MS-7B24

mATX
Ver: 1.0/2.0

PC MATE BAZOOKA

Coffeelake Platform

CPU: Coffeelake S

PCH: H370/B360

SPI ROM : 128 MB

Memory: DDR4 *4 (Dual Channel)

Power Solution:

CPU : RT3607
VCCSA : RT8125E
VCCIO : SY8288
DDR : RT8125E
PCH : RT8125E

ACPI: MPS

Onboard Chip:

LAN RTL8111H

Dual Codec:ALC887

SIO:NTC6797/6795D

Type C: ASM1543

USB3 Redrive : NB7VPQ702 X 1
GPIO : NCT5605 *2

Expansion Slots:

PCI Express (X16) Slot *1

PCI Express (X1) Slot *2

M.2 Slot (Socket 1) *1

LED

EZ Debug LED
Audio Line LED
BOT LED

Rear I/O Connectors

PS2
USB2.0x2
USB3.1 Gen1x2
RJ45 + USB3.1 (Type C+ A)
Audio Jack 3 Port
HDMI+(DVI/DVI+VGA)

Internal Connectors

Dual SATA *1
SINGLE SATA *4
FUSB3.0 Header *1
FUSB2.0 Header *2
Front Audio Header *1
Front Panel Header *2
SPI Header *1
TPM Header *1
CPU Fan *1
System Fan *2

Internal Pin Header

JRGB1
JTBT1
JCI1
JCOM1
JSPI1
JBAT1
JTPM1
JLPT1

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Title: Cover Sheet
Size:
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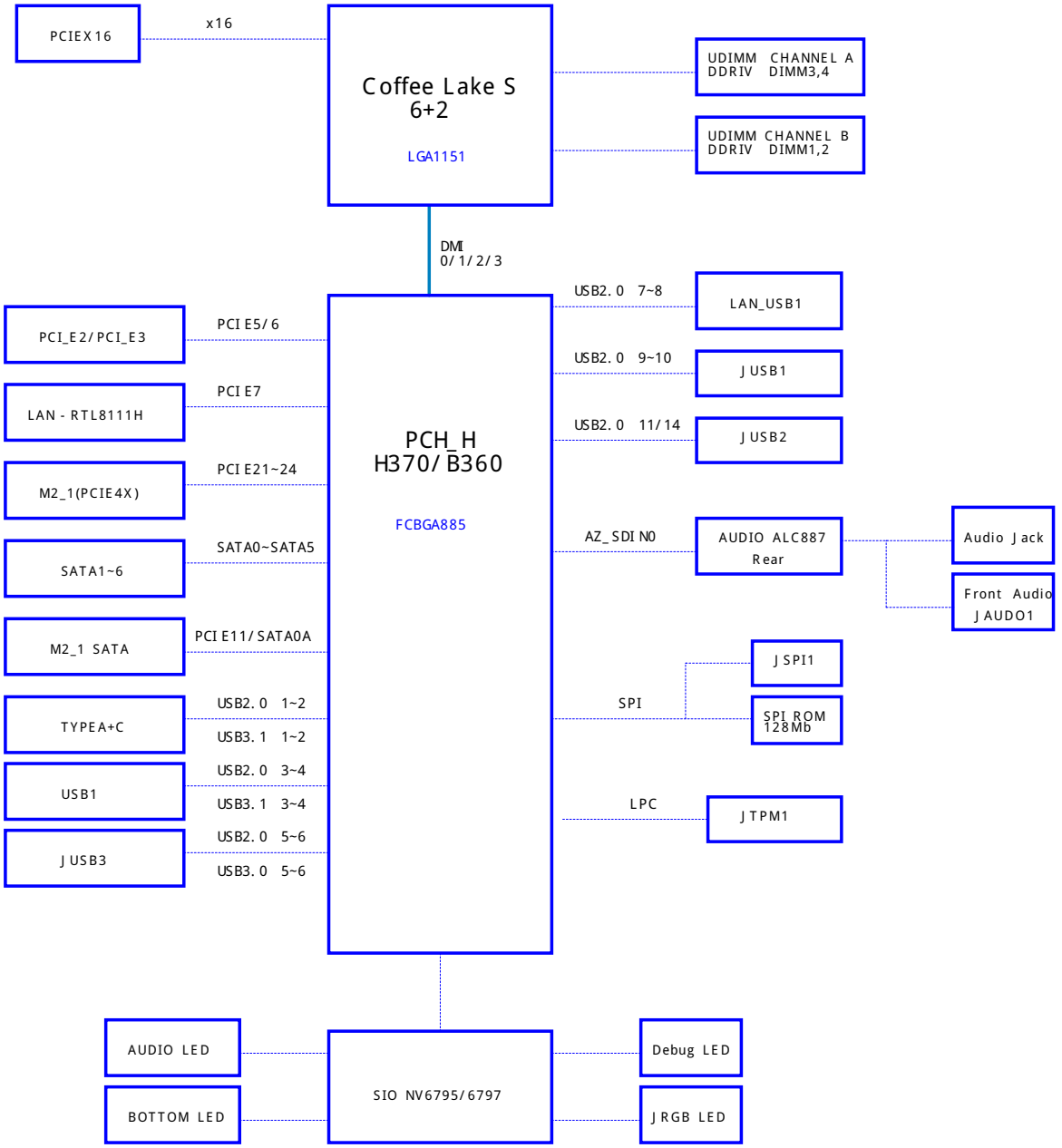
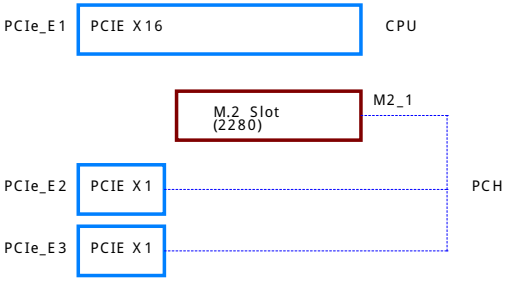
MS-7B24 Block Diagram



Slot Sequence:



msi MICRO-STAR INT'L CO.,LTD.		
Title: Block Diagram		
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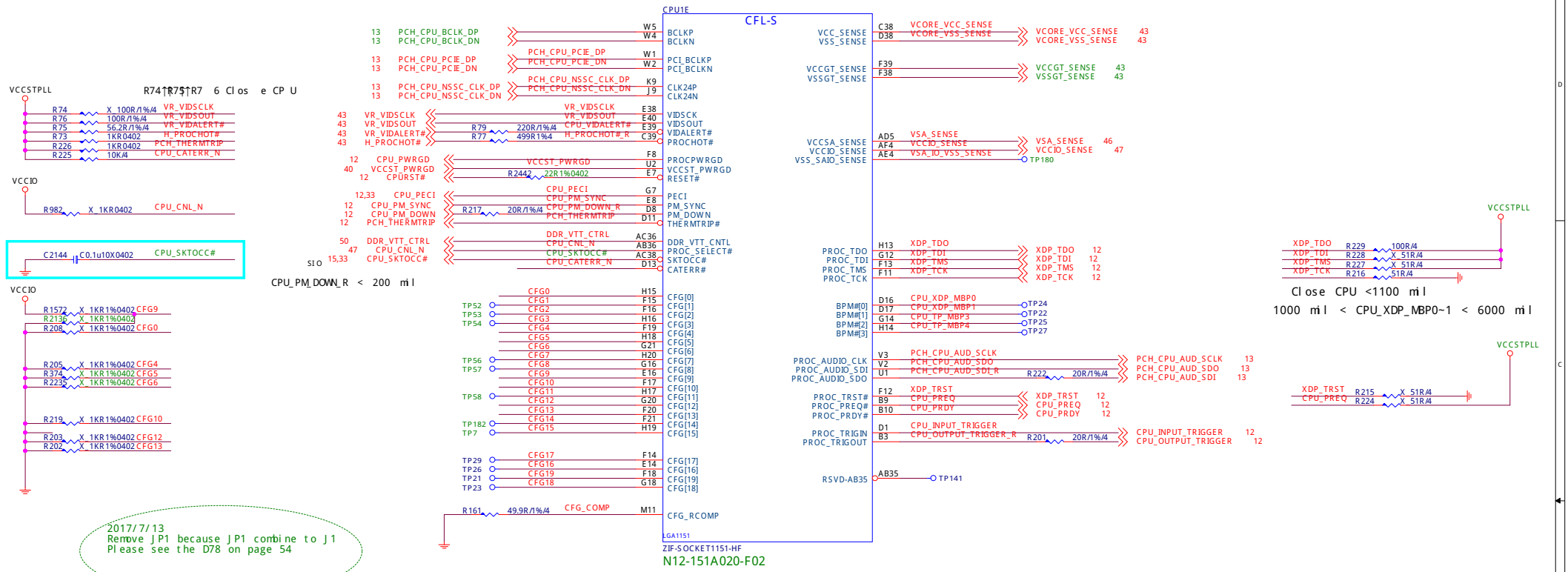

CFG Strap

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

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Title: CPU-Control/MISC/CFG

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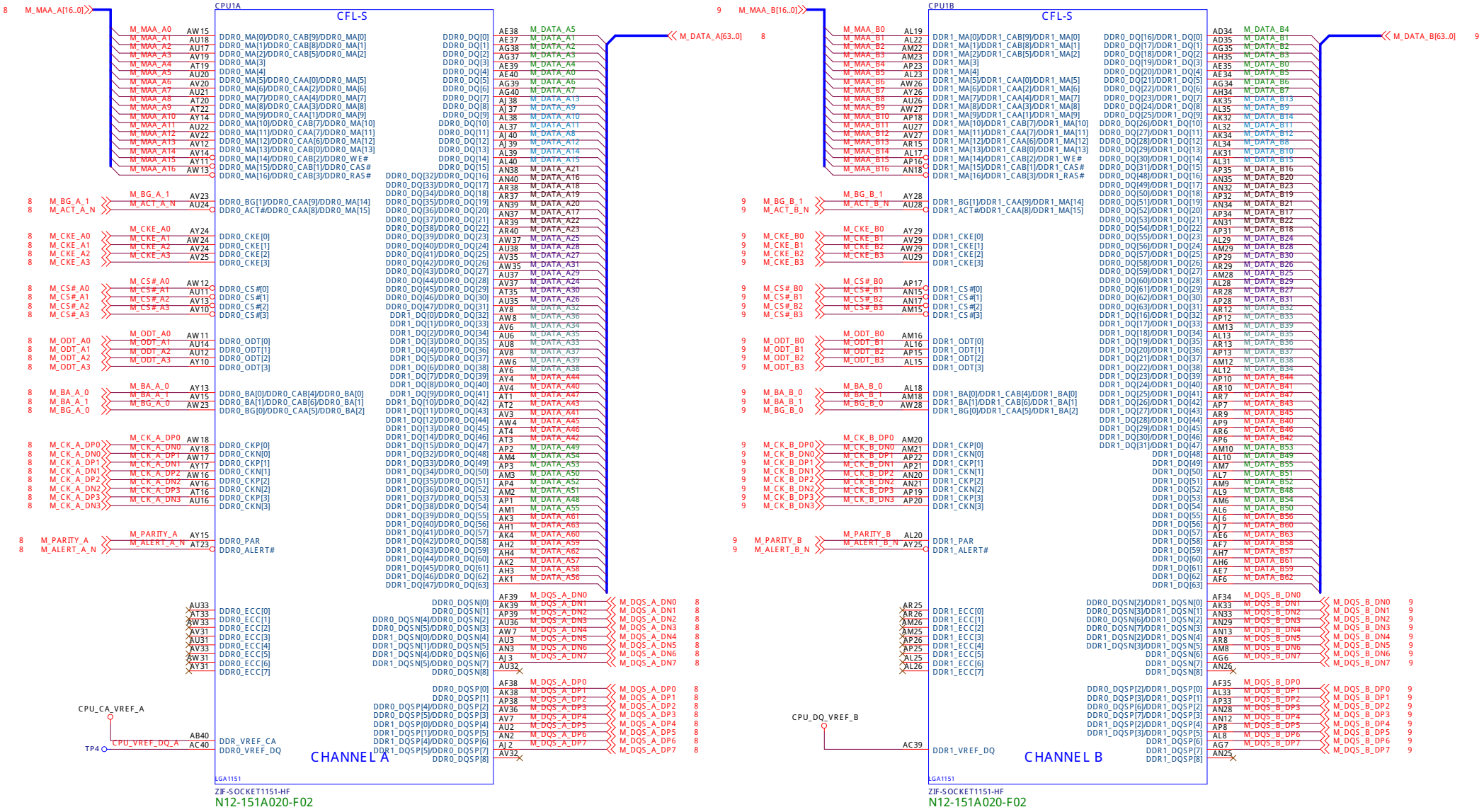
SOCKET PN N12-151A010-L06



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Title: CPU-Memory

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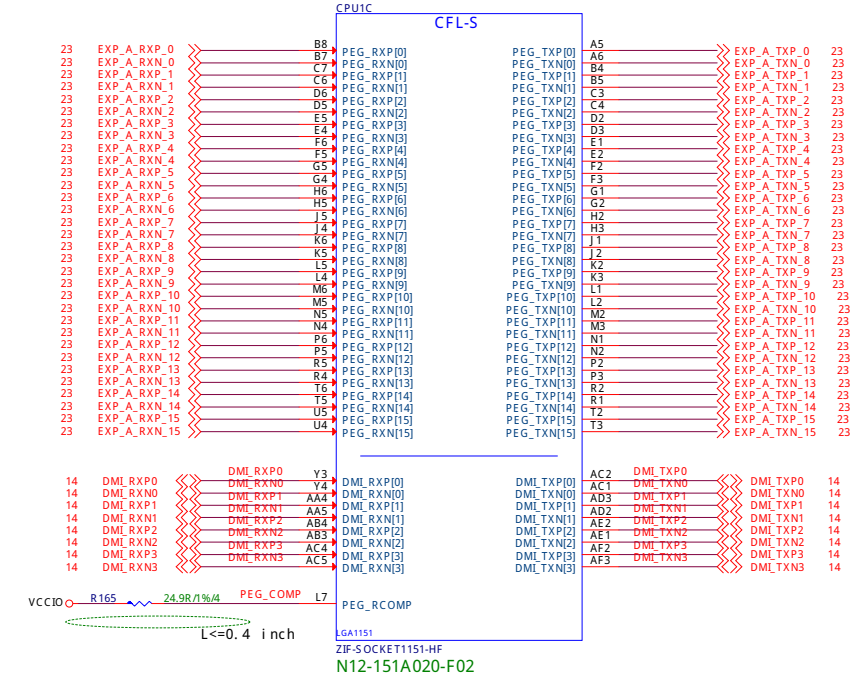
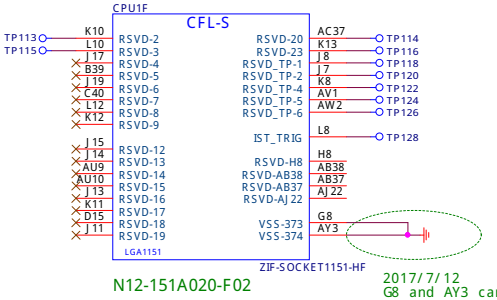
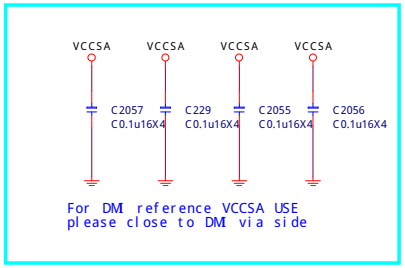
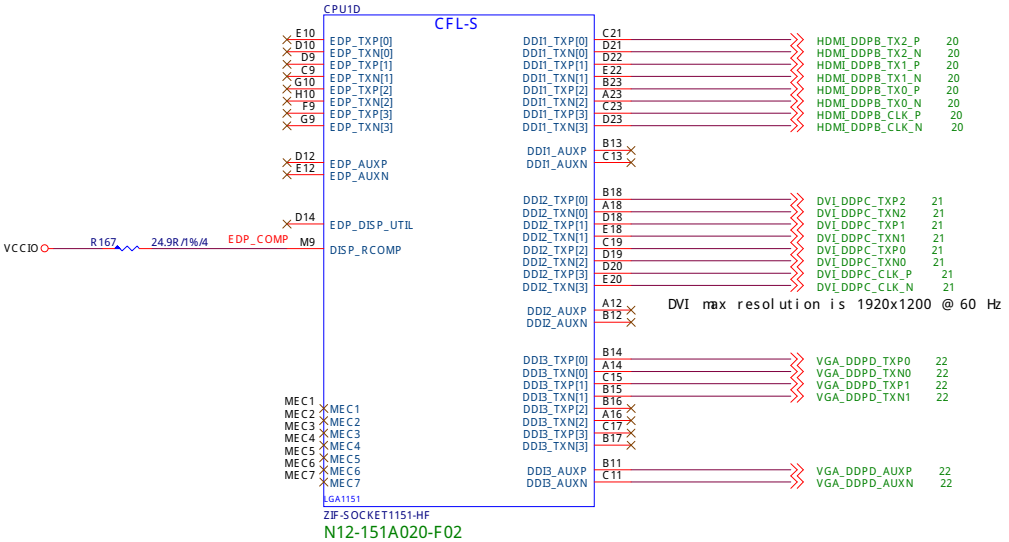






20171013 Review ADD



MICRO-STAR INT'L CO.,LTD.		
Title: CPU-PEG/Display/RSD		
Size	Document Number: MS-7B24	Rev: 1.0/2.0
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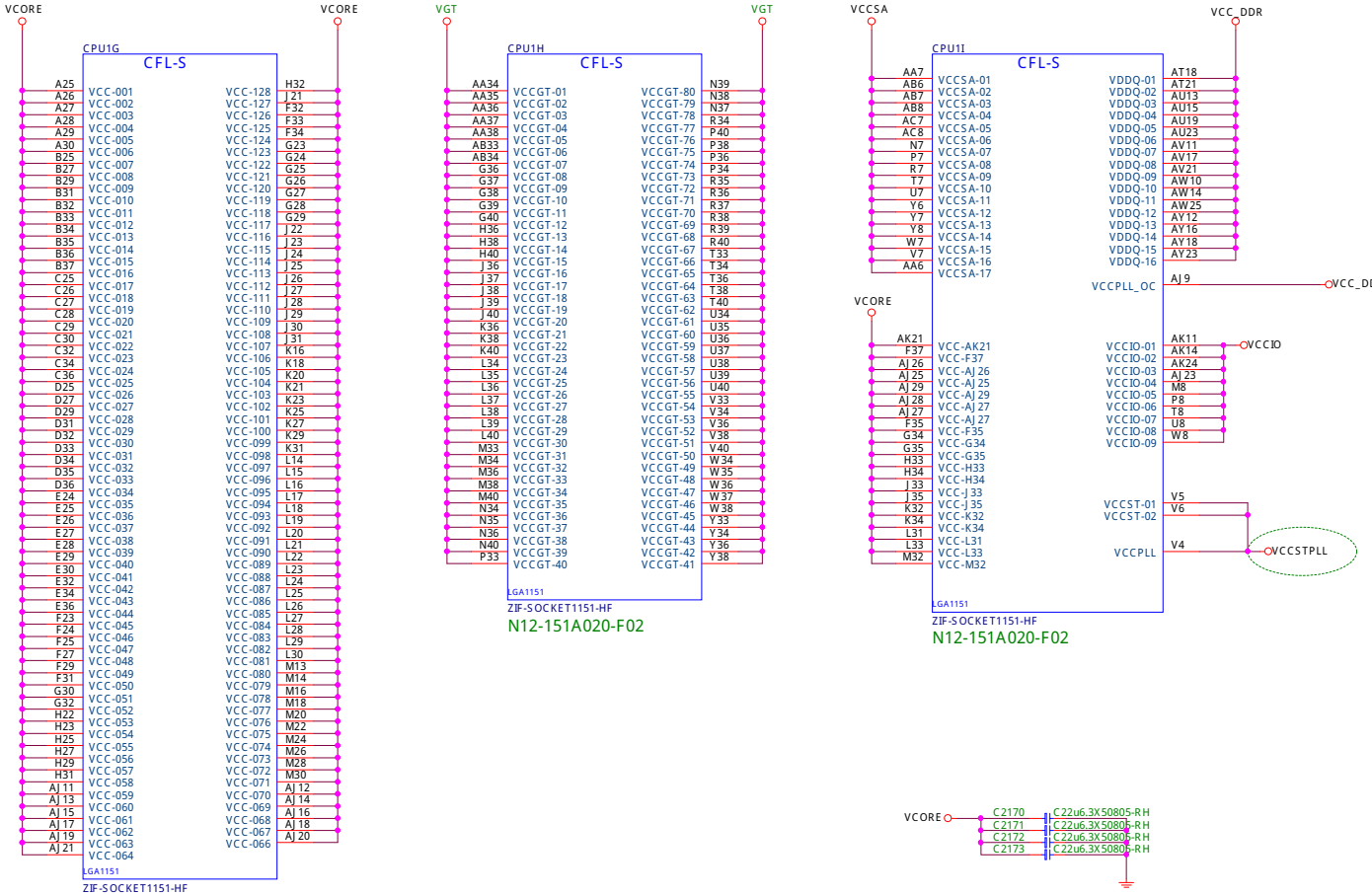
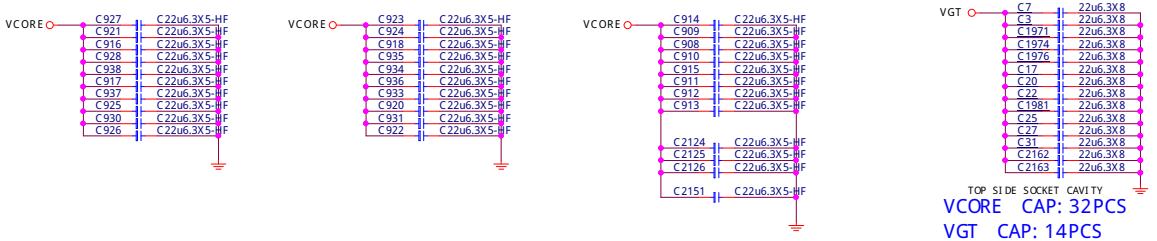
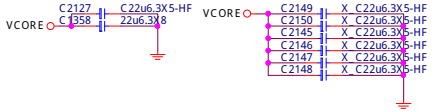
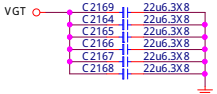
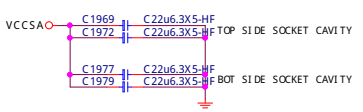


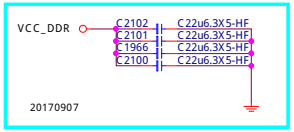
CAP

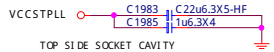


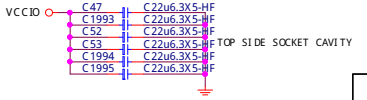












MICRO-STAR INT'L CO.,LTD.

Title: CPU-Power

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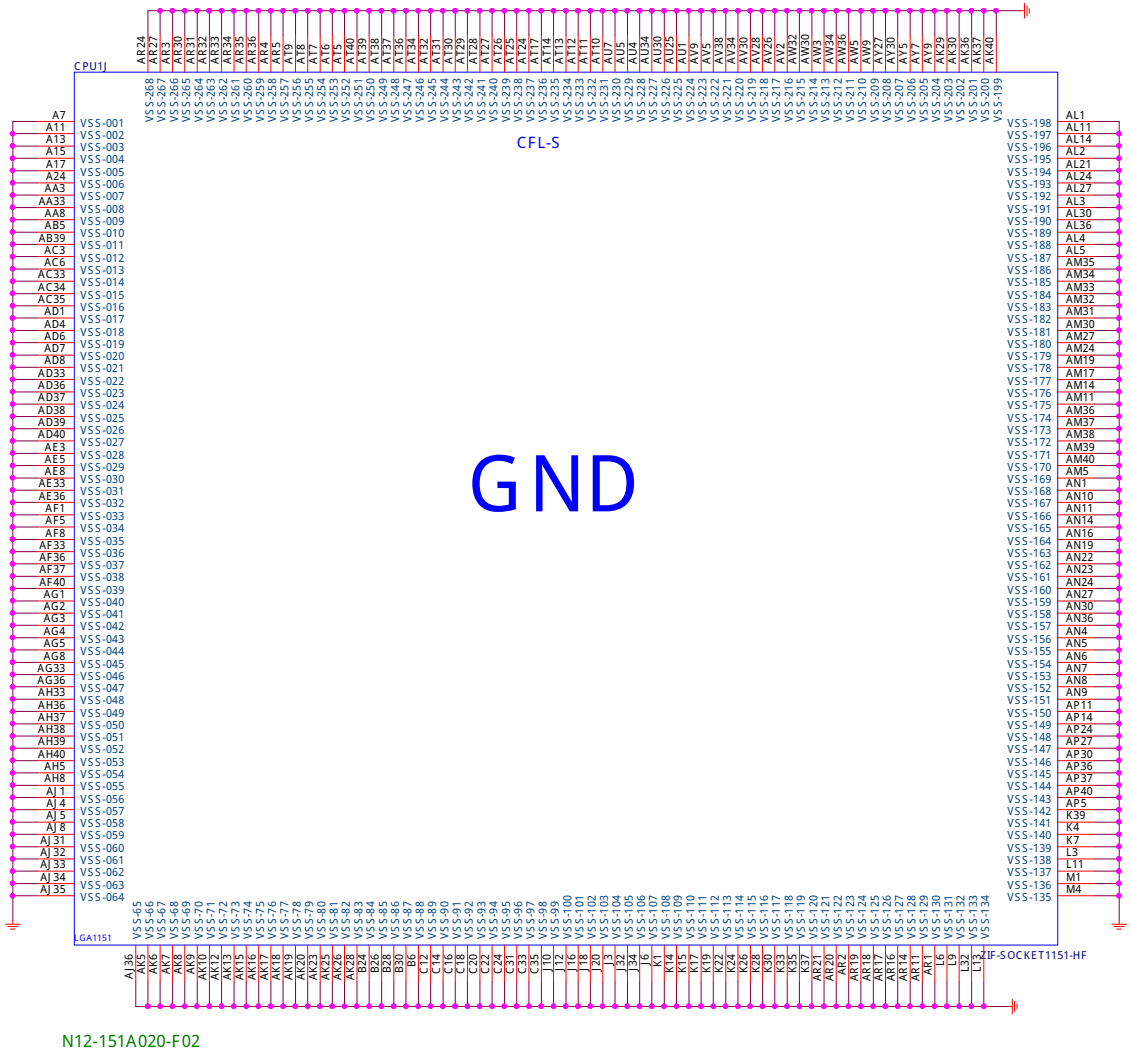

