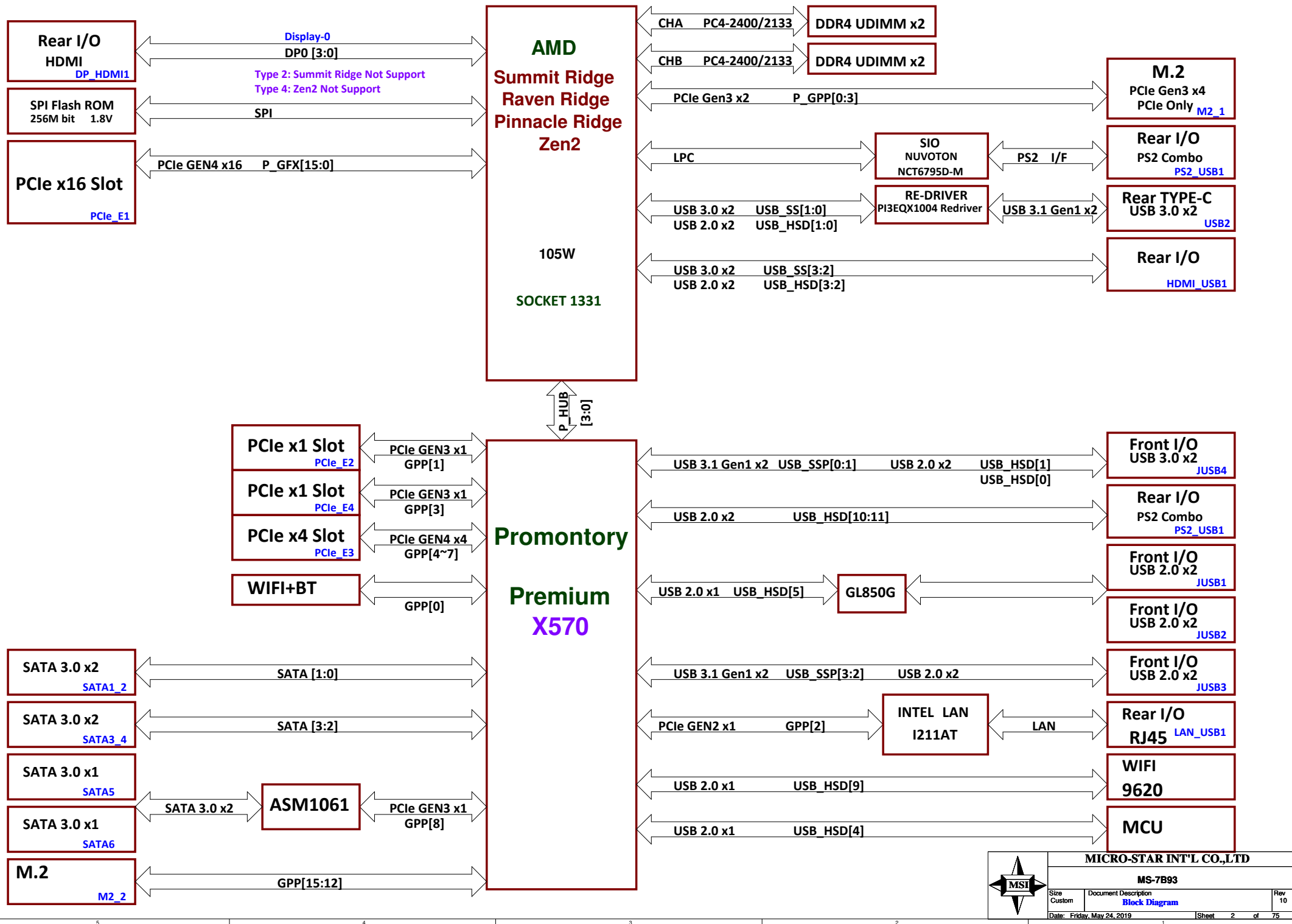


AMD AM4

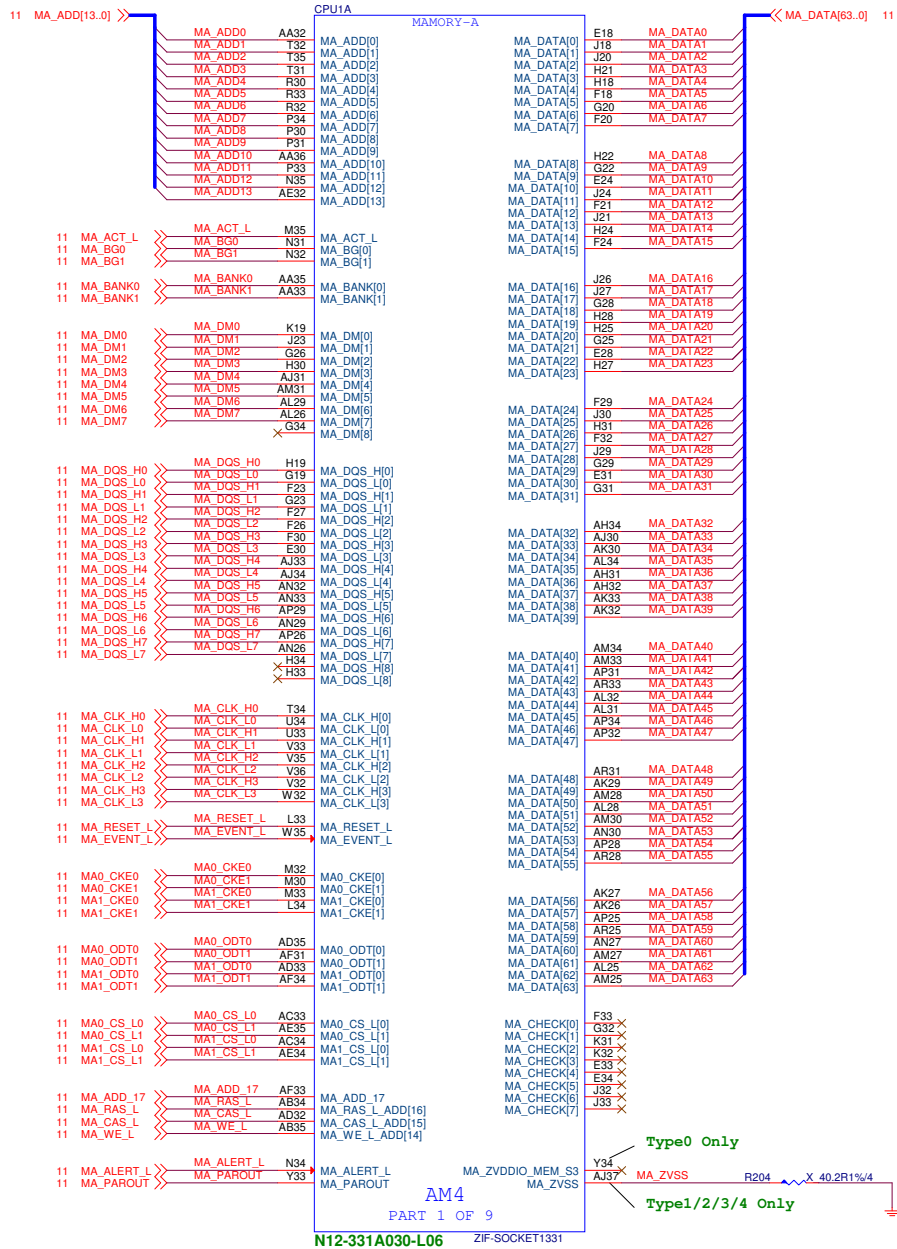
01	Cover Sheet	36	LAN - I211AT	66	LED - Power / JPIPE
02	Block Diagram	37	Audio ALC1220P-VB	67	LED - JLED1 / 2 / 3 / 4
03	FM4 DDR4 I / F	38	Audio DePop	68	LED - Mystic Light
04	AM4 PCIE / SATAE	39	USB Power - UP7501	69	BOM Option
05	AM4 Display / Audio	40	Front USB2.0 Header	70	Manual Parts
06	AM4 SVI / ACPI / GPIO	41	Front USB3.0 Header	71	PG MAP
07	AM4 LPC / SPI / USB / CLK / STRAP	42	Rear USB3.0 + PS2	72	GPIO MAP
08-09	AM4 Power / VDDIO_AUDIO Power / GND	43	Rear USB3.1 / Redriver	73	Power Sequence
10	RTC / CMOS	44	Rear USB3.1 Type A / redrive	74	Power Delivery
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15	Promontory - PCIE / SATA / SATAE	46	GL850G		
16	Promontory - USB / OC	47	HDMI		
17	Promontory - CLK / ACPI / GPIO	48	CPU Power IR35201 10+2		
18-19	Promontory - Power / GND	49	CPU Power Driver IC IR3598		
20	PCI_E1 (X16)	50	CPU Power Vocre Phase 1-6		
21	PCI_E3 (X4)	51	CPU Power Vcore Phase 7-10		
22	PCIE to SATA (ASM1061)	52	CPU Power NB Phase 1-2		
23	NA	53	CPU power 1.8_S0 / S5		
24	PCI_E2/E4_X1	54	CPU power VDDP - NB503		
25	M2_1 PCIE Only(KEY_M)	55	VRM PWRGD		
26	M2_2 PCIE/SATA(KEY_M)	56	DDR Power - RT8125E		
27	M2_WiFi1(KEY_E)	57	DDR PWR-MP2329G-VPP25 / VTT		
28	SIO NCT6797D-M	58	PM - SY8288 CHIP_CLDO-1.2V		
29	SIO HW Monitor / NCT7718W	59	PM - NB503 CHIP_SOC-1V		
30	FAN TYPE-L CPUFAN1	60	OV Control - NCT3933		
31	FAN TYPE-K PUMPFAN1	61	OV 12VIN - RT9553B		
32	FAN TYPE-K SYSFAN1/2	62	ACPI - 3VSB / 5VDIMM		
33	FAN TYPE-K SYSFAN3/4	63	ATX Power - FrpntPanel / EMI		
34	FAN CHIPSET_FAN1	64	LED - EZDEBUG / AMP		
35	FAN GPIO NCT5635	65	MCU - LED Control		



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SATA 0 supported M.2
Not supported PCIE on TYPE 0

	PCIE	SATA
TYPE 0/1	2	2
TYPE 2/3/4	2 or 4	2 or 0

Only supported on TYPE 2/4

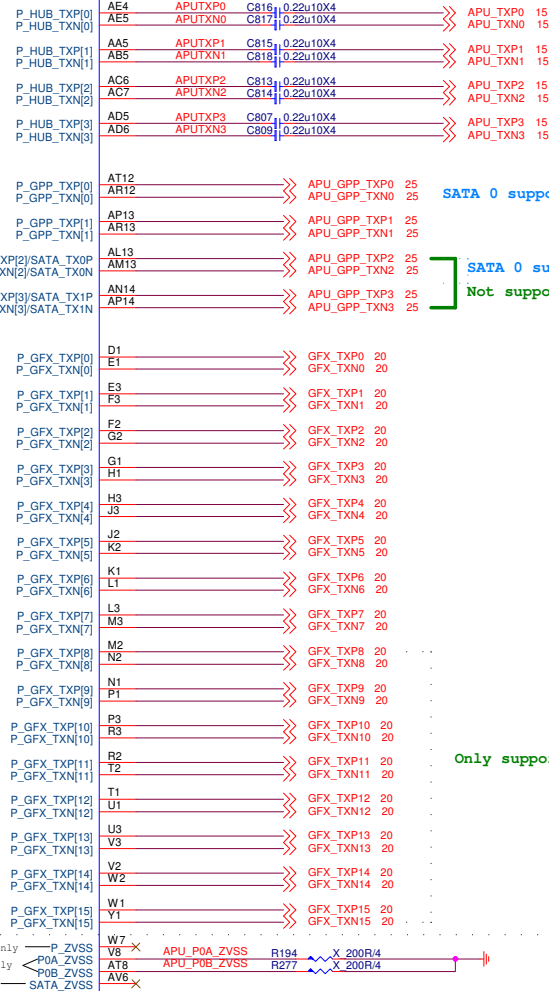
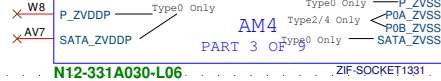
Within 1500 mils from APU

Within 1000 mils from APU

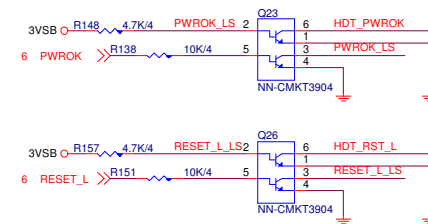
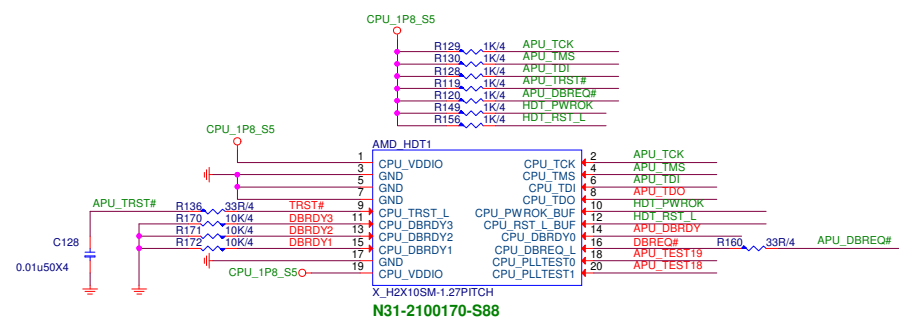
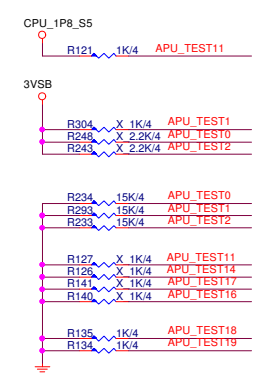
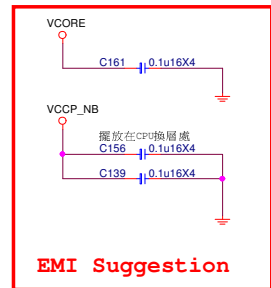
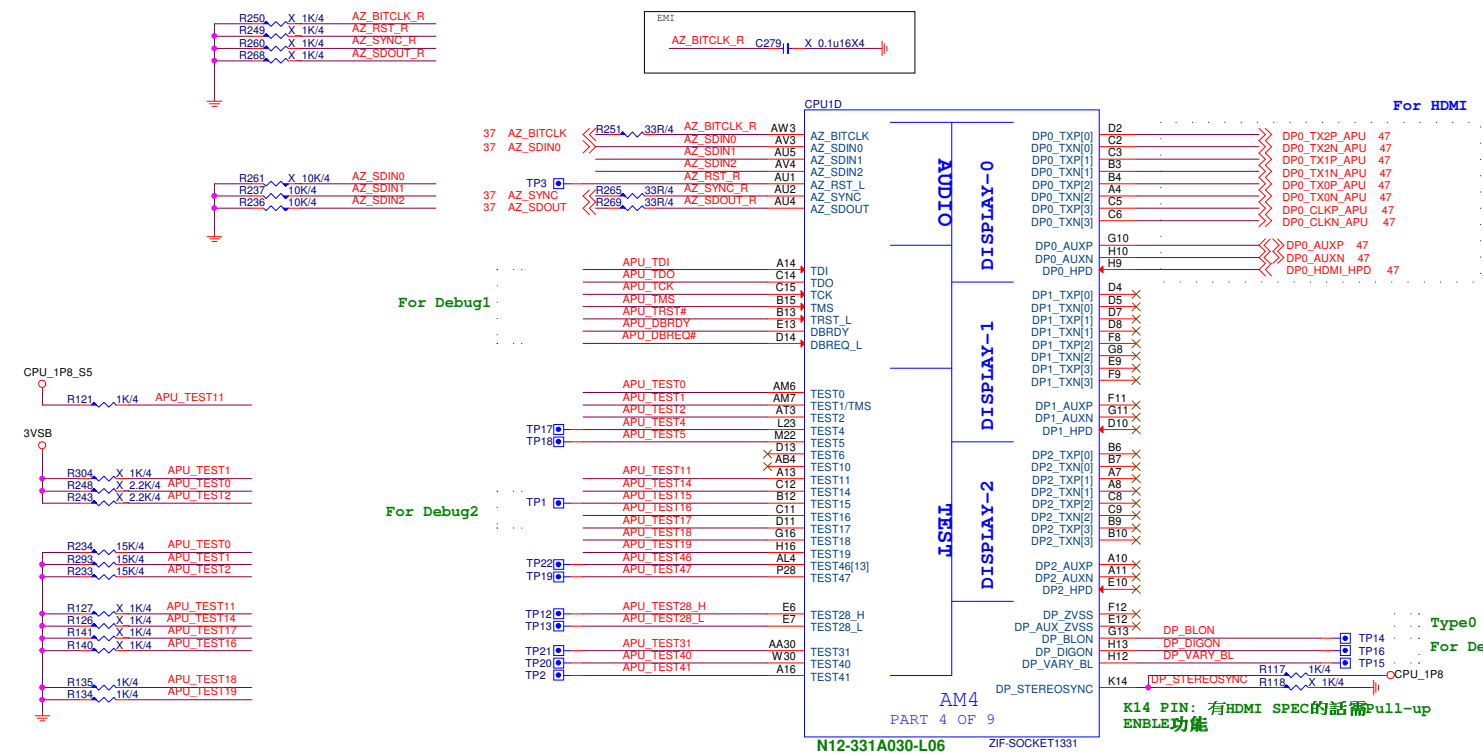
CPU/C

PCIE

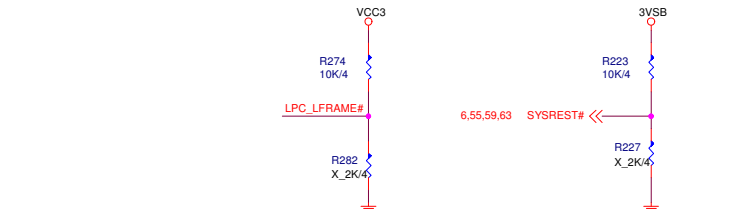
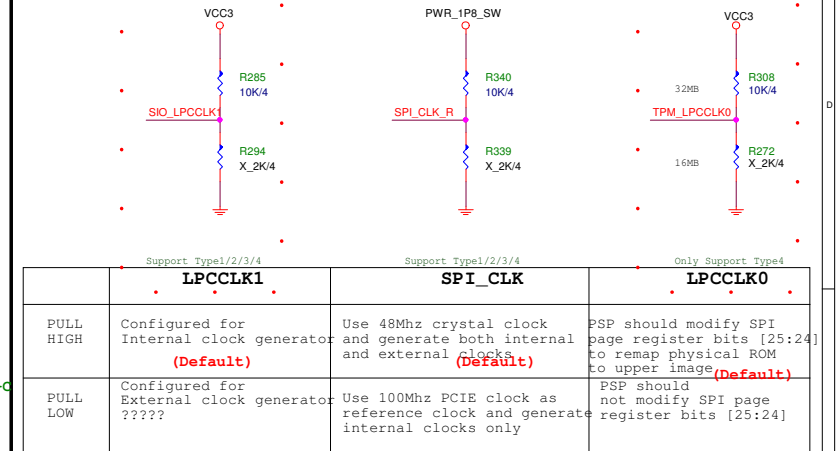
SATA
Express



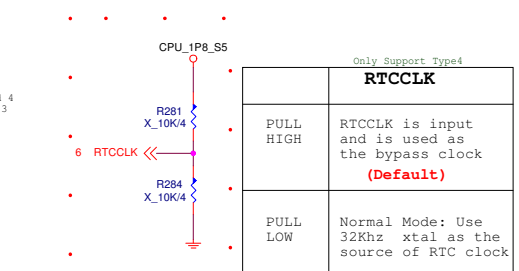
Only supported on TYPE 2/4



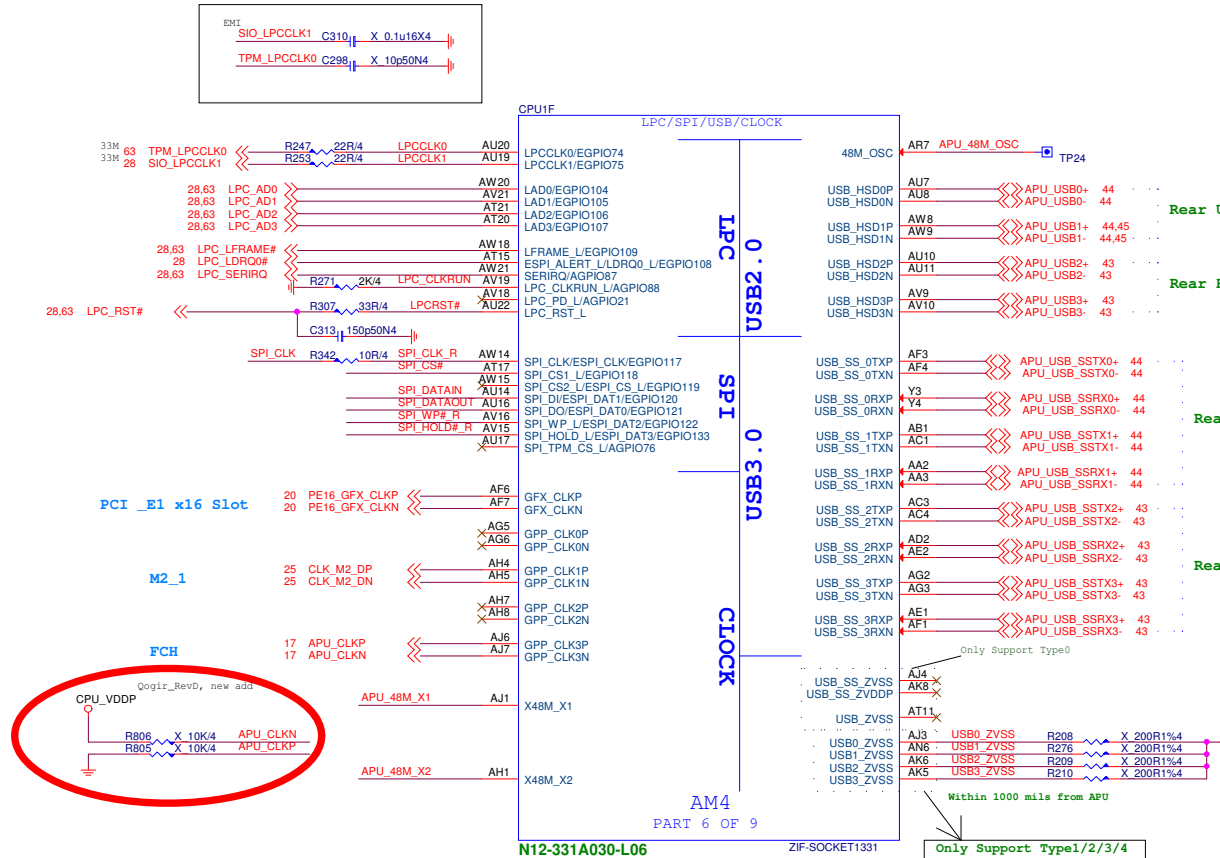
Strapping Options



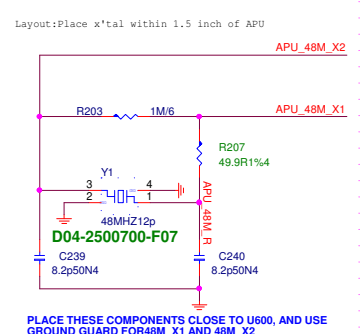
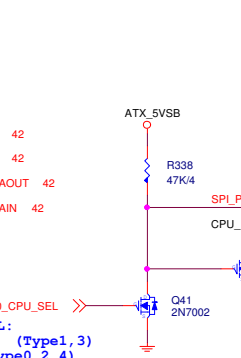
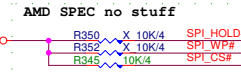
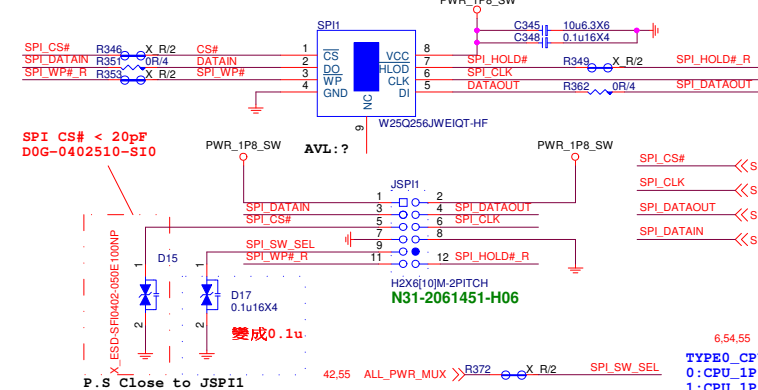
	AGPIO3	LFRAME	SYSREST#
PULL HIGH	Enhanced Reset logic (Default)	SPI ROM (Default)	Normal reset mode (Default)
PULL LOW	Traditional Reset logic	LPC ROM	short reset mode

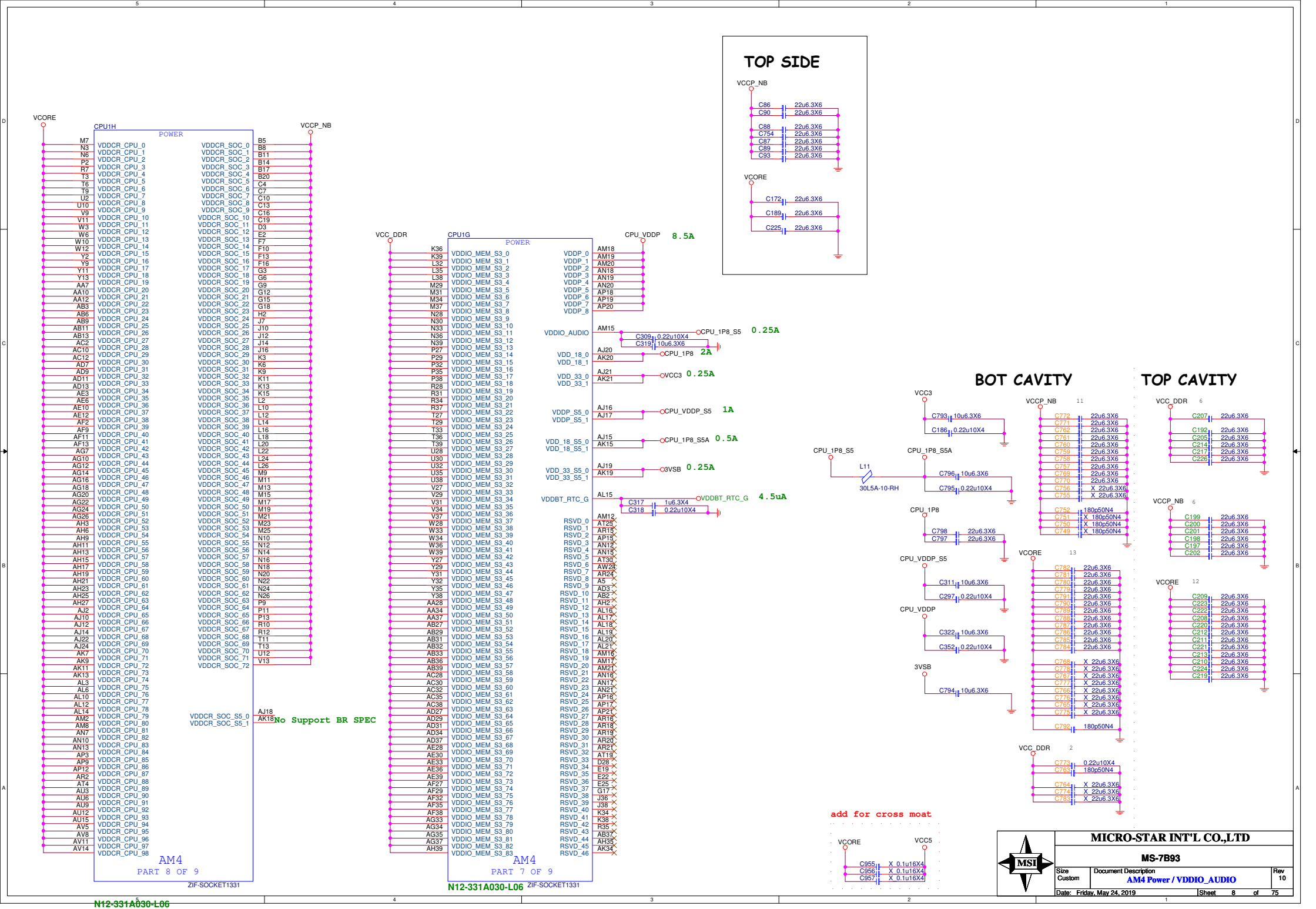


MICRO-STAR INT'L CO.,LTD		
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AM4 LPC/SPI/USB/CLK/STRAP		
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SPI ROM (1.8V)





GND

AM4
PART 9 OF 9

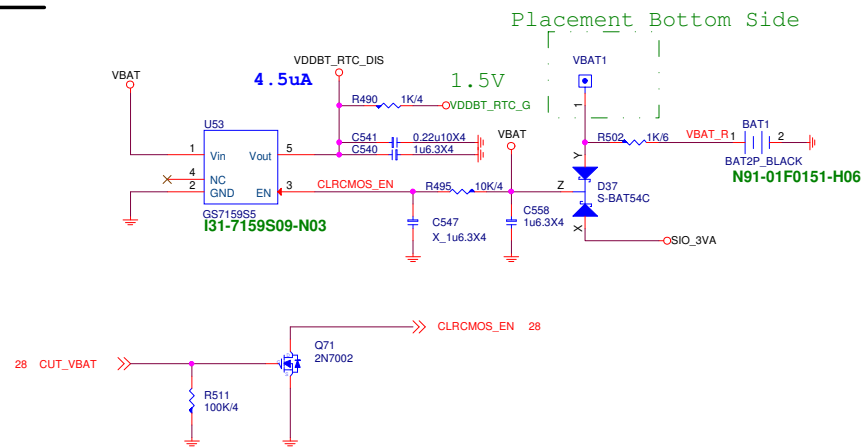


MICRO-STAR INT'L CO.,LTD

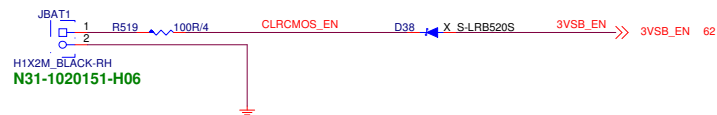
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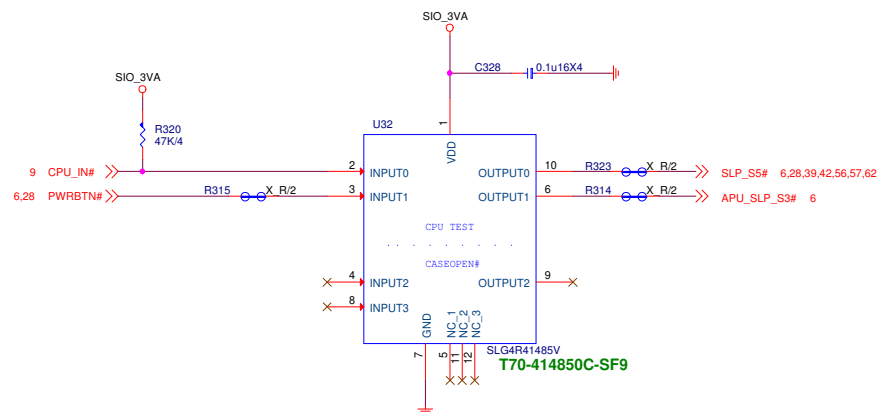
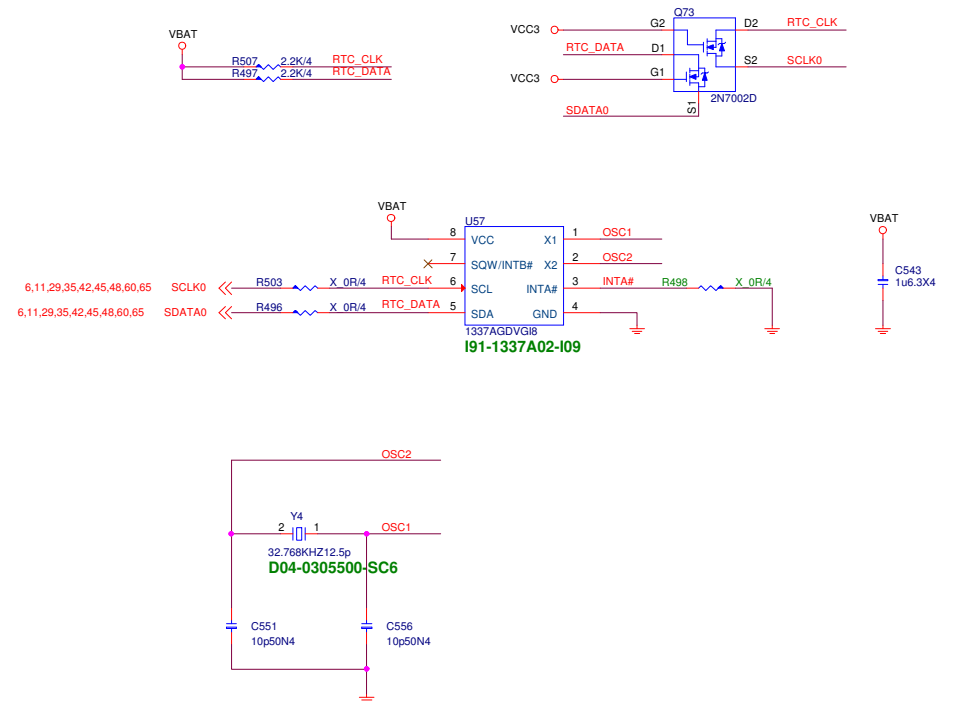
RTC & Clear CMOS Circuit



