MS-7A38 Ver:8.0

CPU:
amd AM4

System Chipset:
Promontory B450
(Value DIY or System Builder)

Main Memory:
DDR IV * 4 MAX:64 GB

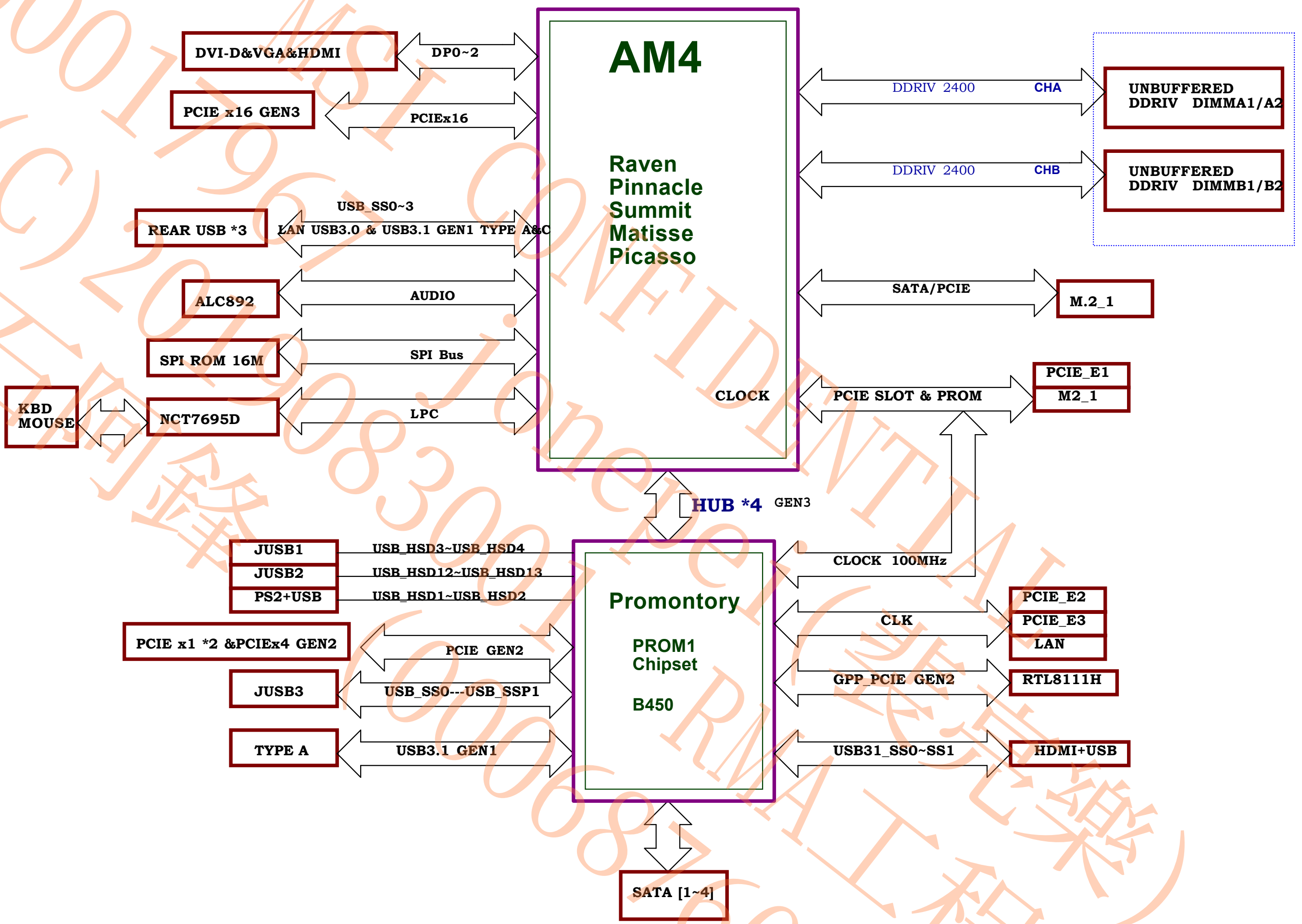
VRM
RT8894 4+2

On Board Chipset:
LPC Super I/O --NCT6795D
LAN RTL8111H
Azalia CODEC - Realtek ALC892

Expansion Slots:
From CPU
PCI Express X16 Slot * 1
PCI Express X1 Slot * 1
PCI Express X1 Slot * 1

OCP IC:
RT9553

FUSION BLOCK DIAGRAM



MSI MICRO-START INT'L CO.,LTD.
Title: Block Diagram
Size: Custom | Document Number: MS-7A38.. | Rev: 8.0
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AMD AM4

01 Block Diagram	37 DVI Connector
02 Cover Sheet	38 HDMI
03 FM4 DDR4 I/F	39 ACPI uPI-5VDIMM&3VSB
04 AM4 PCIE/SATAE	40 PM-NB681-1.05V/GS7133-2.5V
05 AM4 Display/Audio	41 DDR PWR VPP25/VTT-MP2143
06 AM4 SVI/ACPI/GPIO	42 DDR4 8125E Power
07 AM4 LPC/SPI/USB/CLK/STRAP	43 CPU Power 1P8V-MP2147
08 AM4 Power/RTC Power/ 09 AM4 GND	44 CPU Power VDDP-RT8125E
10,11 DDR4-DIMM CH-A/B	45 CPU Power Connector/PWRGD
12,13 DDR4-POWER/GND	46 CPU Power UP9505 4+2 Phase
14 Promontory-PCIE/SATA/SATAE	47 / 48 CPU Power Phase 1-4
15 Promontory-USB/OC	49 CPU Power NB Phase 1-2
16 Promontory-CLK/ACPI/GPIO	50 CPU Power NB Switch/NCT3933
17 Promontory-Power / 18 Promontory-GND	51 UP6273 CURRENT SENSE
19 Reserve	52 ATX/Front Panel
20 PCIE X16 /21 PCIE X1*2) SLOT	53 ALL LED
22 SIO NCT5565	54 ALL LED Control
23 HWM/COM/Debug LED	55 BOM Option
24 CPU/SYS FAN Control TYPE K	56 RTC Circuit/Moat Cap
25 CPU/SYS FAN 2	57 History
26 LAN-RTL8111H	58 Power Sequence
27 / 28 Audio ALC887	59 GPIO MAP
29 USB Rear PS2+USB2.0	60 Power Map
30 USB Rear LAN+USB3.1 GEN1	
31 Rear USB3.1 TYPE A	
32 USB Rear HDMI+TYPE A	
33 USB Front Side	
34 M.2	
35 SATA Connector	
36 DP to VGA ITE6516	

MSI Link to the Future MICRO-START INT'L CO.,LTD.
Title: COVER SHEET
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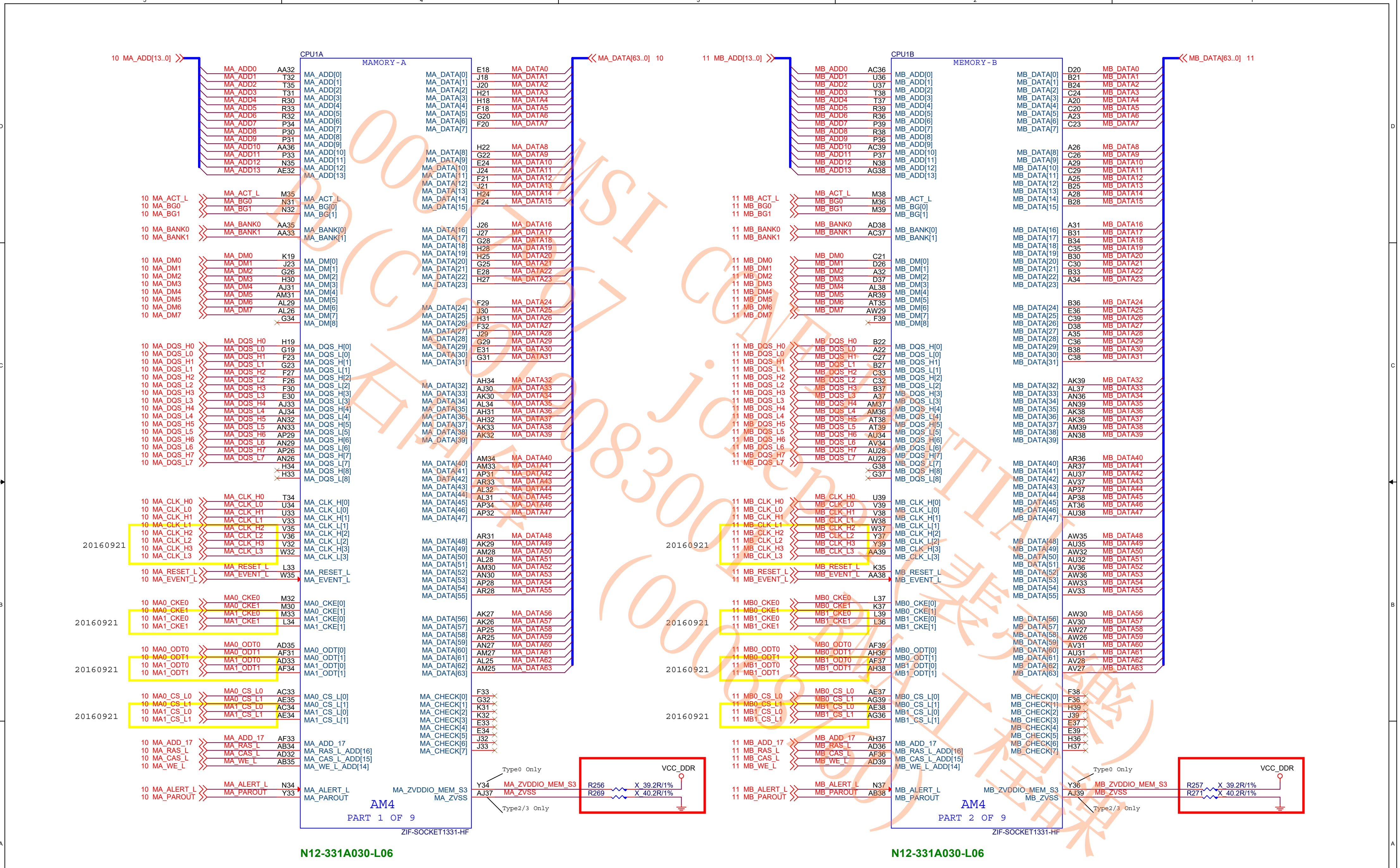

MSI Link to the Future MICRO-START INT'L CO.,LTD.

Title	AM4 DDR4 I/F	
Size: Custom	Document Number: MS-7A38..	Rev: 8.0
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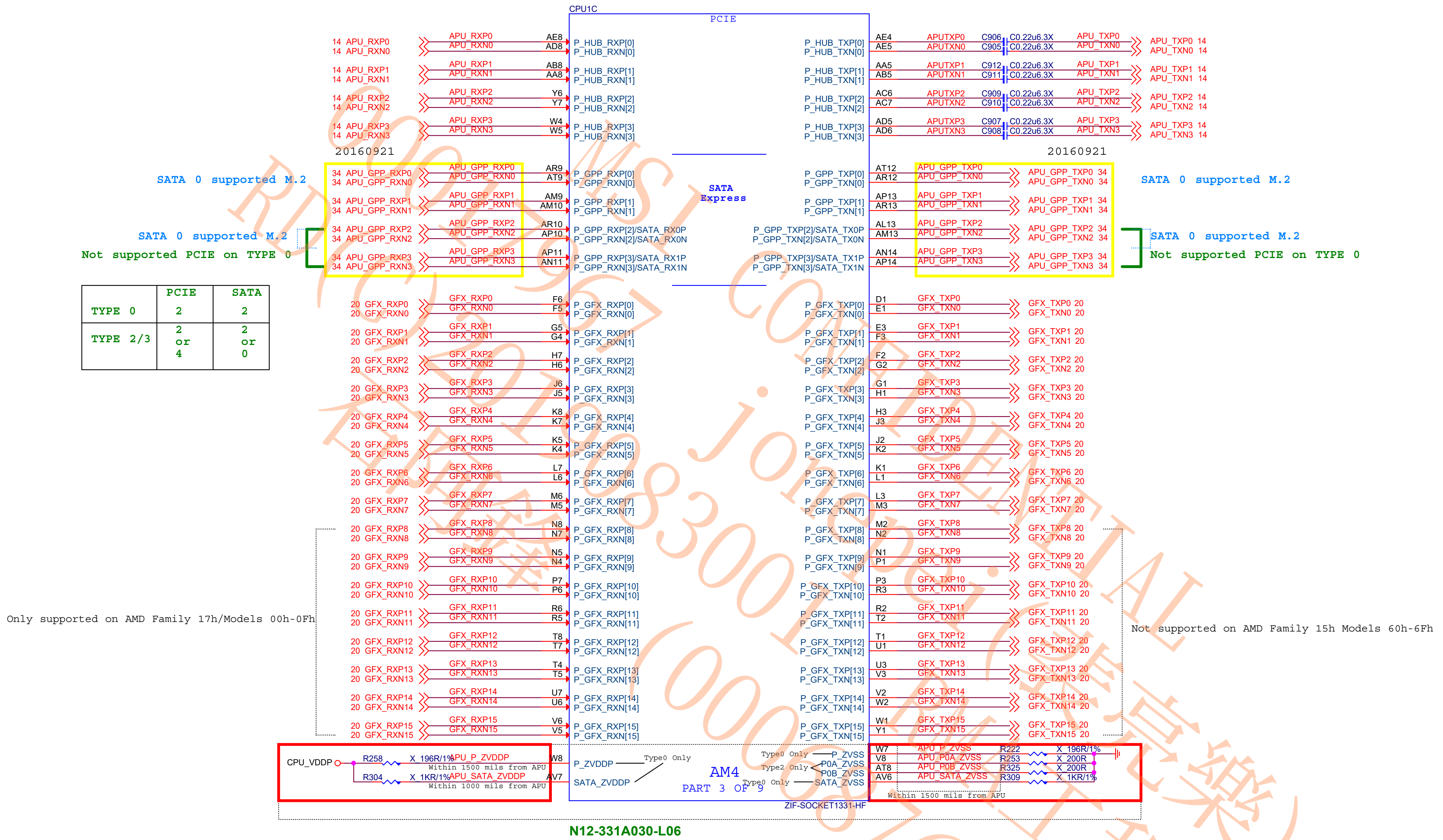

	PCIE	SATA
TYPE 0	2	2
TYPE 2/3	2 or 4	2 or 0

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

Title: AM4 PCIE/SATAE

Size: Custom | Document Number: MS-7A38.. | Rev: 8.0

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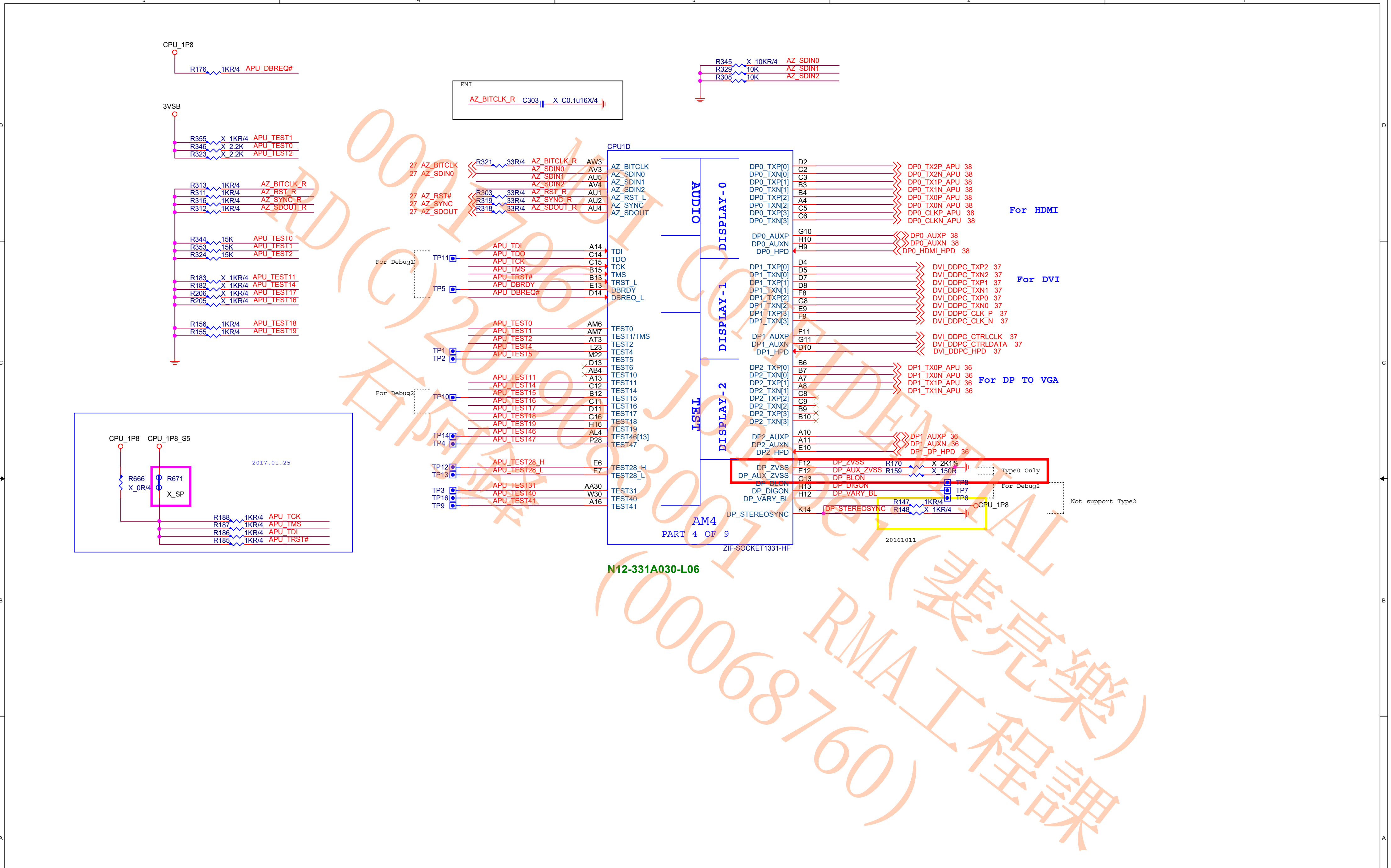

MSI MICRO-START INT'L CO.,LTD.

Title	AM4 DISPLAY/AUDIO	
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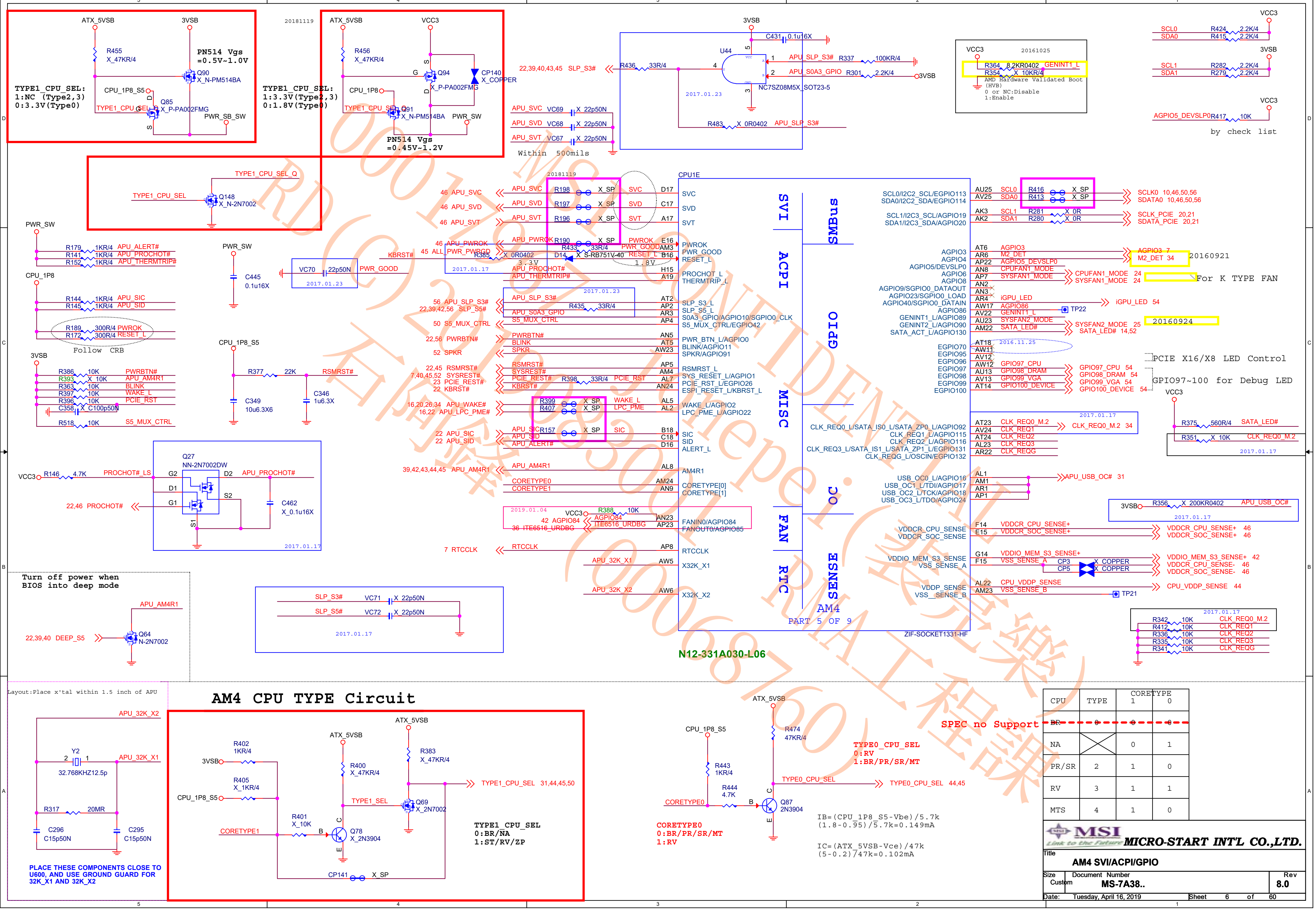

CPU	TYPE	CORETYPE 1	CORETYPE 0
~~BR~~	~~0~~	~~0~~	~~0~~
NA		0	1
PR/SR	2	1	0
RV	3	1	1
MTS	4	1	0

MICRO-START INT'L CO.,LTD.

Title: AM4 SVI/ACPI/GPIO

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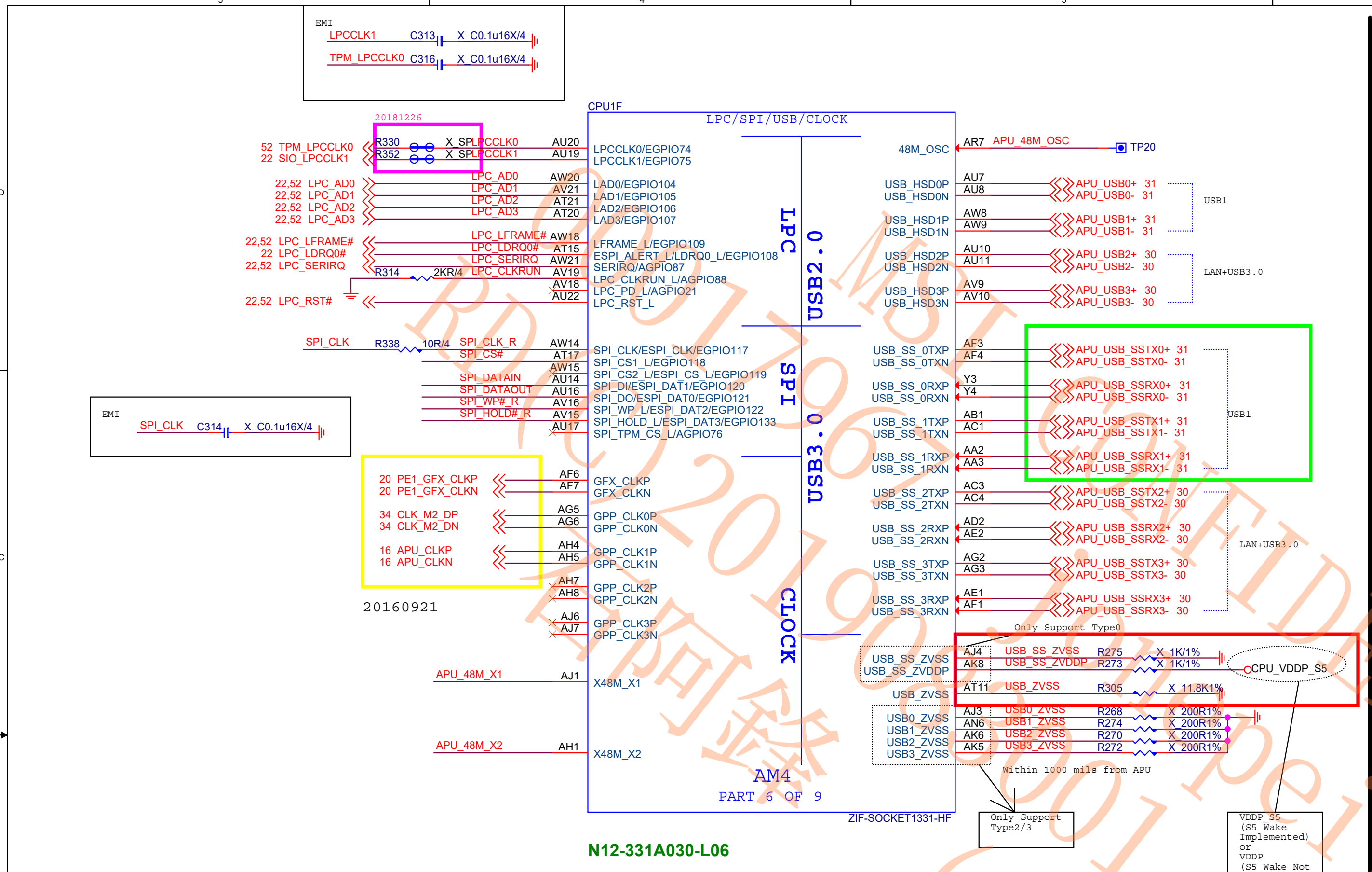
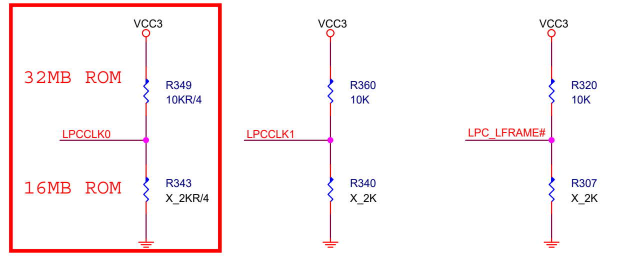
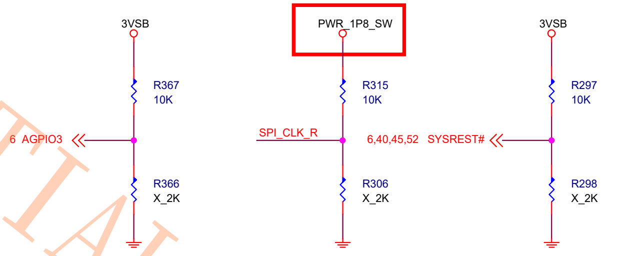


