MS-7B84 Ver:22

CPU:
AMD AM4

System Chipset:
Promontory A320 & B450
(Value DIY or System Builder)

Main Memory:
DDR IV * 2 MAX:32 GB

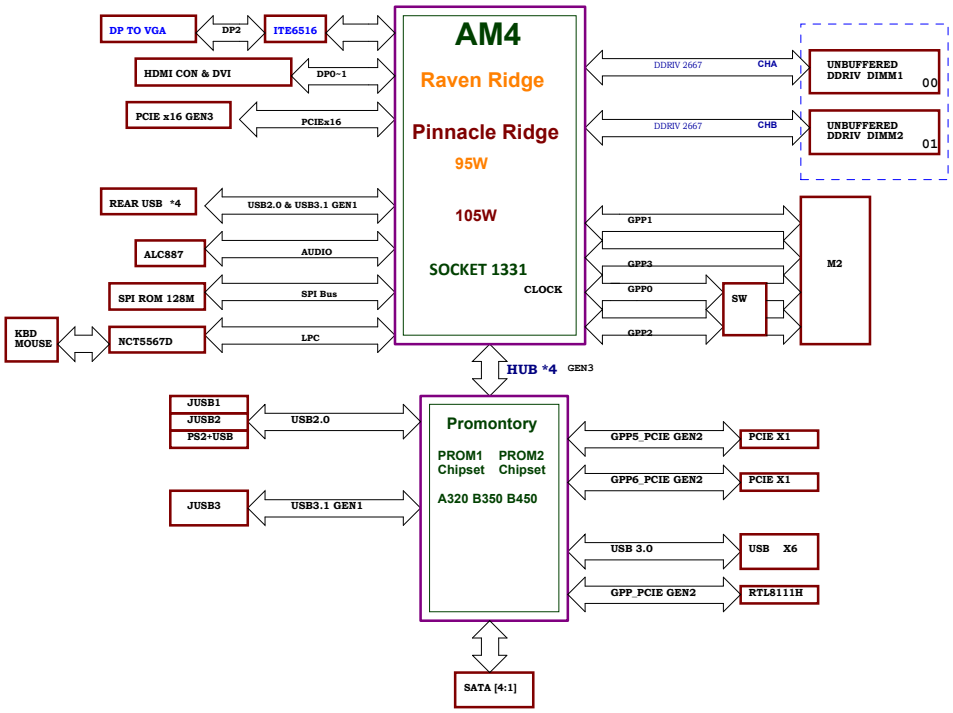
VRM
UP9505 4+2

On Board Chipset:
LPC Super I/O --NCT5567
LAN RTL8111H
Azalia CODEC - Realtek ALC887

Expansion Slots:
From CPU
PCI Express X16 Slot * 1
PCI Express X1 Slot * 1
PCI Express X1 Slot * 1
M2_2 * 1

OCP IC:
RT9553B-Reserve

FUSION BLOCK DIAGRAM



MICRO-STAR INTL CO.,LTD.

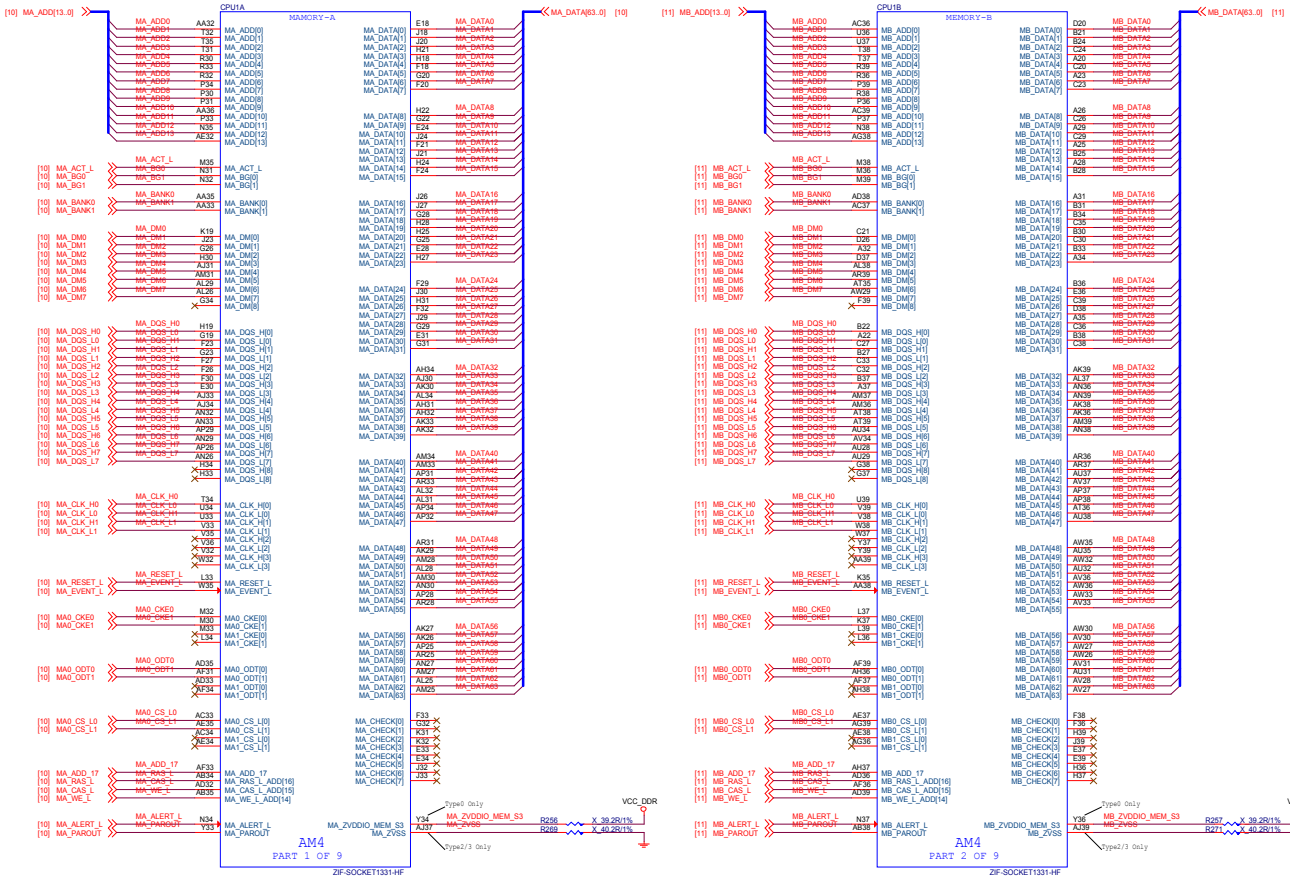
Title: Block Diagram		
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 1 of 53	

AMD AM4

01 Block Diagram	37 CPU Power VDDP-MP8712
02 Cover Sheet	38 CPU Power Connector/PWRGD
03 FM4 DDR4 I/F	39 CPU Power RT9505 4+2 Phase
04 AM4 PCIE/SATAE	40/41 CPU Power Phase 1-4
05 AM4 Display/Audio	42 CPU Power NB Phase 1-2
06 AM4 SVI/ACPI/GPIO	43 CPU Power NB Switch/NCT3933
07 AM4 LPC/SPI/USB/CLK/STRAP	44 RT9553B CURRENT SENSE
08 AM4 Power/RTC Power/ 09 AM4 GND	45 ATX/Front Panel
10,11 DDR4-DIMM CH-A/B	46 ALL LED Control
12,13 DDR4-POWER/GND	47 BOM Option
14 Promontory-PCIE/SATA/SATAE	48 RTC Circuit/Moat Cap
15 Promontory-USB/OC	49 M2_2
16 Promontory-CLK/ACPI/GPIO	50 History
17 Promontory-Power / 18 Promontory-GND	51 Power Sequence
19 PCIE X16(X1*2) SLOT	52 Power Delivery
20 SIO NCT5567D	53 GPIO MAP
21 DVI Connector	
22 CPU/SYS FAN Control TYPE K	
23 / 24 / 25 LAN-RTL8111H/Audio ALC887	
26 USB Rear PS2+USB2.0	
27 USB Rear LAN+USB3.1 GEN1	
28 USB Front Side	
29 SATA Connector	
30 HDMI Connector	
31 DP to VGA RTD2166	
32 ACPI uPI-5VDIMM&3VSB	
33 PM-SY8288RAC-1.05V/GS7133-2.5V	
34 DDR PWR VPP25/VTT-MP2147	
35 DDR Power-RT8231AGQW	
36 CPU Power 1P8V-MP2147	

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

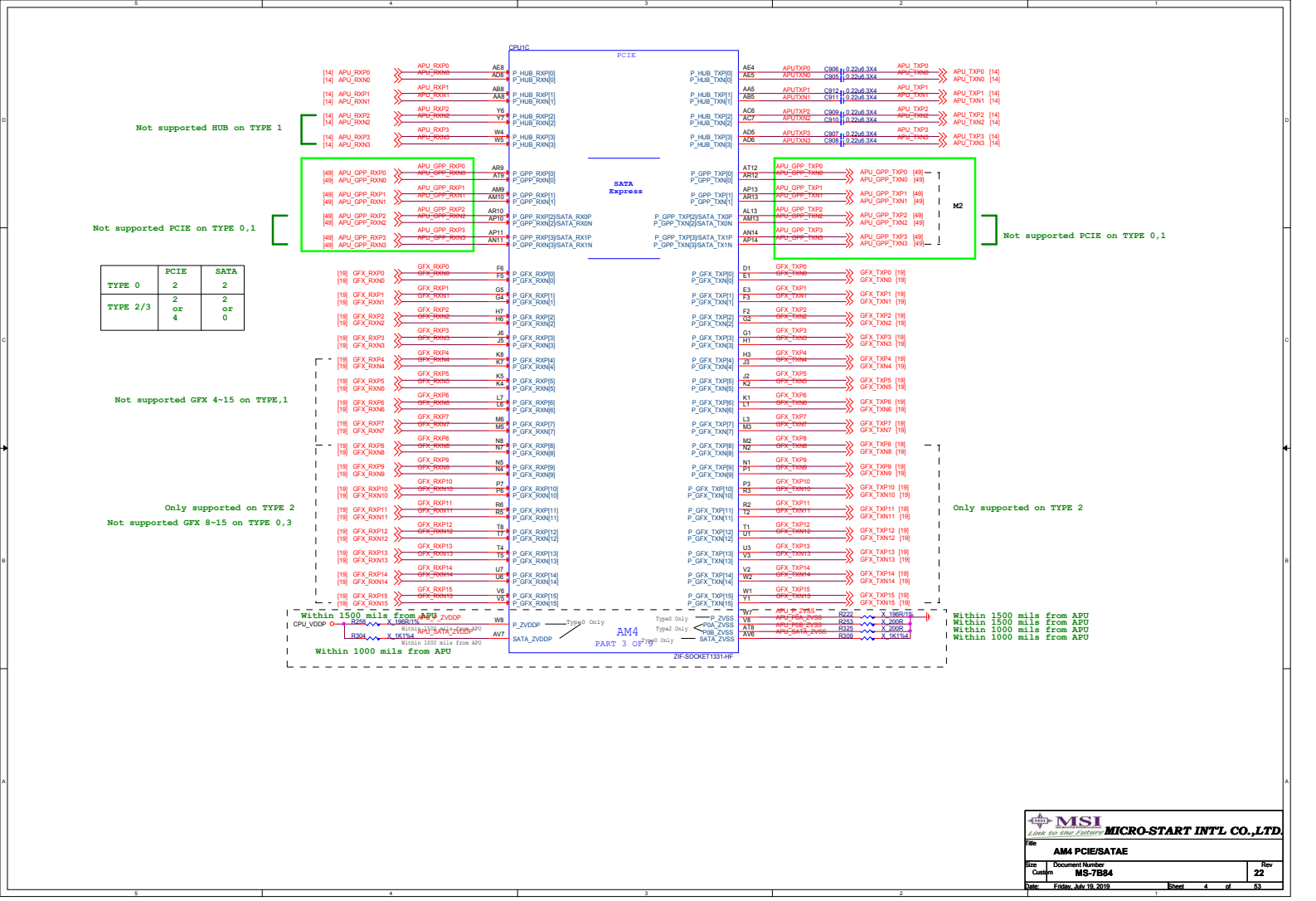
Title: COVER SHEET		
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 2 of 53	



Schematic Cfg	Project	
	V	A

MSI Computer Corp. — Link to the Future — MICRO-START INTL CO.,LTD.

Title	AM4 DDR4 I/F	
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 3 of 53	



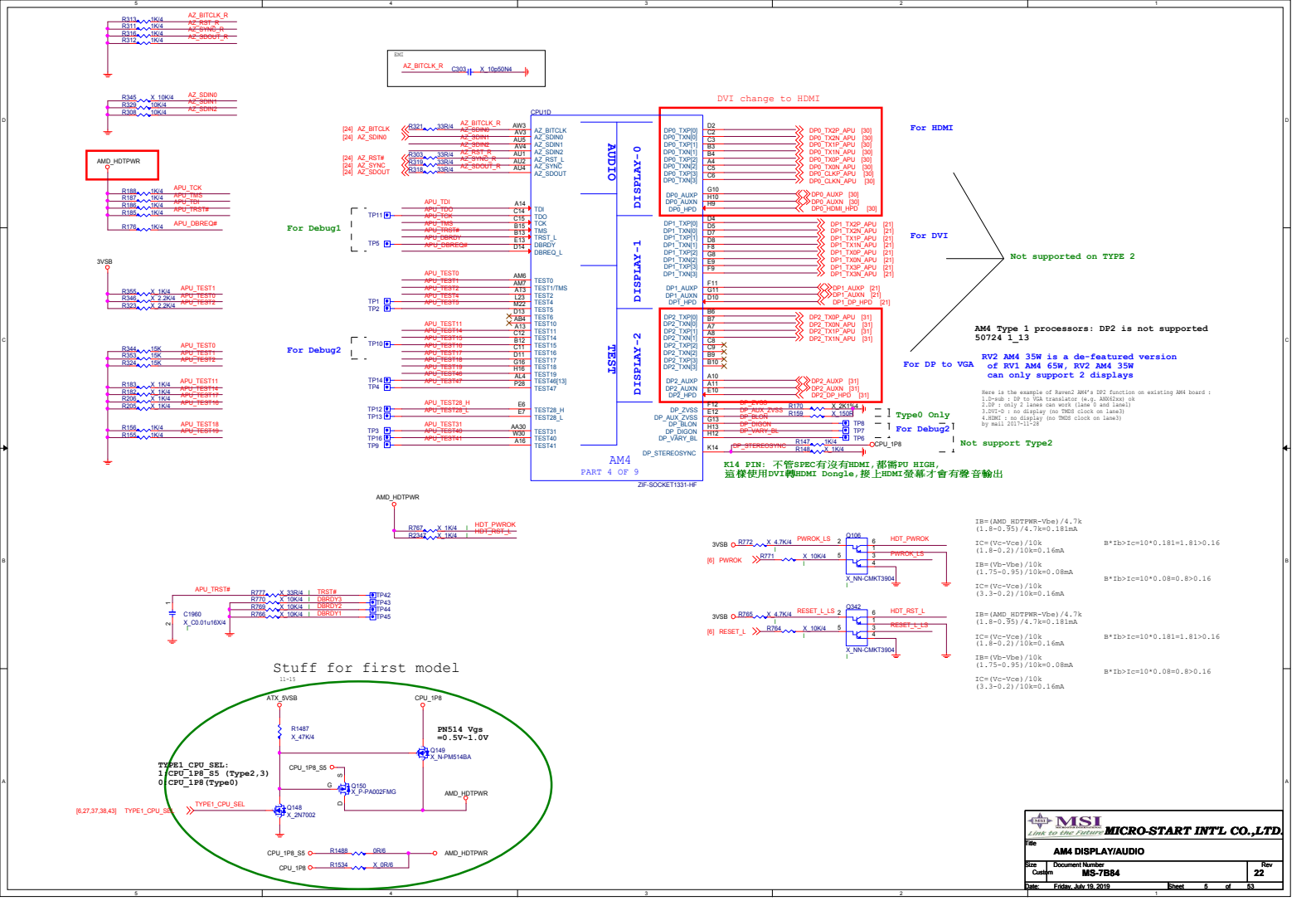
	PCIE	SATA
TYPE 0	2	2
TYPE 2/3	2 or 4	2 or 0

MICRO-START INTL CO.,LTD.

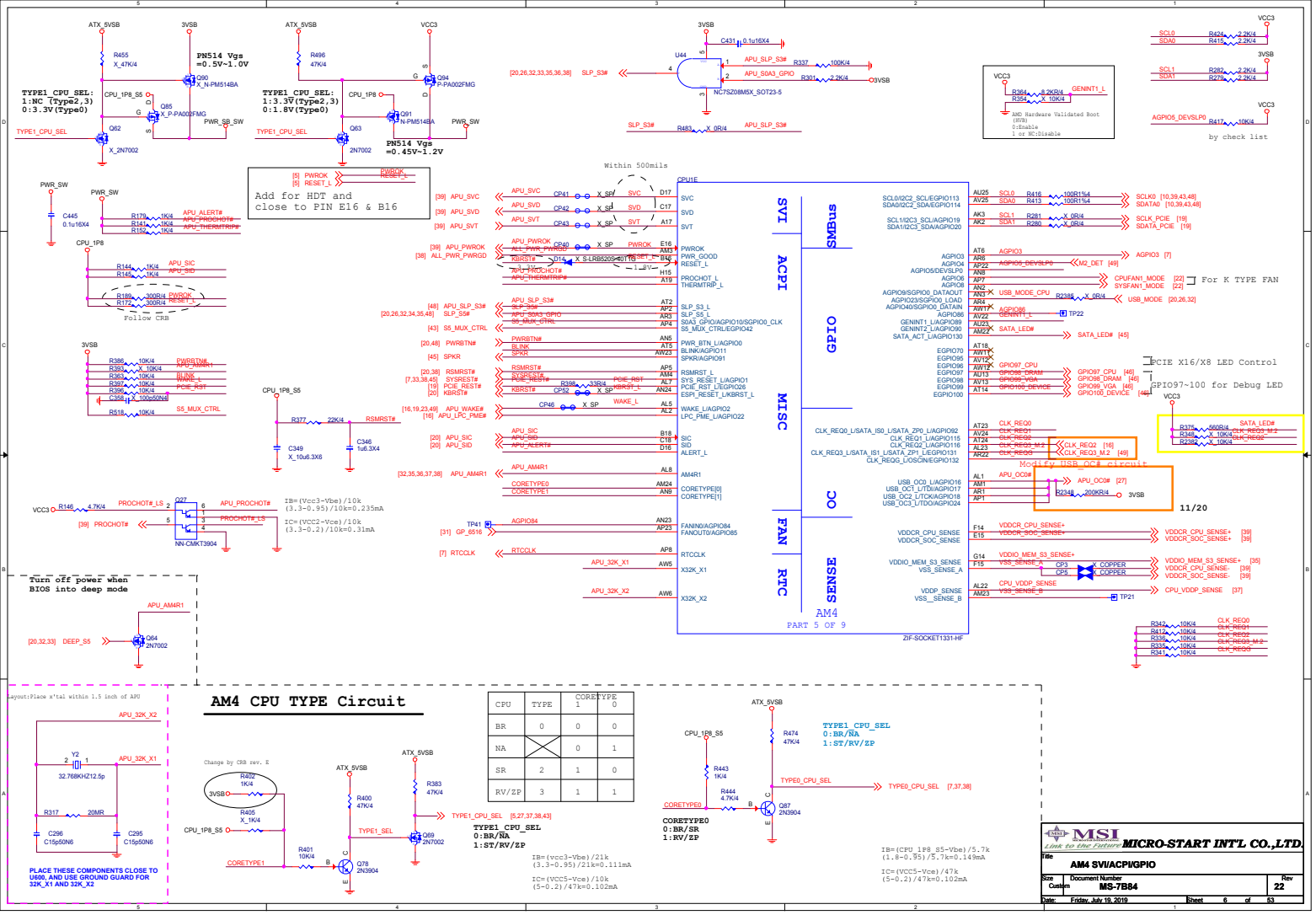
Title: AM4 PCIE/SATAE

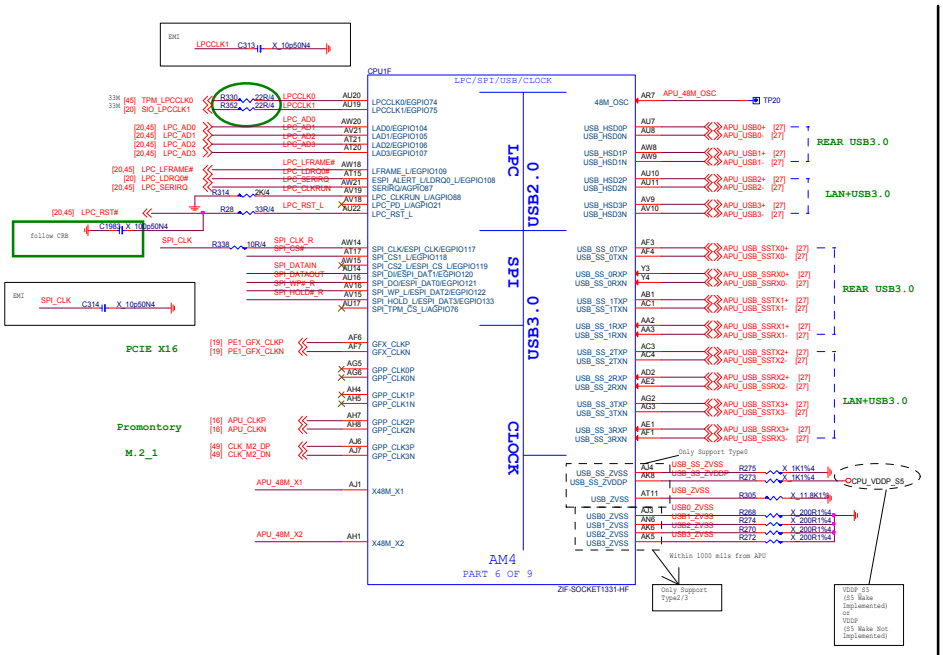
Size: Custom | Document Number: MS-7B84 | Rev: 22

