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MS-7B98

ATX
Ver: 10

Z390-A PRO

Coffeelake Platform

CPU: *Coffeelake S*

PCH: *Z390*

SPI ROM : 128 MB

Memory: *DDR4 * 4 (Dual Channel)*

Power Solution:

CPU : UP9521
VCCSA : RT8125E
VCCIO : SY8288RAC
DDR : RT8125E
PCH : RT8125E

ACPI: *GS7133*

Onboard Chip:

LAN Intel I219
Codec:ALC892
SIO:NTC6797
Type C MUX:HD3SS3220
Clock Gen : --------
USB3.1 Host : --------
USB Charger : SLG55593A
USB3 Redrive : PERICOM/PI3EQX1004HEX
USB2 Redrive : --------
Flash BIOS : --------
GPIO : --------

Expansion Slots:

*PCI Express (X16) Slot * 1*
*PCI Express (X8) Slot *0*
*PCI Express (X4) Slot * 1*
*PCI Express (X1) Slot * 4*
*M.2 Slot (Socket 3) * 1*
*CNVi Slot (KEY E) * 1*

Rear I/O Connectors

PS2+USB2.0x2
VGA+DVI
DP
RJ45 + USB3.1 Gen1x2
USB3.1 Gen2x2
Audio Jack 6 Port

Internal Connectors

*JOC1*1*
*Dual SATA * 3*
*FUSB3 Header * 2*
*FUSB2 Header * 2*
*Front Audio Header * 1*
*Front Panel Header * 2*
*SPI Header * 1*
*TPM Header * 1*
*CPU Fan * 1*
*PUMP_FAN * 1*
*System Fan * 5*

LED

Debug LED

Internal Pin Header

JLED1
JCI1
JSPI1
JBAT1
JTPM1

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Title: Cover Sheet		
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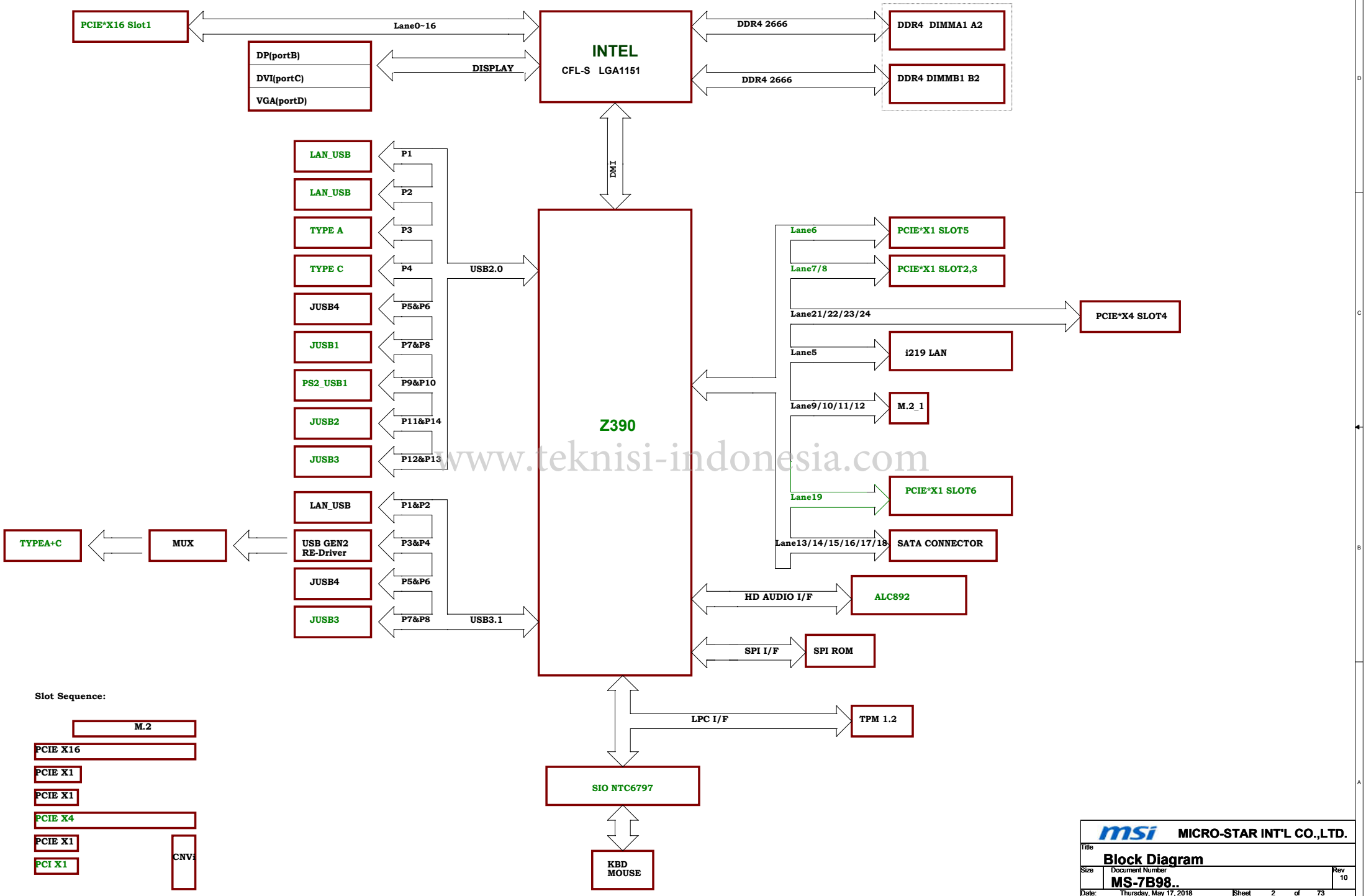
MS-7B98 Block Diagram



MICRO-STAR INT'L CO.,LTD.

Title: Block Diagram

Size | Document Number: MS-7B98.. | Rev: 10

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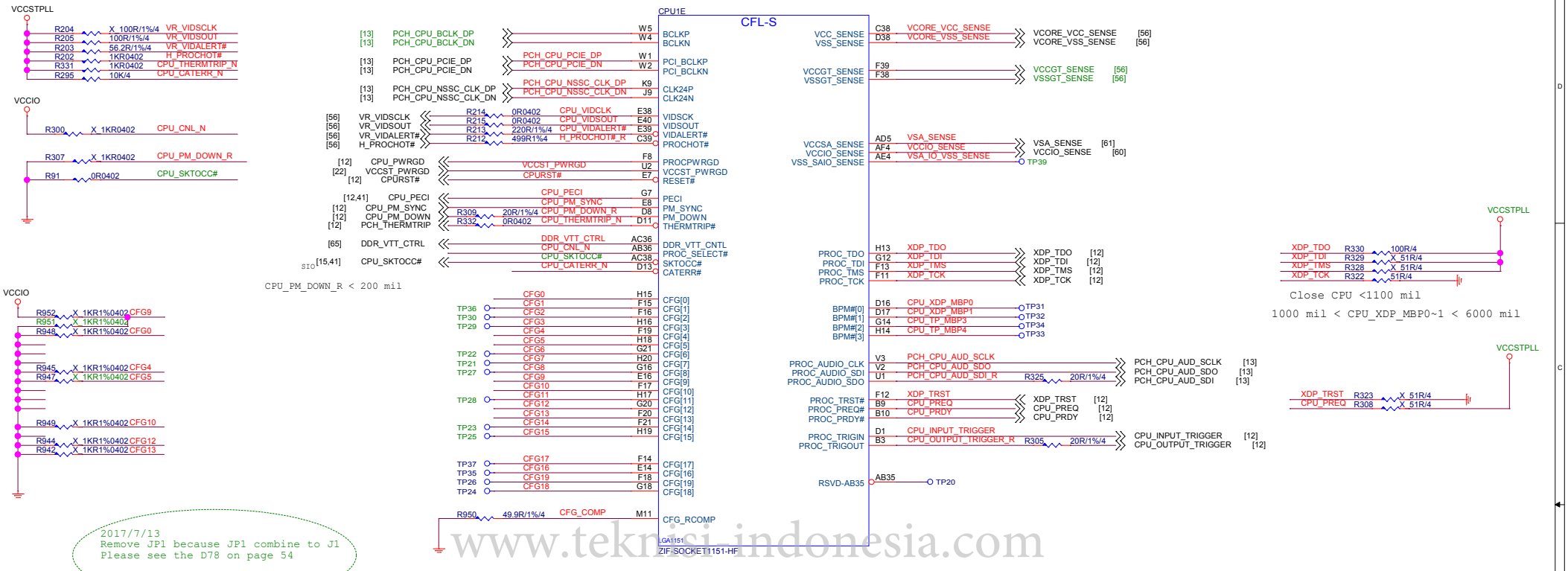
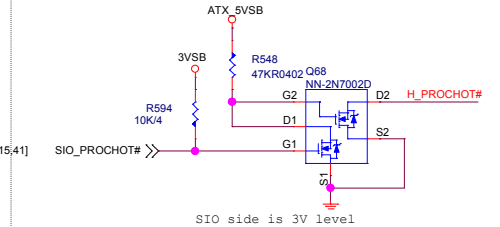


CFG Strap

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



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

Title: CPU-Control/MISC/CFG

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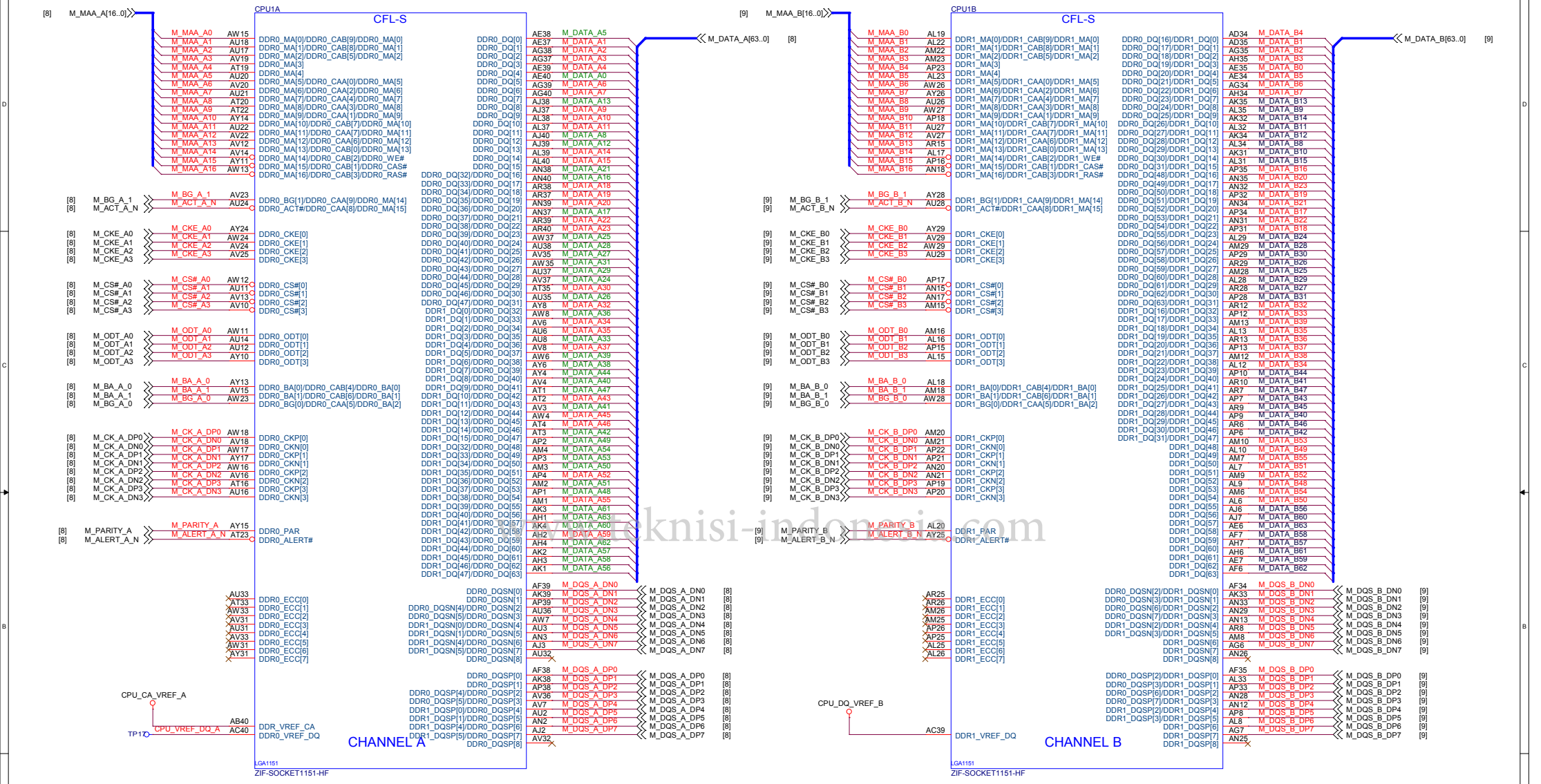
SOCKET PN N12-151A010-L06



MICRO-STAR INT'L CO.,LTD.

Title: CPU-Memory

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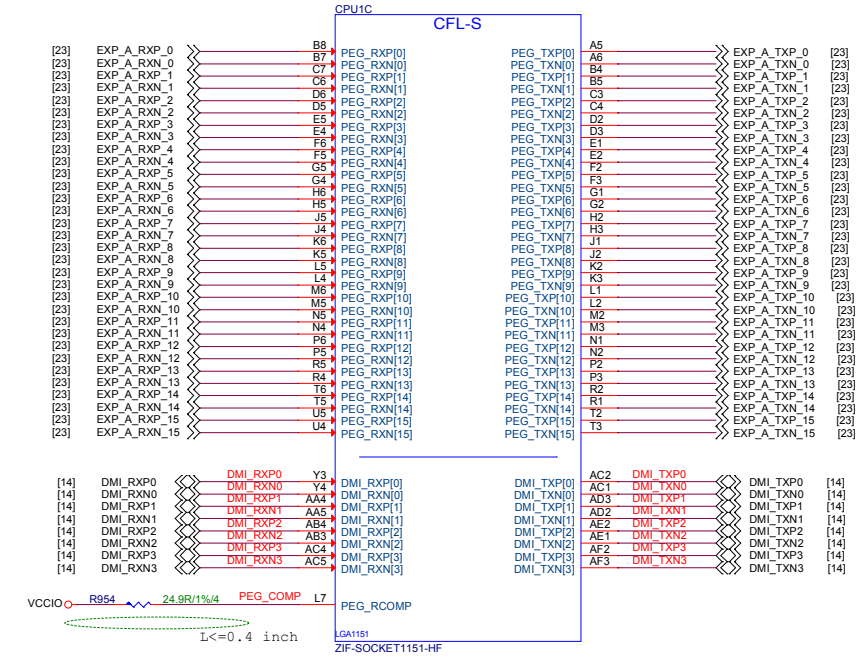

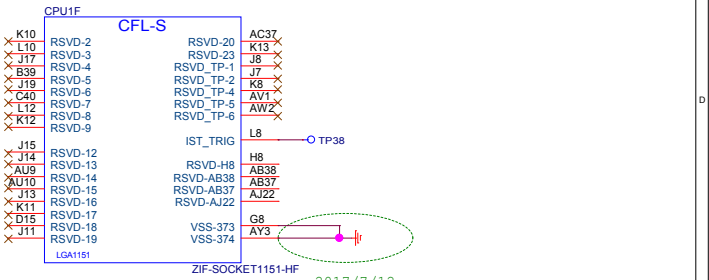

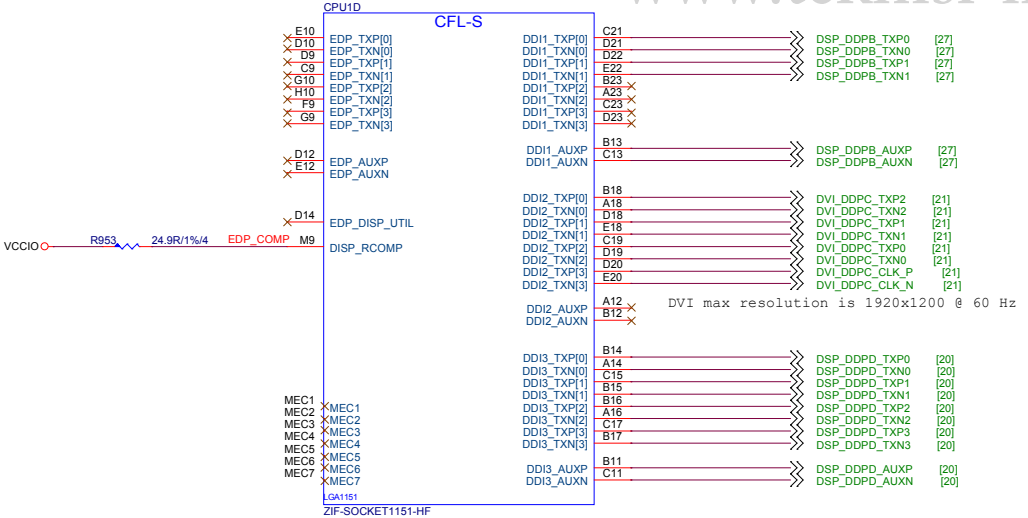

MICRO-STAR INT'L CO.,LTD.

Title: CPU-PEG/Display/RSD

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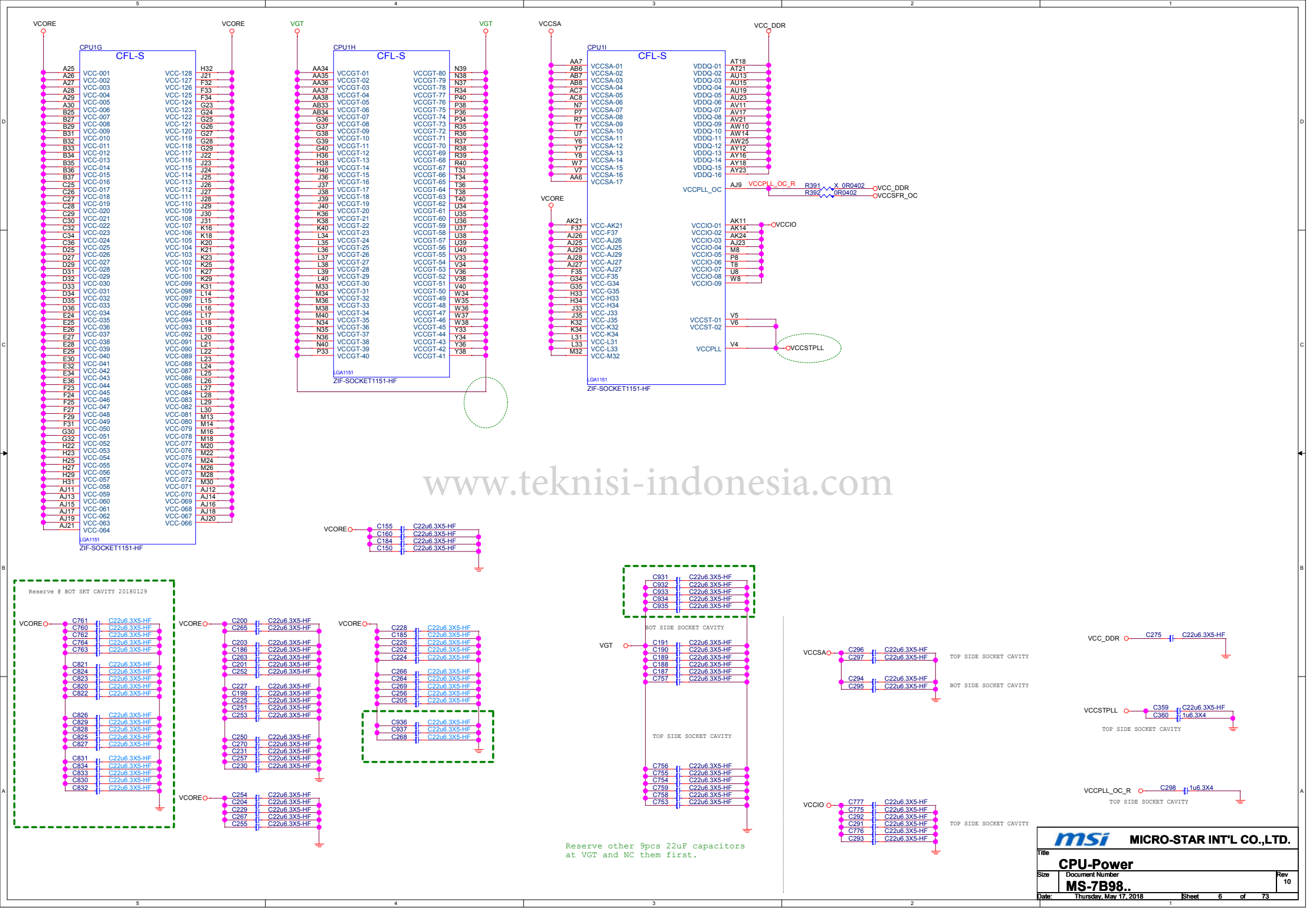
CPU1G
CFL-S
ZIF-SOCKET1151-HF
CPU1H
CFL-S
ZIF-SOCKET1151-HF
CPU1I
CFL-S
ZIF-SOCKET1151-HF
VCORE
VGT
VCCSA
VCC_DDR
VCCIO
VCCSTPLL
VCCPLL_OC_R
VCC_DDR
VCCSFR_OC
R391
R392
X 0R0402
0R0402
C22u6.3X5-HF
1u6.3X4
Reserve @ BOT SKT CAVITY 20180129
BOT SIDE SOCKET CAVITY
TOP SIDE SOCKET CAVITY
Reserve other 9pcs 22uF capacitors
at VGT and NC them first.
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CPU-Power
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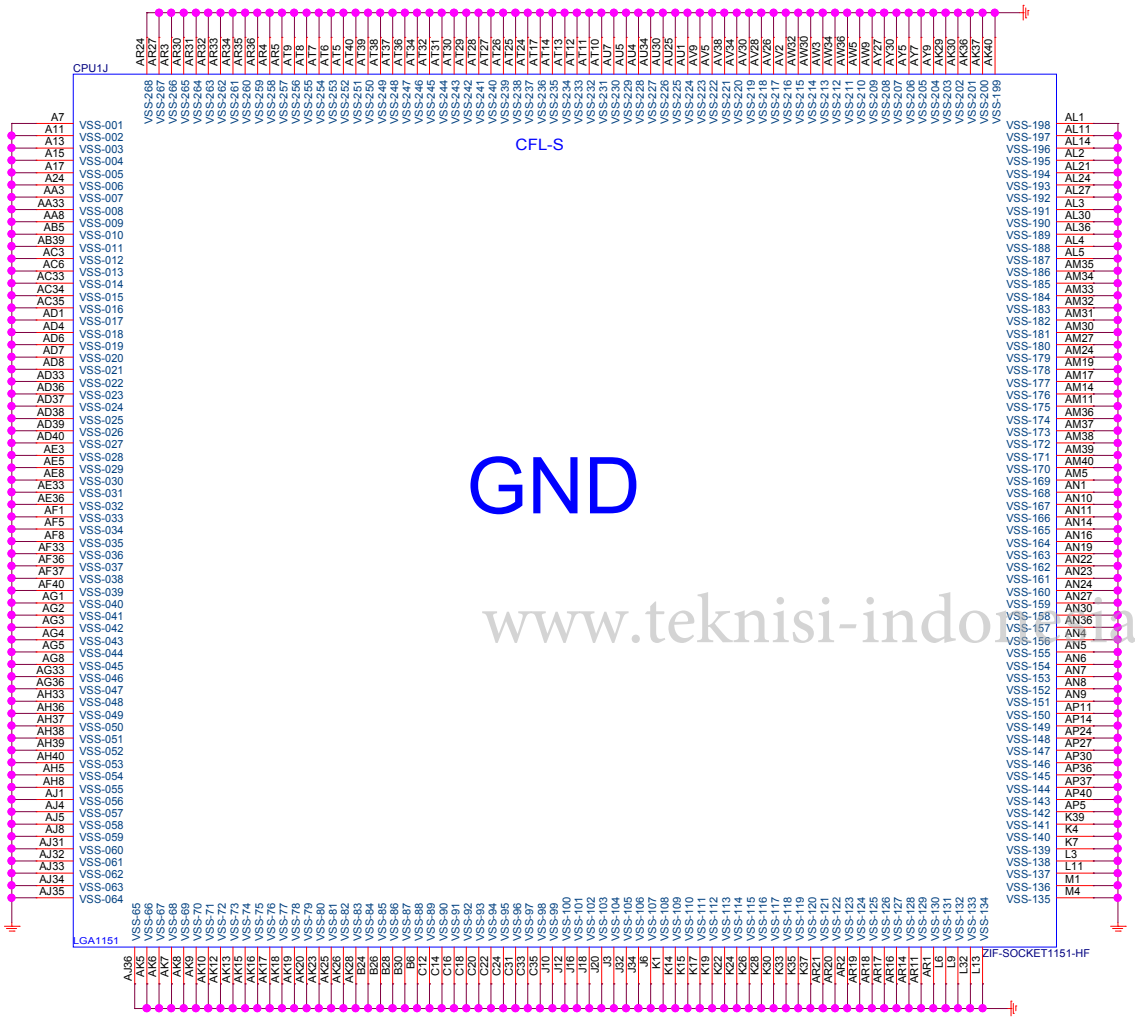

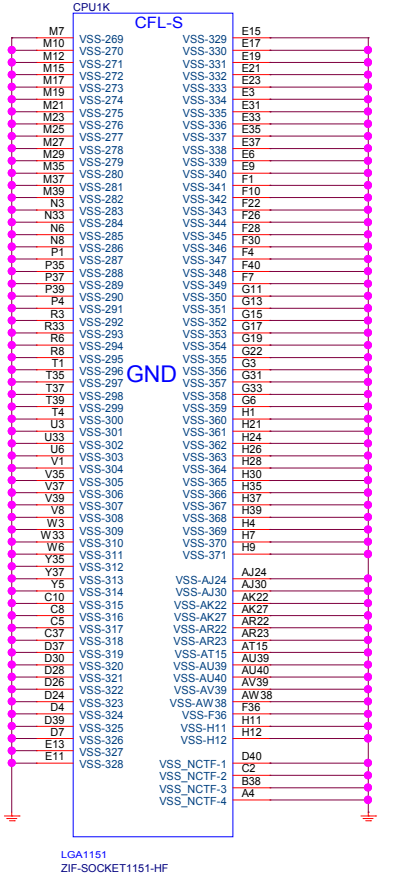

MICRO-STAR INT'L CO.,LTD.		
Title: CPU-GND		
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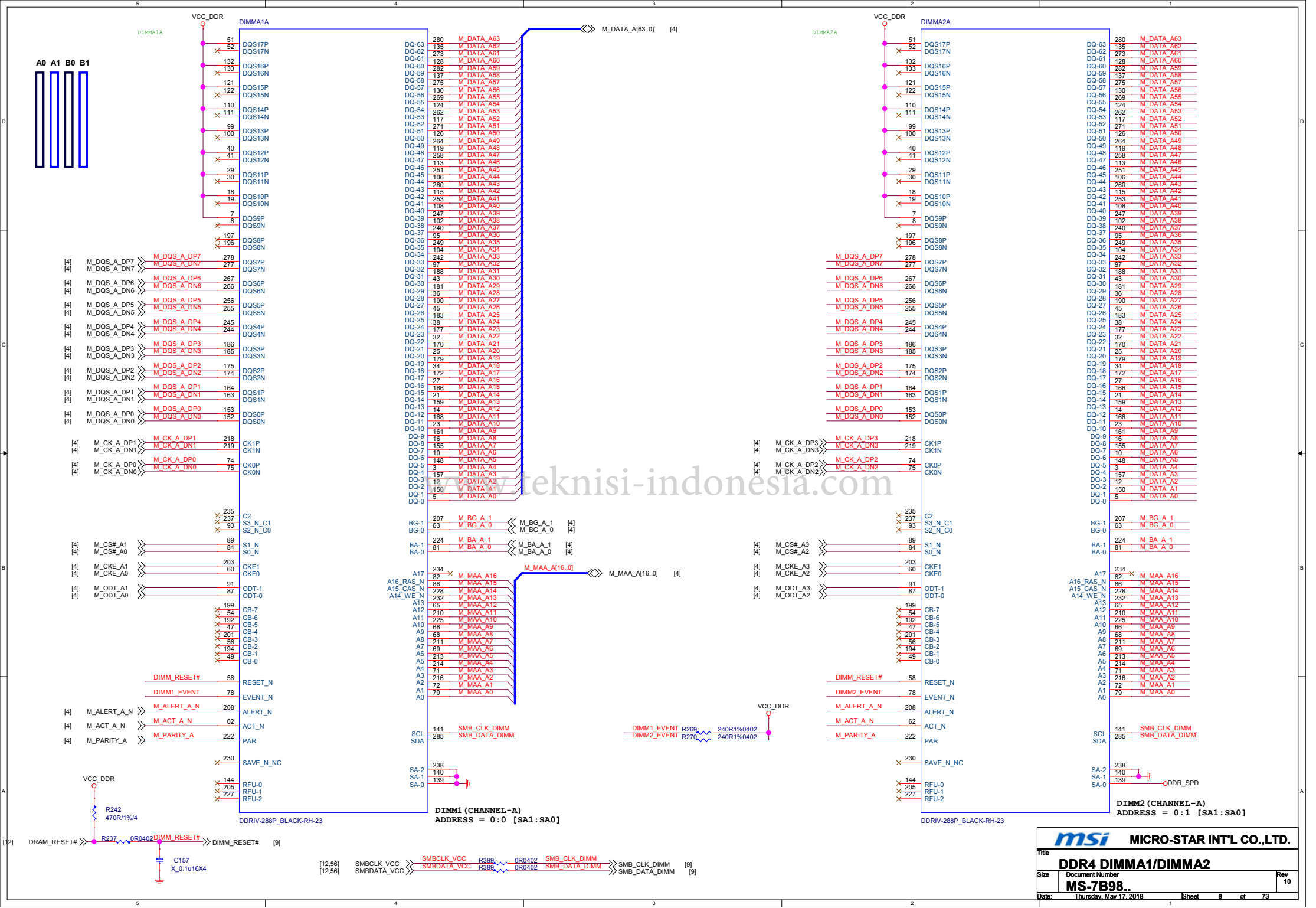
A0 A1 B0 B1
DIMMA1A
DIMMA2A
VCC_DDR
M_DATA_A[63..0]
M_MAA_A[16..0]
DIMM1 (CHANNEL-A)
ADDRESS = 0:0 [SA1:SA0]
DIMM2 (CHANNEL-A)
ADDRESS = 0:1 [SA1:SA0]
DDRIV-288P_BLACK-RH-23
R242 470R/1%/4
R237 0R0402
C157 X_0.1u16X4
DRAM_RESET#
DIMM_RESET#
SMBCLK_VCC
SMBDATA_VCC
R399 0R0402
R389 0R0402
SMB_CLK_DIMM
SMB_DATA_DIMM
DIMM1_EVENT R269 240R1%0402
DIMM2_EVENT R270 240R1%0402
DDR_SPD
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MICRO-STAR INT'L CO.,LTD.
DDR4 DIMMA1/DIMMA2
MS-7B98..
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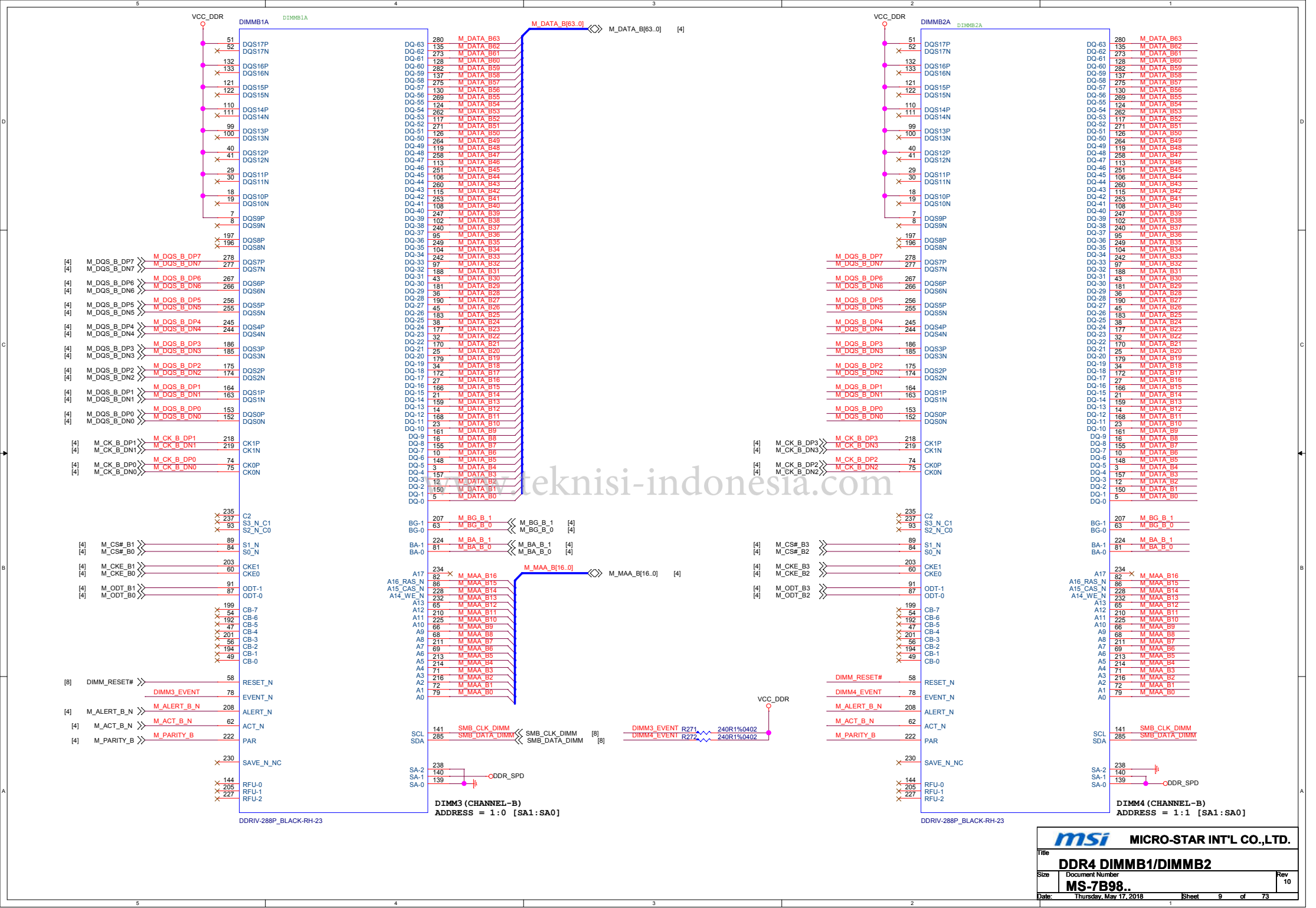

MICRO-STAR INT'L CO.,LTD.