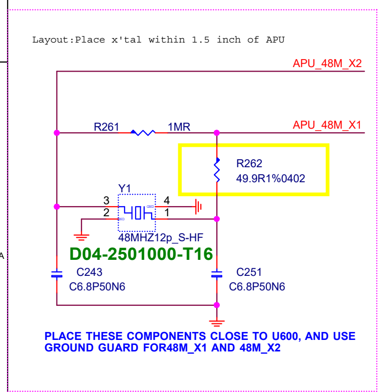
Strapping Options



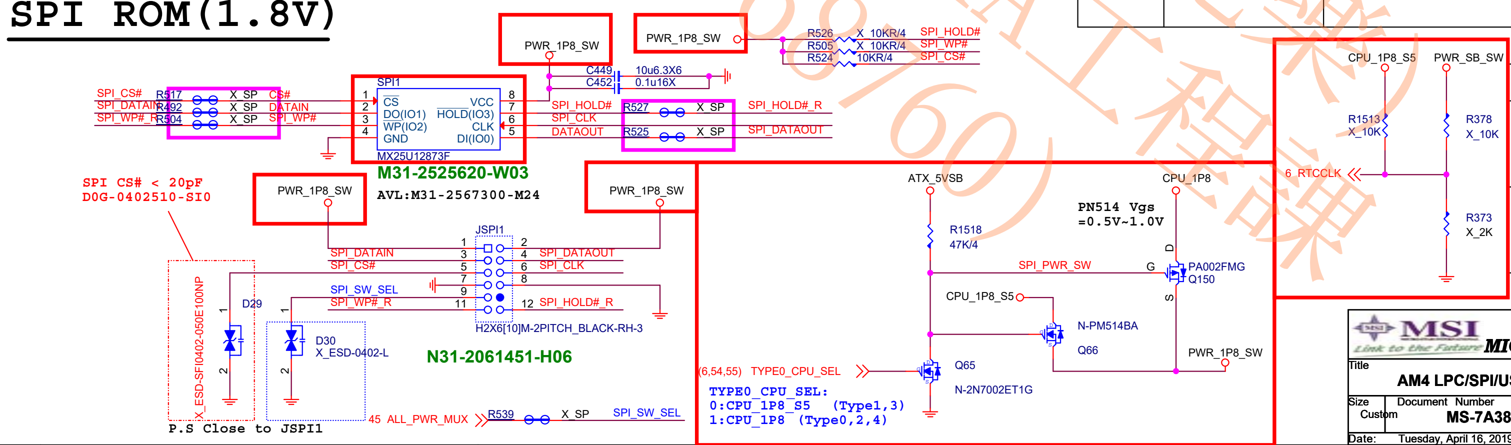
	LPCCLK0	LPCCLK1	SIO_LFRAME
PULL HIGH	LPC device Boot Fail Timer Enabled	Configured for Internal clock generator (Default)	SPI ROM (Default)
PULL LOW	LPC device Boot Fail Timer Disabled (Default)	Configured for External clock generator ?????	LPC ROM



	AGPIO3	SPI_CLK	SYSREST#
PULL HIGH	Enhanced Reset logic (Default)	Use 48Mhz crystal clock and generate both internal and external clocks (Default)	Normal reset mode (Default)
PULL LOW	Traditional Reset logic	Use 100Mhz PCIE clock as reference clock and generate internal clocks only	short reset mode



SPI ROM(1.8V)



	RTCCLK
PULL HIGH	RTC Coin Battery is on board (Default)
PULL LOW	RTC Coin Battery is not on board

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

Title	AM4 LPC/SPI/USB/CLK/STRAP	
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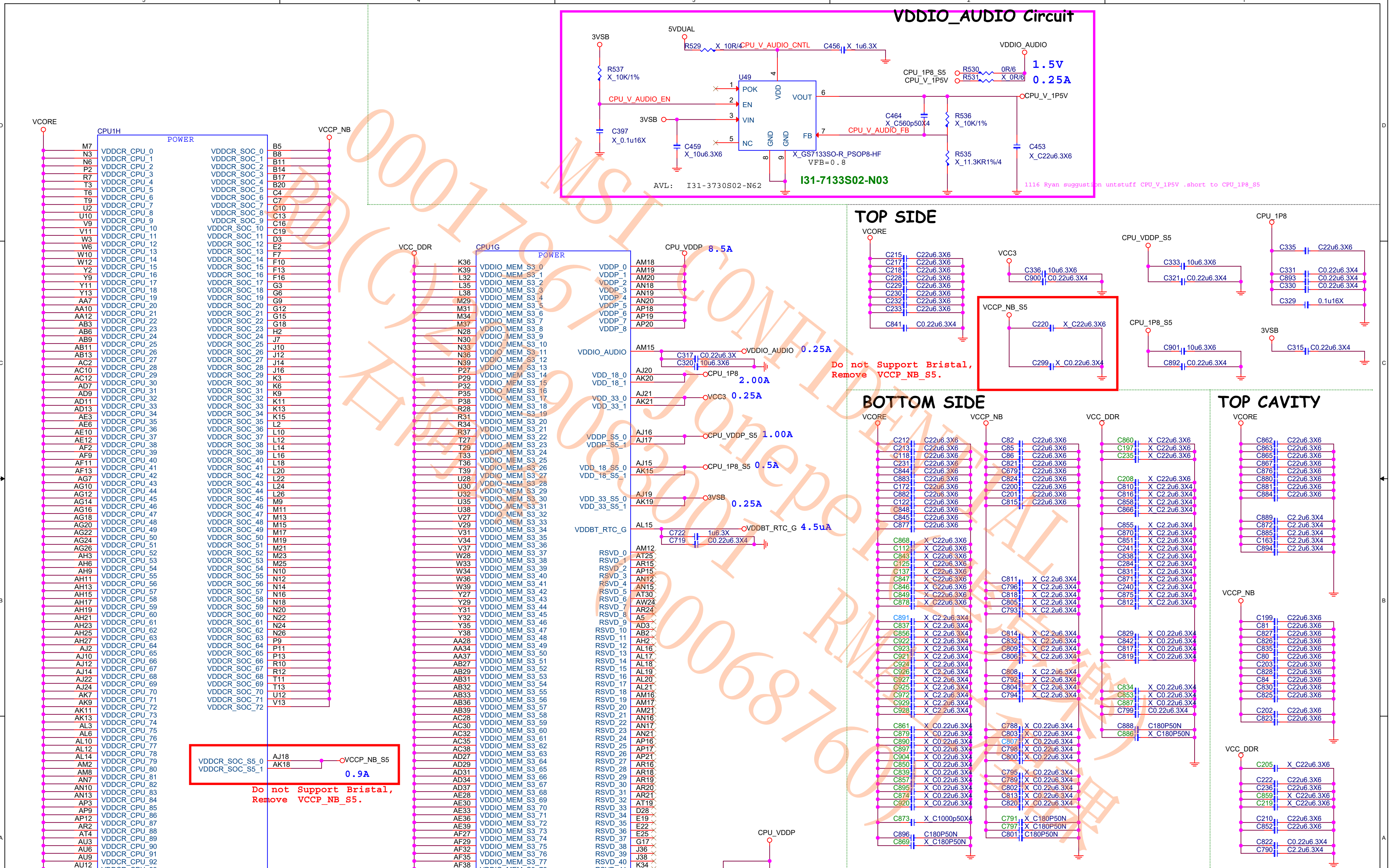

MICRO-START INT'L CO.,LTD.

Title: RTC/Clear CMOS/RTC Power

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

Title	AM4 GND	
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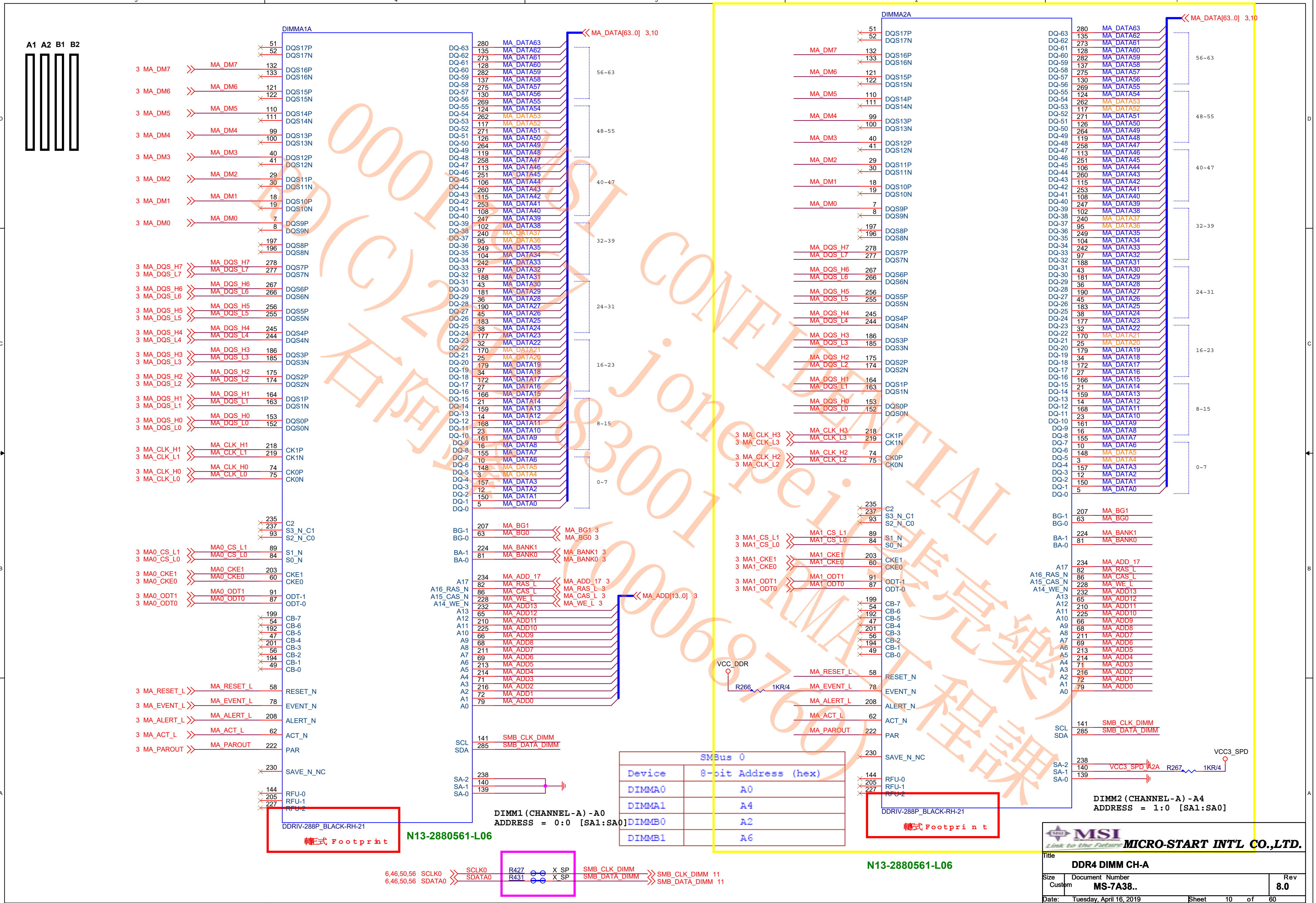

SMBus 0	
Device	8-bit Address (hex)
DIMMA0	A0
DIMMA1	A4
DIMMB0	A2
DIMMB1	A6

MICRO-START INT'L CO.,LTD.

Title: DDR4 DIMM CH-A

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MICRO-START INT'L CO.,LTD.

Title: DDR4 DIMM CH-B

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Title	DDR4-POWER/GND-1	
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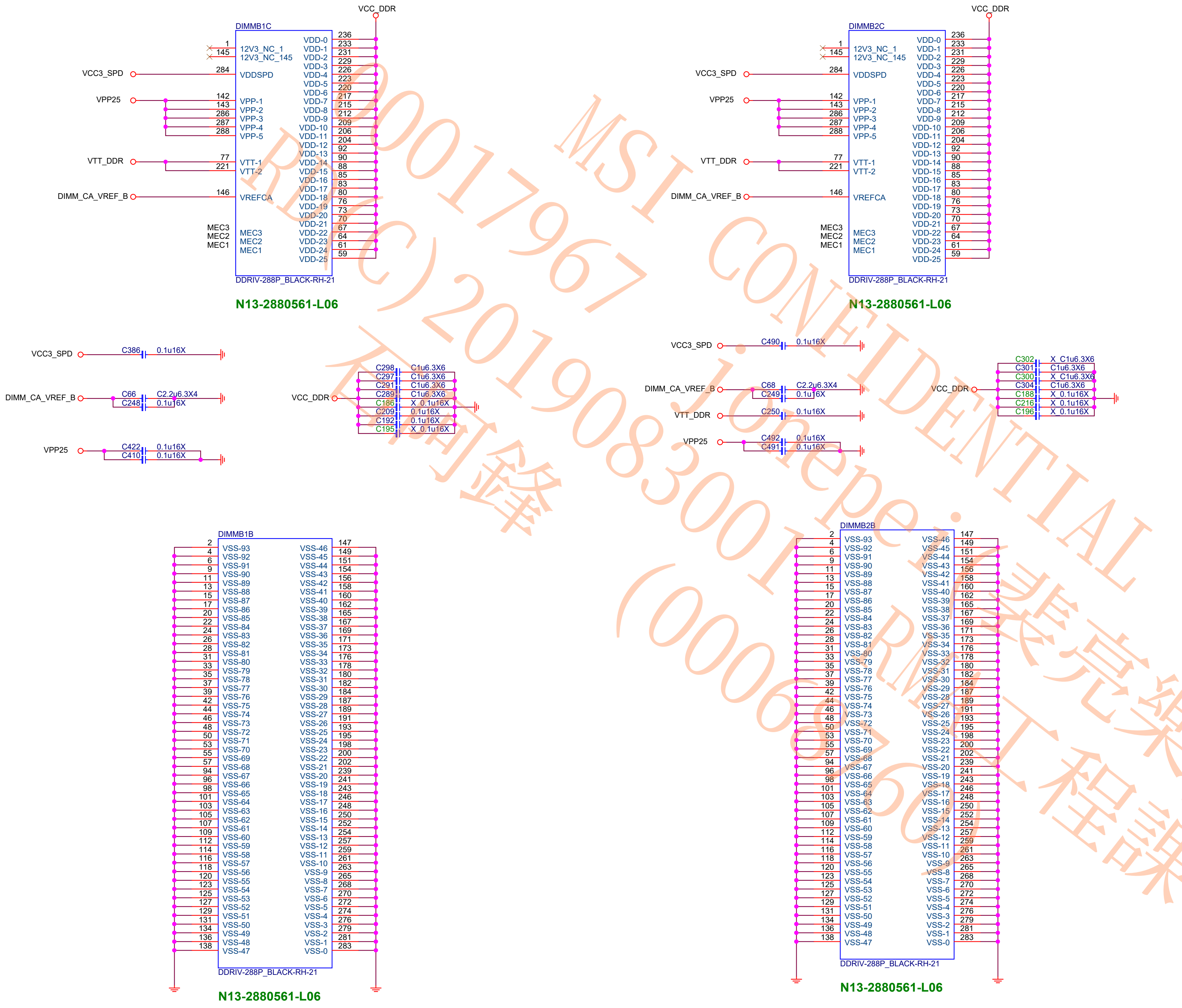
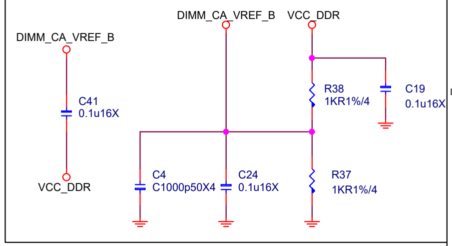


DDR VREF

(place resistors close to DIMMs)



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

Title: DDR4-POWER/GND-2		
Size: Custom	Document Number: MS-7A38..	Rev: 8.0
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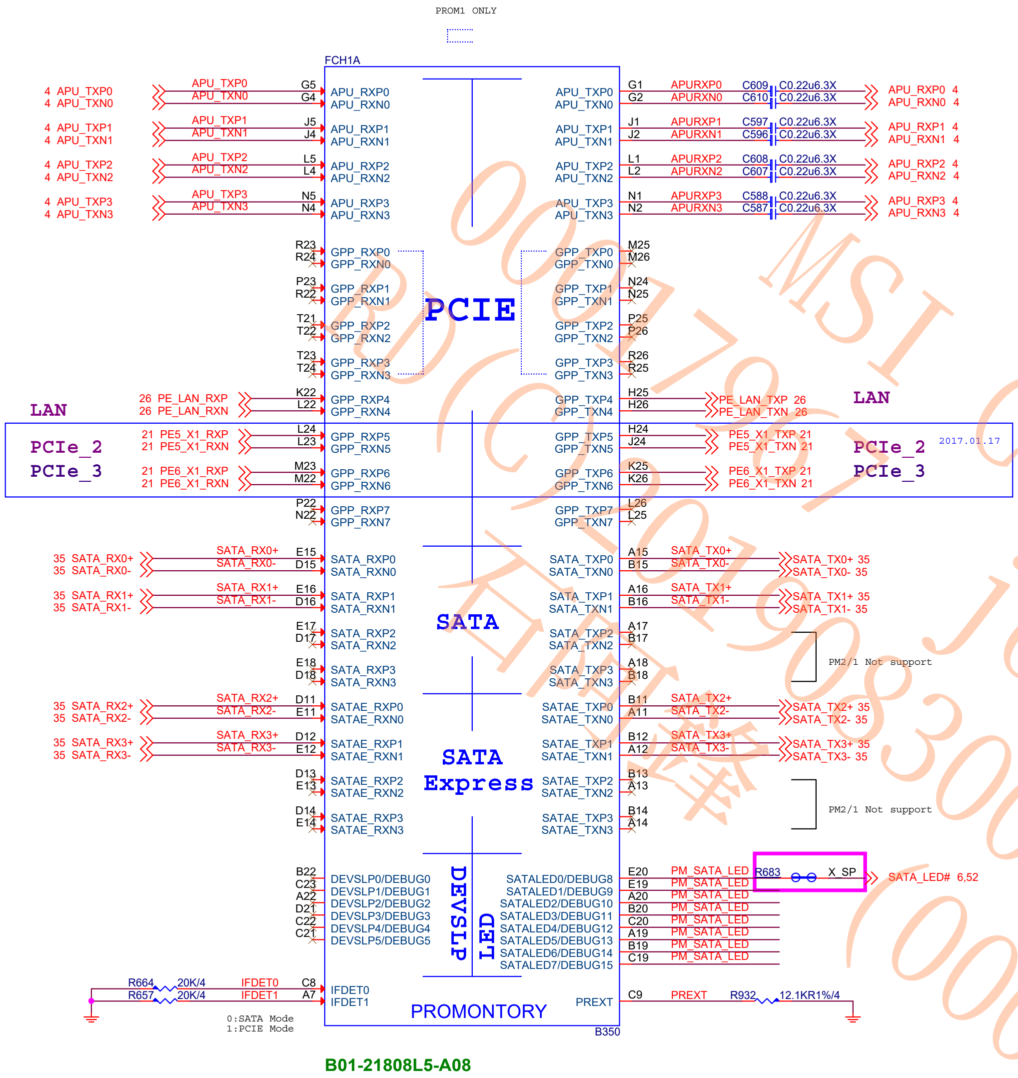

MICRO-START INT'L CO.,LTD.

Title	Promontory-PCIE/SATA/SATAE	
Size: Custom	Document Number: MS-7A38..	Rev: 8.0
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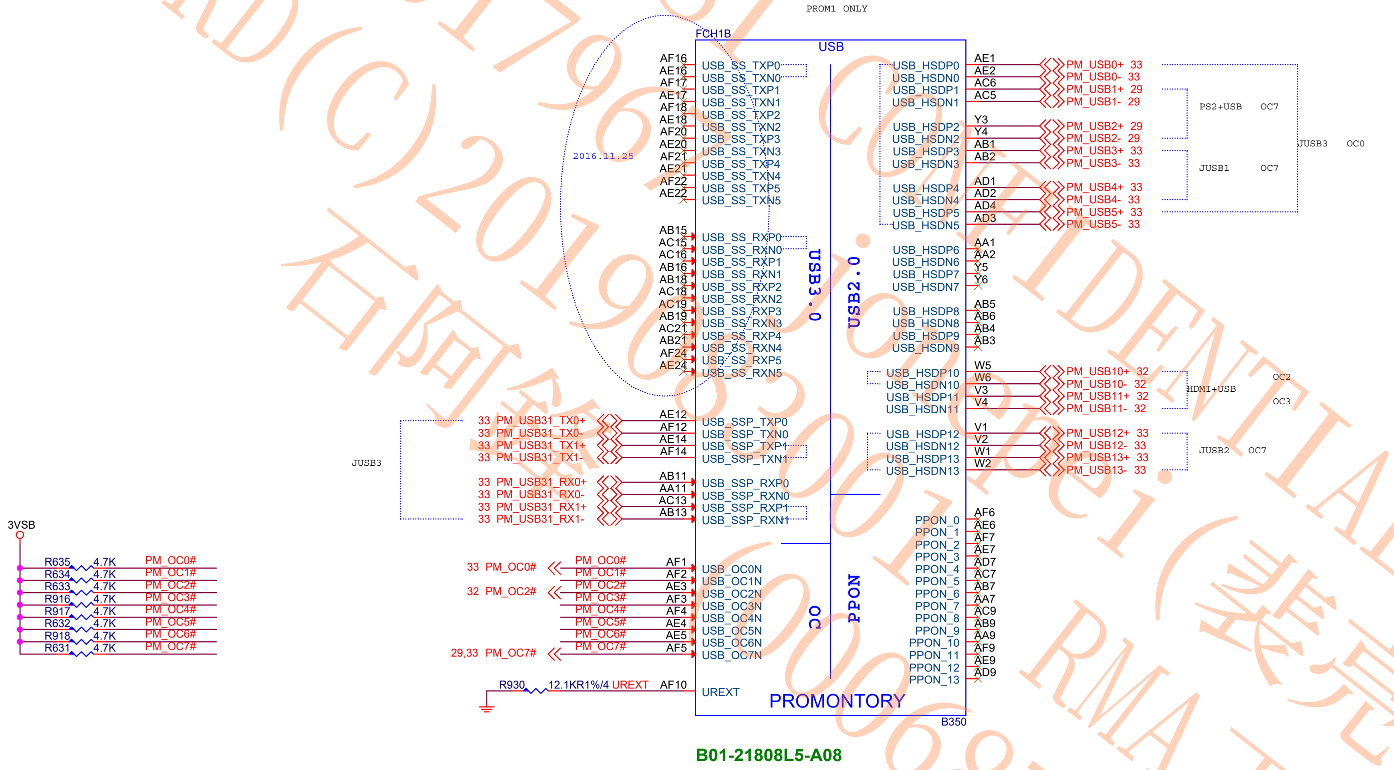

MSI MICRO-START INT'L CO.,LTD.

Title: Promontory-USB/OC

Size: Custom | Document Number: MS-7A38.. | Rev: 8.0

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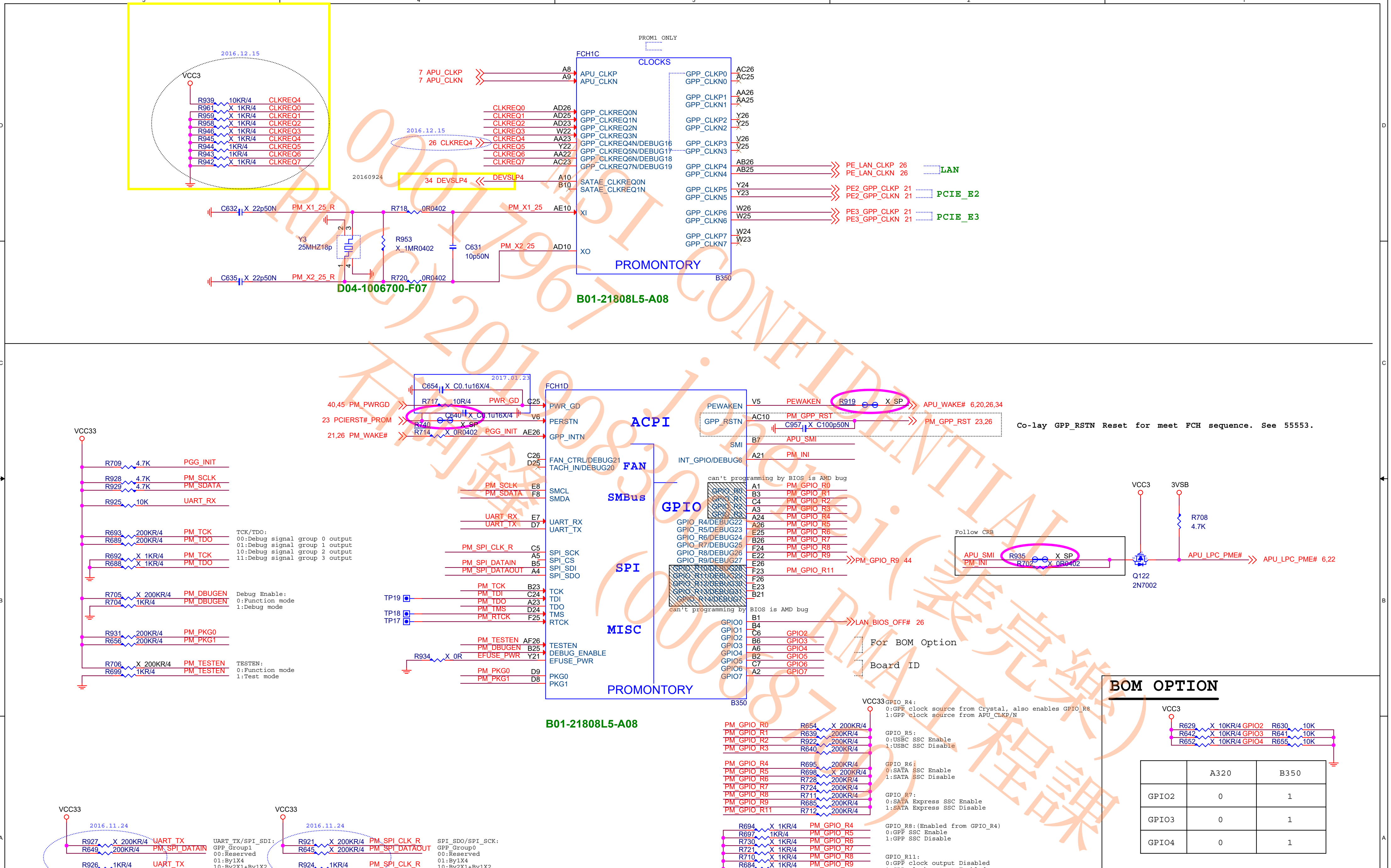

BOM OPTION

	A320	B350
GPIO2	0	1
GPIO3	0	1
GPIO4	0	1

MSI Link to the Future — MICRO-START INT'L CO.,LTD.

Title: Promontory-CLK/ACPI/GPIO

Size: Custom | Document Number: MS-7A38.. | Rev: 8.0

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MSI Link to the Future MICRO-START INT'L CO.,LTD.

Title: **Promontory-Power**

Size	Document Number	Rev
Custom	MS-7A38..	8.0

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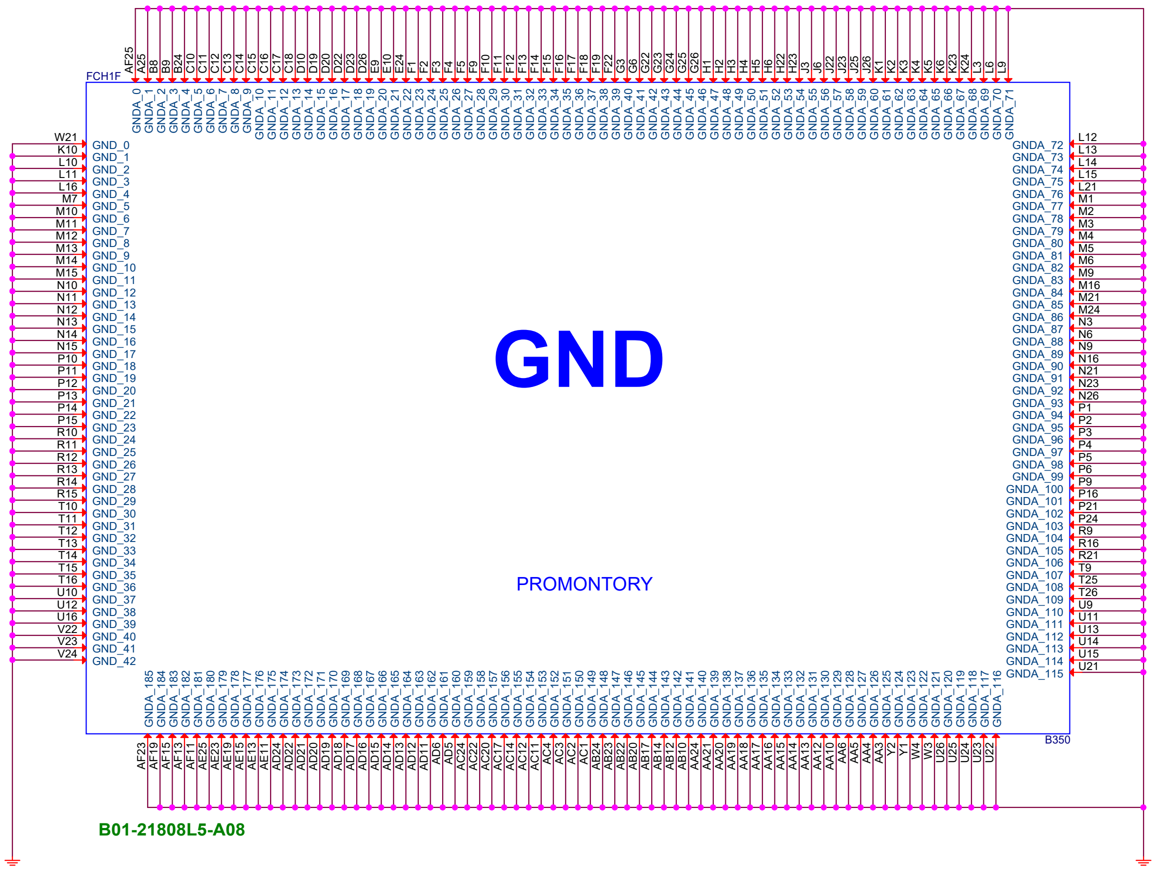

MICRO-START INT'L CO.,LTD.

