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MS-7968 Ver: 3.1 ATX (243.84x304.8) mm

Intel Skylake Platform (Z170-XPOWER)

CPU:Socket H4

2015 Skylake LGA1151

Main Memory:

*Dual Channel DDR4 * 4 (Max 32G)*

Power Solution:

CPU : IR35201 +IIR3599 (10+4)
VCCSA : POWERVATION 3205Q (2PH)
VCCIO : MPS NB685
VCCST : GS7116
VCCPLL : GS7116
DDR : POWERVATION 3205Q (2PH)
PCH : UPI UP1540

ACPI:

3VDSW : GS7166
5VDUAL : UP7501
3VSB : MP2147

Onboard Chip:

Clock Gen : IDT6V41516
Clock Gen : IDT-VC3
SATA Express : ASM1061
USB3.1 Host : ASM1142A
LAN : Intel i219
HD Codec:ALC1150 + AMP
SIO:Nuvoton 6793D
*USB Charger : SLG55583A * 2*
*USB Redrive : ASM1464 * 4*
*HDMI:PTN3360D * 2*
HotKey:F75501
Flash BIOS:F75504
*GPIO : NCT5605 * 2*

Expansion Slots:

*PCI Express (X16) Slot * 3 (16/8+8/8+4+4)*
*PCI Express (X1) Slot * 3*
*PCI Express (X4) Slot * 1*
*M.2 Slot (Socket 3) * 2 (Share SATA)*

PCH:Z170 FCBGA837

Z170
SPI ROM: 128 MB + 128 MB

Rear I/O Connectors

PS2 + Dual USB2
Clear COMS
Reflash BIOS USB2
Dual USB3 + HDMI
RJ45 + Dual USB3
DP+HDMI
Dual USB3.1
Audio Jack 5 Port +SPDIF

Internal Connectors

*Dual SATA Express * 1*
*Dual SATA * 2*
*FUSB2 Header * 2*
*FUSB3 Header * 1*
*Front Audio Header * 1*
*Front Panel Header * 2*
*OC Dash Board * 1*
*SPI Header * 1*
*TPM Header * 1*
*CPU Fan * 2*
*System Fan * 3*
Vcheck points

Botton

Power
Reset
Gaming Boost

Switch

Dual BIOS

LED

Debug LED
HOTKEY

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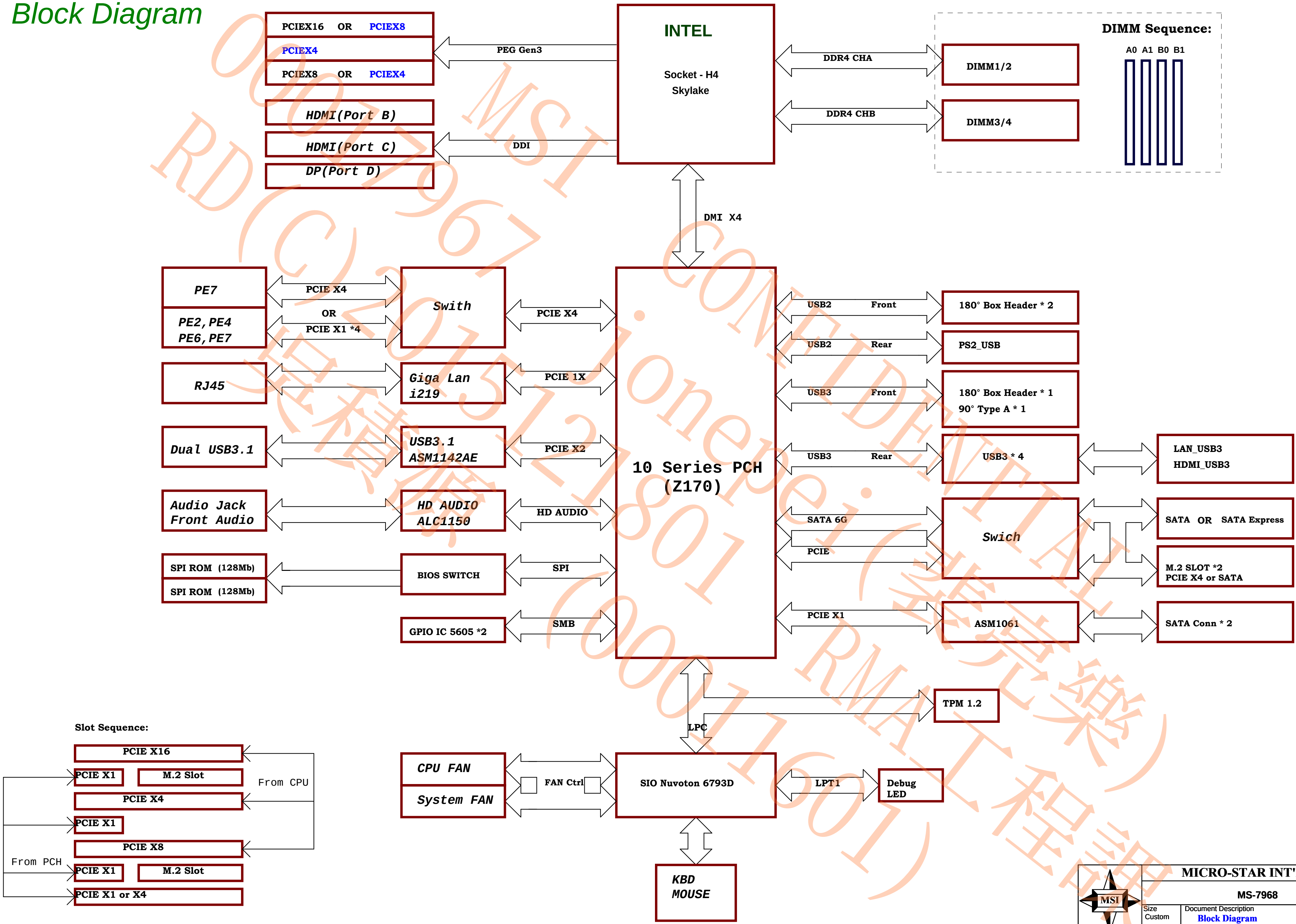
Block Diagram



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Size	Document Description	Rev
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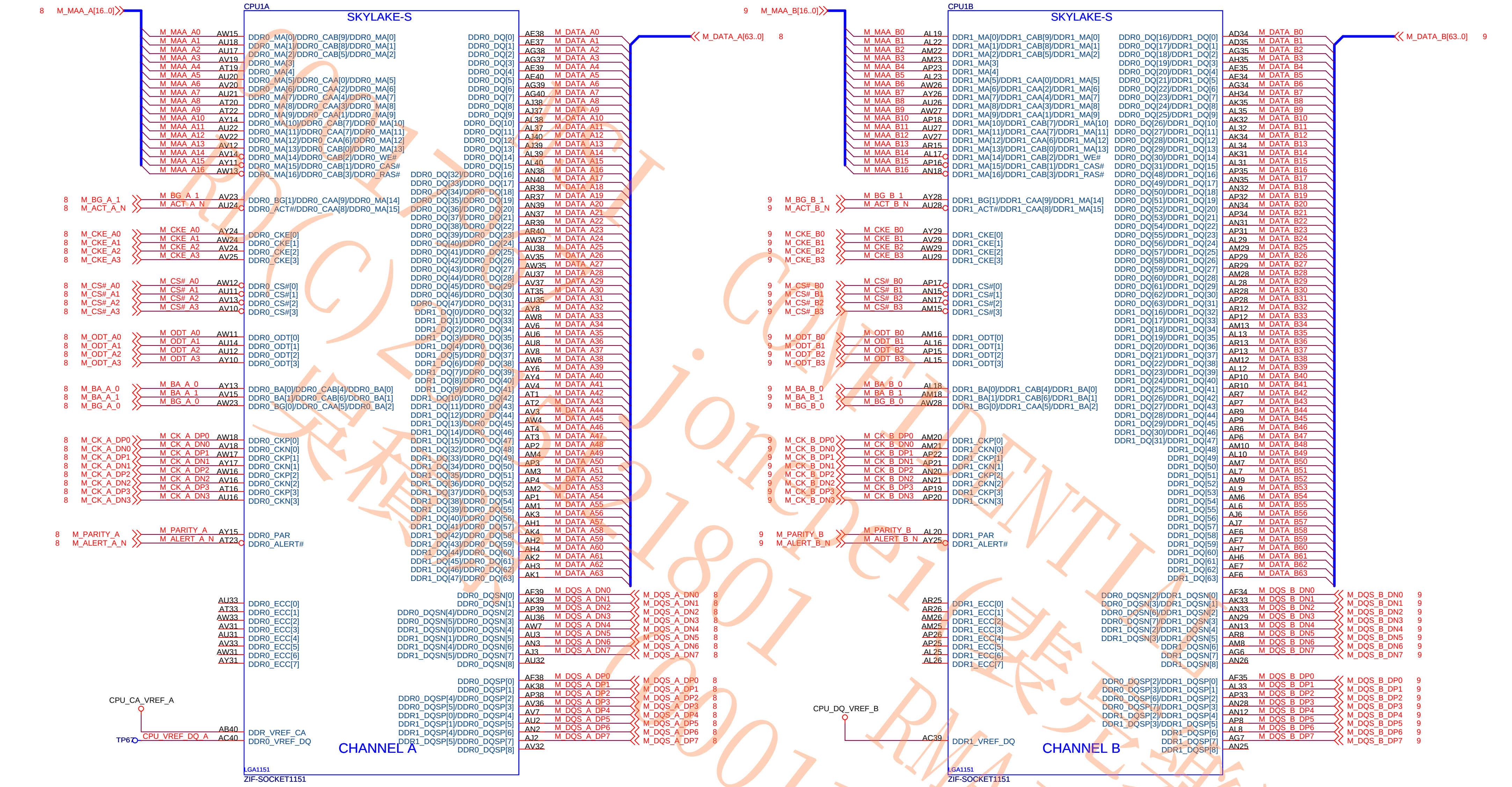
SOCKET PN N12-151A010-L06



MICRO-STAR INT'L CO.,LTD			
MS-7968			
Size: Custom	Document Description: CPU-Memory		Rev: 31
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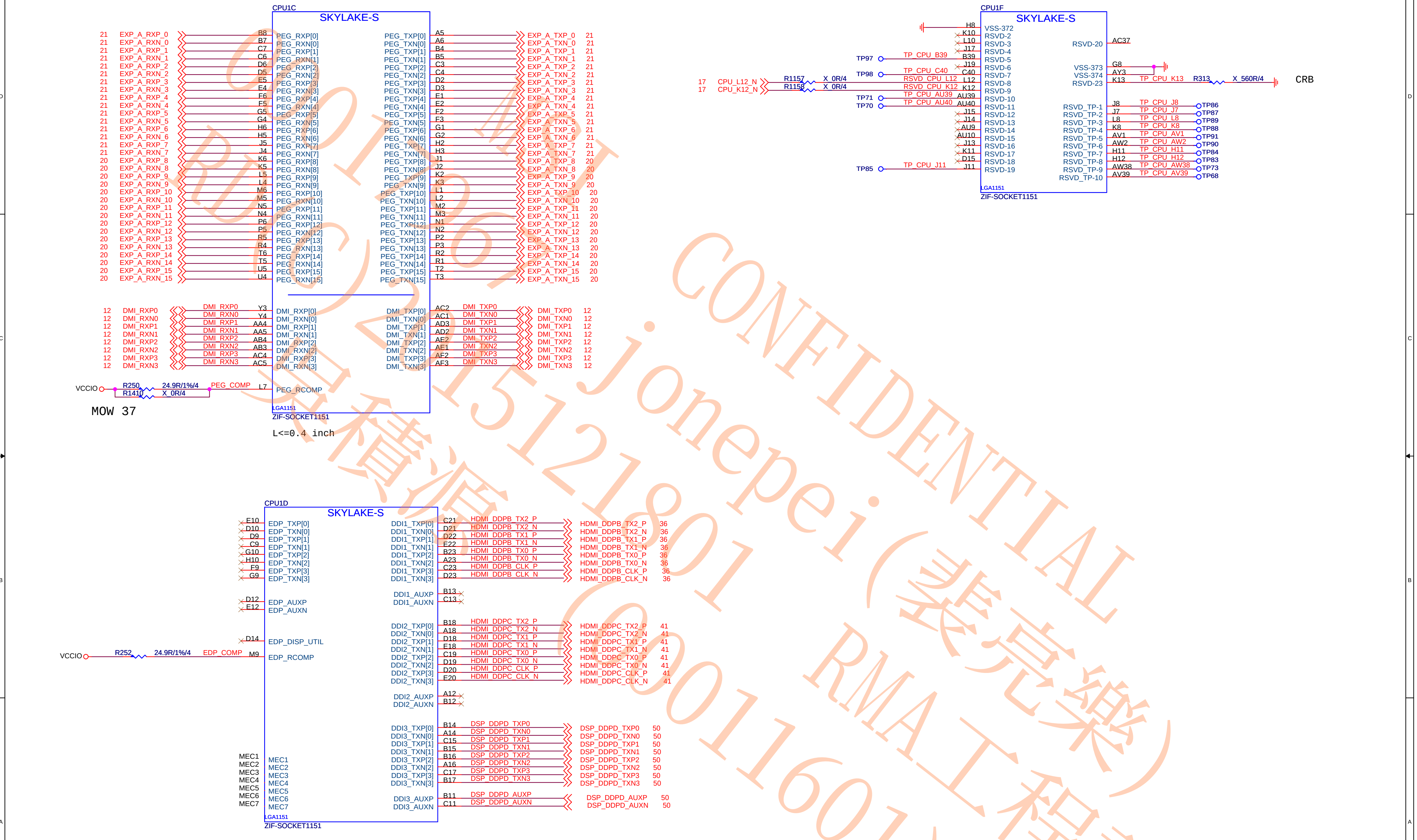

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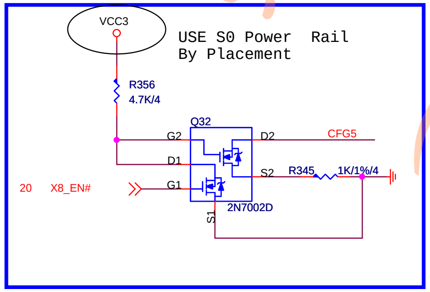
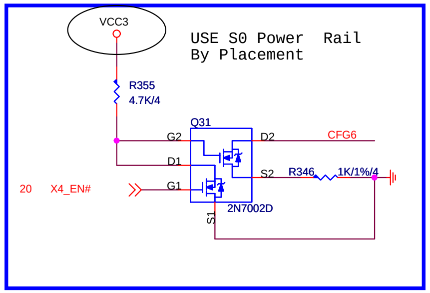
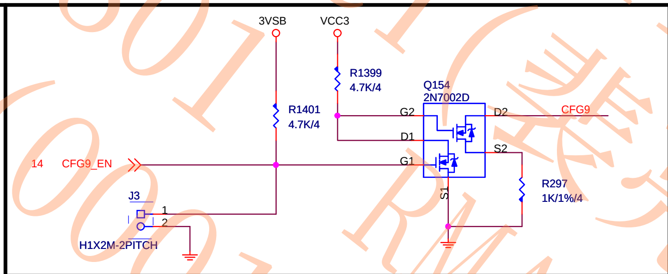
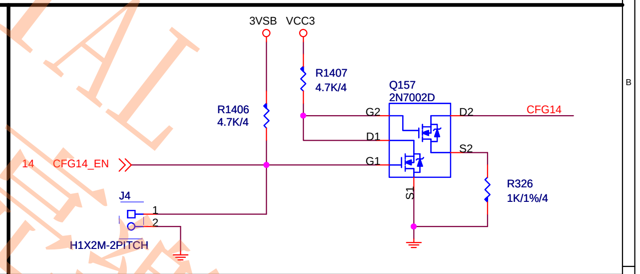
X8 and X4 Ctrl

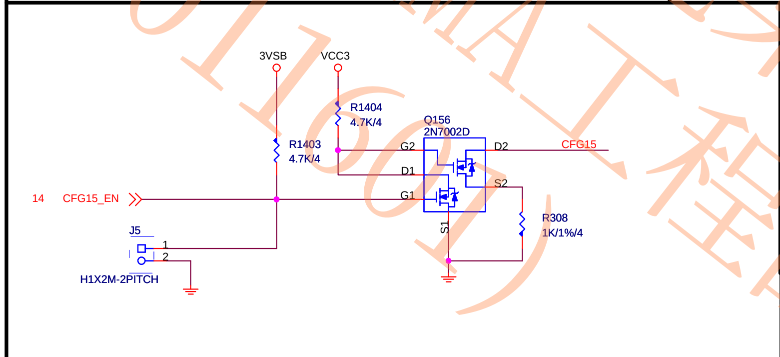
ENABLE#		SLOT2	SLOT5	SLOT7
X8	X4			
0	0	X8	X4	X4
0	1	X8	X8	X0
1	0	None	None	None
1	1	X16	X0	X0

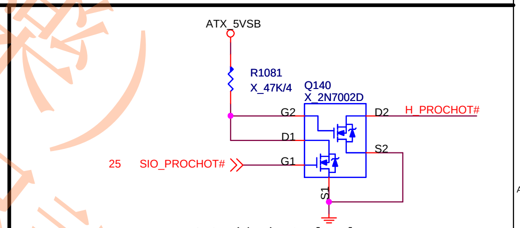












SIO side is 3V level

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		

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

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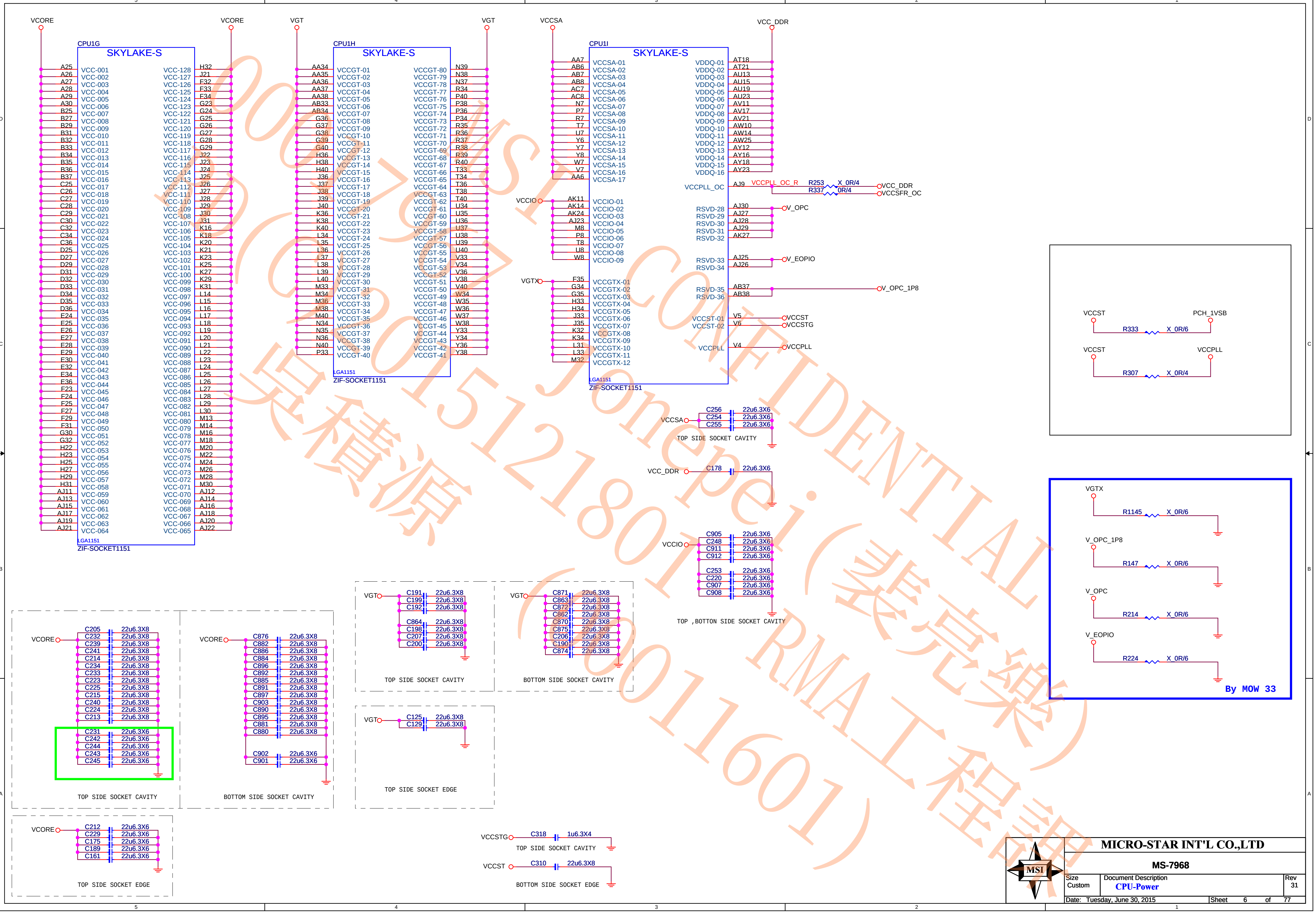

VCORE
VGT
VCCSA
VCC_DDR
CPU1G
SKYLAKE-S
VCC-001
VCC-128
LGA1151
ZIF-SOCKET1151
CPU1H
SKYLAKE-S
VCCGT-01
VCCGT-80
LGA1151
ZIF-SOCKET1151
CPU1I
SKYLAKE-S
VCCSA-01
VDDQ-01
VCCPLL_OC
VCCPLL_OC_R
R253 X_0R/4
R337 0R/4
VCCSFR_OC
VCCIO
VCCIO-01
RSVD-28
V_OPC
V_EOPIO
VGTX
VCCGTX-01
V_OPC_1P8
VCCST-01
VCCST-02
VCCST
VCCSTG
VCCPLL
LGA1151
ZIF-SOCKET1151
PCH_1VSB
R333 X_0R/6
R307 X_0R/4
R1145 X_0R/6
R147 X_0R/6
R214 X_0R/6
R224 X_0R/6
By MOW 33
TOP SIDE SOCKET CAVITY
BOTTOM SIDE SOCKET CAVITY
TOP SIDE SOCKET EDGE
BOTTOM SIDE SOCKET EDGE
TOP ,BOTTON SIDE SOCKET CAVITY
C318 1u6.3X4
C310 22u6.3X8
22u6.3X8
22u6.3X6
MSI
MICRO-STAR INT'L CO.,LTD
MS-7968
Size Custom
Document Description
CPU-Power
Rev 31
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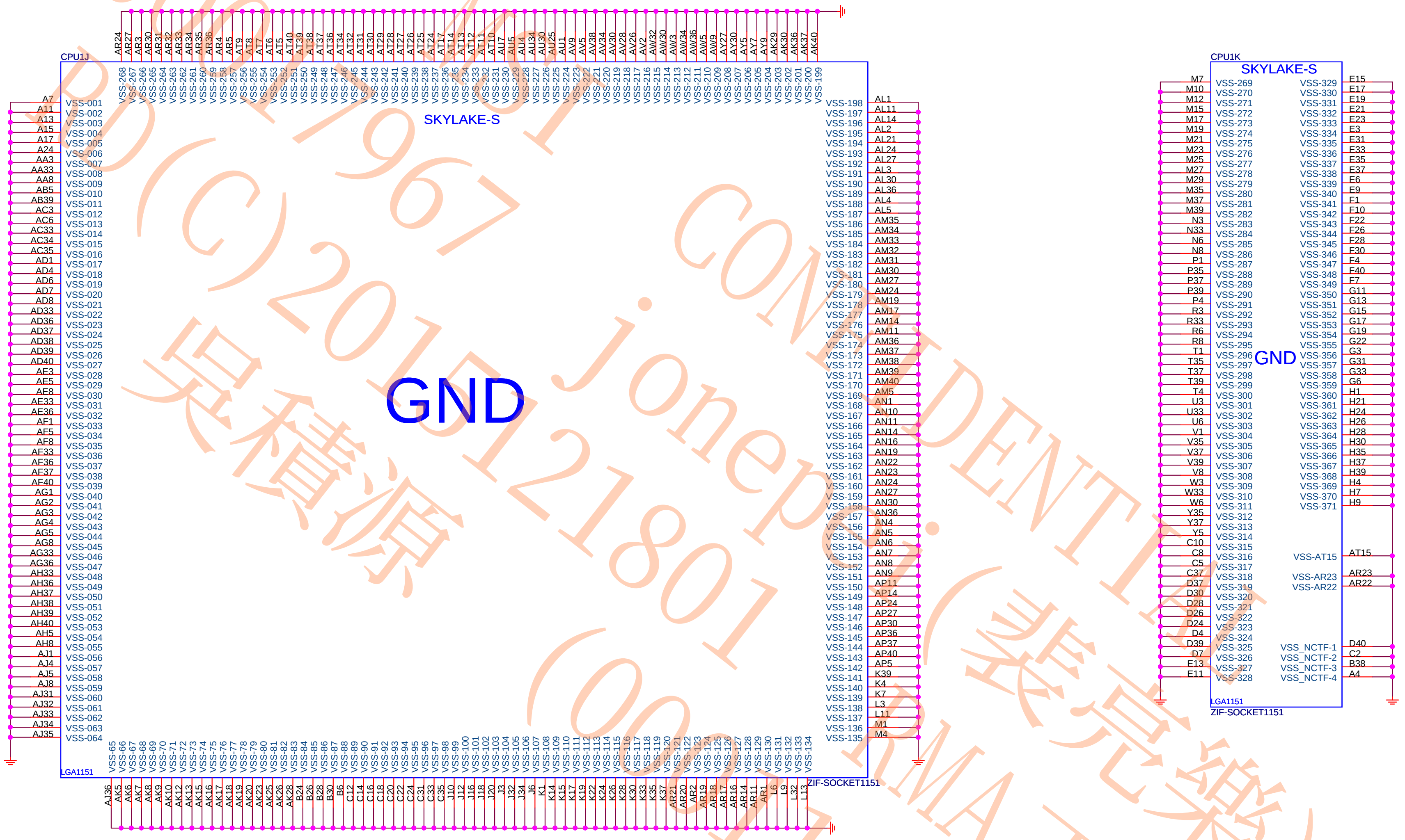

MSI

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Size	Document Description	Rev
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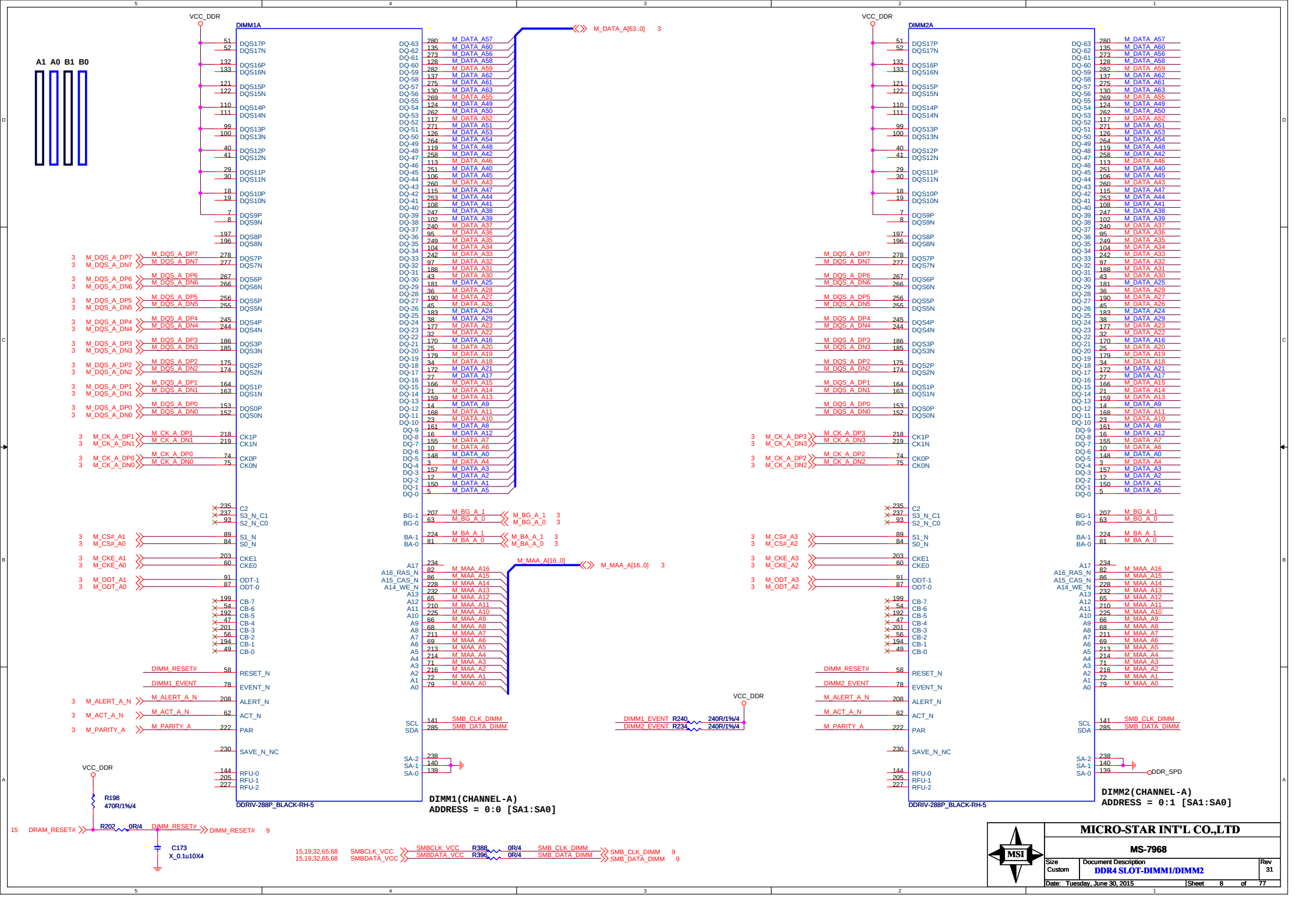
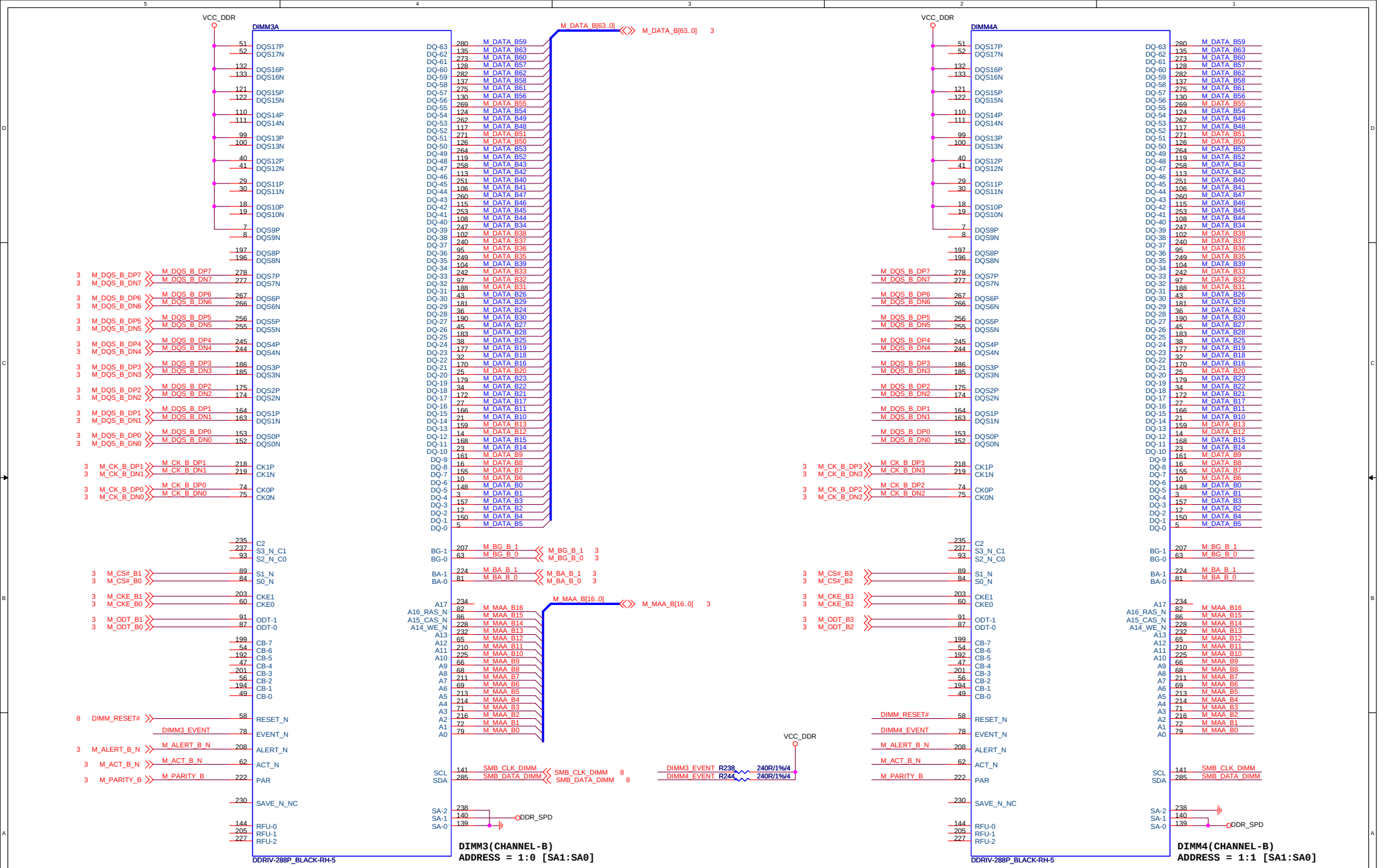


MICRO-STAR INT'L CO.,LTD	
MS-7968	
Size: Custom	Document Description: DDR4 SLOT-DIMM1/DIMM2
Rev: 31	
Date: Tuesday, June 30, 2015	Sheet 8 of 77



MICRO-STAR INT'L CO.,LTD	
MS-7968	
Size: Custom	Document Description: DDR4 SLOT-DIMM3/DIMM4 — Rev: 31
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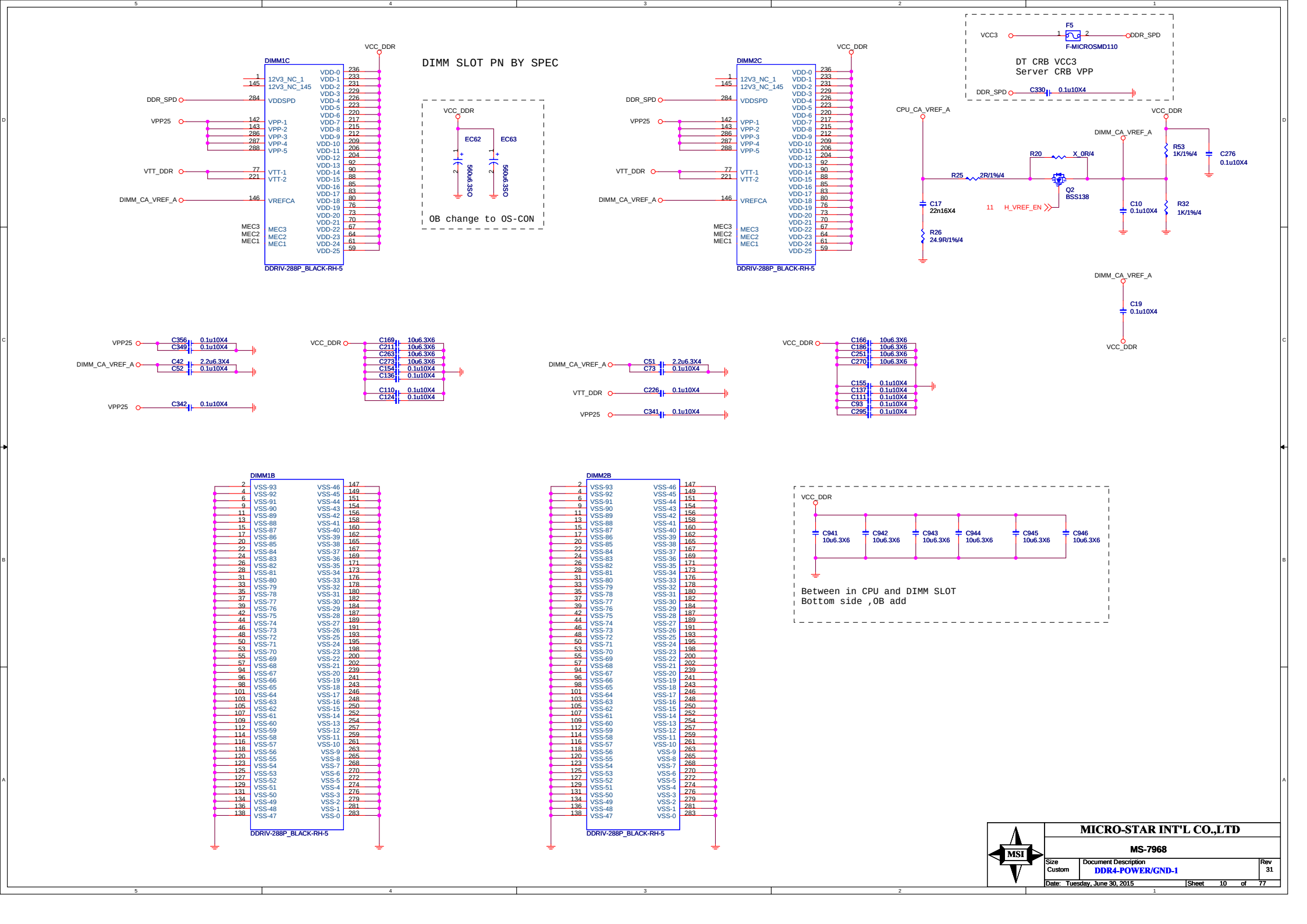
DIMM SLOT PN BY SPEC
DIMM1C
DIMM2C
DDRIV-288P_BLACK-RH-5
VCC_DDR
DDR_SPD
VPP25
VTT_DDR
DIMM_CA_VREF_A
VDDSPD
VREFCA
MEC3
MEC2
MEC1
EC62
EC63
560u6.3SO
OB change to OS-CON
F5
F-MICROSMD110
VCC3
DT CRB VCC3
Server CRB VPP
C330
0.1u10X4
CPU_CA_VREF_A
R20
X_0R/4
R25
2R/1%/4
Q2
BSS138
H_VREF_EN
C17
22n16X4
R26
24.9R/1%/4
R53
1K/1%/4
C276
C10
R32
C19
C356
C349
C42
2.2u6.3X4
C52
C342
C169
C211
C263
C273
C154
C136
C110
C124
10u6.3X6
C51
C73
C226
C341
C166
C186
C251
C270
C155
C137
C111
C93
C295
DIMM1B
DIMM2B
C941
C942
C943
C944
C945
C946
Between in CPU and DIMM SLOT
Bottom side ,OB add
MICRO-STAR INT'L CO.,LTD
MS-7968
Size
Custom
Document Description
DDR4-POWER/GND-1
Rev
31
Date: Tuesday, June 30, 2015
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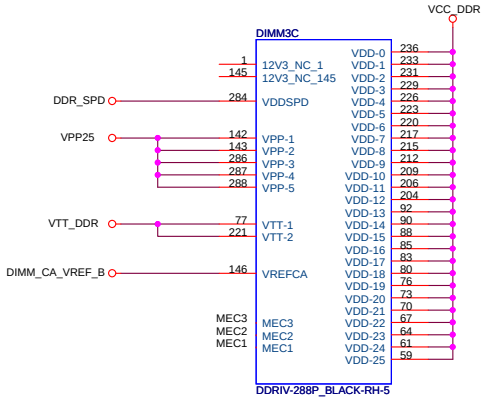

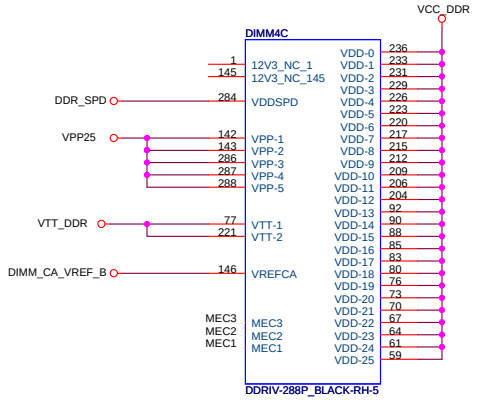

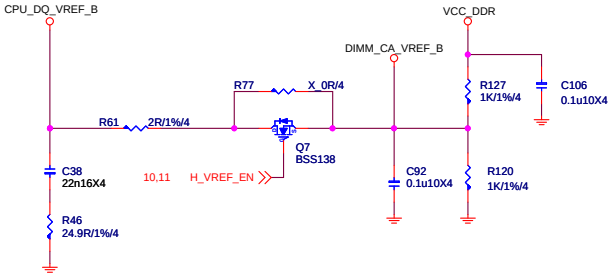

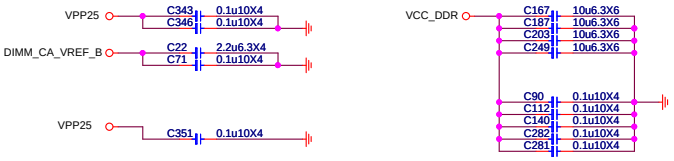

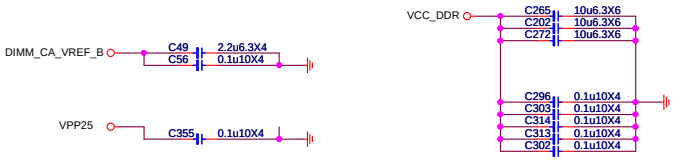

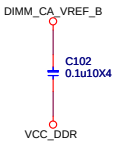

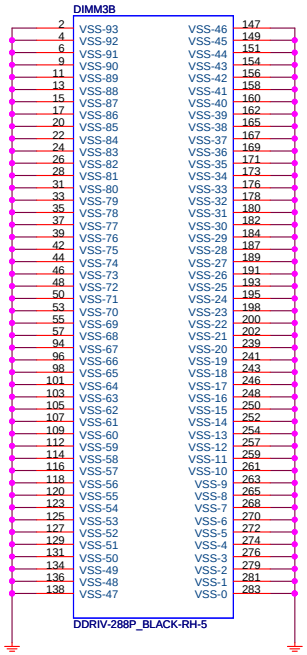

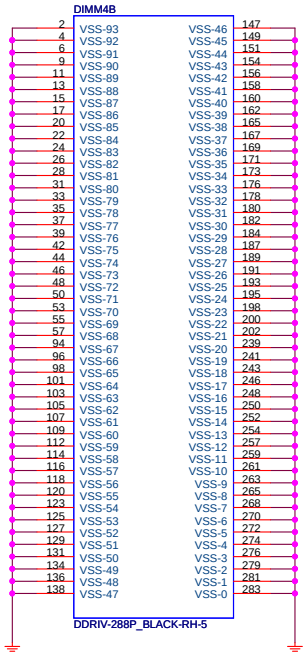

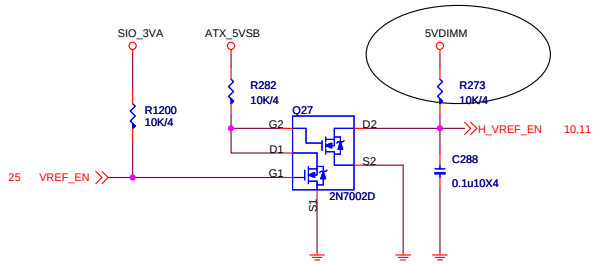

MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7968	
Size: Custom	Document Description: DDR4-POWER/GND-2	Rev: 31
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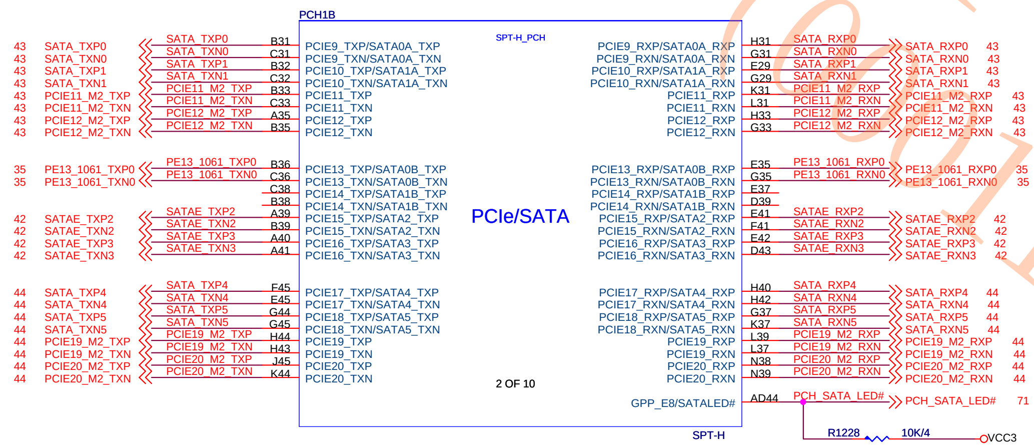
USB2_COMP < 500 mil

