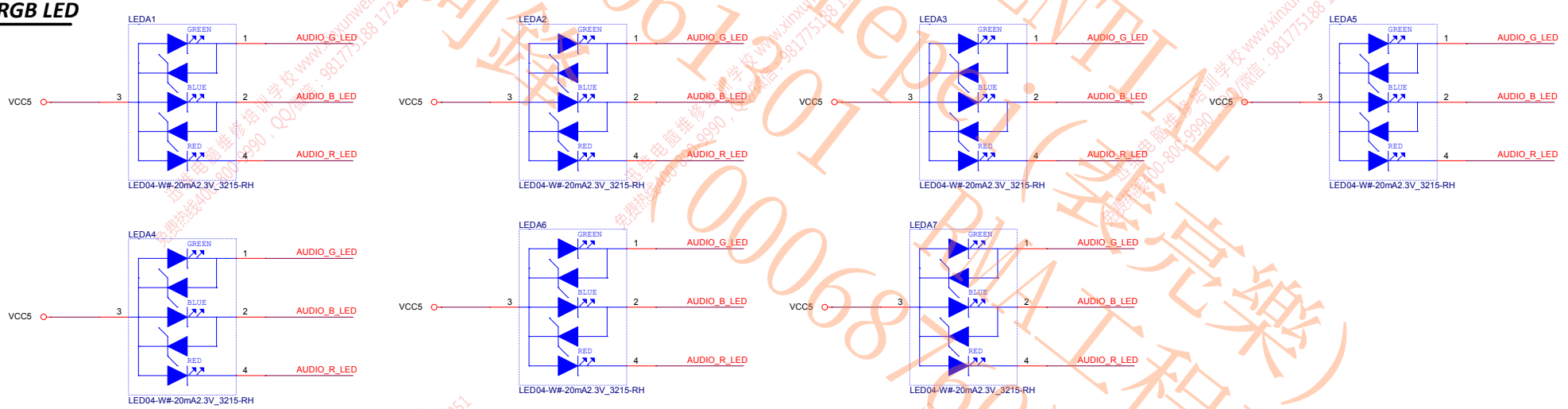
De-pop circuit for Rear Line out & Front Headphone out)

(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)





Audio RGB LED

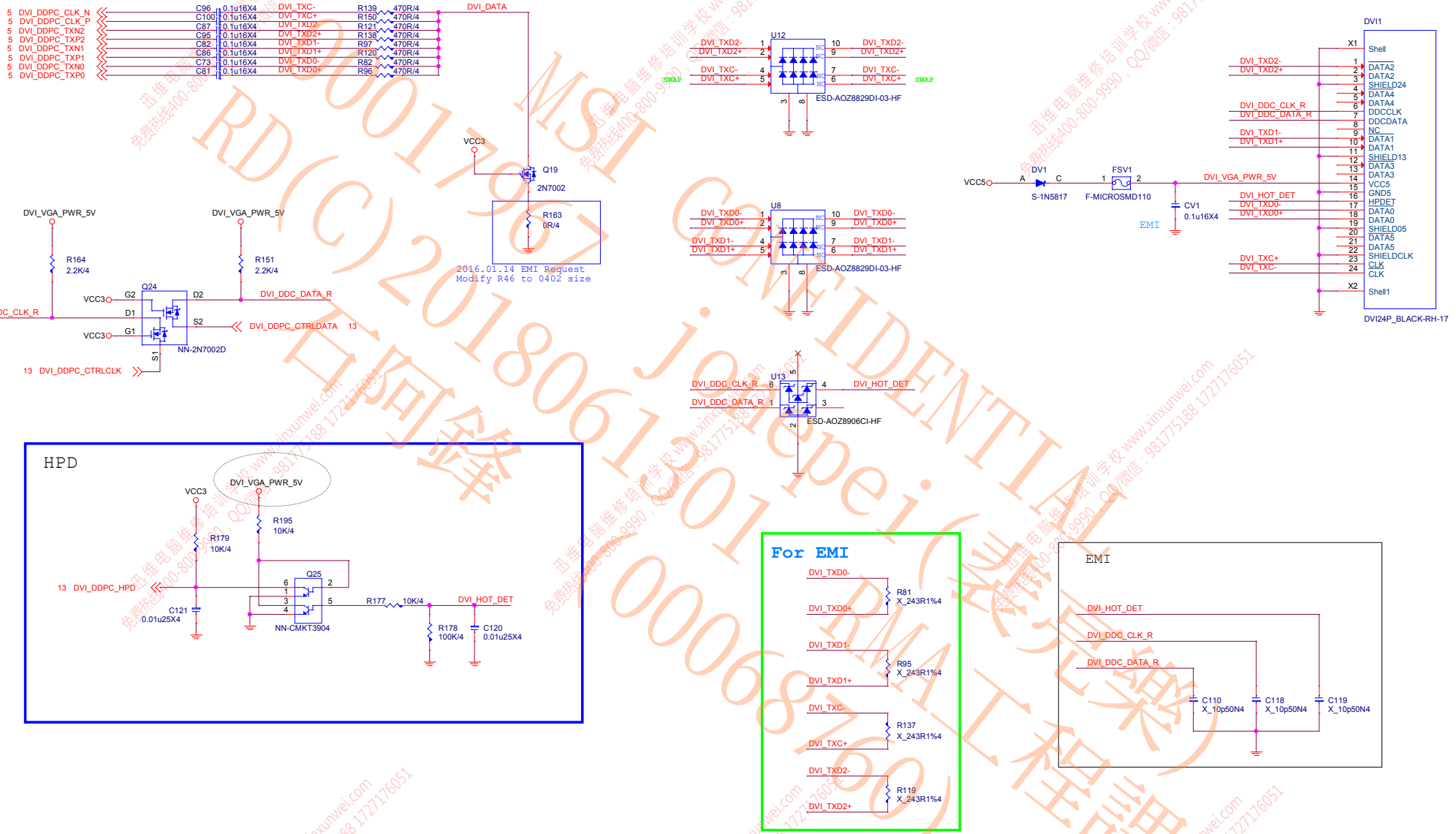


00017967 MSI CONFIDENTIAL
RD(C)2018061201 jonepei (樊完荣)
1000068760 PWA工程课

MICRO-STAR INT'L CO.,LTD		
MS-7B23		
Size: Custom	Document Description: AUDIO - depop circuit	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 28 of 63	

DVI level shifter

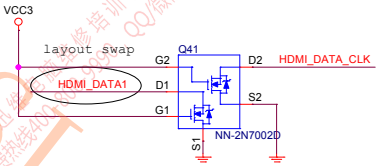
VGA: resolution of 2048x1536 pixels with 32-bit color at 75 Hz (4:3 QXGA)

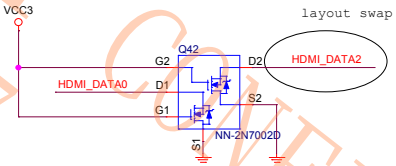


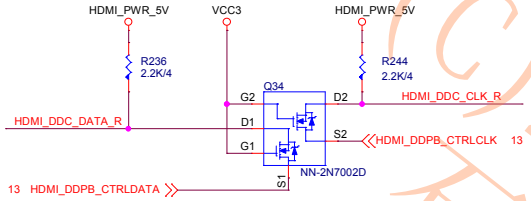
迅维电脑维修培训学校 www.xinxunwei.com 免费热线400-800-9990，QQ/微信：981775188 1727176051
2001967 MSI CONFIDENTIAL 仁寿 Jenpei(技完领) RD(C)20180613 01 000687(60) 已阅签 RMA工程课

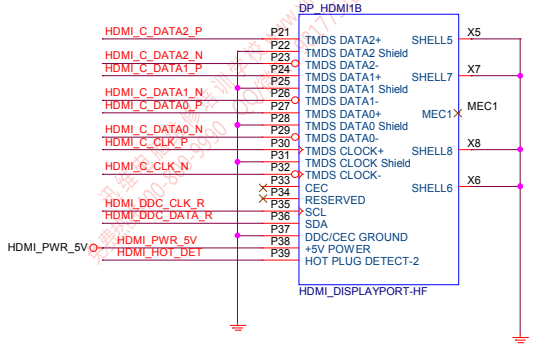
MICRO-STAR INT'L CO.,LTD	
MS-7B23	
Size: Custom	Document Description: DVI
Rev: 1.2	
Date: Tuesday, April 10, 2018	Sheet 29 of 63

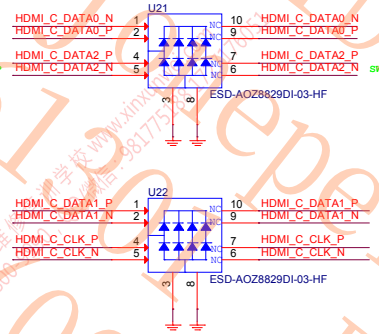
HDMI, DVI : 1920x1200 at 60 Hz (16:10 WUXGA)

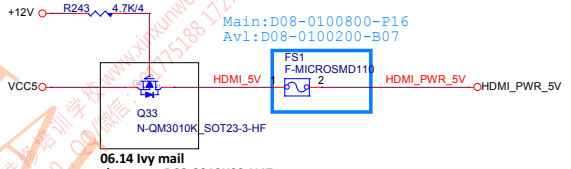




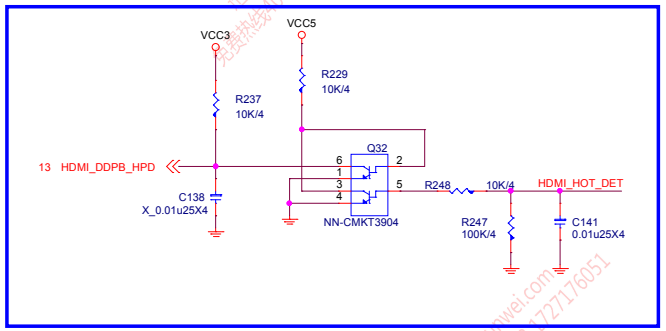


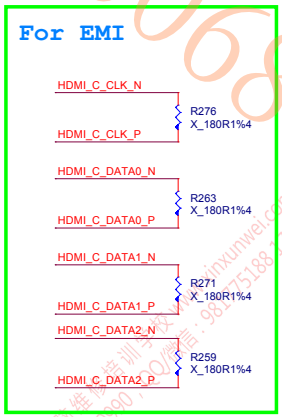


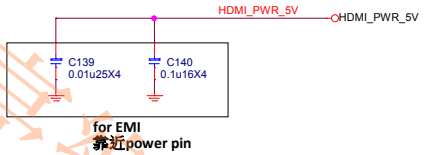


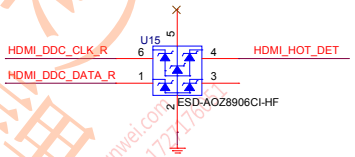


HPD



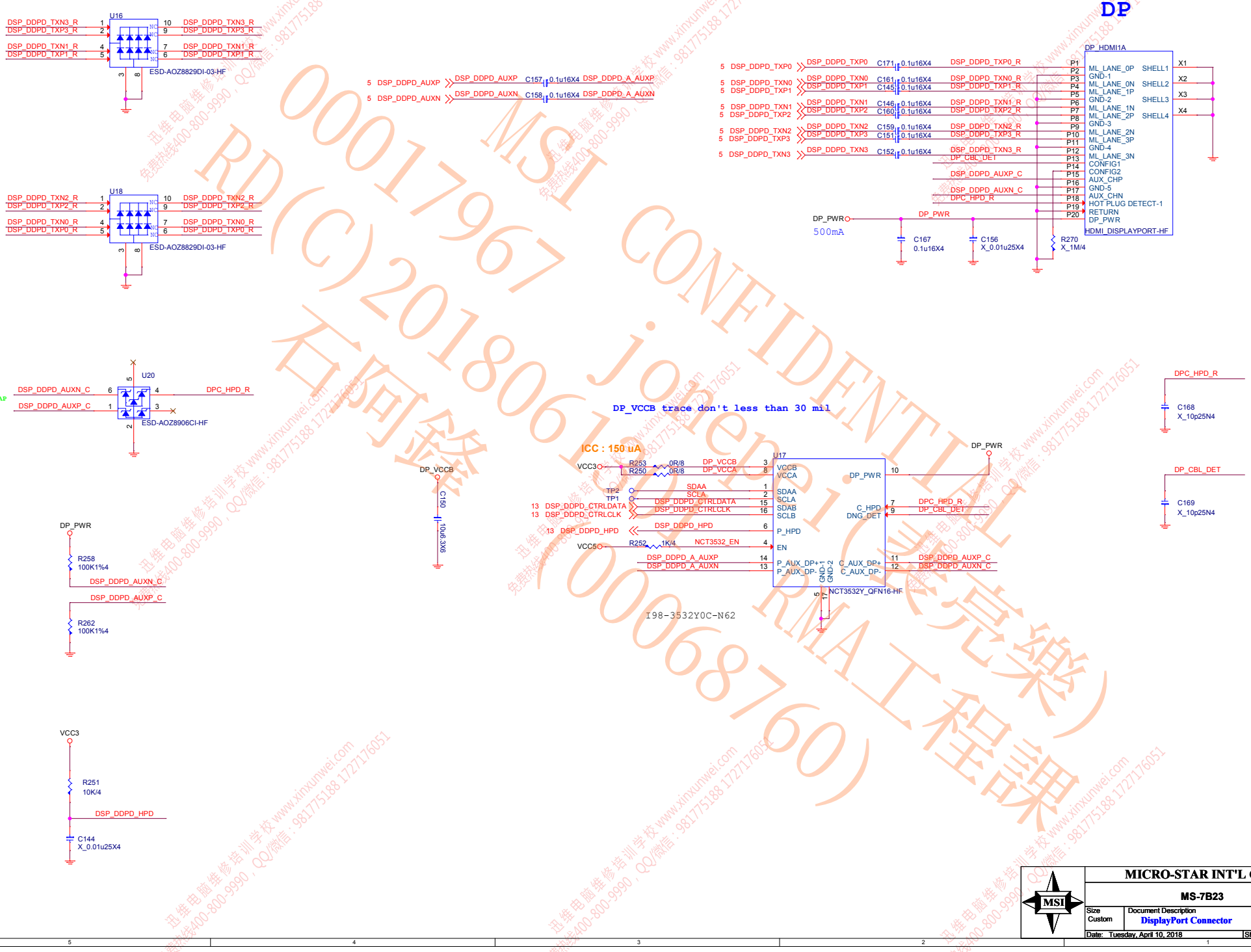




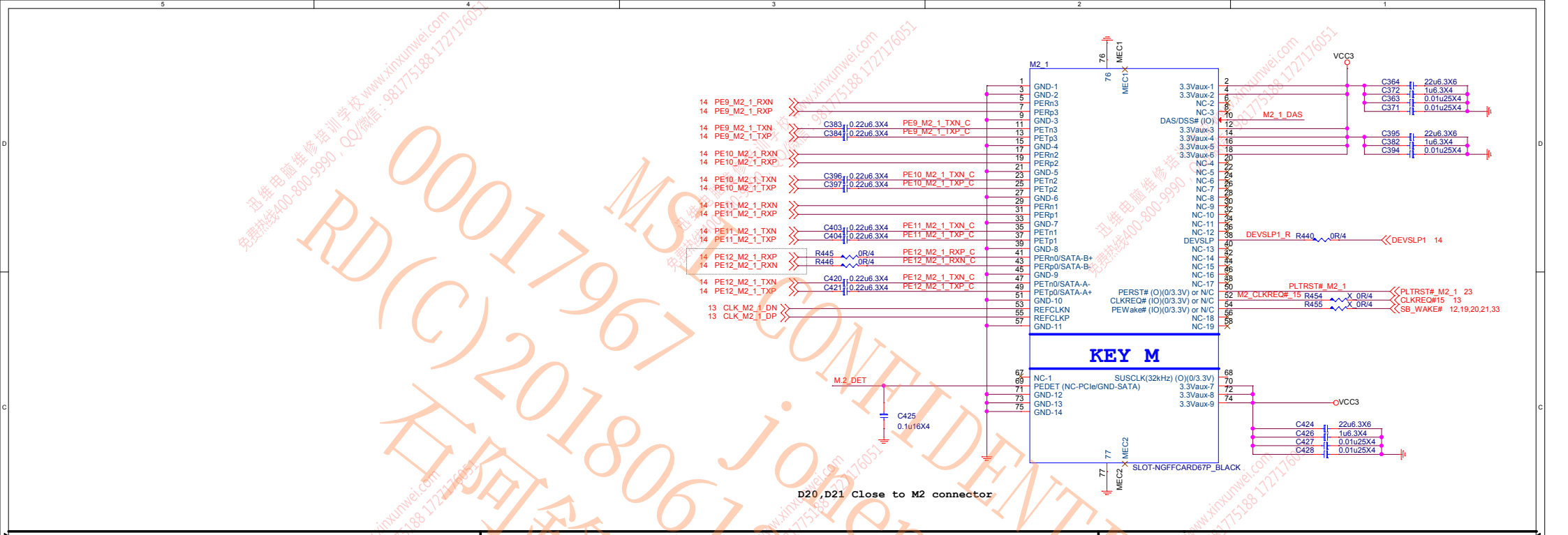


MICRO-STAR INT'L CO.,LTD		
MS-7B23		
Size: Custom	Document Description: HDMI Connector	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 30 of 63	

