10 9 8 7 6 5 4 3 2 1

J J
I I
H H
G G
F F
E E
D D
C C
B B
A A

catalog

01 Cover sheet
02 Block_Diagram
03 SMBUS & Reset Topology
04 Power_On_Sequence
05 Power_Block
06 Clock Generator
07 CPU1 DMI & FDI & X16_PEG
08 CPU2 DDR3 A & B
09 CPU3 RSVD & VSS
10 CPU4 POWER1
11 CPU5 POWER2
12 THERMAL & CPU FAN
13 DDR3 SODIMM0
14 DDR3 SODIMM1
15 PCH1 HDA & SPI & SATA
16 PCH2 PCIE & SMBUS & CLK
17 PCH3 DMI & FDI & VGA & LVDS & DDI
18 PCH4 PCI & USB & NVRAM
19 PCH5 GPIOS & RSVD & VSS
20 PCH6 POWER1
21 PCH7 POWER2
22 LCD Connector
23 CRT Connector
24 HDMI Port
25 PCIE LAN
26 Audio_ALC662
27 Audio Jack
28 Card Reader
29 MiniCard1-WIFI
30 3G Card Connector & Powergoods
31 Camera & Blue Tooth
32 USB Port & LED & ME Holes
33 SATA Connector & Keyboard Connector
34 KBC-IT8502E-NX
35 Small Board Connectors
36 Power_Charger & Battery Connector
37 Power_System +V5A-3.3A-1.5A
38 Power_+V1.5M_+V0.75M-1.8S
39 Power_+V1.05S & +V1.05S_VTT
40 Power_VCCSA
41 Power_VCCCore & GFX Core
42 Power_S3_S4 & Discharge
43 GFX Switch
44 GPU Power Sequence
45 GPU PCIE Gen2x16 Interface
46 GPU Frame Buffer Interface
47 GPU Memory Partition Part1
48 GPU Memory Partition Part2
49 GPU Memory Partition Part3
50 GPU Memory Partition Part4
51 GPU FBVDD/Q Decoupling
52 GPU NVVDD Decoupling
53 GPU IFPA/B/C LVDS & HDMI
54 GPU IFPD/EF DAC-VGA
55 GPU MIOA/B & Straps
56 GPU Thermal Sensor & GPIOS
57 GPU Power NVVDD
58 GPU Power FBVDD&Q
59 GPU Power Rails
60 GPU Powers Discharge
61 GPU Ventura Platform
62 DCIN & USB Board
63 Platform Change List

INTEL Chief River Platform

Version : A

Drawing by : Wain

Notes:

Part Value Prefix : "@" means nopop

Net Value suffix : "#" means Low Active

Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

lengda联达

Title <Title>

Size C

Sheet Name Cover Sheet

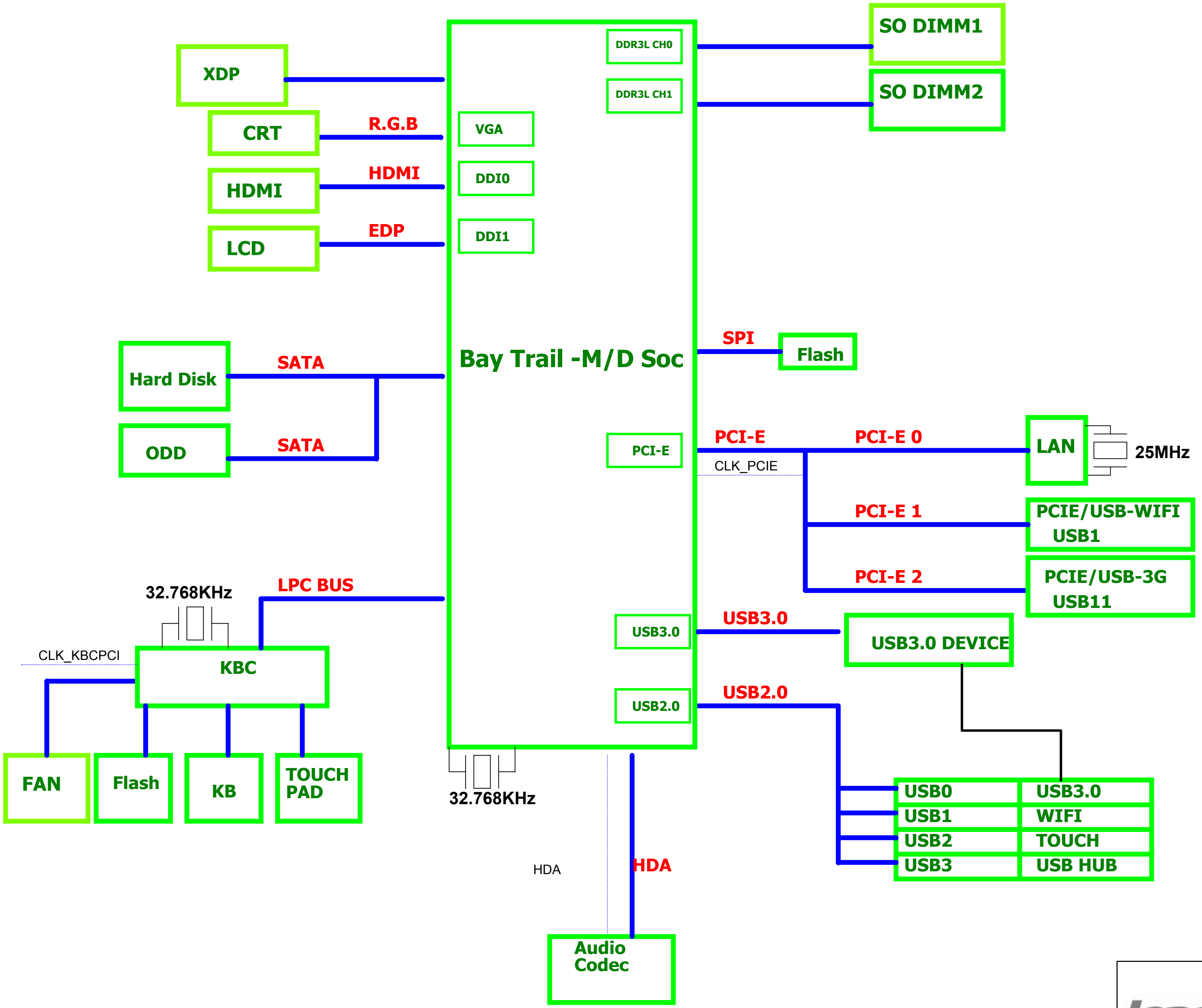
Rev A

ENGINEER: golden

Date: Wednesday, March 05, 2014

Sheet 1 of 38

M300B/M300H BLOCK DIAGRAM



System Power
TPS51125

CPU & GFX Power
TPS59641

dGPU Power
TPS51117

DDR3L Power
TPS51216

Charger
BQ24725

S3/S4 Control
and Discharge

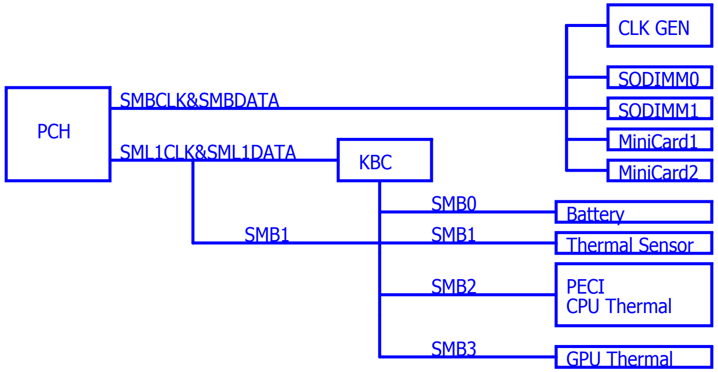
Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

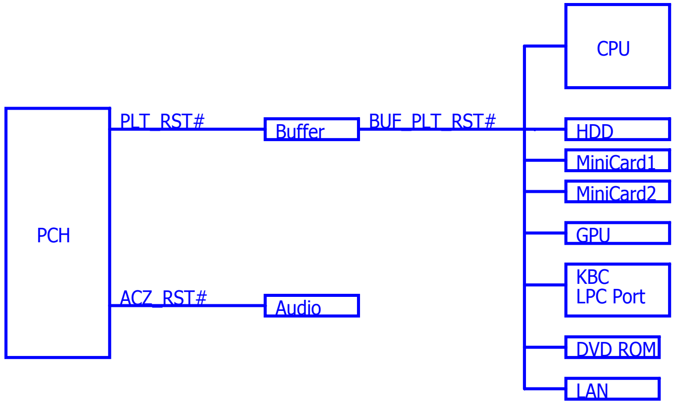
Title	<Title>	
Size C	Sheet Name Block Diagram	Rev A
Date: Wednesday, March 05, 2014	Sheet 2 of 38	

ENGINEER: golden

SMBUS TOPOLOGY



RESET TOPOLOGY



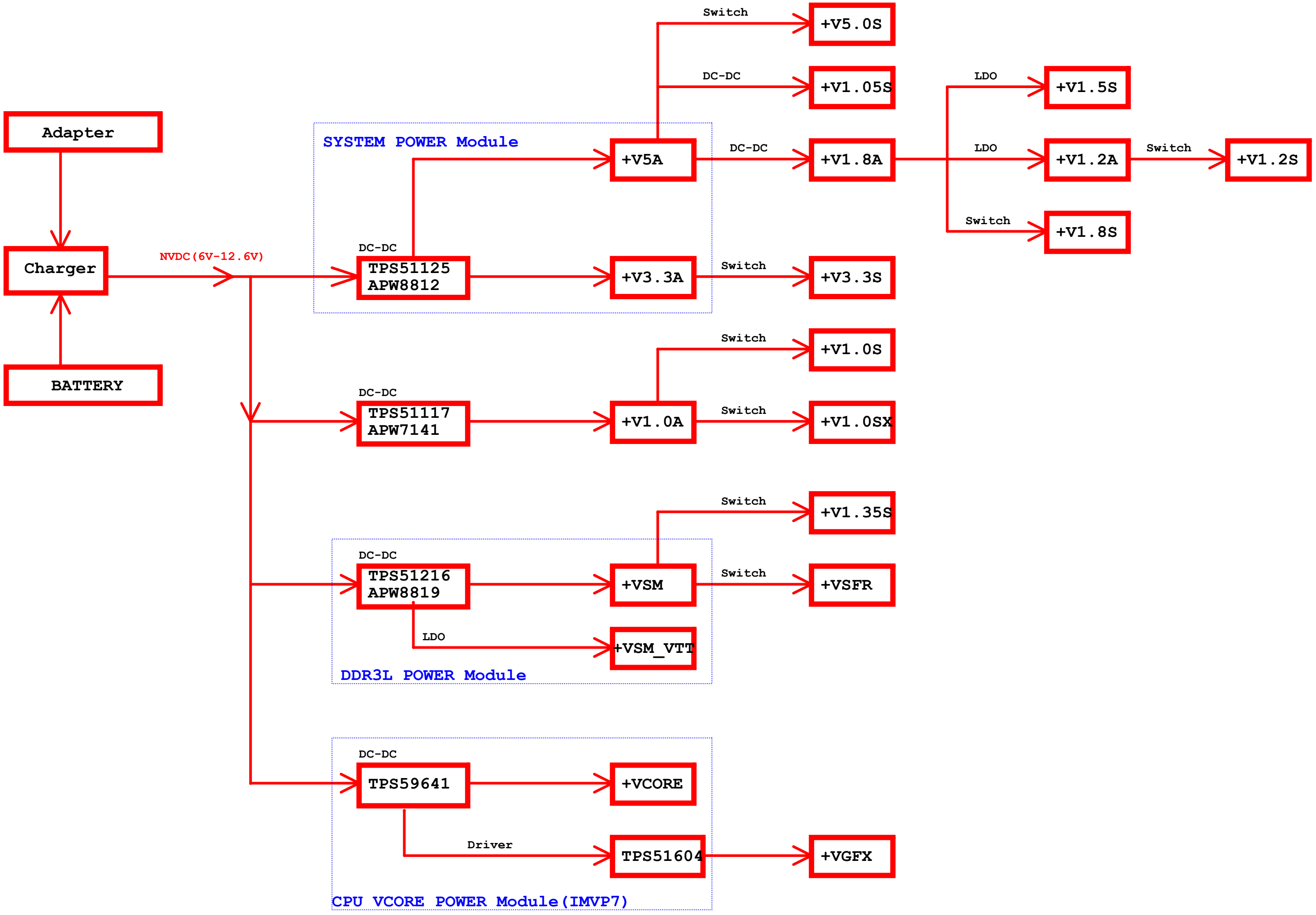
Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title	<Title>		
Size C	Sheet Name	SMBUS & RESET TOPOLOGY	Rev A
Date:	Wednesday, March 05, 2014	Sheet 3 of 38	

ENGINEER: golden

POWER Delivery Architectural Block Diagram



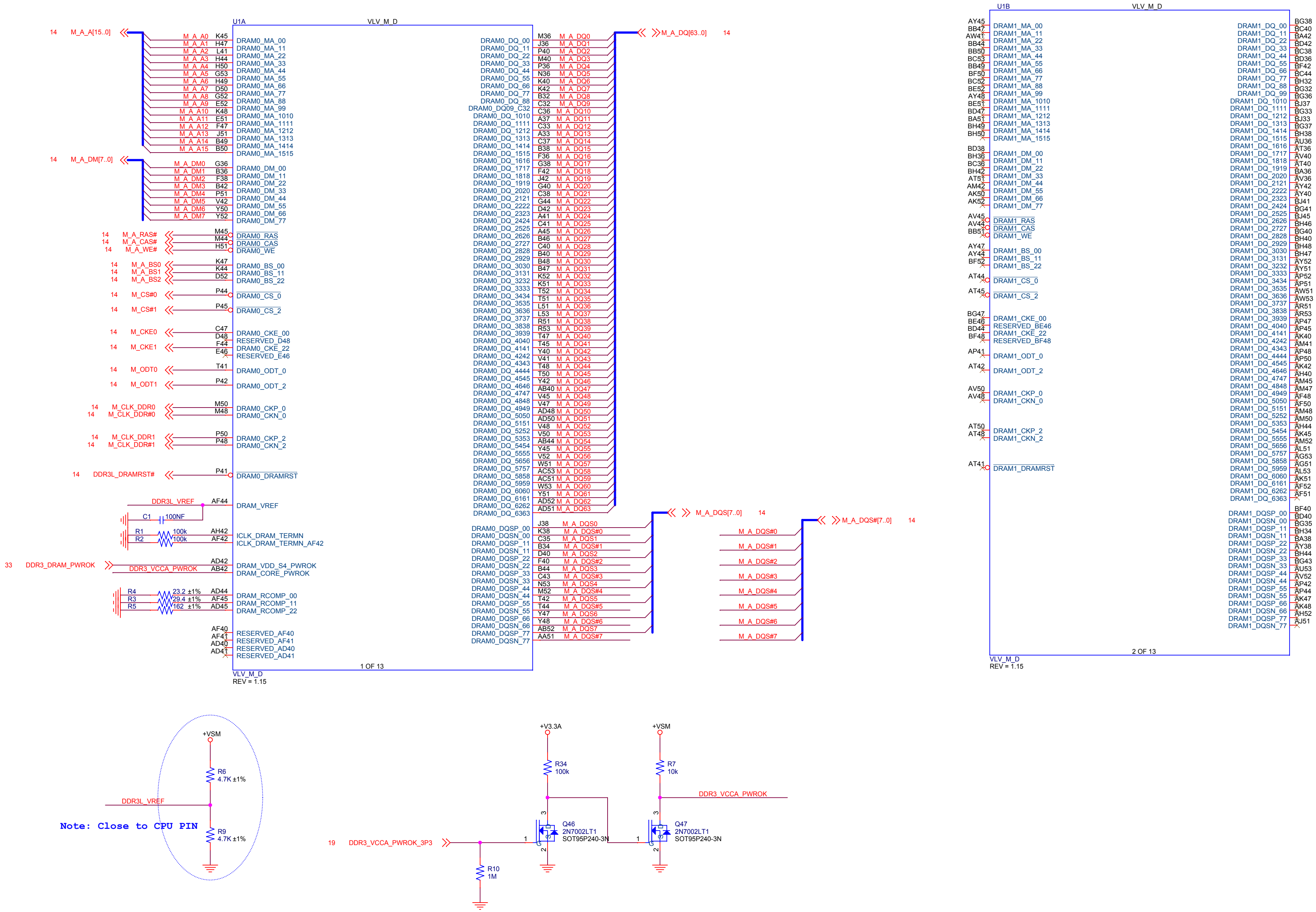
lengda联达

Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title	<Title>	
Size C	Sheet Name Power_Trees	Rev A
Date: Wednesday, March 05, 2014	Sheet 5 of 38	

ENGINEER: golden



Lengda Technology Ltd.