Title	Promontory-GND	
Size Custom	Document Number MS-7A38..	Rev 8.0
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MICRO-START INT'L CO.,LTD.

Title	PCIE CLK	
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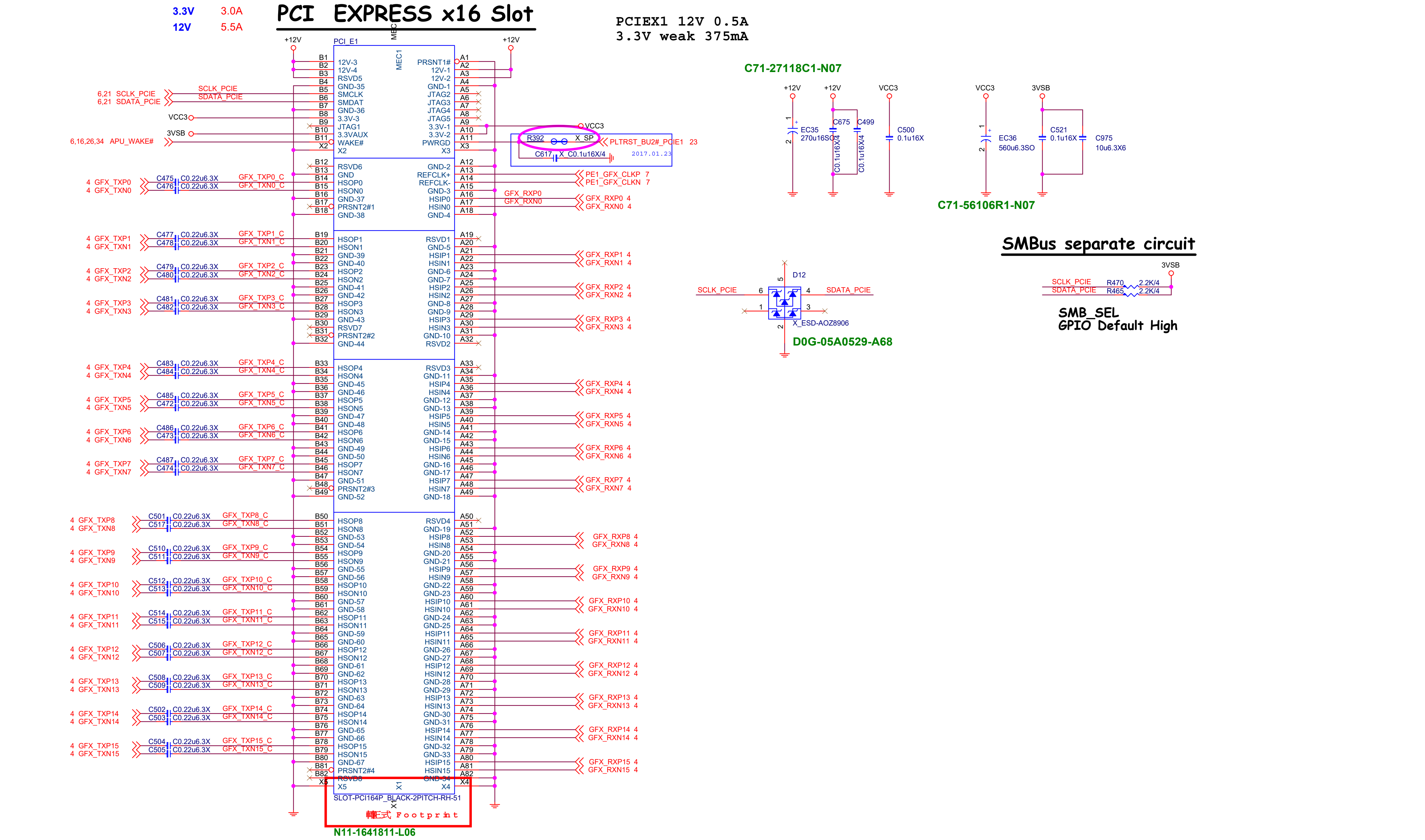
PCI EXPRESS x16 Slot



MICRO-START INT'L CO.,LTD.

Title	PCIE X16 SLOT	
Size: Custom	Document Number: MS-7A38..	Rev: 8.0
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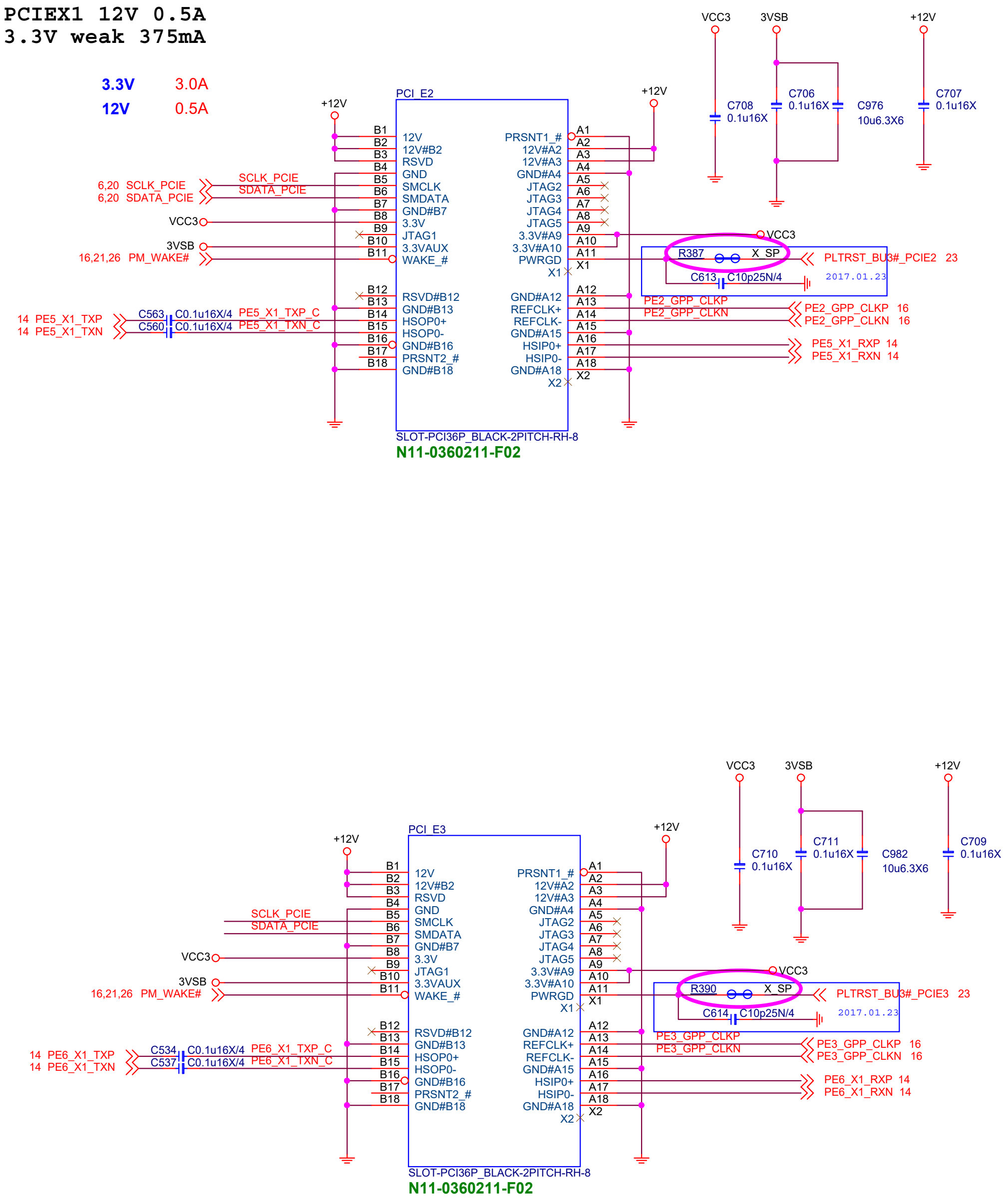

PCI Express x1 Slot *2		
+12V		- 1 A
+VCC3		- 6A
+3V3_S5	(wake)	- 750mA
+3V3_S5	(no wake)	- 40mA

MSI Link to the Future **MICRO-START INT'L CO.,LTD.**

Title: **PCIE X4(X1*2) SLOT**

Size	Document Number	Rev
Custom	MS-7A38..	8.0

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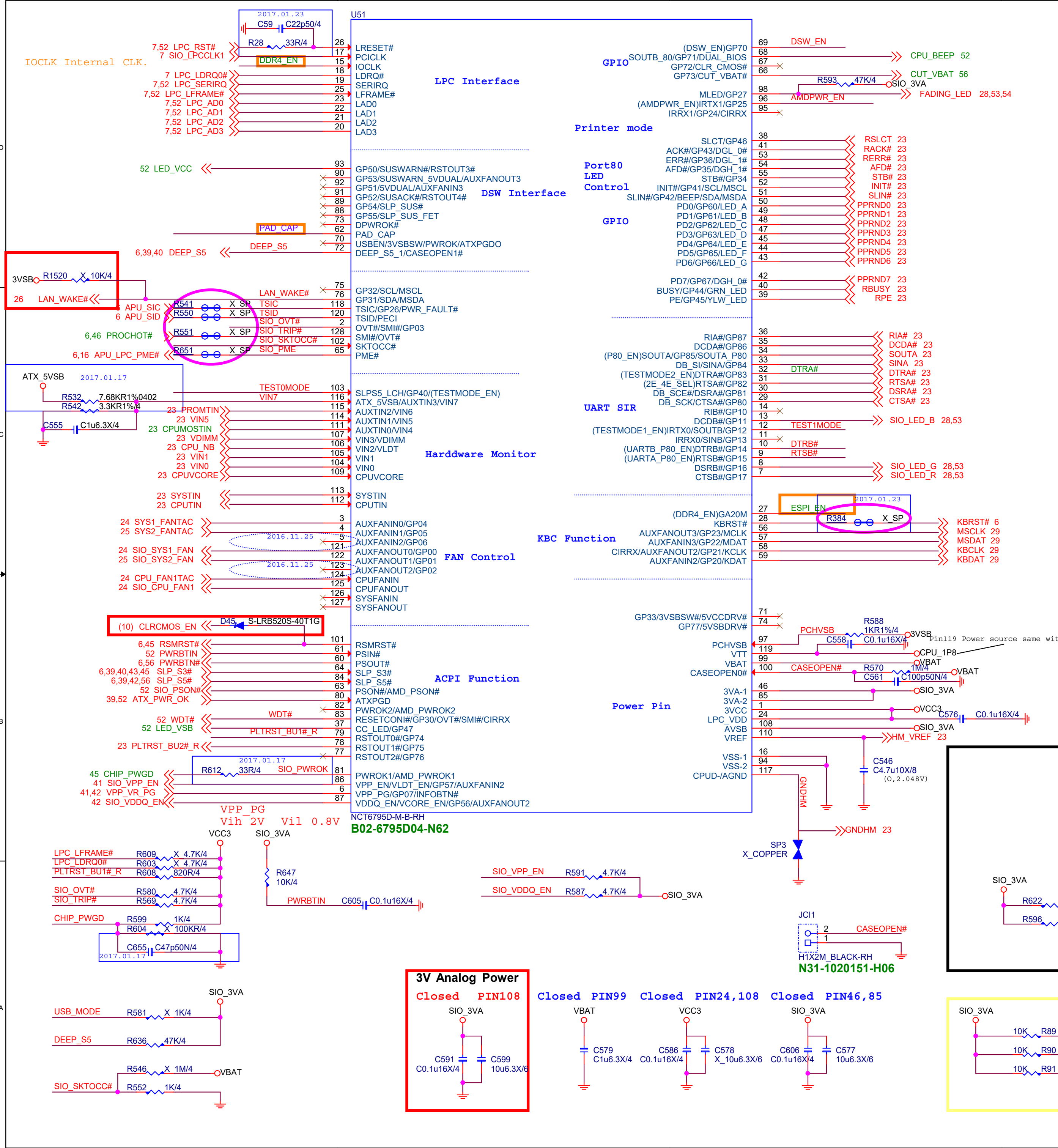
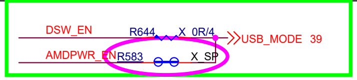
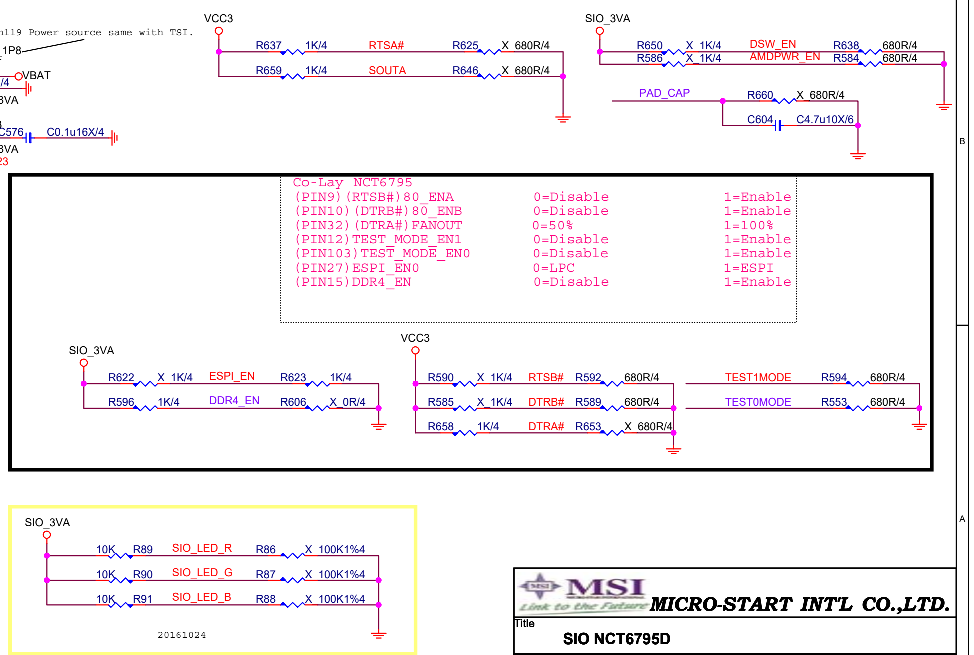




POWER ON STRAPPING PIN FOR NCT6793/6795

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	TEST1MODE_EN	TEST1MODE	DISABLE TEST1MODE	ENABLE TEST1MODE	LRESET
15	6793 test point 6795 DDR4_EN	6793 test point 6795 DDR4_EN	6793 NA 6795 Disable	6793 NA 6795 Enable	
27	6793 DDR4_EN 6795 ESPI_EN	A20GATE	6793 Disable 6795 Disable	6793 Enable 6795 Enable	
31	2E_4E_SEL	RTSA#	I/O ADDRESS 2E	I/O ADDRESS 4E	LRESET
32	6793 TESTMOD2_EN 6795 FANOUT_DEF_EN	DTRA#	6793 disable 6795 default 50%	6793 Enable 6795 default 100%	INTERNAL PWROK
34	P80_EN	SOUTA	ENABLE Non_PORT80	ENABLE PORT80	LRESET
69	DSW_EN	DSW_EN	DISABLE INTEL DSW	ENABLE INTEL DSW	INTERNAL RSMRST
96	AMDPWR_EN	AMDPWR_EN	DISABLE AMD PWR SEQ	ENABLE AMD PWR SEQ	INTERNAL RSMRST
103	TESTMODE_EN	WDT#	DISABLE TESTMODE	ENABLE TESTMODE	INTERNAL RSMRST

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



MICRO-START INT'L CO.,LTD.

Title	SIO NCT6795D	
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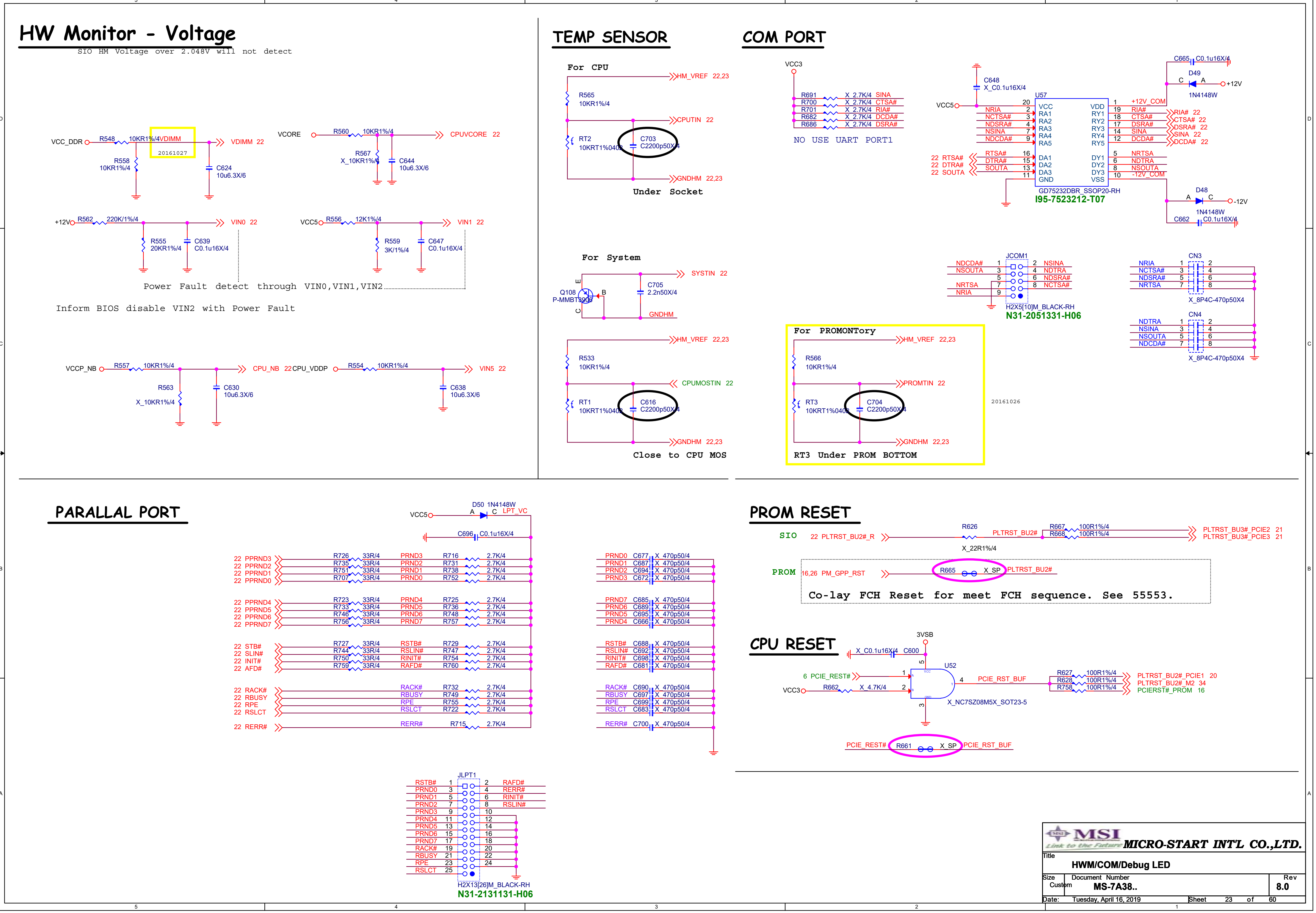
HW Monitor - Voltage
SIO HM Voltage over 2.048V will not detect
Power Fault detect through VIN0,VIN1,VIN2
Inform BIOS disable VIN2 with Power Fault
TEMP SENSOR
For CPU
Under Socket
For System
Close to CPU MOS
For PROMONTory
RT3 Under PROM BOTTOM
COM PORT
NO USE UART PORT1
GD75232DBR_SSOP20-RH
I95-7523212-T07
H2X5[10]M_BLACK-RH
N31-2051331-H06
X_8P4C-470p50X4
PARALLAL PORT
H2X13[26]M_BLACK-RH
N31-2131131-H06
PROM RESET
SIO
PROM
Co-lay FCH Reset for meet FCH sequence. See 55553.
CPU RESET
X_NC7SZ08M5X_SOT23-5
MSI
MICRO-START INT'L CO.,LTD.
Title
HWM/COM/Debug LED
Size Custom
Document Number MS-7A38..
Rev 8.0
Date: Tuesday, April 16, 2019
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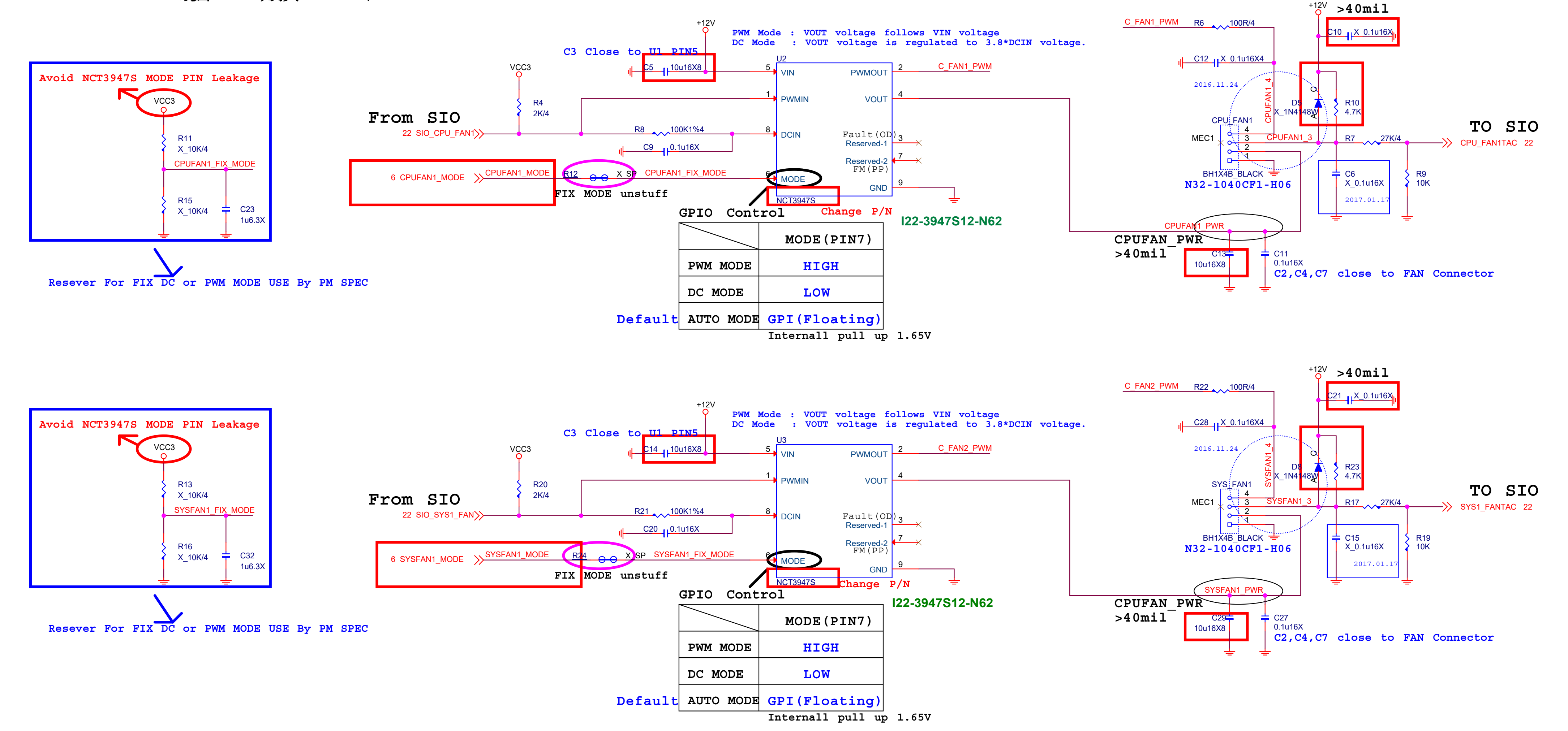
TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE

2.GPIO由BIO 切換 PW M/DC M O D E



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

Internall pull up 1.65V

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

Internall pull up 1.65V

MSI Link to the Future MICRO-START INT'L CO.,LTD.