MSI CONFIDENTIAL
RD(C)20180612(Taipei)(装完版)
石阿锋 (00068760)
RMA工程课
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



MSI CONFIDENTIAL
joneper(完樂)
00017967
RD(C)20180613
石阿铭(00068760)
RMA工程課
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



BIOS_MODE

DIS_SW	M1_SEL_PCIESATA	Mode
0	1	M2-SATA
0	0	M2-PCIE
GPI	GPI	AUTO

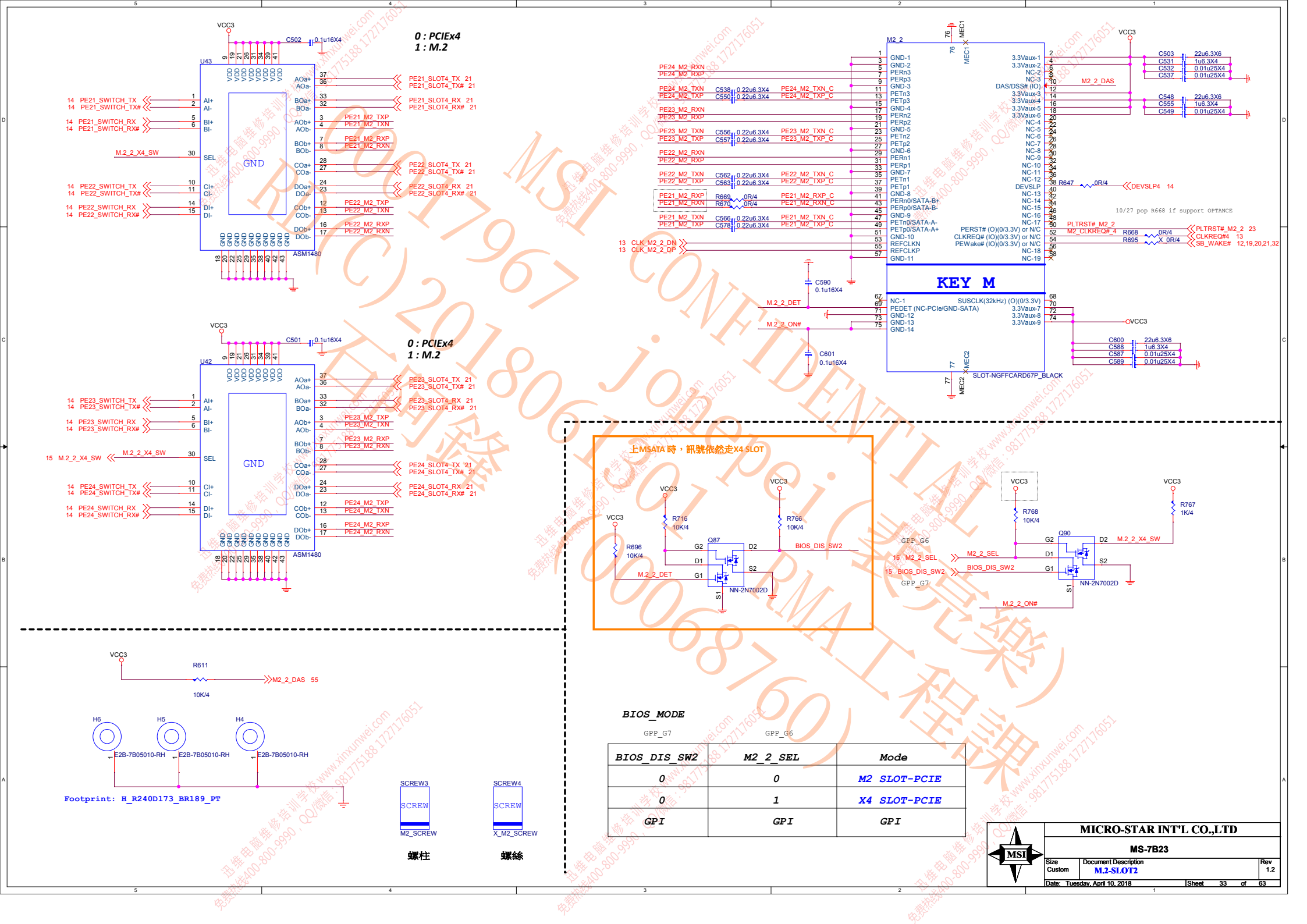
MICRO-STAR INT'L CO.,LTD

MS-7B23

Size: Custom | Document Description: M.2-SLOT1 | Rev: 1.2

Date: Tuesday, April 10, 2018 | Sheet 32 of 63

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
00017967 MSI CONFIDENTIAL jonepei(技完策) RD(C)20180601 RMA工程部 (00068760) 石阿锋



BIOS_MODE

GPP_G7	GPP_G6	
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

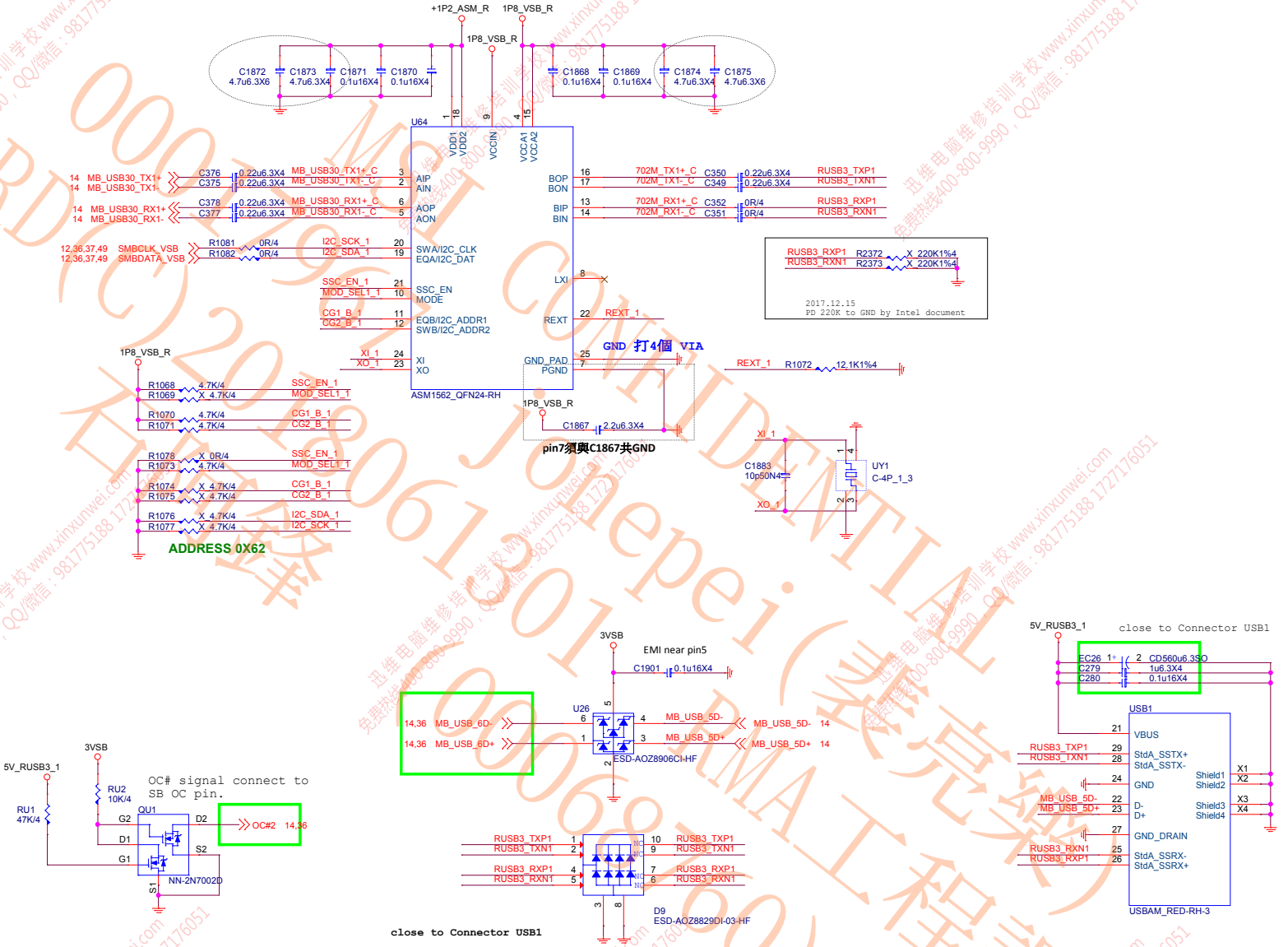
Size	Document Description	Rev
Custom	M.2-SLOT2	1.2

Date: Tuesday, April 10, 2018 Sheet 33 of 63

MSI CONFIDENTIAL
Jonpei (機密檔案)
RMA工程課
RMA#: 0006876
RMA#: 0017967
RMA#: 0018061
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

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

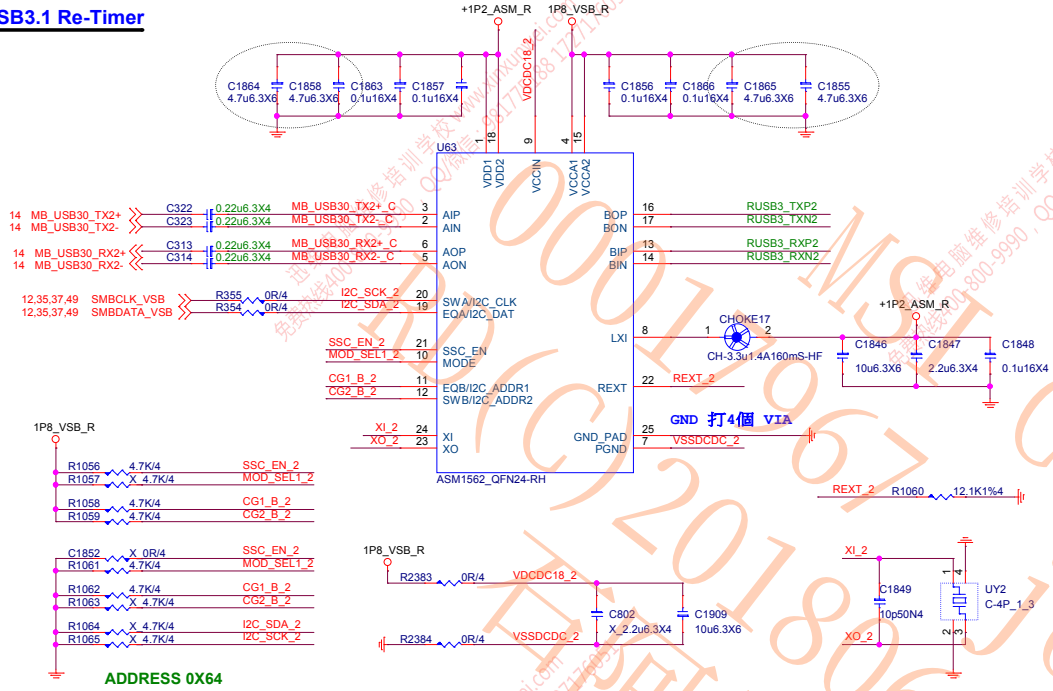
Rear TYPE-A
USB3.1 Re-Timer



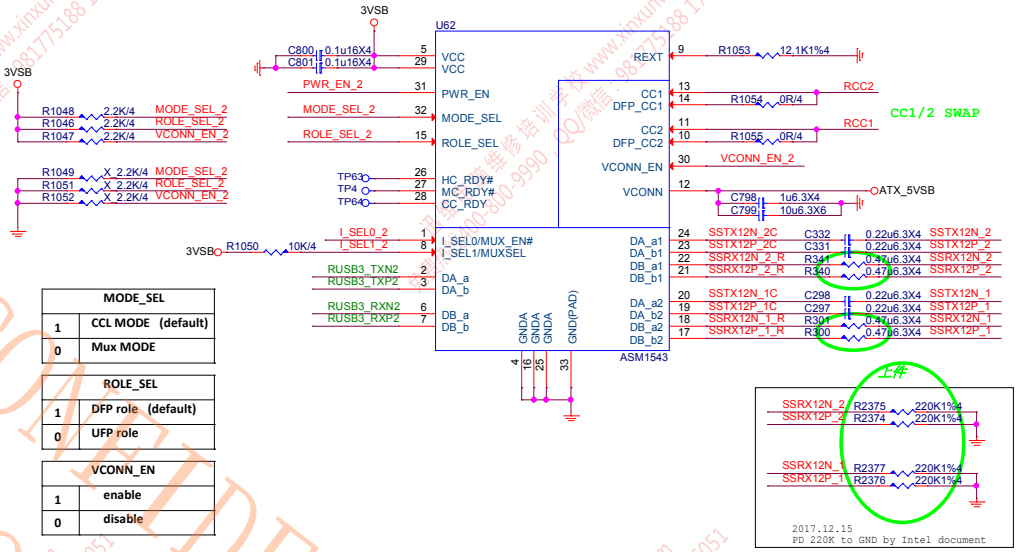
迅维电脑维修培训学校 www.xinxunwei.com 免费热线400-800-9990，QQ/微信：981775188 1727176051
MSI CONFIDENTIAL
RD(C)2018061201 Jonepei(装完线)
RMA工程版
00068760

MICRO-STAR INT'L CO.,LTD		
MS-7B23		
Size: Custom	Document Description: Type-A & Re_driver	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 35 of 63	

USB3.1 Re-Timer



USB Type-C MUX with Configuration Channel (CC)

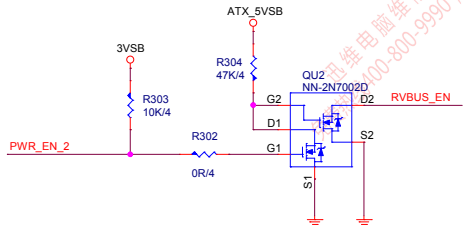


MODE_SEL	
1	CCL MODE (default)
0	Mux MODE

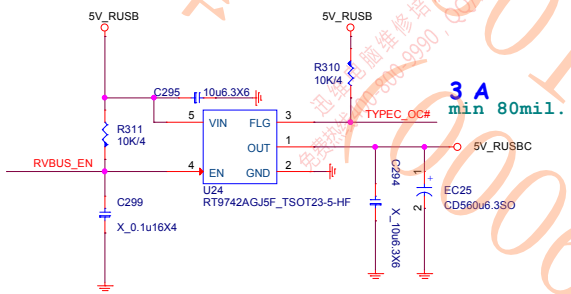
ROLE_SEL	
1	DFP role (default)
0	UFP role