Title: DDR4 DIMMB1/DIMMB2

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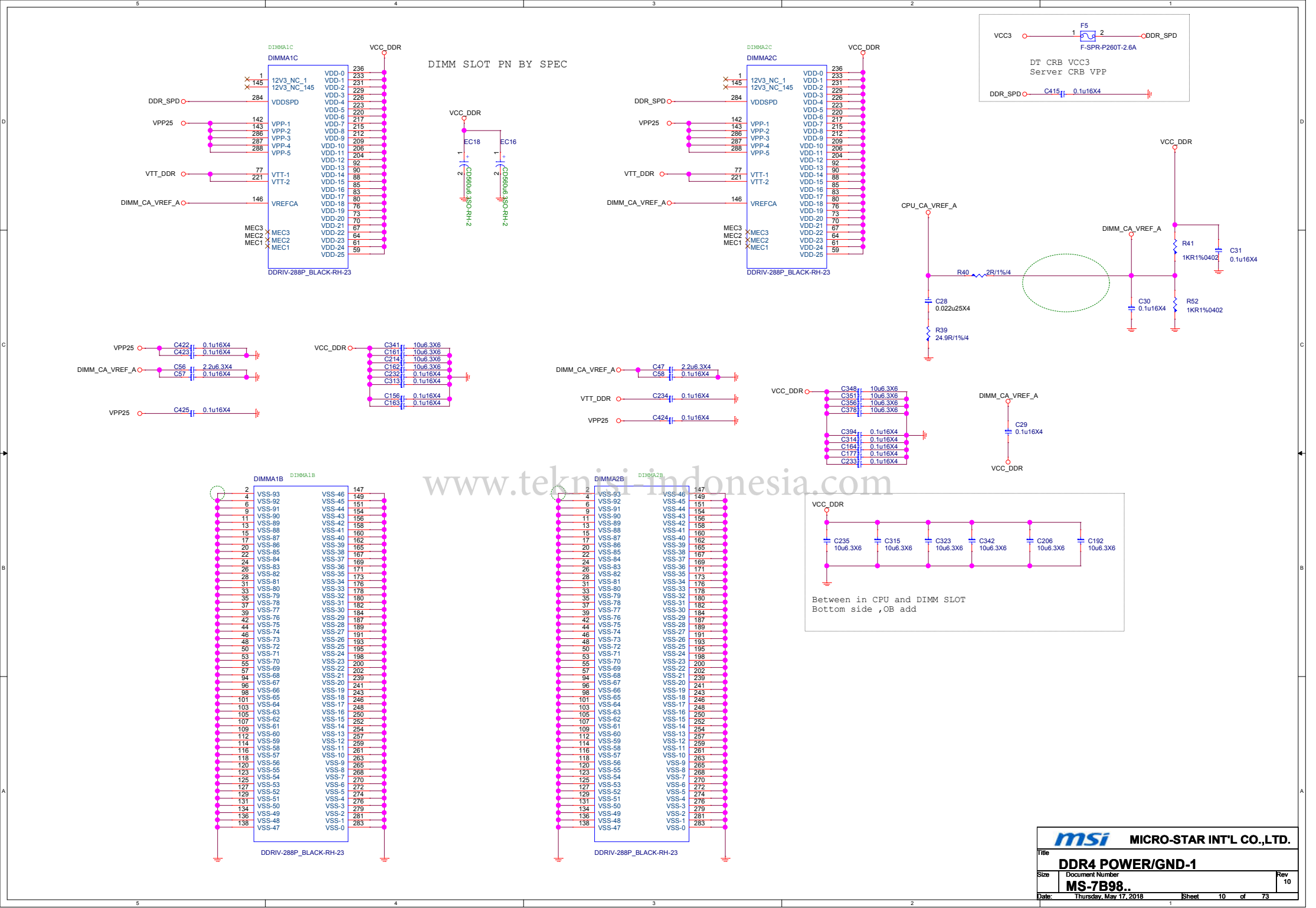

MICRO-STAR INT'L CO.,LTD.

Title: DDR4 POWER/GND-1

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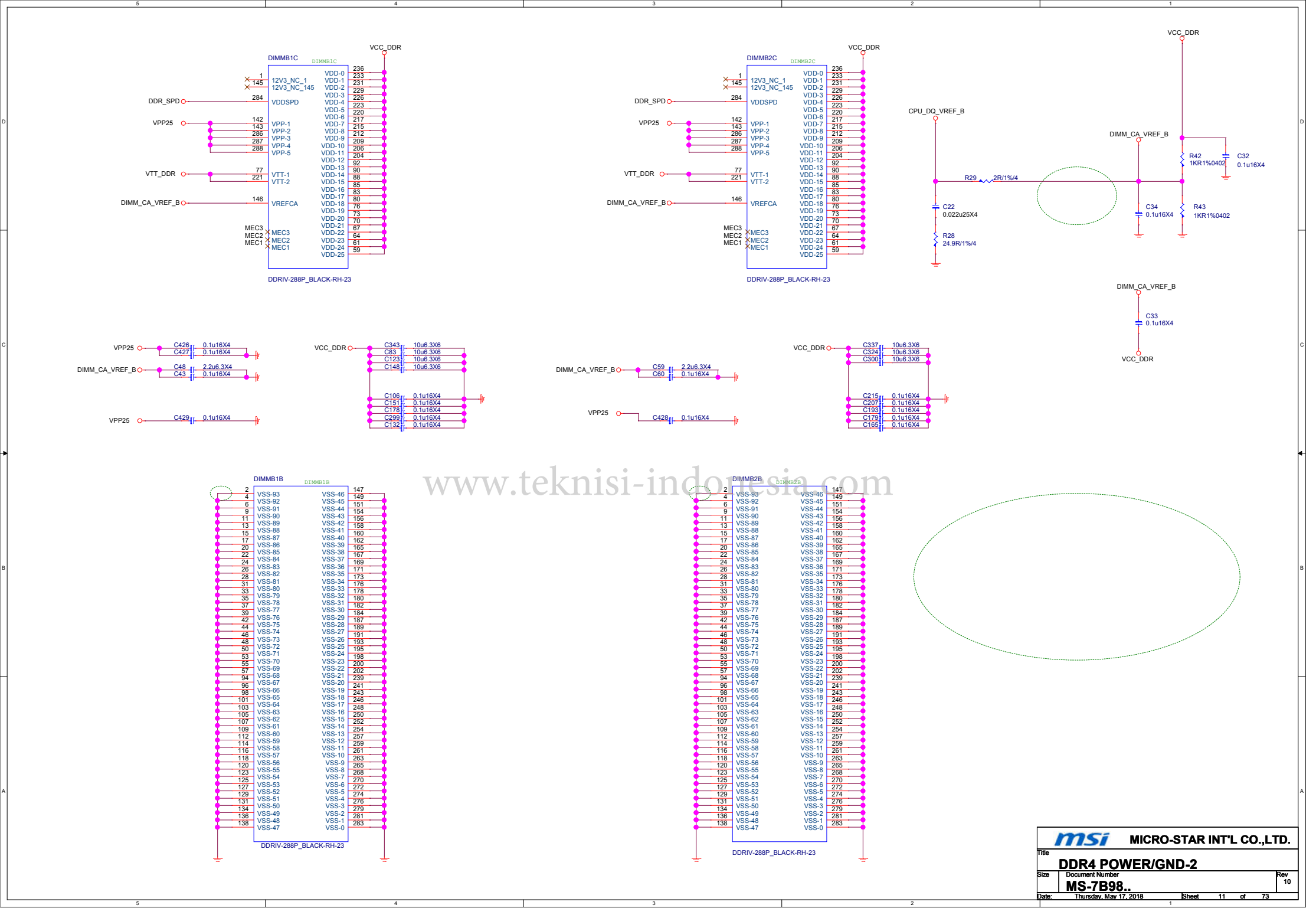

MSI	MICRO-STAR INT'L CO.,LTD.	
Title	DDR4 POWER/GND-2	
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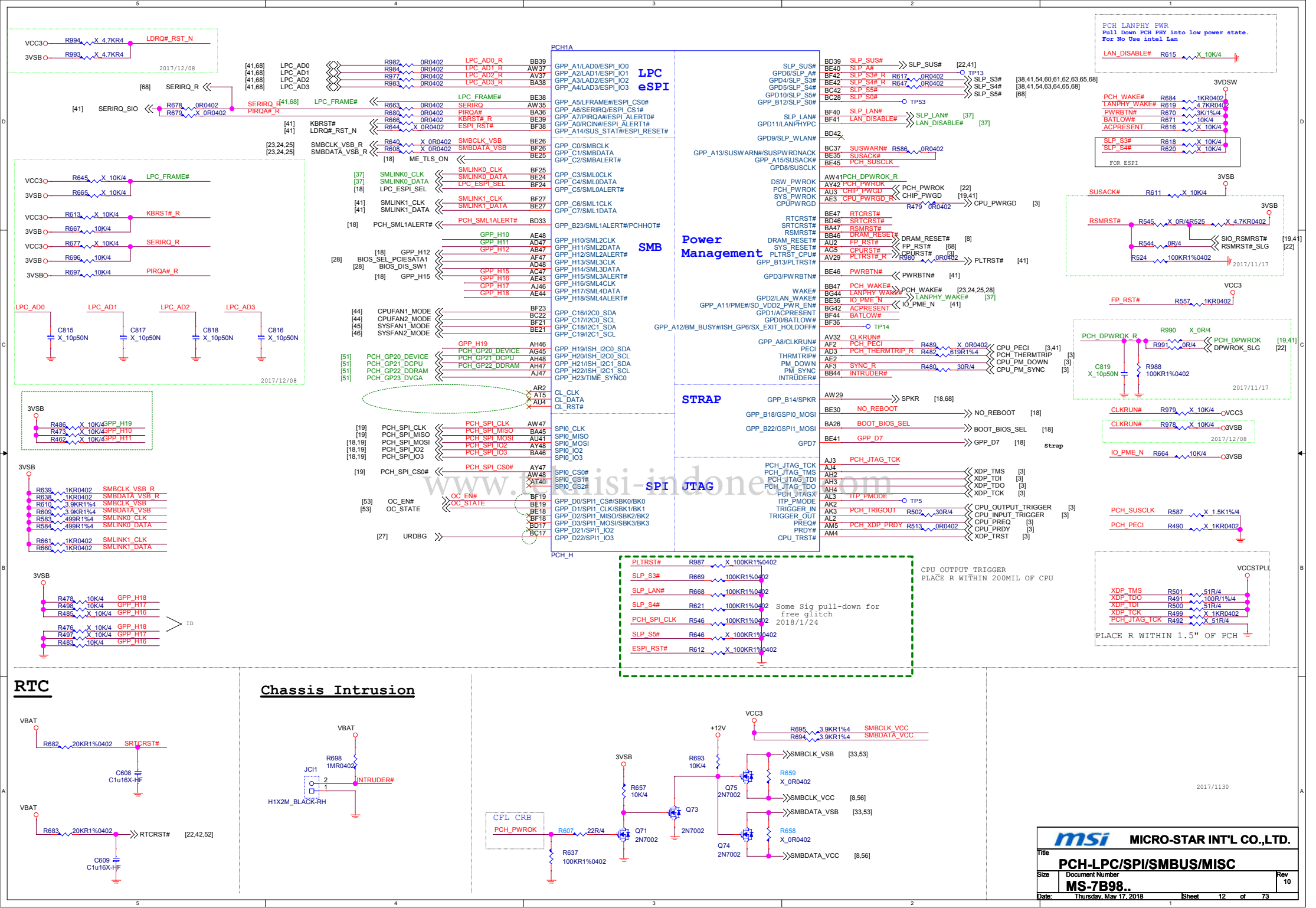
PCH1A
LPC eSPI
SMB
Power Management
STRAP
SPI
JTAG
PCH_H
PCH LANPHY PWR
Pull Down PCH PHY into low power state.
For No Use intel Lan
RTC
Chassis Intrusion
CFL CRB
CPU_OUTPUT_TRIGGER
PLACE R WITHIN 200MIL OF CPU
Some Sig pull-down for free glitch 2018/1/24
PLACE R WITHIN 1.5" OF PCH
MICRO-STAR INT'L CO.,LTD.
PCH-LPC/SPI/SMBUS/MISC
MS-7B98..
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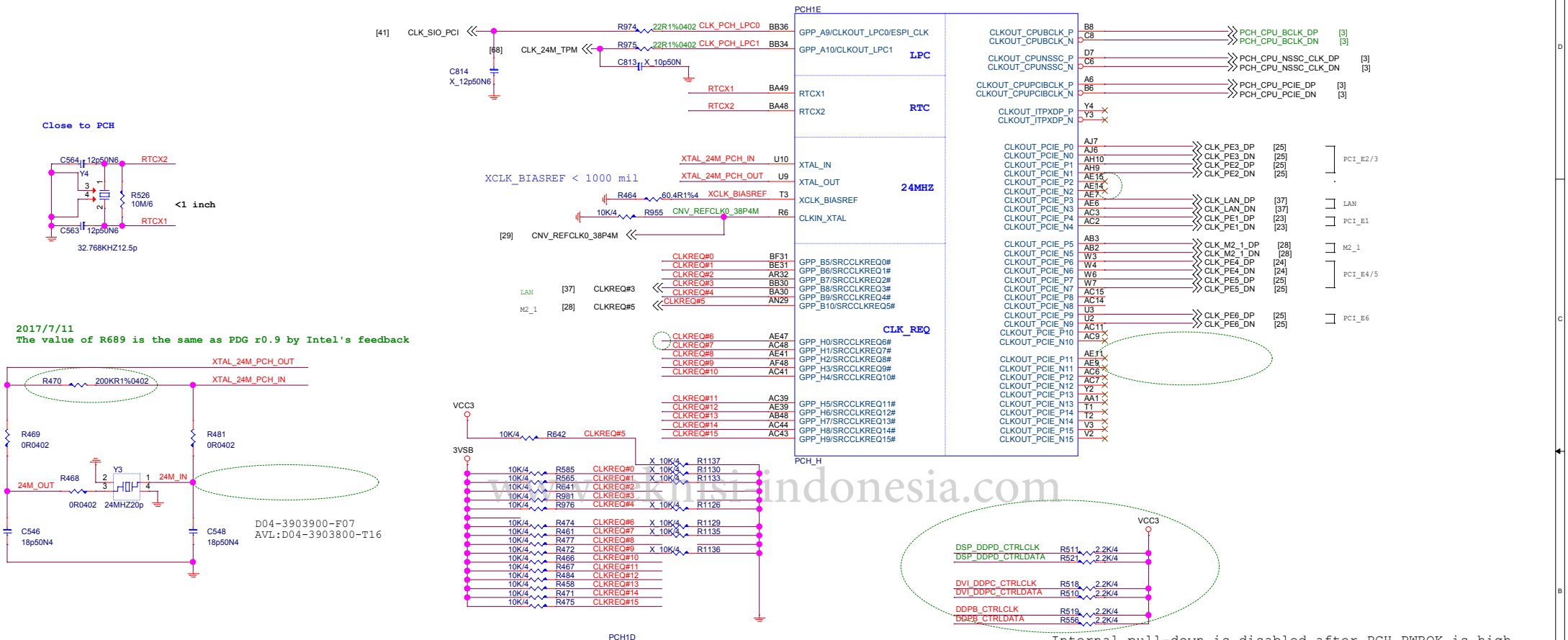
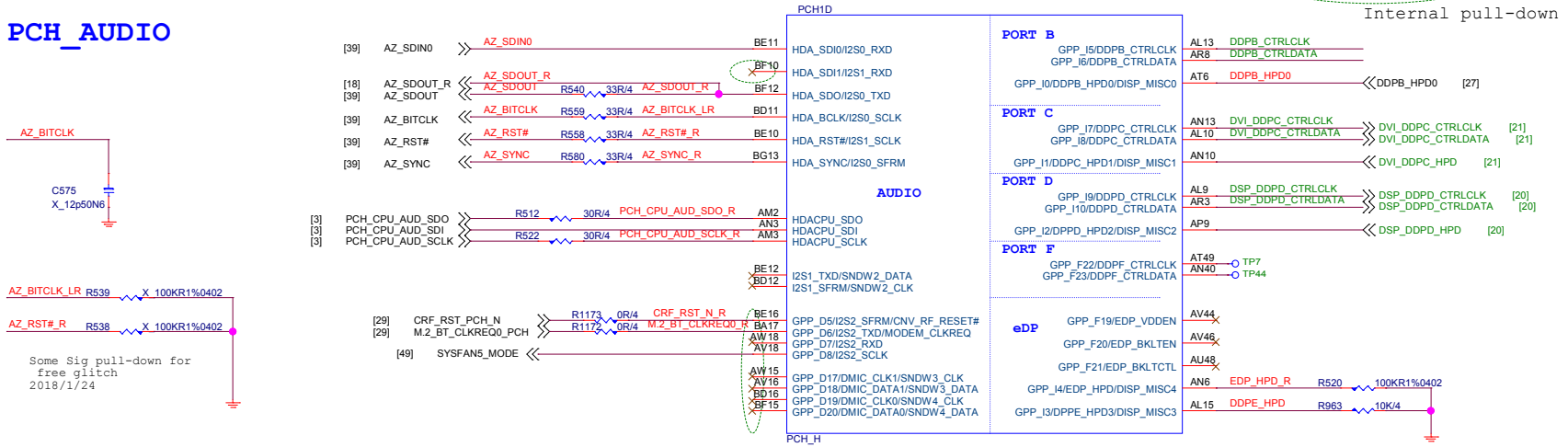
PCH_CLK



PCH_AUDIO



0 : Port B is not detected.(Default)
1 : Port B is detected.

0 : Port C is not detected.(Default)
1 : Port C is detected.

0 : Port D is not detected.(Default)
1 : Port D is detected.

MICRO-STAR INT'L CO.,LTD.		
Title: PCH-Clock/Audio		
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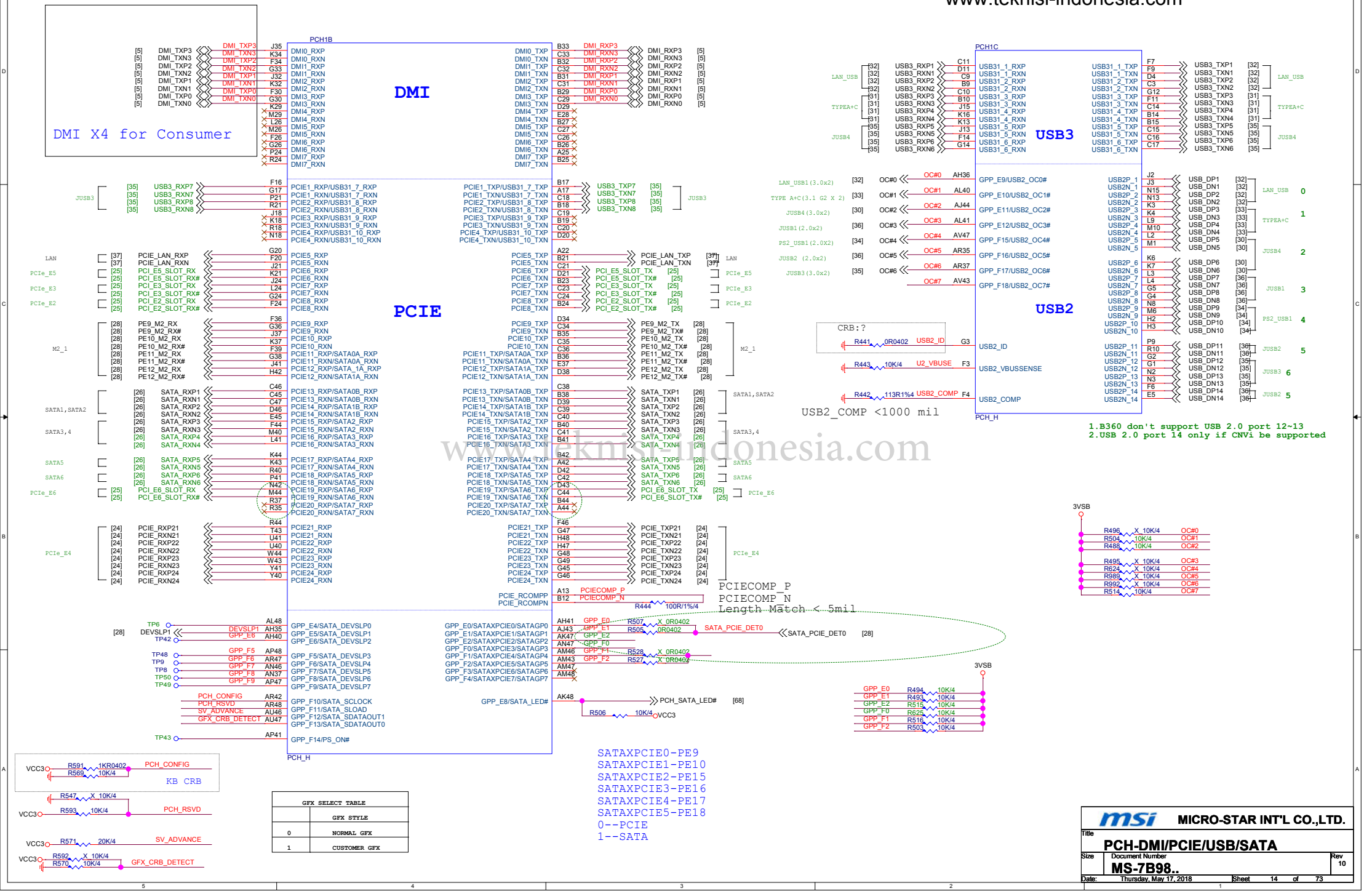

Title		
MICRO-STAR INT'L CO.,LTD.		
PCH-DMI/PCIE/USB/SATA		
Size	Document Number	Rev
	MS-7B98..	10
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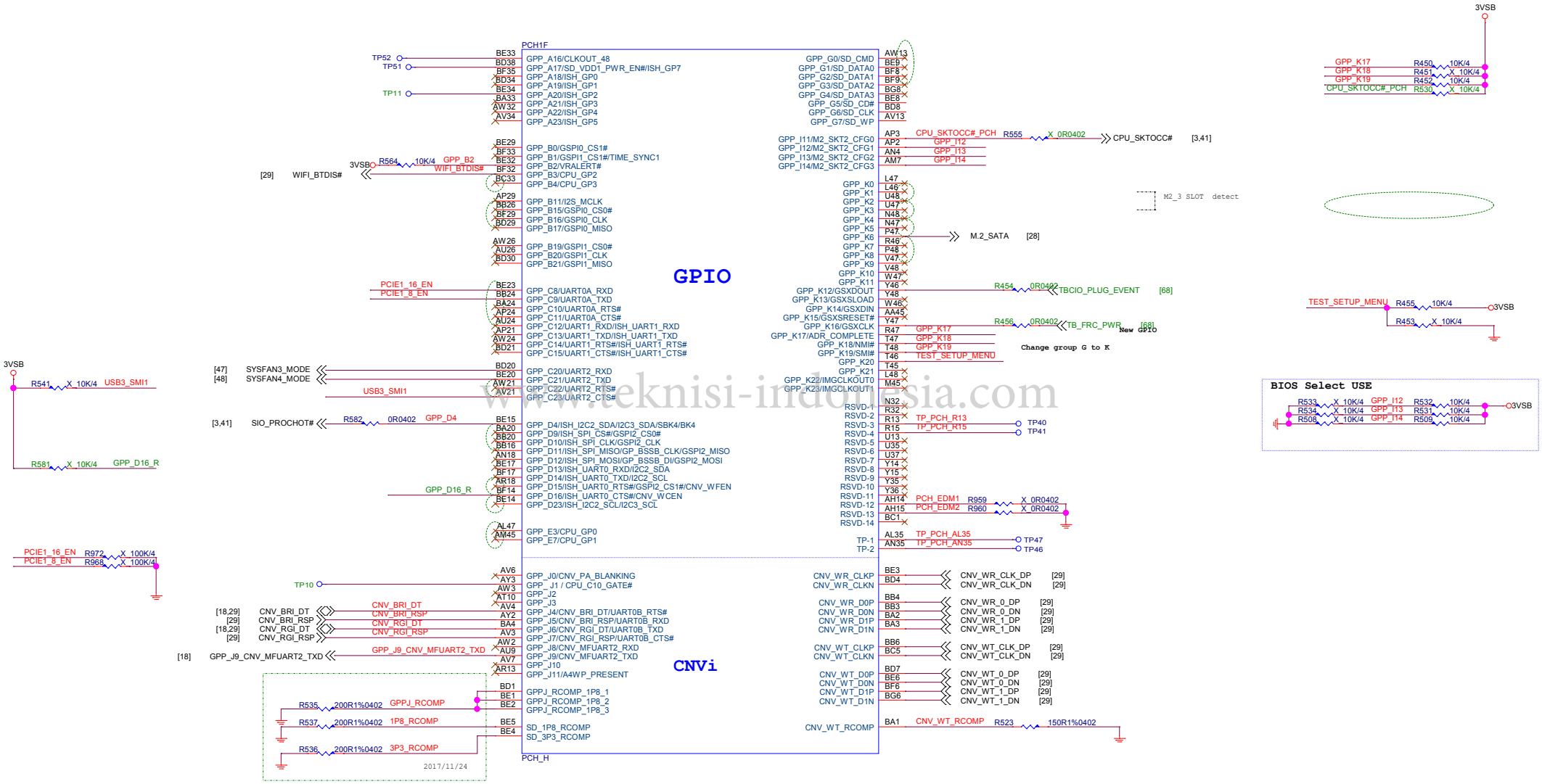

Title	PCH-GPIO/RSVD/CNVi
Size	Document Number: MS-7B98..
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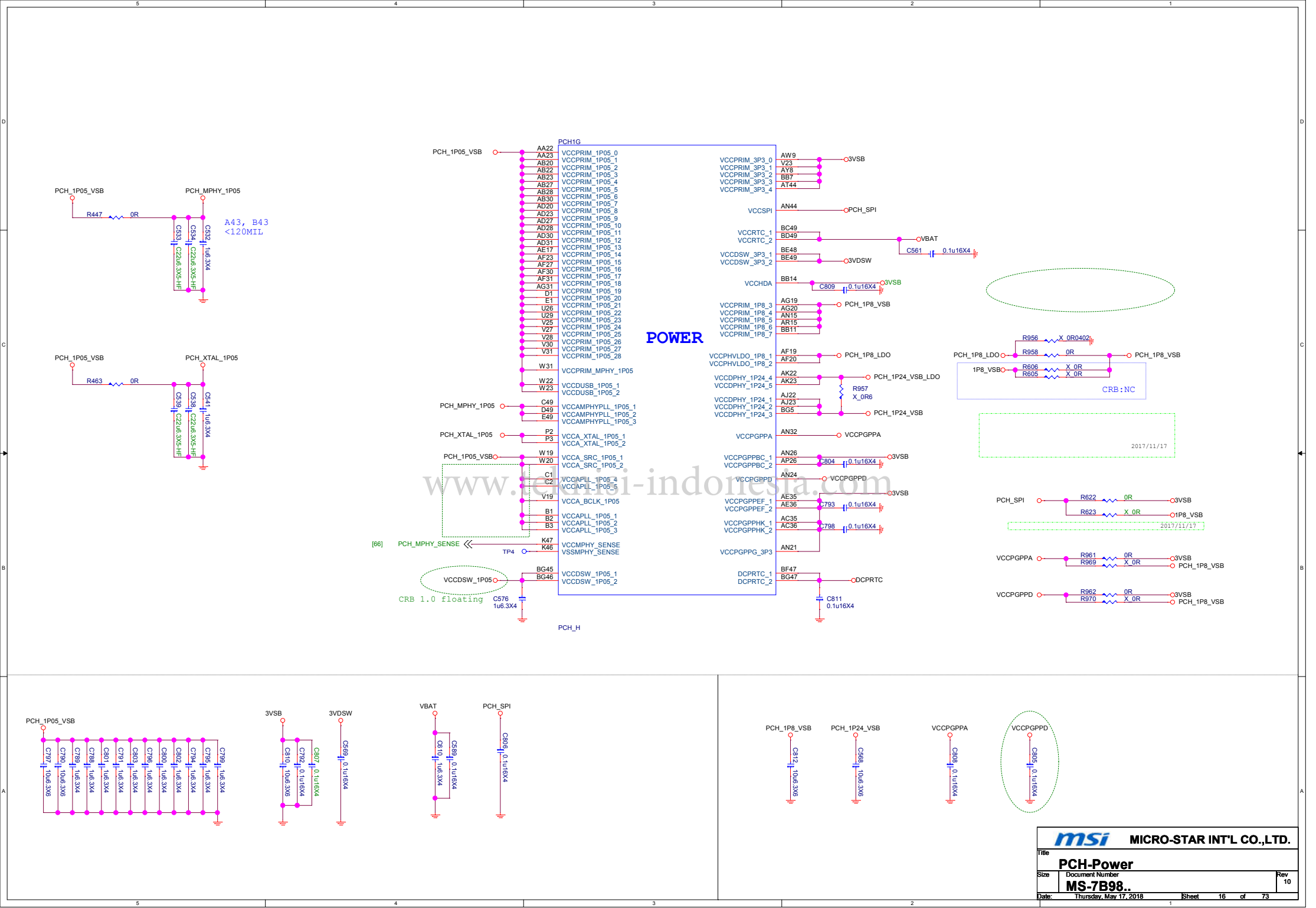
MICRO-STAR INT'L CO.,LTD.



MICRO-STAR INT'L CO.,LTD.