Title: CPU/SYS FAN Control TYPE K

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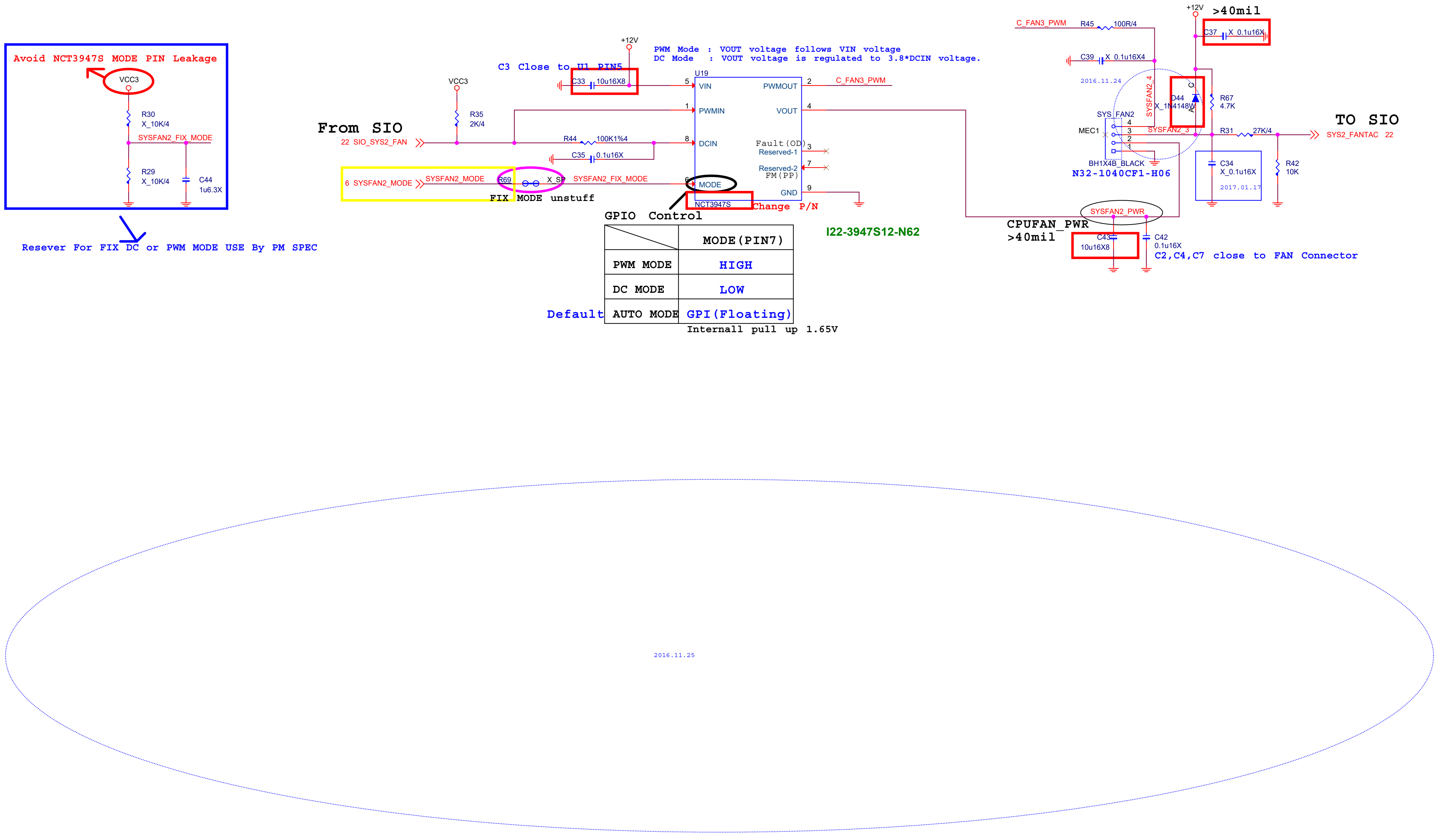

GPIO Control

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

Default

Internall pull up 1.65V

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Title	CPU/SYS FAN 2	
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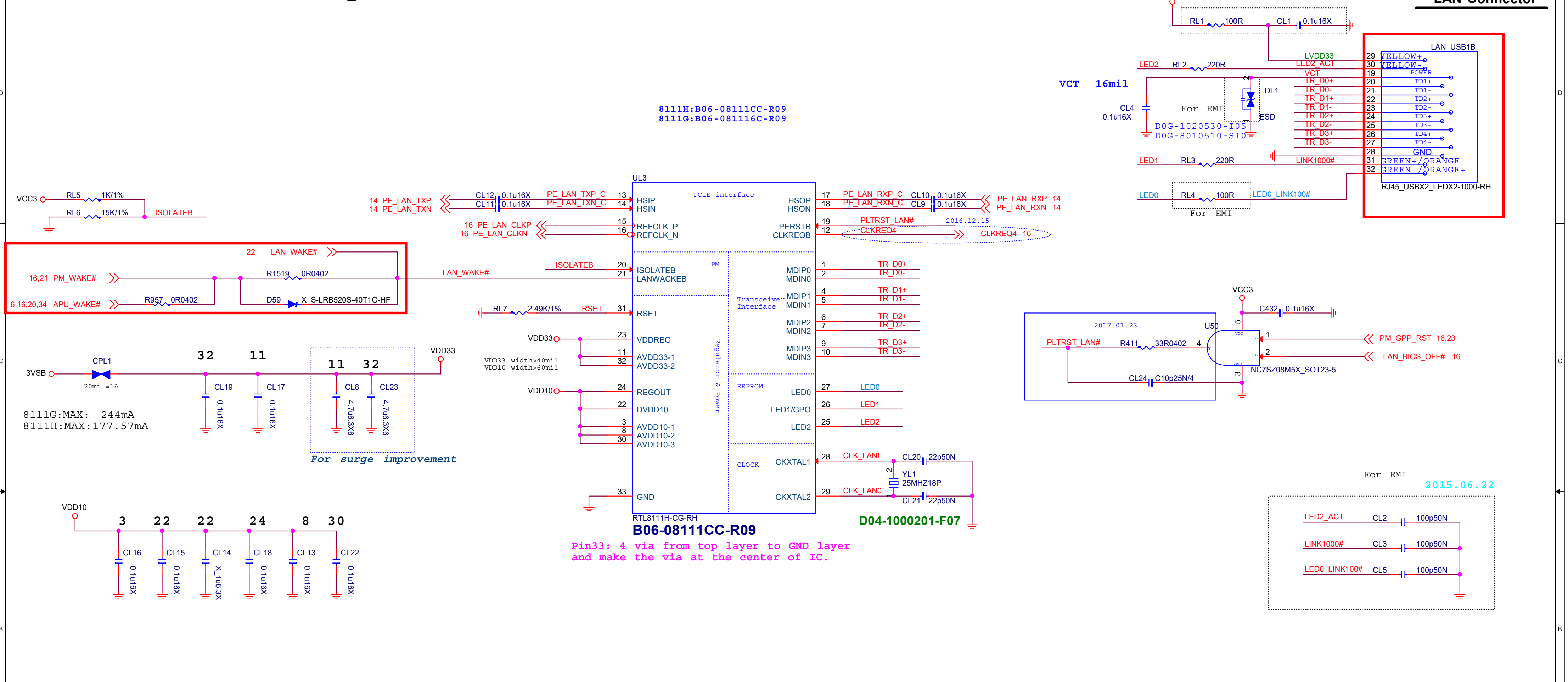
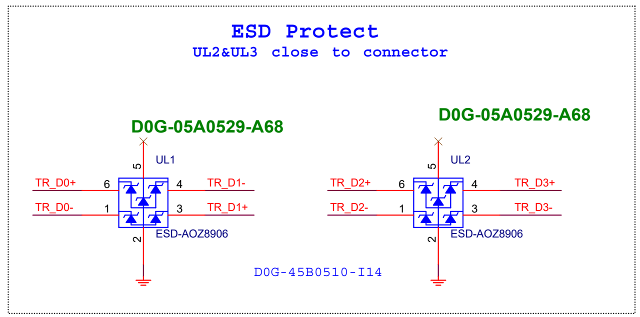
RTL8111G/RTL8111H Giga LAN



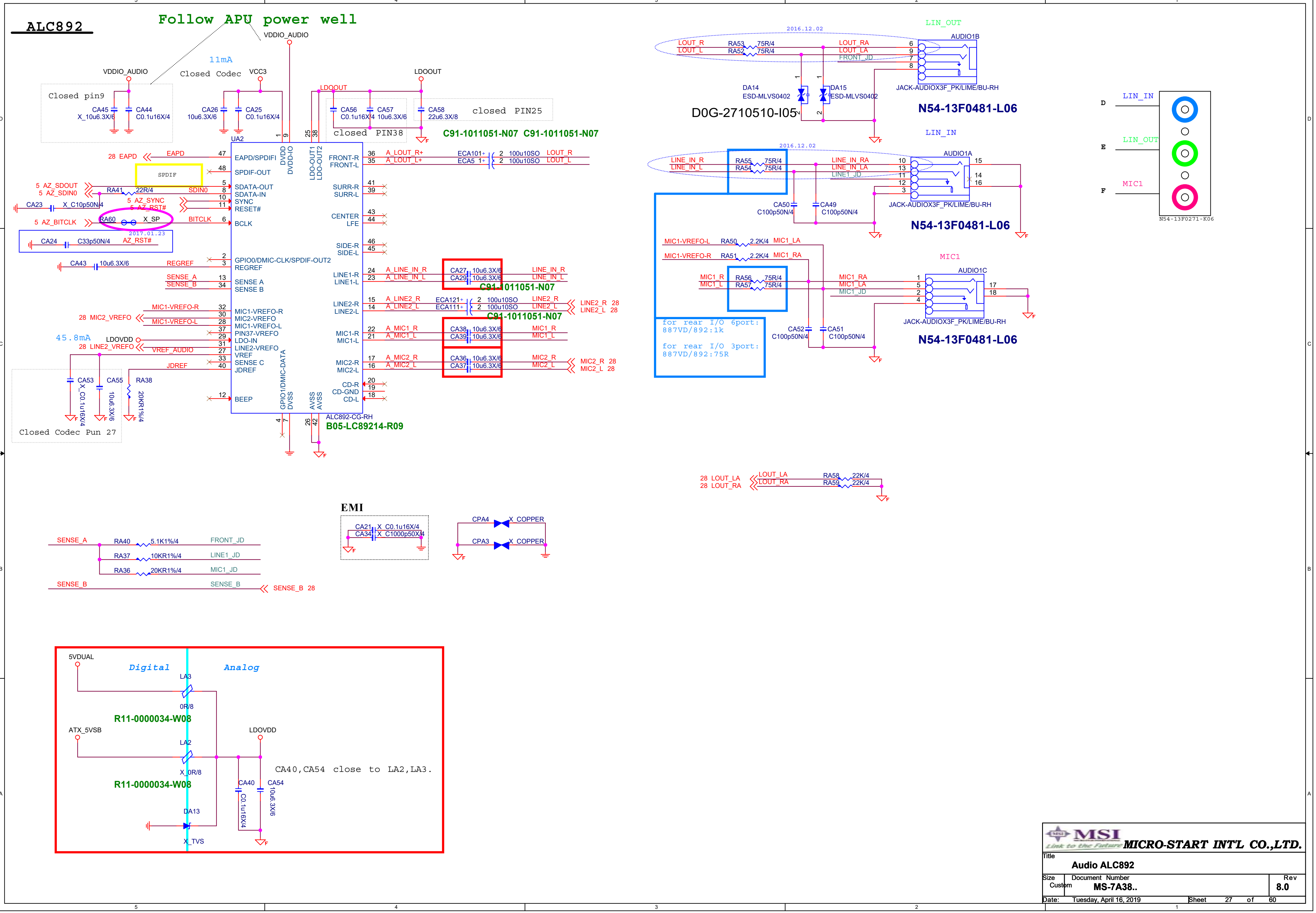


8111G POWER Consumption

	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



ALC892
Follow APU power well
VDDIO_AUDIO
11mA
Closed Codec
Closed pin9
closed PIN25
closed PIN38
C91-1011051-N07
UA2
ALC892-CG-RH
B05-LC89214-R09
Closed Codec Pun 27
45.8mA
LIN_OUT
AUDIO1B
JACK-AUDIOX3F_PK/LIME/BU-RH
N54-13F0481-L06
D0G-2710510-I05
LIN_IN
AUDIO1A
MIC1
AUDIO1C
N54-13F0271-K06
for rear I/O 6port: 887VD/892:1k
for rear I/O 3port: 887VD/892:75R
EMI
Digital
Analog
R11-0000034-W08
CA40,CA54 close to LA2,LA3.
MICRO-START INT'L CO.,LTD.
Title
Audio ALC892
Size Custom
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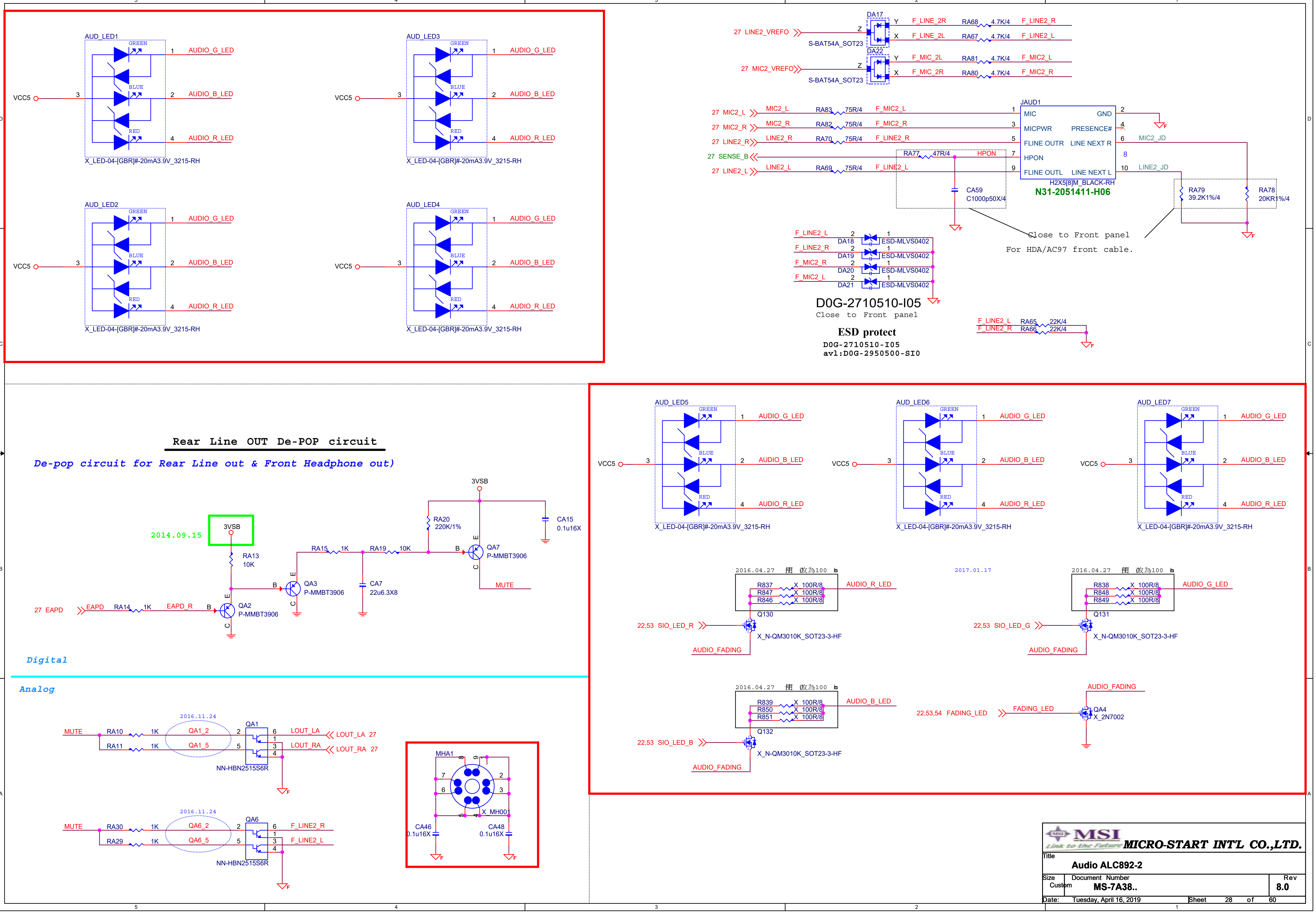
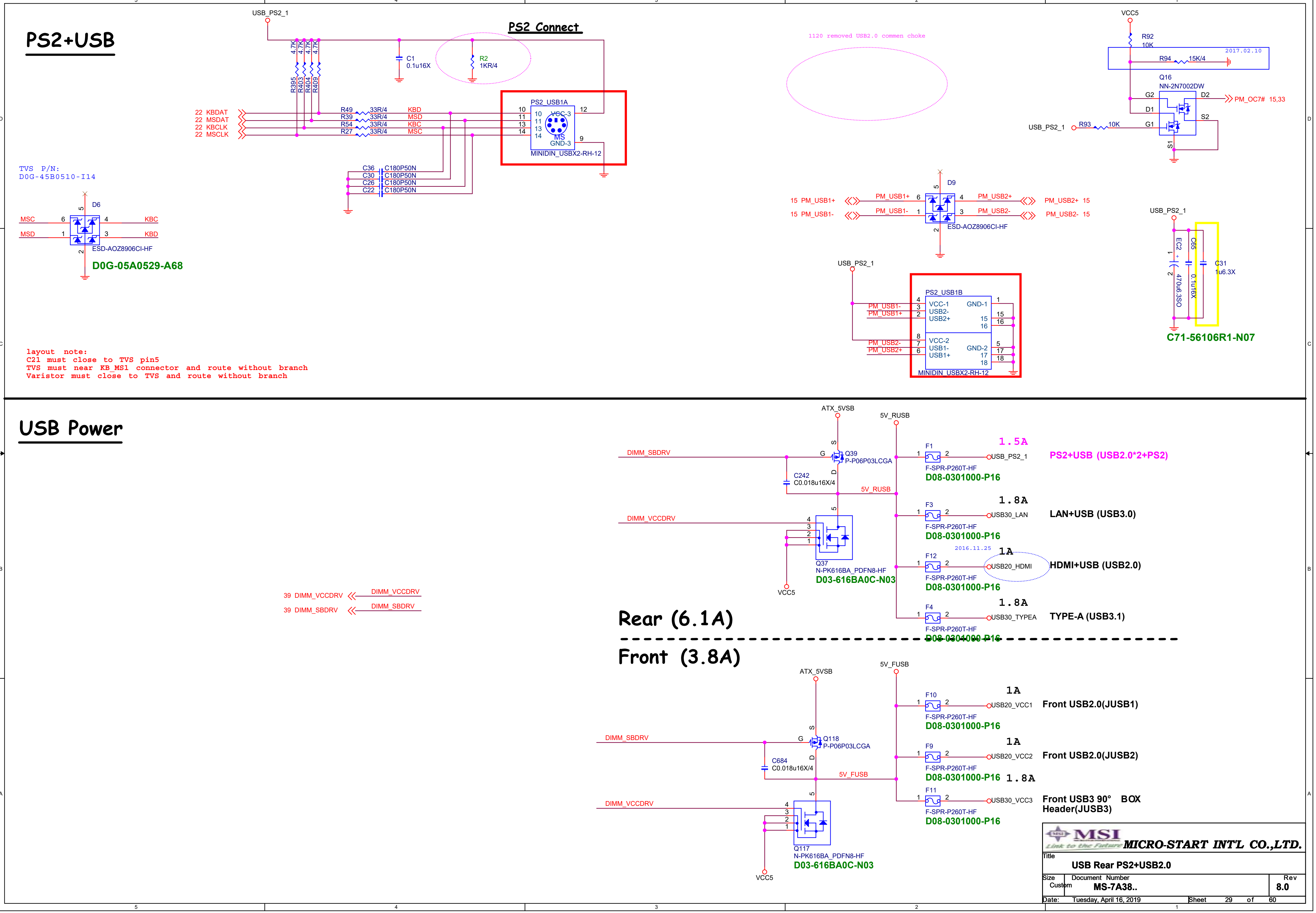

AUD_LED1
AUD_LED2
AUD_LED3
AUD_LED4
AUD_LED5
AUD_LED6
AUD_LED7
AUDIO_G_LED
AUDIO_B_LED
AUDIO_R_LED
VCC5
GREEN
BLUE
RED
X_LED-04-[GBR]#-20mA3.9V_3215-RH
27 LINE2_VREFO
27 MIC2_VREFO
S-BAT54A_SOT23
DA17
DA22
F_LINE_2R
F_LINE_2L
F_MIC_2L
F_MIC_2R
RA68 4.7K/4 F_LINE2_R
RA67 4.7K/4 F_LINE2_L
RA81 4.7K/4 F_MIC2_L
RA80 4.7K/4 F_MIC2_R
JAUD1
27 MIC2_L MIC2_L RA83 75R/4 F_MIC2_L
27 MIC2_R MIC2_R RA82 75R/4 F_MIC2_R
27 LINE2_R LINE2_R RA70 75R/4 F_LINE2_R
27 SENSE_B RA77 47R/4 HPON
27 LINE2_L LINE2_L RA69 75R/4 F_LINE2_L
MIC
MICPWR
FLINE OUTR
HPON
FLINE OUTL
GND
PRESENCE#
LINE NEXT R
LINE NEXT L
MIC2_JD
LINE2_JD
H2X5[8]M_BLACK-RH
N31-2051411-H06
CA59 C1000p50X/4
RA79 39.2K1%/4
RA78 20KR1%/4
Close to Front panel
For HDA/AC97 front cable.
F_LINE2_L DA18 ESD-MLVS0402
F_LINE2_R DA19 ESD-MLVS0402
F_MIC2_R DA20 ESD-MLVS0402
F_MIC2_L DA21 ESD-MLVS0402
D0G-2710510-I05
Close to Front panel
ESD protect
D0G-2710510-I05
avl:D0G-2950500-SI0
F_LINE2_L RA65 22K/4
F_LINE2_R RA66 22K/4
Rear Line OUT De-POP circuit
De-pop circuit for Rear Line out & Front Headphone out)
3VSB
2014.09.15
RA13 10K
27 EAPD
EAPD RA14 1K EAPD_R
QA2 P-MMBT3906
QA3 P-MMBT3906
RA15 1K
RA19 10K
CA7 22u6.3X8
RA20 220K/1%
QA7 P-MMBT3906
CA15 0.1u16X
MUTE
Digital
Analog
2016.11.24
MUTE RA10 1K QA1_2
RA11 1K QA1_5
QA1
LOUT_LA
LOUT_RA
LOUT_LA 27
LOUT_RA 27
NN-HBN2515S6R
MUTE RA30 1K QA6_2
RA29 1K QA6_5
QA6
F_LINE2_R
F_LINE2_L
MHA1
X_MH001
CA46 0.1u16X
CA48 0.1u16X
2016.04.27
2017.01.17
R837 X 100R/8
R847 X 100R/8
R846 X 100R/8
Q130
22,53 SIO_LED_R
X_N-QM3010K_SOT23-3-HF
AUDIO_FADING
R838 X 100R/8
R848 X 100R/8
R849 X 100R/8
Q131
22,53 SIO_LED_G
R839 X 100R/8
R850 X 100R/8
R851 X 100R/8
Q132
22,53 SIO_LED_B
22,53,54 FADING_LED
FADING_LED
QA4 X_2N7002
MICRO-START INT'L CO.,LTD.
Title
Audio ALC892-2
Size Custom
Document Number MS-7A38..
Rev 8.0
Date: Tuesday, April 16, 2019
Sheet 28 of 60



PS2+USB
PS2 Connect
USB_PS2_1
R395 R403 R404 R409 4.7K
C1 0.1u16X
R2 1KR/4
22 KBDAT
22 MSDAT
22 KBCLK
22 MSCLK
R49 33R/4 KBD
R39 33R/4 MSD
R54 33R/4 KBC
R27 33R/4 MSC
PS2_USB1A
VCC-3
MS
GND-3
MINIDIN_USBX2-RH-12
C36 C180P50N
C30 C180P50N
C26 C180P50N
C22 C180P50N
TVS P/N:
D0G-45B0510-I14
D6
MSC
MSD
KBC
KBD
ESD-AOZ8906CI-HF
D0G-05A0529-A68
layout note:
C21 must close to TVS pin5
TVS must near KB_MS1 connector and route without branch
Varistor must close to TVS and route without branch
1120 removed USB2.0 commen choke
VCC5
R92 10K
2017.02.10
R94 15K/4
Q16
NN-2N7002DW
G2 D2 D1 G1 S2 S1
PM_OC7# 15,33
USB_PS2_1 R93 10K
D9
15 PM_USB1+
15 PM_USB1-
PM_USB2+ 15
PM_USB2- 15
ESD-AOZ8906CI-HF
USB_PS2_1
EC2 470u6.3SO
C65 0.1u16X
C31 1u6.3X
C71-56106R1-N07
PS2_USB1B
VCC-1 GND-1
USB2-
USB2+
VCC-2 GND-2
USB1-
USB1+
PM_USB1-
PM_USB1+
PM_USB2-
PM_USB2+
MINIDIN_USBX2-RH-12
USB Power
ATX_5VSB
5V_RUSB
DIMM_SBDRV
Q39 P-P06P03LCGA
C242 C0.018u16X/4
DIMM_VCCDRV
Q37
N-PK616BA_PDFN8-HF
D03-616BA0C-N03
VCC5
39 DIMM_VCCDRV
39 DIMM_SBDRV
F1 F-SPR-P260T-HF D08-0301000-P16
1.5A USB_PS2_1 PS2+USB (USB2.0*2+PS2)
F3 F-SPR-P260T-HF D08-0301000-P16
1.8A USB30_LAN LAN+USB (USB3.0)
2016.11.25
F12 F-SPR-P260T-HF D08-0301000-P16
1A USB20_HDMI HDMI+USB (USB2.0)
F4 F-SPR-P260T-HF D08-0301000-P16
1.8A USB30_TYPEA TYPE-A (USB3.1)
Rear (6.1A)
Front (3.8A)
ATX_5VSB
5V_FUSB
F10 F-SPR-P260T-HF D08-0301000-P16
1A USB20_VCC1 Front USB2.0(JUSB1)
DIMM_SBDRV
Q118 P-P06P03LCGA
C684 C0.018u16X/4
F9 F-SPR-P260T-HF D08-0301000-P16
1A USB20_VCC2 Front USB2.0(JUSB2)
1.8A
F11 F-SPR-P260T-HF D08-0301000-P16
USB30_VCC3 Front USB3 90° BOX Header(JUSB3)
DIMM_VCCDRV
Q117
N-PK616BA_PDFN8-HF
D03-616BA0C-N03
VCC5
MSI Link to the Future
MICRO-START INT'L CO.,LTD.
Title
USB Rear PS2+USB2.0
Size Custom
Document Number MS-7A38..
Rev 8.0
Date: Tuesday, April 16, 2019
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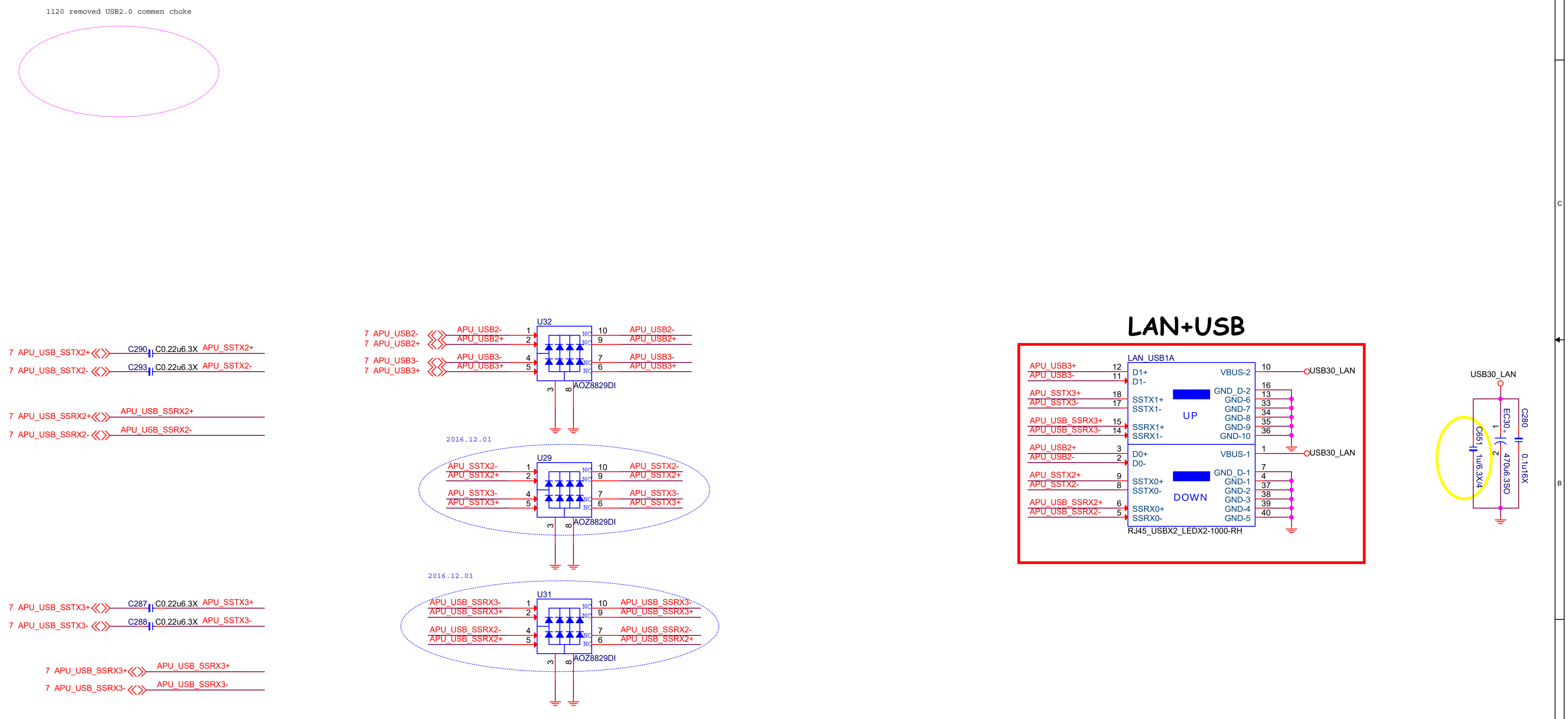
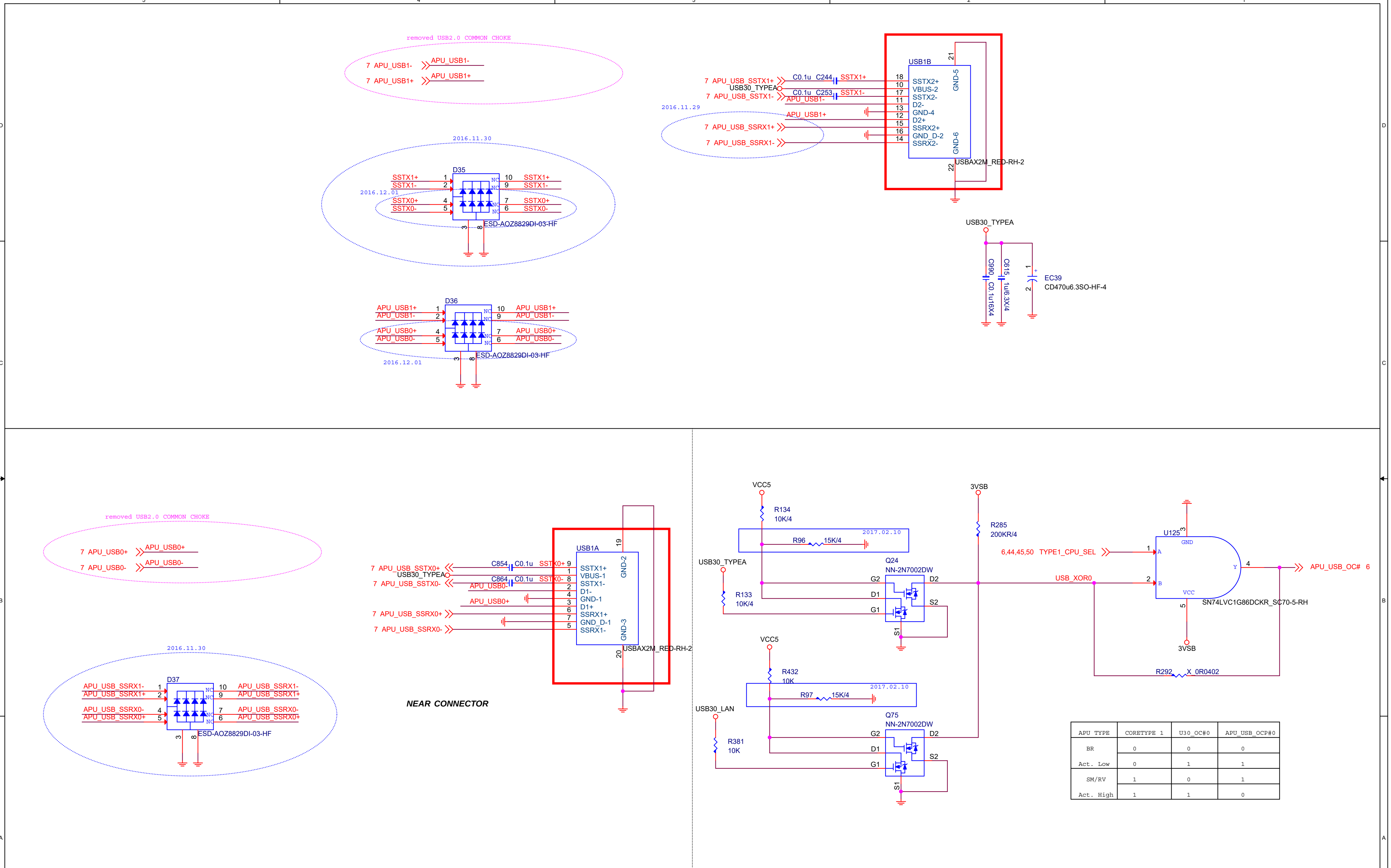
USB3.1 GEN1

