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ITX:170*170

Ver: 1.1

CML Platform

CPU: *Comet lake S*
LGA1200
*CPU POWER PAK *8 Phase*
*GT POWER PAK *1 Phase*

System Chipset: *Z490 PCH_H*

Onboard Chip:
SIO:NTC6687
HD Audio Codec:ALC1220
LAN-Intel I225-V
Flash ROM: SPI 128 MB X1

Main Memory: *DDR4 * 2 (Dual Channel)*

ACPI:
5VDAUL:uP7501
5VDIMM:uP7501
3VSB:TPS566235
3VDSW:GS7133
SIO_3VA:GS7116

Power:
VCORE/GT/SA - ISL69269
VCCIO -RT8125E
VCCST/VCCSTG-MP2333
VCCPLL/VCCPLL_OC-GS7133
DDR - RT8231
PCH(1.05V) - RT8125E
1P8_VSB - GS7133

Expansion Slots:
*PCI Express (X16) Slot * 1*

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Size	Document Description	Rev
Custom	01 Cover Sheet.....	1.1

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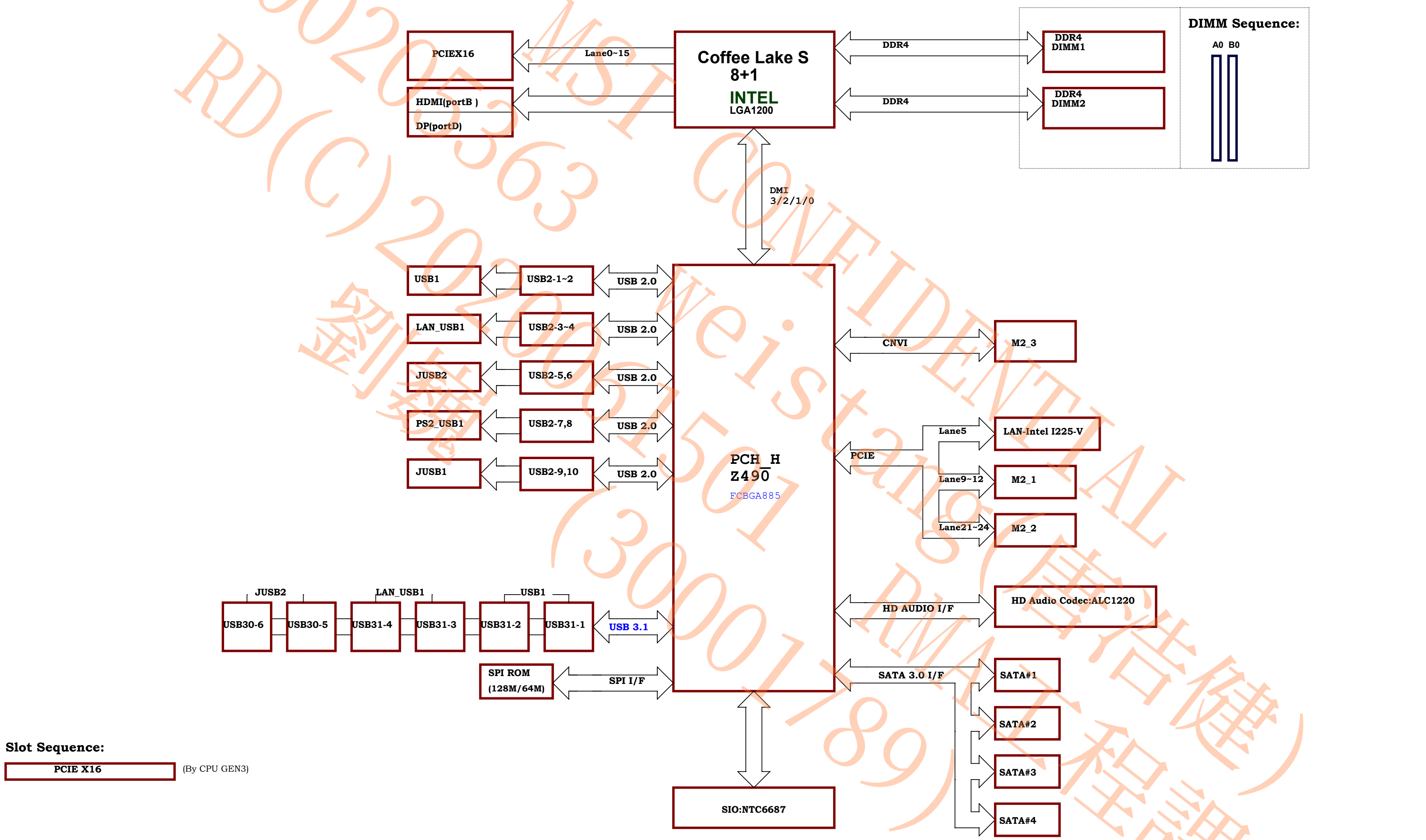
MS-7C77 Block Diagram



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Size	Document Description	Rev
Custom	02 Block Diagram	1.1

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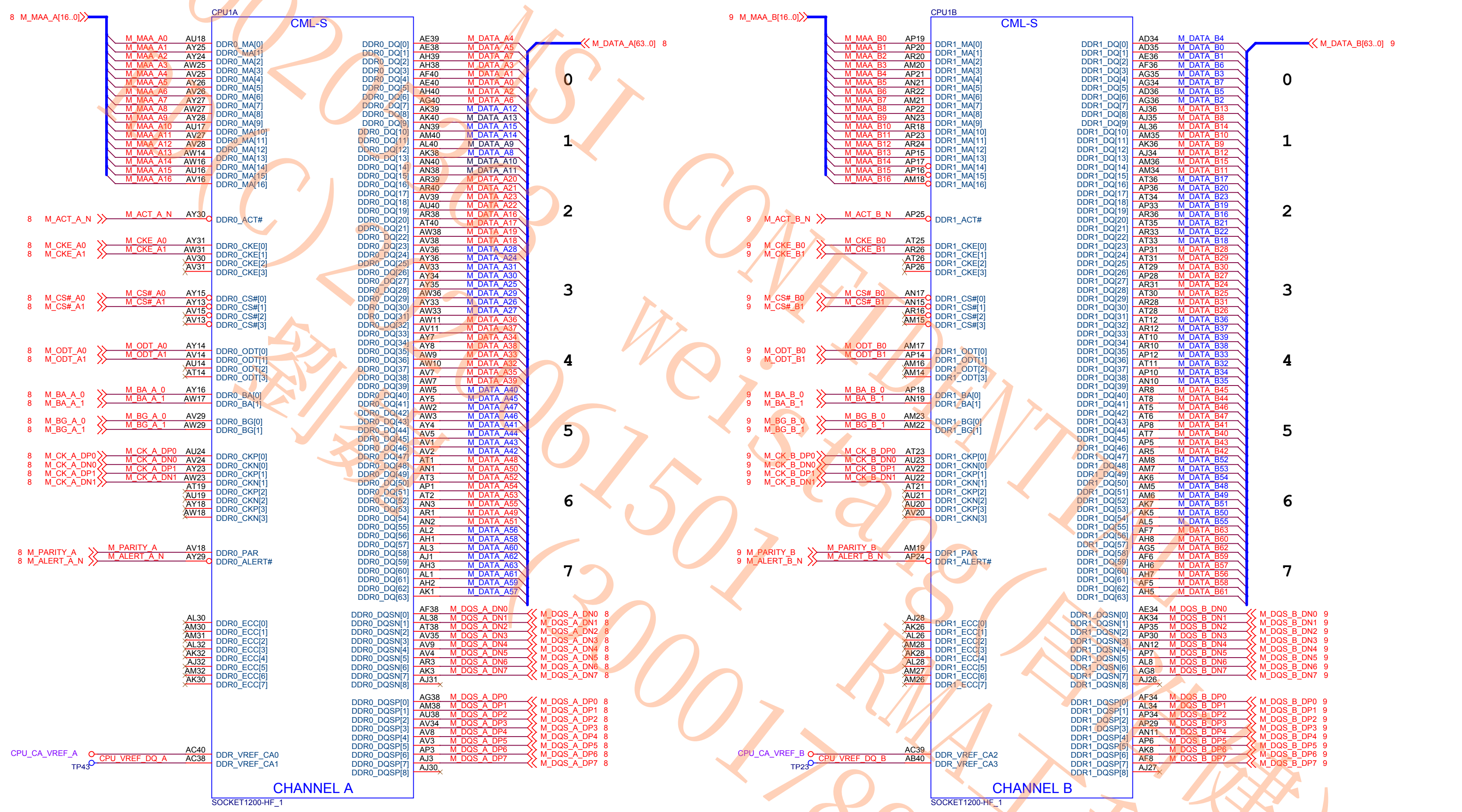

MICRO-STAR INT'L CO.,LTD

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Size	Document Description	Rev
Custom	03 CPU-Memory	1.1

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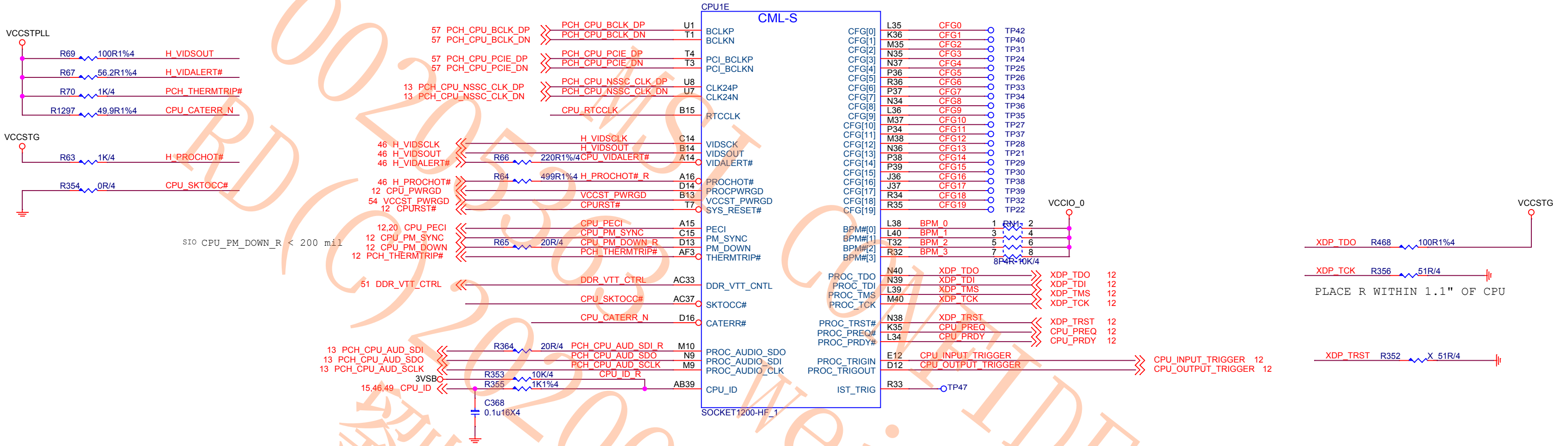
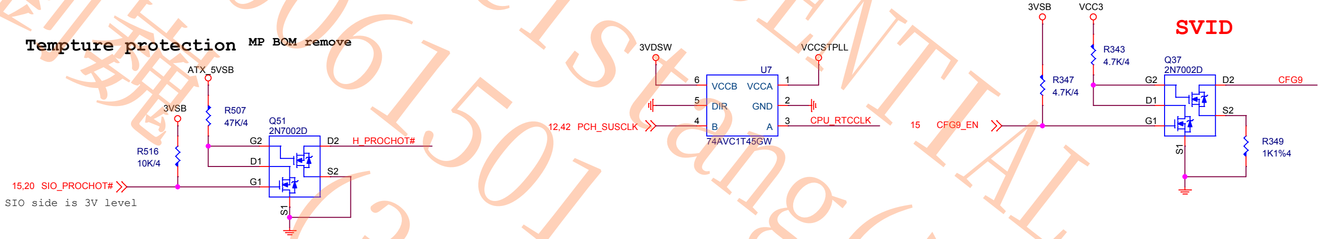


CFG Strap

CFG Table			
	HIGH	LOW	intel
0	(Default)Normal Operation	stall	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			CFG UNLOCK
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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Size	Document Description	Rev
Custom	04 CPU-Control/MISC/CFG	1.1

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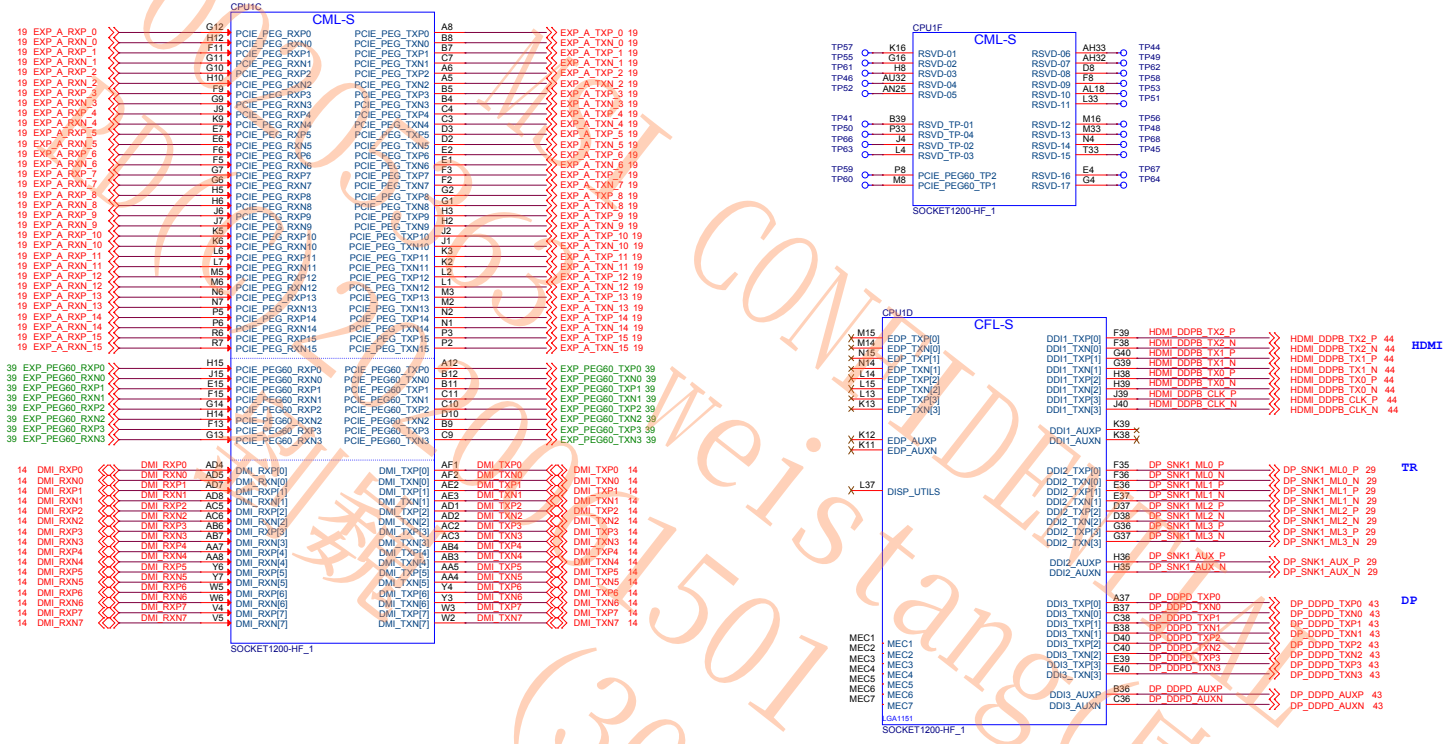
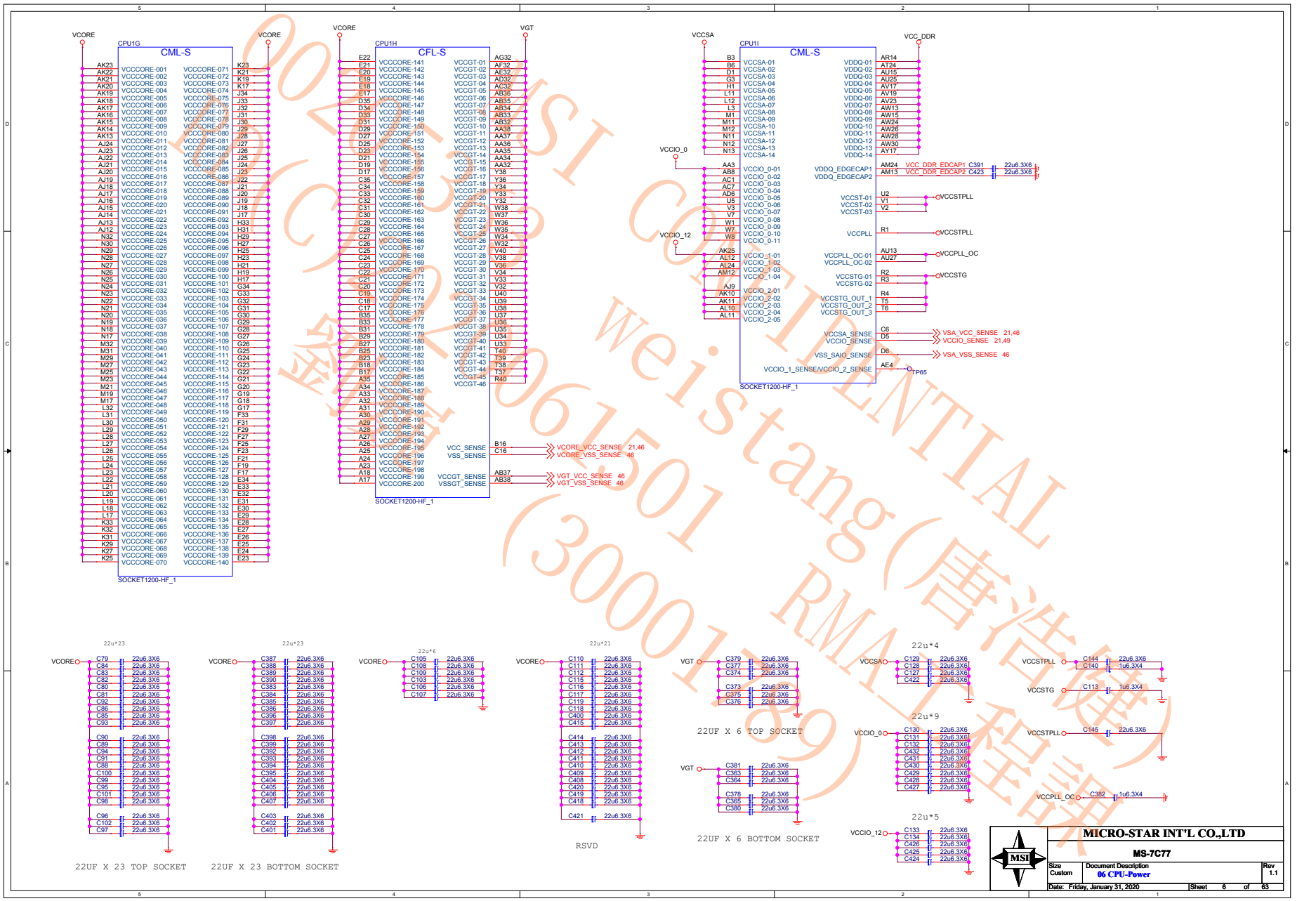


MICRO-STAR INT'L CO.,LTD		
MS-7C77		
Size: Custom	Document Description: 05 CPU-PEG/Display/RSVD	Rev: 1.1
Date: Friday, January 31, 2020	Sheet 5 of 63	


CPU1G
CML-S
SOCKET1200-HF_1
CPU1H
CFL-S
SOCKET1200-HF_1
CPU1I
CML-S
SOCKET1200-HF_1
VCORE_VCC_SENSE 21,46
VCORE_VSS_SENSE 46
VGT_VCC_SENSE 46
VGT_VSS_SENSE 46
VSA_VCC_SENSE 21,46
VCCIO_SENSE 21,49
VSA_VSS_SENSE 46
22UF X 23 TOP SOCKET
22UF X 23 BOTTOM SOCKET
RSVD
22UF X 6 TOP SOCKET
22UF X 6 BOTTOM SOCKET
MICRO-STAR INT'L CO.,LTD
MS-7C77
06 CPU-Power
Rev 1.1
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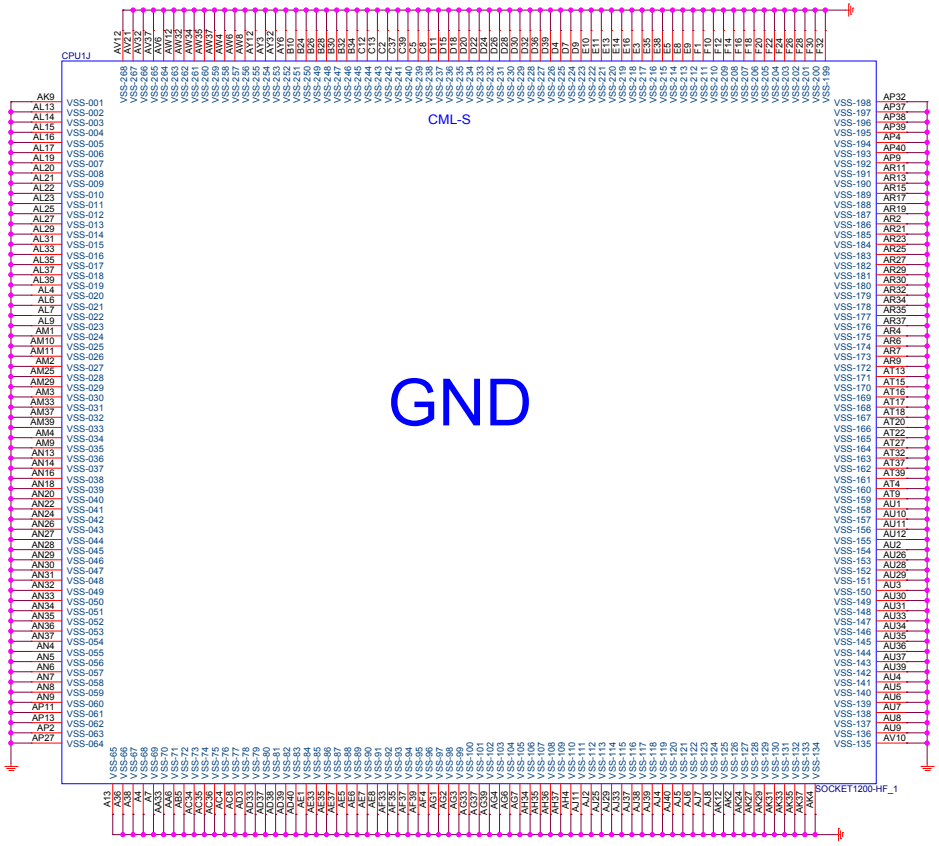
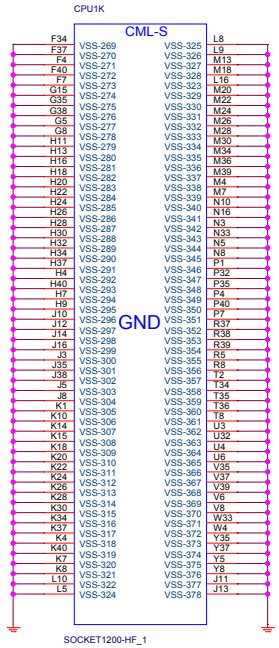
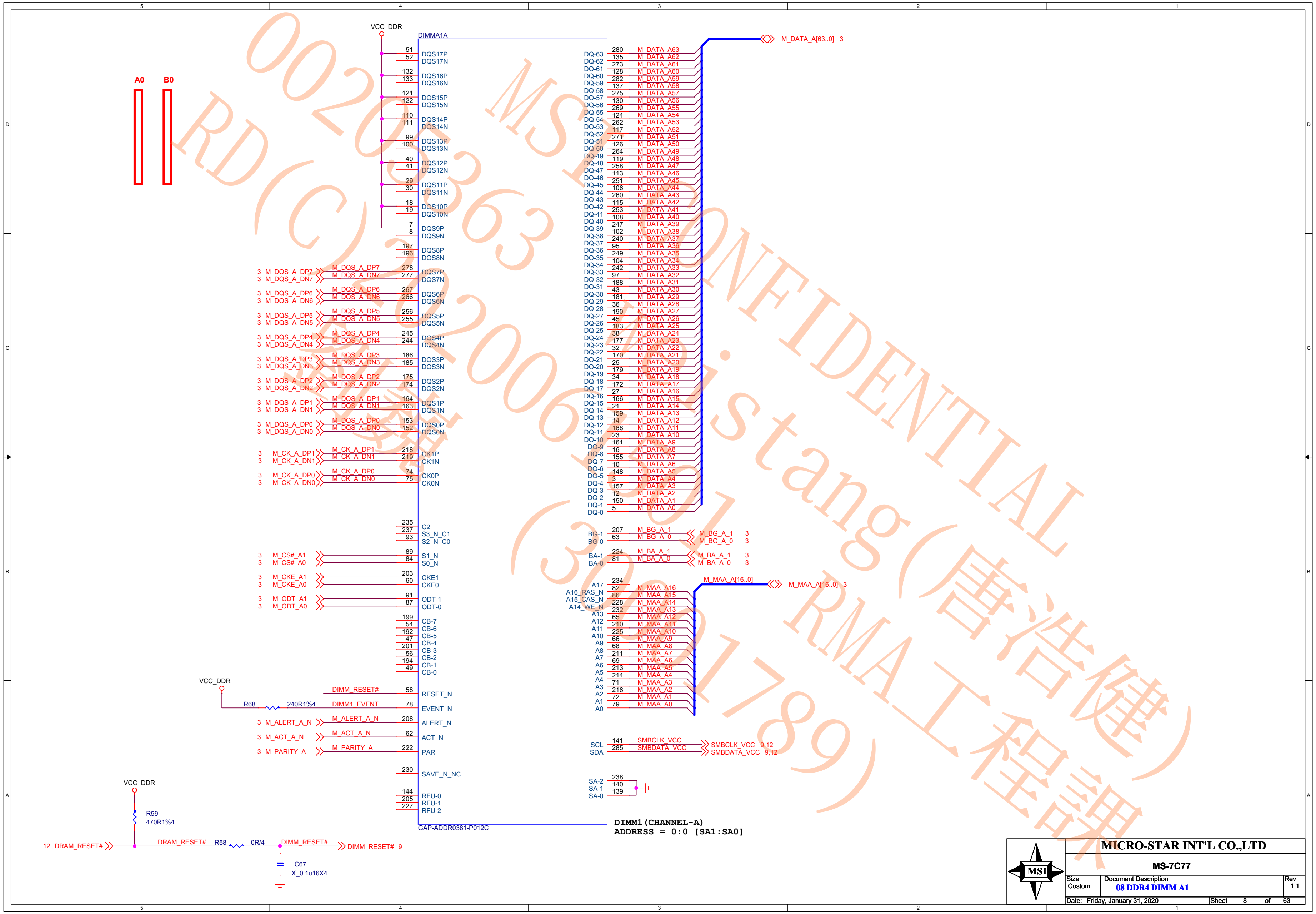




MICRO-STAR INT'L CO.,LTD		
MS-7C77		
Size: Custom	Document Description: 07 CPU-GND	Rev: 1.1
Date: Friday, January 31, 2020	Sheet 7 of 63	