Date: Friday, July 19, 2019 | Sheet 4 of 53

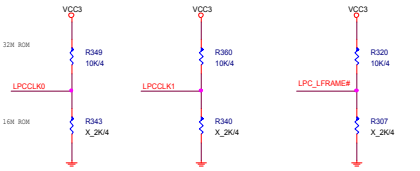


MSI / MICRO-START INTL CO.,LTD.			
Title: AM4 DISPLAY/AUDIO			
Size: Custom	Document Number: MS-7B84		Rev: 22
Date: Friday, July 19, 2019	Sheet 5 of 53		

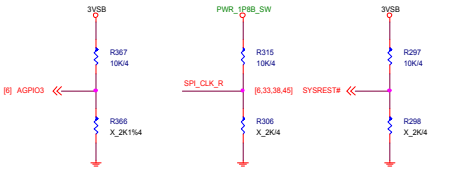

TYPE1_CPU_SEL:
1:NC (Type2,3)
0:3.3V(Type0)
PN514 Vgs
=0.5V~1.0V
TYPE1_CPU_SEL:
1:3.3V(Type2,3)
0:1.8V(Type0)
PN514 Vgs
=0.45V~1.2V
Add for HDT and
close to PIN E16 & B16
Within 500mils
CPU1E
SVC
SVD
SVT
PWROK
PWR_GOOD
RESET_L
PROCHOT_L
THERMTRIP_L
SLP_S3_L
SLP_S5_L
S0A3_GPIO/AGPIO10/SGPIO0_CLK
S5_MUX_CTRL/EGPIO42
PWR_BTN_L/AGPIO0
BLINK/AGPIO11
SPKR/AGPIO91
RSMRST_L
SYS_RESET_L/AGPIO1
PCIE_RST_L/EGPIO26
ESPI_RESET_L/KBRST_L
WAKE_L/AGPIO2
LPC_PME_L/AGPIO22
SIC
SID
ALERT_L
AM4MR1
CORETYPE[0]
CORETYPE[1]
FANIN0/AGPIO84
FANOUT0/AGPIO85
RTCCLK
X32K_X1
X32K_X2
SVI
ACPI
GPIO
MISC
OC
FAN
RTC
SMBus
SENSE
AM4
PART 5 OF 9
ZIF-SOCKET1331-HF
Follow CRB
Turn off power when
BIOS into deep mode
AM4 CPU TYPE Circuit
CPU | TYPE | CORETYPE 1 | CORETYPE 0
BR | 0 | 0 | 0
NA | X | 0 | 1
SR | 2 | 1 | 0
RV/ZP | 3 | 1 | 1
TYPE1_CPU_SEL
0:BR/NA
1:ST/RV/ZP
CORETYPE0
0:BR/SR
1:RV/ZP
PLACE THESE COMPONENTS CLOSE TO U600, AND USE GROUND GUARD FOR 32K_X1 AND 32K_X2
Layout:Place x'tal within 1.5 inch of APU
32.768KHZ12.5p
Change by CRB rev. E
IB=(Vcc3-Vbe)/10k (3.3-0.95)/10k=0.235mA
IC=(VCC2-Vce)/10k (3.3-0.2)/10K=0.31mA
IB=(vcc3-Vbe)/21k (3.3-0.95)/21k=0.111mA
IC=(VCC5-Vce)/10k (5-0.2)/47k=0.102mA
IB=(CPU_1P8_S5-Vbe)/5.7k (1.8-0.95)/5.7k=0.149mA
IC=(VCC5-Vce)/47k (5-0.2)/47k=0.102mA
Modify USB_OC# circuit
11/20
For K TYPE FAN
PCIE X16/X8 LED Control
GPIO97~100 for Debug LED
by check list
MICRO-START INTL CO.,LTD.
AM4 SVI/ACPI/GPIO
MS-7B84
Friday, July 19, 2019



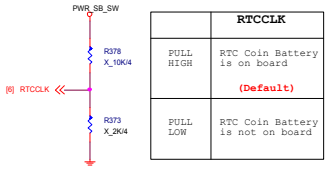
Strapping Options



	LPCCLK0	LPCCLK1	SIO_LFRAME
PULL HIGH	LPC device Boot Fail Timer Enabled (Default)	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

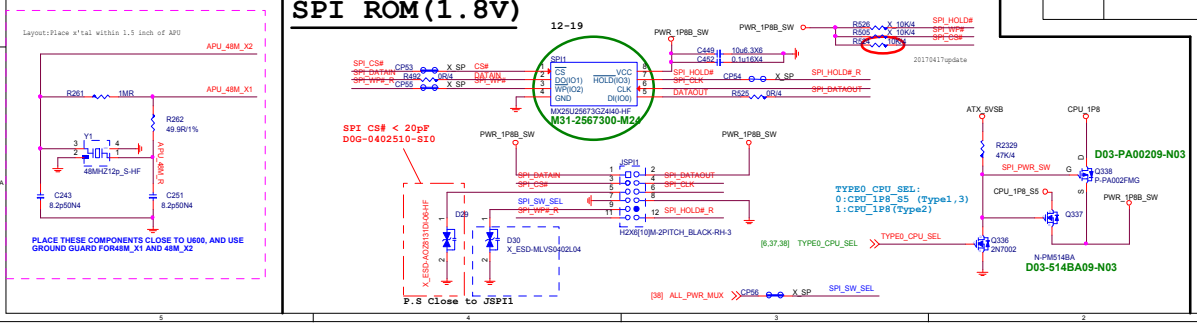


	AGPIO3	SPI_CLK	SYSREST#
PULL HIGH	Enhanced Reset logic (Default)	Use 48Mhz crystal clock and generate both internal and external clocks (Default)	Normal reset mode (Default)
PULL LOW	Traditional Reset logic	Use 100Mhz PCIE clock as reference clock and generate internal clocks only	short reset mode



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

SPI ROM(1.8V)



	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

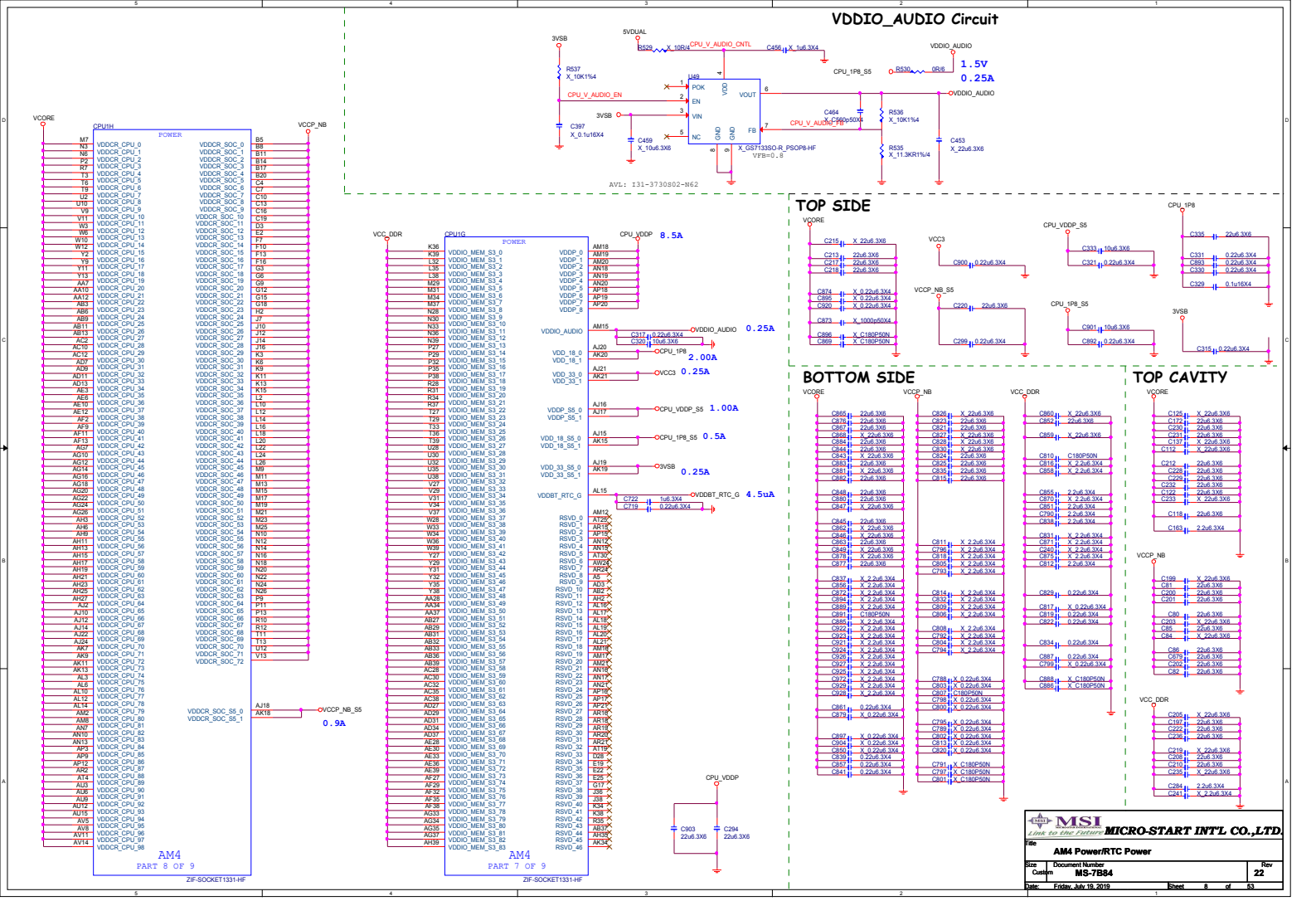
	RTCCLK
PULL HIGH	RTC Coin Battery is on board (Default)
PULL LOW	RTC Coin Battery is not on board

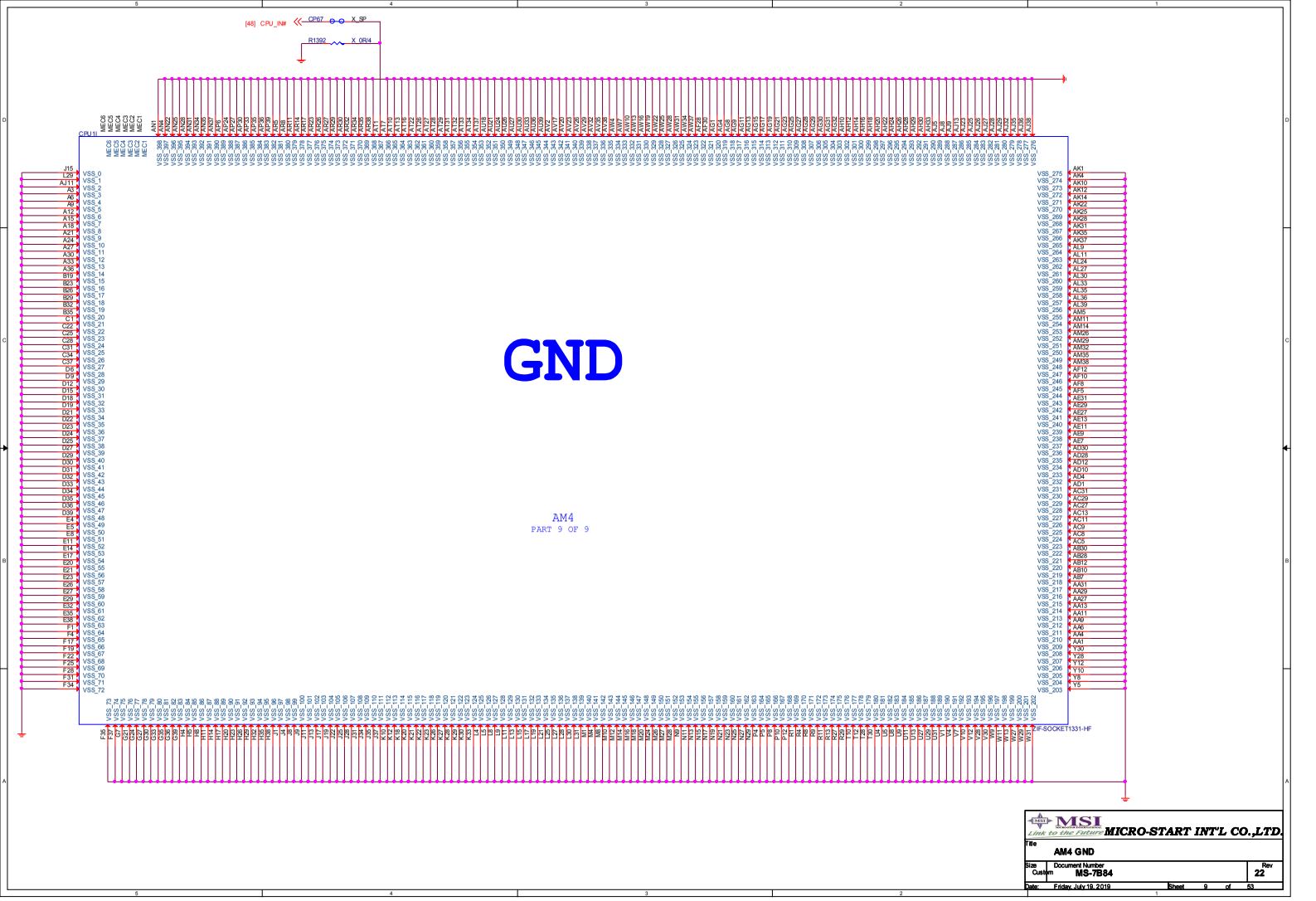
MICRO-START INTL CO.,LTD.

Title: AM4 LPC/SPI/USB/CLK/STRAP

Size	Document Number	Rev
Custom	MS-7B84	22

Date: Friday, July 19, 2019 Sheet 7 of 53


VDDIO_AUDIO Circuit
3VSB
5VDUAL
R529 X_10R/4
CPU_V_AUDIO_ONTL
C456 X_1u6.3X4
R537 X_10K1%4
CPU_V_AUDIO_EN
U49
POK
EN
VIN
NC
VDD
VOUT
GND
FB
C397 X_0.1u16X4
C459 X_10u6.3X6
X_GS7133SO-R_PSOP8-HF
VFB=0.8
CPU_1P8_S5
R530 0R/6
VDDIO_AUDIO
1.5V
0.25A
C464 X_C560p50X4
CPU_V_AUDIO_FB
R536 X_10K1%4
R535 X_11.3KR1%4
C453 X_22u6.3X6
AVL: I31-3730S02-N62
VCORE
CPU1H
POWER
VCCP_NB
AM4
PART 8 OF 9
ZIF-SOCKET1331-HF
VCC_DDR
CPU1G
CPU_VDDP
8.5A
AM4
PART 7 OF 9
ZIF-SOCKET1331-HF
C317 0.22u6.3X4
C320 10u6.3X6
VDDIO_AUDIO
0.25A
CPU_1P8
2.00A
VCC3
0.25A
CPU_VDDP_S5
1.00A
CPU_1P8_S5
0.5A
3VSB
0.25A
C722 1u6.3X4
C719 0.22u6.3X4
VDDBT_RTC_G
4.5uA
VCCP_NB_S5
0.9A
C903 22u6.3X6
C294 22u6.3X6
TOP SIDE
VCORE
C215 X_22u6.3X6
C213 22u6.3X6
C217 22u6.3X6
C218 22u6.3X6
C874 X_0.22u6.3X4
C895 X_0.22u6.3X4
C920 X_0.22u6.3X4
C873 X_1000p50X4
C896 X_C180P50N
C869 X_C180P50N
VCC3
C900 0.22u6.3X4
VCCP_NB_S5
C220 22u6.3X6
C299 0.22u6.3X4
CPU_VDDP_S5
C333 10u6.3X6
C321 0.22u6.3X4
CPU_1P8_S5
C901 10u6.3X6
C892 0.22u6.3X4
CPU_1P8
C335 22u6.3X6
C331 0.22u6.3X4
C893 0.22u6.3X4
C330 0.22u6.3X4
C329 0.1u16X4
3VSB
C315 0.22u6.3X4
BOTTOM SIDE
VCORE
C865 22u6.3X6
C876 22u6.3X6
C867 22u6.3X6
C868 X_22u6.3X6
C894 22u6.3X6
C844 22u6.3X6
C843 X_22u6.3X6
C883 22u6.3X6
C881 X_22u6.3X6
C882 22u6.3X6
C848 22u6.3X6
C880 22u6.3X6
C847 X_22u6.3X6
C845 22u6.3X6
C862 X_22u6.3X6
C846 X_22u6.3X6
C863 22u6.3X6
C849 X_22u6.3X6
C878 X_22u6.3X6
C877 22u6.3X6
C837 X_2.2u6.3X4
C858 X_2.2u6.3X4
C872 X_2.2u6.3X4
C894 X_2.2u6.3X4
C889 X_2.2u6.3X4
C891 C180P50N
C885 X_2.2u6.3X4
C922 X_2.2u6.3X4
C923 X_2.2u6.3X4
C921 X_2.2u6.3X4
C924 X_2.2u6.3X4
C926 X_2.2u6.3X4
C927 X_2.2u6.3X4
C925 X_2.2u6.3X4
C972 X_2.2u6.3X4
C929 X_2.2u6.3X4
C928 X_2.2u6.3X4
C861 0.22u6.3X4
C879 X_0.22u6.3X4
C897 X_0.22u6.3X4
C904 X_0.22u6.3X4
C850 X_0.22u6.3X4
C839 0.22u6.3X4
C857 0.22u6.3X4
C841 0.22u6.3X4
VCCP_NB
C826 X_22u6.3X6
C823 22u6.3X6
C821 22u6.3X6
C827 X_22u6.3X6
C828 X_22u6.3X6
C830 X_22u6.3X6
C824 22u6.3X6
C825 22u6.3X6
C835 22u6.3X6
C815 22u6.3X6
C811 X_2.2u6.3X4
C796 X_2.2u6.3X4
C818 X_2.2u6.3X4
C805 X_2.2u6.3X4
C793 X_2.2u6.3X4
C814 X_2.2u6.3X4
C832 X_2.2u6.3X4
C809 X_2.2u6.3X4
C806 X_2.2u6.3X4
C808 X_2.2u6.3X4
C792 X_2.2u6.3X4
C804 X_2.2u6.3X4
C795 X_2.2u6.3X4
C788 X_0.22u6.3X4
C803 X_0.22u6.3X4
C807 C180P50N
C798 X_0.22u6.3X4
C800 X_0.22u6.3X4
C795 X_0.22u6.3X4
C789 X_0.22u6.3X4
C802 X_0.22u6.3X4
C813 X_0.22u6.3X4
C820 X_0.22u6.3X4
C791 X_C180P50N
C797 X_C180P50N
C801 X_C180P50N
VCC_DDR
C860 X_22u6.3X6
C852 22u6.3X6
C859 X_22u6.3X6
C810 C180P50N
C816 X_2.2u6.3X4
C858 X_2.2u6.3X4
C855 2.2u6.3X4
C870 X_2.2u6.3X4
C851 2.2u6.3X4
C790 2.2u6.3X4
C838 2.2u6.3X4
C831 X_2.2u6.3X4
C871 X_2.2u6.3X4
C240 X_2.2u6.3X4
C875 X_2.2u6.3X4
C812 2.2u6.3X4
C829 0.22u6.3X4
C817 X_0.22u6.3X4
C819 0.22u6.3X4
C822 0.22u6.3X4
C834 0.22u6.3X4
C887 0.22u6.3X4
C799 X_0.22u6.3X4
C888 X_C180P50N
C886 X_C180P50N
TOP CAVITY
VCORE
C125 X_22u6.3X6
C172 22u6.3X6
C230 22u6.3X6
C231 22u6.3X6
C137 X_22u6.3X6
C112 X_22u6.3X6
C212 22u6.3X6
C228 22u6.3X6
C229 22u6.3X6
C232 22u6.3X6
C122 22u6.3X6
C233 X_22u6.3X6
C118 22u6.3X6
C163 2.2u6.3X4
VCCP_NB
C199 X_22u6.3X6
C81 22u6.3X6
C200 22u6.3X6
C201 22u6.3X6
C80 22u6.3X6
C203 X_22u6.3X6
C85 22u6.3X6
C84 X_22u6.3X6
C86 22u6.3X6
C679 22u6.3X6
C202 22u6.3X6
C82 22u6.3X6
VCC_DDR
C205 X_22u6.3X6
C197 22u6.3X6
C222 22u6.3X6
C236 22u6.3X6
C219 X_22u6.3X6
C208 22u6.3X6
C210 22u6.3X6
C235 X_22u6.3X6
C284 2.2u6.3X4
C241 X_2.2u6.3X4
MICRO-START INTL CO.,LTD.
Title
AM4 Power/RTC Power
Size
Custom
Document Number
MS-7B84
Rev
22
Date:
Friday, July 19, 2019
Sheet
8
of
53

