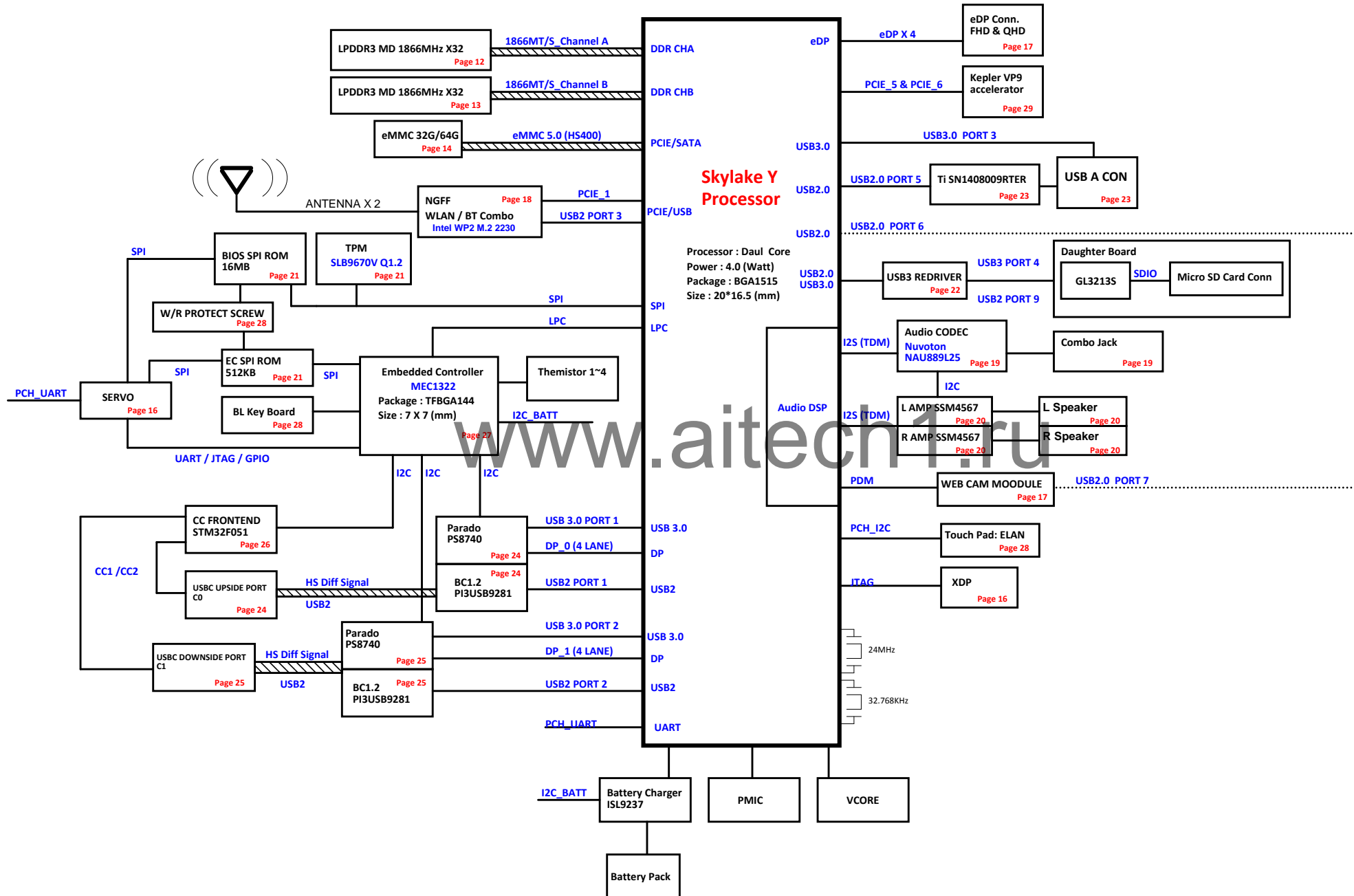


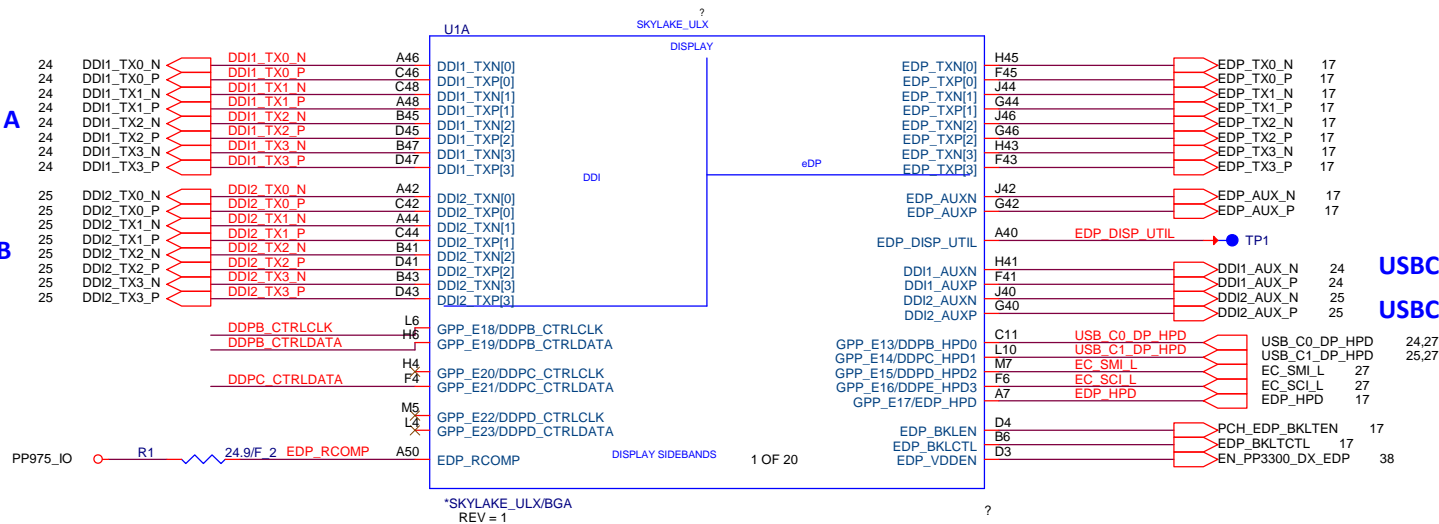
# SPYDER Block Diagram

01

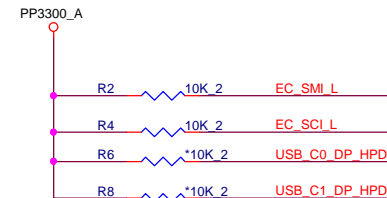
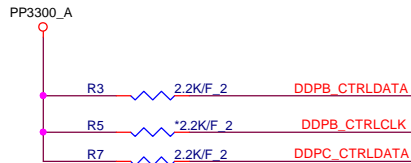


USBC PORT A

USBC PORT B



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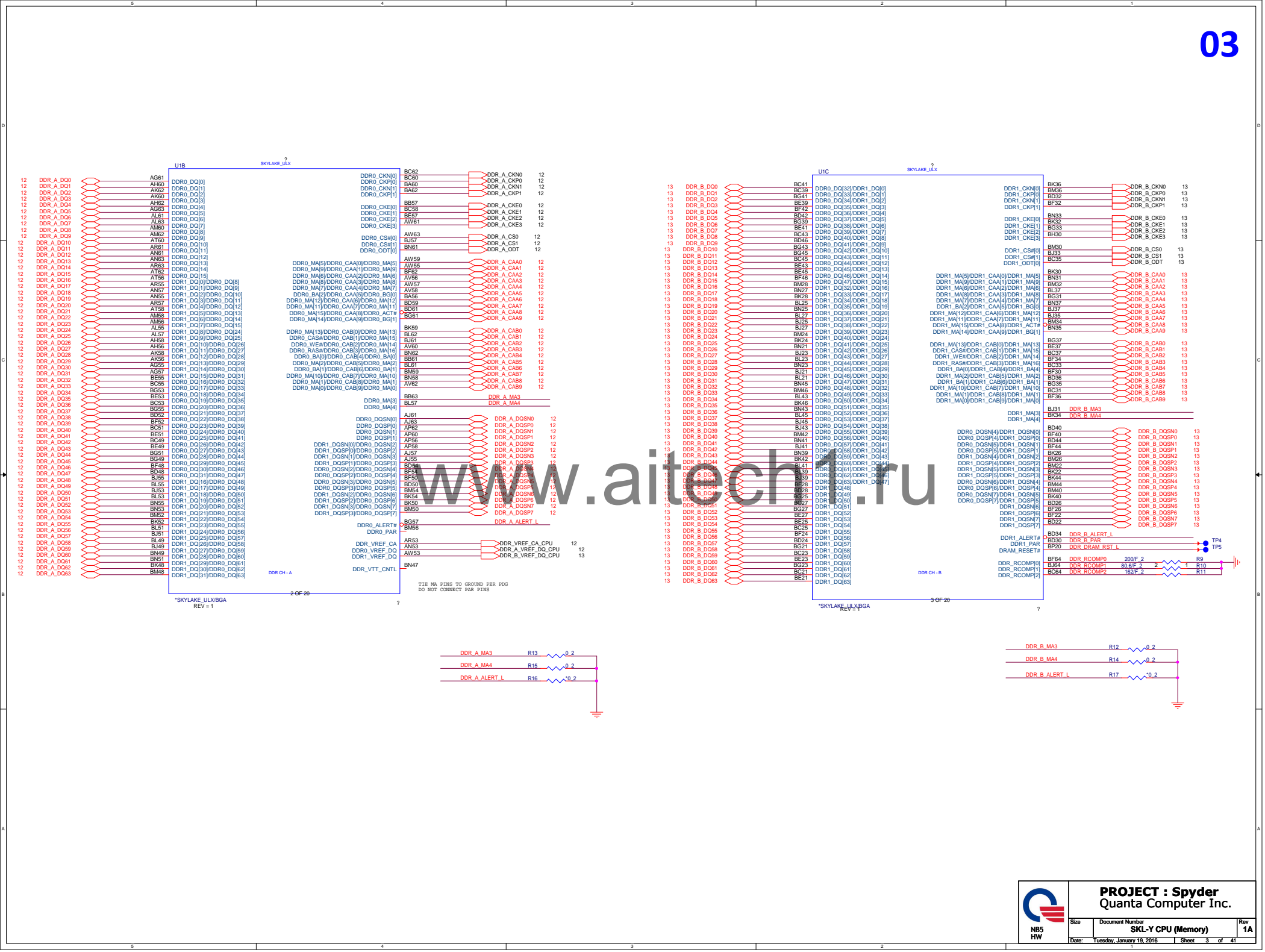


Pin	Function	Intent
GPP_E19	IPD=Do not detect port B PU= detect port B	Detect port B
GPP_E21	IPD=Do not detect port C PU= detect port C	Detect port C



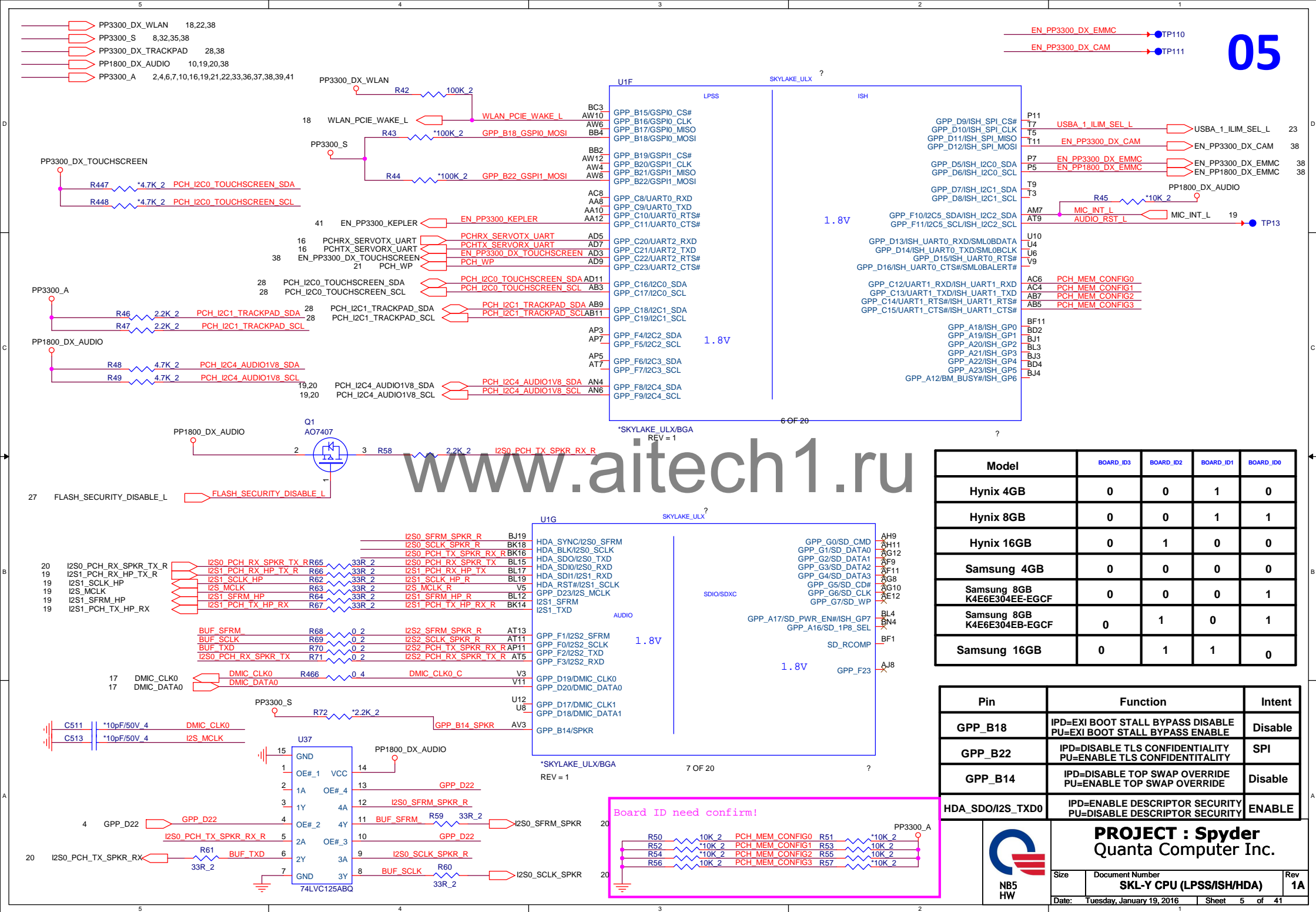
**PROJECT : Spyder**  
Quanta Computer Inc.

Size	Document Number	Rev
	SKL-Y CPU (DDI/EDP)_ERD	1A
Date:	Tuesday, January 19, 2016	Sheet 2 of 41



B

A



WLAN

18 PCIE\_PCH1RX\_WLANTX\_N  
18 PCIE\_PCH1RX\_WLANTX\_P  
18 PCIE\_PCH1TX\_WLANRX\_N  
18 PCIE\_PCH1TX\_WLANRX\_P



U1H

SKYLAKE\_ULX ?