Clear CMOS button



RTC Backup



MICRO-STAR INT'L CO.,LTD

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A1 A2 B1 B2

DIMMA1A

51 DQS17P
52 DQS17N
132 MA_DM7
133 MA_DM7
121 MA_DM6
122 MA_DM6
110 MA_DM5
111 MA_DM5
99 MA_DM4
100 MA_DM4
41 MA_DM3
29 MA_DM2
30 MA_DM2
18 MA_DM1
19 MA_DM1
7 MA_DM0
8 MA_DM0
197 DQS8P
198 DQS8N
278 MA_DQS_H7
277 MA_DQS_L7
267 MA_DQS_H6
266 MA_DQS_L6
256 MA_DQS_H5
255 MA_DQS_L5
245 MA_DQS_H4
244 MA_DQS_L4
186 MA_DQS_H3
185 MA_DQS_L3
175 MA_DQS_H2
174 MA_DQS_L2
164 MA_DQS_H1
163 MA_DQS_L1
153 MA_DQS_H0
152 MA_DQS_L0
218 MA_CLK_H1
219 MA_CLK_L1
74 MA_CLK_H0
75 MA_CLK_L0

235 C2
237 S3_N_C1
93 S2_N_C0

89 MA0_CS_L1
84 MA0_CS_L0
203 MA0_CKE1
60 MA0_CKE0
91 MA0_ODT1
87 MA0_ODT0

199 CB-7
54 CB-6
192 CB-5
47 CB-4
201 CB-3
56 CB-2
194 CB-1
49 CB-0

58 MA_RESET_L
78 MA_EVENT_L
208 MA_ALERT_L
62 MA_ACT_L
222 MA_PAROUT

230 SAVE_N_NC
144 RFU-0
205 RFU-1
227 RFU-2

DDRIV-288P

N13-2880581-L06

AVL: N13-2880441-F02

6,10,29,35,42,45,48,60,65
6,10,29,35,42,45,48,60,65

SCLK0
SDATA0

SCLK0
SDATA0

R366
R363

X R/2
X R/2

SMB_CLK_DIMM
SMB_DATA_DIMM

SMB_CLK_DIMM
SMB_DATA_DIMM

12
12

<< MA_DATA[63..0] 3,11

280 MA_DATA63
135 MA_DATA62
273 MA_DATA61
128 MA_DATA60
282 MA_DATA59
137 MA_DATA58
275 MA_DATA57
130 MA_DATA56
269 MA_DATA55
124 MA_DATA54
262 MA_DATA53
117 MA_DATA52
271 MA_DATA51
126 MA_DATA50
264 MA_DATA49
119 MA_DATA48
258 MA_DATA47
113 MA_DATA46
251 MA_DATA45
106 MA_DATA44
260 MA_DATA43
115 MA_DATA42
253 MA_DATA41
108 MA_DATA40
247 MA_DATA39
102 MA_DATA38
240 MA_DATA37
95 MA_DATA36
249 MA_DATA35
104 MA_DATA34
242 MA_DATA33
97 MA_DATA32
188 MA_DATA31
43 MA_DATA30
181 MA_DATA29
36 MA_DATA28
190 MA_DATA27
45 MA_DATA26
183 MA_DATA25
38 MA_DATA24
177 MA_DATA23
32 MA_DATA22
170 MA_DATA21
25 MA_DATA20
179 MA_DATA19
34 MA_DATA18
172 MA_DATA17
27 MA_DATA16
166 MA_DATA15
21 MA_DATA14
159 MA_DATA13
14 MA_DATA12
168 MA_DATA11
23 MA_DATA10
161 MA_DATA9
16 MA_DATA8
155 MA_DATA7
10 MA_DATA6
148 MA_DATA5
3 MA_DATA4
157 MA_DATA3
12 MA_DATA2
150 MA_DATA1
5 MA_DATA0

207 MA_BG1
63 MA_BG0
224 MA_BANK1
81 MA_BANK0

234 MA_ADD_17
82 MA_RAS_L
86 MA_CAS_L
228 MA_WE_L
232 MA_ADD13
65 MA_ADD12
210 MA_ADD11
225 MA_ADD10
66 MA_ADD9
68 MA_ADD8
211 MA_ADD7
69 MA_ADD6
213 MA_ADD5
214 MA_ADD4
71 MA_ADD3
216 MA_ADD2
72 MA_ADD1
79 MA_ADD0

141 SMB_CLK_DIMM
285 SMB_DATA_DIMM

238 SA-2
140 SA-1
139 SA-0

DIMM1 (CHANNEL-A) -A0
ADDRESS = 0:0 [SA1:SA0]

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

DIMMA2A

51 DQS17P
52 DQS17N
132 MA_DM7
133 MA_DM7
121 MA_DM6
122 MA_DM6
110 MA_DM5
111 MA_DM5
99 MA_DM4
100 MA_DM4
41 MA_DM3
29 MA_DM2
30 MA_DM2
18 MA_DM1
19 MA_DM1
7 MA_DM0
8 MA_DM0
197 DQS8P
198 DQS8N
278 MA_DQS_H7
277 MA_DQS_L7
267 MA_DQS_H6
266 MA_DQS_L6
256 MA_DQS_H5
255 MA_DQS_L5
245 MA_DQS_H4
244 MA_DQS_L4
186 MA_DQS_H3
185 MA_DQS_L3
175 MA_DQS_H2
174 MA_DQS_L2
164 MA_DQS_H1
163 MA_DQS_L1
153 MA_DQS_H0
152 MA_DQS_L0
218 MA_CLK_H3
219 MA_CLK_L3
74 MA_CLK_H2
75 MA_CLK_L2

235 C2
237 S3_N_C1
93 S2_N_C0

89 MA1_CS_L1
84 MA1_CS_L0
203 MA1_CKE1
60 MA1_CKE0
91 MA1_ODT1
87 MA1_ODT0

199 CB-7
54 CB-6
192 CB-5
47 CB-4
201 CB-3
56 CB-2
194 CB-1
49 CB-0

58 MA_RESET_L
78 MA_EVENT_L
208 MA_ALERT_L
62 MA_ACT_L
222 MA_PAROUT

230 SAVE_N_NC
144 RFU-0
205 RFU-1
227 RFU-2

DDRIV-288P

N13-2880581-L06

<< MA_DATA[63..0] 3,11

280 MA_DATA63
135 MA_DATA62
273 MA_DATA61
128 MA_DATA60
282 MA_DATA59
137 MA_DATA58
275 MA_DATA57
130 MA_DATA56
269 MA_DATA55
124 MA_DATA54
262 MA_DATA53
117 MA_DATA52
271 MA_DATA51
126 MA_DATA50
264 MA_DATA49
119 MA_DATA48
258 MA_DATA47
113 MA_DATA46
251 MA_DATA45
106 MA_DATA44
260 MA_DATA43
115 MA_DATA42
253 MA_DATA41
108 MA_DATA40
247 MA_DATA39
102 MA_DATA38
240 MA_DATA37
95 MA_DATA36
249 MA_DATA35
104 MA_DATA34
242 MA_DATA33
97 MA_DATA32
188 MA_DATA31
43 MA_DATA30
181 MA_DATA29
36 MA_DATA28
190 MA_DATA27
45 MA_DATA26
183 MA_DATA25
38 MA_DATA24
177 MA_DATA23
32 MA_DATA22
170 MA_DATA21
25 MA_DATA20
179 MA_DATA19
34 MA_DATA18
172 MA_DATA17
27 MA_DATA16
166 MA_DATA15
21 MA_DATA14
159 MA_DATA13
14 MA_DATA12
168 MA_DATA11
23 MA_DATA10
161 MA_DATA9
16 MA_DATA8
155 MA_DATA7
10 MA_DATA6
148 MA_DATA5
3 MA_DATA4
157 MA_DATA3
12 MA_DATA2
150 MA_DATA1
5 MA_DATA0

207 MA_BG1
63 MA_BG0
224 MA_BANK1
81 MA_BANK0

234 MA_ADD_17
82 MA_RAS_L
86 MA_CAS_L
228 MA_WE_L
232 MA_ADD13
65 MA_ADD12
210 MA_ADD11
225 MA_ADD10
66 MA_ADD9
68 MA_ADD8
211 MA_ADD7
69 MA_ADD6
213 MA_ADD5
214 MA_ADD4
71 MA_ADD3
216 MA_ADD2
72 MA_ADD1
79 MA_ADD0

141 SMB_CLK_DIMM
285 SMB_DATA_DIMM

238 SA-2
140 SA-1
139 SA-0

DIMM2 (CHANNEL-A) -A4
ADDRESS = 1:0 [SA1:SA0]

DDRIV-288P

N13-2880581-L06



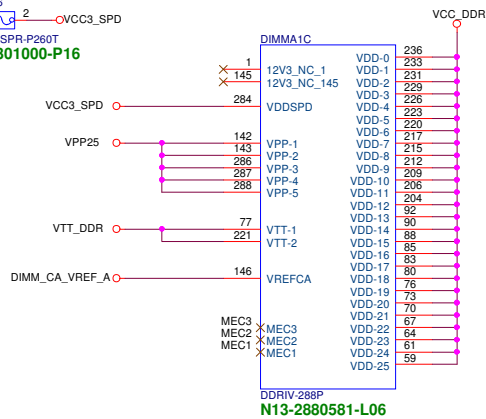
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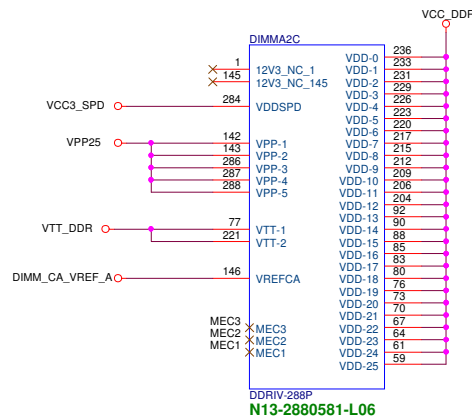
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av1:D08-0301100-B07

VCC3 1 F6 2 VCC3_SPD
F-SPR-P260T
D08-0301000-P16

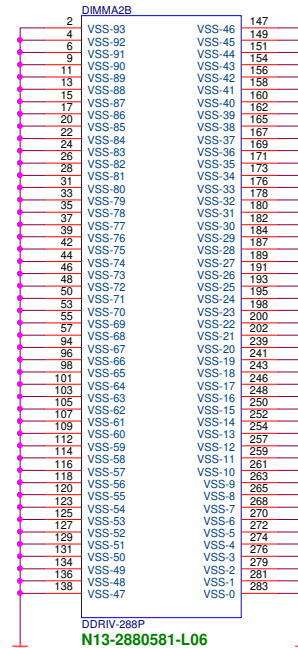
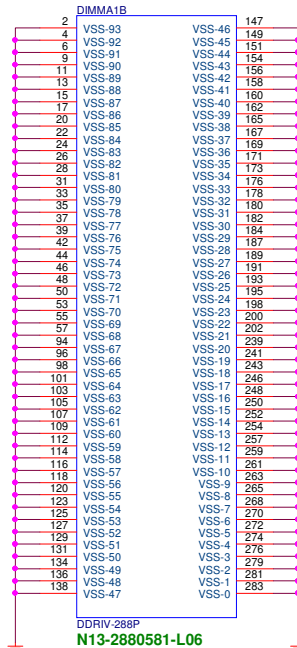
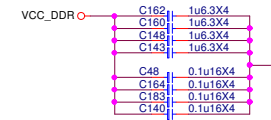
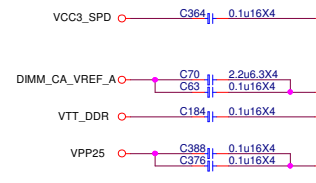
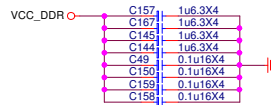
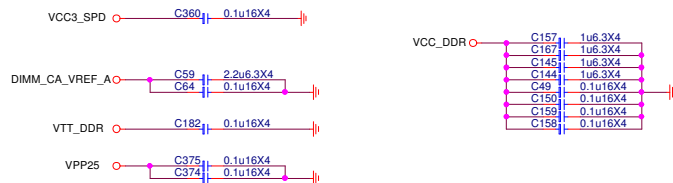
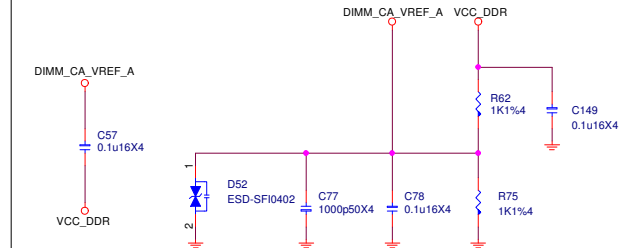


DIMM SLOT PN BY SPEC



DDR VREF

(place resistors close to DIMMs)



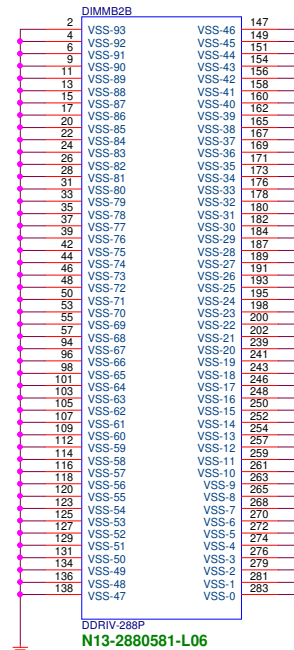
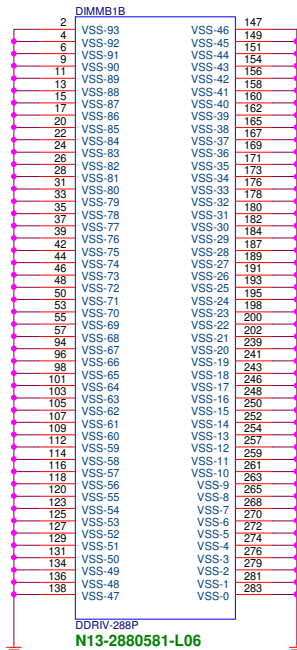
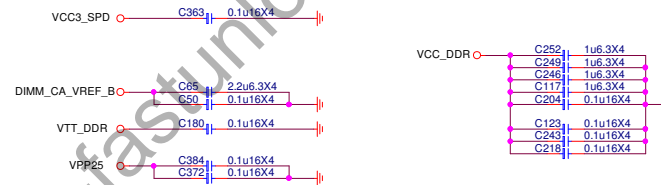
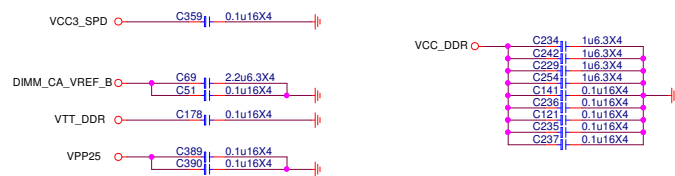
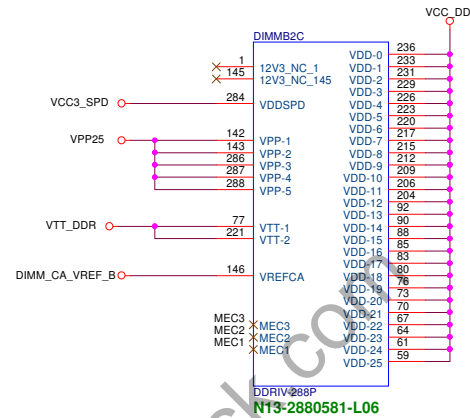
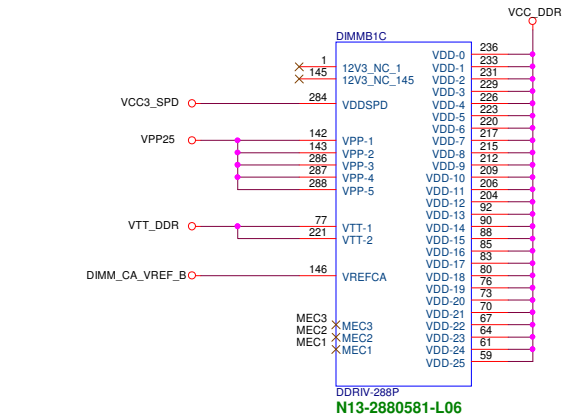
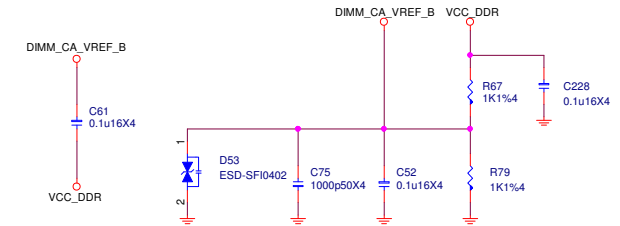
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Custom	DDR4 - POWER/GND-1	10
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DDR VREF

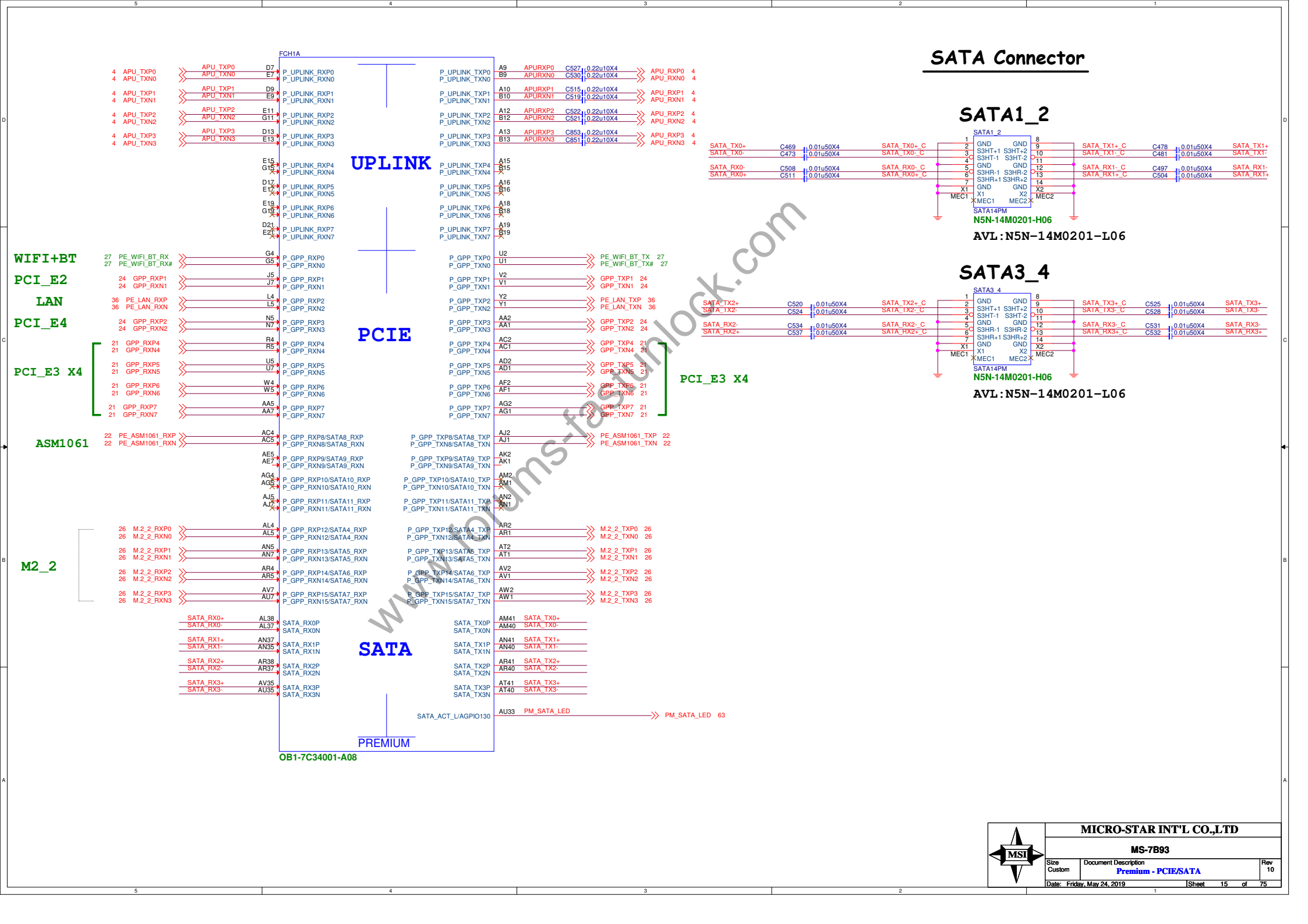
(place resistors close to DIMMs)



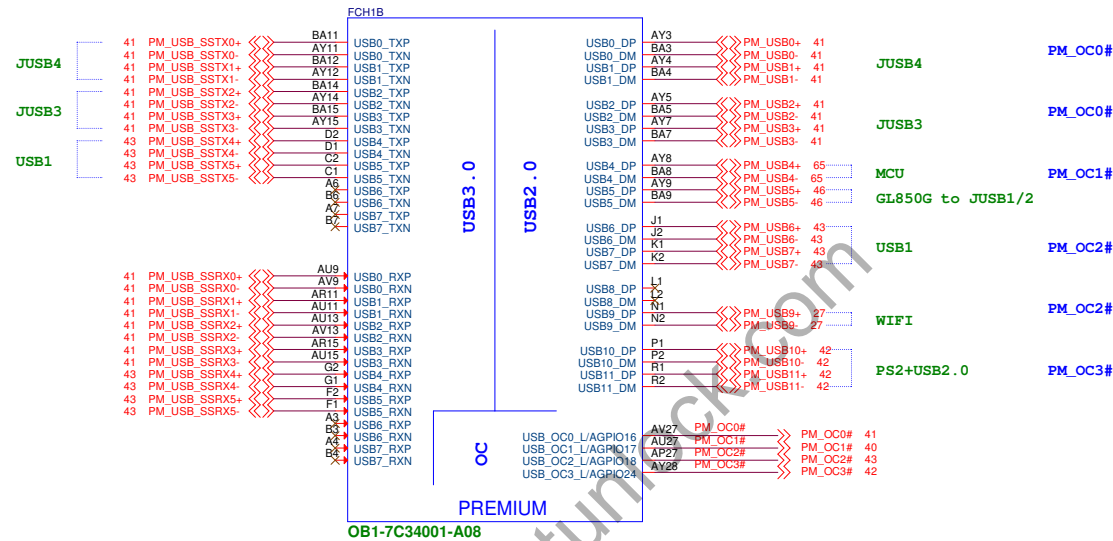
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HC0 will control USB[3:0]_RX/TX(P/N) and USB[5:0]_D(P/M)
 HC1 will control USB[7:4]_RX/TX(P/N) and USB[11:6]_D(P/M)



HC0 will control USB[3:0]_RX/TX(P/N) and USB[5:0]_D(P/M)
 HC1 will control USB[7:4]_RX/TX(P/N) and USB[11:6]_D(P/M)

1	2	3	4	5	6	7	8
PCIe	PCIe	PCIe	PCIe	PCIe	PCIe	PCIe	PCIe
Intel WPI (IT19)	PCI_E2	PCI_E4	NA	PCI_E3			

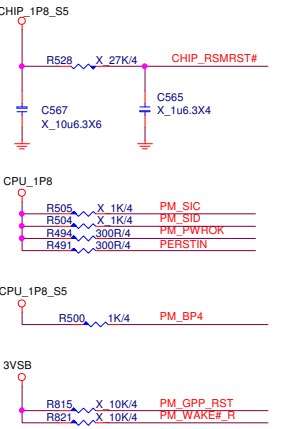
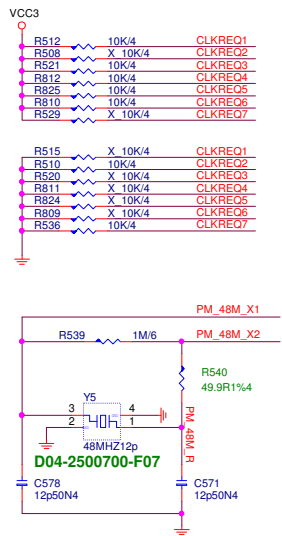
M2_2 支持 PCIe/SATA mode	9	10	11	12	13	14	15	16	17	18	19	20
SATA	SATA	SATA	SATA	SATA	SATA	SATA	SATA	SATA	SATA	SATA	SATA	SATA
S1	S2	S3	S4	M2_2				LAN	ASUS 10G1 (PCIe-SATA 2)	NA	NA	NA

21	22	23	24	25	26	27	28	29	30	31	32	33	34
U3.1	U3.1	U3.1	U3.1	U2	U2	U3.1	U3.1	U3.1	U3.1	U2	U2	NA	NA
Front U3 GEN1				MCU		USB Hub		Rear U3.1 GEN2 type A		NA	WIFI	Rear U2	

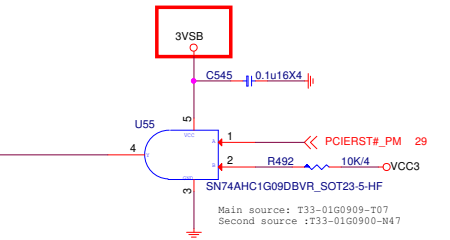
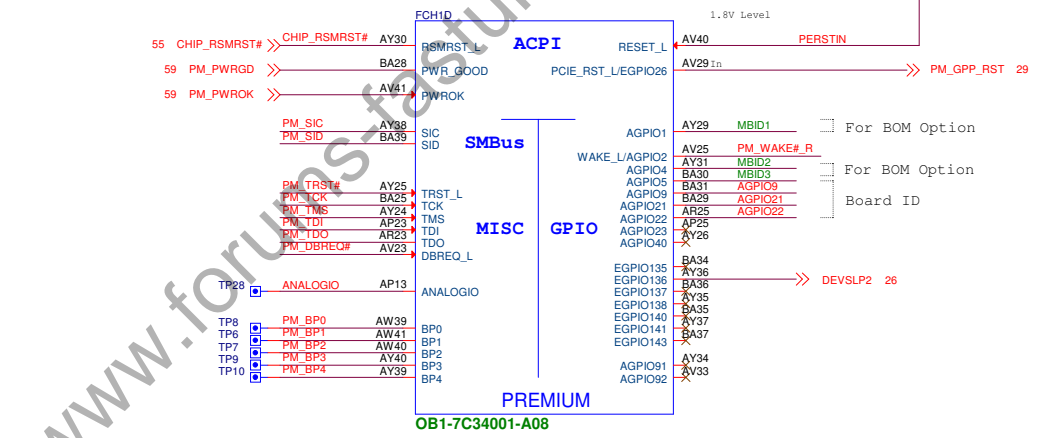
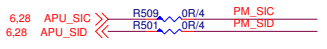
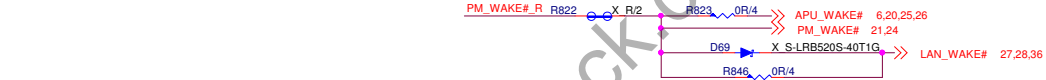
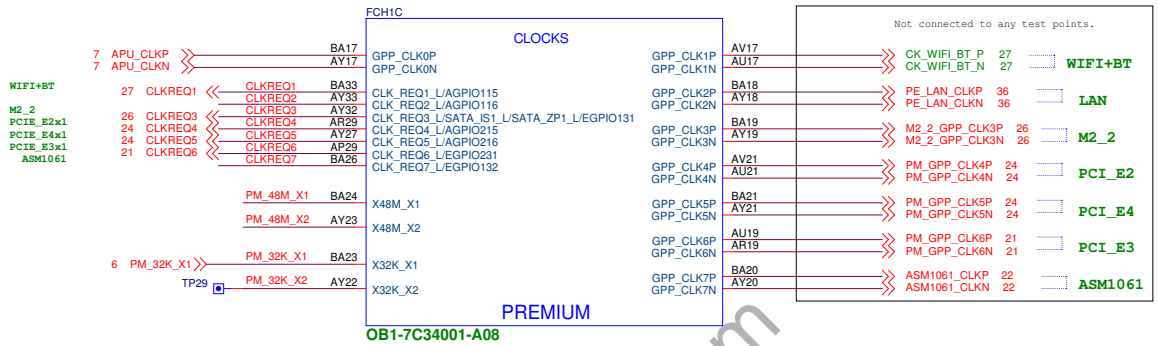
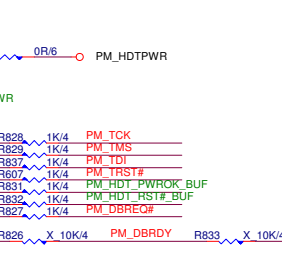
CPU	1	2	3	4	5	6	7	8
ZEN 2 Processor	SATA	SATA	Gen4 x2 PCIe		U3.1	U3.1	U3.1	U3.1
Carbon AC				M2_1	Rear U3.1 GEN1 type A		Rear U3.1 GEN2 An-C	

M2_1 支持 PCIe mode

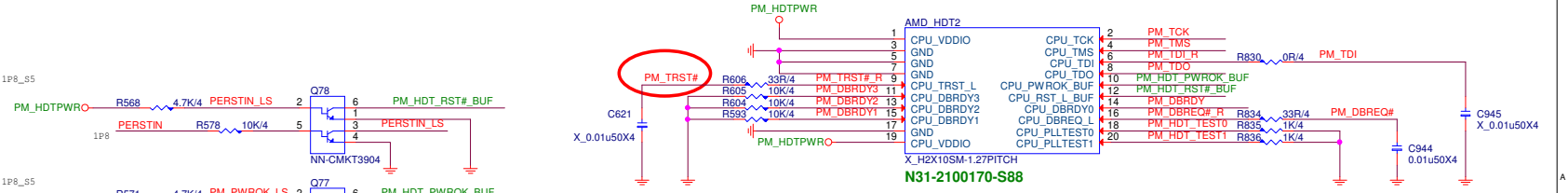
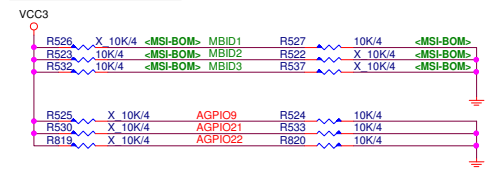
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PREMIUM CHIPSET HDT

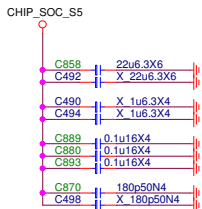
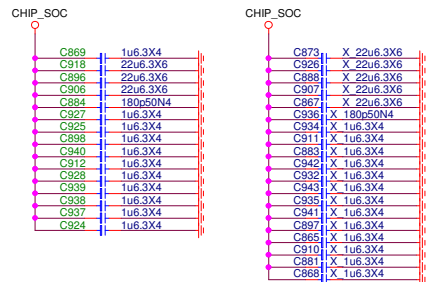


BOM OPTION



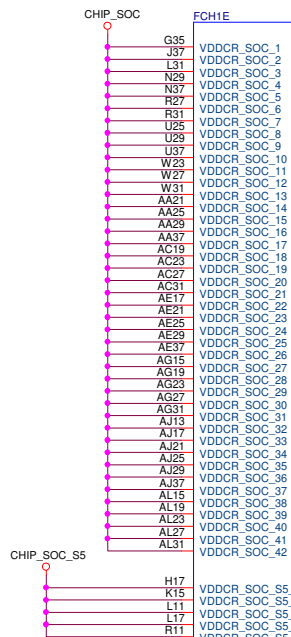


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1A

9A



OB1-7C34001-A08

POWER



5A



0.5A

0.1A

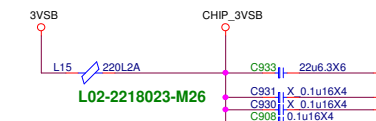
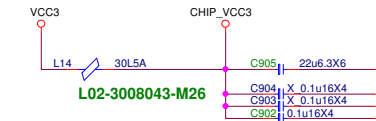
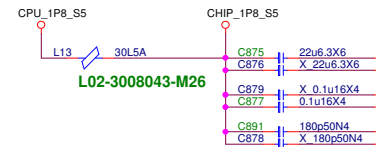
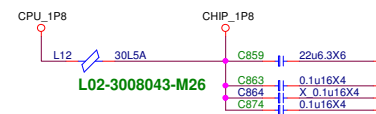
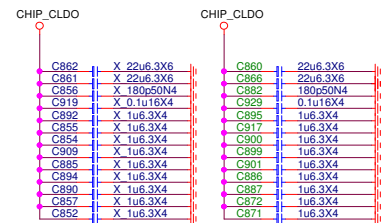
0.2A

