

NB8609 V4.0 DDR4&SO-DIMM

Intel Gemini Lake Platform

01--COVER PAGE
02--BLOCK DIAGRAM
03--POWER BLOCK DIAGRAM
04--SYSTEM LIST
05--GLK_SOC_MEM(CHA)
06--GLK_SOC_MEM(CHB)
07--GLK_SOC (EMMC/SPI/LPC/AUD/PMU)
08--GLK_SOC(DDI/DSI)
09--GLK_SOC(I2C/CNV/LPSS/SPI/UART)
10--GLK_SOC(PCIE/SATA/USB)
11--GLK_SOC(JTAG/GPIO)
12--GLK_SOC(PWR)
13--GLK_SOC(GND)
14--GLK_SOC(DECAP)
15--GLK_SOC(STRAP)
16--MEM_SODIMM
17--MEM_DDR4_CHA0
18--MEM_DDR4_CHA1
19--DDR4_TERMINATIONS
20--MEM_DECAPS
21--SYSTEM_SPI_FLASH
22--HDMI
23--EDP
24--EMMC
25--SSD

26--G_SENSORS&HALL
27--RTC
28--AUDIO
29--WLAN
30--USB3.0
31--EC ITE8987
32--EC ROM &THERMAL SENSOR
33--HDD
34--Reserve_FP
35--KeyBoard&TouchPad&FAN
36--IO BOARD CONN
37--TPM
38--LAN
39--DCIN&DEBUG CONN
40--HYBRID CHARGE
41--POWER DELIVERY 3P3V
42--POWER DELIVERY 5P5V
43--PMIC RT5077_1
44--PMIC RT5077_2
45--POWER DELIVERY VDDQ
46--LOAD SWITCH
47--AC POWER ON SQUENCE 1
48--DC POWER ON SQUENCE 2
49--POWER DELIVERY_Backlight
50--HOLE&BOSS
51--CHANGE LIST



Huaqin Telecom Technology Com.,Ltd.

TITLE	<OrgAddit>
PAGE DETAIL	<Doc>

HQNB

NB8609

Rev V1.0

ID

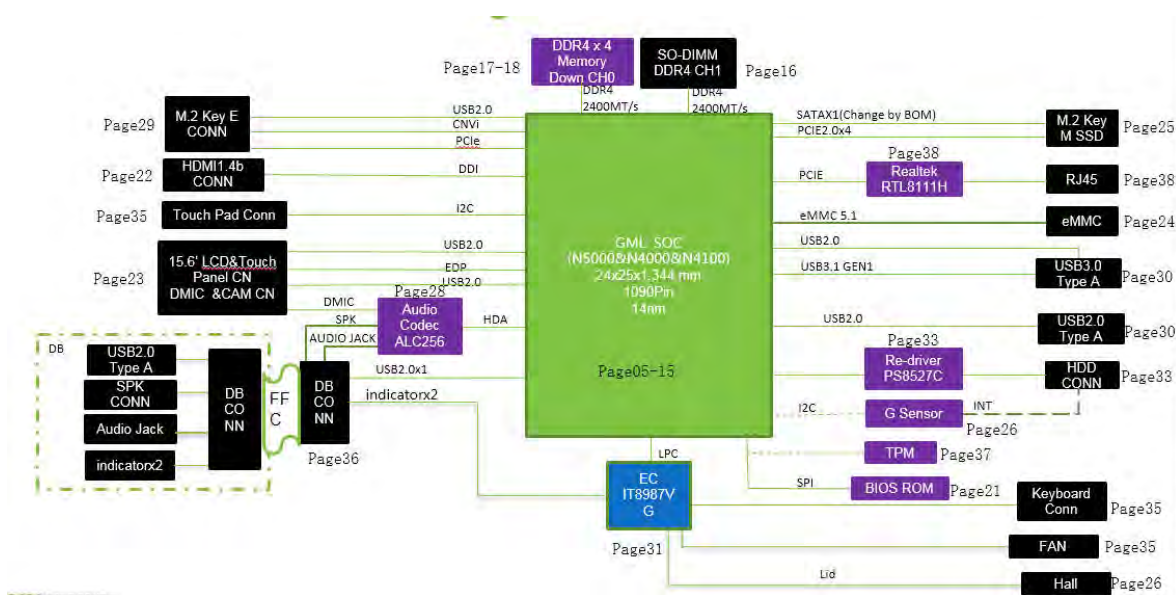
COVER PAGE

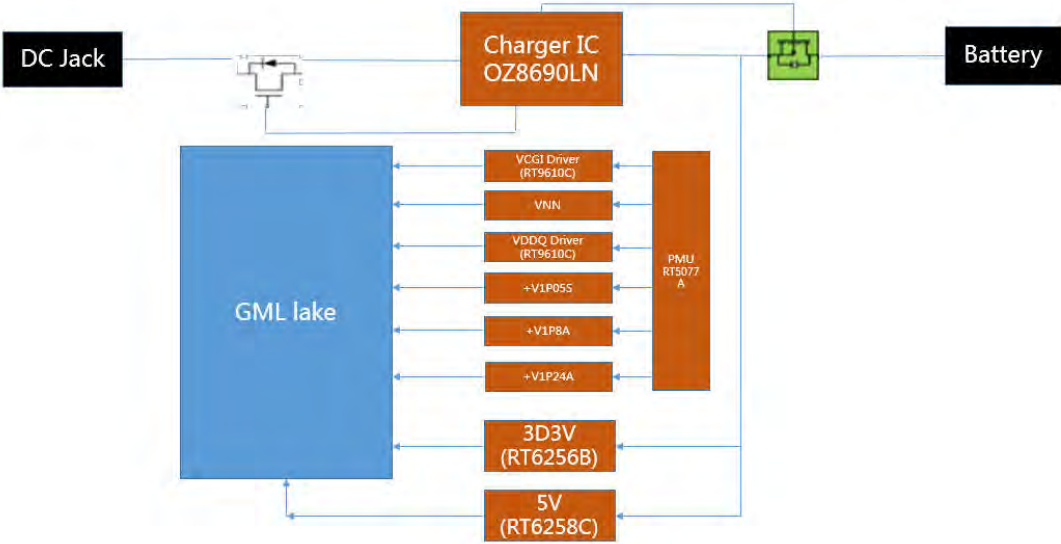
Size B

Date

Thursday, March 28, 2019

Sheet 1 of 51





Huaqin Telecom Technology Com.,Ltd.

TITLE	<OrgAddr4>	HQNBD	NB8809	Rev	V1.0
PAGE DETAIL	<Doc>	ID	<OrgAddr3>	Size	B
		Date	Thursday, March 28, 2019	Sheet	3 of 51

Power States(Adapter)

Signal	SLP_S0#	SLP_S3#	SLP_S4#	+V5P0A	+V3P3A	VNN	V1P8A	V1P2A	VCGI	V1P05S	+V1P20_VDDQ	+3P3SX	+1P8SX	+5P0SX	+V3P3SX_OPS
S0(Full On)	HIGH	HIGH	HIGH	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
S3(STM)	LOW	LOW	HIGH	ON	ON	OFF	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	ON/OFF ²
S4(STD)	LOW	LOW	LOW	ON	ON	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON/OFF ²
S5(SoftOff)	LOW	LOW	LOW	ON	ON	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON/OFF ²

Notel:CNVi moudle on,Pcie moudle off

Power States(Battery)

Signal	SLP_S0#	SLP_S3#	SLP_S4#	+V5P0A	+V3P3A	VNN	V1P8A	V1P2A	VCGI	+V1P05S	+V1P20_VDDQ	+3P3SX	+1P8SX	+5P0SX	+V3P3SX_OPS
S0(Full On)	HIGH	HIGH	HIGH	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
S3(STM)	LOW	LOW	HIGH	ON	ON	OFF	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	ON/OFF ²
S4(STD)	LOW	LOW	LOW	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON/OFF ²
S5(SoftOff)	LOW	LOW	LOW	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON/OFF ²

Notel:CNVi moudle on,Pcie moudle off

MEM ID

MEM_ID2	MEM_ID1	MEM_ID0	
0	0	0	4x HYNIX 1GB (H5AN8G6NCJR-VXC)
0	0	1	4x Micron 1GB (MT40A512M16LY-075:E)
0	1	0	4x Micron 1GB (MT40A512M16TB-062E:J)
0	1	1	xxx
1	0	0	xxx
1	0	1	xxx

MB ID

			HW_ID6	HW_ID5	HW_ID2	HW_ID1	HW_ID0
	EVT		X	X	1	1	1
NB8609	DVT						
NB8612	DVT						

PCle Port

Port	Device
0-3	SSD
4	LAN
5	WLAN

SATA Port

Port	Device
0	HDD
1	SSD

USB2.0 Port

Port	Device
0	USB2.0 Type-A
1	USB3.0 Type-A
2	USB2.0 Type-A(DB)
4	BT
5	Touch screen
6	Camera

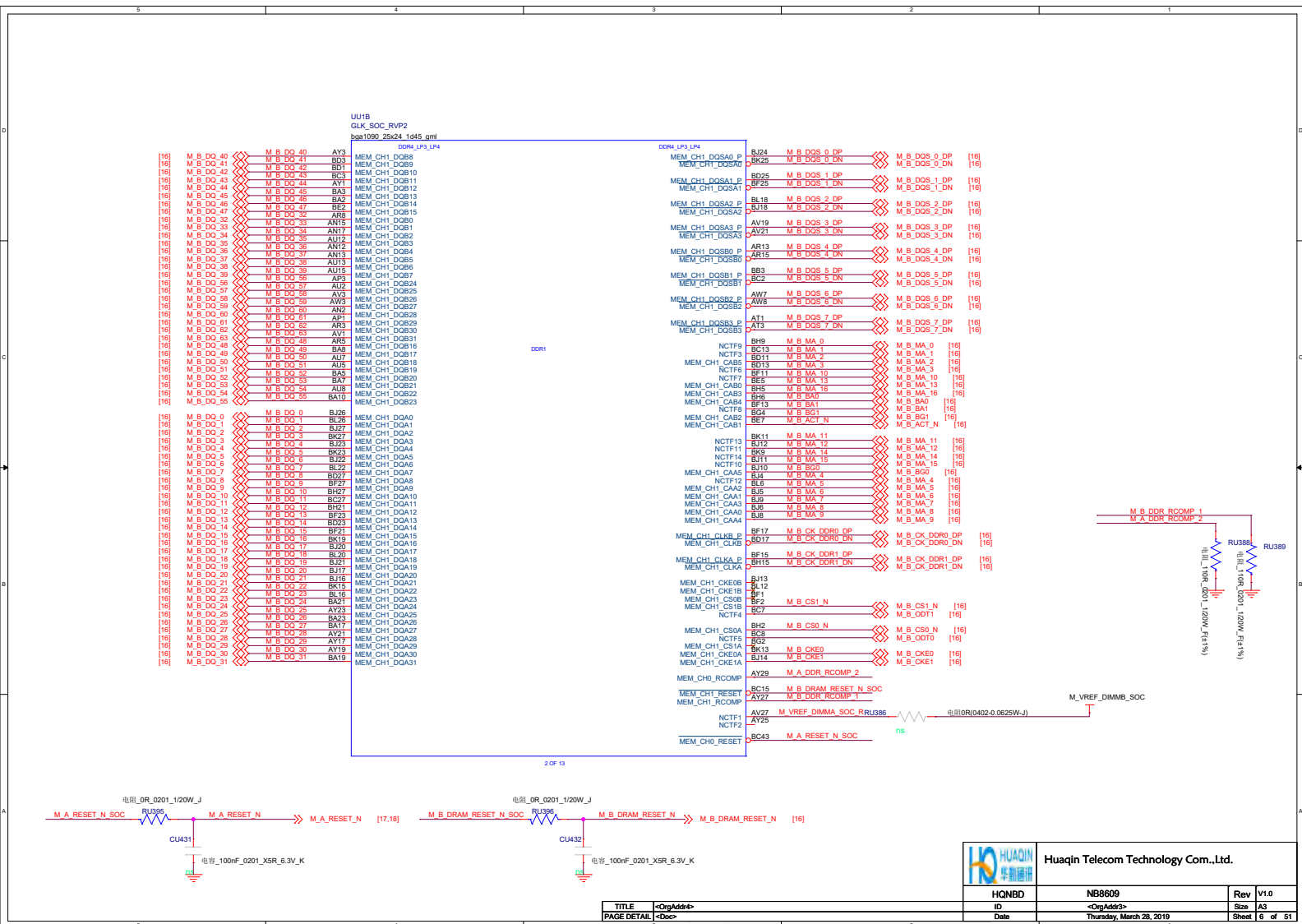
USB3.0 Port

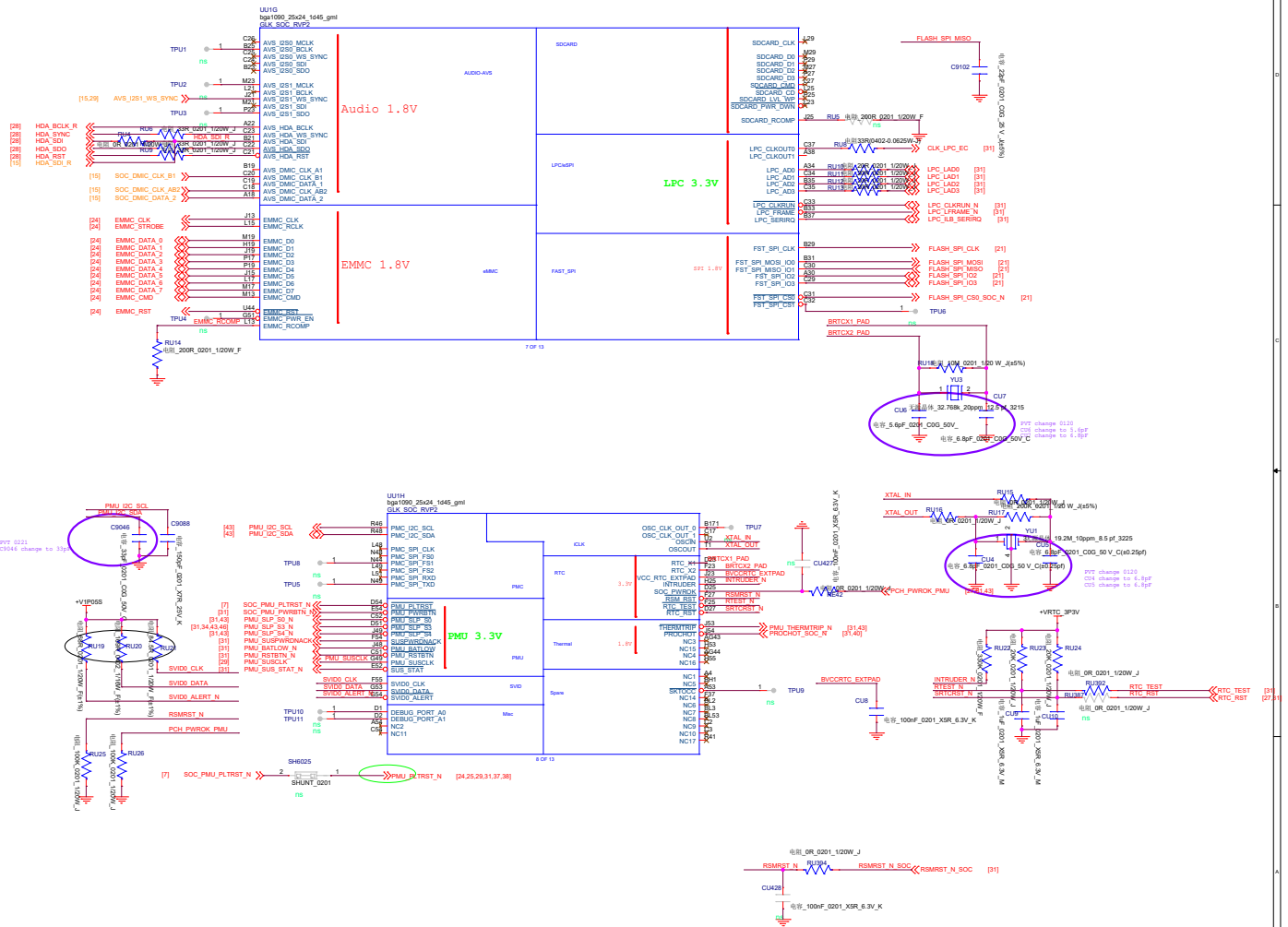
Port	Device
0	USB3.0 Type-A
1	NA



Huaqin Telecom Technology Com.,Ltd.

