AK4M
INTEL Montevina
BIOCK DIAGRAM

01

Model

- AK4M LV
- AK4M VP

CPU
Penryn
u-FCPGA 478PIN

FSB 1066

Thermal Sensor
GMT780-1

CLK Gen
ICS9LPR395

DC/DC & Charge

- DC In
- Battery

Dual CH MEM DDR3 1067M

- SO-DIMM STANDARD — DDR3 CH A
- SO-DIMM STANDARD — DDR3 CH B

NB
CANTIGA GM45
1201-pin FCBGA

CRT DDC2B → **CRT** 1x D-SUB 15-Pin

2x LVDS → **LCD(w/o HQE)** 16(15.4)" W

MCU PIC24FJ256GB106 → **HQE** CD0044AB → **LCD(w HQE)** 16(15.4)" W

TMDS → **LEVEL SHIFTER** PI3VDP411LST → **HDMI**

HDA

DMI LINK(X4)

SB
ICH9M

- SATA HDD — SATA
- SATA ODD — SATA
- eSATA — Repeater — SATA
- MINI WLAN CARD — PCIE
- MINI ROBSON — PCIE
- USB2.0X2 CONNECTOR — USB2.0
- FELICA — USB2.0
- Chicony Camera /MIC — USB2.0
- Bluetooth — USB2.0

PCIE → **BCM5784M** **BCM57780** 10/100/1000BASE-T — MDI → **RJ-45**

USB2.0 / PCIE → **EXPRESS CARD**

PCIE → **CARDREADER** O2Micro OZ888GS0L3N → 1394, SD/MS/xD reader

PCI → **CARDBUS** RICOH R5C804 → PC Card type-I/II

Azalia → **HD_ AUDIO** ALC262 → MAX4411 → MIC-In Jack, Headphone Jack; MAX9710ETP → Int. Speaker

PCIE → **USB3.0 BOARD** PD720200 → USB3.0 → USB3.0X2 CONNECTOR; USB2.0 → USB2.0X1 CONNECTOR

USB2.0 → **USB2.0 BOARD** → USB2.0 → USB2.0X3 CONNECTOR

LPC LPC

TPM 1.2
SLB 9635 TT 1.2

Key Board

- TP BOARD
- MC BOARD
- SW BOARD
- VR BOARD

EC
ITE IT8502

SPI

SIO
ITE IT8305

- LPT PORT
- COM PORT

SPI → **BIOS ROM** 2MB

QUANTA COMPUTER

Title: SYSTEM INFORMATION

Size	Document Number	Rev
B	AK4M MAIN BOARD	1A

Date: Thursday, March 26, 2009 Sheet 1 of 43

AK4M PWR Rails table:

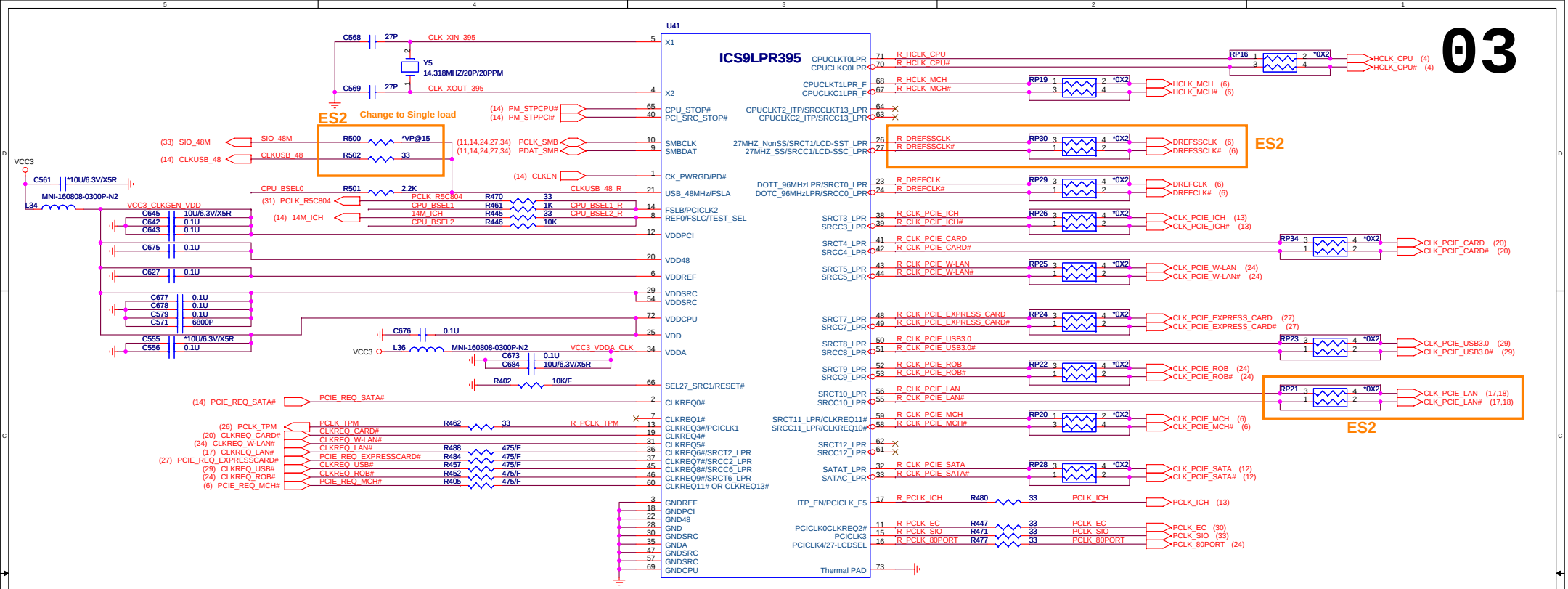
Power Rails	Level	S3	S4	S5	Ctl Signal
15VPCU	15V	O	O	O	
5VPCU	5V	O	O	O	PWR DC/DC
3VPCU	3.3V	O	O	O	
RVCC3	3.3V	O	O	O	RVCC_ON
RVCC5	5V	O	O	O	
VCC3_LAN	3.3V	O	O	O	LAN_WOL_EN_EC
5VSUS	5V	O	X	X	
3VSUS	3.3V	O	X	X	
1.5VSUS	1.8V	O	X	X	SUSON
VTT_MEM	0.9V	X	X	X	
SMDDR_VREF	0.9V	X	X	X	
3V_HQE	3.3V	X	X	X	HQE_POWER_ON
1.2V_HQE	1.2V	X	X	X	
VCC5	5V	X	X	X	
VCC3	3.3V	X	X	X	
VCC1.8	1.8V	X	X	X	MAINON
VCC1.5	1.5V	X	X	X	
VCCP	1.05V	X	X	X	
VCC1.0_USB	1.0V	X	X	X	
CPU_CORE	By VID	X	X	X	VRON

QUANTA COMPUTER

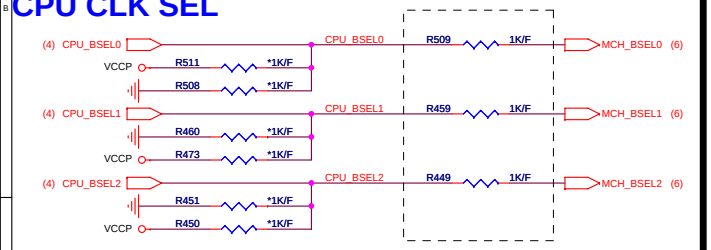
Title: SYSTEM INFORMATION

Size: Custom | Document Number: AK4M MAIN BOARD | Rev: 1A

Date: Thursday, March 26, 2009 | Sheet 2 of 43



CPU CLK SEL

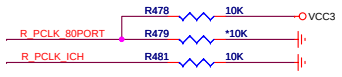


FSC BSEL2	FSB BSEL1	FSA BSEL0	CPU	SRC	PCI	REF	USB	DOT	Spread %	
0	0	0	266.66	100	33.33	14.318	48	96	0.5	Down
0	0	1	133.33	100	33.33	14.318	48	96	0.5	Down
* 0	1	0	200.00	100	33.33	14.318	48	96	0.5	Down
0	1	1	166.66	100	33.33	14.318	48	96	0.5	Down
1	0	0	333.33	100	33.33	14.318	48	96	0.5	Down
1	0	1	100.00	100	33.33	14.318	48	96	0.5	Down
1	1	0	400.00	100	33.33	14.318	48	96	0.5	Down
1	1	1	200.00	100	33.33	14.318	48	96	0.5	Down

ITP_EN(PIN17)

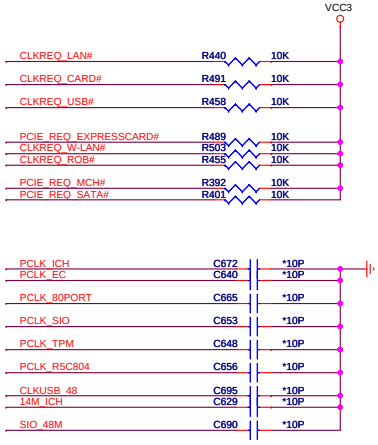
* 0 : PIN63/64 SRC13/SRC13#

1 : ITP/ITP#



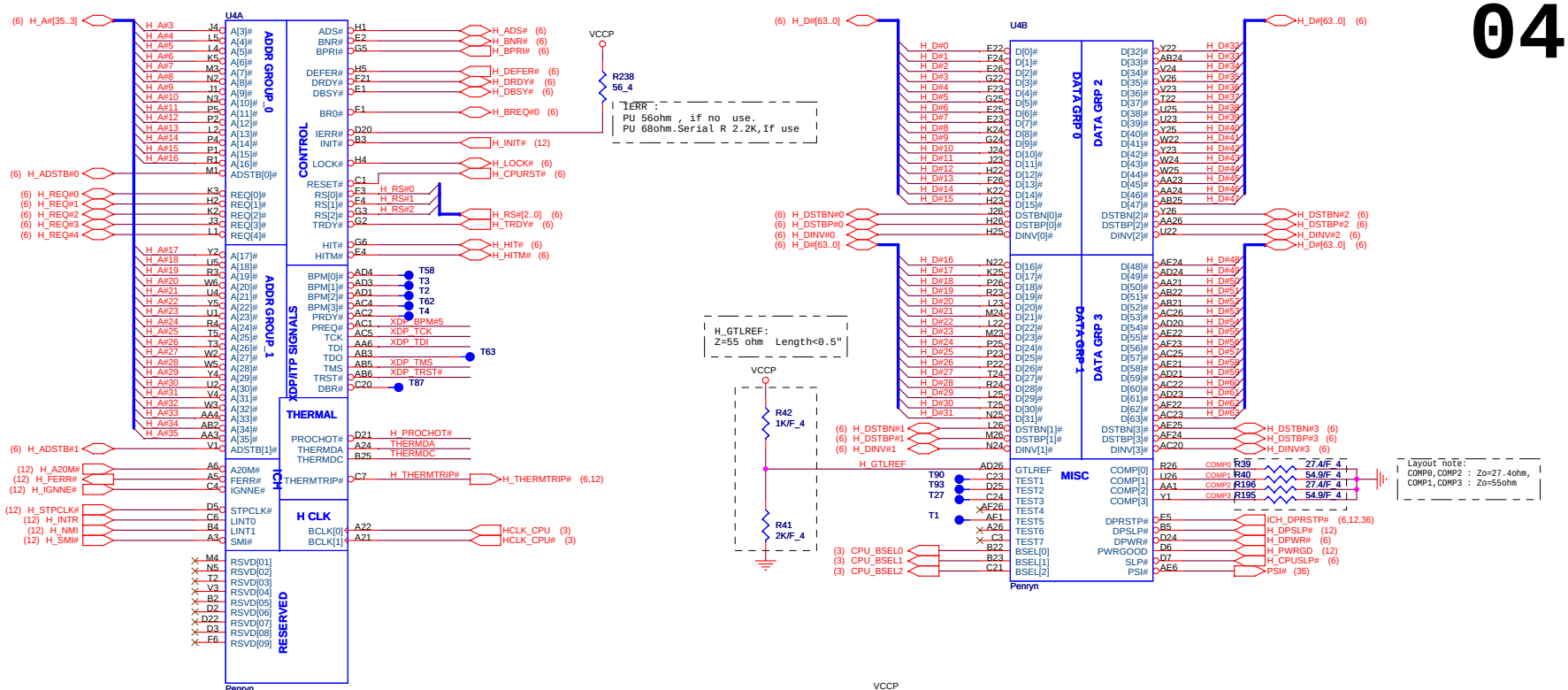
LCDSEL/27M Select Table

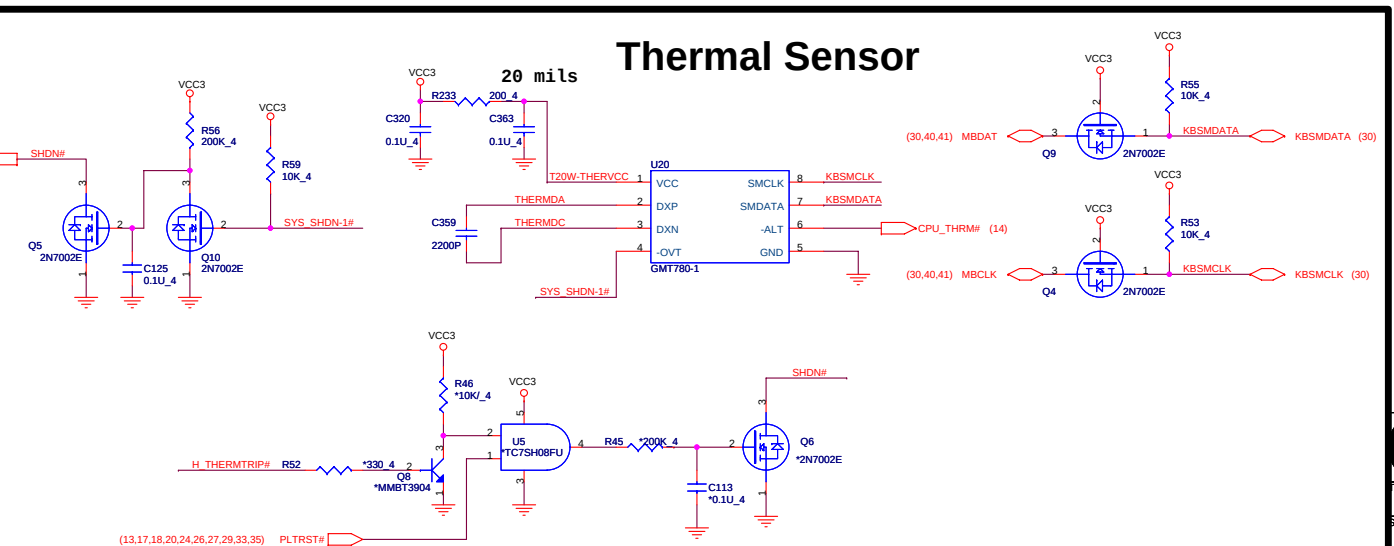
27 Select_SCR PIN16	SEL27_SRC1 PIN66	Dot96/SRC0 PIN 23/24	27MHz/SRC1/LCD PIN 26/27	
0	0	SRC0	27MHZ	(Ext Default)
* 1	0	DOT96	LCD	(INT Default)
0	1	SRC0	SRC1	
1	1	DOT96	SRC1	

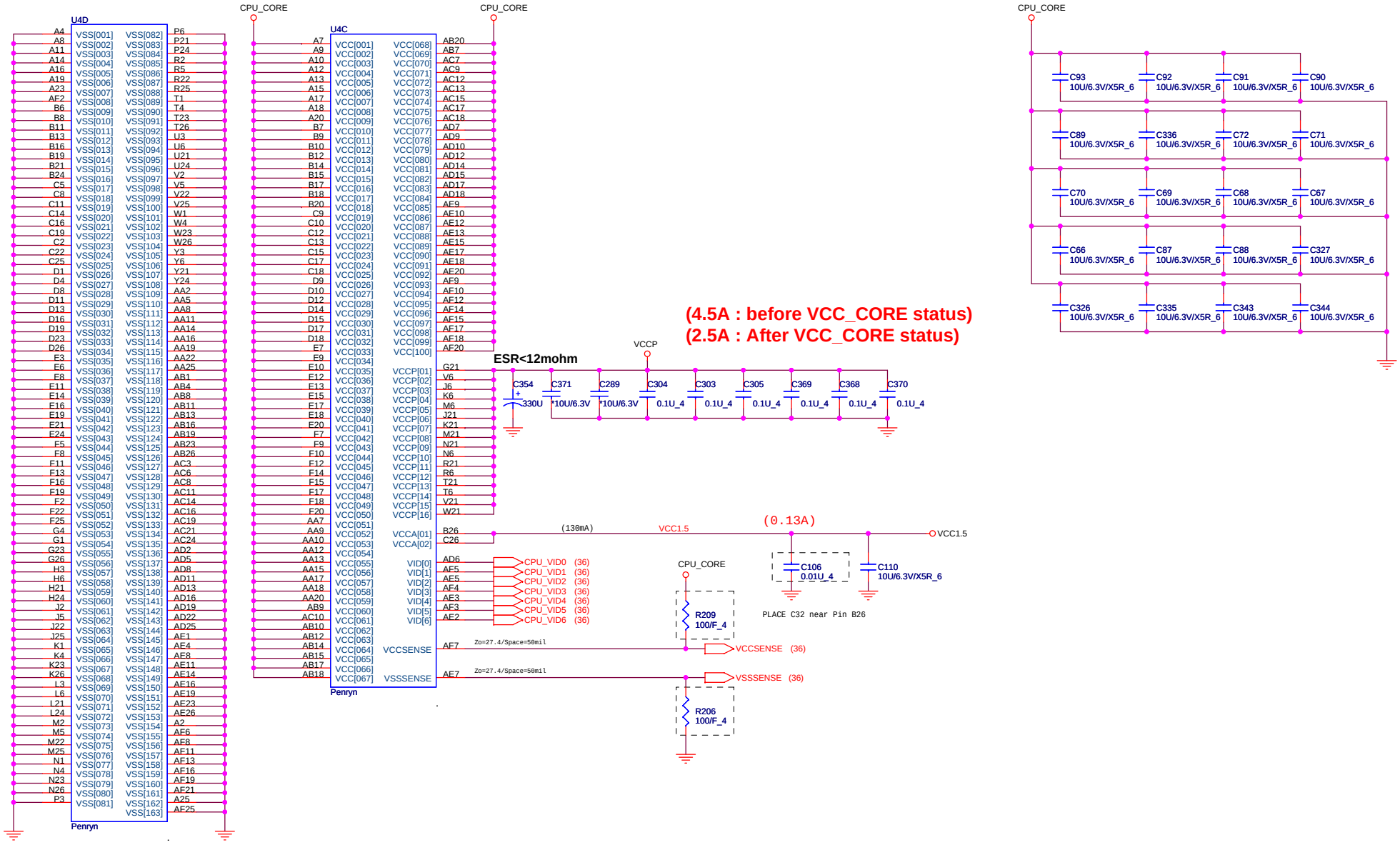


QUANTA COMPUTER

Title	CLOCK GENERATOR-ICS9LPR395	
Size	Document Number AK4M MAIN BOARD	Rev 1A
Date: Friday, March 13, 2009	Sheet 3 of 43	


U4A
ADDR GROUP_0
ADDR GROUP_1
XDP/ITP SIGNALS
CONTROL
THERMAL
H CLK
RESERVED
ICH
Penryn
U4B
DATA GRP 0
DATA GRP 1
DATA GRP 2
DATA GRP 3
MISC
Penryn
H_GTLREF:
Z=55 ohm Length<0.5"
IERR :
PU 56ohm , if no use.
PU 68ohm.Serial R 2.2K,If use
Layout note:
COMP0,COMP2 : Zo=27.4ohm,
COMP1,COMP3 : Zo=55ohm
ES2
2N7002E


Thermal Sensor
20 mils
GMT780-1
MBDAT
MBCLK
2N7002E
XDP PU
QUANTA COMPUTER
Pennyn CPU1 of 2
AK4M MAIN BOARD
Friday, March 13, 2009