C20 PCIE1\_RXN/USB3\_5\_RXN  
A20 PCIE1\_RXP/USB3\_5\_RXP  
G20 PCIE1\_TXN/USB3\_5\_TXN  
J20 PCIE1\_TXP/USB3\_5\_TXP

B19 PCIE2\_RXN/USB3\_6\_RXN  
D19 PCIE2\_RXP/USB3\_6\_RXP  
F19 PCIE2\_TXN/USB3\_6\_TXN  
H19 PCIE2\_TXP/USB3\_6\_TXP

C22 PCIE3\_RXN  
A22 PCIE3\_RXP  
G22 PCIE3\_TXN  
J22 PCIE3\_TXP

B21 PCIE4\_RXN  
D21 PCIE4\_RXP  
F21 PCIE4\_TXN  
H21 PCIE4\_TXP

C24 PCIE5\_RXN  
A24 PCIE5\_RXP  
G24 PCIE5\_TXN  
J24 PCIE5\_TXP

B23 PCIE6\_RXN  
D23 PCIE6\_RXP  
F23 PCIE6\_TXN  
H23 PCIE6\_TXP

C26 PCIE7\_RXN/SATA0\_RXN  
A26 PCIE7\_RXP/SATA0\_RXP  
G26 PCIE7\_TXN/SATA0\_TXN  
J26 PCIE7\_TXP/SATA0\_TXP

B25 PCIE8\_RXN/SATA1A\_RXN  
D25 PCIE8\_RXP/SATA1A\_RXP  
F25 PCIE8\_TXN/SATA1A\_TXN  
H25 PCIE8\_TXP/SATA1A\_TXP

C28 PCIE9\_RXN  
A28 PCIE9\_RXP  
G28 PCIE9\_TXN  
J28 PCIE9\_TXP

B27 PCIE10\_RXN  
D27 PCIE10\_RXP  
F27 PCIE10\_TXN  
H27 PCIE10\_TXP

A9 PCIE\_RCOMP\_N  
B10 PCIE\_RCOMP\_P

PROC\_PRDY#  
PROC\_PREQ#  
GPP\_A7/PIRQA#

\*SKYLAKE\_ULX/BGA

REV = 1

8 OF 20

USB2

SSIC / USB3

USB3\_1\_RXN  
USB3\_1\_RXP  
USB3\_1\_TXN  
USB3\_1\_TXP

USB3\_2\_RXN/SSIC\_1\_RXN  
USB3\_2\_RXP/SSIC\_1\_RXP  
USB3\_2\_TXN/SSIC\_1\_TXN  
USB3\_2\_TXP/SSIC\_1\_TXP

USB3\_3\_RXN/SSIC\_2\_RXN  
USB3\_3\_RXP/SSIC\_2\_RXP  
USB3\_3\_TXN/SSIC\_2\_TXN  
USB3\_3\_TXP/SSIC\_2\_TXP

USB3\_4\_RXN  
USB3\_4\_RXP  
USB3\_4\_TXN  
USB3\_4\_TXP

USB2N\_1  
USB2P\_1

USB2N\_5  
USB2P\_5

USB2N\_7  
USB2P\_7

USB2N\_3  
USB2P\_3

USB2N\_9  
USB2P\_9

USB2N\_2  
USB2P\_2

USB2\_COMP  
USB2\_ID

USB2\_VBUSSENSE  
GPP\_E0/USB2\_OC0#

GPP\_E1/USB2\_OC1#  
GPP\_E11/USB2\_OC2#

GPP\_E12/USB2\_OC3#  
GPP\_E4/DEVSLP0

GPP\_E5/DEVSLP1  
GPP\_E6/DEVSLP2

GPP\_E0/SATA0/PCIE0/SATAGP0  
GPP\_E1/SATA0/PCIE1/SATAGP1  
GPP\_E2/SATA0/PCIE2/SATAGP2

GPP\_E8/SATALED#

C16 USB3\_1\_RX\_N  
A16 USB3\_1\_RX\_P  
G16 USB3\_1\_TX\_N  
J16 USB3\_1\_TX\_P

B15 USB3\_2\_RX\_N  
D15 USB3\_2\_RX\_P  
F15 USB3\_2\_TX\_N  
H15 USB3\_2\_TX\_P

C18 USB3\_3\_RX\_N  
A18 USB3\_3\_RX\_P  
G18 USB3\_3\_TX\_N  
J18 USB3\_3\_TX\_P

B17 USB3\_4\_RX\_N  
D17 USB3\_4\_RX\_P  
F17 USB3\_4\_TX\_N  
H17 USB3\_4\_TX\_P

AJ6 USB2\_1\_N  
AJ4 USB2\_1\_P

AH5 USB2\_5\_N  
AH3 USB2\_5\_P

AF5 USB2\_7\_N  
AF3 USB2\_7\_P

AL6 USB2\_3\_N  
AL4 USB2\_3\_P

AG6 USB2\_9\_N  
AG4 USB2\_9\_P

AM3 USB2\_2\_N  
AM5 USB2\_2\_P

N2 USB2\_COMP  
AF7 USB2\_OTG\_ID

AE6 USB2\_OTG\_VBUSSENSE  
N12 USB2\_OC0\_L

M11 USB2\_OC1\_L  
F8 USB2\_OC2\_L

B8 USB2\_OC3\_L  
F10 USB2\_OC0\_L

H10 USB2\_OC1\_L  
L8 USB2\_OC2\_L

G11 TPM\_PIRQ\_L  
J11 TPM\_PIRQ\_L

N10 TPM\_PIRQ\_L  
H8 TPM\_PIRQ\_L

USB3\_1\_RX\_N  
USB3\_1\_RX\_P  
USB3\_1\_TX\_N  
USB3\_1\_TX\_P

USB3\_2\_RX\_N  
USB3\_2\_RX\_P  
USB3\_2\_TX\_N  
USB3\_2\_TX\_P

USB3\_3\_RX\_N  
USB3\_3\_RX\_P  
USB3\_3\_TX\_N  
USB3\_3\_TX\_P

USB3\_4\_RX\_N  
USB3\_4\_RX\_P  
USB3\_4\_TX\_N  
USB3\_4\_TX\_P

USB2\_1\_N  
USB2\_1\_P

USB2\_5\_N  
USB2\_5\_P

USB2\_7\_N  
USB2\_7\_P

USB2\_3\_N  
USB2\_3\_P

USB2\_9\_N  
USB2\_9\_P

USB2\_2\_N  
USB2\_2\_P

USB2\_OTG\_ID  
USB2\_OTG\_VBUSSENSE

USB2\_OC0\_L  
USB2\_OC1\_L

USB2\_OC2\_L  
USB2\_OC3\_L

TPM\_PIRQ\_L  
TPM\_PIRQ\_L

TPM\_PIRQ\_L  
TPM\_PIRQ\_L

TPM\_PIRQ\_L  
TPM\_PIRQ\_L

TPM\_PIRQ\_L  
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TPM\_PIRQ\_L

TPM\_PIRQ\_L  
TPM\_PIRQ\_L

TPM\_PIRQ\_L  
TPM\_PIRQ\_L

USBC PORT A

USBC PORT B

USBA

SD

USBC PORT A

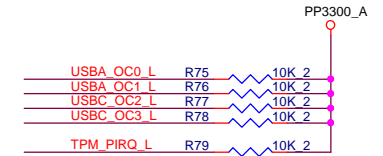
USBA

CAM

BT

SD

USBC PORT B



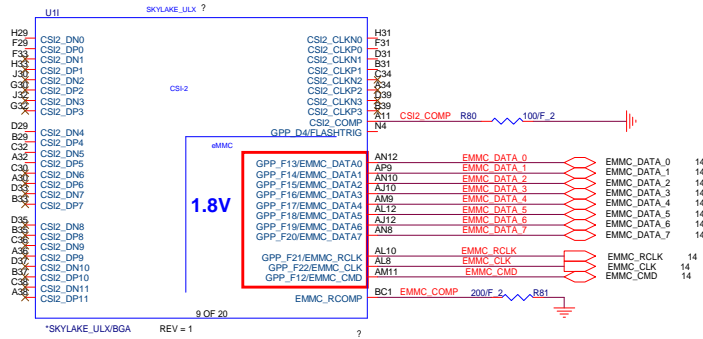
PP3300\_A 2,4,5,7,10,16,19,21,22,33,36,37,38,39,41



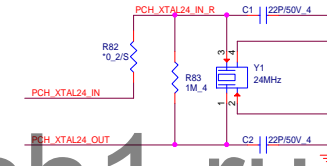
**PROJECT : Spyder**  
Quanta Computer Inc.

Size	Document Number	Rev
	SKL-Y CPU (PCIE/USB3)	1A
Date: Tuesday, January 19, 2016	Sheet 6 of 41	

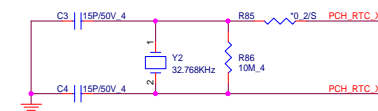
PP3300_A	2,4,5,6,10,16,19,21,22,23,27,33,39,41
PP1000_A	10,16,22,34,39,41
PP3050_RTC	8,10,27,35



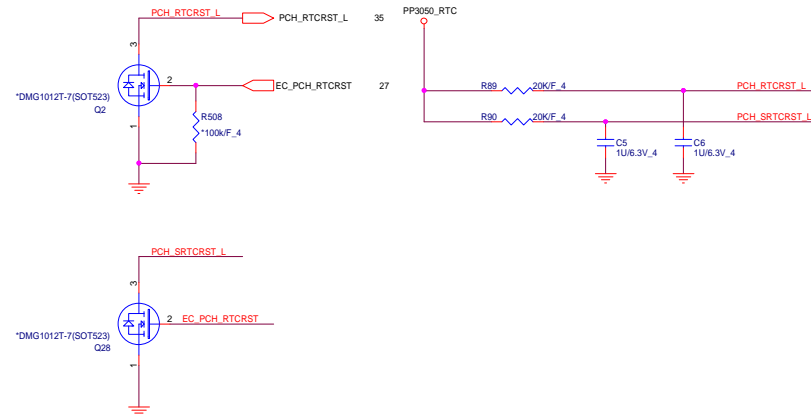
### PCH Crystal (CLG)



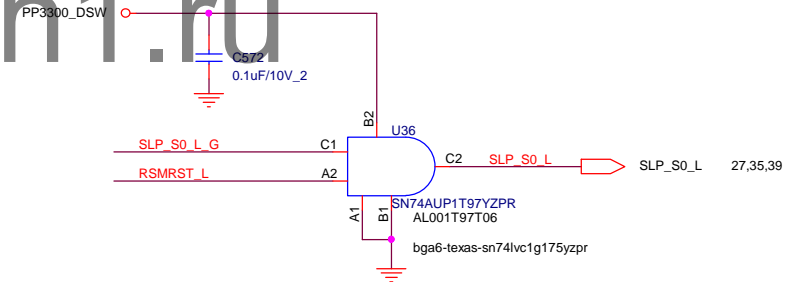
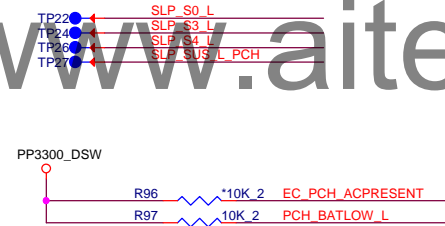
### RTC Crystal (CLG)



### RTC Power trace width 20mils.







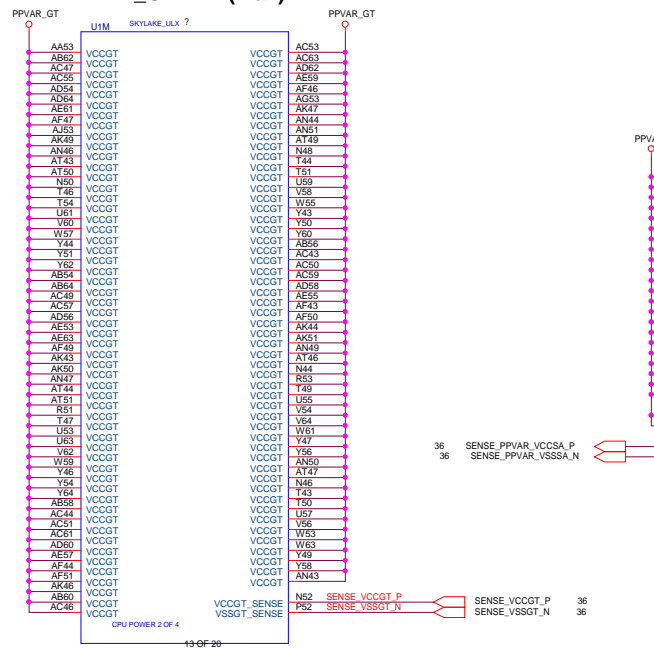
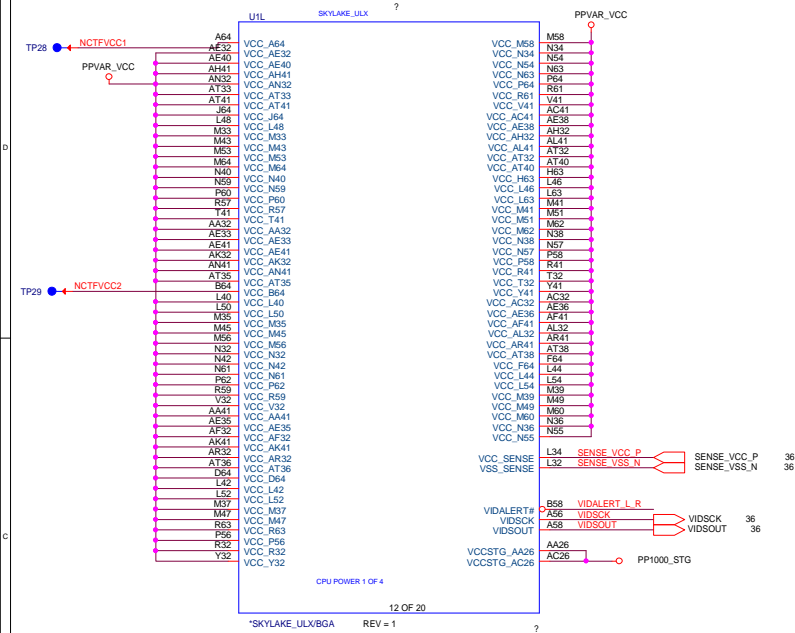


## PPVAR\_VCC=16A(Max)

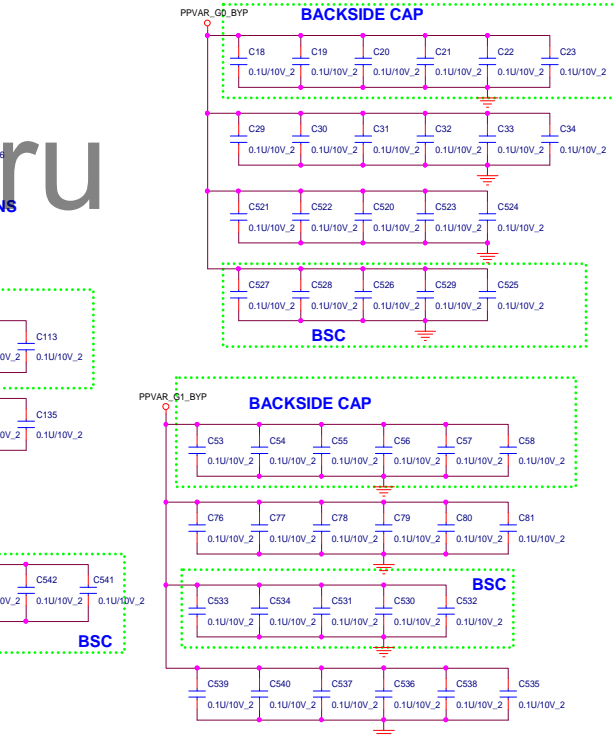
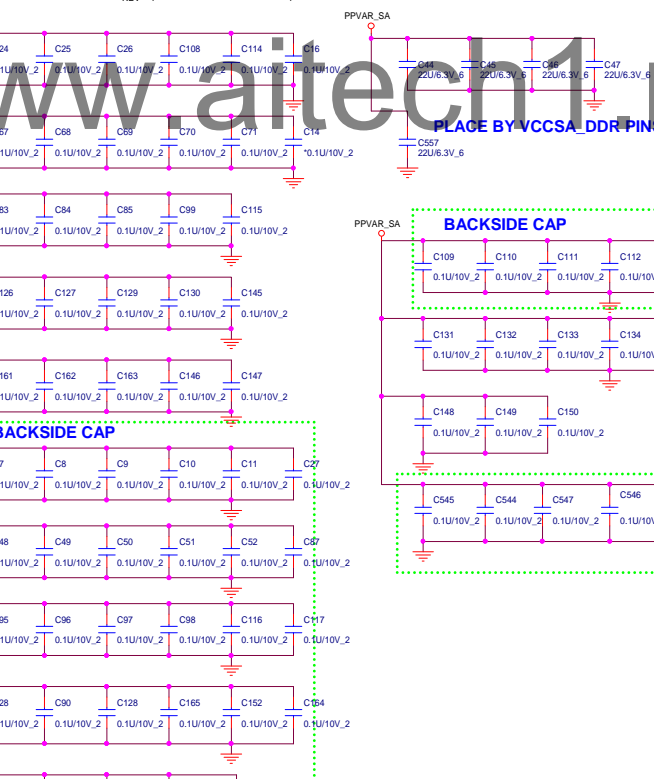
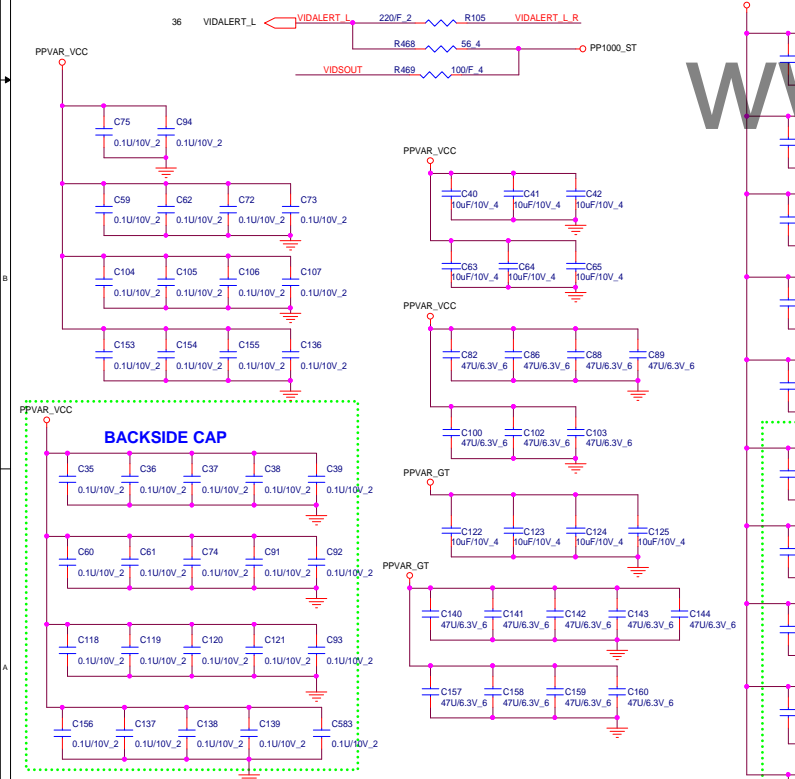
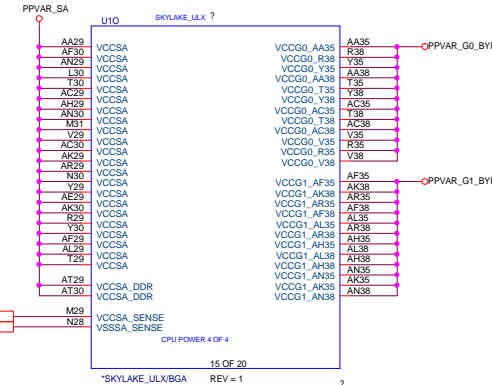
## PPVAR\_GT=22A(Max)