PCIECOMP_P
PCIECOMP_N Length Match < 5mil



sku	1	2	3	4	5	6	7	8	9	10	11	12	13	14
H110	USB3/ OTG	USB3/ SSIC	USB3/ SSIC	USB3	N/A	N/A	N/A	N/A	N/A	LAN Only	PCIe/ LAN	PCIe	PCIe	PCIe
B150	USB3/ OTG	USB3/ SSIC	USB3/ SSIC	USB3	USB3	USB3	N/A	N/A	N/A	LAN Only	PCIe/ LAN	PCIe	PCIe	PCIe
H170	USB3/ OTG	USB3/ SSIC	USB3/ SSIC	USB3	USB3	USB3	USB3	USB3	PCIe	PCIe/ LAN	PCIe/ LAN	PCIe	PCIe	PCIe
Z170	USB3/ OTG	USB3/ SSIC	USB3/ SSIC	USB3	USB3	USB3	USB3/ PCIe	USB3/ PCIe	USB3/ PCIe	USB3/ PCIe/ LAN	PCIe/ LAN	PCIe	PCIe	PCIe

Sku	15	16	17	18	19	20	21	22	23	24	25	26	RST for PCIe Ports
H110	PCIe/ LAN	PCIe	N/A	LAN Only	SATA*/ LAN	SATA*	SATA	SATA	N/A	N/A	N/A	N/A	0
B150	PCIe/LAN SATA*	PCIe/ SATA*	PCIe	PCIe/ LAN	SATA* /LAN	SATA*	SATA	SATA	SATA	SATA	N/A	N/A	0
H170	PCIe/LAN SATA	PCIe/ SATA	PCIe	PCIe/ LAN	PCIe/LAN SATA	PCIe/ SATA	PCIe/ SATA	PCIe/ SATA	SATA	SATA	PCIe	PCIe	2
Z170	PCIe/LAN SATA	PCIe/ SATA	PCIe	PCIe/ LAN	PCIe/LAN SATA	PCIe/ SATA	PCIe/ SATA	PCIe/ SATA	PCIe/ SATA	PCIe/ SATA	PCIe	PCIe	3

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Size: Custom
Document Description: PCH-USB/PCIE/DMI/SATA
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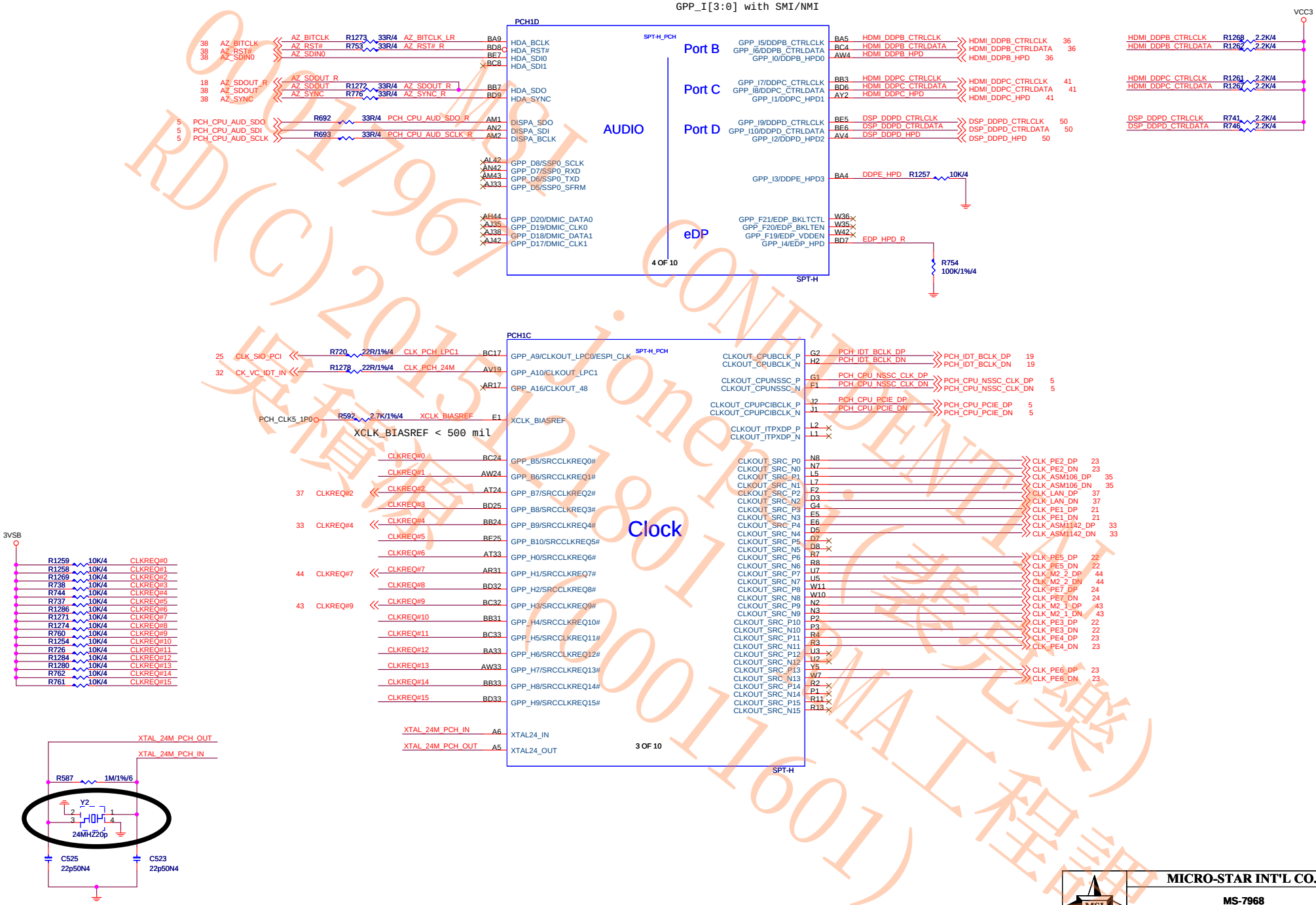
GPP_I[3:0] with SMI/NMI
PCH1D
AUDIO
Port B
Port C
Port D
eDP
4 OF 10
SPT-H
PCH1C
Clock
3 OF 10
XCLK_BIASREF < 500 mil
3VSB
24MHZ20p
C525 22p50N4
C523 22p50N4
R587 1M/1%/6
R754 100K/1%/4
MICRO-STAR INT'L CO.,LTD
MS-7968
PCH-Audio/Display/Clock
Date: Tuesday, June 30, 2015
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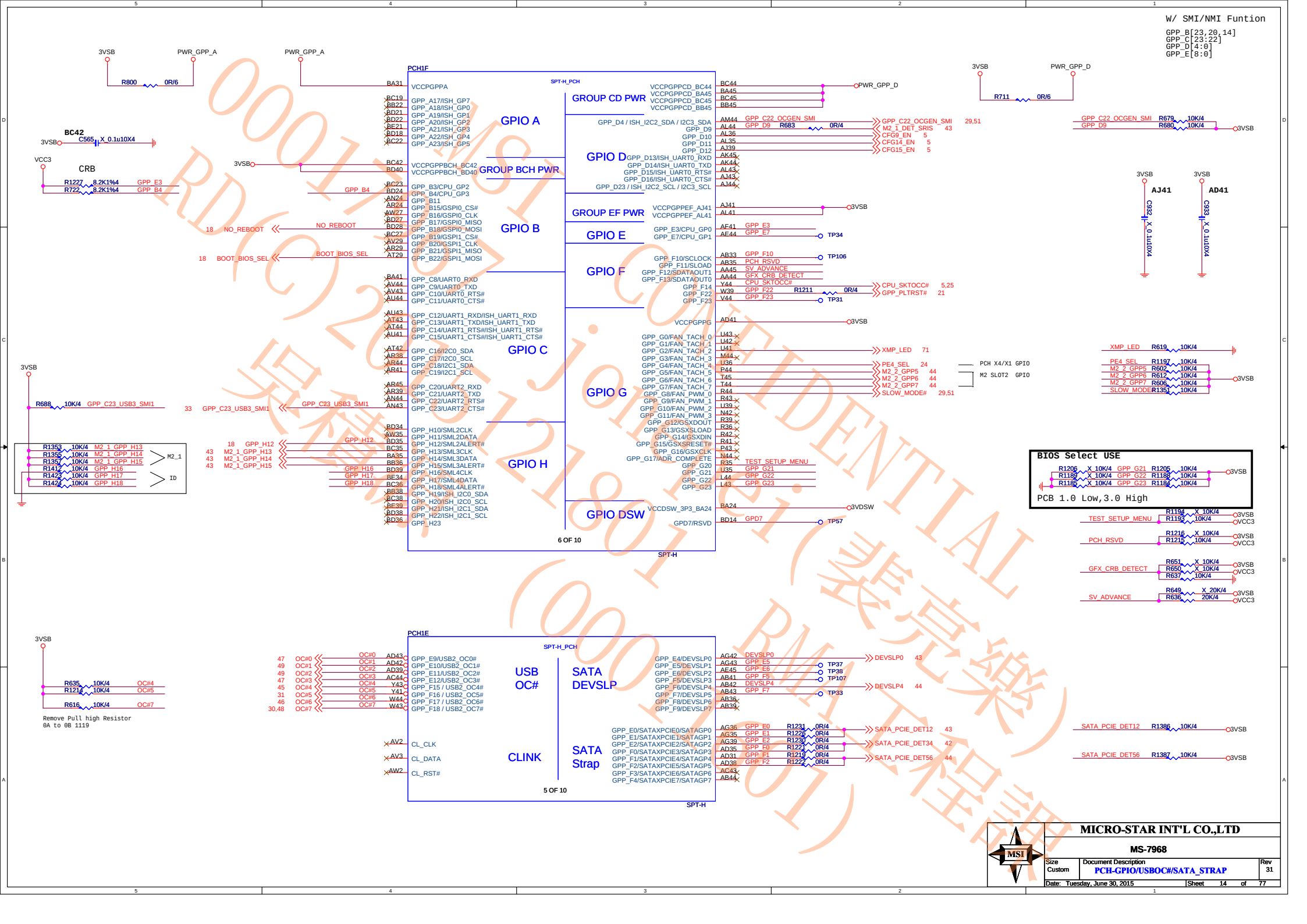
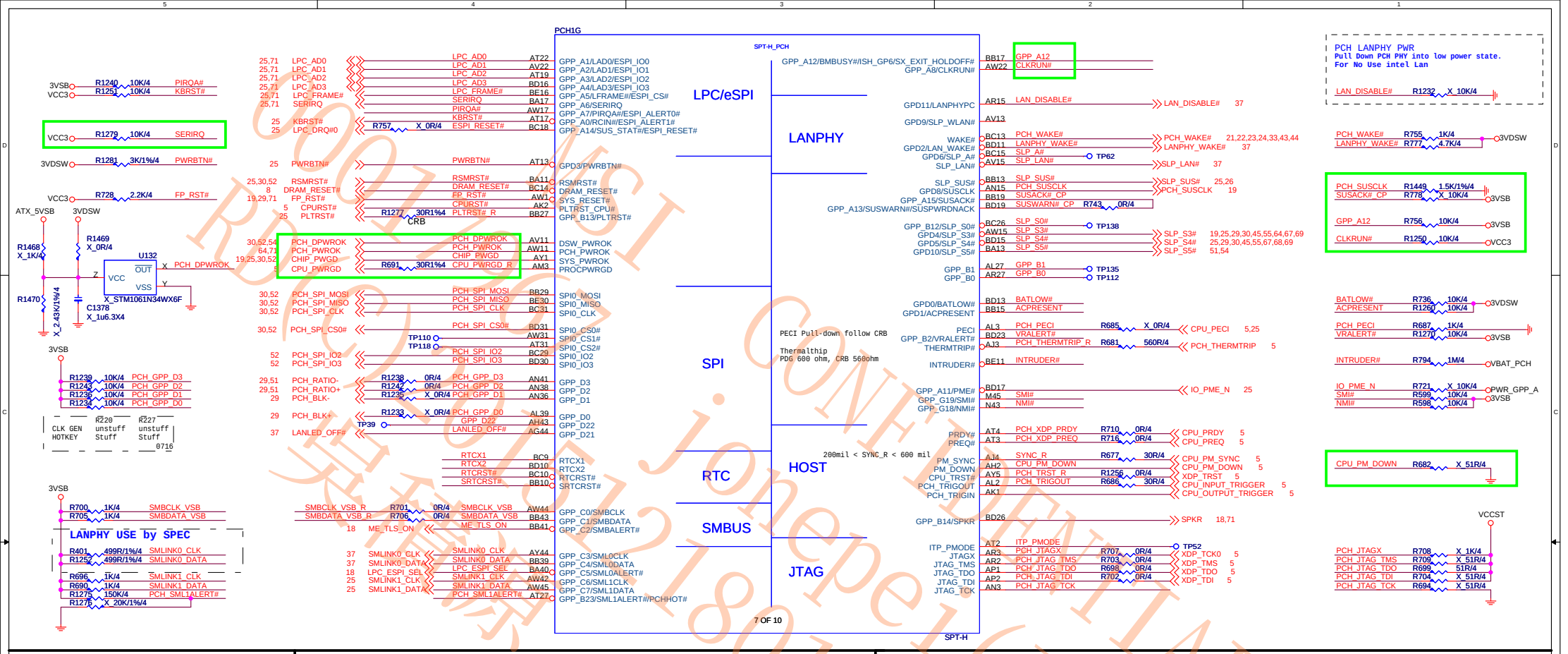
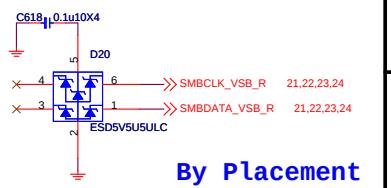

W/ SMI/NMI Funtion
GPP_B[23,20,14]
GPP_C[23:22]
GPP_D[4:0]
GPP_E[8:0]
PCH1F
SPT-H_PCH
GROUP CD PWR
GPIO A
GROUP BCH PWR
GPIO D
GPIO B
GROUP EF PWR
GPIO E
GPIO F
GPIO C
GPIO G
GPIO H
GPIO DSW
6 OF 10
SPT-H
PCH1E
USB OC#
SATA DEVSLP
CLINK
SATA Strap
5 OF 10
BIOS Select USE
PCB 1.0 Low,3.0 High
Remove Pull high Resistor
0A to 0B 1119
MICRO-STAR INT'L CO.,LTD
MS-7968
PCH-GPIO/USBOC#/SATA_STRAP
Tuesday, June 30, 2015



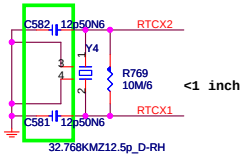
SMBUS_ESD



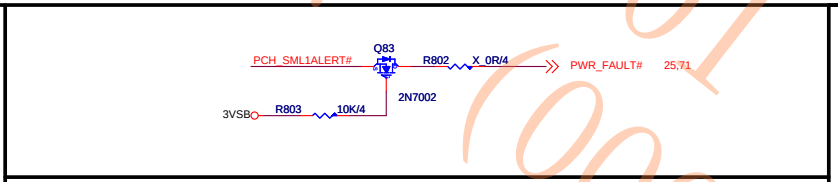
By Placement

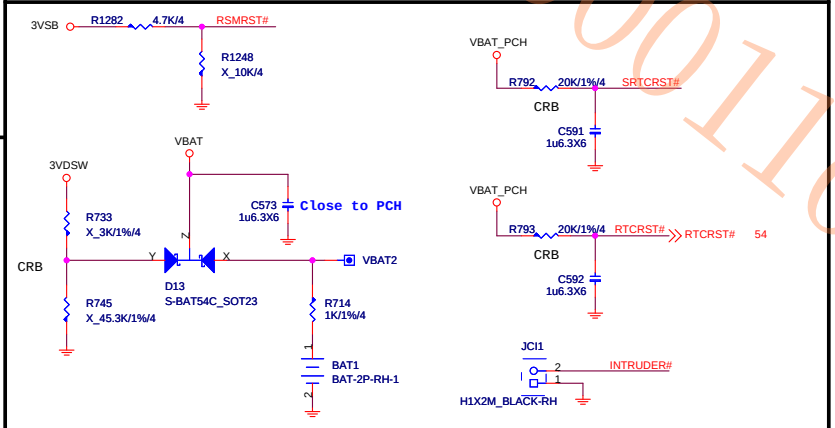
RTC Block

Close to PCH



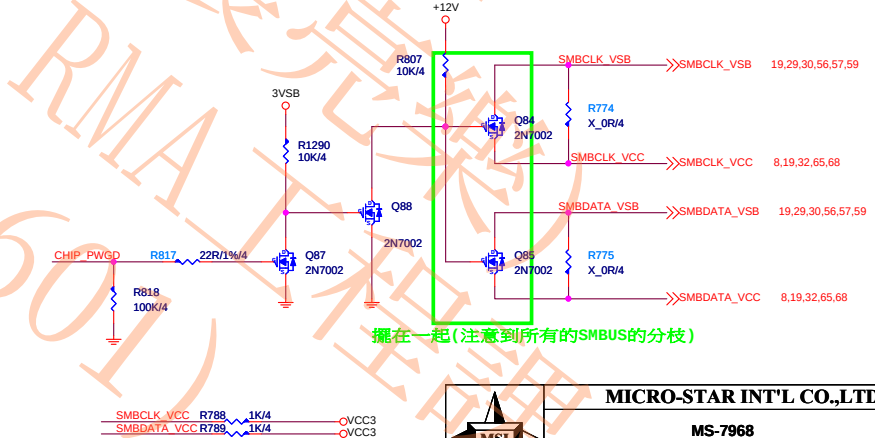
<1 inch





SMBUS隔離線路(PCH接出來是PULL HIGH 3VSB)
需要再S3/S5底下動作的接SMBCLK_VSB/SMBDATA_VSB
不需要的接SMBCLK_VCC/SMBDATA_VCC

基本上PCIE的SLOT要接
3VSB的CPU的PWM IC/DDR
要接VCC3的其他的請注意
要怎麼接



擺在一起(注意到所有的SMBUS的分枝)

MICRO-STAR INT'L CO.,LTD		
MS-7968		
Size: Custom	Document Description: PCH-LPC/SPI/SMBUS/MISC	Rev: 31
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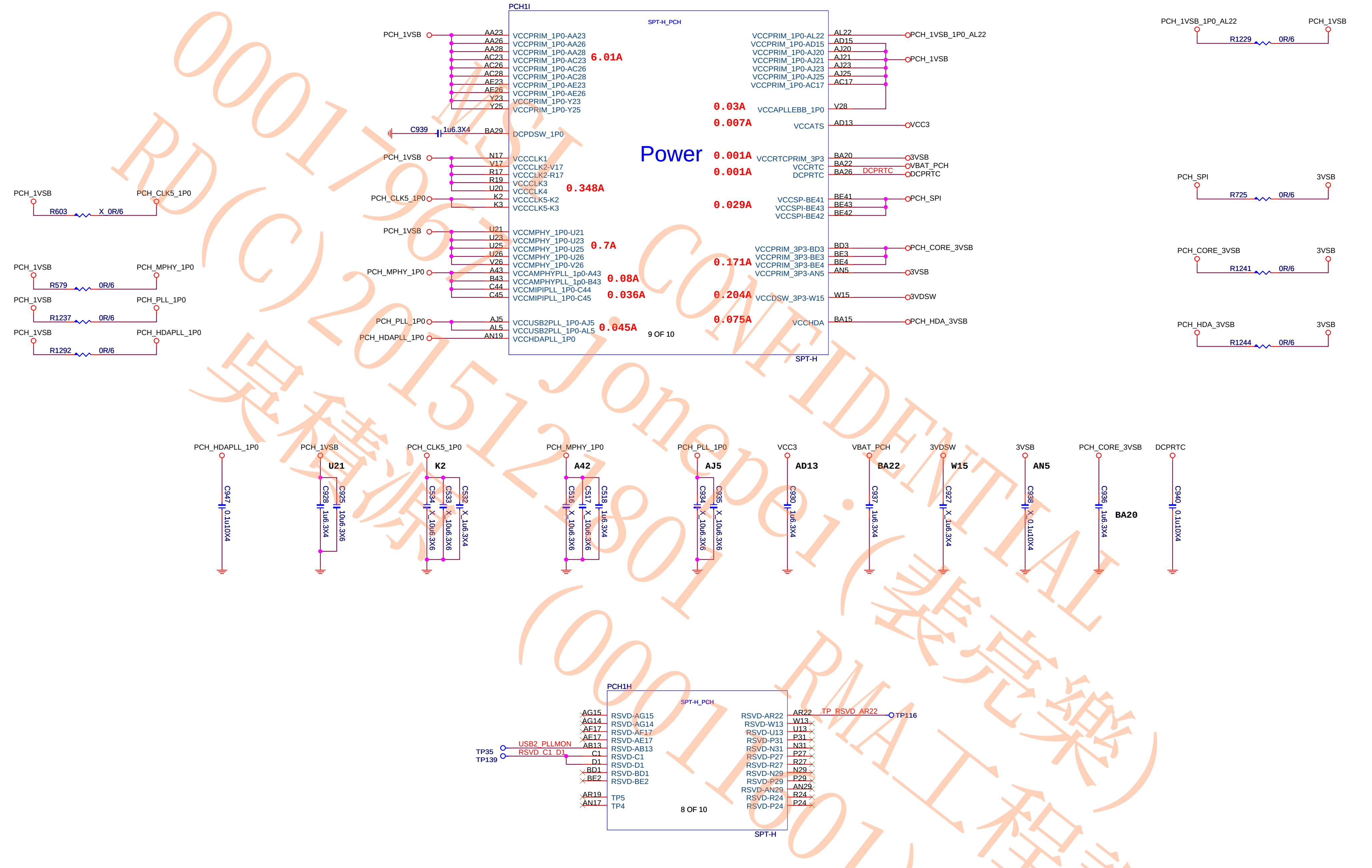
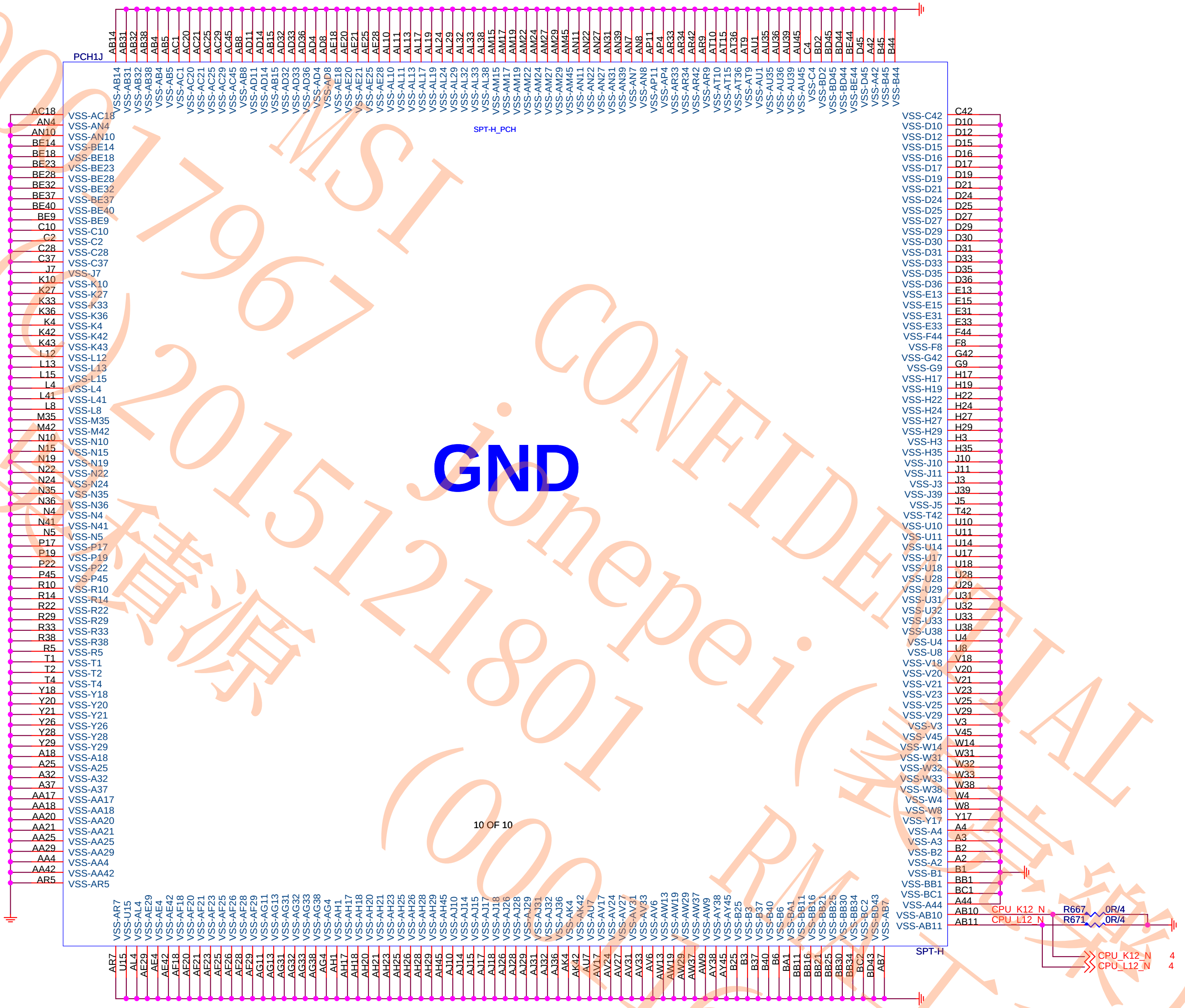


MICRO-STAR INT'L CO.,LTD

MS-7968

Size	Document Description	Rev
Custom	PCH-Power	31

Date: Tuesday, June 30, 2015



MICRO-STAR INT'L CO.,LTD

MS-7968

Size	Document Description	Rev
Custom	PCH-GND	31

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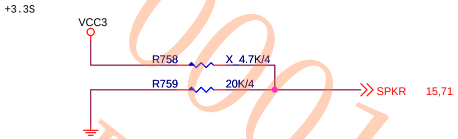
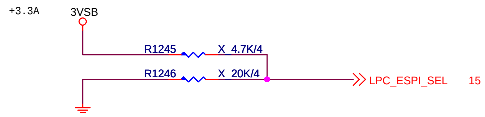
TOP Swap



Internal pull-down is disabled after PLTRST#

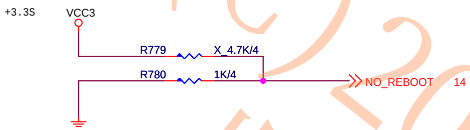
LPC eSPI Mode



0 : LPC
1 : eSPI

Internal pull-down is disabled after RSMRST

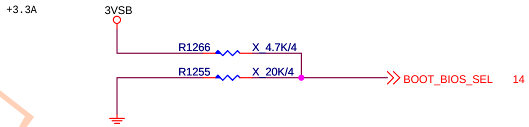
No Reboot



0 : DISABLE (Default)
1 : ENABLE

Internal pull-down is disabled after PLTRST#

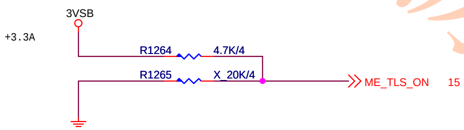
Boot BIOS



0 : SPI
1 : LPC

Internal pull-down is disabled after PLTRST

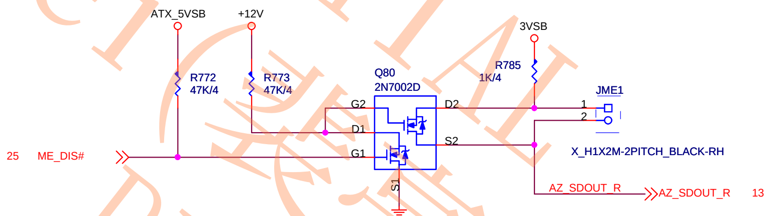
AMT and SBA with confidentiality



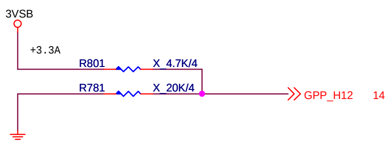
0 : DISABLE
1 : ENABLE (Default)

Internal pull-down is disabled after RSMRST

HDA_SDO



ESPI FLASH SHARING MODE



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

Internal pull-down is disabled after RSMRST

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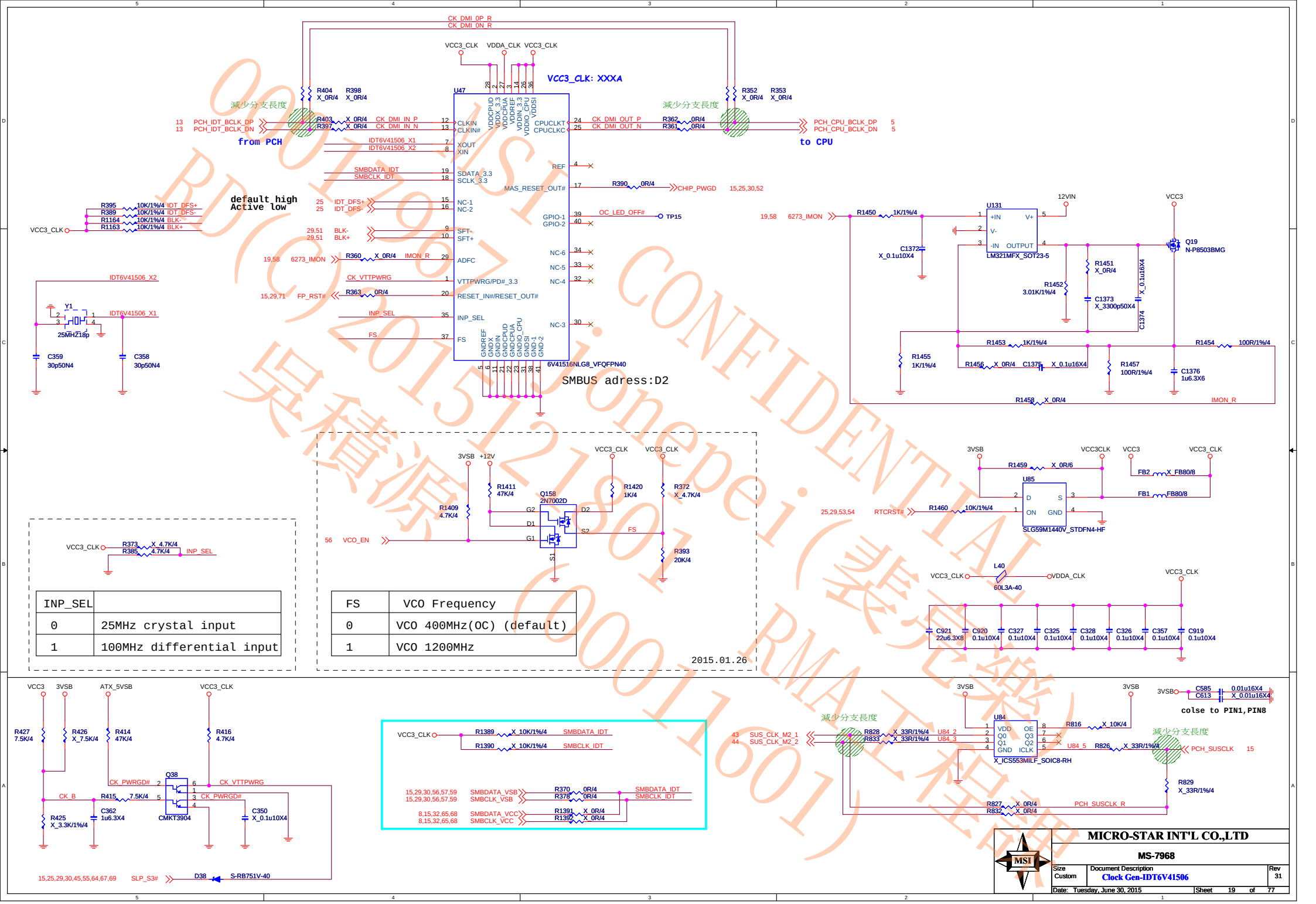
CK_DMI_0P_R
CK_DMI_0N_R
VCC3_CLK VDDA_CLK VCC3_CLK
VCC3_CLK: XXXA
U47
R404 X_0R/4 R398 X_0R/4
R352 X_0R/4 R353 X_0R/4
减少分支長度
from PCH
to CPU
PCH_IDT_BCLK_DP
PCH_IDT_BCLK_DN
CK_DMI_IN_P
CK_DMI_IN_N
CK_DMI_OUT_P
CK_DMI_OUT_N
PCH_CPU_BCLK_DP
PCH_CPU_BCLK_DN
IDT6V41506_X1
IDT6V41506_X2
SMBDATA_IDT
SMBCLK_IDT
CHIP_PWGD
OC_LED_OFF#
TP15
default_high
Active low
IDT_DFS+
IDT_DFS-
BLK-
BLK+
6273_IMON
IMON_R
CK_VTTPWRG
FP_RST#
INP_SEL
FS
SMBUS adress:D2
6V41516NLG8_VFQFPN40
Y1
25MHZ18p
C359 30p50N4
C358 30p50N4
U131
LM321MFX_SOT23-5
12VIN
VCC3
Q19 N-P8503BMG
R1450 1K/1%/4
C1372 X_0.1u10X4
R1451 X_0R/4
R1452 3.01K/1%/4
C1373 X_3300p50X4
C1374 X_0.1u16X4
R1453 1K/1%/4
R1454 100R/1%/4
R1455 1K/1%/4
R1456 X_0R/4
C1375 X_0.1u16X4
R1457 100R/1%/4
C1376 1u6.3X6
R1458 X_0R/4
3VSB +12V
R1411 47K/4
R1409 4.7K/4
Q158 2N7002D
R1420 1K/4
R372 X_4.7K/4
R393 20K/4
VCO_EN
R373 X_4.7K/4
R385 4.7K/4
R1459 X_0R/6
U85
SLG59M1440V_STDFN4-HF
RTCRST#
R1460 10K/1%/4
FB2 X_FB80/8
FB1 FB80/8
L40 60L3A-40
VDDA_CLK
C921 22u6.3X8
C920 0.1u10X4
C327 0.1u10X4
C325 0.1u10X4
C328 0.1u10X4
C326 0.1u10X4
C357 0.1u10X4
C919 0.1u10X4
INP_SEL
0 25MHz crystal input
1 100MHz differential input
FS VCO Frequency
0 VCO 400MHz(OC) (default)
1 VCO 1200MHz
2015.01.26
R427 7.5K/4
R426 X_7.5K/4
R414 47K/4
R416 4.7K/4
Q38 CMKT3904
CK_PWRGD#
CK_VTTPWRG
CK_B
R415 7.5K/4
R425 X_3.3K/1%/4
C362 1u6.3X4
C350 X_0.1u10X4
SLP_S3#
D38 S-RB751V-40
R1389 X_10K/1%/4
R1390 X_10K/1%/4
R370 0R/4
R378 0R/4
R1391 X_0R/4
R1392 X_0R/4
SMBDATA_VSB
SMBCLK_VSB
SMBDATA_VCC
SMBCLK_VCC
SUS_CLK_M2_1
SUS_CLK_M2_2
R828 X_33R/1%/4
R833 X_33R/1%/4
U84
X_ICS553MILF_SOIC8-RH
R816 X_10K/4
R826 X_33R/1%/4
R829 X_33R/1%/4
R827 X_0R/4
R832 X_0R/4
PCH_SUSCLK
PCH_SUSCLK_R
C585 0.01u16X4
C613 X_0.01u16X4
colse to PIN1,PIN8
MICRO-STAR INT'L CO.,LTD
MS-7968
Clock Gen-IDT6V41506
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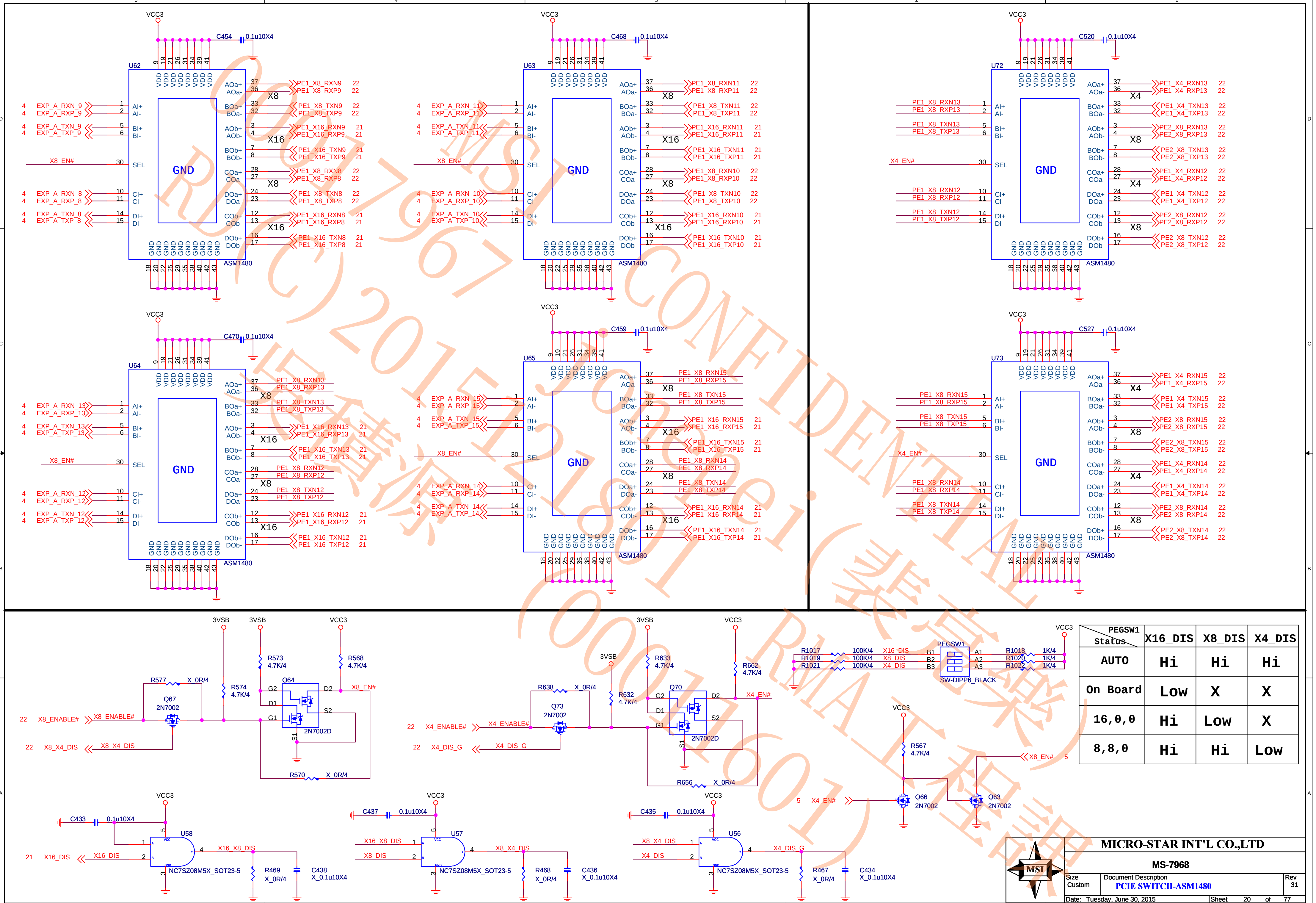

PEGSW1 Status	X16_DIS	X8_DIS	X4_DIS
AUTO	Hi	Hi	Hi
On Board	Low	X	X
16,0,0	Hi	Low	X
8,8,0	Hi	Hi	Low

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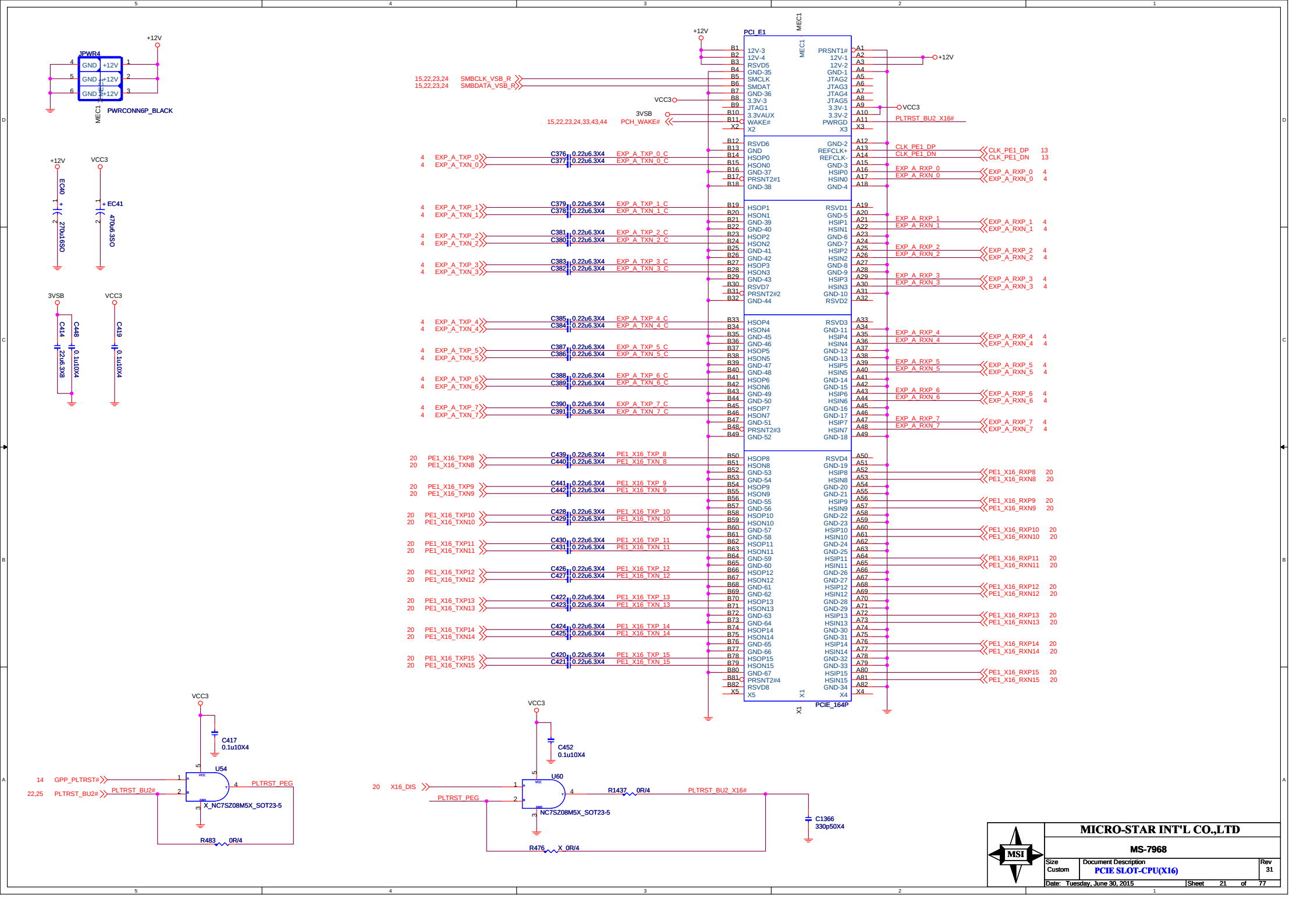

