

Platform : KBL_H+N17P-GX

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| 38. | +5VA/+3.3VAL | | |
| 39. | +1.0VA_PCH/VCCIO | | |

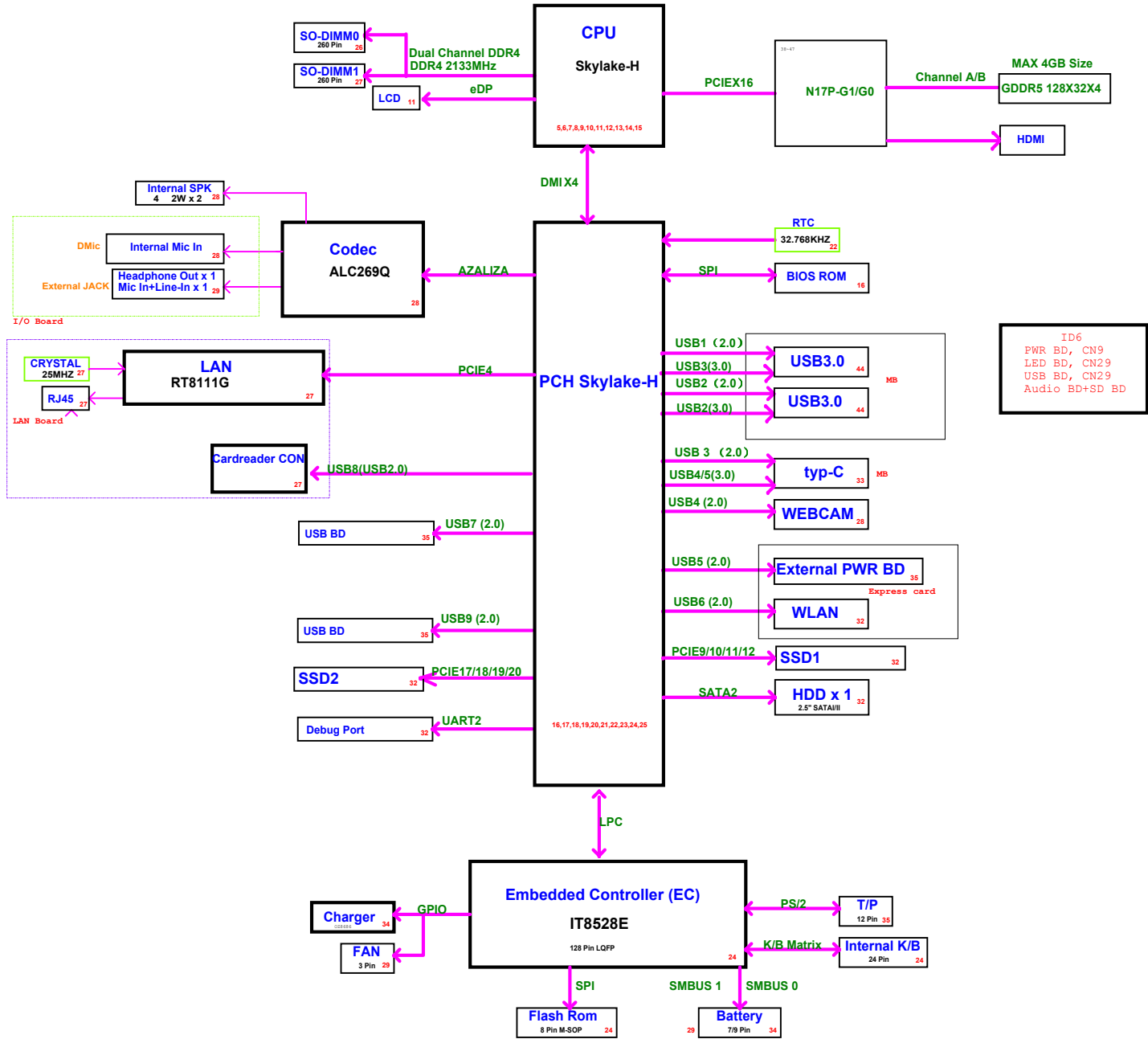
M/B Schematic Version Change List

[illegible]

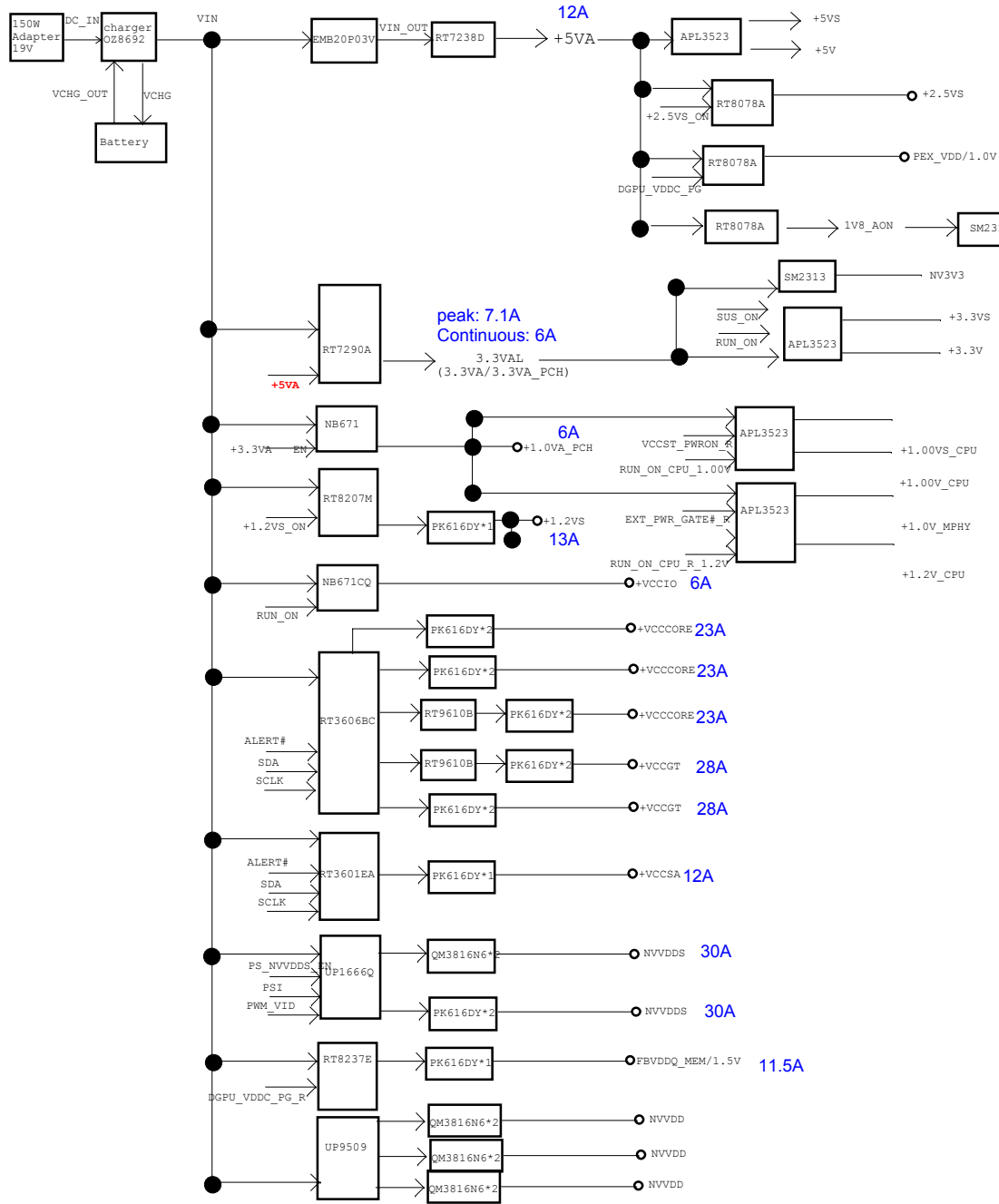
Daughter Board Schematic Version Change List

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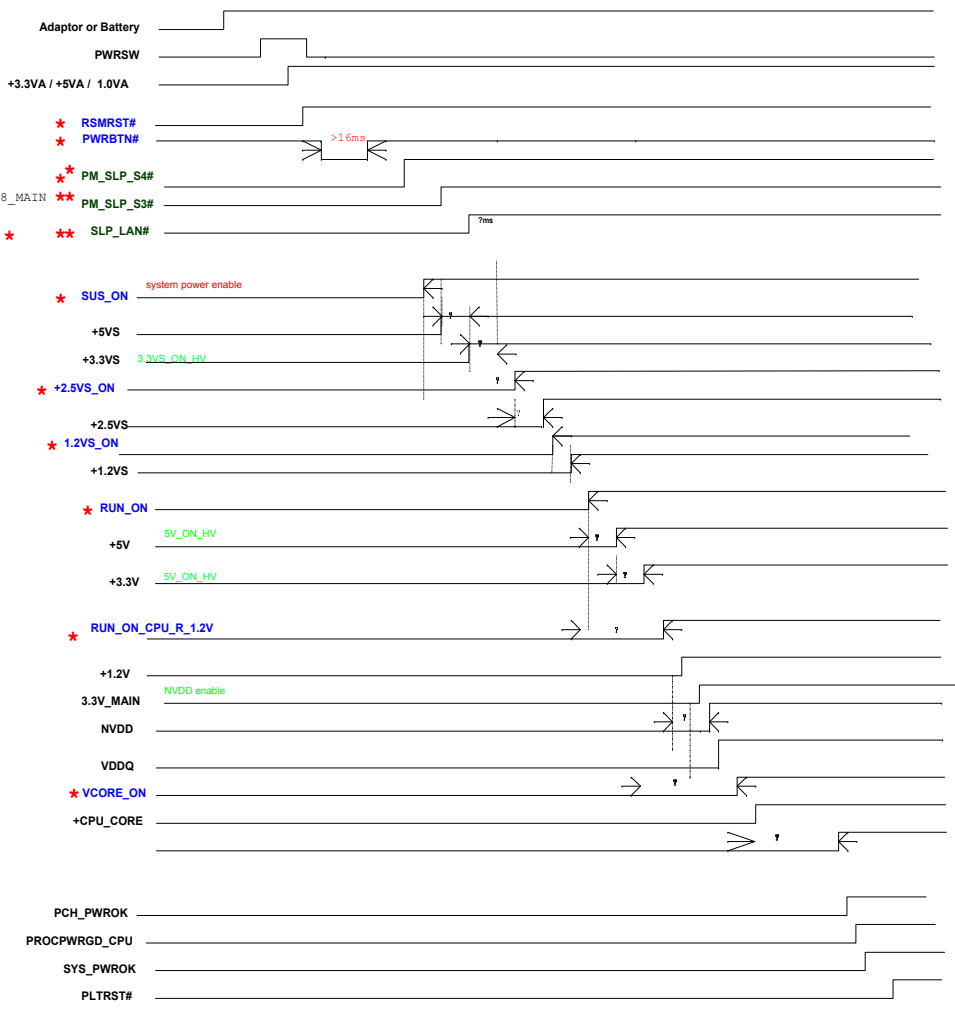
SYSTEM BLOCK DIAGRAM



POWER BLOCK DIAGRAM



System Poewr On Sequence



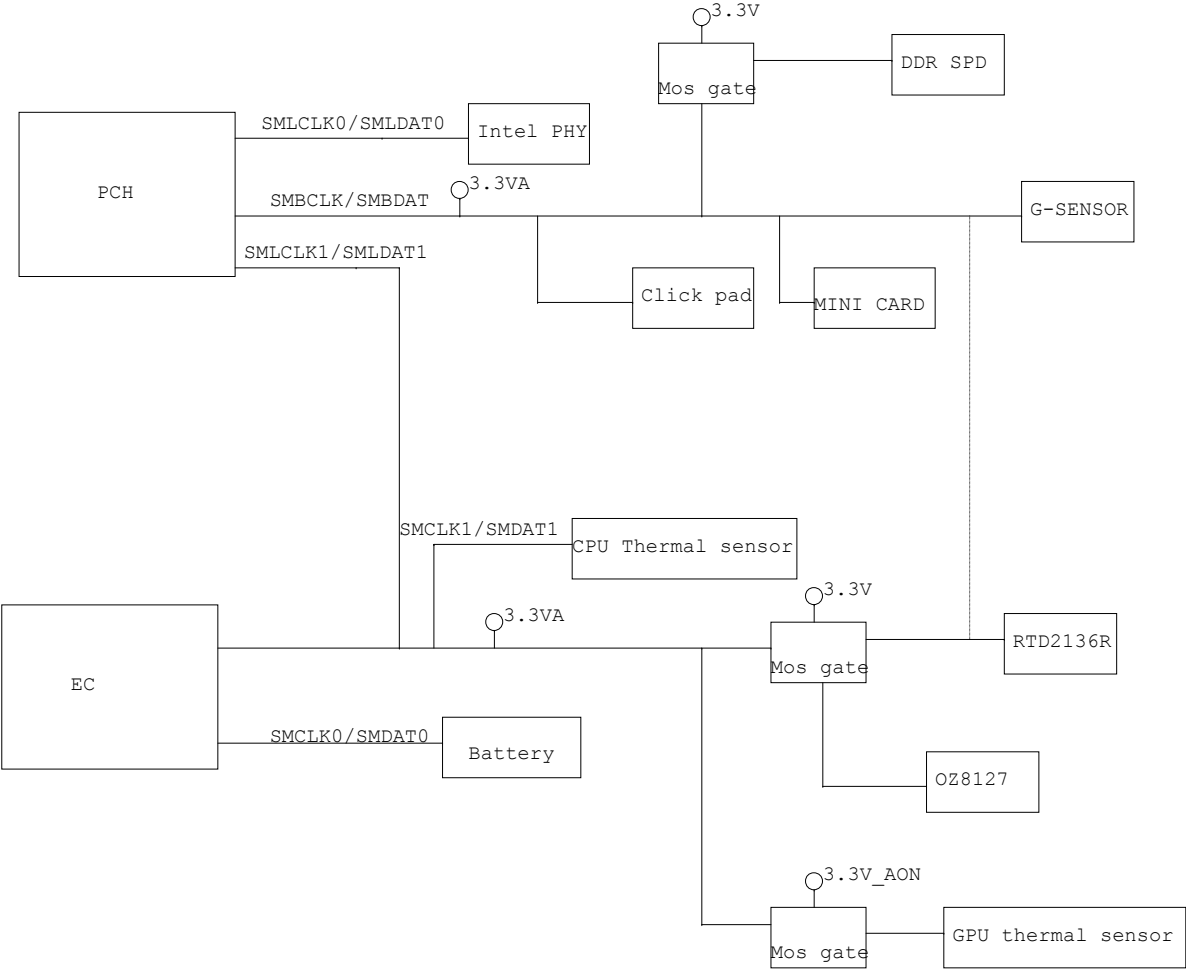
* EC Control Pin (O/P)
** EC Control Pin (I/P)

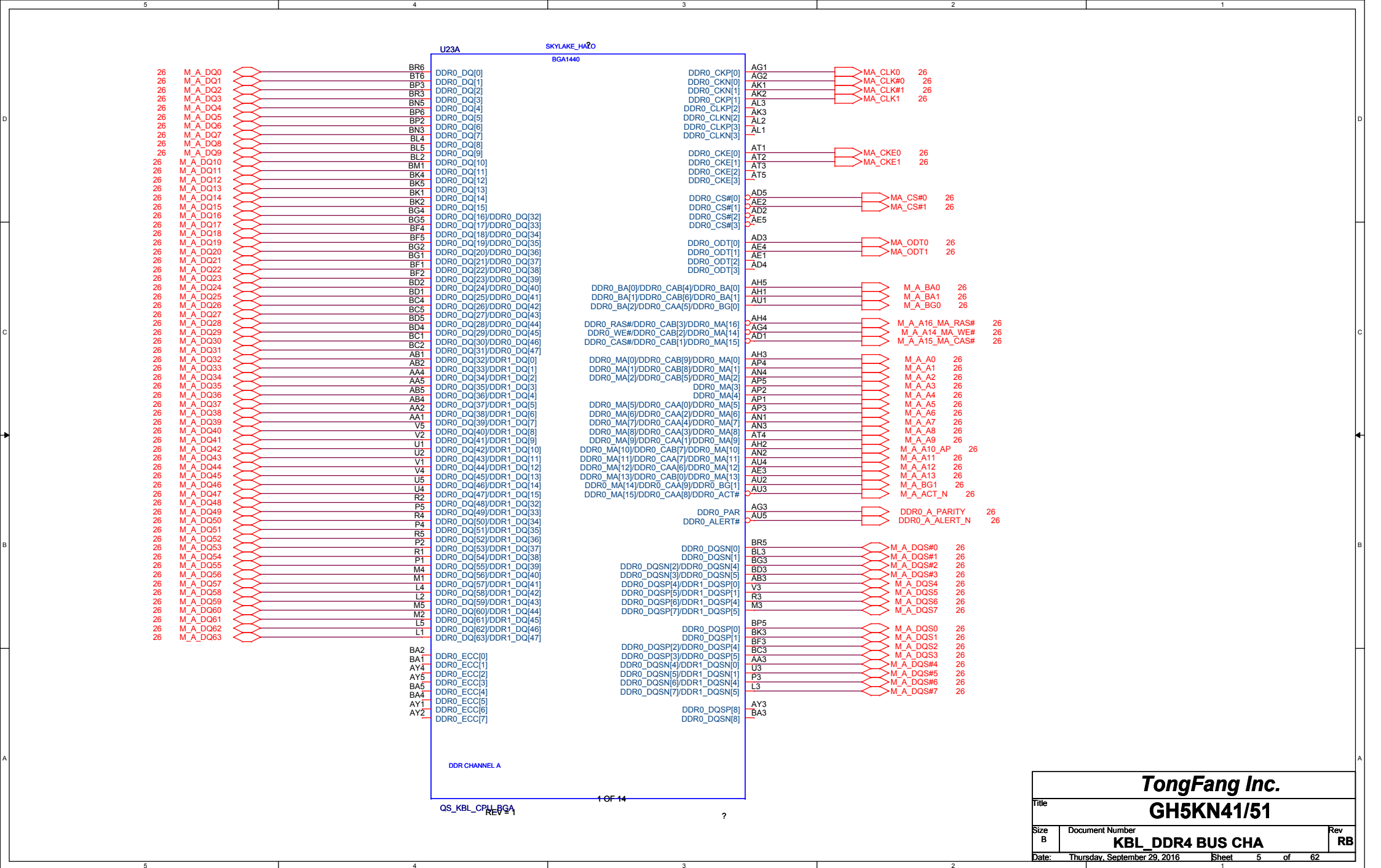
SMBUS BLOCK

SKYLAKE	
GPIO	
GPIO0	S_GPIO
GPIO1	EC_EXTSMI#
GPIO2	G_INT1
GPIO3	INT_PIRQF#
GPIO4	INT_PIRQG#
GPIO5	INT_PIRQH#
GPIO6	TACH2
GPIO7	SMC_WAKE_SCI#
GPIO8	ICC_EN#
GPIO9	USB_OC#_10_11
GPIO10	USB_OC#_12_13
GPIO11	SMBALERT#
GPIO12	SSD_DEVS_L_P
GPIO13	GND
GPIO14	USB_OC#_7
GPIO15	ME_WB#
GPIO16	SATA_DET#4
GPIO17	DGPU_VDDC_PG_PCH
GPIO18	CLK_LAN_REQ
GPIO19	BBS_BIT0
GPIO20	MINI_CLKREQ0#
GPIO21	SATA_DET#
GPIO22	BIOS_REC
GPIO23	LDRQ1#
GPIO24	EN_LP#
GPIO25	EXTVGA_CLKREQ
GPIO26	PCIECLKREQ4#
GPIO27	LAN_EN
GPIO28	SYSTEM_PWM_DET
GPIO29	PCH_WLANPWR
GPIO30	SUS_FWR_ACK_R
GPIO31	ADAP_IN
GPIO33	N.C
GPIO34	SPK_LED_ON
GPIO35	TP11
GPIO36	PCH_SATA2GP
GPIO37	FDI_OVRVLTG
GPIO38	MFG_MODE
GPIO39	GFX_CRB_DET
GPIO40	USB_OC#_2_3
GPIO41	USB_OC#_4_5
GPIO42	USB_OC#_6_7
GPIO43	USB_OC#_8_9
GPIO44	PCIECLKRQ5
GPIO45	PCIECLKRQ6
GPIO46	PCIECLKRQ7
GPIO47	GFX_CLKREQ
GPIO48	BIOS_RESP
GPIO49	CRIT_TEMP_REP_N
GPIO50	Dgpu_RST#
GPIO51	BBS_BIT1
GPIO52	Dgpu_Select#
GPIO53	GPU_EVENT#_GC6
GPIO54	Dgpu_FWR_ON#
GPIO55	NC
GPIO56	PEGB_CLKRQ
GPIO57	NFC_IRQ
GPIO58	SMBCLK_EC
GPIO59	USB_OC#_0_1
GPIO60	SMLALERT#
GPIO61	PM_SUS_STAT#
GPIO62	SUSCLK
GPIO63	SLP_S5#_R
GPIO64	CLKOUTFLEX0
GPIO65	CLKOUTFLEX1
GPIO66	CLKOUTFLEX2
GPIO67	DGPU_Present#
GPIO68	FB_EN_GC6
GPIO69	GPU_EVENT#_GC6
GPIO70	USB3_DET_P2_N
GPIO71	USB3_DET_P3_N
GPIO72	PM_BATLOW#
GPIO73	LAN_CLKREQ
GPIO74	SMLALERT#
GPIO75	SMBDAT_EC

ITE8528	
GPIO	
GPA0	PID_3_RF_LED_ON#
GPA1	T/P_LED_PWM
GPA2	BTL_BEEP
GPA3	PWM_KB_LED
GPA4	PID_1_CHG_R_LED
GPA5	PID_0_CHG_B_LED
GPA6	PM_RSMRST#
GPA7	EC_BL_PWM/DGPU_Con
GPB0	PM_SLP_S4#
GPB1	PM_SLP_S3#
GPB2	SLP_AW/GPU_Adaptor_In
GPB3	BAT_SMBCLK
GPB4	BAT_SMBDAT
GPB5	H_A2OGATE
GPB6	H_RCIN#
GPB7	SAFTY_PROTECT
GPC0	LAN_PWR
GPC1	SMBCLK_EC
GPC2	SMBDAT_EC
GPC3	SENBAT_V
GPC4	PWRBTN3#
GPC5	SYS_PWROK
GPC6	VCCSA_ON
GPC7	+1.5VS_ON
GPD0	ADAP_IN
GPD1	PWRBTN#
GPD2	PLT_RST#
GPD3	PM_SUS_STAT#
GPD4	EC_EXTSMI#
GPD5	LED_ON
GPD6	+5V_ON
GPD7	PWR_USB#
GPE0	LID#
GPE1	OVERT#_EC
GPE2	+1.5V/1.05V_ON
GPE3	Vcore_ON
GPE4	PWRSW
GPE5	LVDS_VIN
GPE6	WLAN_ON
GPE7	AMP_MUTE#
GPF0	PANEL_VCC
GPF1	BAT_SW_EC
GPF2	BT_ON
GPF3	Q_key1
GPF4	TP_CLK
GPF5	TP_DATA
GPF6	EC_PECI
GPF7	Q_Key_LED
GPG0	PWRBTN2#
GPG1	+3.3VS_ON
GPG2	+0.75V_VTT_ON
GPG6	WEBSCAN_ON
GPH0	FM_CLKRUN#
GPH1	PCH_BL_EN
GPH2	PID_2_FWR_LED
GPH3	EC_HSCS0#
GPH4	EC_HSCS
GPH5	EC_HMISO
GPH6	EC_HMOSI
GPI0	Q_key2/CRT_DETECT
GPI1	PANEL_DETECT/Boost_BAN
GPI2	PCIE_WAKE#
GPI3	PWRBTN3#
GPI4	BAT_I
GPI5	BATT_TEMP
GPI6	Iadapter_I_bat
GPI7	BAT_V
GPJ0	EC_BL_ON
GPJ1	EC_PROCHOT
GPJ2	FAN_CTRL0
GPJ3	BATT_VA_OFF#
GPJ4	CHG_ON
GPJ5	CHG_REF
GPM0	LPC_AD0
GPM1	LPC_AD1
GPM2	LPC_AD2
GPM3	LPC_AD3
GPM4	CLK_EC_LPC
GPM5	LPC_FRAME#
GPM6	INT_SERIRQ