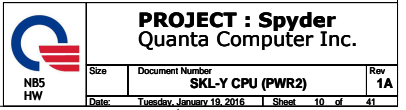
PPVAR\_VCC 36,37  
PPVAR\_GT 4,10,16,39  
PPVAR\_SA 36,37

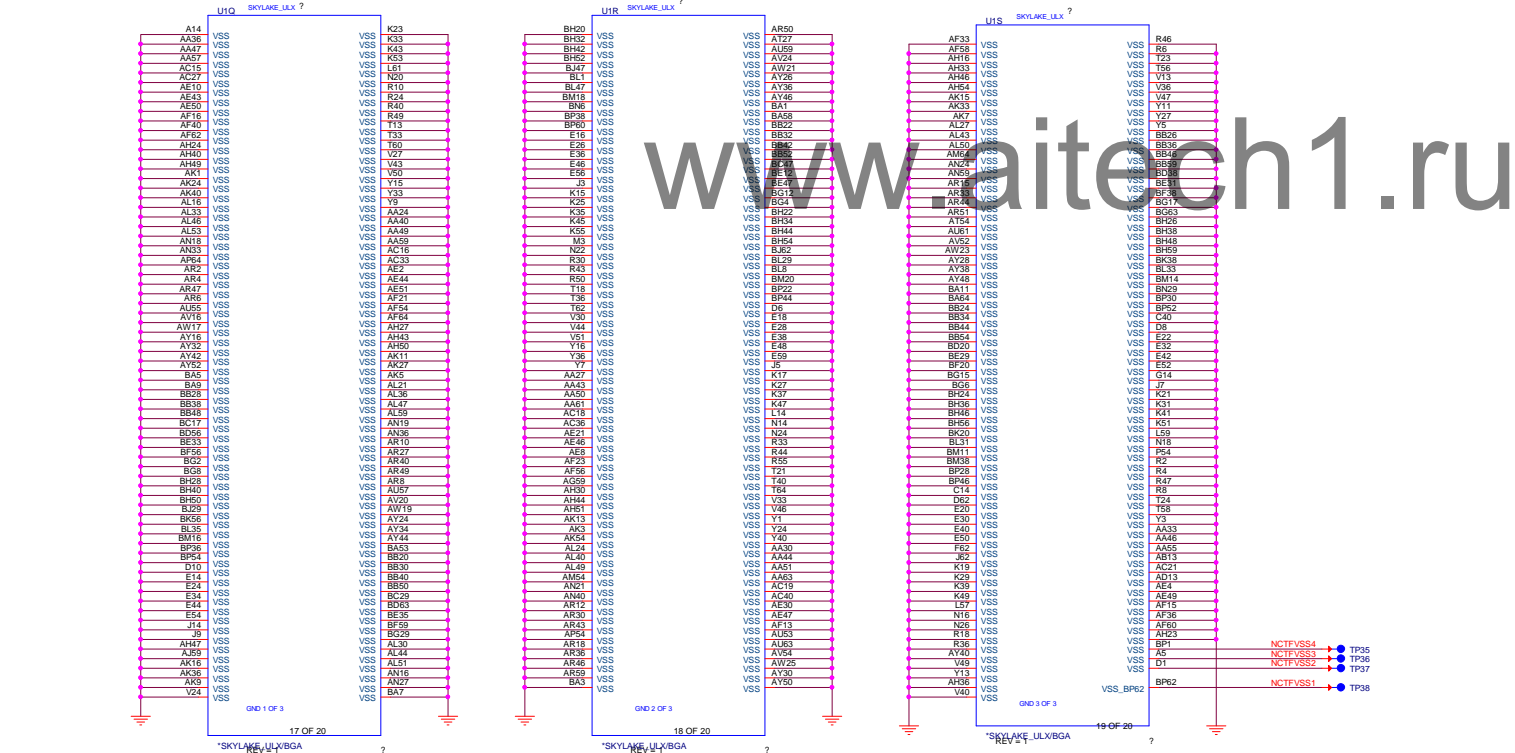
09

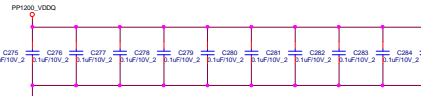
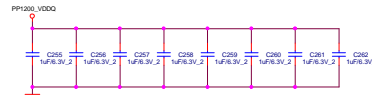
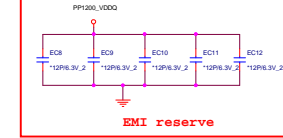
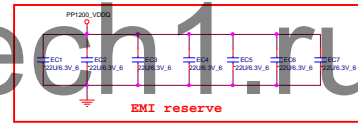
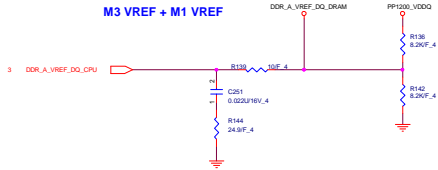
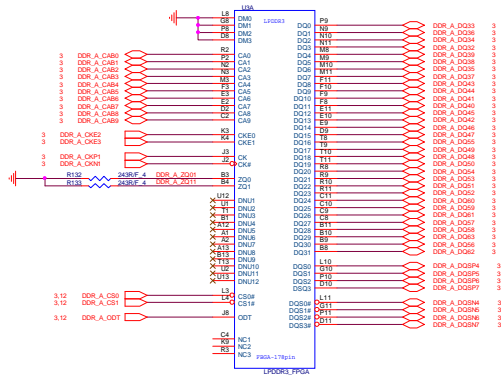
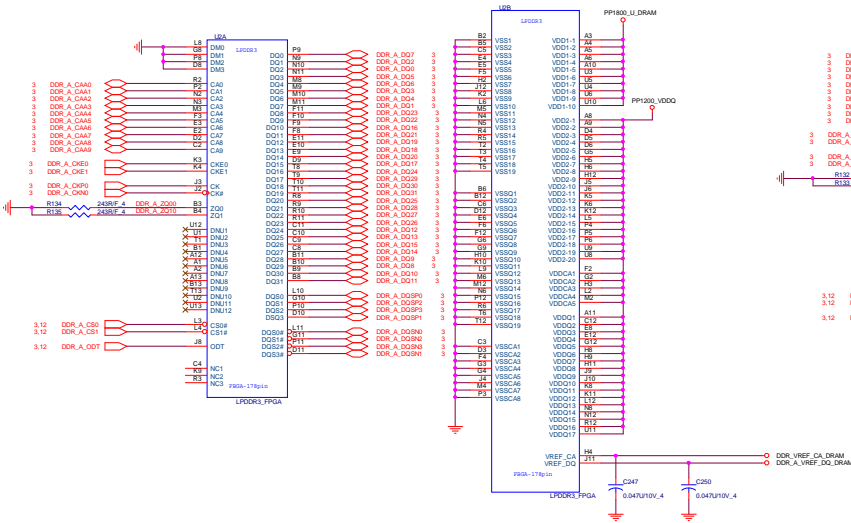


## PPVAR\_SA=5.4A(Max)



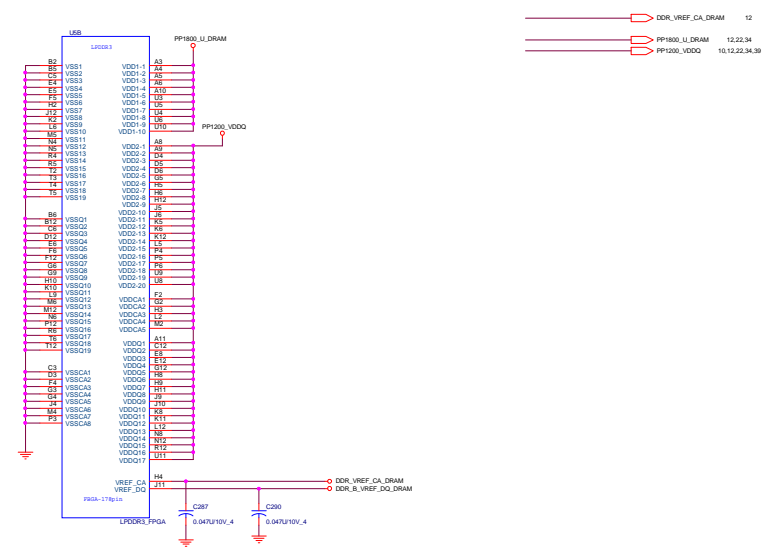
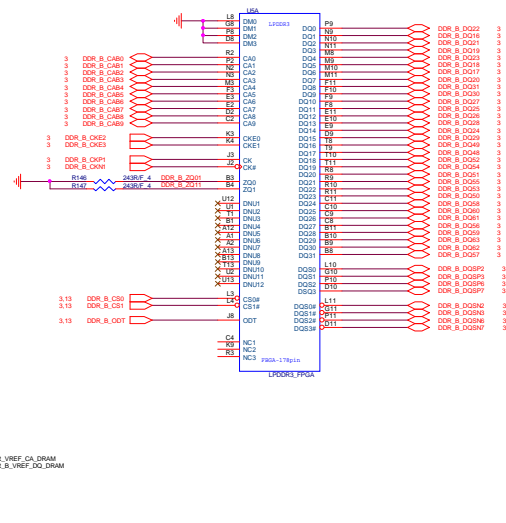
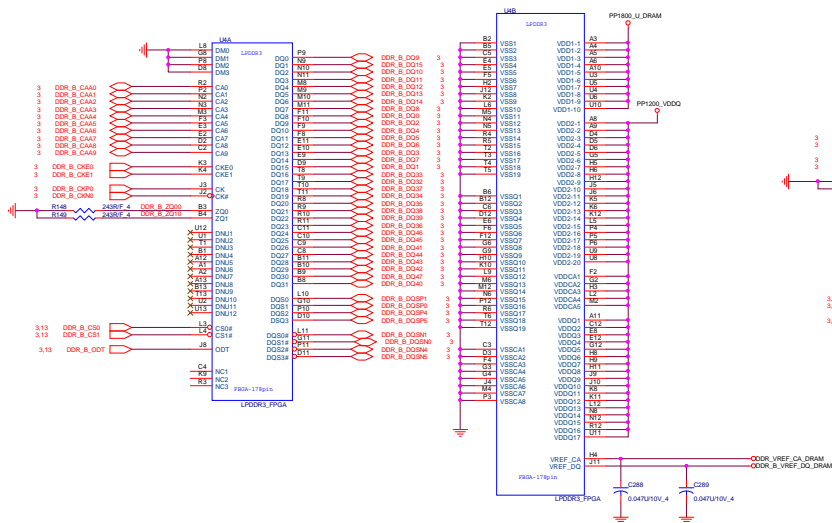




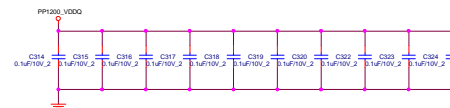
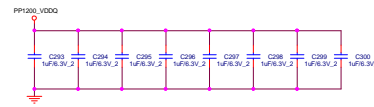
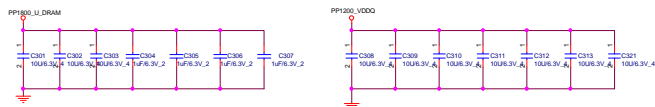
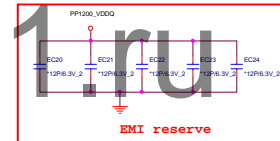
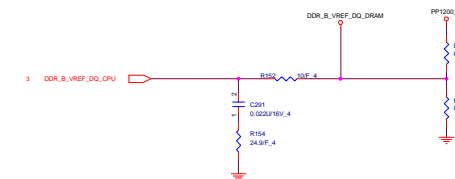


**PROJECT : Spyder**  
Quanta Computer Inc.

Size B	Document Number LPDDR3 (CHA)	Rev 1A
Date:	Tuesday, January 19, 2016	Sheet 12 of 41



**M3 VREF + M1 VRWEF**



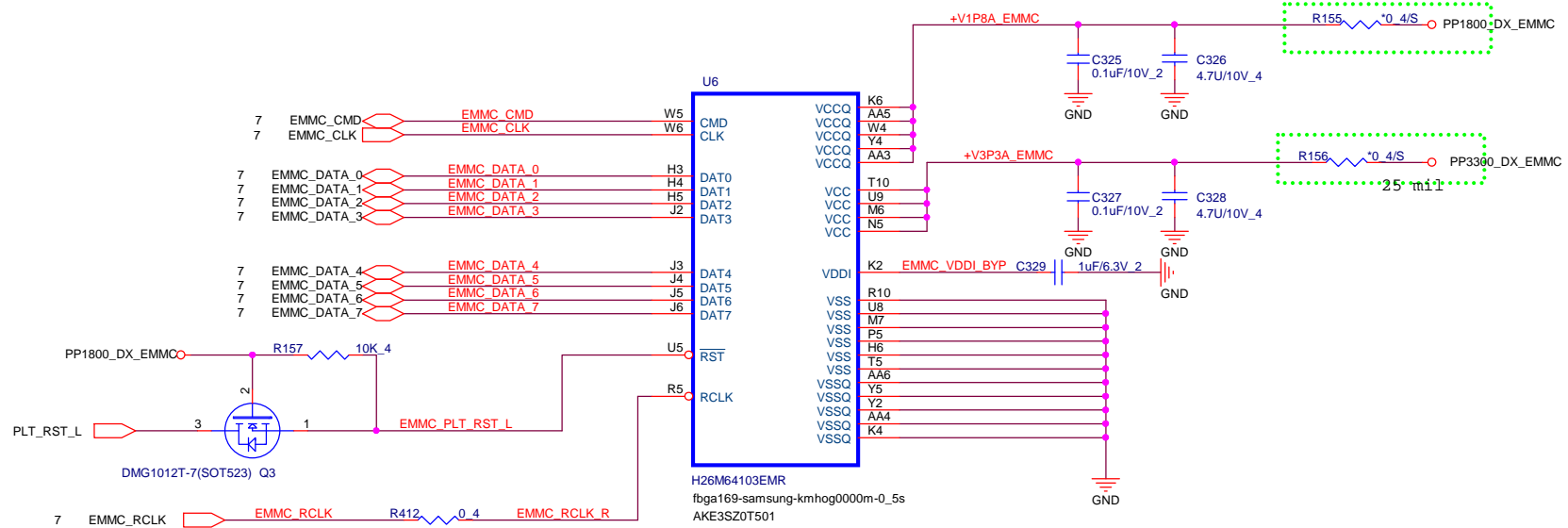
**PROJECT : Spyder**  
Quanta Computer Inc.