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MS-7968	
Size: Custom	Document Description: PCIE SLOT-CPU(X16)
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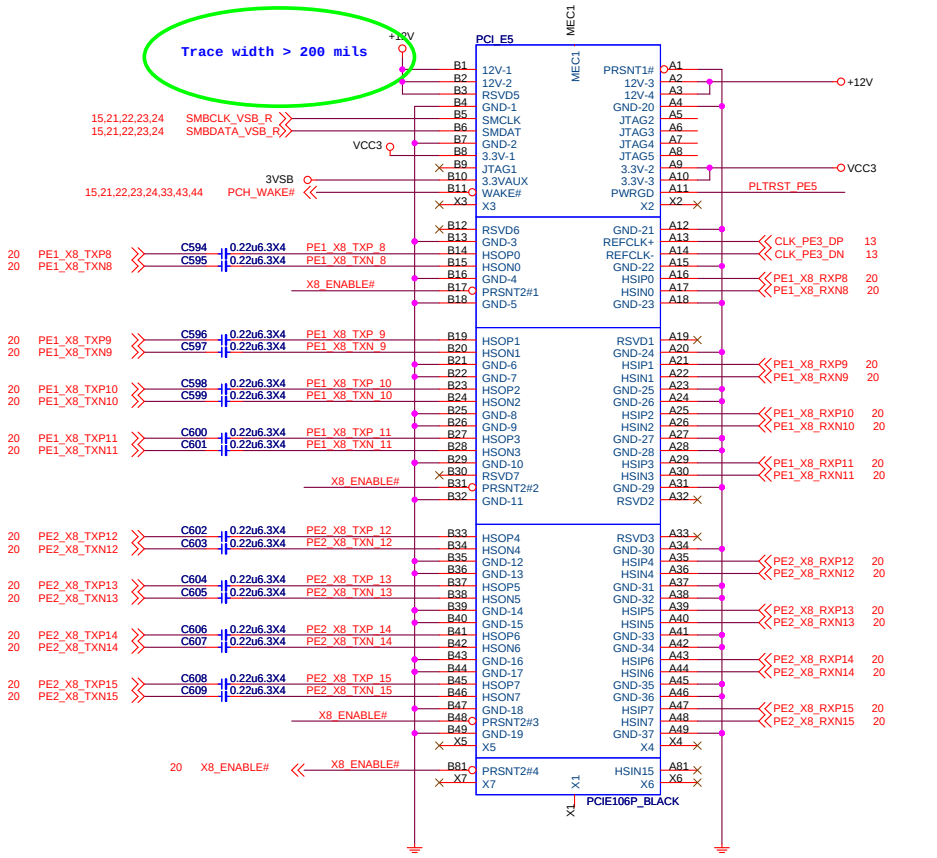
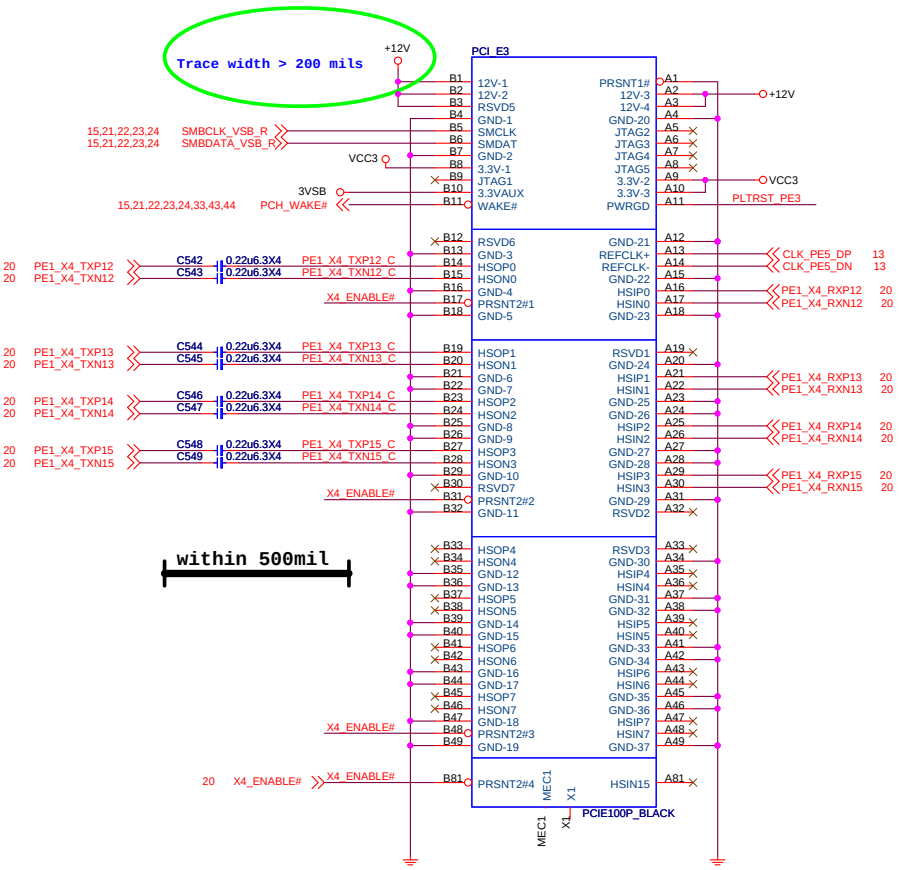
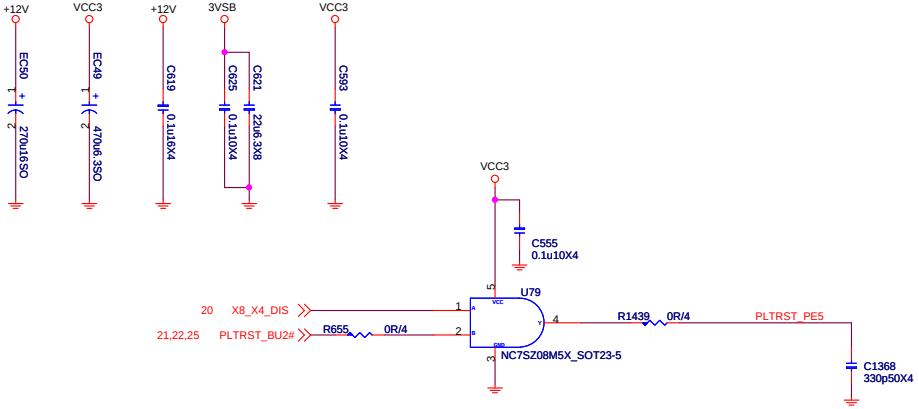
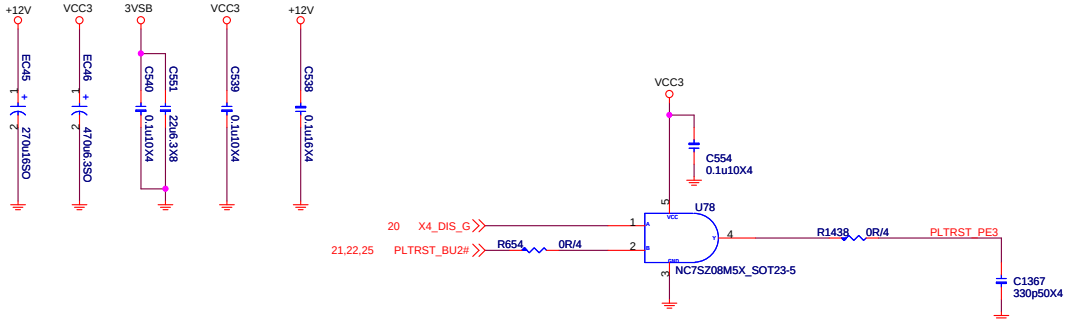
PCI_Express X8 Slot
(Share with PCI_E x16 Slots)



PCI_Express X4 Slot(by CPU)







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MS-7968		
Size: Custom	Document Description: PCIE SLOT-CPU(X8)(X4)	Rev: 31
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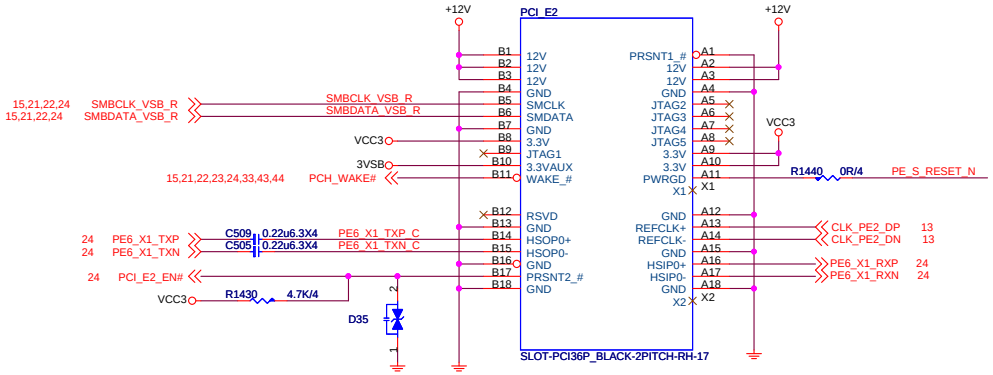
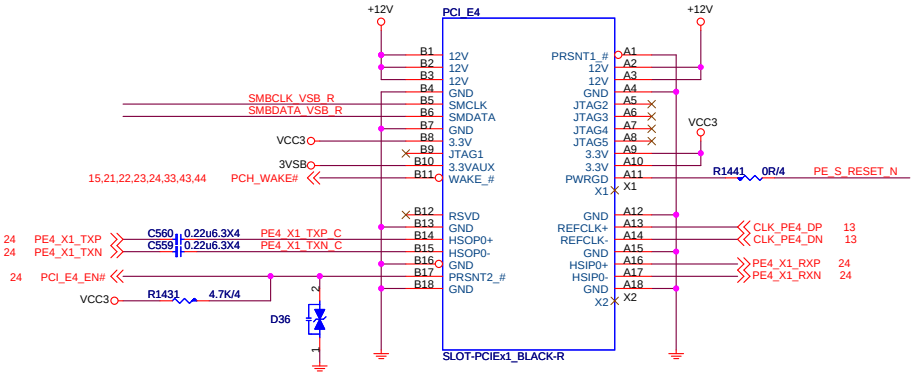
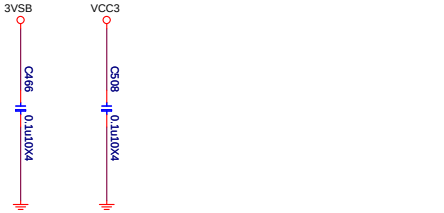
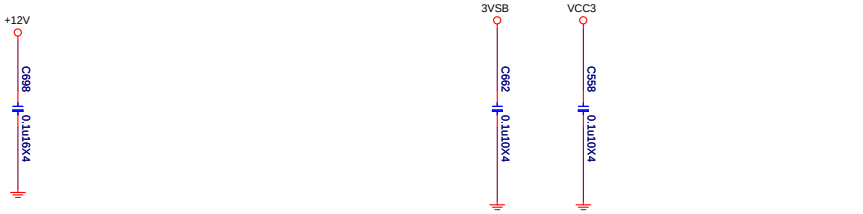
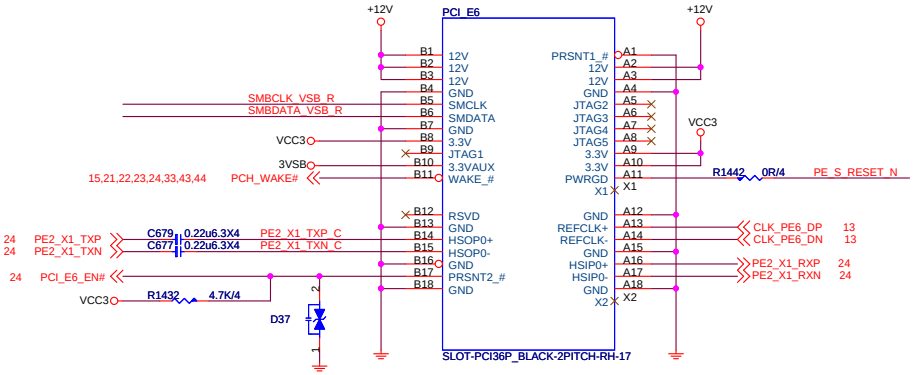
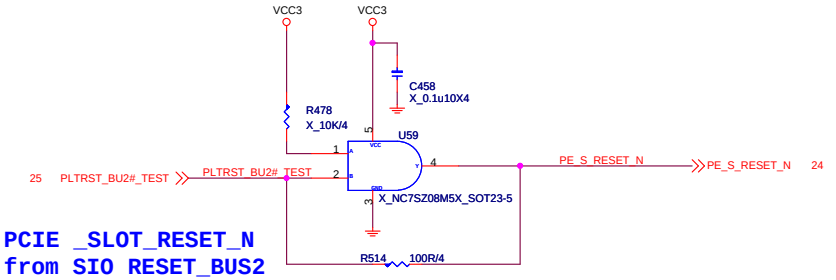




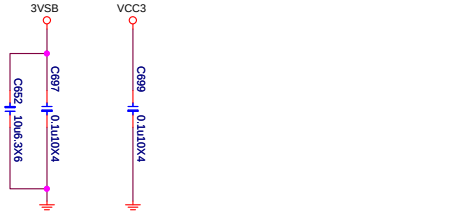








PCIE _SLOT_RESET_N
from SIO RESET_BUS2



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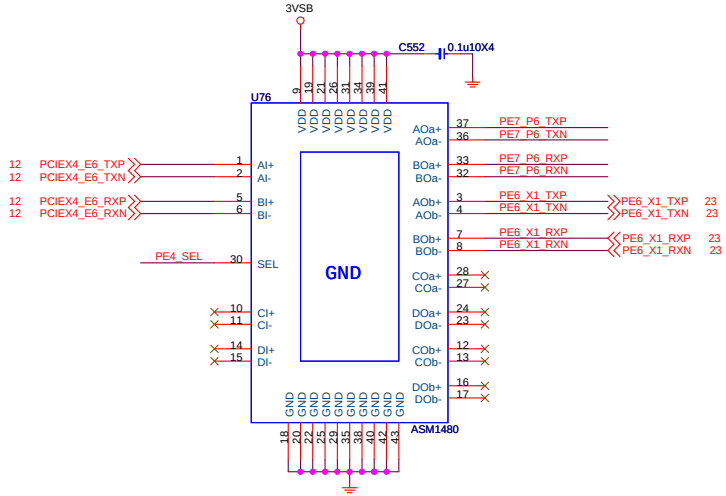
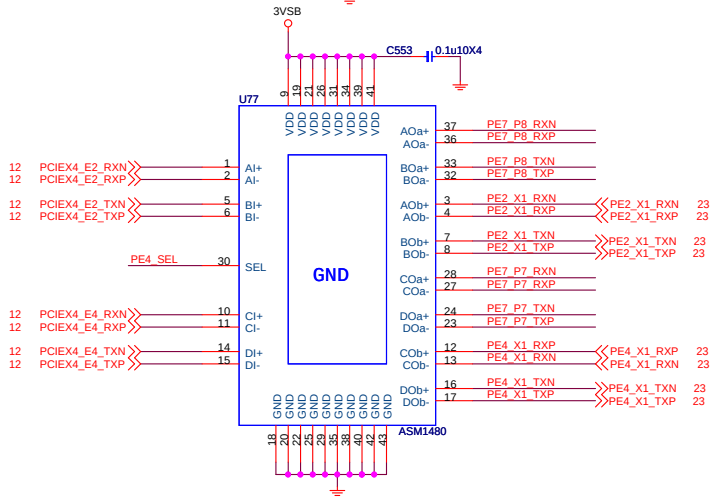
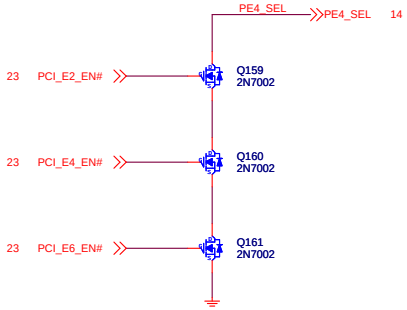
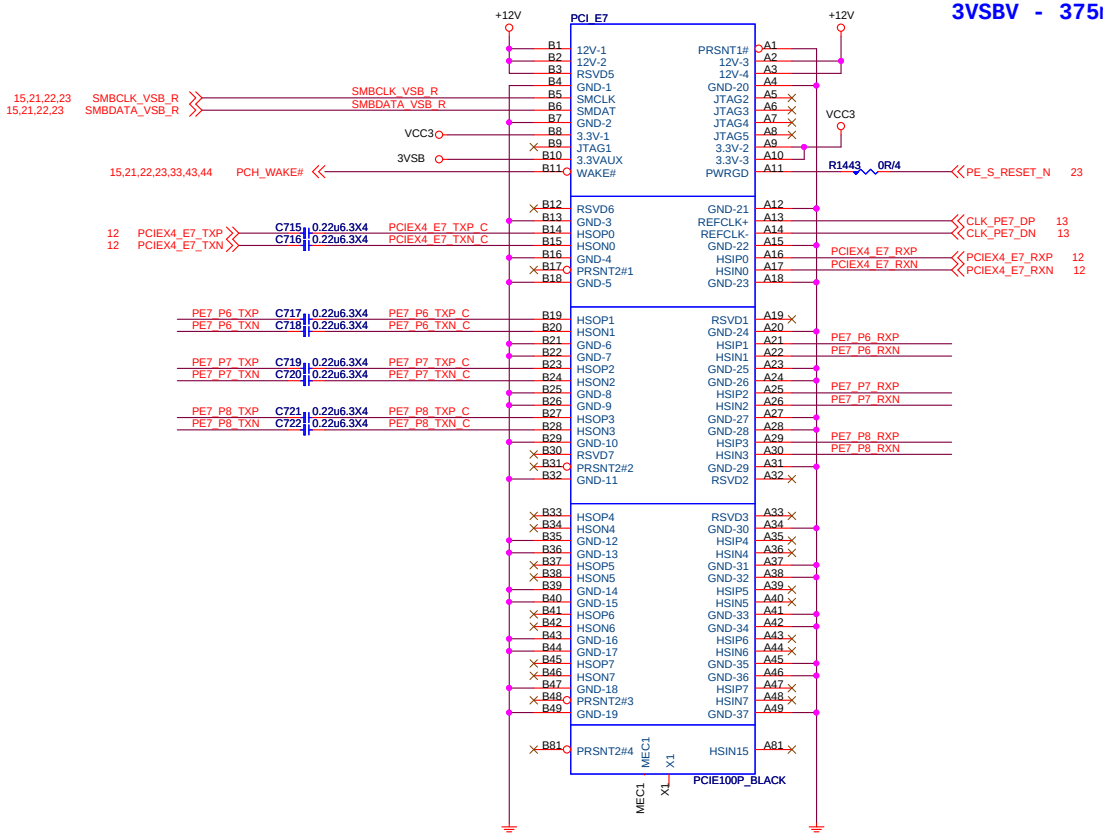
PCI_Express X4 Slot

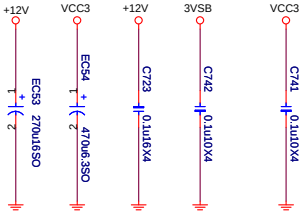
12V - 2.1A
VCC3 - 3A
3VSBV - 375mA











X1 Mode PE2,PE4,PE6,PE7 Working (Default)
X4 Mode PE7 Working

	HW		SW	
	X1	X4	X1	X4
PE4_SEL	High (GPI)	Low (GPI)	High (GPO)	Low (GPO)

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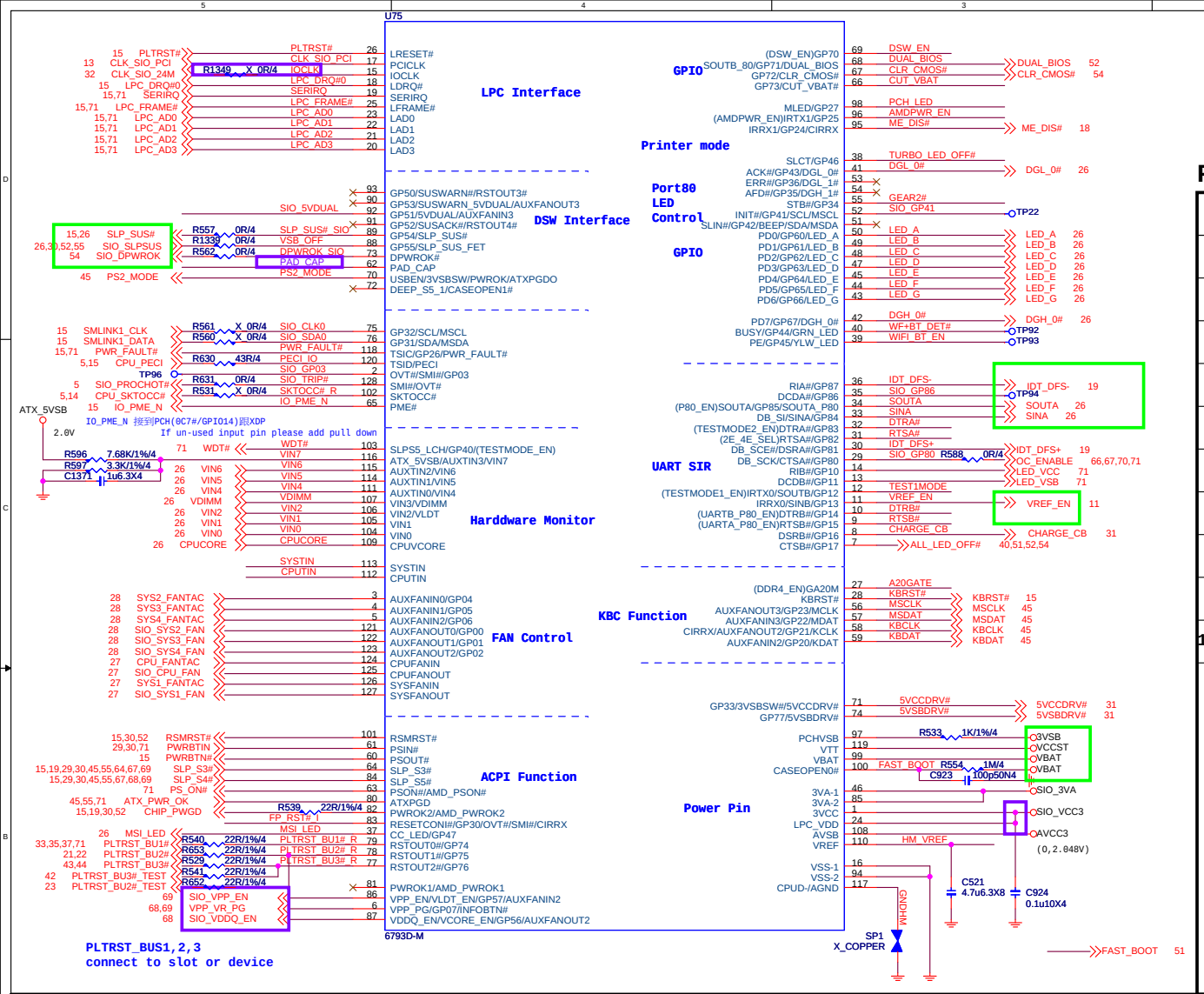
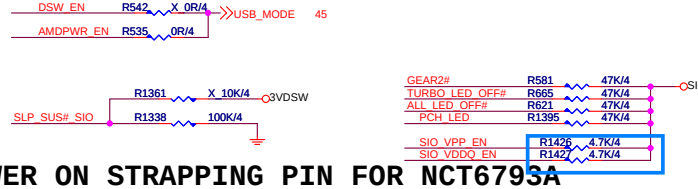
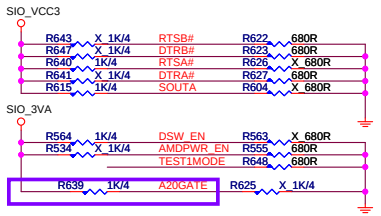




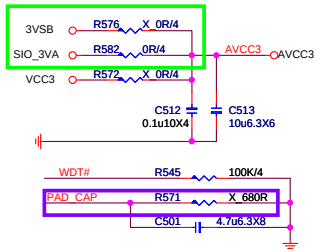
POWER ON STRAPPING PIN FOR NCT6793A

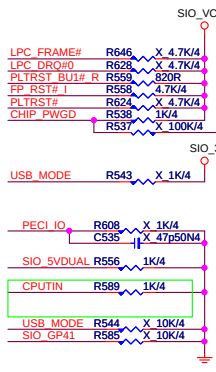
PIN	6793A NAME	Circuit NAME	0	1	Strap Point
9	UARTA_P80_EN	RTSB#	DISABLE UARTA80	ENABLE UARTA80	LRESET
10	UARTB_P80_EN	DTRB#	DISABLE UARTB80	ENABLE UARTB80	LRESET
12	TESTMODE1_EN	TESTMODE1	DISABLE TESTMODE1	ENABLE TESTMODE1	LRESET
31	2E_4E_SEL	RTSA#	I/O ADDRESS 2E	I/O ADDRESS 4E	LRESET
32	TESTMODE2_EN	DTRA#	DISABLE TESTMODE2	ENABLE TESTMODE2	INTERNAL PWROK
34	P80_EN	SOUTA	ENABLE Non_PORT80	ENABLE PORT80	LRESET
27	DDR4_EN	A20GATE	DISABLE DDR4 SEQ	ENABLE DDR4 SEQ	INTERNAL RSMRST
69	DSW_EN	DSW_EN	DISABLE INTEL DSW	ENABLE INTEL DSW	INTERNAL RSMRST
96	AMDPWR_EN	AMDPWR_EN	DISABLE AMD PWR SEQ	ENABLE AMD PWR SEQ	INTERNAL RSMRST
103	TESTMODE_EN	WDT#	DISABLE TESTMODE	ENABLE TESTMODE	INTERNAL RSMRST

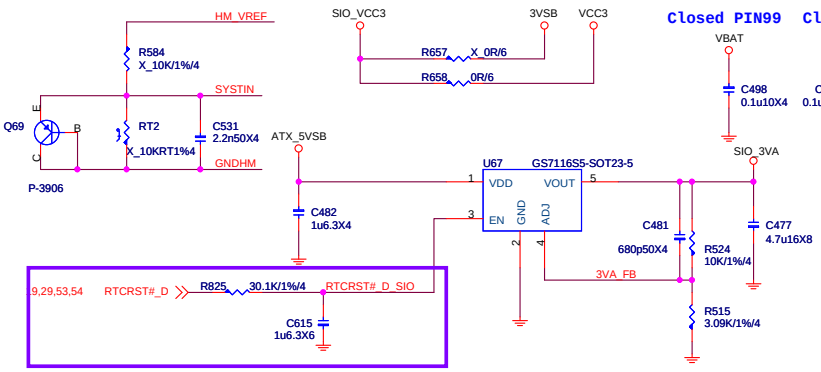
Note:
If PIN34 strapping low,BIOS must programming LPT or GPIO

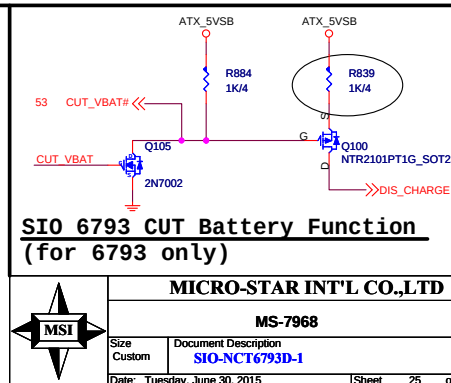


3V Analog Power









SIO 6793 CUT Battery Function (for 6793 only)

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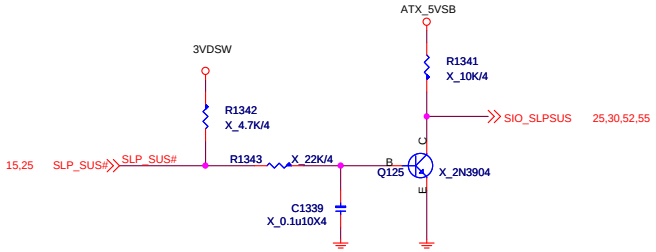
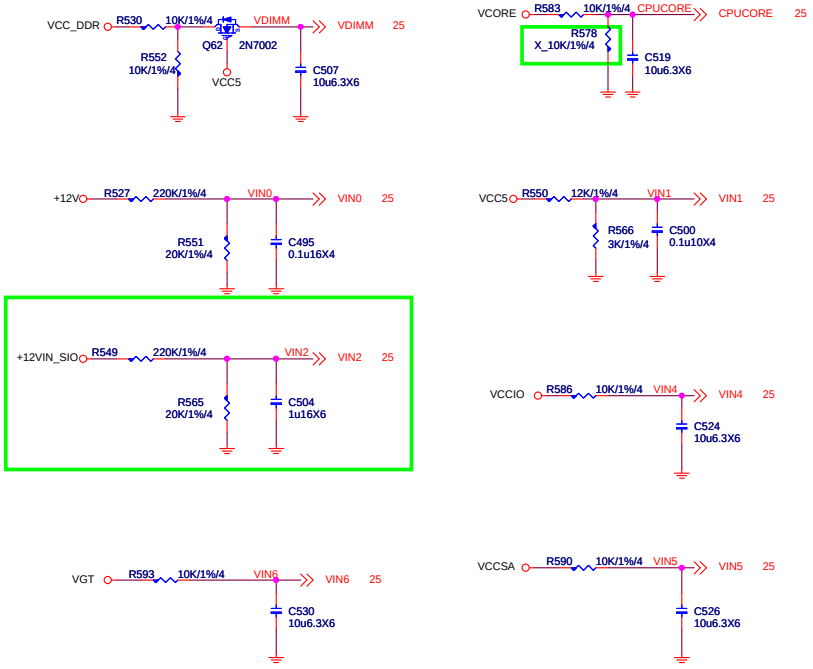
COM Port for BIOS Debug

SLP_SUS Co-lay circuit

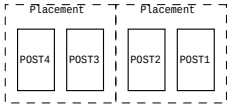


HW Monitor - Voltage

SIO HM Voltage voer 2V will not detect



DEBUG LED

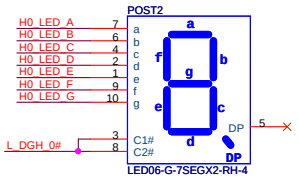


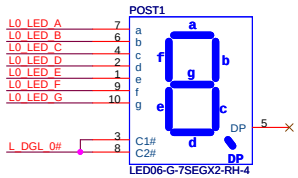
25 LED_A
25 LED_B
25 LED_C
25 LED_D
25 LED_E
25 LED_F
25 LED_G

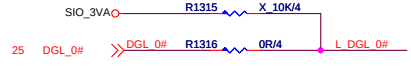
LED_A LED_B LED_C LED_D LED_E LED_F LED_G

Placement一定要對
(DGH1=Post4/DGL1=Post3/DGH0=Post2/DGL0=Post1)

Debug LED OFF BIOS control

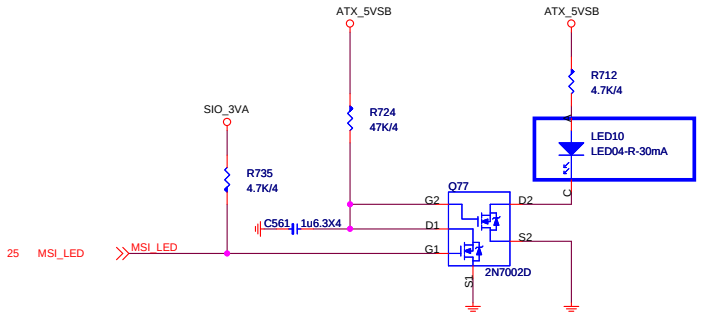






Ver 3.0
Remove Post3,Post4

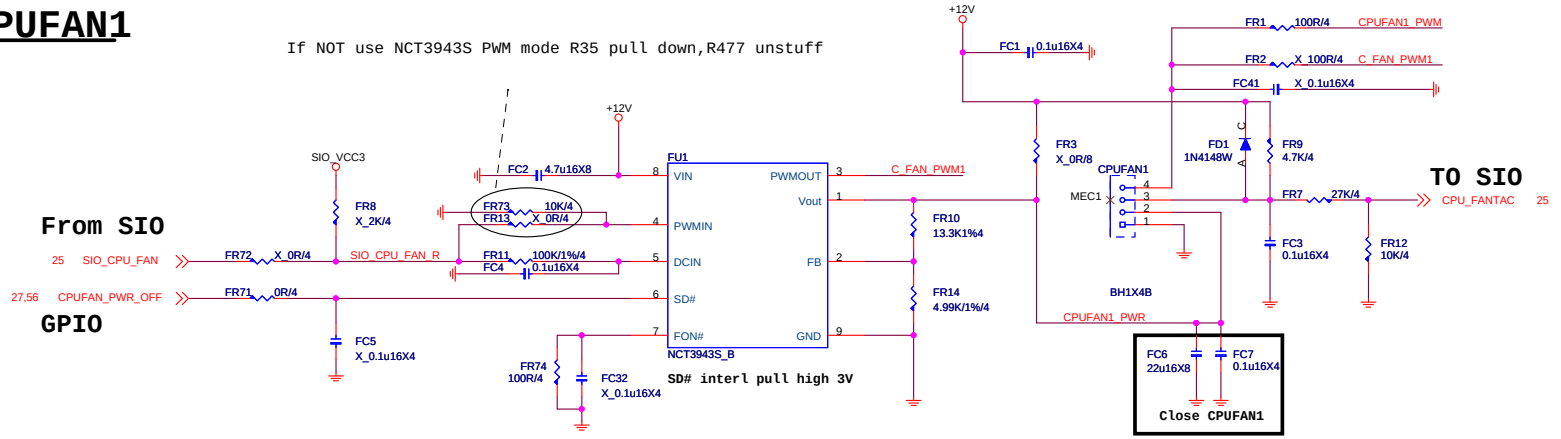
MSI_LED

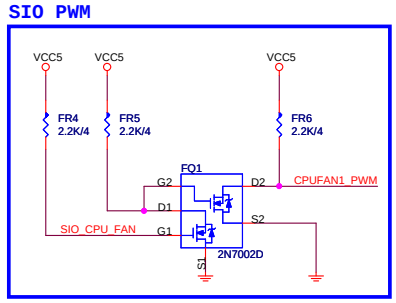


MICRO-STAR INT'L CO.,LTD		
MS-7968		
Size: Custom	Document Description: SIO-NCT6793D-2	Rev: 31
Date: Tuesday, June 30, 2015	Sheet 26 of 77	

Type I : 4 PIN CPU FAN USE SIO PWM (STUFF NCT3943S USE GPIO CUT POWER)

CPUFAN1



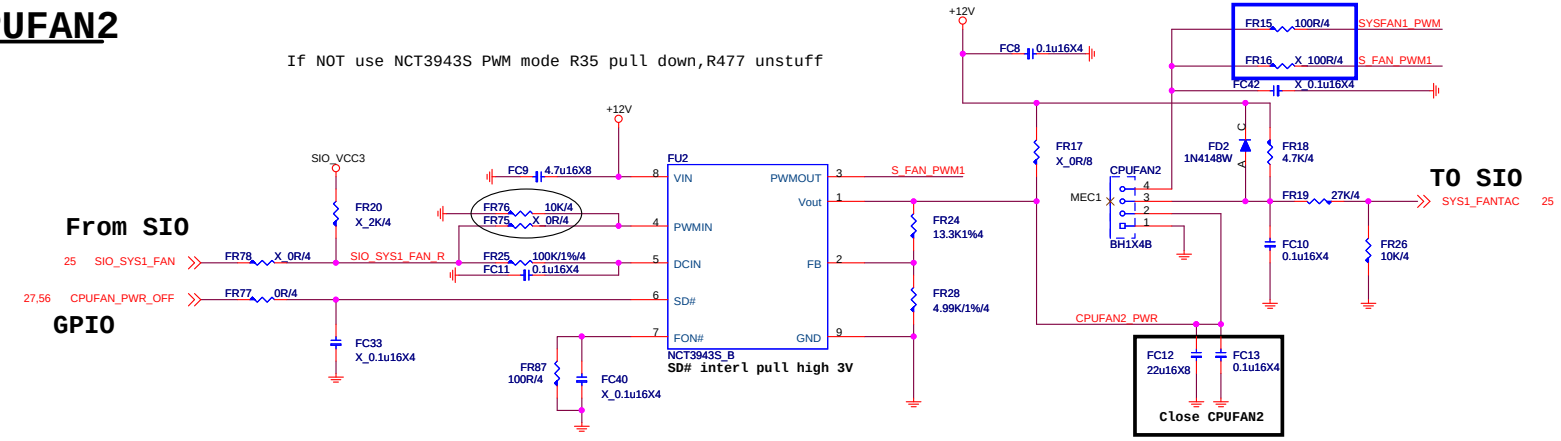


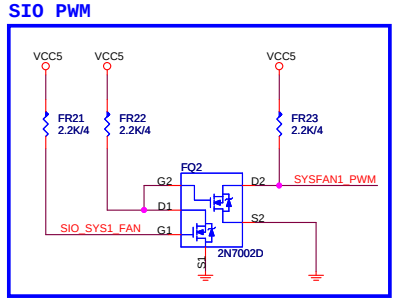
CPUFAN_PWR_OFF
GPIO Control
Deafult GPI
If USE CUT POWER
1.OPEN DRAIN LOW:SD# Active Vout(PIN2)= 0V
2.OPEN DRAIN : Internal Pull high Vout(PIN2)=12V

WITH CUT POWER

BOM OPT	FR2	FR1	FR4	FR5	FR6	FQ1	FR72	FR8	FR73	FR13	FR11	FC4	FR74
SIO PWM	X	0	0	0	0	0	X	X	0	X	X	X	0
NCT3943 PWM	0	X	X	X	X	X	0	0	X	0	0	0	X

CPUFAN2





CPUFAN_PWR_OFF
GPIO Control
Deafult GPI
If USE CUT POWER
1.OPEN DRAIN LOW:SD# Active Vout(PIN2)= 0V
2.OPEN DRAIN : Internal Pull high Vout(PIN2)=12V

WITH CUT POWER

BOM OPT	FR16	FR15	FR21	FR22	FR23	FQ2	FR78	FR20	FR76	FR75	FR25	FC11	FR87
SIO PWM	X	0	0	0	0	0	X	X	0	X	X	X	0
NCT3943 PWM	0	X	X	X	X	X	0	0	X	0	0	0	X

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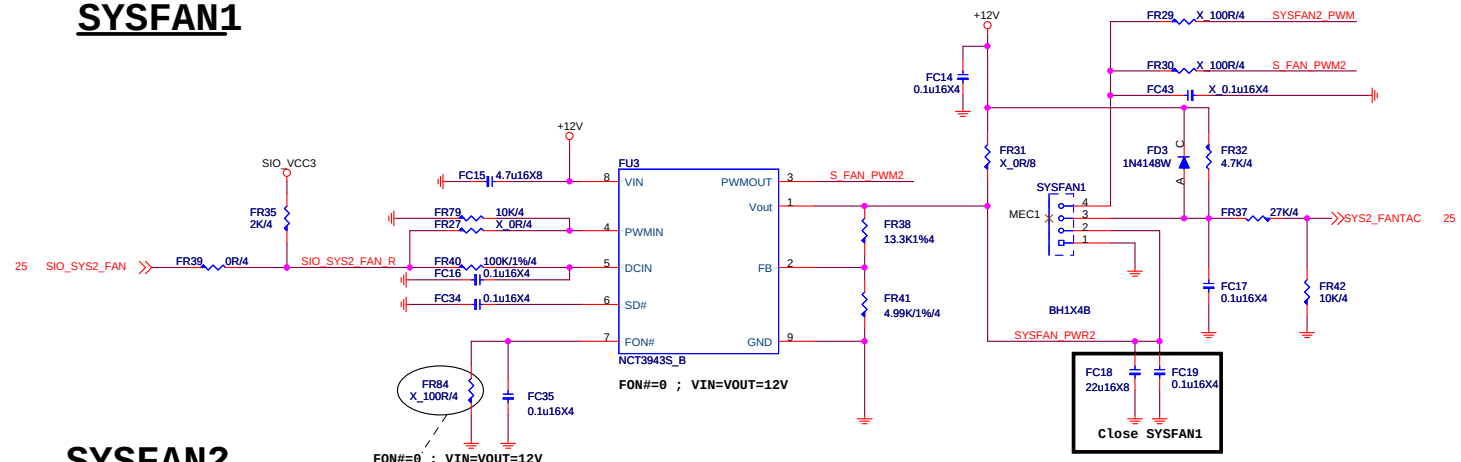
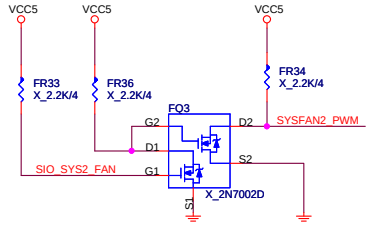
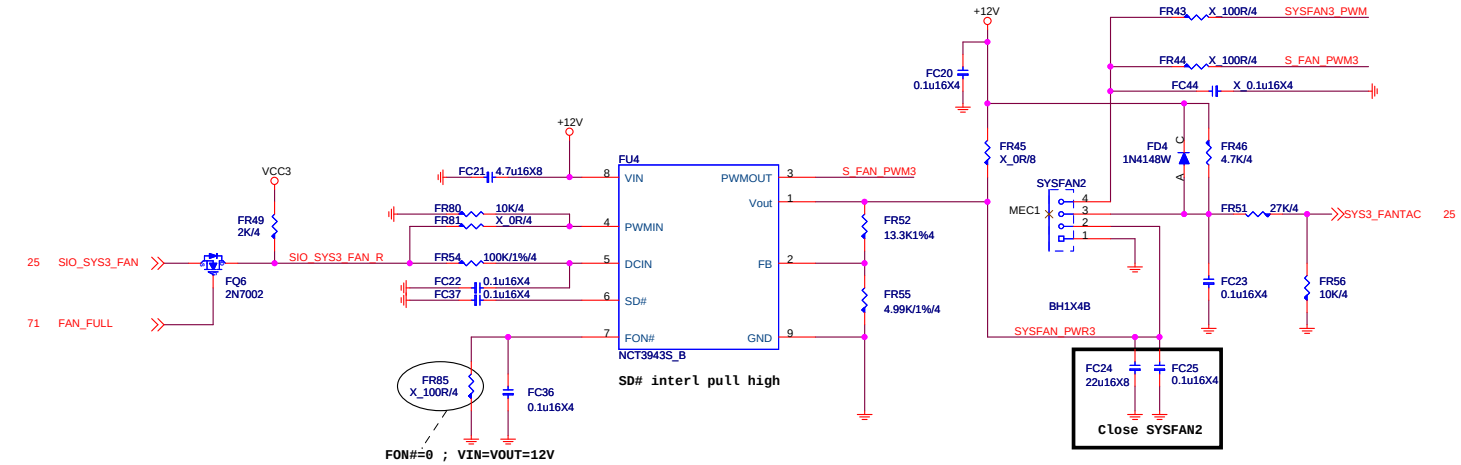
Type H : 4 PIN SYS FAN FROM NCT3943S