VCONN_EN	
1	enable
0	disable

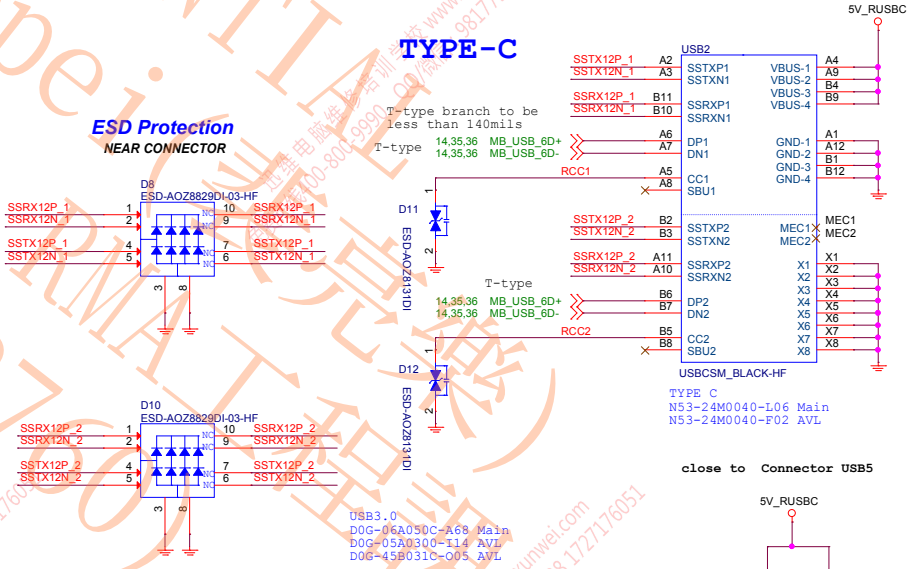
VCOM OC#



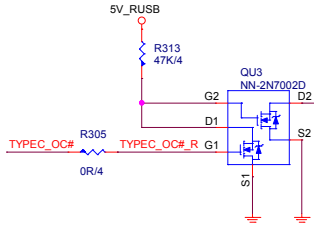
VBUS EN



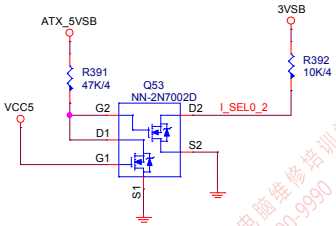
TYPE-C



VBUS OC# LEVEL SHIFT



Current Mode

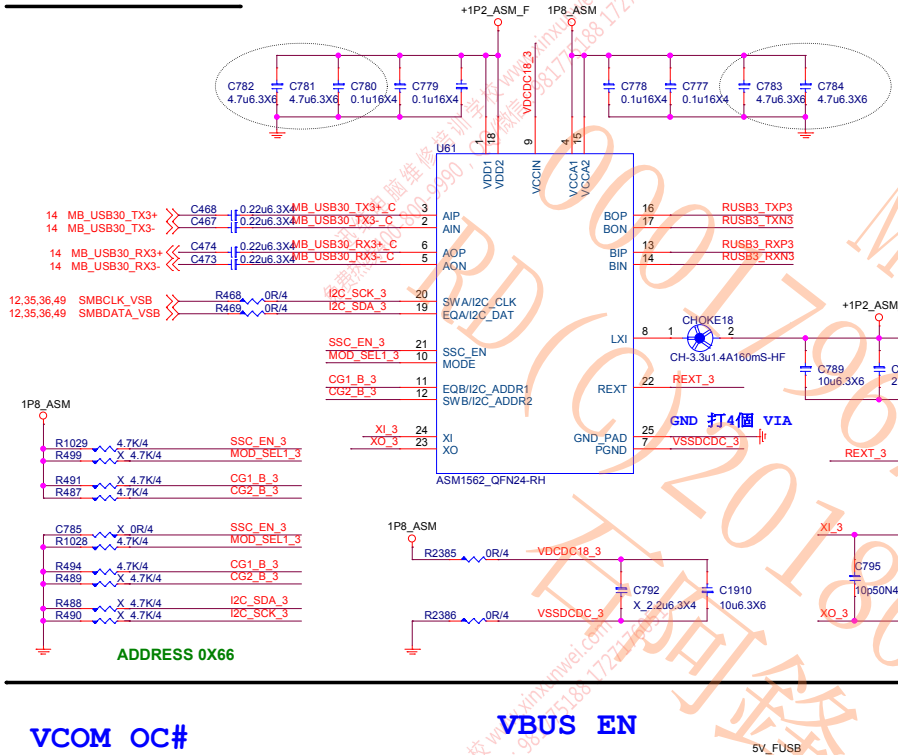


MICRO-STAR INT'L CO.,LTD	
MS-7B23	
Size: Custom	Document Description: Rear Type-C & Re-Timer
Rev: 1.2	
Date: Tuesday, April 10, 2018	Sheet 36 of 63

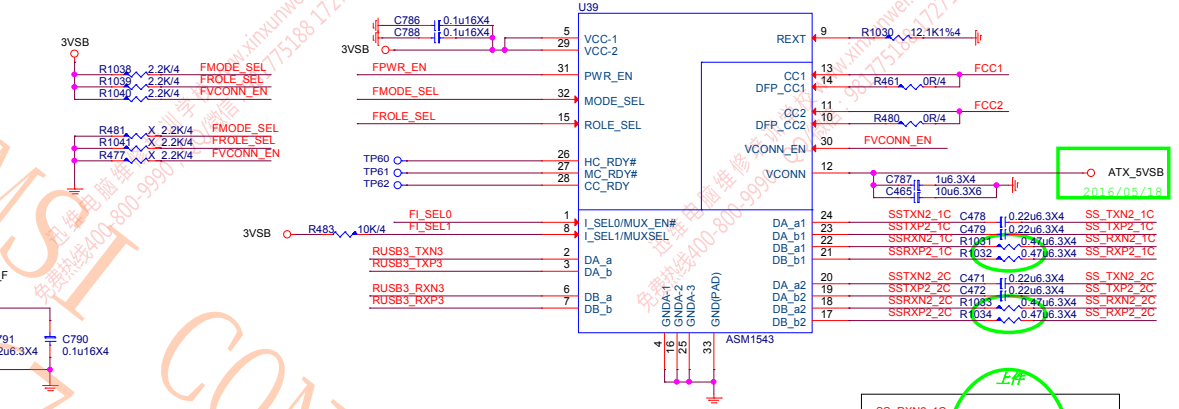
MSI CONFIDENTIAL
RMA下线专用
(C)2018061201 00068760
迅维电脑维修培训学校 www.xinxunwei.com 981775188 1727176051

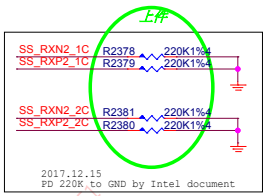
USB3.1 Gen2 Re-Timer

USB Type-C MUX with Configuration Channel (CC)



USB 3.1-Type-C

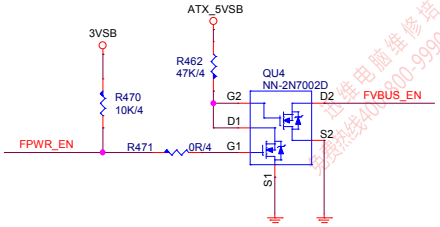




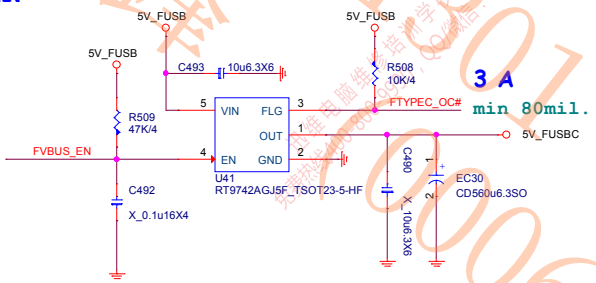
ASM1562 USB3.1 re-timer

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

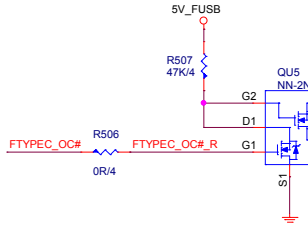
VCOM OC#



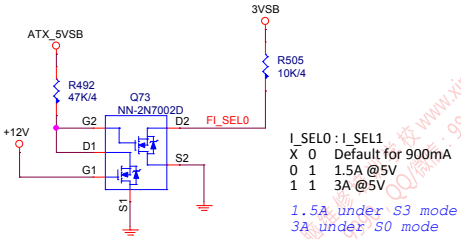
VBUS EN

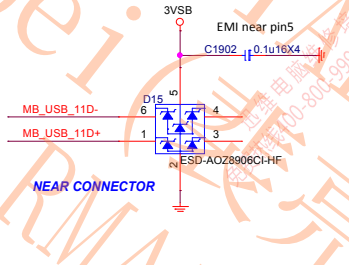


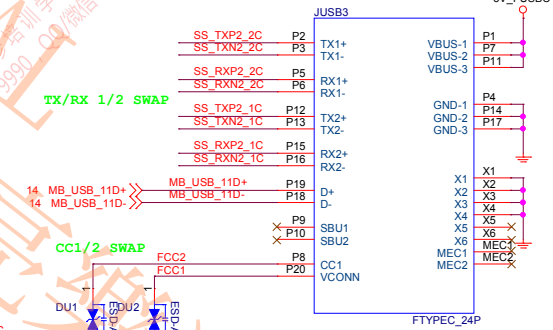
VBUS OC# LEVEL SHIFT

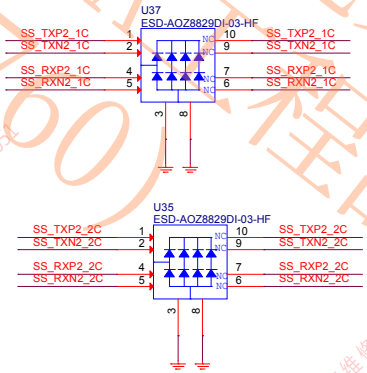


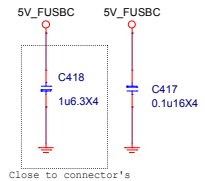
Current Mode







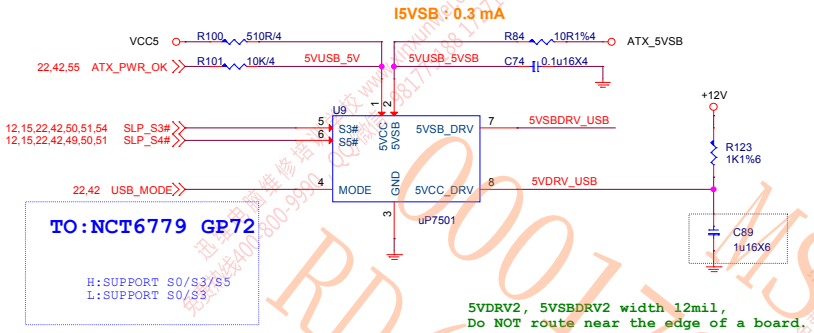




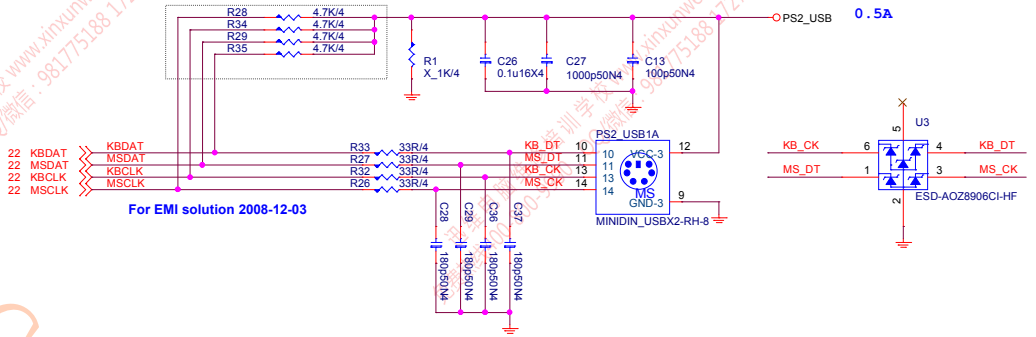
MICRO-STAR INT'L CO.,LTD	
MS-7B23	
Size: Custom	Document Description: Front Type-C & Re-driver
Rev: 1.2	
Date: Tuesday, April 10, 2018	Sheet 37 of 63

MSI CONFIDENTIAL
RMA程序
RD(C)2018061301
0017987
0000680

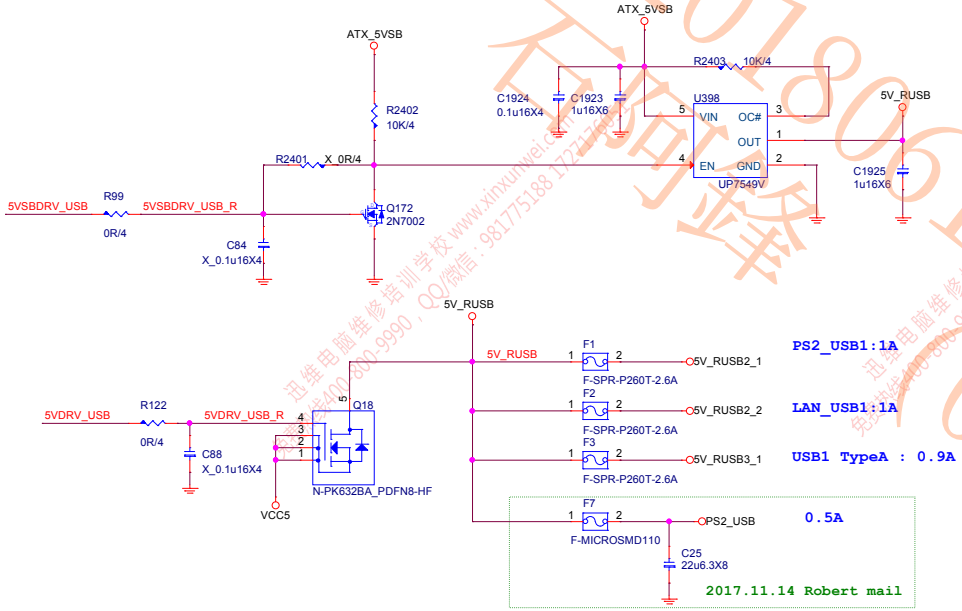
USB POWER



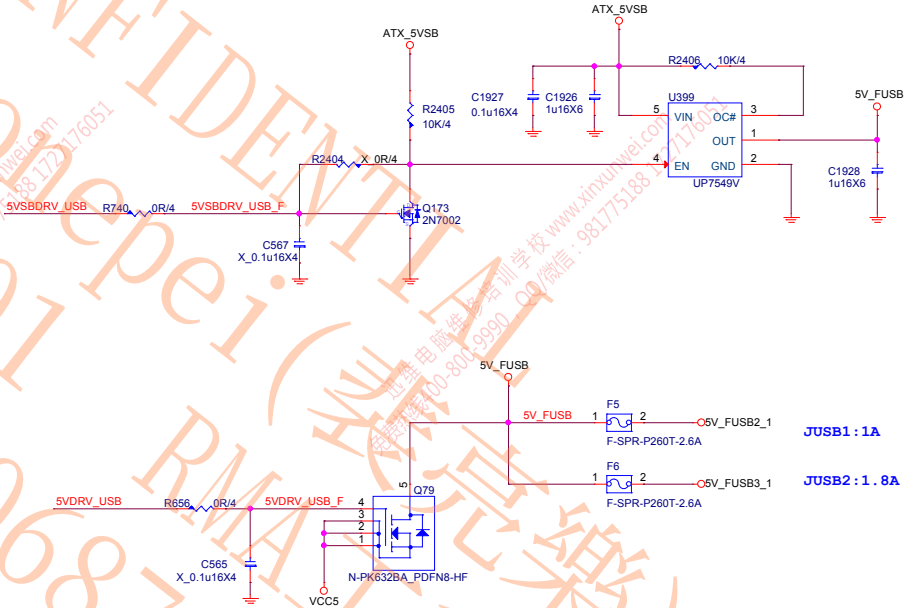
PS2 KEYBOARD & MOUSE CONNECTOR



REAR USB PORT POWER



FRONT USB PORT POWER

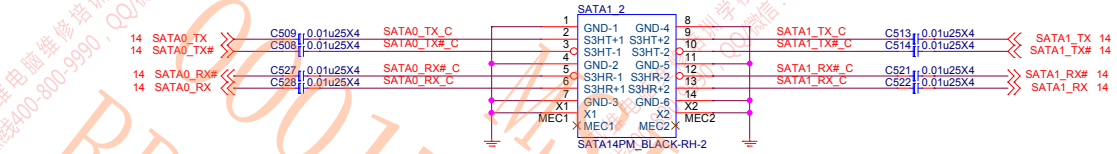


0017967 MSI CONFIDENTIAL Jonepei(致宏樂) RD(C)20180612 01 0006876(0) RMA工程課 下班前交

MICRO-STAR INT'L CO.,LTD		
MS-7B23		
Size: Custom	Document Description: USB Power	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 38 of 63	