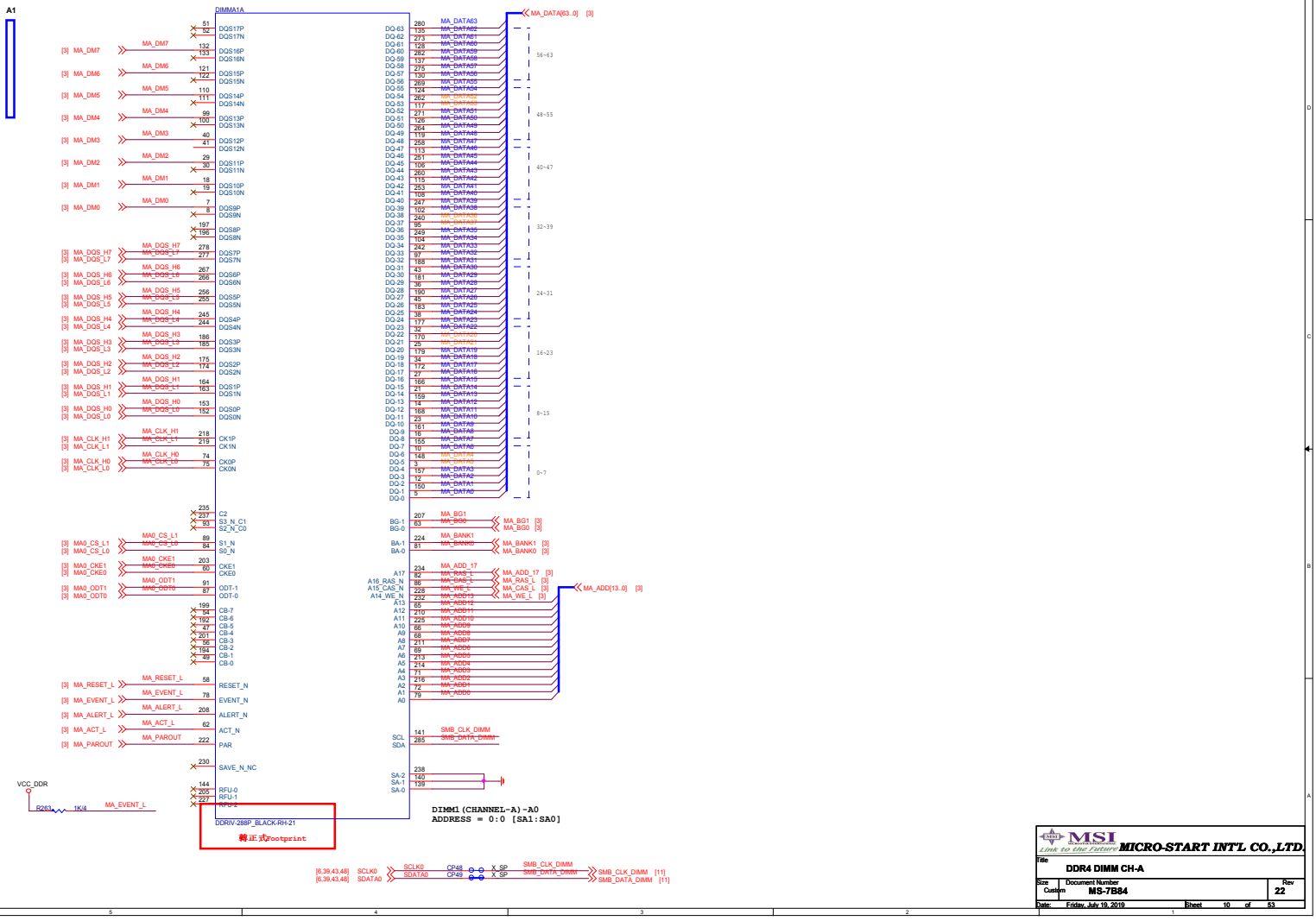


MICRO-STAR INT'L CO.,LTD.

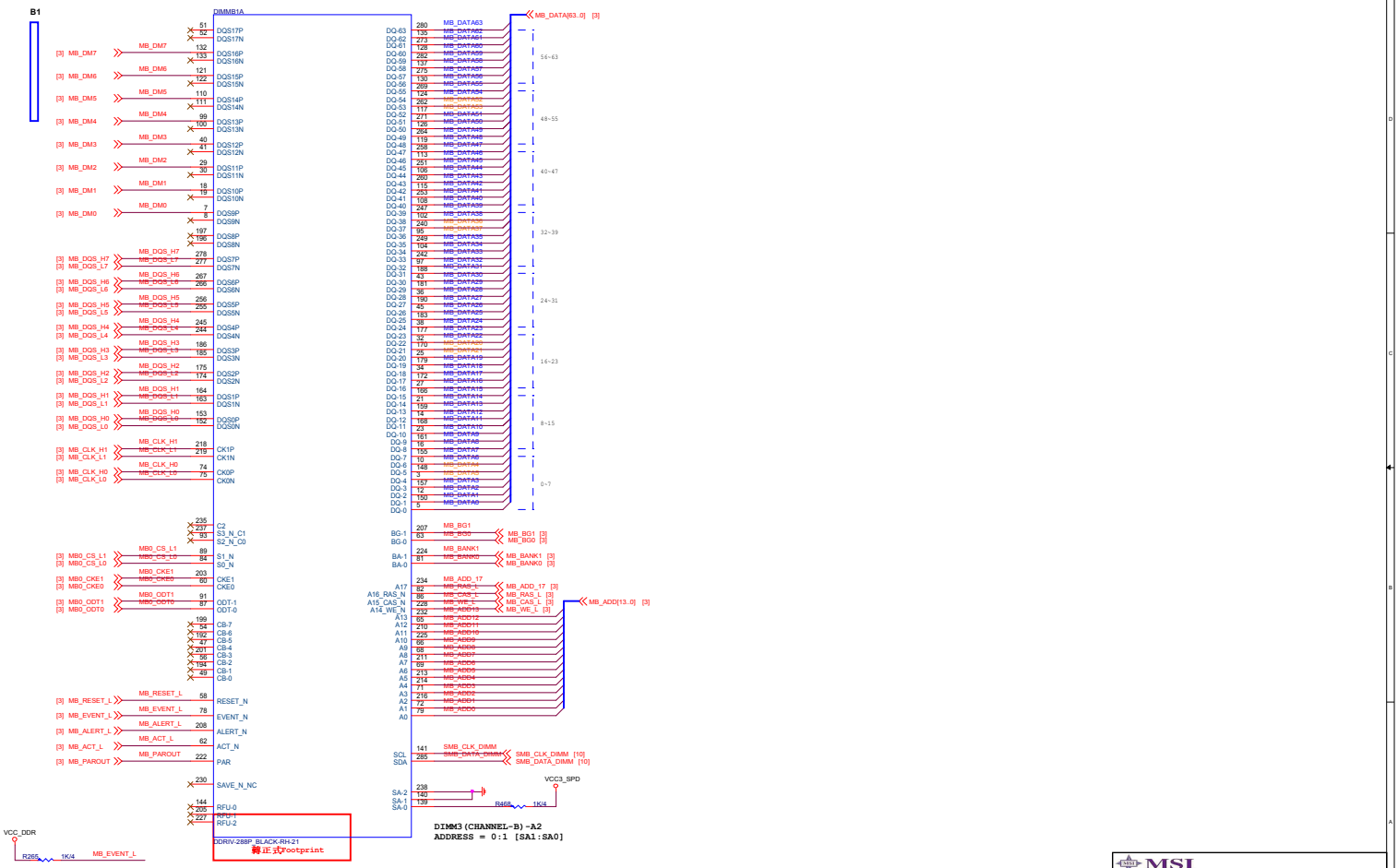
Title: AM4 GND

Size: Custom | Document Number: MS-7B84 | Rev: 22

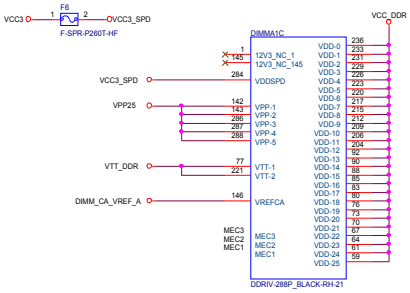
Date: Friday, July 19, 2019 | Sheet 9 of 53



MSI	MICRO-START INTL CO.,LTD.	
Title	DDR4 DIMM CH-A	
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 10 of 53	



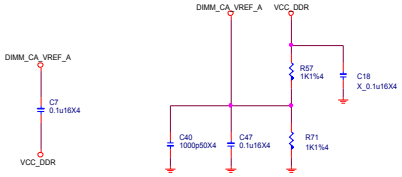
MICRO-START INT'L CO.,LTD.	
Title	DDR4 DIMM CH-B
Size: Custom	Document Number: MS-7B84
Rev	22
Date: Friday, July 19, 2019	Sheet 11 of 53

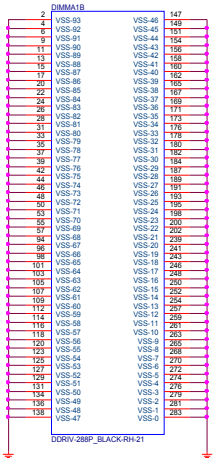


DIMM SLOT PN BY SPEC

DDR VREF

(place resistors close to DIMMs)



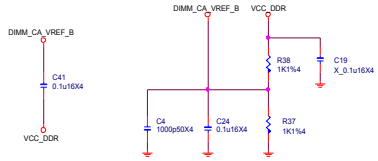


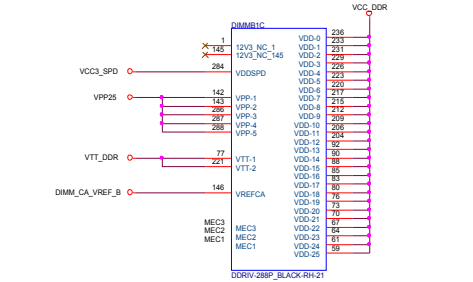
MSI Computer Corp. Link to the Future **MICRO-START INTL CO.,LTD.**

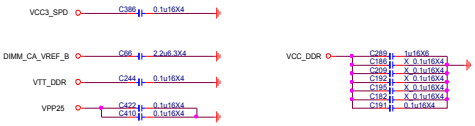
Title	DDR4-POWER/GND-1	
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 12 of 53	

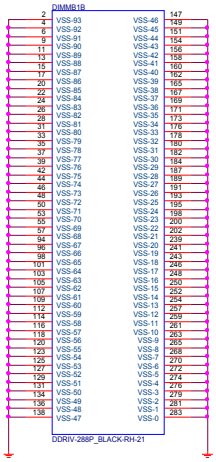
DDR VREF

(place resistors close to DIMMs)









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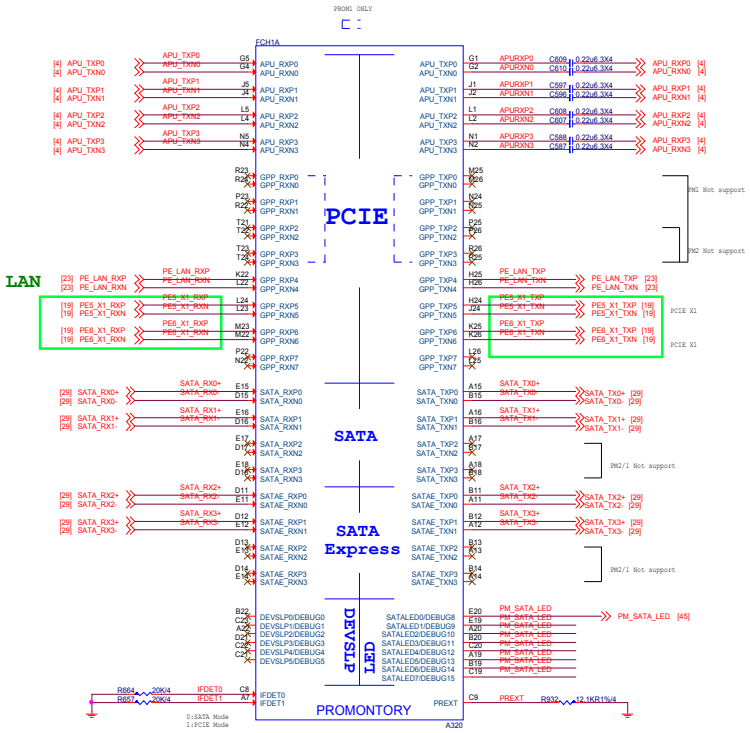
Title: DDR4-POWER/GND-2

Size: Custom | Document Number: MS-7B84 | Rev: 22

Date: Friday, July 19, 2019 | Sheet 13 of 53



SATA Express port0 (IFDET0)
SATA Express port1 (IFDET1)
0:SATA Mode
1:PCIE Mode

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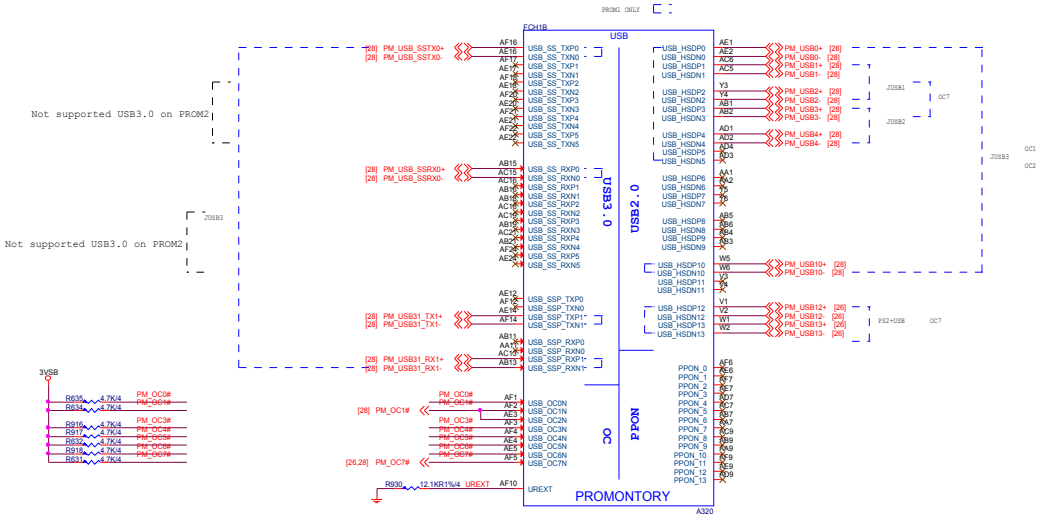
Title	Promontory-PCIE/SATA/SATAE	
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 14 of 53	



Appendix D USB Port to OC Pin Mapping

USB3.1	USB2.0	USB_OC
USB_SSP_TX/RXP/N[0]	USB_HSDP/N[5]	USB_OC0N
USB_SSP_TX/RXP/N[1]	USB_HSDP/N[0]	USB_OC1N
USB3.0	**USB2.0**	**USB_OC**
USB_SS_TX/RXP/N[0]	USB_HSDP/N[10]	USB_OC2N
USB_SS_TX/RXP/N[1]	USB_HSDP/N[11]	USB_OC3N
USB_SS_TX/RXP/N[2]	USB_HSDP/N[6]	USB_OC4N
USB_SS_TX/RXP/N[3]	USB_HSDP/N[7]	USB_OC5N
USB_SS_TX/RXP/N[4]	USB_HSDP/N[8]	USB_OC6N
USB_SS_TX/RXP/N[5]	USB_HSDP/N[9]	USB_OC7N
	USB_HSDP/N[1]	USB_OC7N
	USB_HSDP/N[2]	USB_OC7N
	USB_HSDP/N[3]	USB_OC7N
	USB_HSDP/N[4]	USB_OC7N
	USB_HSDP/N[12]	USB_OC7N
	USB_HSDP/N[13]	USB_OC7N

Appendix C Port Mapping for Different Bus Models

BUS Model	USB			
	3.1 Gen2 10 Gbps	3.1 Gen1 5 Gbps	2.0	Debug Port
PROM4	USB_SSP Port0~1	USB_SS Port 0~3	USB_HSD Port0~13	USB_SSP Port0
PROM2	USB_SSP Port0~1	USB_SS Port 0~1	USB_HSD Port0~5 USB_HSD Port10~13	USB_SSP Port0
PROM1	USB_SSP Port0	USB_SS Port0 USB_SSP Port1	USB_HSD Port0~5 USB_HSD Port10, 12~13	USB_SSP Port0

BUS Model	SATA 3.0	SATA Express	PCI Express® Gen2 GPP	PCI Express® CLK
PROM4	SATA port0~3	SATAE port0~3	GPP lane0~7	CLK0~7
PROM2	SATA port0~1	SATAE port0~1	GPP lane0~1 GPP lane4~7	CLK0~1 CLK4~7
PROM1	SATA port0~1	SATAE port0~1	GPP lane4~7	CLK4~7

CLK2,3不能用
CLK1-3不能用

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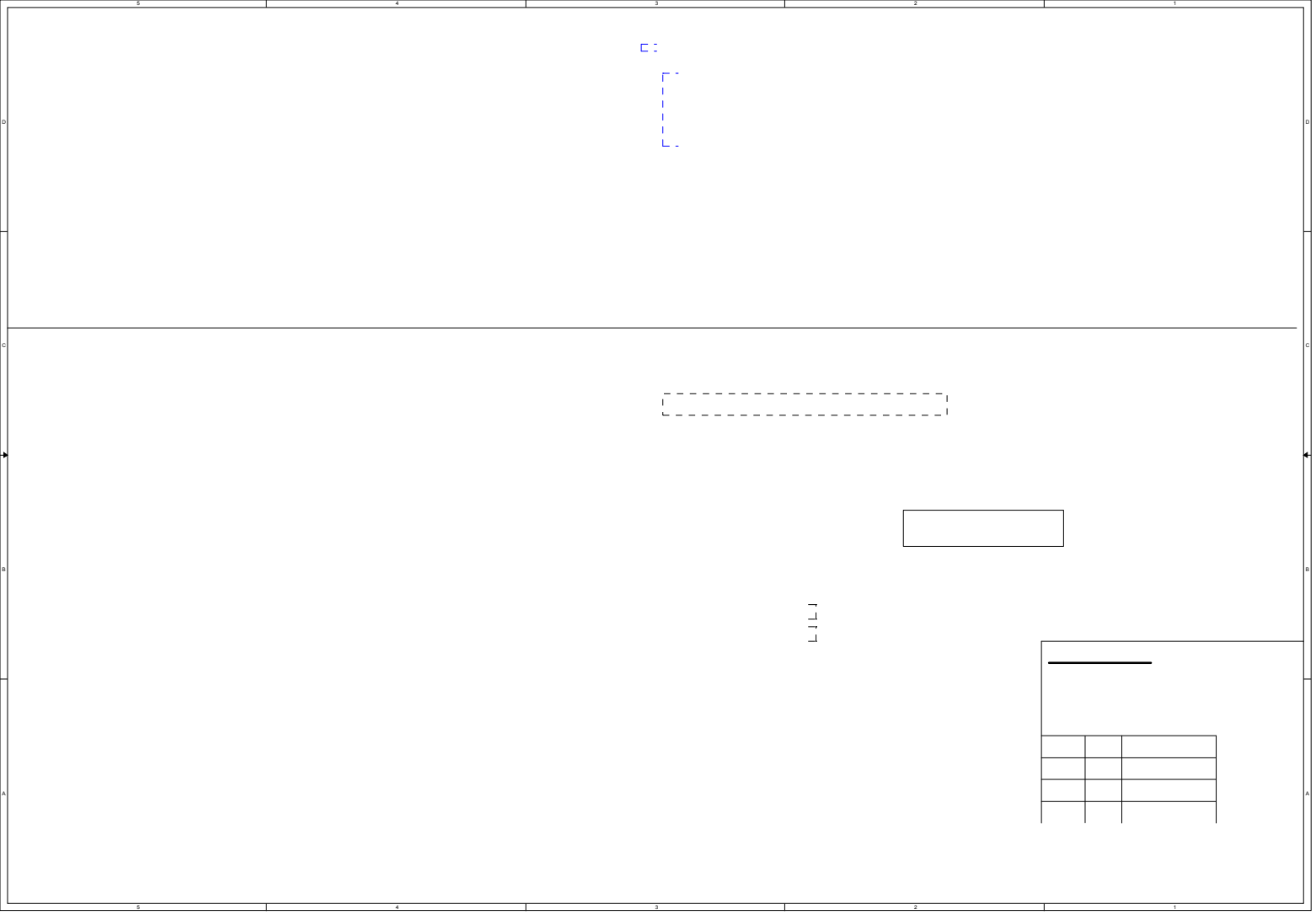
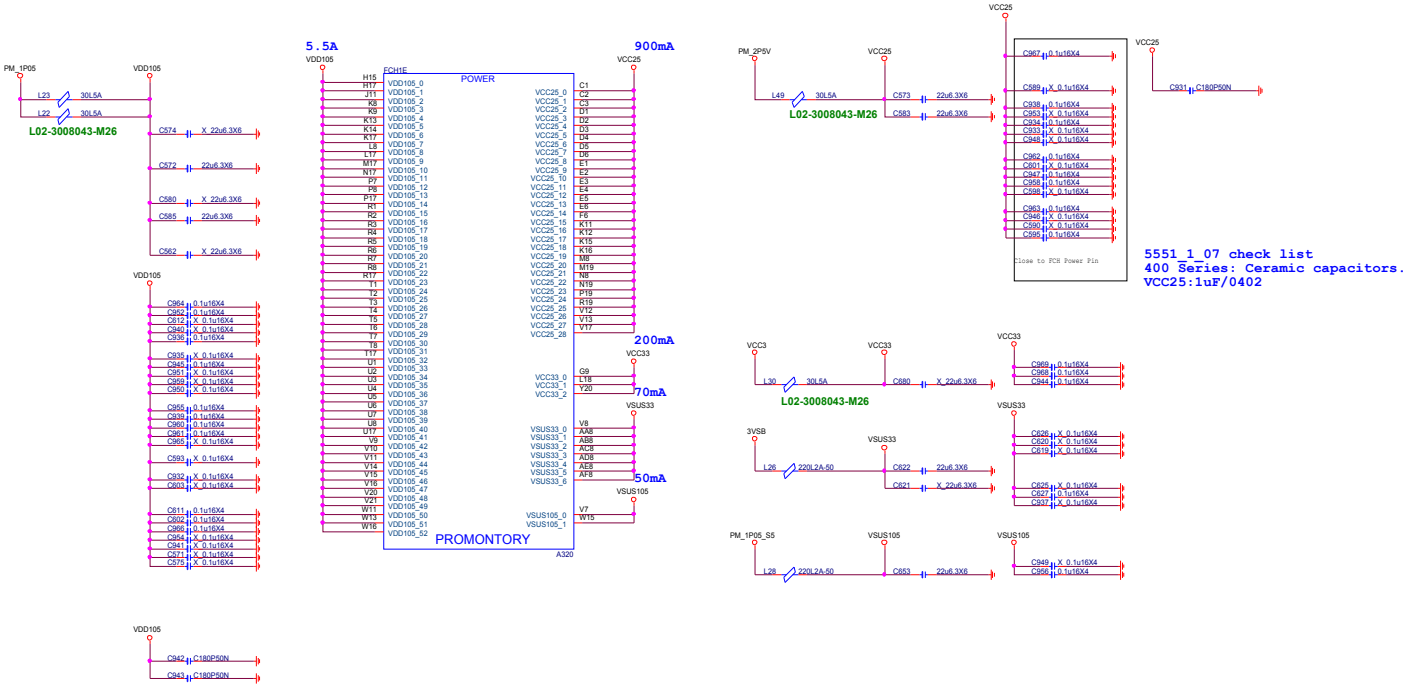
Title: Promontory-USB/OC