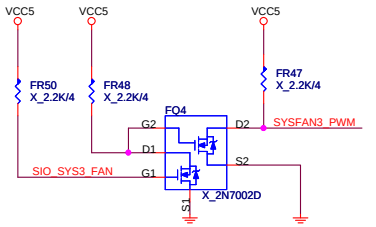
SYSFAN1



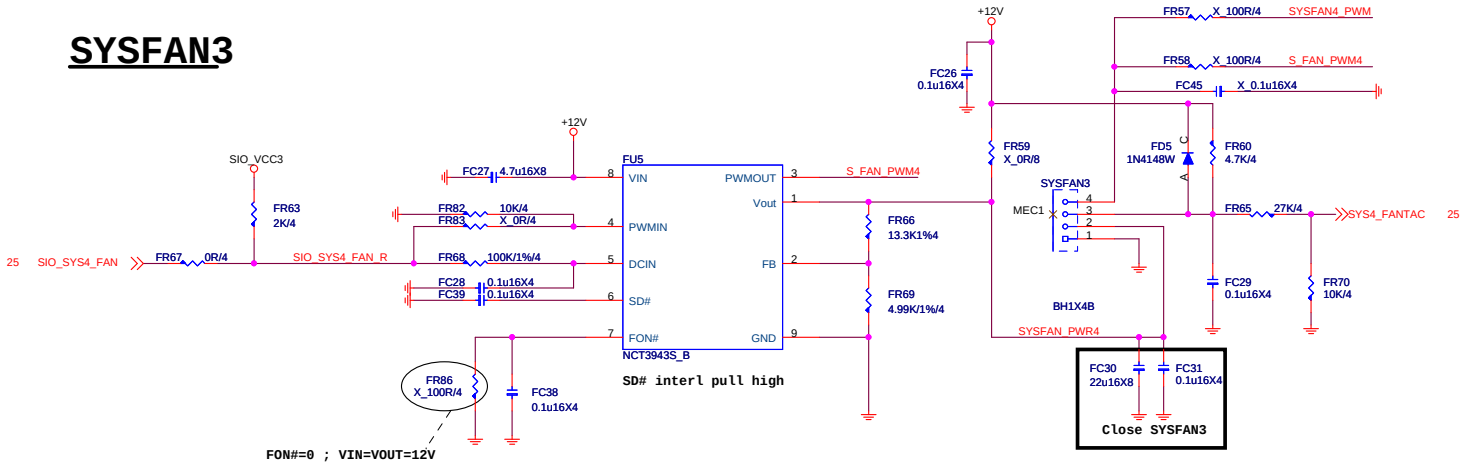


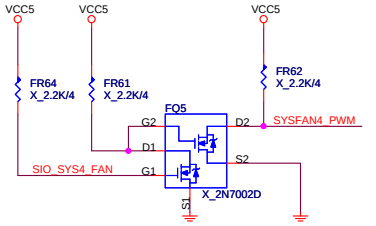
SYSFAN2





SYSFAN3





MICRO-STAR INT'L CO.,LTD		
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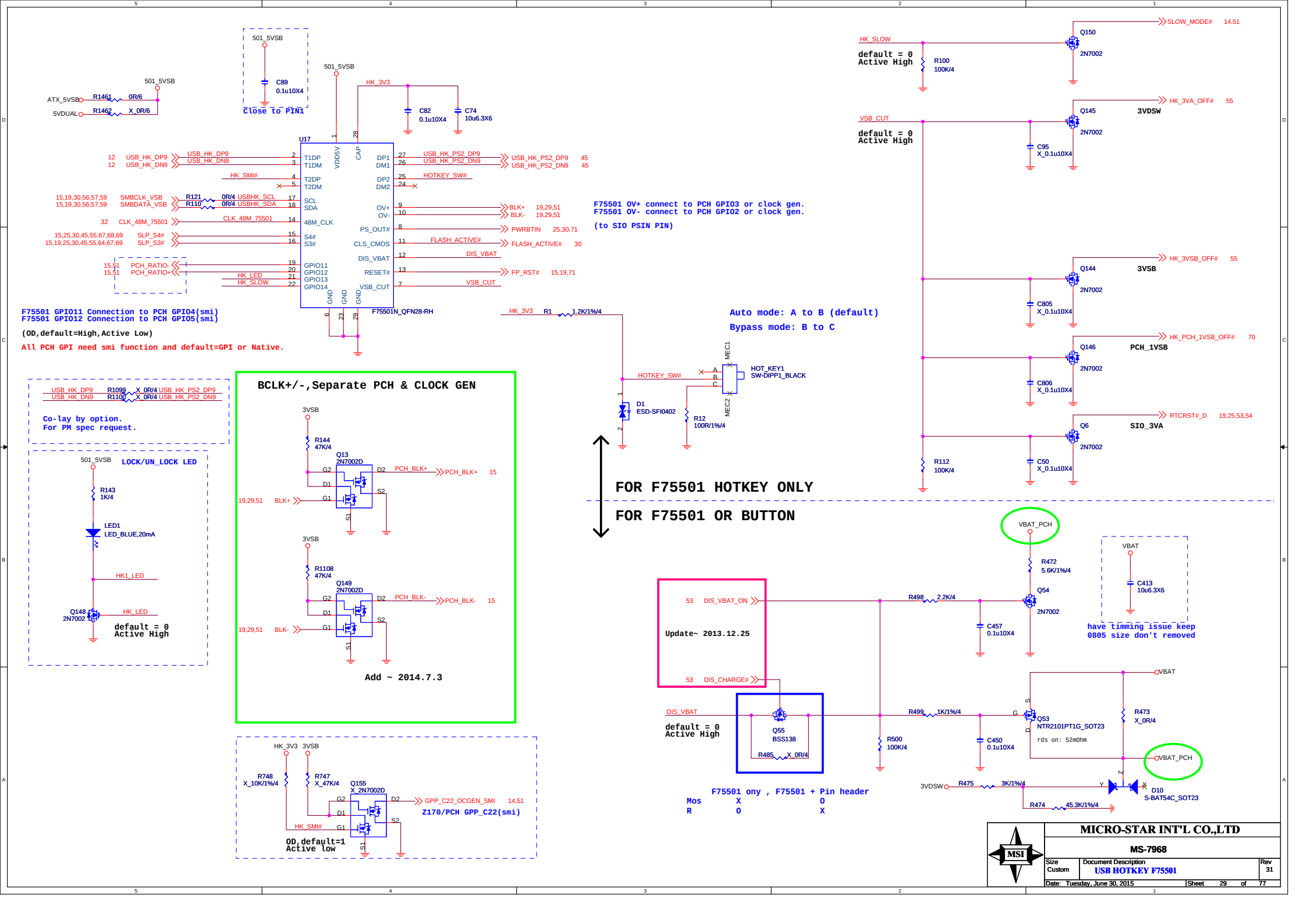
501_5VSB
C89
0.1u10X4
Close to PIN1
501_5VSB
HK_3V3
C82
0.1u10X4
C74
10u6.3X6
ATX_5VSB
5VDUAL
R1461
0R/6
R1462
X_0R/6
U17
T1DP
T1DM
T2DP
T2DM
SCL
SDA
48M_CLK
S4#
S3#
GPIO11
GPIO12
GPIO13
GPIO14
VDD5V
CAP
DP1
DM1
DP2
DM2
OV+
OV-
PS_OUT#
CLS_CMOS
DIS_VBAT
RESET#
VSB_CUT
GND
F75501N_QFN28-RH
USB_HK_DP9
USB_HK_DN9
USB_HK_PS2_DP9
USB_HK_PS2_DN9
HK_SMI#
HOTKEY_SW#
SMBCLK_VSB
SMBDATA_VSB
R121
R110
0R/4 USBHK_SCL
0R/4 USBHK_SDA
CLK_48M_75501
SLP_S4#
SLP_S3#
PCH_RATIO-
PCH_RATIO+
HK_LED
HK_SLOW
BLK+
BLK-
PWRBTIN
FLASH_ACTIVE#
DIS_VBAT
FP_RST#
VSB_CUT
F75501 GPIO11 Connection to PCH GPIO4(smi)
F75501 GPIO12 Connection to PCH GPIO5(smi)
(OD,default=High,Active Low)
All PCH GPI need smi function and default=GPI or Native.
F75501 OV+ connect to PCH GPIO3 or clock gen.
F75501 OV- connect to PCH GPIO2 or clock gen.
(to SIO PSIN PIN)
HK_3V3
R1
1.2K/1%/4
HOTKEY_SW#
HOT_KEY1
SW-DIPP1_BLACK
D1
ESD-SFI0402
R12
100R/1%/4
Auto mode: A to B (default)
Bypass mode: B to C
FOR F75501 HOTKEY ONLY
FOR F75501 OR BUTTON
HK_SLOW
default = 0
Active High
R100
100K/4
Q150
2N7002
SLOW_MODE#
VSB_CUT
Q145
3VDSW
HK_3VA_OFF#
C95
X_0.1u10X4
Q144
3VSB
HK_3VSB_OFF#
C805
X_0.1u10X4
Q146
PCH_1VSB
HK_PCH_1VSB_OFF#
C806
X_0.1u10X4
Q6
SIO_3VA
RTCRST#_D
C50
X_0.1u10X4
R112
100K/4
USB_HK_DP9
USB_HK_DN9
R1099
X_0R/4
R1100
X_0R/4
USB_HK_PS2_DP9
USB_HK_PS2_DN9
Co-lay by option.
For PM spec request.
501_5VSB
LOCK/UN_LOCK LED
R143
1K/4
LED1
LED_BLUE,20mA
HK1_LED
Q148
2N7002
HK_LED
default = 0
Active High
BCLK+/-,Separate PCH & CLOCK GEN
3VSB
R144
47K/4
Q13
2N7002D
PCH_BLK+
R1108
47K/4
Q149
2N7002D
PCH_BLK-
Add ~ 2014.7.3
HK_3V3
3VSB
R748
X_10K/1%/4
R747
X_47K/4
Q155
X_2N7002D
GPP_C22_OCGEN_SMI
Z170/PCH GPP_C22(smi)
OD,default=1
Active low
53
DIS_VBAT_ON
Update~ 2013.12.25
DIS_CHARGE#
DIS_VBAT
default = 0
Active High
Q55
BSS138
R485
X_0R/4
R498
2.2K/4
C457
0.1u10X4
R499
1K/1%/4
R500
100K/4
C450
0.1u10X4
Q53
NTR2101PT1G_SOT23
rds on: 52mOhm
R472
5.6K/1%/4
Q54
2N7002
VBAT_PCH
VBAT
C413
10u6.3X6
have timming issue keep
0805 size don't removed
R473
X_0R/4
R475
3K/1%/4
R474
45.3K/1%/4
D10
S-BAT54C_SOT23
F75501 ony , F75501 + Pin header
Mos X 0
R 0 X
MSI
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MS-7968
Size
Custom
Document Description
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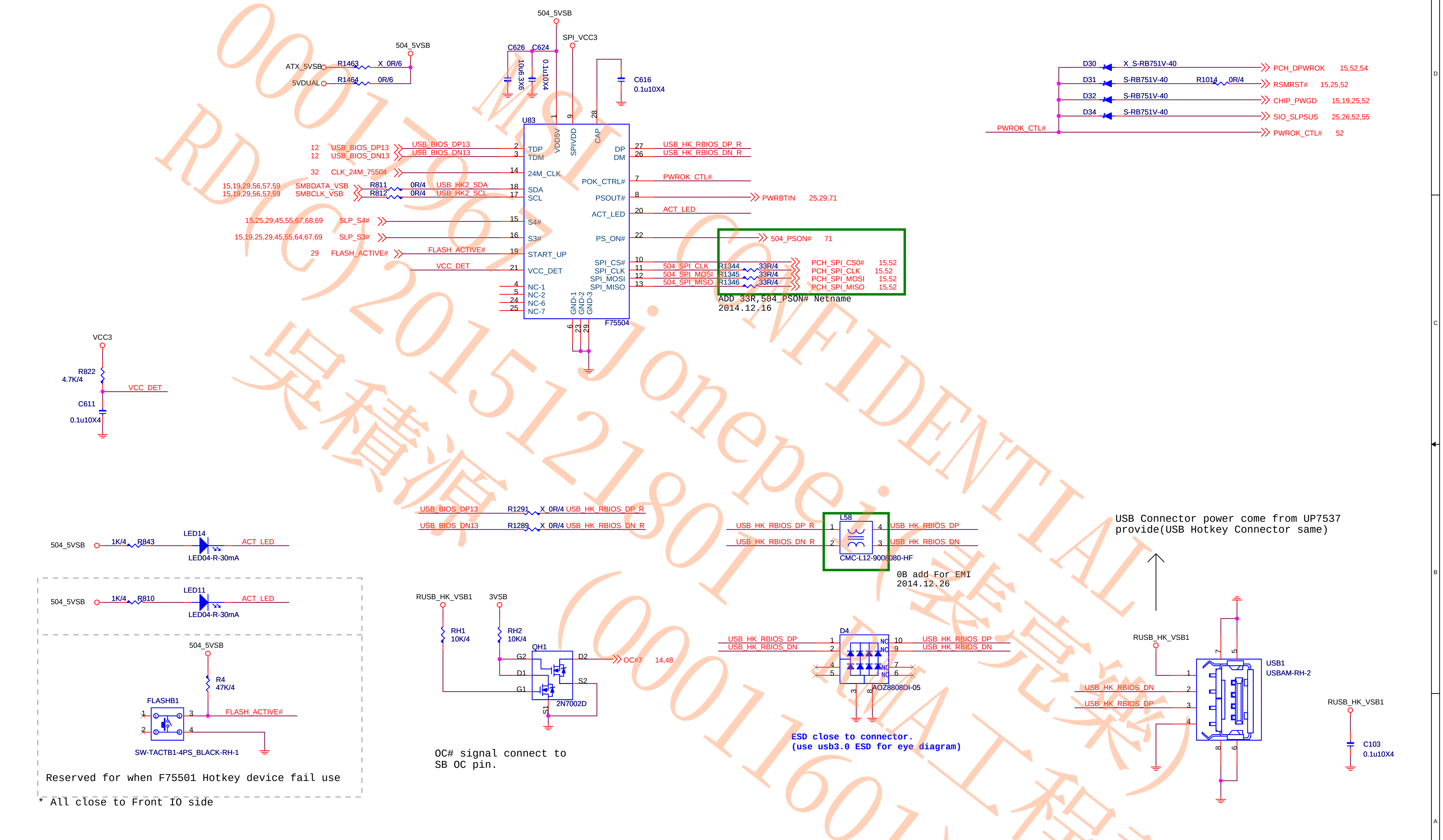
Host USB connector



504_5VSB
SPI_VCC3
ATX_5VSB R1463 X_0R/6
5VDUAL R1464 0R/6
C626 C624 10u6.3X6 0.1u10X4
C616 0.1u10X4
U83
VDD5V SPIVDD CAP
12 USB_BIOS_DP13 USB_BIOS_DP13 2 TDP
12 USB_BIOS_DN13 USB_BIOS_DN13 3 TDM
32 CLK_24M_75504 14 24M_CLK
15,19,29,56,57,59 SMBDATA_VSB R811 0R/4 USB_HK2_SDA 18 SDA
15,19,29,56,57,59 SMBCLK_VSB R812 0R/4 USB_HK2_SCL 17 SCL
15,25,29,45,55,67,68,69 SLP_S4# 15 S4#
15,19,25,29,45,55,64,67,69 SLP_S3# 16 S3#
29 FLASH_ACTIVE# FLASH_ACTIVE# 19 START_UP
VCC_DET 21 VCC_DET
4 NC-1 5 NC-2 24 NC-6 25 NC-7
GND-1 GND-2 GND-3 6 23 29
F75504
DP 27 USB_HK_RBIOS_DP_R
DM 26 USB_HK_RBIOS_DN_R
POK_CTRL# 7 PWROK_CTL#
PSOUT# 8 PWRBTIN 25,29,71
ACT_LED 20 ACT_LED
PS_ON# 22 504_PSON# 71
SPI_CS# 10
SPI_CLK 11 504_SPI_CLK R1344 33R/4 PCH_SPI_CS0# 15,52
SPI_MOSI 12 504_SPI_MOSI R1345 33R/4 PCH_SPI_CLK 15,52
SPI_MISO 13 504_SPI_MISO R1346 33R/4 PCH_SPI_MOSI 15,52
PCH_SPI_MISO 15,52
ADD 33R,504_PSON# Netname
2014.12.16
D30 X_S-RB751V-40 PCH_DPWROK 15,52,54
D31 S-RB751V-40 R1014 0R/4 RSMRST# 15,25,52
D32 S-RB751V-40 CHIP_PWGD 15,19,25,52
D34 S-RB751V-40 SIO_SLPSUS 25,26,52,55
PWROK_CTL# PWROK_CTL# 52
VCC3
R822 4.7K/4
VCC_DET
C611 0.1u10X4
USB_BIOS_DP13 R1291 X_0R/4 USB_HK_RBIOS_DP_R
USB_BIOS_DN13 R1289 X_0R/4 USB_HK_RBIOS_DN_R
L58
USB_HK_RBIOS_DP_R 1 4 USB_HK_RBIOS_DP
USB_HK_RBIOS_DN_R 2 3 USB_HK_RBIOS_DN
CMC-L12-9008080-HF
0B add For EMI
2014.12.26
USB Connector power come from UP7537
provide(USB Hotkey Connector same)
504_5VSB 1K/4 R843 LED14 ACT_LED
LED04-R-30mA
504_5VSB 1K/4 R810 LED11 ACT_LED
LED04-R-30mA
504_5VSB
R4 47K/4
FLASHB1
FLASH_ACTIVE#
SW-TACTB1-4PS_BLACK-RH-1
Reserved for when F75501 Hotkey device fail use
* All close to Front IO side
RUSB_HK_VSB1 3VSB
RH1 10K/4
RH2 10K/4
QH1 G2 D2 D1 G1 S2 S1
OC#7 14,48
2N7002D
OC# signal connect to
SB OC pin.
D4
USB_HK_RBIOS_DP 1 10 USB_HK_RBIOS_DP
USB_HK_RBIOS_DN 2 9 USB_HK_RBIOS_DN
AOZ8808DI-05
ESD close to connector.
(use usb3.0 ESD for eye diagram)
RUSB_HK_VSB1
USB_HK_RBIOS_DN
USB_HK_RBIOS_DP
USB1
USBAM-RH-2
RUSB_HK_VSB1
C103 0.1u10X4

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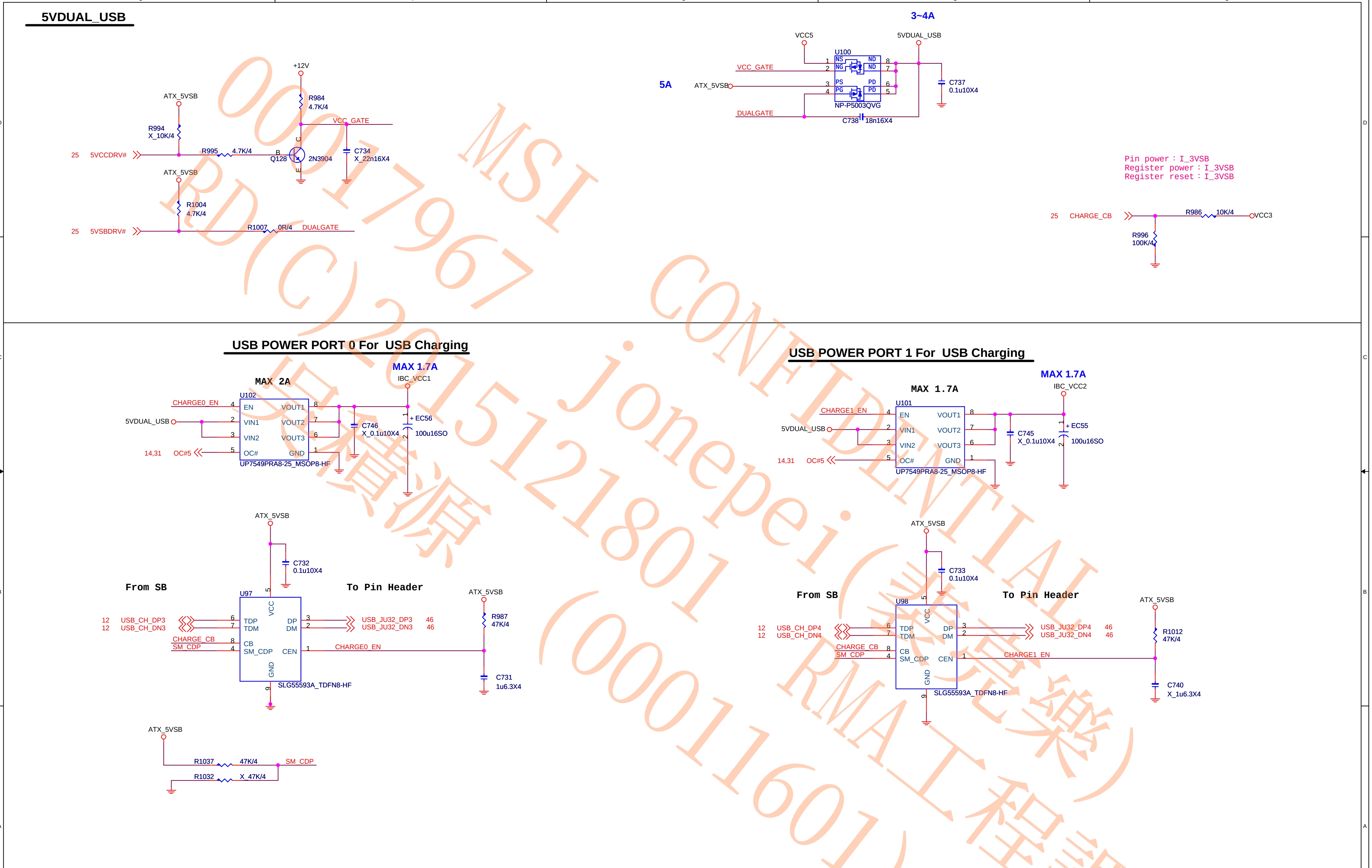

5VDUAL_USB
3~4A
5A
VCC5
5VDUAL_USB
U100
NP-P5003QVG
VCC_GATE
ATX_5VSB
DUALGATE
C737 0.1u10X4
C738 18n16X4
+12V
R984 4.7K/4
ATX_5VSB
R994 X_10K/4
VCC_GATE
25 5VCCDRV#
R995 4.7K/4
Q128 2N3904
C734 X_22n16X4
ATX_5VSB
R1004 4.7K/4
25 5VSBDRV#
R1007 0R/4
DUALGATE
Pin power : I_3VSB
Register power : I_3VSB
Register reset : I_3VSB
25 CHARGE_CB
R986 10K/4
VCC3
R996 100K/4
USB POWER PORT 0 For USB Charging
MAX 1.7A
IBC_VCC1
MAX 2A
U102
CHARGE0_EN
5VDUAL_USB
14,31 OC#5
EN VIN1 VIN2 OC# VOUT1 VOUT2 VOUT3 GND
C746 X_0.1u10X4
EC56 100u16SO
UP7549PRA8-25_MSOP8-HF
USB POWER PORT 1 For USB Charging
MAX 1.7A
IBC_VCC2
MAX 1.7A
U101
CHARGE1_EN
5VDUAL_USB
14,31 OC#5
C745 X_0.1u10X4
EC55 100u16SO
UP7549PRA8-25_MSOP8-HF
ATX_5VSB
C732 0.1u10X4
From SB
To Pin Header
U97
12 USB_CH_DP3
12 USB_CH_DN3
CHARGE_CB
SM_CDP
TDP TDM CB SM_CDP VCC GND DP DM CEN
USB_JU32_DP3 46
USB_JU32_DN3 46
CHARGE0_EN
ATX_5VSB
R987 47K/4
C731 1u6.3X4
SLG55593A_TDFN8-HF
ATX_5VSB
C733 0.1u10X4
From SB
To Pin Header
U98
12 USB_CH_DP4
12 USB_CH_DN4
CHARGE_CB
SM_CDP
USB_JU32_DP4 46
USB_JU32_DN4 46
CHARGE1_EN
ATX_5VSB
R1012 47K/4
C740 X_1u6.3X4
SLG55593A_TDFN8-HF
ATX_5VSB
R1037 47K/4
SM_CDP
R1032 X_47K/4

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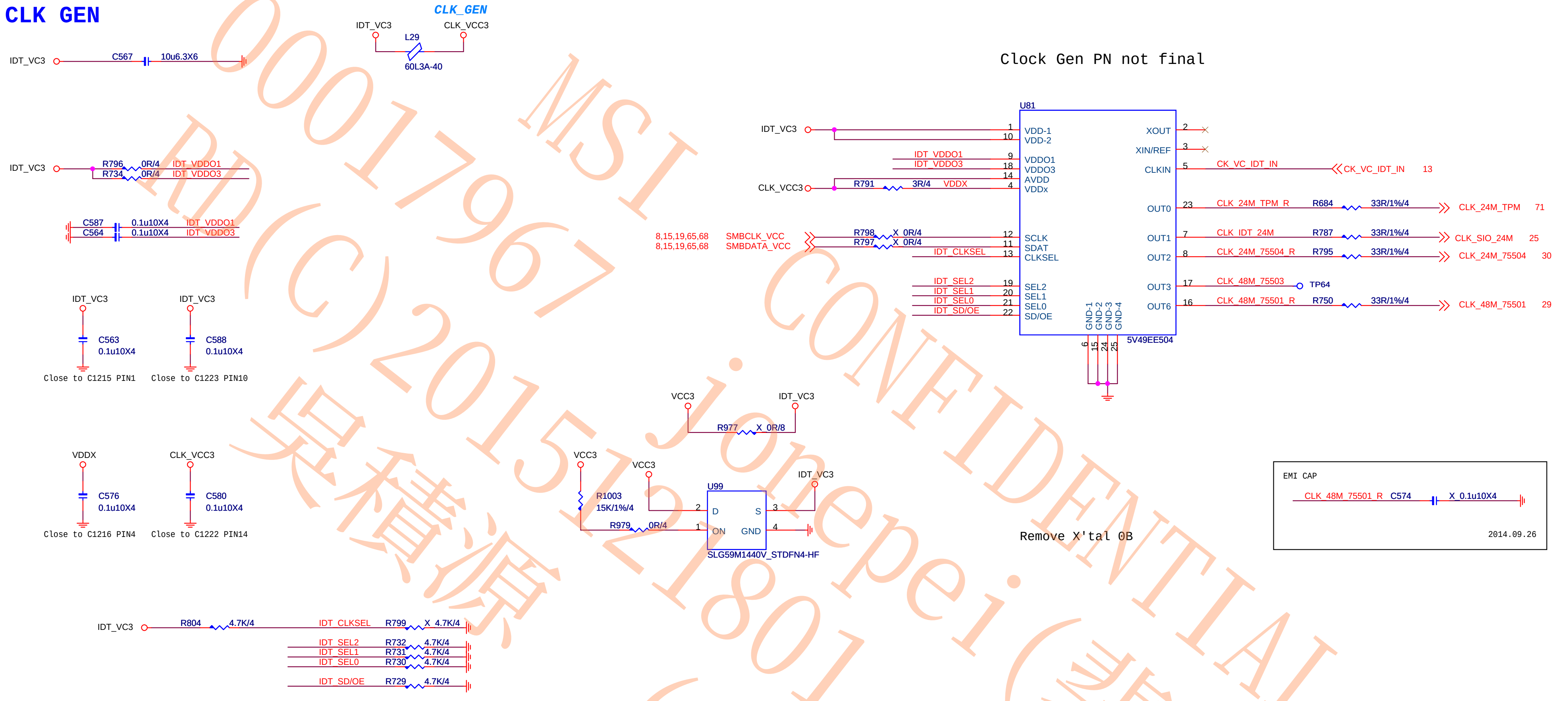
CLK GEN



MICRO-STAR INT'L CO.,LTD

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Size: Custom | Document Description: Clock Gen -IDT_VC3 | Rev: 31

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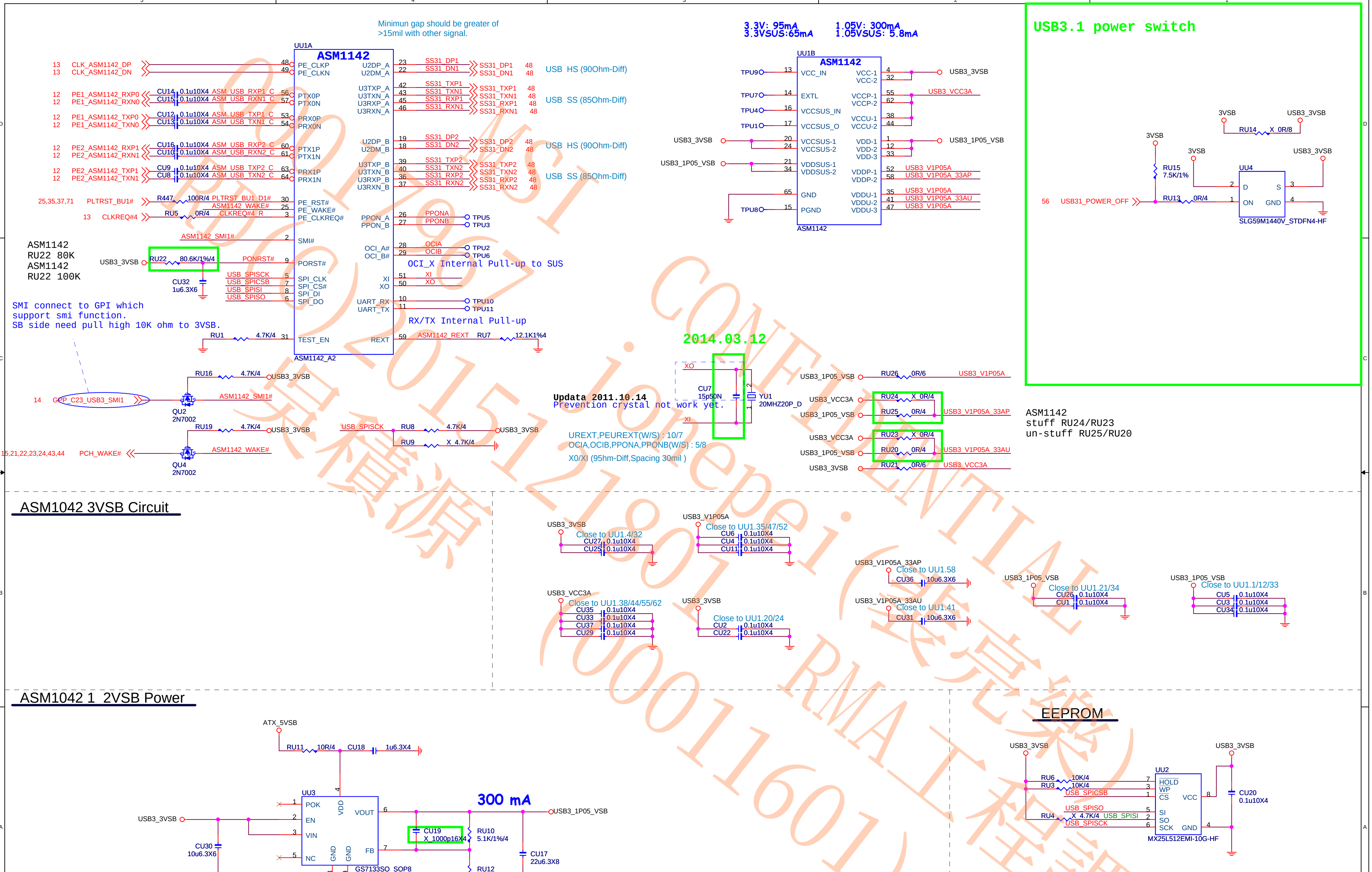

USB3.1 power switch
Minimun gap should be greater of >15mil with other signal.
3.3V: 95mA
3.3VSUS:65mA
1.05V: 300mA
1.05VSUS: 5.8mA
UU1A
ASM1142
CLK_ASM1142_DP
CLK_ASM1142_DN
PE1_ASM1142_RXP0
PE1_ASM1142_RXN0
PE1_ASM1142_TXP0
PE1_ASM1142_TXN0
PE2_ASM1142_RXP1
PE2_ASM1142_RXN1
PE2_ASM1142_TXP1
PE2_ASM1142_TXN1
PLTRST_BU1#
CLKREQ#4
PE_CLKP
PE_CLKN
PTX0P
PTX0N
PRX0P
PRX0N
PTX1P
PTX1N
PRX1P
PRX1N
PE_RST#
PE_WAKE#
PE_CLKREQ#
SMI#
PORST#
SPI_CLK
SPI_CS#
SPI_DI
SPI_DO
TEST_EN
ASM1142_A2
U2DP_A
U2DM_A
U3TXP_A
U3TXN_A
U3RXP_A
U3RXN_A
U2DP_B
U2DM_B
U3TXP_B
U3TXN_B
U3RXP_B
U3RXN_B
PPON_A
PPON_B
OCI_A#
OCI_B#
XI
XO
UART_RX
UART_TX
REXT
USB HS (90Ohm-Diff)
USB SS (85Ohm-Diff)
OCI_X Internal Pull-up to SUS
RX/TX Internal Pull-up
ASM1142
RU22 80K
ASM1142
RU22 100K
SMI connect to GPI which
support smi function.
SB side need pull high 10K ohm to 3VSB.
GPP_C23_USB3_SMI1
PCH_WAKE#
QU2
2N7002
QU4
2N7002
UU1B
ASM1142
VCC_IN
EXTL
VCCSUS_IN
VCCSUS_O
VCCSUS-1
VCCSUS-2
VDDSUS-1
VDDSUS-2
GND
PGND
VCC-1
VCC-2
VCCP-1
VCCP-2
VCCU-1
VCCU-2
VDD-1
VDD-2
VDD-3
VDDP-1
VDDP-2
VDDU-1
VDDU-2
VDDU-3
USB3_3VSB
USB3_VCC3A
USB3_1P05_VSB
USB3_V1P05A
USB3_V1P05A_33AP
USB3_V1P05A_33AU
UU4
SLG59M1440V_STDFN4-HF
USB31_POWER_OFF
RU15 7.5K/1%
2014.03.12
Updata 2011.10.14
Prevention crystal not work yet.
YU1
20MHZ20P_D
CU7
15p50N
UREXT,PEUREXT(W/S) : 10/7
OCIA,OCIB,PPONA,PPONB(W/S) : 5/8
X0/XI (95hm-Diff,Spacing 30mil)
ASM1142
stuff RU24/RU23
un-stuff RU25/RU20
ASM1042 3VSB Circuit
Close to UU1.4/32
Close to UU1.35/47/52
Close to UU1.58
Close to UU1.21/34
Close to UU1.1/12/33
Close to UU1.38/44/55/62
Close to UU1.20/24
Close to UU1.41
ASM1042 1_2VSB Power
ATX_5VSB
UU3
GS7133SO_SOP8
POK
EN
VIN
NC
VOUT
FB
300 mA
1.05V :3.16K
1.2V : 5.1K
EEPROM
UU2
MX25L512EMI-10G-HF
HOLD
WP
CS
SI
SO
SCK
VCC
GND

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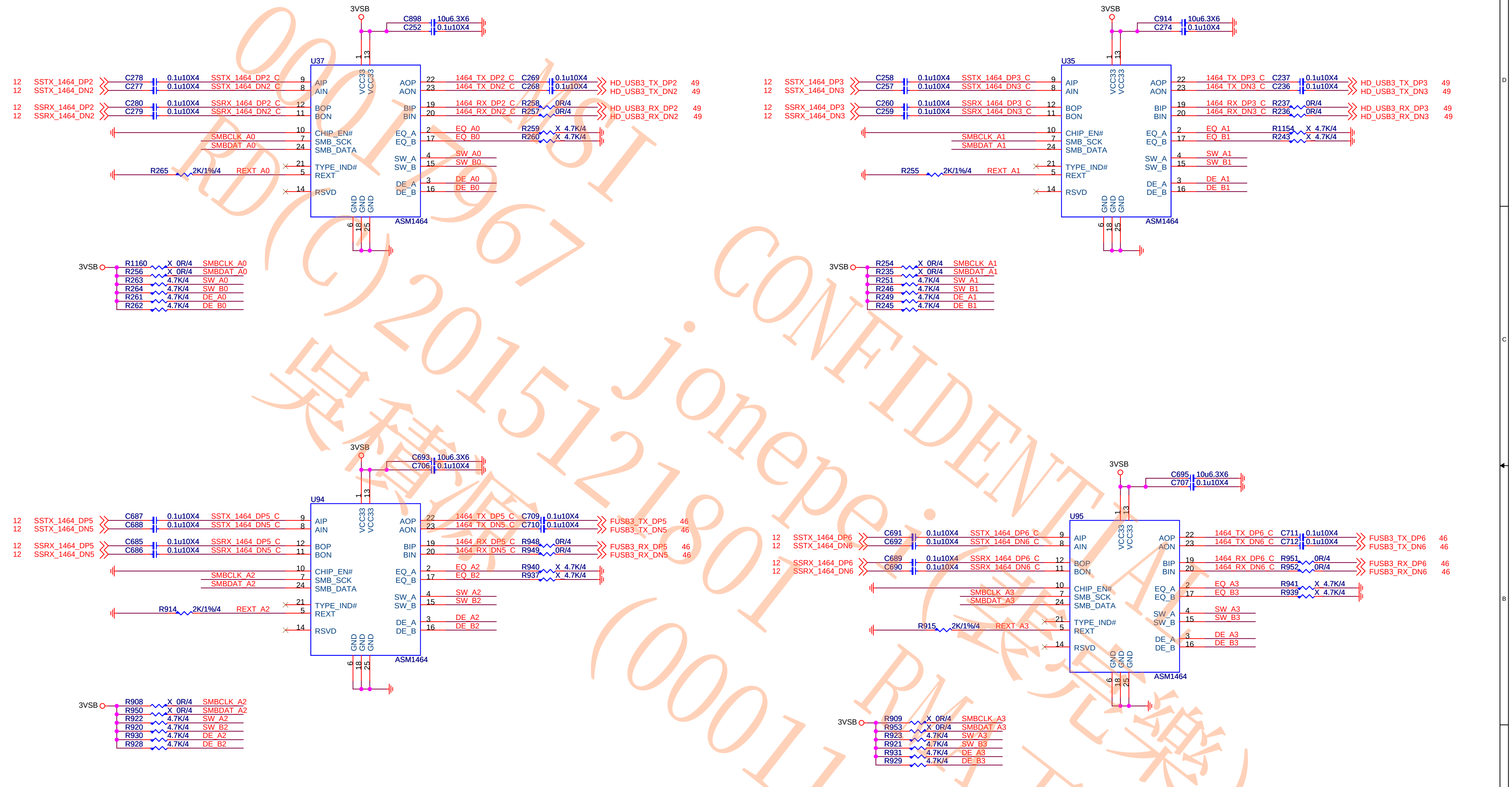

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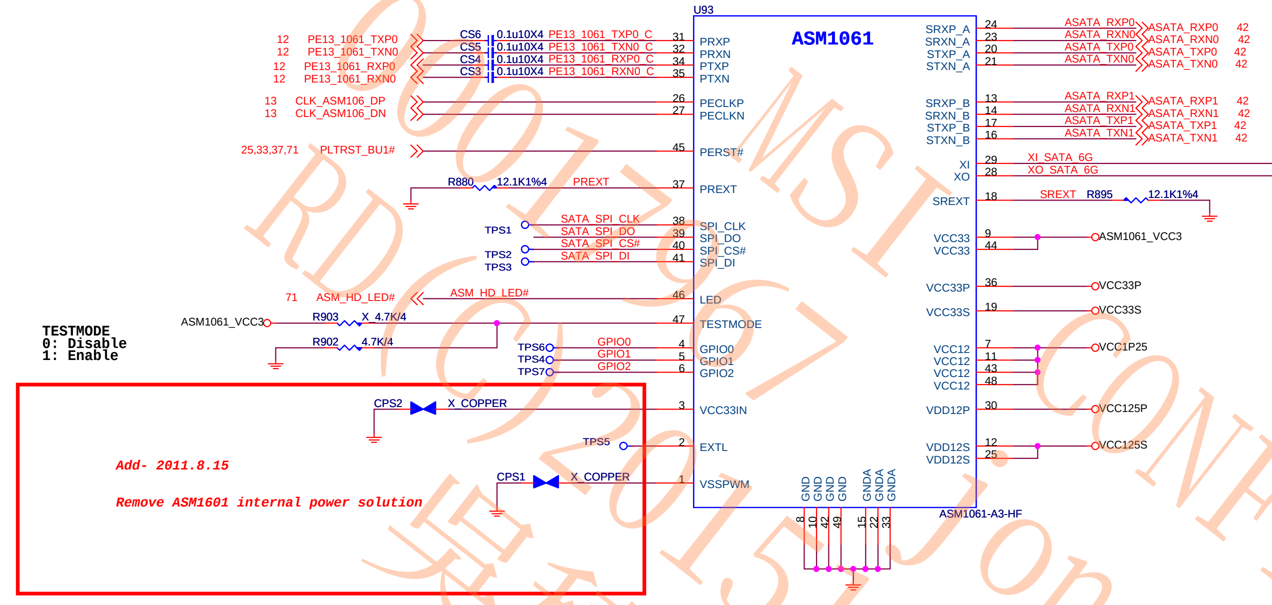
ASM1061 SATA6G

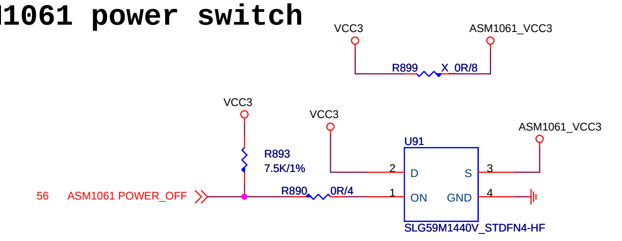


TESTMODE
0: Disable
1: Enable

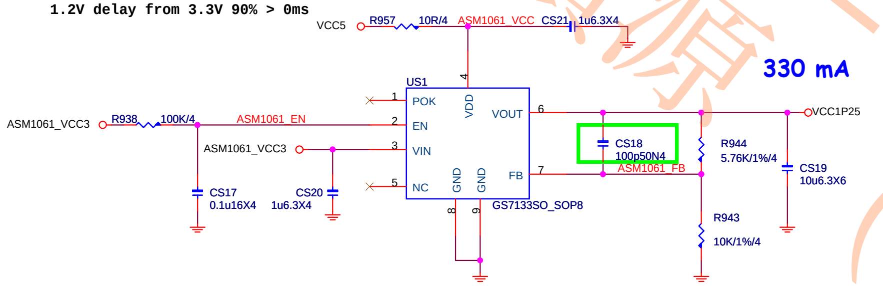
Add- 2011.8.15

Remove ASM1601 internal power solution

ASM1061 power switch



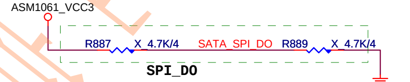
1.2V delay from 3.3V 90% > 0ms



ASM1061 POWER Consumption

	3.3V	1.2V	Power (mW)
Idle (mA)	98.45	212.3	579.645
Busy (mA)	91.1	330.7	697.47

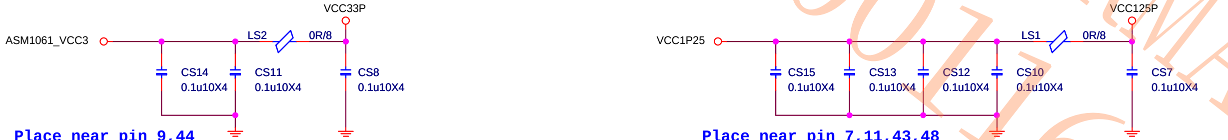
3.0



SPI_DO
0: Spinup by H/W
1: Spinup by S/W

Add- 2011.3.18

SATA_SPI_DO don't need pull up (integrated pull-up)
or pull down for Asmedia recommendation.
Asmedia suggest that we use spinup by s/w mode for MB or PCI-E Card.



Place near pin 9,44

Place near pin 36

Place near pin 7,11,43,48

Place near pin 30

Place near pin 19

Place near pin 12,25

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HDMI level shifter

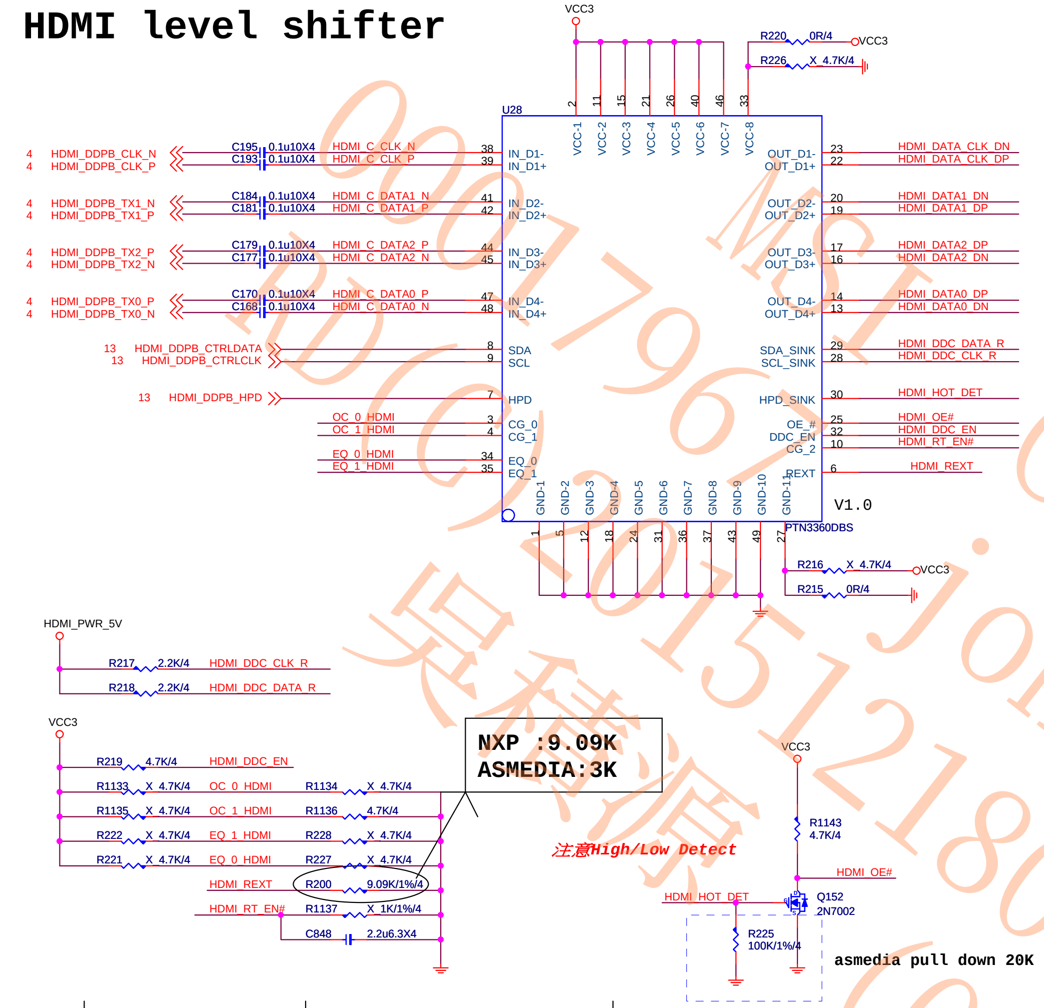
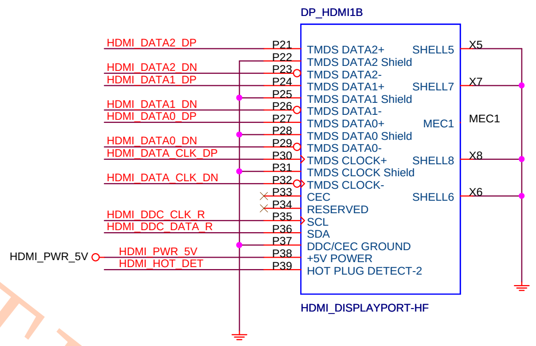
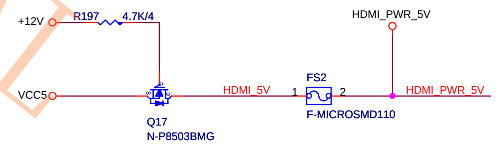


Table 8-1. PCH PCI Express Tx/RX - HDMI Signal Mappings

Port	Digital Display Interface Differential Pairs	HDMI Signals	PCH Digital Display Interface Pins
Port B	DDSP_B_TX0_DN	TMDSB_DATA2#	DDPB_0N
	DDSP_B_TX0_DP	TMDSB_DATA2	DDPB_0P
	DDSP_B_TX1_DN	TMDSB_DATA1#	DDPB_1N
	DDSP_B_TX1_DP	TMDSB_DATA1	DDPB_1P
	DDSP_B_TX2_DN	TMDSB_DATA0#	DDPB_2N
	DDSP_B_TX2_DP	TMDSB_DATA0	DDPB_2P
	DDSP_B_TX3_DN	TMDSB_CLK#	DDPB_3N
	DDSP_B_TX3_DP	TMDSB_CLK	DDPB_3P
	DDPB_HPD	DDSP_B_HPD0	Hot plug detect used by HDMI Port B.
	SDVO_CTRLCLK	HDMIB_CTRL_CLK	HDMI DDC lines for Port B
	SDVO_CTRLDATA	HDMIB_CTRL_DATA	



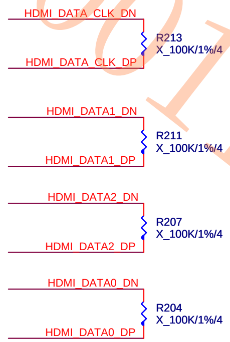


	"0"	"1"	note
DDC_EN	DDC level shifter disable	DDC level shifter enable	internal pull-up at ~500K ohm.
RT_EN#	Input 50 ohm termination resistor enable	the input termination ; resistors are set to high impedances	internal pull-down at ~500K ohm.
OE#	enable	the chip is power down and input termination resistors will be at high impedance.	internal pull-down at ~500K ohm.
HPD_SINK	disable	enable	internal pull-down at ~200K ohm; 5V tolerant.
DDCBUF_EN	For DDC level shifitng configuration, please refer to Table.		internal pull-down at ~500K ohm.
REXT			analog current generation.