VCC_DDR
DIMMA1A
A0
B0
DQS17P
DQS17N
DQS16P
DQS16N
DQS15P
DQS15N
DQS14P
DQS14N
DQS13P
DQS13N
DQS12P
DQS12N
DQS11P
DQS11N
DQS10P
DQS10N
DQS9P
DQS9N
DQS8P
DQS8N
M_DQS_A_DP7
M_DQS_A_DN7
M_DQS_A_DP0
M_DQS_A_DN0
M_CK_A_DP1
M_CK_A_DN1
M_CK_A_DP0
M_CK_A_DN0
CK1P
CK1N
CK0P
CK0N
C2
S3_N_C1
S2_N_C0
M_CS#_A1
M_CS#_A0
S1_N
S0_N
M_CKE_A1
M_CKE_A0
CKE1
CKE0
M_ODT_A1
M_ODT_A0
ODT-1
ODT-0
CB-7
CB-0
VCC_DDR
DIMM_RESET#
RESET_N
R68
240R1%4
DIMM1_EVENT
EVENT_N
M_ALERT_A_N
ALERT_N
M_ACT_A_N
ACT_N
M_PARITY_A
PAR
SAVE_N_NC
RFU-0
RFU-1
RFU-2
GAP-ADDR0381-P012C
VCC_DDR
R59
470R1%4
12 DRAM_RESET#
DRAM_RESET#
R58
0R/4
DIMM_RESET#
DIMM_RESET# 9
C67
X_0.1u16X4
M_DATA_A[63..0] 3
DQ-63
DQ-0
M_DATA_A63
M_DATA_A0
M_BG_A_1 3
M_BG_A_0 3
BG-1
BG-0
M_BA_A_1 3
M_BA_A_0 3
BA-1
BA-0
M_MAA_A[16..0]
M_MAA_A[16..0] 3
A17
A16_RAS_N
A15_CAS_N
A14_WE_N
A13
A0
M_MAA_A16
M_MAA_A0
SCL
SDA
SMBCLK_VCC
SMBDATA_VCC
SMBCLK_VCC 9,12
SMBDATA_VCC 9,12
SA-2
SA-1
SA-0
DIMM1(CHANNEL-A)
ADDRESS = 0:0 [SA1:SA0]
MSI
MICRO-STAR INT'L CO.,LTD
MS-7C77
Size
Custom
Document Description
08 DDR4 DIMM A1
Rev
1.1
Date: Friday, January 31, 2020
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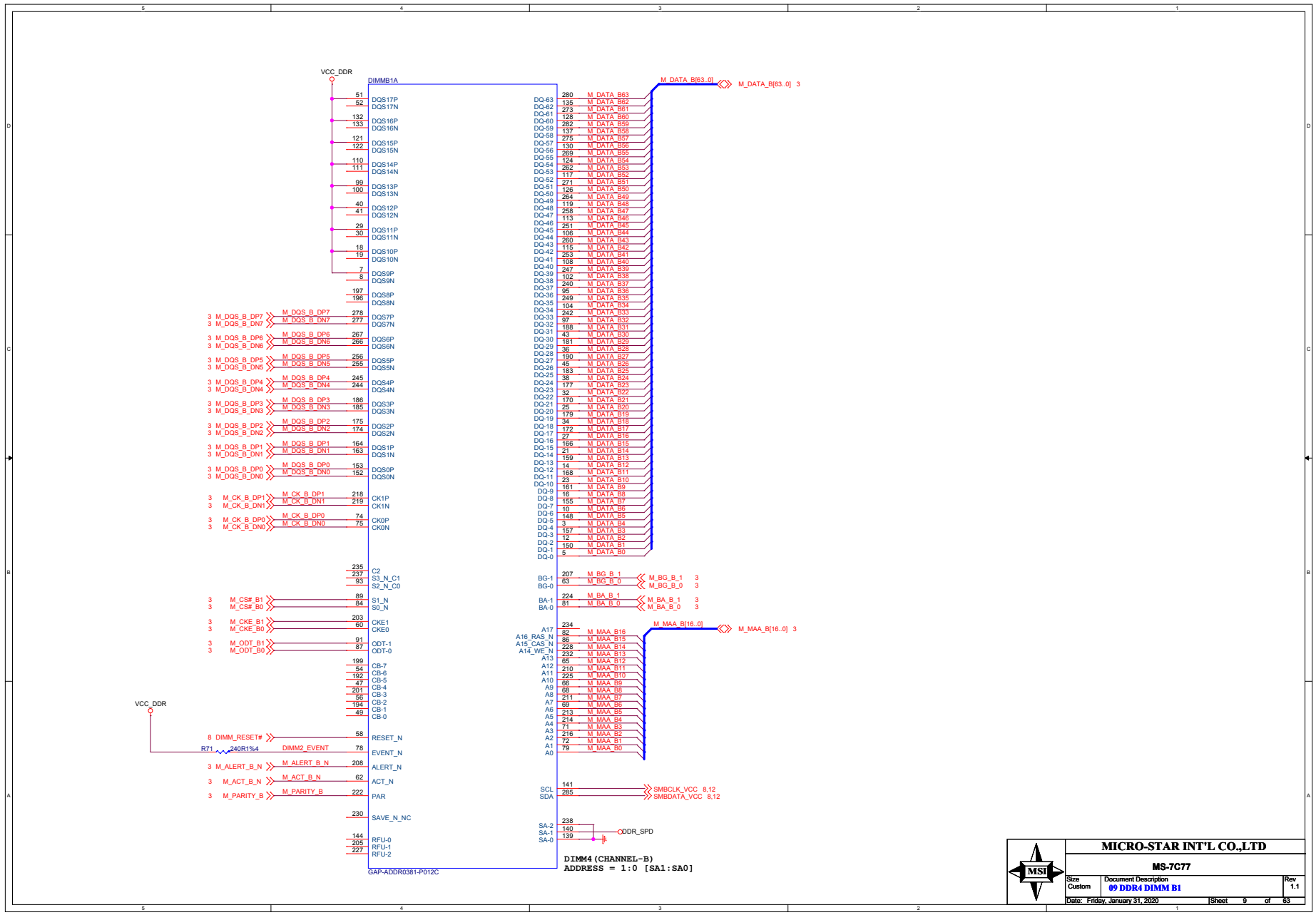
VCC_DDR
DIMMB1A
M_DATA_B[63..0]
M_DATA_B[63..0] 3
DQS17P
DQS17N
DQS16P
DQS16N
DQS15P
DQS15N
DQS14P
DQS14N
DQS13P
DQS13N
DQS12P
DQS12N
DQS11P
DQS11N
DQS10P
DQS10N
DQS9P
DQS9N
DQS8P
DQS8N
DQS7P
DQS7N
DQS6P
DQS6N
DQS5P
DQS5N
DQS4P
DQS4N
DQS3P
DQS3N
DQS2P
DQS2N
DQS1P
DQS1N
DQS0P
DQS0N
CK1P
CK1N
CK0P
CK0N
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
EVENT_N
ALERT_N
ACT_N
PAR
SAVE_N_NC
RFU-0
RFU-1
RFU-2
GAP-ADDR0381-P012C
M_MAA_B[16..0]
M_MAA_B[16..0] 3
SMBCLK_VCC 8,12
SMBDATA_VCC 8,12
SODDR_SPD
DIMM4(CHANNEL-B)
ADDRESS = 1:0 [SA1:SA0]
MICRO-STAR INT'L CO.,LTD
MS-7C77
Size
Custom
Document Description
09 DDR4 DIMM B1
Rev
1.1
Date: Friday, January 31, 2020
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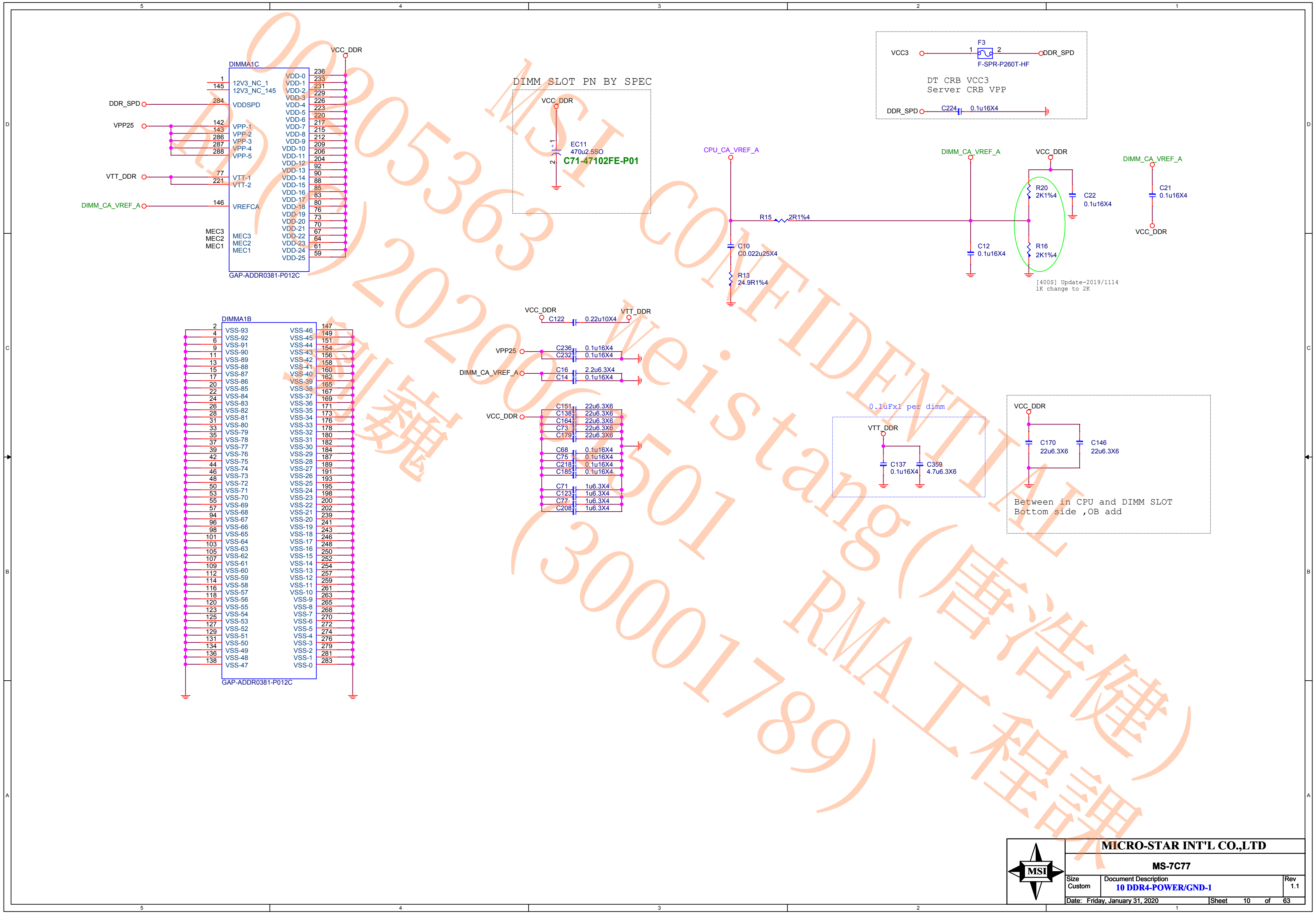
DIMMA1C
VCC_DDR
12V3_NC_1
12V3_NC_145
DDR_SPD
VDDSPD
VPP25
VPP-1
VPP-2
VPP-3
VPP-4
VPP-5
VTT_DDR
VTT-1
VTT-2
DIMM_CA_VREF_A
VREFCA
MEC3
MEC2
MEC1
VDD-0 … VDD-25
GAP-ADDR0381-P012C
DIMMA1B
VSS-0 … VSS-93
GAP-ADDR0381-P012C
DIMM SLOT PN BY SPEC
EC11
470u2.5SO
C71-47102FE-P01
VCC3
F3
F-SPR-P260T-HF
DDR_SPD
DT CRB VCC3
Server CRB VPP
C224
0.1u16X4
CPU_CA_VREF_A
DIMM_CA_VREF_A
R15
2R1%4
C10
C0.022u25X4
R13
24.9R1%4
C12
0.1u16X4
R20
2K1%4
C22
0.1u16X4
R16
2K1%4
[4008] Update-2019/1114
1K change to 2K
C21
0.1u16X4
VCC_DDR
VTT_DDR
C122
0.22u10X4
VPP25
C236 0.1u16X4
C232 0.1u16X4
DIMM_CA_VREF_A
C16 2.2u6.3X4
C14 0.1u16X4
C151 22u6.3X6
C138 22u6.3X6
C164 22u6.3X6
C73 22u6.3X6
C179 22u6.3X6
C68 0.1u16X4
C75 0.1u16X4
C218 0.1u16X4
C185 0.1u16X4
C71 1u6.3X4
C123 1u6.3X4
C77 1u6.3X4
C208 1u6.3X4
0.1uFx1 per dimm
C137 0.1u16X4
C359 4.7u6.3X6
C170 22u6.3X6
C146 22u6.3X6
Between in CPU and DIMM SLOT
Bottom side ,OB add
MICRO-STAR INT'L CO.,LTD
MS-7C77
Size Custom
Document Description
10 DDR4-POWER/GND-1
Rev 1.1
Date: Friday, January 31, 2020
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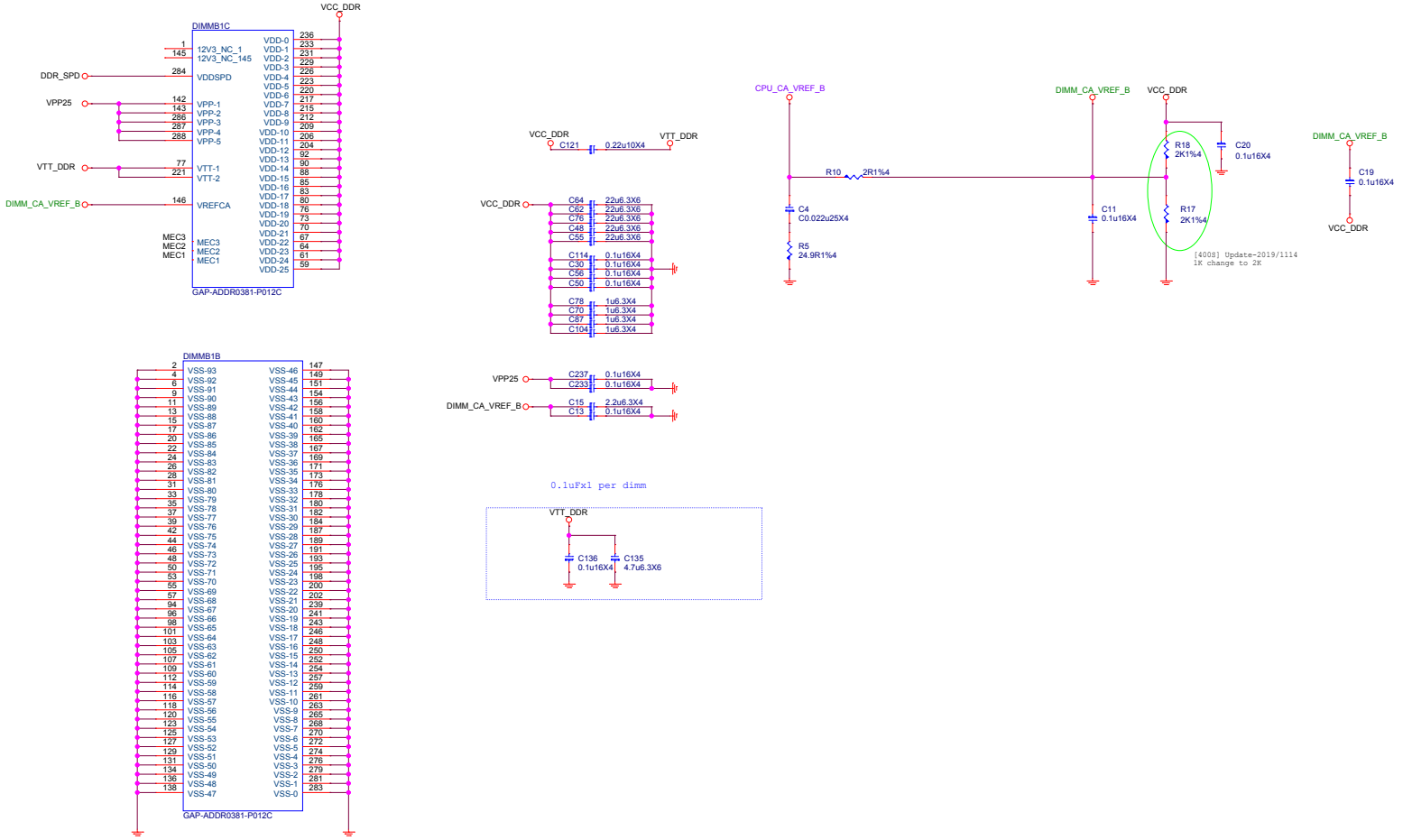

MICRO-STAR INT'L CO.,LTD		
MS-7C77		
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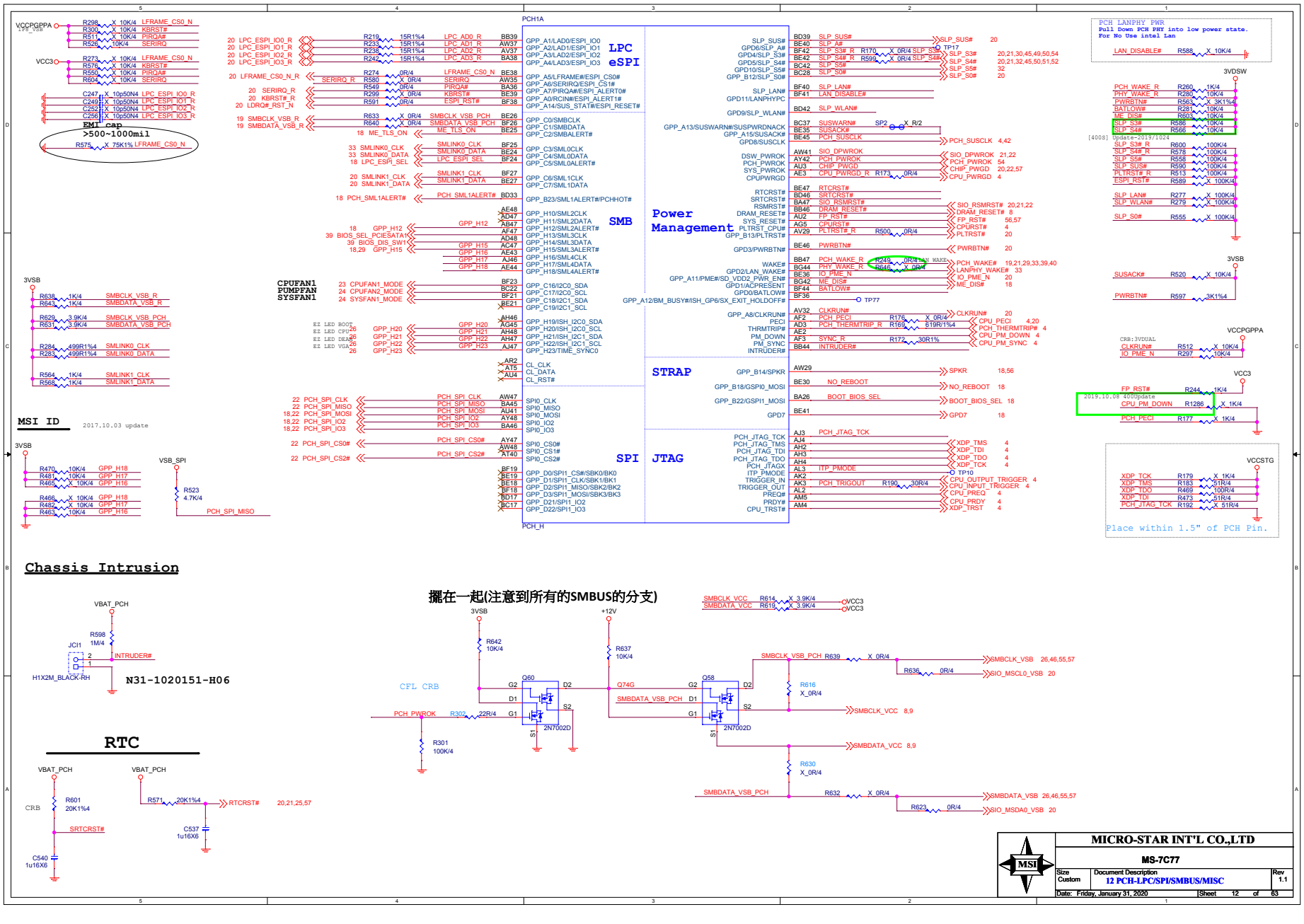
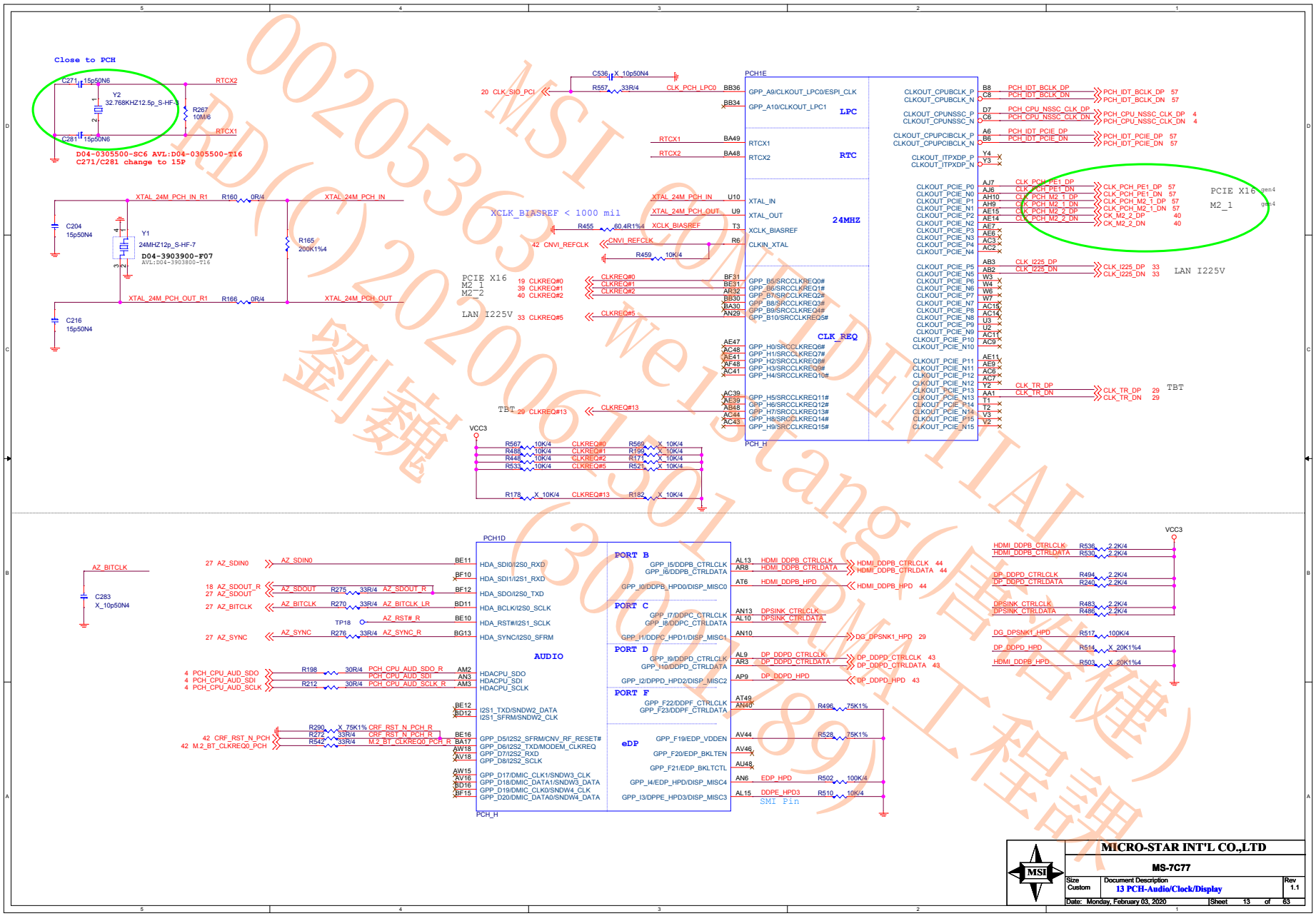
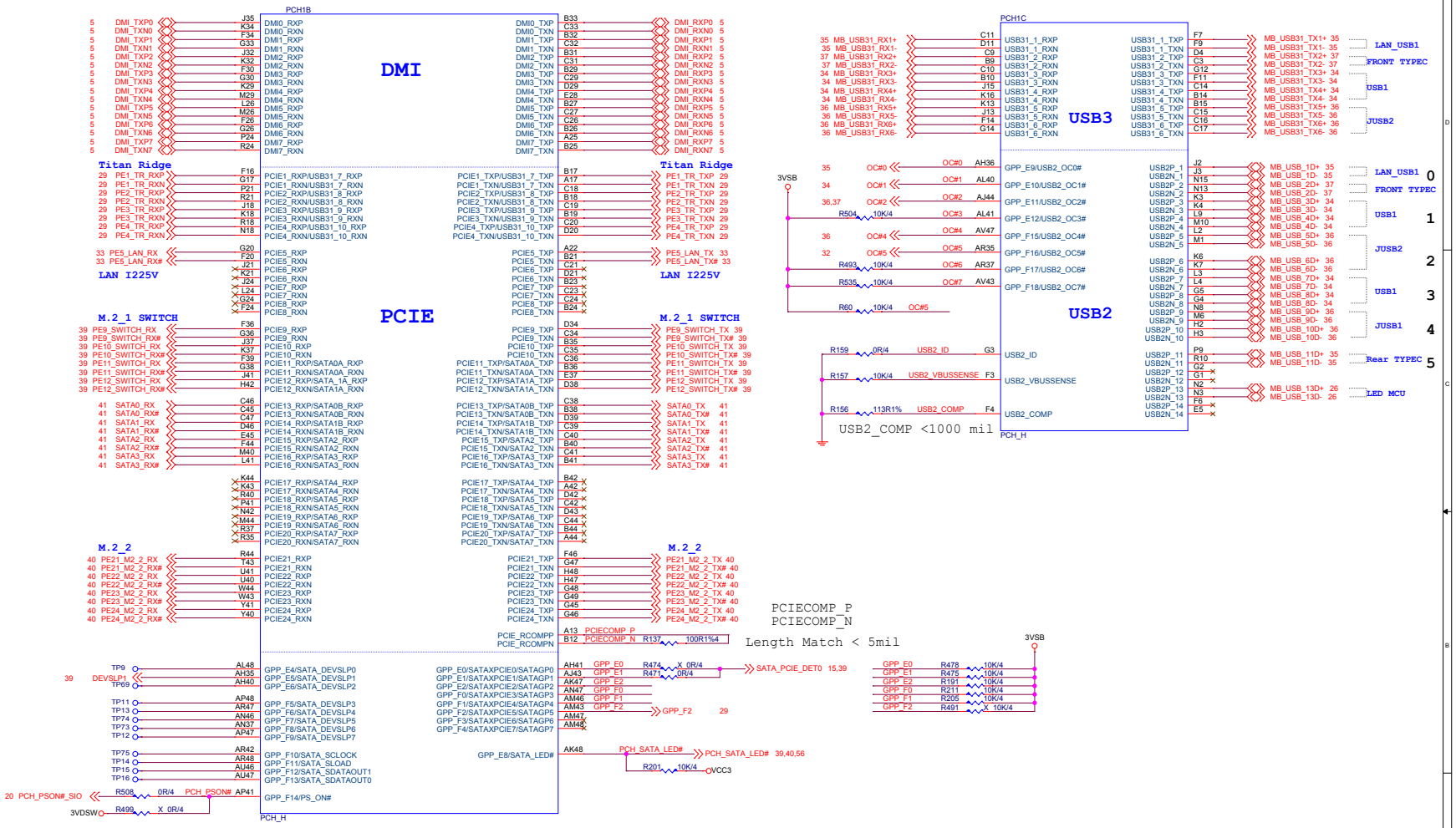
Date: Friday, January 31, 2020	Sheet 11 of 63	

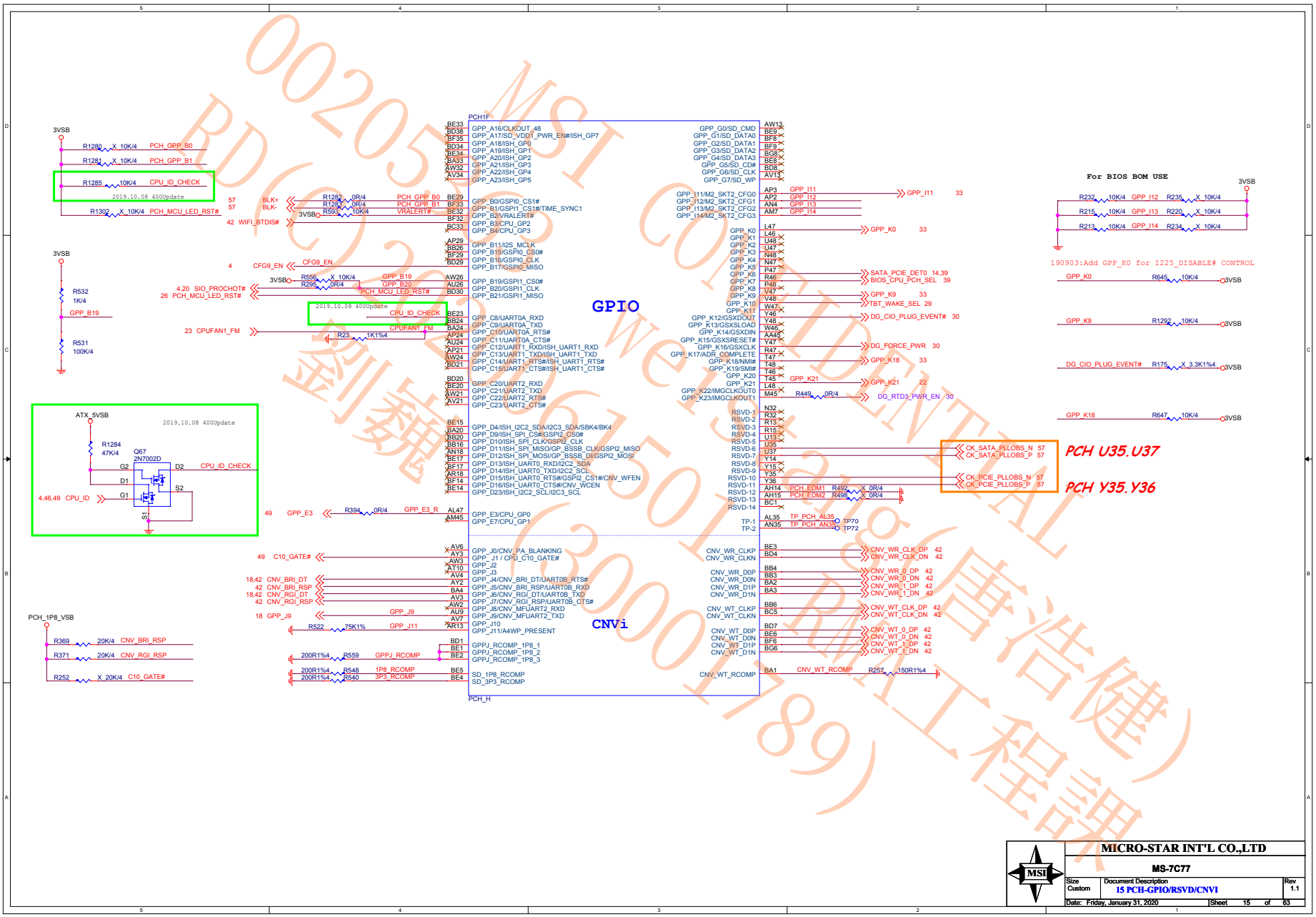


MICRO-STAR INT'L CO.,LTD	
MS-7C77	
Size: Custom	Document Description: 12 PCH-LPC/SPI/SMBUS/MISC
Rev: 1.1	
Date: Friday, January 31, 2020	Sheet 12 of 63