05

QUANTA COMPUTER

Title	Penryn CPU 2 of 2	
Size	Document Number: AK4M MAIN BOARD	Rev: 1A
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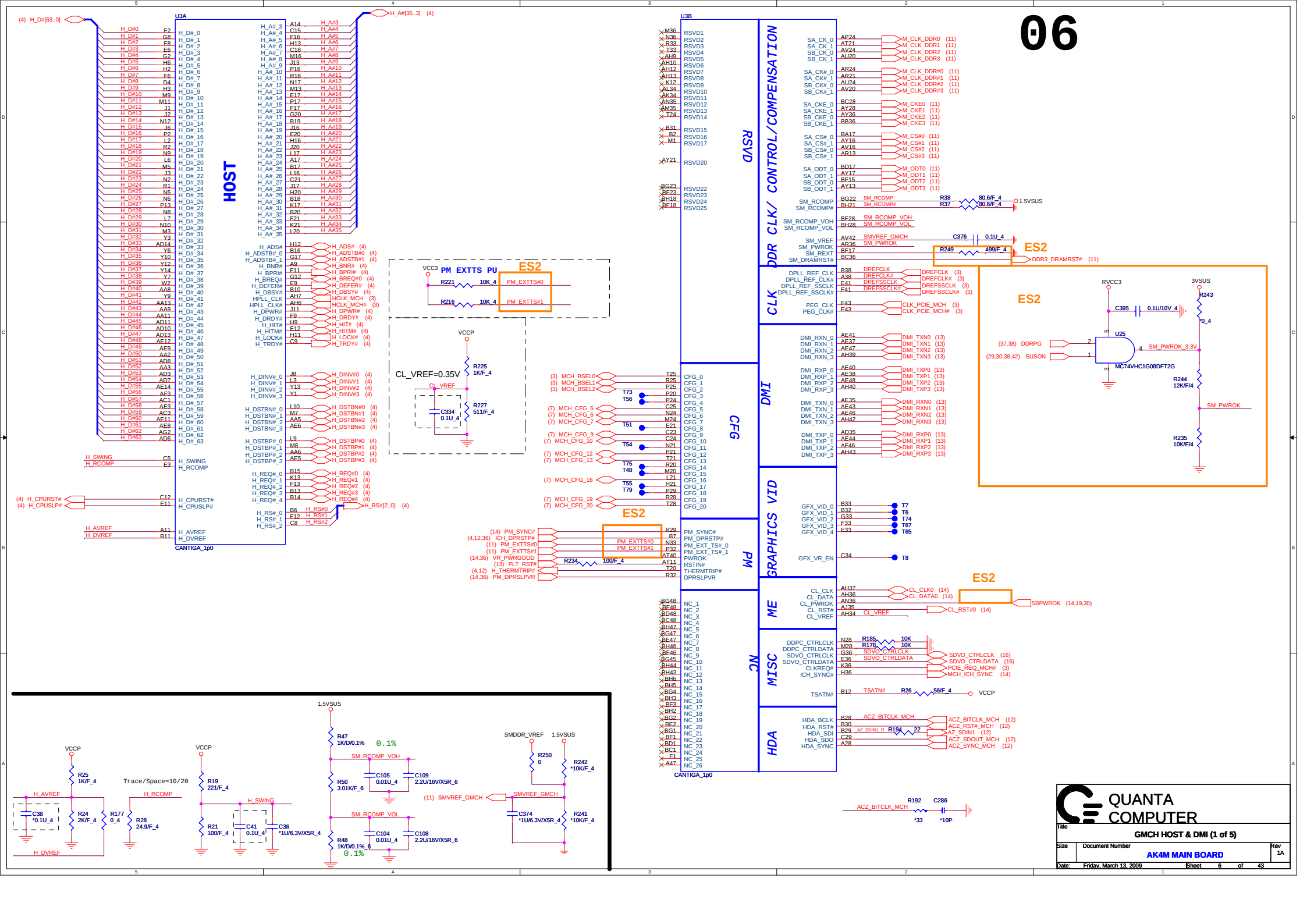
06
U3A
HOST
CANTIGA_1p0
U3B
RSVD
CLK
DMI
CFG
PM
GRAPHICS VID
ME
MISC
NC
HDA
DDR CLK/ CONTROL/COMPENSATION
ES2
PM EXTTS PU
VCC3
PM_EXTTS#0
PM_EXTTS#1
CL_VREF=0.35V
VCCP
R225 1K/F_4
R227 511/F_4
C334 0.1U_4
R221 10K_4
R216 10K_4
SM_RCOMP
SM_RCOMP#
R38 80.6/F_4
R37 80.6/F_4
1.5VSUS
SM_VREF
SM_PWROK
SM_REXT
SM_DRAMRST#
C376 0.1U_4
R249 499/F_4
DDR3_DRAMRST# (11)
RVCC3
3VSUS
C395 0.1U/10V_4
U25
MC74VHC1G08DFT2G
SM_PWROK_3.3V
R243
R244 12K/F4
R235 10K/F4
(37,38) DDRPG
(29,30,38,42) SUSON
SM_PWROK
SBPWROK (14,19,30)
CL_CLK0 (14)
CL_DATA0 (14)
CL_RST#0 (14)
CL_VREF
SDVO_CTRLCLK (16)
SDVO_CTRLDATA (16)
PCIE_REQ_MCH# (3)
MCH_ICH_SYNC (14)
TSATN#
R26 56/F_4
ACZ_BITCLK_MCH (12)
ACZ_RST#_MCH (12)
ACZ_SDIN1 (12)
ACZ_SDOUT_MCH (12)
ACZ_SYNC_MCH (12)
R192 *33
C286 *10P
H_SWING
H_RCOMP
H_CPURST#
H_CPUSLP#
H_AVREF
H_DVREF
H_REQ#0
H_REQ#1
H_REQ#2
H_REQ#3
H_REQ#4
H_RS#0
H_RS#1
H_RS#2
H_RS#[2..0]
H_A#[35..3]
H_D#[63..0]
H_ADS#
H_ADSTB#0
H_ADSTB#1
H_BNR#
H_BPRI#
H_BREQ#0
H_DEFER#
H_DBSY#
HPLL_CLK
HPLL_CLK#
H_DPWR#
H_DRDY#
H_HIT#
H_HITM#
H_LOCK#
H_TRDY#
H_DINV#0
H_DINV#1
H_DINV#2
H_DINV#3
H_DSTBN#0
H_DSTBN#1
H_DSTBN#2
H_DSTBN#3
H_DSTBP#0
H_DSTBP#1
H_DSTBP#2
H_DSTBP#3
MCH_BSEL0
MCH_BSEL1
MCH_BSEL2
MCH_CFG_5
MCH_CFG_6
MCH_CFG_7
MCH_CFG_9
MCH_CFG_10
MCH_CFG_12
MCH_CFG_13
MCH_CFG_16
MCH_CFG_19
MCH_CFG_20
PM_SYNC#
ICH_DPRSTP#
PM_EXTTS#0
PM_EXTTS#1
VR_PWRGOOD
PLT_RST#
H_THERMTRIP#
PM_DPRSLPVR
PM_DPRSTP#
PM_EXT_TS#_0
PM_EXT_TS#_1
PWROK
RSTIN#
THERMTRIP#
DPRSLPVR
R234 100/F_4
SM_RCOMP_VOH
SM_RCOMP_VOL
DPLL_REF_CLK
DPLL_REF_CLK#
DPLL_REF_SSCLK
DPLL_REF_SSCLK#
DREFCLK
DREFCLK#
DREFSSCLK
DREFSSCLK#
PEG_CLK
PEG_CLK#
CLK_PCIE_MCH
CLK_PCIE_MCH#
DMI_RXN_0
DMI_RXN_1
DMI_RXN_2
DMI_RXN_3
DMI_TXN_0
DMI_TXN_1
DMI_TXN_2
DMI_TXN_3
DMI_RXP_0
DMI_RXP_1
DMI_RXP_2
DMI_RXP_3
DMI_TXP_0
DMI_TXP_1
DMI_TXP_2
DMI_TXP_3
GFX_VID_0
GFX_VID_1
GFX_VID_2
GFX_VID_3
GFX_VID_4
GFX_VR_EN
CL_CLK
CL_DATA
CL_PWROK
CL_RST#
CL_VREF
DDPC_CTRLCLK
DDPC_CTRLDATA
SDVO_CTRLCLK
SDVO_CTRLDATA
CLKREQ#
ICH_SYNC#
TSATN#
HDA_BCLK
HDA_RST#
HDA_SDI
HDA_SDO
HDA_SYNC
SA_CK_0
SA_CK_1
SB_CK_0
SB_CK_1
SA_CK#_0
SA_CK#_1
SB_CK#_0
SB_CK#_1
SA_CKE_0
SA_CKE_1
SB_CKE_0
SB_CKE_1
SA_CS#_0
SA_CS#_1
SB_CS#_0
SB_CS#_1
SA_ODT_0
SA_ODT_1
SB_ODT_0
SB_ODT_1
M_CLK_DDR0 (11)
M_CLK_DDR1 (11)
M_CLK_DDR2 (11)
M_CLK_DDR3 (11)
M_CLK_DDR#0 (11)
M_CLK_DDR#1 (11)
M_CLK_DDR#2 (11)
M_CLK_DDR#3 (11)
M_CKE0 (11)
M_CKE1 (11)
M_CKE2 (11)
M_CKE3 (11)
M_CS#0 (11)
M_CS#1 (11)
M_CS#2 (11)
M_CS#3 (11)
M_ODT0 (11)
M_ODT1 (11)
M_ODT2 (11)
M_ODT3 (11)
VCCP
R25 1K/F_4
R24 2K/F_4
R177 0_4
R28 24.9/F_4
C38 *0.1U_4
Trace/Space=10/20
R19 221/F_4
R21 100/F_4
C41 0.1U_4
C36 *1U/6.3V/X5R_4
1.5VSUS
R47 1K/D/0.1% 0.1%
R50 3.01K/F_6
R48 1K/D/0.1% 0.1%
C105 0.01U_4
C109 2.2U/16V/X5R_6
C104 0.01U_4
C108 2.2U/16V/X5R_6
SMDDR_VREF
1.5VSUS
R250 0
R242 *10K/F_4
R241 *10K/F_4
(11) SMVREF_GMCH
C374 *1U/6.3V/X5R_4
QUANTA COMPUTER
GMCH HOST & DMI (1 of 5)
AK4M MAIN BOARD
Rev 1A
Friday, March 13, 2009
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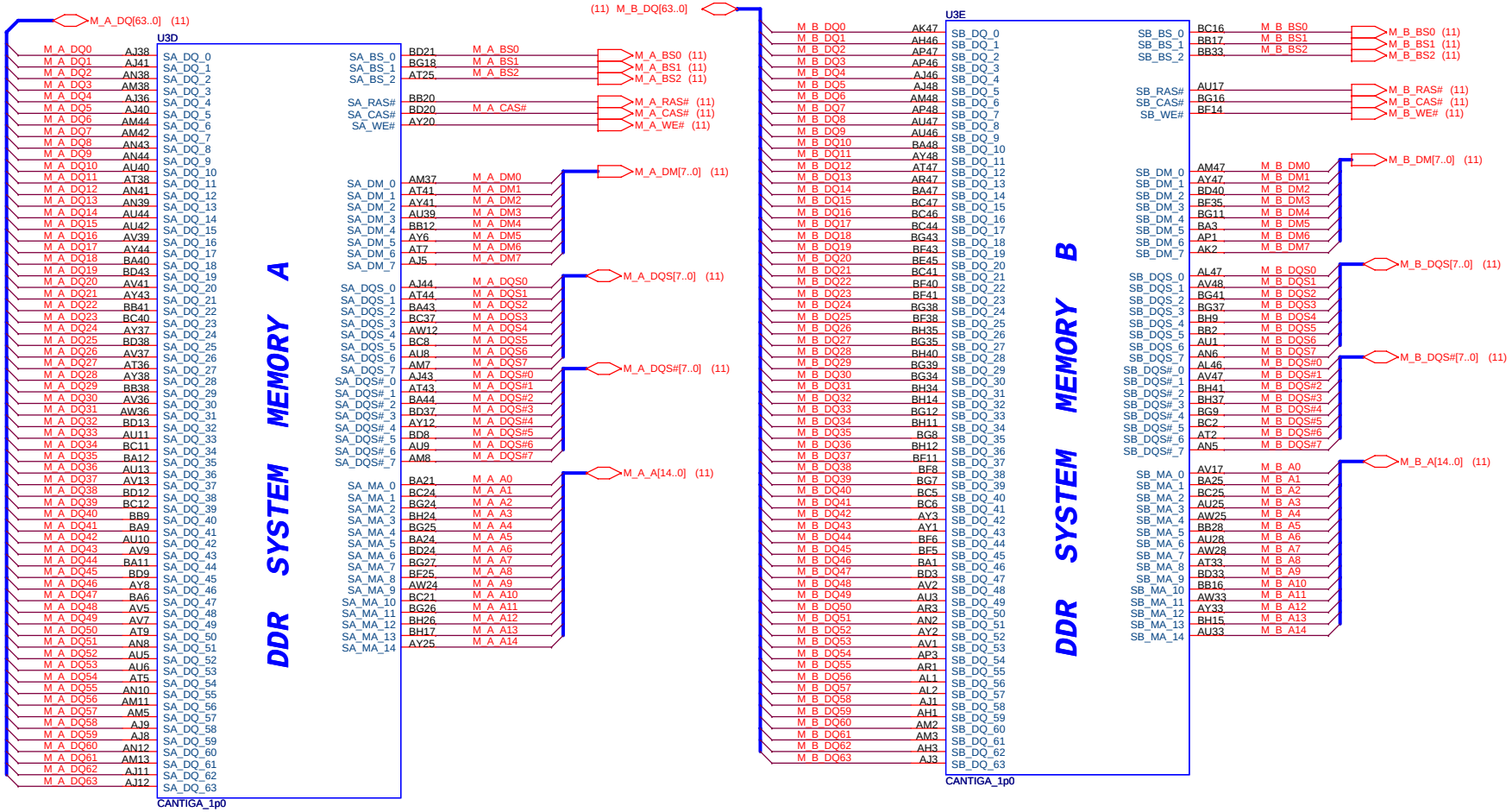
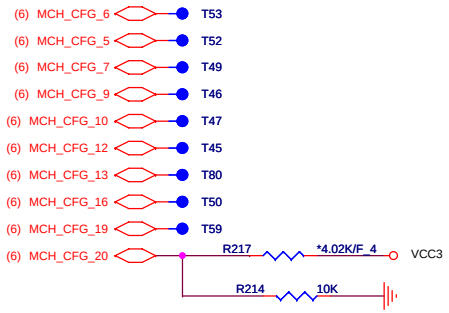


GMCH Strap pin description

	Low	High
CGF5	DMIx2	* DMIx4
CGF6	ITPM HOST interface enable	* ITPM HOST interface disable
CGF7	AMT Fireware will use TLS cipher suite with no confidentiality	* AMT Fireware will use TLS cipher suite with confidentiality
CGF9	PCIE Graphics lan : Reverse Lane	* PCIE Graphics lan : Normal operation
CGF10	PCIE Loopback enable	* PCIE Loopback disable
CGF16	FSB Dynamic ODT Disabled	* FSB Dynamic ODT Enabled
CGF19	* DMI LANE Normal	DMI LANE Reversed
CGF20	* only SDVO/DP/iHDMI or PCIE is operational	SDVO/DP/iHDMI and PCIE are operation simultaneously via the PEG port

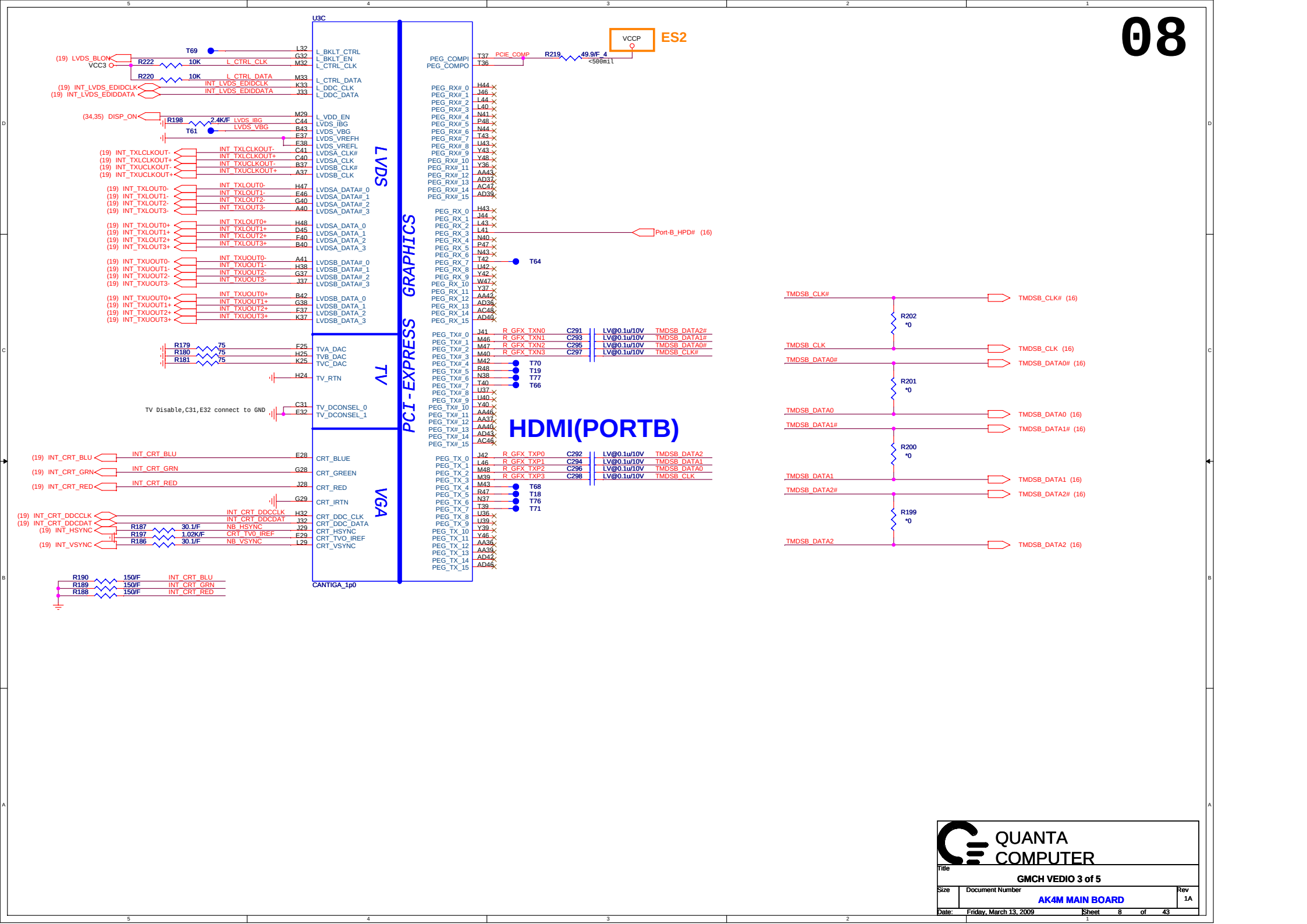
CGF[12:13]:XOR /ALLZ / Clock Un-gating
00 = Reserve
01 = XOR mode enabled
10 = All-Z mode enabled
* 11 = Normal Operation(Default)

int.Pull-down : CFG 18,19,20
int.Pull-high : CFG CFG 3~17



QUANTA COMPUTER

Title	GMCH DDR3 2 of 5	
Size	Document Number: AK4M MAIN BOARD	Rev: 1A
Date: Friday, March 13, 2009	Sheet 7 of 43	



QUANTA COMPUTER

Title	GMCH VEDIO 3 of 5	
Size	Document Number: AK4M MAIN BOARD	Rev: 1A
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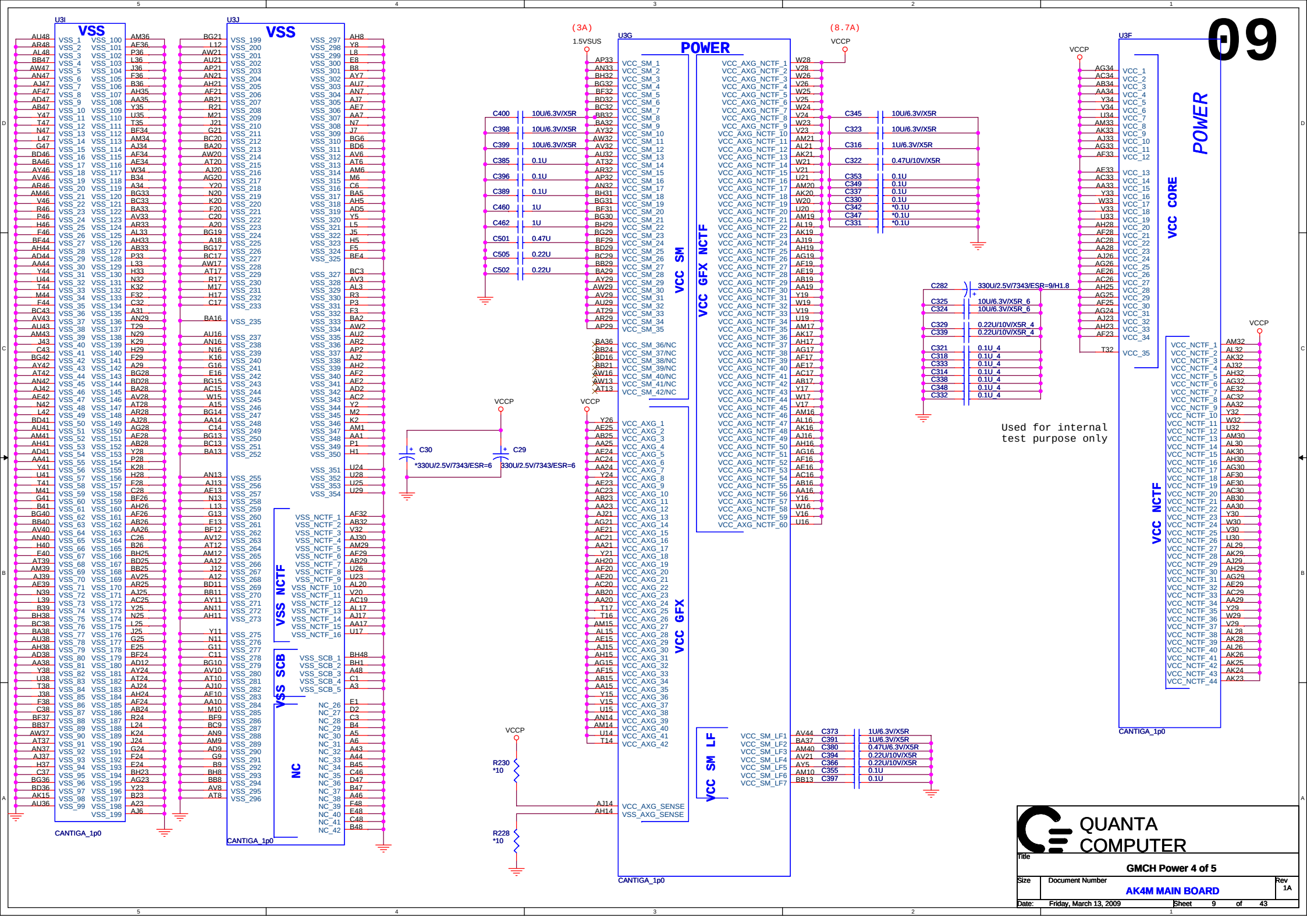
09
U3I
VSS
CANTIGA_1p0
U3J
VSS
VSS NCTF
VSS SCB
NC
CANTIGA_1p0
U3G
POWER
(3A)
1.5VSUS
VCC SM
VCC GFX NCTF
VCC GFX
VCC SM LF
(8.7A)
VCCP
C400 10U/6.3V/X5R
C398 10U/6.3V/X5R
C399 10U/6.3V/X5R
C385 0.1U
C396 0.1U
C389 0.1U
C460 1U
C462 1U
C501 0.47U
C505 0.22U
C502 0.22U
C30 *330U/2.5V/7343/ESR=6
C29 330U/2.5V/7343/ESR=6
R230 *10
R228 *10
VCC_AXG_SENSE
VSS_AXG_SENSE
C345 10U/6.3V/X5R
C323 10U/6.3V/X5R
C316 1U/6.3V/X5R
C322 0.47U/10V/X5R
C353 0.1U
C349 0.1U
C337 0.1U
C330 0.1U
C342 *0.1U
C347 *0.1U
C331 *0.1U
C282 330U/2.5V/7343/ESR=9/H1.8
C325 10U/6.3V/X5R_6
C324 10U/6.3V/X5R_6
C329 0.22U/10V/X5R_4
C339 0.22U/10V/X5R_4
C321 0.1U_4
C318 0.1U_4
C333 0.1U_4
C314 0.1U_4
C338 0.1U_4
C348 0.1U_4
C332 0.1U_4
Used for internal test purpose only
U3F
VCC CORE
VCC NCTF
CANTIGA_1p0
QUANTA COMPUTER
Title: GMCH Power 4 of 5
Size
Document Number: AK4M MAIN BOARD
Rev: 1A
Date: Friday, March 13, 2009
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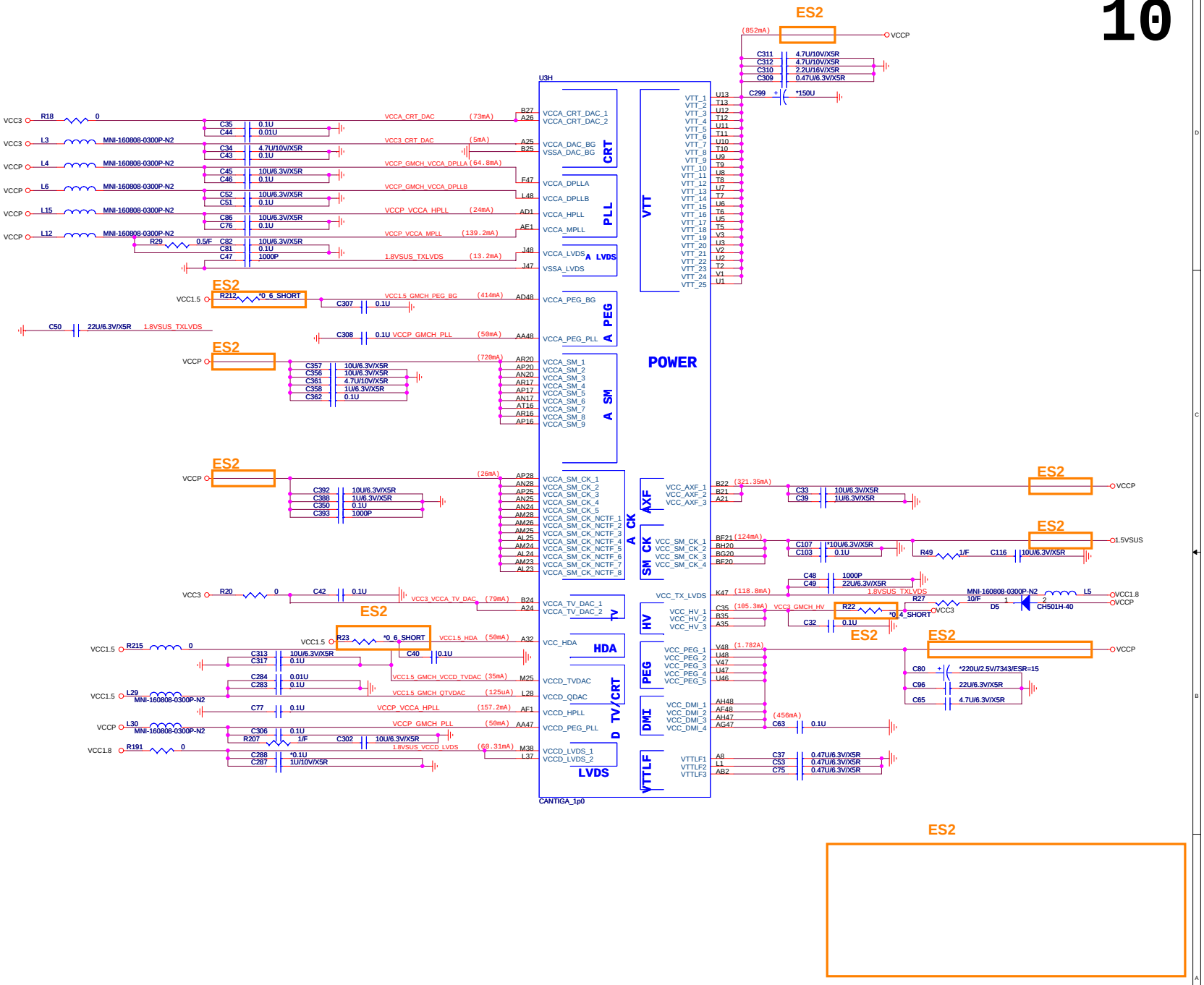