0.1A



PREMIUM

Close to FCH Power Pin



MICRO-STAR INT'L CO.,LTD

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GND

PREMIUM

FCH1G			RSVD		
T40	DFTIO_0	H25			
R41	DFTIO_1	E28			
AJ38	DFTIO_2	E29			
R40	DFTIO_3	E31			
AJ38	DFTIO_4	E27			
L38	DFTIO_5	E35			
AJ38	DFTIO_6	E23			
AD41	DFTIO_7	E34			
V40	DFTIO_8	E39			
H40	DFTIO_9	E24			
J38	DFTIO_10	E35			
G25	DFTIO_11	E38			
M41	DFTIO_12	E30			
E38	DFTIO_13	E21			
J34	DFTIO_14	E23			
M40	DFTIO_15	E25			
AD40	DFTIO_16	E26			
L38	DFTIO_17	E29			
E41	DFTIO_18	E28			
F41	DFTIO_19	E21			
H41	DFTIO_20	E22			
N40	DFTIO_21	E27			
K41	DFTIO_22	E24			
W37	DFTIO_23	E41			
L37	DFTIO_24	E39			
G38	DFTIO_25	E38			
L41	DFTIO_26	E37			
D35	DFTIO_27	E40			
J35	DFTIO_28	E23			
H31	DFTIO_29	E32			
E38	DFTIO_30	E21			
AB40	DFTIO_31	E23			
E27	DFTIO_32	W32			
D40	DFTIO_33	E41			
P40	DFTIO_34	E37			
D40	DFTIO_35	E34			
AC37	DFTIO_36	E41			
T41	DFTIO_37	E41			
P41	DFTIO_38	AC34			
G41	DFTIO_39	AL34			
U38	DFTIO_40	E15			
AA35	DFTIO_41	E26			
AA41	DFTIO_42	E31			
N35	DFTIO_43	E36			
AC40	DFTIO_44	E33			
W35	DFTIO_45	AC32			
AH41	DFTIO_46	W40			
U38	DFTIO_47	E35			
AA34	DFTIO_48	E40			
AA35	DFTIO_49	E33			
N35	DFTIO_50	E37			
W35	DFTIO_51	E34			
AL32	DFTIO_52	E34			
AF41	DFTIO_53	E25			
AC38	DFTIO_54	AA40			
AG32	DFTIO_55	AC41			
AE38	DFTIO_56	AE35			
AE40	DFTIO_57	AA40			
AF40	DFTIO_58	E29			
Y40	DFTIO_59	E30			
AH40	DFTIO_60	E31			
AG41	DFTIO_61	E35			
AC40	DFTIO_62	E40			
R38	DFTIO_63	AG37			
AJ41	DFTIO_64	E41			
AG38	DFTIO_65	E40			
AE32	DFTIO_66	E41			
AB41	DFTIO_67	E41			
AG34	DFTIO_68	E41			
AK40	DFTIO_69	E29			
N35	DFTIO_70	E40			
W41	DFTIO_71	E40			
A30	DFTIO_72	E40			
L33	DFTIO_73	E27			
B31	DFTIO_74	E29			
B32	DFTIO_75	E29			

PREMIUM
OB1-7C34001-A08

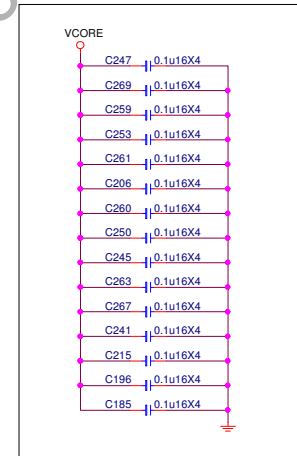



MICRO-STAR INT'L CO.,LTD

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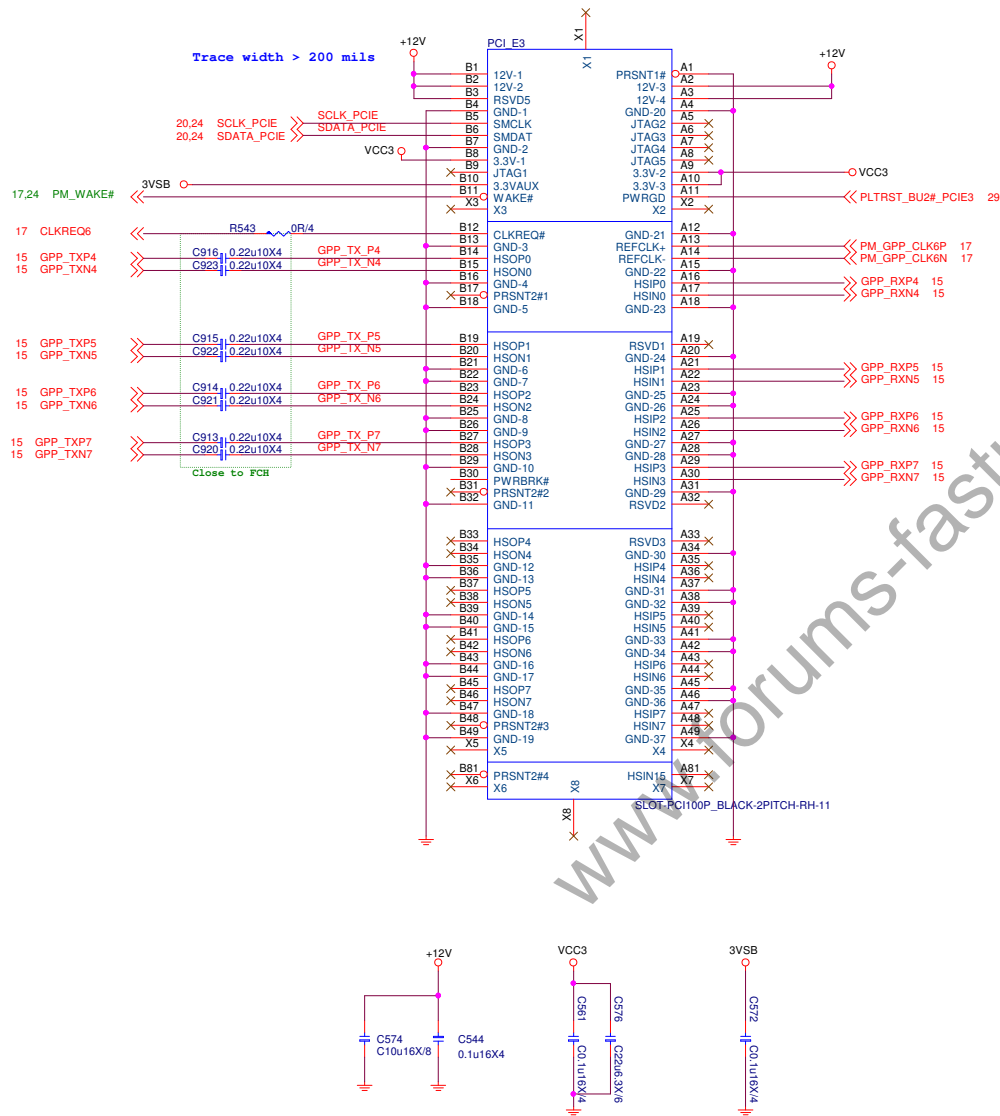
PCI_E1



	MICRO-STAR INT'L CO.,LTD		
	MS-7B93		
	Size Custom	Document Description PCI_E2 (X16)	Rev 10
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PCI EXPRESS x4 SLOT

PCI_E3 X4



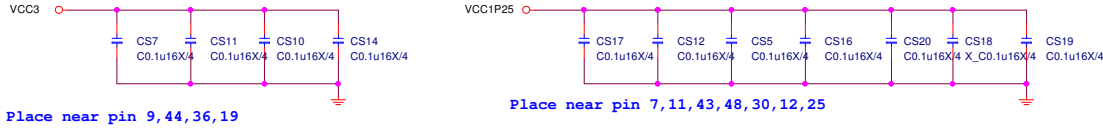
PCI Express x4 Slot		
+12V		- 2.1A
+VCC3		- 3A
+3V3_S5	(wake)	- 375mA
+3V3_S5	(no wake)	- 20mA

SATA Connector

1.2V delay from 3.3V 90% > 0ms

ASM1061 POWER Consumption

	3.3V	1.25V	Power (mW)
Idle (mA)	98.45	212.3	579.645
Busy (mA)	91.1	330.7	697.47

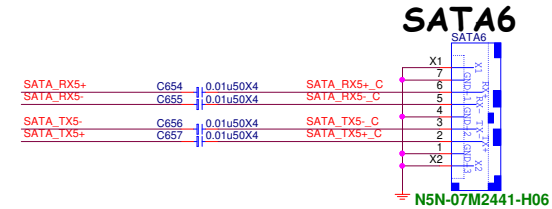
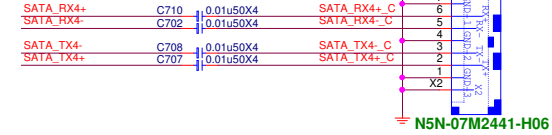
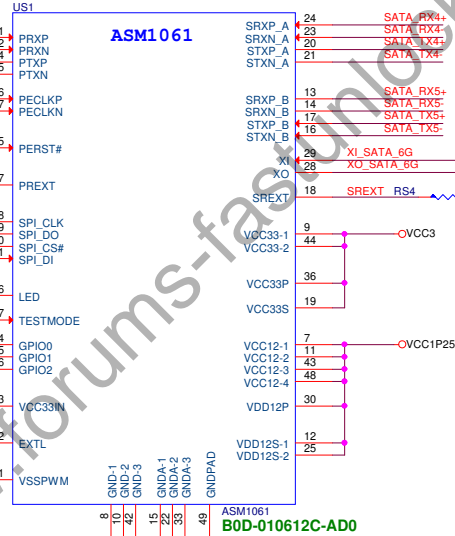
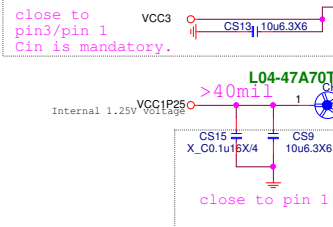
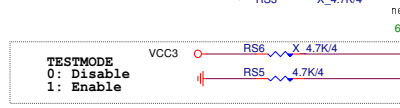


ASM1061 SATA6G

SATA_SPI_DO don't need pull up (integrated pull-up) or pull down for Asmedia recommendation. Asmedia suggest that we use spinup by s/w mode for MB or PCI-E Card.

SPI_DO

0: Spinup by H/W
1: Spinup by S/W



PCIE GEN4 MUX

For PCIE1 & PCIE3

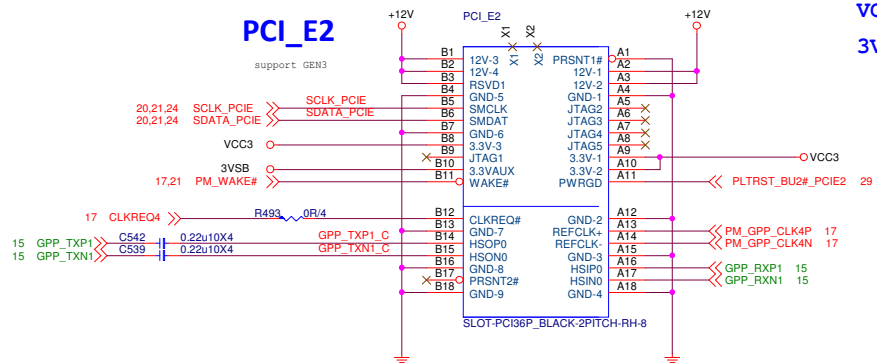
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PCI EXPRESS X1 SLOT

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

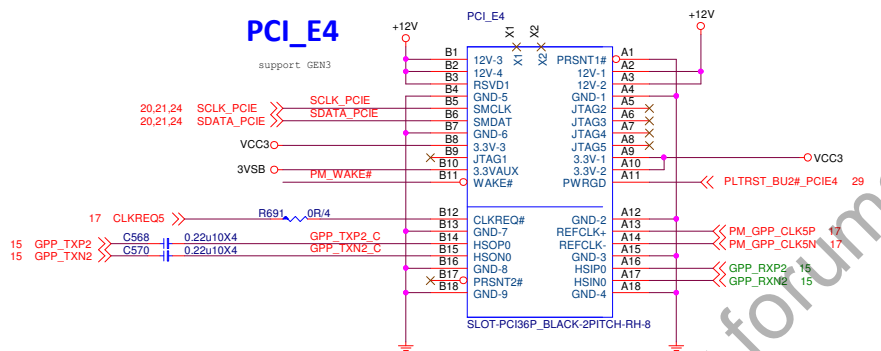
PCI_E2

support GEN3




PCI_E4

support GEN3



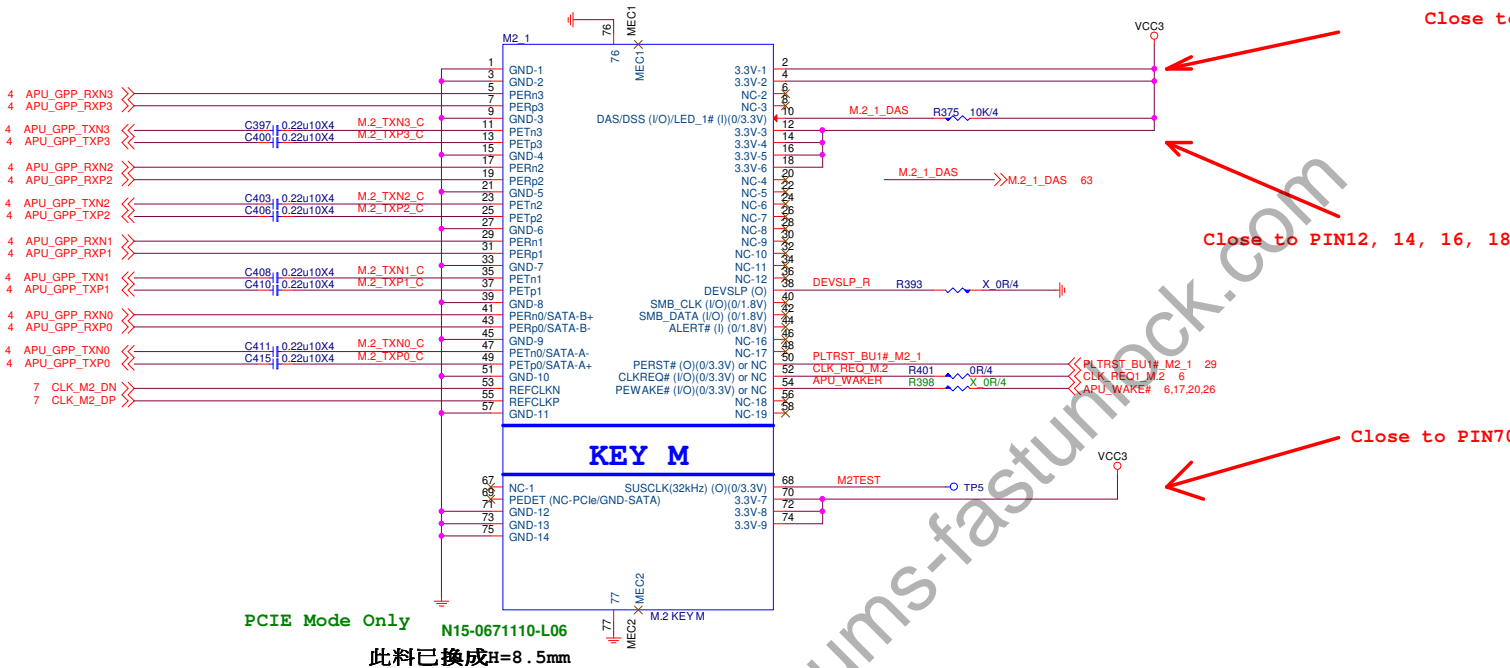
PCI Express x1 Slot *3	
+12V	- 1.5 A
+VCC3	- 9A
+3V3_S5 (wake)	- 1125mA
+3V3_S5 (no wake)	- 20mA

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M.2 1 Connector

VCC3 4.25A
Max: 14W

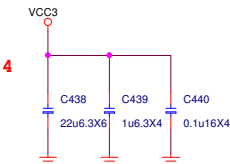
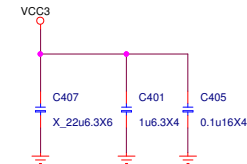
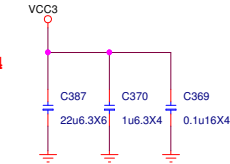
M2下方零件擺放限高要小於0.9mm的零件



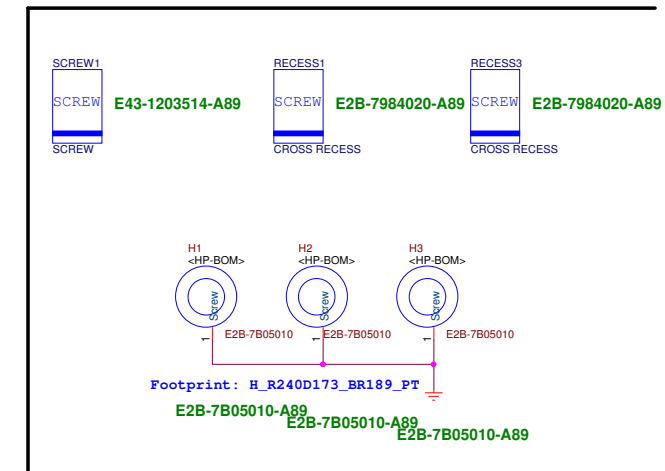
Close to PIN2, 4

Close to PIN12, 14, 16, 18

Close to PIN70, 72, 74



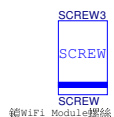
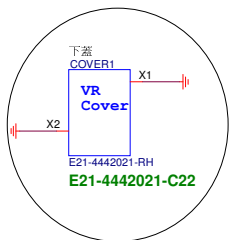
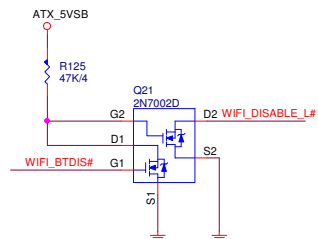
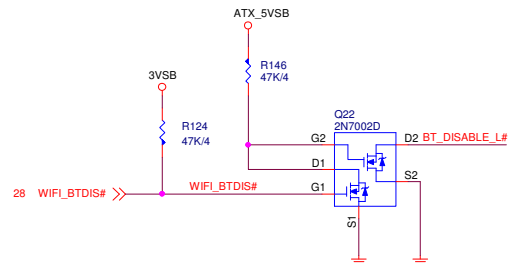
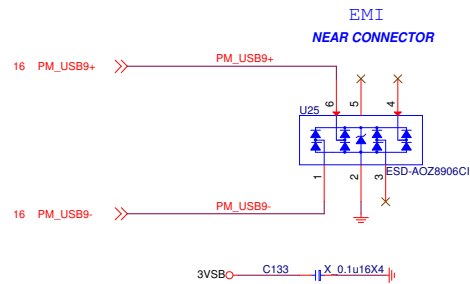
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MS-7B93

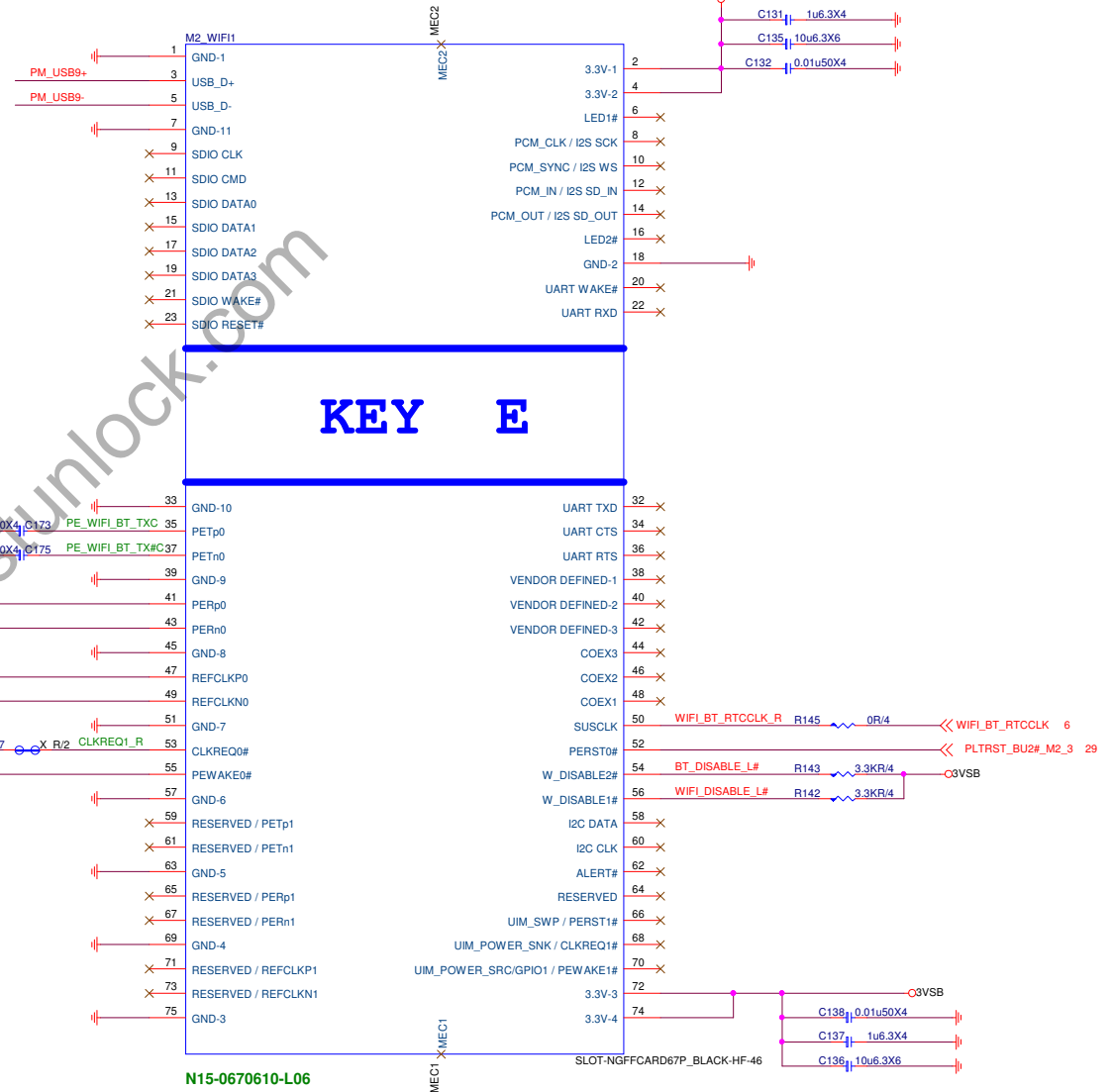
Size	Document Description	Rev
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E43-1204046-P65

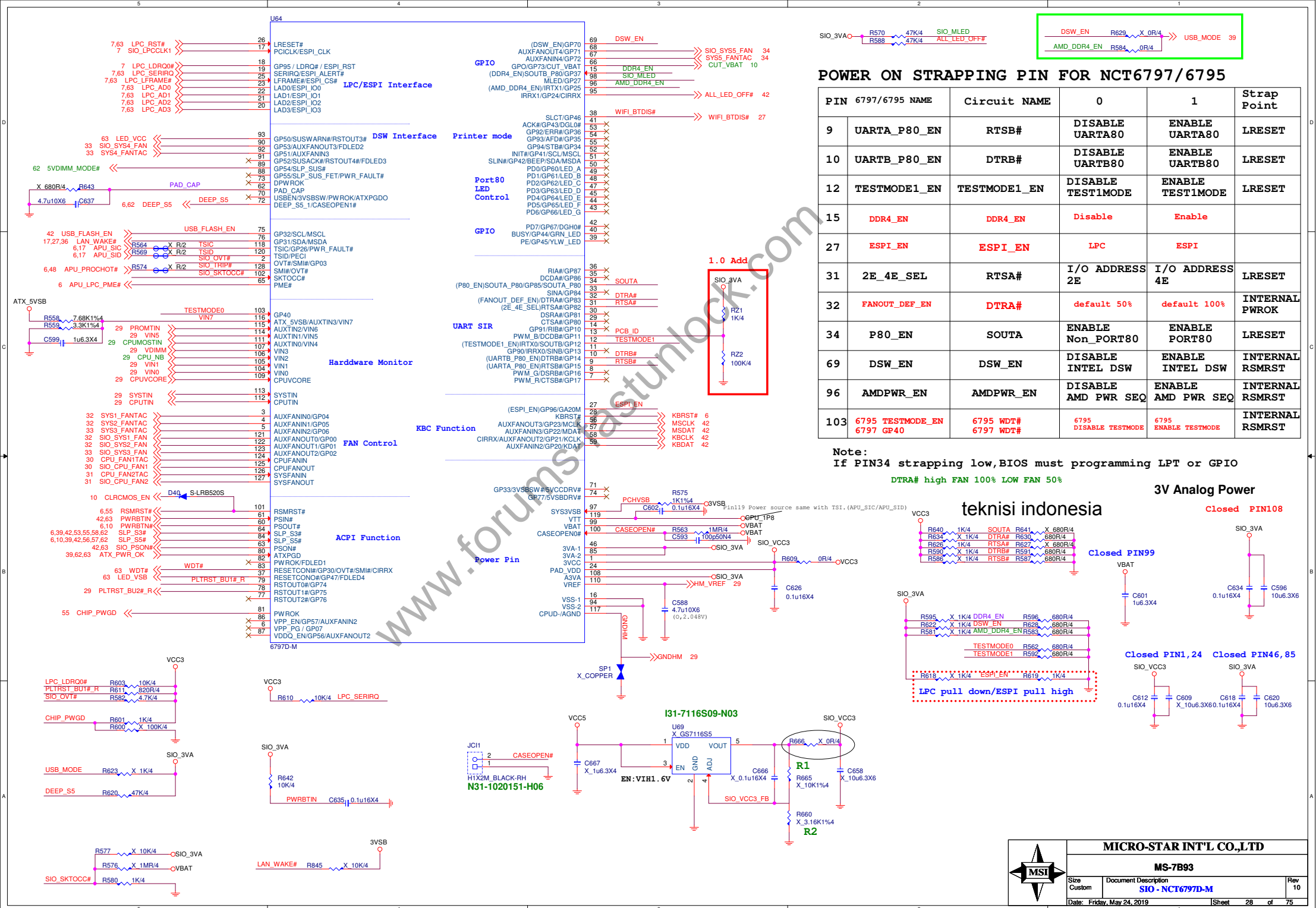


E43-1204046-P65



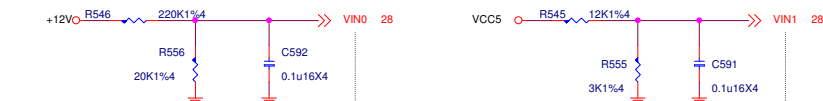
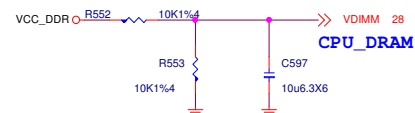
10uF+0.1uF+0.01uF at one end of socket in support of 3.3 V3V pins 2 and 4.
10uF+0.1uF+0.01uF at the other end of the socket in support of 3.3 V3V pins 70 and 72.

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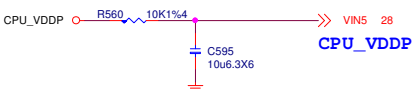


HW Monitor - Voltage

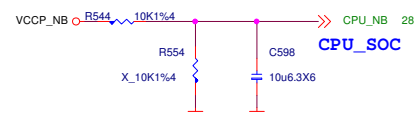
SIO HM Voltage over 2.048V will not detect



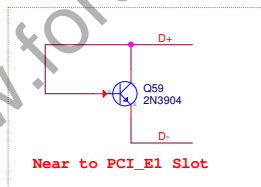
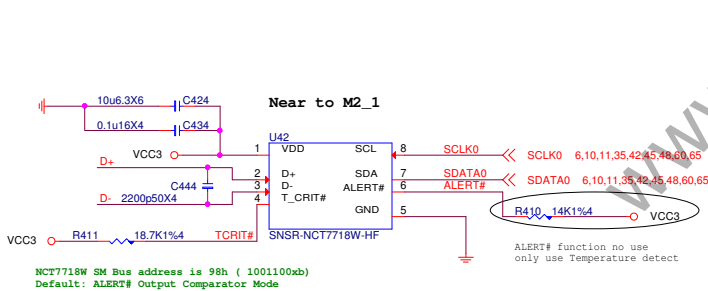
Power Fault detect through VIN0,VIN1,VIN2



Inform BIOS disable VIN2 with Power Fault

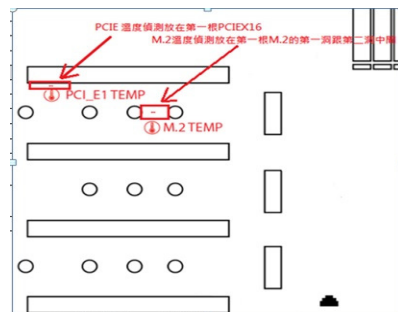


NCT7718W

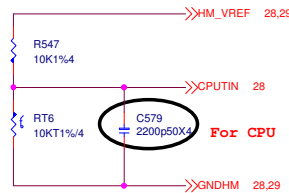


Layout notice:
1. Put the C1 2200pF to close the NCT7718W.
2. Add Ground Shielding For D+ and D- Traces.
3. D+/D- Route Has to be Away From the High Noise Area.
4. The Recommended Traces Width and Ground Shielding Spacing are 10mils.