Close to PCH
C271 15p50N6
C281 15p50N6
Y2
32.768KHZ12.5p_S-HF-1
R267
10M/6
RTCX2
RTCX1
D04-0305500-SC6 AVL:D04-0305500-T16
C271/C281 change to 15P
XTAL_24M_PCH_IN_R1
R160 0R/4
XTAL_24M_PCH_IN
C204
15p50N4
Y1
24MHZ12p_S-HF-7
D04-3903900-F07
AVL:D04-3903800-T16
R165
200K1%4
XTAL_24M_PCH_OUT_R1
R166 0R/4
XTAL_24M_PCH_OUT
C216
15p50N4
C536 X_10p50N4
20 CLK_SIO_PCI
R557 33R/4
CLK_PCH_LPC0
PCH1E
GPP_A9/CLKOUT_LPC0/ESPI_CLK
GPP_A10/CLKOUT_LPC1
LPC
RTCX1
RTCX2
RTC
XTAL_24M_PCH_IN
XTAL_24M_PCH_OUT
XCLK_BIASREF < 1000 mil
R455 60.4R1%4
XCLK_BIASREF
42 CNVI_REFCLK
R459 10K/4
XTAL_IN
XTAL_OUT
XCLK_BIASREF
CLKIN_XTAL
24MHZ
PCIE X16
M2_1
M2_2
LAN I225V
19 CLKREQ#0
39 CLKREQ#1
40 CLKREQ#2
33 CLKREQ#5
GPP_B5/SRCCLKREQ0#
GPP_B6/SRCCLKREQ1#
GPP_B7/SRCCLKREQ2#
GPP_B8/SRCCLKREQ3#
GPP_B9/SRCCLKREQ4#
GPP_B10/SRCCLKREQ5#
CLK_REQ
TBT
29 CLKREQ#13
GPP_H5/SRCCLKREQ11#
GPP_H6/SRCCLKREQ12#
GPP_H7/SRCCLKREQ13#
GPP_H8/SRCCLKREQ14#
GPP_H9/SRCCLKREQ15#
VCC3
R567 10K/4
R488 10K/4
R448 10K/4
R538 10K/4
R569 X_10K/4
R199 X_10K/4
R177 X_10K/4
R521 X_10K/4
R178 X_10K/4
R182 X_10K/4
PCH_H
CLKOUT_CPUBCLK_P
CLKOUT_CPUBCLK_N
CLKOUT_CPUNSSC_P
CLKOUT_CPUNSSC_N
CLKOUT_CPUPCIBCLK_P
CLKOUT_CPUPCIBCLK_N
CLKOUT_ITPXDP_P
CLKOUT_ITPXDP_N
CLKOUT_PCIE_P0
CLKOUT_PCIE_N0
CLKOUT_PCIE_P1
CLKOUT_PCIE_N1
CLKOUT_PCIE_P2
CLKOUT_PCIE_N2
CLKOUT_PCIE_P3
CLKOUT_PCIE_N3
CLKOUT_PCIE_P4
CLKOUT_PCIE_N4
CLKOUT_PCIE_P5
CLKOUT_PCIE_N5
CLKOUT_PCIE_P6
CLKOUT_PCIE_N6
CLKOUT_PCIE_P7
CLKOUT_PCIE_N7
CLKOUT_PCIE_P8
CLKOUT_PCIE_N8
CLKOUT_PCIE_P9
CLKOUT_PCIE_N9
CLKOUT_PCIE_P10
CLKOUT_PCIE_N10
CLKOUT_PCIE_P11
CLKOUT_PCIE_N11
CLKOUT_PCIE_P12
CLKOUT_PCIE_N12
CLKOUT_PCIE_P13
CLKOUT_PCIE_N13
CLKOUT_PCIE_P14
CLKOUT_PCIE_N14
CLKOUT_PCIE_P15
CLKOUT_PCIE_N15
PCH_IDT_BCLK_DP
PCH_IDT_BCLK_DN
PCH_CPU_NSSC_CLK_DP
PCH_CPU_NSSC_CLK_DN
PCH_IDT_PCIE_DP
PCH_IDT_PCIE_DN
CLK_PCH_PE1_DP
CLK_PCH_PE1_DN
CLK_PCH_M2_1_DP
CLK_PCH_M2_1_DN
CLK_PCH_M2_2_DP
CLK_PCH_M2_2_DN
CK_M2_2_DP
CK_M2_2_DN
CLK_I225_DP
CLK_I225_DN
CLK_TR_DP
CLK_TR_DN
AZ_BITCLK
C283
X_10p50N4
PCH1D
AUDIO
HDA_SDI0/I2S0_RXD
HDA_SDI1/I2S1_RXD
HDA_SDO/I2S0_TXD
HDA_BCLK/I2S0_SCLK
HDA_RST#/I2S1_SCLK
HDA_SYNC/I2S0_SFRM
27 AZ_SDIN0
18 AZ_SDOUT_R
27 AZ_SDOUT
27 AZ_BITCLK
27 AZ_SYNC
AZ_RST#_R
TP18
R275 33R/4
R270 33R/4
R276 33R/4
HDACPU_SDO
HDACPU_SDI
HDACPU_SCLK
4 PCH_CPU_AUD_SDO
4 PCH_CPU_AUD_SDI
4 PCH_CPU_AUD_SCLK
R198 30R/4
R212 30R/4
PCH_CPU_AUD_SDO_R
PCH_CPU_AUD_SDI
PCH_CPU_AUD_SCLK_R
I2S1_TXD/SNDW2_DATA
I2S1_SFRM/SNDW2_CLK
42 CRF_RST_N_PCH
42 M.2_BT_CLKREQ0_PCH
R290 X_75K1%
R272 33R/4
R542 33R/4
CRF_RST_N_PCH_R
M.2_BT_CLKREQ0_PCH_R
GPP_D5/I2S2_SFRM/CNV_RF_RESET#
GPP_D6/I2S2_TXD/MODEM_CLKREQ
GPP_D7/I2S2_RXD
GPP_D8/I2S2_SCLK
GPP_D17/DMIC_CLK1/SNDW3_CLK
GPP_D18/DMIC_DATA1/SNDW3_DATA
GPP_D19/DMIC_CLK0/SNDW4_CLK
GPP_D20/DMIC_DATA0/SNDW4_DATA
PORT B
PORT C
PORT D
PORT F
eDP
GPP_I5/DDPB_CTRLCLK
GPP_I6/DDPB_CTRLDATA
GPP_I0/DDPB_HPD0/DISP_MISC0
GPP_I7/DDPC_CTRLCLK
GPP_I8/DDPC_CTRLDATA
GPP_I1/DDPC_HPD1/DISP_MISC1
GPP_I9/DDPD_CTRLCLK
GPP_I10/DDPD_CTRLDATA
GPP_I2/DPPD_HPD2/DISP_MISC2
GPP_F22/DDPF_CTRLCLK
GPP_F23/DDPF_CTRLDATA
GPP_F19/EDP_VDDEN
GPP_F20/EDP_BKLTEN
GPP_F21/EDP_BKLTCTL
GPP_I4/EDP_HPD/DISP_MISC4
GPP_I3/DPPE_HPD3/DISP_MISC3
HDMI_DDPB_CTRLCLK 44
HDMI_DDPB_CTRLDATA 44
HDMI_DDPB_HPD 44
DPSINK_CTRLCLK
DPSINK_CTRLDATA
DG_DPSNK1_HPD 29
DP_DDPD_CTRLCLK 43
DP_DDPD_CTRLDATA 43
DP_DDPD_HPD 43
EDP_HPD
DDPE_HPD3
SMI Pin
R536 2.2K/4
R530 2.2K/4
R494 2.2K/4
R240 2.2K/4
R483 2.2K/4
R486 2.2K/4
R517 100K/4
R514 X_20K1%4
R503 X_20K1%4
R496 75K1%
R528 75K1%
R502 100K/4
R510 10K/4
MICRO-STAR INT'L CO.,LTD
MS-7C77
Size Custom
Document Description
13 PCH-Audio/Clock/Display
Rev 1.1
Date: Monday, February 03, 2020
Sheet 13 of 63



MICRO-STAR INT'L CO.,LTD	
MS-7C77	
Size: Custom	Document Description: 14 PCH-DMI/PCIE/USB/SATA
Rev: 1.1	
Date: Friday, January 31, 2020	Sheet 14 of 63


PCH1F
GPIO
CNVi
PCH_H
PCH U35.U37
PCH Y35.Y36
For BIOS BOM USE
190903:Add GPP_K0 for I225_DISABLE# CONTROL
2019.10.08 400Update
ATX_5VSB
3VSB
MICRO-STAR INT'L CO.,LTD
MS-7C77
Size Custom
Document Description 15 PCH-GPIO/RSVD/CNVI
Rev 1.1
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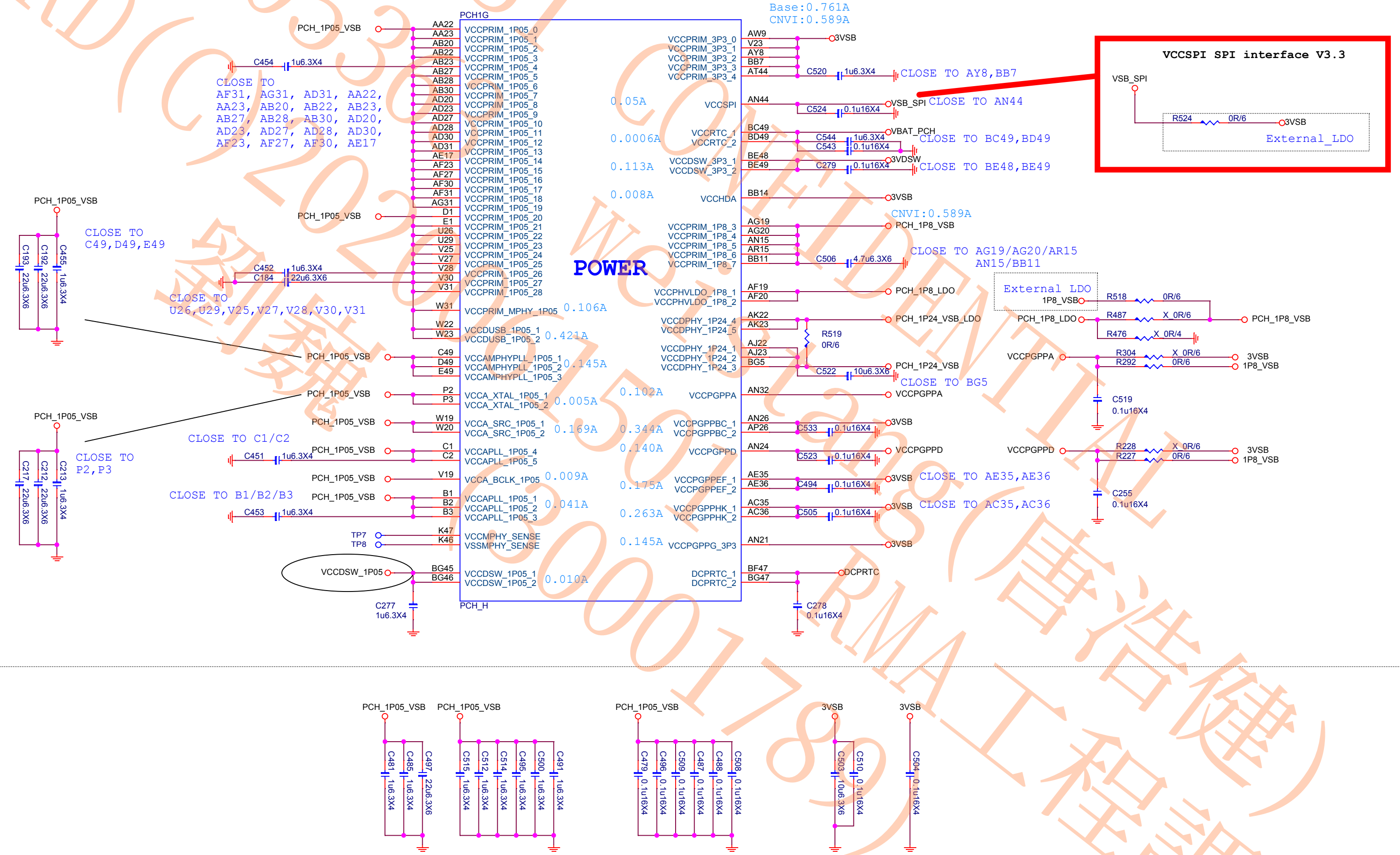
PCH_1P05_VSB Total 11.775A

3VSB
Total 2.437A+0.14A=2.577A
PCH_1P8_VSB
Total 0.772A+0.14A=0.912A

Base 7.169A
Base other 1.089A
DMI Gen3 0.5A
PCIE Gen3 1.602A
USB3.1 Gen1 1.062A
SATA3.0 0.668A

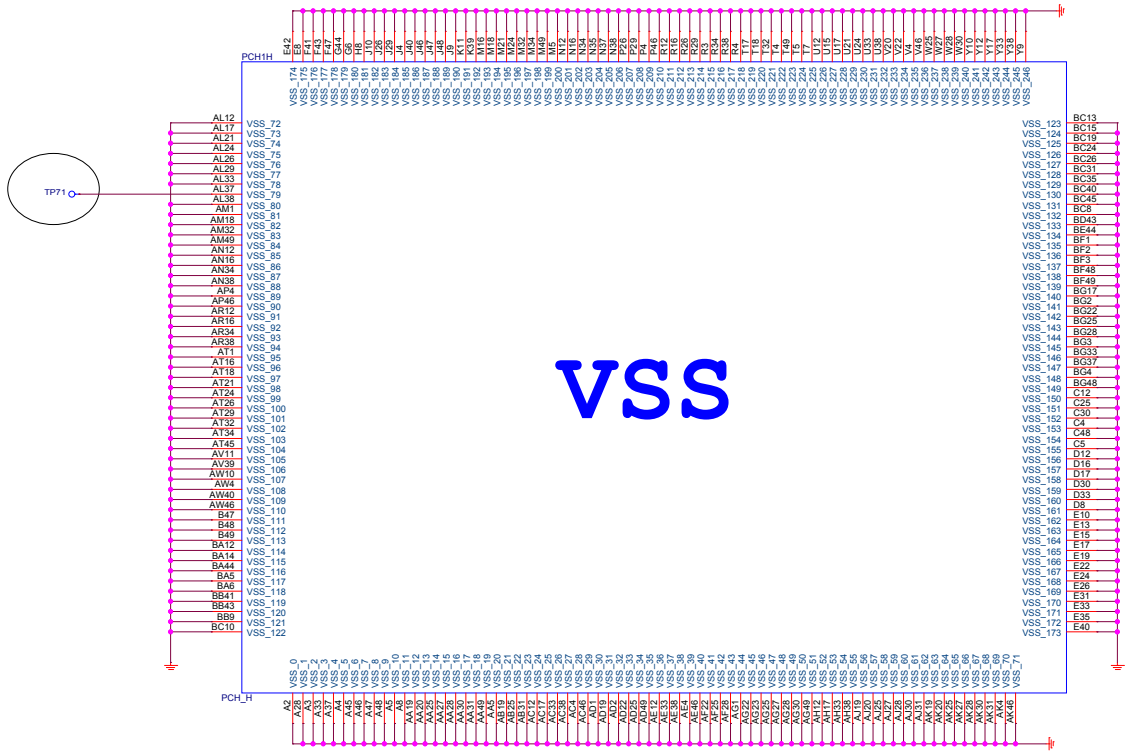


MICRO-STAR INT'L CO.,LTD

MS-7C77

Size	Document Description	Rev
Custom	16 PCH-Power	1.1

Date: Monday, February 03, 2020 Sheet 16 of 63



MICRO-STAR INT'L CO.,LTD		
MS-7C77		
Size: Custom	Document Description: 17 PCH-GND	Rev: 1.1
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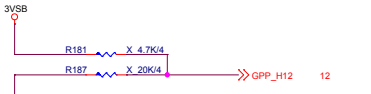
TOP Swap

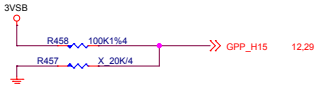
0 : DISABLE (Default)
1 : ENABLE
Internal pull-down is disabled after PCH_PWROK is high.

ESPI FLASH SHARING MODE



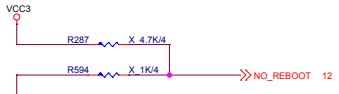
0 : MASTER ATTACHED FLASH SHARING
1 : SLAVE ATTACHED FLASH SHARING
Internal pull-down is disabled after RSMRST# de-assert.

ODT DISABLE



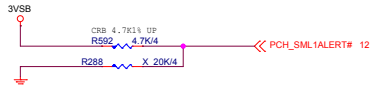
Internal pull-down is disabled after RSMRST# de-assert.

No Reboot



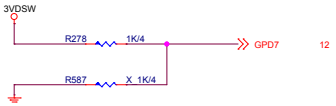
0 : DISABLE (Default)
1 : ENABLE
Internal pull-down is disabled after PCH_PWROK is high.

DCI



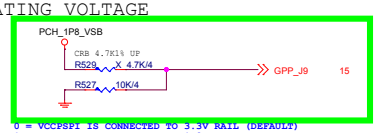
0 : DISABLE Intel DCI-OOB (Default)
1 : ENABLE Intel DCI-OOB
Internal pull-down is disabled after RSMRST# de-assert.

XTAL INPUT MODE



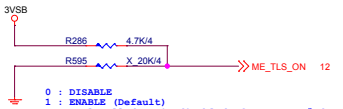
1 = XTAL INPUT IS DIFFERENTIAL
0 = XTAL INPUT IS SINGLE-ENDED
PCH HAS INTERNAL 20K PD

SELECT THE SPI BIOS FLASH INTERFACE OPERATING VOLTAGE

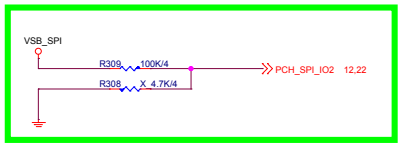


0 = VCCPSPI IS CONNECTED TO 3.3V RAIL (DEFAULT)
1 = VCCPSPI IS CONNECTED TO 1.8V RAIL
PCH HAS INTERNAL 20K PD

TLS confidentiality

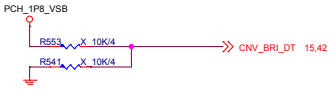


0 : DISABLE
1 : ENABLE (Default)
Internal pull-down is disabled after RSMRST# de-assert.



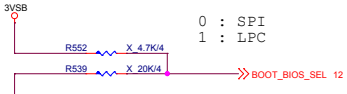
External pull-up is required. Recommend 100 kohm if pulled up to 3.3V or 75 kohm if pulled up to 1.8V

XTAL FREQUENCY

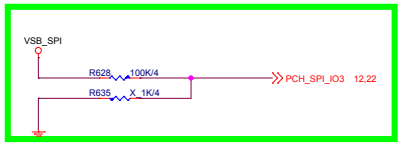


1 = 24MHZ (25MHZ WHEN XTAL FREQ DIVIDER NON ZERO
0 = 38.4/19.2MHZ
XTAL_SEL1 :Internal Pull down

Boot BIOS

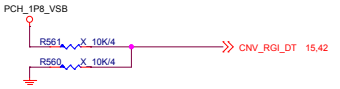


0 : SPI
1 : LPC
Internal pull-down is disabled after PCH_PWROK is high.



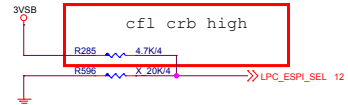
External pull-up is required. Recommend 100 kohm if pulled up to 3.3V or 75 kohm if pulled up to 1.8V

MODEM AND NFC REFFERENCE CLOCK SOURCE

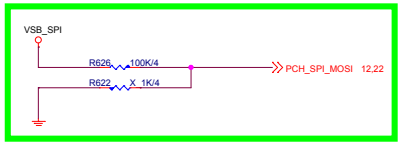


1 = CLKIN_XTAL_LCP
0 = XTAL_IN (CNP AND LCP SHARE XTAL)
XTAL_SEL2: Internal Pull High.

LPC eSPI Mode

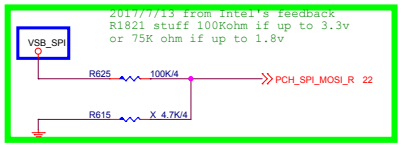


0 : LPC
1 : eSPI
Internal pull-down is disabled after RSMRST# de-assert.

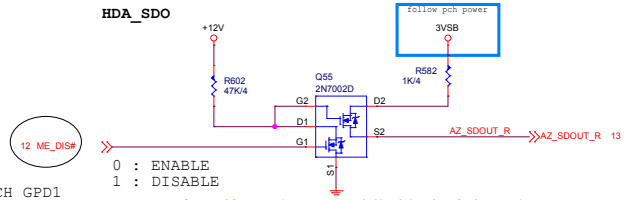


External pull-up is required. Recommend 100 kohm if pulled up to 3.3V or 75 kohm if pulled up to 1.8V

Reserved



change
ME_DIS# front PCH GPD1



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.

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MS-7C77		
Size: Custom	Document Description: 18 PCH-Strap	Rev: 1.1
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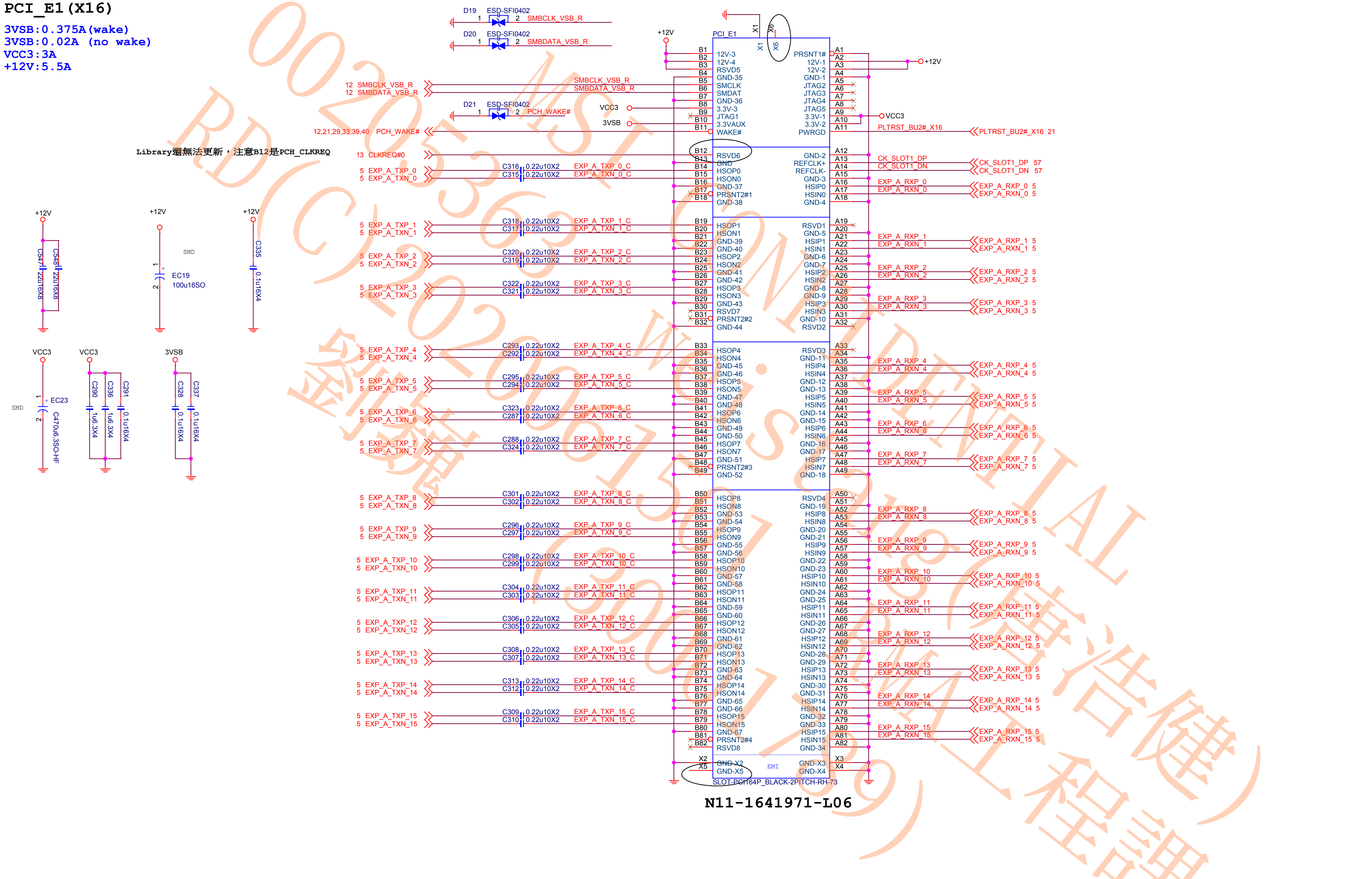
PCI_E1(X16)

3VSB:0.375A(wake)
3VSB:0.02A (no wake)
VCC3:3A
+12V:5.5A

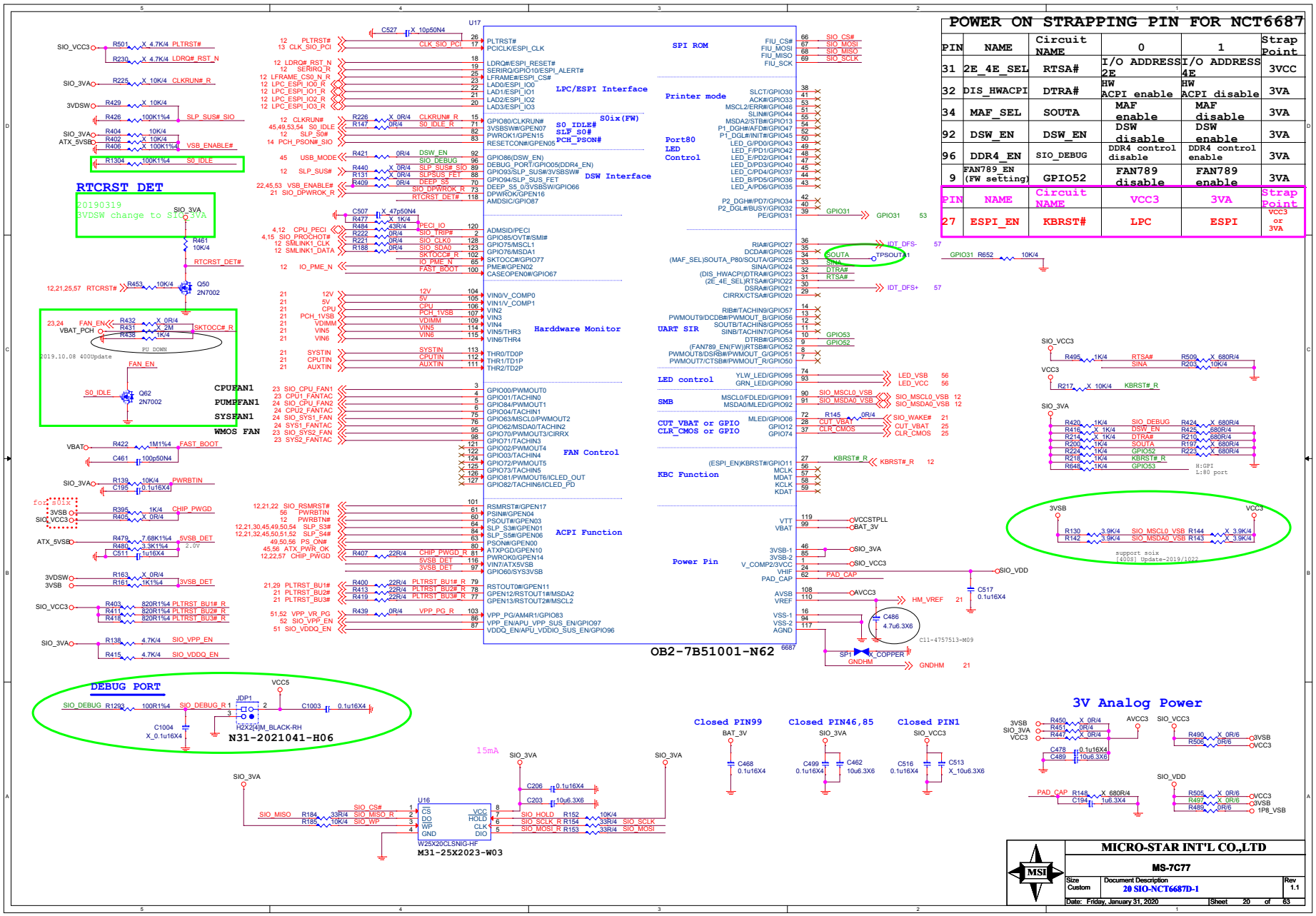


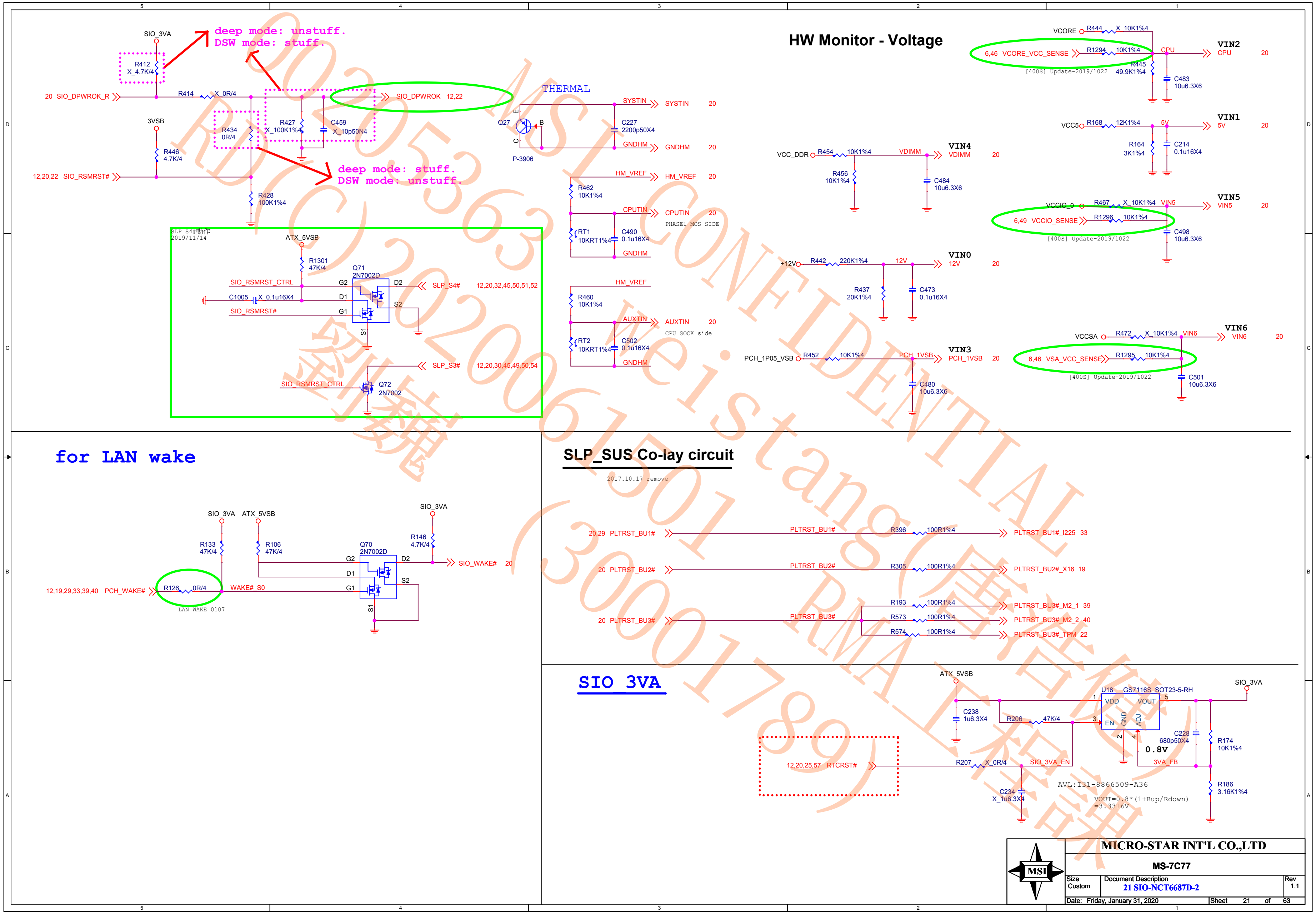
MICRO-STAR INT'L CO.,LTD

MS-7C77

Size	Document Description	Rev
Custom	19 PCIE SLOT-CPU(X16)	1.1

Date: Friday, January 31, 2020 Sheet 19 of 63


POWER ON STRAPPING PIN FOR NCT6687
PIN | NAME | Circuit NAME | 0 | 1 | Strap Point
31 | 2E_4E_SEL | RTSA# | I/O ADDRESS 2E | I/O ADDRESS 4E | 3VCC
32 | DIS_HWACPI | DTRA# | HW ACPI enable | HW ACPI disable | 3VA
34 | MAF_SEL | SOUTA | MAF enable | MAF disable | 3VA
92 | DSW_EN | DSW_EN | DSW disable | DSW enable | 3VA
96 | DDR4_EN | SIO_DEBUG | DDR4 control disable | DDR4 control enable | 3VA
9 | FAN789_EN (FW setting) | GPIO52 | FAN789 disable | FAN789 enable | 3VA
PIN | NAME | Circuit NAME | VCC3 | 3VA | Strap Point
27 | ESPI_EN | KBRST# | LPC | ESPI | VCC3 or 3VA
RTCRST DET
20190319
3VDSW change to SIO_3VA
CPUFAN1
PUMPFAN1
SYSFAN1
WMOS FAN
DEBUG PORT
N31-2021041-H06
OB2-7B51001-N62
M31-25X2023-W03
3V Analog Power
MICRO-STAR INT'L CO.,LTD
MS-7C77
Size Custom
Document Description 20 SIO-NCT6687D-1
Rev 1.1
Date: Friday, January 31, 2020
Sheet 20 of 63