Title	GMCH Power 5 of 5
Size	Document Number: AK4M MAIN BOARD
Rev	1A
Date:	Friday, March 13, 2009
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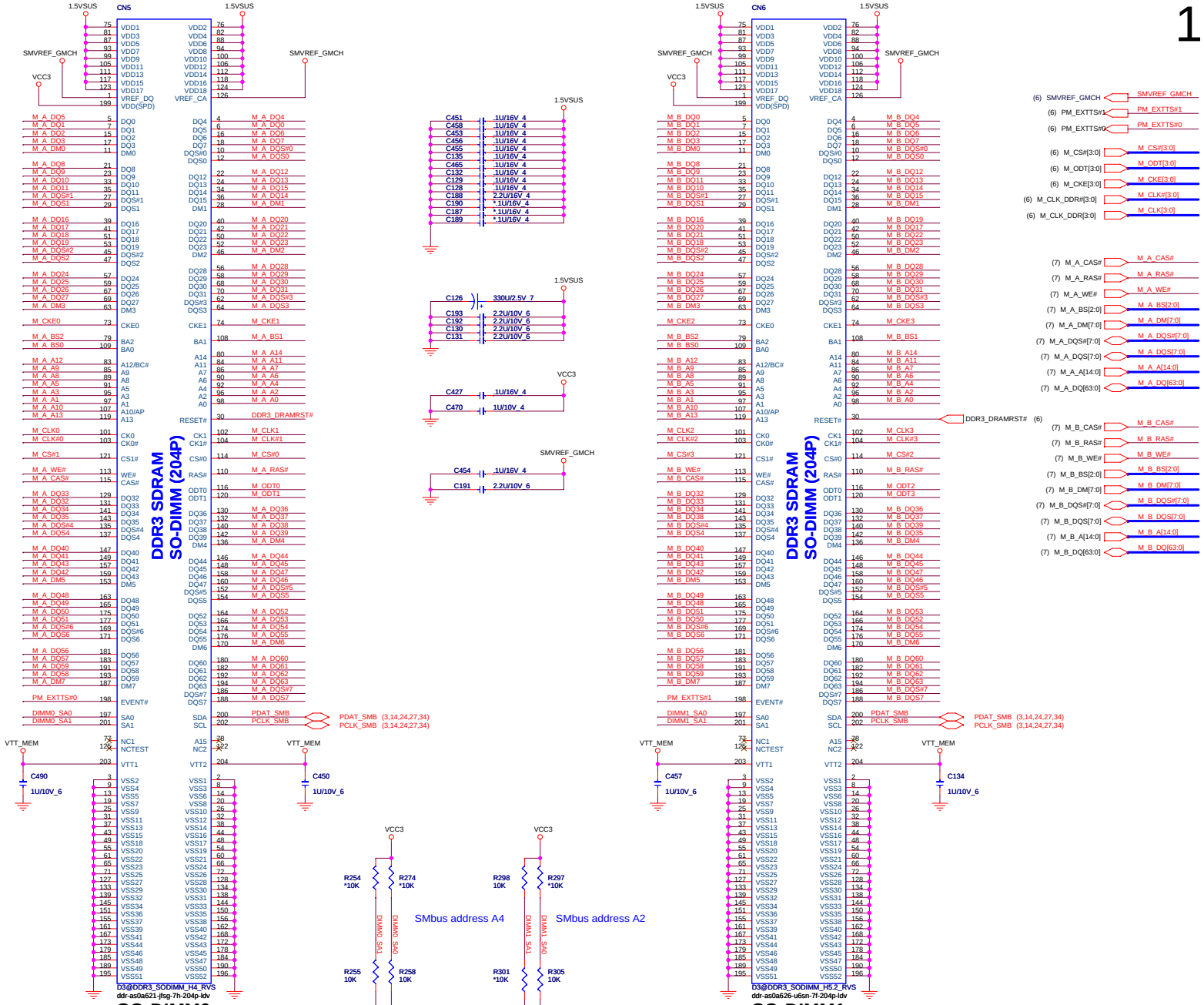
QUANTA COMPUTER



(6) SMVREF_GMCH — SMVREF_GMCH
(6) PM_EXTTS#1 — PM_EXTTS#1
(6) PM_EXTTS#0 — PM_EXTTS#0
(6) M_CS#[3:0] — M_CS#[3:0]
(6) M_ODT[3:0] — M_ODT[3:0]
(6) M_CKE[3:0] — M_CKE[3:0]
(6) M_CLK_DDR#[3:0] — M_CLK#[3:0]
(6) M_CLK_DDR[3:0] — M_CLK[3:0]

(7) M_A_CAS# — M_A_CAS#
(7) M_A_RAS# — M_A_RAS#
(7) M_A_WE# — M_A_WE#
(7) M_A_BS[2:0] — M_A_BS[2:0]
(7) M_A_DM[7:0] — M_A_DM[7:0]
(7) M_A_DQS#[7:0] — M_A_DQS#[7:0]
(7) M_A_DQS[7:0] — M_A_DQS[7:0]
(7) M_A_A[14:0] — M_A_A[14:0]
(7) M_A_DQ[63:0] — M_A_DQ[63:0]

(6) DDR3_DRAMRST# — DDR3_DRAMRST#

(7) M_B_CAS# — M_B_CAS#
(7) M_B_RAS# — M_B_RAS#
(7) M_B_WE# — M_B_WE#
(7) M_B_BS[2:0] — M_B_BS[2:0]
(7) M_B_DM[7:0] — M_B_DM[7:0]
(7) M_B_DQS#[7:0] — M_B_DQS#[7:0]
(7) M_B_DQS[7:0] — M_B_DQS[7:0]
(7) M_B_A[14:0] — M_B_A[14:0]
(7) M_B_DQ[63:0] — M_B_DQ[63:0]

QUANTA COMPUTER

Title	DDR3 SO-DIMM(204P)	
Size	Document Number: AK4M MAIN BOARD	Rev: 1A
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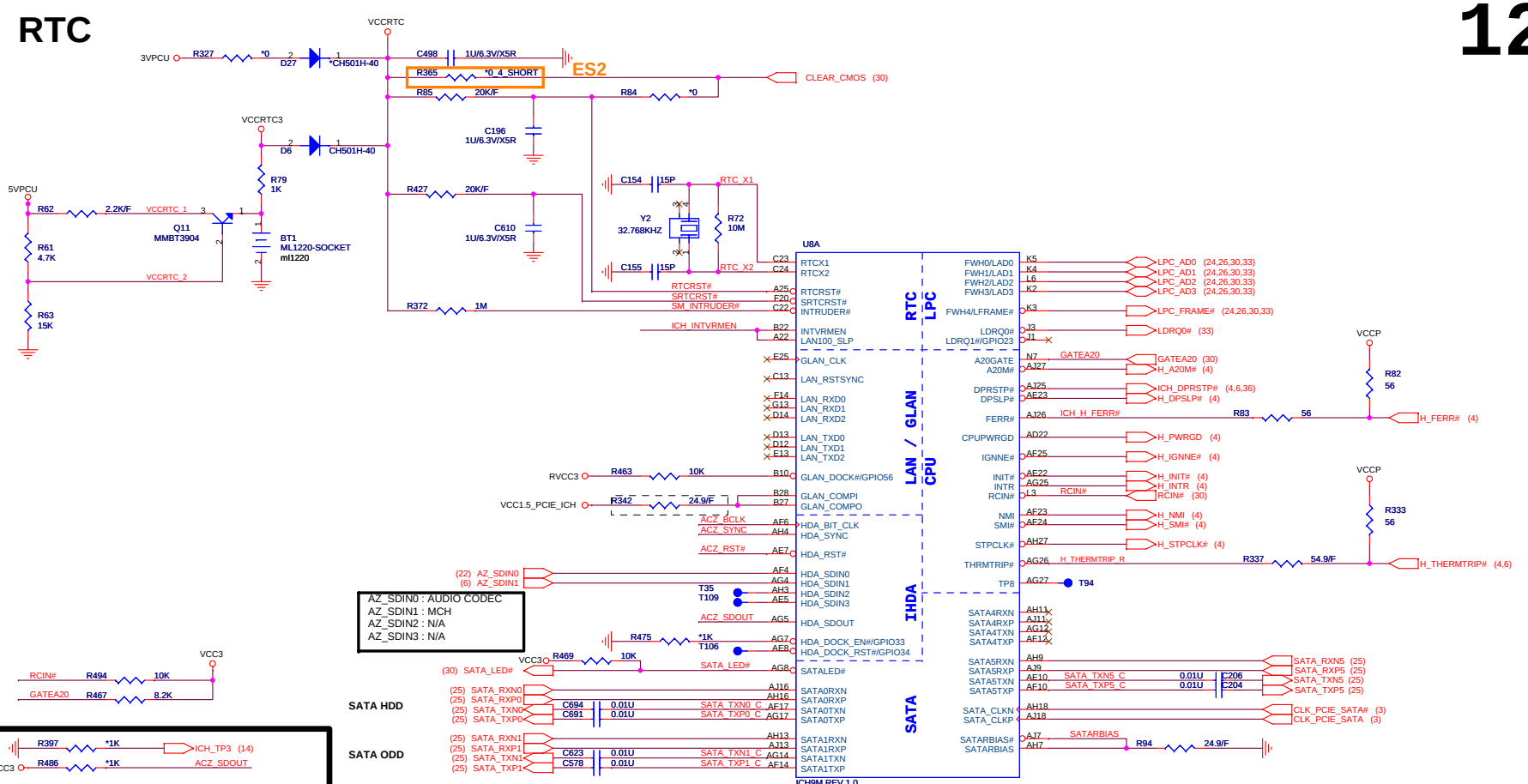
RTC



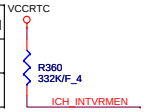
AZ_SDIN0 : AUDIO CODEC
AZ_SDIN1 : MCH
AZ_SDIN2 : N/A
AZ_SDIN3 : N/A

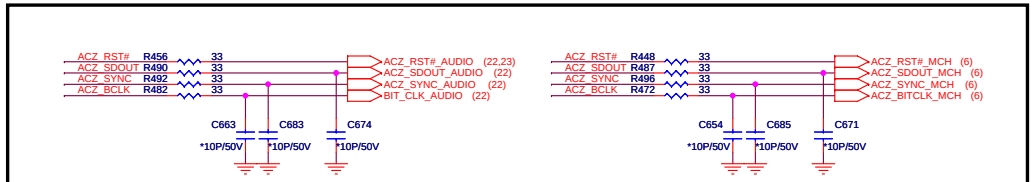
XOR Chain Entrance Strap

ICH_TP3	ACZ_SDOUT	Description
0	0	RSVD
0	1	Enter XOR Chain
1	0	* Normal opration
1	1	Set PCIE port config bit 1

Internal VRM Enable for Vccsus1_05, VccSus1_5 , VccCL1_5, vccLAN1_05,vccCL1_05)

	INTVRMEN
Enable (default)	1
Disable	0

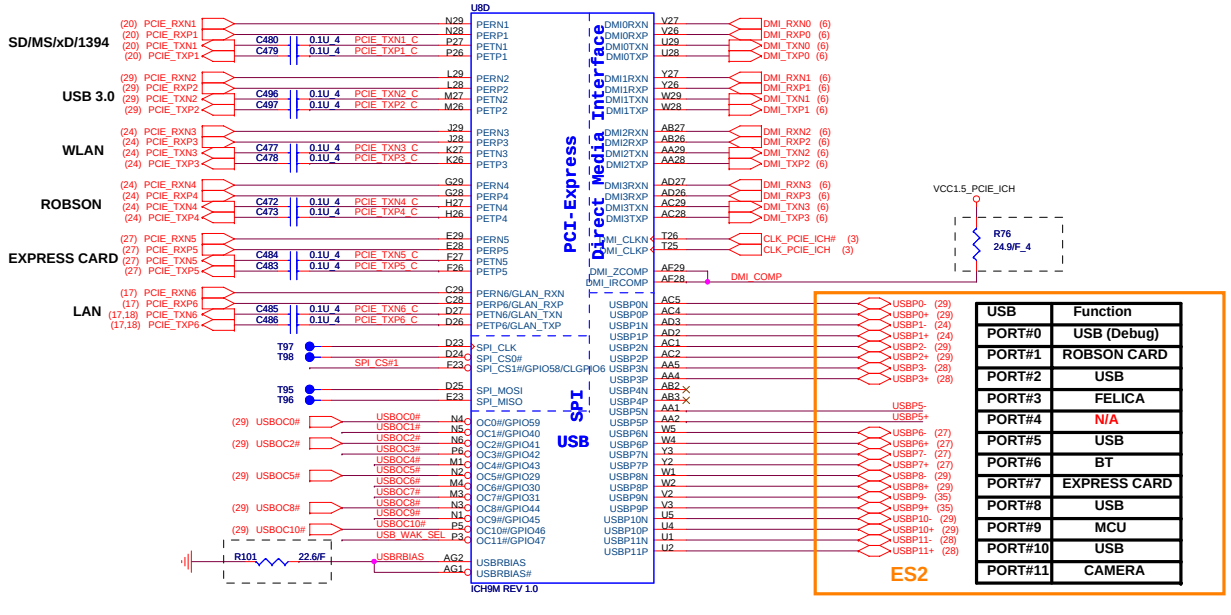




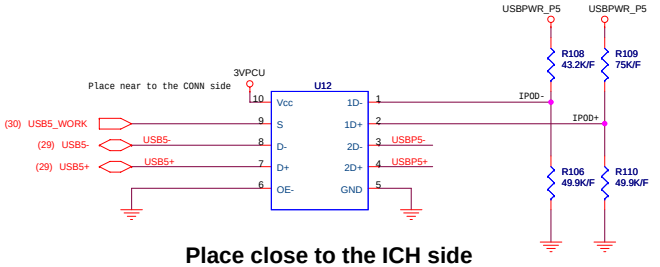
PLACE THESE PARTS NEAR ICH9M

QUANTA COMPUTER

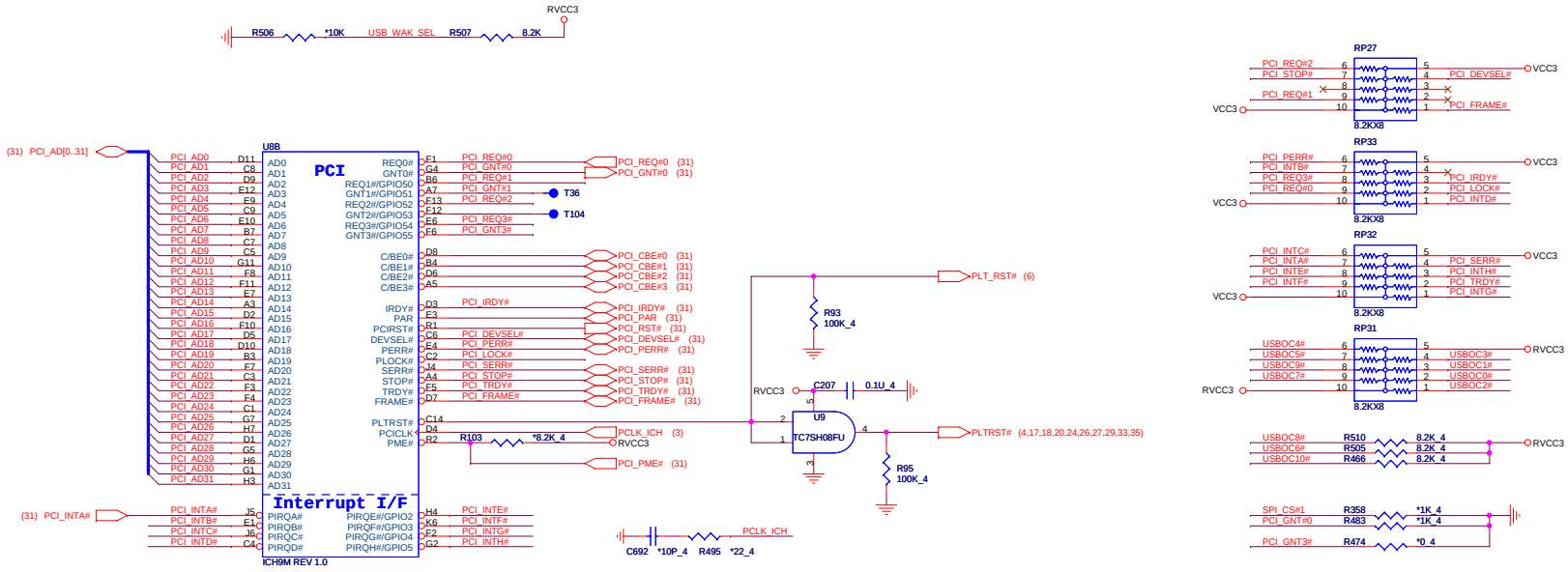
Title	ICH9-M HOST1 of 4	
Size	Document Number: AK4M MAIN BOARD	Rev 1A
Date: Tuesday, March 17, 2009	Sheet 12 of 43	



USB	Function
PORT#0	USB (Debug)
PORT#1	ROBSON CARD
PORT#2	USB
PORT#3	FELICA
PORT#4	N/A
PORT#5	USB
PORT#6	BT
PORT#7	EXPRESS CARD
PORT#8	USB
PORT#9	MCU
PORT#10	USB
PORT#11	CAMERA



Place close to the ICH side



GPIO49 : NC
GPIO20 : Can't pull high.

A16 SWAP Override strap

PCI_GNT#3	Low = A16 swap override enabled High = Default

ICH9 Boot BIOS select

PCI_GNT#0	SPI_CS#1	Boot BIOS Location
0	1	SPI
1	0	PCI
1	1	LPC (Default)

IRQ	Description
PIRQA	USB UHCI Controller #1,USB UHCI Controller #4
PIRQB	Audio, Modem ; SMbus
PIRQC	USB UHCI Controller #3,SATA/IDE Native Mode
PIRQD	USB UHCI Controller #2
PIRQE	INT LAN; option for SCI,TCO,HPET #0,1,2 ; TI8412
PIRQF	option for SCI,TCO,HPET #0,1,2 ; TI8412
PIRQG	option for SCI,TCO,HPET #0,1,2 ; TI8412
PIRQH	USB EHCI Controller ;option for SCI,TCO,HPET #0,1,2

QUANTA COMPUTER

Title: ICH9-M PCIE 2 of 4

Size	Document Number	Rev
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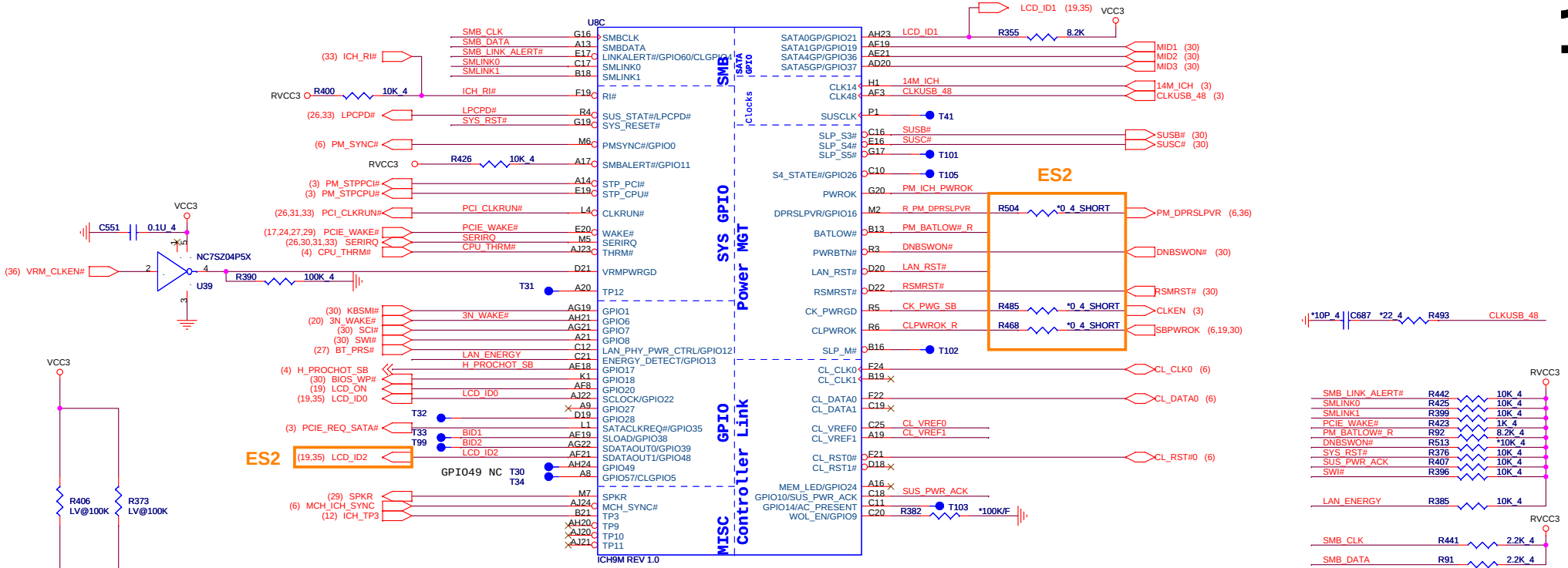
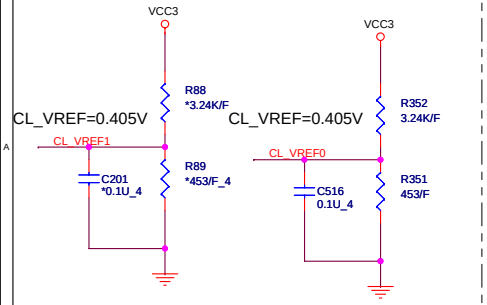
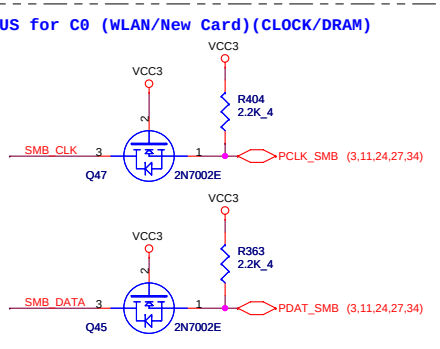