Title: PCH-Power

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MICRO-STAR INT'L CO.,LTD.		
Title	PCH-GND	
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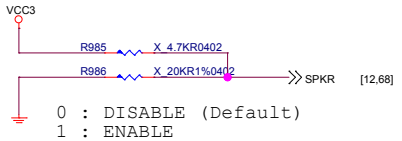
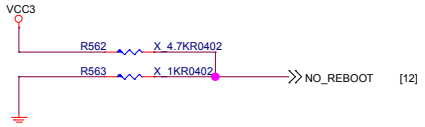
TOP Swap



0 : DISABLE (Default)
1 : ENABLE

Internal pull-down is disabled after PCH_PWROK is high.

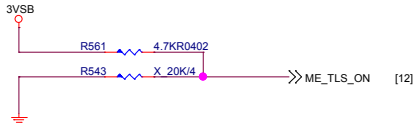
No Reboot



0 : DISABLE (Default)
1 : ENABLE

Internal pull-down is disabled after PCH_PWROK is high.

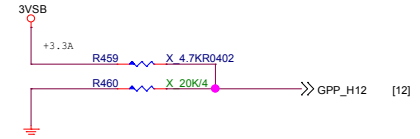
TLS confidentiality



0 : DISABLE
1 : ENABLE (Default)

Internal pull-down is disabled after RSMRST# de-assert.

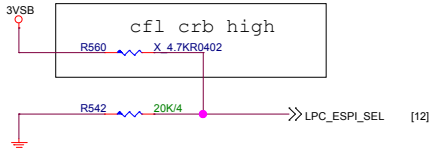
ESPI FLASH SHARING MODE



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

Internal pull-down is disabled after RSMRST# de-assert.

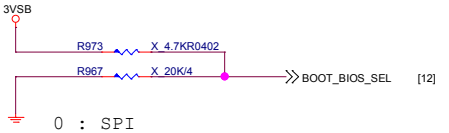
LPC eSPI Mode



0 : LPC
1 : eSPI

Internal pull-down is disabled after RSMRST# de-assert.

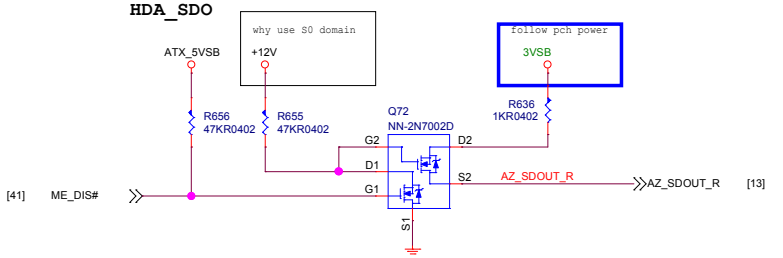
Boot BIOS



0 : SPI
1 : LPC

Internal pull-down is disabled after PCH_PWROK is high.

HDA_SDO



0 : Enable security measures defined in the Flash Descriptor. (Default)
1 : DISABLE:Flash Descritior Decurity(Override).

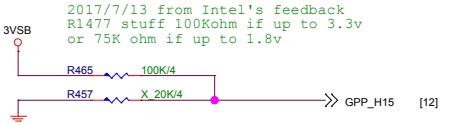
Internal pull-down is disabled after PCH_PWROK is high.

DCI ENABLE

0 : DISABLE Intel DCI-OOB (Default)
1 : ENABLE Intel DCI-OOB

Internal pull-down is disabled after RSMRST# de-assert.

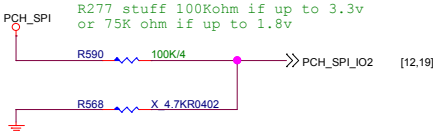
ODT DISABLE



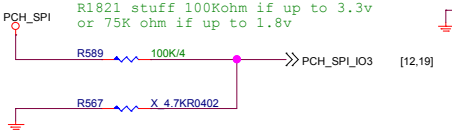
0 : JTAG ODT IS DISABLE IF LOW
1 :

Internal pull-down is disabled after RSMRST# de-assert.

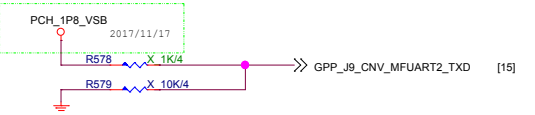
Reserved



Reserved



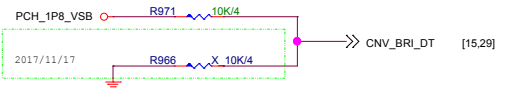
SELECT THE SPI BIOS FLASH INTERFACE OPERATING VOLTAGE



0 = VCCPSPI IS CONNECTED TO 3.3V RAIL (DEFAULT)
1 = VCCPSPI IS CONNECTED TO 1.8V RAIL

PCH HAS INTERNAL 20K PD

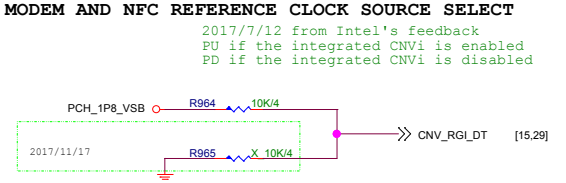
XTAL FREQUENCY SELECTION



1 = 24MHZ (25MHZ WHEN XTAL FREQ DIVIDER NON ZERO
0 = 38.4/19.2MHZ

XTAL_SEL1 :Internal Pull down

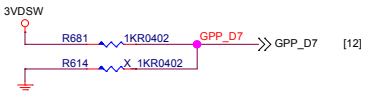
MODEM AND NFC REFERENCE CLOCK SOURCE SELECT



1 = CLKIN_XTAL_LCP
0 = XTAL_IN (CNP AND LCP SHARE XTAL)

XTAL_SEL2: Internal Pull High.

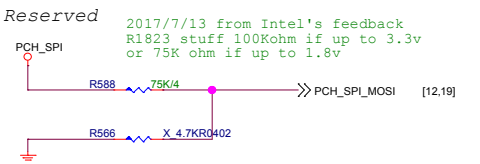
XTAL INPUT MODE



1 = XTAL INPUT IS DIFFERENTIAL
0 = XTAL INPUT IS SINGLE-ENDED

PCH HAS INTERNAL 20K PD

Reserved



MICRO-STAR INT'L CO.,LTD.

Title: PCH-Strap

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[12] PCH_SPI_CS0# — PCH_SPI_CS0#

[12,18] PCH_SPI_MOSI — PCH_SPI_MOSI — R820 0R/4 — PCH_SPI_MOSI_R

[12] PCH_SPI_MISO — PCH_SPI_MISO — R823 0R/4 — PCH_SPI_MISO_R

[12] PCH_SPI_CLK — PCH_SPI_CLK — R818 0R/4 — PCH_SPI_CLK_R

[12,18] PCH_SPI_IO2 — PCH_SPI_IO2 — R826 0R/4 — PCH_SPI_IO2_R

[12,18] PCH_SPI_IO3 — PCH_SPI_IO3 — R816 0R/4 — PCH_SPI_IO3_R

SPI_VCC — R827 X_1KR0402 — PCH_SPI_IO2_R

Reverse Pull high @ PCH_SPIO2_R and PCH_SPI_IO3_R

SPI_VCC — PCH_SPI_IO3_R — R829 X_1KR0402

SPI_VCC — CP5 X_COPPER — 3VSB

SPI CS# < 25pF
D0G-0402510-SI0

Close to JSPI1

SPI_VCC — 0.1u16X4 C694

JSPI1

PCH_SPI_MISO_R — R824 33R/4 — JSPI_MISO
PCH_SPI_CS0# — JSPI_MOSI — R821 33R/4 — PCH_SPI_MOSI_R
JSPI_CLK — R819 33R/4 — PCH_SPI_CLK_R
SPI_SW_SEL
PCH_SPI_IO2_R — R834 33R/4 — JSPI_IO2
JSPI_IO3 — R817 33R/4 — PCH_SPI_IO3_R

H2X6[10]M-2PITCH_BLACK-RH-1

R822 0R0402

D24 X_ESDAQZ8131DJ06-HF

C722 0.1u16X4

SPI_VCC — R833 X_2.2K/4

SPI_VCC — C693 0.1u16X4 — C690 10u6.3X6

SPI_CS1#
PCH_SPI_MISO_R — R825 33R/4 — SPI_MISO
PCH_SPI_IO2_R — R835 33R/4 — SPI_IO2

SPI1
CS — VCC — SPI_IO3 — R830 33R/4 — PCH_SPI_IO3_R
DO(IO1) — HOLD(IO3)
WP(IO2) — CLK — SPI_CLK — R831 33R/4 — PCH_SPI_CLK_R
GND — DI(IO0) — SPI_MOSI — R832 33R/4 — PCH_SPI_MOSI_R

W25Q128JVSIQ-HF

[12,41] CHIP_PWGD — D33 X_S-LRB520S-40T1G-HF

ATX_5VSB — R897 10K/4 — SPI_SW_SEL

Fine tune for SA reset

[12,41] SIO_RSMRST# — D30 X_S-LRB520S-40T1G-HF

[12,41] PCH_DPWROK — D31 X_S-LRB520S-40T1G-HF

[22,54,66,67] VSB_ENABLE# — D32 S-LRB520S-40T1G-HF

[22] ATX5VSB_DET — D29 S-LRB520S-40T1G-HF

2017/11/23

MICRO-STAR INT'L CO.,LTD.

Title: SPI ROM-BIOS

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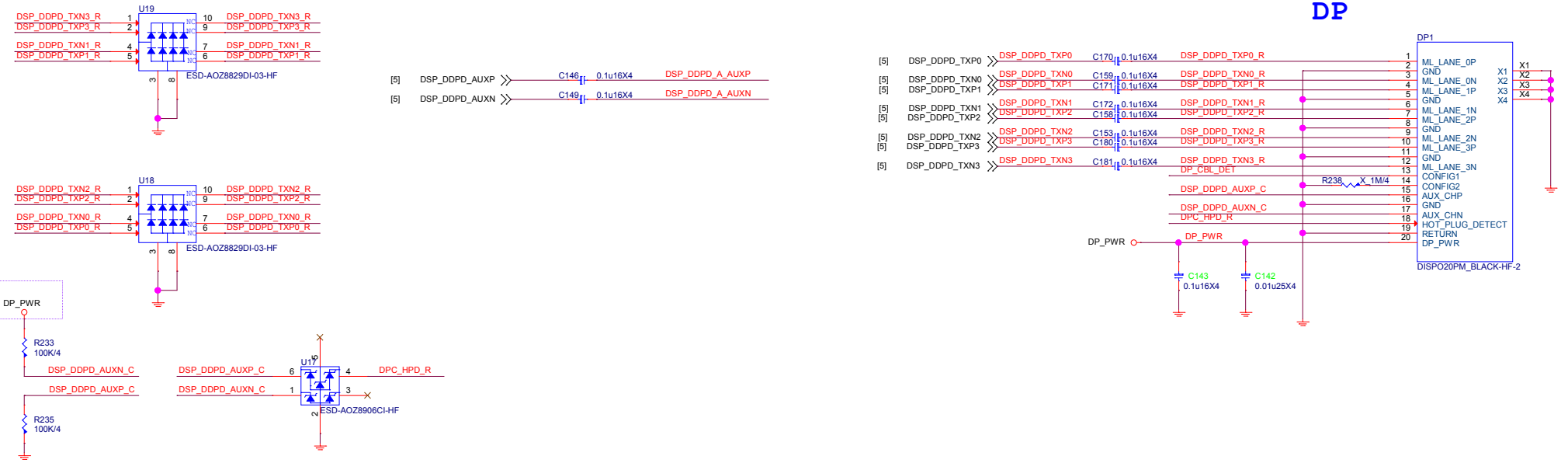
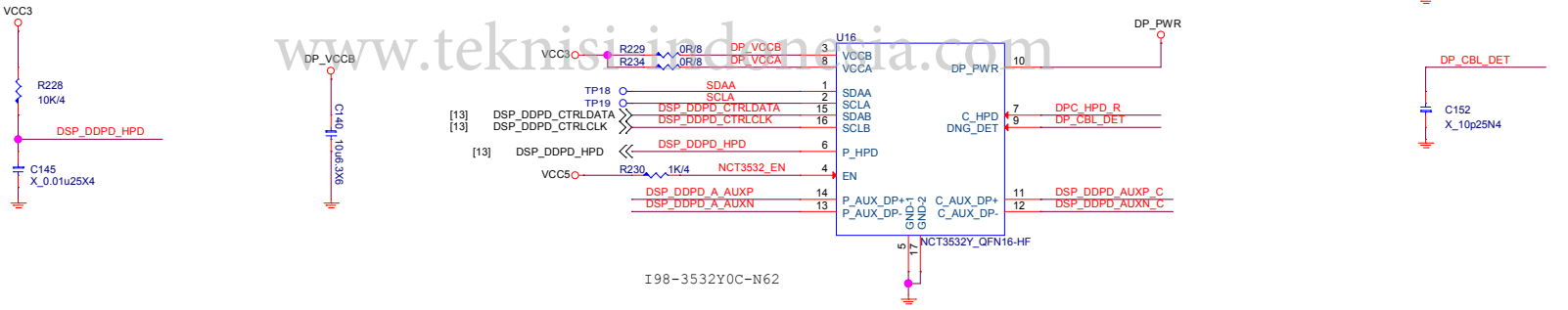
DP



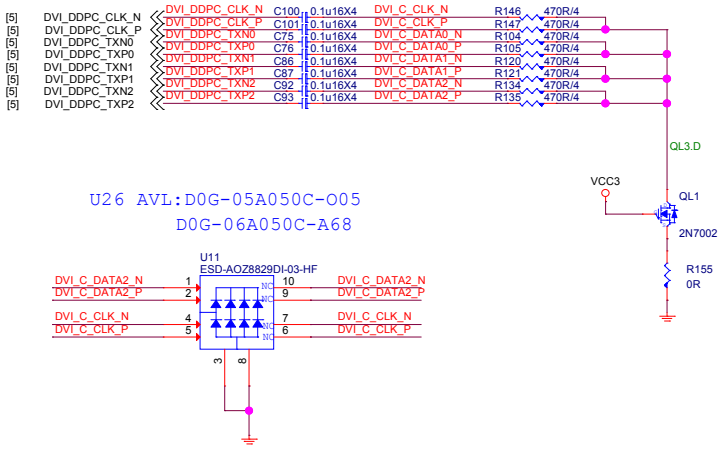
DP_VCCB trace don't less than 30 mil



I98-3532Y0C-N62

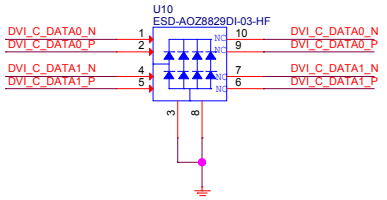
msi MICRO-STAR INT'L CO.,LTD.		
Title: HDMI Connector		
Size	Document Number: MS-7B98..	Rev: 10
Date: Thursday, May 17, 2018	Sheet 20 of 73	

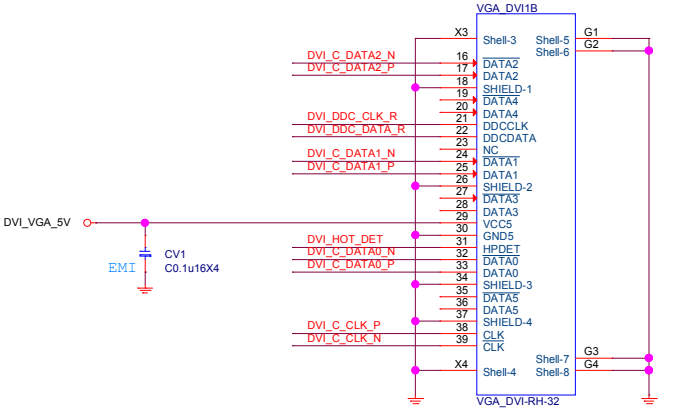
VGA: resolution of 2048x1536 pixels with 32-bit color at 75 Hz (4:3 QXGA)

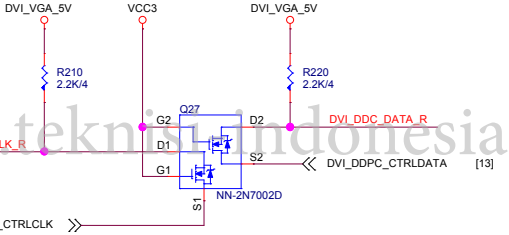


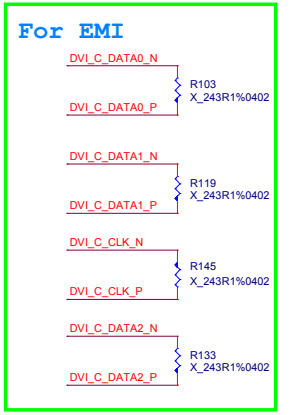
U26 AVL:D0G-05A050C-005
D0G-06A050C-A68

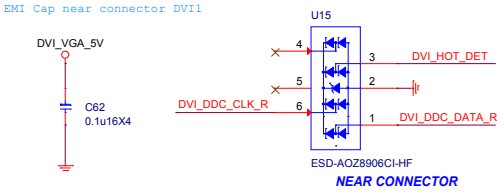
U27 AVL:D0G-05A050C-005
D0G-06A050C-A68

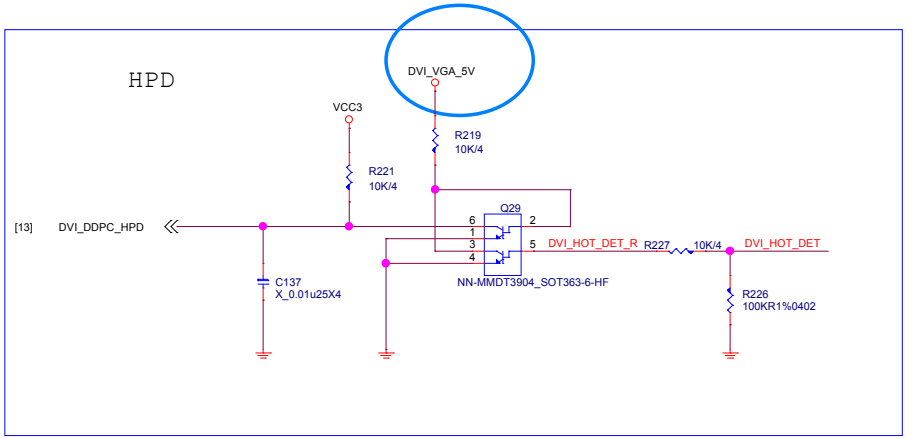


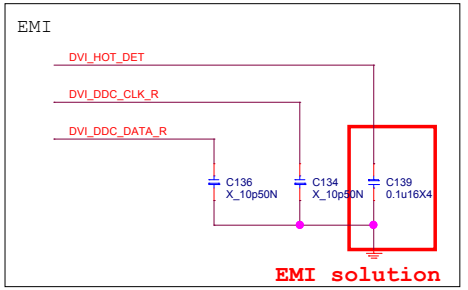












MICRO-STAR INT'L CO.,LTD.

Title: DVI Connector

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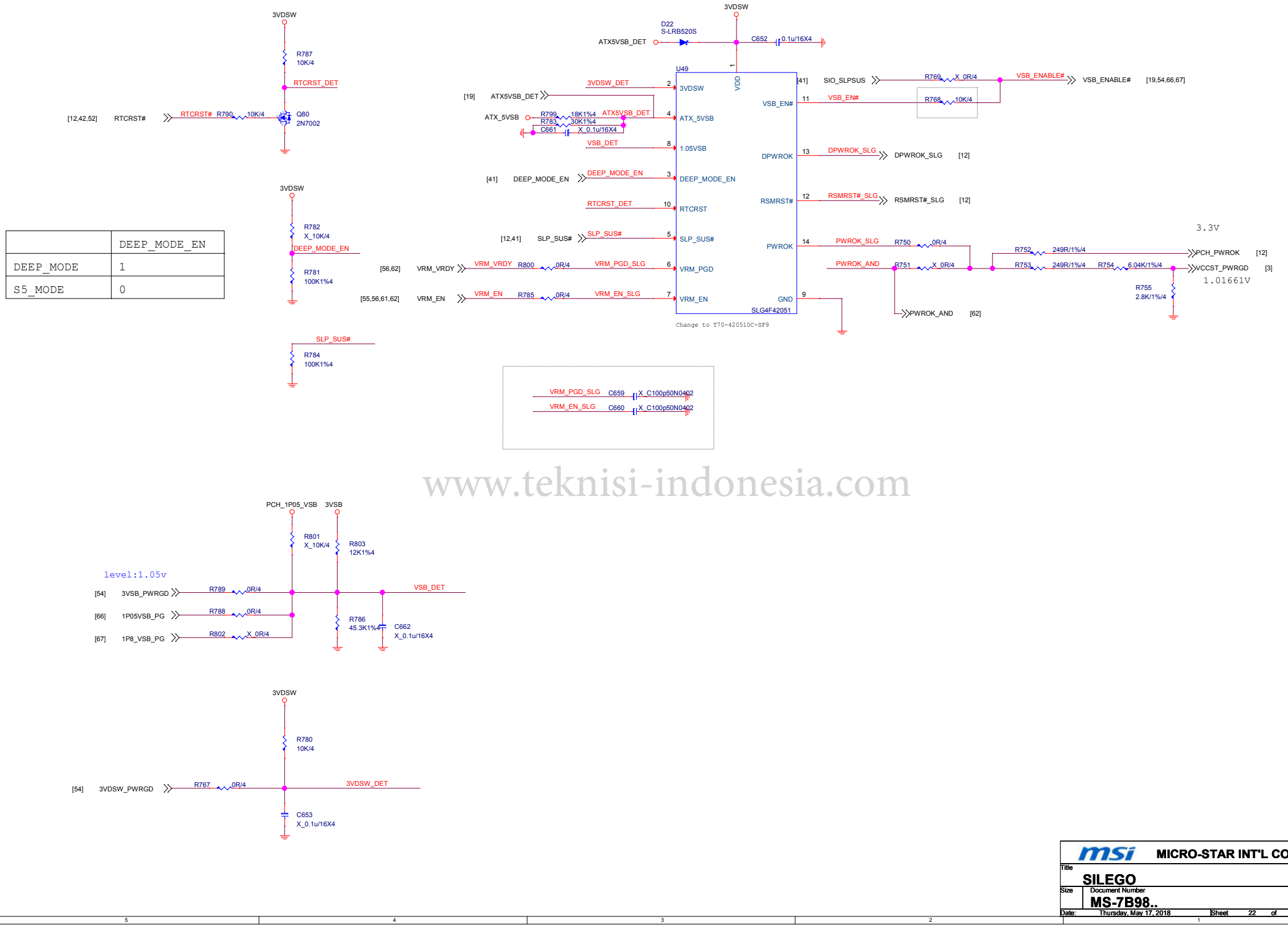

	DEEP_MODE_EN
DEEP_MODE	1
S5_MODE	0

MICRO-STAR INT'L CO.,LTD.

Title: SILEGO

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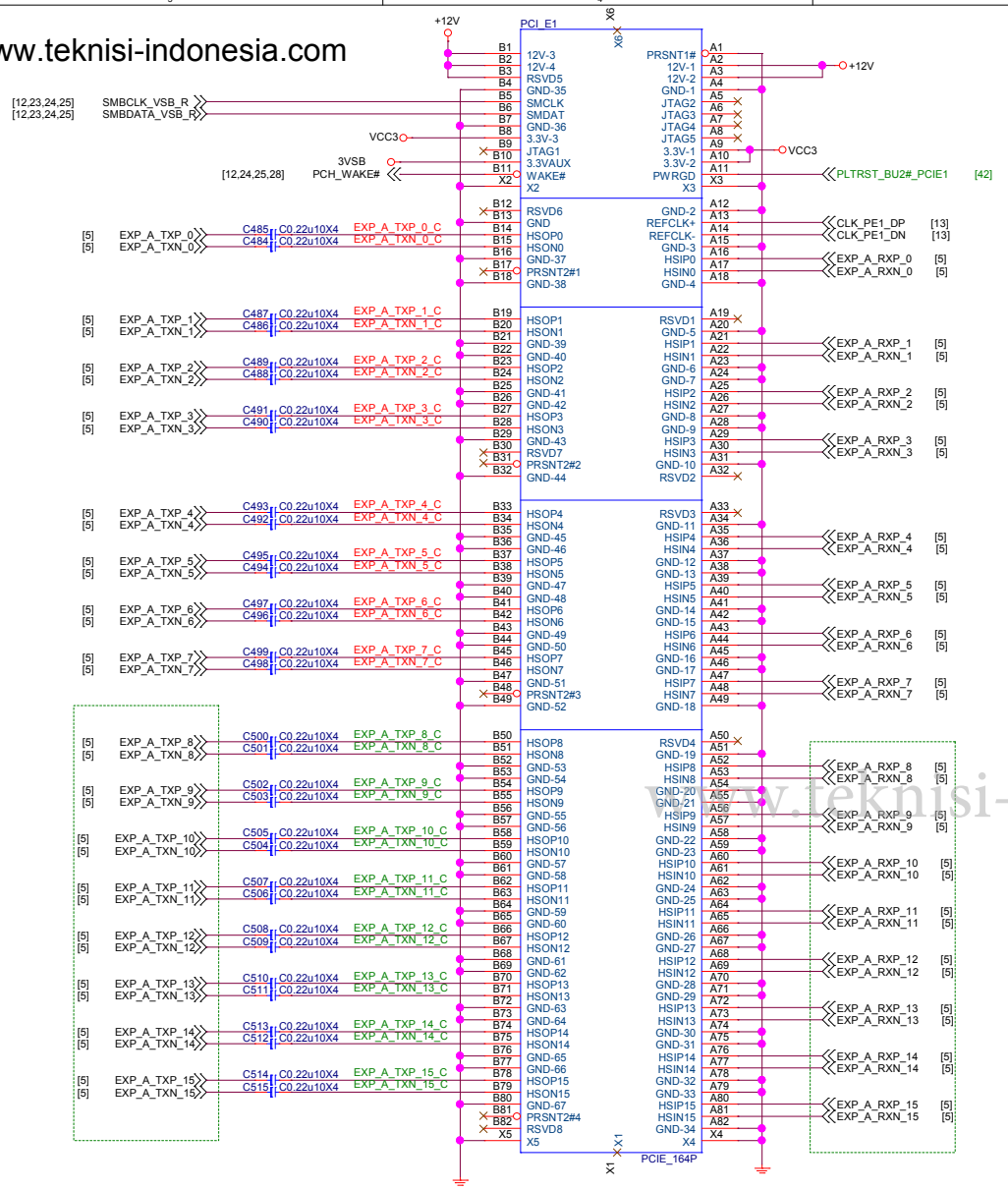
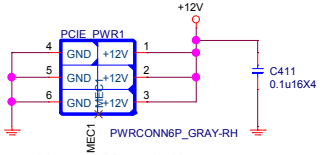
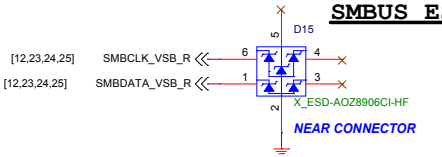
5.5A at +12V
3A at VCC3
375mA at 3VSB

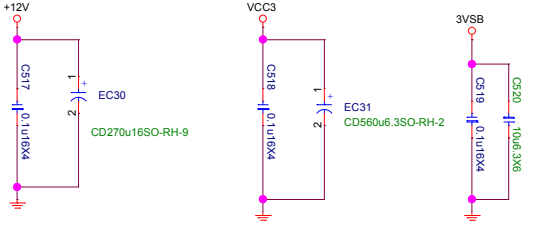




N93-06M0261-H06

SMBUS ESD



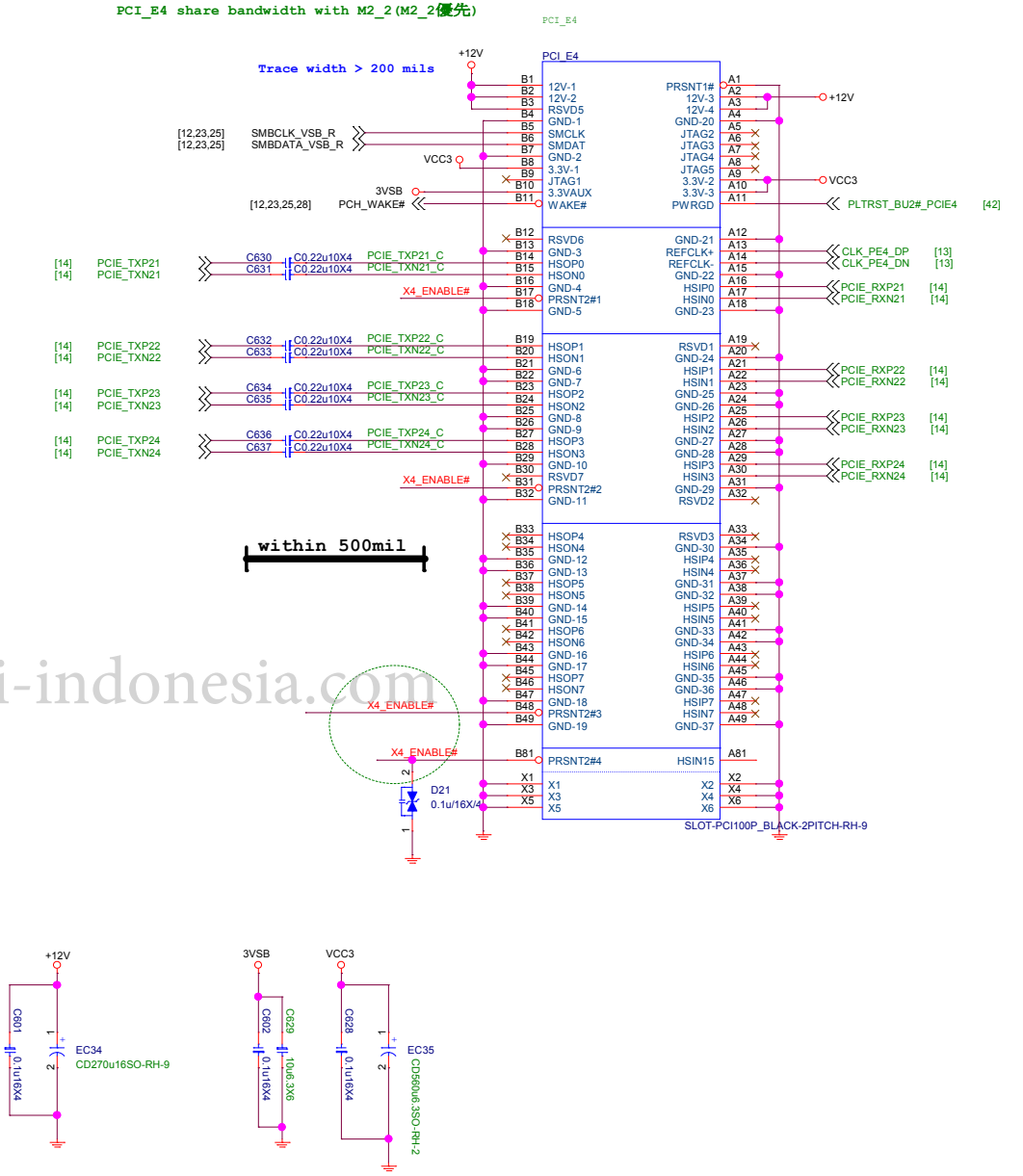


MSI	MICRO-STAR INT'L CO.,LTD.	
Title	PCIE SLOT-CPU (X16)	
Size	Document Number MS-7B98..	Rev 10
Date: Thursday, May 17, 2018	Sheet 23 of 73	

PCI_Express X4 Slot

2.1A at +12V
3A at VCC3
375mA at 3VSB

PCI_E4 share bandwidth with M2_2(M2_2優先)



MICRO-STAR INT'L CO.,LTD.