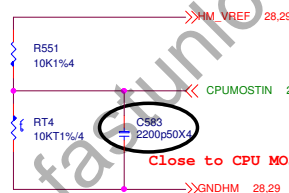
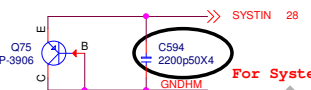
TEMPERATURE(℃)	T_CRIT#					
	2KΩ	7.5KΩ	10.5KΩ	14KΩ	18.7KΩ	
ALERT#	2KΩ	77	87	97	107	117
	7.5KΩ	79	89	99	109	119
	10.5KΩ	81	91	101	111	121
	14KΩ	83	93	103	113	123
	18.7KΩ	85	95	105	115	125



TEMP SENSOR

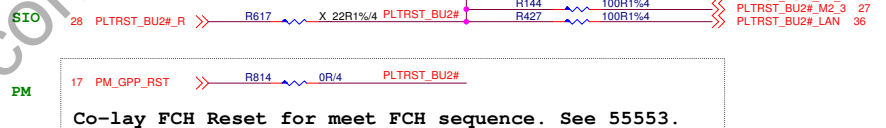


Under Socket

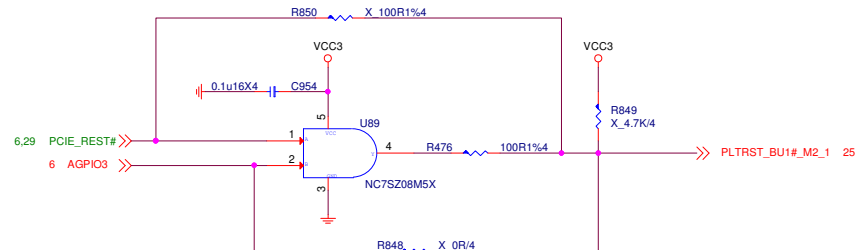
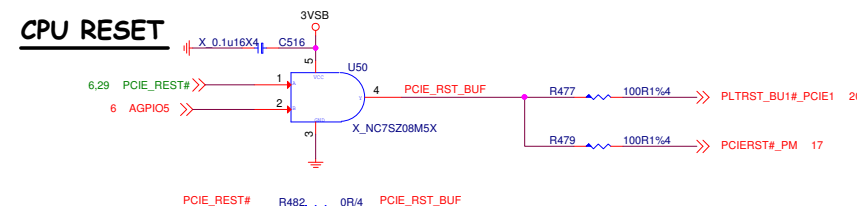


Close to CPU MOS

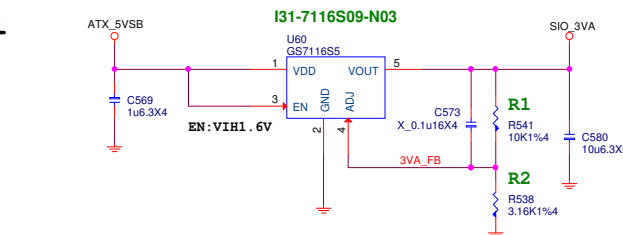
PM RESET



CPU RESET



SIO_3VA



$$V_{out} = V_{ref} * (1 + (R1/R2))$$

$$= 0.8 * (1 + (10K/3.16K))$$

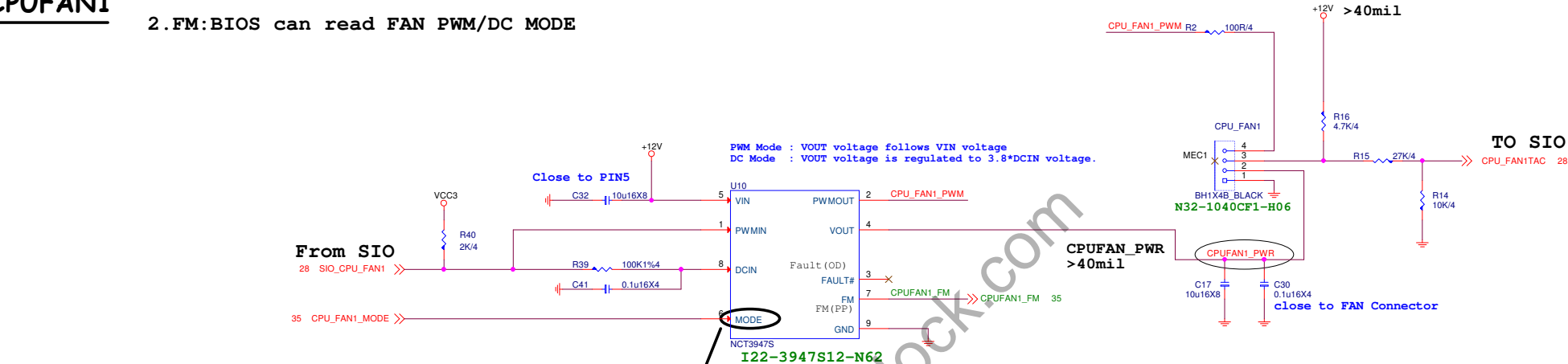
$$= 3.33V$$

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SIO - HW Monitor / NCT7718W
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TYPE L : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO

CPUFAN1

- 1.Mode GPIO BIOS can swtich PWM/DC MODE
- 2.FM:BIOS can read FAN PWM/DC MODE



GPIO Control

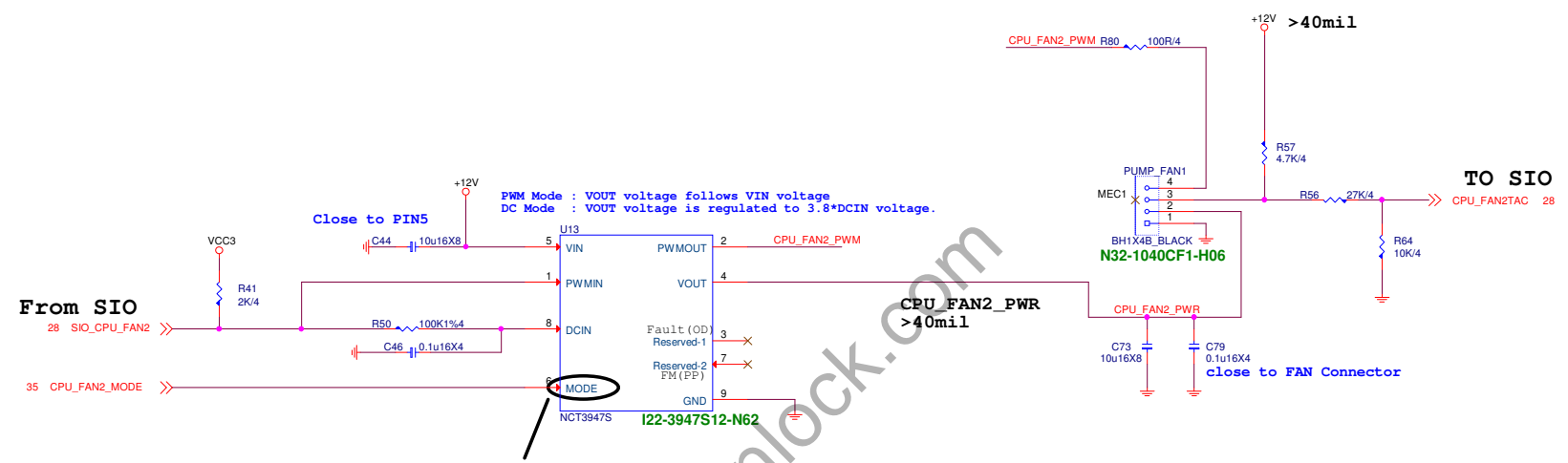
	PCH GPIO
PWM MODE	HIGH
DC MODE	LOW
AUTO MODE	GPI (Floating) Default

NCT3947S Internal pull up 1.65V

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

PUMPFAN1

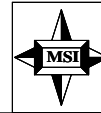
1.Mode GPIO BIOS can swtich PWM/DC MODE



GPIO Control

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

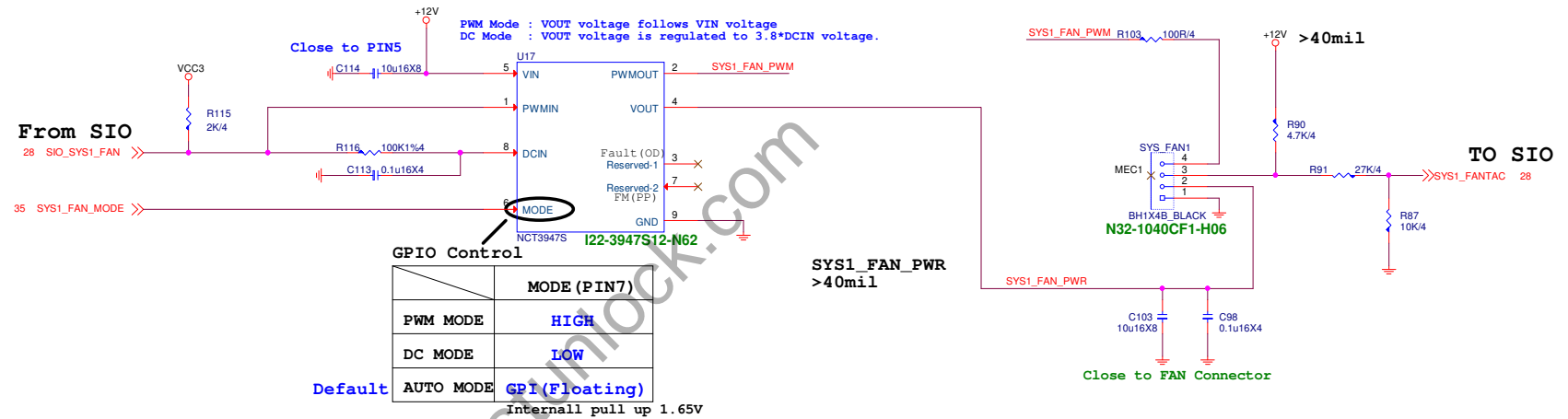
NCT3947S Internall pull up 1.65V



SYSFAN1

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

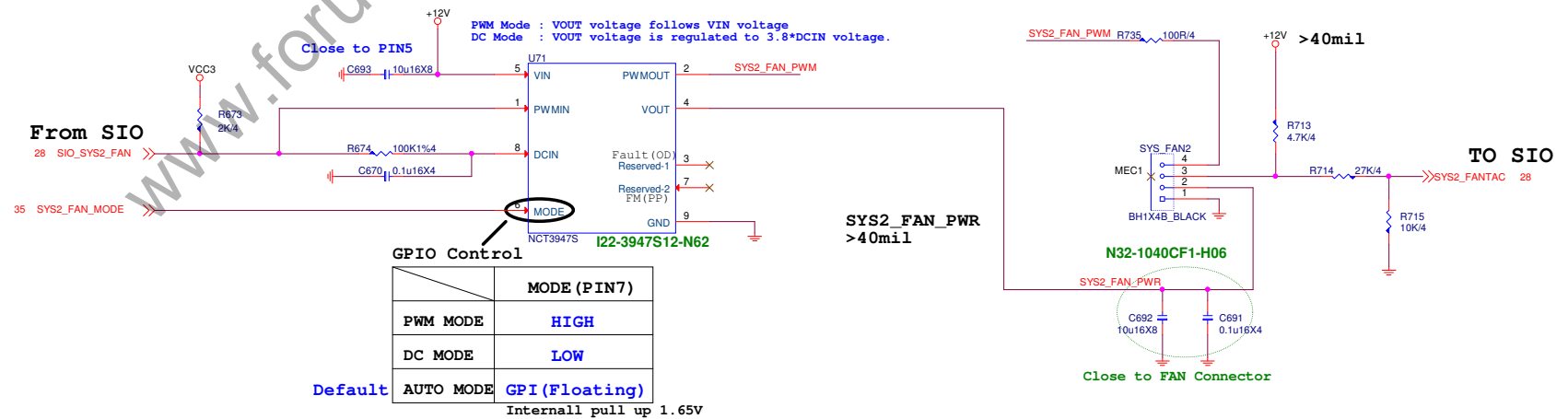
1.Mode GPIO BIOS can switch PWM/DC MODE



SYSFAN2

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

1.Mode GPIO BIOS can switch PWM/DC MODE

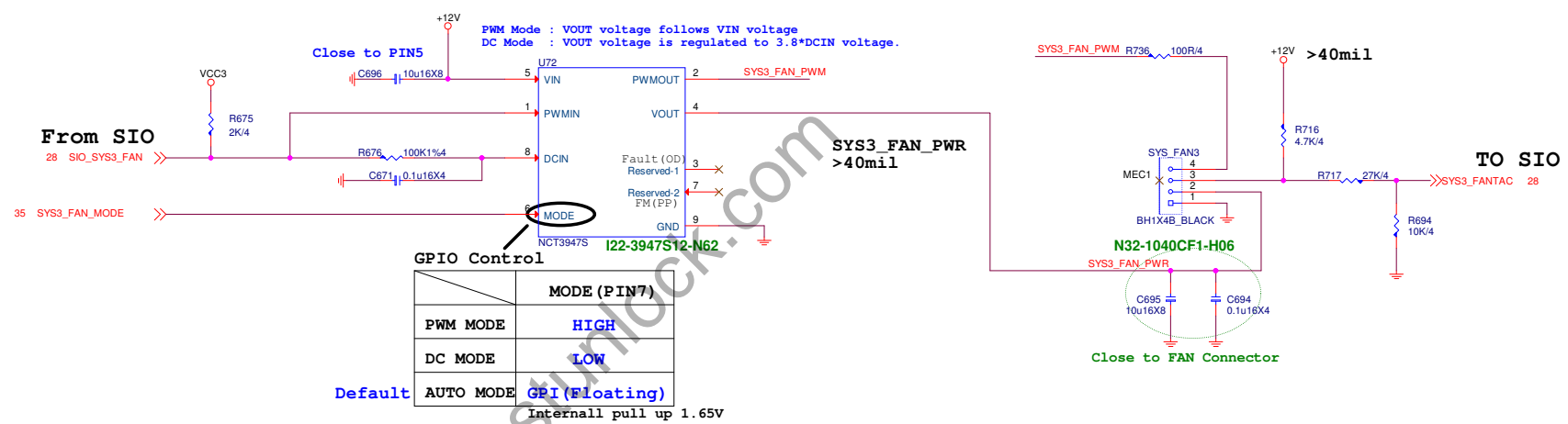


SYSFAN3

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

1.Mode GPIO BIOS can swtich PWM/DC MODE

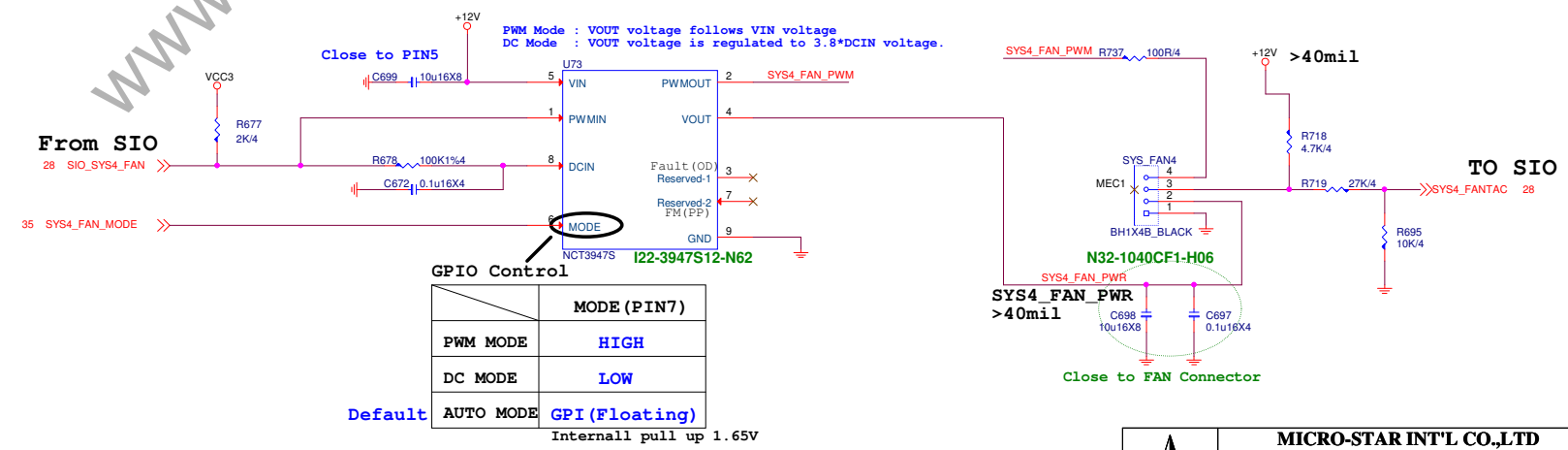
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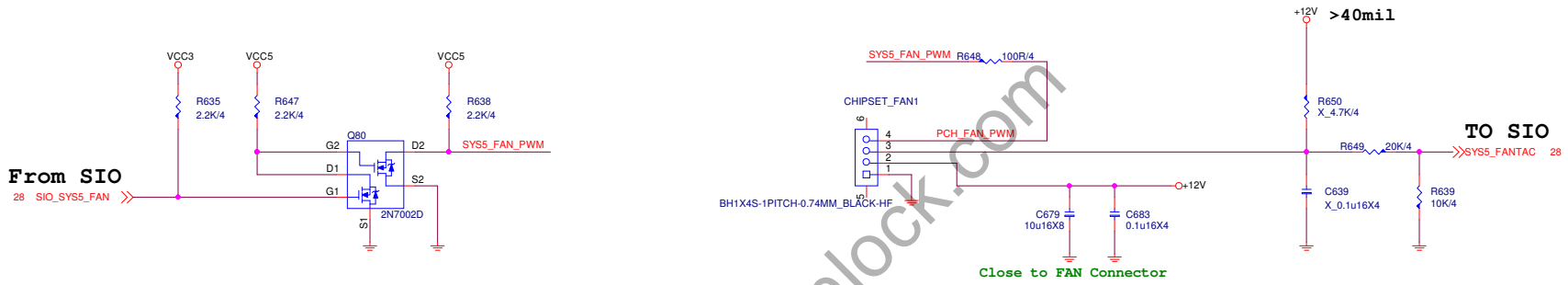
SYSFAN4

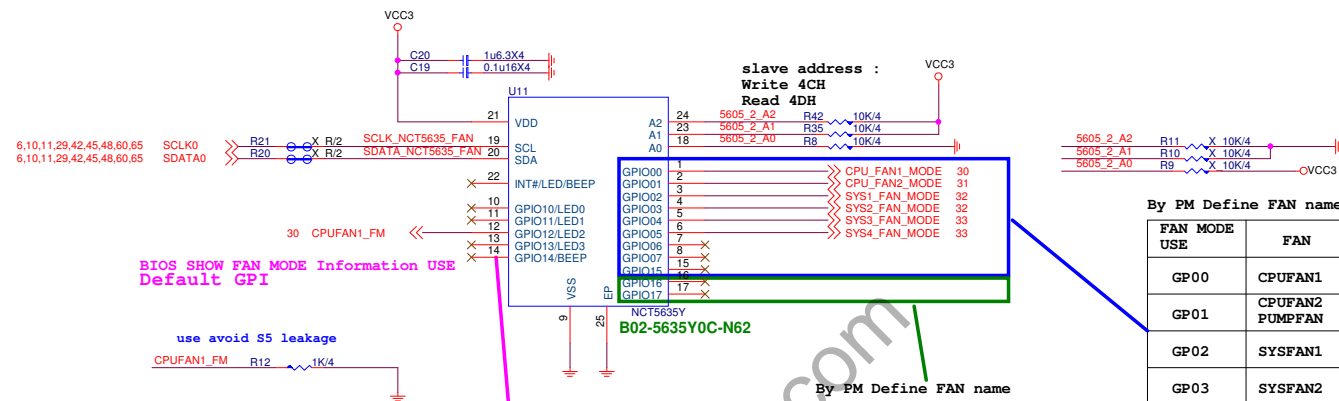
TYPE K : 4 PIN CPU FAN USE NCT3947S USE PCH GPIO CONTROL FAN MODE

1.Mode GPIO BIOS can swtich PWM/DC MODE



CHIPSET_FAN1



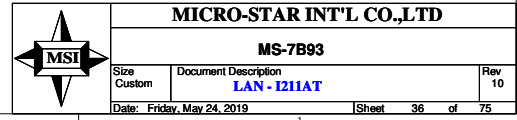


MICRO-STAR INT'L CO.,LTD

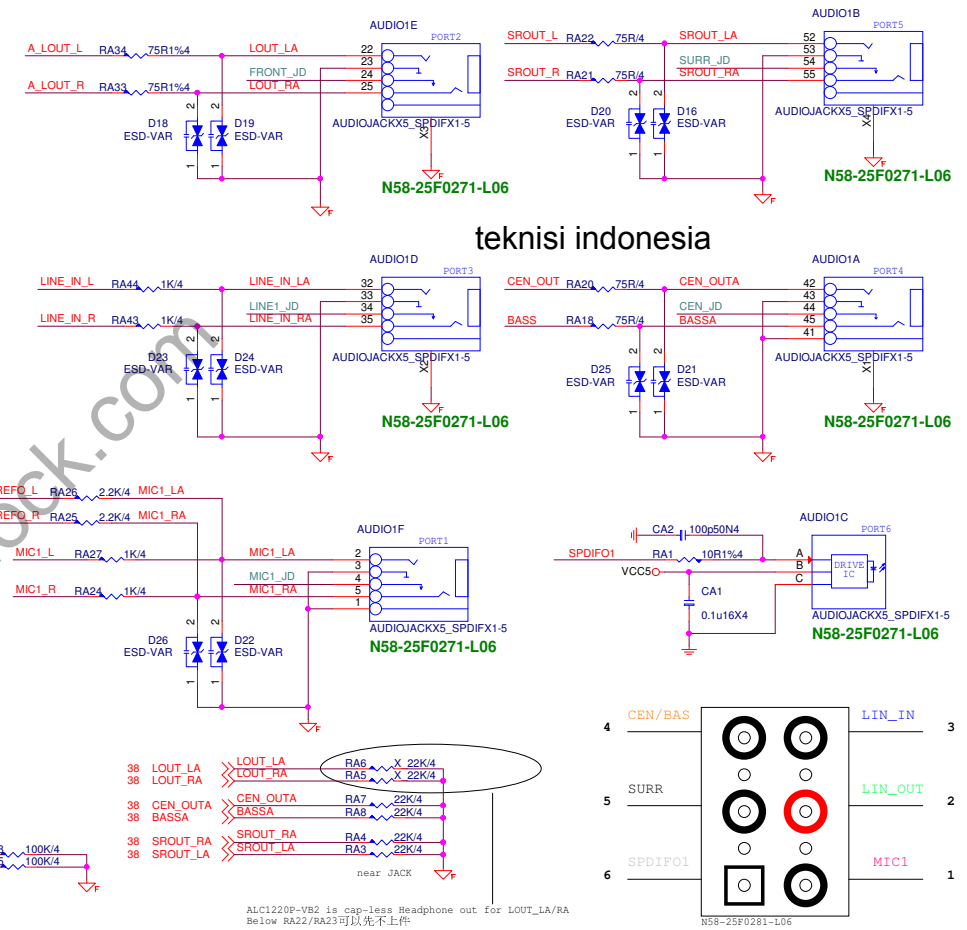
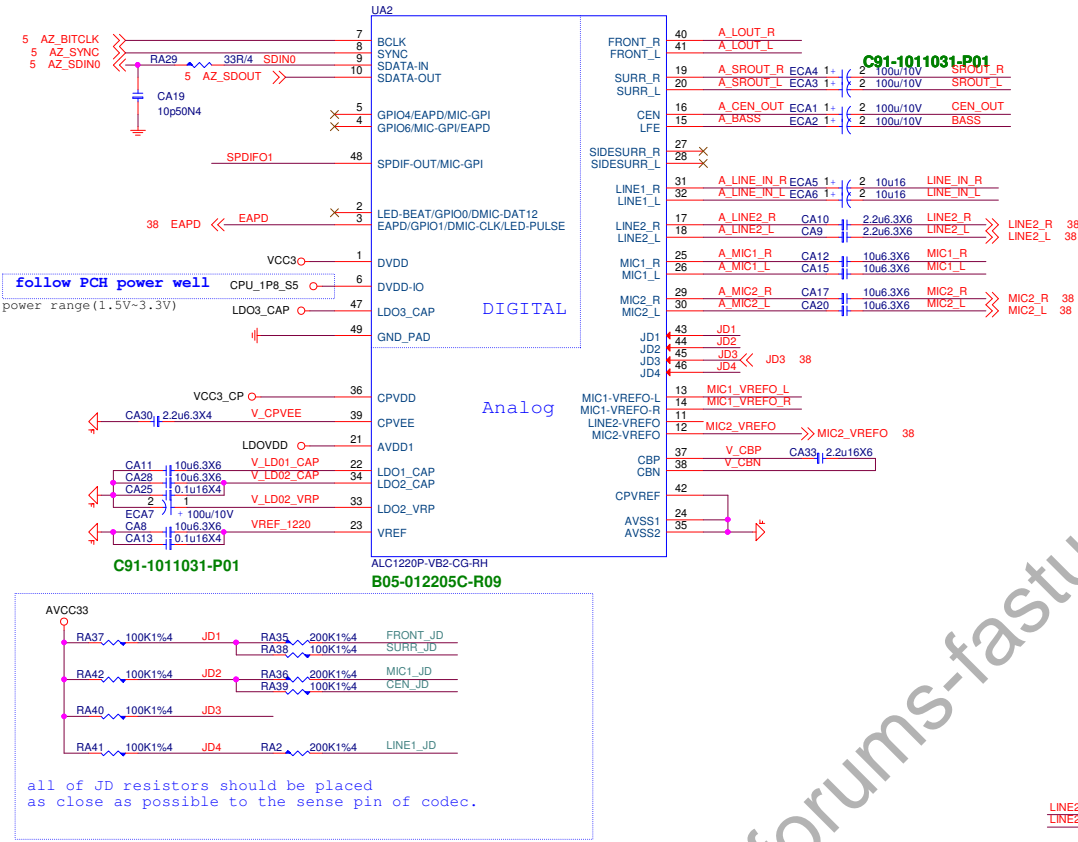
MS-7B93

Size	Document Description	Rev
Custom	FAN GPIO NCT5635	10
Date: Friday, May 24, 2019	Sheet 35 of 75	

i211 PCIE GEN1 SPEC

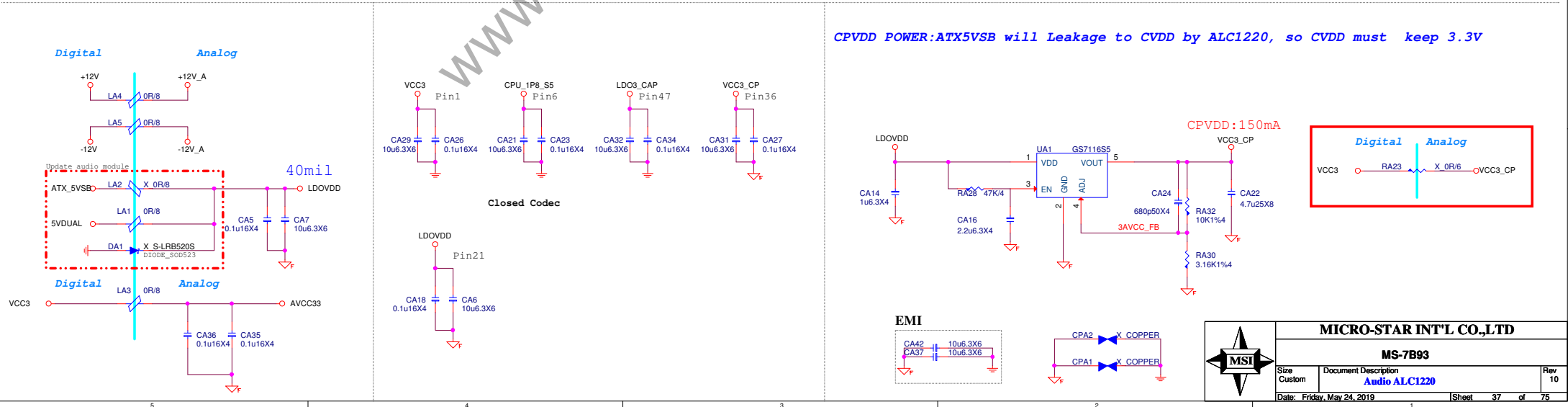


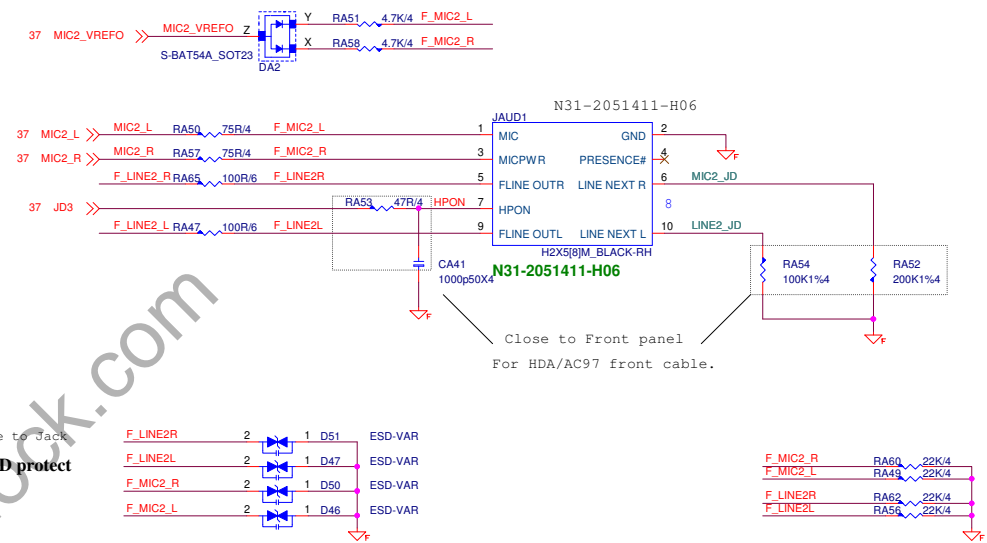
ALC1220P-VB2_48PIN



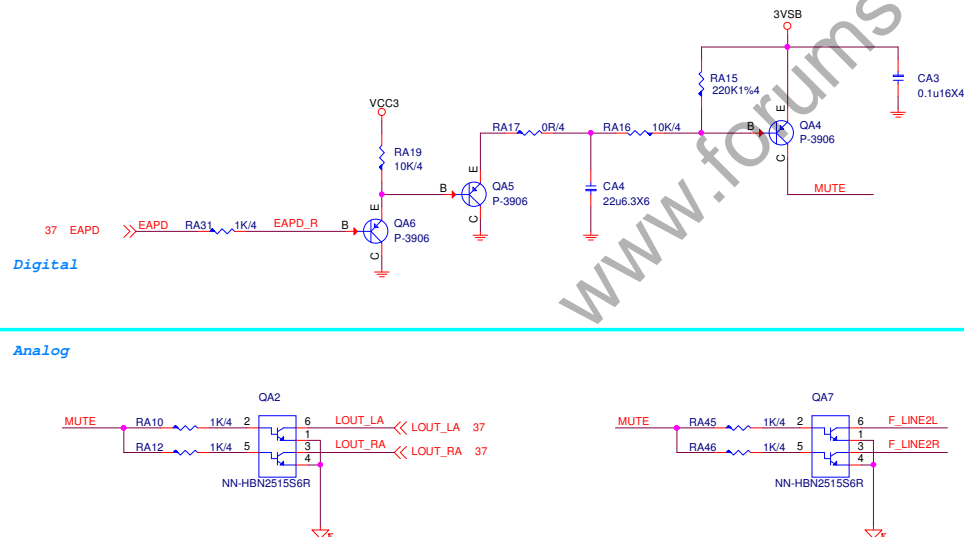
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CPVDD POWER: ATX5VSB will Leakage to CVDD by ALC1220, so CVDD must keep 3.3V

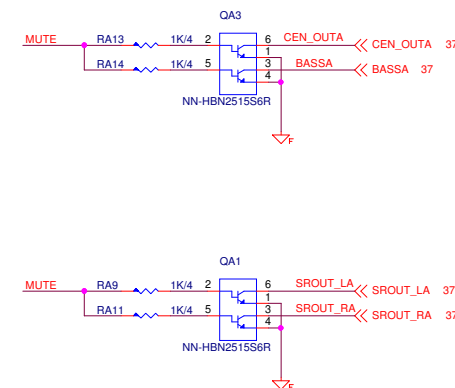




(add de-pop circuit by PM spec or customer request,
NOTE: add de-pop circuit need to change SROUT_LA, SROUT_RA, CEN_OUTA, BASSA to TVS)

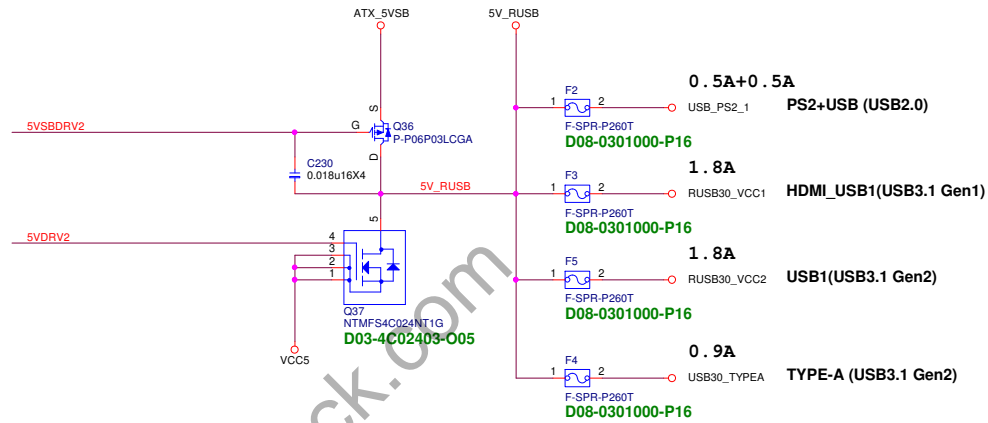
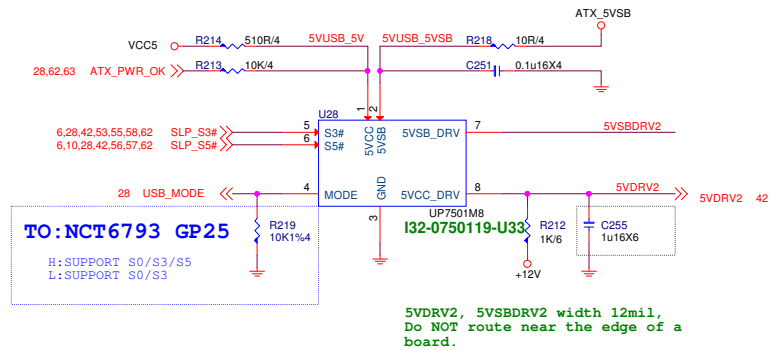