Default
Pull/Mode

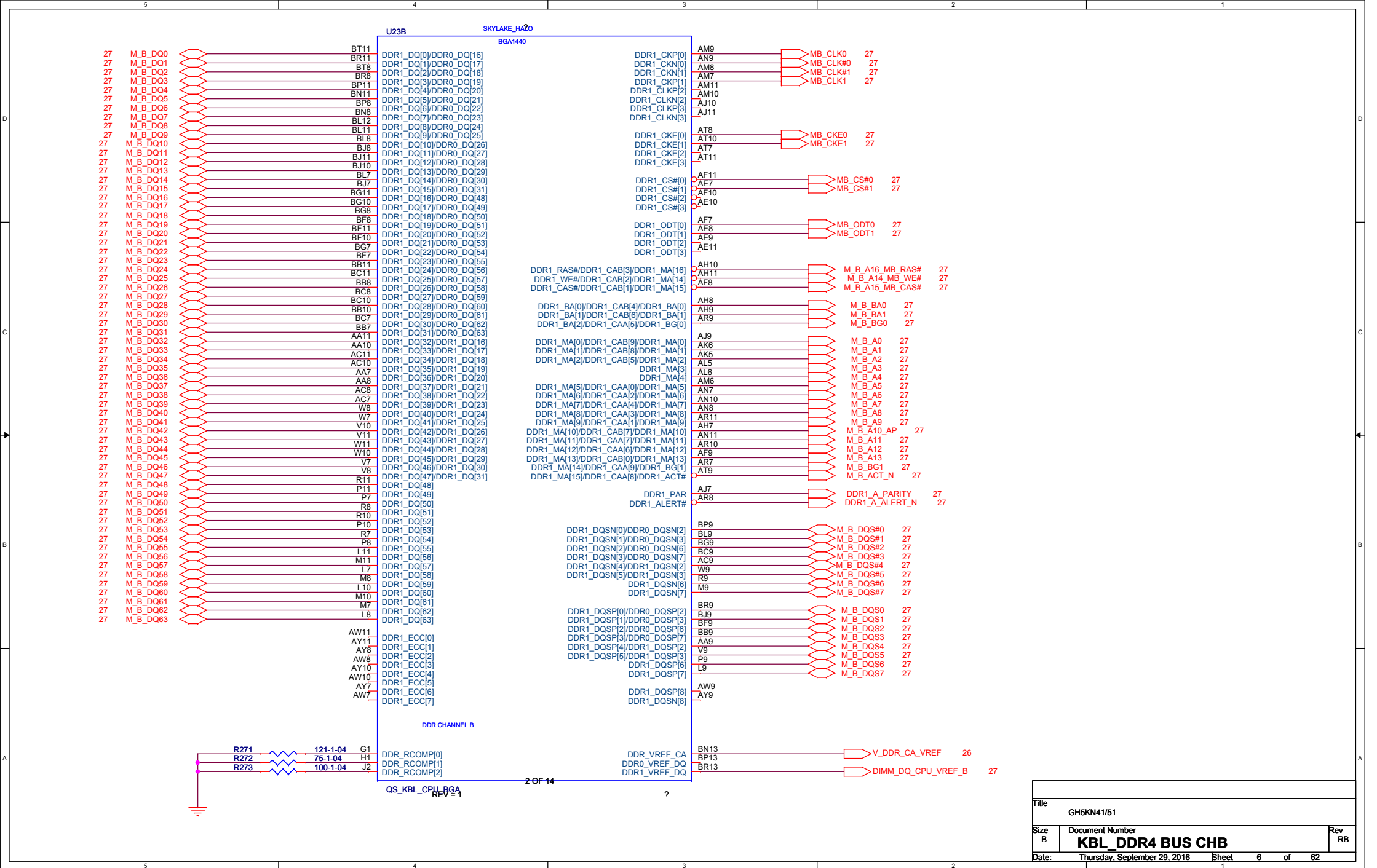


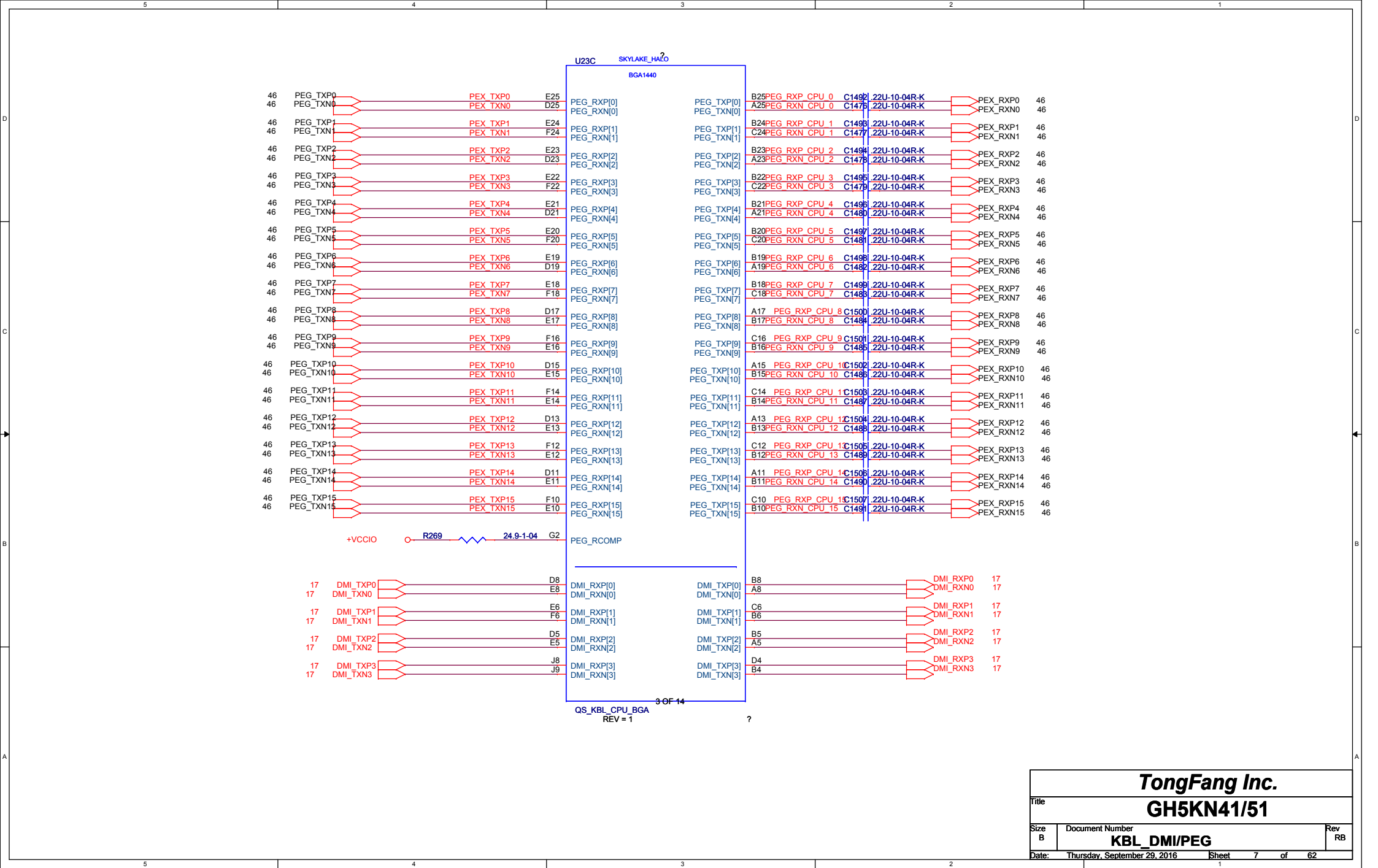


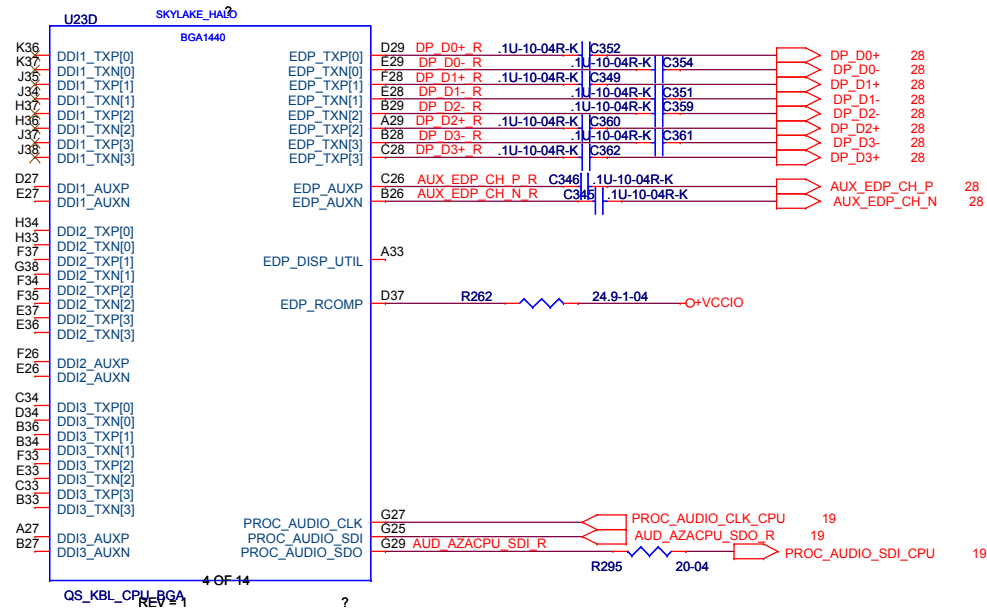
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GH5KN41/51

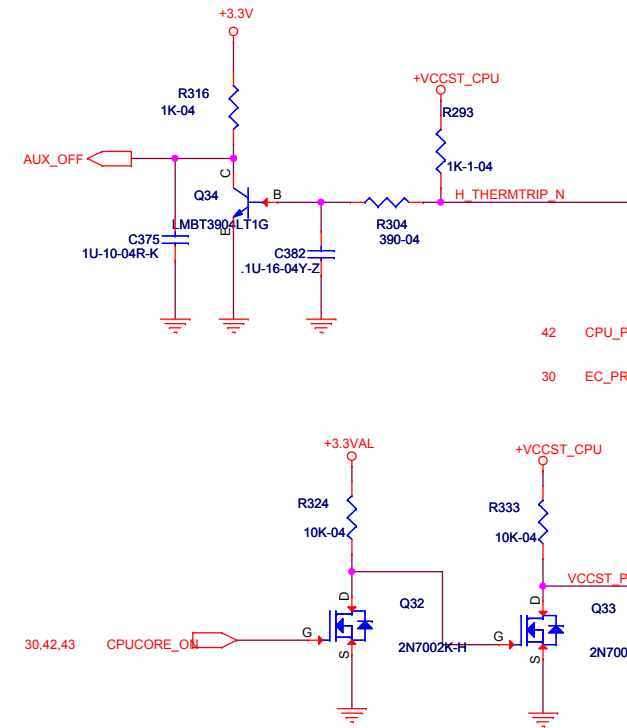
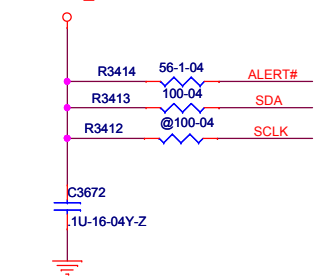
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Size B	Document Number	RB
KBL_DDR4 BUS CHA		
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+VCCST_CPU



30,42,43 CPUCORE_ON

22 PCH_CPU_BCLK_R_DP
22 PCH_CPU_BCLK_R_DN
22 PCH_CPU_PCIBCLK_R_DP
22 PCH_CPU_PCIBCLK_R_DN
22 CPU_24MHZ_R_DP
22 CPU_24MHZ_R_DN