VR Sloution U2 redriver



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

Title	USB Rear LAN+TYPE A	
Size Custom	Document Number MS-7A38..	Rev 8.0
Date: Tuesday, April 16, 2019	Sheet 30 of 60	



APU TYPE	CORETYPE 1	U30_OC#0	APU_USB_OCP#0
BR	0	0	0
Act. Low	0	1	1
SM/RV	1	0	1
Act. High	1	1	0

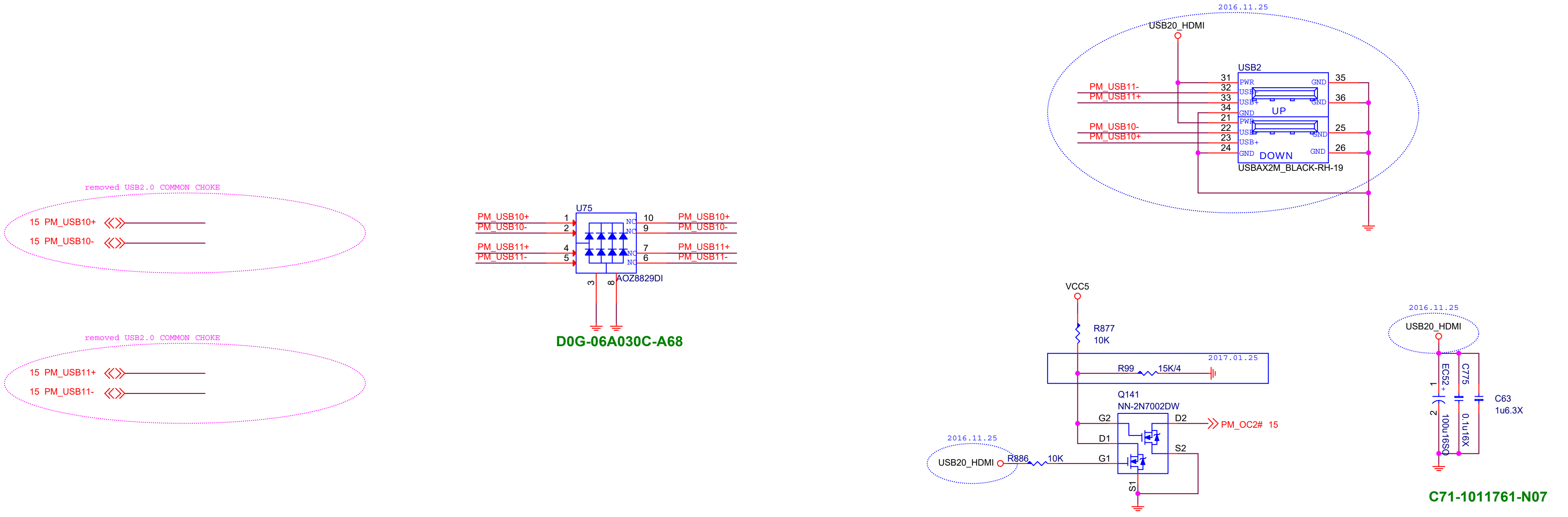
MSI Link to the Future **MICRO-START INT'L CO.,LTD.**

Title: **Rear USB3.1 TYPE C**

Size: Custom | Document Number: **MS-7A38..** | Rev: **8.0**

Date: Tuesday, April 16, 2019 | Sheet 31 of 60

Front USB2.0



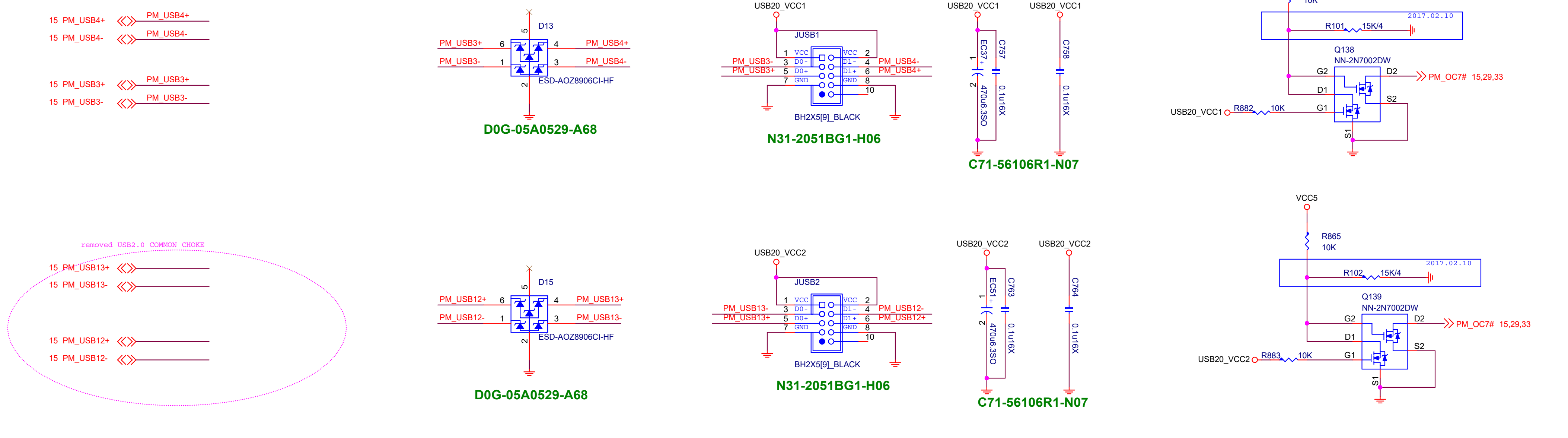
MSI MICRO-START INT'L CO.,LTD.

Title: **USB Rear HDMI+USB2.0**

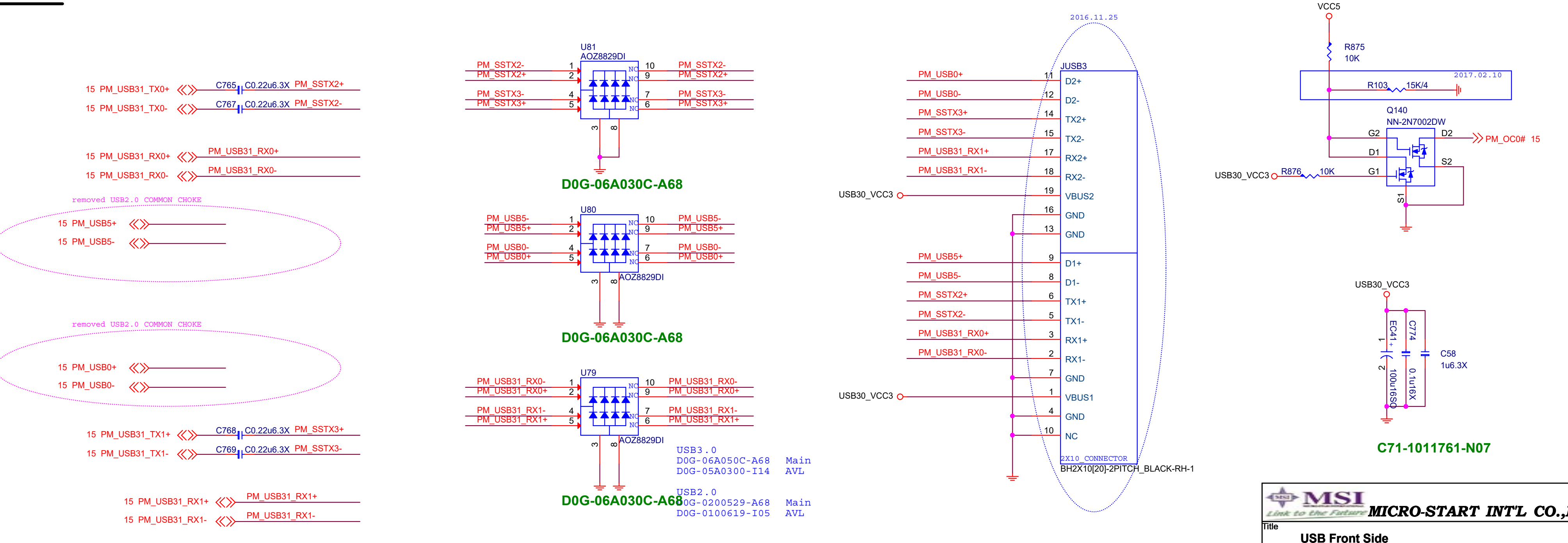
Size	Document Number	Rev
Custom	MS-7A38..	8.0

Date: Tuesday, April 16, 2019 Sheet 32 of 60

Front USB2.0

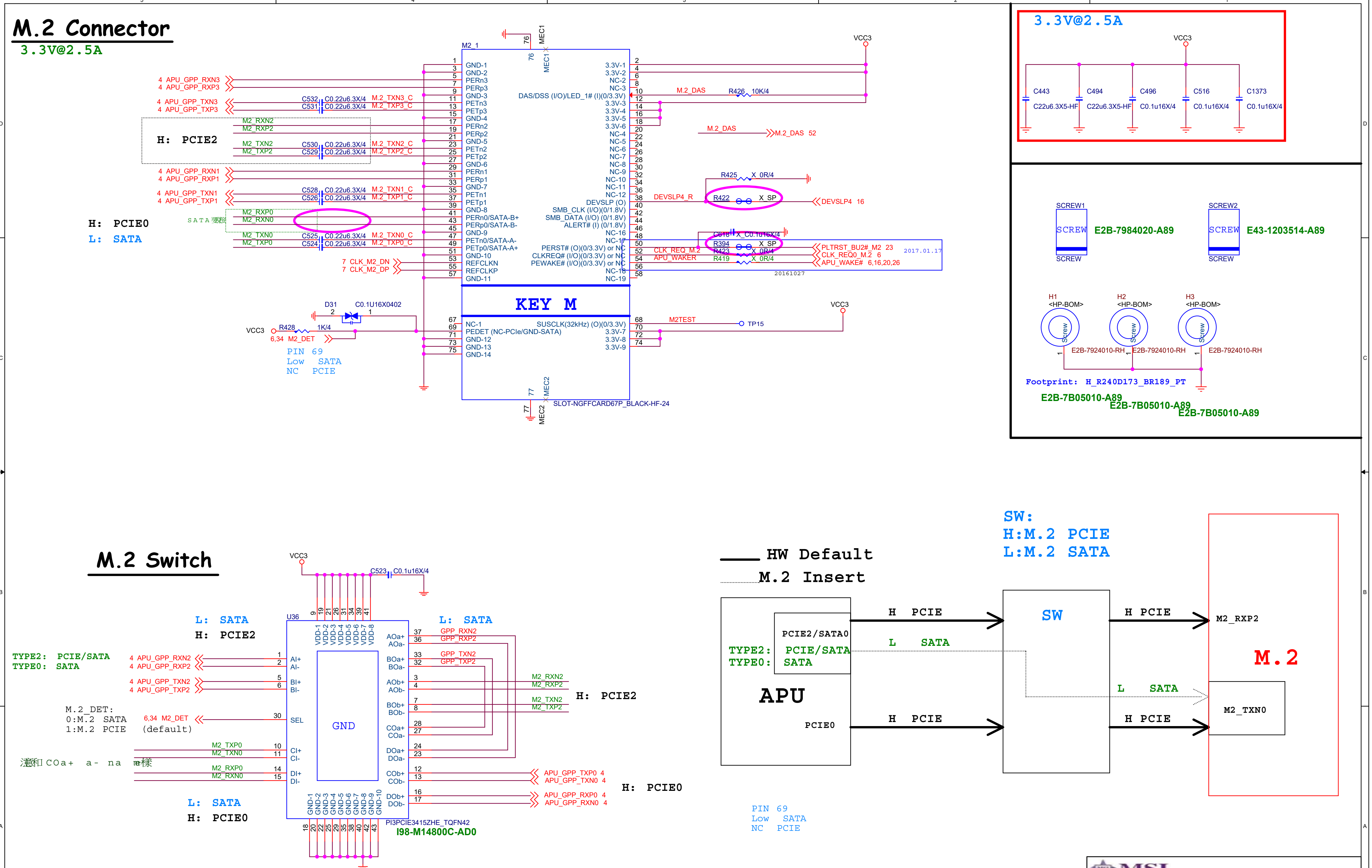


Front USB3.1 GEN1



MICRO-START INT'L CO.,LTD.

Title	USB Front Side
Size	Custom
Document Number	MS-7A38..
Rev	8.0
Date:	Tuesday, April 16, 2019
Sheet	33 of 60



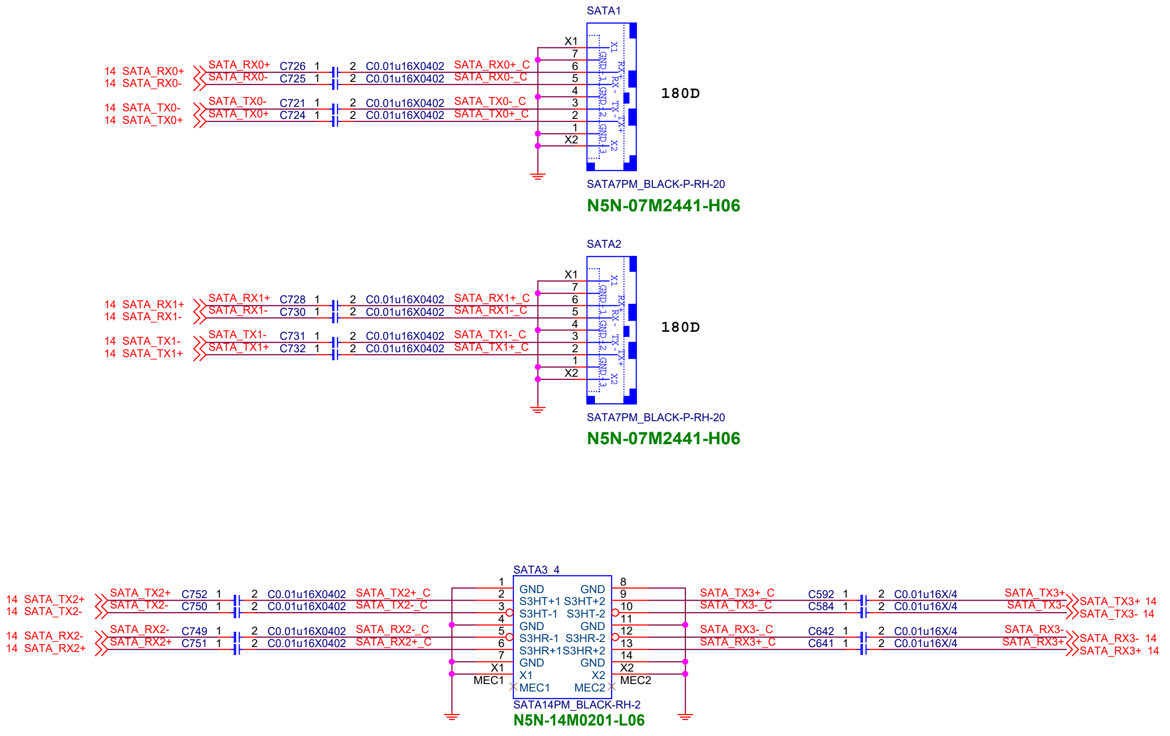
MSI MICRO-START INT'L CO.,LTD.

Title: M.2

Size: Custom | Document Number: MS-7A38.. | Rev: 8.0

Date: Tuesday, April 16, 2019 | Sheet 34 of 60

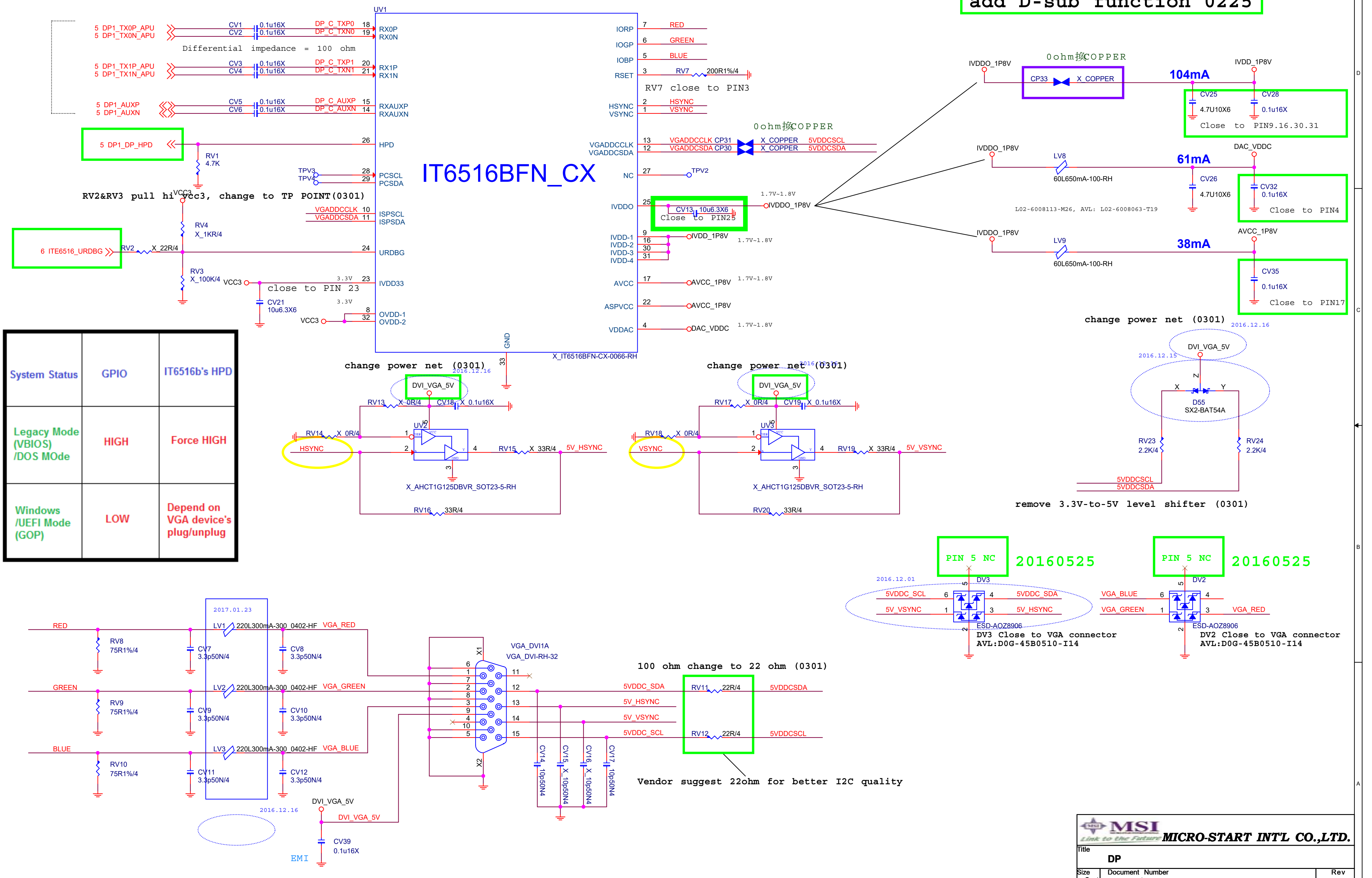
SATA Connector



Note:

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

add D-sub function 0225



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

MSI Link to the Future MICRO-START INT'L CO.,LTD.