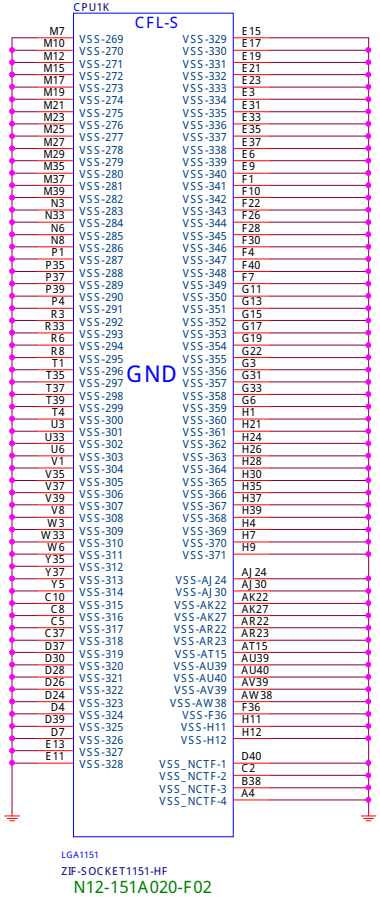

msi MICRO-STAR INT'L CO.,LTD.			
Title: CPU-GND			
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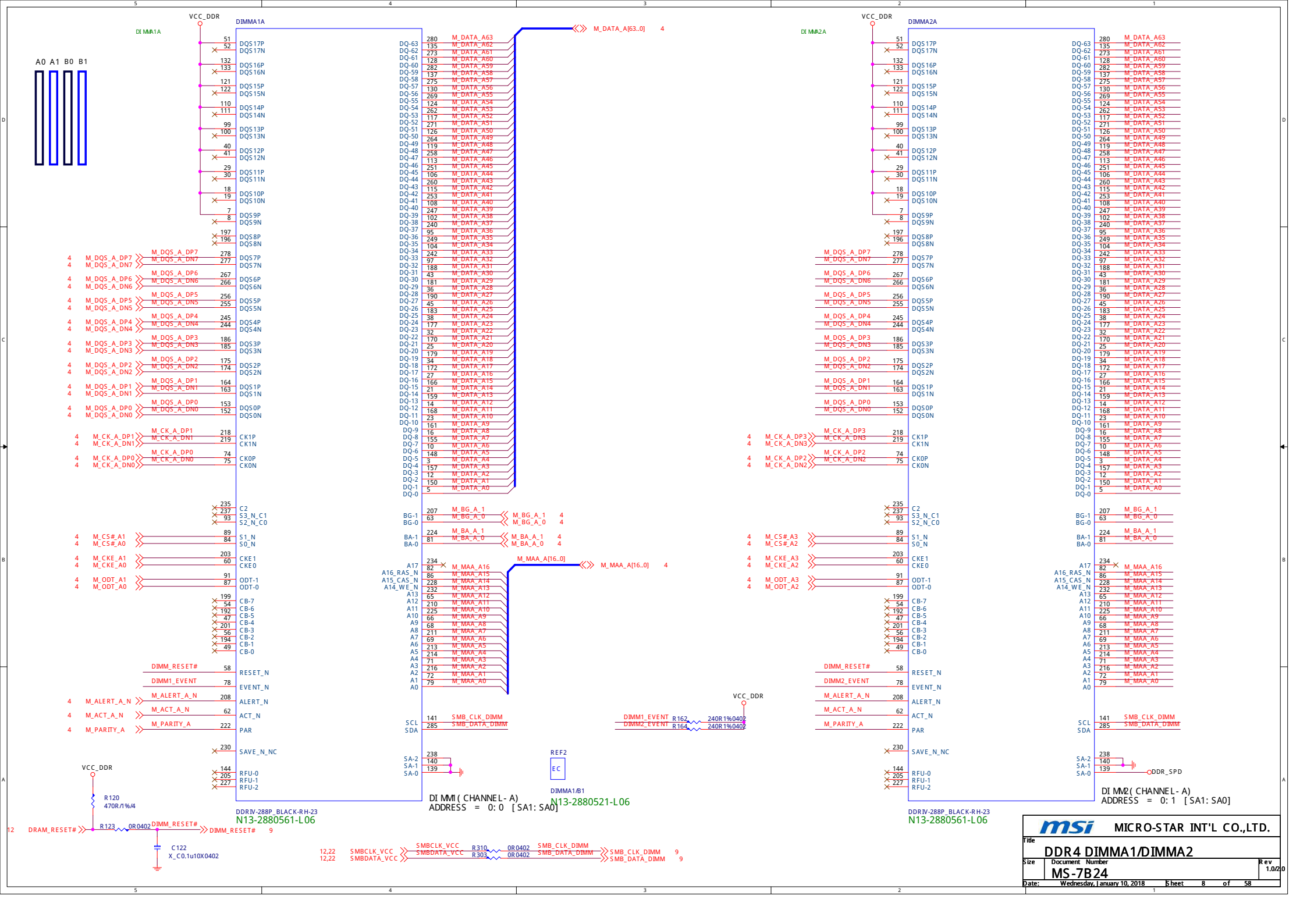
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DIMMA1A
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DQS17N
DQS16P
DQS16N
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DQS14P
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CK1N
CK0P
CK0N
C2
S3_N_C1
S2_N_C0
S1_N
S0_N
CKE1
CKE0
ODT-1
ODT-0
CB-7
CB-6
CB-5
CB-4
CB-3
CB-2
CB-1
CB-0
RESET_N
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ALERT_N
ACT_N
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RFU-0
RFU-1
RFU-2
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M_BA_A_1
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SDA
SA-2
SA-1
SA-0
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DIMM1_EVENT
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M_ACT_A_N
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M_CS#_A0
M_CKE_A1
M_CKE_A0
M_ODT_A1
M_ODT_A0
M_CK_A_DP1
M_CK_A_DP0
M_DQS_A_DP7
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M_DQS_A_DN2
M_DQS_A_DP1
M_DQS_A_DN1
M_DQS_A_DP0
M_DQS_A_DN0
SMB_CLK_DIMM
SMB_DATA_DIMM
VCC_DDR
R120
470R/1%/4
R123
0R0402
DIMM_RESET#
DRAM_RESET#
C122
X_C0.1u10X0402
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N13-2880561-L06
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EC
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DIMM2_EVENT
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R164
240R1%0402
SMBCLK_VCC
SMBDATA_VCC
R310
R303
0R0402
SMB_CLK_DIMM
SMB_DATA_DIMM
DIMMA2A
VCC_DDR
DIMMA2A
DIMM2_EVENT
DDR_SPD
DDRIV-288P_BLACK-RH-23
N13-2880561-L06
DI MM2 (CHANNEL - A)
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MICRO-STAR INT'L CO.,LTD.
Title
DDR4 DIMMA1/DIMMA2
Size
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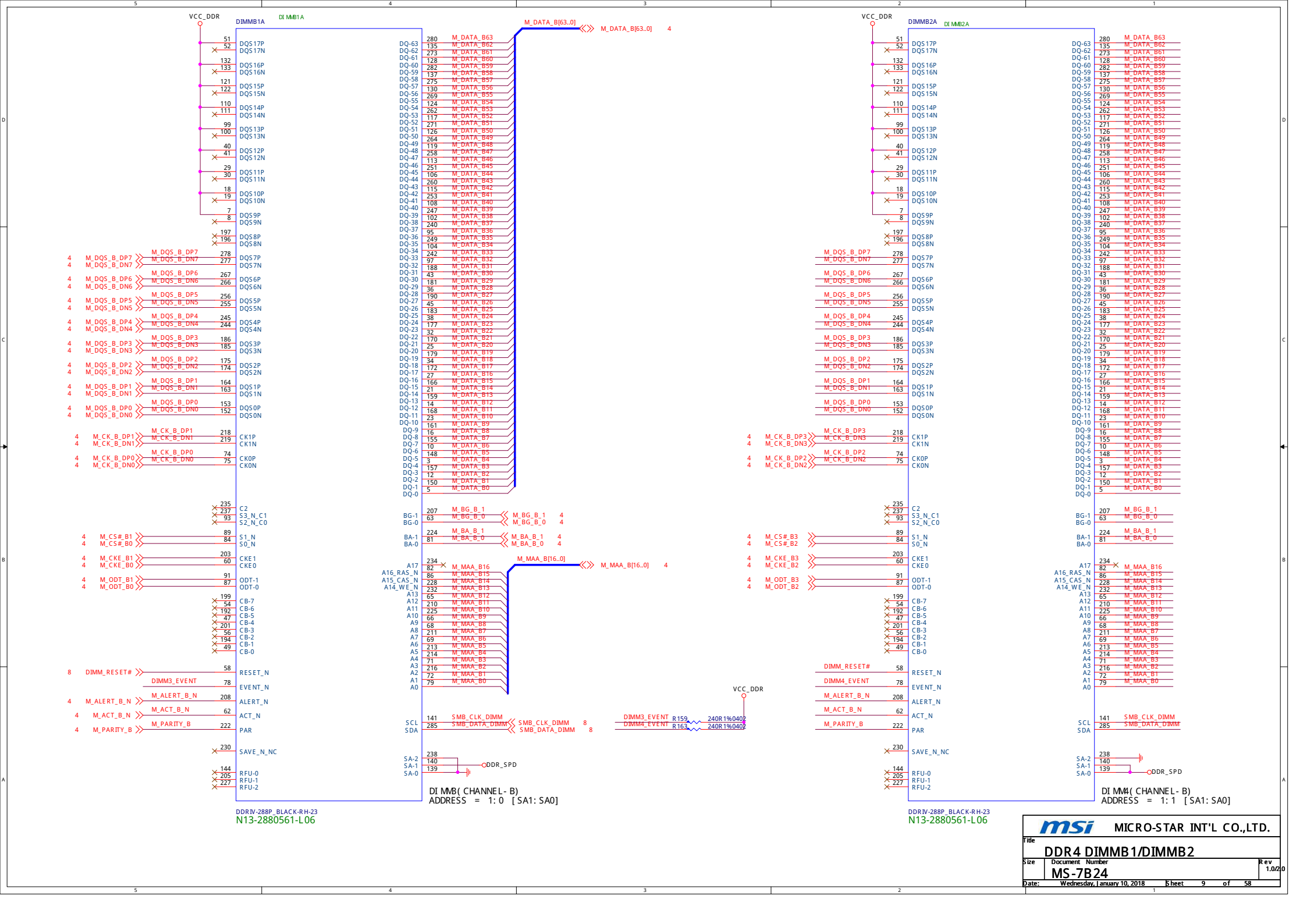
VCC_DDR
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DIMMB1A
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M_DATA_B[63..0] 4
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DQS16P
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M_DQS_B_DN1
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M_CK_B_DN1
M_CK_B_DP0
M_CK_B_DN0
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CK1N
CK0P
CK0N
C2
S3_N_C1
S2_N_C0
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M_CS#_B0
S1_N
S0_N
M_CKE_B1
M_CKE_B0
CKE1
CKE0
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ODT-0
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CB-0
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ACT_N
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RFU-1
RFU-2
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BG-0
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M_BA_B_0
BA-1
BA-0
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M_MAA_B[16..0] 4
A17
A16_RAS_N
A15_CAS_N
A14_WE_N
A13
A12
A11
A10
A9
A8
A7
A6
A5
A4
A3
A2
A1
A0
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M_MAA_B5
M_MAA_B4
M_MAA_B3
M_MAA_B2
M_MAA_B1
M_MAA_B0
SMB_CLK_DIMM
SMB_DATA_DIMM
SCL
SDA
SA-2
SA-1
SA-0
DDR_SPD
DIMM3_EVENT
DIMM4_EVENT
R159
R163
240R1%0402
240R1%0402
VCC_DDR
DDRIV-288P_BLACK-RH-23
N13-2880561-L06
DIMMB(CHANNEL- B)
ADDRESS = 1: 0 [SA1: SA0]
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DIMMB2A
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DQS16P
DQS16N
DQS15P
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M_DQS_B_DN2
M_DQS_B_DP1
M_DQS_B_DN1
M_DQS_B_DP0
M_DQS_B_DN0
M_CK_B_DP3
M_CK_B_DN3
M_CK_B_DP2
M_CK_B_DN2
CK1P
CK1N
CK0P
CK0N
C2
S3_N_C1
S2_N_C0
M_CS#_B3
M_CS#_B2
S1_N
S0_N
M_CKE_B3
M_CKE_B2
CKE1
CKE0
M_ODT_B3
M_ODT_B2
ODT-1
ODT-0
CB-7
CB-6
CB-5
CB-4
CB-3
CB-2
CB-1
CB-0
DIMM_RESET#
RESET_N
DIMM4_EVENT
EVENT_N
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ALERT_N
M_ACT_B_N
ACT_N
M_PARITY_B
PAR
SAVE_N_NC
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RFU-1
RFU-2
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M_BG_B_0
BG-1
BG-0
M_BA_B_1
M_BA_B_0
BA-1
BA-0
A17
A16_RAS_N
A15_CAS_N
A14_WE_N
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A11
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M_MAA_B5
M_MAA_B4
M_MAA_B3
M_MAA_B2
M_MAA_B1
M_MAA_B0
SMB_CLK_DIMM
SMB_DATA_DIMM
SCL
SDA
SA-2
SA-1
SA-0
DDR_SPD
DDRIV-288P_BLACK-RH-23
N13-2880561-L06
DIMM4(CHANNEL- B)
ADDRESS = 1: 1 [SA1: SA0]
MICRO-STAR INT'L CO.,LTD.
Title
DDR4 DIMMB1/DIMMB2
Size
Document Number
MS-7B24
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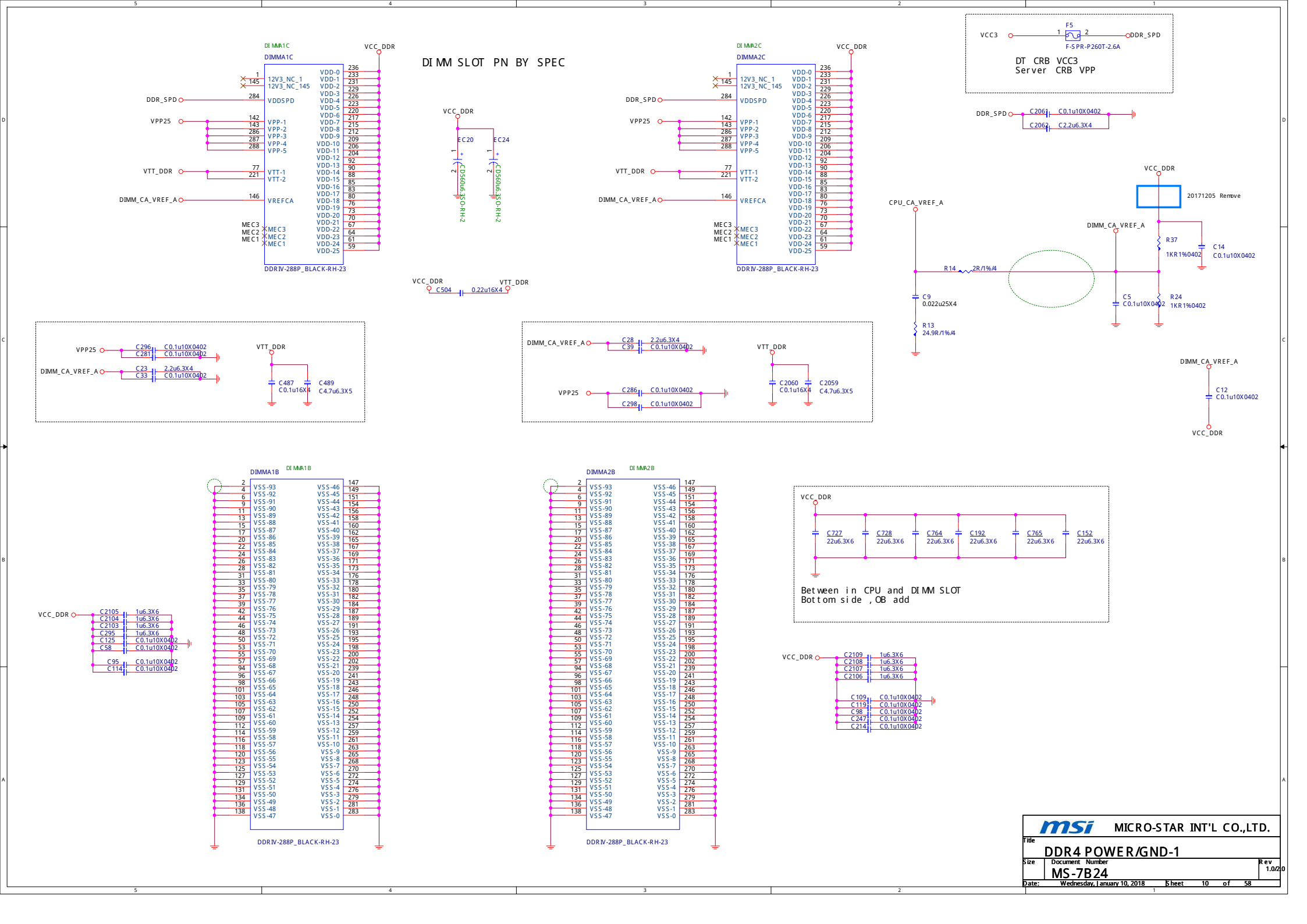
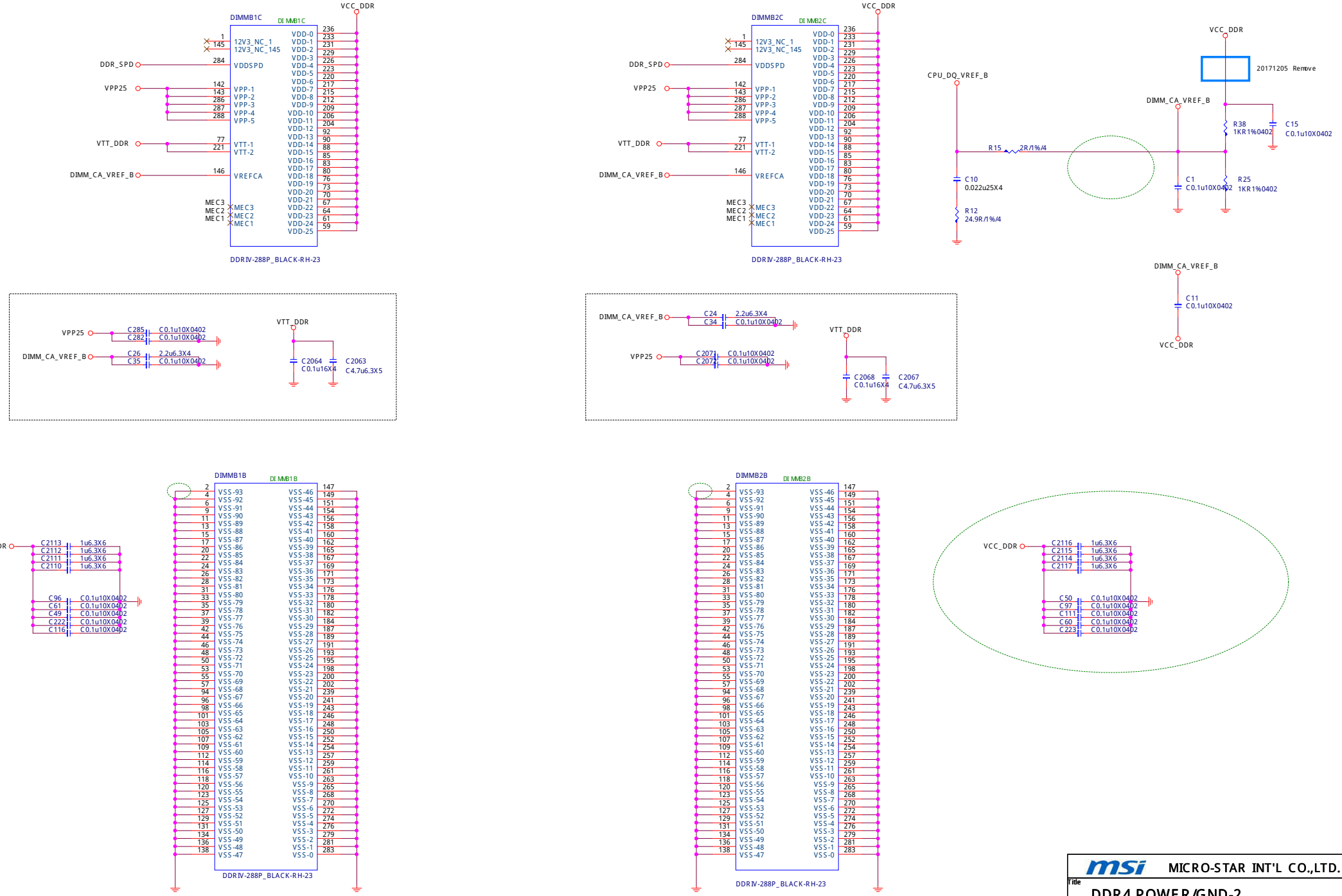
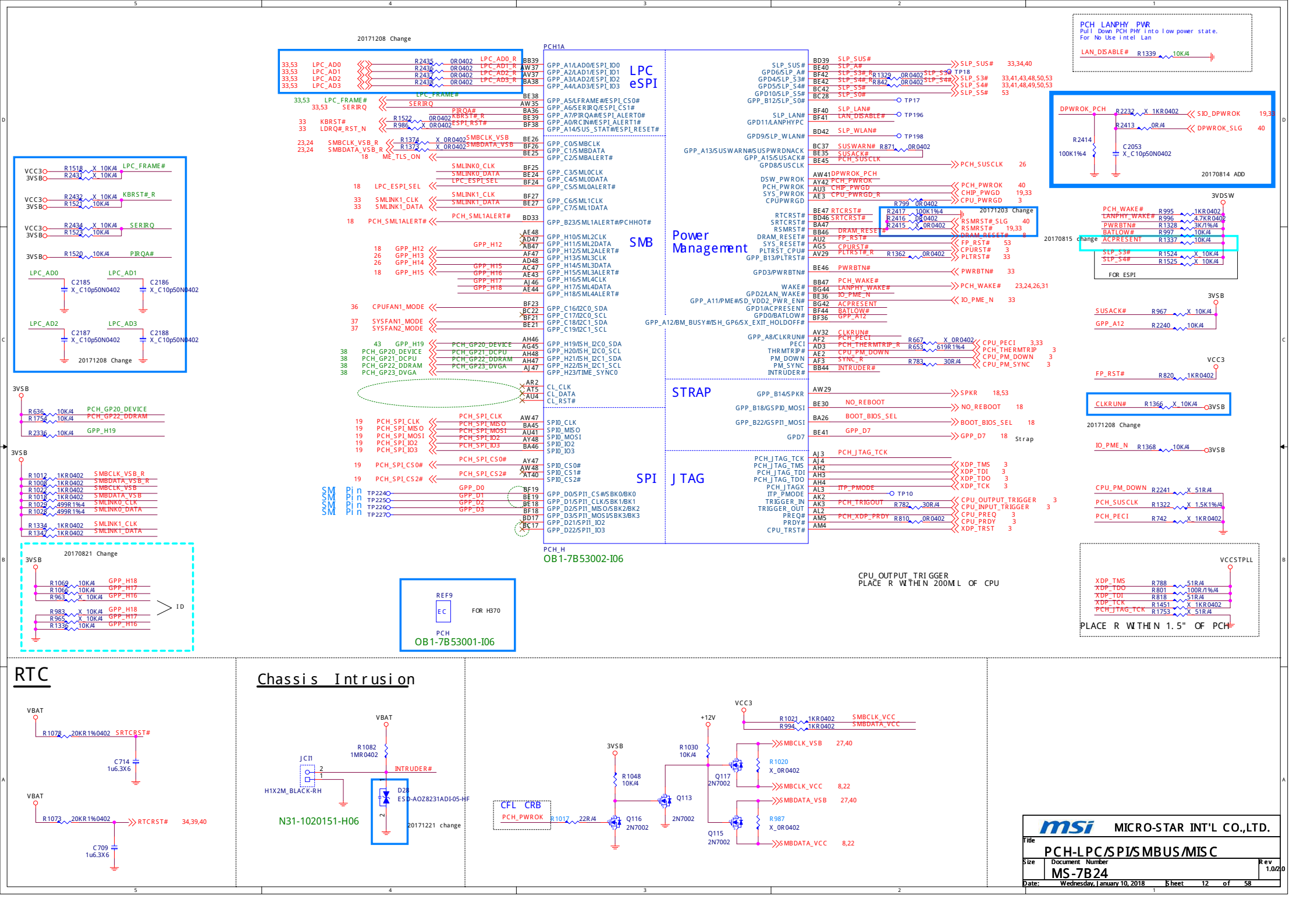

DIMM SLOT PN BY SPEC
DIMMA1C
DIMMA2C
DIMMA1B
DIMMA2B
DDRIV-288P_BLACK-RH-23
VCC_DDR
VTT_DDR
DDR_SPD
VPP25
DIMM_CA_VREF_A
CPU_CA_VREF_A
VCC3
F5
F-SPR-P260T-2.6A
DT CRB VCC3
Server CRB VPP
20171205 Remove
Between in CPU and DIMM SLOT
Bottom side , OB add
MICRO-STAR INT'L CO.,LTD.
DDR4 POWER/GND-1
MS-7B24
Wednesday, January 10, 2018



MICRO-STAR INT'L CO.,LTD.			
Title: DDR4 POWER/GND-2			
Size	Document Number: MS-7B24		Rev: 1.0/2.0
Date: Wednesday, January 10, 2018	Sheet 11 of 58		


PCH_LANPHY_PWR
Pull Down PCH PHY into low power state.
For No Use intel Lan
LAN_DISABLE# R1339 10K/4
20171208 Change
PCH1A
LPC eSPI
SMB
Power Management
STRAP
JTAG
SPI
GPP_A1/LAD0/ESPI_IO0
GPP_A2/LAD1/ESPI_IO1
GPP_A3/LAD2/ESPI_IO2
GPP_A4/LAD3/ESPI_IO3
GPP_A5/LFRAME#/ESPI_CS0#
GPP_A6/SERIRQ/ESPI_CS1#
GPP_A7/PIRQA#/ESPI_ALERT0#
GPP_A0/RCIN#/ESPI_ALERT1#
GPP_A14/SUS_STAT#/ESPI_RESET#
GPP_C0/SMBCLK
GPP_C1/SMBDATA
GPP_C2/SMBALERT#
GPP_C3/SML0CLK
GPP_C4/SML0DATA
GPP_C5/SML0ALERT#
GPP_C6/SML1CLK
GPP_C7/SML1DATA
GPP_B23/SML1ALERT#/PCHHOT#
GPP_H10/SML2CLK
GPP_H11/SML2DATA
GPP_H12/SML2ALERT#
GPP_H13/SML3CLK
GPP_H14/SML3DATA
GPP_H15/SML3ALERT#
GPP_H16/SML4CLK
GPP_H17/SML4DATA
GPP_H18/SML4ALERT#
GPP_C16/I2C0_SDA
GPP_C17/I2C0_SCL
GPP_C18/I2C1_SDA
GPP_C19/I2C1_SCL
GPP_H19/ISH_I2C0_SDA
GPP_H20/ISH_I2C0_SCL
GPP_H21/ISH_I2C1_SDA
GPP_H22/ISH_I2C1_SCL
GPP_H23/TIME_SYNC0
SPI0_CLK
SPI0_MISO
SPI0_MOSI
SPI0_IO2
SPI0_IO3
SPI0_CS0#
SPI0_CS1#
SPI0_CS2#
GPP_D0/SPI1_CS#/SBK0/BK0
GPP_D1/SPI1_CLK/SBK1/BK1
GPP_D2/SPI1_MISO/SBK2/BK2
GPP_D3/SPI1_MOSI/SBK3/BK3
GPD1/LANPHYPC
GPD9/SLP_WLAN#
GPD8/SUSCLK
GPD3/PWRBTN#
GPD2/LAN_WAKE#
GPD0/BATLOW#
GPP_B14/SPKR
GPP_B18/GSPI0_MOSI
GPP_B22/GSPI1_MOSI
GPD7
PCH_JTAG_TCK
PCH_JTAG_TMS
PCH_JTAG_TDI
PCH_JTAG_TDO
PCH_JTAGX
ITP_PMODE
TRIGGER_IN
TRIGGER_OUT
PREQ#
PRDY#
CPU_TRST#
PCH_H
OB1-7B53002-I06
REF9
EC
FOR H370
PCH
OB1-7B53001-I06
CPU_OUTPUT_TRIGGER
PLACE R WITHIN 200MIL OF CPU
PLACE R WITHIN 1.5" OF PCH
20171203 Change
20170814 ADD
20170815 change
FOR ESPI
20170821 Change
RTC
VBAT
R1078 20KR1%0402 SRTCRST#
C714 1u6.3X6
R1073 20KR1%0402 RTCRST# 34,39,40
C709 1u6.3X6
Chassis Intrusion
JCI1
H1X2M_BLACK-RH
R1082 1MR0402
INTRUDER#
D28 ESD-AOZ8231ADI-05-HF
20171221 change
N31-1020151-H06
CFL CRB
PCH_PWROK
R1017 22R/4
Q116 2N7002
Q113 2N7002
Q115 2N7002
Q117 2N7002
R1048 10K/4
R1030 10K/4
R1020 X_0R0402
R987 X_0R0402
SMBCLK_VSB 27,40
SMBDATA_VSB 27,40
SMBCLK_VCC 8,22
SMBDATA_VCC 8,22
MICRO-STAR INT'L CO.,LTD.
PCH-LPC/SPI/SMBUS/MISC
MS-7B24
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Date: Wednesday, January 10, 2018
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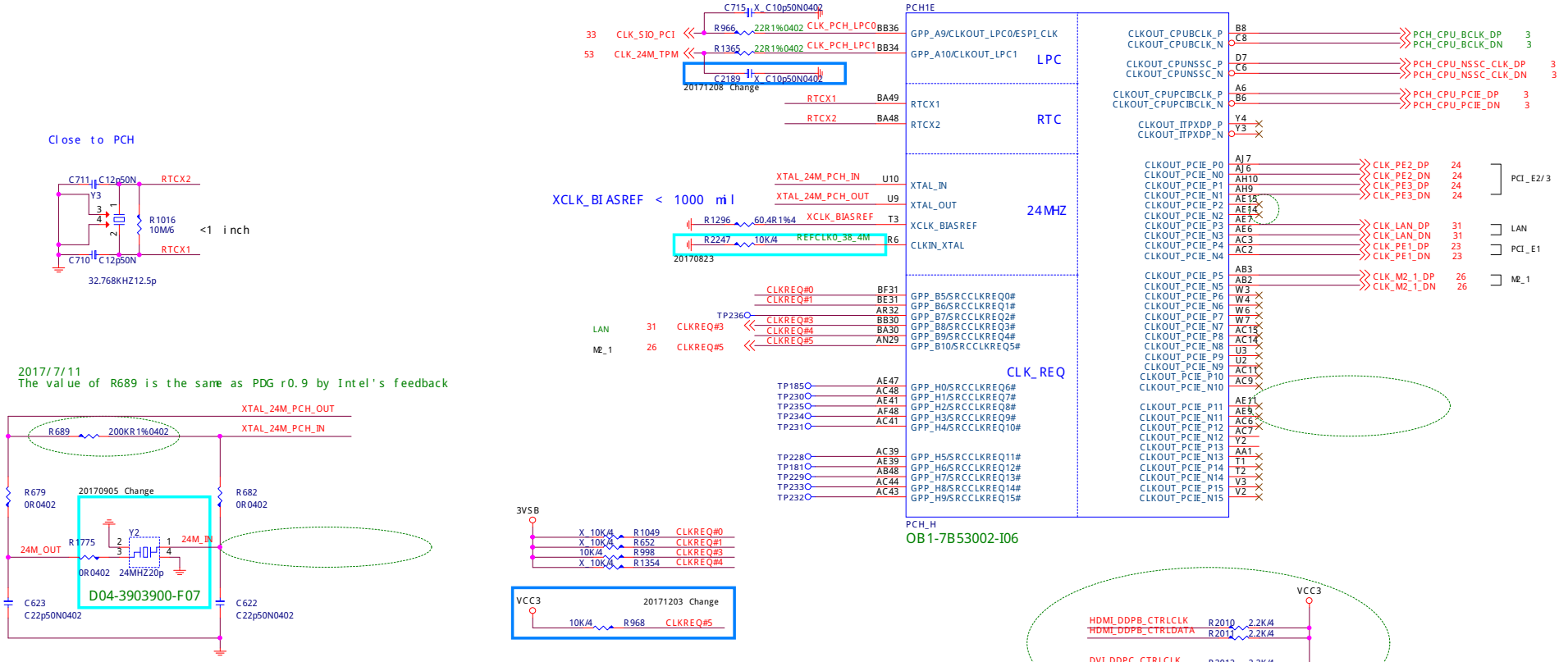
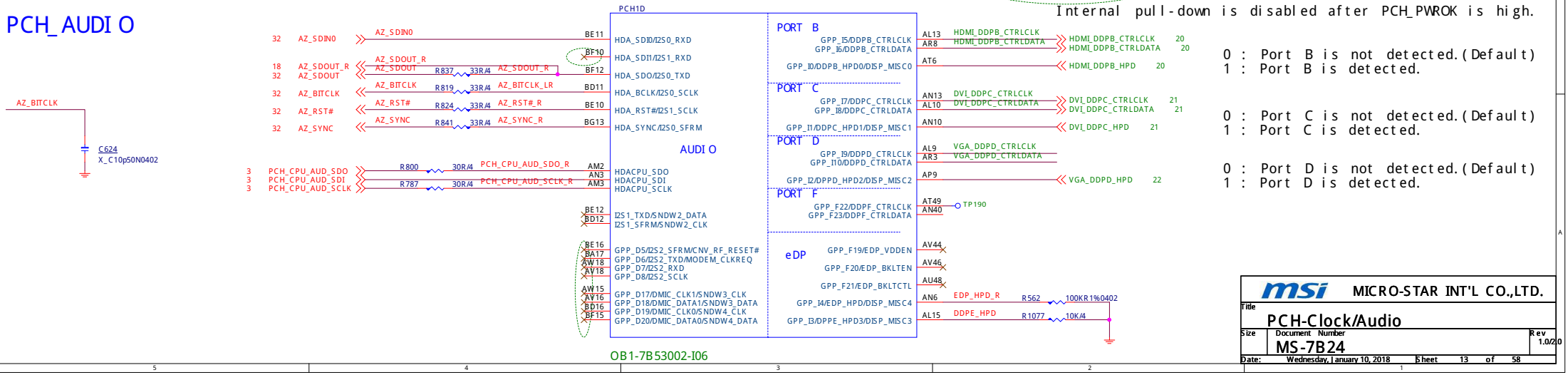
PCH_CLK