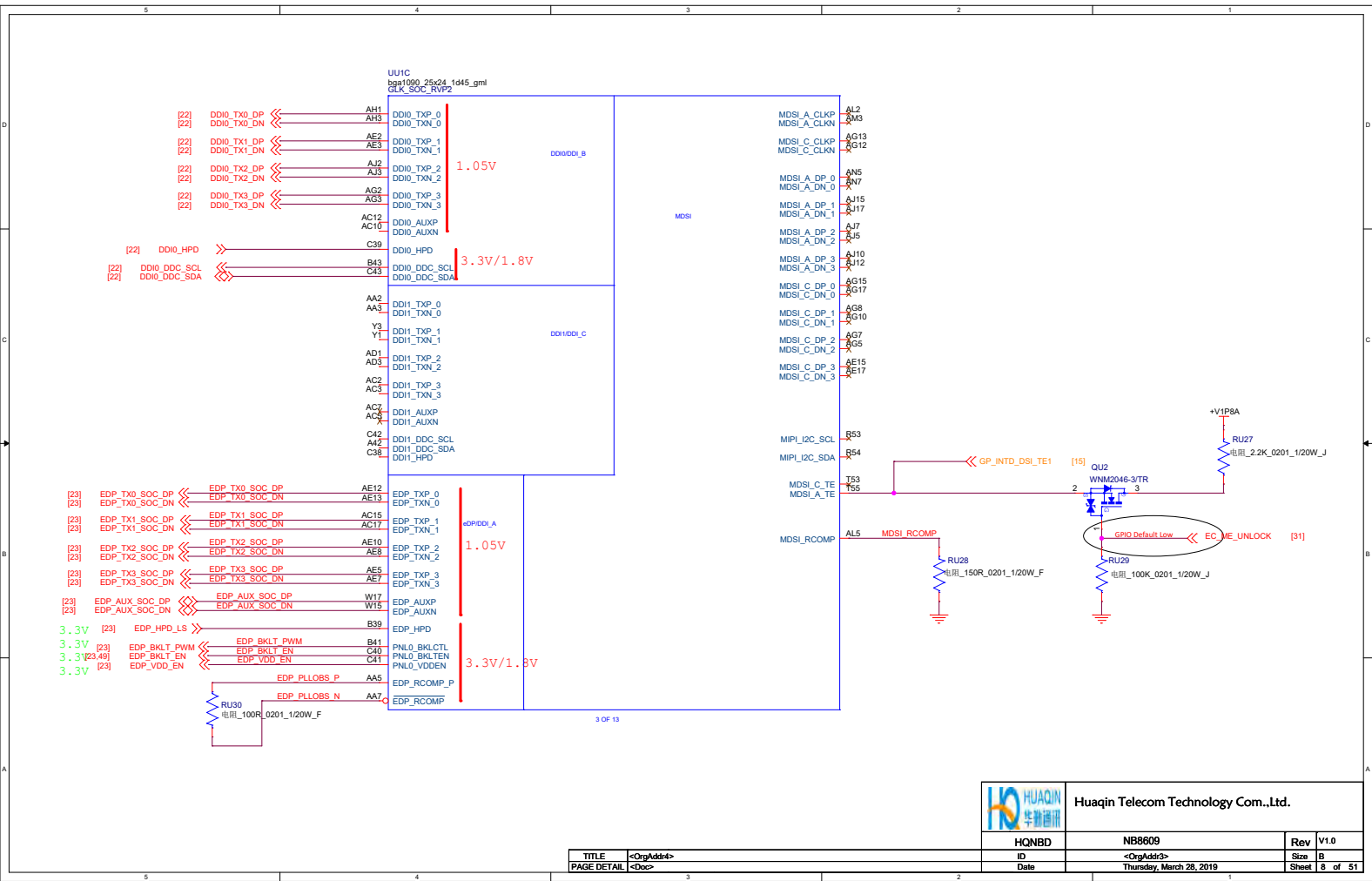
TITLE	<OrgAddr4>	HQNB0D	NB8609	Rev	V1.0
PAGE DETAIL	<Doc>	ID	<OrgAddr3>	Size	B
		Date	Thursday, March 28, 2019	Sheet	4 of 51

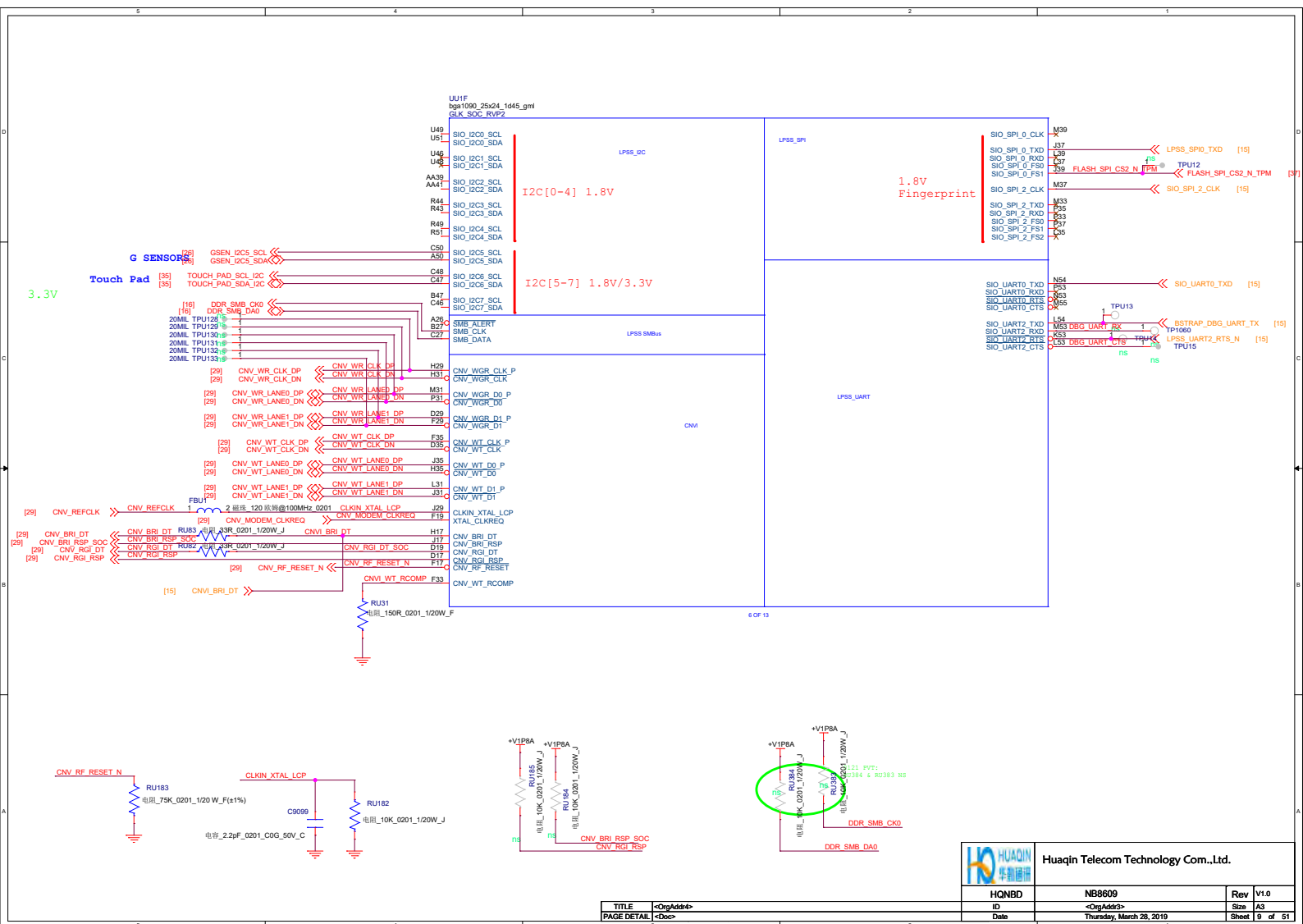


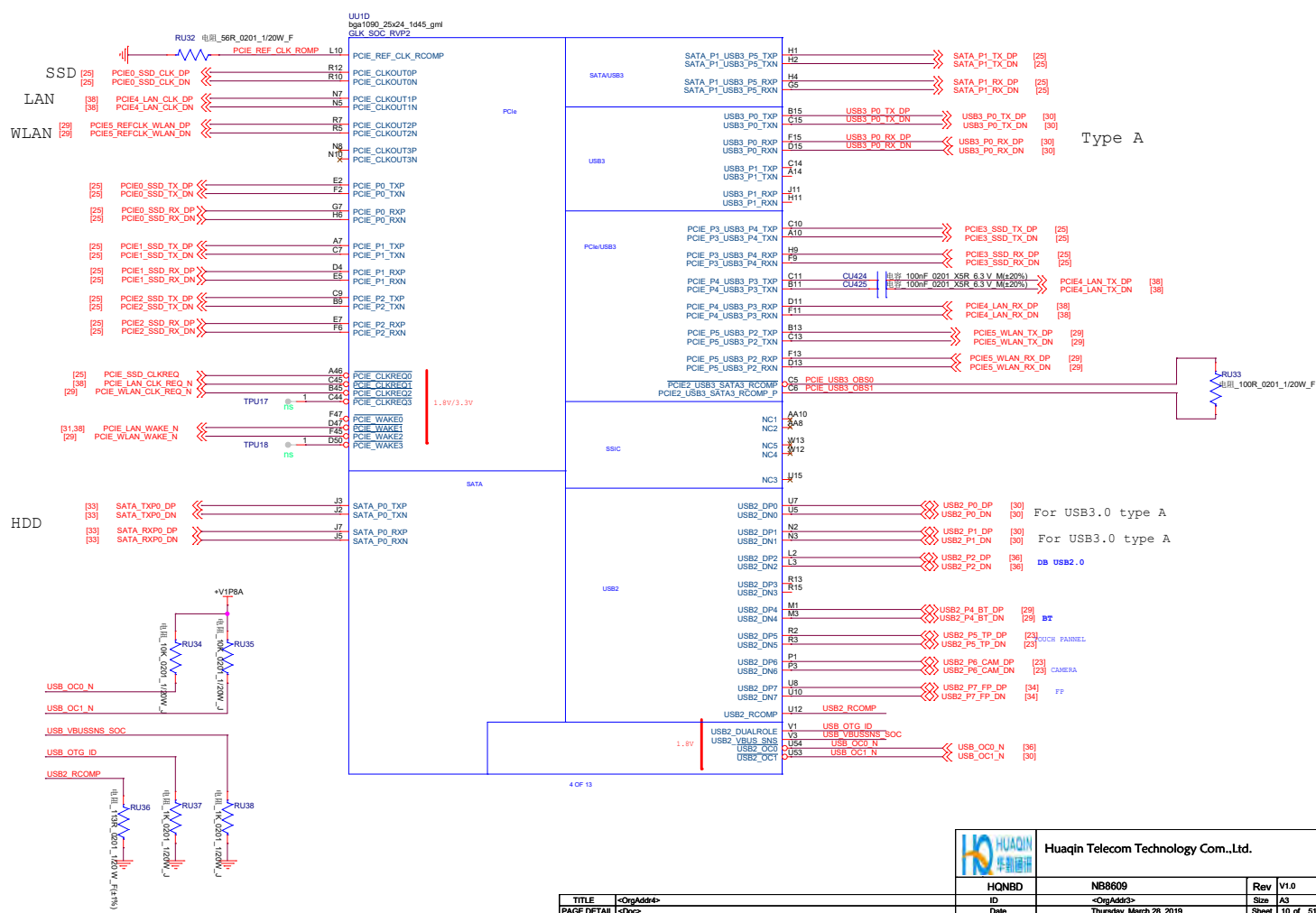


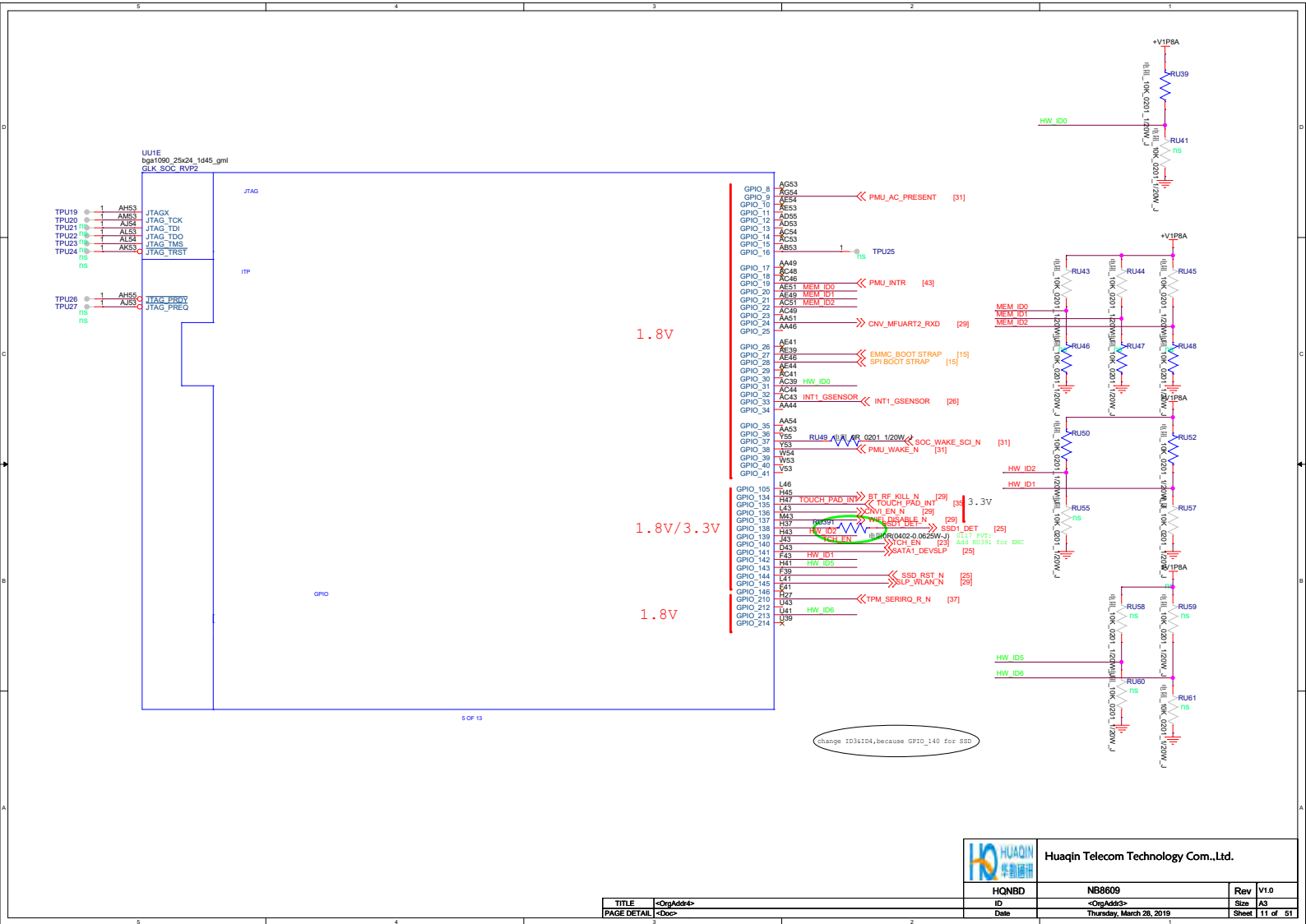
Huaqin Telecom Technology Com., Ltd.	
HONBD	NS8609
ID	<Dgk493>
Date	Thursday, March 28, 2019
Rev	V1.0
Site	C
Sheet	17 of 51