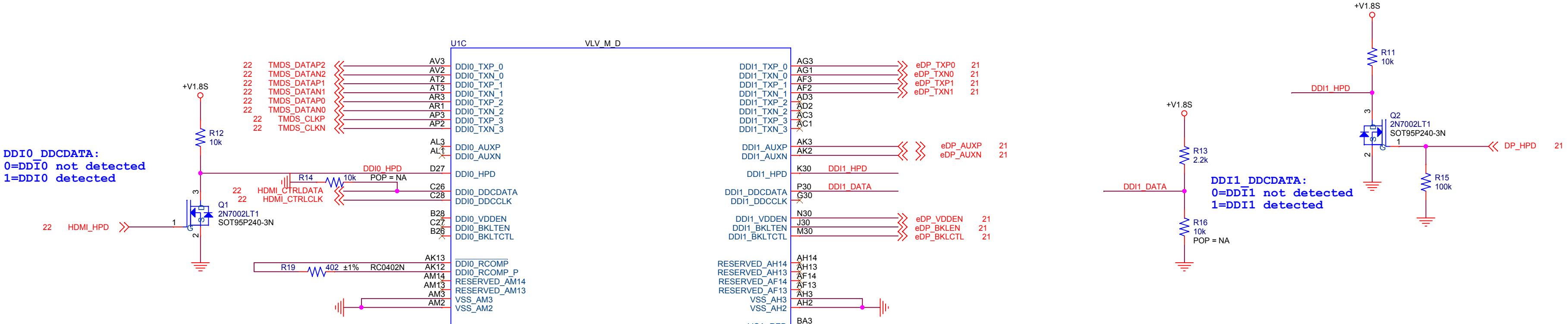
5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

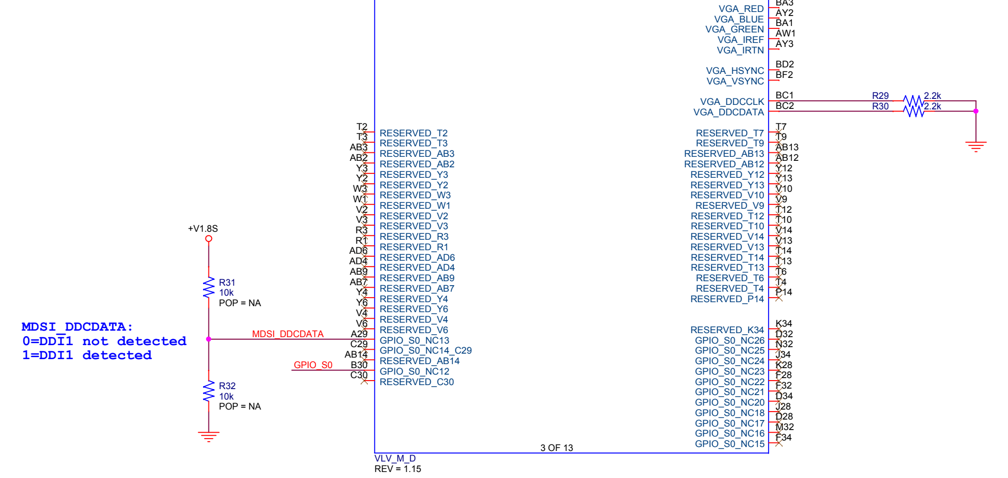
Title <Title>

Size	Sheet Name		Rev
C		SOC DDR3L A & B	A

ENGINEER: golden

Date: Wednesday, March 05, 2014 Sheet 6 of 38





CRT Disable Guidelines

Name	System Pull-up/ Pull-down	Schematics Notes
VGA_RED VGA_GREEN VGA_BLUE VGA_HSYCN VGA_VSYNC VGA_IRTN VGA_IREF		Leave as No Connect
VGA_DDCCLK VGA_DDCDATA	Pull down to GND	

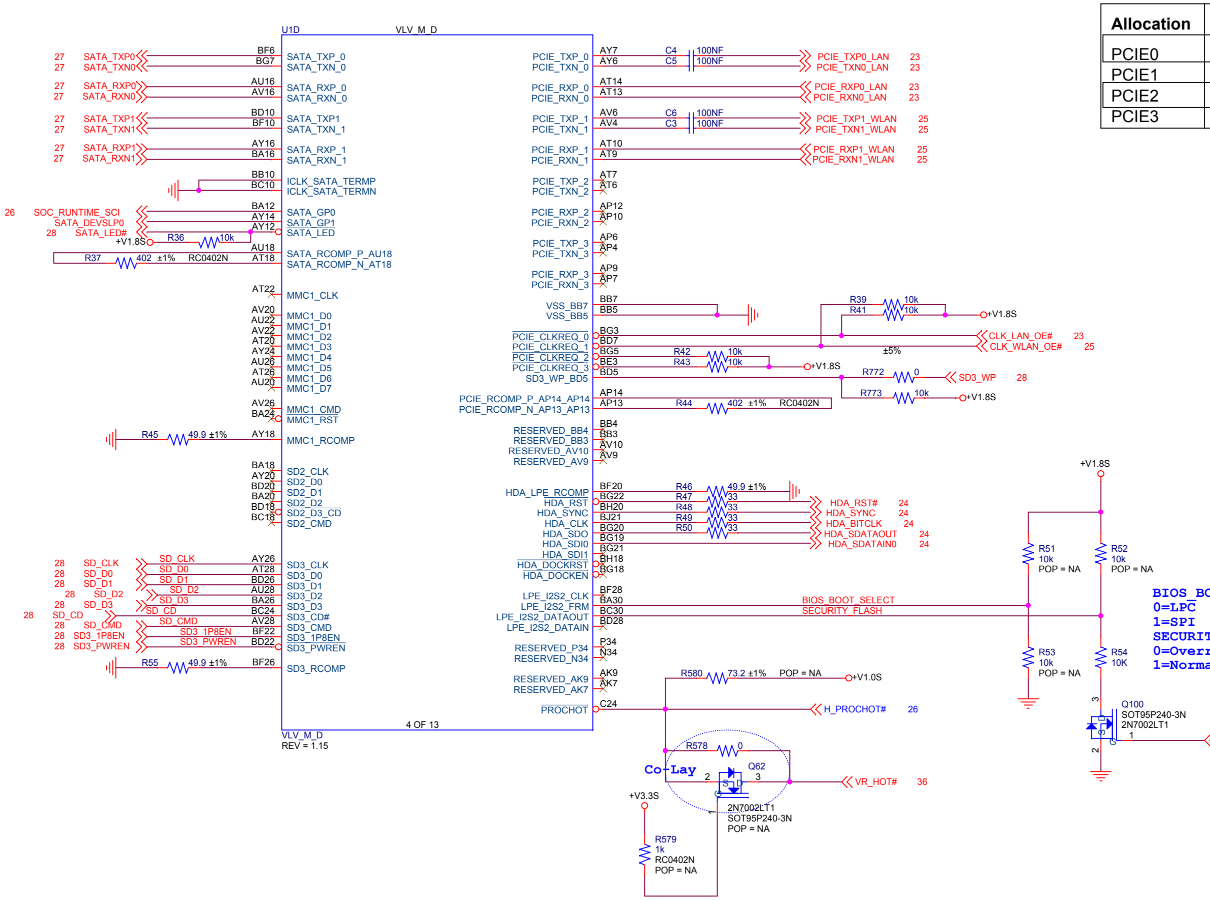
Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title	<Title>
Size	C
Sheet Name	SOC DDI & VGA
Rev	A
ENGINEER:	golden
Date:	Wednesday, March 05, 2014
Sheet	7 of 38

Allocation	SATA Devices
SATA0	ODD
SATA1	HDD

Allocation	PCIE Devices
PCIE0	LAN
PCIE1	WIFI
PCIE2	NA
PCIE3	NA



BIOS_BOOT_SELECT:
0=LPC
1=SPI
SECURITY_FLASH:
0=Override
1=Normal Operation

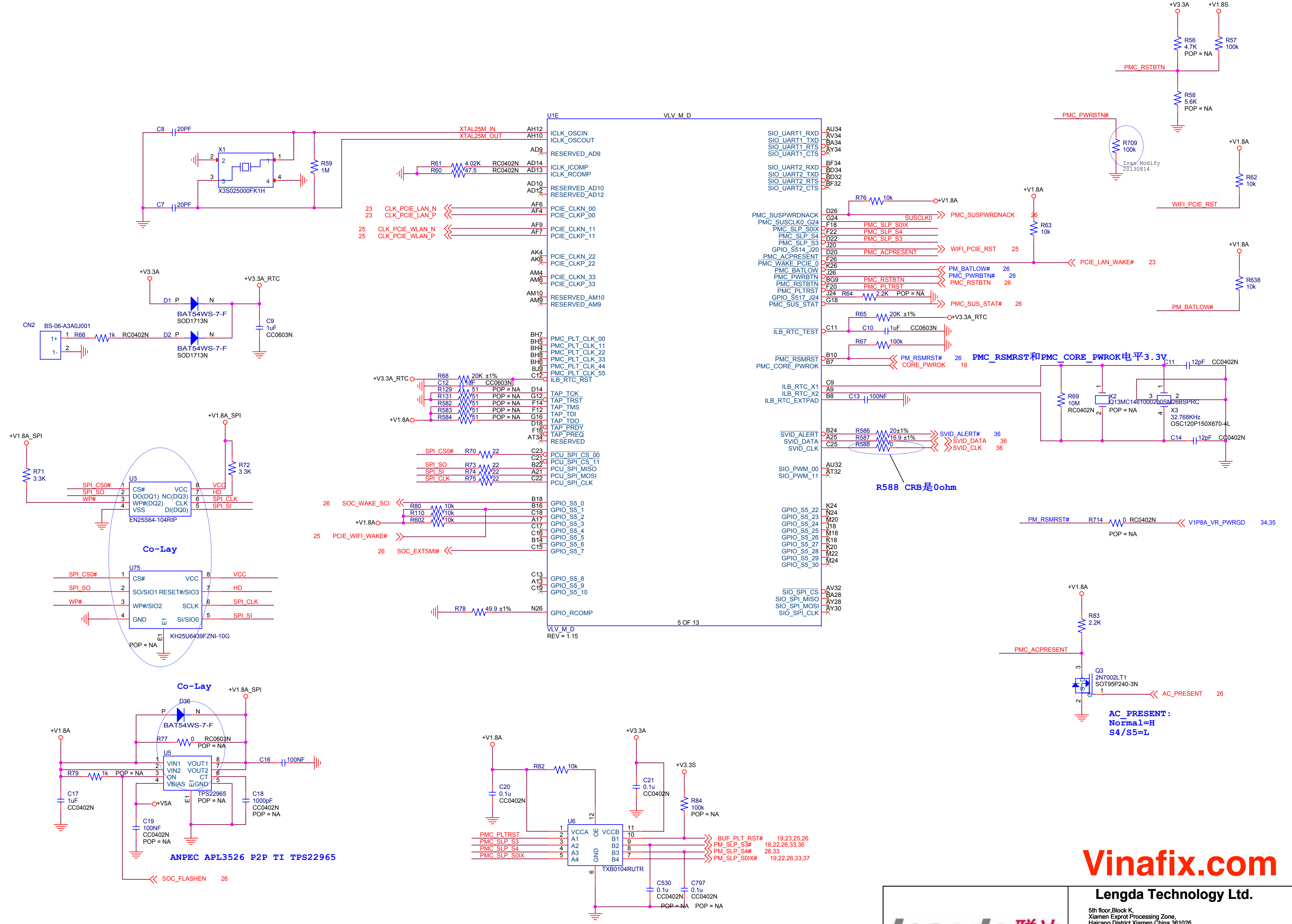
Lengda Technology Ltd.
5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

ENGINEER: golden

Title <Title>

Size	Sheet Name	Rev
C	SOC SATA & PCIE & HDA	A

Date: Sunday, May 04, 2014 **Sheet** 8 of 38



lengda联达

Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title <Title>

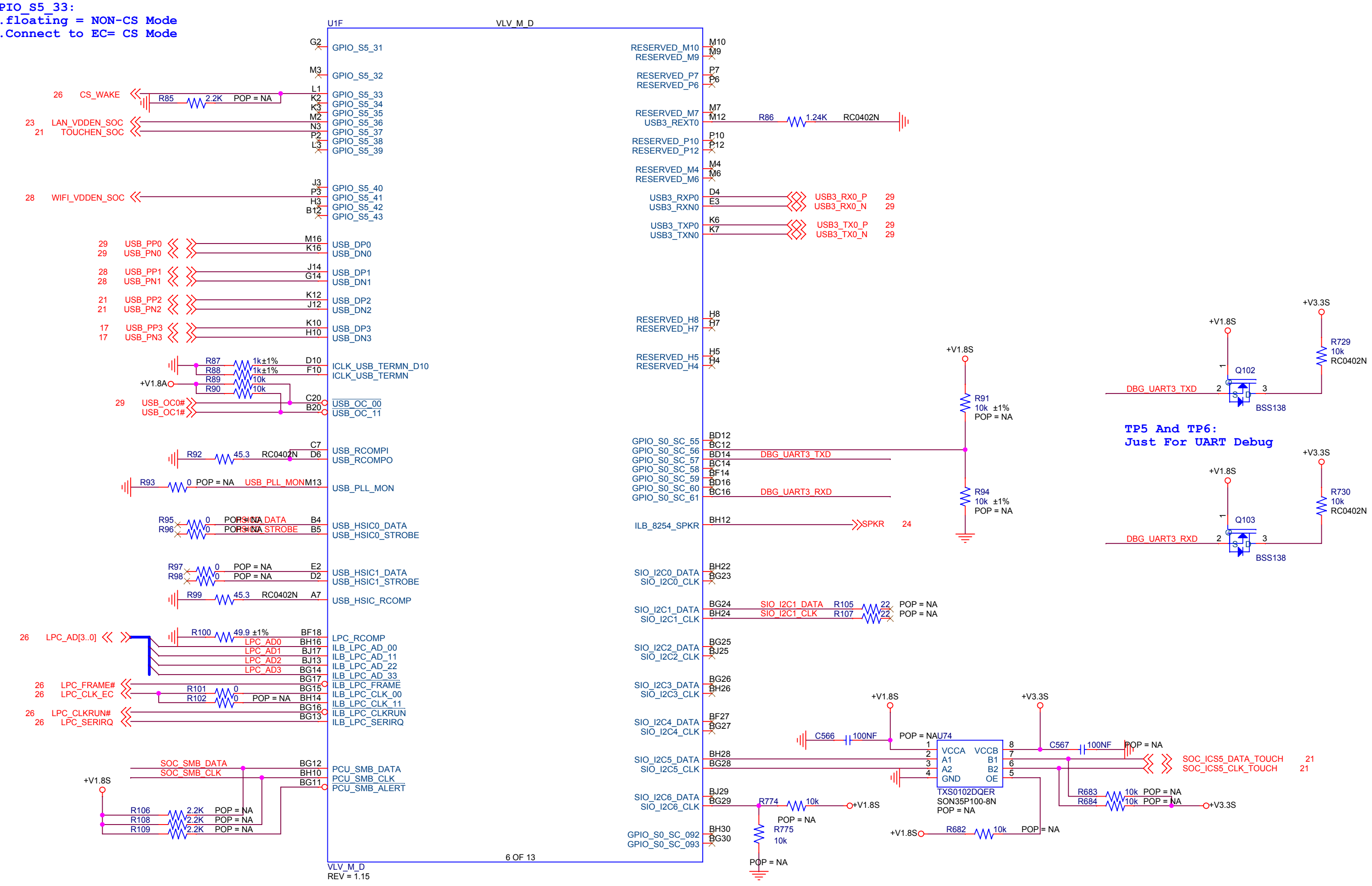
Size C
Sheet Name SOC CLK & SPI & RTC & GPIOS
Rev A