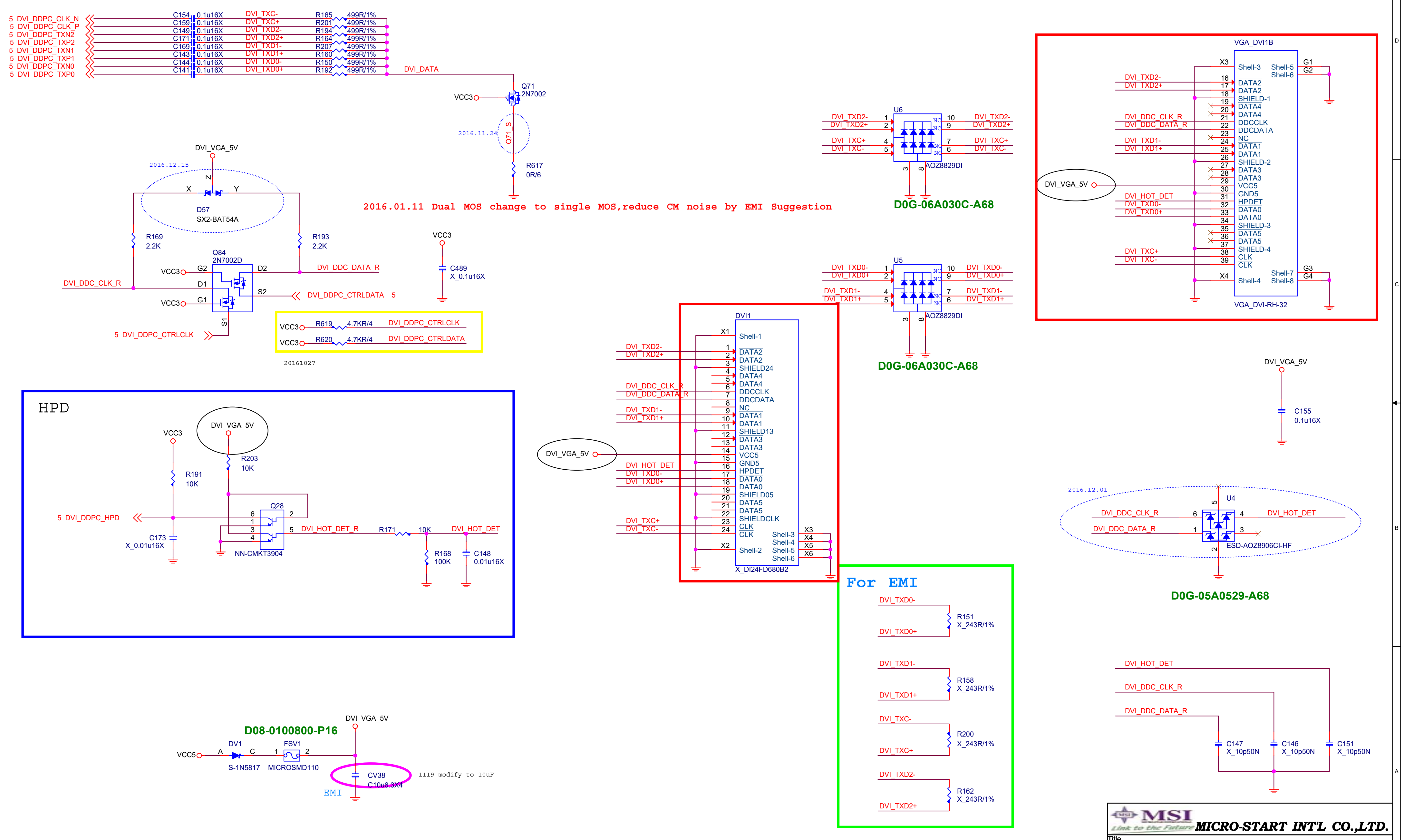
Title: DP

Size: Custom | Document Number: MS-7A38.. | Rev: 8.0

Date: Tuesday, April 16, 2019 | Sheet 36 of 60

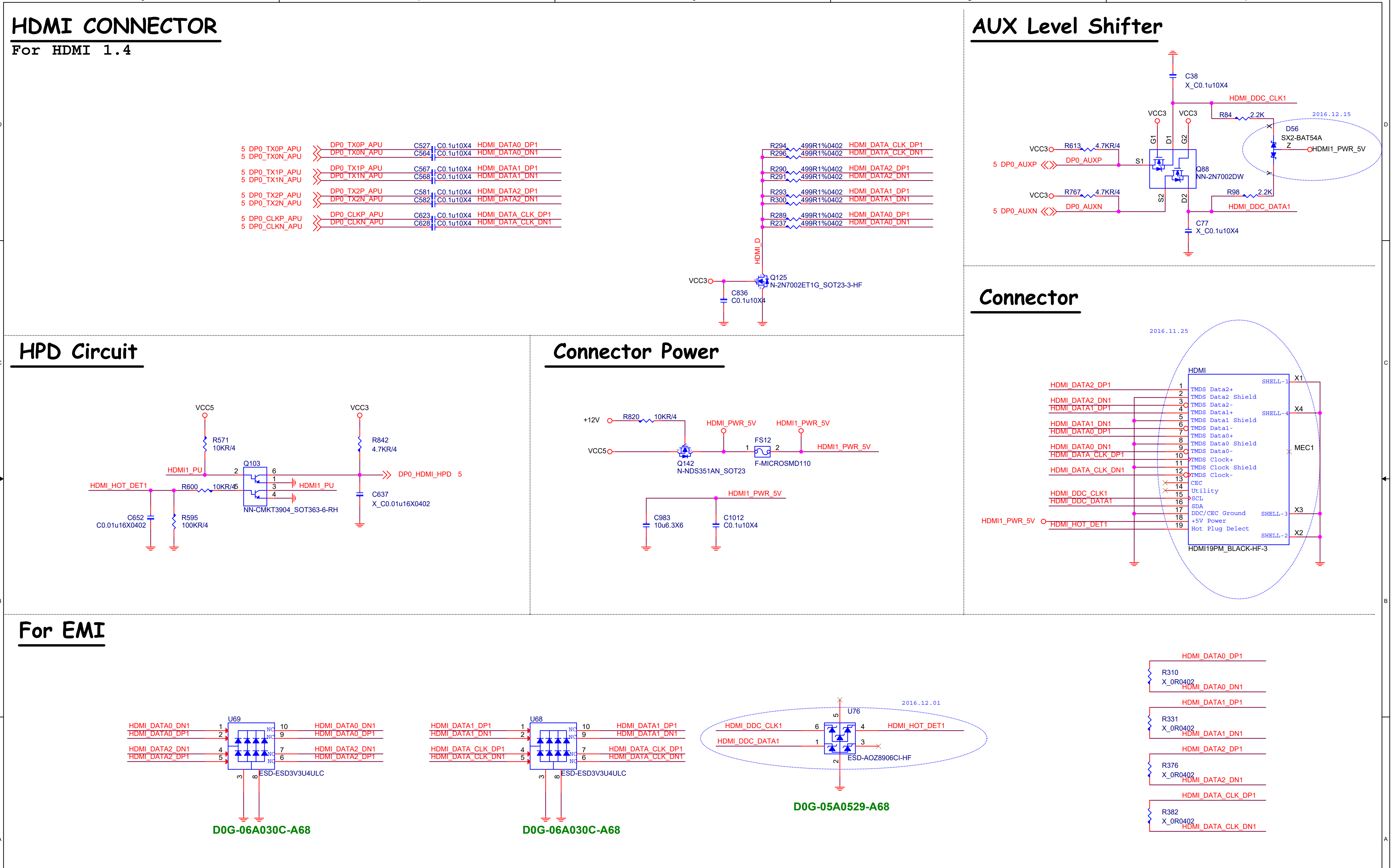
DVI level shifter

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



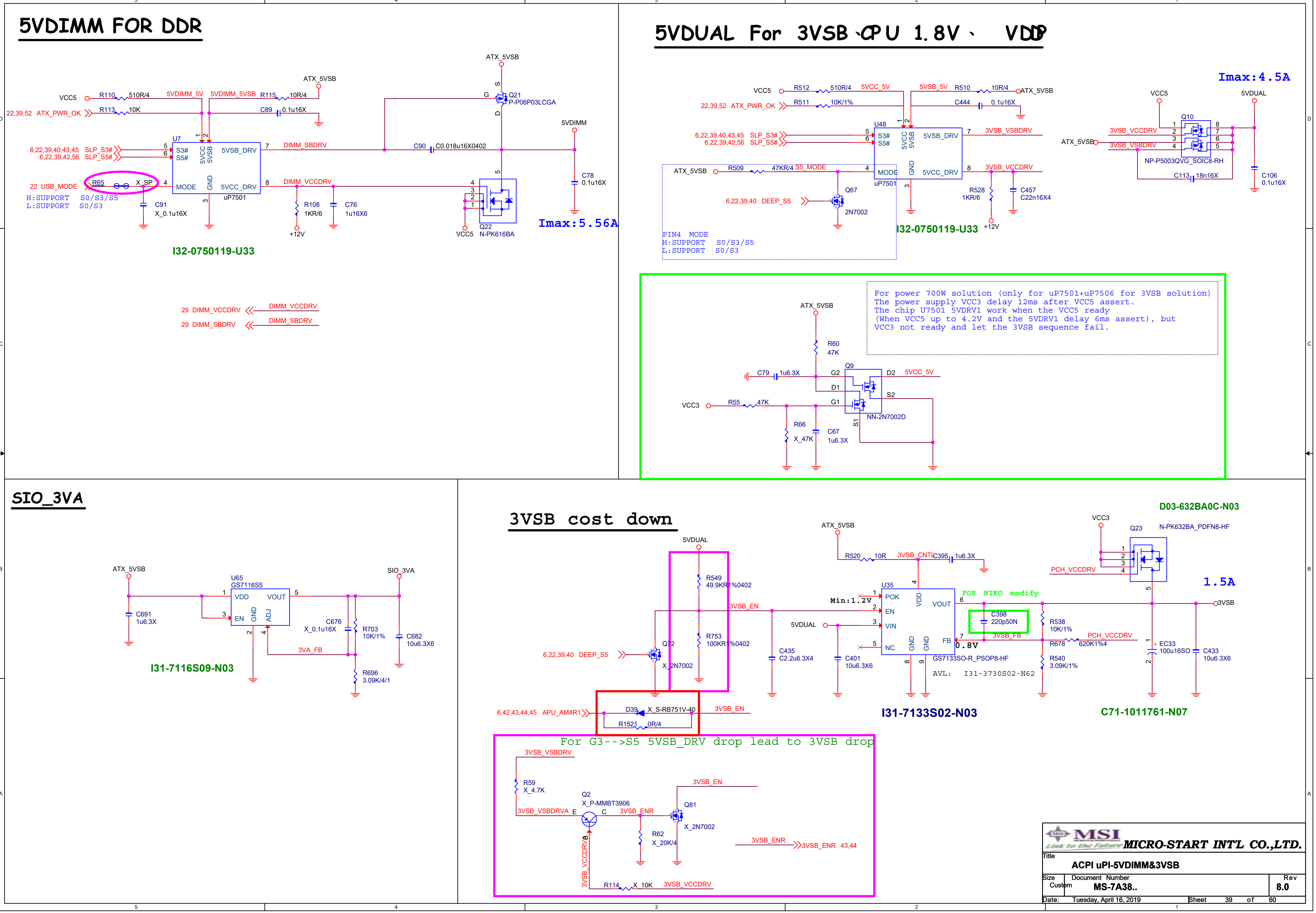
MICRO-START INT'L CO.,LTD.

Title	DVI Connector	
Size Custom	Document Number MS-7A38..	Rev 8.0
Date: Tuesday, April 16, 2019	Sheet 37 of 60	



MICRO-START INT'L CO.,LTD.

Title	HDMI	
Size: Custom	Document Number: MS-7A38..	Rev: 8.0
Date: Tuesday, April 16, 2019	Sheet 38 of 60	


5VDIMM FOR DDR
VCC5
R110 510R/4
5VDIMM_5V
5VDIMM_5VSB
R115 10R/4
ATX_5VSB
22,39,52 ATX_PWR_OK
R113 10K
C89 0.1u16X
Q21 P-P06P03LCGA
5VDIMM
U7
6,22,39,40,43,45 SLP_S3#
6,22,39,42,56 SLP_S5#
S3#
S5#
5VCC
5VSB
5VSB_DRV
DIMM_SBDRV
C90 C0.018u16X0402
22 USB_MODE
R65 X_SP
MODE
GND
5VCC_DRV
DIMM_VCCDRV
uP7501
H:SUPPORT S0/S3/S5
L:SUPPORT S0/S3
C91 X_0.1u16X
R108 1KR/6
+12V
C76 1u16X6
C78 0.1u16X
VCC5
Q22 N-PK616BA
Imax:5.56A
I32-0750119-U33
29 DIMM_VCCDRV
29 DIMM_SBDRV
5VDUAL For 3VSB、CPU 1.8V、 VDDP
Imax:4.5A
R512 510R/4
5VCC_5V
5VSB_5V
R510 10R/4
22,39,52 ATX_PWR_OK
R511 10K/1%
C444 0.1u16X
U48
3VSB_VSBDRV
R509 47KR/4
S5_MODE
5VCC_DRV
3VSB_VCCDRV
Q67
6,22,39,40 DEEP_S5
2N7002
R528 1KR/6
C457 C22n16X4
I32-0750119-U33
PIN4 MODE
H:SUPPORT S0/S3/S5
L:SUPPORT S0/S3
Q10
NP-P5003QVG_SOIC8-RH
5VDUAL
C113 18n16X
C106 0.1u16X
For power 700W solution (only for uP7501+uP7506 for 3VSB solution)
The power supply VCC3 delay 12ms after VCC5 assert.
The chip U7501 5VDRV1 work when the VCC5 ready
(When VCC5 up to 4.2V and the 5VDRV1 delay 6ms assert), but
VCC3 not ready and let the 3VSB sequence fail.
R60 47K
C79 1u6.3X
Q9
NN-2N7002D
VCC3
R55 47K
R66 X_47K
C67 1u6.3X
SIO_3VA
U65 GS7116S5
VDD
VOUT
EN
GND
ADJ
C691 1u6.3X
C676 X_0.1u16X
R703 10K/1%
C682 10u6.3X6
3VA_FB
R696 3.09K/4/1
I31-7116S09-N03
3VSB cost down
R549 49.9KR1%0402
3VSB_EN
R753 100KR1%0402
Q72 X_2N7002
R520 10R
3VSB_CNTL
C395 1u6.3X
U35
POK
EN
VIN
NC
VDD
VOUT
FB
Min:1.2V
0.8V
C435 C2.2u6.3X4
C401 10u6.3X6
GS7133SO-R_PSOP8-HF
AVL: I31-3730S02-N62
FOR NIKO modify
C398 220p50N
R538 10K/1%
3VSB_FB
R678 620K1%4
PCH_VCCDRV
R540 3.09K/1%
I31-7133S02-N03
D03-632BA0C-N03
Q23 N-PK632BA_PDFN8-HF
1.5A
3VSB
EC33 100u16SO
C433 10u6.3X6
C71-1011761-N07
6,42,43,44,45 APU_AM4R1
D39 X_S-RB751V-40
R1521 0R/4
For G3-->S5 5VSB_DRV drop lead to 3VSB drop
R59 X_4.7K
Q2 X_P-MMBT3906
3VSB_VSBDRVA
3VSB_ENR
Q81 X_2N7002
R62 X_20K/4
3VSB_ENR 43,44
R114 X_10K
MICRO-START INT'L CO.,LTD.
Title ACPI uPI-5VDIMM&3VSB
Size Custom
Document Number MS-7A38..
Rev 8.0
Date: Tuesday, April 16, 2019
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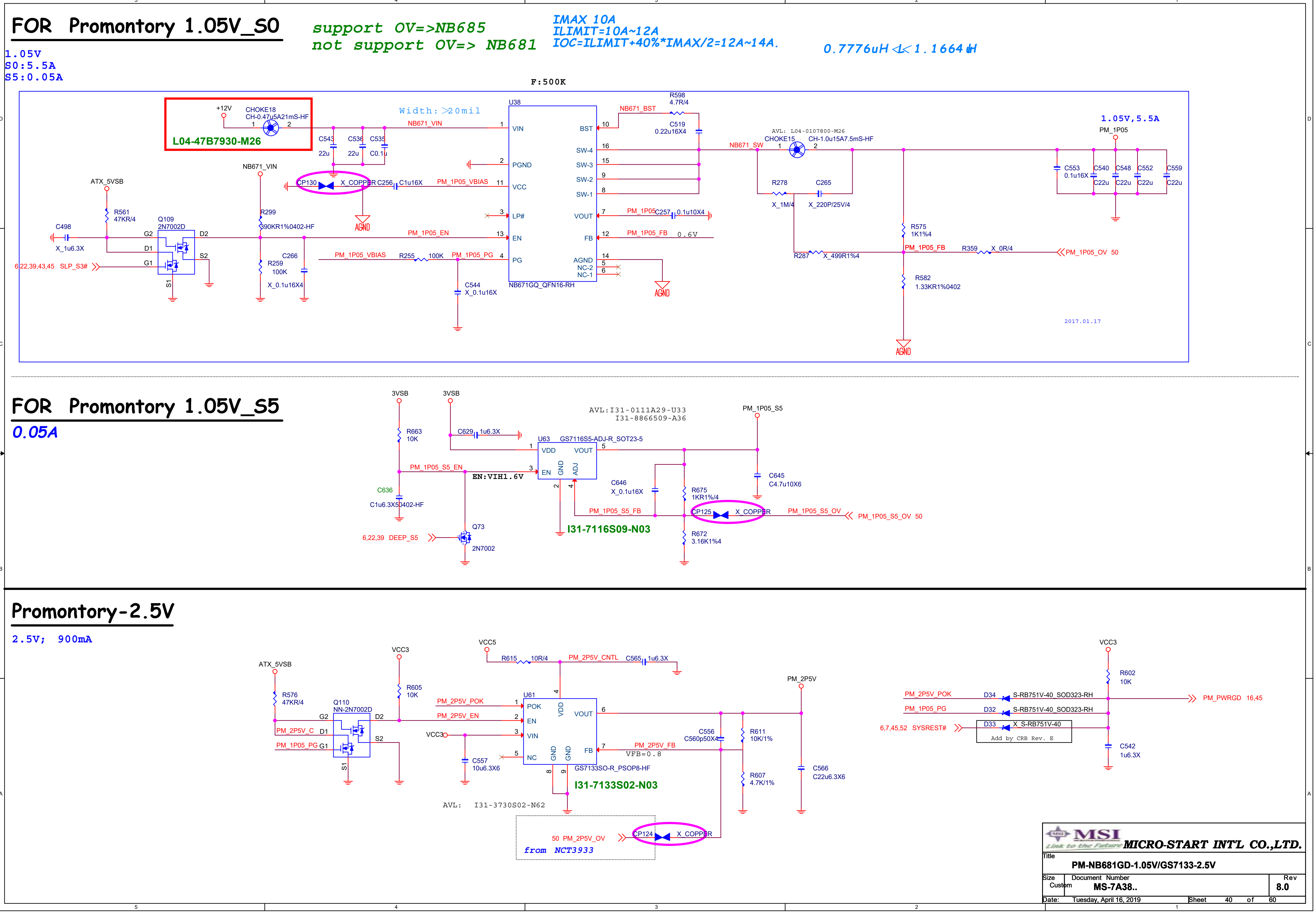
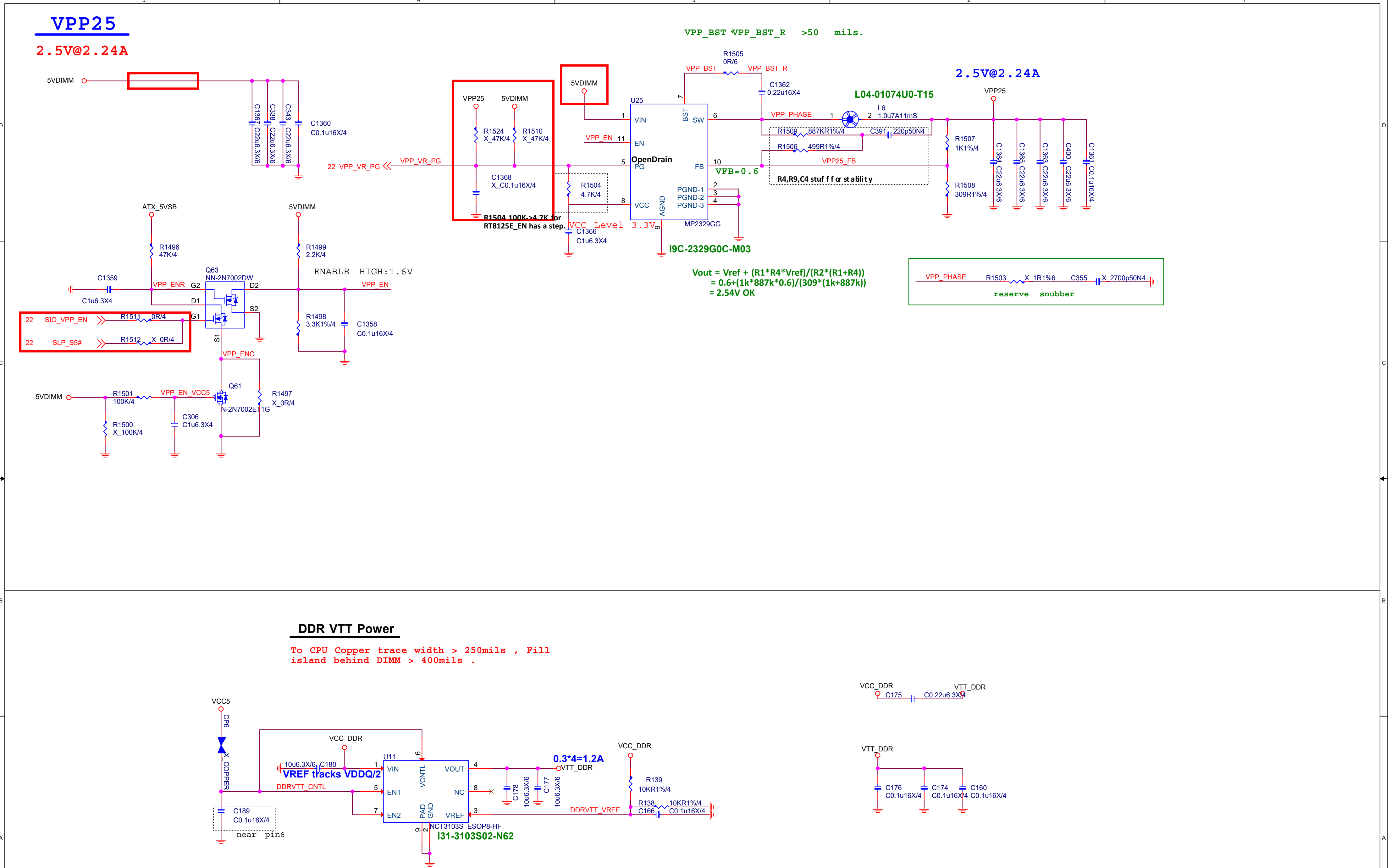
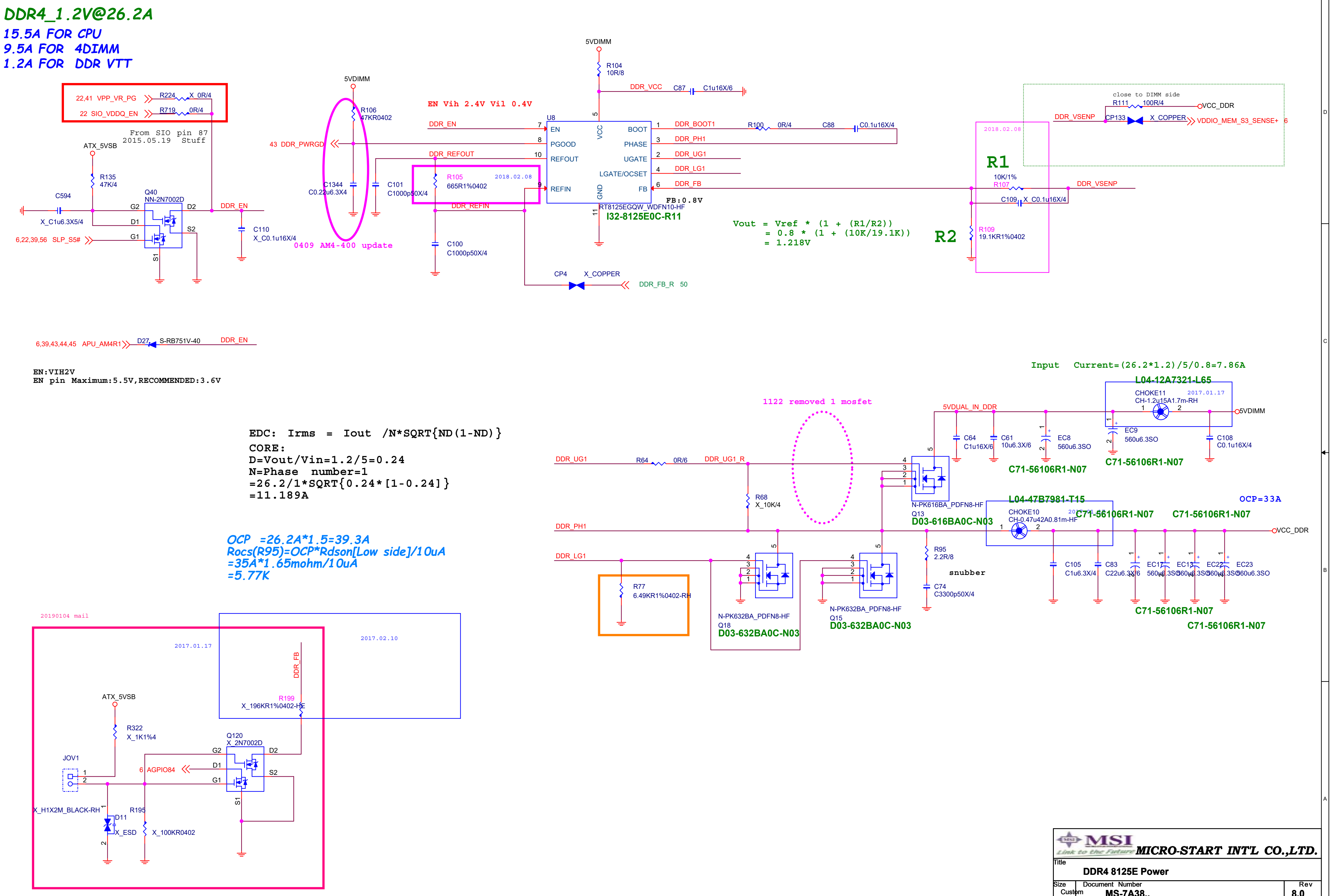

FOR Promontory 1.05V_S0
1.05V
S0:5.5A
S5:0.05A
support OV=>NB685
not support OV=> NB681
IMAX 10A
ILIMIT=10A~12A
IOC=ILIMIT+40%*IMAX/2=12A~14A.
0.7776uH < L < 1.1664 uH
F:500K
+12V
CHOKE18
CH-0.47u5A21mS-HF
L04-47B7930-M26
Width: >20mil
U38
NB671_VIN
C543 22u
C536 22u
C535 C0.1u
VIN
PGND
VCC
LP#
EN
PG
BST
SW-4
SW-3
SW-2
SW-1
VOUT
FB
AGND
NC-2
NC-1
NB671GQ_QFN16-RH
NB671_BST
R598 4.7R/4
C519 0.22u16X4
AVL: L04-0107800-M26
CHOKE15
CH-1.0u15A7.5mS-HF
NB671_SW
R278 X_1M/4
C265 X_220P/25V/4
1.05V,5.5A
PM_1P05
C553 0.1u16X
C540 C22u
C548 C22u
C552 C22u
C559 C22u
ATX_5VSB
CP130 X_COPPER
C256 C1u16X
PM_1P05_VBIAS
AGND
R561 47KR/4
Q109 2N7002D
C498 X_1u6.3X
R299 390KR1%0402-HF
PM_1P05_EN
6,22,39,43,45 SLP_S3#
R259 100K
C266 X_0.1u16X4
R255 100K
PM_1P05_PG
C544 X_0.1u16X
PM_1P05 C257 0.1u10X4
PM_1P05_FB 0.6V
R575 1K1%4
R287 X_499R1%4
PM_1P05_FB
R359 X_0R/4
PM_1P05_OV 50
R582 1.33KR1%0402
2017.01.17
FOR Promontory 1.05V_S5
0.05A
3VSB
R663 10K
C629 1u6.3X
AVL:I31-0111A29-U33
I31-8866509-A36
PM_1P05_S5
U63 GS7116S5-ADJ-R_SOT23-5
VDD
VOUT
EN
GND
ADJ
PM_1P05_S5_EN
EN:VIH1.6V
C636 C1u6.3X50402-HF
C646 X_0.1u16X
R675 1KR1%/4
C645 C4.7u10X6
PM_1P05_S5_FB
CP125 X_COPPER
PM_1P05_S5_OV
PM_1P05_S5_OV 50
I31-7116S09-N03
R672 3.16K1%4
Q73 2N7002
6,22,39 DEEP_S5
Promontory-2.5V
2.5V; 900mA
ATX_5VSB
R576 47KR/4
Q110 NN-2N7002D
PM_2P5V_C
PM_1P05_PG
VCC3
R605 10K
VCC5
R615 10R/4
PM_2P5V_CNTL
C565 1u6.3X
U61
PM_2P5V_POK
PM_2P5V_EN
POK
EN
VIN
NC
VDD
VOUT
GND
FB
C557 10u6.3X6
PM_2P5V_FB
VFB=0.8
GS7133SO-R_PSOP8-HF
I31-7133S02-N03
AVL: I31-3730S02-N62
C556 C560p50X4
R611 10K/1%
R607 4.7K/1%
PM_2P5V
C566 C22u6.3X6
50 PM_2P5V_OV
CP124 X_COPPER
from NCT3933
R602 10K
PM_2P5V_POK D34 S-RB751V-40_SOD323-RH
PM_1P05_PG D32 S-RB751V-40_SOD323-RH
6,7,45,52 SYSREST# D33 X_S-RB751V-40
Add by CRB Rev. E
PM_PWRGD 16,45
C542 1u6.3X
MSI Link to the Future
MICRO-START INT'L CO.,LTD.
Title
PM-NB681GD-1.05V/GS7133-2.5V
Size Custom
Document Number MS-7A38..
Rev 8.0
Date: Tuesday, April 16, 2019
Sheet 40 of 60



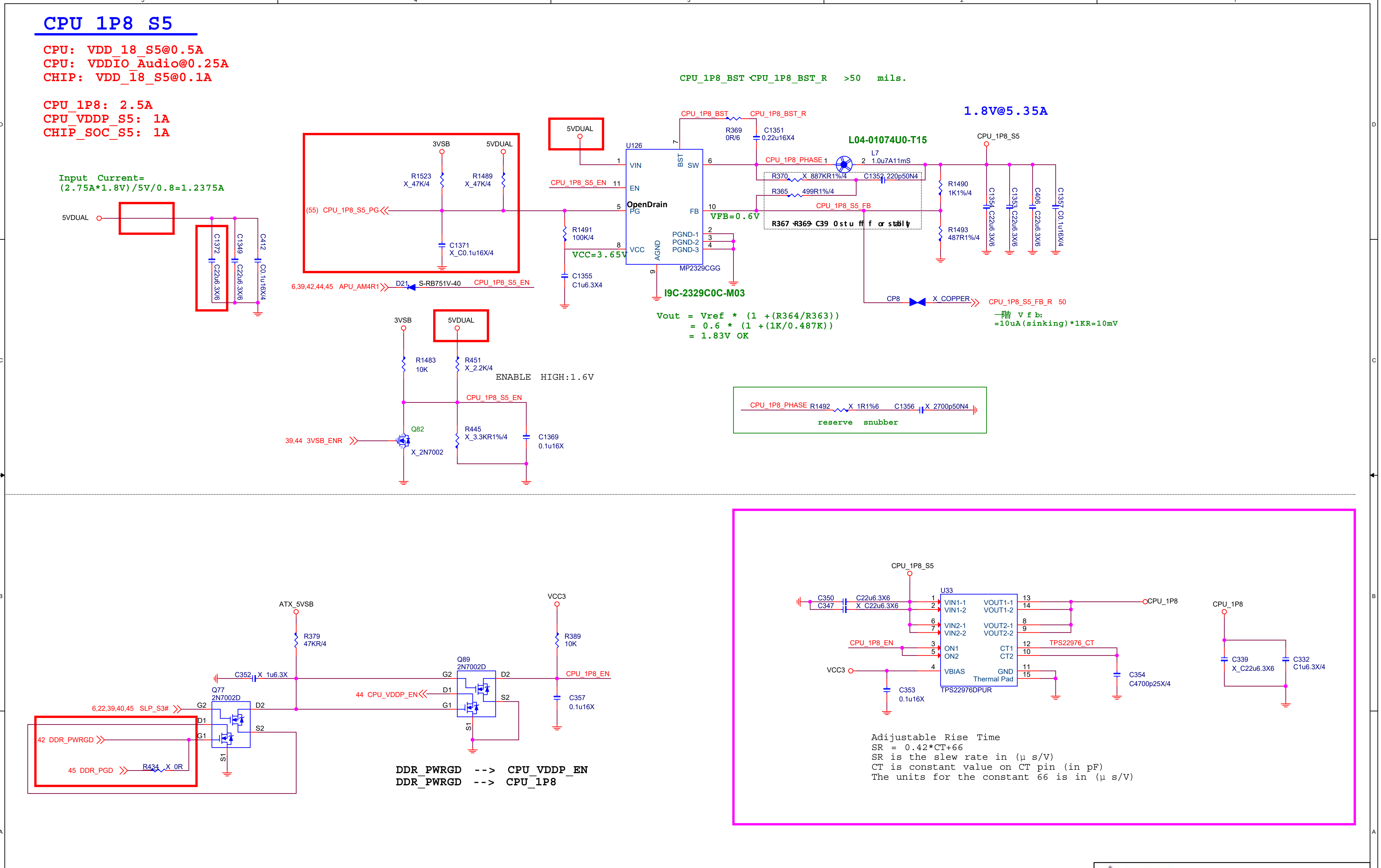
MSI Link to the Future MICRO-START INT'L CO.,LTD.