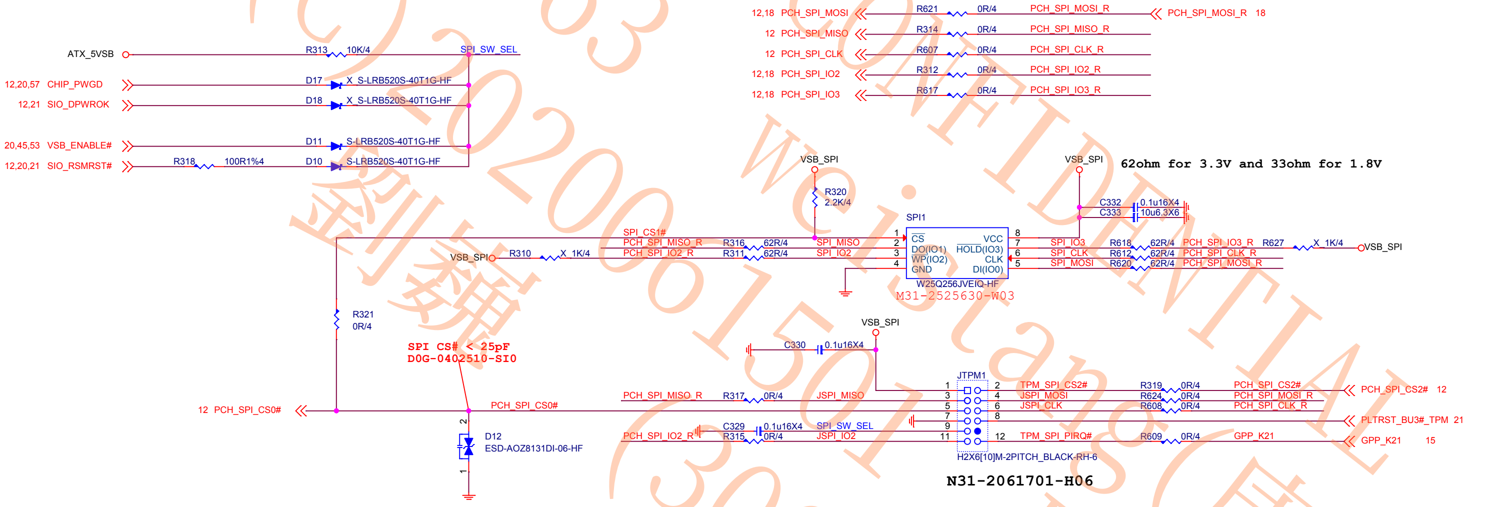


MICRO-STAR INT'L CO.,LTD

MS-7C77

Size	Document Description	Rev
Custom	21 SIO-NCT6687D-2	1.1

Date: Friday, January 31, 2020 Sheet 21 of 63

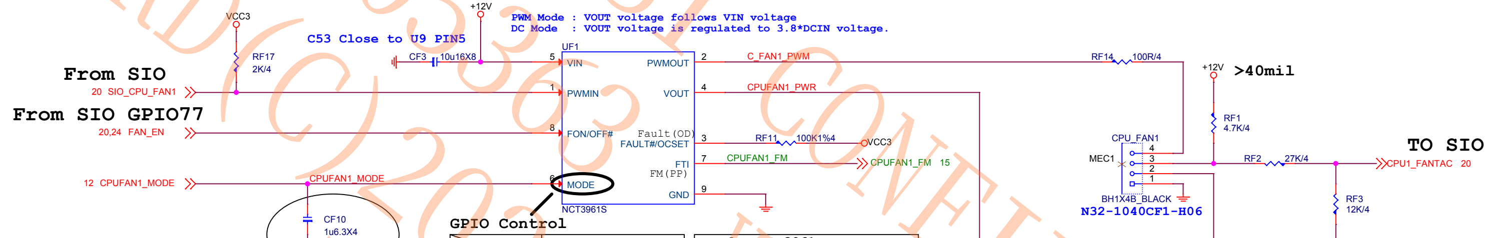


MICRO-STAR INT'L CO.,LTD		
MS-7C77		
Size: Custom	Document Description: 22 SPI ROM BIOS	Rev: 1.1
Date: Monday, February 03, 2020	Sheet 22 of 63	

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

1.Mode GPIO BIOS can swtich PWM/DC MODE

2.FM:BIOS can read FAN PWM/DC MODE



GPIO Control

	PCH GPIO
PWM MODE	HIGH
DC MODE	LOW
AUTO MODE	GPI(Floating)

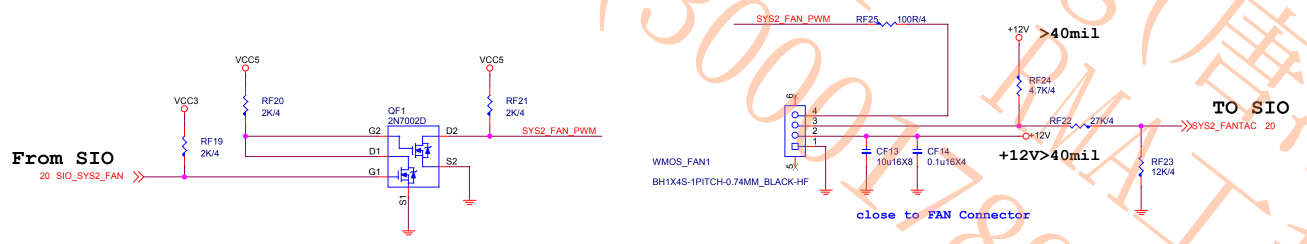
Default

co-lay NCT3961
PIN3 can OCSET three step
10K=3.2~3.8A
49.9K=2.2~2.8A
100K=1.2~1.8A

OC SET By PM SPEC

2019/11/11 add real IO fan

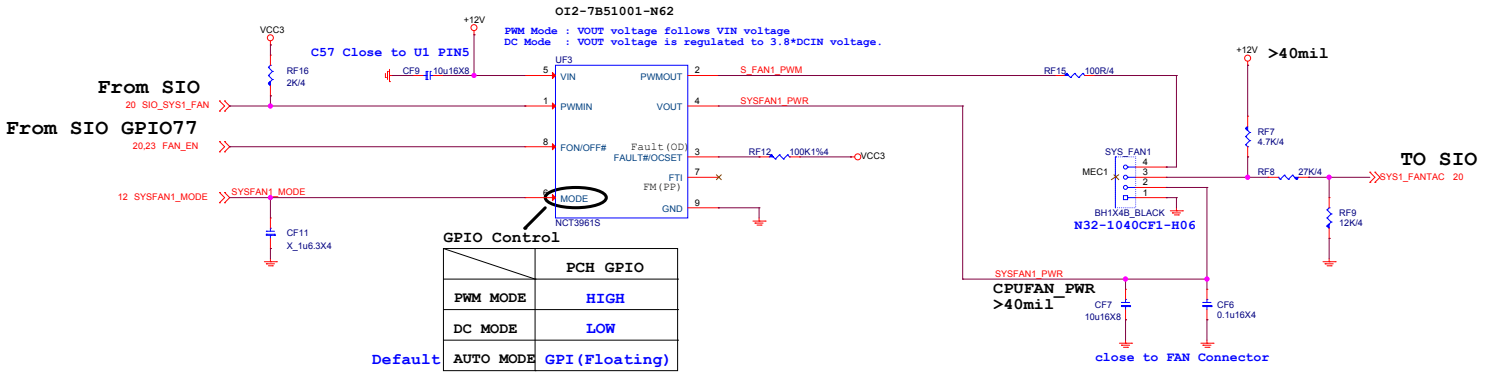
TYPE O : 4 PIN FAN ONLY PWM MODE



MICRO-STAR INT'L CO.,LTD			
MS-7C77			
Size: Custom	Document Description: 23 FAN CPUFAN1 N		Rev: 1.1
Date: Friday, January 31, 2020	Sheet 23	of 63	

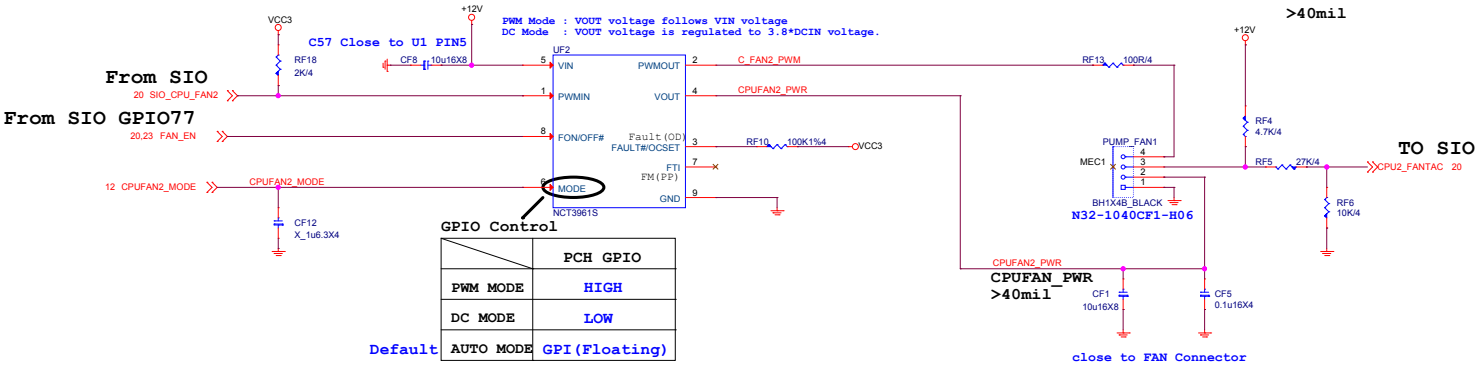
TYPE M : 4 PIN CPU FAN USE NCT3961S USE PCH GPIO CONTROL FAN MODE

1.Mode GPIO BIOS can swtich PWM/DC MODE



GPIO Control

	PCH GPIO
PWM MODE	HIGH
DC MODE	LOW
Default AUTO MODE	GPI(Floating)



GPIO Control

	PCH GPIO
PWM MODE	HIGH
DC MODE	LOW
Default AUTO MODE	GPI(Floating)

MICRO-STAR INT'L CO.,LTD

MS-7C77

Size	Document Description	Rev
Custom	24 FAN PUMP/SYS M	1.1

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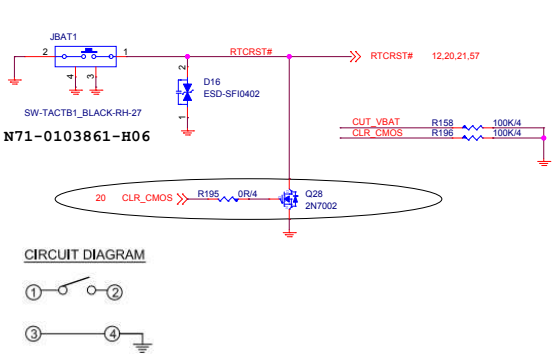
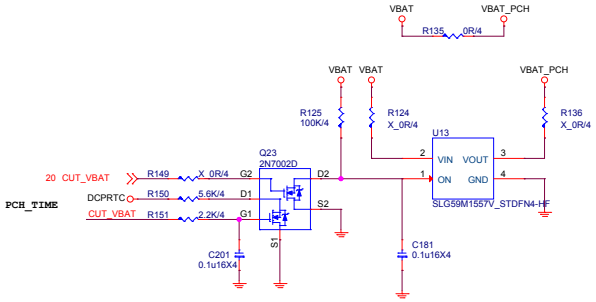
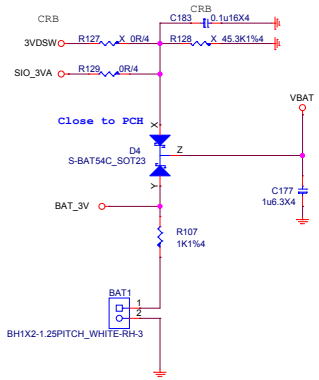
CLR COMS





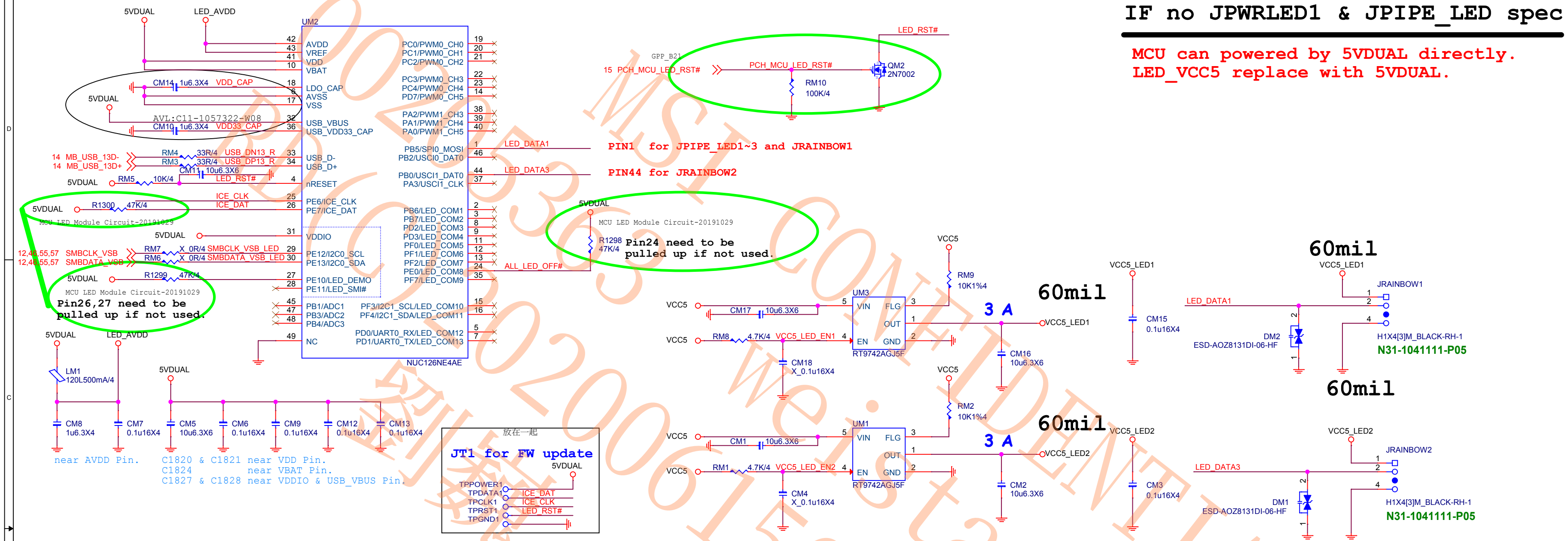
VBAT



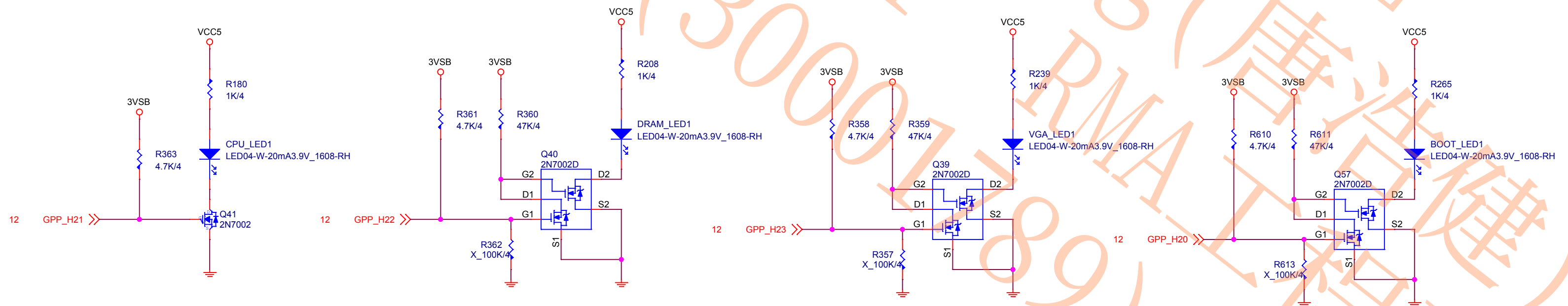
MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7C70	
Size: Custom	Document Description: 25 VBAT/CLR COMS	Rev: 1.1
Date: Friday, January 31, 2020	Sheet 25 of 63	

IF no JPWRLED1 & JPIPE_LED spec

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



DEBUG LED



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

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

MICRO-STAR INT'L CO.,LTD
MS-7C77
Size: Custom | Document Description: 26 MCU JRAINBOW/DEBUG LED | Rev 1.1
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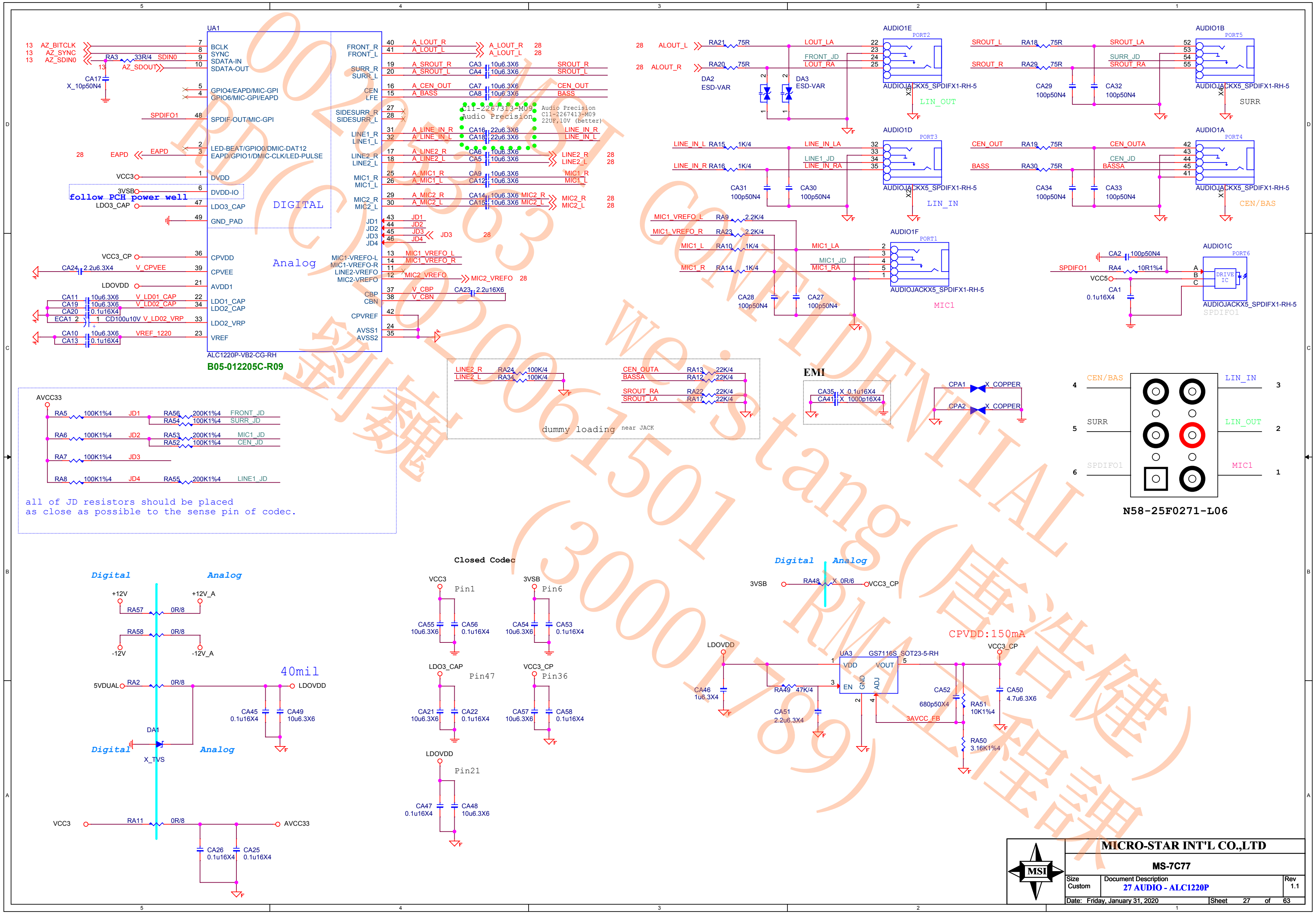

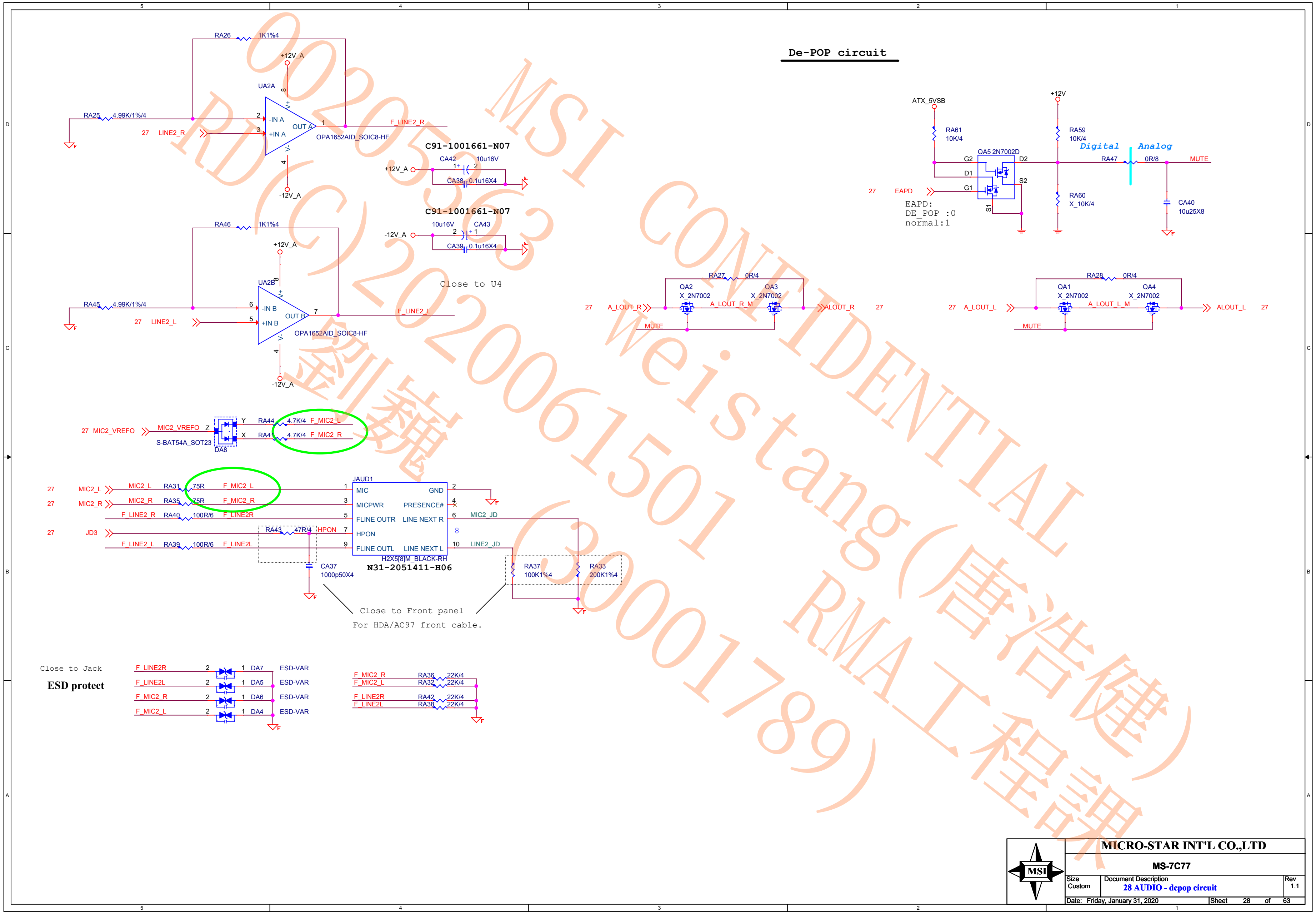
De-POP circuit
RA26 1K1%4
+12V_A
UA2A
RA25 4.99K/1%/4
27 LINE2_R
-IN A
+IN A
OUT A
F_LINE2_R
OPA1652AID_SOIC8-HF
-12V_A
C91-1001661-N07
CA42 10u16V
CA38 0.1u16X4
RA46 1K1%4
UA2B
RA45 4.99K/1%/4
27 LINE2_L
-IN B
+IN B
OUT B
F_LINE2_L
CA43
CA39 0.1u16X4
Close to U4
27 MIC2_VREFO
MIC2_VREFO
S-BAT54A_SOT23
DA8
RA44 4.7K/4 F_MIC2_L
RA41 4.7K/4 F_MIC2_R
JAUD1
MIC
GND
MICPWR
PRESENCE#
FLINE OUTR
LINE NEXT R
HPON
FLINE OUTL
LINE NEXT L
H2X5[8]M_BLACK-RH
N31-2051411-H06
MIC2_L RA31 75R F_MIC2_L
MIC2_R RA35 75R F_MIC2_R
F_LINE2_R RA40 100R/6 F_LINE2R
JD3 RA43 47R/4 HPON
F_LINE2_L RA39 100R/6 F_LINE2L
CA37 1000p50X4
MIC2_JD
LINE2_JD
RA37 100K1%4
RA33 200K1%4
Close to Front panel
For HDA/AC97 front cable.
Close to Jack
ESD protect
F_LINE2R DA7 ESD-VAR
F_LINE2L DA5 ESD-VAR
F_MIC2_R DA6 ESD-VAR
F_MIC2_L DA4 ESD-VAR
F_MIC2_R RA36 22K/4
F_MIC2_L RA32 22K/4
F_LINE2R RA42 22K/4
F_LINE2L RA38 22K/4
ATX_5VSB
RA61 10K/4
+12V
RA59 10K/4
QA5 2N7002D
Digital
Analog
RA47 0R/8
MUTE
27 EAPD
EAPD:
DE_POP :0
normal:1
RA60 X_10K/4
CA40 10u25X8
RA27 0R/4
QA2 X_2N7002
QA3 X_2N7002
27 A_LOUT_R
A_LOUT_R_M
ALOUT_R 27
RA28 0R/4
QA1 X_2N7002
QA4 X_2N7002
27 A_LOUT_L
A_LOUT_L_M
ALOUT_L 27
MICRO-STAR INT'L CO.,LTD
MS-7C77
Size Custom
Document Description
28 AUDIO - depop circuit
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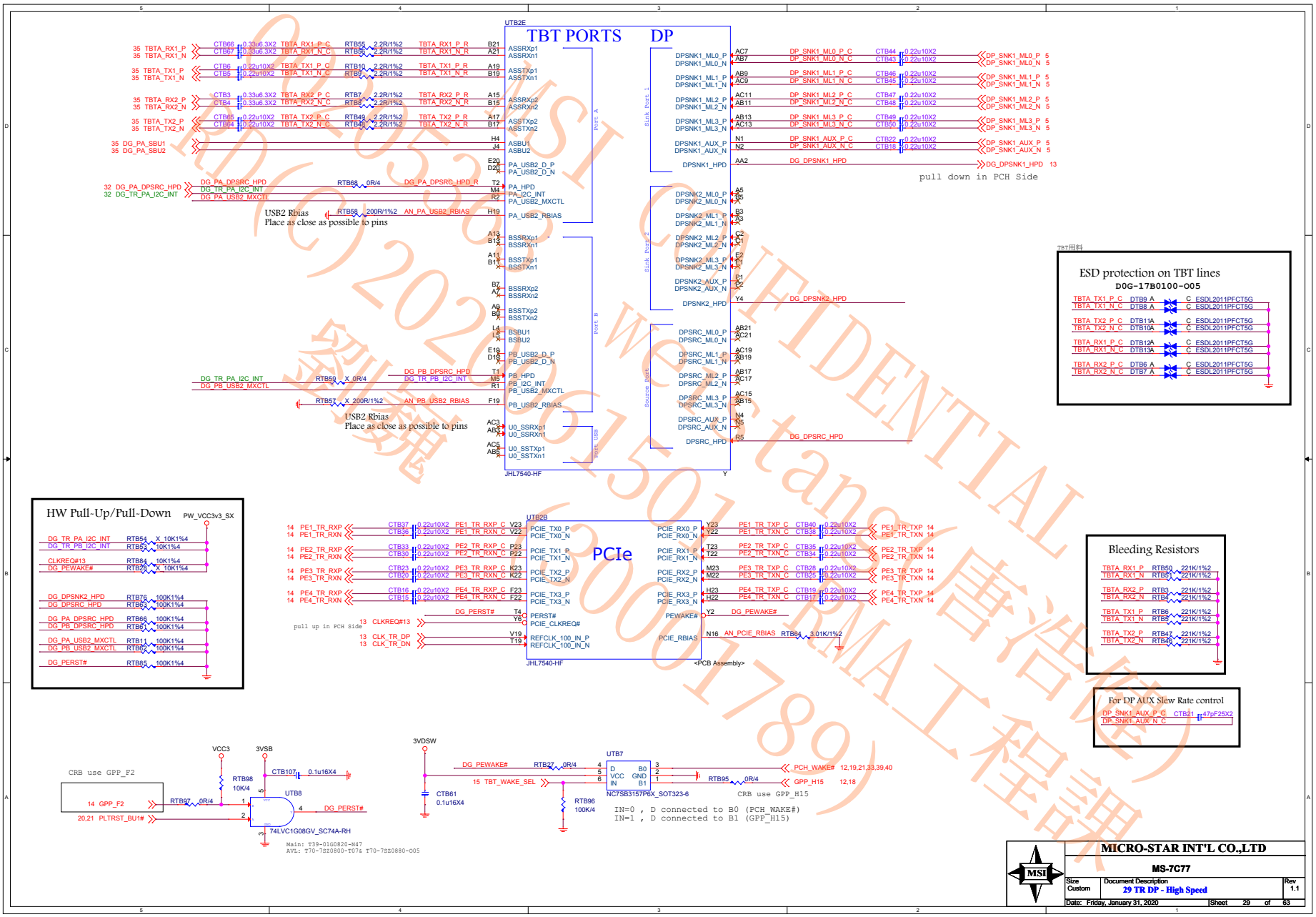
TBT PORTS
DP
UTB2E
JHL7540-HF
pull down in PCH Side
USB2 Rbias
Place as close as possible to pins
ESD protection on TBT lines
D0G-17B0100-O05
HW Pull-Up/Pull-Down
PCIe
UTB2B
Bleeding Resistors
For DP AUX Slew Rate control
CRB use GPP_F2
CRB use GPP_H15
UTB7
UTB8
NC7SB3157P6X_SOT323-6
74LVC1G08GV_SC74A-RH
IN=0 , D connected to B0 (PCH_WAKE#)
IN=1 , D connected to B1 (GPP_H15)
MICRO-STAR INT'L CO.,LTD
MS-7C77
29 TR DP - High Speed
Rev 1.1
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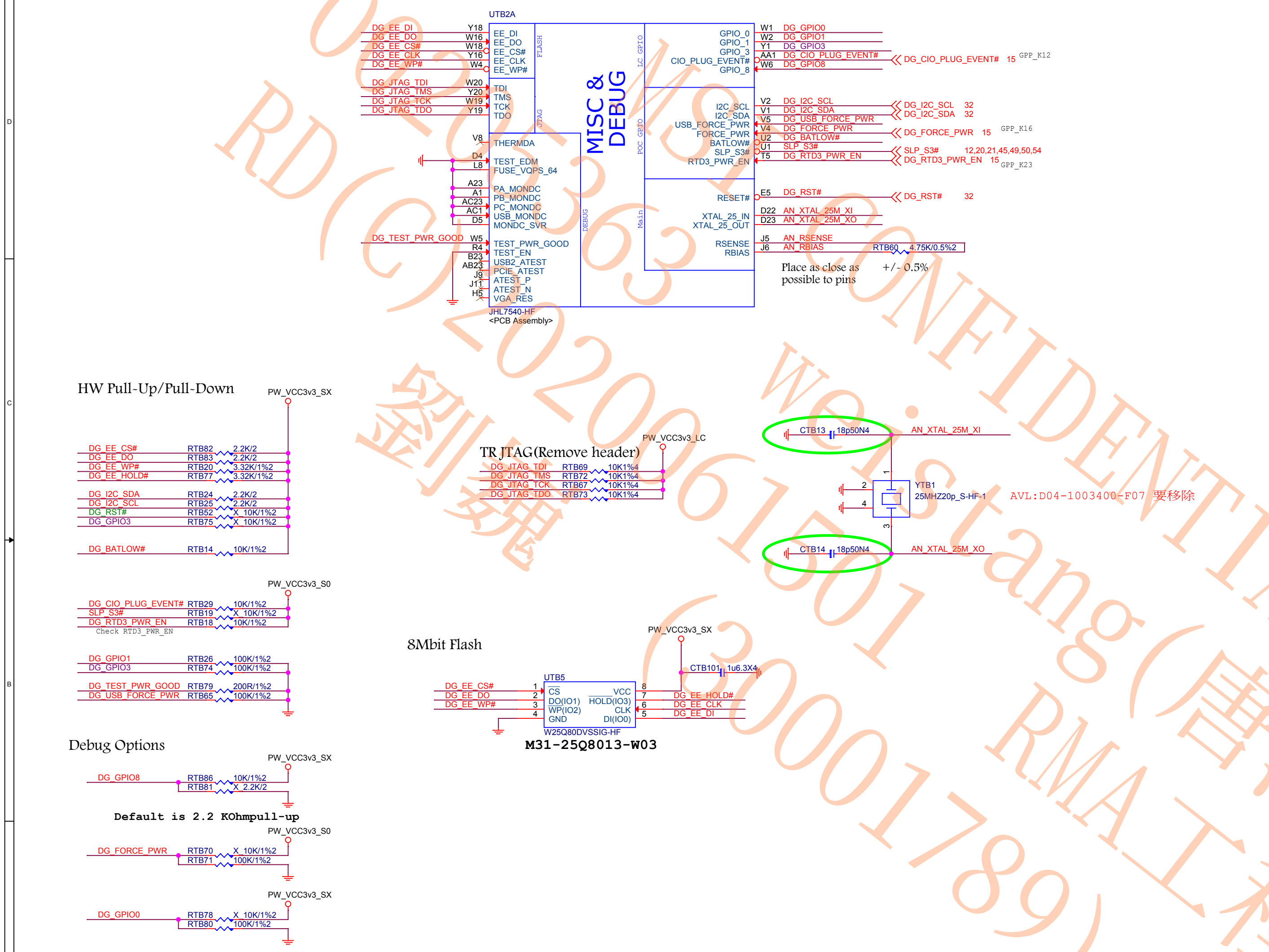

