

# LCFC Confidential


## EG521/EG522 MB Schematics Document

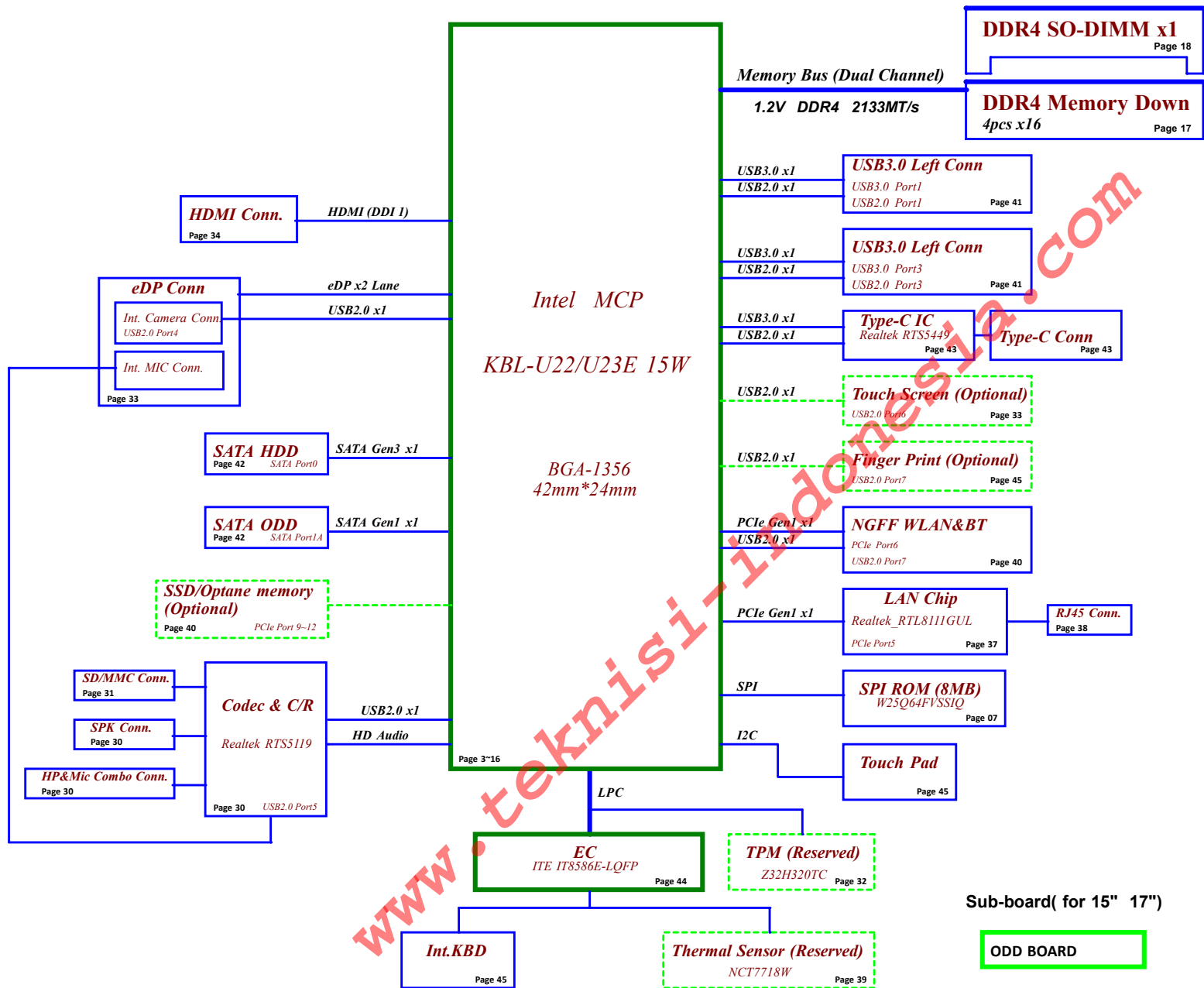
Kabylake-U42 with DDR4

2017-04-25

REV: 0.2

www.teknisi-indonesia.com

Security Classification	LC Future Center Secret Data				Title		
Issued Date	2015/08/20	Deciphered Date	2016/08/20	Cover Page			
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Voltage Rails ( 0 --> Means ON , X --> Means OFF )

Power Plane				
State	V20B+	+3VALW +5VALW +3VALW_PCH +1.8VALW +1.0VALW	+1.2V +2.5V_DDR +VCCST	+5VS +3VS +VCCIO +VCCSTG +VCCSA +VCC_GT +CPU_CORE +0.6VS
S0	0	0	0	0
S3	0	0	0	X
S3 Battery only	0	0	0	X
S5 S4 AC Only	0	0	X	X
S5 S4 Battery only	0	X	X	X
S5 S4 AC & Battery don't exist	X	X	X	X

SMBUS Control Table

	SOURCE	BATT	Charger	DGPU	IT8586E	Memory Down	PCH	PMIC	SODIMM	Thermal Sensor	WLAN
EC_SMB_CK1 EC_SMB_DA1	IT8586E +3VL_EC	V	V	X	V +3VL_EC	X	X	X	X	X	X
EC_SMB_CK2 EC_SMB_DA2	IT8586E +3VS	X	X	V +3VG_AON	V +3VS	X	V +3VALW_PCH	X	X	V	X
EC_SMB_CK3 EC_SMB_DA3	IT8586E +3VL_EC	X	X	X	V +3VL_EC	X	X	V	X	X	X
PCH_SMB_CLK PCH_SMB_DATA	PCH +3VALW_PCH	X	X	X	X	X	V +3VALW_PCH	X	V +3VS	X	V +3VS

EC SMBus1 address      EC SMBus2 address      EC SMBus3 address      PCH SM Bus address

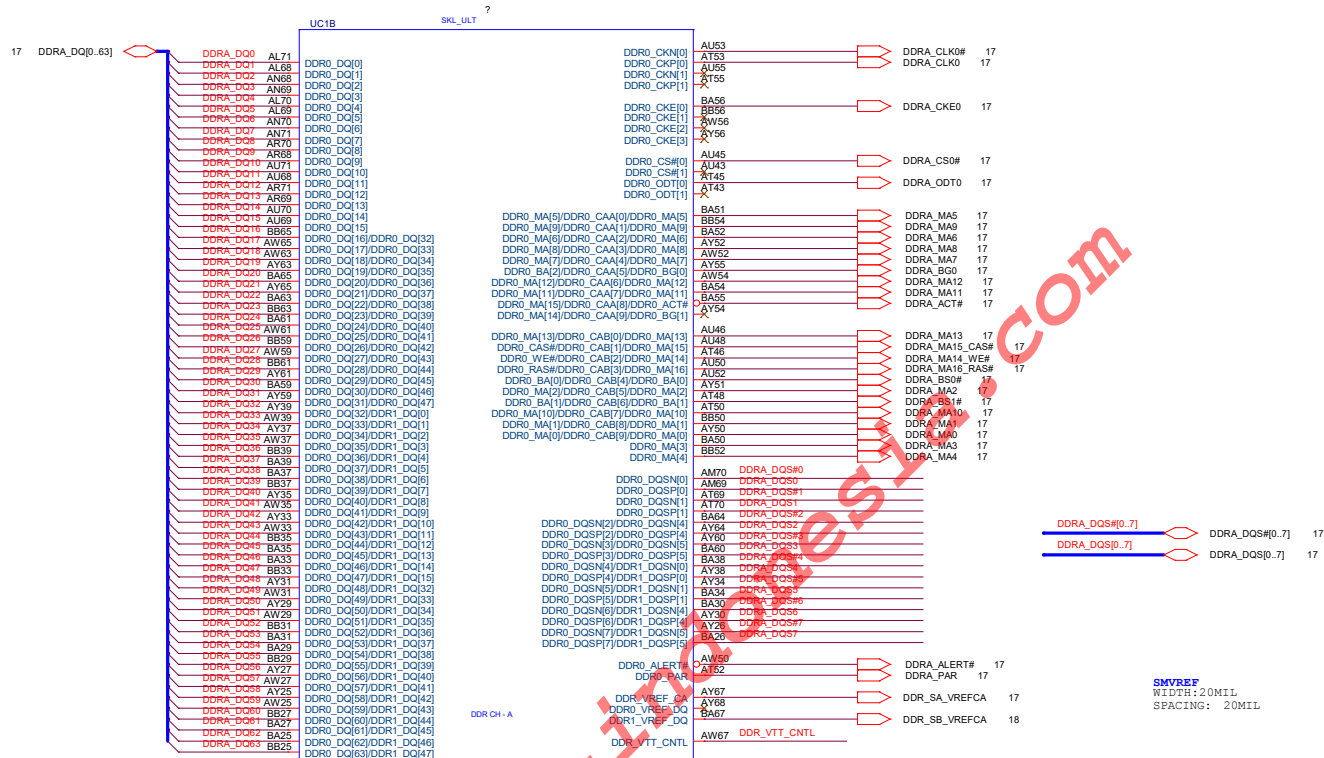
Device	Address	Device	Address	Device	Address	Device	Address
Smart Battery	need to update	Thermal Sensor(NCT7718W)	1001_100xb	DDR4 SODIMM	need to update	Wlan	need to update
Charger	0001 0010 b	PCH	need to update				
		DGPU	need to update				


STATE	SIGNAL	SLP_S3#	SLP_S4#	SLP_S5#	+VALW	+V	+VS	Clock
Full ON		HIGH	HIGH	HIGH	ON	ON	ON	ON
S3 (Suspend to RAM)		LOW	HIGH	HIGH	ON	ON	OFF	OFF
S4 (Suspend to Disk)		LOW	LOW	LOW	ON	OFF	OFF	OFF
S5 (Soft OFF)		LOW	LOW	LOW	ON	OFF	OFF	OFF

HSIO PORT	Function
USB3.0	1 USB3.0 Conn Left
	2 USB Type-C
	3 USB3.0 Conn Left
	4 NC
	5 NC
	6 NC
USB2.0	1 USB3.0 Conn Left
	2 USB Type-C
	3 USB3.0 Conn Left
	4 Finger Print
	5 Cardreader
	6 Touch Panel
	7 Bluetooth
	8 Camera
	9 NC
	10 NC
PCIe	1~4 DGPU
	X4 PCIe
	5 LAN
	6 WLAN
	7 SATA HDD
	8 SATA ODD
	9~12 Optane Memory
	X4 PCIe
SATA	0 HDD
	1A ODD
	1B used as PCIe
	2 used as PCIe

BOM Structure	BTO Item
@	Not stuff
14@	For 14" part
15@	For 15" part
14or15@	For 14" or 15" part
14or17@	For 14" or 17" part
Cannonlake@	For Cannonlake part
CD@	For C cost down
DUALMIC@	For Dual MIC part
EMC@	For EMC part
EMC_15@	For EMC 15" part
EMC_NS@	For EMC nu-stuff part
EMC_PX@	For EMC PX part
EMC_PXNS@	For EMC PX nu-stuff part
ES@	For ES CPU
EXO@	For EXO GPU
ME@	For ME part
NTS@	For nu-touch part
DIS@	For GPU part
OPT@	For NV GPU part
PX@	For AMD GPU part
RANKA@	For VRAM rank A part
RANKB@	For VRAM rank B part
Realtek SD@	For Realtek SD part
SINGLEMIC@	For single MIC part
SINGLERANK@	For single VRAN rank part
DUALRANK@	For dual VRAN rank part
TS@	For touch screen part
TPM@	For TPM part
UMA@	For UMA part





Security Classification		LC Future Center Secret Data		Title									
Issued Date		2015/08/20		Deciphered Date			2016/08/20		MCP (DDR4)				
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Date:				Tuesday, April 25, 2017				Sheet 5		of 60			

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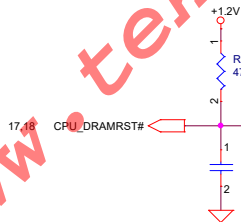
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SKYLAKE-U\_BGA1356