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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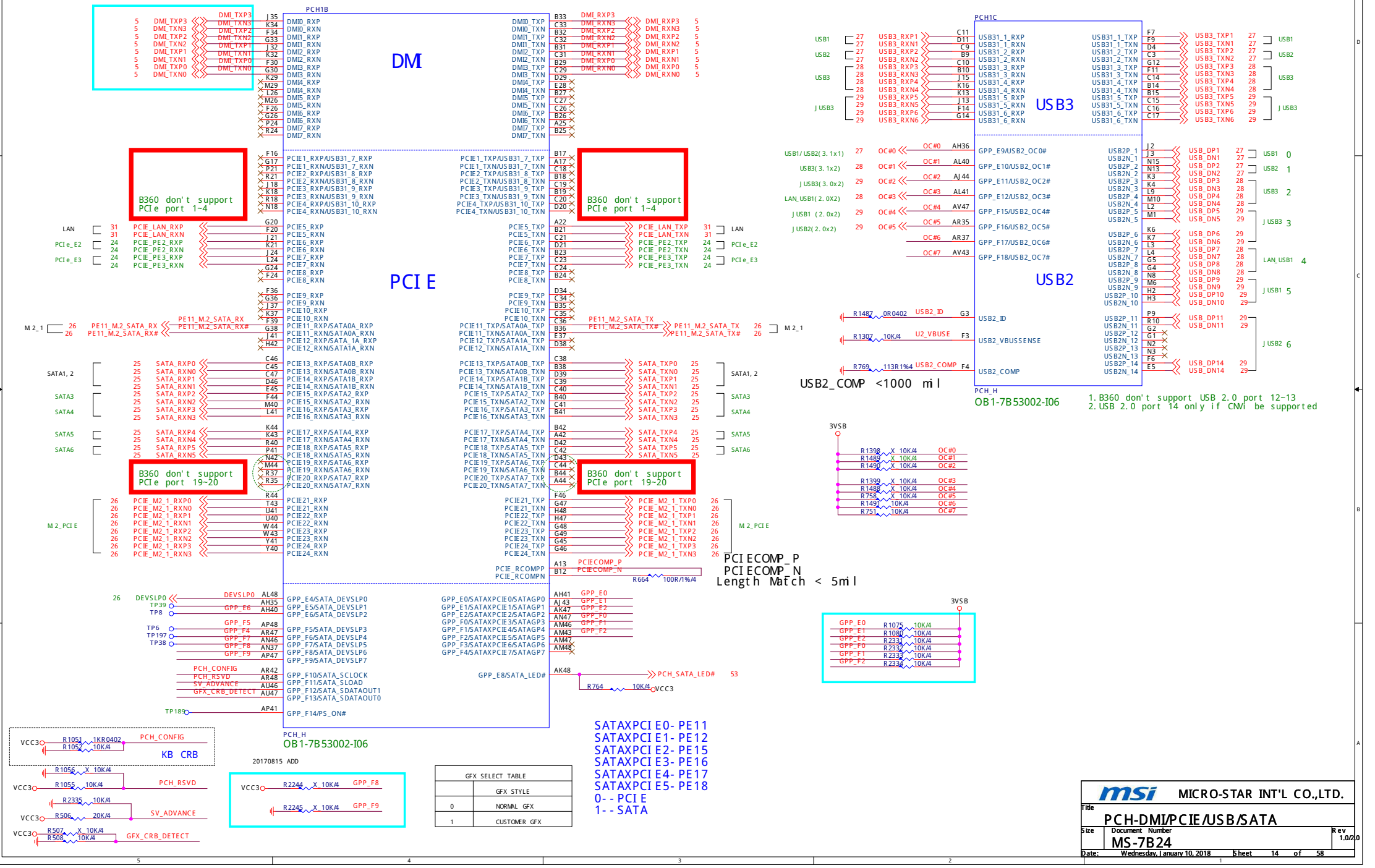
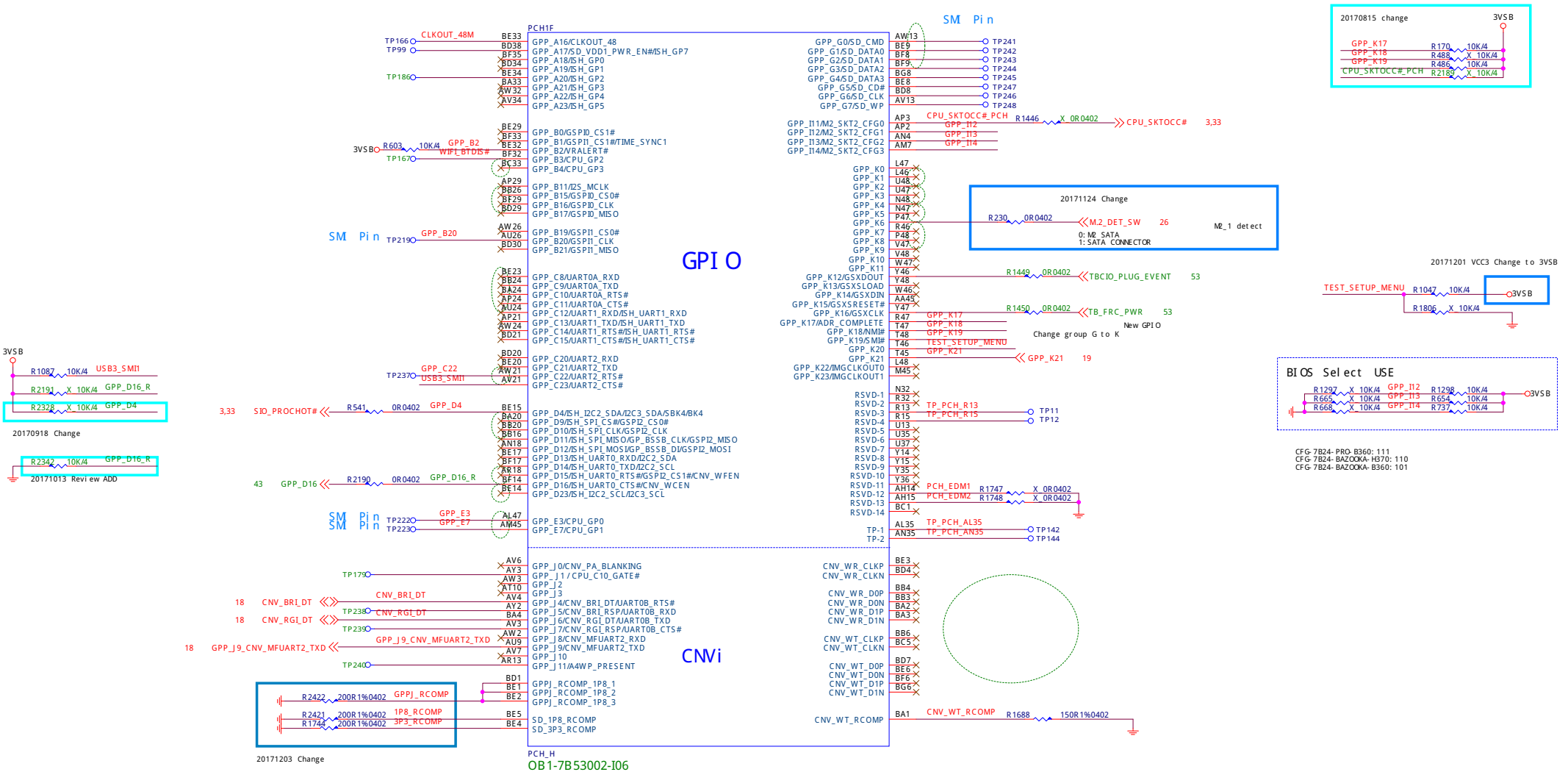


Title			
MICRO-STAR INT'L CO.,LTD.			
PCH-DMI/PCIE/USB/SATA			
Size	Document Number		Rev
	MS-7B24		1.0/2.0
Date: Wednesday, January 10, 2018	Sheet 14 of 58		



MICRO-STAR INT'L CO.,LTD.	
Title	PCH-GPIO/RSVD/CNVi
Size	Document Number: MS-7B24
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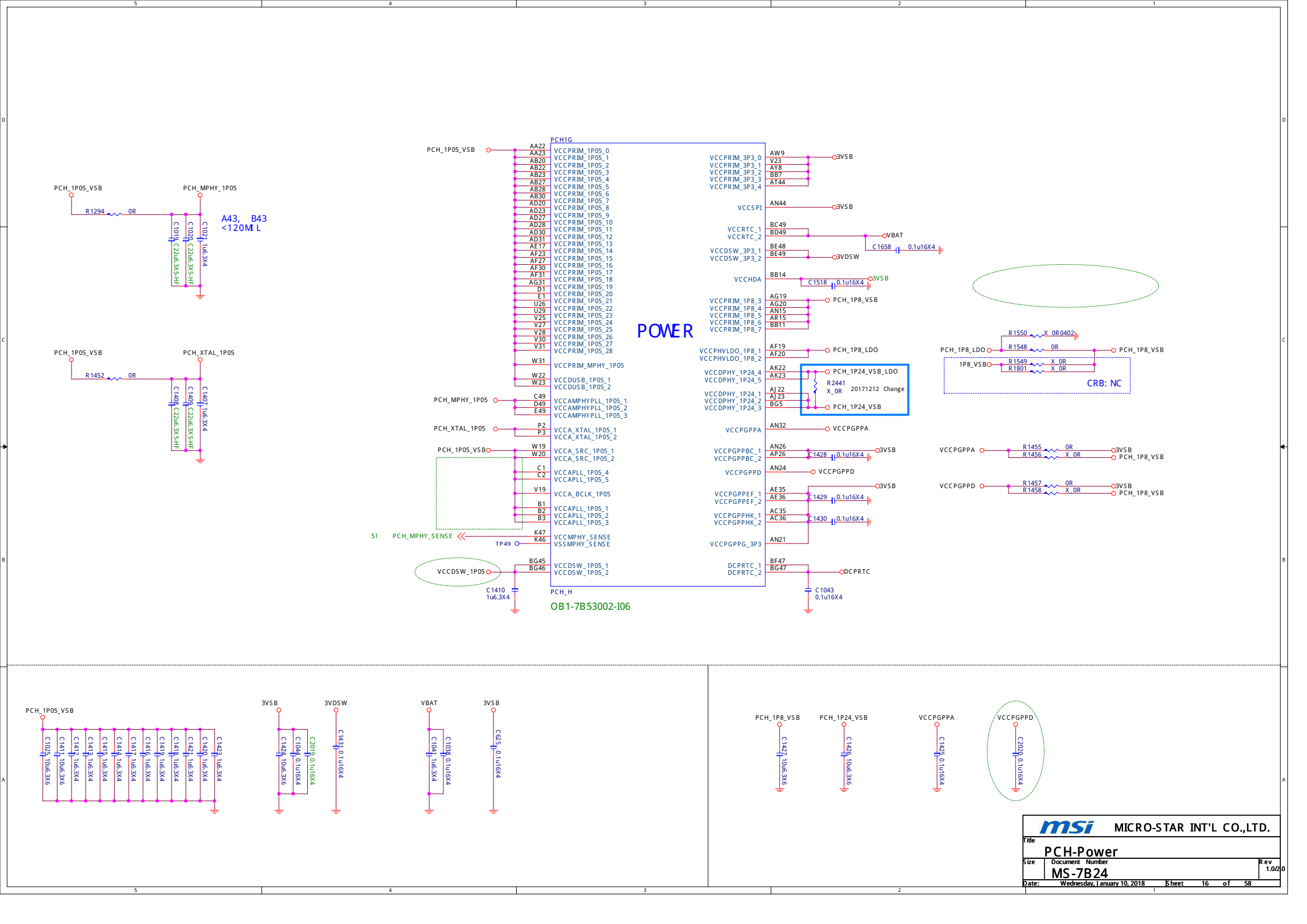
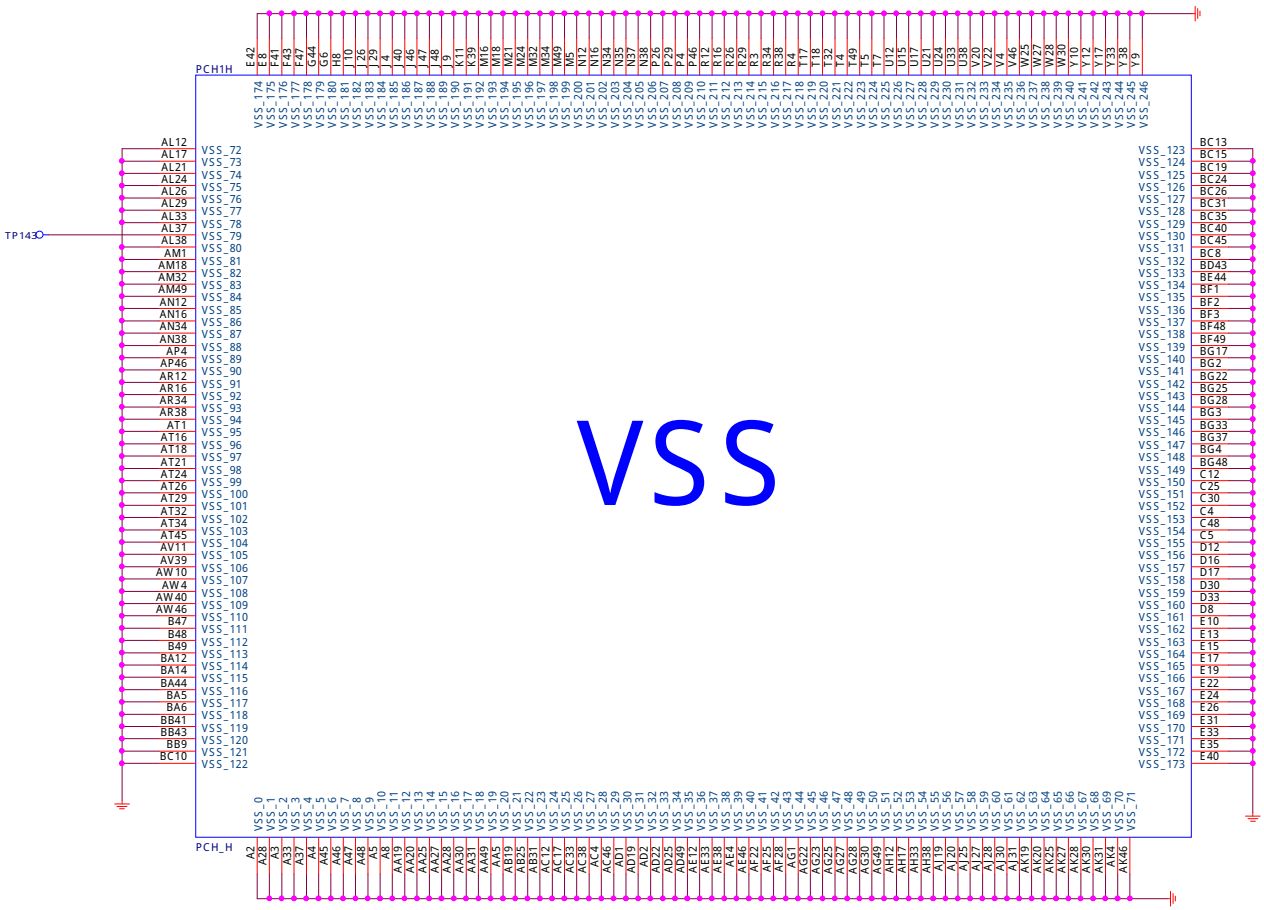


MICRO-STAR INT'L CO.,LTD.

Title: PCH-Power

Size | Document Number: MS-7B24 | Rev: 1.0/2.0

Date: Wednesday, January 10, 2018 | Sheet 16 of 58



MICRO-STAR INT'L CO.,LTD.	
Title	PCH-GND
Size	Document Number: MS-7B24
Rev	1.0/2.0
Date:	Wednesday, January 10, 2018
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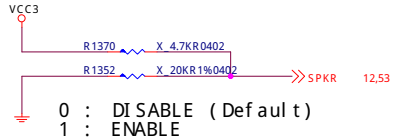
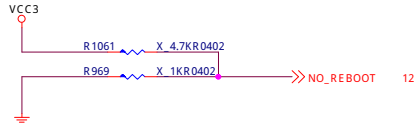
TOP Swap



0 : DISABLE (Default)
1 : ENABLE

Internal pull-down is disabled after PCH_PWROK is high.

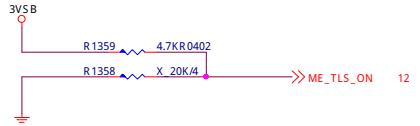
No Reboot



0 : DISABLE (Default)
1 : ENABLE

Internal pull-down is disabled after PCH_PWROK is high.

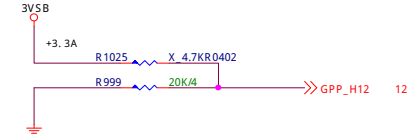
TLS confidentiality



0 : DISABLE
1 : ENABLE (Default)

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

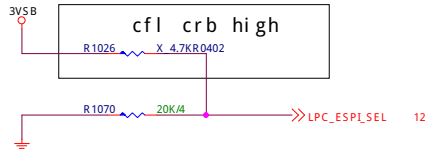
ESPI FLASH SHARING MODE



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

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

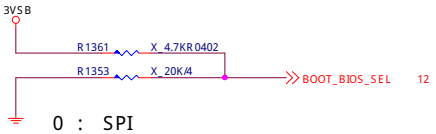
LPC eSPI Mode



0 : LPC
1 : eSPI

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

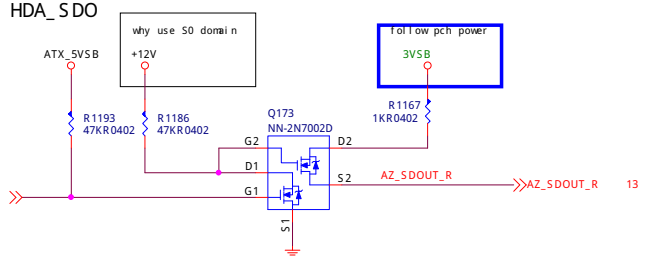
Boot BIOS



0 : SPI
1 : LPC

Internal pull-down is disabled after PCH_PWROK is high.

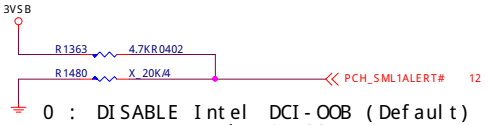
HDA_SDO



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

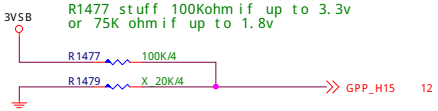


0 : DISABLE Intel DCI-OOB (Default)
1 : ENABLE Intel DCI-OOB

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

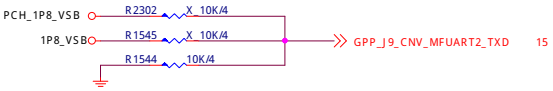
ODT DISABLE

2017/7/13 from Intel's feedback
R1477 stuff 100Kohm if up to 3.3v
or 75K ohm if up to 1.8v



0 : JTAG ODT IS DISABLE IF LOW
1 :

SELECT THE SPI BIOS FLASH INTERFACE OPERATING VOLTAGE

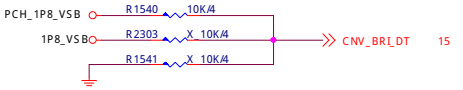


0 = VCCPSPI IS CONNECTED TO 3.3V RAIL (DEFAULT)
1 = VCCPSPI IS CONNECTED TO 1.8V RAIL

PCH HAS INTERNAL 20K PD

20170814 CHANGE

XTAL FREQUENCY SELECTION

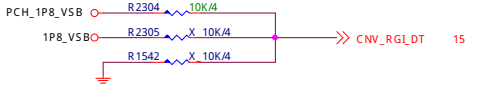


1 = 24MHZ (25MHZ WHEN XTAL FREQ DIVIDER NON ZERO
0 = 38.4/19.2MHZ

XTAL_SEL1 :Internal Pull down

MODEM AND NFC REFERENCE CLOCK SOURCE SELECT

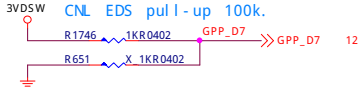
2017/7/12 from Intel's feedback
PU if the integrated CNVi is enabled
PD if the integrated CNVi is disabled



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

20170816 change

XTAL INPUT MODE



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

PCH HAS INTERNAL 20K PD

MICRO-STAR INT'L CO.,LTD.