Title	DDR PWR VPP25/VTT_DDR	
Size: Custom	Document Number: MS-7A38..	Rev: 8.0
Date: Tuesday, April 16, 2019	Sheet 41 of 60	



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

Title	DDR4 8125E Power
Size: Custom	Document Number: MS-7A38..
Rev	8.0
Date: Tuesday, April 16, 2019	Sheet 42 of 60

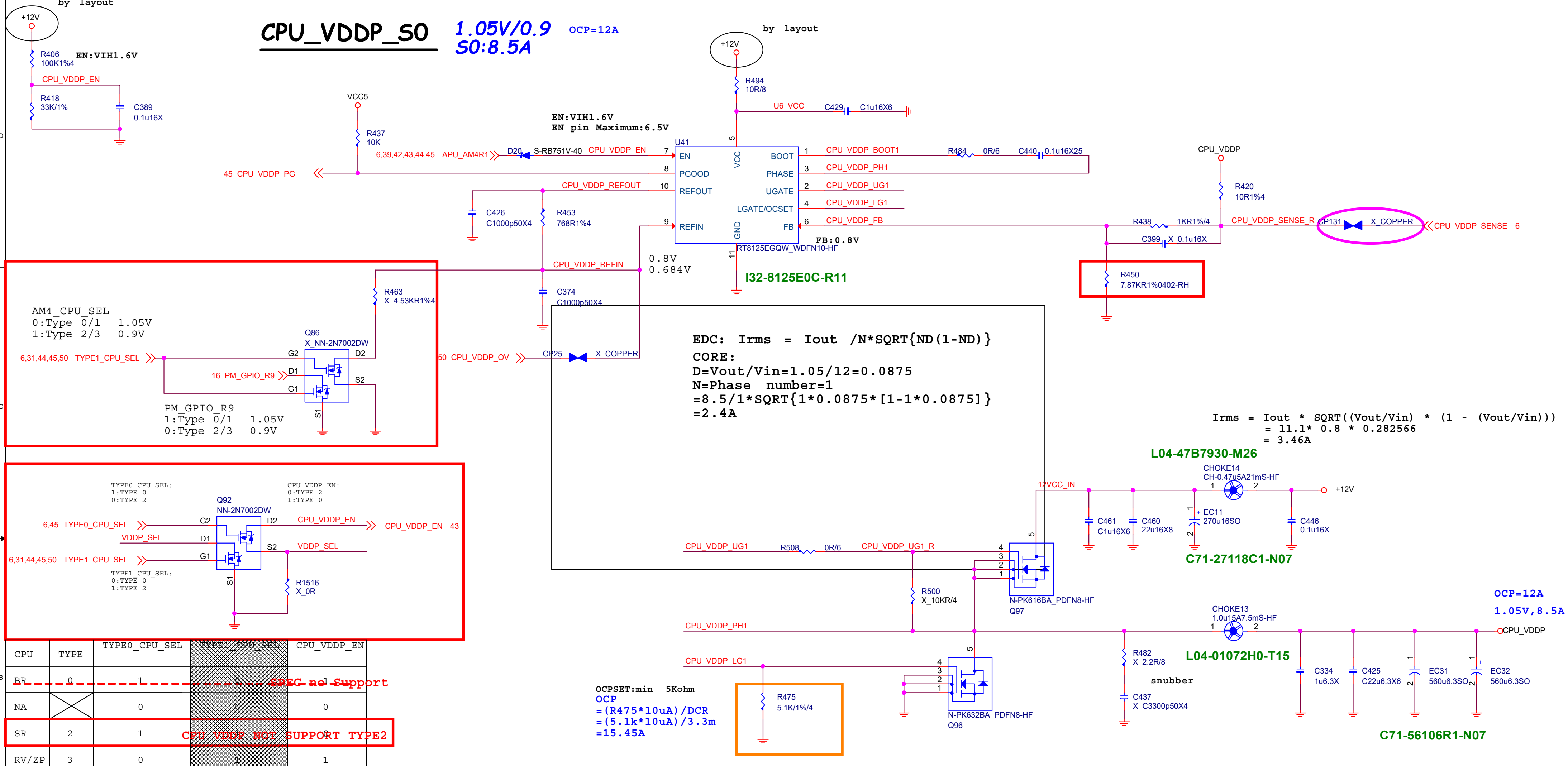


MICRO-START INT'L CO.,LTD.

Title	CPU Power 1P8V-MP2147	
Size: Custom	Document Number: MS-7A38..	Rev: 8.0
Date: Tuesday, April 16, 2019	Sheet 43 of 60	

CPU_VDDP_S0

1.05V/0.9 S0:8.5A OCP=12A



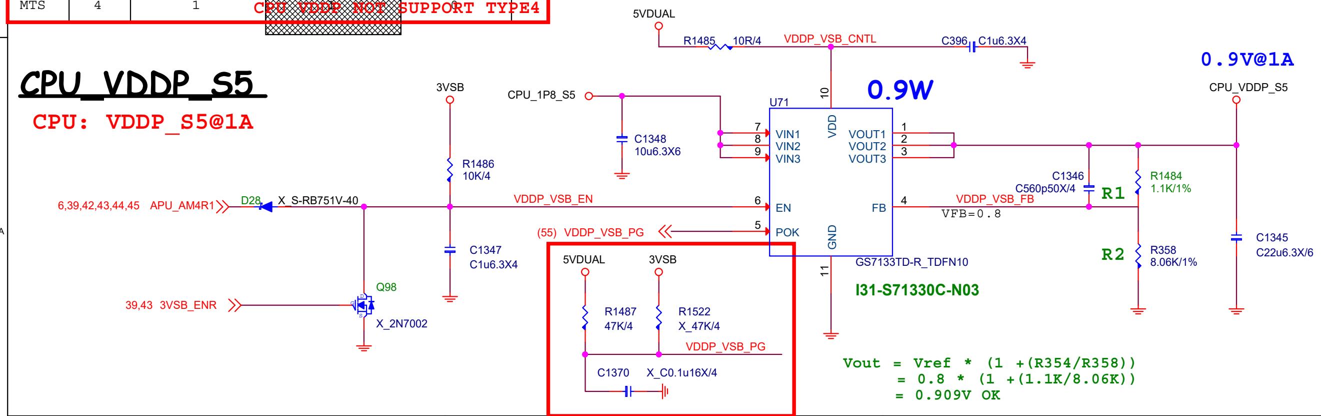
CPU	TYPE	TYPE0_CPU_SEL	TYPE1_CPU_SEL	CPU_VDDP_EN
~~BR~~	~~0~~	~~1~~	~~0~~	~~1~~ SPEC no Support
NA		0	0	0
SR	2	1	CPU VDDP NOT SUPPORT TYPE2	0
RV/ZP	3	0	1	1
MTS	4	1	CPU VDDP NOT SUPPORT TYPE4	0

CPU_VDDP_S5

CPU: VDDP_S5@1A

0.9V@1A

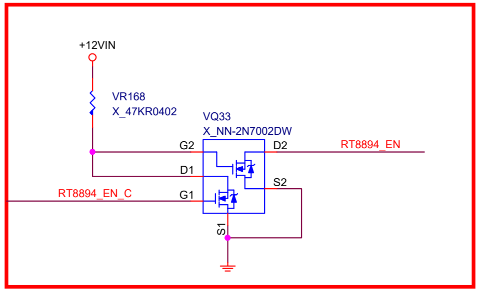
0.9W



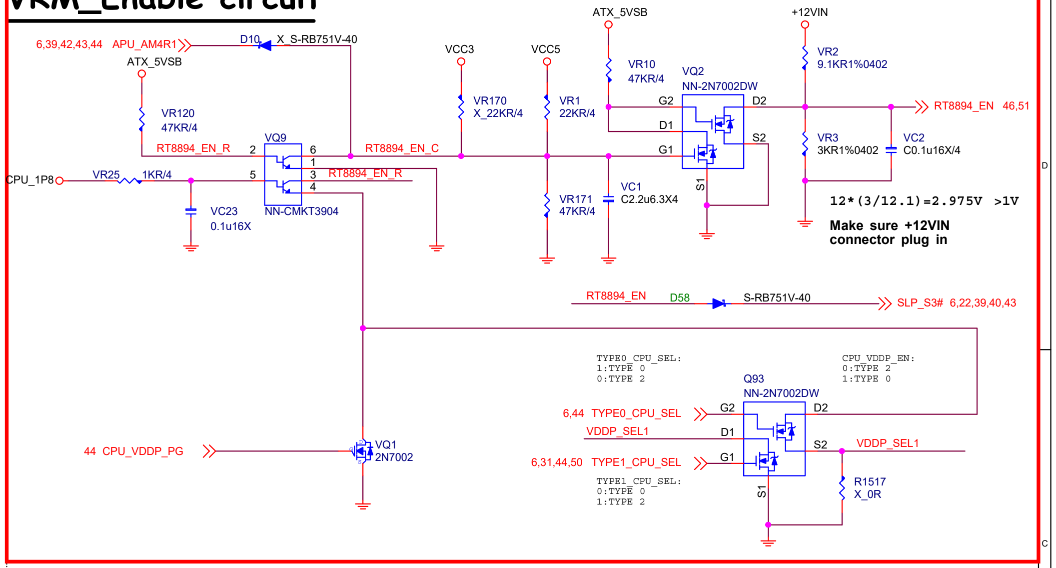
Vout = Vref * (1 +(R354/R358))
= 0.8 * (1 +(1.1K/8.06K))
= 0.909V OK

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

Title	CPU Power VDDP-RT8125E	
Size Custom	Document Number MS-7A38..	Rev 8.0
Date: Tuesday, April 16, 2019	Sheet 44 of 60	

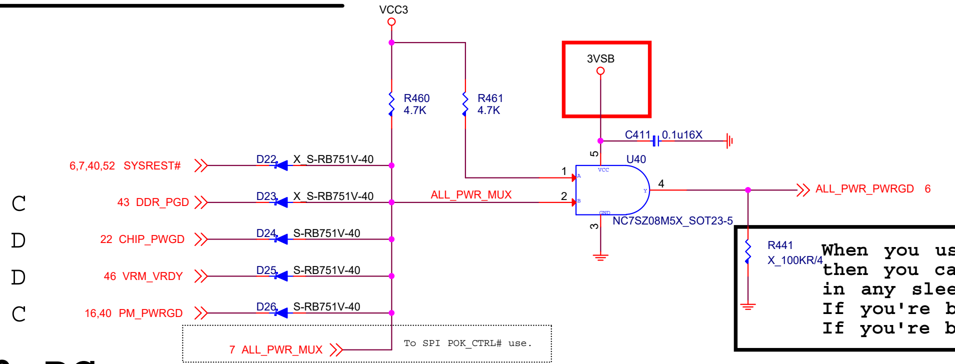


VRM_Enable circuit



CPU	TYPE	TYPE1_CPU_SEL	TYPE0_CPU_SEL
~~BR~~	~~0~~	~~0~~ SPEC no Support	~~1~~
NA	X	0	0
SR	2	1 CPU VDDP NOT SUPPORT TYPE2	1
RV/ZP	3	1	0
MTS	4	1 CPU VDDP NOT SUPPORT TYPE4	1

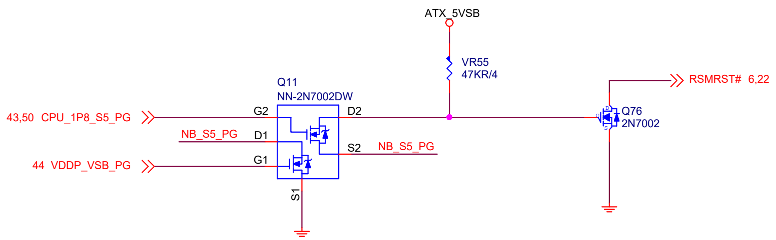
ALL POWER GOOD MUX



When you use external buffer
then you cannot let APU PWR_GOOD pin float
in any sleep state.
If you're buffer use 3.3V_S0 and you need Pull-down 100K
If you're buffer use 3.3V_S5 and you don't need PD.

S0 PG

S5 PG



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

Title	CPU Power Connector/PWRGD
Size	Custom
Document Number	MS-7A38..
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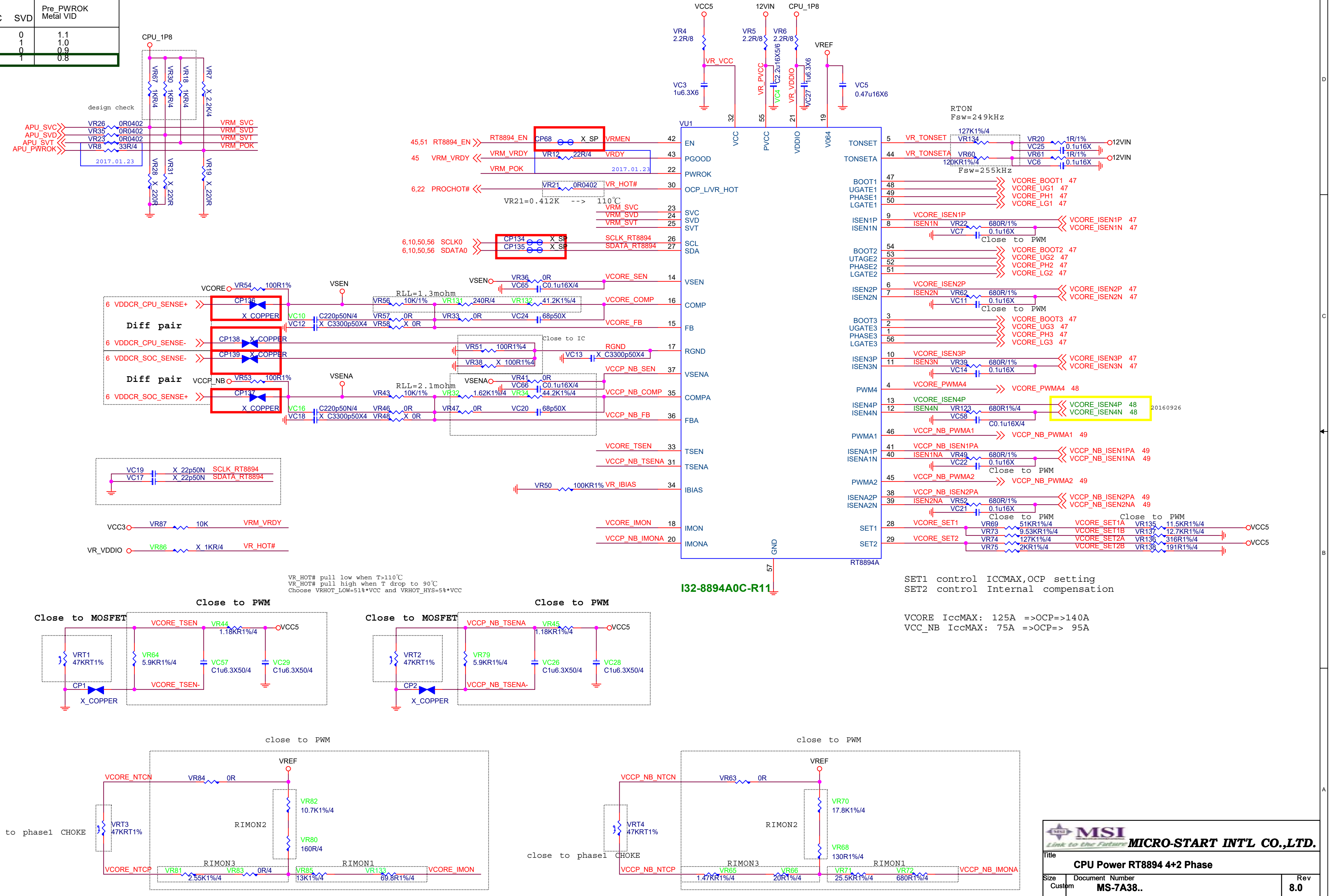
Note:VID Override Circuit

SVC	SVD	BOOT VOLTAGE Pre_PWROK Metal VID
0	0	1.1
0	1	1.0
1	0	0.9
1	1	0.8

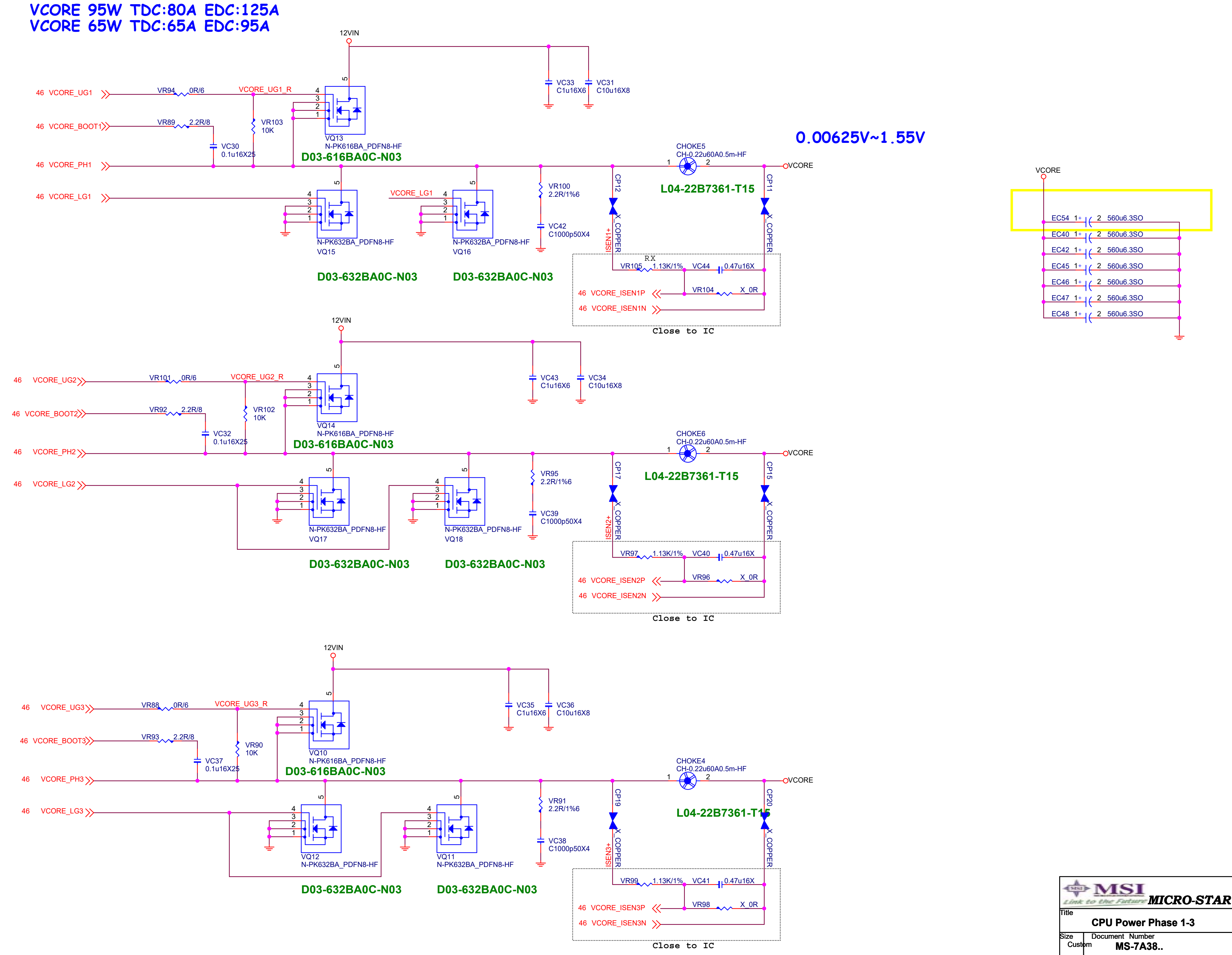


SET1 control ICCMAX,OCP setting
SET2 control Internal compensation

VCORE IccMAX: 125A =>OCP=>140A
VCC_NB IccMAX: 75A =>OCP=> 95A

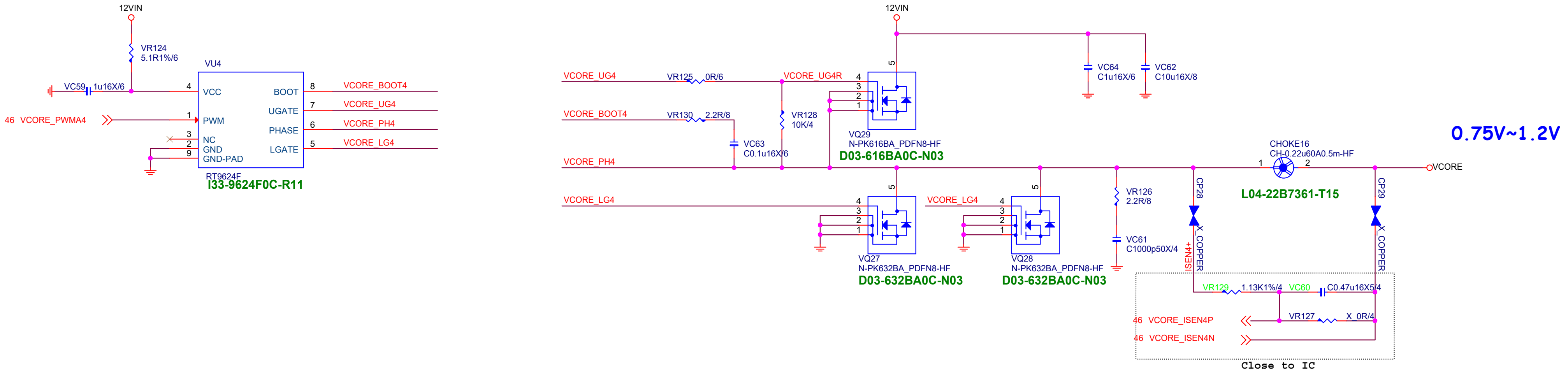
MICRO-START INT'L CO.,LTD.

Title	CPU Power RT8894 4+2 Phase	
Size Custom	Document Number MS-7A38..	Rev 8.0
Date: Tuesday, April 16, 2019	Sheet 46 of 60	



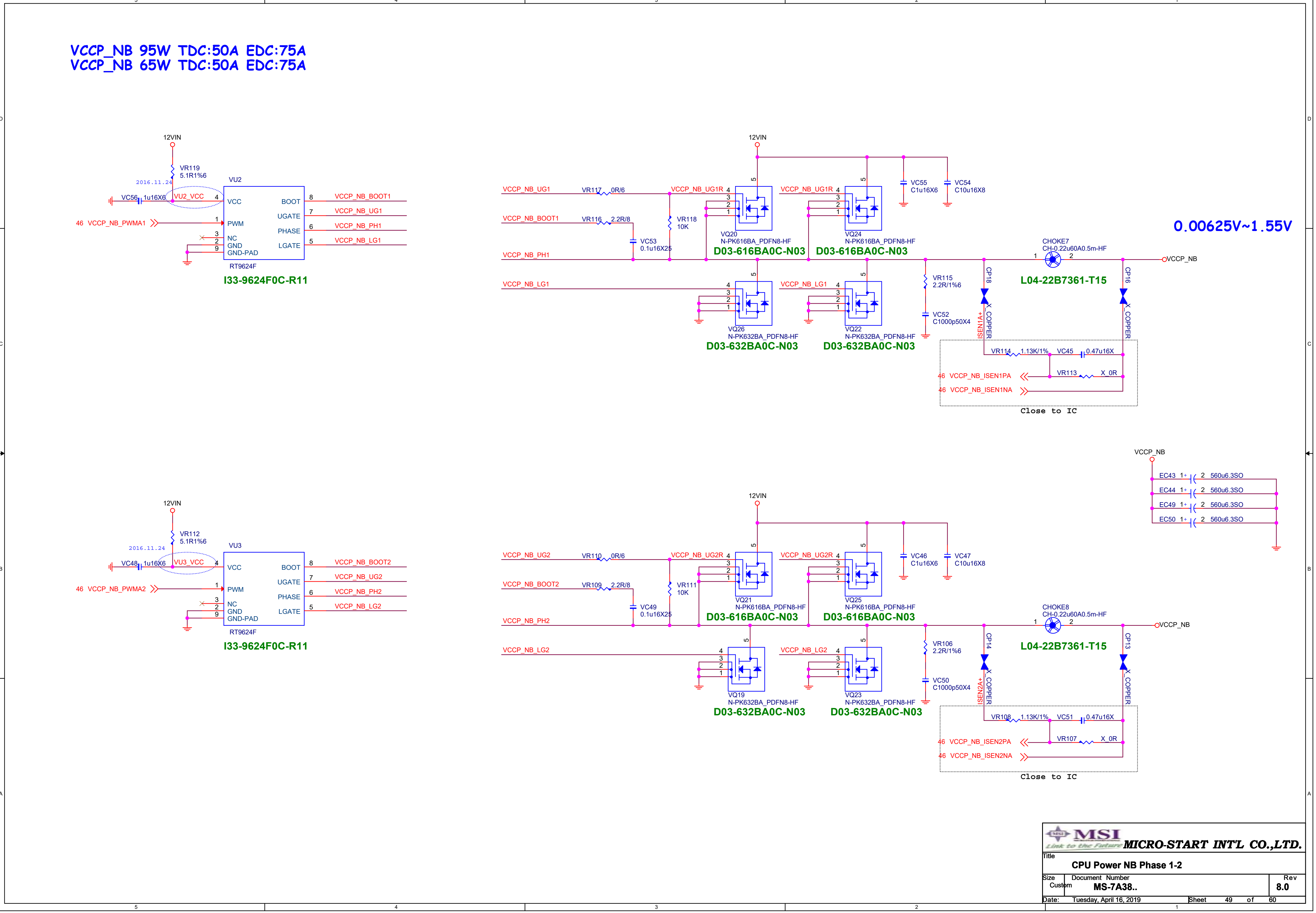
MSI MICRO-START INT'L CO.,LTD.

Title	CPU Power Phase 1-3	
Size: Custom	Document Number: MS-7A38..	Rev: 8.0
Date: Tuesday, April 16, 2019	Sheet 47 of 60	



MICRO-START INT'L CO.,LTD.