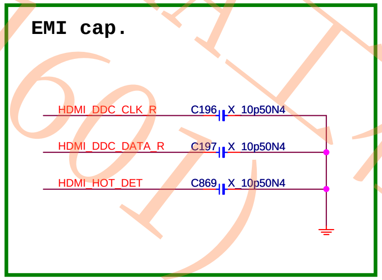
[DDC_EN, DDCBUF_EN, OE#]	DDC Passive Switch	DDC Active Buffer
1, 0, X	On	Off
1, 1, 0	Off	On
1, 1, 1	Off	Off
0, X, X	Off	Off

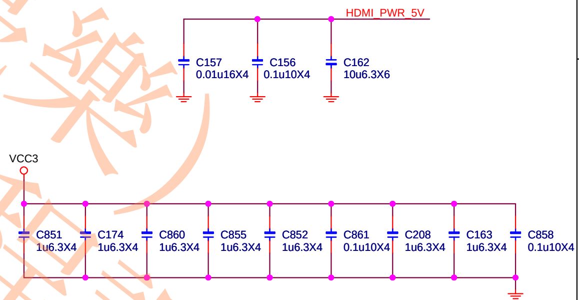
PC1, PC0		note
00	8 dB	internal pull-down at ~500K ohm.
01	4 dB	
10	12 dB	
11	0 dB	

EMI



EMI cap.





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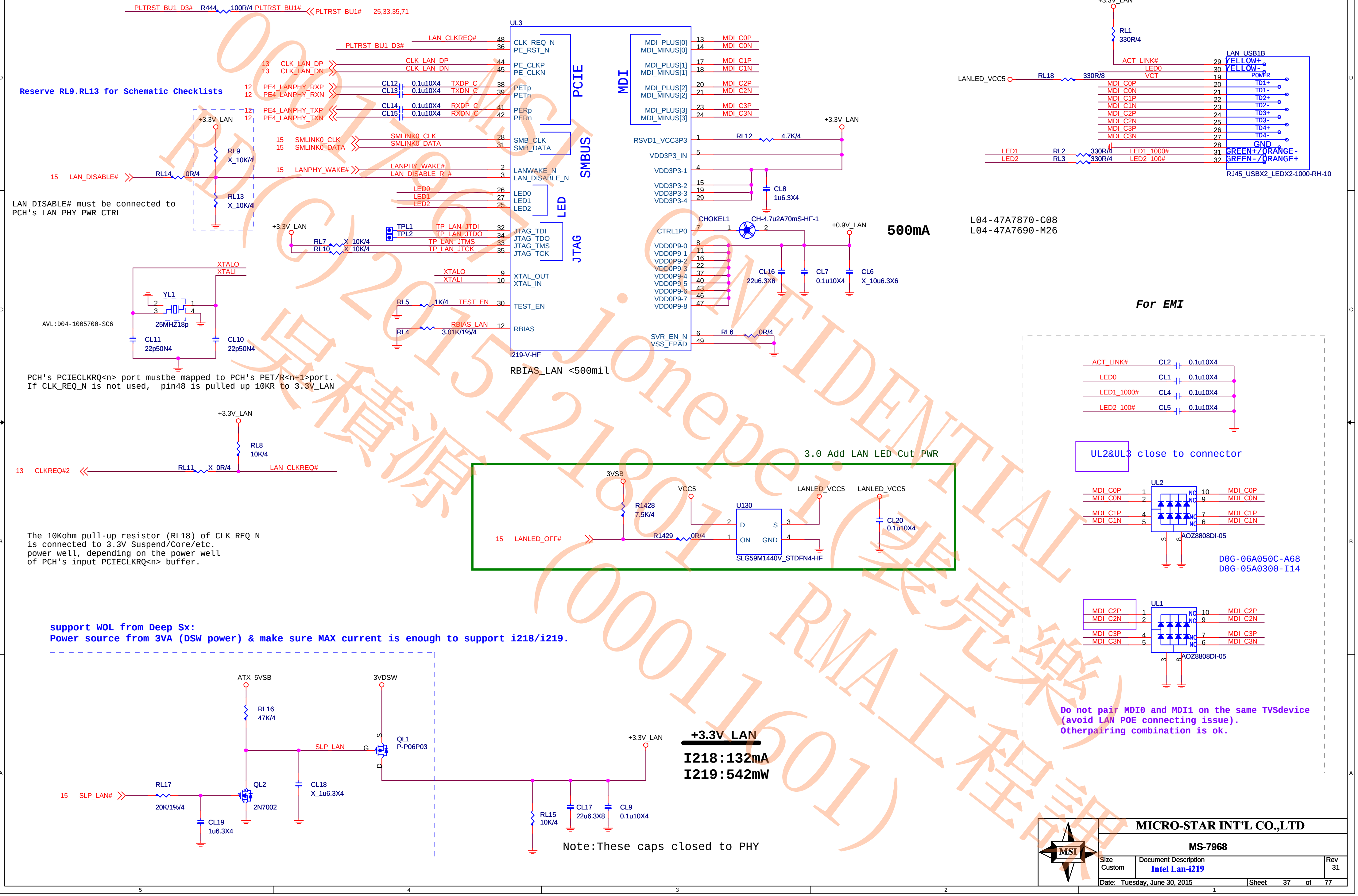
Intel I219V / I218V PHY



PLTRST_BU1_D3#
R444
100R/4
PLTRST_BU1#
25,33,35,71
UL3
LAN_CLKREQ#
CLK_REQ_N
PE_RST_N
CLK_LAN_DP
CLK_LAN_DN
PE_CLKP
PE_CLKN
PCIE
PE4_LANPHY_RXP
PE4_LANPHY_RXN
PE4_LANPHY_TXP
PE4_LANPHY_TXN
CL12 0.1u10X4 TXDP_C
CL13 0.1u10X4 TXDN_C
CL14 0.1u10X4 RXDP_C
CL15 0.1u10X4 RXDN_C
PETp
PETn
PERp
PERn
SMLINK0_CLK
SMLINK0_DATA
SMB_CLK
SMB_DATA
SMBUS
LANPHY_WAKE#
LAN_DISABLE_R_#
LANWAKE_N
LAN_DISABLE_N
LED0
LED1
LED2
LED
JTAG_TDI
JTAG_TDO
JTAG_TMS
JTAG_TCK
JTAG
TPL1
TPL2
TP_LAN_JTDI
TP_LAN_JTDO
TP_LAN_JTMS
TP_LAN_JTCK
RL7 X_10K/4
RL10 X_10K/4
XTALO
XTALI
XTAL_OUT
XTAL_IN
RL5 1K/4 TEST_EN
TEST_EN
RL4 RBIAS_LAN 3.01K/1%/4
RBIAS
I219-V-HF
RBIAS_LAN <500mil
MDI
MDI_PLUS[0]
MDI_MINUS[0]
MDI_PLUS[1]
MDI_MINUS[1]
MDI_PLUS[2]
MDI_MINUS[2]
MDI_PLUS[3]
MDI_MINUS[3]
MDI_C0P
MDI_C0N
MDI_C1P
MDI_C1N
MDI_C2P
MDI_C2N
MDI_C3P
MDI_C3N
RSVD1_VCC3P3
VDD3P3_IN
VDD3P3-1
VDD3P3-2
VDD3P3-3
VDD3P3-4
RL12 4.7K/4
+3.3V_LAN
CL8 1u6.3X4
CTRL1P0
CHOKEL1
CH-4.7u2A70mS-HF-1
+0.9V_LAN
500mA
VDD0P9-0
VDD0P9-1
VDD0P9-2
VDD0P9-3
VDD0P9-4
VDD0P9-5
VDD0P9-6
VDD0P9-7
VDD0P9-8
CL16 22u6.3X8
CL7 0.1u10X4
CL6 X_10u6.3X6
SVR_EN_N
VSS_EPAD
RL6 0R/4
L04-47A7870-C08
L04-47A7690-M26
Reserve RL9.RL13 for Schematic Checklists
RL9 X_10K/4
RL13 X_10K/4
15 LAN_DISABLE#
RL14 0R/4
LAN_DISABLE# must be connected to PCH's LAN_PHY_PWR_CTRL
YL1
25MHZ18p
AVL:D04-1005700-SC6
CL11 22p50N4
CL10 22p50N4
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
RL8 10K/4
13 CLKREQ#2
RL11 X_0R/4
LAN_CLKREQ#
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.
+3.3V_LAN
RL1 330R/4
LAN_USB1B
ACT_LINK#
LED0
VCT
LANLED_VCC5
RL18 330R/8
YELLOW+
YELLOW-
POWER
TD1+
TD1-
TD2+
TD2-
TD3+
TD3-
TD4+
TD4-
GND
LED1 RL2 330R/4 LED1_1000#
LED2 RL3 330R/4 LED2_100#
GREEN+/ORANGE-
GREEN-/ORANGE+
RJ45_USBX2_LEDX2-1000-RH-10
For EMI
ACT_LINK# CL2 0.1u10X4
LED0 CL1 0.1u10X4
LED1_1000# CL4 0.1u10X4
LED2_100# CL5 0.1u10X4
UL2&UL3 close to connector
UL2
AOZ8808DI-05
D0G-06A050C-A68
D0G-05A0300-I14
UL1
AOZ8808DI-05
Do not pair MDI0 and MDI1 on the same TVSdevice
(avoid LAN POE connecting issue).
Otherpairing combination is ok.
3.0 Add LAN LED Cut PWR
3VSB
R1428 7.5K/4
VCC5
LANLED_VCC5
U130
15 LANLED_OFF#
R1429 0R/4
D S ON GND
SLG59M1440V_STDFN4-HF
CL20 0.1u10X4
support WOL from Deep Sx:
Power source from 3VA (DSW power) & make sure MAX current is enough to support i218/i219.
ATX_5VSB
3VDSW
RL16 47K/4
QL1 P-P06P03
SLP_LAN
CL18 X_1u6.3X4
15 SLP_LAN#
RL17 20K/1%/4
QL2 2N7002
CL19 1u6.3X4
+3.3V_LAN
RL15 10K/4
CL17 22u6.3X8
CL9 0.1u10X4
+3.3V_LAN
I218:132mA
I219:542mW
Note:These caps closed to PHY
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MSI
MS-7968
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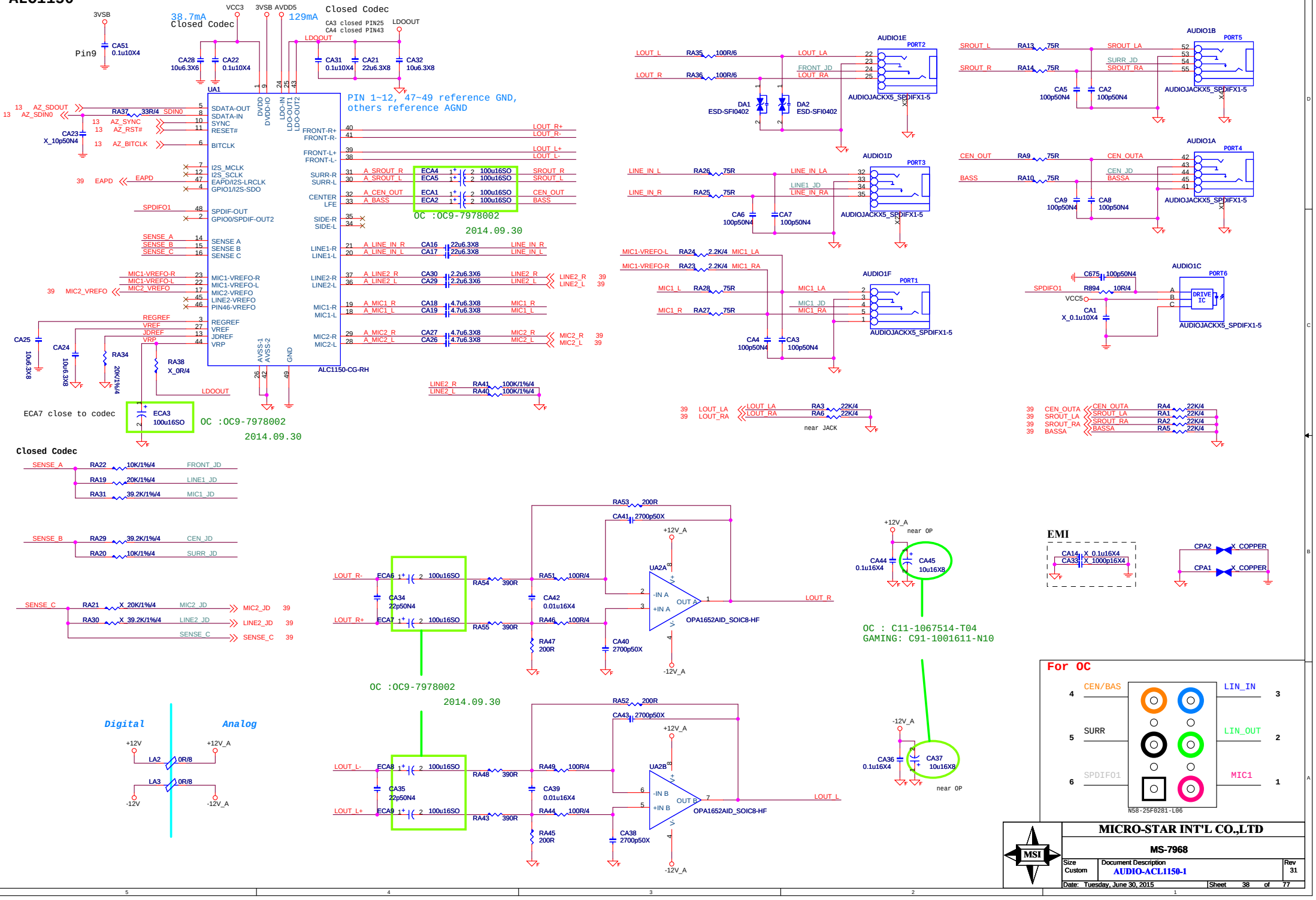
ALC1150



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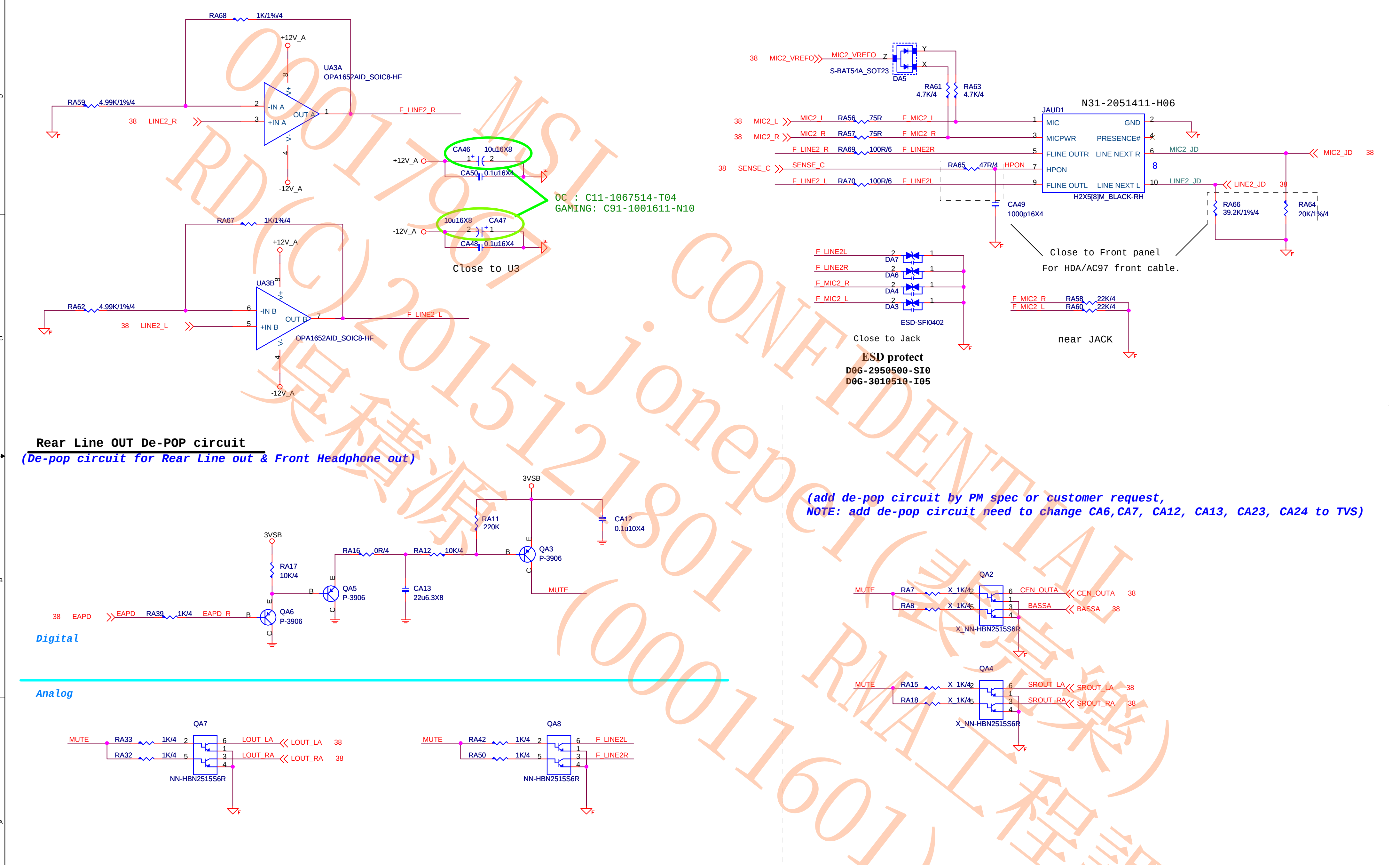

RA68 1K/1%/4
+12V_A
UA3A
OPA1652AID_SOIC8-HF
RA59 4.99K/1%/4
38 LINE2_R
-IN A
+IN A
OUT A
F_LINE2_R
-12V_A
CA46 10u16X8
+12V_A
CA50 0.1u16X4
OC : C11-1067514-T04
GAMING: C91-1001611-N10
RA67 1K/1%/4
10u16X8 CA47
-12V_A
CA48 0.1u16X4
Close to U3
UA3B
RA62 4.99K/1%/4
38 LINE2_L
-IN B
+IN B
OUT B
F_LINE2_L
OPA1652AID_SOIC8-HF
38 MIC2_VREFO
MIC2_VREFO
S-BAT54A_SOT23
DA5
RA61 4.7K/4
RA63 4.7K/4
N31-2051411-H06
JAUD1
38 MIC2_L
MIC2_L
RA56 75R
F_MIC2_L
38 MIC2_R
MIC2_R
RA57 75R
F_MIC2_R
F_LINE2_R
RA69 100R/6
F_LINE2R
38 SENSE_C
SENSE_C
RA65 47R/4
HPON
F_LINE2_L
RA70 100R/6
F_LINE2L
MIC
MICPWR
FLINE OUTR
HPON
FLINE OUTL
GND
PRESENCE#
LINE NEXT R
LINE NEXT L
H2X5[8]M_BLACK-RH
MIC2_JD
MIC2_JD 38
LINE2_JD
LINE2_JD 38
CA49 1000p16X4
RA66 39.2K/1%/4
RA64 20K/1%/4
Close to Front panel
For HDA/AC97 front cable.
F_LINE2L
DA7
F_LINE2R
DA6
F_MIC2_R
DA4
F_MIC2_L
DA3
ESD-SFI0402
Close to Jack
ESD protect
D0G-2950500-SI0
D0G-3010510-I05
F_MIC2_R
F_MIC2_L
RA58 22K/4
RA60 22K/4
near JACK
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 CA6,CA7, CA12, CA13, CA23, CA24 to TVS)
3VSB
RA11 220K
CA12 0.1u10X4
QA3 P-3906
3VSB
RA17 10K/4
RA16 0R/4
RA12 10K/4
CA13 22u6.3X8
QA5 P-3906
MUTE
38 EAPD
EAPD
RA39 1K/4
EAPD_R
QA6 P-3906
Digital
Analog
QA2
MUTE
RA7 X_1K/4
RA8 X_1K/4
CEN_OUTA
CEN_OUTA 38
BASSA
BASSA 38
X_NN-HBN2515S6R
QA4
MUTE
RA15 X_1K/4
RA18 X_1K/4
SROUT_LA
SROUT_LA 38
SROUT_RA
SROUT_RA 38
X_NN-HBN2515S6R
QA7
MUTE
RA33 1K/4
RA32 1K/4
LOUT_LA
LOUT_LA 38
LOUT_RA
LOUT_RA 38
NN-HBN2515S6R
QA8
MUTE
RA42 1K/4
RA50 1K/4
F_LINE2L
F_LINE2R
NN-HBN2515S6R

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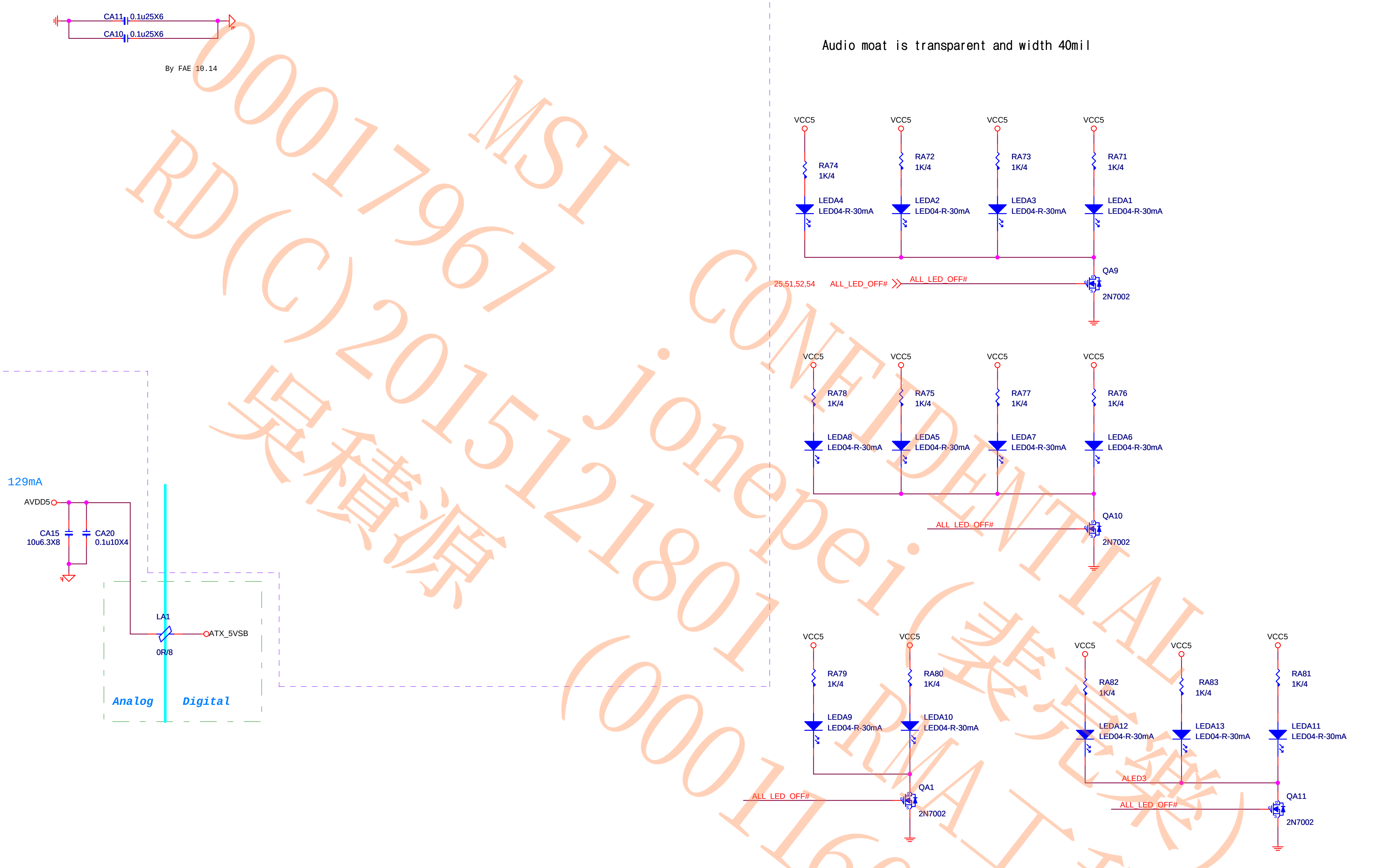

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HDMI level shifter

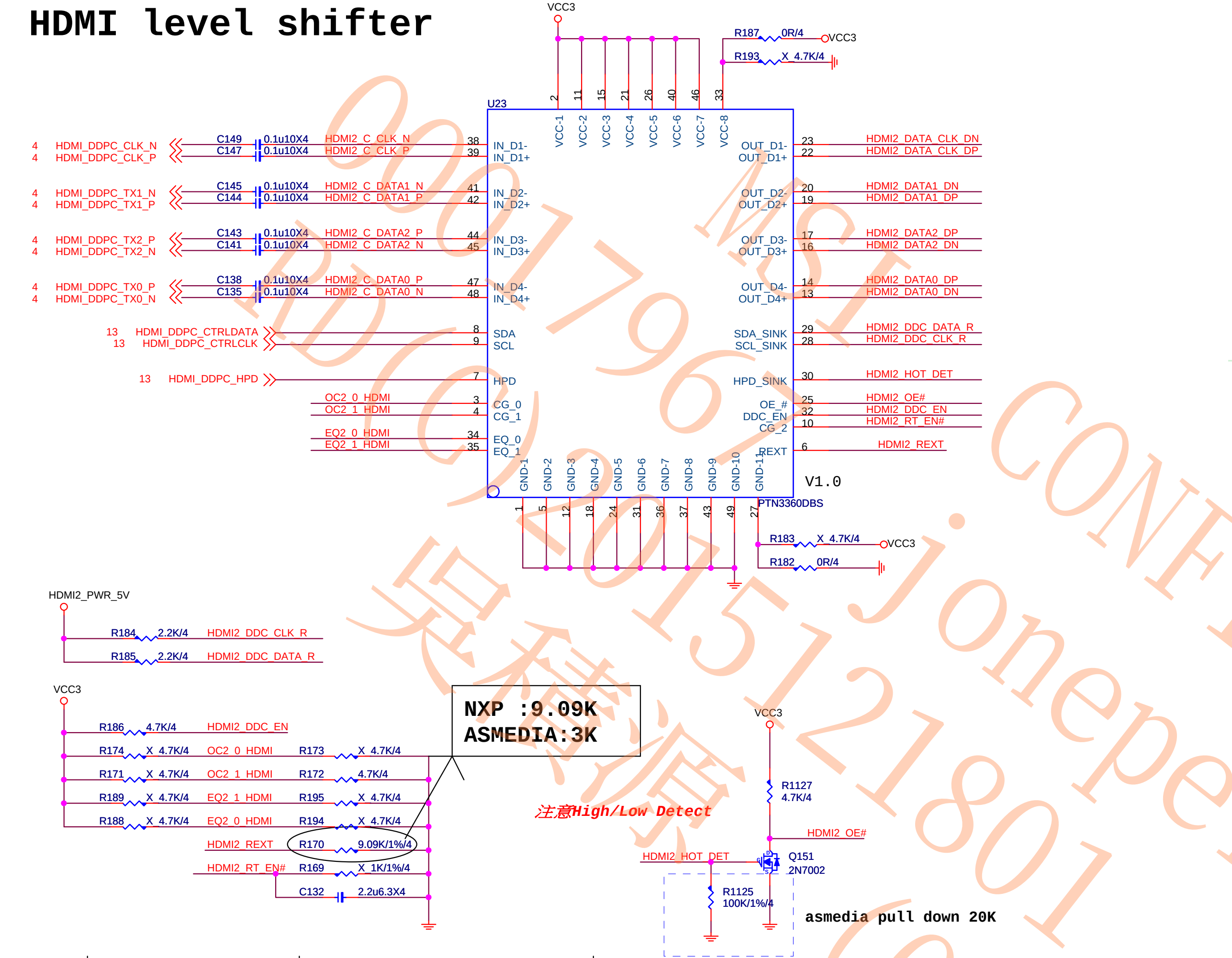
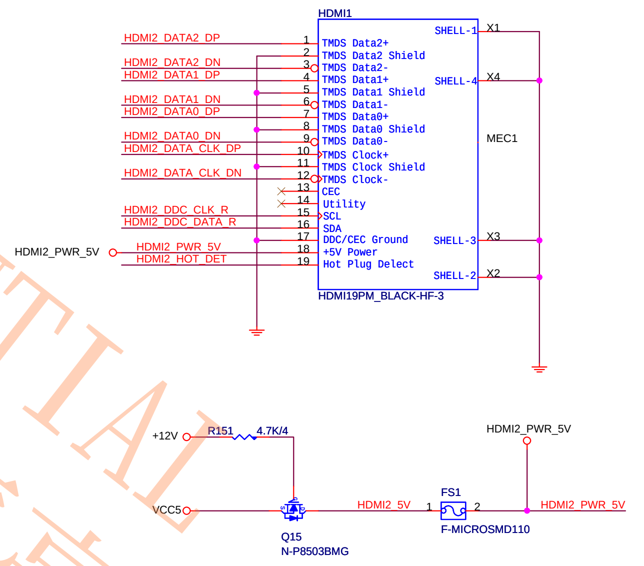


Table 8-1. PCH PCI Express Tx/RX - HDMI Signal Mappings

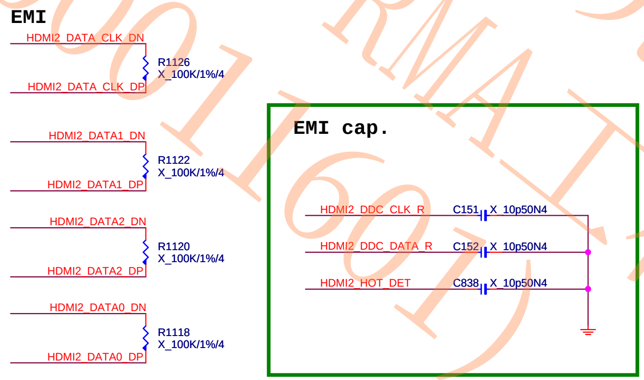
Port	Digital Display Interface Differential Pairs	HDMI Signals	PCH Digital Display Interface Pins
Port B	DDSP_B_TX0_DN	TMDSB_DATA2#	DDPB_0N
	DDSP_B_TX0_DP	TMDSB_DATA2	DDPB_0P
	DDSP_B_TX1_DN	TMDSB_DATA1#	DDPB_1N
	DDSP_B_TX1_DP	TMDSB_DATA1	DDPB_1P
	DDSP_B_TX2_DN	TMDSB_DATA0#	DDPB_2N
	DDSP_B_TX2_DP	TMDSB_DATA0	DDPB_2P
	DDSP_B_TX3_DN	TMDSB_CLK#	DDPB_3N
	DDSP_B_TX3_DP	TMDSB_CLK	DDPB_3P
	DDPB_HPD	DDSP_B_HPD0	Hot plug detect used by HDMI Port B.
	SDVO_CTRLCLK	HDMIB_CTRL_CLK	HDMI DDC lines for Port B
	SDVO_CTRLDATA	HDMIB_CTRL_DATA	

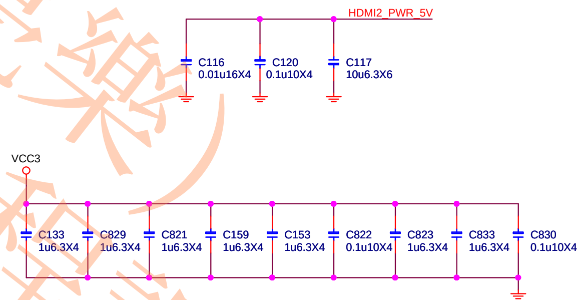


	"0"	"1"	note
DDC_EN	DDC level shifter disable	DDC level shifter enable	internal pull-up at ~500K ohm.
RT_EN#	Input 50 ohm termination resistor enable	the input termination ; resistors are set to high impedances	internal pull-down at ~500K ohm.
OE#	enable	the chip is power down and input termination resistors will be at high impedance.	internal pull-down at ~500K ohm.
HPD_SINK	disable	enable	internal pull-down at ~200K ohm; 5V tolerant.
DDCBUF_EN	For DDC level shifitng configuration, please refer to Table.		internal pull-down at ~500K ohm.
REXT			analog current generation.

[DDC_EN, DDCBUF_EN, OE#]	DDC Passive Switch	DDC Active Buffer
1, 0, X	On	Off
1, 1, 0	Off	On
1, 1, 1	Off	Off
0, X, X	Off	Off

PC1, PC0		note
00	8 dB	internal pull-down at ~500K ohm.
01	4 dB	
10	12 dB	
11	0 dB	





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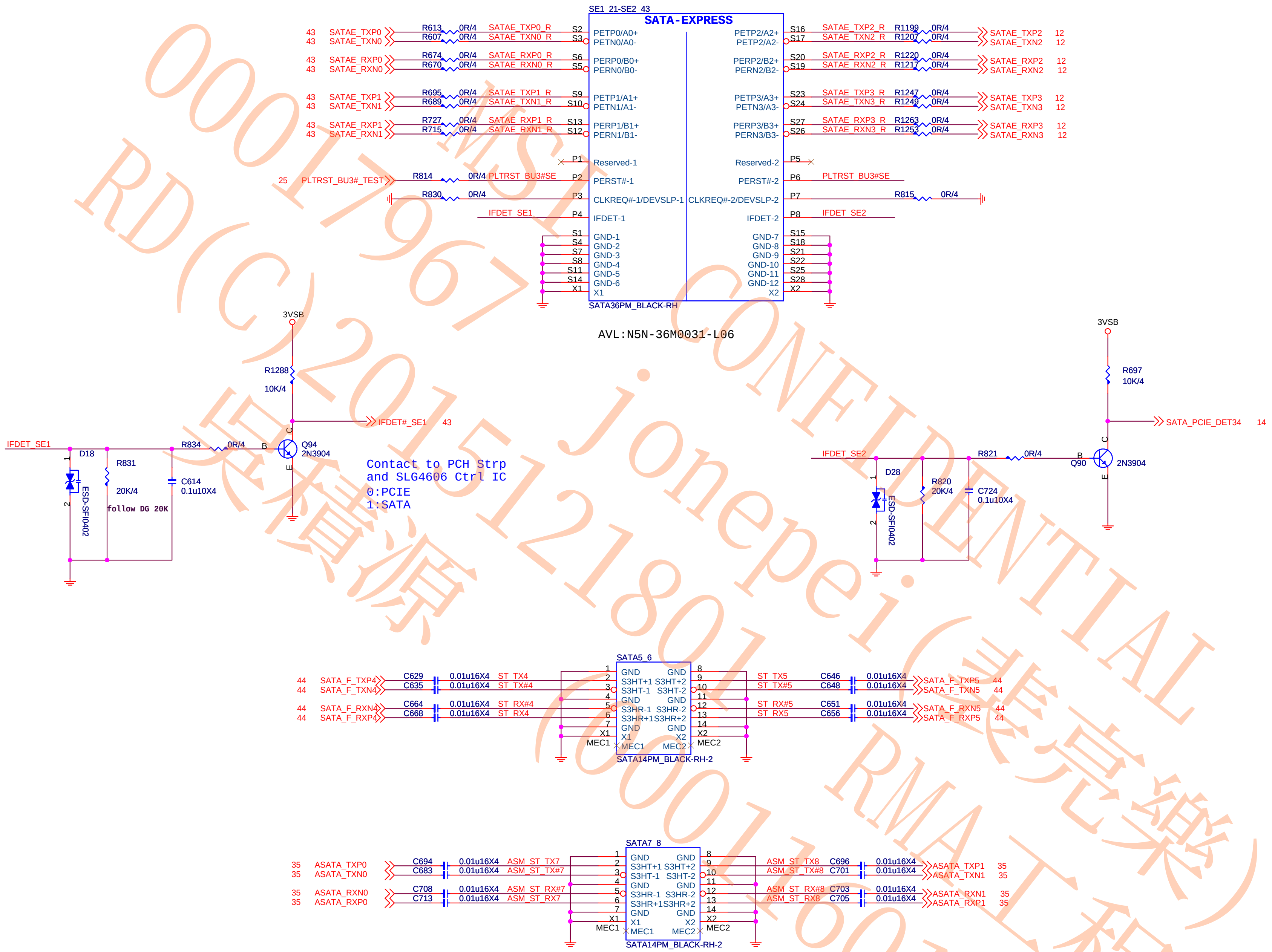

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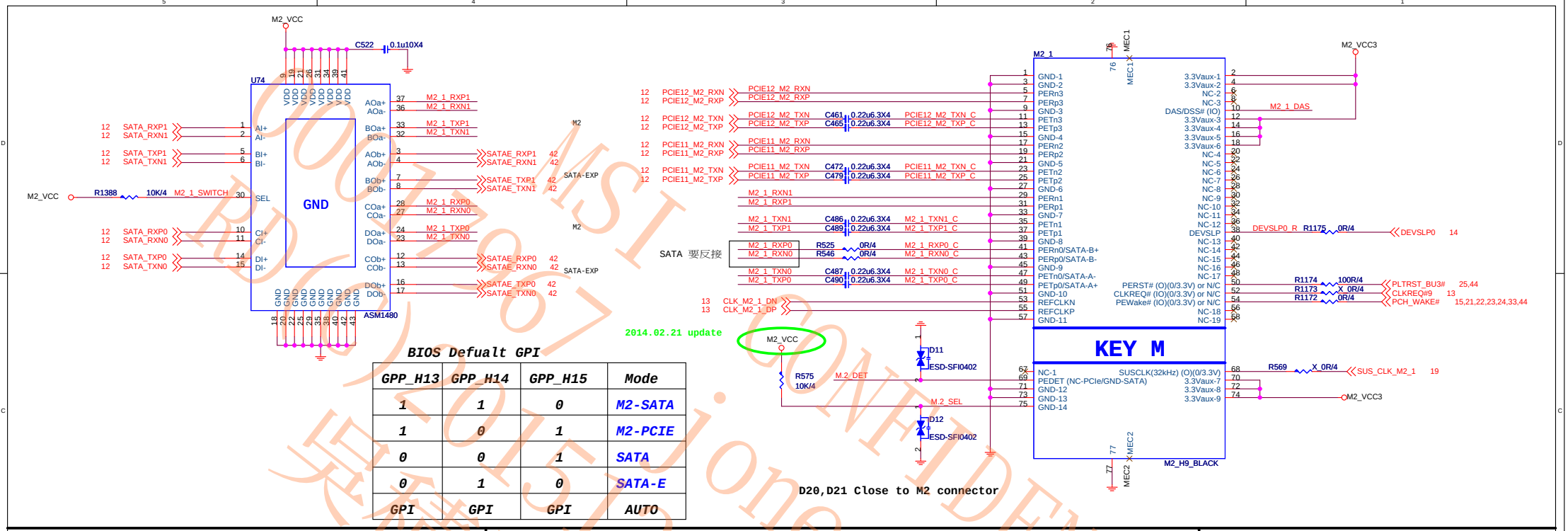