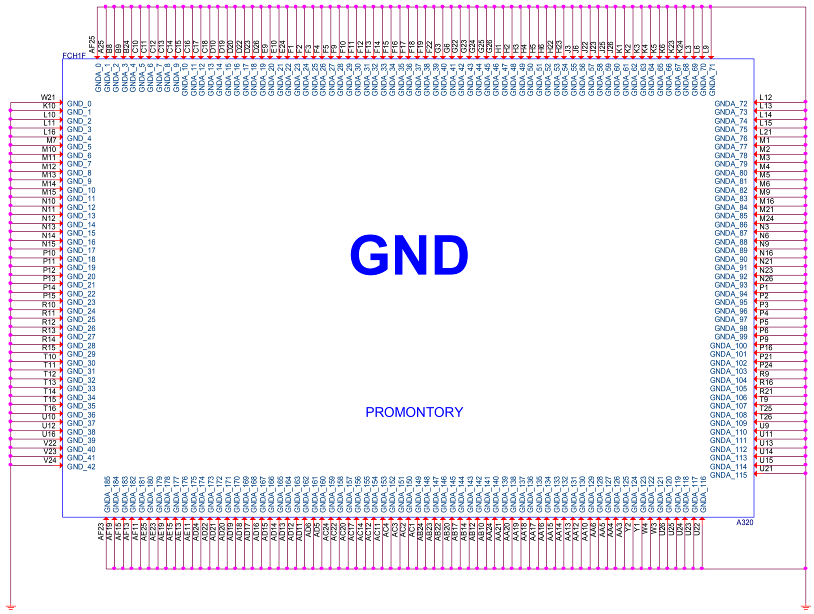
Size: Custom | Document Number: MS-7B84 | Rev: 22

Date: Friday, July 19, 2019 | Sheet 15 of 53





MICRO-START INTL CO.,LTD.			
Title: Promontory-Power			
Size: Custom	Document Number: MS-7B84		Rev: 22
Date: Friday, July 19, 2019	Sheet 17 of 53		



MICRO-START INTL CO.,LTD.

Title	Promontory-GND	
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 18 of 53	

PCI EXPRESS x16 Slot

3.3V 3.0A
12V 5.5A

Trace width > 200 mils

PCIEX1 12V 0.5A
3.3V weak 375mA

3.3V 3.0A
12V 0.5A

PCI_E1

PCI_E2

PCI_E3

SLOT-PCI164P_BLACK-2PITCH-RH-66

SLOT-PCI36P_BLACK-2PITCH-RH-8

within 500mil

PROM RESET

SIO [20] PLTRST_BU2#_R

PROM [9,23] PLTRST_BU1#_LAN

Co-lay FCH Reset for meet FCH sequence. See 55553.

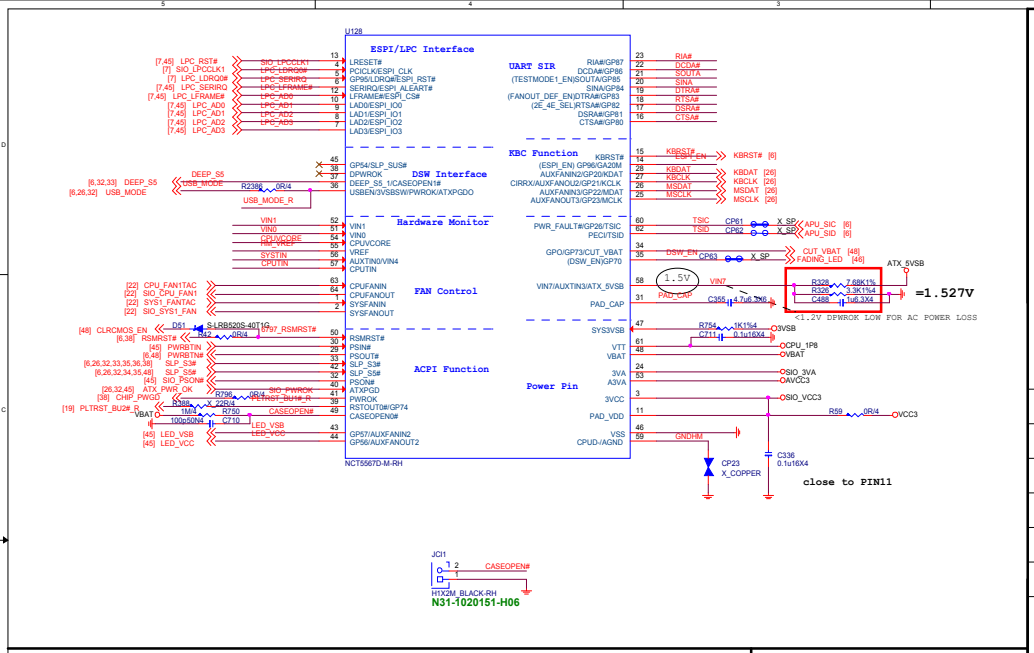
SMBus separate circuit

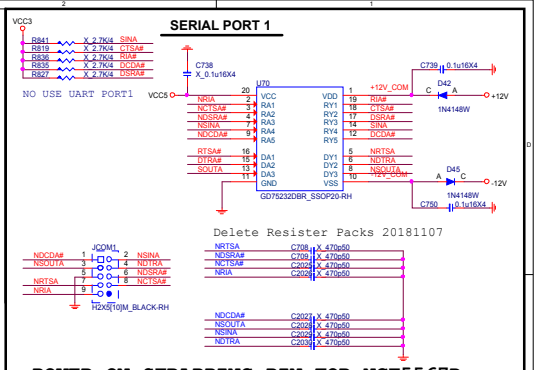
SMB_SEL
GPIO Default High

韩正式footprint

Title	PCIE X16(X1*2) SLOT
Size	Custom
Document Number	MS-7B84
Rev	22
Date:	Friday, July 19, 2019
Sheet	19 of 53

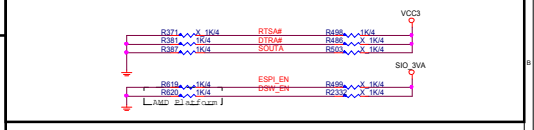
MICRO-STAR INTL CO.,LTD.

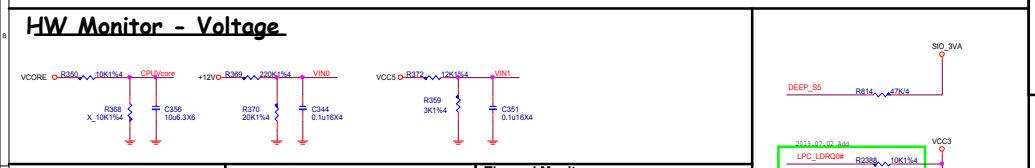


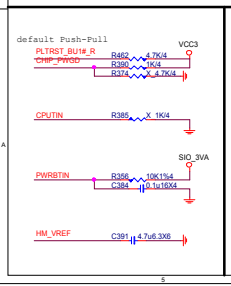


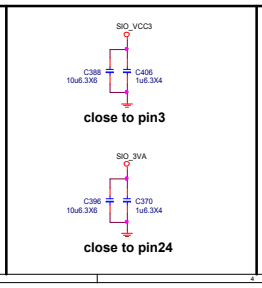
POWER ON STRAPPING PIN FOR NCT5567D

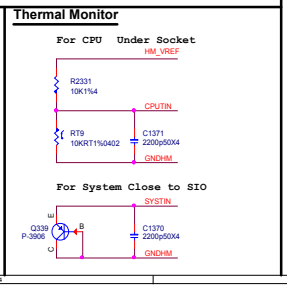
PIN	5567D NAME	Circuit NAME	0	1
18	2E_4E_SEL	RTSA#	I/O ADDRESS 2E	I/O ADDRESS 4E
19	FANOUT_DEF_EN	DTRA#	default 50%	default 100%
21	TESTMODE1_EN	SOUTA	DISABLE TEST1MODE	ENABLE TEST1MODE
14	ESPI_EN	ESPI_EN	ENABLE LPC	ENABLE ESPI
35	DSW_EN	DSW_EN	GPIO function	DSW function

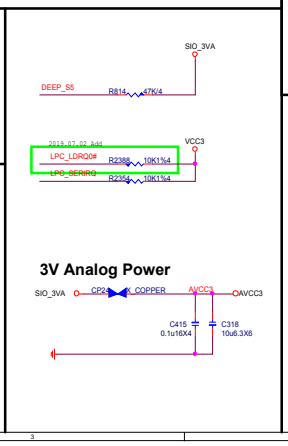


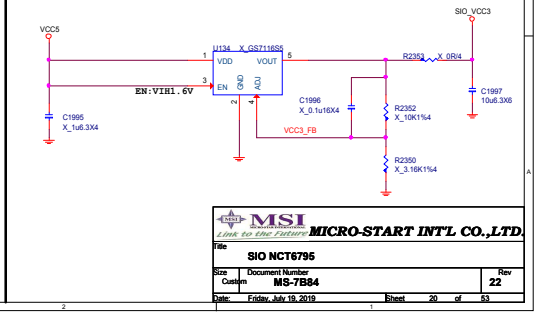












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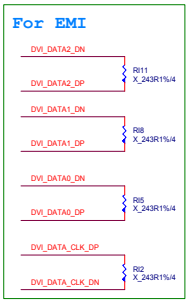
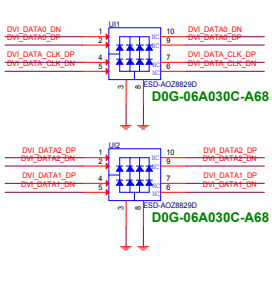
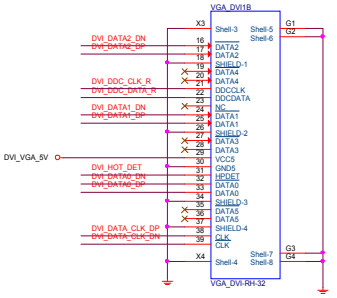
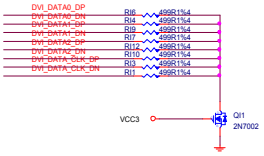
Title	SIO NCT6795		
Size: Custom	Document Number: MS-7B84		Rev: 22
Date: Friday, July 19, 2019	Sheet 20 of 53		

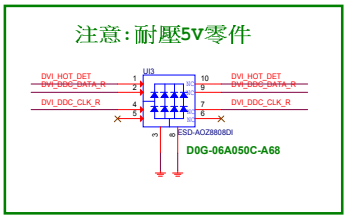
DVI CONNECTOR

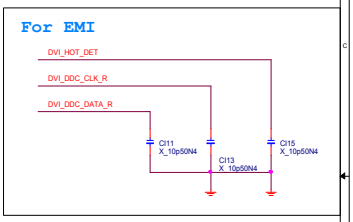


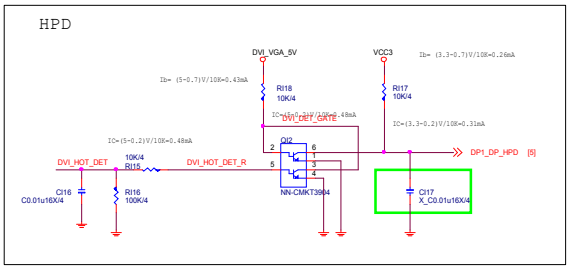


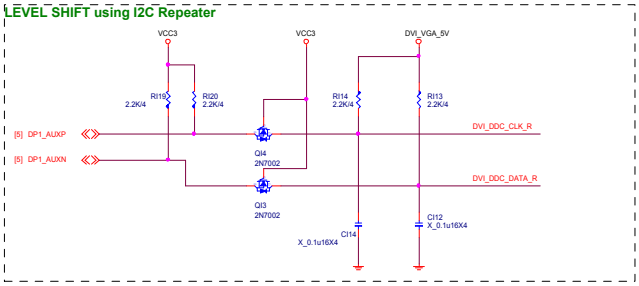


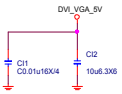












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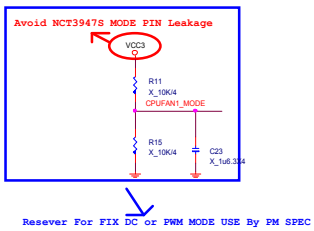
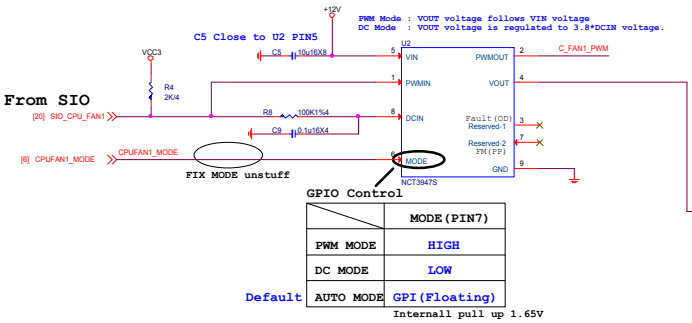
Title: DVI		
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 21 of 53	

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

2.GPIO可以由BIOS切換 PWM/DC MODE



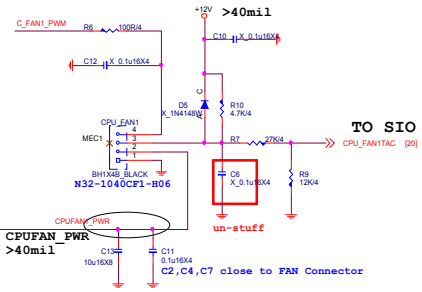
Resever For FIX DC or PWM MODE USE By PM SPEC

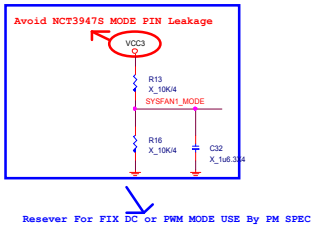


GPIO Control

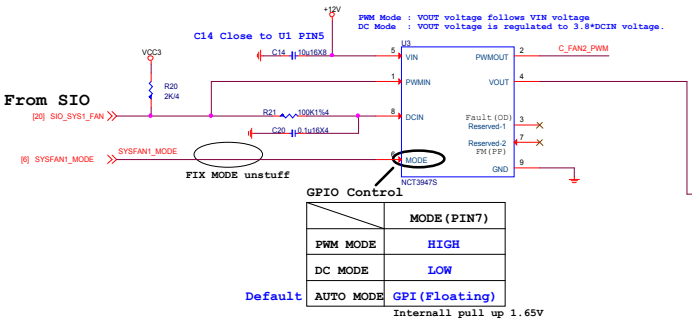
	MODE(PIN7)
PWM MODE	HIGH
DC MODE	LOW
Default AUTO MODE	GPI(Floating)

Internall pull up 1.65V





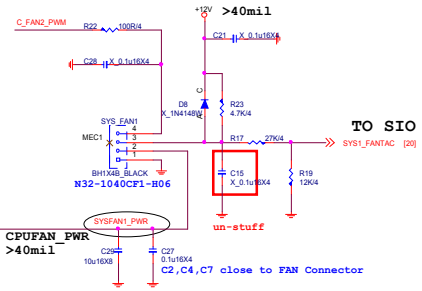
Resever For FIX DC or PWM MODE USE By PM SPEC



GPIO Control

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

Internall pull up 1.65V



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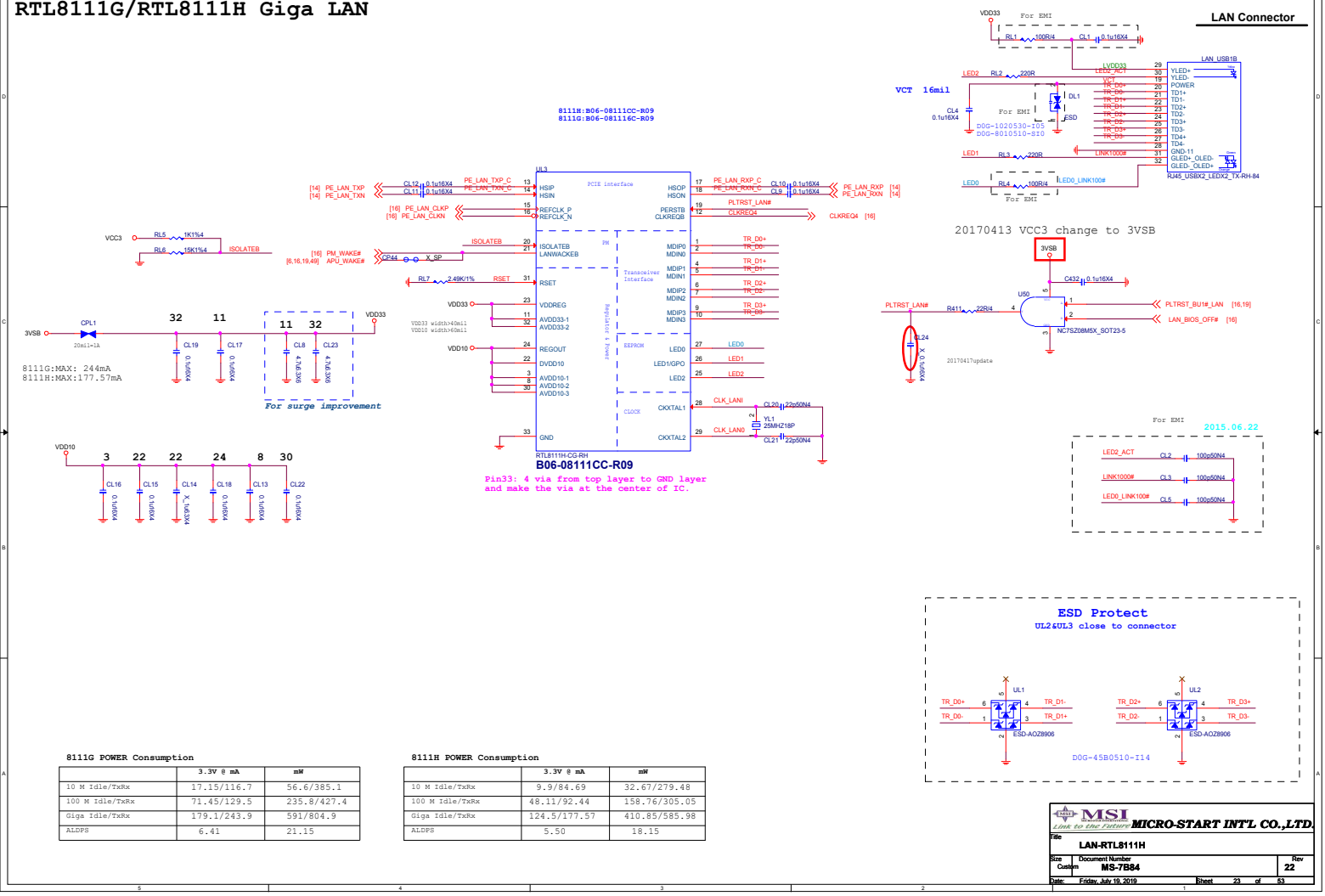
Title: CPU FAN Control