BID[2,1]	Project name
00	AK4M VP
01	TBD
10	TBD
11	AK4M LV





QUANTA COMPUTER

Title	ICH9-M GPIO 3 of 4	
Size	Document Number: AK4M MAIN BOARD	Rev: 1A
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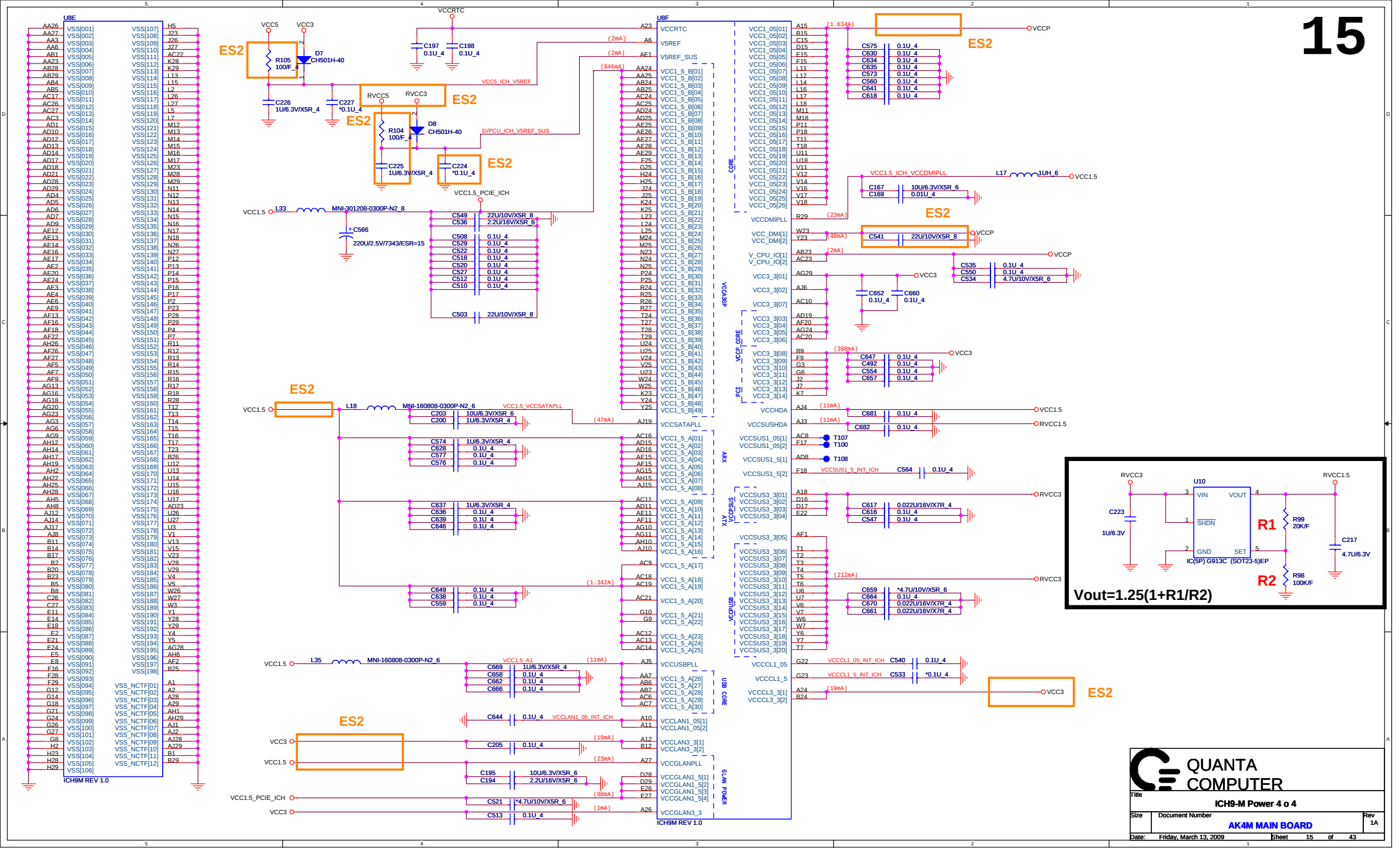

Title	ICH9-M Power 4 o 4
Size	Document Number: AK4M MAIN BOARD
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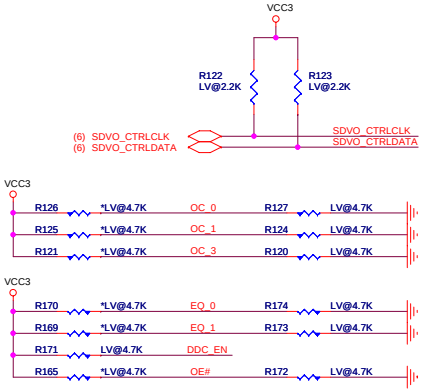
QUANTA COMPUTER

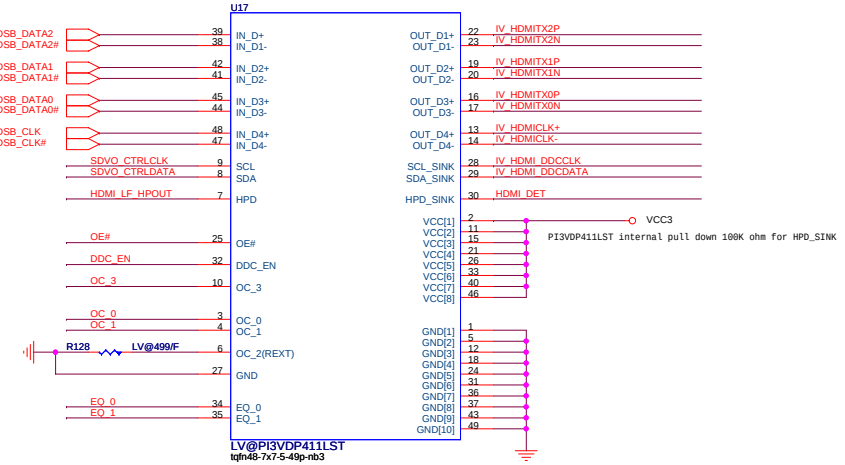
AK4M LV

HDMI CONNECTOR

16

HDMI LEVEL SHIFT





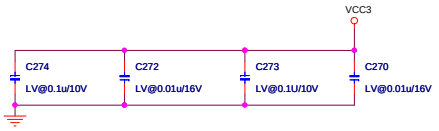
PI3VDP411LST internal pull down 100K ohm for HPD_SINK

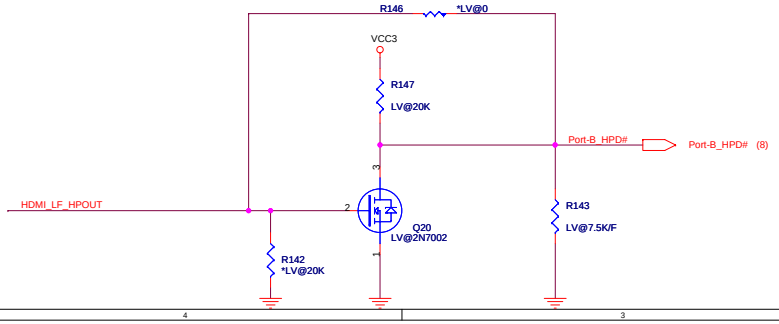
Vswing SETTING

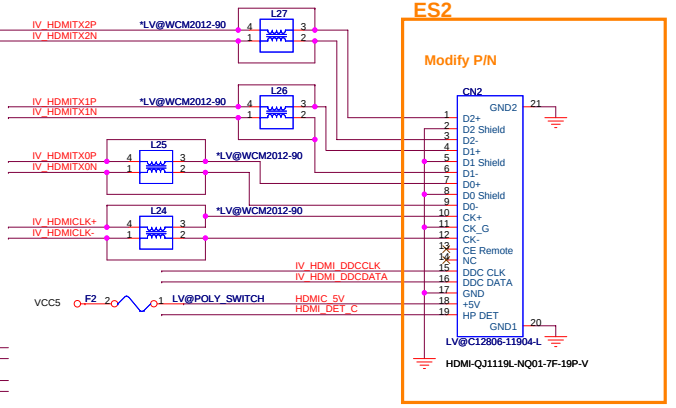
OC_3	OC_2	OC_1	OC_0	Vswing(V)
0	0	0	0	0.5
0	0	0	1	0.6
0	0	1	0	0.75
0	0	1	1	1
1	0	0	0	0.4
1	0	0	1	0.4
1	0	1	0	0.4
1	0	1	1	0.4

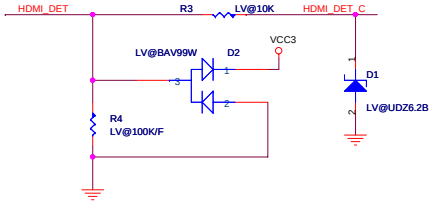
EQUALIZATION SETTING

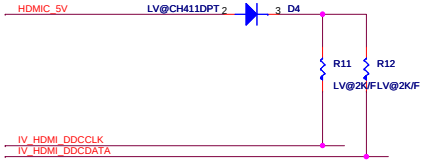
EQ_0	EQ_1	EQUALIZATION
0	0	3dB
0	1	7.2dB
1	0	10dB
1	1	12dB











QUANTA COMPUTER

Title	HDMI(PI3VDP411LST)	
Size	Document Number: AK4M MAIN BOARD	Rev: 1A
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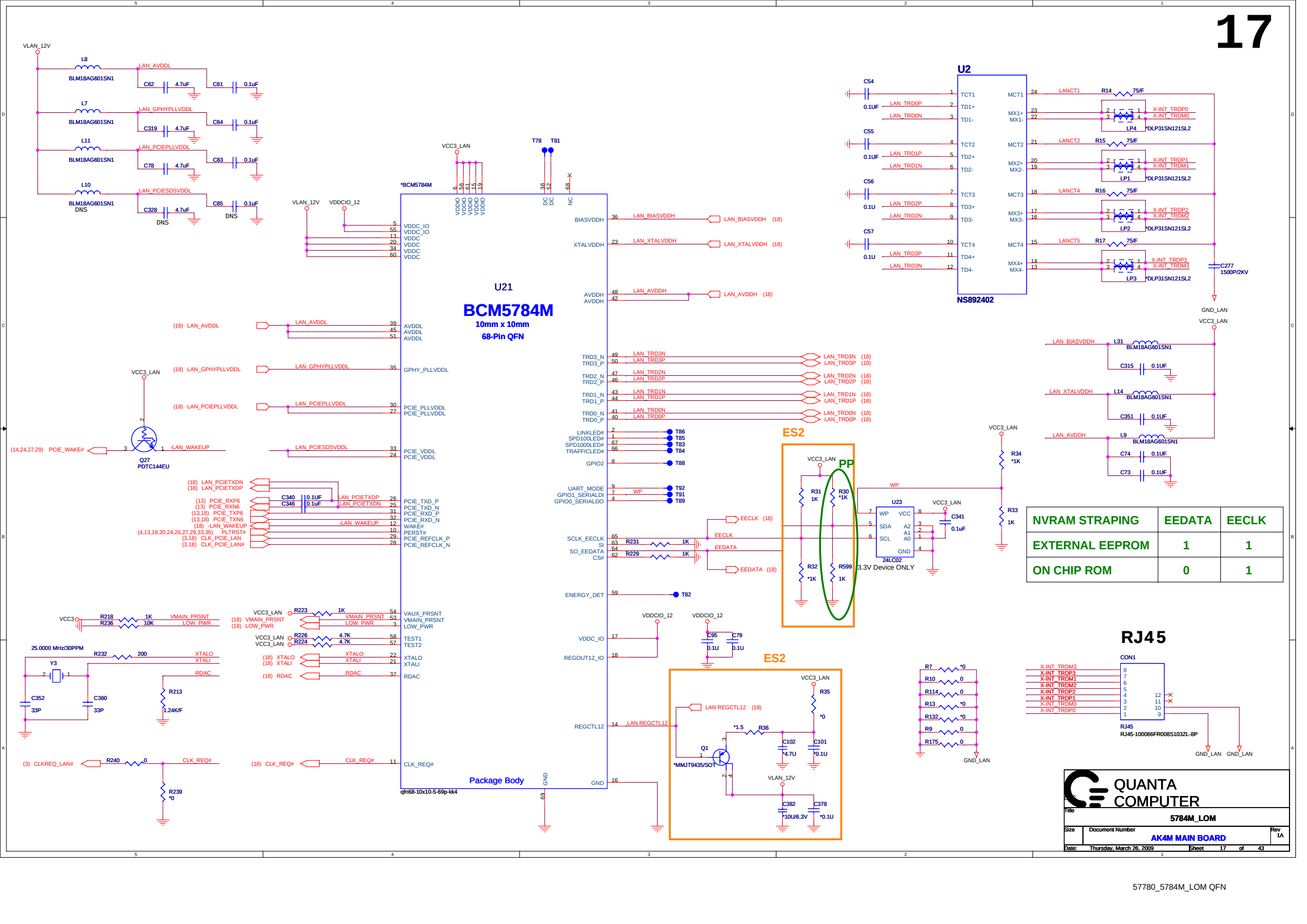
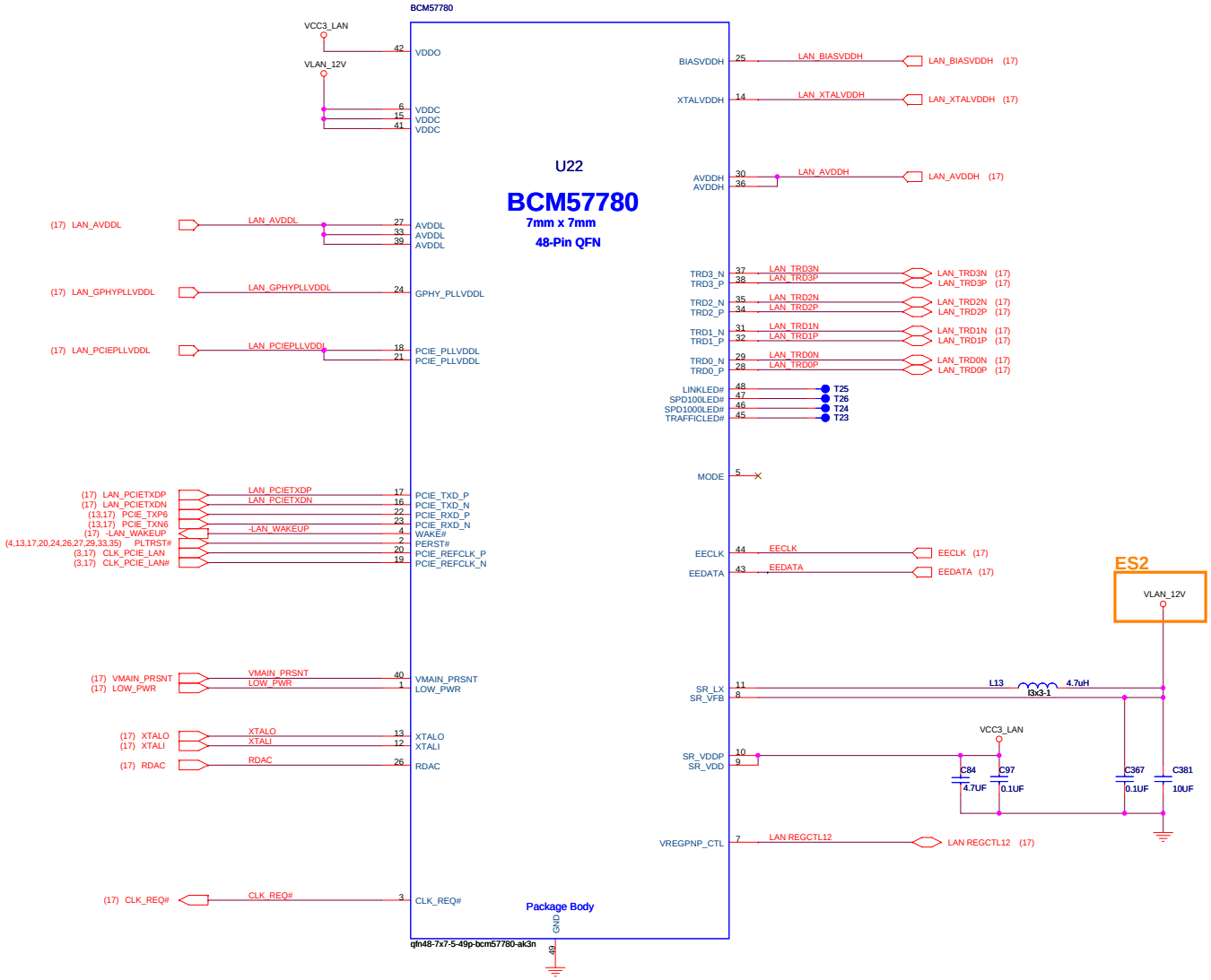

U21
BCM5784M
10mm x 10mm
68-Pin QFN
*BCM5784M
Package Body
qfn68-10x10-5-69p-kk4
U2
NS892402
ES2
PP
3.3V Device ONLY
RJ45
RJ45-100086FR008S103ZL-8P
NVRAM STRAPING | EEDATA | EECLK
EXTERNAL EEPROM | 1 | 1
ON CHIP ROM | 0 | 1
QUANTA COMPUTER
Title 5784M_LOM
Size Document Number AK4M MAIN BOARD Rev 1A
Date: Thursday, March 26, 2009 Sheet 17 of 43



Title	57780_LOM_7x7 QFN		
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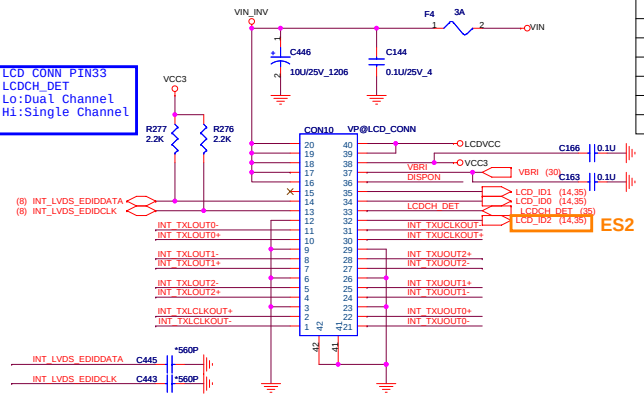
LVDS(w/o HQE)

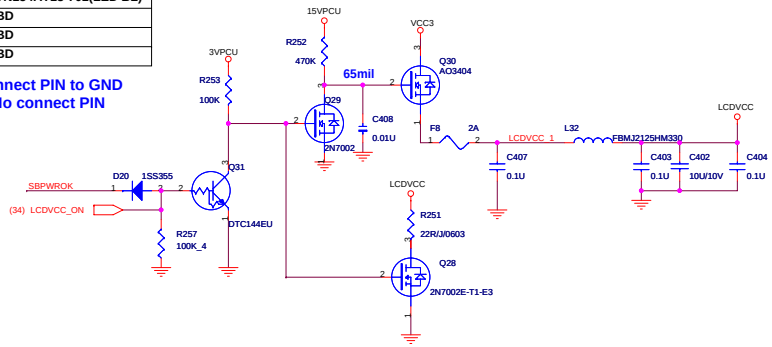
LCD_ID[2.1.0]	LCD name
000	LTN160HT03-N01(Dual Ch)
001	LTN160AT04-N01
010	LTN160AT01-N02
011	LTN160HT03-0 (Dual Ch)
100	LTN154AT13-701(LED BL)
101	TBD
110	TBD
111	TBD

LCD CONN PIN33
LCDCH_DET
Lo:Dual Channel
Hi:Single Channel

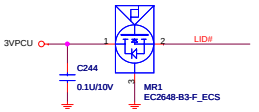
LCD CABLE: 0 Connect PIN to GND
1 No connect PIN



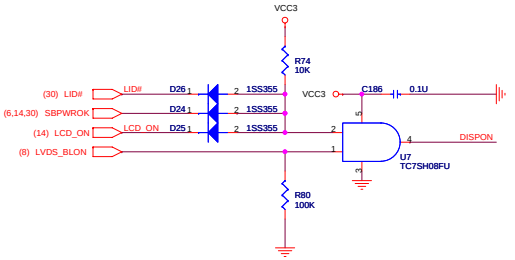
PANEL VCC CONTROL



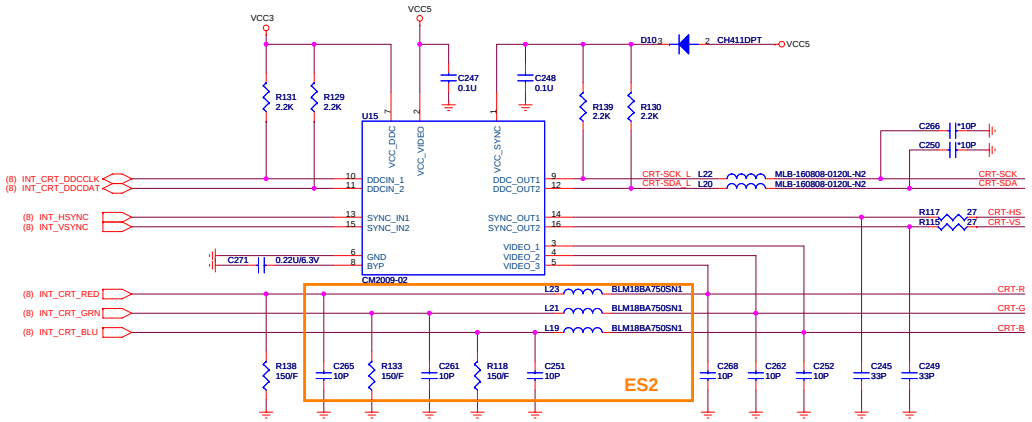
HALL SENSOR

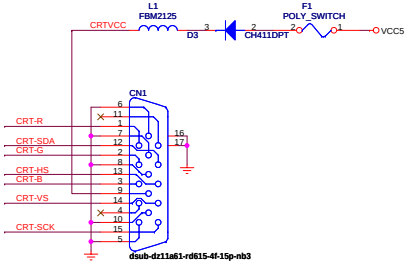


BACKLIGHT CONTROL

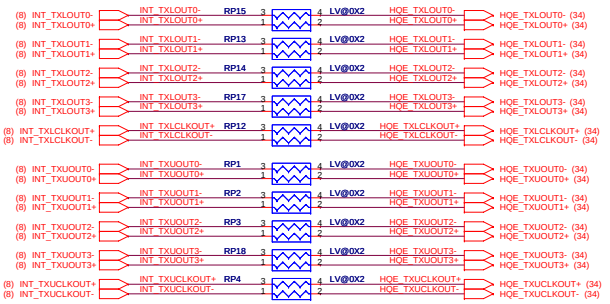


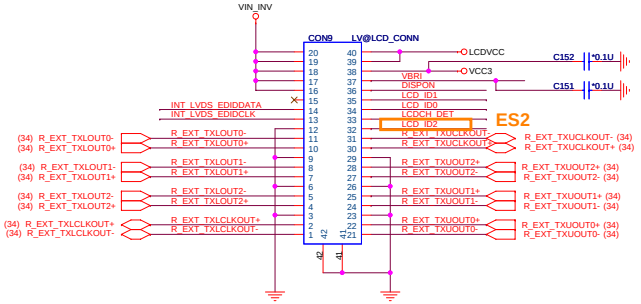
CRT CONNECTOR

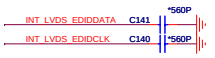




LVDS(w HQE)







QUANTA COMPUTER

Title	CRT & LCD	
Size	Document Number	Rev
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NOTE4:
IF OZ888GS0L3N REVC IS APPLIED, DON'T LOAD C6236, C6249, C6250, FB2, R6476, R5964 ,R6477.
IF OZ888GS0L3N REVD IS APPLIED, DON'T LOAD R6475, FB3.

NOTE2:
THESE PCI EXPRESS SIGNALS ARE HIGH SPEED DIFFERENTIAL PAIRS AND MUST BE KEPT EQUAL LENGTH WITH A DIFFERENTIAL IMPEDANCE (Z0) OF 100 OHMS. EACH LANE OF THE DIFFERENTIAL SIGNAL PAIR MUST BE AC-COUPLED.

NOTE3:
THIS 100MHZ REFERENCE CLOCK IS HIGH SPEED DIFFERENTIAL PAIR AND MUST BE KEPT EQUAL LENGTH WITH A DIFFERENTIAL IMPEDANCE (Z0) OF 100 OHMS. A DC CONNECTION FROM THE CLOCK DRIVER OUTPUT TO THE OZ888GS0 INPUT IS REQUIRED.

NOTE6:
PLEASE CONNECT WAKEUP# TO SPECIFIC GPIO PIN OF SYSTEM, PLEASE SEE APPLICATION NOTE AND BIOS GUIDE FOR DETAIL.

