

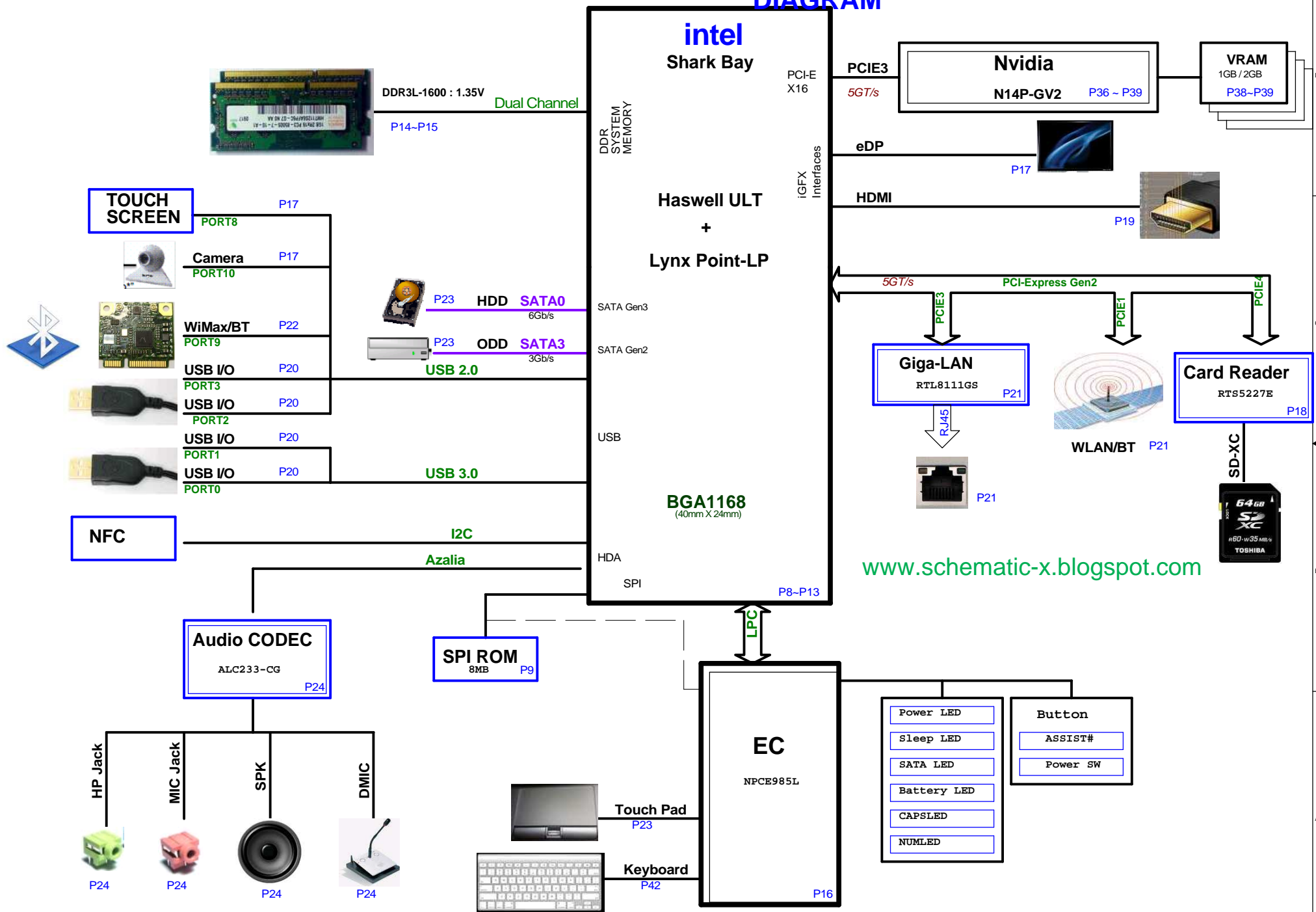
Page	Title of schematic page	Rev.	Date
01	Page List	1A	
02	Block Diagram	1A	
03	Change List	1A	
04	HSW MCP(DISPLAY/Sideband)	1A	
05	HSW MCP(MEMORY/GND)	1A	
06	HSW MCP(CFG/PwrMGT)	1A	
07	HSW MCP(POWER)	1A	
08	HSW PCH(RTC/HDA/SATA)	1A	
09	HSW PCH(PCIE/USB)	1A	
10	HSW PCH(CLK/LPC/SPI/SMB)	1A	
11	HSW PCH(GPIO/LPIO/MISC)	1A	
12	HSW PCH(POWER)	1A	
13	DDR3 DIMM0-STD (5.2H)	1A	
14	DDR3 DIMM1-RSV (5.2H)	1A	
15	HOLE/EMI/KB	1A	
16	WPCE985L & FLASH	1A	
17	LVDS/CAMERA	1A	
18	CARD READER(RTS5227E)	1A	
19	HDMI/THERMAL	1A	
20	USB	1A	
21	LAN (RTL8111GS)	1A	
22	WLAN/KB-BL	1A	
23	HDD/ODD/G-SENSOR/TP/FAN	1A	
24	Audio ALC233-CG	1A	
25	LED/PS/DMIC	1A	
26	POWER +VCC_CORE (NCP81101)	1A	
27	POWER 3VPCU&RVCC5(TPS51427)	1A	
28	POWER 1.35VSUS/VTT_MEM	1A	
29	POWER +1.05V(G5602R41U)	1A	
30	POWER VCC1.5/Thermal	1A	
31	POWER(BAT IN / ADA IN/ UL)	1A	
32	POWER CHARGER (ISL88731C)	1A	
33	POWER VGA_CORE/1.0(RT8812A)	1A	
34	POWER VGS1CORE/ANALOG/BIOS	1A	
35	NVIDIA N14 GB2-64 PCIE 1/4	1A	
36	NVIDIA N14 GB2-64 TMDS 2/4	1A	
37	NVIDIA N14 GB2-64 VRAM 3/4	1A	
38	NVIDIA N14 GB2-64 VRAM 4/4	1A	
39	AUDIO Woofer	1A	

Page	Title of schematic page	Rev.	Date
40	IO PORT LIST	1A	
		1A	
		1A	
		1A	

* : No mount
L@ : For LVDS output
D@ : For eDP output
E@ : For DIS GFX
I@ : For UMA

HKC Haswell ULT BLOCK DIAGRAM

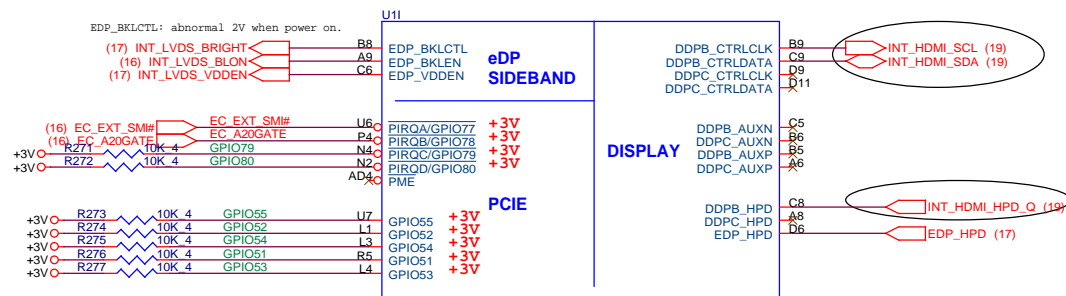
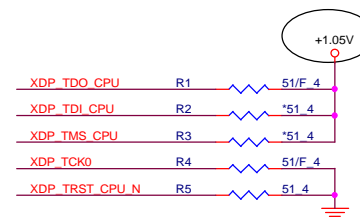
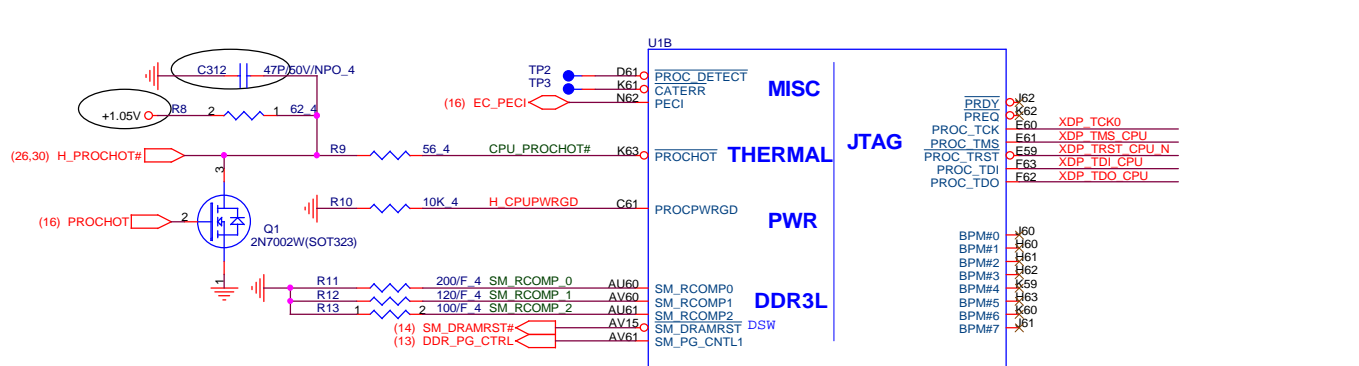
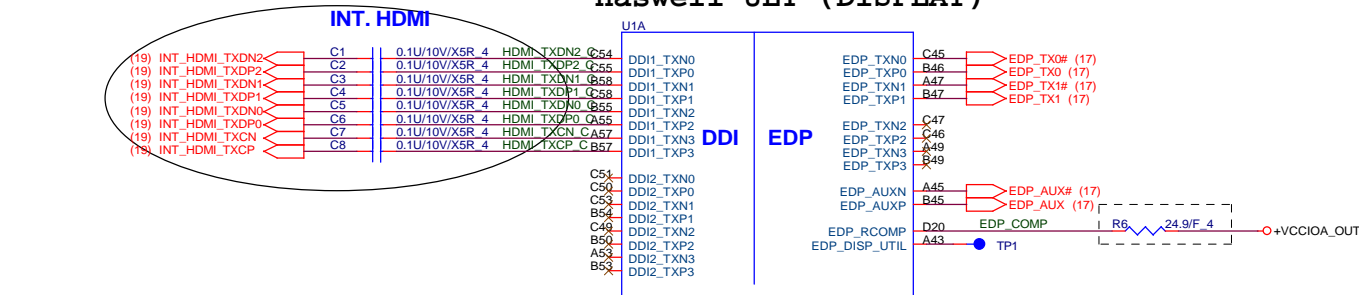
02



Change List					03				

Haswell ULT (DISPLAY)

4



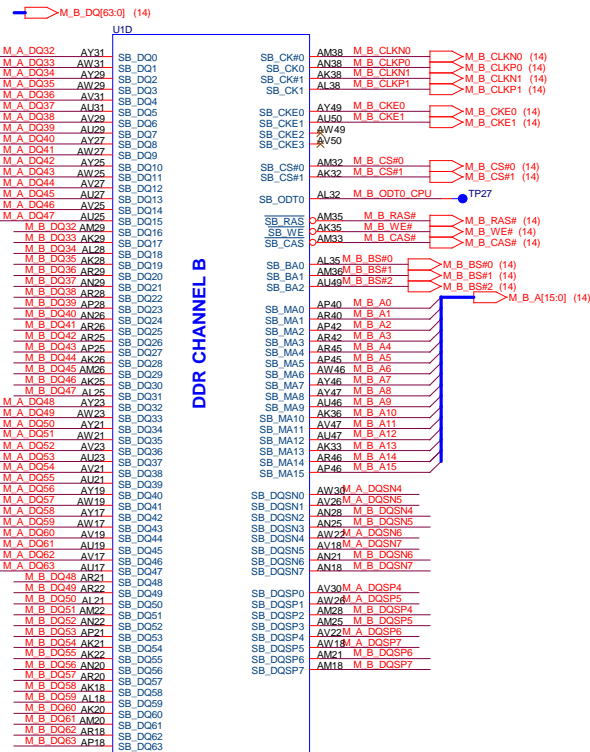
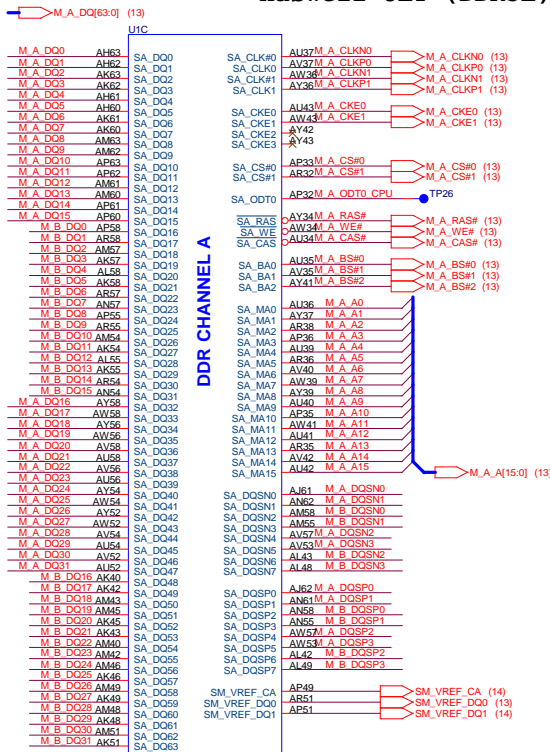
Quanta Computer Inc.

PROJECT : HKC

Size	Document Number	Rev
1A	HSW MCP(Display/eDP)	1A
Date:	Thursday, January 31, 2013	Sheet 4 of 40

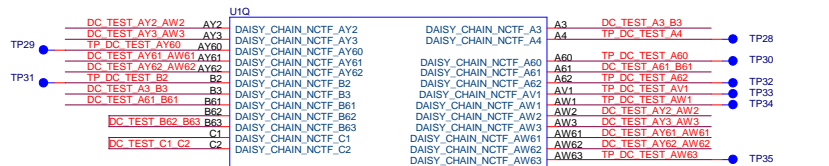
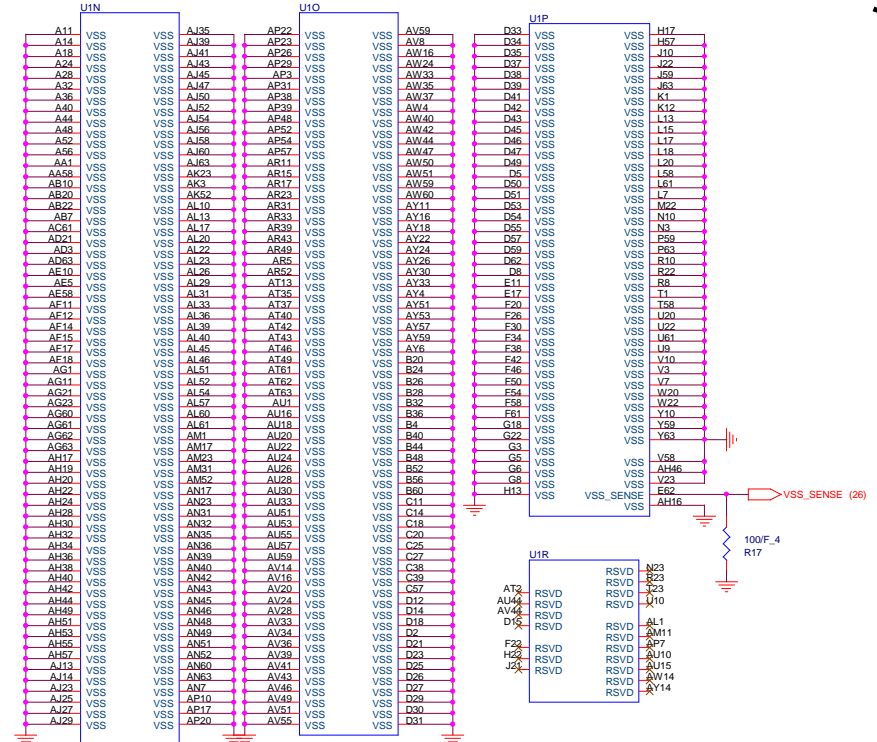
1.Level 1 Environment-related Substances Should Never be Used.
 2.Recycled Resin and Coated Wire should be procured from Green Partners.