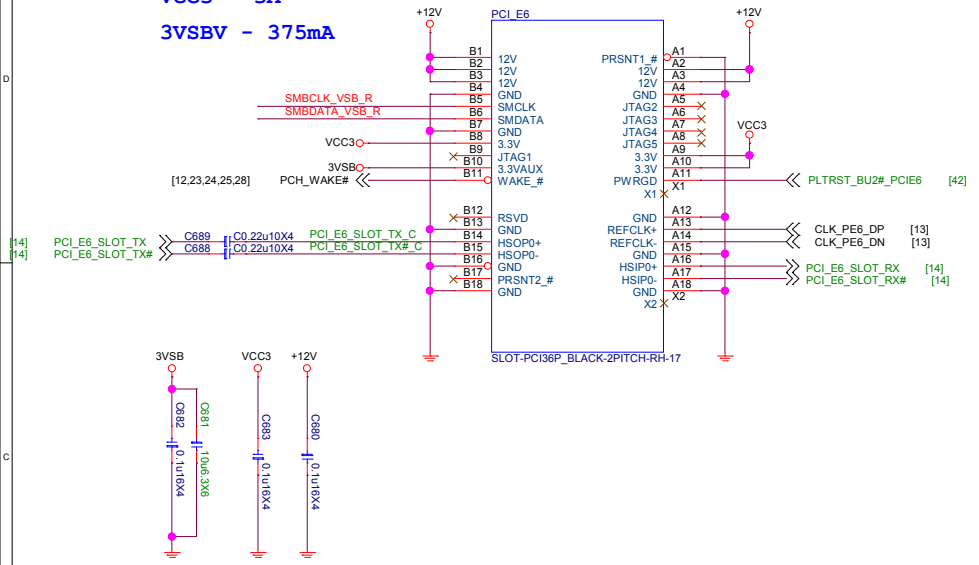
Title: PCIE SLOT-PCH (X4)

Size | Document Number: MS-7B98.. | Rev: 10

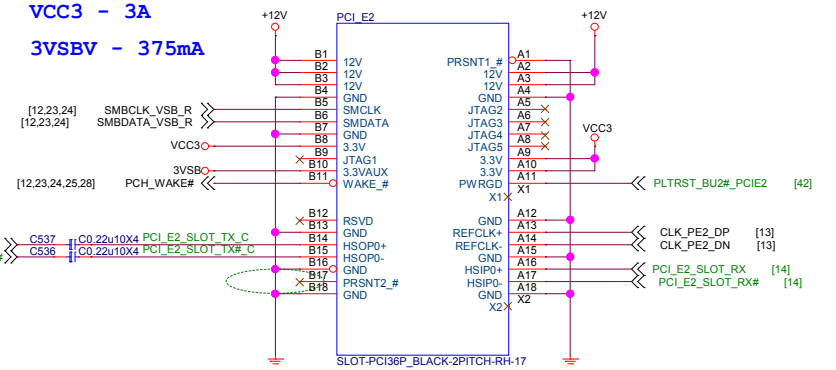
Date: Thursday, May 17, 2018 | Sheet 24 of 73

PCH PCIE X1 Slot

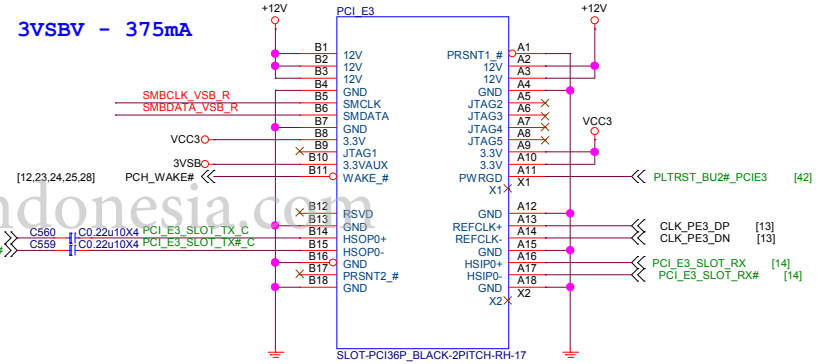
12V - 0.5A
VCC3 - 3A
3VSBV - 375mA



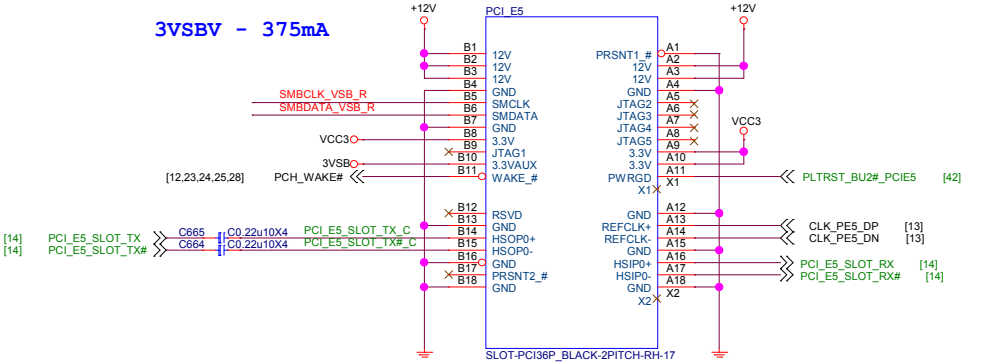
12V - 0.5A
VCC3 - 3A
3VSBV - 375mA



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



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



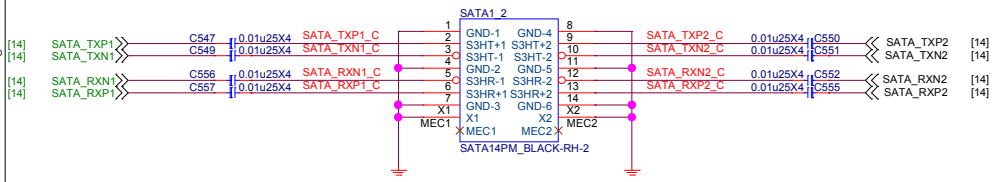
MICRO-STAR INT'L CO.,LTD.

Title: PCIE SLOT-PCH (X1)

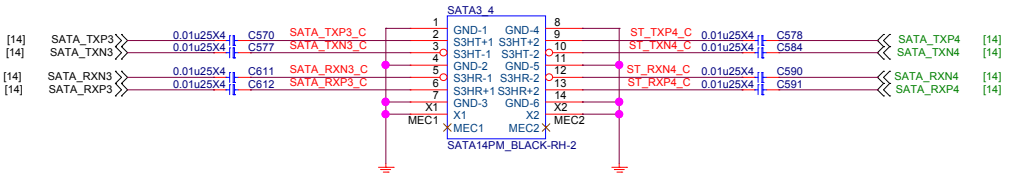
Size | Document Number: MS-7B98.. | Rev: 10

Date: Thursday, May 17, 2018 | Sheet 25 of 73

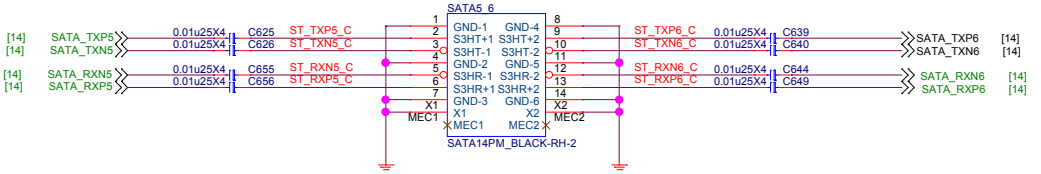
SATA 6G PORT 1.2



SATA 6G PORT 3.4



SATA 6G PORT 5.6



MICRO-STAR INT'L CO.,LTD.

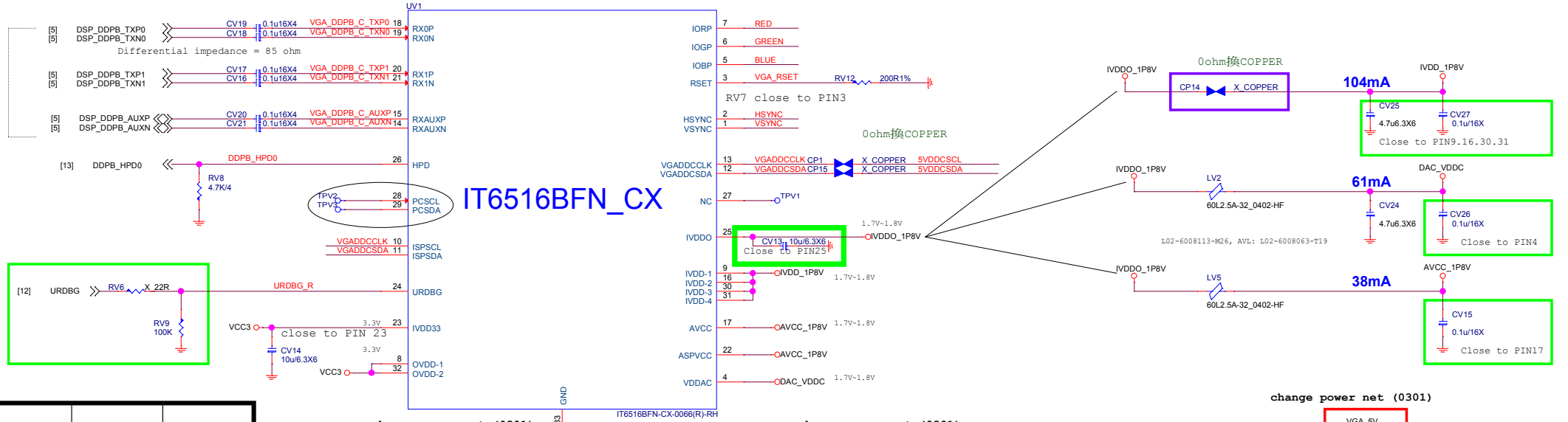
Title: SATA CNT

Size | Document Number: MS-7B98.. | Rev: 10

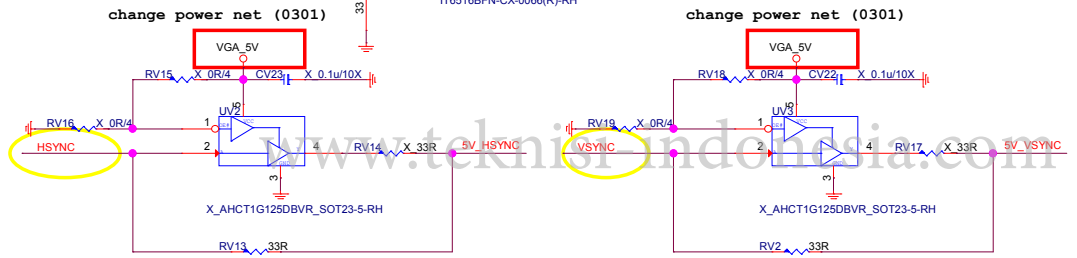
Date: Thursday, May 17, 2018 | Sheet 26 of 73

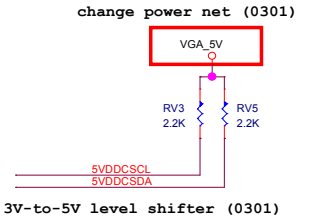
Note:

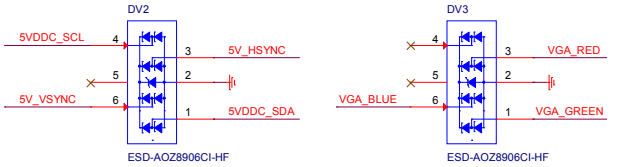
If connect to eDP port,must confirm whether it support hot plug detection HPD and re-auxtraining



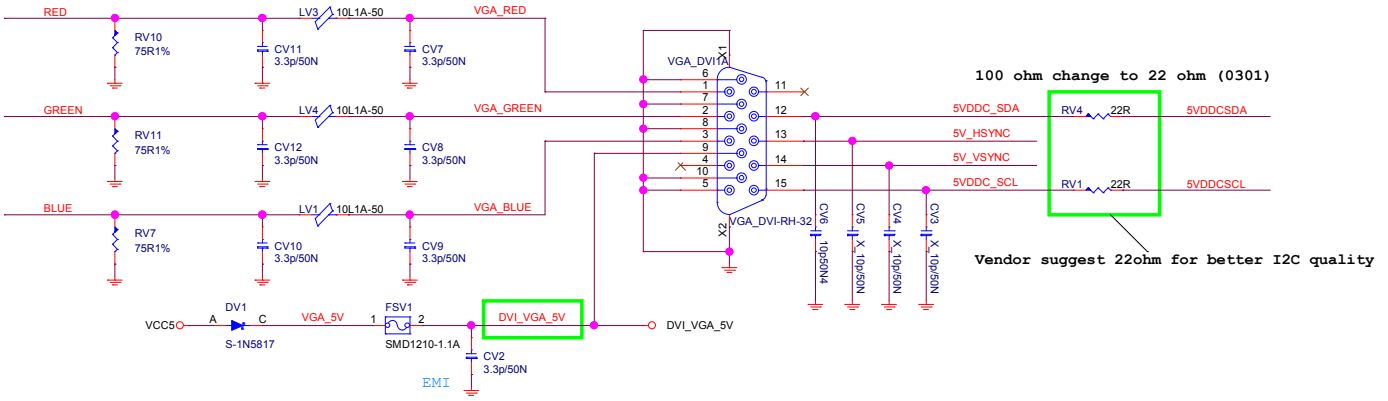
System Status	GPIO	IT6516b's HPD
Legacy Mode (VBIOS) /DOS MOde	HIGH	Force HIGH
Windows /UEFI Mode (GOP)	LOW	Depend on VGA device's plug/unplug







modify DV2,DV5 library :library pin5 change to dummy,
Avoid PIN5(Power PIN) short other same library
20180116



MICRO-STAR INT'L CO.,LTD.

Title: M.2-SLOT1

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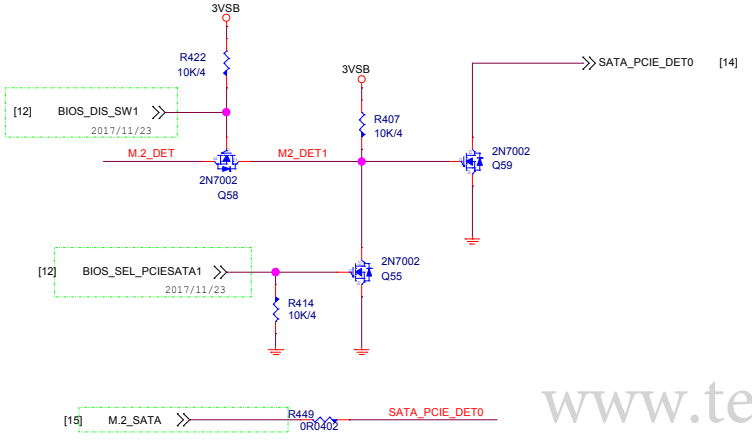
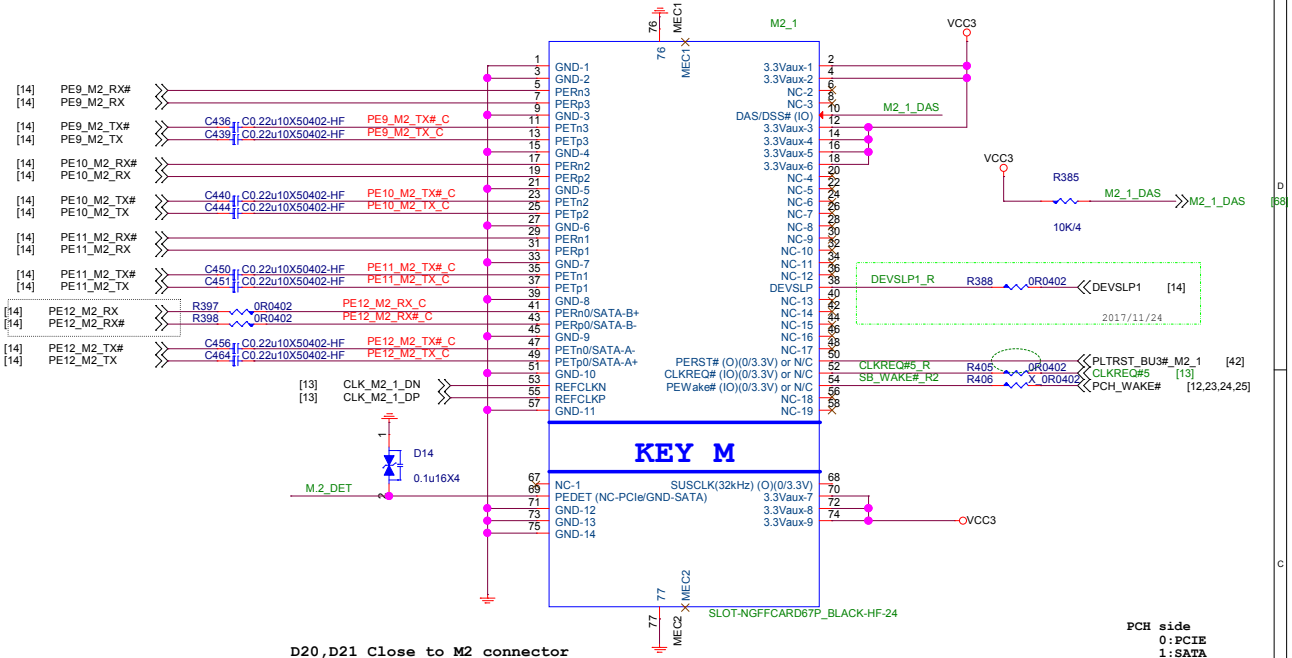
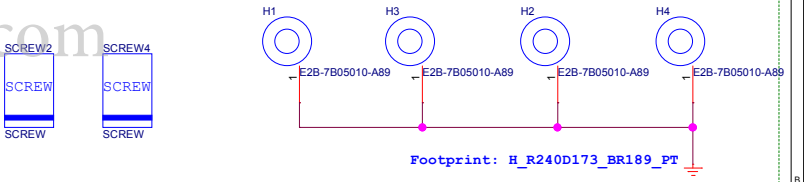
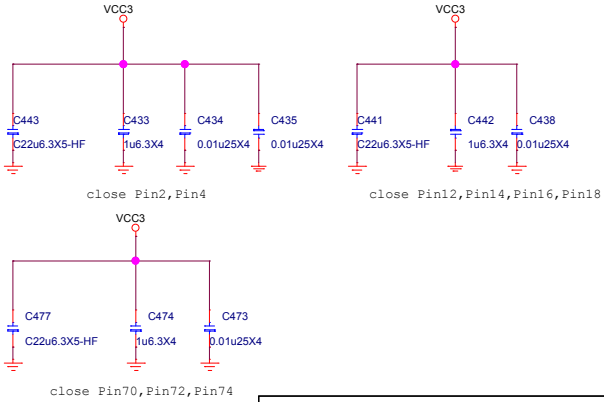




D20,D21 Close to M2 connector

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





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.

Title: M.2-SLOT2

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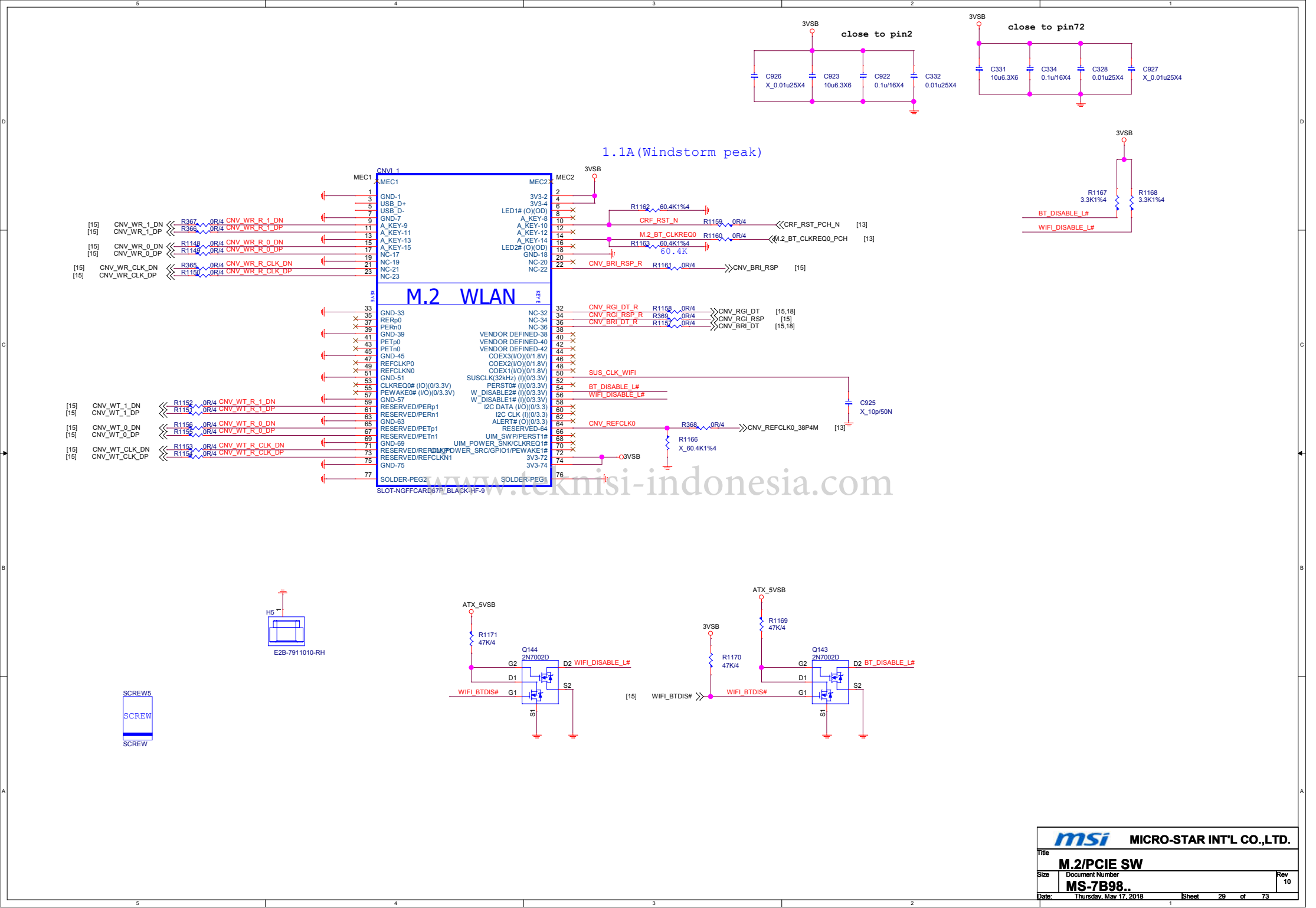

MICRO-STAR INT'L CO.,LTD.	
Title	M.2/PCIE SW
Size	Document Number: MS-7B98.. Rev: 10
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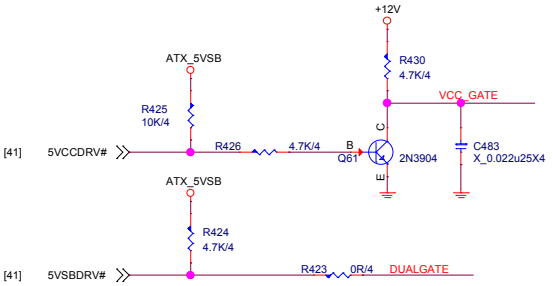
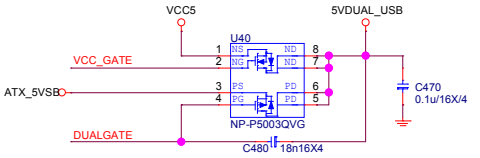
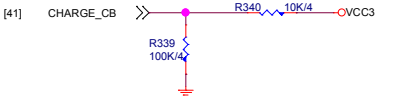
5VDUAL_USB



5A 3~4A



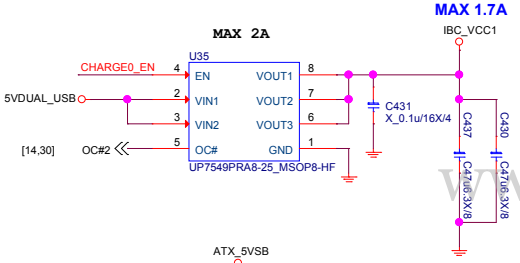
Pin power : I_3VSB
Register power : I_3VSB
Register reset : I_3VSB

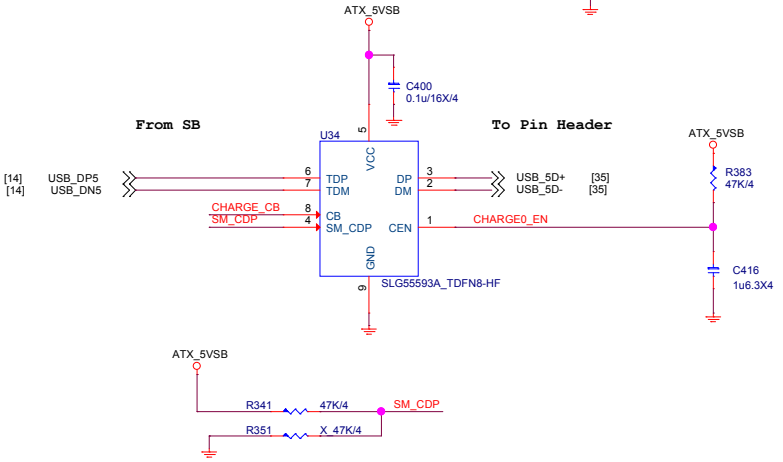


USB POWER PORT 0 For USB Charging

MAX 1.7A

MAX 2A

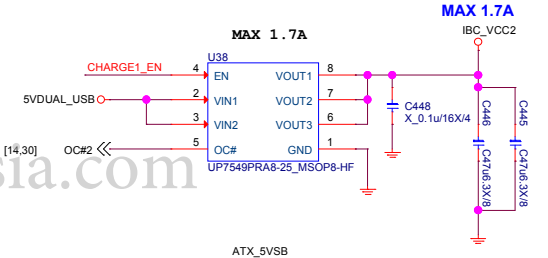


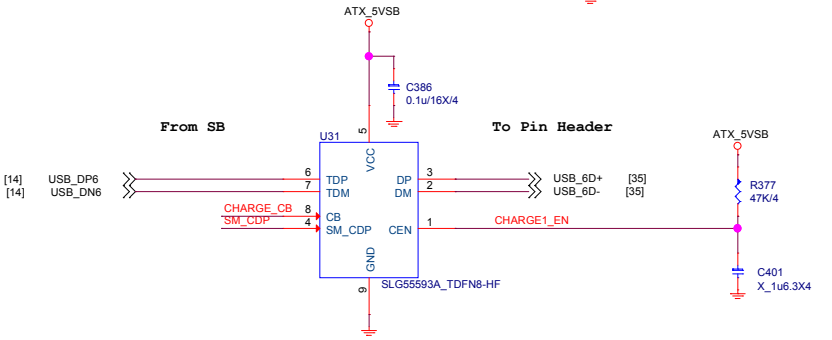


USB POWER PORT 1 For USB Charging

MAX 1.7A

MAX 1.7A





MICRO-STAR INT'L CO.,LTD.

Title: ASM1083 bri

Size | Document Number: MS-7B98.. | Rev: 10

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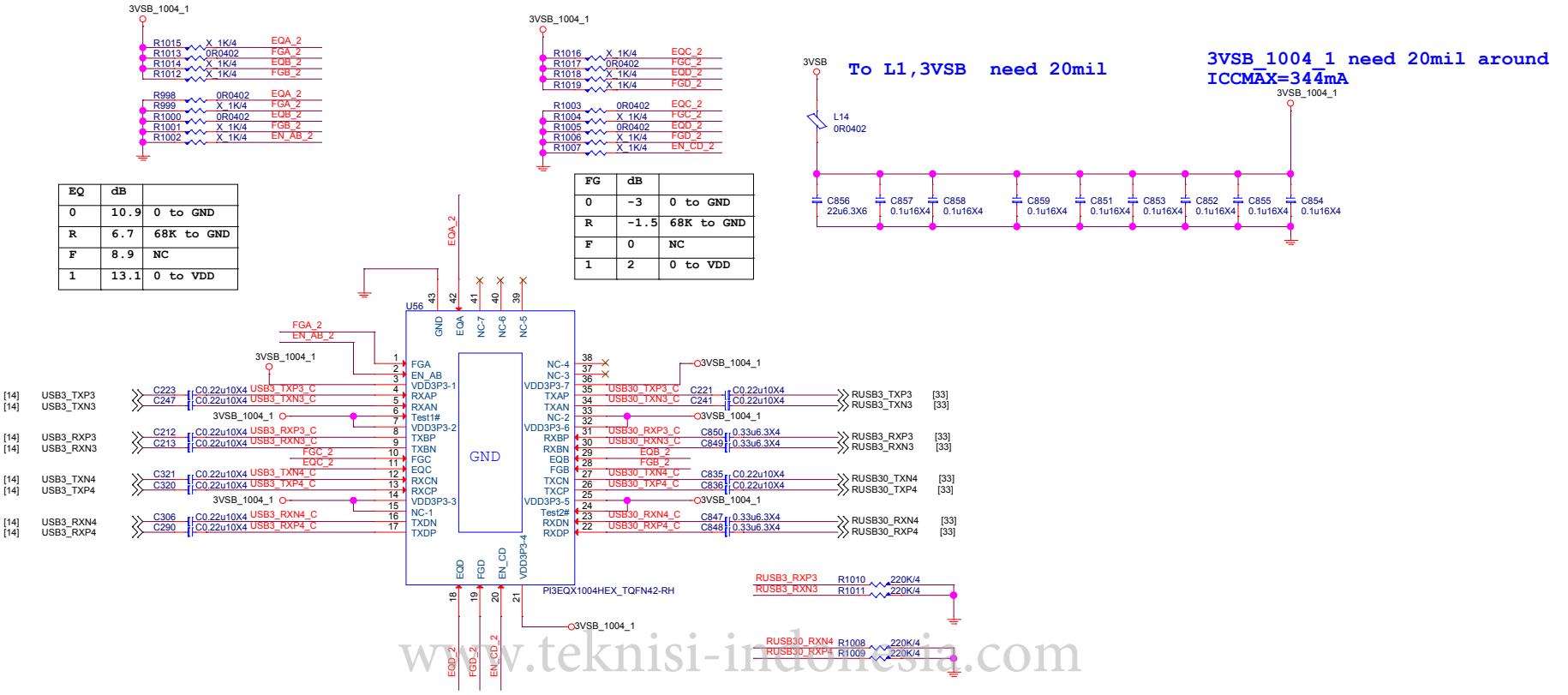
Rear USB3.1 Redriver



EQ	dB	
0	10.9	0 to GND
R	6.7	68K to GND
F	8.9	NC
1	13.1	0 to VDD

FG	dB	
0	-3	0 to GND
R	-1.5	68K to GND
F	0	NC
1	2	0 to VDD

MICRO-STAR INT'L CO.,LTD.

Title: Rear USB31 redriver

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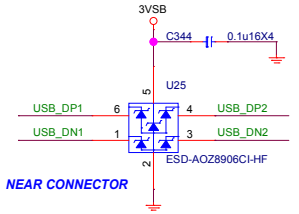
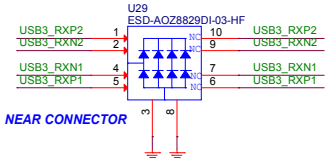
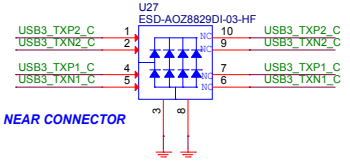
[14] USB_DP2
[14] USB_DN2

[14] USB_DP1
[14] USB_DN1

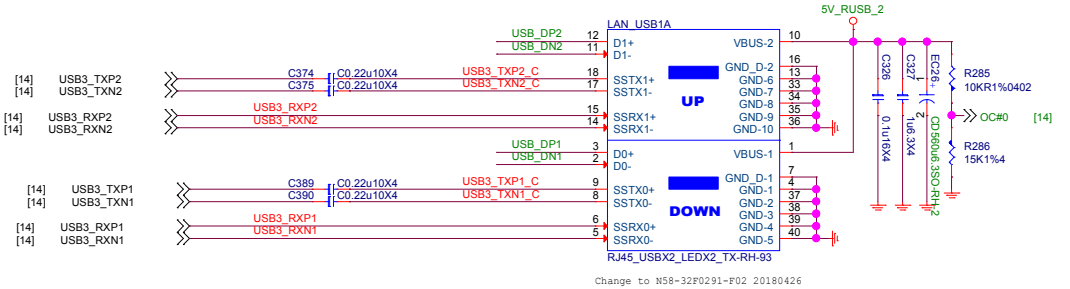






2017/6/22
EC58 is changed from 470uF
to 560uF by buyer request

LAN_USB1



Change to N58-32F0291-F02 20180426

MICRO-STAR INT'L CO.,LTD.