Size: Custom | Document Number: MS-7B84 | Rev: 22

Date: Friday, July 19, 2019 | Sheet 22 of 53

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

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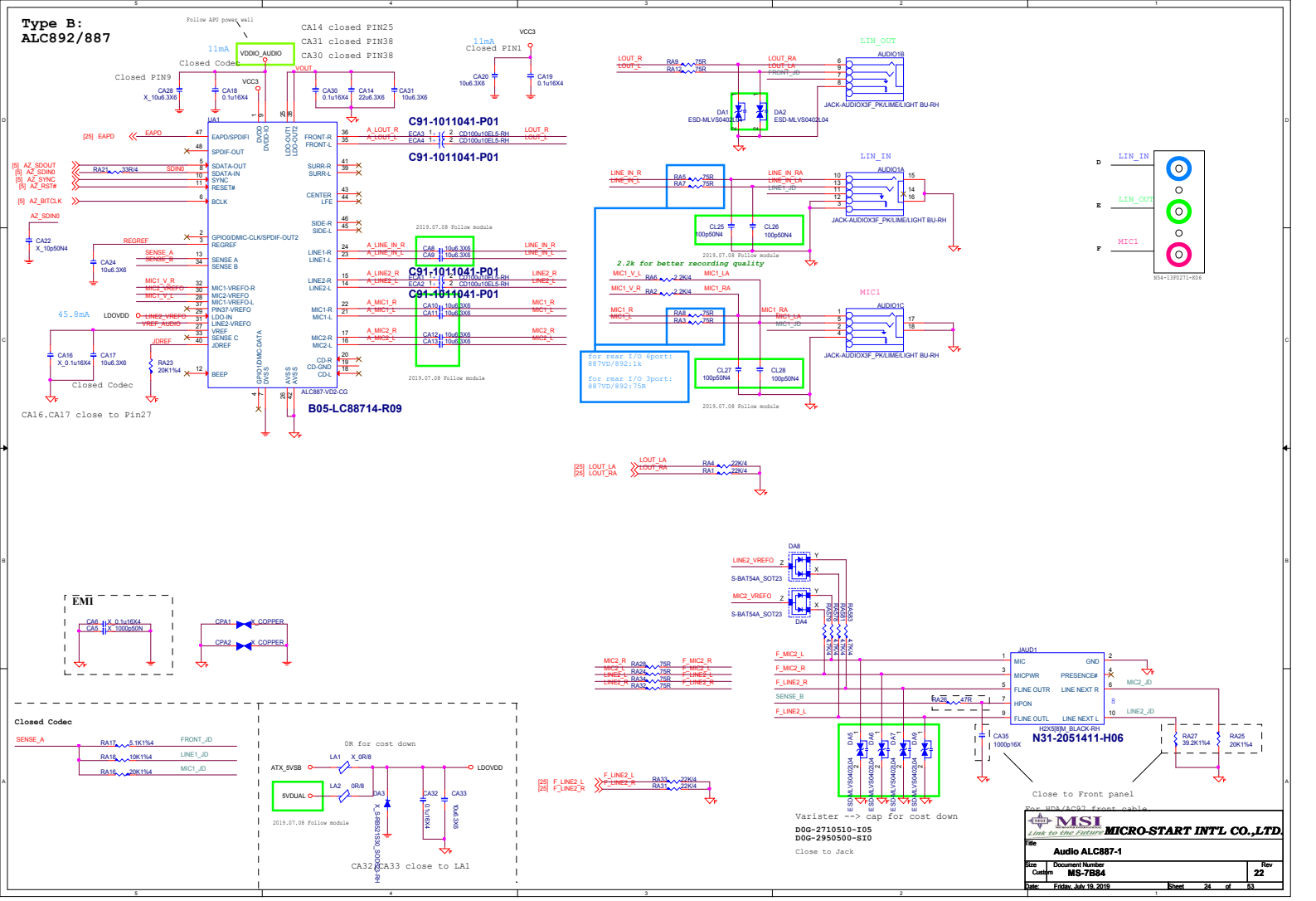
Title: LAN-RTL8111H

Size: Custom | Document Number: MS-7B84 | Rev: 22

Date: Friday, July 19, 2019 | Sheet 23 of 53

Type B:
ALC892/887



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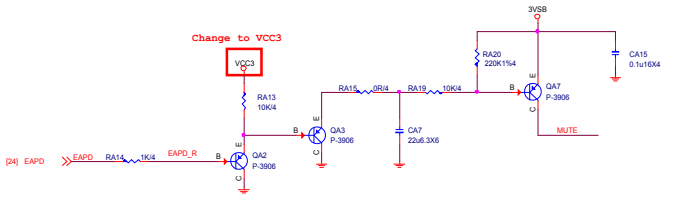
Title	Audio ALC887-1		
Size: Custom	Document Number: MS-7B84		Rev: 22
Date: Friday, July 19, 2019	Sheet 24 of 53		

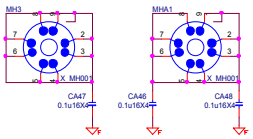
Rear Line OUT De-POP circuit

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



Digital

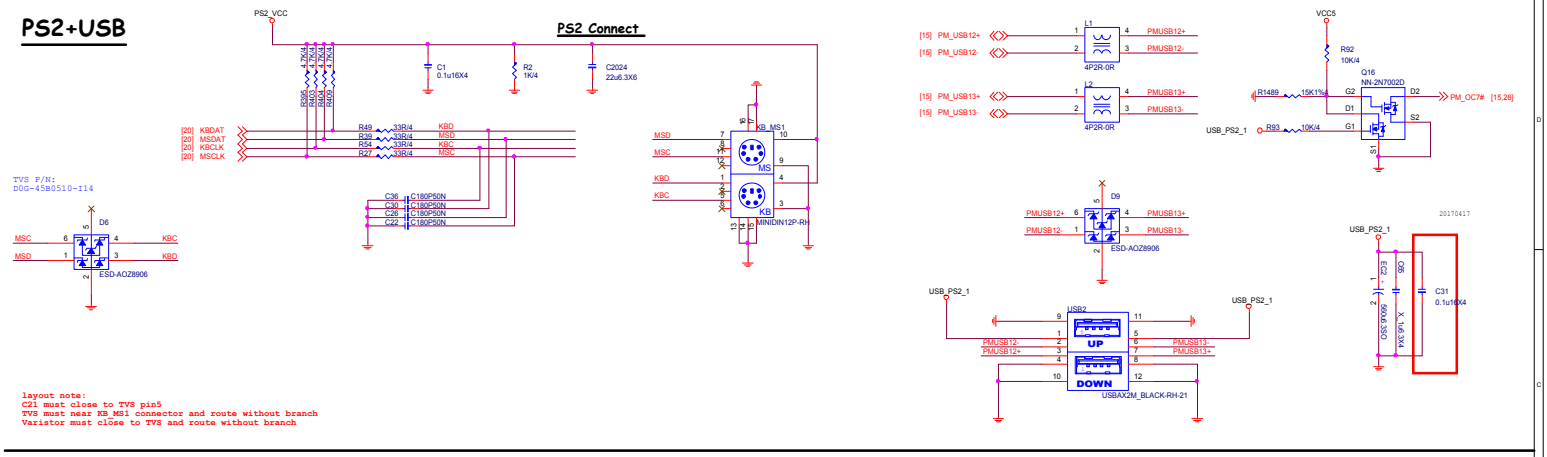
Analog



MICRO-START INTL CO.,LTD.

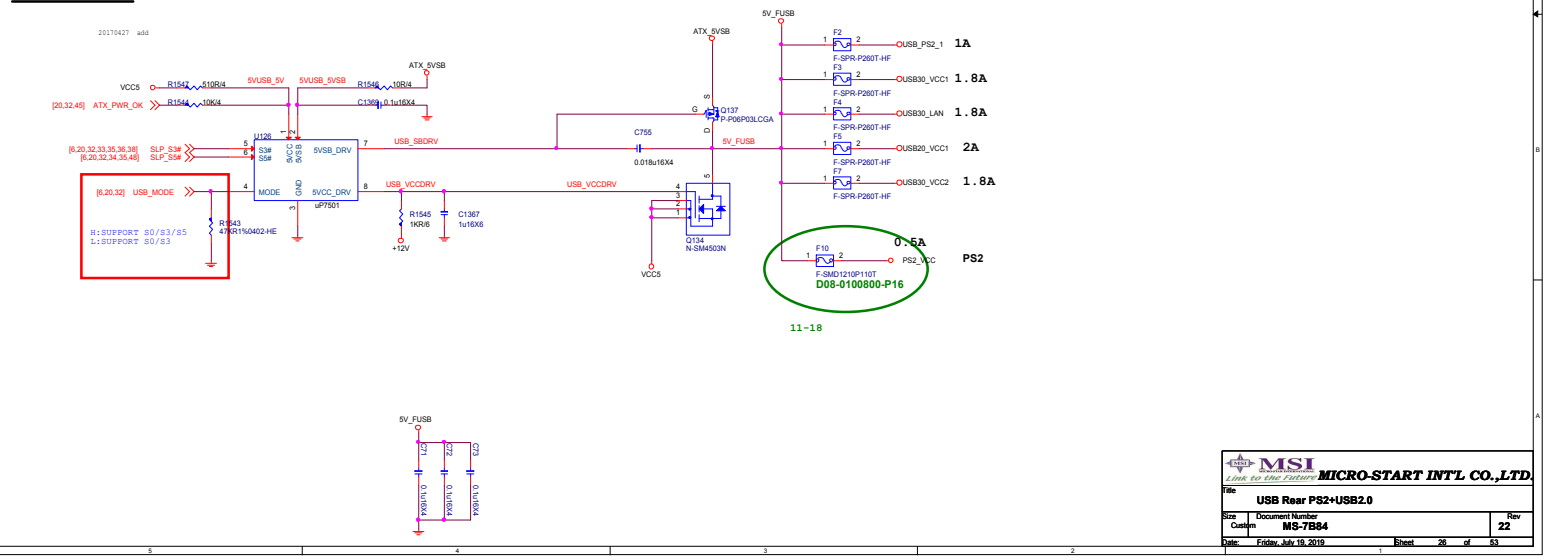
Title	Audio ALC887-2	
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 25 of 53	

PS2+USB



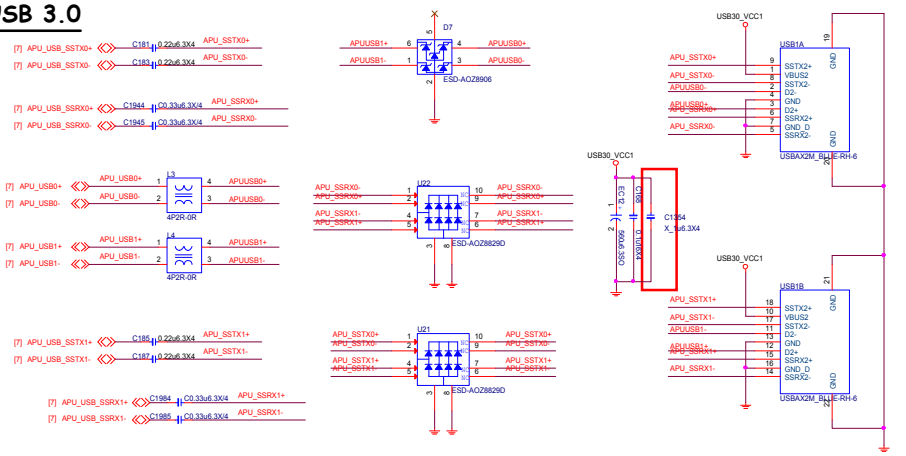
layout note:
C21 must close to TVS pin5
TVS must near KB_MS1 connector and route without branch
Varistor must close to TVS and route without branch

USB Power

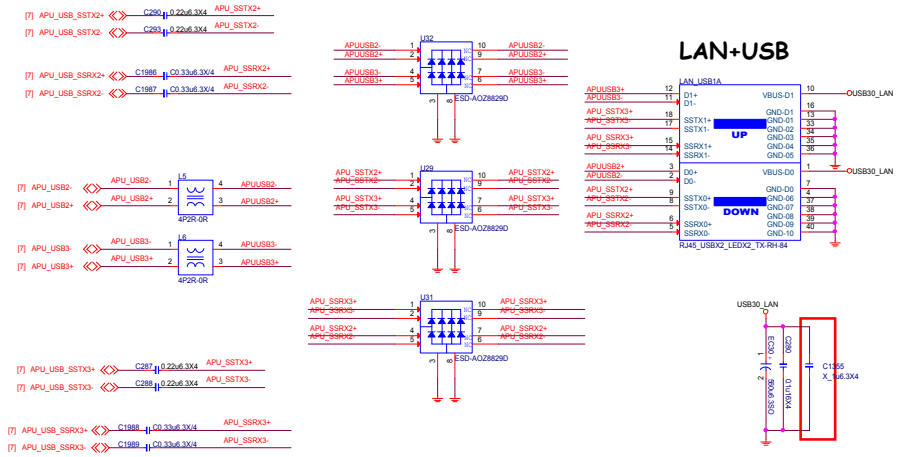


MSI	MICRO-START INTL CO.,LTD.		
Title	USB Rear PS2+USB2.0		
Size: Custom	Document Number: MS-7B84		Rev: 22
Date: Friday, July 19, 2019	Sheet 26 of 53		

USB 3.0

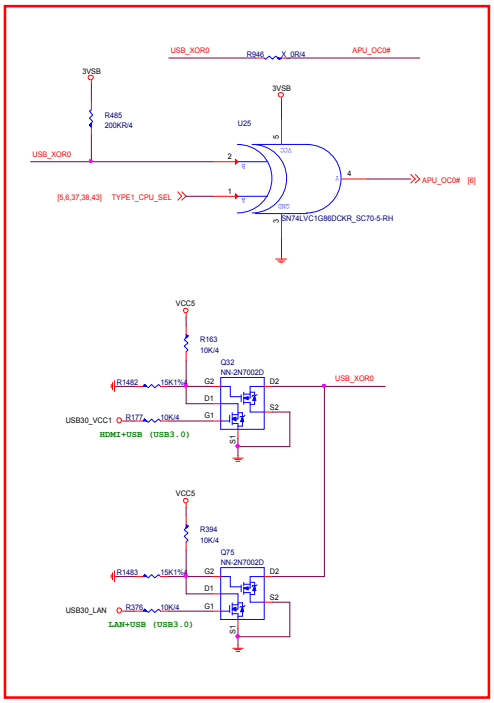


USB3.1 GEN1



APU_USB_OC

Modify USB_OC# circuit



	CORETYPE1(A)	USB_PWR(B)	APU_USB_OC(Y)
BR	0	0	0
Act. Low	0	1	1
SR	1	0	1
Act. High	1	1	0

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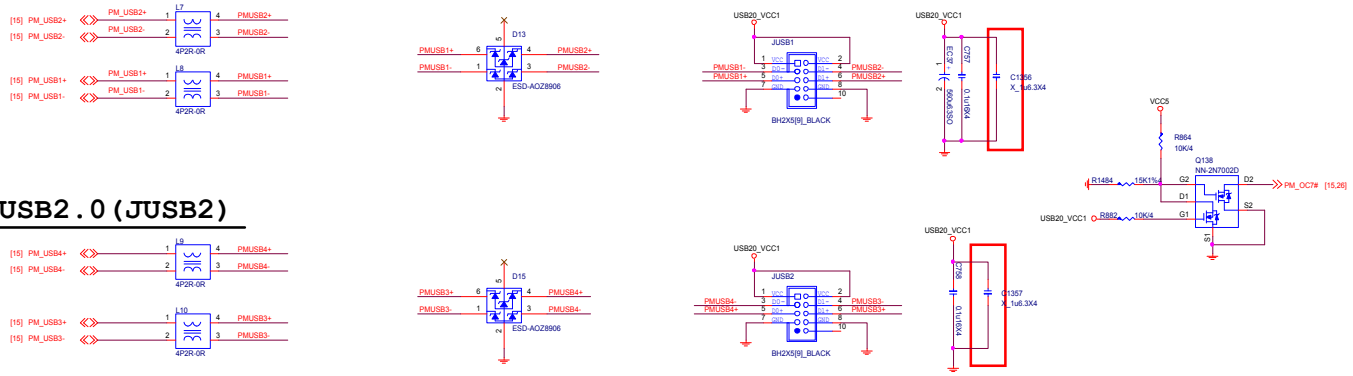
Title: USB Rear LAN+USB3.1 GEN1

Size: Custom | Document Number: MS-7B84 | Rev: 22

Date: Friday, July 19, 2019 | Sheet 27 of 53

Front USB2.0(JUSB1)

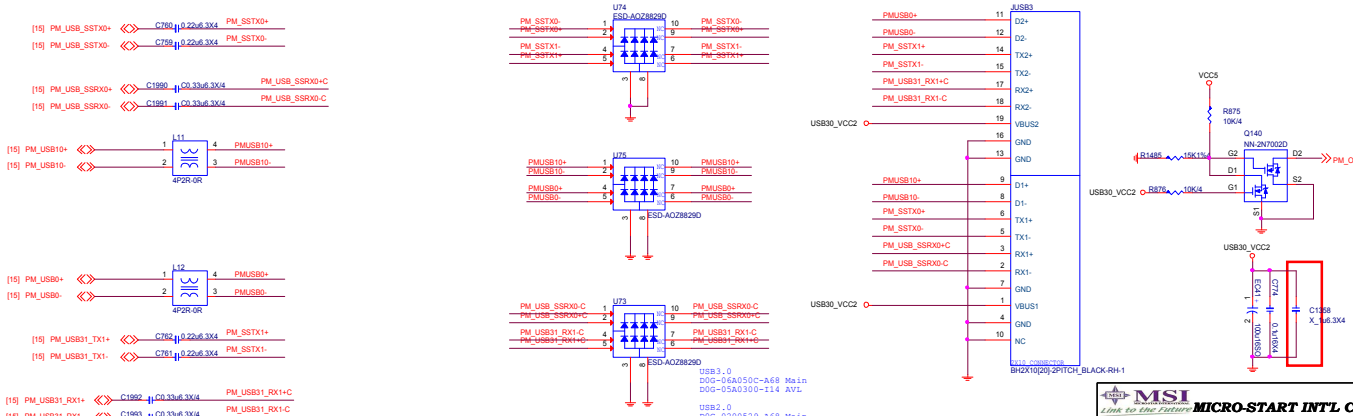
5V@1A



Front USB2.0(JUSB2)

5V@1A

Front USB3.1 GEN1



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Title	USB Front Side	
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 28 of 53	

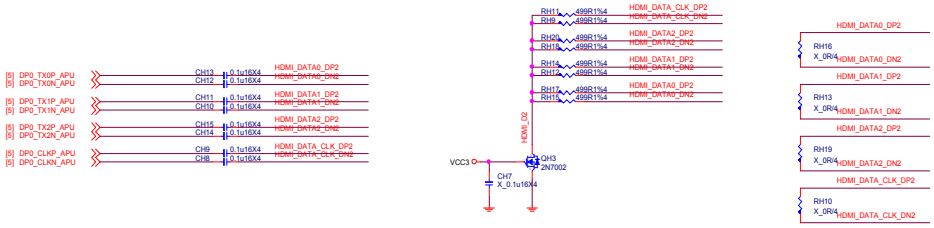
SATA Connector

MICRO-START INT'L CO.,LTD.