42,43 ALERT#
42,43 SCLK
42,43 SDA
36 PROCHOT#
41 DDR_VTT_PG_CTRL

VCCST_PWRGD R592 60.4-1-04
19 PROCPWRGD_CPU
18 PCH_PLTRST_PROC
18 PM_SYNC
18 PM_DOWN

30 EC_PECI
18 PCH_PECI
18 H_THERMTRIP_N
18 H_PECI

R556 @0-04 SKL_CNCL_N
R3155 0-04
R318 1K-04
+VCCST_CPU

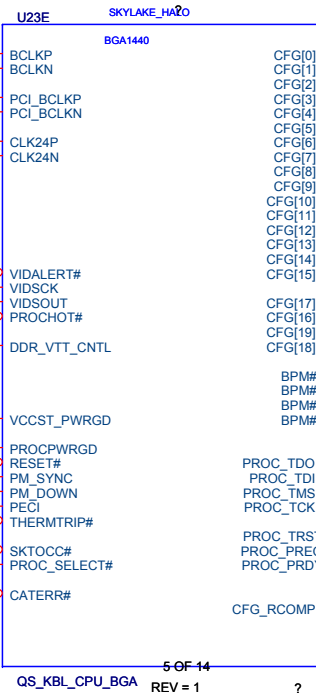
+VCCSTG
R288 1K-1-04
PROCHOT#

42 CPU_PROCHOT#
30 EC_PROCHOT#

R290 @0-04
R289 100K-04
Q29 2N7002K-H

+VCCSTG
R333 10K-04
VCCST_PWRGD

Q32 2N7002K-H
Q33 2N7002K-H



5 OF 14
REV = 1

30,58 Reserved for AC removal

AC IN1 R299 0-04
ADAP_IN R298 @0-04
GPU_ADAP_IN 58

Q31 2N7002K-H
C401 1000P-25-04X-K

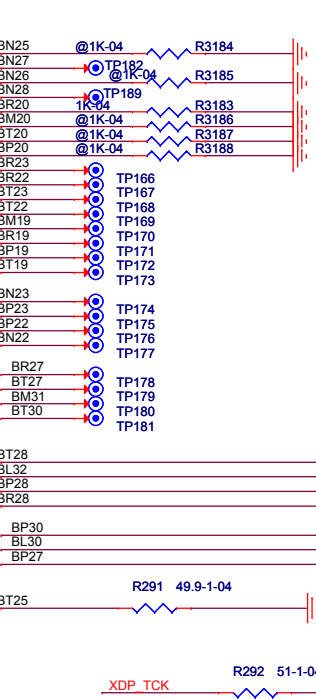
Q51 2N7002K-H
R321 10K-04

PROCHOT#

DC_IN+
R353 40.2K-04
R366 10K-04
C399 1000P-25-04X-K

+3.3VAL_LDO
U89 TL331
R302 @1M-04
C400 1U-10-04R-K

AC Removal Trigger
Point=16.56V



9/14 R353:-->40.2K

AC Removal Trigger
Point=16.56V

DC_IN+
R353 40.2K-04
R366 10K-04
C399 1000P-25-04X-K

+3.3VAL_LDO
U89 TL331
R302 @1M-04
C400 1U-10-04R-K

AC Removal Trigger
Point=16.56V

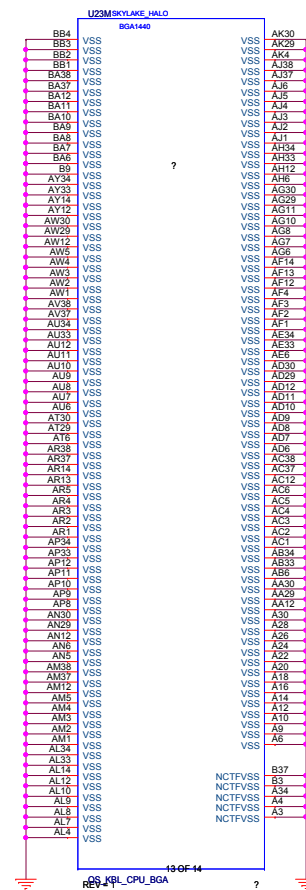
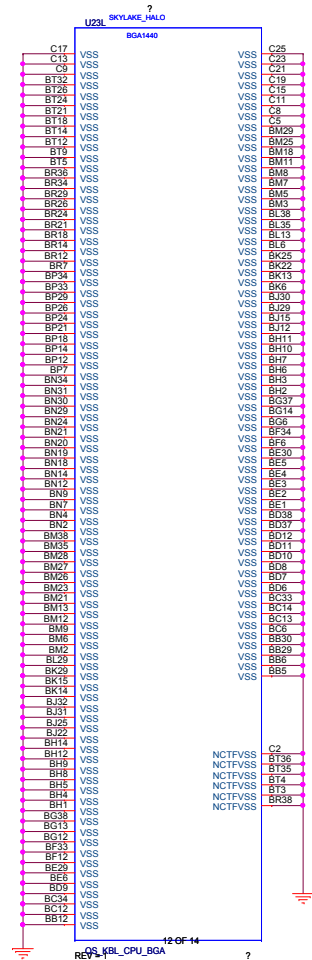
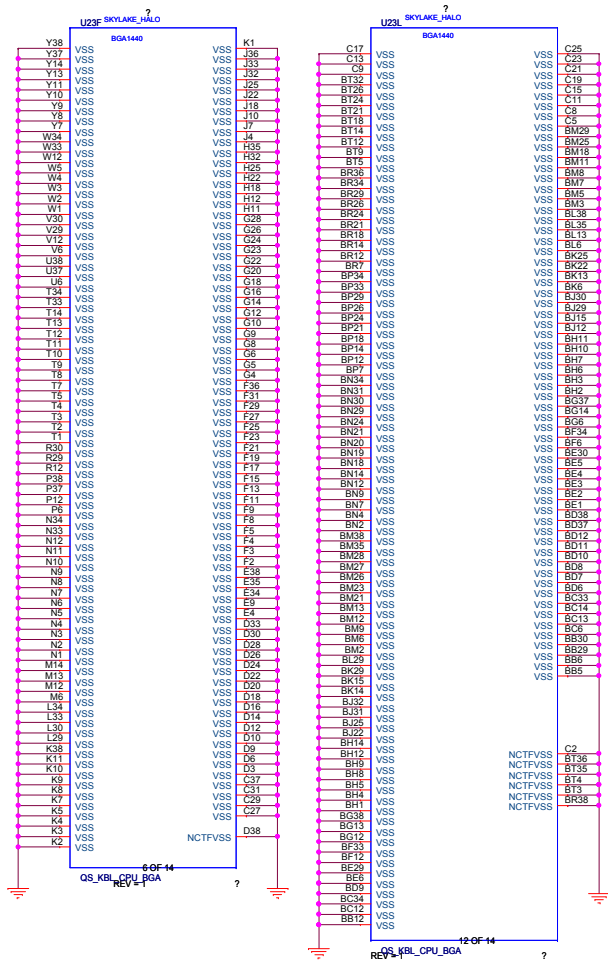
AC Removal Trigger
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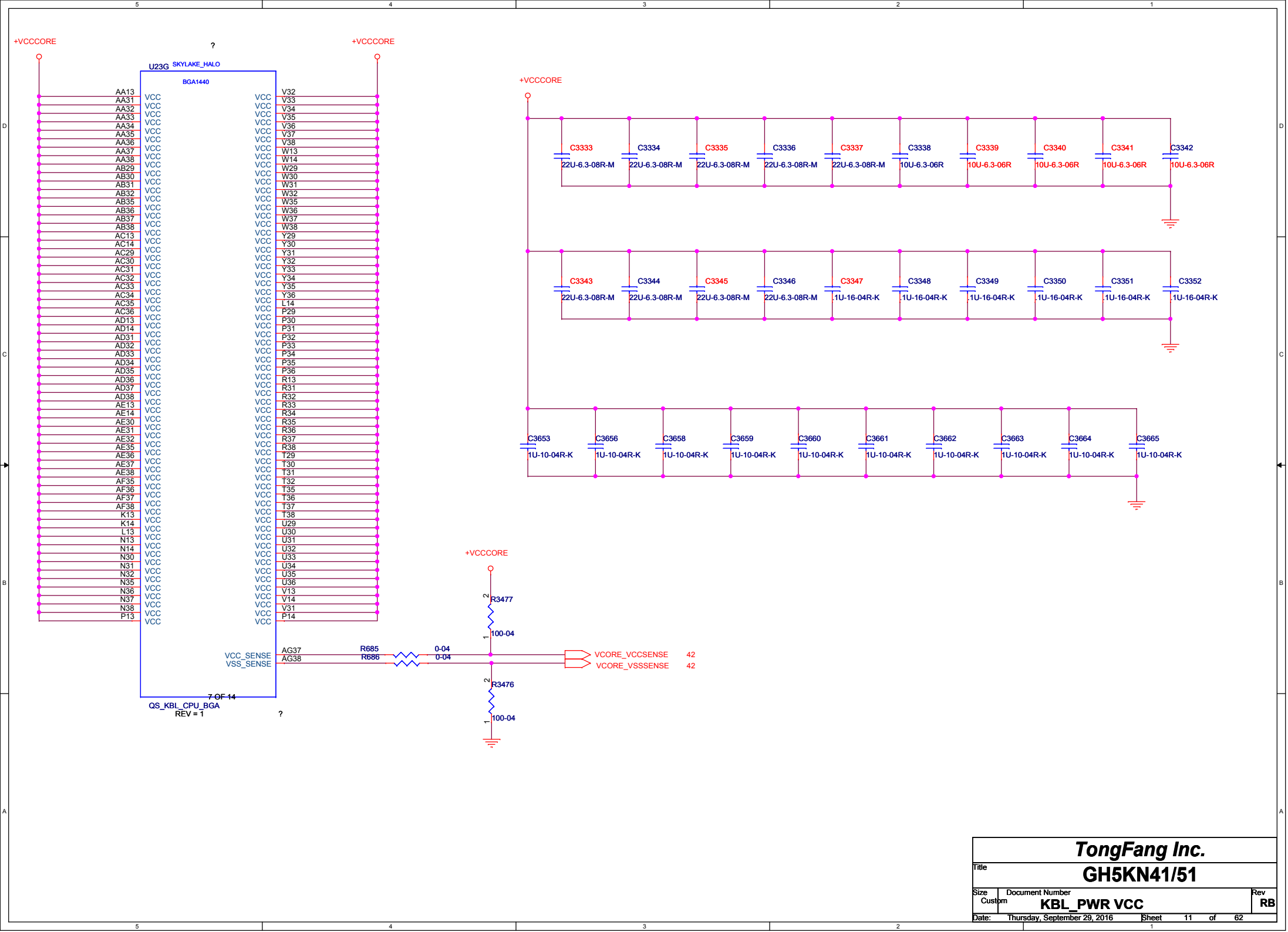
AC Removal Trigger
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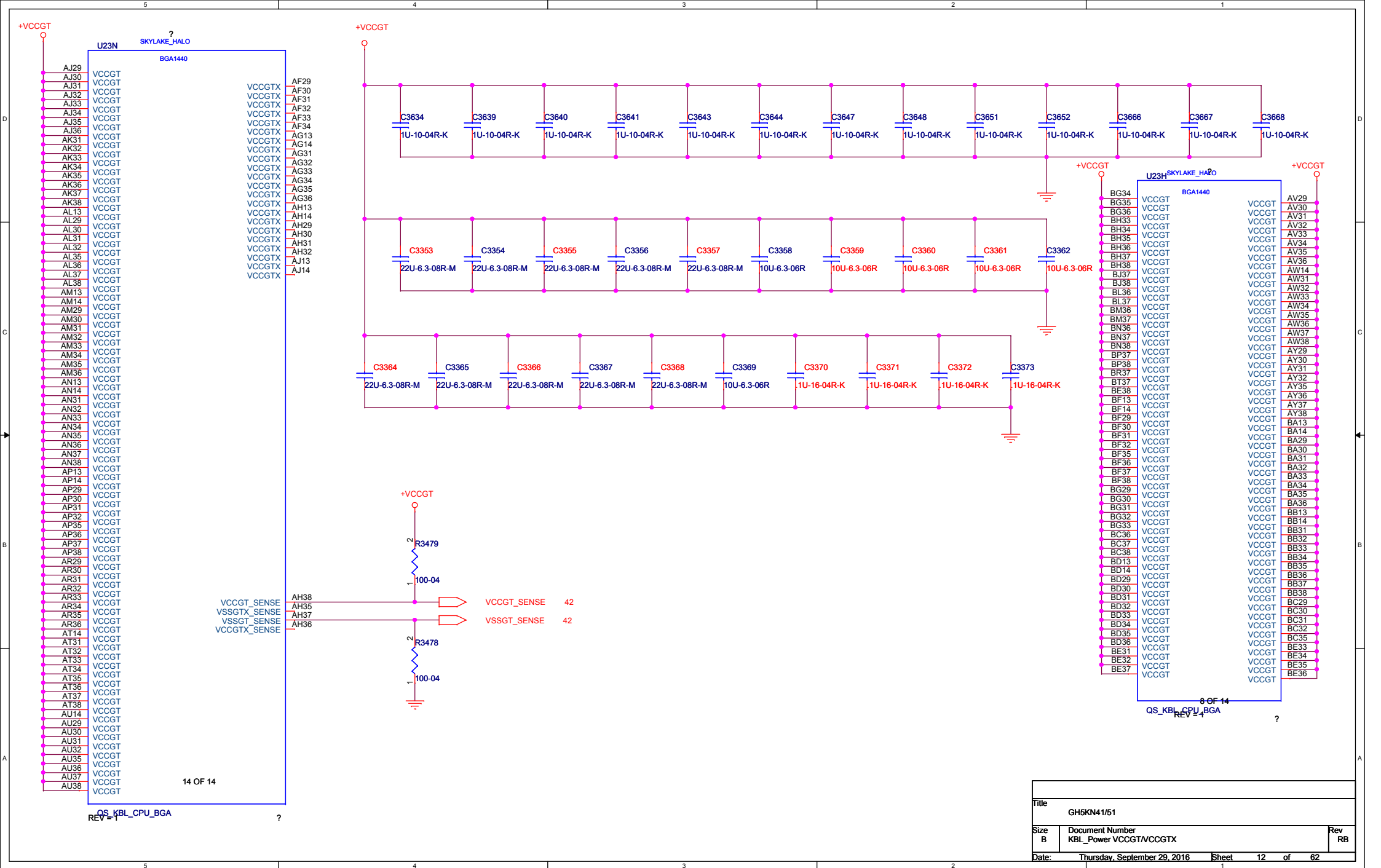
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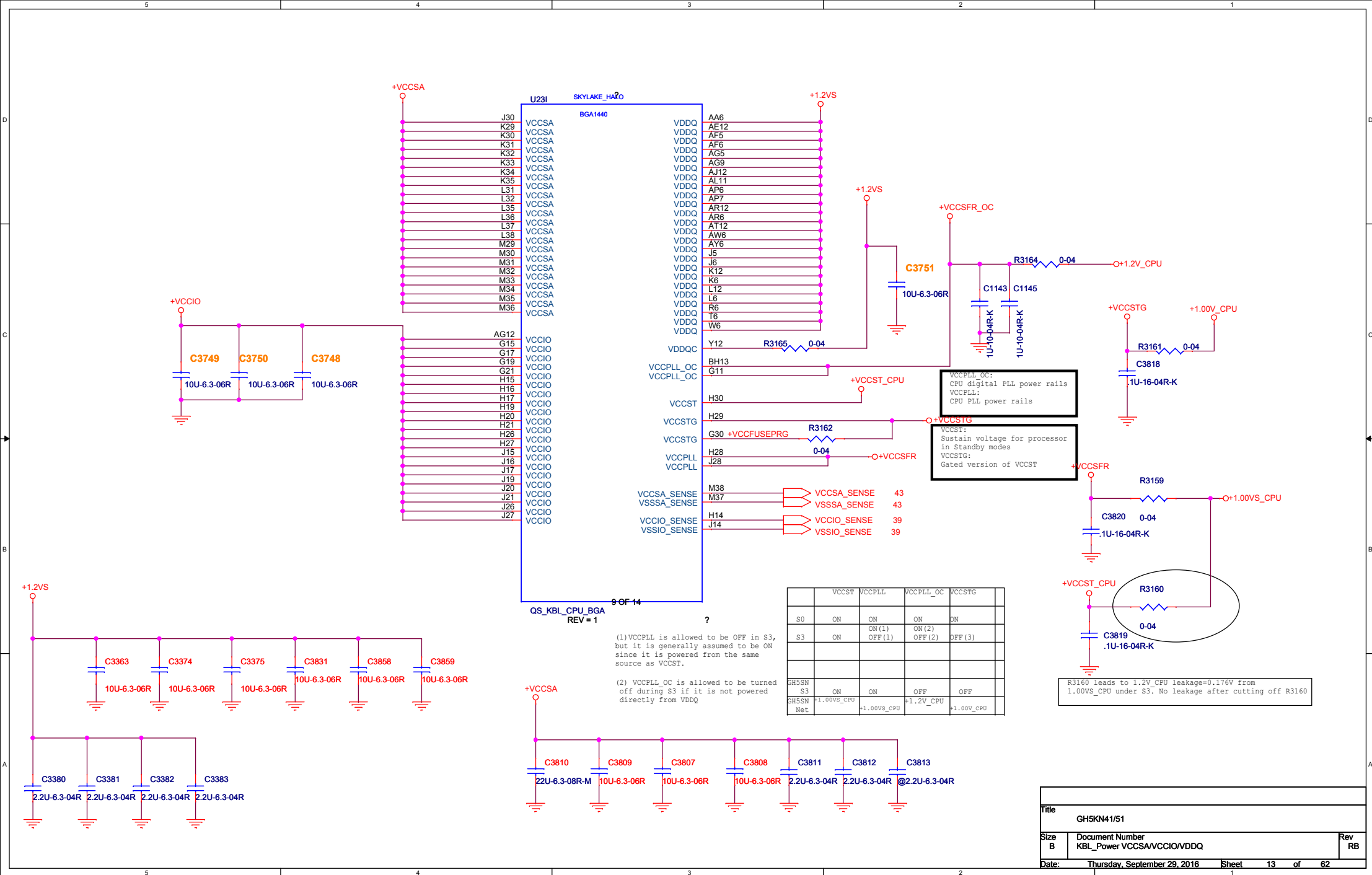
AC Removal Trigger
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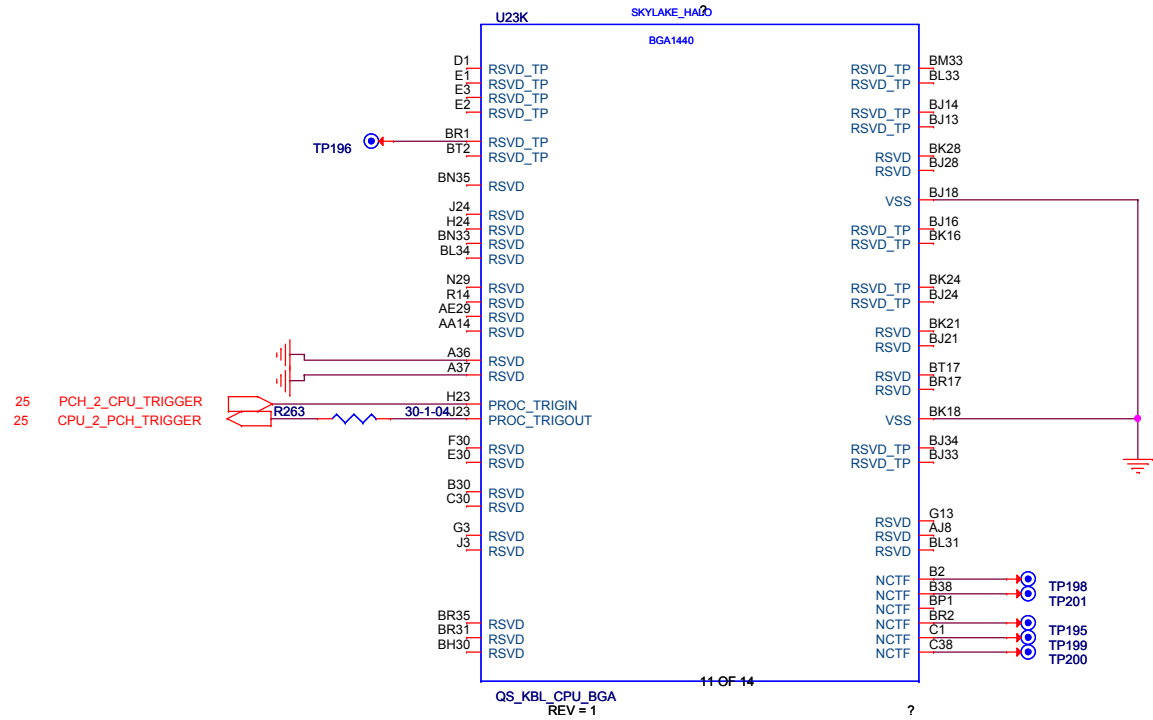
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Size	Document Number	Rev	
B	KBL_MISC/CLK/JTAG/CF	RB	
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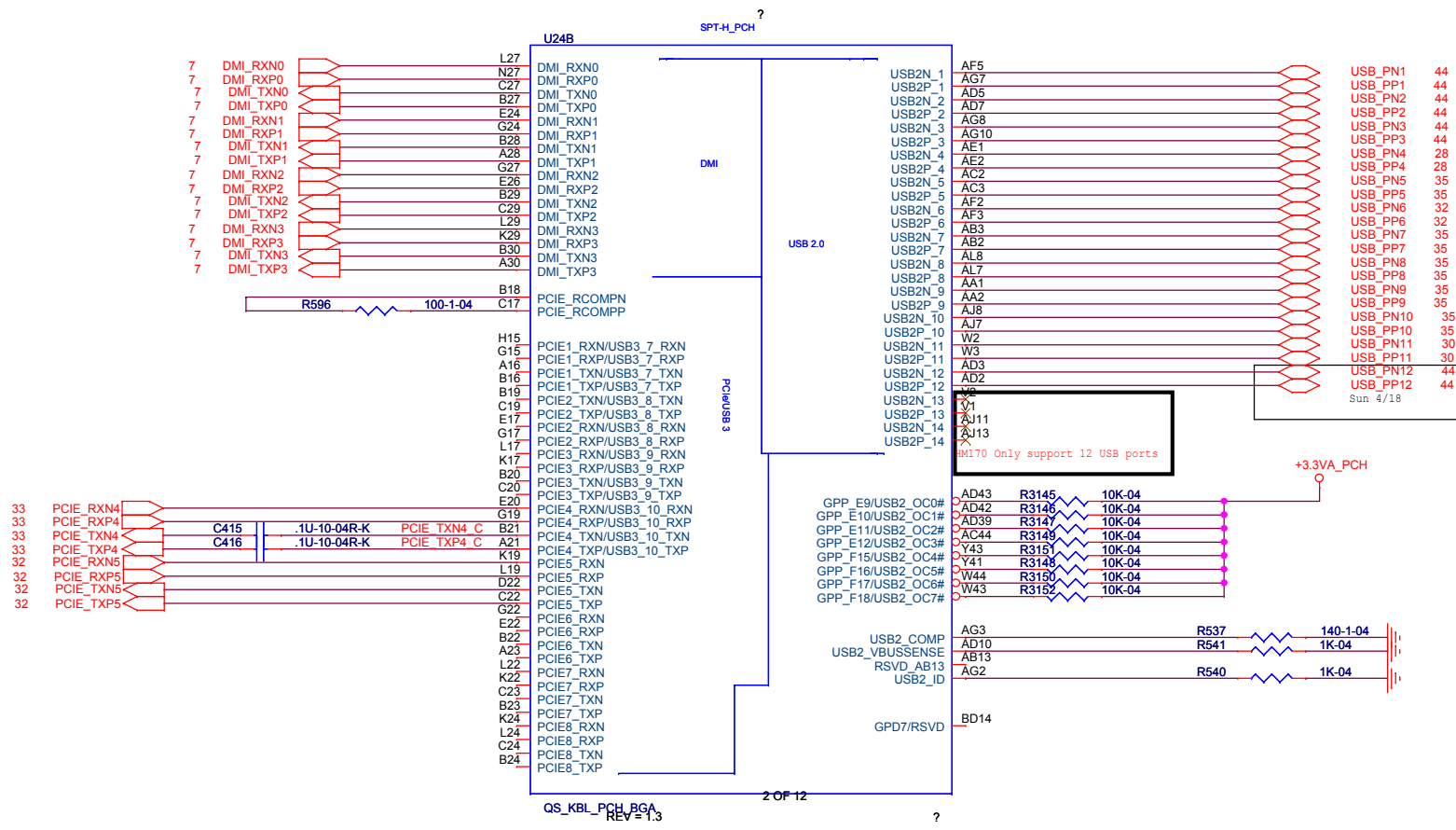








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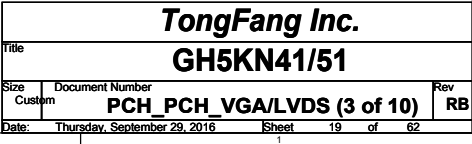
USB	Location
USB 1	USB3.0
USB 2	USB3.0
USB 3	TYP-C
USB 4	WEBCAM
USB 5	USB Port for N17P ID
USB 6	WI-FI
USB 7	CN27 (18pin External USB BD)
USB 8	USB Port for N17P ID
USB 9	CN27 (18pin External USB BD)
USB 10	CN27 (18pin External USB BD)
USB 11	CN4 M.2 Key
USB 12	Intel® RST PCIe

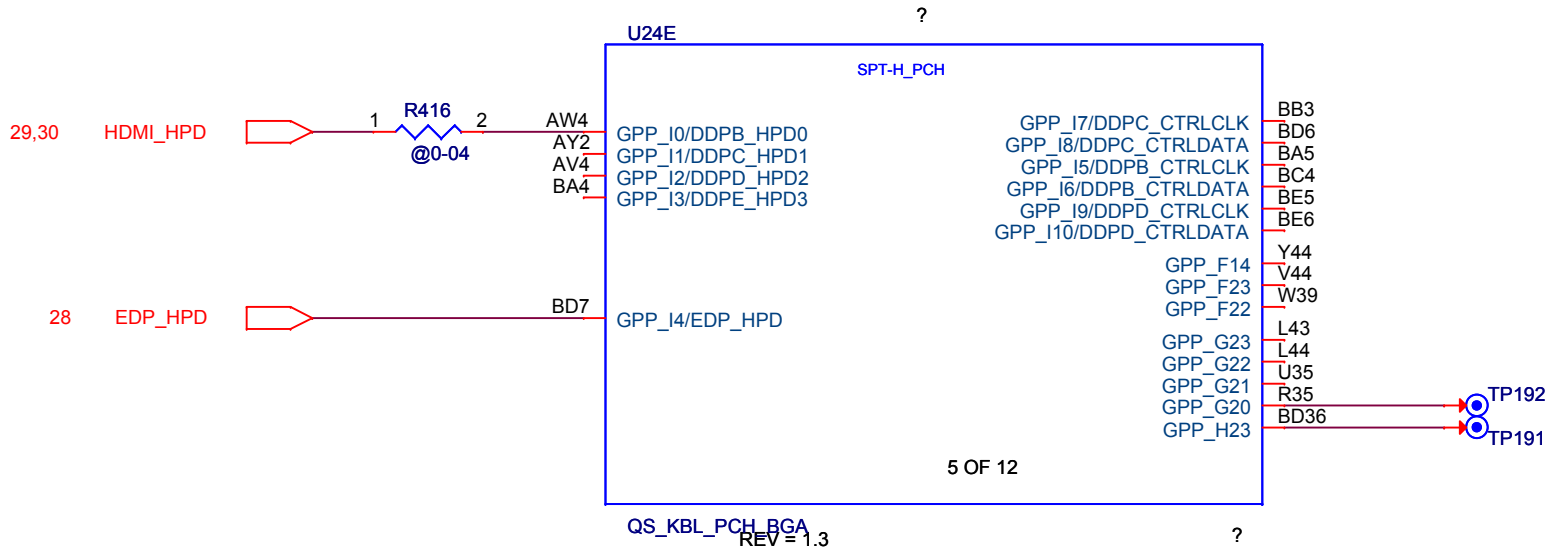
1.3 PCH SKUs

Table 1-2. PCH-H SKUs

Features	H110	H170	HM170
Intel® Rapid Storage Technology	AHCI Mode	Full Features	Full Features
Total USB 3.0 Ports	4	8	8
Total USB 2.0 Ports	10 ¹	14 ²	12 ²
Total SATA 3.0 Ports (Max 6 Gb/s)	4	6	4
Total PCI Express® Lanes (Gen)	6 (2.0)	16 (3.0)	16 (3.0)
Total Intel® RST capable PCIe and SATA Express® Storage Devices	0	2 ⁵	2 ⁵
SKL Processor dgfx bifurcation support	No	No	Yes ⁶

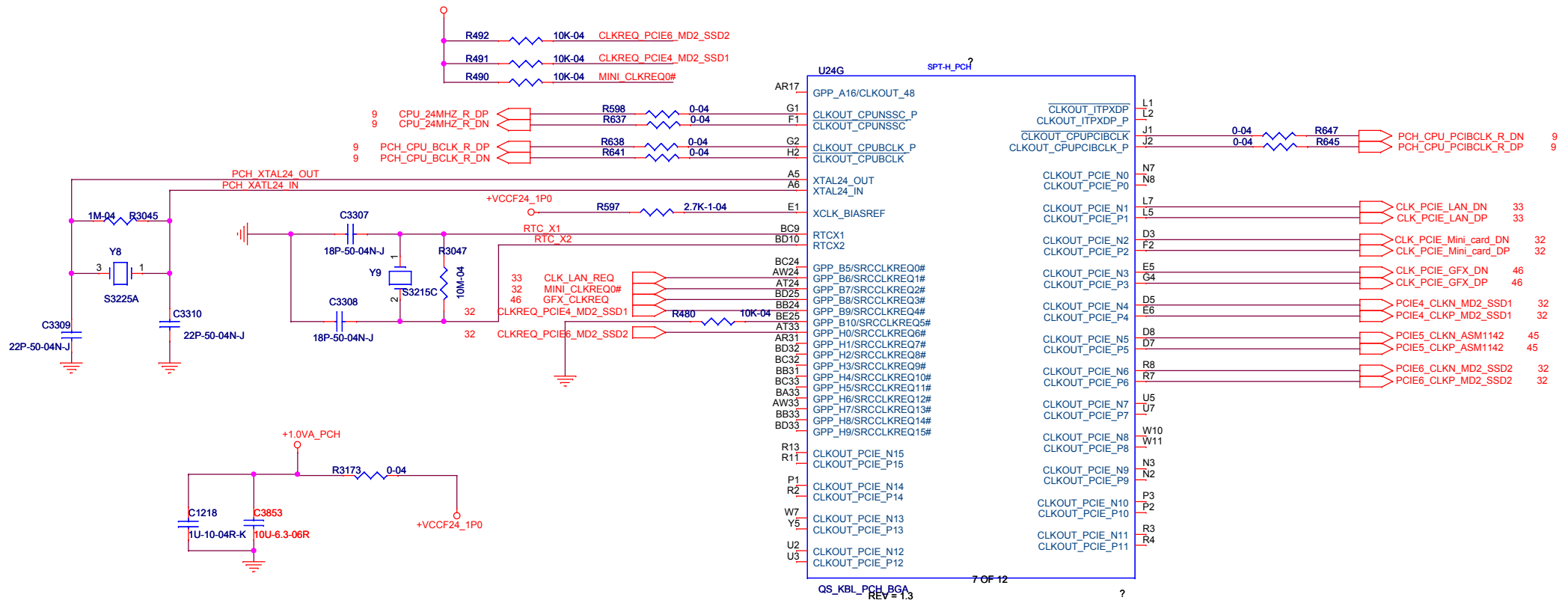
- Notes:
1. USB 2.0 port numbers: 1-10
 2. USB 2.0 port numbers: 1-12
 3. USB 2.0 port numbers: 1-14
 4. SATA Express Capable Ports (x2)
 5. PCIe configuration 1x16, or 2x8 or 2x4 or 1x8 are supported
 6. Intel® RST PCIe supports RAID configuration 0/1
 7. Intel® RST PCIe supports RAID configuration 0/1/5.



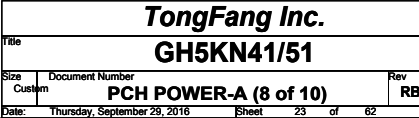


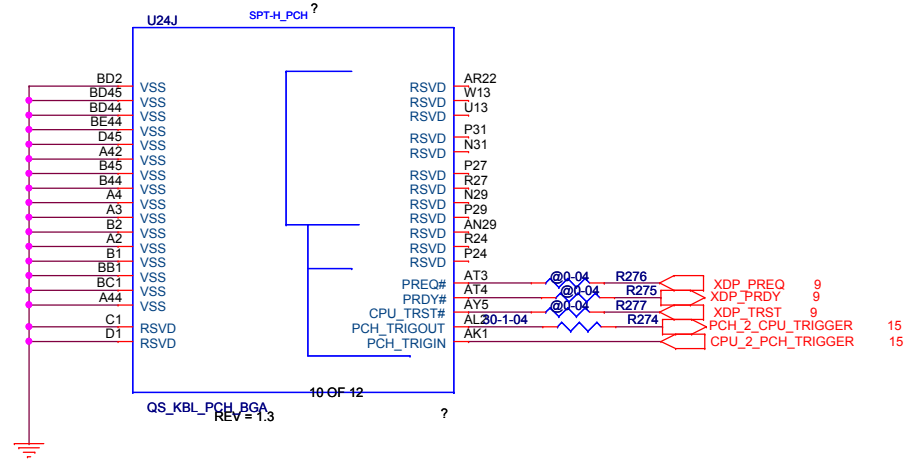
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A	PCH_GPIO (6 of 10)		RB
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+3.3V

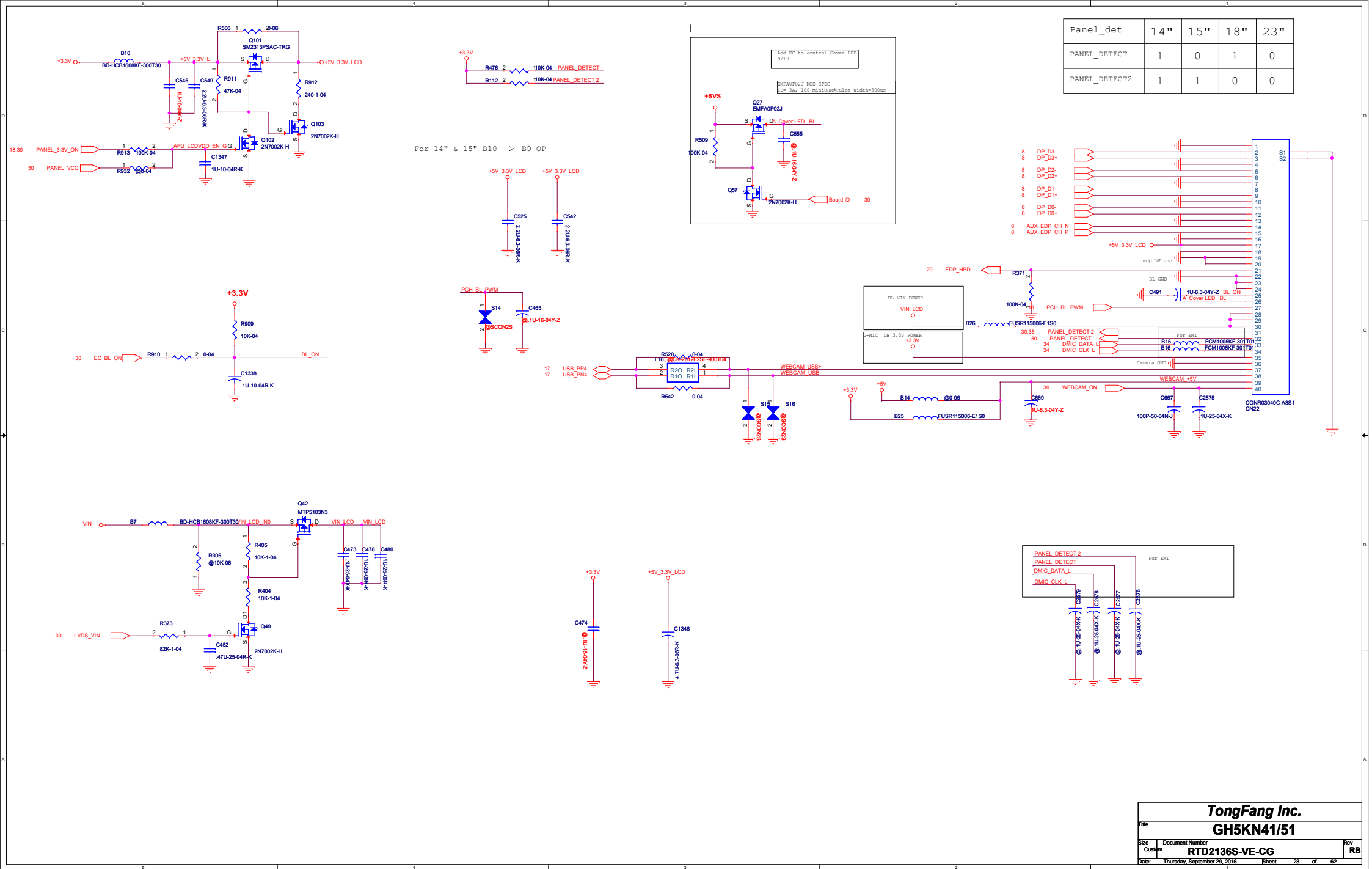


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B	PCH_DMI/FDI (7 of 10)		RB
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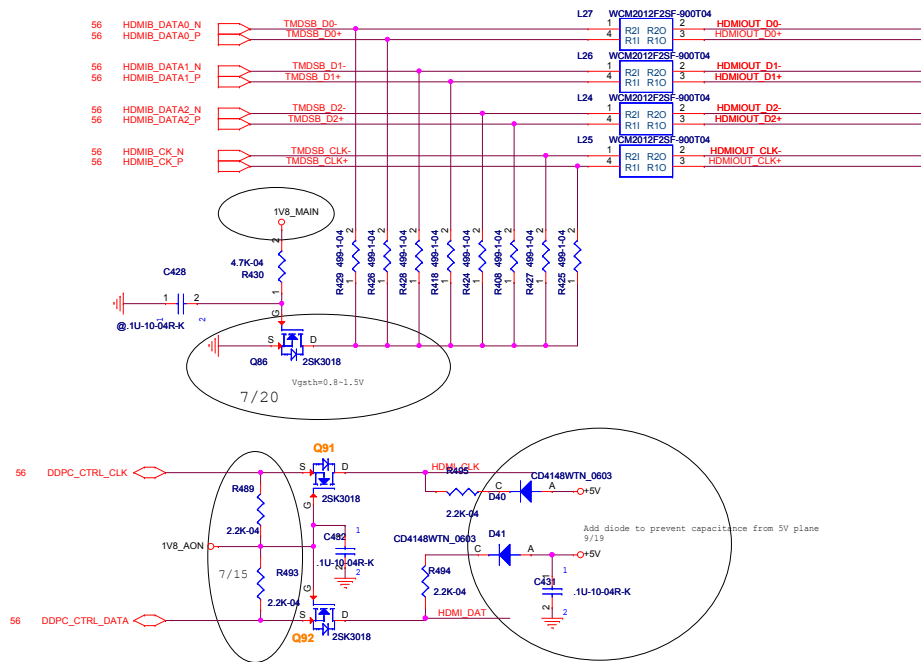