Size B	Document Number <b>LPDDR3 (CHB)</b>	Rev 1A
Date:	Tuesday, January 19, 2016	Sheet 13 of 41

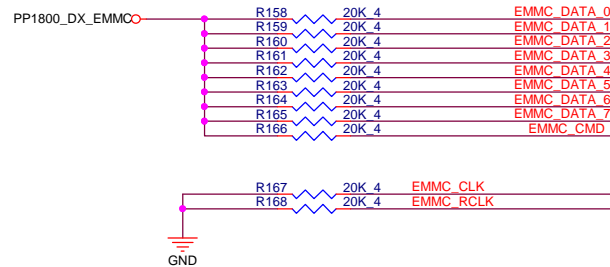
# EMMC

14

25 mil



footprint : BGA 169 - BGA 153 co-lay  
BGA 169 PIN : 14mmX18mm  
BGA 169 PIN : 12mmX16mm  
BGA 153 PIN : 11.5mmX13mm

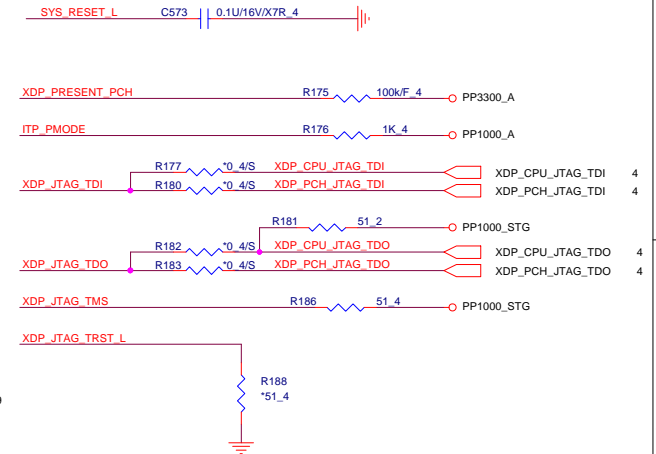




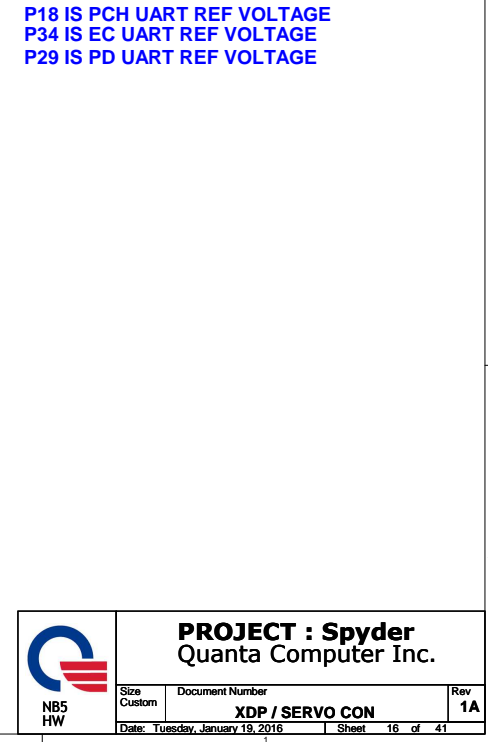
**PROJECT : Spyder**  
Quanta Computer Inc.

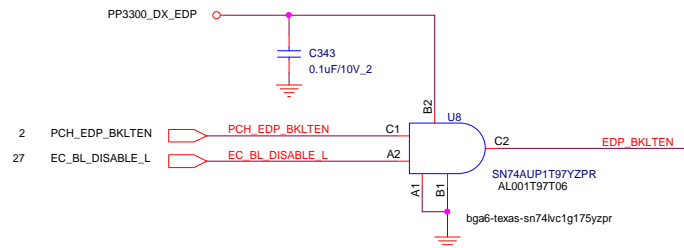
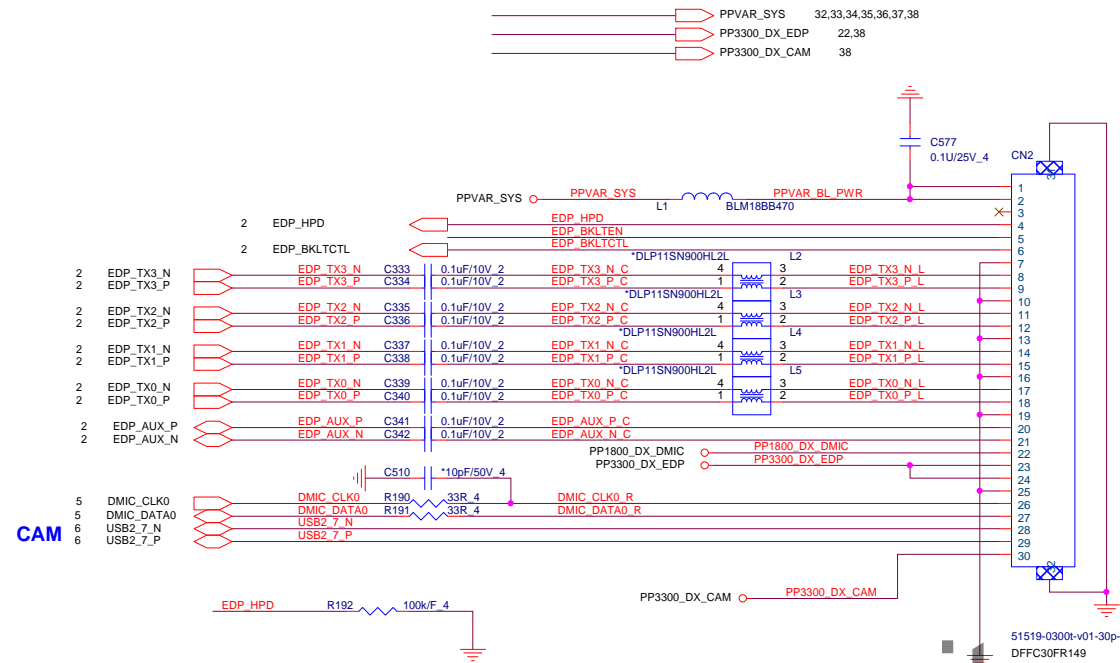
Size B	Document Number <b>LID &amp; LED</b>	Rev <b>1A</b>
Date: Tuesday, January 19, 2016		Sheet 15 of 41



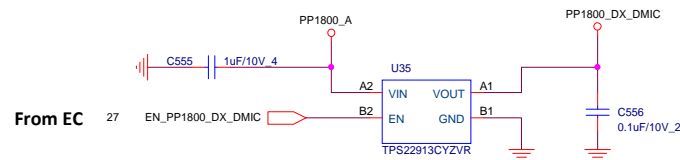


Pinout diagram for the ATmega328P microcontroller. The diagram shows two rows of pins. The top row (pins 1-12) includes: SERVO\_PCH, SPI\_CS0\_L, SERVO\_PCH, SPI\_CLK, SERVO\_PCH, SPI\_MISO, and a blank pin. The bottom row (pins 13-24) includes: SERVO\_EC, SPI\_LCK, SERVO\_EC, SPI\_CS1\_L, SERVO\_EC, SPI\_MISO, and a blank pin. A blue box highlights pins 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12. A red box highlights pins 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, and 24. The background features the text 'www.attech.in'.





TP98 PCH\_EDP\_BKLTEN  
TP99 EC\_BL\_DISABLE\_L  
TP100 EDP\_BKLTEN



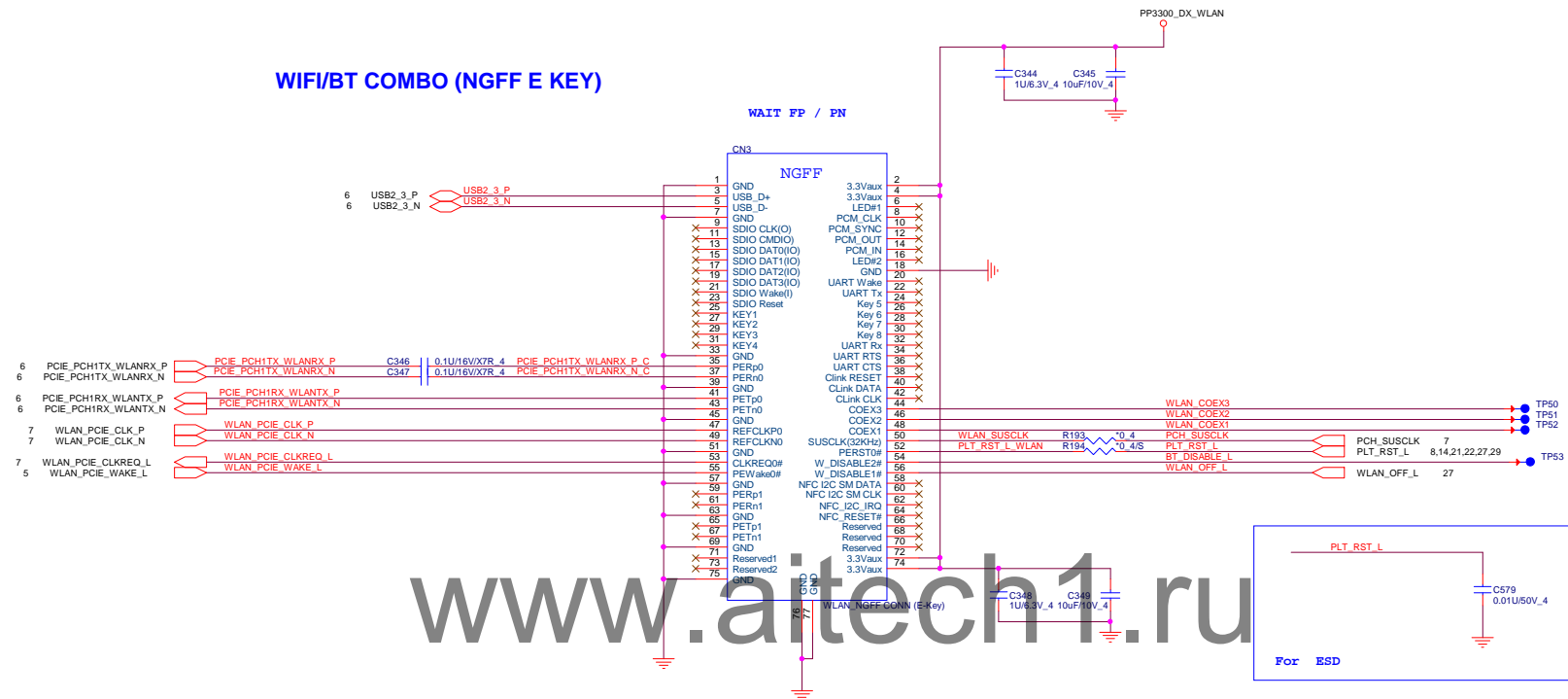
EDP\_TX3\_N\_C R413 0.4 EDP\_TX3\_N\_L  
EDP\_TX3\_P\_C R414 0.4 EDP\_TX3\_P\_L  
EDP\_TX2\_N\_C R415 0.4 EDP\_TX2\_N\_L  
EDP\_TX2\_P\_C R416 0.4 EDP\_TX2\_P\_L  
EDP\_TX1\_N\_C R417 0.4 EDP\_TX1\_N\_L  
EDP\_TX1\_P\_C R418 0.4 EDP\_TX1\_P\_L  
EDP\_TX0\_N\_C R419 0.4 EDP\_TX0\_N\_L  
EDP\_TX0\_P\_C R420 0.4 EDP\_TX0\_P\_L



**PROJECT : Spyder**  
Quanta Computer Inc.

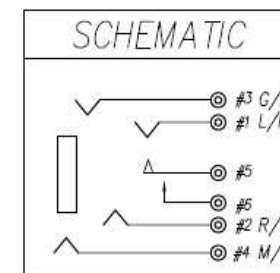
Size	Document Number	eDP	Rev
Date: Tuesday, January 19, 2016	Sheet 17	of 41	1A

## WIFI/BT COMBO (NGFF E KEY)



**PROJECT : Spyder**  
Quanta Computer Inc.

Size	Document Number	Rev
Custom	WIFI/BT(NGFF) & POGO	1A
Date: Tuesday, January 18, 2016	Sheet 18 of 41	



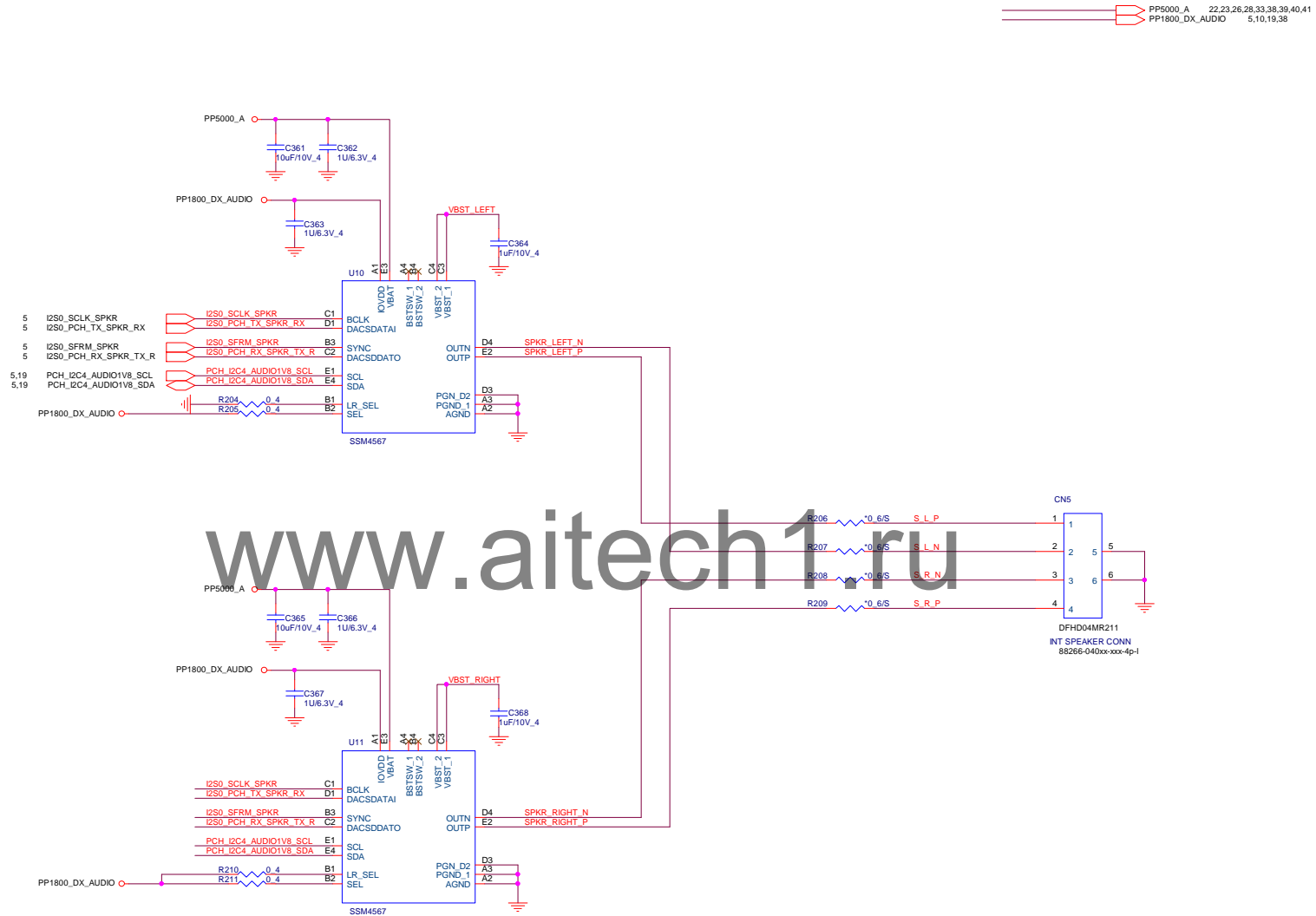
**All Clamp-Diode need close to ADO Jack.**


PP3300_S	5,8,32,35,38
PP3300_A	2,4,5,6,7,10,16,21,22,33,36,37,38,39,41
PP1800 DX AUDIO	5,10,20,38



**PROJECT : Spyder**  
Quanta Computer Inc.

Size	Document Number	Rev
	<b>AUDIO CODEC_NAU88L25</b>	<b>1A</b>
Date:	Tuesday, January 19, 2016	Sheet 19 of 41