TITLE	<Dgk493>
PAGE	DETAIL





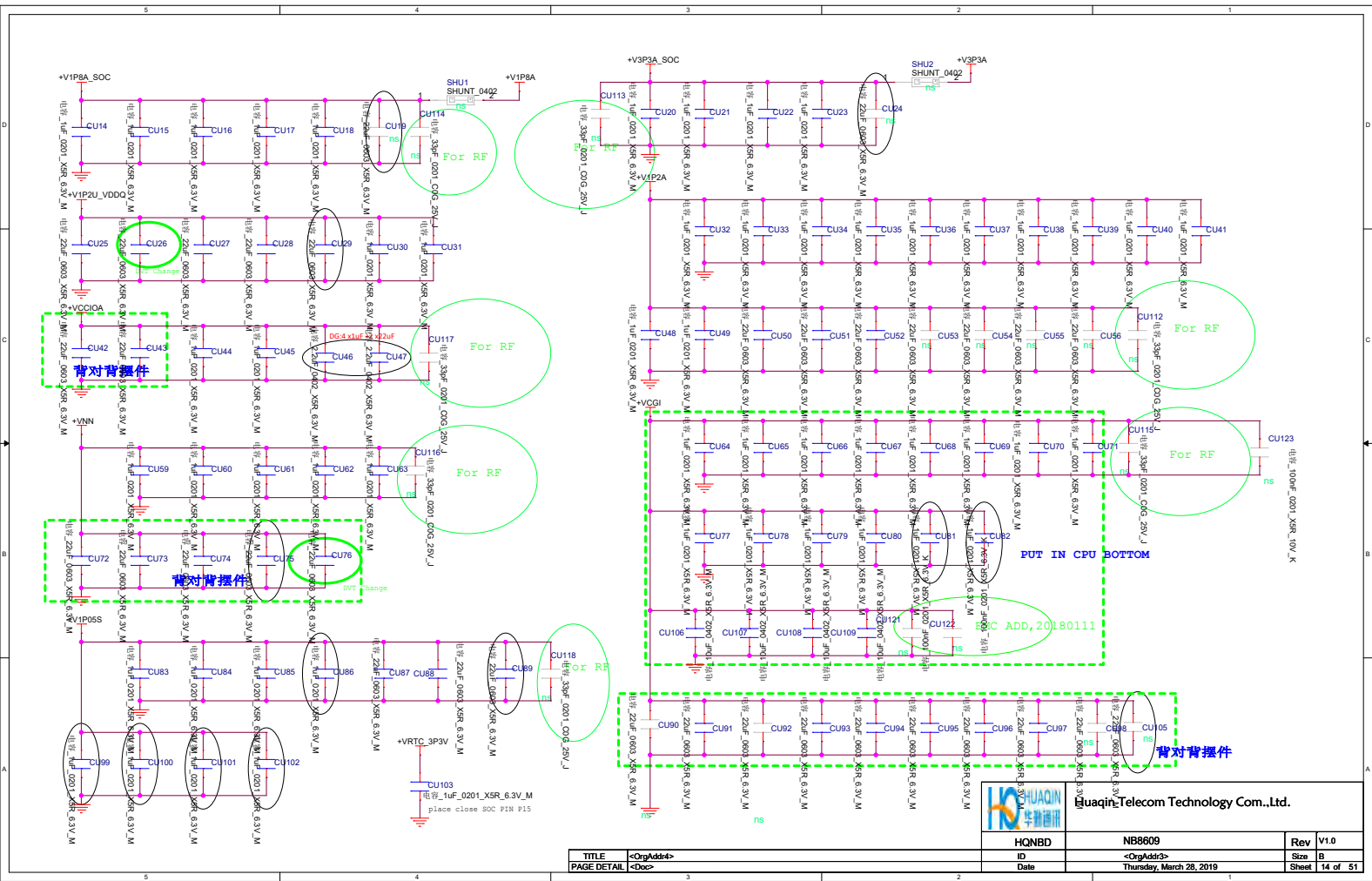




 HUAQIN 华勤通信		Huaqin Telecom Technology Com.,Ltd.	
HQNB0	NB8609	Rev	V1.0
ID	<OrigAddr>	Size	A3
Date	Thursday, March 28, 2019	Sheet	11 of 51

TITLE	<OrigAddr>
PAGE DETAIL	<Doc>

5		4		3		2		1																																																													
D																																																																					
UUI1K bga1090_25x24_1d45_gml GLK SOC RVP2										UUI1L bga1090_25x24_1d45_gml GLK SOC RVP2										UUI1M bga1090_25x24_1d45_gml GLK SOC RVP2																																																	
A3 A6 VSS6 VSS13 A17 VSS1 A20 VSS3 A24 VSS4 A26 VSS5 A37 VSS7 A38 VSS8 A40 VSS9 A44 VSS10 A48 VSS11 A51 VSS12 AA12 VSS14 AA13 VSS15 AA15 VSS16 AA17 VSS17 AA21 VSS18 AA25 VSS19 AA27 VSS20 AA30 VSS21 AA43 VSS22 AA48 VSS23 AB1 VSS25 AB5 VSS26 AB55 VSS27 AC5 VSS33 AC23 VSS28 AC25 VSS29 AC27 VSS30 AC28 VSS31 AC29 VSS32 AE23 VSS34 AE25 VSS35 AE27 VSS36 AE43 VSS37 AE48 VSS38 AF1 VSS39 AF3 VSS40 AF4 VSS41 AF6 VSS50 AF8 VSS61 AF9 VSS82 AF11 VSS63 AF12 VSS41 AF14 VSS42 AF16 VSS43 AF18 VSS44 AF23 VSS45 AF25 VSS46 AF29 VSS47 AF40 VSS48 AF51 VSS49 VSS52										VSS53 AF45 VSS54 AF47 VSS55 AF48 VSS56 AF50 VSS57 AF52 VSS58 AF53 VSS59 AF55 VSS60 AG20 VSS61 AG21 VSS62 AG22 VSS63 AG23 VSS64 AG24 VSS65 AG25 VSS66 AG26 VSS67 AG27 VSS68 AG28 VSS69 AG29 VSS70 AG30 VSS71 AG31 VSS72 AG32 VSS73 AG33 VSS74 AG34 VSS75 AG35 VSS76 AG36 VSS77 AG37 VSS78 AG38 VSS79 AG39 VSS80 AL3 VSS81 AL4 VSS82 AL5 VSS83 AL6 VSS84 AL7 VSS85 AL8 VSS86 AL9 VSS87 AL10 VSS88 AL11 VSS89 AL12 VSS90 AL13 VSS91 AL14 VSS92 AL15 VSS93 AL16 VSS94 AL17 VSS95 AL18 VSS96 AM1 VSS97 AM2 VSS100 AM23 VSS101 AM25 VSS102 AM26 VSS103 AM27 VSS104 AM28 VSS105 AM29 VSS106 AN3 VSS107 AN8 VSS110 AN10 VSS107 AN46 VSS109										AF44 AF45 VSS54 AF47 VSS55 AF48 VSS56 AF50 VSS57 AF52 VSS58 AF53 VSS59 AF55 VSS60 AG20 VSS61 AG21 VSS62 AG22 VSS63 AG23 VSS64 AG24 VSS65 AG25 VSS66 AG26 VSS67 AG27 VSS68 AG28 VSS69 AG29 VSS70 AG30 VSS71 AG31 VSS72 AG32 VSS73 AG33 VSS74 AG34 VSS75 AG35 VSS76 AG36 VSS77 AG37 VSS78 AG38 VSS79 AG39 VSS80 AL3 VSS81 AL4 VSS82 AL5 VSS83 AL6 VSS84 AL7 VSS85 AL8 VSS86 AL9 VSS87 AL10 VSS88 AL11 VSS89 AL12 VSS90 AL13 VSS91 AL14 VSS92 AL15 VSS93 AL16 VSS94 AL17 VSS95 AL18 VSS96 AM1 VSS97 AM2 VSS100 AM23 VSS101 AM25 VSS102 AM26 VSS103 AM27 VSS104 AM28 VSS105 AM29 VSS106 AN3 VSS107 AN8 VSS110 AN10 VSS107 AN46 VSS109										AN48 VSS111 AN51 VSS112 VSS113 VSS114 AP23 VSS115 AP27 VSS116 AP28 VSS117 AP29 VSS118 AP33 VSS119 AP35 VSS120 AR2 VSS121 AR7 VSS124 AR10 VSS125 AR12 VSS126 AR17 VSS127 AR39 VSS128 AR44 VSS129 AR49 VSS130 AR54 VSS131 AT23 VSS132 AT33 VSS133 AU0 VSS134 AU28 VSS135 AU3 VSS136 AV15 VSS137 AV17 VSS138 AV23 VSS139 AV25 VSS140 AV31 VSS141 AV33 VSS142 AV39 VSS143 AV41 VSS144 AW2 VSS145 AW5 VSS147 AW10 VSS150 AW28 VSS151 AW46 VSS152 AW51 VSS153 AW54 VSS154 AY13 VSS155 AY15 VSS156 AZ1 VSS157 BA27 VSS158 BA29 VSS159 BB1 VSS160 BB28 VSS161 BB65 VSS162 BC5 VSS163 VSS164 VSS178										VSS165 BC11 VSS166 BC19 VSS167 BC21 VSS168 BC23 VSS169 BC25 VSS170 BC31 VSS171 BC33 VSS172 BC35 VSS173 BC37 VSS174 BC39 VSS175 BC41 VSS176 BC45 VSS177 BC51 VSS178 BD1 VSS179 BD15 VSS180 BD19 VSS181 BD21 VSS182 BD23 VSS183 BD35 VSS184 BD37 VSS185 BE3 VSS186 BE33 VSS187 BE35 VSS188 BF9 VSS189 BF19 VSS190 BF37 VSS191 BF47 VSS192 BG1 VSS193 BG6 VSS194 BG28 VSS195 BG50 VSS196 BH11 VSS197 BH13 VSS198 BH17 VSS199 BH23 VSS200 BH29 VSS201 BH35 VSS202 BH39 VSS203 BH45 VSS204 BH47 VSS205 BH51 VSS206 BH53 VSS207 BH55 VSS208 BH57 VSS209 BH59 VSS210 BH61 VSS211 BH65 VSS212 BH67 VSS213 BH69 VSS214 BH75 VSS215 BH77 VSS216 BH79 VSS217 BH81 VSS218 BH83 VSS219 BH85 VSS220										AL23 VSS1 BK1 VSS2 BK17 VSS3 BK21 VSS4 BK23 VSS5 BK39 VSS6 BK51 VSS7 BL5 VSS8 BL8 VSS17 BL10 VSS18 BL14 VSS19 BL28 VSS20 BL32 VSS21 VSS23 BL46 VSS24 BL48 VSS25 BL51 VSS26 C1 VSS27 C12 VSS28 C16 VSS29 VSS22 C29 VSS30 C36 VSS31 D5 VSS32 D6 VSS33 D9 VSS34 D21 VSS35 D28 VSS36 D41 VSS37 D45 VSS38 D55 VSS39 E28 VSS40 E30 VSS41 E33 VSS42 F1 VSS43 F4 VSS44 F21 VSS45 F31 VSS46 G28 VSS47 H13 VSS48 H15 VSS49 H21 VSS50 H23 VSS51 H33 VSS52 H39 VSS53 J6 VSS54 J27 VSS55 J33 VSS56 J41 VSS57 J45 VSS58 VSS59										VSS51 J51 VSS53 K1 VSS55 K3 VSS56 K5 VSS57 K7 VSS58 L8 VSS59 L19 VSS60 L33 VSS61 M15 VSS62 M25 VSS63 M28 VSS64 M35 VSS65 M41 VSS66 N12 VSS67 N28 VSS68 N51 VSS69 N66 VSS70 P21 VSS71 P55 VSS72 R8 VSS73 R28 VSS74 T27 VSS75 T38 VSS77 U13 VSS78 V27 VSS79 V38 VSS80 V55 VSS81 W5 VSS82 W2 VSS83 W3 VSS84 W5 VSS85 W7 VSS86 W8 VSS89 W10 VSS90 W39 VSS91 W41 VSS92 W43 VSS93 W46 VSS94 W48 VSS95 W49 VSS96 W51 VSS97 Y21 VSS98 Y23 VSS99 Y26 VSS100 Y27 VSS101 Y31 VSS102 Y3 VSS103 Y3 VSS104 Y3 VSS105 Y3 VSS106 Y3 VSS107 Y3 VSS108 Y3 VSS109 Y3									
11 OF 13										12 OF 13										13 OF 13																																																	
A										B										C										D																																							
5										4										3										2										1																													
HUAQIN 华勤通信										HUAQIN 华勤通信										HUAQIN 华勤通信										HUAQIN 华勤通信																																							
HONBD										HONBD										HONBD										HONBD																																							
ID										ID										ID										ID																																							
Date										Date										Date										Date																																							
TITLE										TITLE										TITLE										TITLE																																							
<OrigAddr>										<OrigAddr>										<OrigAddr>										<OrigAddr>																																							
<Doc>										<Doc>										<Doc>										<Doc>																																							
PAGE DETAIL										PAGE DETAIL										PAGE DETAIL										PAGE DETAIL																																							
Thursday, March 28, 2019										Thursday, March 28, 2019										Thursday, March 28, 2019										Thursday, March 28, 2019																																							
Rev										Rev										Rev										Rev																																							
v1.0										v1.0										v1.0										v1.0																																							
Sheet										Sheet										Sheet										Sheet																																							
13 of 51										13 of 51										13 of 51										13 of 51																																							