Title: PCH-Strap

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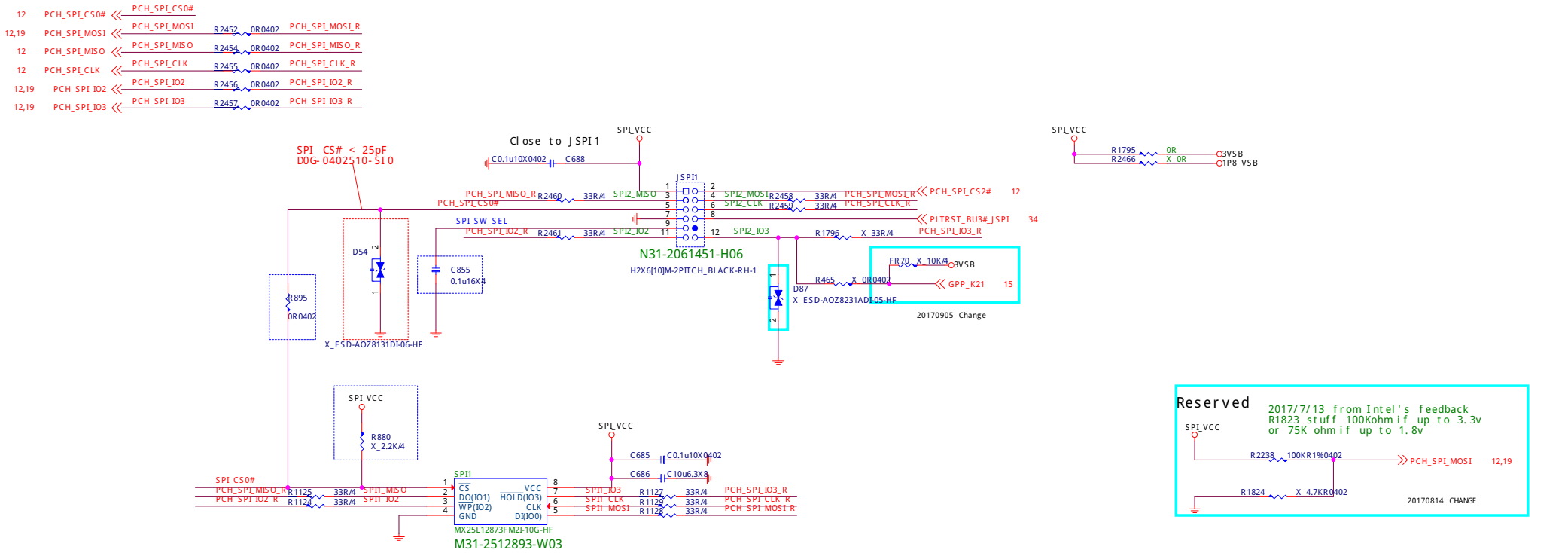

MSI	MICRO-STAR INT'L CO.,LTD.
Title	SPI ROM-BIOS
Size	Document Number: MS-7B24
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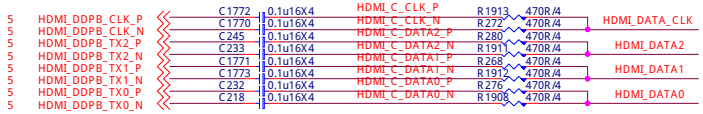
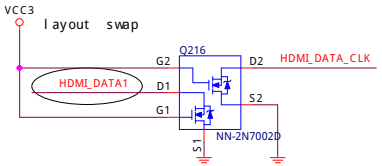
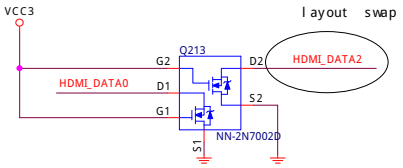
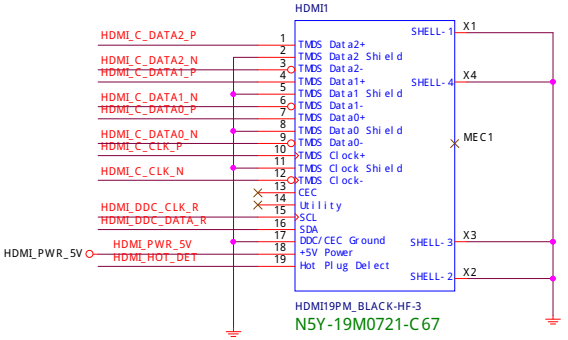
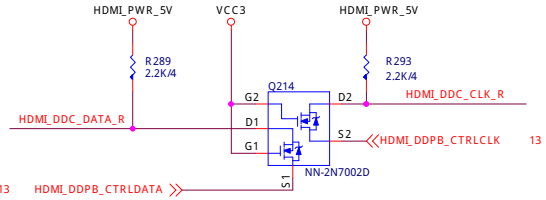
HDMI, DVI : 1920x1200 at 60 Hz (16:10 WUXGA)

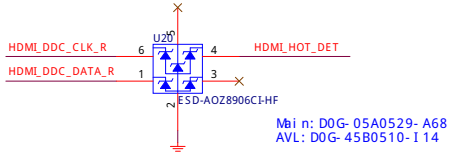


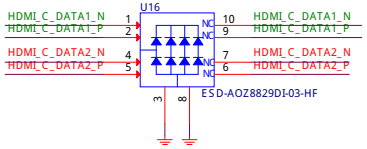


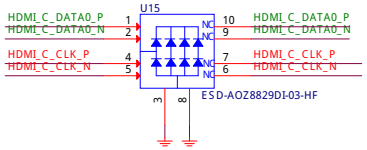


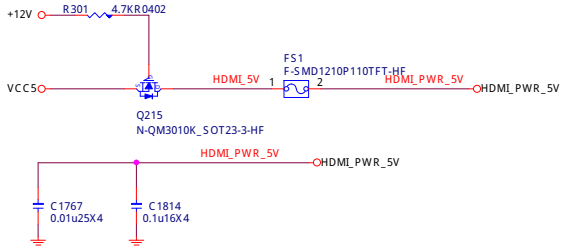


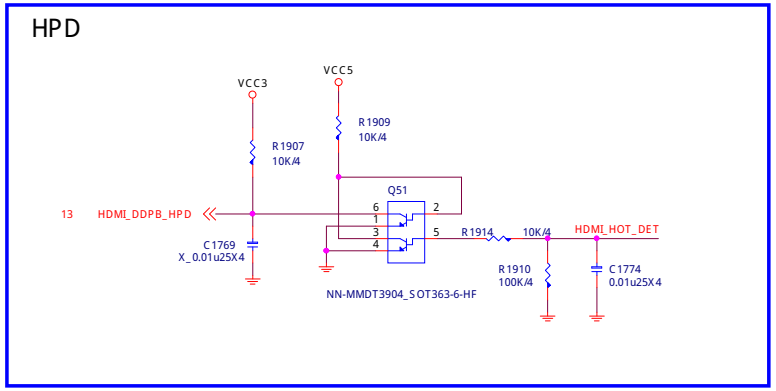


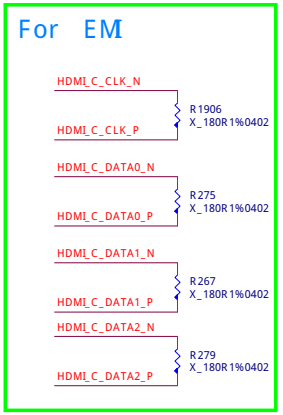












MICRO-STAR INT'L CO.,LTD.

Title: HDMI Connector

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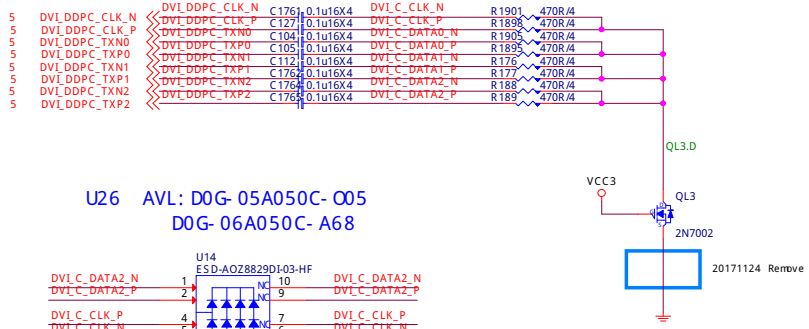
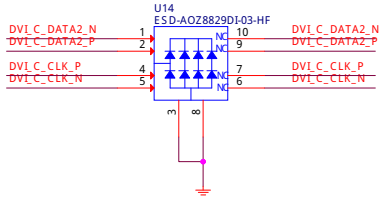
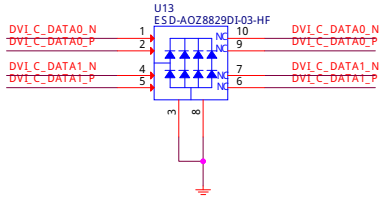
VGA: resolution of 2048x1536 pixels with 32-bit color at 75 Hz (4:3 QXGA)

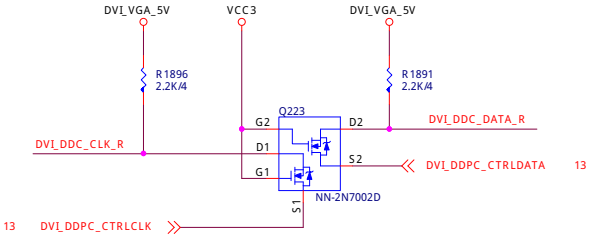


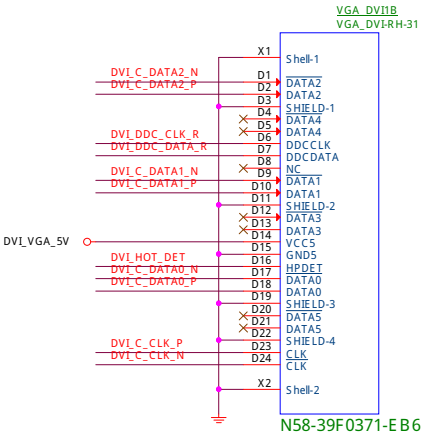
U26 AVL: D0G-05A050C-005
D0G-06A050C-A68

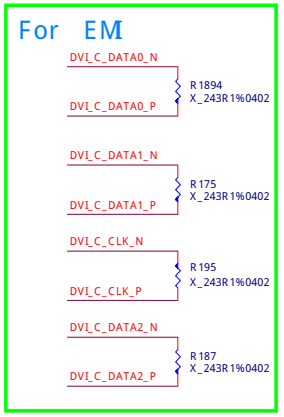


U27 AVL: D0G-05A050C-005
D0G-06A050C-A68

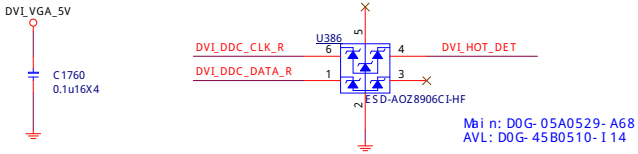




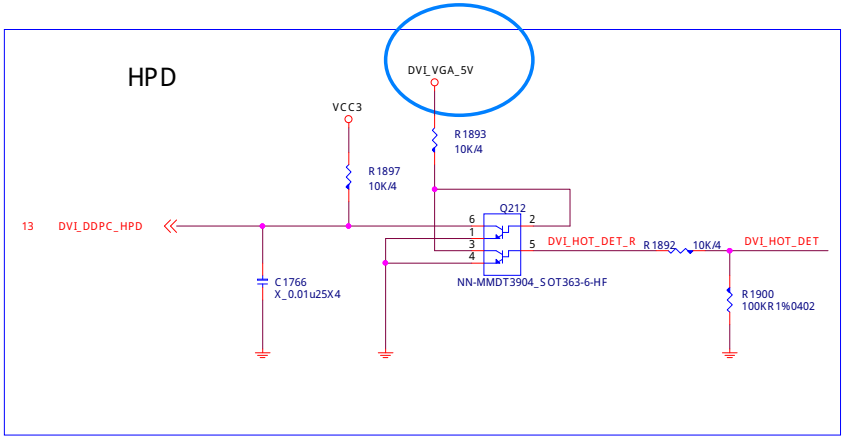


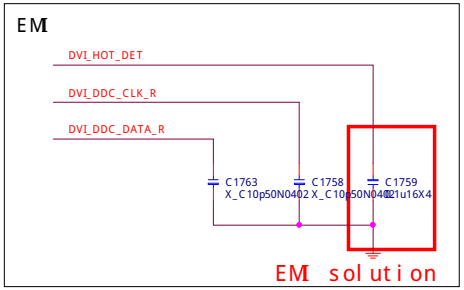


EMI Cap near connector DVI1



Main: D0G-05A0529-A68
AVL: D0G-45B0510-I14





MICRO-STAR INT'L CO.,LTD.

Title: DVI Connector

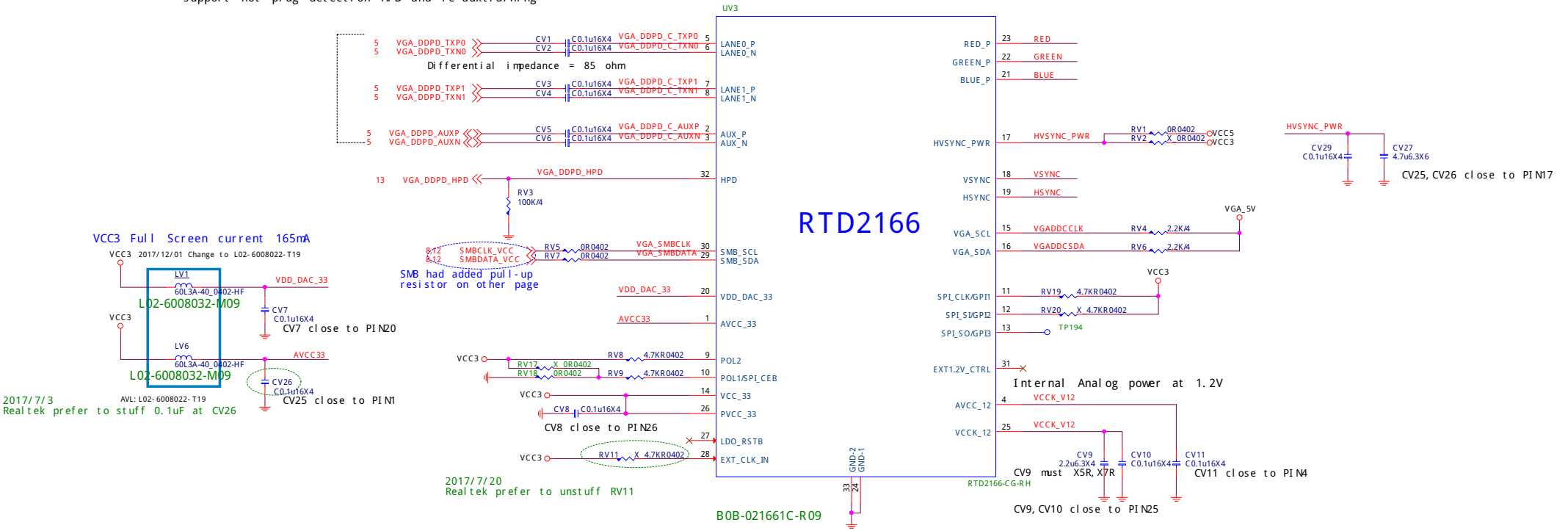
Size | Document Number: MS-7B24 | Rev: 1.0/2.0

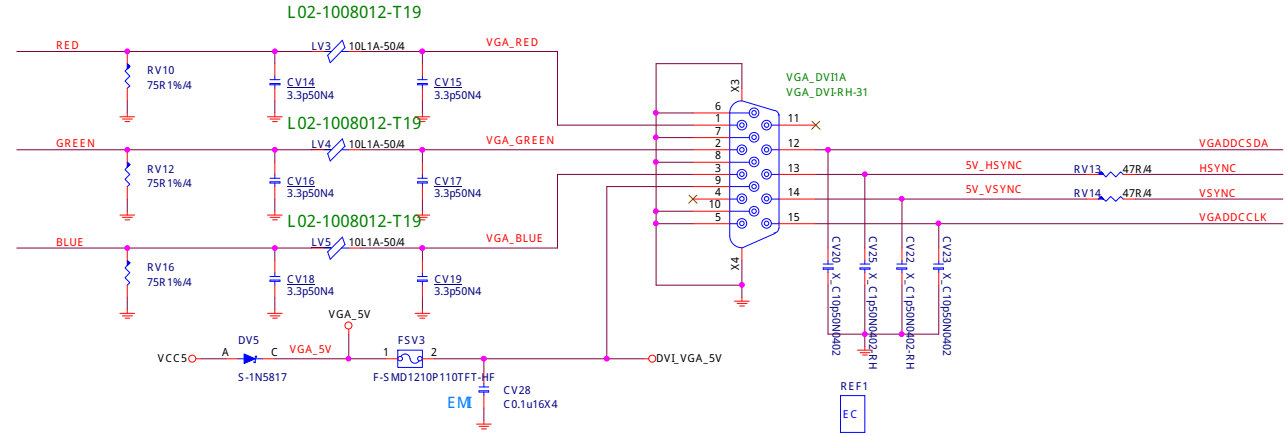
Date: Wednesday, January 10, 2018 | Sheet 21 of 58

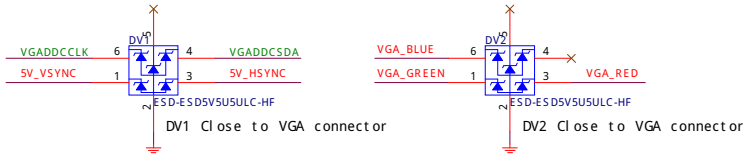
MAX Resolution: 1920x1440 @ 60Hz, RB

Note:

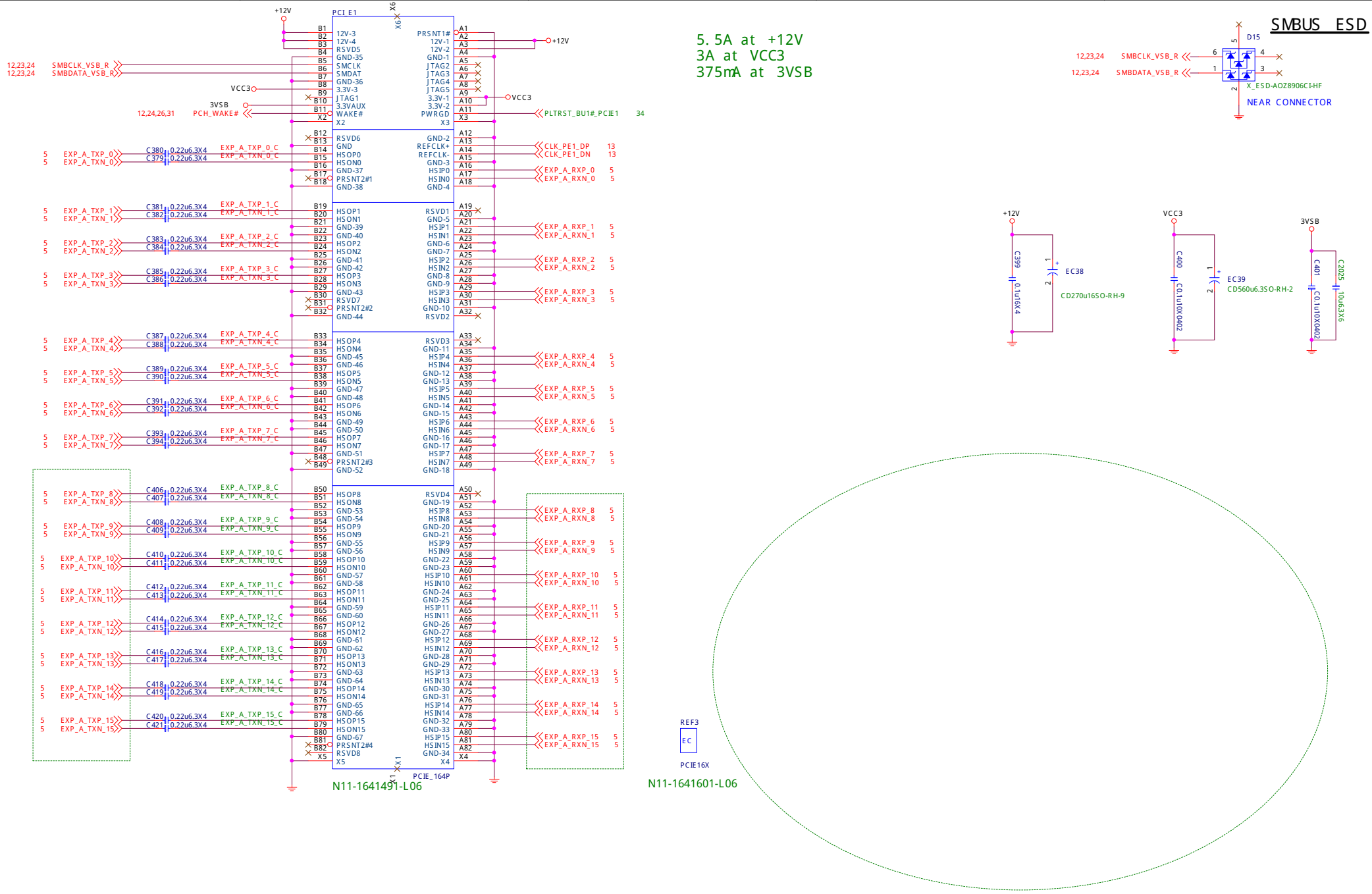
If connect to eDP port, must confirm whether it support hot plug detection HPD and re-auxtraining







MICRO-STAR INT'L CO.,LTD.			
Title: VGA - RTD2166			
Size	Document Number: MS-7B24		Rev: 1.0/2.0
Date: Wednesday, January 10, 2018	Sheet 22 of 58		

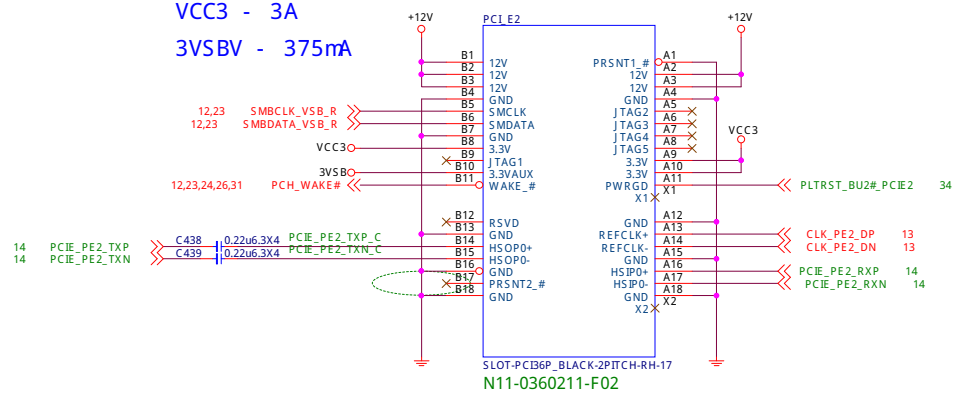


SMBUS ESD

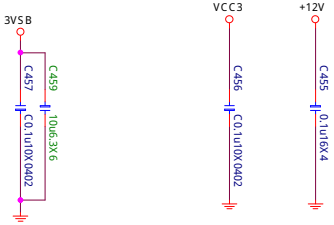
MSI	MICRO-STAR INT'L CO.,LTD.	
Title	PCIE SLOT-CPU (X16)	
Size	Document Number MS-7B24	Rev 1.0/2.0
Date: Wednesday, January 10, 2018	Sheet 23 of 58	

PCH PCIE X1 Slot

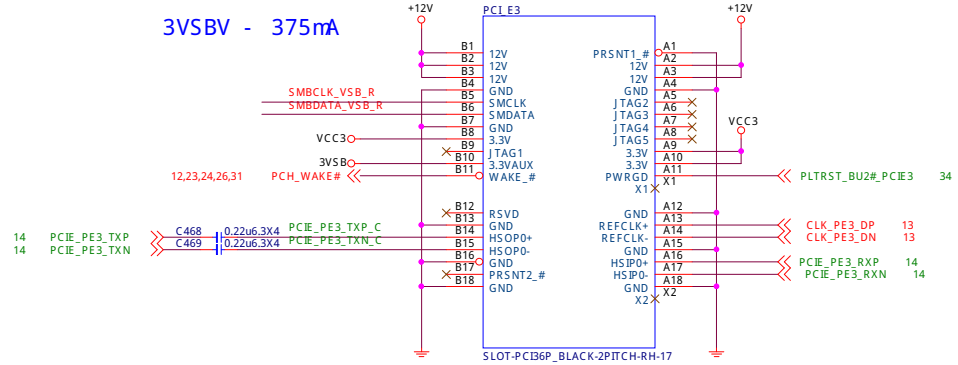
12V - 0.5A
VCC3 - 3A
3VSBV - 375mA



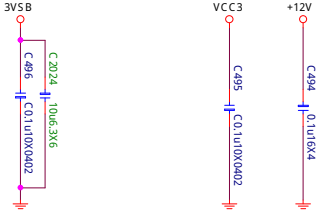
N11-0360211-F02



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



N11-0360211-F02



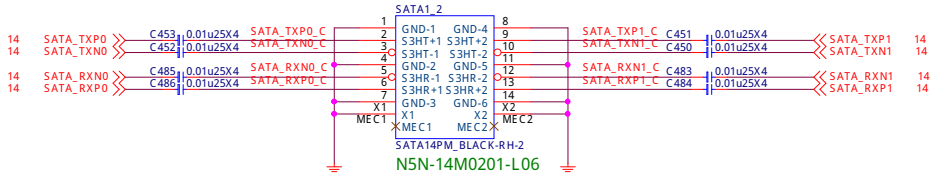
MICRO-STAR INT'L CO.,LTD.

Title: PCIE SLOT-PCH (X1)

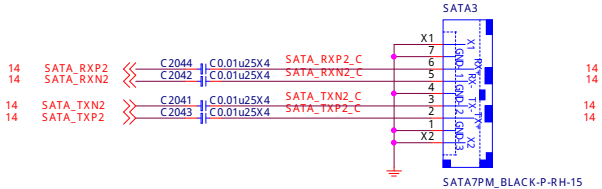
Size | Document Number: MS-7B24 | Rev: 1.0/2.0

Date: Wednesday, January 10, 2018 | Sheet 24 of 58

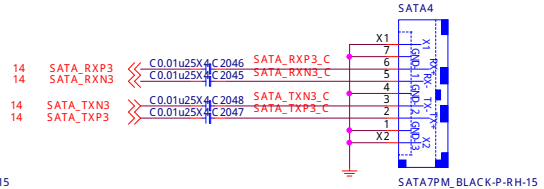
SATA 6G PORT 0.1



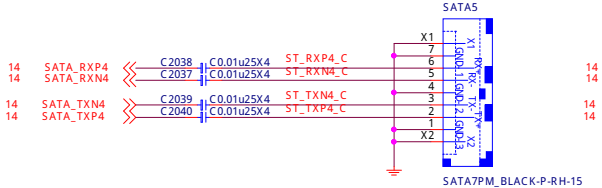
N5N-14M0201-L06



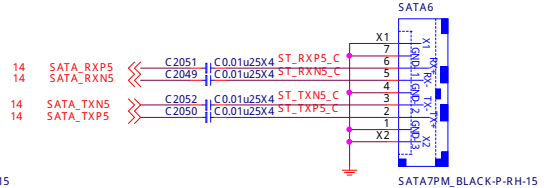
N5N-07M2441-L06



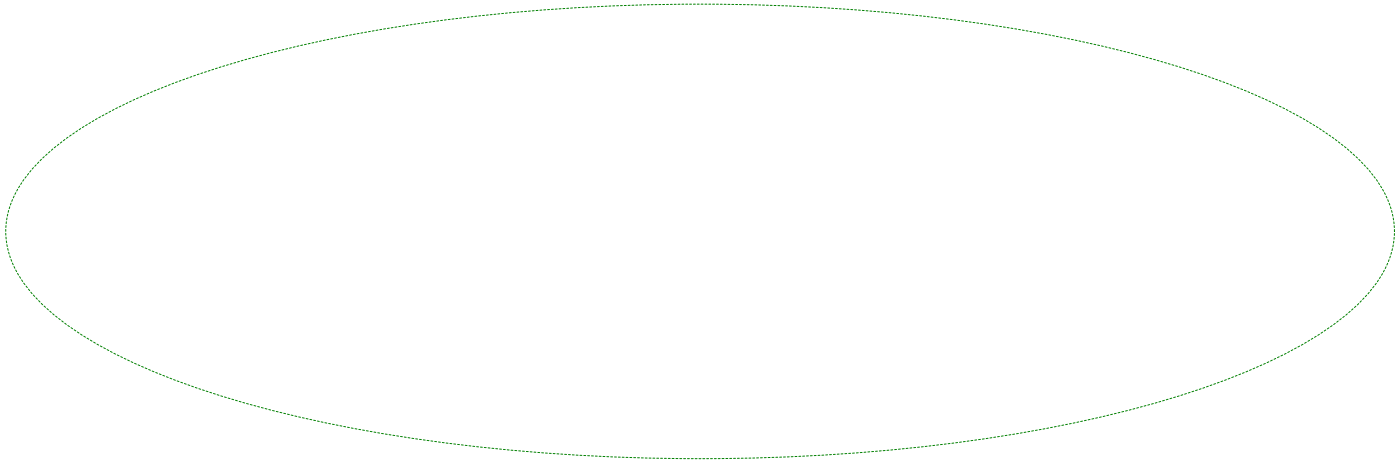
N5N-07M2441-L06



N5N-07M2441-L06



N5N-07M2441-L06

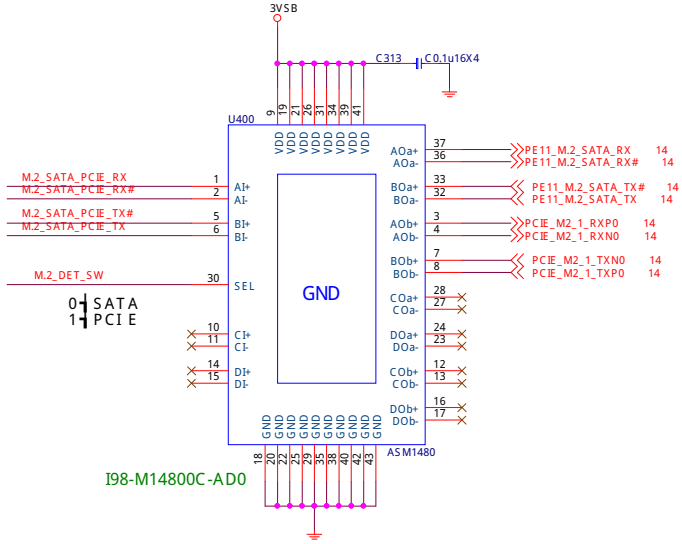


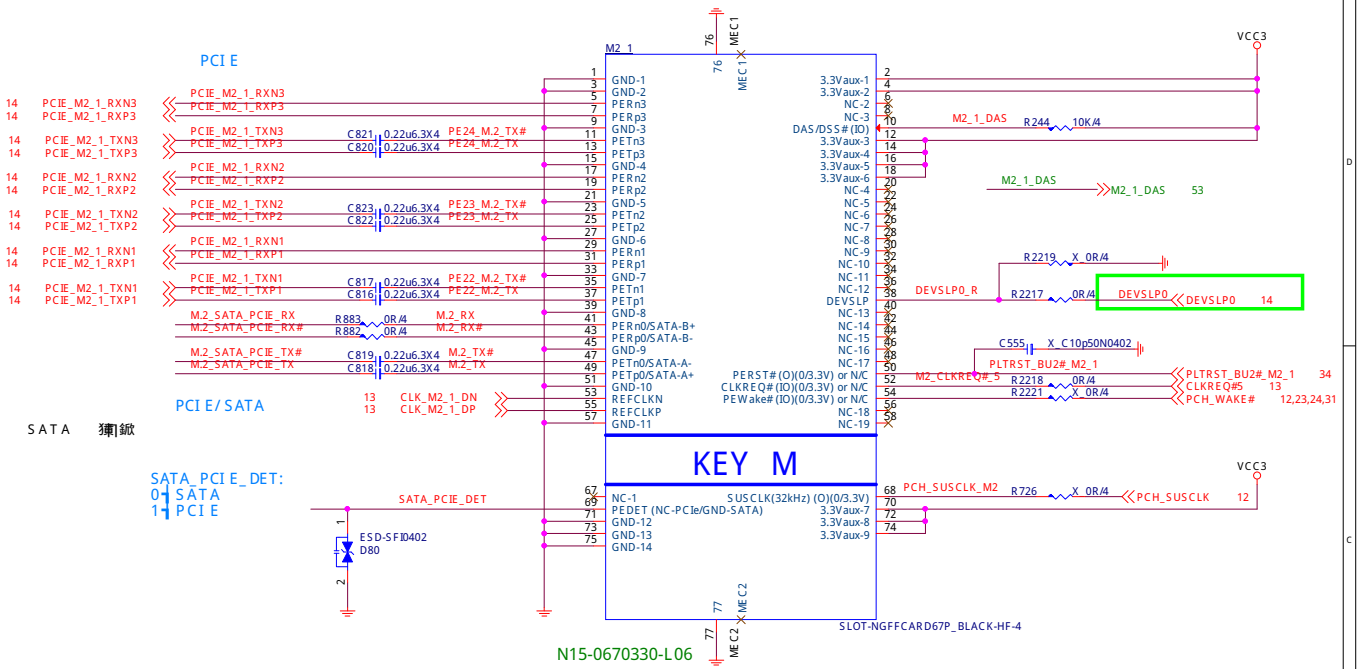
MICRO-STAR INT'L CO.,LTD.