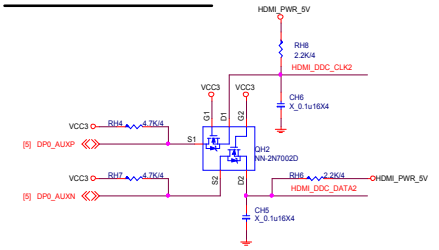
Title: SATA Connector		
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 29 of 53	

HDMI CONNECTOR

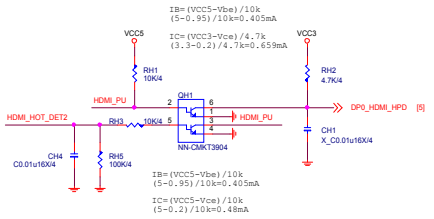
For HDMI 1.4



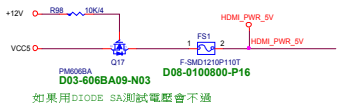
AUX Level Shifter



HPD Circuit

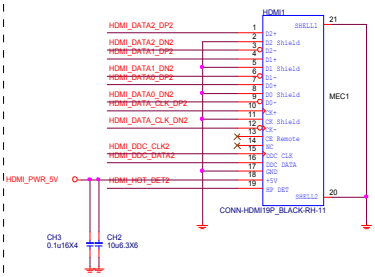


Connector Power

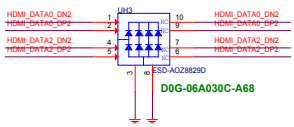


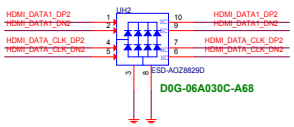
如果用DIODE SA測試電壓會不過

Connector

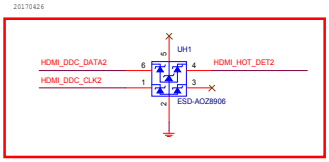


For EMI





20170426



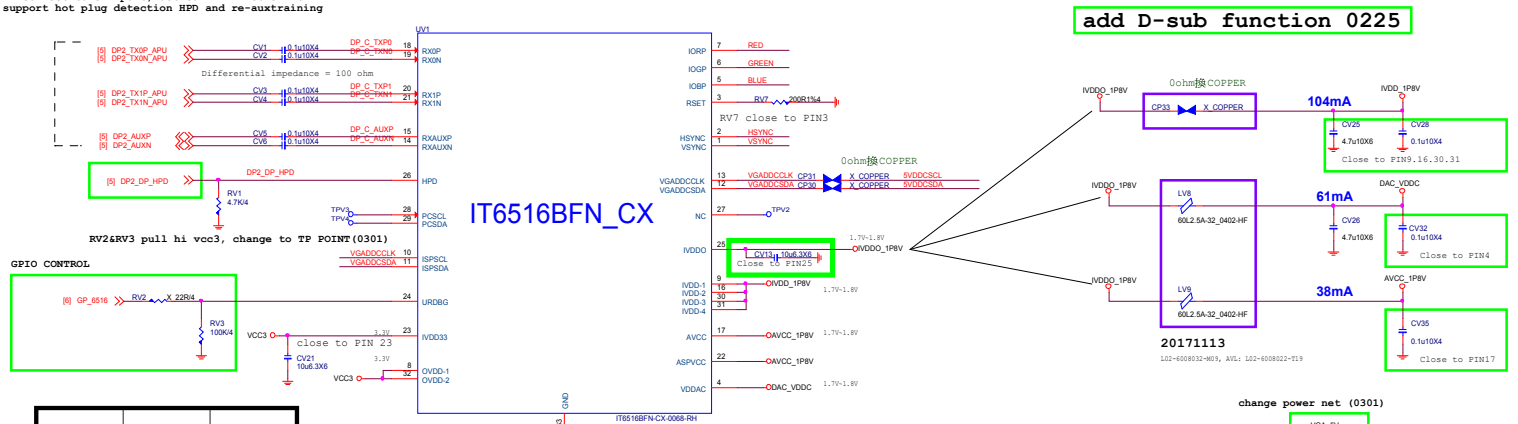
MICRO-START INTL CO.,LTD.

Title	HDMI Connector	
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 30 of 53	

Note:

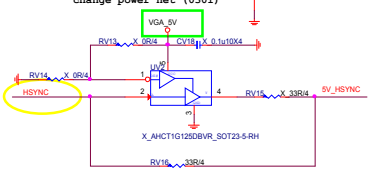
If connect to eDP port,must confirm whether it support hot plug detection HPD and re-auxtraining

add D-sub function 0225

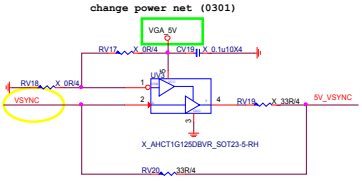


System Status	GPIO	IT6516b's HPD
Legacy Mode (VBIOS) /DOS MOde	HIGH	Force HIGH
Windows /UEFI Mode (GOP)	LOW	Depend on VGA device's plug/unplug

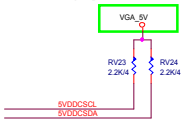
change power net (0301)



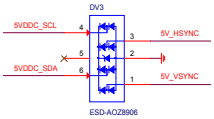
change power net (0301)



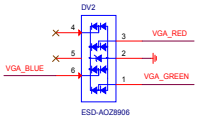
change power net (0301)



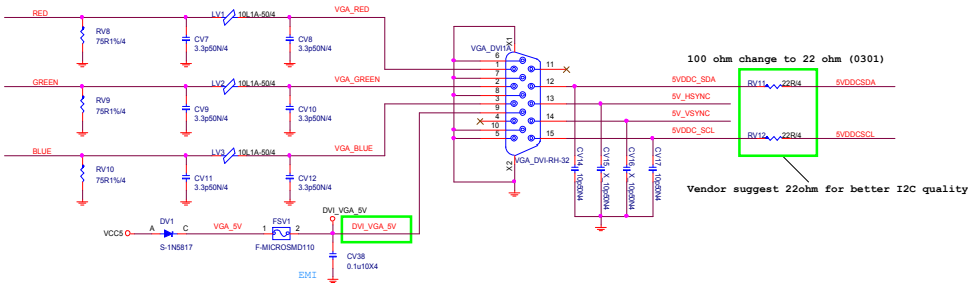
remove 3.3V-to-5V level shifter (0301)



DV3 Close to VGA connector
AVL:D0G-45B0510-I14

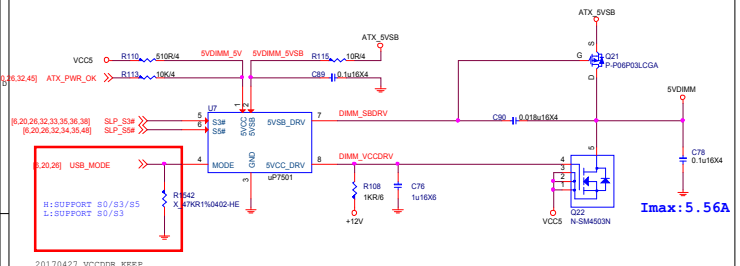


DV2 Close to VGA connector
AVL:D0G-45B0510-I14



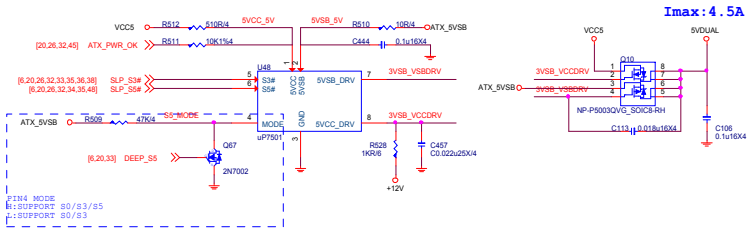
MSI	MICRO-START INTL CO.,LTD.		
Title	DP to VGA RT6516		
Size: Custom	Document Number: MS-7B84		Rev: 22
Date: Friday, July 19, 2019	Sheet 31 of 53		

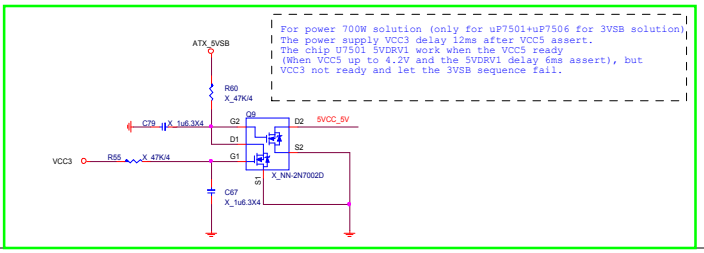
5VDIMM FOR DDR



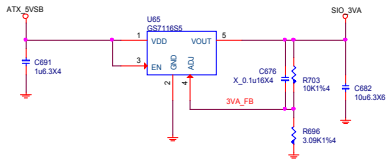
20170427 VCCDDR KEEP

5VDUAL For 3VSB、CPU 1.8V 、 VDDP

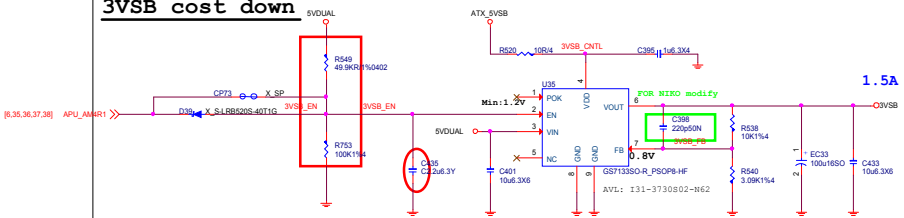




SIO_3VA



3VSB cost down



MSI Link to the Future	MICRO-START INTL CO.,LTD.	
Title: ACPI uPI-5VDIMM&3VSB		
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 32 of 53	

FOR Promontory 1.05V_S0

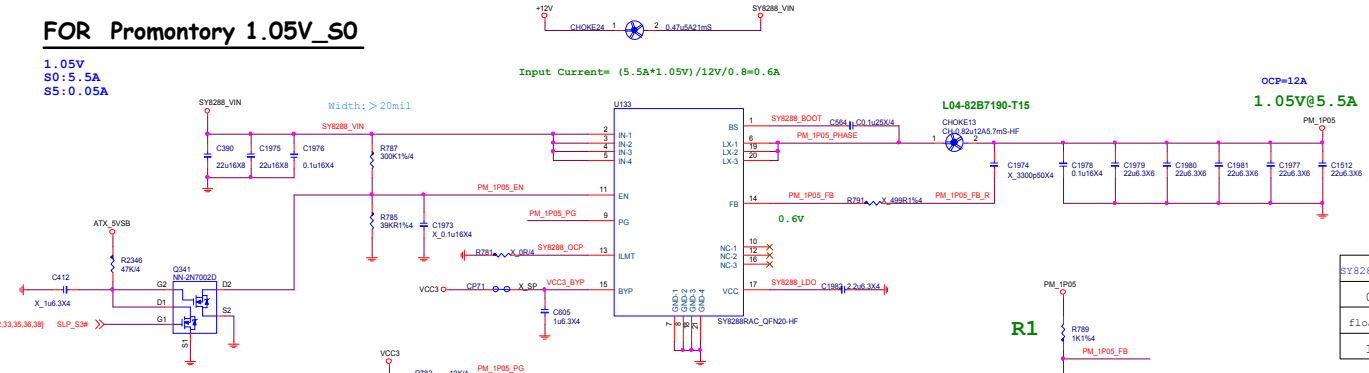
1.05V
S0:5.5A
S5:0.05A

Input Current= (5.5A*1.05V)/12V/0.8=0.6A

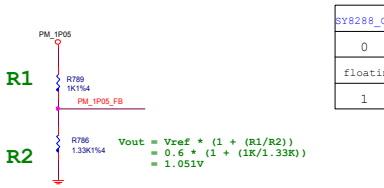
OCP=12A

1.05V@5.5A

L04-82B7190-T15

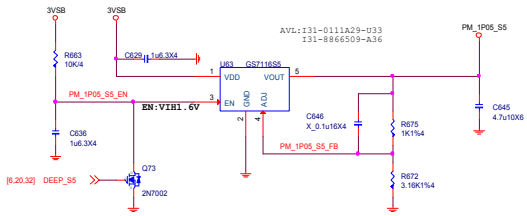


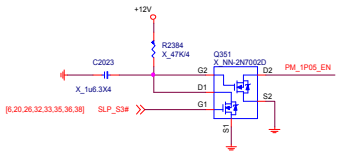
SY8288_OCP	OCP
0	8A
floating	12A
1	16A



FOR Promontory 1.05V_S5

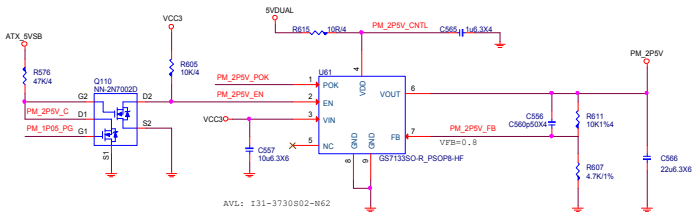
0.05A

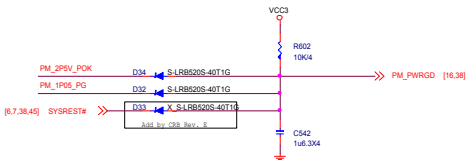




Promontory-2.5V

2.5V; 900mA

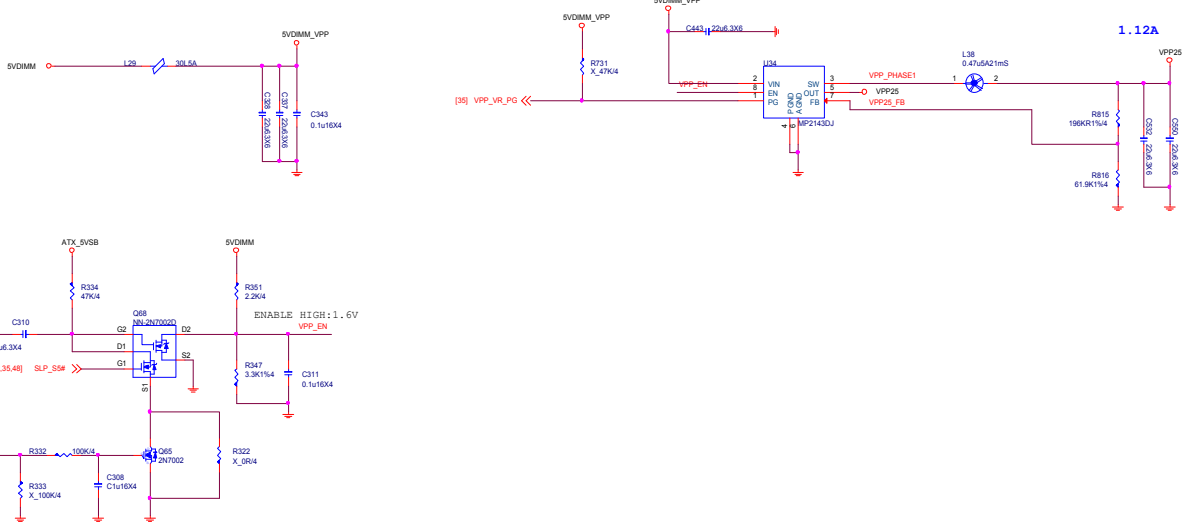


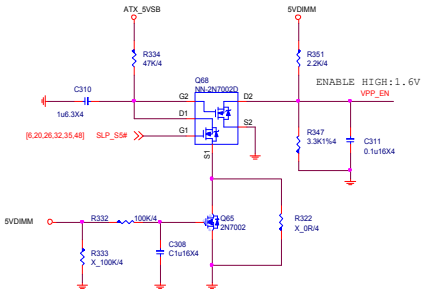


MSI Computer Corp. Link to the Future
MICRO-START INTL CO.,LTD.

Title	Promontory-NB671LB-1.05V/GS7133-2.5V	
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 33 of 53	

2DIMM :1.12A FOR DDR VPP2.5V





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

Title	DDR PWR VPP25/VTT-MP2143	
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 34 of 53	

DDR4_1.2V 15.5A+4.75A+0.6A=20.85A

15.5A FOR CPU

4.75A FOR 2DIMM

0.6A FOR DDR VTT

Irms = Iout * SQRT{D/N- (D)^2]}
VCCDDR:
D=Vout/Vin=1.2/5=0.24
N=Phase number=1
=20.85A*SQRT(0.24-0.0576)
=5.21A

VID	Reference Voltage (V)
H	0.675
L	0.75

OCP:27.5A

Imax: 20.85A

I32-8231A0C-R11

MAX:20.85A

1.2V

1.1uH change to 0.47uH

D03-4337N0C-ST8

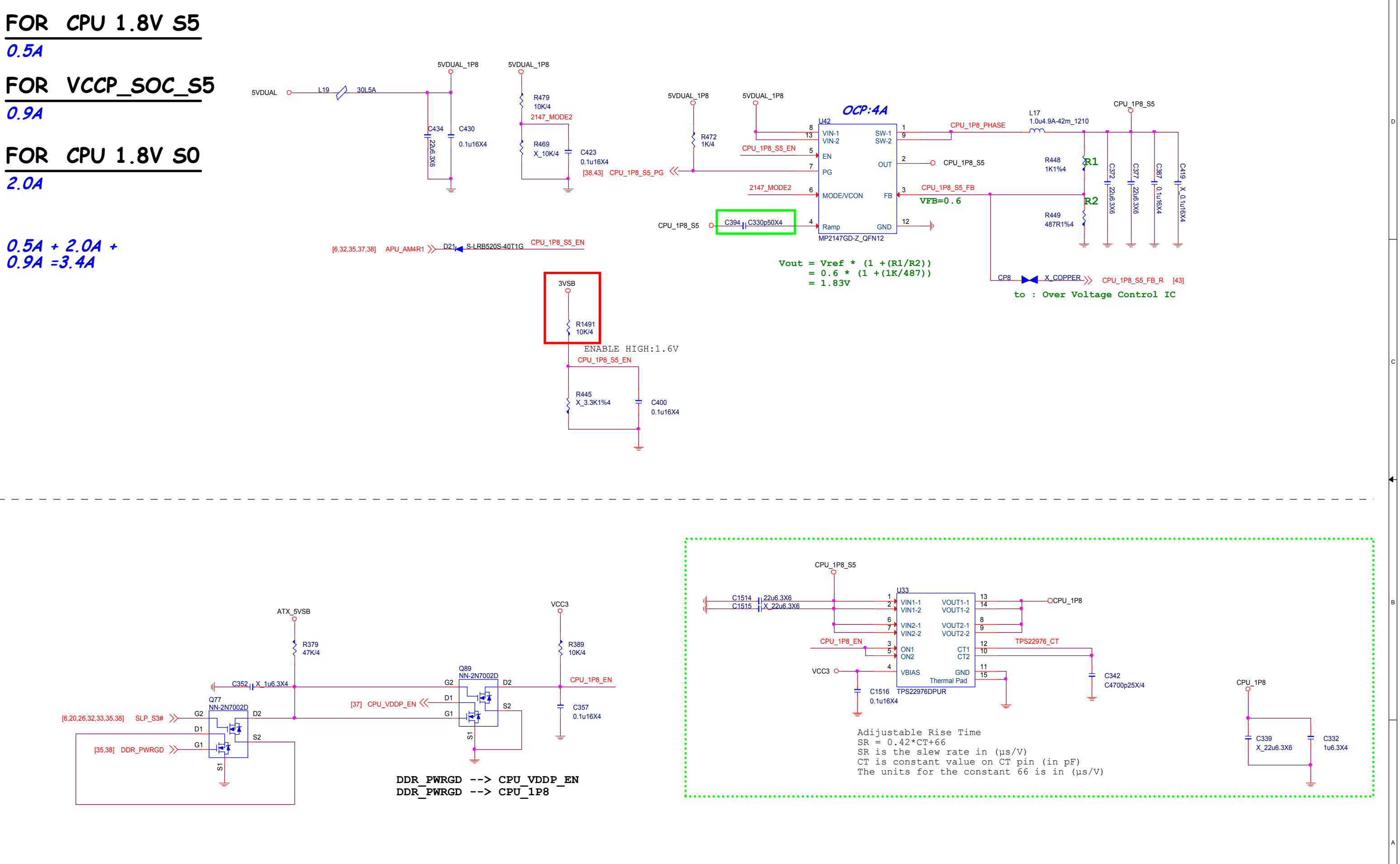
D03-4503N0C-ST8

By layout modify

Close to PIN19

Title	DDR PWR VPP25/VTT-MP2143
Size	Custom
Document Number	MS-7B84
Rev	22
Date:	Friday, July 19, 2019
Sheet	35 of 53

MICRO-START INTL CO.,LTD.



MSI MICRO-START INTL CO.,LTD.