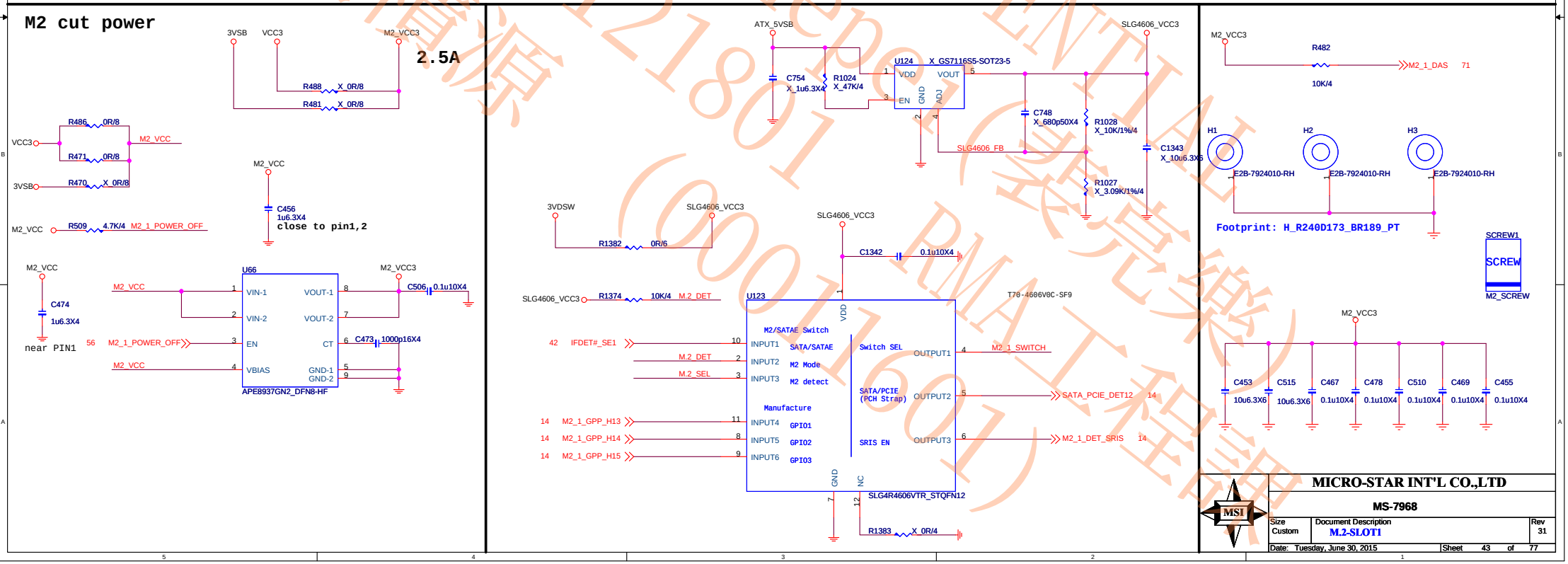

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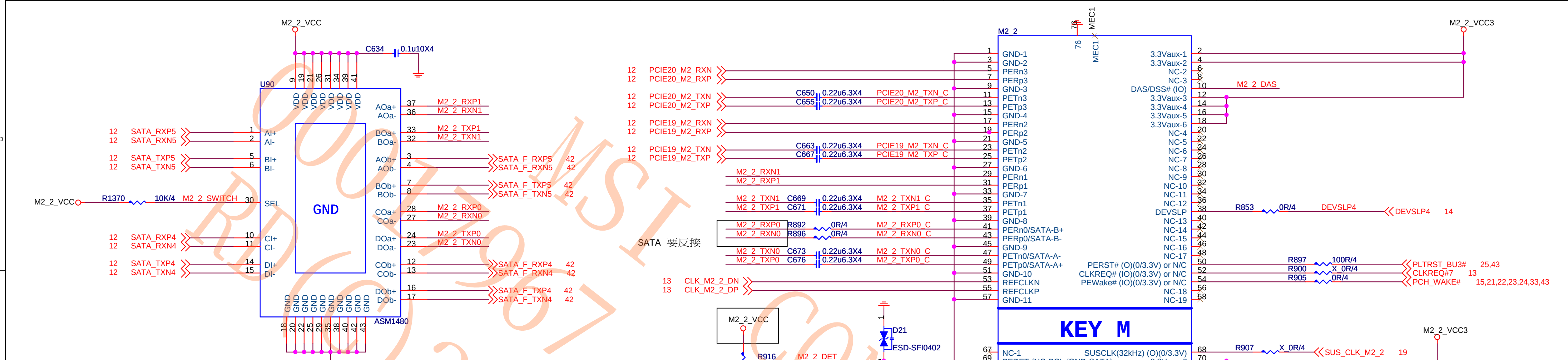
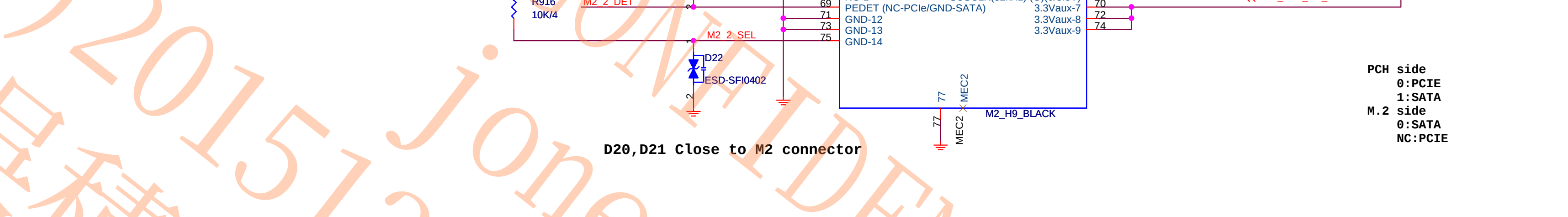
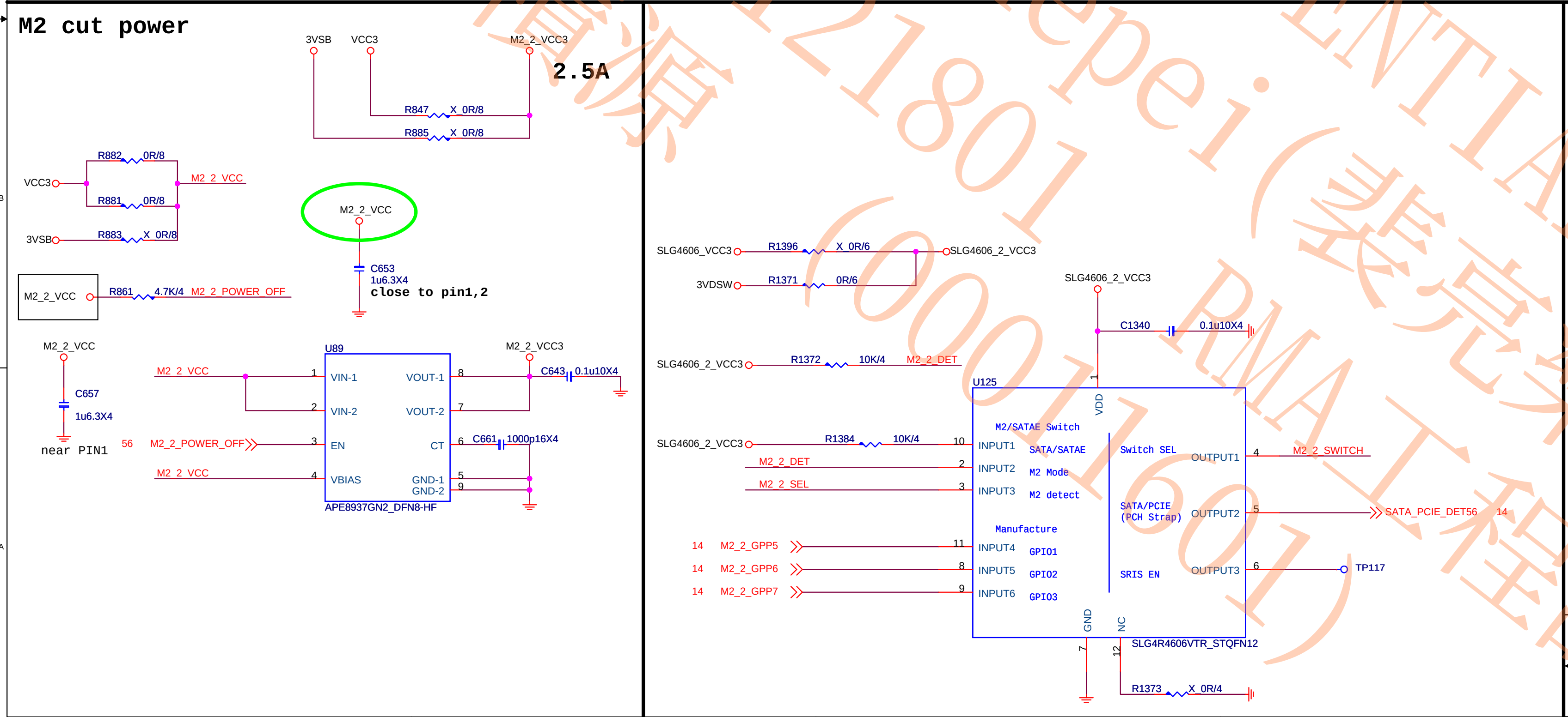


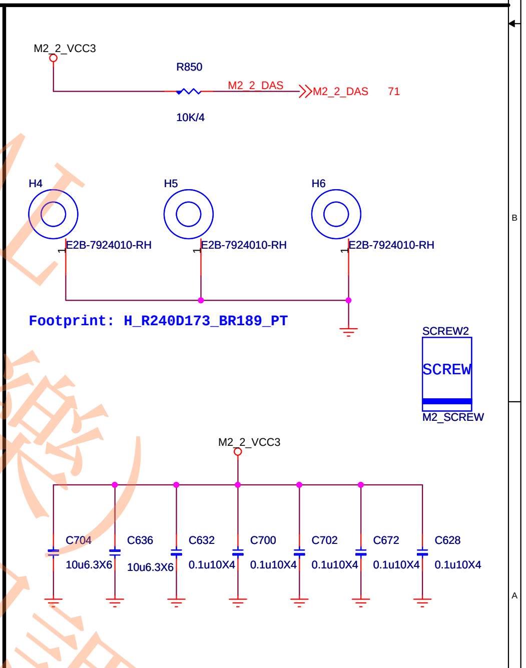
BIOS Defualt GPI

M2_2_GPP5	M2_2_GPP6	M2_2_GPP7	Mode
1	1	0	M2-SATA
1	0	1	M2-PCIE
0	0	1	SATA
GPI	GPI	GPI	AUTO



M2 cut power





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Custom	M.2-SLOT2	31

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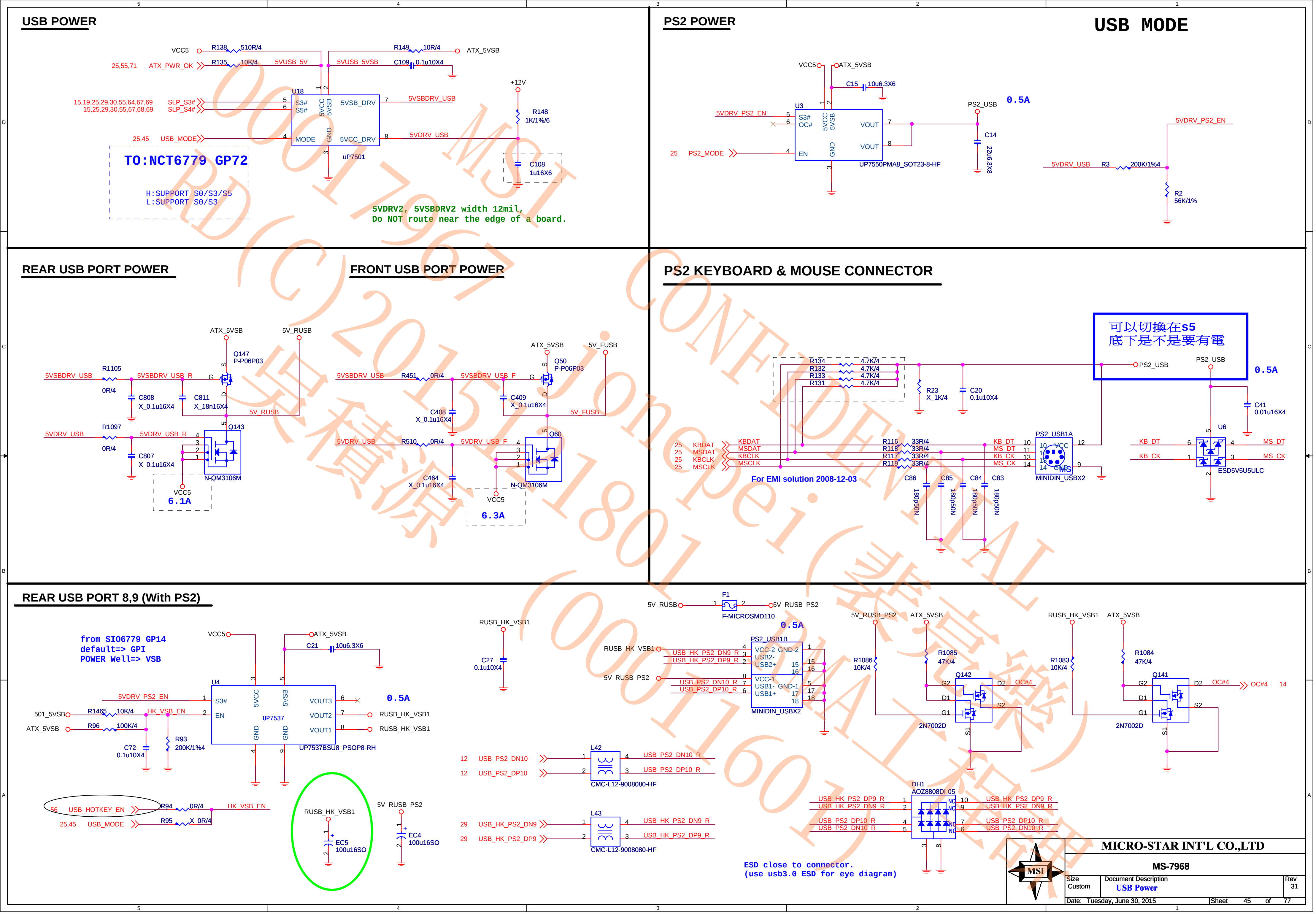
USB MODE
USB POWER
VCC5
R138 510R/4
R149 10R/4
ATX_5VSB
25,55,71 ATX_PWR_OK
R135 10K/4
5VUSB_5V
5VUSB_5VSB
C109 0.1u10X4
+12V
U18
15,19,25,29,30,55,64,67,69 SLP_S3#
15,25,29,30,55,67,68,69 SLP_S4#
S3#
S5#
5VCC
5VSB
5VSB_DRV
5VSBDRV_USB
R148 1K/1%/6
25,45 USB_MODE
MODE
GND
5VCC_DRV
5VDRV_USB
uP7501
C108 1u16X6
TO:NCT6779 GP72
H:SUPPORT S0/S3/S5
L:SUPPORT S0/S3
5VDRV2, 5VSBDRV2 width 12mil,
Do NOT route near the edge of a board.
PS2 POWER
VCC5
ATX_5VSB
C15 10u6.3X6
U3
5VDRV_PS2_EN
S3#
OC#
5VCC
5VSB
VOUT
VOUT
EN
GND
25 PS2_MODE
UP7550PMA8_SOT23-8-HF
PS2_USB
0.5A
C14 22u6.3X8
5VDRV_PS2_EN
5VDRV_USB R3 200K/1%4
R2 56K/1%
REAR USB PORT POWER
FRONT USB PORT POWER
ATX_5VSB
5V_RUSB
Q147 P-P06P03
5VSBDRV_USB
R1105 0R/4
5VSBDRV_USB_R
C808 X_0.1u16X4
C811 X_18n16X4
5V_RUSB
5VDRV_USB
R1097 0R/4
5VDRV_USB_R
Q143
C807 X_0.1u16X4
N-QM3106M
VCC5
6.1A
ATX_5VSB
5V_FUSB
Q50 P-P06P03
5VSBDRV_USB R451 0R/4 5VSBDRV_USB_F
C408 X_0.1u16X4
C409 X_0.1u16X4
5V_FUSB
5VDRV_USB R510 0R/4 5VDRV_USB_F
Q60
C464 X_0.1u16X4
N-QM3106M
VCC5
6.3A
PS2 KEYBOARD & MOUSE CONNECTOR
可以切換在s5
底下是不是要有電
PS2_USB
0.5A
R134 4.7K/4
R132 4.7K/4
R133 4.7K/4
R131 4.7K/4
R23 X_1K/4
C20 0.1u10X4
C41 0.01u16X4
25 KBDAT
25 MSDAT
25 KBCLK
25 MSCLK
R116 33R/4
R118 33R/4
R117 33R/4
R119 33R/4
KB_DT
MS_DT
KB_CK
MS_CK
PS2_USB1A
MINIDIN_USBX2
U6
ESD5V5U5ULC
For EMI solution 2008-12-03
C86 180p50N
C85 180p50N
C84 180p50N
C83 180p50N
REAR USB PORT 8,9 (With PS2)
from SIO6779 GP14
default=> GPI
POWER Well=> VSB
VCC5
ATX_5VSB
C21 10u6.3X6
U4
5VDRV_PS2_EN
501_5VSB R1465 10K/4 HK_VSB_EN
ATX_5VSB R96 100K/4
C72 0.1u10X4
R93 200K/1%4
S3#
EN
5VCC
5VSB
UP7537
VOUT3
VOUT2
VOUT1
GND
0.5A
RUSB_HK_VSB1
RUSB_HK_VSB1
UP7537BSU8_PSOP8-RH
56 USB_HOTKEY_EN
R94 0R/4
HK_VSB_EN
25,45 USB_MODE
R95 X_0R/4
RUSB_HK_VSB1
EC5 100u16SO
5V_RUSB_PS2
EC4 100u16SO
RUSB_HK_VSB1
C27 0.1u10X4
5V_RUSB
F1
F-MICROSMD110
5V_RUSB_PS2
0.5A
PS2_USB1B
USB_HK_PS2_DN9_R
USB_HK_PS2_DP9_R
USB_PS2_DN10_R
USB_PS2_DP10_R
MINIDIN_USBX2
5V_RUSB_PS2
ATX_5VSB
R1086 10K/4
R1085 47K/4
Q142
OC#4
2N7002D
RUSB_HK_VSB1
ATX_5VSB
R1083 10K/4
R1084 47K/4
Q141
OC#4
OC#4 14
2N7002D
12 USB_PS2_DN10
12 USB_PS2_DP10
L42
CMC-L12-9008080-HF
USB_PS2_DN10_R
USB_PS2_DP10_R
29 USB_HK_PS2_DN9
29 USB_HK_PS2_DP9
L43
CMC-L12-9008080-HF
USB_HK_PS2_DN9_R
USB_HK_PS2_DP9_R
DH1
AOZ8808DI-05
ESD close to connector.
(use usb3.0 ESD for eye diagram)
MICRO-STAR INT'L CO.,LTD
MS-7968
Size Custom
Document Description
USB Power
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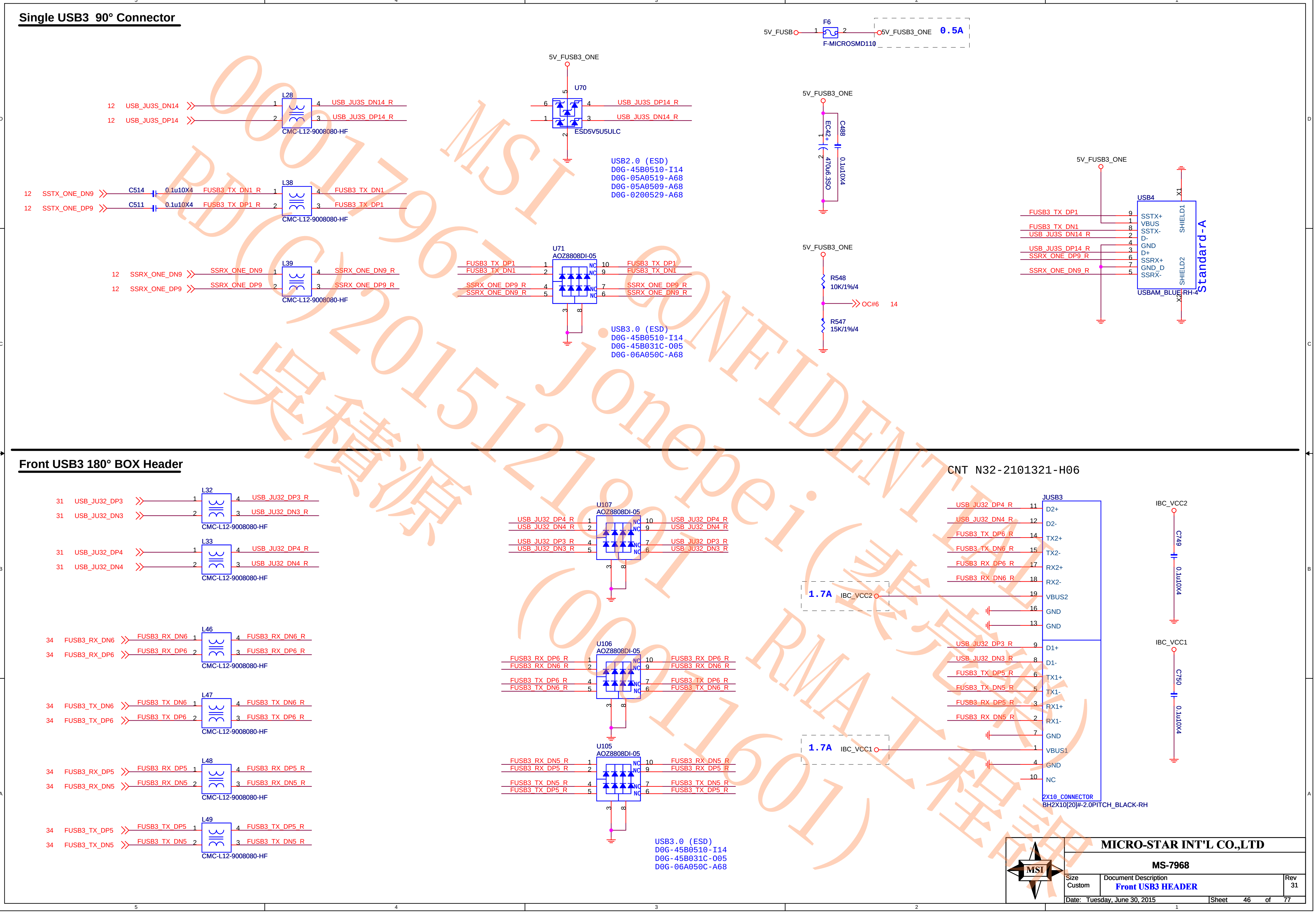

Single USB3 90° Connector
5V_FUSB
F6
F-MICROSMD110
5V_FUSB3_ONE
0.5A
L28
USB_JU3S_DN14
USB_JU3S_DP14
USB_JU3S_DN14_R
USB_JU3S_DP14_R
CMC-L12-9008080-HF
U70
ESD5V5U5ULC
USB2.0 (ESD)
D0G-45B0510-I14
D0G-05A0519-A68
D0G-05A0509-A68
D0G-0200529-A68
C514
C511
0.1u10X4
SSTX_ONE_DN9
SSTX_ONE_DP9
FUSB3_TX_DN1_R
FUSB3_TX_DP1_R
L38
FUSB3_TX_DN1
FUSB3_TX_DP1
EC42
470u6.3SO
C488
0.1u10X4
L39
SSRX_ONE_DN9
SSRX_ONE_DP9
SSRX_ONE_DN9_R
SSRX_ONE_DP9_R
U71
AOZ8808DI-05
USB3.0 (ESD)
D0G-45B0510-I14
D0G-45B031C-005
D0G-06A050C-A68
R548
10K/1%/4
R547
15K/1%/4
OC#6
USB4
USBAM_BLUE-RH-4
SSTX+
VBUS
SSTX-
D-
GND
D+
SSRX+
GND_D
SSRX-
SHIELD1
SHIELD2
Standard-A
Front USB3 180° BOX Header
CNT N32-2101321-H06
L32
USB_JU32_DP3
USB_JU32_DN3
USB_JU32_DP3_R
USB_JU32_DN3_R
L33
USB_JU32_DP4
USB_JU32_DN4
USB_JU32_DP4_R
USB_JU32_DN4_R
U107
AOZ8808DI-05
L46
FUSB3_RX_DN6
FUSB3_RX_DP6
FUSB3_RX_DN6_R
FUSB3_RX_DP6_R
L47
FUSB3_TX_DN6
FUSB3_TX_DP6
FUSB3_TX_DN6_R
FUSB3_TX_DP6_R
L48
FUSB3_RX_DP5
FUSB3_RX_DN5
FUSB3_RX_DP5_R
FUSB3_RX_DN5_R
L49
FUSB3_TX_DP5
FUSB3_TX_DN5
FUSB3_TX_DP5_R
FUSB3_TX_DN5_R
U106
AOZ8808DI-05
U105
AOZ8808DI-05
USB3.0 (ESD)
D0G-45B0510-I14
D0G-45B031C-005
D0G-06A050C-A68
1.7A
IBC_VCC2
IBC_VCC1
JUSB3
D2+
D2-
TX2+
TX2-
RX2+
RX2-
VBUS2
GND
D1+
D1-
TX1+
TX1-
RX1+
RX1-
VBUS1
NC
2X10_CONNECTOR
BH2X10[20]#-2.0PITCH_BLACK-RH
C749
C750
0.1u10X4
MICRO-STAR INT'L CO.,LTD
MS-7968
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Custom
Document Description
Front USB3 HEADER
Rev
31
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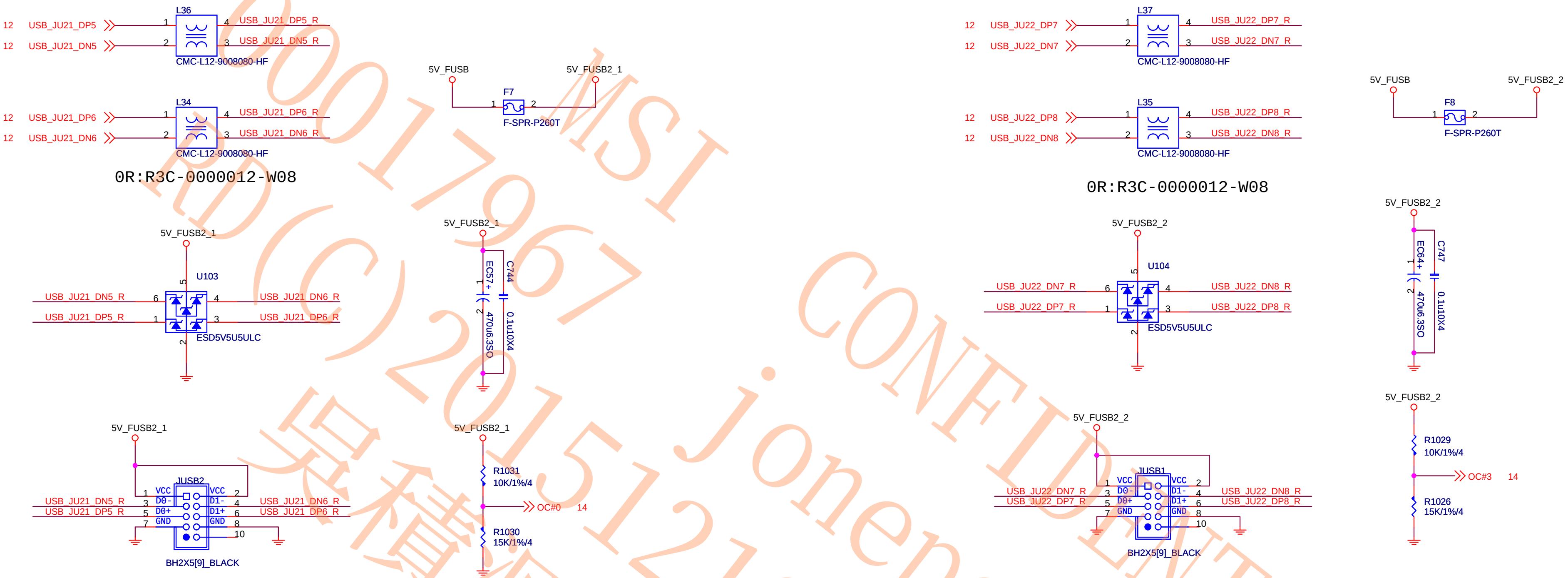
FRONT USB PORT 1,2

FRONT USB PORT 7,8



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Size	Document Description	Rev
Custom	Front USB2 HEADER	31

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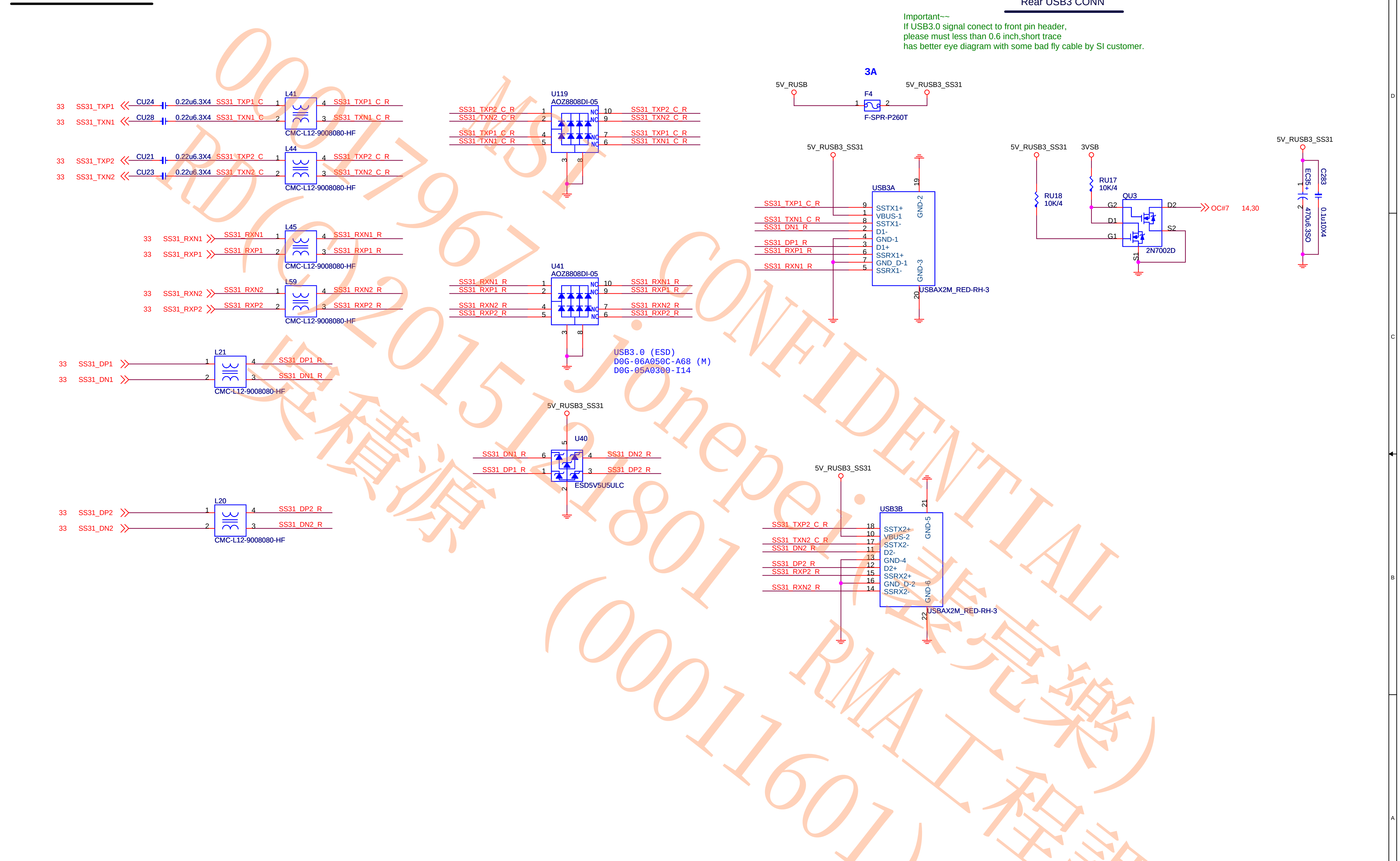
Rear USB3.1 Connector



Rear USB3 CONN
Important~~
If USB3.0 signal conect to front pin header,
please must less than 0.6 inch,short trace
has better eye diagram with some bad fly cable by SI customer.
3A
5V_RUSB
5V_RUSB3_SS31
F4
F-SPR-P260T
33 SS31_TXP1
33 SS31_TXN1
33 SS31_TXP2
33 SS31_TXN2
CU24 0.22u6.3X4 SS31_TXP1_C
CU28 0.22u6.3X4 SS31_TXN1_C
CU21 0.22u6.3X4 SS31_TXP2_C
CU23 0.22u6.3X4 SS31_TXN2_C
L41 CMC-L12-9008080-HF
L44 CMC-L12-9008080-HF
L45 CMC-L12-9008080-HF
L59 CMC-L12-9008080-HF
L21 CMC-L12-9008080-HF
L20 CMC-L12-9008080-HF
SS31_TXP1_C_R
SS31_TXN1_C_R
SS31_TXP2_C_R
SS31_TXN2_C_R
33 SS31_RXN1
33 SS31_RXP1
33 SS31_RXN2
33 SS31_RXP2
SS31_RXN1_R
SS31_RXP1_R
SS31_RXN2_R
SS31_RXP2_R
33 SS31_DP1
33 SS31_DN1
SS31_DP1_R
SS31_DN1_R
33 SS31_DP2
33 SS31_DN2
SS31_DP2_R
SS31_DN2_R
U119 AOZ8808DI-05
U41 AOZ8808DI-05
USB3.0 (ESD)
D0G-06A050C-A68 (M)
D0G-05A0300-I14
U40 ESD5V5U5ULC
USB3A
SSTX1+ VBUS-1 SSTX1- D1- GND-1 D1+ SSRX1+ GND_D-1 SSRX1-
GND-2 GND-3
USBAX2M_RED-RH-3
USB3B
SSTX2+ VBUS-2 SSTX2- D2- GND-4 D2+ SSRX2+ GND_D-2 SSRX2-
GND-5 GND-6
USBAX2M_RED-RH-3
3VSB
RU17 10K/4
RU18 10K/4
QU3 2N7002D
G2 D2 D1 S2 G1 S1
OC#7 14,30
EC35 470u6.3SO
C283 0.1u10X4

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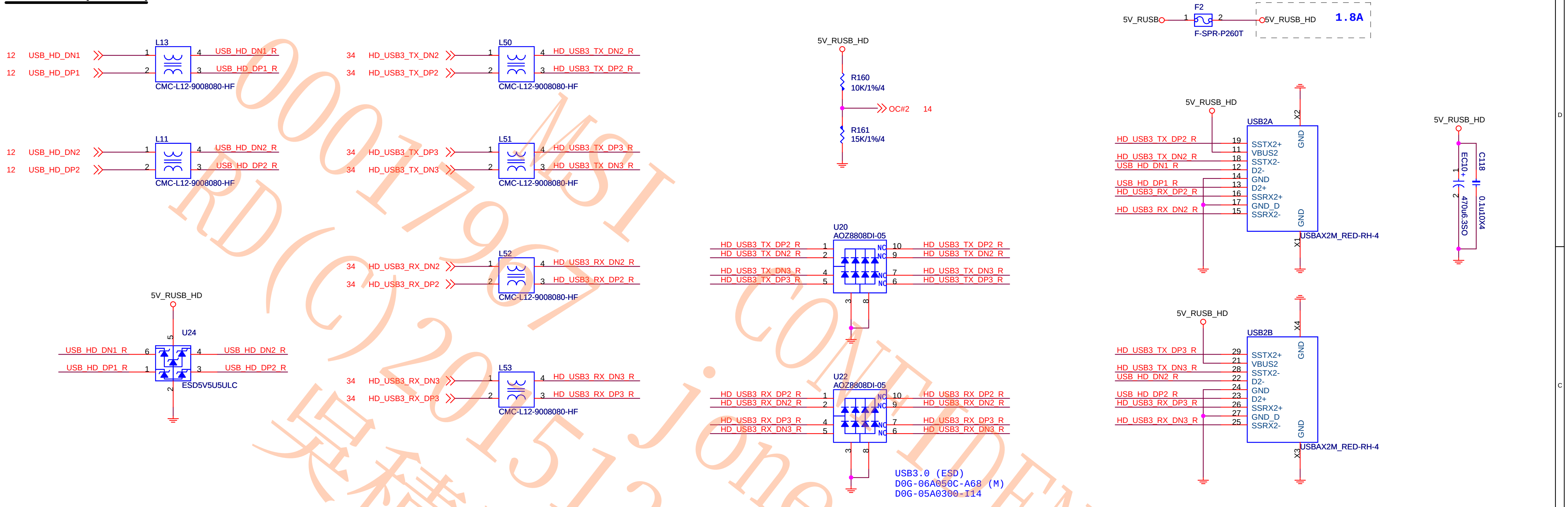
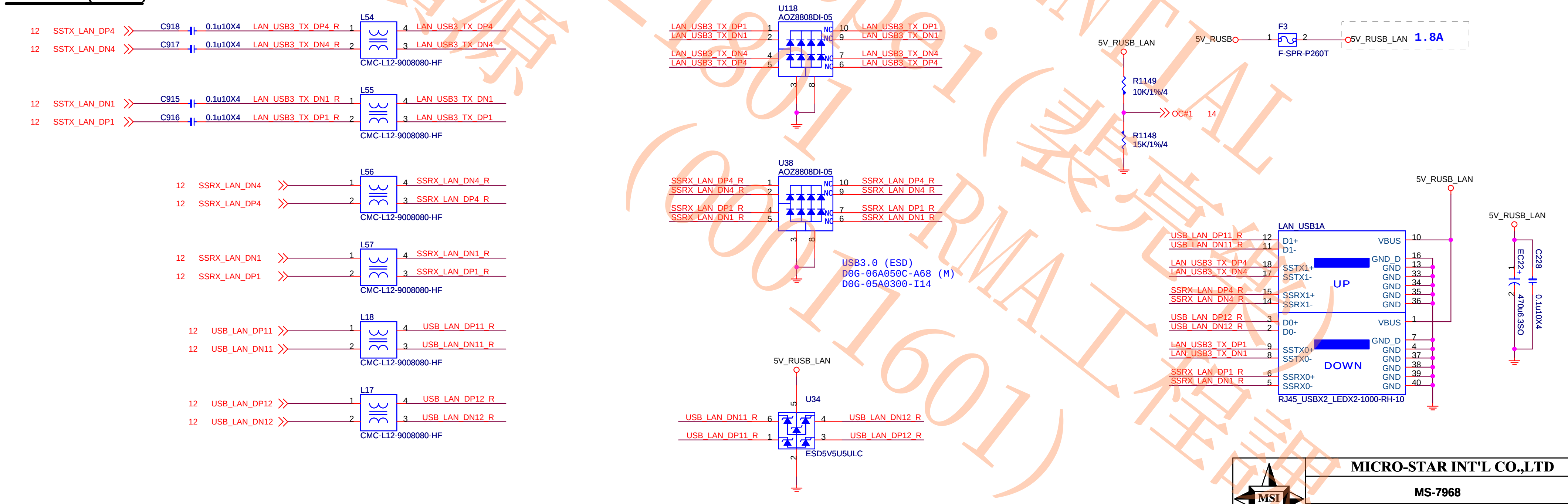
Rear USB3 (w/ HDMI)



Rear USB3 (w/ LAN)



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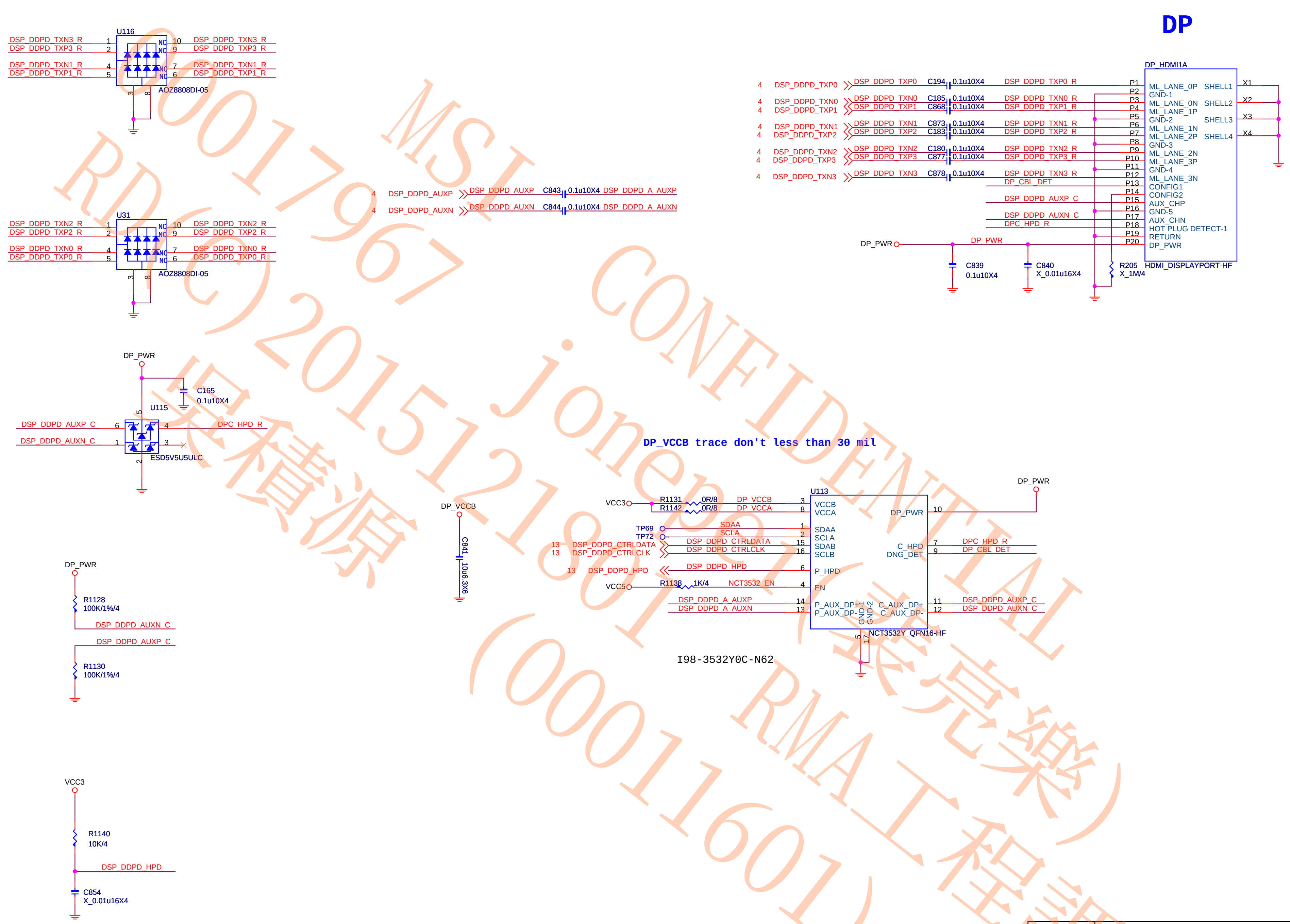
DP



MICRO-STAR INT'L CO.,LTD			
MS-7968			
Size: Custom	Document Description: DISPLAYPORT CONN		Rev: 31
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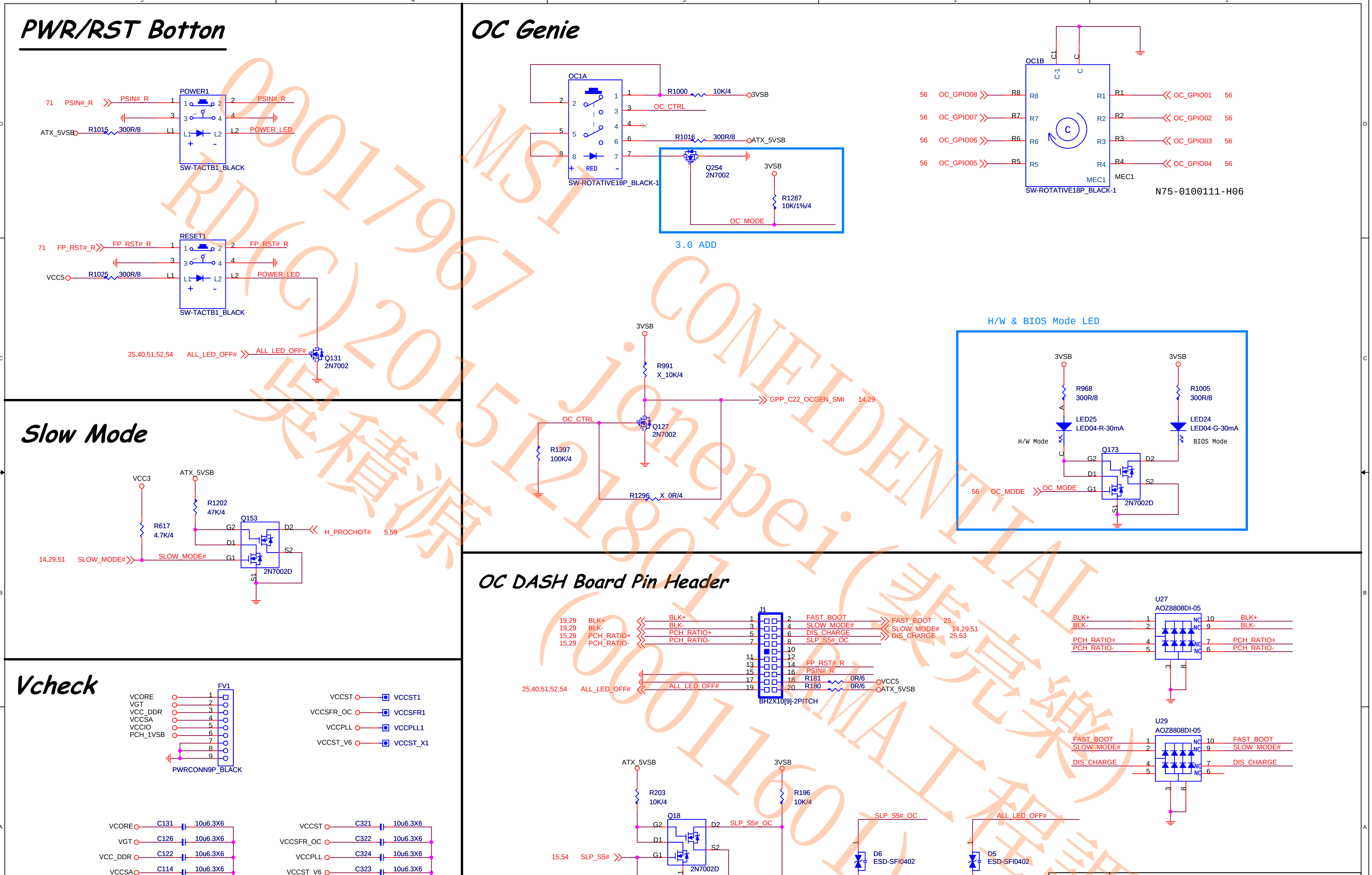

MICRO-STAR INT'L CO.,LTD

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Custom	BOTTON/Vcheck	31

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Part Number:N31-2061341-H06

SPI CS# < 25pF
D0G-0402510-SI0

close to JSPI1 for ESD use

SPI DEBUG PROT
Close to SPI ROM

P.S Close to JSPI1

For TL624-1.1 : Stuff D7
Old : Only RSVD (Because 12V level)

HW MODE

For TL624-1.1 : Don't stuff R235
Old : Stuff R235

For auto testing in factory.

SPI FLASH ROM
Place close to SB.

MXIC:M31-2512832-M24
WinB:M31-2512853-W03

*SPI_CLK & SPI_MOSI must be length matched to within 500mils. < 6 inch
*SPI_CLK & SPI_CS0# must be length matched to within 500mils.