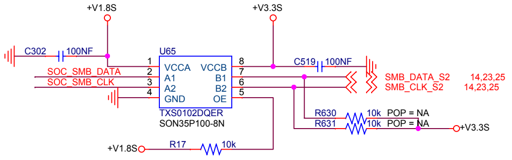
ENGINEER: golden

Date: Wednesday, March 05, 2014
Sheet 9 of 38

GPIO_S5_33:
1.floating = NON-CS Mode
2.Connect to EC= CS Mode

Allocation	USB Devices
USB0	USB3.0 Port1
USB1	CAMERA
USB2	Touch/TV CARD
USB3	USB HUB





Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

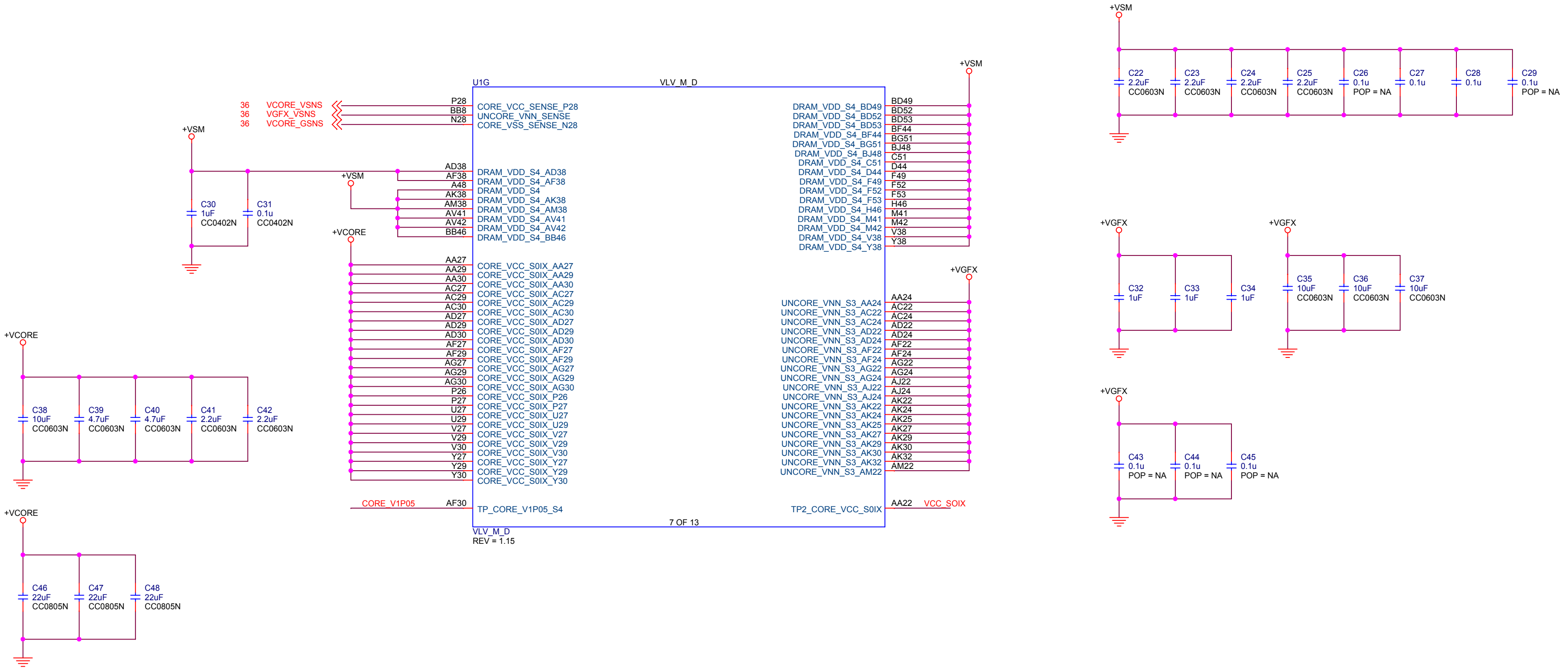
lengda联达

ENGINEER: golden

Title <Title>

Size	Sheet Name		Rev
C	SOC USB & LPC & I2C		A

Date: Sunday, May 04, 2014 Sheet 10 of 38

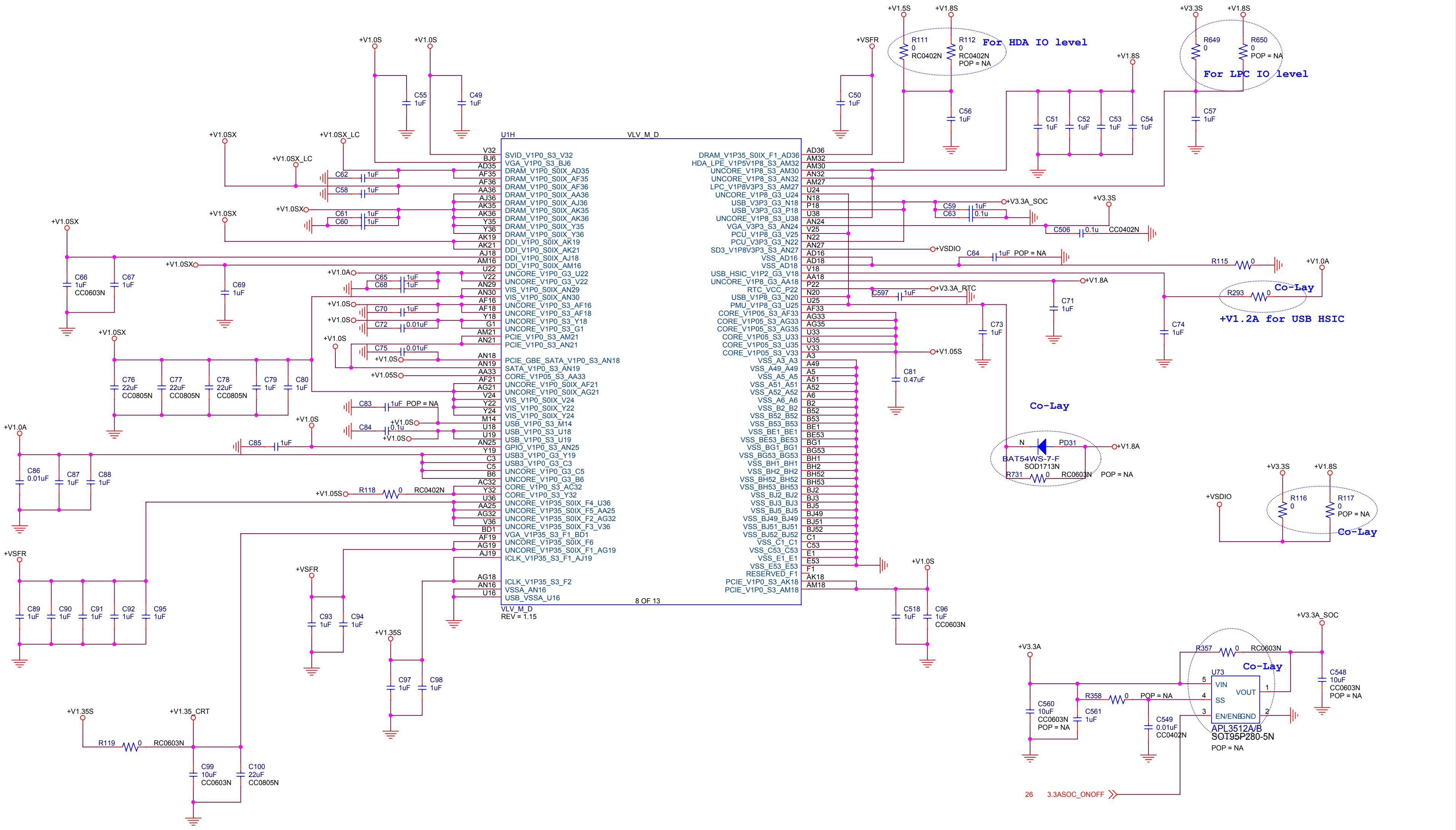


Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title	<Title>	
Size C	Sheet Name SOC VCORE & VGFX & VDDR	Rev A
Date: Wednesday, March 05, 2014	Sheet 11 of 38	

ENGINEER: golden

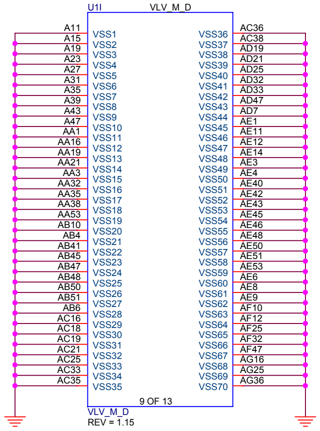


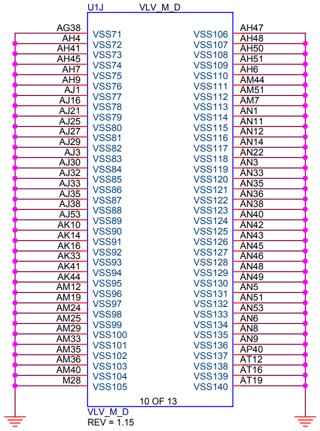
Lengda Technology Ltd.

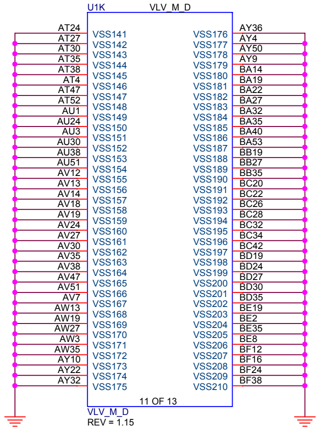
5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

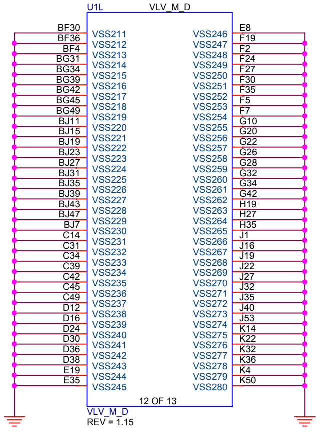
Title	<Title>	
Size C	Sheet Name SOC POWERS	Rev A
Date: Tuesday, May 06, 2014	Sheet 12 of 38	

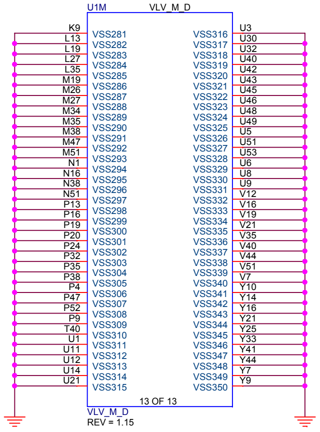
ENGINEER: golden











lengda联达

ENGINEER: golden

Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

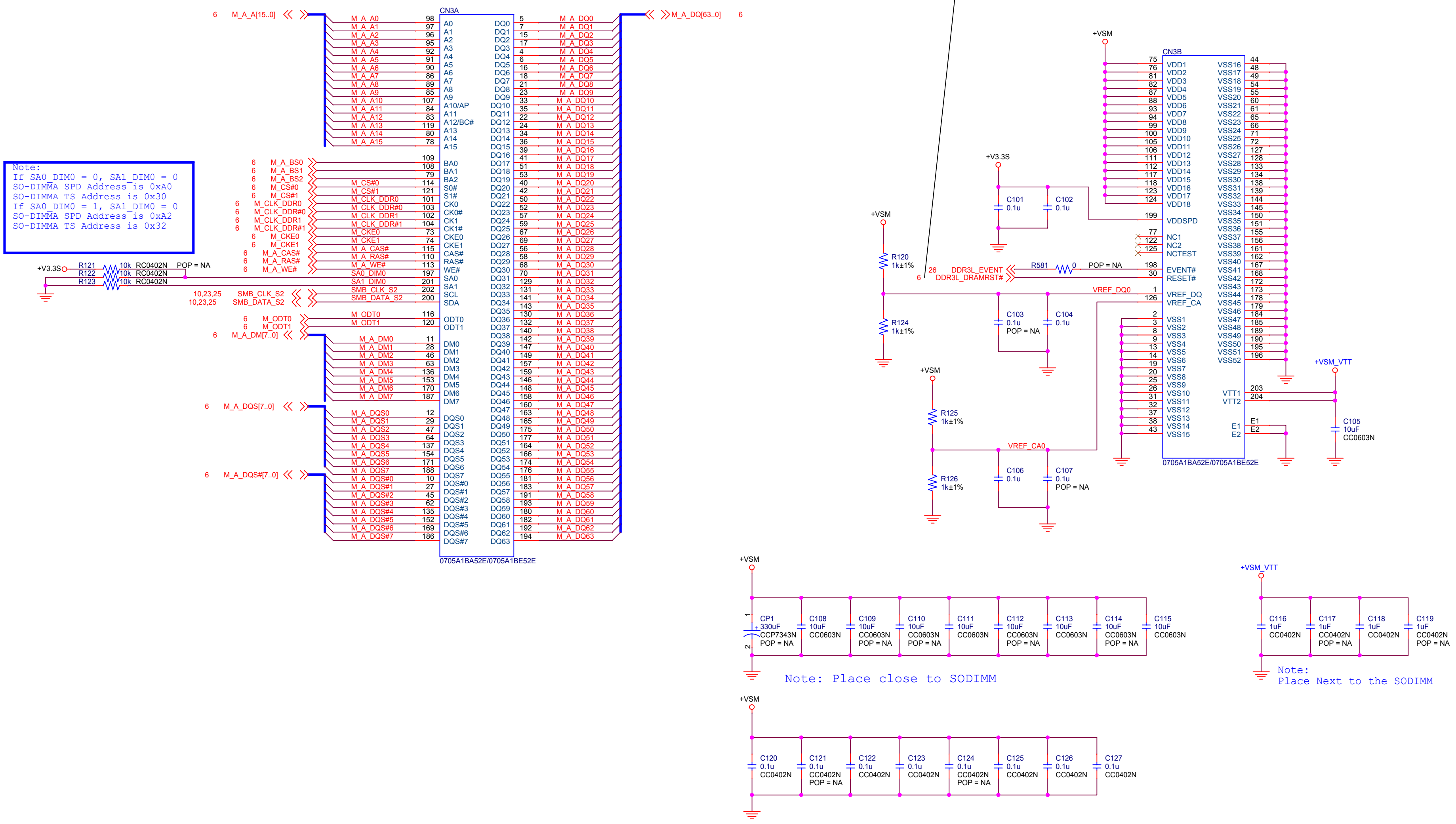
Title <Title>

Size C
Sheet Name SOC VSS
Rev A

Date: Wednesday, March 05, 2014
Sheet 13 of 38

DDR3 SODIMM0

Layout Note:
Place the 0-Ω resistors close to SO-DIMM connector.
The overall routing length for both DIMM_VREF traces should be <= 5000 mils (127 mm).
Avoid changing reference plane during the entire routing length. If reference plane has to be changed
during the transition to 0-Ω resistors, then GND stitching vias are needed next to resistor pads.
Place GND stitching vias within 100 mils (2.54 mm) of DIMM_VREF traces close to SO-DIMM connector.



Note:
If SA0_DIM0 = 0, SA1_DIM0 = 0
SO-DIMMA SPD Address is 0xA0
SO-DIMMA TS Address is 0x30
If SA0_DIM0 = 1, SA1_DIM0 = 0
SO-DIMMA SPD Address is 0xA2
SO-DIMMA TS Address is 0x32

Note: Place close to SODIMM

Note:
Place Next to the SODIMM

Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title	<Title>	
Size C	Sheet Name DDR3L_SODIMM0	Rev A
Date: Wednesday, March 05, 2014	Sheet 14 of 38	

ENGINEER: golden

Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title <Title>

Size C | **Sheet Name** CPU FAN & Thermal Sensor | **Rev** A

Date: Wednesday, March 05, 2014 **Sheet** 15 of 38

ENGINEER: golden

lengda联达

Lengda Technology Ltd.