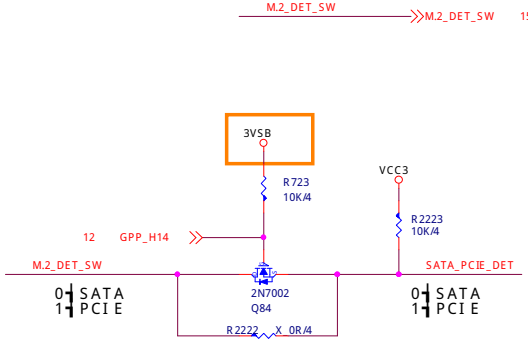
Title: SATA CNT

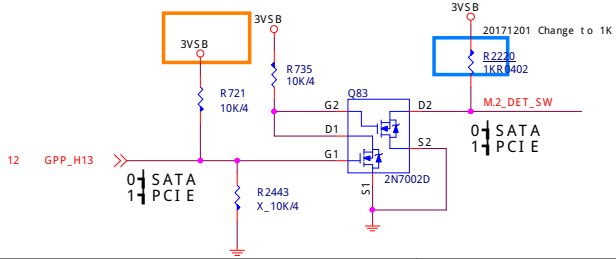
Size | Document Number: MS-7B24 | Rev: 1.0/2.0

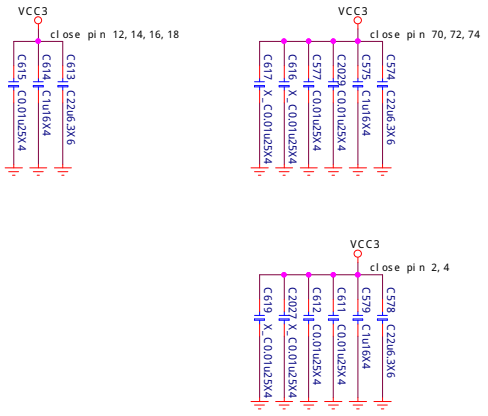
Date: Wednesday, January 10, 2018 Sheet 25 of 58

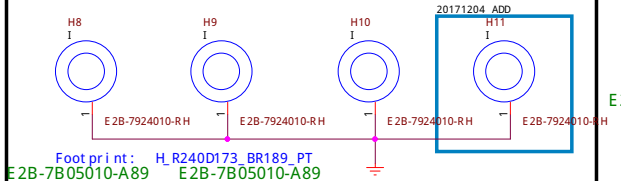


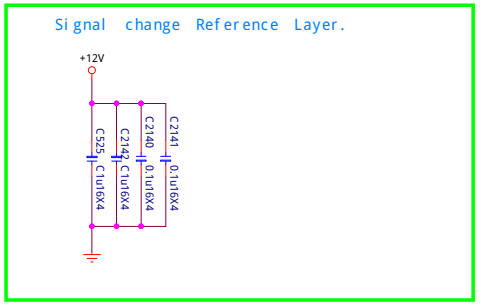


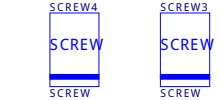










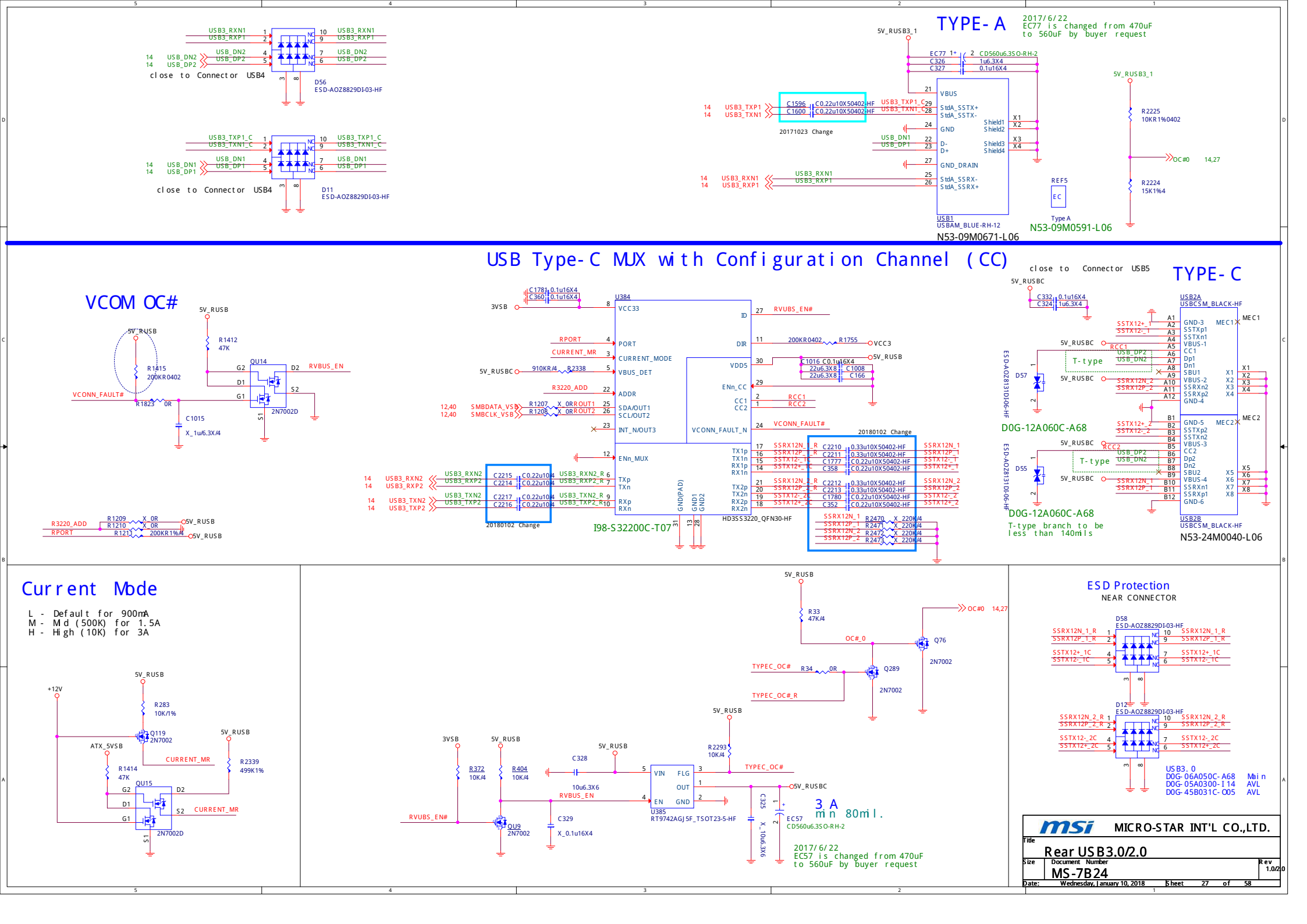


MSI MICRO-STAR INT'L CO.,LTD.

Title: M.2-SLOT1

Size: | Document Number: MS-7B24 | Rev: 1.0/2.0

Date: Wednesday, January 10, 2018 | Sheet 26 of 58


TYPE-A
2017/6/22
EC77 is changed from 470uF to 560uF by buyer request
close to Connector USB4
D56
ESD-AOZ8829DI-03-HF
D11
ESD-AOZ8829DI-03-HF
20171023 Change
USB1
USBAM_BLUE-RH-12
N53-09M0671-L06
N53-09M0591-L06
USB Type-C MUX with Configuration Channel (CC)
VCOM OC#
I98-S32200C-T07
HD3SS3220_QFN30-HF
20180102 Change
close to Connector USB5
TYPE-C
D0G-12A060C-A68
T-type branch to be less than 140mils
N53-24M0040-L06
Current Mode
L - Default for 900mA
M - Md (500K) for 1.5A
H - High (10K) for 3A
3 A min 80mil.
2017/6/22
EC57 is changed from 470uF to 560uF by buyer request
ESD Protection
NEAR CONNECTOR
USB3.0
D0G-06A050C-A68 Main
D0G-05A0300-I14 AVL
D0G-45B031C-005 AVL
MICRO-STAR INT'L CO.,LTD.
Rear USB3.0/2.0
MS-7B24
Rev 1.0/2.0
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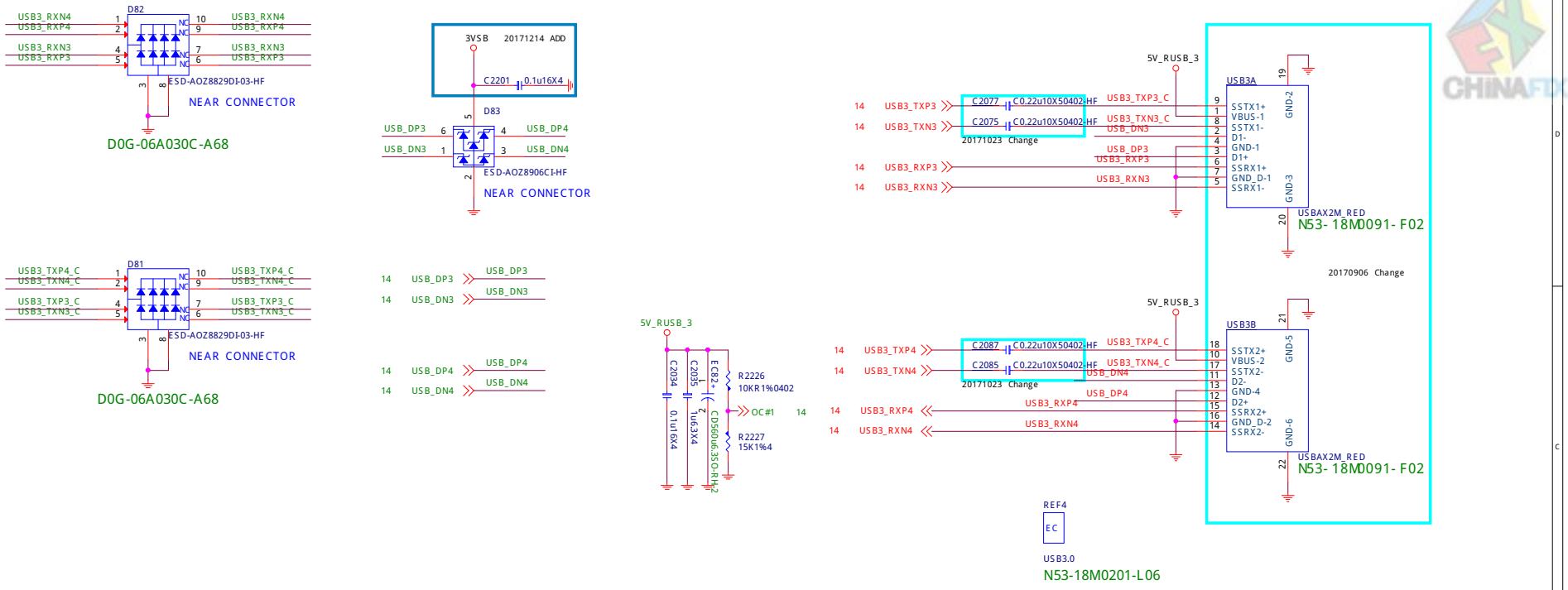
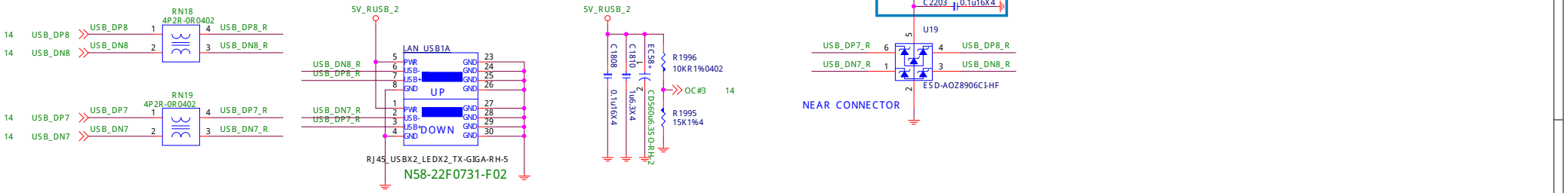


LAN_USB1



MICRO-STAR INT'L CO.,LTD.		
Title: USB3.0-ASM1042		
Size	Document Number: MS-7B24	Rev: 1.0/2.0
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FRONT USB2.0

2017/6/22
EC62 is changed from 470uF
to 560uF by buyer request

EC62 2 + 1 CD560u6.3SO-RH-2
C1997 1u6.3X4
C1852 0.1u16X4

5V_FUSB_1

USB_DN10_R
USB_DP10_R
USB_DN9_R
USB_DP9_R

J USB1
H2X5[9]M_BLACK-RH-3

N31-2051BG1-H06

14 USB_DP9 — USB_DP9 — USB_DP9_R
14 USB_DN9 — USB_DN9 — USB_DN9_R
4P2R-0R0402
RN13

14 USB_DN10 — USB_DN10 — USB_DN10_R
14 USB_DP10 — USB_DP10 — USB_DP10_R
4P2R-0R0402
RN14

3VSB 20171214 ADD
C2204 0.1u16X4
D75
USB_DN10_R
USB_DP10_R
USB_DN9_R
USB_DP9_R
ESD-AOZ8906CI-HF
NEAR CONNECTOR

5V_FUSB_1 5V_FUSB_2

R2213 10KR1%0402
R2215 10KR1%0402
14 OC#4 — OC#5 14
R2212 15K1%4
R2214 15K1%4

2017/6/22
EC75 is changed from 470uF
to 560uF by buyer request

EC75 2 + 1 CD560u6.3SO-RH-2
C1998 1u6.3X4
C1999 0.1u16X4

5V_FUSB_2

USB_DN14_R
USB_DP14_R
USB_DN11_R
USB_DP11_R

J USB2
H2X5[9]M_BLACK-RH-3

N31-2051BG1-H06

14 USB_DP11 — USB_DP11 — USB_DP11_R
14 USB_DN11 — USB_DN11 — USB_DN11_R
4P2R-0R0402
RN17

14 USB_DN14 — USB_DN14 — USB_DN14_R
14 USB_DP14 — USB_DP14 — USB_DP14_R
4P2R-0R0402
RN16

3VSB 20171214 ADD
C2205 0.1u16X4
D76
USB_DN14_R
USB_DP14_R
USB_DN11_R
USB_DP11_R
ESD-AOZ8906CI-HF
NEAR CONNECTOR

FRONT USB3.0
180

D41
USB3_RXN5
USB3_RXP5
USB3_RXN6
USB3_RXP6
ESD-AOZ8829DI-03-HF
NEAR CONNECTOR

D0G-06A030C-A68

D40
USB3_TXN5_C
USB3_TXP5_C
USB3_TXN6_C
USB3_TXP6_C
ESD-AOZ8829DI-03-HF
NEAR CONNECTOR

D0G-06A030C-A68

3VSB 20171214 ADD
C2206 0.1u16X4
D39
USB_DP5
USB_DN5
USB_DP6
USB_DN6
ESD-AOZ8906CI-HF
NEAR CONNECTOR

D0G-05A0529-A68

J USB3

14 USB_DP6 — USB_DP6 — D2+
14 USB_DN6 — USB_DN6 — D2-
14 USB3_TXP6 — C373 0.1u16X4 — USB3_TXP6_C — TX2+
14 USB3_TXN6 — C374 0.1u16X4 — USB3_TXN6_C — TX2-
14 USB3_RXP6 — USB3_RXP6 — RX2+
14 USB3_RXN6 — USB3_RXN6 — RX2-
5V_FUSB_3 — VBUS2
GND
GND
14 USB_DP5 — USB_DP5 — D1+
14 USB_DN5 — USB_DN5 — D1-
14 USB3_TXP5 — C1646 0.1u16X4 — USB3_TXP5_C — TX1+
14 USB3_TXN5 — C1647 0.1u16X4 — USB3_TXN5_C — TX1-
14 USB3_RXP5 — USB3_RXP5 — RX1+
14 USB3_RXN5 — USB3_RXN5 — RX1-
GND
5V_FUSB_3 — VBUS1
C2000 C0.1u10X0402
C2001 1u6.3X4
EC25 2 CD100u16SO-RH-4
GND
NC
C71-10116J 1-N07

RU66 10KR1%0402
OC#2 14
RU67 15K1%4

2X10_CONNECTOR
BH2X10[20]-2PITCH_BLACK-RH-1
N32-2101091-H06

MICRO-STAR INT'L CO.,LTD.

Title: Front USB 3.0/2.0
Size: Document Number: MS-7B24 Rev: 1.0/2.0
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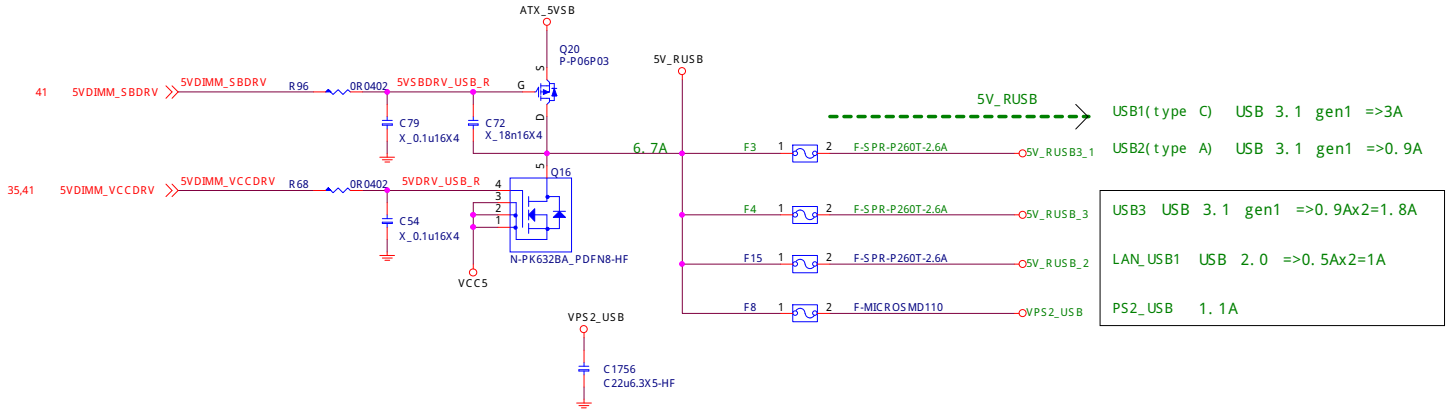
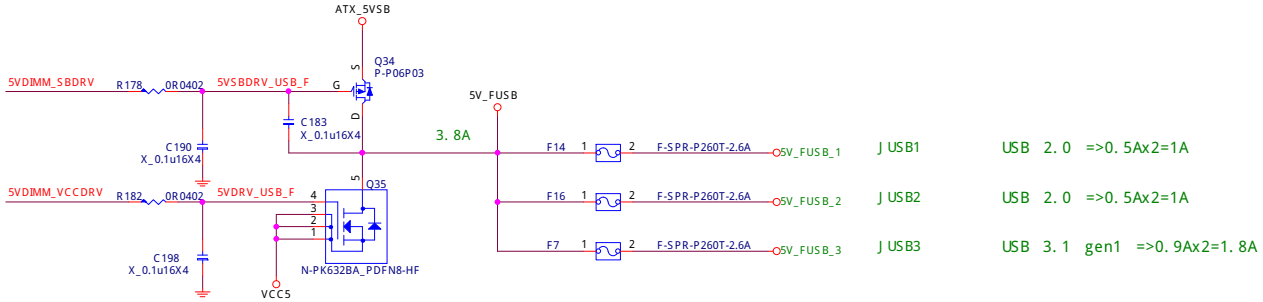
REAR USB PORT POWER



FRONT USB PORT POWER



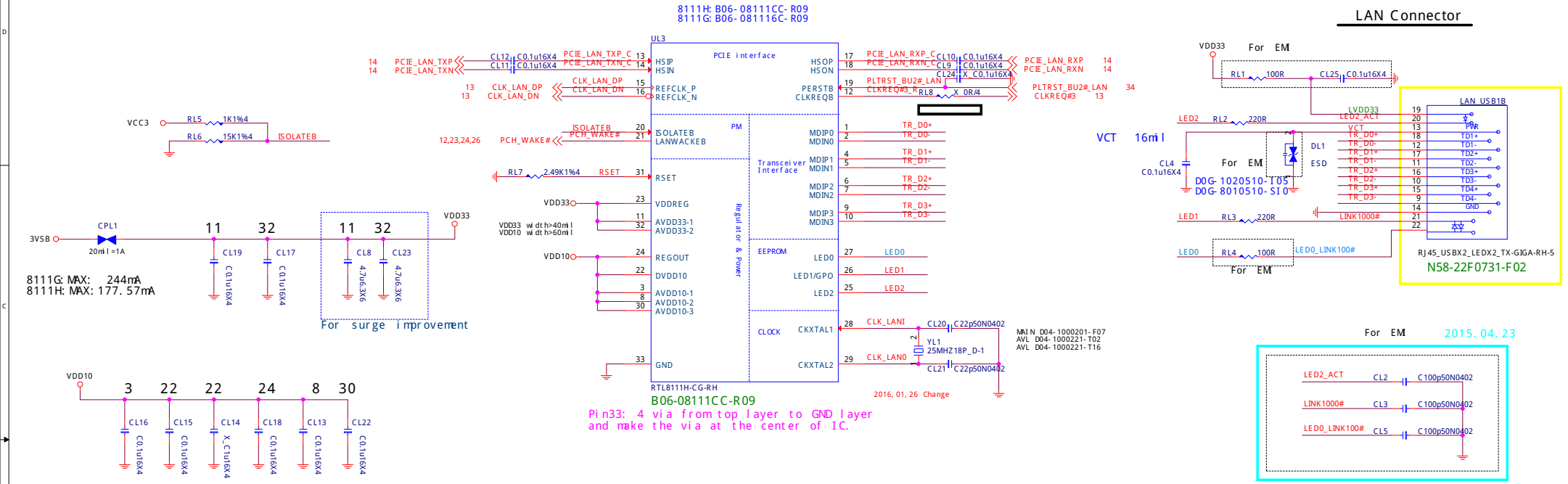
MICRO-STAR INT'L CO.,LTD.

Title: USB Power

Size | Document Number: MS-7B24 | Rev: 1.0/2.0

Date: Wednesday, January 10, 2018 | Sheet 30 of 58

RTL8111G/RTL8111H Giga LAN



8111G POWER Consumption

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

8111H POWER Consumption

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

MICRO-STAR INT'L CO.,LTD.

Title: LAN - RTL8111H

Size | Document Number: MS-7B24 | Rev: 1.0/2.0

Date: Wednesday, January 10, 2018 | Sheet 31 of 58

Type B:
ALC892/887

CA4 closed PIN25
CA3 closed PIN38
CA38 closed PIN38

11mA
Closed Codec

11mA
Closed PIN9

SMD CAP: Fail to test THD+N
EL/SOLID cap: Test THD+N will Pass

C91-1011021-N07

150311 change Audio cap

150311 6 port change to 3 port

N54-13F0271-K06

LIN_IN
LIN_OUT
MIC1

N54-13F0591-F02

20171201 Change to ESD

2.2k for better recording quality

for rear I/O 6port: 887VD/892: 1k
for rear I/O 3port: 887VD/892: 75R

20171211 Change PN

45.8mA

Closed Codec

B05-LC88714-R09

CA27. CA28 close to Pin27

ALC887-VD2-CG-HF

EMI

CA32 X_C1000p50X0805

CPA2 X_COPPER
CPA1 X_COPPER

Rear Line OUT De-POP circuit

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

20170928 Change

Varister --> cap for cost down
DOG-2950500-SI0
DOG-3010510-I05
Close to Jack

Close to Front panel
For HDA/AC97 front cable.

0R for cost down

CA34, CA35 close to LA1

Digital

Analog

NN-HBN2515S6R

MICRO-STAR INT'L CO.,LTD.

Title: AUDIO ALC887
Size: | Document Number: MS-7B24 | Rev: 1.0/2.0
Date: Wednesday, January 10, 2018 | Sheet 32 of 58

U74

LPC and ESPI co lay 6793 LPC function
6795 LPC or ESPI by HW strapping

LPC/ESPI Interface

DSW Interface

Printer mode

Port80 LED Control

GPIO

UART SIR

Harddware Monitor

KBC Function

FAN Control

ACPI Function

Power Pin

20171208 Change

IF INTEL DSW ENABLE
Other unused pin can be other function
(EX: GPIO)

6797D-M

B02-6797D04-N62

SIO_INFOBTN# for 4 debug led

6795 use CLR_CMOS#
6797 change to GP72 or AUXFANIN4
Use 6795 R1706 stuff, R1707 unstuff
Use 6797 R1706 unstuff, R1707 stuff

POWER ON STRAPPING PIN FOR NCT6797/6795

PIN	6793/6795 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_EN	DISABLE TESTMODE1_EN	ENABLE TESTMODE1_EN	LRESET
15	DDR4_EN	DDR4_EN	Disable	Enable	
27	ESPI_EN	ESPI_EN	LPC	ESPI	
31	2E_4E_SEL	RTSA#	I/O ADDRESS 2E	I/O ADDRESS 4E	LRESET
32	FANOUT_DEF_EN	DTRA#	default 50%	default 100%	INTERNAL PWROK
34	P80_EN	SOUTA	ENABLE Non_PORT80	ENABLE PORT80	LRESET
69	DSW_EN	DSW_EN	DISABLE INTEL DSW	ENABLE INTEL DSW	INTERNAL RSMRST
96	AMD_DDR4_EN	AMD_DDR4_EN	DISABLE AMD DDR4 PWR	ENABLE AMD DDR4 PWR	INTERNAL RSMRST
103	6795 TESTMODE_EN 6797 GP40	6795 WDT# 6797 WDT#	6795 DISABLE TESTMODE	6795 ENABLE TESTMODE	INTERNAL RSMRST

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

LPC pull down/ESPI pull high

20170829 ADD

20171203 Change

3V Analog Power

ESPI CONNECT PCH_1P8
LPC CONNECT VCC3 POWER

THERMAL

Closed PIN24, 108

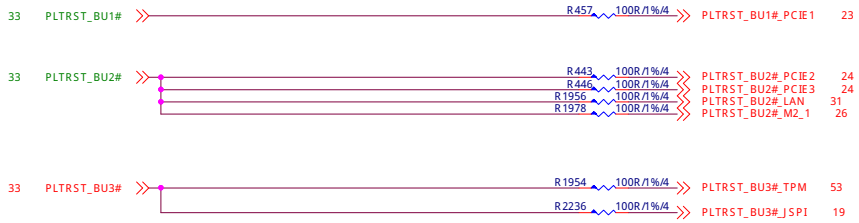
Closed PIN99

Closed PIN46, 85

20170831 ADD

Title	SIO-NCT6797D-1
Size	Document Number: MS-7B24
Rev	1.0/2.0
Date:	Wednesday, January 10, 2018
Sheet	33 of 58

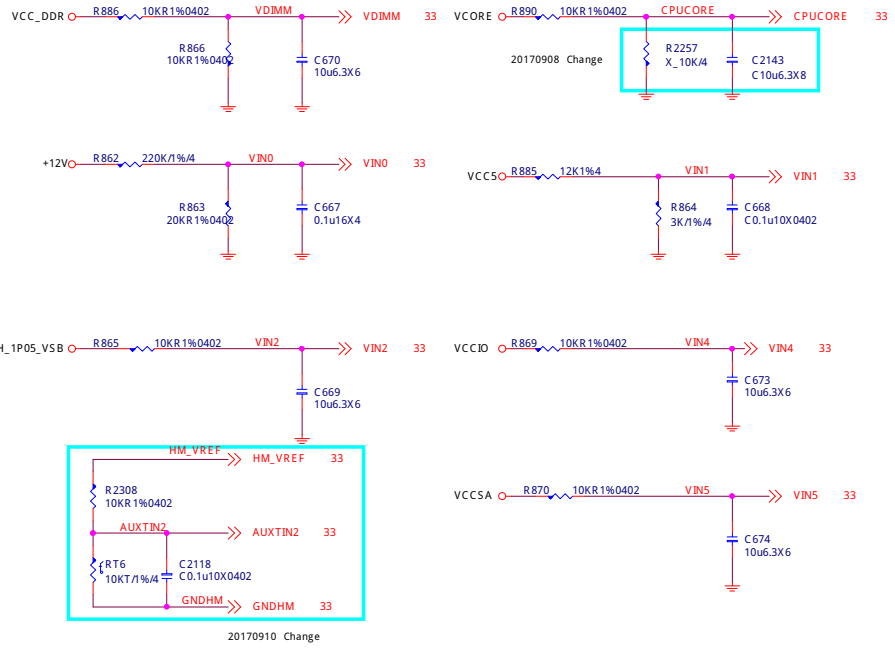
MICRO-STAR INT'L CO.,LTD.