MICRO-STAR INT'L CO.,LTD

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Size	Document Description	Rev
Custom	30 TR DP - Misc	1.1

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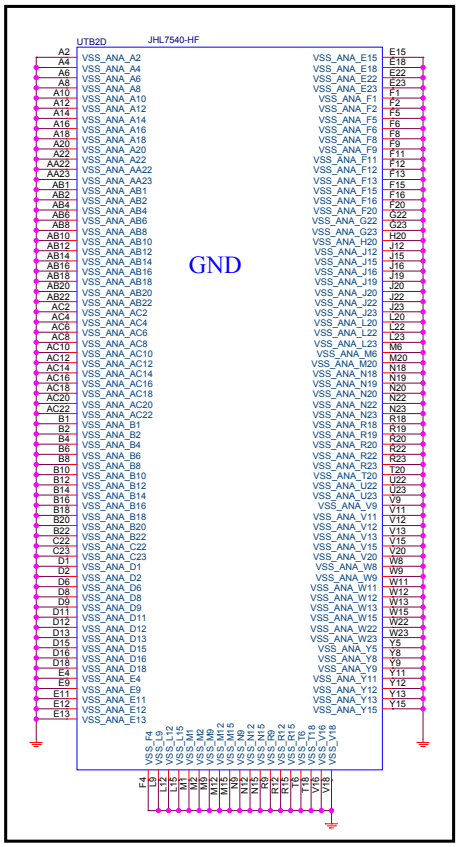
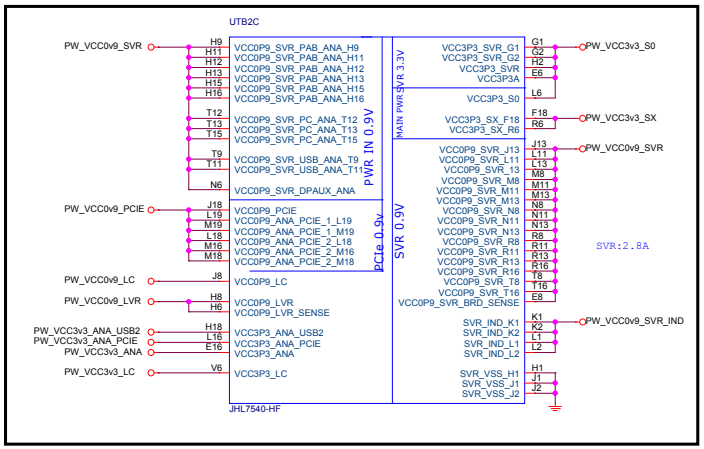
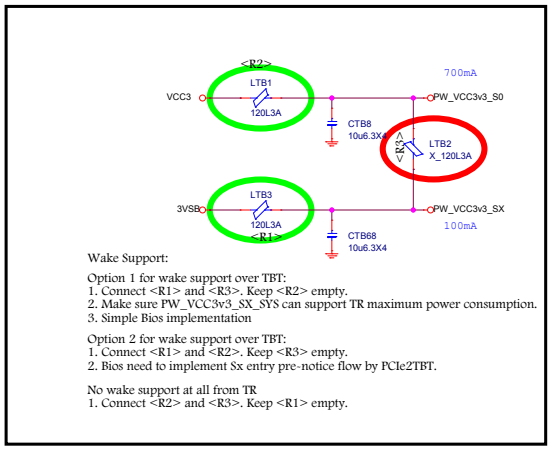




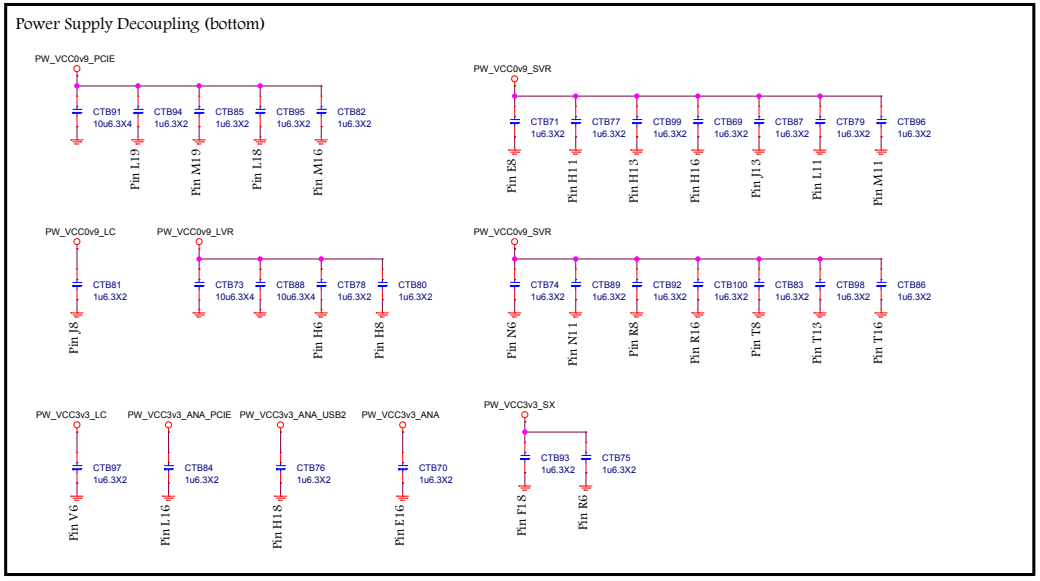


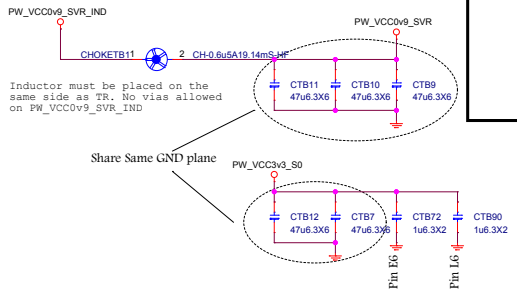
Wake Support:

Option 1 for wake support over TBT:
1. Connect <R1> and <R3>. Keep <R2> empty.
2. Make sure PW_VCC3v3_SX_SYS can support TR maximum power consumption.
3. Simple Bios implementation

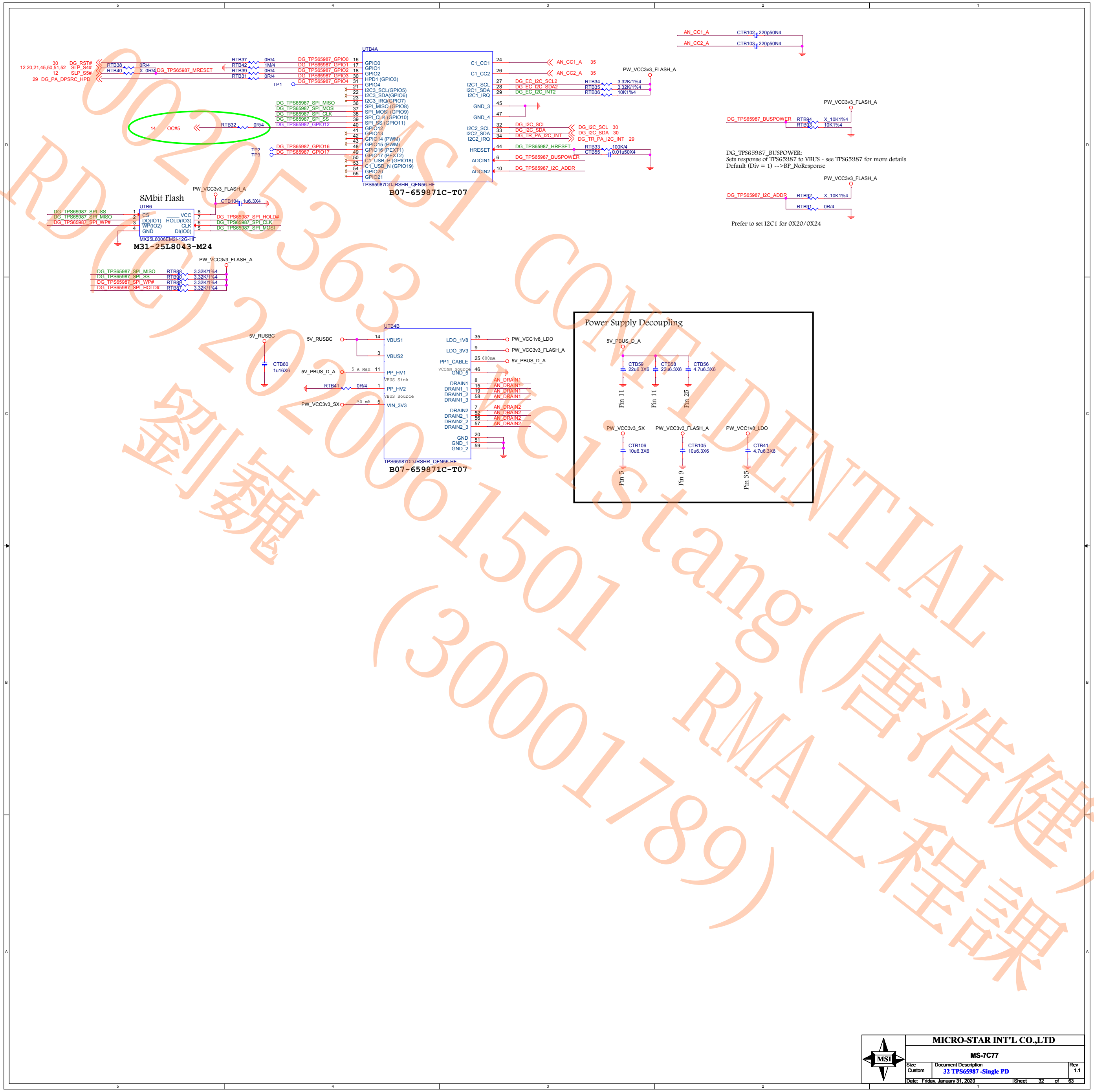
Option 2 for wake support over TBT:
1. Connect <R1> and <R2>. Keep <R3> empty.
2. Bios need to implement Sx entry pre-notice flow by PCIe2TBT.

No wake support at all from TR
1. Connect <R2> and <R3>. Keep <R1> empty.





MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7C77	
Size: Custom	Document Description: 31 TR DP - Power & GND	Rev: 1.1
Date: Friday, January 31, 2020	Sheet 31 of 63	



1.For non-vPro platforms or standard PCIe device: SMBUS is not required (2.2K-10K pull-ups to +3.3V_LAN).
2.For vPRO platforms: I225 SMBUS must connect to PCH's SMLINK0
3.The pull-up power rail should be same with PCH's SMLINK0 power rail (to avoid leakge current)

Intel I225V

SMBUS Address 0x49

U32

PCIE: PE_TX_P, PE_TX_N, PE_RX_P, PE_RX_N, PE_CLK_P, PE_CLK_N, PE_CLKREQ_N, PE_WAKE_N, PE_RST_N
MDI: MDI_A_P, MDI_A_N, MDI_B_P, MDI_B_N, MDI_C_P, MDI_C_N, MDI_D_P, MDI_D_N
SMBUS: SMB_CLK, SMB_DATA, ULP_WAKE_N
LED: LED0, LED1, LED2
POWER: LAN_PWR_GOOD, LAN_DISABLE_N, SDP0, RBIAS, PHY_CAL, +3.3V_PAD-1, +3.3V_PAD-2, +3.3V_DC, +3.3V_VPH, +3.3V_XO, +3.3V_CDB, +3V3_A-1, +3V3_A-2, VDD_CTRL-1, VDD_CTRL-2, VDD_VP, VDD_CORE-1, VDD_CORE-2, VDD_A-1, VDD_A-2, VDD_A-3, RESERVED, EPAD
SPI: SPI_DOUT/SEC_ENA, SPI_CLK, SPI_DIN/AUX_PWR, SPI_CS_N/PCIE_ENA
JTAG: JTAG_RST, JTAG_TMS_SDP2, JTAG_TDO/MDI_LANE_SWAP, JTAG_TDI_SDP1, JTAG_CLK
CRYSTAL: XTAL_OUT, XTAL_IN

Main: OB6-7C70001-I06

LAN_USB1B
RJ45_USB_LEDX2-RH-6
ON5-7C71001-F02

2019.10.09 400Update
Main: T39-01G0820-N47
AVL: T70-7SZ0800-T07& T70-7SZ0880-005
74LVC1G08GV_SC74A-RH

2019.10.08 400Update

JTAG_TDO_MDI_SWAP for MDI strap
High:MDI no swap
Low:MDI swap

Main: D04-1008700-M09

RL26
PCIe Disable Strapping
(Normal Operation: Empty)

2019.10.09 400Update
W25Q16JVSNIQ-HF

Optional Security Strapping
Short JL1 to disable Flash Security
Normal Operation: No Jumper

+3.3V_LAN
I225:<1W

pu hi 3vsb pch side

UL6
TPS22976DPUR_WSON14-HF

CHOKEL1 CH-1.0u3A50mS-RH **L04-01076L0-M26**

near PIN7 0.1uF PER PIN
near PIN9 & 38 0.1uF PER PIN

For EMI

UL3&UL5 close to connector
ESD-UT148ZAD5A-HF

Main:D0G-06A030C-A68
AVL:Follow LOB AVL

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MS-7C77		
Size: Custom	Document Description: 33 LAN - INTEL I255V	Rev: 1.1
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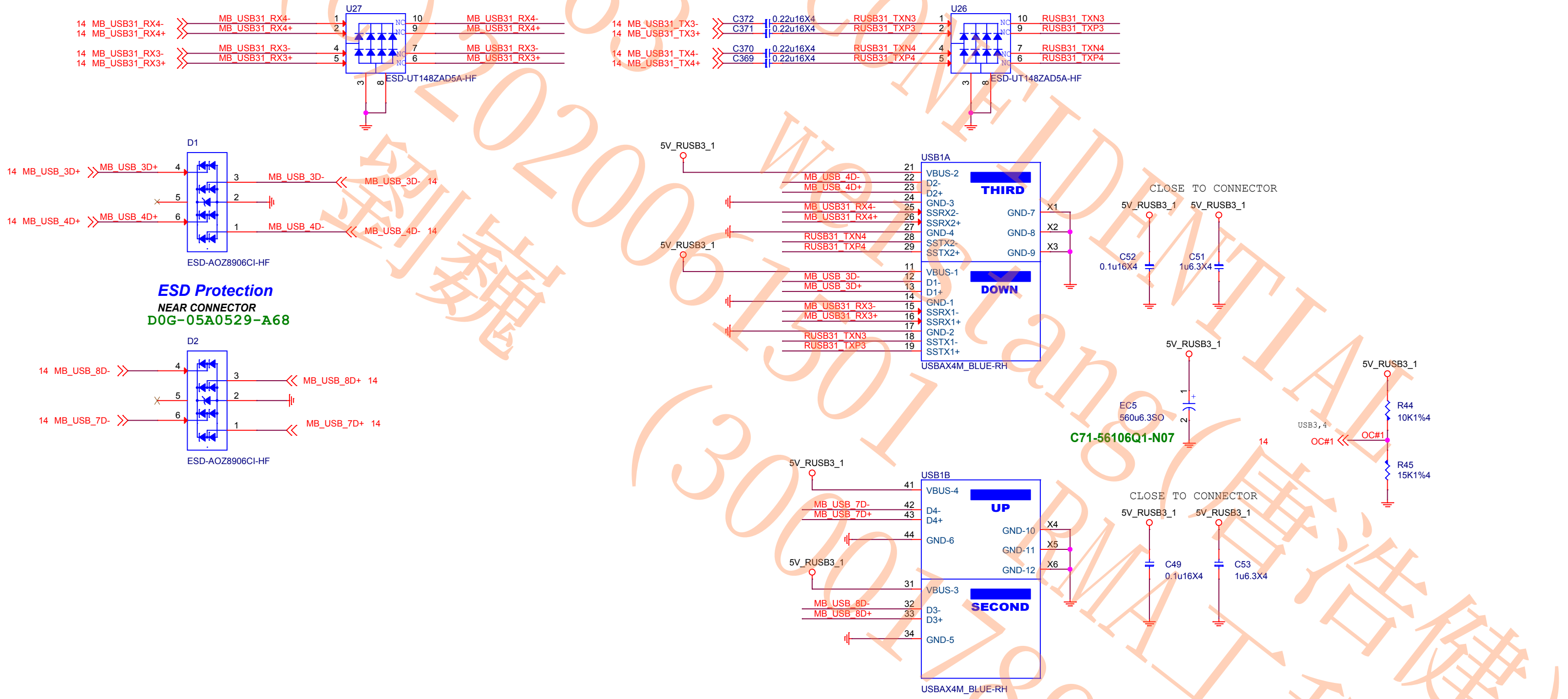
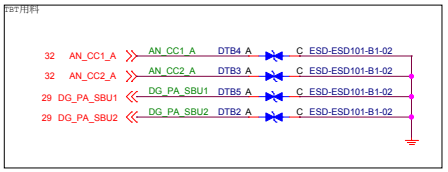


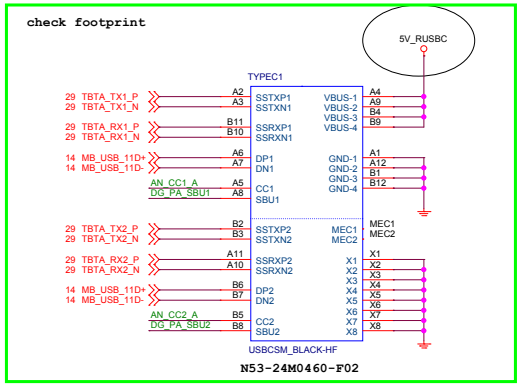
MICRO-STAR INT'L CO.,LTD

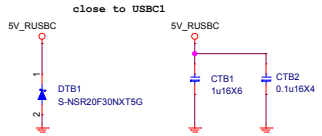
MS-7C77

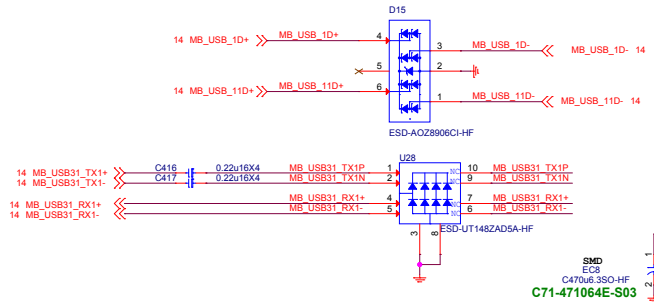
Size	Document Description	Rev
Custom	34 Rear LAN USB3.1&USB2.0	1.1

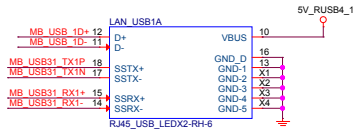
Date: Friday, January 31, 2020 | Sheet 34 of 63

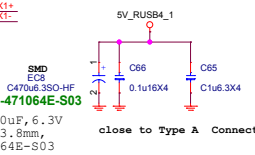


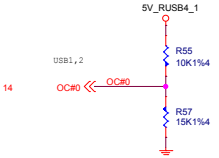












MSI	MICRO-STAR INT'L CO.,LTD	
	MS-7C77	
Size: Custom	Document Description: 35 Rear-USB31 TYPEA+TYPE C	Rev: 1.1
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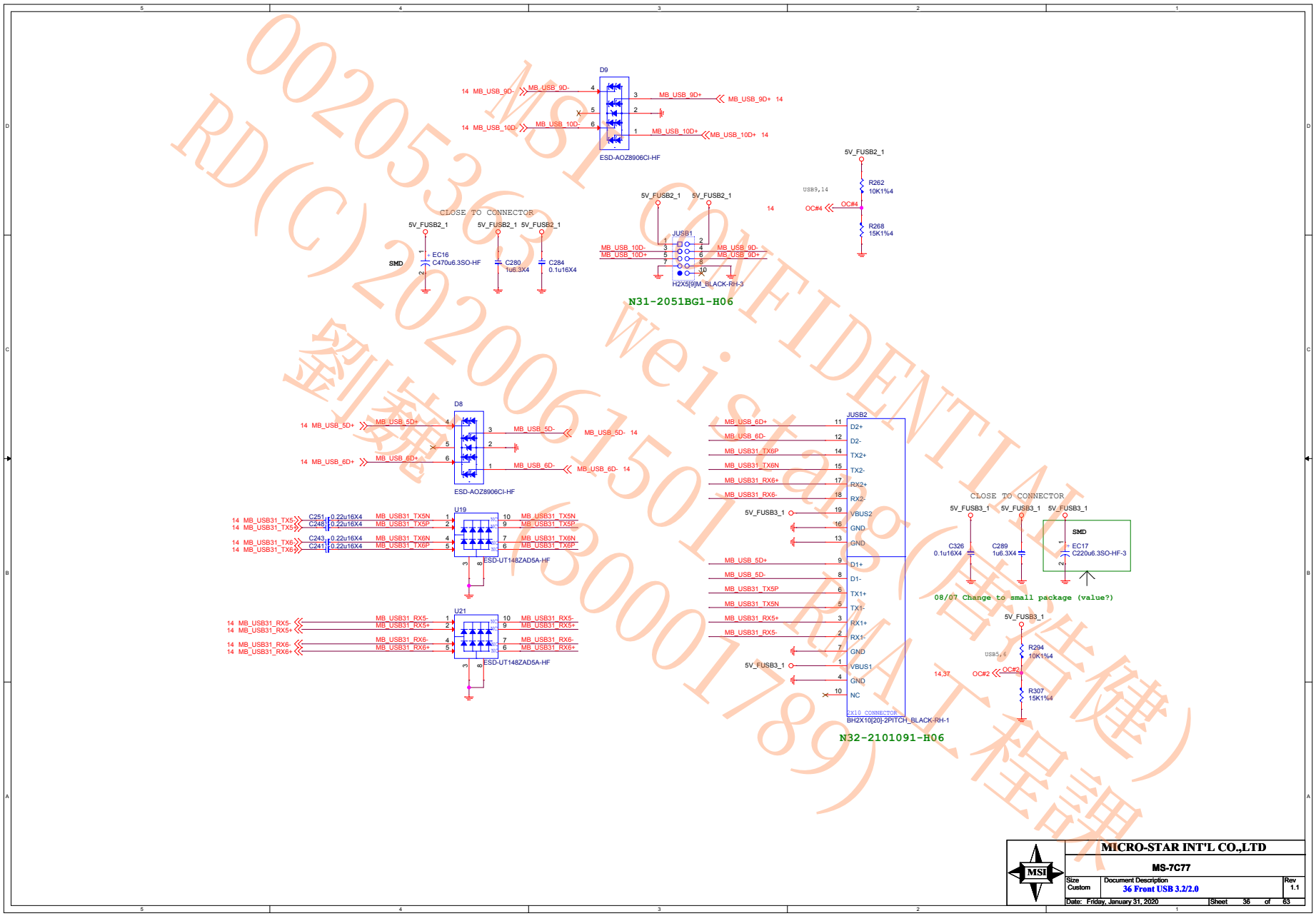
D9
ESD-AOZ8906CI-HF
CLOSE TO CONNECTOR
5V_FUSB2_1
EC16
C470u6.3SO-HF
C280
1u6.3X4
C284
0.1u16X4
JUSB1
H2X5[9]M_BLACK-RH-3
N31-2051BG1-H06
R262
10K1%4
R268
15K1%4
D8
ESD-AOZ8906CI-HF
U19
ESD-UT148ZAD5A-HF
U21
ESD-UT148ZAD5A-HF
JUSB2
BH2X10[20]-2PITCH_BLACK-RH-1
N32-2101091-H06
CLOSE TO CONNECTOR
5V_FUSB3_1
C326
0.1u16X4
C289
1u6.3X4
EC17
C220u6.3SO-HF-3
08/07 Change to small package (value?)
R294
10K1%4
R307
15K1%4
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MS-7C77
Size
Custom
Document Description
36 Front USB 3.2/2.0
Rev
1.1
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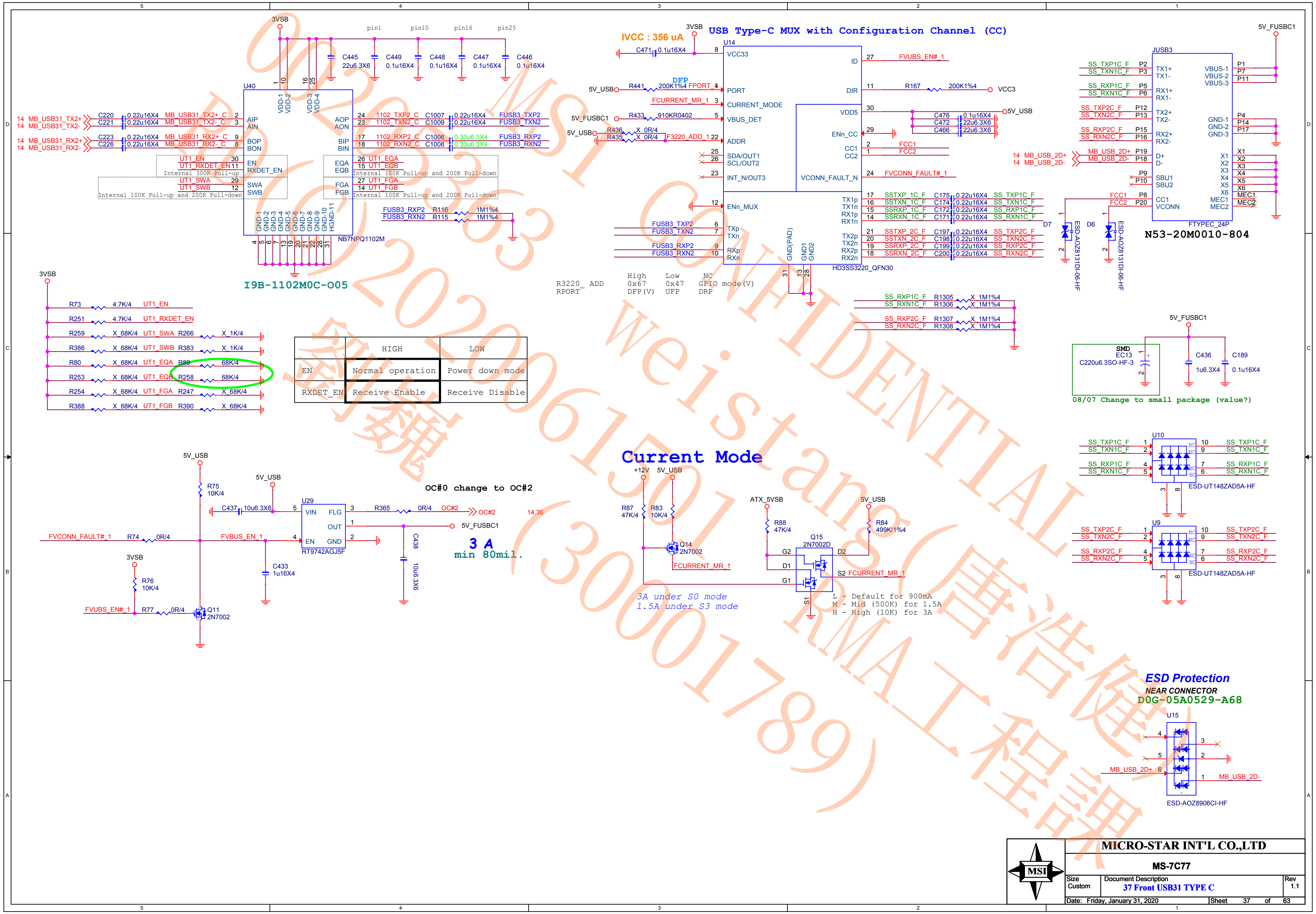