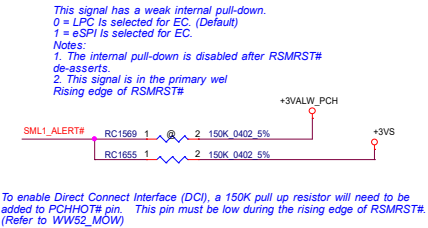
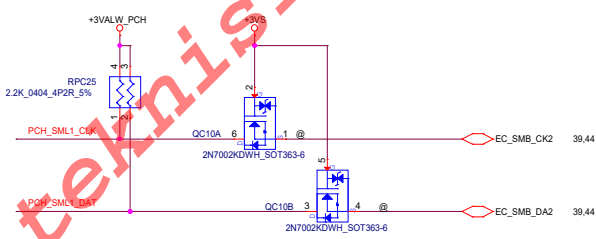
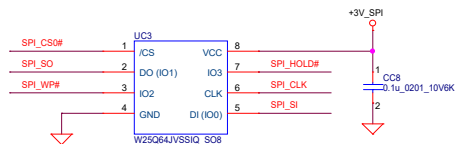
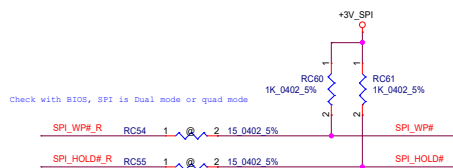
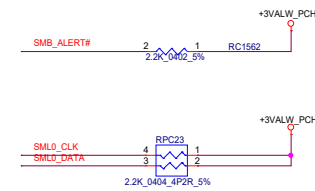
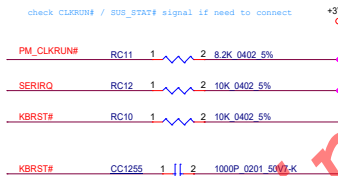
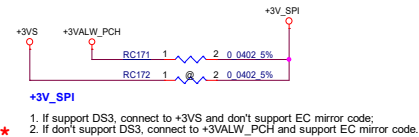
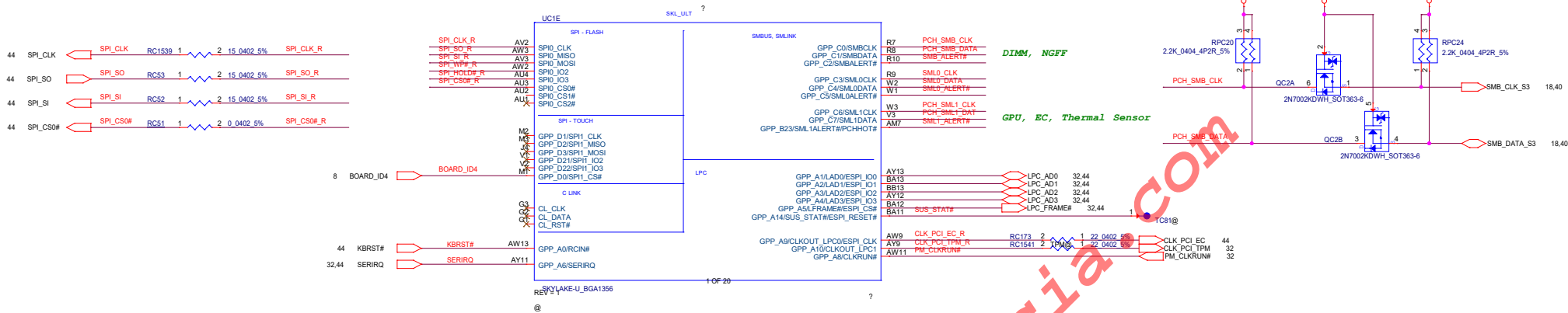
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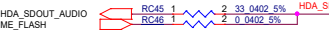
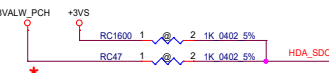
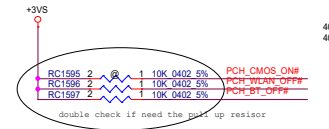
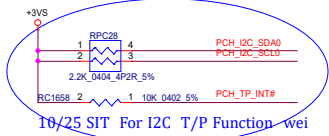
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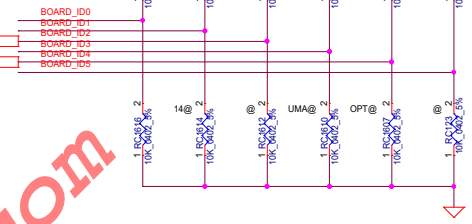
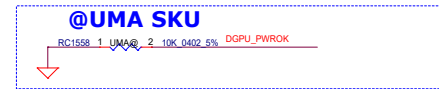
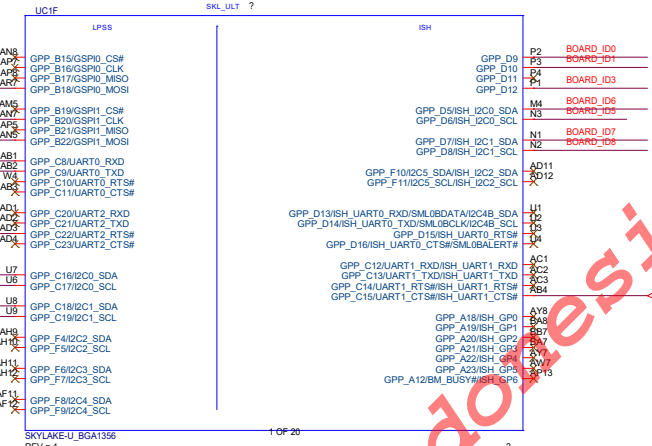
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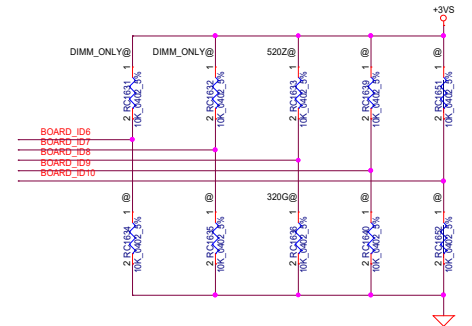




Pin Name	Strap Description	Configuration	Default Value	When Sampled
SPKR / GPP_B14	Top Swap Override	Internal PD 0 = Disable "Top Swap" mode. (Default) ★ 1 = Enable "Top Swap" mode.	0	Rising edge of PCH_PWR0K
GSPI0 MOSI /GPP_B18	No Reboot	Internal PD 0 = Disable "No Reboot" mode. (Default) ★ 1 = Enable "No Reboot" mode	0	Rising edge of PCH_PWR0K
GSPI1 MOSI /GPP_B22	Boot BIOS Strap Bit BBS	Internal PD 0 = SPI (Default) ★ 1 = LPC	0	Rising edge of PCH_PWR0K

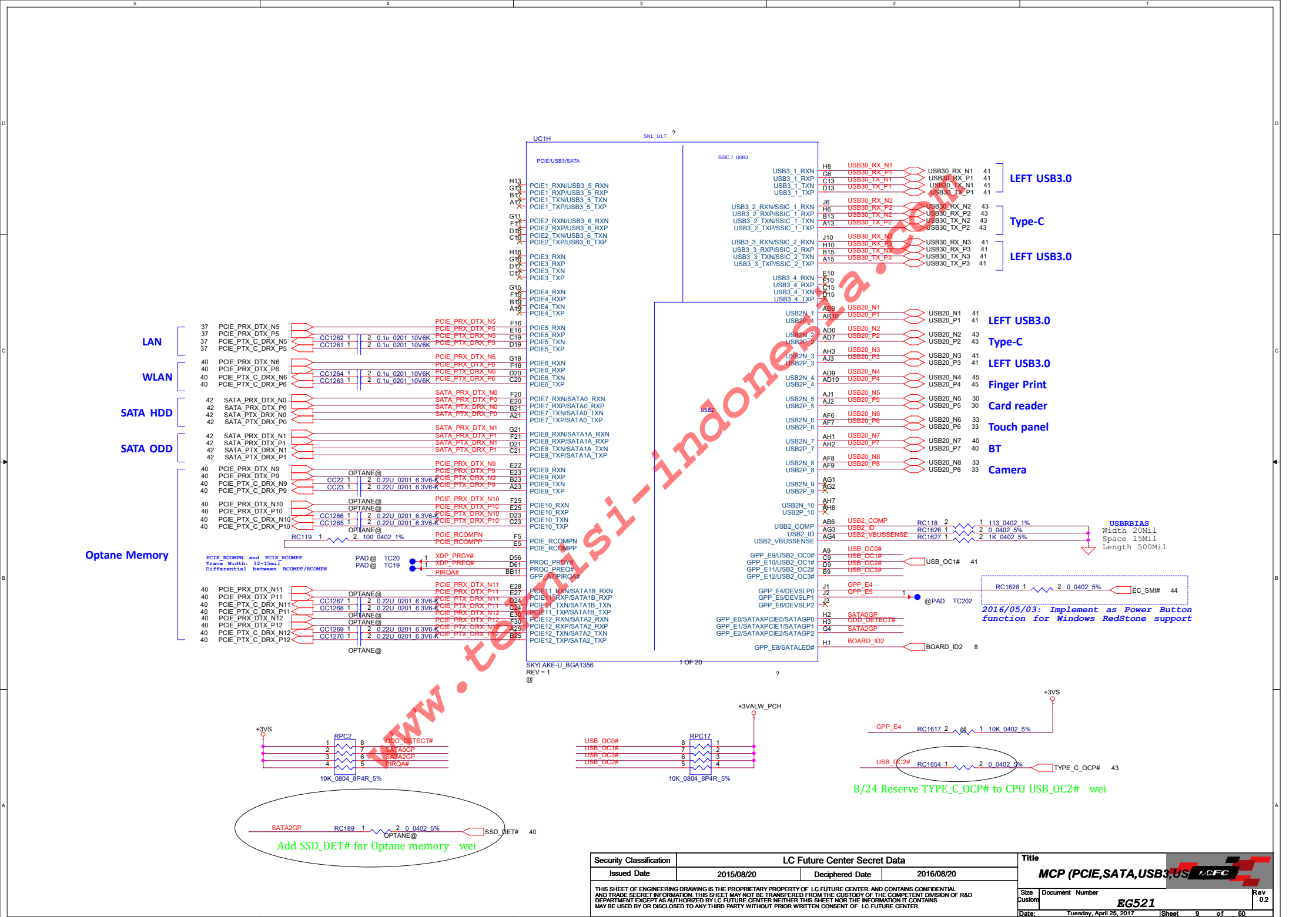


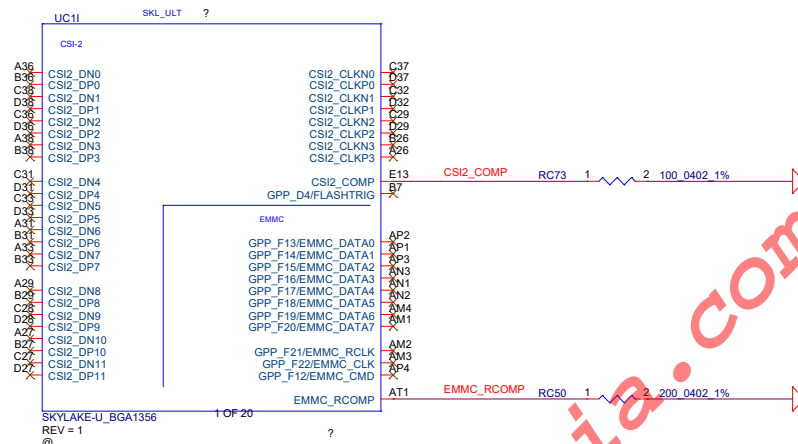
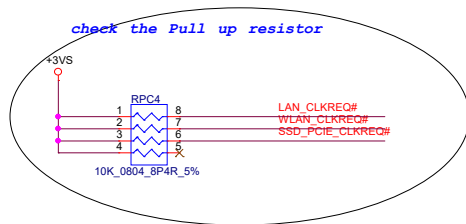
Board ID	Description	Stuff R
Board_ID[0:1]	00 14"	RC1616 RC1614
	01 15"	RC1616 RC1613
	10 17"	RC1615 RC1614
	11 Reserved	RC1615 RC1613
Board_ID2	0 Reserved	RC1612
	1 Reserved	RC1611
Board_ID3	0 UMA	RC1610
	1 DIS	RC1609
Board_ID4	0 NV GPU	RC1607
	1 AMD GPU	RC1608
Board_ID5	0 Reserved	RC123
	1 Reserved	RC1606



Board ID	Description	Stuff R
Board_ID [6,7]	00 Samsung 8Gb 2400 MT/s	RC1634 RC1635
	01 Hynix 8Gb 2400 MT/s	RC1634 RC1632
	10 Micron 8Gb 2400 MT/s	RC1631 RC1635
	11 SO-DIMM Only	RC1631 RC1632
Board_ID8	0 320G	RC1636
	1 520Z	RC1633
Board_ID9	0 Reserved	RC1640
	1 Reserved	RC1639
Board_ID10	0 Reserved	RC1652
	1 Reserved	RC1651







Optane memory

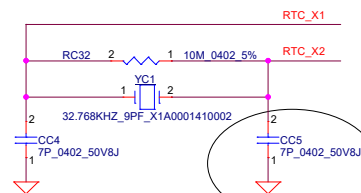
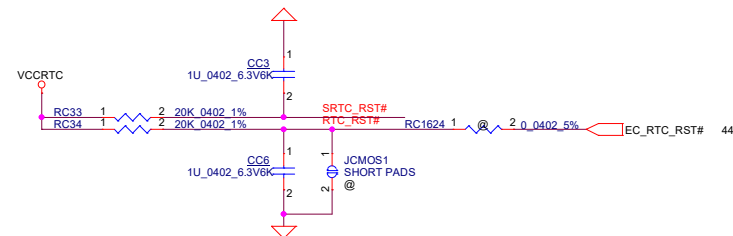
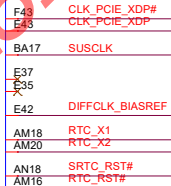
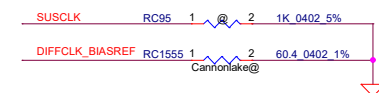
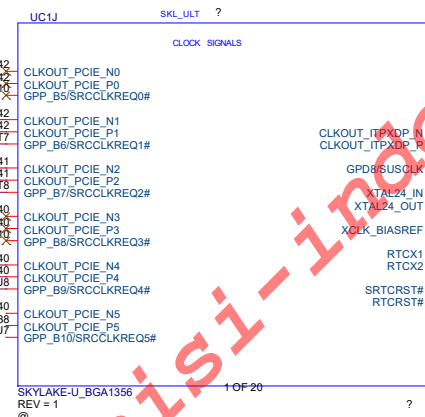
PCIE CLK5 WLAN

PCIE CLK4 LAN

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40 CLK\_PCIE\_SSD  
40 SSD\_PCIE\_CLKREQ#

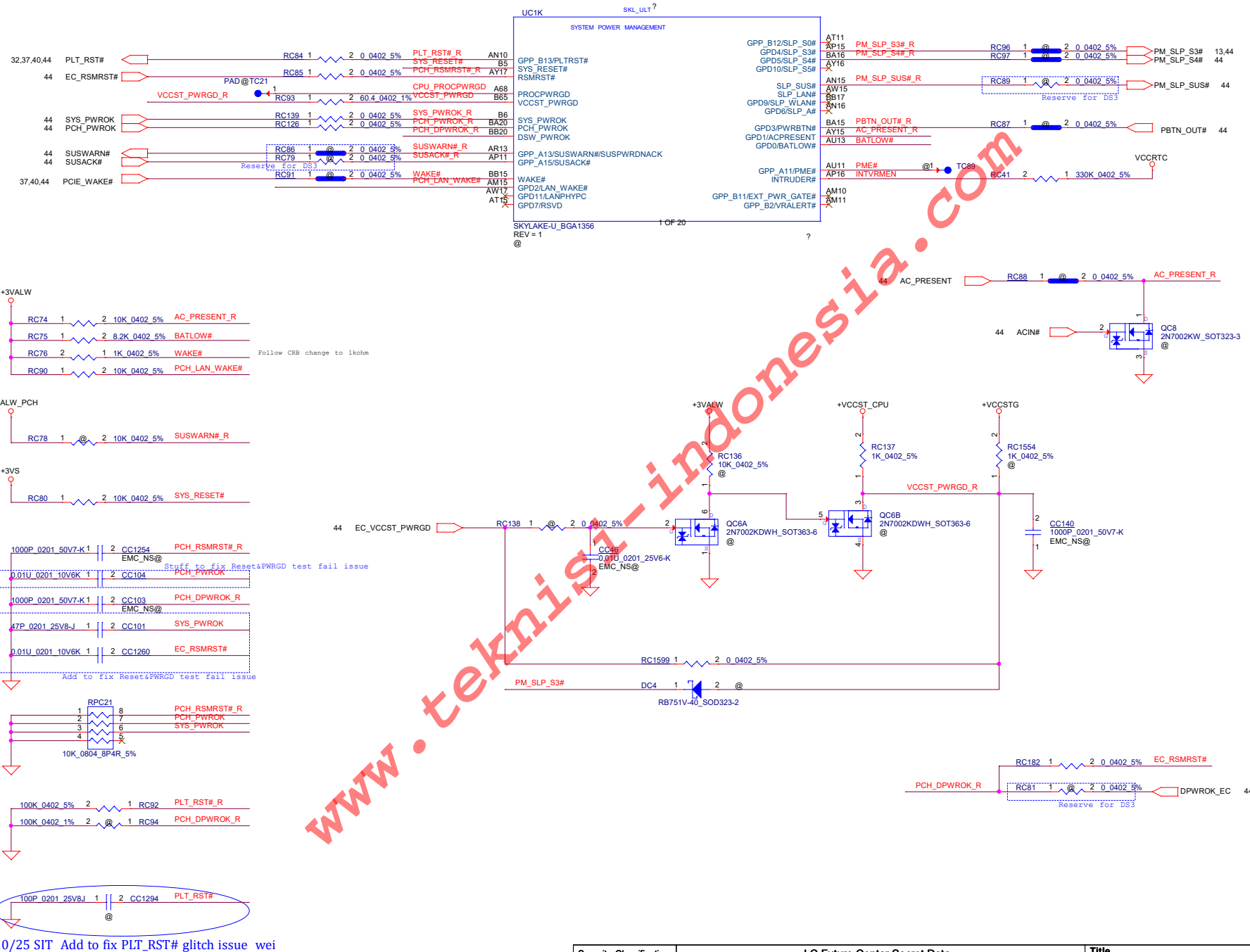
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37 CLK\_PCIE\_LAN#  
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37 LAN\_CLKREQ#