HDMI 2.0 Max =18Gbps, 4K resolution at 60Hz

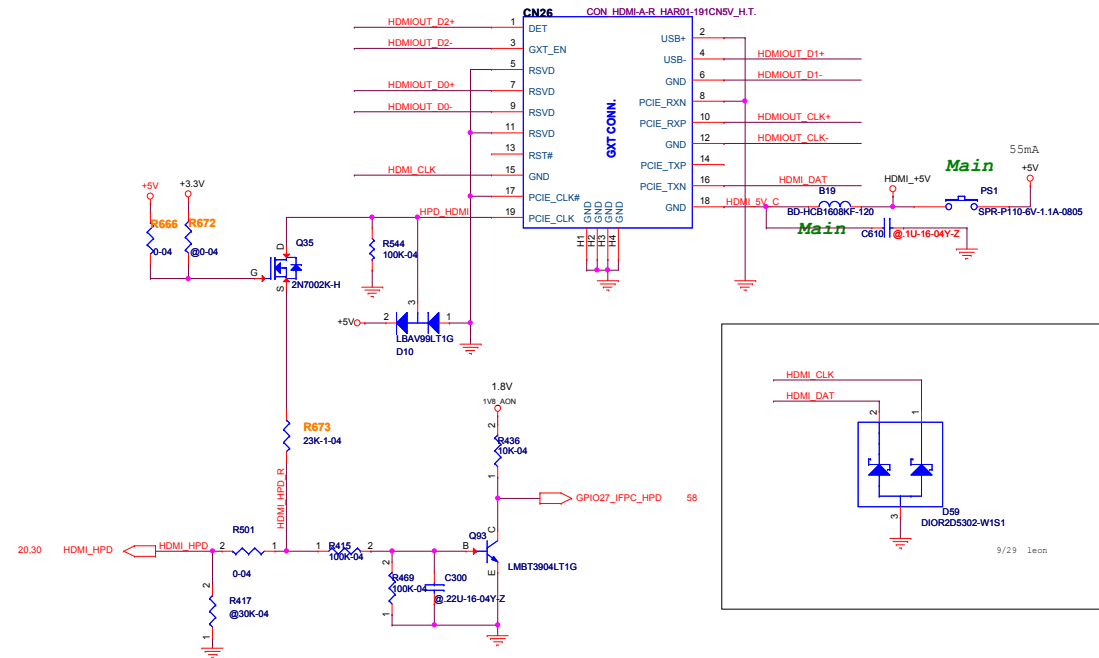
HDMI R2.0 670MHz NV Supported
HDMI R1.4 340MHz Intel Supported

TMSB_D0-	1	R444	2	HDMIOUT_D0-
TMSB_D0+	1	R463	2	HDMIOUT_D0+
TMSB_D1-	1	R472	2	HDMIOUT_D1-
TMSB_D1+	1	R496	2	HDMIOUT_D1+
TMSB_D2-	1	R497	2	HDMIOUT_D2-
TMSB_D2+	1	R498	2	HDMIOUT_D2+
TMSB_CLK-	1	R499	2	HDMIOUT_CLK-
TMSB_CLK+	1	R500	2	HDMIOUT_CLK+

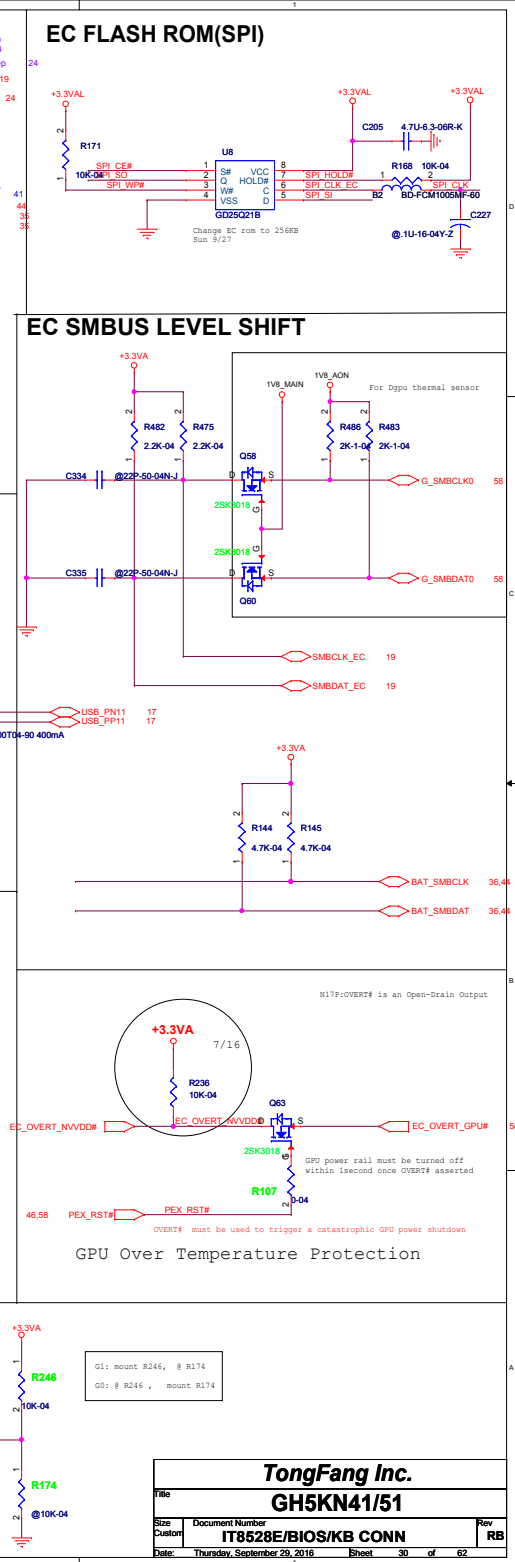
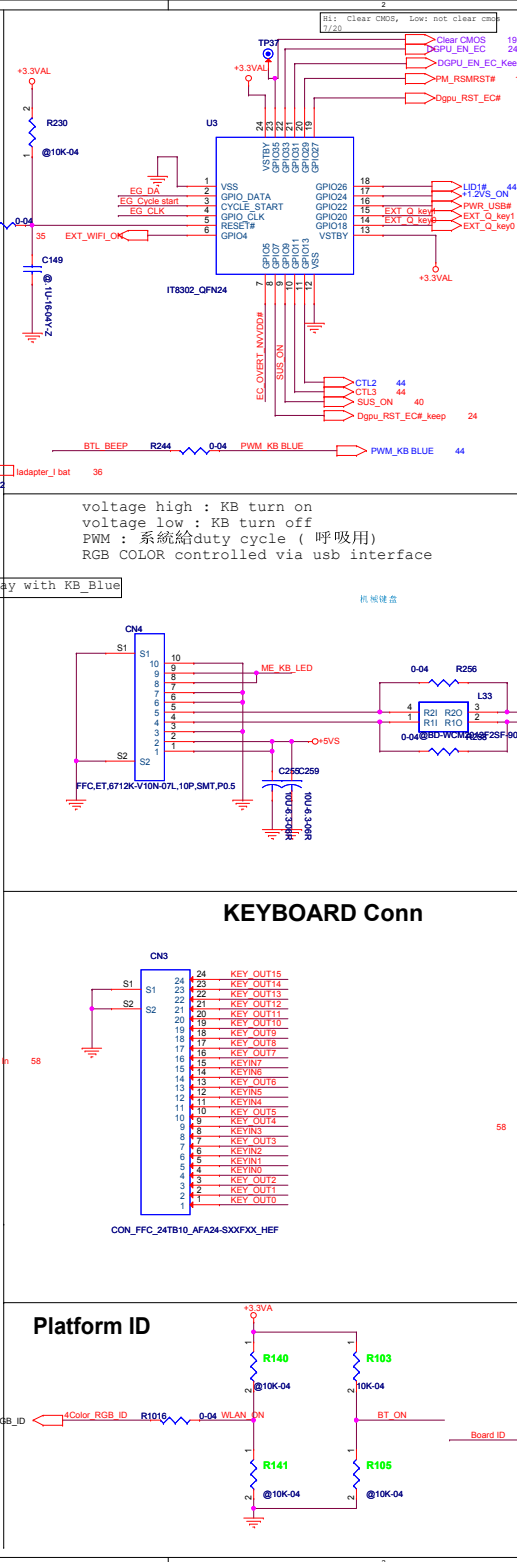
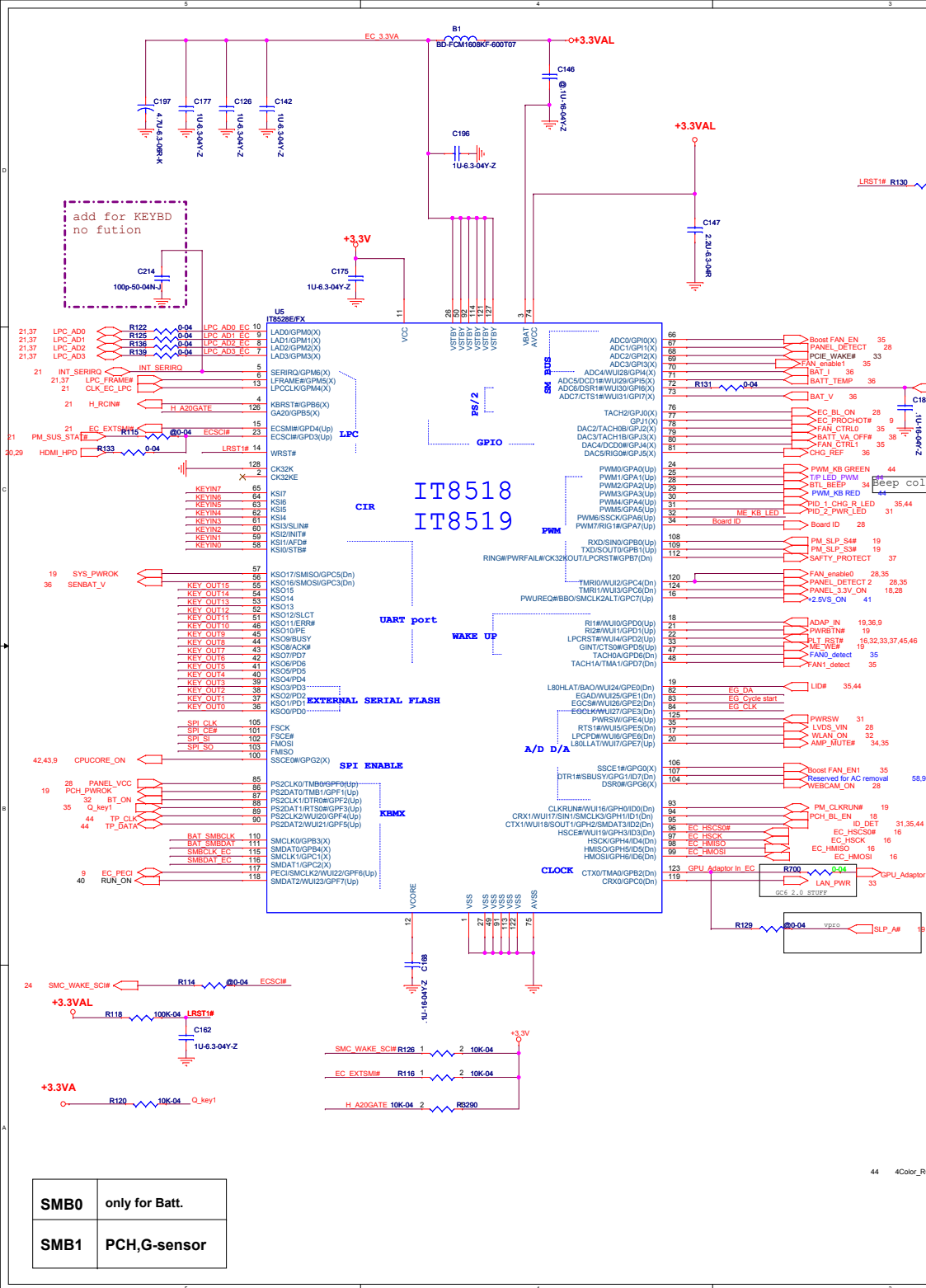


HDMI CONN

Main

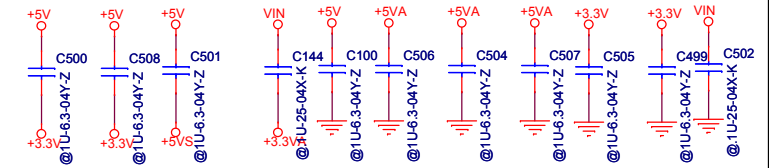


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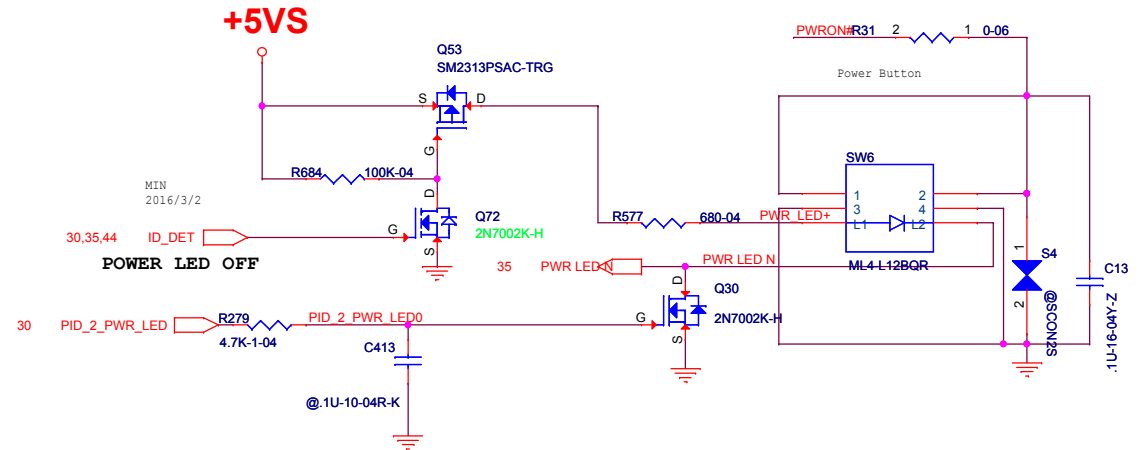
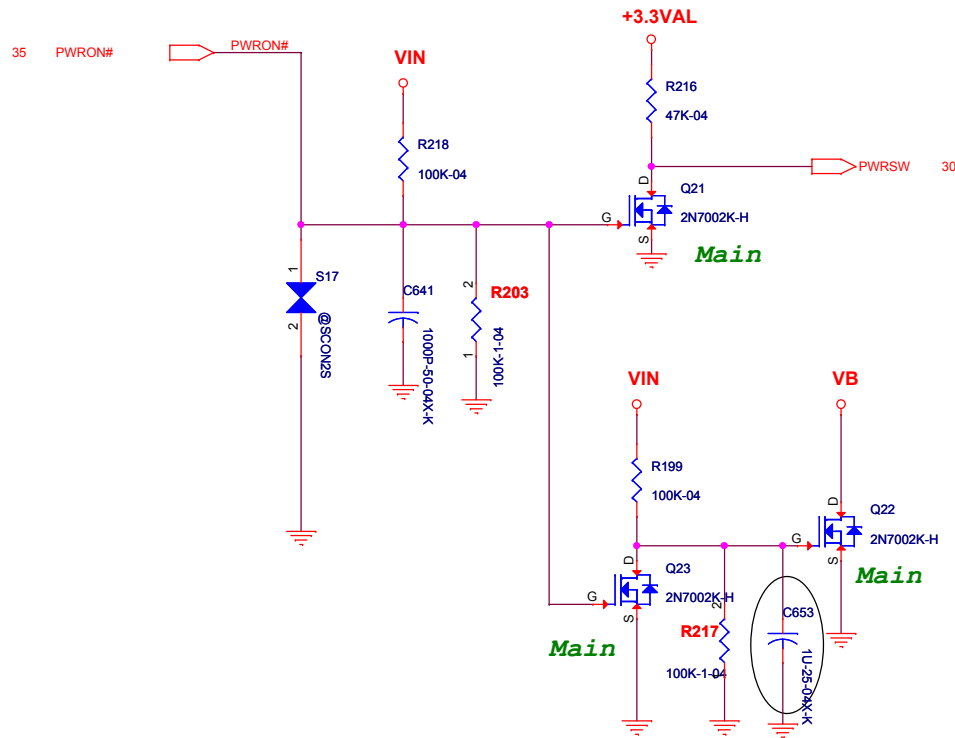


PWR SW

HIGH-SPEED CAP

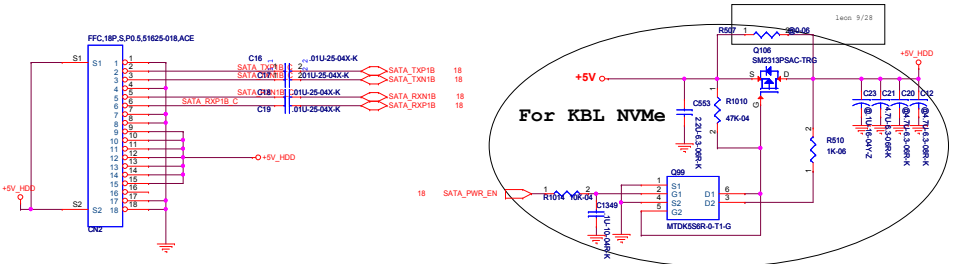


PWR LED

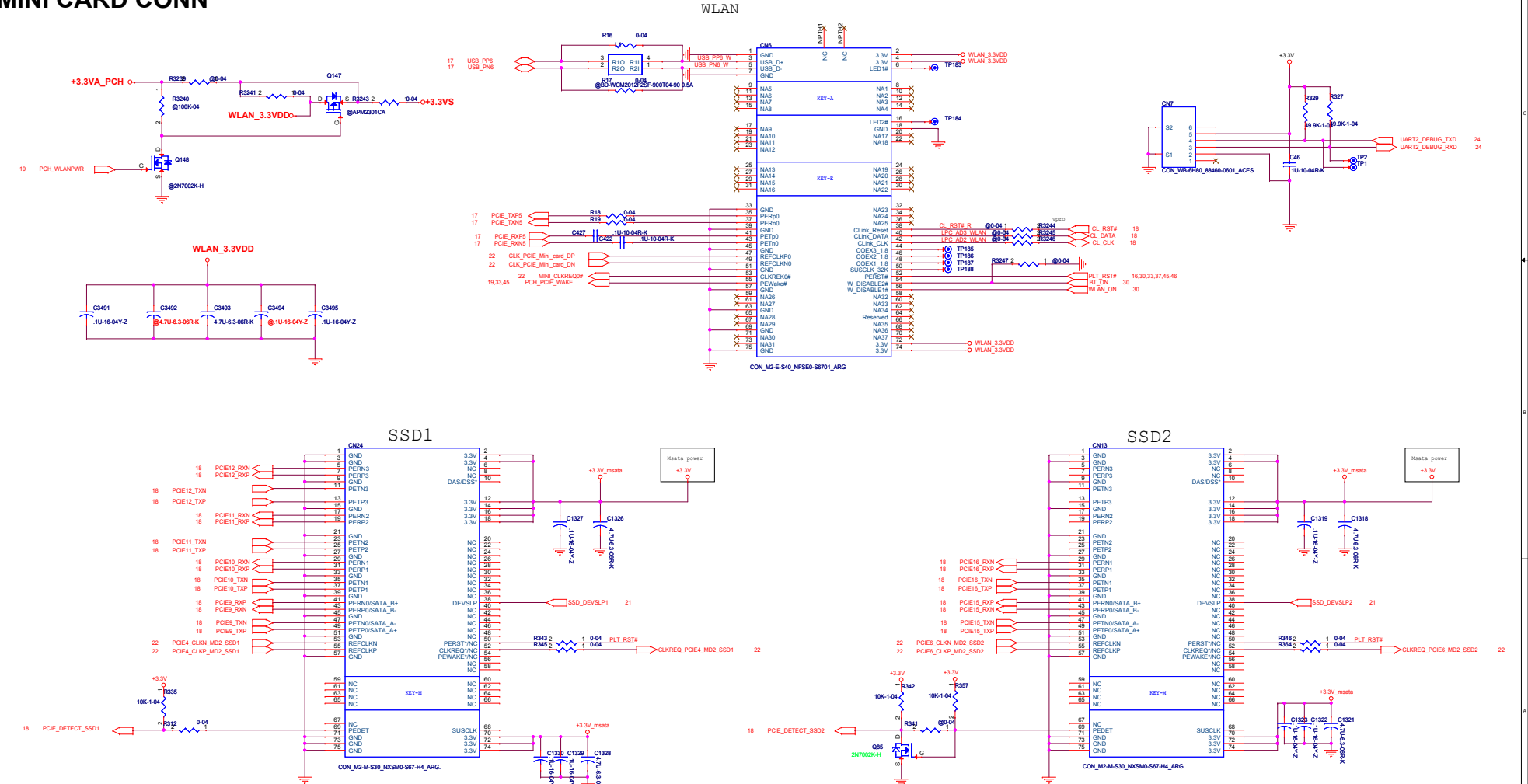


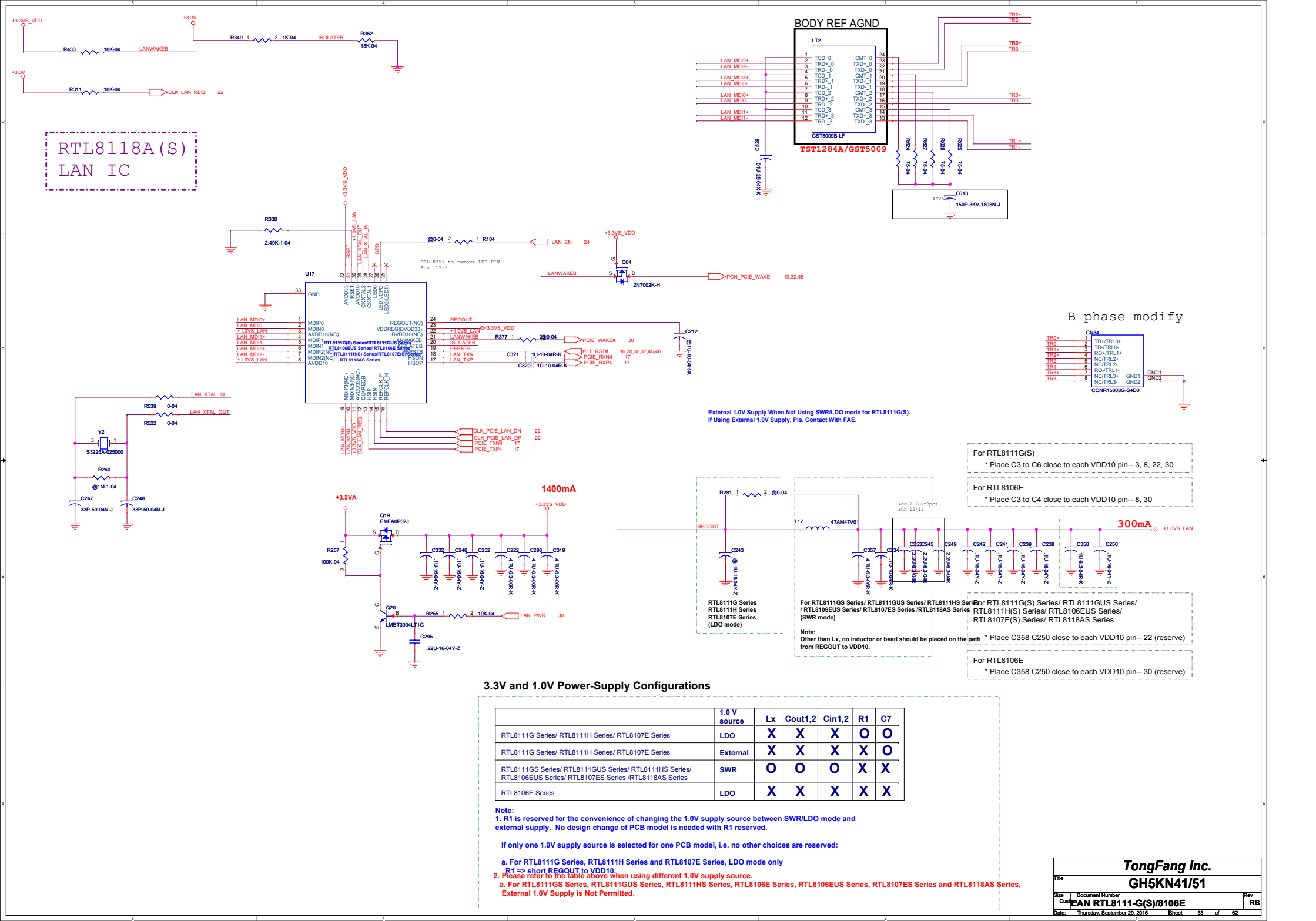
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SATA-HDD