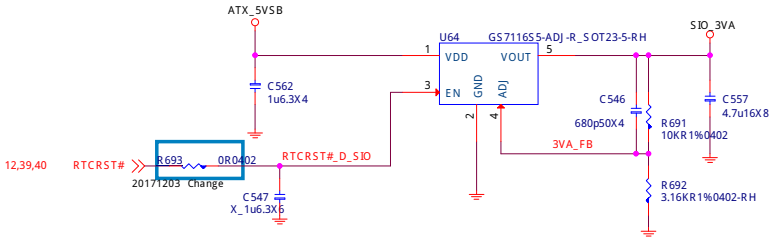


HW Monitor - Voltage

SIO HM Voltage voer 2V will not detect

VCORE → VCORE1
VCC_DDR → VCC_DDR1
PCH_1P05_VSB → PCH_1P05_VSB1
VCCSA → VCCSA1
VCCIO → VCCIO1





MICRO-STAR INT'L CO.,LTD.			
Title: SIO-NCT6797D-2			
Size	Document Number: MS-7B24		Rev: 1.0/2.0
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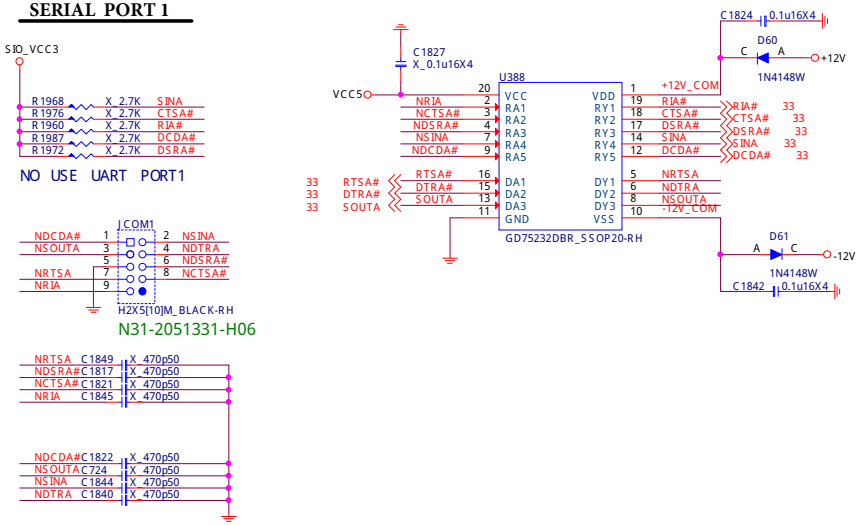
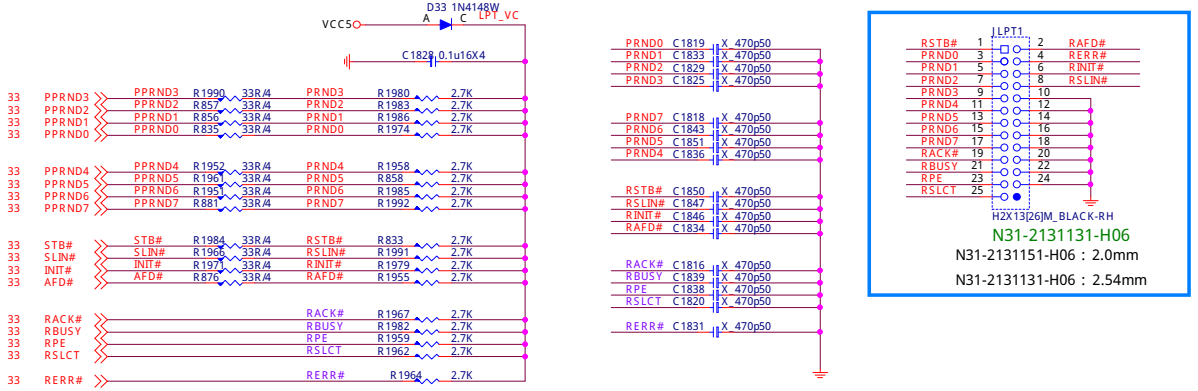
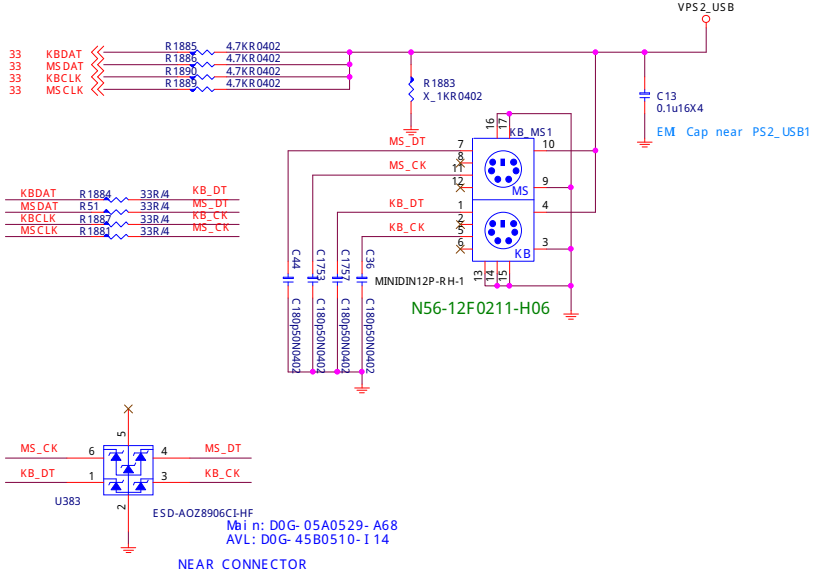
SERIAL PORT 1



PARALLAL PORT



PS2 Connector



MICRO-STAR INT'L CO.,LTD.

Title: COM/LPT/PS2

Size | Document Number: MS-7B24 | Rev: 1.0/2.0

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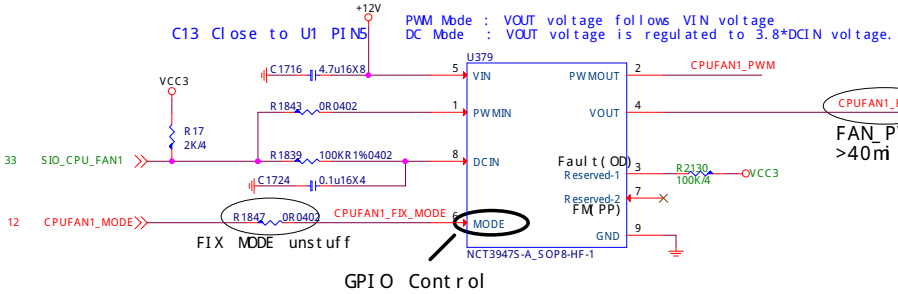
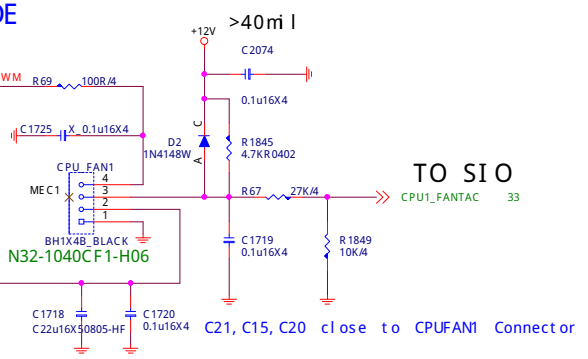
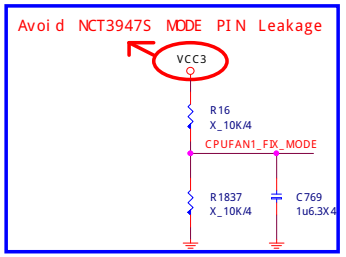
TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE

1. PWM/DC/OCP LED(
2. GPIO
3. OCP
4. PWM OR DC FAN
5. FAN







	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	CPU FAN Type K
Size	Document Number: MS-7B24
Rev	1.0/2.0
Date:	Wednesday, January 10, 2018
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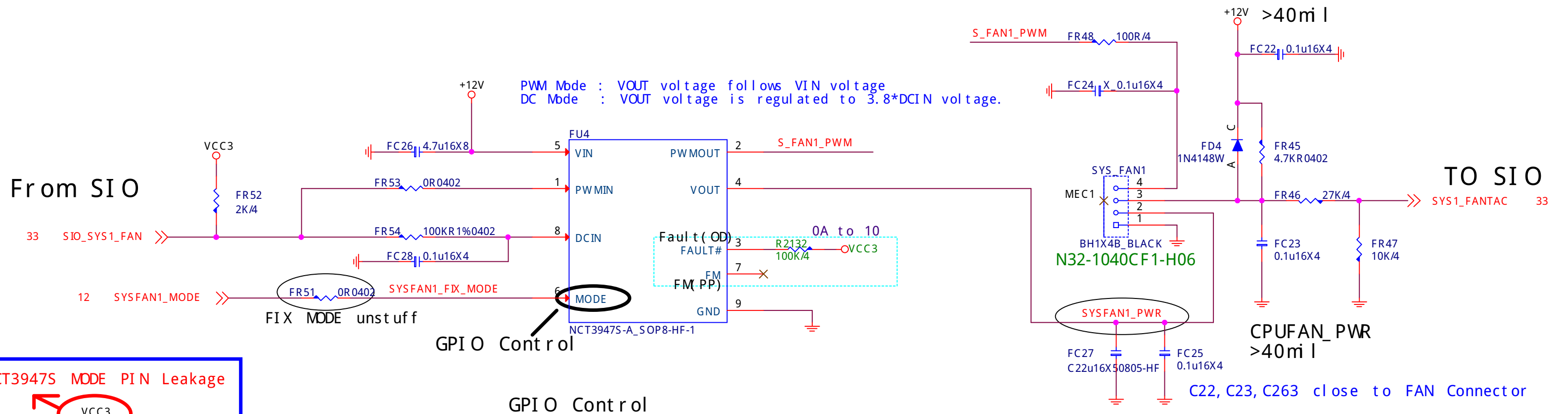
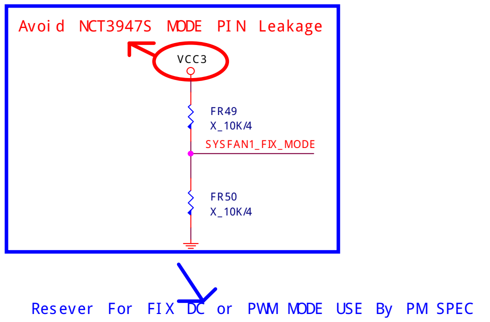
TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE

2.GPIO(10)BD ⇸nm PW M/DC MODE





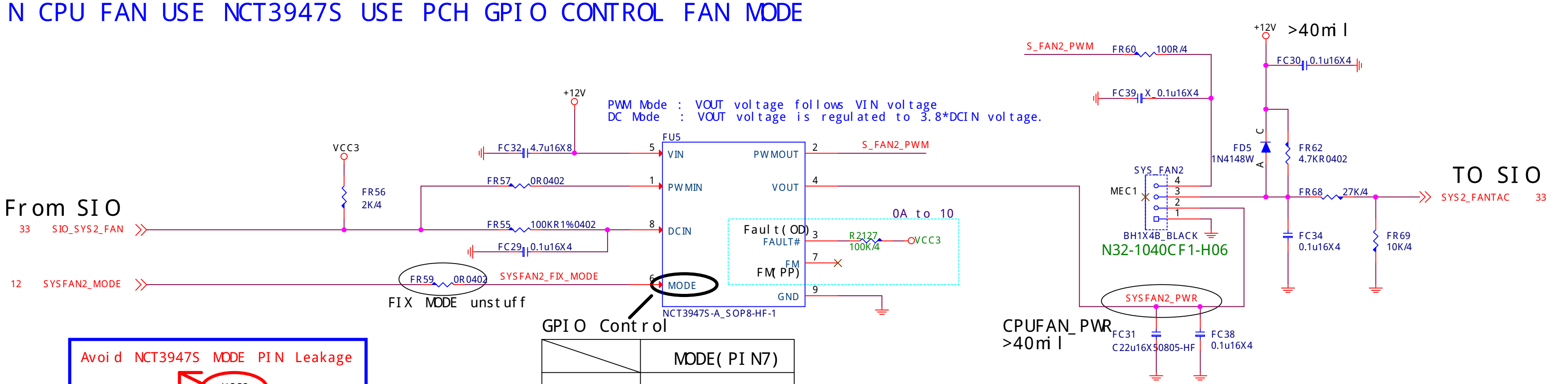
GPIO Control

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

Default

Internall pull up 1.65V

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

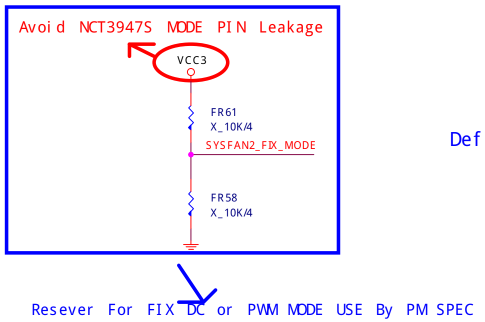


GPIO Control

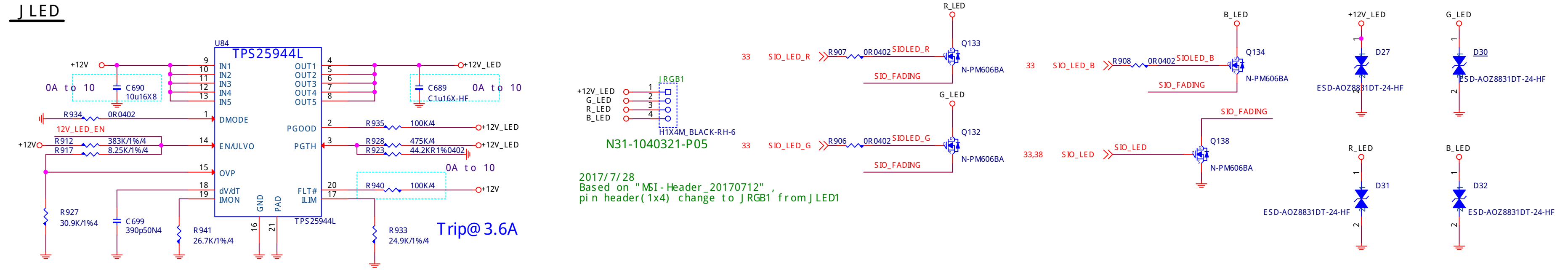
	MODE(PIN7)
PWM MODE	HIGH
DC MODE	LOW
AUTO MODE	GPI(Floating)

Default

Internall pull up 1.65V

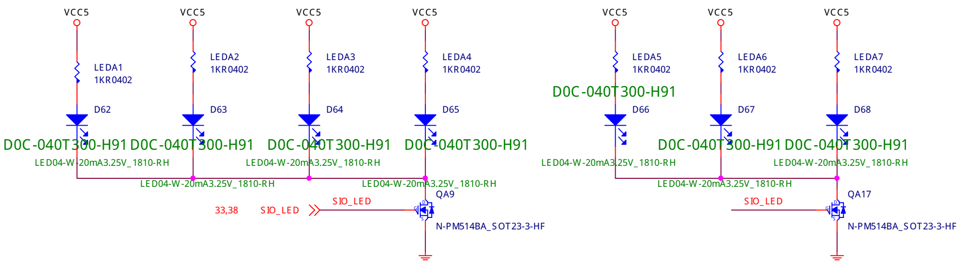


JLED



AUDIO LED

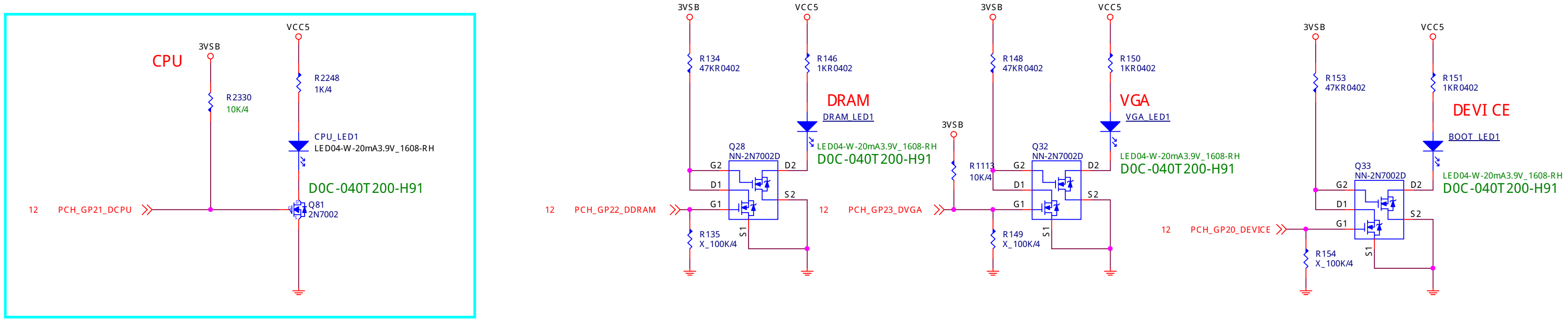
Audio moat is transparent and width 40mil
(4): M D0C-040T300-H91/S: D0C-040S300-E07*8



BOTTOM LED

EZ DEBUG

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

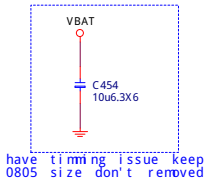


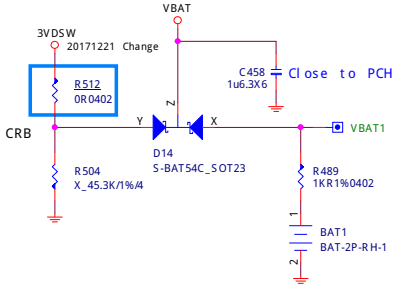
GPIO / LED	PCH_GP20	PCH_GP21	PCH_GP22	PCH_GP23
燿	NATIVE PULL HIGH	GPO PULL HIGH	GPO PULL HIGH	NATIVE PULL HIGH
钼	NATIVE LOW	GPO LOW (default LOW)	GPO LOW (default LOW)	GPO LOW (default LOW)

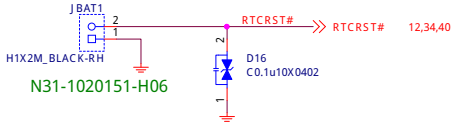
钱秋璞積 4 LED 藭 default 碑 碰詠盤稟N
1.碑 " CPU check CPU Ð 燿 check PASS N 牖钼 埴
2.鑢碑 "Memory/memory LED燿 check PASS N 牖 memory
3.VGA8check/VGA LED燿 check PASS N 牖 VGA 钼埴
4. 碰N 砬 殭 碃詠N 3 LED 龚 峘犬 钼B
刿岡 ⓜ 盱 ë 刿碃詠 牖LED 仚: 獣 T 禦

MICRO-STAR INT'L CO.,LTD.
Title: RGB/AUDIO/EZ DEBUG LED
Size | Document Number: MS-7B24 | Rev 1.0/2.0
Date: Wednesday, January 10, 2018 | Sheet 38 of 58

VBAT







MICRO-STAR INT'L CO.,LTD.		
Title: CLR COMS/CUT VBAT		
Size	Document Number: MS-7B24	Rev: 1.0/2.0
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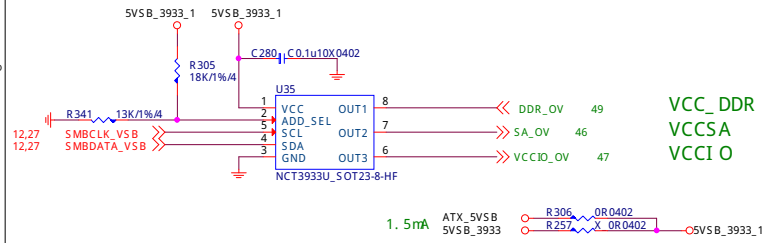
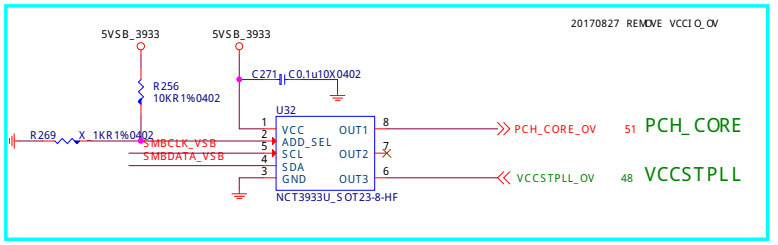
UPI VOLTAGE CONSOLE

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

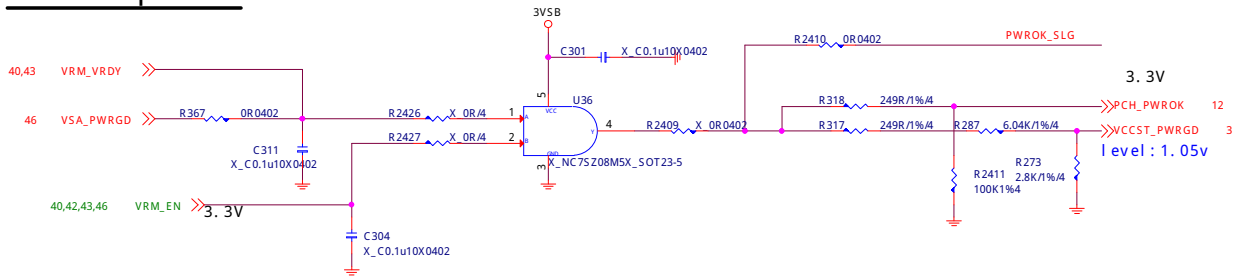


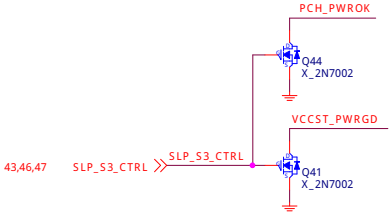
UPI VOLTAGE CONSOLE

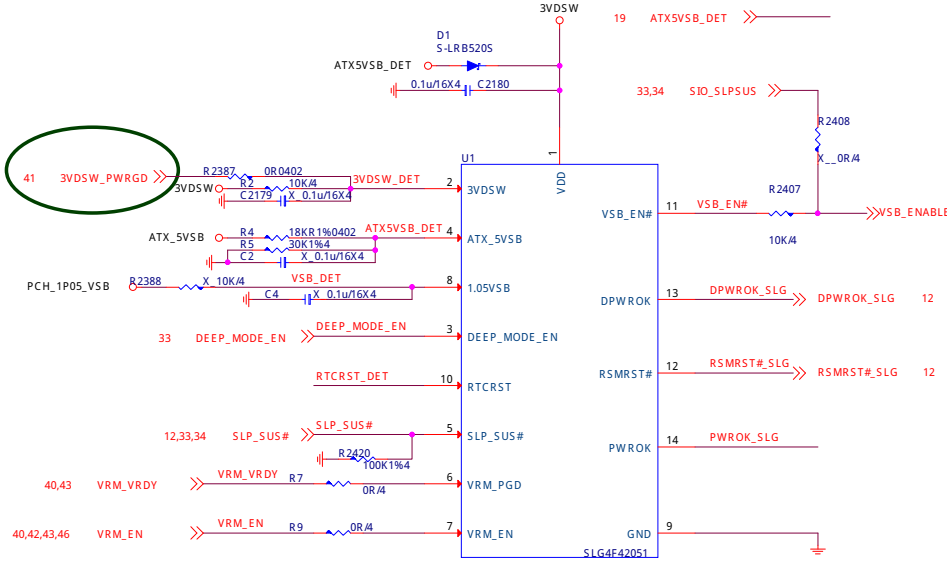
0x20: RH=10K, RL=OPEN

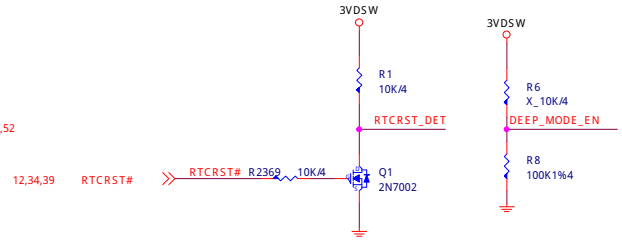


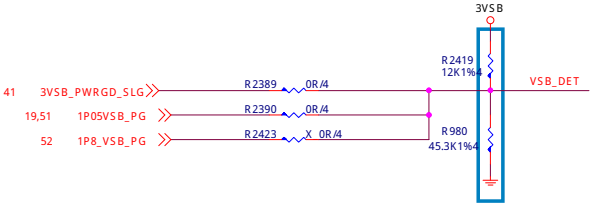
VRM Sequence











MICRO-STAR INT'L CO.,LTD.