NOTE 1:
THESE 1394 SIGNALS ARE HIGH SPEED DIFFERENTIAL PAIRS AND MUST BE KEPT EQUAL LENGTH WITH A DIFFERENTIAL IMPEDANCE (Z0) OF 110 OHMS.

PLACE THESE PARTS NEAR OZ888GS0

NOTE 5:
TERMINAL 65 (DGND) IS THE EXPOSED PAD ON THE BOTTOM OF PACKAGE AND MUST BE SOLDERED TO GND OF PCB.

Stuffed for RevD
Stuffed for RevC
SEE NOTE 1
SEE NOTE 2
SEE NOTE 3
40MIL

U45 LV@OZ888GS0L3N vqfn64-8x8-4-65p

Title	4IN1 CARD/1394 888GS0L3N	
Size: Custom	Document Number: AK4M MAIN BOARD	Rev: 1A
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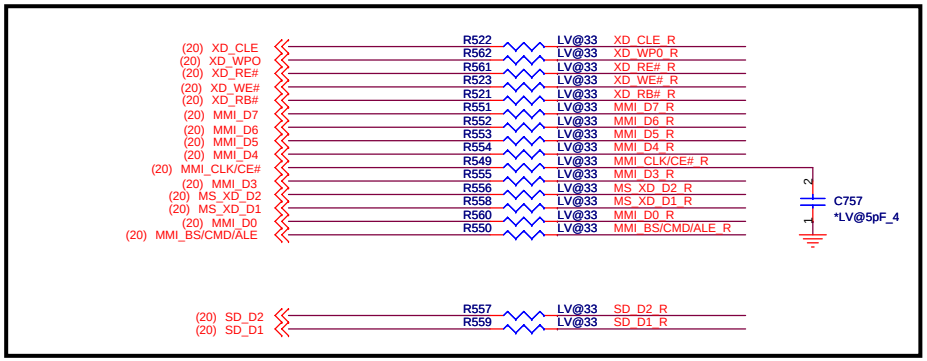
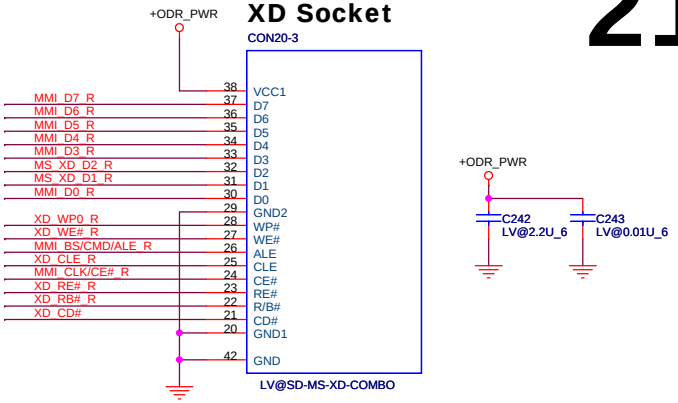
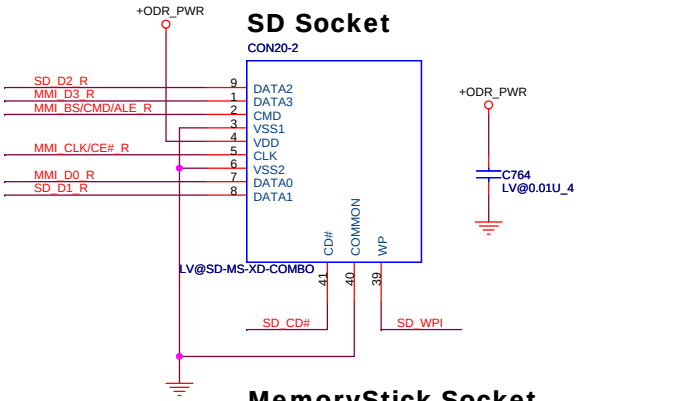
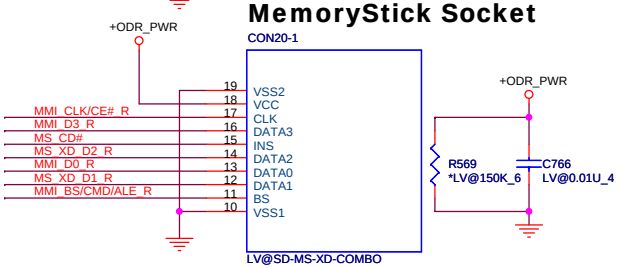
QUANTA COMPUTER

PLACE THESE PARTS NEAR OZ888GS0









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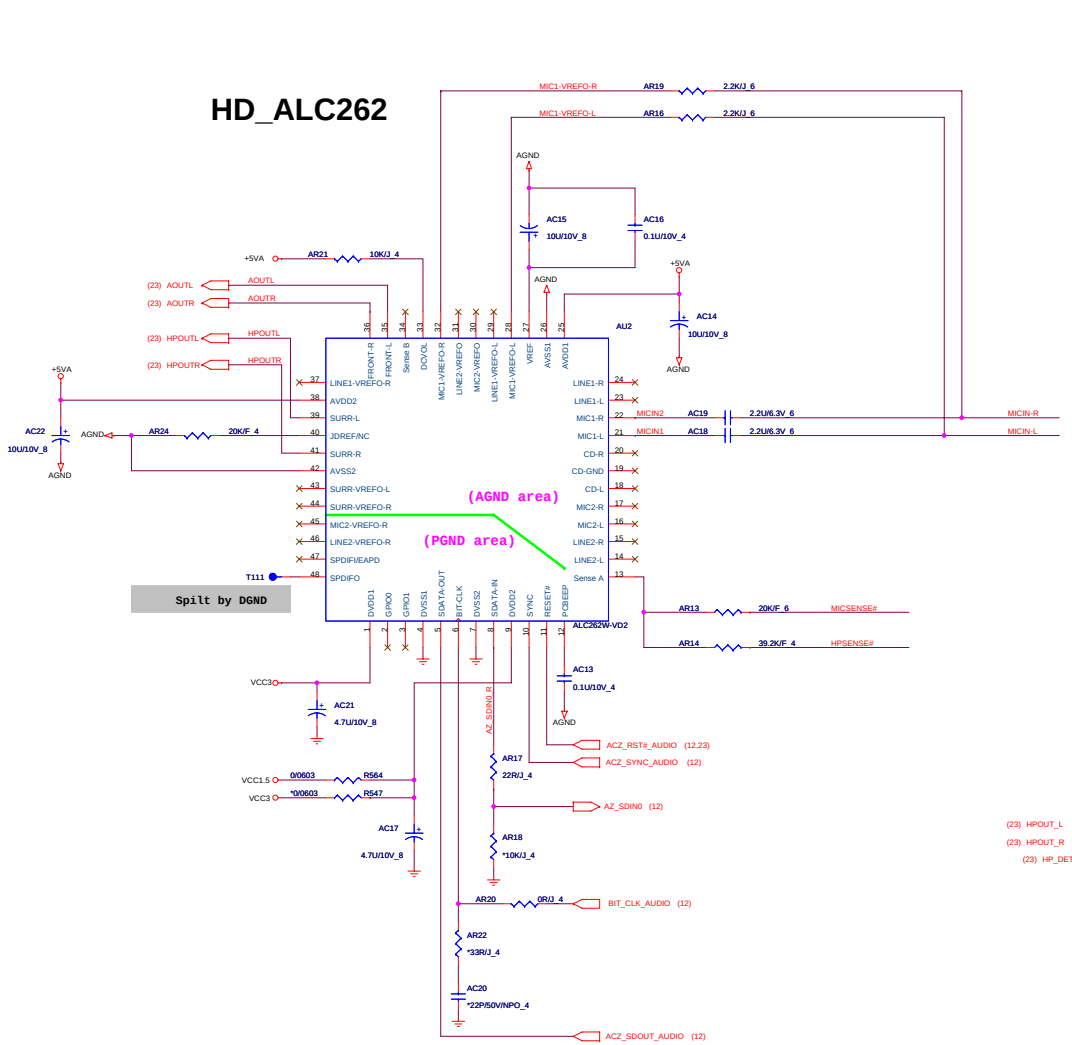
QUANTA COMPUTER

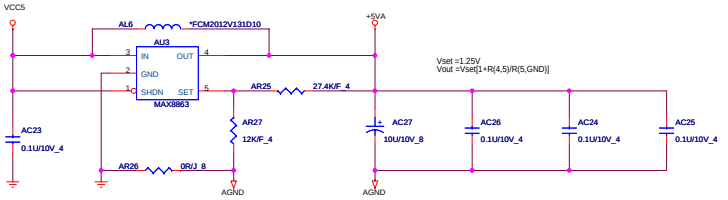
Title: SD_MS_XD SLOT

Size: Custom | Document Number: AK4M MAIN BOARD | Rev: 1A

Date: Thursday, March 26, 2009 | Sheet 21 of 43

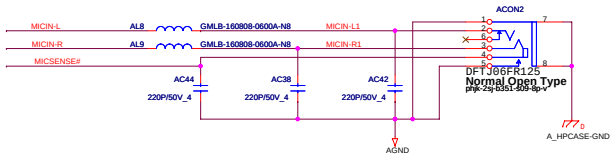
HD_ALC262





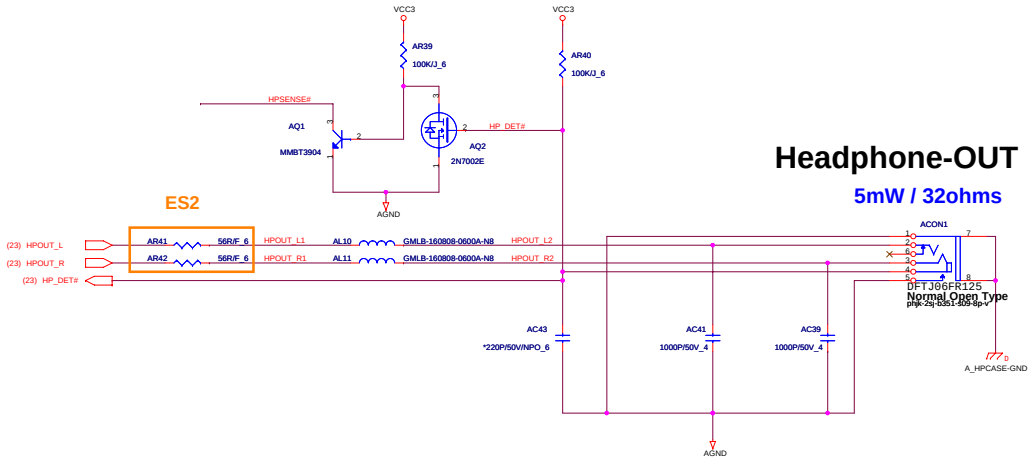
MIC-IN

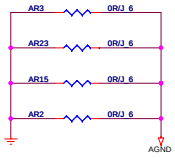
Max. 100mVrms input for Mic-IN

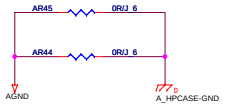


Headphone-OUT

5mW / 32ohms







Place at CODEC bottom between the GND and AGND

QUANTA COMPUTER		
Title: HD_ALC262		
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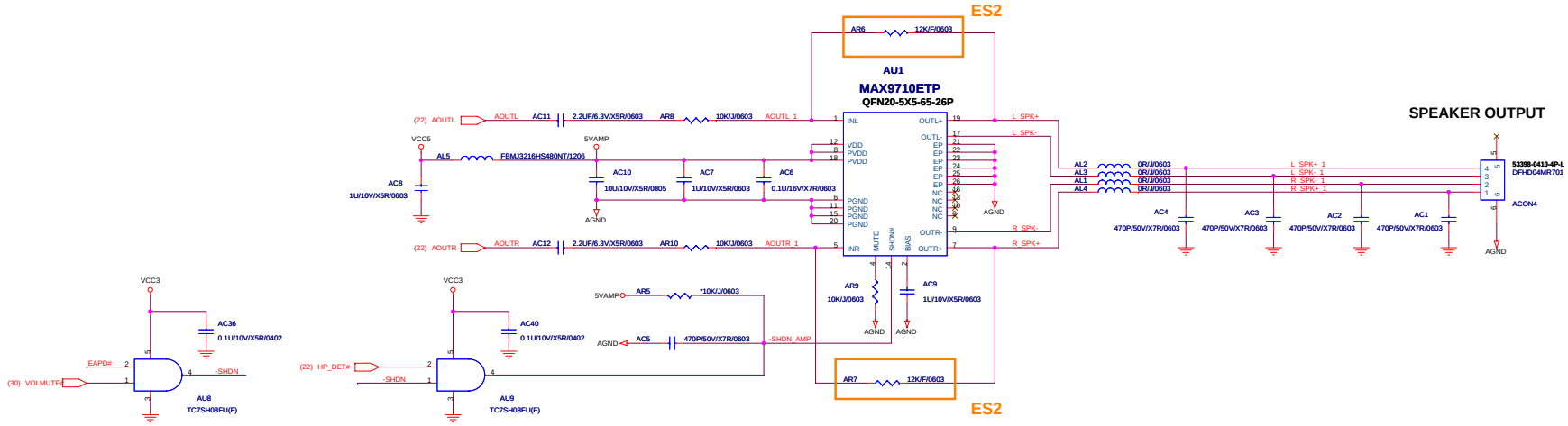
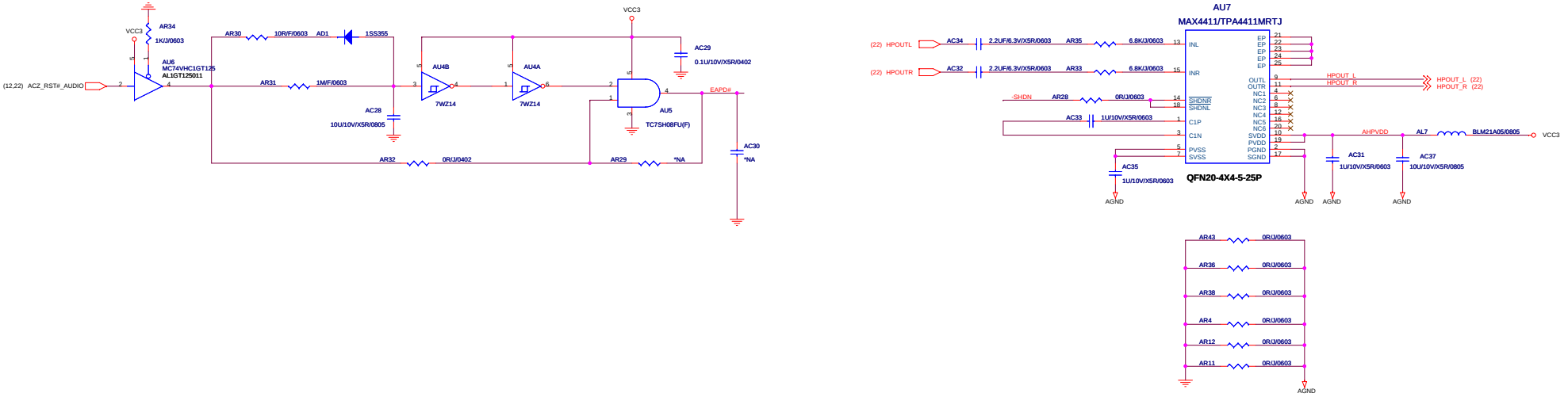
Audio AMP.

AUDIO AMPLIFIER



H.P AMPLIFIER



QUANTA COMPUTER

Title	AUDIO AMP.	
Size: Custom	Document Number: AK4M MAIN BOARD	Rev: 1A
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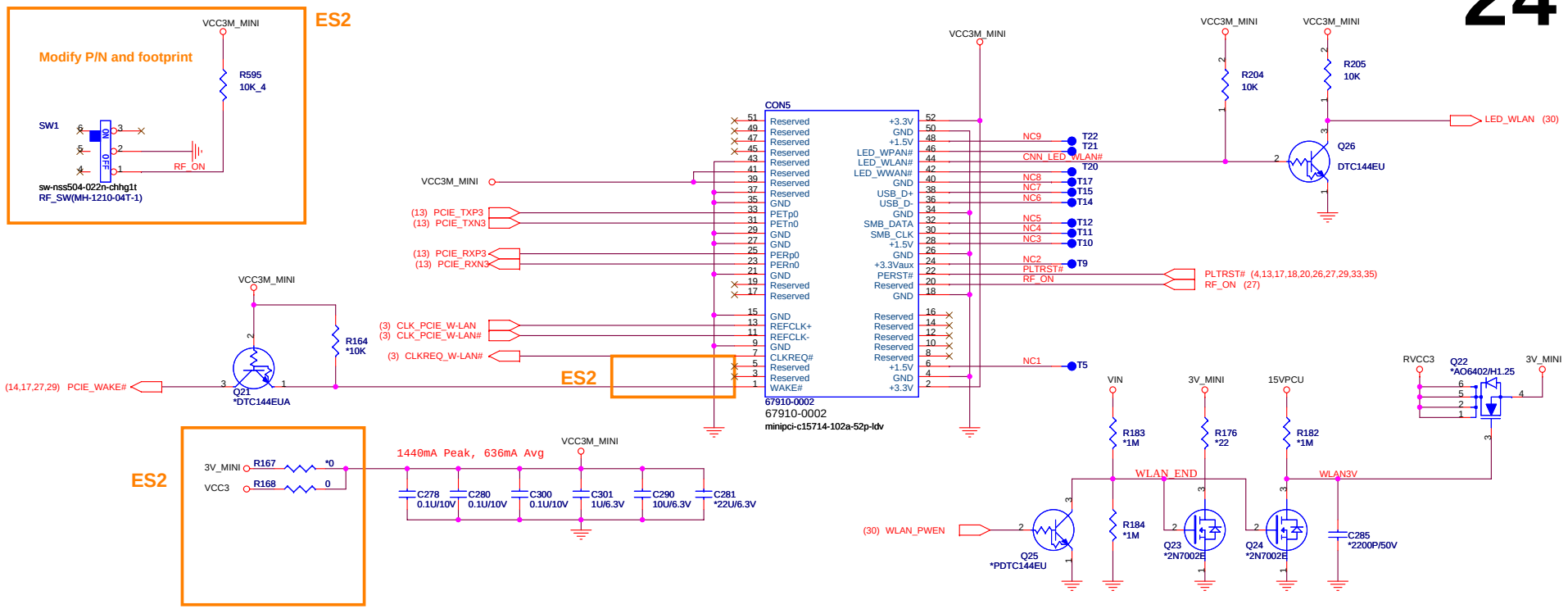
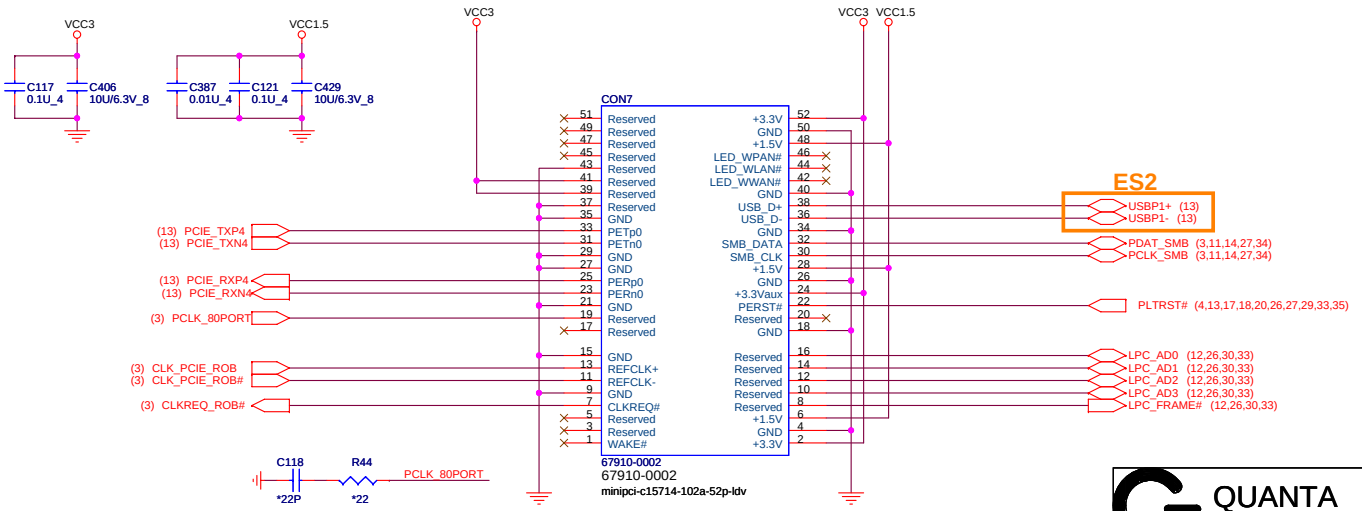
MINI PCIE CARD (WLAN)



MINI PCIE CARD (ROBSON)



QUANTA COMPUTER

Title	MINI PCI-E	
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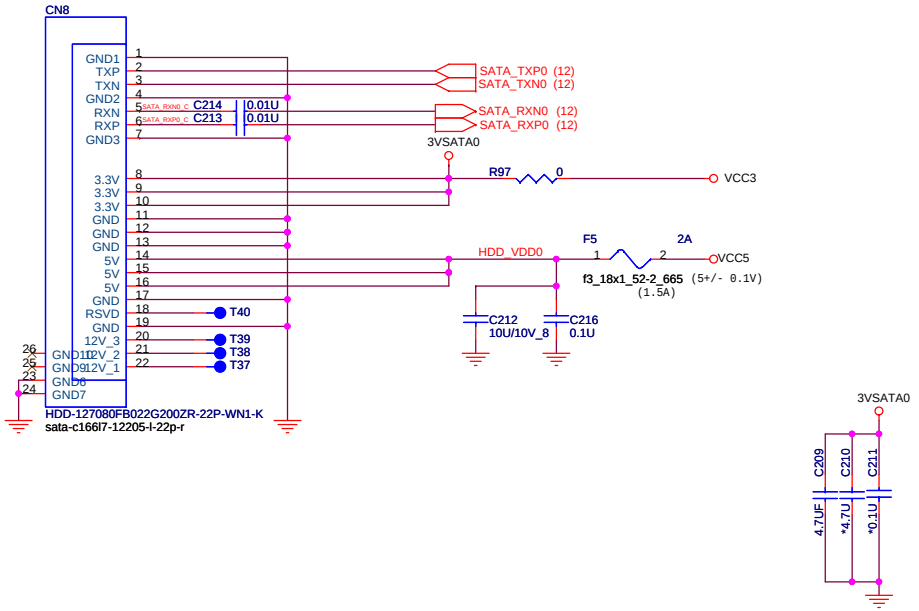
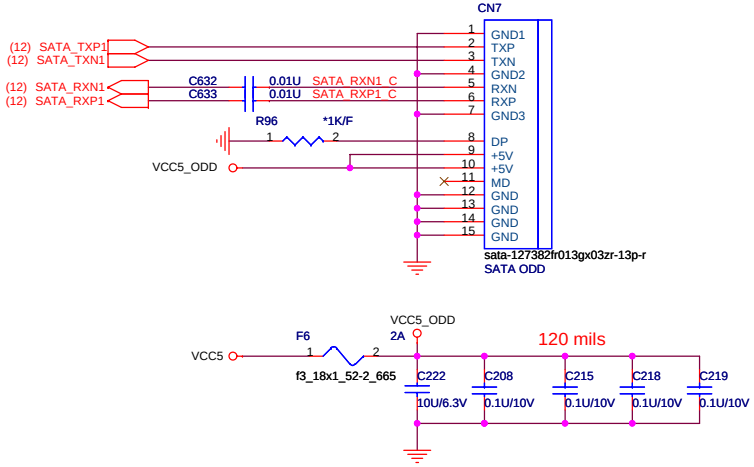
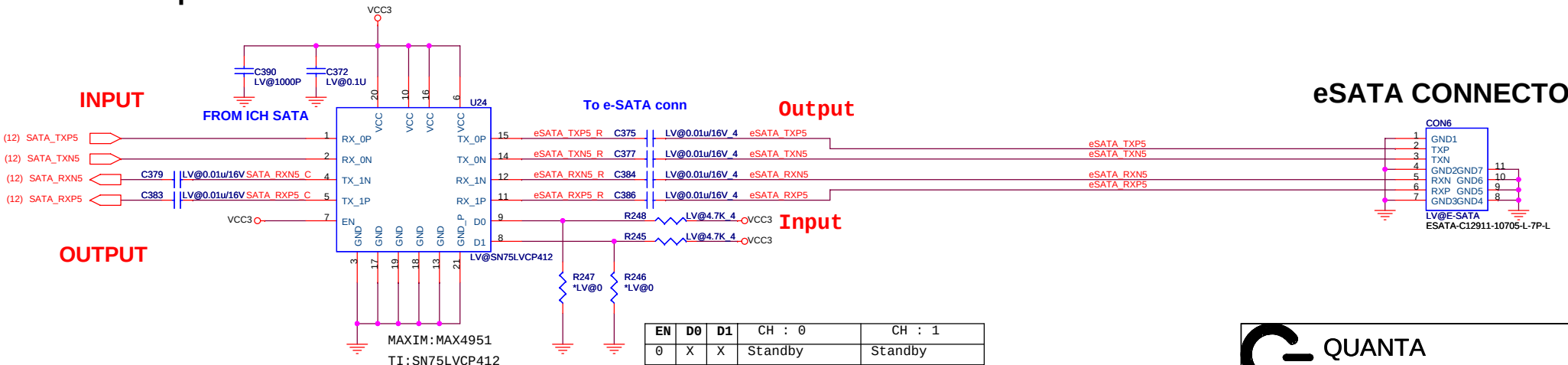
SATA HDD