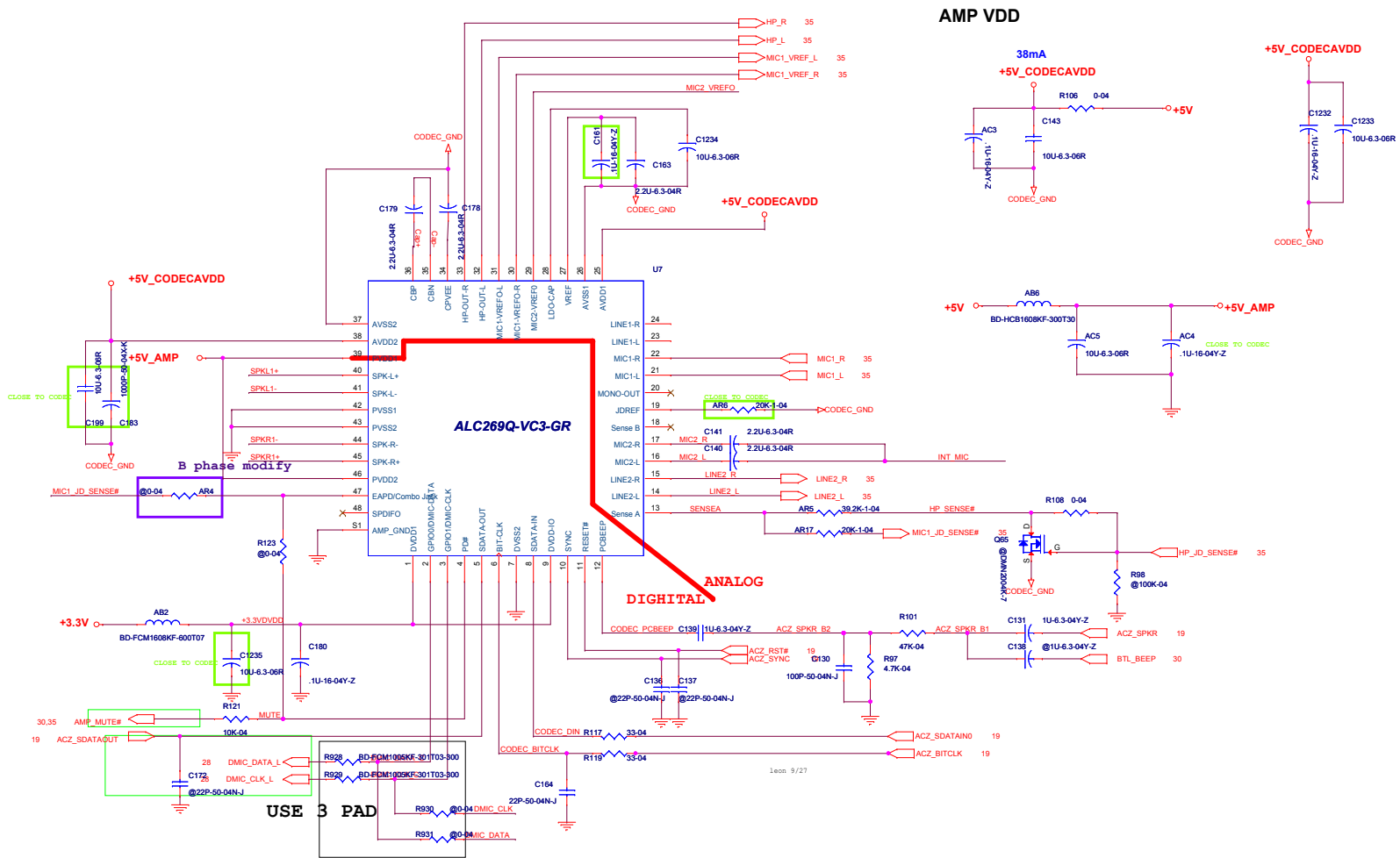
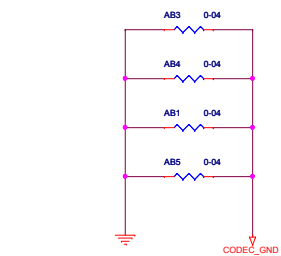
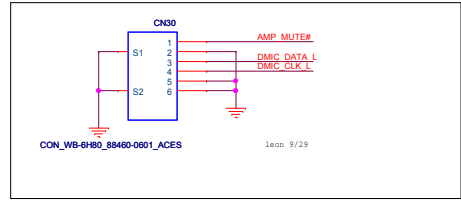
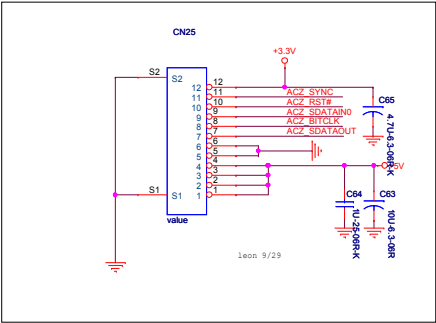


MINI CARD CONN

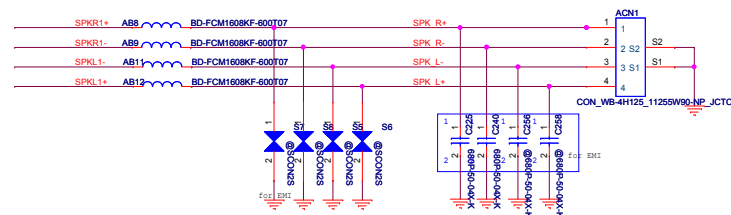




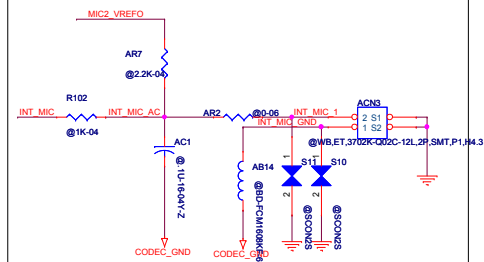
CODEC ALC269Q



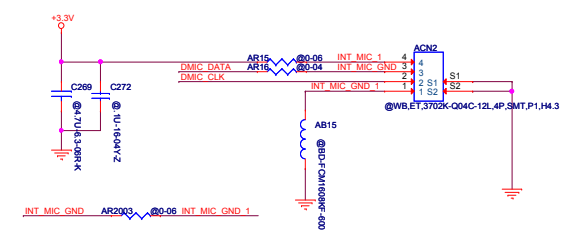
INT_SPEAKER



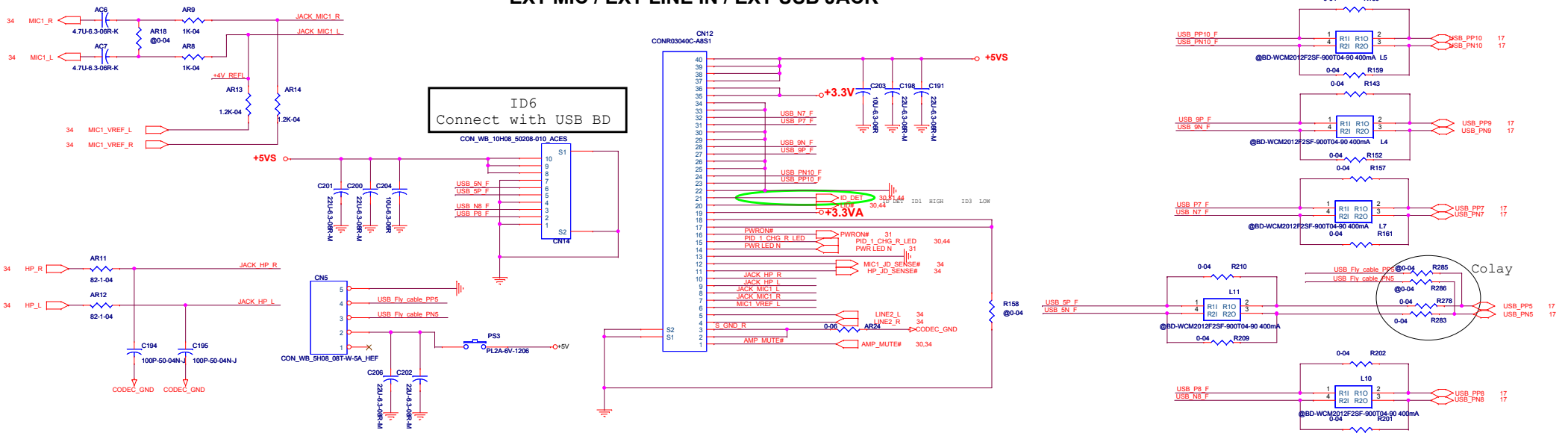
INT_MIC



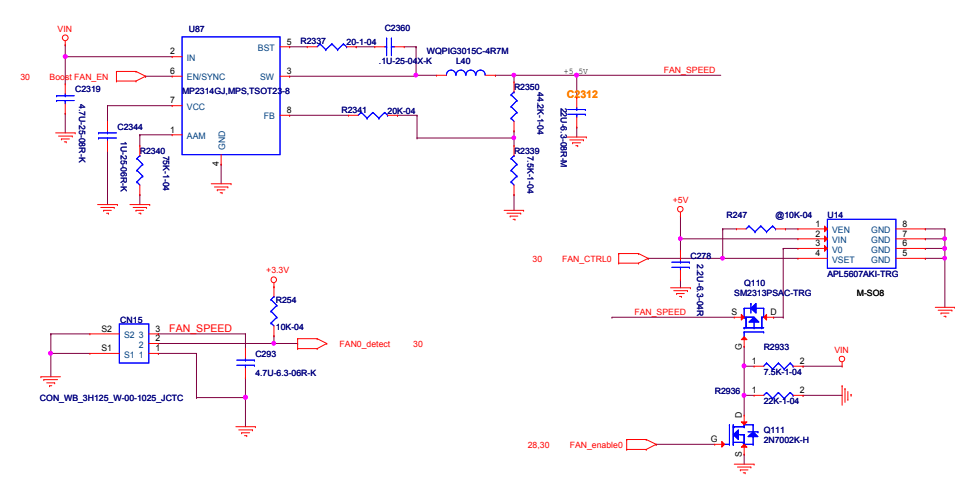
Digital Mic



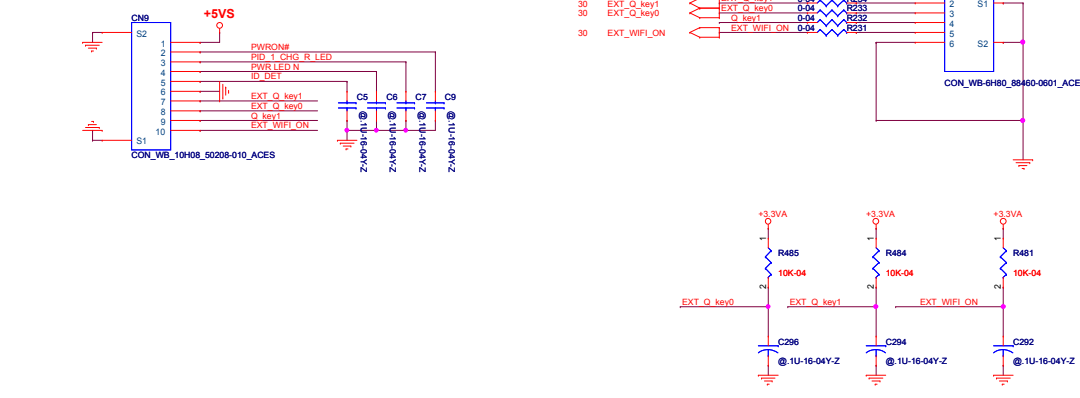
EXT MIC / EXT LINE IN / EXT USB JACK



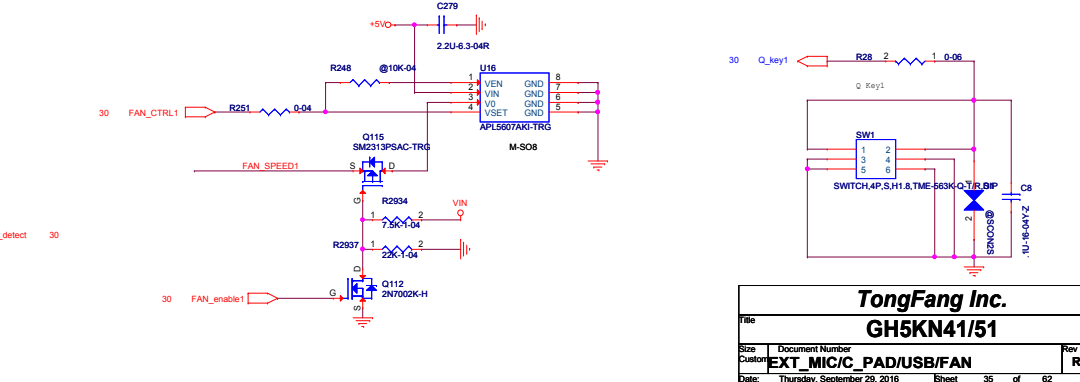
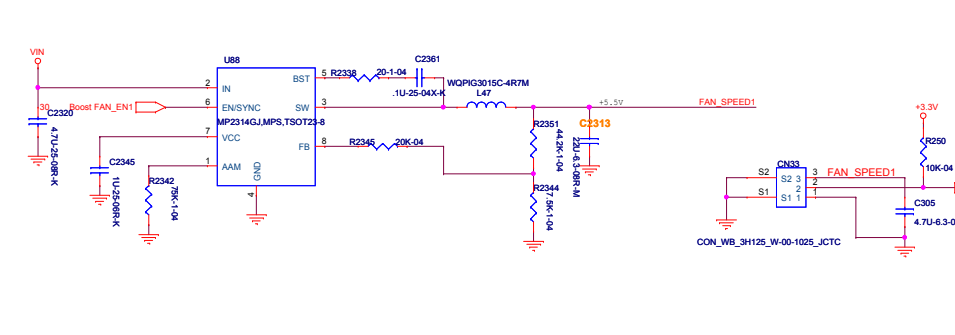
FAN CONTROLLER

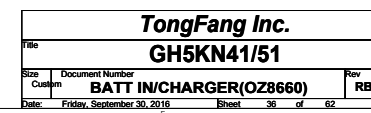


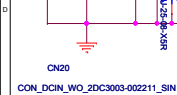
ID6 Connect with PWR BD



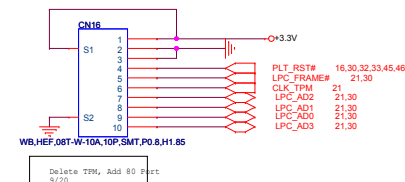
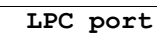
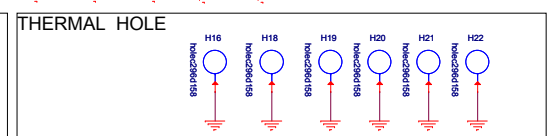
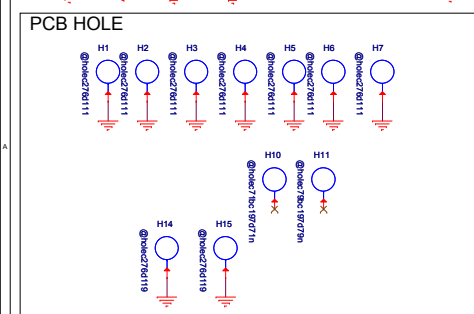
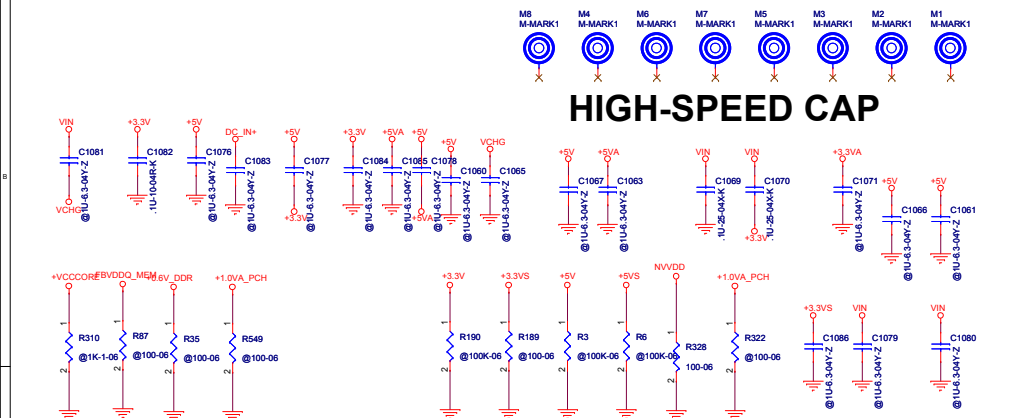
FAN CONTROLLER





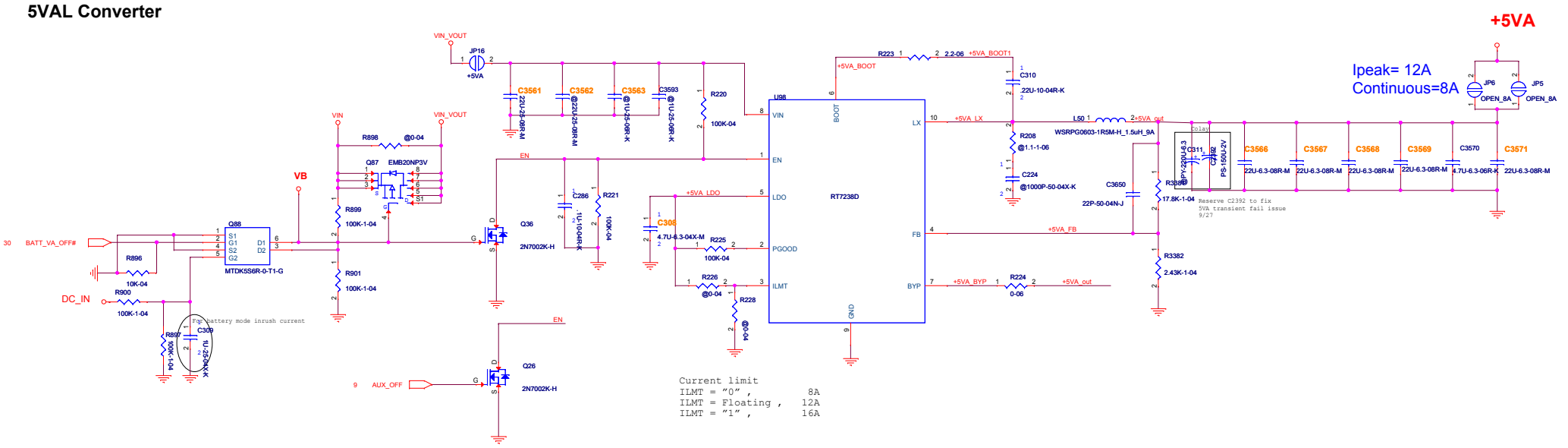


Discharge Resistor

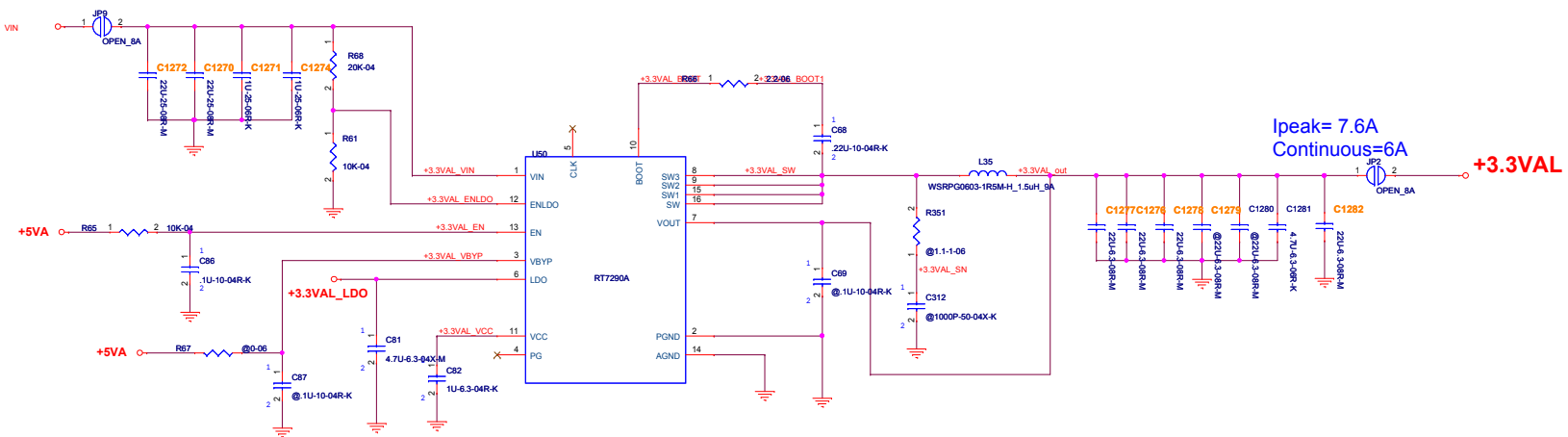


TongFang Inc.			
Title			
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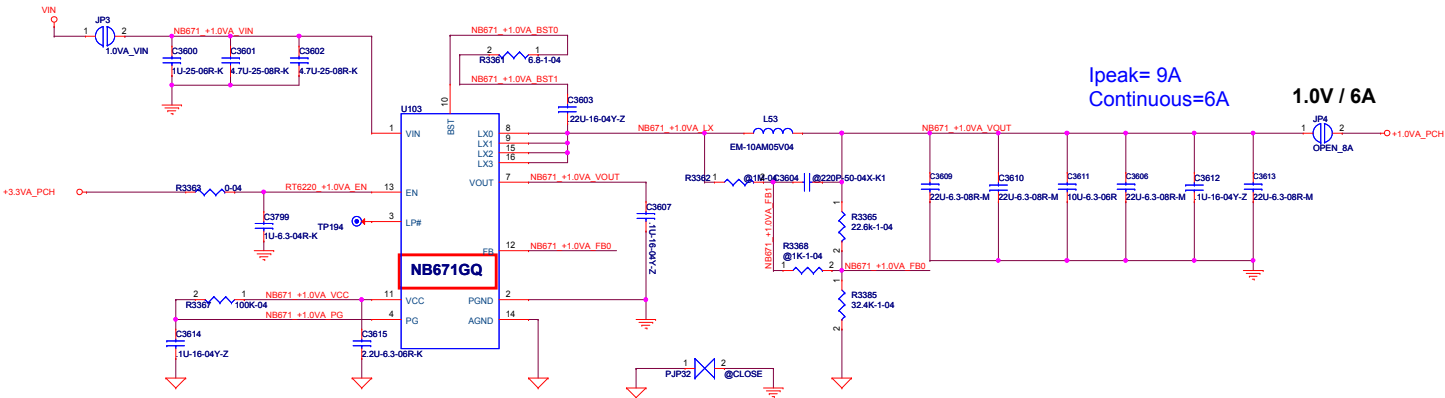
5VAL Converter