Haswell ULT (DDR3L)



DDR CHANNEL B

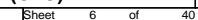
HSW ULT (GND)



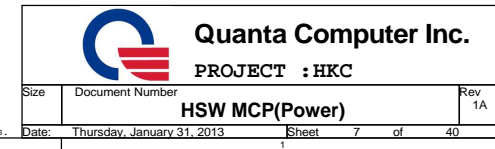
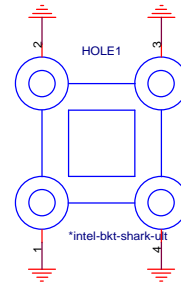
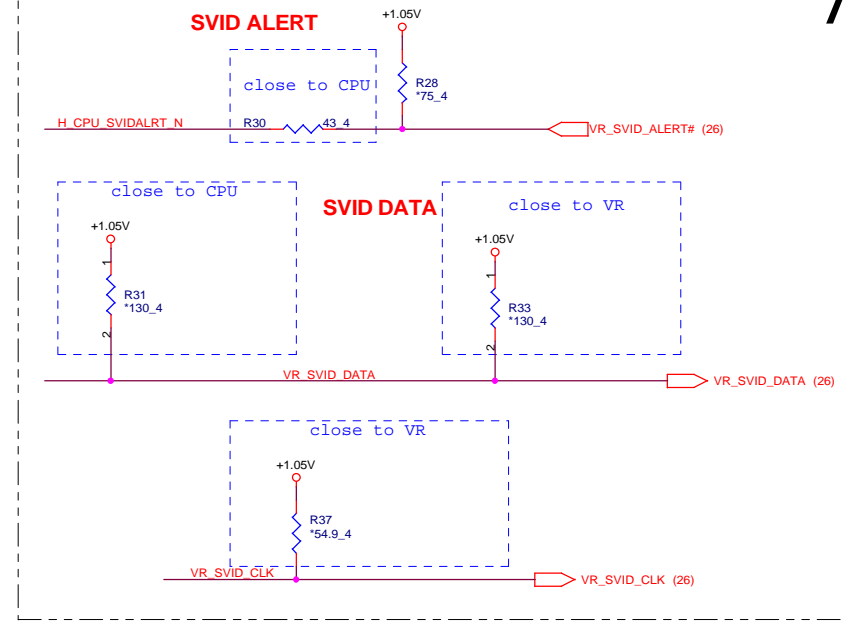
Quanta Computer Inc.
PROJECT : HKC
Size Document Number HSW MCP(Memory) Rev 1A
Date Thursday, January 31, 2013 Sheet 5 of 40

1. Level 1 Environment-related Substances Should Never be Used.
2. Recycled Resin and Coated Wire should be procured from Green Partners.

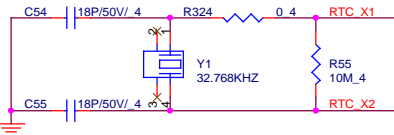
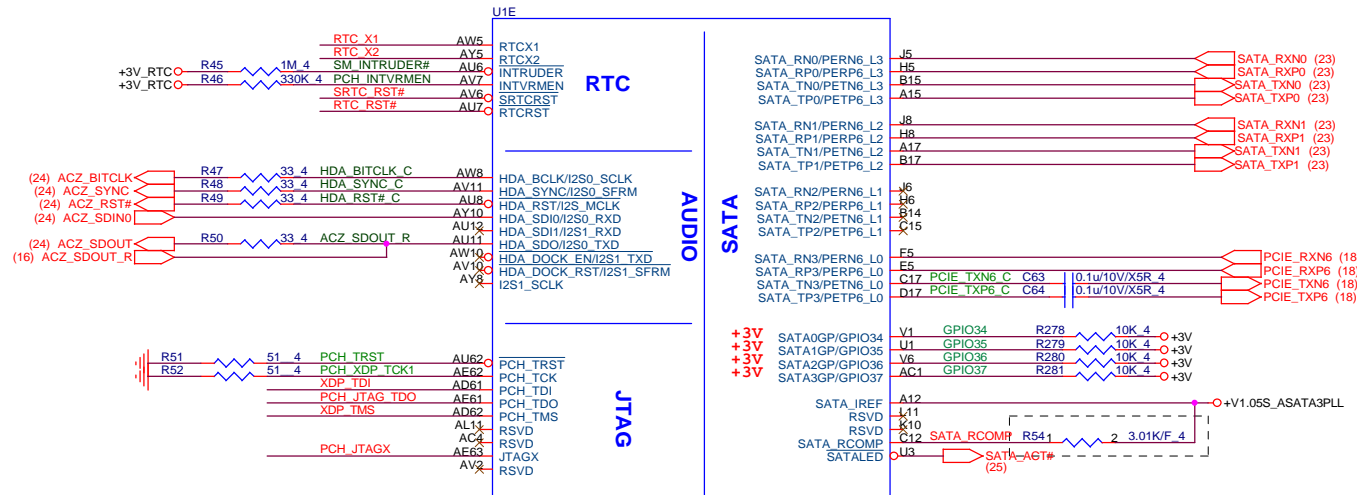
	1	0	
CFG0 EAR-STALL/NOT STALL RESET SEQUENCE AFTER PCU PLL IS LOCKED	(DEFAULT) NORMAL OPERATION; NO STALL	STALL	
CFG1 PCH/ PCH LESS MODE SELECTION	(DEFAULT) NORMAL OPERATION	PCH-LESS MODE	
CFG3 PHYSICAL_DEBUG_ENABLED (DFX PRIVACY)	DISABLED	ENABLED SET DFX ENABLED BIT IN DEBUG INTERFACE MSR	
CFG4 DISPLAY PORT PRESENCE STRAP	DISABLED NO PHYSICAL DISPLAY PORT ATTACHED TO EMBEDDED DISPLAY PORT	ENABLED; NOA WILL BE AVAILABLE REGARDLESS OF THE LOCKING OF THE UNIT	
CFG 8 ALLOW THE USE OF NOA ON LOCKED UNITS	DISABLED(DEFAULT); IN THIS CASE, NOA WILL BE DISABLED IN LOCKED UNITS AND ENABLED IN UN-LOCKED UNITS	ENABLED AN EXTERNAL DISPLAY PORT DEVICE IS CONNECTED TO THE EMBEDDED DISPLAY PORT	
CFG9 NO SVID PROTOCOL CAPABLE VR CONNECTED	VRS SUPPORTING SVID PROTOCOL ARE PRESENT	NO VR SUPPORTING SVID IS PRESENT. THE CHIP WILL NOT GENERATE (OR RESPOND TO) SVID ACTIVITY	
CFG10 SAFE MODE BOOT	POWER FEATURES ACTIVATED DURING RESET	POWER FEATURES (ESPECIALLY CLOCK GATINE ARE NOT ACTIVATED	



7

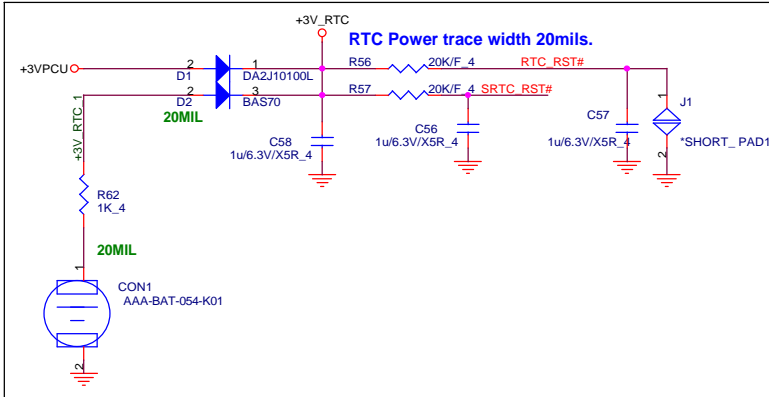
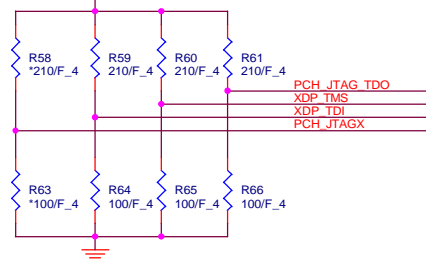


- 1.Level 1 Environment-related Substances Should Never be Used.
- 2.Recycled Resin and Coated Wire should be procured from Green Partners.



PCH JTAG Debug (CLG)

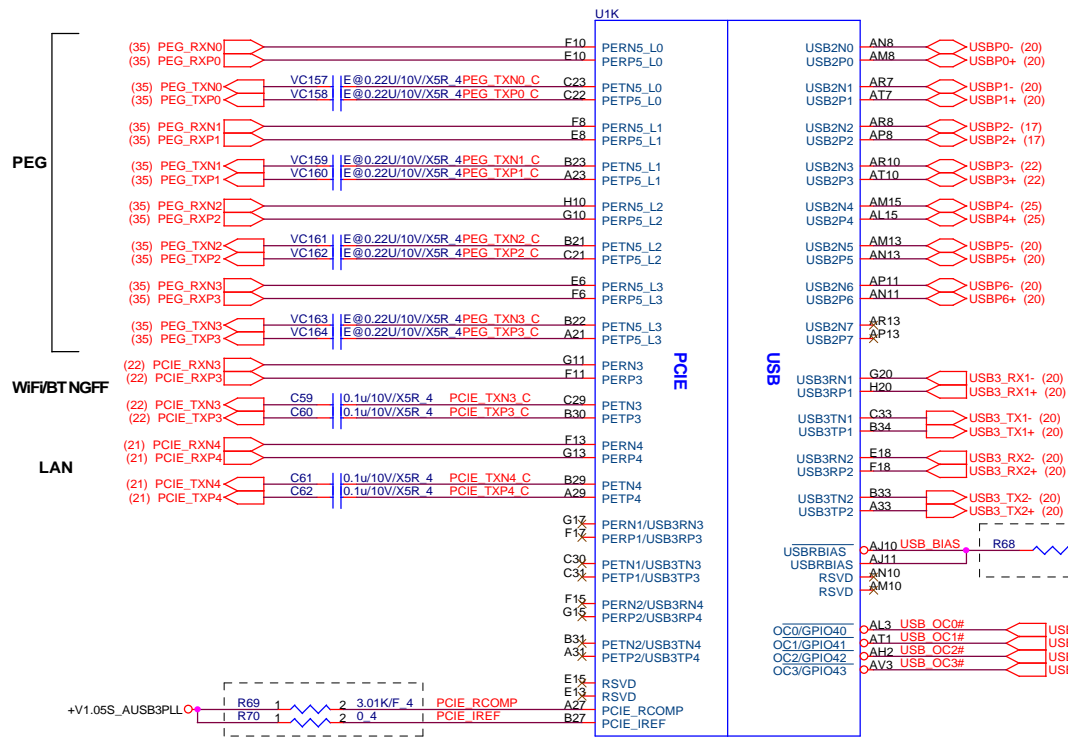
MP remove(Intel)



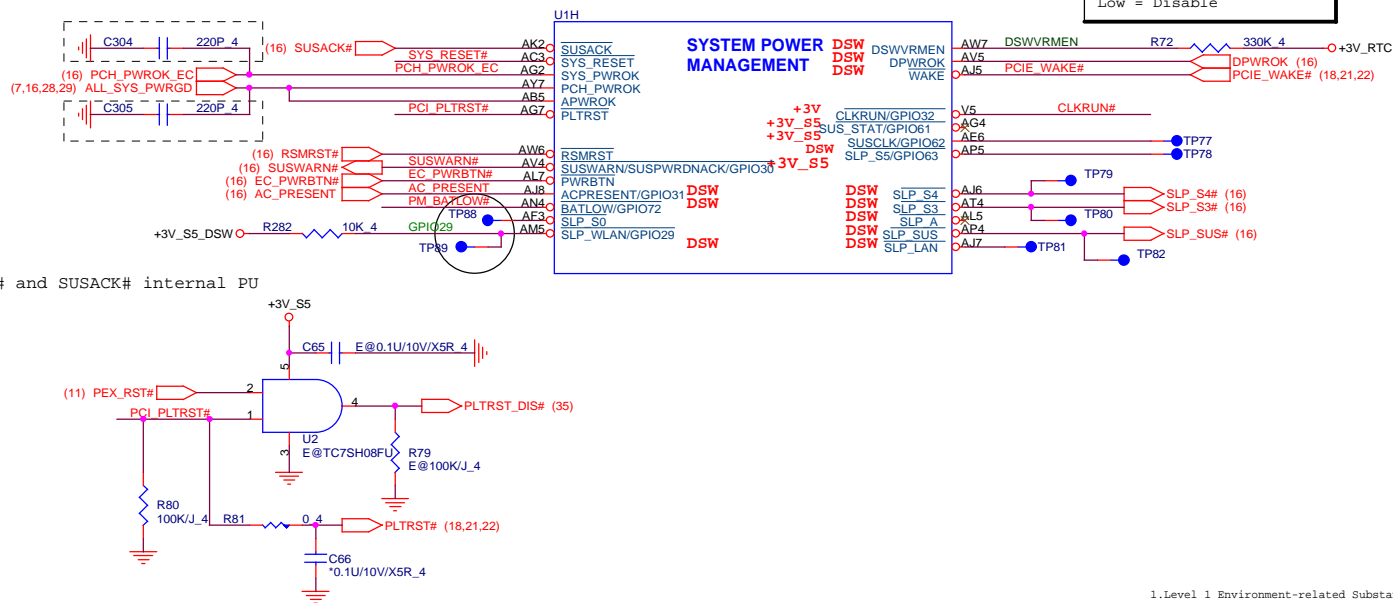
PCH Strap Table

Pin Name	Strap description	Sampled	Configuration	note
SPKR	No reboot mode setting	PWROK	0 = Default (weak pull-down 20K) 1 = Setting to No-Reboot mode	+3V — R67 — *1K_4 — SPCR (11,24)
HDA_SDO	Flash Descriptor Security Override / Intel ME Debug	PWROK	0 = Security Effect (Int PD) 1 = Can be Override	
INTVRMEN	Mode Integrated 1.05V VRM enable	ALWAYS	Should be always pull-up	

Haswell ULT (PCIe,USB)

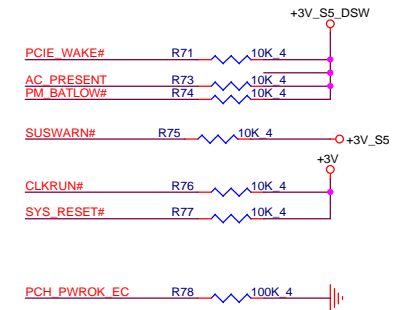


Haswell ULT (SYSTEM POWER MANAGEMENT)



On Die DSW VR Enable
High = Enable (Default)
Low = Disable

PCH Pull-high/low(CLG)



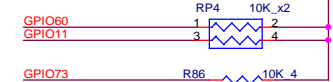
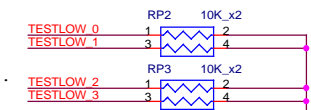
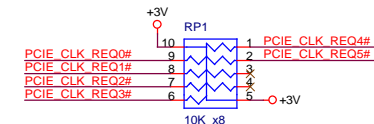
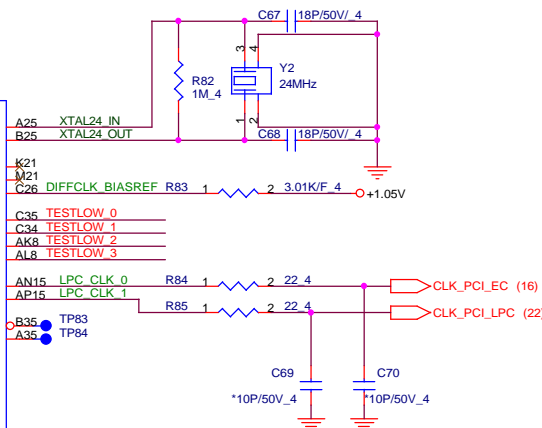
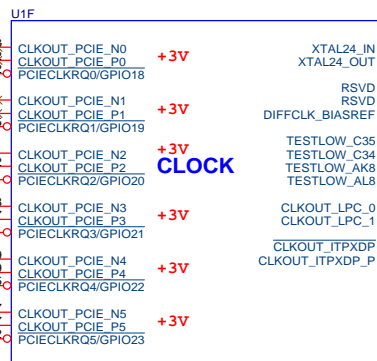
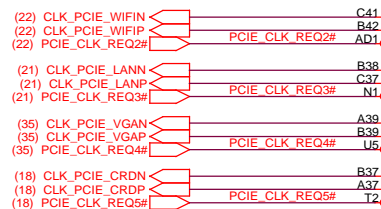
Haswell ULT (CLK)

WIFI/BT(NGFF)

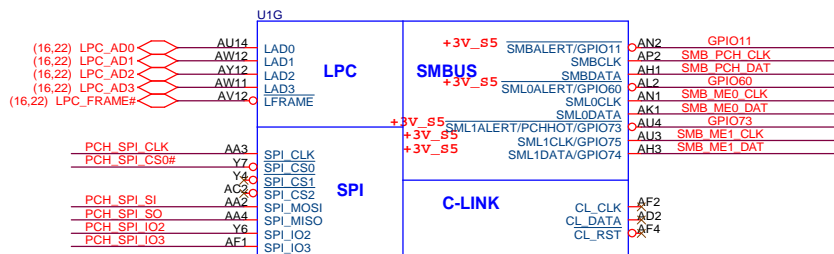
LAN

GFX

Card Reader

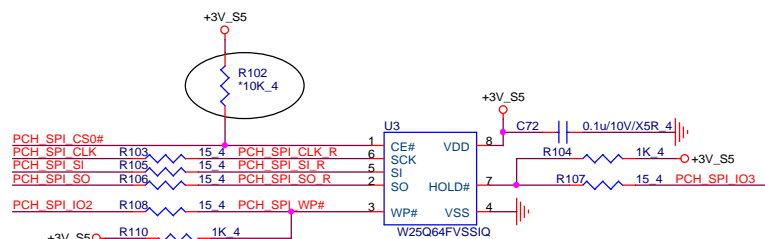
Do not short
the testlow pins together.