Title	CPU Power Phase 3-4	
Size: Custom	Document Number: MS-7A38..	Rev: 8.0
Date: Tuesday, April 16, 2019	Sheet 48 of 60	



VCCP_NB 95W TDC:50A EDC:75A
VCCP_NB 65W TDC:50A EDC:75A
0.00625V~1.55V
12VIN
VR119 5.1R1%6
2016.11.24
VU2
VC56 1u16X6
VU2_VCC
VCC
BOOT
UGATE
PWM
PHASE
NC
GND
GND-PAD
LGATE
RT9624F
I33-9624F0C-R11
46 VCCP_NB_PWMA1
VCCP_NB_BOOT1
VCCP_NB_UG1
VCCP_NB_PH1
VCCP_NB_LG1
VR117 0R/6
VCCP_NB_UG1R
VR116 2.2R/8
VR118 10K
VC53 0.1u16X25
VQ20 N-PK616BA_PDFN8-HF
D03-616BA0C-N03
VQ24 N-PK616BA_PDFN8-HF
D03-616BA0C-N03
VC55 C1u16X6
VC54 C10u16X8
VQ26 N-PK632BA_PDFN8-HF
D03-632BA0C-N03
VQ22 N-PK632BA_PDFN8-HF
D03-632BA0C-N03
VR115 2.2R/1%6
VC52 C1000p50X4
CHOKE7 CH-0.22u60A0.5m-HF
L04-22B7361-T15
VCCP_NB
CP18
CP16
X_COPPER
ISEN1A+
VR114 1.13K/1%
VC45 0.47u16X
VR113 X_0R
46 VCCP_NB_ISEN1PA
46 VCCP_NB_ISEN1NA
Close to IC
EC43 560u6.3SO
EC44 560u6.3SO
EC49 560u6.3SO
EC50 560u6.3SO
VR112 5.1R1%6
VU3
VC48 1u16X6
VU3_VCC
46 VCCP_NB_PWMA2
VCCP_NB_BOOT2
VCCP_NB_UG2
VCCP_NB_PH2
VCCP_NB_LG2
VR110 0R/6
VCCP_NB_UG2R
VR109 2.2R/8
VR111 10K
VC49 0.1u16X25
VQ21 N-PK616BA_PDFN8-HF
D03-616BA0C-N03
VQ25 N-PK616BA_PDFN8-HF
D03-616BA0C-N03
VC46 C1u16X6
VC47 C10u16X8
VQ19 N-PK632BA_PDFN8-HF
D03-632BA0C-N03
VQ23 N-PK632BA_PDFN8-HF
D03-632BA0C-N03
VR106 2.2R/1%6
VC50 C1000p50X4
CHOKE8 CH-0.22u60A0.5m-HF
L04-22B7361-T15
CP14
CP13
ISEN2A+
VR108 1.13K/1%
VC51 0.47u16X
VR107 X_0R
46 VCCP_NB_ISEN2PA
46 VCCP_NB_ISEN2NA
Close to IC
MSI MICRO-START INT'L CO.,LTD.
Title
CPU Power NB Phase 1-2
Size Custom
Document Number MS-7A38..
Rev 8.0
Date: Tuesday, April 16, 2019
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FOR VCCP_SOC_s5 0.9A

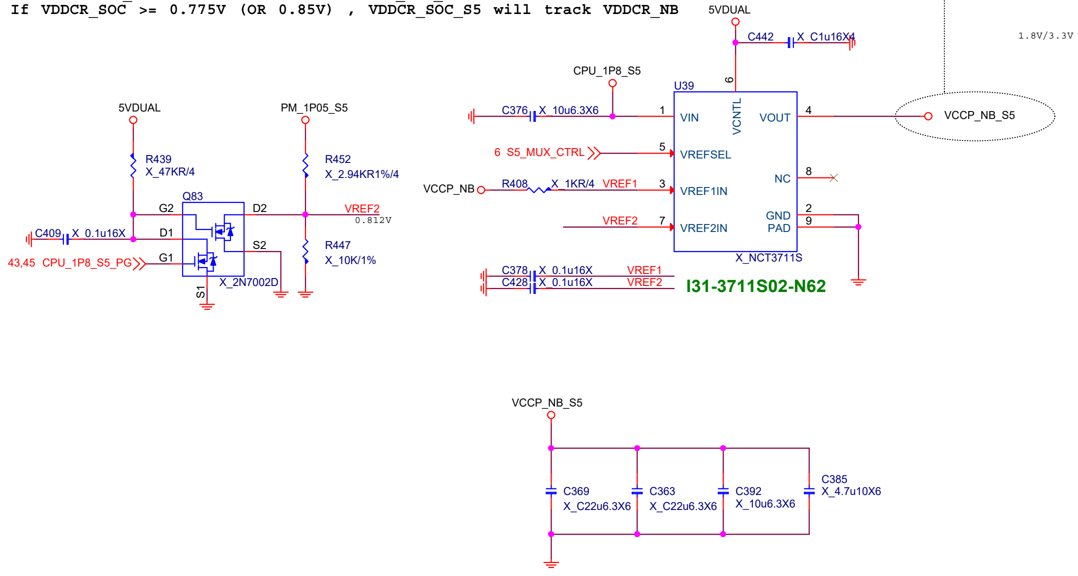
Do not Support Bristal, Remove VCCP_NB_S5.

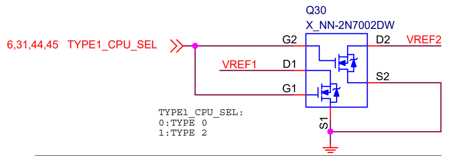
TYPE0 Only

S5_MUX_CTRL
HIGH:S0
LOW: S3/S5

H: +VDDCR_FCH_ALW will track VDDNB
L: If VDDCR_SOC<0.775V (OR 0.85V),VDDCR_SOC_S5 =0.775V.
If VDDCR_SOC >= 0.775V (OR 0.85V) , VDDCR_SOC_S5 will track VDDCR_NB

(VDDCR_SOC_S5 is only used for AMD Family 15h Models 60h-6Fh processors)Bristol Ridge TYPE0





CPU	TYPE	TYPE1_CPU_SEL	TYPE0_CPU_SEL
BR	0	0	1
NA		0	0
SR	2	1	1
RV/ZP	3	1	0

CPU VCCP_NB_S5 ONLY SUPPORT TYPE0

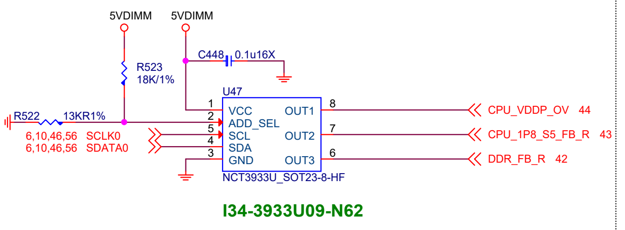
Over Voltage Control IC

UPI VOLTAGE CONSOLE

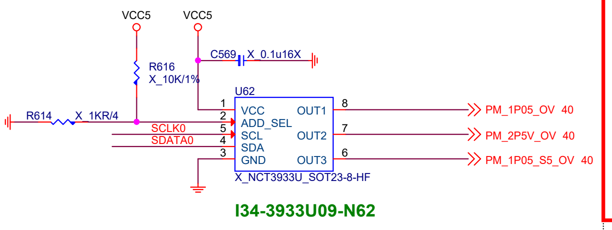
ADDRESS	0x2A	0X28	0x26	0x24	0x22	0x20
RH (KOhm)	OPEN	3.9	3	2.2	1.3	10
RL (KOhm)	10	1.3	2.3	3	3.9	OPEN
BUS_SEL	0%	25%	40%	60%	75%	100%

除非超壓功能有任何幫助，否則不上NCT3933與開超壓選項

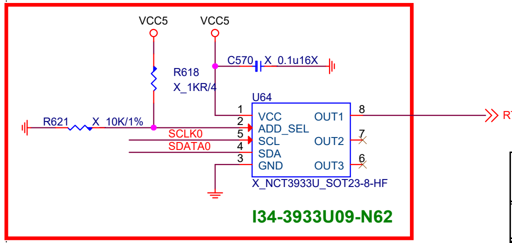
0x26:RH=18K,RL=13K



0x20:RH=10K,RL=OPEN



0x2A:RH=OPEN,RL=10K

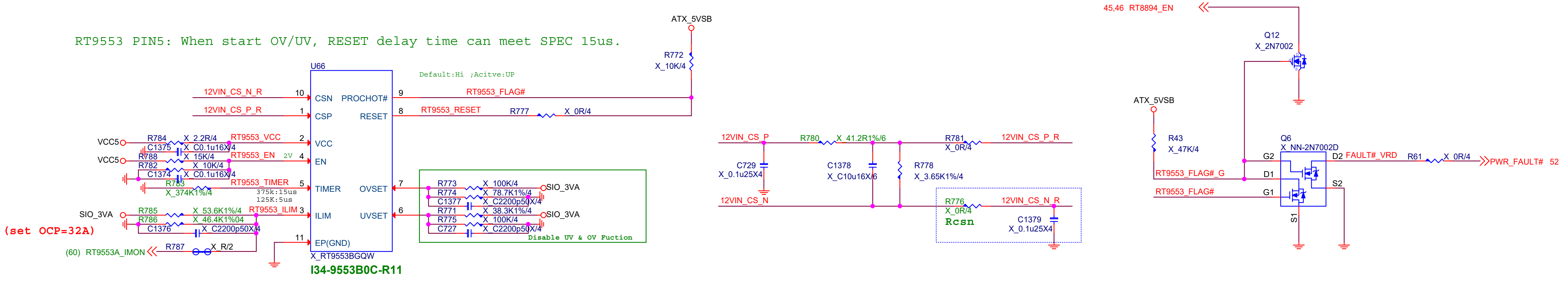


RT9553 CURRENT SENSE

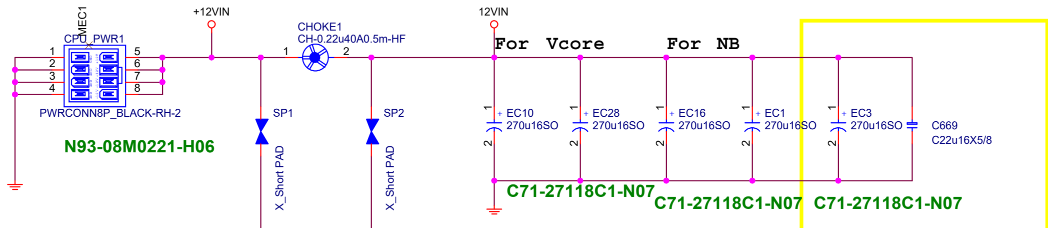
VCORE EDC MAC 125A

NB EDC MAX75A

RT9553 PIN5: When start OV/UV, RESET delay time can meet SPEC 15us.



CPU POWER CONNECTOR



TDC: Irms = Iout /N*SQRT{ND(1-ND)}

CORE:

D=Vout/Vin=1.5/12=0.125

N=Phase number=4

=80/4*SQRT{4*0.125*[1-4*0.125]}

=10A

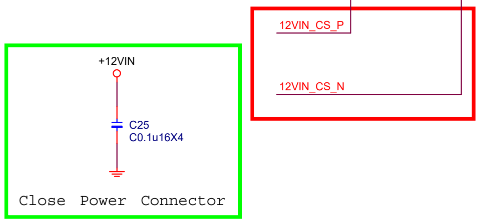
NB:

D=Vout/Vin=1.2/12=0.1

N=Phase number=2

=65A/2*SQRT(2*0.1*(1-2*0.1))

=13A



EDC: Irms = Iout /N*SQRT{ND(1-ND)}

CORE:

D=Vout/Vin=1.5/12=0.125

N=Phase number=4

=125/4*SQRT{4*0.125*[1-4*0.125]}

=15.625A

NB:

D=Vout/Vin=1.2/12=0.1

N=Phase number=2

=75A/2*SQRT(2*0.1*(1-2*0.1))

=15A

MSI Link to the Future MICRO-START INT'L CO.,LTD.

Title: UP6273 CURRENT SENSE

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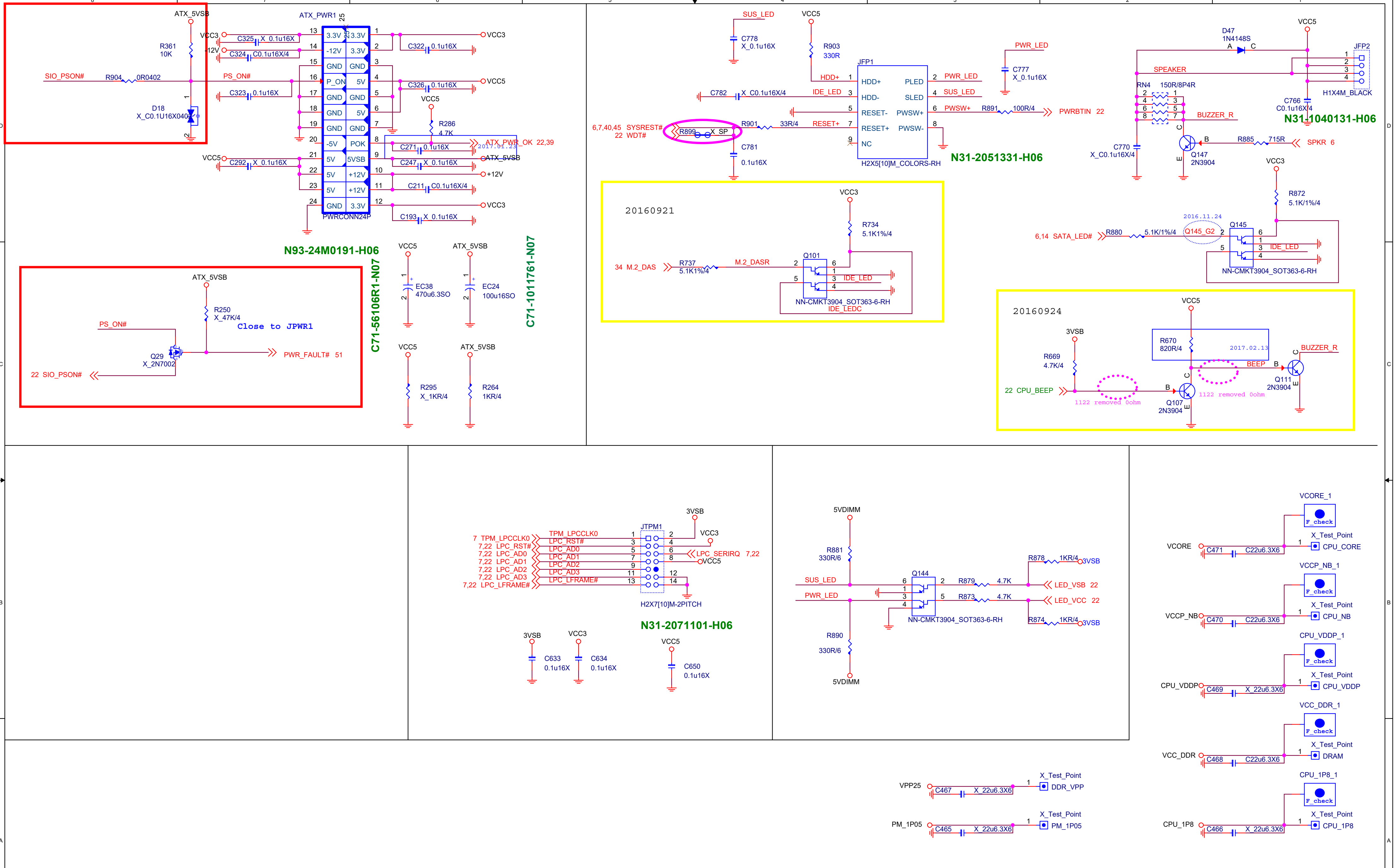

MSI MICRO-START INT'L CO.,LTD.

Title: ATX/Front Panel

Size	Document Number	Rev
Custom	MS-7A38..	8.0

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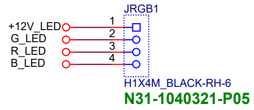
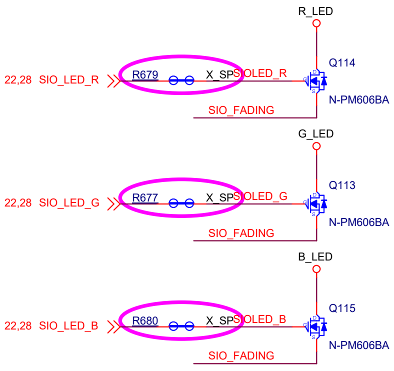
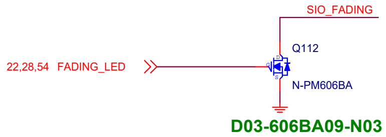
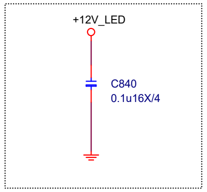
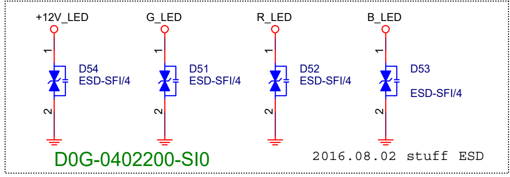






2016.08.02 Add +12V_LED 0.1uF





2016.08.02 stuff ESD

FCH LED Place under Heat-sink

2016.11.25

LED
紅 : D0C-040S600-E07
白 : D0C-040S300-E07

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

Title	ALL LED	
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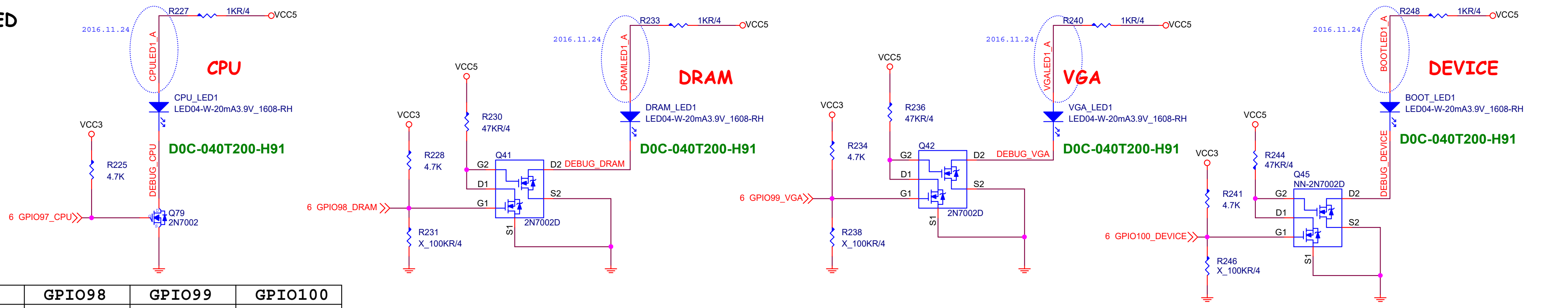
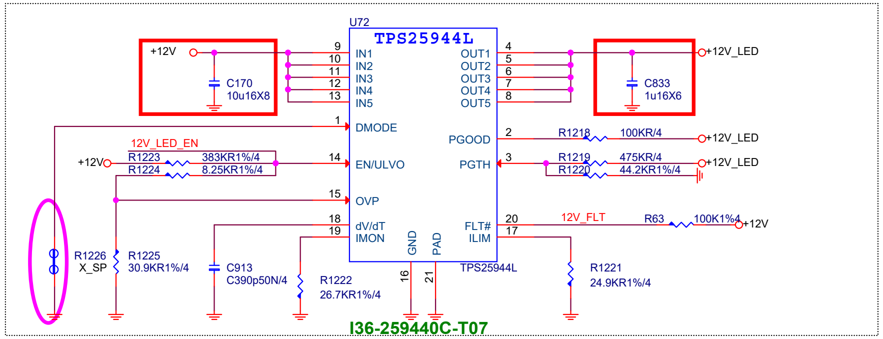
EZ Debug LED



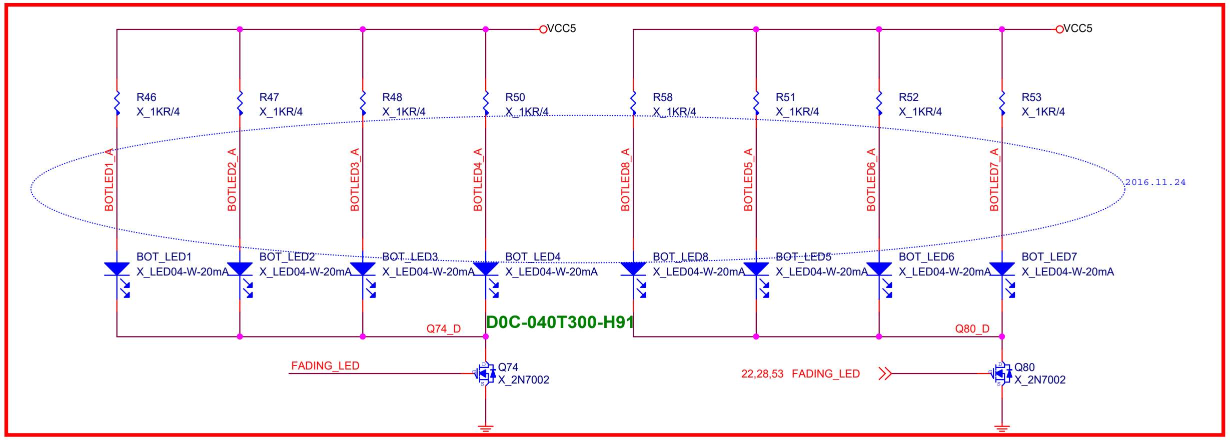
GPIO / LED	GPIO97	GPIO98	GPIO99	GPIO100
亮	GPI PULL HIGH	GPO PO LOW	GPO PO LOW	GPO PO LOW
滅	GPO LOW	GPO HIGH (default HIGH)	GPO HIGH (default HIGH)	GPO HIGH (default HIGH)

LED Control by SIO

2016.07.06 Use TPS25944L

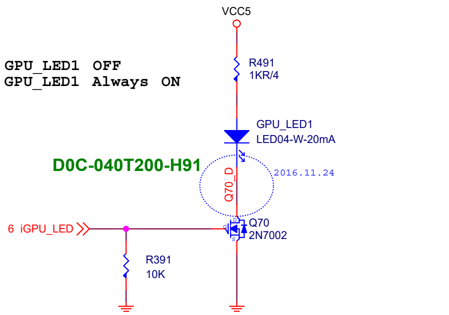


Bottom LED



AM4 APU Detect LED Circuit

iGPU GPU_LED1 OFF
dGPU GPU_LED1 Always ON



MICRO-START INT'L CO.,LTD.

Title: ALL LED Control

Size: Custom | Document Number: MS-7A38.. | Rev: 8.0

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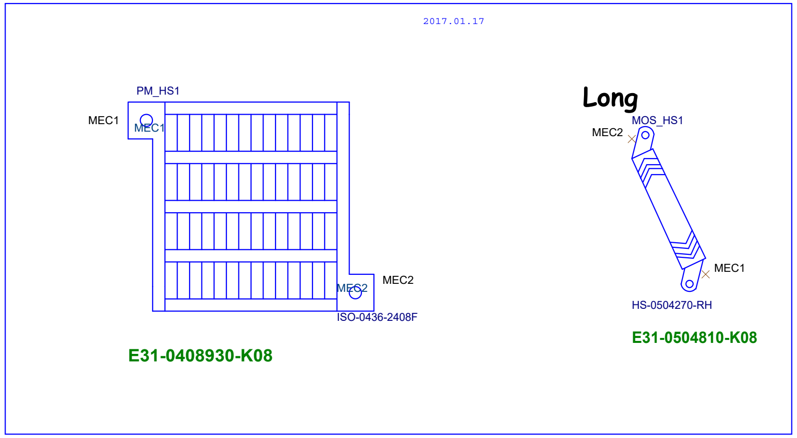
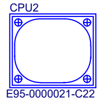
HEAT SINK



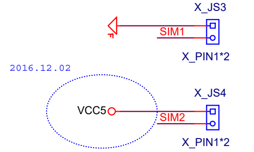
CPU Socket



RETENTION MODULE

E95-0000022-C22

Simulation



VCC_DDR VCC_DDR

MANUAL PART

UEFI1
G51-M1SPXXA-A09
G51-M1SPXXA-A09

MKT1
G51-M1SPP10-Q13
G51-M1SPP25-Q13

cFosSoftware
X_Y02-MU00170-CFO
Y02-MU00170-CFO

BAT1_X1
BAT-CR2032-RH
D06-0100101-P01

諾祥雅

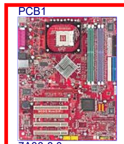
HDMI_LA1
Label
HDMI
HDMI LABEL
Y01-RHDMI03-000

NAH_LA1
Label
HDMI
NAHIMIC LABEL
Y02-MU00100-NAH

XSPLIT_LA1
Label
HDMI
X_SPLIT LABEL
Y02-MA00401-XSP

SSE_LA1
Label
HDMI
X_SSE LABEL
Y02-MA00101-SSE

PCB1

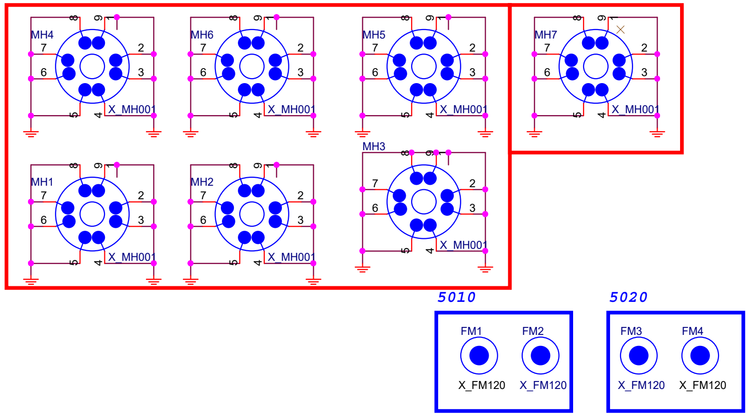


7A38-8.0

REF1
OPT
X_FCH

REF2
OPT
X_MKT

Optics Orientation Holes



FM5 X_FM120
FM6 X_FM120
FM8 X_FM120
FM7 X_FM120

OPT	Configure	BOM	Function
		601-7A38-A01	XXXX

MSI Link to the Future **MICRO-START INT'L CO.,LTD.**

Title: **BOM Option**

Size: Custom | Document Number: **MS-7A38..** | Rev: **8.0**

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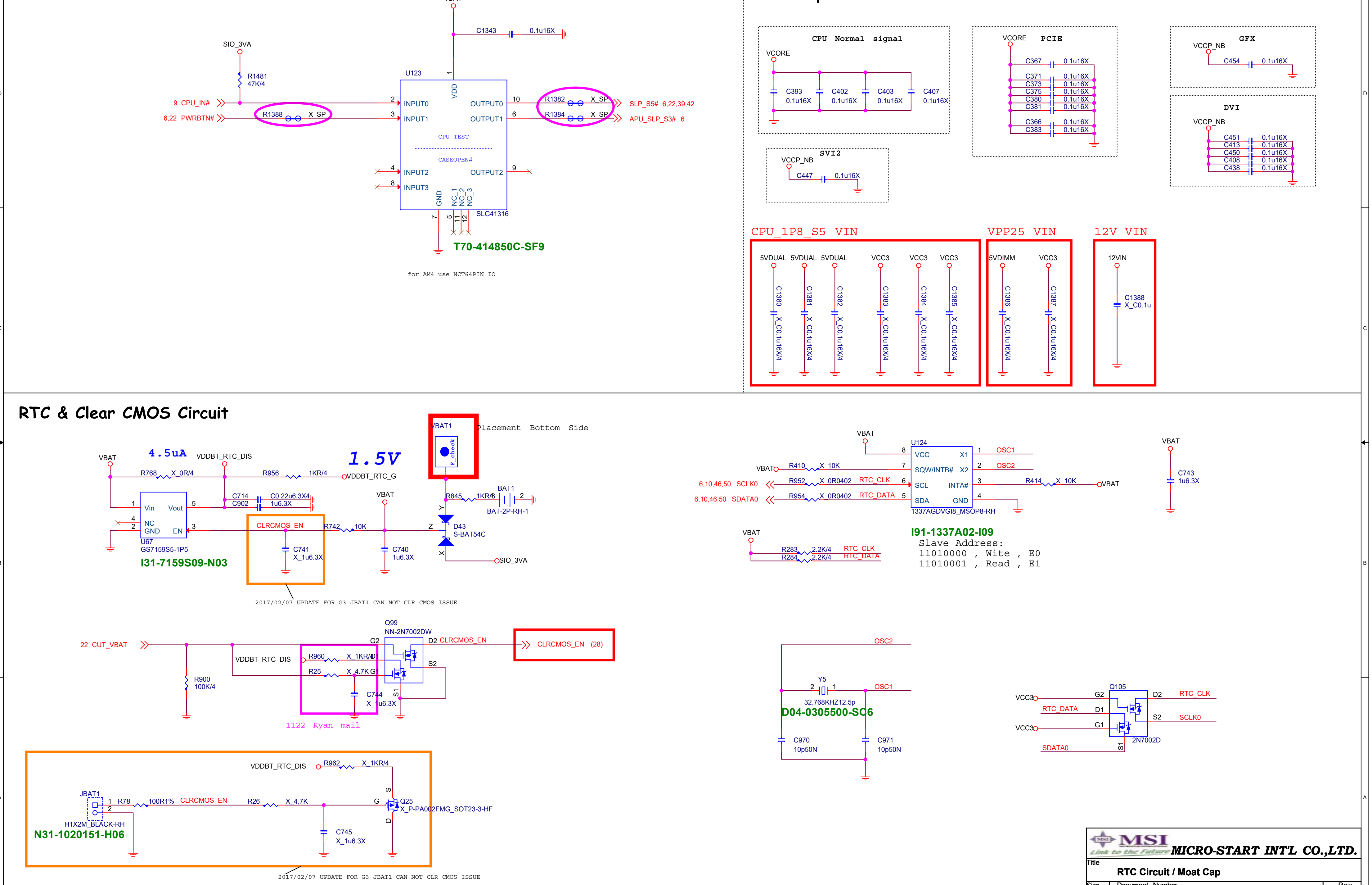
Moat Cap



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

Title: RTC Circuit / Moat Cap

Size	Document Number	Rev
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