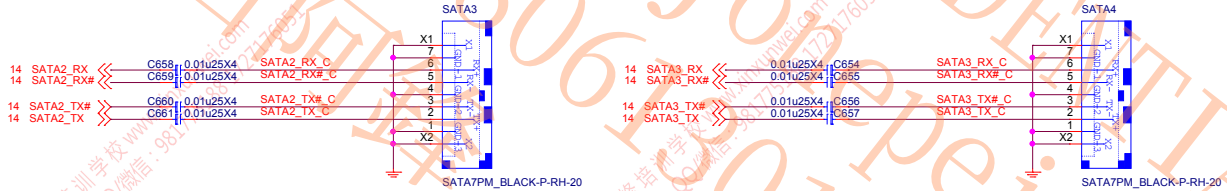
SATA PORT 0,1

Black 90 degree



SATA PORT 2,3

Black 180 degree

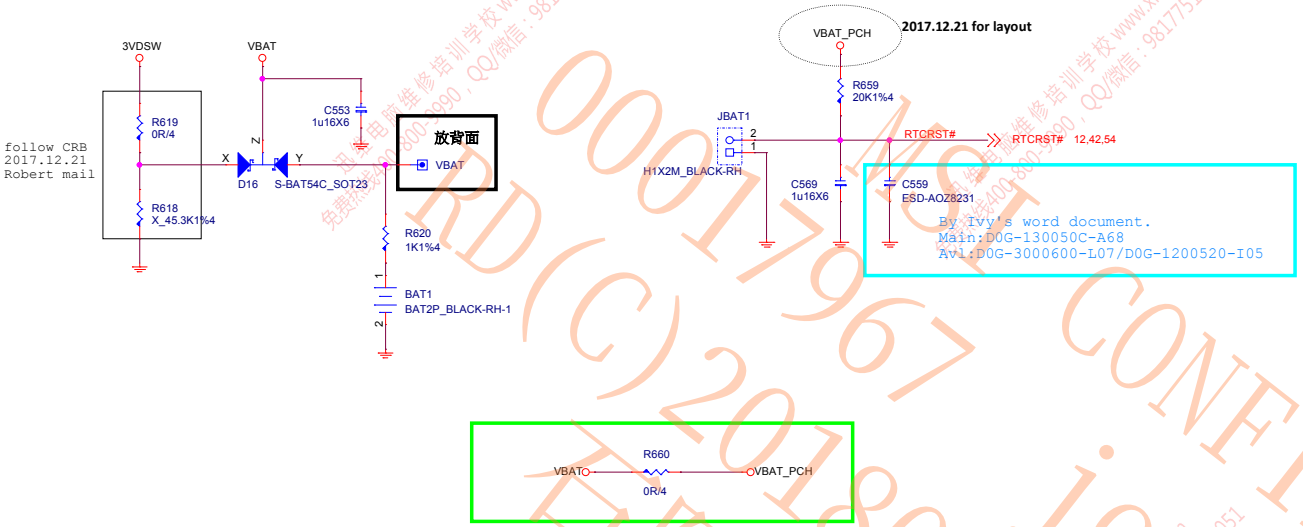


MICRO-STAR INT'L CO.,LTD		
MS-7B23		
Size: Custom	Document Description: SATA connector	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 39 of 63	

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
00017967 MSI CONFIDENTIAL
RD(C)20180601 Jonpei（装完集）
石阿强（00068760） RMA工程课

VBAT

Cut VBAT



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

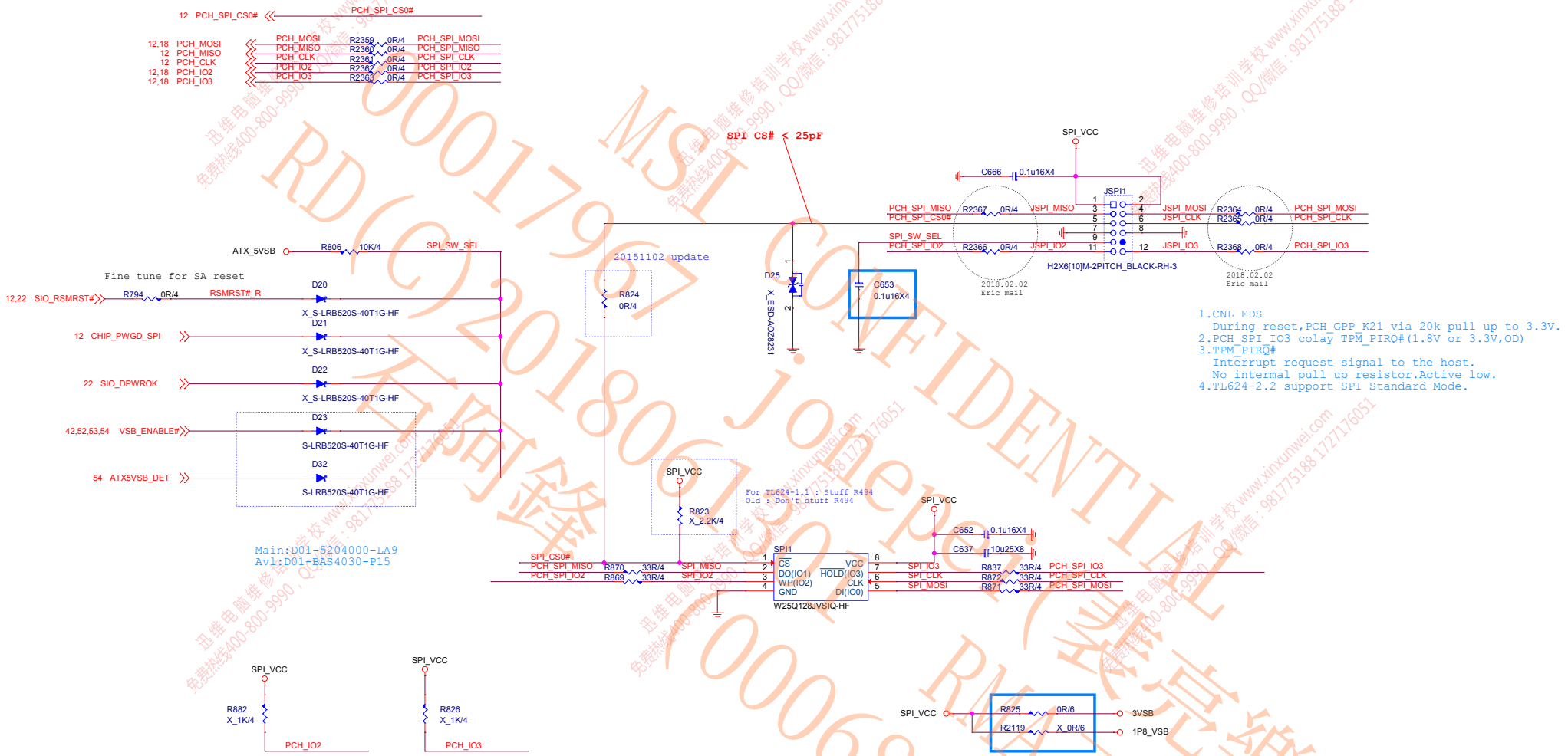
Default

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

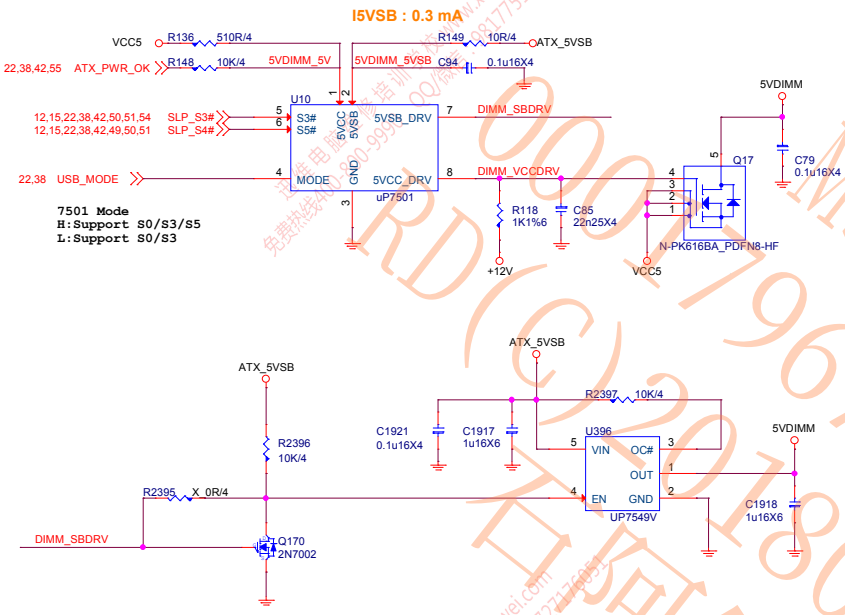
MICRO-STAR INT'L CO.,LTD		
MS-7B23		
Size: Custom	Document Description: CUT VBAT circuit	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 40 of 63	

MSI CONFIDENTIAL
jonepei(绝密)
RD(C)20180201
RMA(000768760)
石阿锋
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

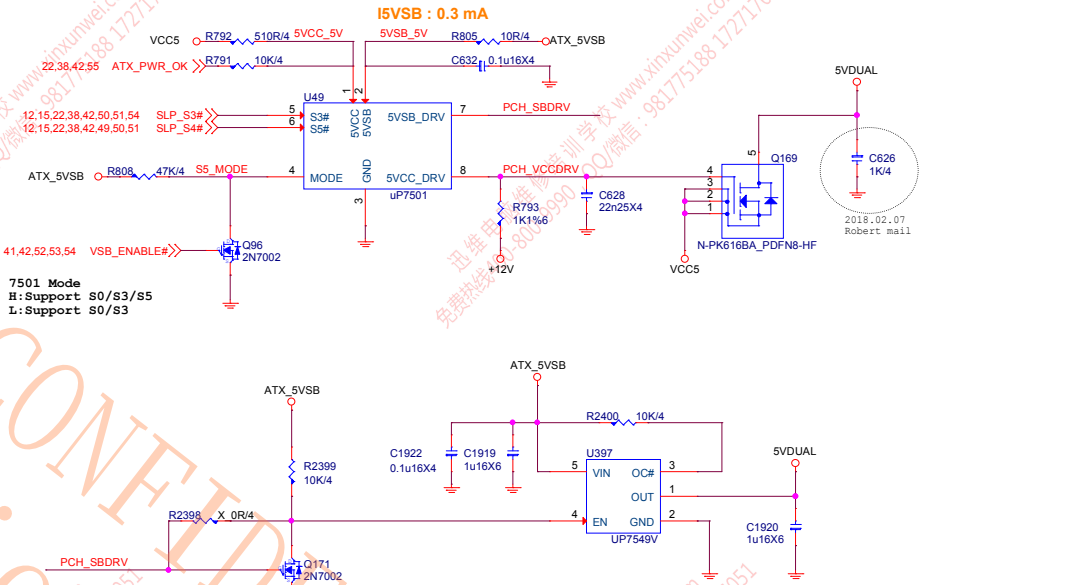


迅维电脑维修培训学校 www.xinxunwei.com 免费热线400-800-9990，QQ/微信：981775188 1727176051
MSI CONFIDENTIAL Jonepei（绝密）
RD(C)20180612001（00068760）
RMA工程课

5VDIMM FOR DDR

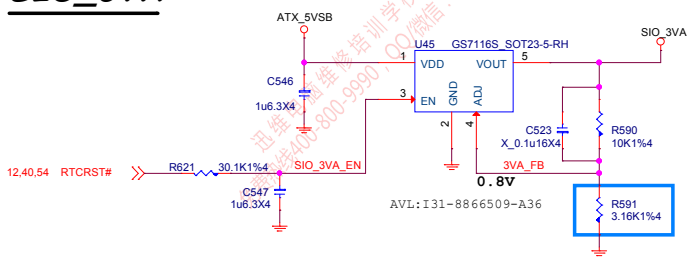


5VDUAL

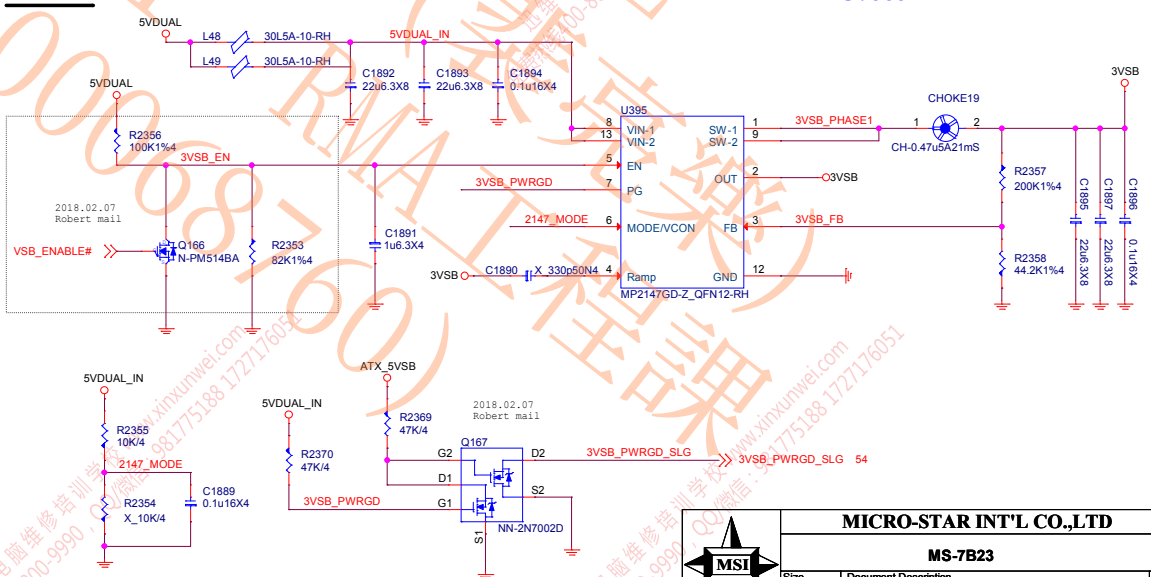


For power 700W solution (only for uP7501+uP7506 for 3VSB solution)
The power supply VCC3 delay 12ms after VCC5 assert.
The chip U7501 5VDRV1 work when the VCC5 ready
(When VCC5 up to 4.2V and the 5VDRV1 delay 6ms assert), but
VCC3 not ready and let the 3VSB sequence fail.