Haswell ULT (LPC/SPI/SMB/CLINK)

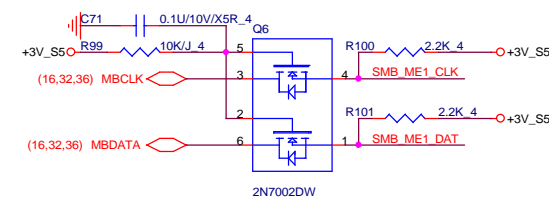
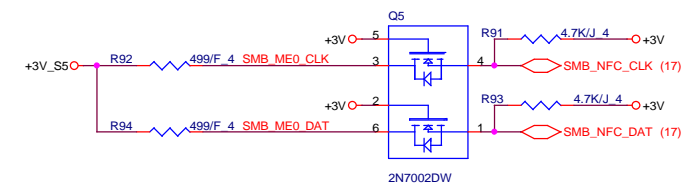
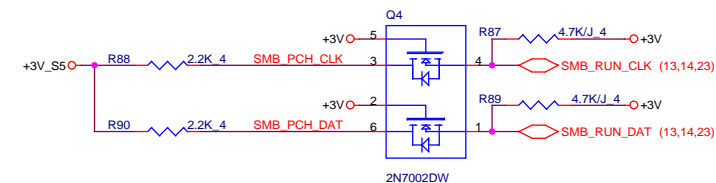


For NPCE985L Using

SPI FLASH



SMBus/Pull-up(CLG)



Quanta Computer Inc.

PROJECT : HKC

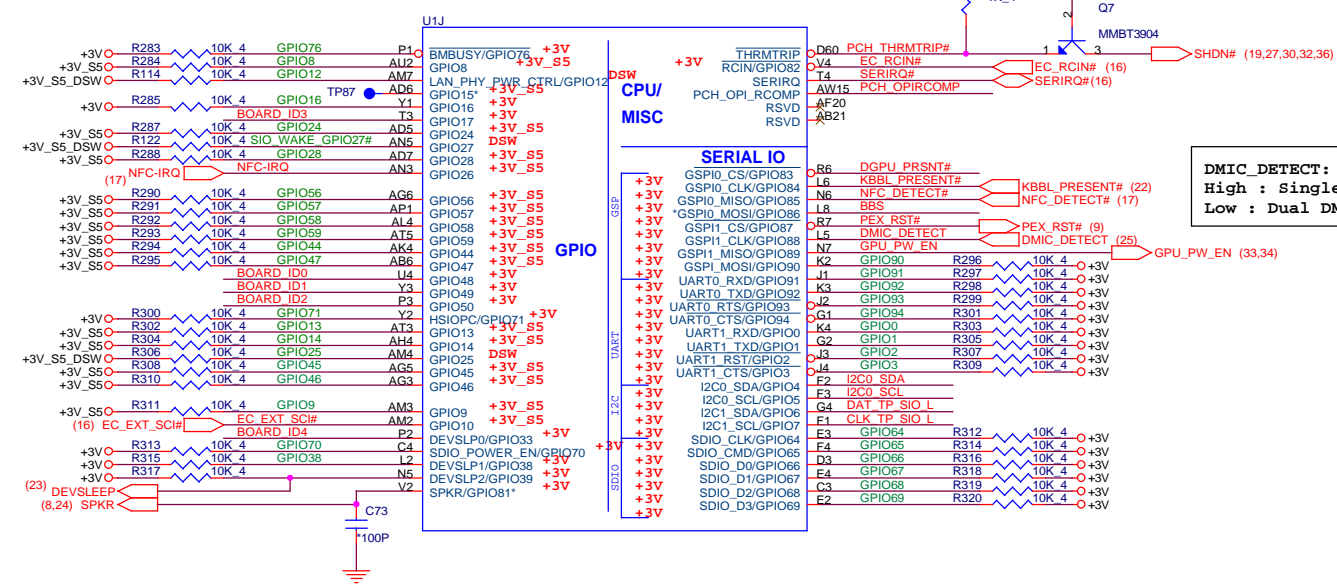
Size	Document Number	Rev
	HSW PCH(CLK/LPC/SPI/SMB)	1A
Date:	Thursday, January 31, 2013	Sheet 10 of 40

1.Level 1 Environment-related Substances Should Never be Used.

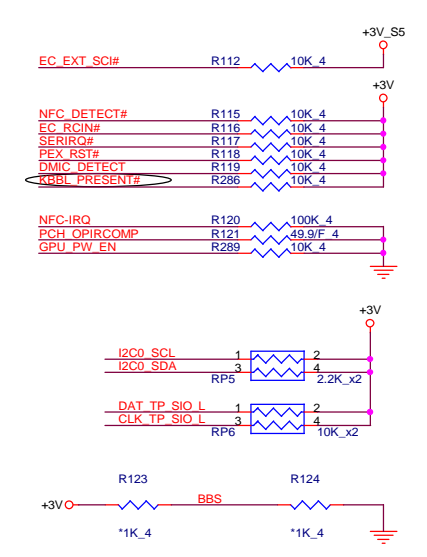
2.Recycled Resin and Coated Wire should be procured from Green Partners.

Hasswell ULT(GPIO,LPIO,MISC)

GPIO27
With Intel LAN:
Connect to LANWAKE# pin on the LAN
Without Intel LAN:
Used to wake event from DSx



GPIO Pull-up/Pull-down(CLG)

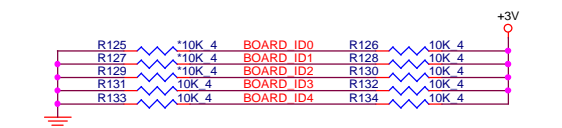


DMIC_DETECT:
High : Single DMIC
Low : Dual DMIC

GPIO86	
PU	LPC
PD	SPI (Default IPD)


No Reboot Strap(GPIO81)	
NC	Default
PU	EN

TLS CONFIDENTIALITY STRAP(GPIO15)	
NC	Default
PU	EN



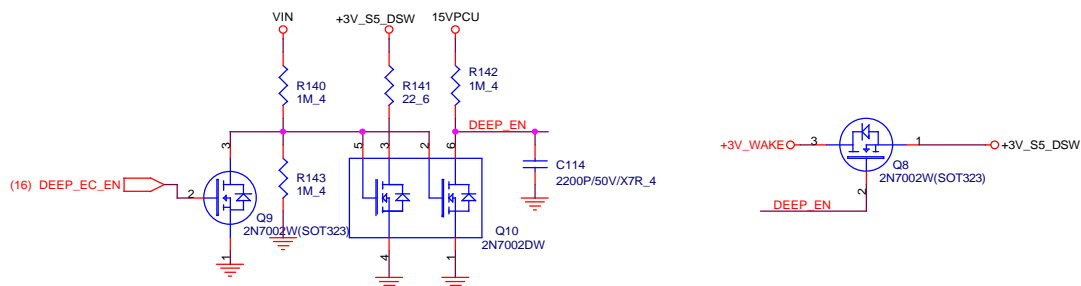
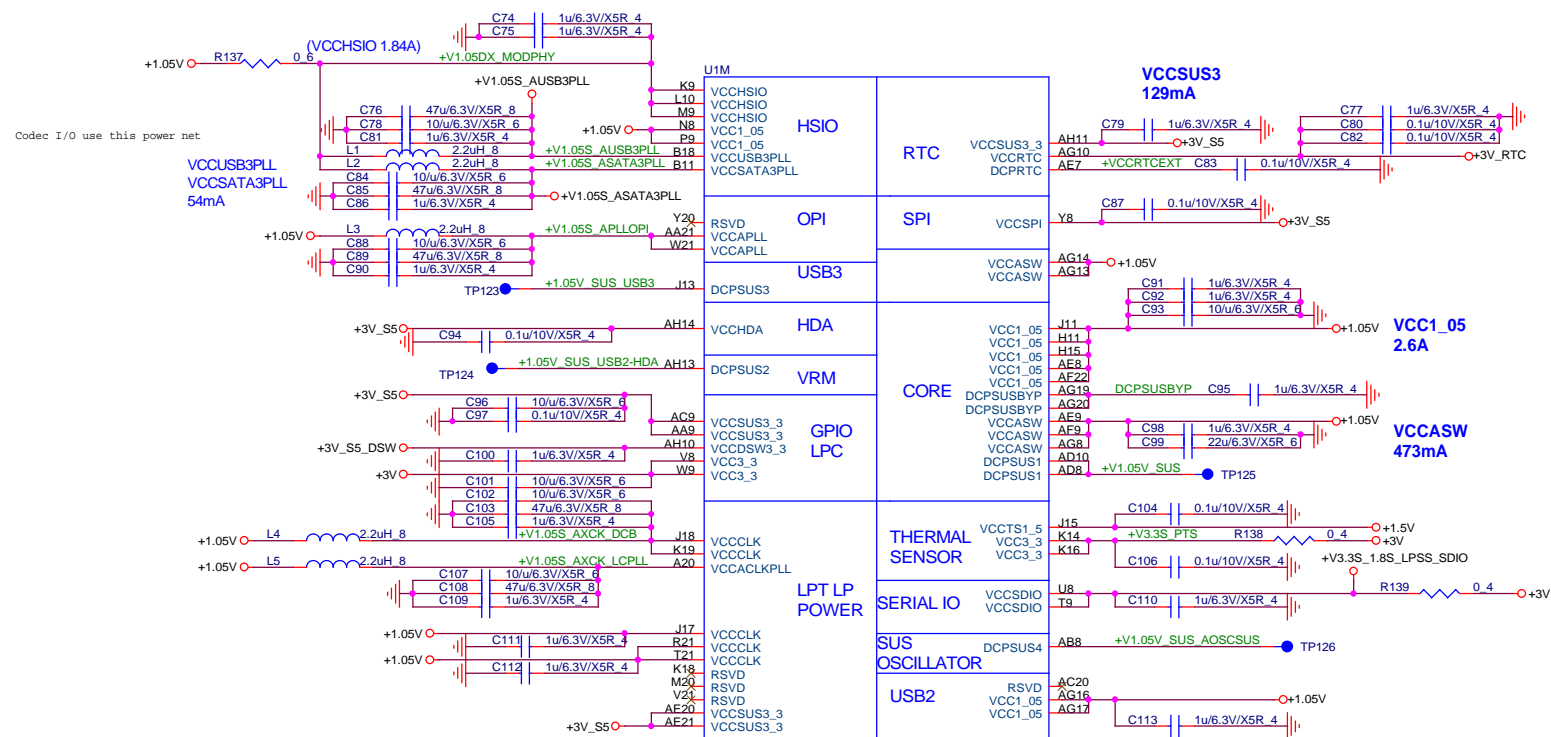
	0	1
Board ID0	CaspISHA1-CaspISHB1 HKC/HKD	SuperiorSHA1-SuperiorSHB1 GD9/GDA
Board ID1	HKC1/GD9 14"	HKD-GDA 15"

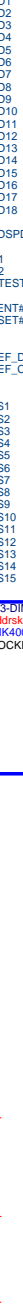
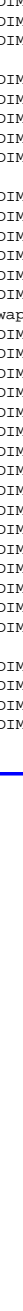
PCBA SKU	Discrete	UMA
R277(Pull High)	Stuff	No Stuff
R275(Pull Low)	No Stuff	Stuff

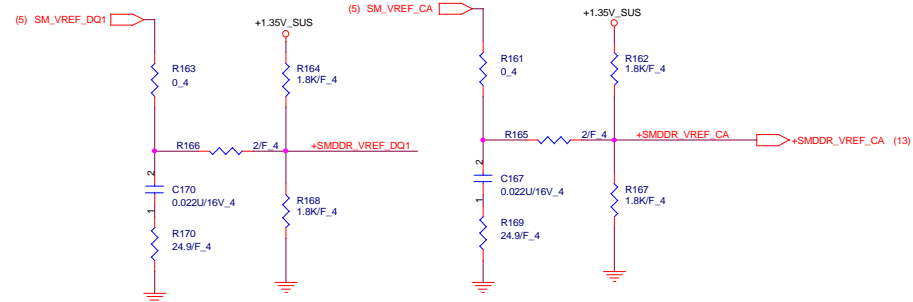
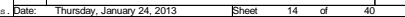


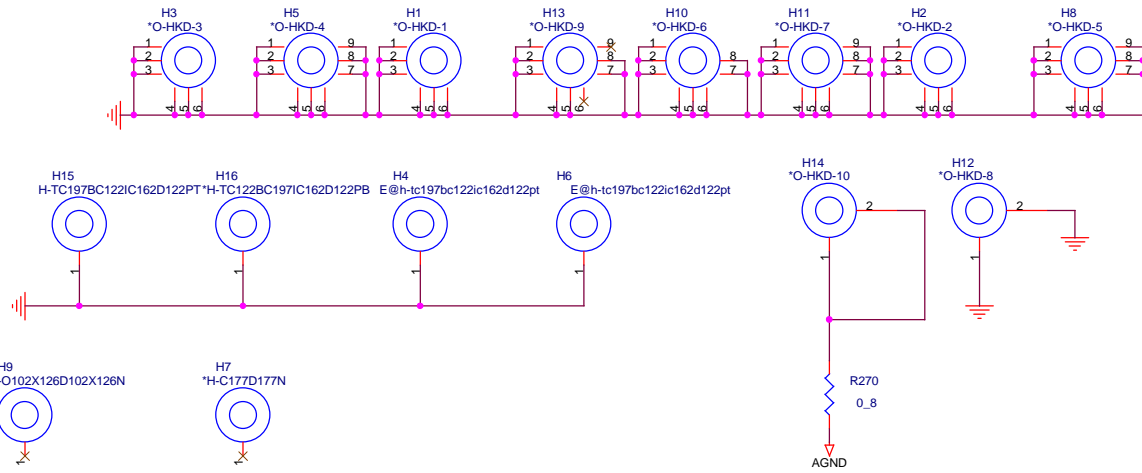
Quanta Computer Inc.
PROJECT : HKC

Size	Document Number	Rev
	HSW PCH(GPIO/MISC)	1A

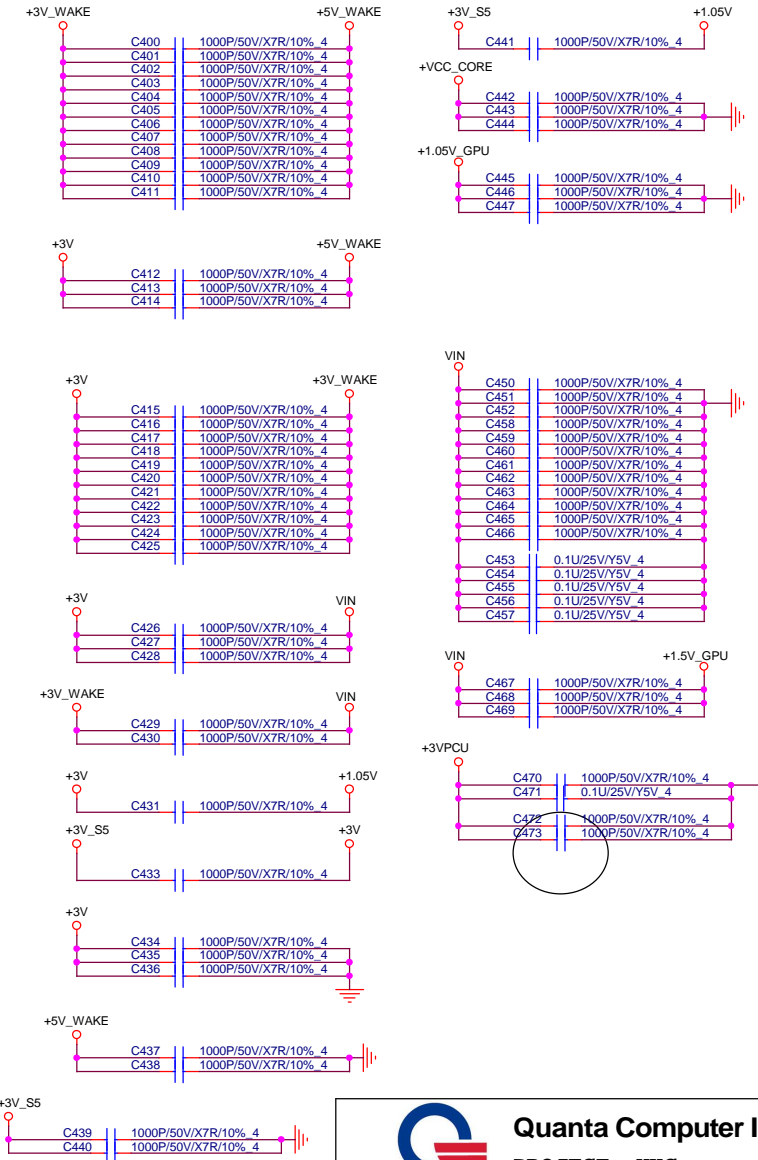
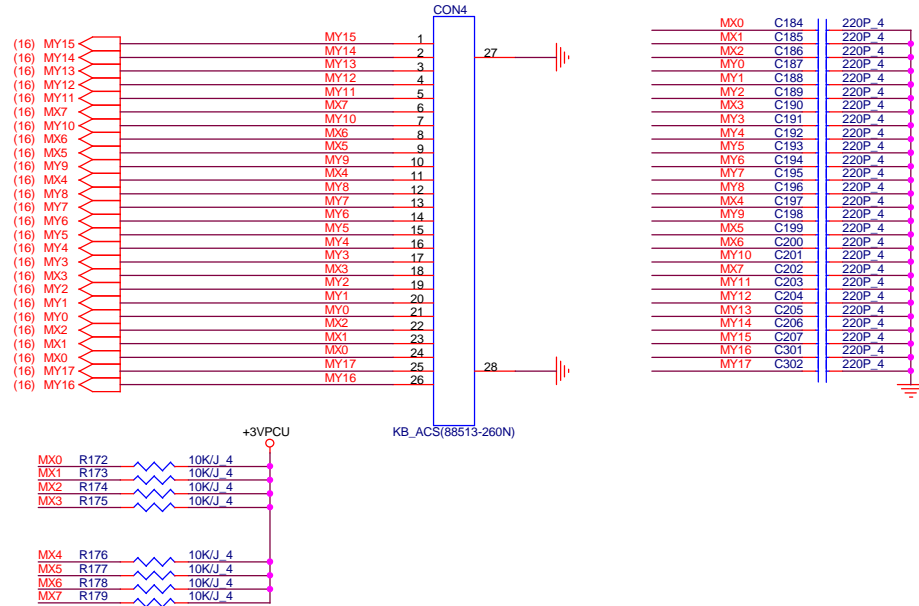









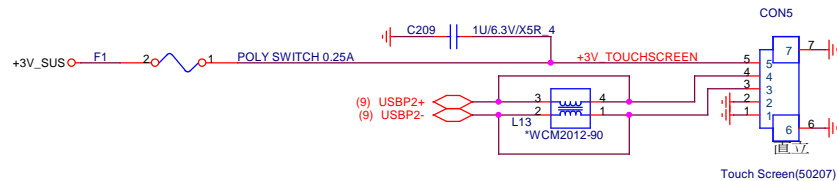
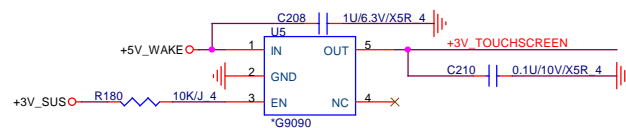
KEY BOARD Connector



1. Level 1 Environment-related Substances Should Never be Used.
2. Recycled Resin and Coated Wire should be procured from Green Partners.