SATA ODD



SATA Repeater



Model	eSATA
AK4M LV	V
AK4M VP	X

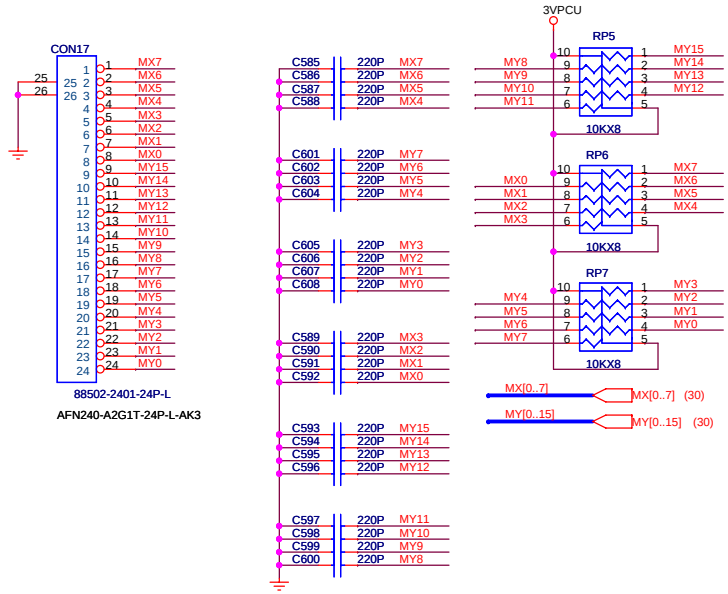
EN	D0	D1	CH : 0	CH : 1
0	X	X	Standby	Standby
1	0	0	Standard SATA	Standard SATA
1	1	0	Boost	Standard SATA
1	0	1	Standard SATA	Boost
1	1	1	Boost	Boost

eSATA CONNECTOR

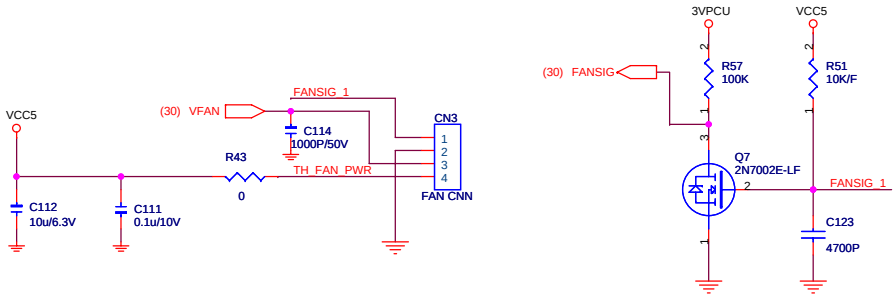
QUANTA COMPUTER

Title	SATA(HDD)/SATA(ODD)/eSATA	
Size	Document Number: AK4M MAIN BOARD	Rev 1A
Date: Friday, March 13, 2009	Sheet 25 of 43	

INT. KEYBOARD

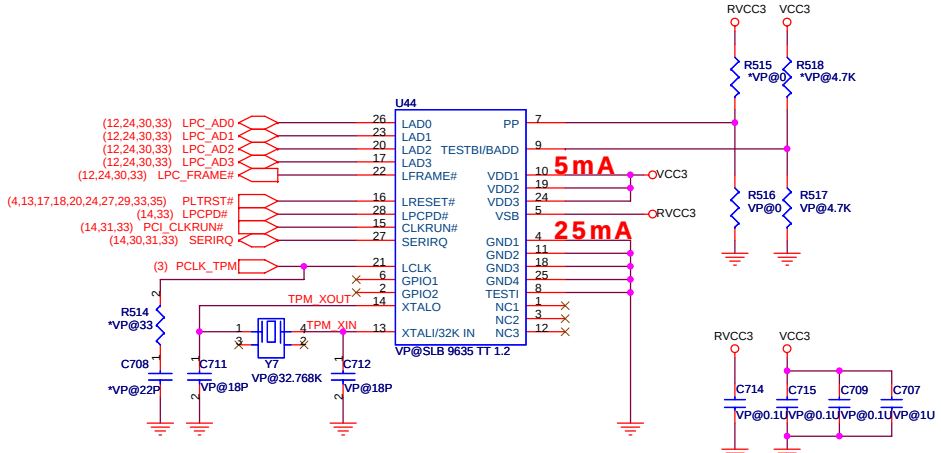


PWM FAN CONTROL



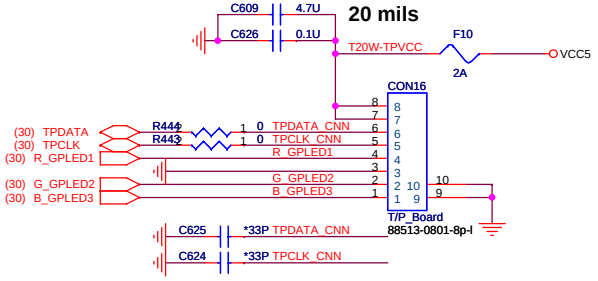
26

TPM 1.2



*	BADDR	I/O Address	
		Index	Data
	0	2E	2F
	1	4E	4F

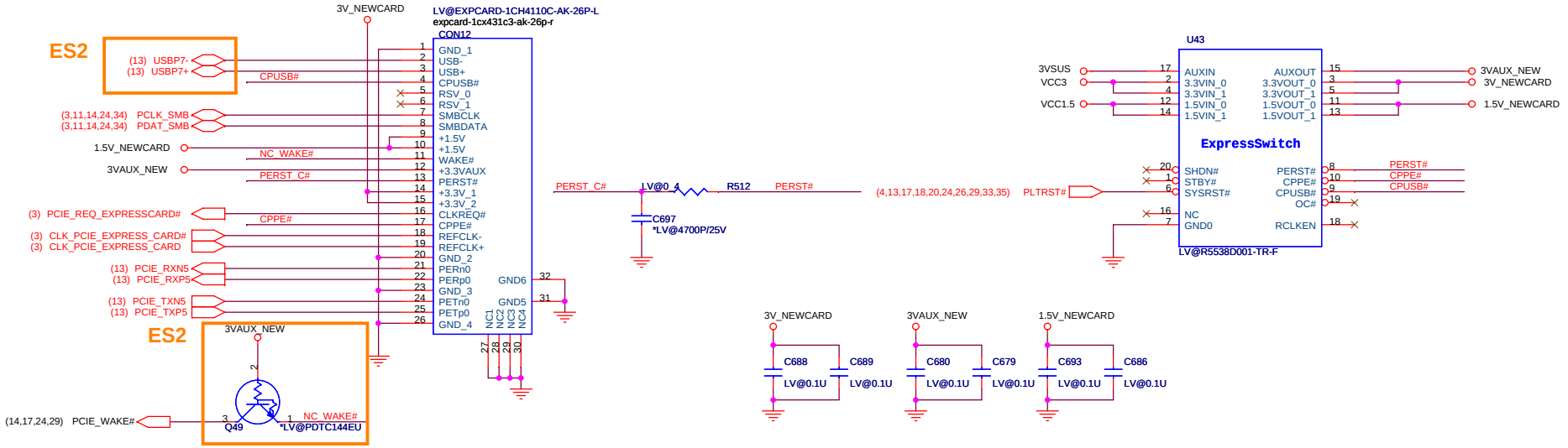
TOUCH PAD CONN



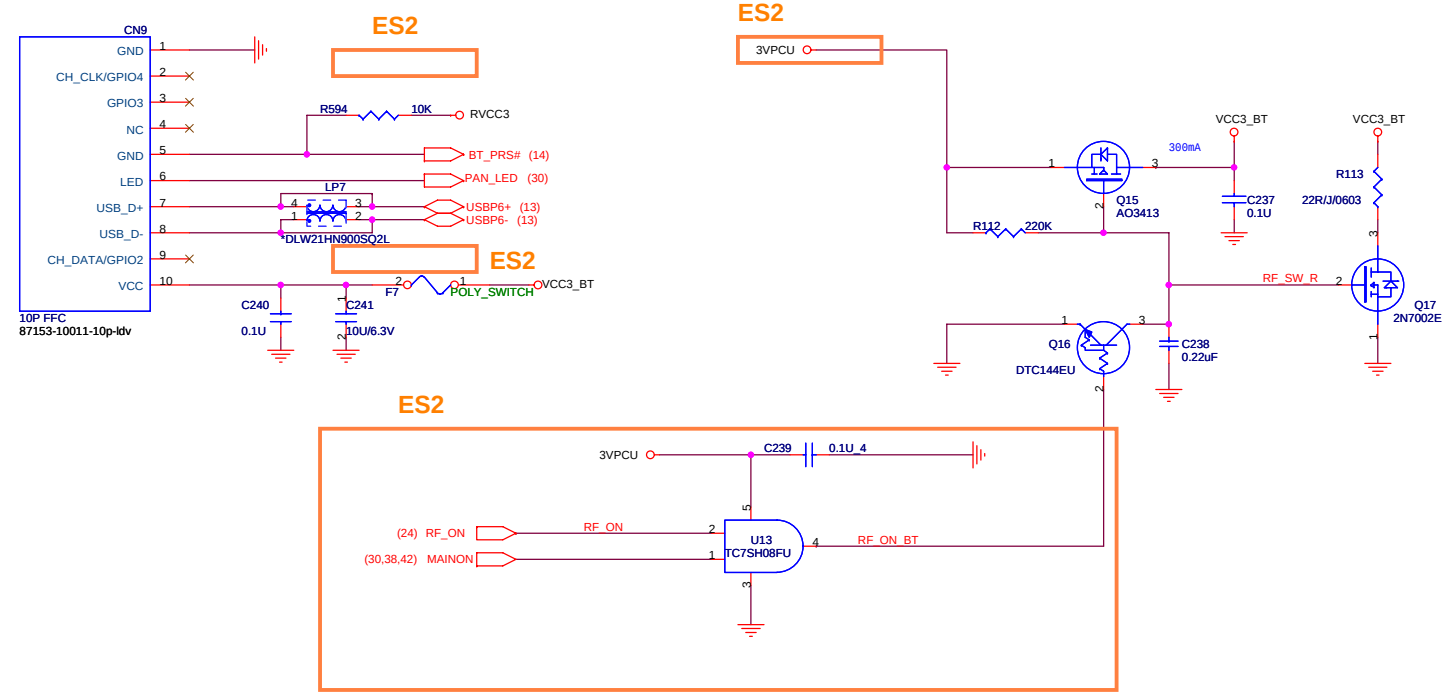
QUANTA COMPUTER

Title	INT.KB/TOUCH-PAD/FAN/TPM	
Size	Document Number: AK4M MAIN BOARD	Rev: 1A
Date: Friday, March 13, 2009	Sheet 26 of 43	

EXPRESS CARD



BLUETOOTH



QUANTA COMPUTER		
Title: NEW CARD/BLUETOOTH		
Size	Document Number: AK4M MAIN BOARD	Rev: 1A
Date: Thursday, March 26, 2009	Sheet 27 of 43	

H1 AK4M H-SPED126P2
H43 AK4M h-c354d126p2
H37 AK4M h-c354d126p2
H13 AK4M h-c354d126p2
H11 AK4M h-tc256d39pt
H7 AK4M h-tc256d39pt
H38 h-c256d126p2 h-c256d126p2
H49 ak4m-5 ak4m-5
H16 AK4M h-c354d126p2
H2 AK4M GND_LAN h-tsbc315d126p2
H3 AK4M h-c335d126p2
H27 AK4M h-c256d126p2
H19 AK4M h-tc256d39pt
H24 AK4M h-tc256d39pt
H52 ak4m-6 ak4m-6
H15 AK4M h-c354d126p2
H12 AK4M h-c354d126p2
H21 AK4M h-c256d146p2
H10 AK4M h-c256d146p2
H23 AK4M h-tc256d39pt
H18 AK4M h-tc256d39pt
H6 ak4m-2 ak4m-2
H51 ak4m-7 ak4m-7
H40 AK4M H-TSBC354D1
H20 AK4M h-c256d146p2
H9 AK4M h-c256d146p2
H28 AK4M h-c354d126p2
H22 AK4M h-c354d126p2
H14 AK4M h-c256d150p2
H42 ak4m-3 ak4m-3
H17 h-c1713d1713n O-C1713D1713N
H26 AK4M h-c256d150p2
H25 AK4M H-C315I166D126P2
H45 AGND_H h-c354d110p2
AR37 0R/J_6
0R/J_6
AGND AGND
H39 AK4M h-c354d126p2
H35 AK4M h-c256d150p2
H36 ak4m-4 ak4m-4
H41 h-c1575d1575n O-C1575D1575N
H8 AK4M h-c354d110p2
H44 AK4M h-c354d110p2
H47 ak4m-8 h-ts315bc315d126p29
H46 ak4m-9
H48 ak4m-10 ak4m-10
AGND
H50 ak4m-4 ak4m-4
H34 AK4M H-TC197BSD91P2
H30 AK4M H-C197BSD91P2
H33 AK4M H-TC91BSD91PB
H29 AK4M H-TC91BSD91PB
H4 AK4M H-C79D79N
H5 AK4M H-C79D79N
H31 AK4M H-C197D91P2
H32 AK4M H-C197D91P2
H53 AK4M Emi293x425np

VCC3: C464 *0.1U, C463 *0.1U, C434 *0.1U, C440 *0.1U, C517 *0.1U, C716 *0.1U
1.5VSUS: C127 *0.1U, C531 *0.1U, C705 *0.1U
CS_IN: C405 *0.1U, C655 *0.1U, C696 *0.1U, C738 *0.1U
VCC3: C710 *0.1U, C701 *0.1U, C6 *0.1U, C60 *0.1U, C542 *0.1U, C31 *0.1U
3VSUS: C100 *0.1U, C119 *0.1U, C229 *0.1U, C236 *0.1U, C124 *0.1U, C220 *0.1U, C98 *0.1U, C365 *0.1U
VCC5: C717 *0.1U, C699 *0.1U, C202 *0.1U, C233 *0.1U, C234 *0.1U, C698 *0.1U
5VSUS: C221 *0.1U, C145 *0.1U, C115 *0.1U, C99 *0.1U, C782 *0.1U, C769 *0.1U
VA: C449 *0.1U, C562 *0.1U, C667 *0.1U, C706 *0.1U, C713 *0.1U, C783 *0.1U
VCC5: C232 *0.1U, C539 *0.1U, C702 *0.1U, C143 *0.1U, C401 *0.1U
3V_HQE: C94 *0.1U, C136 *0.1U, C185 *0.1U, C506 *0.1U, C519 *0.1U
RVCC3: C228 *0.1U, C703 *0.1U, C364 *0.1U
3VPCU: C424 *0.1U, C491 *0.1U, C553 *0.1U, C235 *0.1U, C704 *0.1U, C461 *0.1U
VCC1.8: C758 *0.1U, C700 *0.1U
VCC1.5: C58 *0.1U, C452 *0.1U
5VPCU: C59 *0.1U, C137 *0.1U, C142 *0.1U, C230 *0.1U, C729 *0.1U, C765 *0.1U, C784 *0.1U

FELICA

VCC3 — F9 POLY_SWITCH — 3V_FELICA
C651 0.1U_4
C631 10U/6.3V_8

3V_FELICA : 20 mil

3V_FELICA — 500mA — LP9 *PLW2012S
(13) USBP3-
(13) USBP3+
CON18: VDD1, USB1-, USB1+, GND1, LED1, PRS1
ACES-87153-06
88511-060N-6P-L

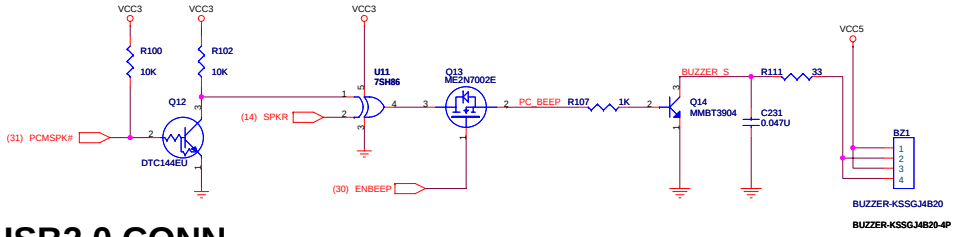
CAMERA

VCC3 — F3 LV@POLY_SWITCH — 3V_CAMERA
C138 LV@0.1U_4
C139 LV@10U/10V_8
LP6 *LV@PLW3216S
(13) USBP11-
(13) USBP11+
53398-0410-4P-L
LV@DFHD04MR779
JP1

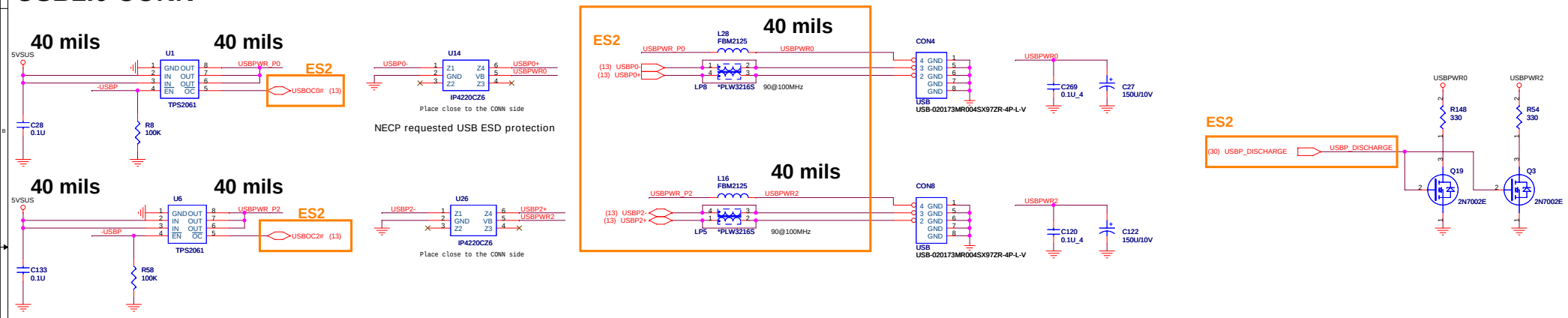
QUANTA COMPUTER

Title	FELICA/CAMERA/SCREW HOLE	
Size	Document Number: AK4M MAIN BOARD	Rev 1A
Date: Monday, March 16, 2009	Sheet 28 of 43	