Title: Rear LAN USB3.1 G2

Size | Document Number: MS-7B98.. | Rev: 10

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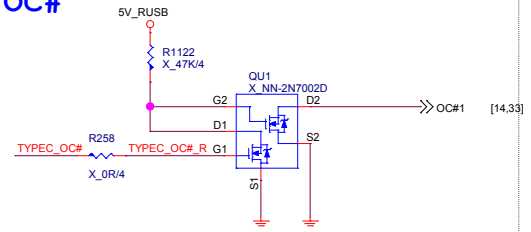
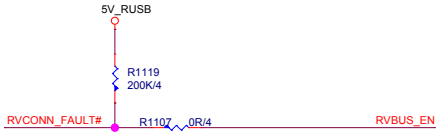
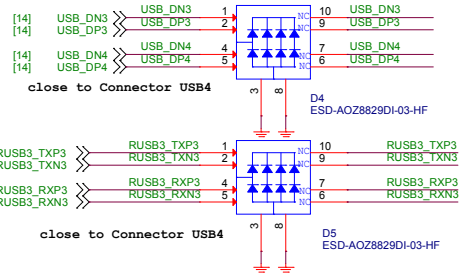
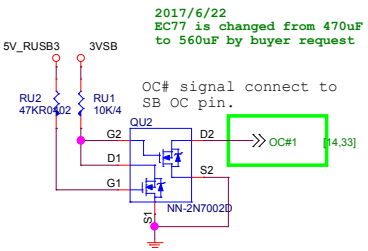
VBUS OC#



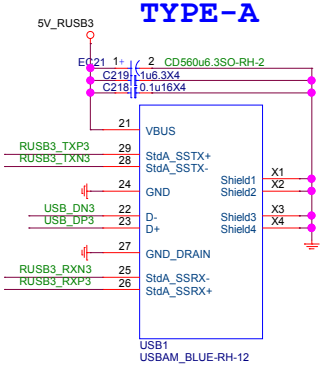
VCONN OC#







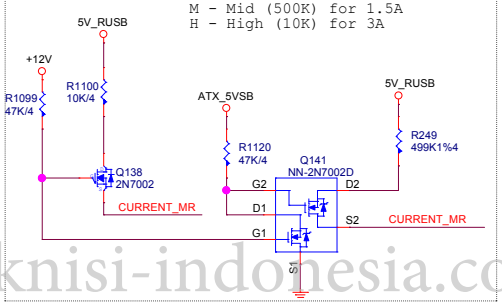
TYPE-A



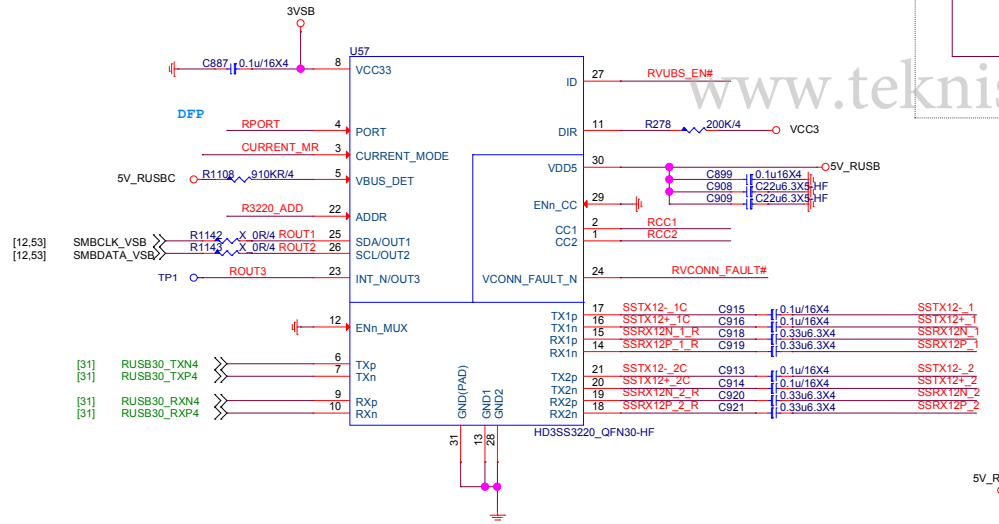
Current Mode

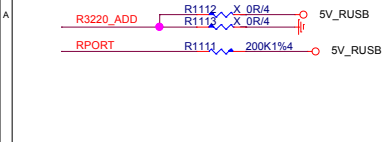
3A under S0 mode
1.5A under S3 mode

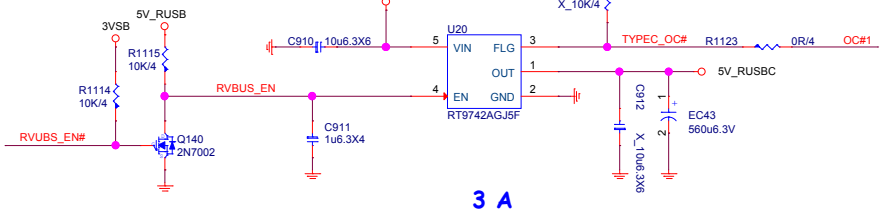
L - Default for 900mA
M - Mid (500K) for 1.5A
H - High (10K) for 3A



USB Type-C MUX with Configuration Channel (CC)



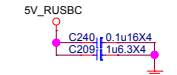




3 A
min 80mil.

www.teknisi-indonesia.com

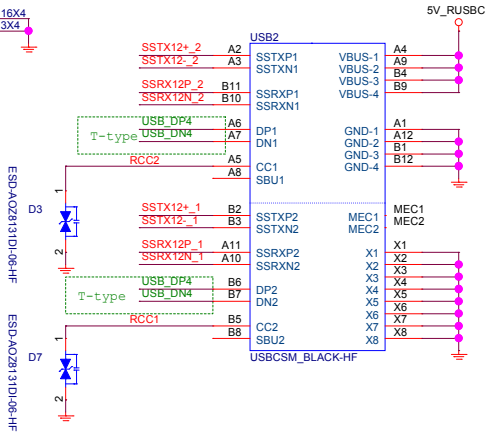
close to Connector USB5



T-type branch to be less than 140mils

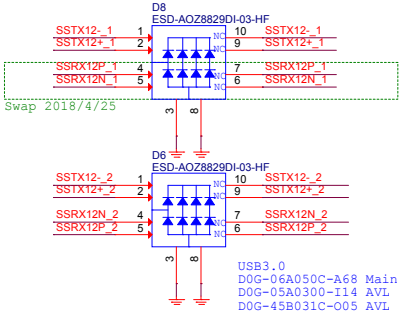
T-type branch to be less than 140mils

TYPE-C



ESD Protection

NEAR AC CAP



USB3.0
D0G-06A050C-A68 Main
D0G-05A0300-I14 AVL
D0G-45B031C-O05 AVL

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Title: RUSB 3.1 G2 A+C

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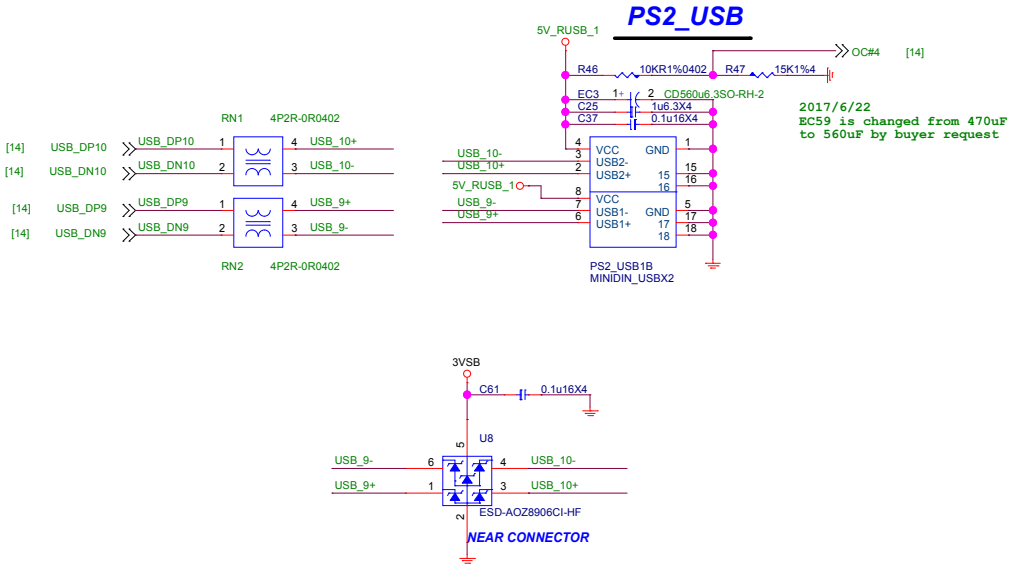
REAR USB2.0



MICRO-STAR INT'L CO.,LTD.		
Title: Rear USB2.0		
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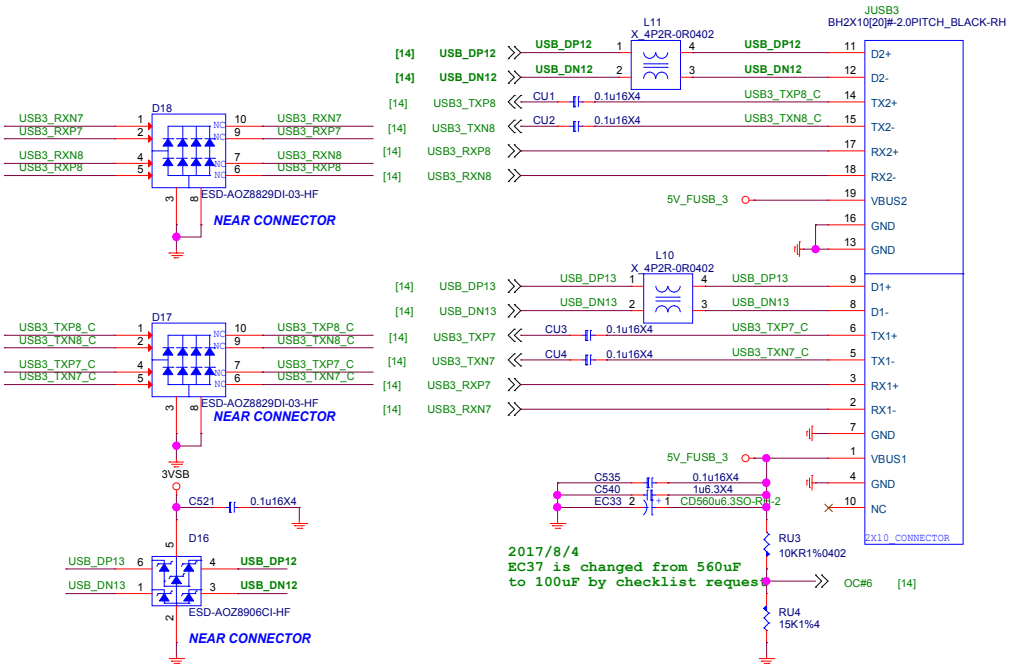
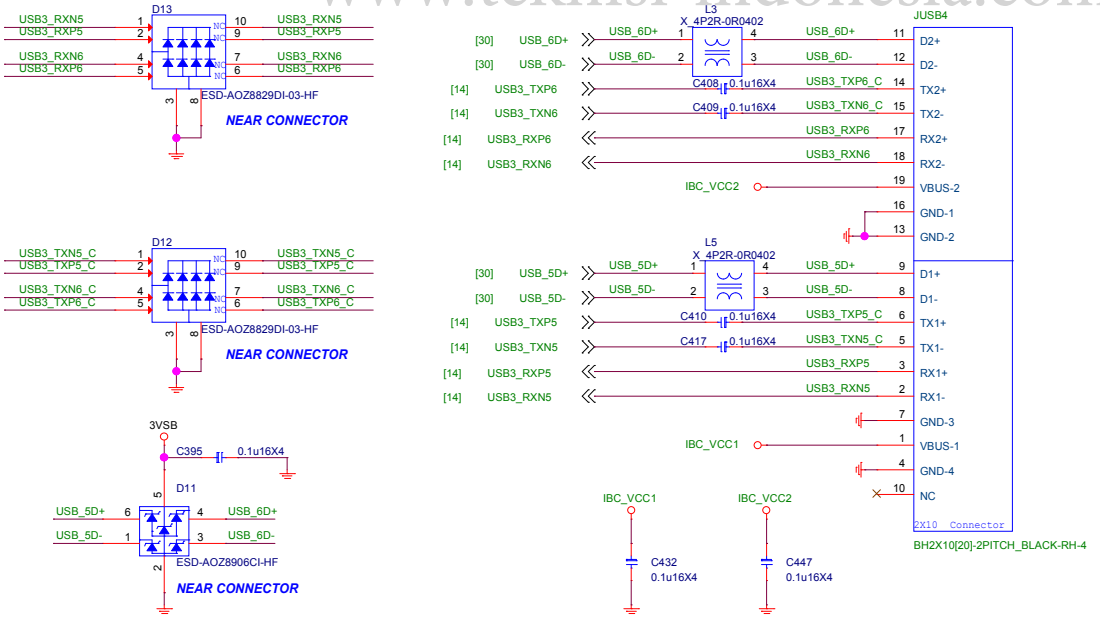
FUSB5 90°

B SKU 不上件



FUSB3 180°



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Title: Front USB 3.1			
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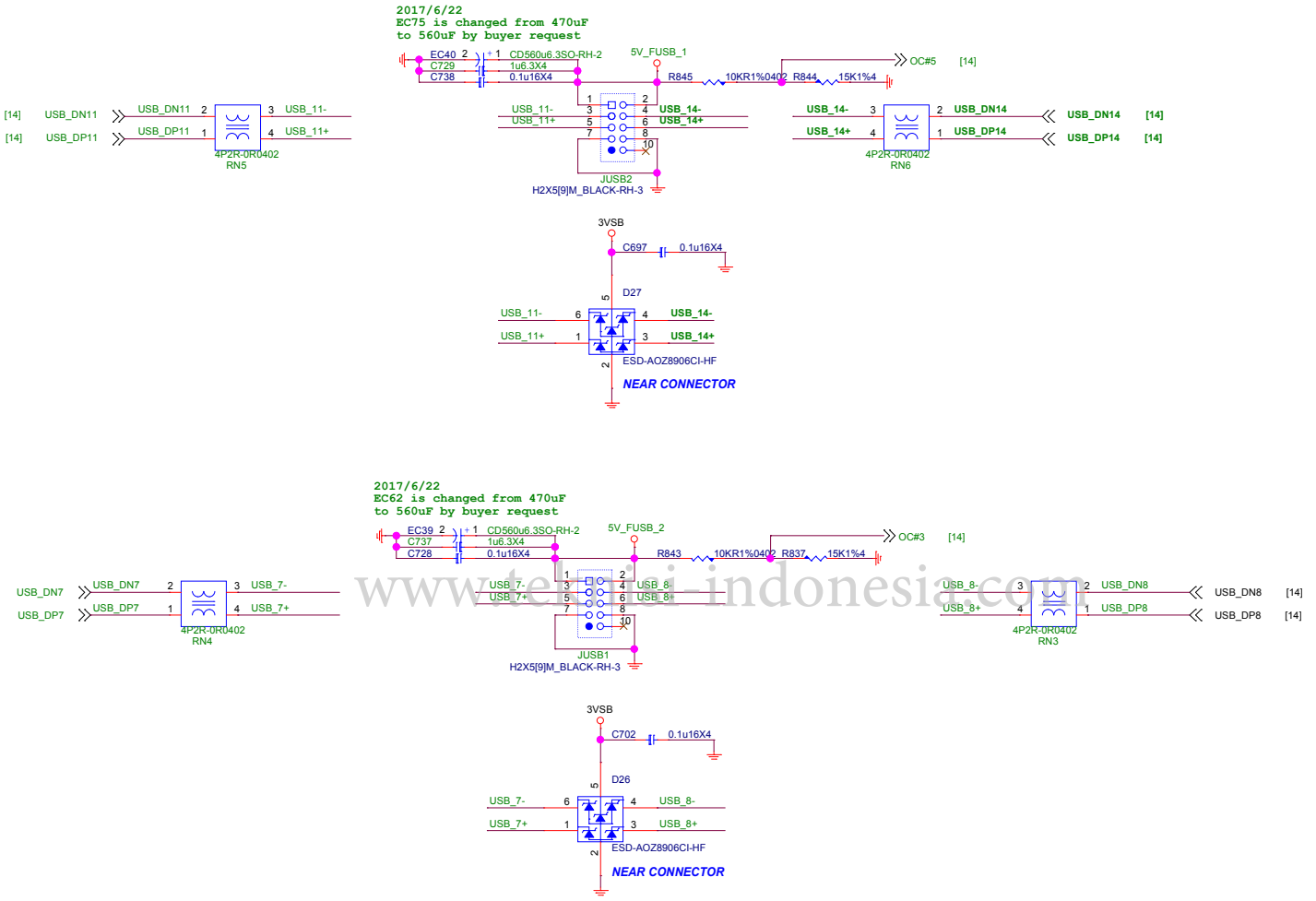
FRONT USB2.0



MICRO-STAR INT'L CO.,LTD.

Title: Front USB 2.0

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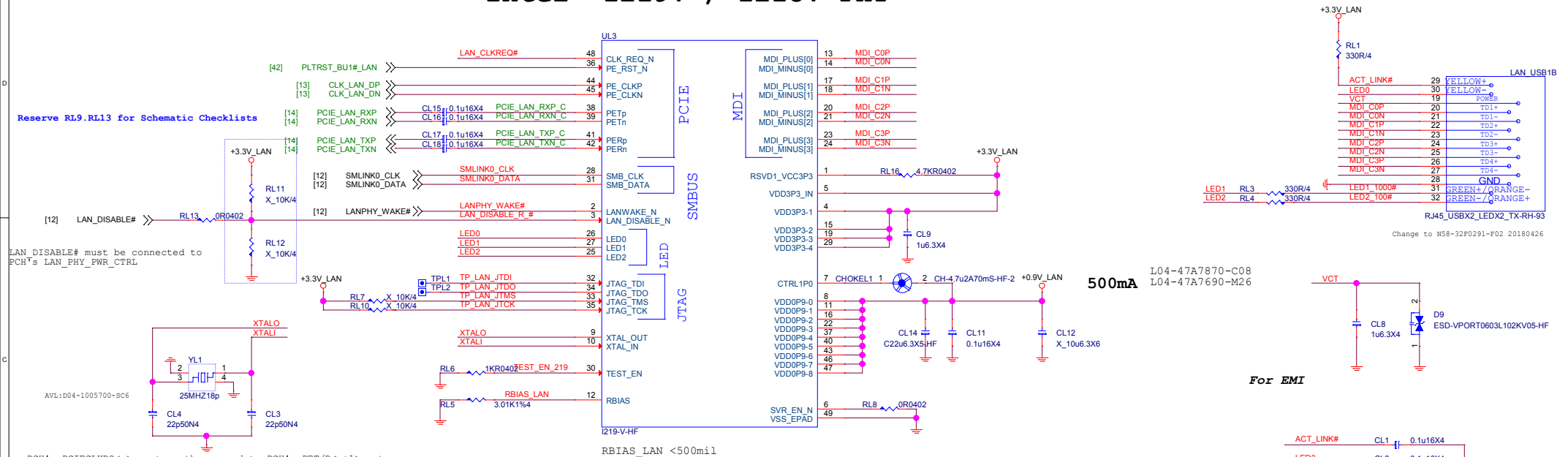
Intel I219V / I218V PHY



Reserve RL9.RL13 for Schematic Checklists

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

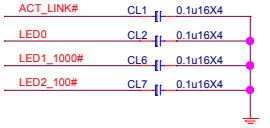
RBIAS_LAN <500mil

500mA

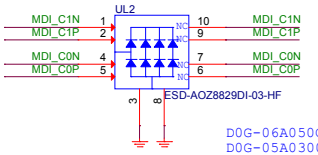
L04-47A7870-C08
L04-47A7690-M26

Change to N58-32F0291-F02 20180426

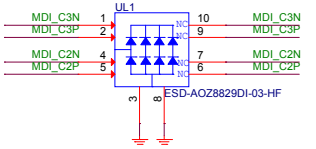
For EMI

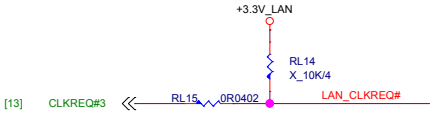


UL2&UL3 close to connector



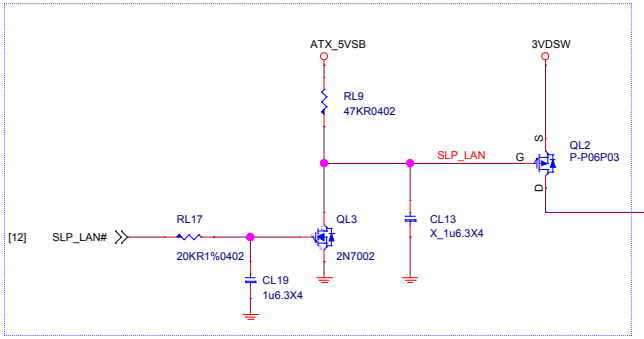
D0G-06A050C-A68
D0G-05A0300-I14

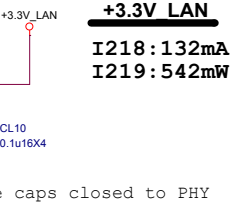




The 10Kohm pull-up resistor (RL18) of CLK_REQ_N is connected to 3.3V Suspend/Core/etc. power well, depending on the power well of PCH's input PCIECLKRQ<n> buffer.

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





+3.3V_LAN

I218:132mA
I219:542mW

Note:These caps closed to PHY

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Title: LAN-Intel i219		
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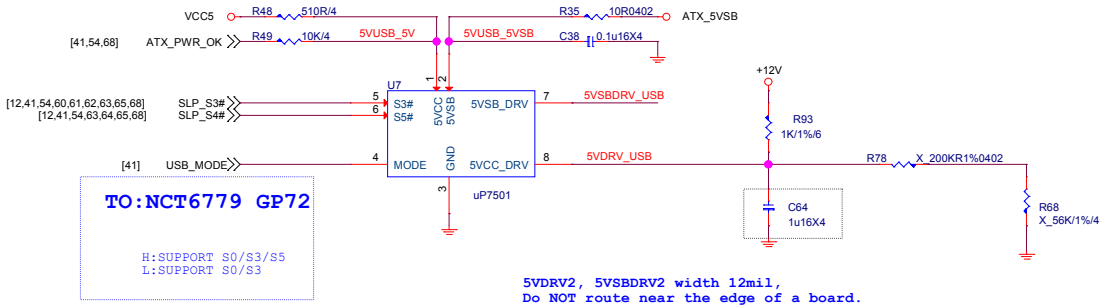
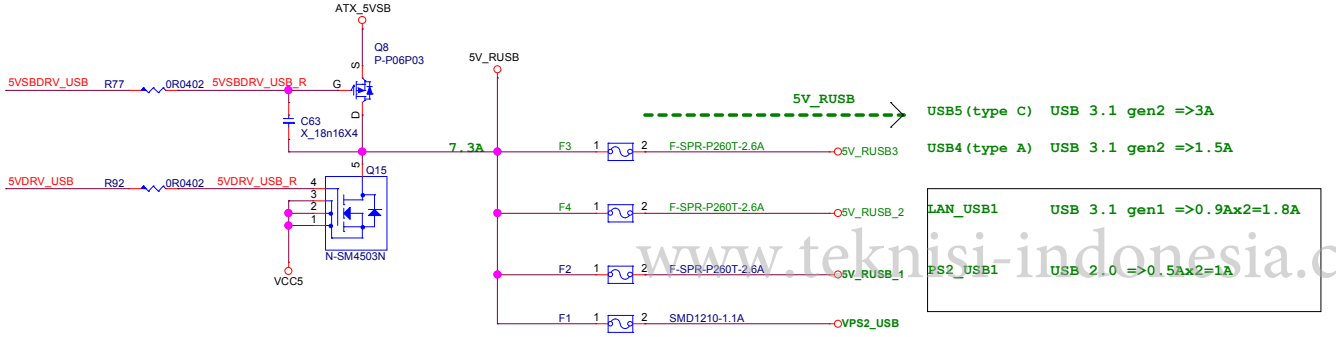
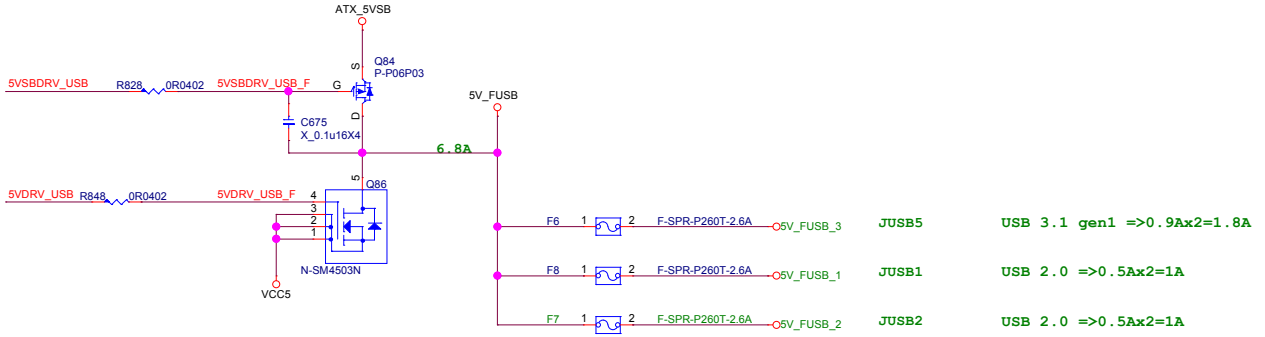
USB POWER



REAR USB PORT POWER



FRONT USB PORT POWER



MICRO-STAR INT'L CO.,LTD.

Title: USB Power

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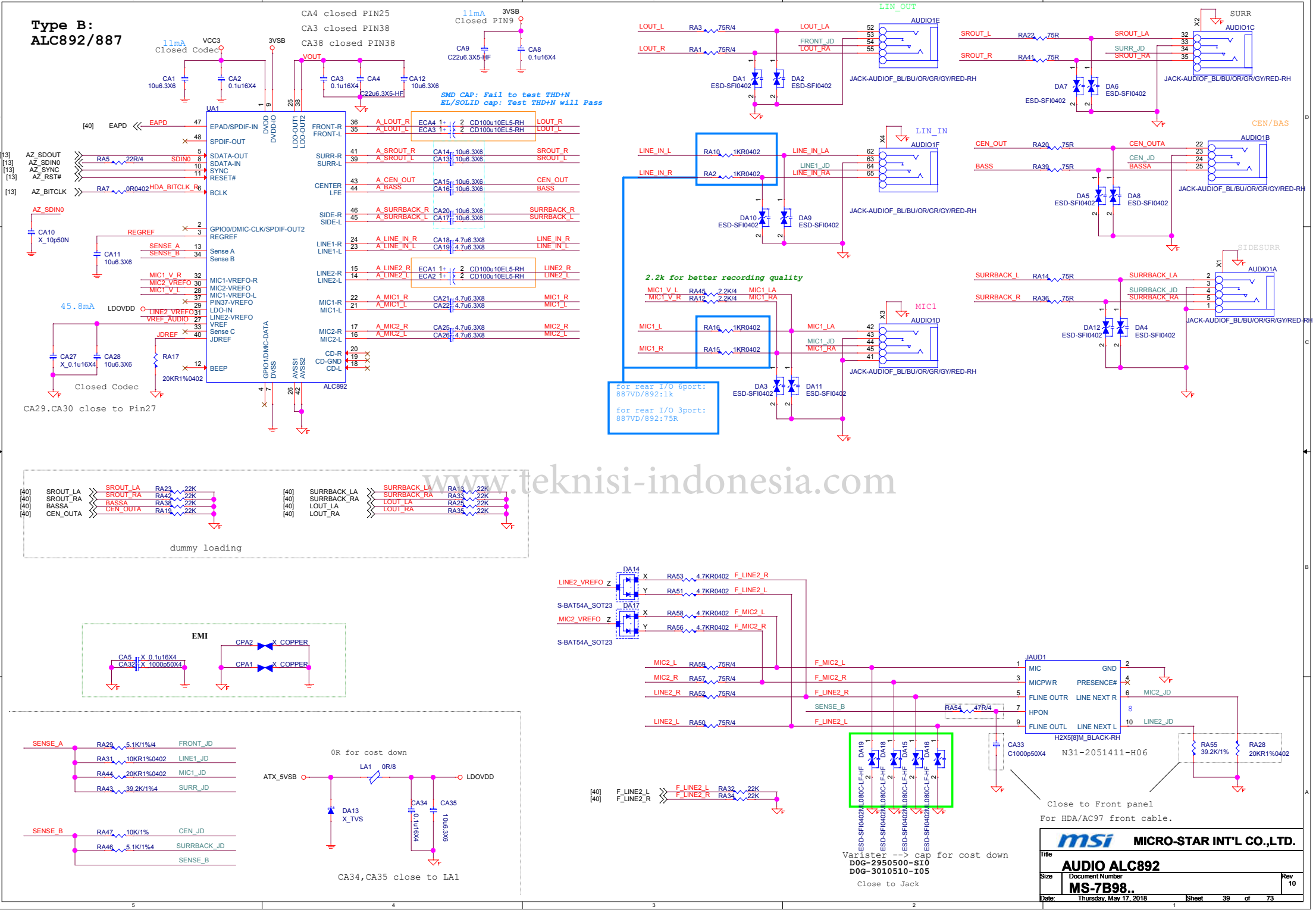
Type B:
ALC892/887



Title	AUDIO ALC892
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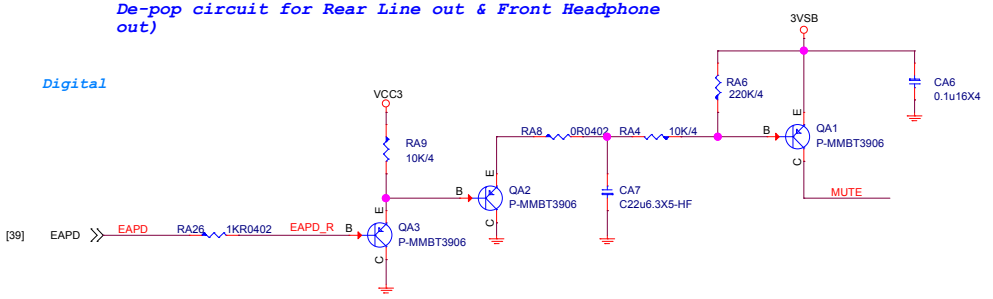
MICRO-STAR INT'L CO.,LTD.

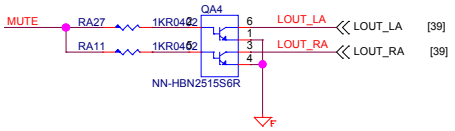
Rear Line OUT De-POP circuit

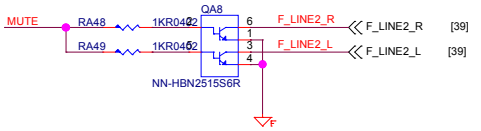
De-pop circuit for Rear Line out & Front Headphone out)

Digital

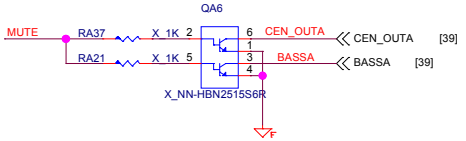


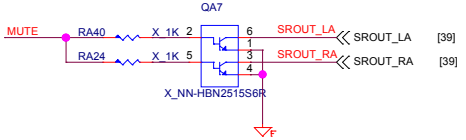
Analog

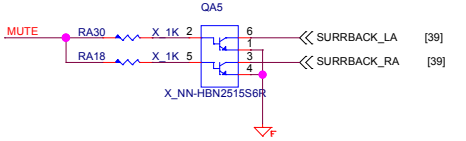




(add de-pop circuit by PM spec or customer request,
NOTE: add de-pop circuit need to change CA5,CA11, CA12, CA13, CA21, CA22 to TVS)







MICRO-STAR INT'L CO.,LTD.