 Quanta Computer Inc. PROJECT :HKC		Size	Document Number	Rev
				1A
Date:	Tuesday, February 05, 2013	Sheet	15	of 40

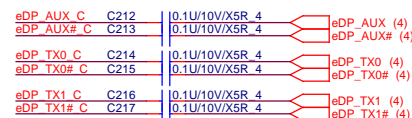
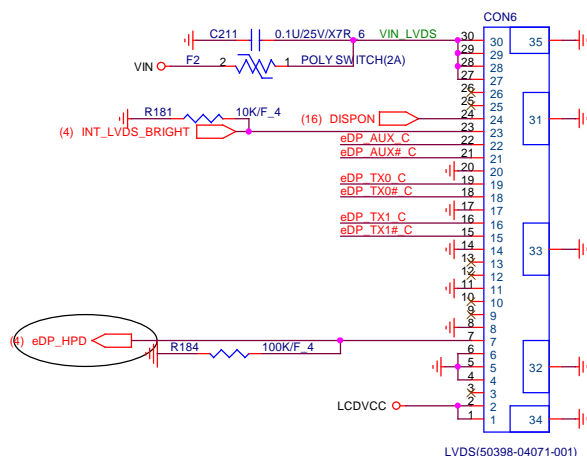
Touch Screen



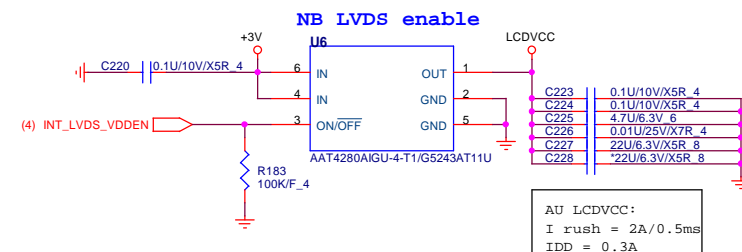
NFC module :
Vender : Samsung SNC-i20
Power consumption : Max. 160mW/48mA
Power Ripple +/- 50mV

FAST, UL/CSA

eDP

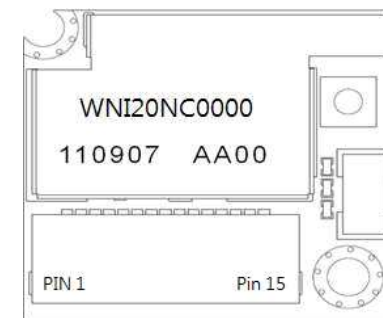
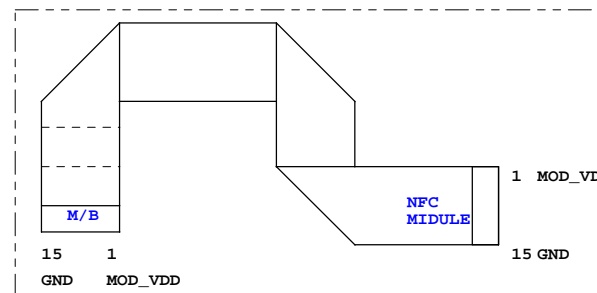
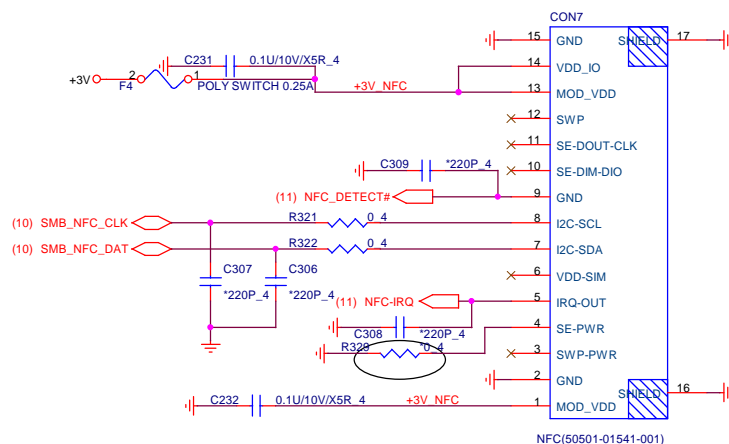


Camera HD specification
Voltage: Max. 3.6V
Current : Max. 200mA
OCP: 200mA ~ 300mA



AU LCDVCC:
I rush = 2A/0.5ms
IDD = 0.3A

NFC



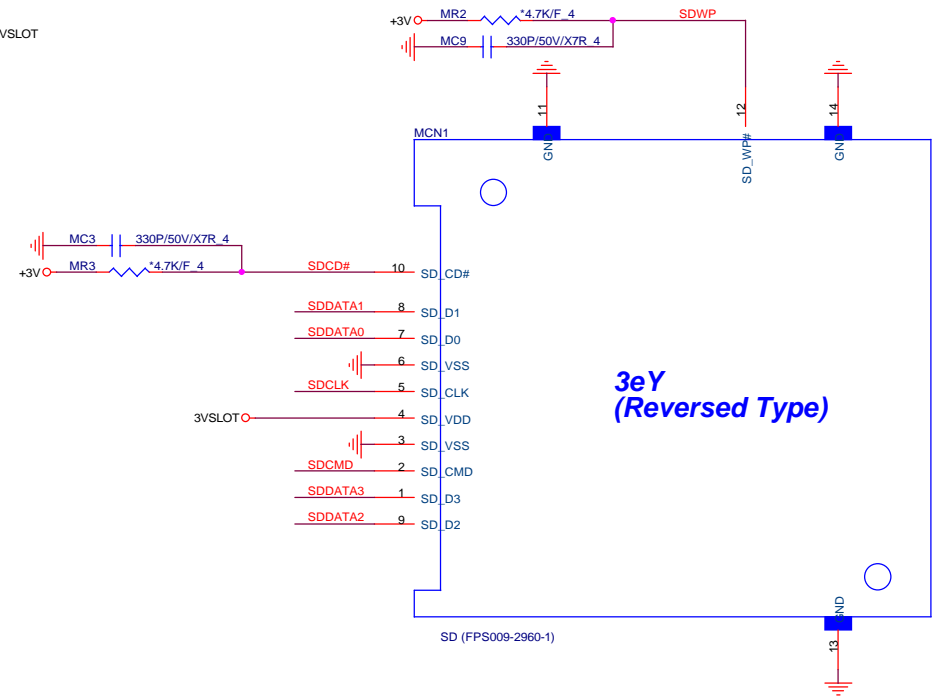
Quanta Computer Inc.

PROJECT :HKC

Size	Document Number	Rev
	CRT/LVDS	1A

Date: Monday, February 04, 2013 Sheet 17 of 40

1.Level 1 Environment-related Substances Should Never be Used.
2.Recycled Resin and Coated Wire should be procured from Green Partners.



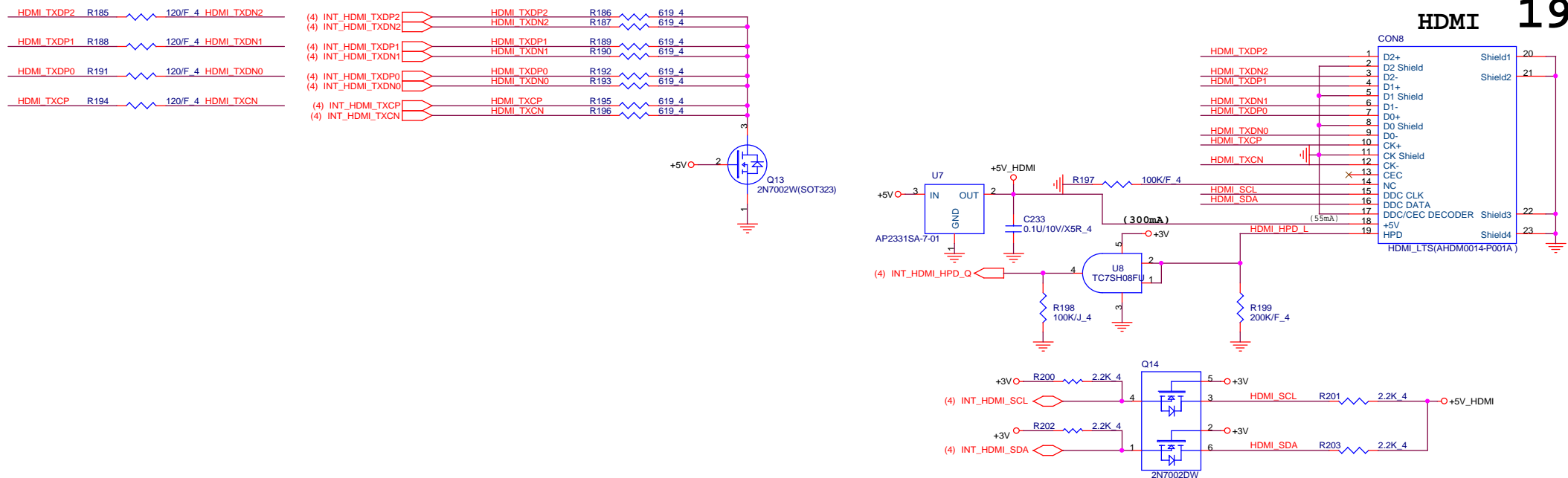
40 mil

MC7 0.1U/10V/X5R 4

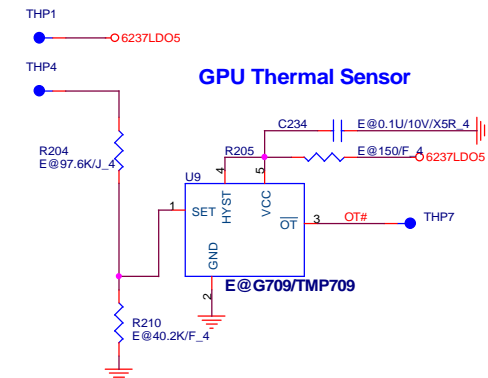
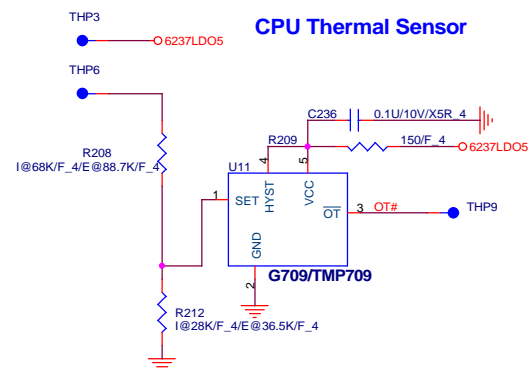
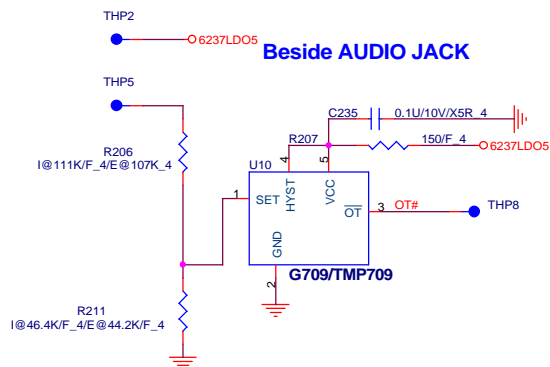
MC4 1U/6.3V/X5R 4

MC6 1U/6.3V/X5R 4

3VSL0T



H/W Thermal Protect



$$RSET(k\Omega) = 0.0012T^2 - 0.9308T + 96.147$$

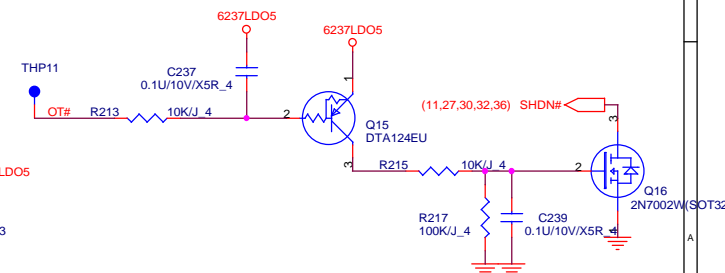
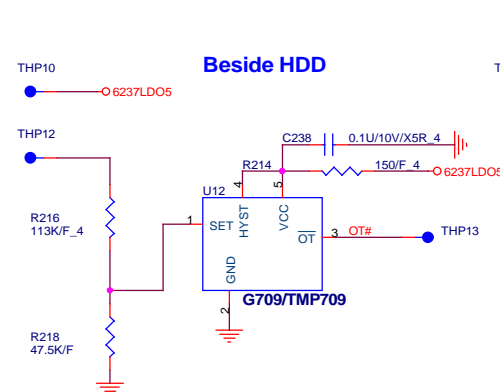
95	18.5K
100	15K
107	10.3K
110	8.2K

DIS SKU

Location of IC	Temp	R-Set	Parts in BOM	Max	Min
Near CPU sensor temp	70	R208=36.87K	36.5K	71	70
Near GFX sensor temp	65	R146=40.72K	40.2K	66.3	65.1
Near AUDIO sensor temp	60	R345=44.62K	44.2K	61.2	60

UMA SKU

Location of IC	Temp	R-Set	Parts in BOM	Max	Min
Near CPU sensor temp	81	R208=28.63K	28K	82.3	81.4
Near AUDIO sensor temp	58	R345=46.2K	46.4K	58.4	57.1



Quanta Computer Inc.

PROJECT : HKC

HDMI/Thermal IC

Rev	1A
-----	----

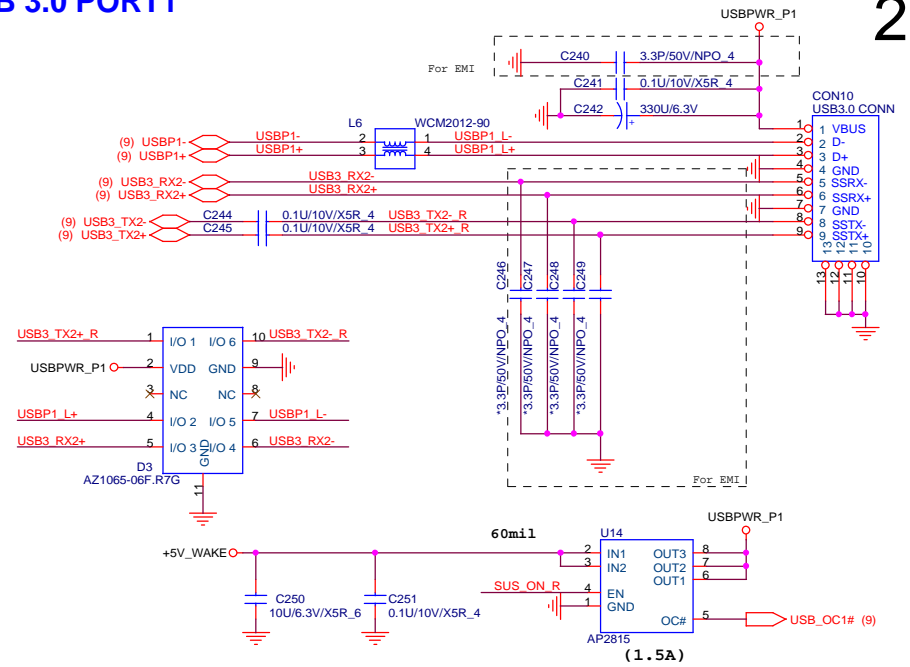
1.Level 1 Environment-related Substances Should Never be Used.