TITLE <OrgAddr>
PAGE DETAIL <Doc>

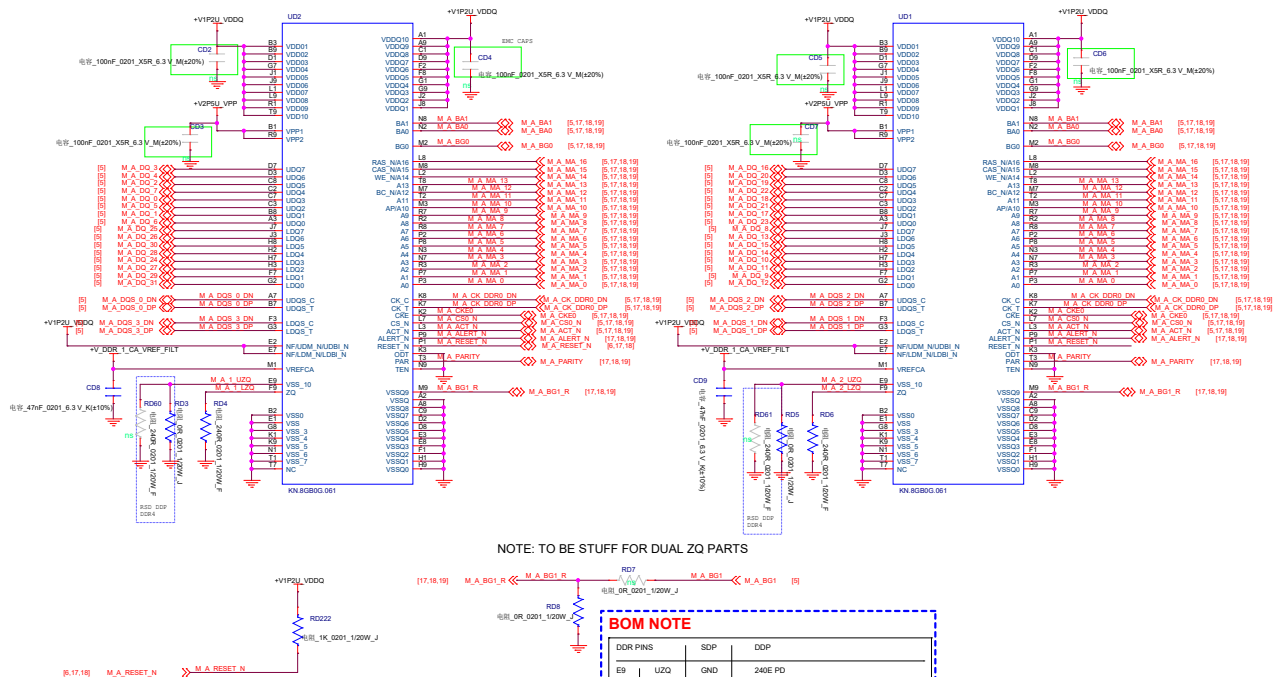


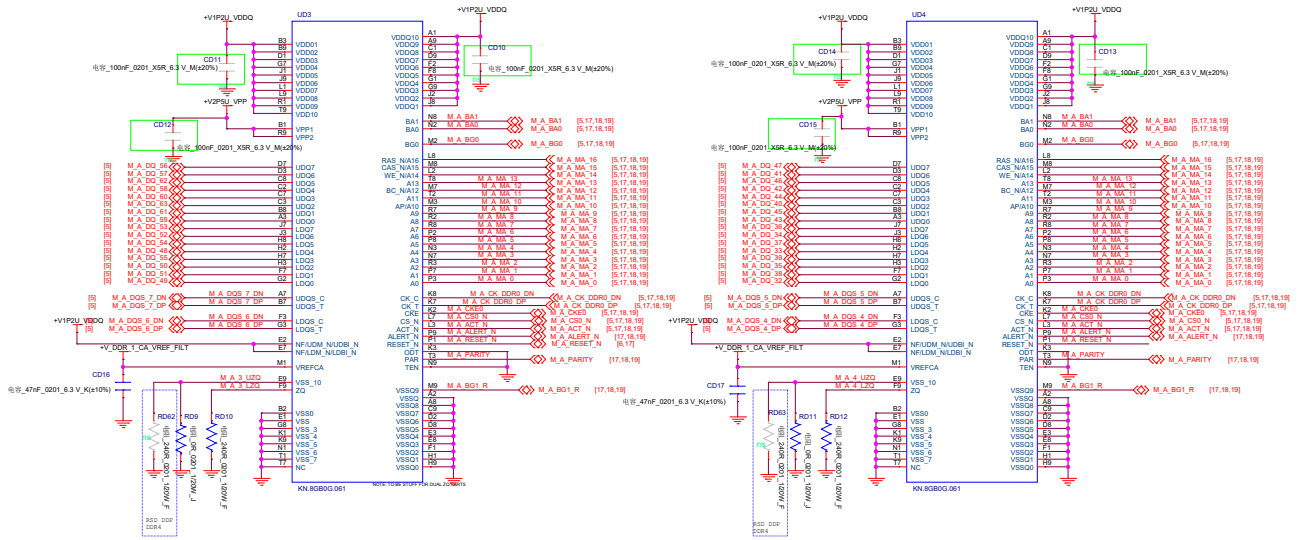
Huaqin Telecom Technology Com., Ltd.

HCNBD
ID
Date

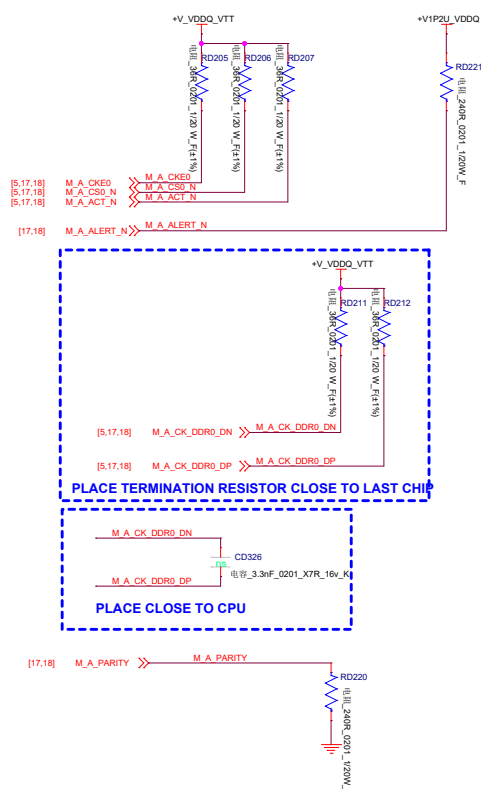
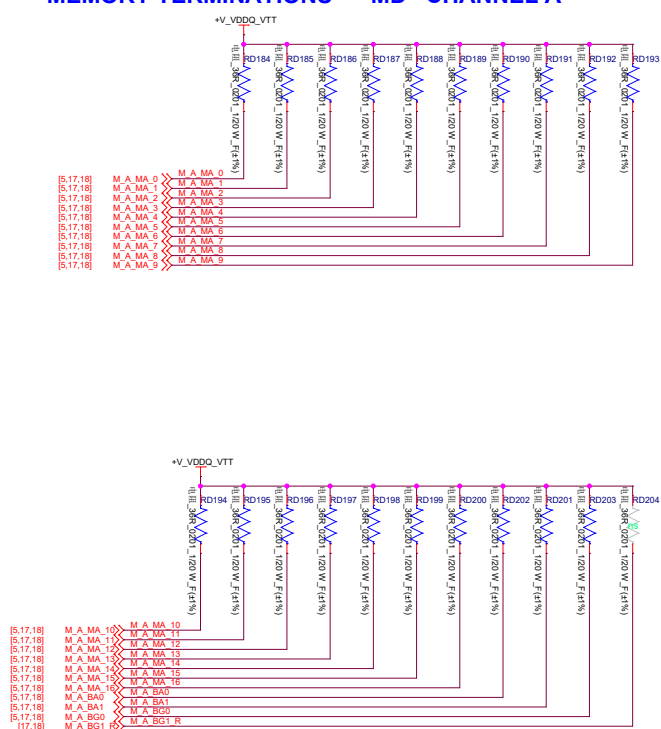
NB8809
<OrgAddr3>
Thursday, March 28, 2019