Audio mat is transparent and width 40mil



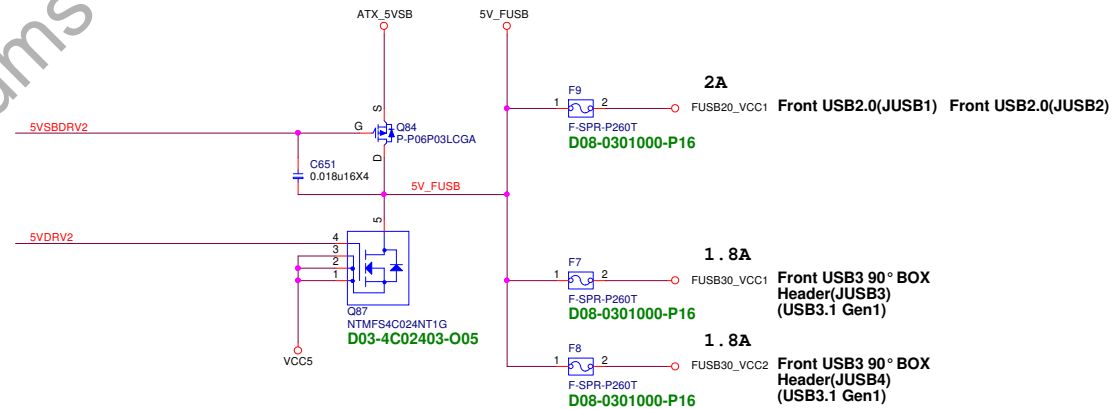
MICRO-STAR INT'L CO.,LTD			
MS-7B93			
Size Custom	Document Description Audio DePop		Rev 10
Date: Friday, May 24, 2019		Sheet 38 of 75	

USB Power



Rear (6A)

Front (5.6A)



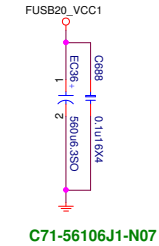
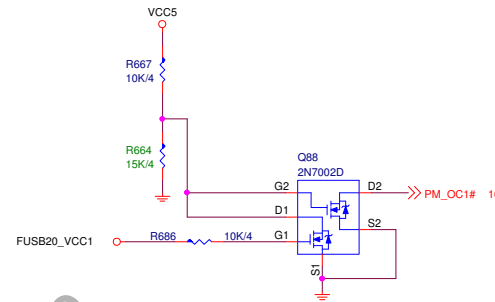
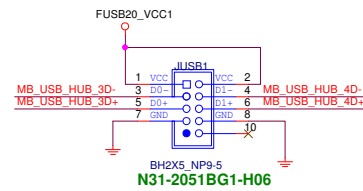
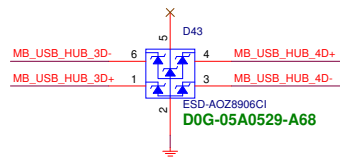
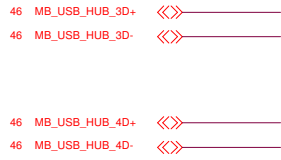
MICRO-STAR INT'L CO.,LTD

MS-7B93

Size	Document Description	Rev
Custom	USB Power - UP7501	10
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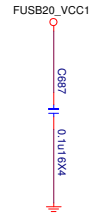
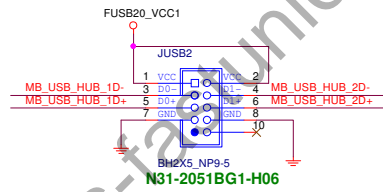
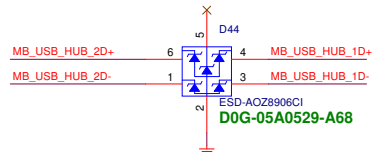
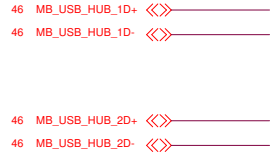
Front USB2.0 (JUSB1) Form GL850G USB2.0 HUB

5V@1A



Front USB2.0 (JUSB2) Form GL850G USB2.0 HUB

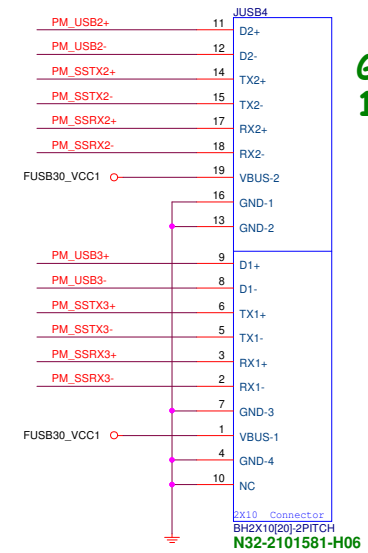
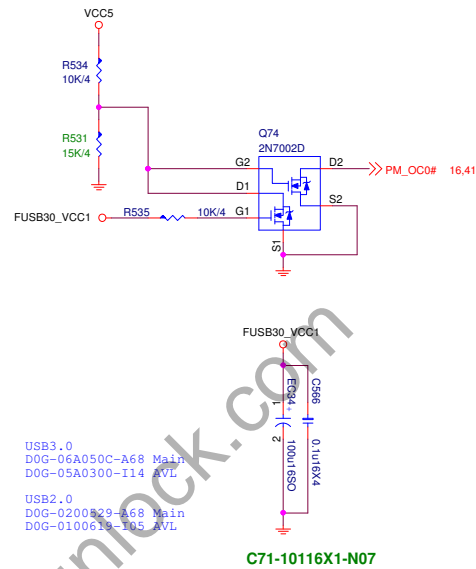
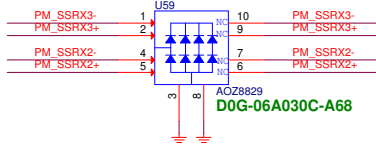
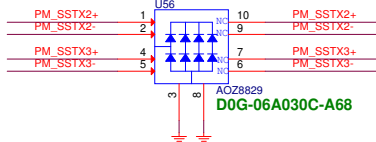
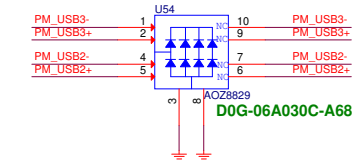
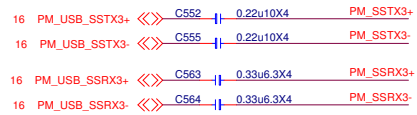
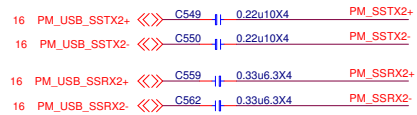
5V@1A



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Front USB3 90° BOX Header(JUSB3)

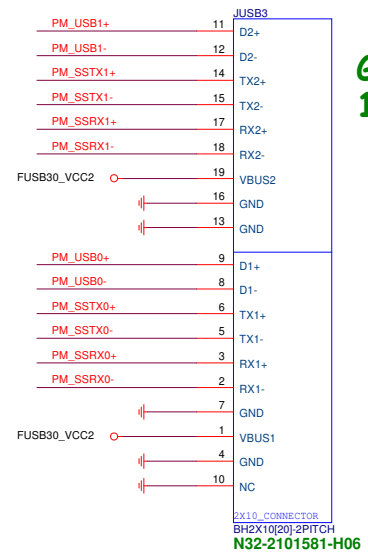
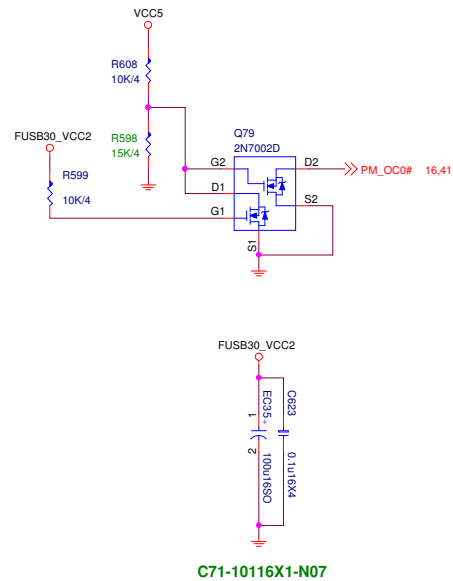
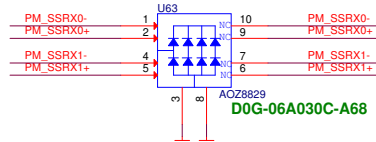
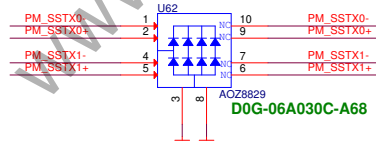
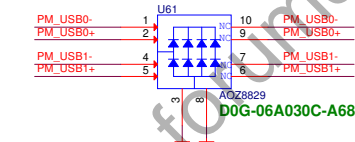
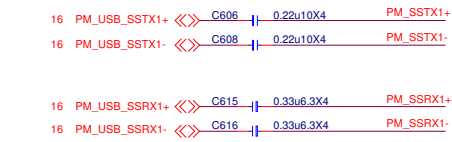
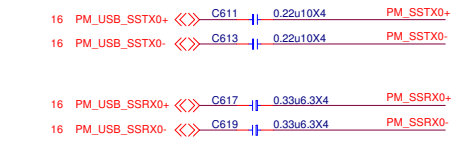
5V@1.8A



GEN1
1.8A

Front USB3 90° BOX Header(JUSB4)

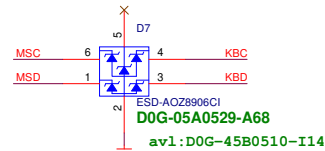
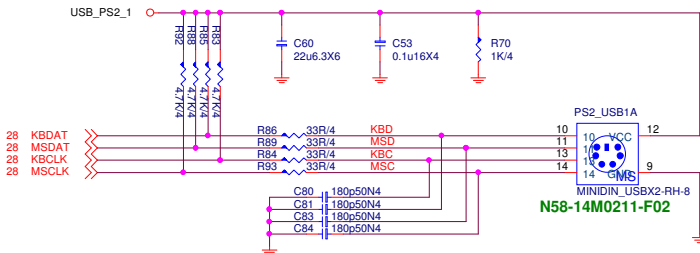
5V@1.8A



GEN1
1.8A

PS2+USB (USB2.0)

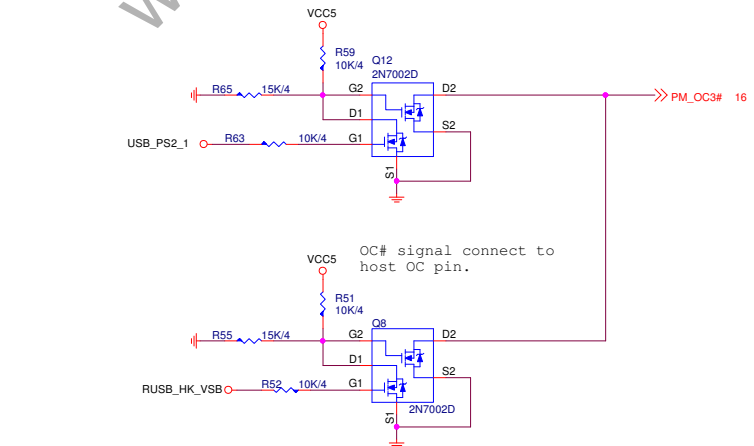
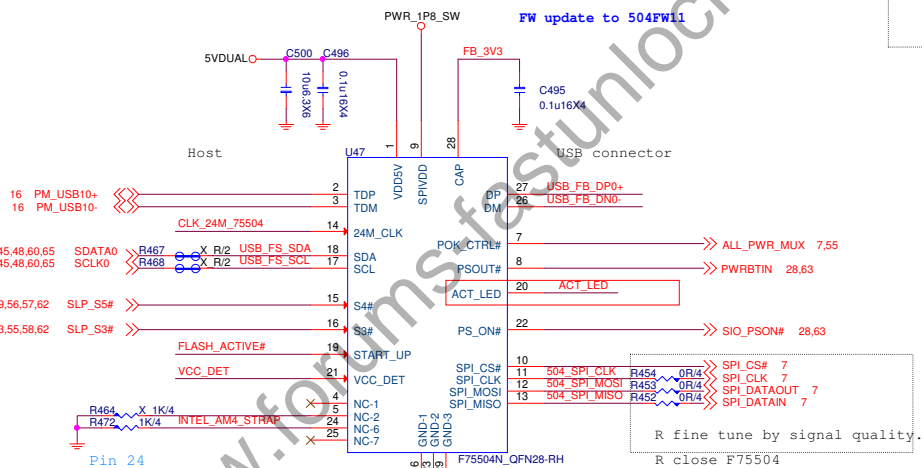
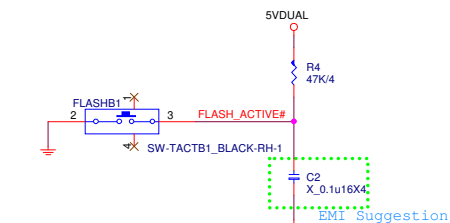
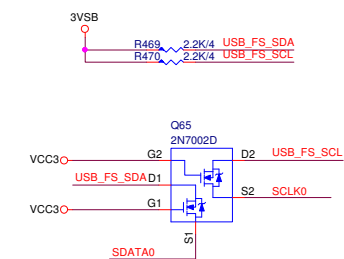
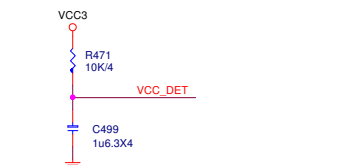
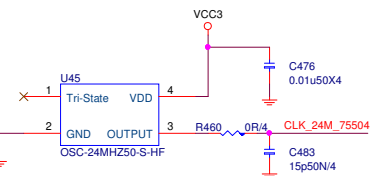
5V@1A



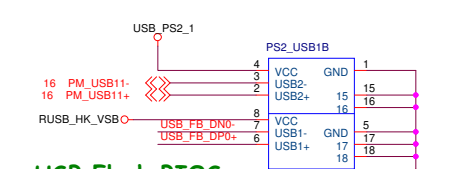
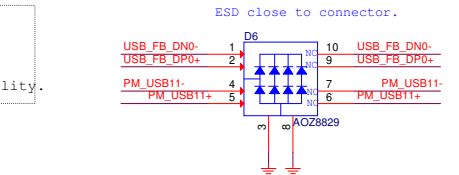
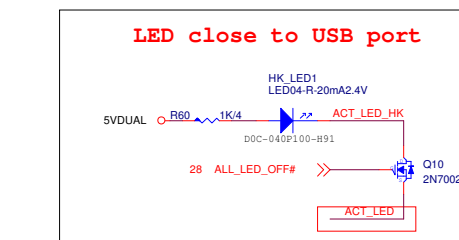
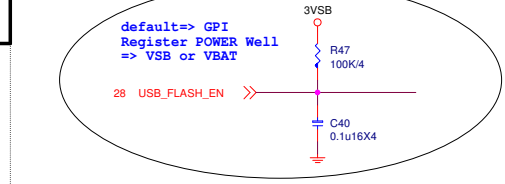
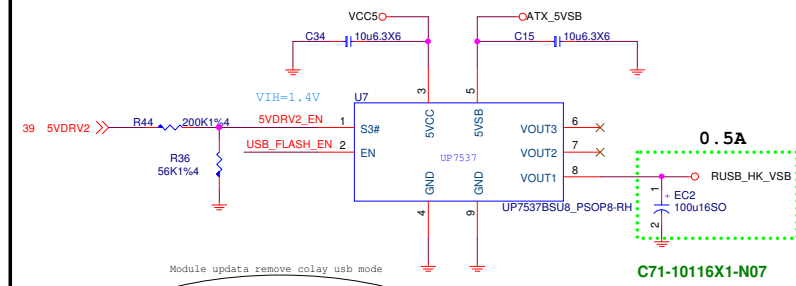
USB Flash BIOS

F75504 layout placement must meet to spi/usb trace length spec with host.
As for as possible place near to host.

CLK running in S0,don't require in sleep



HOTKEY POWER

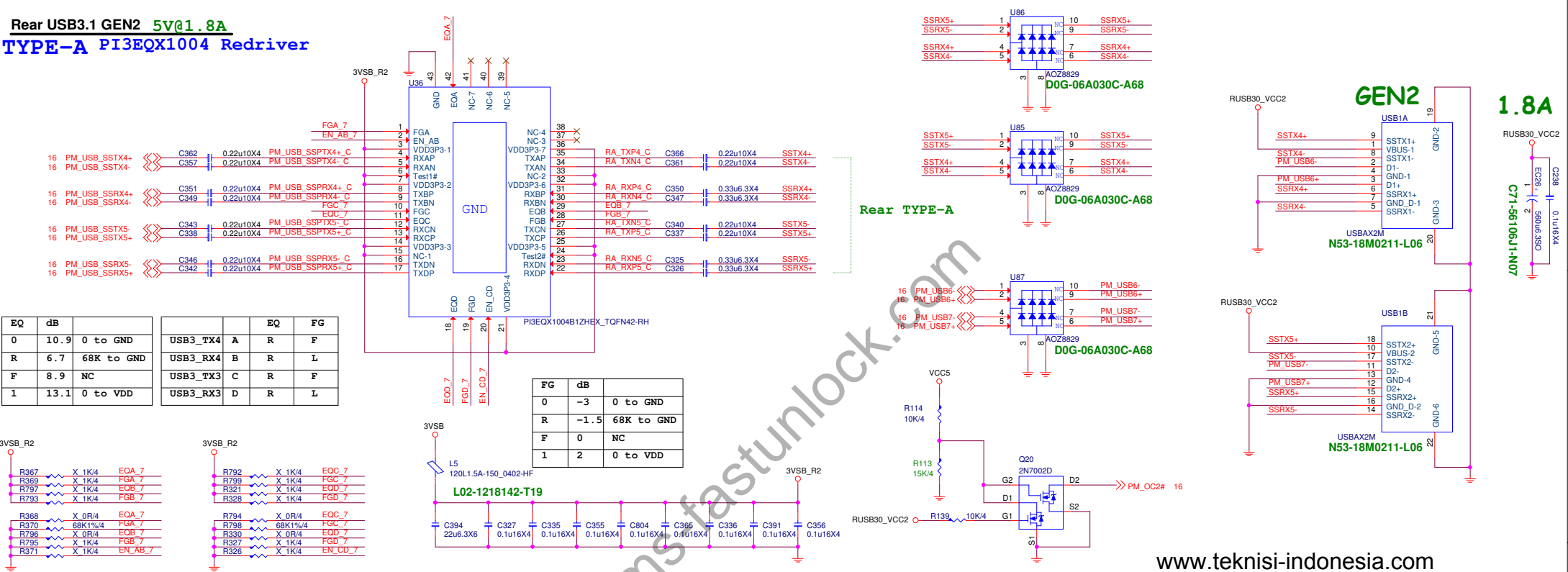


USB Flash BIOS



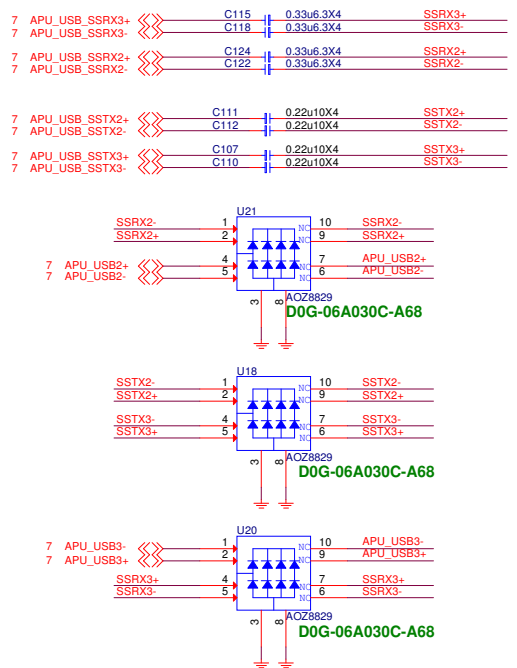
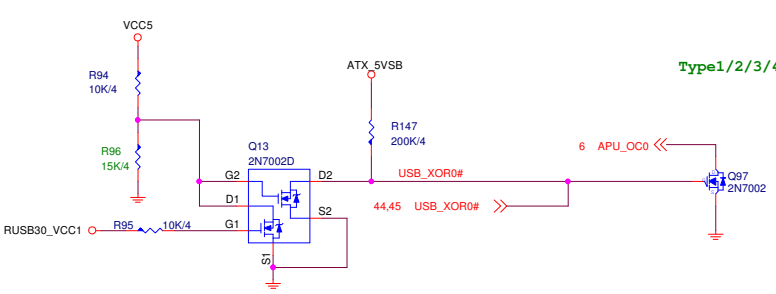
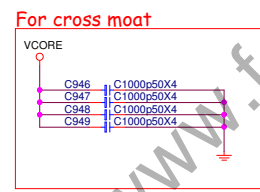
MICRO-STAR INT'L CO.,LTD			
MS-7B93			
Size	Document Description	Rev	
Custom	Rear USB2.0 + PS2	10	
Date: Friday, May 24, 2019		Sheet	42 of 75

Rear USB3.1 GEN2 5V@1.8A TYPE-A PI3EQX1004 Redriver



EQ	dB		EQ	FG
0	10.9	0 to GND	USB3_TX4	A
R	6.7	68K to GND	USB3_RX4	B
F	8.9	NC	USB3_TX3	C
1	13.1	0 to VDD	USB3_RX3	D

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



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GEN1 HDMI 上方

1.8A

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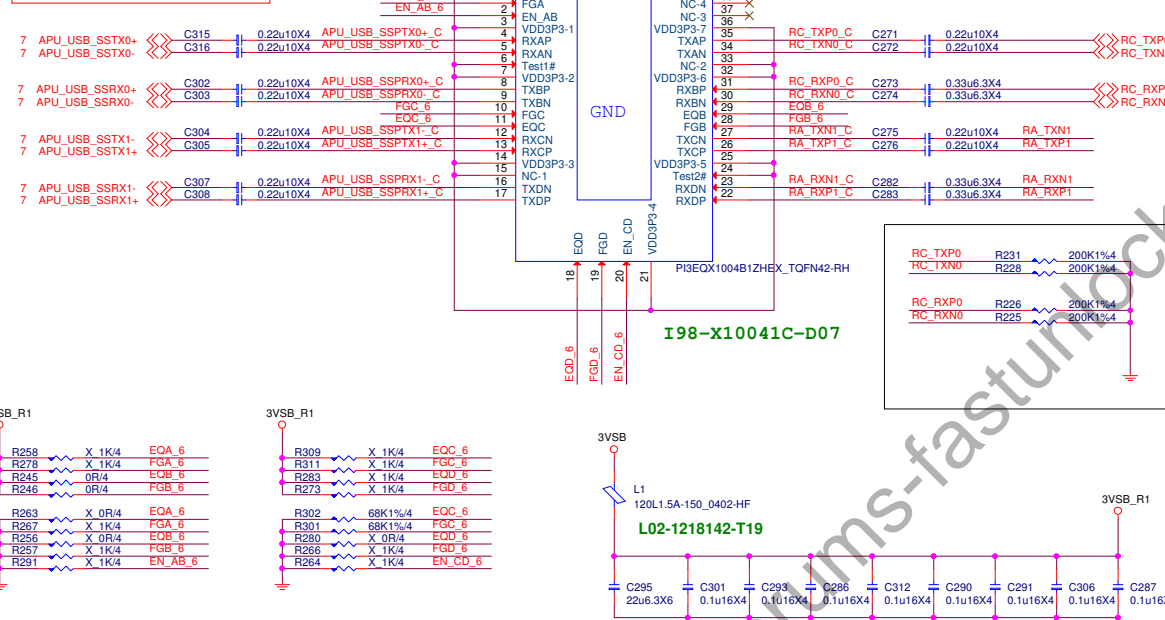
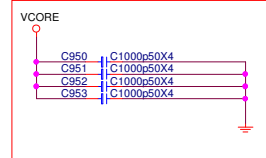
MS-7B93

Size Custom Document Description Rear_USB3.0 * 4 Rev 10

Date: Friday, May 24, 2019 Sheet 43 of 75

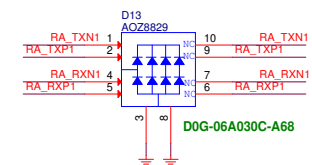
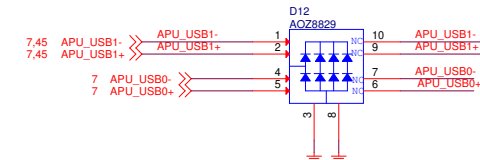
TYPE-A PI3EQX1004 Redriver

For cross moat

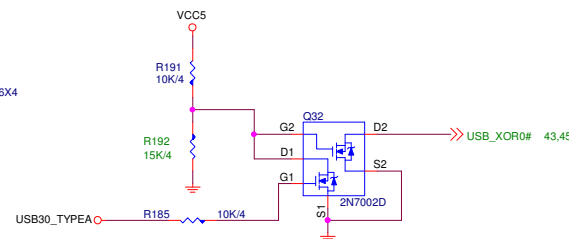
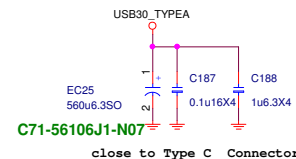
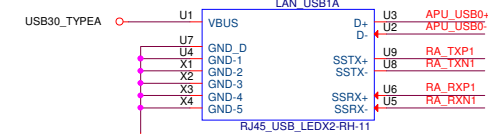


Rear TYPE-C

Rear TYPE-A



GEN2 0.9A



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

USB3_TX4	A	R	F
USB3_RX4	B	R	L
USB3_TX3	C	R	F
USB3_RX3	D	R	L

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

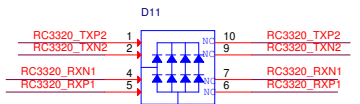


MICRO-STAR INT'L CO.,LTD

MS-7B93

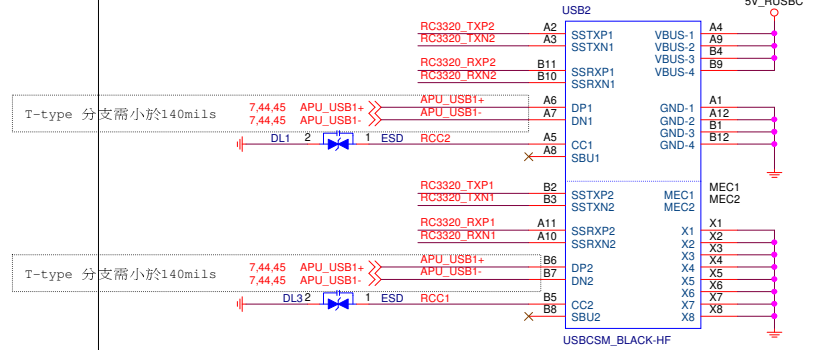
Size	Document Description	Rev
Custom	Rear USB3.1 Type A / redrive	10
Date: Friday, May 24, 2019	Sheet 44 of 75	

USB Type-C MUX with Configuration Channel (CC)



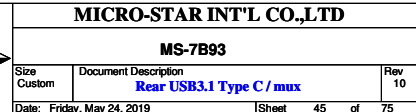
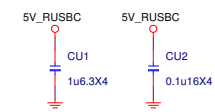
USB3.0
D0G-06A050C-A68 Main
D0G-05A0300-I14 AVL
D0G-45B031C-O05 AVL

VBUS EN

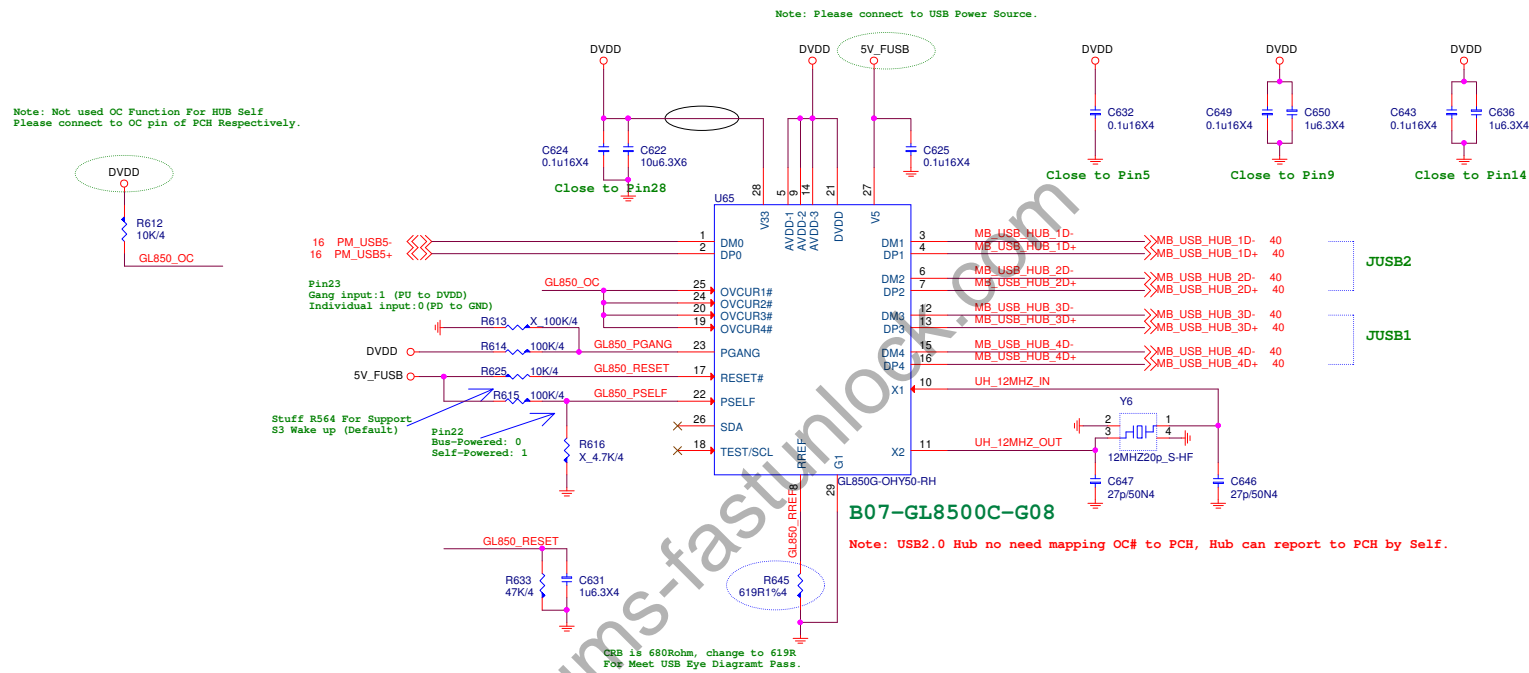


close to Type C Connector

Current Mode



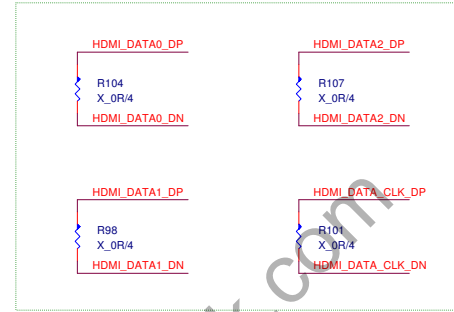
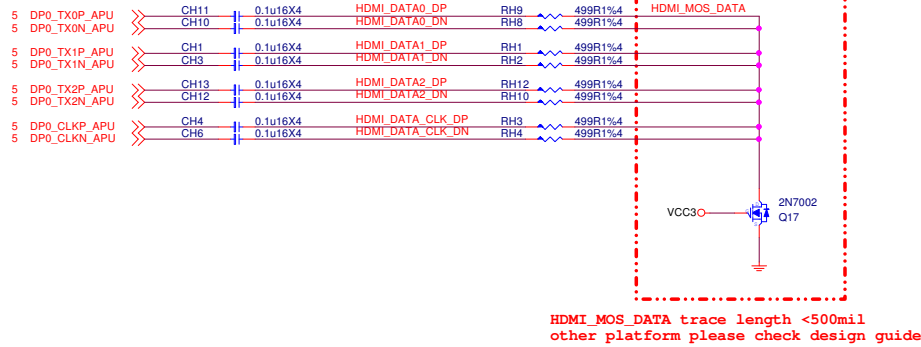
5V_FUSB



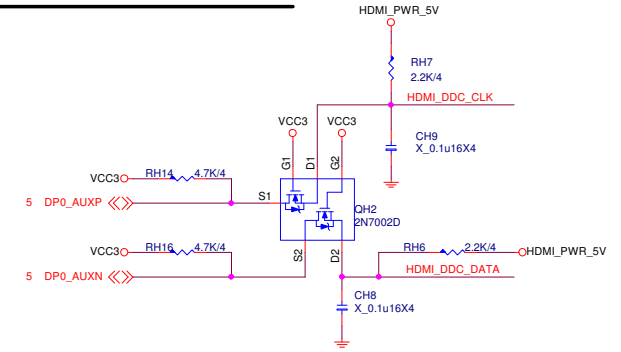
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HDMI CONNECTOR