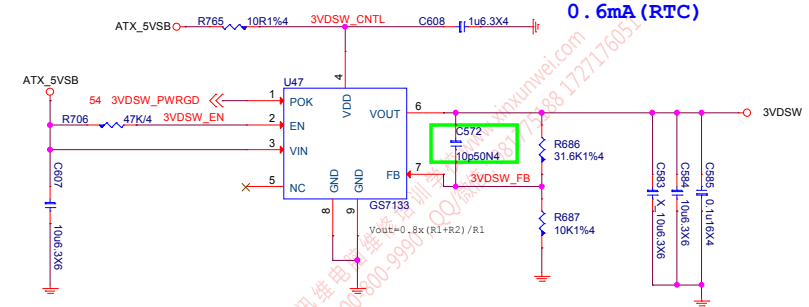
SIO_3VA



3VSB



3VDSW



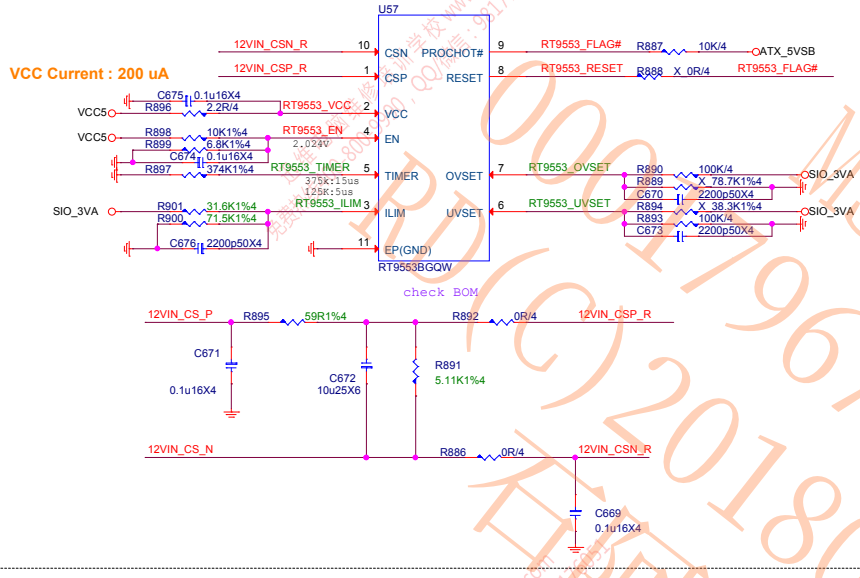
MSI CONFIDENTIAL
RD(C)2018061201
RMA工程保留
00068760
00071967
jonepei(张培)
小阿锋

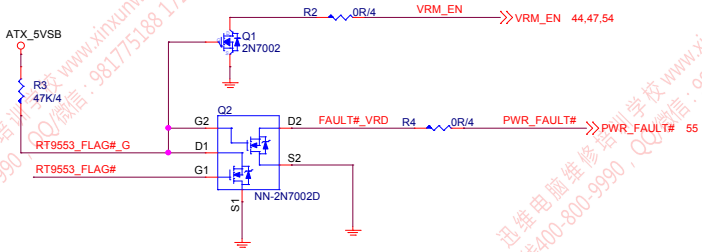
MICRO-STAR INT'L CO.,LTD

MS-7B23

Size	Document Description	Rev
Custom	ACPI CONTROLLER	1.2

Date: Tuesday, April 10, 2018 Sheet 42 of 63

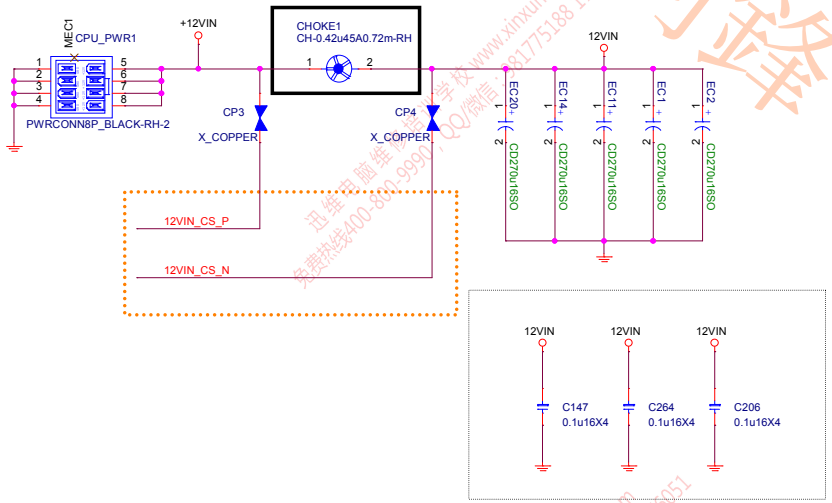




OCP:30A
Real OCP:30.05A
R17+R18>100k Vsio_3va= 3.38V Rdcr= 0.5 mohm

I3933_imon*[R17*R18/(R17+R18)]= Istep* Rdcr*100
I3933_imon= 10uA/step
Istep=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	

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

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

How many pcs. Of Cap.			
I ripple(cap)	=	5000	m A
COE TEMP	=	1	
Input Cap.	=	2	pcs.

CORE:
D = Vout/Vin
= 1.52/12
= 0.126667
N = 4
Irms = Iout * [D/N - (D)^2]^(1/2)
= 138* (0.031667 - 0.016044)^(1/2)
= 17.2489A

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

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

I ripple={ Io*√D*√(1-D)} / Phase			
Phase	=	2	phase
I ripple	=	5.986785	A

How many pcs. Of Cap.			
I ripple(cap)	=	5000	m A
COE TEMP	=	1	
Input Cap.	=	2	pcs.

GT:
D = Vout/Vin
= 1.52/12
= 0.126667
N = 2
Irms = Iout * [D/N - (D)^2]^(1/2)
= 45* (0.063333 - 0.016044)^(1/2)
= 9.7857A

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

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

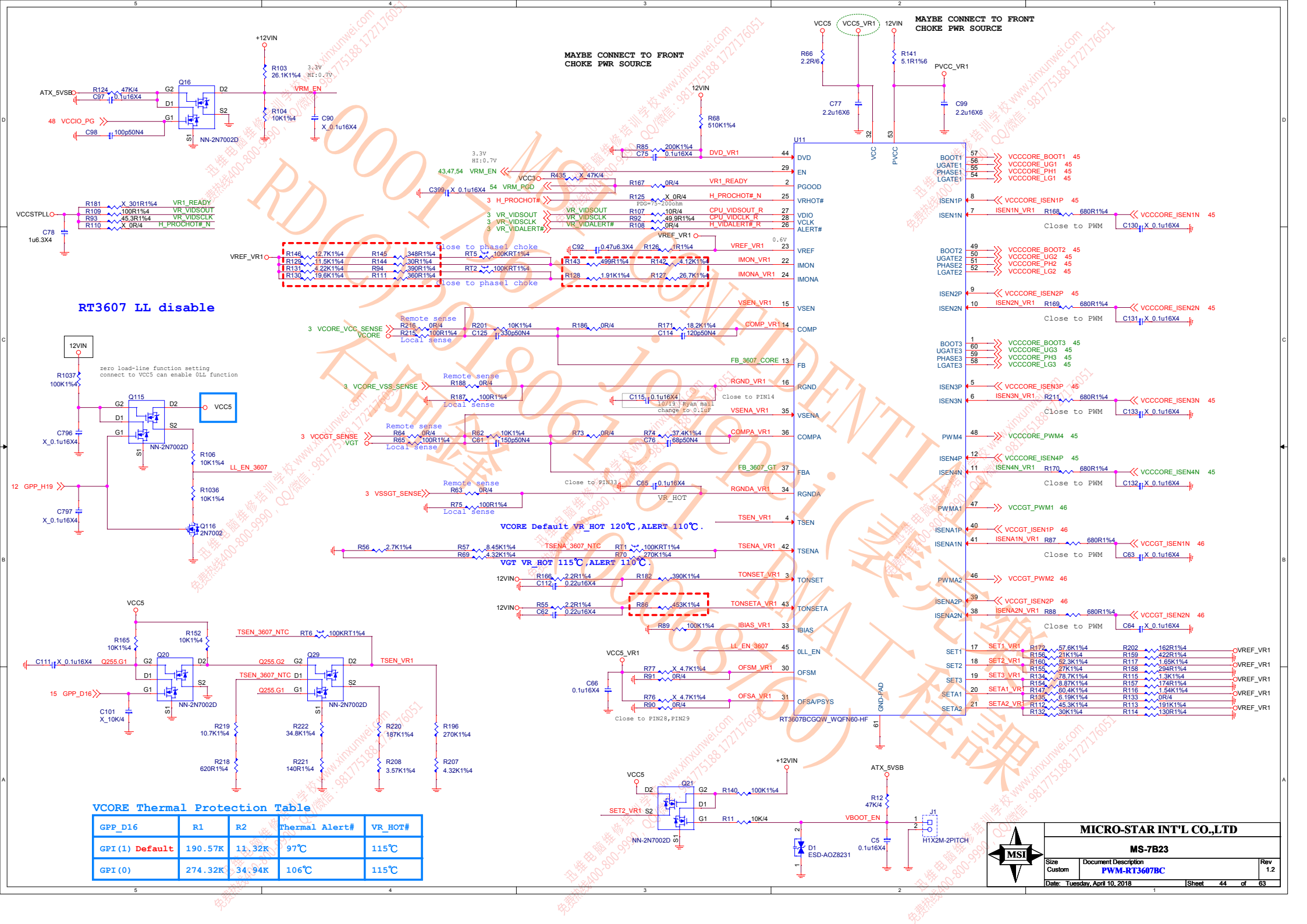
I ripple={ Io*√D*√(1-D)} / Phase			
Phase	=	1	phase
I ripple	=	1.382393	A

How many pcs. Of Cap.			
I ripple(cap)	=	5000	m A
COE TEMP	=	1	
Input Cap.	=	1	pcs.

VCCIO:
D = Vout/Vin
= 0.95/12
= 0.079167
N = 1
Irms = Iout * [D/N - (D)^2]^(1/2)
= 6.4* (0.079167 - 0.006267)^(1/2)
= 1.728A

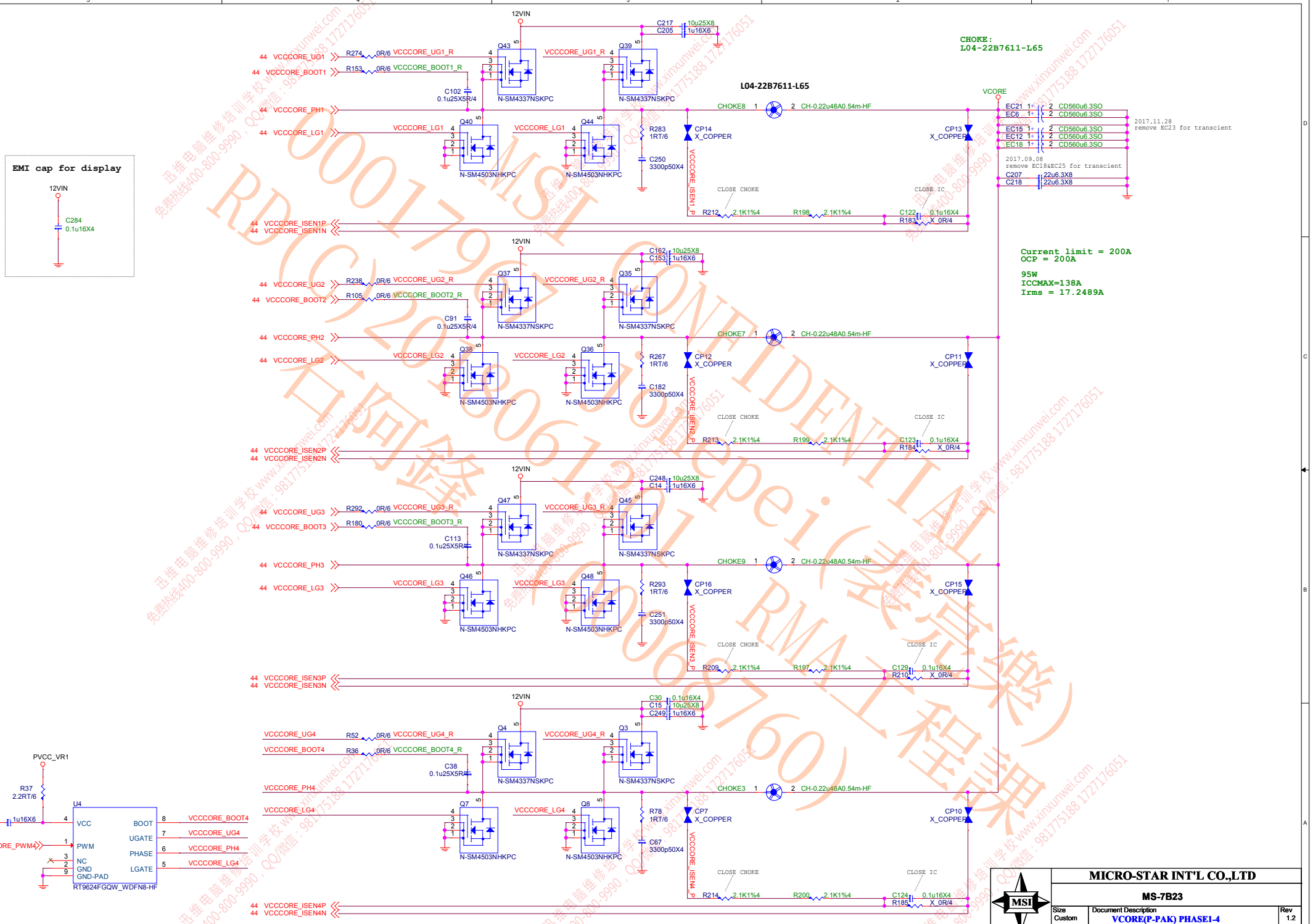
MICRO-STAR INT'L CO.,LTD		
MS-7B23		
Size: Custom	Document Description: 12VIN/CURRENT SENSE-RT9553	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 43 of 63	

MSI 0002967 RD(C)20180612 Jonepc(徐代锋) CONFIDENTIAL 程式碼 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



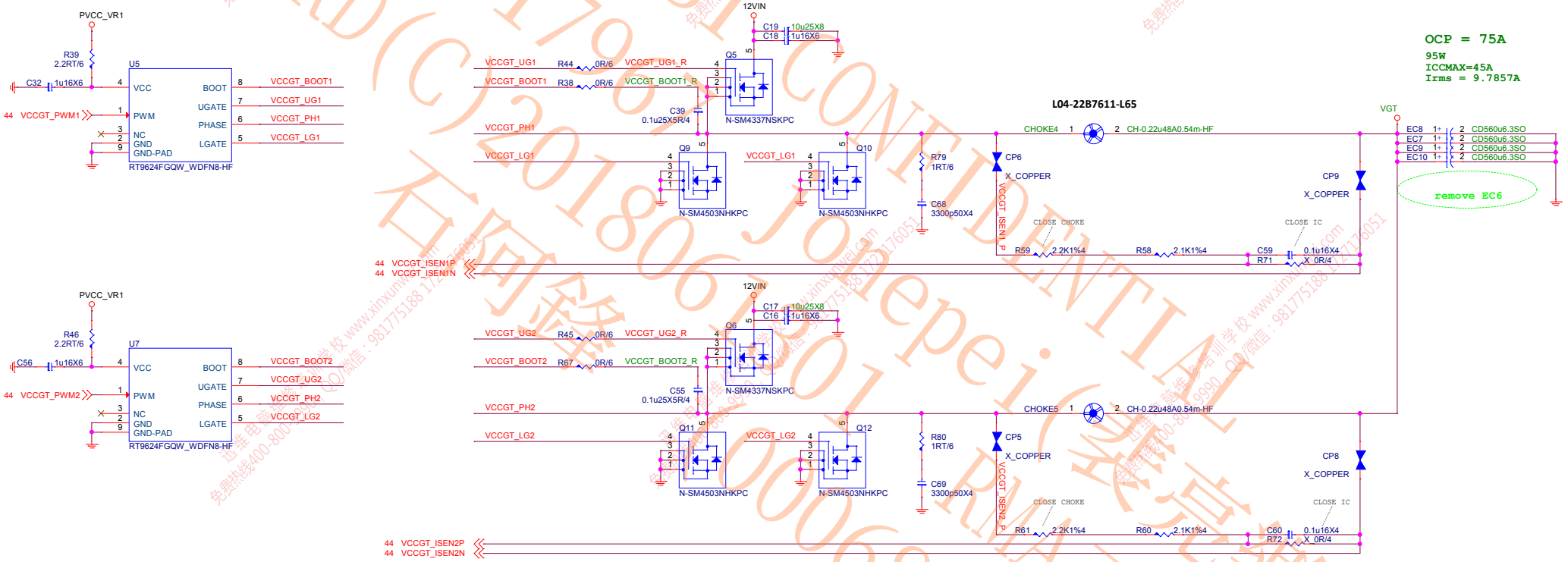
VCORE Thermal Protection Table

GPP_D16	R1	R2	Thermal Alert#	VR_HOT#
GPI(1) Default	190.57K	11.32K	97℃	115℃
GPI(0)	274.32K	34.94K	106℃	115℃