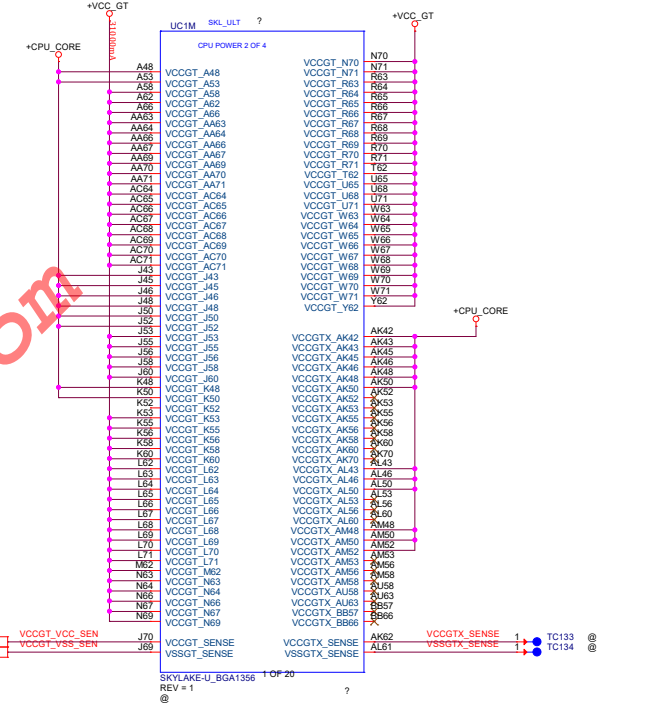
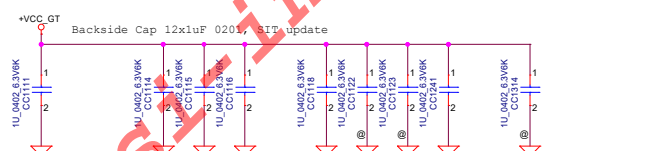
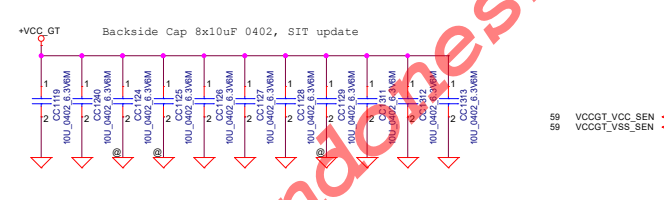
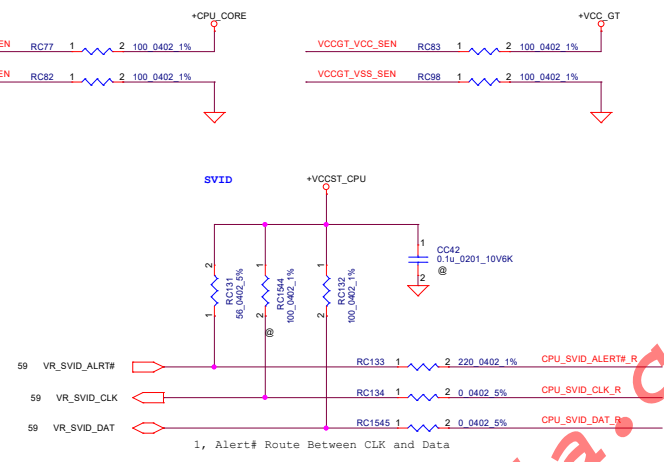
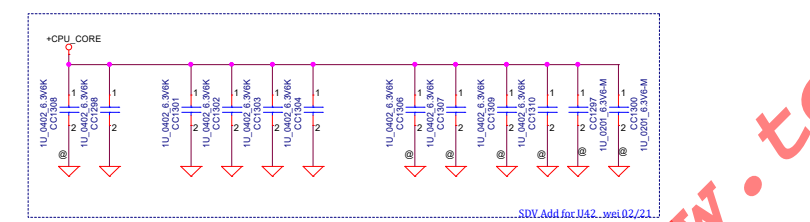
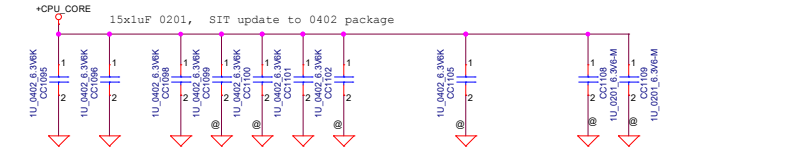
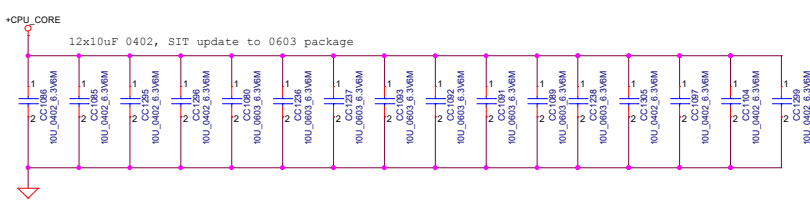
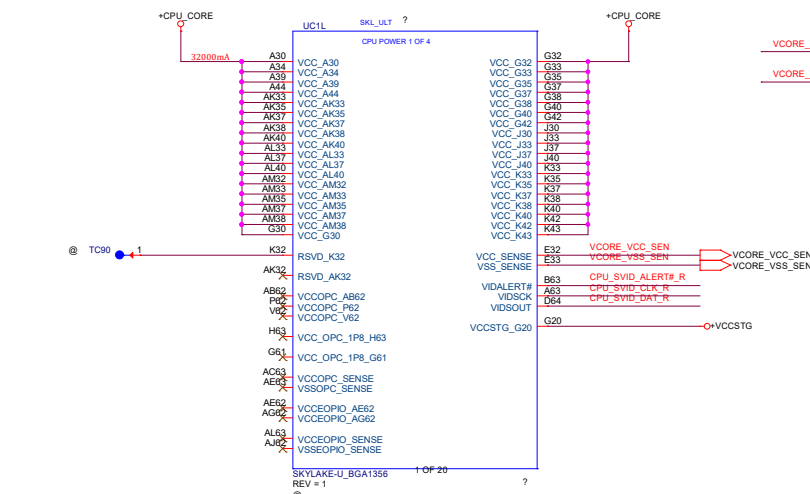


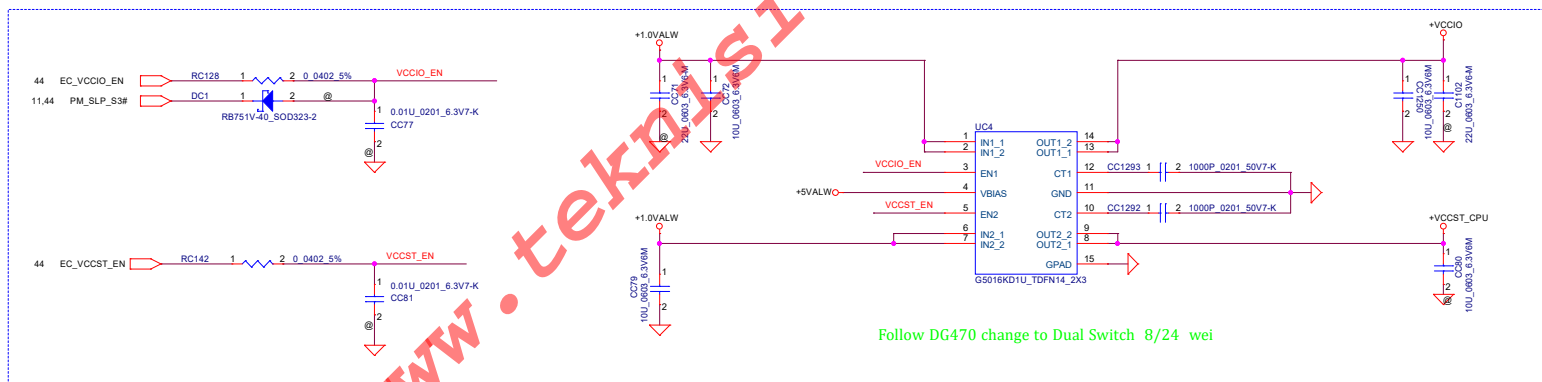
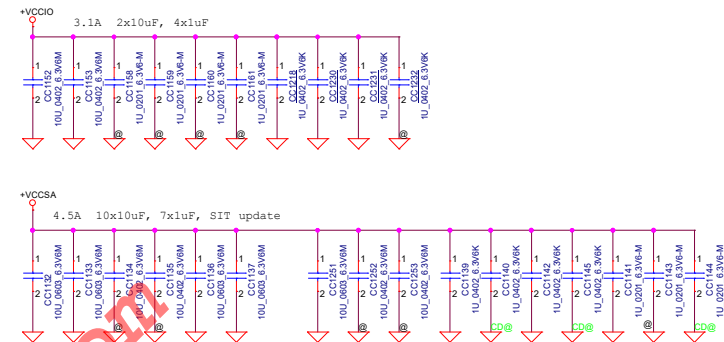
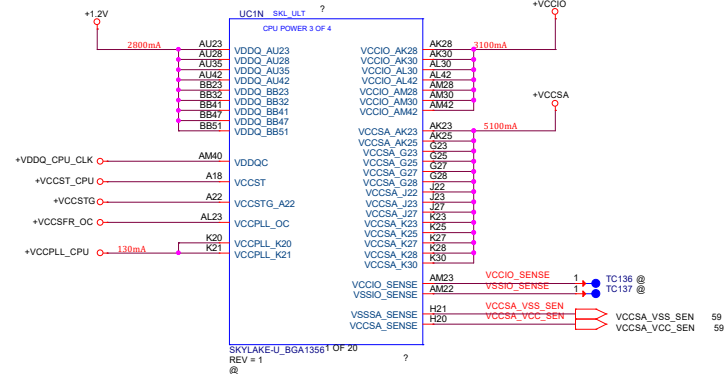
when single end external clock generator used, this pin should be grounded

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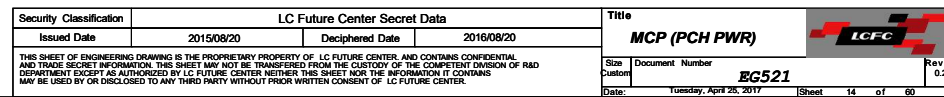
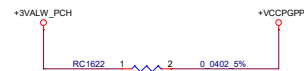
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Issued Date	2015/08/20	Deciphered Date	2016/08/20	<b>MCP (SYSTEM PWR MANA</b>	
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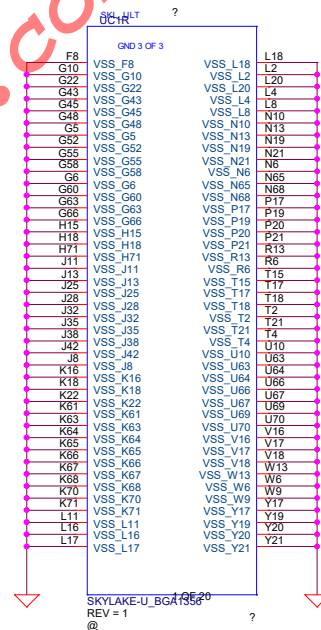
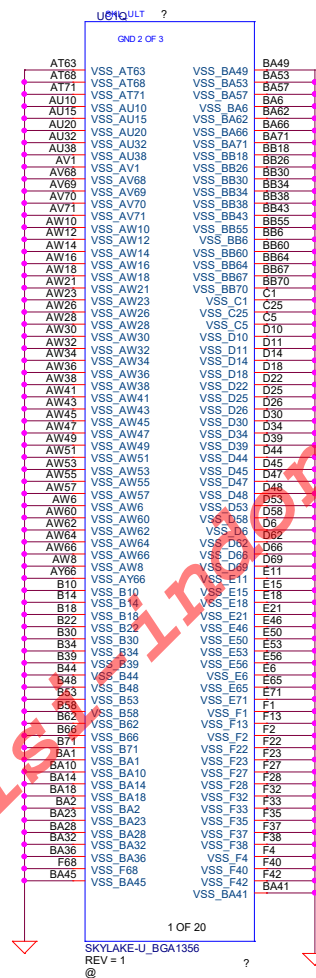
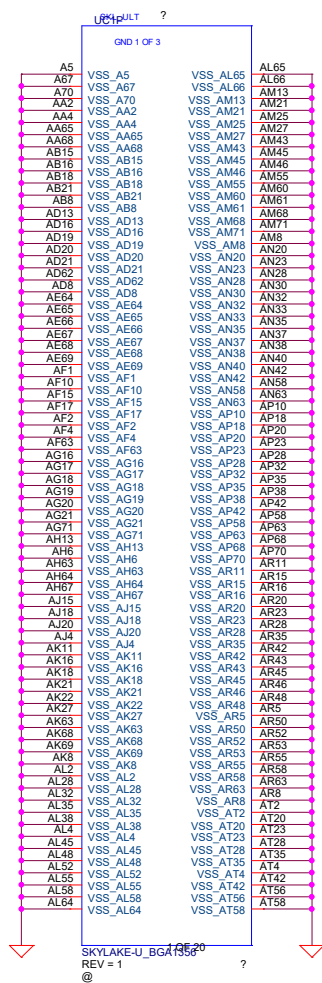