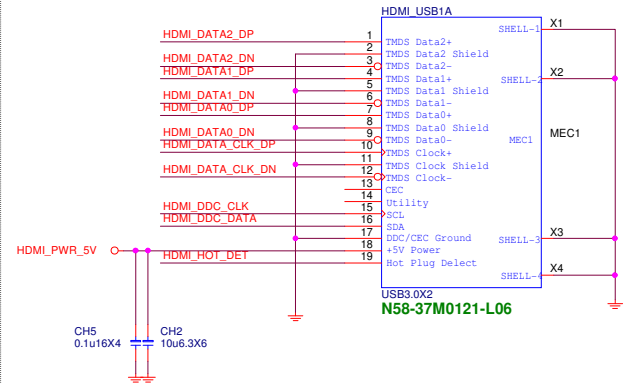
For HDMI 1.4



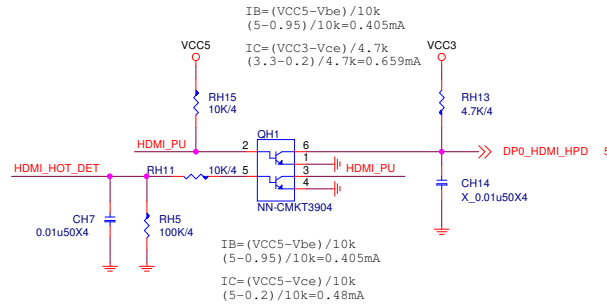
AUX Level Shifter



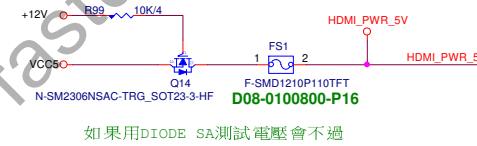
Connector



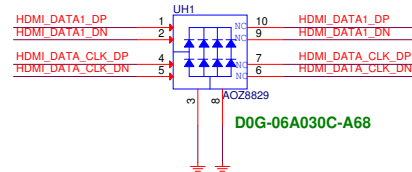
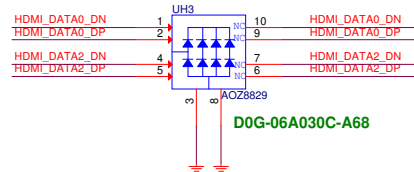
HPD Circuit



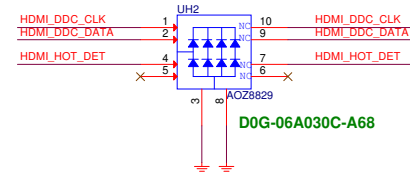
Connector Power

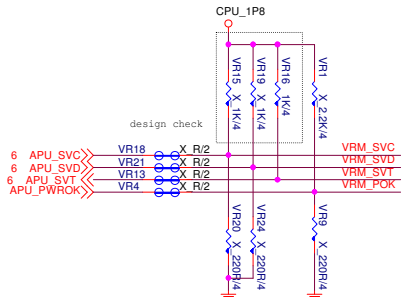


For EMI



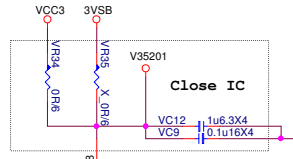
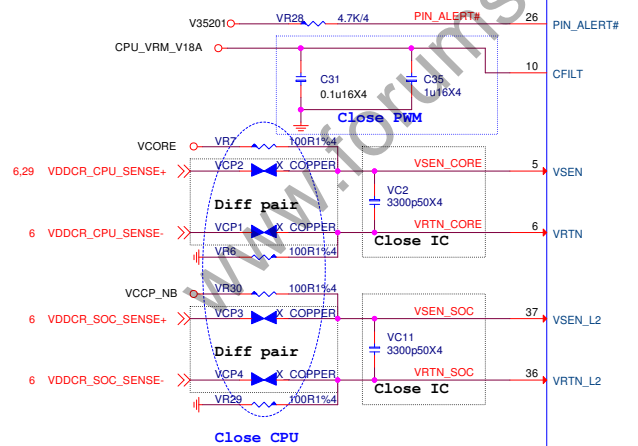
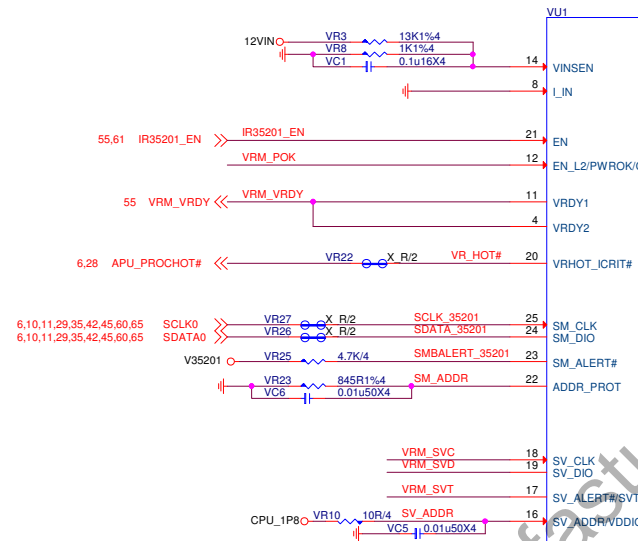
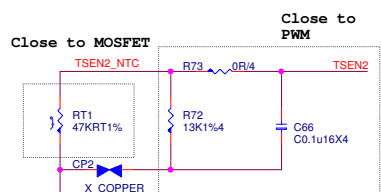
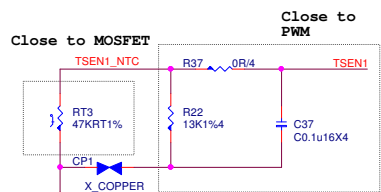
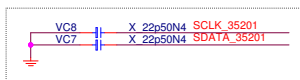
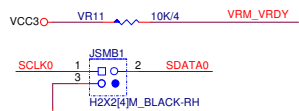
注意:耐壓5V零件





Note:VID Override Circuit

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



燒錄打點:IC正面上橘+金色點

VCORE: ICCMax 140A
LL: 1.3mohm
OCP: 400A

SOC: ICCMax 75A
LL: 2.1ohm
OCP: 100A

Phase 1 close to CPU power pin.

Loop 1

Loop 2

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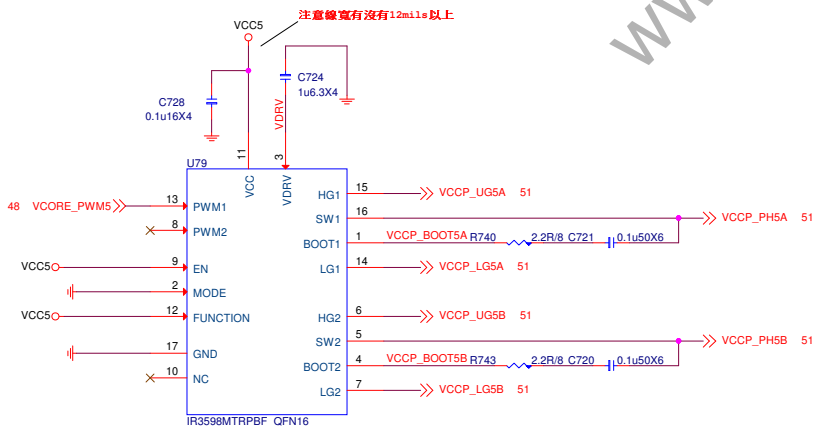
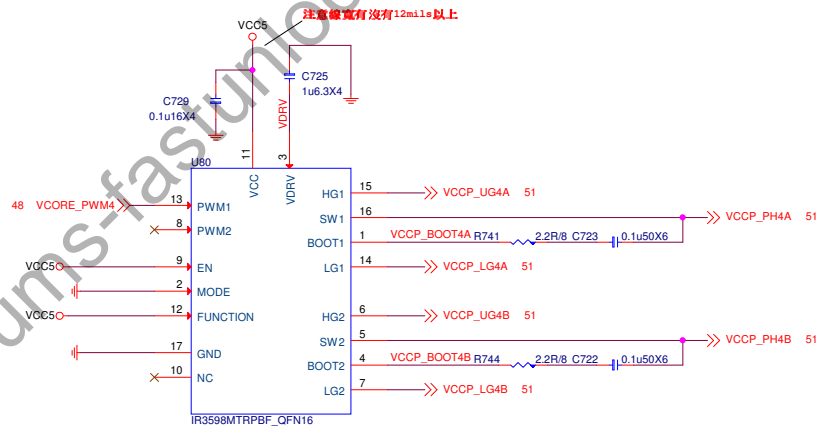
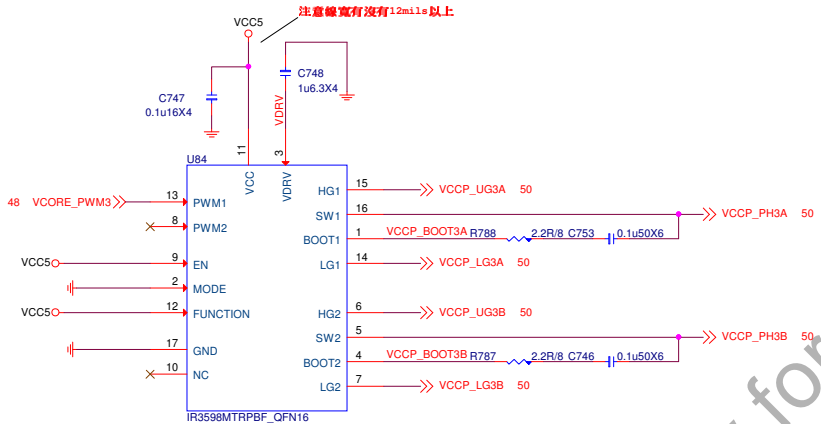
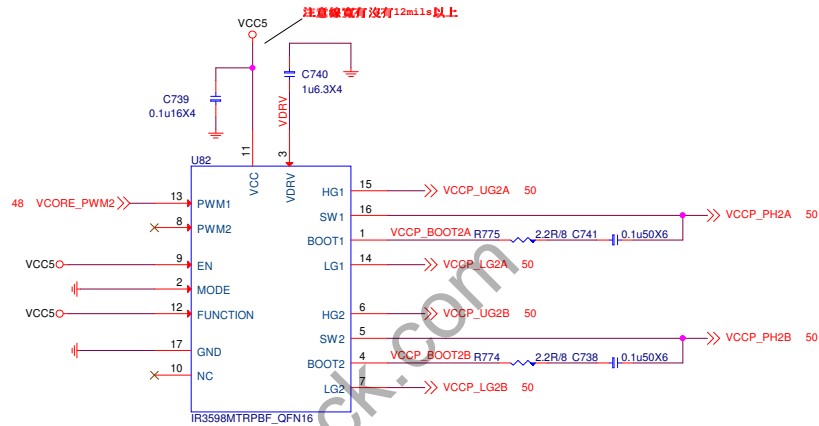
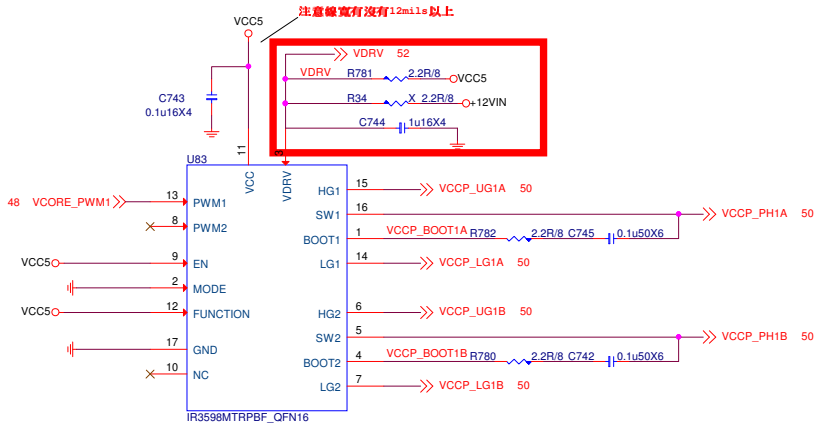


SMB Address: 0X10

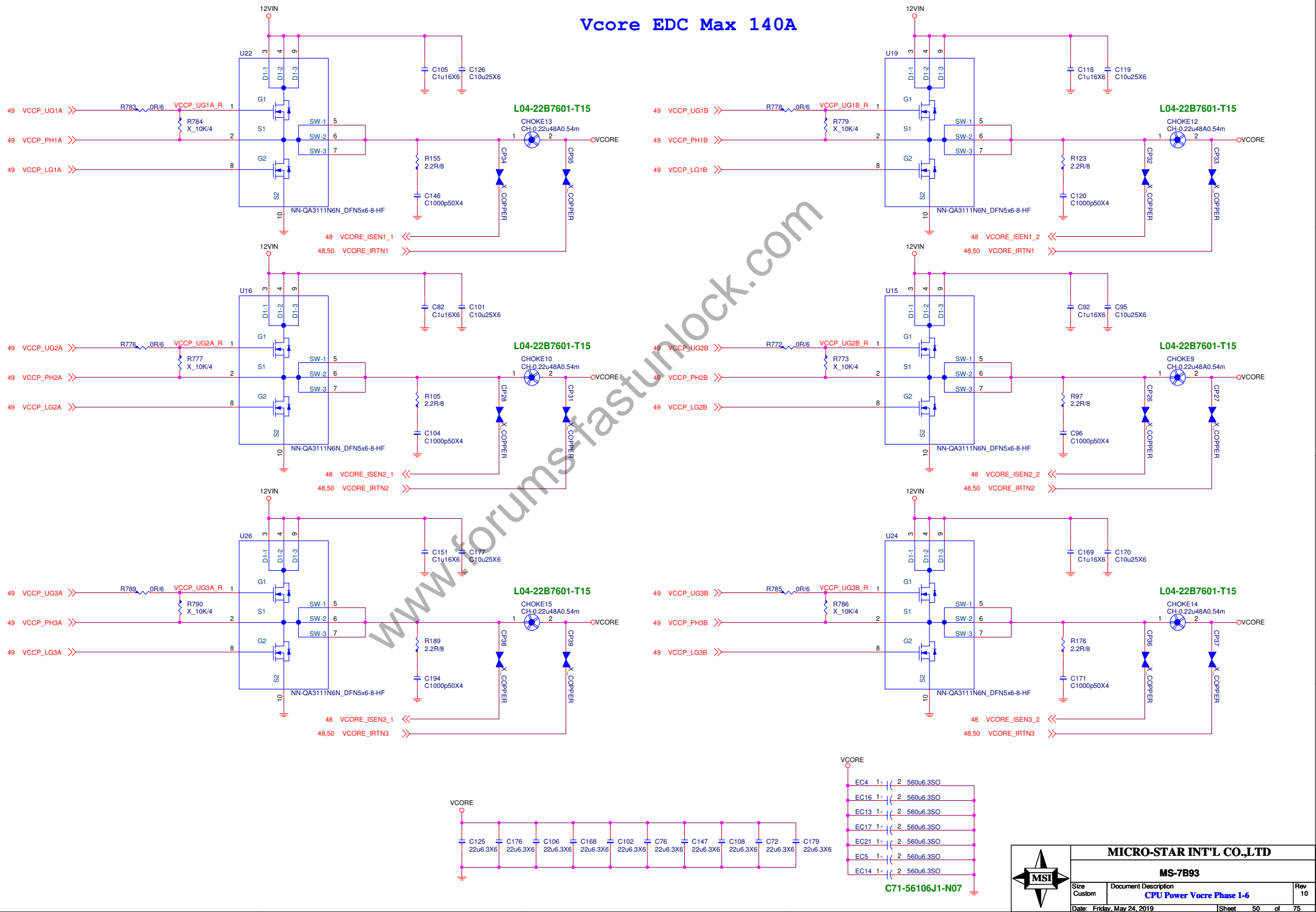
I32-35201YC-I08

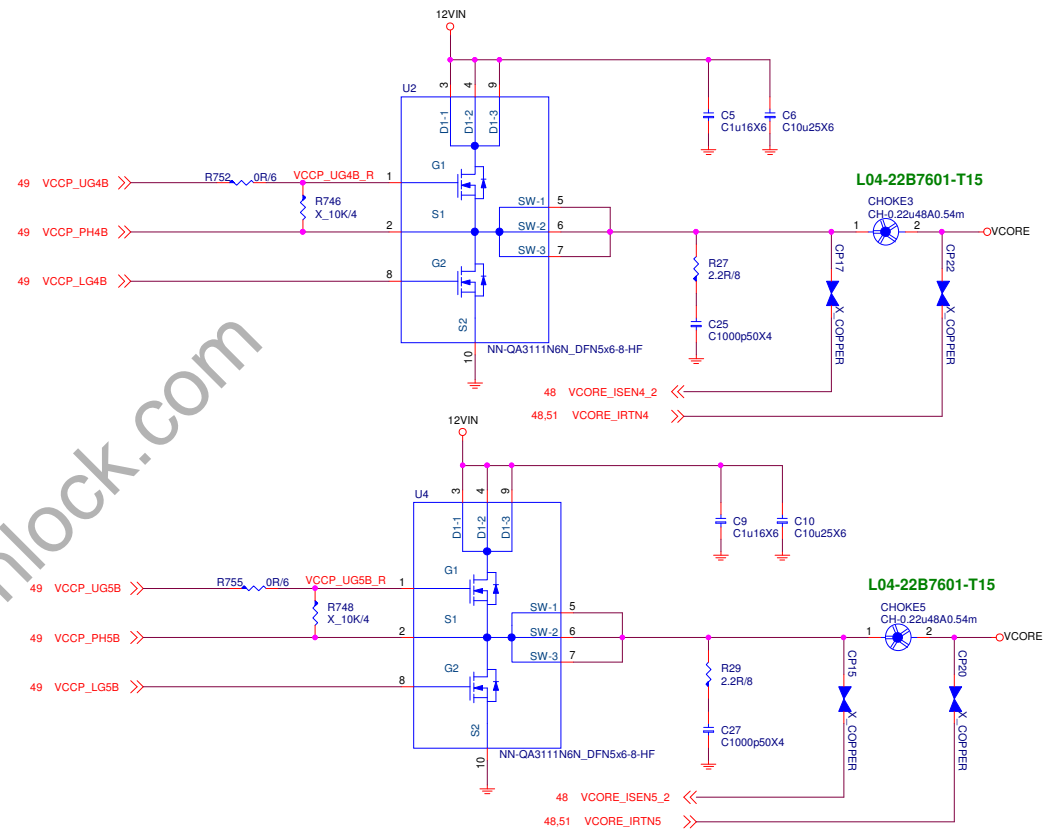
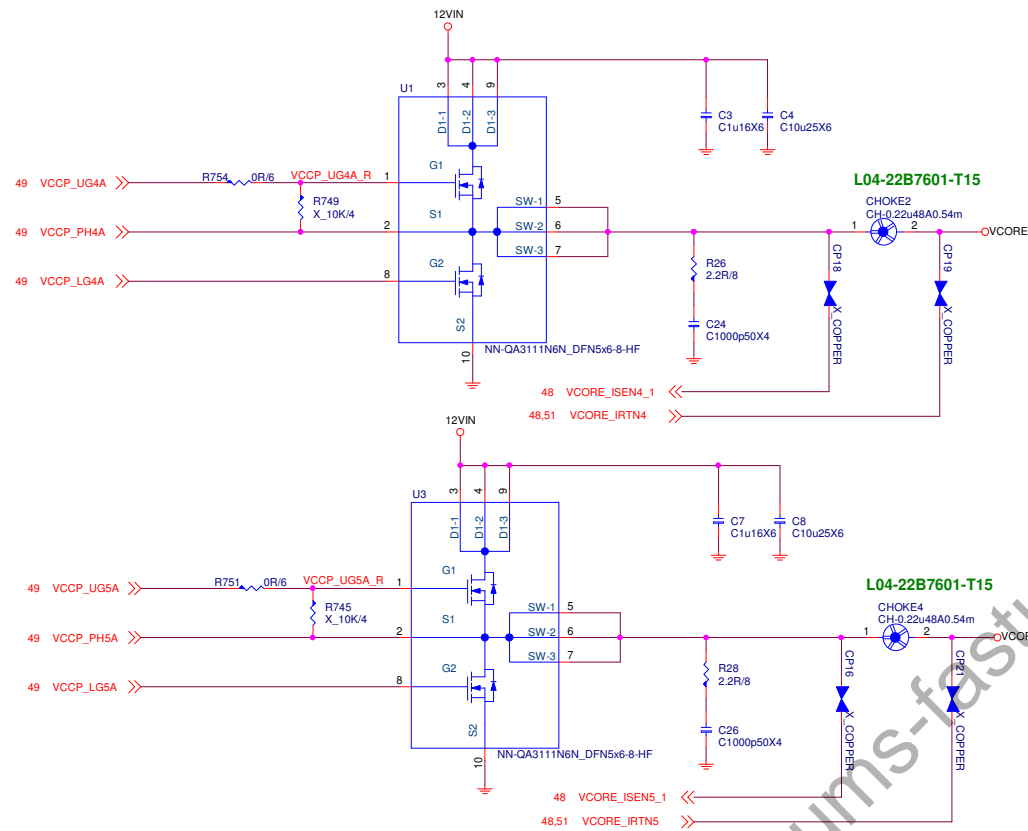
MICRO-STAR INT'L CO.,LTD			
MS-7B93			
Size	Document Description	Rev	
Custom	CPU Power IR35201 12+2	10	
Date: Friday, May 24, 2019	Sheet 48 of 75		

CPU_CORE Driver IC VCORE Double 10-PHASE



Vcore EDC Max 140A





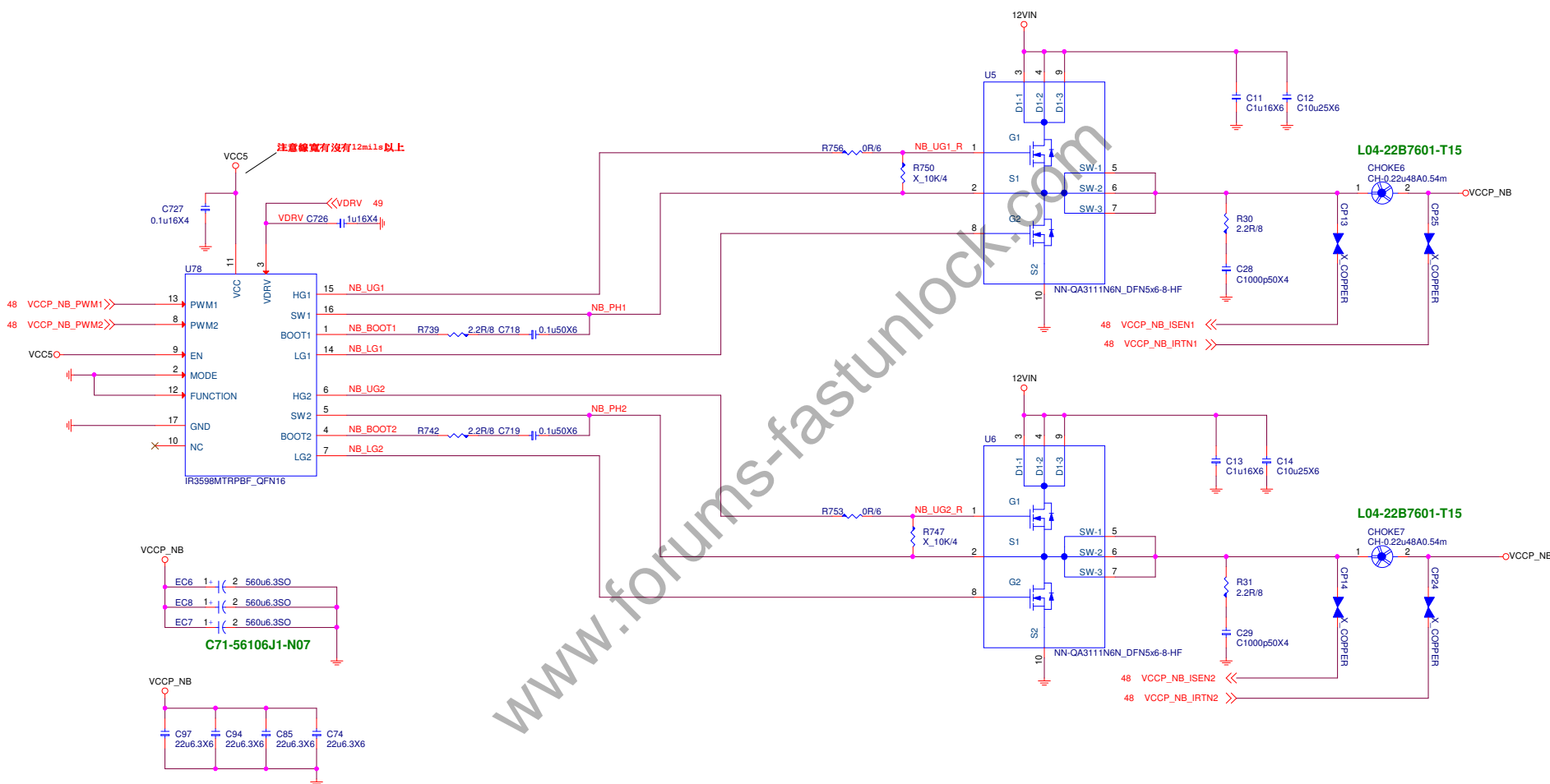
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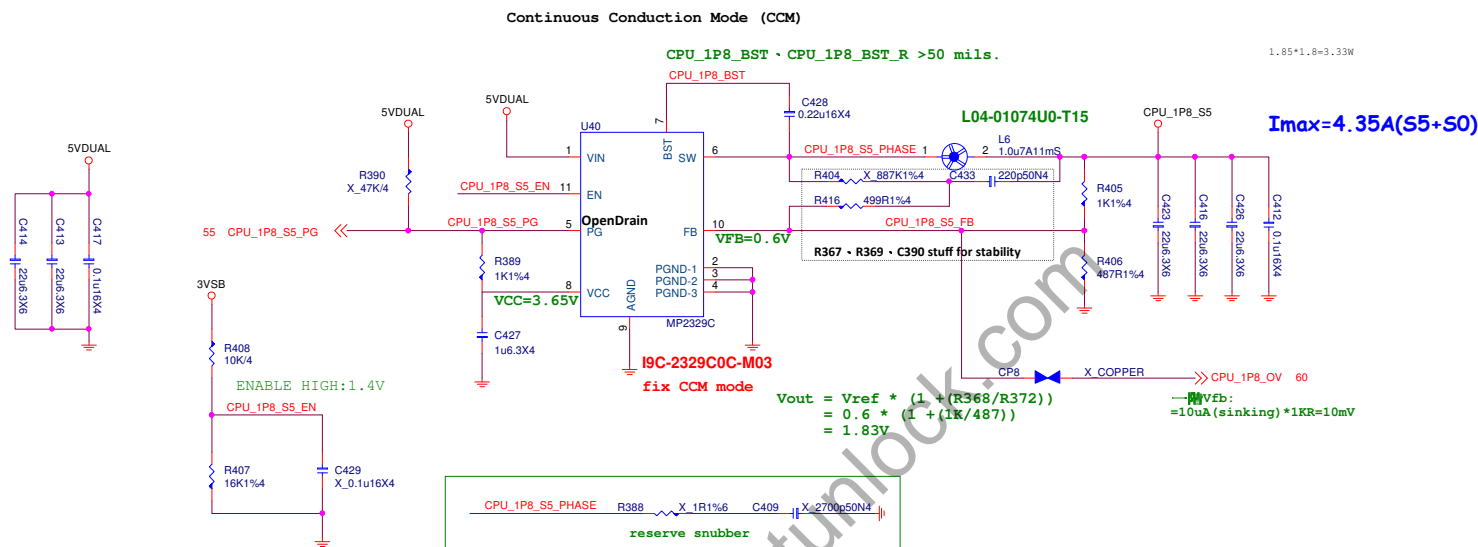
MICRO-STAR INT'L CO.,LTD

MS-7B93

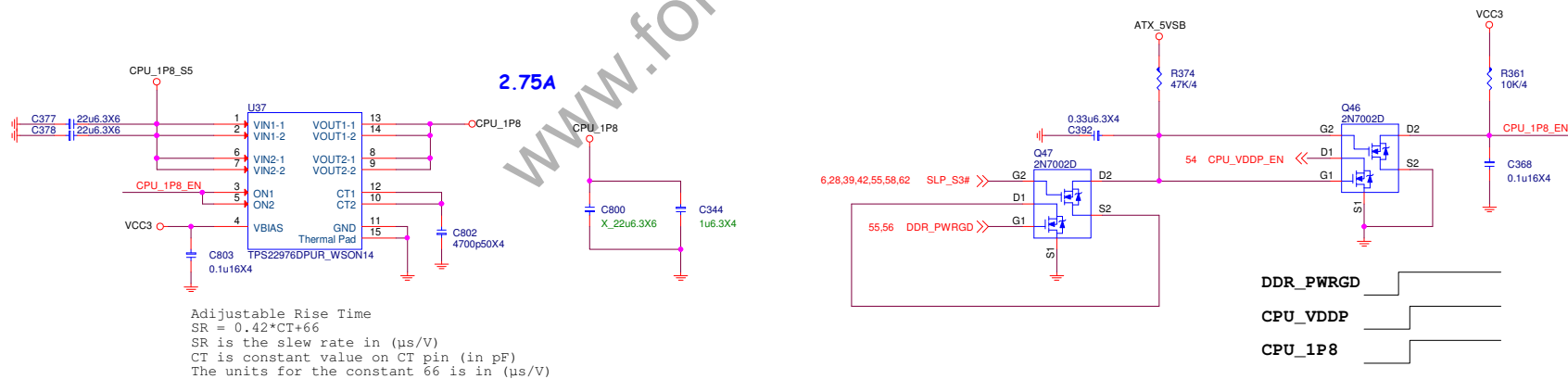
Size	Document Description	Rev
Custom	CPU Power Vcore Phase 7 - 10	10
Date: Friday, May 24, 2019	Sheet 51 of 75	



CPU 1.8V_S5@0.5A
CHIP_1.8V_S5@0.1A
CPU_VDDP_S5@1A
AUDIO1.8V@0.25A



CPU 1.8V_S0@2A
CHIP_1.8V@0.5A



MS-7B93

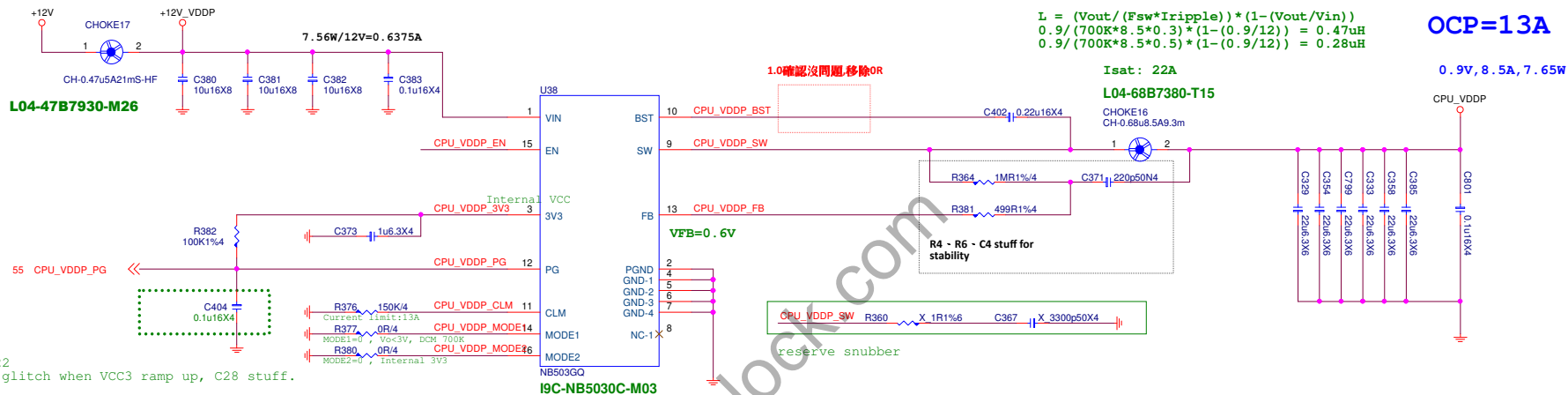
Size Custom	Document Description CPU Power 1.8_S0 / S5	Rev 10
Date: Friday, May 24, 2019		Sheet 53 of 75

CPU_VDDP_S0

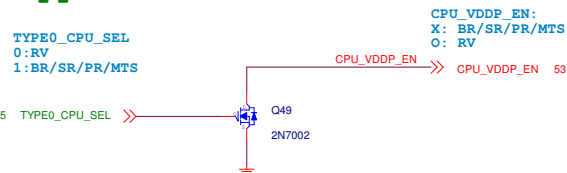
0.9V@S0:8.5A

S0:8.5A
S5:1A

Input Current = $(13A \cdot 0.9V) / 12V / 0.8 = 1.22A$
Choke Isat = 8A
 $I_{rms} = I_{out} \cdot \sqrt{D} \cdot \sqrt{1 - D} = 13A \cdot \sqrt{0.9/12} \cdot \sqrt{1 - (0.9/12)} = 3.42A$
Choke Irms = 5A