0001796 CONFIDENTIAL
RD(C)2018061201 Chiepei(技宸樂)
RMA工程樂
(0006760)
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

MICRO-STAR INT'L CO.,LTD	
MS-7B23	
Size: Custom	Document Description: VCORE(P-PAK) PHASE1-4
Rev: 1.2	
Date: Tuesday, April 10, 2018	Sheet 45 of 63



MICRO-STAR INT'L CO.,LTD		
MS-7B23		
Size: Custom	Document Description: VGT(P-PAK) PHASE1-2	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 46 of 63	

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
0001796 MSI CONFIDENTIAL 仁
RD(C)20180 Jonepei(复宏策)
石网络 00006760) RMA工程策

SA Power:1.05V,11.1A

OCP:16.65A

ICC : 1.25 mA

Rocset = 1.5 * Imax * Rdson(low) / Iocset
= 16.65* 3mohm / 10uA
= 14.28K

Rdson(low)10V

MOS : 5.1mohm

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

FB:0.8V

Vout = Vrefout * (1 + Rpull-up/Rpull-down)
= 0.8 * (1 + 1/3.16)
= 1.053v

Irms = Iout * SQRT((Vout/Vin) * (1 - (Vout/Vin)))
= 11.1 * (1.05/12 * (1 - 1.05/12))^(1/2)
= 3.136A

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

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

2018.01.31
change to SINOPOWER

snubber

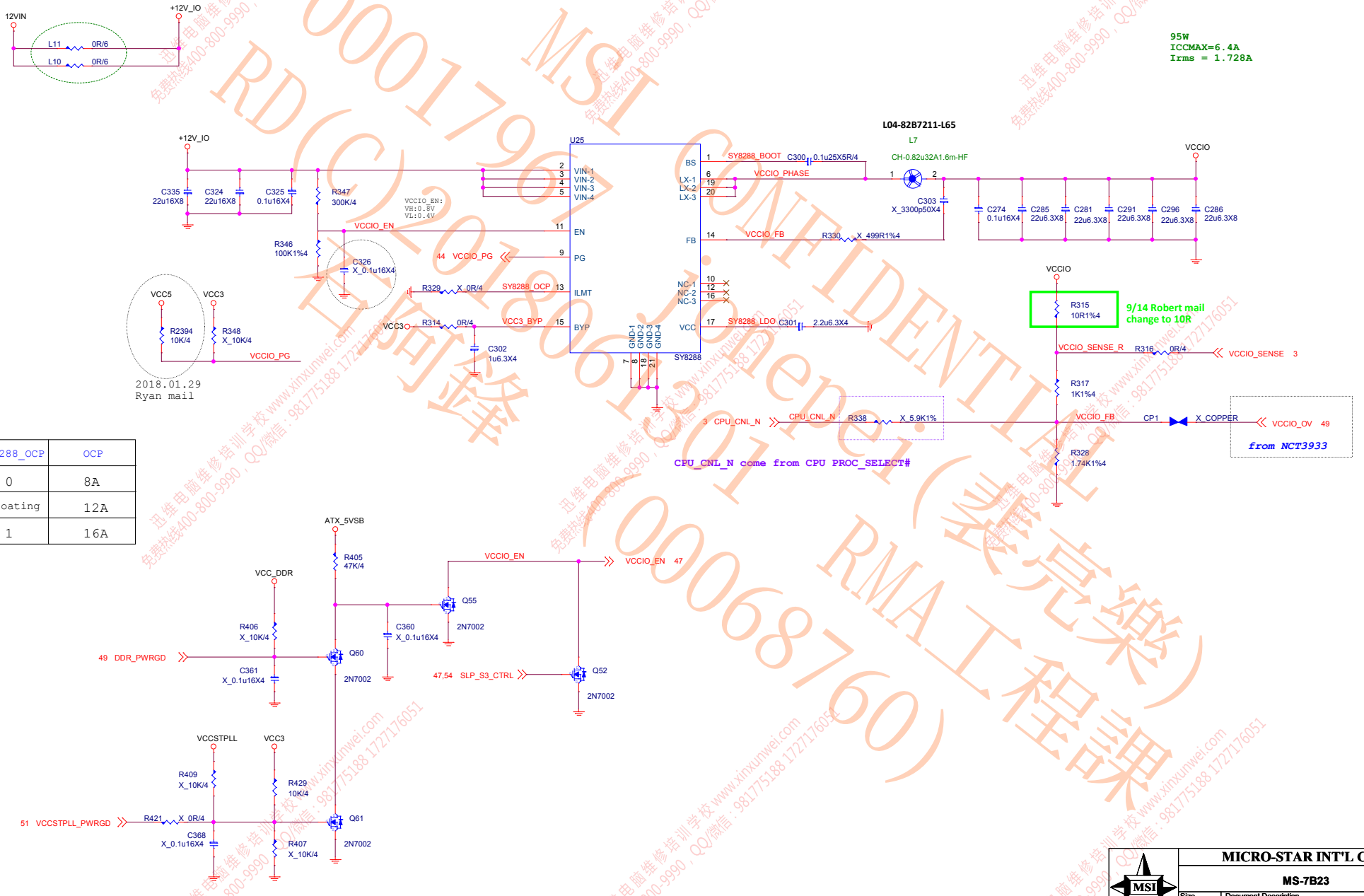
close to L12

MSI CONFIDENTIAL
joepei(裴完燊)
0061967
RD(C)20180612001
石阿锋(00060760)
RMA工程课

MICRO-STAR INT'L CO.,LTD	
MS-7B23	
Size: Custom	Document Description: VCCSA - POWER RT8125E
Rev: 1.2	
Date: Tuesday, April 10, 2018	Sheet 47 of 63

IO Power:0.95V,6.4A

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



SY8288_OCP	OCP
0	8A
floating	12A
1	16A

MICRO-STAR INT'L CO.,LTD

MS-7B23

Size: Custom | Document Description: VCCIO - SY8288 | Rev: 1.2

Date: Tuesday, April 10, 2018 | Sheet 48 of 63

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
MSI CONFIDENTIAL Joneper（装完集） RD(C)2018061501 RMA工程课 00017967 00068760

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

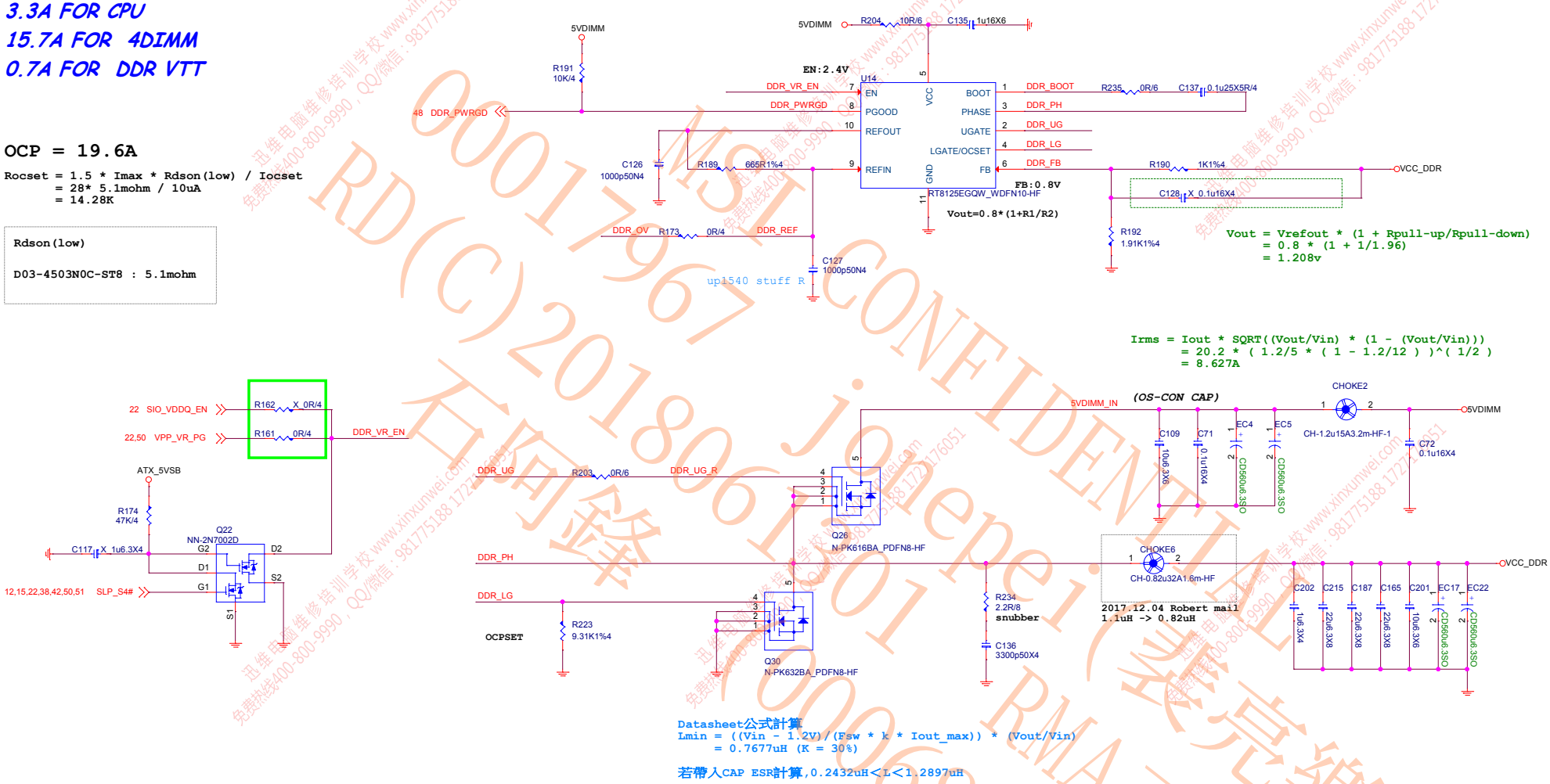
3.3A FOR CPU
15.7A FOR 4DIMM
0.7A FOR DDR VTT

OCP = 19.6A

```
Rocset = 1.5 * Imax * Rdson(low) / Iocset
       = 28* 5.1mohm / 10uA
       = 14.28K
```

Rdson(low)

D03-4503N0C-ST8 : 5.1mohm

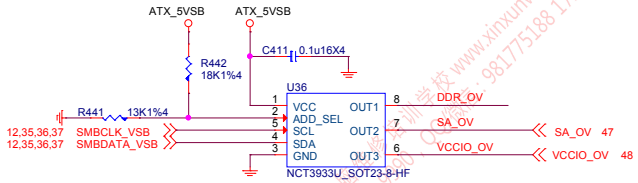


Datasheet公式計算
Lmin = ((Vin - 1.2V)/(Fsw * k * Iout_max)) * (Vout/Vin)
= 0.7677uH (K = 30%)

若帶入CAP ESR計算,0.2432uH＜L＜1.2897uH

UPI VOLTAGE CONSOLE

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



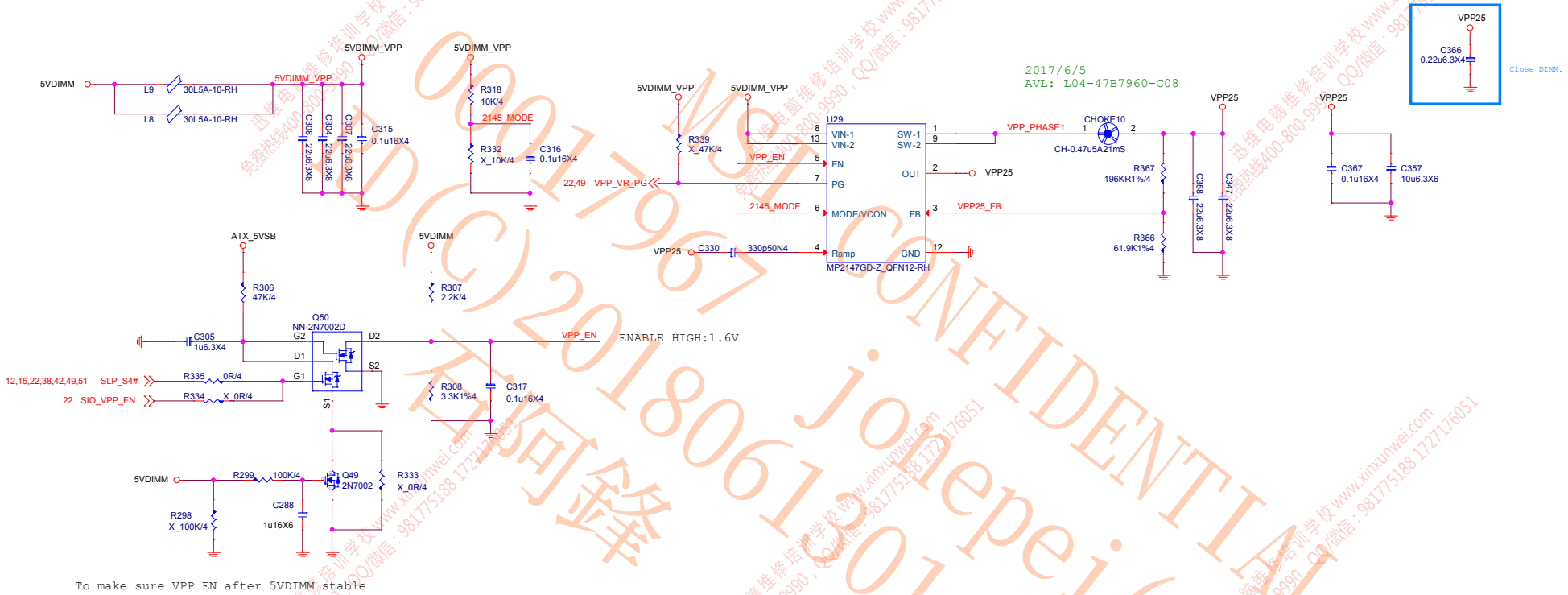
MICRO-STAR INT'L CO.,LTD		
MS-7B23		
Size: Custom	Document Description: DDR - RT8125E	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 49 of 63	

MSI CONFIDENTIAL
00017967 jonepei(樊完荣) RD(C)20180601 00068760) 石阿锋 RMA工程课
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