Title: De-pop circuit

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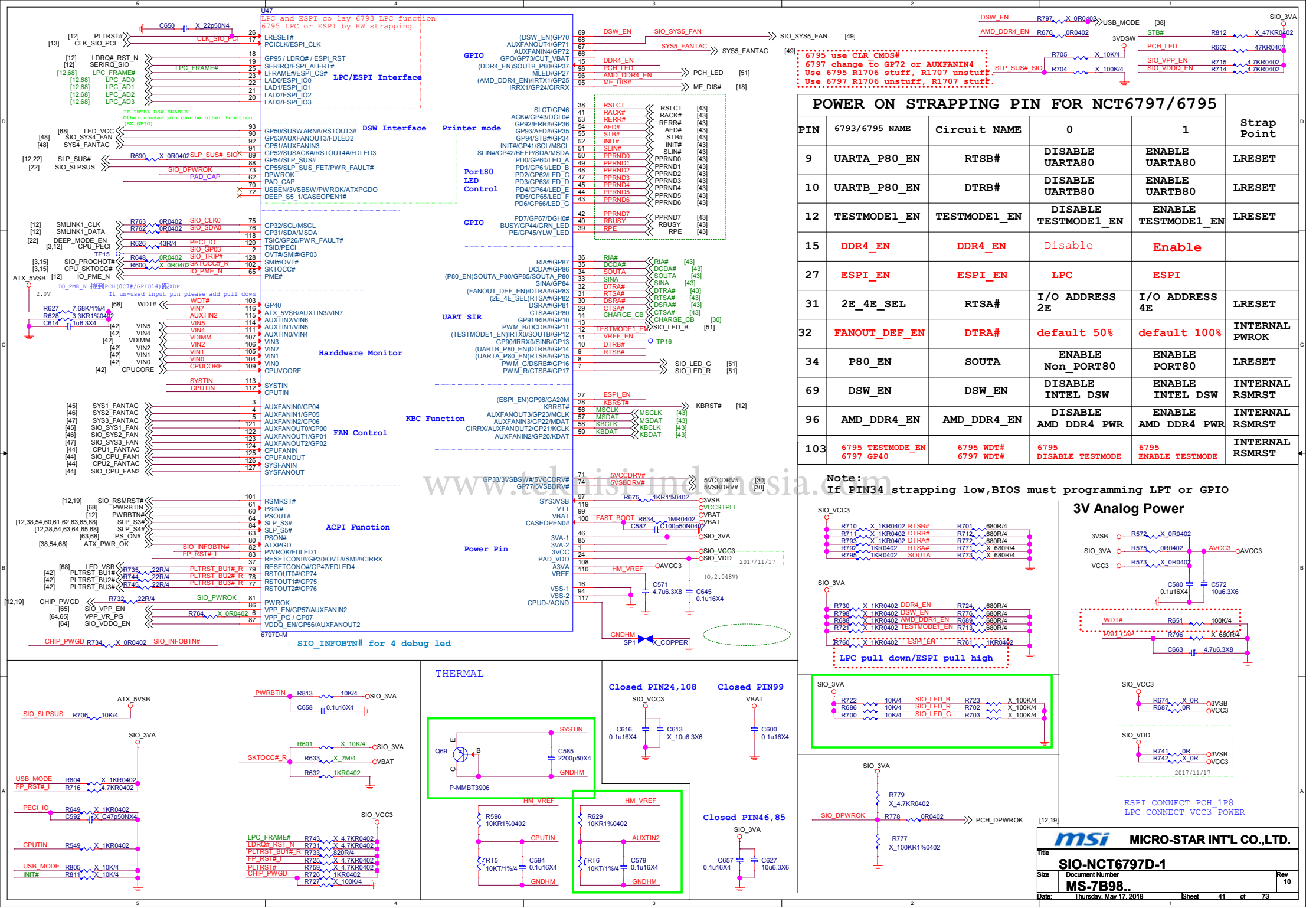
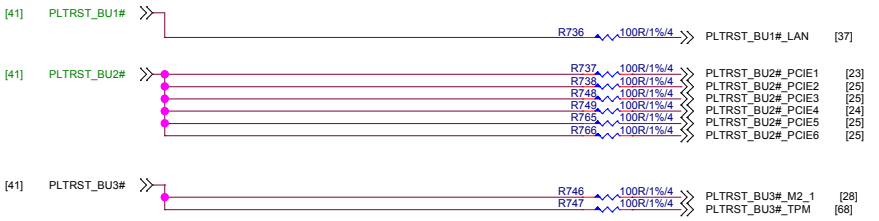
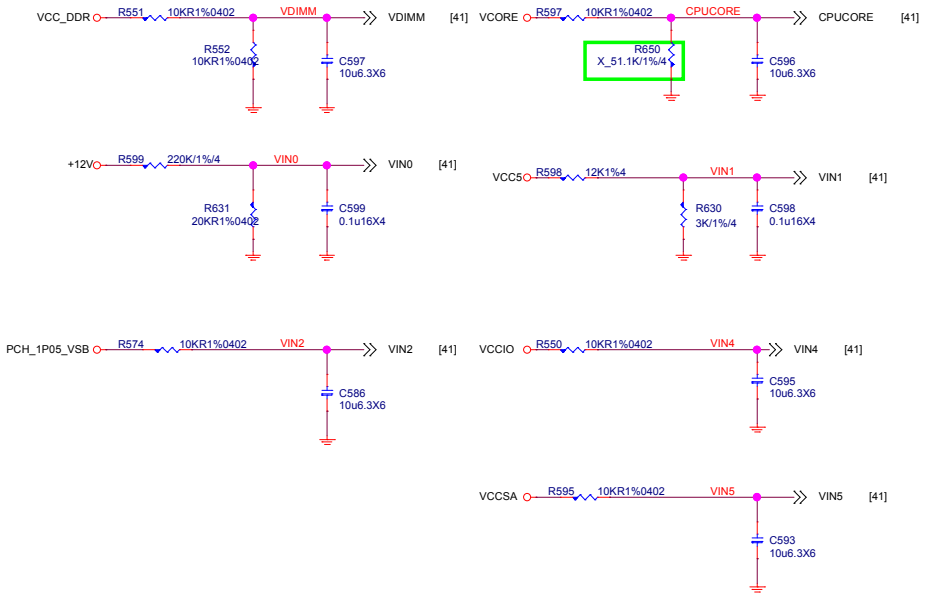


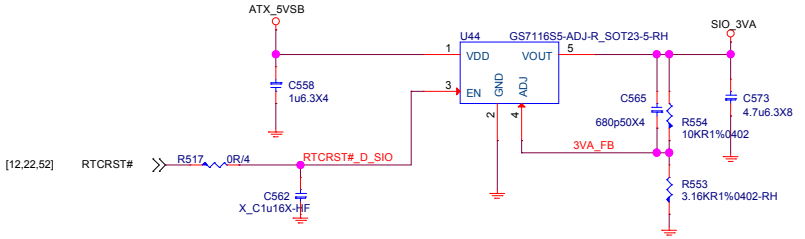


HW Monitor - Voltage

SIO HM Voltage voer 2V will not detect



2017/11/23



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Title: SIO-NCT6797D-2		
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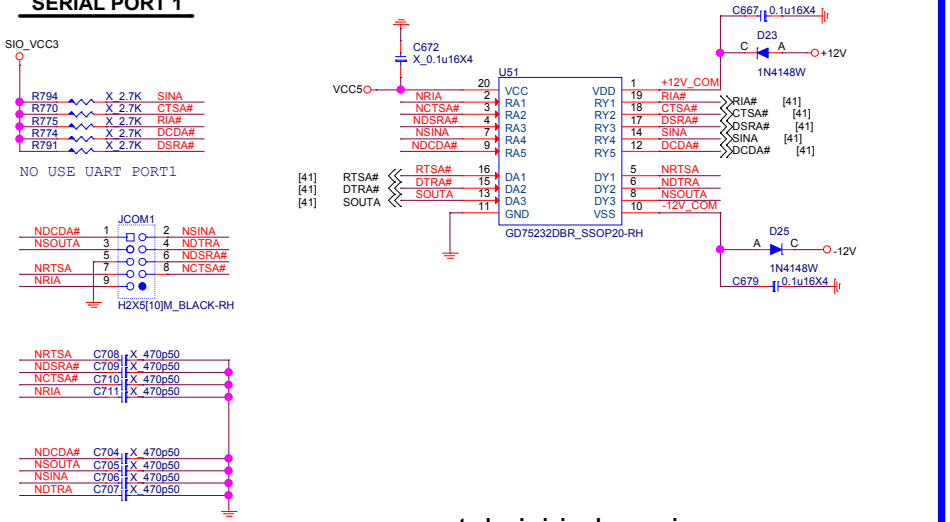
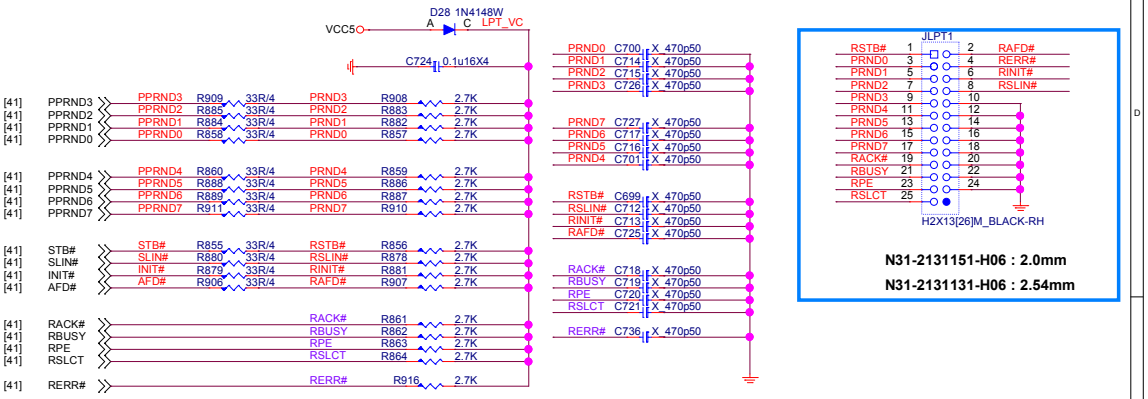
SERIAL PORT 1

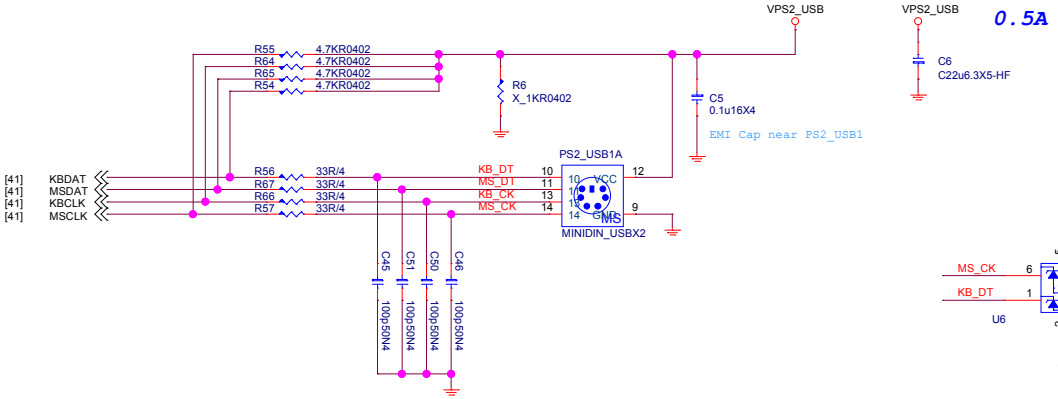


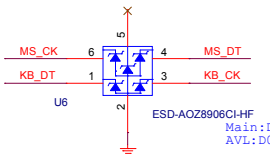
PARALLAL PORT



PS2 KEYBOARD & MOUSE CONNECTOR

PS2 Power





MICRO-STAR INT'L CO.,LTD.

Title: COM/LPT/PS2

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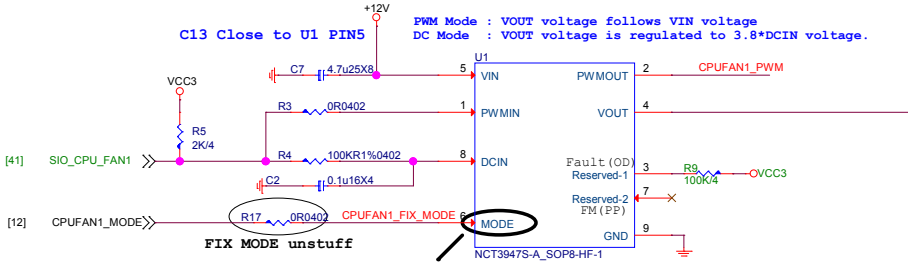
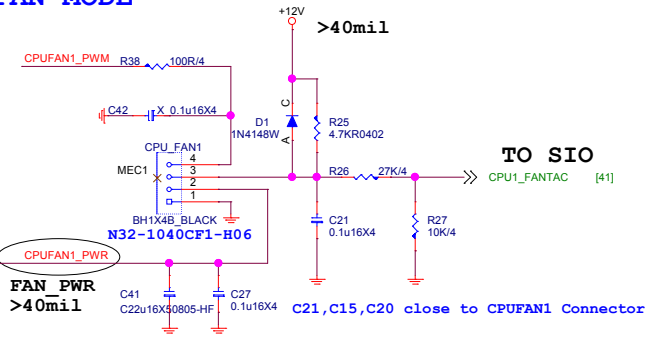
TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE

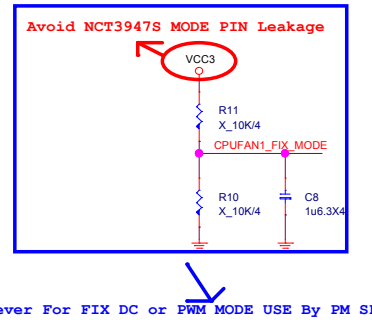
1.PWM/DC/OCP LED(現在是改成R/G/B3色LED)
2.GPIO可以由BIOS切換 PWM/DC MODE
3.OCP拉回GPIO給BIOS認
4.PWM OR DC FAN拉回GPIO給BIOS認
5.FAN轉速加快的時候由SOFTWARE 控制GPIO讓燈的變化



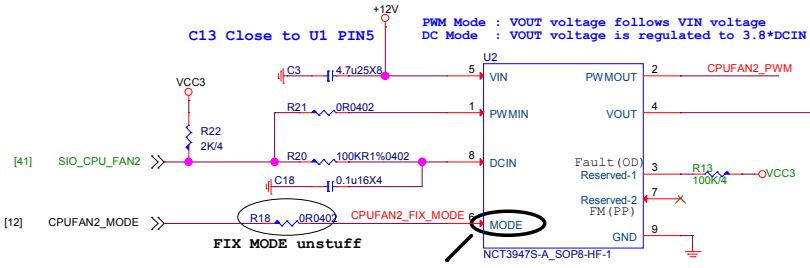
	MODE(PIN7)
PWM MODE	HIGH
DC MODE	LOW
Default AUTO MODE	GPI(Floating)

Internall pull up 1.65V



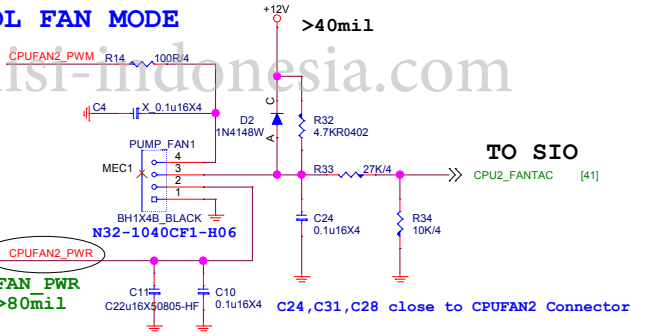


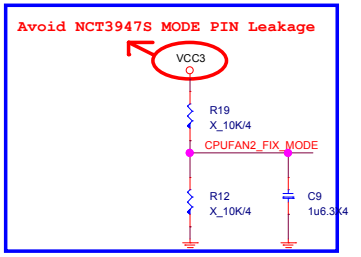
TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE



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

Internall pull up 1.65V





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

MICRO-STAR INT'L CO.,LTD.

Title: CPU FAN 1/2

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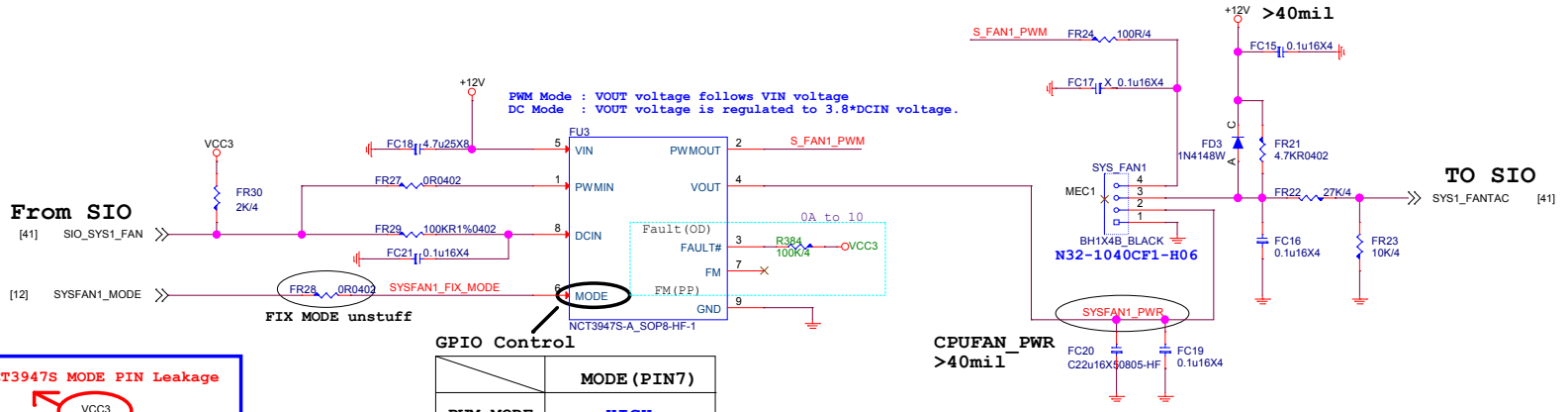
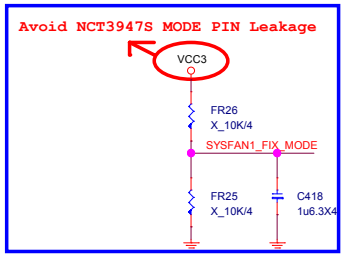
TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE



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

Internall pull up 1.65V



Resever For FIX DC or PWM MODE USE By PM SPEC

MICRO-STAR INT'L CO.,LTD.

Title: SYSTEM FAN1 Type K

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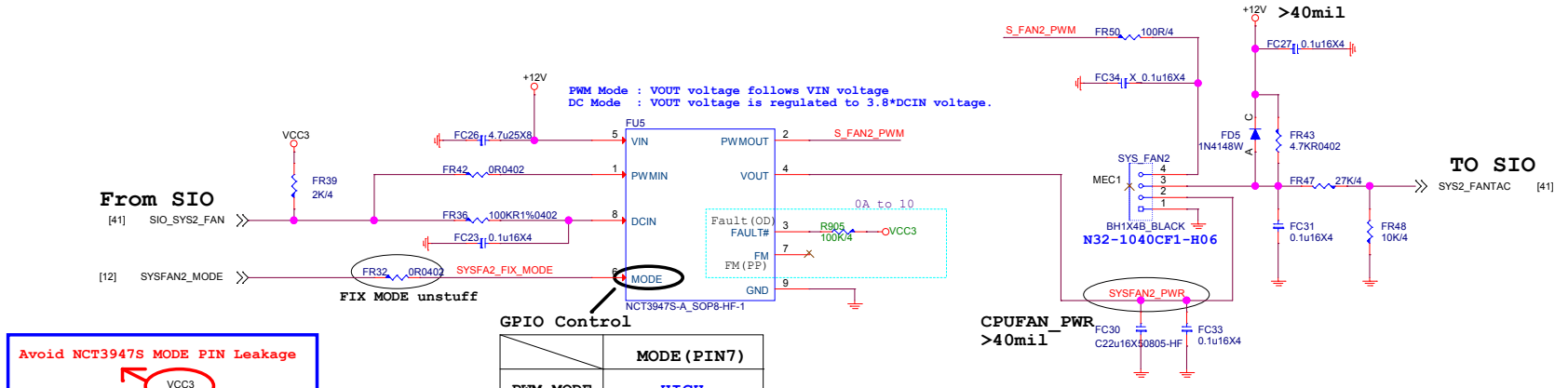
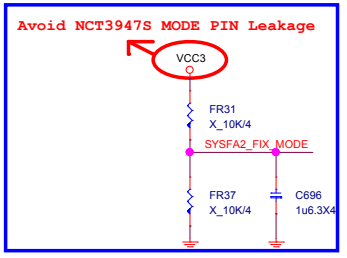
TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE



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

Internall pull up 1.65V



Resever For FIX DC or PWM MODE USE By PM SPEC

MICRO-STAR INT'L CO.,LTD.

Title: SYSTEM FAN2 Type K

Size | Document Number: MS-7B98.. | Rev: 10

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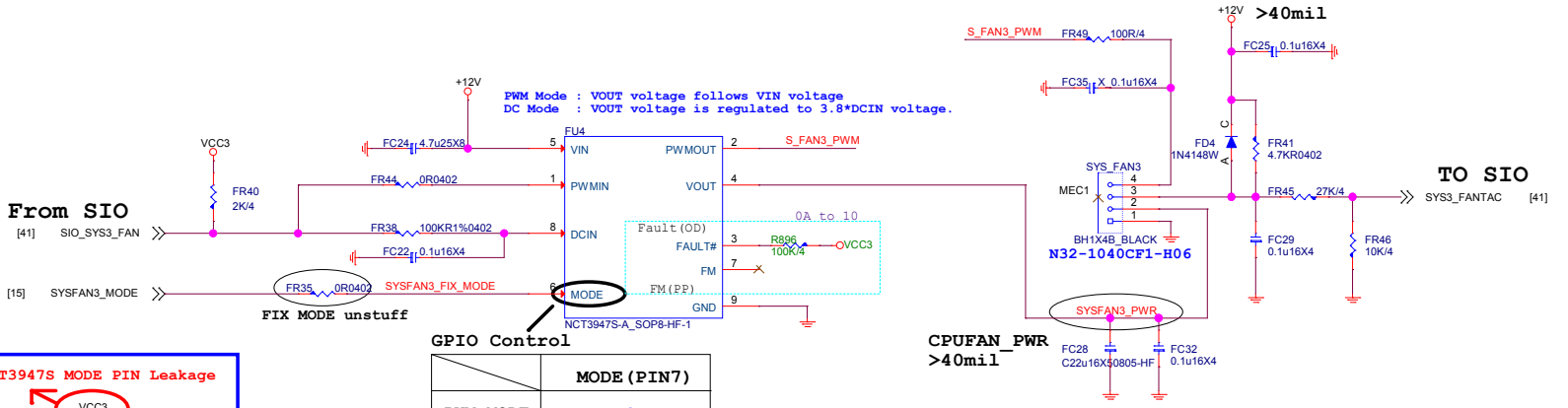
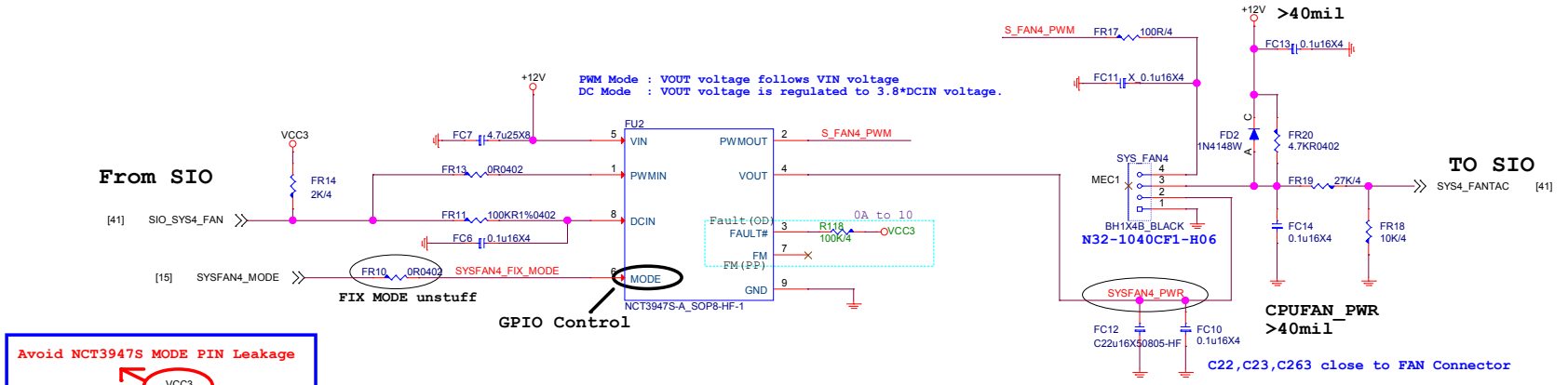
TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE

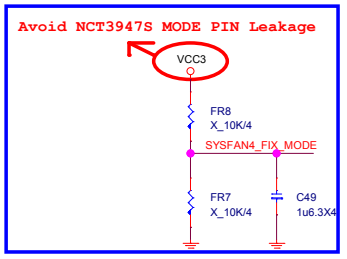


	MICRO-STAR INT'L CO.,LTD.	
Title	SYSTEM FAN3 Type K	
Size	Document Number MS-7B98..	Rev 10
Date: Thursday, May 17, 2018	Sheet 47 of 73	

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

2.GPIO可以由BIOS切換 PWM/DC MODE





Resever For FIX DC or PWM MODE USE By PM SPEC

GPIO Control

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

Internall pull up 1.65V

MICRO-STAR INT'L CO.,LTD.

Title: SYSTEM FAN4 Type K

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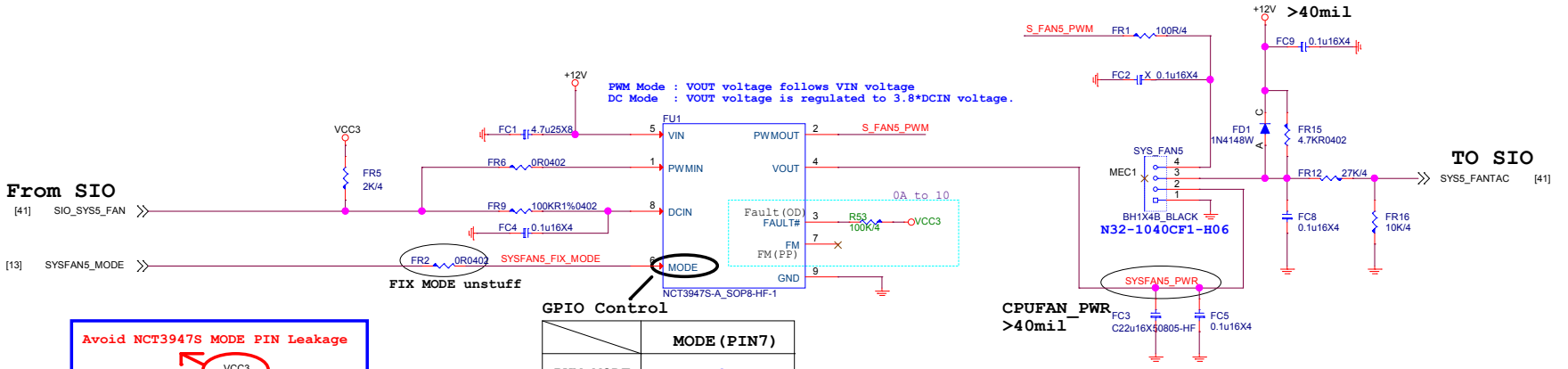
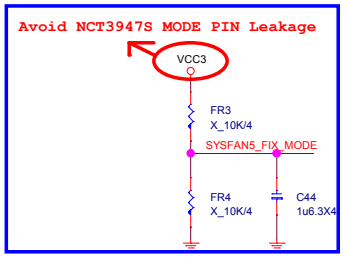
TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE



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

Internall pull up 1.65V



Resever For FIX DC or PWM MODE USE By PM SPEC

MICRO-STAR INT'L CO.,LTD.

Title: SYSTEM FAN5 Type K

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Delete ALL Audio LED BY Spec Change 2018/4/19

msi MICRO-STAR INT'L CO.,LTD.		
Title: BOTTOM LED		
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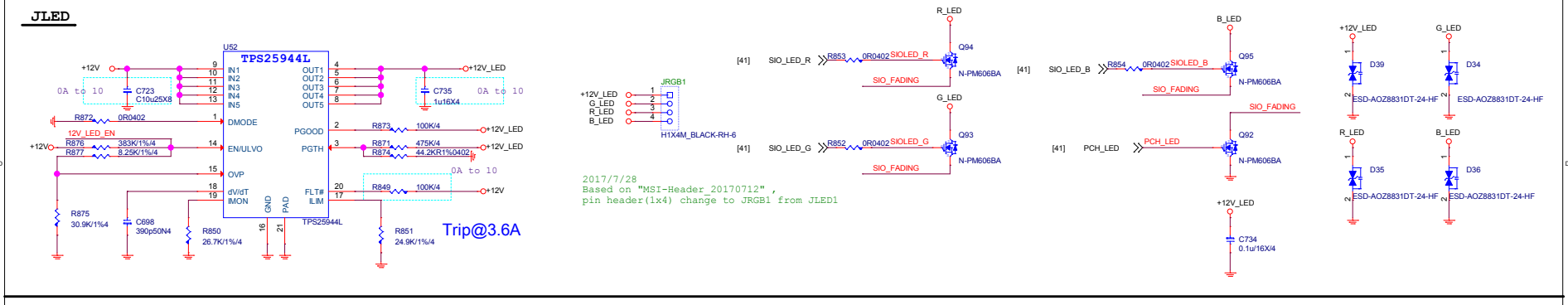
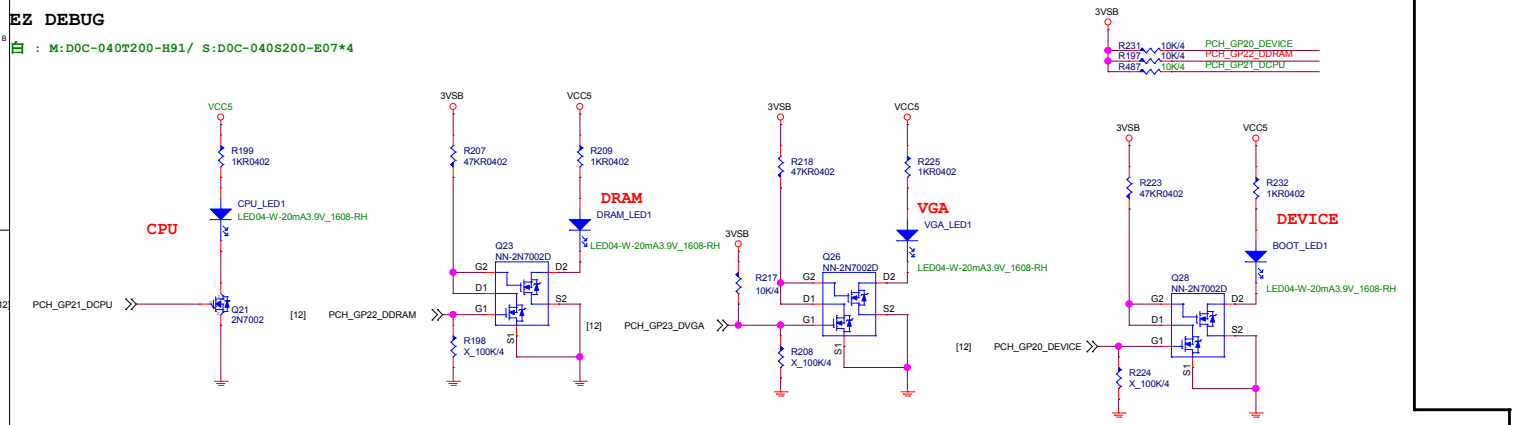
JLED



Delete ALL Audio LED BY Spec Change 2018/4/19

EZ DEBUG

白 : M:D0C-040T200-H91/ S:D0C-040S200-E07*4



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

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

MICRO-STAR INT'L CO.,LTD.