Rev v1.0
Size B
Sheet 14 of 51





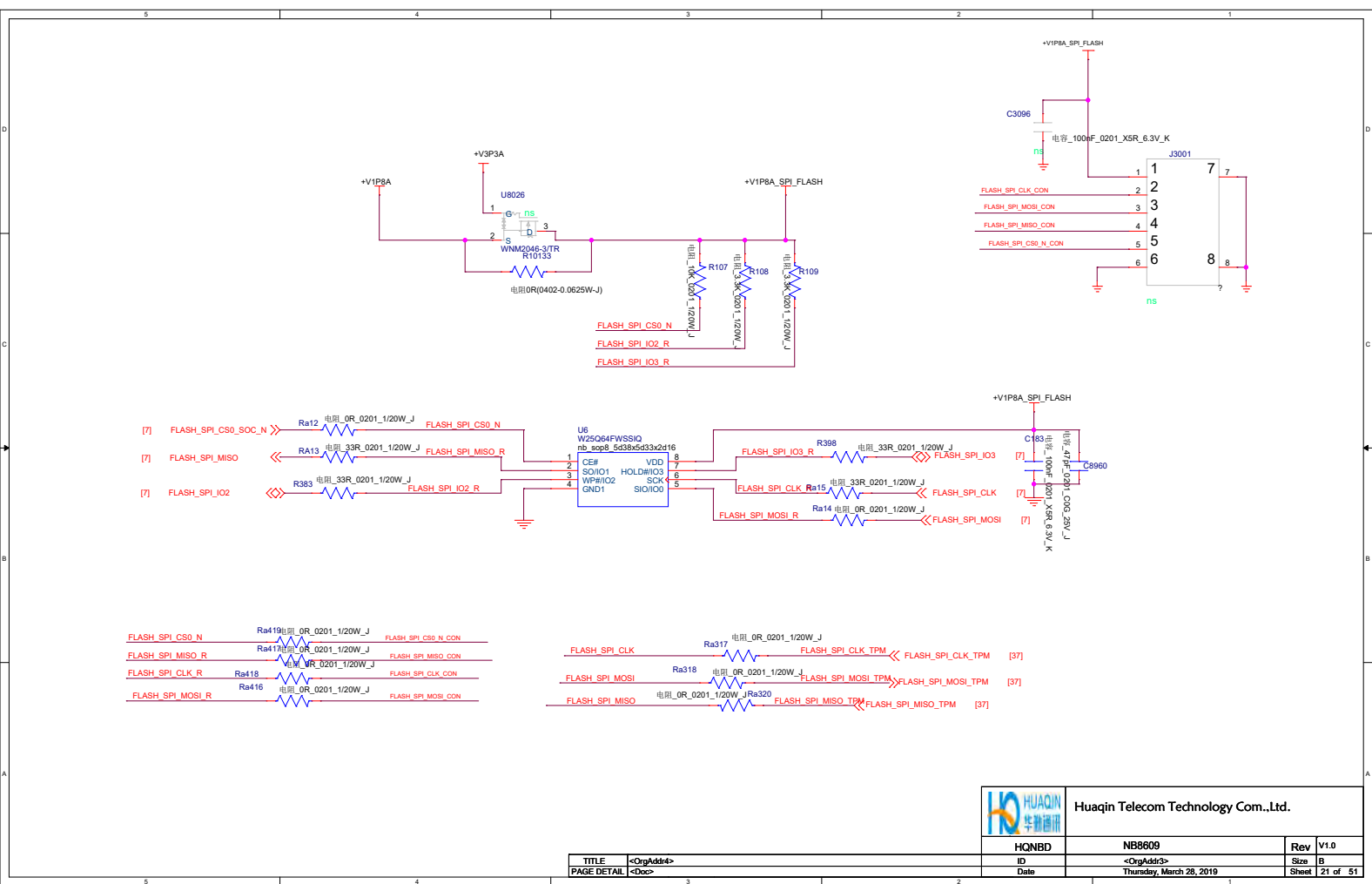
MEMORY TERMINATIONS MD CHANNEL A

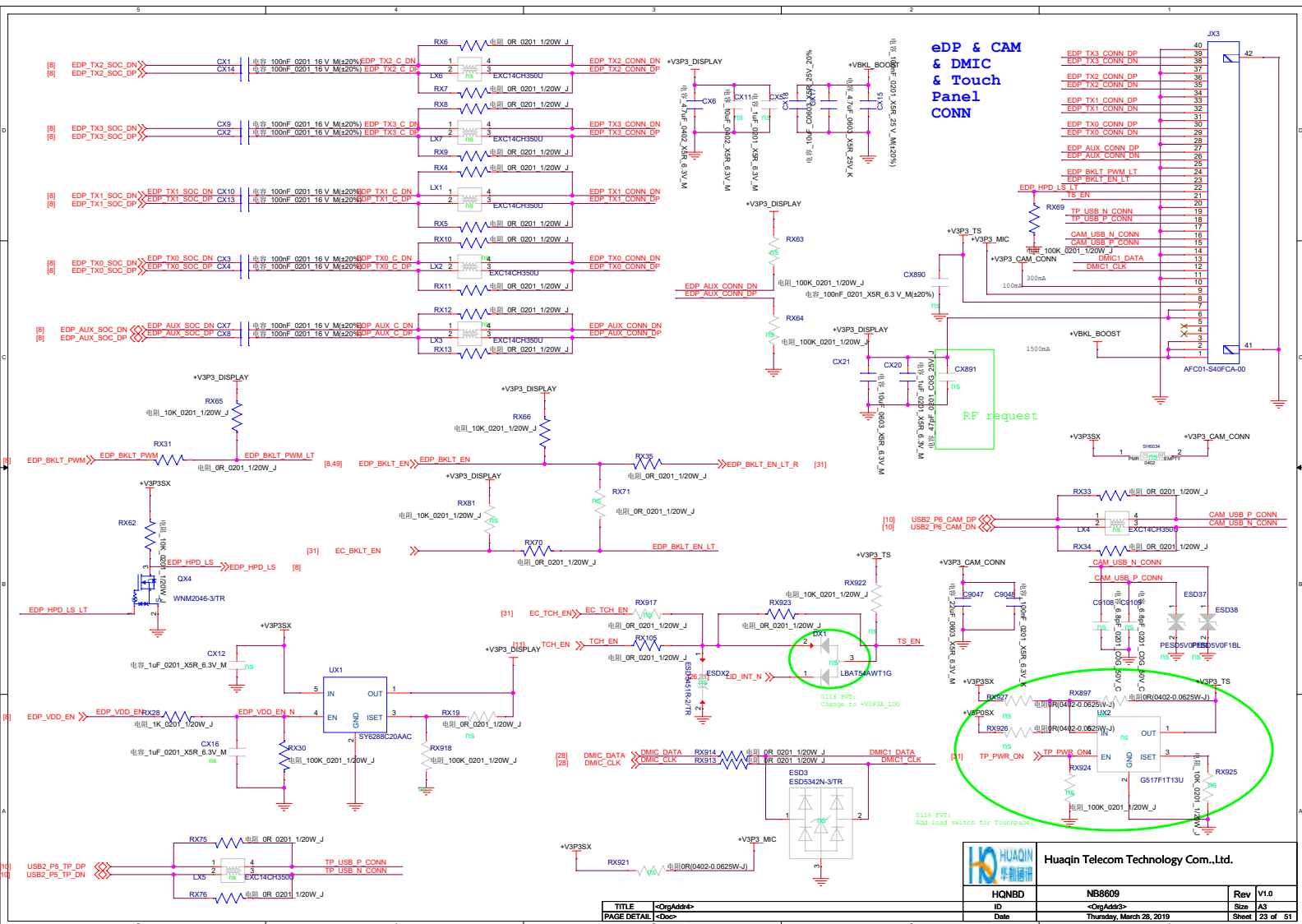


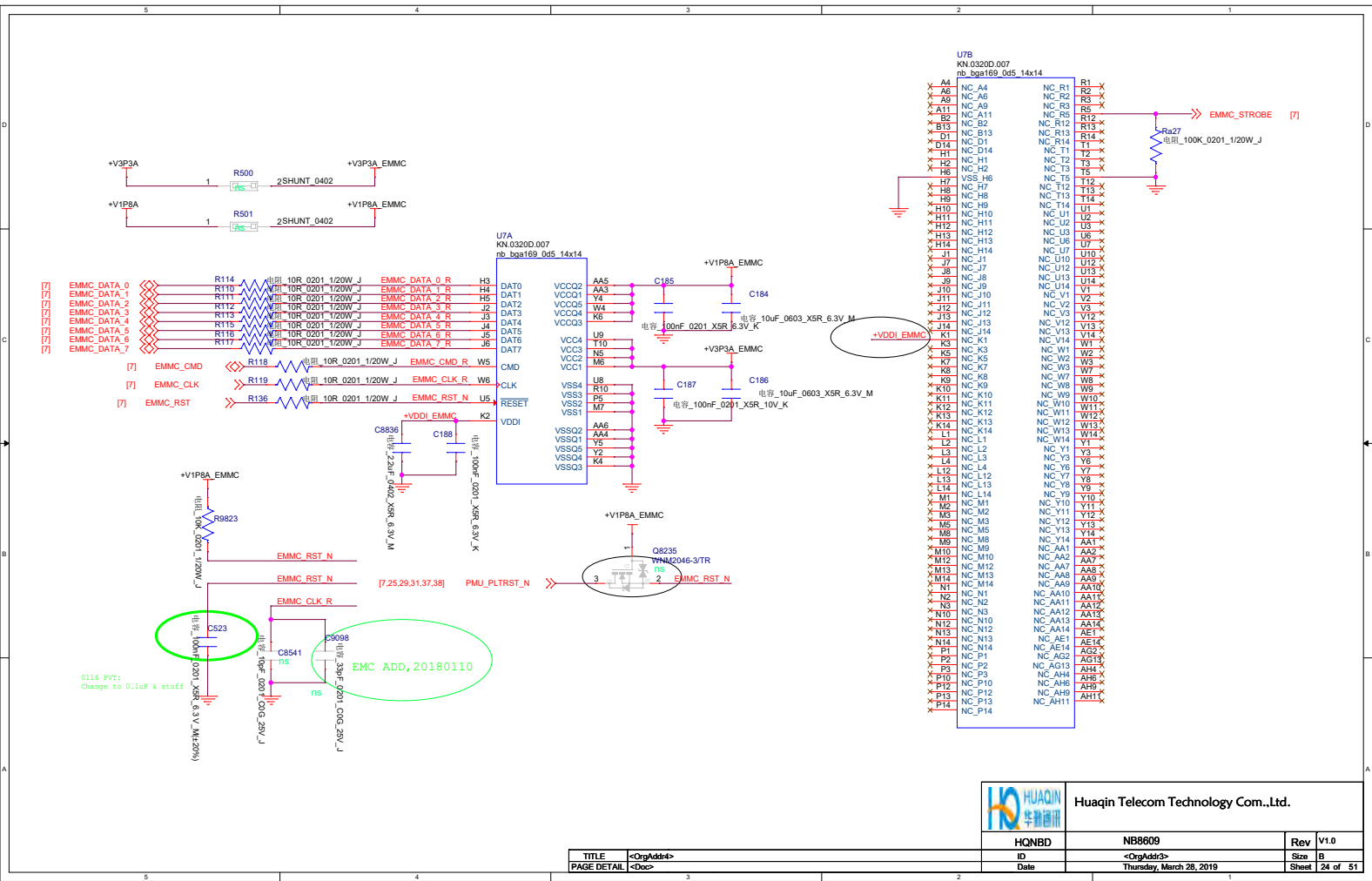
Huaqin Telecom Technology Com.,Ltd.

		HQNB	NB8609	Rev	V1.0
TITLE	<OrgAddr4>	ID	<OrgAddr3>	Size	A3
PAGE DETAIL	<Doc>	Date	Thursday, March 28, 2019	Sheet	19 of 51

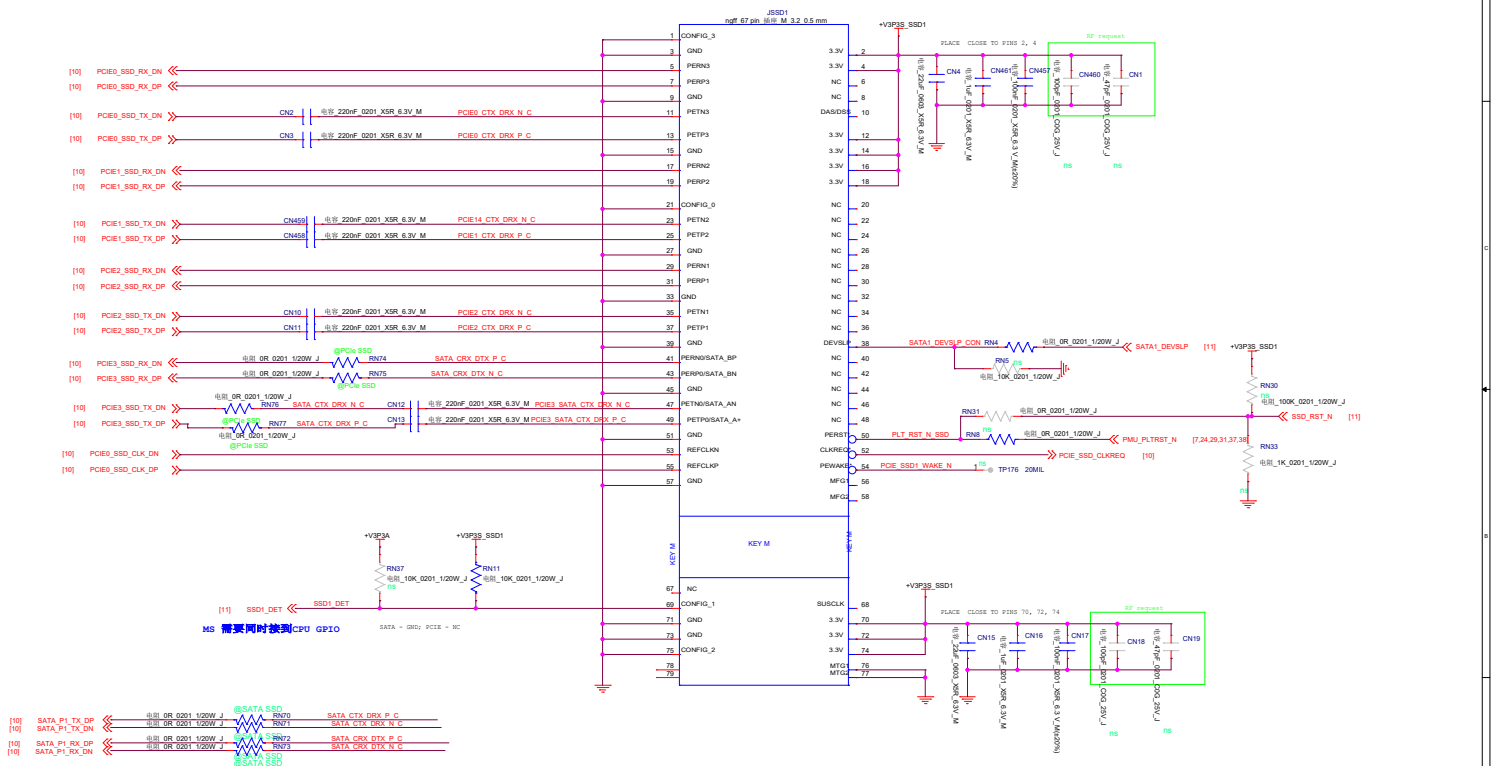
The schematic diagram illustrates the M_VREF_DIMMB signal path. A +V1P2V_VDDQ supply is connected to a resistor network. A central node is connected to M_VREF_DIMMB and M_VREF_DIMMB_SOC. The path includes resistors R0S4, R0S5, R0S6, R0S7, and R0D5, along with capacitors C0D9 and C0D10. The signal is terminated at both ends with 24 Ohm resistors.





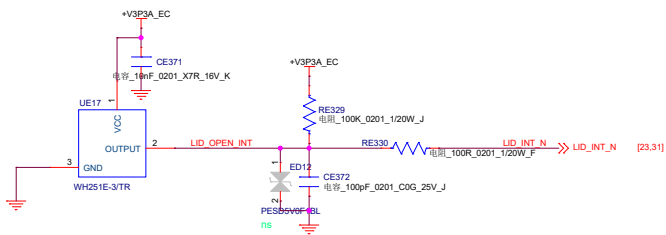
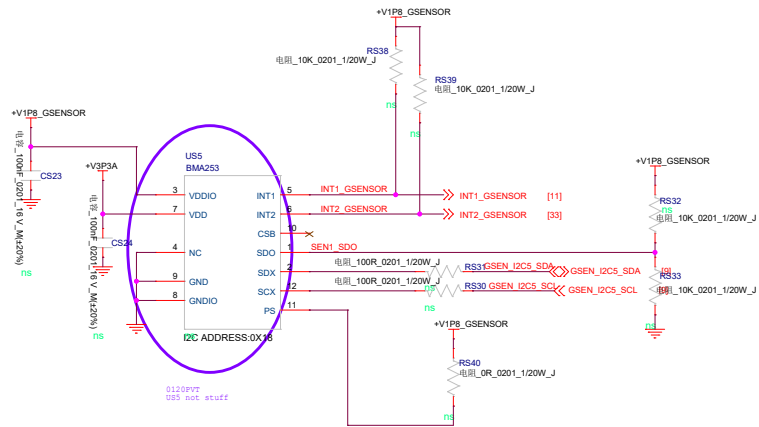
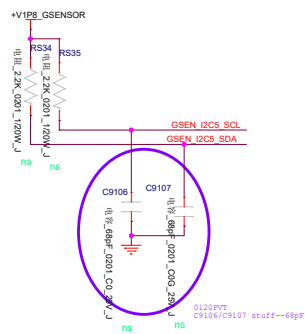
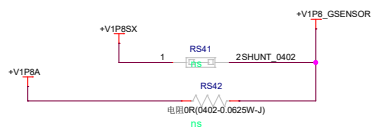


SSD



Huaqin Telecom Technology Com., Ltd.	
HQNB01	NB8600
ID	<Design>
Date	Thursday, March 28, 2019
Rev	V1.0
Sheet	51