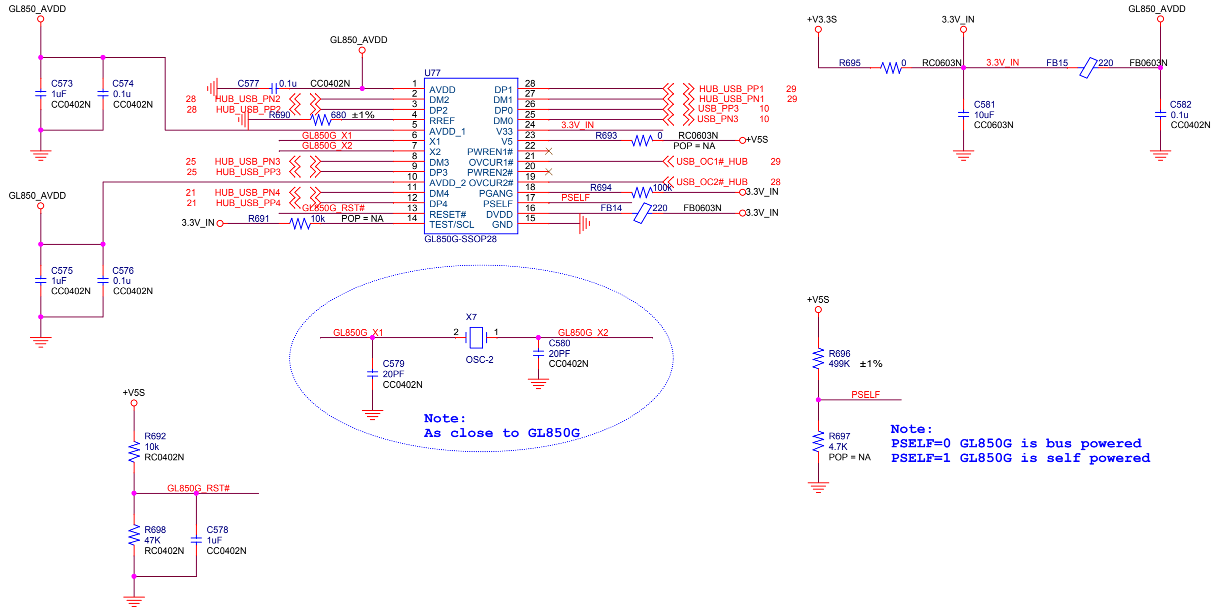
5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title <Title>

Size C	**Sheet Name** BLANK	**Rev** A

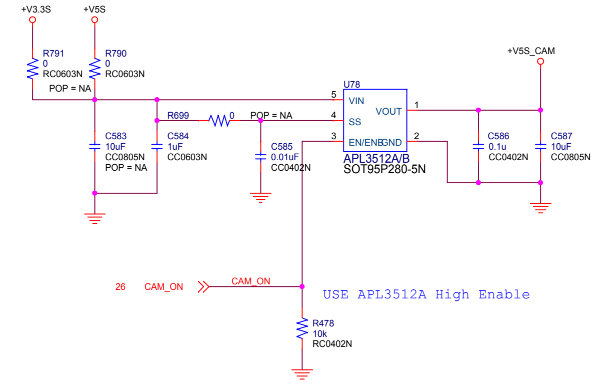
ENGINEER: golden

Date: Wednesday, March 05, 2014 **Sheet** 16 of 38



Note:
As close to GL850G

Note:
PSELF=0 GL850G is bus powered
PSELF=1 GL850G is self powered



USE APL3512A High Enable

Lengda Technology Ltd.

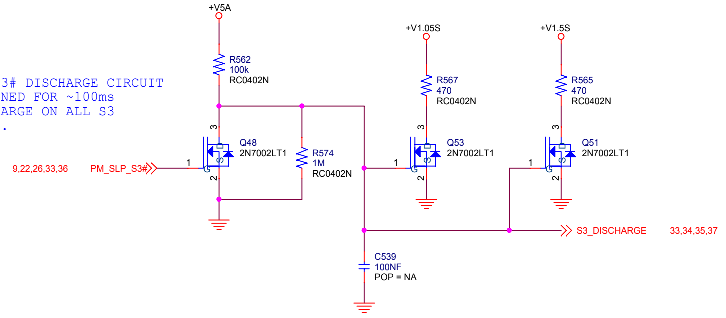
5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title <Title>

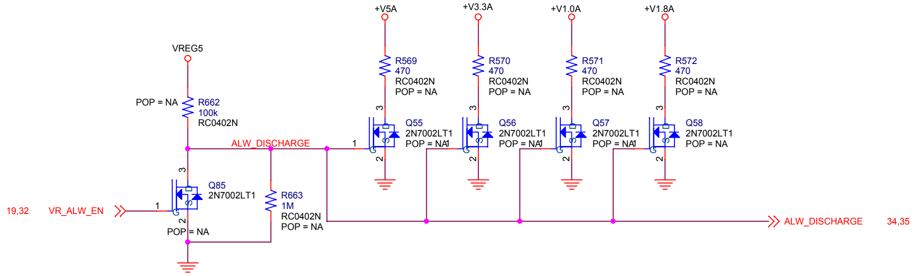
Size C	**Sheet Name** USB HUB	**Rev** A
Date: Tuesday, May 06, 2014	**Sheet** 17 of 38	

ENGINEER: golden

Power Discharge Circuit



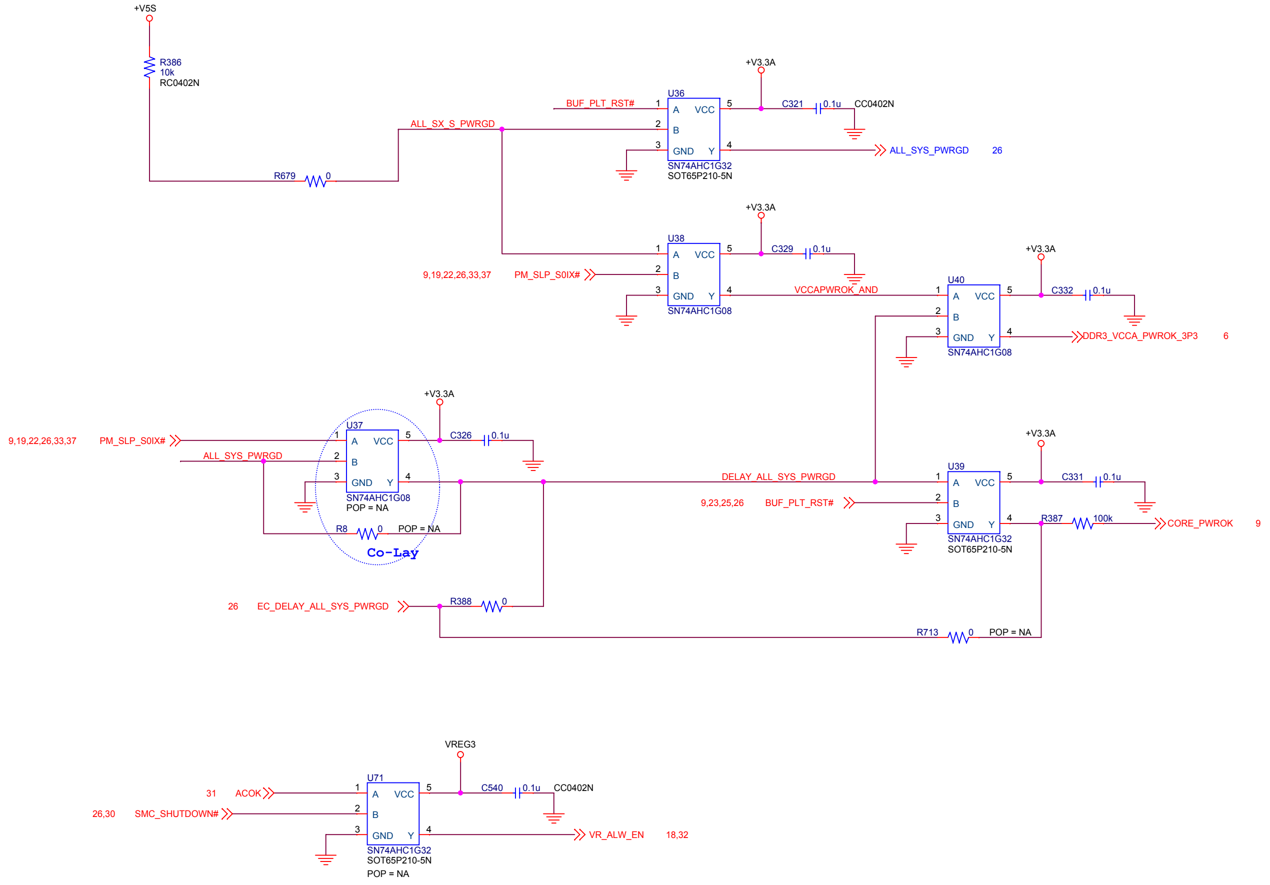
SLP_S3# DISCHARGE CIRCUIT
DESIGNED FOR ~100ms
DISCHARGE ON ALL S3
RAILS.



Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title	<Title>
Size	C
Sheet Name	**Powers Discharge**
Rev	A
ENGINEER:	golden
Date:	Wednesday, March 05, 2014
Sheet	18 of 38



lengda联达

Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title <Title>		
Size C	Sheet Name Platform PWRGOOD	Rev A
Date: Wednesday, March 05, 2014	Sheet 19 of 38	

ENGINEER: golden

lengda联达

ENGINEER: golden

Lengda Technology Ltd.

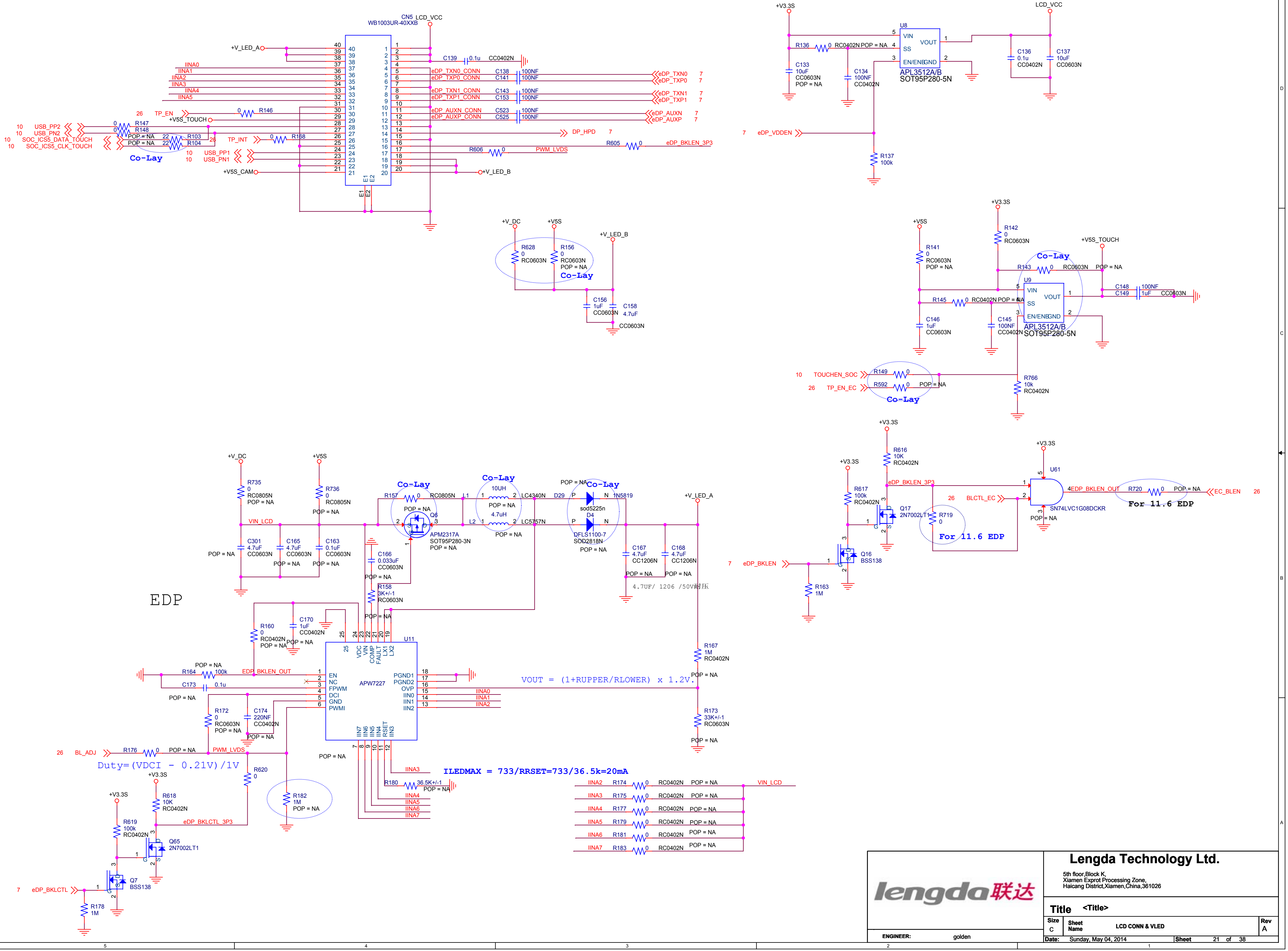
5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title <Title>

Size C
Sheet Name BLANK
Rev A

Date: Wednesday, March 05, 2014

LCD Connector



VOUT = (1+RUPPER/RLOWER) x 1.2V.