Title: RGB/AUDIO/EZ DEBUG LED

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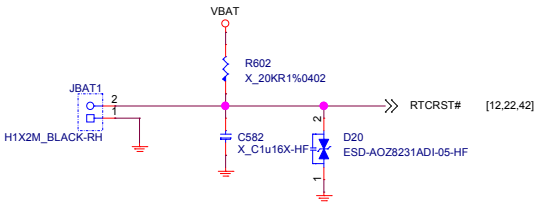
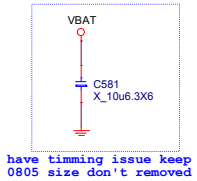
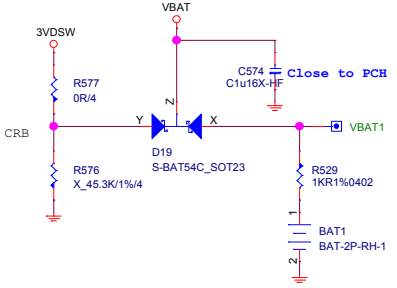


VBAT



have timming issue keep
0805 size don't removed



MICRO-STAR INT'L CO.,LTD.		
Title: CLR COMS/CUT VBAT		
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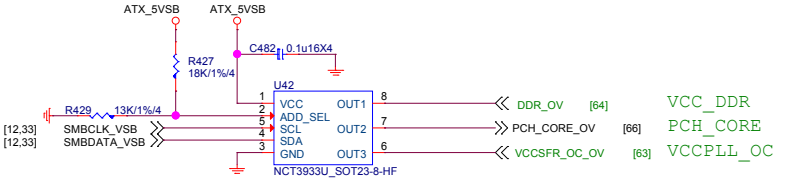
UPI VOLTAGE CONSOLE

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%

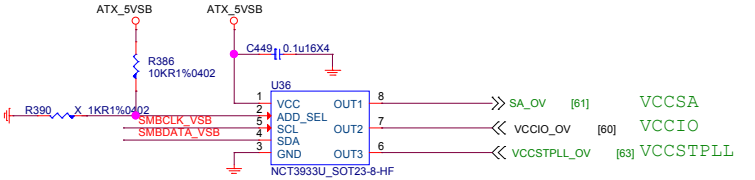
UPI VOLTAGE CONSOLE

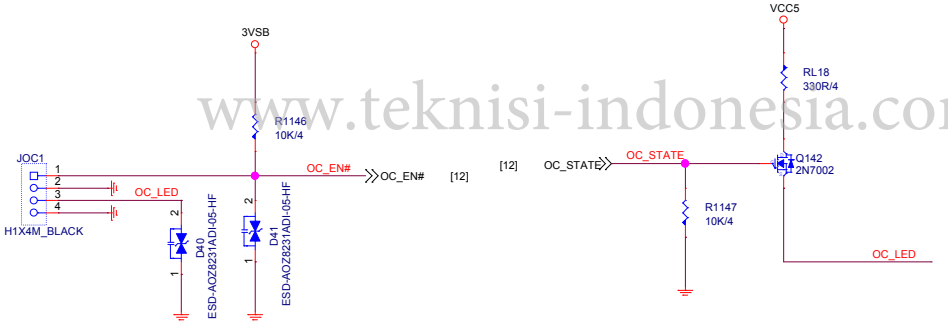
0x26:RH=18K,RL=13K



UPI VOLTAGE CONSOLE

0x20:RH=10K,RL=OPEN





MICRO-STAR INT'L CO.,LTD.

Title: OV-NCT3933/OV

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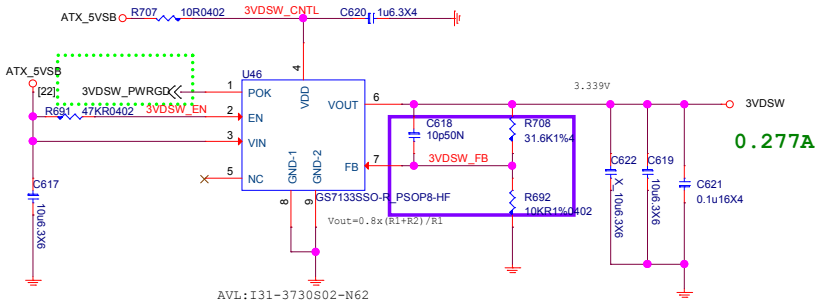
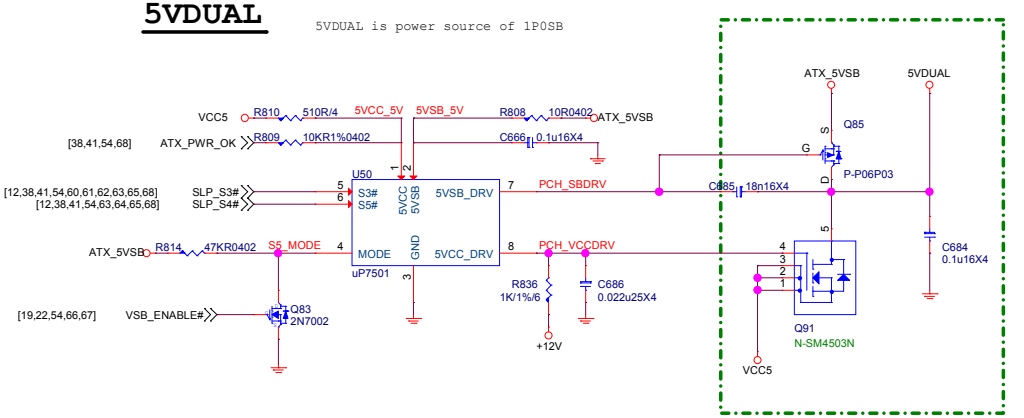
3VDSW



5VDUAL

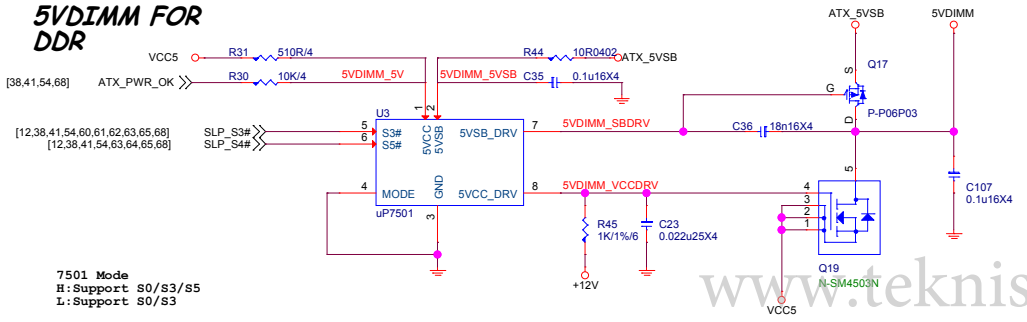
5VDUAL is power source of 1P0SB



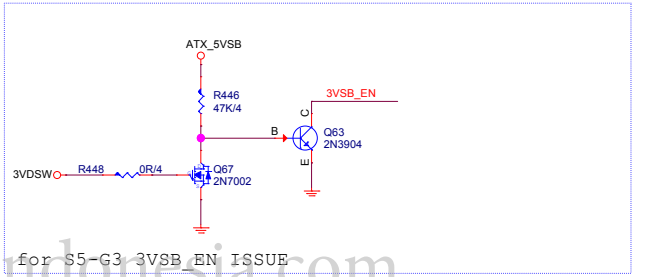
Change to discrete type
2018/1/18

5VDIMM FOR DDR

7.022A



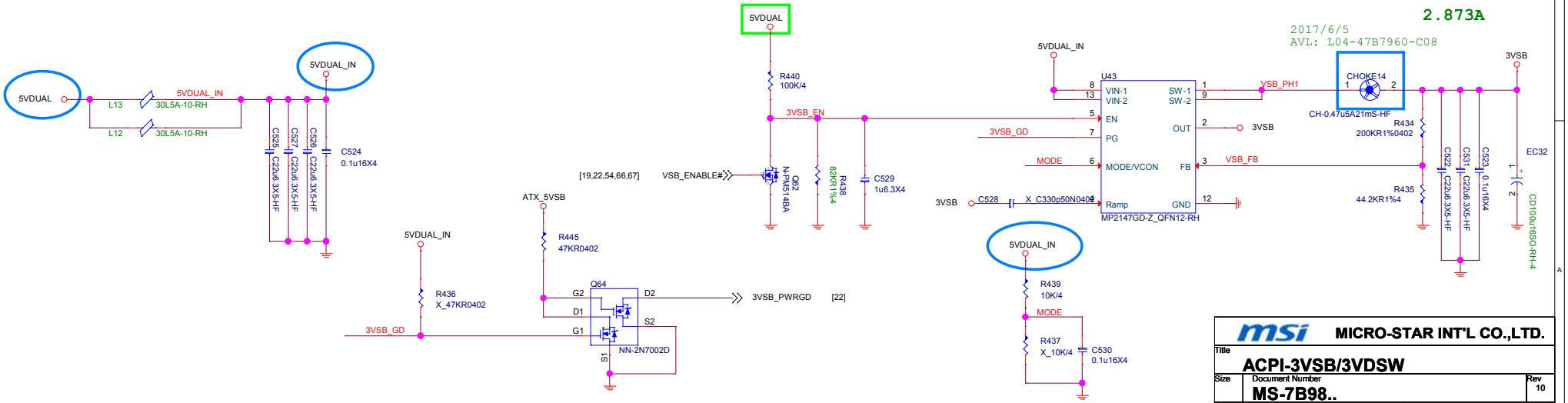
7501 Mode
H:Support S0/S3/S5
L:Support S0/S3



for S5-G3 3VSB_EN ISSUE

2.873A

2017/6/5
AVL: L04-47B7960-C08



MICRO-STAR INT'L CO.,LTD.			
Title: ACPI-3VSB/3VDSW			
Size	Document Number: MS-7B98..		Rev: 10
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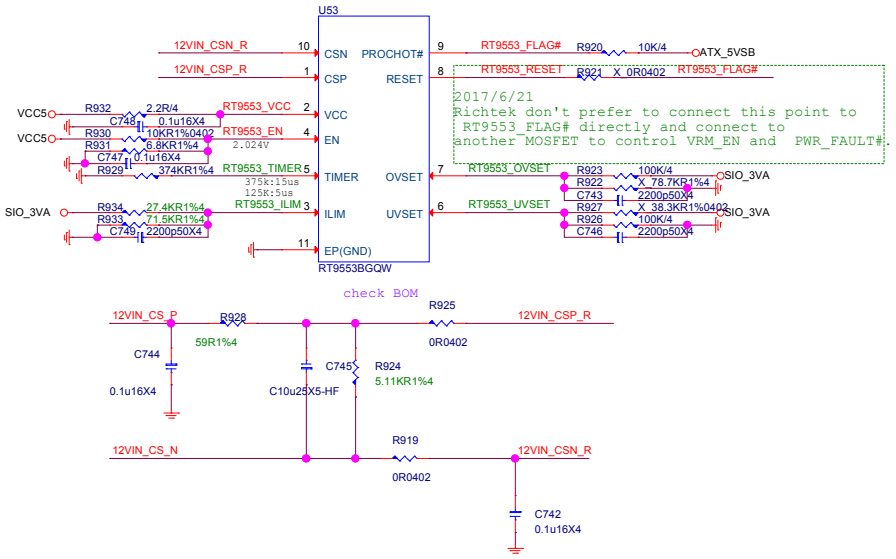
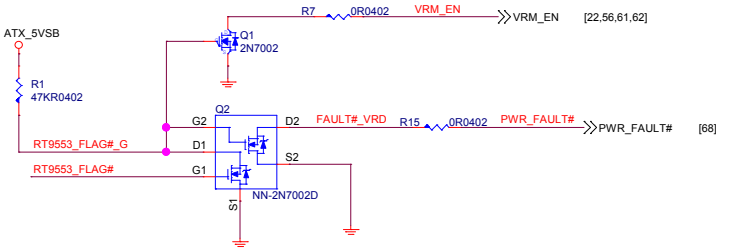
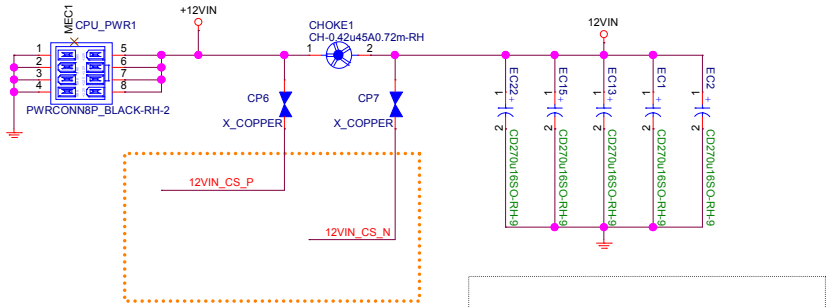
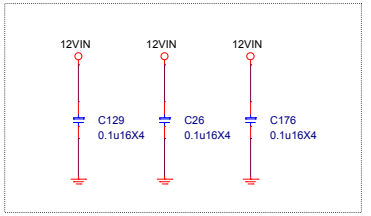




OCP set 32A





MICRO-STAR INT'L CO.,LTD.		
Title: CURRENT SENSE-RT9553B		
Size	Document Number: MS-7B98..	Rev: 10
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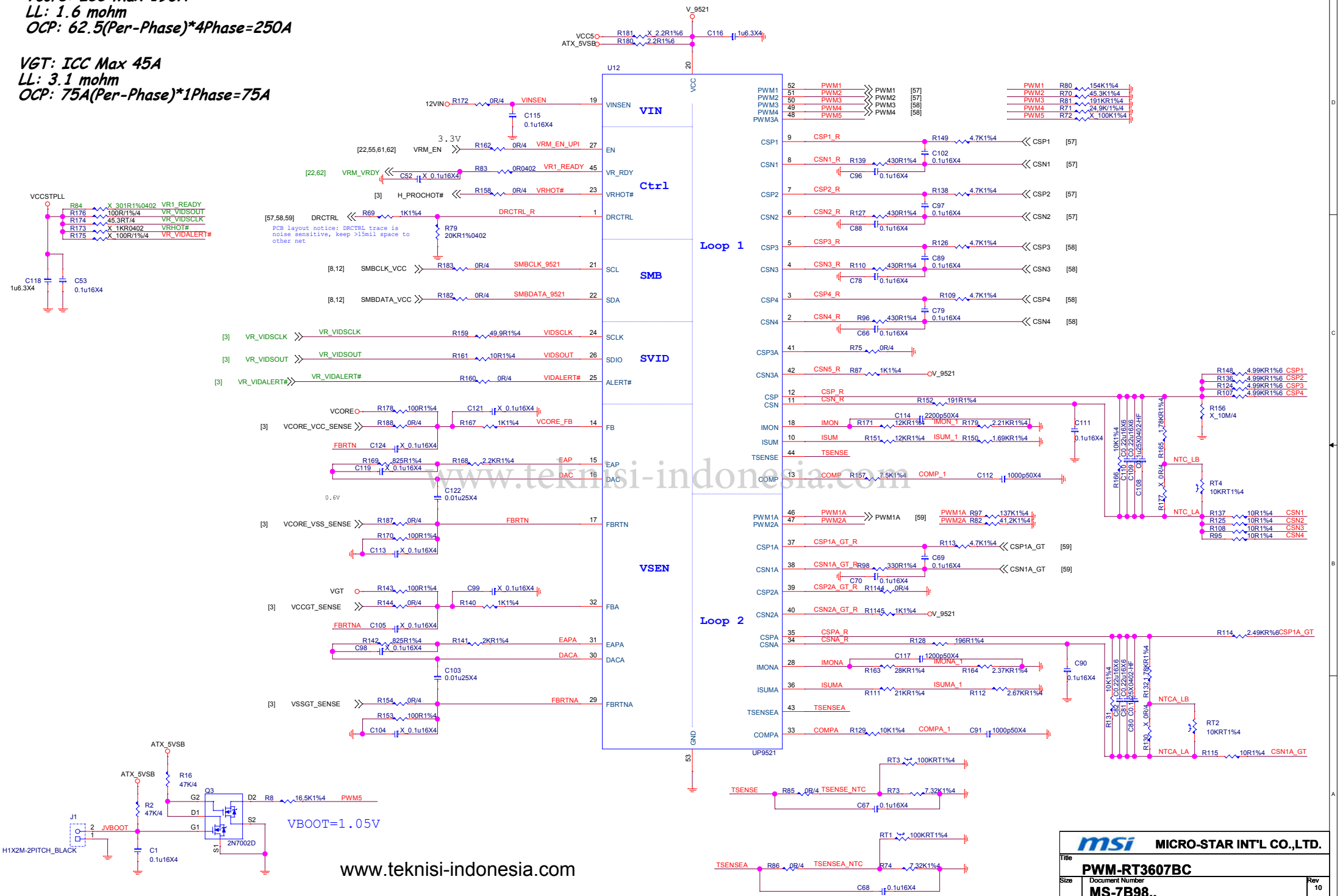
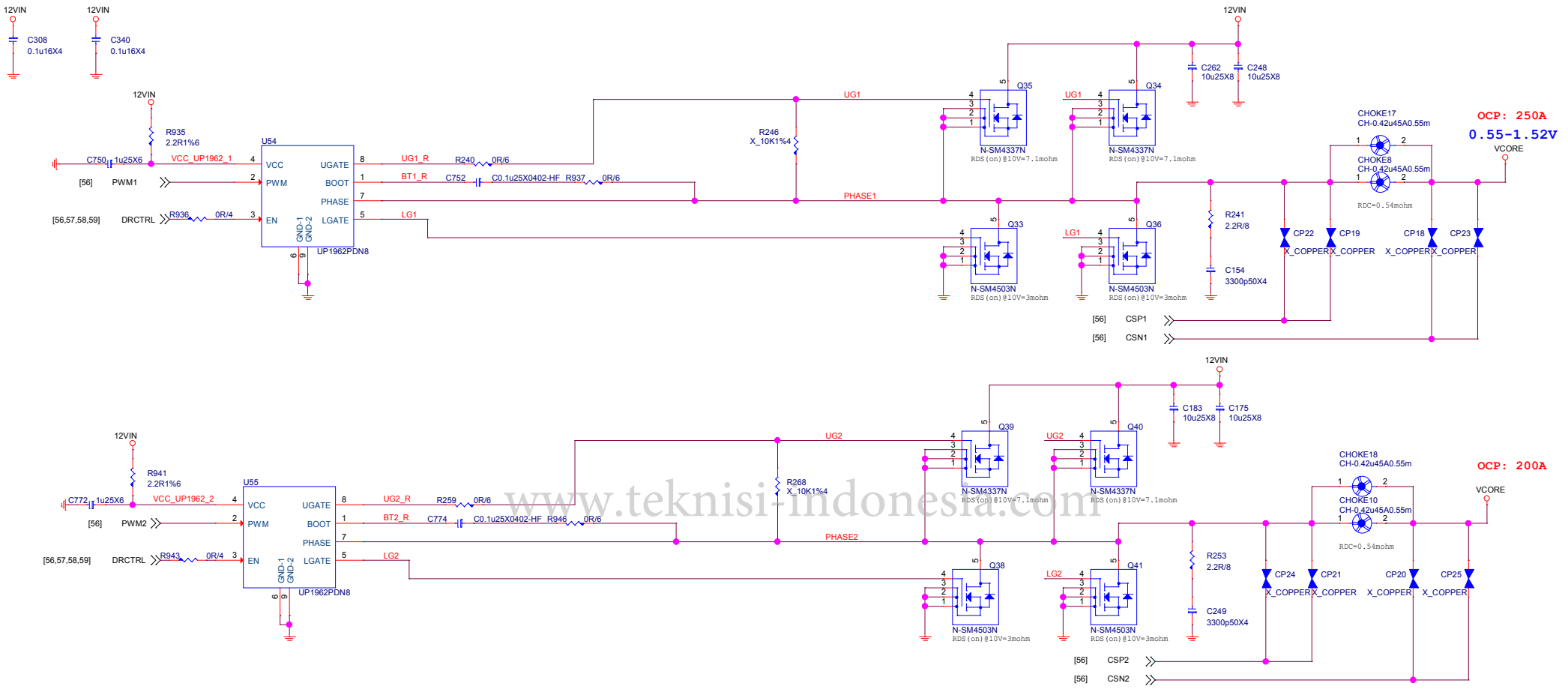
Vcore: ICC Max 193A
LL: 1.6 mohm
OCP: 62.5(Per-Phase)*4Phase=250A

VGT: ICC Max 45A
LL: 3.1 mohm
OCP: 75A(Per-Phase)*1Phase=75A





Title	VCORE MOS-PHASE 1~4
Size	Document Number: MS-7B98..
Rev	10
Date:	Thursday, May 17, 2018
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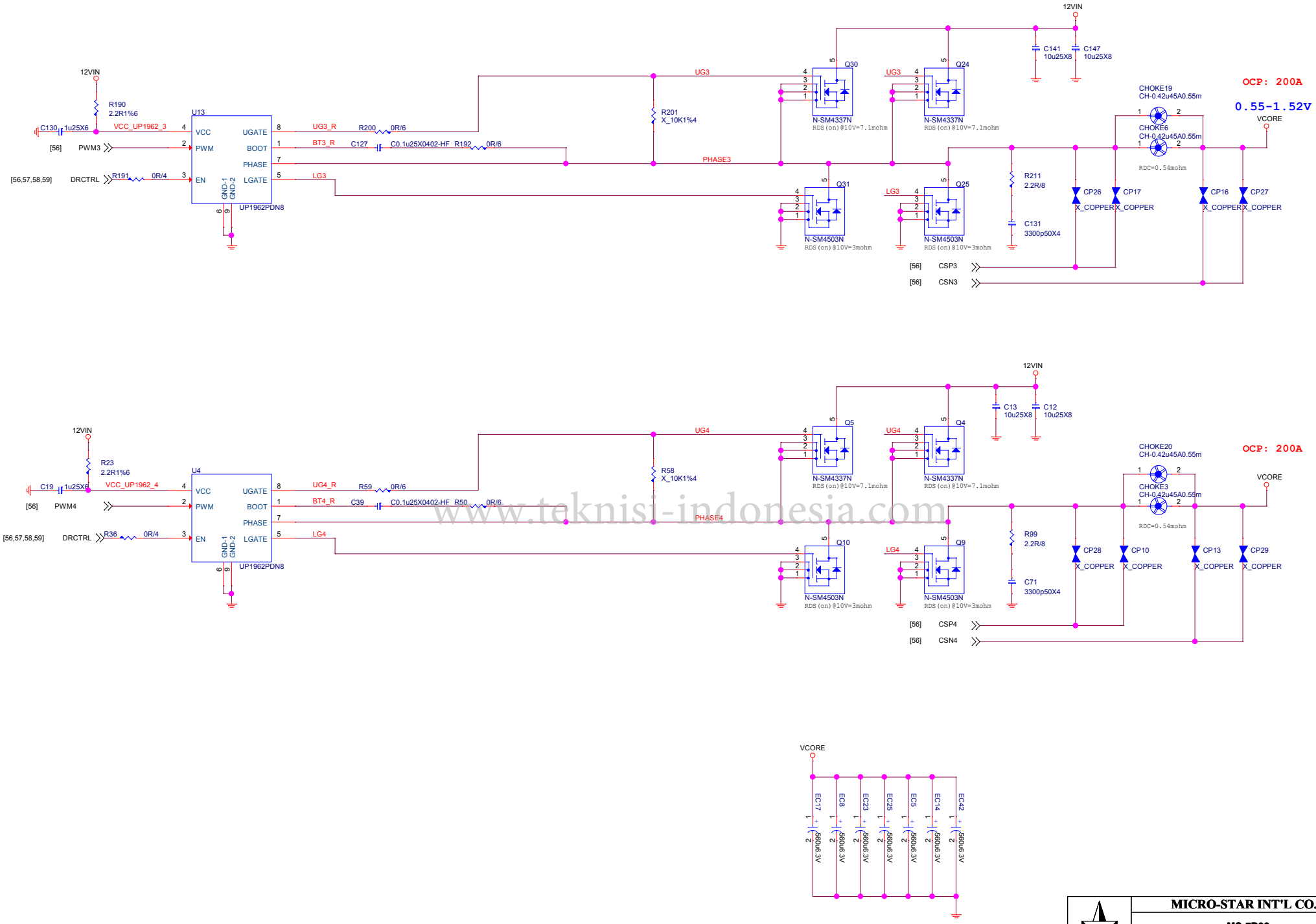
MICRO-STAR INT'L CO.,LTD.



MICRO-STAR INT'L CO.,LTD		
MS-7B98..		
Size: Custom	Document Description: VCORE MOS-PHASE 3-4	Rev: 10
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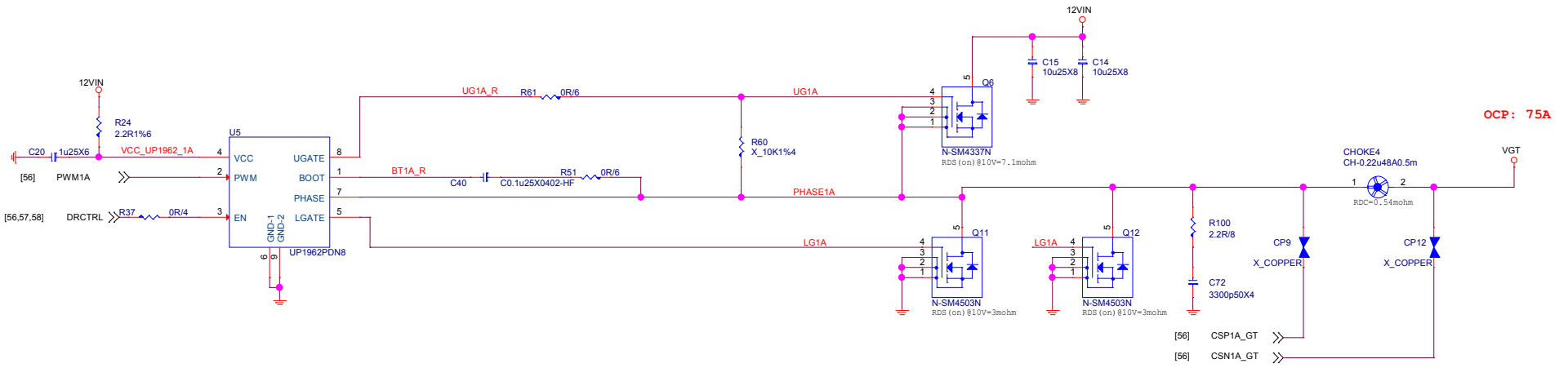
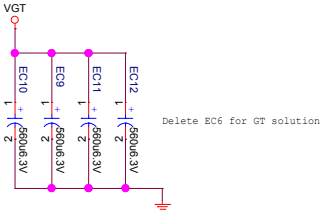


Delete VGT 1 Phase 20180425



MICRO-STAR INT'L CO.,LTD.		
Title: VGT MOS-PHASE 1~3		
Size	Document Number: MS-7B98..	Rev: 10
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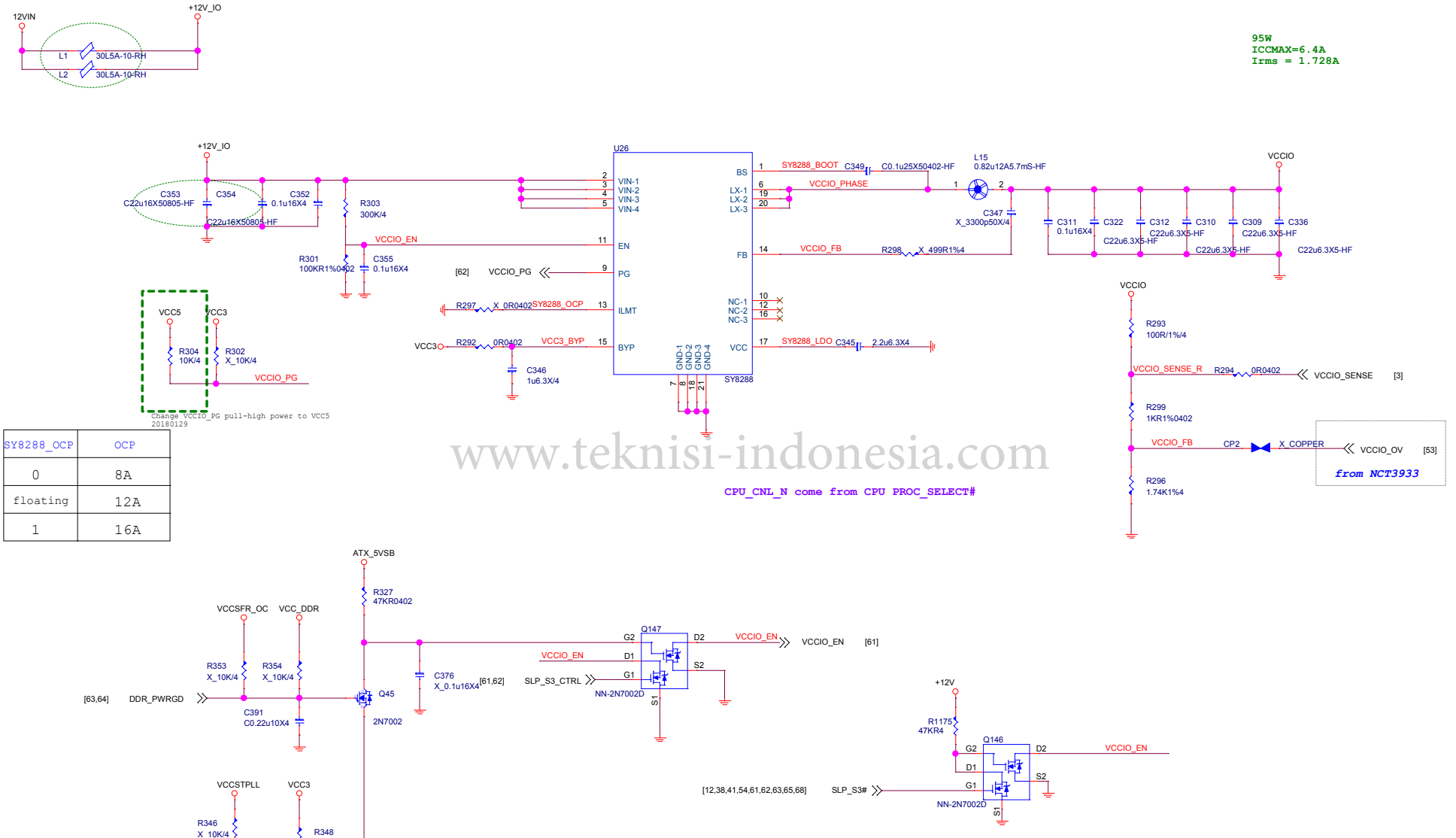
IO Power:0.95V,6.4A

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

95W
ICCMAX=6.4A
Irms = 1.728A



SY8288_OCP	OCP
0	8A
floating	12A
1	16A

MICRO-STAR INT'L CO.,LTD.

Title: CPU PWR-VCCIO-SY8288

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SA Power:1.05V

1.05V; 11.1A

OCP = 11.1*1.4=15.54A

Rocset = 1.4 * Imax * Rdson(low) / Iocset
= 1.4 * 11.1 * 3.3mohm / 10uA
= 5.12K (BOM上5.1K)

Rdson(low)10V
D03-4503N0C-ST8 : 3mohm

2014.08.25 update

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

up1540上C5/R415 no stuff

2014.12.25
for up1540:C39 is OCP set min:5K ohm
stuff 5.36K OCP SET:15.76A

FB:0.8V

2014.08.21 update

Pull up by layout&Check level

Irms = Iout * SQRT((Vout/Vin) * (1 - (Vout/Vin)))
= 18* 0.2825
= 5.086A

Near Q25

Footprint:CHK_IHLP2525CZ01

11.1A
1.05V

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

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

2014.12.25
for up1540:R417 no stuff

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

SLP_S3# assertion to VR disabled
max:1us

Title	CPU PWR-VCCSA-RT8125E
Size	Document Number: MS-7B98.. Rev: 10
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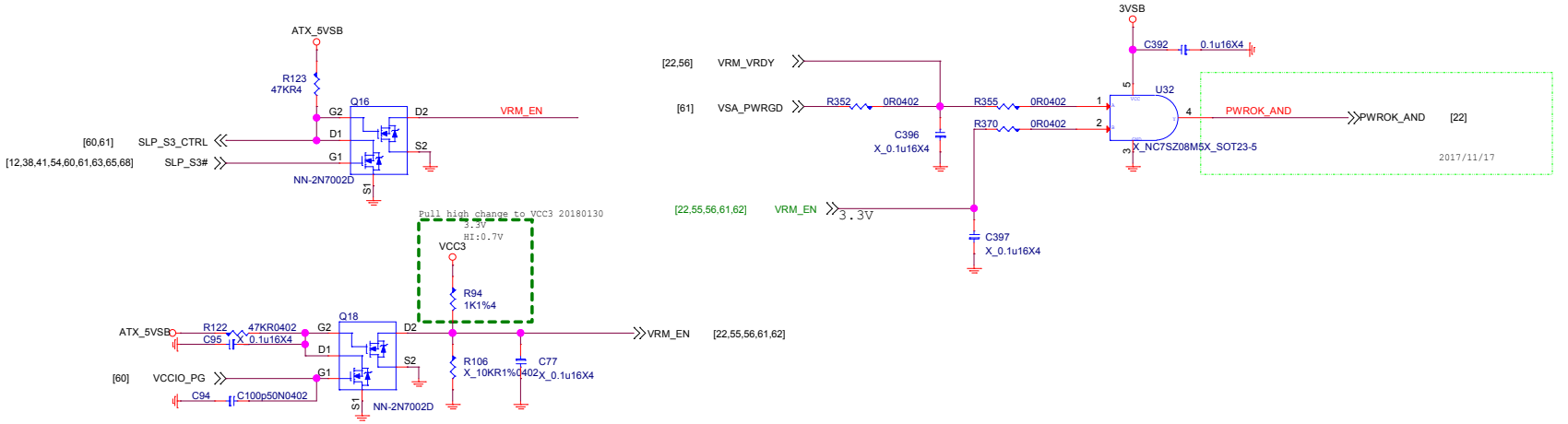
MICRO-STAR INT'L CO.,LTD.