4DIMM :2.24A FOR
DDR VPP2.5V

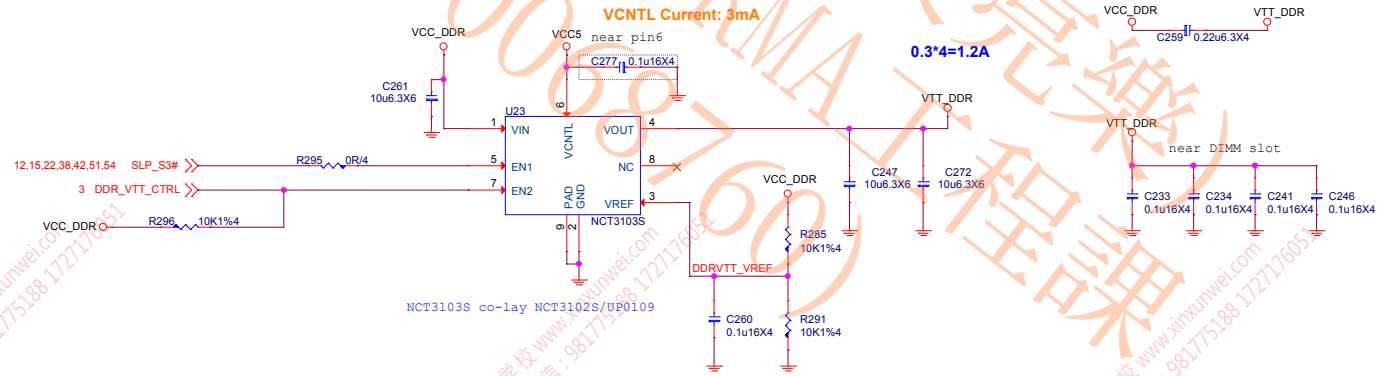
VPP25 Power

2.5V; 2.24A



DDR VTT Power

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



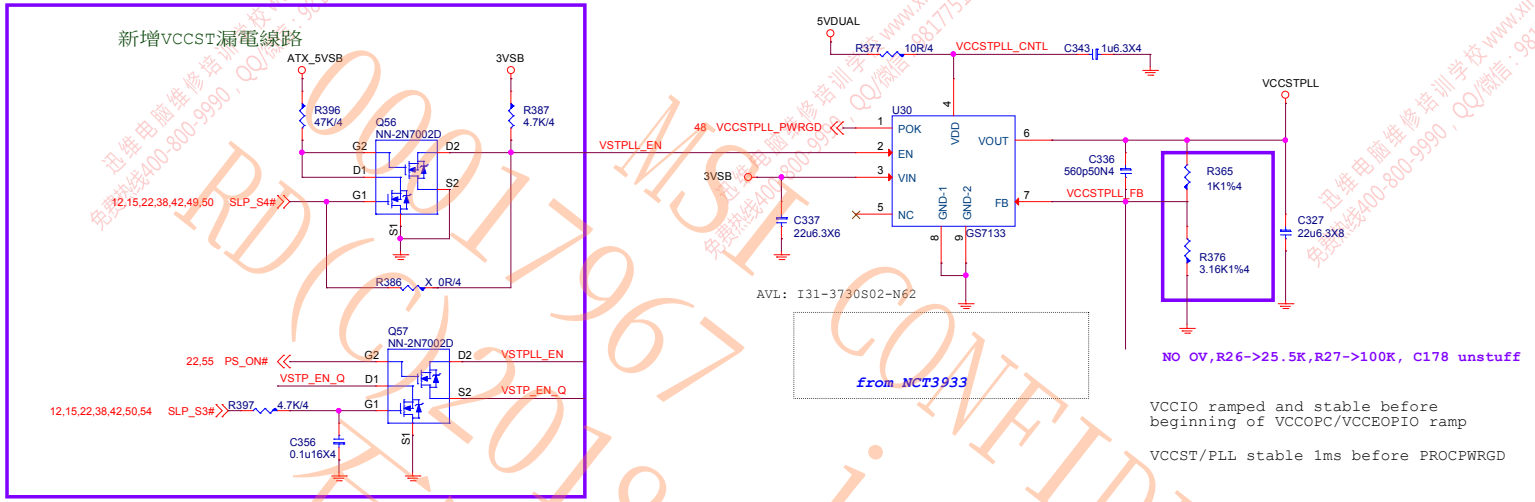
MICRO-STAR INT'L CO.,LTD		
MS-7B23		
Size: Custom	Document Description: VPP-2147 / VTT-3103	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 50 of 63	

MSI CONFIDENTIAL
jonepei(致宏维)
RMA(0006760)
00017967
DD(C)20180612O1

VCCSTPLL

1.05V; 230mA

For Cost down VCCST&VCCPLL merge



VCCPLL_OC

1.2V; 130mA

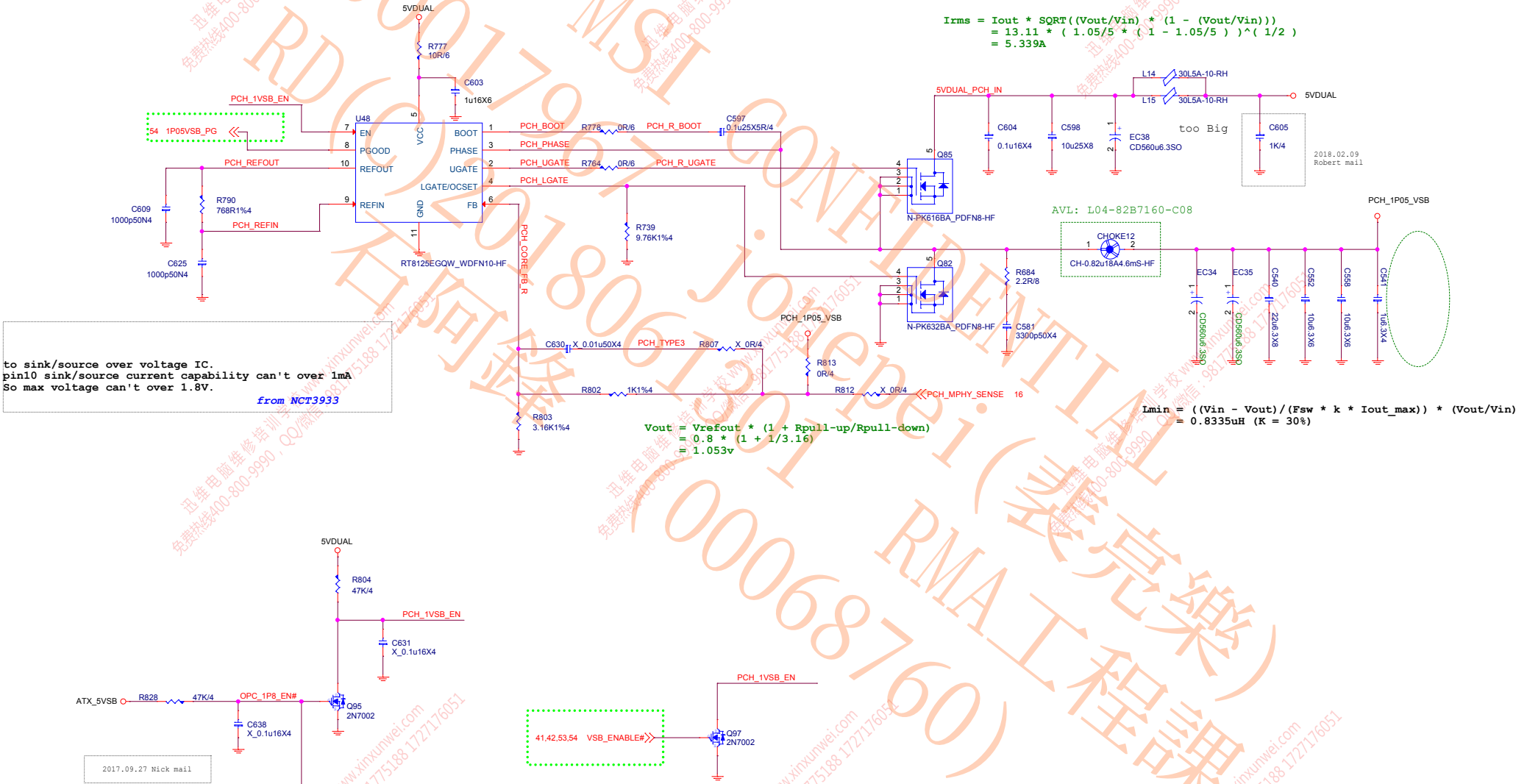
MICRO-STAR INT'L CO.,LTD		
MS-7B23		
Size: Custom	Document Description: CPU PWR_ST/PLL_OC	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 51 of 63	

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
00017967 MSI CONFIDENTIAL
RD(C)20180612 01 jonepei(裝完樂)
石阿鋒 (00068760) RMA工程課

PCH_1VSB

1.05V; 13.1A

OCP=Rocset x Iocset / Rlgds(on)
=9.76K x 10u / 3.3m
= 21.21A



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
00017967 MSI CONFIDENTIAL
RD(C)2018061201 Jonepei（装完樂）
石阿维（00068760）
RMA工程課

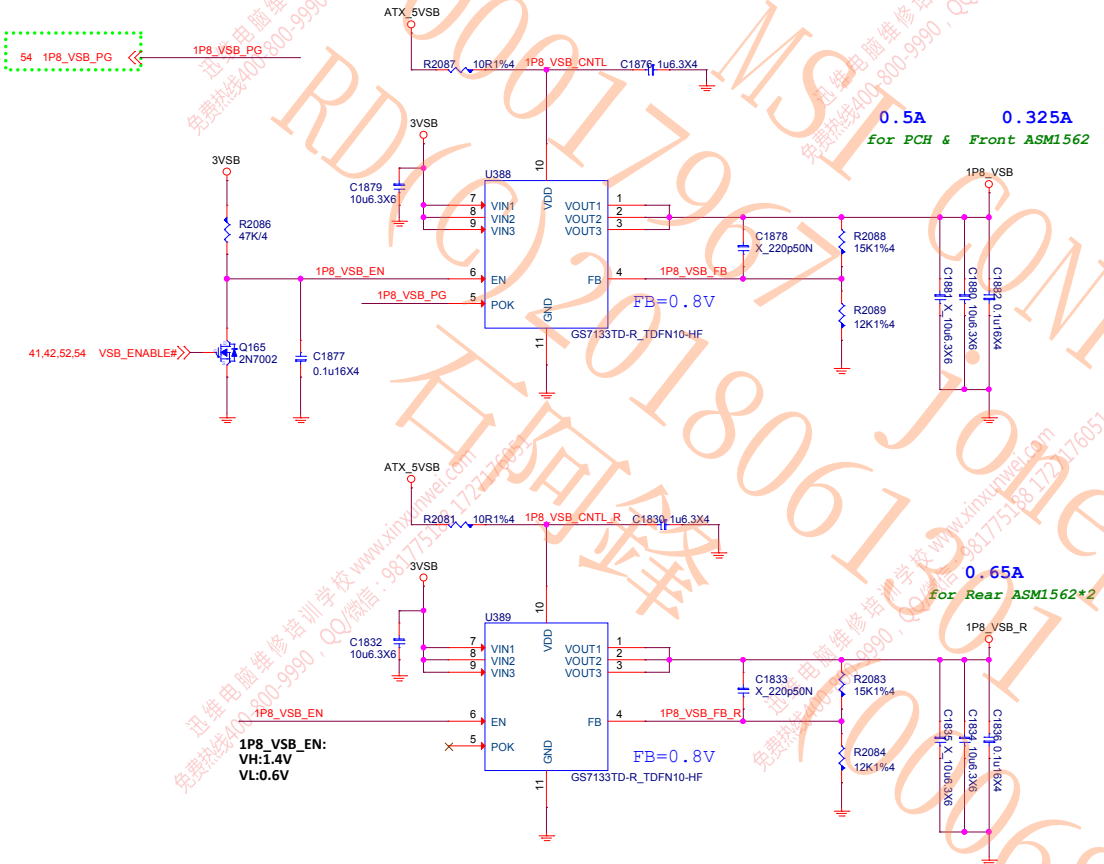
MICRO-STAR INT'L CO.,LTD		
MS-7B23		
Size: Custom	Document Description: PCH Core power	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 52 of 63	

1P8_VSB

1.8V; 500mA

Current Limit: 3.8A

2017.12.07
GS7133 down size to I31-S71330C-N03.



The power consumption with Internal LDO

item	Power state	VCCA 1.8V (mA)	Total power (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 1.8V (mA)	VDD 1.2V (mA)	Total power (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

MSI CONFIDENTIAL
RD(6)-20180612-1
RMA工程課

MICRO-STAR INT'L CO.,LTD

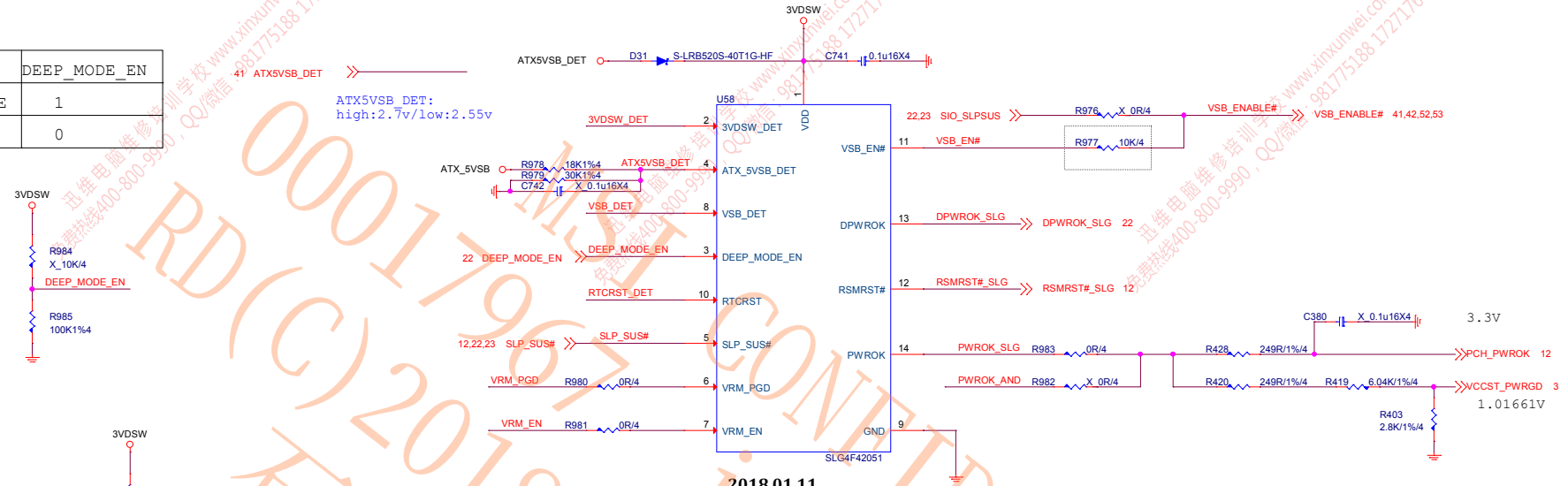
MS-7B23

Size	Document Description	Rev
Custom	PCH 1P8V	1.2

Date: Tuesday, April 10, 2018 Sheet 53 of 63

Sequence

	DEEP_MODE_EN
DEEP_MODE	1
S5_MODE	0

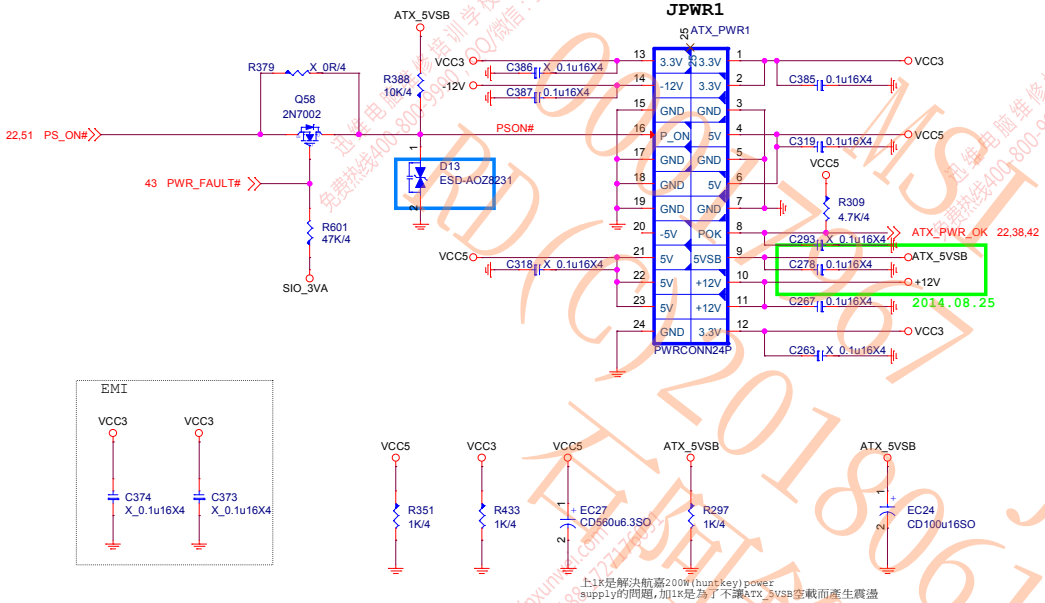


迅维电脑维修培训学校 www.xinxunwei.com 免费热线400-800-9990，QQ/微信：981775188 1727176051
0001796 CONFIDENTIAL Jonepei(发完为止)
RD(C)20180612 01 (00068760)
石阿锋 RMA工程部