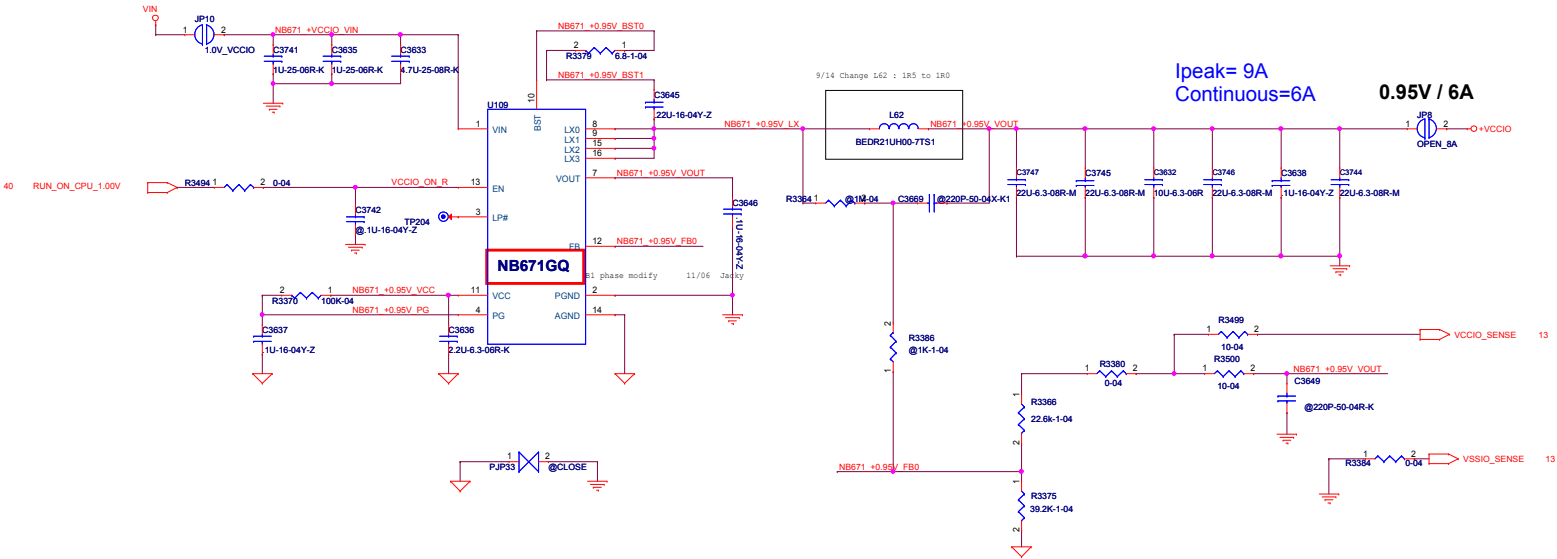
3.3VAL Converter



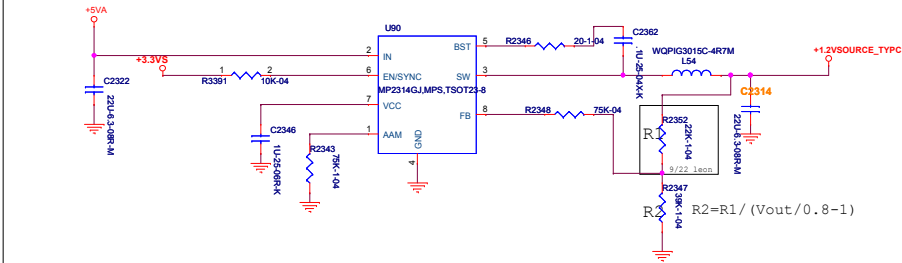
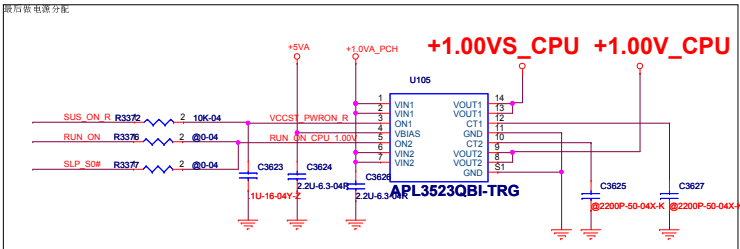
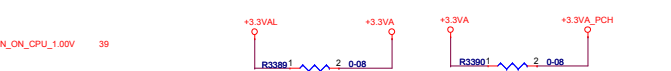
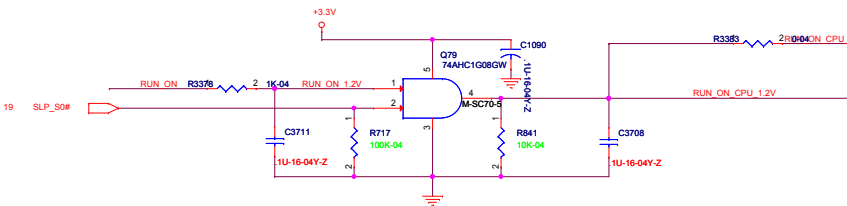
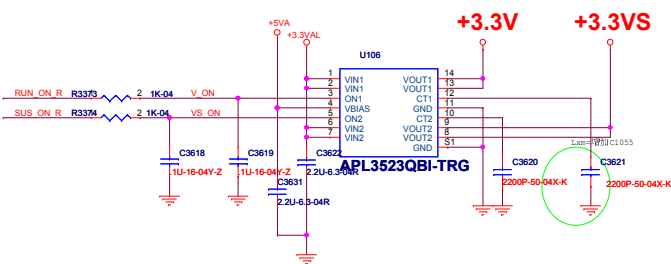
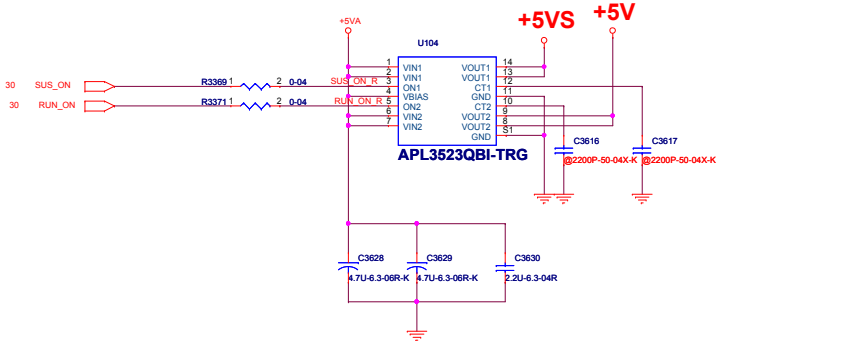
1.0VA Converter



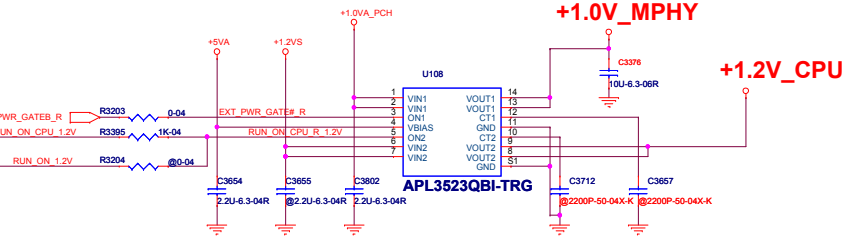
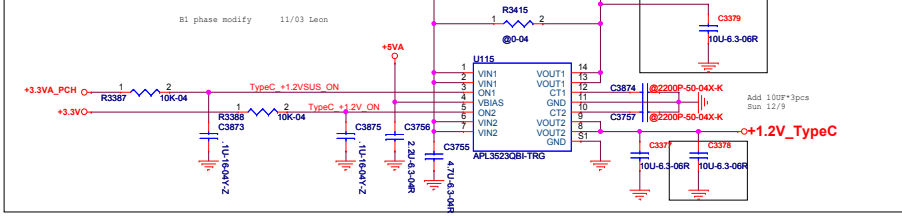
VCCIO Converter



VCCSW SUS

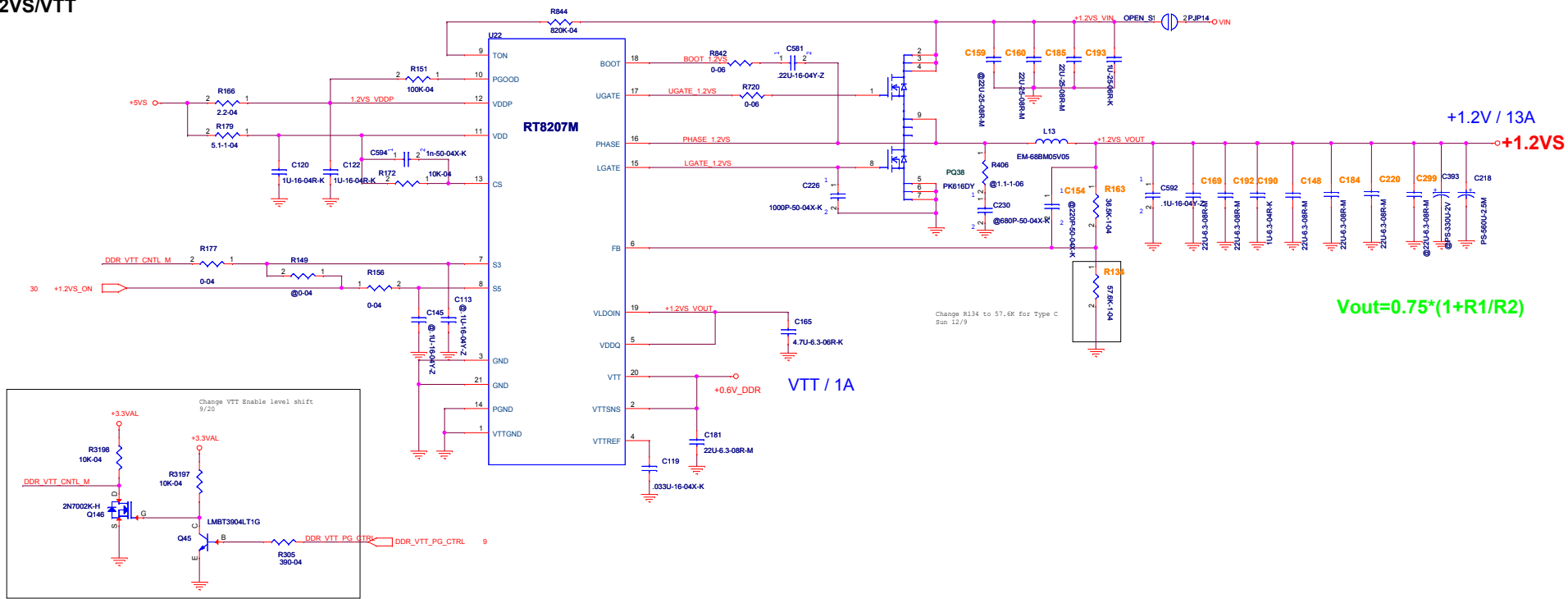


+1.2V_TypeC
+1.2VS_TypeC

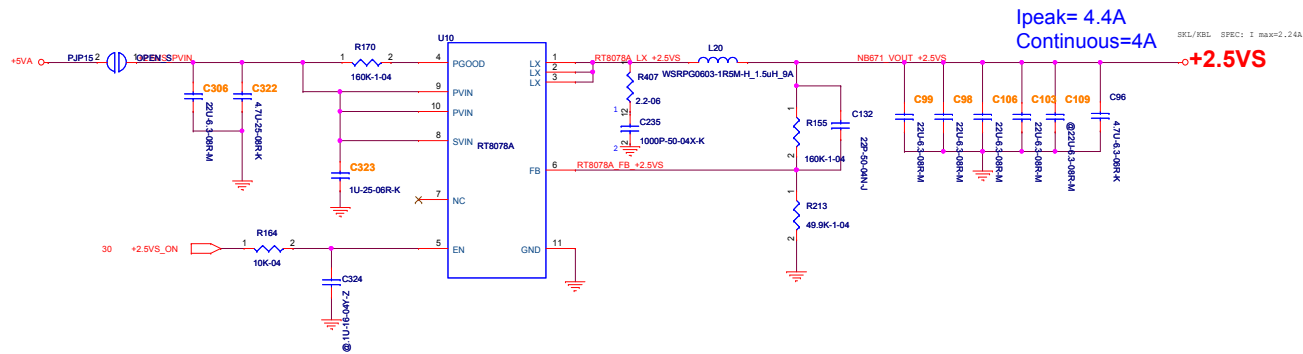


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RB	RB

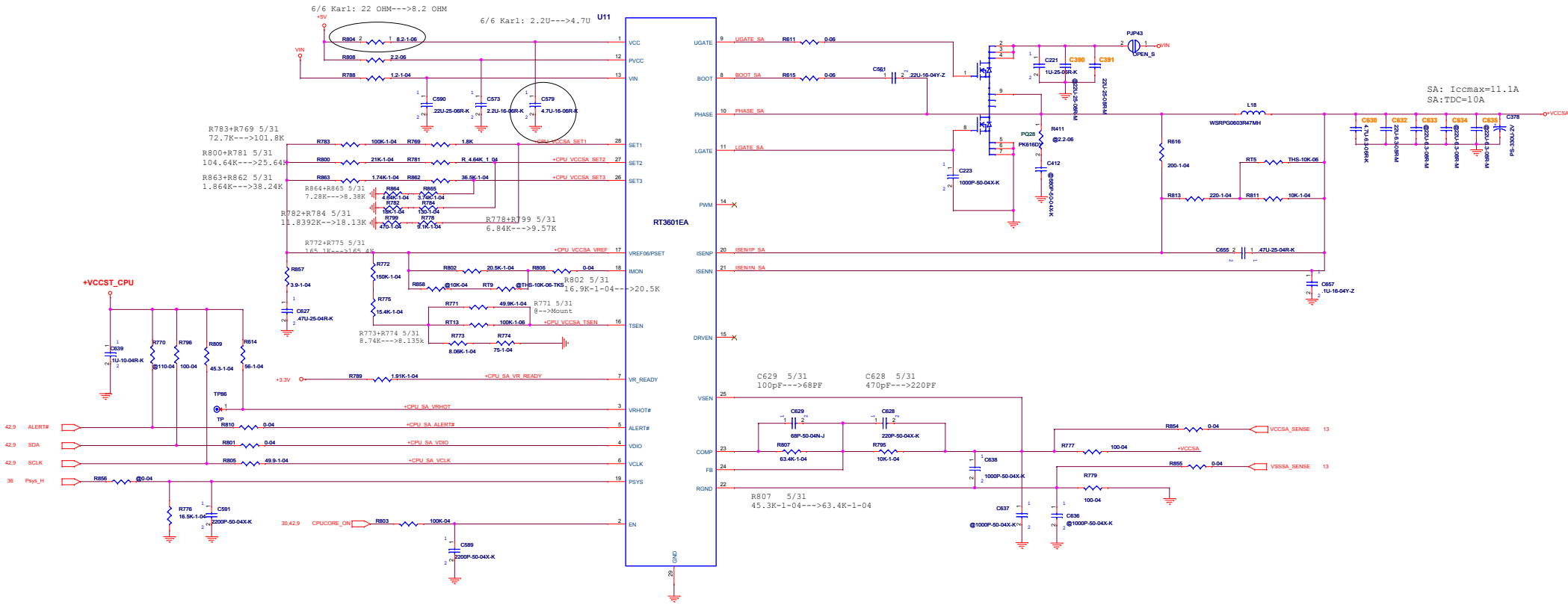
1.2VS/VT

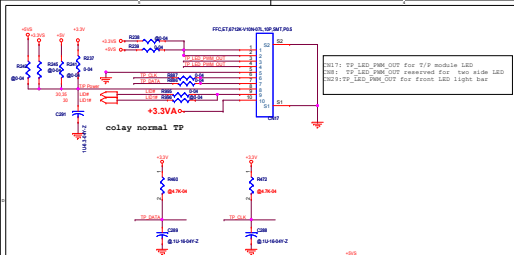


2.5VS Converter

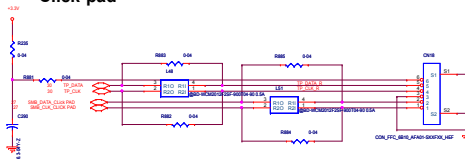








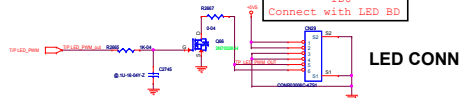
Click-pad



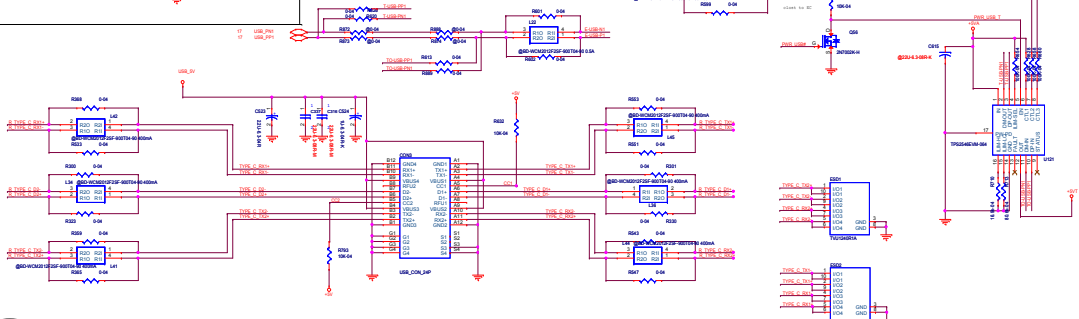
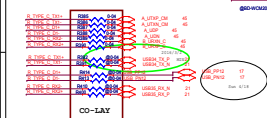
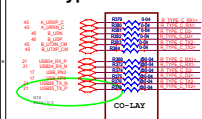
	Power icon LED	KB	Pulse (TP) LED	Charging LED
Power on	on	on	on	
Fan 全轉 (Q-Key)	on	on	快呼吸	
Power off	off	off	off	
Suspend	呼吸(follow KB)	呼吸	呼吸(follow KB)	
Charging				on
Stop Charging (Full Battery)				off
Power on/Battery Low (<65%)				閃爍 1.5s

ID6
Connect with LED BD

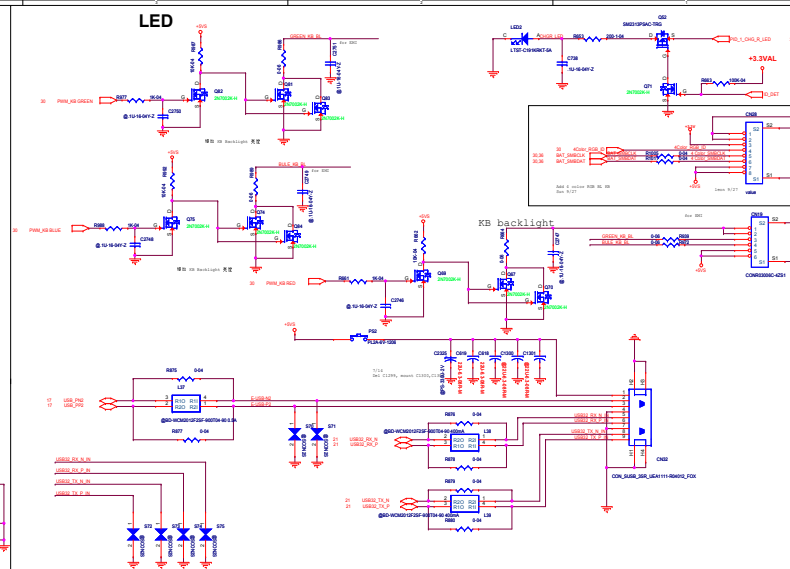
LED CONN



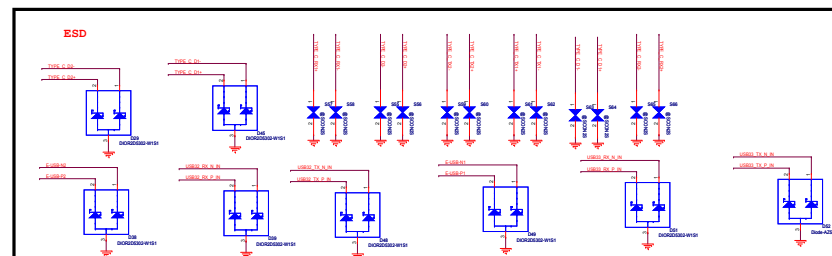
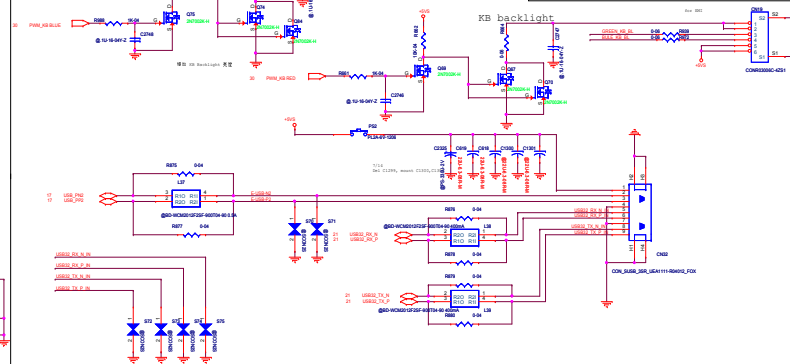
USB Type-C Port

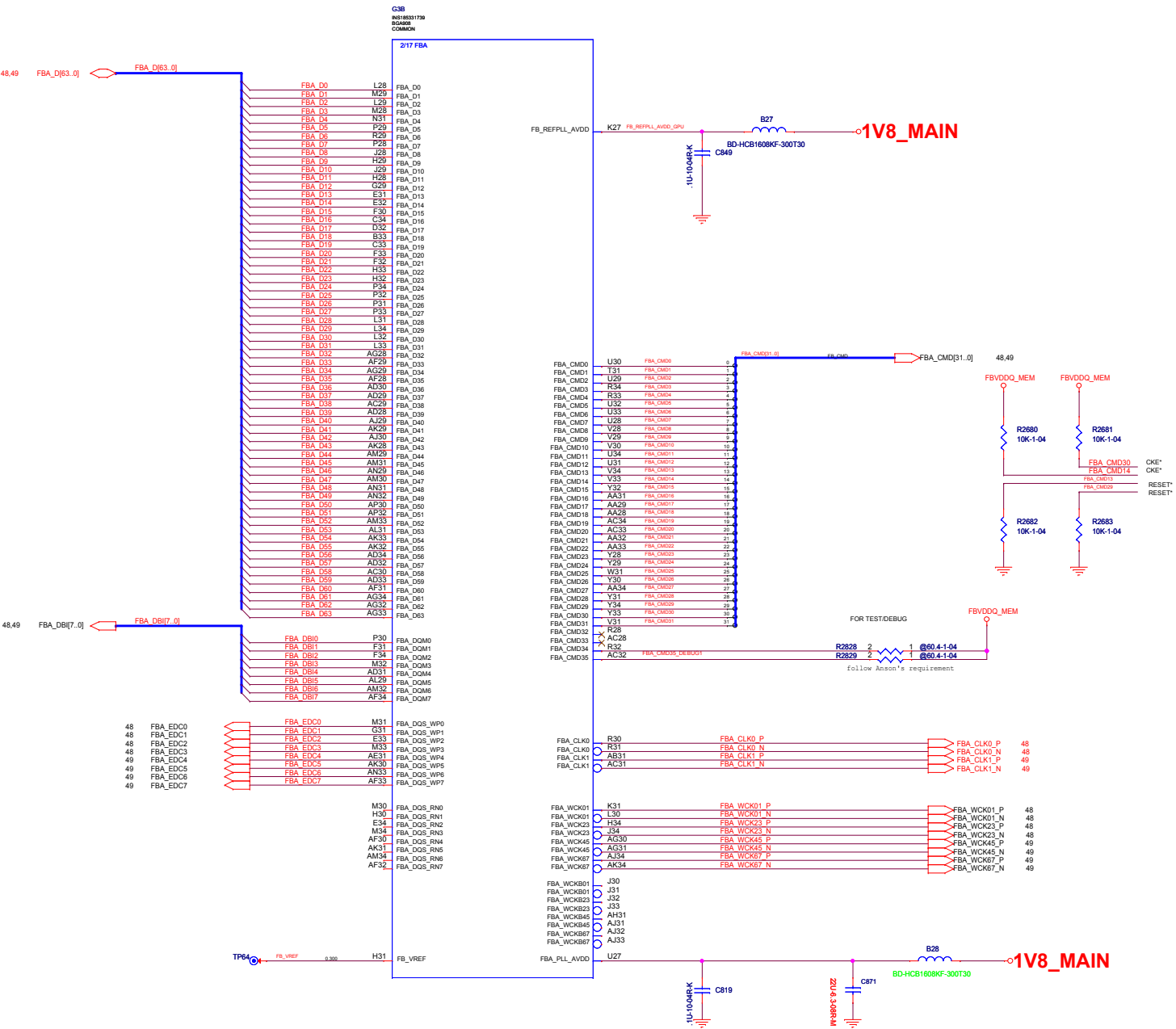


LED



KB backlight





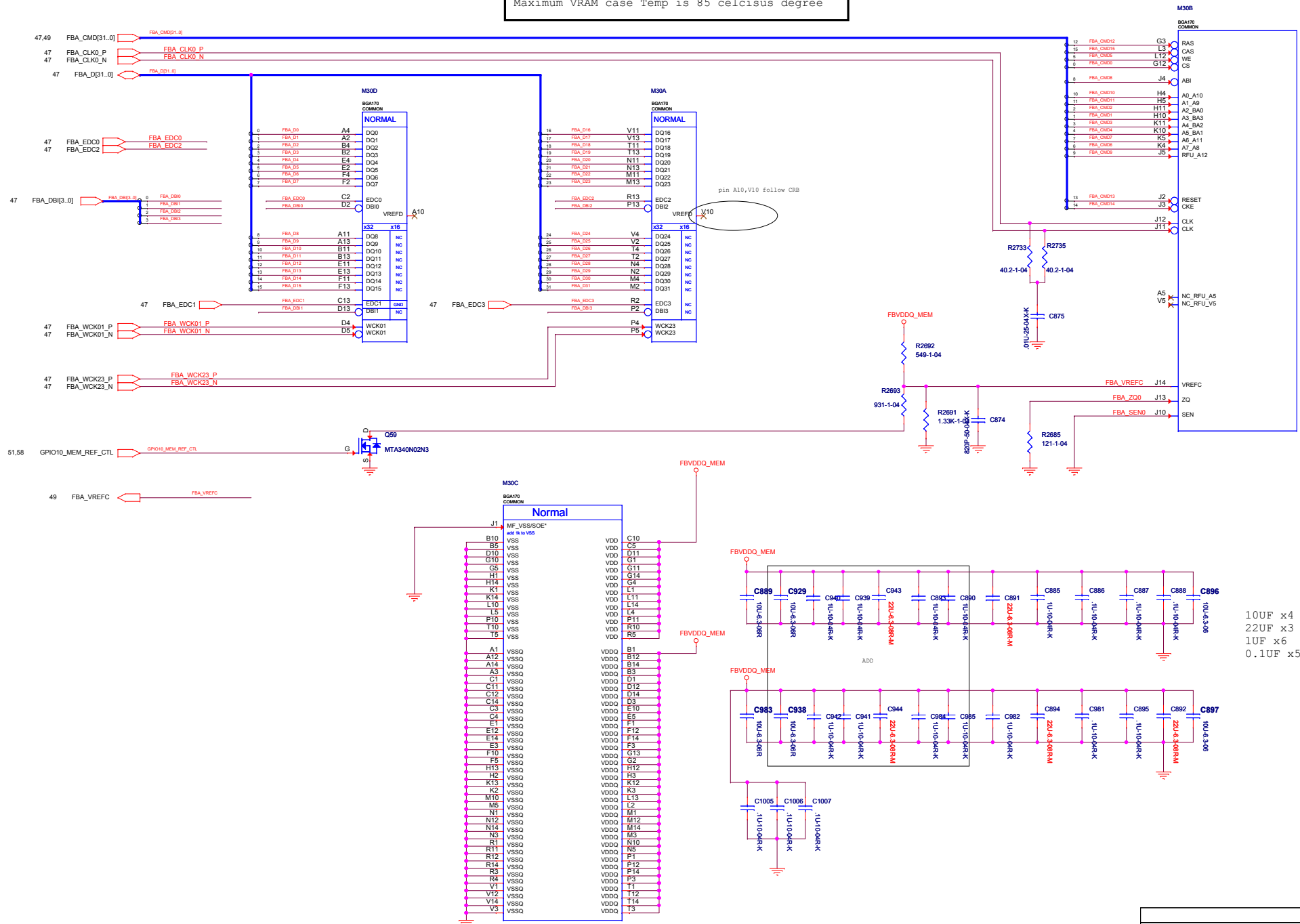
48,49 FBA_D[0:31]