Placement 1

Placement 2

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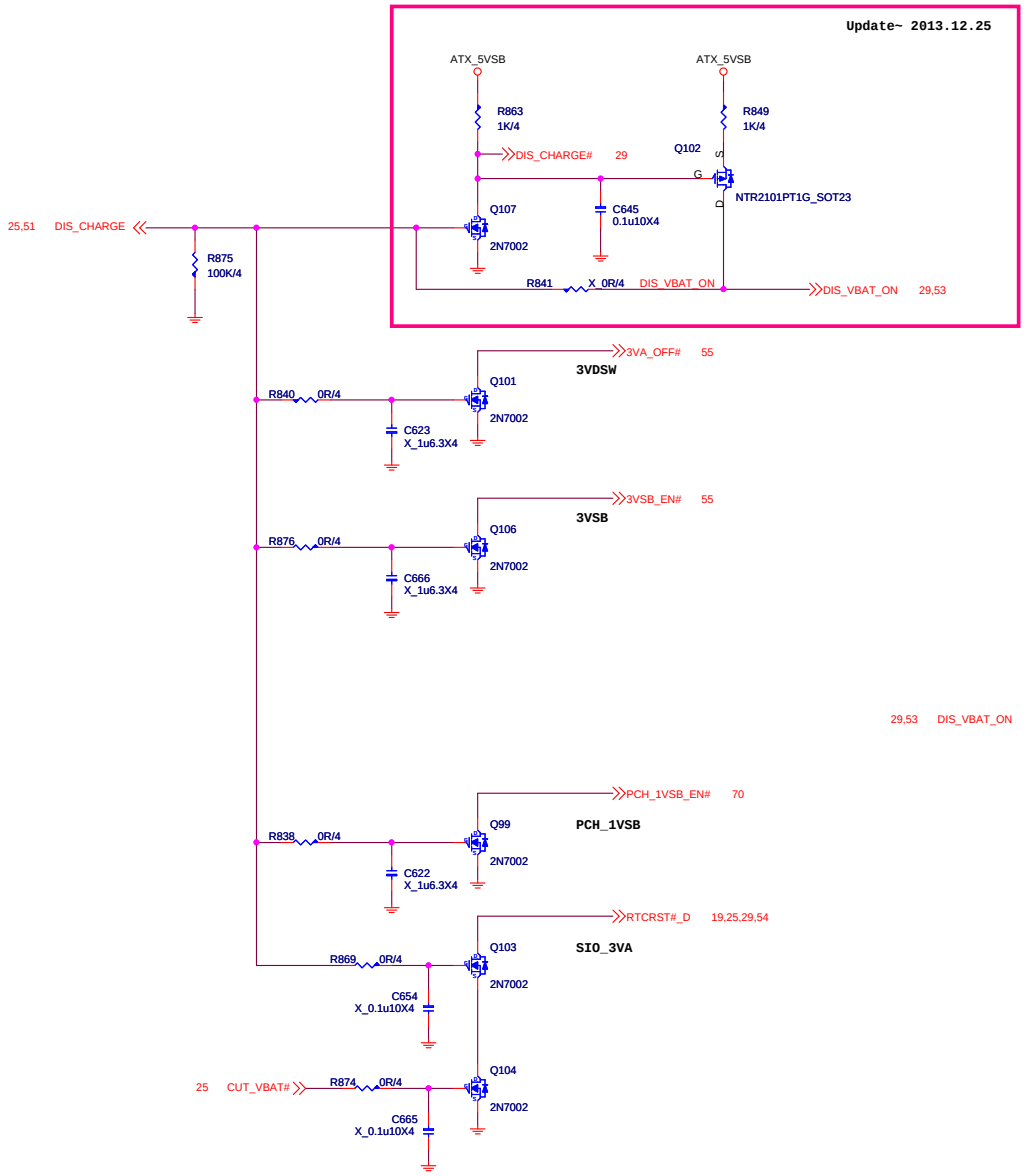
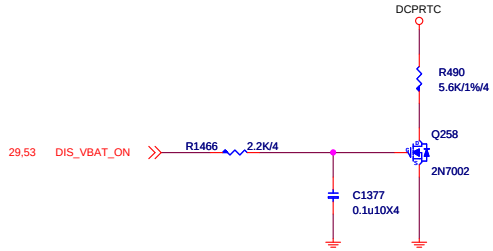
Update~ 2013.12.25



	R891,R892,Q115,Q114	/ R894
pin header+F75501	0	X
pin header only	X	0

Add DCRTC dischage circuit



MICRO-STAR INT'L CO.,LTD

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Size	Document Description	Rev
Custom	Discharge	31

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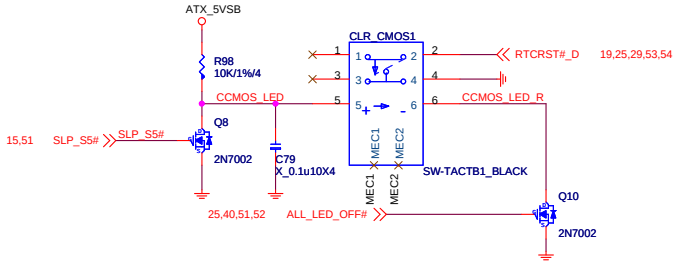
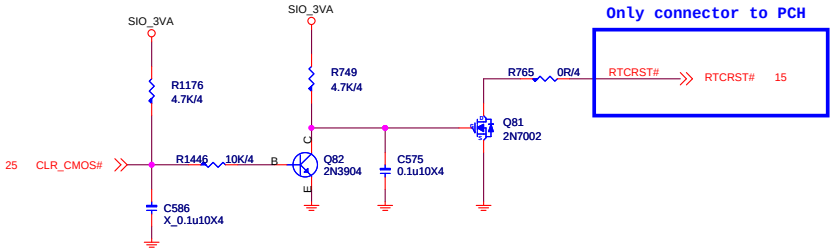
HW MODE

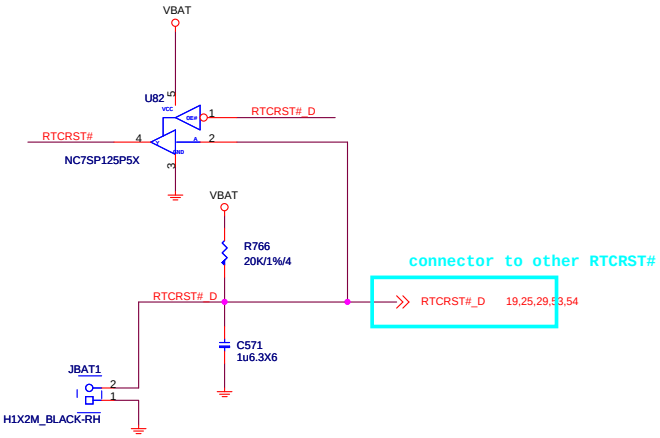


Clear CMOS button

LED LIGHTING RULE
S0/S3/S4 : LED OFF
S5 : LED ON

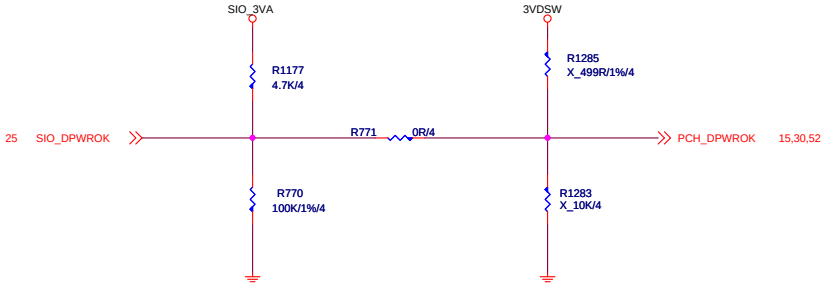
BIOS MODE





co-lay

tri-state		
INPUT		outout
PIN1	PIN2	pin4
L	H	H
L	L	L
H	X	Z



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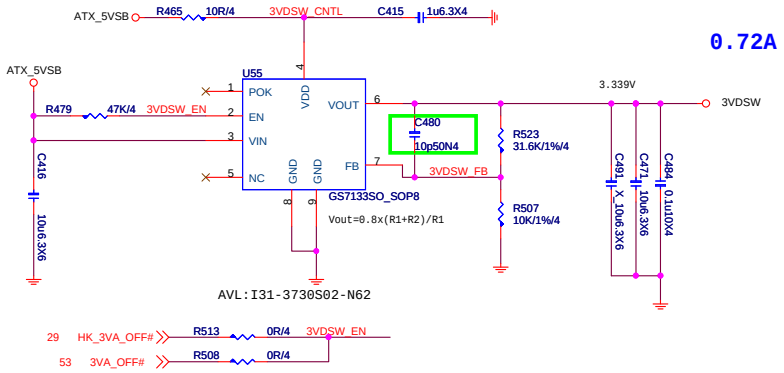
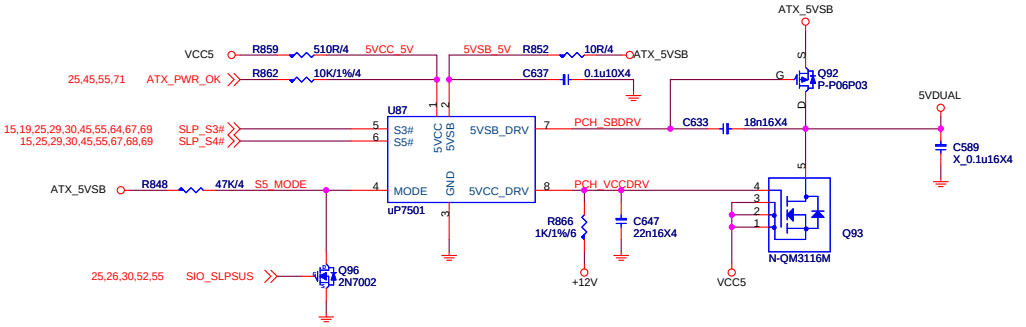
3VDSW



0.72A

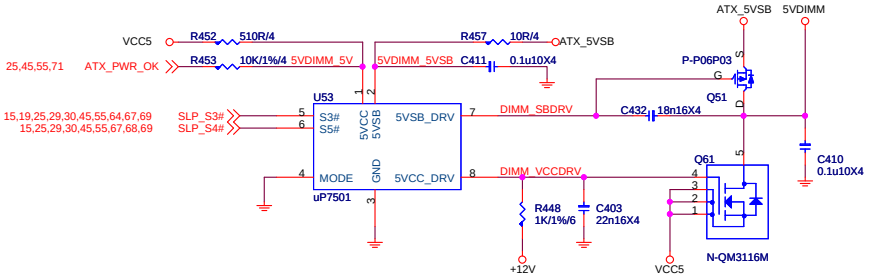
5VDUAL



6.25A

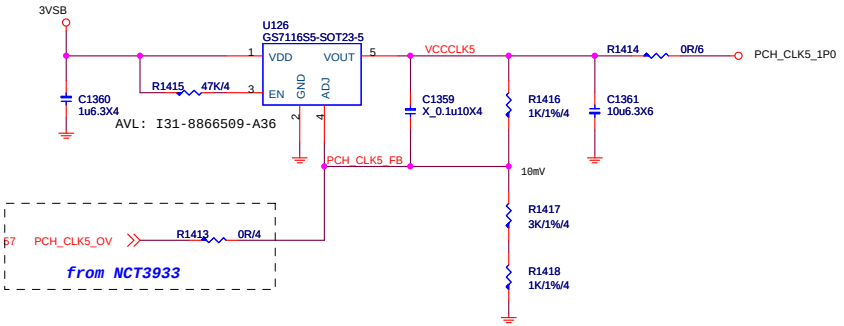
5VDIMM FOR DDR

4.8A

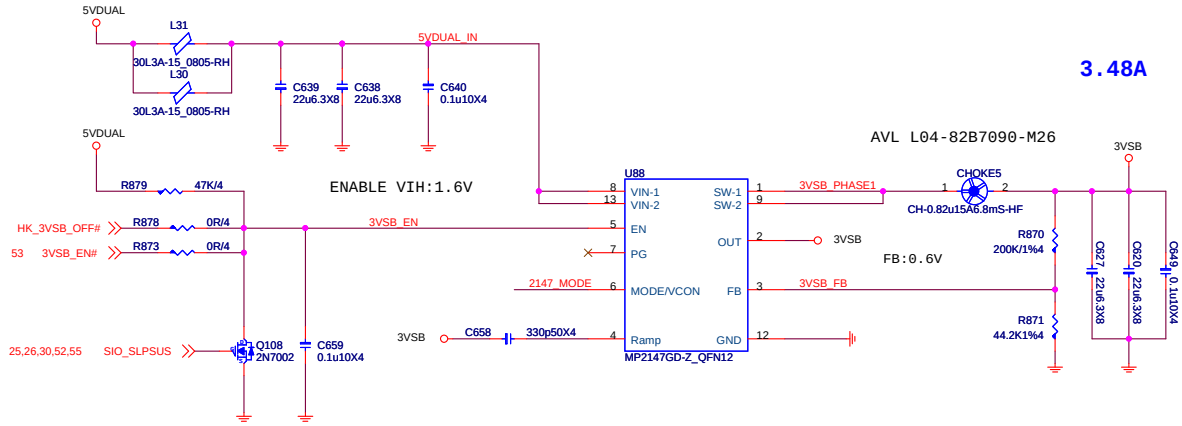


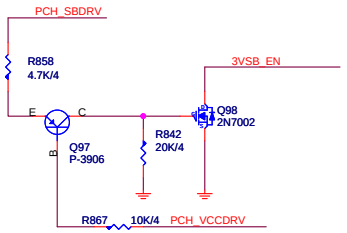
7501 Mode
H:Support S0/S3/S5
L:Support S0/S3

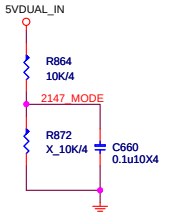
5VDRV1看VCC5起來6-10ms後起來,因為當初挑power



3VSB for OC & Gaming







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

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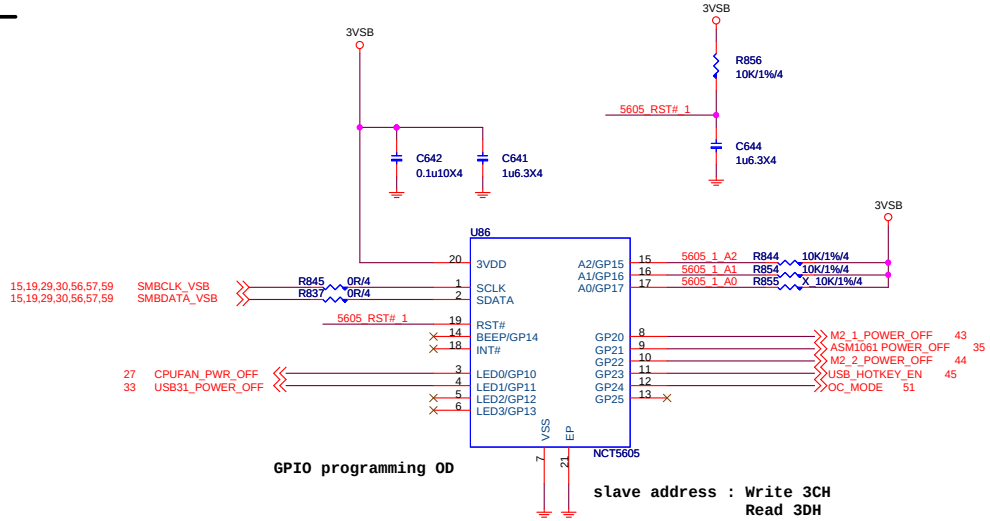
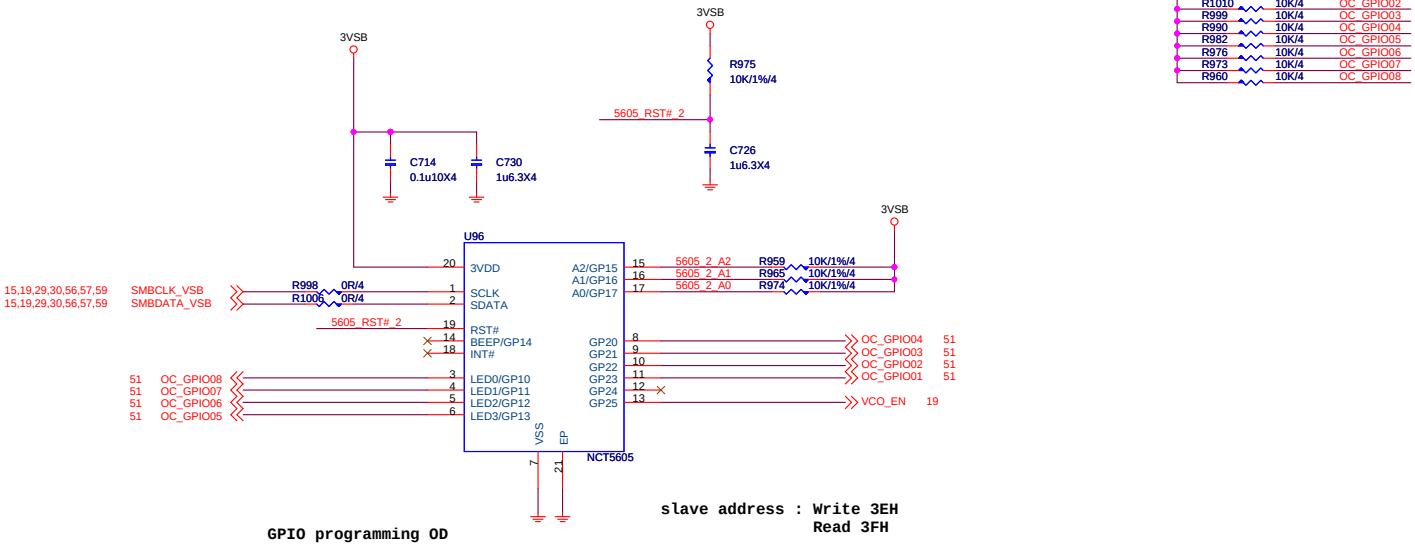
CUT POWER

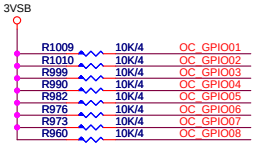


GPIO programming OD

slave address : Write 3CH
Read 3DH

RSVD FOR OC





GPIO programming OD

slave address : Write 3EH
Read 3FH

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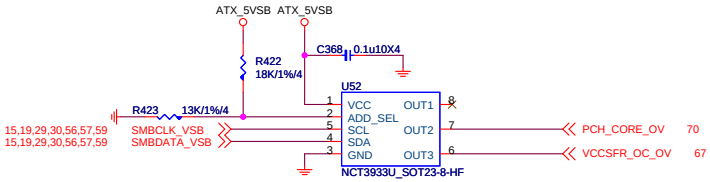
UPI VOLTAGE CONSOLE

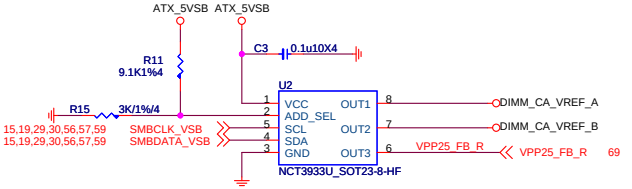
0x26:RH=18K,RL=13K



PCH_1VSB
VCCSFR_OC

UPI VOLTAGE CONSOLE

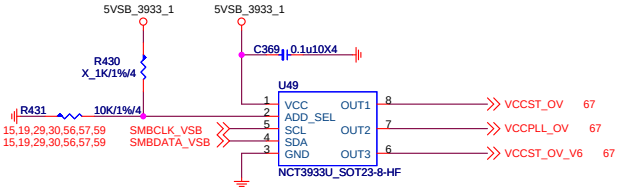
0x28:RH=9.1K,RL=3K



CHA_VREF
CHB_VREF
VPP25

UPI VOLTAGE CONSOLE

0x2A:RH=9.1K,RL=3K

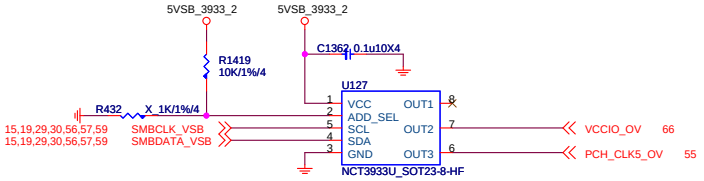


VCCST
VCCPLL
VCCST_V6

For VCCST keep Voltage

UPI VOLTAGE CONSOLE

0x20:RH=18K,RL=13K



VCCIO
PCH_CLK5_1P0

For VCCIO keep Voltage

UPI VOLTAGE CONSOLE

0x20:RH=10K,RL=OPEN

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

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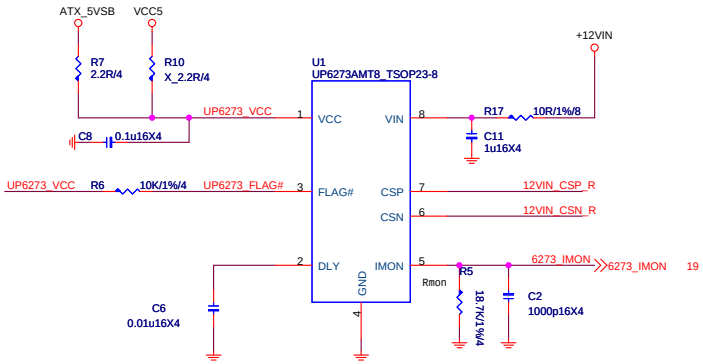
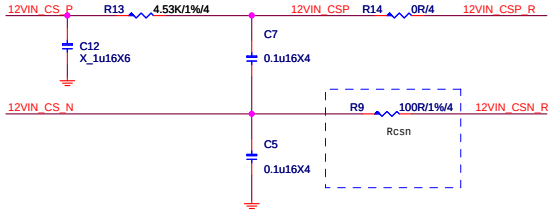
POWER METER



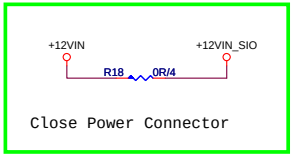
Iin=(Vmon*Rcsn)/(Rmon*Rdc)
Vmon=1.2
can change OCP trigger level by Rcsn and Rmon

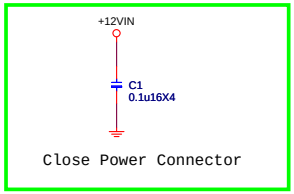


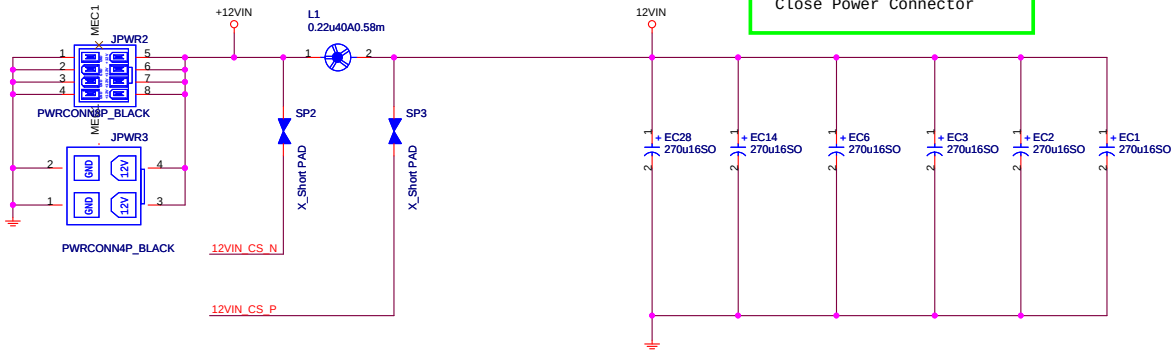
UPI VOLTAGE CONSOLE

0xD4:RL=10K

ADDRESS	0xD4			0xD6			0xD8			0xDA		
	Min	Typ.	Max	Min	Typ.	Max	Min	Typ.	Max	Min	Typ.	Max
BUS_SEL Vlotage	70	90	110	170	210	250	310	380	450	510	600	690







MICRO-STAR INT'L CO.,LTD	
MS-7968	
Size: Custom	Document Description: CURRENT SENSE-UP6273
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Vcore: ICC Max 100A
LL: 2.1 mohm
OCP: 240A

VGT: ICC Max 51A
LL: 3.1 mohm
OCP: 88A

U129
IR35201

VIN
Ctrl
Loop 1
SMB
SVID
VSEN
Loop 2

SMB Address: 0X70

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

Close CPU

		VR53	VR54	VC20	VR58	VR57	VR59	VR60
Default	Temp	6.49k	10k	100p	X	0R	X	0R
	VAUXSEN	5.76k	1k	0.01u	0R	X	0R	X

MICRO-STAR INT'L CO.,LTD

MS-7968

Size: Custom
Document Description: CPU POWER-ISL69137-VCORE
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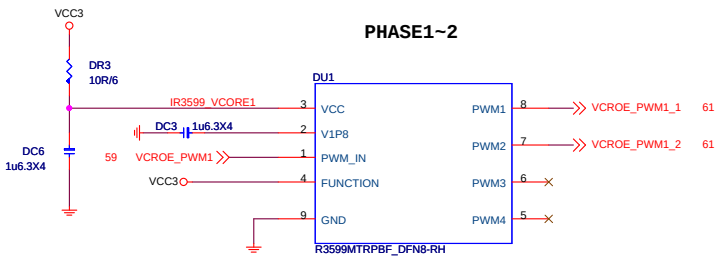
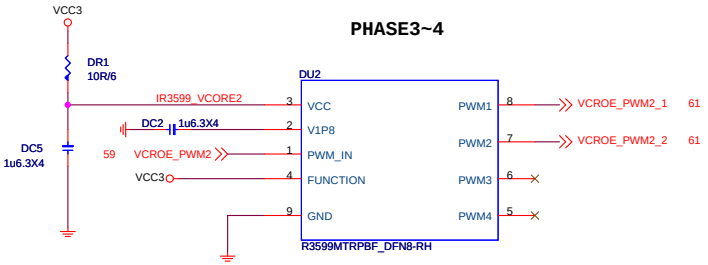
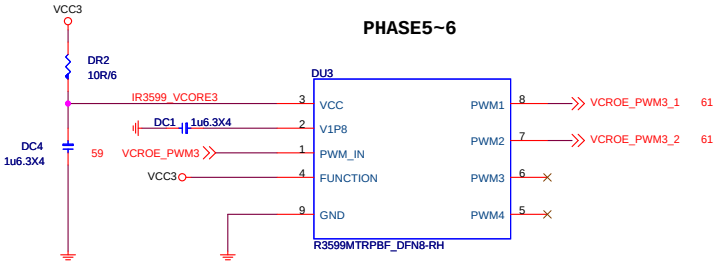
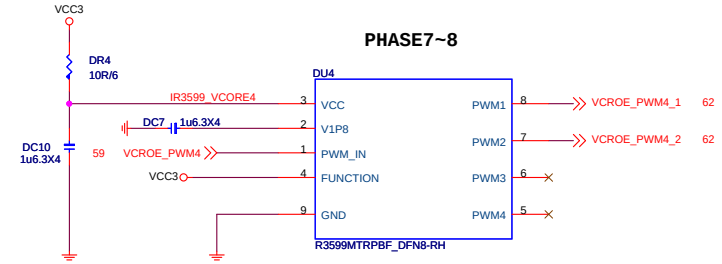
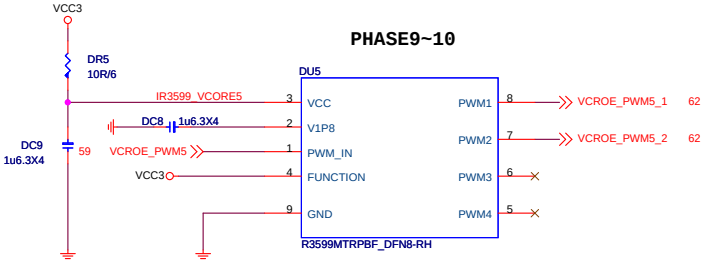
VCORE Double



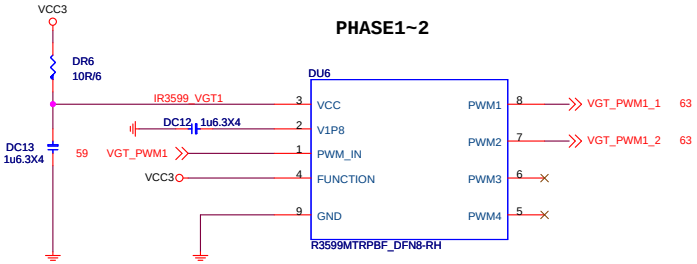


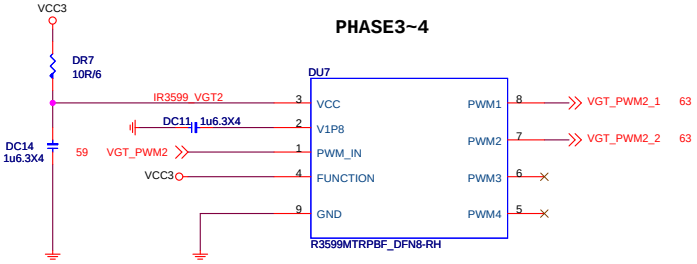






VGT Double





MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7968	
Size: Custom	Document Description: CPU POWER-ISL6617-VCORE	Rev: 31
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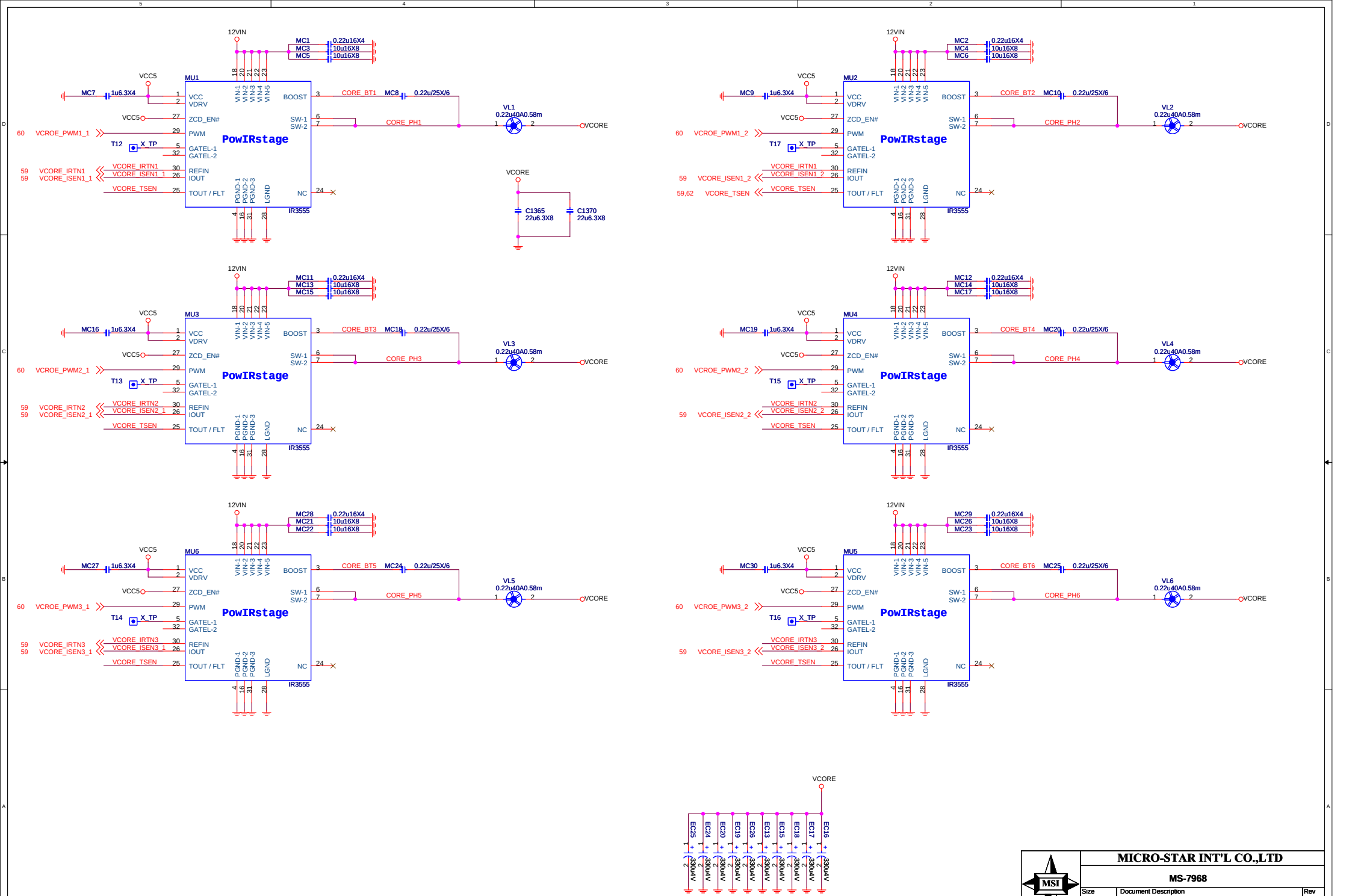

MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7968	
Size: Custom	Document Description: CPU POWER-VCORE-Phase1~4	Rev: 31
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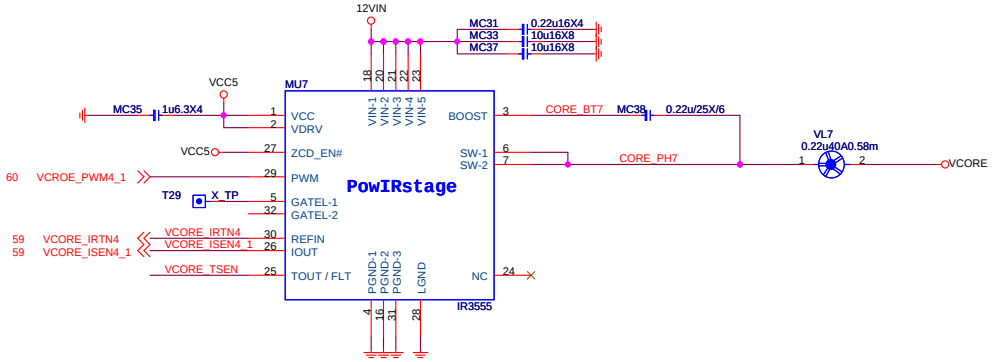

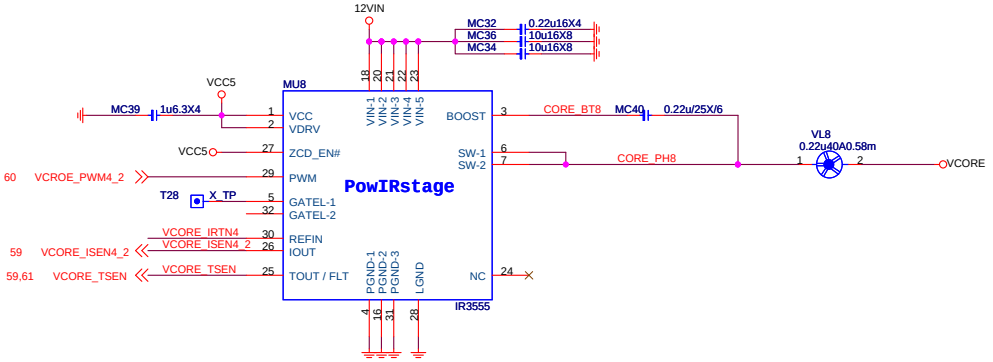

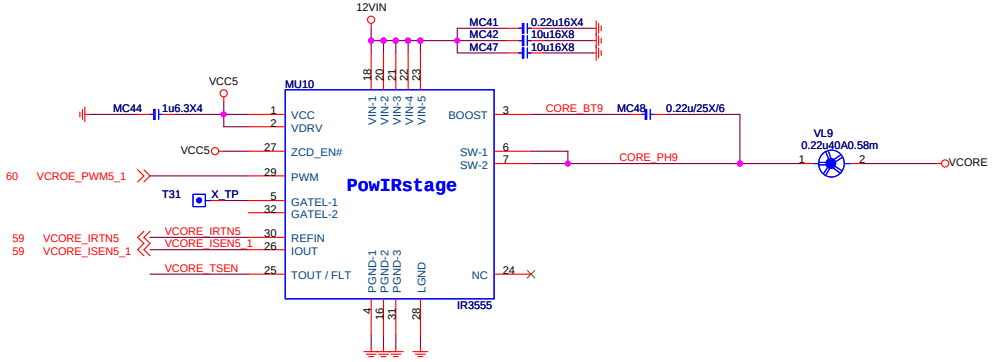

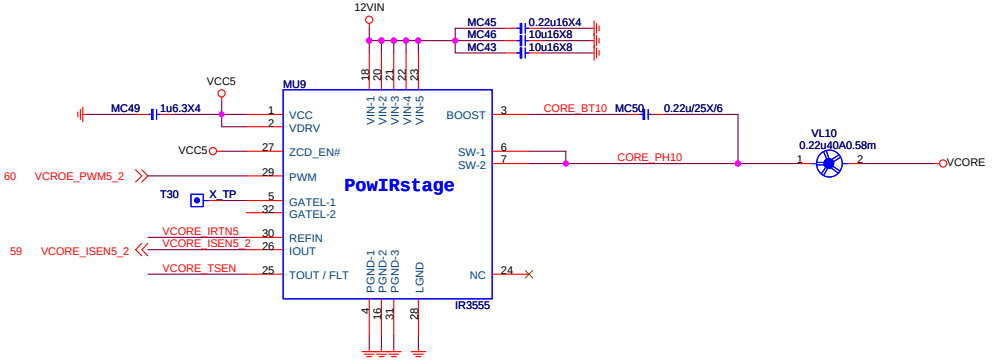

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MS-7968		
Size: Custom	Document Description: CPU POWER-VCORE-Phase5~8	Rev: 31
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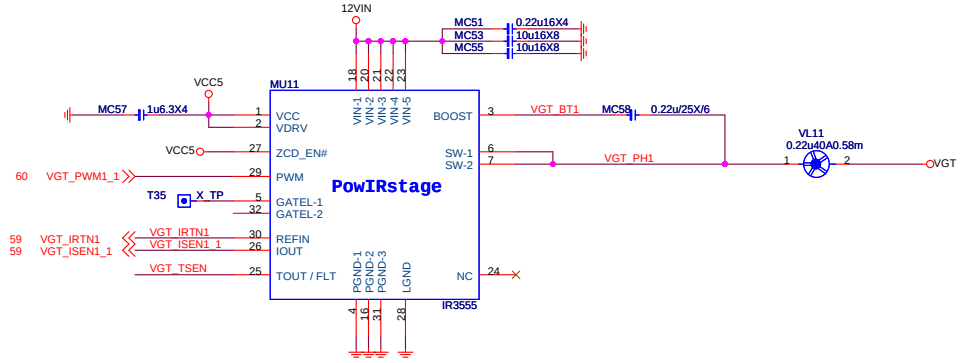

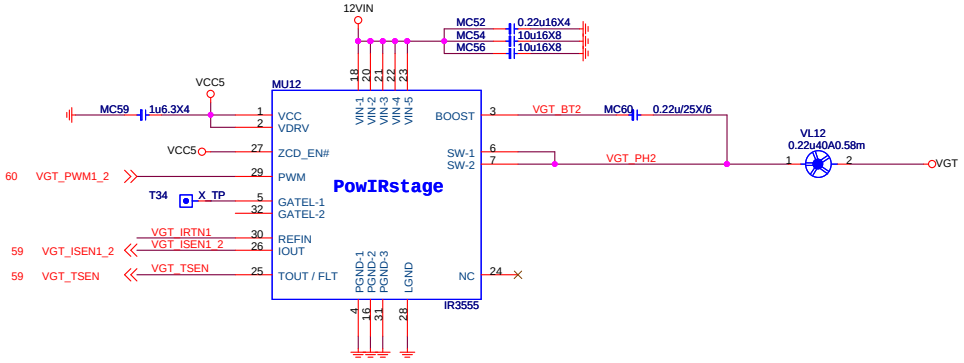

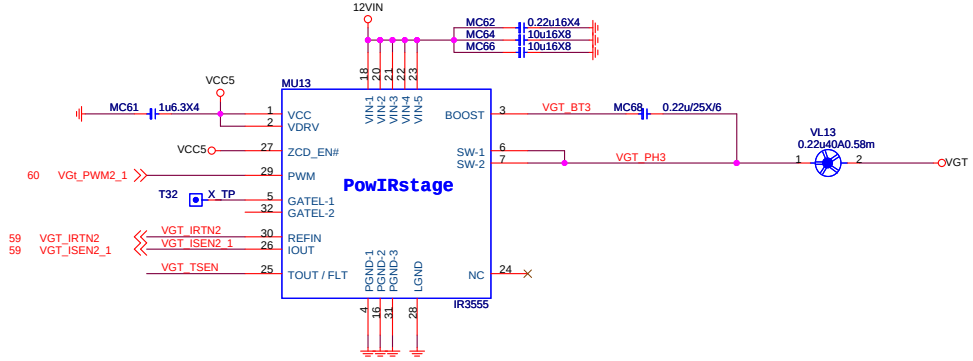

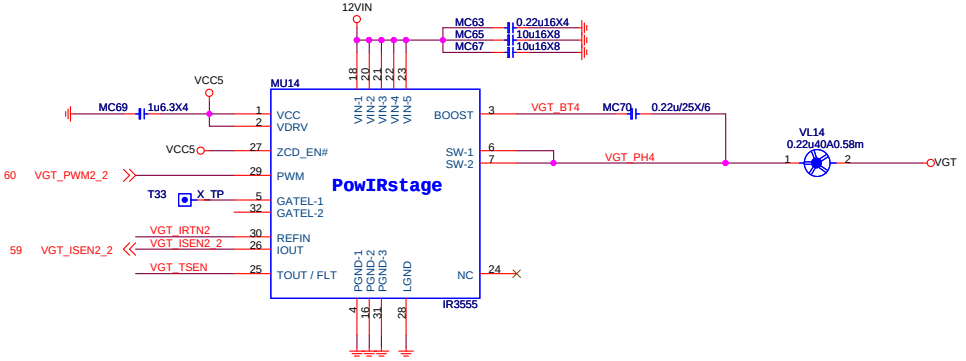

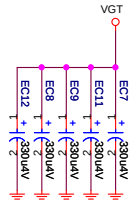

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MS-7968		
Size: Custom	Document Description: CPU POWER-VCORE-Phase9~10	Rev: 31
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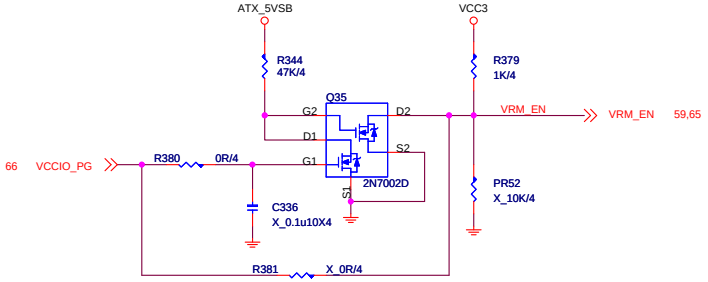

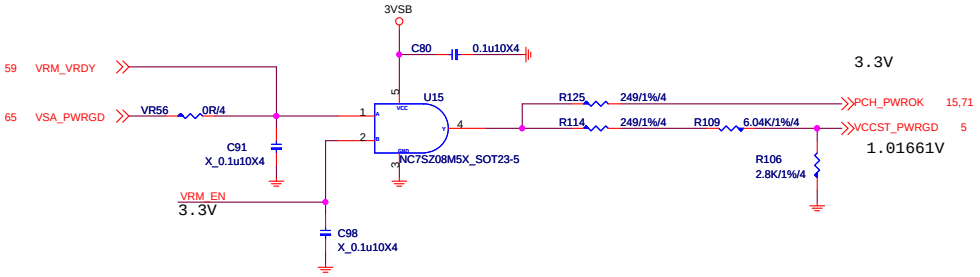

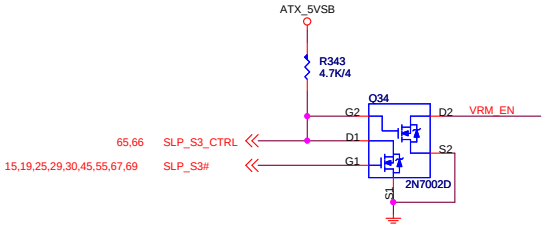

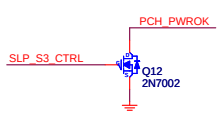

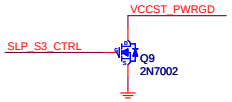

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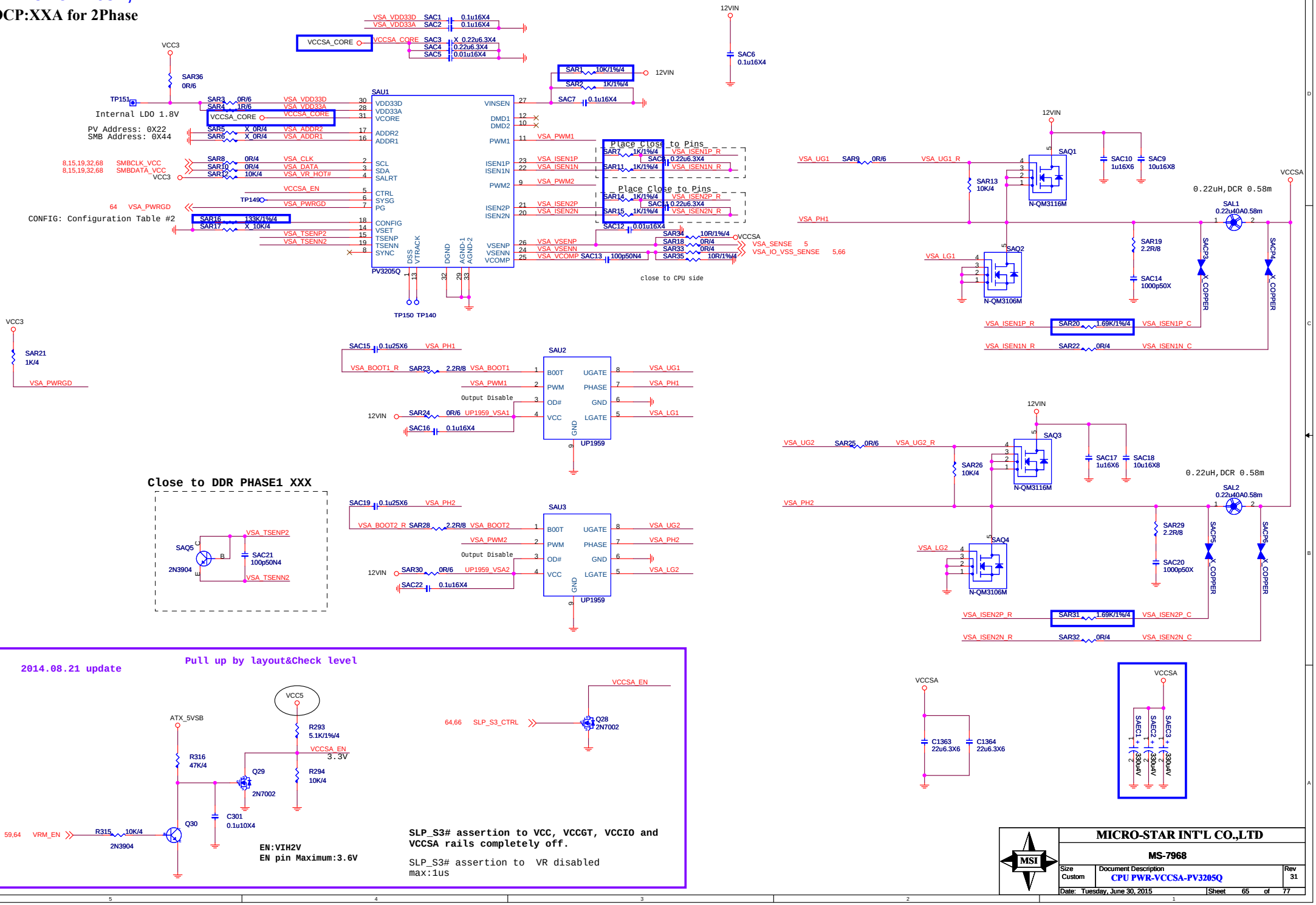
SA Power:1.05V,11.1A