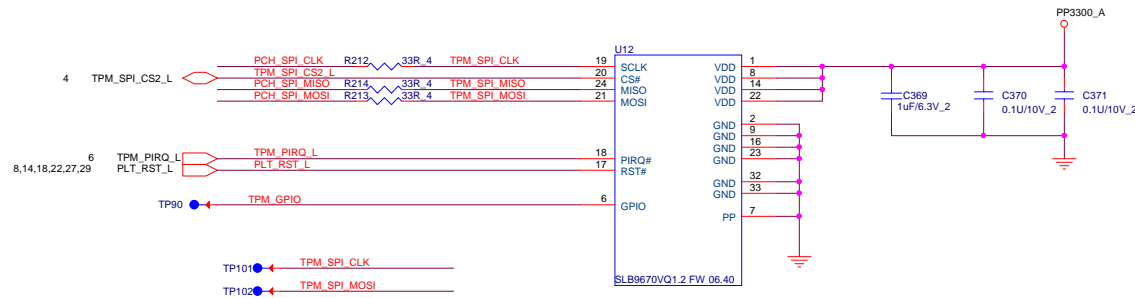


**PROJECT : Spyder**  
Quanta Computer Inc.

Size A	Document Number <b>SPK AMP</b>	Rev 1A
Date: Tuesday, January 19, 2016		
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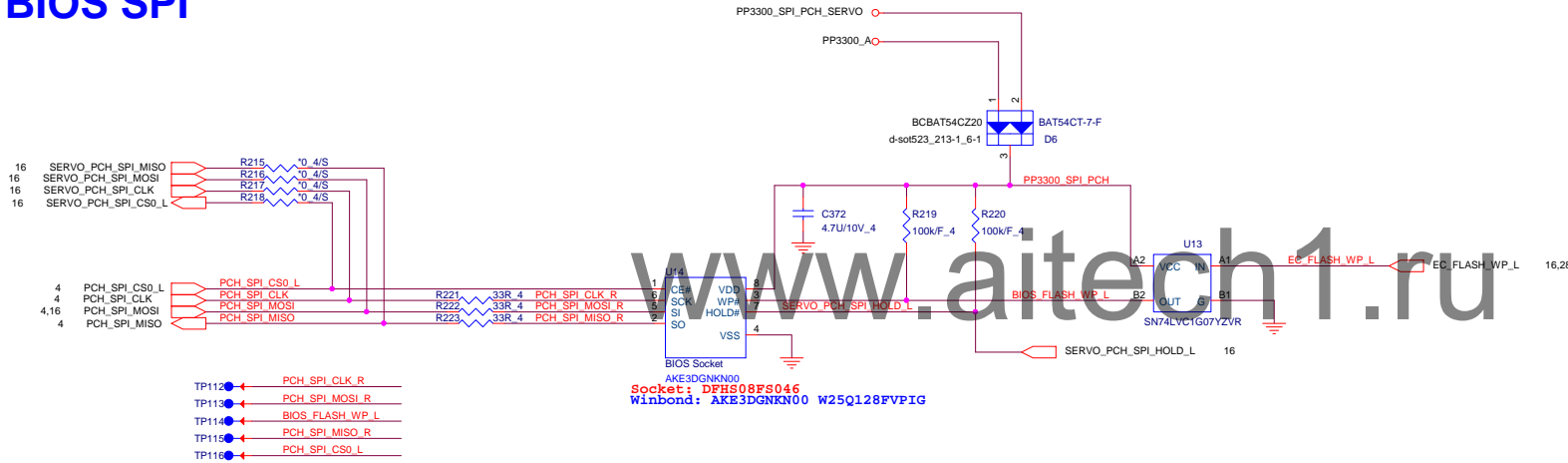
# TPM

21

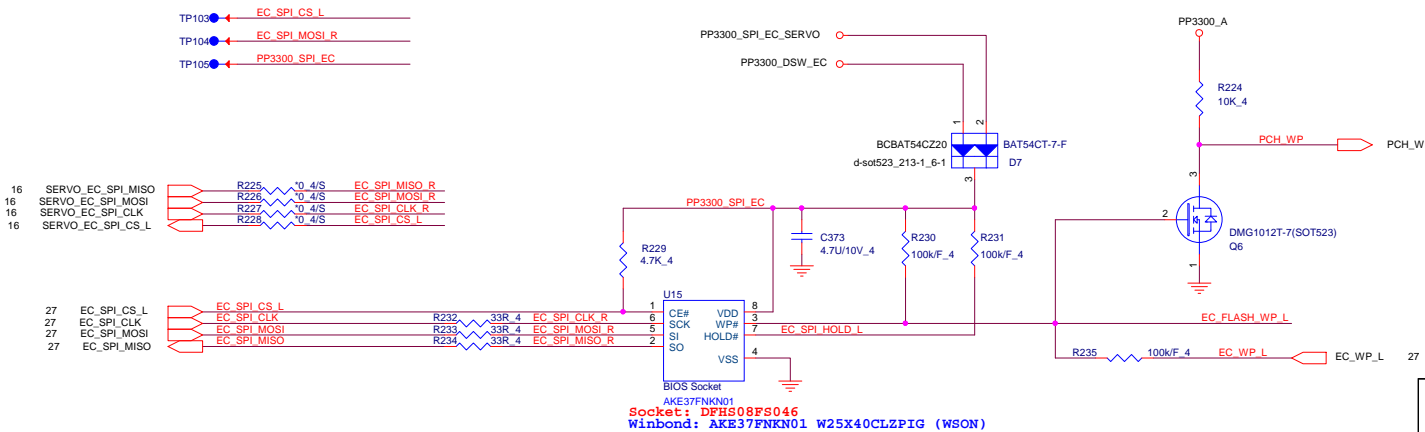


PP3300\_A 2,4,5,6,7,10,16,19,22,33,34,35,36,37,38,39,40,41  
PP3300\_SPI\_PCH\_SERVO 16  
PP3300\_DS\_W\_EC 15,16,22,27,28,35,38  
PP3300\_SPI\_EC\_SERVO 16

# BIOS SPI



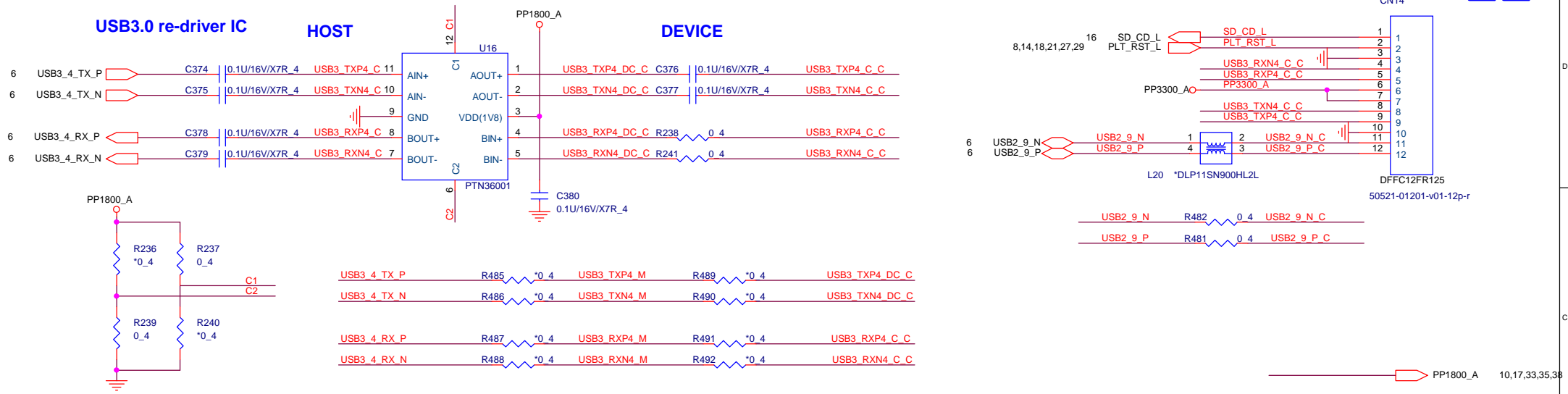
# EC SPI



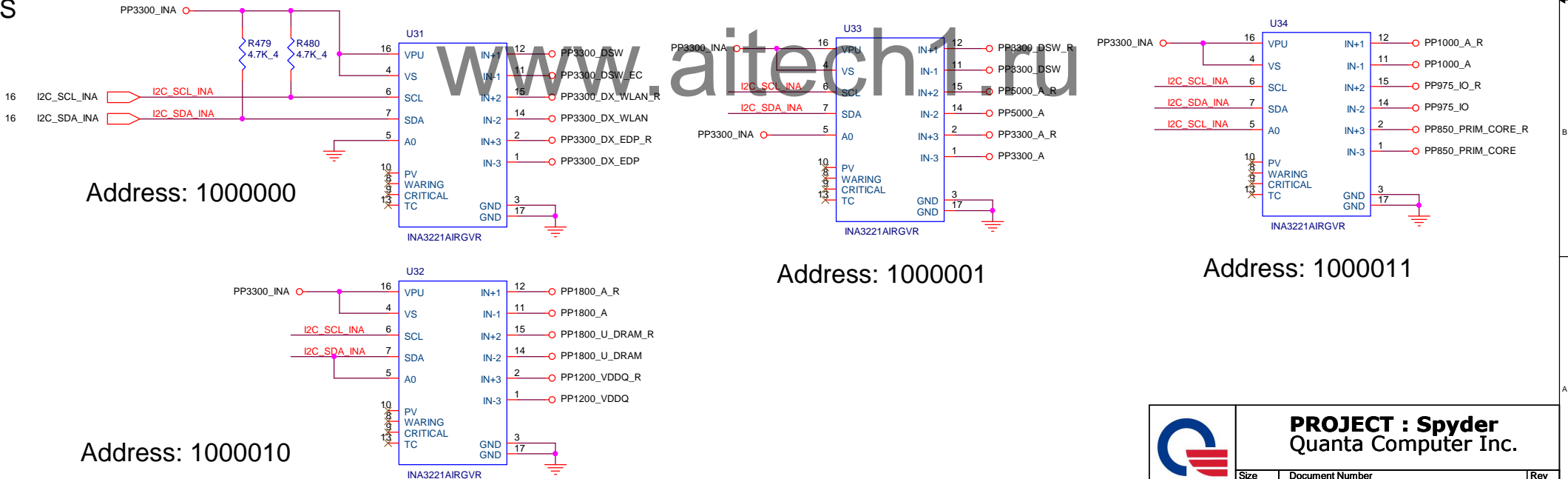
**PROJECT : Spyder**  
**Quanta Computer Inc.**


Size Custom	Document Number <b>TPM / SPI</b>	Rev 1A
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SD CARD



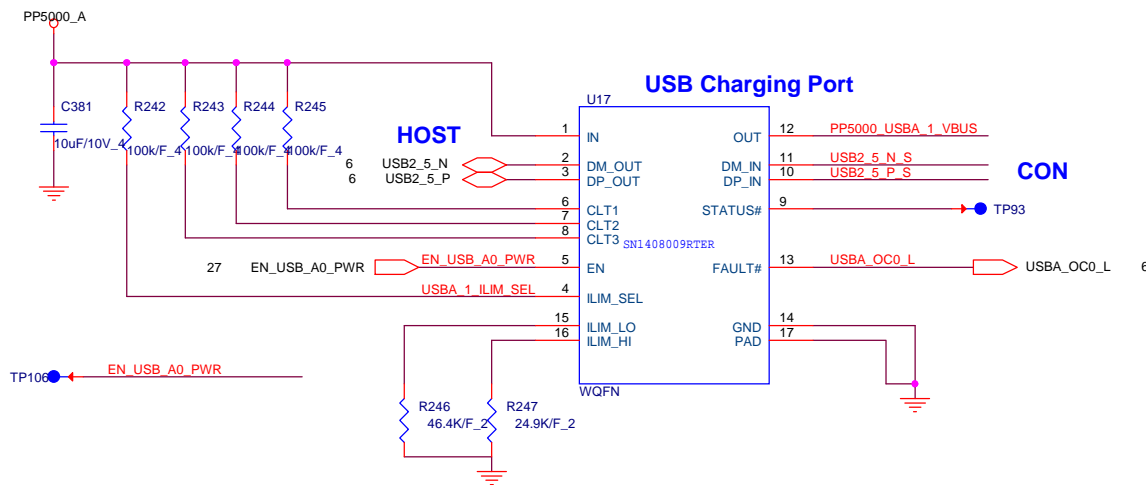
INAS



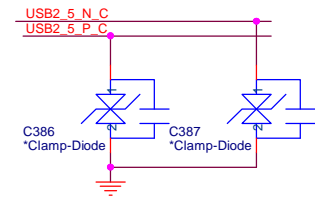
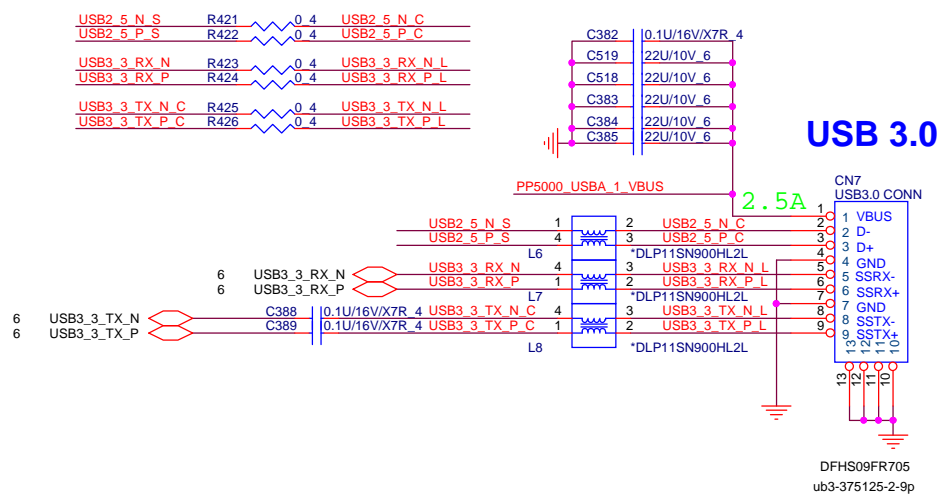
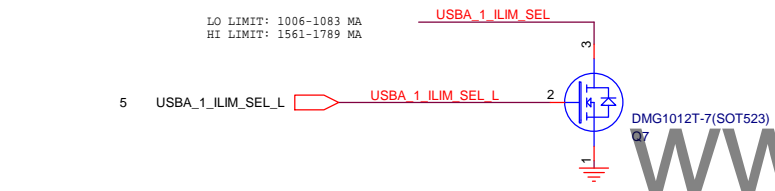
	<b>PROJECT : Spyder</b> Quanta Computer Inc.	Rev <b>1A</b>
	Size <b>SD &amp; INA3221</b>	
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# USB3



Device Control Pins				
Flow Line Condition	CTL1	CTL2	CTL3	ILIM_SEL
DCH (Discharge)	0	0	0	X
CDP	1	1	1	1
SDP2 (No Discharge from/to CDP)	1	1	1	0
SDP1 (Discharge from/to any charging state including CDP)	1	1	0	X
DCP_SHORTED	1	0	0	X
DCP_DIVIDER	1	0	1	X
DCP_Auto	0	1	1	X
	0	0	1	X

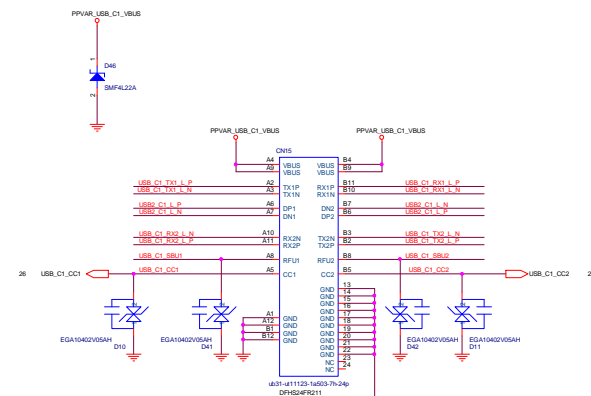
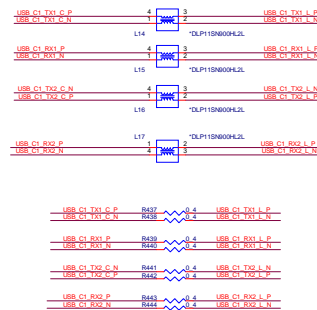
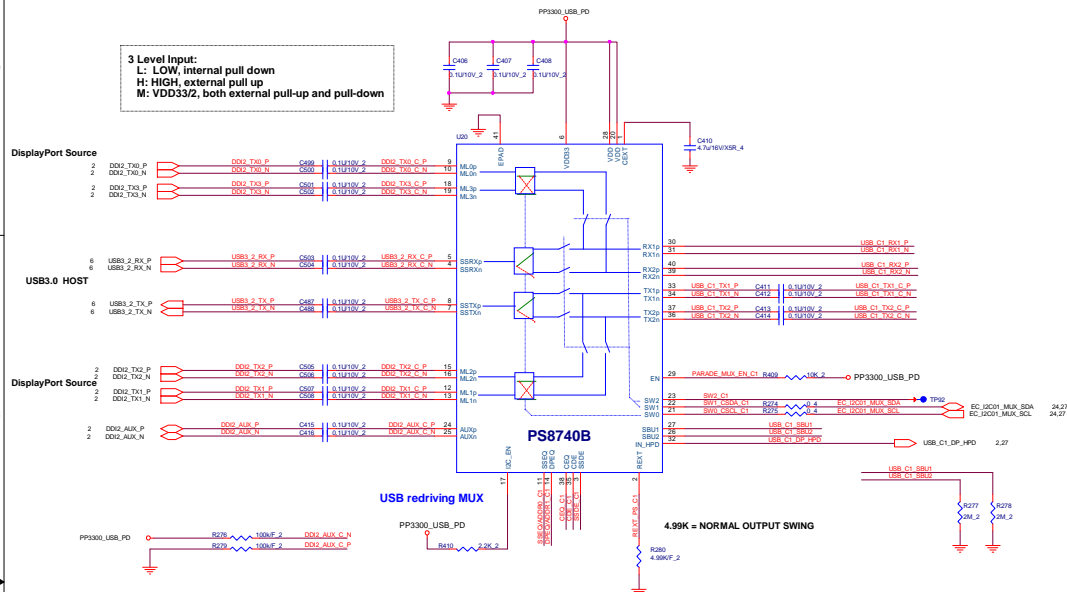


**PROJECT : Spyder**  
Quanta Computer Inc.

Size	Document Number	Rev
	<b>USB3.0 Conn</b>	<b>1A</b>
Date:	Tuesday, January 19, 2016	Sheet 23 of 41