ILEDMAX = 733/RRSET=733/36.5k=20mA

Duty=(VDCI - 0.21V)/1V

4.7UF/ 1206 /50V耐压

For 11.6 EDP

For 11.6 EDP

Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title <Title>

Size C

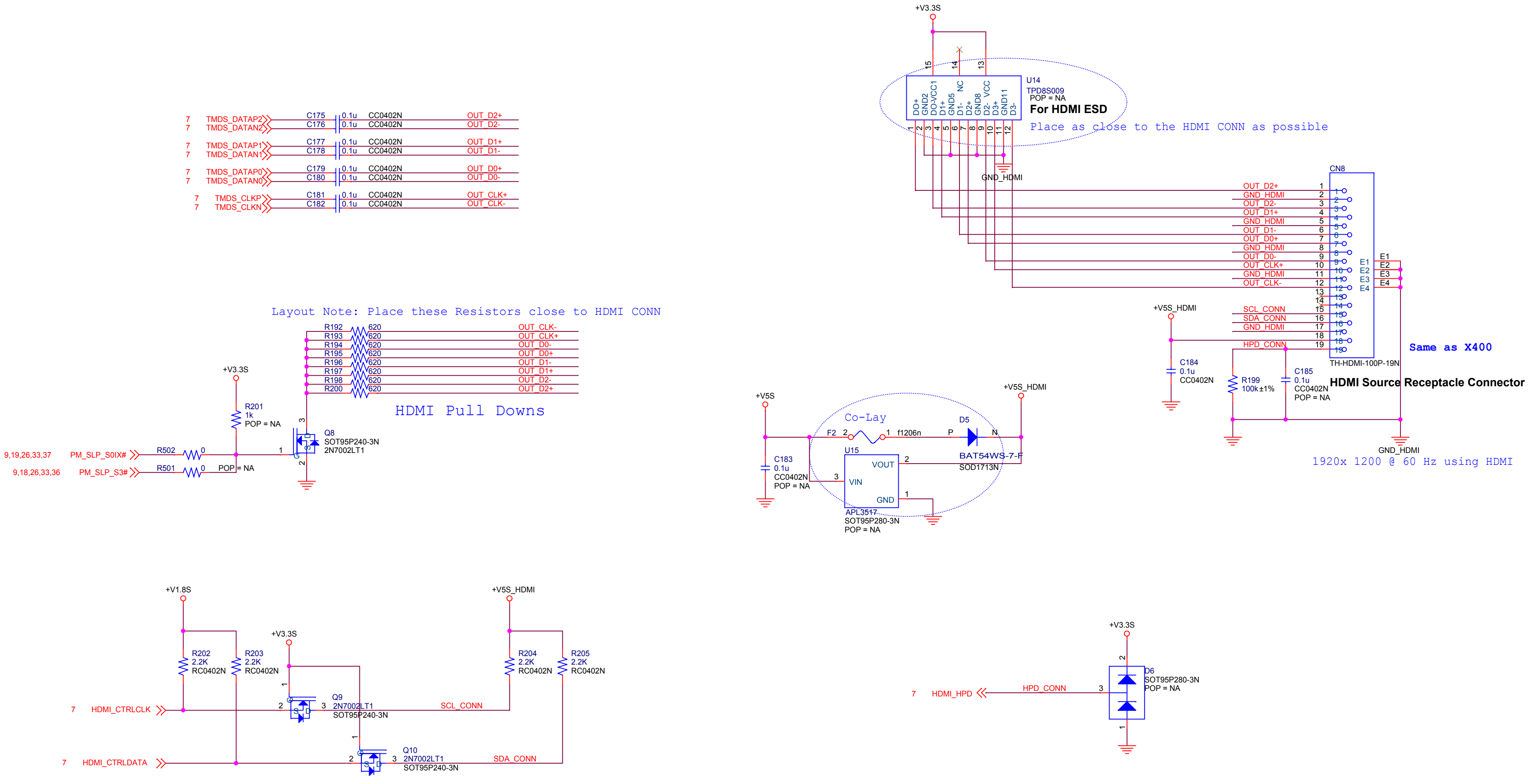
Sheet Name LCD CONN & VLED

Rev A

ENGINEER: golden

Date: Sunday, May 04, 2014

Sheet 21 of 38



For HDMI ESD

Place as close to the HDMI CONN as possible

Layout Note: Place these Resistors close to HDMI CONN

HDMI Pull Downs

Co-Lay

Same as X400

HDMI Source Receptacle Connector

1920x 1200 @ 60 Hz using HDMI

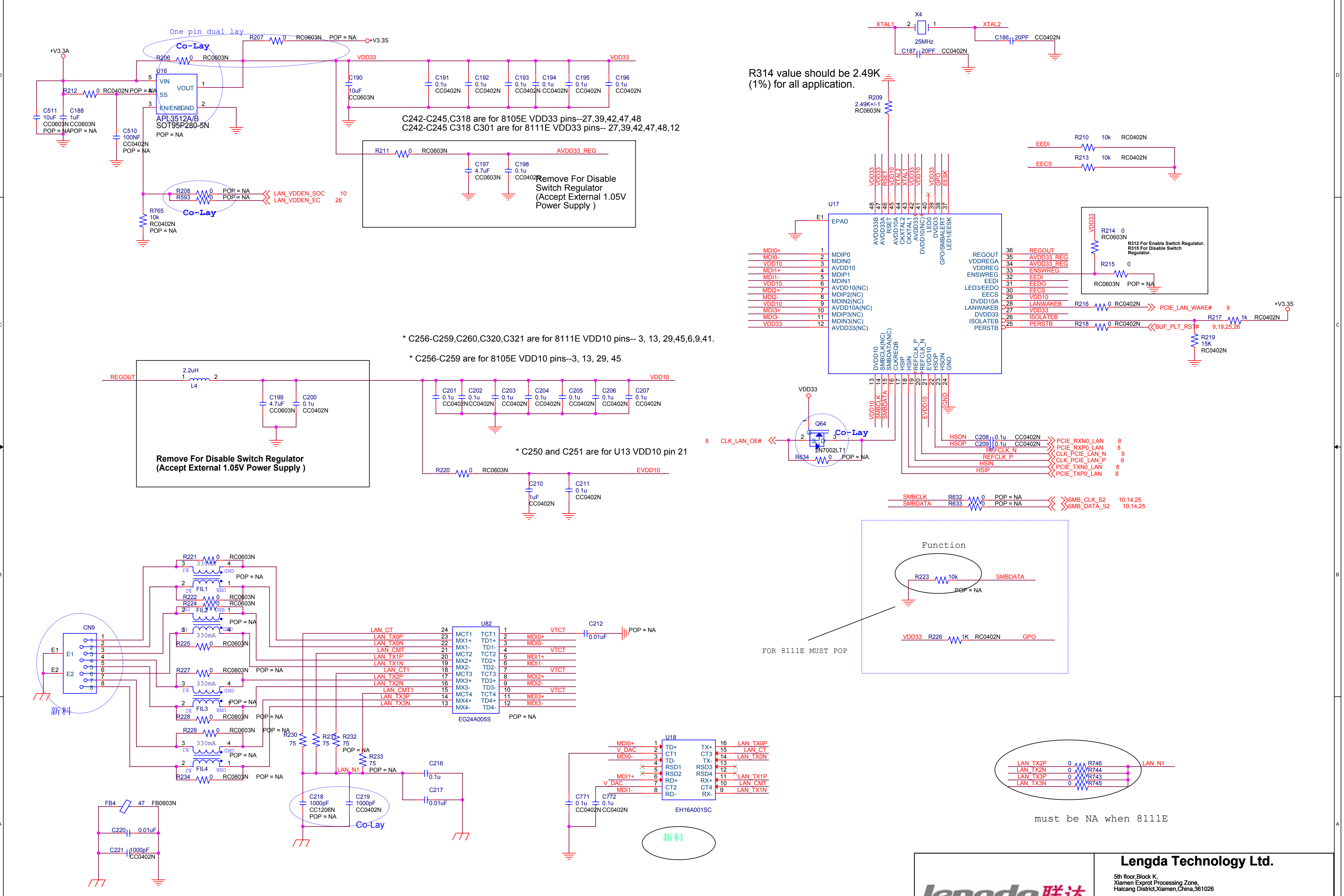
lengda联达

Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title	<Title>	
Size C	Sheet Name HDMI Port	Rev A
Date: Wednesday, March 05, 2014	Sheet 22 of 38	

ENGINEER: golden



C242-C245,C318 are for 8105E VDD33 pins--27,39,42,47,48
C242-C245 C318 C301 are for 8111E VDD33 pins-- 27,39,42,47,48,12

Remove For Disable Switch Regulator (Accept External 1.05V Power Supply)

R314 value should be 2.49K (1%) for all application.

* C256-C259,C260,C320,C321 are for 8111E VDD10 pins-- 3, 13, 29,45,6,9,41.

* C256-C259 are for 8105E VDD10 pins--3, 13, 29, 45

Remove For Disable Switch Regulator
(Accept External 1.05V Power Supply)

* C250 and C251 are for U13 VDD10 pin 21

FOR 8111E MUST POP

must be NA when 8111E

Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

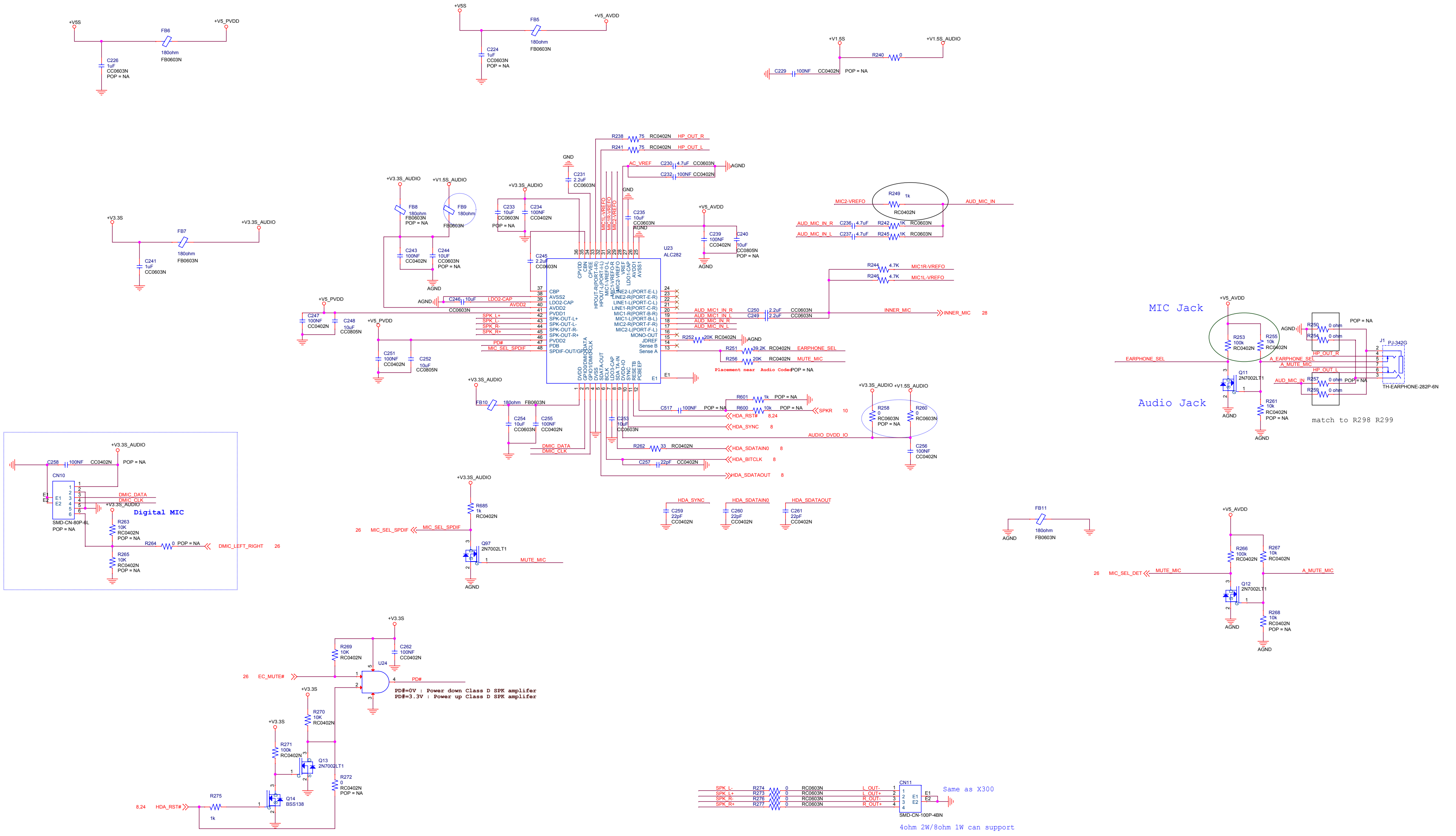
lengda联达

Title <Title>

Size C
Sheet Name PCIE-GIGA LAN
Rev A

ENGINEER: golden

Date: Wednesday, March 05, 2014 Sheet 23 of 38

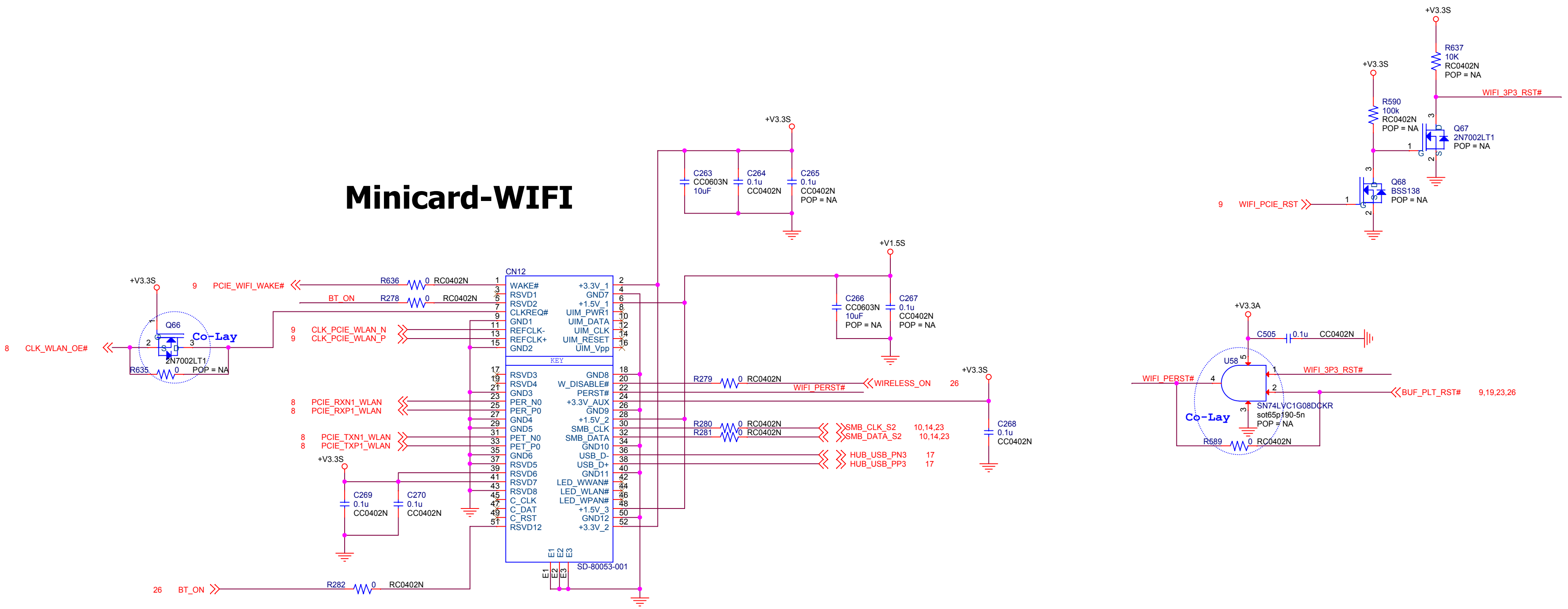


Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title	<Title>	
Size D	Sheet Name Audio Codec	Rev A
ENGINEER: golden		
Date: Tuesday, May 06, 2014	Sheet 24 of 38	

Minicard-WIFI

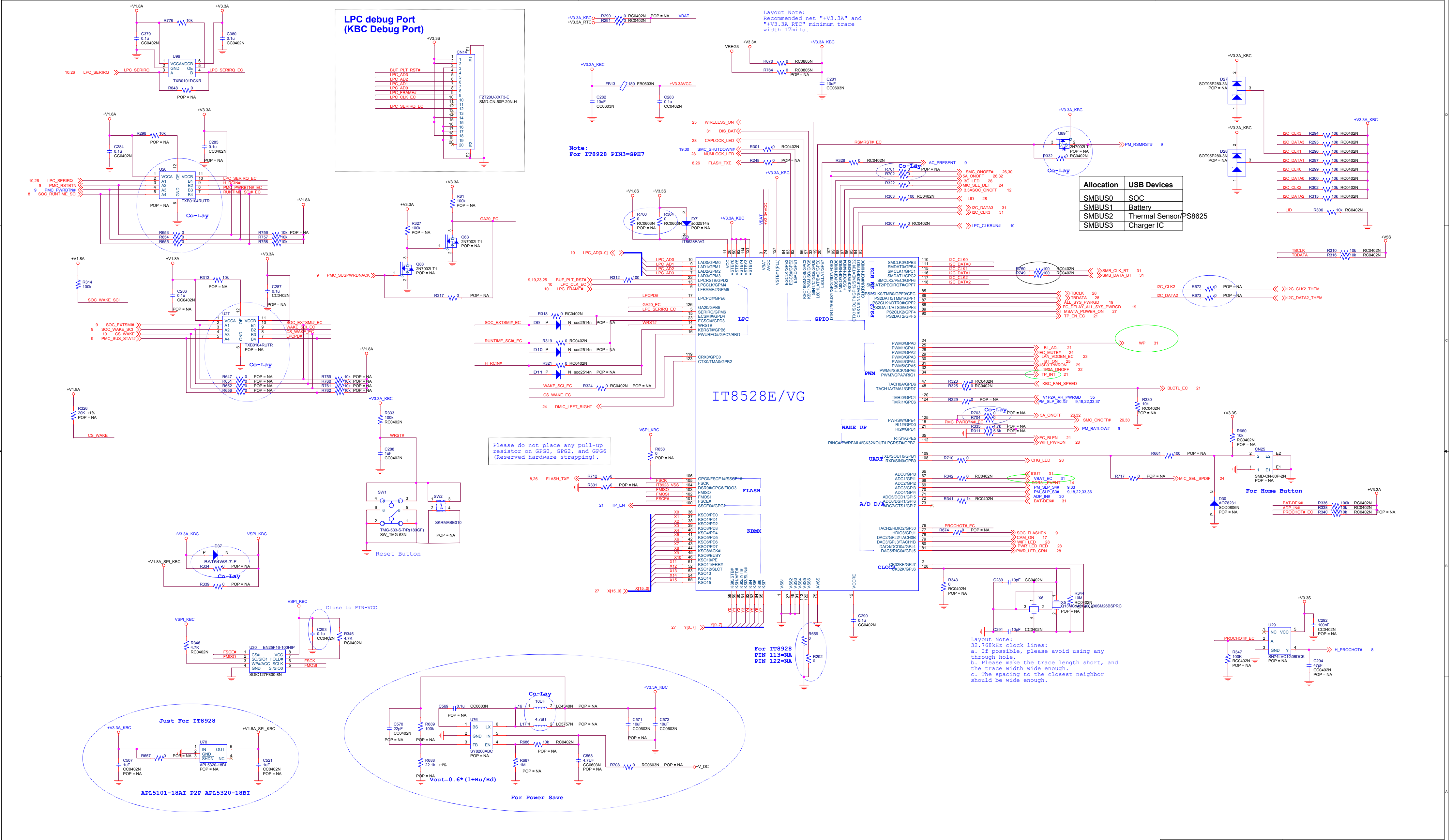


Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title	<Title>	
Size C	Sheet Name Minicard-Wifi	Rev A
Date:	Wednesday, March 05, 2014	Sheet 25 of 38

ENGINEER: golden



Layout Note:
Recommended net "+V3.3A" and "+V3.3A_RTC" minimum trace width 12mils.