2. Recycled Resin and Coated Wire should be procured from Green Partners.

rs. Date: Thursday, January 31, 2013

Sheet 19 of 40

40



USB Charger

100 mils

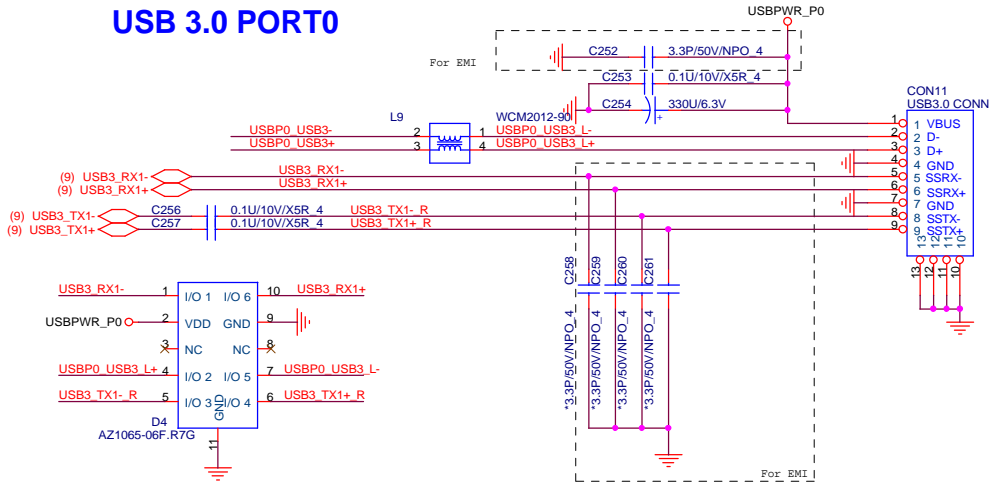
100 mils

TPS2540A

Mode CDP OFF DCP

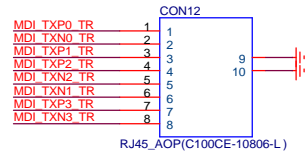
VBUS

VBUS stop time 1Sec

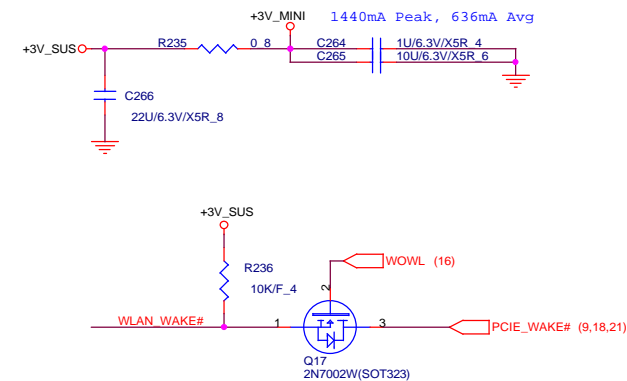
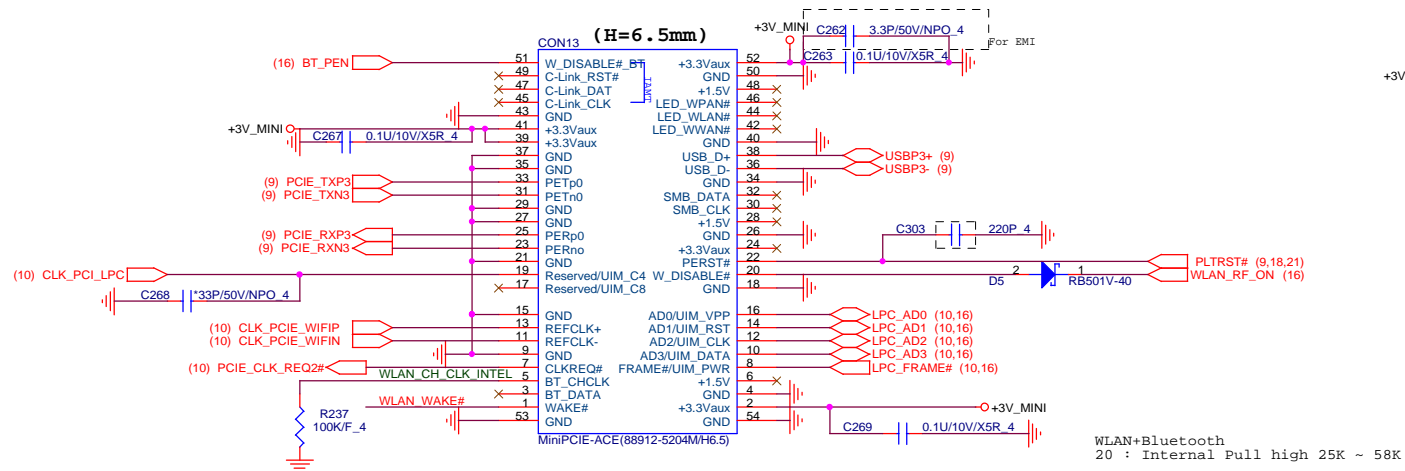


System State	USB Battery Charging Setting			
	Disable	C(1 2 3)	Enable	C(1 2 3)
S0	SDP	(X 1 0)	CDP	(1 1 1)
S3	SDP	(X 1 0)	DCP BC	(1 0 0)
DS3	Charger OFF	(0 0 0)	DCP BC	(1 0 0)
S4	Charger OFF	(0 0 0)	DCP BC	(1 0 0)
S5	Charger OFF	(0 0 0)	DCP BC	(1 0 0)

ILIM_SEL (I LIMIT(A)= 48000/R)		
HI	I_LIM_1	
LO	I_LIM_0	48000/22.6K=2.123A

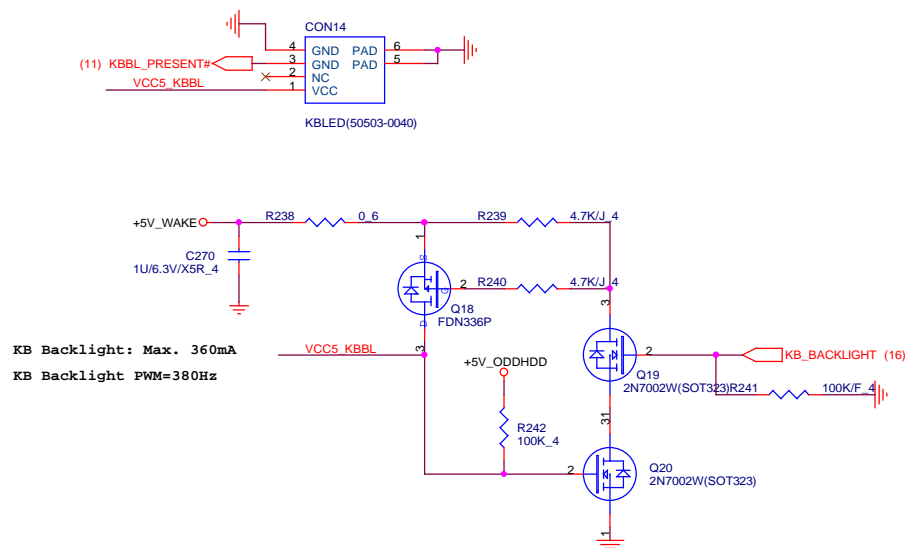


WLAN/WIMAX/WIDI



AC Mode : Support Wake on WLAN
DC Mode : Don't support wake on WLAN

KB BACKLIGHT



Quanta Computer Inc.

PROJECT : HKC

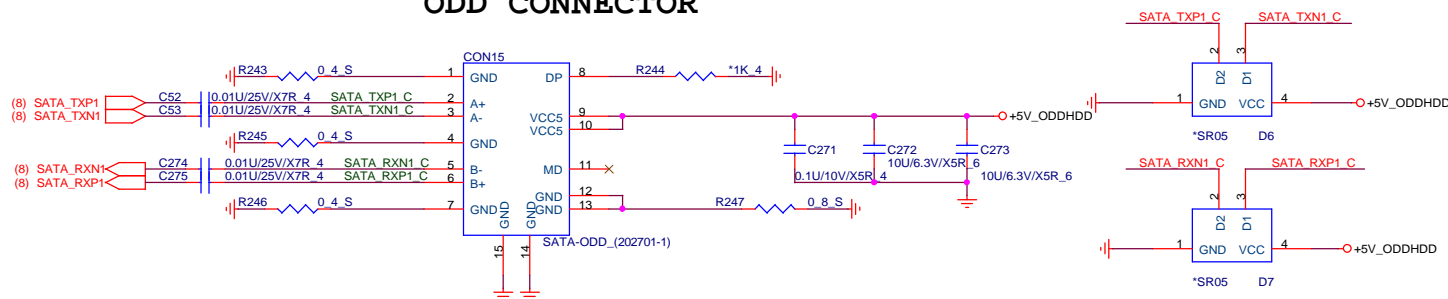
Size Document Number
WLAN/KB BL Rev 1A

1. Level 1 Environment-related Substances Should Never be Used.

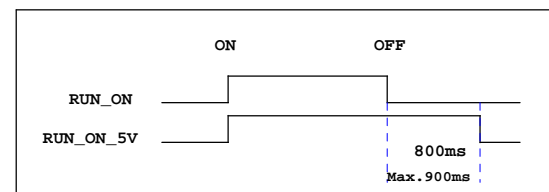
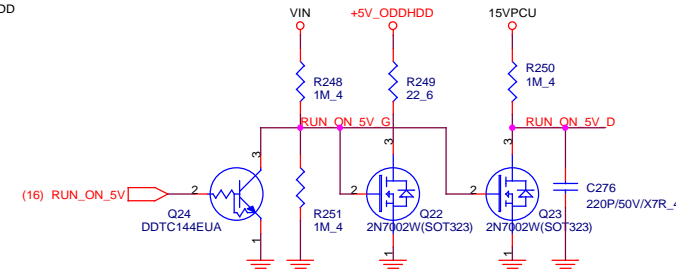
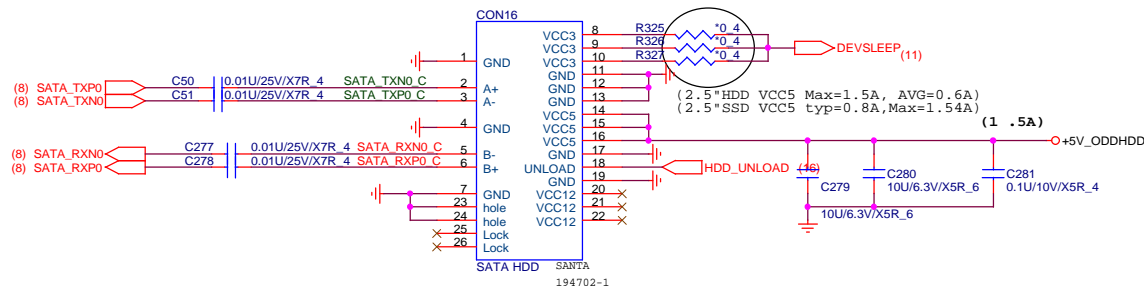
2. Recycled Resin and Coated Wire should be procured from Green Partners.

Date: Thursday, January 24, 2013 Sheet 22 of 40

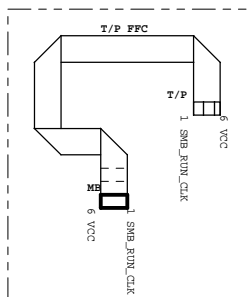
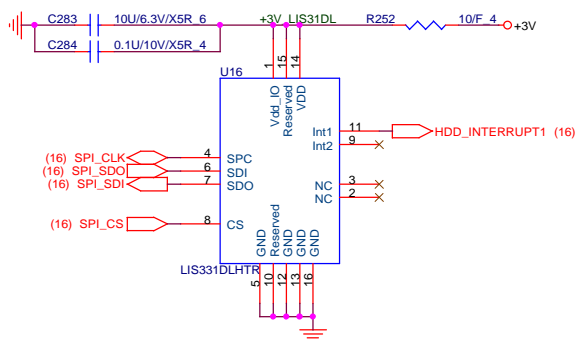
ODD CONNECTOR



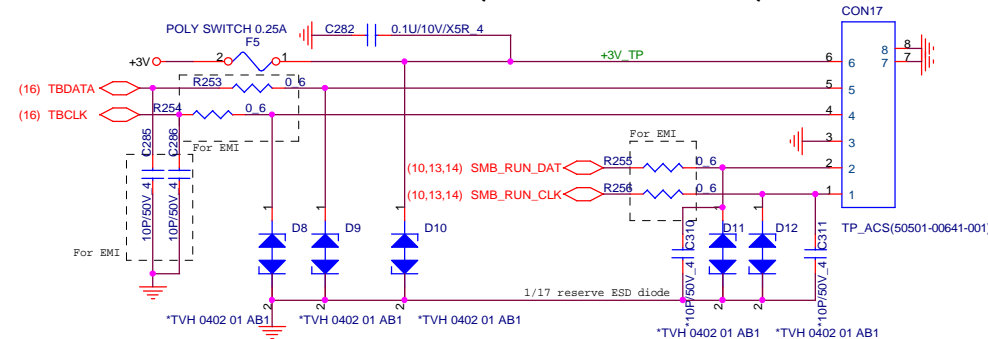
HDD CONNECTOR



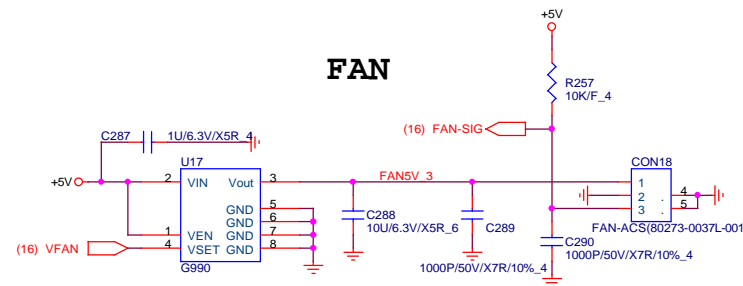
HDD PROTECT SPI INTERFACE



T/P Board to T/P



FAN



Quanta Computer Inc.
PROJECT : HKC

Size	Document Number	Rev
	HDD/ODD/TP/FAN	1A

1. Level 1 Environment-related Substances Should Never be Used.
2. Recycled Resin and Coated Wire should be procured from Green Partners.

Date: Thursday, January 31, 2013 Sheet 23 of 40

Analog

Digital

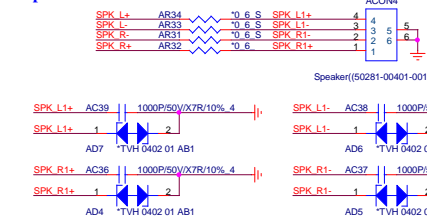
ALC233-CG

Analog

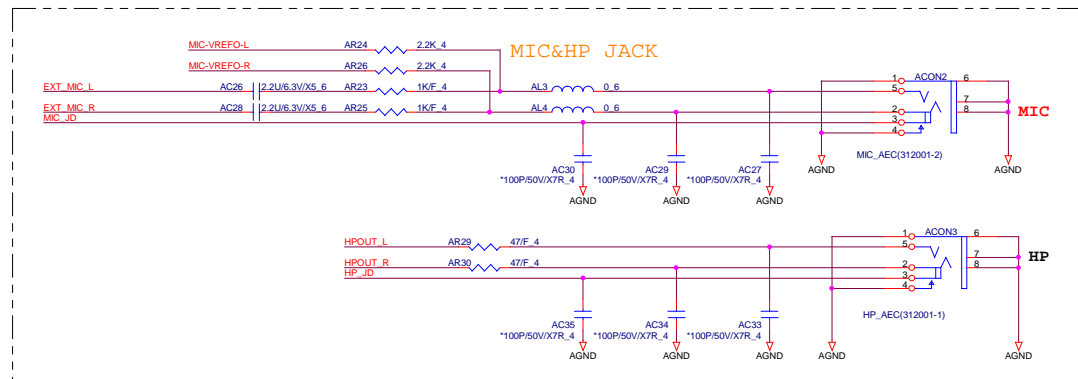
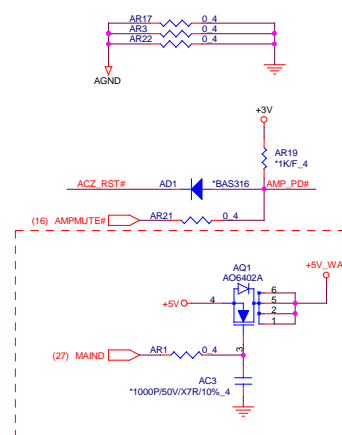
Digital

SPK L+ L- R+ R- trace width
Speaker 4 ohm ==> 40 mils

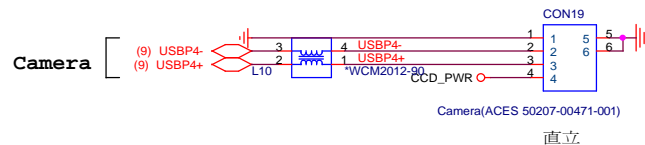
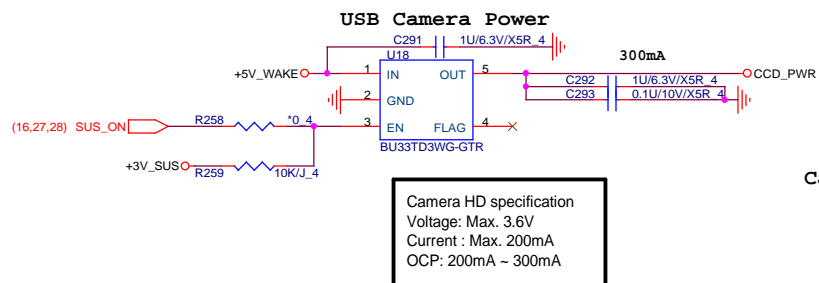
SPEAKER CON.