3 Level Input:  
L: LOW, internal pull down  
H: HIGH, external pull up  
M: VDD33/2, both external pull-up and pull-down



## I2C control MODE: I2C\_EN=L

USB HOST facing RX channel receiver equalization settings;  
Internal tied to VDD33/2, 3.3V I/O.  
SSBQ =  
L: Programmable DE level#1  
H: Programmable DE level#2  
M: Programmable DE level#3 (default)

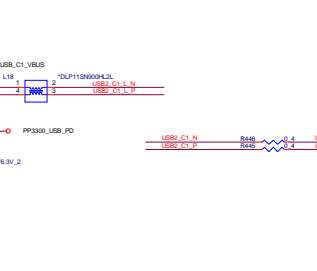
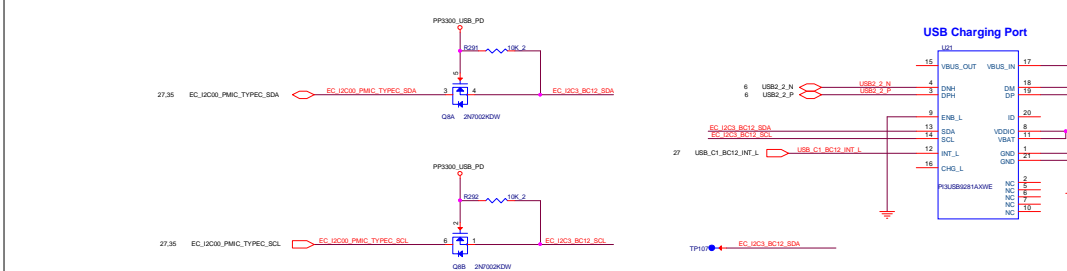
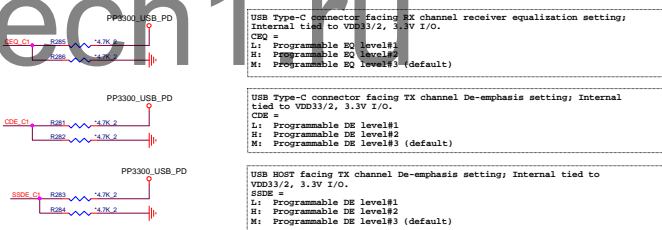
DP Receiver equalization setting; Internal tied to VDD33/2, 3.3V I/O.  
DPWQ =  
L: Programmable DE level#1  
H: Programmable DE level#2  
M: Programmable DE level#3 (default)

## I2C control MODE: I2C\_EN=H

ADDR1, ADDR0: I2C control bus address LSB. Internally pull down at 150k Ohm 3.3V I/O  
[ADDR1, ADDR0] =  
L: 0x20 / 0x21 (default)  
H: 0x22 / 0x23  
M: 0x24 / 0x25  
H: 0x26 / 0x27

Pin	Signal	Level
1	TX1_P	3.3V
2	TX1_N	3.3V
3	TX2_P	3.3V
4	TX2_N	3.3V
5	RX1_P	3.3V
6	RX1_N	3.3V
7	RX2_P	3.3V
8	RX2_N	3.3V
9	CC1	3.3V
10	CC2	3.3V
11	EN	3.3V
12	DPWQ	3.3V
13	SSBQ	3.3V
14	ADDR1	3.3V
15	ADDR0	3.3V

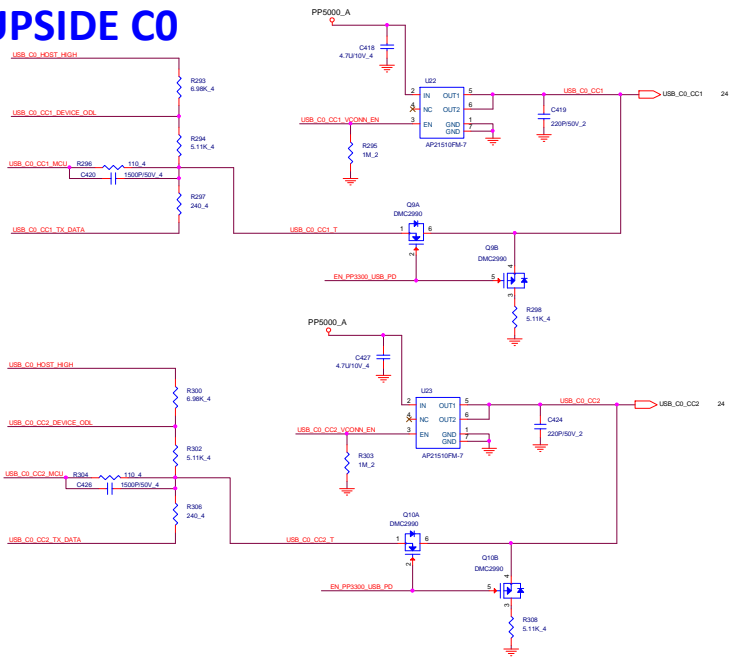
## PS8740B Pin Control Mode



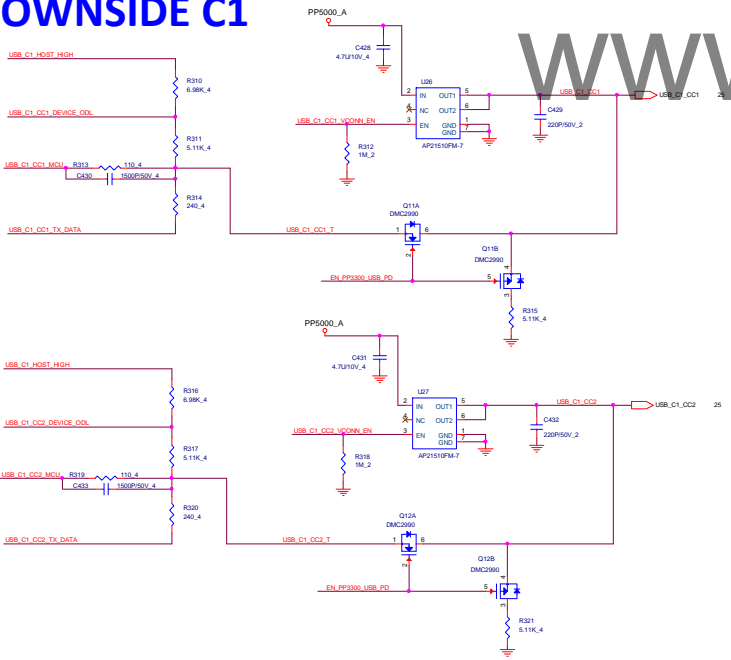
**PROJECT : Spyder**  
Quanta Computer Inc.

Size B	Document Number	Rev 1A
<b>USBC DOWN SIDE PORT (C1)</b>		
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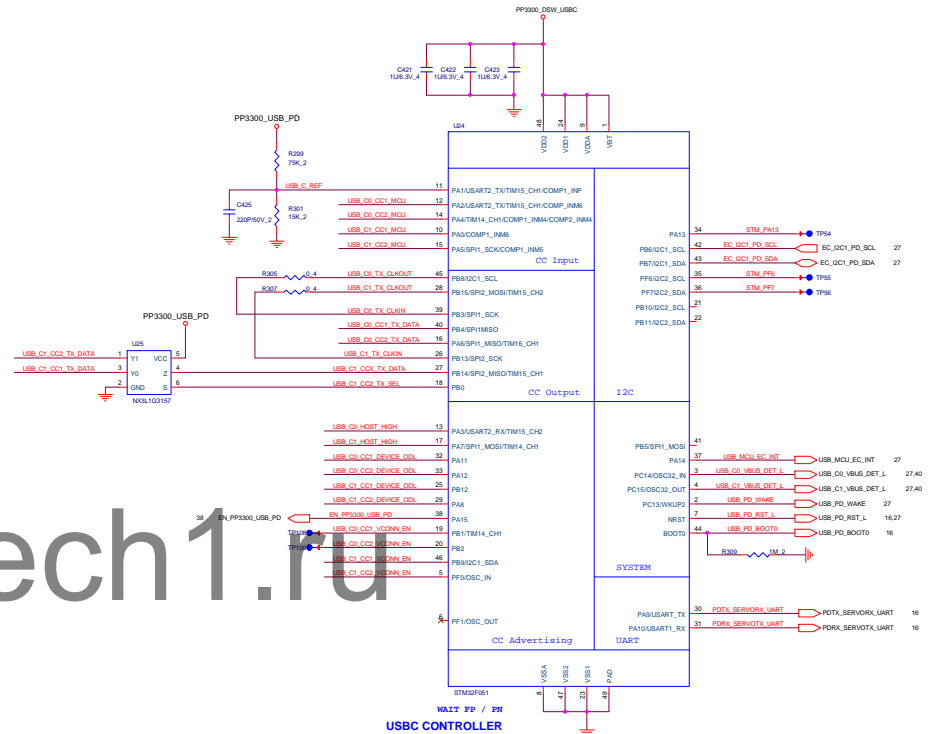
## USBC UPSIDE C0



## USBC DOWNSIDE C1



## USB CONTROLLER



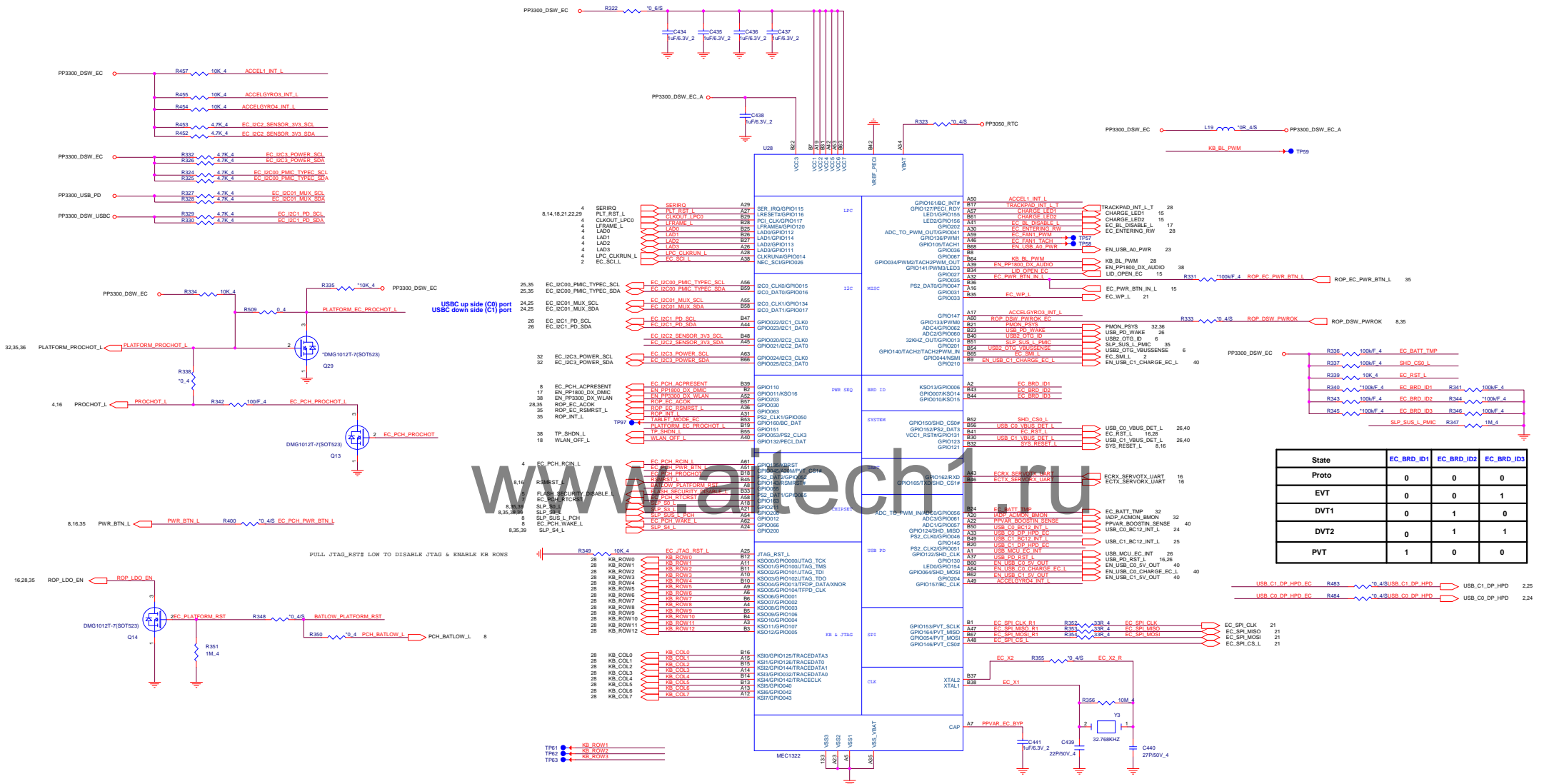
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B	USB CONTROLLER	1A
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PP3050_RTC	7,8,10,35
PP3030_DSW_EC	15,16,21,22,28,35,38
PP3030_USB_PD	24,25,26,38
PP3030_DSW_USBC	16,26,38,40

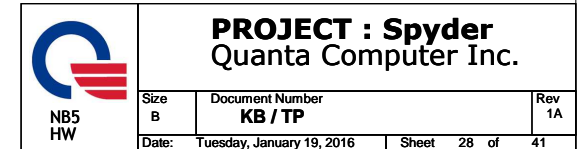
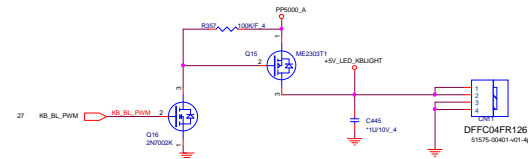


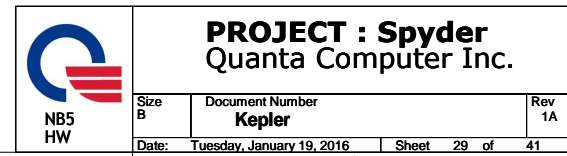
## PROJECT : Spyder

### Quanta Computer Inc.

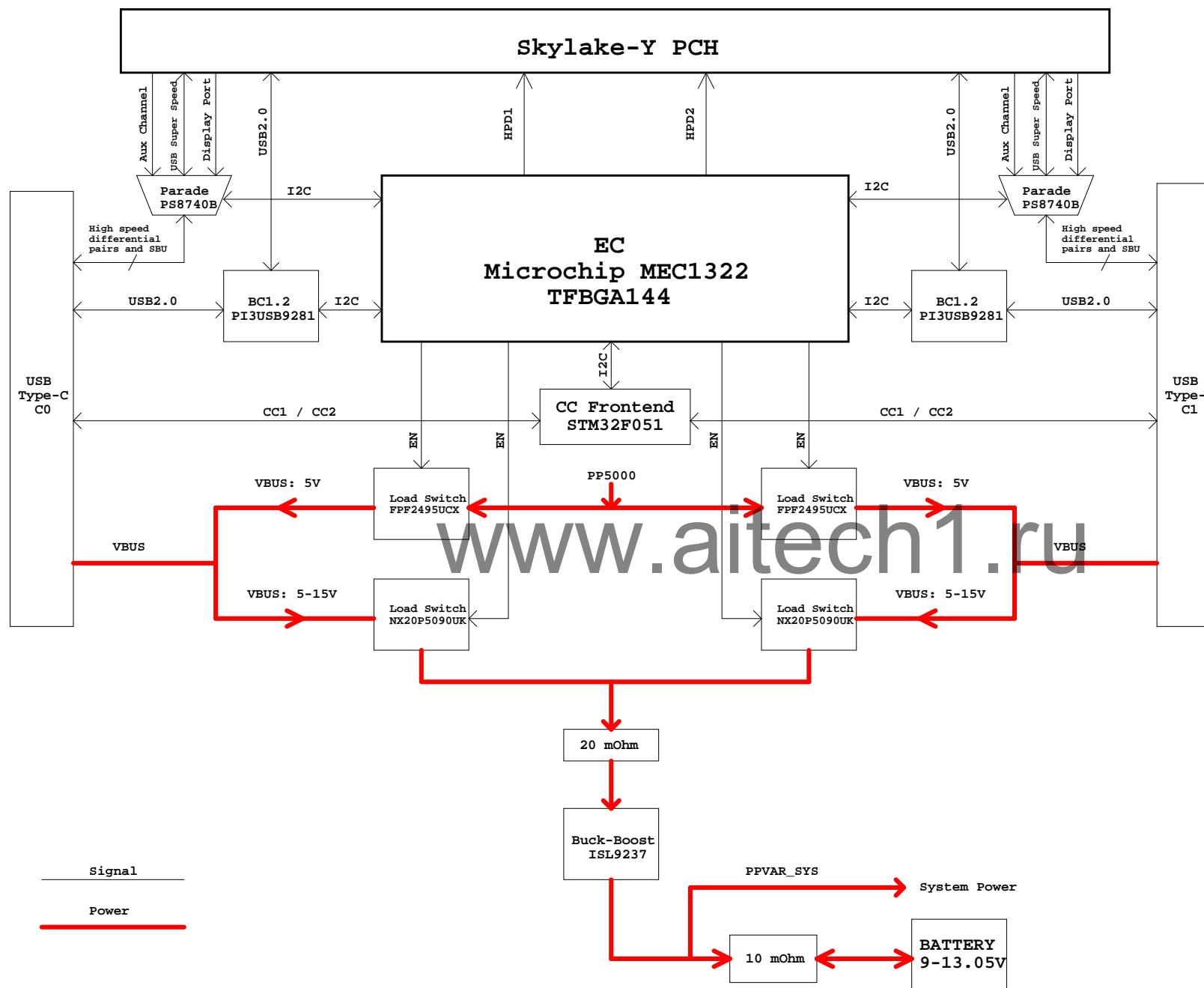
Size Custom	Document Number <b>EC MEC1322</b>	Rev 1A
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### Track Pad