Note:
For IT8928 PIN3=GPH7

Allocation	USB Devices
SMBUS0	SOC
SMBUS1	Battery
SMBUS2	Thermal Sensor/PS8625
SMBUS3	Charger IC

Please do not place any pull-up resistor on GPG0, GPG2, and GPG6 (Reserved hardware strapping).

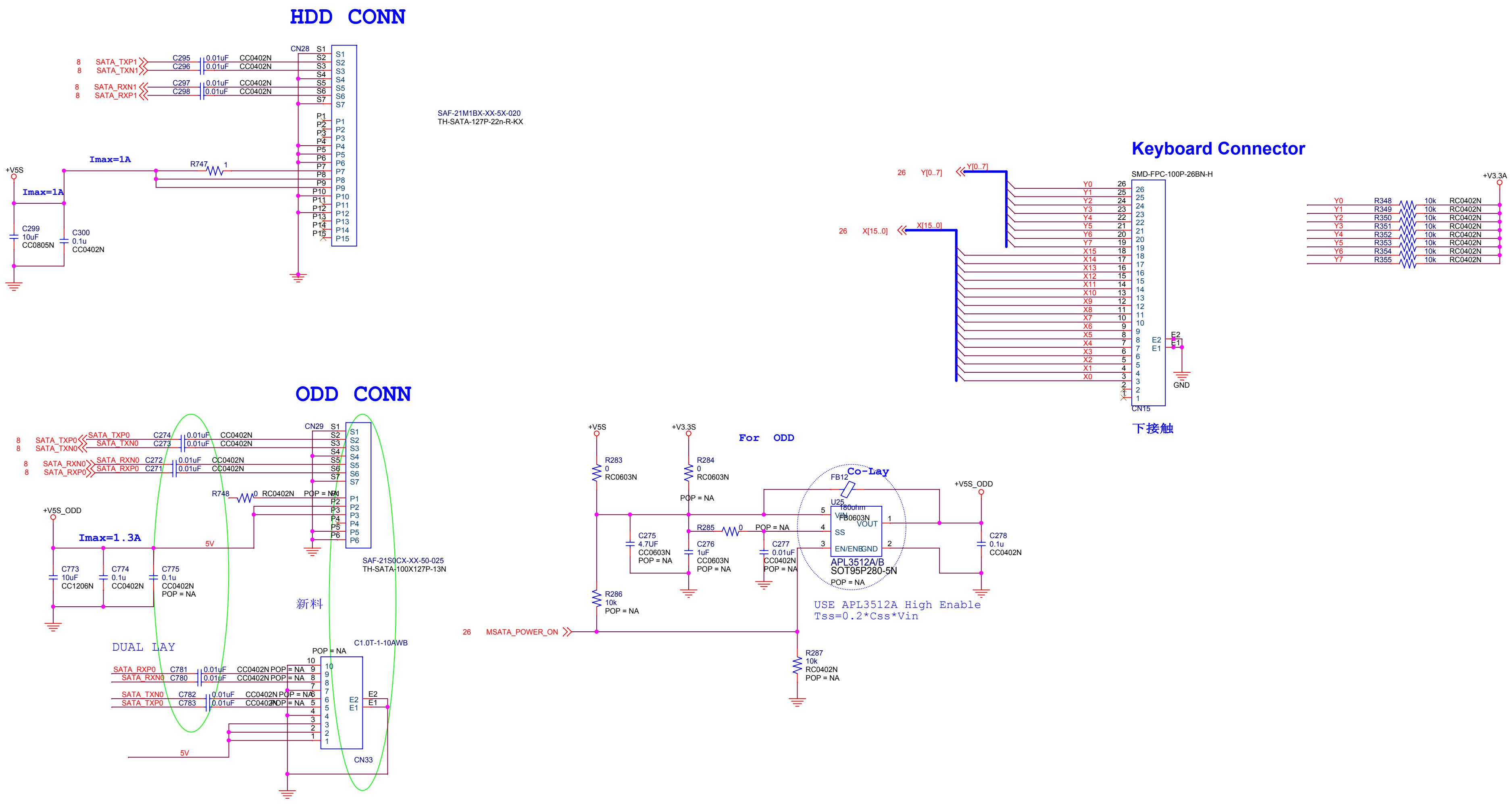
For IT8928
PIN 113=NA
PIN 122=NA

Layout Note:
32.768kHz clock lines:
a. If possible, please avoid using any through-hole.
b. Please make the trace length short, and the trace width wide enough.
c. The spacing to the closest neighbor should be wide enough.

Lengda Technology Ltd.
5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title	<Title>	
Size D	Sheet Name KBC_IT8528E	Rev A
Date: Sunday, May 04, 2014	Sheet 26 of 38	

ENGINEER: golden



Lengda Technology Ltd.

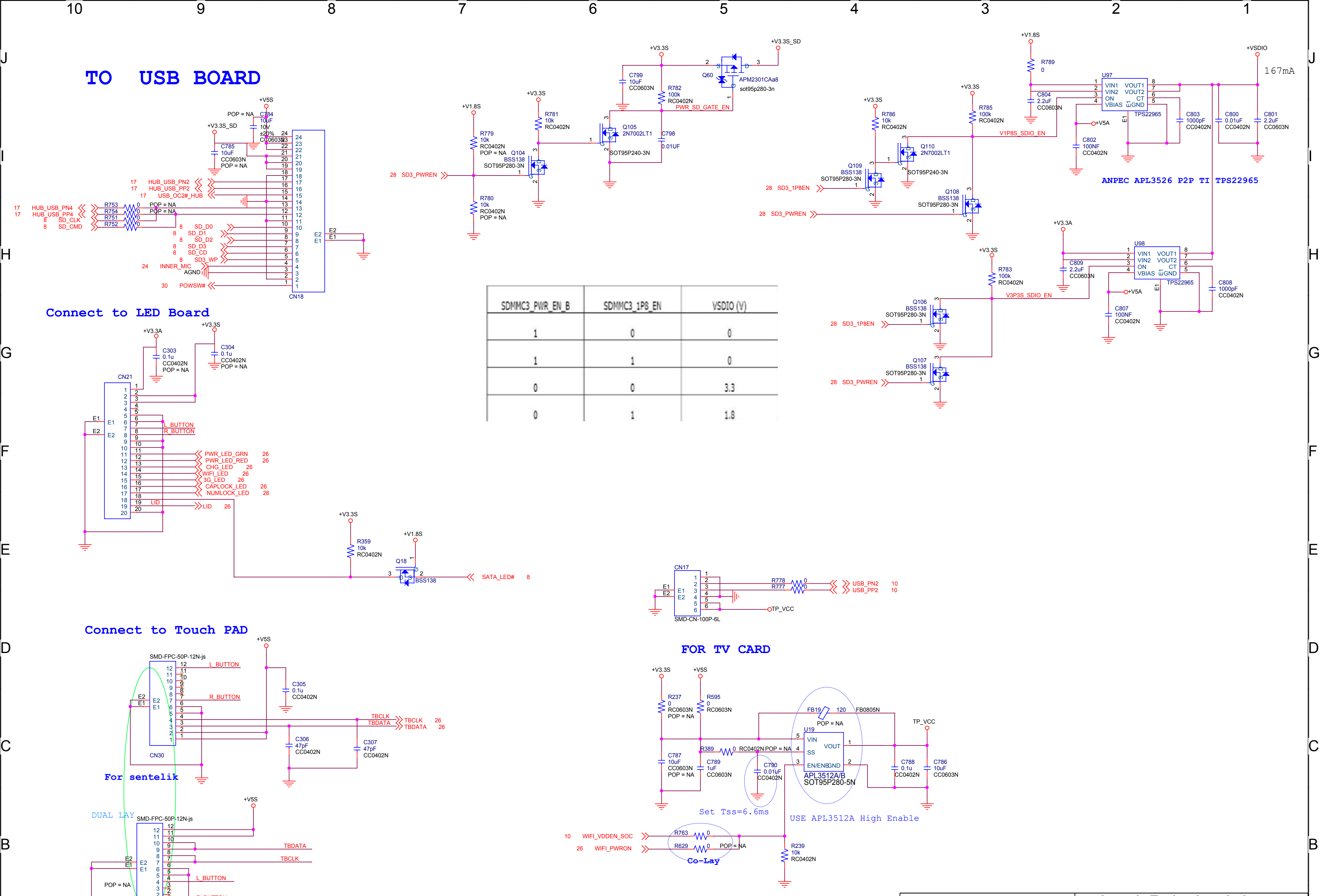
5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title <Title>

Size C
Sheet Name SATA Ports & KB CONN
Rev A

ENGINEER: golden

Date: Wednesday, March 05, 2014 Sheet 27 of 38



SDMMC3_PWR_EN_B	SDMMC3_1P8_EN	VSDIO (V)
1	0	0
1	1	0
0	0	3.3
0	1	1.8

lengda联达

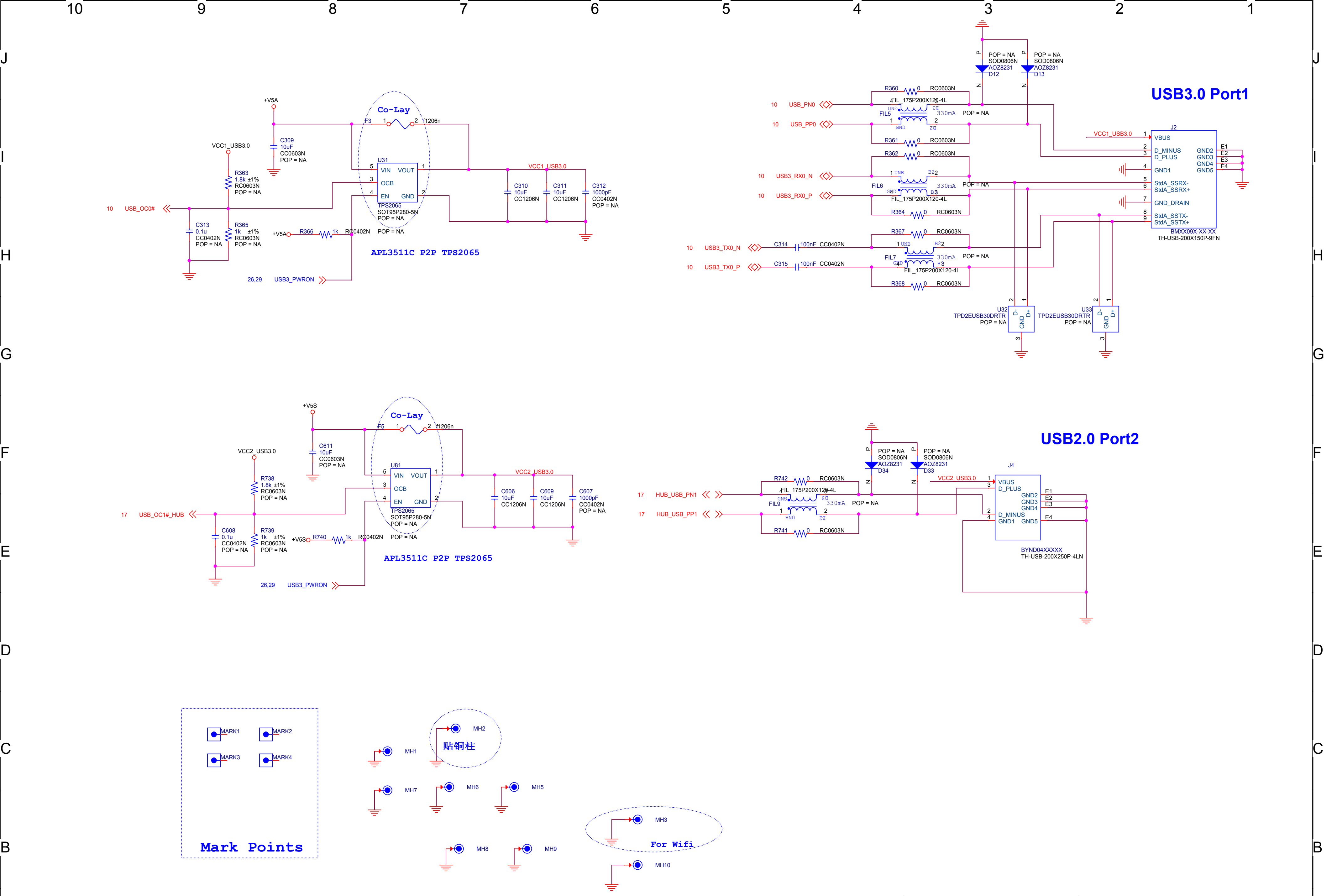
Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title <Title>

Size C
Sheet Name LEDS & Buttons
Rev A

ENGINEER: golden
Date: Tuesday, May 06, 2014
Sheet 28 of 38



Lengda Technology Ltd.

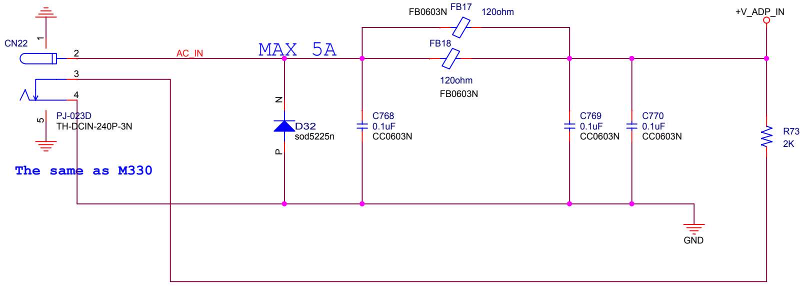
5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

lengda联达

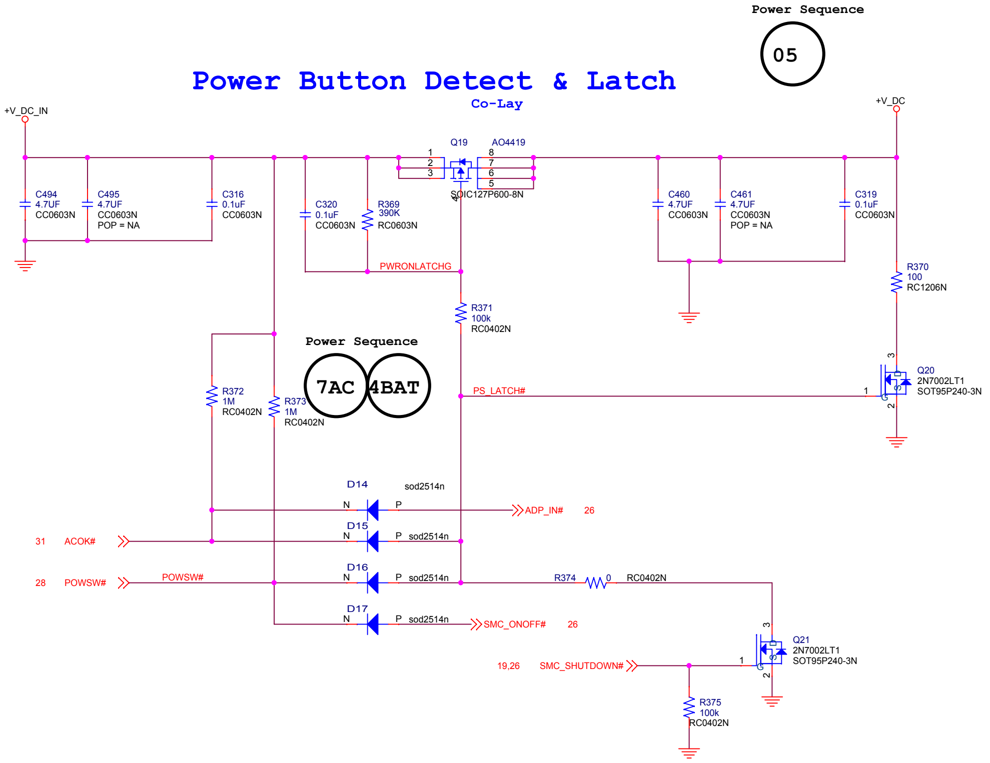
Title	<Title>	
Size C	Sheet Name USB Ports	Rev A
Date: Wednesday, March 05, 2014	Sheet 29 of 38	

ENGINEER: golden

ADP_IN



Power Button Detect & Latch



lengda联达

Lengda Technology Ltd.