48,49 FBA_DBI[7:0]

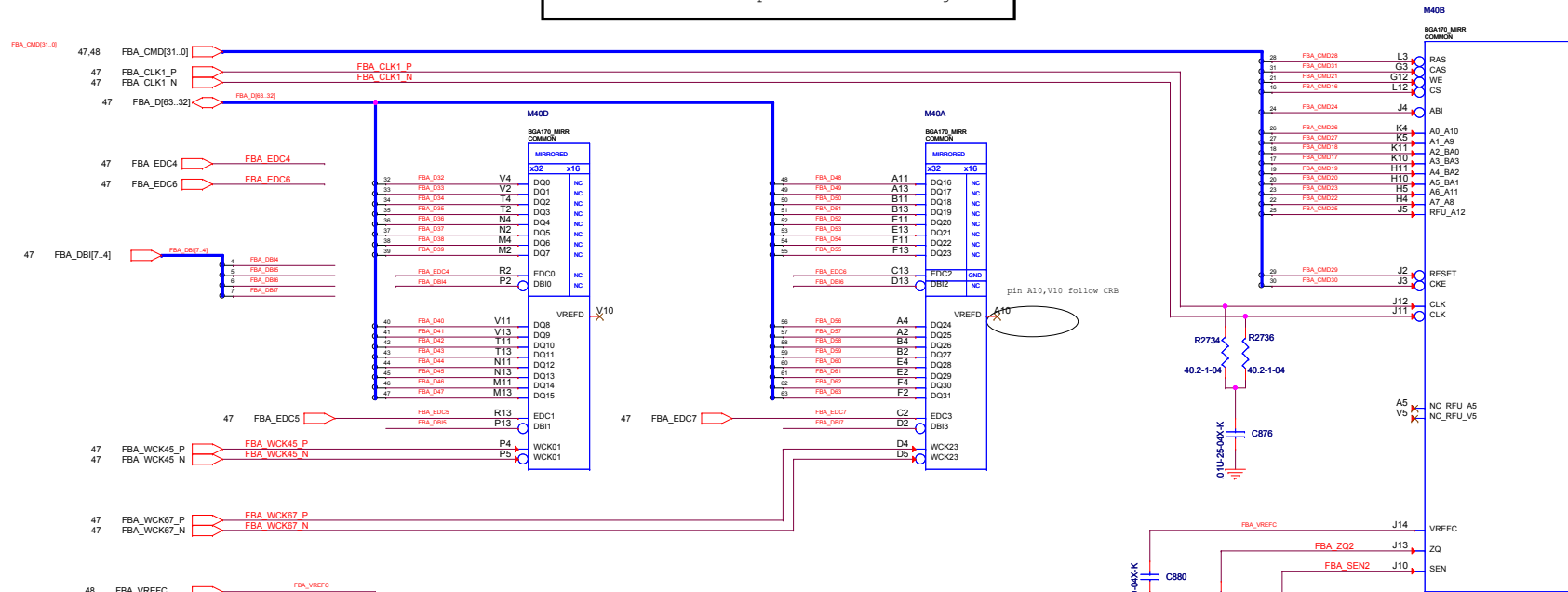
48 FBA_EDC0
48 FBA_EDC1
48 FBA_EDC2
48 FBA_EDC3
49 FBA_EDC4
49 FBA_EDC5
49 FBA_EDC6
49 FBA_EDC7

TP64

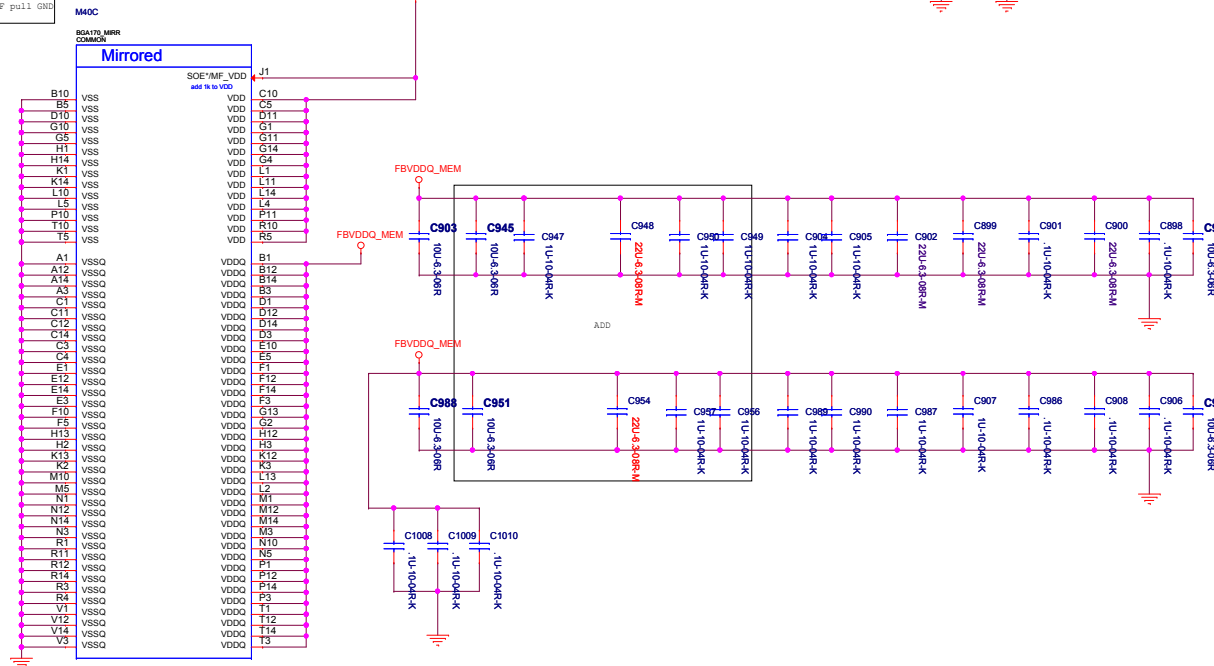
Maximum VRAM case Temp is 85 celcuis degree



Maximum VRAM case Temp is 85 celcius degree

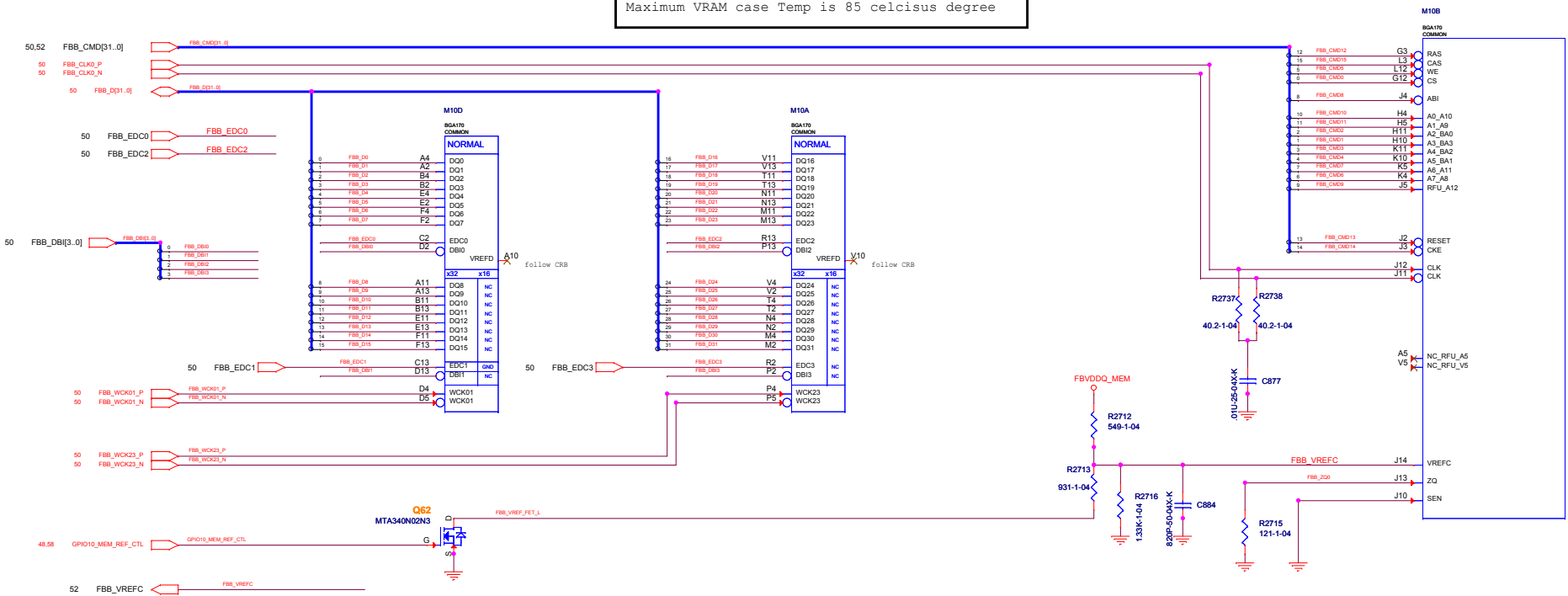


Mirrored: MF pull high
Non-mirrored: MF pull GND

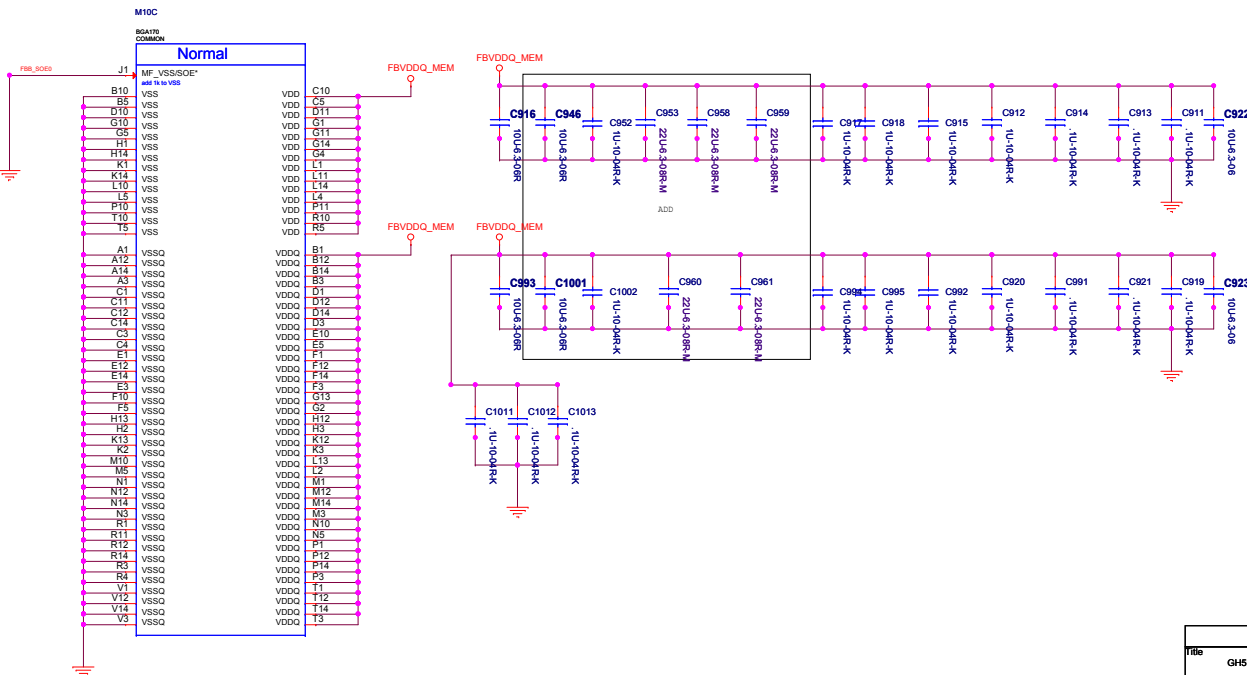


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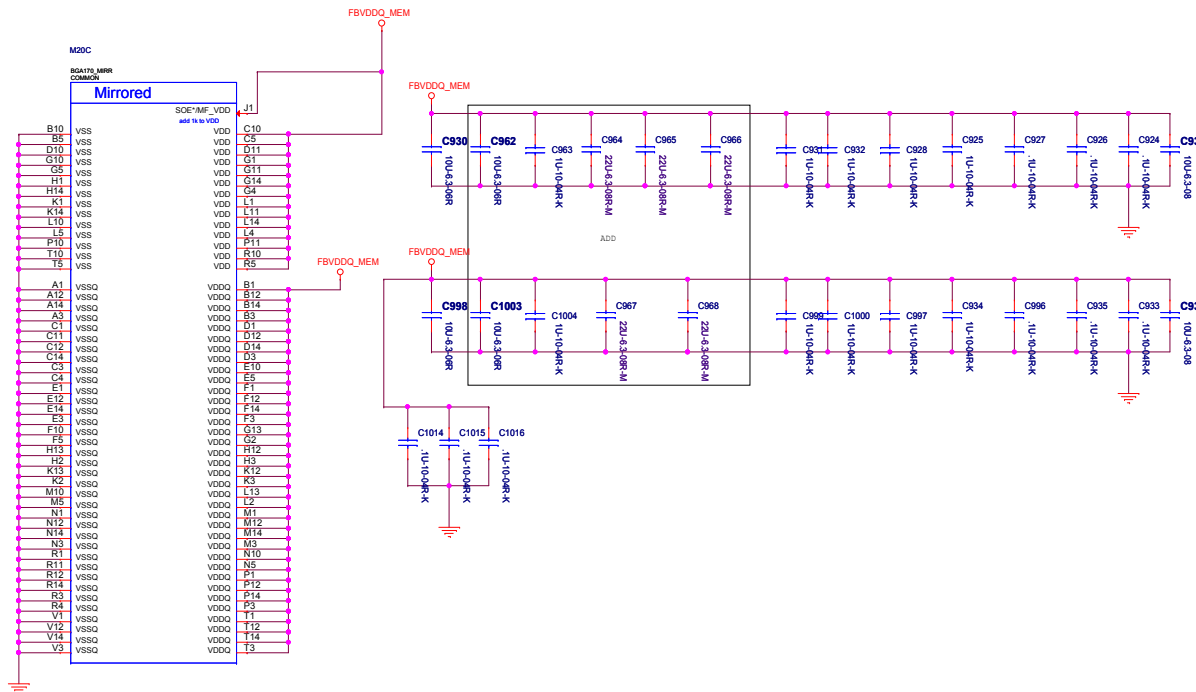
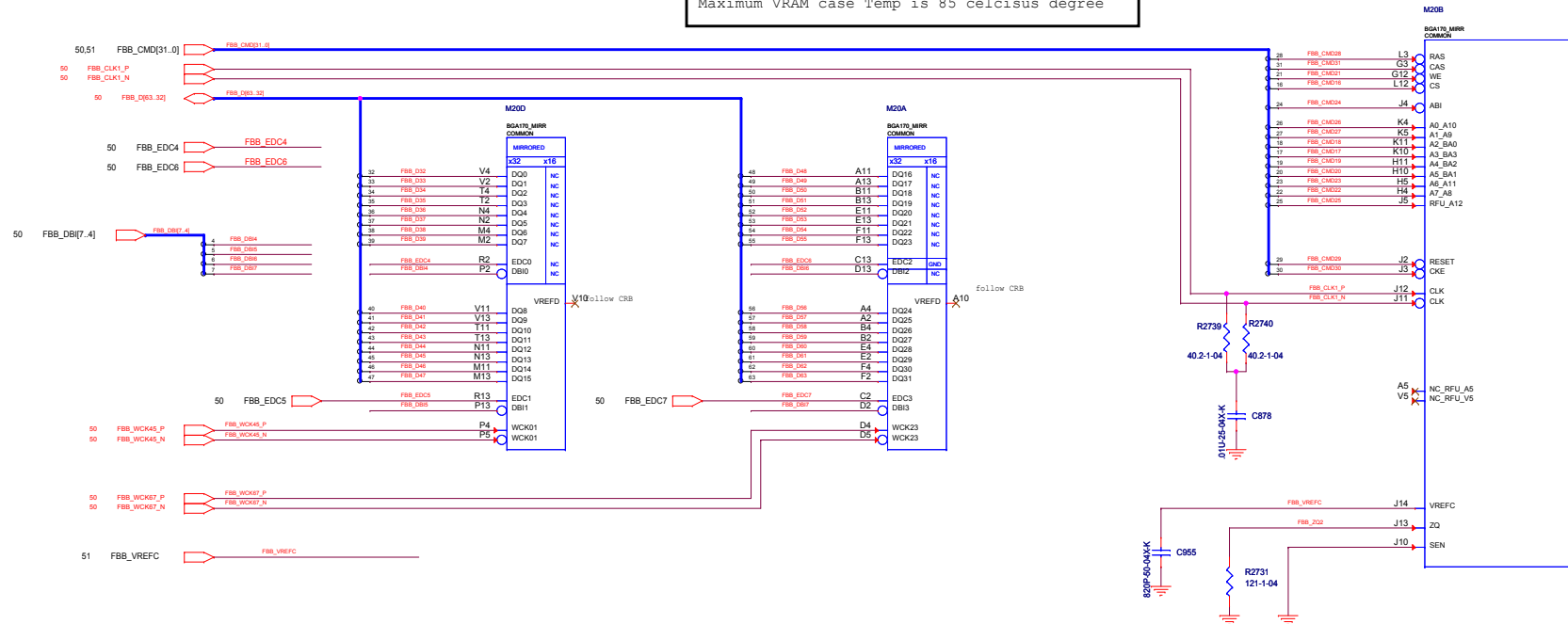
Maximum VRAM case Temp is 85 celcius degree



Mirrored: Pull high to VDDQ
Normal: GND



Maximum VRAM case Temp is 85 celcibus degree



1.8V Converter

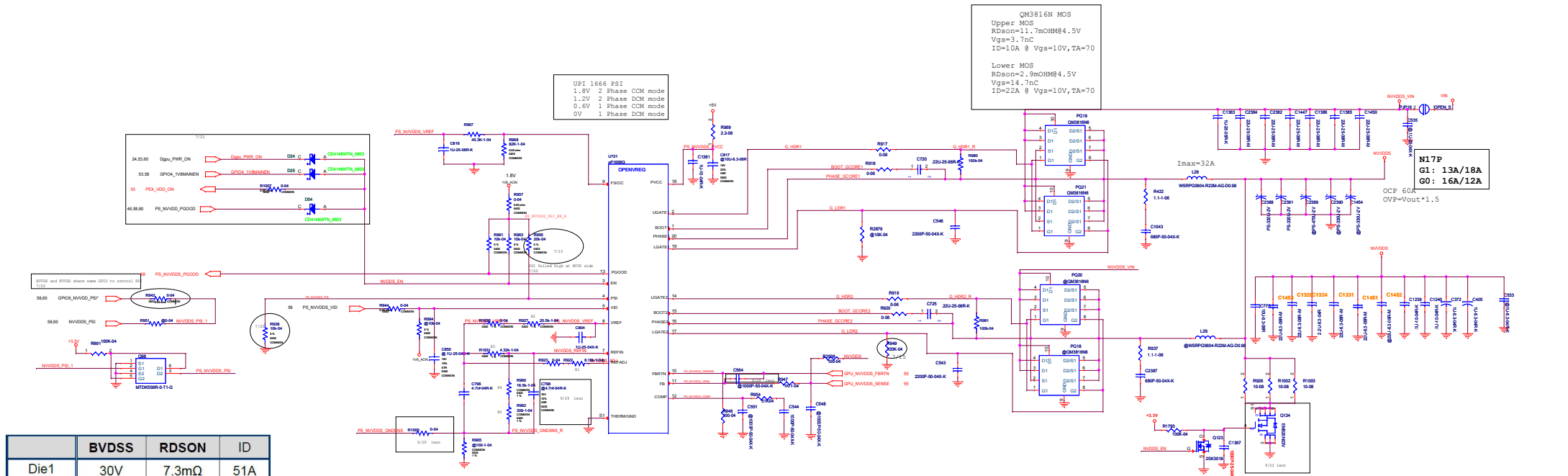
$V_o = 0.6 * (1 + R_1 / R_2)$

N1P7: I1V8_AON Continuous = 1.6A + 330mA = 1.93A
330mA for each IFP in use

1V8_AON

1V8_MAIN

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Rev:	RB				

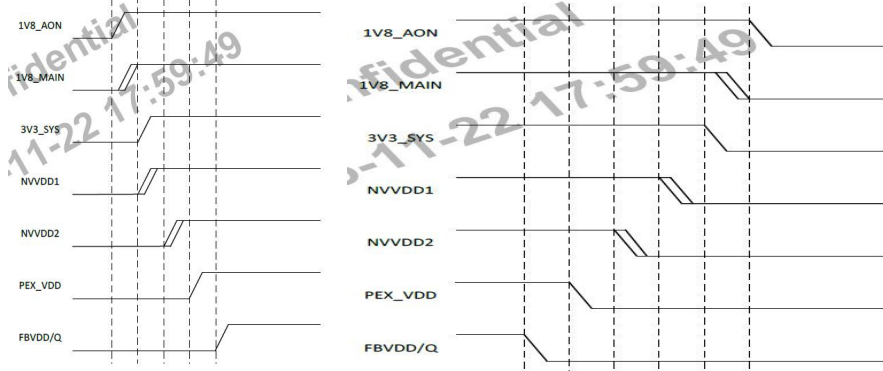


	BVDSS	RDSON	ID
Die1	30V	7.3mΩ	51A
Die2	30V	1.9mΩ	117A

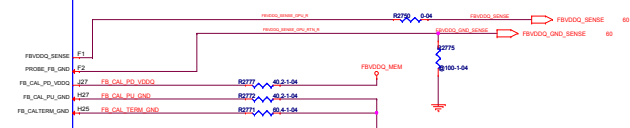
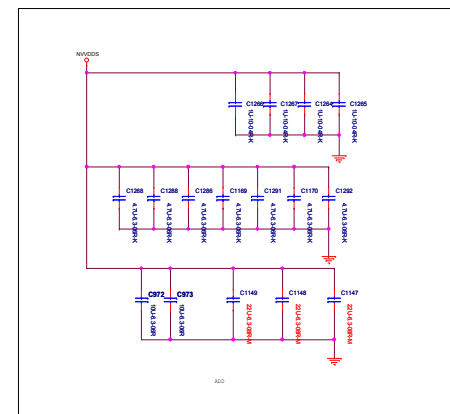
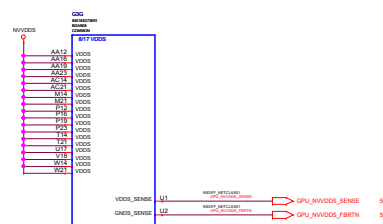
Symbol	QM3816N6	Rating		Units
		Die1	Die2	
V _{DS}	Drain-Source Voltage	30	30	V
V _{GS}	Gate-Source Voltage	±20	±20	V
I _D @T _C =25°C	Continuous Drain Current, V _{GS} @ 10V ¹	51	117	A
I _D @T _C =100°C	Continuous Drain Current, V _{GS} @ 10V ¹	32	74	A
I _D @T _A =25°C	Continuous Drain Current, V _{GS} @ 10V ¹	13	28	A
I _D @T _A =70°C	Continuous Drain Current, V _{GS} @ 10V ¹	10	22	A