Host	Bus Name	Frequency	Pull up	Device	Part Number	7 bit used	8 bit R	8 bit W
EC	EC_I2C00_PMIC_TYPEC	400KHz	PP3300_DSW_EC	ROP PMIC	BD99992GW	0b0110000	0x60	0x61
			PP3300_USB_PD	BC 1.2 Part (C1/Down port)	PI3USB9281	0b0100101	0x4A	0x4B
	EC_I2C01_MUX_TYPEC	400KHz	PP3300_USB_PD	Parade Mux (C0/Up port)	PS8470	0b0011010	0x34	0x35
				Parade Mux (C1/Down port)	PS8470	0b0010000	0x20	0x21
				BC 1.2 Part (C0/Up port)	PI3USB9281	0b0100101	0x4A	0x4B
	EC_I2C1_PD	1MHz	PP3300_DSW_USBC	PD MCU	STM32F051C8	0b0011110	0x3C	0x3D
	EC_I2C2_SENSOR	400KHz	PP3300_DX_SENSOR	Accelerometer	KX022-1020	0b0011111	0x3E	0x3F
				Accelerogyre	BMI160	0b1101000	0xD0	0xD1
				ALS	OPT3001	0b1000100	0x88	0x89
	EC_I2C3_POWER	100KHz	PP3300_DSW_EC	Battery Pack	BQ40Z55	0b0001011	0x16	0x17
Battery Charger				ISL9237	0b0001001	0x12	0x13	
PCH	PCH_I2C0_TOUCHSCREEN	400KHz	PP3300_DX_TOUCHSCREEN	Touchscreen	ekTH3990	0b0010000	0x20	0x21
	PCH_I2C1_TRACKPAD	400KHz	PP3300_DX_TRACKPAD	Touchpad	SA765A-25H0	0b0010101	0x2A	0x2B
	PCH_I2C4_AUDIO1V8	400KHz	PP1800_DX_AUDIO	Headset Amp	NUO88L25	0b0011100	0x38	0x39
				Speaker Amp L	SSM4567	0b0110100	0x68	0x69
				Speaker Amp R	SSM4567	0b0110101	0x6A	0x6B

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NB5  
HW

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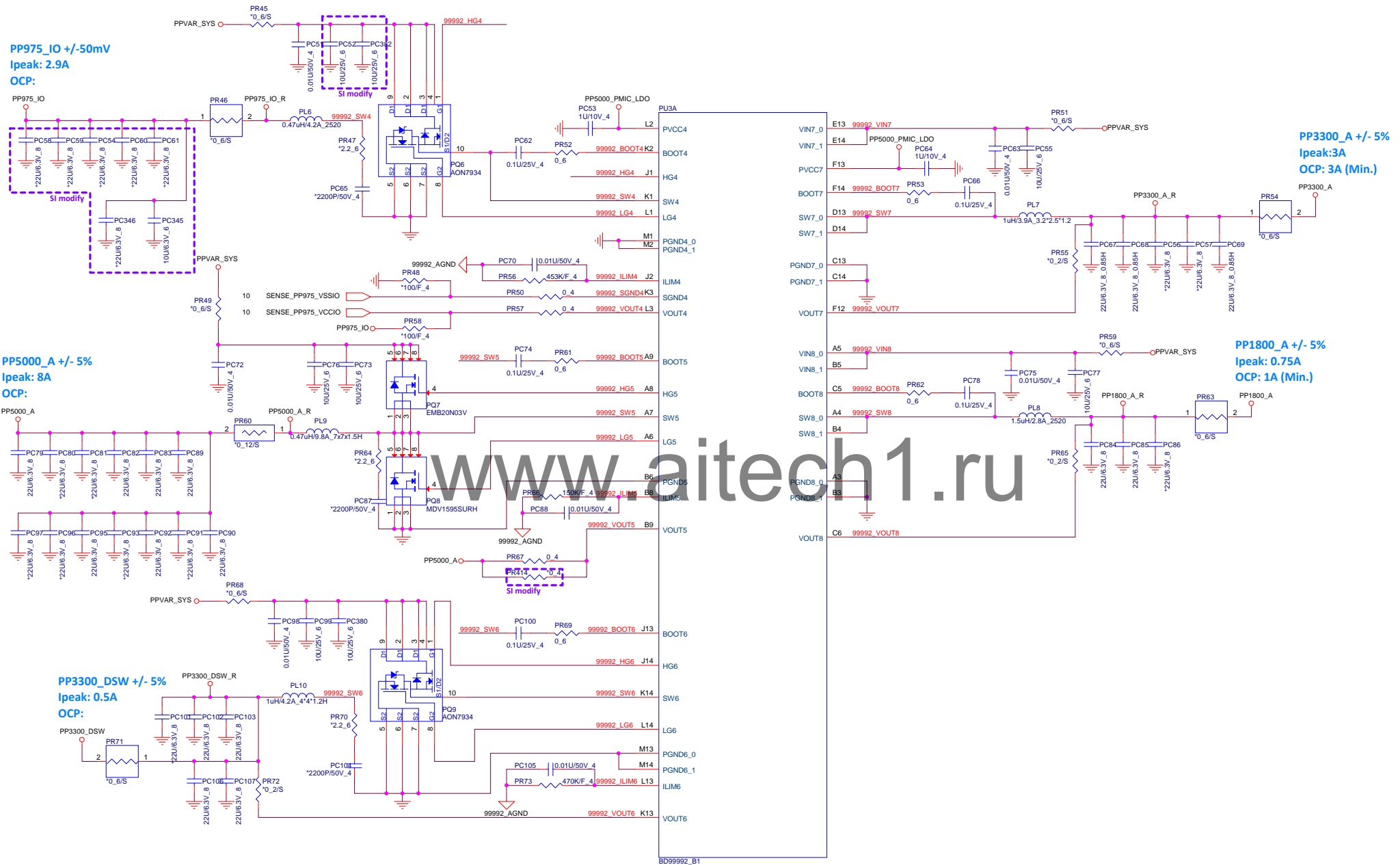
Size  
A

Document Number  
**I2C MAP**

Rev  
1A

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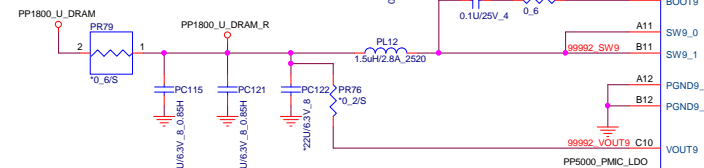




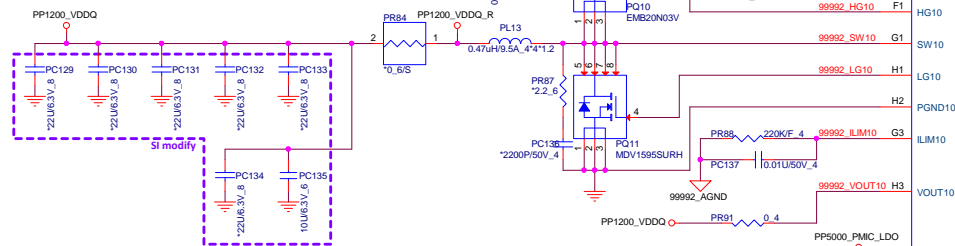
**PROJECT : Spyder**  
Quanta Computer Inc.

Size	Document Number	Rev
Custom	PMIC (BD99992_1)	1A
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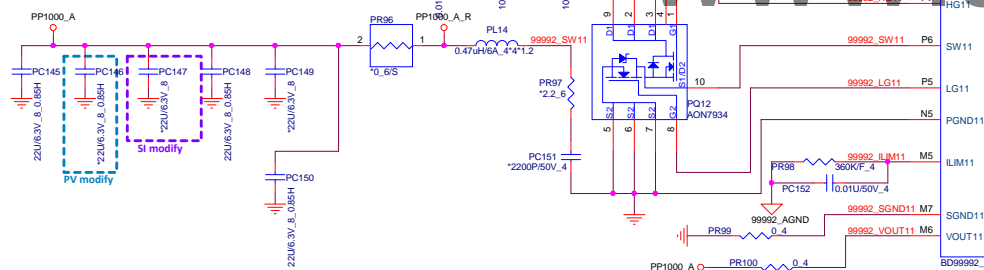
**PP1800\_U\_DRAM +/-5%**  
Ipeak: 1A  
OCP: 1A (Min.)



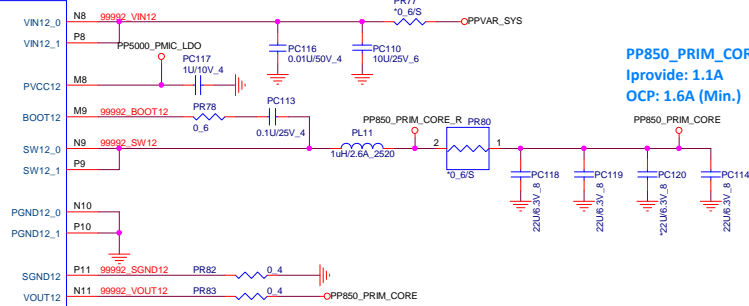
**PP1200\_VDDQ +/-5%**  
Ipeak: 5A  
OCP:



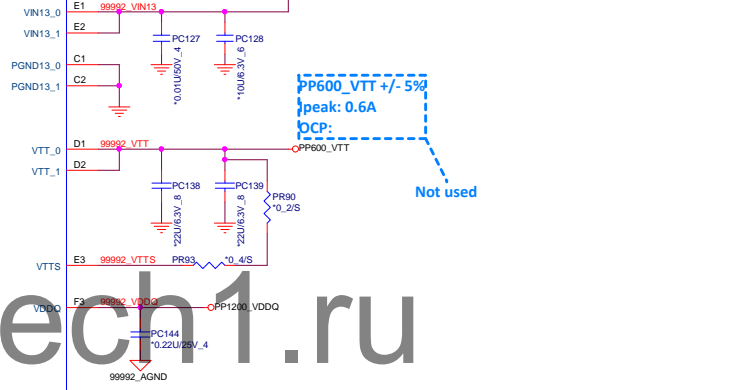
**PP1000\_A +/- 50mV**  
Iprovide: 3.5A  
OCP:



**PP850\_PRIM\_CORE +/-5%**  
Iprovide: 1.1A  
OCP: 1.6A (Min.)



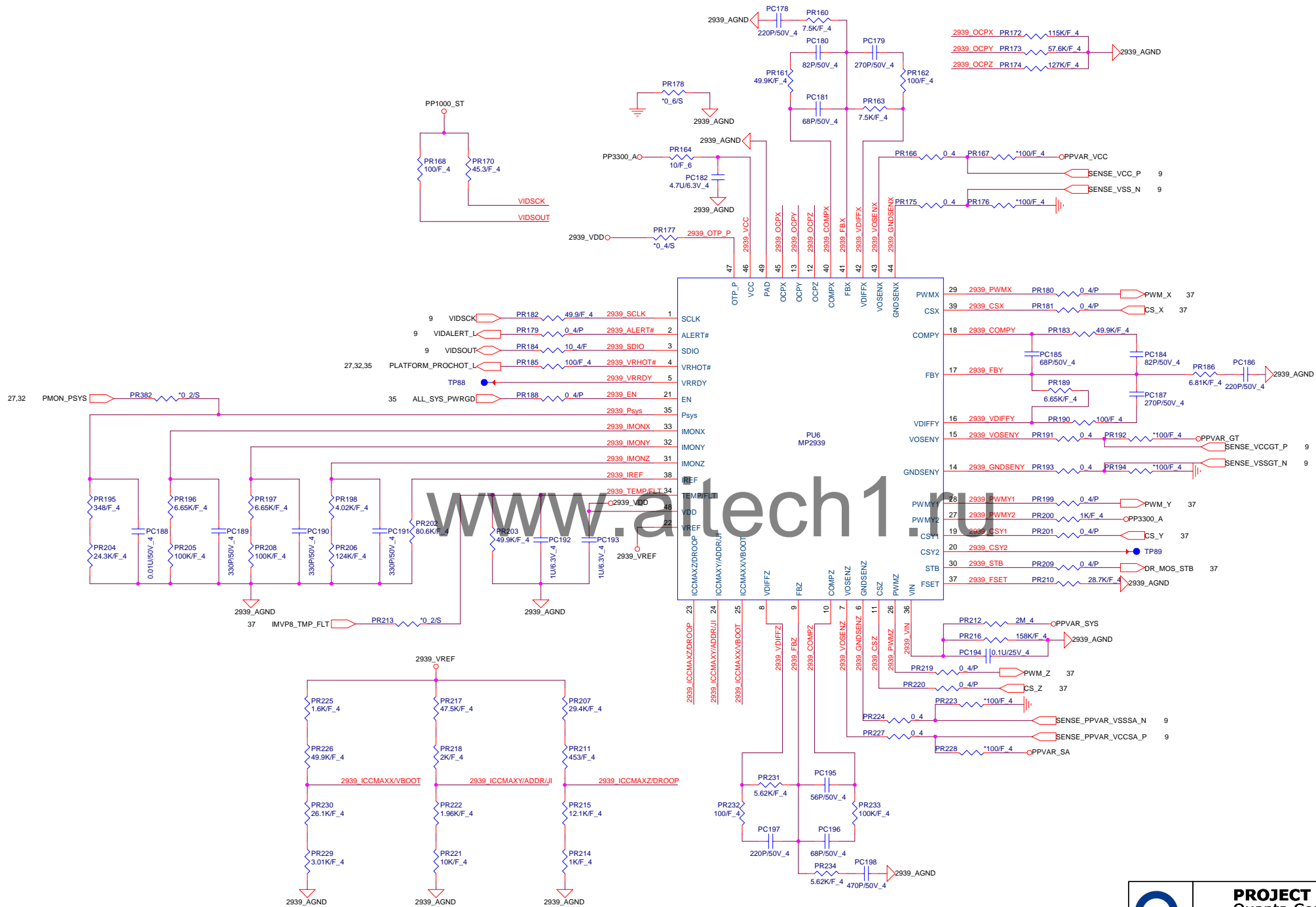
**PP600\_VTT +/- 5%**  
Ipeak: 0.6A  
OCP:



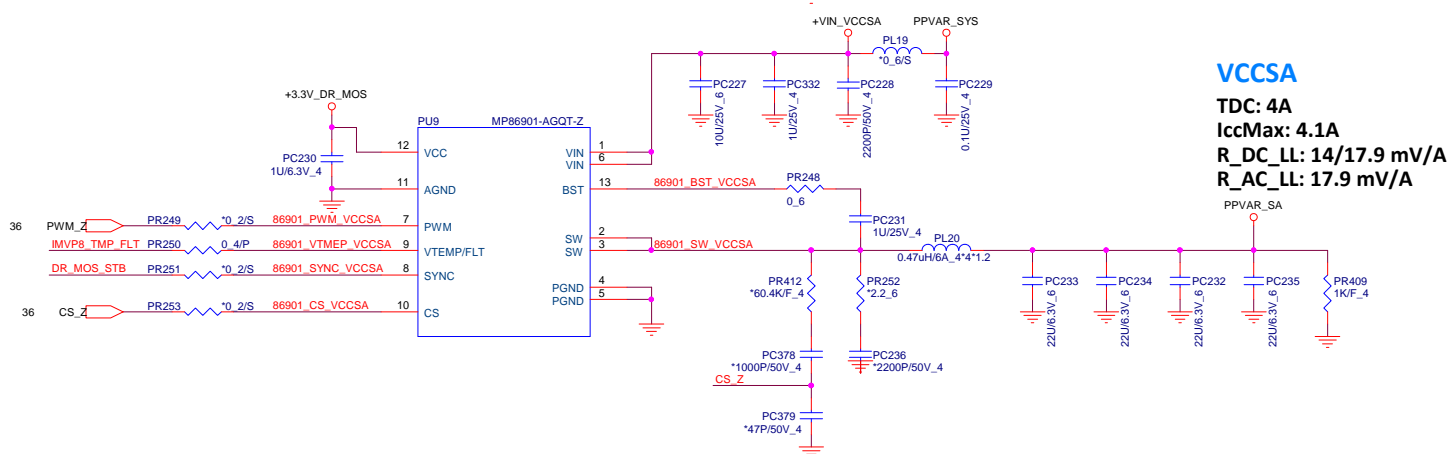
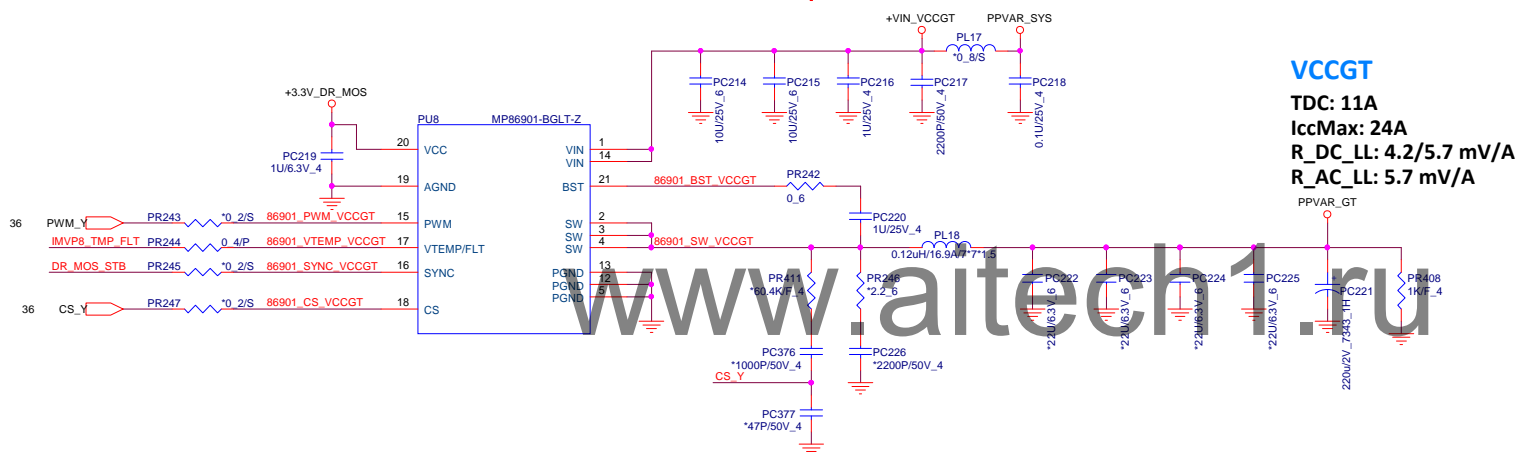
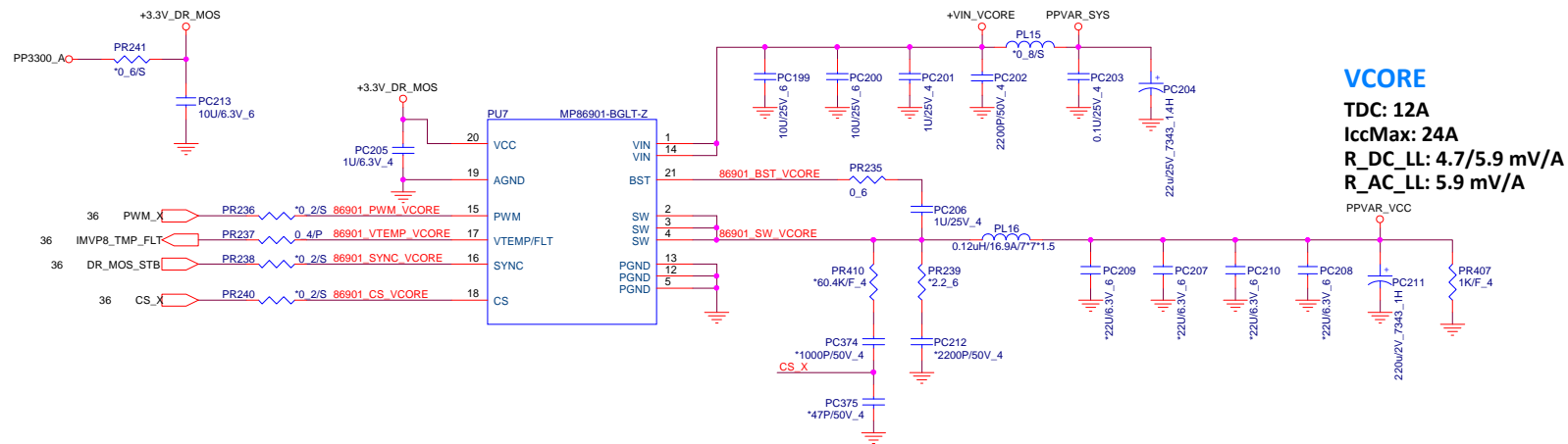
Not used

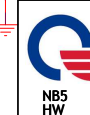
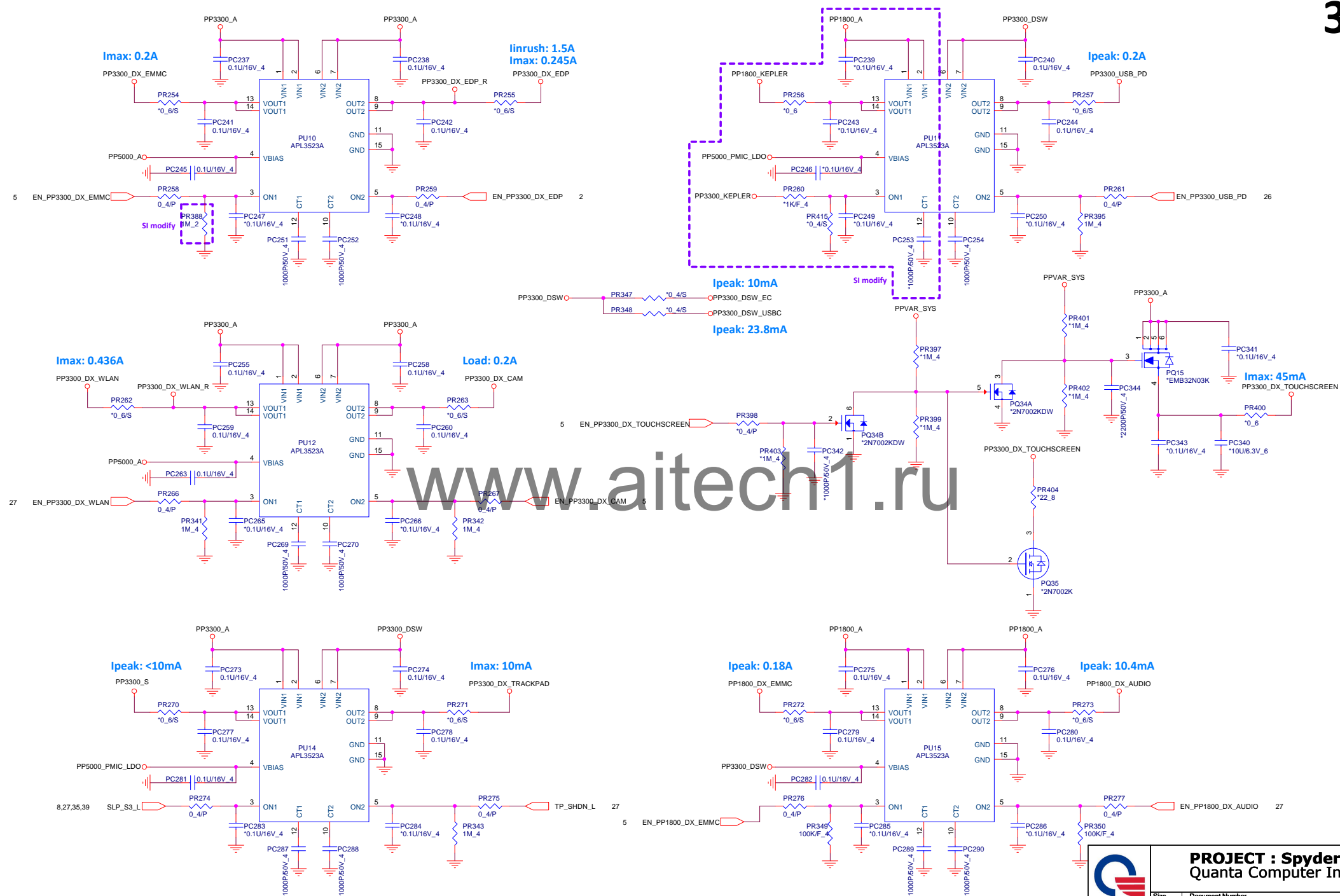
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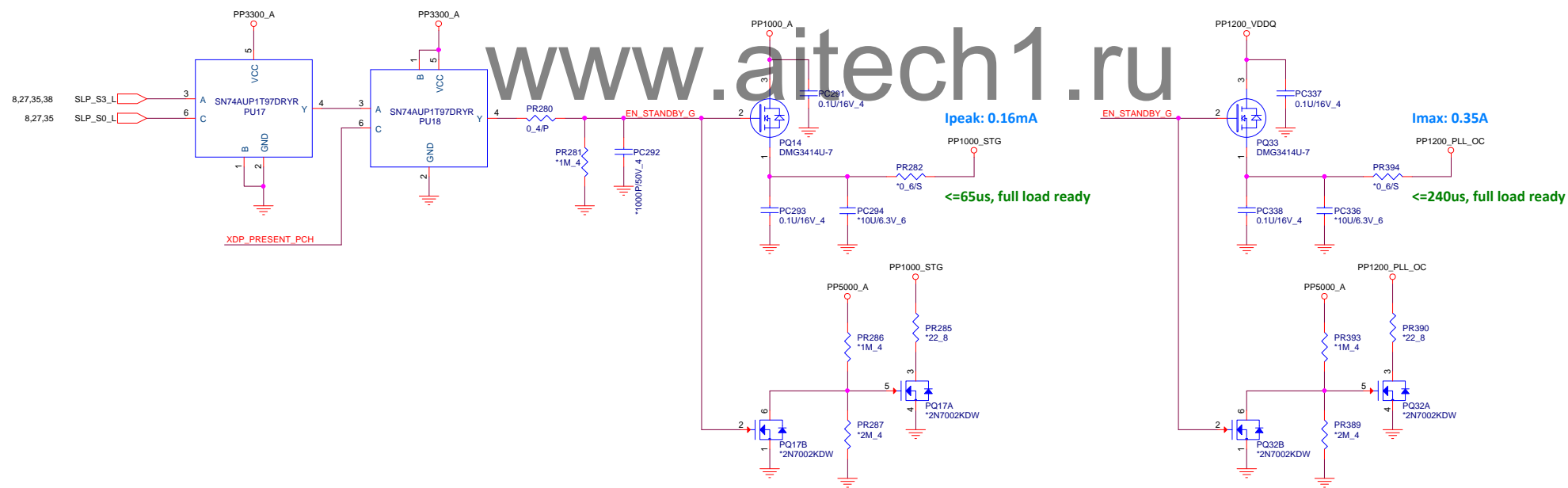
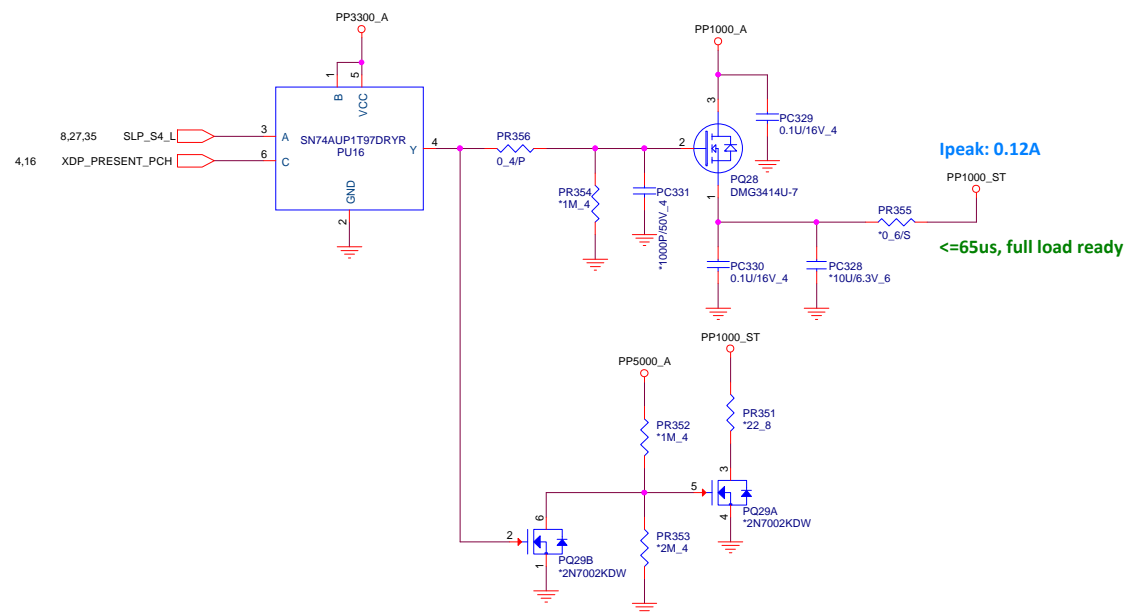


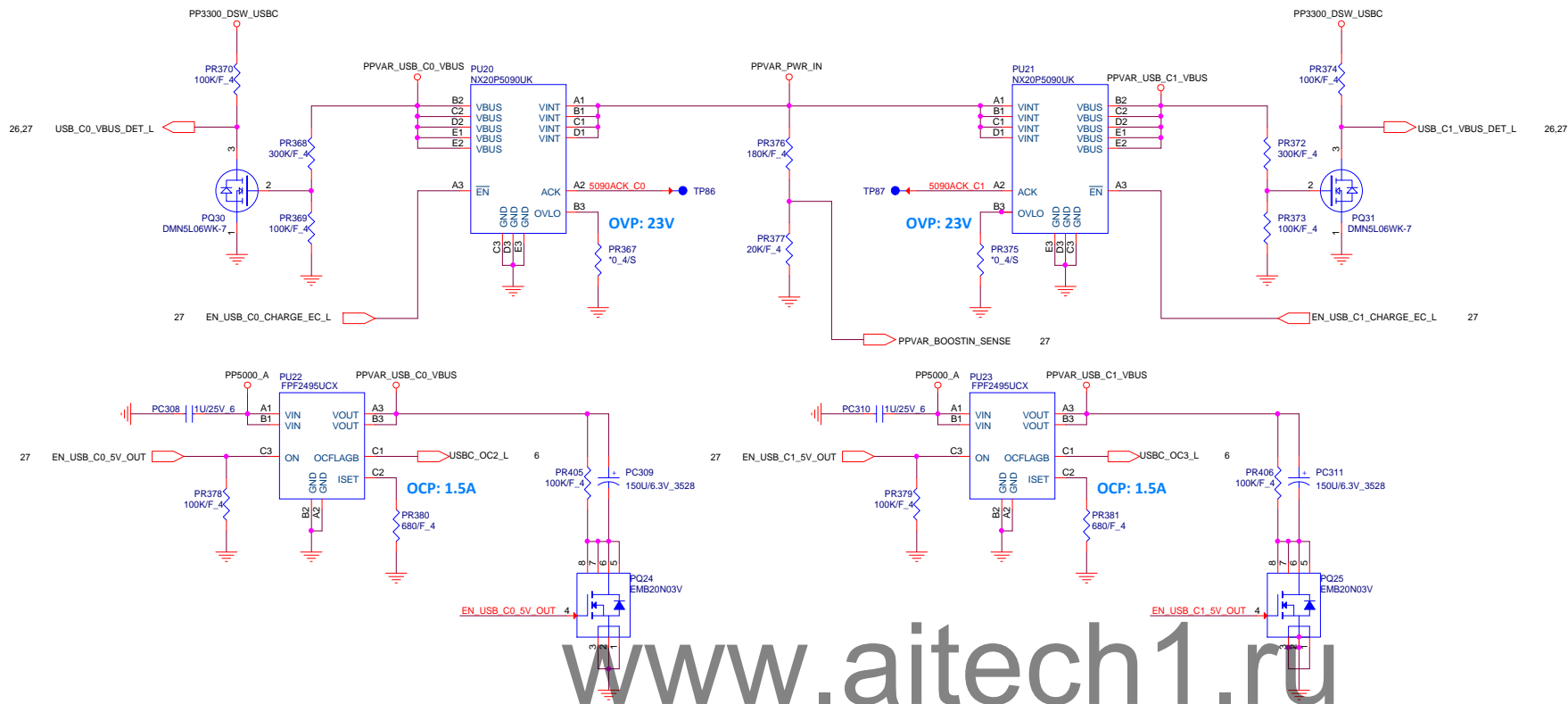




**PROJECT : Spyder**  
**Quanta Computer Inc.**

Size	Document Number	Rev
Custom	<b>Load Switch 1</b>	1A
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Power rail "PP1800\_KEPLER" is on the page 38

$$V_{out} = 1.2(1 + R1/R2)$$

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SI modify