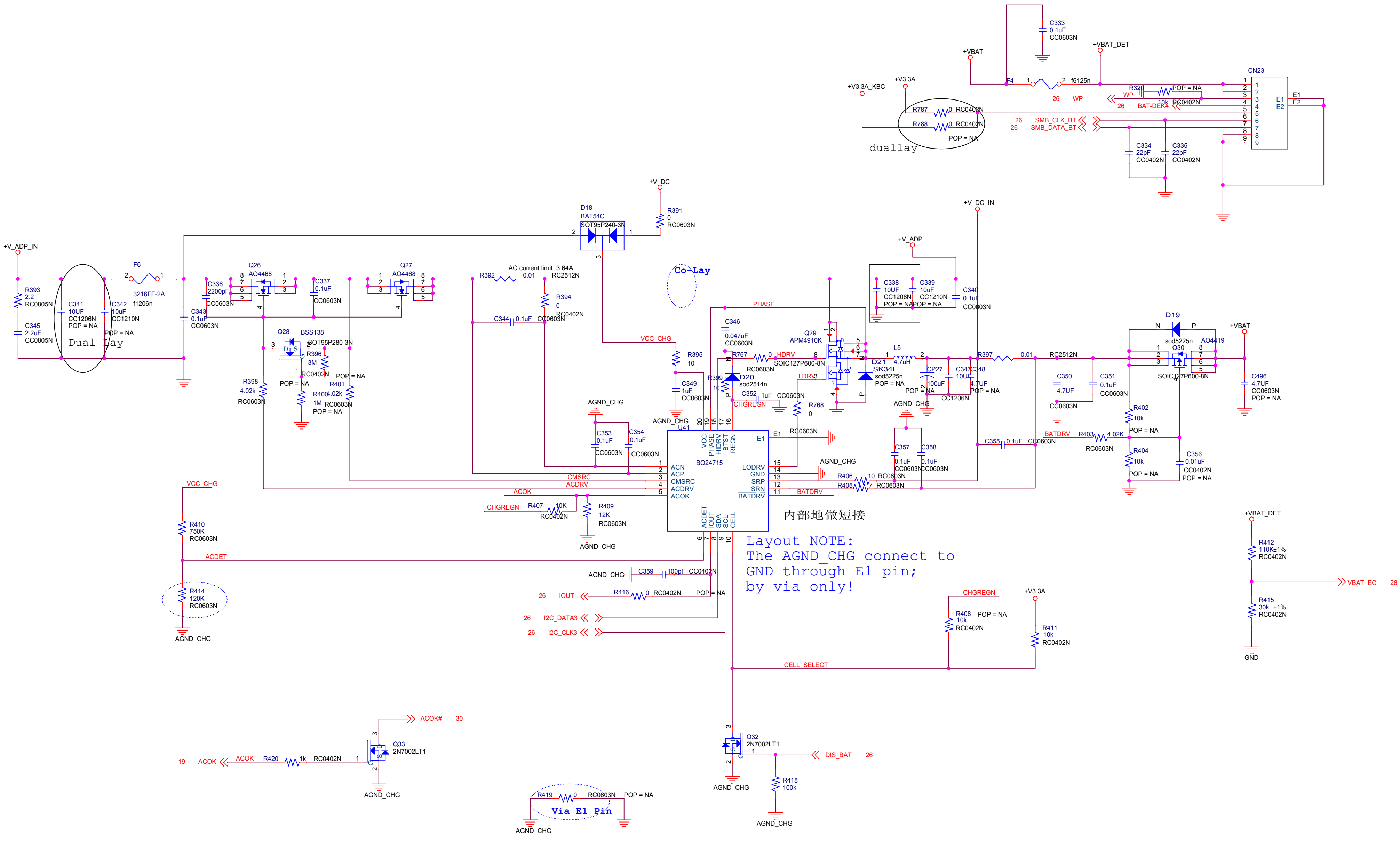
5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title <Title>

Size	Sheet Name	Rev
C	DC_IN & Power Good	A

Date: Wednesday, March 05, 2014 Sheet 30 of 38

ENGINEER: golden



Layout NOTE:
The AGND_CHG connect to
GND through E1 pin;
by via only!

lengda联达

Lengda Technology Ltd.

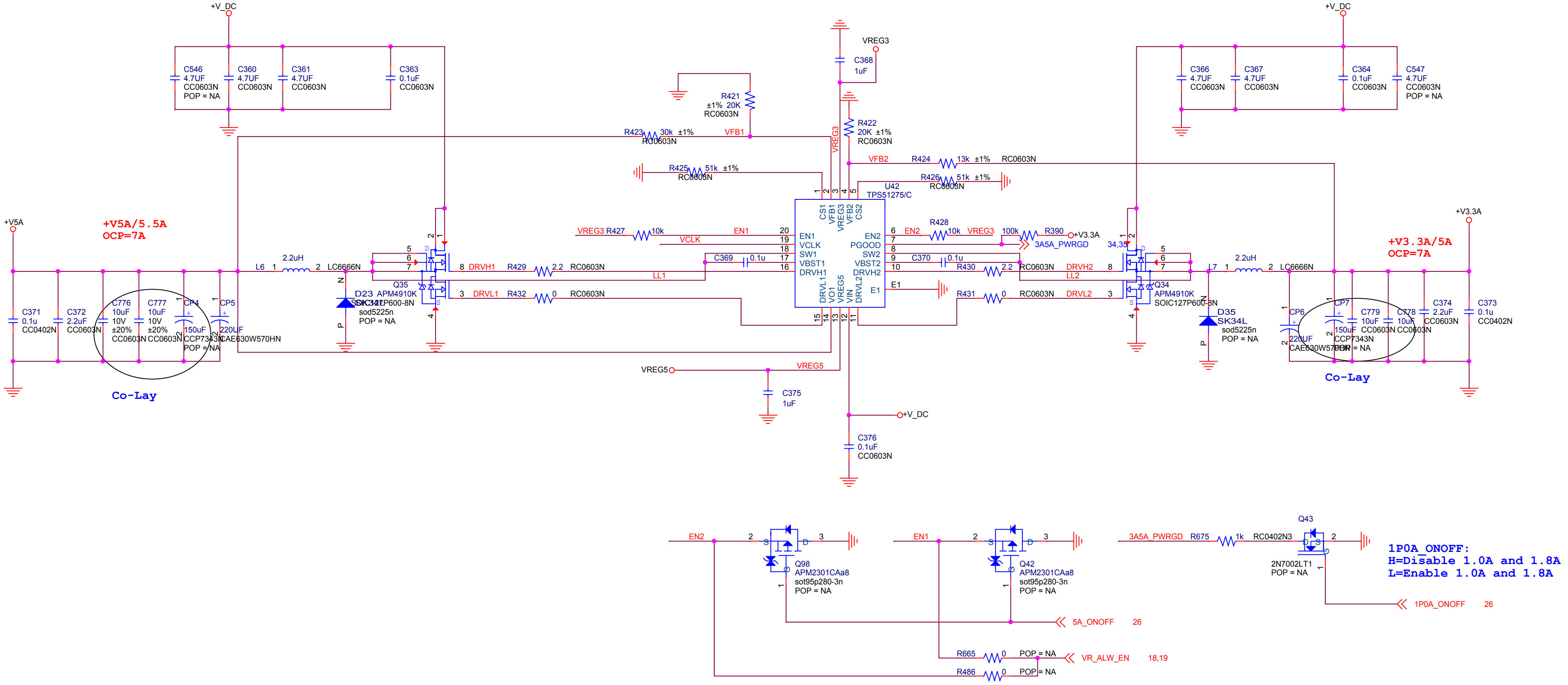
5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title <Title>

Size	Sheet Name		Rev
C		Power Charger & Battery Conn	A

ENGINEER: golden

Date: Sunday, May 04, 2014 Sheet 31 of 38

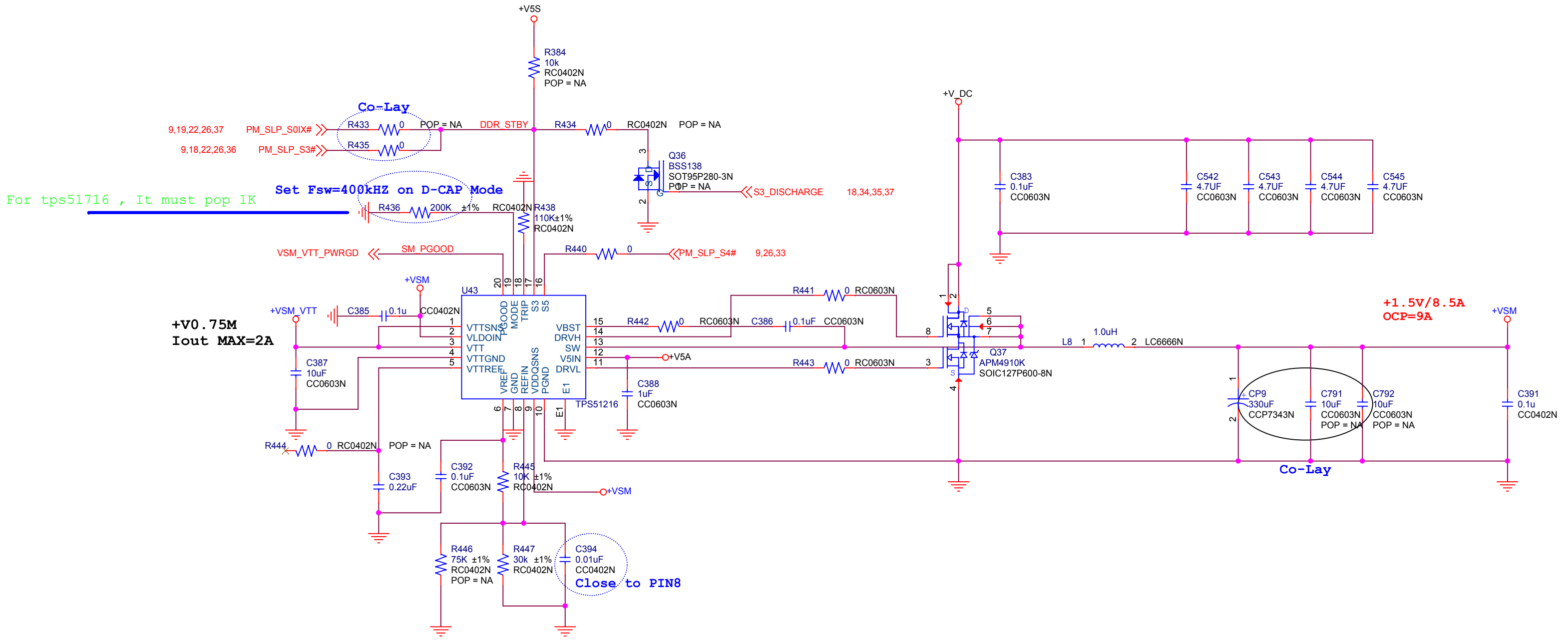


Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title	<Title>	
Size C	Sheet Name +V5A & +V3.3A	Rev A
Date: Wednesday, March 05, 2014	Sheet 32 of 38	

ENGINEER: golden



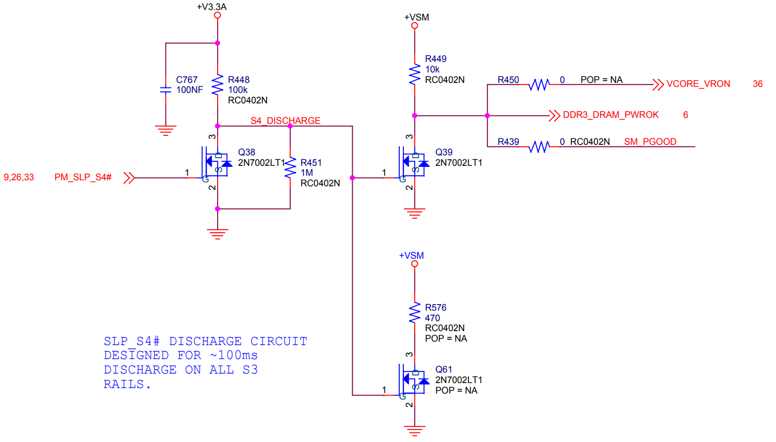
R446 和R447改为一颗30K的即可得1.35V

Table 1. S3/S5 Power State Control

STATE	S3	S5	VREF	VDDQ	VTTREF	VTT
S0	HI	HI	ON	ON	ON	ON
S3	LO	HI	ON	ON	ON	OFF(High-Z)
S4/S5	LO	LO	OFF	OFF(Discharge)	OFF(Discharge)	OFF(Discharge)

Table 2. MODE Selection

MODE NO.	RESISTANCE BETWEEN MODE AND GND (kΩ)	SWITCHING FREQUENCY (kHz)	DISCHARGE MODE
3	200	400	Tracking
2	100	300	
1	68	300	Non-tracking
0	47	400	



SLP_S4# DISCHARGE CIRCUIT
DESIGNED FOR ~100ms
DISCHARGE ON ALL S3
RAILS.