Title: OV-NCT3933/Sequence

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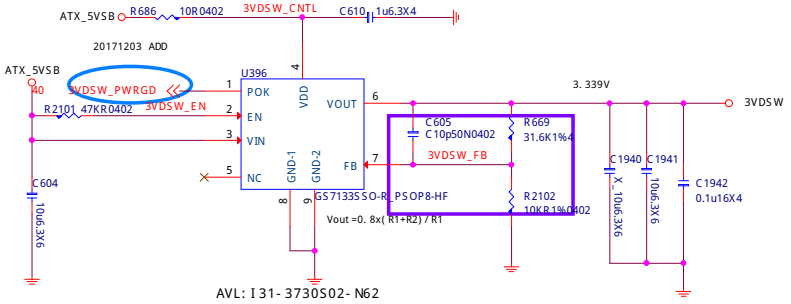
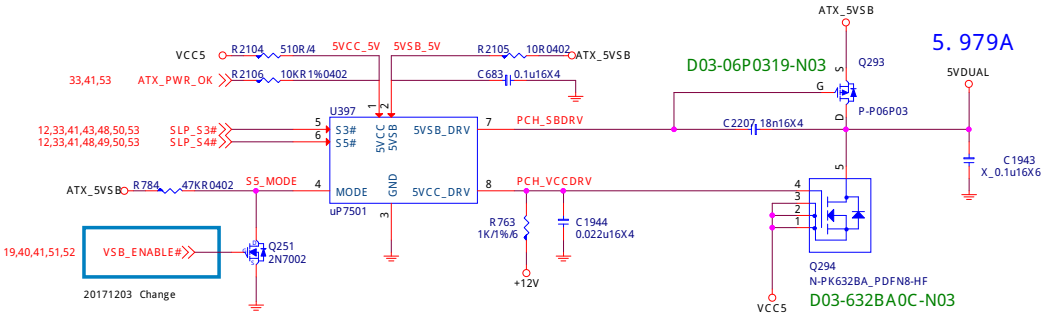
3VDSW



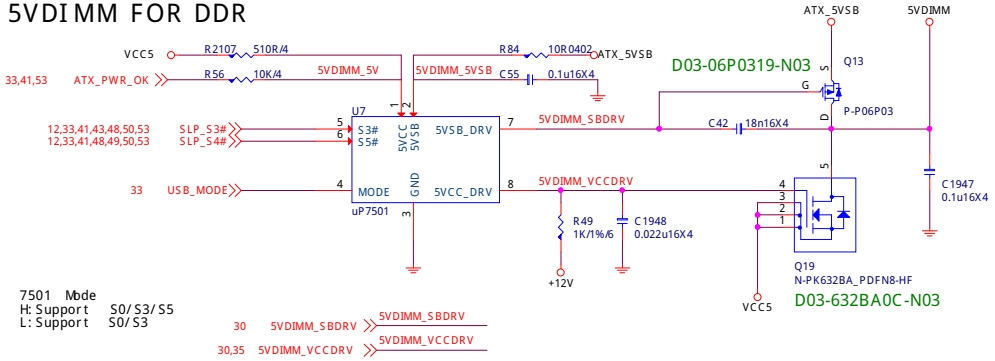
5VDUAL

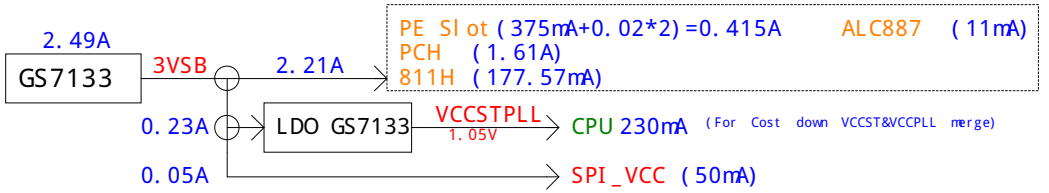
5VDUAL is power source of 1P0SB

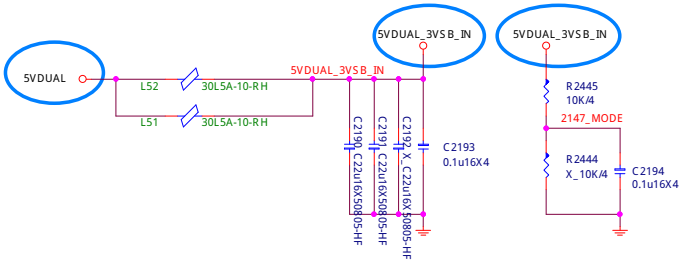


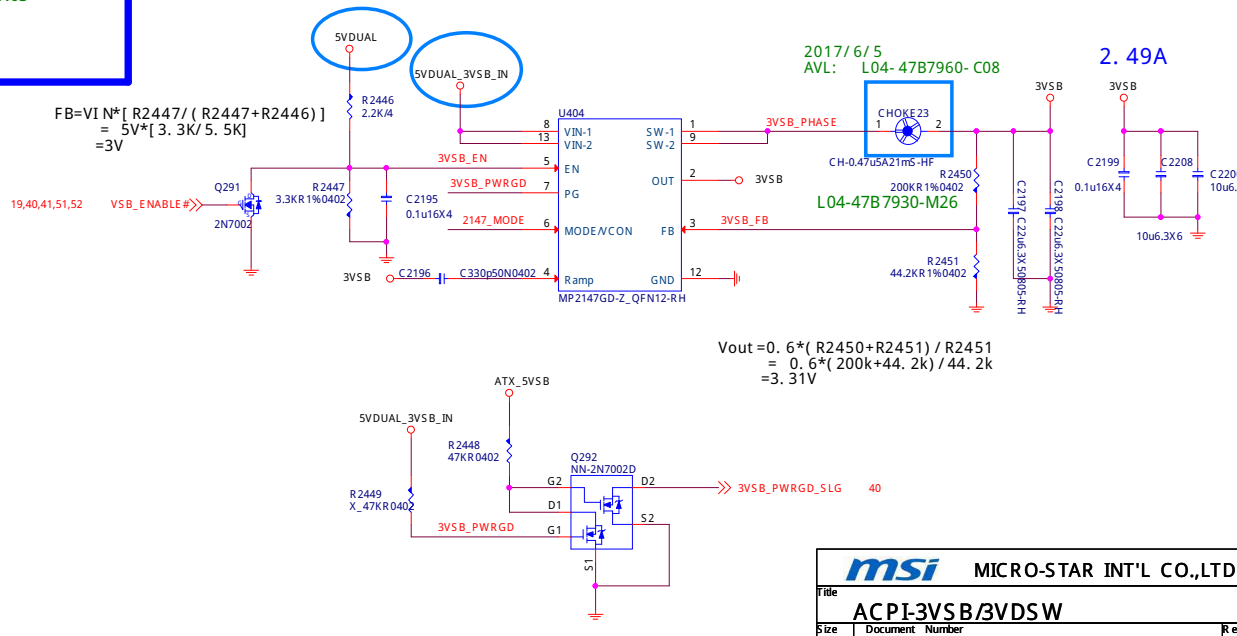
5VDIMM FOR DDR

7. 022A









MICRO-STAR INT'L CO.,LTD.

Title: ACPI-3VSB/3VDSW

Size | Document Number: MS-7B24 | Rev: 1.0/2.0

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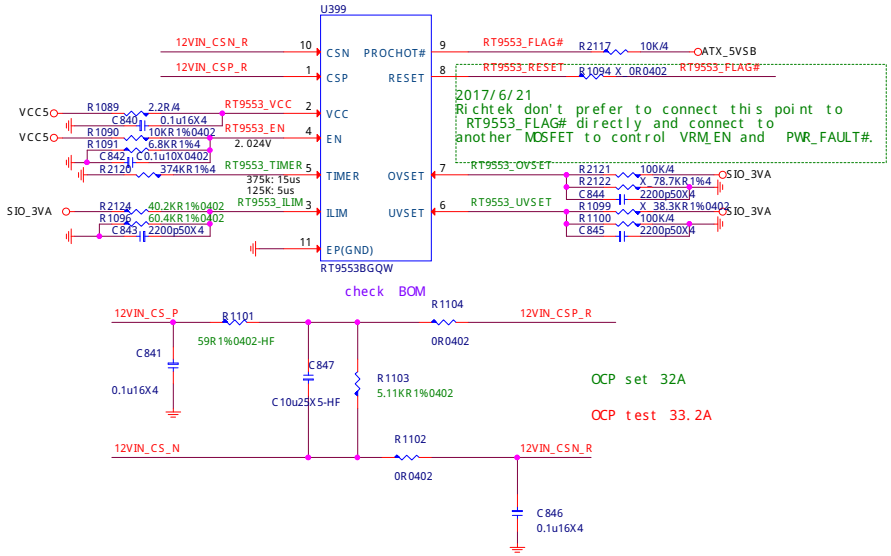

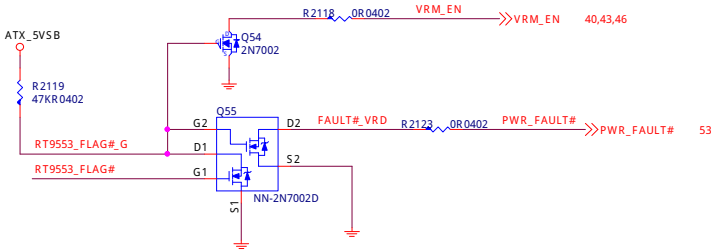

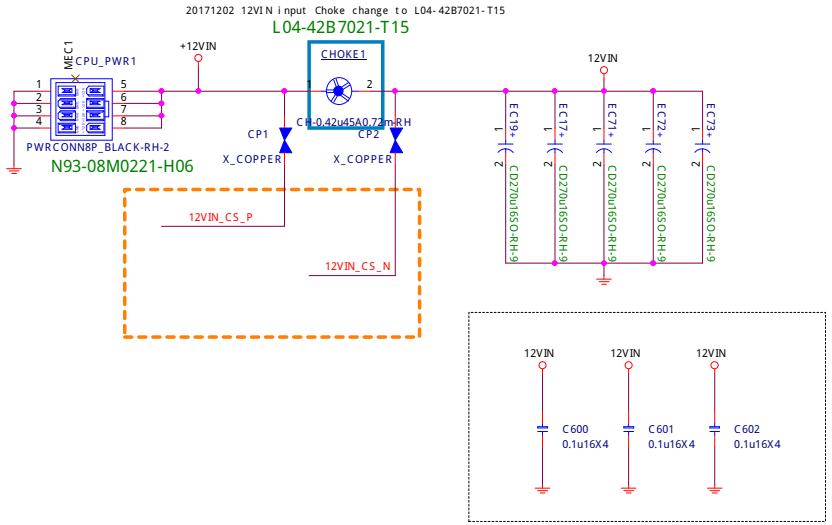

CORE:
D = Vout/Vin
= 1.52/12
= 0.126667
N = 4
Irms = Iout /N*SQRT(N*D*(1-N*D)
= 138/4*SQRT(4*0.126*(1-4*0.126))
= 17.249A

GT:
D = Vout/Vin
= 1.52/12
= 0.126667
N = 2
Irms =Iout /N*SQRT(N*D*(1-N*D)
= 45/2*SQRT(2*0.126*(1-2*0.126))
= 9.7857A

MICRO-STAR INT'L CO.,LTD.

Title: CURRENT SENSE-RT9553B

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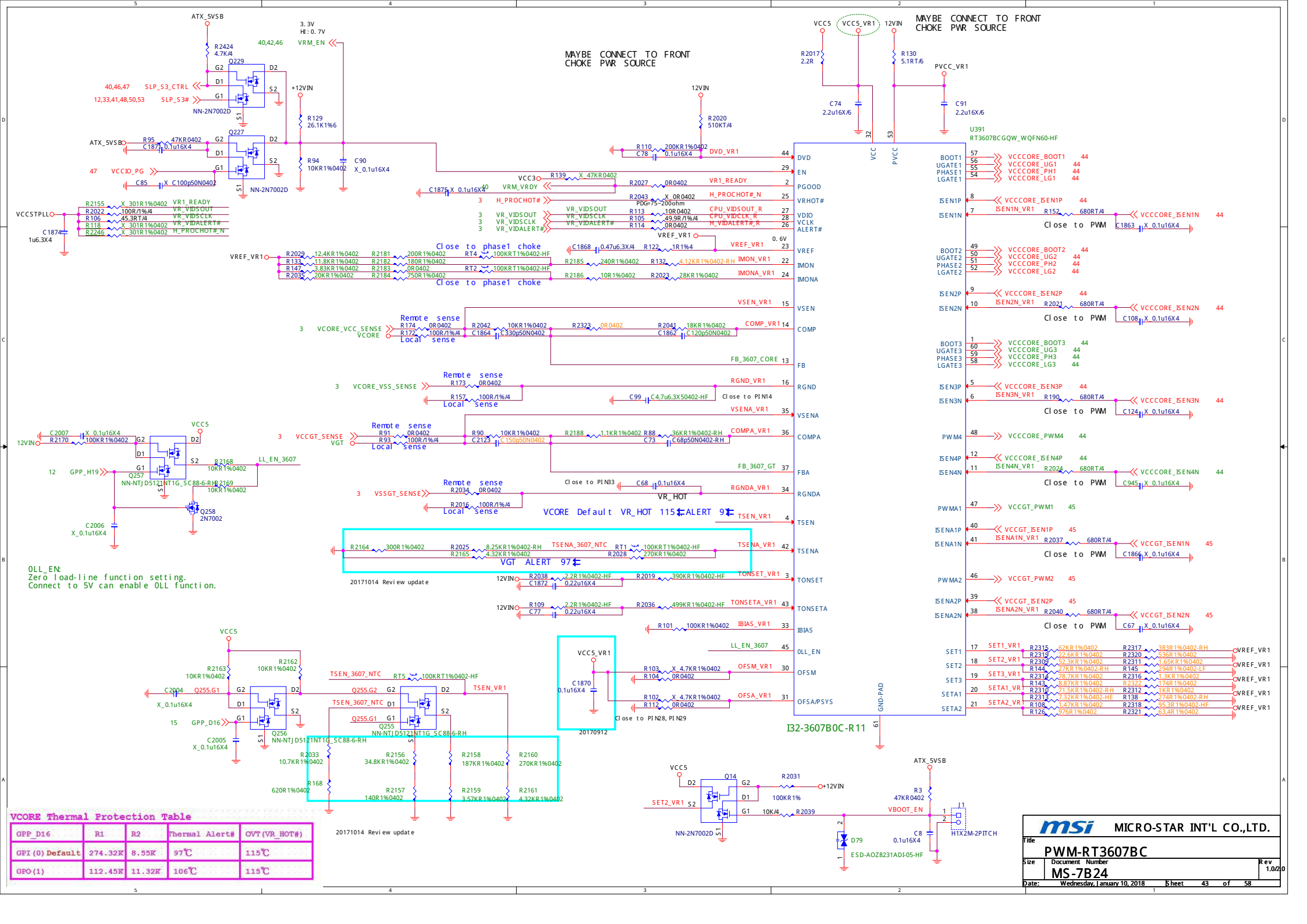
MAYBE CONNECT TO FRONT CHOKE PWR SOURCE
MAYBE CONNECT TO FRONT CHOKE PWR SOURCE
Close to phase1 choke
Close to phase1 choke
Remote sense
Local sense
VCORE Default VR_HOT 115 ALERT 97
VGT ALERT 97
OLL_EN:
Zero load-line function setting.
Connect to 5V can enable OLL function.
20171014 Review update
20171014 Review update
20170912
I32-3607B0C-R11
Close to PWM
VCORE Thermal Protection Table
GPP_D16 | R1 | R2 | Thermal Alert# | OVT(VR_HOT#)
GPI(0) Default | 274.32K | 8.55K | 97℃ | 115℃
GPO(1) | 112.45K | 11.32K | 106℃ | 115℃
MICRO-STAR INT'L CO.,LTD.
PWM-RT3607BC
MS-7B24
Rev 1.0/2.0
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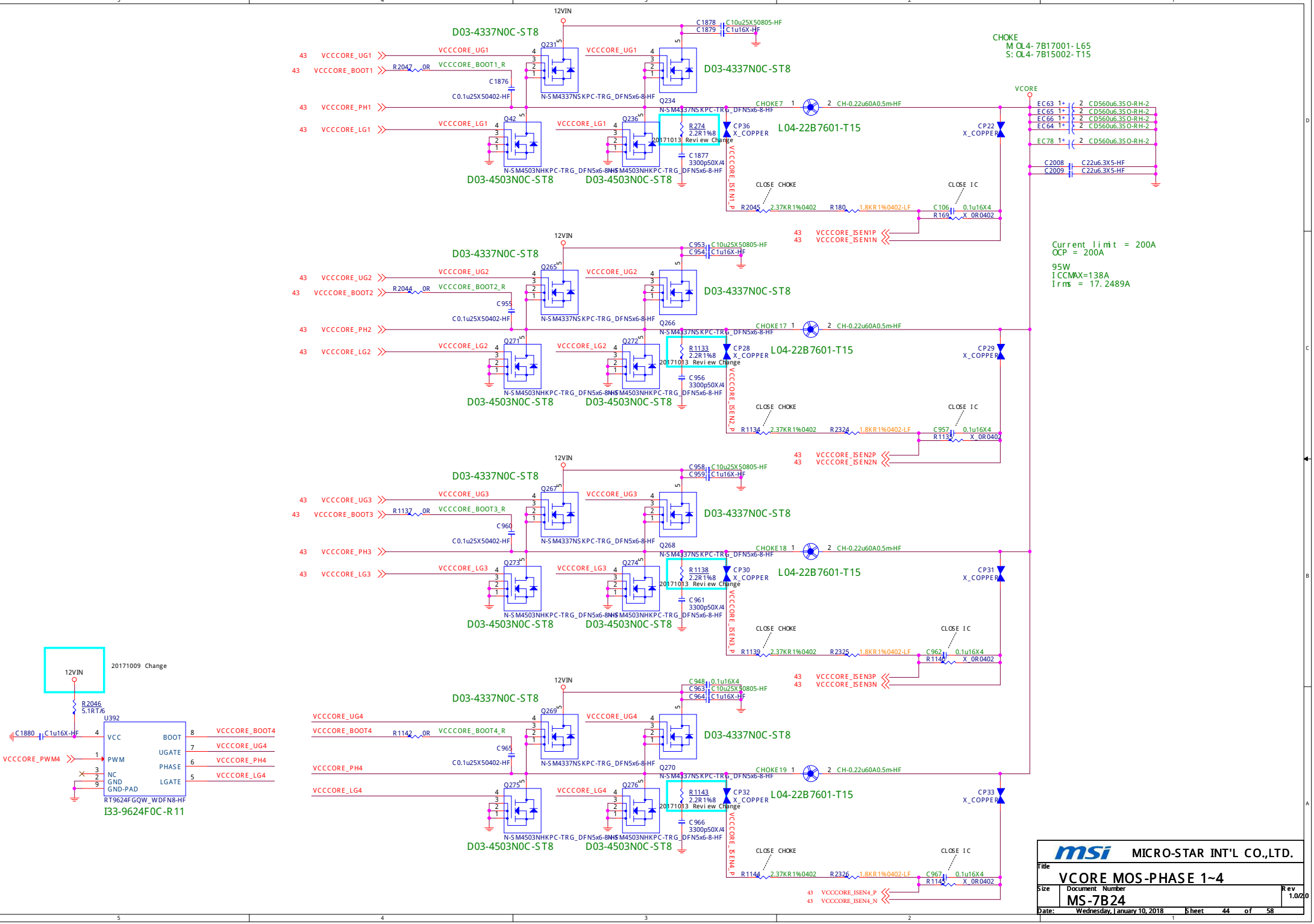
12VIN
D03-4337N0C-ST8
D03-4503N0C-ST8
CHOKE
M:OL4-7B17001-L65
S:OL4-7B15002-T15
L04-22B7601-T15
VCORE
Current limit = 200A
OCP = 200A
95W
ICCMAX=138A
Irms = 17.2489A
20171009 Change
20171013 Review Change
I33-9624F0C-R11
RT9624FGQW_WDFN8-HF
MICRO-STAR INT'L CO.,LTD.
VCORE MOS-PHASE 1~4
MS-7B24
Rev 1.0/2.0
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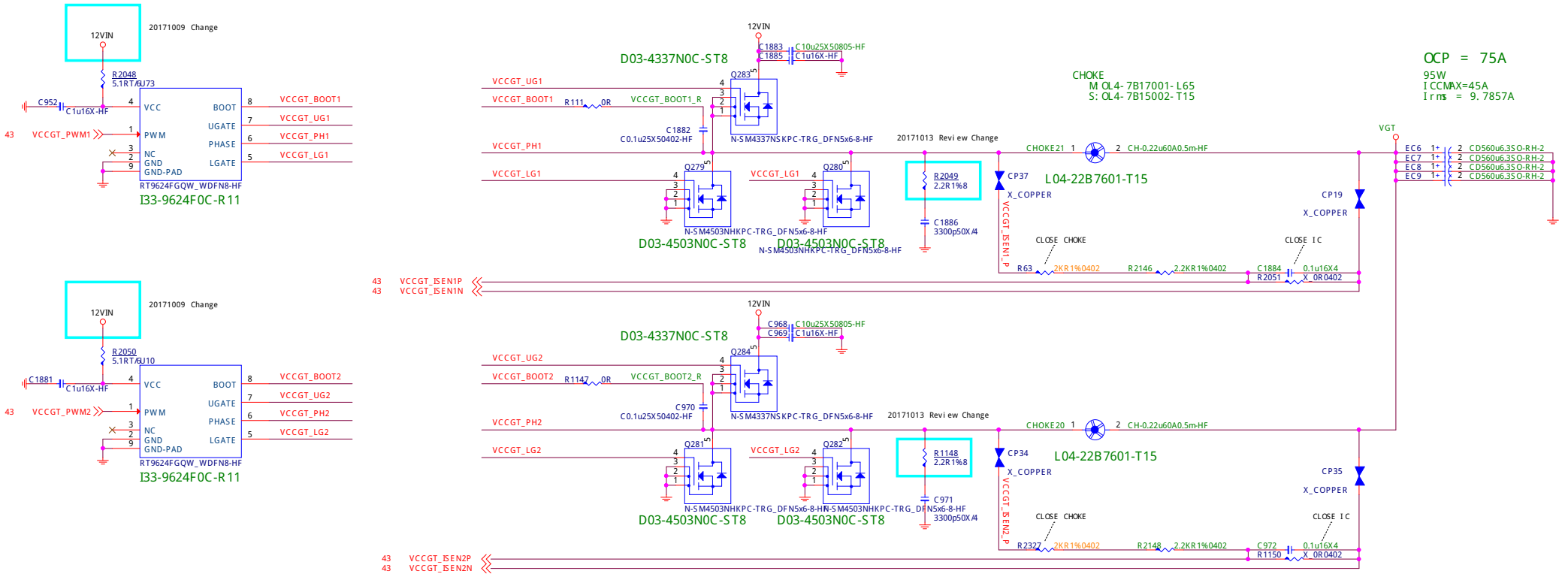

MICRO-STAR INT'L CO.,LTD.

Title: VGT MOS-PHASE 1~3

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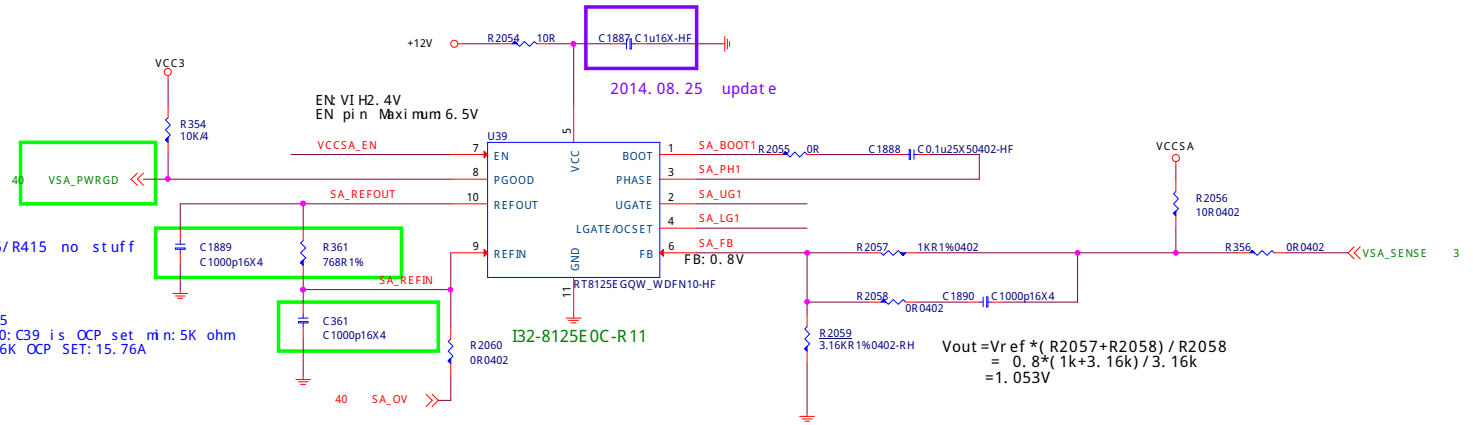
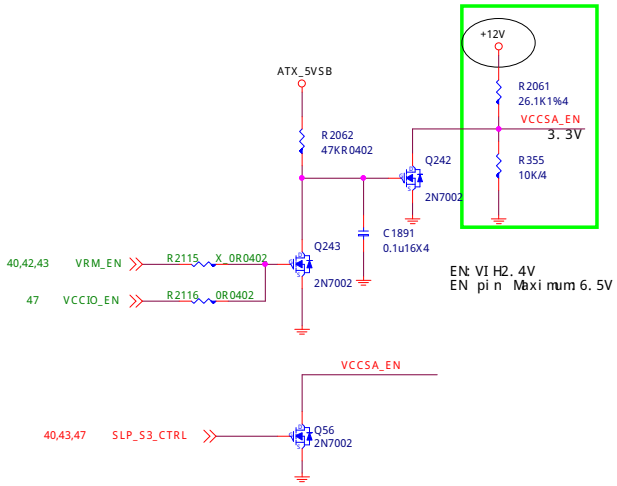
SA Power:1.05V,12.3A

Rocpset: 5. 6K
OCP(min)=Rocset*Iocset/Rdson(Low side)
=5. 1K*10uA/3. 3mohm
=15. 45A
OCP(max)=Rocset*Iocset/Rdson(Low side)
=5. 1K*10uA/2. 1mohm
=24. 2A
OCP(test)=19. 2A

Rdson(low)10V
D03-632BA0C-N03 :
Max: 3. 3mohm Type: 2. 1mohm

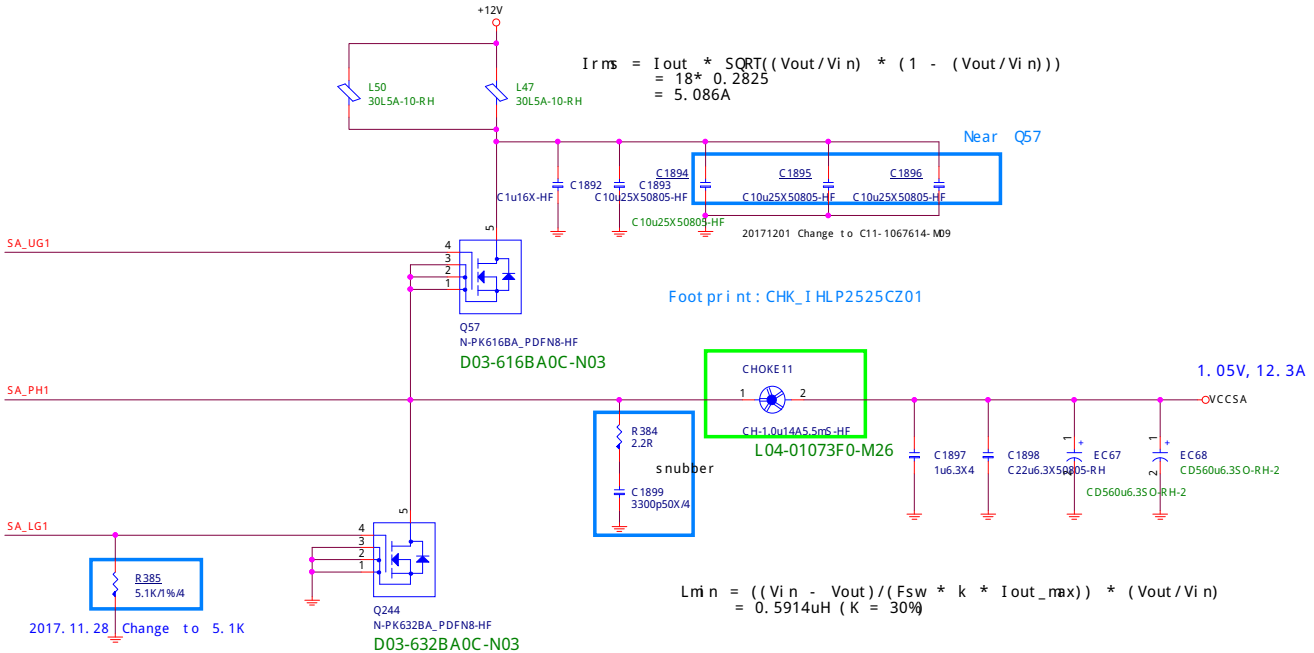


Pull up by layout&Check level



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

SLP_S3# assertion to VR disabled max: 1us



msi MICRO-STAR INT'L CO.,LTD.		
Title: CPU PWR-VCCSA-RT8125E		
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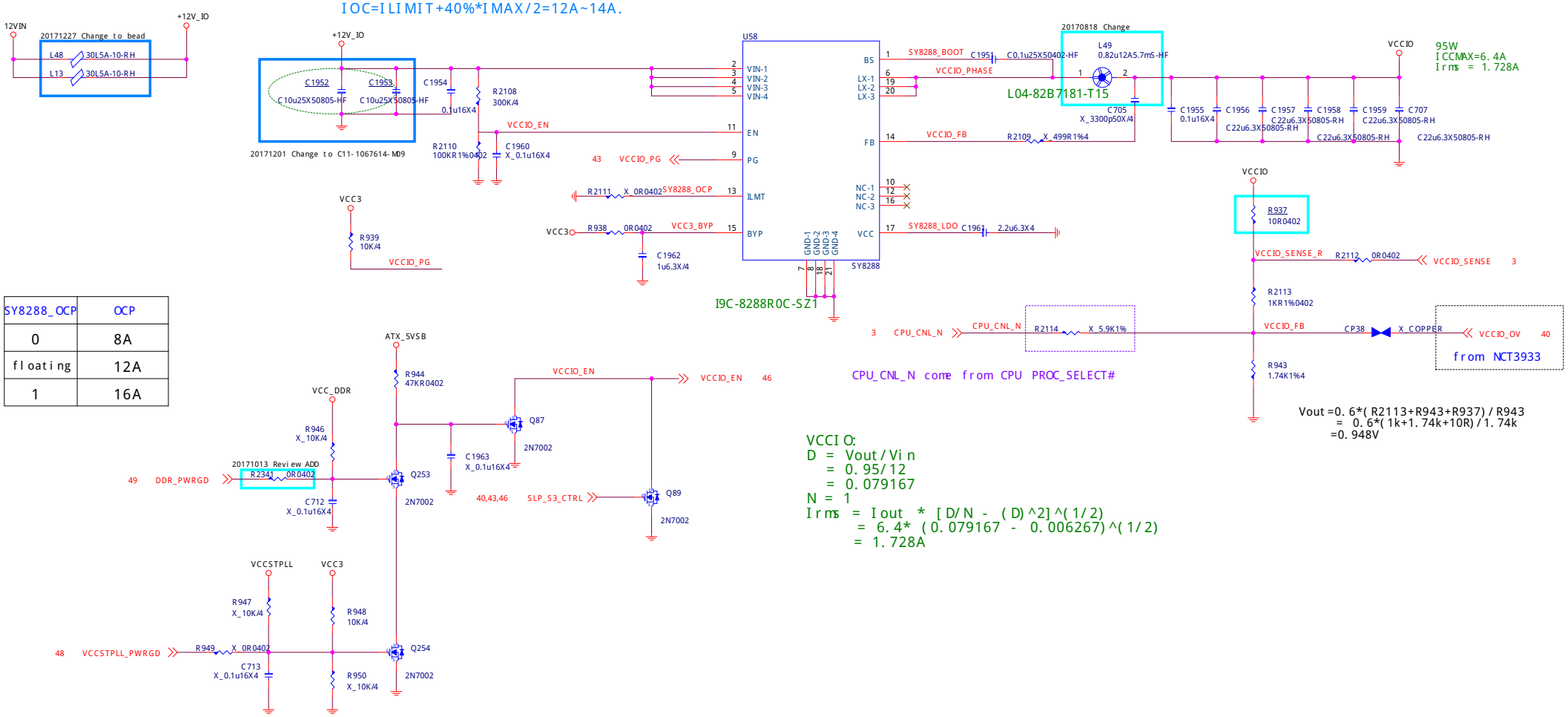
IO Power:0.95V,6.4A

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



SY8288_OCP	OCP
0	8A
floating	12A
1	16A

MICRO-STAR INT'L CO.,LTD.