Follow DG470 change to Dual Switch 8/24 wei

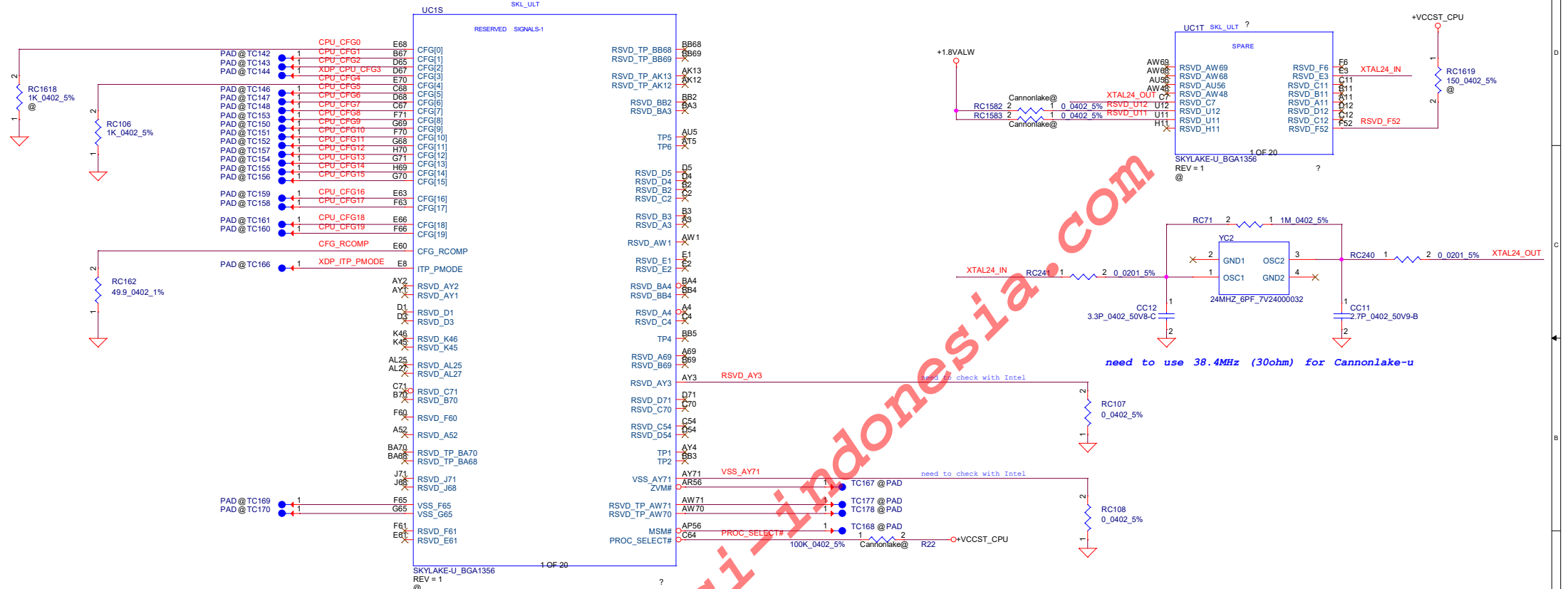
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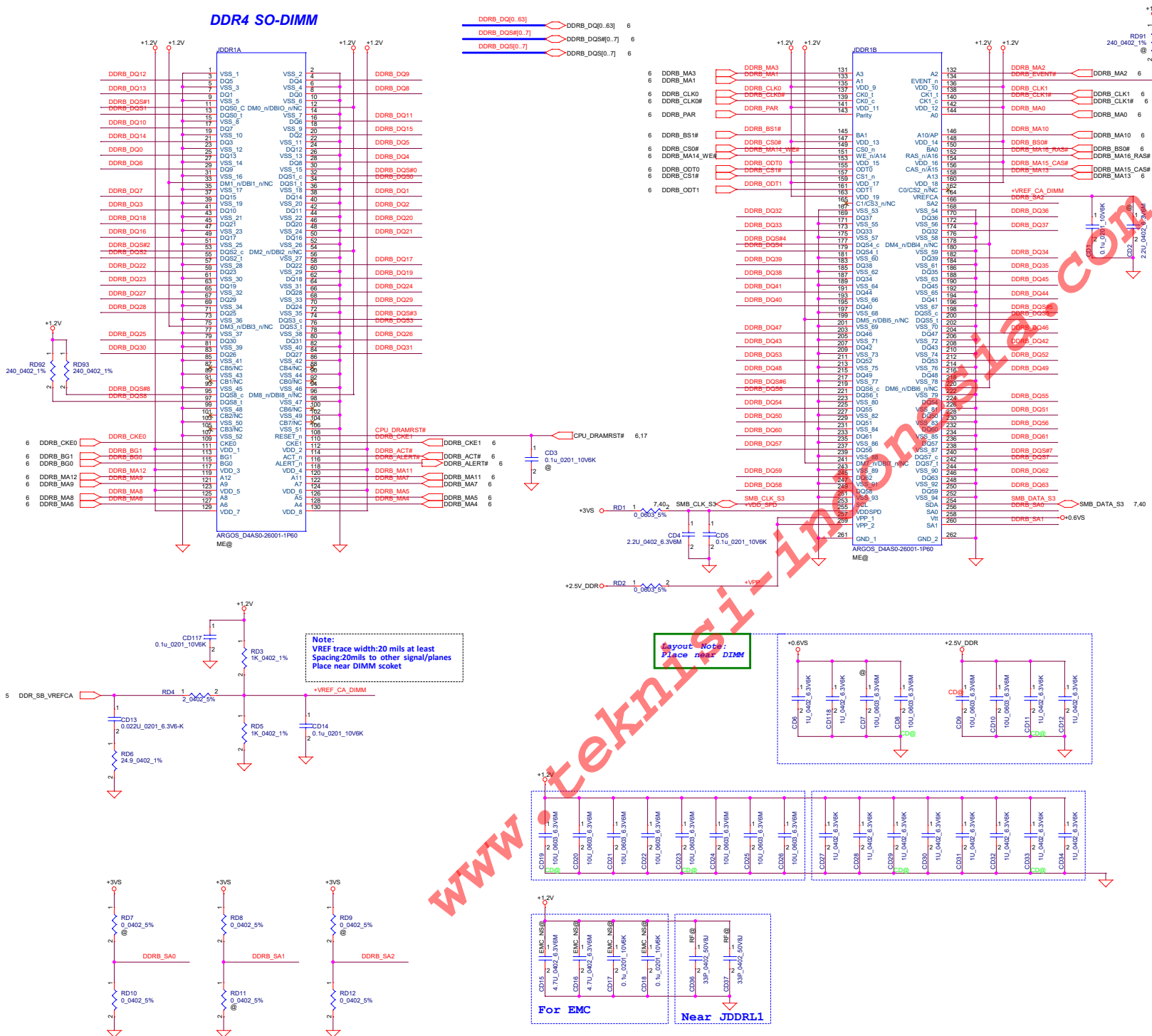
Pin Name	Strap Description	Configuration	Default Value
CFG[4]	Display Port Presence strap	- 1 = eDP Disabled - 0 = eDP Enabled *	1

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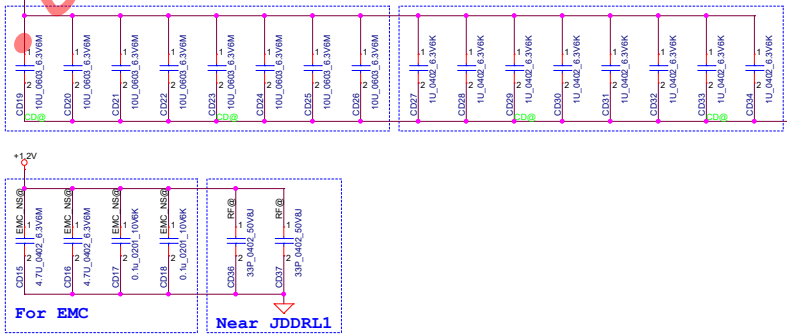


# DDR4 SO-DIMM




Note:  
VREF trace width:20 mils at least  
Spacing:20mils to other signal/planes  
Place near DIMM socket


Layout Note:  
Place near DIMM



SPD Address = 2H

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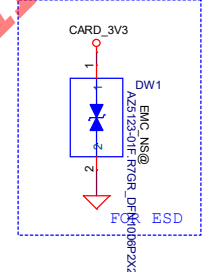
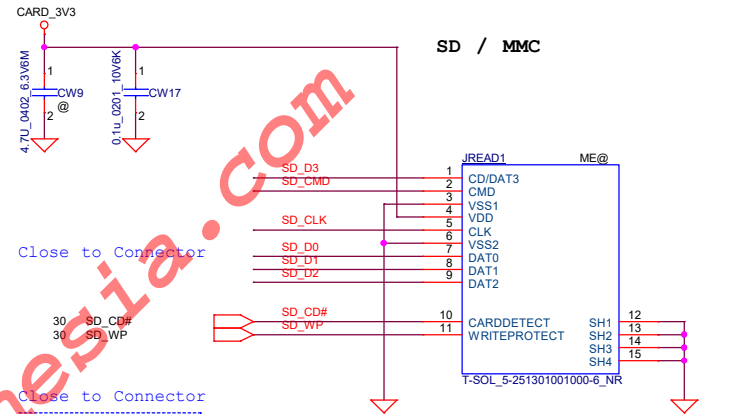
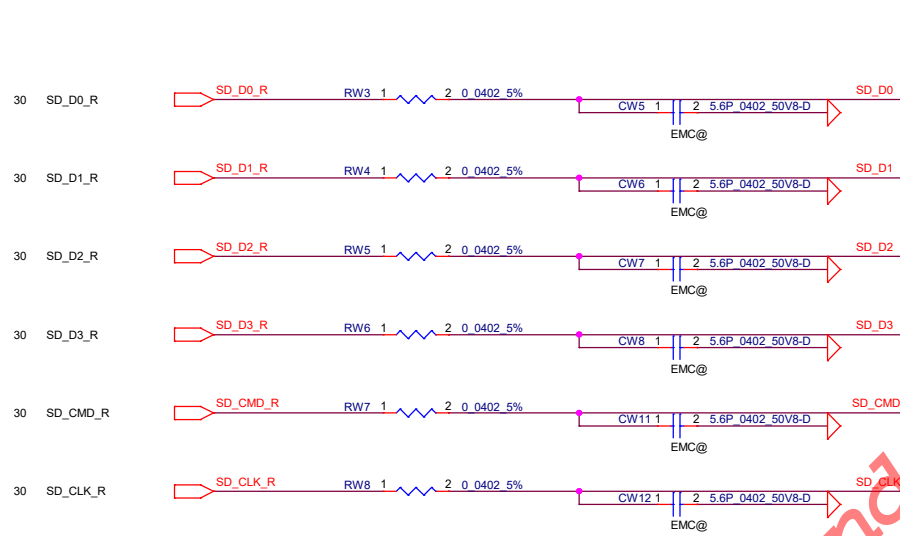
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8/16 Update Conn. P/N SP07000WG00 wei

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The diagram shows the PCB layout for the U5 microcontroller. Key components and connections include:

- U5 (SY6288C20AAC\_S0T23-5):** The central microcontroller component.
- Power Connections:**
  - +3VS:** Connected to pin 1 (IN) and pin 4 (EN) via a 0.1uF capacitor (C1).
  - +LCDVDD:** Connected to pin 1 (OUT) via a 0.0805\_5% resistor (R263).
  - +LCDVDD\_CON:** Connected to pin 2 (GND) via a 0.0805\_5% resistor (R263).
  - +LEDVDD:** Connected to pin 3 (OCB) via a 0.0805\_5% resistor (R17).
- Signal Connections:**
  - PCH\_ENVDD:** Connected to pin 4 (EN) via a 0.1uF capacitor (C1).
  - W=60mils:** A dimension line indicating the width of the signal trace.
  - RF NSD:** A dimension line indicating the width of the RF trace.
- Other Components:**
  - C14:** 4.7uF capacitor connected to +3VS.
  - C122:** 4.7uF capacitor connected to +LCDVDD.
  - C123:** 33pF capacitor connected to +LEDVDD.
  - R17:** 0.0805\_5% resistor connected to +LEDVDD.
  - R263:** 0.0805\_5% resistor connected to +LCDVDD.
- Dimensions:**
  - 2A 80 mil:** Dimension for the +LEDVDD trace.
  - 2A 80 mil:** Dimension for the +LCDVDD trace.
  - W=60mils:** Dimension for the signal trace.
  - RF NSD:** Dimension for the RF trace.
- EMC Request:** A note indicating the EMC requirements for the design.

**CMOS Camera**

**Need short**

W=40 mils

3V3\_CMOS

JUMP\_43X39

LP2301ALT1G\_SOT23-3

Q7

3V3\_CMOS

W=40mils

0.1u\_0201\_10V6K

0.1u\_0201\_10V6K

0.1u\_0201\_10V6K

0.1u\_0603\_6.3V6K

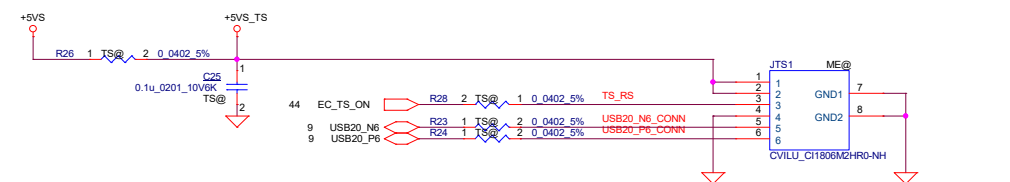
CMOS\_ON#


100K\_0402\_5%

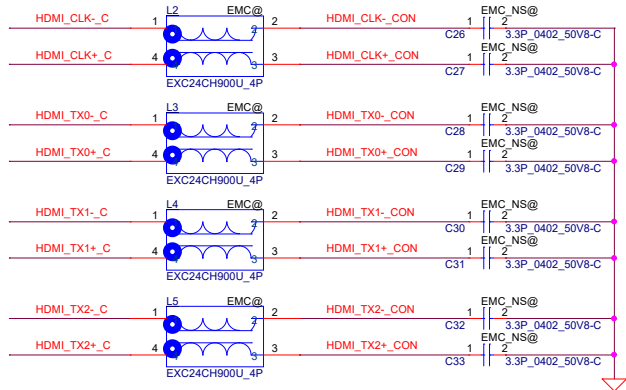
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EMC\_NS@