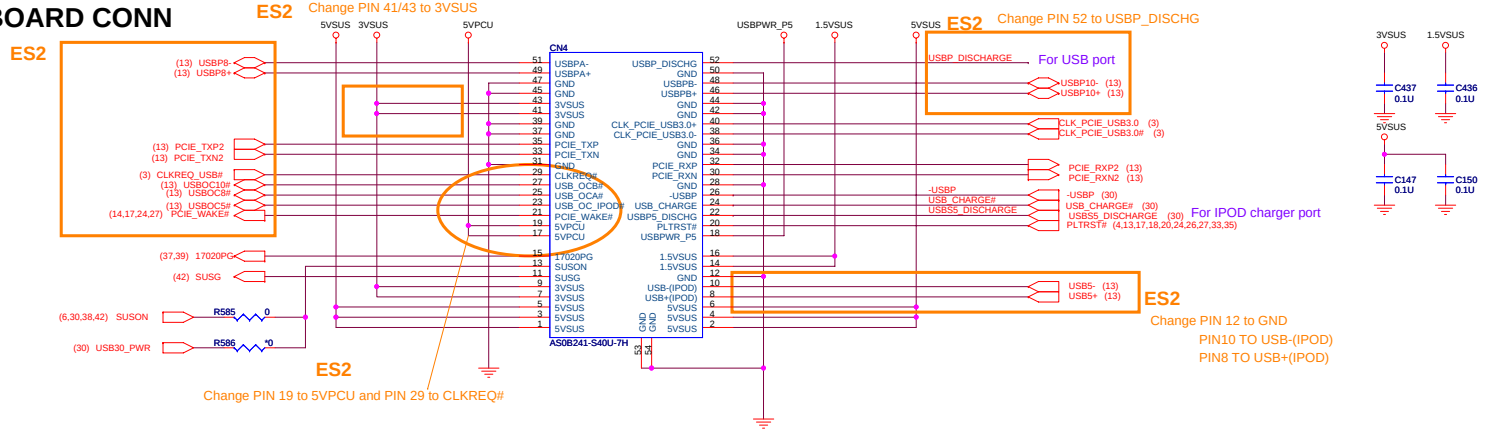
BUZZER



USB2.0 CONN

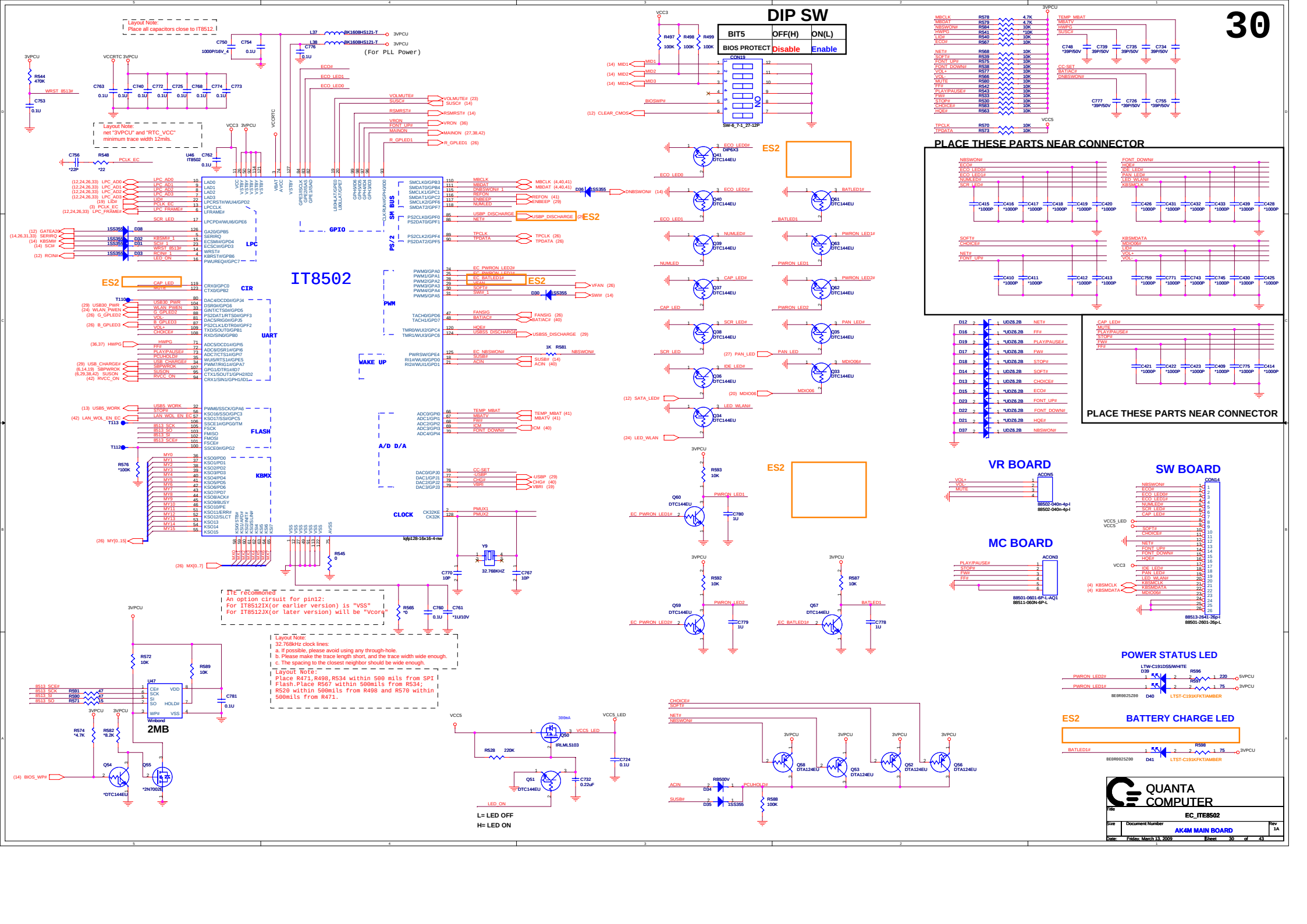


USB BOARD CONN

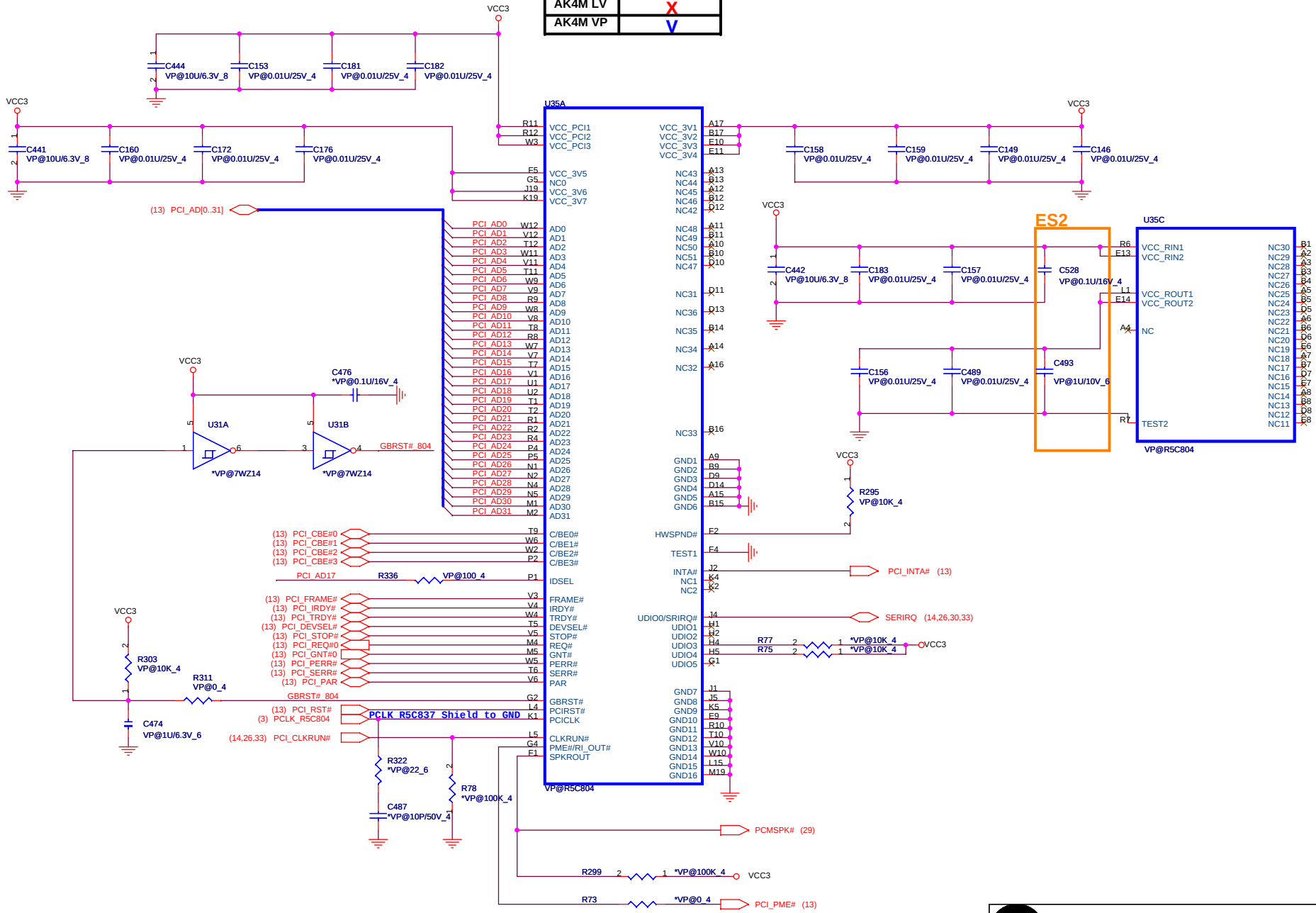


QUANTA COMPUTER

Title	USB/BUZZER	
Size	Document Number: AK4M MAIN BOARD	Rev: 1A
Date: Friday, March 13, 2009	Sheet 29 of 43	

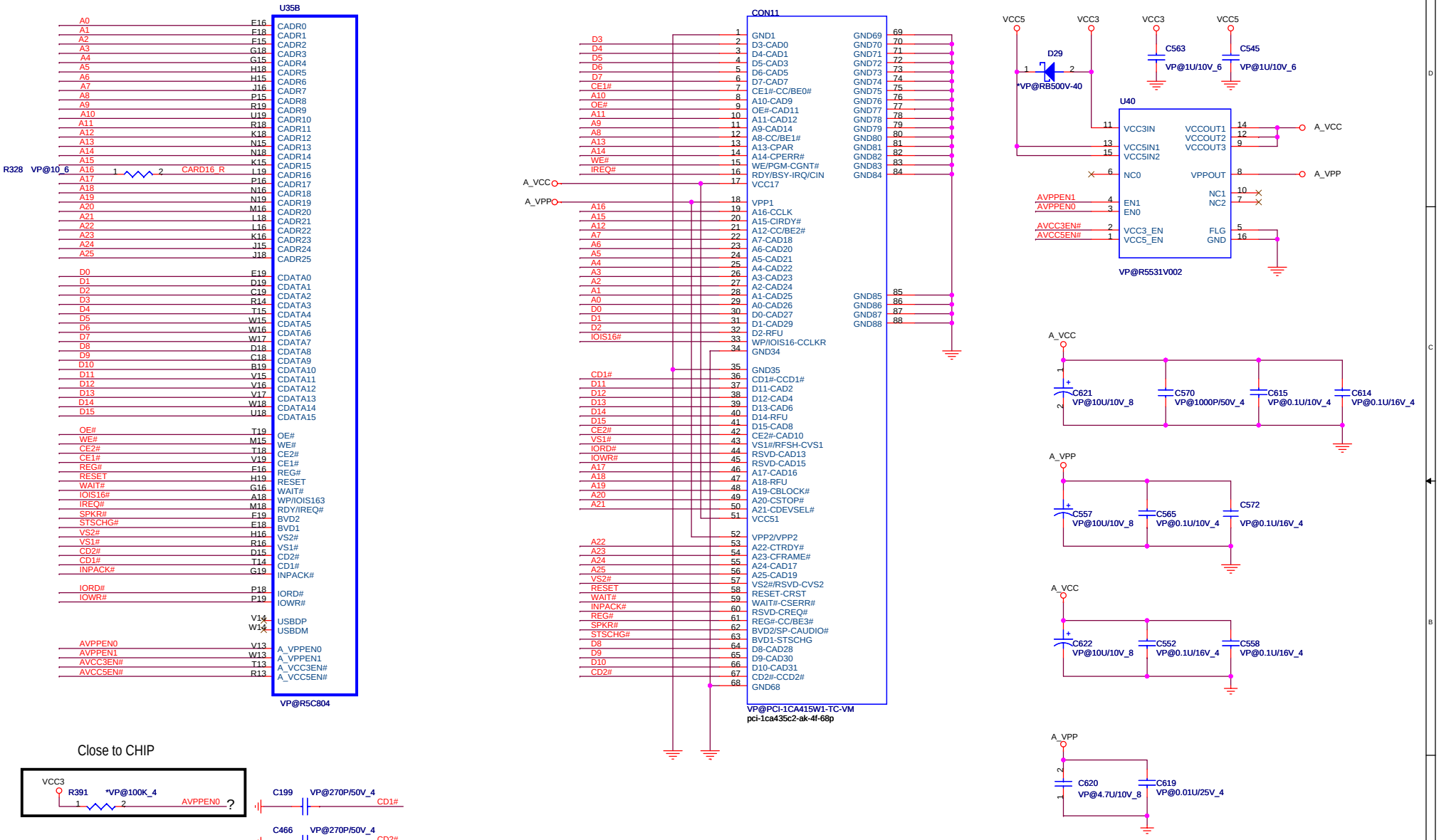

DIP SW
BIT5 OFF(H) ON(L)
BIOS PROTECT Disable Enable
CON19
SW-6_7-1_27-12P
PLACE THESE PARTS NEAR CONNECTOR
PLACE THESE PARTS NEAR CONNECTOR
IT8502
LPC
FWH
ES2
CIR
UART
FLASH
KBMX
PWM
WAKE UP
A/D D/A
CLOCK
GPIO
SM BUS
PS/2
VR BOARD
ACON5
MC BOARD
ACON3
SW BOARD
CON14
POWER STATUS LED
BATTERY CHARGE LED
LTW-C191DSS/WHITE
LTST-C191KFKT/AMBER
2MB
Winbond
L= LED OFF
H= LED ON
QUANTA COMPUTER
EC_ITE8502
AK4M MAIN BOARD
Friday, March 13, 2009
30

Model	PCMCIA
AK4M LV	X
AK4M VP	V



QUANTA COMPUTER

Title	R5C804_PCI	
Size	Document Number: AK4M MAIN BOARD	Rev: 1A
Date: Friday, March 13, 2009	Sheet 31 of 43	



QUANTA COMPUTER

Title	R5C804_CARDBUS	
Size	Document Number: AK4M MAIN BOARD	Rev: 1A
Date: Friday, March 13, 2009	Sheet 32 of 43	

Note for pin 2:
If needs to support power on from IT8305 CIR, please connect pin2 for "VSTBY".
If don't need to support power on from IT8305 CIR, please connect pin2 for "V33".

From External CLK for 14.318MHz(default) or 48MHz

ES2

Check fooprint and P/N

33

PARALLEL PORT

SERIAL PORT

I/O Address		
BADDR	Index	Data
R153	2E	2F
R154	4E	4F

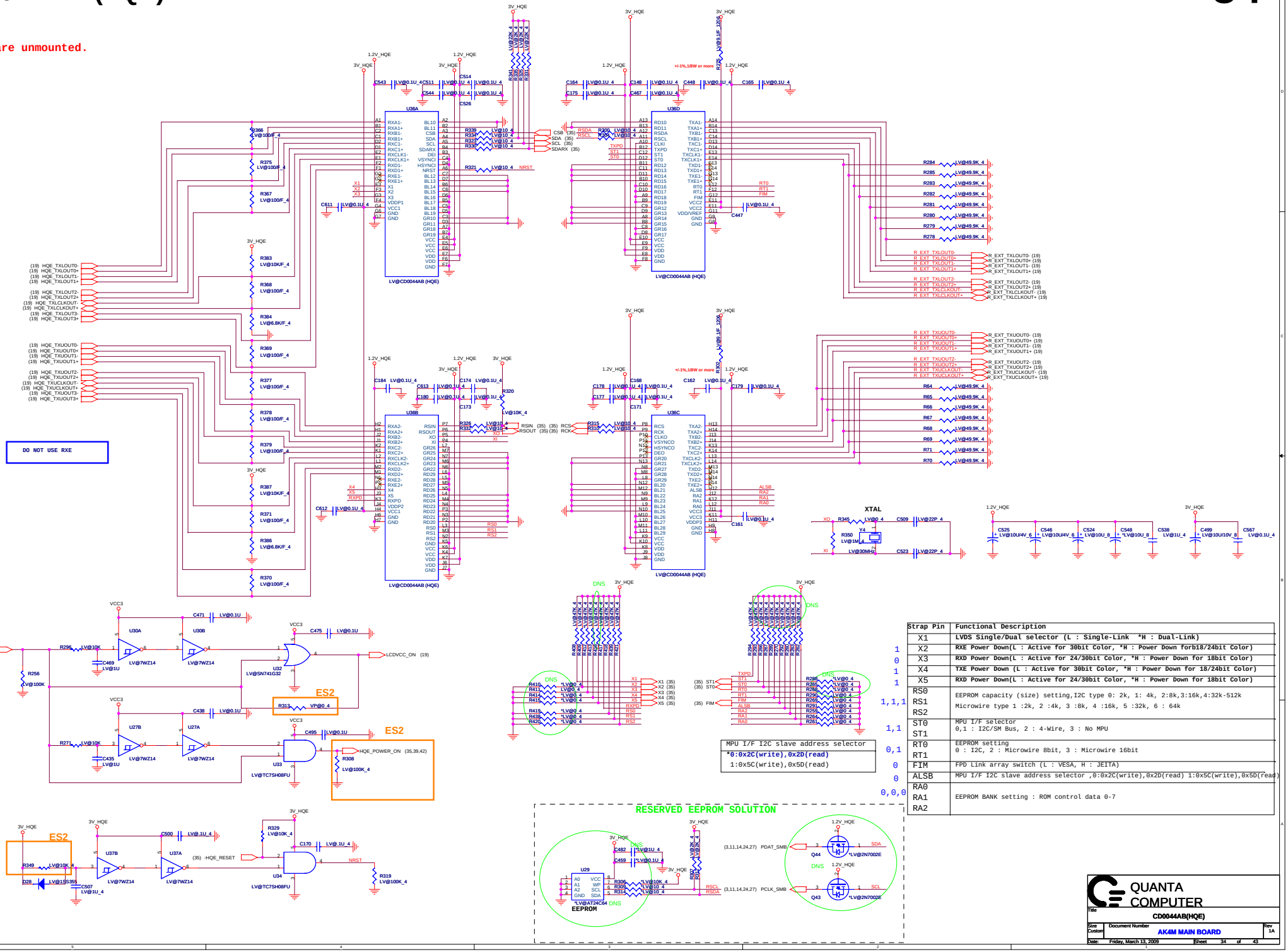
Model	SIO
AK4M LV	X
AK4M VP	V

Title	ITE8709 SUPER IO
Size: Custom	Document Number: AK4M MAIN BOARD
Rev	1A
Date: Thursday, March 26, 2009	Sheet 33 of 43

QUANTA COMPUTER

CD0044AB (HQE)

Mark * are unmounted.



Strap Pin	Functional Description	
X1	LVDS Single/Dual selector (L : Single-Link *H : Dual-Link)	
X2	RXE Power Down(L : Active for 30bit Color, *H : Power Down forb18/24bit Color)	1
X3	RXD Power Down(L : Active for 24/30bit Color, *H : Power Down for 18bit Color)	0
X4	TXE Power Down (L : Active for 30bit Color, *H : Power Down for 18/24bit Color)	1
X5	RXD Power Down(L : Active for 24/30bit Color, *H : Power Down for 18bit Color)	1
RS0 RS1 RS2	EEPROM capacity (size) setting,I2C type 0: 2k, 1: 4k, 2:8k,3:16k,4:32k-512k Microwire type 1 :2k, 2 :4k, 3 :8k, 4 :16k, 5 :32k, 6 : 64k	1,1,1
ST0 ST1	MPU I/F selector 0,1 : I2C/SM Bus, 2 : 4-Wire, 3 : No MPU	1,1
RT0 RT1	EEPROM setting 0 : I2C, 2 : Microwire 8bit, 3 : Microwire 16bit	0,1
FIM	FPD Link array switch (L : VESA, H : JEITA)	0
ALSB	MPU I/F I2C slave address selector ,0:0x2C(write),0x2D(read) 1:0x5C(write),0x5D(read)	0
RA0 RA1 RA2	EEPROM BANK setting : ROM control data 0-7	0,0,0

MPU I/F I2C slave address selector
*0:0x2C(write),0x2D(read)
1:0x5C(write),0x5D(read)

RESERVED EEPROM SOLUTION

QUANTA COMPUTER

Title	CD0044AB(HQE)	
Size: Custom	Document Number: AK4M MAIN BOARD	Rev: 1A
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*3: *** are unmounted.
*4 are Low active signals.
*8: C80 must use the low ESR capacitor.

Project_ID[2,1,0]	Project name
000	AK4
001	AK4D
010	AK4M
011	TBD
100	TBD
101	TBD
110	TBD
111	TBD

MCU_RESET

LCDCH_DET
Lo:Dual Channel
Hi:Single Channel

LCDCH_DET
L:Dual-Link
H:Single-Link

OUT_MODE
L:18bitRGB
H:24bitRGB

ICSP Programing HEADER

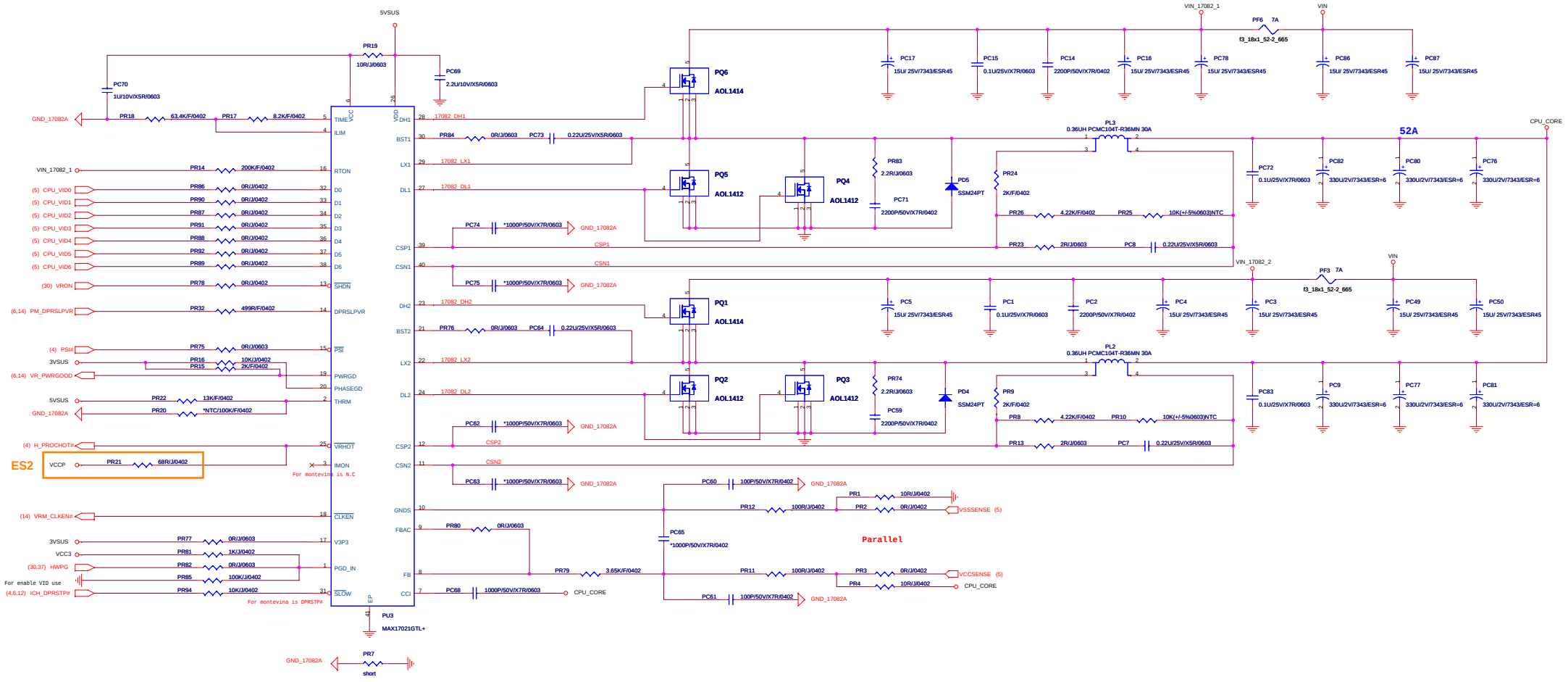
*LV@ICSP PIN HEADER
NEED TO CHANGE FOOTPRINT

LCD_ID[2.1.0]	LCD name
000	LTN160HT03-N01(Dual Ch)
001	LTN160AT04-N01
010	LTN160AT01-N02
011	LTN160HT03-0 (Dual Ch)
100	LTN154AT13-701(LED BL)
101	TBD
110	TBD
111	TBD

QUANTA COMPUTER

Title: MCU PIC24FJ256GB106
Size: Custom
Document Number: AK4M MAIN BOARD
Rev: 1A
Date: Tuesday, March 24, 2009
Sheet 35 of 43