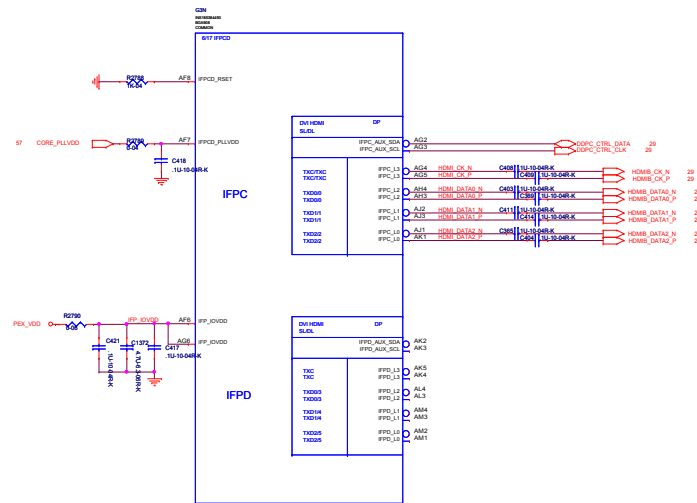
Table 1. Power Saving Features

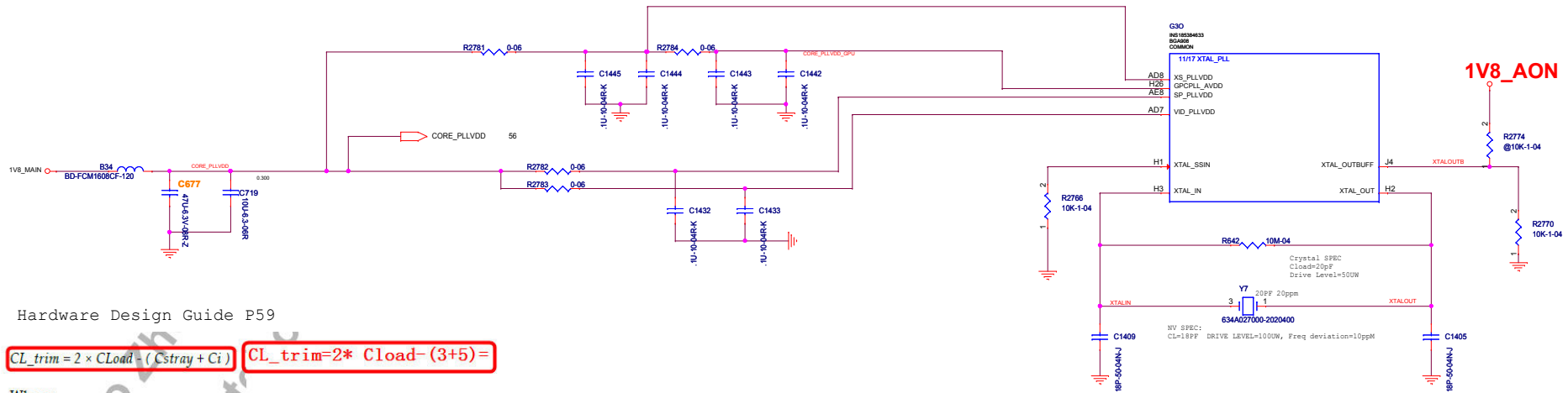
GPU Feature	Guidance
GC6.2.1	<ul style="list-style-type: none"> Mandatory for Optimus®/MS-Hybrid design Mandatory for discrete GPU design with G-SYNC NVSR display Mandatory for discrete GPU design with non-NVSR display Optional for GPU design without battery
NVIDIA BATTERY BOOST™	<ul style="list-style-type: none"> Mandatory for systems with battery Not supported for system without battery (e.g., AIO, SFF)
Discrete GPU configuration	Supported
Optimus configuration	Supported
MS-Hybrid configuration	Supported



<p>FOR GM107 DECOUPLING CAPS UNDER GPU</p> <p>8X 0602 1uF 15X 0605 4.7uF</p> <p>NEAR GPU</p> <p>7x 0805 22uF 5x 0805 4.7uF 1x 7374 330uF</p>	<p>FOR GM108 DECOUPLING CAPS UNDER GPU</p> <p>4X 0602 1uF 10X 0605 4.7uF</p> <p>NEAR GPU</p> <p>1x 0805 22uF 1x 0805 4.7uF 5x 0805 4.7uF 1x 7374 330uF</p>
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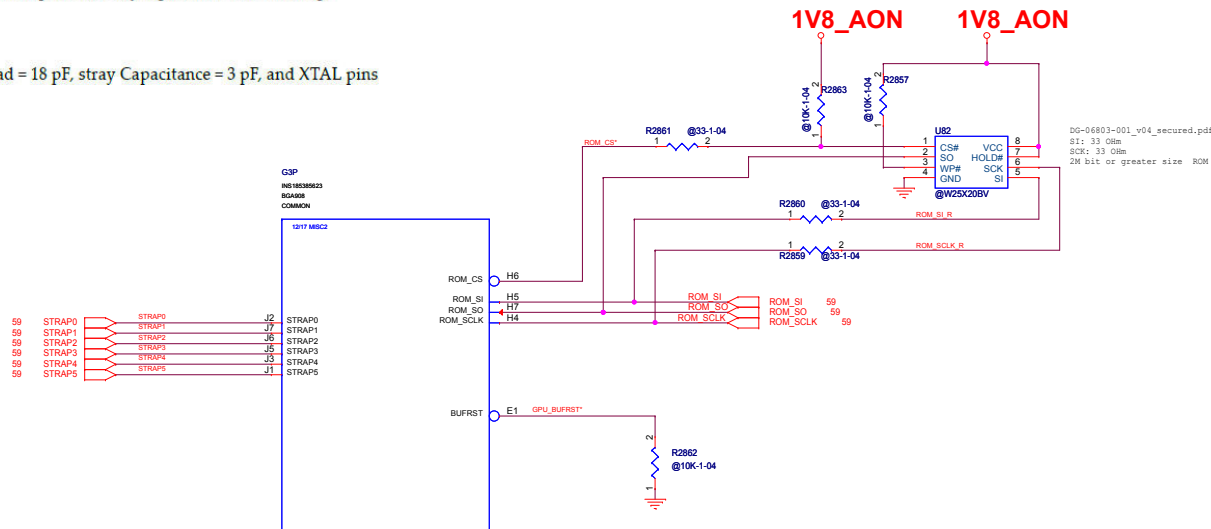
Hardware Design Guide P59

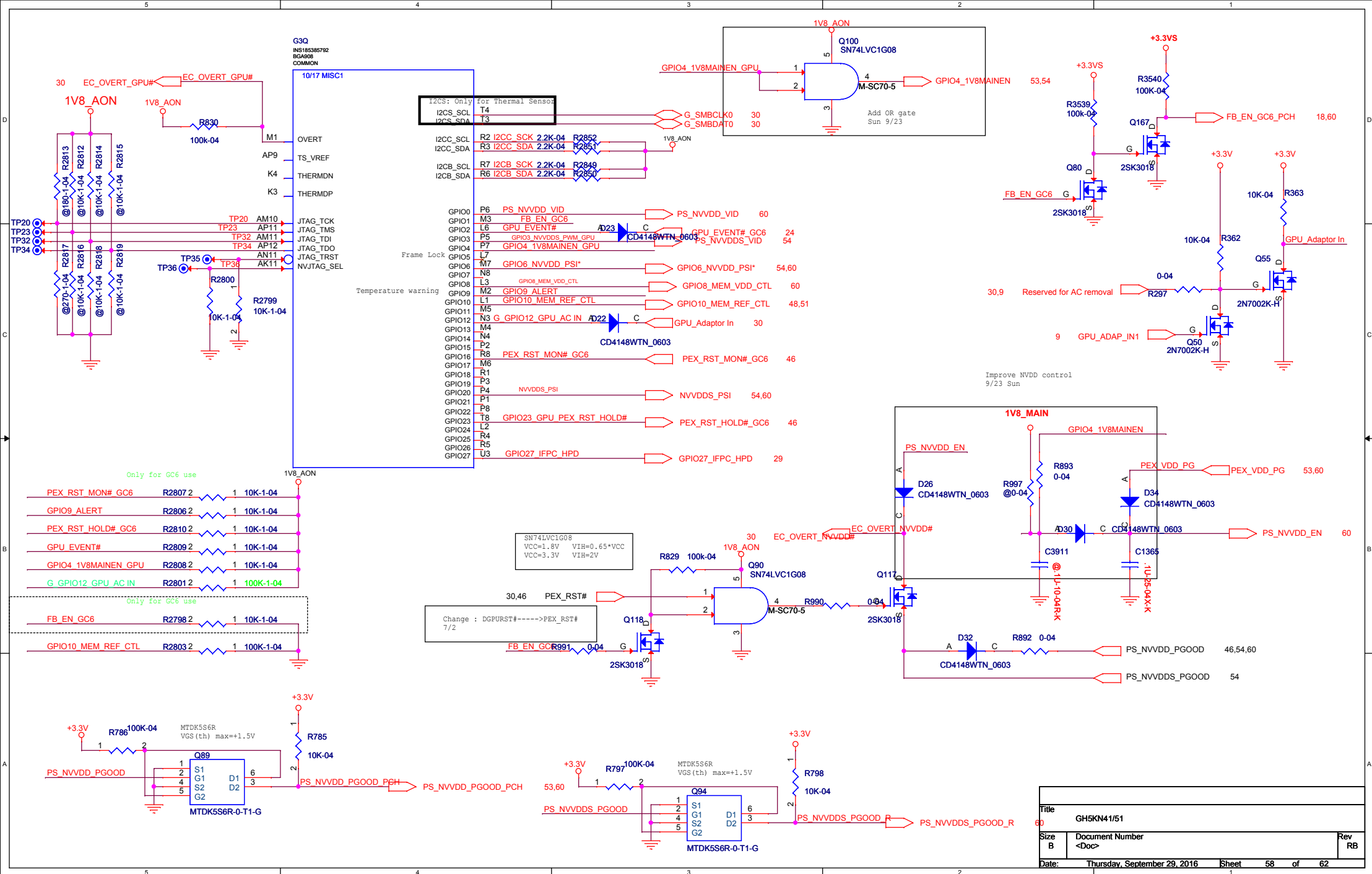
$$CL_{trim} = 2 \times C_{Load} = (C_{stray} + C_i) \quad CL_{trim} = 2 * C_{Load} - (3+5) =$$

Where:

- C_{Load} is the crystal load capacitance (from data sheet of XTAL used)
- C_{stray} is ~ 3pF (Stray capacitance of XTAL pads and any significant trace routing)
- C_i is pin capacitance (5 pF)

Typical CL_{trim} = 28 pF when crystal load = 18 pF, stray Capacitance = 3 pF, and XTAL pins capacitance = 5 pF.

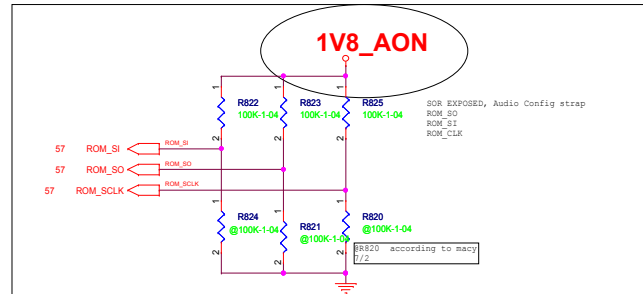




H=High :Tied to 1.8V
M=Middle:Tied to 0.9V
L=Low :Tied to 0V

RAMCFG:
STRAP0, STRAP1, STRAP2
SOR EXPOSED, Audio Config strap
ROM_S0
ROM_S1
ROM_CLK
SET SMB_ALT_ADDR,DEVID_SEL, PCIE_CFG,VGA_DEVICE
STRAP3,STRAP4,STRAP5:-

7/20



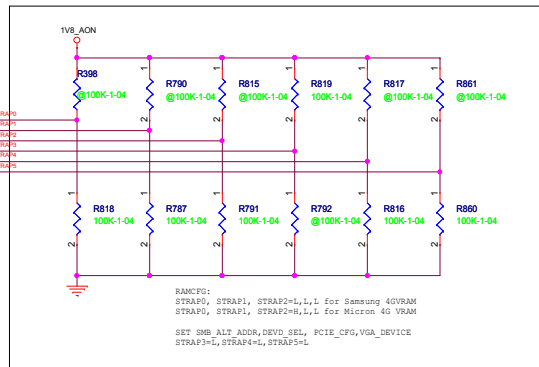
1:SMB_ALT_ADDR ENABLE
0:SMB_ALT_ADDR DISABLE

1:DEVID_SEL REBRAND
0:DEVID_SEL ORIGINAL

1:PCIE_CFG LOW POWER
0:PCIE_CFG HIGH POWER

1:VGA_DEVICE ENABLE
0:VGA_DEVICE DISABLE

57 STRAP0
57 STRAP1
57 STRAP2
57 STRAP3
57 STRAP4
57 STRAP5



VRAM type

R398	R818	VRAM	Size
@	Mount	Samsung4G	256M bit*32
Mount	@	Micron 4G	256M bit*32

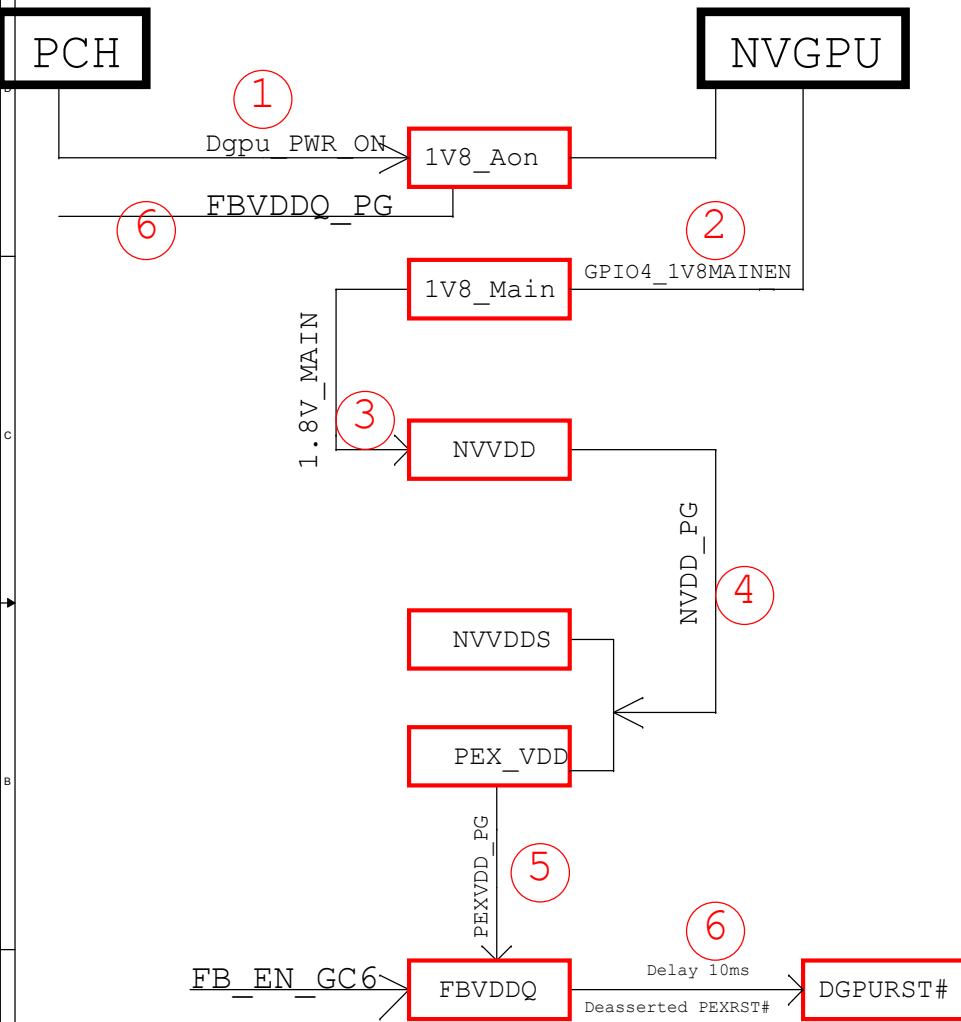
Table 9. Output EDP-Continuous

	NVVD	NVDDS	GPU FBIO	FB Total ⁵	1.0V Total ¹	1.8V Total ²
	—	—	1.50V ⁴	1.50V ⁴	1.0V ⁴	1.8V ⁴
Product	(A)	(A)	(A)	(A)	(A)	(A)
N17P-G1	47	19	5	11	3	1
N17P-G0	40	16	5	11	3	1

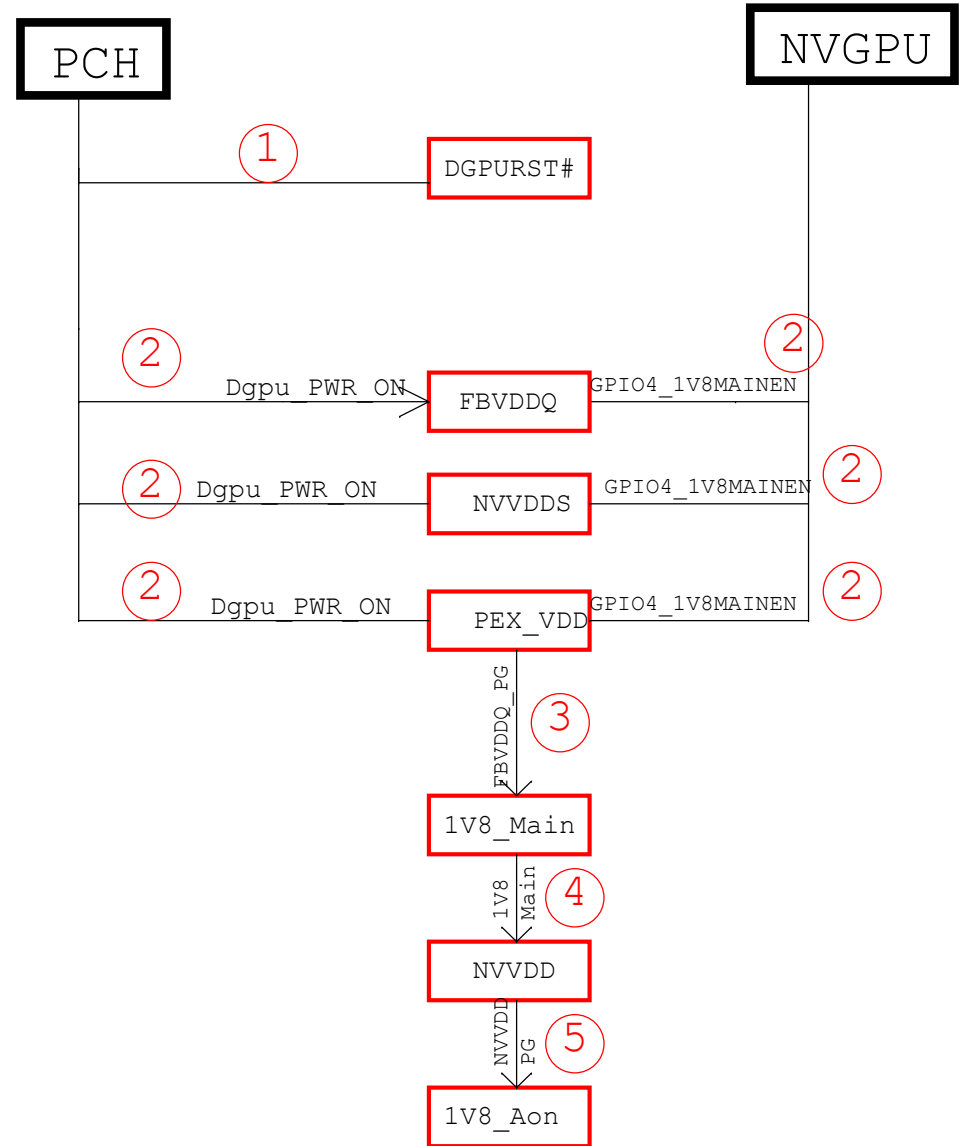
PS1	Mode
1.0V	Multi phase CCM
1.2V	Multi phase CCM
0.6V	Single-Phase CCM
0	Single-Phase DCM
	DCM

Date	Chang History	Comment
9/14	@U26 to add apple charger, R353:-->40.2K, Add R367 to pull H ADAP_IN, Mount R488 to PH DGPURST, Add R673 , Change L46 to 1R0, Change 0.47U 16V to 0.47U 25V	
9/16	Change 5VA to +5V for VAC discharger.	
9/19	1. Add PEX VDD for IFP_ IOVDD 2. Add D40.D41 for HDMI 3. Change GPIO for DGPU_PWR_ON_PCH 4. R3306=0805 5. EC controls A Cover LED 6. page60:	
9/20	1. Delete TPM, Add 80 Port 2. Change VTT Enable level shift	
9/22	1. DEL: C3910, C3911, R3541, C1365 , DEL R1012 2. Add: C1365 0.1uF (PN: CAPR1040T5-0040) 3.Change Q124 to EMB20N03V 4.Change R1011 to Diode (PN: DIOR24148W-5CS1) 5.Add: R950 30K (PN: RESR303001-0540) 6.Change C1426 to 10nF (PN: CAPR1030T7-0040) 7.D56 reversed 8.D30 Pin A pull up +3.3V 9.add or gate Q164 these item for GPU timing	
9/22	change R193 to 56K,change R219 to 27K, increase 1.8V to 1.84,Solve the problem of 3D mark hang up	
9/22	CPU_Core:Change R747 to 13.3K,Change R706 to 3.48K,Change R693 to 0 OHM VCCGT:Change R735 to 13.3K,Change R843 to 3.48K,Change R734 to 0 OHM	
9/22	1. Type_C 1.2V:R2352 change to 22K 2. Update Q165 design to optimize 1V8_Main off sequence 3. Reserved RC delay for 1V8_Aon off sequence	
9/23	1. Improve NVDD control and add OR gate for GPIO4 2. Add D58 for 1V8_Aon control 3. Add discharge Res for FBVDDQ	
9/27	1. Add 4 color RGB BL KB 2. Change EC ROM to 256KB 3. Reserve C2392 4. Add C1297 for FBVDDQ_VIN	
9/27	1. Add CN25,CN28	
9/27	1. Add R192 co-lay R185,Add R198 co-lay R197,Add R517 co-lay R516,Add R518 co-lay R514	
9/28	1. @R507, 2.Del U9 & C233, 3.Add R2806 4.@R3320,@CN38,Add CN27 5.Reserve B38	
9/29	1.cancel R192 co-lay R185,cancel R198 co-lay R197,cancel R517 co-lay R516,cancel R518 co-lay R514 2.Add CONN CN30	
9/29	1.HDMI Add ESD diode 2.CN25 mirror vertically	
9/29	1.ADD C2550,C564 2.change CN30 package 3.ADD R1000 4.change CN25 package	
9/30	1. Add @ RCH3 ,add R2751,add C2392 150UF	

DPU Power On Timing



DPU Power Off Timing



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