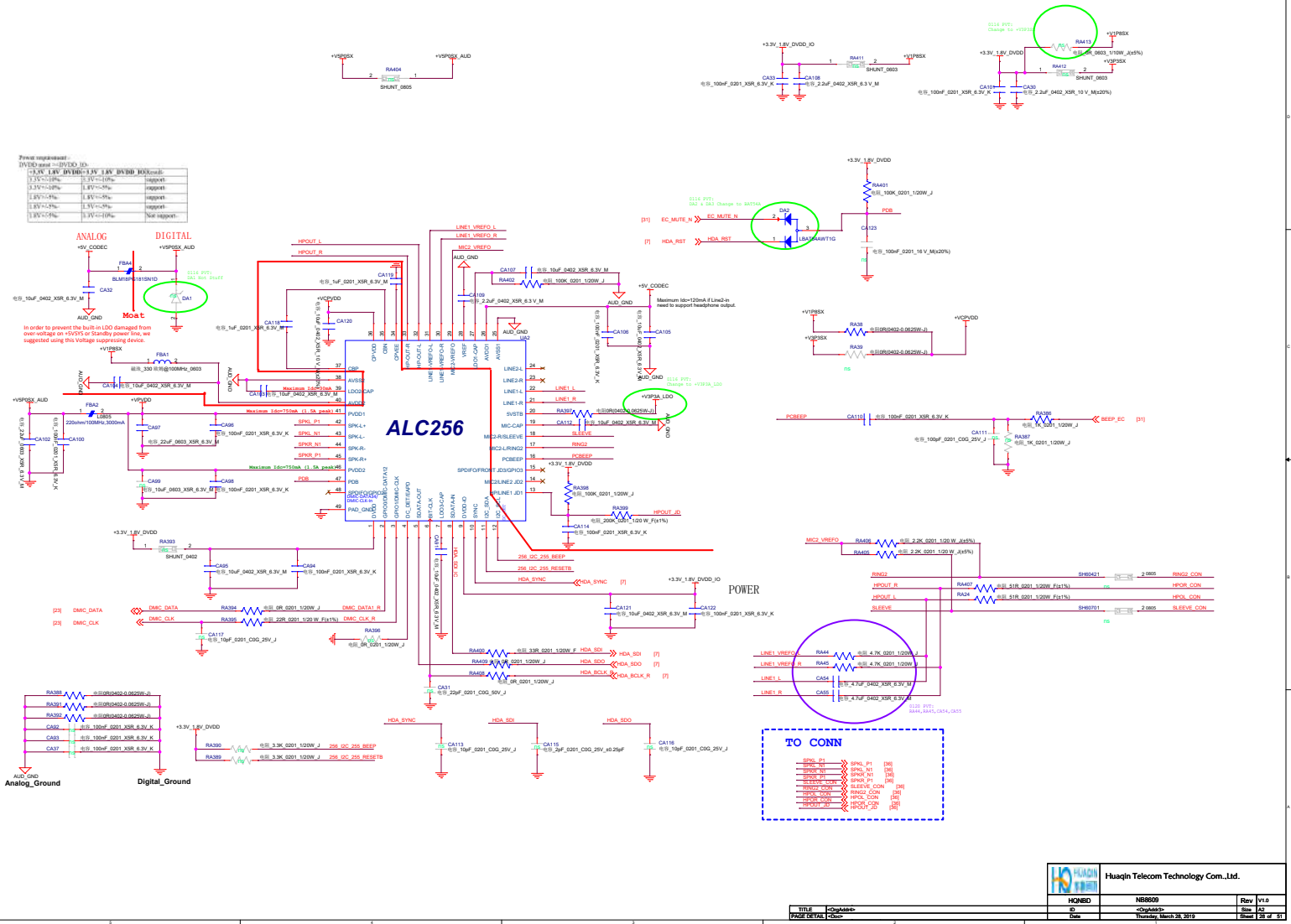
TITLE	<Design>
PAGE	DETAIL



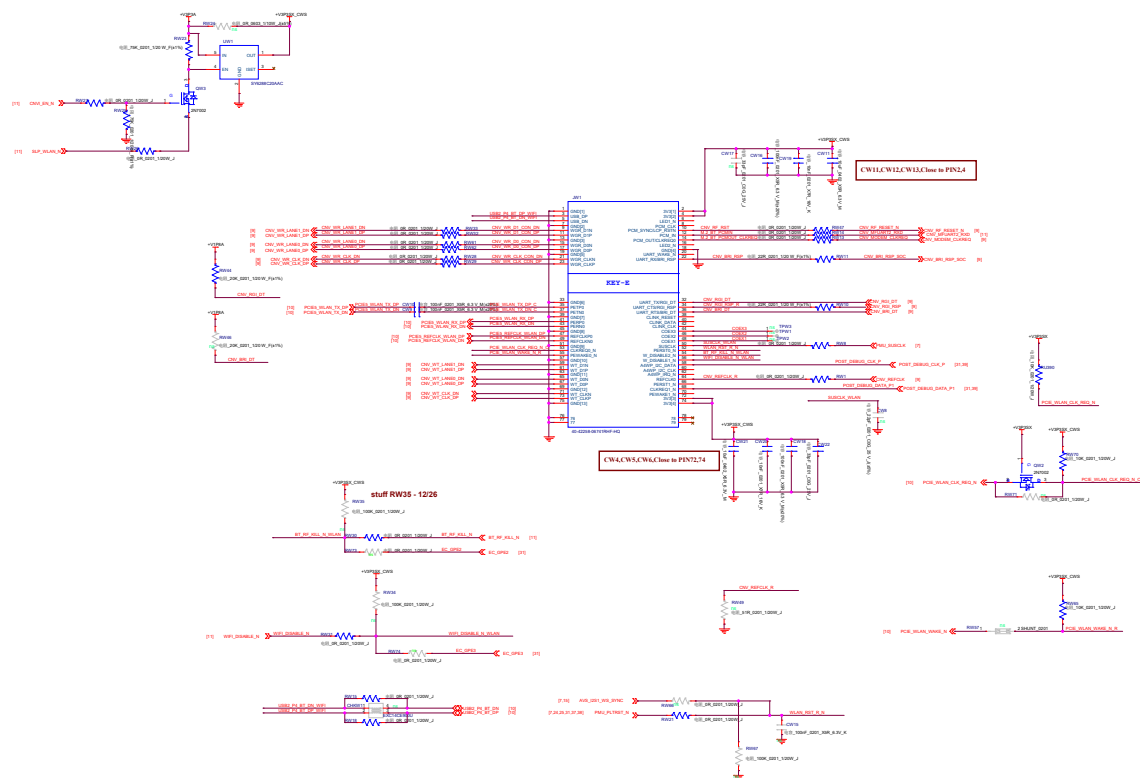
HUAQIN 华勤通信		Huaqin Telecom Technology Com.,Ltd.	
HQNBD	NB8609	Rev	V1.0
ID	<OrigAddr>	Size	A3
Date	Thursday, March 28, 2019	Sheet	26 of 51

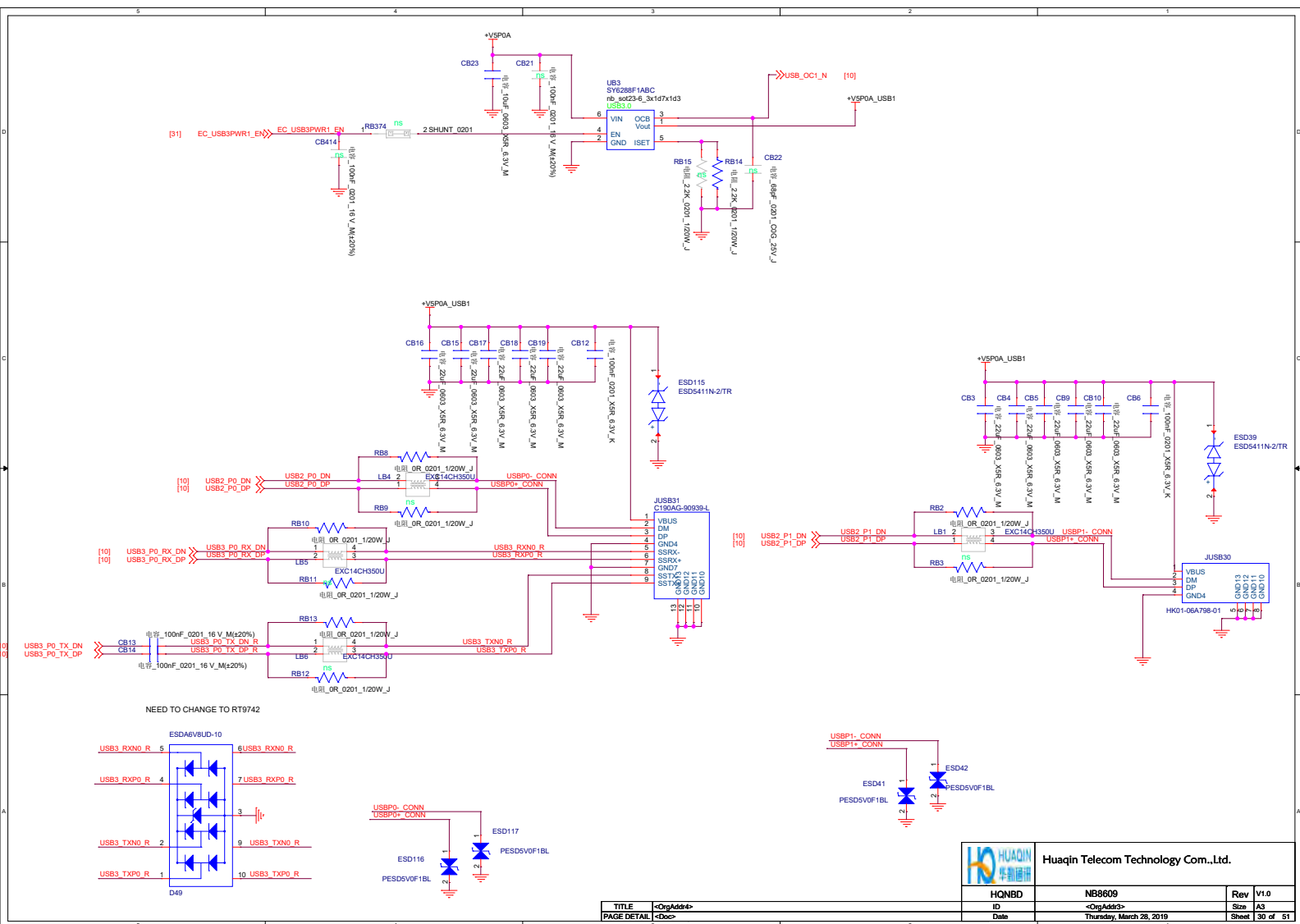
TITLE <OrigAddr>
PAGE DETAIL <Doc>

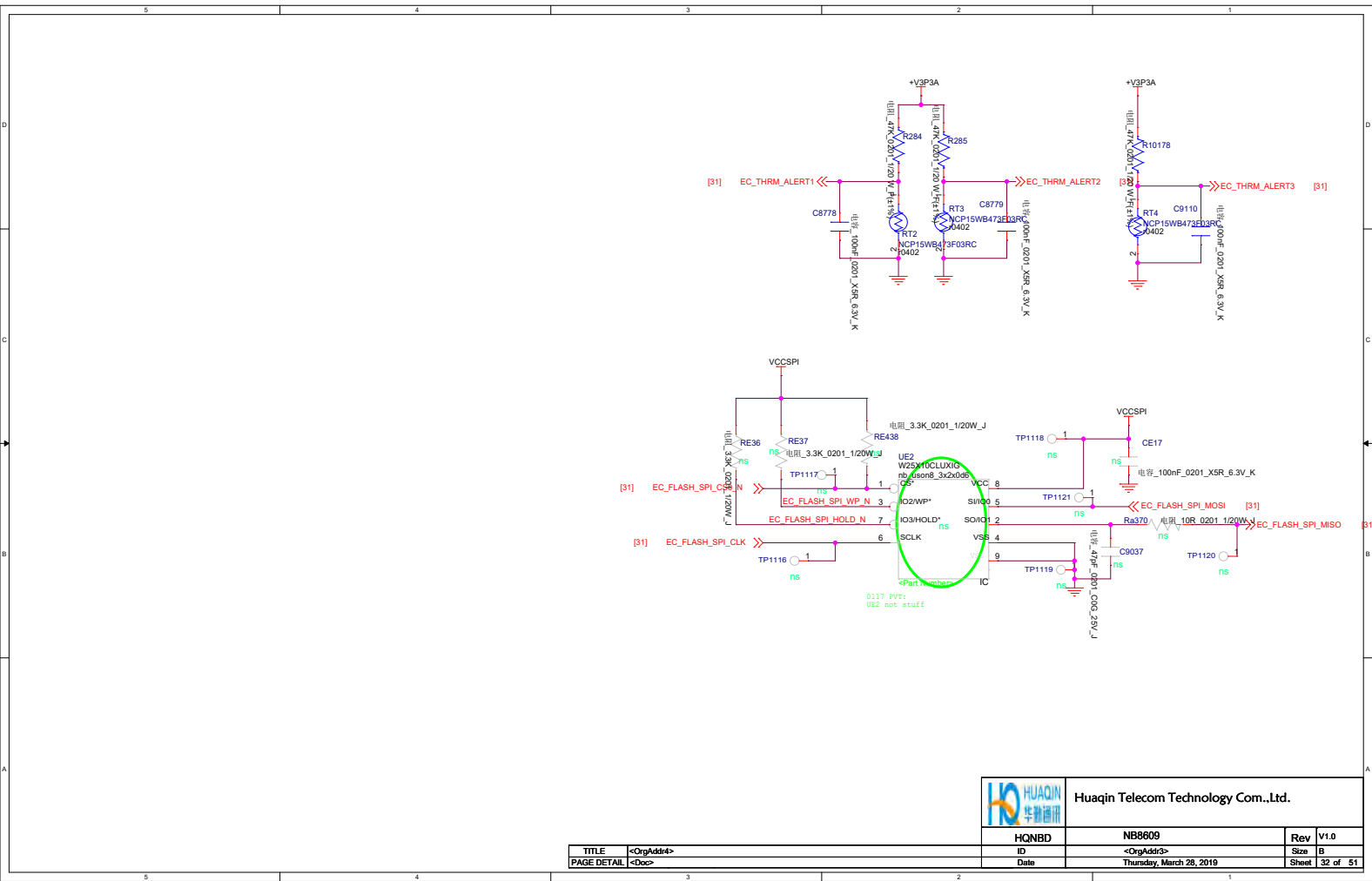
Power requirement:			
VDDIO and VDDIO ID:			
+3.3V LAY BYRD-1.3V LAY BYRD ID:0x00:			
1.3V<50%	1.3V<50%	Support	
1.3V<48%	1.3V<48%	Support	
1.3V<46%	1.3V<46%	Support	
1.3V<44%	1.3V<44%	Support	
1.3V<42%	1.3V<42%	Not support	



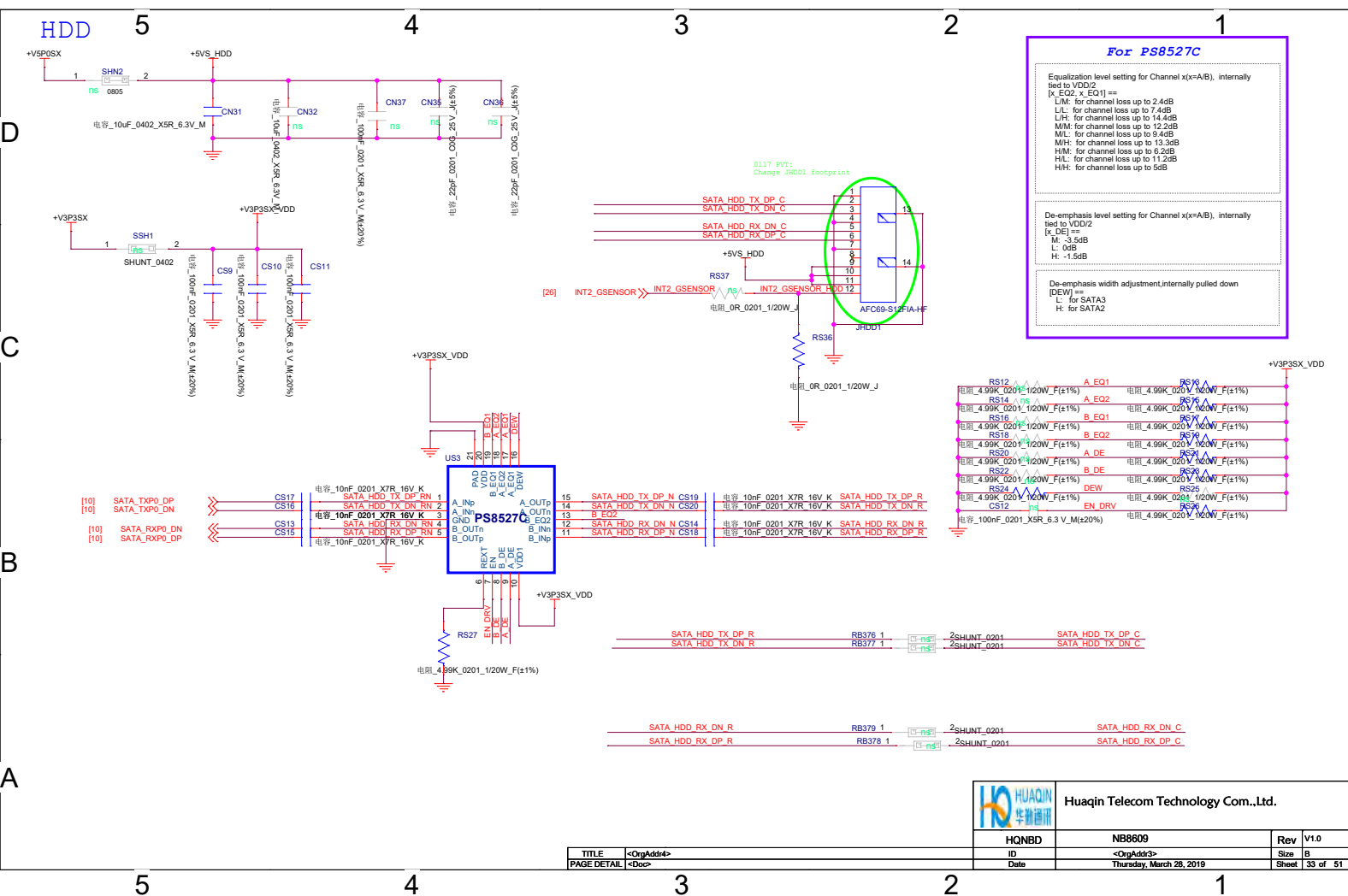
Huaqin Telecom Technology Com., Ltd.			
HCN800	NB8000	Rev	V1.0
01	01	Rev	01
01	01	Rev	01







 HUAQIN 华勤通信		Huaqin Telecom Technology Com.,Ltd.	
TITLE	<OrgAdd4>	HQMBD	NB88609
PAGE DETAIL	<Doc>	ID	<OrgAdd3>
		Date	Thursday, March 28, 2019
		Rev	V1.0
		Size	B
		Sheet	32 of 51