<<Attention>>
Place these EMI components close to codec; For EMI issue.

For EMI

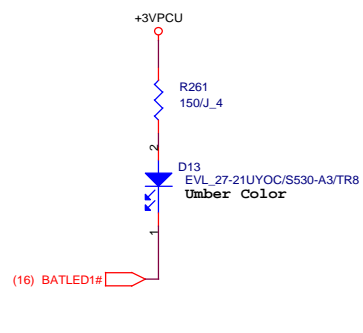
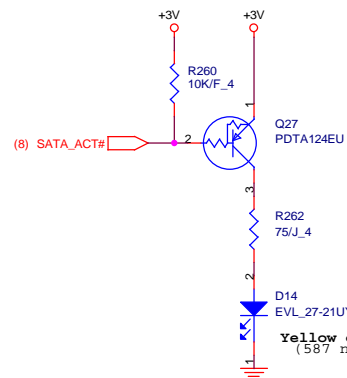


Camera

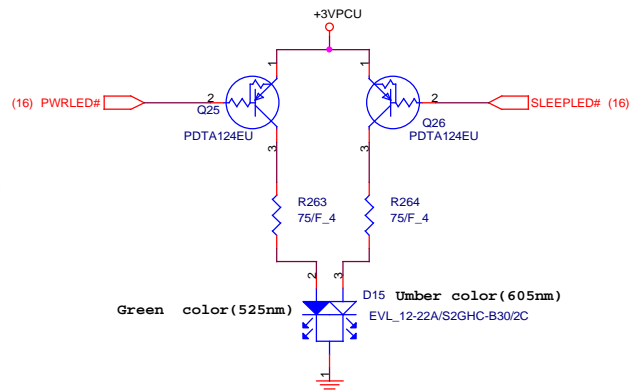


SATA LED

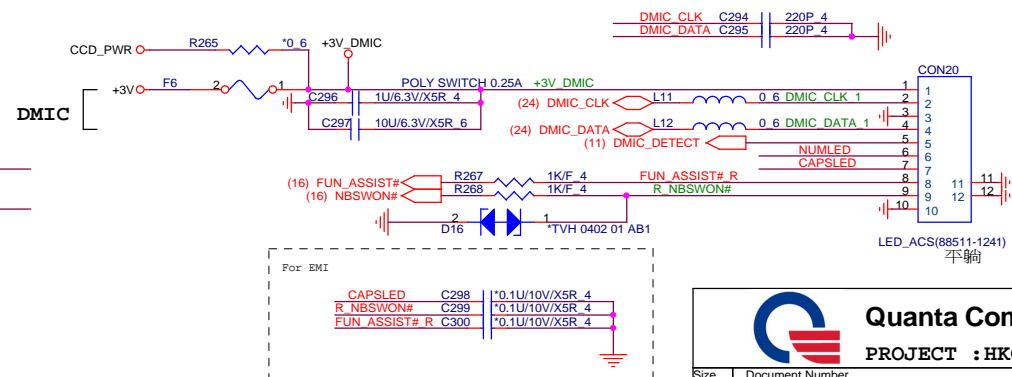
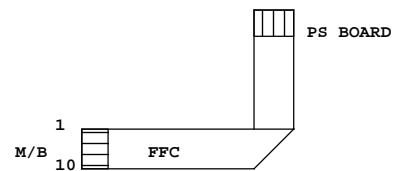
BATTERY LED



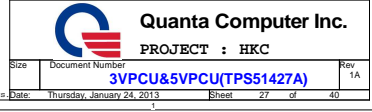
Power/Sleep LED



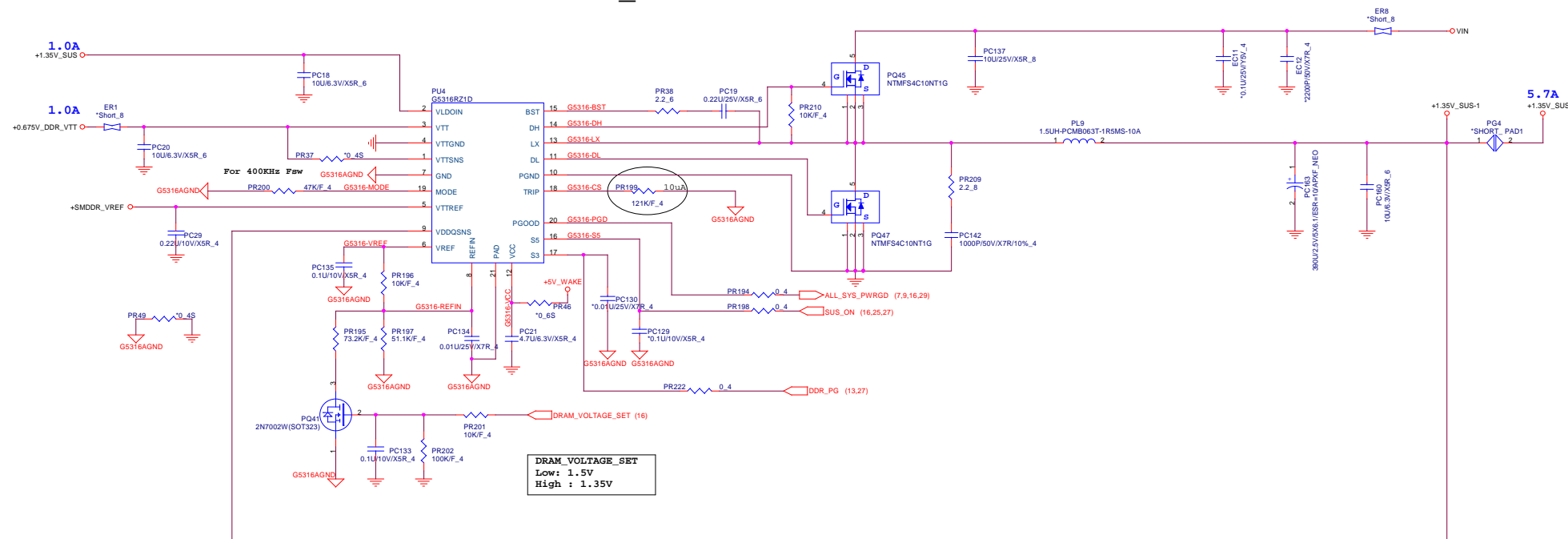
Power SW Board Connector



1.Level 1 Environment-related Substances Should Never be Used.
2.Recycled Resin and Coated Wire should be procured from Green Partners.



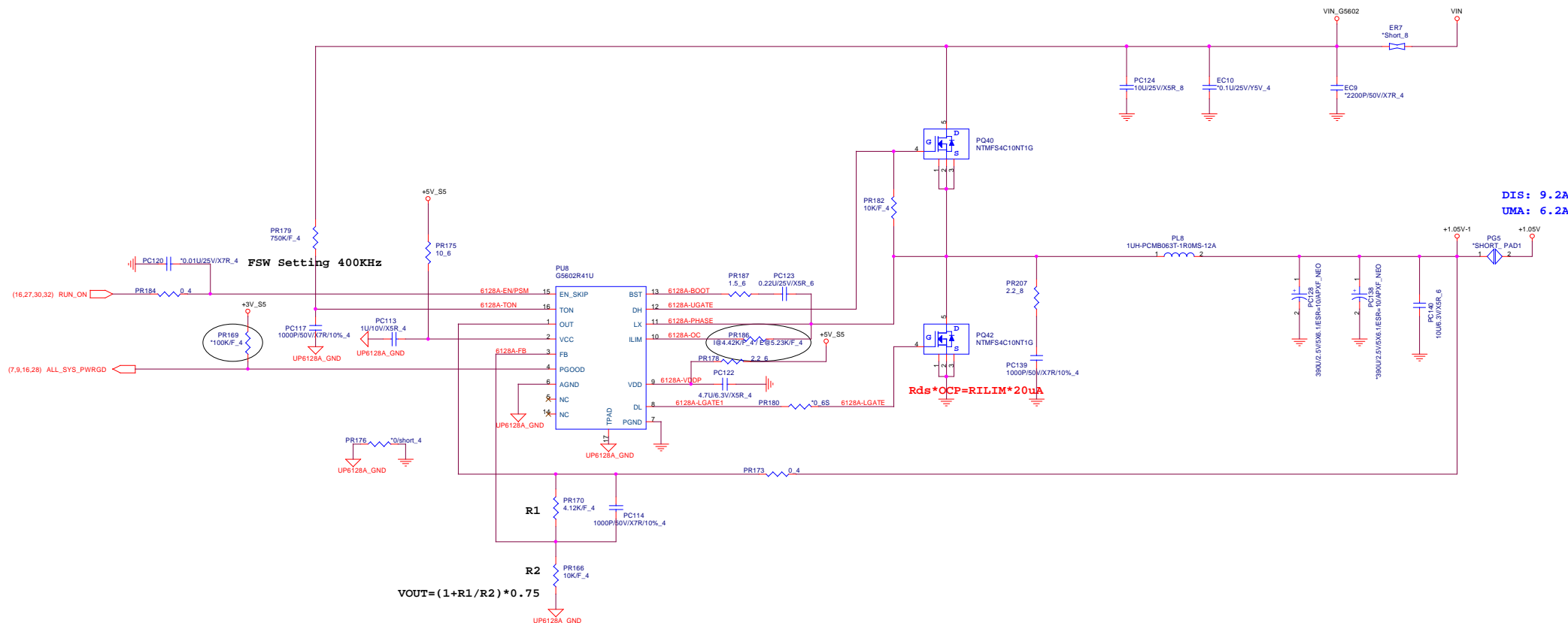
1.5VSUS & VTT_MEM



MODE	Resistor on Mode	Fsw	Discharge Mode
3	200Kohm	400KHz	Tracking discharge
2	100Kohm	300KHz	
1	68Kohm	300KHz	Non-tracking discharge
0	47Kohm	400KHz	

STATE	S3	S5	1.5VSUS	VTTREF	VTT
S0	1	1	On	On	On
S3	0	1	On	On	Off/High Z
S4/S5	0	0	Off	Off	Off

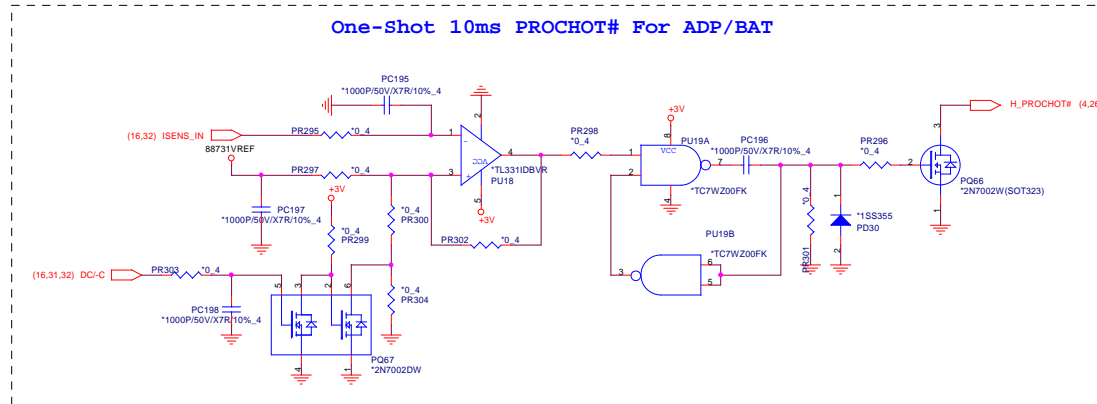
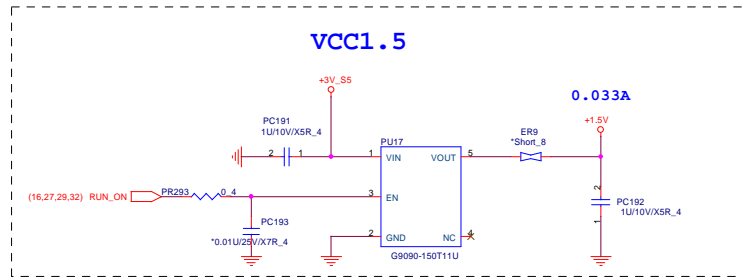
+1.05V



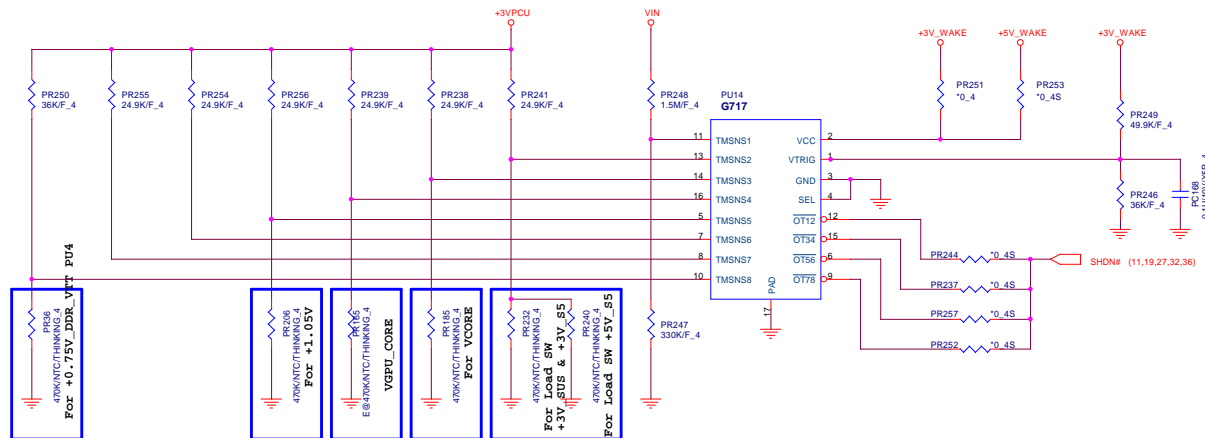
Quanta Computer Inc.
PROJECT : HKC

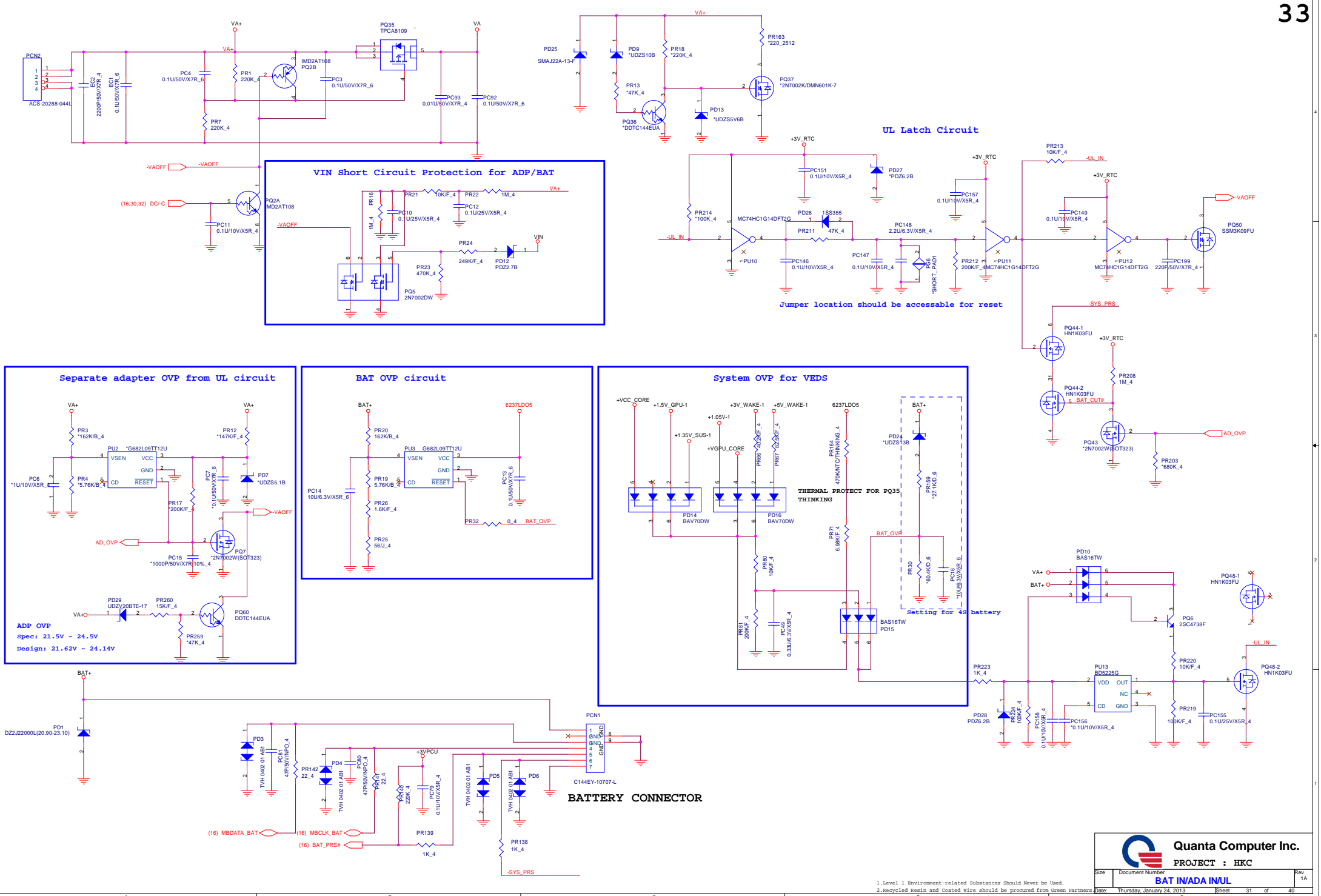
Size	Document Number	Rev
	+1.05V (UP1522RQDD)	1A