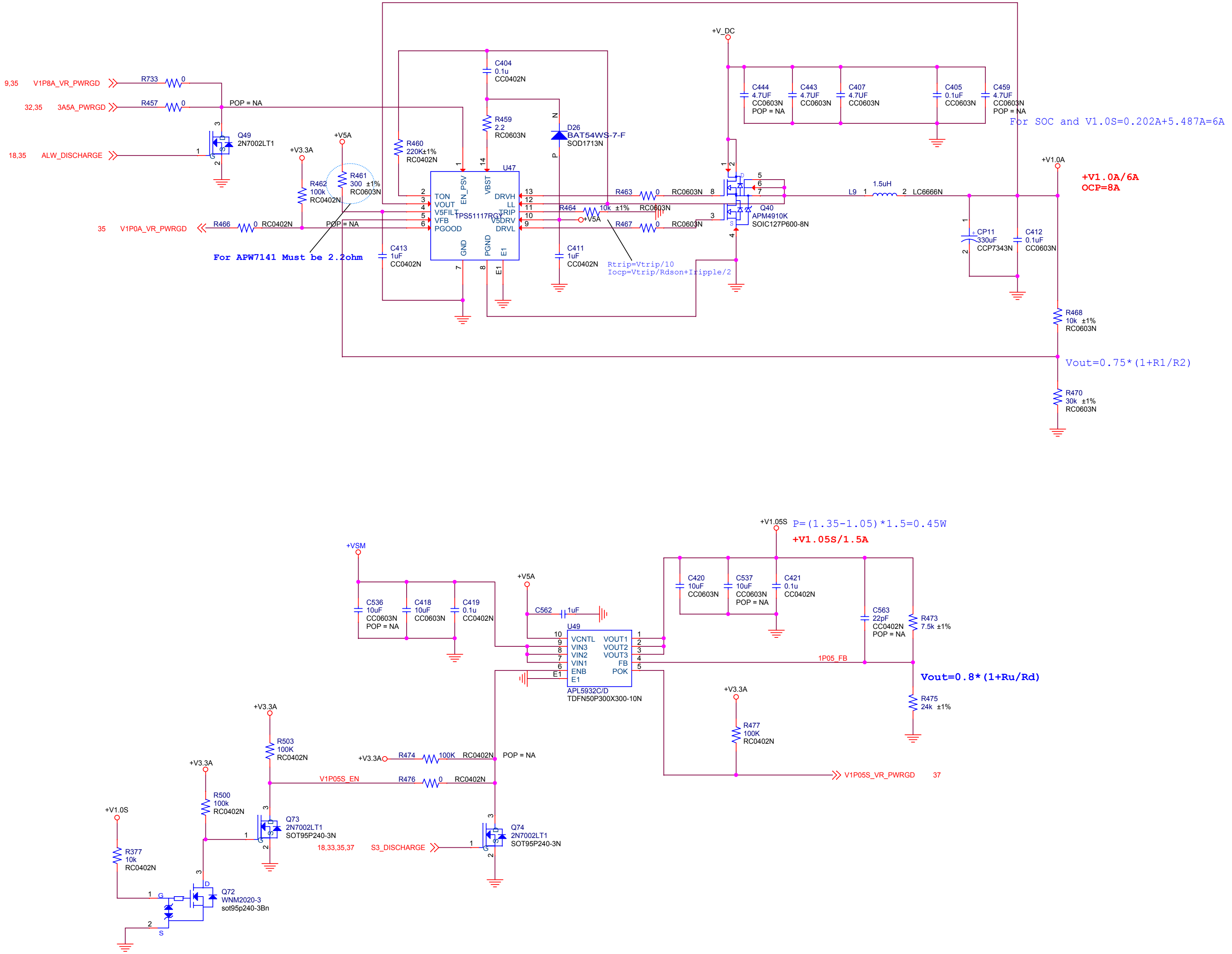
Lengda Technology Ltd.
5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

lengda联达

ENGINEER: golden

Title <Title>

Size C
Sheet Name Power_DDR3/DDR3L
Rev A
Date: Wednesday, March 05, 2014
Sheet 33 of 38



For APW7141 Must be 2.2ohm

Rtrip=Vtrip/10
Iocp=Vtrip/Rdson+Iripple/2

For SOC and V1.0S=0.202A+5.487A=6A

+V1.0A/6A
OCP=8A

Vout=0.75*(1+R1/R2)

P=(1.35-1.05)*1.5=0.45W

+V1.05S/1.5A

Vout=0.8*(1+Ru/Rd)

Lengda Technology Ltd.

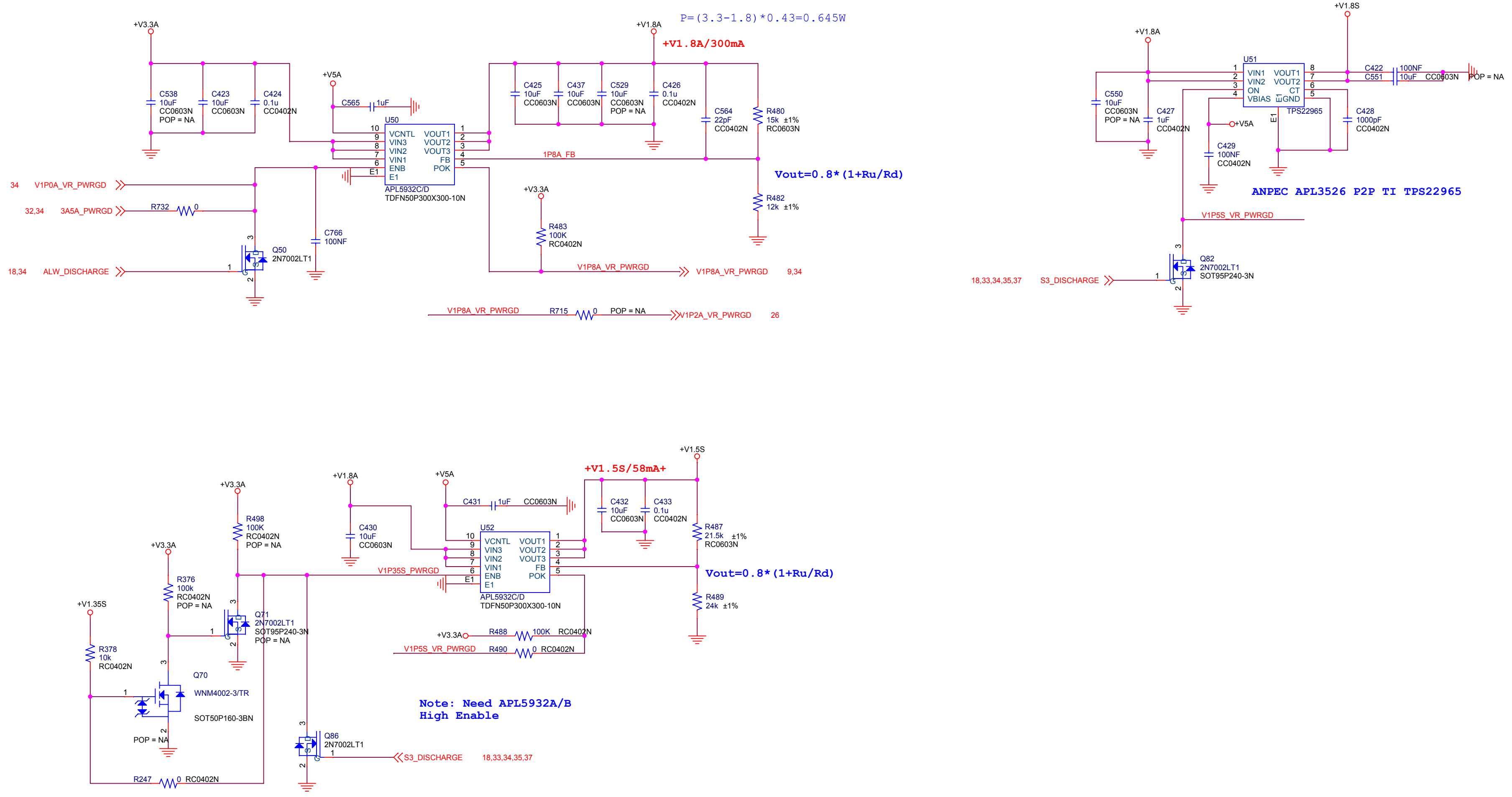
5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title <Title>

Size C
Sheet Name +V1.0A & +V1.05S
Rev A

ENGINEER: golden

Date: Wednesday, March 05, 2014
Sheet 34 of 38



lengda联达

Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title <Title>

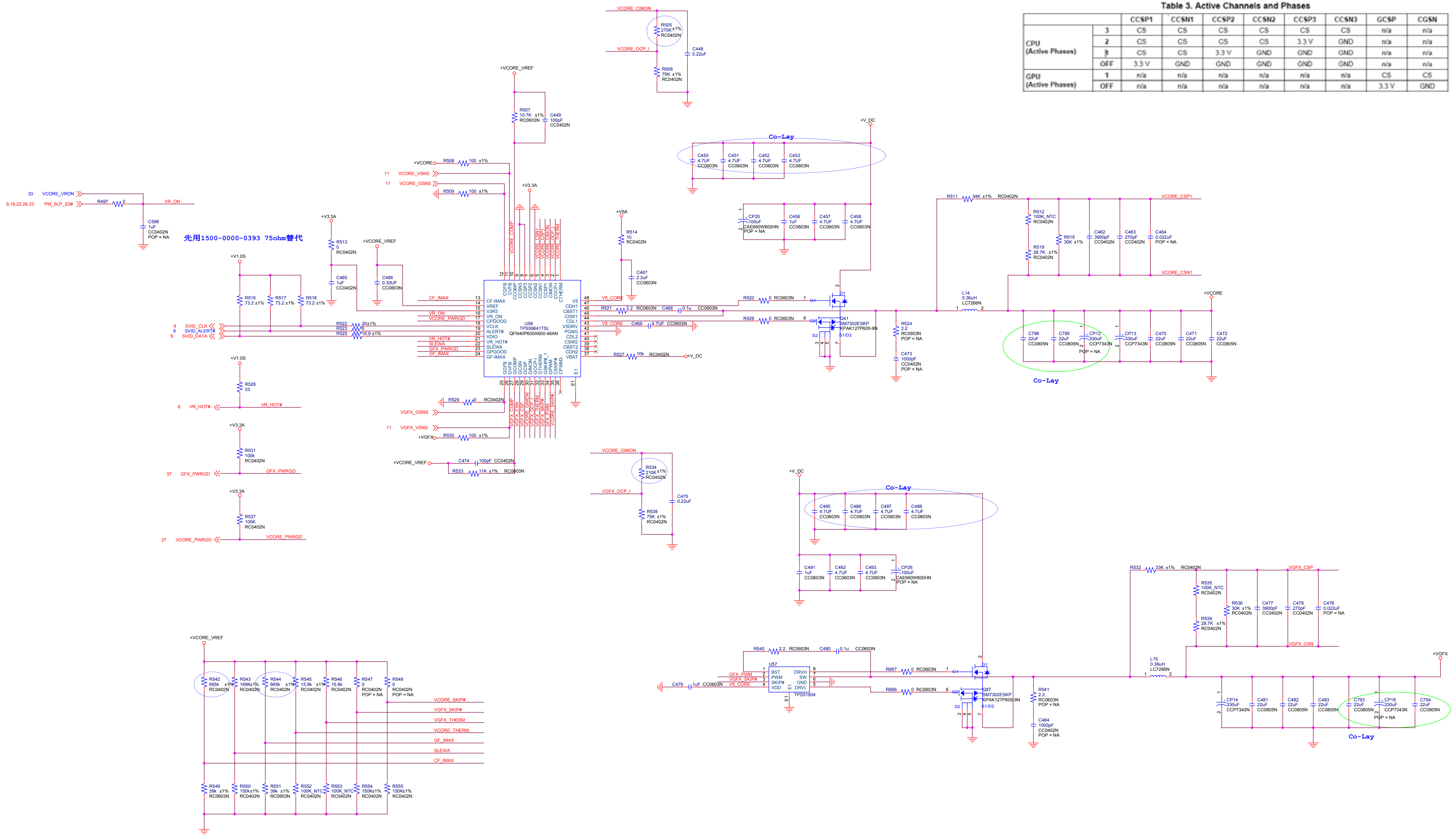
Size	Sheet Name		Rev
C		+V1.8A & +V1.2A & +V1.5S	A

ENGINEER: golden

Date: Wednesday, March 05, 2014 Sheet 35 of 38

Table 3. Active Channels and Phases

		CCSP1	CCSN1	CCSP2	CCSN2	CCSP3	CCSN3	GCSP	CGSN
CPU (Active Phases)	3	CS	CS	CS	CS	CS	CS	n/a	n/a
	2	CS	CS	CS	CS	3.3 V	GND	n/a	n/a
	1	CS	CS	3.3 V	GND	GND	GND	n/a	n/a
	OFF	3.3 V	GND	GND	GND	GND	GND	n/a	n/a
GPU (Active Phases)	1	n/a	n/a	n/a	n/a	n/a	n/a	CS	CS
	OFF	n/a	n/a	n/a	n/a	n/a	n/a	3.3 V	GND

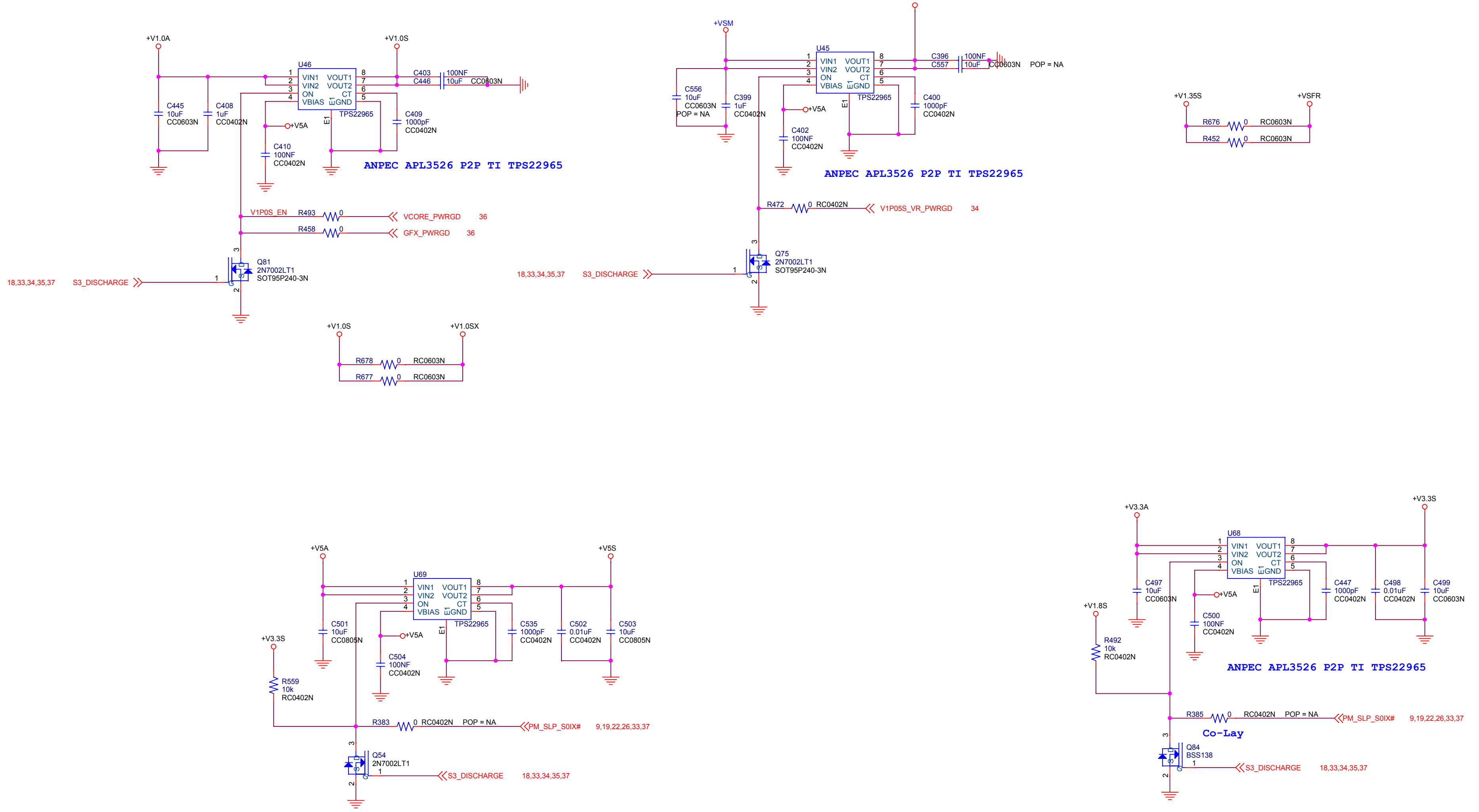


Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title	<Title>
Size	D
Sheet Name	POWER VCORE & GFXCORE
Rev	A
Date:	Wednesday, March 05, 2014
Sheet	36 of 38
ENGINEER:	golden

S3 /S4 Power control



Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title	<Title>		
Size C	Sheet Name	Power_S3_S4	Rev A
ENGINEER: golden	Date: Wednesday, March 05, 2014	Sheet 37 of 38	

Changelist

Changelist v1.01

1、增加FLASH_TXE和5A_ONOFF信号----------兼容ITE8928预留
2、DDR电源更改layout
3、增加CP5，CP6并duallay
4、增加信号LPC_SERIRQ电平转换电路
5、cn32，cn30管脚会短路，拉开间距-------layout更改
6、CN29光驱定义反，需更改
7、增加SD3_WP信号，删除cardread的USB信号

Changelist v1.02

1、变更信号LPC_SERIRQ电平转换电路

2、USB配置重新调整，CAMERA 触摸屏，SD

3、SD卡SDIO电源配置预留

Lengda Technology Ltd.

5th floor,Block K,
Xiamen Exprot Processing Zone,
Haicang District,Xiamen,China,361026

Title <Title>

Size D	Sheet Name Change List	Rev A

Date: Sunday, May 04, 2014 Sheet 38 of 38

ENGINEER: golden