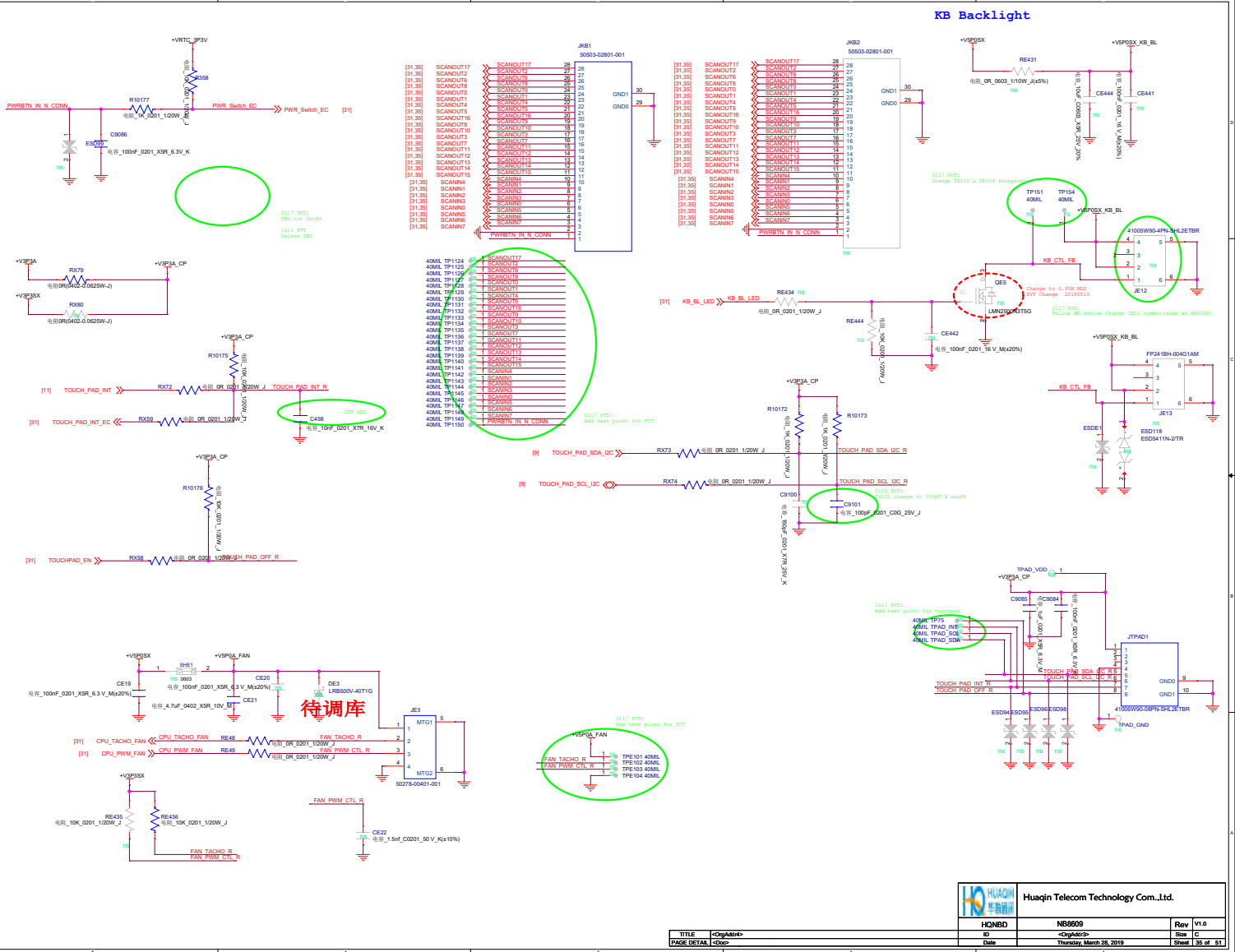
D

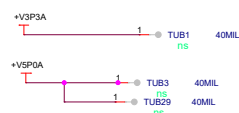
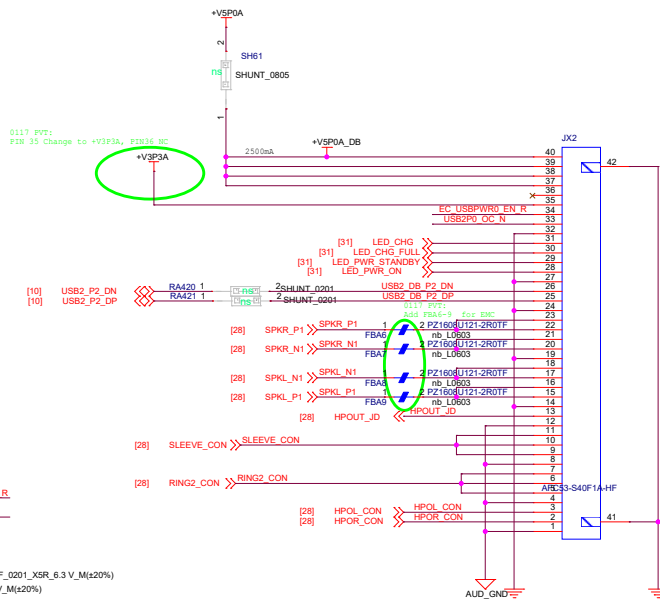
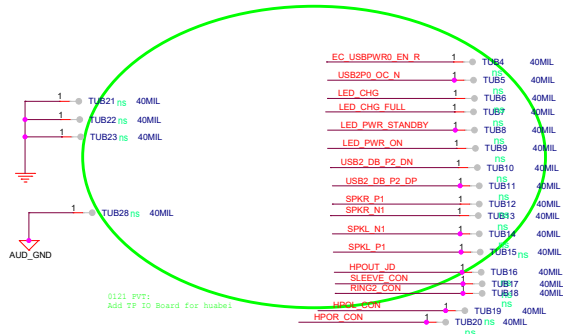
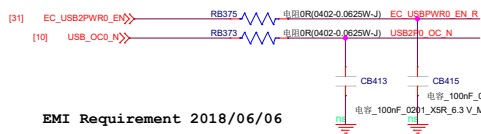
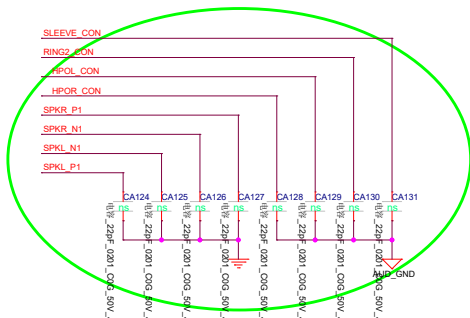


9



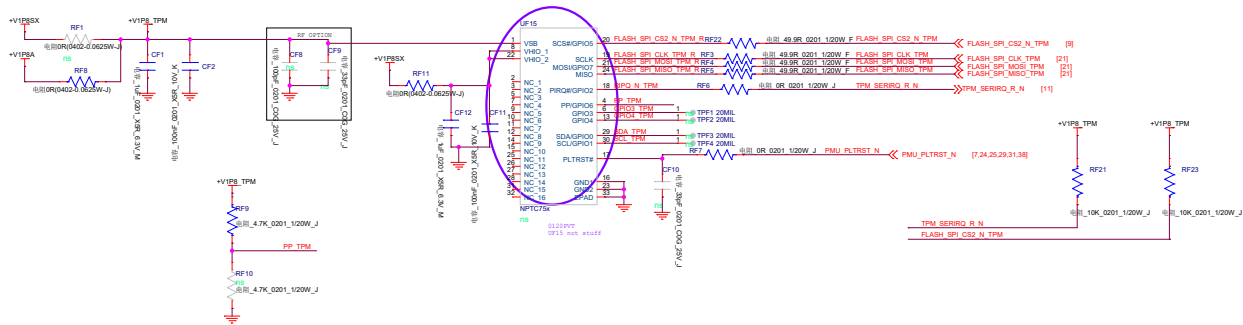
11





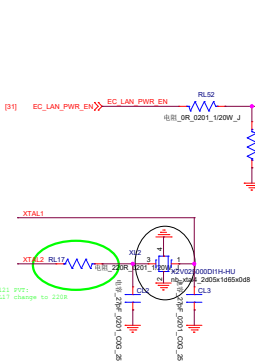
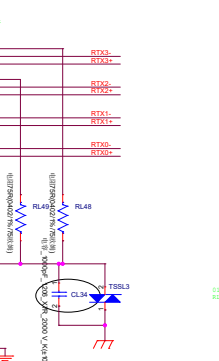
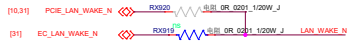
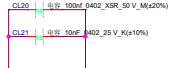
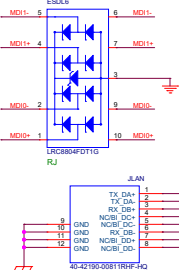
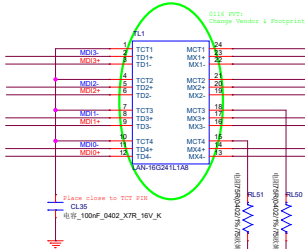
		Huaqin Telecom Technology Com.,Ltd.	
HQNB0	NB8609	Rev	V1.0
ID	<OrigAdd3>	Size	A3
Date	Thursday, March 28, 2019	Sheet	36 of 51

TITLE	<OrigAdd4>
PAGE DETAIL	<Doc>

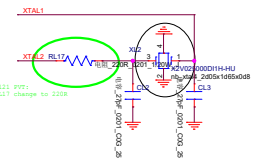
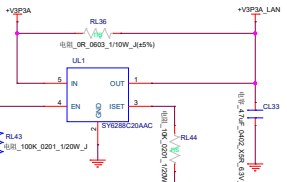


 Huaqin Telecom Technology Co., Ltd.	
HQNB0 02	NB9000 <Original>
Date Thursday, March 28, 2019	Rev v1.0 Size 1 C Sheet 37 of 51

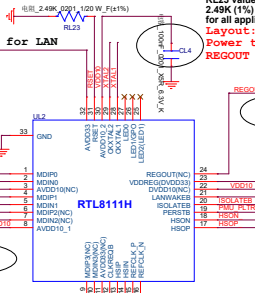
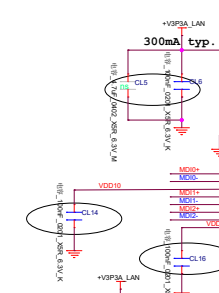
TITLE	<Original>
PAGE DETAIL	<Original>



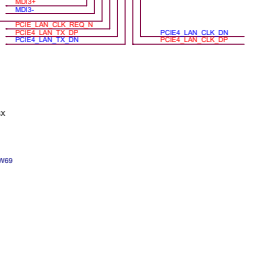
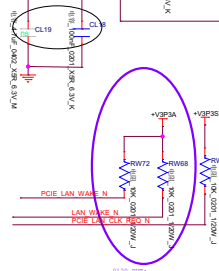
Support S5 LAN WAKE



Layout: Ctl close to pin2



Layout: Power trace VDDREG > 40 mil, REGOUT trace > 60 mil

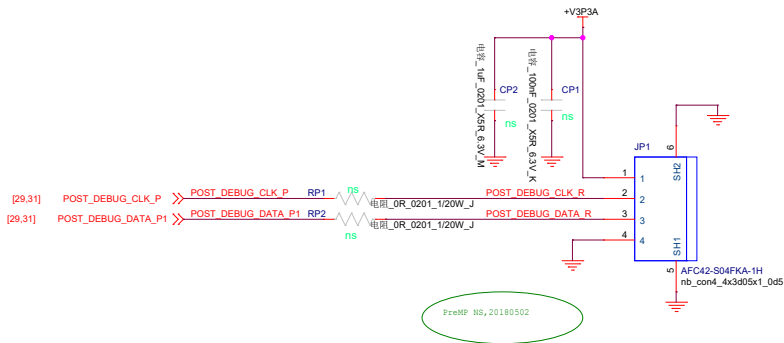


Layout Guide for PMB (all within 200mil):

1. pin24--CL10 (0.1uF)
2. For VDD33 (pin11, pin32, pin23)
3. pin11--CL10 (0.1uF) and CL10 (VDD33, 4.7uF)
4. pin32--CL10 (0.1uF) and CL10 (VDD33, 4.7uF)
5. pin23--CL10 (0.1uF) and CL10 (VDD33, 4.7uF)
6. For VDD10 (pin3, pin8, pin22, pin30)
7. pin3--CL14 (0.1uF)
8. pin8--CL14 (0.1uF)
9. pin22--CL12 (0.1uF) and CL11 (VDD10, 1uF)
10. pin30--CL14 (0.1uF)

HONBD		Rev	V1.0
NB8600		Rev	C
Date		Thursday, March 28, 2019	
Sheet		5 of 51	

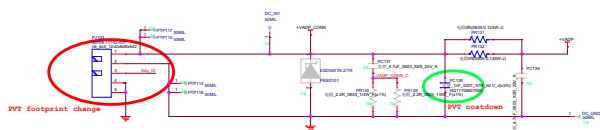
TITLE	<OphAde>
PAGE DETAIL	Doc



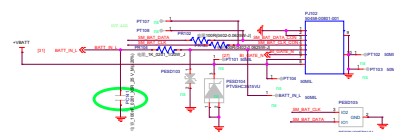
 HUAQIN 华勤通信		Huaqin Telecom Technology Com.,Ltd.	
HQNBD	NB8809	Rev	V1.0
ID	<OrgAddr3>	Size	B
Date	Thursday, March 28, 2019	Sheet	39 of 51