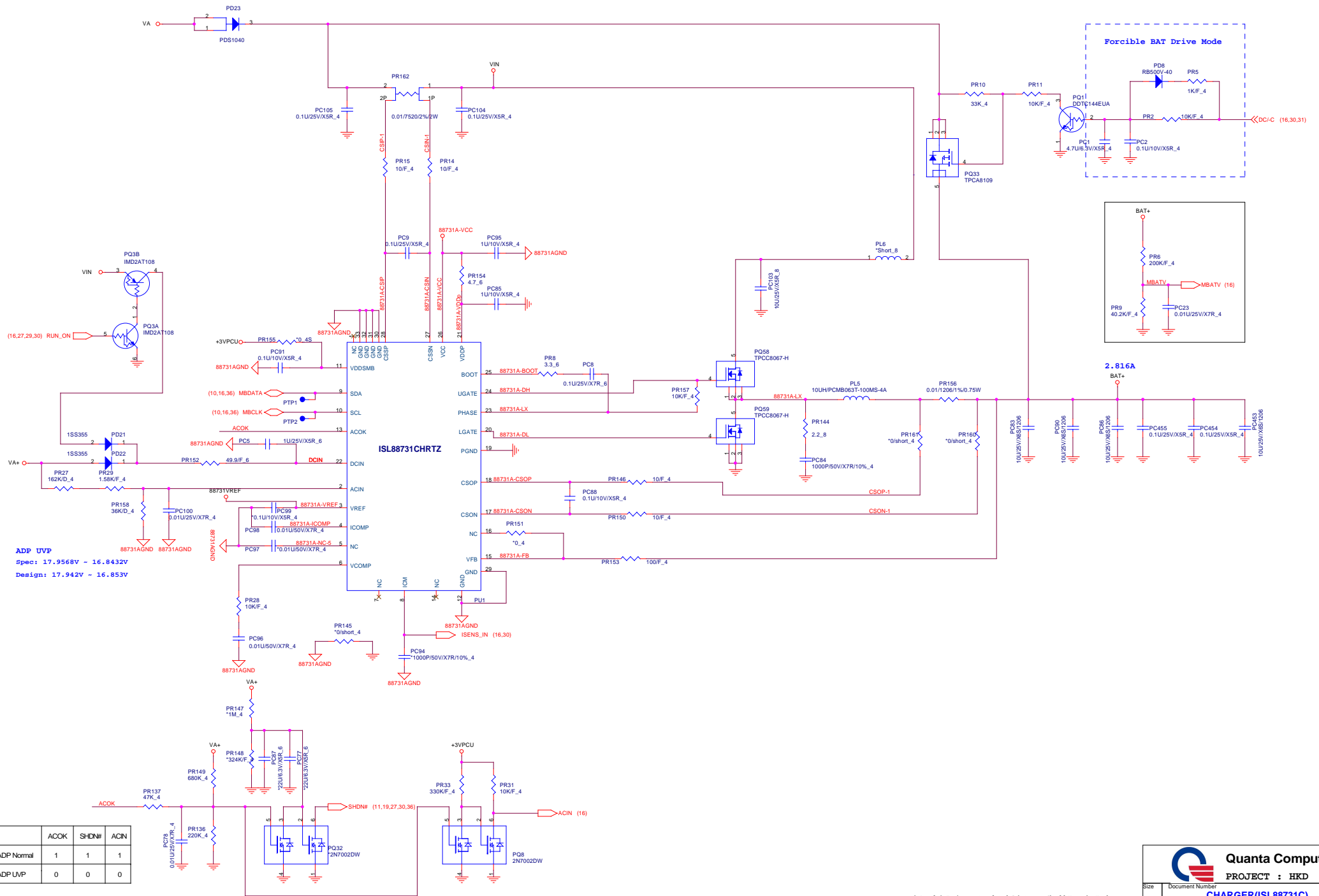
1. Level 1 Environment-related Substances Should Never be Used.
2. Recycled Resin and Coated Wire should be procured from Green Partners.
Date: Wednesday, January 30, 2013 Sheet 29 of 40



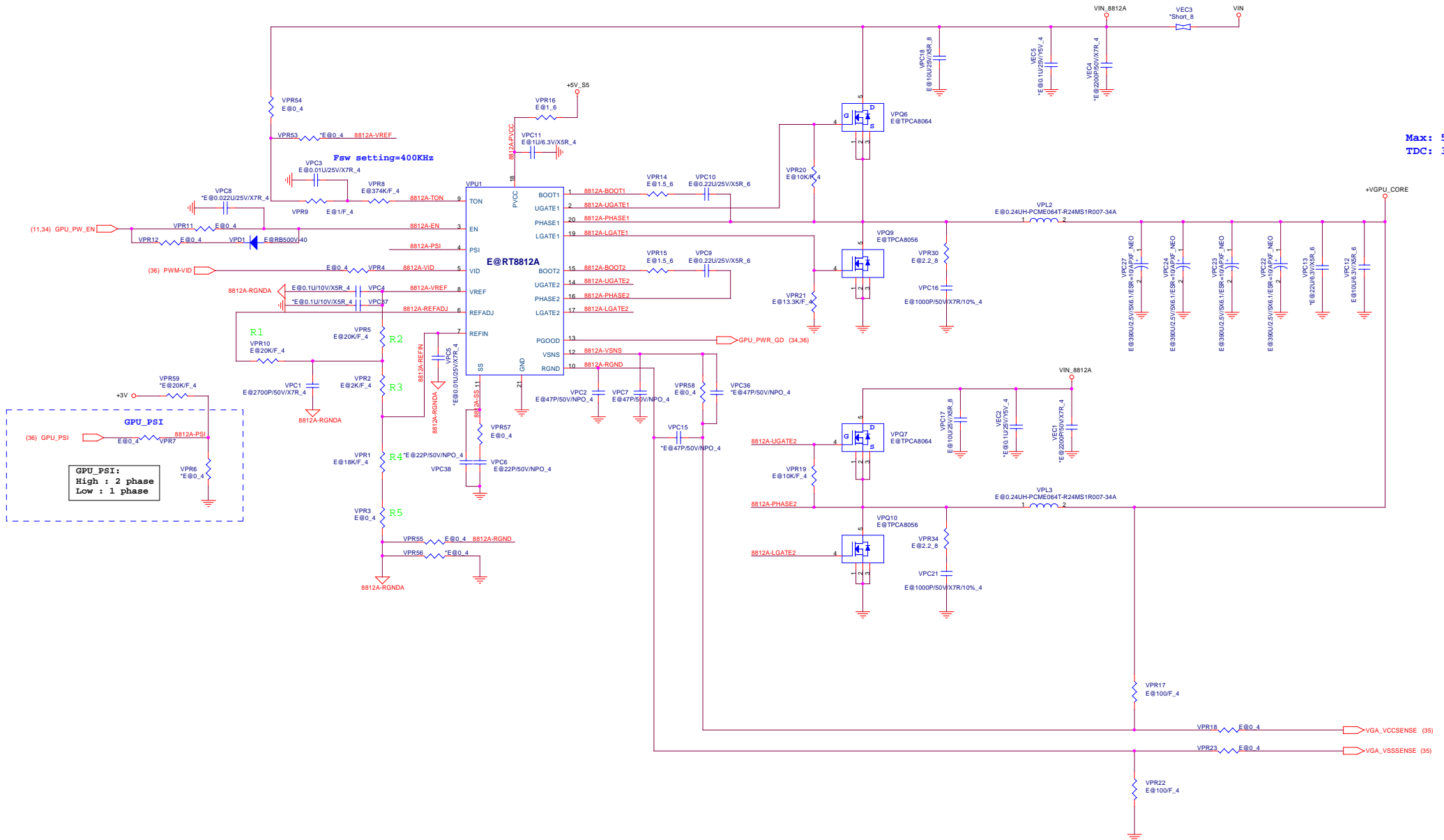
Thermal Protection and Battery UVP for VEDS







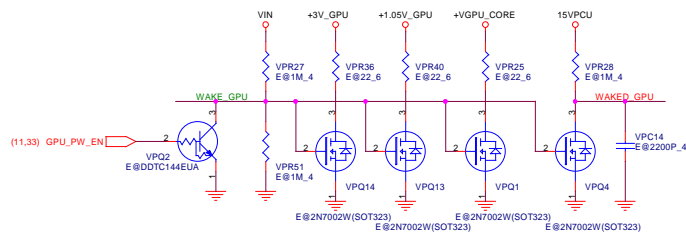
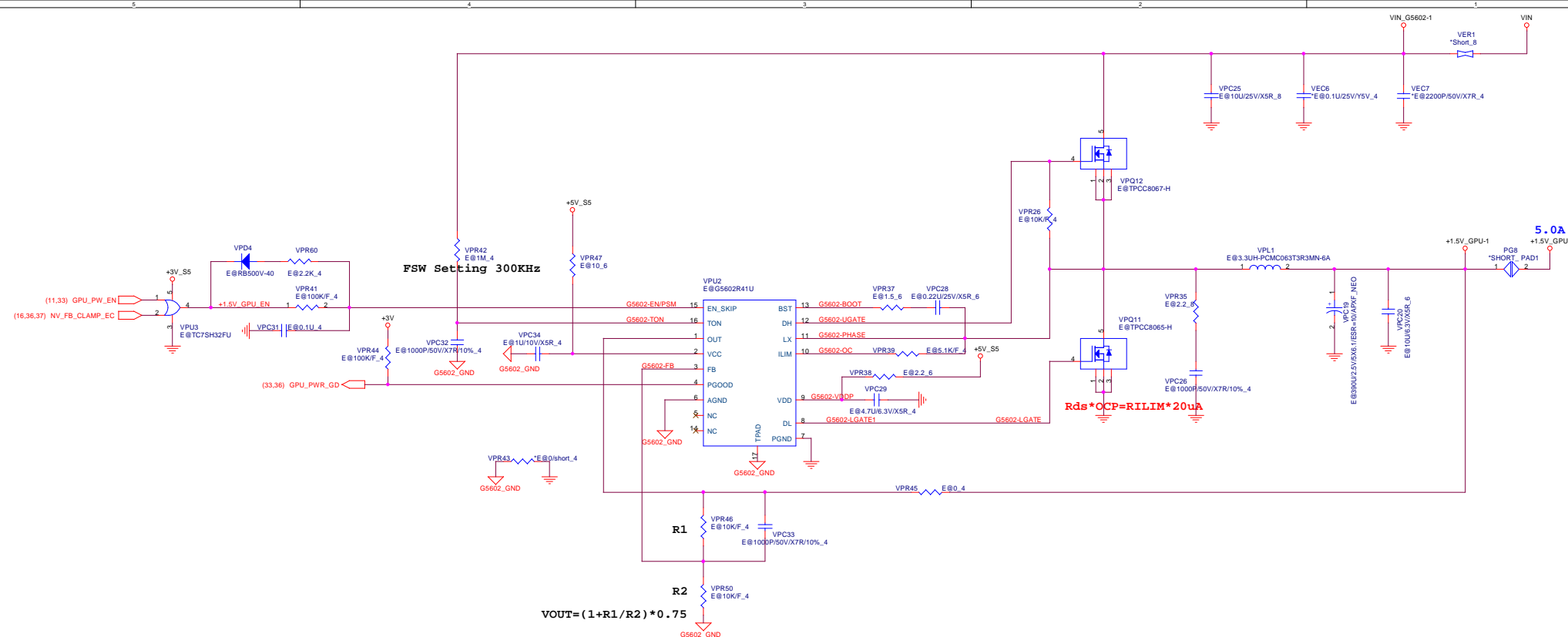
VGA-CORE



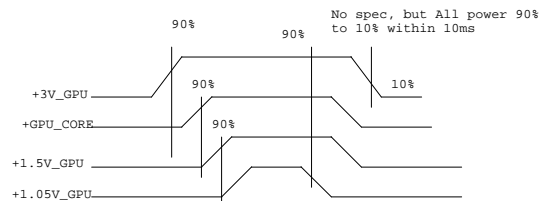
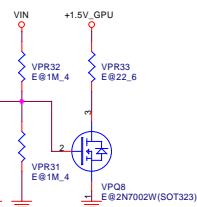
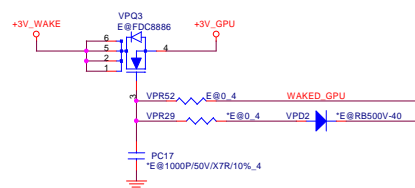
Quanta Computer Inc.
PROJECT : HKC

Size	Document Number	Date	Monday, February 04, 2013	Sheet	33 of 40	Rev	1A
	VGA_CORE (RT8812A)						

1. Level 1 Environment-related Substances Should Never be Used.
2. Recycled Resin and Coated Wire should be procured from Green Partners.



+3V_GPU

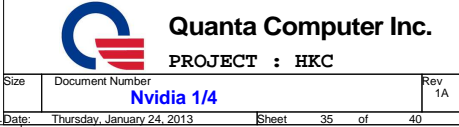


Quanta Computer Inc.
PROJECT : HKC

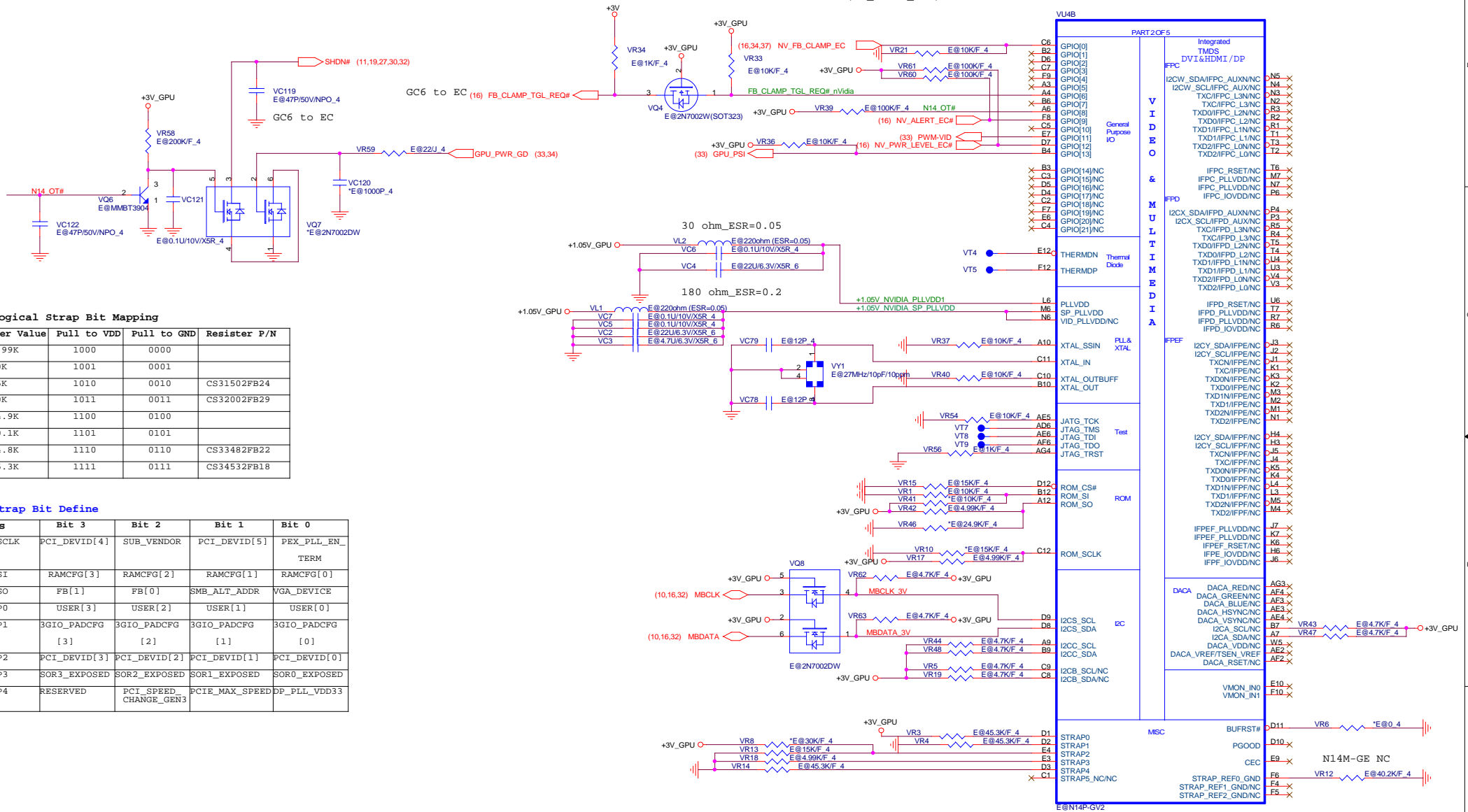
Size Document Number
1.8_GPU/1.0_GPU
Rev 1A

1. Level 1 Environment-related Substances Should Never be Used.
2. Recycled Resin and Coated Wire should be procured from Green Partners.