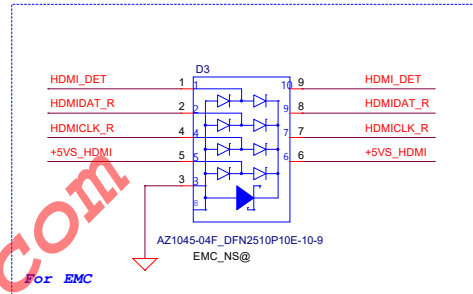
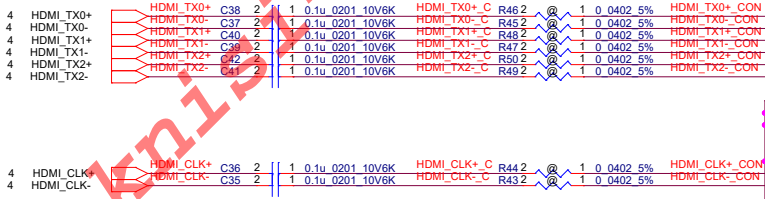
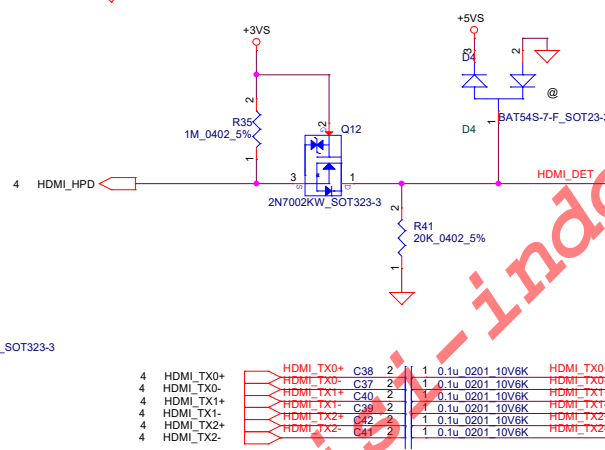
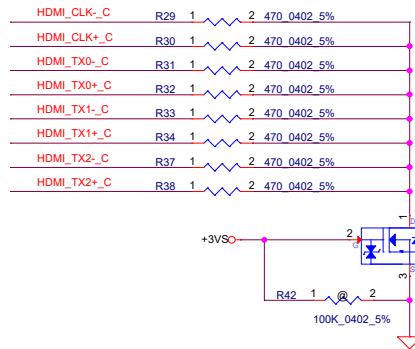
For EMI  
Close to R5



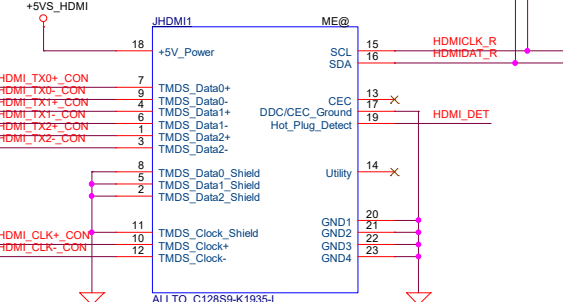
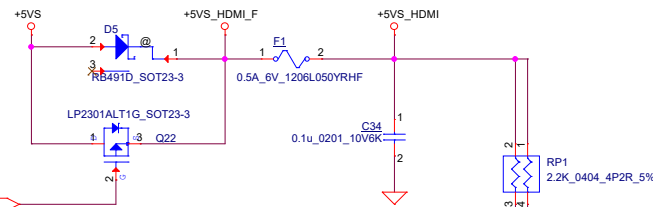
Title			
eDP/CMOS/Touch screen			
Size Custom	Document Number	Re	
	EG521		
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For EMC

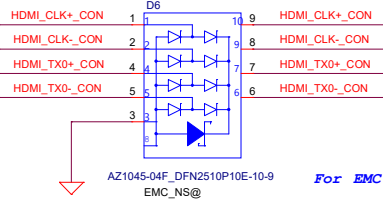


For EMC

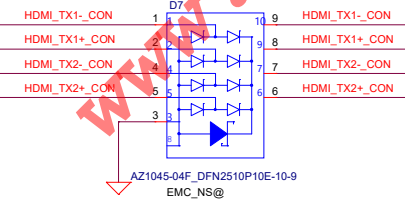


8/16 Update HDMIConn. P/N DC021608081 wei

Close to JHDMI1



For EMC




For EMC

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Custom		BG521		0.2	
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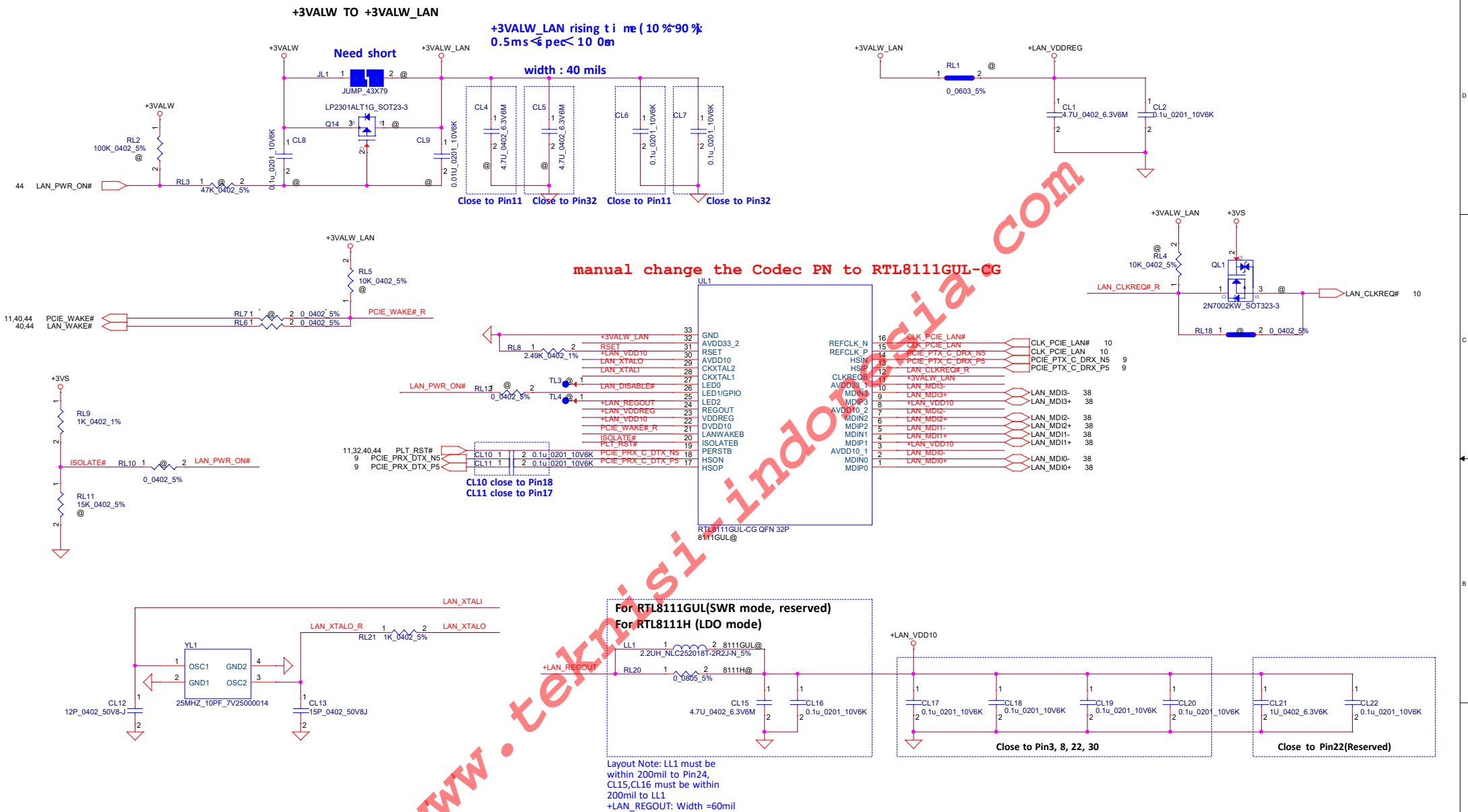


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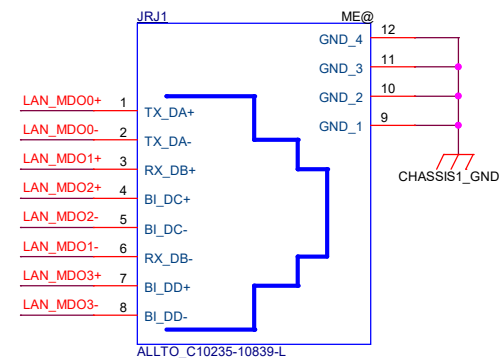
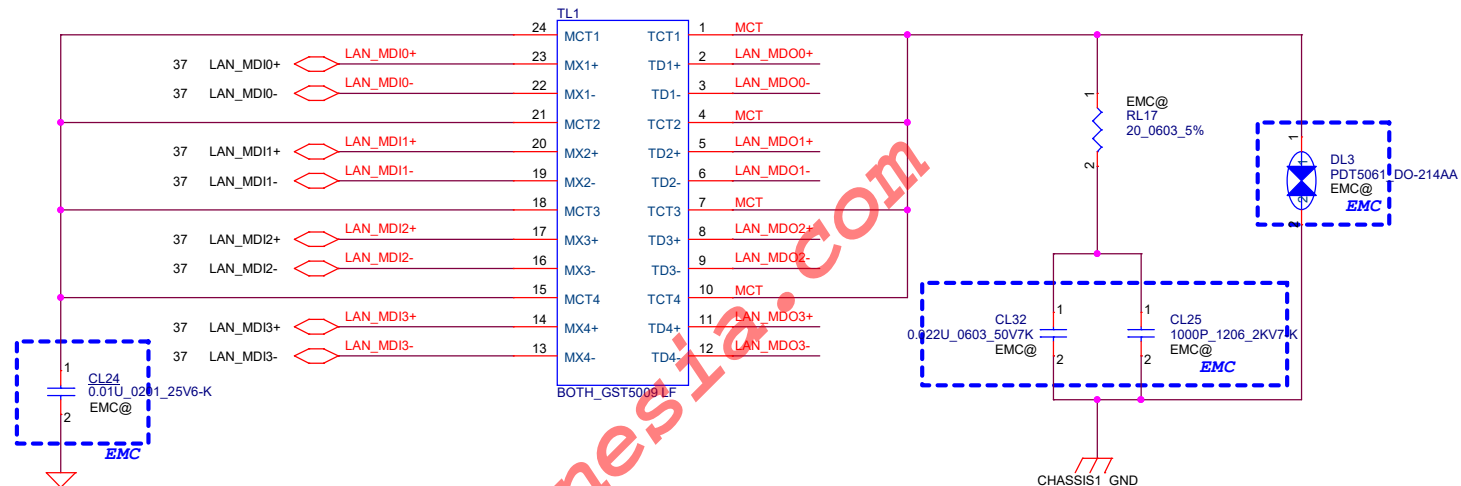
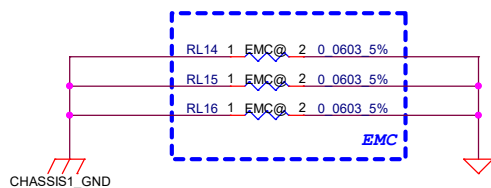
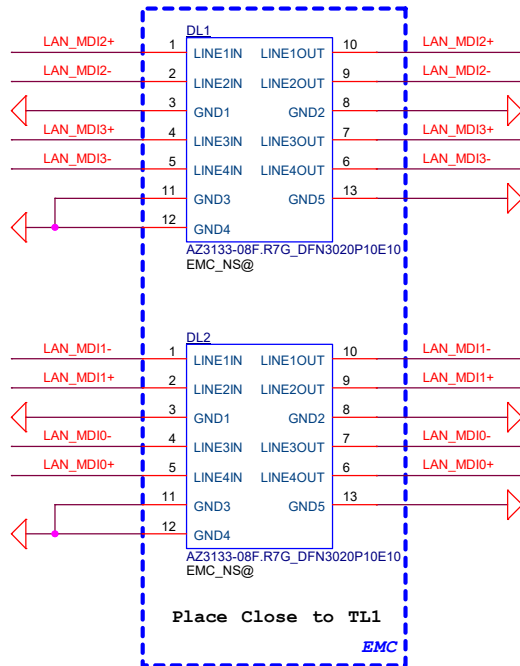
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DL1/DL2  
1'S PN:SC300003M00



8/16 Update RJ45 P/N DC021608091 wei

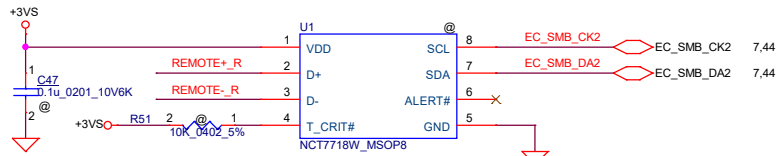
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Issued Date	2015/08/20	Deciphered Date	2016/08/20		
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				Date:	Tuesday, April 25, 2017         Sheet 38 of 60

# Close to U1

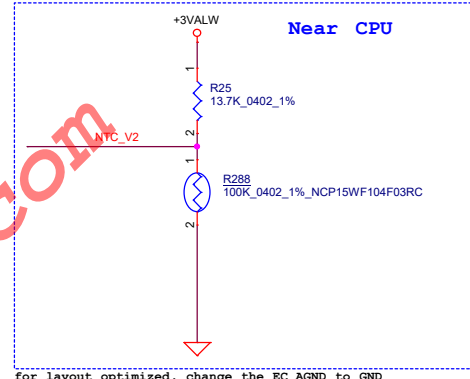
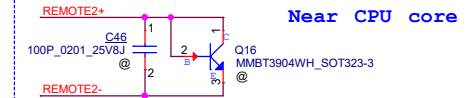


REMOTE+/- R, REMOTE1+/-, REMOTE2+/-:  
Trace width/space:10/10 mil  
Trace length:<8"