	HIGH	LOW
EN	Normal operation	Power down mode
RXDET_EN	Receive Enable	Receive Disable

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Size: Custom | Document Description: 37 Front USB31 TYPE C | Rev: 1.1

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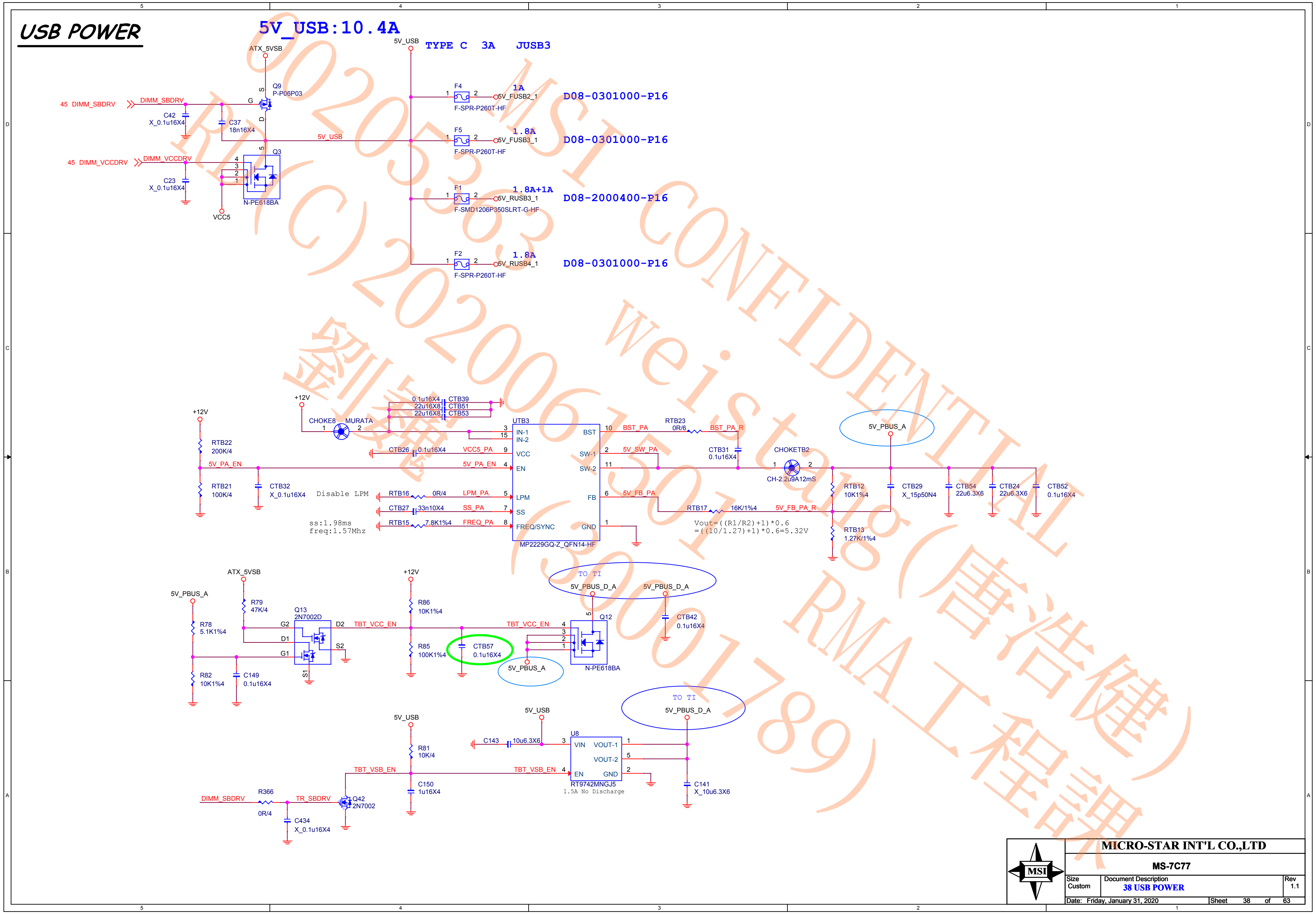

USB POWER
5V_USB:10.4A
TYPE C 3A JUSB3
ATX_5VSB
5V_USB
Q9 P-P06P03
45 DIMM_SBDRV
DIMM_SBDRV
C42 X_0.1u16X4
C37 18n16X4
Q3 N-PE618BA
45 DIMM_VCCDRV
DIMM_VCCDRV
C23 X_0.1u16X4
VCC5
F4 F-SPR-P260T-HF 1A 5V_FUSB2_1 D08-0301000-P16
F5 F-SPR-P260T-HF 1.8A 5V_FUSB3_1 D08-0301000-P16
F1 F-SMD1206P350SLRT-G-HF 1.8A+1A 5V_RUSB3_1 D08-2000400-P16
F2 F-SPR-P260T-HF 1.8A 5V_RUSB4_1 D08-0301000-P16
+12V
CHOKE8 MURATA
CTB39 0.1u16X4
CTB51 22u16X8
CTB53 22u16X8
UTB3 MP2229GQ-Z_QFN14-HF
IN-1 IN-2 VCC EN LPM SS FREQ/SYNC BST SW-1 SW-2 FB GND
RTB22 200K/4
RTB21 100K/4
5V_PA_EN
CTB32 X_0.1u16X4
Disable LPM
CTB26 0.1u16X4 VCC5_PA
RTB16 0R/4 LPM_PA
CTB27 33n10X4 SS_PA
RTB15 7.8K1%4 FREQ_PA
ss:1.98ms
freq:1.57Mhz
RTB23 0R/6 BST_PA BST_PA_R
CTB31 0.1u16X4
5V_SW_PA
CHOKETB2 CH-2.2u9A12mS
5V_PBUS_A
5V_FB_PA
RTB17 16K/1%4 5V_FB_PA_R
Vout=((R1/R2)+1)*0.6
=((10/1.27)+1)*0.6=5.32V
RTB12 10K1%4
RTB13 1.27K/1%4
CTB29 X_15p50N4
CTB54 22u6.3X6
CTB24 22u6.3X6
CTB52 0.1u16X4
ATX_5VSB
5V_PBUS_A
R79 47K/4
R78 5.1K1%4
Q13 2N7002D
TBT_VCC_EN
R82 10K1%4
C149 0.1u16X4
+12V
R86 10K1%4
R85 100K1%4
CTB57 0.1u16X4
TO TI
5V_PBUS_D_A
Q12 N-PE618BA
CTB42 0.1u16X4
5V_USB
R81 10K/4
TBT_VSB_EN
C150 1u16X4
DIMM_SBDRV
R366 0R/4
TR_SBDRV
Q42 2N7002
C434 X_0.1u16X4
C143 10u6.3X6
U8 RT9742MNGJ5
VIN VOUT-1 VOUT-2 EN GND
1.5A No Discharge
C141 X_10u6.3X6
MICRO-STAR INT'L CO.,LTD
MS-7C77
Size Custom
Document Description 38 USB POWER
Rev 1.1
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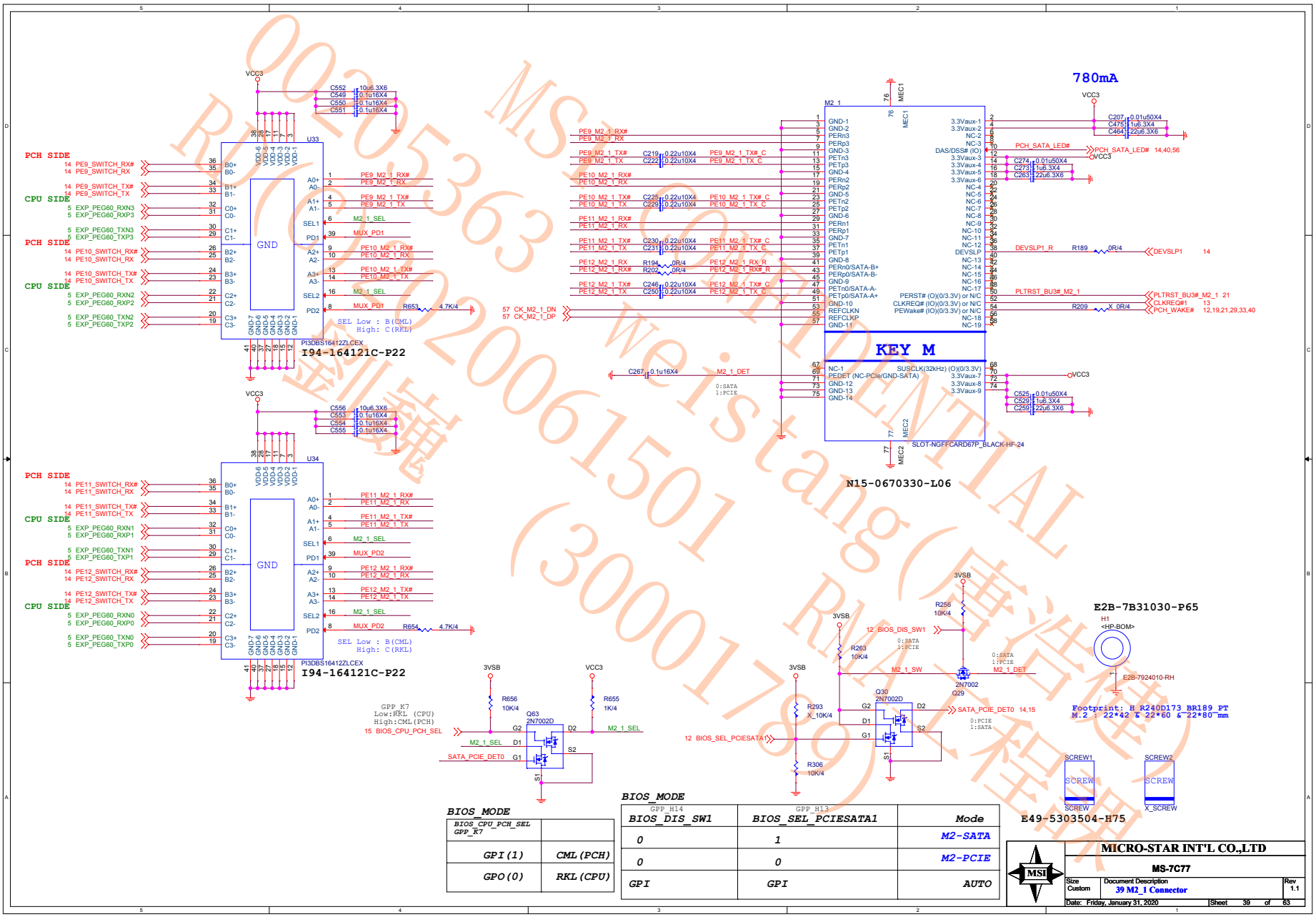
780mA
N15-0670330-L06
I94-164121C-P22
I94-164121C-P22
E2B-7B31030-P65
E49-5303504-H75
KEY M
SLOT-NGFFCARD67P_BLACK-HF-24
PI3DBS16412ZLCEX
PI3DBS16412ZLCEX
BIOS_MODE
BIOS_CPU_PCH_SEL GPP_K7
GPI(1) CML(PCH)
GPO(0) RKL(CPU)
BIOS_MODE
BIOS_DIS_SW1 BIOS_SEL_PCIESATA1 Mode
0 1 M2-SATA
0 0 M2-PCIE
GPI GPI AUTO
MICRO-STAR INT'L CO.,LTD
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39 M2_1 Connector
Rev 1.1
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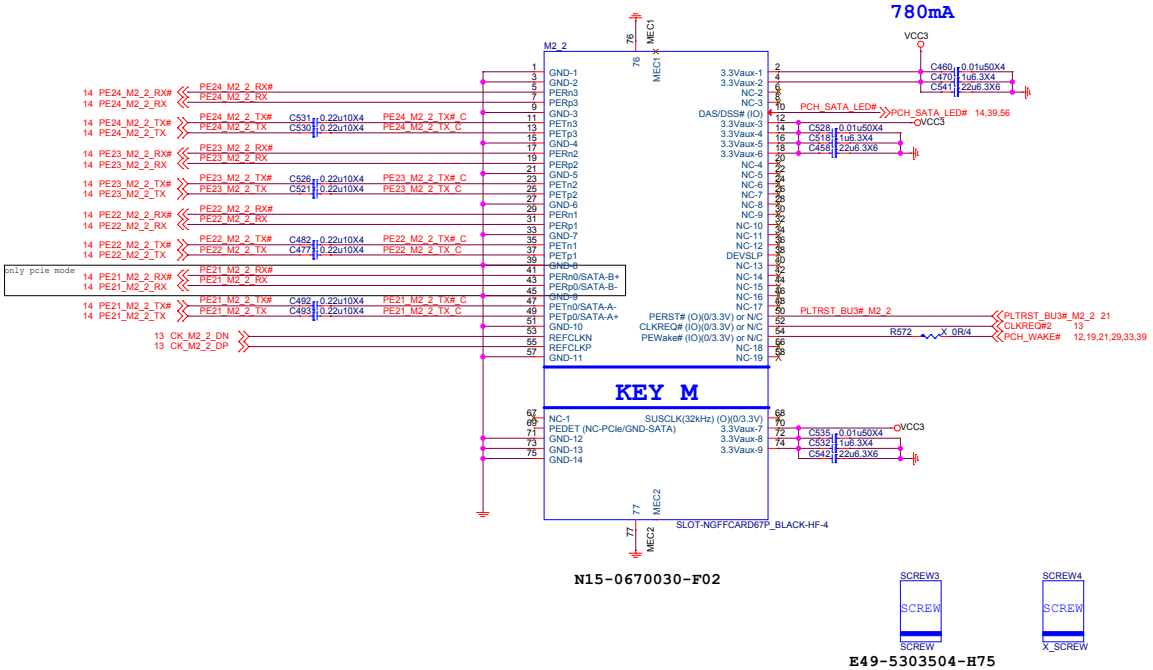

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Size: Custom	Document Description: 40 M2_2 Connector
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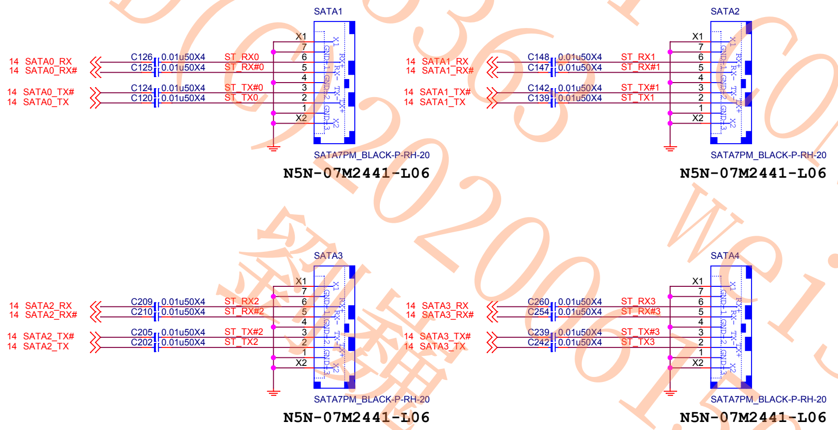
SATA GEN3



MICRO-STAR INT'L CO.,LTD

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Size	Document Description	Rev
Custom	41 SATA connector	1.1

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support BT&WIFI, not support LTE

CNVI 1

MEC2

	1	GND-1	
	3	USB_D+	
	5	USB_D-	
	7	GND-11	
15 CNV_WR_1_DN R113 0R/4 CNV_WR_R_1_DN	9	SDIO CLK	
15 CNV_WR_1_DP R112 0R/4 CNV_WR_R_1_DP	11	SDIO CMD	
	13	SDIO DATA0	
15 CNV_WR_0_DN R111 0R/4 CNV_WR_R_0_DN	15	SDIO DATA1	
15 CNV_WR_0_DP R110 0R/4 CNV_WR_R_0_DP	17	SDIO DATA2	
	19	SDIO DATA3	
15 CNV_WR_CLK_DN R109 0R/4 CNV_WR_R_CLK_DN	21	SDIO WAKE#	
15 CNV_WR_CLK_DP R108 0R/4 CNV_WR_R_CLK_DP	23	SDIO RESET#	
	33	GND-10	
	35	PETp0	
	37	PETn0	
	39	GND-9	
	41	PERp0	
	43	PERn0	
	45	GND-8	
	47	REFCLKP0	
	49	REFCLKN0	
	51	GND-7	
	53	CLKREQ0#	
	55	PEWAKE0#	
	57	GND-6	
15 CNV_WT_1_DN R122 0R/4 CNV_WT_R_1_DN	59	RESERVED / PETp1	
15 CNV_WT_1_DP R121 0R/4 CNV_WT_R_1_DP	61	RESERVED / PETn1	
	63	GND-5	
15 CNV_WT_0_DN R120 0R/4 CNV_WT_R_0_DN	65	RESERVED / PERp1	
15 CNV_WT_0_DP R119 0R/4 CNV_WT_R_0_DP	67	RESERVED / PERn1	
	69	GND-4	
15 CNV_WT_CLK_DN R118 0R/4 CNV_WT_R_CLK_DN	71	RESERVED / REFCLKP1	
15 CNV_WT_CLK_DP R117 0R/4 CNV_WT_R_CLK_DP	73	RESERVED / REFCLKN1	
	75	GND-3	

3VSB	2	3.3V-1	
	4	3.3V-2	
	6	LED1#	
	8	PCM_CLK / I2S SCK	
CRF_RST_N R375 0R/4 CRF_RST_N_PCH 13 R367 75K1%	10	PCM_SYNC / I2S WS	
	12	PCM_IN / I2S SD_IN	
M.2_BT_CLKREQ0 R376 0R/4 M.2_BT_CLKREQ0_PCH 15 R368 75K1%	14	PCM_OUT / I2S SD_OUT	
	16	LED2#	
	18	GND-2	
	20	UART WAKE#	
CNV_BRI_RSP_R R377 22R/4 CNV_BRI_RSP 15	22	UART RXD	
CNV_RGI_DT_R R378 22R/4 CNV_RGI_DT 15,18	32	UART TXD	
CNV_RGI_RSP_R R379 22R/4 CNV_RGI_RSP 15	34	UART CTS	
CNV_BRI_DT_R R380 22R/4 CNV_BRI_DT 15,18	36	UART RTS	
	38	VENDOR DEFINED-1	
	40	VENDOR DEFINED-2	
	42	VENDOR DEFINED-3	
	44	COEX3	
	46	COEX2	
C442 X_10p50N4	48	COEX1	
SUS_CLK_WIFI R570 X_0R/4 PCH_SUSCLK 4,12	50	SUSCLK	
	52	PERST0#	
BT_DISABLE_L# R381 10K1%4	54	W_DISABLE2#	
WIFI_DISABLE_L# R382 10K1%4 3VSB	56	W_DISABLE1#	
	58	I2C DATA	
	60	I2C CLK	
	62	ALERT#	
CNVI_REFCLK_R R464 0R/4 CNVI_REFCLK 13 R384 X_10K/4	64	RESERVED	
	66	UIM_SWP / PERST1#	
	68	UIM_POWER_SNK / CLKREQ1#	
	70	UIM_POWER_SRC/GPIO1 / PEWAKE1#	
3VSB	72	3.3V-3	
	74	3.3V-4	

MEC1

SLOT-NGFFCARD67P_BLACK-HF-46

N15-0670610-L06

1.36A PEAK CURRENT 9560

2017.10.26 update .CRB

KEY E

close to pin2

3VSB: C435 10u6.3X6, C439 0.1u16X4, C152 0.01u50X4

3VSB: C443 10u6.3X6, C441 0.1u16X4, C444 0.01u50X4

ATX_5VSB: R391 47K/4

3VSB: R389 47K/4

Q45 2N7002D: G2, D1, G1, S2, S1; D2 BT_DISABLE_L#

15 WIFI_BTDIS# WIFI_BTDIS#

ATX_5VSB: R392 47K/4

Q46 2N7002D: G2, D1, G1, S2, S1; D2 WIFI_DISABLE_L#

WIFI_BTDIS# G1

PCH_1P8_VSB: R370 100K1%4 CNV_RGI_DT_R

PCH_1P8_VSB: R372 4.7K/4 CNV_BRI_DT_R

COVER1 VR Cover X1 X2 X_E21-4442021-RH

SCREW5 SCREW SCREW

SCREW6 SCREW SCREW

TOP E21-7C73020-C22

BOT E21-7C73010-C22

Footprint WIFI_MODULE_37_7X35_4

Wireless1 INTEL-8265 X_Wireless

604-4467-01S

MICRO-STAR INT'L CO.,LTD

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Size	Document Description	Rev
Custom	42 CNVI WIFI	1.1

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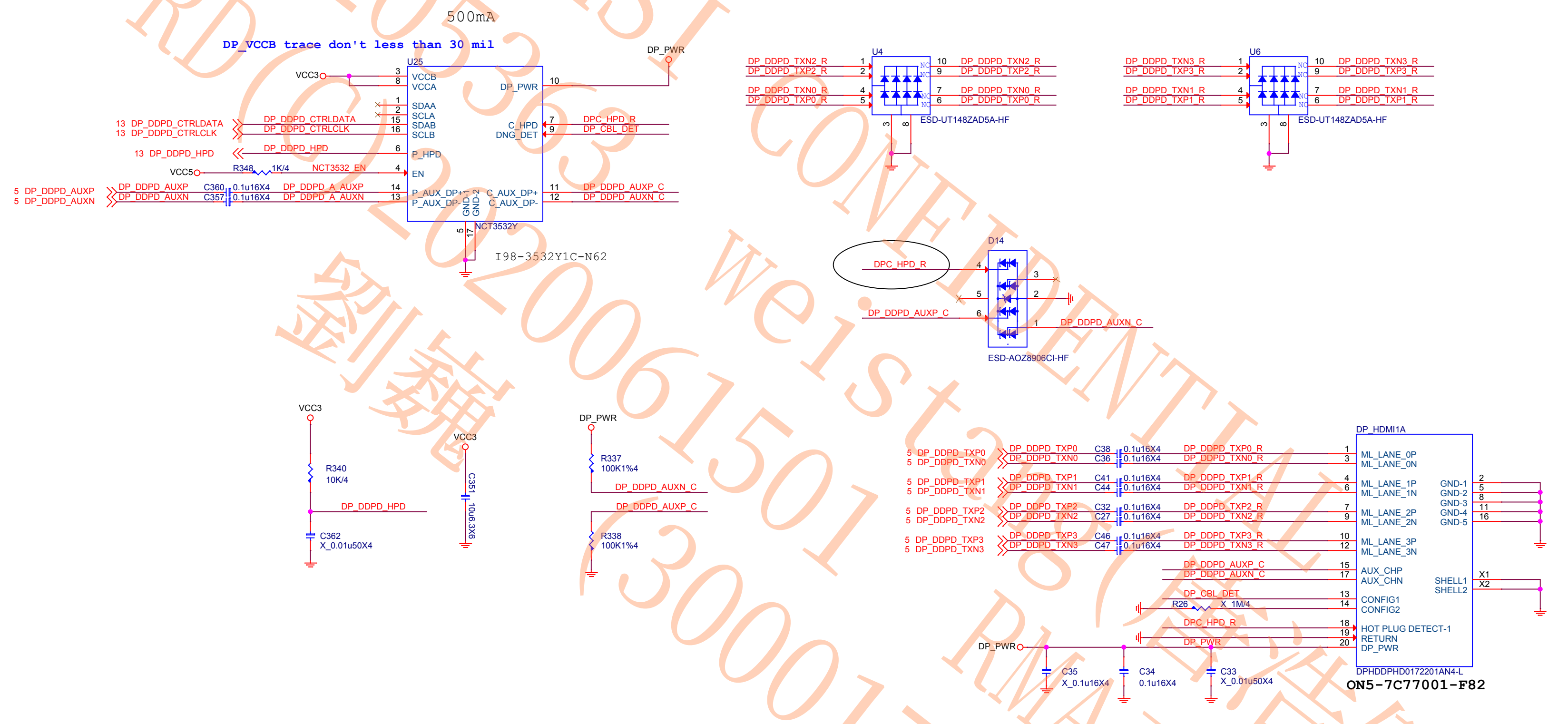

MICRO-STAR INT'L CO.,LTD

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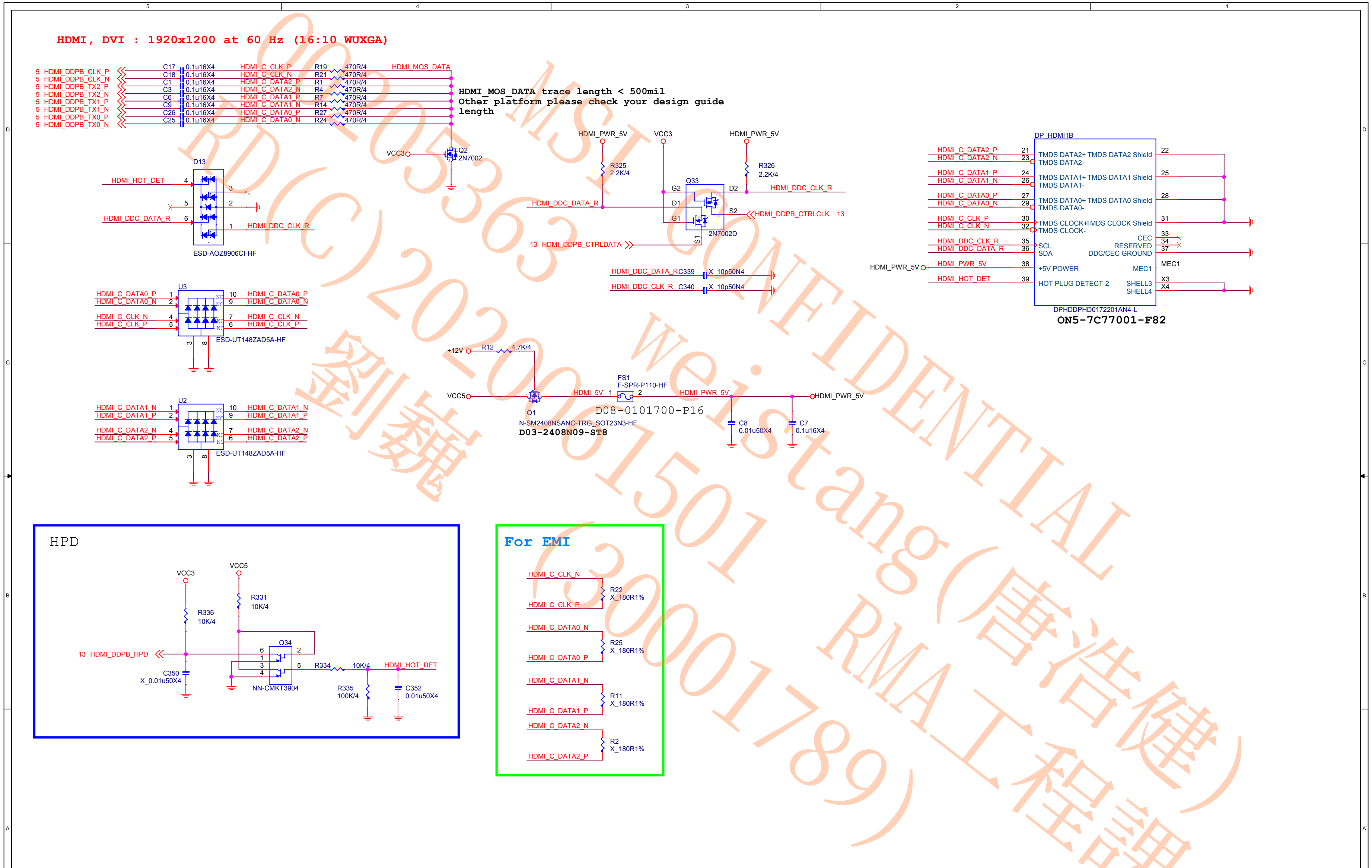
Size	Document Description	Rev
Custom	43 DP Connector	1.1

Date: Friday, January 31, 2020 Sheet 43 of 63



MICRO-STAR INT'L CO.,LTD

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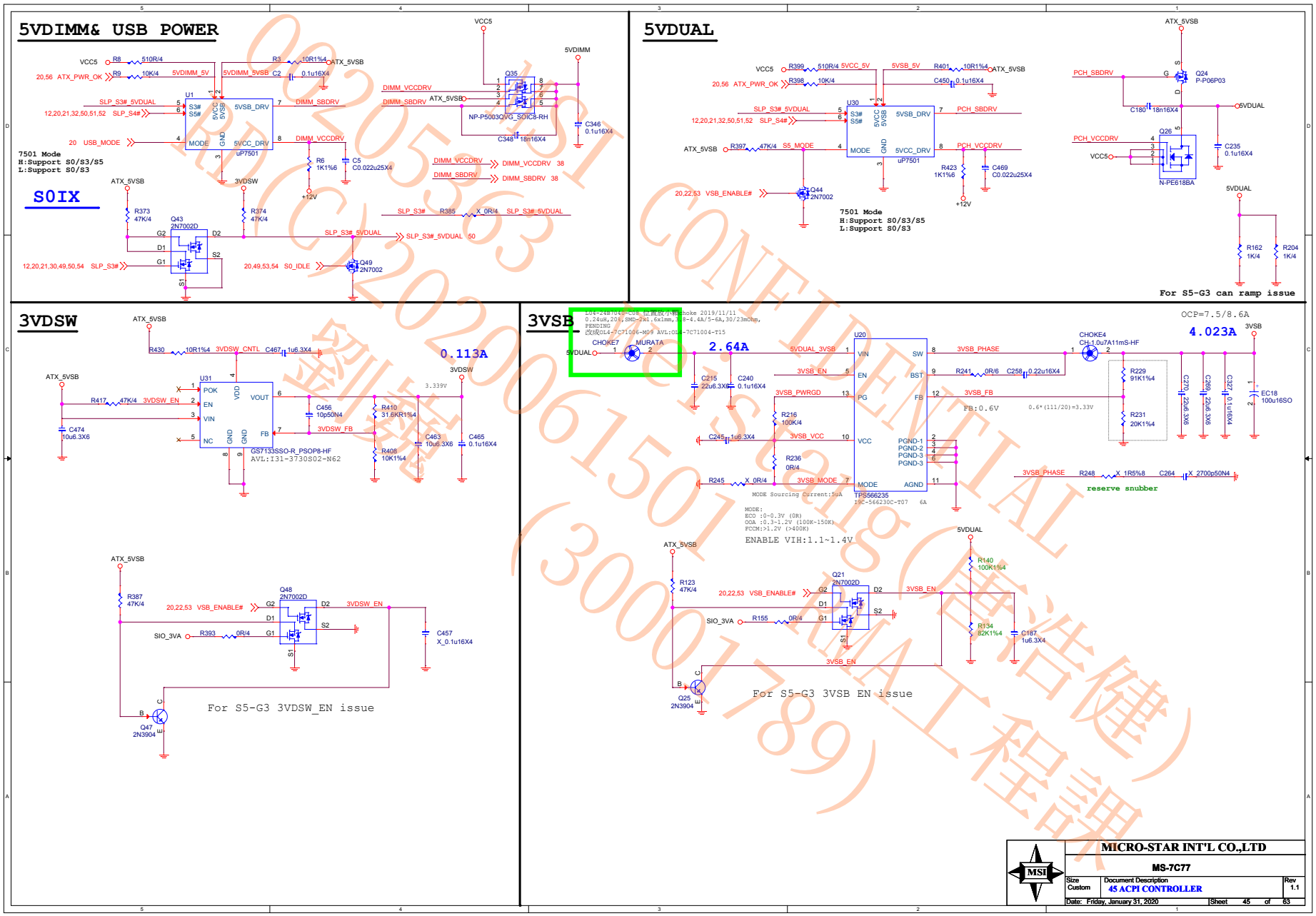
Size: Custom | Document Description: 44 HDMI Connector | Rev: 1.1