Date: Thursday, January 24, 2013 Sheet 34 of 40



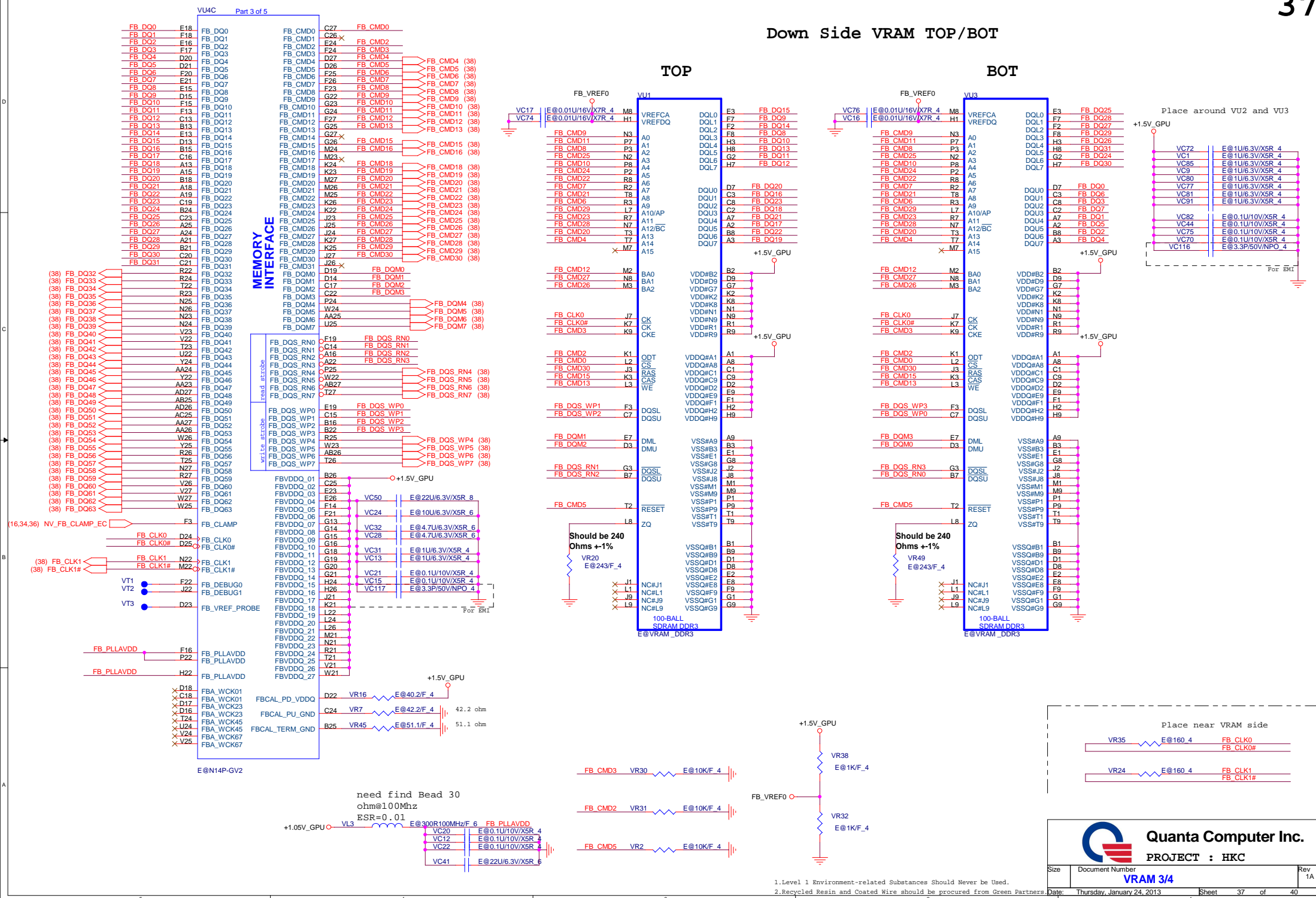
For GC6 GPU Monitor
Status(FB_CLAMP_MON)



	VRAM Capacity	VRAM Vender	ID	VR1	Mfr P/N	Quanta P/N
N14M-LP N14P-GV2	128Mx16 DDR3	Samsung	0111	PD45.3K	K4W2G1646E-BC11	AKD5MGGT525
		Hynix	0110	PD34.8K	H5TQ2G63DFR-11C	AKD5MGWTW15
	256Mx16 DDR3	Samsung	0011	PD20K	K4W4G1646B-HC11	AKD5MGWT525
		Hynix	0010(TBD)	PD15K	H5TC4G63AFR-11C	AKD5PGWTW10

1.Level 1 Environment-related Substances Should Never be Used.
2.Recycled Resin and Coated Wire should be procured from Green Partners.

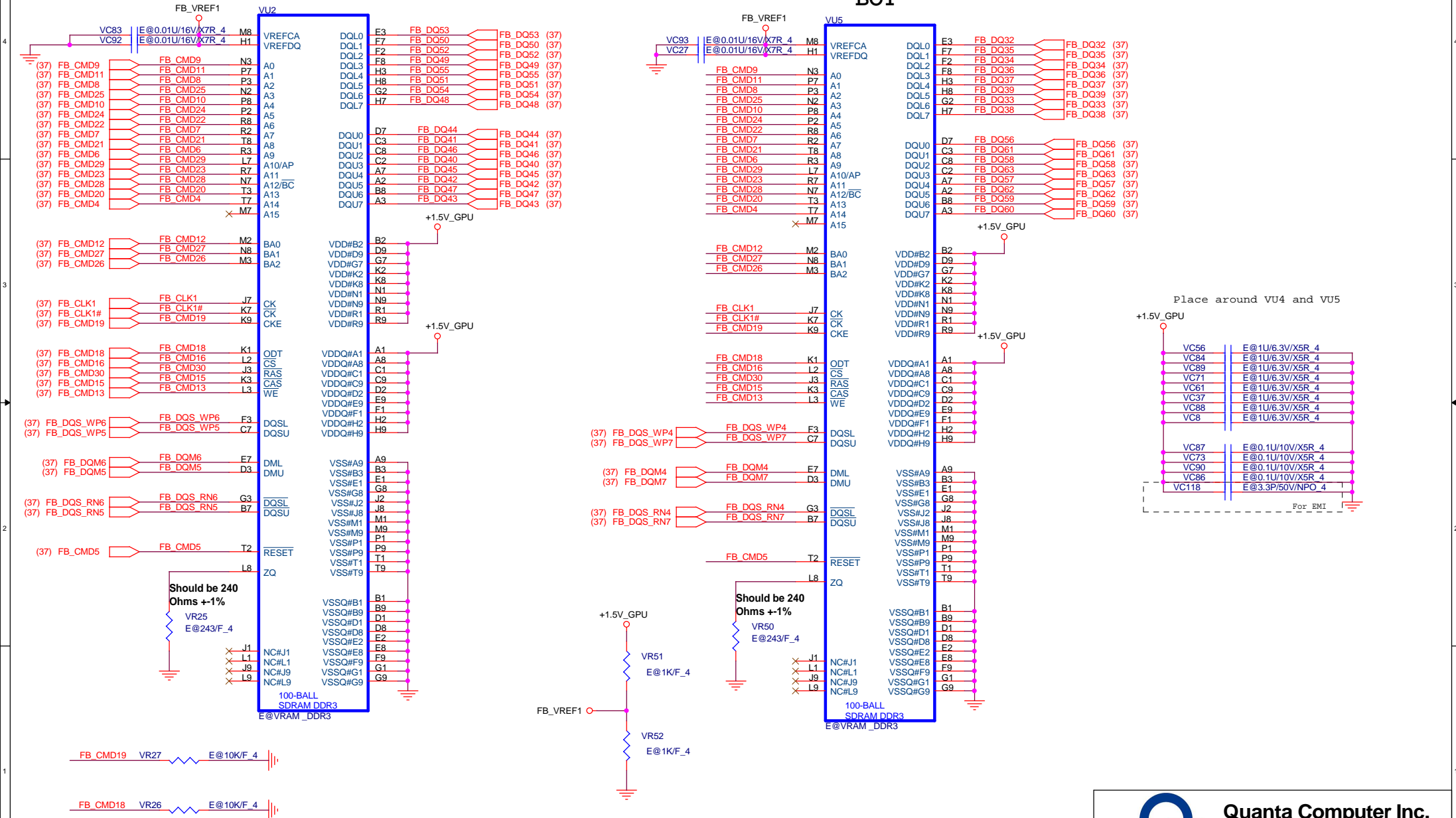
Down Side VRAM TOP/BOT



Up Side VRAM TOP/BOT

TOP

BOT



Quanta Computer Inc.

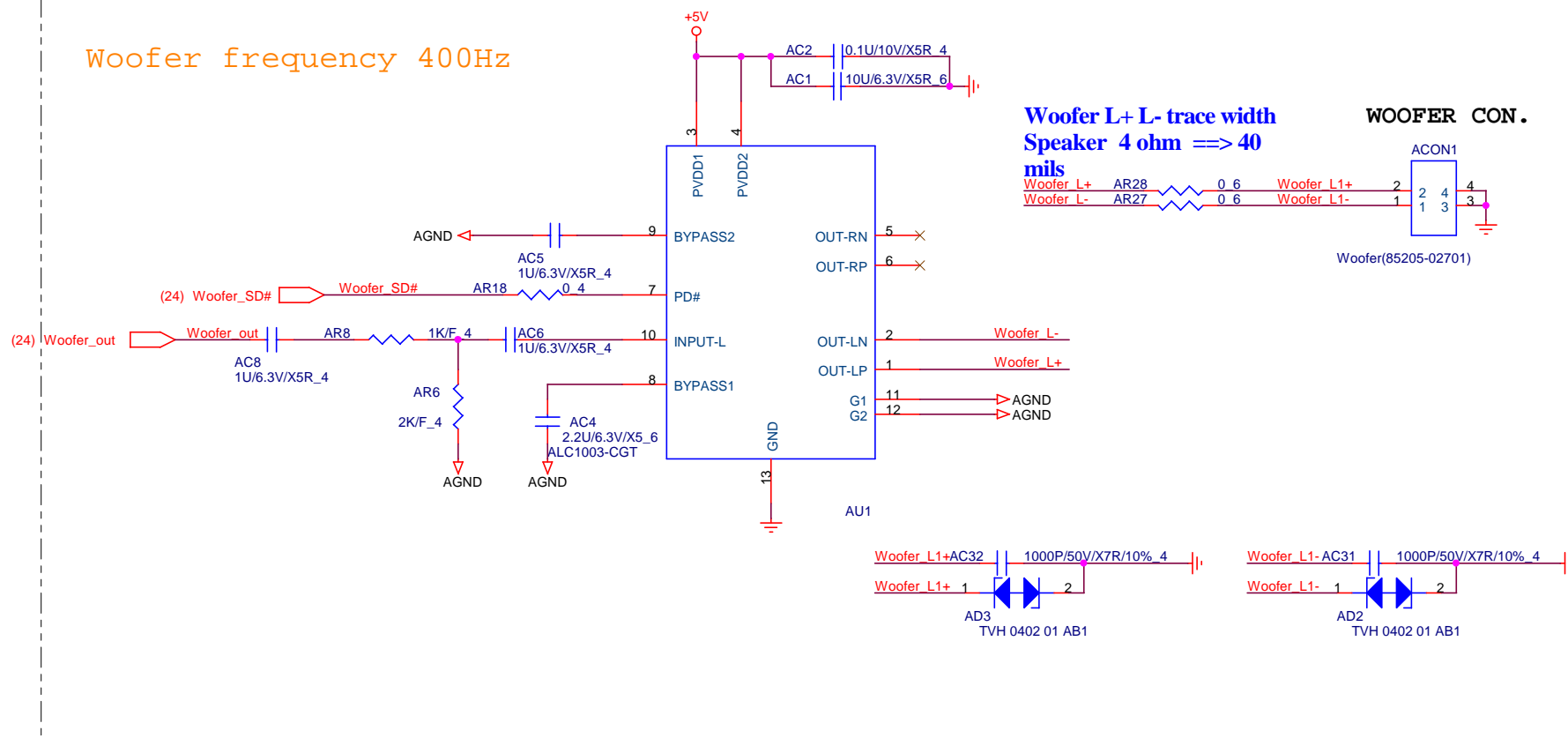
PROJECT : HKC

Size	Document Number	VRAM 4/4	Rev 1A
Date:	Thursday, January 24, 2013	Sheet 38 of 40	

1.Level 1 Environment-related Substances Should Never be Used.

2.Recycled Resin and Coated Wire should be procured from Green Partners.

Woofers frequency 400Hz



1.Level 1 Environment-related Substances Should Never be Used.
2.Recycled Resin and Coated Wire should be procured from Green

Partners.



Quanta Computer Inc.

PROJECT : HKC

Size	Document Number	Rev
	Audio Codec Woofer	1A
Date:	Thursday, January 24, 2013	Sheet 39 of 40

USB PORT Architecture	
PORT 0	USB3.0
PORT 1	USN3.0
PORT 2	USN2.0
PORT 3	USB2.0
PORT 4	NFC
PORT 5	N/A
PORT 6	N/A
PORT 7	N/A
PORT 8	N/A
PORT 9	WiMax/BT
PORT 10	Camera
PORT 11	Card Reader
PORT 12	Touch Screen
PORT 13	N/A

PCIE BUS	
PORT 1	WLAN Port
PORT 2	CARD READER
PORT 3	GLAN(RTL8111G)
PORT 4	N/A
PORT 5	N/A
PORT 6	N/A
PORT 7	N/A
PORT 8	N/A

SATA BUS	
PORT 0	HDD
PORT 1	N/A
PORT 2	N/A
PORT 3	N/A
PORT 4	ODD
PORT 5	N/A

SM BUS	MBCLK/MBDATA	WRITE	READ	Function
ISL88731CHRTZ	0001 001X	0001 0010	0001 0011	Charger
Nvidia	1001 1110	-	1001 1110	Graphice
LIS331DL	0011 101X	0011 1010	0011 1011	G Sensor

SM BUS	MBCLK_BAT/MBDATA_BAT	WRITE	READ	Function
VGP-BPS35A	0001 011X	0001 0110	0001 0111	Battery

SM BUS	SMB_PCH_CLK/SMB_PCH_DAT	WRITE	READ	Function
DIMM Module0	1010 000X	1010 0000	1010 0001	DDRIII
DIMM Module 1	1010 010X	1010 0100	1010 0101	DDRIII
Synaptics	0010 110X	0010 1100	0010 1101	Click PAD

	R363(High) R362(Low)	R294(High) R297(low)
	Board ID3	Board ID0
14"/HK6	0	0
15"/HK5	0	1
17"/HK7	1	0

Board ID1 (VRAM Vendor)	Samaung(1)	Hynix(0)
R47(High)	Stuff	No Stuff
R48(Low)	No Stuff	Stuff

Board ID2		
14" 4PCS	1G	512M
15" 8PCS	1G	2G
R39(High)	Stuff	No Stuff
R27(Low)	No Stuff	Stuff

PCBA SKU	Discrete	UMA
R277(Pull High)	Stuff	No Stuff
R275(Pull Low)	No Stuff	Stuff

OS status	S0	S3	DS3	(Soft OFF)	(Soft OFF)	(Soft OFF)	(Soft OFF)	(Soft OFF)
H/W status	S0	S3	DS3	S4 (Win8 off) RTC wake Enable WOLAN Enable	S4 (Win8 off) RTC wake Disable WOLAN Disable	S5 Charge Enable	S5 Charge Disable WoL Disable	S5 WoL Enable
RUN_ON	H	L	L	L	L	L	L	L
+3V	H	L	L	L	L	L	L	L
+5V	H	L	L	L	L	L	L	L
+0.675V_DDR_VTT	H	L	L	L	L	L	L	L
+1.05V	H	L	L	L	L	L	L	L
+0.85V	H	L	L	L	L	L	L	L
+1.5V	H	L	L	L	L	L	L	L
+3V_GPU	H	L	L	L	L	L	L	L
+1.05V_GPU	H	L	L	L	L	L	L	L
+VGPU_CORE	H	L	L	L	L	L	L	L
+VCC_CORE	H	L	L	L	L	L	L	L
SUS_ON	H	H	H	L	L	L	L	L
+1.35V_SUS	H	H	H	L	L	L	L	L
S5_ON	H	H	L	H	L	L	L	H
+5V_S5	H	H	L	H	L	L	L	H
+3V_S5	H	H	L	H	L	L	L	H
EC_WAKE_ON	H	H	H	H	L	H	L	H
+3V_WAKE	H	H	H	H	L	H	L	H
+5V_WAKE	H	H	H	H	L	H	L	H
DEEP_EC_EN	H	H	H	H	L	L	L	L
+3V_S5_DSW	H	H	H	H	L	L	L	L
+3V_SUS	H	H	L	L	L	L	L	L