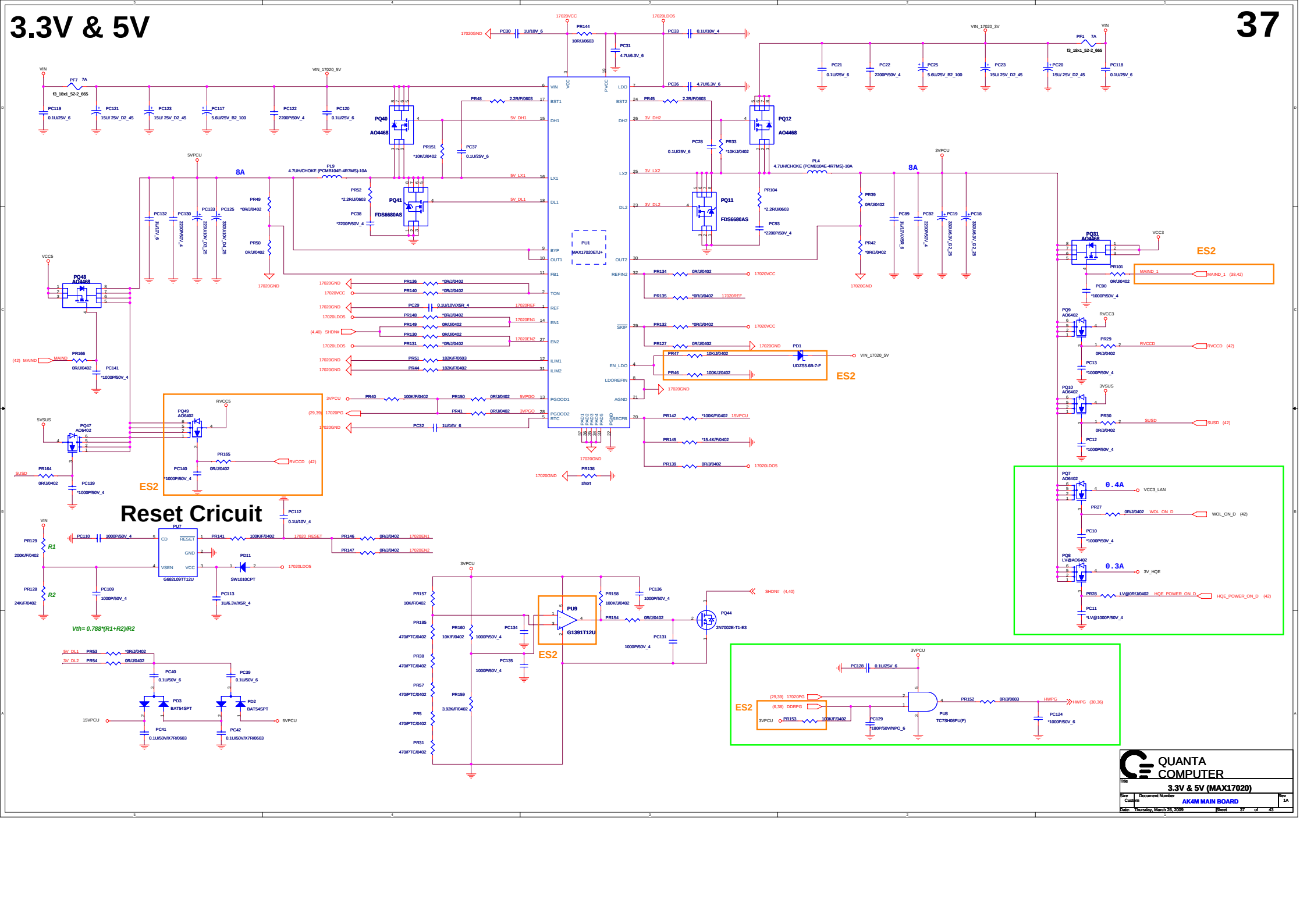
+CPU_CORE



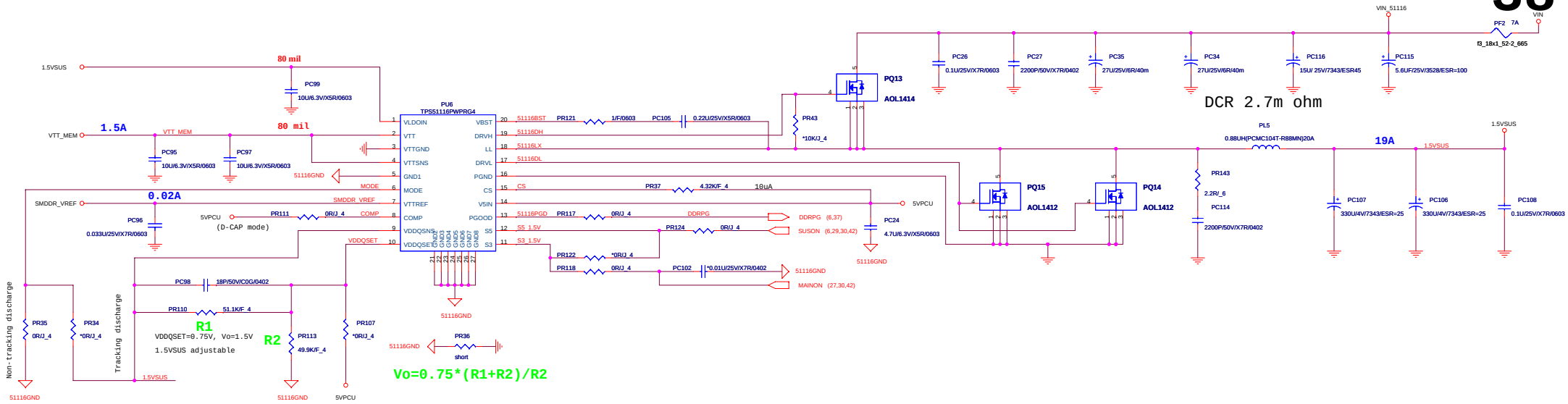
QUANTA COMPUTER

Title	+CPU_CORE	
Size: Custom	Document Number: AK4M MAIN BOARD	Rev: 1A
Date: Thursday, March 26, 2009	Sheet 36 of 43	

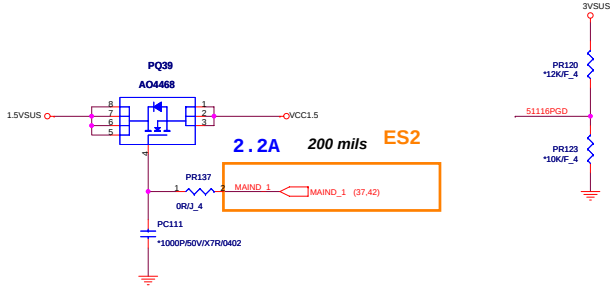
3.3V & 5V


Reset Cricuit
Vth= 0.788*(R1+R2)/R2
ES2
8A
MAIN
SUSD
RVCCD
HQE_POWER_ON_D
WOL_ON_D
VCC3_LAN
3V_HQE
HWPG
SHDN# (4,40)
0.4A
0.3A
QUANTA COMPUTER
3.3V & 5V (MAX17020)
AK4M MAIN BOARD
Thursday, March 26, 2009

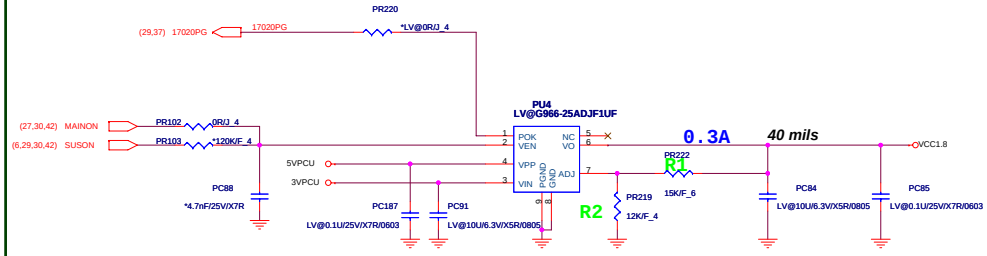
1.5VSUS & VTT_MEM & VCC1.8 & VCC1.5



PP



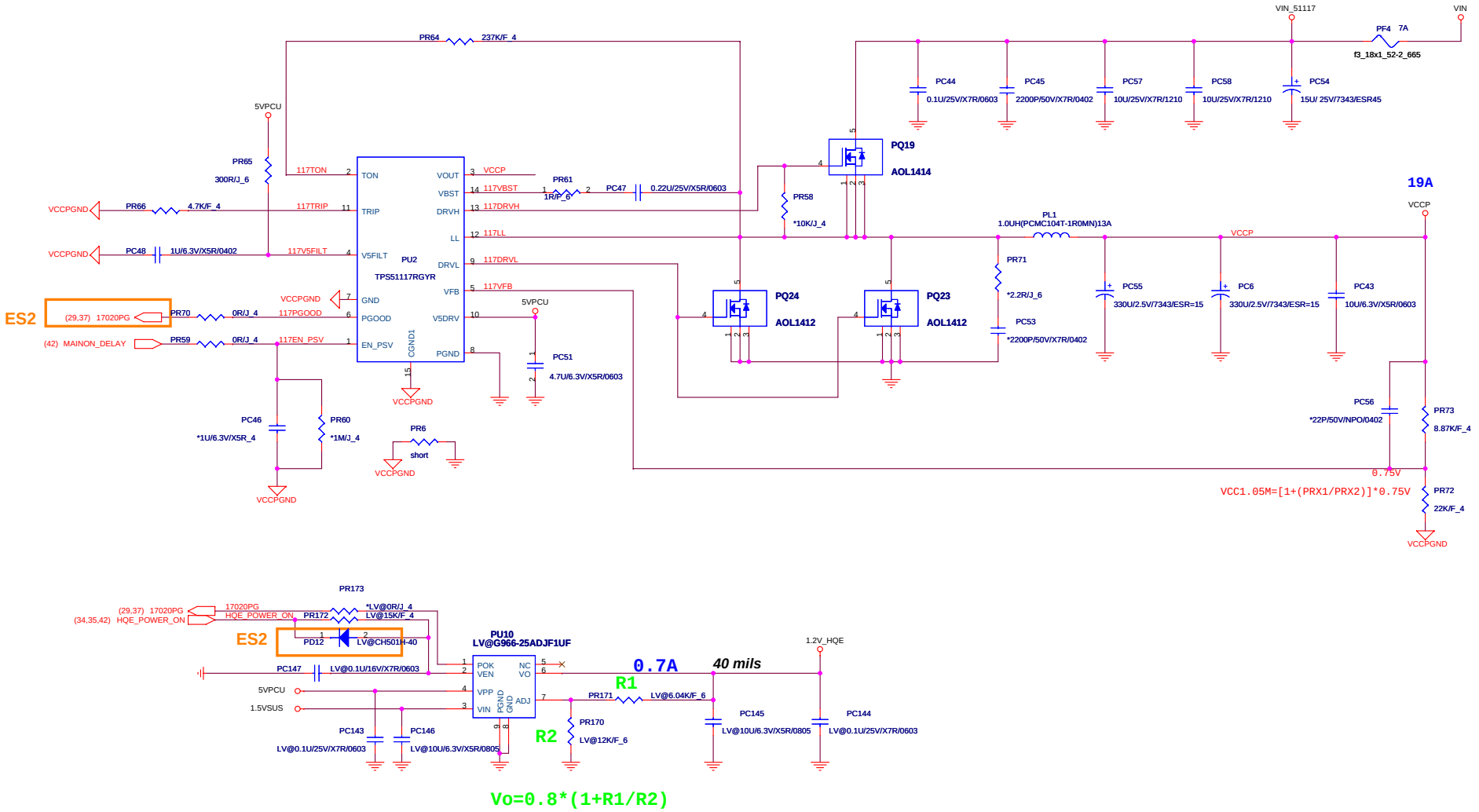
PP



QUANTA COMPUTER

Title	POWER 1.5VSUS/VTT_MEM	
Size	Document Number: AK4M MAIN BOARD	Rev: 1A
Date: Wednesday, March 25, 2009	Sheet 38 of 43	

VCCP & 1.2V_HQE



Vo=0.8*(1+R1/R2)

QUANTA COMPUTER

Title	POWER VCCP & 1.2V_HQE	
Size	Document Number: AK4M MAIN BOARD	Rev: 1A
Date: Wednesday, March 25, 2009	Sheet 39 of 43	

Battery Charger

ES2

PJ1
DFHS04FR063
20288-044L3

AC ADAPTOR IN CONN

PL7 FBMJ3216HS480NT/1206
PL8 FBMJ3216HS480NT/1206
PF5 FUSE 10A 0453010.MR
PC67 0.1U/25V/X7R/0603
PC66 1000P/50V/X7R/0603
PC79 0.1U/25V/X7R/0603
PR93 10K/F/0603

PD9 SSM34PT
PD7 SSM34PT
PD8 SSM34PT
PD6 P4SMAJ20A

PR178 RES 0.01R 2W +-2%/7520

PQ34 AO4427
PQ59 AO4427
PQ33 IMD2AT108
PQ61 2N7002E-T1-E3

PC94 0.1U/25V/X7R/0603
PR105 220K/F/0603
PR106 220K/F/0603
PC155 0.1U/25V/X7R/0603
PR188 33K/F/0603
PR189 10K/F/0603
PR108 0R/J/0603
PR190 0R/J/0603

PR198 10R/F/0603
PR200 10R/F/0603
PC164 *0.1U/25V/X7R/0603
PC171 *0.1U/25V/X7R/0603
PC169 0.1U/50V/X7R/0603

PD15 UDZS15B-7-F
PR196 4.7K/F/0603
PR197 4.7K/F/0603

PQ62 DTC144EUEUA-7-F
PR199 10K/J/0402

PC179 10U/25V/X6S/1206
PC177 10U/25V/X6S/1206
PC182 1000P/50V/X7R/0402
PC183 0.1U/50V/X7R/0603

PC170 1U/16V/X5R/0603
PR209 4.7R/J/0603
PC178 1U/16V/X5R/0603
PD17 RB500V
PC172 0.1U/50V/X7R/0603
PR201 2.7R/J/0603
PC173 0.1U/50V/X7R/0603

PQ64 FDS6900AS_NL
PL6 10UH(PCMB063T-100MS)4A/68m
PR191 RES 0.010R 1W +-1%/3720
PR206 *1R/F/0402
PC176 *2200P/50V/X7R/0402

PC161 10U/25V/X6S/1206
PC160 10U/25V/X6S/1206
PC162 10U/25V/X6S/1206
PC159 0.1U/50V/X7R/0603
PF9 5A

PU12 ISL88731HRZ-T

PC174 0.1U/50V/X7R/0603
PR202 *100K/F/0402
PR204 49.9R/F/0603
PR193 22K/F/0603
PR194 82.5K/F/0603
PC181 *1000P/50V/X7R/0402
PR211 10R/F/0603
PC175 0.1U/50V/X7R/0603
PR210 10R/F/0603
PC180 *1000P/50V/X7R/0402
PR208 0R/J/0402
PR205 100R/J/0402

PC167 *1U/16V/X5R/0603
PC166 0.01U/50V/X7R/0603
PC165 *0.01U/50V/X7R/0603
PR192 10K/F/0603
PC163 0.01U/50V/X7R/0603
PR195 0R/J/0402
PC168 3300P/50V/X7R/0402

ES2

CLOSE BATTERY CONNECTER

Battery OVP

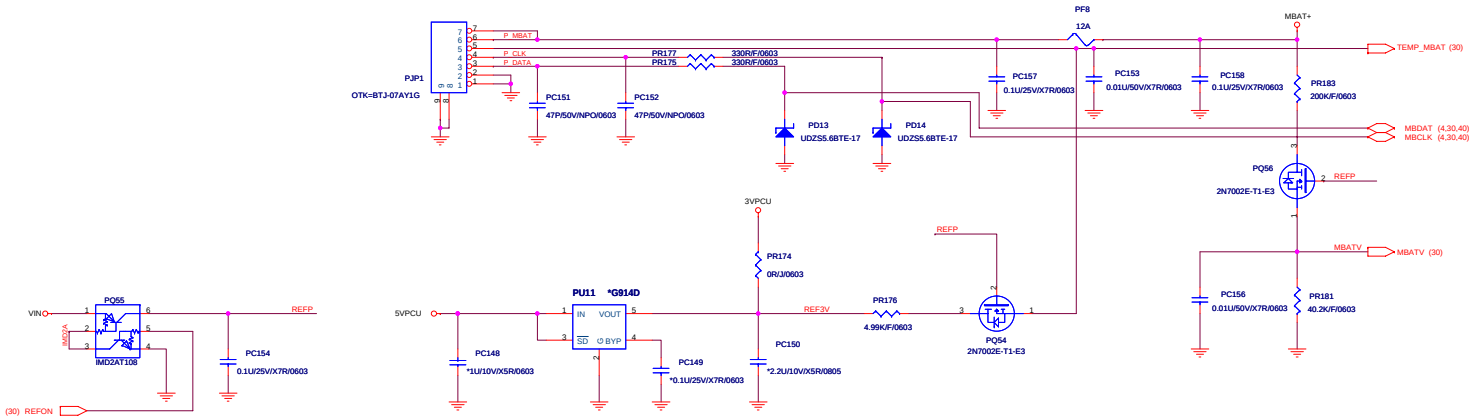
*G682L09TT12U
PR213 *100K/F_4
PC186 *1000P/50V/X7R_4
PR214 *6.04K/F_4
PC185 *1000P/50V/X7R_4
PR217 *0_4
PR218 *100K/F_4
PC184 *0.1U/10V/X5R_4
PQ65 *2N7002K
PR215 *200K/F_4
PR216 *100K/F_4
PD19 *UDZS5.1B
PU13

PD10 UDZS10B
PR115 10K/F/0402
PR109 470/PTC/0402
PC100 1000P/50V/X7R/0402
PR212 470/PTC/0402
PR112 2.7K/F/0402
PC101 1000P/50V/X7R/0402
PC104 1000P/50V/X7R/0402
PR119 100K/F/0402
PR116 0R/J/0402
PR114 10K/F/0402
PC103 1000P/50V/X7R/0402
PU5 G1391T12U
PQ35 2N7002E-T1-E3
PQ36 2N7002E-T1-E3
PQ32 2N7002E-T1-E3

QUANTA COMPUTER

Title: CHARGER (ISL6251AHAZ-T)
Size: Custom | Document Number: AK4M MAIN BOARD | Rev: 1A
Date: Thursday, March 26, 2009 | Sheet 40 of 43

Battery Connector



TEMP_MBAT voltage :		
	System Off	System On
Battery	0V	1.6V
Adapter	3.3V	3.3V
Battery+Adapter	1.6V	1.6V

MBATV voltage :	
Li-ion 4S*P	16.8V*40.2/(200+40.2)= 2.812V 12.0V*40.2/(200+40.2)= 2.008V
Ni-MH 8S1P	8.0V*40.2/(200+40.2)= 1.34V

QUANTA COMPUTER

Title: Battery Connector

Size: Custom | Document Number: AK4M MAIN BOARD | Rev: 1A

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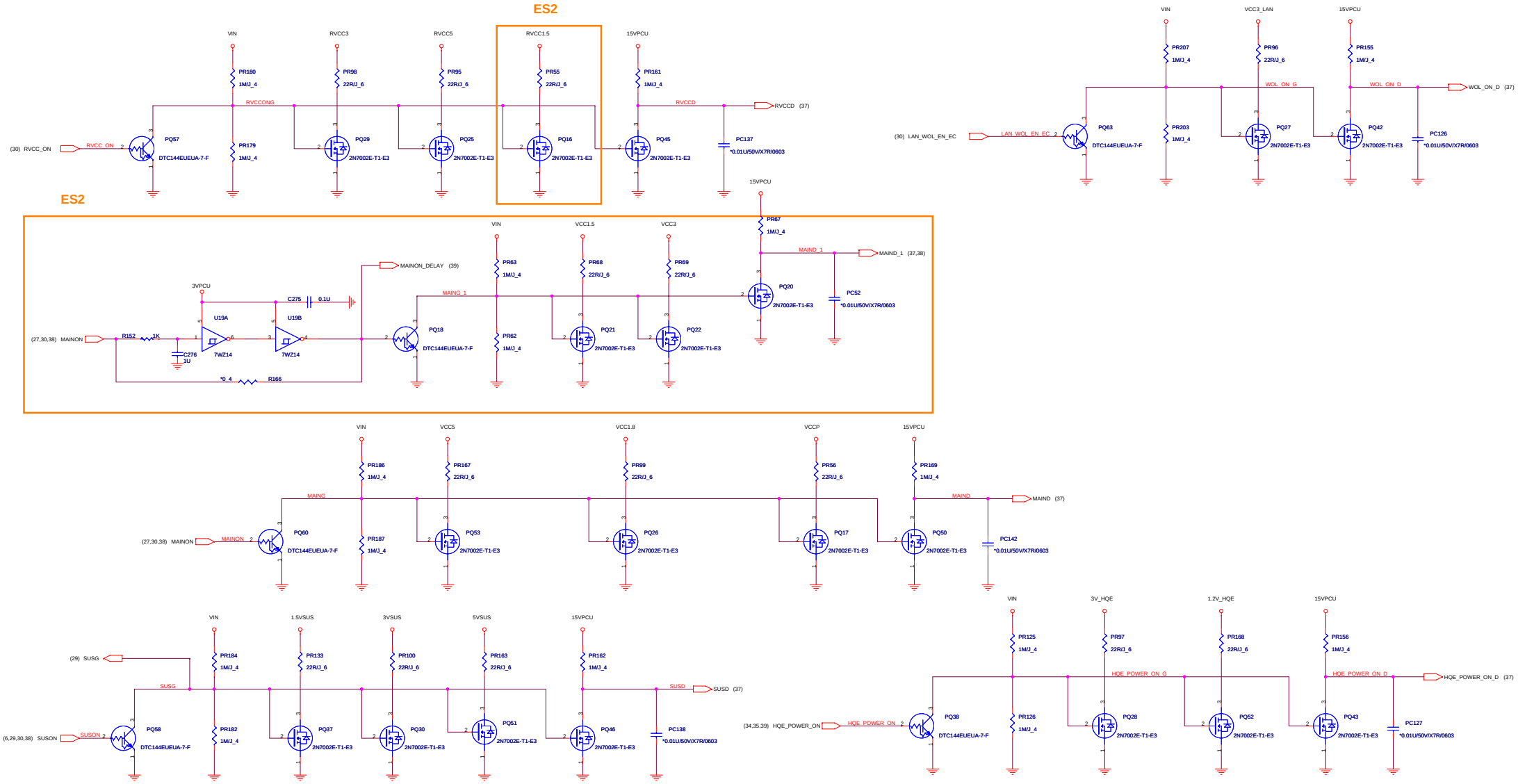
Discharge Circuit



QUANTA COMPUTER

Title: DISCHARGE

Size: Custom | Document Number: AK4M MAIN BOARD | Rev: 1A

Date: Thursday, March 26, 2009 | Sheet 42 of 43

CHANGE HISTORY

ES2

PAGE03:Del R500 to single load;exchange DREFSSCLK and CLK_PCIE_LAN for can not found LAN function
PAGE04:Del R5408 0 ohm for SMT request
PAGE06:Del R5275,R5298 0ohm,so change NET name;Add logic gate to control SM_PWROK;Del R5319 0ohm
PAGE08:Change VCCP_PCIE to VCCP
PAGE10:Del R5300,R5302,R5309,R5308,R5018,R5016,R5061,R5019,R5047 0ohm,Del Q5003
PAGE12:Del R5384 ohm
PAGE13:Change EXPRESS CARD to PORT#7
PAGE14:Del R5407,R5415,R5422 0ohm;Add GPIO LCD_ID2;Add LCD_ID2,H_PROCHOT_SB pull high;Add C650
PAGE15:Del R5429,R5426,L5021,L5020,R5139,R5431 for SMT requset;Change 5VPCU,3VPCU to RVCC5,RVCC3
PAGE19:Add LCD_ID2
PAGE27:Change EXPCARD USB4 to USB7;Add Q49 for WAKE function;Del VCC3,R6385;Add logic gate to control RF_ON_BT
PAGE29:Change USBOC to 0,2;Change USBPWR to P0,P2;Change USB5_DISCHANGE to USBP_DISCHANGE;Change CN4 more pin define
PAGE30:Exchange CAP_LED,EC_BATLED;Change USB5_DISCHANGE to USBP_DISCHANGE;Del Q5084,Q5094,D5051,R6415;Change VCC5_LED to VCC3M_MINI
PAGE33:<1>Add Y1 oscillate 48Mhz for SUPER I/O
PAGE34:Change R349 to 10K;Add R313 to link LCDVCC_ON;Add R308 100K pull down
PAGE36:Change PR21 pull high to VCCP
PAGE37:Add PQ49 for RVCCD;Change PU9 to G1391T12U;Add PR153 100K ohm pull high for DDRPG;Add PD1
PAGE39:Change PU2-6 pin to 1702PG
PAGE40:Change PR199 to pull high 5VPCU;Change PU5 to G1391T12U
PAGE41:Add discharge circuit for MAIND_1
PAGE22: change AR41,AR42 to 56 ohm for NECP AUDIO team request
PAGE23: change AR6,AR7 to 12K for NECP AUDIO team request
PAGE24: change WLAN power supply from 3VSUS to VCC3.
PAGE42: Add discharge circuit for RVCC1.5
PAGE3: Add CAP 0.1U,1U for RICOH request
PAGE29: Change PIN8/10/12/41/43 of USB boad connector to improve USB(IPOD)signal quality
PAGE17: attach R6450 and remove R9109 for NECP request
PAGE17:No mount Q5060,R6463,C6239,C6239,C6240,Becuase BCM57780 internal has VR
PAGE18: Removing R9115/R6466 for NECP request
PAGE15:Change R105,R104 to 100 ohm &Mount C225,C224 unmount for VREF/VREF_SUS power sequence.
PAGE3~42:RENANE ALL PARTS
PAGE40:Add close battery connecter for NECP request
PAGE40:Change PF9 location for NECP request
PAGE19:Change L19,L21,L23 to BLM18BA750SN1&Mount C251,C261,C265