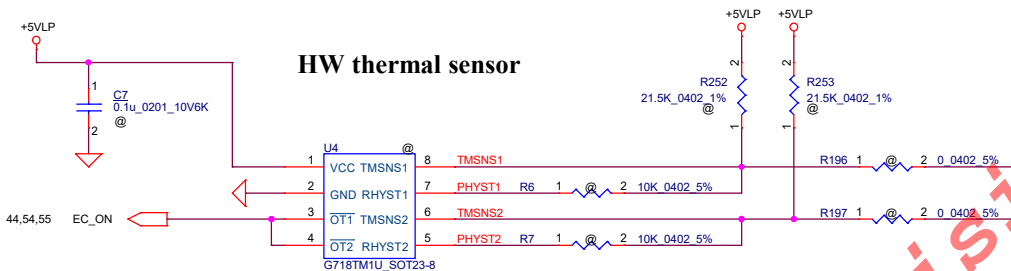
## SMSC thermal sensor placed near DIMM



Address 1001\_101xb

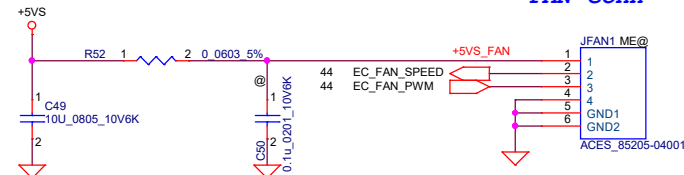


## HW thermal sensor



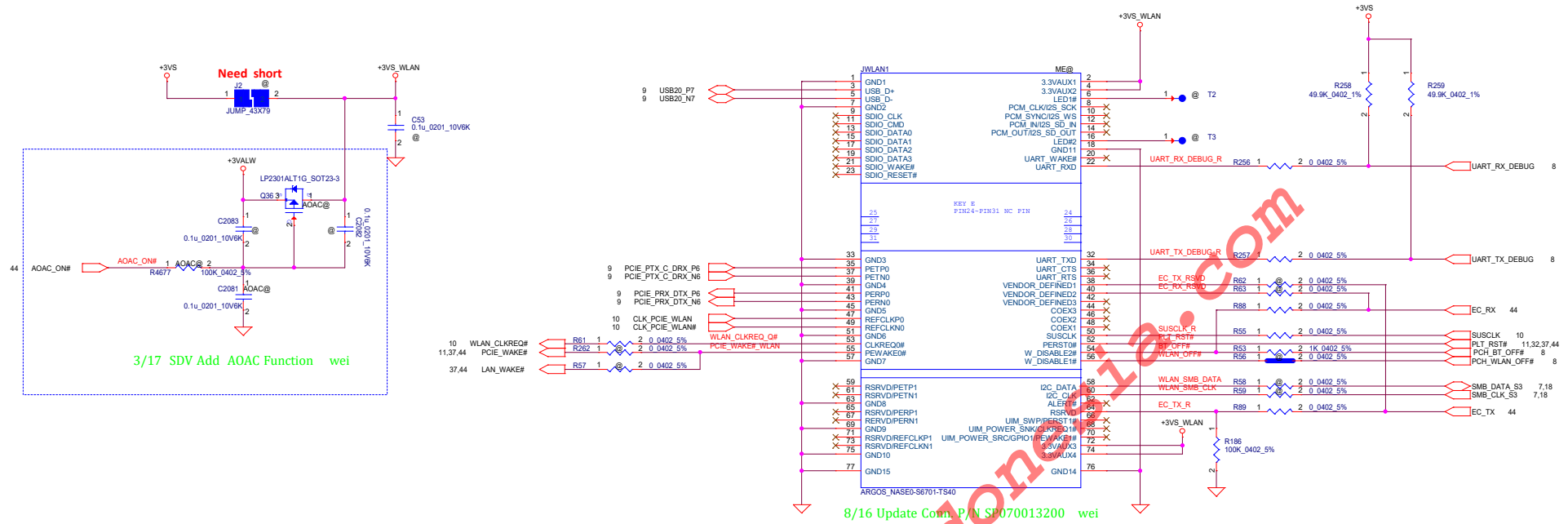
over temperature threshold:  
RSET=3\*RTMH  
92+/-30C  
Hysteresis temperature threshold.  
RHYST=(RSET\*RTML) / (3\*RTML-RSET)  
56+/-30C

## FAN Conn

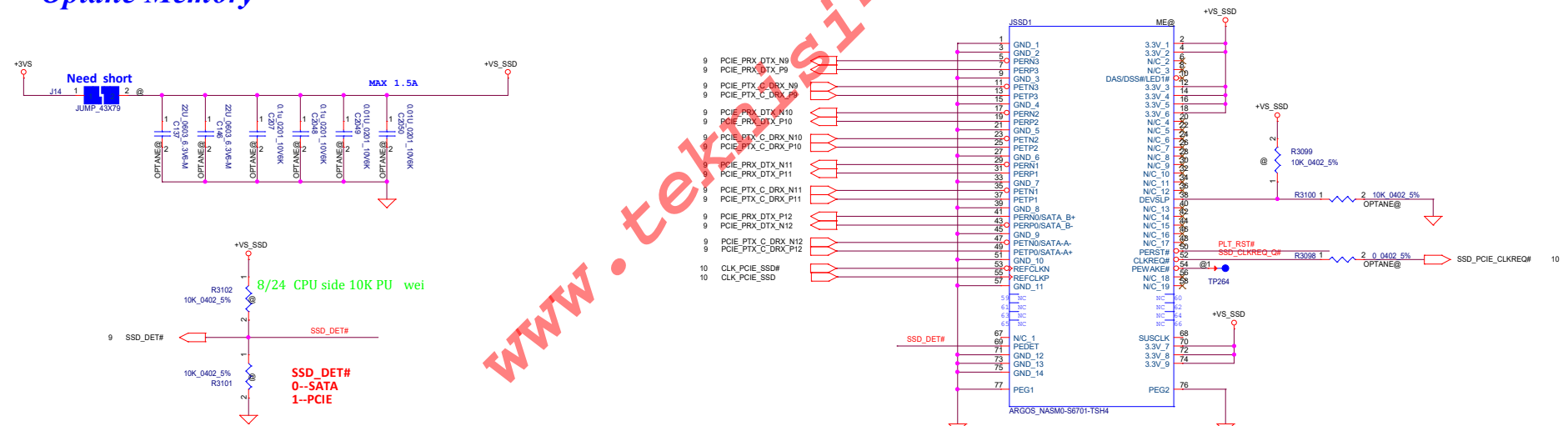



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### Mini-Express Card(WLAN/WiMAX)



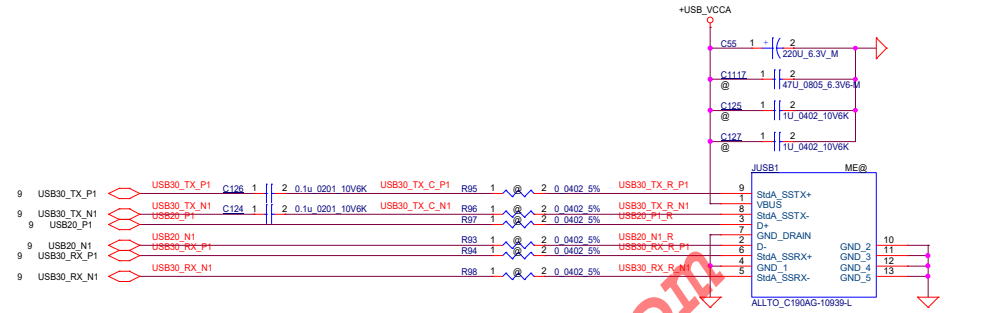
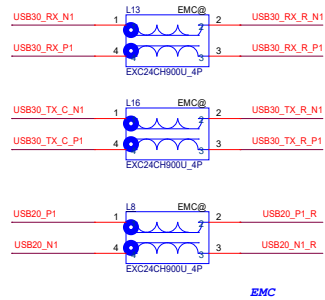
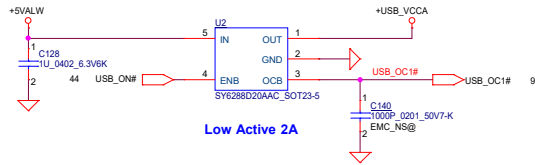
## Optane Memory



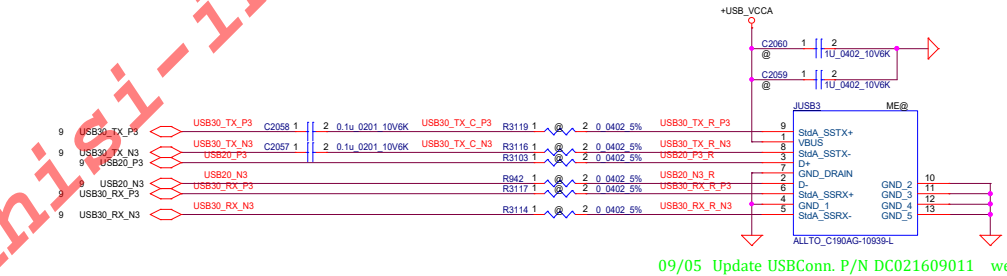
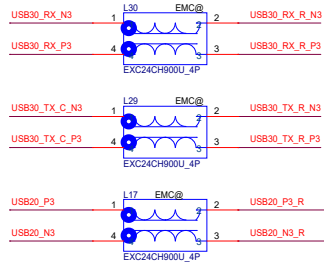
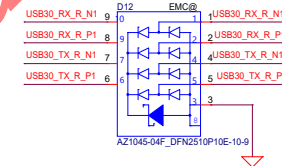
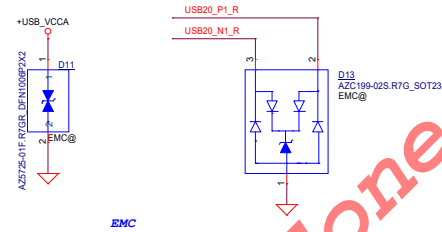
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					EG523	0.2	
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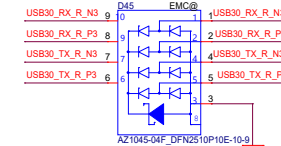
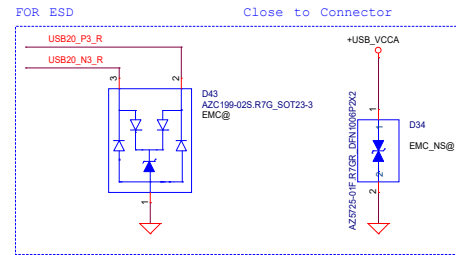
# LEFT SIDE USB3.0 PORT x2



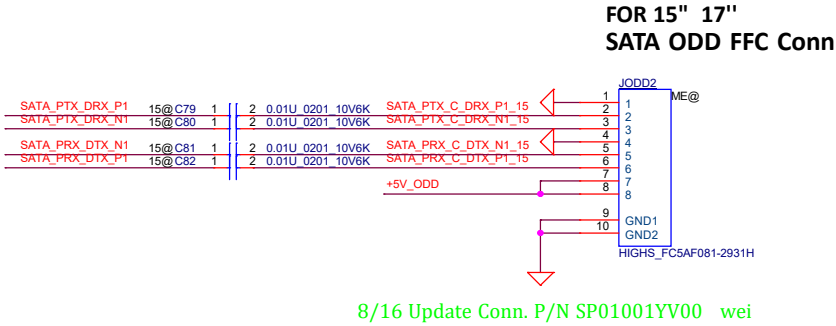
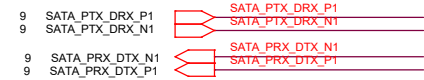
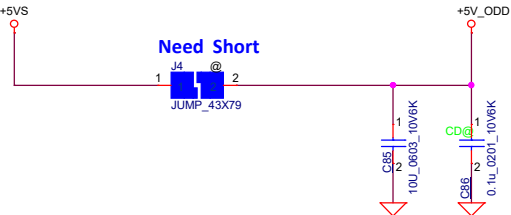
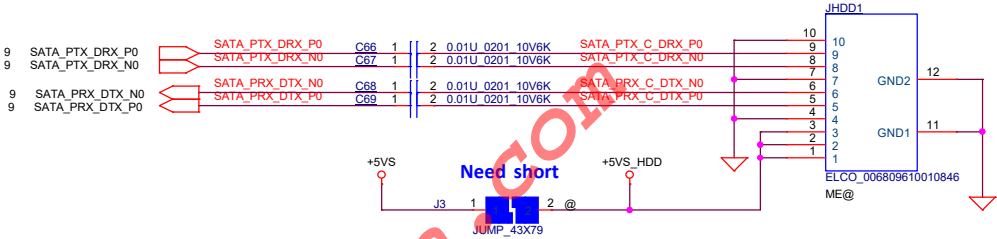
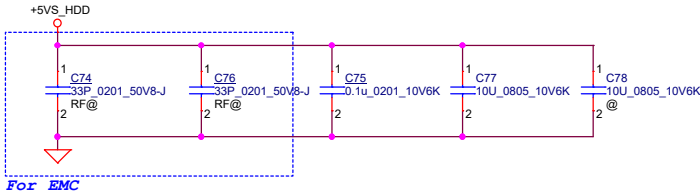
09/05 Update USBConn. P/N DC021609011 wei



09/05 Update USBConn. P/N DC021609011 wei



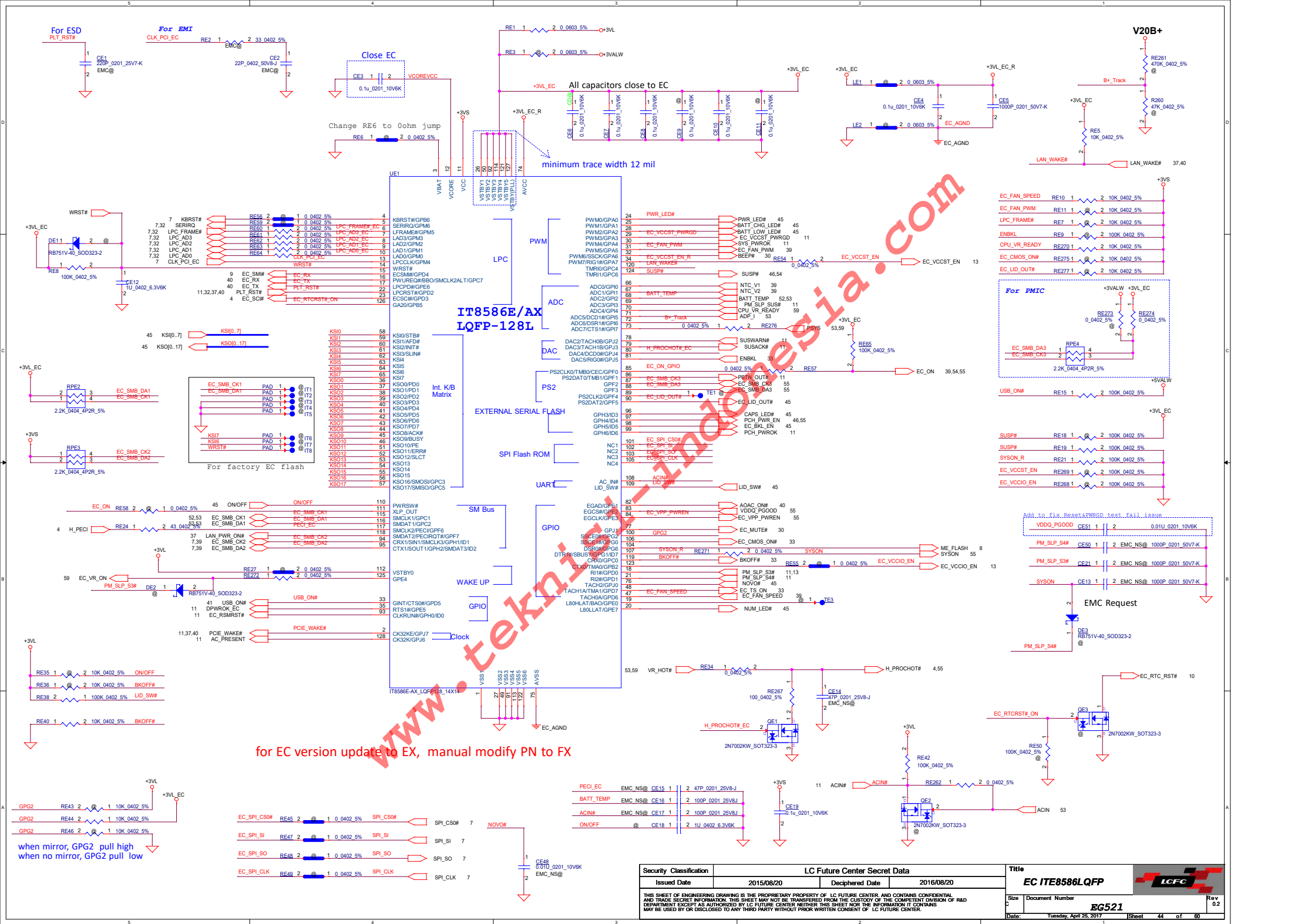
SATA HDD Conn.