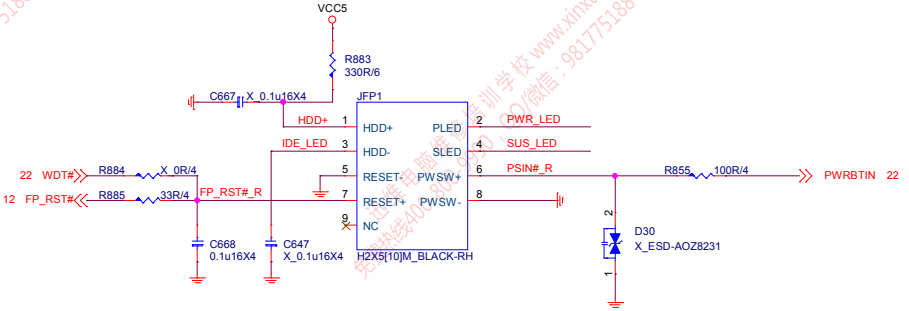
MICRO-STAR INT'L CO.,LTD		
MS-7B23		
Size: Custom	Document Description: CPU PWR-VRM-Seqence	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 54 of 63	

ATX POWER CONNECTOR

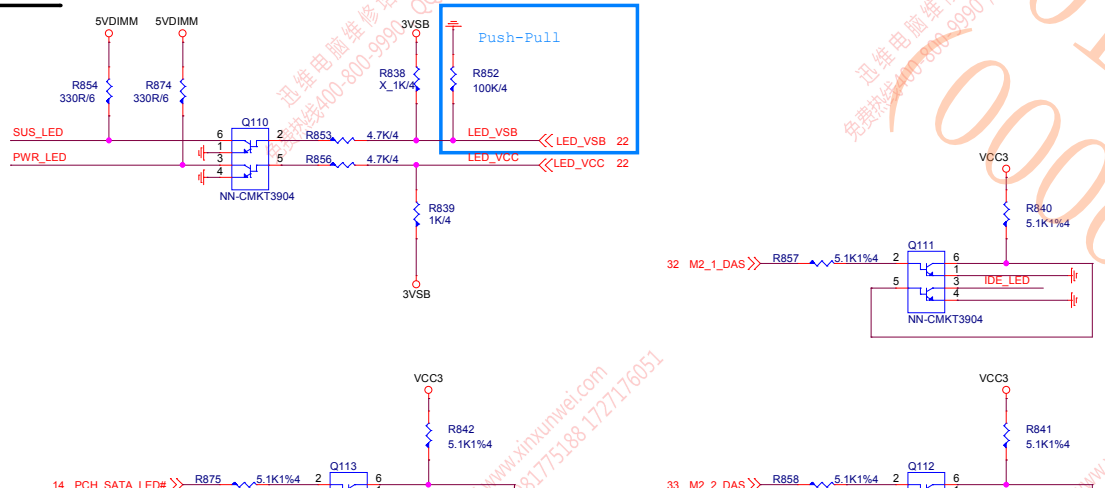
D26:By Ivy's word document.
Main:D0G-1300500-A68
Avl:D0G-3000600-L07/D0G-1200520-I05



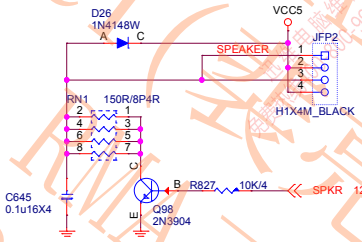
FRONT PANNEL



LED

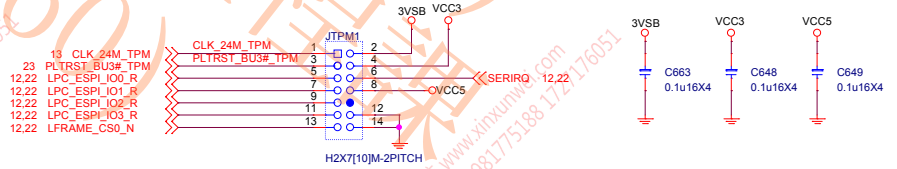


Speaker Pin Header



TPM

Don't colay espi debug.



MICRO-STAR INT'L CO.,LTD

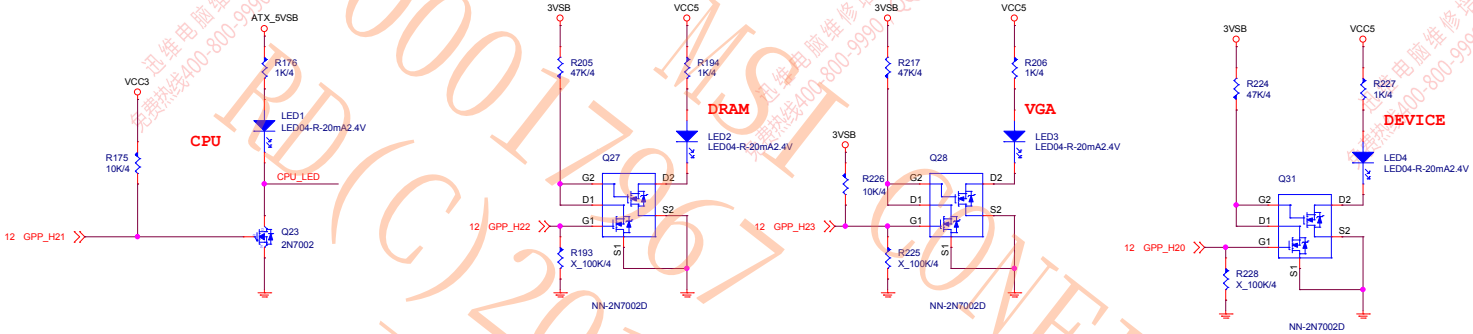
MS-7B23

Size	Document Description	Rev
Custom	ATX F_Panel/TPM/MSI_LED	1.2

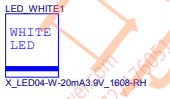
Date: Tuesday, April 10, 2018 Sheet 55 of 63

MSI CONFIDENTIAL
Jonepe(设计)
RD(C)2018061201 00068760 研发中心
仅供参考
迅维电脑维修培训学校 www.xinxunwei.com QQ/微信：981775188 1727176051 免费热线400-800-9990

DEBUG LED



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



2018.01.12
PCB2.1 default white LED

WHITE
PN:D0C-040T200-H91
AVL:D0C-040S200-E07

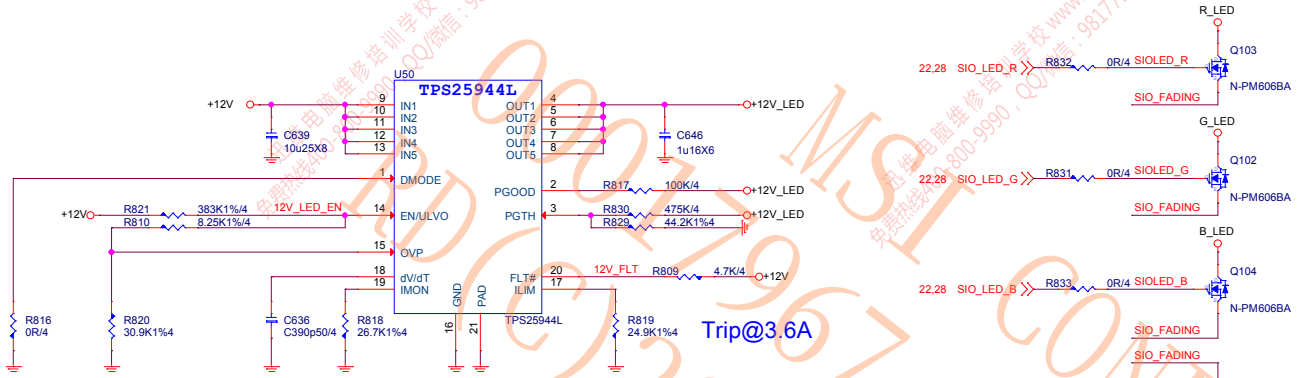
GPIO / LED	PCH_GP20	PCH_GP21	PCH_GP22	PCH_GP23
亮	NATIVE PULL HIGH	GPO PULL HIGH	GPO PULL HIGH	NATIVE PULL HIGH
滅	NATIVE LOW	GPO LOW (default LOW)	GPO LOW (default LOW)	GPO LOW (default LOW)

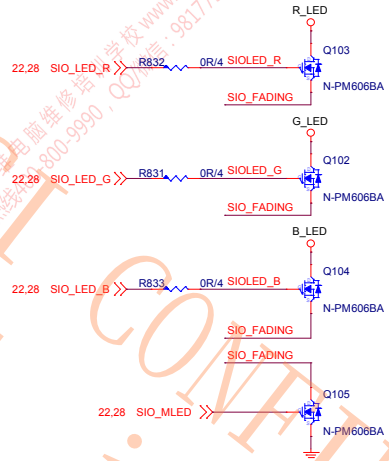
開機斷電狀態下，3個LED先維持default全暗，開機通電後：
1. 首先進行CPU checkCPU LED 亮，check PASS後則CPU LED滅掉。
2. 接著依序進行Memory /memory LED亮check PASS後則memory LED滅掉。
3. VGA的check/VGA LED亮，check PASS後則VGA LED滅掉。
4. 因此最後正常順利開機後，三個LED燈都是滅掉的。（系統重啟或其他原因造成系統重開機，則LED仍按上述行為動作）

MSI CONFIDENTIAL
RD(C)20180621001
RMA工程課
0001796 7
Jonpei(装完樂)
(00068760)
石阿鋒
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

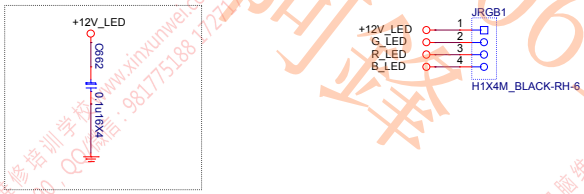
MICRO-STAR INT'L CO.,LTD		
MS-7B23		
Size: Custom	Document Description: ATX F_Panel/TPM/MSI_LED	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 56 of 63	

LED STRIPLINE

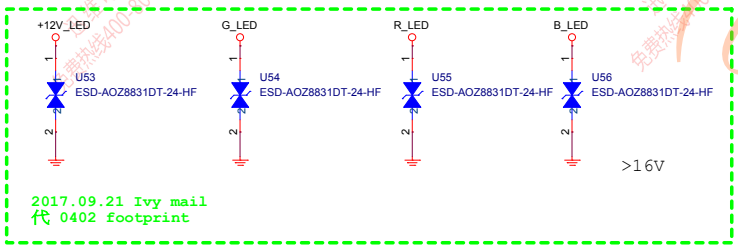




2016.08.02 Add +12V_LED 0.1uF



2016.07.06 only reserve now
2016.08.02 stuff ESD



MSI CONFIDENTIAL
Jonepei(装完繳)
RMA工程課
0017967
RD(C)20180612001
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

MICRO-STAR INT'L CO.,LTD

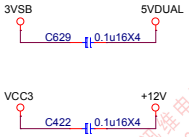
MS-7B23

Size	Document Description	Rev
Custom	LED STRIP	1.2

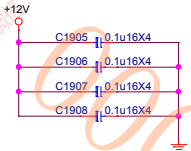
Date: Tuesday, April 10, 2018 Sheet 57 of 63

EMI CAP

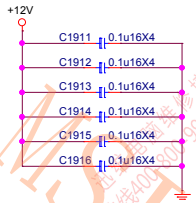
2017.10.13 moat cap



2017.12.21 SA_PH decouple cap



2018.02.02 SA_PH decouple cap



MSI CONFIDENTIAL
jonepei(装完燊)
RD(C)20180612 01
RMA工程課
石阿鋒(00068760)

MICRO-STAR INT'L CO.,LTD		
MS-7B23		
Size: Custom	Document Description: EMI	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 58 of 63	

Optical Fiducial Marks-120

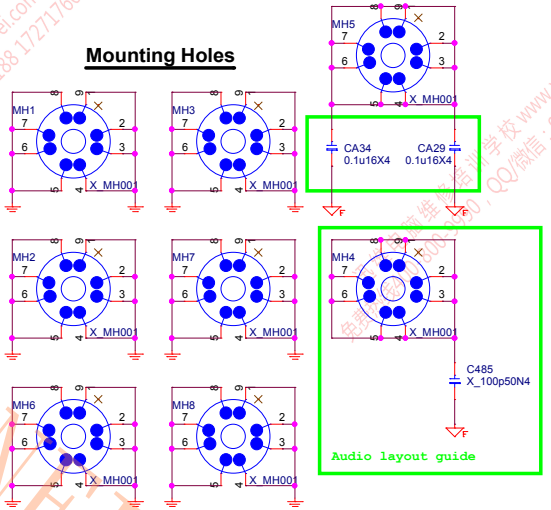
FM3 FM2 FM5 FM8
X_FM X_FM X_FM X_FM

FM1 FM4 FM6 FM7
X_FM X_FM X_FM X_FM

Simulation

SIM2 SIM1
SIM4 SIM3
X_PIN1*2 X_PIN1*2

Mounting Holes



VCC_DDR
VTT_DDR
5VDIMM
3VSB
3VDSW
PCH_1P05_VSB
PCH_1P8_VSB
VCORE
VGT
VCCSA
VCCSTPLL
VCCIO

BAT1_X1
BAT-BCR2032P-RH

CPU_H1
CPU
鐵座
CPU_H1

BIOS_LA1
AMI
AMI

HDMI_LA1
HDMI
VIRTUAL
HDMI LABEL

CFOS_LA1
CFOS
CFOS

DDR_COVER1
X4 X1
DDR COVER
X2
X5 X3
X_E21-7A63010-RH

CPU_PWR2
Silver
8 pin
X_PWRCONN8P_GRAY-RH

PCB1
7B23_12
PD0-07B2311-G37

Marketing Name

LA10
B360
MORTAR
MKT_0A

LA11
B360
MORTAR
ARCTIC
X_MKT_20

LA12
B360 MORTAR
ILYA MUROMETS
X_MKT_RU

HEATSINK

1.2

PCH_HS1
PCH
E31-0409500-A87

MOS_HS1
West
MOS
E31-0505490-A87

MOS_HS2
North
MOS
E31-0505500-A87

0001967 MSI CONFIDENTIAL jonepei(裝完樂)
RD(C)20180612 01 (2000068760)
石頭版 RMA工程課
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

MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7B23	
Size: Custom	Document Description: Manual Parts	Rev: 1.2
Date: Tuesday, April 10, 2018	Sheet 59 of 63	