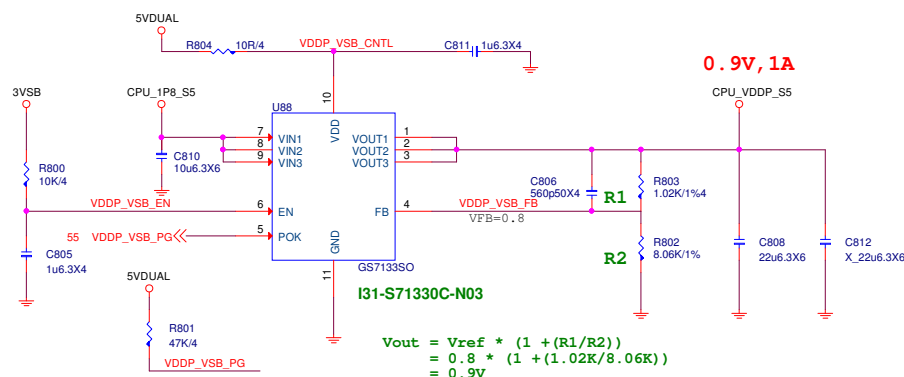
No support BR SPEC



CPU	TYPE	TYPE0_CPU_SEL	TYPE1_CPU_SEL	CPU_VDDP_EN
BR	0	1	0	SPEC not Support
NA	1	0	0	0
SR	2	1	0	CPU VDDP NOT SUPPORT TYPE2
RV/ZP	3	0	1	1
MTS	4	1	0	CPU VDDP NOT SUPPORT TYPE4

CPU_VDDP_S5

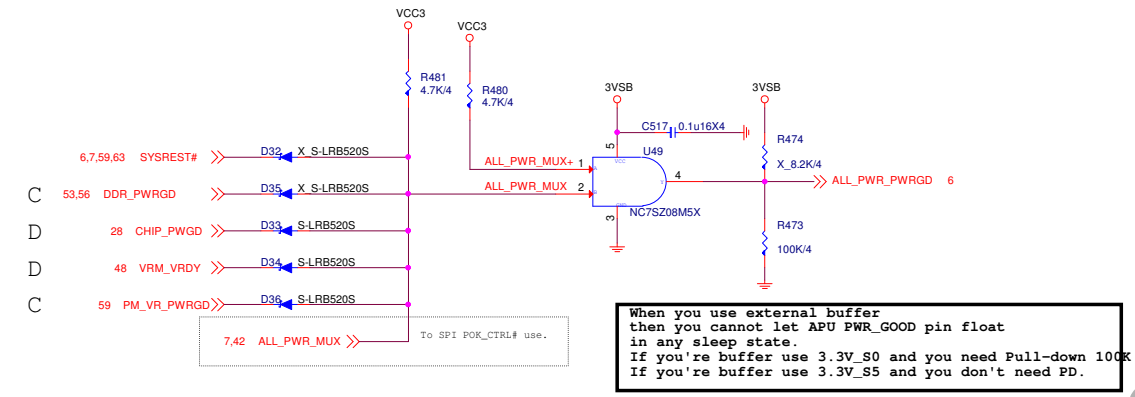
0.9V
S5:1A



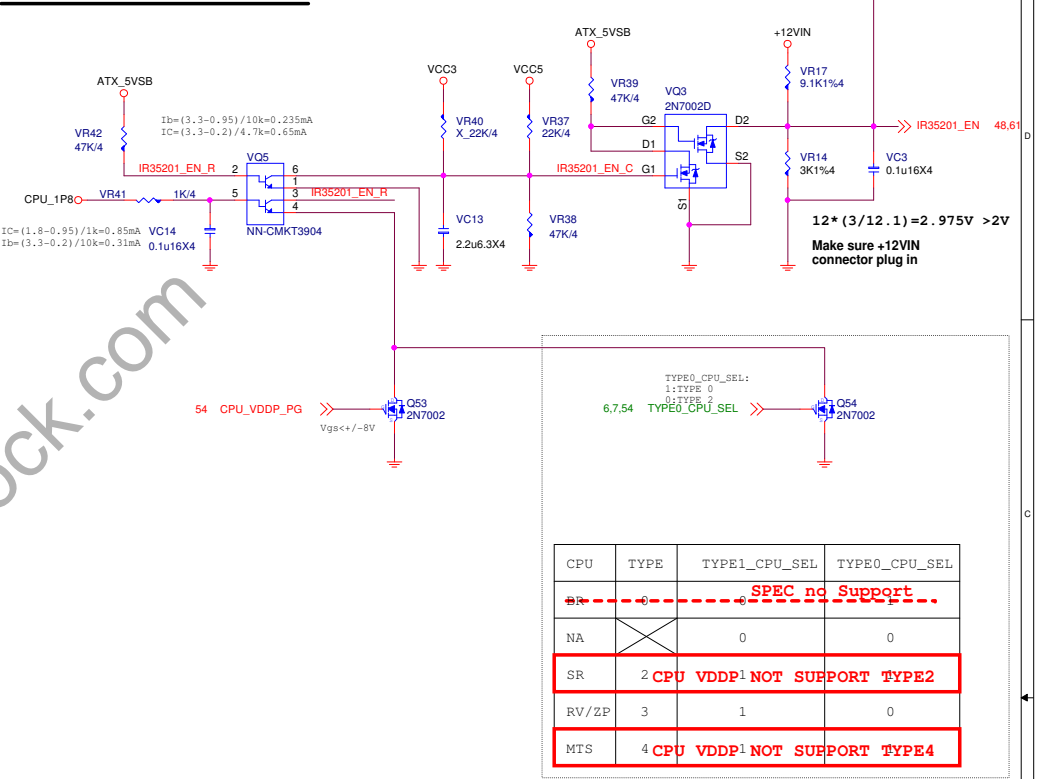
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ALL POWER GOOD MUX

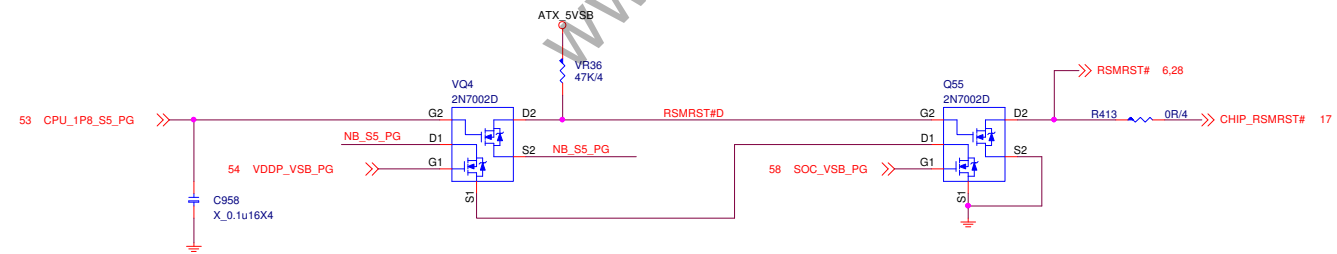
S0 PG



VRM_Enable circuit



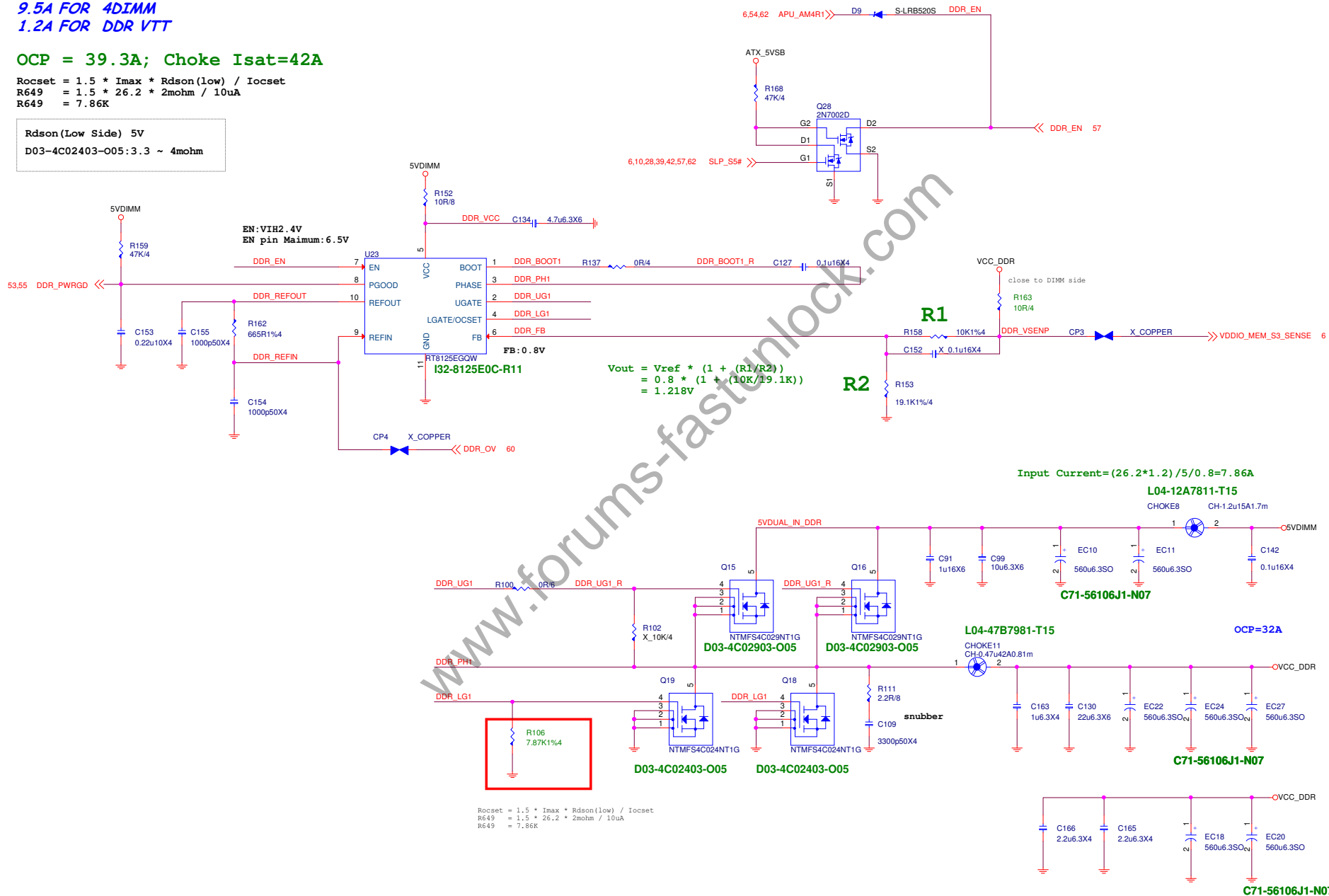
S5 PG



15.5A FOR CPU
9.5A FOR 4DIMM
1.2A FOR DDR VTT

```
Rocset = 1.5 * Imax * Rdson(low) / Iocset
R649   = 1.5 * 26.2 * 2mohm / 10uA
R649   = 7.86K
```

Rdson(Low Side) 5V
D03-4C02403-005:3.3 ~ 4mohm

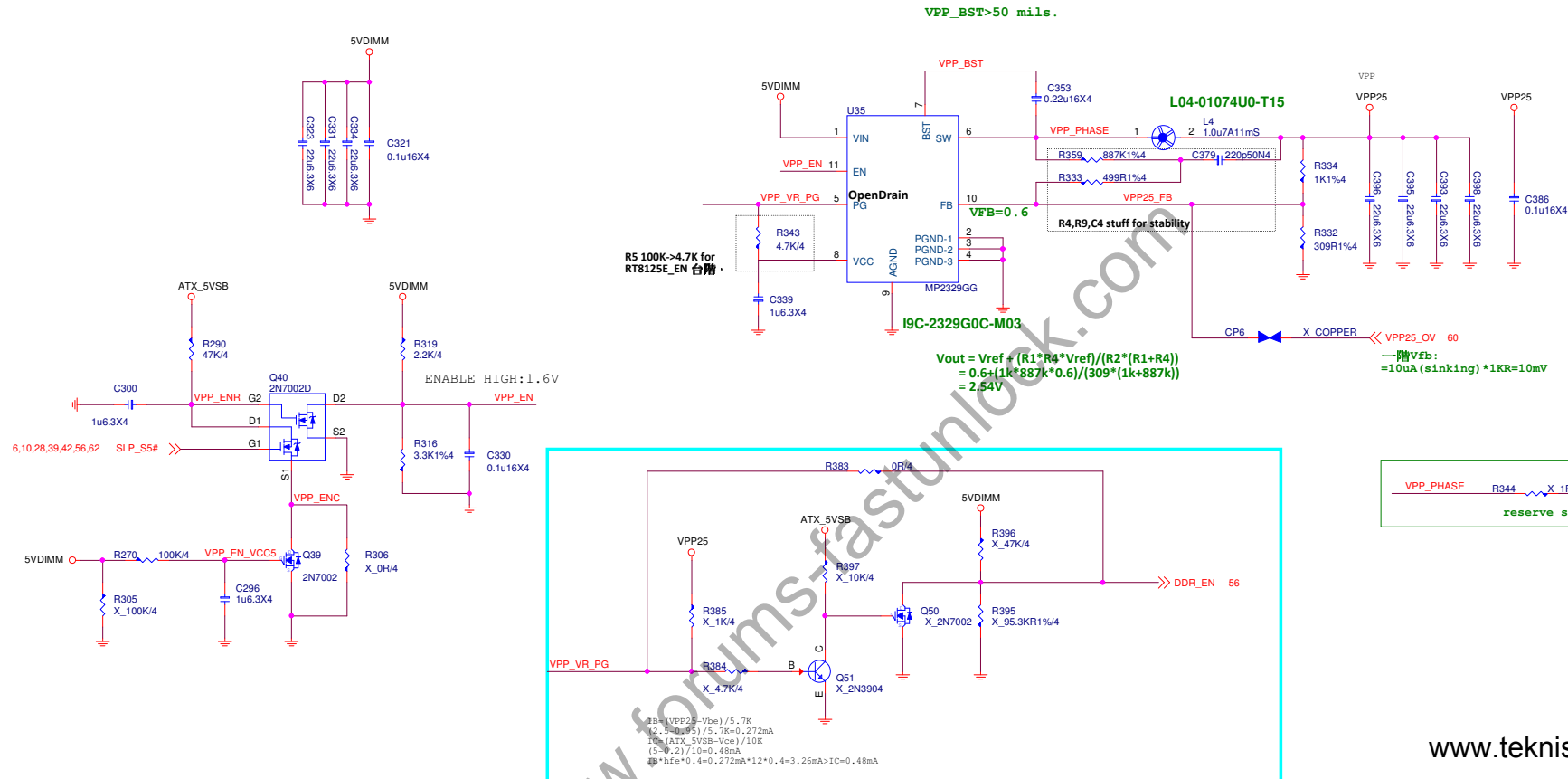


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Size Custom	Document Description DDR Power - 8125E	Rev 10
Date: Friday, May 24, 2019		Sheet 56 of 75

4DIMM : VPP25

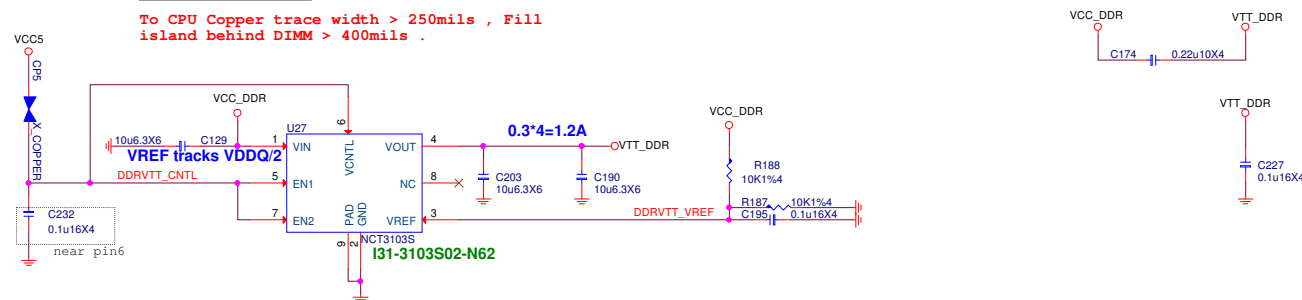
2.5V@2.24A



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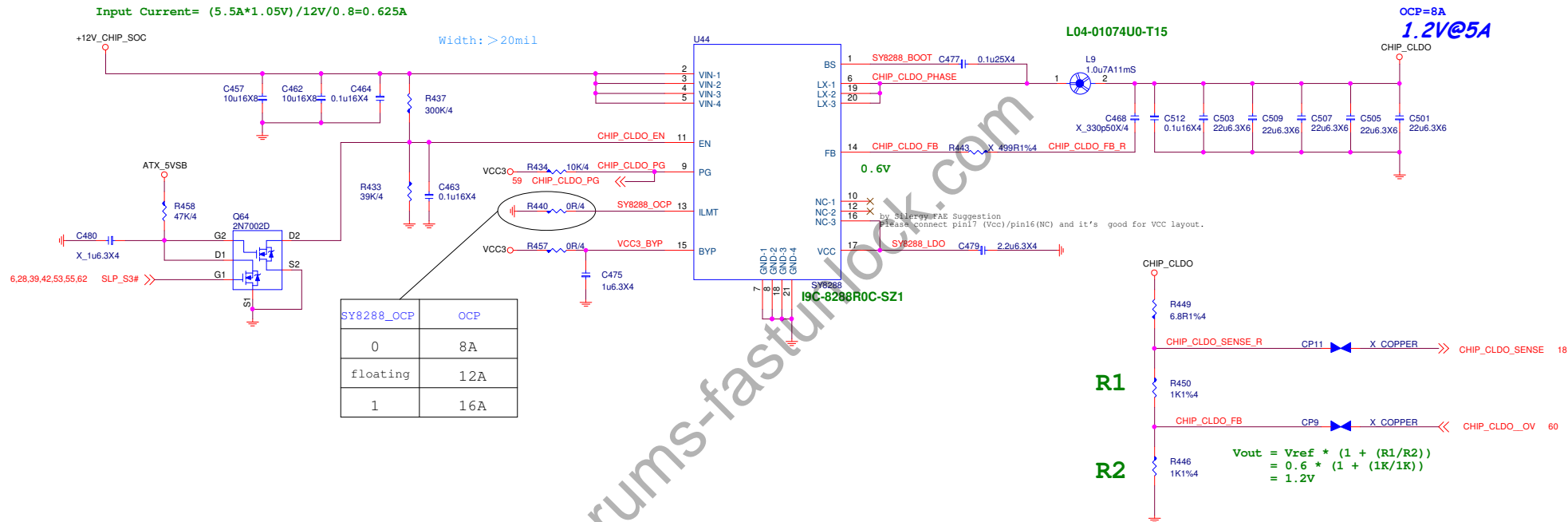
DDR VTT Power

To CPU Copper trace width > 250mils , Fill island behind DIMM > 400mils .



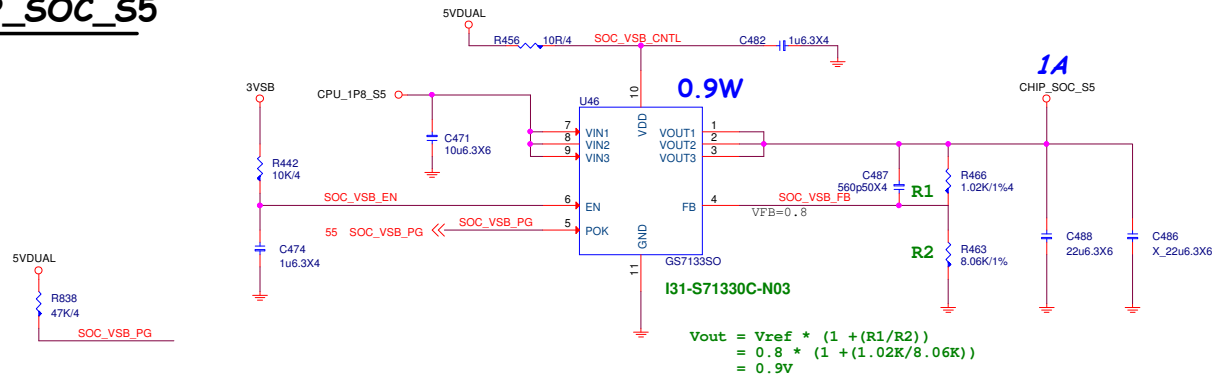
FOR Premium CHIP_CLDO

1.2V
S0:5A



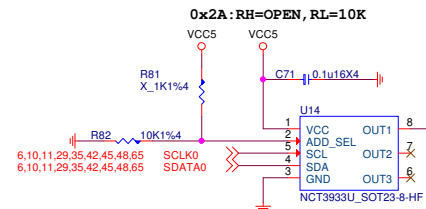
FOR Premium CHIP_SOC_S5

1V@1A



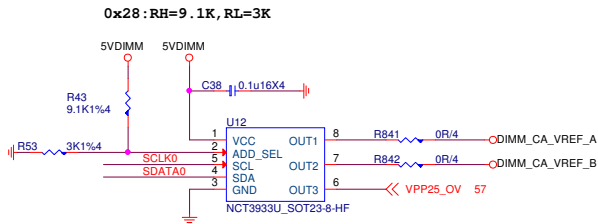
MICRO-STAR INT'L CO.,LTD		
MS-7B93		
Size Custom	Document Description PROM - SY8288RAC / 1.05V	Rev 10
Date: Friday, May 24, 2019	Sheet 58	of 75

Over Voltage Control IC

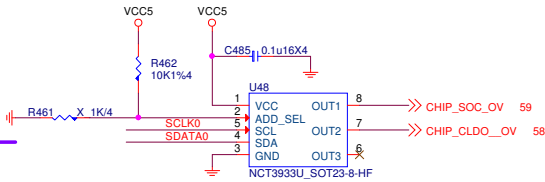


UPI VOLTAGE CONSOLE

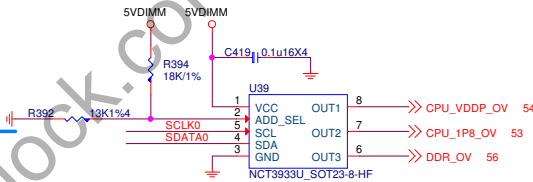
ADDRESS	0x2A	0x28	0x26	0x24	0x22	0x20
RH (KOhm)	OPEN	3.9	3	2.2	1.3	10
RL (KOhm)	10	1.3	2.3	3	3.9	OPEN
BUS_SEL	0%	25%	40%	60%	75%	100%



0x20: RH=10K, RL=OPEN



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



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%

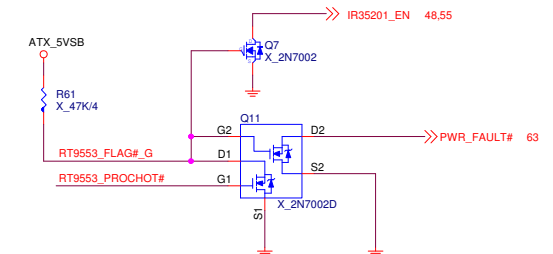
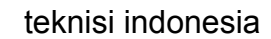


MICRO-STAR INT'L CO.,LTD

MS-7B93

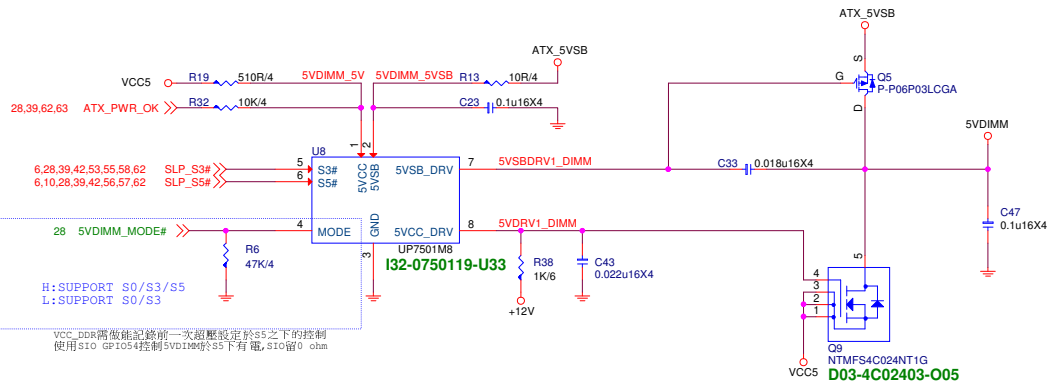
Size	Document Description	Rev
Custom	OV Control - NCT3933	10
Date:	Friday, May 24, 2019	Sheet 60 of 75

RT9553B CURRENT SENSE



Vcore	SOC
D=Vout/Vin Vin = 12 > input voltage Vout = 2 > output Vcore D = 0.166667	D=Vout/Vin Vin = 12 > input voltage Vout = 1.55 > output Vcore D = 0.129167
I o = Icore(max)*0.8 I core(max) = 200 > Vcore current I avg = 160 A	I o = Icore(max)*0.8 I core(max) = 75 > Vcore current I avg = 60 A
I ripple=(Io*√ D*√ (1-D)) / Phase Phase = 10 phase I ripple = 5.962848 A	I ripple=(Io*√ D*√ (1-D)) / Phase Phase = 2 phase I ripple = 10.06153 A
How many pcs. Of Cap. I ripple(cap) = 4700 m A COE _{TEMP} = 1 Input Cap. = 2 pcs.	How many pcs. Of Cap. I ripple(cap) = 4700 m A COE _{TEMP} = 1 Input Cap. = 3 pcs.

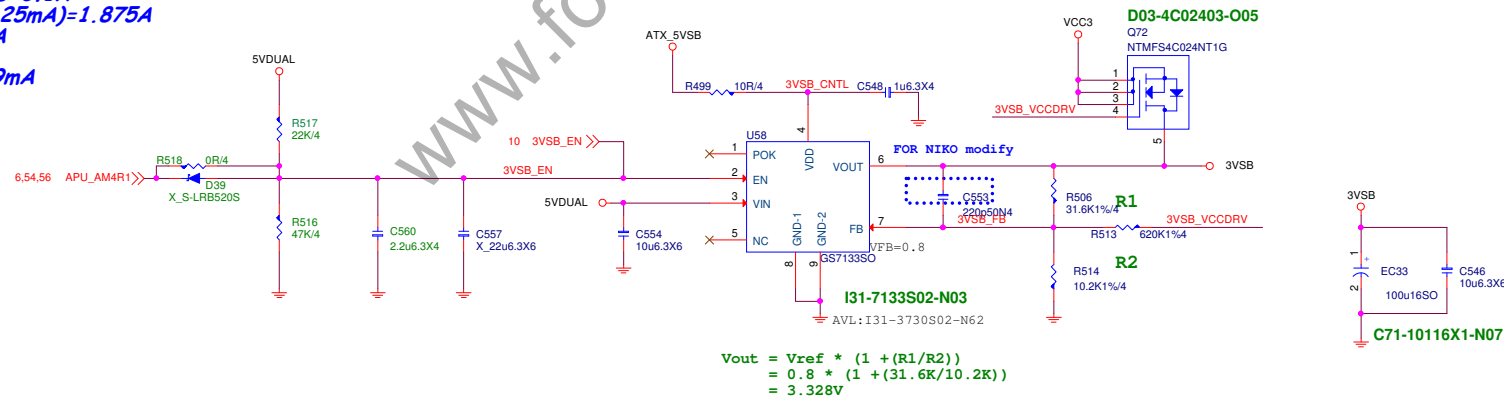
5VDIMM FOR DDR



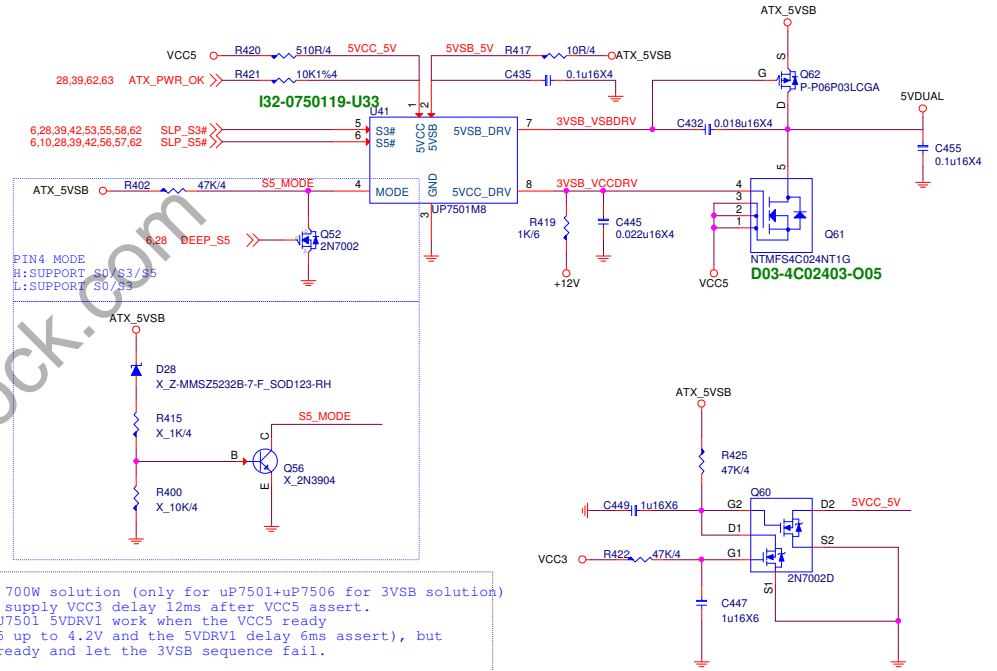
3VSB cost down

3.3V@3.125A

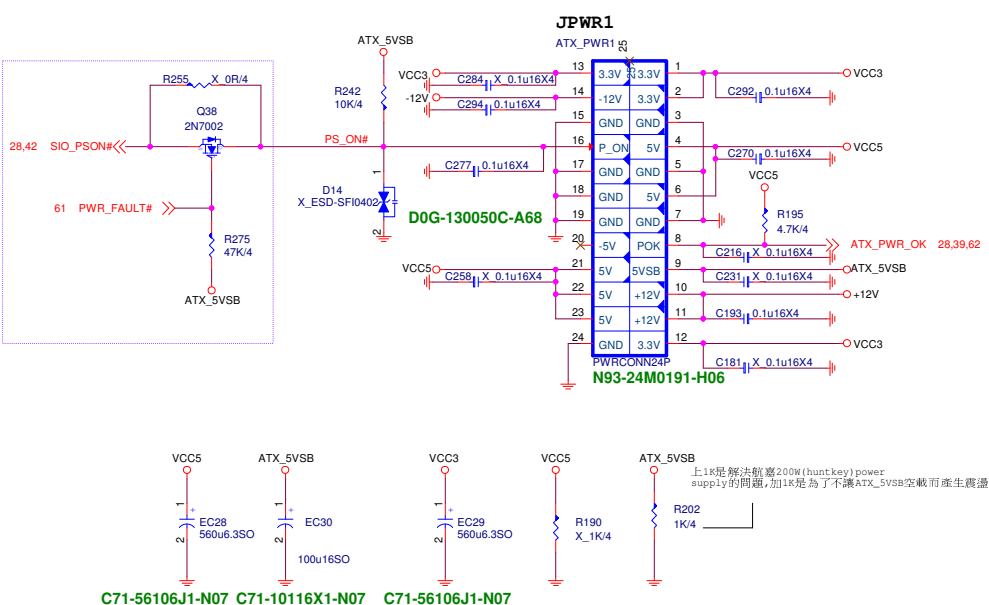
CPU:VDD_33_S5=0.25A
CHIP:VDD_33_S5=0.1A
PCI-E=(375mA*1.125mA)=1.875A
M.2WIFI= 0.78A
LAN=0.12A
USB TYPE C :0.9mA