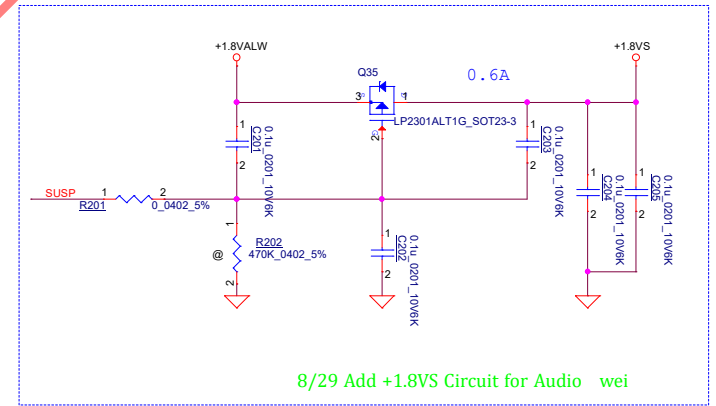
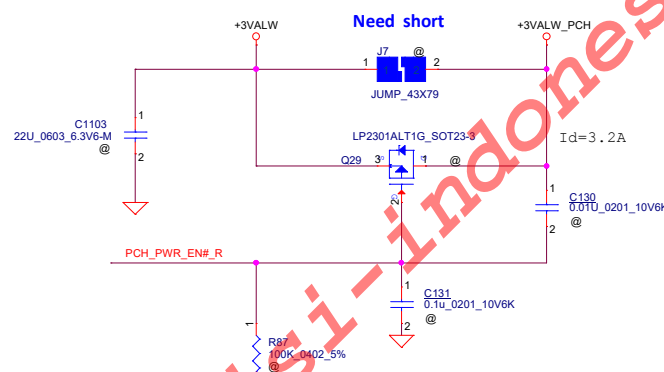
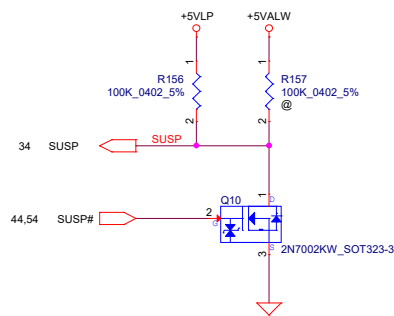
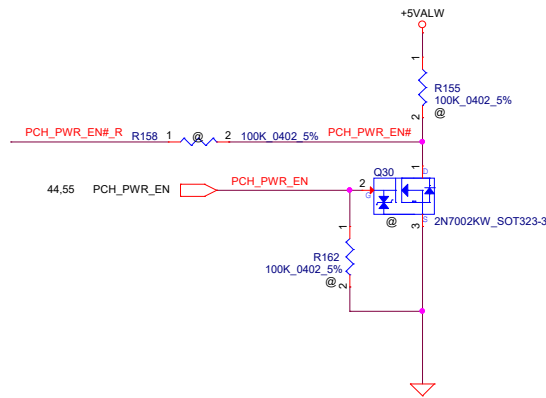
FOR 15" 17"  
SATA ODD FFC Conn

8/16 Update Conn. P/N SP01001YV00 wei









8/29 Add +1.8VS Circuit for Audio wei

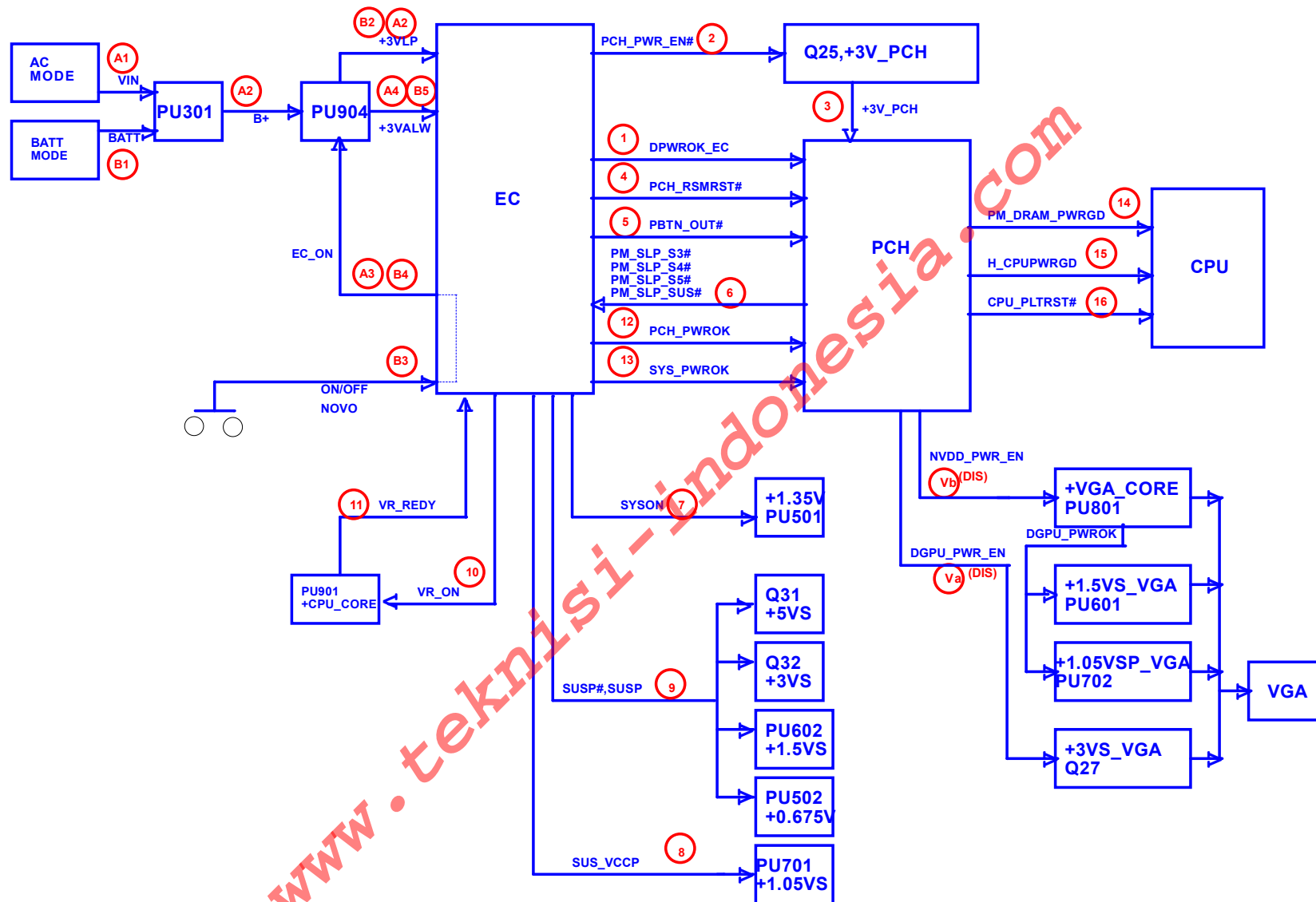
### For DisCharge



08/29: Need double check enable signal and the resistance

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Title		Rev	
DC V TO VS INTERFACE		0.2	
Size	Document Number	EG521	
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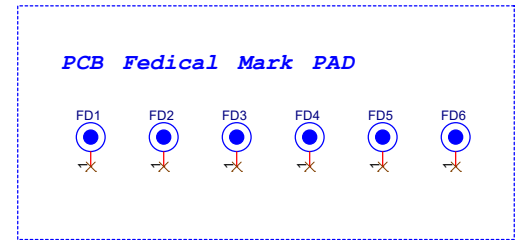
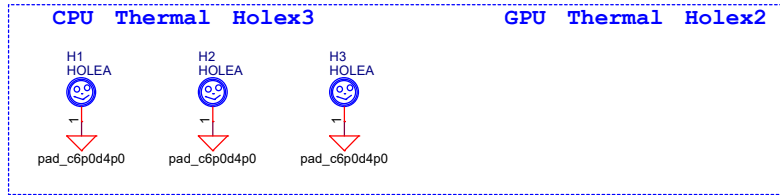
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Title		Power sequence block	
Size	Document Number	Rev	0.2
Custom	EG521		
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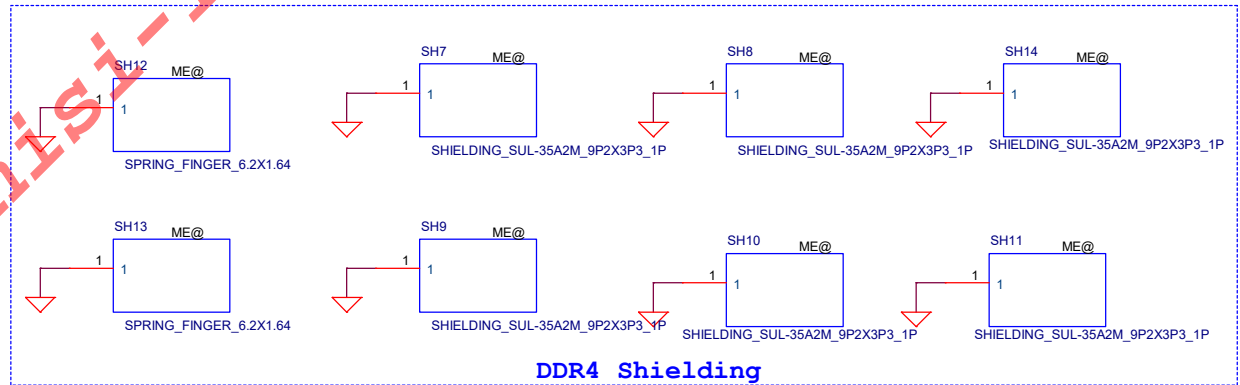
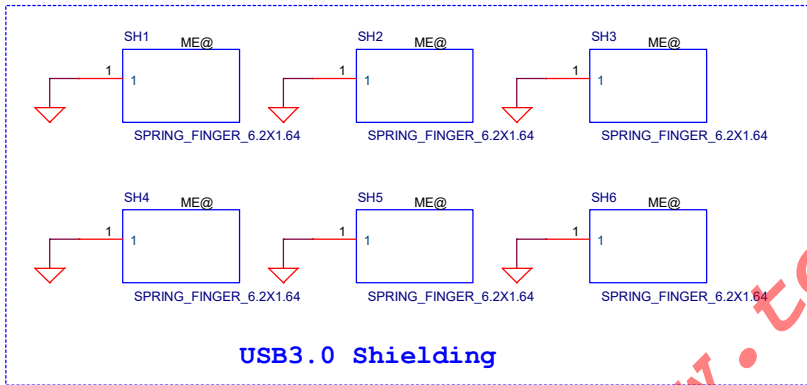
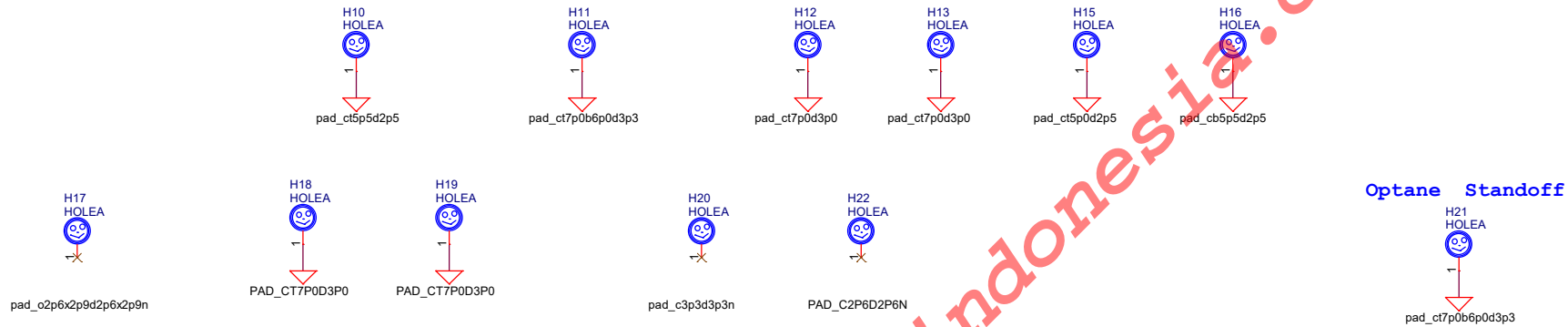
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Size C	Document Number <b>EG521</b>			Date: Tuesday, April 25, 2017		Sheet 48	of 60
				Rev 02			