OCP:XXA for 2Phase



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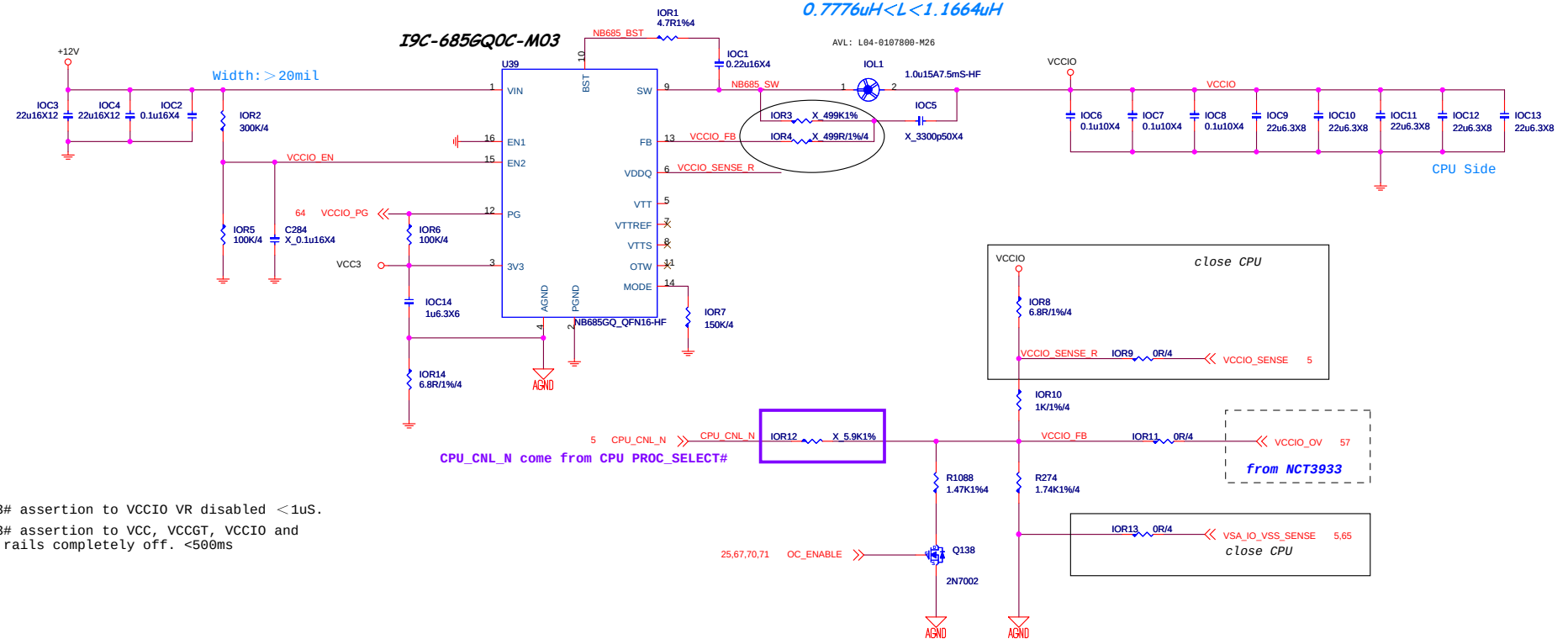
VCCIO

0.95V; 5.5A

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

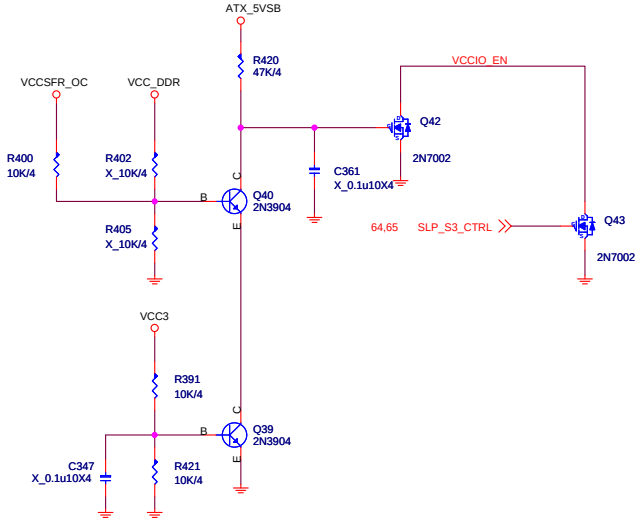
support 0V=>NB685

0.7776uH<L<1.1664uH



SLP_S3# assertion to VCCIO VR disabled ＜1uS.

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



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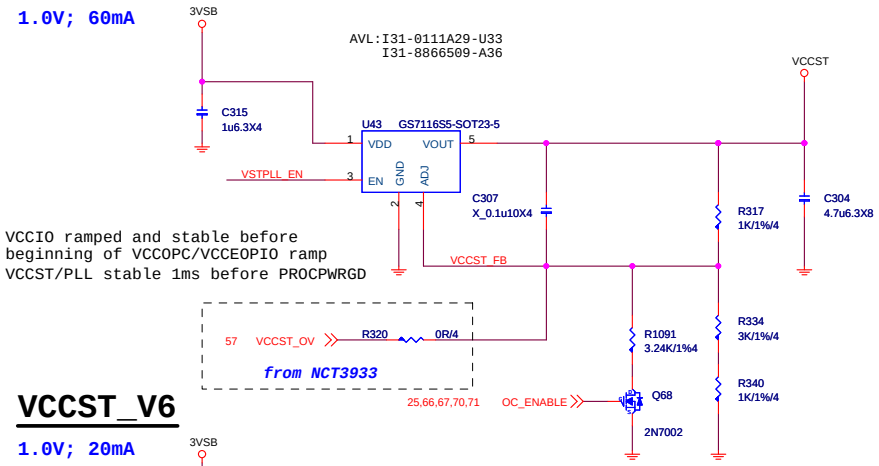
only for OC & Gaming7/9/11

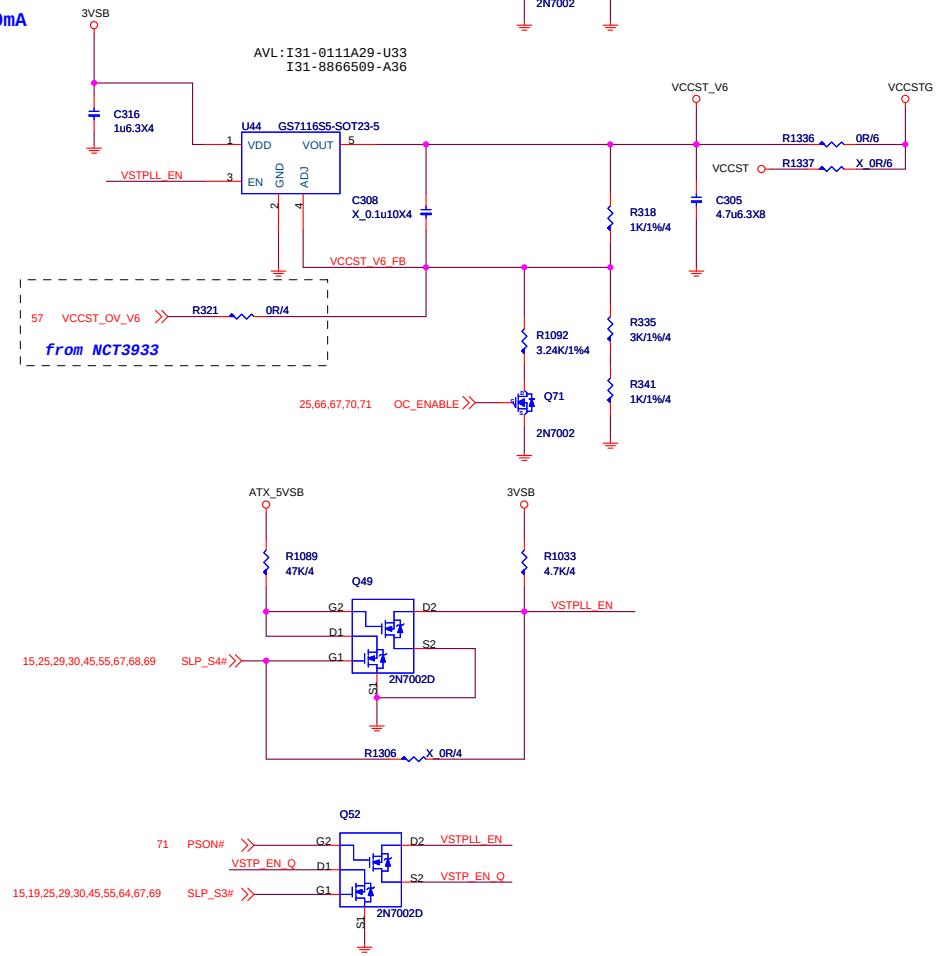
VCCST_V5

1.0V; 60mA



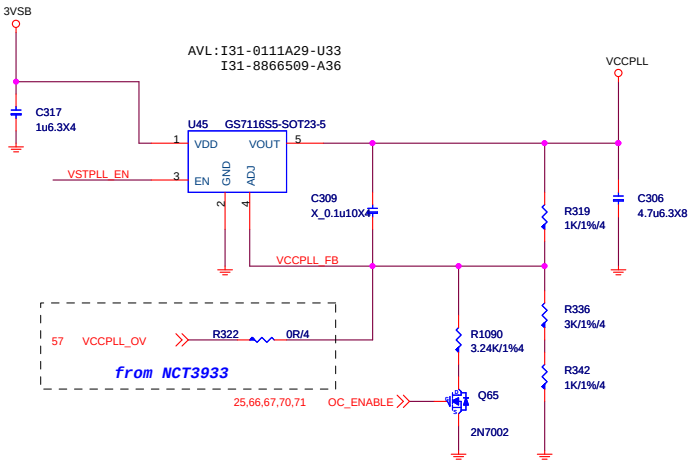
VCCST_V6

1.0V; 20mA



VCCPLL_V4

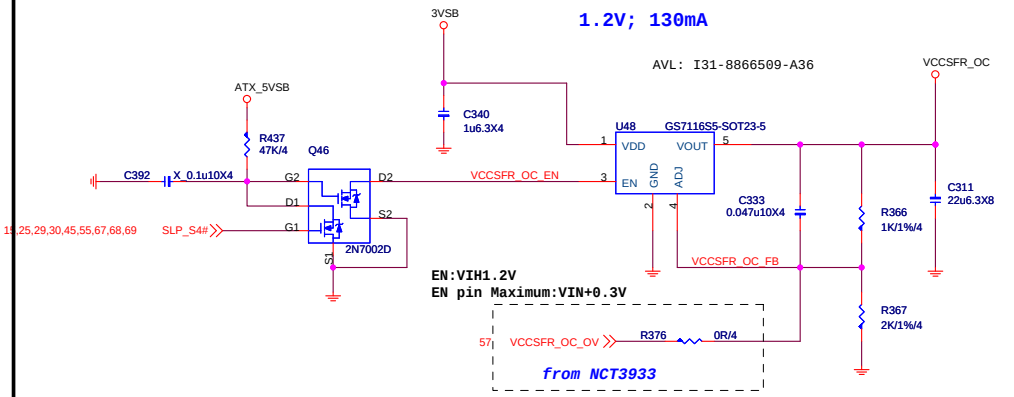
1.0V; 150mA

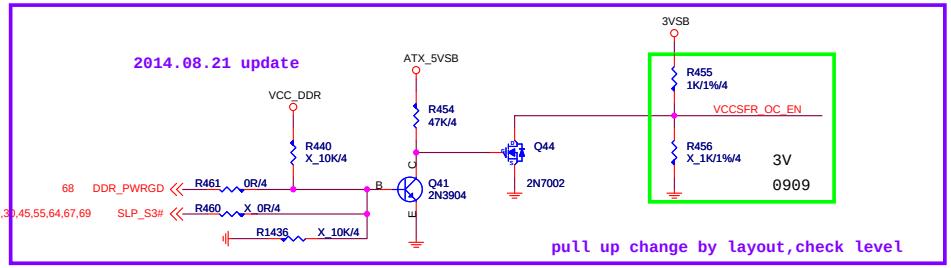


VCCPLL_OC

1.2V; 130mA

2014.08.21 update





MICRO-STAR INT'L CO.,LTD		
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DDR4_1.2V 2.5A+9.5A+1.2A=13.2A

2.5A FOR CPU

9.5A FOR 4DIMM

1.2A FOR DDR VTT

L04-47B7730-T15

L27 CH-0.47u22A2.2mS

OCP:XXA for 2Phase

Imax: 13.2A

Iout ripple = 2.255A

Internal LDO 1.8V

PV Address: 0X21

SMB Address: 0X42

2014.08.21 update

CONFIG: Configuration Table #3

Place Close to Pins

Close to DDR PHASE1 XXX

close to DIMM side

L04-22B7120-M26

2014.08.21 update

pull up change by layout,Check level

3.12V

EN:VIH2V

EN pin Maximum:5.5V,RECOMMENDED:3.6V

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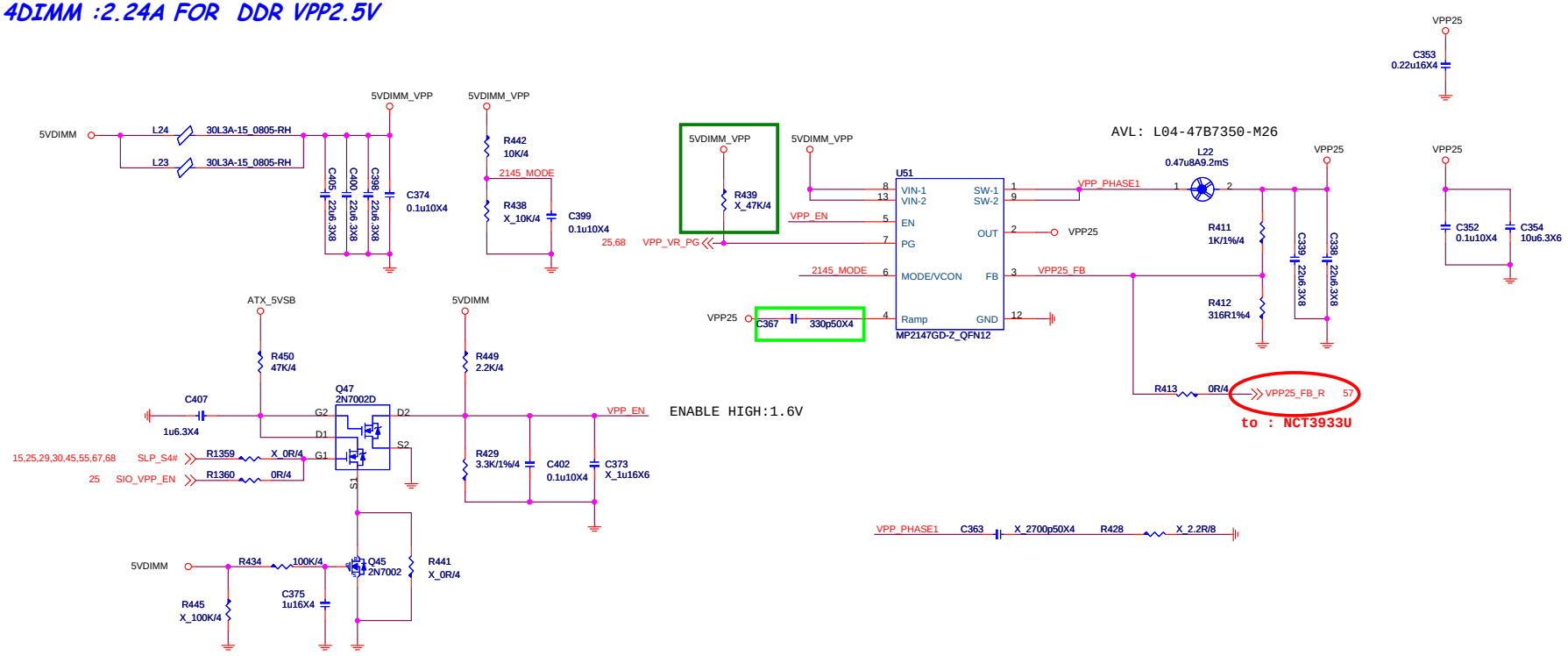
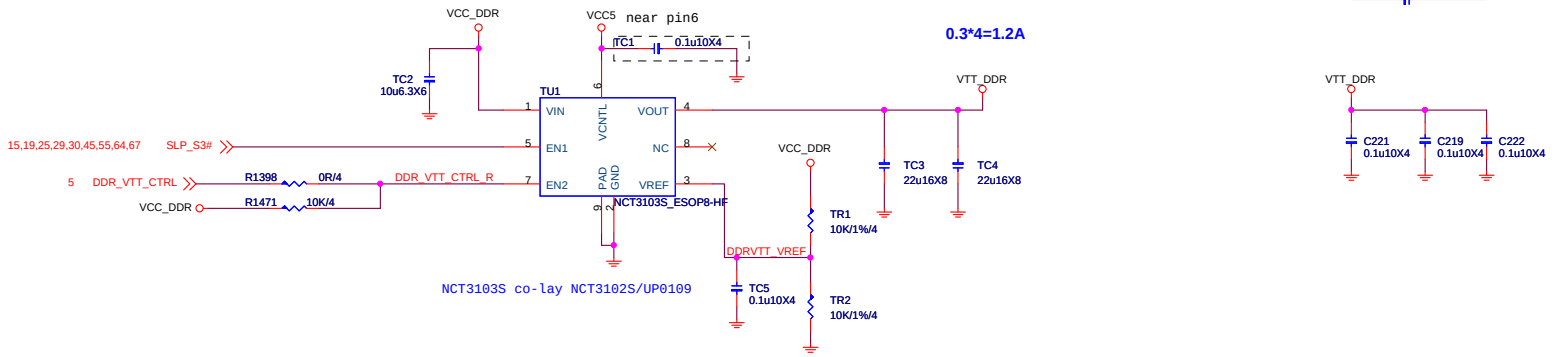
4DIMM :2.24A FOR DDR VPP2.5V



DDR VTT Power

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



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PCH_1VSB

1.0V; 10.664A

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

OCP = 16.21A

Rocset = 1.5 * Imax * Rdson(low) / Iocset
= 1.5 * 10.664 * 4.2mohm / 10uA
= 6.71K

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

2014.12.25
for up1540:
C579 , R783 ->NC

2014.12.25
For up1540:
C578 is OCP set min:5K
7.87K OCP = 15.74A
For RT8125C stuff 1000P
C11-1022032-W08

2014.08.21 update

2014.12.25
for up1540:R742->NC

to sink/source over voltage IC.
pin10 sink/source current capability can't over 1mA
So max voltage can't over 1.8V.
from NCT3933

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

PLACE UNDER THE PCH

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

MAX:10.664A

L04-01072H0-T15
L04-0107800-M26

0728: add

0728: Change net name

RSVD for up1540

2014.12.25
for up1540:stuff R782->36K,
C577->330pF,C584->680pF

	C579	C578	R783	C577	R782	C584	R742	R1394
RT8125C I32-8125C0C-R11	1000P	1000P	1K	X	X	X	7.87K	X
UP1540Q I32-1540Q0C-U33	X	X	X	33p	36K	3300p	X	0R

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Size: Custom
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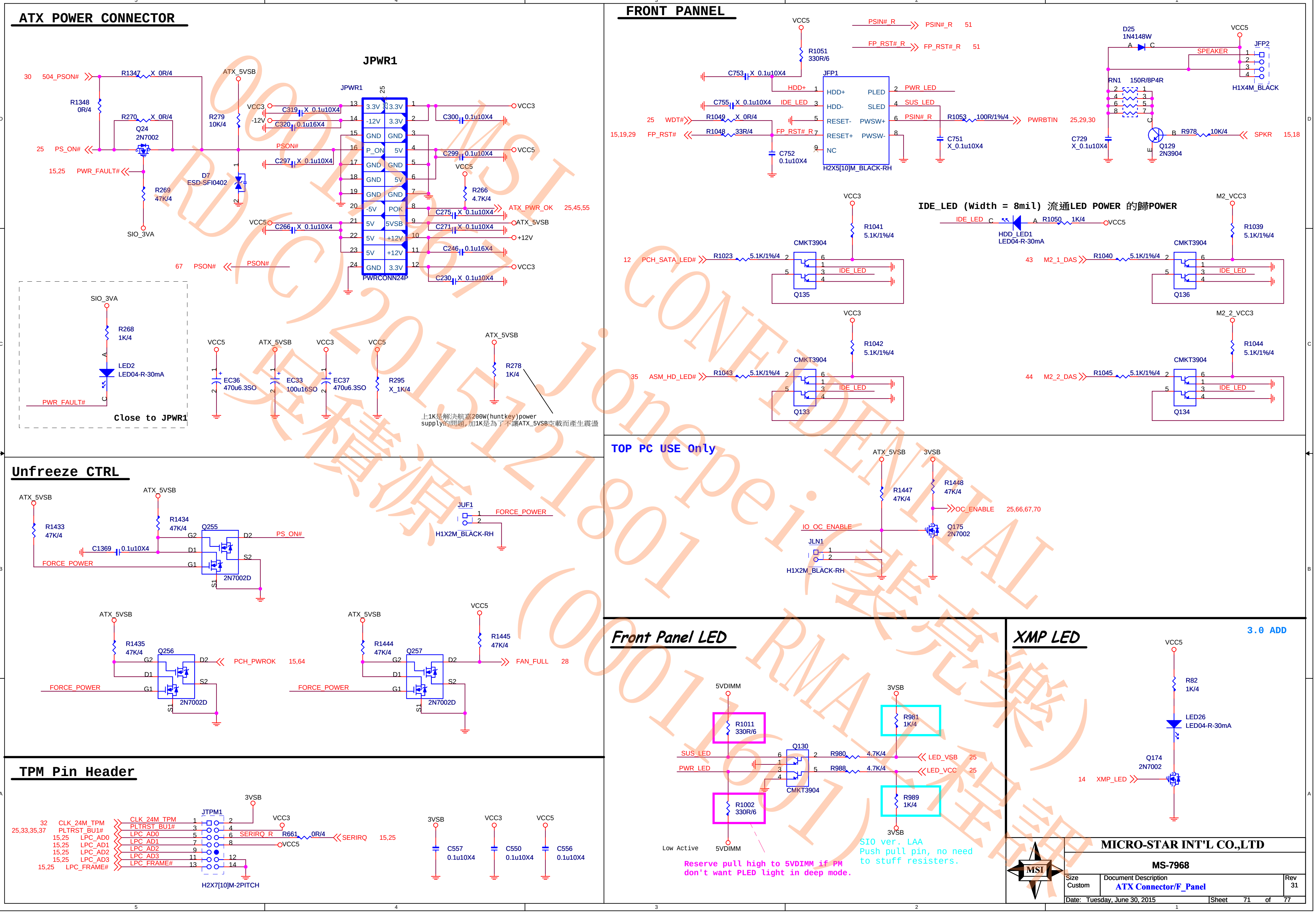

ATX POWER CONNECTOR
JPWR1
PWRCONN24P
Close to JPWR1
上1K是解決航嘉200W(huntkey)power supply的問題,加1K是為了不讓ATX_5VSB空載而產生震盪
FRONT PANNEL
JFP1
H2X5[10]M_BLACK-RH
JFP2
H1X4M_BLACK
IDE_LED (Width = 8mil) 流通LED POWER 的歸POWER
Unfreeze CTRL
JUF1
H1X2M_BLACK-RH
TOP PC USE Only
JLN1
TPM Pin Header
JTPM1
H2X7[10]M-2PITCH
Front Panel LED
Low Active
Reserve pull high to 5VDIMM if PM don't want PLED light in deep mode.
SIO ver. LAA Push pull pin, no need to stuff resisters.
XMP LED
3.0 ADD
MICRO-STAR INT'L CO.,LTD
MS-7968
Size Custom
Document Description ATX Connector/F_Panel
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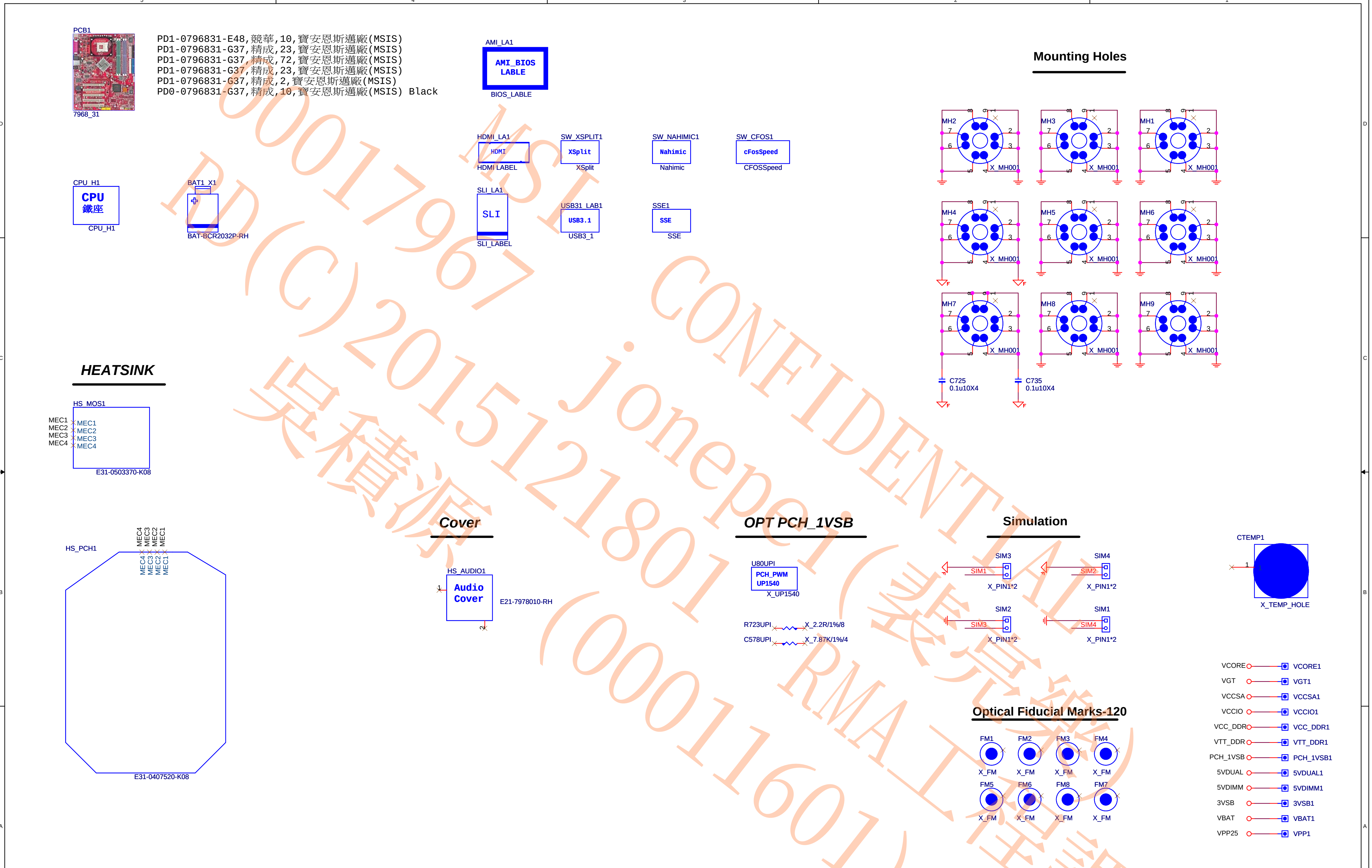
PCB1
7968_31
PD1-0796831-E48,競華,10,寶安恩斯邁廠(MSIS)
PD1-0796831-G37,精成,23,寶安恩斯邁廠(MSIS)
PD1-0796831-G37,精成,72,寶安恩斯邁廠(MSIS)
PD1-0796831-G37,精成,23,寶安恩斯邁廠(MSIS)
PD1-0796831-G37,精成,2,寶安恩斯邁廠(MSIS)
PD0-0796831-G37,精成,10,寶安恩斯邁廠(MSIS) Black
AMI_LA1
AMI_BIOS LABLE
BIOS_LABLE
Mounting Holes
HDMI_LA1
HDMI
HDMI LABEL
SW_XSPLIT1
XSplit
SW_NAHIMIC1
Nahimic
SW_CFOS1
cFosSpeed
CFOSSpeed
CPU_H1
CPU 鐵座
BAT1_X1
BAT-BCR2032P-RH
SLI_LA1
SLI
SLI_LABEL
USB31_LAB1
USB3.1
USB3_1
SSE1
SSE
MH1
MH2
MH3
MH4
MH5
MH6
MH7
MH8
MH9
X_MH001
C725
0.1u10X4
C735
0.1u10X4
HEATSINK
HS_MOS1
MEC1
MEC2
MEC3
MEC4
E31-0503370-K08
HS_PCH1
E31-0407520-K08
Cover
HS_AUDIO1
Audio Cover
E21-7978010-RH
OPT PCH_1VSB
U80UPI
PCH_PWM UP1540
X_UP1540
R723UPI
X_2.2R/1%/8
C578UPI
X_7.87K/1%/4
Simulation
SIM1
SIM2
SIM3
SIM4
X_PIN1*2
CTEMP1
X_TEMP_HOLE
Optical Fiducial Marks-120
FM1
FM2
FM3
FM4
FM5
FM6
FM7
FM8
X_FM
VCORE
VCORE1
VGT
VGT1
VCCSA
VCCSA1
VCCIO
VCCIO1
VCC_DDR
VCC_DDR1
VTT_DDR
VTT_DDR1
PCH_1VSB
PCH_1VSB1
5VDUAL
5VDUAL1
5VDIMM
5VDIMM1
3VSB
3VSB1
VBAT
VBAT1
VPP25
VPP1

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MS-7918

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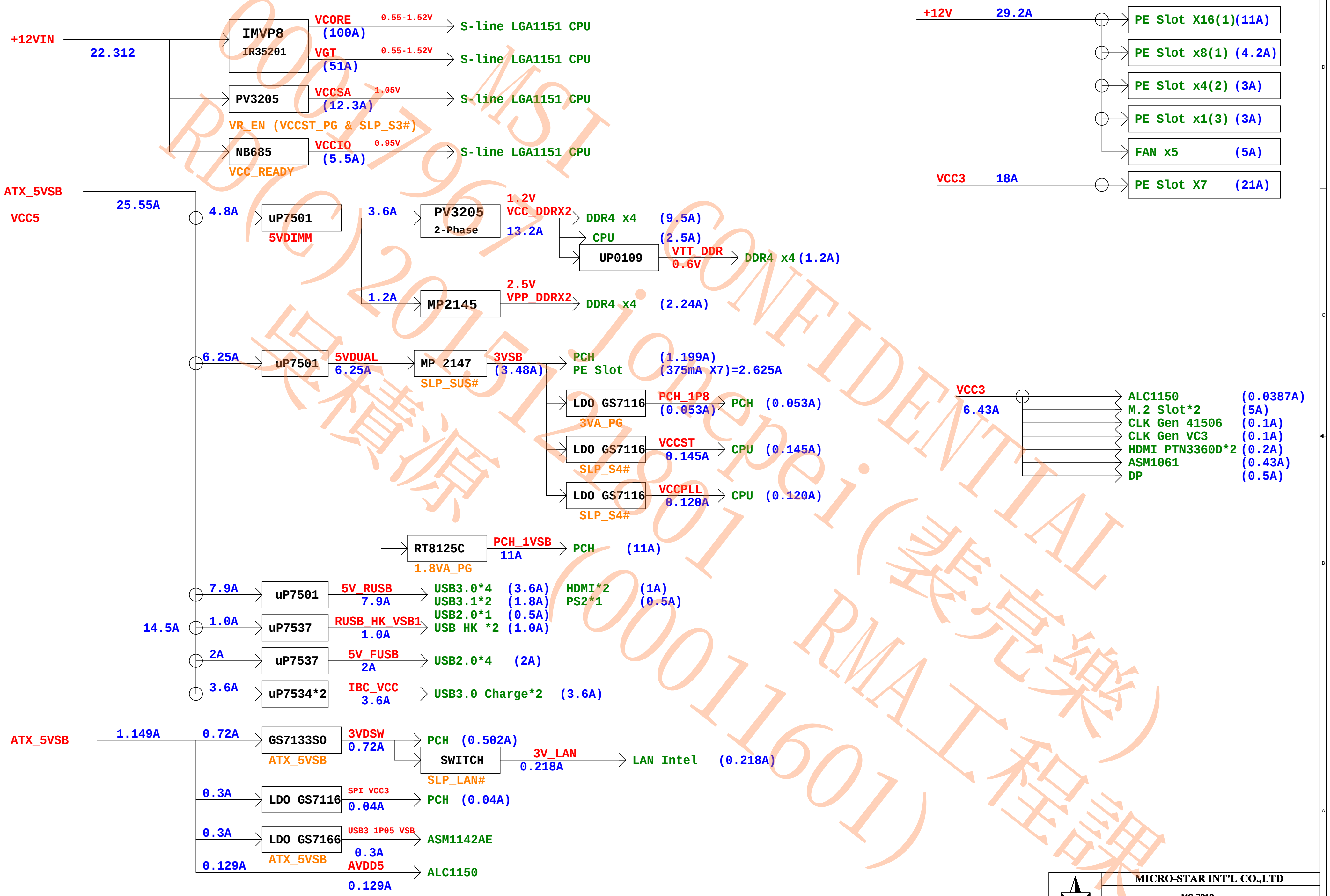
Power Delivery

CPU TYPE
(4+2)



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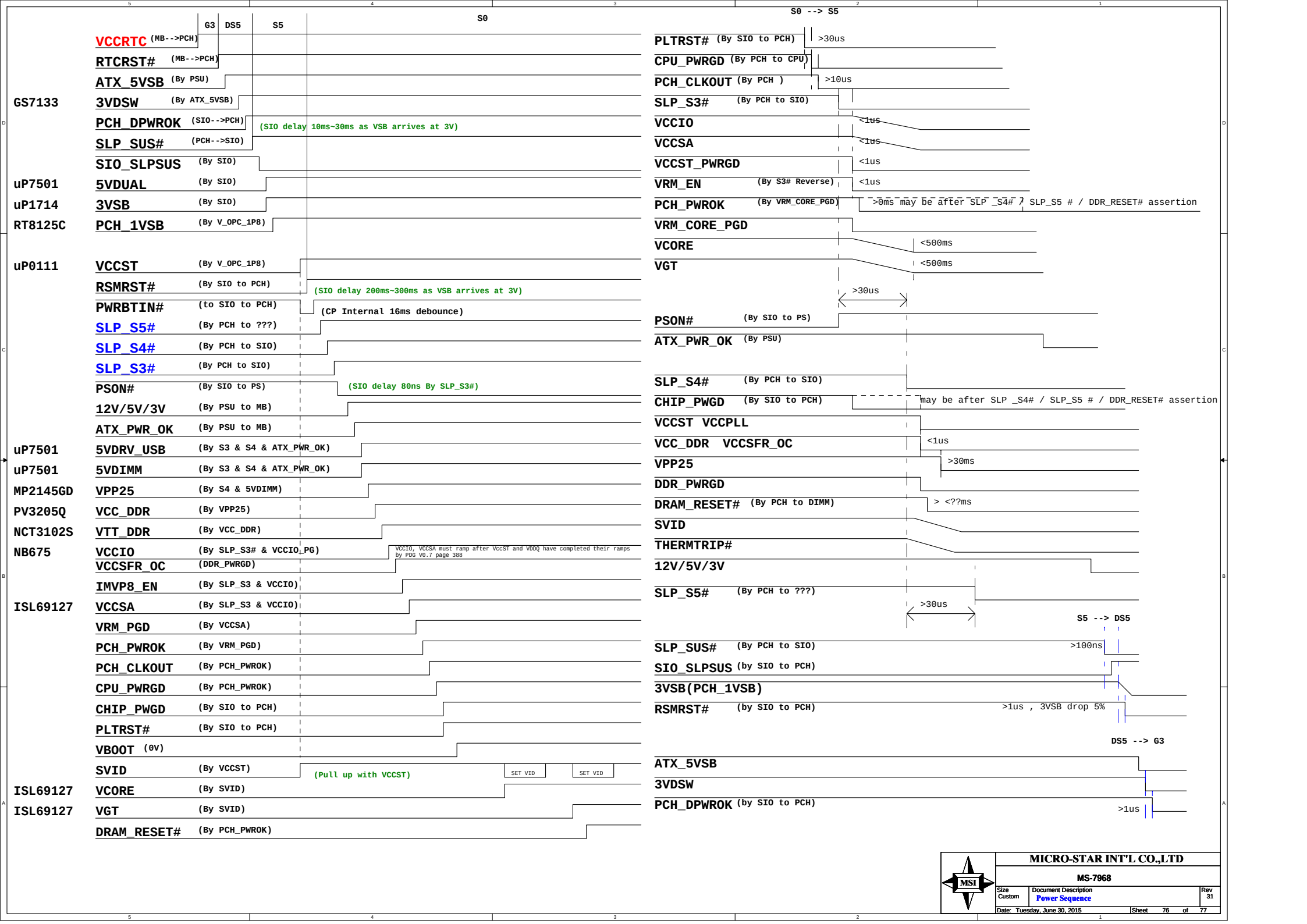

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0A to 0B

Update CPU and PCH LIB

Page 4 Add R1410,TP97,TP98 For internal test
Page 5 Add CFG9,CFG14,CFG15 CTRL circuit
Page 6 Stuff C874
Page10 Change VCC_DDR to DIP Cap,Add C941,C942,C943,C944,C945,C946
Page13 Remove R1187,R1191,R1190,R1195,R1182,R1181,R1183,R1186,R1179,R1180
R1196,R1204,R1203,R1209,R1206,R1212,R618,R614,R634,R619,R1218,R1213

Page14 Remove R663,R1223,R664,R1210,R629
Add R1353,R1355,R1357,R1352,R1354,R1356,R1412,R1423,R1424
Page15 Change Value R1275 150K,R792,R793 20K
Page16 Remove R786 Group_A Co-lay PCH_1P8
Page19 Add FS Ctrl circuit
modify SMBUS co-lay circuit

Page25 Change PWRBTIN pull up Resistor to SIO side
add C1338 for ESD
add R1338,R1339 for SLPSUS leakage
add R825,C615 for auto clean CMOS
R577 un-stuff
CHARGE_CB change to GP16
For 6793 RevA
Add DDR4 Sequence circuit
LED_VCC to GP10
LED_VSB to GP11
remove ESPI function and 1P8 Power

Page27 Change FAN Module to Type I
Page28 Change FAN Module to Type H

Page29 Modify Hot_key1 circuit
Page30 Add R1344,R1345,R1346,R843,LED14,D30,D31
un-stuff R835,co-lay common choke for EMI

Page32 Remove X'tal
Add U99 for VC3 soft-start

page42 modify IFDET circuit.
page43 simplify M2_1,SATA,SE1 switch circuit
page44 simplify M2_2,SATA, switch circuit
Page45 co-lay common choke for EMI
Page46 co-lay common choke for EMI
Page47 co-lay common choke for EMI
Page48 co-lay common choke for EMI
Page49 co-lay common choke for EMI
Page50 stuff R1140
page51 change J1 to housing type
Add R1397
page52 Add Q169,R1421
Remove R1014
page54 R766 change to 20.1K
page56 Add VCO_EN for CLk Gen
page57 Add PCH_CLK5_1P0 for PCH ICC power OV
page58 Change value R9 57.6,R13 4.53K
Page59 Change Current Sense to DCR Mode
R64 4.02K,R85 1K
Add R1422
Page66 Change pwm to PV3205Q
Page71 Remove U85 PCH_1P8
Page72 Add J2 for Dual PSU

0B to 30

Page 5 add R1425 Pull high to VCCST
Page 6 add C256 change to VCCSA
Page 14 add R618,R619 for XMP LED
remove R595,R594
Cheange net name PCH_X4_SEL2 to PE4_SEL
Page 21 Add C1366 for SA Reset Issue
Add C1367,C1368 for SA Reset Issue
Page 23 Add R1430,R1431,R1432,D35,D36,D37
for PCI_E2,PCI_E4,PCH_E6 PRSNT Ctrl logic
Change R514 to 100R for SA Reset Issue
Page 24 Remove Q123,Q122 and Add Q159,Q160,Q161
for PCH X4 and X1 mode Ctrl logic
Page 25 Remove R588,C528,RT1
Stuff R589
Page 26 Remove Post3,Post4
Page 27 add FC41,FC42,stuff FQ1,FQ2
Page 28 FC43,FC44,FC45
Page 33 Change RU10 to 5.1K
Page 34 Remove R891,LED12,Q109
Page 43 Remove R591,LED9,Q68
Page 44 Remove R966,LED13,Q118
Page 45 F1 change footprint to USMD100
Page 46 F6 change footprint to USMD100
Page 47 F7,F8 change footprint to 0805
Page 48 F4 change footprint to 0805
Page 49 F2,F3 change footprint to 0805
Page 51 Add OC1 HW,SW LED ctrl circuit
Page 52 Add Q170 fixed Dual BIOS LED issue
Page 58 Change R5 to 100R,R9 to 18.7K
unstuff Q138,Q139,R1057,R1056
Page 59~63 Change PWM to IR
Page 67 Add R440,R1436 for PV3205 PWRGD issue
Page 69 Change DDR_VTT to NCT3102S
Page 70 unstuff R713
Page 71 add Unfreeze CTRL circuit

30 to 31

Page 5 Remove R1400,R1402,R105
Page 6 Change VGT MLCC to 22uF
Page 14 Change R619 Pull Down to GND
Change OC1 GPIO to PCH1.AM44
Remove Some 0R and TP
Page 15 R1235,R1233 stuff,add R1449
Page 16 Add R1292 by MOW23
Page 19 Add IMON and Cut power circuit,
Add D36 for Seq
Page 27 unstuff FC41,FC42
Page 28 unstuff FC43,FC44,FC45
Page 29 Change U17 power to 501_5VSB
Page 30 Change U83 power to 504_5VSB
Page 31 unstuff R994,R995 change to 4.7k
Page 52 Add D33,unstuff R912
Page 53 Add R490,Q258,R1466,C1377
Page 57 Add R1098,R1467
Page 59 VR37 to 37.4K
VR52 to 53.6K
VR25 to 845R
Page 63 Remove EC58~61
Page 66 Add Power on change voltage circuit
Page 67 Add Power on change voltage circuit
Page 69 Add R1471
Page 70 Add Power on change voltage circuit

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