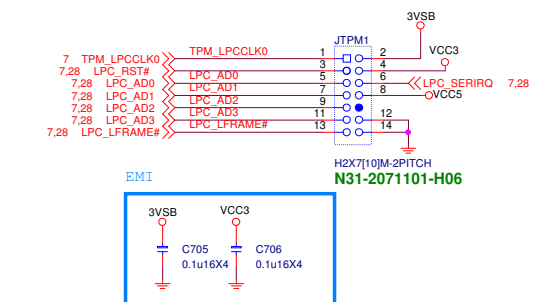
5VDUAL For 3VSB/CPU1.8V/VDDP



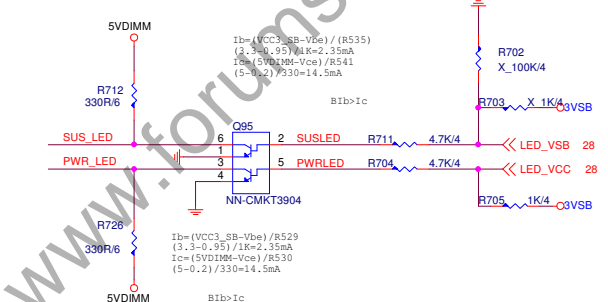
ATX POWER CONNECTOR



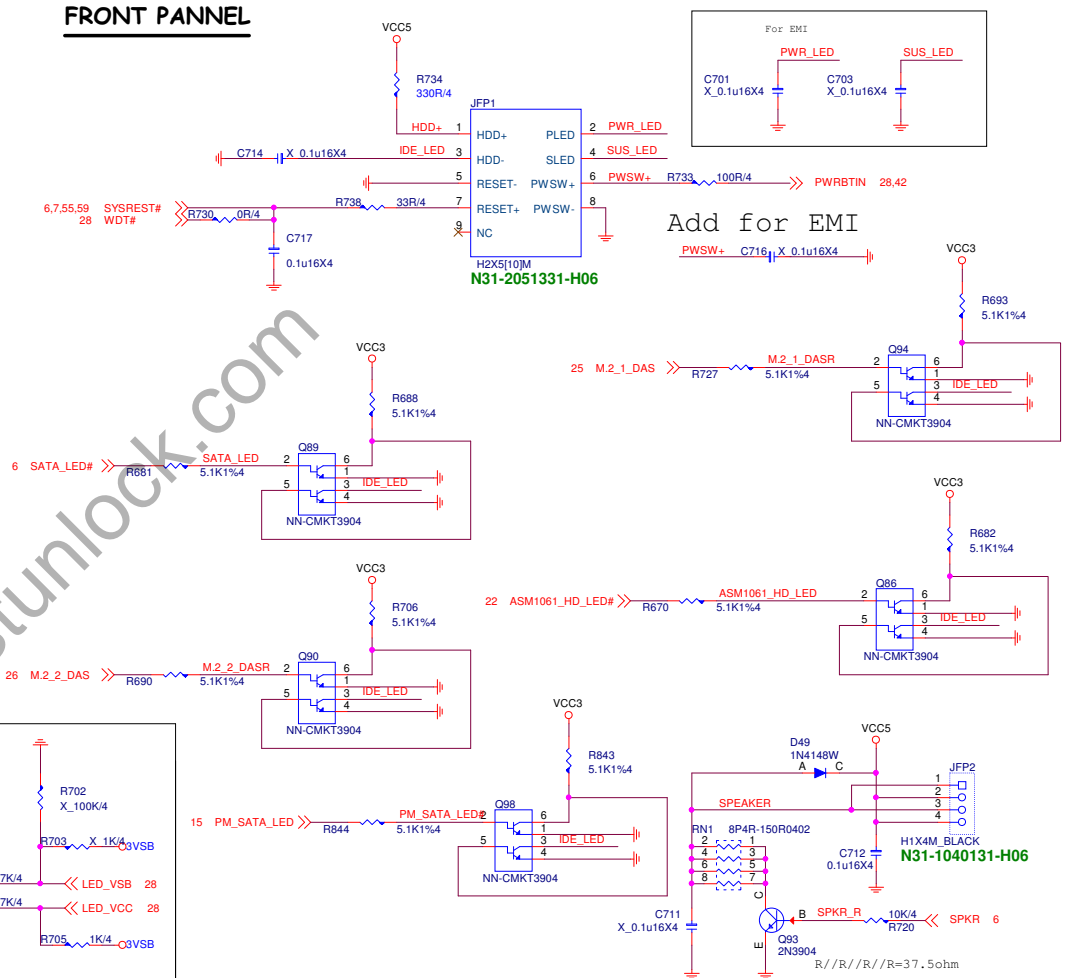
TPM



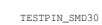
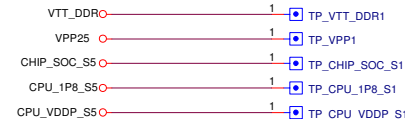
LED (for NCT6797D)



FRONT PANNEL

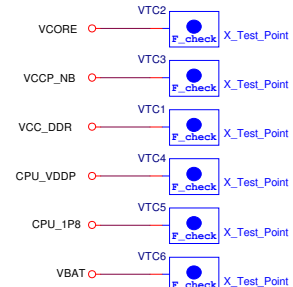


Voltage Measure Point



Factory check point

```
put bottom side
```



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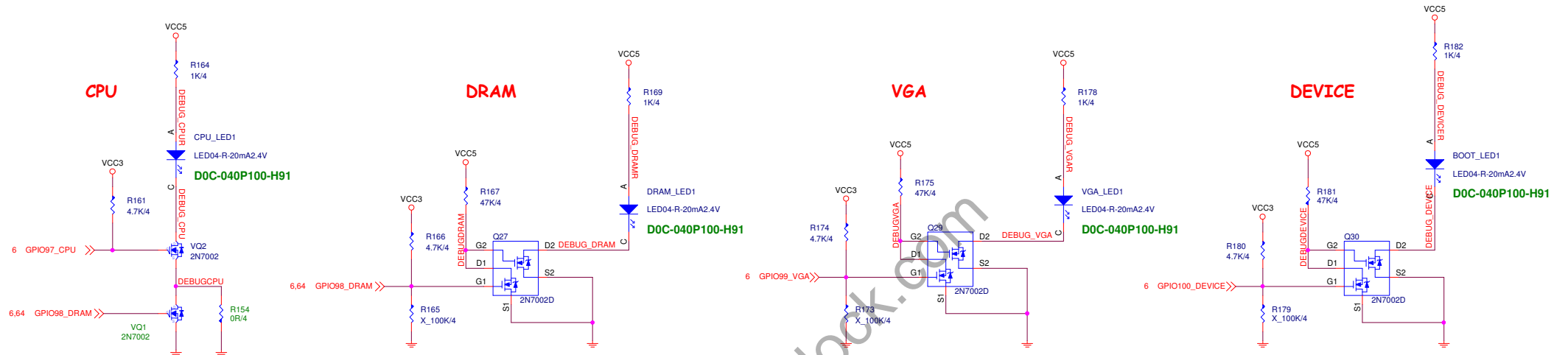
MS-7B93

Size	Document Description
Custom	ATX power - FrontPanel / EMI

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EZ Debug LED



LED亮燈時同時將CPU LED關掉

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)

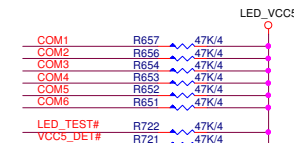
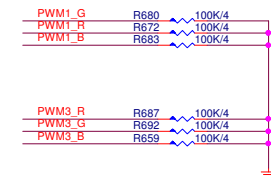
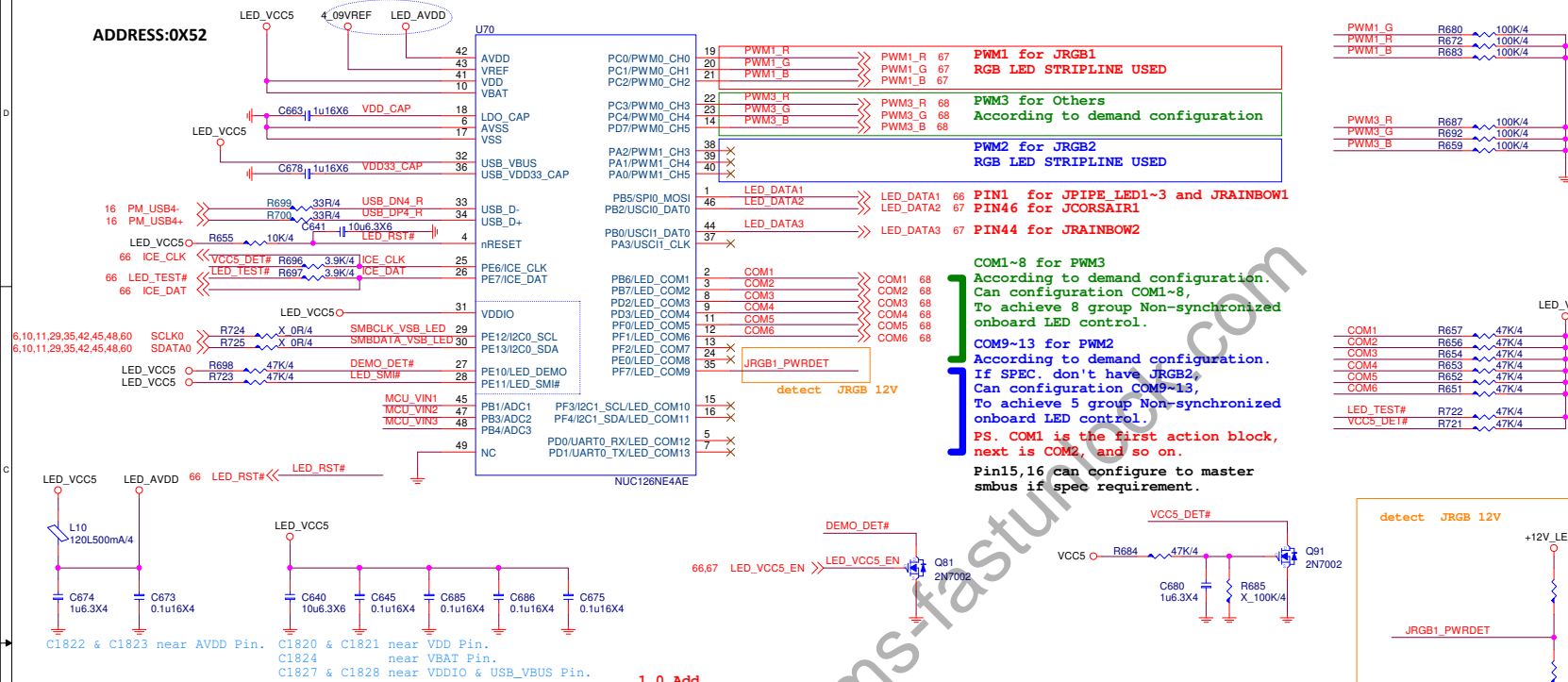
DIMM_SLOT FORM SIO

D0C-040P100-H91/D0C-040S500-E07

AMD AMP Detect LED

48 PIN LED MCU

If you use ADC function, need to separate VREF from AVDD and 4_09VREF stuff for VREF.

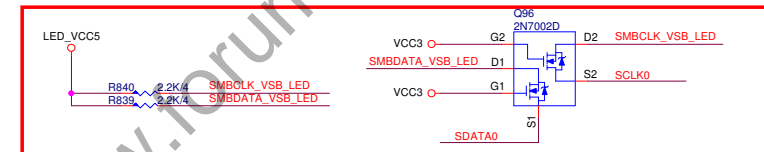
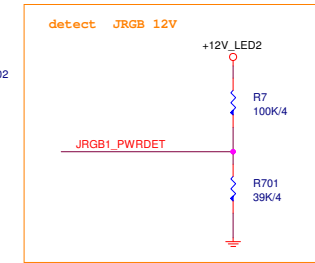


COMI-8 for PWM3
According to demand configuration.
Can configuration COM1-8,
To achieve 8 group Non-synchronized
onboard LED control.

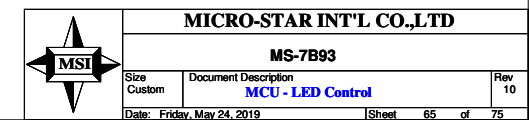
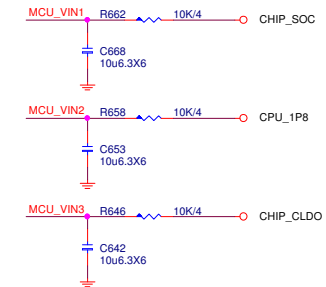
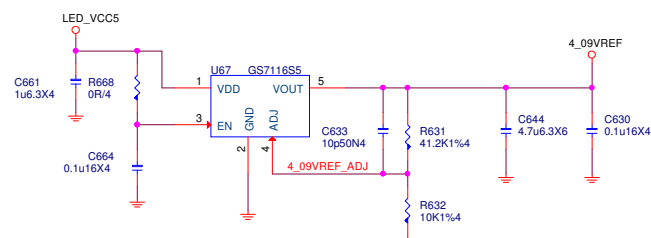
COM9-13 for PWM2
According to demand configuration.
If SPEC. don't have URGE2,
Can configuration COM9-13,
To achieve 5 group Non-synchronized
onboard LED control.

**PS. COM1 is the first action block,
next is COM2, and so on.**

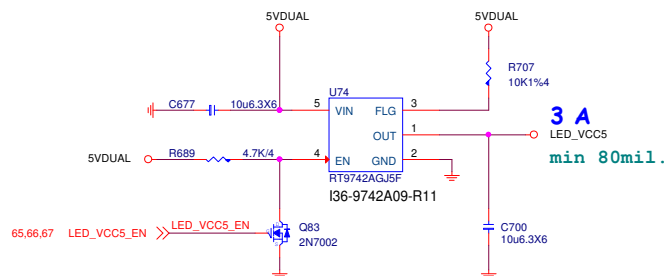
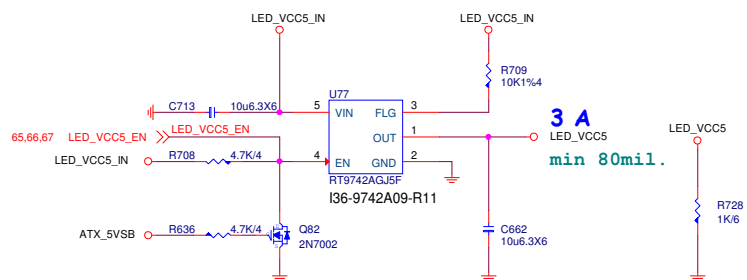
Pin15,16 can configure to master
smbus if spec requirement.



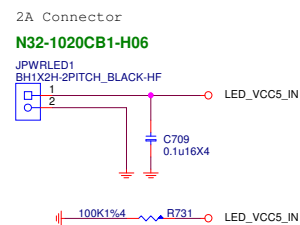
Control	Net Name	PWM USE
PCH	LED_DATA1	No Use
AUDIO Cover	LED_GPIO_01	No Use
MOS/IO cover	LED_GPIO_02	No Use
JRAINBOW1	LED_GPIO_03	No Use
JCORSAIR1	LED_DATA2	No Use
JRGB1/JRGB2	PWM1/ PWM2	PWM1/ PWM2
Board Side LED	COM 1~8	PWM3
Board Side LED	COM 9~13	PWM2



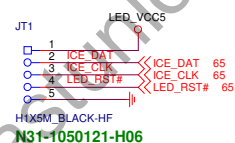
EXTERNAL POWER INPUT



External Power



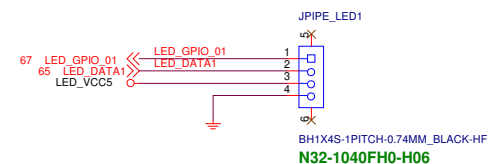
JT1 for FW update



JF1 for Factory test

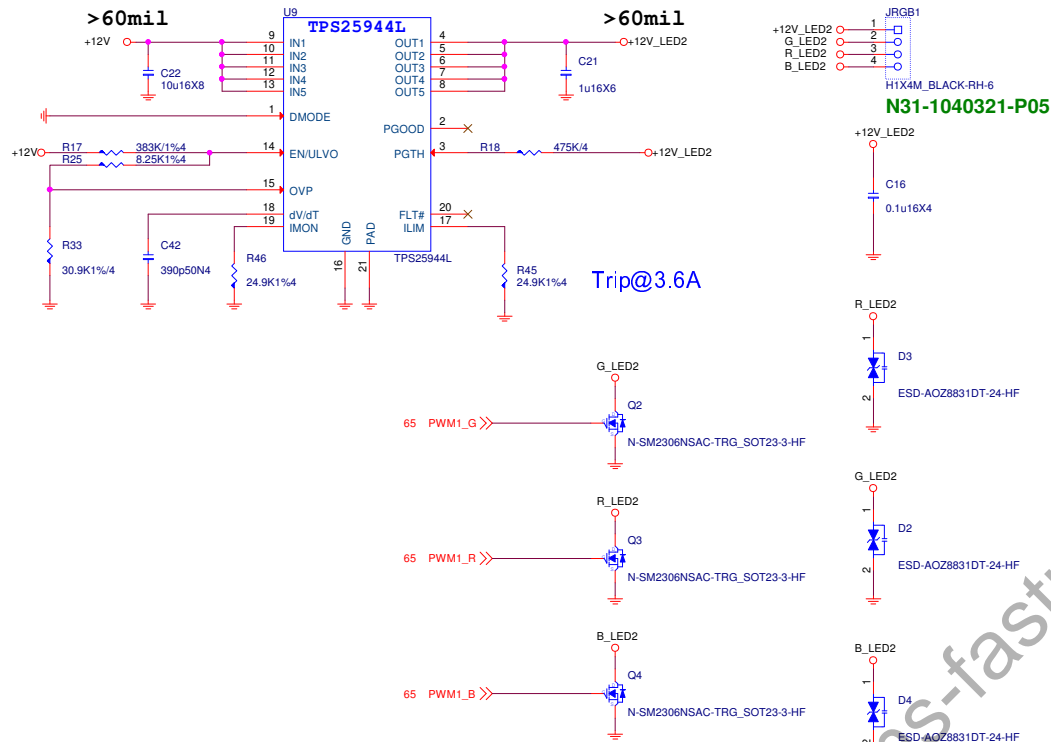


1 AUDIO/IO Cover LED



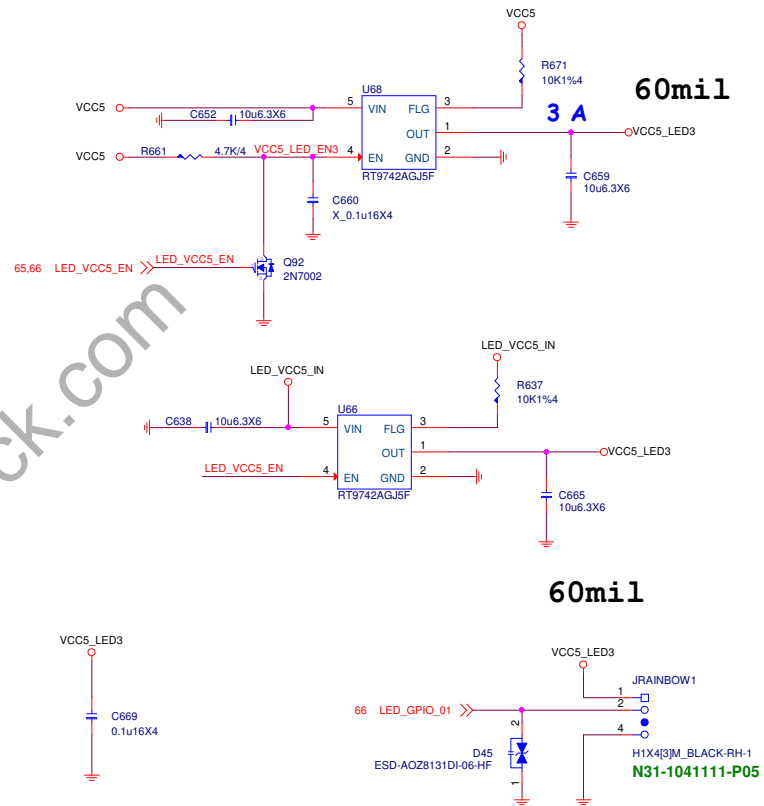
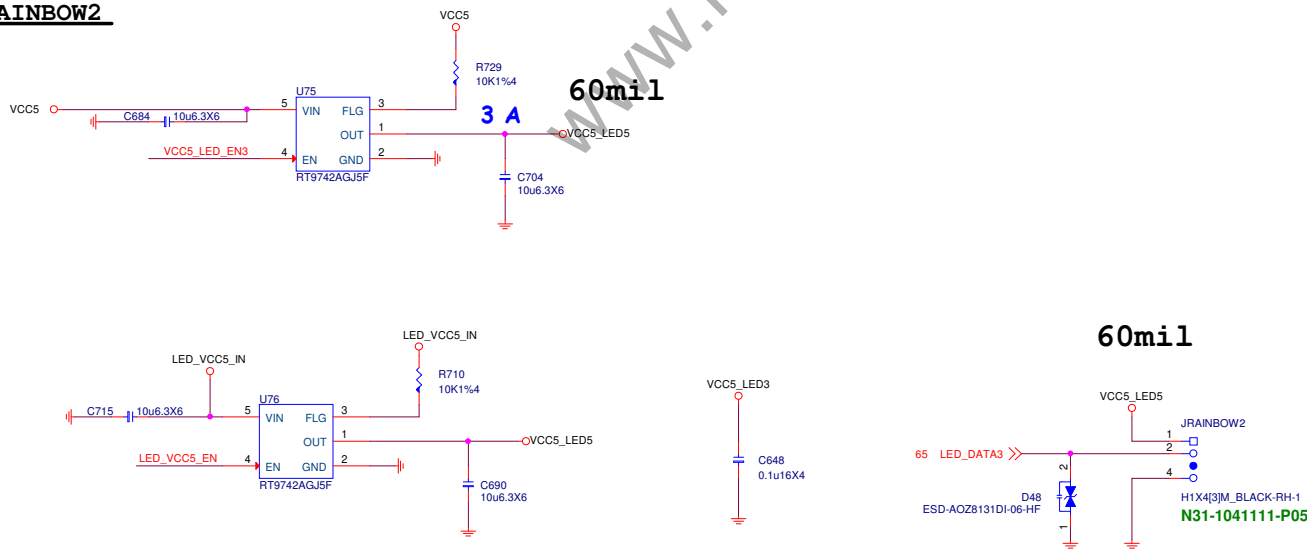
```
JPIPE:PIN1:output ,PIN2:input
```

PIN2:MCU IN
PIN1:HEATSINK OUT

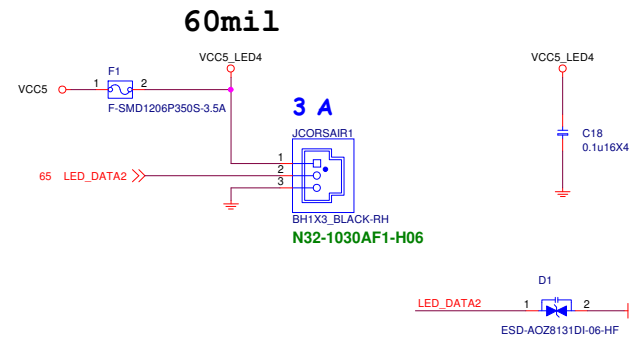
JRGB1

外接LED 燈條 (RGB)
----- PCB 文字面 (JRGB2)
----- 手冊註明 RGB 接頭支援標準 5050 RGB LED 燈條 (12V/G/R/B) , 燈條總輸出電流限制為3安培 (12 伏特) , 長度限制為2公尺

JRAINBOW1

JRAINBOW2

JCORSAIR1



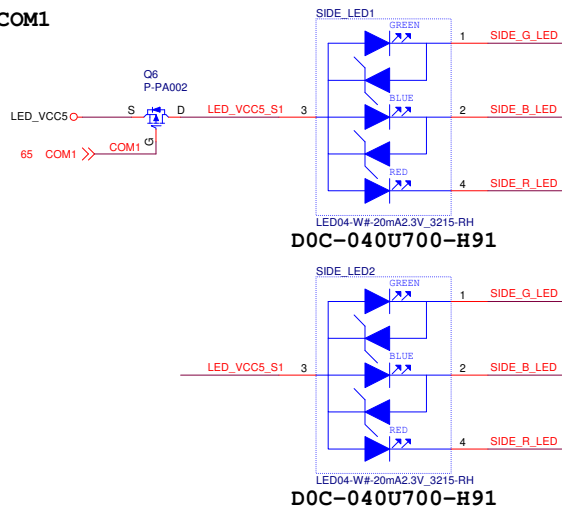
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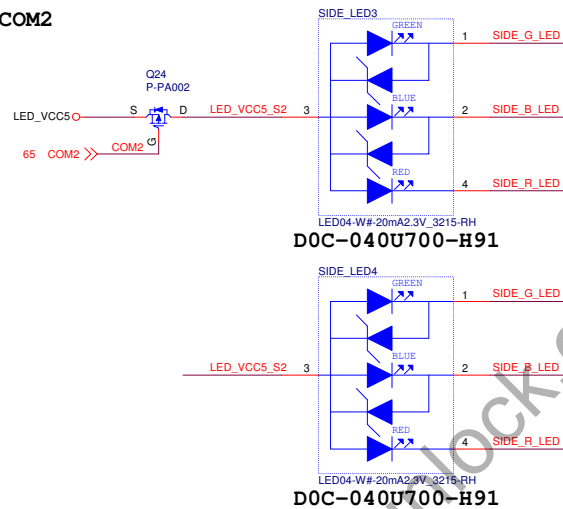
Size Custom	Document Description LED - JLED1/2/3/4	Rev 10
Date: Friday, May 24, 2019		Sheet 67 of 75

BOARD SIDE LED *12

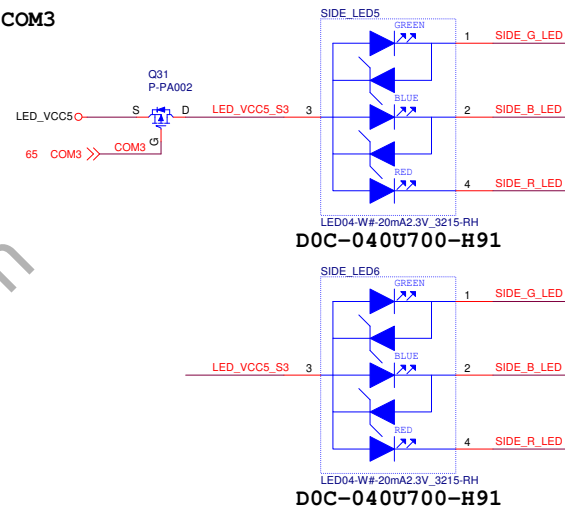
COM1



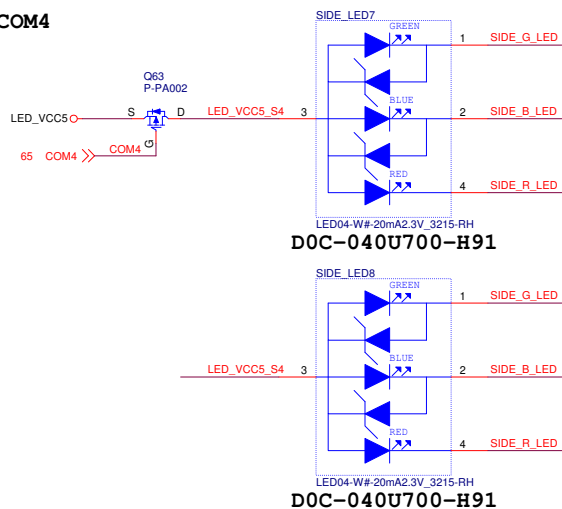
COM2



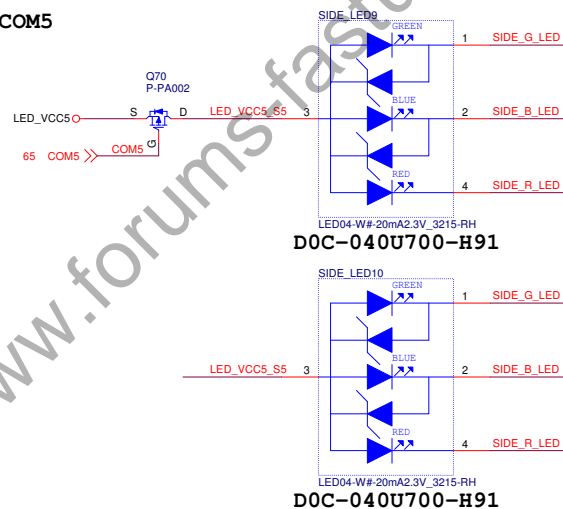
COM3



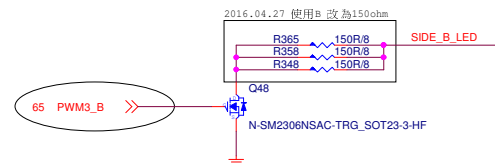
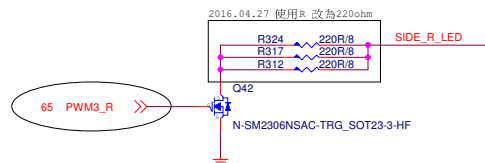
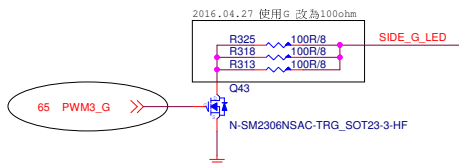
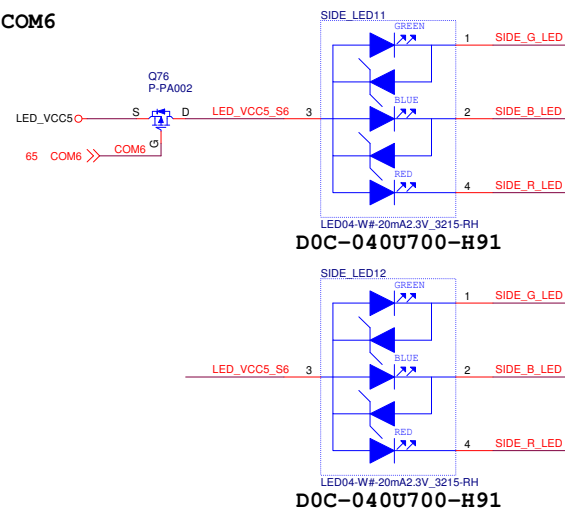
COM4



COM5




COM6

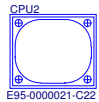


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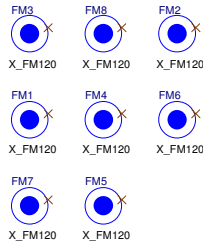
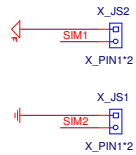
			MICRO-STAR INT'L CO.,LTD	
			MS-7B93	
Size	Document Description			Rev
Custom	BOM Option			10
Date: Friday, May 24, 2019		Sheet 69 of 75		

CPU Socket

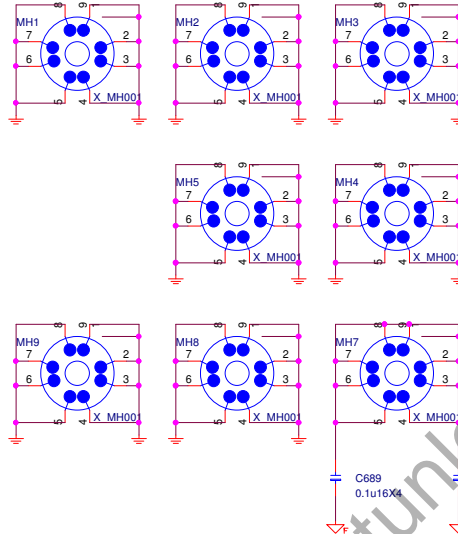


E95-0000022-C22

Simulation



Optics Orientation Holes



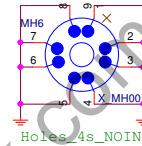
MANUAL PART

UEFI1
G51-M1SPXXA-A09
G51-M1SPXXA-A09

CFOS
Y02-MU00170-CFO
Y02-MU00170-CFO

HDMI_LA1
Label
HDMI
HDMI LABEL
Y01-RHDMI03-000

NAHIMIC1
Y02-MU00100-NAH
Y02-MU00100-NAH



AV1:
D06-0100161-F52
D06-0100101-K26

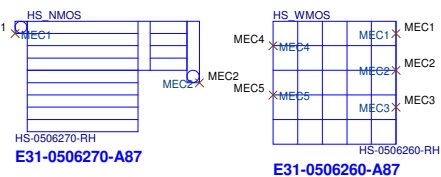
PCB

PCB

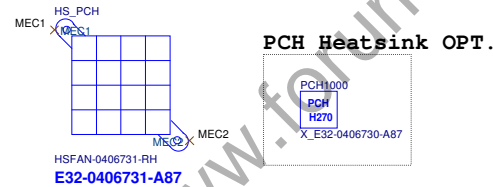


PD0-07B930A-E48
PD1-07B930A-G37

MOS HEATSINK



PCH HEATSINK



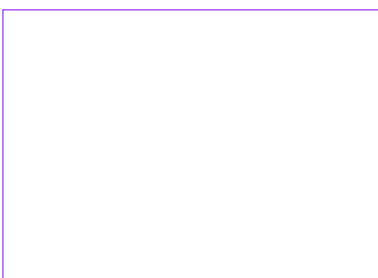
Audio COVER



IO COVER



DDR COVER



20190201 Remove DDR_COVER1