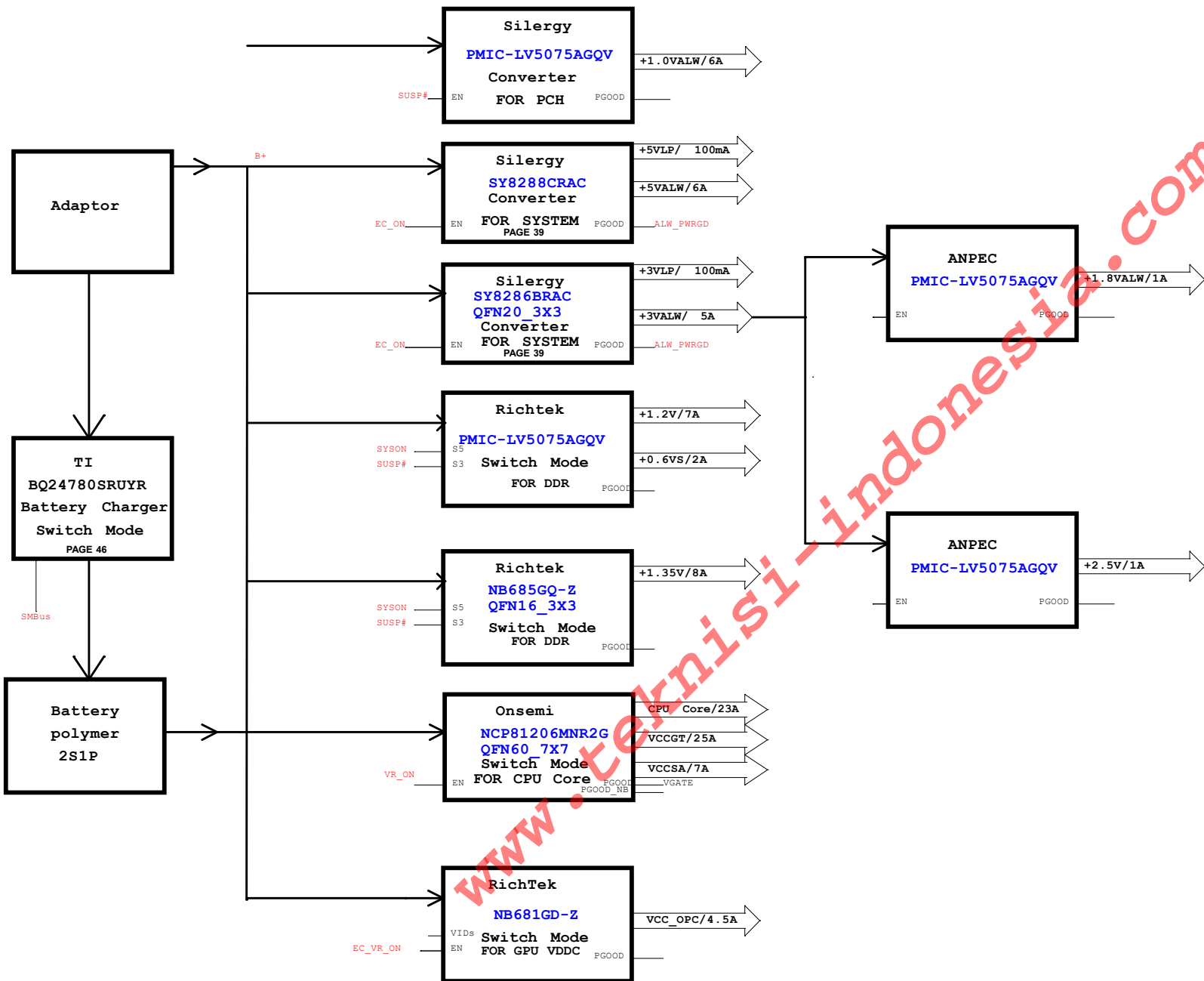


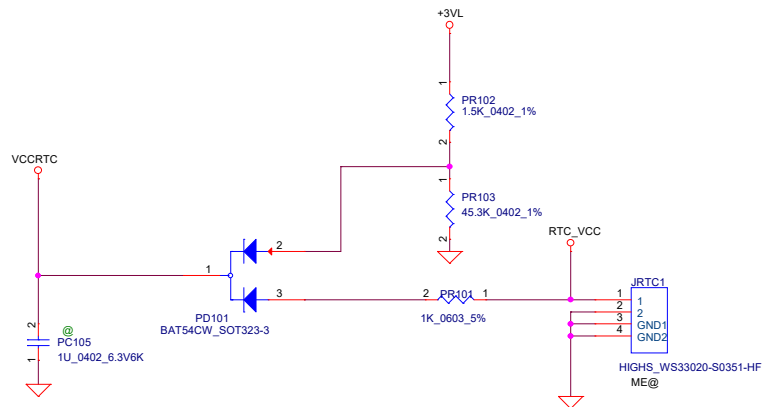
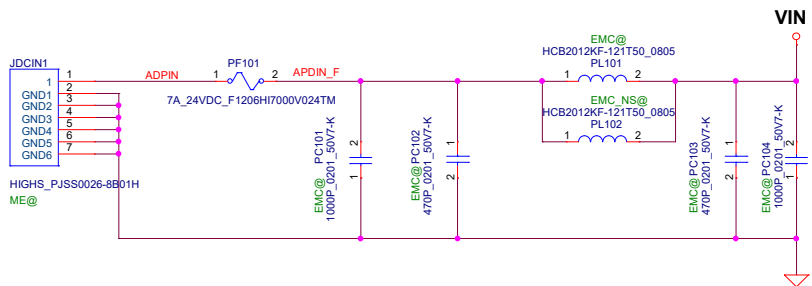
**WLAN Standoff**



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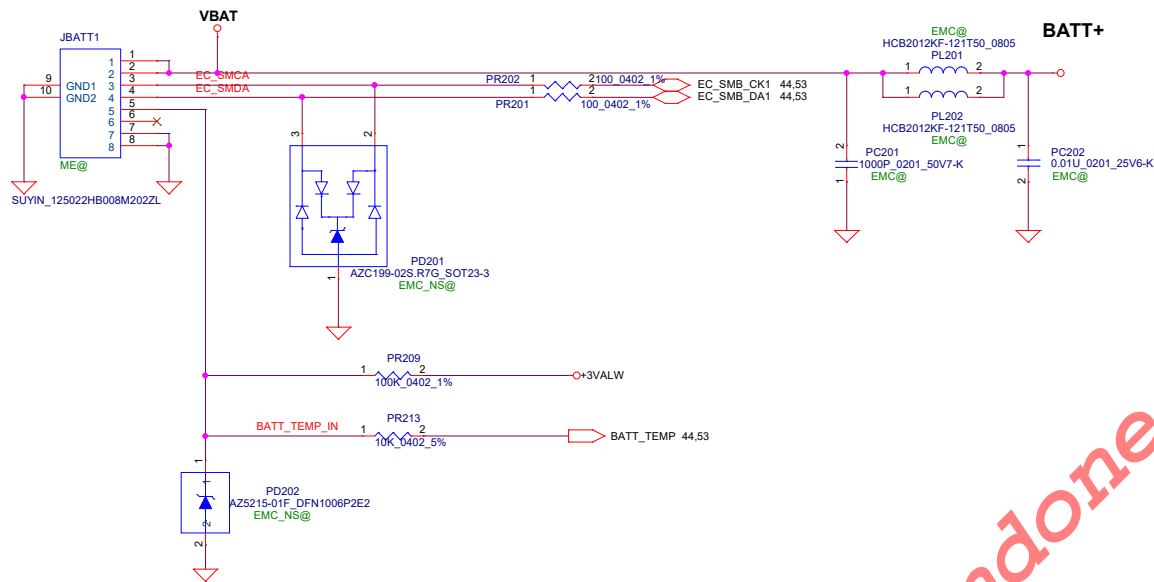




RTC\_VCC 20MIL  
+3VL 20MIL  
VCCRTC 20MIL


No charge RTC with 35mm cable  
RTC Battery for GCM BOM  
(2nd source and quoted price )

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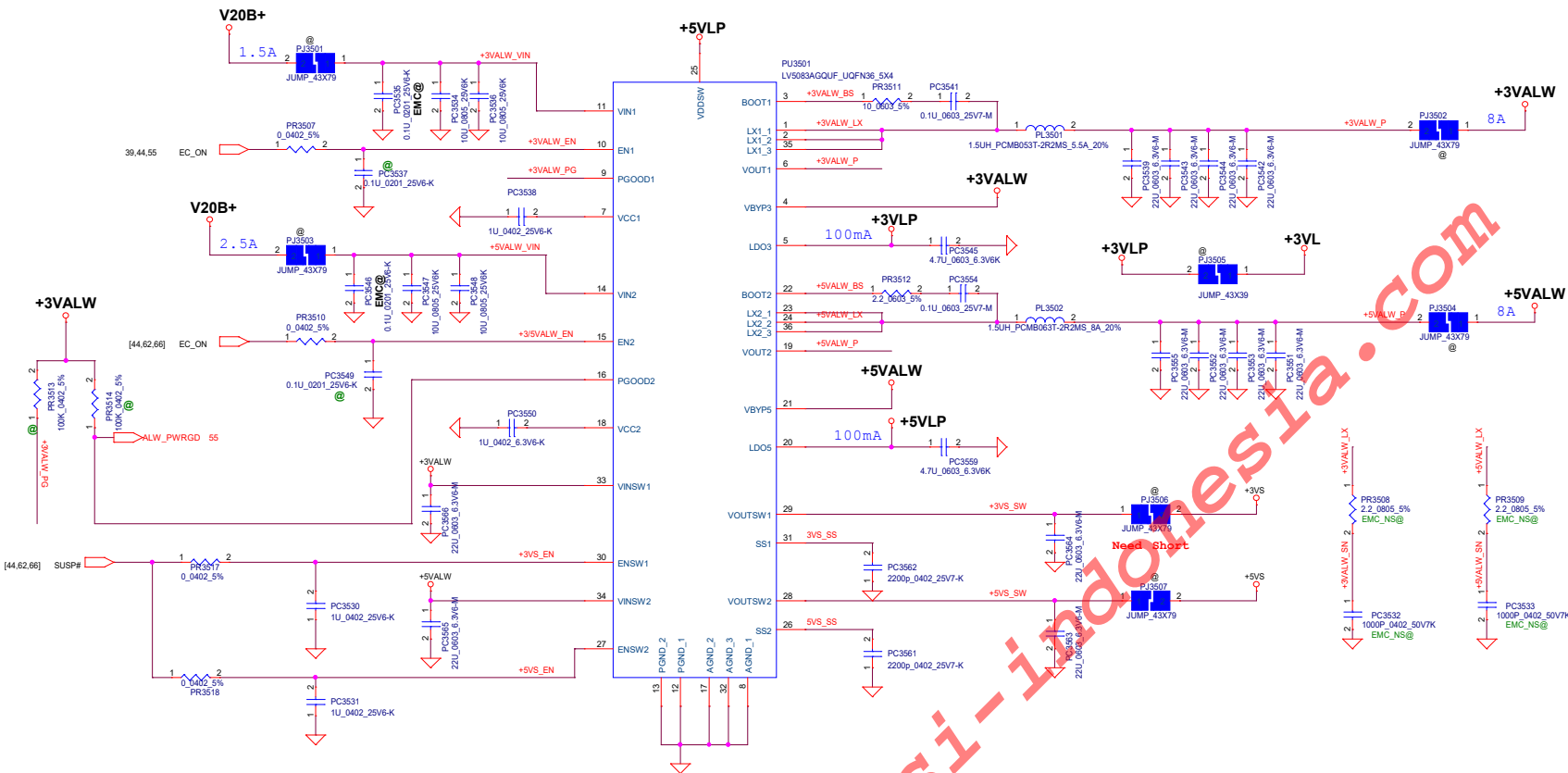


2S1P polymer battery  
voltage level: +6V ~  
8.4 V

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Issued Date	2015/08/20	Deciphered Date	2016/08/20	PWR-BATTERY CONN/OTF 	
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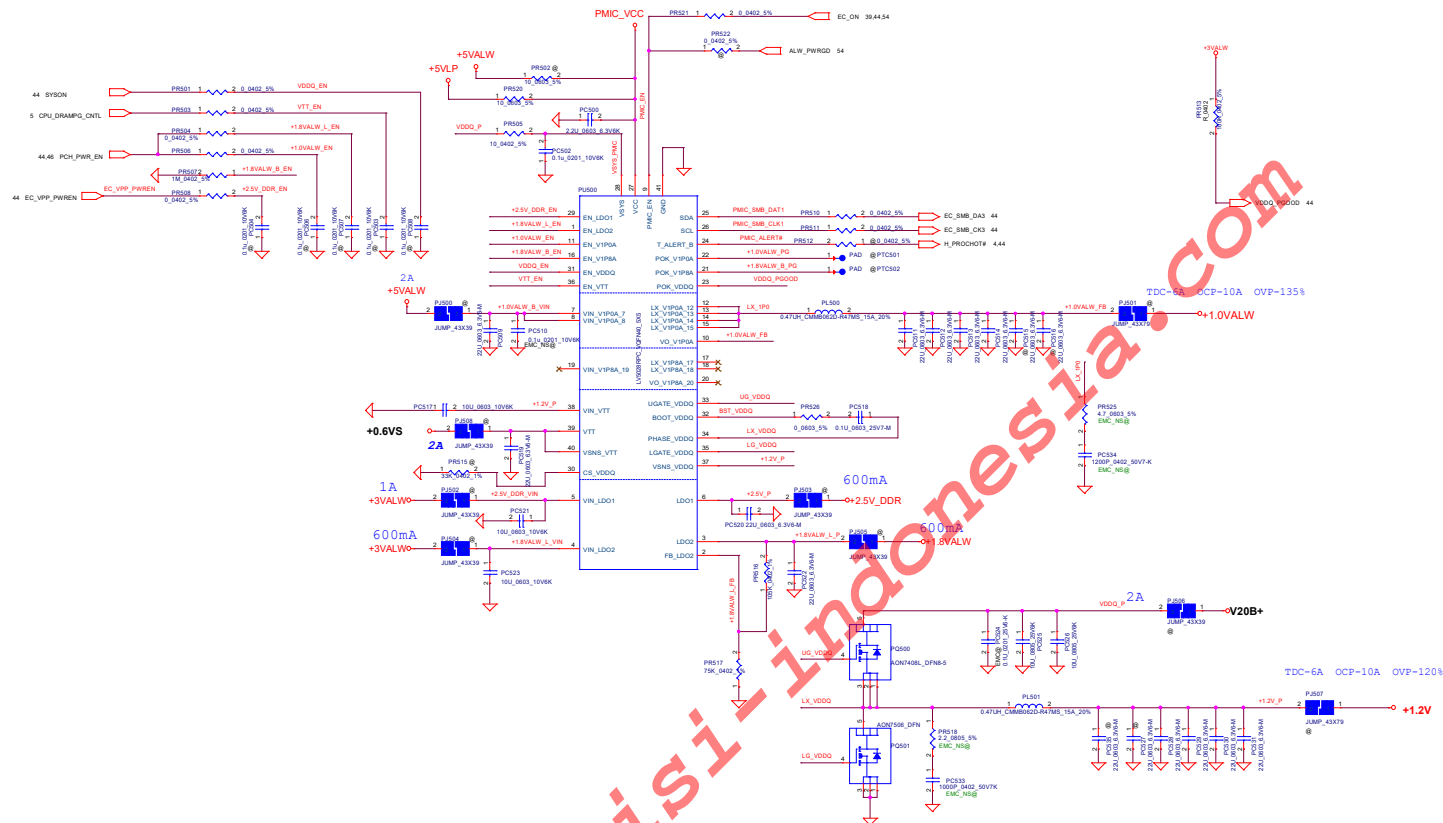




$V_{out}=3.3V \pm 5\%$   
 $V_{set}=3.37V \pm 1.5\%$   
 $OCp=12A$   
 $OVp=(1.15 \sim 1.25) * V_{out}$   
 $UVp=(0.55 \sim 0.65) * V_{out}$   
 $F_{sw}=500Khz$


$V_{out}=5V \pm 3\%$   
 $V_{set}=5.1V \pm 1.5\%$   
 $OCp=12A$   
 $OVp=(1.15 \sim 1.25) * V_{out}$   
 $UVp=(0.55 \sim 0.65) * V_{out}$   
 $F_{sw}=500Khz$

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	5	4	3	2	1	
D						
C						
B						
A						
	5	4	3	2	1	


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SVID Specification	
Config	
Vmin(V)	0
Vmax(V)	1.52
Vstep(mV)	5

RFsw	Core/GT	SA
28.7K	550K	550K

RVboot	Core	GT	SA
35.7K	0V	0V	1.05V