Title: CPU PWR-VCCIO-SY8288

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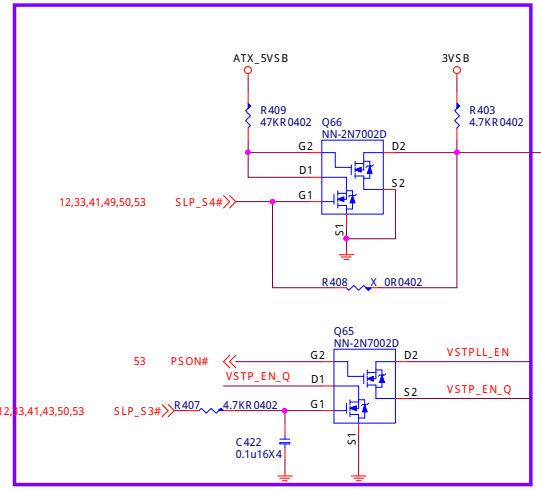
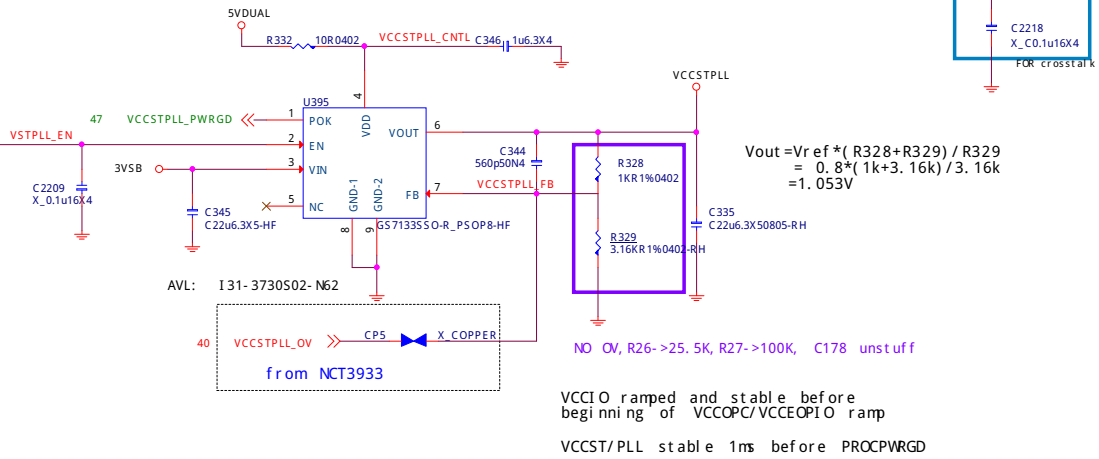
VCCSTPLL

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

MICRO-STAR INT'L CO.,LTD.		
Title: CPU PWR-VCCST/PLL		
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DDR4_1.2V 2.5A+9.5A+1.2A=13.2A

3.3A FOR CPU

15.7A FOR 4DIMM

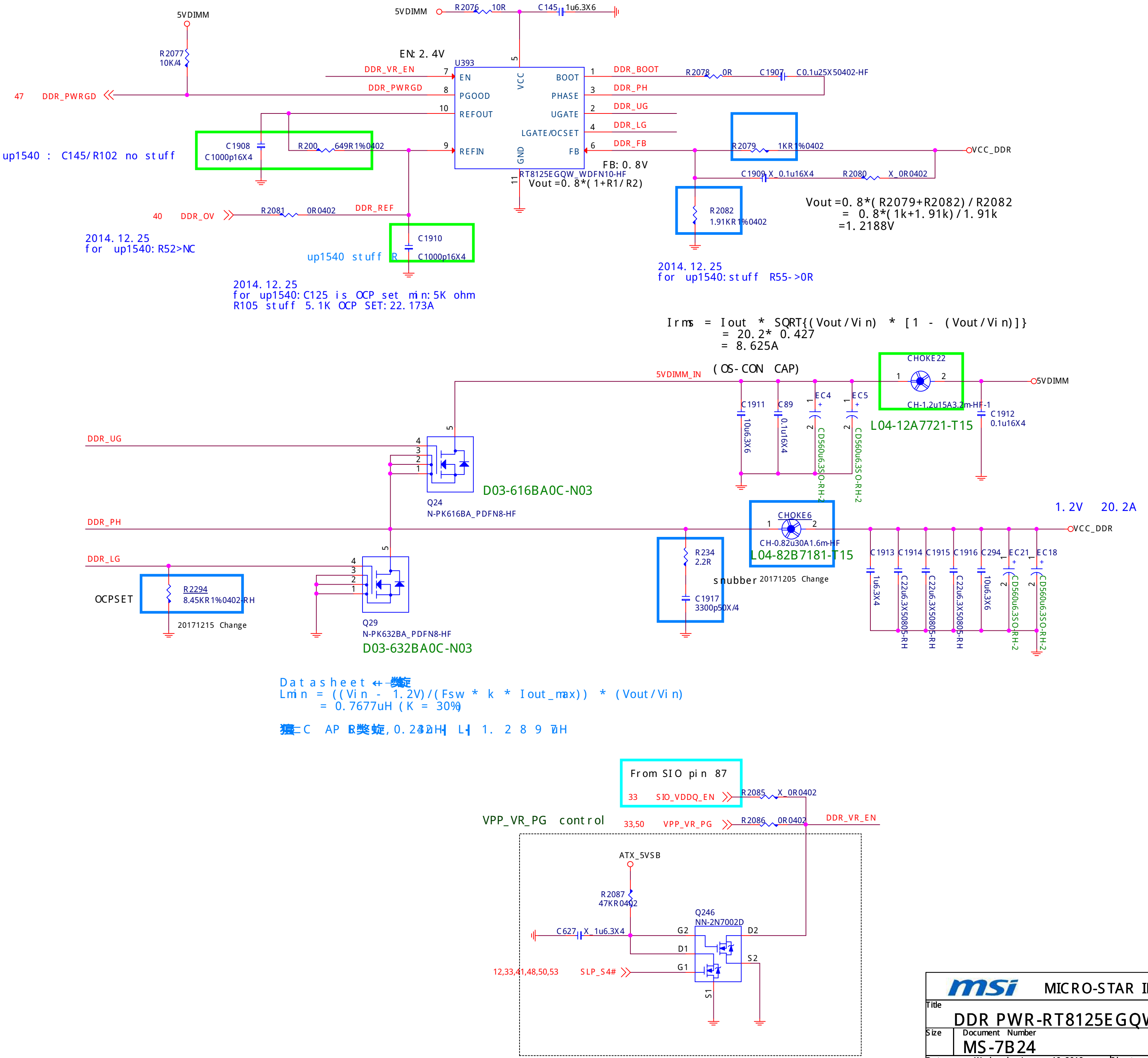
1.2A FOR DDR VTT

Rocpset: 6.04K
OCP(type)=Rocset*Iocset/Rdson(Low side)
=8.45K*10uA/4.6mohm
=18.3A

OCP(max)=Rocset*Iocset/Rdson(Low side)
=8.45K*10uA/3mohm
=28.2A

OCP(test)=23.4A

Rdson(low)4.5V
D03-632BA0C-N03 :
MAX: 4.6mohm TYPE: 3mohm



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

C AP R 建議, 0.24 uH L 1. 2 8 9 uH

msi	MICRO-STAR INT'L CO.,LTD.
Title	DDR PWR-RT8125EGQW
Size / Document Number	MS-7B24
Rev	1.0/2.0
Date:	Wednesday, January 10, 2018
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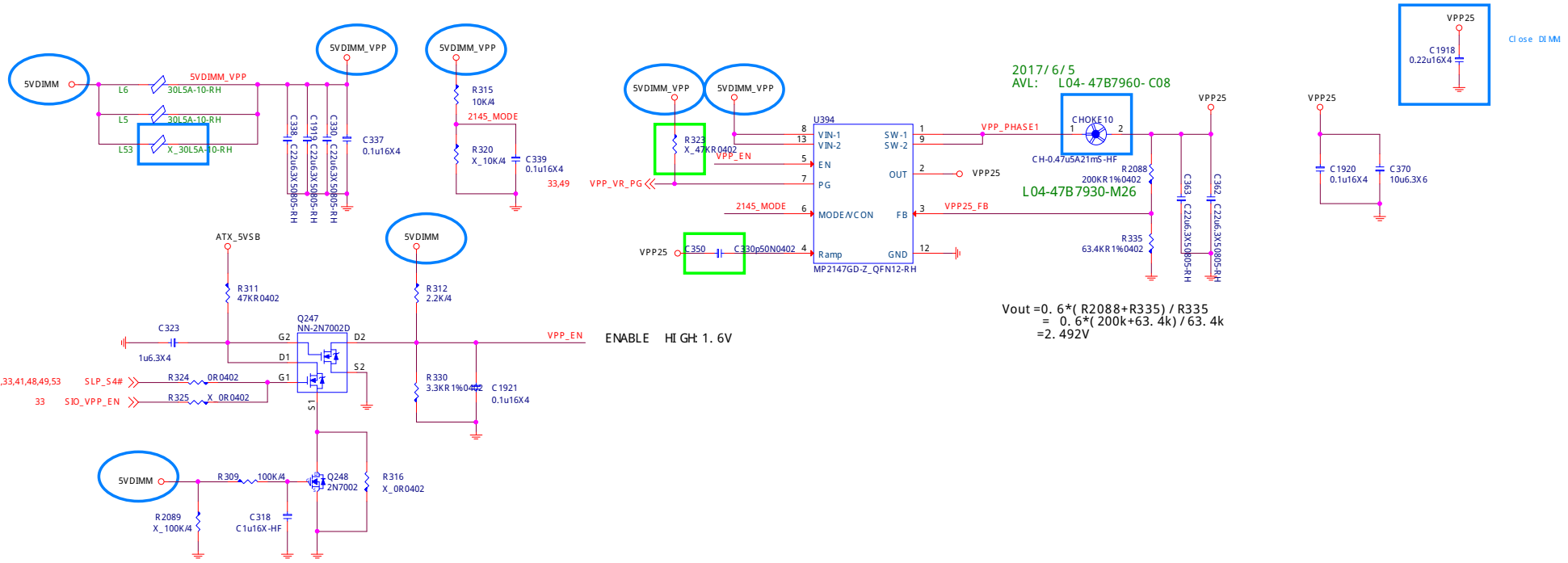
4DIMM :2.24A FOR DDR VPP2.5V

VPP25 Power

2.5V; 2.24A

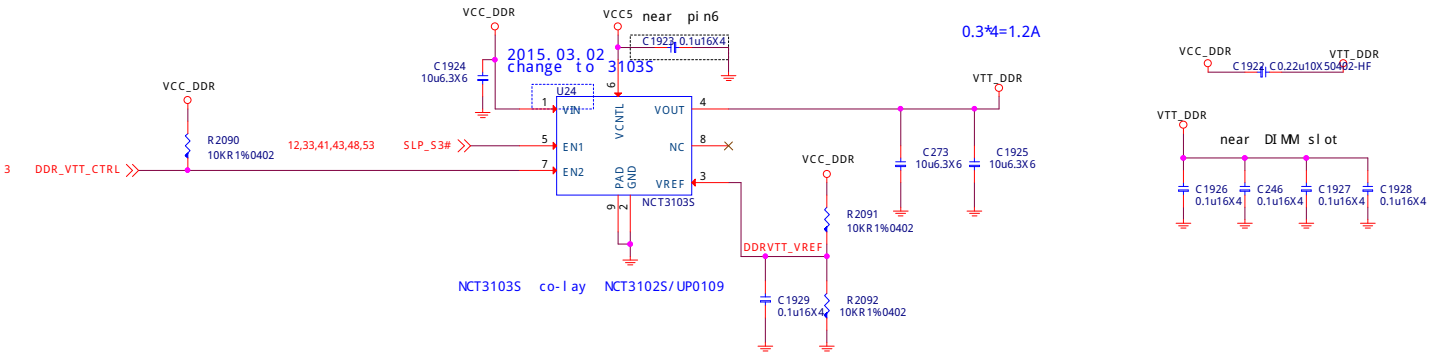


ENABLE HIGH: 1.6V

Vout =0.6*(R2088+R335) / R335
= 0.6*(200k+63.4k) / 63.4k
=2.492V

To make sure VPP EN after 5VDIMM stable

DDR VTT Power



MICRO-STAR INT'L CO.,LTD.

Title: DDR PWR VPP25-MP2147/VTT

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PCH_1VSB

1.05V; 11.576A

Rocpset: 6.04K
OCP(type)=Rocset*10uA/Rdson(Low side)
=5.6K*10uA/4.6mohm
=12.1A
OCP(max)=Rocset*10uA/Rdson(Low side)
=5.6K*10uA/3mohm
=18.6A

OCP(test)=17.16A

Rdson(low)4.5V
D03-632BA0C-N03 :
MAX:4.6mohm TYPE:3mohm

L04-47B7730-T15 for OC, Gaming 10, 9, 7, 5
L04-12A7321-L65 for Gaming 3, SLI, ECO
L04-12A7721-T15 for cost down

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

Iin=13.11A*1.05V/0.8/5V=3.44A
L02-3008043-M26

L02-3008043-M26
too Big

MAX: 11.576A

AVL: L04-82B7160-C08

L04-82B7090-M26

5VDUAL
R2093 10R
C650 1u6.3X6
U61
RT8125EGQW_WDFN10-HF
PCH_1VSB_EN
1P05VSB_PG
PCH_REFOUT
C1933 1000p16X4
R2095 806R1%0402-RH
C1934 1000p16X4
PCH_REFIN
R759 0R0402
40 PCH_CORE_OV
PCH_BOOT
R2094 0R
PCH_R_BOOT
C634 C0.1u25X50402-HF
PCH_PHASE
PCH_UGATE
PCH_LGATE
R2295 5.6KR1%0402
2017.11.28 Change to 5.6K
PCH_CORE_FB_R
5VDUAL_PCH_IN
C1932 0.1u16X4
C626 10u16X8
EC69 CD560u6.3SO-RH-2
C651 X_0.1u16X4
L10 30L5A-10RH
L9 30L5A-10RH
L54 X_30L5A-10-RH
5VDUAL
Q92
N-PK616BA_PDFN8-HF
D03-616BA0C-N03
Q90
N-PK632BA_PDFN8-HF
D03-632BA0C-N03
R648 2.2R
C597 3300p50X/4
CHOKE12
CH-0.82u18A4.6mS-HF
EC32 CD560u6.3SO-RH-2
EC33 CD560u6.3SO-RH-2
C537 C22u6.3X5080S-RH
C1935 10u6.3X6
C536 10u6.3X6
C1936 10u6.3X4
PCH_1P05_VSB
C1937 X_0.01u25X4
PCH_TYPE3
R738 X_0R0402
R2195 10R1%0402
R2097 1KR1%0402
R2196 0R0402
PCH_MPHY_SENSE 16
R750 3.16KR1%0402-RH
PCH_1P05_VSB
Vout = Vref * ((R2097+ R750)/R750)
= 0.8 * ((3.16K+ 1K)/3.16K)
= 1.053V

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

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

5VDUAL
20171009 Change
R2098 47KR0402
PCH_1VSB_EN
C1938 X_0.1u16X4
R768
ATX_5VSB
47KR0402
OPC_1P8_EN#
C1939 X_0.1u16X4
Q249 2N7002
PCH_1P8_VSB
R2099 1KR1%0402
3VSB
R2300 X_10K/4
20170831 Change
R2100 X_2.21KR1%4
Q250 2N3904

PCH_1VSB_EN
19,40,41,52 VSB_ENABLE#
VSB_ENABLE#
Q110 2N7002
20171203 Change

20171203 ADD

MSI	MICRO-STAR INT'L CO.,LTD.		
Title	PCH POWER-RT8125E		
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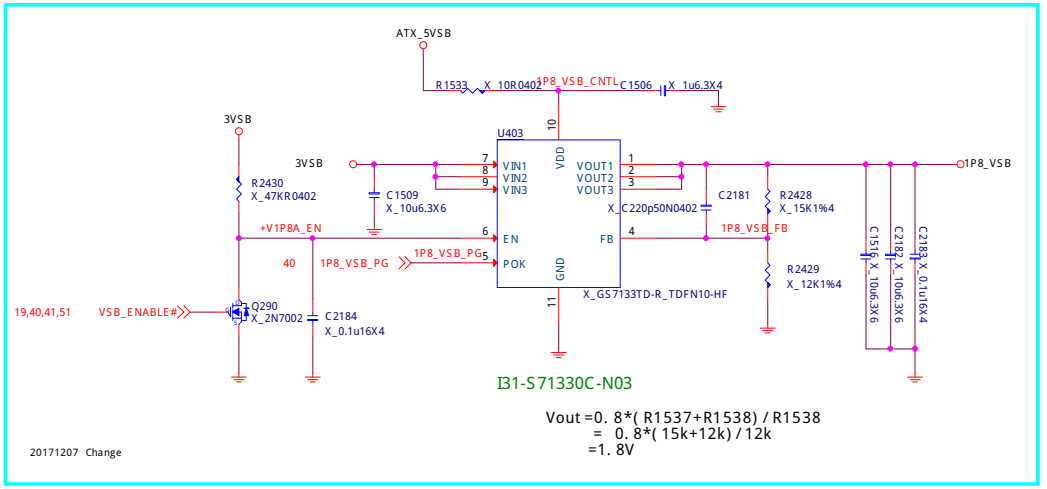

MICRO-STAR INT'L CO.,LTD.		
Title: PCH POWER-1P8V/1P24V		
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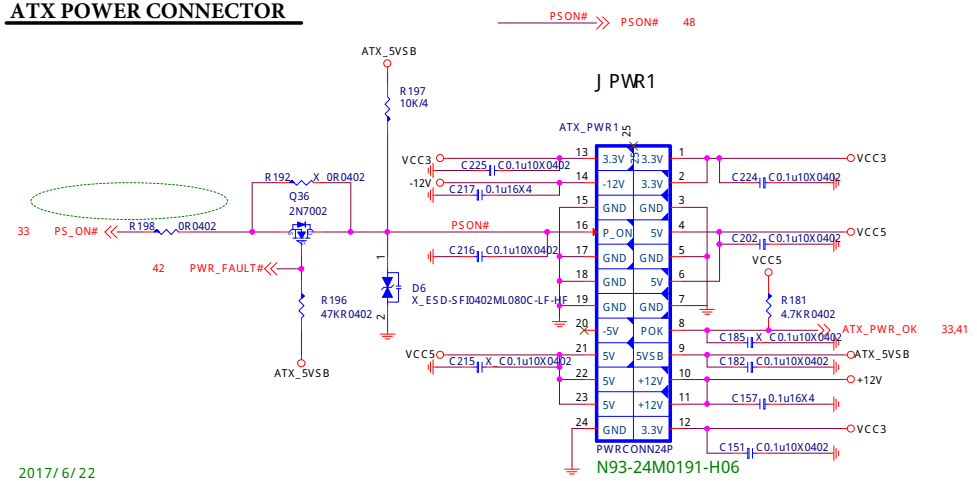
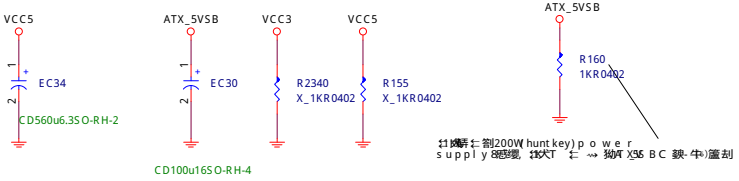
ATX POWER CONNECTOR



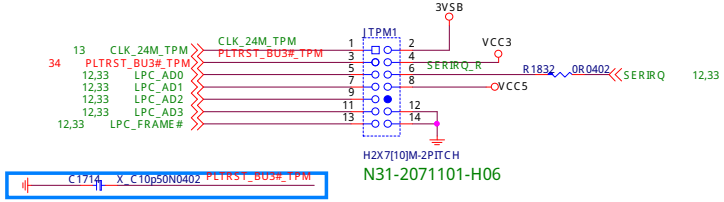
N93-24M0191-H06

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

2017/7/6
EC36 move to PCI1

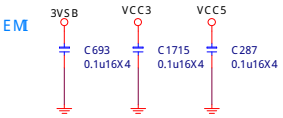


TPM Pin Header

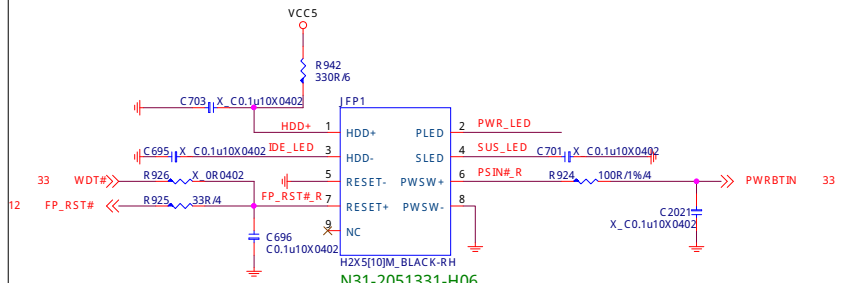


N31-2071101-H06

EMI

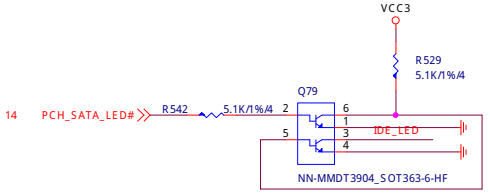


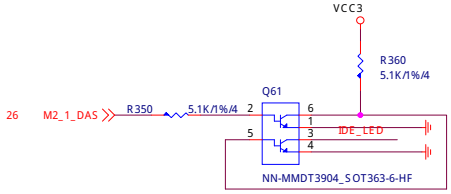
FRONT PANEL

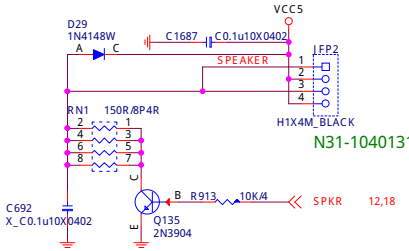


N31-2051331-H06

D77 is as close as possible to pin6 at JFP1

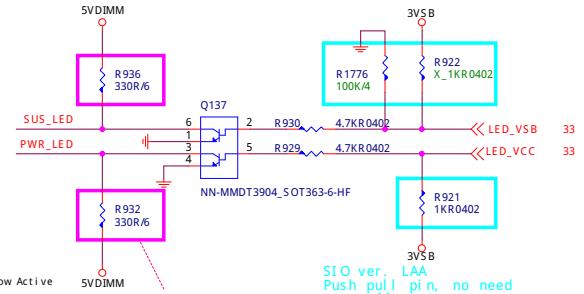






N31-1040131-H06

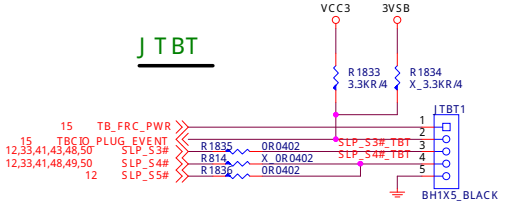
Front Panel LED



SIO ver. LAA
Push pull pin, no need to stuff resisters.

Reserve pull high to 5VDIMM if PM don't want PLED light in deep mode.

J TBT



N32-1050271-H06

MICRO-STAR INT'L CO.,LTD.		
Title: ATX Connector/F_Panel		
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VIRTU_LA1
Label
VI RTU
AMI

VIRTU_LA2
Label
VI RTU
HDMI

G51-M1SPXXA-A09

Y01-RHDMI03-000

CPU_H1
CPU
CPU_H1
E21-7869020-F02

BAT1_X1
BAT-BCR2032P-RH
D06-0100101-P01

MK_LABLE1
Market
Lable
B360
G51-M1SPM23-Q13

FOR PRO

PCB1
7B24_1.0

PK0-07B2420-G37
PK0-07B2420-E48

FOR BAZOOKA H370

REF6
EC
MK
G51-M1SPM24-Q13

REF7
EC
MK
G51-M1SPM22-Q13

FOR BAZOOKA B360

MEC1
T_MOS_HS1
HS-0505530-RH
MEC1
MEC2
20171215 Change
MEC2
E31-0505530-A87

HS_PCH1
PCH
Shi nk
MCE1
MCE2
HS-0409500-RH
E31-0409500-A87

FOR BAZOOKA

REF8
EC
MK
E31-0409430-K08

FOR PRO

Mounting Holes

MH5 MH6 MH8
MH7 MH3 MH9
MH11 MH10
X_MH001

C698
C0.1u10X0402

C680
C0.1u10X0402

Simulation

SIM1
SIM1
X_PIN1*2

SIM2
VCC5
SIM2
X_PIN1*2

Optical Fiducial Marks-120

FM2 FM4 FM1 FM3
FM5 FM6 FM8 FM7
X_FM

Vcheck

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

MICRO-STAR INT'L CO.,LTD.

Title: Manual Parts

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