Link to the Future

Title	CPU Power 1P8V-MP2147	
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 36 of 53	

CPU_VDDP_S0

1.05V/0.9V@S0:8.5A

S0:8.5A

S5:1A

OCP=14A

Input Current= (8.5A*1.05V)/12V/0.8=0.93A

L02-3008043-M26

+12V — L39 30L5A — +12V_VDDP

+12V — L50 30L5A — +12V_VDDP

L02-3008043-M26

+12V_VDDP

C1835 0.1u16X4 | C1842 22u16X8 | C1829 22u16X8 | C1833 22u16X8

VCC3

R2293 10K/4

[38] CPU_VDDP_PG

CP77 X_SP

20171215
VCC3A_PG disconnect
MP8712_VCC' pull up VCC3.

C1972 0.1u16X4

+12V_VDDP

R2297 100K1%4

CPU_VDDP_EN

12-27

[6,32,35,36,38] APU_AM4R1 — D48 S-LRB520S-40T1G

R2298 39.2K1%4

C1971 0.1u16X4

U132

9	VIN	BST	1
5	EN	SW	2
7	PG	VOUT	10
13	VCC	FB	11
12	SS		
8	PGND		
14	AGND		
3	NC-1		
4	NC-2		
6	NC-3		

MP8712

I9C-8712G0C-M03

CPU_VDDP_EN — EN 1.2V

CPU_VDDP_PG_R

VDDP_VCC — 3.5V output

C1831 C0.47u10X5/4 | C1837 C0.022u25X/4

CPU_VDDP_BOOT — R2321 0R/6 — CPU_VDDP_BOOT_R — C1845 C0.1u25X/4

CPU_VDDP_SW

CPU_VDDP_SENSE_R

CPU_VDDP_FB_R — R2294 10K/4 — CPU_VDDP_FB

L04-68B7350-T15

CHOKE17

CH-0.68u15A5mS-HF-1

R2358 X_1R1%6

C1998 X_3300p50X4

C1802 0.1u16X4 | C1803 22u6.3X6 | C1844 22u6.3X6 | C1843 22u6.3X6 | C1828 22u6.3X6 | C1841 X_22u6.3X6

CPU_VDDP

OCP=14A

1.05V,8.5A

TYPE0_CPU_SEL: 1:TYPE 0 0:TYPE 2

CPU_VDDP_EN: 0:TYPE 2 1:TYPE 0

[6,7,38] TYPE0_CPU_SEL — Q340 NN-2N7002D — CPU_VDDP_EN — CPU_VDDP_EN [36]

VDDP_SEL

[5,6,27,37,38,43] TYPE1_CPU_SEL — VDDP_SEL

TYPE1_CPU_SEL: 0:TYPE 0 1:TYPE 2

CPU	TYPE	TYPE0_CPU_SEL	TYPE1_CPU_SEL	CPU_VDDP_EN
BR	0	1	0	1
NA	X	0	0	0
SR	2	1	CPU VDDP NOT SUPPORT TYPE2	
RV/ZP	3	0	1	1

CPU_VDDP

R358 6.8R1%4

C1838 22p50N4 — CPU_VDDP_SENSE_R — CP72 X_SP — CPU_VDDP_SENSE [6]

R1 R362 1K1%4

CPU_VDDP_FB — CP7 X_COPPER — CPU_VDDP_OV [43]

ATX_5VSB

R3 R2303 3.83K1%4

R2 R2345 2K1%4

R2300 47K/4

C1846 0.1u16X4

Q66 NN-2N7002D

[5,6,27,37,38,43] TYPE1_CPU_SEL

[16] PM_GPIO_R9

Q353 2N7002

AM4_CPU_SEL
0:Type 0/1 =>1.053V
1:Type 2/3 =>0.9V

PM_GPIO_R9
Page 17 pull high
1:Type 0/1 1.05V
0:Type 2/3 0.9V

Type 0/1:
Vout = Vref * (1 +(R1/(R2//R3))
= 0.6 * (1 +(1K/(2K//3.83K))
= 1.056V

Type 2/3:
Vout = Vref * (1 +(R1/R2))
= 0.6 * (1 +(1K/2K))
= 0.9V

CPU_VDDP_S5

1.05V/0.9V

S5:1A

Input Current=0.04A

12-27

5VDUAL — 5VSB

5VDUAL

L16 30L5A — L02-3008043-M26

R2342 X_10K/4

R2340 10K/4

C1407 1u6.3X4

C319 22u6.3X6

I9C-2143D09-M03

U131

2	VIN	SW	3
8	EN	OUT	5
1	PG	FB	7
4	GND		
	PAD		

MP2143DJ

VDDP_VSB_VIN

VDDP_VSB_EN

[38] VDDP_VSB_PG

C1840 X_0.1u16X4

FB: 0.6V

VDDP_VSB_PHASE

VDDP_VSB_FB

default:0.775V,0.2A

L01-0107118-M26

L15 1.0u4.9A-42m_1210

CPU_VDDP_S5

R2341 1K1%4

R285 2K1%4

C283 22u6.3X6 | C301 22u6.3X6 | C298 0.22u6.3X4

MP2143 has an open drain with 500kΩ pull-up resistor pin for power good (PG) indication.

VDDP_VSB_FB

ATX_5VSB

R2339 47K/4

C1839 0.1u16X4

Q44 NN-2N7002D

[5,6,27,37,38,43] TYPE1_CPU_SEL

AM4_CPU_SEL
0:Type 0/1
1:Type 2/3

R3 R2343 3.83K1%4

Type 0/1:
Vout = Vref * (1 +(R1/(R2//R3))
= 0.6 * (1 +(1K/(2K//3.83K))
= 1.058V

Type 2/3:
Vout = Vref * (1 +(R1/R2))
= 0.6 * (1 +(1K/2K))
= 0.9V

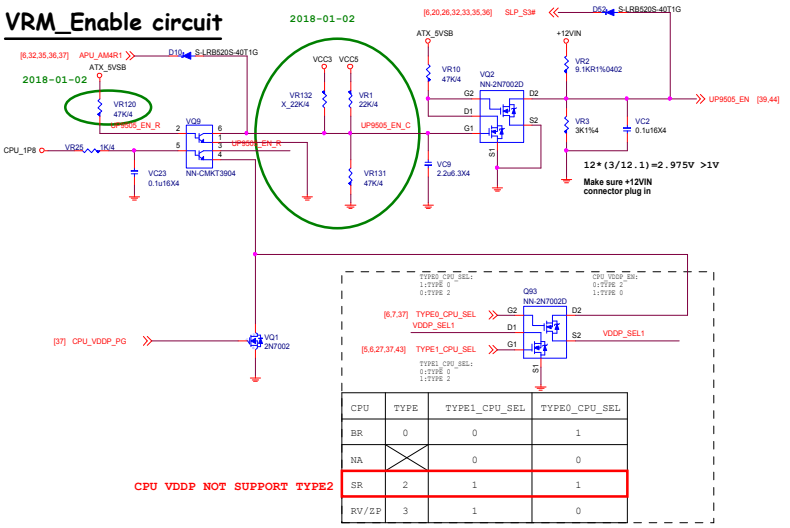
MICRO-STAR INTL CO.,LTD.

Title: CPU Power VDDP-RT8125E

Size: Custom | Document Number: MS-7B84 | Rev: 22

Date: Friday, July 19, 2019 | Sheet 37 of 53

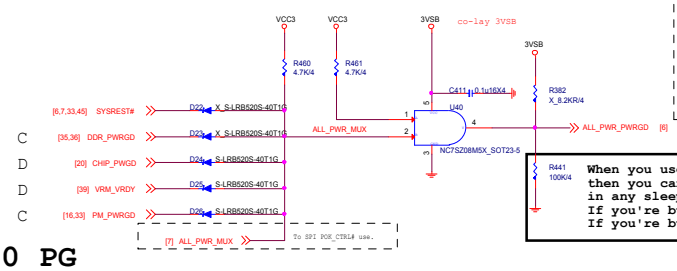
VRM_Enable circuit



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

CPU VDDP NOT SUPPORT TYPE2

ALL POWER GOOD MUX

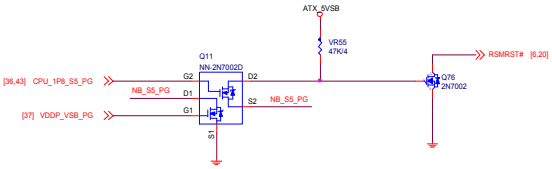


R441 100K/4

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

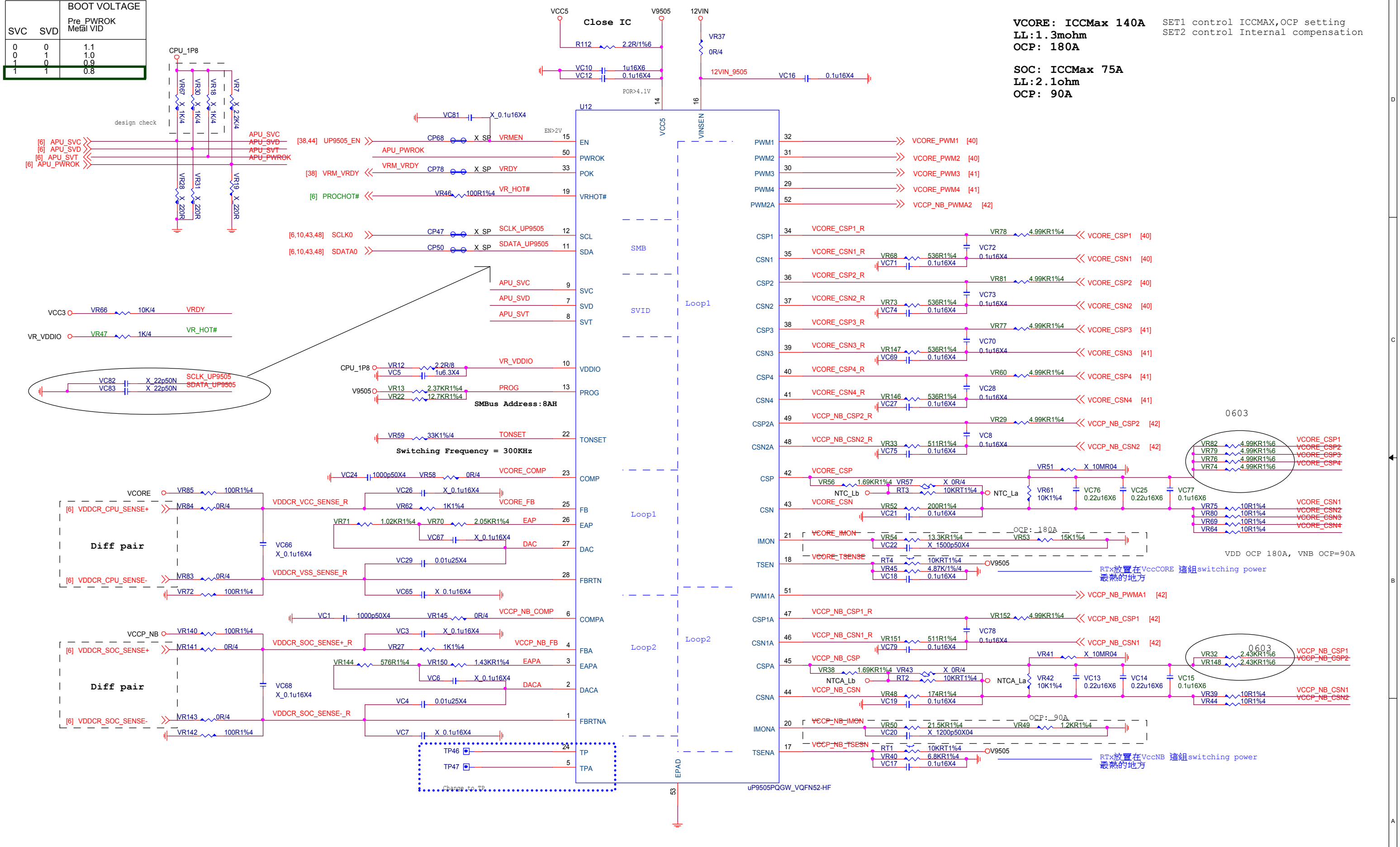


MICRO-STAR INTL CO.,LTD.

Title	CPU PWR-IR3599	
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 38 of 53	

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



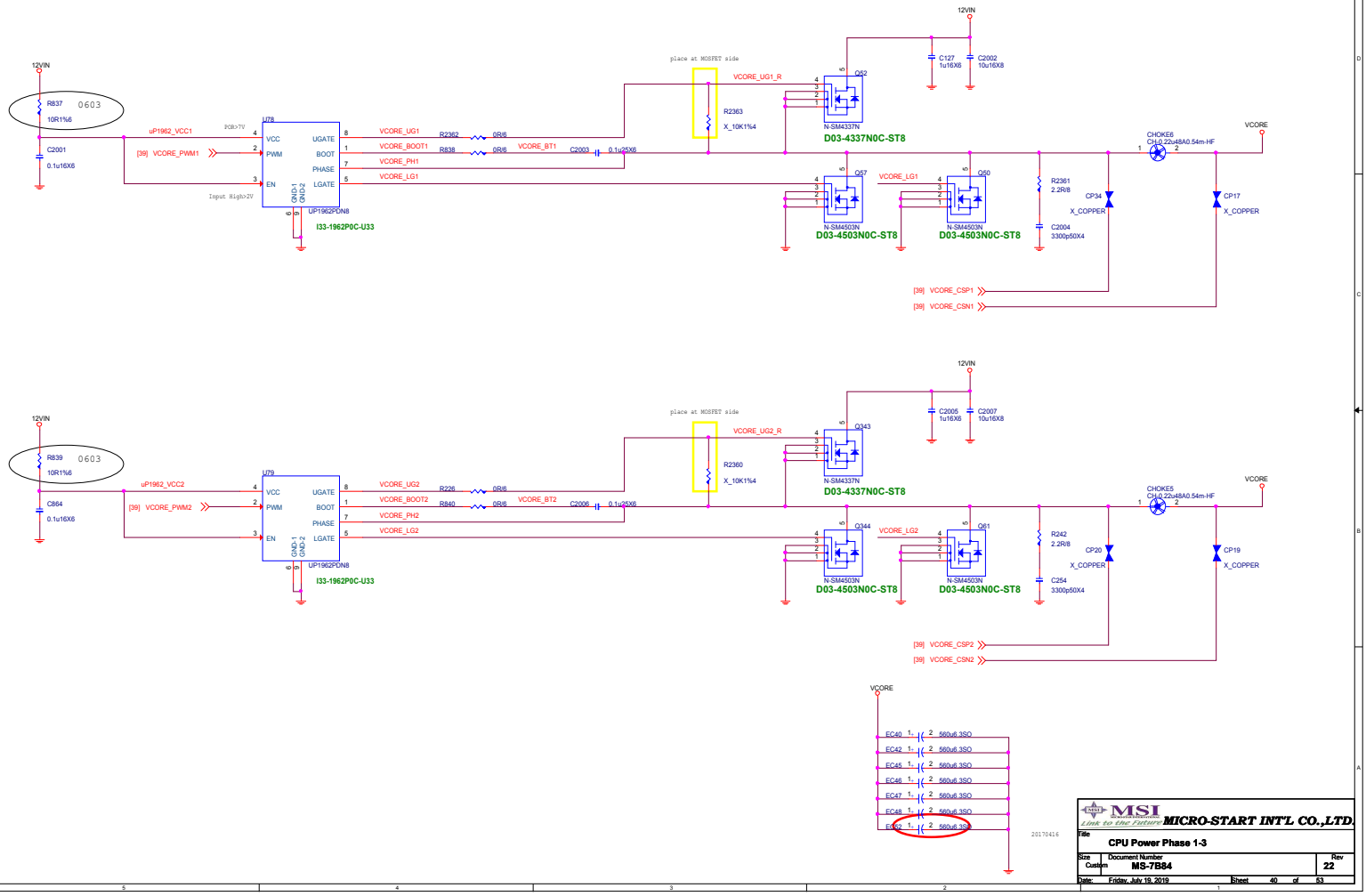
Close IC
VCORE: ICCMax 140A
LL:1.3mohm
OCP: 180A
SOC: ICCMax 75A
LL:2.1ohm
OCP: 90A
SET1 control ICCMAX,OCP setting
SET2 control Internal compensation
SMBus Address:8AH
Switching Frequency = 300KHz
Diff pair
Diff pair
SMB
SVID
Loop1
Loop1
Loop2
Loop2
0603
0603
VDD OCP 180A, VNB OCP=90A
OCP: 180A
OCP: 90A
RTx放置在VccCORE 這組switching power 最熱的地方
RTx放置在VccNB 這組switching power 最熱的地方
design check
uP9505PQGW_VQFN52-HF
U12

MICRO-START INTL CO.,LTD.

Title: CPU Power RT8894 4+2 Phase

Size	Document Number	Rev
Custom	MS-7B84	22

Date: Friday, July 19, 2019 | Sheet 39 of 53

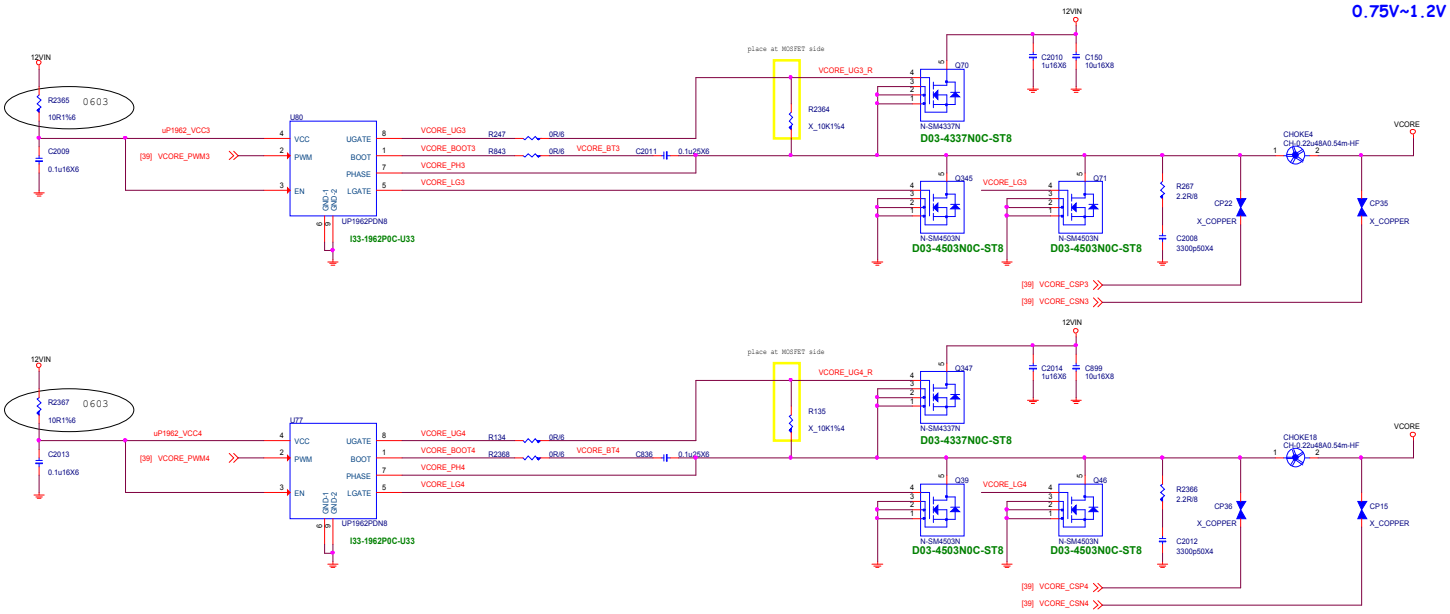


MICRO-START INTL CO.,LTD.

Title: CPU Power Phase 1-3

Size	Document Number	Rev
Custom	MS-7B84	22

Date: Friday, July 19, 2019 Sheet 40 of 53



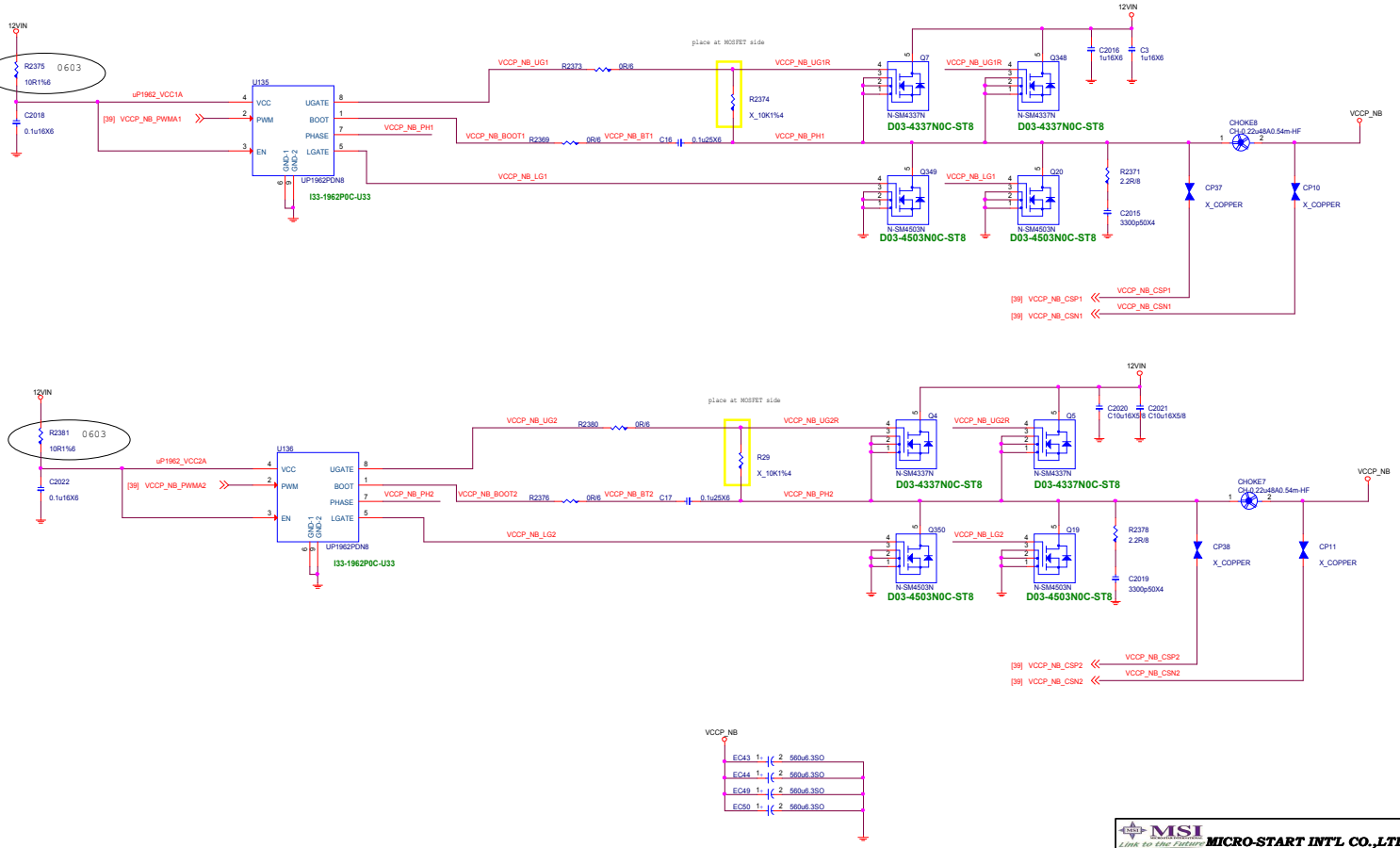
MICRO-START INTL CO.,LTD.