TITLE	<OrgAddr4>
PAGE DETAIL	<Doc>

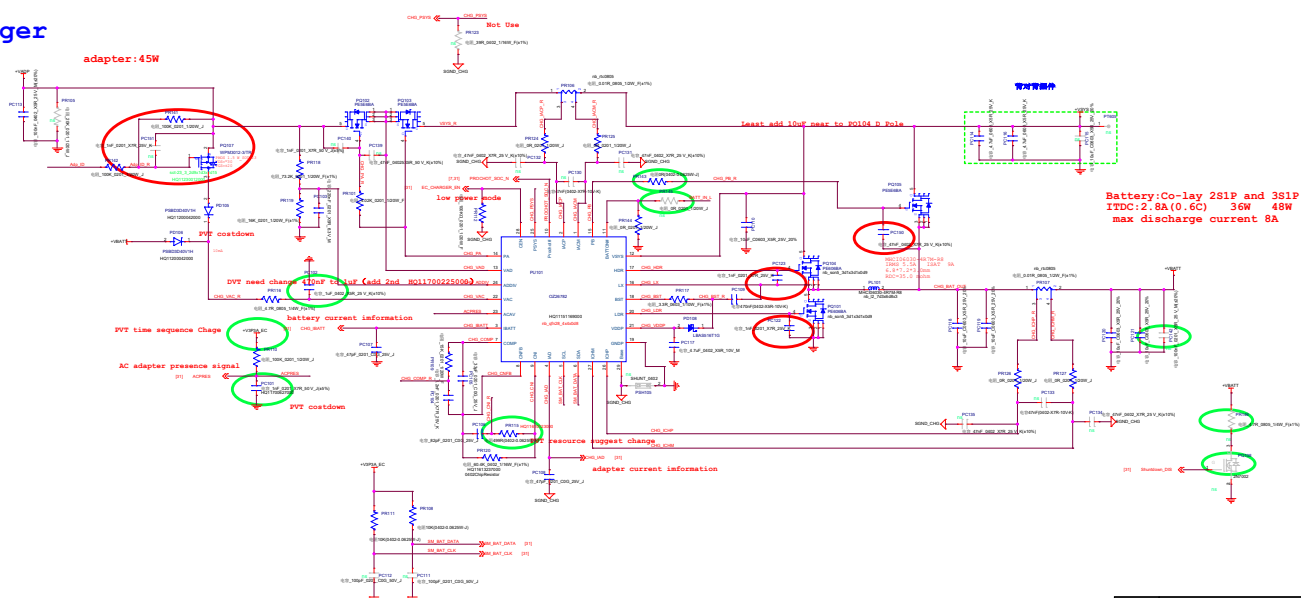
DC IN

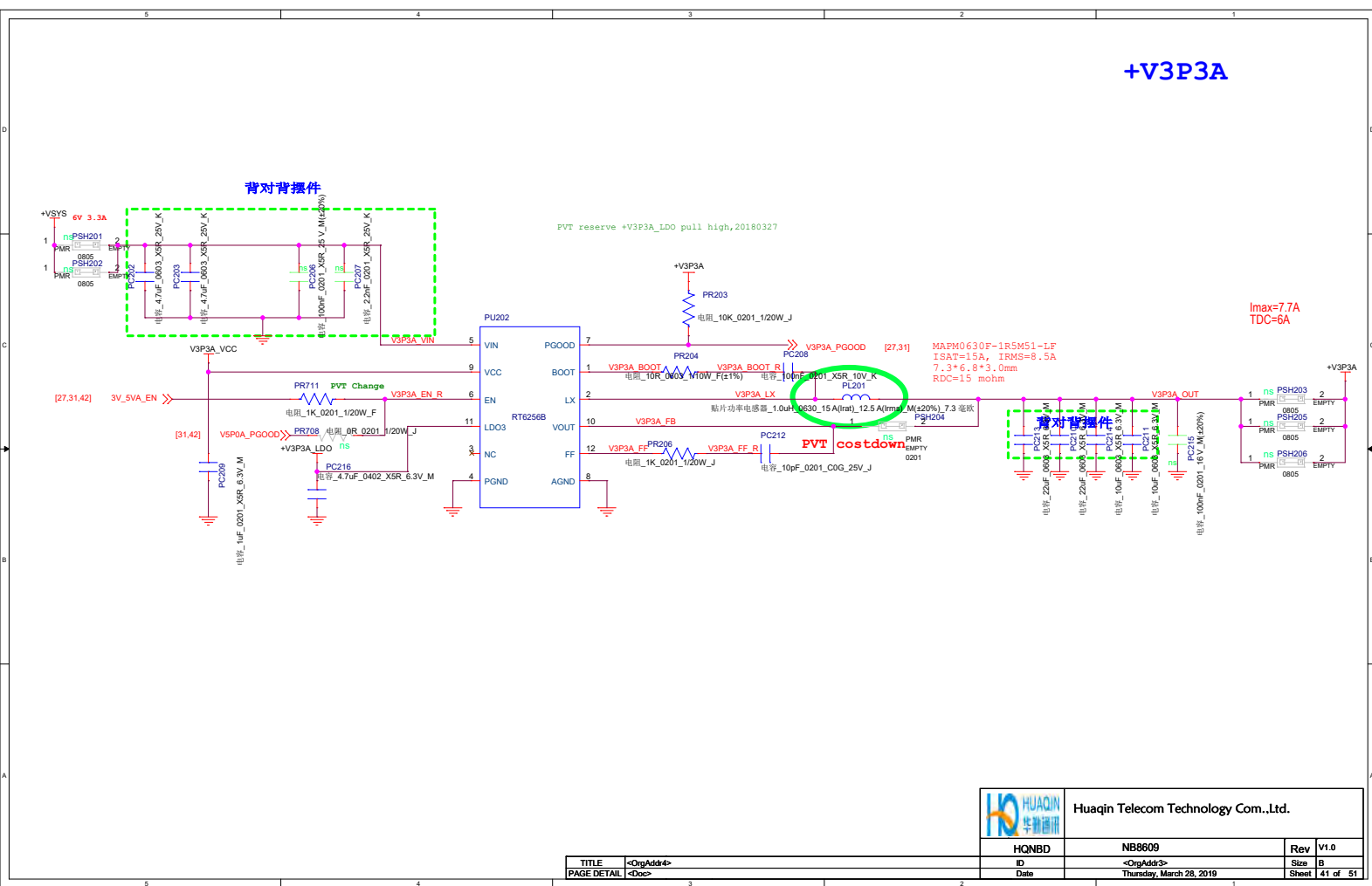


Battery CONN



Charger





VCGI

+VCGI
Imax = 25A
Vboot = 0V

can reduce 3 pos cap not add costdown plan

PRT601 Close to choke

HUAQIN 华勤通信		Huaqin Telecom Technology Com.,Ltd.	
HONBD	NE8609	Rev	V1.0
ID	<SigA493>	Site	Custom
DATE	Thursday, March 26, 2015	Sheet	1 of 1

TITLE	PCBAsses
DATE	2015-03-26
DESIGNER	Wang
CHECKER	Wang
DATE	2015-03-26

VDDQ

IMAX: 8.9A



Huaqin Telecom Technology Com.,Ltd.

TITLE <OrgAddit>
PAGE DETAIL <Doc>

HQNBND
ID
Date

NB8809
<OrgAddit3>
Thursday, March 28, 2019

Rev v1.0
Size B
Sheet 45 of 51

V3P3SX V5P0SX V1P8SX

ITDC:1000mA

ID=6A, RDS (ON) =17mΩ

IMAX:3.72A

PVT costdown

IMAX:2.75A

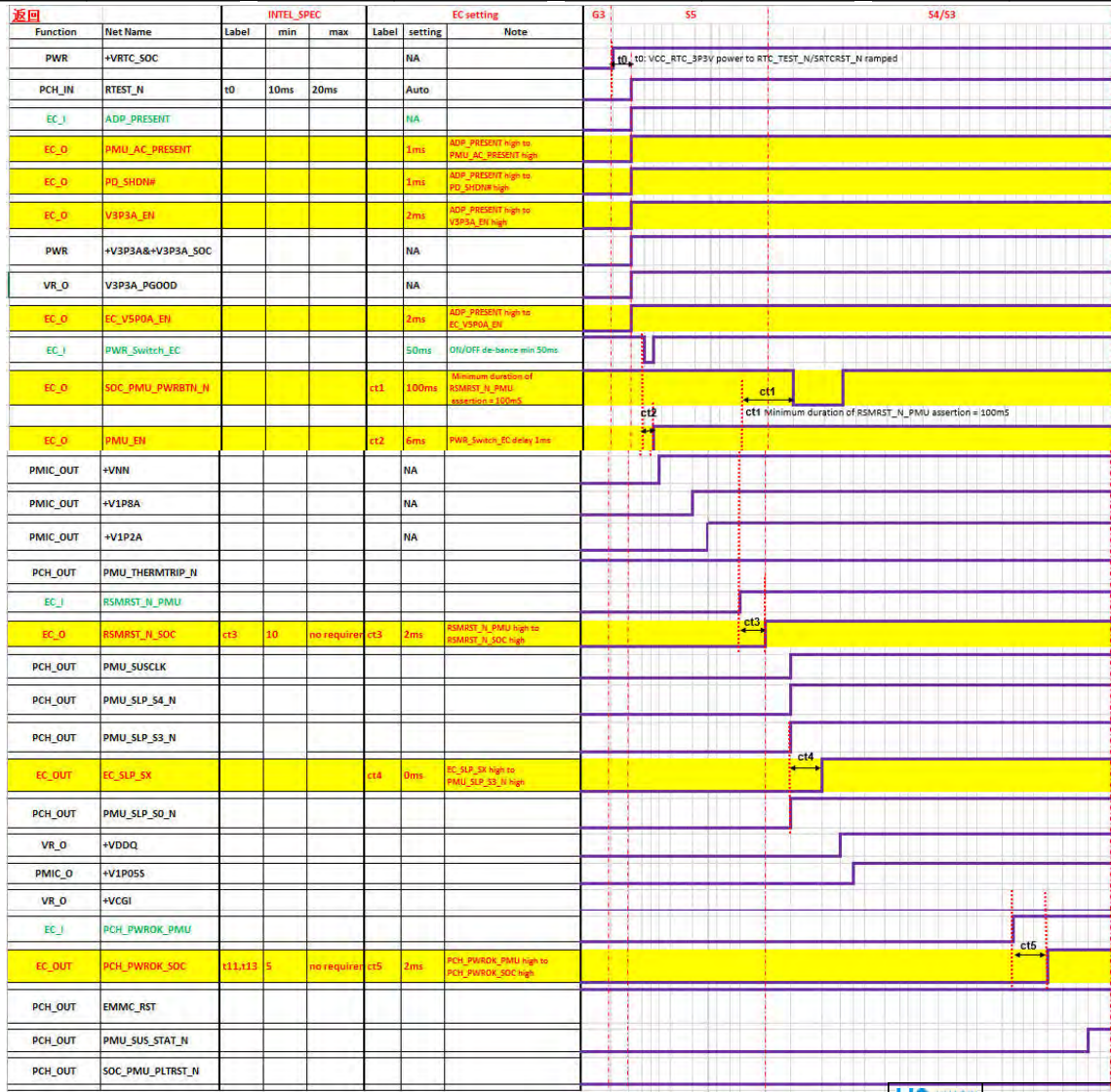
PVT costdown

PVT costdown

 HUAQIN 华勤通信		Huaqin Telecom Technology Com.,Ltd.	
HQNBD		NB8609	Rev V1.0
ID		<OrgAddr3>	Size B
Date		Thursday, March 28, 2019	Sheet 46 of 51

TITLE <OrgAddr4>			
PAGE DETAIL <Doc>			

5



1



Huaqin Telecom Technology Com.,Ltd.

TITLE <OrgAddId>
PAGE DETAIL <Doc>

HQNBD

NB8609

Rev V1.0

ID

<OrgAddId>

Size Custom

Date

Thursday, March 28, 2019

Sheet 47 of 51

5

4

3

2

1

D

C

B

A

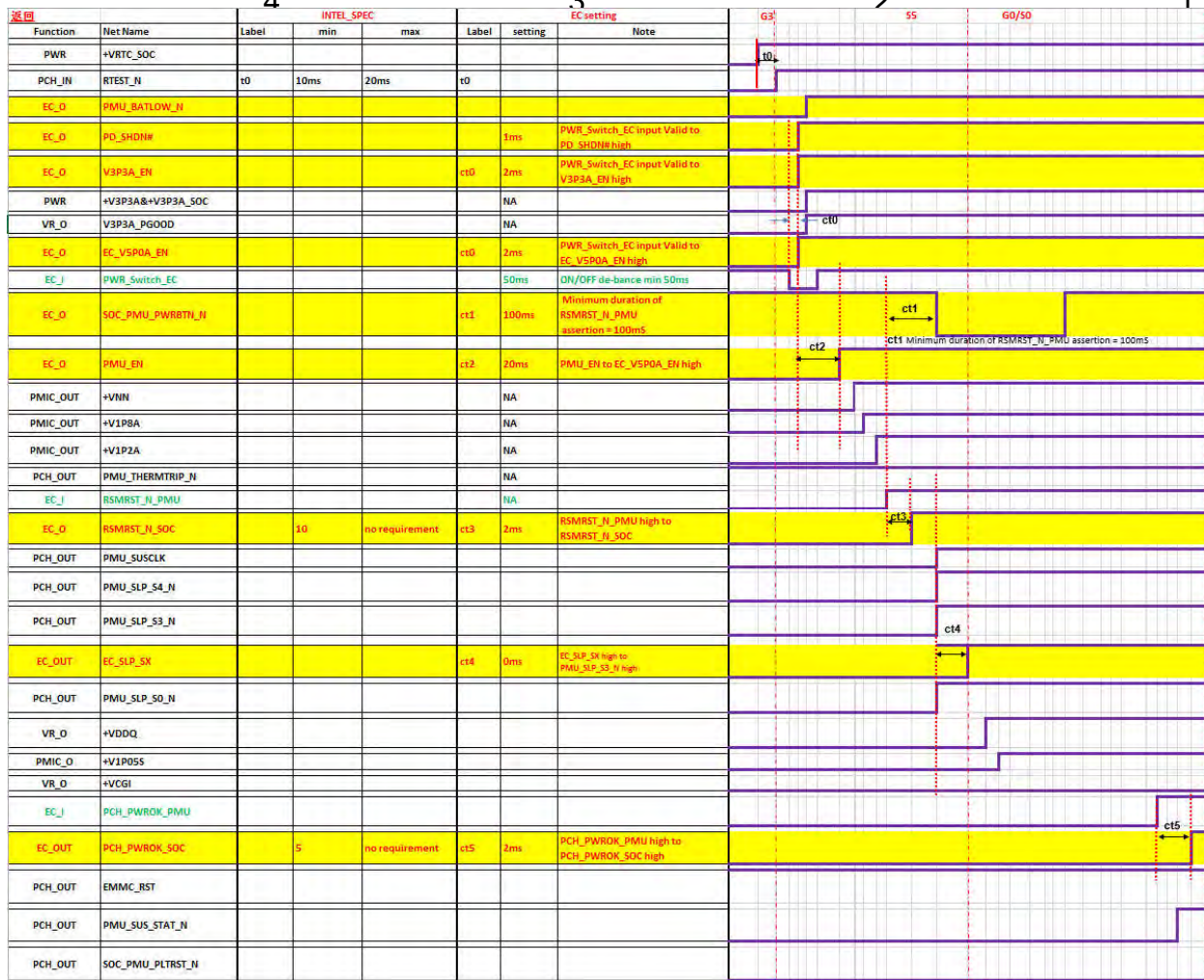
5

4

3

2

1



Huaqin Telecom Technology Com.,Ltd.

TITLE <OrgAdd3>
PAGE DETAIL <Doc>

HQNB	NB8609	Rev	V1.0
ID	<OrgAdd3>	Size	Custom
Date	Thursday, March 28, 2019	Sheet	48 of 51

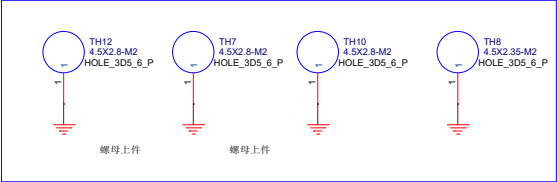
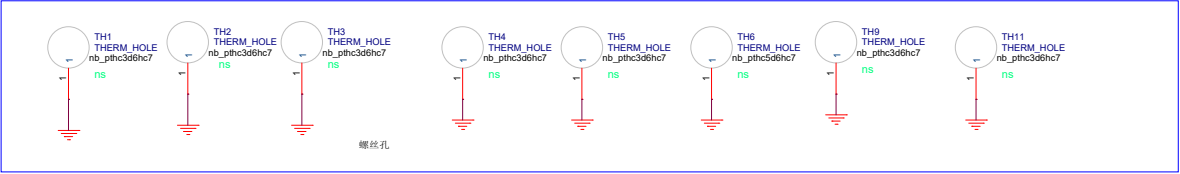
5

4

3

2

1



		Huaqin Telecom Technology Com.,Ltd.	
HQNB	NB8609	Rev	V1.0
ID	<OrgAddr3>	Size	B
Date	Thursday, March 28, 2019	Sheet	50 of 51

TITLE	<OrgAddr4>
PAGE DETAIL	<Doc>

1.Add Battery SMBUS test point,PT603,PT604.----20180131
2.JHD01 PIN4&PIN5 NC.----20180131
3.Memory ID table order from ID0,ID1,ID2 to ID2,ID1,ID0--20180202



Huaqin Telecom Technology Com.,Ltd.

TITLE	<OrgAddr4>	HQNBD	NB8809	Rev	V1.0
PAGE DETAIL	<Doc>	ID	<OrgAddr3>	Size	B
		Date	Thursday, March 28, 2019	Sheet	51 of 51