Date: Friday, January 31, 2020 | Sheet 44 of 63


5VDIMM& USB POWER
7501 Mode
H:Support S0/S3/S5
L:Support S0/S3
S0IX
5VDUAL
7501 Mode
H:Support S0/S3/S5
L:Support S0/S3
For S5-G3 can ramp issue
3VDSW
0.113A
For S5-G3 3VDSW_EN issue
3VSB
2.64A
4.023A
OCP=7.5/8.6A
reserve snubber
For S5-G3 3VSB EN issue
MICRO-STAR INT'L CO.,LTD
MS-7C77
45 ACPI CONTROLLER
Rev 1.1
Friday, January 31, 2020
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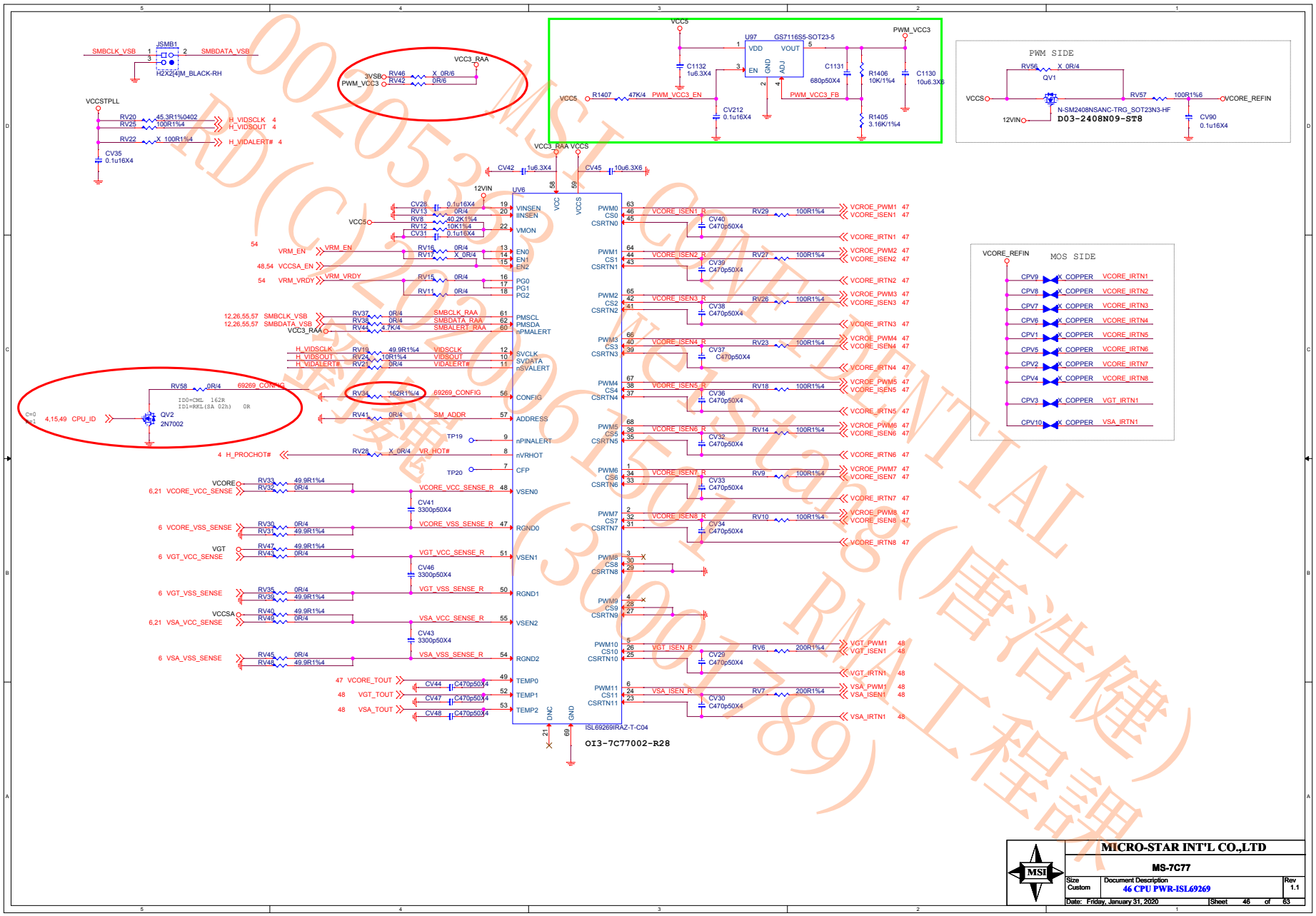
SMBCLK_VSB
SMBDATA_VSB
JSMB1
H2X2[4]M_BLACK-RH
VCC3_RAA
3VSB
PWM_VCC3
RV46 X_0R/6
RV42 0R/6
VCCSTPLL
RV20 45.3R1%0402
RV25 100R1%4
RV22 X_100R1%4
H_VIDSCLK 4
H_VIDSOUT 4
H_VIDALERT# 4
CV35 0.1u16X4
U97 GS7116S5-SOT23-5
VDD VOUT EN GND ADJ
C1132 1u6.3X4
C1131 680p50X4
R1406 10K/1%4
R1405 3.16K/1%4
C1130 10u6.3X6
R1407 47K/4
PWM_VCC3_EN
PWM_VCC3_FB
CV212 0.1u16X4
PWM SIDE
RV55 X_0R/4
QV1
RV57 100R1%6
VCORE_REFIN
N-SM2408NSANC-TRG_SOT23N3-HF
D03-2408N09-ST8
CV90 0.1u16X4
VCCS
12VIN
CV42 1u6.3X4
CV45 10u6.3X6
UV6
VCC
VCCS
VINSEN
IINSEN
VMON
EN0
EN1
EN2
PG0
PG1
PG2
PMSCL
PMSDA
nPMALERT
SVCLK
SVDATA
nSVALERT
CONFIG
ADDRESS
nPINALERT
nVRHOT
CFP
VSEN0
RGND0
VSEN1
RGND1
VSEN2
RGND2
TEMP0
TEMP1
TEMP2
DNC
GND
ISL69269IRAZ-T-C04
OI3-7C77002-R28
VRM_EN
VRM_VRDY
VCCSA_EN
SMBCLK_RAA
SMBDATA_RAA
SMBALERT_RAA
VIDSCLK
VIDSOUT
VIDALERT#
RV58 0R/4 69269_CONFIG
RV34 162R1%/4 69269_CONFIG
QV2 2N7002
CPU_ID
RV41 0R/4 SM_ADDR
TP19
RV28 X_0R/4 VR_HOT#
H_PROCHOT#
TP20
VCORE
VCORE_VCC_SENSE
VCORE_VSS_SENSE
VGT
VGT_VCC_SENSE
VGT_VSS_SENSE
VCCSA
VSA_VCC_SENSE
VSA_VSS_SENSE
VCORE_TOUT
VGT_TOUT
VSA_TOUT
PWM0 PWM1 PWM2 PWM3 PWM4 PWM5 PWM6 PWM7 PWM8 PWM9 PWM10 PWM11
CS0 CS1 CS2 CS3 CS4 CS5 CS6 CS7 CS8 CS9 CS10 CS11
CSRTN0 CSRTN1 CSRTN2 CSRTN3 CSRTN4 CSRTN5 CSRTN6 CSRTN7 CSRTN8 CSRTN9 CSRTN10 CSRTN11
VCORE_ISEN1_R VCORE_ISEN2_R VCORE_ISEN3_R VCORE_ISEN4_R VCORE_ISEN5_R VCORE_ISEN6_R VCORE_ISEN7_R VCORE_ISEN8_R
VGT_ISEN_R VSA_ISEN_R
VCORE_PWM1 VCORE_ISEN1 VCORE_IRTN1
VCORE_PWM2 VCORE_ISEN2 VCORE_IRTN2
VCORE_PWM3 VCORE_ISEN3 VCORE_IRTN3
VCORE_PWM4 VCORE_ISEN4 VCORE_IRTN4
VCORE_PWM5 VCORE_ISEN5 VCORE_IRTN5
VCORE_PWM6 VCORE_ISEN6 VCORE_IRTN6
VCORE_PWM7 VCORE_ISEN7 VCORE_IRTN7
VCORE_PWM8 VCORE_ISEN8 VCORE_IRTN8
VGT_PWM1 VGT_ISEN1 VGT_IRTN1
VSA_PWM1 VSA_ISEN1 VSA_IRTN1
MOS SIDE
VCORE_REFIN
CPV9 CPV8 CPV7 CPV6 CPV1 CPV5 CPV2 CPV4 CPV3 CPV10
X_COPPER
VGT_IRTN1
VSA_IRTN1
MICRO-STAR INT'L CO.,LTD
MS-7C77
Size Custom
Document Description
46 CPU PWR-ISL69269
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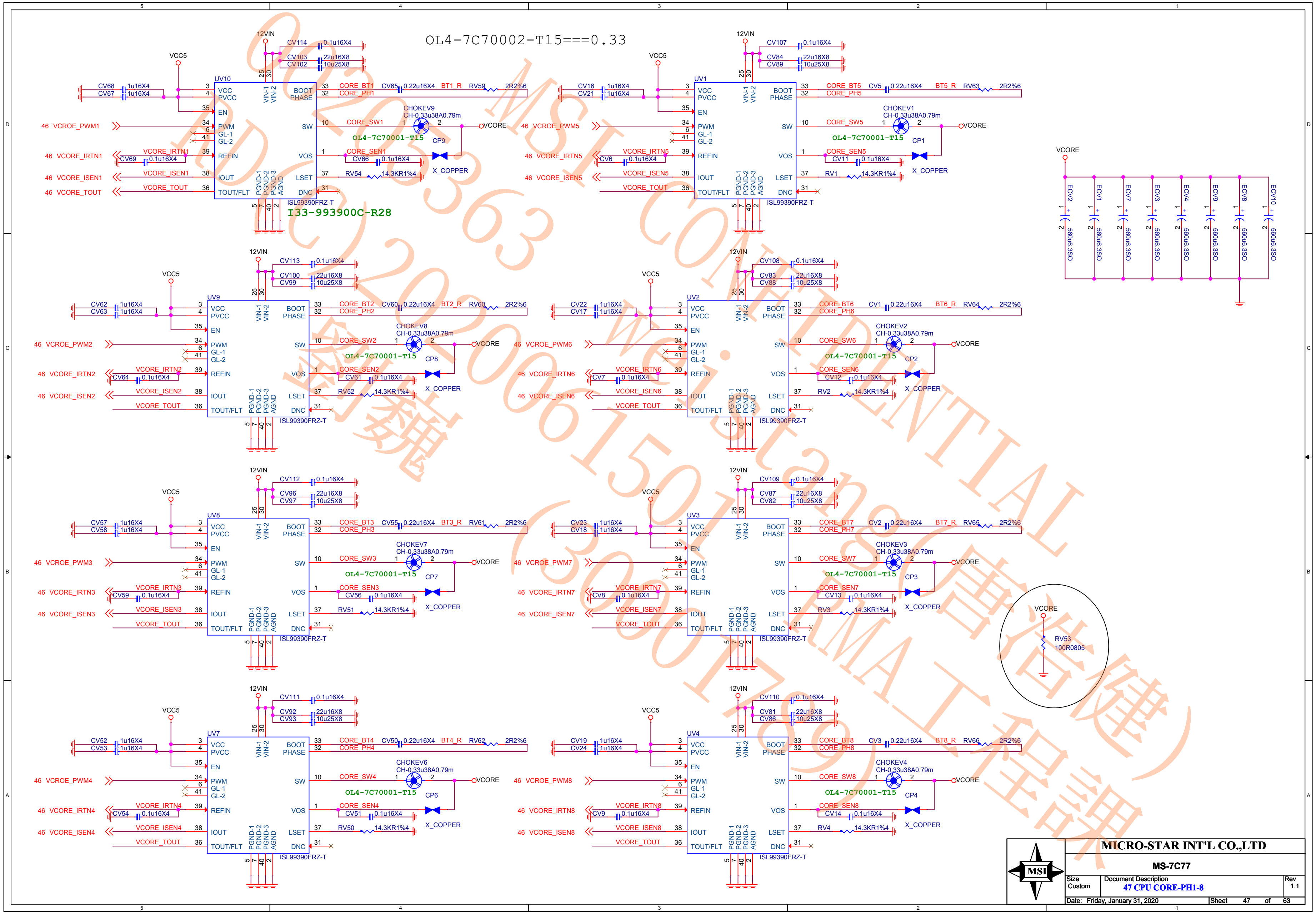

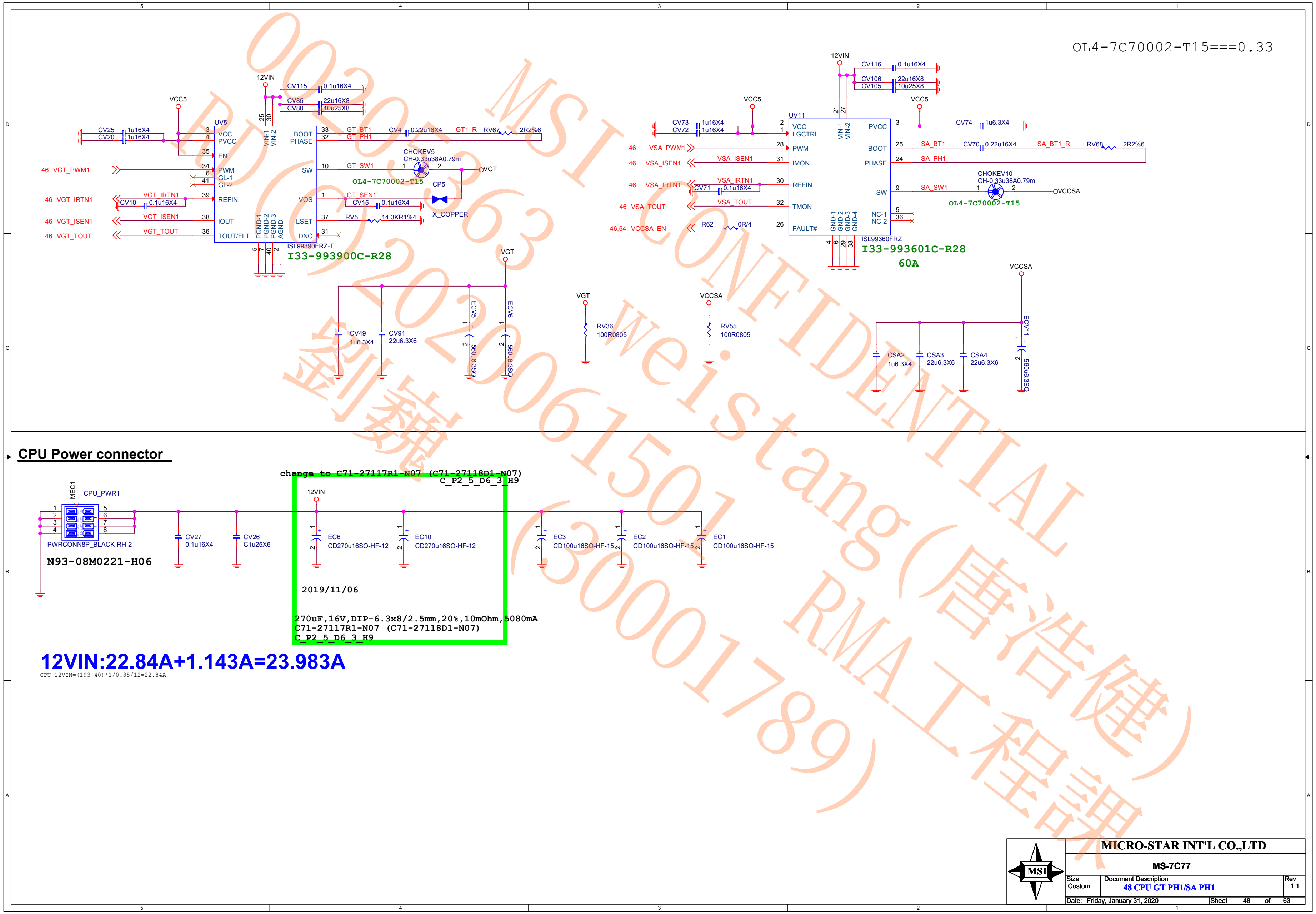
OL4-7C70002-T15===0.33
12VIN
CV115 0.1u16X4
CV85 22u16X8
CV80 10u25X8
VCC5
CV25 1u16X4
CV20 1u16X4
UV5
VCC
PVCC
EN
PWM
GL-1
GL-2
REFIN
IOUT
TOUT/FLT
VIN-1
VIN-2
BOOT
PHASE
SW
VOS
LSET
DNC
PGND-1
PGND-2
PGND-3
AGND
ISL99390FRZ-T
I33-993900C-R28
46 VGT_PWM1
46 VGT_IRTN1
46 VGT_ISEN1
46 VGT_TOUT
VGT_IRTN1
CV10 0.1u16X4
VGT_ISEN1
VGT_TOUT
GT_BT1
GT_PH1
CV4 0.22u16X4
GT1_R
RV67
2R2%6
GT_SW1
CHOKEV5
CH-0.33u38A0.79m
OL4-7C70002-T15
VGT
CP5
X_COPPER
GT_SEN1
CV15 0.1u16X4
RV5 14.3KR1%4
CV49 1u6.3X4
CV91 22u6.3X6
ECV5 560u6.3SQ
ECV6 560u6.3SQ
VGT
RV36 100R0805
VCCSA
RV55 100R0805
12VIN
CV116 0.1u16X4
CV106 22u16X8
CV105 10u25X8
VCC5
CV73 1u16X4
CV72 1u16X4
UV11
VCC
LGCTRL
PWM
IMON
REFIN
TMON
FAULT#
VIN-1
VIN-2
PVCC
BOOT
PHASE
SW
NC-1
NC-2
GND-1
GND-2
GND-3
GND-4
ISL99360FRZ
I33-993601C-R28
60A
46 VSA_PWM1
46 VSA_ISEN1
46 VSA_IRTN1
46 VSA_TOUT
46,54 VCCSA_EN
VSA_ISEN1
VSA_IRTN1
CV71 0.1u16X4
VSA_TOUT
R62 0R/4
VCC5
CV74 1u6.3X4
SA_BT1
CV70 0.22u16X4
SA_BT1_R
RV68
2R2%6
SA_PH1
CHOKEV10
CH-0.33u38A0.79m
SA_SW1
OL4-7C70002-T15
VCCSA
CSA2 1u6.3X4
CSA3 22u6.3X6
CSA4 22u6.3X6
ECV11 560u6.3SQ
CPU Power connector
MEC1
CPU_PWR1
PWRCONN8P_BLACK-RH-2
N93-08M0221-H06
CV27 0.1u16X4
CV26 C1u25X6
change to C71-27117R1-N07 (C71-27118D1-N07)
C_P2_5_D6_3_H9
12VIN
EC6 CD270u16SO-HF-12
EC10 CD270u16SO-HF-12
2019/11/06
270uF,16V,DIP-6.3x8/2.5mm,20%,10mOhm,5080mA
C71-27117R1-N07 (C71-27118D1-N07)
C_P2_5_D6_3_H9
EC3 CD100u16SO-HF-15
EC2 CD100u16SO-HF-15
EC1 CD100u16SO-HF-15
12VIN:22.84A+1.143A=23.983A
CPU 12VIN=(193+40)*1/0.85/12=22.84A
MICRO-STAR INT'L CO.,LTD
MS-7C77
Size Custom
Document Description
48 CPU GT PHI/SA PHI
Rev 1.1
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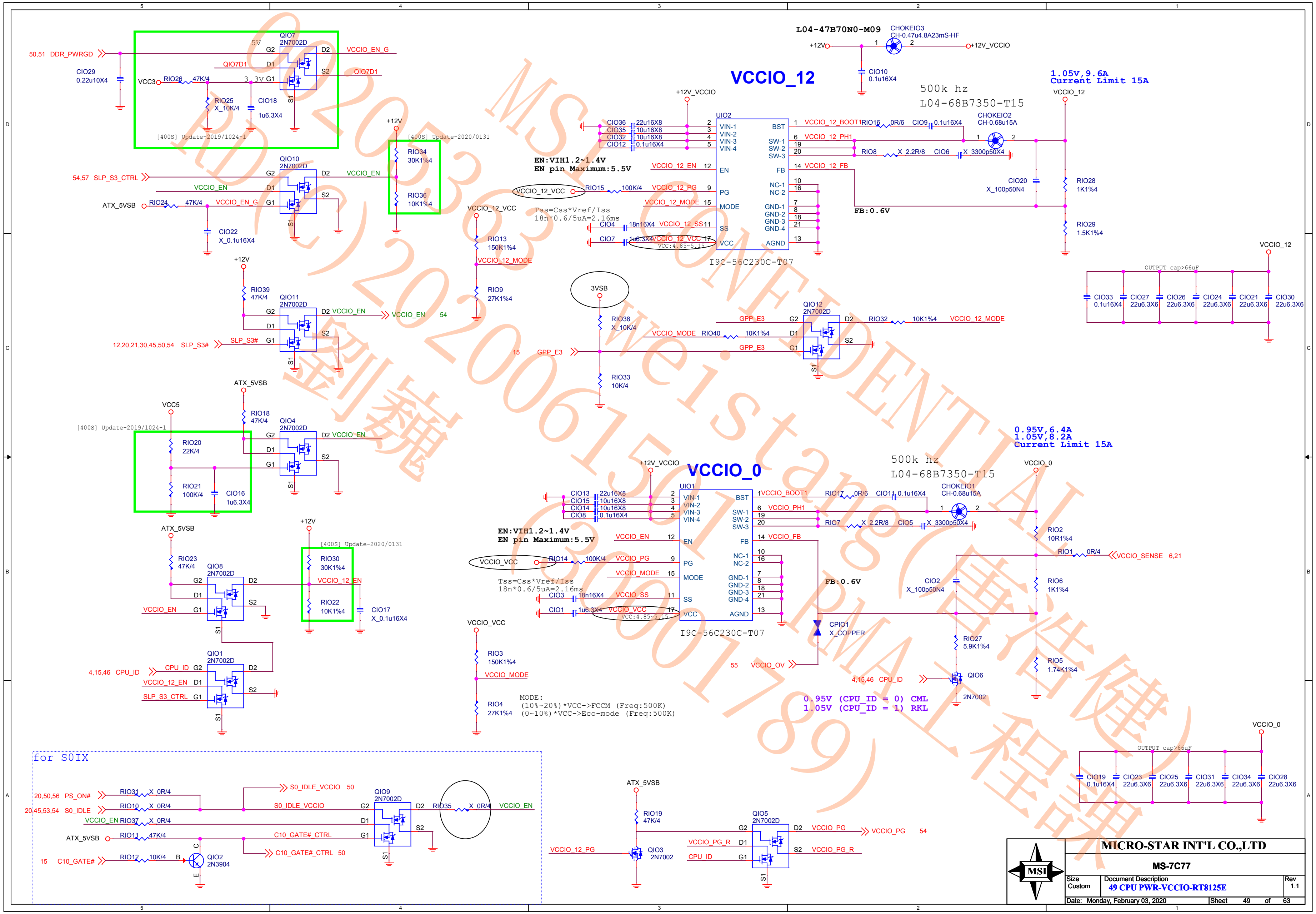
VCCIO_12
VCCIO_0
L04-47B70N0-M09
500k hz
L04-68B7350-T15
1.05V,9.6A
Current Limit 15A
0.95V,6.4A
1.05V,8.2A
Current Limit 15A
EN:VIH1.2~1.4V
EN pin Maximum:5.5V
Tss=Css*Vref/Iss
18n*0.6/5uA=2.16ms
FB:0.6V
I9C-56C230C-T07
OUTPUT cap>66uF
MODE:
(10%~20%)*VCC->FCCM (Freq:500K)
(0~10%)*VCC->Eco-mode (Freq:500K)
0.95V (CPU_ID = 0) CML
1.05V (CPU_ID = 1) RKL
for S0IX
[400S] Update-2019/1024-1
[400S] Update-2020/0131
MICRO-STAR INT'L CO.,LTD
MS-7C77
Size: Custom
Document Description: 49 CPU PWR-VCCIO-RT8125E
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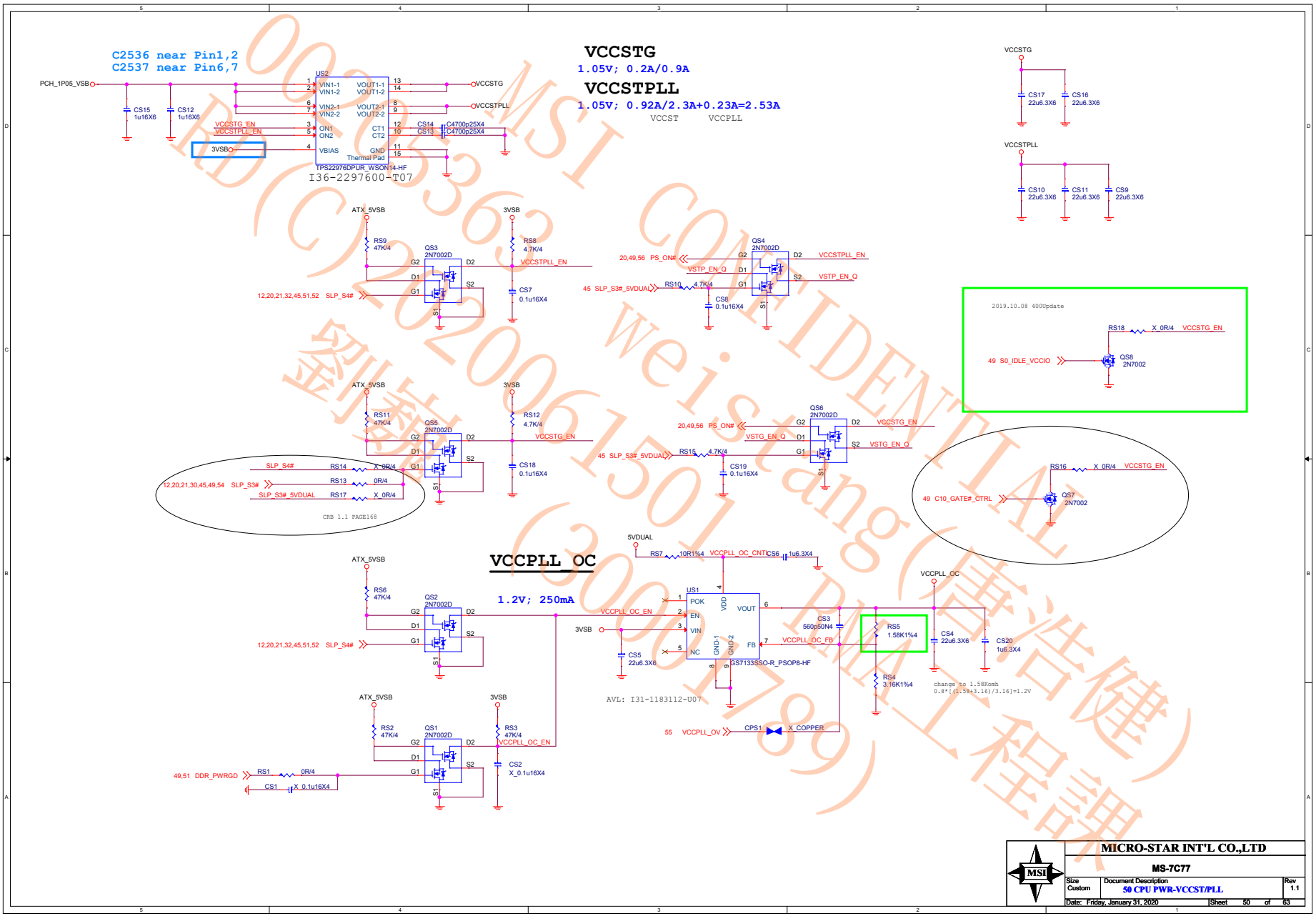
Sheet 49 of 63


C2536 near Pin1,2
C2537 near Pin6,7
VCCSTG
1.05V; 0.2A/0.9A
VCCSTPLL
1.05V; 0.92A/2.3A+0.23A=2.53A
VCCST VCCPLL
I36-2297600-T07
VCCPLL_OC
1.2V; 250mA
AVL: I31-1183112-U07
2019.10.08 400Update
CRB 1.1 PAGE168
MICRO-STAR INT'L CO.,LTD
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50 CPU PWR-VCCST/PLL
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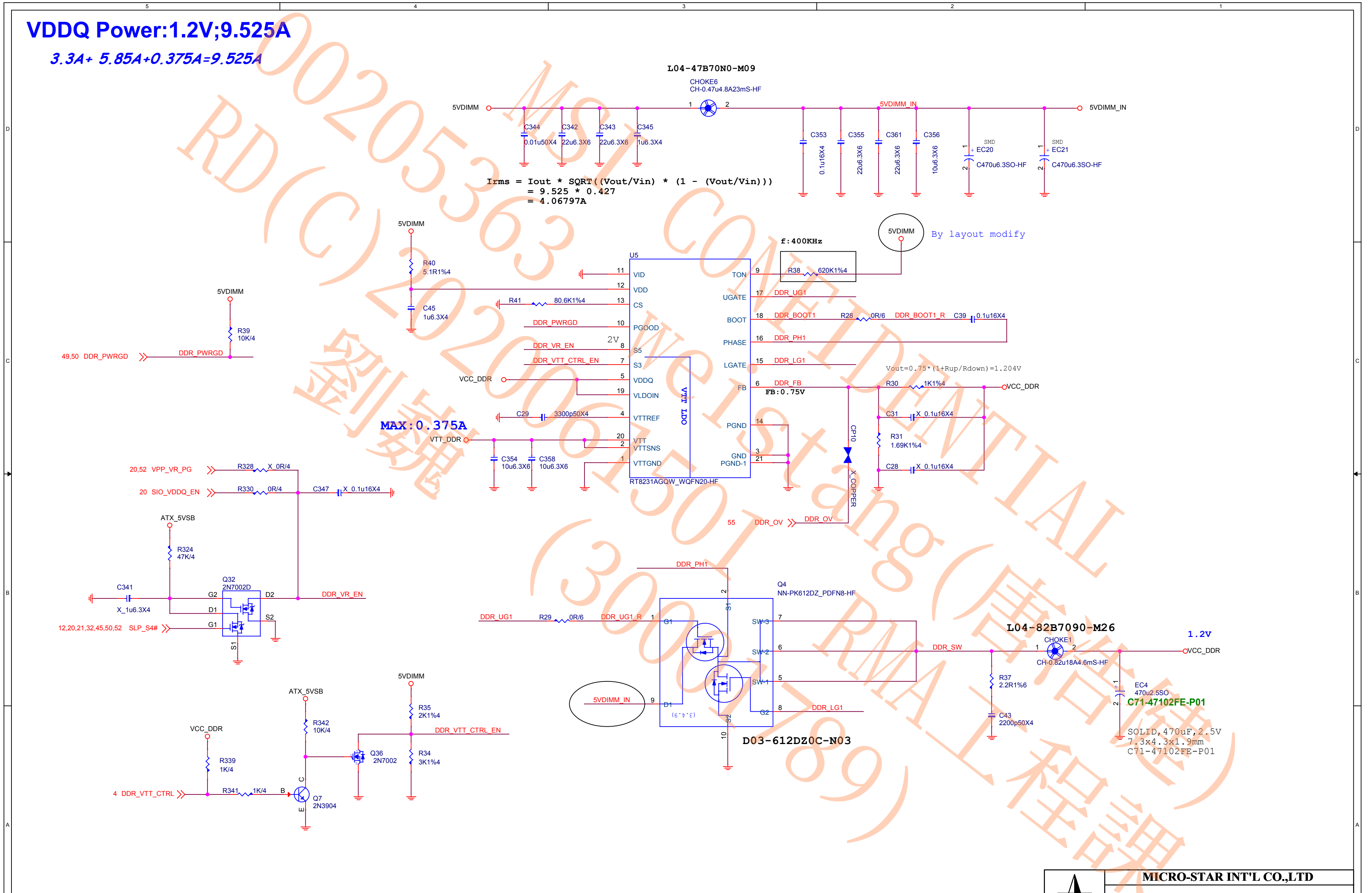