Title: CPU Power Phase 4

Size: Custom | Document Number: MS-7B84 | Rev: 22

Date: Friday, July 19, 2019 | Sheet 41 of 53

0.00625V~1.55V



MSI Computer Corp. — Link to the Future — MICRO-START INTL CO.,LTD.

Title	CPU Power NB Phase 1-2	
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 42 of 53	

FOR VCCP_SOC_s5

0.9A

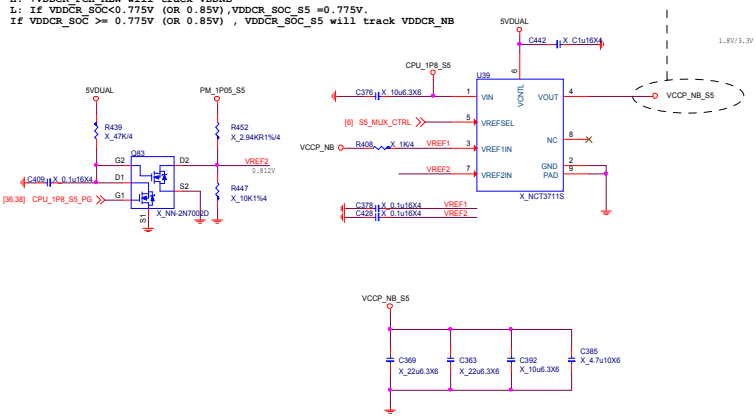
(VDDCR_SOC_S5 is only used for AMD TYPE0)

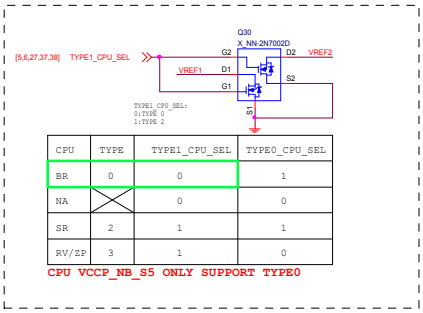
TYPE0 Only

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



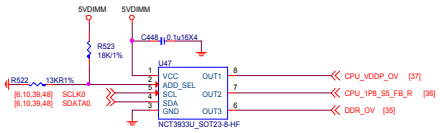


CPU	TYPE	TYPE1_CPU_SEL	TYPE0_CPU_SEL
BR	0	0	1
NA	X	0	0
SR	2	1	1
RV/ZP	3	1	0

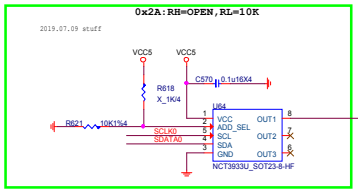
CPU VCCP_NB_S5 ONLY SUPPORT TYPE0

Over Voltage Control IC

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



0x2A:RH=OPEN,RL=10K



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%

MICRO-START INTL CO.,LTD.

Title: CPU Power NB Switch / NCT3933 OV

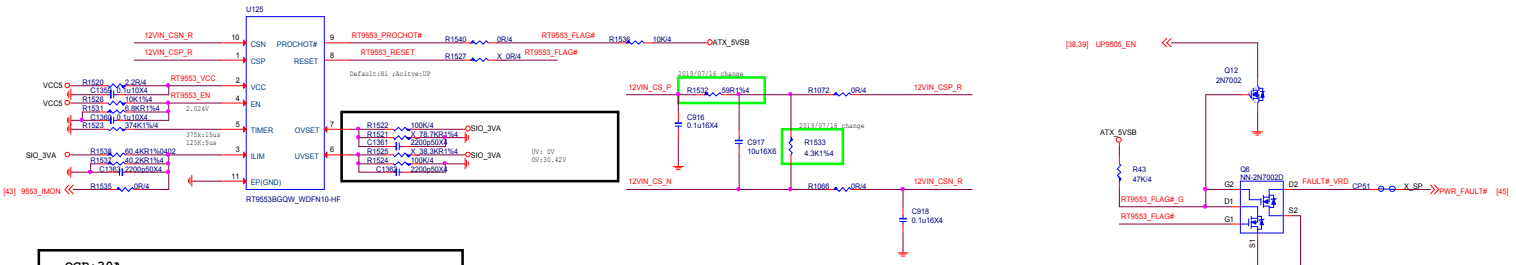
Size: Custom | Document Number: MS-7B84 | Rev: 22

Date: Friday, July 19, 2019 | Sheet 43 of 53

RT9553 CURRENT SENSE

VCORE EDC MAC 125A

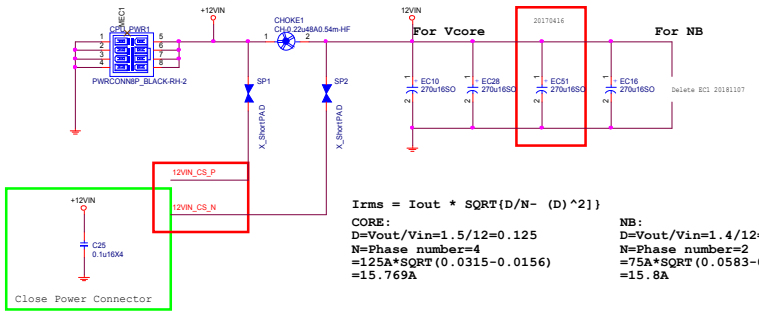
NB EDC MAX75A



OCP:30A
Real OCP:30.05A
R17+R18>100k Vsio_3va= 3.38V Rdcr= 0.5 mohm

I3933_imon*[R17*R18/(R17+R18)]= Istep* Rdcr*100
I3933_imon= 10uA/step
Istep=4.785A

CPU POWER CONNECTOR



Irms = Iout * SQRT{D/N- (D)^2]}

CORE:
D=Vout/Vin=1.5/12=0.125
N=Phase number=4
=125A*SQRT(0.0315-0.0156)
=15.769A

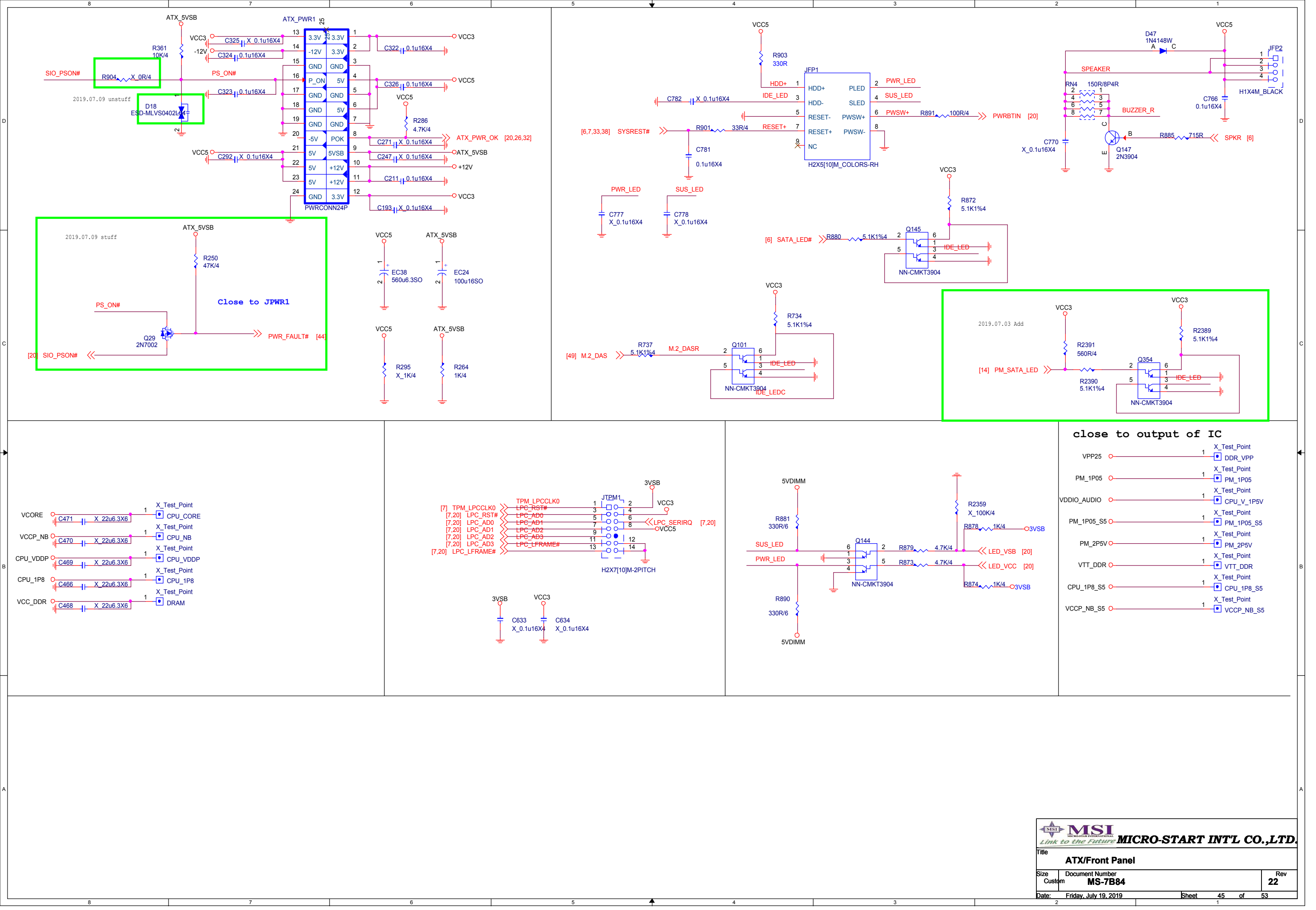
NB:
D=Vout/Vin=1.4/12=0.1166
N=Phase number=2
=75A*SQRT(0.0583-0.0136)
=15.8A

MSI MICRO-STAR INTL CO.,LTD.

Title: RT9553B CURRENT SENSE

Size: Custom | Document Number: MS-7B84 | Rev: 22

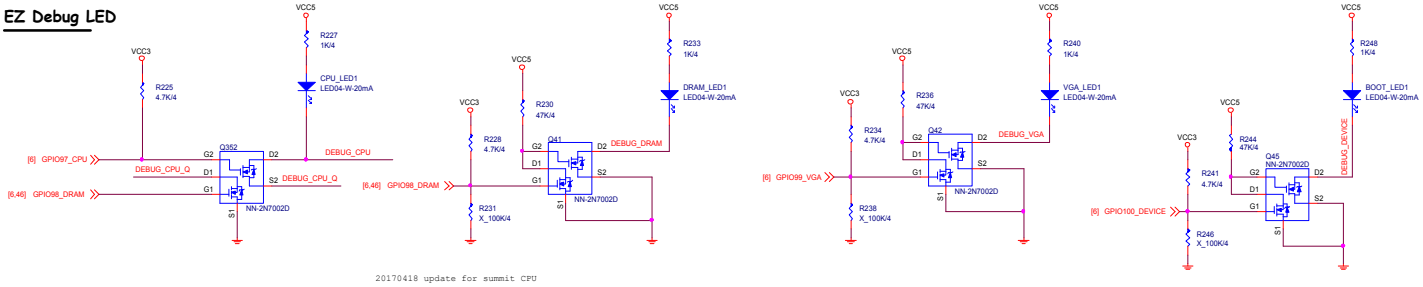
Date: Friday, July 19, 2019 | Sheet 44 of 53



MSI MICRO-START INTL CO.,LTD.

Title		
ATX/Front Panel		
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 45 of 53	

EZ Debug LED



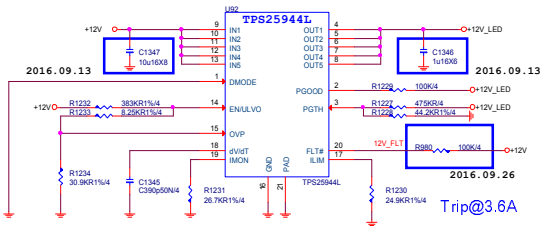
20170418 update for summit CPU

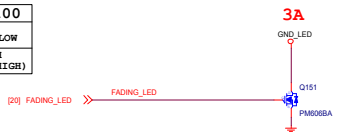
LED Control by SIO

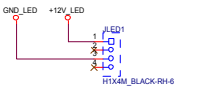
JLED

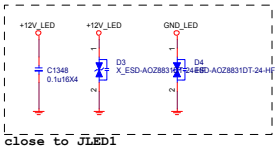
2016.07.06 Use TPS25944L

LED / GPIO	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)







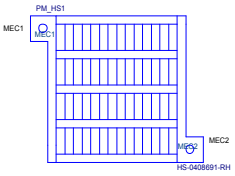


AM4 APU Detect LED Circuit

MSI Computer Corp. Link to the Future MICRO-START INTL CO.,LTD.

Title	ALL LED Control	
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 46 of 53	

HEAT SINK



5010 Level

A B C

FCH

OPT_B450_NB
X_AMD-218-0891011
B01-21808L5-A08

OPT_A320_NB
X_218-0891004-00
B01-21808C5-A08

1uF (0402)

OPT_1UF_5010_1
X_1u6.3X4
5010_0402
C11-1057322-S02

1uF for B450 ONLY

60 Level

CPU Socket

RETENTION MODULE

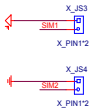
5020 Level

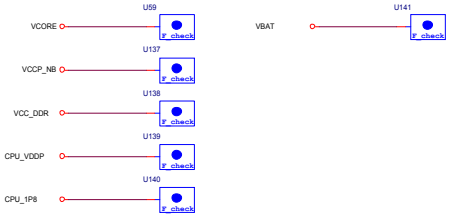
1uF for B450 ONLY

1uF (0402)

OPT_1UF_5020_1
X_1u6.3X4
5020_0402
C11-1057322-S02

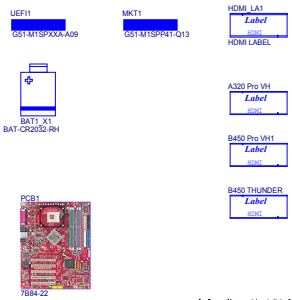
Simulation





CAP USE N07 for A320/B450 SKU

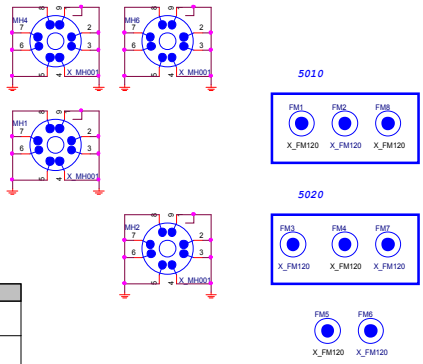
MANUAL PART



PK0-07B8422-G37,精成-深圳,22,寶安恩斯邁廠(MSIS)
PK0-07B8422-E48,競華,23,寶安恩斯邁廠(MSIS)

OPT	Configure	BOM	Function
		601-7B84-A01	XXXX

Optics Orientation Holes

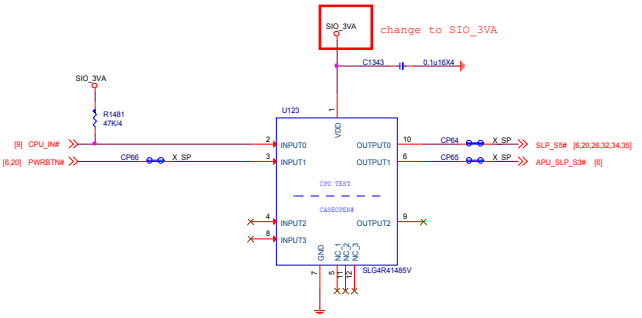


MICRO-START INTL CO.,LTD.

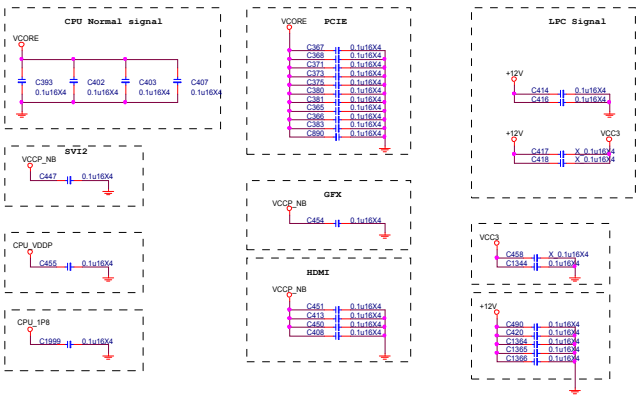
Title: BOM OPTION

Size: Custom | Document Number: MS-7B84 | Rev: 22

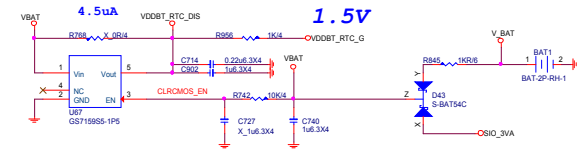
Date: Friday, July 19, 2019 | Sheet 47 of 53



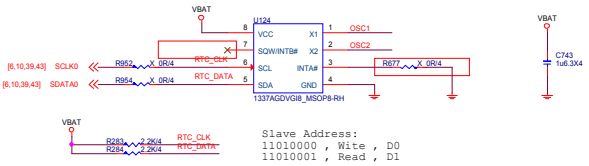
Moat Cap



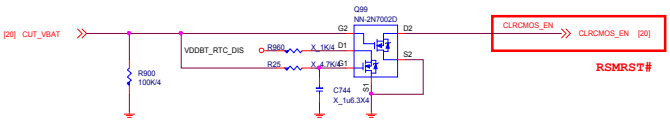
RTC & Clear CMOS Circuit

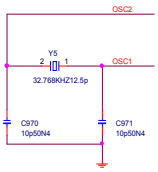


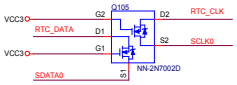
20170413 PIN7floating PIN3 resever pull down



Slave Address:
11010000 , Wite , D0
11010001 , Read , D1





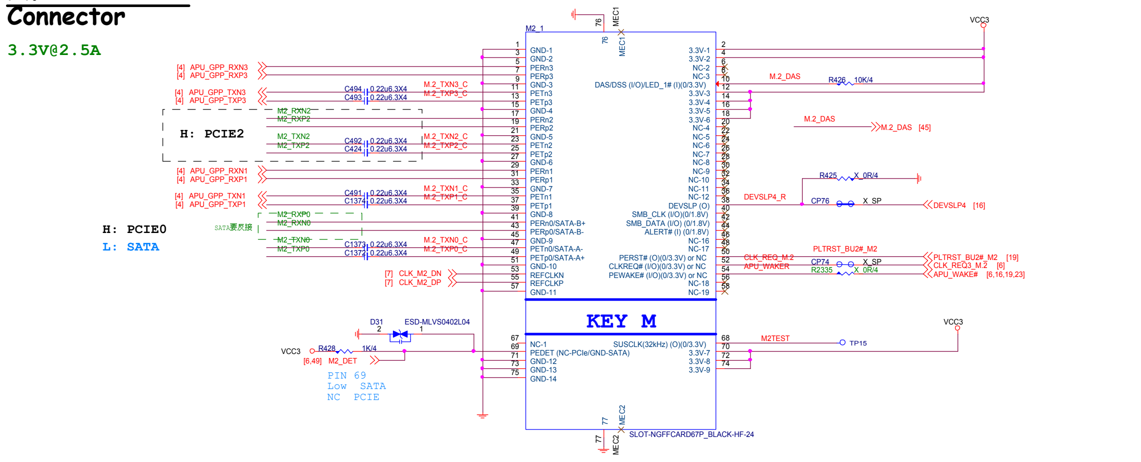


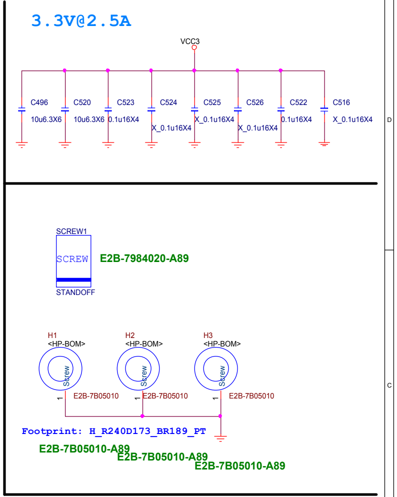
MICRO-START INTL CO.,LTD.

Title: RTC Circuit		
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 48 of 53	

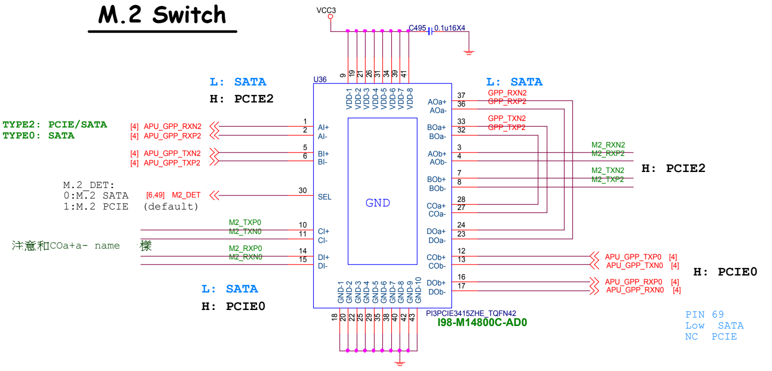
M.2 Connector

3.3V@2.5A





M.2 Switch



MSI MICRO-START INTL CO.,LTD.

Title	M2	
Size: Custom	Document Number: MS-7B84	Rev: 22
Date: Friday, July 19, 2019	Sheet 49 of 53	