Sequence



MICRO-STAR INT'L CO.,LTD.		
Title: CPU VRM-Seqence/VCCAPLL		
Size	Document Number: MS-7B98..	Rev: 10
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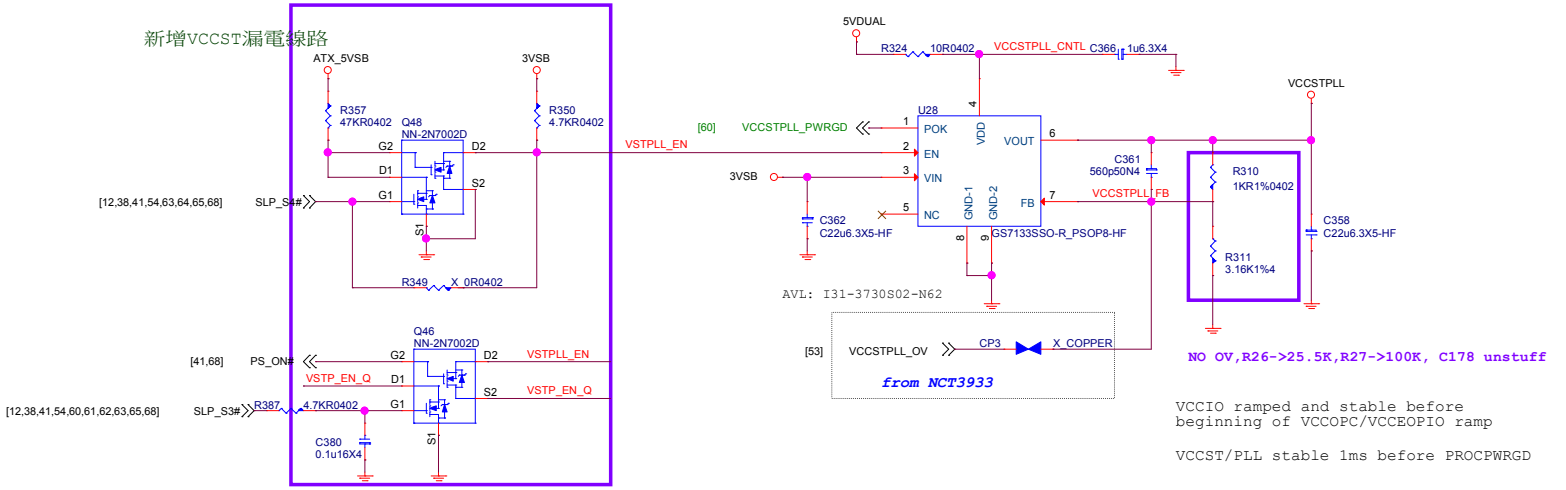
VCCSTPLL

1.05V; 230mA

For Cost down VCCST&VCCPLL merge



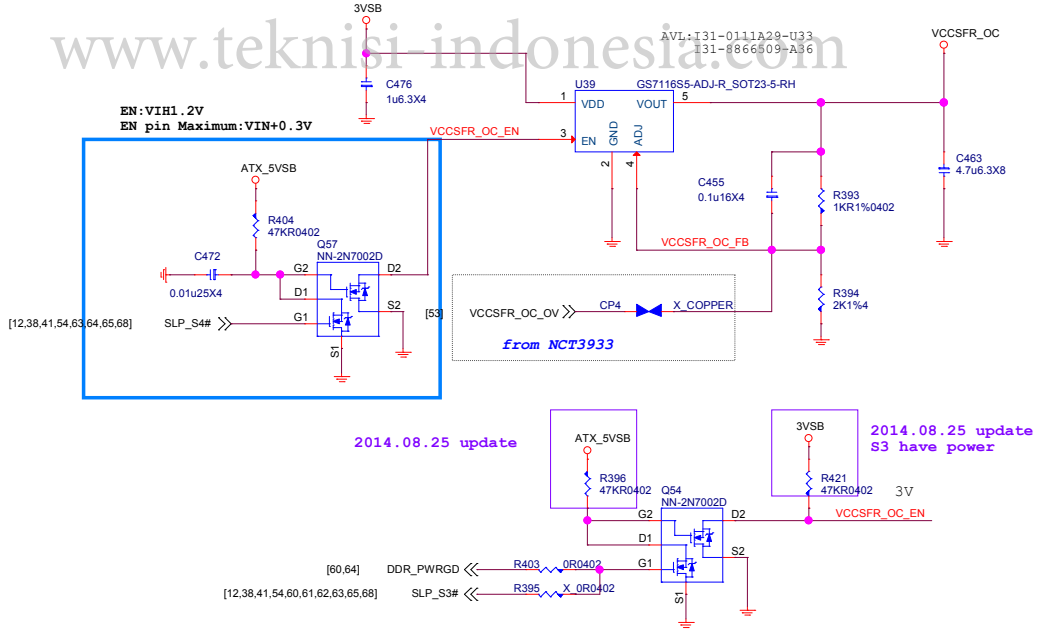
VCCIO ramped and stable before
beginning of VCCOPC/VCCEOPIO ramp

VCCST/PLL stable 1ms before PROCPWRGD

VCCPLL_OC

1.2V; 130mA

2014.08.21 update



2014.08.25 update

2014.08.25 update
S3 have power

MICRO-STAR INT'L CO.,LTD.

Title: CPU PWR-VCCST/PLL

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DDR4_1.2V 19.5A

OCP 27.58

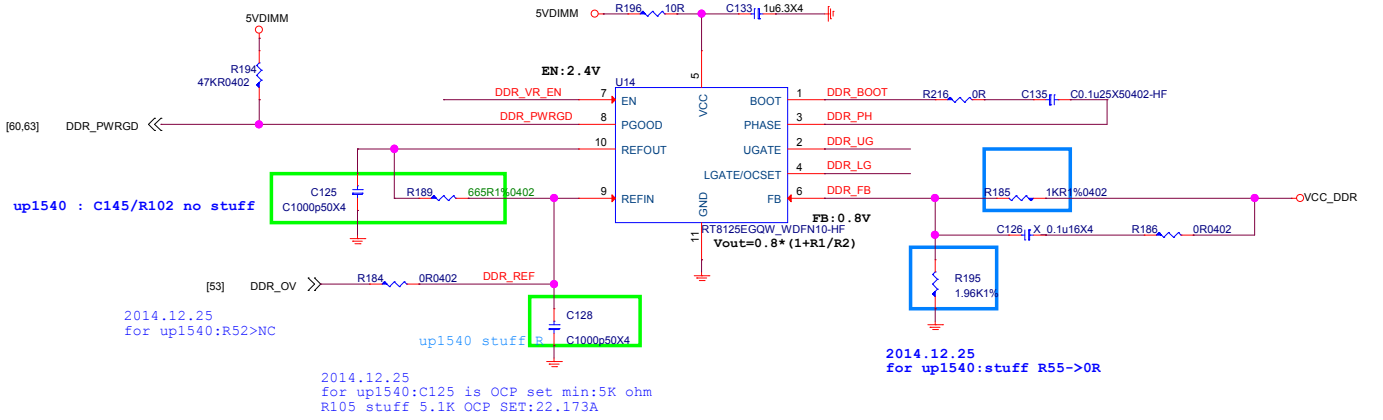
3.3A FOR CPU

15.7A FOR 4DIMM

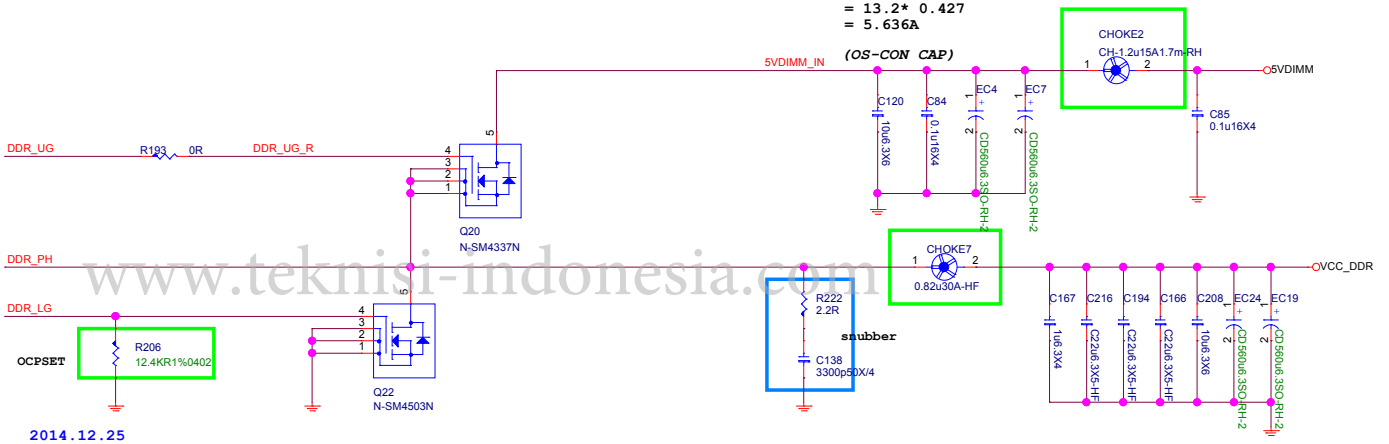
0.5A FOR DDR VTT

OCP = 19.7*1.4=27.58A

Rocset = 1.4 * Imax * Rdson(low) / Iocset
= 1.4 * 19.5 * 4.6mohm / 10uA
= 12.6K (BOM上12.4K)



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

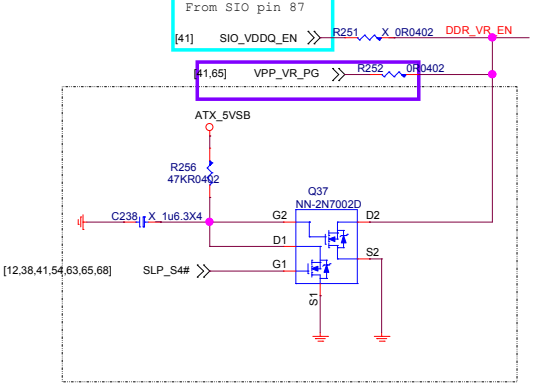


2014.12.25
for up1540:R95 ->NC

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

若帶入CAP ESR計算,0.2432uH＜L＜1.2897uH

2014.12.17 update



MICRO-STAR INT'L CO.,LTD.

Title: DDR PWR-RT8125EGQW

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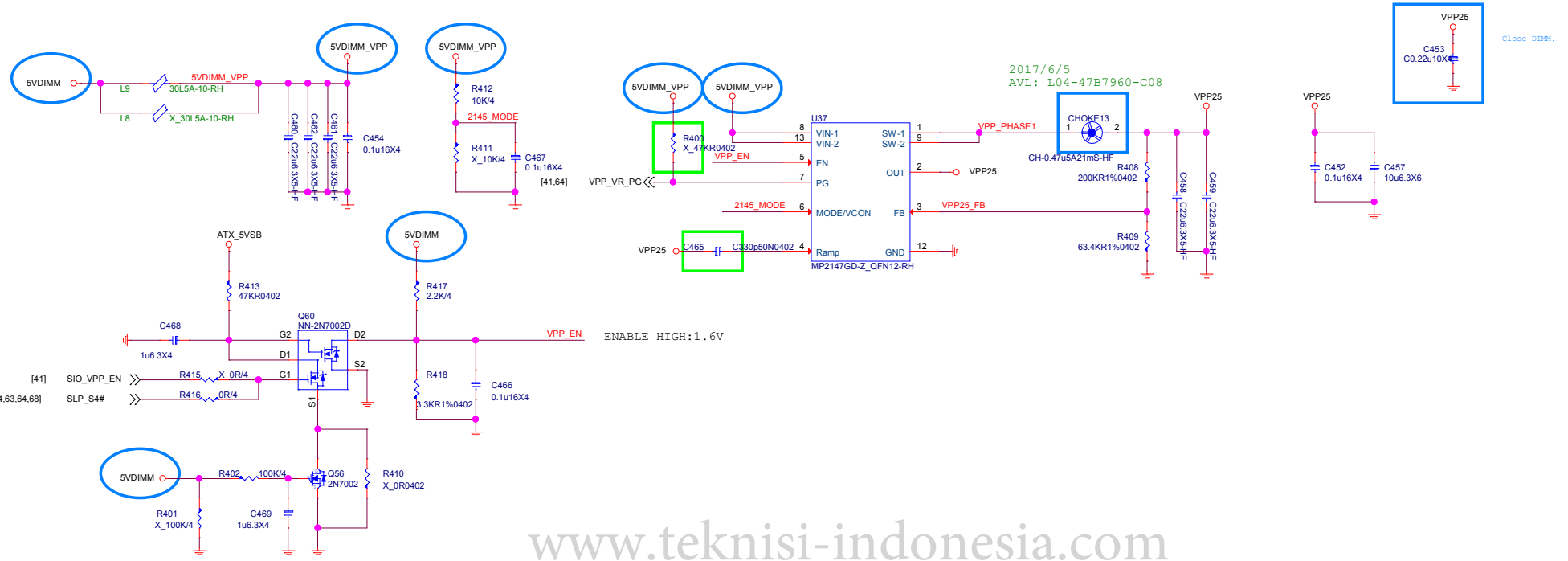
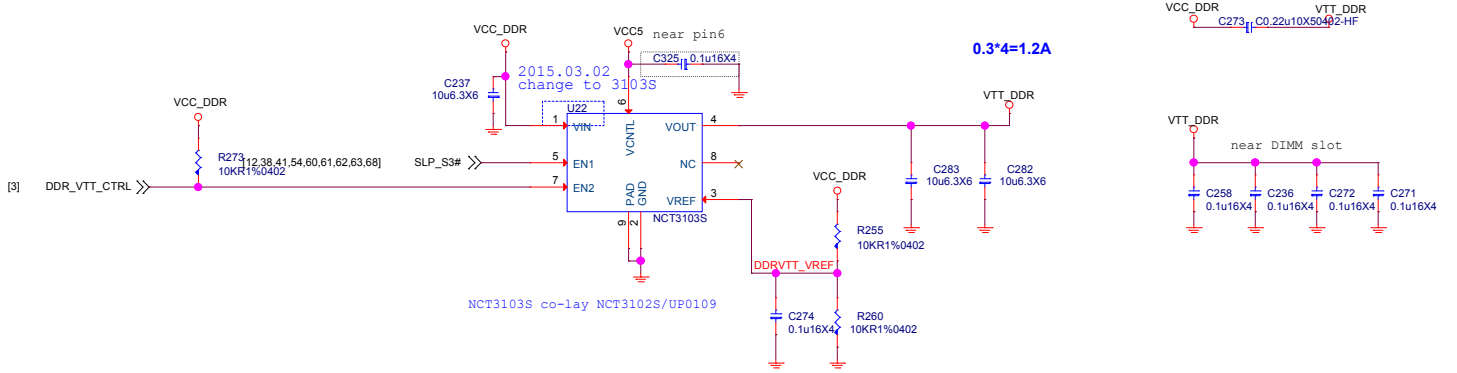
4DIMM :2.24A FOR
DDR VPP2.5V

VPP25 Power

2.5V; 2.24A



DDR VTT Power



MICRO-STAR INT'L CO.,LTD.

Title: DDR PWR VPP25-MP2147/VTT

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PCH_1VSB

1.05V; 13.36A

Rdson(low)4.5V

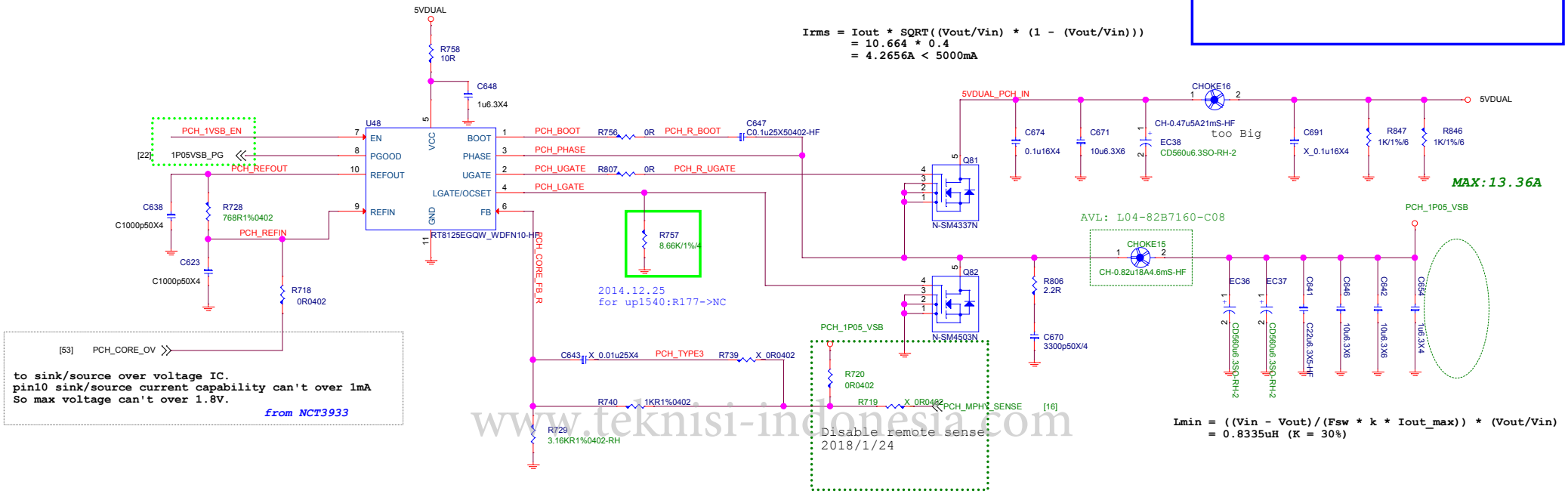
D03-3116M00-U47 : 3.6 mohm
D03-632BA0C-N03 : 4.6mohm
D03-3056M00-U47 : 6.2mohm

OCP = 13.36*1.4=18.704A

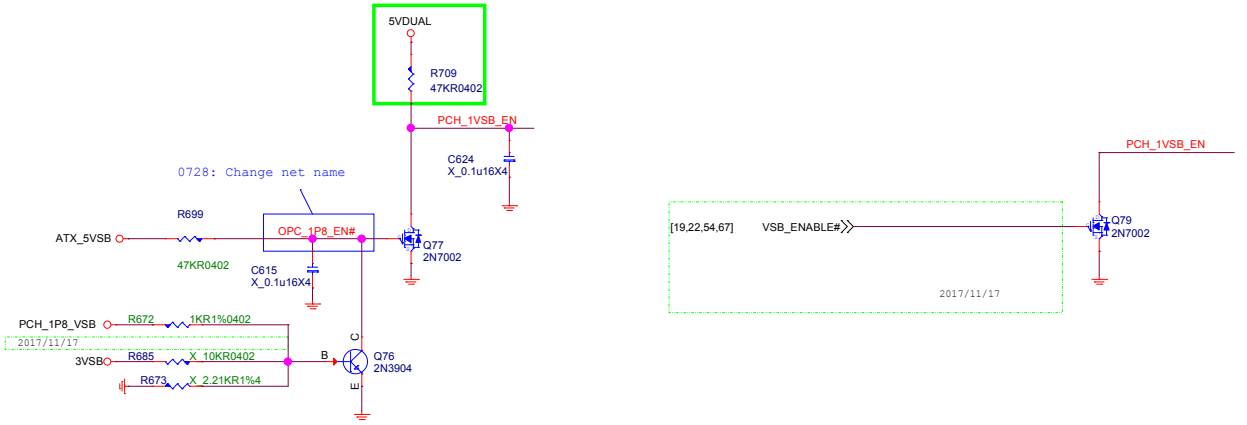
Rocset = 1.4 * Imax * Rdson(low) / Iocset
= 1.4 * 13.36 * 4.6mohm / 10uA
= 8.6K (BOM上8.66K)

Change to Choke (L04-47B7930-M26) form bead

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



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



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Title: PCH POWER-RT8125E

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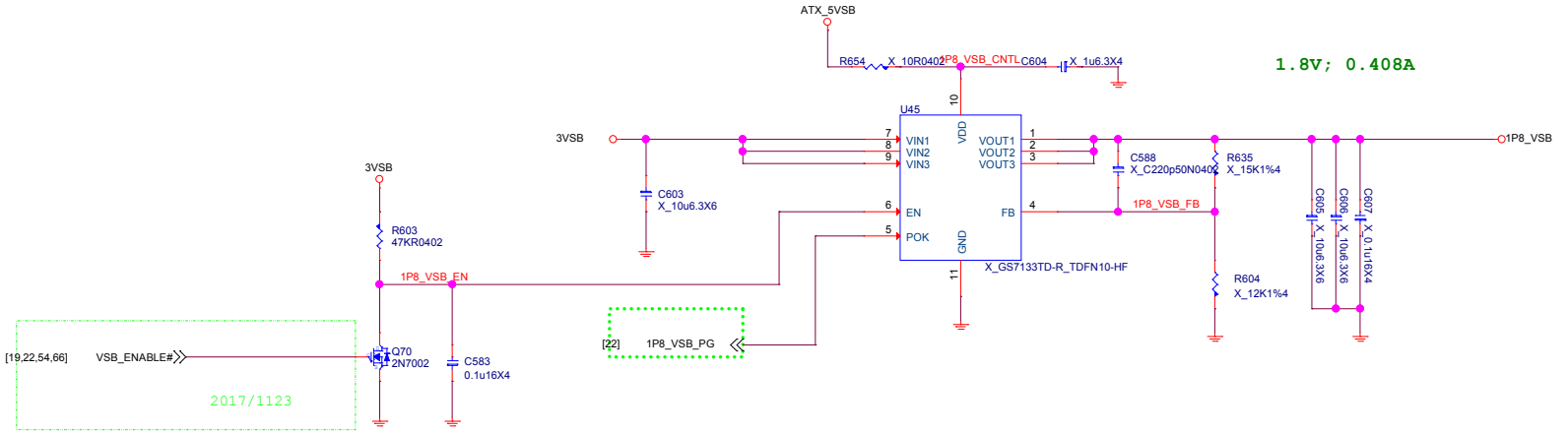

Delete due to USB retimer use external DC to DC schematic
2018/01/17

ASM_1P8_VSB Delete ,due to drop ASM 1562

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Title: PCH POWER-1P8V/1P24V		
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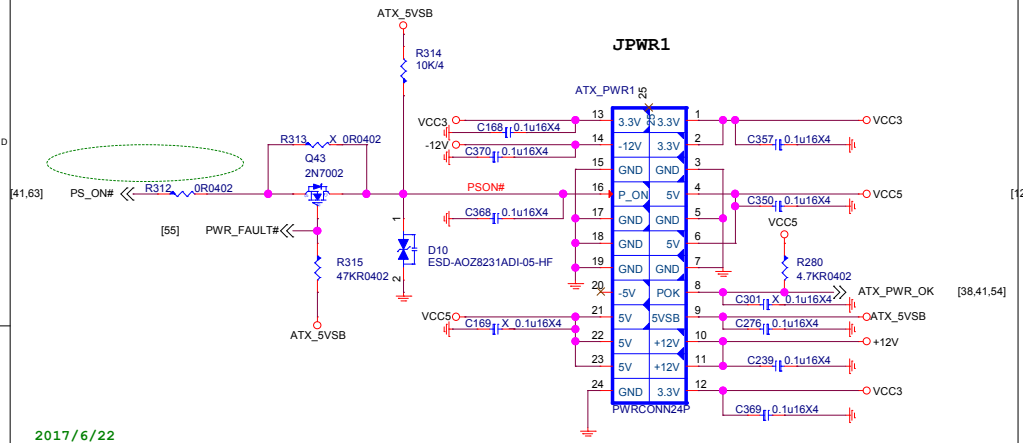
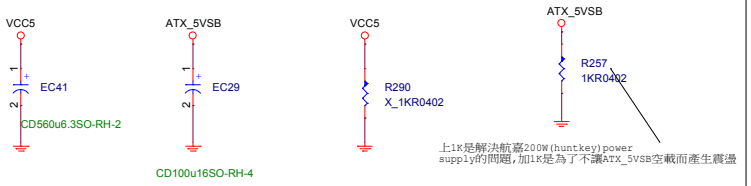
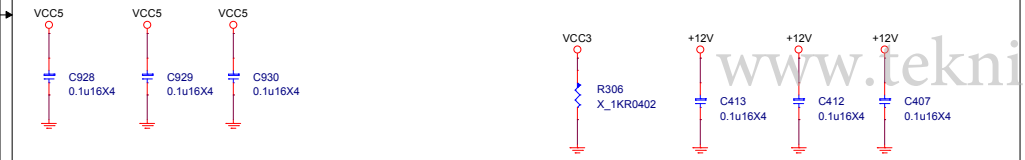
ATX POWER CONNECTOR



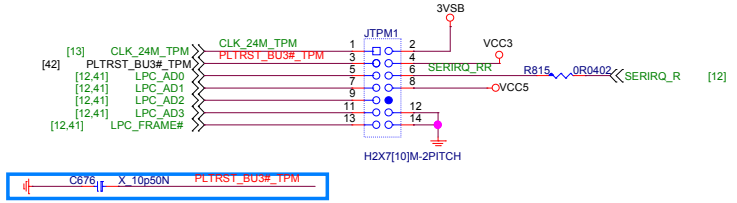
2017/6/22
EC34, EC36 are changed from 470uF to 560uF by buyer request

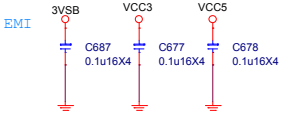
2017/7/6
EC36 move to PCI1



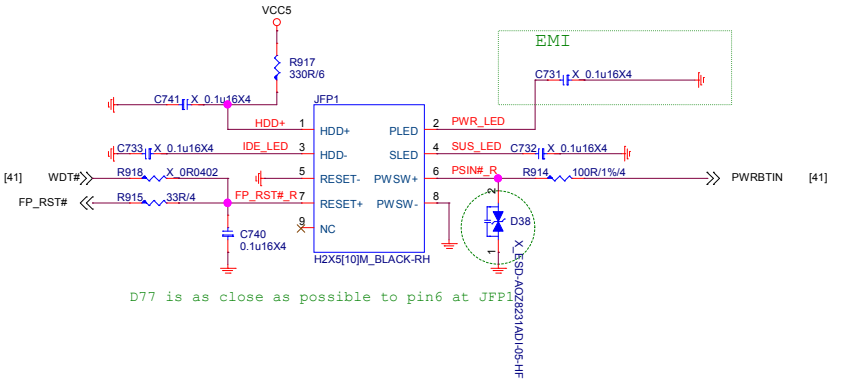


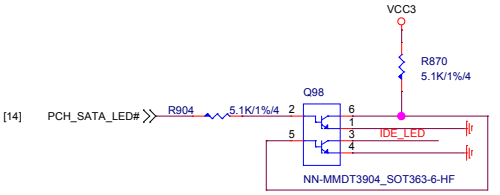
TPM Pin Header

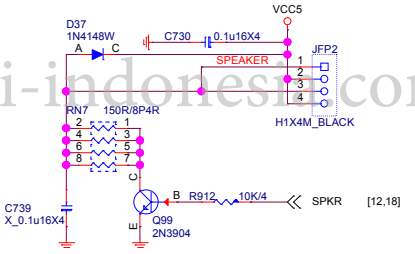


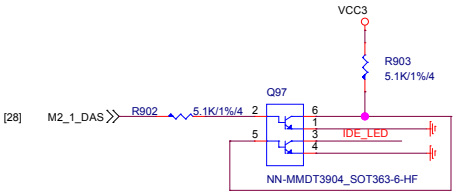


FRONT PANNEL

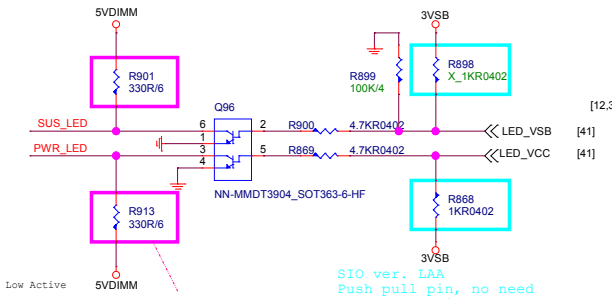




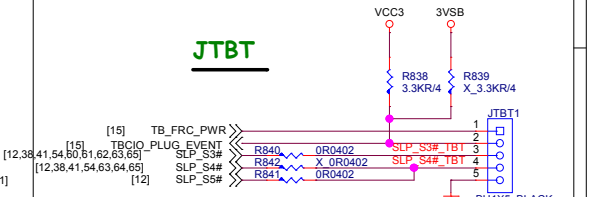




Front Panel LED



JTBT



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PCB1

7B98-0A

PK0-07B980A-G37,精成-深圳,23,寶安恩斯邁廠(MSIS)
PK0-07B980A-E48,競華,23,寶安恩斯邁廠(MSIS)

VIRTU_LA1
Label
VIRTU
AMI

TMOS_HS1
MOS
HS
T_MOS_HS1

LMOS_HS1
MOS
HS
L_MOS_HS1

CPU_H1
CPU
鐵座
CPU_H1

BAT1_X1
BAT-BCR2032P-RH

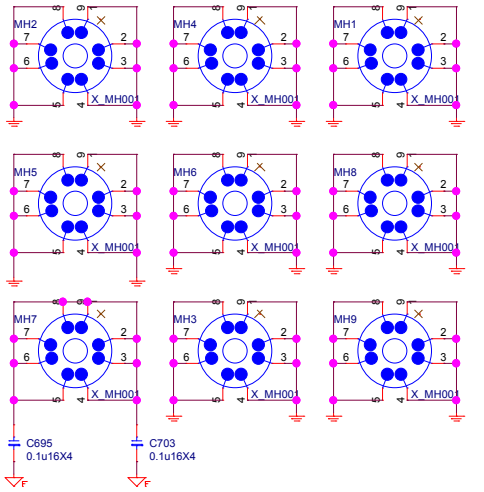
MK_LABLE1
Market
Lable
H370

CFOS_LA1
LABEL
CFOS_LABEL

PCH_HS1
PCH
HS
HS-0409230-RH

LED001
LED
RED
X_LED04-R-20mA2.4V

Mounting Holes

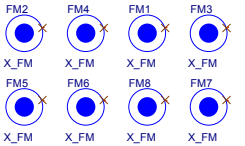


Simulation

SIM1
SIM1
X_PIN1*2

SIM2
VCC3
SIM2
X_PIN1*2

Optical Fiducial Marks-120



Vcheck

VCORE	VCORE
VGT	VGT
VCC_DDR	VCC_DDR
VCCSA	VCCSA
VCCIO	VCCIO
PCH_1P05_VSB	PCH_1P05_VSB
VCCSTPLL	VCCST
VCCSFR_OC	VCCSFR
VTT_DDR	VTT_DDR
VPP25	VPP25

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Title: Manual Parts

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