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Size	Document Description	Rev
Custom	51 DDR-RT8231	1.1

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VPP Power:2.5V; 1.12A FOR 2DIMM

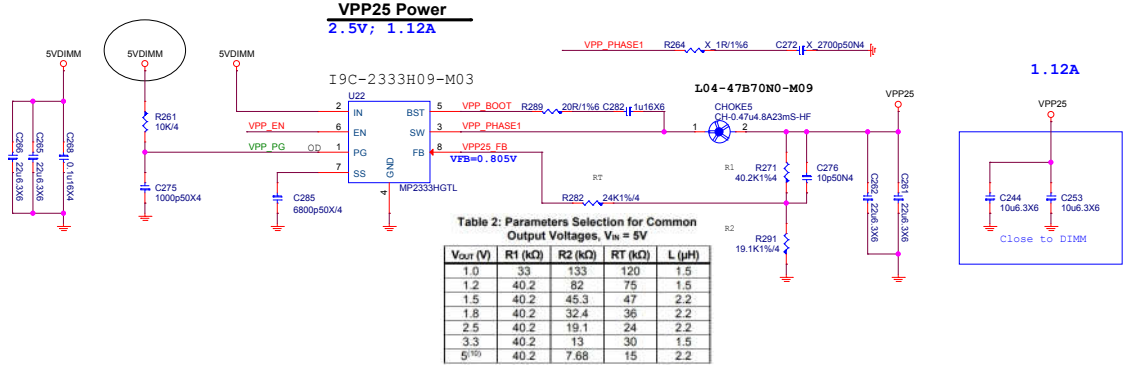
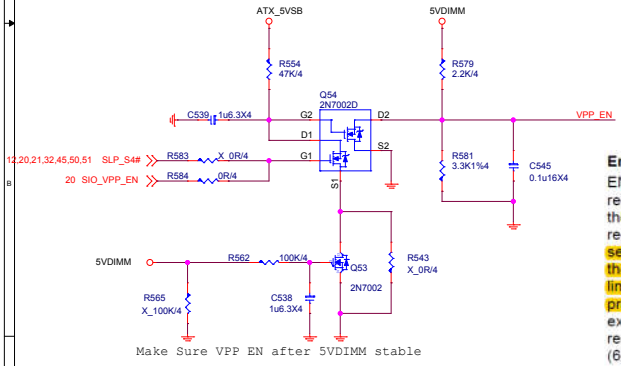
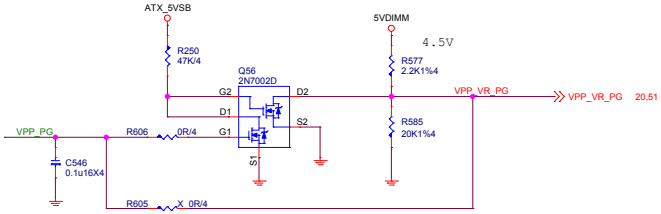


Table 2: Parameters Selection for Common Output Voltages, V_{IN} = 5V

V_{OUT} (V)	R1 (kΩ)	R2 (kΩ)	RT (kΩ)	L (µH)
1.0	33	133	120	1.5
1.2	40.2	82	75	1.5
1.5	40.2	45.3	47	2.2
1.8	40.2	32.4	36	2.2
2.5	40.2	19.1	24	2.2
3.3	40.2	13	30	1.5
5(10)	40.2	7.68	15	2.2





Enable (EN) Control

EN is a digital control pin that turns the regulator on and off. Drive EN high to turn on the regulator. Drive EN low to turn off the regulator. EN is clamped internally using a 2.8V series Zener diode (see Figure 2). Connecting the EN input through a pull-up resistor to V_{IN} limits the EN input current below 40µA to prevent damage to the Zener diode. For example, when connecting a 604kΩ pull-up resistor to 12V VIN, I_{Zener} = (12V - 2.8V) / (604kΩ + 35kΩ) = 14µA.

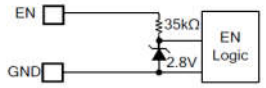


Figure 2: Zener Diode between EN and GND

MICRO-STAR INT'L CO.,LTD		
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Size: Custom	Document Description: 52 DDR-VPP25-MP2333	Rev: 1.1
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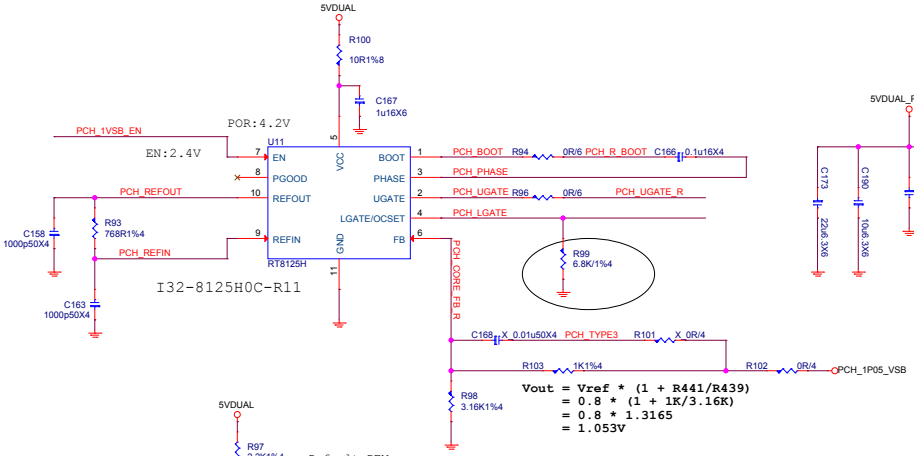
PCH_1P05_VSB Power:1.05V, 16A

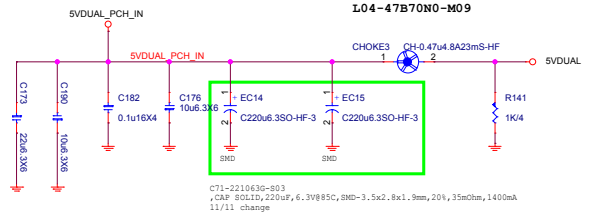
D03-612DZ0C-N03 2.2~3.1mohm@5V
OCP=1.6A*1.3=20.8A

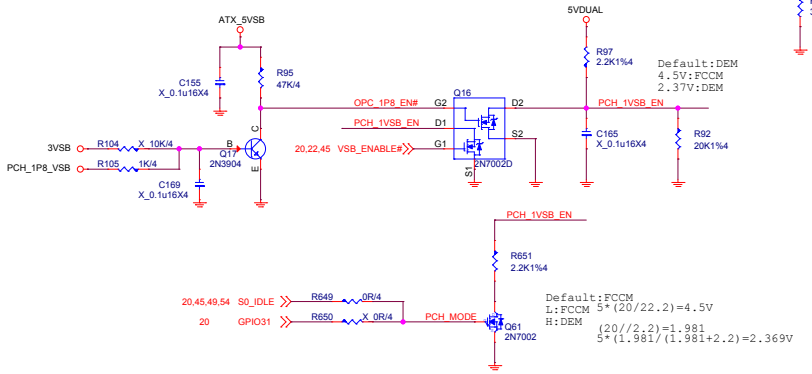
IOCSET=10uA
OCP_max=Iocset*Rocset/Rdson(min)
=10uA*6.8k/2.2mohm
=21.9A

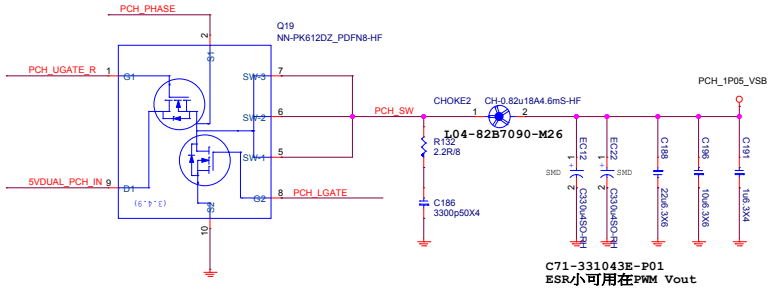
OCP_max=Iocset*Rocset/Rdson(min)
=10uA*6.8k/2.2mohm
=21.9A



Vout = Vref * (1 + R441/R439)
= 0.8 * (1 + 1K/3.16K)
= 0.8 * 1.3165
= 1.053V

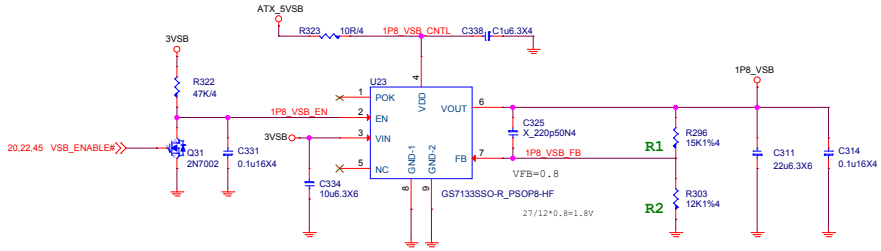






C71-331043E-P01
ESR小可用在PWM Vout

1P8_VSB Power:1.8V, 0.741A



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Size	Document Description	Rev
Custom	53 PCH POWER-RT8125E/1P8_VSB	1.1

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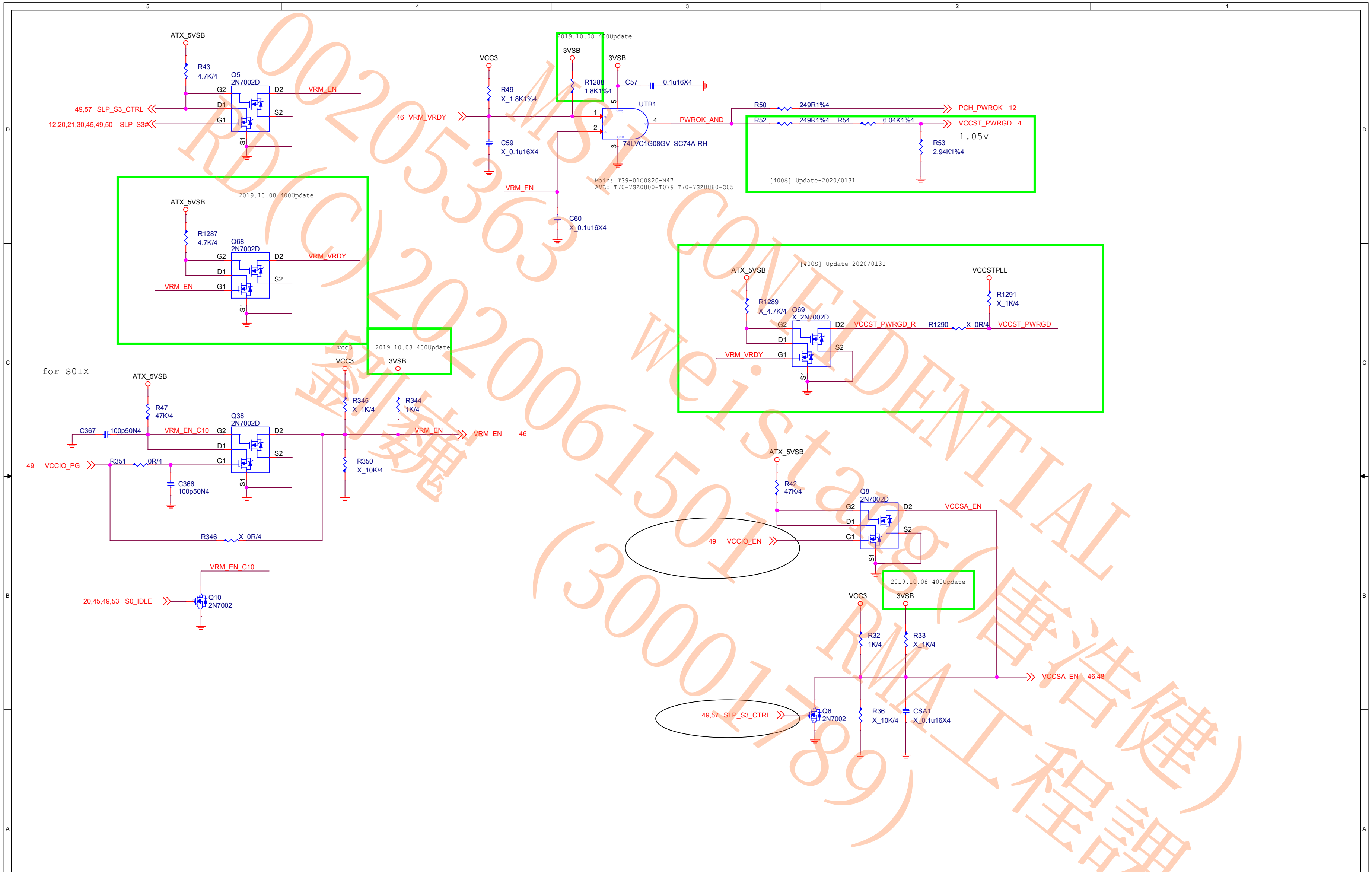

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Custom	54 PWR-VRM/PCH Seqence	1.1

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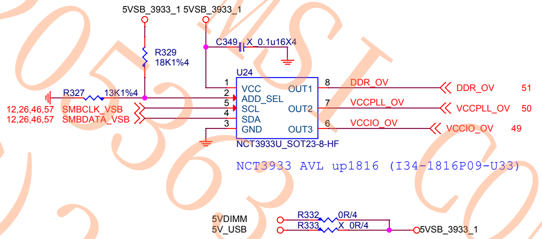
UPI VOLTAGE CONSOLE

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

```
NCT3933 source 10uA
Vout=[VREF*(1+R173/R1056)]+10uA*R173
=0.75V*(1+1K/3.16K)+10uA*1K=1.204V+0.010V=1.214V
NCT3933 sink 10uA
Vout=[VREF*(1+R173/R1056)]-10uA*R173
=0.75V*(1+1K/3.16K)-10uA*1K=1.204V-0.010V=1.194V
```



MICRO-STAR INT'L CO.,LTD		
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Size: Custom	Document Description: 55 OV-NCT3933	Rev 1.1
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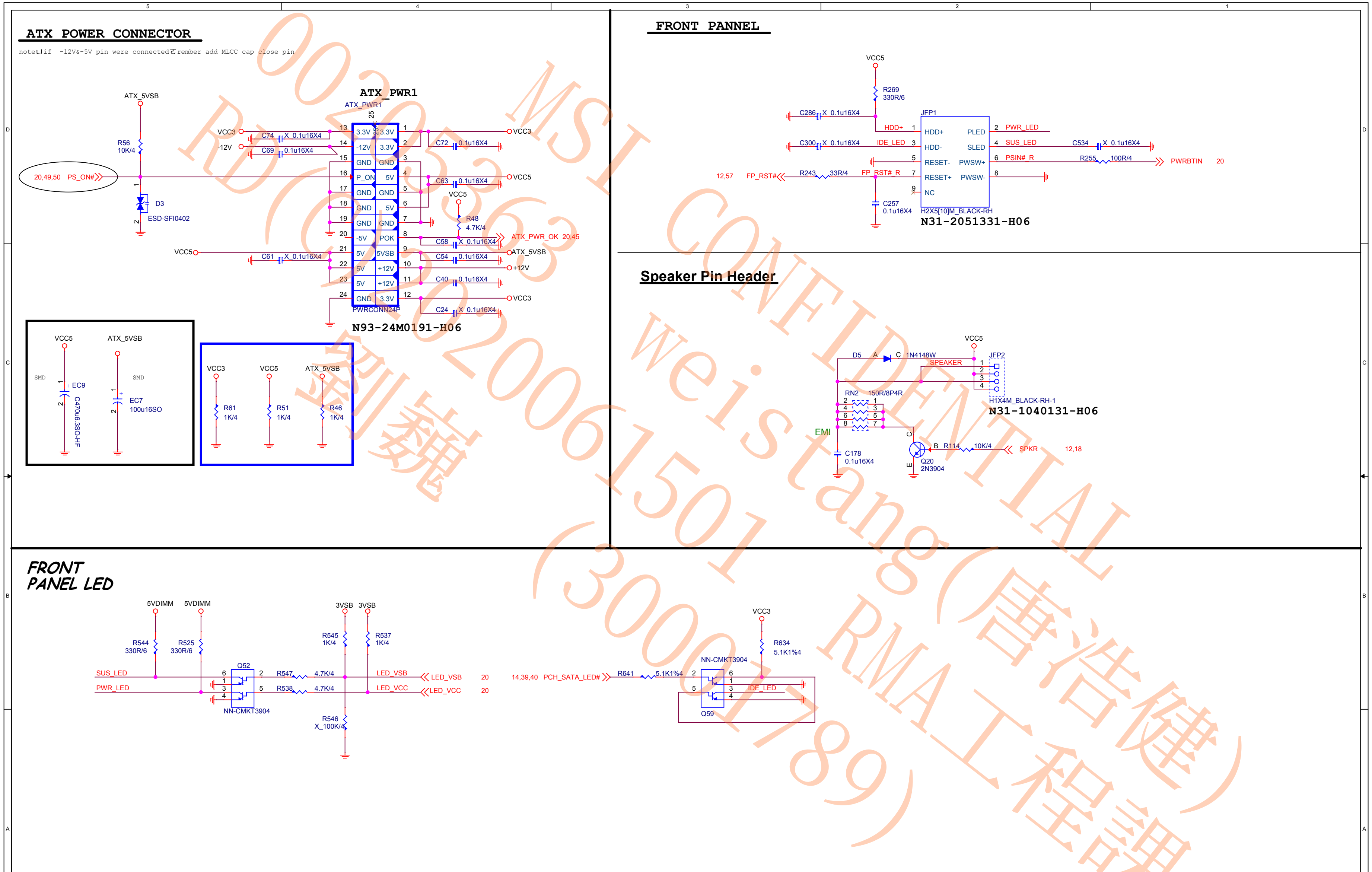
ATX POWER CONNECTOR
note:if -12V&-5V pin were connected,rember add MLCC cap close pin
ATX_PWR1
N93-24M0191-H06
PWRCONN24P
ATX_5VSB
R56 10K/4
20,49,50 PS_ON#
D3 ESD-SFI0402
VCC3
-12V
VCC5
+12V
ATX_PWR_OK 20,45
C74 X_0.1u16X4
C69 0.1u16X4
C72 0.1u16X4
C63 0.1u16X4
C58 X_0.1u16X4
C54 0.1u16X4
C40 0.1u16X4
C24 X_0.1u16X4
C61 X_0.1u16X4
R48 4.7K/4
3.3V
GND
P_ON
5V
-5V
POK
5VSB
+12V
EC9 C470u6.3SO-HF
EC7 100u16SO
SMD
R61 1K/4
R51 1K/4
R46 1K/4
FRONT PANNEL
VCC5
R269 330R/6
JFP1
H2X5[10]M_BLACK-RH
N31-2051331-H06
C286 X_0.1u16X4
C300 X_0.1u16X4
C257 0.1u16X4
HDD+
HDD-
RESET-
RESET+
NC
PLED
SLED
PWSW+
PWSW-
PWR_LED
SUS_LED
IDE_LED
PSIN#_R
C534 X_0.1u16X4
R255 100R/4
PWRBTIN 20
12,57 FP_RST#
R243 33R/4
FP_RST#_R
Speaker Pin Header
VCC5
D5 1N4148W
SPEAKER
JFP2
H1X4M_BLACK-RH-1
N31-1040131-H06
RN2 150R/8P4R
EMI
C178 0.1u16X4
Q20 2N3904
R114 10K/4
SPKR 12,18
FRONT PANEL LED
5VDIMM
R544 330R/6
R525 330R/6
SUS_LED
PWR_LED
Q52
NN-CMKT3904
3VSB
R545 1K/4
R537 1K/4
R547 4.7K/4
R538 4.7K/4
R546 X_100K/4
LED_VSB 20
LED_VCC 20
14,39,40 PCH_SATA_LED#
R641 5.1K1%4
VCC3
R634 5.1K1%4
Q59
IDE_LED

MICRO-STAR INT'L CO.,LTD

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Size	Document Description	Rev
Custom	56 ATX F_Panel	1.1

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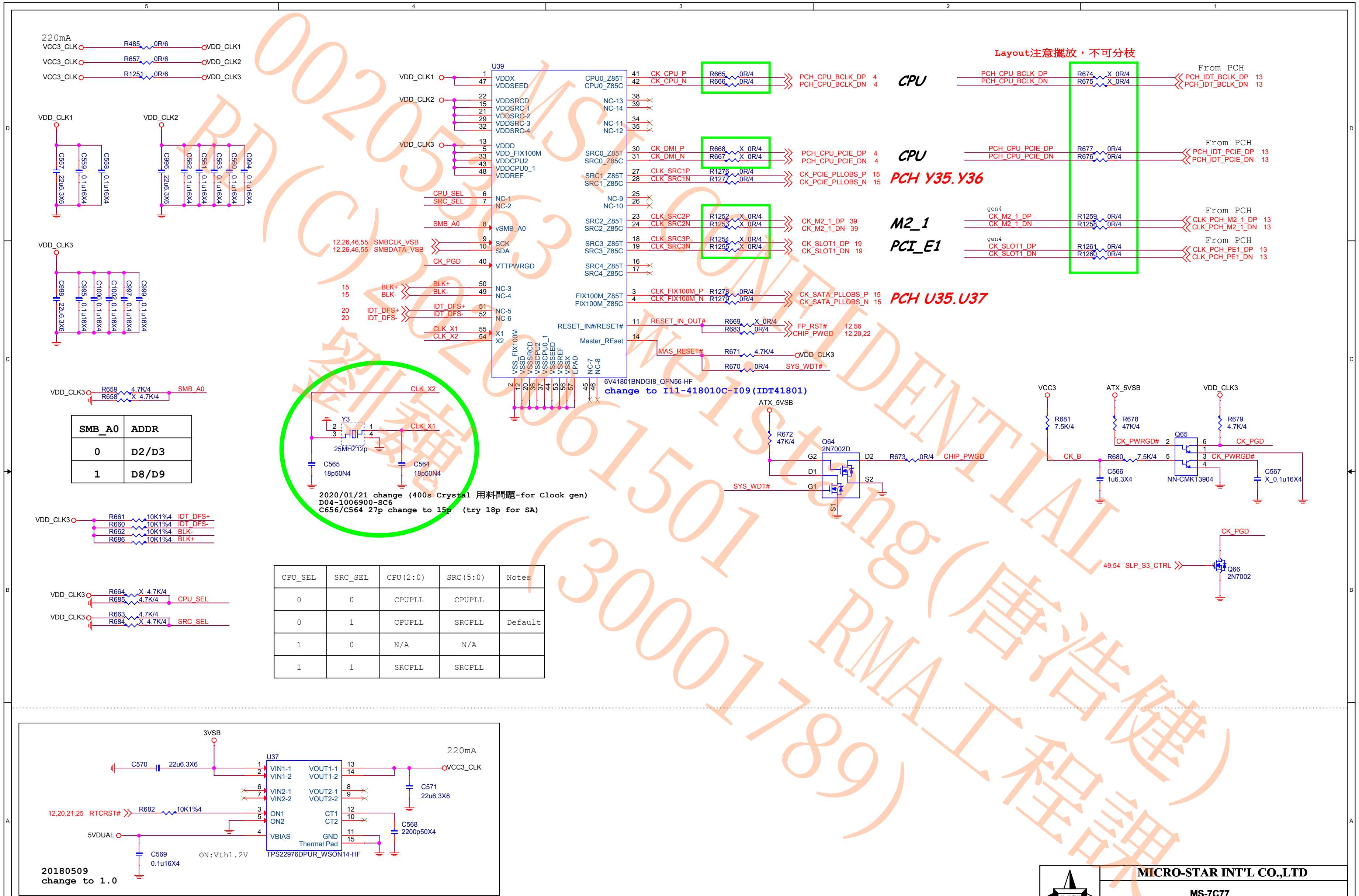

SMB_A0	ADDR
0	D2/D3
1	D8/D9

CPU_SEL	SRC_SEL	CPU(2:0)	SRC(5:0)	Notes
0	0	CPUPLL	CPUPLL	
0	1	CPUPLL	SRCPLL	Default
1	0	N/A	N/A	
1	1	SRCPLL	SRCPLL	

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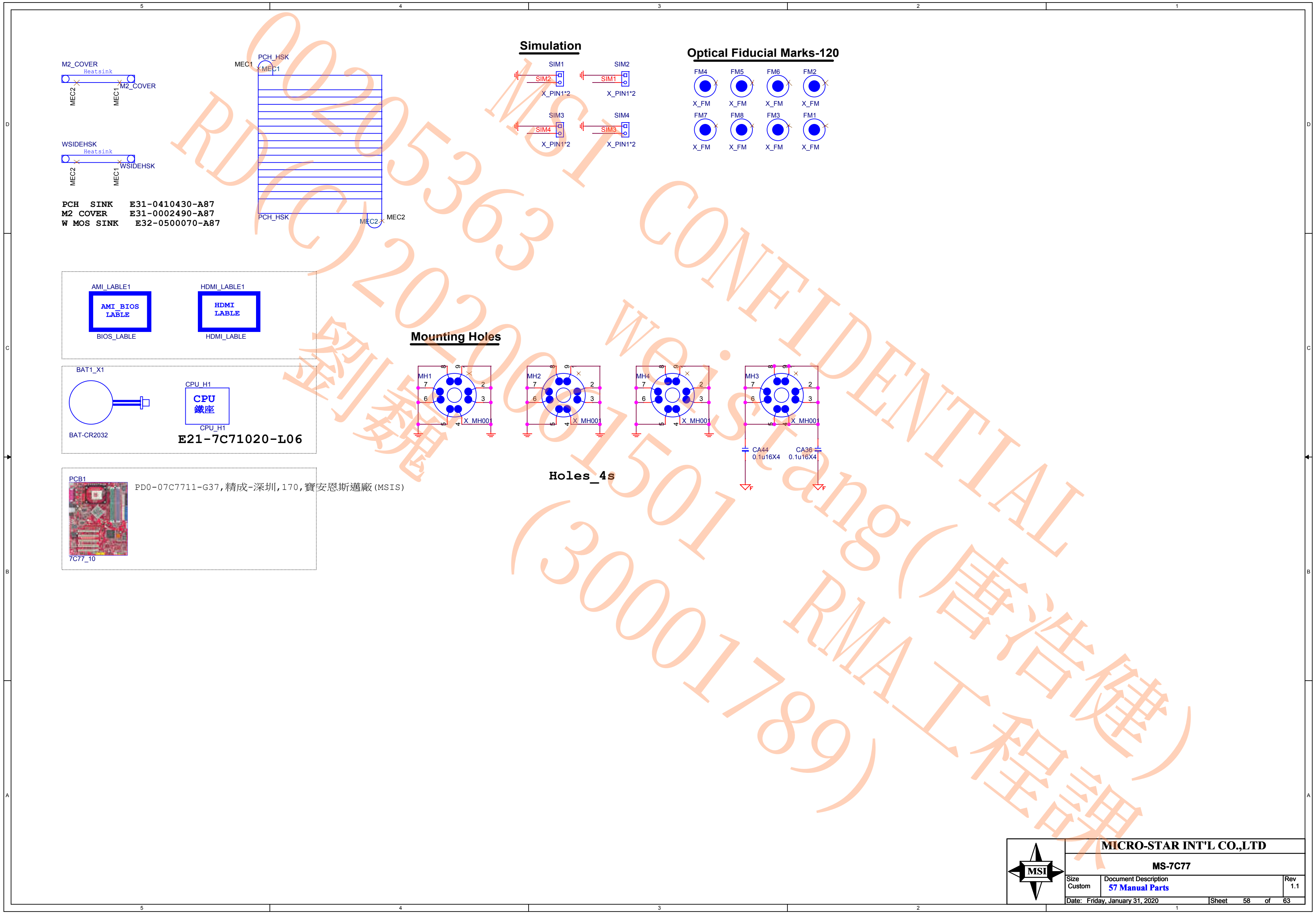
M2_COVER
Heatsink
M2_COVER
MEC2
MEC1
WSIDEHSK
Heatsink
WSIDEHSK
MEC2
MEC1
PCH SINK E31-0410430-A87
M2 COVER E31-0002490-A87
W MOS SINK E32-0500070-A87
PCH_HSK
MEC1
MEC1
PCH_HSK
MEC2
MEC2
Simulation
SIM1
SIM2
SIM1
SIM2
X_PIN1*2
X_PIN1*2
SIM3
SIM4
SIM4
SIM3
X_PIN1*2
X_PIN1*2
Optical Fiducial Marks-120
FM4
FM5
FM6
FM2
X_FM
FM7
FM8
FM3
FM1
X_FM
AMI_LABLE1
AMI_BIOS LABLE
BIOS_LABLE
HDMI_LABLE1
HDMI LABLE
HDMI_LABLE
Mounting Holes
MH1
MH2
MH4
MH3
X_MH001
CA44 0.1u16X4
CA36 0.1u16X4
Holes_4s
BAT1_X1
BAT-CR2032
CPU_H1
CPU 鐵座
CPU_H1
E21-7C71020-L06
PCB1
7C77_10
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